Speed Management Techniques for Collectors and Arterials

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ABSTRACT

Speed management goes a step beyond traffic calming by also looking at higher speed facilities such as collectors and arterials. The most frequently used techniques on collectors and arterials were increased enforcement, flashing beacons, speed limit signing, radar trailers, and rumble strips.

INTRODUCTION

Speeding and speed control are often considered critical issues on residential and collector streets. In addition, speeding complaints are a continuing problem for traffic engineers and police departments. Supporting the idea of controlling speeds is the assumption that reducing speeds also reduces accidents.

Residential and collector streets are intended to provide access and to distribute local traffic between neighborhoods and arterial street systems. Low operating speeds are desired on these facilities to accommodate pedestrians, bicyclists, and local access. On arterial streets, the primary function of the road is to carry traffic, which is frequently associated with high speeds. However, speed management is also needed on arterials due to concerns about pedestrian and cyclist safety, excessive speeds in neighboring areas, pedestrian accessibility, and parking availability in retail areas (*1*). The goal of managing speeds on arterials is safety related: maintaining mobility or capacity but increasing safety by managing speeds.

Traffic calming uses geometric changes to influence travel speed and to perhaps cause drivers to select another route for travel. It is intended to restore local streets to their intended function, thus providing a more livable environment for residents. In most cases, problems on local streets are caused by through traffic, speeding, and/or noise. Speed management goes a step beyond traffic calming by also looking at higher speed facilities, including collectors and arterials. Many of the typical traffic calming techniques used in residential areas to control volume and speed would be difficult to implement on these roadways; however, other techniques need only modifications or a different approach to be effective. Although this area has not had the same amount of attention as traffic calming on residential streets, managing speeds on higher speed

roadways can be an effective part of a neighborhood traffic management plan. Integrating speed management techniques on local, collector, and arterial streets can encourage traffic to use major roadways rather than residential streets and can address needs on an areawide basis rather than for an isolated roadway or intersection.

OBJECTIVES

The goals of a Texas Department of Transportation (TxDOT) project were to identify speed management techniques that are used throughout the country and to develop a handbook documenting these techniques. The project provided one of the first comprehensive approaches to speed management on collector and arterial roadways in addition to providing information regarding the use of traffic calming techniques on local streets. The findings were documented in the *Handbook of Speed Management Techniques* (*2*).

RESEARCH APPROACH

The research approach included reviewing the literature, processing a written mail-out survey, conducting follow-up telephone interviews, performing site visits, summarizing experiences, and developing the *Handbook*. These tasks are summarized in the following sections.

Literature Review

A literature review identified current state-of-the-practice for various speed management techniques used on collector and arterial facilities. Because information for collector and arterial facilities was limited, techniques used on residential streets were also included. The literature review was used to define the speed management techniques available, to determine how they are being used, and to focus the study on areas that warranted additional study. The major findings from the literature review are documented in the *Handbook's* annotated bibliography.

Written Survey

A mail-out survey was used to identify techniques for speed management and to suggest potential locations for on-site visits. Surveys were mailed or faxed to 400 agencies to identify locations where speed management techniques have been considered or implemented. Emphasis was placed on techniques used for collector or arterial facilities or state highways passing through small towns. Other issues addressed by the survey include: public involvement; criteria for approval by residents or businesses; and locations where speed management techniques have been installed. Additional information was requested on local policies and procedures used when considering speed management techniques. Thirty-nine percent (157 of 400) of the surveys distributed to local and state agencies in the United States and Canada were returned. The responses represented 41 states, three Canadian provinces, 78 state agencies, 50 cities, 4 counties, one transportation research center, and one consulting firm. Approximately 40 percent of

the respondents indicated that they had installed or considered speed management techniques on suburban arterials. The most frequently used techniques on collectors and arterials were:

- Increased enforcement,
- Flashing beacons,
- Speed limit signing,
- Radar trailers, and
- Rumble strips.

Survey respondents also stated that they believed that signal coordination with speed limit signing, photo radar, and narrow lanes and/or chokers would be effective in managing speed on collector and arterial streets.

Twenty-eight agencies indicated that they have a process to handle requests for speed management techniques; 49 agencies indicated that they do not have such a program. Additionally, 56 agencies do not require approval of residents or businesses affected by the installation of speed management techniques, while 14 agencies do require such approval.

Phone Interviews

Telephone interviews were conducted to obtain more information about specific techniques, programs, or policies identified in the written surveys and to further identify locations for site visits. Phone interviews were informal, focusing on the particular experience of the agency being contacted. Some of the issues addressed in the phone interviews included: public involvement and response; approval process for installation of techniques; the input of emergency response agencies; cost sharing; removal of implemented techniques; landscaping and maintenance responsibilities; and any before and after study that had been conducted.

Site Visits

Locations for site visits were selected based upon information from the literature review, written survey, telephone interviews, and related site visits for other puposes. The site visits were used to clarify and expand areas with limited information, to identify useful information about specific techniques and sites, and to take photographs for inclusion in the *Handbook* (*2*). Because the use of speed management techniques on arterials and collectors was limited, information on techniques for local and residential streets was also collected for inclusion in the *Handbook*. Both in-state and out-of-state visits were made in order to record a broad spectrum of the types of techniques currently in use. Texas sites visited included Austin, San Antonio, College Station, Bryan, Carrollton, Plano, Garland, Arlington, and several towns in the Atlanta District in northeast Texas. Out-of-state visits included various sites within the states of California, Oregon, Washington, Georgia, Maryland, Virginia, and Wisconsin in addition to the Canadian cities of Toronto, Ontario, and Vancouver.

Handbook Development

The information obtained through the written surveys, telephone interviews, and on-site visits was summarized according to technique. Experiences for each technique include descriptions of the technique, characteristics of the technique, notes on its effectiveness or ineffectiveness, maintenance requirements, and advantages and disadvantages. Both successes and problems with various techniques are included in the discussions.

The *Handbook of Speed Management Techniques* (*2*) was developed as a user-friendly document to provide practitioners with a general overview of speed management techniques. The *Handbook* focuses on collector and arterial streets and also includes techniques used on local streets. The techniques are organized into four chapters: Roadway Design Techniques, Road Surface Techniques, Traffic Control Techniques, and Enforcement Techniques. All the techniques included in the *Handbook* are illustrated in Figure 1.

The Roadway Design Techniques chapter includes physical techniques designed to alter the driver's path. The Road Surface Techniques chapter discusses changing the roadway surface by adding vertical elements such as speed humps, by narrowing the roadway, or by drawing the driver's attention through the use of pavement markings. The Traffic Control Techniques chapter describes the use of traffic control devices such as signs and flashing beacons to reduce speeds or speed variation. The Enforcement Techniques chapter discusses enforcement techniques such as photo radar and speed trailers to remind drivers of the speed limit and of the speed at which they are traveling. Each chapter includes descriptions of the techniques, photographs of the techniques, experiences of agencies that have used the technique, and lessons that have been learned.

SPEED MANAGEMENT TECHNIQUES FOR ARTERIALS AND COLLECTORS

Survey respondents identified five techniques as those most frequently used on arterials and collectors: increased enforcement, flashing beacons, speed limit signing, radar trailers, and rumble strips. The use of these techniques is summarized on the following pages.

Increased Enforcement

Increased enforcement targets specific areas to effectively use public safety and/or police personnel to encourage reduce speeds. Enforcement usually involves the use of radar to identify speeders and the subsequent ticketing of the violators (see Figure 2). Increased enforcement may be handled on a citizen request basis, by a program of alternating locations for added enforcement, or by specific programs funded particularly for this purpose.

Studies have shown that appreciable speed reductions result from enforcement operations. However, speeds are usually reduced only as long as the enforcement is maintained. While speeds are reduced, the number of accidents is generally reduced and overall safety is improved.(*3*)

The city of Madison, Wisconsin, uses annual 402 Highway Safety Funds to provide increased enforcement through overtime hours for law enforcement officers. One officer uses a radar gun to monitor speeds and then calls ahead with license plate numbers

FIGURE 1 Illustration of speed management techniques (*1*).



FIGURE 2 Law enforcement in Texas.

to approximately five other officers who are stationed downstream. Warning signs are installed in targeted areas to notify the public of the "Speed Wave." The program started with the traffic engineering department and is now with the police department. The Speed Wave was originally used at higher-speed accident locations, with locations now also being determined by citizen requests during the year.

In Texas, the Speed Selective Traffic Enforcement Program (Speed STEP) is used to provide additional enforcement using funds from the Texas Highway Traffic Safety Program (Federal 402 funds). The project description is: "Selective traffic enforcement and information projects designed to bring motorists into compliance with all posted speed limits in order to reduce risk-taking behavior by motorists." For fiscal year 1997, the city of College Station, Texas, received a $15,000 grant which was used to target speeders on six roadways in College Station. Citizens were notified of the increased enforcement through articles in the local newspapers.

Flashing Beacons

Flashing beacons are typically used with warning signs and are intended to reduce vehicle speeds prior to an intersection, potential hazard, or unique condition (see example in Figure 3). They are generally used in advance of a downstream traffic control device or hazardous or unique condition. They are also used with school crossing signs to alert drivers that they are entering a school zone. Issues considered for beacon installation include: volume- and crash-based conditions, percentage of repeat users on the roadway, beacon type, placement on post (hardware mounting) and lateral placement, power requirements (for solar options), flash rate, and maintenance requirements.



FIGURE 3 Flashing beacon in Arlington, Texas.

The city of Arlington, Texas, installed flashing sign beacons to reduce vehicle speeds on a 72.5-km/h (45-mph) section of four-lane, divided arterial roadway in advance of an intersection on the crest of a curve. The city was concerned about sight distance for motorists on the minor approach of the intersection and motorists' ability to safely make left and right turns from a stopped position. The major street volume (uncontrolled) is approximately 20,000 vehicles per day, and the minor street volume is significantly less than required to warrant a traffic signal. The city's decision to install the flashing beacon was based on numerous complaints from residents traveling through the intersection on a daily basis. Once the beacons were installed, the agency experienced a significant decline in complaints and received positive feedback from residents.

Speed Limit Signs and Markings

Speed limit signs display the speed limit established by law or by regulation. Drivers generally travel at speeds which they consider reasonable, comfortable, convenient, and safe under the existing conditions, which may or may not be in compliance with the speed limit sign. Therefore, speed limits are most effective when established by an engineering study of the roadway section using the 85th percentile speed approach. Some procedures allow for consideration of horizontal and vertical alignment, sight distance, development, parking and pedestrian activity, and accident history. Speed limits may also be marked on the pavement to reinforce the posted speed limit (see Figure 4). Other horizontal pavement markings, such as arrows or specific words such as "Stop Ahead," may also be used to encourage speed reduction when cars are approaching another traffic control device or unique situation.

A change in a speed limit or the use of a larger sign may result in reduced traffic speeds when used in conjunction with regular enforcement. Officials at the Minnesota Department of Transportation report that larger speed limit signs [91.4 m by 121.9 m (36 in by 48 in)] are more effective when used along with increased enforcement and in locations where normal speed limit signs are being missed.

Researchers with the Insurance for Highway Safety conducted studies to determine if specially designed pavement markings were effective at reducing excessive



FIGURE 4 Speed limit sign and markings in Santa Barbara, California.

speeds on rural and suburban two-lane roadways with sharp horizontal curvatures. These pavement markings consisted of the word “Slow” and a left-curve arrow painted on the roadway. A marginal speed reduction of about 7 percent was attributable to the pavement markings (*5*).

Speed or Radar Trailers

Speed or radar trailers (also known as speed display boards or mobile radar trailers) are mobile roadside devices that use radar to measure the speed of approaching vehicles by recording and displaying the speed to passing drivers in an effort to decrease speed (see Figure 5). The portable units post the legal speed of the roadway and display the current speed of the approaching vehicle. Speed trailers have been used as an enforcement tool in some areas when police officers enforce the speeds; however, they are mainly used as a public relations measure to inform motorists of their speeds in the hope that the speeding motorists will voluntarily reduce their speed (*6*). Speed trailers are also used for automated enforcement in a few states, where speeds and license plate numbers are recorded by hidden cameras and citations are issued by the local law enforcement agency. Equipment to collect traffic volumes may also be used within the speed trailer.

A research study in Bryan, Texas, confirmed that speed trailers *are* effective in reducing speeds and the proportion of speeders on low-speed urban roadways for speeders downstream of the trailer. However, the same research study showed that speed trailers *do not* appear effective in reducing speeds and the proportion of speeders *after* the trailer is removed (*6*). A study in Riverside, California, demonstrated that speed trailers used with enforcement have a carryover effect both alongside and downstream of the device one week after its removal.

Speeds alongside the trailer were reduced by 10.6 km/h (6.6 mph) and speeds downstream of the trailer were reduced by 7 km/h (4.4 mph) one week afer the trailer was removed. Other studies in Orange County and Santa Barbara, California, and in North Carolina have also demonstrated positive effects on vehicle speeds. The Santa Barbara study found that speeds were reduced by 10 percent alongside the device and by 7 percent downstream for a distance of up to 0.8 km/h (0.5 mi) (*7*).



FIGURE 5 Speed trailer in Bryan, Texas.

Rumble Strips

Rumble strips are pavement undulations placed across the driving lane, causing the vehicle to "rumble" or vibrate when crossing them (*8*). Rumble strips can be an effective attention-getting device where a particular situation exists that warrants alerting the approaching driver. They are generally used in advance of a downstream traffic control device or hazardous or unique condition. Rumble strips can be treatments on top of the pavement surface, including asphalt strips, patterned sections of rough pavement, traffic buttons or dots glued to the pavement, brick paving blocks, or layers of thermoplastic striping material. Rumble strips may also be installed by cutting grooves in the pavement. They have had some applications for speed control in residential areas, but the noise generated by vehicles crossing the strips tends to create more protests from residents than the speeding problems they were intended to solve. Advance warning signs are often installed upstream of rumble strips, and a sign indicating the purpose of the strip may be placed adjacent to it.

Rumble strips have been placed north of Houston, Texas, at a high-speed approach to an isolated signalized intersection. They have also been used in Atlanta, Lubbock, and Austin, Texas, at approaches to rural signalized intersections to alert motorists of the signal. Rumble strips are used on the approach to a roundabout in Taneytown, Maryland. They are also installed at a school crossing near Greenbelt, Maryland. The roadway is a six-lane facility, and the school is located across this roadway from a residential area. The rumble strips are placed at 2.7 m (9 ft) intervals in the first grouping and then at 1.5 m (5 ft) intervals approaching the pedestrian crosswalk. The strips are constructed of layers of yellow thermostatic striping material, and the word "School" is also painted on the pavement. In Catonsville, Maryland, rumble strips have been installed on both approaches to a high-accident horizontal curve in addition to warning signs and a hazardous indication beacon. The strips are constructed of thermoplastic material (see Figure 6).

Other Techniques

Other techniques that are appropriate for use on collectors and arterials are illustrated and described in Table 1.



FIGURE 6 Rumble strips in Maryland.

TABLE 1 Summary of Techniques for Collectors and Arterials (*2*)

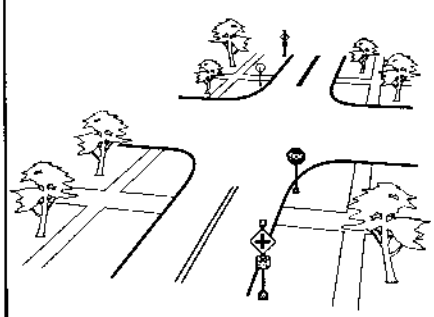
INCREASED ENFORCEMENT (CONVENTIONAL) increases the use of conventional enforcement to reduce speeds in target areas.



Key Advantages
- Reduces speed during enforcement period
- Increases driver awareness of speeding
- Makes response quick and effective

Key Disadvantages
- Requires regular long-term enforcement to gain long-term benefits
- Is costly for law enforcement agencies

FLASHING BEACONS are used to attract drivers' attention and to inform them of right-of-way conditions or potential roadway hazards.

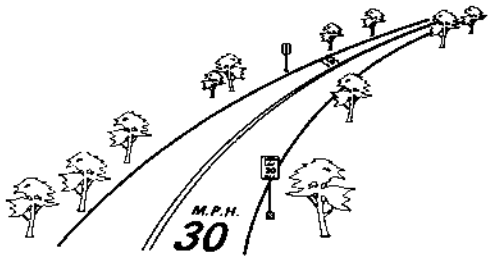


Key Advantages
- Are effective in drawing attention to hazards
- May be a low-cost solution
- Require low maintenance

Key Disadvantages
- Effect may diminish over time if there is a high number of repeat users
- May become over used

SPEED LIMIT SIGNS display the speed limit established by law or by regulation.

PAVEMENT MARKINGS may be used to reinforce the message.

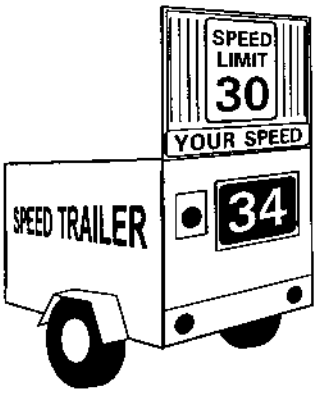


Key Advantages
- (Signs) are well recognized and understood
- (Pavement markings) reinforce speed limits
- (Both) are inexpensive to install
- (Signs) can reduce speeds with regular enforcement

Key Disadvantages
- (Signs) have significant non-compliance rates
- (Pavement markings) are not proven to be effective
- (Pavement markings) may cause concern regarding conspicuity and legibility

TABLE 1 (*continued*) **Summary of Techniques for Collectors and Arterials** (*2*)

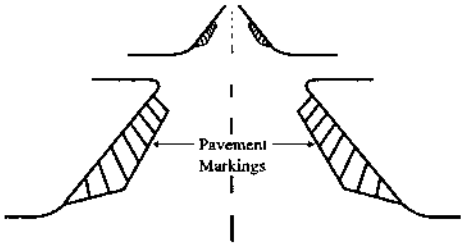
SPEED TRAILERS are mobile roadside devices that use a radar device to detect the speed of approaching vehicles. The devices display the speed limit and the speed of approaching vehicles.



Key Advantages
- Educate the public on posted and excessive speeds
- Are a good educational and public relations tool
- Are easily moved from one location to another

Key Disadvantages
- Do not appear effective in reducing speeds after the trailer is removed
- Have limited use unless combined with enforcement
- Have limited use on multi-lane roadways

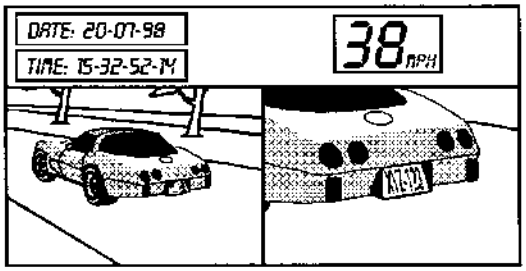
ROADWAY NARROWING TECHNIQUES narrow the roadway for a continuous length using geometric features, pavement markings, or landscaping.



Key Advantages
- Provide continuous, visual channelization
- Can be inexpensive to install
- Can be quickly implemented

Key Disadvantages
- Require regular maintenance
- Increase cost of roadway resurfacing
- May be expensive to install, depending upon technique

AUTOMATED ENFORCEMENT uses a radar device, processing unit, and camera to record vehicle speeds and photograph those vehicles exceeding the speed limit.



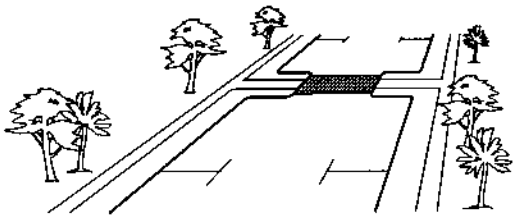
Key Advantages
- Can detect and record information about a large number of speeders
- Can provide enforcement in areas where roadway geometry makes it difficult for police officers
- Targets speeders objectively

Key Disadvantages
- Allows impaired or unsafe drivers to remain on the road because no traffic stop is made
- May be a less effective learning tool than if the violator were stopped and given a citation immediately
- Doesn't allow an officer to give discretion for an emergency situation

TABLE 1 (*continued*) Summary of Techniques for Collectors and Arterials (*2*)

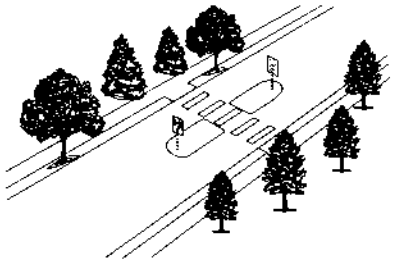
NECKDOWNS/CHOKERS are constrictions of the roadway that reduce the width of the traveled path.

Key Advantages
- Can shorten the crossing time for pedestrians
- Can make pedestrian crossings more visible to drivers
- Do not slow emergency vehicles
- Can be used as a bus stop



Key Disadvantages
- May require some parking removal
- May create potential crash obstacles
- Make it difficult to accommodate full bicycle lanes
- May impede trucks

CENTRAL ISLAND NARROWING ISLANDS are used in the center of the roadway to provide refuge to pedestrians during the crossing maneuver.

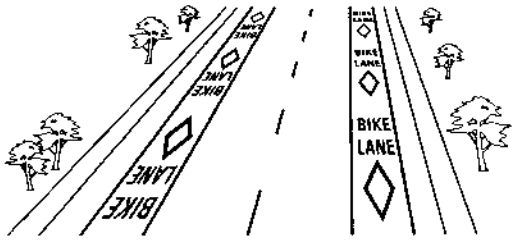


Key Advantages
- Create a refuge so pedestrians can cross half the street at a time
- Make pedestrian crossings more visible to drivers

Key Disadvantages
- May give pedestrians a false sense of security
- May create potential crash obstacles for drivers
- May create problems for street-sweeping or snow-plowing efforts

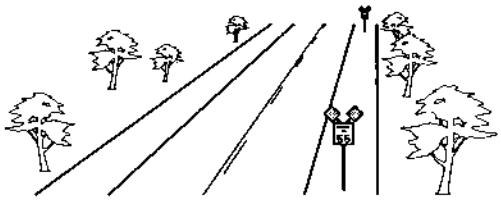
BICYCLE MOBILITY TECHNIQUES are used to accommodate bicyclists. They include shared lanes, bike lanes, bike paths, or bicycle routes.

Key Advantages
- Encourage non-motorist travel
- Better define where bicyclists are expected



Key Disadvantages
- Could create additional conflicts between vehicles and bicycles

UNIQUE TRAFFIC CONTROL SIGNS include regulatory, informational, warning, and guide signs. Such signs are typically designed for a unique situation believed to warrant special attention.

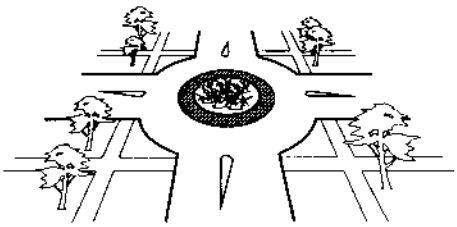


Key Advantages
- May be successful in informing drivers of a unique situation

Key Disadvantages
- May not conform to standards in the *MUTCD*
- Are not easily recognized

TABLE 1 (*continued*) Summary of Techniques for Collectors and Arterials (*2*)

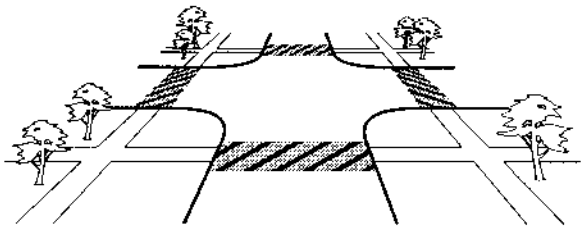
ROUNDABOUTS are raised islands that create a circular one-way flow of traffic.



Key Advantages
- Can noticeably reduce speeds
- Reduces the number of conflict points at the intersection
- Can increase capacity
- Provides an orderly and continuous flow of traffic
- Are effective at multi-leg intersections

Key Disadvantages
- May be restrictive for some larger emergency and service vehicles
- Require pedestrians and bicyclists to adjust to less traditional crossing patterns
- May have reduced aesthetic value due to safety signage

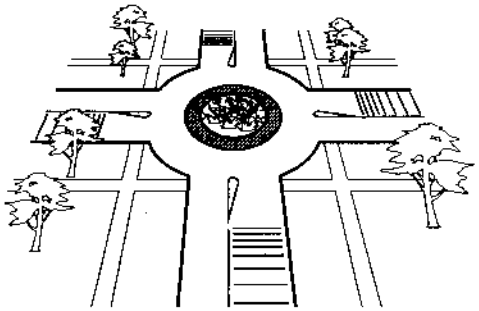
CROSSWALKS are portions of roadways designated for pedestrians to use in crossing the street. **HIGHER VISIBILITY CROSSWALKS** attract additional attention to pedestrian areas. **WIDER SIDEWALK AREAS** provide additional pedestrian space and streetscaping space off the roadway.



Key Advantages
- (Crosswalks) indicate the preferred crossing locations to pedestrians
- (Higher visibility crosswalks) provide more visibility to drivers than standard crosswalks
- (Wider sidewalks) provide additional space for pedestrians and street furniture
- (Wider sidewalks) can improve the aesthetics of the area

Key Disadvantages
- (Higher visibility crosswalks) may provide a false sense of security to pedestrians
- (Higher visibility crosswalks) require consideration of the effect of the materials on the vehicle tires
- Both may require increased construction and maintenance costs

INNOVATIVE PAVEMENT MARKINGS are used to give drivers the illusion that they are traveling faster than they really are.



Key Advantages
- May serve to reduce traffic speeds and crashes by warning or alerting drivers to an upcoming situation and by causing drivers to perceive that they are traveling too fast
- May give drivers a heightened sense of awareness in which they are better prepared to avoid a crash even if vehicle speeds are not reduced

Key Disadvantages
- Need more research to verify the use of these patterns
- Can be expensive to maintain the complex marking patterns

TABLE 1 (*continued*) **Summary of Techniques for Collectors and Arterials** (*2*)

CITIZEN SPEED WATCH PROGRAMS are public awareness programs involving residents, agency staff, and motorists.



Key Advantages
- Are an effective public relations and educational tool
- Make neighbors feel that they are part of the solution for speed problems
- Long-term effects are possible due to resident interaction

Key Disadvantages
- Are very labor intensive
- Are not an enforcement tool

SCHOOL SPEED ZONES use warning signs, crosswalks, pavement markings, and/or traffic signals to alert drivers of the school zone and to inform them of the beginning and ending of the reduced speed area.

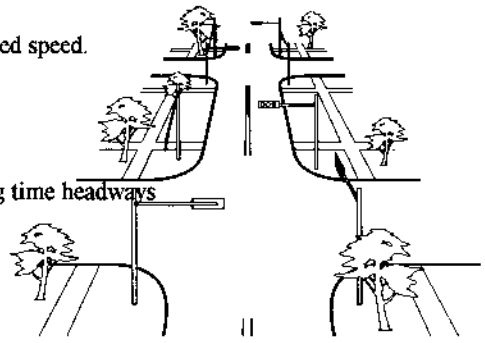




Key Advantages
- Alert drivers of possible pedestrian presence
- Use uniform colors and symbols for easy recognition
- Reduce speed limits for specified hours only

Key Disadvantages
- Can be costly to implement flashing signs
- Can be costly to enforce
- May cause confusion if non-uniform devices or enforcement procedures are used

TRAFFIC SIGNAL COORDINATION allows a platoon of vehicles to progress through a series of intersections at a specified speed.



Key Advantages
- Can reduce the number of stops and reduce delay
- Can encourage a preferred speed
- Can send vehicles through intersections in platoons, reducing time headways
- Can conserve fuel and minimize air pollution

Key Disadvantages
- May be difficult to include all intersections within a corridor
- May be difficult to optimize both directions

WARNING SIGNS are used to warn drivers of existing or potentially hazardous conditions on or adjacent to a highway or street.



Key Advantages
- Are easily recognizable
- Alert drivers of approaching hazards or unique conditions
- Can be supplemented with advisory speed plates or flashing beacons to provide drivers with additional guidance

Key Disadvantages
- Can cause disrespect for signs if used unnecessarily
- Can increase roadside clutter

SUMMARY

A Texas Department of Transportation project identified speed management techniques that are used throughout the country, providing one of the first comprehensive documentations of speed management on arterials and collectors. These techniques are documented in the *Handbook of Speed Management Techniques*, which also provides additional information about techniques on residential streets. The *Handbook* includes descriptions of the techniques, photographs of the techniques in use, experiences of agencies that have used the techniques, and lessons that have been learned. The most frequently used techniques for collectors and arterials include increased enforcement, flashing beacons, speed limit signs and markings, speed or radar trailers, and rumble strips.

ACKNOWLEDGMENTS

The material for this paper is from a study funded by the Texas Department of Transportation (TxDOT). Any opinions, findings, conclusions, or recommendations expressed in the paper are those of the authors and do not necessarily reflect the views of TxDOT.

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9. *Collier County Neighborhood Traffic Management Plan. Traffic Calming—League of California Cities*. Annual Conference, October 12, 1997.

DEPARTMENT OF TRANSPORTATION
DIVISION OF RIGHT OF WAY AND LAND SURVEYS
OFFICE OF LAND SURVEYS
1727 30TH STREET
P.O. BOX 168041, MS 35
SACRAMENTO, CA 95816-8041
PHONE (916) 227-7669
FAX (916) 227-7670
TTY 711
www.dot.ca.gov

C.F. 16-0147

Serious Drought.
Help save water!

October 27, 2016

R/W ENGINEERING
Relinquishment
7-LA-187-PM 3.5/8.9
Rel. Req. No. 1260
Legislative Deletion
CTC Res.: R-3958
CTC Date: October 19-20, 2016

City of Los Angeles
City Council
200 N Springs Street
Los Angeles, CA 90012

RELINQUISHMENT OF HIGHWAY RIGHT OF WAY

Enclosed for informational purposes only is a certified copy of the above-referenced California Transportation Commission Resolution of Relinquishment. This action was taken in accordance with Section 316 of the Streets and Highways Code, as amended by Chapter 630 of the 2015 statutes.

The relinquishment will become effective upon recordation with the County Recorder. Our District Office will handle the recording and will advise you immediately thereafter.

Sincerely,

Mark S. Turner

MARK S. TURNER
Chief, Office of Land Surveys
Division of Right of Way and Land Surveys

Enclosures

TRANSPORTATION COMMISSION
RESOLUTION No. R-3958

PASSED BY
CTC
OCT 19 2016
CALIFORNIA
TRANSPORTATION COMMISSION

RELINQUISHMENT OF HIGHWAY RIGHT OF WAY IN THE
CITY OF LOS ANGELES, ROAD 07-LA-187-PM 3.5/8.9
Request No. 1260

WHEREAS, by Relinquishment Agreement No. 07-5097, dated September 1, 2016, between the City of Los Angeles and the State of California (CALTRANS), the City waived the 90-day notice requirement and agreed to accept title to a portion of State Route 187 (Venice Boulevard), lying within the City limits, from Route 1 (Lincoln Boulevard) to Route 10 (Santa Monica Freeway), referred to as RELINQUISHED FACILITIES in said agreement, upon relinquishment thereof to said City by the State of California; and

WHEREAS, by said Relinquishment Agreement the City of Los Angeles is willing to accept a payment of $14,500,000, determined by the California Transportation Commission (CTC) to be in the best interest of CALTRANS, as CALTRAN's only payment obligation for RELINQUISHED FACILITIES and even if funds are not available with CALTRANS at the time of resolution of

relinquishment by the CTC, to accept title to said portion of State Route 187 and defer the receipt of payment for RELINQUISHED FACILITIES to a date when funding becomes available; and

WHEREAS, this Commission does hereby approve the terms and conditions of said Relinquishment Agreement; and

WHEREAS, this relinquishment is pursuant to agreement with the City of Los Angeles in accordance with Assembly Bill 810, Chapter 561, Statutes of 2015, and this Commission has the authority by resolution to relinquish pursuant to Legislative enactment; and

WHEREAS, in accordance with Section 487 of the Streets and Highways Code, as amended by Chapter 561 Statutes of 2015, this Commission has found and determined, and does hereby find and determine, that it is desirable and in the public interest that said highway be relinquished to the City of Los Angeles for use as city streets.

NOW, THEREFORE, IT IS VOTED by the California Transportation Commission that it relinquish and it does hereby relinquish, to the City of Los Angeles, effective upon the recordation of a certified copy hereof with the Recorder of Los Angeles County, all of the State of California's right, title and interest in and to said State highway, described as follows:

All that portion of State Highway right of way shown as

SEGMENT 1 and SEGMENT 2, as delineated and shaded or stippled on a map recorded July 1, 2016 in State Highway Map Book No. 20, at page 96, records of Los Angeles County.

EXCEPTING AND RESERVING to the State of California any and all rights of ingress to and egress from the Highway hereby relinquished in and to the adjacent and adjoining freeway, except at such points as are now or may be established by resolution of this Commission.

THIS IS TO CERTIFY that the foregoing resolution was duly passed by the California Transportation Commission at its meeting regularly called and held on the 19th and 20th days of October 2016 in the city of San Jose and that the foregoing is a full and correct copy of the original resolution. Dated this 24 day of October 2016.

Susan Bransen

SUSAN BRANSEN, Executive Director
CALIFORNIA TRANSPORTATION COMMISSION

STATE	FEDERAL PROJECT NO.
CALIF	

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
07	LA	187	3.5/8.9	1	3

D. Diane Wells, PLS
DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

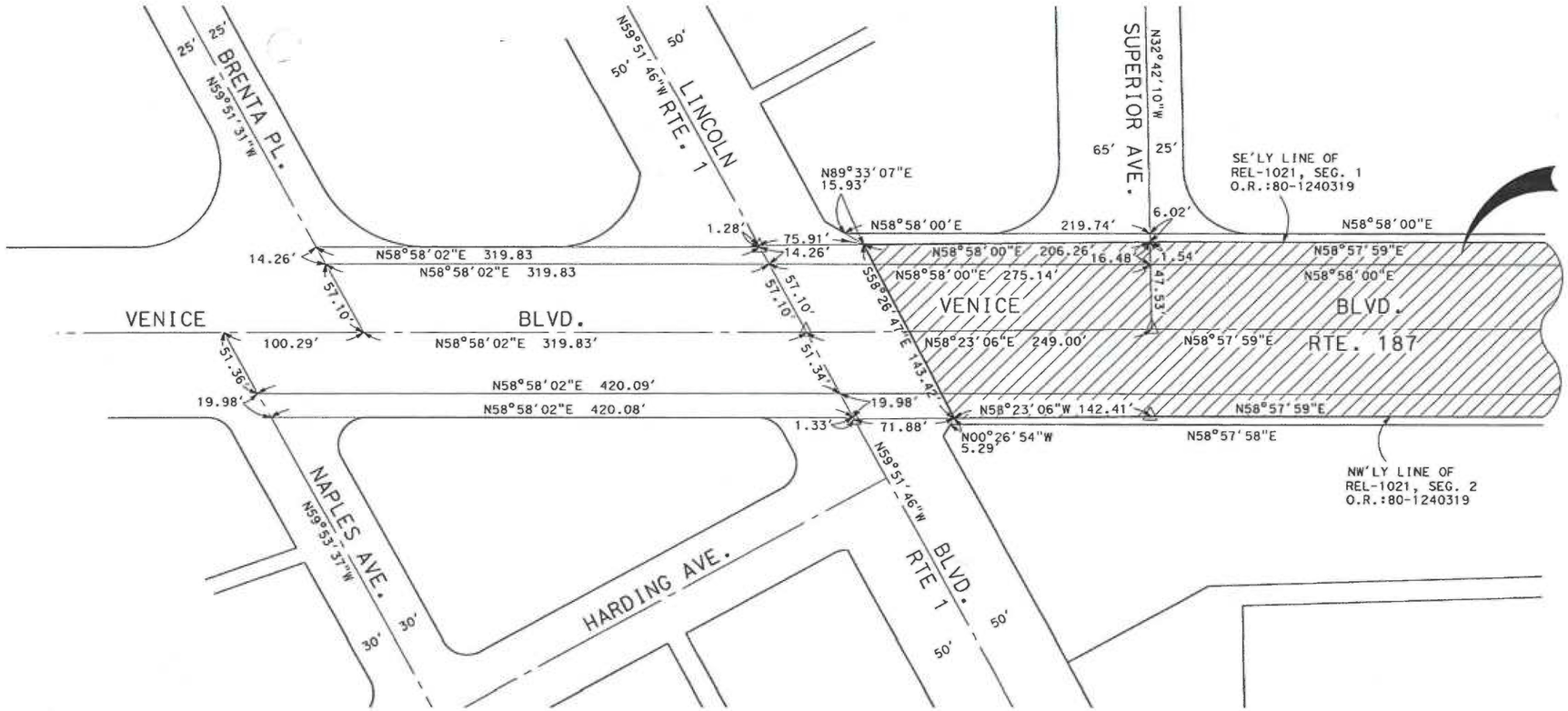
June 30, 2016
APPROVAL DATE

PROFESSIONAL LAND SURVEYOR * D. DIANE WELLS No. 7651 Exp. 12-31-16 * STATE OF CALIFORNIA

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

IN THE CITY OF LOS ANGELES, ROUTE 187 (VENICE BOULEVARD) FROM LINCOLN BOULEVARD TO CADILLAC AVENUE



NOTE:
1. COORDINATES AND BEARINGS ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE 7, NORTH AMERICAN DATUM (NAD) OF 1927.
2. ALL DISTANCES ARE GRID. TO OBTAIN GROUND DISTANCE DIVIDE GRID DISTANCE BY COMBINATION FACTOR 0.99999I.

FILED FOR RECORD IN
STATE HIGHWAY MAP BOOK NO. 20
DATE: July 01, 2016 AT PAGE 96
RECORDERS INDEX NO. 20160771721
RECORDS OF Los Angeles COUNTY
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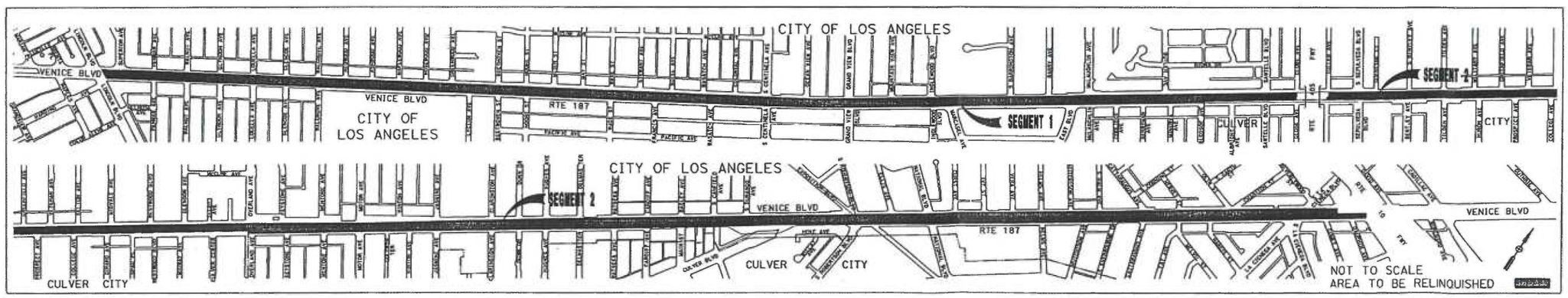

CALIFORNIA STATE TRANSPORTATION AGENCY
DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY	JV	REL-1260	
REVISED			

STATE	FEDERAL PROJECT NO.	DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
CALIF		07	LA	187	3.5/8.9	2	3

D. Diane Wells, PLS
DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

June 30, 2016
APPROVAL DATE

D. DIANE WELLS No. 7651 Exp. 12-31-16 PROFESSIONAL LAND SURVEYOR STATE OF CALIFORNIA

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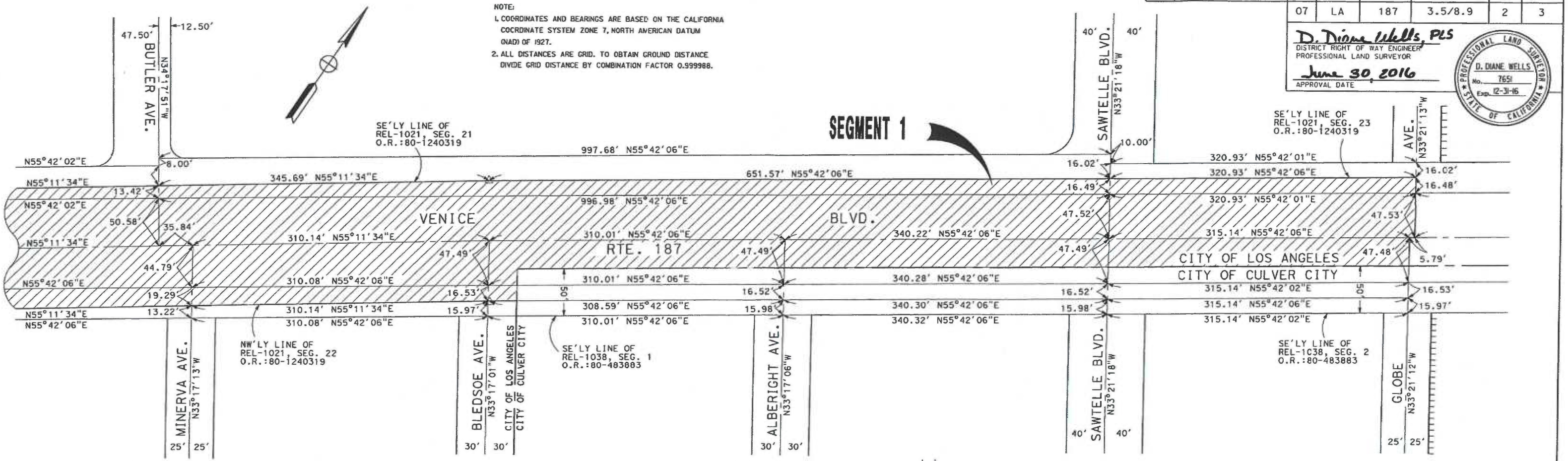

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DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED
ACCESS PROHIBITED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY	JV		
REVISED			

REL-1260

STATE CALIF	FEDERAL PROJECT NO.	DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
		07	LA	187	3.5/8.9	3	3

D. Diane Wells, PLS
DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

June 30, 2016
APPROVAL DATE

PROFESSIONAL LAND SURVEYOR * D. DIANE WELLS No. 7651 Exp. 12-31-16 * STATE OF CALIFORNIA

CITY OF LOS ANGELES

SEGMENT 2

SE'LY LINE OF REL-1021, SEG. 41 O.R.:80-1240319

N55°45'44"E
N55°42'26"E
N55°45'44"E
N55°42'26"E
N55°45'39"E
N55°42'26"E
N55°45'39"E
N55°45'39"E

29.72'
12.81'
209.57' N55°42'26"E
271.34' N55°45'45"E
226.91' N55°42'26"E
205.63' N55°42'26"E
78.01'
84.80'
6.03'
5.30'
137.37' N55°45'39"E
96.13'
78.00'
12.82'
280.44' N55°45'39"E
29.42'
226.92' N55°42'26"E
29.72'
255.40' N55°42'26"E
226.71'
321.21' N55°45'39"E
37.28' N55°56'27"E

LA CIENEGA BLVD. N10°54'06"E 50'
LA CIENEGA AVE. N10°54'06"E 50'
ALLEY N10°54'23"E 20'
LA CIENEGA BLVD. N53°42'31"W

VENICE BLVD.
RTE. 187

N55°45'45"E 241.19'
N54°01'17"E 52.71'
19.16' N34°14'15"W
10.84' N34°17'34"W
50.02'
64.08' N34°17'34"W
N34°17'34"W 54.71'
479.03' N55°45'45"E
N55°42'26"E 153.21'
144.04'
N55°42'26"E 121.05'
N55°42'26"E
58.56'
58.82'
65.50' N34°17'34"W
50'
229.51' N55°42'26"E
N34°17'34"W 55.60'
UNDERCROSSING
74.40'
278.65' N55°45'39"E
N55°45'39"E
9.46'
265.18' N55°45'39"E
10.34'
22.37'
265.48' N55°56'27"E
21.48'
130.21' N55°56'27"E
50'
N34°17'34"W 10.16'
N34°14'21"W 19.84'
123.05' N55°45'39"E
123.05' N55°45'39"E

NW'LY LINE OF REL-1021, SEG. 43 O.R.:80-1240319

COMEY AVE. N53°42'55"W 50' 25' 25'
DAUPHIN AVE. N53°42'45"W 50' 25' 25'

SANTA MONICA FWY. RTE. 10 N75°38'00"W
DAVID AVE. N71°39'48"W 50' 25' 25'

72.26'
100.24'
74.40'



SEGMENT 2

SANTA MONICA FWY. RTE. 10 N75°38'00"W
DAVID AVE. N71°39'48"W 50' 25' 25'
CADILLAC AVE. N71°43'55"W 50'
BURCHARD AVE. N53°42'43"W 50' 25' 25'

N55°45'45"E 100.24'
550.09' N55°45'45"E
72.26'
138.65'
N55°42'26"E 50'
229.51' N55°42'26"E
N34°17'34"W 55.60'
UNDERCROSSING
74.40'
278.65' N55°45'39"E
383.39' N55°45'39"E
154.11' N55°45'39"E
65.50' N34°17'34"W
50'
N55°56'27"E
N34°17'34"W 10.16'
N55°45'39"E
N34°14'21"W 19.84'

VENICE BLVD.

NOTE:
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CALIFORNIA STATE TRANSPORTATION AGENCY
DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED
ACCESS PROHIBITED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY	JV	**REL-1260**	
REVISED			

Kansas
LTAP Fact Sheet
A Service of Kansas University Transportation Center for Road, Street & Bridge Agencies

Smarter, Safer Roadways: Road Diets for Rural Communities

By Mehrdad Givechi, MS, PE, PTOE

A buzz word among transportation professionals today is "diet," specifically the "road diet." It has become an increasingly popular strategy to increase multi-modal road use and improve safety in urban areas, and it is starting to get some traction in small and rural communities. This article addresses pros and cons of road diet projects, feasibility, and community benefits to give local governments the necessary information to determine if road diets, or the underlying concepts, have a place in their communities.

What is a Road Diet?

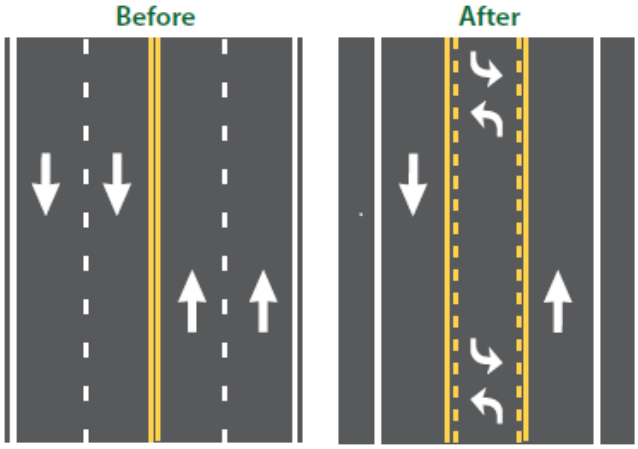
Roadways without medians or other separation between opposing lanes of traffic often experience a relatively high number of crashes, especially between high-speed through-traffic, left-turning vehicles, and other road users. One safety countermeasure is the road diet, which typically involves removing or narrowing vehicle lanes and utilizing the space for other uses, such as a two-way left-turn lane, bike lanes, or parking.[2] Figure 1 shows the addition of a center two-way left-turn lane and wider shoulders.

Fact or Myth: Road Diets Make Traffic Worse

There is a common misconception that reducing the number of through-lanes on a multi-lane roadway (as when implementing a road diet) will cause congestion. This is not true when road diets are utilized strategically in the proper location and with the correct application.[3] To determine if a road diet makes sense for a specific area, consider the following:

- Is the four-lane roadway already operating like a three-lane road (i.e. heavy left-turn movements)?

- Are the traffic volumes sufficiently low for a road diet to be implemented successfully, without lowering the Level-of-Service (LOS), or ability to move traffic?



FHWA

Figure 1. This road was reconfigured from four through-traffic lanes to two through-traffic lanes with a center two-way left-turn lane and wider shoulders.[1]

(Specific traffic volume thresholds are detailed in the next section.)

- Do controlled intersections along the road determine the effective capacity of the roadway (e.g. signalized intersections or stop signs)?

- Can a road diet help overall LOS? LOS measurements should account for all road users, not just motorists (e.g. bicyclists and pedestrians). Trading off a little vehicular capacity to benefit other road users may be worth it in terms of safety and connectivity.

When is a Road Diet Appropriate?

Several transportation agencies, along with the Federal Highway Administration (FHWA), have developed traffic volume guidelines for assessing road diet viability and minimizing traffic disruption. Traffic volume thresholds for a 4-lane undivided roadway are:

- Less than 10,000 ADT (Average Daily Traffic): Great candidate in most cases; capacity will most likely not be affected.

- 10,000 – 15,000 ADT: Good candidate in many cases. Conduct intersection analysis and consider signal retiming to determine any effect on capacity.

- 15,000 – 20,000 ADT: Good candidate in some cases. Conduct a corridor analysis. Capacity may be affected depending on the "before" condition.

- Greater than 20,000 ADT: Complete a feasibility study to determine whether this is a good candidate. There are some examples nationwide that road diets have been successful with ADTs as high as 26,000. Capacity may be affected.[5]

Other types of data that may be useful in a road diet feasibility study include: lane widths, speed limits, crash data, land use, number of access points, and road surface type.

Factors to Consider

LOS is one measure of road diet suitability, but the overall considerations, as with any road project, are safety, cost efficiency, and quality of life.

Safety – Road diets can make the roadway environment safer for all users by reducing the number of conflict points, potentially reducing crash frequency. Figure 2 identifies conflict points before and after a road diet.

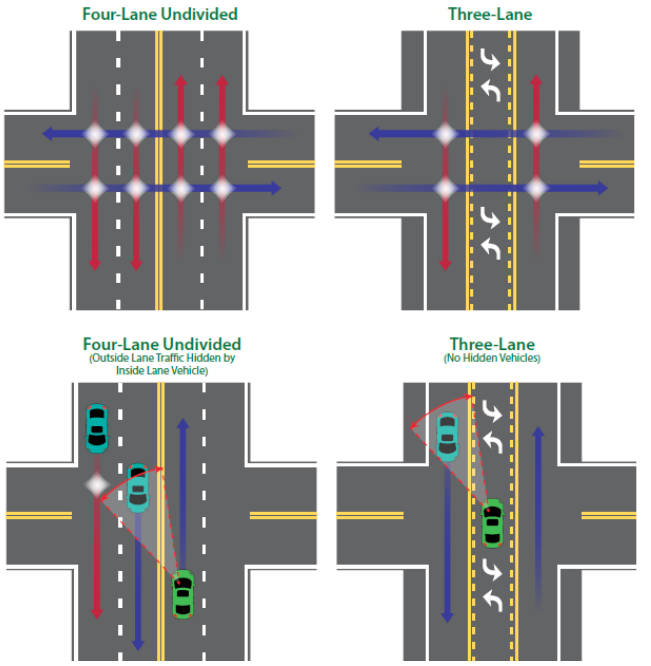


Figure 2. This road diet reduces the number of cross-traffic conflict points from eight to four (top) and improves visibility for left-hand turns (bottom).[4]

Cost efficiency – Road diets make efficient use of the existing roadway cross-section, accomodating other modes (sidewalks, bike lanes) without having to acquire additional right-of-way. They can be implemented in conjunction with planned reconstruction or overlay projects to maximize safety and operational benefits, often at only the cost of restriping.

Figure 3. Pros and Cons of Road Diets [6]

Road Diet Pros	Road Diet Cons
Slows Traffic: Road diets can eliminate speeding and merge-and-weave driving. Slower traffic in downtown areas encourages shopping/economic development and cautious driving.	***Slows Traffic:*** All through-traffic in one direction must travel in one lane instead of two and is therefore limited by the speed of the slowest driver.
Improves Safety: Crashes due to left-turning movements from through-travel lanes are reduced because movements have been moved to center turn lane.	***Difficult Entry:*** Cars may have difficulty pulling onto the roadway from driveways or side streets if traffic volumes are high (above 15,000 vehicles per day) due to lack of gaps in the travel lane, especially during peak hours.
Complete Street: Existing right-of-way can be utilized for other uses, such as bicycle lanes, parking or streetscape enhancements.	***Level-of-Service:*** Slightly reduces roadway capacity due to loss of a through-lane in each direction.
Cost-Effective: Diets are an inexpensive roadway fix, especially when part of an existing repaving project.	***Sharing the Road:*** If a bus runs on the road, after a road diet, all traffic will stop when bus stops for passengers because cars cannot pass bus in a second through-lane.
Lane Improvement: By reducing the number of lanes, lane width can be improved to standard 12 feet in areas where lanes may be too narrow and not meeting standards.	***Driver Expectations:*** Motorists accustomed to 4 lanes on the road will have to adjust to the 3-lane configuration.

Candidates for Road Diets in Genesee County, Michigan

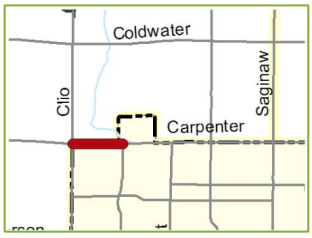
Figure 4. A technical report from Genesee County, Michigan includes profiles of major corridors rated by their road diet suitability.[7]

Complete Streets 4 to 3 Lane Conversion Study

Carpenter Road

From: **Clio Rd**
To: **Fleming Rd**
Number of Signals: 1
Driveways and Side Streets: Some
Land Use: Residential, Commercial
Left Turn Lane: Clio
Speed Limit: 35
Width Inside Lane: 12
Width Outside Lane: 12
Total Width: 50
Bus Route: Yes
High ADT: 8713
Low ADT: 6752





2008-2013 Crash Data

Rear End Crashes: 5
Read End – Left Turn Crashes: 0
Head On – Left Turn Crashes: 0
Side-Swipe Crashes: 1
Total All Crash Types: 10
Crashes per mile per year: 3.33

Recommendations ★★★★

This is a good candidate for a road diet. The traffic count is within the range appropriate for a road diet. Two high schools are located on this corridor, so it would benefit from traffic calming and bike lanes. The section of Carpenter Road between Dupont and Saginaw was recently converted to a three-lane road, and it would be good to convert the rest of the corridor.

Genesee County MPC

Quality of Life – Road diets make wide streets more livable and easier to cross when on foot, providing a complete street environment.

Safety Benefits of Road Diets

One of the most important benefits of a road diet is improved safety for all road users. There are safety advantages to a 4-to-3 lane road reconfiguration, as seen in Figure 2. The National Cooperative Highway Research Program (NCHRP) reported crash reduction rates of 19 to 47 percent in a study of 4-to-3 lane reconfigurations with a center two-way left-turn lane.[8]

The NCHRP study also reported fewer rear-end and left-turn crashes by using the two-way left-turn lane and fewer right-angle crashes with side street motorists, as they only need to cross three lanes of traffic instead of four. A reconfigured road also simplifies road scanning and gap selection for motorists making left-turns from side streets onto the mainline.

One effect of a road diet can be slower traffic, which can be both an asset and a disadvantage, as seen in the pro-con list in Figure 3. With only one through-lane each way, traffic tends to slow down. The reduced speed differential means fewer and less severe crashes.

Road dieting can also provide opportunities to install bike lanes within the existing cross section and allocate "leftover" roadway width for on-street parking, transit stops, or other functions.

Road Diets in Small and Rural Communities

There are no comprehensive studies of the effectiveness of road diets in rural or small communities compared to urban ones. Jack Messer, director of planning and development for the City of Overland Park, Kansas said it is difficult to generalize road diets as particularly good or bad for smaller communities. "It's important to understand the context of the environment and the specific issue to be resolved," he said.

Messer went on to explain the various reasons for considering a road diet, including: addressing a perceived or real speeding issue, providing space within the right-of-way for other uses, designing roads that take pedestrians and bicyclists into consideration, enhancing road aesthetics, and developing parking. "As you can see, any or all of these things are potentially relevant discussion points and would apply regardless of the size of cities," Messer said.[9]

With the growing popularity of road diets, several studies have been conducted to further examine their effectiveness in general. A study in Michigan assessed crash data to pinpoint roads that would benefit from a road diet. Rural communities like Storm Lake, Iowa have also had good experiences with road dieting.

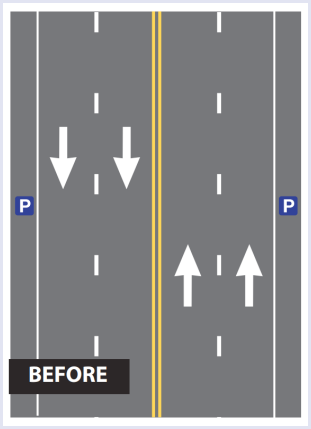
Genesee County, Michigan

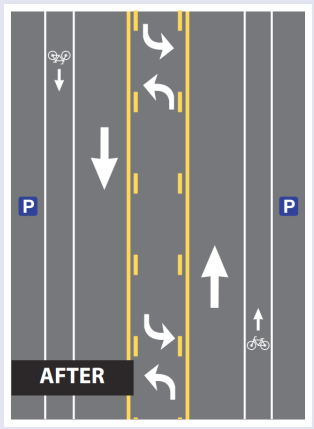
After the Michigan state legislature passed a measure to encourage the development of Complete Streets in 2010, the Michigan Department of Transportation adopted a statewide policy and many municipalities followed suit. The Genessee County Planning Commission published a technical report exploring the use of road diets to achieve Complete Street goals.

According to the report, all types of crashes have declined on roads that were narrowed in recent years. Average annual reductions after conversions from four to three lanes were 31.8 percent for head-on crashes, 35.3 percent for rear-end crashes, and 32.8 percent for same-

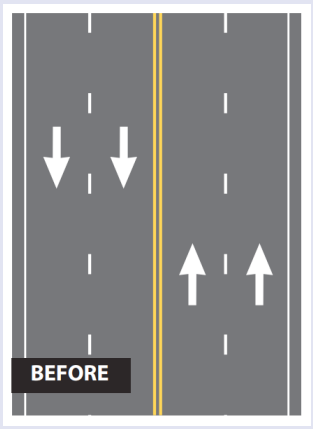
Road Diet Options

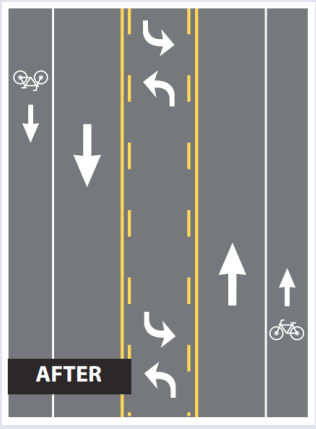
There are many options for using the space made available by removing lanes of through-traffic with a road diet. Popular uses for the space include: center two-way left-turn lane, street parking, bike lanes, and wider paved shoulders. Below are diagrams showing how space can be allocated in road diets.[10]



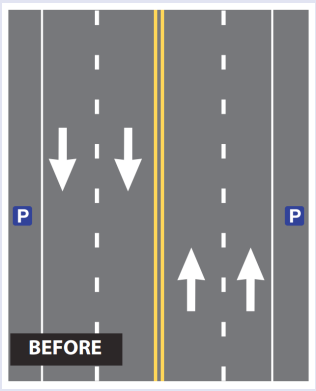


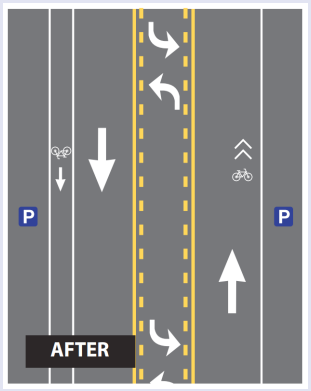
4-to-3 lane conversion with center two-way left-turn lane, bike lanes, and street parking



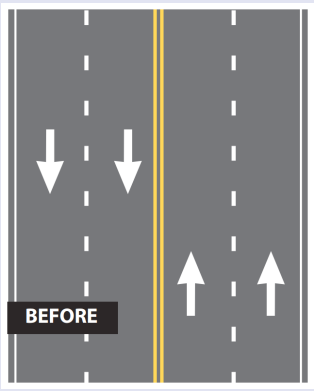


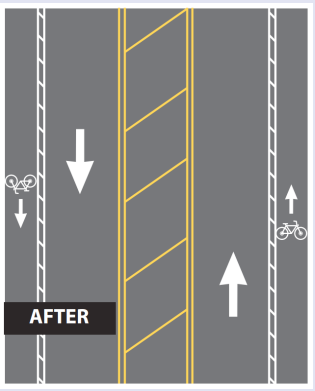
4-to-3 lane conversion with center two-way left-turn lane and bike lanes





4-to-3 lane conversion with center two-way left-turn lane, one designated bike lane (left) and one sharrow (shared lane marking, right), and street parking on both sides





4-to-2 lane conversion with median and buffered bike lanes

All Images: FHWA

side, side-swipe crashes.[11] County planners have been suggesting several existing four-lane roads as candidates for road diets because they currently carry less traffic than they were initiatlly designed to handle.

Some roads, like King Boulevard from Fifth Avenue to Welch Boulevard in Flint, MI, have already been narrowed, with wider shoulders or parking added with the extra right-of-way space.[12]

Storm Lake and Muscatine, Iowa

Two cities in Iowa have also had positive experiences with the conversion of four-lane undivided roadways to a three-lane cross section. In 1996, the city of Storm Lake, Iowa converted a portion of Flindt Drive. This roadway was 40 feet wide and had an ADT of 8,500 VPD (Vehicles Per Day).[13] No formal before-and-after analysis has been done, but there was a generally positive public response to the conversion. City officials are also pleased with the traffic flow and increased safety on the roadway.

The city of Muscatine, Iowa had a similar experience with the conversion of Clay Street. City engineer Ray Childs reported a large reduction in accidents due to the conversion. In general, the Iowa Department of Transportation has started encouraging the conversion of four-lane undivided roadways to three-lane cross sections where safety is an issue.[14]



FHWA

Before and after photographs of a road diet of Edgewater Drive in Orlando, Florida. While this is an urban area, commercial districts in rural areas have a similar look and a similar need for parking. Street parking was retained in this reconfigured road.[15]

ADDITIONAL ROAD DIET RESOURCES

Federal Highway Administration's "Road Diet Informational Guide" (Report No. FHWA-SA-14-028)

Road Diet Case Studies (Report No. FHWA SA-15-052)

FHWA Road Diet Quarterly Newsletter:
http://safety.fhwa.dot.gov/road_diets/newsletter/spring/

"Every Day Counts" (EDC), workshops and webinars through FHWA:
https://www.fhwa.dot.gov/innovation/everydaycounts/

Speeds, Travel Times, Delays on US 75 4/3 Lane Conversion Through Sioux Center, Iowa (1999). Knapp and Giese. Iowa State University Center for Transportation Research and Education.

Iowa's Experience with Road Diet Measures: Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates (2006). Pawlovich, et. al. *Journal of the Transportation Research Board*, No. 1953.
http://trrjournalonline.trb.org/doi/pdf/10.3141/1953-19

Conclusion

Road dieting, or road reconstruction, is one of the nine proven safety countermeasures recommended by the Federal Highway Administration under the "intersection and corridor" focus area. It is also an FHWA Every Day Counts initiative. A number of communities are coming onboard to use this concept as a tool to create complete streets that are friendly and safe to all road users, including pedestrians and bicyclists. Although the concept is not yet widely used in small and rural communities, it can be viable as an effective low-cost safety countermeasure in areas where conditions are suitable.

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Note: Additional background information provided by email correspondence with Becky Crowe, Manager, FHWA Office of Safety.

International Journal of Engineering Research and Development
e-ISSN: 2278-067X, **p**-ISSN: 2278-800X, www.ijerd.com
Volume 7, Issue 3 (May 2013), PP. 01-05

Determination of Heavy Metal Contaminants in Leafy Vegetables Cultivated By the Road Side

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Abstract:- A study was conducted to analyze the heavy metals in some leafy vegetable cultivated by roadside including *Talium triangulare, Amaranthus hybridus* and *Telfairia occidentalis.* The vegetables were sampled from different areas of Ojo local goverment. The vegetables were digested using 98% nitric acid ($HN0_3$) and analyzed with the aid of Atomic Absorption Spectrophotometer(AAS) to determine heavy metals. The mean concentration for each heavy metal in the samples gotten from each sites were calculated and the comparison of these data was done amongst the three differnt locations. These were compared with the permissible levels set by the FAO and WHO. Results showed that the levels of Copper and Cadmium for the leafy vegetables ranged from 0.3944 ± 0.159 to 1.6559 ± 0.919 and from 0.0854 ± 0.043 to 0.2563 ± 0.249mg/kg dry weight respectively. While that of Zinc and Lead was 1.8028 ± 0.111 to 6.2267 ± 1.572 and 0.0856 ± 0.040 to 2.104 ± 1.490mg/kg . When compared with standards, heavy metal levels were found to be within safe limit which is an indicator that the leafy vegetable in Ojo local government area are safe for consumption without the risk of environmental toxicants.

Keywords:- Heavy metals, Leafy vegetables, Environmental pollutants, Road side, Atomic absorption spectrometer

I. INTRODUCTION

Air pollution of the natural environment by heavy metals is a universal problem because these metals are indestructible and most of them have toxic effect on living organisms, when permissible concentration levels are exceeded. Heavy metals frequently reported in literature with regards to potential hazards and occurrences in contaminated soil are cadmium, copper, zinc and lead (Akoto *et al*., 2008., Alloway, 1995). The vehicular exhausts, as well as several industrial activities emit these heavy metals so that soils, plants and even residents along roads with heavy traffic loads are subjected to increasing levels of contamination with heavy metals (Ghrefat and Yusuf, 2006). However, heavy metals are natural components of the earth's crust and cannot be degraded nor destroyed. They enter the human body through food, water and air. Heavy metals are ubiquitous; therefore they tend to bio accumulate, thus causing an increase in their concentration in a biological system. Chronic heavy metal toxicity has been the result of long term low level exposure to pollutants and is associated with many chronic diseases. Heavy metals are given significant interest throughout the globe due to their toxic, mutagenic and teratogenic effects even at very low concentrations.

Vegetables constitute an important part of the human diet since they are rich in carbohydrates, proteins as well as vitamins, minerals and trace elements however; they contain both essential and toxic elements over a wide range of concentrations. Metals accumulation in vegetables may pose a direct threat to human health. Heavy metals are one of a range of important types of contaminants that can be found on the surface and in tissue of dry vegetables. Vegetables are also part of daily diets in many households forming an important source of vitamins and minerals required for human health. They are made up of chiefly cellulose, hemi-cellulose and pectin substances that give them their texture and firmness (Sobukola and Sairo 2007). Vegetables takes up metals by absorbing them from contaminated soils, as well as from deposits on different parts of the vegetables exposed to the air from polluted environments (Sobukola *et al.,* 2010). Vegetable plants growing on heavy metal contaminated medium can accumulate high concentrations of trace elements to cause serious health risk of consumers. Regular monitoring of these heavy metals from effluents, sewage, in vegetables and in other food materials is essential for preventing excessive buildup of the metals in the food chain. Heavy metals depositions are associated with a wide range of sources such as small scale industries (including battery production, metal

products, metal smelting and cable coating industries); brick kilns; vehicular emissions; re-suspended road dust and diesel generator sets. These can be important contributors to the contamination found in vegetables. Heavy metals, such as cadmium, copper, lead and zinc are important environmental pollutants, particularly in areas under irrigated with waste water. Metals such as lead, zinc, copper and cadmium are cumulative poisons. These metals cause environmental hazards and are reported to be exceptionally toxic. Heavy metals may enter the human body through inhalation of dust, direct ingestion of soil and consumption of food plants grown in metal contaminated soil, indicated that the cadmium concentrations in shoots and roots varied both with different cadmium levels and type of vegetable crop was increased with the increasing cadmium concentrations in the growth medium.

Telfairia occidentalis (fluted pumpkin) is one of the commonly consumed leafy vegetables in Nigeria. It is used in herbal preparations in African traditional medicine; it has the ability to attenuate hypercholesterolemia. The vegetable is cultivated in various parts of southern Nigeria. It is widely cultivated for its palatable and nutritious leaves which are used mainly as vegetable. The seeds are also nutritious and rich in an oil which may be used for cooking and soap manufacture. Its taxonomy, morphology and potential uses are discussed in relation to its economic importance as a tropical crop. (Berti *et al*., 1996).

Amaranthus hybridus also known as "Amaranth or pigweed", is an annual herbaceous plant of 1- 6 feet high. The leaves are alternate petioled, 3 – 6 inches long, dull green, and rough, hairy, ovate or rhombic with wavy margins. They have small flowers, with greenish or red terminal panicles. Taproot is long, fleshy red or pink. The seeds are small and lenticellular in shape; with each seed and average of 1 – 1.5 mm in diameter and 1000 seeds weighing 0.6 – 1.2 g. It is rather a common species in waste places, cultivated fields and barnyards. In West African, *A. hybridus* leaves are normally used to prepare soup (Oke, 1983; Mepha *et al.*, 2007). They leaves are eaten as spinach or green vegetables (Dhellot et al., 2006).

Talinum triangulare (water leaf) is an herbaceous perennial leaf, caules cent and glabrous plant widely grown in tropical regions as a leaf vegetable (Ezekwe et al., 2001). It is consumed as a vegetable and constituent of a sauce and soups in Nigeria. Nutritionally, water leaf has been shown to possess the essential nutrients like Beta carotene, minerals (such as calcium, potassium and magnesium), pectin, protein and vitamins (Ezekwe *et al*., 2001). Water leaf has been also found to be used medically in the management of cardiovascular diseases like stroke, obesity, etc. (Adewunmi and Sofowora, 1980) and traditionally culinary as a softener of other vegetable species (Anete and 2006).

The objective of this research work is to determine the suitability of the leafy vegetable consumed in the Ojo Local government Area of Lagos Metropolitan area and viz a viz the heavy metal contaminants of the three leafy vegetable used as a delicacy in this area.

II. MATERIALS AND METHODS

2.1 *Experimental plants*

Three vegetable species were selected for the purpose of the experiment based on their availability. These vegetable leaves were *Telfairia occidentalis, Amaranthus hybridus* (Green) and *Talinum triangulare*. The vegetable leaves used for the experiment were harvested fresh or purchased directly from local farmers at the sites located in Lasu Iyana-Iba road, Iyana-Iba Market and LASU Campus (This serves as a control experiment, It was planted in the green house of Botany Department of Lagos State University Ojo). The freshly harvested vegetable leaves were immediately subjected to dry oven and was done by constantly exposing the plants to oven for 3-4 days at 70c. Sample collections were carried out according to the methods described by Udosen *et al.*, 2006. The samples were analyzed for heavy metal contents: Cadmium (Cd), Copper (Cu), Lead (Pb) and Zinc (Zn).

2.2 *Determination of heavy metal content in plants*

The whole plants where dried in an oven at 70°C for 3 days. The dry samples were crushed in a mortal and the resulting powder was packaged for analysis of the heavy metals copper, cadmium, zinc and lead. Approximately 5g of the powder was transferred to a 25ml conical flask; 5ml of concentrated H_2SO_4 was added followed by 25ml of concentrated HNO_3 and 5ml of concentrated HCL. The contents of the tube were heated at 200°C for 2 hour in a fuming hood, and then cooled to room temperature. Then, 20ml of distilled water was added and the mixture was filtered using filter paper to complete the digestion of organic matter. Finally, the mixture was transferred to a 50ml volumetric flask, filled to the mark, and allowed to settle for at least 15 hours. The resulted filtrate was analyzed for total Cd, Zn, Cu and Pb by Atomic Absorption Spectrometer. This sample procedure was carried out for each plant sample (Jones, 1984).

2.3 *Metal analysis*

All plants samples were analyzed using Atomic Absorption Spectrophotometer (AAS) model for determination of lead, cadmium, zinc and copper. The method used was by direct aspiration of sample digest, using air

acetylene flame. The calculating of metal is based on the comparison of absorbance of samples against standard known concentration, and all results are converted to mg kg^{-1}.

III RESULTS

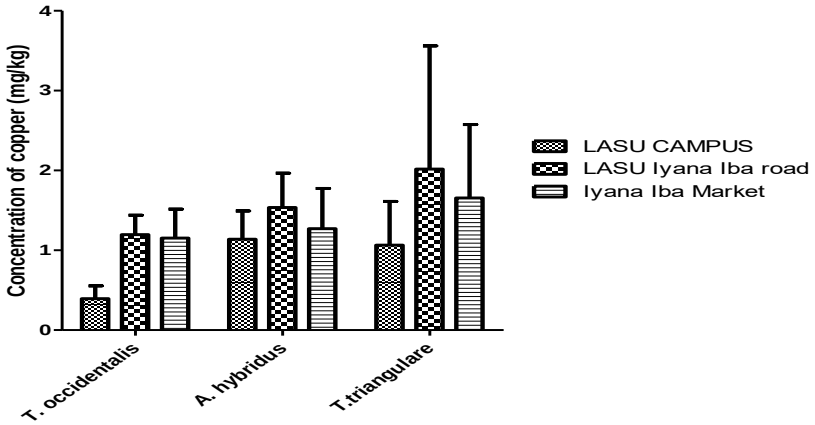

Figure 1: Amount of heavy metal Copper (Cu) in different plant collected at different location for period of three weeks

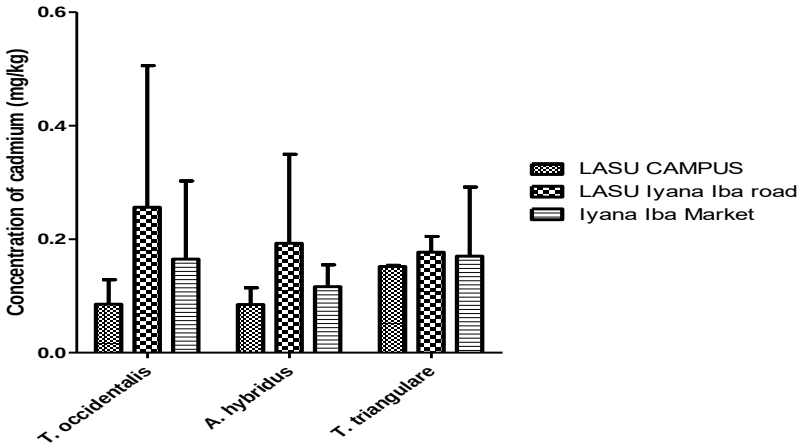

Figure 2: Amount of heavy metal cadmium (Cd) in different plant collected at different location for period of three weeks

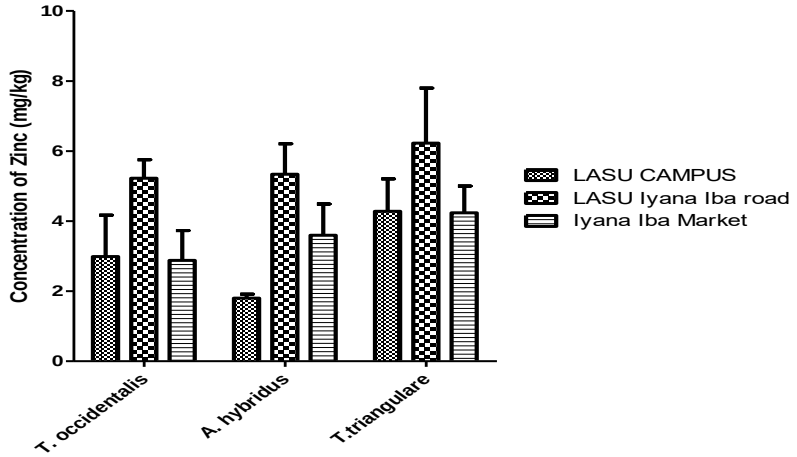

Figure 3: Amount of heavy metal Zinc (Zn) in different plant collected at different location for period of three weeks

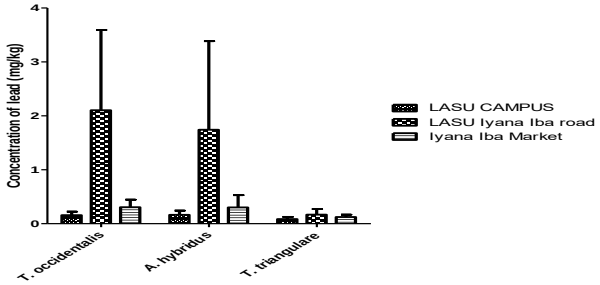

Figure 4: Amount of heavy metal lead (Pb) in different plant collected at different location for period of three weeks

IV. DISCUSSION

Pollution is a major urban problem and its direct or indirect effect is hazardous to human life and organisms. Vegetable is a major part of Nigerian diet and is very susceptible to environmental pollution due to the activity practice in the area where it is gotten from. Copper is a component of other proteins associated with the processing of oxygen. In cytochrome oxidase, which is required for aerobic respiration, copper and iron cooperate in the reduction of oxygen. Copper is also found in many superoxide dismutases, proteins that detoxify superoxides, by converting it (by disproportionation) to oxygen and hydrogen peroxide. (Jones, 2009).
From the result (Figure 1) the concentration of copper in *T.occidentalis* is quite low in Iyana Iba market compared to the other sites although the result is not statistically significant, on the other hand *A. hybridus* in LASU Campus that serves as the control is very low compared to the other two sources, the concentration is 1.1392 ± 0.353 while the other from LASU Iyana Iba road and Iyana Iba Market are 1.2215 ± 0.502 and 1.5368 ± 0.429. On the other hand the *T.triangulare* has a lower concentration of copper than the other vegetable gotten from LASU Campus. This shows that the level of heavy metal pollution in LASU campus site is very low and minimal compare to other sources.

Cadmium is a heavy metal with high poisonous ability and it is a non-essential element in foods and natural waters and it accumulates principally in the kidneys and liver (Divrikli *et al.*, 2006). Various sources of environmental contamination have been implicated for its presence in foods (Adriano, 1984). Various values have been previously reported for leafy vegetables which include 0.090 mg/kg for fluted pumpkin by Sobukola *et al* (2010), 0.049 mg/kg (Muhammed and Umer, 2008). According to FAO/WHO, the safe limit for Cd consumption in vegetables is 0.2mg/kg**.** The contents of both Cadmium and Zinc reported in this study are within the permissible levels by FAO/WHO in vegetables. Among all heavy metals, Zinc is the least toxic and essential elements in human diet as it require maintaining the functioning of the immune system. Zinc deficiency in the diet may be highly detrimental to human health than too much Zinc in the diet. The recommended dietary allowance for Zinc is 15mg/day for men and 12mg/day for women (ATSDR 1994a) but high concentration of Zinc in vegetables may cause vomiting, renal damage, cramps.

In this study, the concentration of Zinc was high in the LASU campus, while low concentration of Zinc was observed in vegetable sample from LASU Iyana Iba road and Iyana Iba Market, the concentration of zinc in LASU campus compared to that of other site is statistically significant ($P<0.05$). Lead is a serious cumulative body poison which enters into the body system through air, water and food and cannot be removed by washing fruits and vegetables. The high levels of Lead in some plants may probably be attributed to pollutants in irrigation water, farm soil or due to pollution from the highways traffic (Qui et al., 2000). Chinese cabbage has been reported to accumulate higher Lead concentrations compared to Pumpkin leaves from Mazimbu and Towelo (Chove *et al.*, 2006). Wong *et al.*, (1996) also reported that Chinese cabbage picks up Lead more readily compared to other heavy metals such as Cadmium, Copper, Zinc and Lead. In contrast, lower level of Lead has been reported with *Telfaria* (Akinola and Ekiyoyo, 2006). *Talinum,* and *Amaranthus* (Afolami et al 2010) similar to the result of this study is the result of Ladipo and Doherty, 2011.

Lead pollution has been shown to be commensurate with population/vehicular density (Afolami *et al.*, 2010). It can be stated that the site of growth noticeably influences the heavy metal uptake by vegetables. Generally, lead contaminations occur in vegetables grown on contaminated soils. Lead poisoning is a global reality, and fortunately is not a very common clinical diagnosis yet in Nigeria except for few occupational exposures (Anetor *et al.*, 1999). Low levels of heavy metals were observed in the markets because most of the markets are located away from source of contamination which includes: tire wear, motor oil, grease, brake emissions, corrosion of galvanized parts, fuel burning, and batteries and so on. It may also be attributed to the soil on which the vegetables were grown. Such soil may be sited in rural areas which may be related and not contaminated. Although the concentrations of the Cadmium and Zinc established for the vegetables are lower than those permitted by FAO/WHO, what matters in the long run is the quantities consumed and the frequency of intake. There is a cumulative effect on sustained intake of heavy metals, as they are not easily removed from the body. *Telfaria occidentalis* has a low level of lead and it is not statistically significant and also falls below

the permissible limit. It is advisable that for consumption purposes, regular monitoring should be conducted to detect increasing levels of Lead in vegetables. Many rural and urban low-income families in Nigeria consume large quantities of vegetables on a daily basis and this exposes them to the health risks associated with heavy metals ingestion.

V. CONCLUSION

However, the levels of heavy metals were observed to be lower than those of previous published works and regulatory standards. This may be in due partly to the low level of pollution in the area under investigation and the season of the year in which the sample is harvested. Further works should be carried out in the soil samples were the vegetables are grown as the pollution of these soils may cause a serious pollution on the plants.

Acknowledgments
The authors appreciate and than all laboratory colleagues for their cooperation and valuable comments

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memorandum

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Date: September 25, 2014

To: **Mr. Jesse Quirion**
City of Menlo Park

From: Mark Spencer
Tony Henderson

Project: MPA010

Subject: 500 El Camino Real – Neighborhood Cut-through Traffic Analysis

W-Trans has completed an analysis of potential neighborhood cut-through traffic for the proposed mixed-use development project at 500 El Camino Real. The memorandum summarizes current and projected future traffic conditions within the vicinity of the project-site, including an analysis of the potential for project-generated traffic to use residential streets to avoid congestion on El Camino Real. Measures are presented that could be used to minimize project-generated traffic using neighborhood streets as cut-through routes.

This analysis represents the third of three building block documents that were prepared for this analysis. The first element was the *500 El Camino Real – El Camino Real/Downtown Specific Plan Vehicular Traffic Consistency* (March 7, 2014), in which the proposed project was compared to the El Camino Real/Downtown Specific Plan. The second element was the *500 El Camino Real – Traffic Operational Analysis* (May 6, 2014), in which changes on El Camino Real in traffic operations were analyzed for the proposed site configuration as well as five alternative configurations.

Attached to this memorandum are the following figures:

- Figure 1A and Figure 1B – Existing Traffic Volumes
- Figure 2 – Existing Average Daily Traffic
- Figure 3A and Figure 3B – Existing Pedestrian Volumes
- Figure 4A and Figure 4B – Existing Bicycle Volumes
- Figure 5A and Figure 5B – Future without Project Traffic Volumes
- Figure 6 – Future without Project Average Daily Traffic
- Figure 7A and Figure 7B – Project Added Traffic Volumes
- Figure 8 – Daily Project Added Roadway Segment Volumes

Background Traffic Volume Data

Traffic volume data was collected for the project area in June 2013. The existing intersection traffic volumes are shown on Figure 1, and daily roadway segment volumes are shown on Figure 2.

Future traffic volumes include projected traffic volumes for the horizon year of 2035. This scenario includes traffic that would be generated by planned and approved developments identified by the City plus a growth rate of one percent per year to account for growth in regional traffic. This includes the development of projects within the El Camino Real/Downtown Specific Plan area that had pending or approved development applications before the City at the time this analysis initiated, excluding the

subject 500 El Camino Real site. Future without project intersection traffic volumes are shown on Figure 5 and projected roadway segment volumes are shown on Figure 6.

Project Information

The proposed project would include development of 199,500 square feet of general (non-medical) office space, 10,000 square feet of retail space, and 170 apartment units. The following is a summary of project information and analysis assumptions that were presented in detail in the *500 El Camino Real – El Camino Real/Downtown Specific Plan Vehicular Traffic Consistency* Memorandum as well as the *500 El Camino Real – Traffic Operational Analysis* Memorandum.

Site Access

As part of the *El Camino Real – Traffic Operational Analysis*, alternative access plans were considered for the site. Based on direction from City of Menlo Park staff, the access configuration proposed by the applicant was selected as the preferred configuration, and is therefore used for analysis presented in this memorandum. The proposed site plan submitted by the applicant includes the following access configuration:

- Middle Avenue – the existing signalized intersection would be modified to incorporate the project driveway on the east side of El Camino Real. A southbound left-turn lane would be installed on El Camino Real and all turning movements would be permitted at the driveway.
- College Avenue – the intersection would remain stop-controlled on the College Avenue and project driveway approaches. The project driveway would be restricted to right-turn in and out movements only.
- Partridge Avenue – the driveway would connect to an underground parking garage. The intersection would remain stop controlled on the Partridge Avenue and project driveway approaches. The project driveway access would be restricted to right-turn in and out movements only.
- Cambridge Avenue – a driveway is currently provided at this signalized intersection that provides access to the existing site and the adjacent Stanford Park Hotel. The driveway would be reconfigured with the proposed project, but the intersection would remain signalized and the remaining three approaches would be unchanged. All turning movements would continue to be permitted at this driveway.

For the purposes of this analysis it was assumed that internal drive aisles would allow for circulation between all parts of the project site. Therefore, drivers could enter at the Middle Avenue, College Avenue or Cambridge Avenue driveways and access any portion of the site. However, the Partridge Avenue driveway would provide access only to an underground parking structure. It is noted that this underground parking garage would also be accessible via internal drive aisles, so a driver could enter the site through any of the project driveways and then proceed to the underground parking garage.

Trip Generation

The anticipated trip generation potential for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012 and was compared to the trip generation estimations presented in the Specific Plan EIR. The trip generation potential of the project as currently proposed was developed using the rates for Apartment (Land Use 220), General Office Building (Land Use 710) and Shopping Center (Land Use 820).

Existing Uses

Since the site has recently been occupied by a Tesla sales and service center, the traffic generated by this use was deducted from the total trip generation calculations to represent the total number of net new trips that would be generated by the proposed project. Typically, this would be accomplished by using trip generation data published by ITE; however, it is acknowledged that how the Tesla center operated does not closely match any of the ITE land-use descriptions. Since the Tesla center was in operation when traffic volume data was collected in June 2013, the existing trip generation was calculated based on actual observed traffic volumes, including additional data collected in February 2014, after the center closed, details of which are provided in the *500 El Camino Real – El Camino Real/Downtown Specific Plan Vehicular Traffic Consistency* Memorandum.

Internal Capture Trips

The *Trip Generation Manual* also includes data and methodologies that can be applied to determine the proportion of internal trips that may occur within a development area that includes a variety of land uses. Internal trips occur at mixed-use developments, and in the case of the proposed project this would consist of residents patronizing adjacent retail, as well as employees of nonresidential uses patronizing other nonresidential uses. Furthermore, there is a potential for some employees of either the office or retail components to live in the on-site apartments. These trips would be made by walking and would not affect traffic on the adjacent street network.

In the *El Camino Real/Downtown Specific Plan: Transportation Impact Analysis*, a uniform reduction rate of ten percent was applied to all new development within the Specific Plan area. Such a uniform rate is appropriate when analyzing a large area plan. However, since a specific development application is being considered instead of the area-wide plan, a more detailed analysis of interaction between land uses in a specific development is appropriate. Therefore, methodologies presented in the *Trip Generation Manual* were applied to this site-specific analysis. These methodologies incorporate a projected demand between uses based on the size and trip generation potential of each use.

In general, the largest potential for internal trip capture is between retail/service use and either residential or office uses. While the proposed project has large residential and office components that would result in a demand for retail and services, the relatively small amount of retail space on the site would limit the potential for internal trip capture. It is acknowledged that there is potential for project-site residents or employees to choose to walk to adjacent retail uses or Downtown Menlo Park. However, to provide for a conservative analysis, the internal capture reduction was calculated for the proposed development only.

The ITE publication does not provide guidance for internal trip capture during the a.m. peak hour. Since retail uses are either generally closed or generate minimal traffic during the a.m. peak hour, the potential for internal trip capture is minimal. To account for the potential a.m. internal trip capture from business that may be open, internal trip capture rates published by ITE for the p.m. peak hour were assigned to the a.m. peak hour trip generation rates. It is noted during the a.m. peak hour, the applied internal capture rates would reduce the trip generation by two trips, which represents less than one-half of one-percent of total trips.

Pass-by Trips

Some portion of traffic associated with retail uses may be drawn from existing traffic on nearby streets. These vehicle trips would not be considered "new," but are instead comprised of drivers who are

already driving on the adjacent street system and choose to make an interim stop, and are referred to as "pass-by." However, since the retail component of the proposed project is only 10,000 square feet, no adjustment to trip generation projections were made for pass-by trips. This results in a conservative analysis and is consistent with methodologies presented in the *El Camino Real/Downtown Specific Plan: Transportation Impact Analysis.*

Transit Usage

Some project site employees or residents may choose to utilize transit instead of driving to complete their trips. To account for transit use, a trip reduction rate that was presented in the Specific Plan EIR was applied to this analysis. In the Specific Plan EIR, a two percent trip reduction was applied to apartment uses, a one percent reduction was applied to the office uses, and no reduction as applied to the retail components. Given the proximity of the site to the both the Menlo Park Caltrain Station (approximately one-half mile north, or about a 10 to 15 minute walk) and Palo Alto Caltrain Station (approximately three-quarters of a mile south, or about a 15 to 20 minute walk) , there is a possibility for higher transit use. To provide a conservative analysis, however, the rates applied in the Specific Plan EIR traffic analysis were also applied to this site-specific analysis.

Trip Generation Summary

The proposed project is expected to generate approximately 3,115 net new trips on a typical weekday, of which 402 would occur during the a.m. peak hour and 393 would occur during the p.m. peak hour. Table 1 presents a summary of project trip generation.

Table 1
Proposed Project Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Apartment	170 du	6.79	1,154	0.51	87	17	70	0.65	111	72	39
Office Building	199.5 ksf	11.12	2,219	1.67	333	293	40	1.51	302	51	251
Retail	10 ksf	42.70	427	0.96	10	6	4	3.71	37	18	19
Subtotal			3,800		430	316	114		450	141	309
Internal Capture Reduction [1]			*-148*		*-2*	*-1*	*-1*		*-12*	*-6*	*-6*
Transit Reductions [2]			*–44*		*-5*	*-3*	*-2*		*–5*	*-1*	*-4*
Subtotal			3,608		423	312	111		433	134	299
Existing Use [3]			-493		-21	-13	-8		-40	-19	-21
Total Net New Trips			**3,115**		**402**	**299**	**103**		**393**	**115**	**278**

Note: du = dwelling unit; ksf = 1,000 square feet
[1] Source: *Trip Generation Manual;* Effective reduction rate: 0.46% of a.m. peak hour trips and 2.7% of p.m. peak hour trips
[2] Transit Reduction Rates applied: 2% of residential trips, 1% of office trips, no reduction of retail trips
[3] Source: Data collected in June 2013 and February 2014

Trip Distribution

The traffic projected to be generated by the proposed project was distributed to local and regional destinations based on the City of Menlo Park *Circulation System Assessment* (CSA) document. The CSA includes three distribution profiles depending on the type of land use: residential, employment and commercial. These percentages are based on the differing travel characteristics that are generally found for these land uses and the locations of homes, businesses and other origins and destinations. The CSA distribution profiles are shown in Table 2 and the distributed traffic is shown on the attached Figure 7 and Figure 8. These CSA distribution profiles were also used in development of the *El Camino Real/Downtown Specific Plan: Transportation Impact Analysis.*

Table 2
CSA Traffic Distribution– West Menlo/Downtown/El Camino Real Area

Destination	Residential	Employment	Commercial
I-280 North	5%	12%	7%
I-280 South	9%	16%	3%
Sand Hill West	1%	1%	1%
SR 84 East	2%	20%	1%
US 101 South	9%	17%	3%
US 101 North	2%	4%	2%
Alameda North	6%	4%	4%
El Camino Real North	10%	7%	6%
Alpine South	0%	0%	0%
Junipero South	5%	3%	4%
Sand Hill East	3%	1%	3%
Middlefield South	0%	0%	0%
El Camino Real South	14%	7%	15%
Middlefield North	0%	0%	0%
Local Sharon Heights	5%	1%	8%
Local Downtown	26%	6%	38%
Local Willows	3%	1%	5%
Local Belle Haven	0%	0%	0%

Source: 2004 Circulation System Assessment Document, City of Menlo Park

Operational Analysis

The study intersections along El Camino Real were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000.

Service Standards

The City of Menlo Park has established a threshold of Level of Service (LOS) D or better for all study intersections, except for the intersection of El Camino Real/Sand Hill Road which is located in the City of Palo Alto and has an LOS E or better threshold.

Level of Service

An operational analysis for intersections along El Camino Real was completed for existing conditions as well as projected future and future plus project conditions. Under future conditions, the intersections of El Camino Real/Menlo Avenue-Ravenswood Avenue is expected to operate unacceptably. With the

addition of project-generated traffic, the intersection would continue to operate unacceptably. Mitigation measures for this intersection were addressed in the *Menlo Park El Camino Real/Downtown Specific Plan Draft EIR* (Mitigation Measure TR-7b). The level of service results are summarized in Table 3. It is noted that due to some modifications and enhancements to the intersection operational analysis tools used (such has adjustments to traffic signal timing or programmed intersection configuration), the results presented in Table 3 have changed slightly than what was shown in the *500 El Camino Real – Traffic Operational Analysis* Memorandum. However, the findings have not changed as a result of these adjustments.

Table 3
Future and Future plus Project Peak Hour Levels of Service

Study Intersection ***Approach***	**Existing Conditions**				**Future Conditions**				**Future plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**	
El Camino Real/Menlo Ave-Ravenswood Ave	40.7	D	43.0	D	**71.3**	**E**	**115.0**	**F**	**77.6**	**E**	**121.6**	**F**
El Camino Real/Live Oak Ave	0.2	A	0.2	A	0.2	A	0.2	A	0.2	A	0.2	A
Eastbound Live Oak	*10.5*	*B*	*11.0*	*B*	*12.0*	*B*	*11.3*	*B*	*12.0*	*B*	*11.4*	*B*
El Camino Real/Roble Ave	7.9	A	12.1	B	6.9	A	8.8	A	5.9	A	12.5	B
El Camino Real/Middle Ave	12.1	B	11.8	B	17.6	B	17.6	B	25.7	C	22.7	C
El Camino Real/College Ave	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A	0.2	A
Eastbound College Ave	*9.7*	*A*	*9.6*	*A*	*10.8*	*B*	*10.4*	*B*	*11.3*	*B*	*10.7*	*B*
Westbound Driveway	–	–	–	–	–	–	–	–	*9.3*	*A*	*10.9*	*B*
El Camino Real/Partridge Ave	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A
Eastbound Partridge Ave	*9.7*	*A*	*9.4*	*A*	*10.8*	*B*	*10.3*	*B*	*11.4*	*B*	*10.5*	*B*
Westbound Driveway	–	–	–	–	–	–	–	–	*8.9*	*A*	*10.5*	*B*
El Camino Real/Cambridge Ave	3.7	A	5.8	A	4.3	A	5.6	A	4.9	A	8.3	A
El Camino Real/Harvard Ave	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A
Eastbound Harvard Ave	*9.3*	*A*	*9.4*	*A*	*10.0*	*A*	*9.6*	*A*	*10.2*	*B*	*9.9*	*A*
El Camino Real/Sand Hill Rd	19.7	B	40.4	D	24.1	C	74.1	E	28.4	C	77.5	E

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation

It is noted that the intersection of El Camino Real/Roble Avenue is projected to experience a slight decrease in overall intersection delay with the implementation of the project. This should not be interpreted that the project results in a positive benefit to the intersection. Instead, the project-generated traffic is expect to predominantly use underutilized movements, thereby resulting in more efficient use of the traffic signal timing. Based on this, the project's impact to the intersection would be negligible.

Roadway Segment Analysis

In addition to the intersection capacity analysis, a roadway volume threshold analysis was completed. The City of Menlo Park, in the Transportation Impact Analysis Guidelines section of the Circulation System Assessment (CSA) document, has established acceptable thresholds for traffic added to local and collector streets. These thresholds do not necessarily represent the capacity of the streets, but instead are a quality of life target set by the City to balance the needs of regional mobility while minimizing traffic volumes on neighborhood streets.

As summarized in Table 4, the project-added traffic is expected to exceed the acceptable threshold on Middle Avenue, Cambridge Avenue, University Drive and Yale Road.

Table 4
Future Roadway Segment Analysis

Segment	Classification	ADT	Additional Trips to Exceed Threshold	Project-Added Volume	Potentially Significant Impact
Middle Avenue - between El Camino Real and University Drive	Collector	10,717	50	**528**	**Yes**
College Avenue - between University Drive and El Camino Real	Local	842	76	45	No
Partridge Avenue - between University Drive and El Camino Real	Local	688	138	20	No
Cambridge Avenue - between University Drive and El Camino Real	Local	1,779	25	**151**	**Yes**
University Drive - between Middle Avenue and Cambridge Avenue	Local	2,428	25	**100**	**Yes**
Yale Road - between Middle Avenue and Cambridge Avenue	Local	263	53	**73**	**Yes**

Notes: ADT = Average Daily Traffic, projected for the year 2035; **Bold** indicates a potentially significant impact

The roadway segment impact to Middle Avenue was identified in the *Menlo Park El Camino Real/Downtown Specific Plan Draft EIR* (Impact TR-8) and was found to be a significant and unavoidable impact (Mitigation Measure TR-8). The Cambridge Avenue, University Drive and Yale Road segments were not studied in the *Menlo Park El Camino Real/Downtown Specific Plan Draft EIR;* therefore, no finding of significance was previously made for these segments. However, based on this analysis, the project would result in a significant impact on Cambridge Avenue and Yale Road. The added traffic to the remaining study segments is expected to be within the acceptable threshold.

Neighborhood Traffic Management Program

El Camino Real currently experiences congestion, especially during peak periods. In the future, the level of congestion is expected to increase. As a result, some drivers may choose to follow alternative routes through a neighborhood in an effort to avoid driving in congested conditions along El Camino Real. To account for this, a portion of project-generated traffic was assumed to travel on local neighborhood streets, thereby resulting in an increase in traffic on these local streets. The addition of project-generated traffic on neighborhood streets, regardless of the quantity, may be a concern to residents. Therefore, the following sections present techniques that could be used to reduce the amount of traffic traveling on neighborhood streets that do not have an origin or destination on those streets.

The City of Menlo Park has established a Neighborhood Traffic Management Program (NTMP), with the goals of correcting "demonstrably unsafe conditions" and "to provide residents of residential streets with protection and release from disproportionate traffic increases".

The NTMP identifies two levels of potential traffic management measures. Level I, or "express", measures are focused on education and enforcement, with limited physical changes to the roadway. These features may include:

- Educational programs
- Targeted police enforcement
- Regulatory signs
    - Speed Limit signs
    - STOP signs
    - Truck restriction signs
    - Parking prohibition signs
- Static warning and specialty signs
    - High visibility signs
    - School Area signs
    - Pedestrian Crossing signs
    - Neighborhood information signs
- Special striping and markings
    - Reduced lane width/edge line
    - Marking of street narrowing features
    - High visibility crosswalks
    - Red curbs
- Dynamic speed signs
- Radar speed trailer
- Improvement to street lighting
- Addition or removal of turn lanes
- Changes in traffic signal timing
- Street Trees

Level II measures are generally more restrictive and may result in diversion of existing neighborhood traffic and restricted access within a neighborhood. Level II features are identified to include:

- Flashing Beacons
- Crosswalk Warning Systems
- Textured pavement

- Gateways and entry treatments
- Turn Prohibition signs
- Traffic circles
- Speed humps and cushions
- Speed tables and raised crosswalks
- Bulbouts, curb extensions, and chokers
- Median island slow points
- Chicanes and angle points
- Median barriers
- Forced-turn channelization
- Diagonal diverters
- Half (one-way) street closure
- Full street closure

Many of these measures are used for the purpose of traffic calming, with the goal of reducing travel speed. Reduction in speed would not directly reduce cut-through traffic on neighborhood streets. However, any reduction in travel speeds could make these neighborhood streets a less attractive route, thereby indirectly reducing cut-through traffic.

Emergency Response

The NTMP notes that the need for "emergency vehicle access and response should be preserved." The Fire District has prepared a map of primary response routes, on which the implementation of traffic calming measures will not be permitted if it will delay emergency response by one minute or more. Furthermore, the City has established in the NTMP that "the use of stop signs and all Level II features will be evaluated in consultation with the Fire District."

Within the study area, the following streets are identified as a primary emergency response route:

- El Camino Real
- Middle Avenue
- Cambridge Avenue
- Creek Drive

Existing Traffic Management Features

Three Level II traffic calming measures have previously been installed within the study area, including speed humps on Cambridge Avenue, bulbouts at Cambridge Avenue/University Drive and gateways feature on the southern leg of Middle Avenue/University Drive as well as on Cambridge Avenue near Alto Lane. Furthermore, many of the neighborhood streets immediately adjacent to the proposed project site (such as College Avenue, Partridge Avenue and Cambridge Avenue), are relatively narrow (36 feet wide or less), have on-street parking and are lined with large trees. While these streets were not necessarily designed with the intent of calming traffic and minimizing cut-through movements, the design itself lends itself to providing these benefits.

Traffic Management Strategies

To reduce the potential for cut-through traffic on neighborhood streets in the vicinity of the project site, the following traffic management techniques may be considered. The measures focus primarily on Middle Avenue and Cambridge Avenue as these are the neighborhood streets expected to experience

the highest level of cut-through traffic. Potential strategies are presented for specific locations as well as the area as a whole.

Additional consideration was given to both University Drive and Yale Road as these roadways would also experience potentially significant impacts related to the proposed project. While segment-specific strategies are not identified for University Drive or Yale Road, application of project-wide traffic management strategies discussed below, as well as application of traffic management strategies on Middle Avenue and Cambridge Avenue, would benefit these streets by reducing traffic that travels on all neighborhood streets.

Middle Avenue

Middle Avenue, west of El Camino Real is the widest of the neighborhood streets adjacent to the project site at approximately 40 feet wide. It is designated as a collector in the City of Menlo Park General Plan. It provides connectivity between El Camino Real and Olive Street, with intermediate connections to University Drive and Downtown Menlo Park. Furthermore, there are no trees or other large features on Middle Avenue near El Camino Real, so visually the street may appear to be more like a regional street and therefore more enticing than the other neighborhood streets. After El Camino Real, Middle Avenue is expected to experience the second highest level of project-added traffic.

Lane Markings

Currently, the westbound lane of Middle Avenue, west of El Camino real is approximately 20 feet wide, but is marked as a single lane without on-street parking. This wide single travel-lane may result in drivers to view Middle Avenue as a wide-open street appropriate for regional traffic. In an effort to visually narrow the street, a westbound right-turn lane could be considered west of El Camino Real entering the Safeway driveway.

East of the Safeway driveway, an edge line to mark the lane width could be considered. Where parking is prohibited, cross-hatch markings in the shoulder area may be an option to avoid the appearance that the shoulder is intended for parking (this would be in addition to the continued maintenance of red-curb markings and no parking signs).

The *Menlo Park Comprehensive Bicycle Development Plan* (January 2005), identifies Middle Avenue as a route for future designation as a Class III bicycle route. However, in the El Camino Real/Downtown Specific Plan, Middle Avenue was identified for "Future Class II/Minimum Class III" bicycle facilities. Class III bicycle routes do not include dedicated bicycle facilities, but instead signs and pavement markings are provided to direct bicyclists to use the route while informing drivers that bicyclists may be on the route. Installation of the potential turn lane and/or shoulder discussed above would not restrict future designation of the bicycle route.

If the City chooses to pursue Class II bicycle lanes on this route, this additional roadway space would need to be used for bicycle lanes instead of the turn lane and shoulder. However, installation of a Class II bicycle lane on this segment would have a similar beneficial impact on Middle Avenue by visually narrowing the street. Therefore, it is recommended that modifications to the lane makings to this segment be made only after the City has selected the preferred bicycle facility for Middle Avenue.

Speed Feedback Signs

Speed feedback signs provide drivers with instant feedback when they are exceeding the posted speed limit. This is unlikely to directly affect the volume of traffic traveling on these streets, but would instead help encourage drivers to travel at a speed appropriate for the corridor. Potential locations for speed feedback sign on Middle Avenue include the segment mid-way between El Camino Real and University Drive, facing each direction of traffic.

Bulbouts

Intersection bulbouts (or curb extensions) are generally used as a tool to reduce pedestrian crossing distances by extending the sidewalk into the street at an intersection. These bulbouts can provide a secondary benefit of narrowing the street, which makes the street appear less appropriate for through traffic. Additionally, bulbouts also have the potential for a traffic-calming and speed reduction affects.

Bulbouts could be considered at the intersection of Middle Avenue/University Drive. Bulbouts could be considered on three corners without impacting travel lanes, with the northwest corner remaining as-is, as there is a westbound right-turn lane. Furthermore, bulbouts could also be considered in mid-segment locations on Middle Avenue between El Camino Real and University Drive. The midblock locations would help visually narrow the road, which would likely help reduce traffic speeds. Potential locations for installation of bulbouts include the following minor-street intersections:

- Middle Avenue/Blake Street, aligned with the existing crosswalk
- Middle Avenue/Kenwood Drive
- Middle Avenue/Morey Drive

Installation of bulbouts could result in negative impacts on emergency response by reducing the intersection turning radius. Therefore, if the City considers installation of bulbouts, a Level II design feature as specified in the City's NTMP, coordination with the Fire District would be necessary to determine if the impacts to emergency response are acceptable. Furthermore, installation of bulbouts may result in the loss of one to two on-street parking spaces per bulbout.

College Avenue and Partridge Avenue

Of the neighborhood streets located adjacent to the project site, College Avenue and Partridge Avenue are expected to experience the lowest level of cut-through traffic. This is attributed to the fact that there is no direct access proposed between the project site and these streets; therefore, the use of these streets for cut-through purposes would result in a fairly circuitous route. Therefore, no traffic management measures are recommended for consideration at this time. However, as part of monitoring discussed in the "Project Monitoring" section below, the City could reevaluate these streets after occupancy of the project to determine if traffic calming measures should be considered.

Cambridge Avenue

Cambridge Avenue between El Camino Real and University Drive currently has speed humps installed mid-block, bulbouts at the intersection of Cambridge Avenue/University Drive and a gateway feature near Alto Lane. Since these features are already installed on the street, no additional traffic management measures are recommended for consideration at this time. However, as part of monitoring discussed in the "Project Monitoring" section below, the City could reevaluate the street after occupancy of the project to determine if additional traffic calming measures should be considered.

Enforcement

Increased police enforcement is a recommended tool that is used to promote safer driving. This would not directly stop drivers from using neighborhood streets for cut-through routes, but instead can be beneficial in reducing travel speeds on these routes which may discourage the use of these routes. Increased police enforcement would include an occasional, targeted deployment of police officers to a particular area to cite drivers who exceed the speed limit, or violate other traffic laws.

Education

Educational campaigns could be targeted at project-site employees, residents and visitors. This could include preparing printed and online directions to the site that are provided to the office and retail staff and visitors. This information would direct people to use alternate routes to access the site.

Gateway Treatments

Installation of gateway treatments could be beneficial to remind drivers that they are entering a residential neighborhood that may not be an appropriate route for regional traffic. This could include installation of either temporary or permanent signs or monuments at the entry to the neighborhood, and could be incorporated into public art displays. The City could consider coordinating with neighborhood groups to determine if there is desire and willingness in the neighborhood to install such gateway treatments.

Other Measures Considered and Rejected

In addition to the measures discussed above, the following, more invasive, measures to restrict cut-through traffic were considered on study roads, but were found not to be appropriate in this instance.

Street Closures

A partial closure of adjacent neighborhood streets to through traffic would greatly restrict cut-through traffic. However, this would also result in the need to redirect traffic that currently uses the route and would restrict access to properties along the route. Furthermore, street closures would result in increased emergency response time. Therefore, partial street closures should not be considered.

Median Islands

Median islands can have a traffic calming affect by visually narrowing the street. However, since these are residential streets, there are numerous driveways along both sides of the street. Installation of median islands on neighborhood streets would greatly restrict access to individual homes, and therefore should not be considered.

One-Way Conversions

Converting streets to allow only one-way traffic would have the potential to reduce cut-through traffic, but would also result in other consequences:

- This would restrict access to adjacent properties, resulting in a redistribution of traffic onto other nearby streets.

- May induce higher travel speeds by providing two lanes in one direction of travel (without opposing travel lanes) compared to the existing configuration of one lane in each direction.
- May result in an increase in cut-through traffic in the allowed direction of travel, while drivers traveling in the restricted direction would need to seek other routes.
- Could result in increased emergency response times as emergency vehicles may not be able to drive on the most-direct route possible.

Turn Restrictions

One potential cut-through route would involve drivers traveling on Middle Avenue, then connecting to University Drive to continue to the north. A possible strategy would be to restrict turning movements at the intersection of Middle Avenue/University Drive, during either just peak travel periods or at all times. Restricting the southbound left-turn and westbound right-turn movements would produce the greatest benefit on reducing traffic on Middle Avenue. However, there would be other implications related to any turn restriction:

- Turn restrictions would restrict the travel of all drivers on this route, including people with homes on either Middle Avenue or University Drive. To minimize the impact, a turn restriction could be limited to peak time periods.
- Turn restrictions would likely result in a redistribution of some traffic onto other local streets, such as Fremont Street and Cambridge Avenue, thereby impacting conditions on these routes.
- Generally, it is preferred to establish movement restrictions with physical barriers such as center medians and channelizing islands as turn restrictions may be difficult to enforce. However, installation of these barriers at the intersection would affect other movements. Therefore, any reduction in traffic on Middle Avenue would be dependent on drivers' compliance with regulatory signs, and enforcement of these regulations as necessary.

Speed Humps

Speed humps are designed to physically limit the speed at which drivers travel on a street. Since Middle Avenue is classified as a collector street and is identified as a primary emergency response route, speed humps should not be considered on Middle Avenue.

<u>Project Monitoring</u>

Upon completion and occupancy of the project, a monitoring plan could be established to determine the actual changes in traffic on neighborhood streets. The details of a monitoring plan would need to be determined in coordination with City staff, but could include the following:

- Collection of traffic volume and speed data on the following six streets prior to occupancy of the proposed project:
    - Middle Avenue
    - College Avenue
    - Partridge Avenue
    - Cambridge Avenue
    - University Drive
    - Yale Road
- Once occupied, the traffic volume data would be collected again on a regular basis (for example, one week annually, for a period of five years).

- If the data collection shows a larger than projected increase in traffic on these streets, and/or a substantial increase in travel speeds, traffic management strategies should then be considered.
- If the data collection show a less than projected increase in traffic on these streets and no increase in substantial travel speeds, no further action would be necessary.

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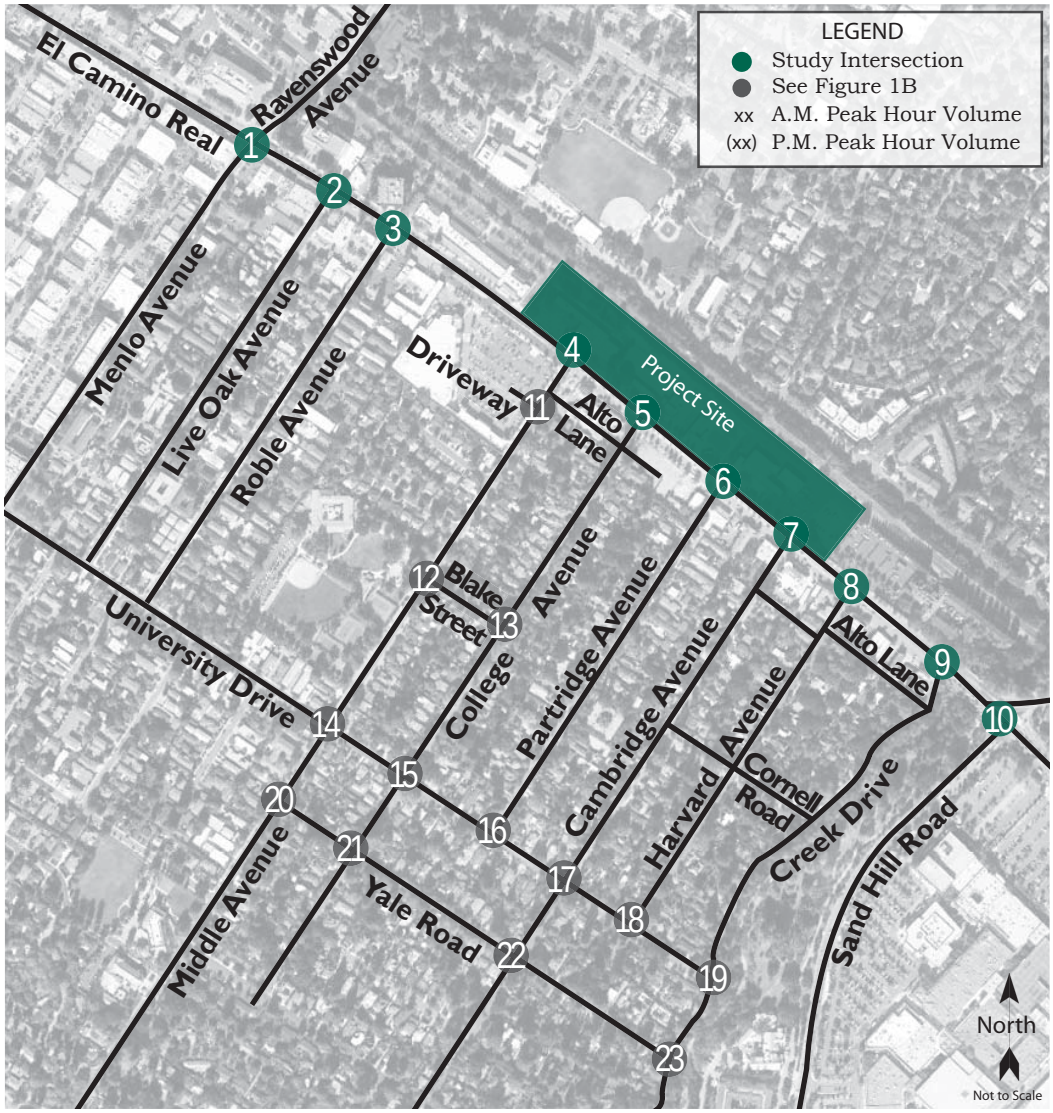
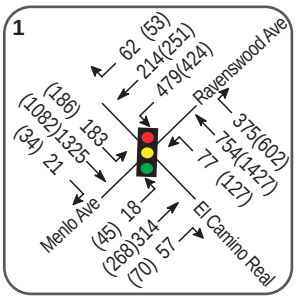
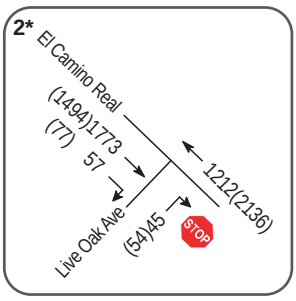
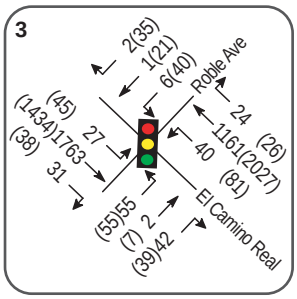
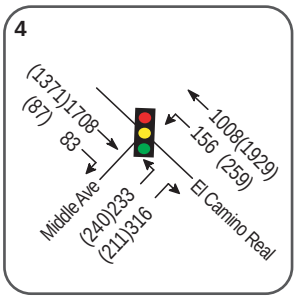
Attachments:
Figure 1A and Figure 1B – Existing Traffic Volumes
Figure 2 – Existing Average Daily Traffic
Figure 3A and Figure 3B – Existing Pedestrian Volumes
Figure 4A and Figure 4B – Existing Bicycle Volumes
Figure 5A and Figure 5B – Future without Project Traffic Volumes
Figure 6 – Future without Project Average Daily Traffic
Figure 7A and Figure 7B – Project Added Traffic Volumes
Figure 8 – Daily Project Added Roadway Segment Volumes

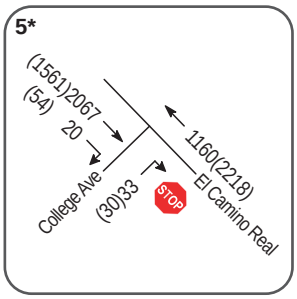


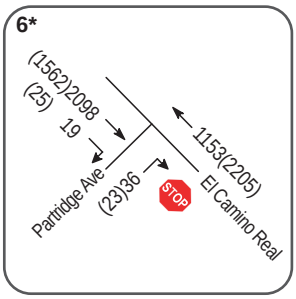


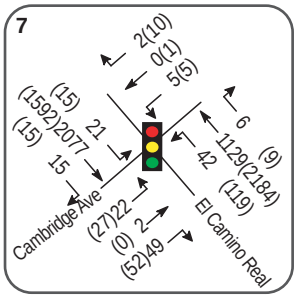


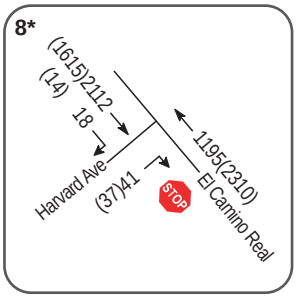


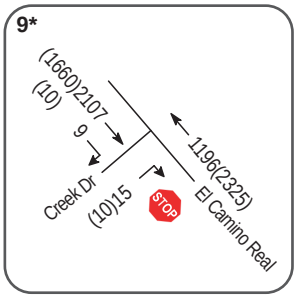


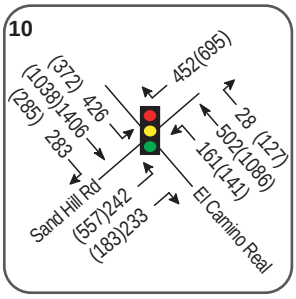










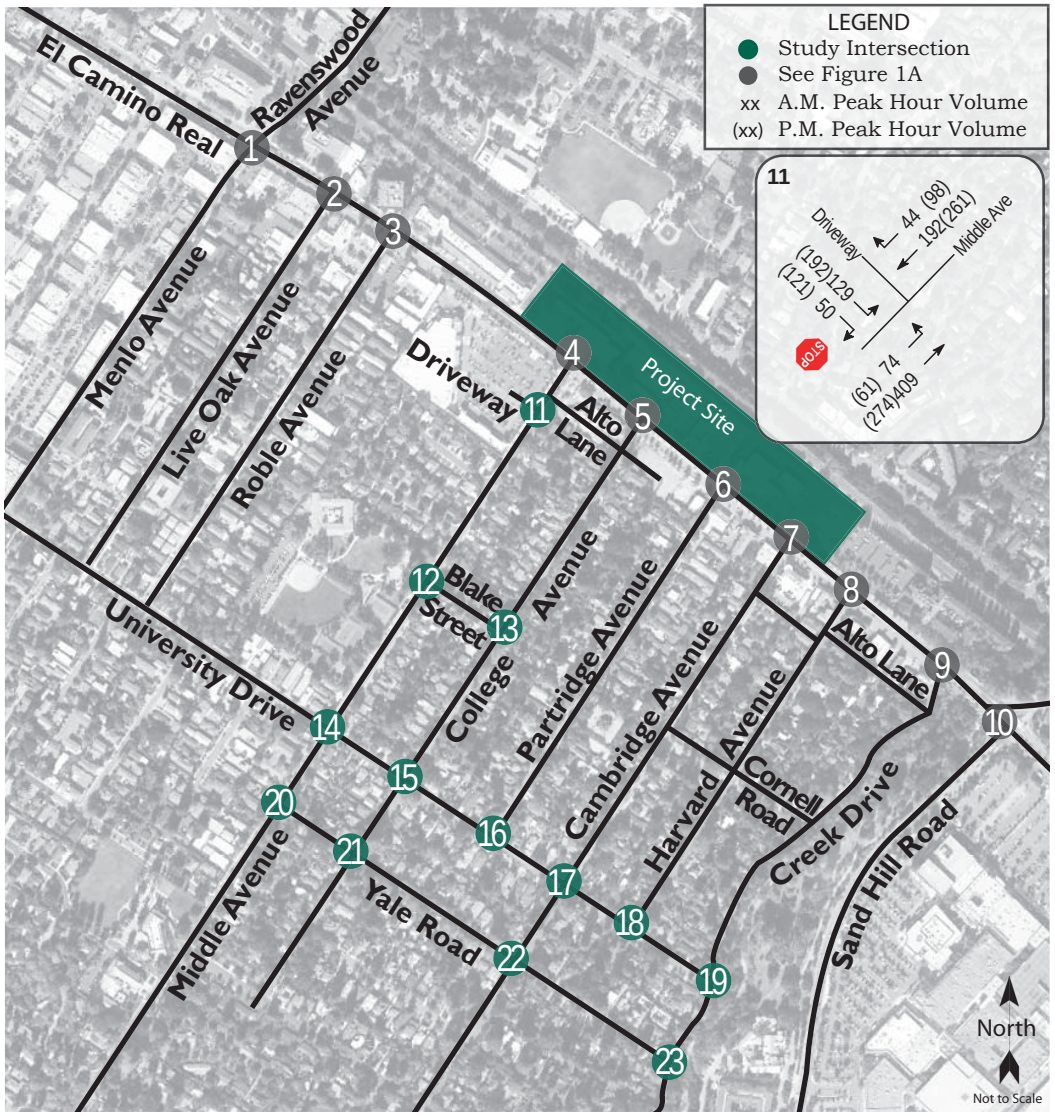


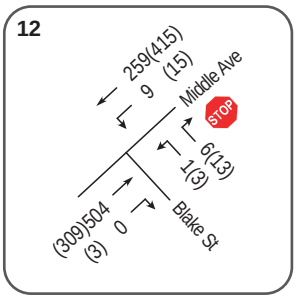
*Northbound through traffic volumes were balanced based on upstream and downstream intersection volumes. 010mpa 7-2014-Final.ai 9/14

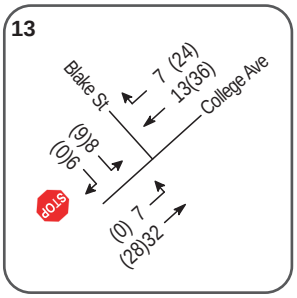
Traffic Engineering Analysis for the 500 El Camino Real Project

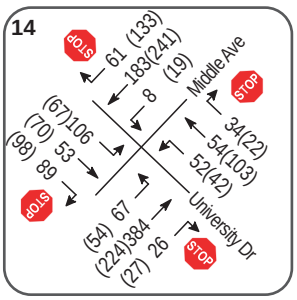
Figure 1A – Existing Traffic Volumes - El Camino Real

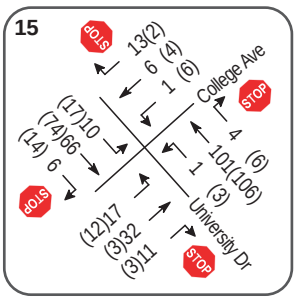
w-trans

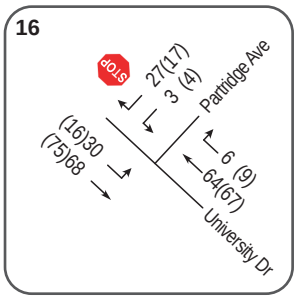


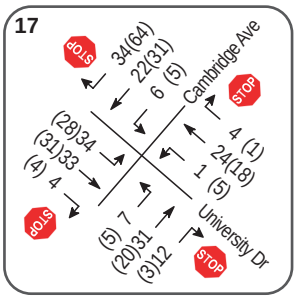


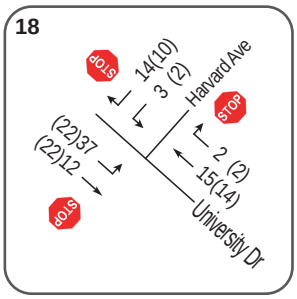


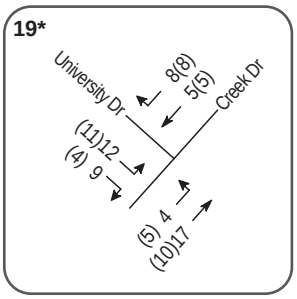


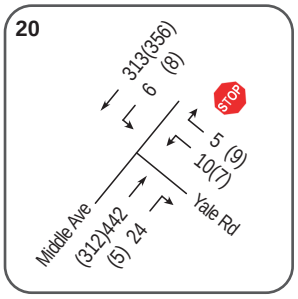


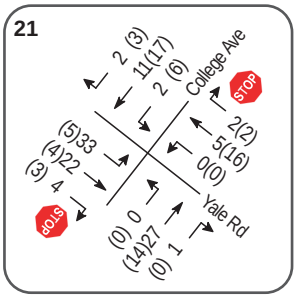


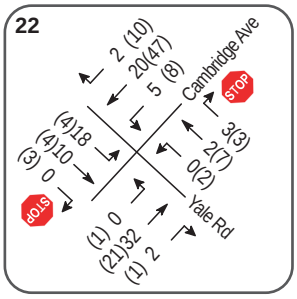


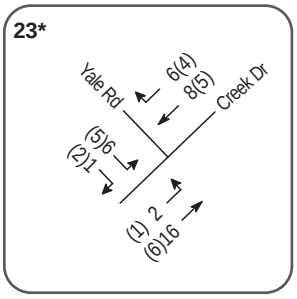












*These intersections are uncontrolled on all approaches.

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Traffic Engineering Analysis for the 500 El Camino Real Project

Figure 1B – Existing Traffic Volumes - Neighborhood Streets

w-trans



North

Not to Scale

LEGEND

Project Driveway

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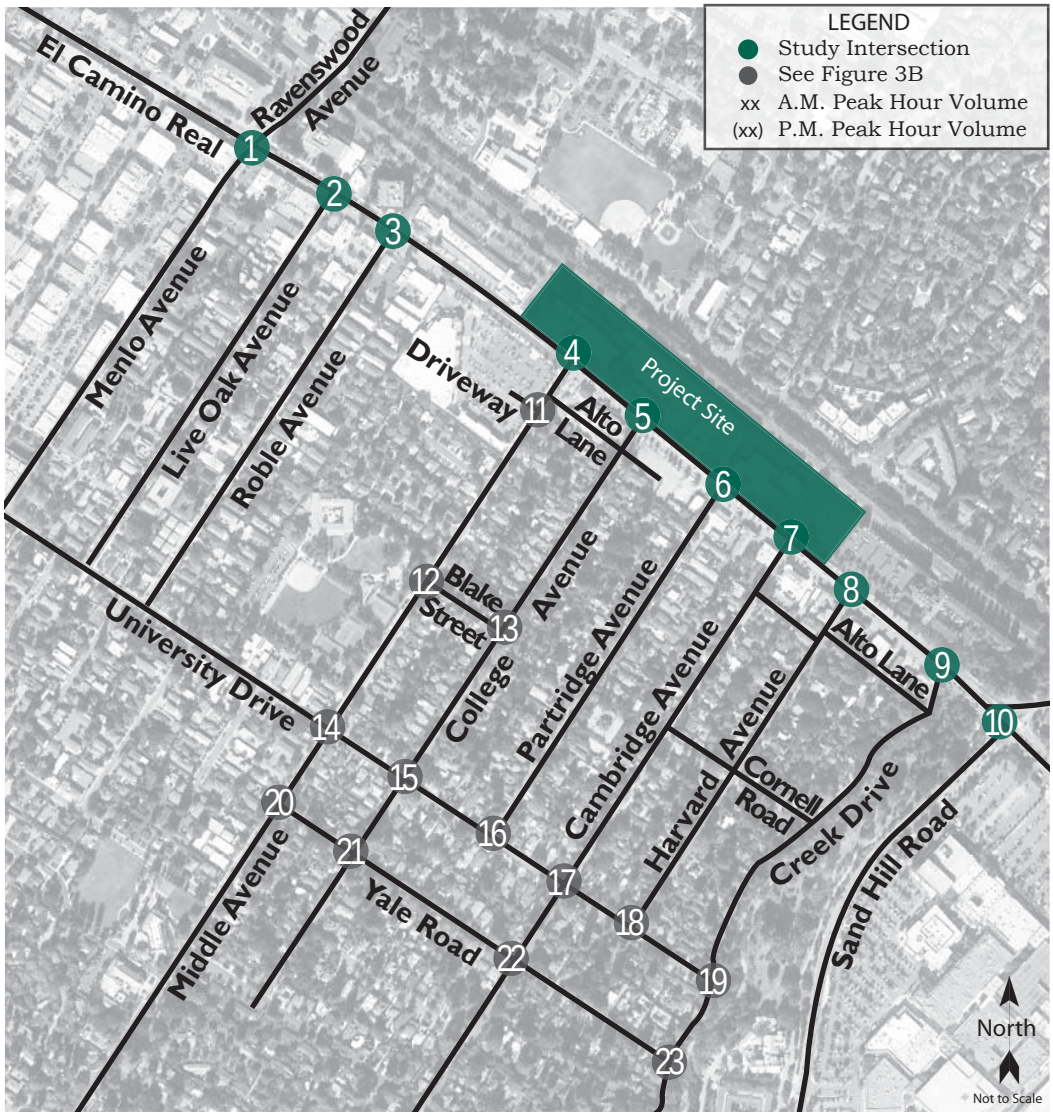
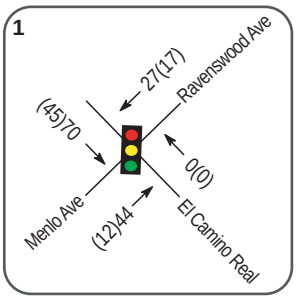
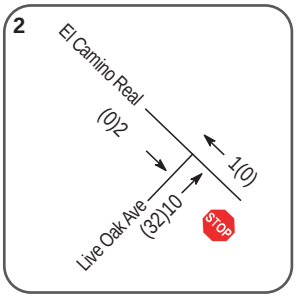
Traffic Engineering Analysis for the 500 El Camino Real Project

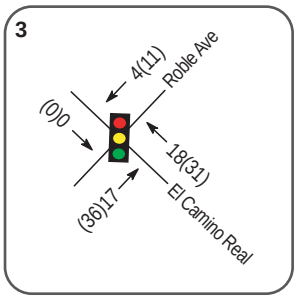
Figure 2 – Existing Average Daily Traffic

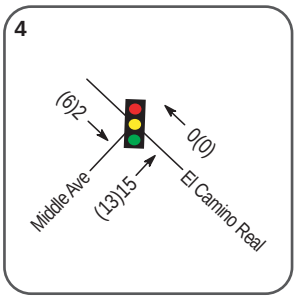
w-trans

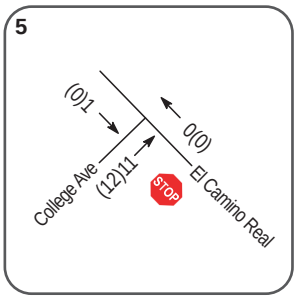


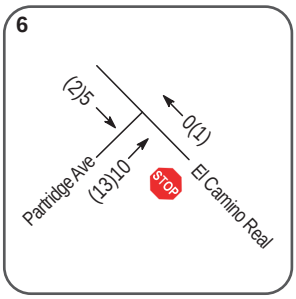


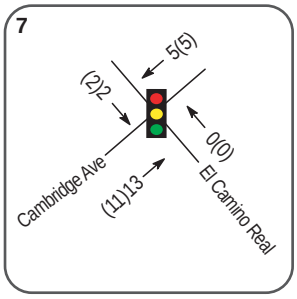


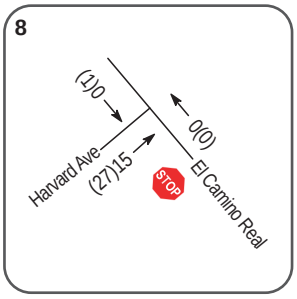


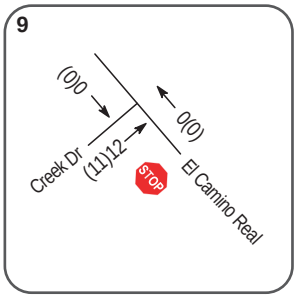


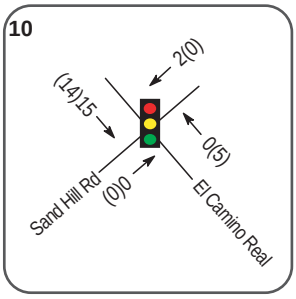












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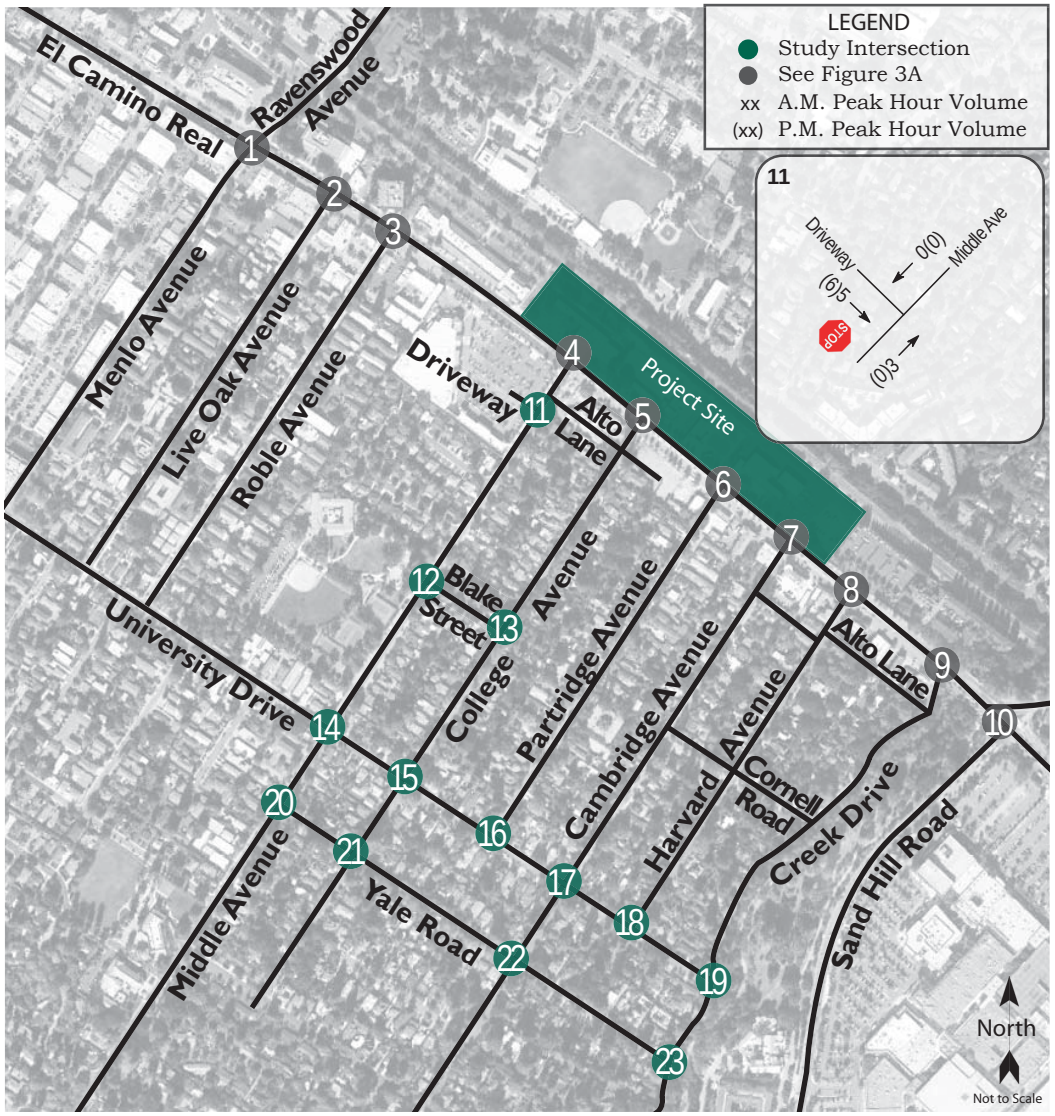
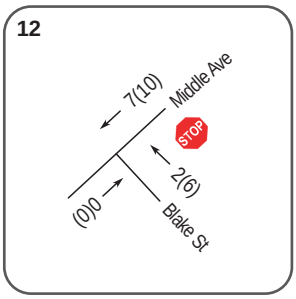
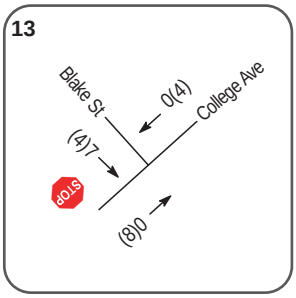
Traffic Engineering Analysis for the 500 El Camino Real Project

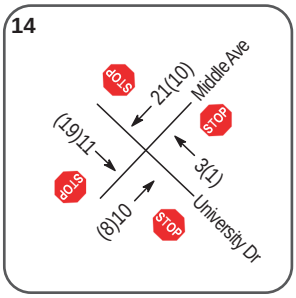
Figure 3A – Existing Pedestrian Volumes - El Camino Real

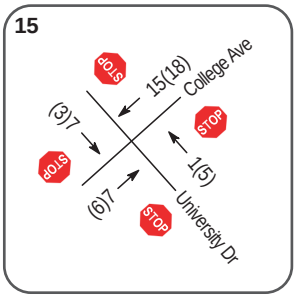
w-trans

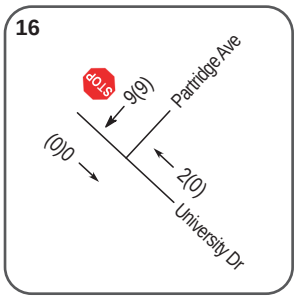


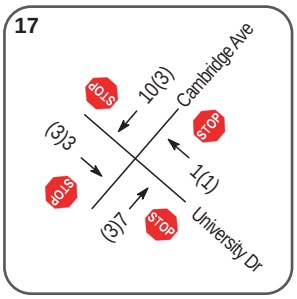


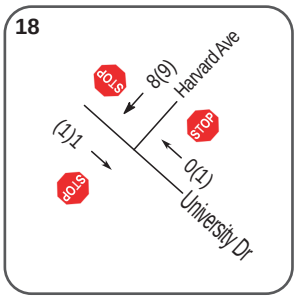


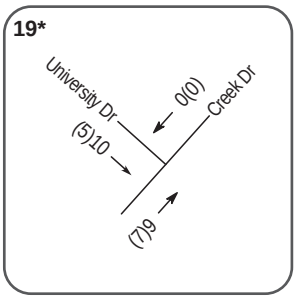


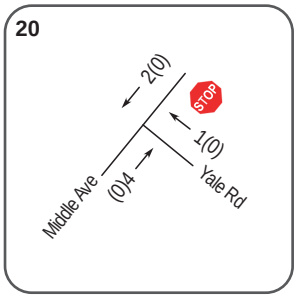


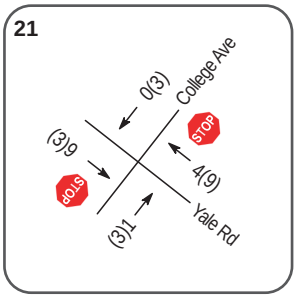


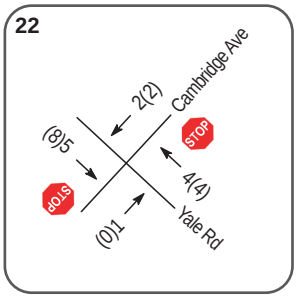


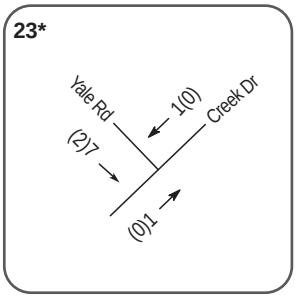












*These intersections are uncontrolled on all approaches.

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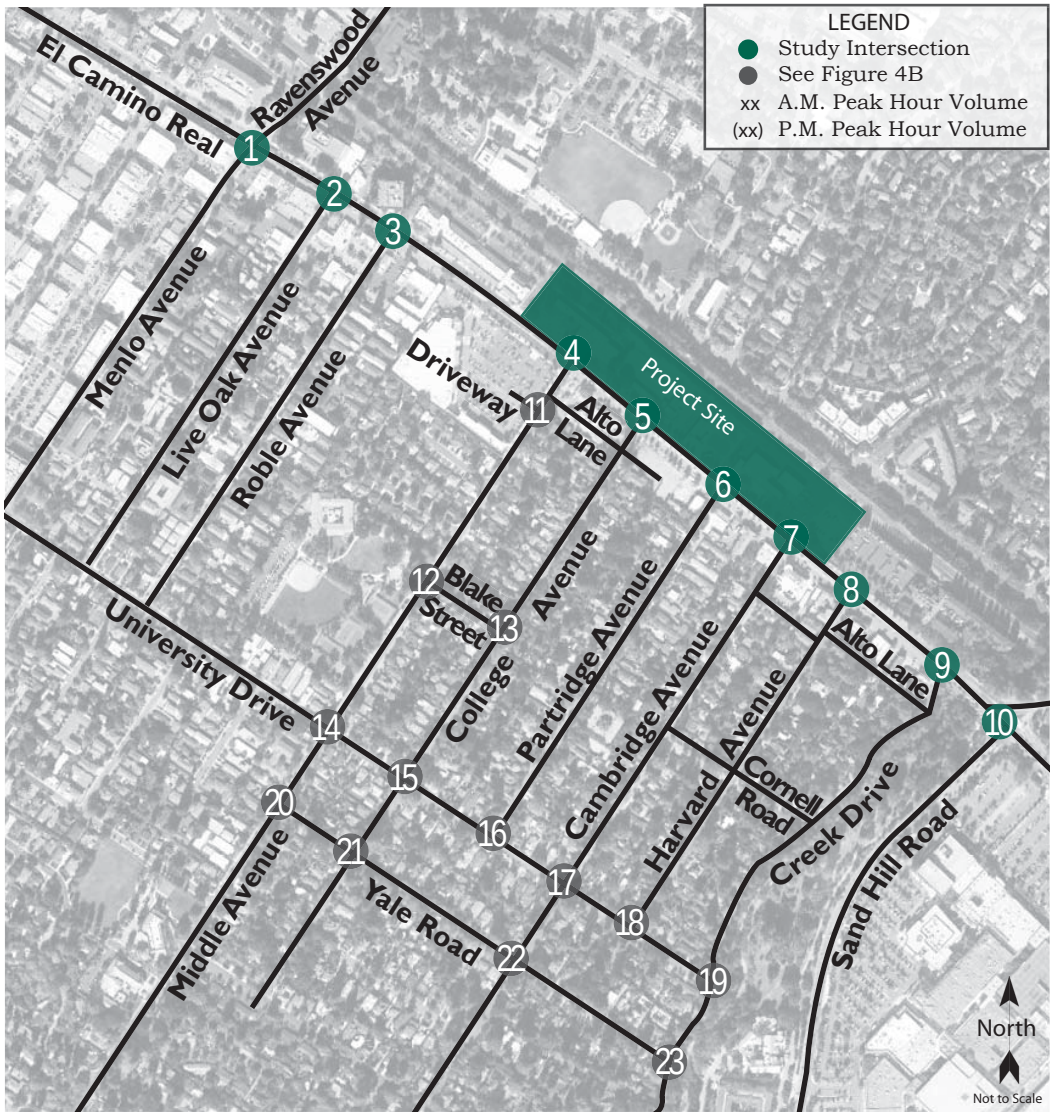
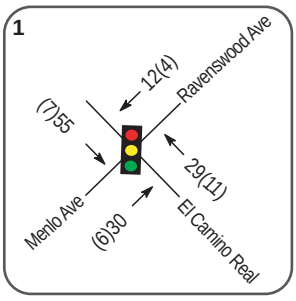
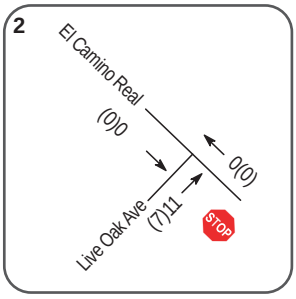
Traffic Engineering Analysis for the 500 El Camino Real Project

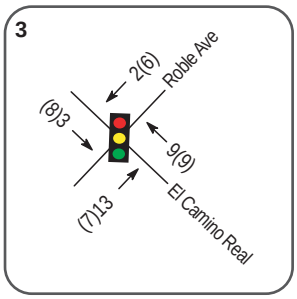
Figure 3B – Existing Pedestrian Volumes - Neighborhood Streets

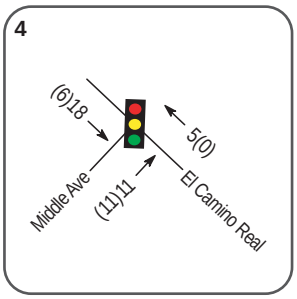
w-trans

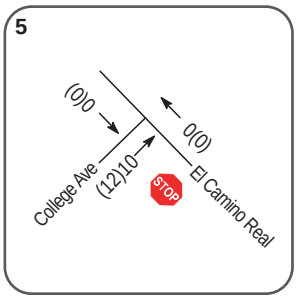


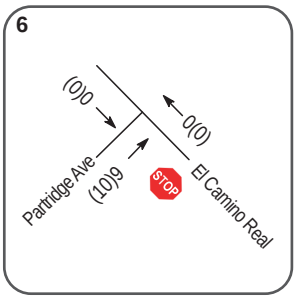


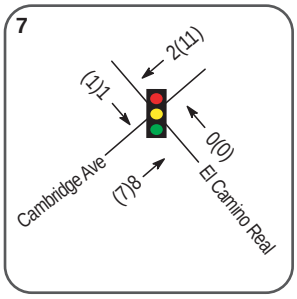


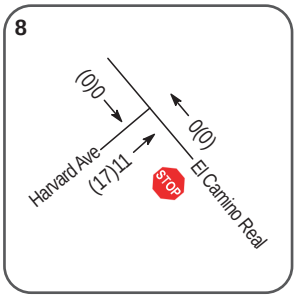


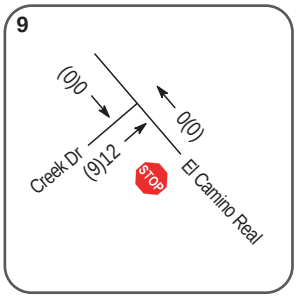


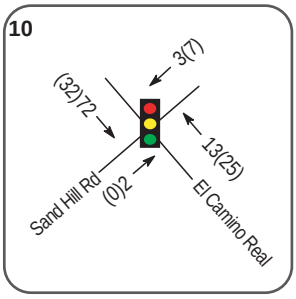












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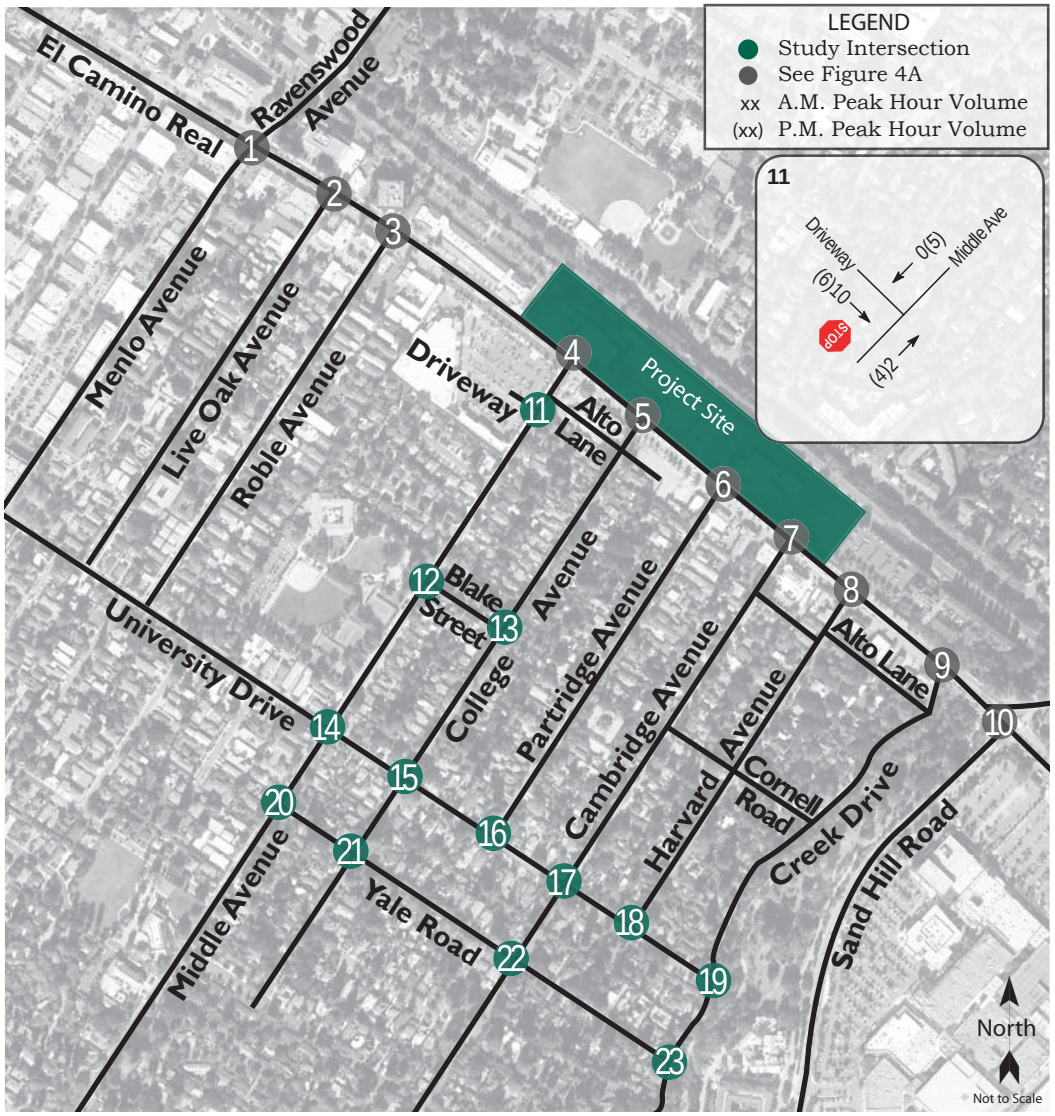
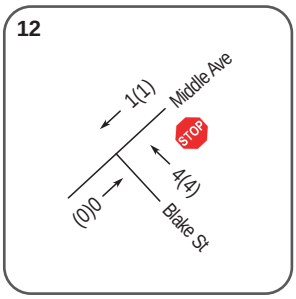
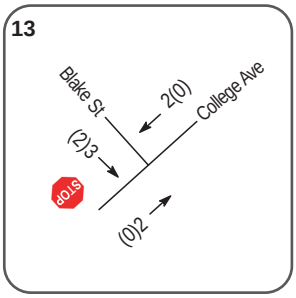
Traffic Engineering Analysis for the 500 El Camino Real Project

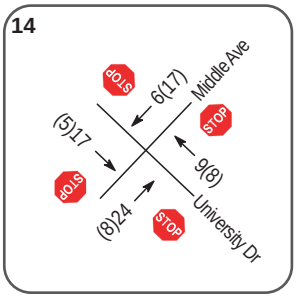
Figure 4A – Existing Bicycle Volumes - El Camino Real

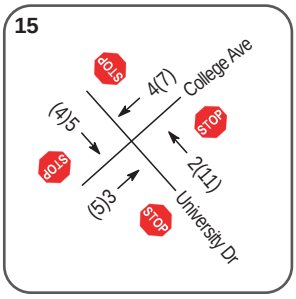
w-trans

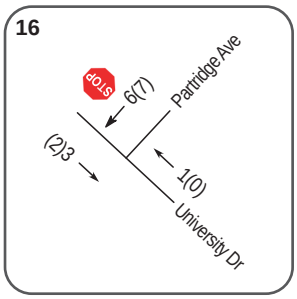


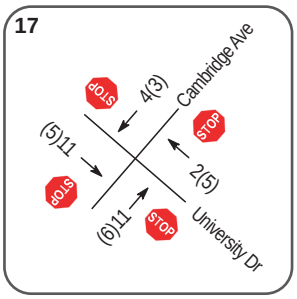


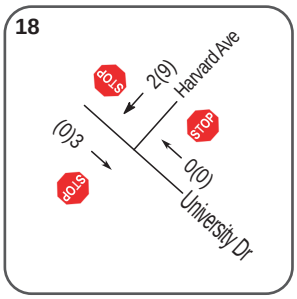


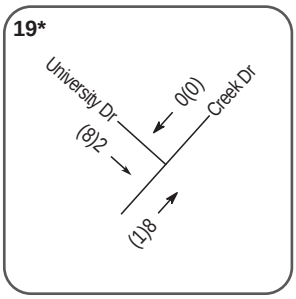


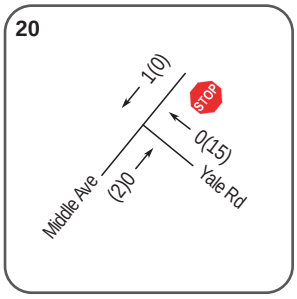


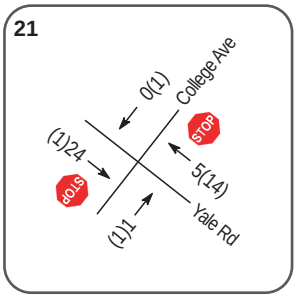


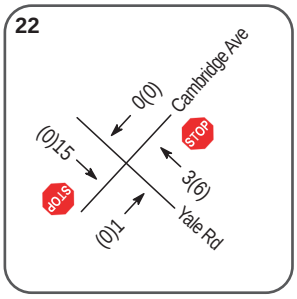


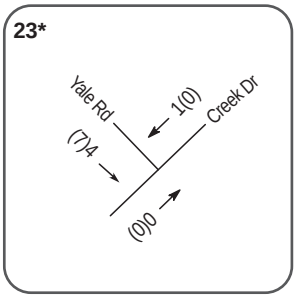












*These intersections are uncontrolled on all approaches.

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Figure 4B – Existing Bicycle Volumes - Neighborhood Streets

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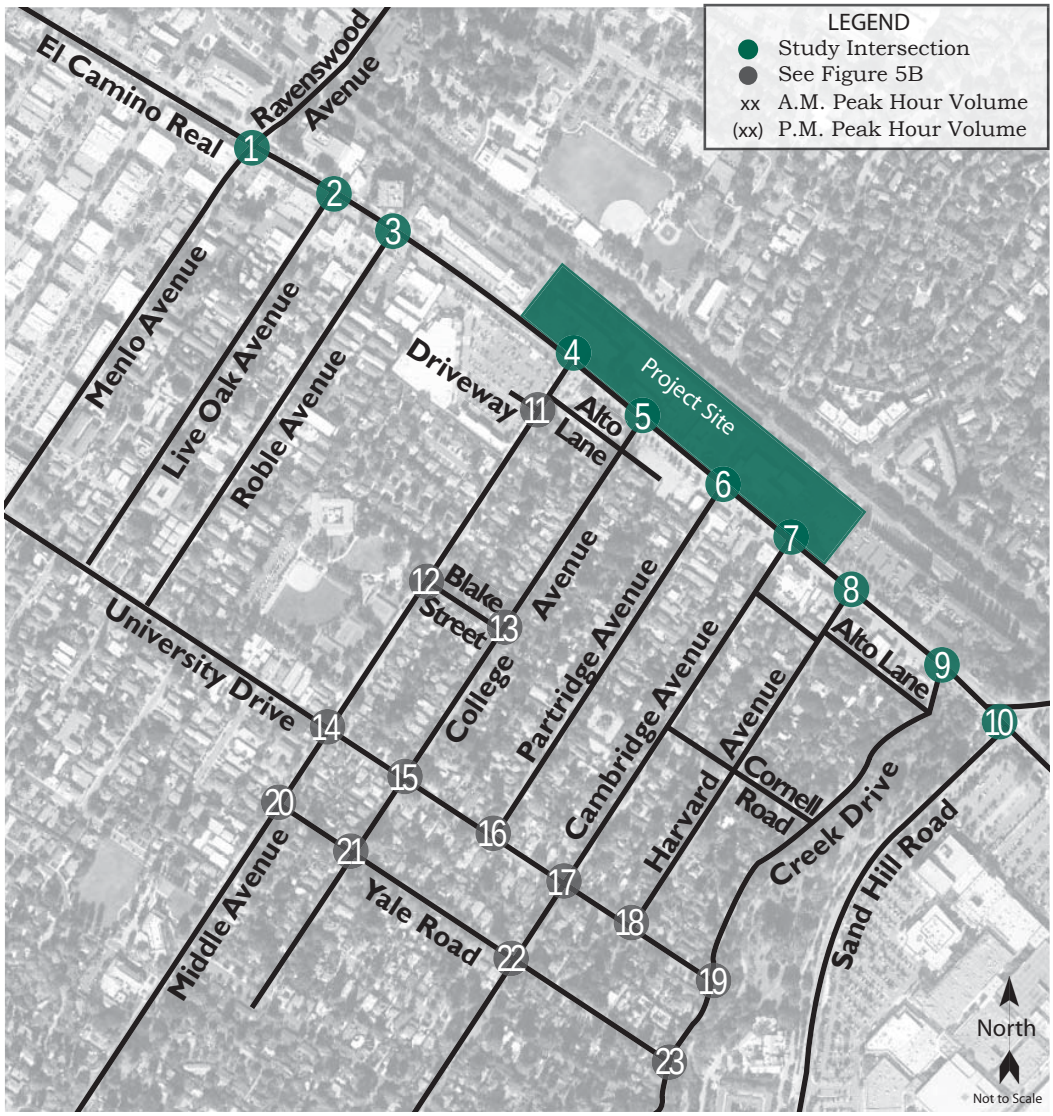
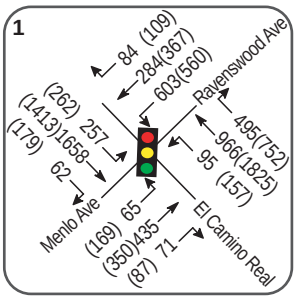
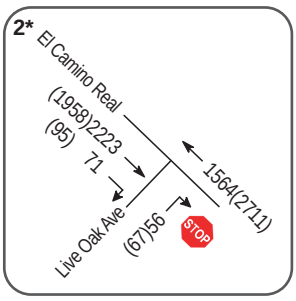
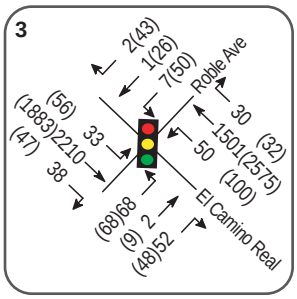
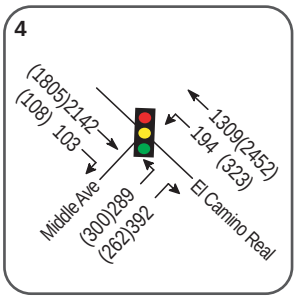
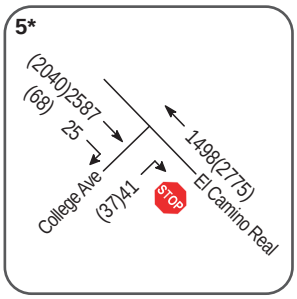


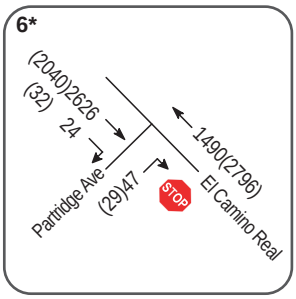


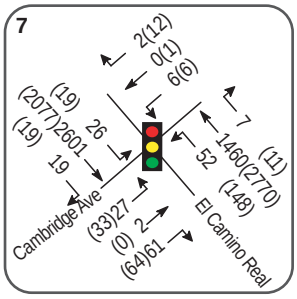


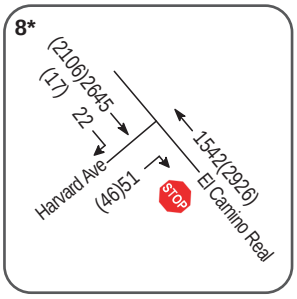


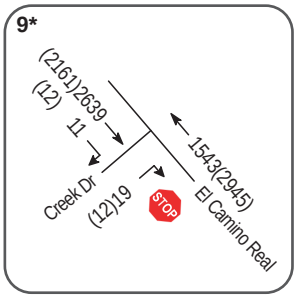


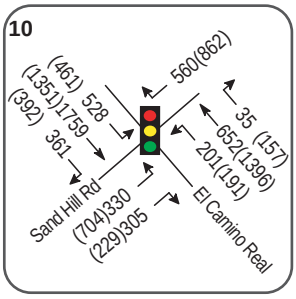








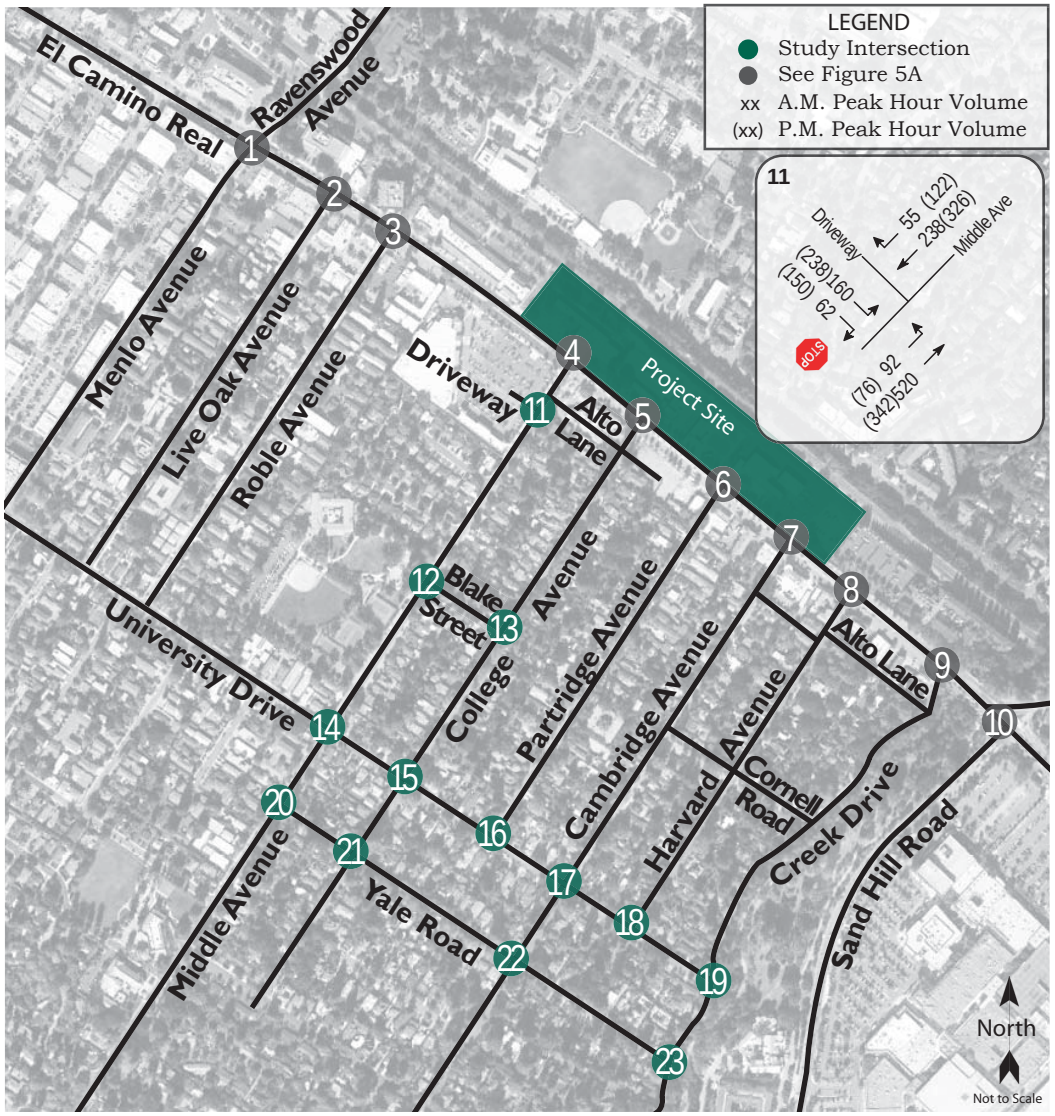


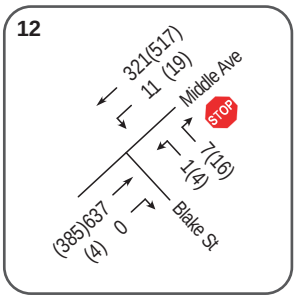


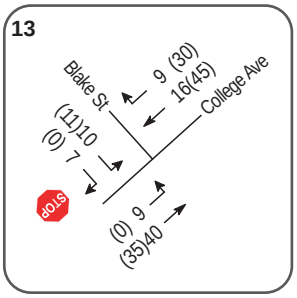
*Northbound through traffic volumes were balanced based on upstream and downstream intersection volumes. 010mpa 7-2014-Final.ai 9/14

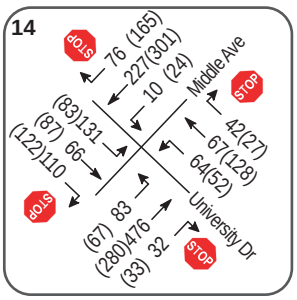
Figure 5A – Future without Project Traffic Volumes - El Camino Real

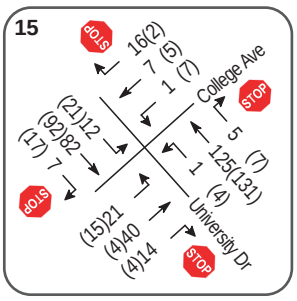
w-trans

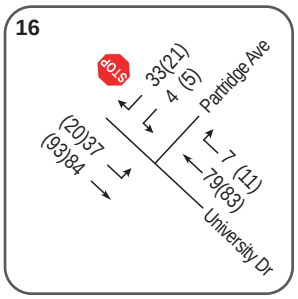


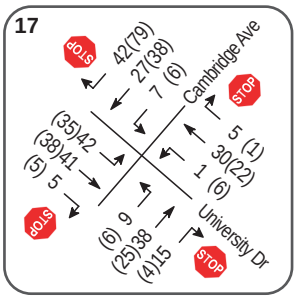


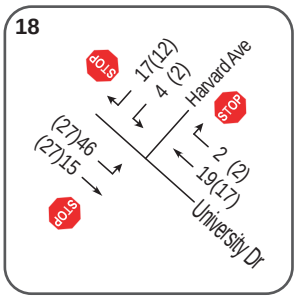


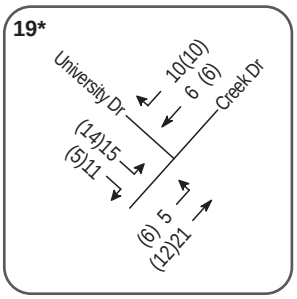


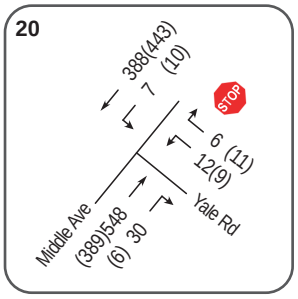


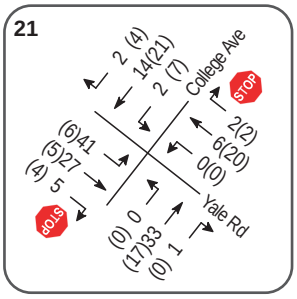


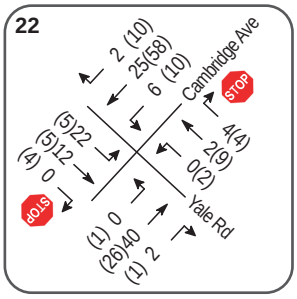


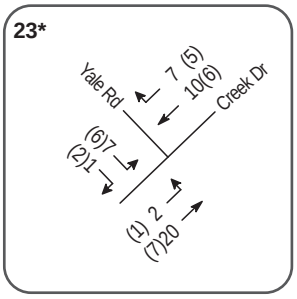












*These intersections are uncontrolled on all approaches.

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Traffic Engineering Analysis for the 500 El Camino Real Project

Figure 5B – Future without Project Traffic Volumes - Neighborhood Streets

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Traffic Engineering Analysis for the 500 El Camino Real Project

Figure 6 – Future without Project Average Daily Traffic

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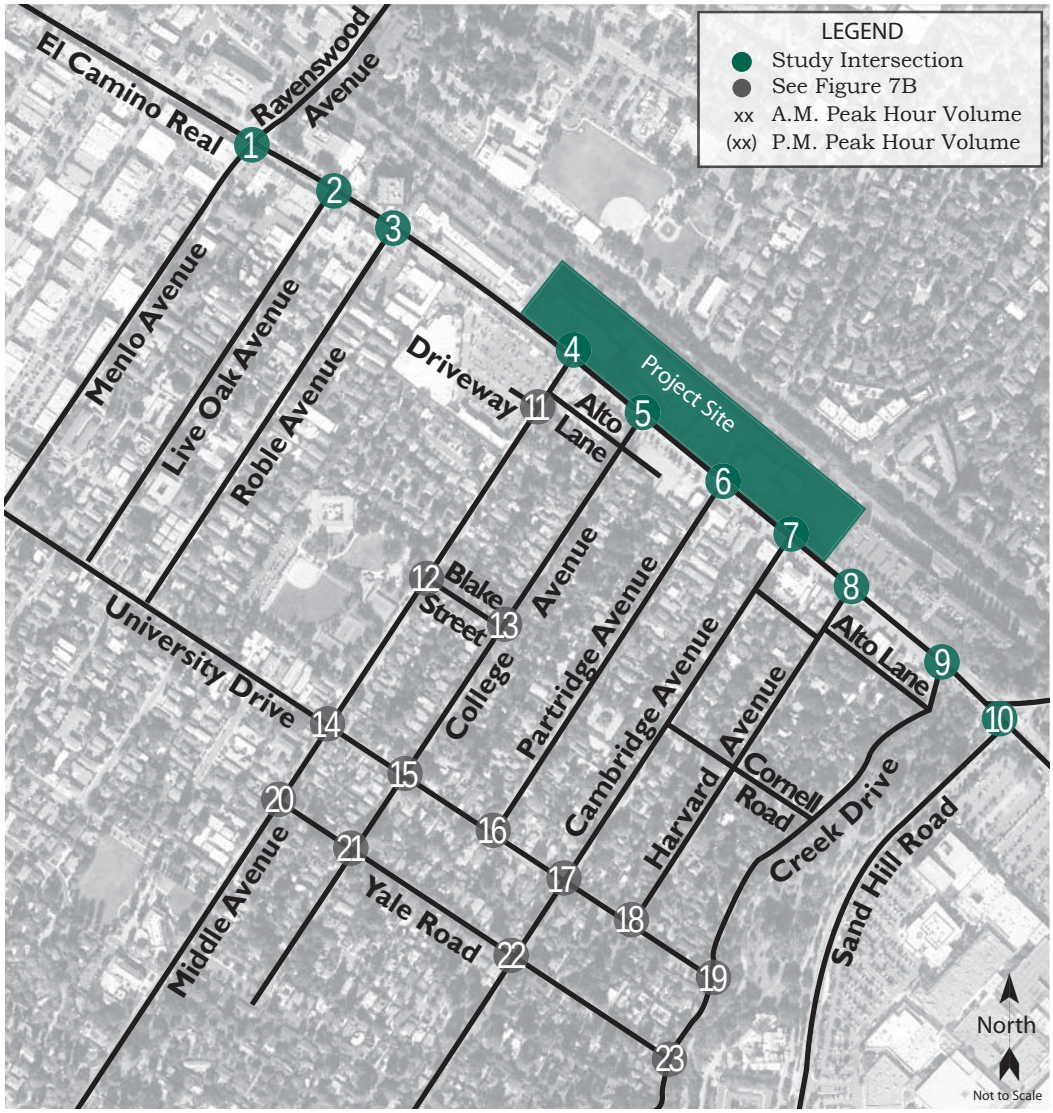

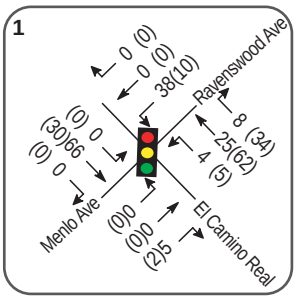

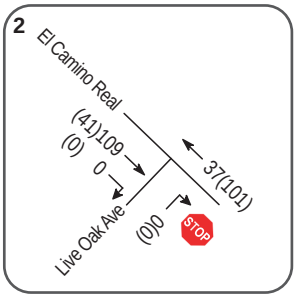

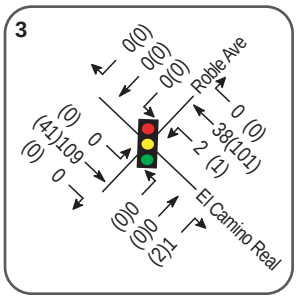

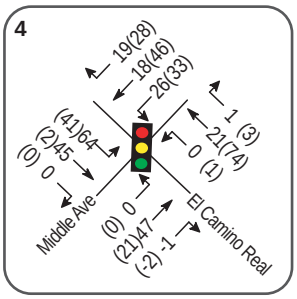

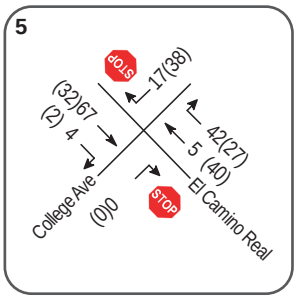

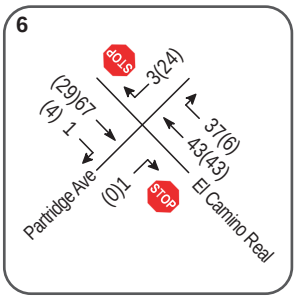

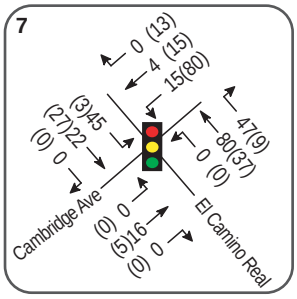

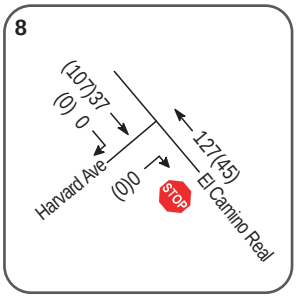

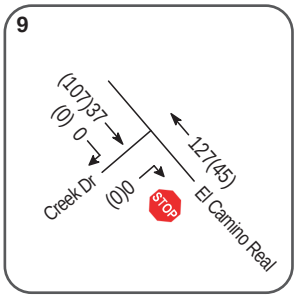

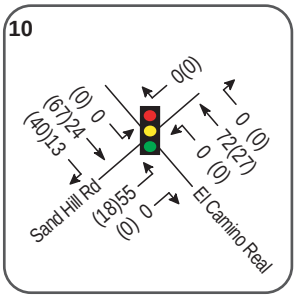

Note: Net change includes the removal of traffic generated by existing land uses and the addition of proposed project-generated traffic
Due to rounding, total added traffic volumes are within +/- 3 trips of the total project net new trip generation

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Traffic Engineering Analysis for the 500 El Camino Real Project

Figure 7A – Project Added Traffic Volumes - El Camino Real

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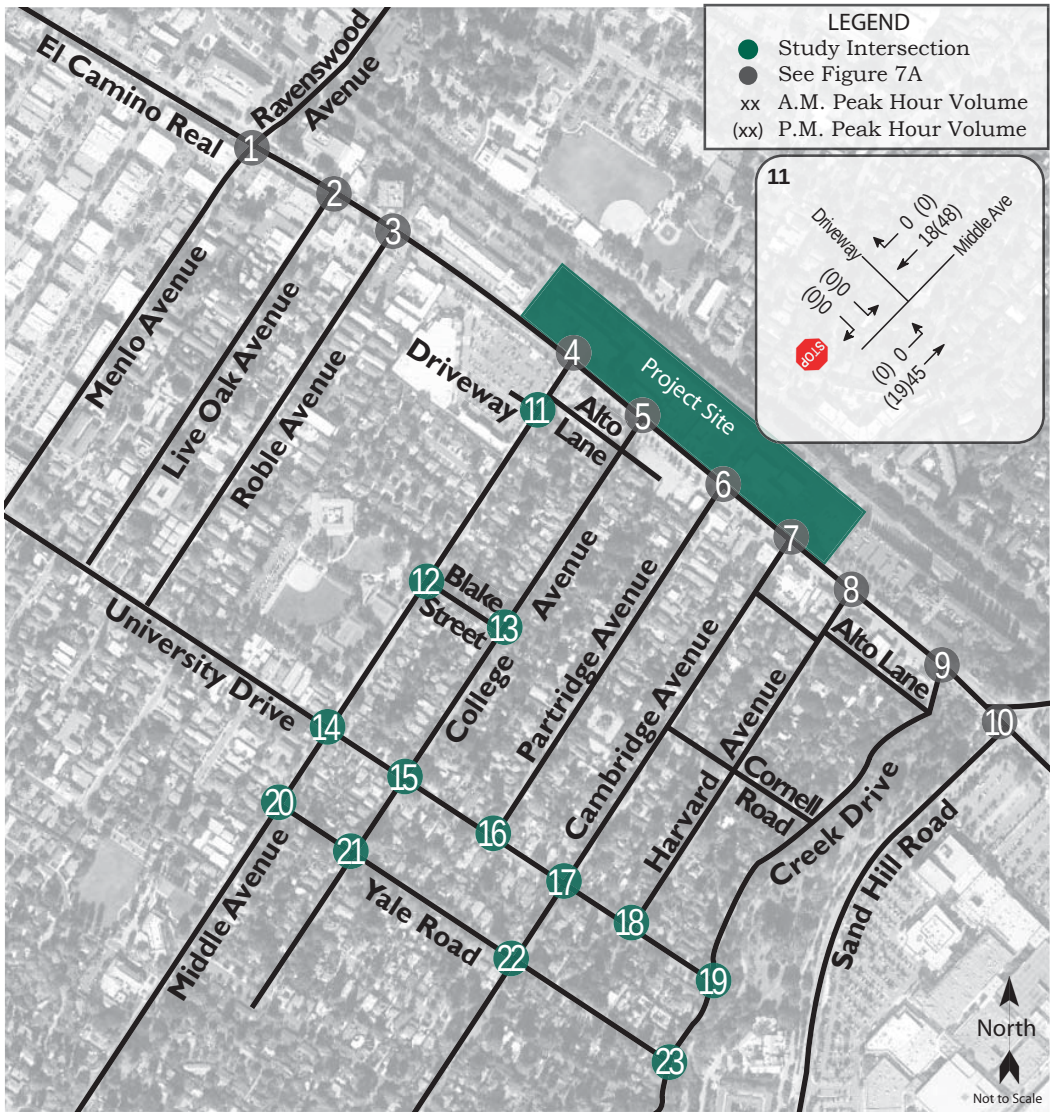

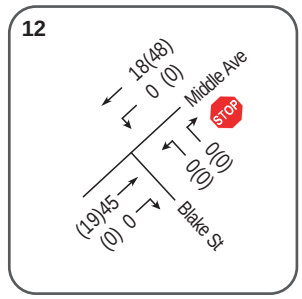

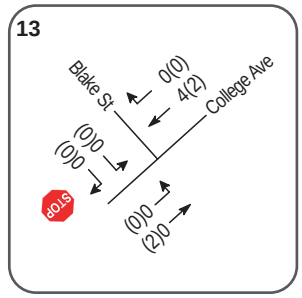

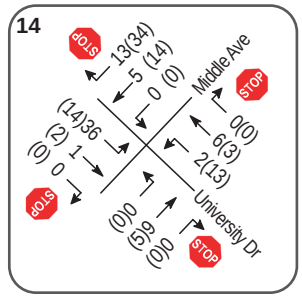

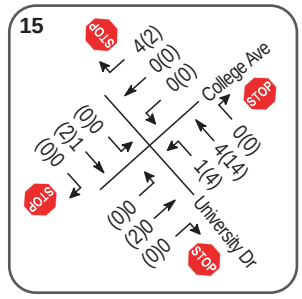

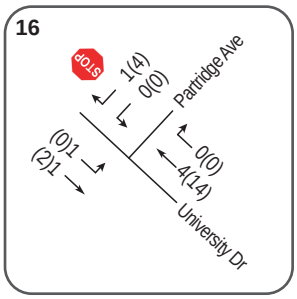

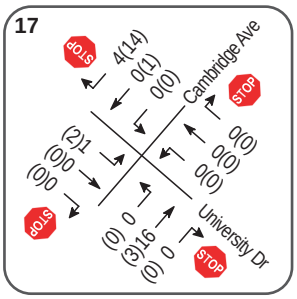

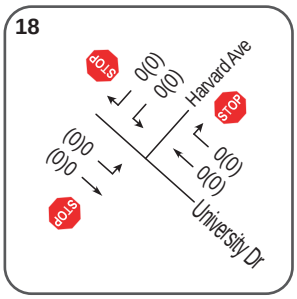

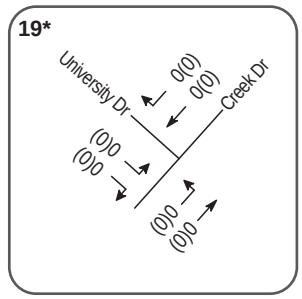

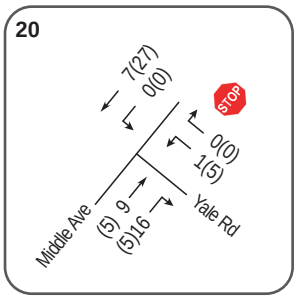

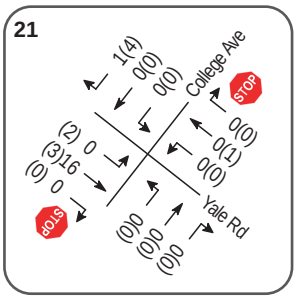

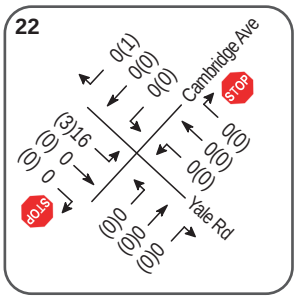

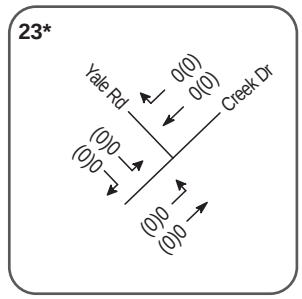

*These intersections are uncontrolled on all approaches.

Note: Net change includes the removal of traffic generated by existing land uses and the addition of proposed project-generated traffic

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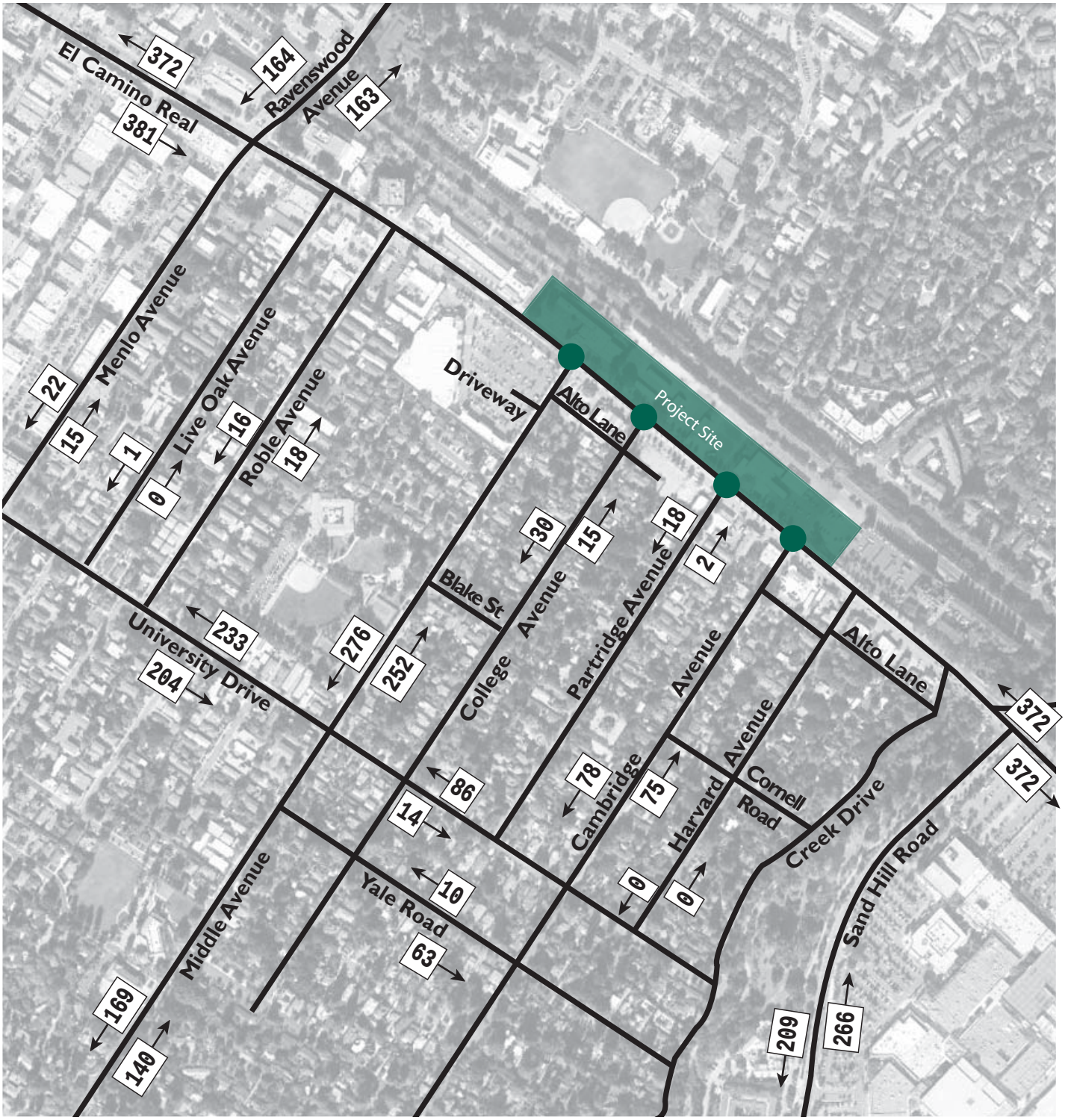
Traffic Engineering Analysis for the 500 El Camino Real Project

Figure 7B – Project Added Traffic Volumes - Neighborhood Streets

w-trans



North

Not to Scale

LEGEND

Project Driveway

Note: Net change includes the removal of traffic generated by existing land uses and the addition of proposed project-generated traffic
Due to rounding, total added traffic volumes are within +/- 3 trips of the total project net new trip generation

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Traffic Engineering Analysis for the 500 El Camino Real Project

Figure 8 – Daily Project Added Roadway Segment Volumes

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Eur Respir J 2008; 32: 535–537
DOI: 10.1183/09031936.00073708
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EDITORIAL

The neurological effects of air pollution in children

J. Sunyer*,#,¶

Environmental exposures *in utero* and during early life may permanently change the body's structure, physiology and metabolism, and lead to diseases in adult life [1]. Infants are particularly vulnerable because of their rapid growth and cell differentiation, immaturity of metabolic pathways and development of vital organ systems. The central nervous system has unprotected barriers and a broad time window of conformation, leading to a long period of vulnerability in the developmental process and to susceptibility to any environmental insult [2]. Research conducted among a limited series of pollutants (including lead, mercury and polycyclic aromatic hydrocarbons (PAH)) shows that early-life exposure to chemicals at current environmental levels can be neurotoxic years or even decades after exposure [3].

Traffic-related air pollution, basically urban outdoor pollution, is a global public health problem [4]. Cardiorespiratory effects and mechanisms have been fully investigated [5]. In contrast, little is known regarding neurological effects, with only some preliminary evidence. In rats, ultrafine carbon particles have been found in the olfactory bulb and the cerebrum and cerebellum after inhalation exposure [6]; this finding has been reproduced more recently with manganese particles directly translocated to the olfactory nerve from the nose to the brain [7]. In one study, dogs living in a highly polluted region in Mexico City (Mexico) had an increase in brain inflammation compared with animals living in a less polluted area [8]. The brain tissue of animals from Mexico City had higher levels of nuclear factor-κB activation and nitric oxide production, as well as the principal pro-inflammatory cytokines interleukin (IL)-1 and tumour necrosis factor (TNF)-α, compared with the animals from the nonpolluted area [9]. In a study on human autopsies in Mexico City, exposure to severe air pollution has been associated with increased levels of cyclooxygenase (COX)-2 and accumulation of the 42-amino-acid form of β-amyloid, a cause of neuronal dysfunction [10].

There are two small studies in children from the general population exposed to urban air. The first study related PAH in particulate form, as collected with individual pumps during two consecutive days in 181 pregnant women from New York City (NY, USA), to mental health measured at age 3 yrs in their offspring [11]. The short measurement of the exposure (only 2 days), their narrow variability (only low and high levels), and the poor specificity of PAH (the principal source is smoking) resulted in preliminary research that is not very conclusive. The second study related average air pollution exposure during childhood (carbon particles at home address derived by spatial modelling) to intelligence at age 9 yrs in 202 children from Boston (MA, USA) [12]. The study, however, followed only 20% of those recruited and did not measure prospectively the variations in air pollution or the time-activity patterns of the participants. The two studies adjusted for potential confounders, such as socio-economic conditions or internal doses of lead, but failed to adjust for other factors, such as noise. Overall, these two studies were the first to translate into humans the evidence suggested in animal studies, but their deficiencies in size and design call for larger and more detailed research.

THE LUNG AND THE UNDERLYING MECHANISMS

Oxidative stress, changes in autonomous function and progression of atherosclerosis have been hypothesised to be mechanisms of the neurological effect of urban air pollution in humans at any age [13]. Among them, inflammation secondary to oxidative stress appears to be the major suspected culprit for delay in conformation and maturation during developmental steps. Even though most of the available research about the inflammatory effects of air pollution refers to the lungs, there is evidence that the oxidative stress and inflammation induced by particles translates systemically beyond the lungs [14]. For example, we found in an international longitudinal study of 1,003 adult subjects that particle count increased markers of systemic inflammation (IL-6 and fibrinogen peripheral levels) [15].

The major underlying hypothesis is that chronic respiratory tract inflammation may lead to brain inflammation by altering levels of circulating cytokines, such as TNF-α and IL-1. These cytokines have the ability to upregulate COX-2, a potent active mediator of inflammation, in capillary brain endothelium [16]. Changes in brain cytokine and chemokine expression in mice have been directly linked to intranasal exposure to ultrafine carbon [17]. Carbon particles themselves generally adsorb transition metals (including antimony, barium, copper, iron and zinc) emitted from traffic exhaust and also from tyres and brake wear. These metals, which are mainly generated by traffic in the current urban atmospheres [18], have been shown to induce oxidative stress in the lung [16].

An alternative hypothetical mechanism of the neurological effect of air pollution is based on the observation that ultrafine particles containing metals translocate directly to the brain,

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SUPPORT STATEMENT: J. Sunyer has received funds for research from the European Union, the government of Spain and Catalonia, and La Caixa Fundation.

STATEMENT OF INTEREST: None declared.

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without entering the lung [7]. Changes in cognitive function in children have been shown to be associated with relatively low internal doses of lead [19] and mercury [3]. In addition to being linked to cognitive deficits in children, lead has been related to a diversity of behavioural problems (reading problems, school failure and delinquent behaviour), with a high social impact [20]. In experimental studies, some metals, such as mercury and lead, inhibit neuronal differentiation, myelinisation and synaptogenesis [21], but the specific mechanisms for lead-induced intellectual deficits have not been fully elucidated.

THE CONSTELLATION OF FACTORS IN BRAIN MATURATION

A well-known constellation of factors related to neurodevelopment could all play a confounding role or they could explain differences in vulnerability of the dose–response relationship between air pollution and neurodevelopment [20]. These factors must be considered and include, for example, the social environment (including parental psychological status), breast-feeding, diet, maternal smoking, birthweight and noise [22]; along with other pollutants such as lead, mercury, DDT and indoor air pollutants (those originating from indoor sources, such as heating and cooking, or from microbial contaminants, such as endotoxins). Endotoxins are the common structural component of Gram-negative bacteria in indoor air that induced chronic inflammation in the rat brain [23].

Therefore, it is important to examine diet, since it is a major source of antioxidants. Antioxidant defence mechanisms could be increased by dietary means (vitamins, omega-3 (docosahexaenoic acid) and omega-6 (arachidonic acid) fatty acids, and other micronutrients (zinc and folic acid)) to protect against air pollutants [24]. Antioxidants in the lung are the first line of defence against oxygen free radicals. All of these antioxidants are free radical scavengers and they react rapidly to limit interaction with lung fluid lipids and proteins [25]. The brain is particularly susceptible to free radical-mediated insult, due to its inherent biochemical and physiological characteristics, including high lipid content and energy requirements [26]. Reactive oxygen species are generated continuously in the nervous system during normal metabolism and neuronal activity [27]. Similarly, genetic background may result in a differential susceptibility toward the oxidative stress pathway [28]. For example, antioxidant supplementation with vitamins C and E appears to modulate the effect of ozone in asthmatic children homozygous for the GSTM1 null allele [29]. Inflammatory cytokines released in the periphery (*e.g.* respiratory epithelia) upregulate the innate immune Toll-like receptor 2. Such activation and the subsequent events leading to neurodegeneration have recently been observed in lung lavage in mice exposed to ambient Los Angeles (CA, USA) particulate matter [30].

CONCLUSION

The study of chronic effects of urban air pollution should incorporate subtle health effects, such as functional delays in brain maturation and impairment of neurobehavioural competences, from early life exposures. The long-term consequences of these effects in the co-causation of neurodegenerative diseases have so far only been speculated, but it is time for multidisciplinary research in human populations (including neurobehavioural and lung examination, and assessments of individual exposure to air pollutants and antioxidants, and of the genetic contribution) to further investigate the suspicion that our urban air is neurotoxic for our children.

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Chapter 1231 Geometric Cross Section – Highways

1231.01 General
1231.02 Design Up
1231.03 Common Elements
1231.04 Vehicle Lanes
1231.05 Modally Integrated Cross Sections
1231.06 Road Diets and Retrofit Options
1231.07 References

1231.01 General

Geometric cross sections for state highways are governed by the need to balance performance metrics, the context, and selected design controls. The objective is to optimize the use of available public space while avoiding an unreasonable investment in right of way acquisition.

The term "highways" refers to all WSDOT roadways, including freeways. However, note that freeways have their own geometric cross section guidance. This chapter is not intended for freeway design. See Chapter 1232 for freeways.

1231.02 Design Up

Unless otherwise specified, use the "design up" method described in Chapter 1106 to choose a design element width when a range of widths is given in this chapter.

1231.03 Common Elements

The geometric cross sections shown in this chapter have many elements that are also common to facilities addressed in other chapters. The following chapters contain guidance related to these common geometric cross section elements:

- Lanes — Chapter 1231
- Shoulders, side slopes & ditches, medians & curbs — Chapter 1239
- Lateral clearance to curb or barrier — Chapter 1239
- Parking & streetside (behind the curb) elements — Chapter 1238
- Cross slope and superelevation — Chapter 1250

1231.04 Vehicle Lanes

1231.04(1) Type of Lanes

There are many types of lanes that may exist in a cross section, and each has its own purpose and sizing needs. General-purpose traffic lanes need to accommodate a variety of vehicle types including buses, freight vehicles, personal automotive vehicles, and bicycles. The target speed, modal priority, balance of performance needs, and transportation context are all considerations when determining size, type, and number of lanes.

Some common types of vehicle lanes include:

Through Lanes

Through lanes are the most common lane type. All highways have at least one lane in each direction to provide unimpeded traffic flow from Point A to Point B.

Turn Lanes

Dedicated turn lanes are separated from the through lanes and provide storage for turning vehicles waiting for a signal or gap in opposing traffic. There are a number of different types of turn lanes which are discussed in detail in Chapter 1310. Turn lanes are critical to meet mobility and accessibility performance for motorized and bicycle modes. Traffic analysis determines the type, storage length, and number of turn lanes that are needed to achieve the balance of multimodal performance needs.

Turn lanes present potential conflicts, particularly with bicyclists and pedestrians. See Chapters 1510 and 1520 for additional discussion on ways to mitigate for these conflicts.

Bicycle Lanes

There are several different types of bicycle lanes and many different ways to arrange bike lanes within the geometric cross section (see Chapter 1520). Shoulders designed to function for bikes are not considered bike lanes.

Transit-Only Lanes

Transit-only lanes are ideal for improving transit mobility performance and segregating heavily used or complex intermodal connections. There are many different ways to configure these within a geometric cross section. Some configurations are limited due to passenger loading needs for both the transit vehicle type and the stop locations. Develop widths for transit-only lanes with the partnering transit agency. See Chapter 1430 for additional information on Transit Facility considerations.

Auxiliary lanes

Auxiliary lanes enhance mobility performance for motor vehicles. See Chapter 1270 for design guidance and a detailed discussion on the types of auxiliary lanes.

Managed and Shared Lanes

There are many different types of managed and shared lanes. Some examples include:

- High occupancy vehicle (HOV) lanes (see Chapter 1410)
- High occupancy toll lanes (discuss with Tolling Division and see Chapter 1410)
- Hard shoulder running
- Peak hour use
- Bicycle shared lane (see Chapter 1520)
- Business access and transit (BAT) lane (see Chapter 1410, Arterial Street HOV)

1231.04(2) Lane Width

Lane width ranges for highways are listed in Exhibit 1231-1.

Exhibit 1231-1 Lane Widths for Highways

Speed	Highway Type	Lane Width Range*
High Speed	Freeway (incl. Interstate)	See Chapter 1232
	Other Highway	11' - 12'
Intermediate Speed	All	11' - 12'
Low Speed	All	10' - 12'

* The width shown is exclusive of the gutter if the gutter is a color that contrasts with the roadway.

1231.04(2)(a) Lane Width Considerations

Exhibit 1231-2 lists some considerations that may be helpful in choosing the most appropriate lane width from the range given in Exhibit 1231-1. This is not a comprehensive list. The considerations listed are meant to help understand the modal needs and function associated with different lane widths. Work with your Region Traffic Office when choosing lane widths.

Exhibit 1231-2 Lane Width Considerations

Lane Width Considerations	
General	Roadways on curves, see Chapter 1240 Turning Roadway Widths
	Narrower lanes may be used as part of a speed reduction strategy
	Two-lane, two-way rural highways: 12 ft lanes provide clearance between large vehicles traveling in opposing directions. Especially beneficial when high volumes or high truck percentages expected
	On multilane facilities with width constraints, utilizing narrower inside lanes may permit wider outside lanes for bicycles, freight, and transit
	Reduced lane widths allow more lanes to be provided in areas with constraints and allow shorter pedestrian crossing times because of reduced crossing distances
Intermediate to High Speed	12 ft lanes provide increased benefit on high speed, free-flowing principle arterials
	12 ft lanes provide increased benefit where there are higher truck volumes, especially for intermediate and high speed facilities
	Safety and mobility performance difference between 11 ft and 12 ft lanes can be negligible. Work with Region Traffic Office to evaluate performance differences for the subject roadway
Low Speed	11 ft lanes are common on urban arterials
	Lane widths of 10 ft may be appropriate in constrained areas with low truck and bus volume
	In pedestrian oriented sections, 10 ft lanes can be beneficial in minimizing crossing distance

1231.05 Modally Integrated Cross Sections

WSDOT's goal is to optimize existing system capacity through better interconnectivity of all transportation modes. Choosing the appropriate geometric cross section relies heavily on designing for the appropriate modes. See Chapter 1103 for guidance in selecting modes to accommodate and choosing modal priorities.

Once a decision is made regarding which modes to accommodate and which modes will have priority, a geometric cross section can be developed. The cross sections in this chapter are organized by modal priority for the following primary modes:



Motor Vehicles, including freight



Bicycles



Pedestrians



Transit

The cross-section examples shown in Exhibits 1231-3 through 1231-7 depict various combinations of elements that may be included in a cross section. The examples are intended to stimulate designer creativity and awareness of modal accommodations, and are not intended to be standard cross sections to be reproduced for a given modal priority. It is expected that innovative project alternatives will result in diverse configurations that best balance baseline and contextual needs (see Chapter 1101).

Since the cross-sections shown are only examples, and are really combinations of various elements, it is important to read the guidance associated with the specific elements (see 1231.03) in order to understand the considerations that may affect a choice of width, and to understand documentation requirements.

The cross section examples provide a range of dimensions for different design elements. See Chapter 1106 for guidance regarding choosing a width when a range of widths is given.

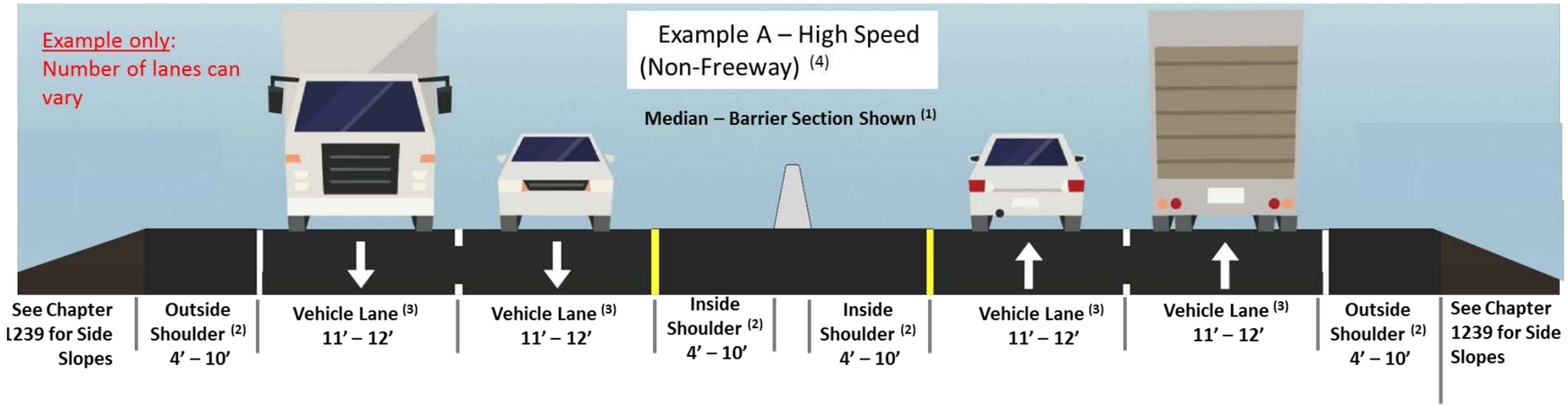
Maintaining the continuity of a roadway is an important consideration, particularly for limited access and other high-speed highways. However, it is also appropriate to change continuity as context changes in order to influence driver behavior. When designing intentional changes to the continuity of the geometric cross section, consider what is needed to enable the transition. High-speed to low-speed changes will need to transition the geometric cross section over a distance utilizing a speed transition segment (see Chapter 1103).

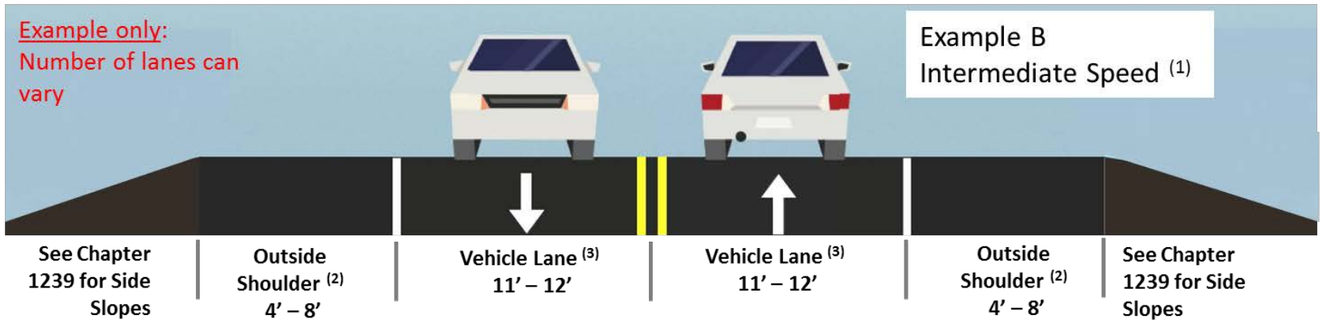
1231.05(1) Auto-and Freight Oriented Cross Sections

Exhibit 1231-3 shows examples of motorized vehicle-oriented designs. Motorized vehicles come in a variety of types which are operated on many vehicle lanes and parking areas. The performance needs of freight and other automotive vehicle types are often similar. However, certain truck vehicle types may require additional turning roadway width for off-tracking (see Chapter 1240), or at other locations a truck climbing lane may be needed to facilitate mobility performance (see Chapter 1270). Generally, lane width within suburban and urban contexts is less critical for mobility and safety performance than in rural and high-speed contexts. Within urban areas, placement of and sizing for loading areas within the parking areas can depend on the freight vehicle type.



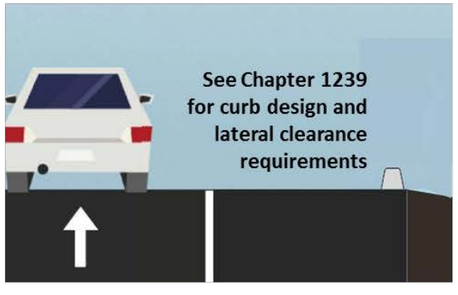
Exhibit 1231-3 Motor Vehicle Oriented Cross Sections







Barrier Present



Curb Present

Notes:

[1] Overall median width and design will vary. Some median designs include barrier and some do not. See Chapters 1239 and 1600.

[2] See Chapter 1239 for guidance on choosing a dimension from the range given.

[3] See 1231.04 for guidance on choosing a dimension from the range given. See Chapter 1410 for guidance on HOV facilities.

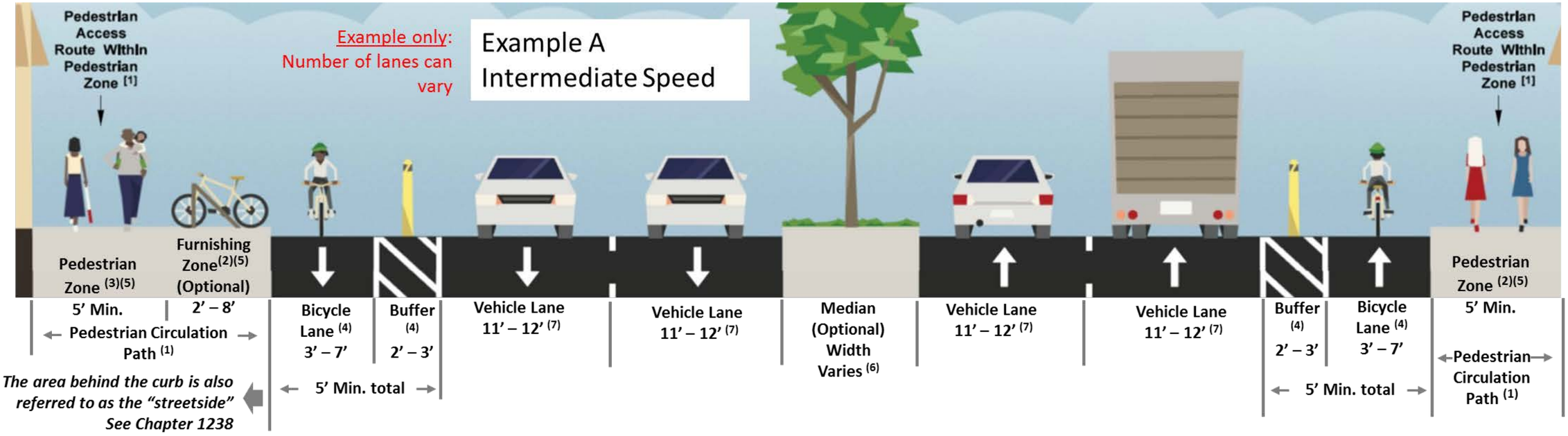
[4] See Chapter 1232 to see if your roadway meets the definition of a freeway.

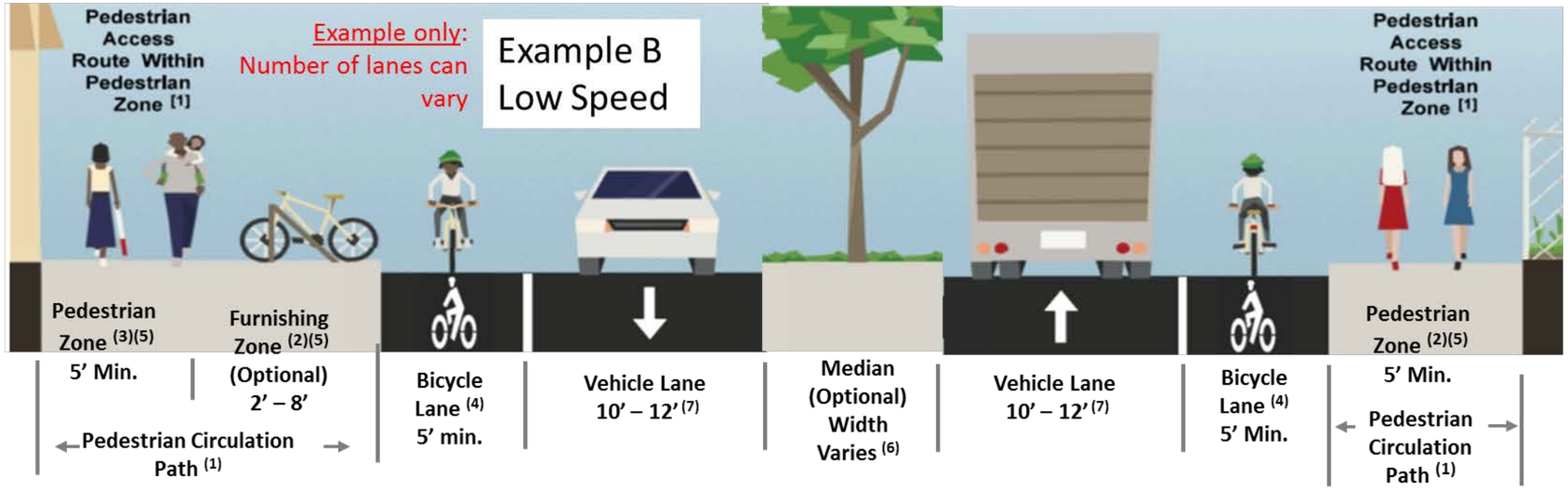
1231.05(2) Cross Sections Featuring Bicycle Facilities

Exhibit 1231-4 Example A features bicycle facilities at an intermediate-speed location. Bike lane location within the cross section depends largely on how cyclists will interact with the land use and potential modal conflicts. Locating bike lanes on the outside of the motor vehicle lanes can improve accessibility for bicyclists. If cyclist mobility performance is a primary concern or intermodal conflicts (such as transit stop locations) are present, locating bike facilities in the center of the roadway may be more appropriate. Whether or not a bike lane buffer is needed depends mostly on the target speed and average daily traffic (ADT) of the facility; the intent of bike buffers or other protected bike facilities is to address safety performance for cyclists. Buffers and other means of modal segregation also benefit motor vehicle drivers and pedestrians by showing allocated spaces. Both roadway bike lane configurations and bike facility selection are discussed in more detail in Chapter 1520.



Exhibit 1231-4 Cross Sections Featuring Bicycle Facilities





Notes:

[1] See Chapter 1510.

[2] Minimum width specified is exclusive of the curb width.

[3] If no furnishing zone is provided, minimum width is exclusive of the curb width.

[4] See Chapter 1520 for bike facility options.

[5] See Chapter 1238.

[6] Overall median width and design will vary. See Chapter 1239 .

[7] See 1231.04 for guidance on choosing a dimension from the range given.

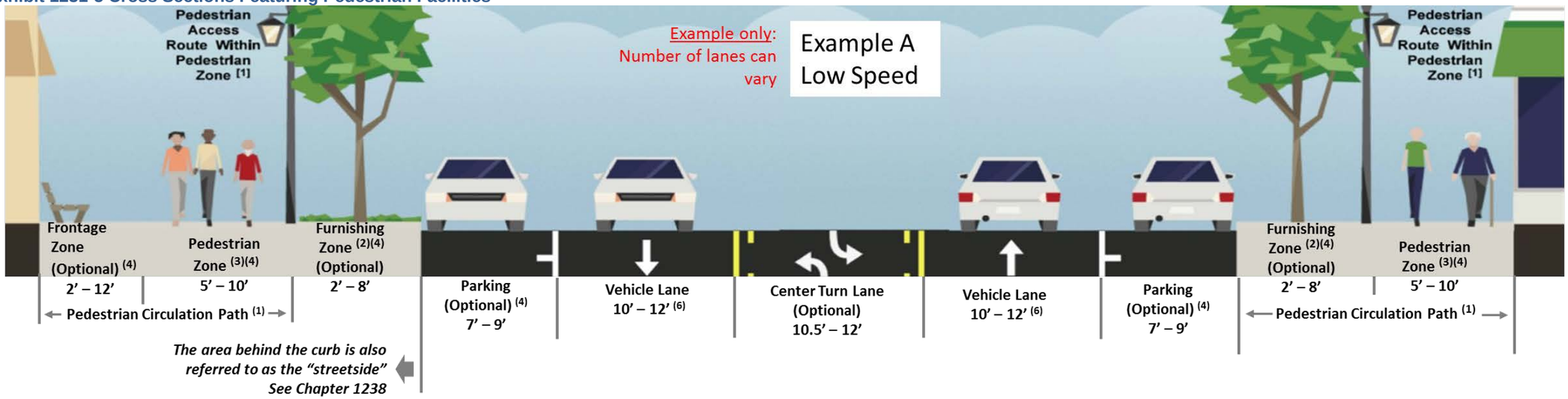
1231.05(3) Cross Sections Featuring Pedestrian Facilities

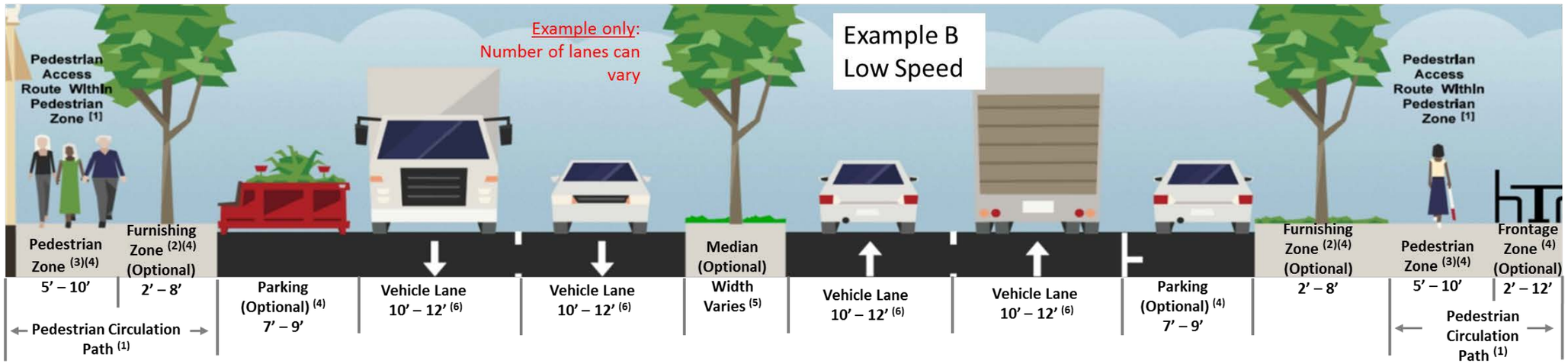
Exhibit 1231-5 shows cross-section examples featuring pedestrian facilities. The pedestrian mode is a vital transportation mode since, for most people, nearly every trip at least begins and ends by walking. Roadway facilities prioritized for pedestrians emphasize streetside elements. See Chapter 1238 for guidance regarding streetside elements.

The objective is to achieve the Pedestrian Circulation Path (PCP) necessary to support mobility, socioeconomic, and accessibility needs and provide access to intermodal connections. The configuration and dimension of streetside elements varies significantly depending on the performance needs being addressed. See Chapter 1510 for additional pedestrian design requirements and considerations.



Exhibit 1231-5 Cross Sections Featuring Pedestrian Facilities





Notes:

[1] See Chapter 1510.
[2] Minimum width specified is exclusive of curb width.
[3] If no furnishing zone is provided, minimum width is exclusive of the curb width.
[4] See Chapter 1238.
[5] Overall median width and design will vary. See Chapter 1239.
[6] See 1231.04 for guidance on choosing a dimension from the range given.

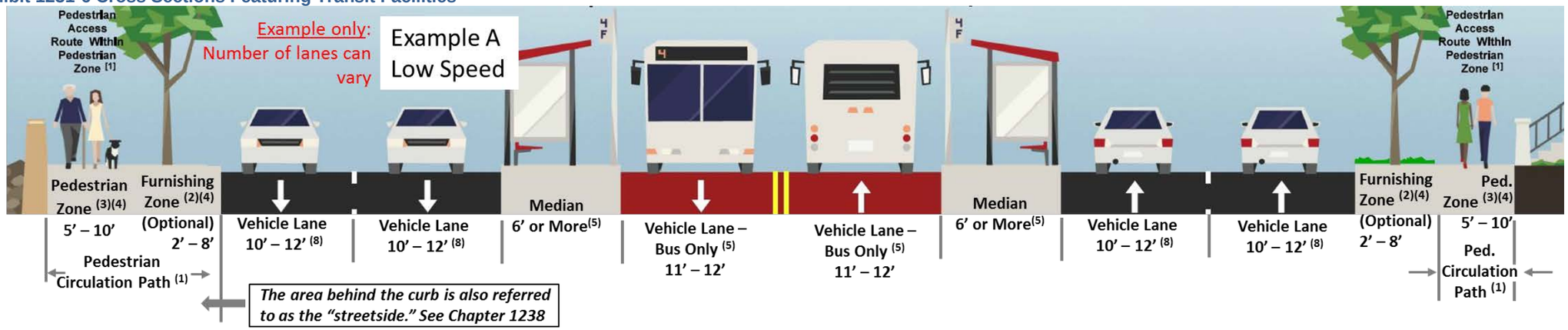
1231.05(4) Cross Sections Featuring Transit Facilities

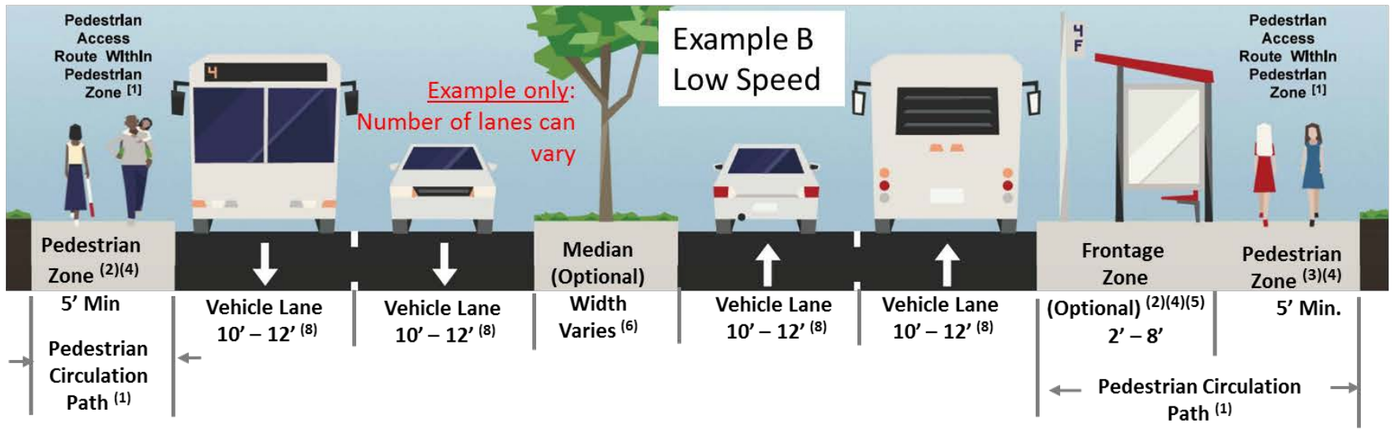
Exhibit 1231-6 provides examples of different potential configurations oriented for the transit mode. Work with the transit provider to determine their ability to operate within a given cross-sectional arrangement. In general, transit configurations can be positioned toward the side or center of a roadway. Both side and center configurations can be implemented with medians or outer separations to improve safety performance for intermodal connections, or mobility performance for the transit service.

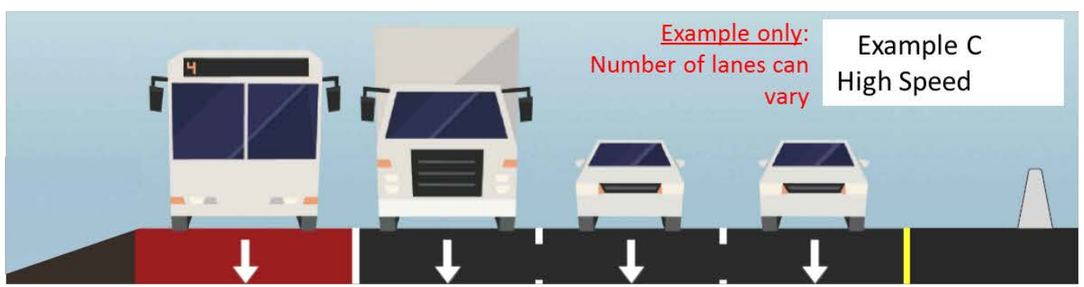
Exhibit 1231-6 Example A shows a central configuration for transit service that provides a separated bus-only lane. Other transit vehicle types may require different widths and may also require other center cross section configurations for passenger loading. Exhibit 1231-6 Example B shows a side configuration where transit vehicles occupy the outside lane. This example can also be configured as business access and transit [BAT] lanes. Note the importance of streetside elements to assist with intermodal connections. Exhibit 1231-6 Example C is an example of a type of special use lane for high-speed routes that are routinely congested. In this example, the shoulder allows the restricted use for buses.



Exhibit 1231-6 Cross Sections Featuring Transit Facilities







Notes:

[1] See Chapter 1510.
[2] Minimum width specified is exclusive of the curb width
[3] If no furnishing zone is provided, minimum width is exclusive of the curb width.
[4] See Chapter 1238.
[5] Verify width needs with transit provider, including lift extension needs. See Chapter 1510 for Pedestrian Access Route requirements, which may be affected by presence of a shelter. See Chapter 1430 Transit Facilities.
[6] Median width and design will vary. See Chapter 1239
[7] Verify width needs with transit provider. See Chapter 1239 for bus use only shoulder, requires a Design Analysis.
[8] See 1231.04 for guidance on choosing a dimension from the range given.
[9] See Chapter 1239 for guidance on choosing a dimension from the range given.

1231.05(5) Example Cross-Sections – Complete Streets

Complete street configurations attempt to balance the performance needs of all users, regardless of age, ability, or mode. The general intent is to provide context-appropriate designs that enable safe access for all design users. It is always important to consider modal connectivity and conflicts that may occur with complete street configurations, particularly at intersections and/or transit stop locations.

There are different potential configurations for complete streets, such as:

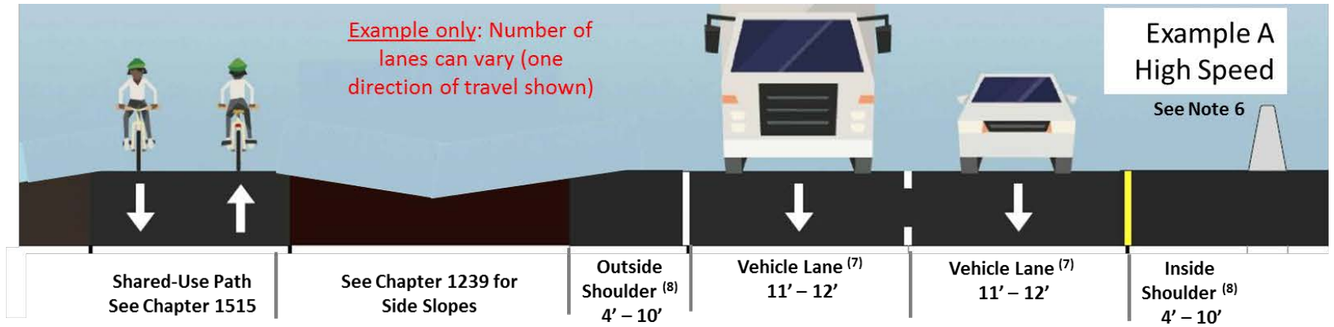
- A rural two-lane highway with wide shoulders; the shoulders can be used by motor vehicles in emergencies and by pedestrians and bicyclists.
- An urban highway or street with vehicle lanes, bike lanes, bus lanes, and sidewalks.
- Retrofitting a highway or street to clearly mark and sign a shared-use lane.
- An urban highway that undergoes a “road diet” (see 1231.06) or installation of additional pedestrian crossings.

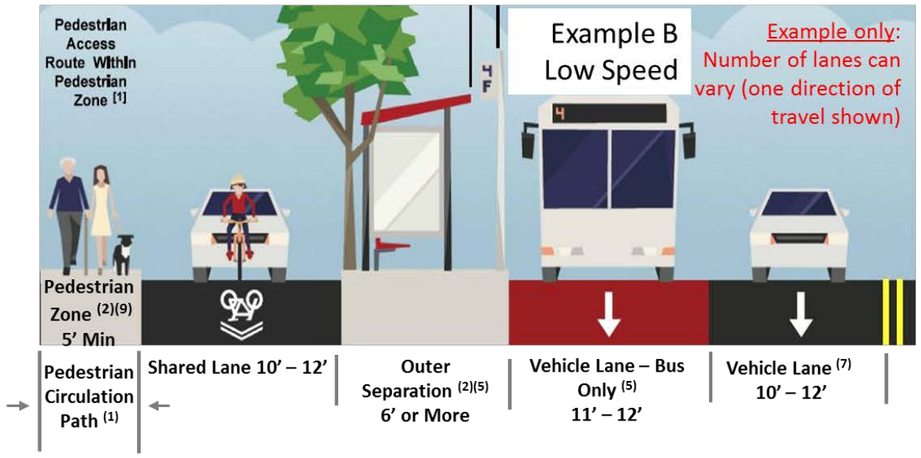
The low speed examples in Exhibit 1231-7 illustrate roadway cross sections that:

- Separate access lanes from through traffic lanes using curbed islands.
- Reduce conflicts between pedestrian, bike, transit and auto modes by separating them.
- Provide transit stops integrated with raised islands.
- May result in improved operations for all modes.



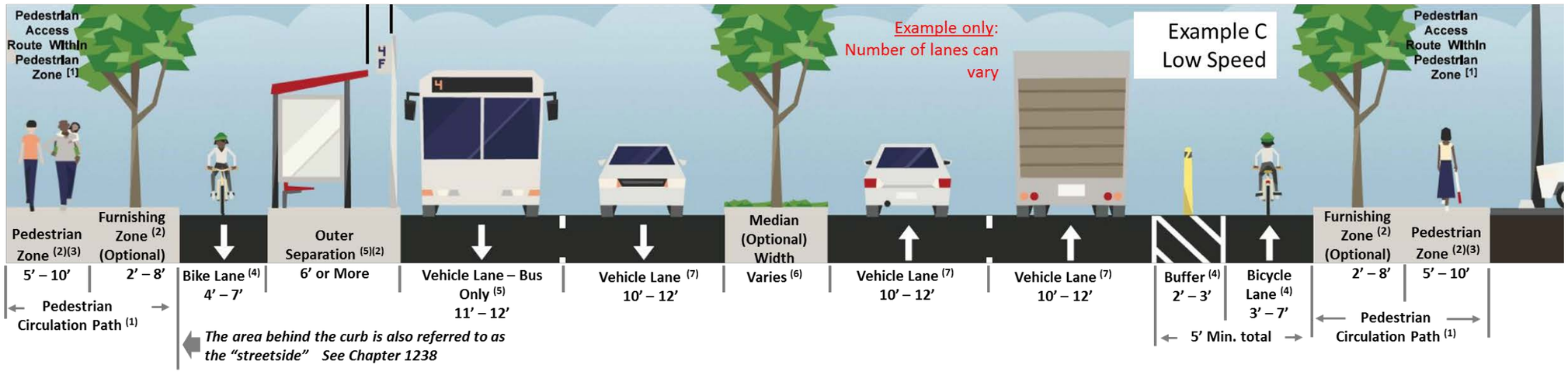
Exhibit 1231-7 Complete Street Cross Sections





Notes:

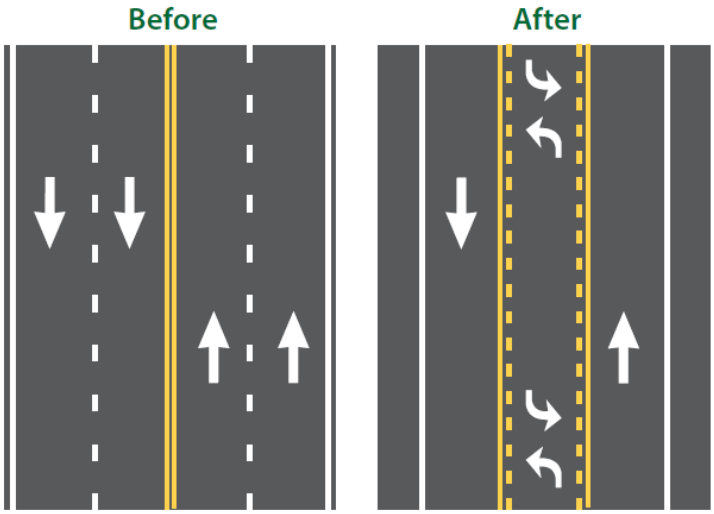
[1] See Chapter 1510.
[2] See Chapter 1238.
[3] If no furnishing zone is provided, minimum width is exclusive of the curb width.
[4] See Chapter 1520 for bike facility options.
[5] Verify width needs with transit provider. See Chapter 1430.
[6] Overall median width and design will vary. See Chapter 1239.
[7] See 1231.04 for guidance on choosing a dimension from the range given.
[8] See Chapter 1239 for guidance on choosing a dimension from the range given.
[9] Minimum width specified is exclusive of the curb width.



1231.06 Road Diets and Retrofit Options

Generally, road diets refer to converting four-lane undivided highways to three lanes with the center lane for left turning movements and the remaining outside space repurposed for bicyclists or other functions. The center lane can consist of a two-way left-turn lane (TWLTL) or can be dedicated for directional left turns either by paint or other median treatments. The choice of how to configure the center lane depends largely on balancing the resulting safety and accessibility performance of different modes and land uses.

The application of road diets also has the benefit of reallocating existing space within a cross section, which provides distinct opportunities to improve roadway bicycle facilities and/or elements of the streetside. At intersections and access points, a road diet can improve sight distance, may improve access management along the road, and in some cases, improve mobility performance for motorists.



Typical Road Diet Basic Design from FHWA Road Diet Informational Guide

The success of road diet implementation varies due to a number of factors such as signal spacing and timing, access connection density, modal priority, and average daily traffic (ADT). ADT is a reasonable indicator for implementation. FHWA recommends limiting road diet applications to roadways of 20,000 ADT or less, although road diets have been successful at locations with 25,000 ADT in various parts of the country (see Chapter 540 for additional restrictions on the use of TWLTLs). Motor vehicle mobility performance is most likely deemed the primary measure of success for the road diet configurations with higher ADT values described. However, locations with a different modal priority and higher ADT may still be candidates for road diets. The Region Traffic Engineer must approve road diet applications on state highways.

Retrofit options refer to the application of lower-cost treatments that utilize paint and other delineation devices rather than hardscape features. See Chapter 1238 for more information on retrofit options such as relocating the curb, parklets and plazas.

1231.07 References

1231.07(1) Design Guidance

Highway Runoff Manual, M 31-16, WSDOT

Local Agency Guidelines (LAG), M 36-63, WSDOT

Plans Preparation Manual, M 22-31, WSDOT

Standard Plans for Road, Bridge, and Municipal Construction, M 21-01, WSDOT

Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10, WSDOT

1231.07(2) Supporting Information

FHWA Road Diet Informational Guide, FHWA, 2014
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Understanding Flexibility in Transportation Design – Washington, WA-RD 638.1, Washington State Department of Transportation, 2005
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Urban Bikeway Design Guide, National Association of City Transportation Officials, New York, NY, 2012 revised 2013
www.nacto.org

Urban Street Design Guide, National Association of City Transportation Officials, New York, NY, 2013
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Designing Walkable Thoroughfares: A Context Sensitive Approach, Institute of Transportation Engineers, Washington D.C., 2010.
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Guide for Geometric Design of Transit Facilities on Highways and Streets, AASHTO, Washington, D.C., 2011
www.transportation.org/Pages/Default.aspx

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A Policy on Design Standards Interstate System, AASHTO, 2005
www.transportation.org/Pages/Default.aspx

NCHRP Synthesis 443 – Practical Highway Design Solutions, Transportation Research Board, Washington D.C., 2013
http://www.trb.org/Main/Blurbs/168619.aspx

NCHRP Report 785 – Performance-Based Analysis of Geometric Design of Highways and Streets, Transportation Research Board, Washington D.C., 2014
www.trb.org/Main/Blurbs/171431.aspx

NCHRP Report 783 – Evaluation of the 13 Controlling Criteria for Geometric Design, Transportation Research Board, Washington D.C., 2014
www.trb.org/Main/Blurbs/171358.aspx

NCHRP Report 505 – Review of Truck Characteristics as Factors in Roadway Design, Transportation Research Board, Washington D.C., 2003
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_505.pdf

Road Diets: Fitter, Healthier Public Ways

September 2013

Briefing Note

For up-to-date knowledge relating to healthy public policy

This briefing note introduces the road diet, an engineering technique that reallocates space on a street or road for other uses when they are over-built and have excess lanes. In what follows, we will present a definition, some study results and practical implementation considerations for road diets.

When applied with consideration for contextual details, it is generally agreed that road diets provide significant safety benefits for motorists, cyclists and pedestrians alike.

With fewer and narrower lanes, the crossing distances for pedestrians are shorter, vehicle speeds come down to more appropriate levels, and protected space for cyclists is created. Road diets are most successful on streets carrying average annual daily traffic (AADT) of up to 12,000, but can be implemented on streets with higher volumes if intersections are studied and configured carefully.

Because much of the opposition to road diets stems from misconceptions about the function of the roadway after lanes are reallocated, thoughtful messaging is needed to communicate the ways in which road diets improve the safety of the road for all.

What is a Road Diet?

In 1999, Dan Burden and Peter Lagerwey coined the term “road diet” to explain road conversion measures to “right-size” travel lanes and to remove excess lanes from streets.[1] A road diet typically involves converting an undivided four lane roadway into three lanes, made up of two through lanes and a centre two-way left turn lane. However, road diets have been completed on roadways comprising more lanes, and the number of lanes remaining after interventions can vary. What is constant is that the reduction of the number of lanes and/or lane widths allows the roadway space to be reallocated for other uses such as bike lanes, pedestrian crossing islands, buffered sidewalks, and/or parking.

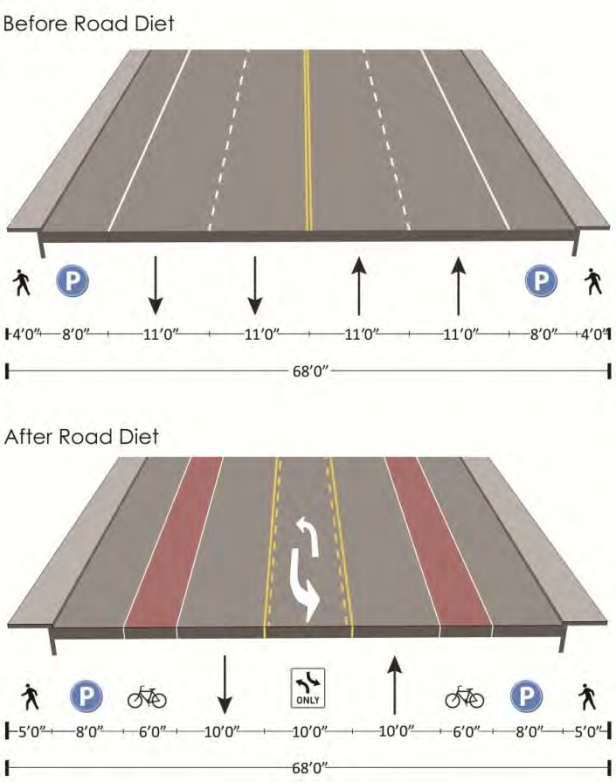

Figure 1 Before and after a road diet

A road diet re-allocates the existing right-of-way to better support all modes of transportation: pedestrians, cyclists, motorists, transit and freight/delivery. When converting a four lane roadway to three, a road will have one vehicle travel lane in each direction. This allows a prudent driver to set the prevailing speed for all cars following that driver. On-street parking and comfortably wide bike lanes create buffers of two kinds—between motorists and the edge of the road, and between pedestrians and moving traffic. The centre lane can be used for left turns, to allow emergency responders to pass, for pedestrian refuge crossing islands or for delivery bays.

Note: The values in this figure are in feet. The conversion is: 1 foot = 0.30 metres.

Source: Walkable and Livable Communities Institute (WALC Institute).

[1] Dan Burden is a co-founder and the executive director of the Walkable and Livable Communities Institute (WALC Institute), a U.S.-based not-for-profit organization dedicated to education and community engagement by focusing on changes to the built environment that promote active modes of transportation. Peter Lagerwey is the Regional Office Director for Toole Design Group, a private consulting group in transportation and urban planning based in the United States.

Centre de collaboration nationale sur les politiques publiques et la santé
National Collaborating Centre for Healthy Public Policy

Institut national de santé publique Québec

Methods

Since 1999, numerous studies on the effects of road diets have been undertaken. This fact sheet includes all the identified evaluations of road-diet interventions. The project team worked from the available literature. It also contacted Peter Lagerwey for updated materials on road diet performance and learned that while no current study exists, Mr. Lagerwey is conducting a comprehensive study on the performance of road diets in 2012-2013. Additionally, the project team contacted Dr. Carol H. Tan, Team Leader of Safety Management for the Office of Safety Research and Development of the U.S. Department of Transportation Federal Highway Administration (FHWA), to learn whether additional data on road diet performance exist. Dr. Tan confirmed that the project team was using current findings and noted that in 2012, the FHWA issued a technical memorandum with nine proven countermeasures to improve roadway safety; road diets were on this list (Furst, 2012). Finally, research officers from the National Collaborating Centre for Healthy Public Policy (NCCHPP) conducted a search using the federated search engine 360[2] and Google Scholar, using the expression “road diet.” The evaluations identified and used are referenced at the end of this document.

Evaluations of road diets have focused on road safety issues. Despite variations in the interventions studied and in the evaluative methods mobilized, these studies indicate positive outcomes. Although we feel the research in general leaves little room for doubt on the benefits of road diets for road safety, we nonetheless urge the reader to be careful in the interpretation of the results presented. A road diet intervention is context sensitive. Therefore, the results are likely to reflect the types and combination of treatments employed in any one case studied. Further, design decisions are, and should be, based on the community’s desired level of service for all modes of transportation, and the results of interventions and their evaluations are likely to be different because of variations in that regard as well.

Road Diets: How They Work

In their article, titled *Road Diets: Fixing the Big Roads*, Burden and Lagerwey noted the dangers of the four lane undivided highway: speeding, unpredictable behaviour, rear-end and side-swipe collisions, increased severity of injuries from collisions, and blind spots. They also noted how, pre–road diet, the corridor often discouraged active transportation due to high speeds and numerous conflict points between pedestrians, cyclists and vehicles (Burden & Lagerwey, 1999). Indeed, 4-lane undivided highways are particularly dangerous to pedestrians because of the potential for multiple-threat crashes, in which one vehicle stops and screens the pedestrian, while another motorist continues on in the through lane.

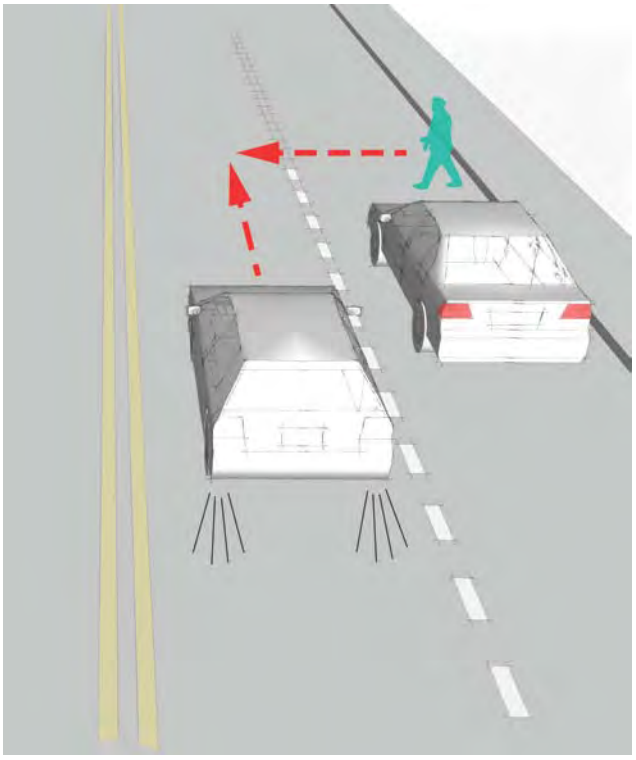

Figure 2 Less conflict, more visibility

A three-lane cross section produces fewer conflict points between vehicles and crossing pedestrians. In addition, although the total roadway width does not change, the complexity of the pedestrian crossing manoeuvre is reduced.

Source: WALC Institute.

[2] This search by the Serials Solution search engine covered the following databases: BioMedCentral, Cambridge Journals Online, CINAHL, EMBASE (1980 to Present), Environmental Sciences & Pollution Management, Érudit, HighWire Press, ipl2 – Internet Public Library, Journals@Ovid LWW Total Access Collection, MEDLINE (Ovid), MEDLINE Plus Health Information, MEDLINE with Full Text (EBSCO), MetaPress Complete, Nature Journals Online, OAIster, PILOTS, Political Science Complete, Psychology & Behavioral Sciences Collection, PsycINFO 1887-Current, Public Affairs Index, PubMed, PubMed Central, ScienceDirect, ScienceDirect Journals, Scirus, Social Services Abstracts, SocINDEX with Full Text (EBSCO), Sociological Abstracts, Sociology, Wikipedia, Wiley InterScience Journals.

The pedestrian and motorist cannot see each other, and the fact that the motorist in one lane has stopped to allow the crossing does not necessarily mean that the motorist in the next lane can see the pedestrian or will respond in the same way.

Road diets, also called “right-sizing” of roads, reallocate existing public right of ways. When excess lanes are removed and lane widths are narrowed to 10–12 feet (3.0–3.7 m), the existing right of way can be allocated to support all modes. Because drivers base their travel speeds on what feels comfortable given the street design, lane width reductions and the removal of excess travel lanes have an effect both on speeds and collision rates, since the number and severity of collisions tend to increase with increased speed. In general, the wider the road in front of us, the faster we tend to drive. The faster a car is going, the more severe the injuries in the event of a collision.

In a study of design factors that affect driver speed on suburban arterials, a lane-width reduction from 12 feet to 11 feet (3.7 m to 3.4 m) correlated with a 3 km/h reduction in speed, and a lane reduction from 12 feet to 10 feet (3.7 m to 3 m) with an 11 km/h reduction in speed (Transportation Research Board, 1994). Wider lanes encourage faster driving. Wide roads also pose problems for pedestrians. The wider a roadway, the farther a pedestrian has to cross, and the longer the pedestrian is exposed to the threat of a collision.

Research suggests that the number of collision injuries can increase significantly—by as much as 487 percent—with additional lane width on residential streets (Swift, Painter, & Goldstein, 2006).

After a road diet, one vehicle travel lane in each direction allows a prudent driver to set the prevailing speed for all cars following that driver. On-street parking and comfortably wide bike lanes create buffers of two kinds—both between motorists and the edge of the road, and between pedestrians and moving traffic. A road diet allows for the construction of a “complete street” that provides safe and equal access for users of all ages and abilities.

Conditions of Road Diets: Types and contexts of streets, flow and volumes of cars

Reconfiguring a roadway for both lane and lane-width reductions depends on the current configuration and desired operational and safety outcomes. The majority of four-lane roadways were built or widened to accommodate daily peak vehicle traffic volumes, but for the remaining hours, there is excess capacity. When considering a candidate for a road diet, there is no definitive set of criteria that can determine viability. The guidelines below thus present general characteristics of streets where road diets have been successfully implemented.

Traffic Volumes

Road diets have been successfully implemented on streets carrying a wide variety of average annual daily traffic (AADT) volumes. Ranges from 8,000 to 15,000 are generally considered to be good candidates for road diets (Burden & Lagerwey, 1999). Four-lane undivided roadways with an AADT between 8,400 and 24,000, and a relatively wide range of traffic flow have been successfully converted to three-lane cross sections in many areas of the United States (Knapp, 2003). However, for road diets with AADTs above approximately 20,000 vehicles, there is a greater likelihood that traffic congestion will increase to the point of diverting traffic to alternate routes (Huang, 2002). When road diets are being considered on streets whose AADT exceeds 20,000, signalized intersections should be studied and possibly upgraded to roundabouts to reduce vehicle congestion and diversion.

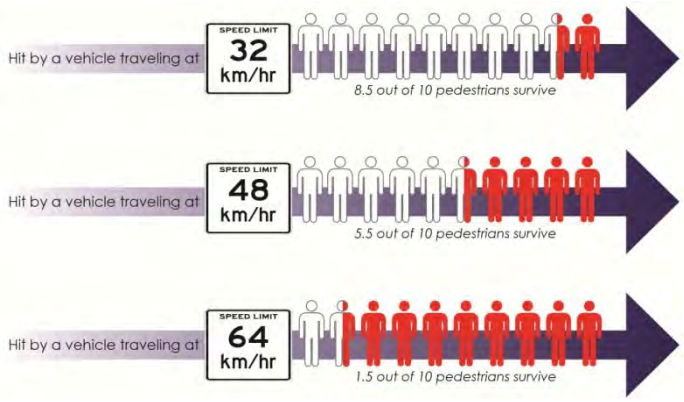

Figure 3 Collision speed and pedestrians' survival rate: reduced speed is significantly better

The graphic shows pedestrians’ likely survival rate if hit by a vehicle. Between 30 km/h and 60 km/h, the rate goes down exponentially.

Source: WALC Institute, based on data from UK Department of Transport, 1987, 1994.

Missing Infrastructure to Support All Modes

If a roadway does not provide sufficient infrastructure for other modes of transportation, a road diet may create the extra space needed to provide or improve infrastructure for cyclists, pedestrians, or transit riders. Bicycle infrastructure should be considered if bike lanes are missing or too narrow, especially if the corridor is a popular or essential bicycle route or system. If sidewalks are too narrow or if they are missing on one or both sides of the street, a road diet allows for improvement. Pedestrian crossings can be improved with a road diet, as well. A road diet should be considered if pedestrians have difficulty finding gaps in four-lane traffic to cross the roadway. Bus, trolley, or other transit service along a corridor can also make it a good candidate for a road diet.

Surrounding Land Uses

Roadways in areas with surrounding land uses that attract pedestrians, cyclists, visitors, and residents are also good road-diet candidates. These can include historic streets, scenic drives, main streets, streets with schools, or roads in an entertainment district. Four-lane undivided highways often encourage drive-through behaviour for motorists, rather than the desire to stop, park or spend time in the area.

Some study results

- Road-diet conversion case studies show both a reduction of average speeds and a dramatic reduction in excessive speeding (Knapp & Rosales, 2007).
- Overall collisions on conversions studied were reduced by 17–62% post–road diet, an extremely high reduction rate for a single traffic-calming tool (Knapp, Giese, & Lee 2003).
- Where crashes did still occur post–road diet on the conversions studied, involvement of at-risk age groups—under 25 and over 65 years of age—was reduced (Stout, Pawlovich, Souleyrette, & Carriquiry, 2006).
- A 2001 study found a reduction in pedestrian crash risk when crossing two- and three-lane roads compared to roads with four or more lanes (Zegeer, 2001).

Other Considerations

Road diets may also be considered if the following conditions exist:

- A high number of left-turning movements
- Roads with safety issues or high crash rates
- Availability of transit
- Proximity to schools or hospitals
- The road diet features will better integrate with adjacent roadway segments
- Support of the community is in place.

Because a complete street can be provided within the existing right-of-way after removing or narrowing vehicle travel lanes, road diets are less expensive than widening roads, have fewer negative impacts on adjacent properties, and interrupt traffic for less time during the conversion than a road-widening project would (Knapp, 2001).

Road Diets: Study Results

Studies on road diets have focused mainly on road safety issues and related outcomes. Evaluations have mostly concentrated their attention on their effects on the speed of motorized vehicles, on collisions and on their consequences in terms of morbidity and mortality. In this section, we summarize the available research.

Safety data indicates that three-lane roadways have lower collision rates than four-lane undivided roadways in medium and high-density residential and commercial land use areas (Knapp, Giese, & Lee, 2003). In addition, according to researchers at North Carolina State University, unlike the two-lane and four-lane undivided roadways, the collision rates of three-lane roadways did not seem to increase with development density (Knapp, 2001).

A comprehensive appraisal of various safety engineering measures was performed under the auspices of the National Cooperative Research Program. Among the list of measures appraised are road diet interventions. Consisting of a re-analysis of the data used in existing studies that had yielded inconsistent results, it integrated the original and

Table 1 Before and after collision data per mile in Iowa and HSIS studies (Washington and California)

Database/Site Type	*Characteristic*	*Mean*	*Minimum*	*Maximum*
Iowa Treatment (15 sites)	Crashes/mile-year before	23.74	4.91	56.15
	Crashes/mile-year after	12.19	2.27	30.48
	AADT before	7,987	4,854	11,846
	AADT after	9,212	3,718	13,908
	Average length (mi)	1.02	0.24	1.72
HSIS Treatment (30 sites)	Crashes/mile-year before	28.57	0	111.1
	Crashes/mile-year after	24.07	0	107.62
	AADT before	11,928	5,500	24,000
	AADT after	12,790	6,194	26,376
	Average length (mi)	0.84	0.08	2.54

Source: WALC Institute, adapted from Federal Highway Administration, 2010.

complementary data (to include more non-treated sites than the first studies had).[3] The methodological approach used in this analysis was the Empirical Bayes Method.[4] Further, it controlled for other road and traffic characteristics (such as speed limit and functional class) and used data from various jurisdictions, lessening the potential for error in estimates of the effects related to variance in road and traffic characteristics and in crash reporting practices.

The analysis, for which some of the main results have been summarized in Table 1, concluded that road diet interventions consisting of conversion from four lanes to three had resulted in collision reductions of 47% in the study sites in Iowa (IA) and 19% in both California (CA) and Washington states (WA). Commenting on these very different outcomes, the authors note that these differences:

- "May be a function of traffic volumes and characteristics of the urban environments where the road diets were implemented" because traffic volumes on the Iowa roads were considerably lower and in centres with smaller populations; and
- May also be due to a calming effect of the type observed in one Iowa site, an effect that "would be less likely in the larger cities in the […] study where the approaching speed limits (and traffic speeds) might have been lower to start with" (Harkey et al., 2008, p. C-6).

These comments serve as a reminder that the anticipation of potential benefits has to be adjusted to the specificities of the interventions themselves, but also to that of their contexts and of the modifications they create in a given environment.

Data from Minnesota indicate that three-lane roadways have a collision rate 27% lower than the rates for four-lane undivided roadways. Researchers found that the monthly collision frequency decreased by between 2% and 42% after conversion from a four-lane undivided to three-lane cross-section (Huang, 2002). Collision severity also decreased, but the changes in collision type (between adjusted and comparable non-adjusted sites) were found to be similar. The expected increase in safety that results from a four-lane undivided to three-lane cross section conversion may primarily be the result of a reduction in speed and speed variability along the

[3] The data were extracted from two databases, namely those of the Iowa Department of Transportation and the Highway Safety Information System (HSIS).

[4] As some researchers have presented it: "This method makes it possible to take into account changes in traffic volume, the underlying trend in the number of collisions and the effects of regression to the mean (Persaud & Lyon, 2007). It uses data collected from control sites, the number and severity of collisions at the intervention sites before installation of the calming measures, and data concerning the evolution of traffic volumes to estimate, using regression models, the number and severity of collisions that could reasonably have been expected to occur without the installation of traffic-calming measures. The effectiveness of the intervention is then determined by comparing the number and severity of collisions having occurred since the intervention with those expected" (Bellefleur & Gagnon, 2011).

roadway, a decrease in the number of conflict points between vehicles, and improved sight distance for left-turning vehicles on major streets.

Final Thoughts: Addressing Concerns about Road Diets

If road diet interventions are to be successful, they need public and political support. Overly wide roads have been the norm in many places, and changing those norms requires capacity- and awareness-building among community members, elected officials and municipal leaders. The following concerns about proposed road diets might be raised and proponents will likely have to address them. As such, this section is in a question and answer format to anticipate these concerns.

If we go from four lanes down to two, what happens to half the traffic? Won't the road be terribly congested?

In most cases, traffic volumes on streets that reduce the number of travel lanes from four to two show no significant change. Under most average annual daily traffic (AADT) conditions tested, road diets have minimal effects on vehicle capacity, because left-turning vehicles are moved into a common two-way left-turn lane. Congestion may be lessened on a "road-dieted" street because turning cars can pull into turn pockets, leaving the through-lane clear. There is less jockeying back and forth for position. If the corridor is a bus route, buses can ease into the bike lane at stops, or dedicated bays, and allow cars to pass them in the through lane. Providing safe and comfortable spaces for walking and biking means some people may choose not to drive, putting fewer cars on the road in the first place.

Will surrounding neighbourhoods be plagued by cut-through traffic as drivers speed around the redesigned corridor?

In road-diet case studies, traffic diversion off of the study corridor has been a rare occurrence. However, for road diets with AADTs above approximately 20,000 vehicles, there is a greater likelihood that traffic congestion will increase to the point of diverting traffic to alternate routes (Huang, 2002). When road diets are being considered on streets whose AADT exceeds 20,000, signalized intersections should be studied and possibly upgraded to modern roundabouts to reduce vehicle congestion and diversion. Where there is significant neighbourhood concern, a plan to implement neighbourhood traffic-calming measures concurrently with the road diet must be considered.

Will access to and from driveways or side streets be harder?

Turning onto the corridor can actually be easier, because there is only one lane of traffic in each direction to negotiate. If there is a centre left-turn lane, drivers turning left can cross one lane of traffic, then wait in the turn lane to merge into a gap in the travel lane. A 2008 study, *Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads*, demonstrated how adding a two-way centre turn lane to previous two-lane roadways in rural areas resulted in a 29% decrease in total crashes, a 19% reduction in injury collisions and a 36% reduction in rear-end crashes (Persaud et al., 2008).

Will emergency response times be slower?

On a four-lane road, when an emergency vehicle approaches, two lanes of cars must merge into one lane and then stop at the curb. After a road diet, the single lane of through traffic simply shifts into the bike lane and stops, allowing the emergency vehicle to pass in the through lane, or to use the centre lane.

Is investing money in non-motorized transportation wasteful when the roads are already in need of fixing?

Walking and cycling are actually often more efficient than driving for short trips, and walking is a component of many vehicle trips as well. When considered in terms of "effective speed"—the total time spent in travel, including time devoted to working in order to pay for vehicles and fares—non-motorized transport can often be compared advantageously to motorized transport (Litman, 2013). The Political Economy Research Institute (PERI), established in 1998, is an independent unit of the University of Massachusetts, Amherst, with close ties to the US Department of Economics. According to their study, bicycle projects yield 11.4 jobs per million dollars spent, versus 7.8 jobs created per million spent on road-widening projects (Heintz, 2009). The 2009 report titled *Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure*, by the League of American Bicyclists and the Alliance for Biking and Walking, revealed

that bicycling brings in one billion dollars a year to Colorado's state economy, while bicycle-related activity in Portland, Oregon, contributes $90 million to its local economy and provides 850 to 1,150 jobs. The report also noted the economic and health benefits of bicycling in Iowa. In 2009, that state's estimated 24,921 bicycle commuters generated $51,965,317 in economic activity and provided health savings of $13,266,020. Similar data are being captured in other states in the United States of America too. In 2009, the Minnesota Department of Employment and Economic Development found that cyclists were the second most active trail users in the state after walkers/hikers. The value of all goods and services produced in the state attributed to cyclists' spending came to $261 million. This spending supported more than 5,000 jobs and helped generate $35 million in taxes (Flushce, 2009).

Where can I learn more about road diets?

Founded in 1975, Project for Public Spaces is a New York City based nonprofit, dedicated to helping people create and sustain public spaces that build stronger communities.

Project for Public Spaces has created an online resource to explain how reconfiguring the layout of streets can create places that better serve communities. Through their Rightsizing Streets resource, Project for Public Spaces highlights communities large and small who are achieving impressive safety, mobility, and community outcomes by changing their street design.

See: http://www.pps.org/reference/rightsizing/

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September 2013

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Editing: Michael Keeling and Marianne Jacques, National Collaborating Centre for Healthy Public Policy

SUGGESTED CITATION

Bowman, S. (2013). *Road Diets: Fitter, Healthier Public Ways*. Montréal, Québec: National Collaborating Centre for Healthy Public Policy.

ACKNOWLEDGEMENTS

The NCCHPP would like to thank Dr. David Mowat (Peel Public Health), Mr. Claude Bégin (Direction de la santé publique de Lanaudière) and Dr. Carol Tan (Federal Highway Administration) for their comments on an earlier version of this document.

The National Collaborating Centre for Healthy Public Policy (NCCHPP) seeks to increase the expertise of public health actors across Canada in healthy public policy through the development, sharing and use of knowledge. The NCCHPP is one of six centres financed by the Public Health Agency of Canada. The six centres form a network across Canada, each hosted by a different institution and each focusing on a specific topic linked to public health. In addition to the Centres' individual contributions, the network of Collaborating Centres provides focal points for the exchange and common production of knowledge relating to these topics. The National Collaborating Centre for Healthy Public Policy is hosted by the Institut national de santé publique du Québec (INSPQ), a leading centre in public health in Canada.

Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada through funding for the National Collaborating Centre for Healthy Public Policy (NCCHPP). The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

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Publication N°: 1842

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LEGAL DEPOSIT – 3rd QUARTER 2014
BIBLIOTHÈQUE ET ARCHIVES NATIONALES DU QUÉBEC
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ISBN: 978-2-550-70859-9 (FRENCH PRINTED VERSION)
ISBN: 978-2-550-70860-5 (FRENCH PDF)
ISBN: 978-2-550-70861-2 (PRINTED VERSION)
ISBN: 978-2-550-70862-9 (PDF)

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March 2010

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Final Report

Evaluation of Road Diet Plan for Fifth Street Corridor Improvement

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1. Introduction

The "Fifth Street Corridor" is defined as the section of Fifth that runs between A Street and L Street through Downtown Davis (See Fig. 1-1). This corridor serves many modes of transportation, including vehicles, delivery trucks, buses, emergency vehicles, pedestrians, and bicycles.

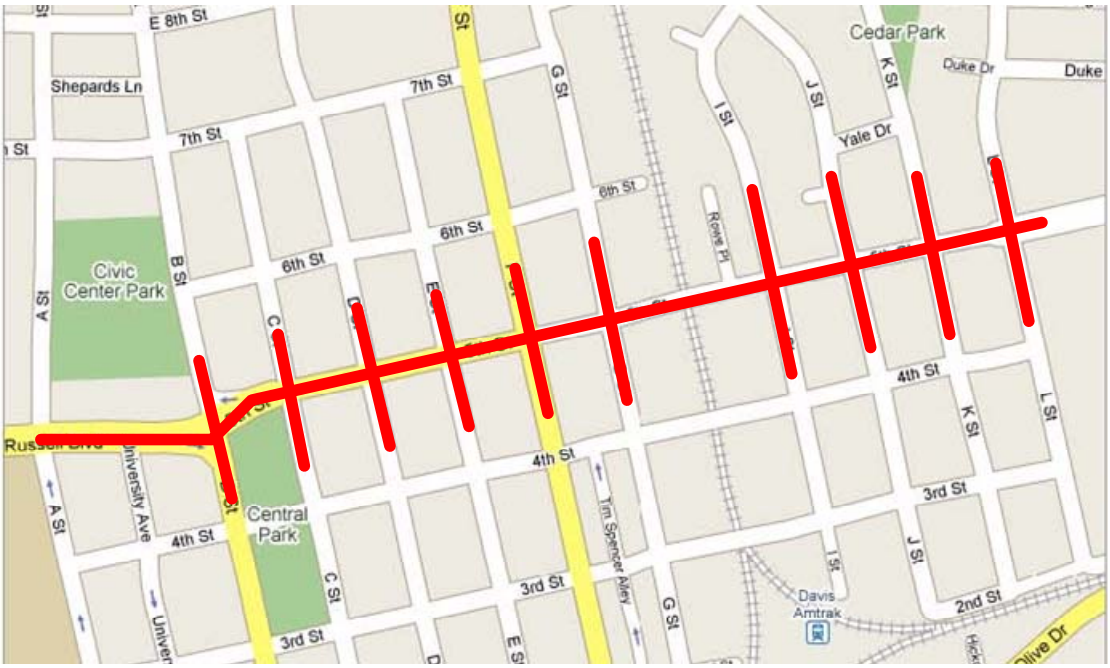


Figure 1-1 Fifth street corridor planning area

In the recent couple of years, discussions of the Fifth Street corridor raised several issues related to pedestrian safety, bicycle connectivity through the downtown core area, motor vehicle travel impacts in terms of delay and accidents, and economic impacts to the

downtown business community. Different alternative strategies were carried out to partially or comprehensively deal with the multiple interests. In April 2003, staff presented to the City Council the scope for modifications to the F and G Street signals on Fifth Street (CIP #8714). During discussion of this project, the issue of pedestrian safety along the Fifth Street corridor surfaced. In July 2005, the City Council identified five issues to guide staff deliberations:

1. Bicycle route connectivity;
2. Improved pedestrian safety at street crossings;
3. Reduced motor vehicle speeds;
4. Protected left turns off of Fifth Street; and
5. The pursuit of grant funds for potential improvements.

Based on the above criteria the Old North Davis Neighborhood suggested a lane reduction approach would be an appropriate strategy to address pedestrian safety, which is so called "Road diet" plan. There was discussion of whether reducing the number of travel lanes from four to two, and incorporating bicycle lanes might be appropriate for this stretch of Fifth Street. Staff evaluated the lane reduction option and various other concepts to address issues. Ultimately, staff informed the Council that any option that would potentially achieve all of the objectives would also come with a negative impact – be it traffic delays, safety tradeoffs, loss of mature trees, or expense. With many different groups articulating different needs for the corridor, and no universally agreeable plan identified, the Council chose to table discussion for a period of time.

In June 2008, the issue of the Fifth Street corridor was raised again by the Council and staff was asked to prepare a plan to address the subject. In prior discussions, the primary driver of the analysis was responding to a proposed solution, or options, rather than making a comprehensive effort to engage the community to identify what problems, or opportunities existed in the corridor. Staff recognizes that there are myriad interests in the Fifth Street Corridor. In recognition of these interests, staff proposes engaging the community to gain a better understanding of the full breadth of interests and issues.

This research is to develop a microscopic, time step and behavior based simulation model to model the traffic operations within the planned fifth street corridor area. The program analyzes the traffic operations under constraints such as lane configuration, traffic composition, traffic signals, transit stops, etc., thus making it a useful tool for the evaluation of various design alternatives based on planning measures of effectiveness.

This study focuses on the comparison of two scenarios: the current plan with modification to F&G street signals and the road diet plan. Their performances are evaluated and compared in terms of vehicle speed, total stops, total delay time, queue length at the intersection, etc. In

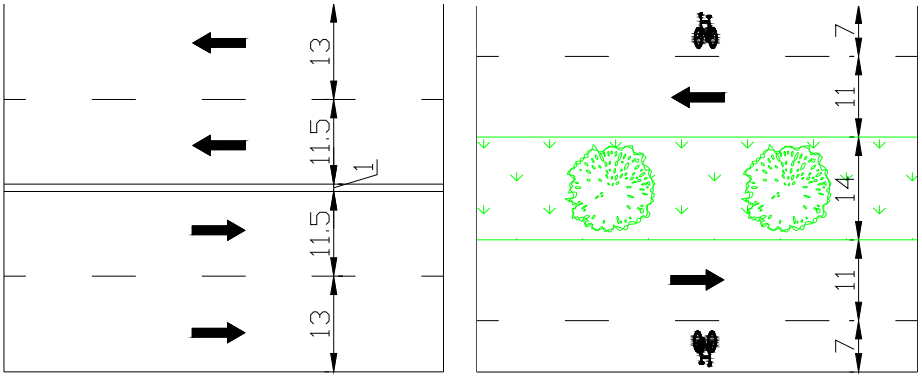
the “road diet” scenario, new signal timing plan will be proposed to optimize the operation of the whole planning area.

2. The Two Strategies for Fifth Street Corridor

In this section we first provide the details of the two strategies for Fifth Street corridor: the existing one and road diet. They have different geometric designs on both road sections and intersections, as well as signal plans.

2.1 Geometric design

In existing case, the section of Fifth Street in the corridor is bi-directional with two motor lanes on both directions, as shown in Fig. 2-1a. In road diet case, to avoid the costs of pavement rebuilding and land-use change, etc, the total width of the section of Fifth Street will remain unchanged, except that the motor lanes will be downgraded to two, with two bike lanes at each side and isolation strip in the middle (See Fig. 2-1b).



a) Existing case b) Road diet case

Figure 2-1 Geometric layout of road section

There are ten intersections along the street from B Street to L Street. The detailed layouts of these intersections are shown in Fig. 2-2 ~7.

In road diet case, the approaches from Fifth Street to each intersection will be channelized to keep the capacity, as shown in Fig. 2-8. Moreover, an exclusive left-turn lane, which replaces the isolation strip in the middle section of the road, will be added at each approach to make the turning movements smoother. Since right-turn traffic should use bike lanes to finish the turning, compared with the existing case, which has only two lanes at the approach, there are actually three lanes for through vehicle.

2.2 Signal plan

In existing case, there are four signal intersections out of ten along the whole corridor, which are B&5th St., F&5th St., G&5th St., and L&5th St. All the four signals are fully vehicle actuated.

The existing signal plans at B&5th St. and L&5th St. have four phases with ring-and-barrier structure, as shown in Fig 2-9 and 2-10. The two intersections are not running on signal procession and the geometric designs do not change too much except that the straight lanes of the east approach of B&5th St. and the west approach of L&5th St. will be reduced from two to one for each direction. Thus we keep the two signal plans unchanged in road diet plan.

The existing signal plans at F&5th St. and G&5th St. are coordinated with each other because of the short distance between them. Both plans have three phases, with a cycle length of 90 seconds at daytime and 64 seconds at night. The plans are shown in Fig 2-11 and 2-12. In the road diet plan, to improve the safety of pedestrians and cyclists and the efficiency at the intersections, protected left-turn phases are added in the signal plans of F&5th St. and G&5th St. intersections. The new signal plans have three phases with ring-and-barrier structure, as shown in Fig. 2-13 and 2-14.

3. Simulation and Optimization

In this project, we use microscopic traffic simulation to evaluate the effects of the road diet plan on the traffic on Fifth Street corridor. We choose PTV VISSIM, a widespread used simulation software package, as the simulation tool. Compared with other simulations tools, VISSIM has several characteristics fitting the needs of this study:

- Modeling options for urban traffic;
- Powerful lane-changing behavior models provide the user with realistic modeling of various merging situations;
- Modeling parallel vehicle flows, such as cars and motorbikes/cycles driving in the same lane and overtaking inside wide lanes;
- Expandable collection of different vehicle types and user-defined changes of driving behavior (e.g. desired speed distribution, acceleration and car-following behavior);
- Selecting between different types of traffic demand modeling:
- True multi-class networks, i.e. route choice can be determined for each vehicle type, thus allowing pedestrian precincts, bicycle lanes, driving restrictions for cars, etc. to be modeled.

Both the existing case and road diet case are simulated in VISSIM for comparison. The simulation and optimization procedure contains six steps shown in Fig. 3-1.

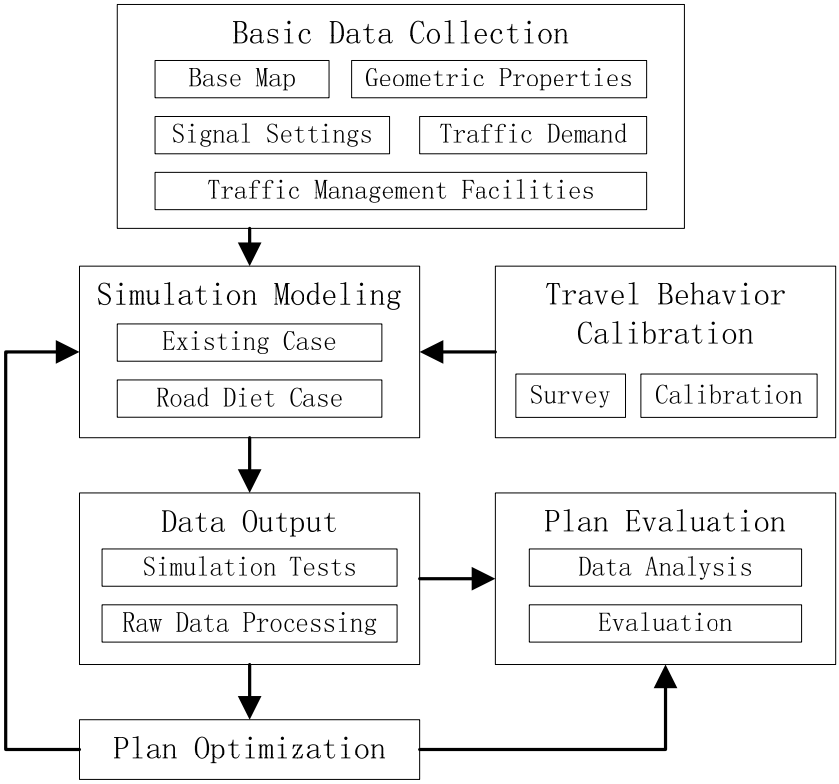


Figure 3-1 Technology roadmap of this project

3.1 Data collection

The following data are collected as inputs of the simulation model:

- Background map: we use Google earth map of Fifth Street corridor from B Street to L Street as the background map, based on which the road network is built;
- Geometric parameters: the detailed configurations and dimensions at cross section of each link and intersection and the detailed dimensions of blocks and cross street;
- Signal settings: the signal timing plans of all the four signalized intersections, B&5th St., F&5th St., G&5th St. and L&5th St., which are all full vehicle-actuated;
- Traffic demand: the flow split at each intersections during evening peak from 4:00pm-6:00pm and traffic mix (e.g. car, truck, bicycle percentages) for all links entering the network.

3.2 Model set-up

The simulation model set-up is a process to build a virtual road network to simulate the actual Fifth Street corridor based on all the necessary information we collect, which comprises three steps:

- Traffic network coding: building the road network with the same dimensions as real roads, including all the traffic management facilities;
- Travel behavior modeling: adding travelers to the network with specified volume and routes, setting the running rules and behavior factors, e.g. safety distance for travelers for different travel modes;
- Signal control coding: adding signal control facilities such as signals and detectors on the network, and setting the signal control parameters and strategies for them.

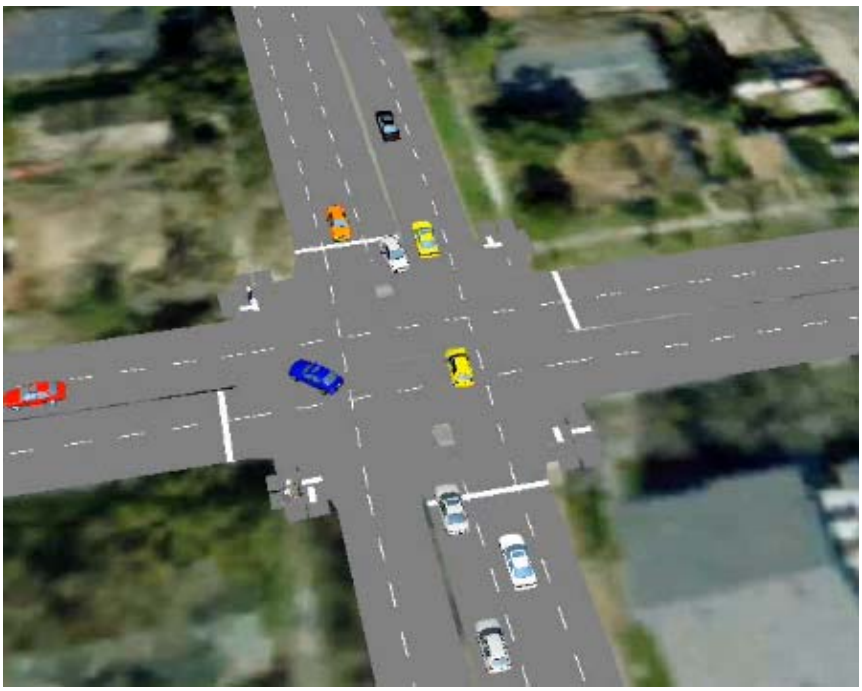


Figure 3-2 A sample intersection of the existing plan

A sample of the finished intersection in the existing plan is shown in Fig. 3-2.

3.3 Travel behavior calibration

To make the simulation results reliable, we have to calibrate the travel behavior. The calibration follows three steps:

- Operational characteristic indicators survey: the capacity and total travel time are selected as two operational characteristic indicators. The former is obtained by

recording the saturation time headway and the latter by the on-road travel time measurement;

- Capacity calibration: we compare the output capacity of the simulation model with the survey data and adjust the parameter settings until they match up;
- Travel time calibration: it follows the similar procedure as the capacity calibration. Fig. 3-3 shows 10 iterations of the calibration. The procedure stops when the error is acceptable.

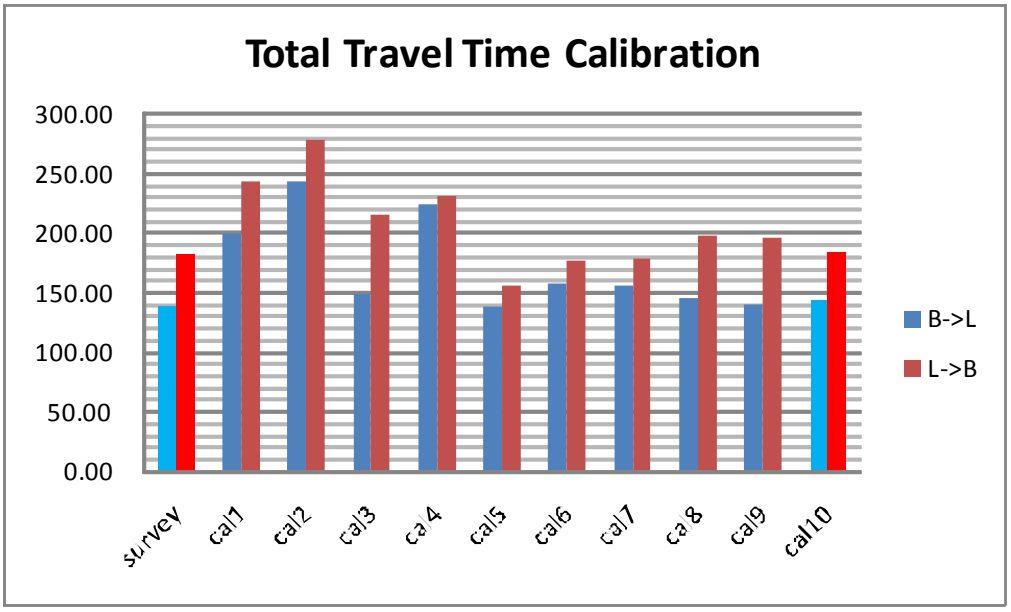


Figure 3-3 Calibration for travel time

3.4 Optimizing the road diet plan by offset adjustment

Although the geometric design and signal phases are predetermined, we still can optimize the road diet plan by adjusting the offset of the coordinative control between the two intersections F&5th St. and G&5th St. We compared the outcomes of different offset settings and the quasi-optimal one is chosen.

4. Data Analysis and Conclusions

VISSIM offers a wide range of evaluations that result in data being displayed during the simulation runs and in data being stored in text files. The text files are imported in spreadsheet applications (Microsoft Excel) for further calculation and graphical representation. The evaluation types utilized for performance measure here include:

- Through vehicle travel time;

- Through vehicle delay;
- Through vehicle speed;
- Number of stops of through vehicles;
- Network vehicle speed;
- Network vehicle delay;
- Delay of through vehicles at each intersection.

We repeated the simulation runs with 5 different random seeds for each scenario and take the average to counteract the system error. The outputs are listed in Table 4-1 below.

Table 4-1 Comparison of evaluations

Average	Current plan	Road Diet(Optimal Signal)	Percentage Change
Travel time(Through)	161.71	141.38	-12.57%
Speed(Through)	14.5	16.7	15.56%
Delay(Through)	71.60	50.42	-29.58%
Stop delay(Through)	51.36	25.67	-50.03%
Stop times(Through)	1.71	1.23	-27.64%
Speed(Network)	13.72	13.06	-4.80%
Delay(Network)	44.50	49.37	10.95%
Stop delay(Network)	31.77	32.82	7.89%
Stop times(Network)	1.31	1.42	3.30%
Delay(Side street)	24.26	32.68	34.71%

From the comparison we have following observations:

- Compared with the current plan, the travel time, number of stops (See Fig. 4-1~2), vehicle delay, stop delay, for the through traffic are all reduced by the road diet plan, except that the delay of the whole network is increased by 11%, which indicates that the road diet plan will not add significant congestion to the corridor; The signal timing is set to give priority to the through traffic instead of side street traffic for the consideration of the overall performance of the corridor area;
- The stop delay of the through traffic is reduced by half, which provides significant advantage for addressing the fuel consumption and Emission issues, since most emissions are released during the time when vehicle stops;
- The average speed of the through traffic is increased by 15.56%, which helps to maintain the vehicle throughput of the corridor after the road capacity is reduce by half;
- The reduced street motor lane width makes the pedestrian and cyclists easier and safer to cross the street and in some degree reduces the vehicle confliction, which have been serious issues along the fifth street corridor for long. The improved bicycle lane connectivity will significantly reduce the risks of cyclists who have to ride on the

motor lanes under the current situation, and also reduce the delays for not only cyclists but vehicles;

- The average vehicle delay for the side street is increased by 34.71% because of the road diet plan. Most of the delay occurs at the non-signalized intersections. The major reason causing the problem may come from the lane reduction. Under the current plan, the capacity of the four-lane street is not fully utilized. However, after one lane is cut for each direction in the road diet plan, to satisfy the same or even higher through traffic demand, the density of the through traffic increases a lot. As a result, the turning vehicles from the side street can then hardly find a gap to get into the flow. This is the major negative side of the road diet plan that we could find in our simulation. The stop delay of the whole network is also increased by 7.89%, most of which comes from the side street traffic. Such amount of increase may not be serious because of high demand level we proposed in the model: first, the demand we input into the simulation model is already 25% higher than the existing demand; second, we didn't consider traffic redistribution here. If we look at the whole downtown network, some of the traffic may switch to alternative routes when they face a higher delay, so that the delay along the 5th street corridor might be over-estimated by our simulation;
- A planting isolation strip is added in the middle of the road to isolate the traffics in two opposite directions. Such strip could increase the driving safety by reducing crossing street violations, purify the air in downtown area and add to the visual effects.

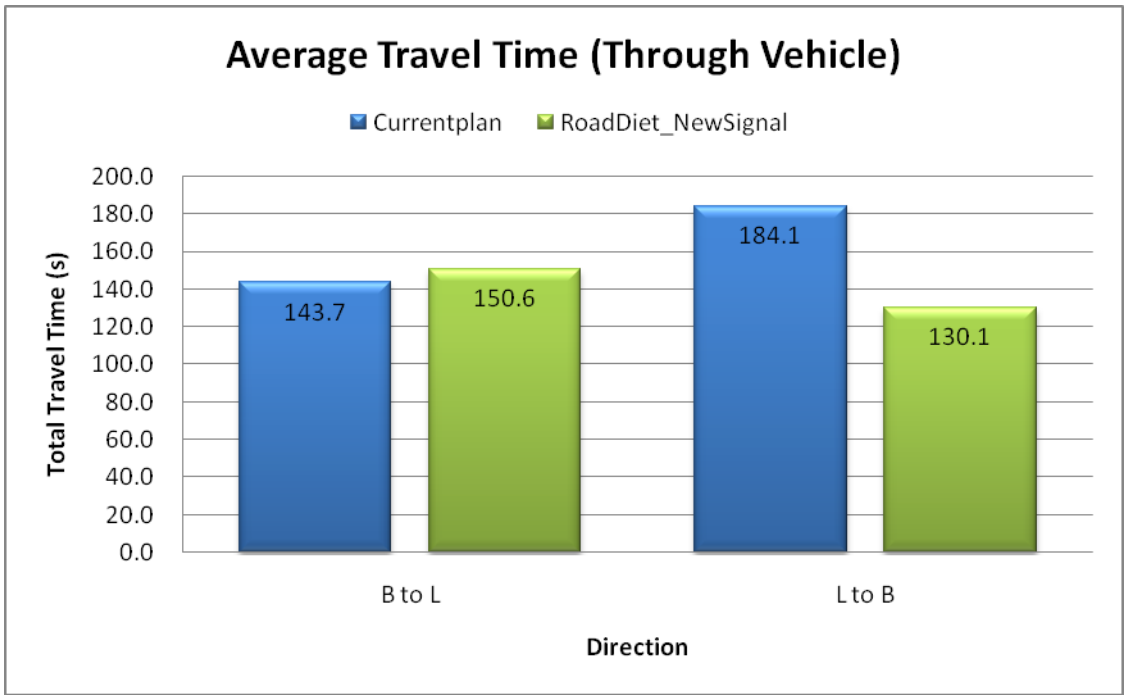


Figure 4-1 Comparison of average travel time

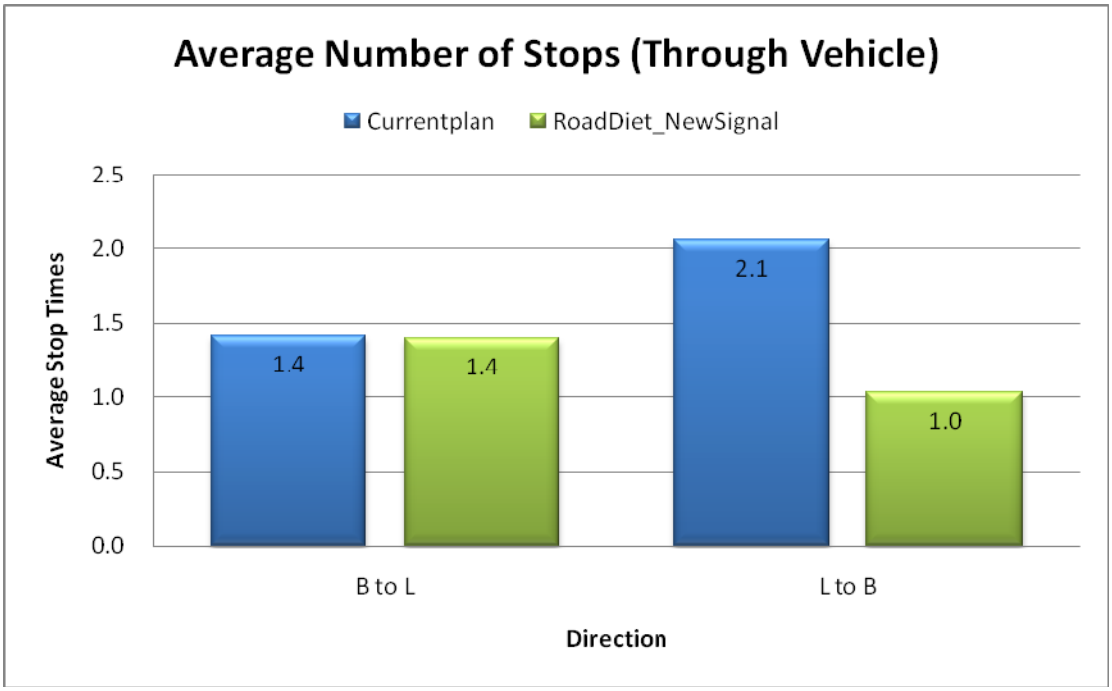


Figure 4-2 Comparison of average number of stops

The density and speed distributions in Figure 4-2~5 for both the current plan and road diet also support our conclusion that the road diet plan will not seriously increase congestion along the corridor, yet congestion will still exist under the road diet plan at intersections B, F, G and L&5th, since these are the four intersections with signal controls and high demands.

Acknowledgement:

We wish to thank Steve Tracy for providing the initial impetus for this study and for sharing with us traffic data. This study is made possible by a seed grant from the Sustainable Transportation Center at University of California, Davis. The opinions and conclusions contained in this report are those of the authors alone.

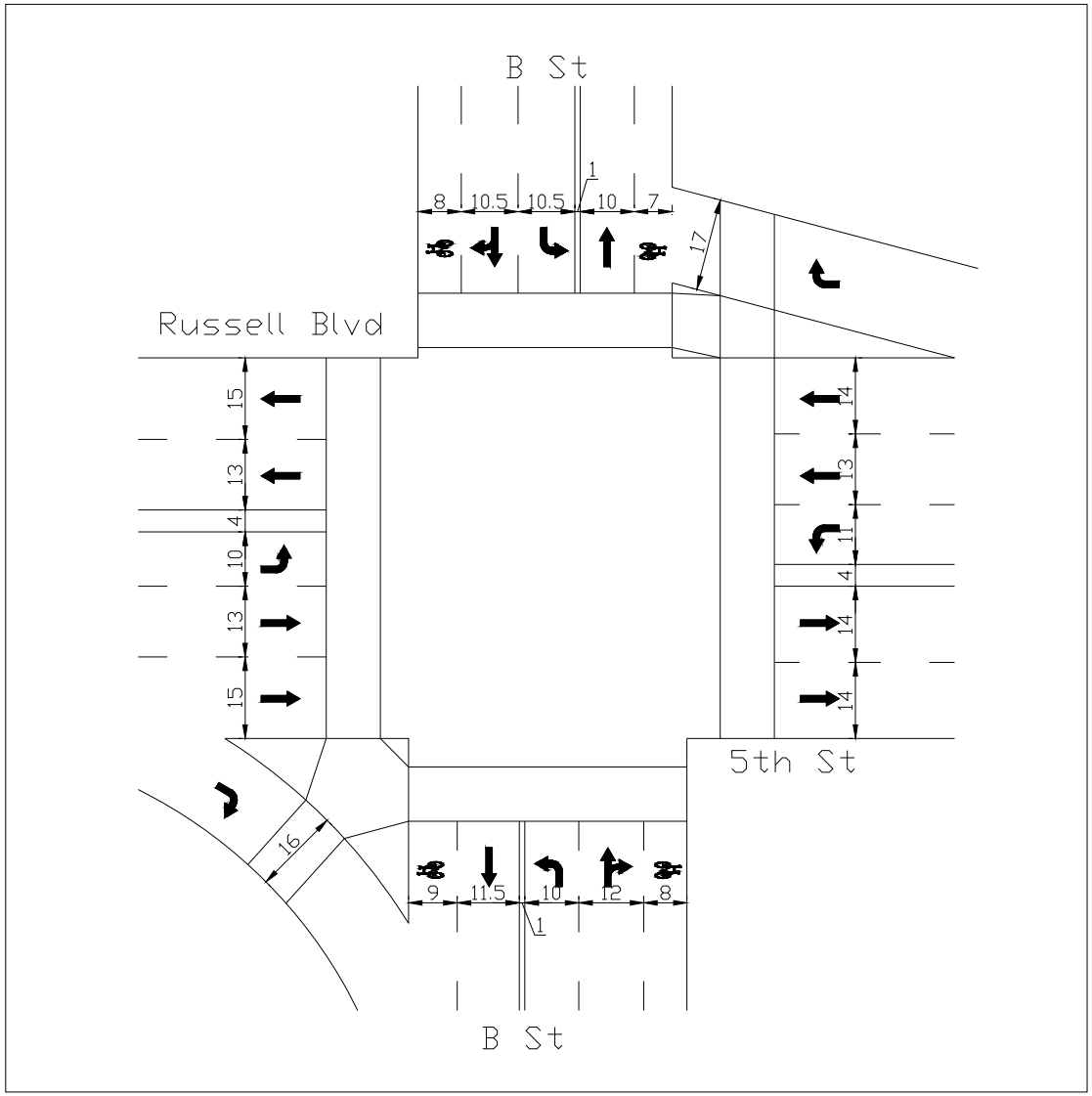


Figure 2-2 Existing geometric layout of B & 5th St. intersection

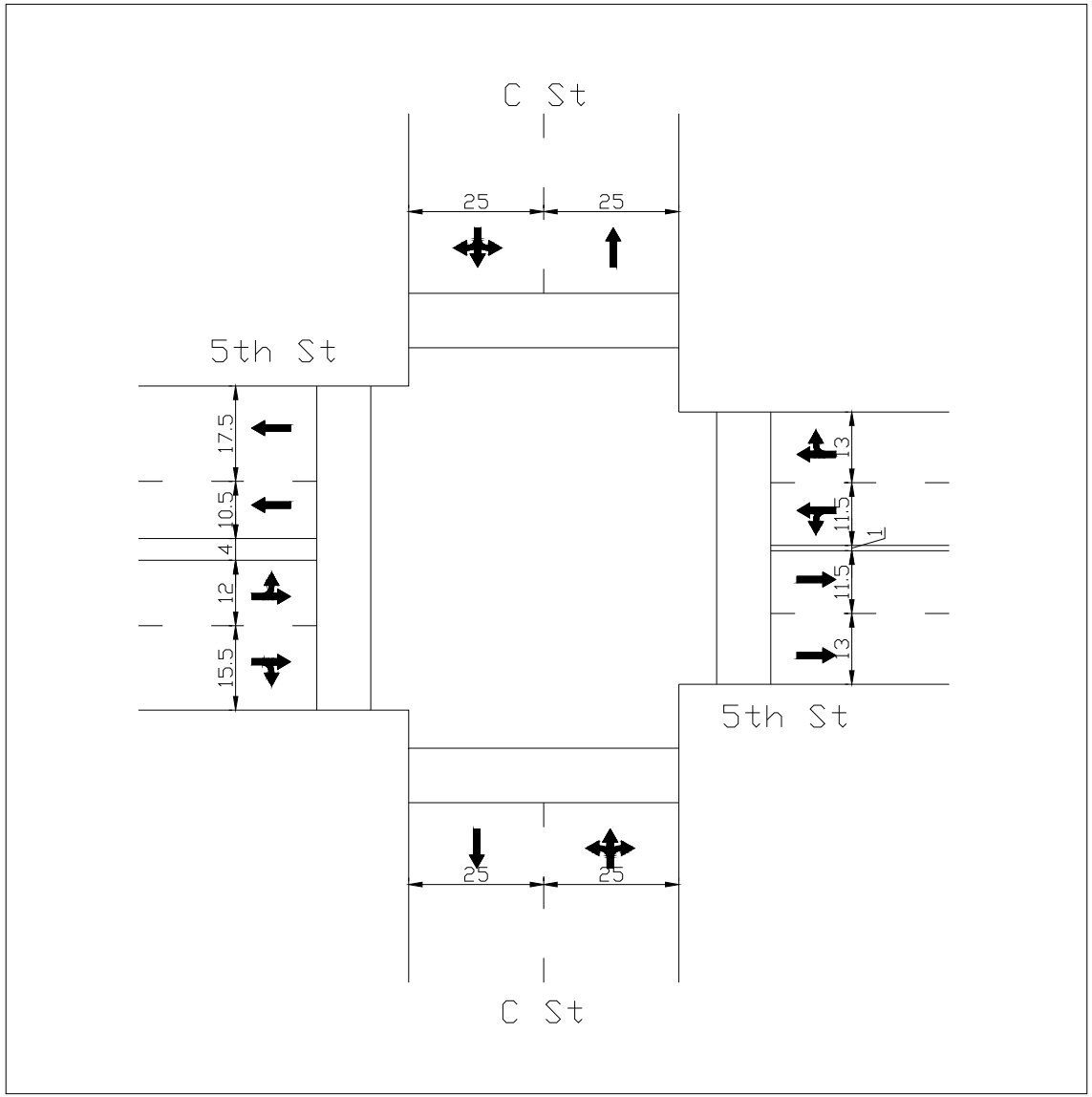


Figure 2-3 Existing geometric layout of C & 5th St. intersection

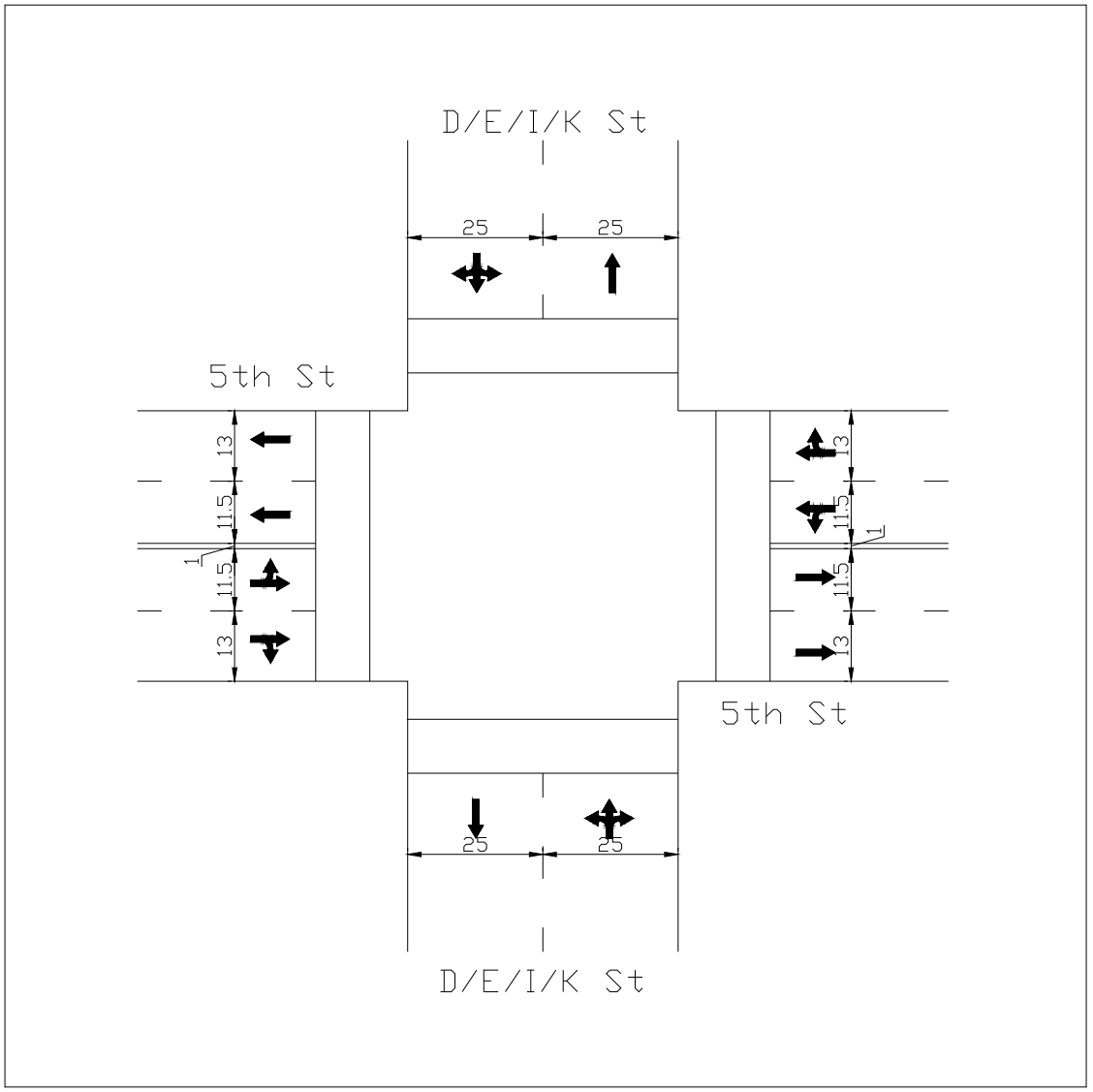


Figure 2-4 Existing geometric layout of D/E/I/K & 5th St. intersection

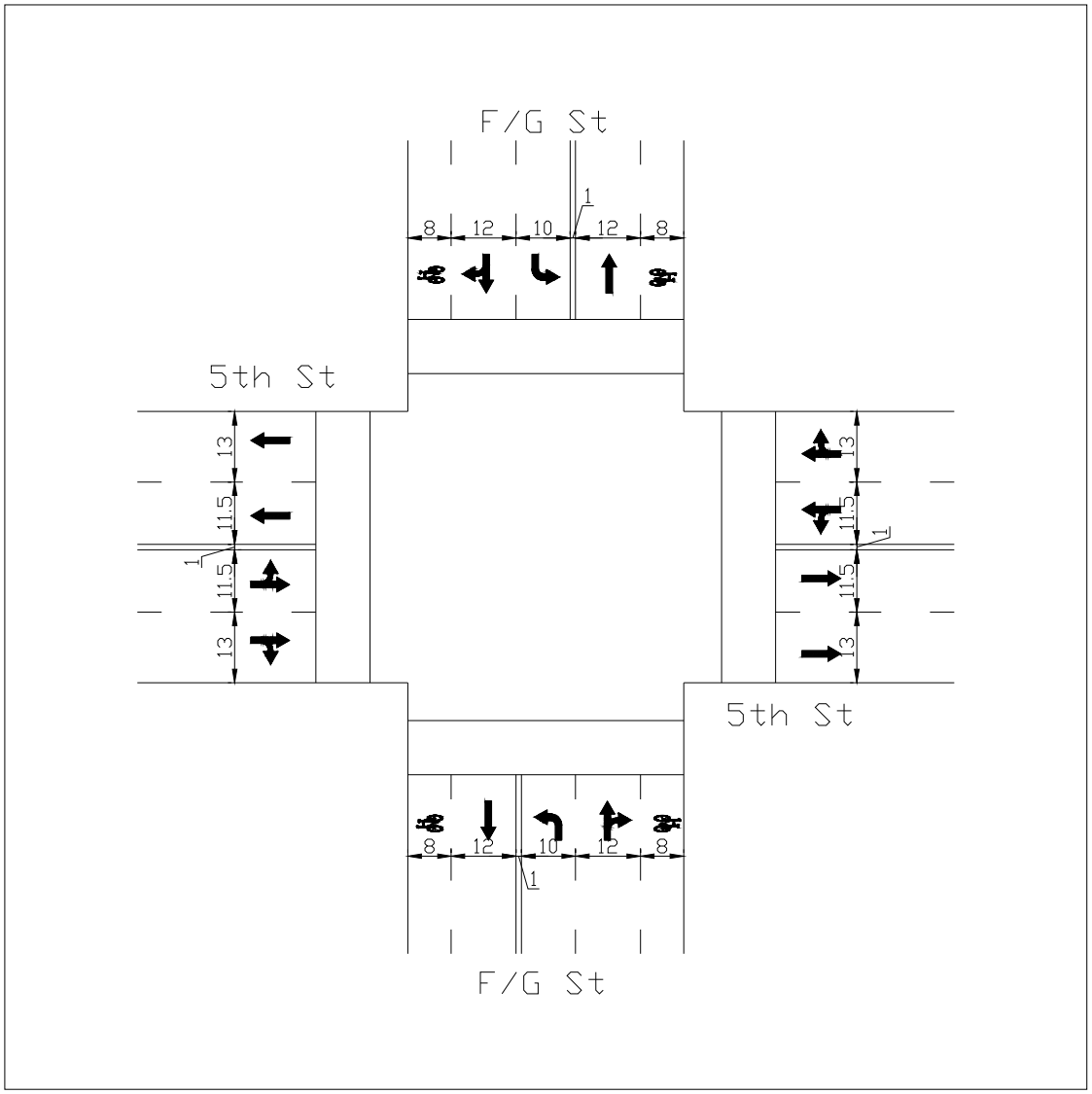


Figure 2-5 Existing geometric layout of F/G & 5th St. intersection

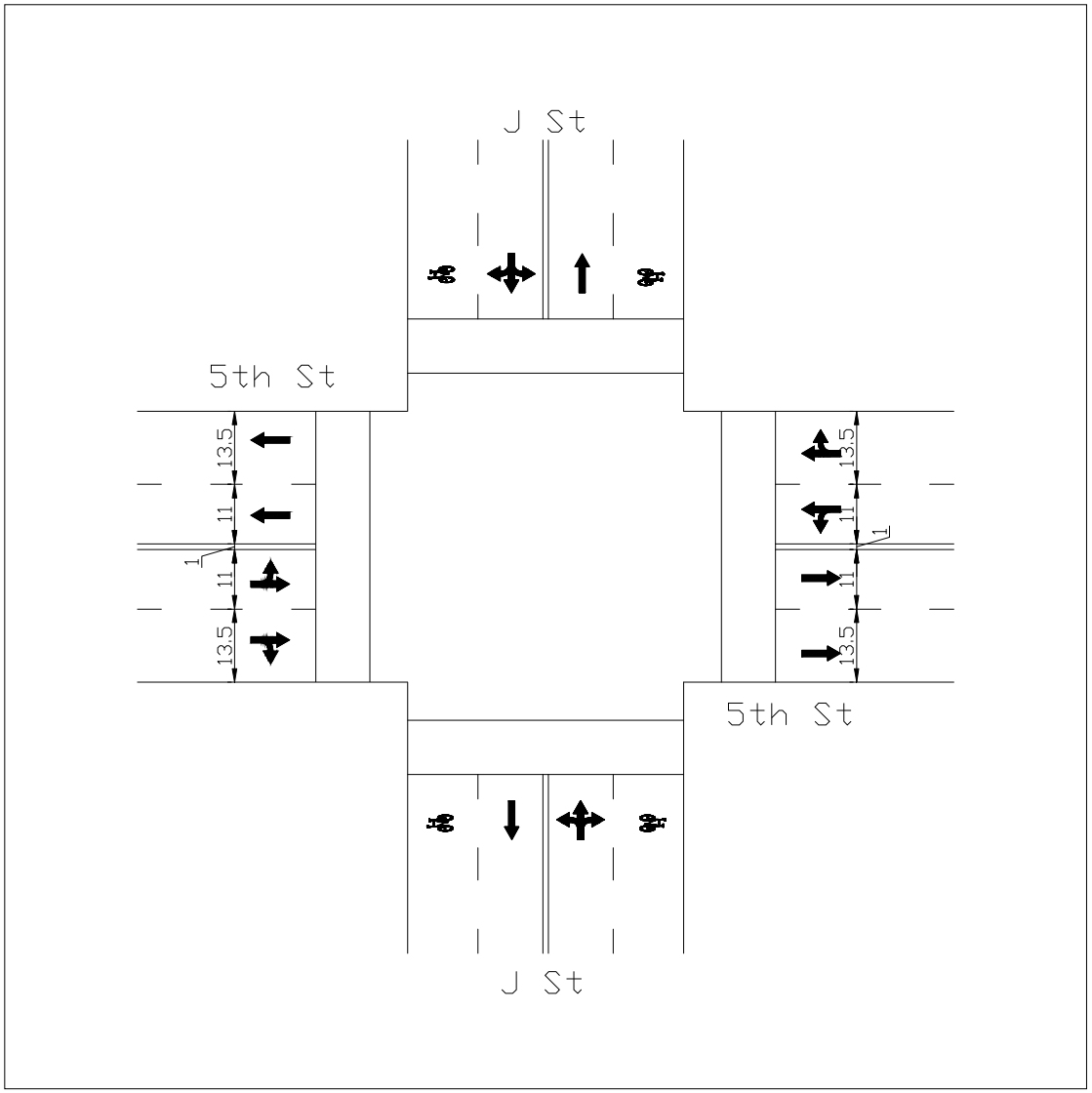


Figure 2-6 Existing geometric layout of J & 5th St. intersection

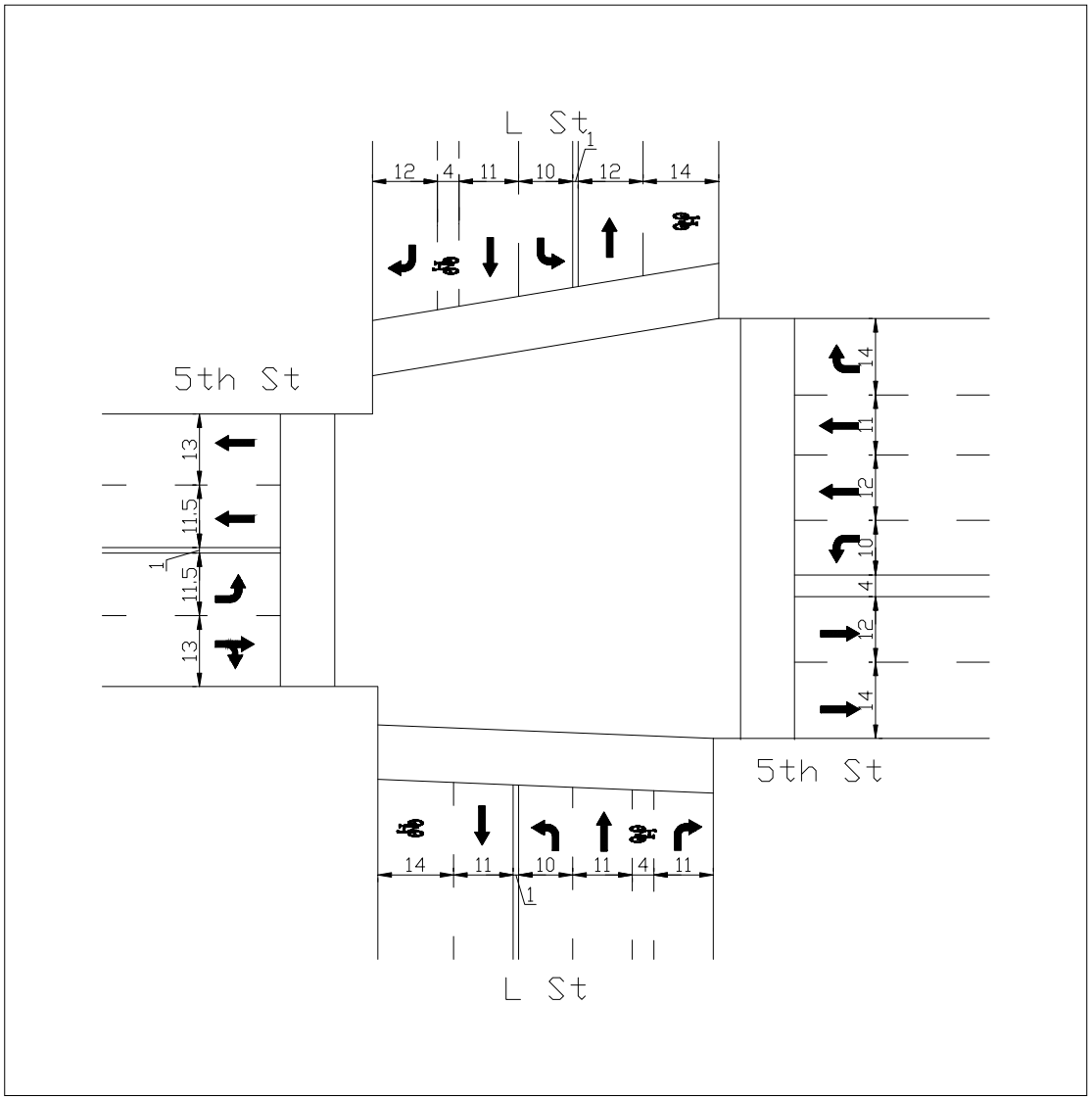
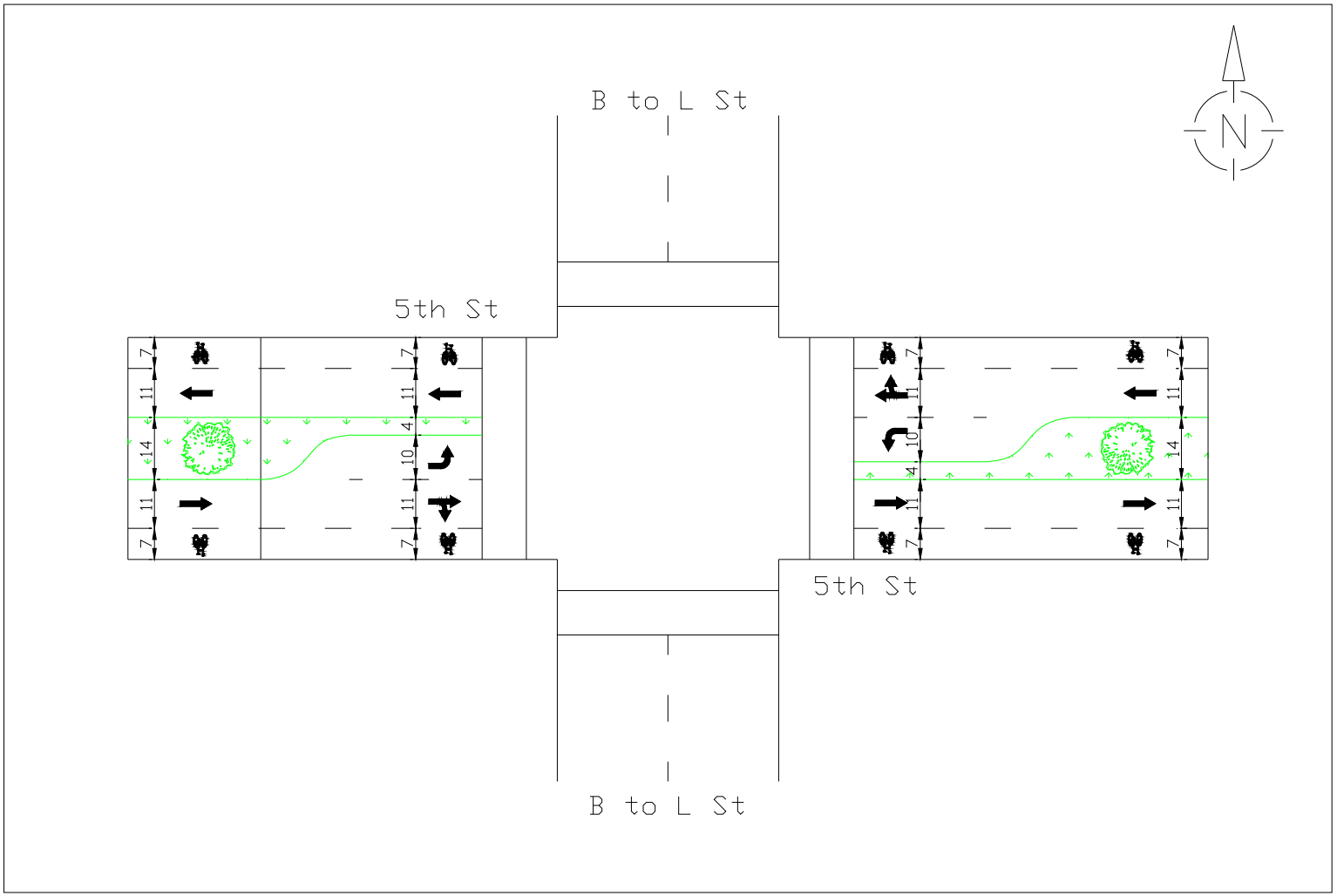


Figure 2-7 Existing geometric layout of L & 5th St. intersection



Note: the west approach of B&5th St. and the east approach of L&5th St. will keep unchanged.

Figure 2-8 Road diet geometric layout of intersections on 5th St. corridor

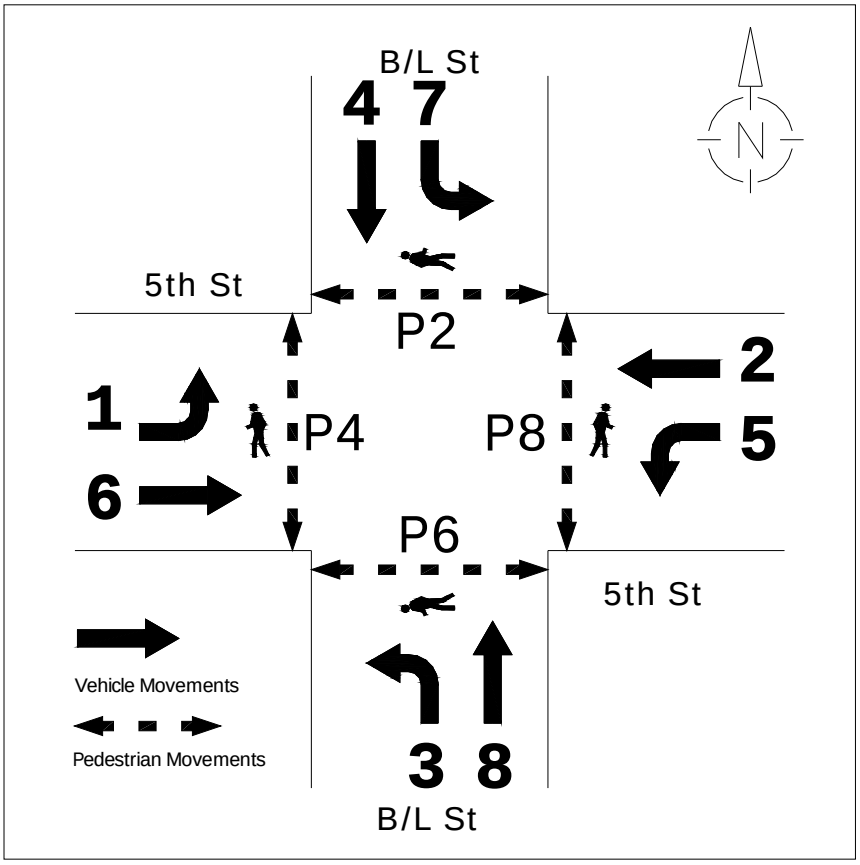


Figure 2-9 Traffic movements at B/L&5th St. intersection

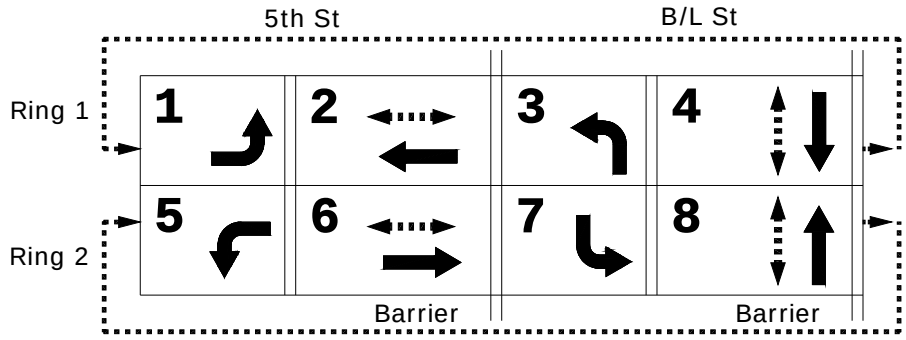


Figure 2-10 Signal phase diagram of B/L&5th St. intersection

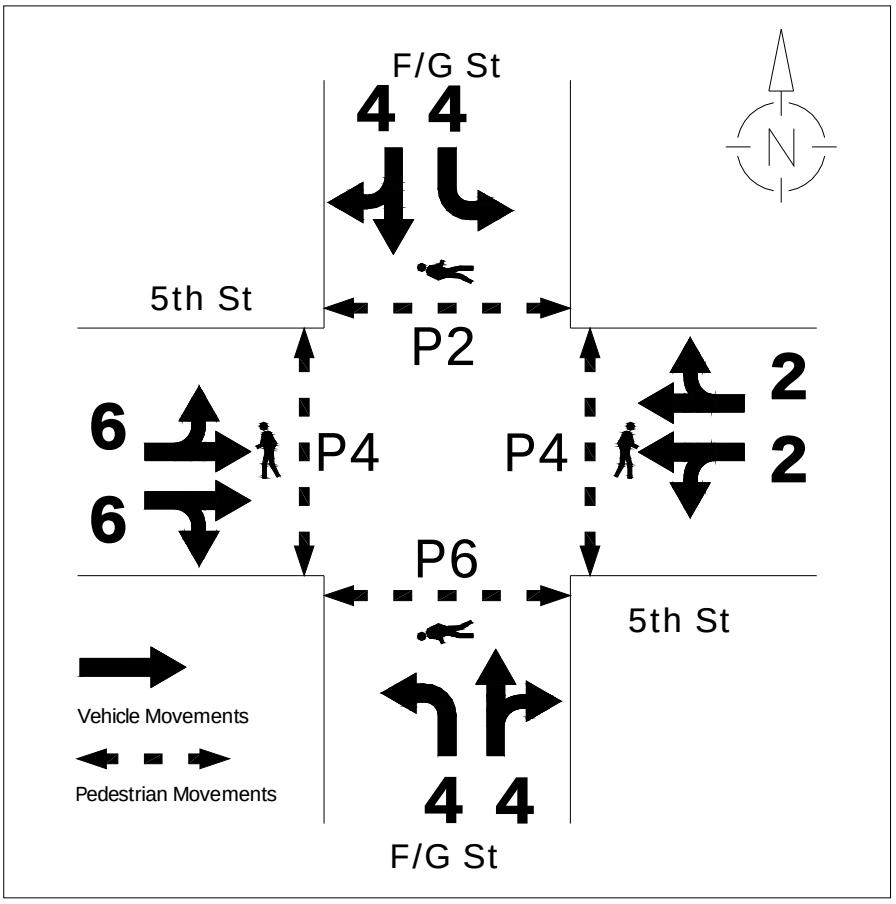


Figure 2-11 Traffic movements at F/G&5th St. intersection in existing case

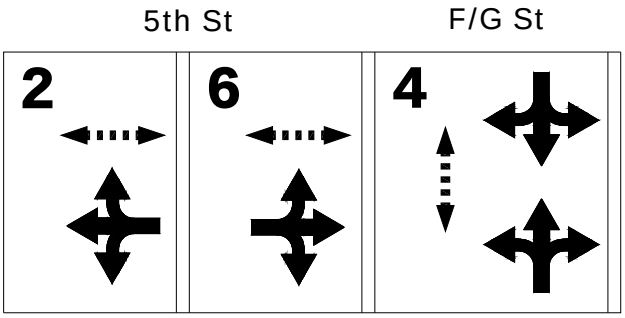


Figure 2-12 Signal phase diagram of F/G&5th St. intersection in existing case

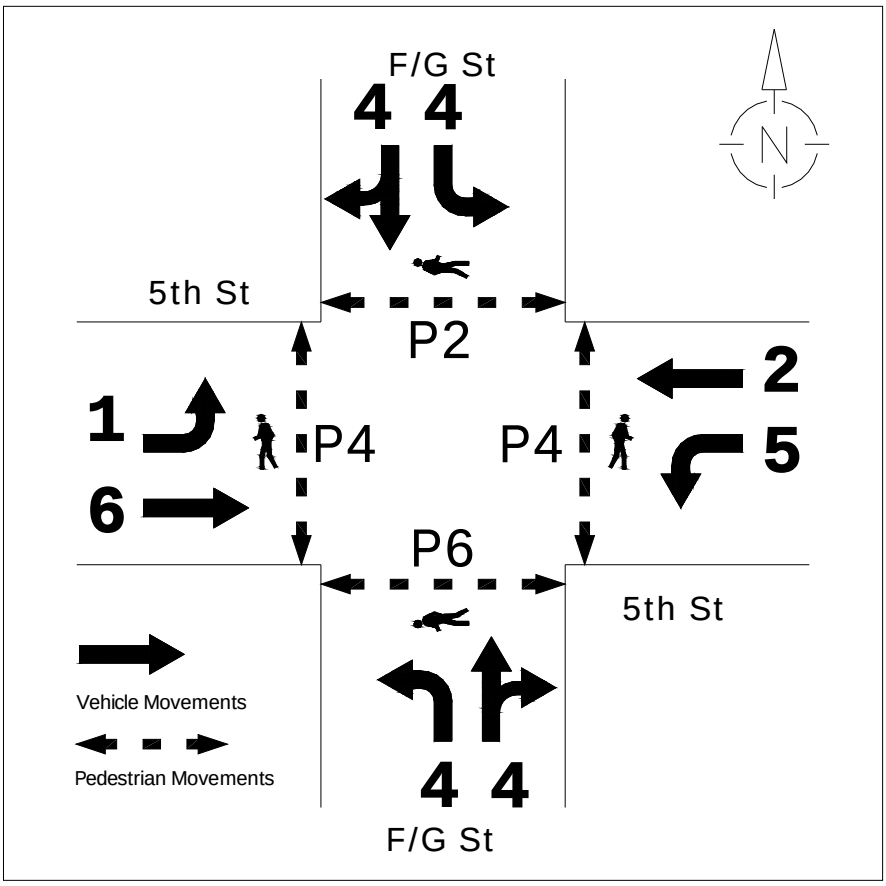


Figure 2-13 Traffic movements at F/G&5th St. intersection in road diet case

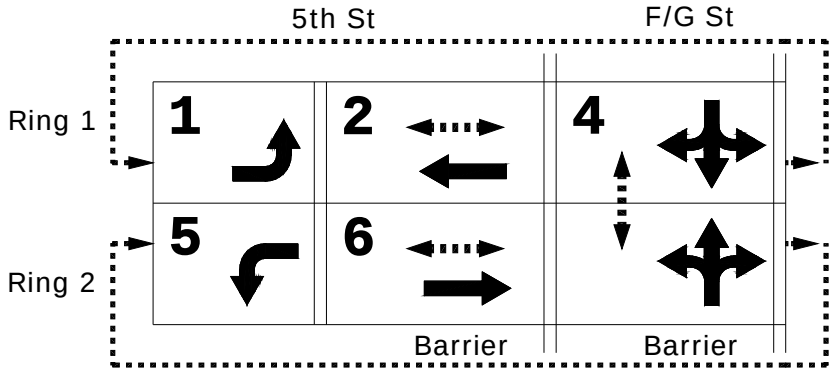


Figure 2-14 Signal phase diagram of F/G&5th St. intersection in road diet case

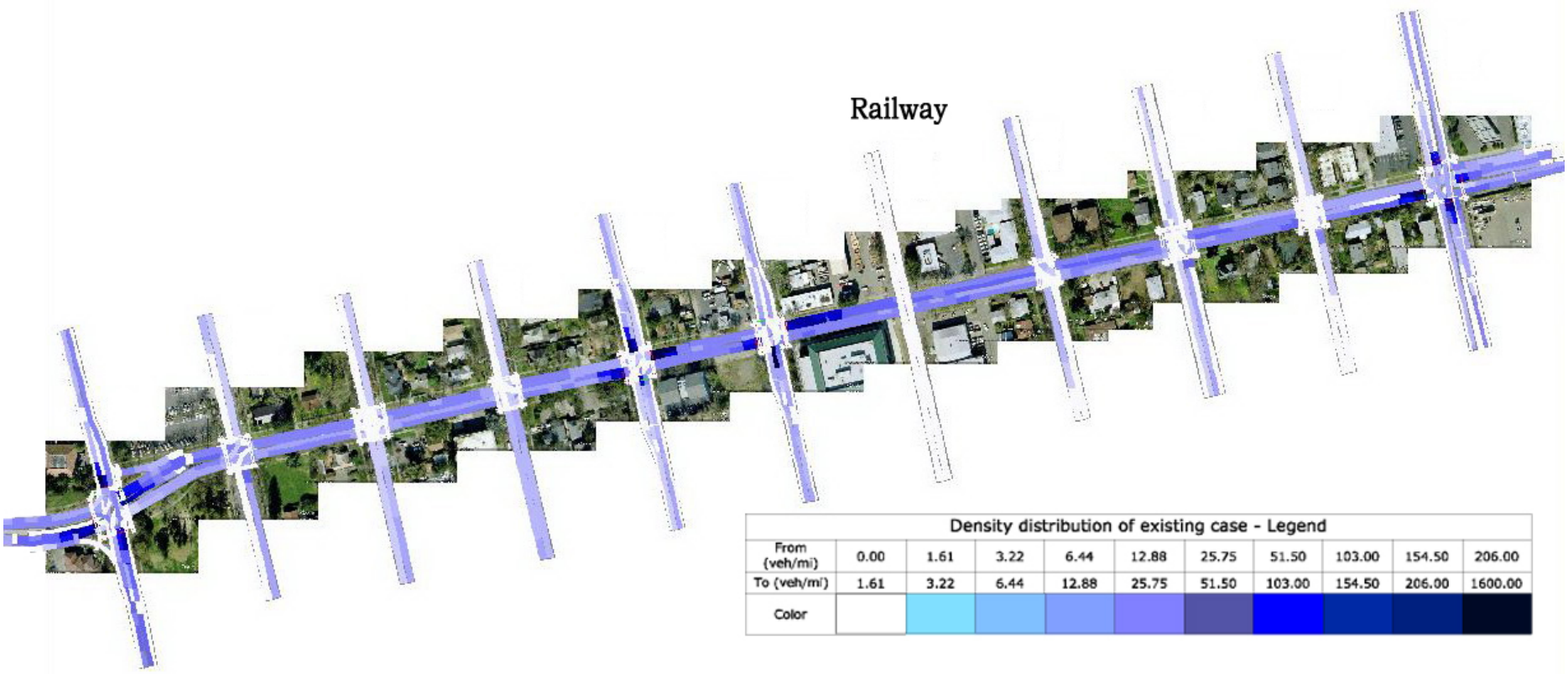


Figure 4-2 Density distribution (Existing plan)

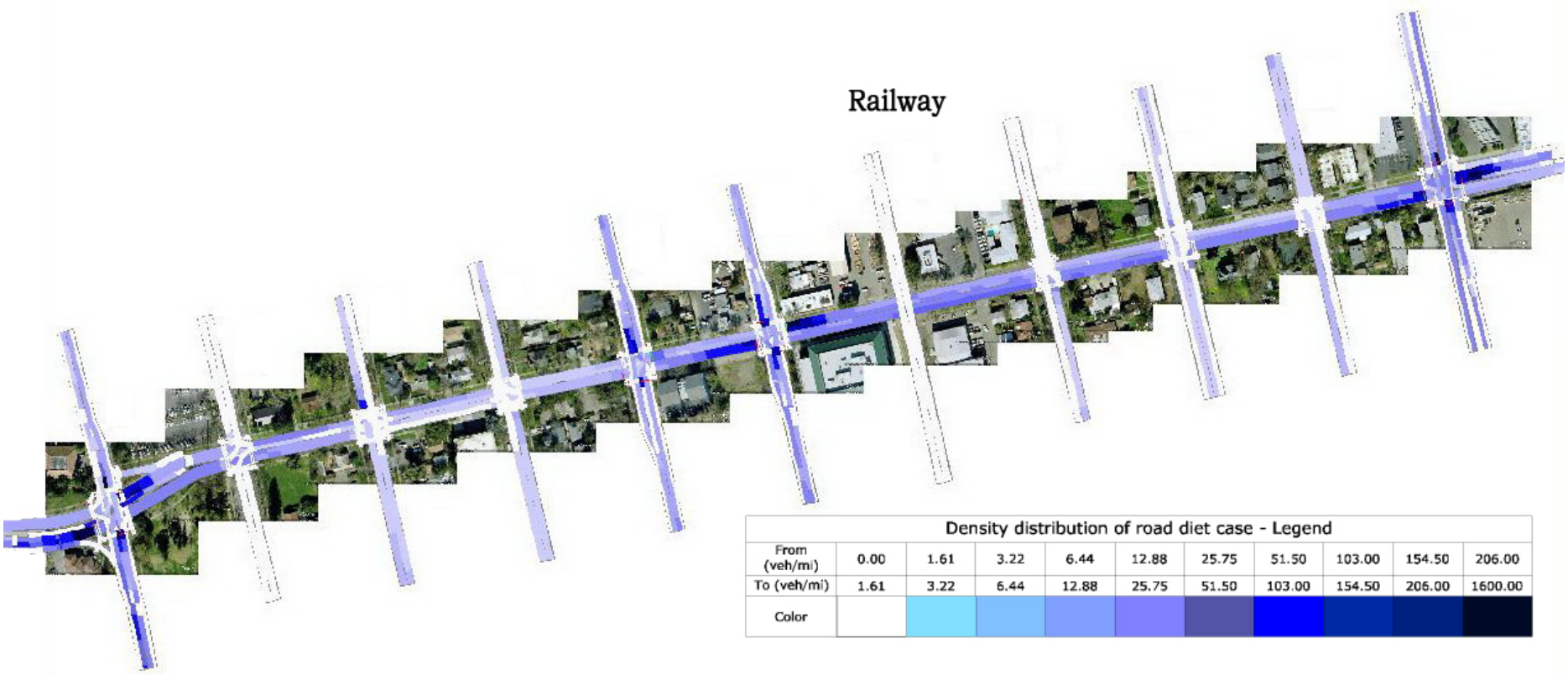


Figure 4-3 Density distribution (Road diet plan)

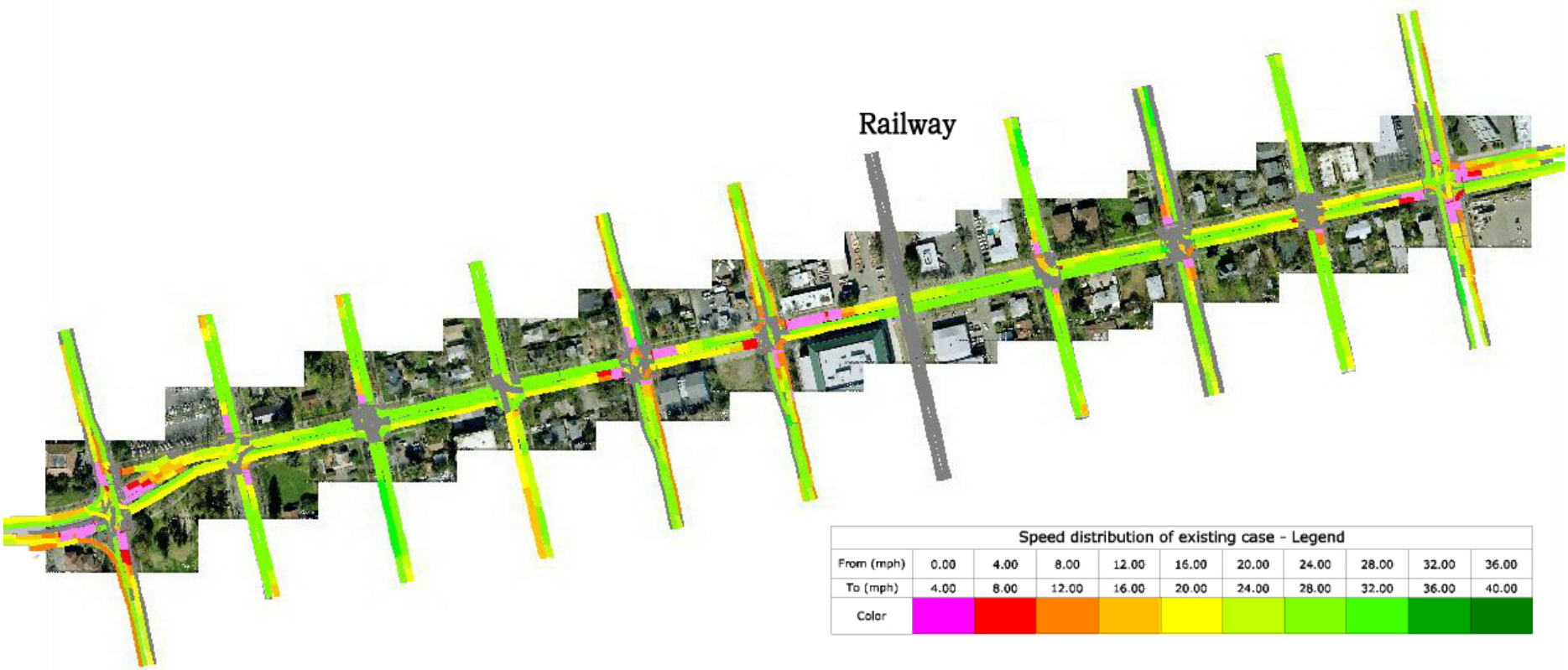


Figure 4-4 Speed distribution (Existing plan)

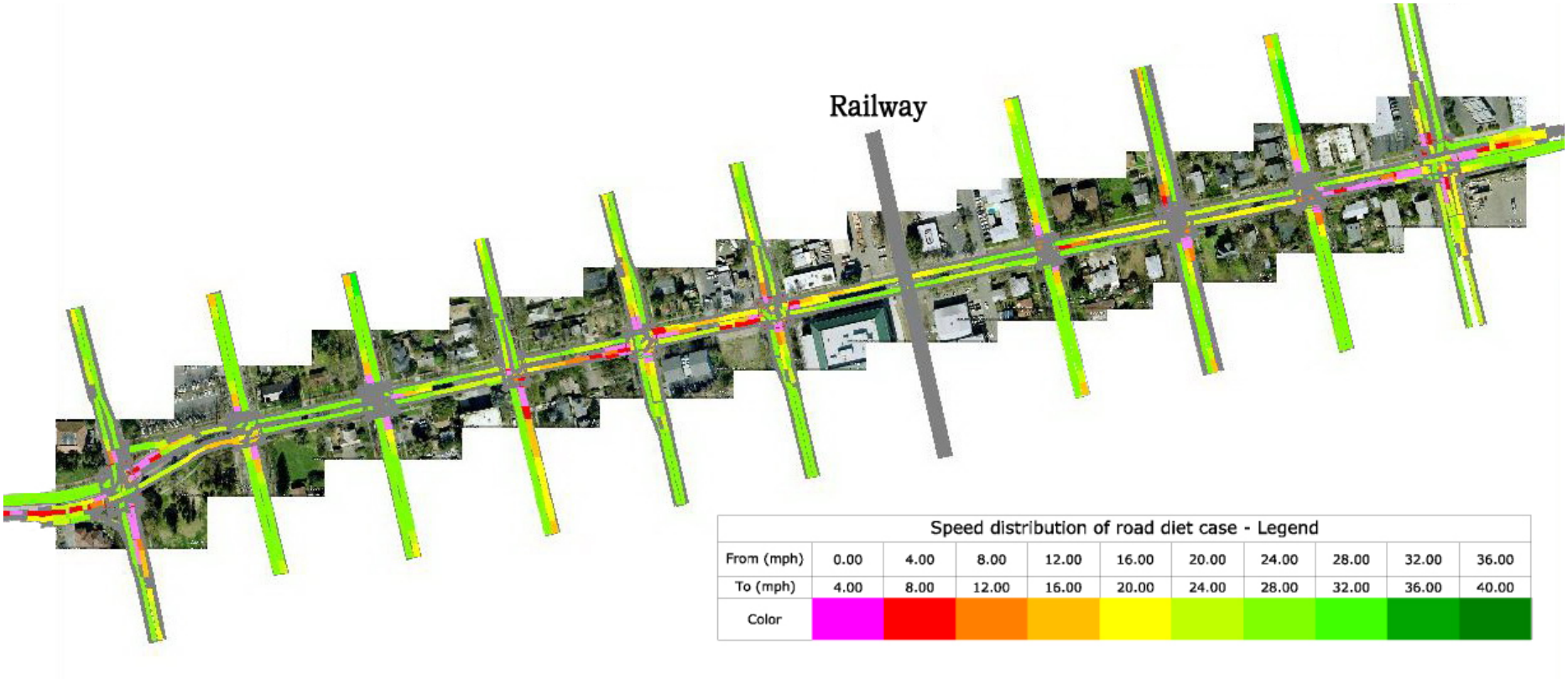


Figure 4-5 Speed distribution (Road diet plan)

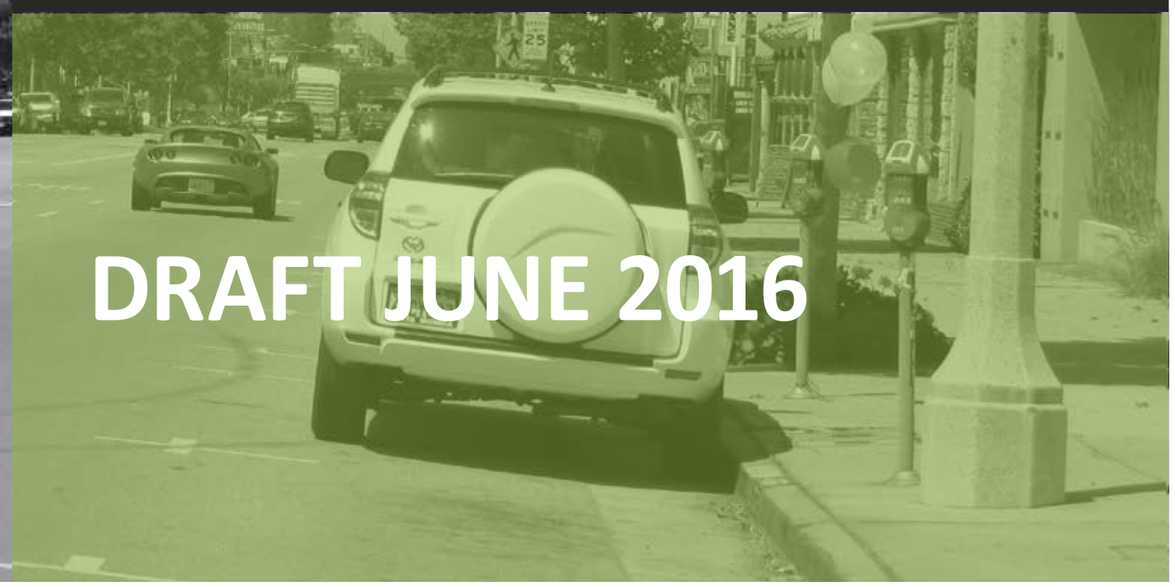




LIVABLE BOULEVARDS

STREETSCAPE PLAN

Westside Mobility Plan
City of Los Angeles



DRAFT JUNE 2016

Approved by the Cultural Affairs Commission on [date]

Approved by the Board of Public Works [or City Engineer] on [date]

Approved by the City Planning Commission [or Planning Director] on [date]

[Or in place of all of the above, if Cultural Affairs is included in the Street Standards Committee, “Approved by the Street Standards Committee on [date]]

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1.0 INTRODUCTION

This Streetscape Plan provides a blueprint for streetscape improvements in the public rights-of-way on key street segments in the West Los Angeles Transportation Improvement and Mitigation Specific Plan (WLA TIMP) and Coastal Transportation Corridor (CTCSP) Specific Plan areas with the goal of creating pedestrian friendly environments and enhancing the identity of the neighborhood in which each segment is located.

Per this Streetscape Plan, streetscape improvements may be constructed and/or maintained through a variety of means, such as:

By Certified Neighborhood Councils, Business Improvement Districts or other community groups

By private property owners, developers and business owners, in conjunction with development projects or as voluntary improvements

By the City in conjunction with street improvement projects

The Streetscape Plan does not supersede established standards by other City departments.

Figure 1 shows the street segments to which this Streetscape Plan currently applies:

PICO GREEN Pico Blvd from Centinela Avenue to the I-405 Freeway

PICO PATRICIA Pico Blvd from the 405 Freeway to Patricia Ave

MOTOR AVE from the I-10 Freeway to Venice Blvd

CENTINELA AVE from Washington Blvd to Jefferson Blvd

VENICE BLVD from Lincoln Blvd to Inglewood Boulevard



FIGURE 1-1 Streetscape Plan Segments
This Streetscape Plan provisions apply to the public rights-of-way of the street segments shown in this diagram. Additionally, the diagram also shows the half-mile proximity of some Metro Expo Line Stations in relation to some of the streetscape segments.

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2.0 GOALS & PRINCIPLES

GOALS

The overarching goal of this Streetscape Plan is to create a safe, attractive, and pedestrian-friendly environment that promotes neighborhood identity, multimodal accessibility, and local commerce.

AESTHETICS & IDENTITY

Improve the aesthetics of the street by implementing pedestrian amenities (benches, trash receptacles, street lighting) and landscaping (street trees, parkway plantings).

Foster a cohesive identity for each neighborhood through unique placemaking elements (gateways, banners).

MULTIMODAL MOBILITY & ACCESSIBILITY

Expand the function of the street to be more inclusive of active travel modes by providing bicycle and pedestrian-oriented streetscape amenities.

Improve connections to nearby transit and local businesses by promoting streetscape amenities, pedestrian infrastructure, and bicycle facilities.

SAFETY

Reduce the likelihood of collisions between people and vehicles by supporting bicycle and ADA-accessible pedestrian-oriented features such as curb extensions, continental crosswalks, and protected bikeways.

Increase pedestrian activity by creating a safe and inviting environment for shopping, leisure, and community events.

ECONOMIC DEVELOPMENT

Enhance commerce and business activity by improving the aesthetic quality, safety, and multimodal accessibility of the street.

SUSTAINABILITY

Incorporate sustainable practices including, but not limited to stormwater management, drought-tolerant landscaping, and energy-efficient street lighting.

PRINCIPLES

The following principles reflect the overall intent and theme of the Livable Boulevards Streetscape Plan's goals:

CONSISTENCY

Coordinated streetscape elements, including street trees, street lights, sidewalk paving, enhanced crosswalks and street furniture can improve the aesthetic quality and contribute to the economic vitality of neighborhoods.

BEAUTY

A street that is pleasant and enjoyable to travel along, whether walking, on a bicycle, in a vehicle or on transit, is an asset to the businesses on it and to the community that it serves.

SIMPLICITY

Streetscape elements should be clean and simple in their design and visual appearance and their placement should promote unobstructed views of storefronts and an ADA-accessible path of travel on sidewalks to minimize visual distractions and enhance the appearance of the corridor.

COMFORT

Streetscape elements should offer basic comforts to pedestrians and transit users, including shade, seating and shelters at transit stops and allow for gathering and social interaction.

MAINTENANCE

Streetscape elements should be readily available for replacement or repair purposes and should be easily maintainable.

DURABILITY

Streetscape components should be designed to serve the many pedestrians of the community. This includes the use of structurally sound and long lasting materials for each streetscape element.

This **Streetscape Plan** addresses these goals and principles by:

- Documenting the community's vision for how the street looks and functions
- Identifying a consistent palette of streetscape amenities such as street benches, trash receptacles, street lighting, trees and unique community identifiers
- Defining maintenance responsibilities for the city, businesses and community partners
- Providing a basis for pursuing related funding opportunities

Reinforce neighborhood or district identity






Bolster local businesses






Enhance walking, bicycling & transit experiences






Implement sustainable practices






Improve overall corridor aesthetics and livability






Note: The images above are meant to illustrate the goals and principles of this plan. All technical and/or design specificities are ultimately subject to City review.

3.0 ADMINISTRATION

The standards in this Streetscape Plan apply to all improvements in the public right-of-way of the identified segments along Pico Boulevard, Motor Avenue, Centinela Avenue and Venice Boulevard, as shown in Figure 1-1. The public right-of-way is that area between property lines on opposite sides of the street.

Within these design guidelines and standards, the strongest level of design intent is specified by the use of terms such as “must” and “shall.” Preferred streetscape design elements are expressed as being “encouraged,” “preferred,” or “recommended,” or as ones that “should,” or “may” be included as part of a project. Elements not found within this Streetscape Plan are not immediately precluded from future implementation as long as it can be demonstrated that they are in keeping with the overall design intent as expressed within this plan and are found to be consistent with the Goals and Principles (see Chapter 2.0) of this Streetscape Plan.

Applicability

Projects required to comply with the provisions of the Streetscape Plan are those that involve one or more of the following:

- Issuance of a Building Permit by the Department of Building and Safety for new construction or a major exterior remodel, defined as costing more than 50% of the assessed value of the existing improvement.
- Discretionary approval by the Department of City Planning (i.e., approvals by the Zoning Administrator, City or Area Planning Commission, Director of Planning or Advisory Agency).
- Issuance of a Building Permit or other required permits (such as a grading permit, change of use permit, parking permit, etc) by the Department of Building and Safety for the rehabilitation of existing surface parking areas that are adjacent to or can be seen from a public street.

Improvements in the public right-of-way that require an A-Permit, B-Permit, E-Permit, U-Permit or Revocable Permit by the Department of Public Works are also required to comply with the provisions of the Streetscape Plan. All streetscape improvements must be consistent with the technical specifications in this streetscape plan and applicable City Standard Plans.

Table 1 provides examples of types of projects or streetscape improvements that would require compliance with the provisions of the Streetscape Plan.

TABLE 1. Streetscape Plan Applicability

TYPE OF PROJECT OR IMPROVEMENT	SUBJECT TO STREETSCAPE PLAN PROVISIONS?
Tenant Improvement or Interior Remodel	No
Facade Improvement	No
Change of Use	No
New Construction, Additions, or Major Exterior Remodel, defined as a costing more than 50% of the assessed value of the existing improvement.	Yes
Requests requiring discretionary approval from Department of City Planning (i.e. approvals by the Zoning Administrator, City or Area Planning Commission, Director of Planning or Advisory Agency).	Yes
Rehabilitation of existing or addition of new surface parking areas that are adjacent to or can be seen from any public street	Yes
Planting of street trees, tree wells, parkways, bioswales, medians and related irrigation, planters, etc.	Yes
Installation of benches, trash cans, transit shelters, street lights or any other street furniture or elements.	Yes

Implementation

The Streetscape Plan itself does not specify the means of funding to build the required improvements. The Streetscape Plan will be implemented as new projects, both publicly and privately financed, are constructed over time. Examples of public agency streetscape investments include improvements by the City of Los Angeles Department of Public Works, and other governmental entities, such as the Los Angeles County Metropolitan Transportation Authority (Metro) or the City of Los Angeles’ Neighborhood Councils. Examples of private streetscape investments include improvements made through local Business Improvement Districts or by private developers proposing projects in the area. If eligible, implementation can also occur through the approval of projects consistent with the Exposition Corridor Transit Neighborhood Plan, including projects required to provide public benefits in return for increased development rights. Projects may also be required to implement portions of the Streetscape Plan, with the Department of City Planning imposing conditions of approval pertaining to streetscape improvements. Streetscape improvements done by non-profit community groups or individuals will also serve to implement the Streetscape Plan.

The Streetscape Plan will aid the City in securing grants from other sources. Specifically, the Streetscape Plan and the allocated monies in the West LA TIMP and Coastal Transportation Corridor Specific Plans should be used to leverage additional funds that could help pay for more capital-intensive improvements such as curb extensions, bioswale medians, and potential utility relocation.

Per the guidance in Table 3 and Chapter 5.0 of this plan, the streetscape elements located on the sidewalk shall be required as a condition of approval, to the extent determined feasible by DPW, for all development projects that require discretionary approval or site plan review. Other types of elements (e.g., improvements within the roadway, community identifiers, etc) may also be required depending on more detailed discussions between the City and the applicant.

Maintenance

Successful implementation of this Streetscape Plan requires not only that improvements are constructed in accordance with the Plan, but that all approved improvements are maintained. All proposed streetscape improvements shall include a maintenance plan. Such plans shall be included in any project submittal to the Department of Public Works. Issues to be addressed include graffiti abatement, vandalism, irrigation repair and replacement (including water billing responsibility), maintenance of landscape, trash collection for receptacles not emptied by the City, and any other maintenance tasks identified by the Department of Public Works.

If an improvement is required as a condition of development approval, the property owner shall maintain the improvement in perpetuity. BOE will determine whether a Revocable Permit and Maintenance Agreement are required. If an improvement is otherwise provided, for example, by a community group or voluntarily by a property owner, permit and maintenance requirements will vary as determined by BOE. BOE will determine whether a Revocable Permit and Maintenance Agreement are required.

Approval and Permits

The implementation of streetscape improvements must be approved by the City, typically by more than one department or bureau. City agencies can also assist in the implementation of streetscape improvements by private property owners through providing design expertise, the permit approval process, qualified City-funded programs, and/or assistance with access to appropriate state and federal grant funds. Chapter 4.0 (Streetscape Elements) generally notes the City departments that must approve each streetscape component. Individual departments and bureaus should be contacted directly for more specific information regarding their respective approval procedures and requirements.

Department of Public Works Permits

Streetscape improvement approvals result in the issuance of permits by the Department of Public Works. By approving the Livable Boulevards Streetscape Plan, the Board of Public Works has adopted the standards contained in the Plan as its own. This means that, in addition to existing citywide standards that apply to streetscape improvements, improvements will be reviewed for consistency with the Livable Boulevards Streetscape Plan as a condition of approval, as part of the permitting process by the Department of Public Works. Different types of permits are issued for individual improvements, with varying levels of review. Table 2 to the right summarizes the permits issued by the Bureau of Engineering (BOE). Additional permits may be required by other bureaus, including the Bureau of Street Services (BSS) and the Bureau of Street Lighting (BSL). See contact information to the right for more information.

Bureau of Contract Administration: Shop and Field Inspection

All improvements in the public right-of-way are subject to Shop and Field Inspection by the Department of Public Works, Bureau of Contract Administration. This requirement applies to major and minor improvements in the public right-of-way, including construction of bus shelters, benches, bike racks, gateway monuments, news racks, and permanent signs in the public right-of-way. Standard Specifications for Public Works Construction (Green Book) and BOE Brown Book amendments provide a list of materials that require shop inspection. The purpose of this inspection is to assure quality in the construction and materials, which are fabricated in a shop away from the construction site. All streetscape improvement plan drawings should include a note with the following text:

> *"Shop Fabrication should be made only from approved shop drawings and under inspection by the Bureau of Contract Administration. To arrange for inspection, call (213) 485-5080 two (2) weeks in advance for items more than fifty (50) miles outside of the City of Los Angeles, and 24 hours in advance for others."*

TABLE 2. Department of Public Works Permits - Bureau of Engineering

PERMIT TYPE	TYPE OF WORK	PROCESS
A-Permit (LAMC 62.106.a)	Minor street construction. Common examples include: • Repair, construction, reconstruction of standard street elements (curbs, sidewalks, tree wells, driveway approaches, gutters, curb drains, etc) that match existing grades • Repair of sidewalk damage caused by tree roots (Also requires a Tree Permit by Bureau of Street Services, Urban Forestry Division) Only projects that use standard, City-approved materials, comply with applicable City design specifications, and do not alter the established fl ow line of a gutter are eligible for an A-Permit.	• Staff level review • Typically does not require a survey or engineered plans • Additional permits may also be required. • Any associated excavation shall obtain an excavation permit
B-Permit (LAMC 62.106.b)	Major street improvements. Common examples include: • Widening of streets and alleys • Changing existing street grade • Installation of street lighting and traffic signals	• Staff level review • Require professionally prepared construction plans • May be required for a series of improvements that would individually require an A-Permit or when done in conjunction with a development project • Issued for design and/or construction • Additional permits may also be required. • Any associated excavation must also obtain an excavation permit
E-Permit (Excavation) U-Permit (Utility)	Issued to allow construction, inspection, maintenance, repair or removal of facilities that require boring, trenching or excavation in the public right-of-way. Common examples include: • Relocation of utility boxes • Street lights • Drilling of monitoring wells • Test boring to locate substructures	• Staff level review • May be issued in conjunction with an A- or B-Permit • Ensures consistency with the City's design and material specifications and proper inspection of construction work
R-Permit (Revocable)	• Major street improvements that encroach into the public right-of-way • Street improvements that include non-standard materials and/or elements and require repair and maintenance by the permittee • Grants conditional encroachment into the public right-of-way	• Staff level review • Applicant must keep improvements in a safe and maintained condition • Applicant typically must show proof of liability insurance. These are temporary permits which the City may revoke at any time, at which time permittee is required to restore the street to its original condition • Typically tied to A- or B-Permit and is not stand-alone

Contacts for Additional Permit Information

- For A-, B-, E-, U-, and R-Permits, see the Bureau of Engineering Permit and Procedure Manual: http://eng.lacity.org/techdocs/permits/
- For street tree permits and street use permits, contact the Bureau of Street Services: http://bsspermits.lacity.org
- For information on street lighting, contact the Bureau of Street Lighting: http://bsl.lacity.org
- For information on the City's Stormwater Program, contact the Bureau of Sanitation: http://www.lastormwater.org

Department of City Planning

Review of streetscape improvements by the Department of City Planning is required when the proposed project includes any of the following elements:

- Raised medians
- Midblock crossings
- Crosswalks
- Curb extensions
- Paving treatments
- Transit stop locations
- Directional and informational signs[1]
- City-owned hardware (e.g. controller boxes) - colors and materials
- Street light fixtures
- Gateway monuments and/or neighborhood markers

Department of Transportation

Review by the Department of Transportation is required for the following elements:

- Medians
- Pedestrian refuge areas
- Crosswalks
- Curb extensions
- Midblock crossings
- Transit stop locations
- Loading and drop-off zones
- Directional and informational signs[1]
- LADOT hardware (e.g. controller boxes) - colors and materials
- Bicycle racks, lockers, bike corrals and other bicycle facilities
- All Metro projects (interagency coordination)
- Bicycle parking zones and approval locations
- Traffic control devices (signals, pavement markings, traffic signs) and on-street parking zone
- Tree placement in landscaped medians

[1] Directional and informational signs shall also be reviewed by BSS for content, and by BOE for structural issues.

Department of Cultural Affairs

Pursuant to LAMC Sec. 22.109, the Board of Cultural Affairs Commissioners shall approve all works of art in the public right of-way. Public art improvements may include, but are not limited to, the following streetscape elements:

- Decorative pavers
- Street light fixtures
- Artwork/sculptures
- Street furniture (bus shelters, benches, trash receptacles)
- Tree wells
- Bicycle racks
- Planters

Community input on public art is recommended prior to submitting an application to the Department of Cultural Affairs' Cultural Affairs Commission.

Minimum Document Submittal Requirements:

- Two sets of plans identifying the type and placement of the proposed streetscape elements. If streetscape elements already exist within the project boundaries, the set of plans should identify existing elements and those proposed to be removed.
- Photographs (as applicable) of the (1) Subject site, (2) Existing streetscape elements, and (3) Proposed streetscape elements.

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4.0 STREETSCAPE ELEMENTS

Streetscape Elements Table

When streetscape improvements are implemented on the street segments specified in this Plan, they shall abide by the requirements listed in Table 3. Table 3 on the following pages lists the streetscape elements applicable to each Streetscape Plan segment, as well as a description of each element's key characteristics.

The notes below refer to or provide additional information about the column headings listed across the top row of Table 3:

Standard Plan or Contact. Refers to the BOE Standard Plan (download at eng.lacity.org/techdocs/stdplans/) or, where there is no standard plan, the City agency to contact for design, permit and maintenance requirements.

Review. Refers to the City agency or agencies responsible for reviewing and approving proposed improvements.

Typical Maintenance Refers to the general description of required maintenance; specific requirements will be provided by reviewing agency.

Table 3 is followed by an general narrative description of each streetscape element and its benefits to the community. Descriptions are not intended to repeat or replace the key characteristics in Table 3.

NOTE: The photos and images that follow Table 3 are intended to serve as conceptual and illustrative examples of each streetscape element and may not necessarily reflect existing City standards.

The street cross section below illustrates the portions of the public right-of-way as well as examples of typical streetscape elements.

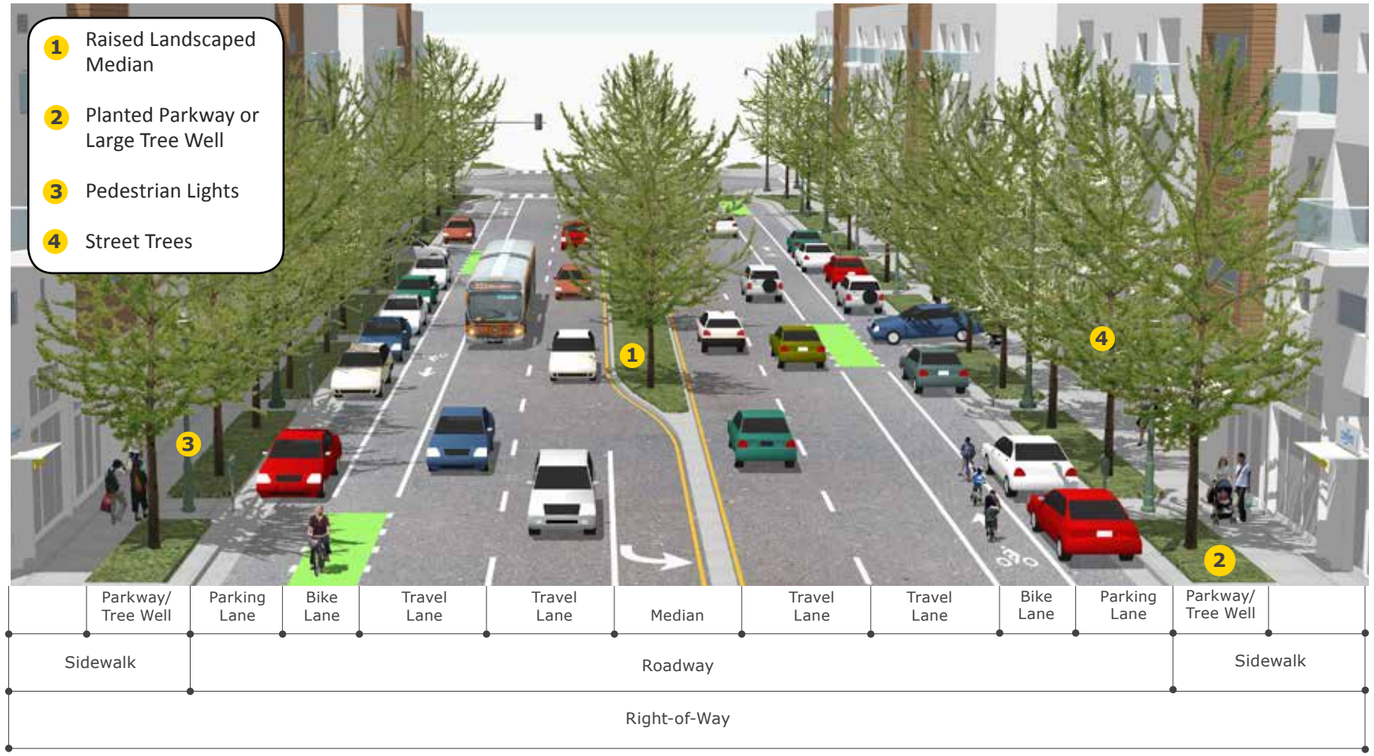

TABLE 3 ACRONYMS

DCP	Department of City Planning
DOT	Department of Transportation
DCA	Department of Cultural Affairs
DPW	Department of Public Works
BOE	Bureau of Engineering in DPW
BOS	Bureau of Sanitation in DPW
BSS	Bureau of Street Services in DPW
BSL	Bureau of Street Lighting in DPW

TABLE 3. Streetscape Elements (Page 1 of 5)

Element / Attribute	Street Segment	Key Characteristics	Standard Plan or Contact	Review	Typical Maintenance
Street Furniture[1] – required adjacent to development projects; may be provided in other locations					
Trash Receptacles[2]	ALL	Development requirement: 1 per 100' of property frontage in parkway zone. • Pico Green/Pico Patricia: Victor Stanley RB36 trash receptacle - Titanium. • Motor Ave: LandscapeForms Presidio • Centinela Ave: LandscapeForms Presidio • Venice Blvd: LandscapeForms Presidio	BOS	BOS	Empty as needed.
Seating[2]	ALL (in front of commercial/mixed-use developments)	Development requirement: 1 per 100' of property frontage in parkway zone. • Pico Green/Pico Patricia: Victor Stanley RB28 bench with center arm rests - Titanium. • Motor Ave: LandscapeForms Presidio with back and center arm rests • Centinela Ave: LandscapeForms Presidio with back and center arm rests • Venice Blvd: Fixed, movable or artist-designed in coordination with Neighborhood Council or BID, as approved by DPW.	BSS	BSS	Remove graffiti, clean, replace as needed.
Bicycle Racks	ALL	Development requirement: per Zoning Code; in parkway zone subject to LADOT approval. Style: City standard. Other: Propose locations to LADOT for approval.	S-671	DOT	Remove graffiti, clean, replace as needed.
Planters (OPTIONAL)	Pico Patricia Other segments, if requested	Planters shall be maximum 36" in height (including plant material at maturity) when placed in parkway or between tree wells. Planters shall be no taller than 24" in height (including plant material at maturity) within 45' visibility triangle of street intersection, within 20' visibility triangle of an alley, and within 5' of a driveway/walkway edge. Planters shall be placed per the BSS furniture placement guidelines. Must have saucer trays or internal watering system. Planters may be installed between back of curb and minimum 4' clear pedestrian path of travel. Style [for Pico Patricia]: Architectural Pottery Legacy Series - Gunmetal	BSS	BSS	Water, weed, replace/ prune/fertilize plants.
Bus Stop Furniture and Information Kiosks[1]					
Bus Shelters and Benches	ALL	Request through City Coordinated Street Furniture Program.	BSS	BSS	-- (by City contractor).
Trash Receptacles	ALL	Request through City Coordinated Street Furniture Program.	BSS	BSS	-- (by City contractor).
Information Kiosks	As requested by BID or Neighborhood Council.	Request through City Coordinated Street Furniture Program.	BSS	BSS	-- (by City contractor).
Street Lighting					
Existing Street Lights	ALL	Existing poles and luminaires (typically ±30' tall poles); unpainted galvanized steel poles.	BSL	BSL	By BSL
Bus Stop Lights	ALL	In pairs at bus stops.			By BSL
Pedestrian Lights[2] (attached to street light poles and/or between street lights)	• Pico Green • Pico Patricia • Motor Ave • Centinela [Culver Blvd – Short Ave]; [Stewart Ave – Washington Blvd] • Venice Blvd [Beethoven Ave – Moore Ave]; [Stewart Ave (north side)/Wasatch Ave (south side) – Inglewood Blvd]	• Pico Green: STILL Citysite or similar • Pico Patricia: King Luminaire Coachman • Motor Ave: Historic Replica • Centinela Ave: Contemporary (Modified Historic or Traditional) or Historic Replica • Venice Blvd: Historic Replica			By BSL funded by assessment.

[1] All street furniture must either conform to or not conflict with the City's requirements and contractual obligations of the Citywide Coordinated Street Furniture and Bus Bench Programs at all transit stops.
[2] If a specific model cannot be implemented or accommodated, then DPW shall use an approved equal.

TABLE 3. Streetscape Elements (Page 2 of 5)

Element / Attribute	Street Segment	Key Characteristics	Standard Plan or Contact	Review	Typical Maintenance
Street Trees					
Existing	ALL	To remain until replaced following BSS/DPW approval.	BSS	BSS	Prune for clearance (permit required).
New	ALL	36" box (preferred), 24" box (minimum) / average 30-40' on center (refer to BSS Tree Spacing guidelines). • Pico Green: *Platanus x hispanica* (*P. x acerifolia*) 'Columbia' (London Plane)* • Pico Patricia [405 Fwy – Westwood Blvd]: *Pyrus calleryana* 'Aristocrat' (Aristocrat Pear) • Pico Patricia [Westwood Blvd – Patricia Ave]: *Pyrus kawakamii* (Evergreen Pear) • Motor Ave: *Koelreuteria bipinnata* (Chinese Flame) • Centinela Ave: *Lyonothamnus floribundus* subsp. *asplenifolius* (Catalina Ironwood) • Venice Blvd: *Plantanus racemosa* (California Sycamore) or *Platanus x hispanica* (*P. x acerifolia*) 'Columbia' (London Plane)* * Known reproductive host to Polyphagus Shot Hole Borer; use alternative species if pest is not controlled.	S-456	BOE, BSS	3-year establishment period is required. Refer to BSS for specific maintenance requirements. Regular irrigation per BSS; prune as needed to maintain clearance (permit required).
Tree Wells					
Dimensions (includes curb)	ALL (where applicable)	5' x 10'	S-450	BOE, BSS	Weed, remove litter, sweep/ replenish DG.
Surface - Standard		Decomposed granite (DG).	S-450 S-455		
Surface - Non-Standard (optional)		• Drought tolerant plants less than 24" tall with a 18" walkable surface ("convenience strip") from back of curb directly adjacent to marked on-street parking spaces. • Tree grates, if desired by community and if approved by BOE.			Weed, remove litter, replace/prune plants. Cut grates to expand opening as tree grows.
Parkways					
Width (includes curb)	ALL (where applicable)	• Pico Green/Pico Patricia: 7'-wide parkway on 15' sidewalks; 5'-wide parkway on 10' sidewalks • Motor Ave: 6'-wide parkway • Centinela Ave: 5'-wide parkway • Venice Blvd: Variable (see below); Parkway width on ≥20' sidewalk = (Sidewalk width) - (10' walkway) Parkway width on 15-19' sidewalk = (Sidewalk width) - (8' walkway) Parkway width on 10-14' sidewalk = (Sidewalk width) - (6' walkway)	BOE	BOE	--
Surface treatment		Drought tolerant plants less than 24" high. Adjacent to marked on-street parking or loading spaces, a 5'-wide walkable surface across parkway every two on-street parking spaces and an 18" walkable surface from the back of curb (not required in other locations without a parkway). Walkable surface should be concrete, or permeable pavers if approved by BOE.	BOE, BSS	BOE, BSS	Weed, remove litter, replace/prune plants.
Grade		Slope planted areas down at 1% from all edges toward center to collect sidewalk runoff.	S-450		Maintain grade.
Low-Level Plants (for Medians, Parkways, Tree Wells and Other Planting Areas)					
Plant species or cultivars	ALL	Plants listed in Chapter 5.0 and Appendix A.	BSS	BSS	
Irrigation (for Trees and Other Plantings)					
Method if planting is a condition of development approval	ALL	Automatic in-line drip system, subsurface pop-up bubblers (preferred) or spray with no over-spray; Smart controller.	BSS	BOE, BSS	As directed by BSS.
Alternative method	ALL	Hand or truck watering.			As directed by BSS.

TABLE 3. Streetscape Elements (Page 3 of 5)

Element / Attribute	Street Segment	Key Characteristics	Standard Plan or Contact	Review	Typical Maintenance
Sidewalk Width and Paving					
Minimum Width	ALL – see Key Characteristics.	• Pico Green/Pico Patricia: 15’ • Motor Ave: 12’ • Centinela Ave: 10’ • Venice Blvd: 15’ or maintain existing if already greater than 15’		DCP, DOT	--
Paving - Standard	ALL (except Pico Patricia)	Concrete scored every 10’.	S-444, S-601	BOE	--
Paving – Non-Standard	Pico Patricia	Colored, scored concrete (for color/scoring pattern see Pico Patricia page in Chapter 5.0): Walkway: Davis Colors Baja Red (SRI 42), or approved equal. Between Street Trees: Davis Colors Palomino (SRI 47), or approved equal. Driveways and curb ramps shall be paved with standard concrete.		BOE	Repair/replace as needed.
Sidewalk Corners					
Curb Radii	ALL – see Key Characteristics.	Maximum 25’ corner radius at intersections without curb extensions; Maximum 20’ corner radius at corners with curb extensions (unless Autoturn analysis shows a greater radius is required at non-perpendicular intersections or to accommodate LAFD trucks or WB-40 trucks).		BOE	--
Ramps	ALL	Directional ramps (both corners) where they can be accommodated.	S-442	BOE	--
Driveways					
Location, number and width	ALL	Only the minimum number and width needed to accommodate vehicular access. No driveways on an arterial street where there is alley or non-arterial street access. Remove unused driveway approaches.	DOT \ MPP-321	DOT	--
Design of driveway approach	ALL	Minimize the sloped portion and locate it entirely in the parkway zone where feasible without exceeding 10% slope, e.g., 6” curb requires 5.5’ long slope. Maximize the flat portion.	S-440	BOE	--
Sidewalk Dining					
Allowed as follows	• Pico Green/Pico Patricia • Motor Ave • Centinela Ave: [Culver Blvd– Short Ave]; [Stewart Ave–Washington Blvd] • Venice Blvd: [Beethoven St–Moore St]; [Stewart Ave (north side)/ Wasatch Ave (south side) – Inglewood Blvd]	With BOE permit where an ADA-compliant clear path of travel (currently 4’ wide) is provided. Note that path of travel does not have to be in a straight line.	BOE	BOE	Per permit requirements.
Crosswalks					
Existing Marked Crosswalks	ALL	Per LADOT Standards: White continental striping at applicable locations Yellow continental striping near schools	DOT	DOT, BOE	--
New Marked Crosswalks (at unsignalized intersection or midblock locations)	See plans in Chapter 5.0 for location detail: • Pico Blvd at: Amherst Ave; Westgate Ave; Tennessee Pl; Corinth Ave • Motor Ave at: midblock b/t Venice Blvd & Regent St; b/t Regent St & Tabor St • Centinela Ave at: Hammack Ave; Greene Ave; Gilmore Ave; Louise Ave; Stewart Ave • Venice Blvd at: Meier St; Boise Ave; Ocean View Ave; Mountain View Ave	Per LADOT Standards: White continental striping at applicable locations Yellow continental striping near schools Pedestrian signals, overhead flashers, curb extensions, refuge islands as determined to be appropriate by DOT.	DOT	DOT, BOE	--

TABLE 3. Streetscape Elements (Page 4 of 5)

Element / Attribute	Street Segment	Key Characteristics	Standard Plan or Contact	Review	Typical Maintenance
Landscaped Medians					
Median Trees	Initial candidate locations, where feasible (see plans in Chapter 5.0): • Pico Green: [Centinela Ave – Gateway Blvd] • Pico Patricia: [Kelton Ave – Midvale Ave]; [Pelham Ave – Manning Ave]; [Overland Ave north of Pico Blvd] • Motor Ave: Coordinate with Neighborhood Council or BID • Centinela Ave: [Alberta Ave – Ballona Creek]; [Greene Ave–Short Ave] • Venice Blvd: [Beethoven St – Inglewood Blvd] Additional medians may be added as curb cuts are eliminated or property owners agree to right-turn only access.	Trees spaced an average of 30' on center except within 50' of intersections. • Pico Green: *Quercus tomentella* (Island Oak) • Pico Patricia: *Jacaranda mimosifolia* (Jacaranda) • Centinela Ave: *Ginkgo biloba* (Ginkgo) • Venice Blvd.: *Hespercyparis macrocarpa* (Monterey Cypress) between Beethoven St – Centinela Ave; *Tipuana tipu* (Tipu) between Centinela Ave – Inglewood Blvd	BSS	BOE, BSS	Prune trees for clearance (permit required).
Low-level planting		Drought tolerant plants less than 36" high, non-invasive, no thorns/spines –see Appendix A.			Weed, prune, fertilize, replace/prune plants. mulch, irrigation, etc.
Drainage		Slope to center to collect runoff; infiltration or treatment of street runoff where feasible.			--
OPTIONAL: Curb Extensions[3]					
Dimensions	Candidate locations, where feasible (see plans in Chapter 5.0 for each streetscape segment): • Pico Blvd at: Amherst Ave; Bundy Dr; Westgate Ave; Granville Ave; Barrington Ave; Tennessee Ave; Federal Ave; Corinth Ave; Sawtelle Blvd • Motor Ave at: Venice Blvd; Regent St; Tabor St; Palms Blvd; Woodbine St; National Blvd • Centinela Ave at: Allin St; Walsh Ave; Greene Ave; Gillman Ave; Short Ave; Louise Ave; Stewart Ave • Venice Blvd at: bus stops (see Option 2 on plans in Chapter 5.0)	4 to 6' wide, 25' inside curb radius for street cleaning. ADD CURB AND GUTTER	S-484	BOE, BSS, DOT	If planted,weed,remove litter, replace/prune plants.
Utilities Conflicts		May require relocation of storm drain inlets, fire hydrants, and other utilities. New push button on post may be required.			
Surface Treatment		Paved path of travel; remainder may be paved or planted, requires DPW approval			
OPTIONAL: Protected Bicycle Lanes[4]					
Locations	Motor Ave Venice Blvd	Curbside bicycle lanes with protection in the form of: (1) on-street parking that serves as a buffer between moving vehicles and bicyclists, or (2) A striped buffer in conjunction with plastic posts; or a raised concrete buffer with potential landscaping; or (3) LADOT's latest best practices for protected bicycle lanes at the time of implementation. This element requires coordination with LADOT/LADCP prior to implementation.	DOT	DOT, DCP	--
OPTIONAL: Stormwater/Runoff Infiltration/Treatment (in curb extensions or parkway)					
BMPs for Low Impact Development (LID) ordinance compliance	ALL	Permitted where soil/groundwater/other conditions meet S-480 requirements; requires site survey, Soil Report by a Geotechnical Engineer, project plans, landscape/ irrigation operation/ maintenance plans stamped by Civil Engineer or Architect.	S-480-483	BOE, BSS	Detailed operation/ maintenance plan required.
OPTIONAL: Community Identity Elements					
Banners on street light poles	As requested by BID or Neighborhood Council.	Max. 24 sq. ft. 14' above sidewalk with permit (bannerpermits.lacity.org); not where adjacent use is predominantly residential.	BSL	BSL	Per permit requirements.
Gateway or other identity elements	As requested by BID or Neighborhood Council.	Monument or vertical element on median or vertical element in parkway zone, set back 18" from curbs.	BSS CA	BSS, DCA	Remove graffiti, clean, replace as needed.
Wayfinding elements	As requested by BID or Neighborhood Council.	Signs or medallions attached to street or pedestrian light poles.	BSS CA	BSS, DCA	Remove graffiti, clean, replace as needed.

[3] Curb extensions may not be feasible at all in all locations, are subject to DPW and DOT approval.
[4] Per the WLA TIMP and CTC Specific Plans and their accompanying resolutions, partial funding for protected bicycle lanes have been set aside separately from funding specifically for streetscape improvements.

TABLE 3. Streetscape Elements (Page 5 of 5)

Element / Attribute	Street Segment	Key Characteristics	Standard Plan or Contact	Review	Typical Maintenance
OPTIONAL: Uses in On-Street Parking Lane					
Parklet or Bicycle Corral	As requested by BID, Neighborhood Council, Community Group, etc.	Download manual at peoplest.lacity.org	DOT	DOT	Per LADOT People St. Program
Intermittent Parkways with Street Trees	As requested by BID, Neighborhood Council, Community Group, etc.	Primarily where sidewalks are less than 8' wide to accommodate street trees that can provide shade and stormwater infiltration.	BSS	DOT	
OPTIONAL: Repurposed Roadway					
Pedestrian Plaza	As requested by BID, Neighborhood Council, Community Group, etc.	Download manual at peoplest.lacity.org	DOT	DOT	Per LADOT People St. Program
Permanent Pedestrian Plaza	May be added in the future.	Raised to sidewalk level.	DOT	DOT, BOE	

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Street Furniture

Trash Receptacles

Through this Streetscape Plan, certain development projects are required to install and maintain one or more trash receptacles specified in Chapter 5.0 adjacent to their frontage. A Business Improvement District or community organization may install and maintain additional receptacles in other locations. Alternatively, with approval, the Bureau of Sanitation may provide and maintain a standard plastic trash receptacles that City trash trucks can empty.





Typically community members prefer separate trash and recycling bins and, in particular, the solar trash compactors (left) that can hold up to four times as much trash as a standard bin. A BID or other community group needs to maintain these receptacles.



Coordinated furnishings, seen above, require a property owner, BID, or neighborhood group to maintain them.



Basic receptacles, seen above, may be provided by the Bureau of Sanitation.

Seating

Through this Streetscape Plan, certain development projects are required to install and maintain one or more benches or seats specified in Chapter 5.0 adjacent to their frontage. A Business Improvement District may install and maintain additional receptacles in other locations. In addition, individual businesses may provide seating and sidewalk dining provided they obtain the required permits.











Examples of seating that could be provided by property owners, business improvement districts, or other community groups with maintenance by them.

Bicycle Racks

The current standard City bike rack is an inverted U rack, designed to support two locked bicycles. Bike racks can be requested from LADOT who will install them in appropriate locations. Typically they will be installed in the “parkway zone” in line with tree wells or in parkways. An alternative to the inverted U rack may be an artist designed bike rack. Maintenance funding would need to be provided and City’s Department of Transportation would have to approve design and installation.



Standard City bike rack.



Bike racks can be located adjacent to large tree wells or in a parkway.

Bus Stop Furniture

Furnishings at bus stops, including shelters, benches and trash receptacles, as well as information/advertising kiosks, are provided and maintained by City contractors with funding from the advertising panels on the furnishings. The bus stop furniture is maintained by the vendor, including routine maintenance of a trash receptacle and removal of graffiti.

Bus Benches

Benches with advertising panels are installed at bus stops with moderate ridership and advertising potential. The current standard bus bench is shown below.

Bus Shelters

Bus shelters with advertising panels are installed at bus stops where there is a combination of high ridership and advertising potential.

The standard City bus shelter is the Boulevard shelter shown below. The standard color is dark green, but communities may request a different color. In the future, there may be several other styles of shelters available through the City's Coordinated Street Furniture Program.

Information Kiosks

The City's Coordinated Street Furniture Program can provide information kiosks in approved locations. These three-sided kiosks have two sides dedicated to advertising and one for community purposes. The community panel could have a map of the nearby businesses and other amenities, information concerning community events, and other community- approved information.



Standard bus bench.



Standard Boulevard shelter.



Standard advertising/information kiosk.

Street Lighting

Street lights, as well as signs and other vertical elements, should be consolidated onto as few poles as possible to avoid conflicts with street trees and maximize space for other sidewalk uses.

Existing Street Lights

Street lights are typically on poles about 30 feet tall and spaced to provide adequate lighting for both the roadway and sidewalk. Energy-efficient LED bulbs are the current City standard. Most street light poles on Westside boulevards are unpainted galvanized steel, which is more sustainable that painted poles, as it does not require painting. However, some communities may request painted poles, which will require additional maintenance.



Typical example of existing street light poles.

New Street Light Components

Street lights typically include three components: pole, arm and luminaire. One or more of these components may be replaced by a new ornamental version (to the extent the remaining existing components are compatible with the proposed new component. If poles are replaced, the concrete footing to which the pole is attached will typically have to be replaced as well).

Property owners pay for the operation and maintenance of street lights through an assessment district. In order to have street light components replaced and paid for, the approval of the property owners must be obtained.

The assessment ballot process is described under Pedestrian Lights.



Bus Stop Lighting

Generally, one to three pedestrian lights can be installed at bus stops as "general benefit" lights, which do not require the approval or assessment of adjacent property owners.

Bus stop lighting should be requested from the Bureau of Street Lighting (BSL) for all bus stop locations that do not currently have it. The City has several approved bus stop lighting fixtures including the King Luminaire Coachman shown below. Communities may request a different pedestrian light, particularly if they have pedestrian lighting of a different style.



Bus stop lights on Olympic Boulevard are compatible with the historic street lights and consistent with the pedestrian light for the entire district.

Pedestrian Lights

Pedestrian lighting provides illumination along sidewalks to supplement that provided by the roadway street lights. Pedestrian lights are typically mounted at about half the height of street lights, that is, 12 to 16 feet compared with 28 to 30 feet. In addition to providing more illumination and making sidewalks more welcoming, pedestrian lights can contribute to the identity of a district and the larger community in which it is located and, together with street lights and street trees, establish a pattern or rhythm on the street.

Property owners must pay for the maintenance and operation of the lights, other than bus stop lighting and other "general benefit" lighting, through an assessment. Therefore, regardless of how the capital cost is funded, installation of pedestrian lighting requires the approval of adjacent property owners. Ballots are sent to the owners of all properties that will benefit from the lighting. Only those ballots received are counted. Each ballot is weighted proportionally by the amount of the proposed assessment for the corresponding property. A simple majority (50%) is required to approve the assessment.

Community members who participated in the Livable Boulevards workshops expressed their preference for one of the four general styles of energy-efficient LED pedestrian lights shown in the adjacent images for the commercial segments of each street:

- Historic replicas lights
- Modified historic lights
- Traditional lights (not historically based but using traditional forms and elements)
- Modern lights

In addition for some segments, community members selected a specific preferred pedestrian street light. Chapter 5.0 lists the preferred general style or specific fixture for each street segment.

Once a community group obtains a funding commitment, they can begin to work with BSL to obtain approval for a specific fixture and to initiate the assessment ballot process.







Historic replicas







Traditional







Modified historic









Modern

Street Trees

The benefits of healthy, mature street trees include:

- Providing shade to make streets more pleasant to walk and enjoy.
- Providing shade to adjacent buildings to lower temperatures and reduce energy use.
- Slowing and capturing rainwater, helping water soak into the ground to restore local hydrological functions and aquifers.
- Improving air quality by producing oxygen, cooling air, and absorbing and storing carbon in woody plant tissues.
- Making streetscape environments for adjacent land uses more attractive.
- Increasing property values for residences and helping attract customers toward businesses along the street.
- Enhancing community identity through the use of a consistent palette of trees, the act of planting, and provision of sheltered spaces for social interaction.
- Enhancing safety on a street by helping to calm traffic.
- Providing cover, food, and nesting sites for indigenous wildlife.

Typically, existing healthy street trees should be retained. However, they may be replaced on request of adjacent property owner or community group with approval of BSS and the Board of Public Works. Existing street trees are candidates for replacement when they are significantly damaged or in decline, causing damage to property (such as the raising of sidewalks or breaking of curbs) that cannot be corrected by simply enlarging the tree wells, or cannot be maintained in a safe and healthy condition.

The goal of this plan is to provide a relatively continuous canopy along the street in order to provide the above benefits and scale to the street.

Street Tree Palette. Chapter 5.0 lists the proposed street tree and, in some cases, an alternate for each street segment. Each proposed tree has a form appropriate to the street segment's conditions. In particular, trees with a single central leader (trunk) that can be pruned up above business signs are proposed in commercial districts and trees with a narrow canopy spread are proposed for narrow sidewalks.

Note that DPW provides final approval of street tree species/cultivars and acceptable selections may change over time as conditions change, for example, sidewalks may widen or a new pest or disease may appear. If the proposed street tree cannot be planted in the future, a tree with a similar form should be selected in its place.

Key DPW Requirements. The BSS UFD online information library (bss.lacity.org) provides the required spacing between trees for 150 common trees and palms. The predominant spacing is 30 to 35 feet, but some larger trees are listed at 40 feet and some smaller trees at 25 feet.

The following spacing from other elements is typically required:

Water and Gas Meters	6 feet
Underground Vaults	6 feet
Driveway Aprons and crosswalks	6 feet
Fire Hydrants	10 feet
Pedestrian lights	10 feet
Street Lights	20 feet
Electrical utility poles	20 feet
Alley Entrances:	20 feet
Street Intersections:	45 feet
Railroad Tracks/Crossings:	100 feet

Where street trees are required as a condition of development approval, automatic irrigation to parkways and tree wells is required. Watering by hand or watering truck may be substituted when no developer is responsible for the new planting.











Street trees in commercial districts that are pruned up above business signs and provide a relatively continuous canopy and shade along the sidewalk without blocking business signs and display windows.

Tree Wells

Tree wells are defined by DPW as openings for trees that are not more than 12 feet long. The standard surface material for tree wells is currently non-stabilized decomposed granite (DG). Maintenance includes sweeping DG that migrates onto the pavement back into tree wells, replenishing it, and weeding. Tree wells may be planted with low-level plants, in which case the surface should be covered with at least three inches of mulch to reduce weed growth. Plants in tree wells must be maintained as described for parkways.

Non-standard alternatives include cast iron tree grates. In addition to weeding the surface under the grates, tree grate openings must be enlarged over time as the tree trunk diameter increases. If they are not enlarged, the grates will cut off the flow of water and nutrients upward and sugars downward in the outer layers of the tree trunk just under the bark and kill the trees. Since grates are rarely maintained, they are discouraged.

Tree wells with either planting or DG may be provided. Tree wells with DG should be provided at high-volume bus stops since the surface is walkable.

Where a planted tree well is located adjacent to on-street parking, an 18-inch wide strip along the back of the curb must have a walkable surface (also known as the “convenience strip”) as described under Parkways on the following page.







Tree well surfaces include:
Above: Low-level planting
Above right: Decomposed granite
Right: Cast iron grate.

Parkways

In the City of Los Angeles, a tree well becomes a parkway when it is longer than 12 feet. Parkways provide more soil volume for trees and increase infiltration of stormwater and other runoff than tree wells, but also require more maintenance since they are larger and DPW requires that they be planted with low-growing plants as well as trees. In addition to irrigation, the low-level plants need to be pruned along the edges of the planting area, dead flowers and branches removed, and plants replaced when they die. The parkway surface should be covered with mulch in the planted area, except adjacent to on-street parking, as specified below. The mulch and DG should be swept off the walkway as needed.

On the streetscape segments in this plan, parkways are preferred over tree wells, except at bus stops, since they provide greater environmental benefits.

Where a planted parkway is located adjacent to on-street parking, a walkable surface must be provided as follows, unless otherwise directed by DPW:

- An 18-inch wide strip along the back of the curb (the "convenience strip") should be paved with concrete, or with permeable pavers if approved by BOE
- A five-foot wide path across the parkway at a spacing of 40 to 50 feet (two parking spaces) to provide access from parking to the walkway



Path from curb to walkway every two parking spaces.



Examples of planted parkways with a walkable surface adjacent to on-street parking and between the curb and main walkway.





Low-Level Plants

In addition to increasing permeable surface area and thereby reducing runoff and heat gain, planted areas with low-level planting provide visual interest, color, visual relief from the otherwise paved street environment, and community identity, all of which improve the experience of people on the street. In addition, low-level planting in tree wells and parkways provides an extra layer of visual separation between pedestrians and vehicles, while median landscaping provides another layer of texture for drivers to view, encouraging slower vehicle speeds. The plants themselves function as filters, reducing the amount of small particulate matter that is circulated by the motion of vehicles.

Medians and parkways are required to be planted with low-growing groundcover, perennials, shrubs or grasses. In addition, tree wells may be planted with such plants. In some Streetscape Plan areas, businesses and community groups may wish to provide plants in pots or other containers.

BSS requires that plants in the public rights-of-way comply with the following criteria:

1. Shall not be poisonous
2. Shall not have sharp edges,spiky or thorny points
3. Shall not be invasive
4. Shall not be taller than 36 inches at maturity
5. Shall not be taller than 24 inches within 45-foot visibility triangle of street intersection, within 20 feet visibility triangle of an alley, or within five feet of a driveway or walkway edge
6. Should be drought-tolerant, cold hardy and long lived

See the Westside Plant Palette in Appendix A for a list of low-growing grass, perennial, groundcover and shrub selections appropriate to the streetscape plan segments in this plan. See Chapter 5.0 for the specific palette for each street segment. Most of these plants are drought tolerant and many are California natives.

Low-level planting require water and other maintenance, including weeding, pruning, fertilizing, mulching and replacing dead or damaged plants. Plants in containers typically requires additional care.



Drought-tolerant median planting.



Parkway planting can provide a buffer where there is no on-street parking.

Irrigation

Even though the proposed street trees and low-level plants are drought tolerant, they still require water, especially when they getting established, during hot summer and fall, and when rainfall is below average. DPW will specify the required watering schedule in conjunction with permit approval for planting.

If planting is provided in conjunction with a development project, an efficient irrigation system, for example, in-line drip or bubblers with a “smart” controller, which automatically adjusts the watering schedule based on local conditions, is required. If an irrigation system is not feasible for trees or other plants installed by a community group, they can be watered by hand or water truck.





Rosemary is one of the few groundcovers/shrubs that survives with no supplemental water as demonstrated by the median on Glendale Boulevard.

Sidewalk Width and Paving

In general, it is City policy to provide minimum 15-foot wide sidewalks on most arterial streets, where feasible. However, in some circumstances, it may be appropriate to allow narrower sidewalks. For example, where the predominant land use is single-family residences with low pedestrian volumes and houses are setback 15 to 20 feet or where commercial lot depths are shallow and a five-foot dedication would make it difficult to develop, a 10 to 12-foot wide sidewalk may be acceptable. On the other hand, where higher pedestrian volumes are anticipated with future development and where sidewalk dining and other sidewalk activity is desirable, sidewalks at least equal to or wider than 15 feet are desirable.

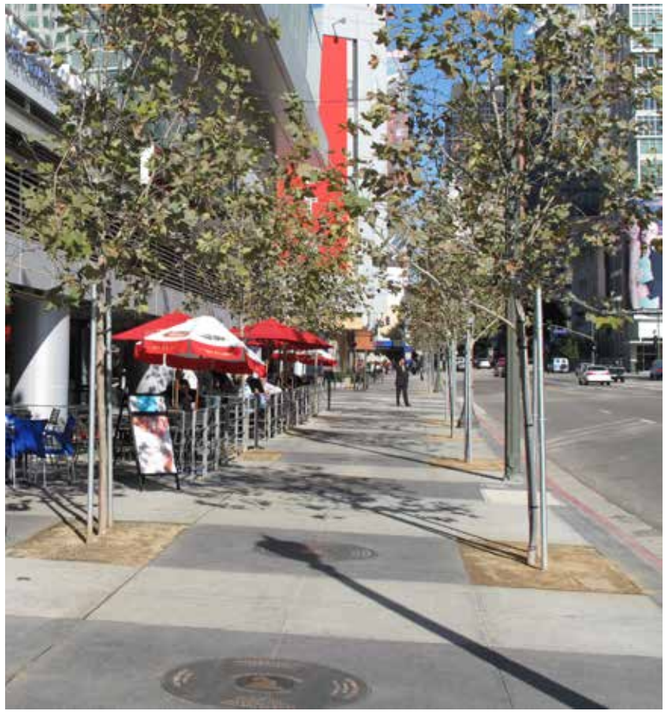
The following text generally describes the existing and proposed sidewalk widths for the Westside Livable Boulevards streetscape segments:

- Pico Boulevard generally has 15-foot wide sidewalks, except where they have been narrowed generally to 10 feet wide (between Purdue Avenue and Sawtelle Boulevard, Midvale Avenue and Glendon Avenue, and Selby Avenue and Manning Avenue. The proposed sidewalk width is 15 feet, where feasible.
- Motor Avenue's existing sidewalk width range in width from 9 to 14 feet, the latter where right-of-way has been widened in conjunction with development. Proposed sidewalk width is 12 feet, where feasible.
- Centinela Avenue's existing sidewalks range in width from eight to 15 feet. Proposed sidewalk width is 10 to 12 feet, where feasible.
- Venice Boulevard's existing sidewalks range from 8 to 26 feet wide. In locations where existing sidewalks are less than 15 feet wide, proposed sidewalk widths are 15 feet, where feasible.

Standard sidewalk paving is natural concrete scored at the corners of tree wells and other openings in the paving and at least every 10 feet to reduce cracking.

Non-standard alternatives include colored concrete and concrete or stone pavers, including permeable pavers approved by BOE.

For the Livable Boulevards, if non-standard paving is proposed between tree wells, Angelus Block Permeable Holland pavers should be considered, which are manufactured in a blend of gray, moss and charcoal, or equal in a Herringbone pattern.







Natural concrete is the standard paving for sidewalks. Colored concrete (dark gray bands in the above top image), permeable pavers (above bottom image), and other pavers (right image) are non-standard.

Sidewalk Corners

Curb Radii

According to the FHWA Pedestrian Safety Guide, “one of the common pedestrian crash types involves a pedestrian who is struck by a right-turning vehicle at an intersection. A wide curb radius typically results in high-speed turning movements by motorists. Reconstructing the turning radius to a tighter turn will reduce turning speeds, shorten the crossing distance for pedestrians, and also improve sight distance between pedestrians and motorists.” On the other hand, if a curb radius is too small, large truck and buses may run over the curb.

This streetscape plan encourages a reduced curb radii (where feasible) that improves pedestrian safety and shorten crossing distances at intersections. Multiple factors are considered when determining curb radii, such as the street’s classification, intersection sight line requirements, and ability to accommodate turning movements. Such techniques ensure that intersections are designed to minimize crossing distances, crossing time and the pedestrian’s exposure to traffic. Curb radius give pedestrians a larger waiting area on the sidewalk and reduce the speed of turning vehicles at intersections. Limiting curb radii to a maximum of 25 feet increases the safety of all users.

Curb Ramps

Every corner must have at least one ADA-compliant access ramp, unless crossing is explicitly prohibited. Where feasible, directional ramps, that is, one ramp aligned with each crosswalk, should be installed. Directional ramps direct pedestrians into the crosswalk rather than into the intersection as single corner ramps do. This is particularly beneficial for those who are visually impaired or in wheelchairs.

Directional ramps can almost always be installed where curb extensions are provided. With new development, which is required to provide a property corner cut, they can typically be accommodated on 15-foot wide sidewalks even without curb extensions.

The goal of this plan is to provide ADA-compliant ramps at all street crossings and directional ramps where they can be accommodated.



This corner has curb extensions, directional ramps and special paving for enhanced visibility and identity.



Plan view of directional ramps at a curb extension.

Driveways

Driveway location and design can either enhance or undermine the safety and livability of streets. Driveways create conflicts between motor vehicles and bicycles, pedestrians, and other motor vehicles. They also create gaps in the street wall on active retail streets and reduce the available sidewalk space for all other uses, including pedestrian and business-related activity, bus stop access areas, shade trees, stormwater infiltration, bicycle parking, pedestrian lighting, and street furnishings.

Location, Number and Width

According to Section 321 of LADOT's Manual of Policies and Procedures (MPP): "The basic principle of driveway location planning is to minimize possible conflicts between users of the parking facility and users of the abutting street system....This calls for **the minimum number of driveways**, consistent with street and lot capacity, **located on streets with the least traffic volume**, when there is a choice." In particular, the MPP specifies that driveways should not be permitted along arterial highways where the proposed development is 1) residential and access is possible using an alley or non-arterial street or 2) commercial or industrial and access is possible along a non-arterial frontage. Access to commercial development may also be provided via an alley.

A driveway, including the "approach", which crosses the sidewalk, should be only as wide as necessary to provide safe access for the types of vehicles that will be using it. MPP Section 321 provides recommended widths.

These policies have not been implemented on many of the street segments addressed by this plan, resulting is sidewalks with frequent conflicts and reduced opportunities for active sidewalk uses.

The goal of this plan is to minimize the sidewalk area devoted to driveways, consistent with MMP 321, in order to allow for other uses that contribute to the livability and vitality of the street.

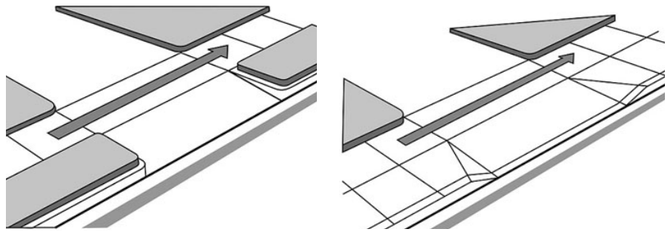
Design of Driveway Approach

City Standard Plan S-440-4 specifies a maximum slope of 10% and minimum four-foot wide flat area. Often, engineers and contractors use the minimum flat area width, resulting in a slope that extends beyond width of the parkway zone of the sidewalk into the walkway zone.

Instead, the objective should be to maximize the flat area and minimize the sloped area, in particularly, limiting it to the width of the parkway or tree well, so that it does not extend into the walkway.



Driveways create conflicts between vehicles and pedestrians, bicycles, and other vehicles. The goal of this plan is to minimize the number and width of driveways in order to reduce conflicts.



The goal of this plan is to maximize the level area of the driveway and to minimize the sloped area and align it with the parkway, unless the sidewalk is 10' wide or narrower. Image source: ITE *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* at ITE.com.



Where the sidewalk is at least 11' wide and the parkway is at least 5.5' wide, the sloped area of the driveway can align with the parkway. In this portion of Pico Blvd, the sidewalk is 15' wide and the parkway is wider than 5.5', so the slope of the driveway can be less than 10%..



Where the sidewalk is only 10' wide, as on recently widened portions of Centinela Avenue, the maximum slope allowed by S-440 (10%), will result in the sloped portion of the driveway approach encroaching into the walkway zone.

Sidewalk Dining

Walkway width in excess of the required path of travel may be used for outdoor dining, provided required permits are obtained.

Just as sidewalk dining contributes to street life, the physical facilities associated with it should contribute to the quality of the street environment and the project. All dining facilities located on the sidewalk should be freestanding, that is, not be attached to the sidewalk.

Enclosures of sidewalk dining areas are required only where alcohol is served, but may be provided elsewhere to create a sense of security. Enclosures should not exceed 42 inches in height, should be fabricated of durable materials that are in the same family as or compatible with the project's architectural materials, and should be primarily transparent. The use of movable planters to define a sidewalk dining area is encouraged.



A simple railing enclosure separates dining.



No separation is required.



Seating and sidewalk dining combine with street trees and lights to create a complete pedestrian environment.



Sidewalk dining on both sides of the pedestrian path of travel.



Casual seating along a busy retail street.

Crosswalks

According to the Motor Vehicle Code, every intersection is a crosswalk, except where posted otherwise. This includes T-intersections and intersections through which a continuous median runs, as on Venice Boulevard. Therefore, pedestrians can cross the boulevards and intersecting streets at unsignalized, unmarked intersections as well as signalized and marked crosswalks. In the City of Los Angeles, signalized intersections have marked crosswalks, while most unsignalized intersections do not.



Striping

In 2012, the City of Los Angeles adopted Continental striping as its standard crosswalk striping to be implemented at all crosswalks over time as funding becomes available, with priority to crosswalks near schools, transit stations, and at intersections with a high incidence of vehicle-pedestrian collisions. It is widely considered to be the most visible crosswalk marking. Most jurisdictions in the area use Continental striping.

The goal of this plan is to convert all marked crosswalks to Continental striping as soon as is feasible.





Continental striping is the City's standard crosswalk striping - yellow near schools and white elsewhere.

Improvements at Unsignalized Intersections and Midblock Locations

At unsignalized intersections along street segments that are intended to be walkable, it is often desirable to add elements to facilitate pedestrian movement across the street. In addition, where blocks are 600 feet or longer, midblock crosswalks with similar elements may be appropriate.

Elements to be considered include:

- Continental crosswalk marking (the City Standard)
- Pedestrian signal or overhead flashers
- Curb extensions to make pedestrians more visible to motorists and to reduce crossing distance
- Median refuge where crosswalk corresponds to a raised median or crosses a center turn lane where there is no turn movement
- Pedestrian access through an existing raised median

The goal of this plan is to provide appropriate elements to allow pedestrians to cross more safely every 300 to 400 feet in commercial, mixed-use and multi-family residential districts that are intended to be walkable.



This midblock crosswalk on Colorado Avenue in Santa Monica includes a median refuge and is clearly labelled.

Landscaped Medians

Landscaped medians:

- Enhance the pedestrian scale by reducing the apparent roadway width
- Moderate the rate of traffic flow
- Accommodate trees and other plants that collect stormwater, provide shade, generate oxygen, and improve the appearance of the street
- Collect and infiltrate stormwater
- Contribute to community identity with unique landscaping and gateway and other identity elements
- Provide a pedestrian refuge island at mid-block crosswalks or where there is no left-turn lane at an intersection

Pending a review and approval with LADOT and DPW, landscaped medians can typically be provided on boulevards with at least two lanes in each direction and a two-way center turn lane and on street segments where the two-way left-turn lane is not needed. Generally, landscaped medians are feasible when the following conditions are present:

- Where there are no driveways
- Where there may be a driveway but driveway access is also available from a cross street or alley
- Where U-turns can be made to access driveways

Chapter 5.0 shows proposed landscaped medians and plant palettes for each street segment. Additional medians may be added over time as driveway curb cuts are eliminated in conjunction with new development.

Trees and Low-Level Planting

Median planting should be simple, drought-tolerant, and low-maintenance, contributing to the identity of the street and community. Trees, in particular, can play a role in establishing community identity. While canopy trees and native species are preferred for their environmental benefits, palms may be planted in medians if the community feels strongly that they are important to community identity.

Drainage

Medians should be designed to collect and infiltrate stormwater and irrigation runoff within the median. For example, the surface can slope to the center to create a swale.













Top left: Narrow median on National Blvd., Culver City, along the Expo Line accommodates trees and improves the visual character of the street, reducing the expanse of asphalt.
Top right: On Orange Grove Avenue in South Pasadena, the median contributes to traffic calming and enhances community identity.
Middle row: The medians on Sepulveda Boulevard in Westchester contribute to community identity and provide a pedestrian refuge for a midblock crosswalk.
Bottom row: On Santa Monica Boulevard in West Hollywood, the medians include pedestrian refuges at staggered midblock crosswalks and locations for public art.

Curb Extensions

Curb extensions (also known as bulb-outs or bump-outs) serve multiple functions. At intersections or mid-block crosswalks, they reduce the crossing distance, make pedestrians more visible to motorists, and make it easier to provide directional ramps. They can provide additional sidewalk space at corners where pedestrian activity is concentrated or additional unpaved area for stormwater infiltration/treatment, trees and other landscaping or for seating, public art, wayfinding, or gateway elements. At bus stops, they provide space for bus patrons to wait and make it easier for buses to stop without merging in and out of the travel lane. They can also provide a "gateway" to a slower speed residential cross street.

Curb extensions can be costly if they require the relocation of utilities (storm drain inlets, fire hydrants, or pedestrian activated signal push buttons) or street reconstruction to maintain curbside drainage.

The goal of this plan is to provide curb extensions at crosswalks where appropriate, as shown in Chapter 5.0, except where the parking lane is required to accommodate high volumes of right turns or peak hour vehicle travel. Curb extensions should be considered at bus stops on streets in the Transit Enhanced Network, including Venice Boulevard, Pico Boulevard and Centinela Avenue.











Above top: Curb extension with directional ramps and landscaping.
Above bottom: Paved curb extensions accommodate pedestrian activity and bike parking and create a gateway.
Right top: Bus stop curb extension accommodates bus patrons and allows bus to move in and out of traffic more easily.
Right middle: Curb extension at a mid-block crossing can buffer pedestrians and collect stormwater runoff from the street.
Right bottom: Curb extension accommodates both planting and seating along a commercial street.

Protected Bicycle Lanes

Locations

On Motor Avenue and Venice Boulevard, there are currently standard bicycle lanes, that is, a five to seven-foot wide striped lane between the parking lane and travel lane in each direction. In both cases, protected bike lanes (also known as cycle tracks) present a desirable upgrade from the existing standard bike lane design. Protected bike lanes are typically located adjacent to the curb with, depending on certain site conditions, a minimum three-foot wide physical separation between the bike lane and the parking lane. Community members have expressed strong support for conversion of the standard bicycle lanes to protected bike lanes on Motor Avenue and on Venice Boulevard. Design elements unique to protected bike lanes include the following:

Type of Protected Buffer

The separation between the bicycle lane and parking lane can take a variety of forms, including, but not limited to, flexible posts, raised concrete buffers and landscaped buffers. Community members have expressed a preference for a separation on Motor Avenue that is 1) raised and, if feasible, 2) permeable to collect stormwater and 3) landscaped. In coordination with DPW, LADOT will ultimately have the final authority on the design of the bikeway and its buffer.

Design Guidance at Signalized Intersections

Where feasible, the physical separation between traffic and bicycles should extend to the intersection, in which case an additional traffic signal phase that allows people who are biking and walking to cross while people in motor vehicles are prohibited from making a right turn. As an alternative, the separation can be dropped approaching the intersection and the bike lane can be treated as a standard bike lane. In coordination with DPW, LADOT will ultimately have the final authority on the design of the bikeway as it approaches intersections.

Design Guidance at Bus Stops

At bus stops, the raised buffer must be widened from a minimum of three feet to, depending on site conditions, a minimum of six feet wide to accommodate transit boardings and alightings. Where the bus can stop in the travel lane, the bus stop can widen into the parking lane and the cycle track can continue in a straight line adjacent to the curb. Where the bus needs to stop in the parking lane, the cycle track can jog into the sidewalk. The separated bike lane can be at either street level with ADA access to the bus stop across it or sidewalk level. In coordination with DPW, LADOT will ultimately have the final authority on the design of the bikeway as it interacts with bus stops.







Top: Bollards.

Middle: Raised curb with paved surface.

Bottom: Raised curb with permeable, planted surface infiltrates street runoff.





Top: On Reseda Blvd, the cycle track is dropped at intersections and bikes and cars share a “mixing zone.”

Bottom: Alternatively, the cycle track could continue through the intersection,where protection is most critical, with the addition of a protected pedestrian/bike signal cycle as in Long Beach.

Stormwater Treatment

In the past, stormwater management moved water off-site and into storm drains as quickly as possible. Today it seeks to infiltrate or use water on-site. The storm drain system becomes an overflow support system rather than a primary conveyance system. The primary goals are to:

- Reduce impervious surface area that generates runoff
- Slow the flow of runoff
- Keep water on site and use it:
  - Store it for indoor or outdoor purposes, in particular, irrigation; or
  - Infiltrate it to irrigate plants and recharge the groundwater table where soil conditions permit infiltration.

New development is required to collect and infiltrate, use, or treat and release on-site stormwater, which reduces runoff into the public right-of-way. Within the public right-of-way, parkways and tree wells should, at a minimum, collect and infiltrate stormwater and other runoff from the sidewalk by creating a swale along the center of the parkways and tree wells. In addition, parkways, curb extensions and medians can be used to infiltrate runoff from the roadway where soil and other conditions permit.

Stormwater infiltration provides the following benefits:

- Reduced use of potable water for irrigation
- Reduced surface water pollution
- Support for the urban ecosystem and wildlife habitat
- Enhanced flood control
- Biological filtration and bio-remediation
- Groundwater recharge
- Reduced heat island effect
- Potential reductions in stormwater infrastructure and treatment costs
- Improved aesthetics and public space within neighborhoods.

Runoff can be collected in a variety of ways. Common examples include the following, which are illustrated below:

1. Parkways, long tree wells and curb extensions at sidewalk level with a swale or depression to collect sidewalk runoff.
2. Parkways, long tree wells and curb extensions at sidewalk level with depressed soil level to collect street runoff through breaks in the curb.
3. Parkways and curb extension at street level without curbs.
4. Parkways and curb extension at street level with curbs.
5. Medians at the top of the roadway crown (typical) with pipes from the curb inlets to collect street runoff.
6. Medians along the slope or at the low point of the crown with breaks in the curb to collect street runoff.

The goal of this plan is to provide parkways and large tree wells that can infiltrate sidewalk runoff and to encourage the collection and infiltration of roadway runoff in parkways, curb extensions and medians.





1. Parkways at sidewalk level with a swale or depression to collect and infiltrate sidewalk runoff. This example on Elmer Avenue in Sun Valley also infiltrates street runoff. *(Photo source: Council for Watershed Health)*



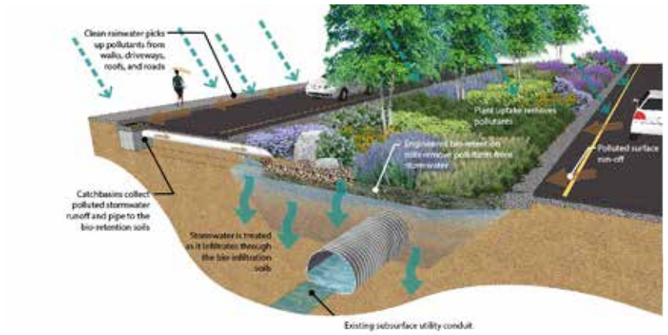
2. Tree wells at sidewalk with depressed soil level and curb breaks to collect street runoff are connected to function as a continuous infiltration basin. Curbs are often required where the soil level is lower than the sidewalk, as shown here. Overflow is released back into the street at the end of the connected tree wells.*(Photo source: Blue-Green Building.org)*



3. Curb extensions at street level without curbs. Street runoff flows directly into these curb extensions and is infiltrated or continues along the gutter to a storm drain system. *(Photo source: SvR Design Company)*



4. Curb extensions at street level with curbs. In this example runoff flowing along the gutter is directed into the curb extension swale where it can be absorbed into an “infiltration gallery” beneath the surface; in a heavy rain, excess runoff flows back into the gutter and into the existing storm drain system. *(Photo source: land8.com)*







5. Medians at the top of the roadway crown cannot collect runoff directly. These images show drainage systems in which runoff is piped to the median from catch basins along the curb. *(Image sources: top two - AHBL; bottom - Google Earth)*



5. Medians along the slope of the roadway crown can collect runoff directly through breaks in the median curb. In this example on Woodman Avenue in Sun Valley, Los Angeles, the median divides the primary roadway (right side) from a residential frontage road (left side)and openings in the curb on the right side.



5. On Western Heritage Way between the Zoo and Autry Museum in Griffith Park, the median between the zoo parking lot, which is several feet higher than the roadway, collects runoff from the roadway through openings in the curb.



This street level parkway with a curb along the roadway on Rosemead Boulevard in Temple City separates the bike lane from traffic lanes. Street runoff flows from the street into the parkway through openings in the curb. Runoff that is not infiltrated flows across the bike lane into the gutter.





These curb extensions at street level with curbs collect and infiltrate street runoff. The excess runoff in the above right example flows into the storm drain system through a raised drain.

Community Identity Elements

Gateway and Other Placemaking Elements

Design elements at gateways and at key locations along the street can contribute to the identity of the community and to a sense of place. Gateway elements can be placed in a variety of locations, including medians, in the parkway zone of the sidewalk, or on a bridge, guard rail or retaining wall. Other identity elements can be attached to street lights, street furniture, or be embedded in pavement.









































Community Identity Elements (cont'd)

Wayfinding Elements

Wayfinding elements, located in medians or on the sidewalk can be designed to be read by either motorists or pedestrians. Wayfinding for motorists typically provides directions to key destinations or parking. Wayfinding for pedestrians can provide more detailed information, including more destinations, business districts, history and other local information.





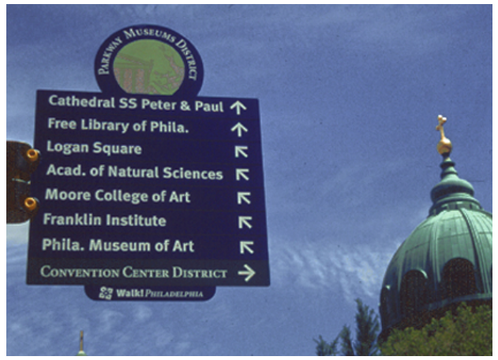












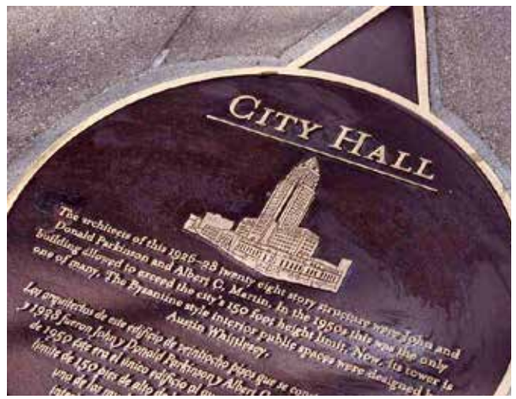














Wayfinding elements for pedestrians include:

Top row: directional signs typically mounted on street light poles

Middle row: maps, either mounted on street light poles or freestanding

Bottom row: interpretive signs pole-mounted upright, embedded in pavement or low-profile for easier reading by everyone.

Uses in On-Street Parking Lanes

Parking and Loading

On-street parking can provide the following benefits to businesses, residents and pedestrians:

- A more vibrant environment with convenient access to storefronts
- Additional parking for businesses and residences, especially older buildings with limited on-site parking
- A buffer between pedestrians on the sidewalk and moving motor vehicles in the roadway
- Positive friction to calm traffic along the street, which is especially important in areas with high pedestrian volumes or on residential through streets

Bicycle Corrals and Parklets

To provide better access to bicycle facilities, especially on streets with bike lanes or sharrows, and to prevent congestion on sidewalks, a few on-street parking spaces can be used for bicycle parking. Currently, bicycle corrals are the LADOT People St program (www.peoplest.lacity.org)

When permanent curb extensions are not feasible, temporary spaces may be appropriate as a public gathering space for pedestrians. Typically, narrower roadways and light, slow-moving traffic provide safer locations for these spaces. Currently, bicycle corrals and parklets in the on-street parking lane can be provided through the LADOT People St program (www.peoplest.lacity.org).

Intermittent Parkways

Intermittent parkways with trees and other planting in the on-street parking lane are particularly beneficial where the sidewalks are less than 8 feet wide. In addition to providing room for canopy trees that can shade pedestrians on the sidewalk, parking lane parkways provide an enhanced buffer, an opportunity to infiltrate or collect/treat stormwater runoff, add community identity. Parking lane parkways should have raised curbs facing the adjacent travel lane and parking, but not in the gutter to avoid interrupting the flow line.















Top row: Bicycle parking in the on-street lane provides more bike parking, including bike share, and helps to prevent congestion and clutter on the sidewalk.

Middle row: Parklets provide more pedestrian space and support businesses, contributing to a more vibrant street.

Bottom row: Intermittent parkways between parking spaces can provide trees and pedestrian buffers on narrow sidewalks.

Repurposed Roadway

On many streets there are areas of roadway that are not being used, are underutilized, or are unsafe. In some cases, the roadway may have been widened in the past beyond its current designation and is simply wider than required. Another example is a “pork chop” island/slip lane that is unsafe for pedestrians and often for vehicles as well due to uncontrolled higher speed right turns. These areas may provide an opportunity for adding additional pedestrian space, either temporarily or permanently.

Pedestrian Plaza

A pedestrian plaza creates accessible public open space by closing a portion of street to vehicular traffic. Paint or other treatments are applied to the street surface, while large planters and other elements define the Plaza perimeter. The Community Partner maintains and operates the Plaza, providing movable tables and chairs, public programs, and ongoing neighborhood outreach. Providing expanded public spaces can increase safety for people who walk, bike, and take transit. It also encourages increased levels of walking and bicycling, while supporting economic vitality. New local gathering spaces can foster a greater sense of community and social cohesion. Plazas can also become centerpieces of neighborhoods, providing venues for events and celebrations. As more pedestrians come to spend time in neighborhoods, the increased activity may support the vibrancy of local businesses.

Currently, pedestrian plazas can be applied for under LADOT’s People St program (www.peoplest.lacity.org).

Permanent Pedestrian Space

A more permanent use of excess roadway is to move the curb and incorporate it into the pedestrian realm at sidewalk level. Typical opportunities for permanent pedestrian spaces include:

- Slip lanes that can be closed to create safer right-turn conditions for both pedestrians and vehicles
- A very short street segment, like the segment of Griffith Park Boulevard that was closed to create the Sunset Junction People St Plaza, and could be closed permanently so that landscaping and other permanent elements could be added

These changes will require the an application and approval from LADOT and Department of Public Works.







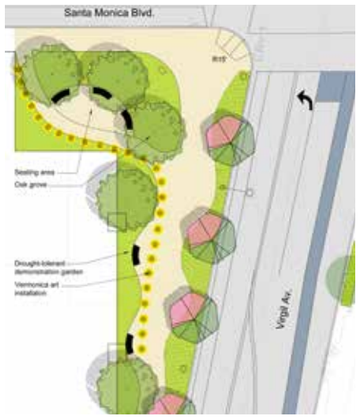




In recent years, LADOT’s People St program has partnered with communities to create pedestrian plazas in Leimert Park in South LA (top left), in Pacoima (top right), North Hollywood (middle row, left), and Sunset Triangle Plaza in Silver Lake (middle row, middle and right).







Where existing slip lanes are not appropriate, the corner can be redesigned as a pedestrian plaza at corners. Los Angeles examples include: completed Pico/Normandie (left) and proposed Santa Monica/Virgil (middle and right).

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5.0 IMPROVEMENTS BY STREET

This chapter includes the following for each street segment:

STREETSCAPE ELEMENTS specific to each street segment, including trees, low-level plants, street lighting and street furniture selected by each community.

ILLUSTRATIVE STREETSCAPE PLANS at 1" = 80' show the approximate location of proposed medians, continental crosswalk striping, curb extensions, street trees, tree wells, parkways, pedestrian-scale street lights, and bus stop improvements.

STREET CROSS SECTIONS at 1" = 10' illustrate typical existing conditions and proposed improvements.

ILLUSTRATIVE SKETCHES show existing conditions and proposed improvements at typical locations or proposed gathering places.

STREET SEGMENTS are presented in the following pages:

PICO GREEN 5-2
(Centinela Ave to 405 Fwy)

PICO PATRICIA 5-18
(405 Fwy to Patricia Ave)

MOTOR AVENUE 5-34
(10 Fwy to Venice Blvd)

CENTINELA AVENUE 5-52
(Washington Blvd to Jefferson Blvd)

VENICE BOULEVARD 5-80
(Lincoln Blvd to Inglewood Blvd)



5.1 PICO GREEN

The Mobility Plan 2035 redesignated Pico Boulevard between the I-405 Freeway and Centinela Avenue from Major Highway Class II (generally 104-foot right-of-way with an 80-foot wide roadway and 12-foot wide sidewalks and, where required at intersections, 114-foot right-of-way with a 90-foot wide roadway and 12-foot wide sidewalks) to an Avenue I designation with a 100-foot right-of-way with a 70-foot wide roadway and 15-foot wide sidewalks, consistent with the predominant existing condition. Since there is full-time on-street parking and a parallel off-street bicycle facility, there is no need to widen the roadway. Over time, existing 80-foot wide roadway segments should be restored to 70 feet with 15-foot wide sidewalks where feasible.

Proposed improvements are illustrated in the following subsections:

STREETSCAPE ELEMENTS describes the trees, low-level plants, street lighting and street furniture selected by the community for Pico Boulevard between the 405 Freeway and Centinela Avenue.

ILLUSTRATIVE STREETSCAPE PLAN shows the approximate location of proposed medians, continental crosswalk striping, curb extensions, street trees, tree wells, parkways, pedestrian-scale street lights, and bus stop improvements.

In addition to the specific elements shown on the Illustrative Streetscape Plan:

- Trash receptacles and seating shall be provided at the spacing specified in Table 3 in conjunction with a project or may be provided in other locations approved by DPW.
- Gateway and wayfinding elements may be provided in locations to be determined feasible by the City.
- Additional medians may be added as driveways are eliminated or if property owners agree to allow medians which would require vehicles to make U-turns to access driveways.

STREET CROSS SECTIONS illustrate the typical existing condition and proposed future conditions at several typical locations:

- Midblock where there is a street tree.
- Midblock between street trees.
- At corner curb extensions.

ILLUSTRATIVE SKETCHES show:

- A typical view from a sidewalk of a proposed median.
- Two examples of permanent pedestrian space that could be created at the intersection of Pico Boulevard and Tennessee Avenue.

STREETSCAPE ELEMENTS



Preferred Street Tree
Platanus x *histanica* (*P. acerifolia*)
'Columbia'
Columbia London Plane*

Type:	Deciduous
Origin:	California
Height:	40 to 50 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Relatively drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Fast if adequate soil volume and water



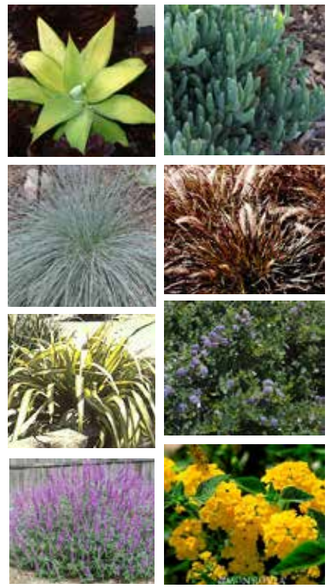
Median Tree
Quercus tomentella
Island Oak

Type:	Evergreen
Origin:	California
Height:	30 to 40 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Drought tolerant (WUCOLS Low)
Growth rate:	Fast if adequate soil volume and water



Alternate Street Tree
Platanus racemosa
California Sycamore*

Type:	Deciduous
Origin:	California
Height:	40 to 50 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Relatively drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Fast if adequate soil volume and water



Low-Level Plant Palette
All locations:
Festuca idahoensis
Rosmarinus officinalis 'Prostratus'
Senicio sepens
Ceanothus 'Centennial'

Medians only:
Muhlenbergia dubia
Pennisetum 'Eaton Canyon'
Agave attenuata 'Kara's Stripe'
Aloe maculata or *A. striata*
Phormium 'Cream Delight'
Ceanothus gloriosus 'Anchor Bay'
Lantana 'Gold Rush' or 'New Gold'
Salvia leucantha 'Santa Barbara'

* Known reproductive host of the Polyphagus Shot Hole Borer. If pest is not controlled, used alternative species.



Pedestrian Lights
An LED fixture similar in appearance to the STILL Citysite.



Trash Receptacles and Seating
Community members preferred a bench and trash receptacles such as the Victory Stanley Steelsites RB Series (RB28 bench and RB36 trash receptacle) in Titanium.





Bus Shelters
Boulevard shelter in silver.

ILLUSTRATIVE STREETSCAPE PLAN

BASE MAP LEGEND

Base map is LADOT striping plan.
Key information from LADOT striping plans:

- Travel lane
- Two way left turn lane
- Left turn lane
- Signalized intersection
- Curb
- Driveway apron
- ADA ramp

Other base map information:

- Building footprint (approximate)

STREETSCAPE PLAN LEGEND

Existing Elements

- Sidewalk
- Tree well: enlarge
- Parkway - typically grass: enlarge/replant
- Street trees:
  Platanus x *hispanica* (*P. acerifolia*) or *P. racemosa* (London Plane or California Sycamore)
- Other canopy tree / palm
- Street Light
- Utility pole
- Fire hydrant
- Storm drain inlet:
  to remain
  to be moved
- Bus stop with shelter
- Bus stop with bench(es)

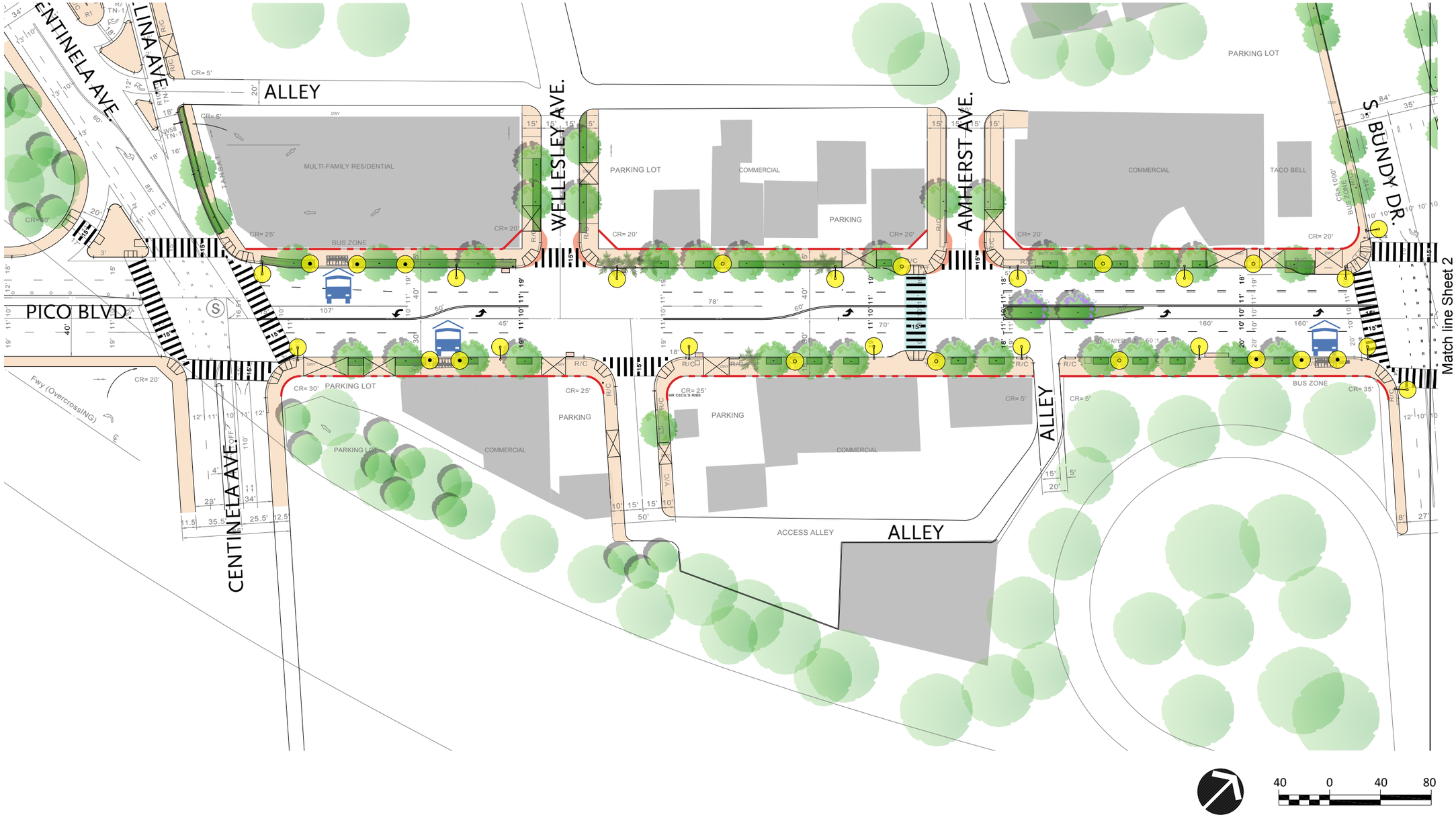
Proposed Elements

- Tree well with low-level planting
- Parkway with low-level planting
- Raised landscaped median
- Infill street trees:
  Platanus x *hispanica* (*P. acerifolia*) or *P. racemosa* (London Plane or California Sycamore)*
  Quercus tomentella (Island Oak) on medians
- Bus stop pedestrian light
- Other pedestrian light
- Corner curb extension
- Midblock curb extension
- Side street curb extension under study by BOE
- Relocated storm drain inlet
- Continental striping at existing marked crosswalk
- New crosswalk with continental striping
- Future property line

* Reproductive host to Polyphagus Shot Hole Borer. Use alternative species if pest is not controlled.



ILLUSTRATIVE STREETSCAPE PLAN SHEET 1



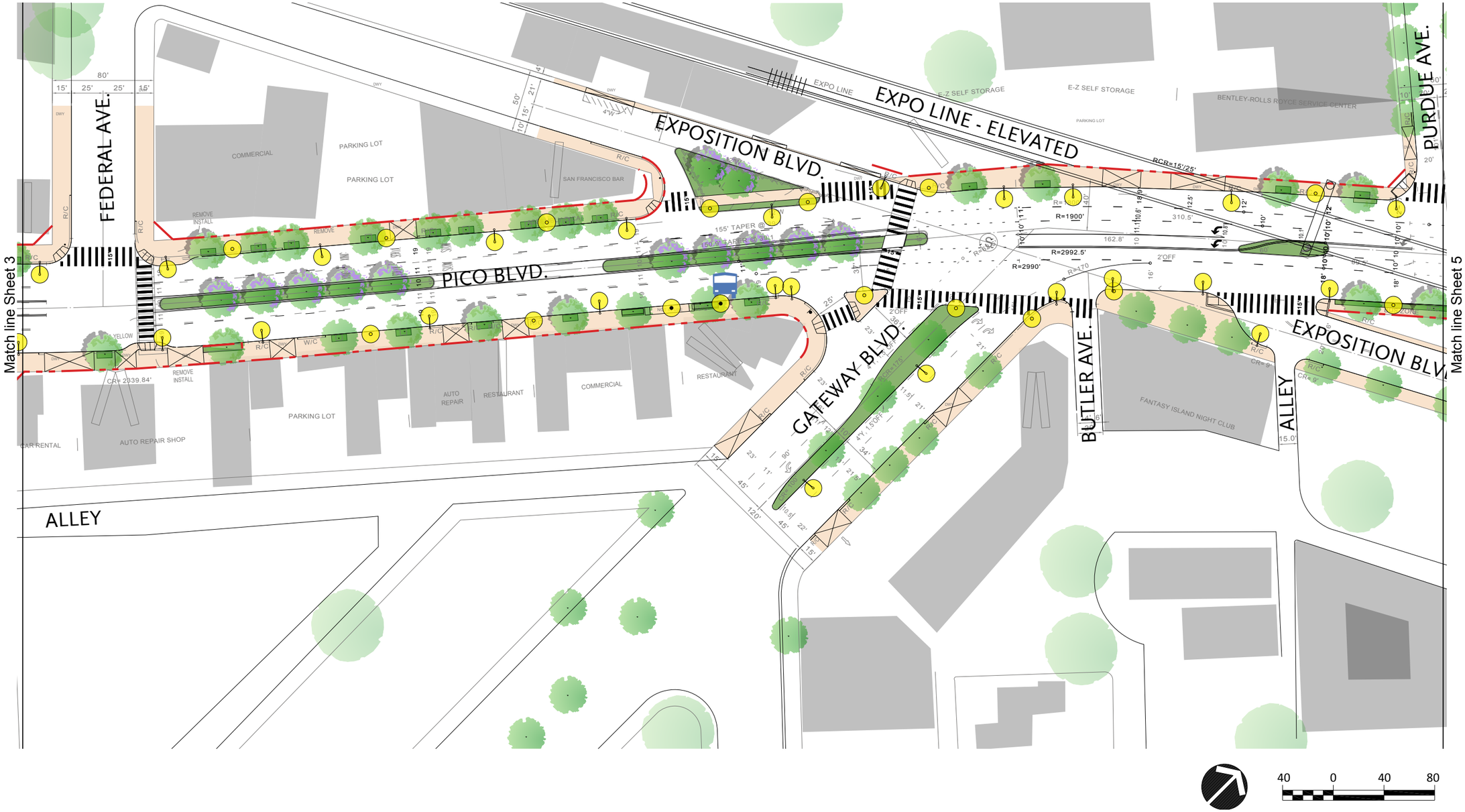
ILLUSTRATIVE STREETSCAPE PLAN SHEET 2



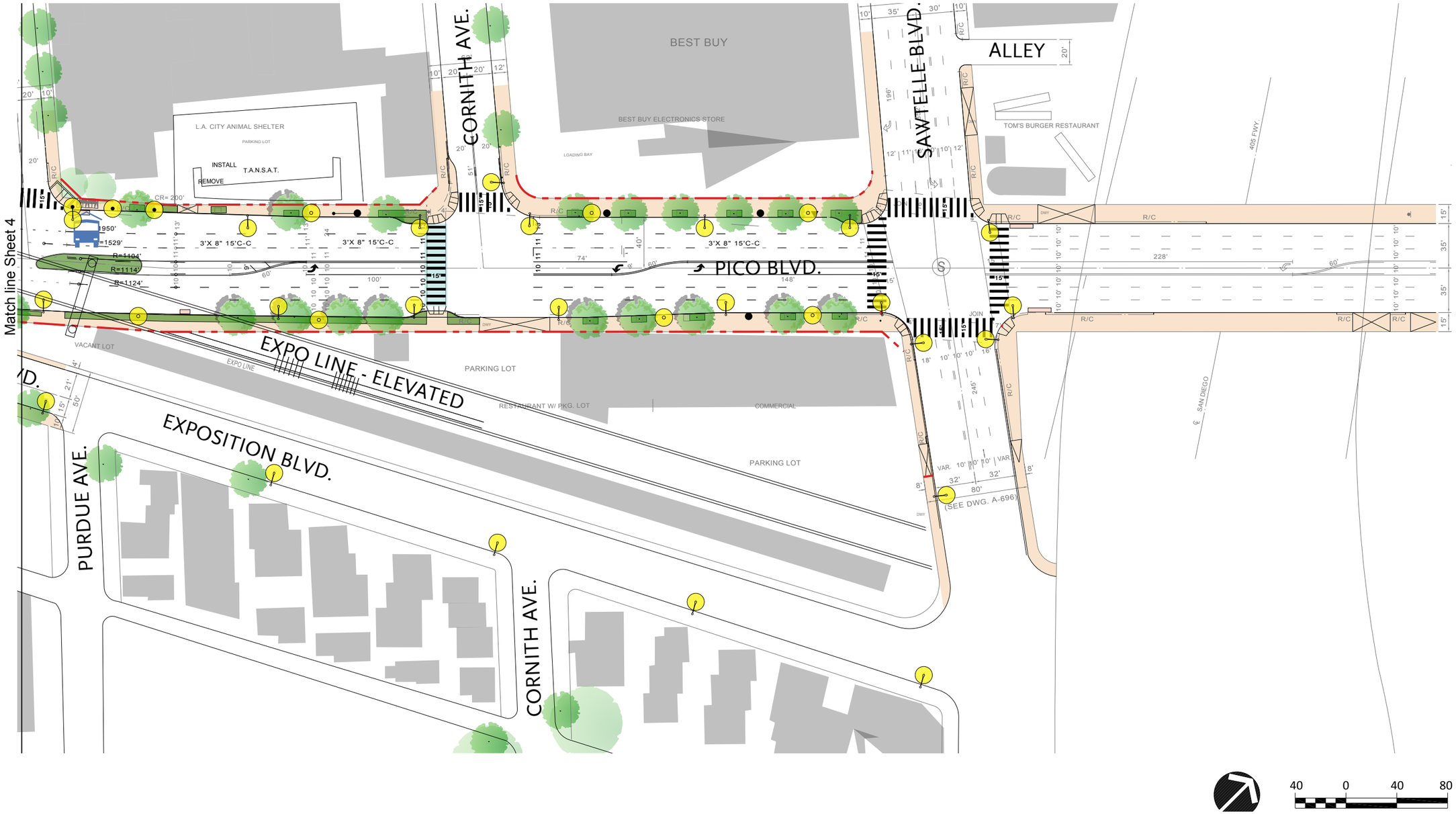
ILLUSTRATIVE STREETSCAPE PLAN SHEET 3



ILLUSTRATIVE STREETSCAPE PLAN SHEET 4



ILLUSTRATIVE STREETSCAPE PLAN SHEET 5

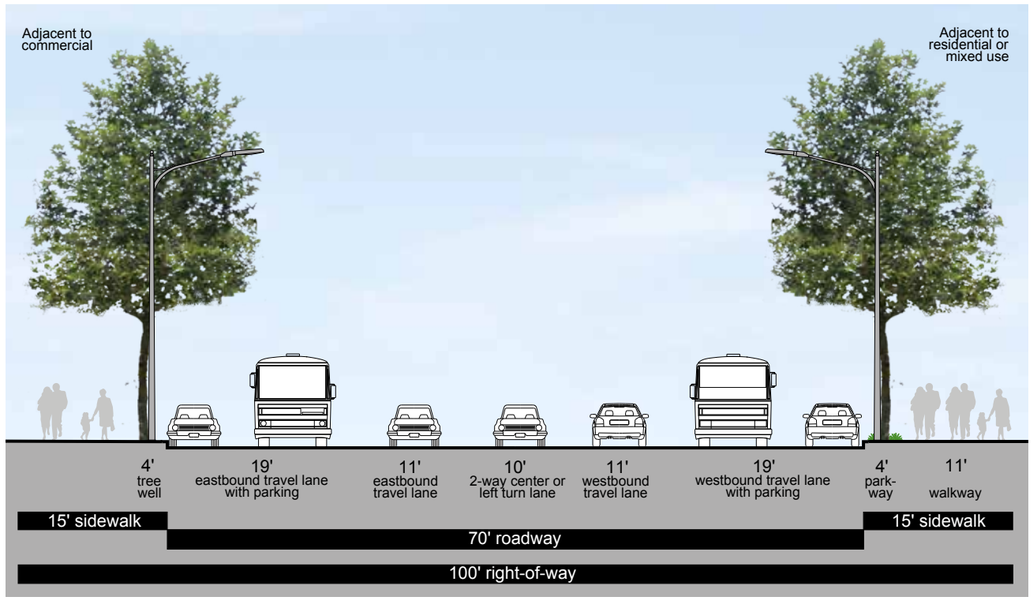


STREET CROSS SECTIONS

From Centinela Ave to Exposition Blvd

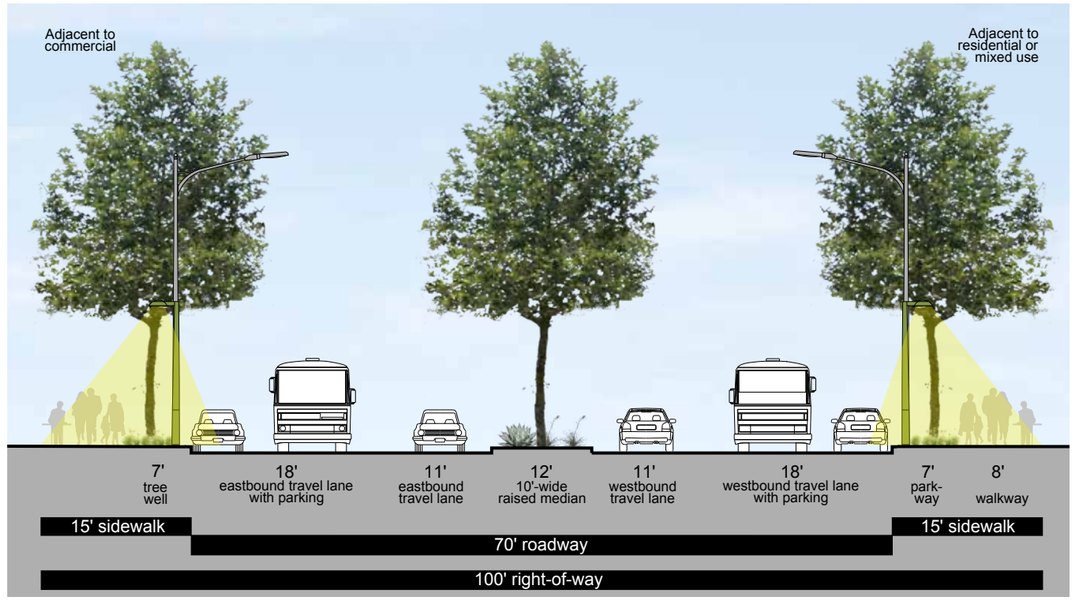
Typical Midblock Location

EXISTING



All Pico Boulevard cross sections are looking west.

PROPOSED*



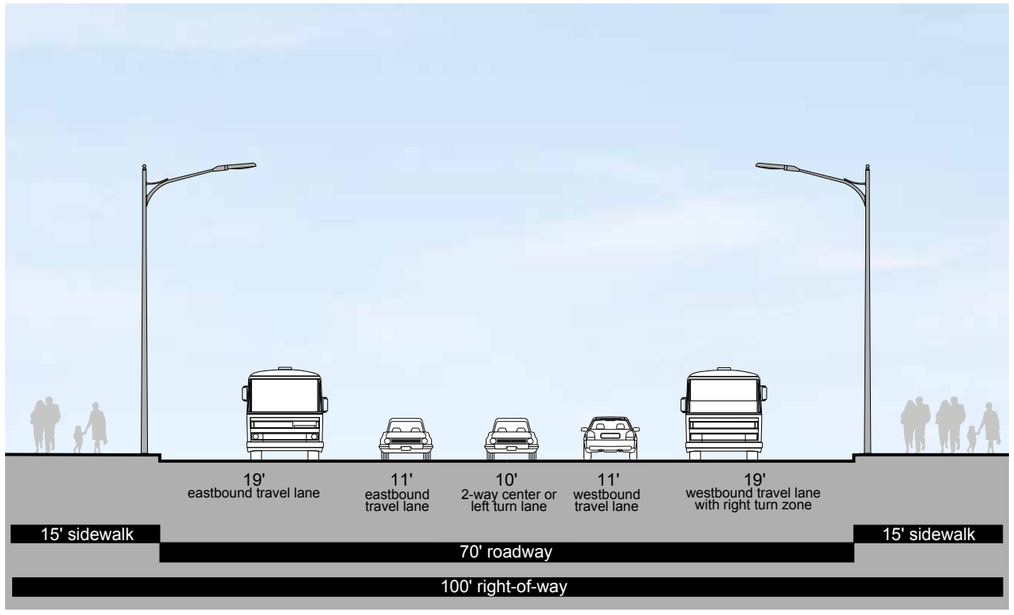
*Where a median is proposed

STREET CROSS SECTIONS

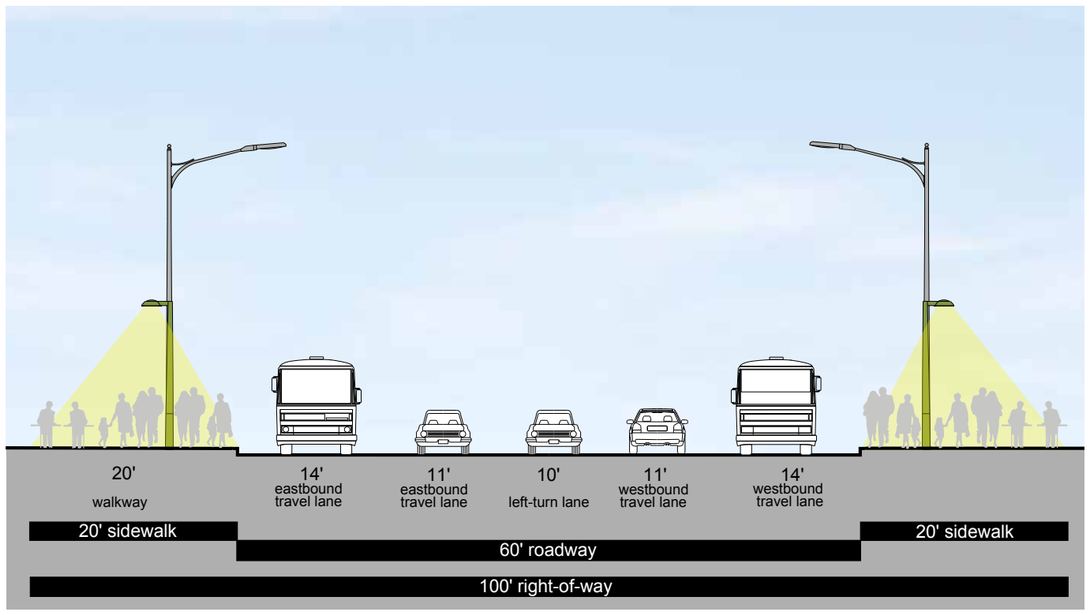
From Centinela Ave to Exposition

Typical Corner Location

EXISTING



PROPOSED*



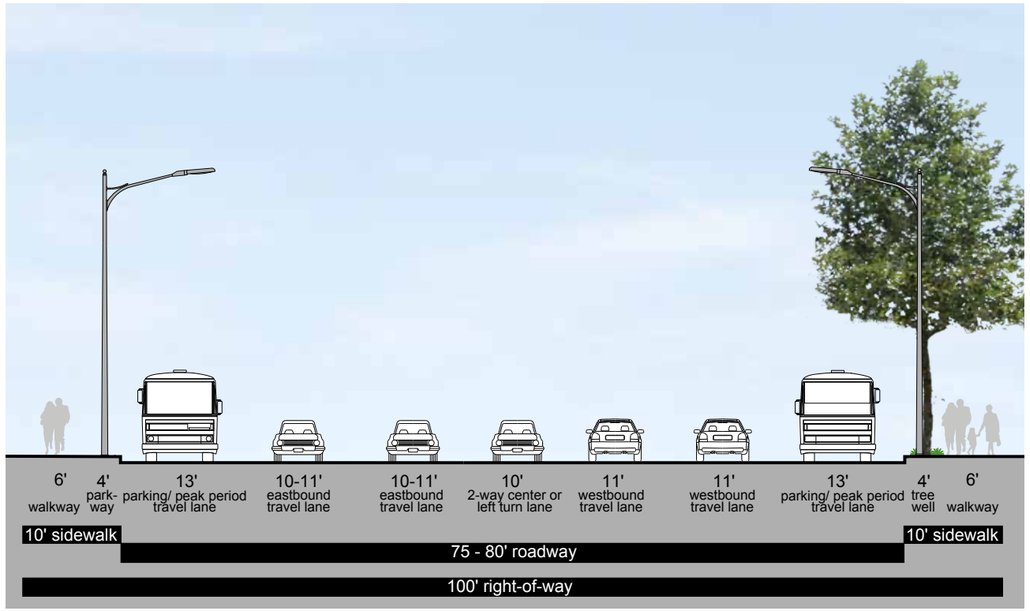
*Where curb extensions are proposed

STREET CROSS SECTIONS

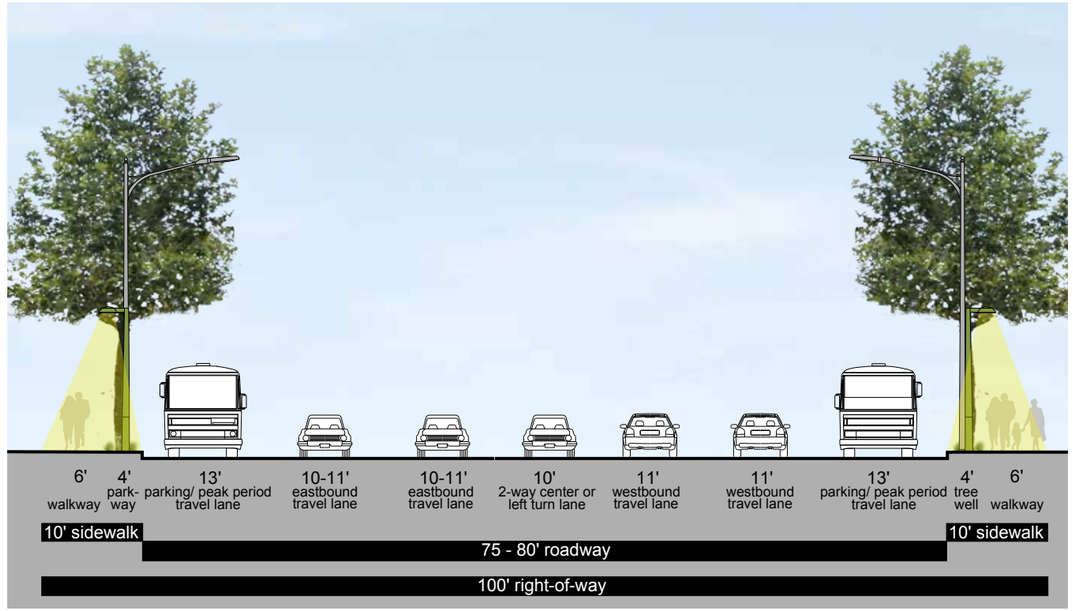
From Exposition Blvd to Sawtelle Blvd

Typical Midblock Location

EXISTING



PROPOSED



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ILLUSTRATIVE SKETCHES

Between Barrington Ave and Granville Ave

Midblock Location

EXISTING



Existing roadway condition looking west.

PROPOSED



Image of proposed median planting to transform the street, making it appear narrower and providing shade and stormwater infiltration. Assumes left turns from southbound Tennessee Place to eastbound Pico Boulevard are eliminated.

ILLUSTRATIVE SKETCHES

At Tennessee Pl
Potential Design Concepts

EXISTING

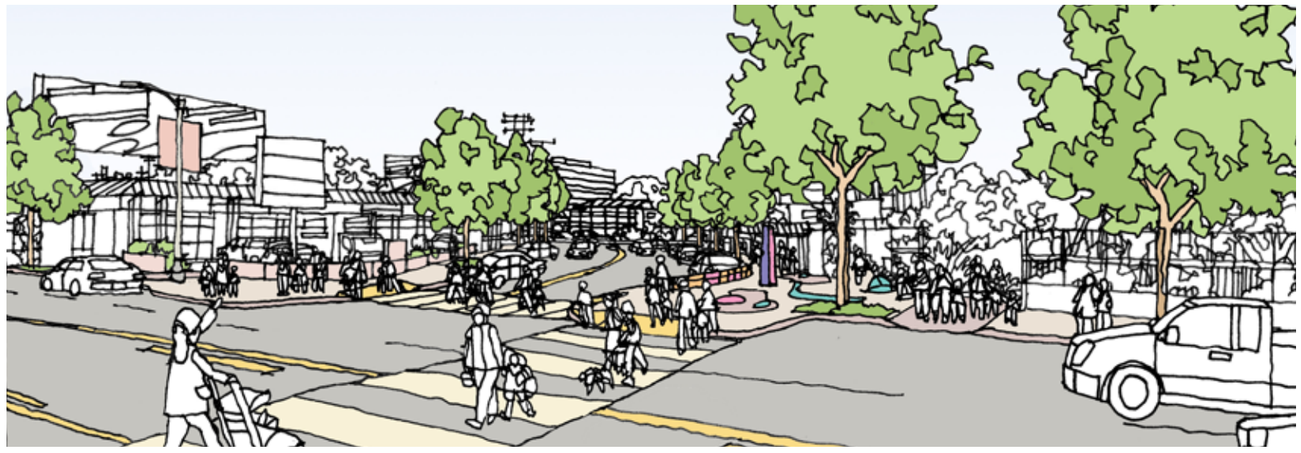


Existing roadway condition looking north at Tennessee Place.

PROPOSED



Design Concept #1: Image of potential landscaped median to repurpose excess roadway, with curb extensions on NE & NW corners.



Design Concept #2: Image of alternative potential sidewalk widening to repurpose excess roadway, with curb extensions on NE & NW corners.

5.2 PICO PATRICIA

The Mobility Plan 2035 redesignated Pico Boulevard between the I-405 Freeway and Patricia Avenue from Major Highway Class II Major Highway Class II (generally 104-foot right-of-way with an 80-foot wide roadway and 12-foot wide sidewalks and, where required at intersections, 114-foot right-of-way with a 90-foot wide roadway and 12-foot wide sidewalks) to an Avenue I with a 100-foot right-of-way, a 70-foot wide roadway and 15-foot wide sidewalks, consistent with the existing condition along 75% of the street segment. The remaining 25%, which is in the vicinity of Westwood Boulevard and Overland Avenue, has an 80 to 90-foot wide roadway with 10-foot or narrower sidewalks. In these locations, the existing right-of-way will remain and a sidewalk easement should be required as a condition of project approval to provide 15-foot wide sidewalks. Currently the curb lanes are used as a peak-period travel lanes, making curb extensions infeasible.

Proposed improvements are illustrated in the following subsections:

STREETSCAPE ELEMENTS describes the trees, low-level plants, street lighting and street furniture selected by the community for Pico Boulevard between the 405 Freeway and Centinela Avenue.

ILLUSTRATIVE STREETSCAPE PLAN shows the approximate location of proposed medians, continental crosswalk striping, curb extensions, street trees, tree wells, parkways, pedestrian-scale street lights, and bus stop improvements.

In addition to the specific elements shown on the Illustrative Streetscape Plan:

- Trash receptacles and seating shall be provided at the spacing specified in Table 1 in conjunction with a project or may be provided in other locations approved by DPW.
- Gateway and wayfinding elements may be provided in locations to be determined.
- Additional medians may be added as driveways are eliminated or if property owners agree to allow medians which would require vehicles to make U-turns to access driveways.

STREET CROSS SECTIONS illustrate the typical existing condition and proposed future conditions at several typical locations:

- Midblock where the sidewalk is 15 feet wide.
- Midblock where the sidewalk is 10 feet wide.

ILLUSTRATIVE SKETCHES show:

- View of a typical sidewalk.
- Potential median improvement on Overland Avenue north of Pico Boulevard.

STREETSCAPE ELEMENTS



Street Tree East of Westwood Blvd.
Pyrus kawakamii
Evergreen Pear

Type:	Semi-evergreen
Origin:	China
Height:	20 to 30 feet
Spread:	15 to 25 feet
Form:	Round headed
Spacing:	25 to 30 feet
Flowers:	White - early spring
Water:	Somewhat drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Moderate



Street Tree West of Westwood Blvd.
Pyrus calleryana 'Aristocrat'
Aristocrat Ornamental Pear

Type:	Semievergreen
Origin:	China
Height:	20 to 30 feet
Spread:	20 to 30 feet
Form:	Pyramidal
Spacing:	25 to 30 feet
Flowers:	White - early spring
Water:	Somewhat drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Moderate



Median Tree
Jacaranda mimosifolia
Jacaranda

Type:	Briefly Deciduous
Origin:	Brazil
Height:	30 to 40 feet
Spread:	30 to 40 feet
Form:	Round/spreading
Spacing:	30 feet
Flowers:	Lavender - late spring
Water:	Relatively drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Moderate



Low-Level Plant Palette
All locations:
Aeonium canariense
Agapanthus orientalis 'Baby Pete', 'Tinkerbell'
Carex barbarae 'Santa Barbara'
Convolvulus sabatius
Rosmarinus 'Huntington Carpet'
Lantana 'White Lighting'
Lomondra 'Tropic Belle'
Phormium 'Tom Thumb'

Medians only:
Arctois acaulis 'Magenta'
Lavendula minutolli
Rhaphiolepis 'Georgia Petite'

Planters only:
Aeonium arboreum 'Zwartkop'
Cupressus sempervirens 'Monshel'
Cordyline 'Jurred'
Kalanchoe luciae
Sedum rubrotinctum 'Aurora', Pork and Beans'



Pedestrian Lights
Traditional "Coachman King," placed in pairs at each bus stop and between existing street lights, per City's Bureau of Street Lighting standards. Preferred pole and fixture color is French gray to match the repainted street light poles.



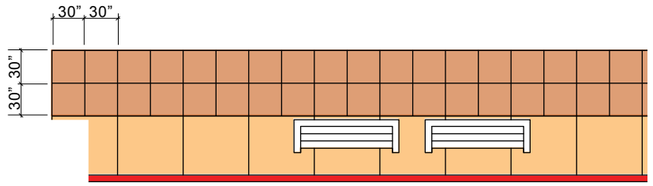


Trash Receptacles and Seating
The Victory Stanley Steelsites RB Series (RB28 bench and RB36 trash receptacle) in Titanium.





Paving
A special paving pattern using colored concrete. The colors are Davis Color Baja Red (top left) for a five-foot wide walk zone and Davis Color Palomino (bottom left) between the walk zone and curb. The patterns and colors are shown in the plan diagram below.



Bus Shelters
Sunset in silver, selected because of its transparency and slim profile. As an alternative, the standard Boulevard shelter in silver (see Pico Green) may be used.





Planters
Architectural Pottery Legacy Series (714-895-3359) in Gunmetal.

Placement requires approval by both City and adjacent property owner.

ILLUSTRATIVE STREETSCAPE PLAN

BASE MAP LEGEND

Base map is composite of LADOT striping plans.
Key information from LADOT striping plans:

- Travel lane
- Two way left turn lane
- Left turn lane
- Signalized intersection
- Curb
- Driveway apron
- ADA ramp

Other base map information:

- Building footprint (approximate)

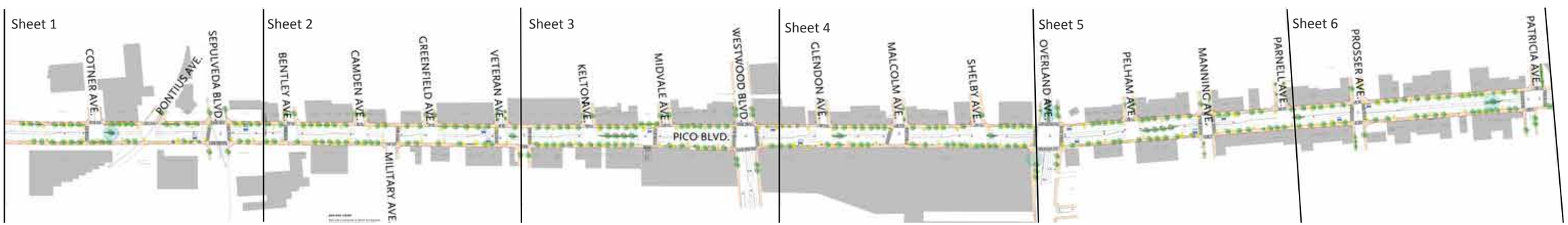
STREETSCAPE PLAN LEGEND

Existing Elements

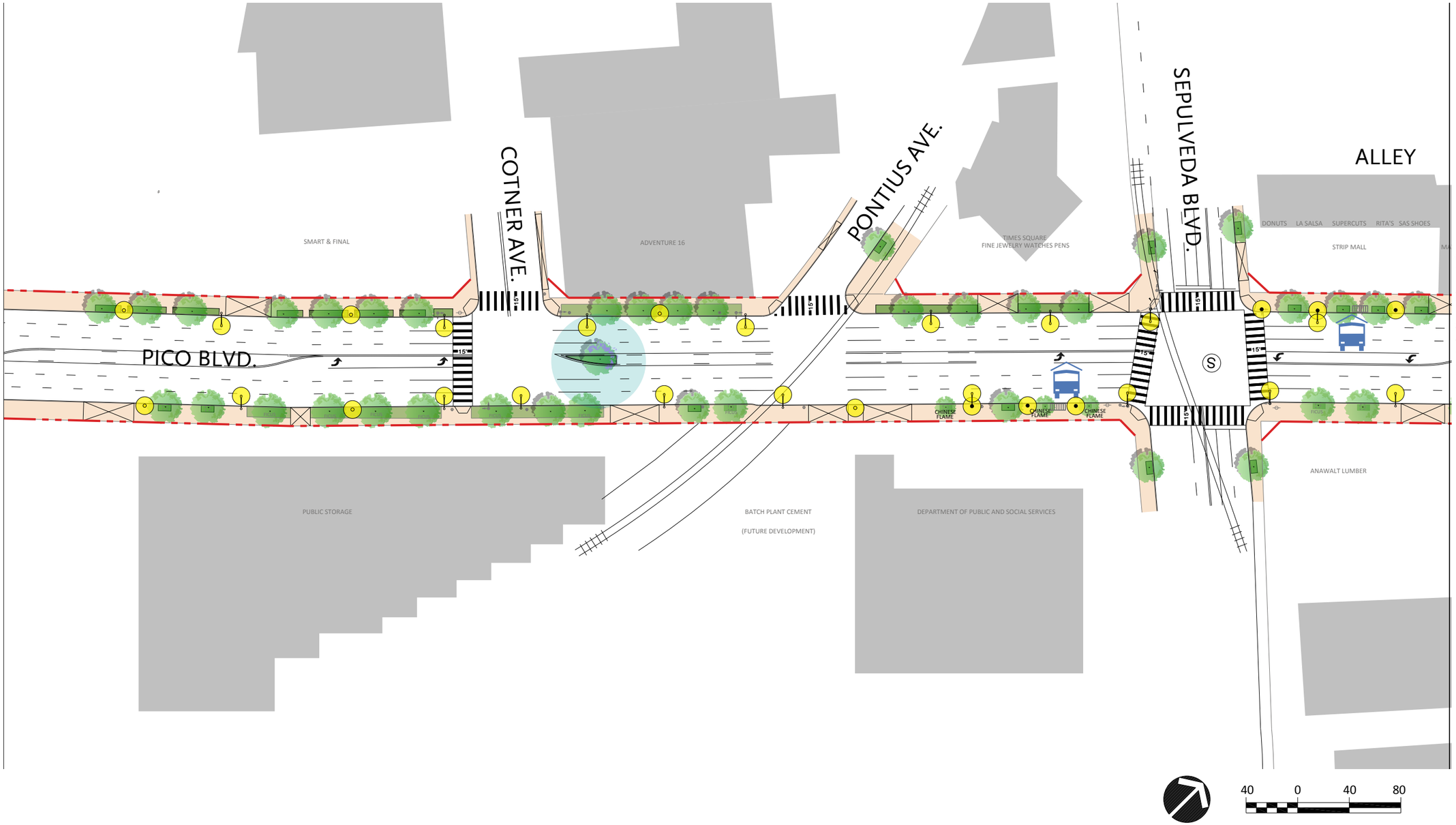
- Sidewalk
- Tree well - enlarge
- Parkway - modify to accommodate walkway
- Existing street tree:
  Pyrus kawakami (Evergreen Pear)
  east of Westwood Blvd.; *Pyrus calleryana*
  'Aristocrat' west of Westwood Blvd.
  unless otherwise noted
- Street light
- Utility pole
- Bus stop with shelter
- Bus stop with bench(es)

Proposed Elements

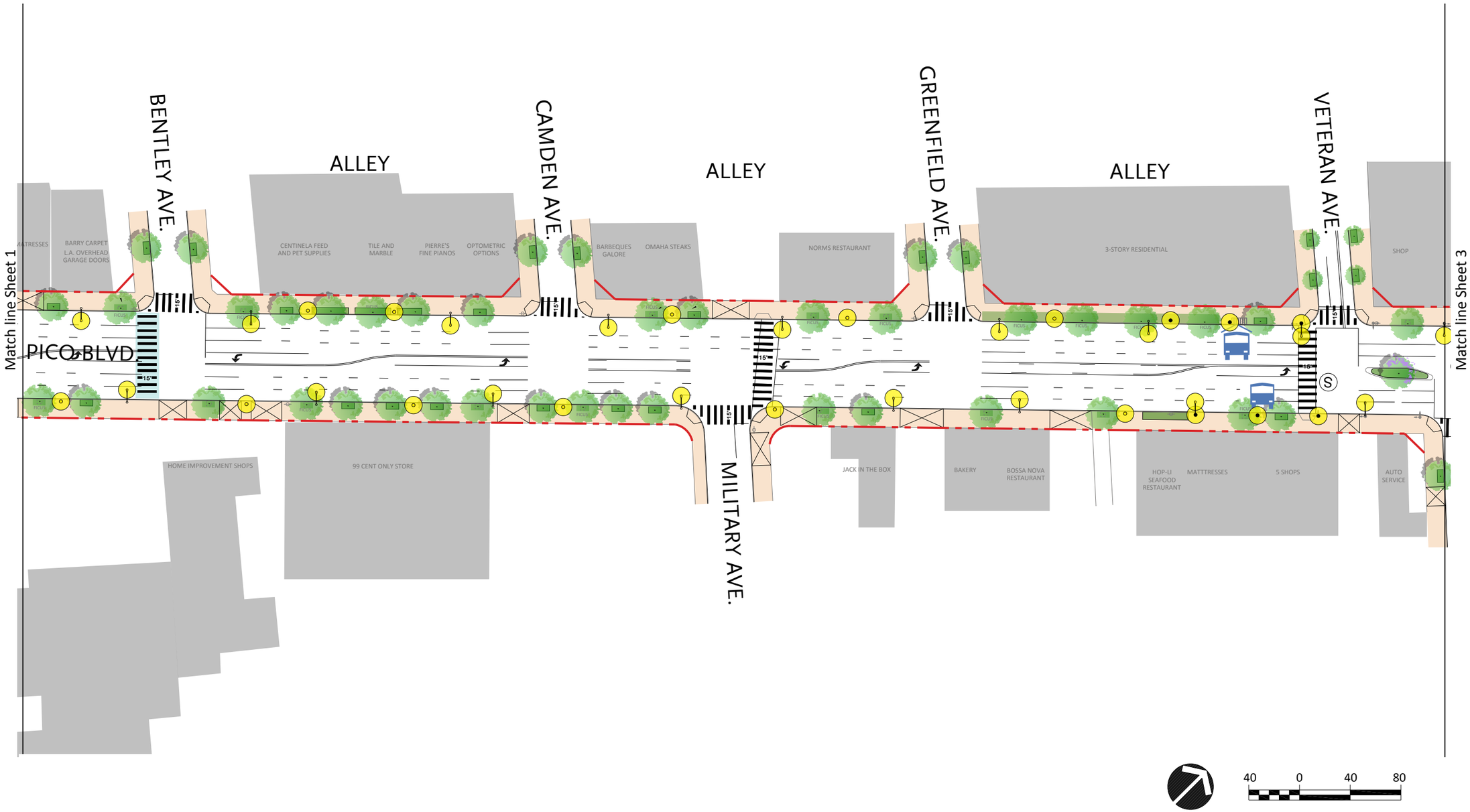
- Tree well
- Parkway with low-level planting
- Raised landscaped median
- Infill street trees:
  Pyrus kawakami (Evergreen Pear)
  east of Westwood Blvd.; *Pyrus calleryana*
  'Aristocrat' west of Westwood Blvd.
- *Jacaranda mimosifolia* (Jacaranda) on medians
- Bus stop pedestrian light
- Other pedestrian light
- Continential striping at existing marked crosswal
- New marked crosswalk with continental striping
- Future property line
- Potential location of gateway element



ILLUSTRATIVE STREETSCAPE PLAN SHEET 1



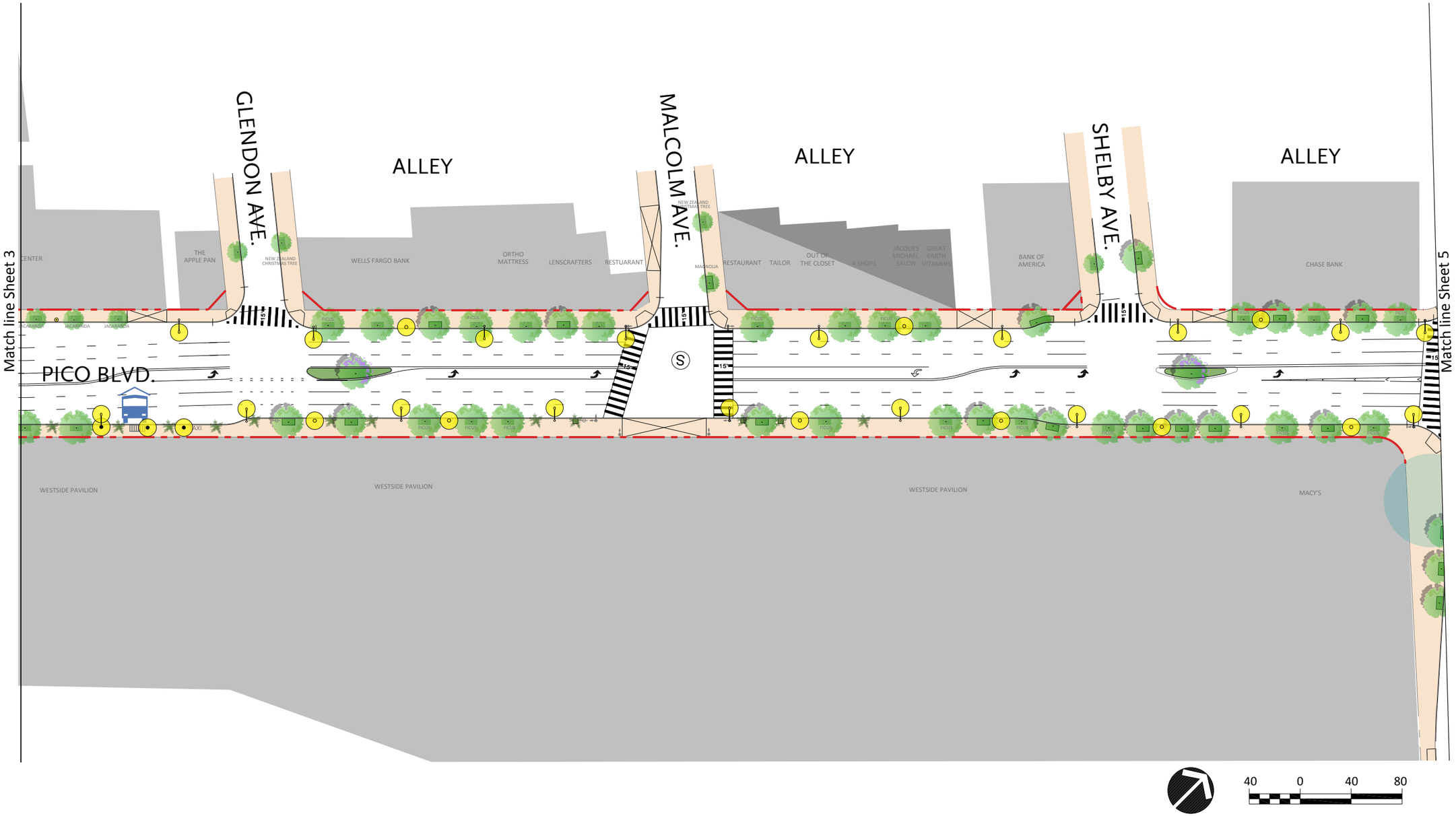
ILLUSTRATIVE STREETSCAPE PLAN SHEET 2



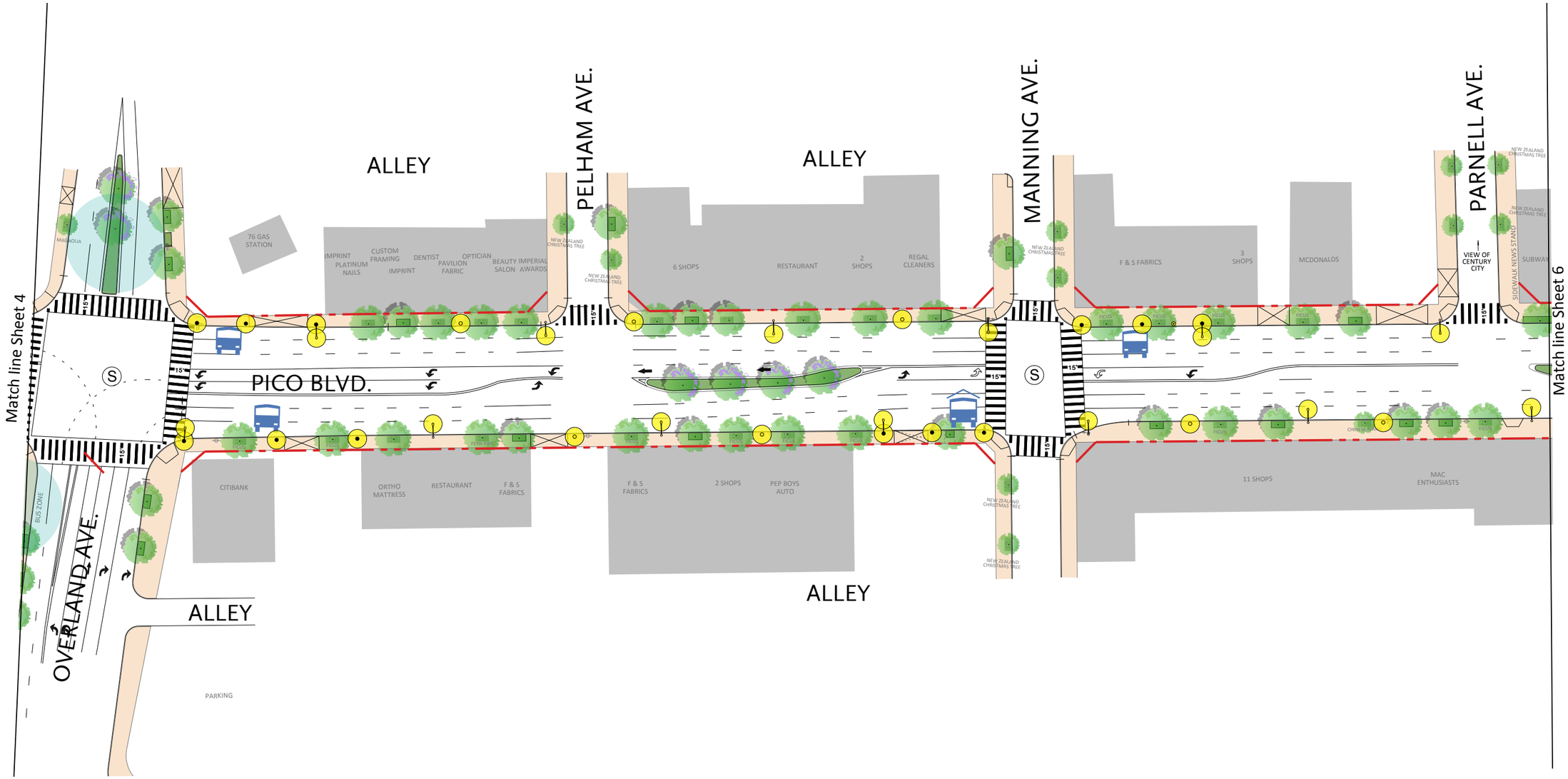
ILLUSTRATIVE STREETSCAPE PLAN SHEET 3



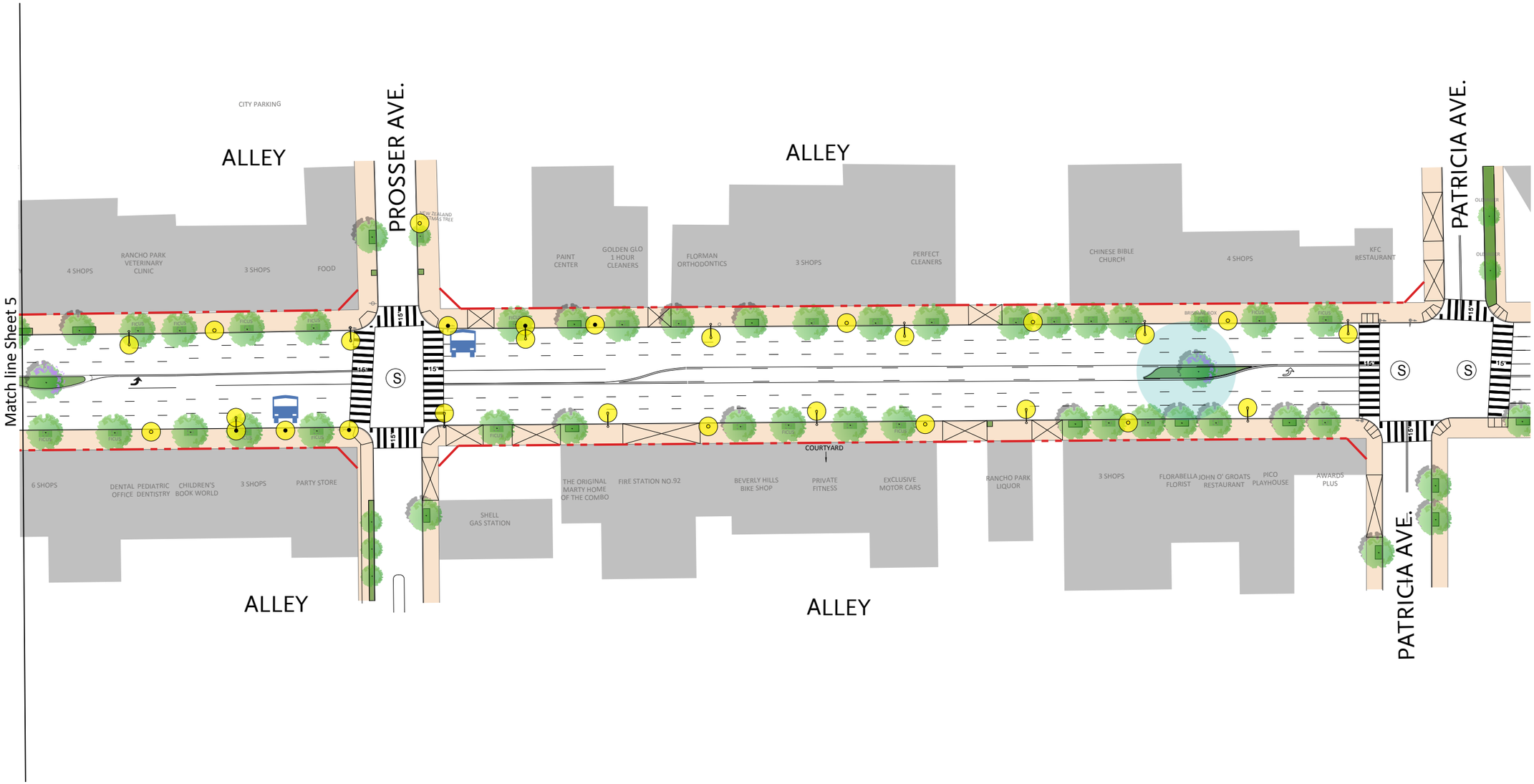
ILLUSTRATIVE STREETSCAPE PLAN SHEET 4



ILLUSTRATIVE STREETSCAPE PLAN SHEET 5



ILLUSTRATIVE STREETSCAPE PLAN SHEET 6



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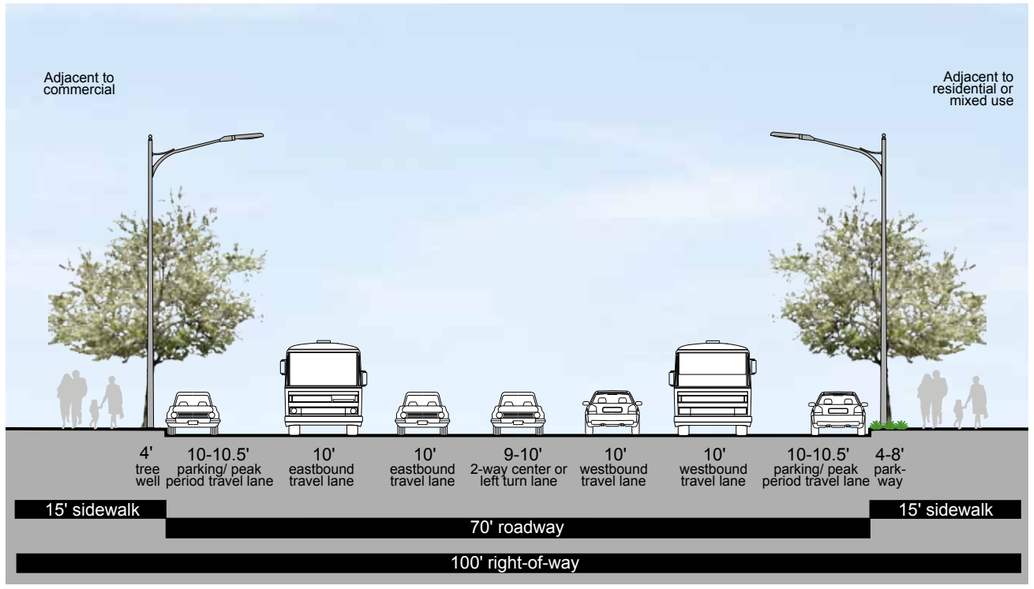
STREET CROSS SECTIONS

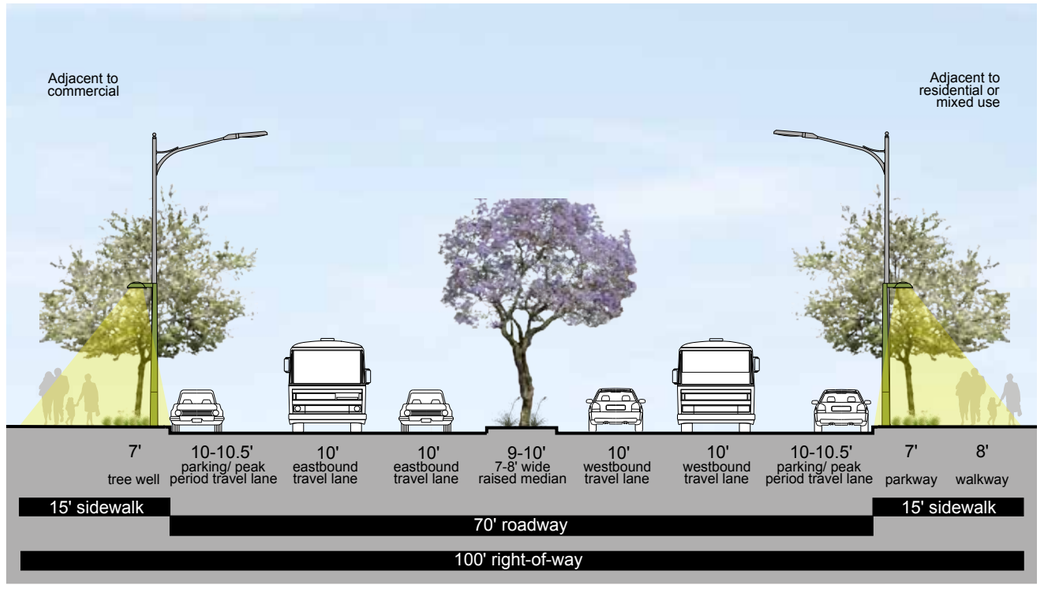
From 405 Freeway to Patricia Ave

Typical Midblock Location (with 15’ sidewalks)

EXISTING



PROPOSED



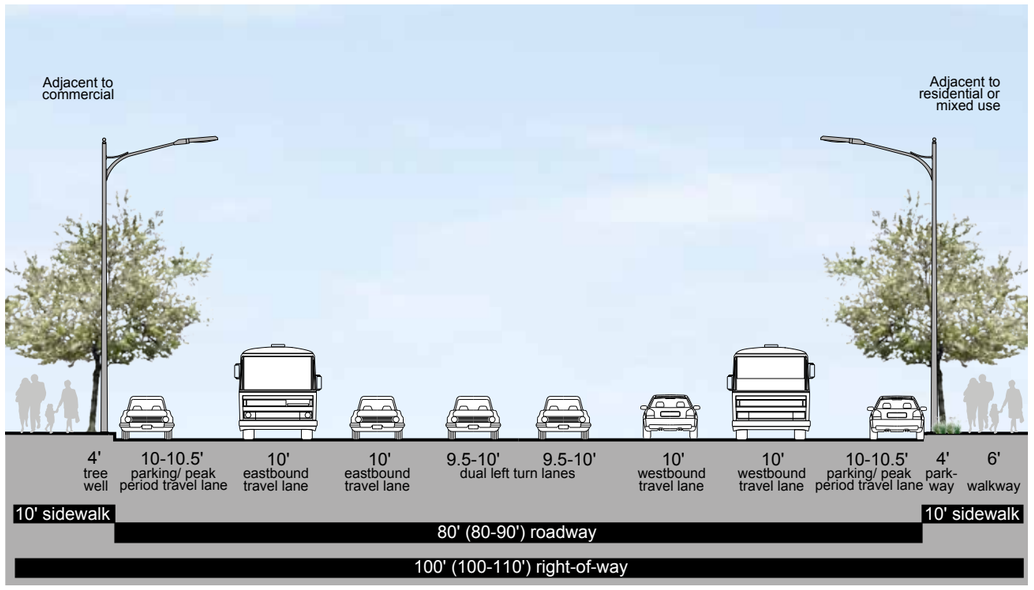
Note: All Pico Boulevard cross sections are looking west.

*As of the date of this document, 15’ sidewalk widths exist on the following portions of Pico Blvd: 405 Freeway to Midvale Ave. Glendon Ave to Shelby Ave, and Manning Ave to Patricia Ave.

STREET CROSS SECTIONS

From 405 Freeway to Patricia Ave
Typical Midblock Location (with 10’ sidewalks)

EXISTING



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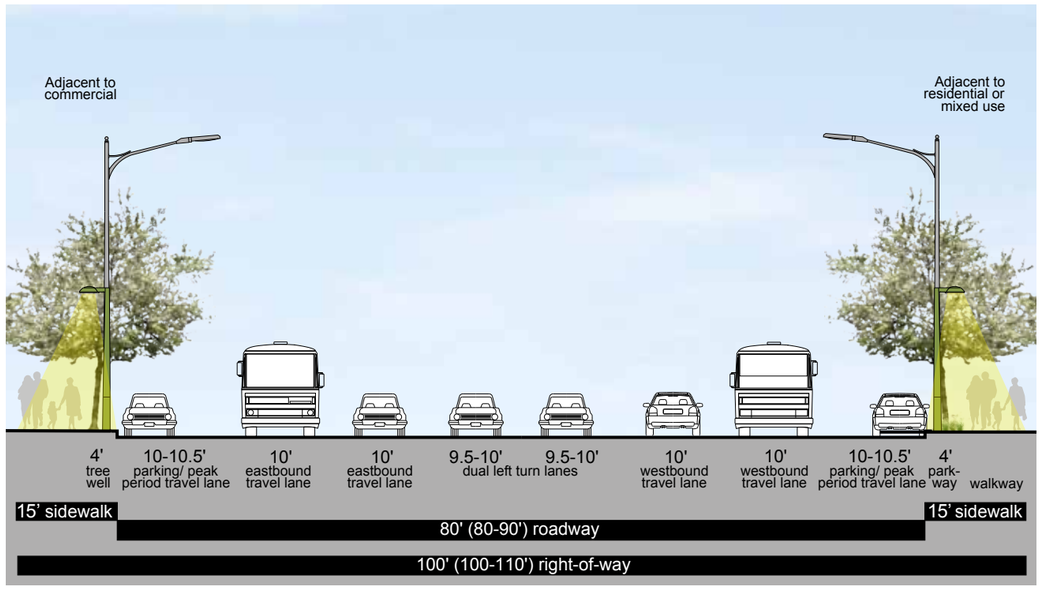


Note: For new development, pursue easements to achieve 15’ sidewalks

*As of the date of this document, 10’ sidewalk widths exist on the following portions of Pico Blvd: Midvale Ave to Glendon Ave, Selby Ave to Manning Ave.

ILLUSTRATIVE SKETCHES

EXISTING



Typical view of existing sidewalk conditions.



Existing view looking south at the intersection from Overland Avenue.

PROPOSED



Proposed improvements including enhanced sidewalk paving, street trees with planted tree wells, pedestrian lights, benches, and planters.



Proposed median on Overland Avenue would create a gateway.

ILLUSTRATIVE SKETCHES

Between Kelton Ave and Midvale Ave

Midblock Location

EXISTING



Existing view facing north.

PROPOSED



Proposed median with low-level planting.

5.3 MOTOR AVENUE

The Mobility Plan 2035 redesignated Motor Avenue between Venice Boulevard and the 10 Freeway from the prior Secondary Highway (90-foot right-of-way with a 70-foot wide roadway and 12-foot wide sidewalks) to an Avenue II Modified with an 86 -foot wide right-of-way, 62-foot wide roadway and 12-foot wide sidewalks. The roadway width is consistent with the predominant existing condition. The sidewalk is wider than most existing 9-foot wide sidewalks, but narrower than some 14-foot wide sidewalks.

Proposed improvements are illustrated in the following subsections:

STREETSCAPE ELEMENTS describes the trees, low-level plants, street lighting and street furniture selected by the community.

ILLUSTRATIVE STREETSCAPE PLAN shows the approximate location of proposed separated bike lanes, continental crosswalk striping, curb extensions, street trees, tree wells, parkways, pedestrian-scale street lights, bus stop improvements, and potential gateway element locations.

In addition to the specific elements shown on the Illustrative plan, trash receptacles and seating shall be provided at the spacing specified in Table 1 in conjunction with a project or may be provided in other locations approved by DPW.

While not depicted, medians may be added as driveways are eliminated or if property owners agree to allow medians which would require vehicles to make U-turns to access driveways.

STREET CROSS SECTIONS illustrate the typical existing condition and proposed future conditions at several typical locations:

- Midblock in the short term.
- Midblock in the longer term following dedication of additional right-of-way and sidewalk widening in conjunction with future development.
- At bus stops in the short term.
- At bus stops in the longer term following dedication of additional right-of-way and sidewalk widening in conjunction with future development.

ILLUSTRATIVE SKETCHES show:

- A typical midblock view.
- A view of an intersection with bus stops.

STREETSCAPE ELEMENTS





Street Tree.
Koelreuteria bipinnata
Chinese Flame

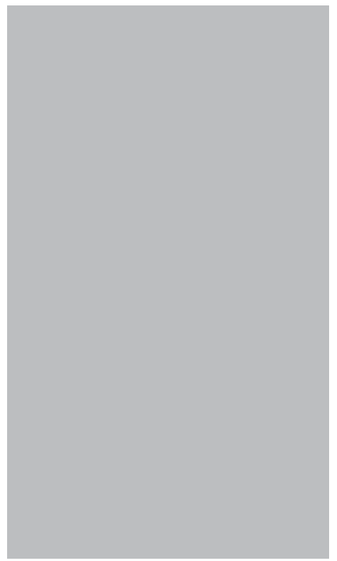
Type:	Deciduous
Origin:	China
Height:	30 to 40 feet
Spread:	30 to 40 feet
Form:	Round headed
Spacing:	25 to 35 feet
Flowers:	Yellow - summer
Fruits:	Showy orange capsules - fall
Water:	Relatively drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Moderate



Street Tree on Key Cross Streets*
Lyonothamnus floribundus subsp. *asplenifolius*
Catalina Ironwood

Type:	Evergreen
Origin:	California
Height:	30 to 40 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Drought tolerant (WUCOLS Low)
Growth rate:	Moderate

* as determined by the Palms Neighborhood Council



Median Tree
Not applicable (no medians).



Low-Level Plant Palette
All locations:
Achillea millifolium
Aloe 'Grassy Lassie'
Arctotis 'Magenta', 'Pumpkin Pie'
Rosmarinus 'Huntington Carpet'
Lantana 'Gold Rush'
Lomondra 'Breeze'
Phormium 'Jack Spratt'





Pedestrian Lights
Historic replica street lights and poles with a single luminaire.



Trash Receptacles and Seating
A family of seating and trash receptacles such as the Landscape Forms Presidio in green. The BID or individual property owners would be required to maintain these furnishings.



Bus Shelters
Boulevard shelter in green.



Alternative Trash Receptacles
City-provided and maintained trash receptacles as a low-cost alternative.

ILLUSTRATIVE STREETSCAPE PLAN

BASE MAP LEGEND

Base map is LADOT striping plan aligned with City orthophoto aerial.
Key information from LADOT striping plans:

- Two way left turn lane
- Left turn lane
- Signalized intersection
- Curb
- Driveway apron
- ADA ramp

Other base map information:

- Building footprint (approximate)

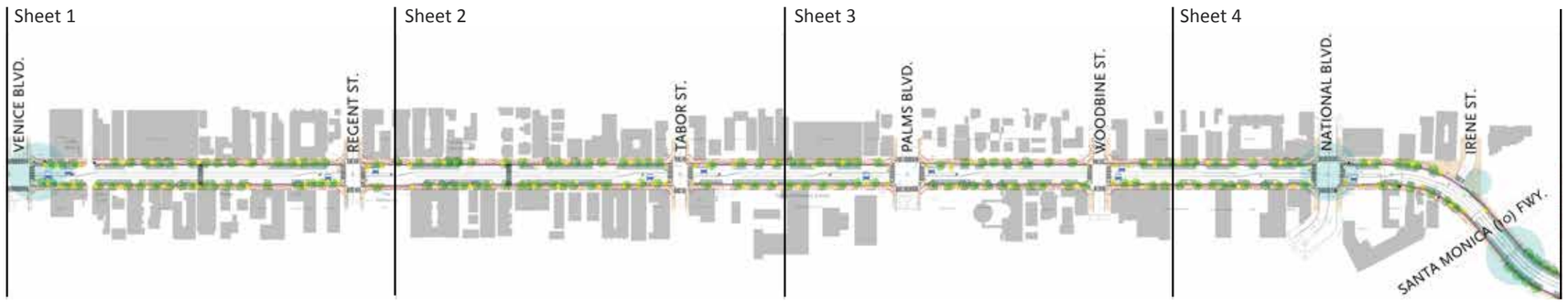
STREETSCAPE PLAN LEGEND

Existing Elements

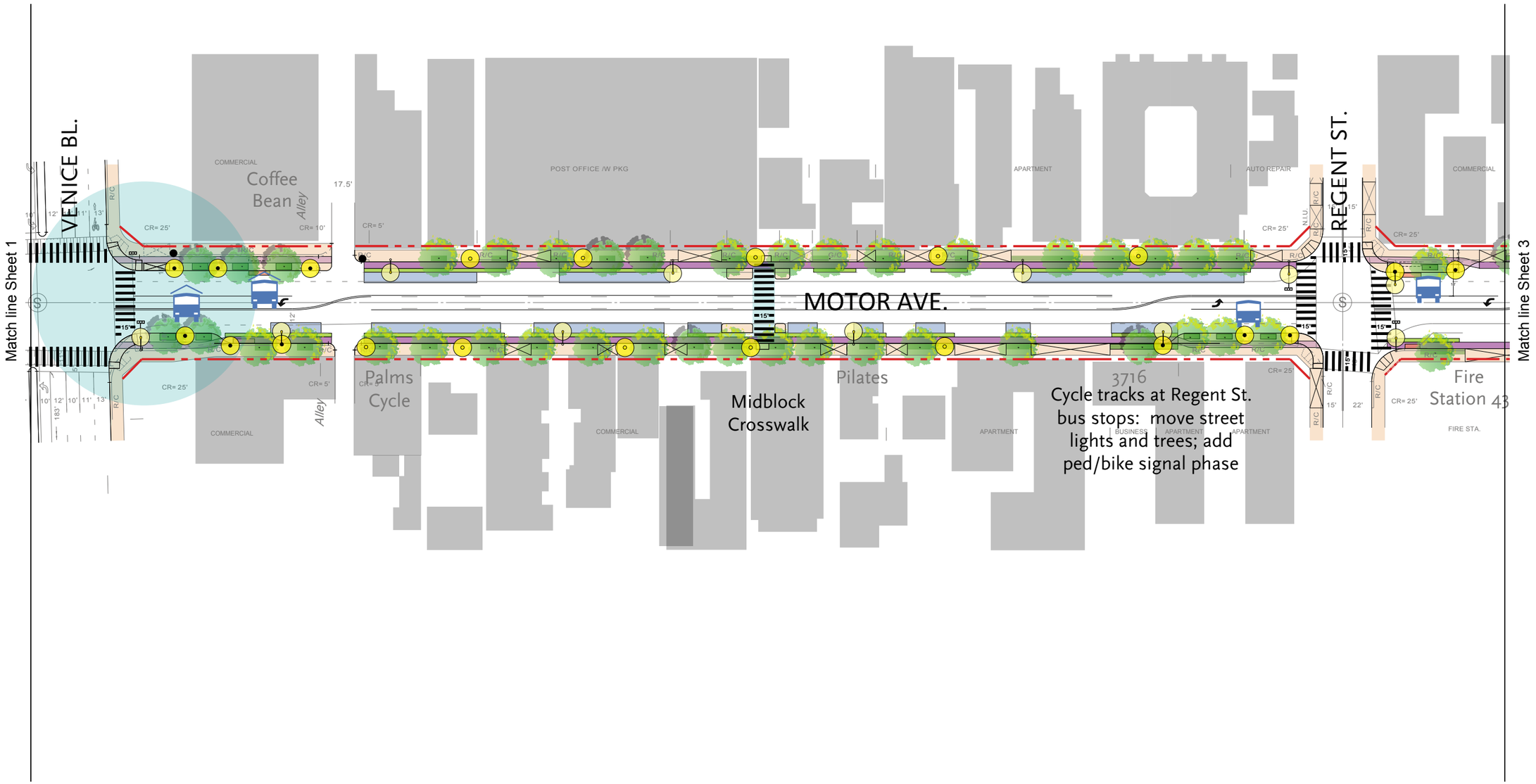
- Sidewalk
- Tree well - enlarge
- Parkway typically grass - enlarge/replant
- Street trees: *Koelreuteria bipinnata* (Chinese Flame Tree)
- Street light
- Traffic signal
- Utility pole
- Fire hydrant
- Storm drain inlet: to remain / to be moved
- Driveway: to remain / to be relocated
- Bus stop with shelter
- Bus stop with bench(es)

Proposed Elements

- Tree well
- Parkway with low-level planting
- Infill street tree - *Koelreuteria bipinnata* (Chinese Flame)
- Corner curb extension with ramp for pedestrians/bikes
- Midblock curb extension
- Relocated storm drain inlet
- Relocated driveway
- Bus stop pedestrian light
- Other pedestrian light
- Continental striping at existing marked crosswalk
- New crosswalk with continental striping
- Bicycle lane
- Bicycle lane with pedestrian crossing
- Buffer
- Curbside parking
- Future right-of-way line after dedication
- Potential location of gateway element or gathering place



ILLUSTRATIVE STREETSCAPE PLAN SHEET 1



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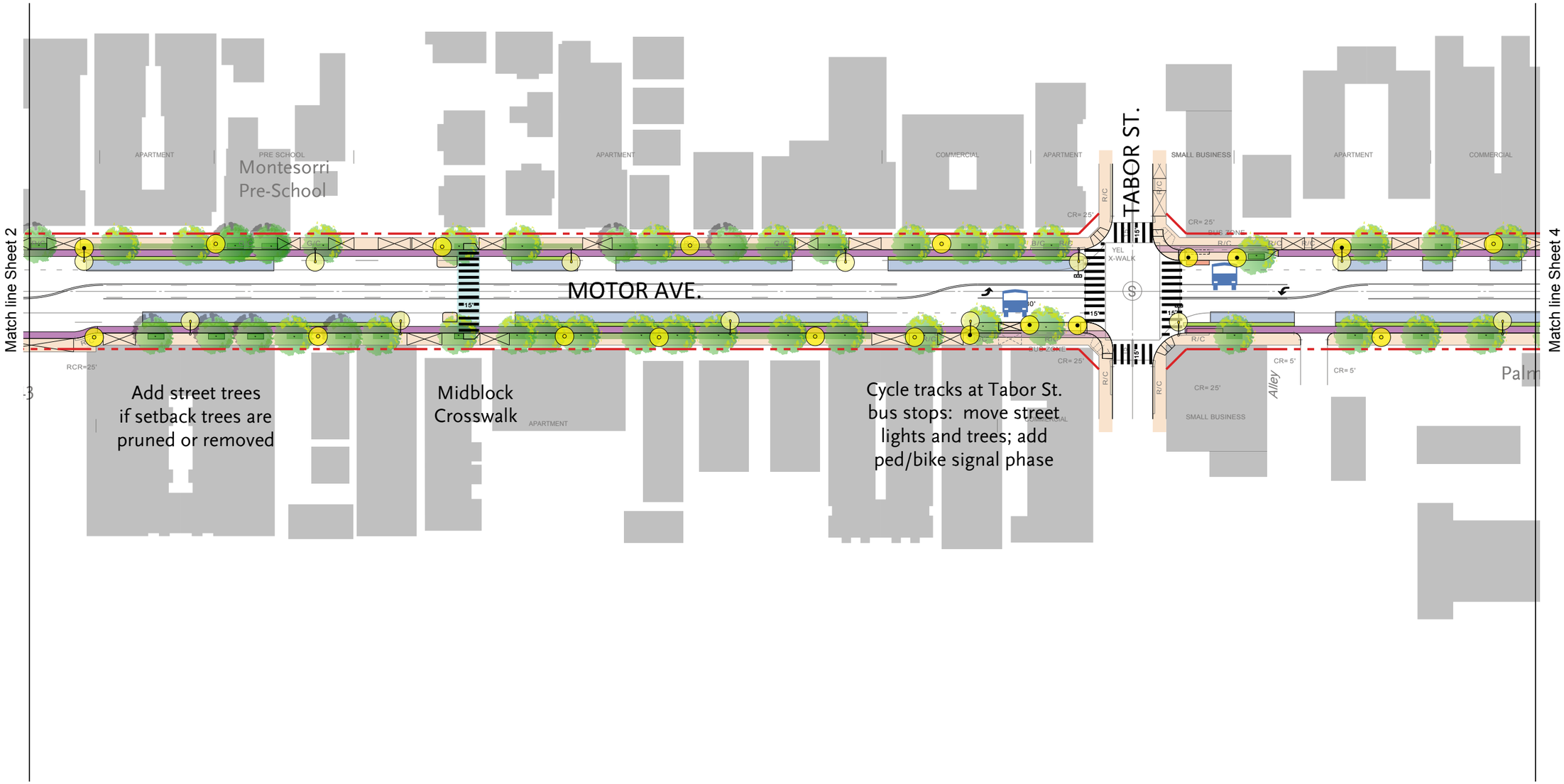

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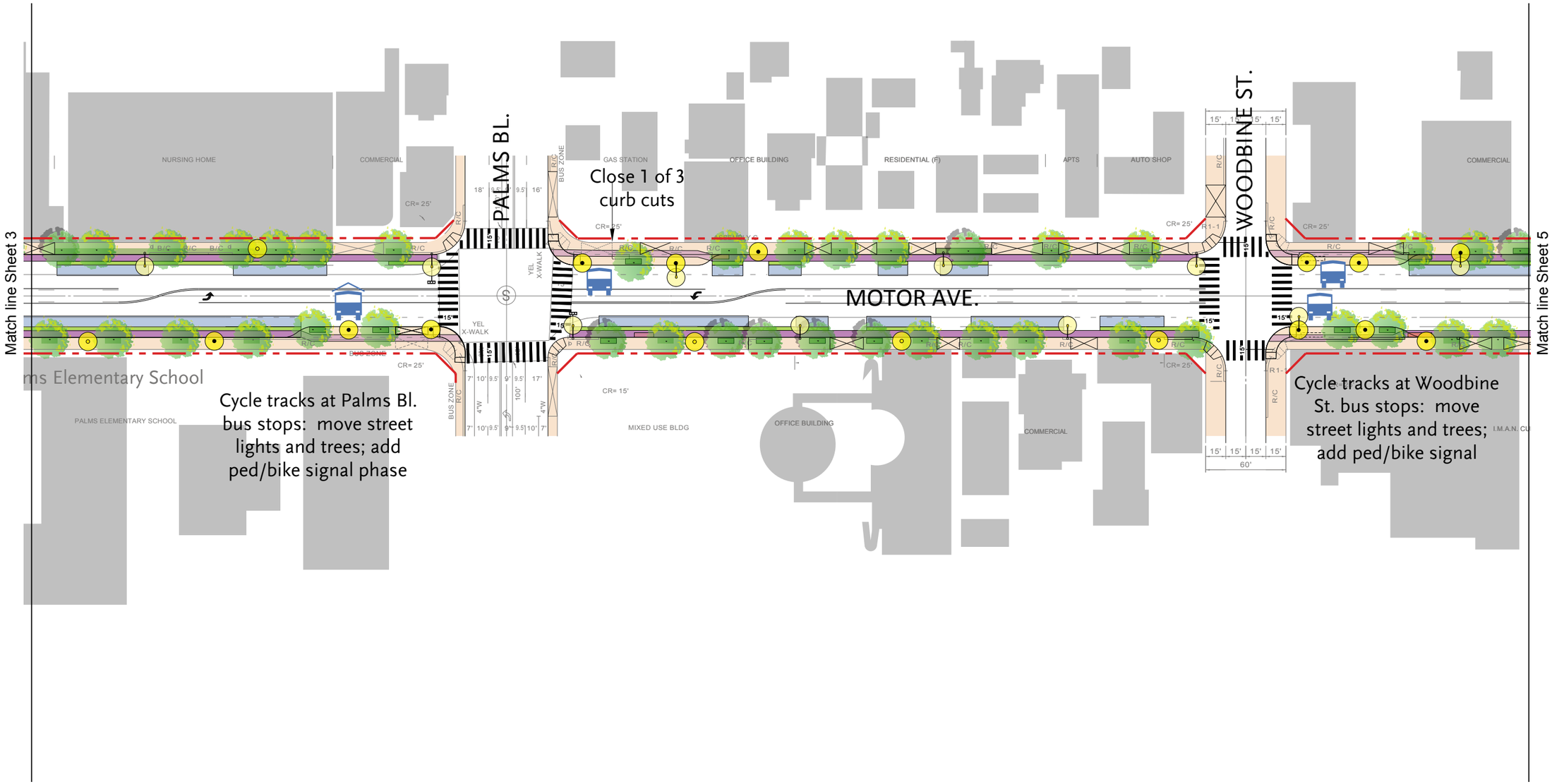
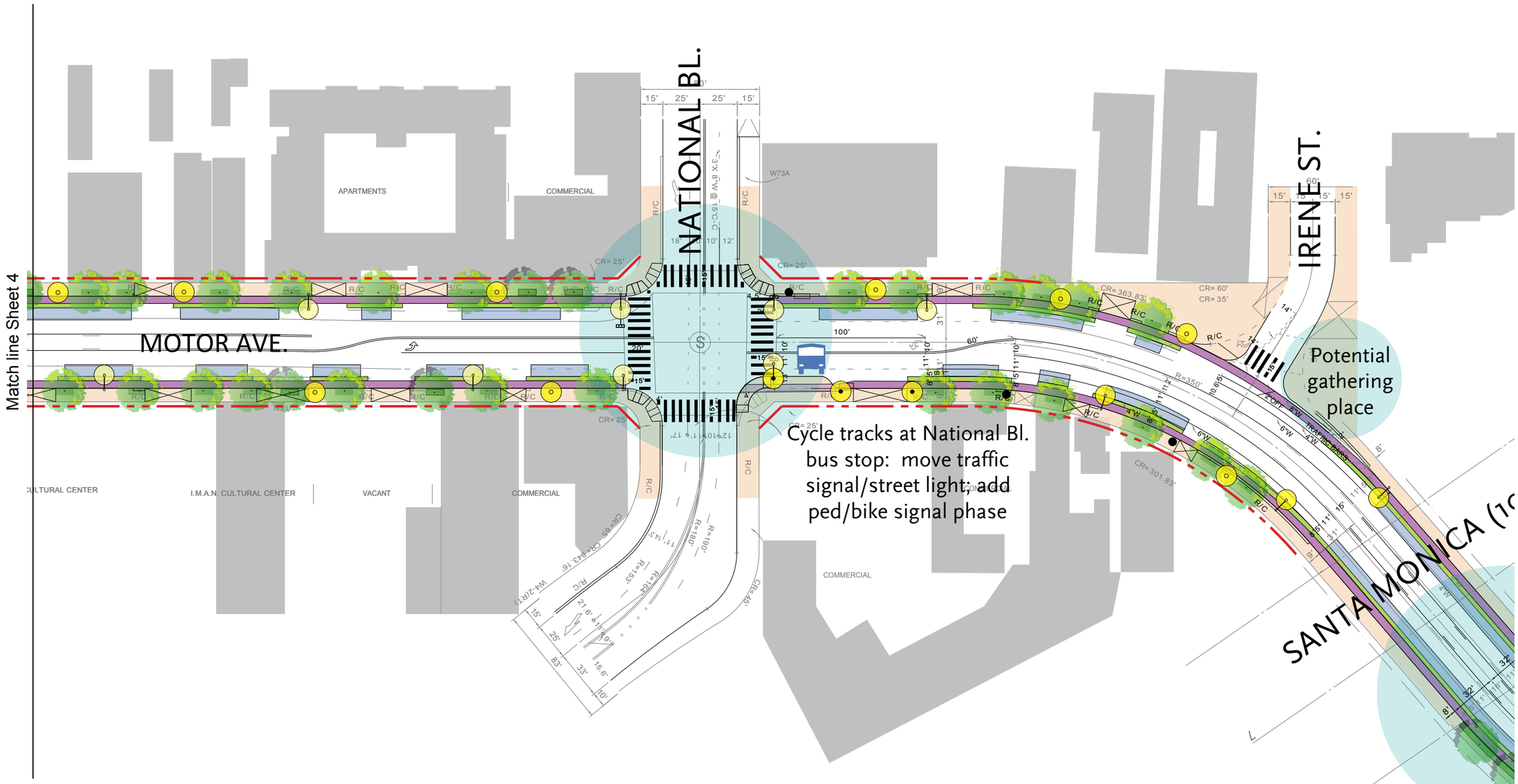


ILLUSTRATIVE STREETSCAPE PLAN SHEET 4



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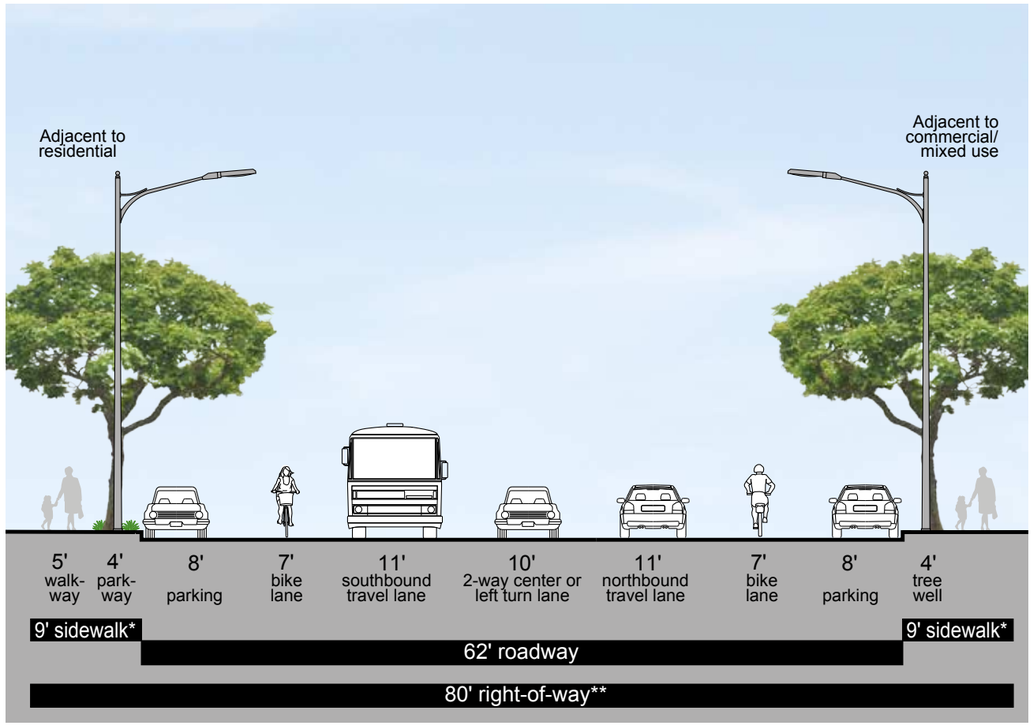
STREET CROSS SECTIONS

From 10 Freeway to Venice Blvd

Typical Midblock Location

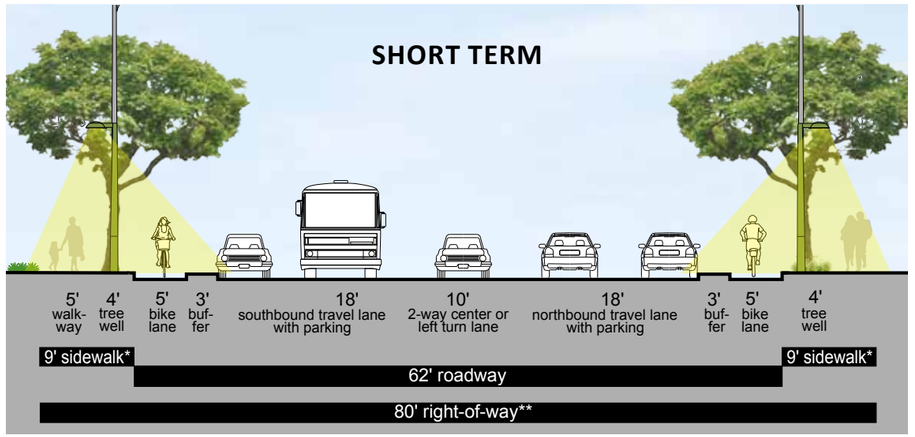
EXISTING



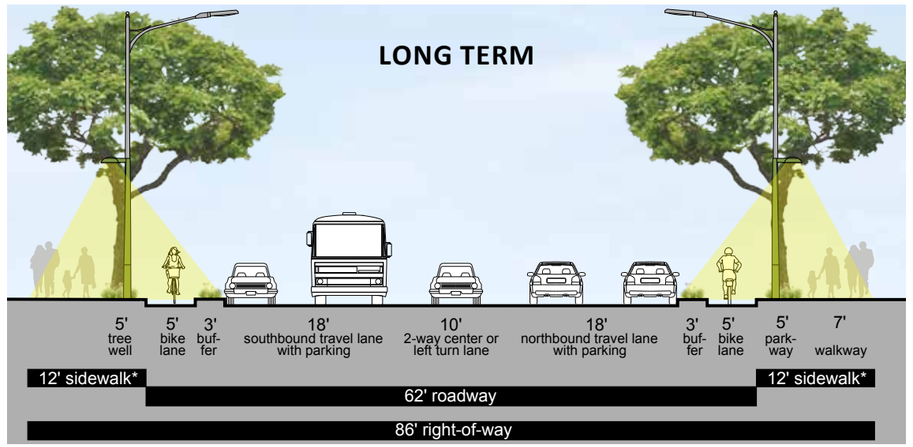
* Sidewalks are 14’ wide in some locations.
** Right-of-way is 85’ or 88’ in some locations.

Note: All Motor Avenue cross sections are looking north.

PROPOSED



* Sidewalks are 14’ wide in some locations.
** Right-of-way is 85’ or 88’ in some locations.



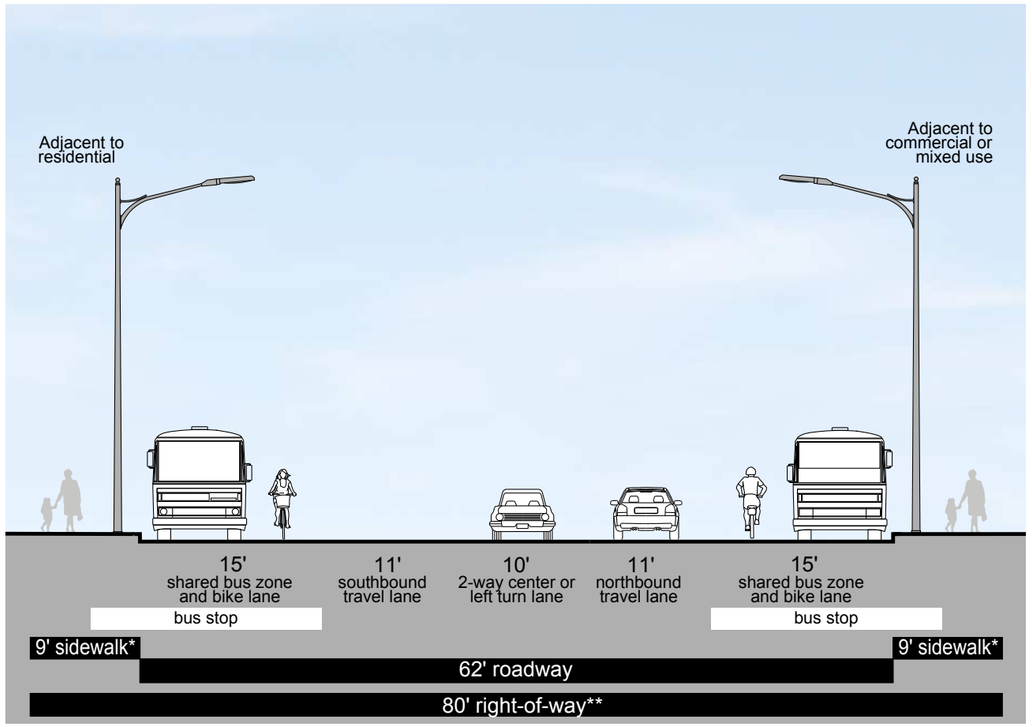
* Street dedications from new development will provide at least 12’ wide sidewalks.
Existing 14’ wide sidewalks with 6’ parkways and 8’ walkways in 85’ or 88’ rights-of-way will remain.

STREET CROSS SECTIONS

From 10 Freeway to Venice Blvd

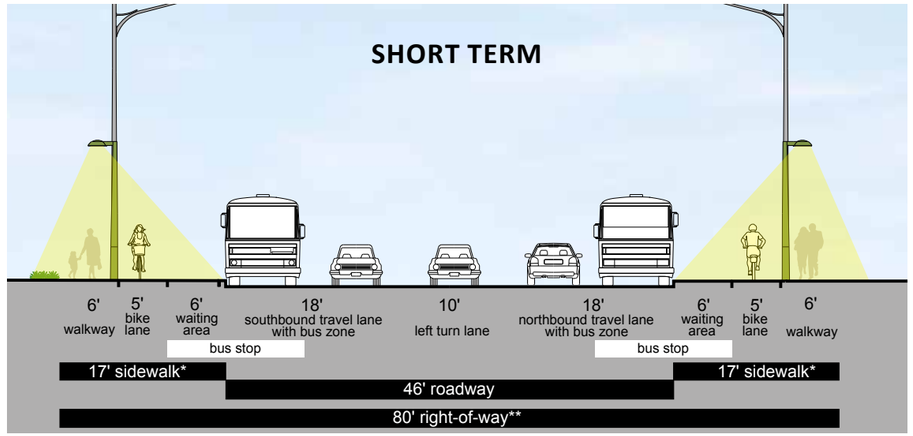
Typical Bus Stop Location at Corners

EXISTING

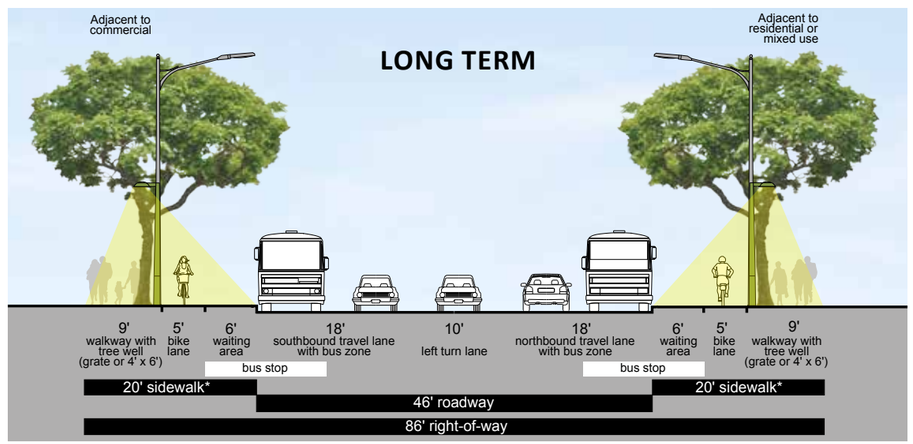


* Sidewalks are 14’ wide in some locations.
** Right-of-way is 85’ or 88’ in some locations.

PROPOSED



* Sidewalks are 14’ wide in some locations.
** Right-of-way is 85’ or 88’ in some locations.



*12’ typical sidewalk + 8’ curb extension = 20’ sidewalk at bus stops.
Street dedications from new development will provide at least 12’ wide sidewalks.
Existing 14’ wide sidewalks with 6’ parkways and 8’ walkways in 85’ or 88’ rights-of-way will remain.

ILLUSTRATIVE SKETCHES

From 10 Freeway to Venice Blvd

Typical Midblock Location

EXISTING



Existing view of a typical midblock location looking north.

PROPOSED



Proposed long-term view of the same location with protected bike lanes.

ILLUSTRATIVE SKETCHES

From 10 Freeway to Venice Blvd

Typical Bus Stop Locations at Corners



EXISTING

Existing view of the intersection of Motor Avenue and Woodbine Street looking north. Bus stops are located on both sides of the street north of the intersection.

PROPOSED

Proposed long-term view of the intersection with protected bike lanes, and curb extensions for bus stop boardings.



ILLUSTRATIVE SKETCHES

From 10 Freeway to Venice Blvd
Typical Midblock Location

EXISTING



Existing view in front of the post office looking north.

PROPOSED



Future view of the same location with a midblock crosswalk and pedestrian street lights.

ILLUSTRATIVE SKETCHES

From 10 Freeway to Venice Blvd

Typical Midblock Location

EXISTING



Existing view just north of post office.



Existing view of typical sidewalk condition and street tree.

PROPOSED



Proposed view of the same location with a midblock crosswalk.



Proposed view with longer tree wells that will allow trees to grow bigger and healthier.

5.4 CENTINELA AVENUE

The Mobility Plan 2035 redesignated Centinela Avenue between Washington Boulevard and Jefferson Boulevard in Del Rey from Major Highway Class II (generally a 104-foot right-of-way with an 80-foot wide roadway and 12-foot wide sidewalks and, where required at intersections, 114-foot right-of-way with a 90-foot wide roadway and 12-foot wide sidewalks) to an Avenue II Modified with varying dimensions, including:

- 86-foot right-of-way with a 66-foot wide roadway and 10-foot wide sidewalks north of Walsh Avenue, which is consistent with the existing street condition north of Short Avenue;
- 86 to 100-foot right-of-way with 66 to 80-foot wide roadway and 10' wide sidewalks between Walsh Avenue and Wagner Street;
- 90-foot right-of-way with 66-foot wide roadway and 12-foot wide sidewalks generally between Wagner Street and Milton Street;
- 100 to 104-foot right-of-way with 74 to 84-foot wide roadway and eight to 13-foot wide sidewalks south of Milton Street.

Proposed improvements are illustrated in the following subsections:

STREETSCAPE ELEMENTS describes the trees, low-level plants, street lighting and street furniture selected by the community.

PUBLIC ART ELEMENTS & SHADE STRUCTURES depict potential ideas for placemaking elements around Culver Blvd and Walsh Ave.

ILLUSTRATIVE STREETSCAPE PLAN shows the approximate location of proposed medians, continental crosswalk striping, curb extensions, street trees, tree wells, parkways, pedestrian-scale street lights, bus stop improvements and potential gateway element locations. In addition to the specific elements shown on the illustrative plan, trash receptacles and seating shall be provided at the spacing specified in Table 1 in conjunction with a project or may be provided in other locations approved by DPW. Additional medians may be added as driveways are eliminated or if property owners agree to allow medians which would require vehicles to make U-turns to access driveways.

STREET CROSS SECTIONS illustrate the typical existing condition and proposed future conditions in the following segments:

- Walsh Avenue to Short Avenue
- Short Avenue to Stewart Avenue
- 90 Freeway to Wagner Street.

ILLUSTRATIVE SKETCHES shows improvements in the commercial district between Greene Avenue and Walsh Avenue, including medians, curb extensions to provide more sidewalk space, street trees and street lights.

STREETSCAPE ELEMENTS



Street Tree
Residential Areas
Lyonothamnus floribundus subsp. *asplenifolius*
Catalina Ironwood

Type:	Evergreen
Origin:	California
Height:	30 to 40 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Drought tolerant (WUCOLS Low)
Growth rate:	Moderate



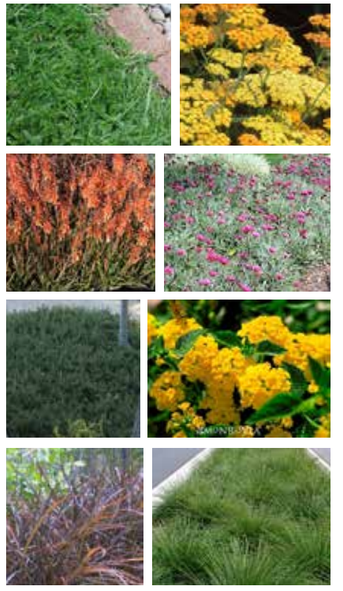
Median Tree
Calocedrus decurrens
Incense Cedar

Type:	Conifer
Origin:	California
Height:	40+ feet
Spread:	20-30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	None
Water:	Drought tolerant (WUCOLS Low)
Growth rate:	Slow at first, then moderate



Street Tree
Commercial Areas
Koelreuteria paniculata
Goldenrain Tree

Type:	Deciduous
Origin:	China
Height:	25 to 35 feet
Spread:	20 to 30 feet
Form:	Round headed
Spacing:	25 to 35 feet
Flowers:	Yellow - summer
Fruits:	Showy orange capsules - fall
Water:	Drought tolerant (WUCOLS Low)
Growth rate:	Moderate



Low-Level Plant Palette
All locations:
Achillea millifolium
Aloe 'Grassy Lassie'
Arctotis 'Magenta', 'Pumpkin Pie'
Rosmarinus 'Huntington Carpet'
Lantana 'Gold Rush'
Lomondra 'Breeze'
Phormium 'Jack Spratt'







Pedestrian Lights
To date there is no clear preference for pedestrian light style: one-third preferred historic replicas, half preferred contemporary styles (modified historic or traditional) styles, and the reminder preferred modern styles.



Trash Receptacles and Seating
A family of seating and trash receptacles such as the Landscape Forms Presidio in Bronze.



Alternate Street Tree north of Short Ave
Losphostemon conferta
Brisbane Box

Type:	Evergreen
Origin:	Australia
Height:	30 to 40 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Relatively drought tolerant once established in big tree well (WUCOLS Moderate)
Growth rate:	Rapid

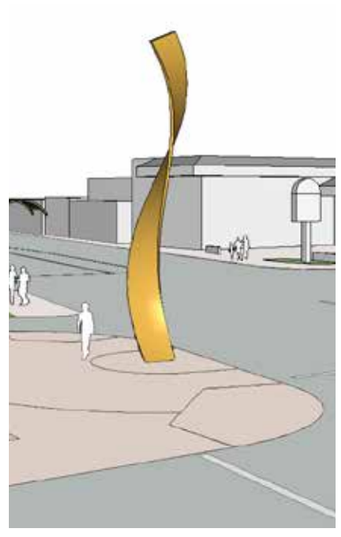
Brisbane Box trees were planted by DPW between Short Ave and Washington Blvd.



Bus Shelters
Boulevard shelter in bronze.



Alternative Trash Receptacles
City-provided and maintained trash receptacles as a low-cost alternative.

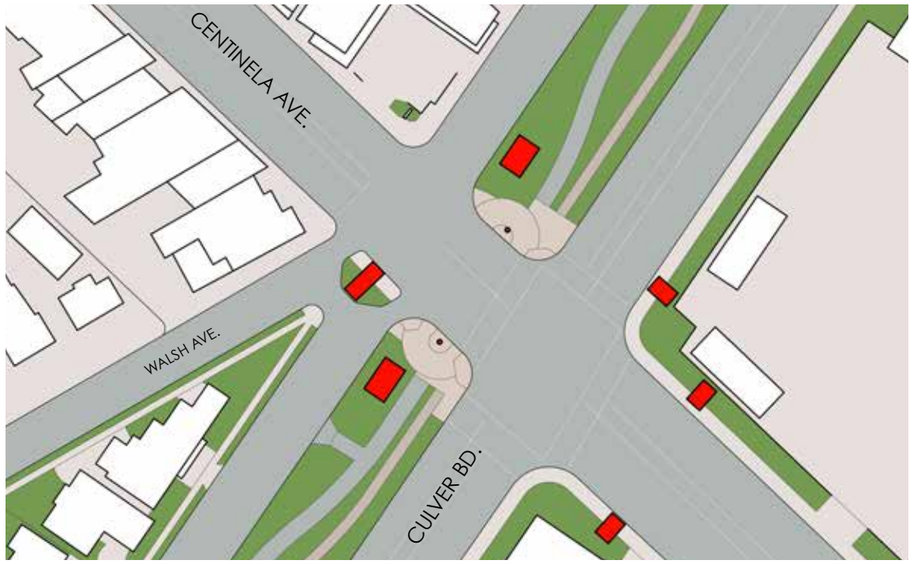


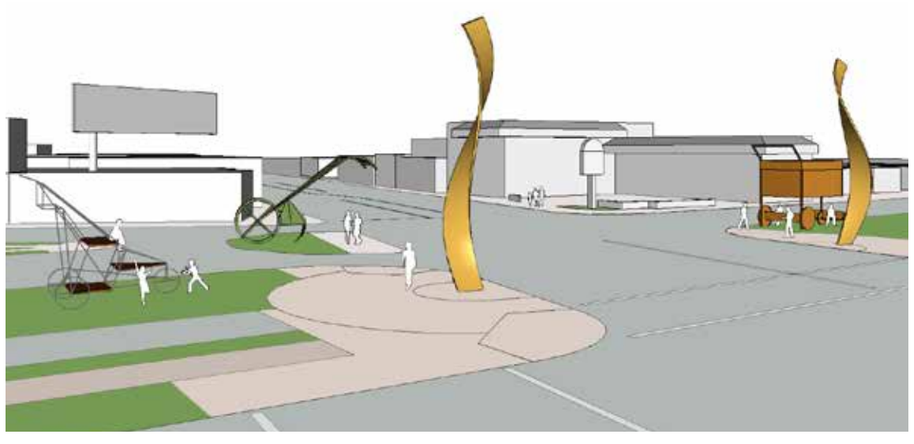
Gateway/Gathering Place at Centinela Ave and Culver Blvd
The following pages illustrate two concepts developed by local architecture firm Digbar to reinforce the sense of place at the heart of Del Rey.

POTENTIAL PUBLIC ART ELEMENTS

At Culver Blvd and Walsh Ave

On Public Right of Ways





Centro Del Rey



Del Rey Fields







Del Rey Points



Ballona Del Rey

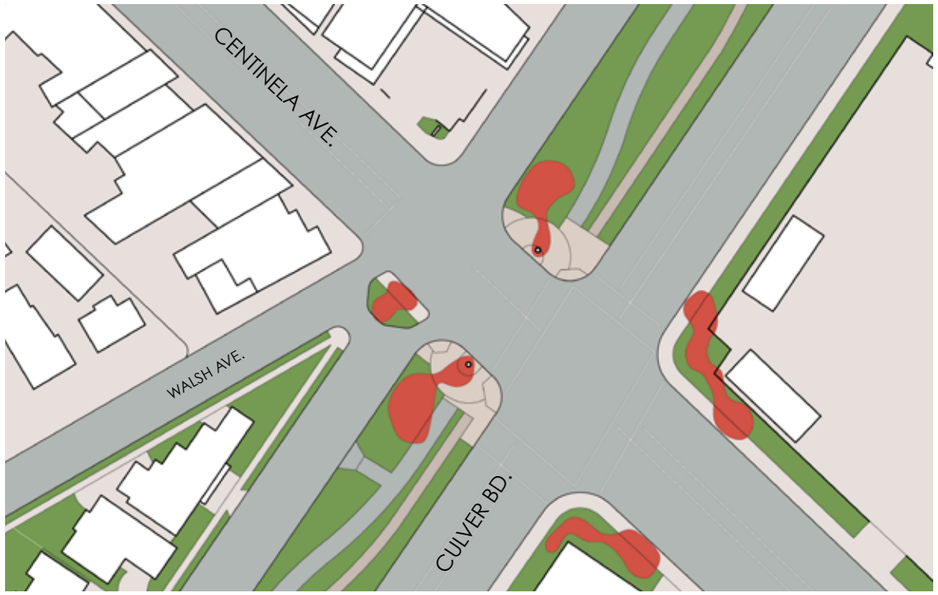


Art elements are based on vehicles that would have been seen historically and are present today along Centinela Ave.

POTENTIAL SHADE STRUCTURES

AT CULVER BLVD AND WALSH AVE

On Public Right of Ways



Del Rey Center-nela



Del Rey Fields



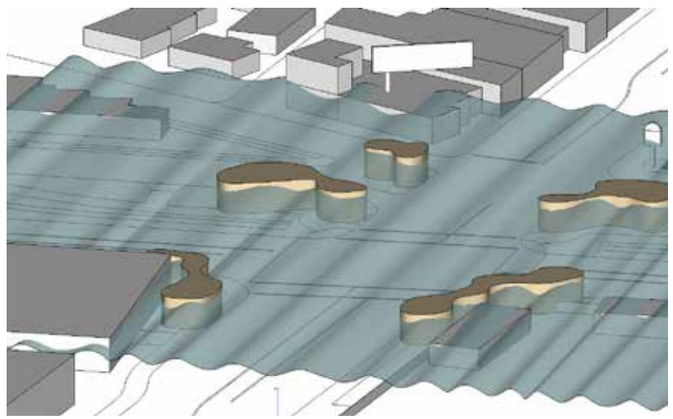


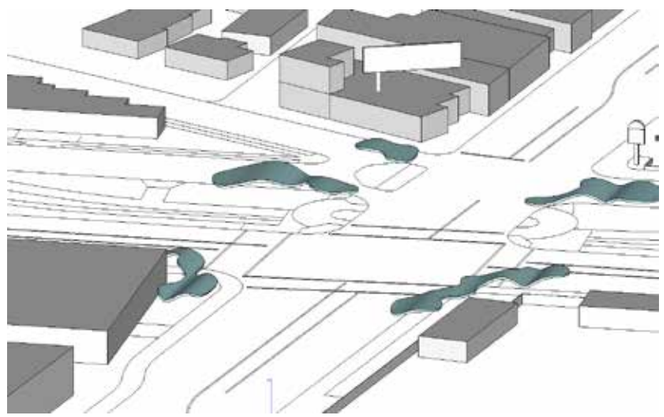
Ballona Del Rey



DIGBAR

Shade structures are based on the history of the area as a floodplain.







ILLUSTRATIVE STREETSCAPE PLAN

BASE MAP LEGEND

Base map is composite of LADOT striping plans.
Key information from LADOT striping plans:

- Travel lane
- Two way left turn lane
- Left turn lane
- Signalized intersection
- Curb
- Driveway apron
- ADA ramp

Other base map information:

- Building footprint (approximate)

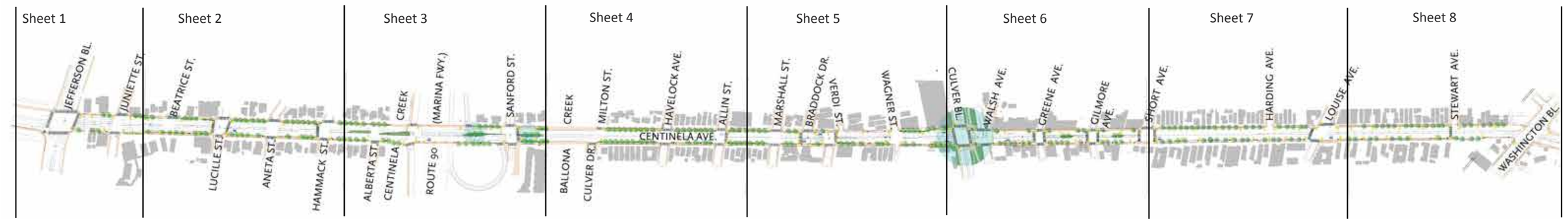
STREETSCAPE PLAN LEGEND

Existing Elements

- Sidewalk
- Tree well - enlarge
- Parkway - modify to accommodate walkway
- Street trees:
  - *Lophostemon confertus* (Brisbane Box)
  - other (species listed)
- Street light
- Traffic signal
- Utility pole
- Storm drain inlet at proposed curb extension:
  - to remain
  - to be moved
- Bus stop

Proposed Elements

- Tree well
- Parkway with low-level planting
- Infill street trees:
  - *Lyonothamus floribundus* subsp. *asplendifolius* (Catalina Ironwood)
  - *Koelreuteria paniculata* (Goldenrain Tree)
- *Calocedrus decurrens* (Incense Cedar) - medians
- Bus stop pedestrian light
- Other pedestrian light
- Corner curb extension
- Midblock curb extension
- Raised landscaped median
- Continental striping at existing marked crosswalk
- New marked crosswalk with continental striping
- Future property line
- Potential location of gateway element



ILLUSTRATIVE STREETSCAPE PLAN SHEET 1

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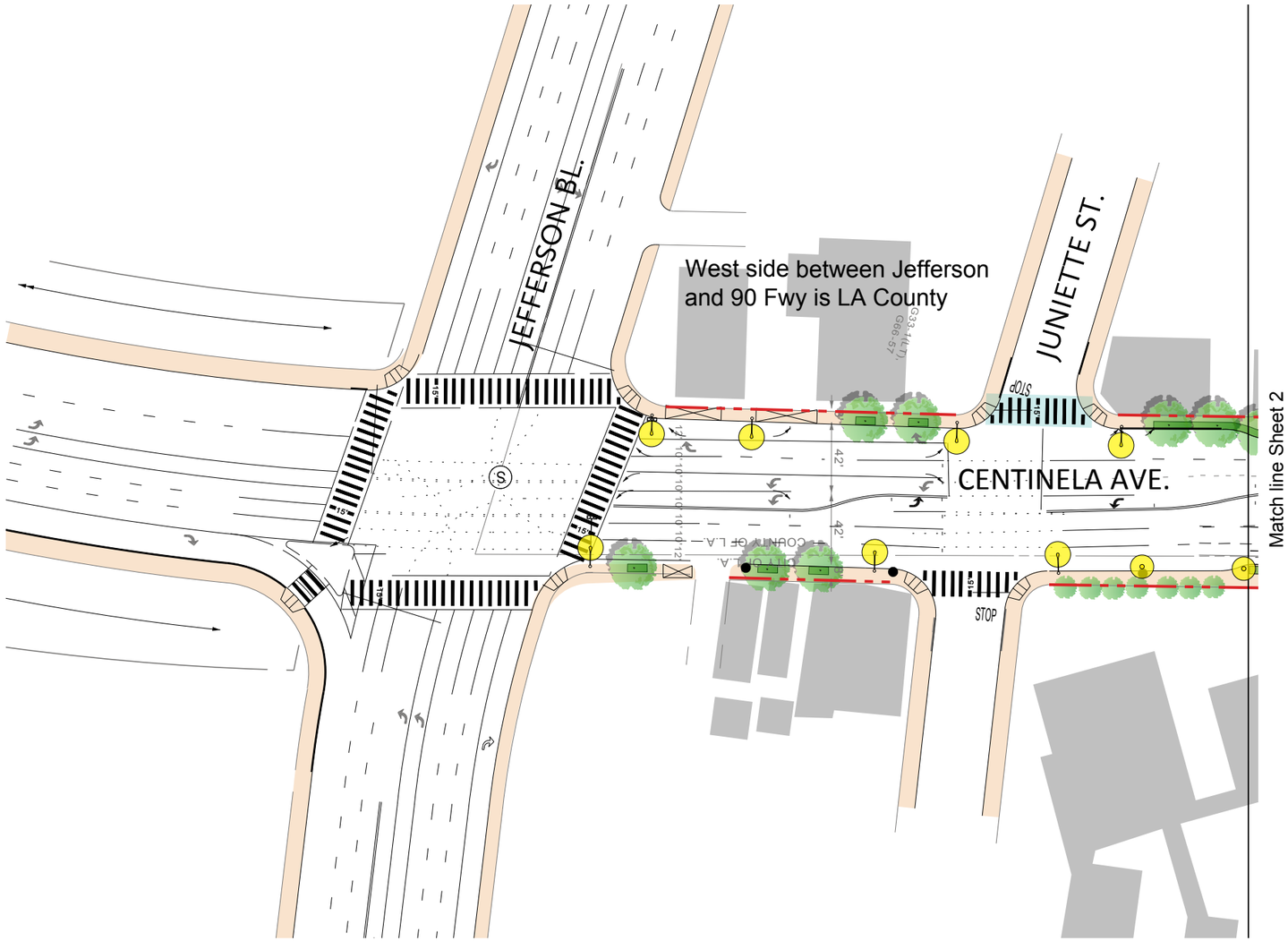
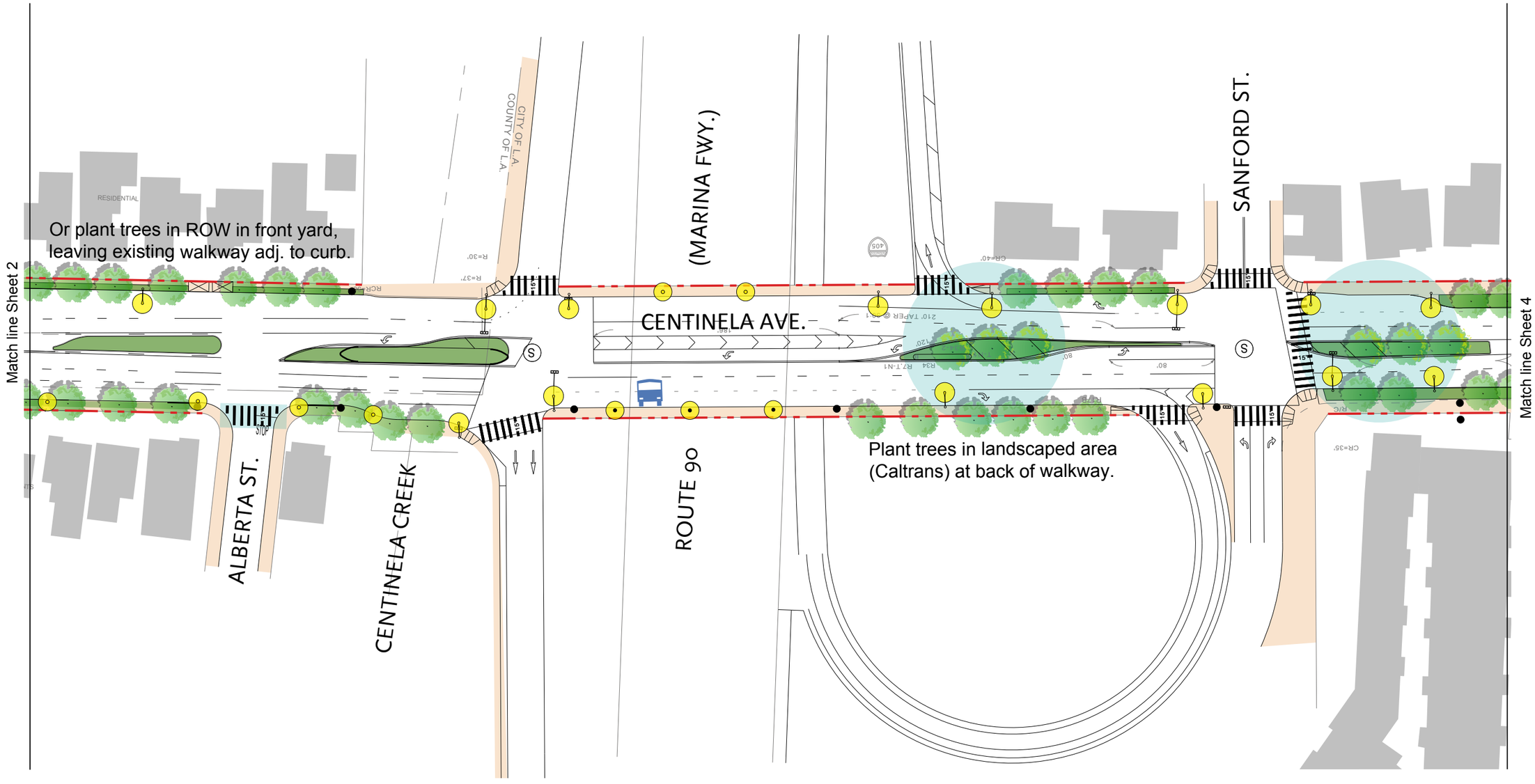


ILLUSTRATIVE STREETSCAPE PLAN SHEET 2



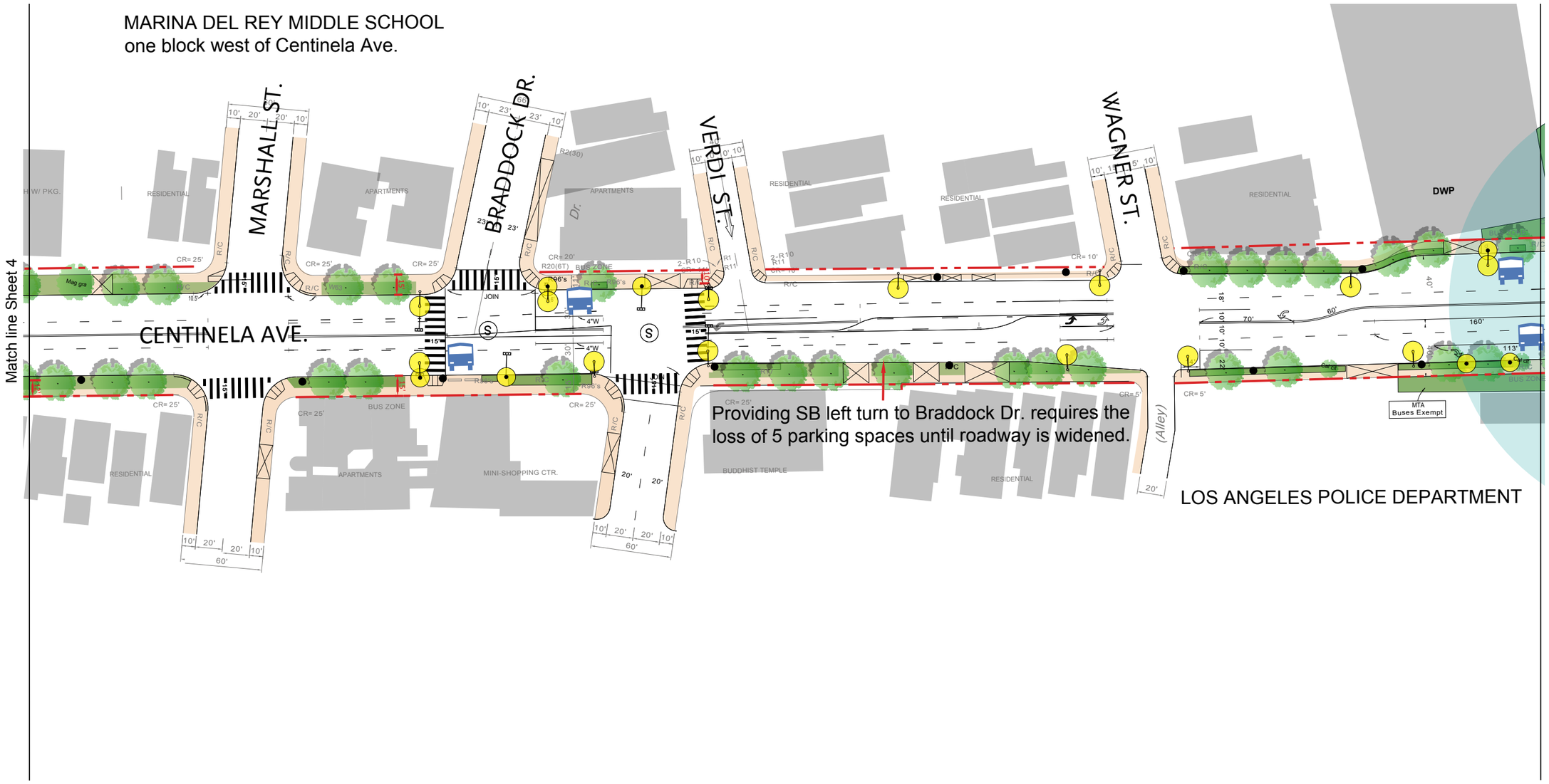
ILLUSTRATIVE STREETSCAPE PLAN SHEET 3



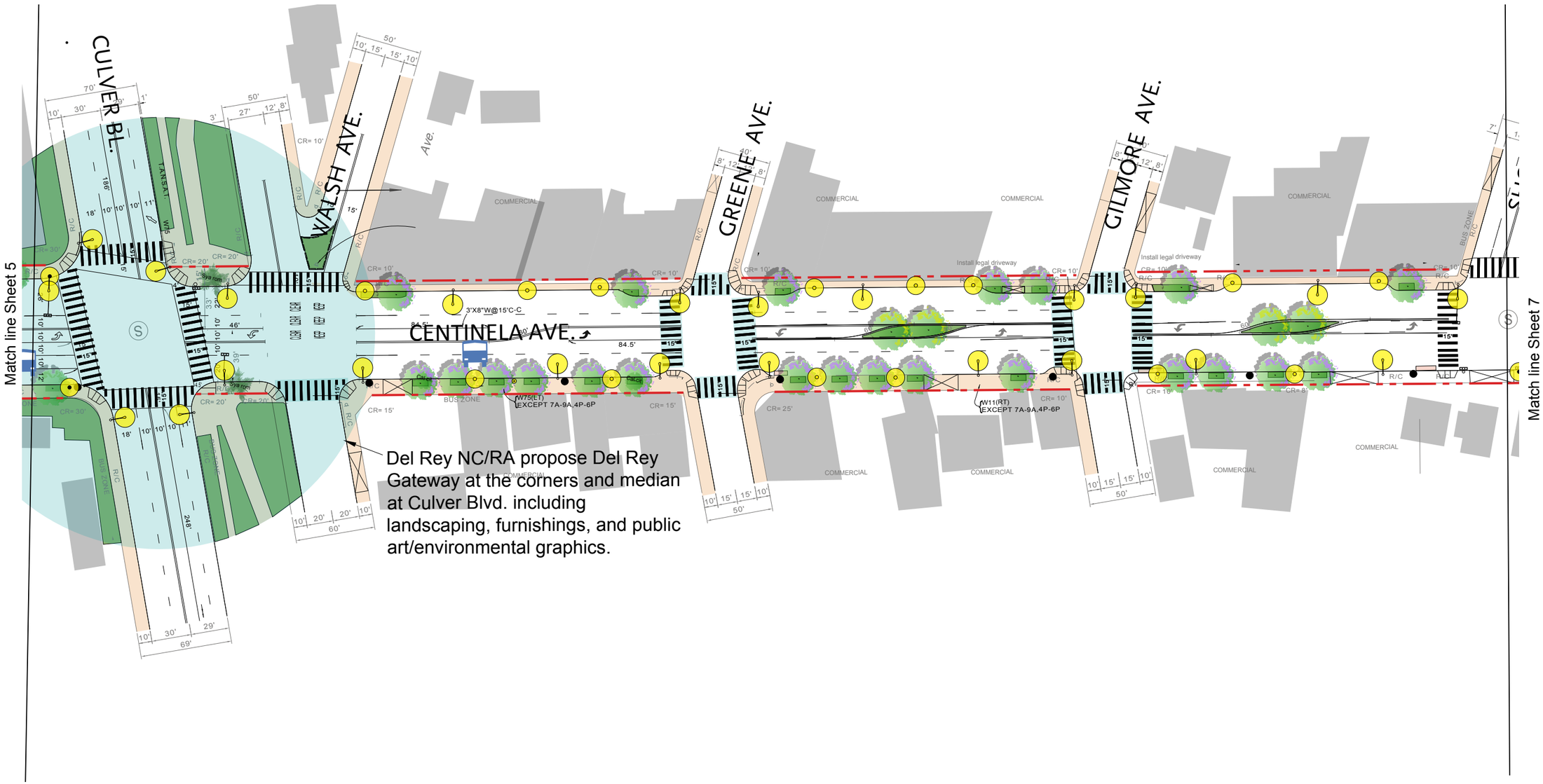
ILLUSTRATIVE STREETSCAPE PLAN SHEET 4



ILLUSTRATIVE STREETSCAPE PLAN SHEET 5



ILLUSTRATIVE STREETSCAPE PLAN SHEET 6



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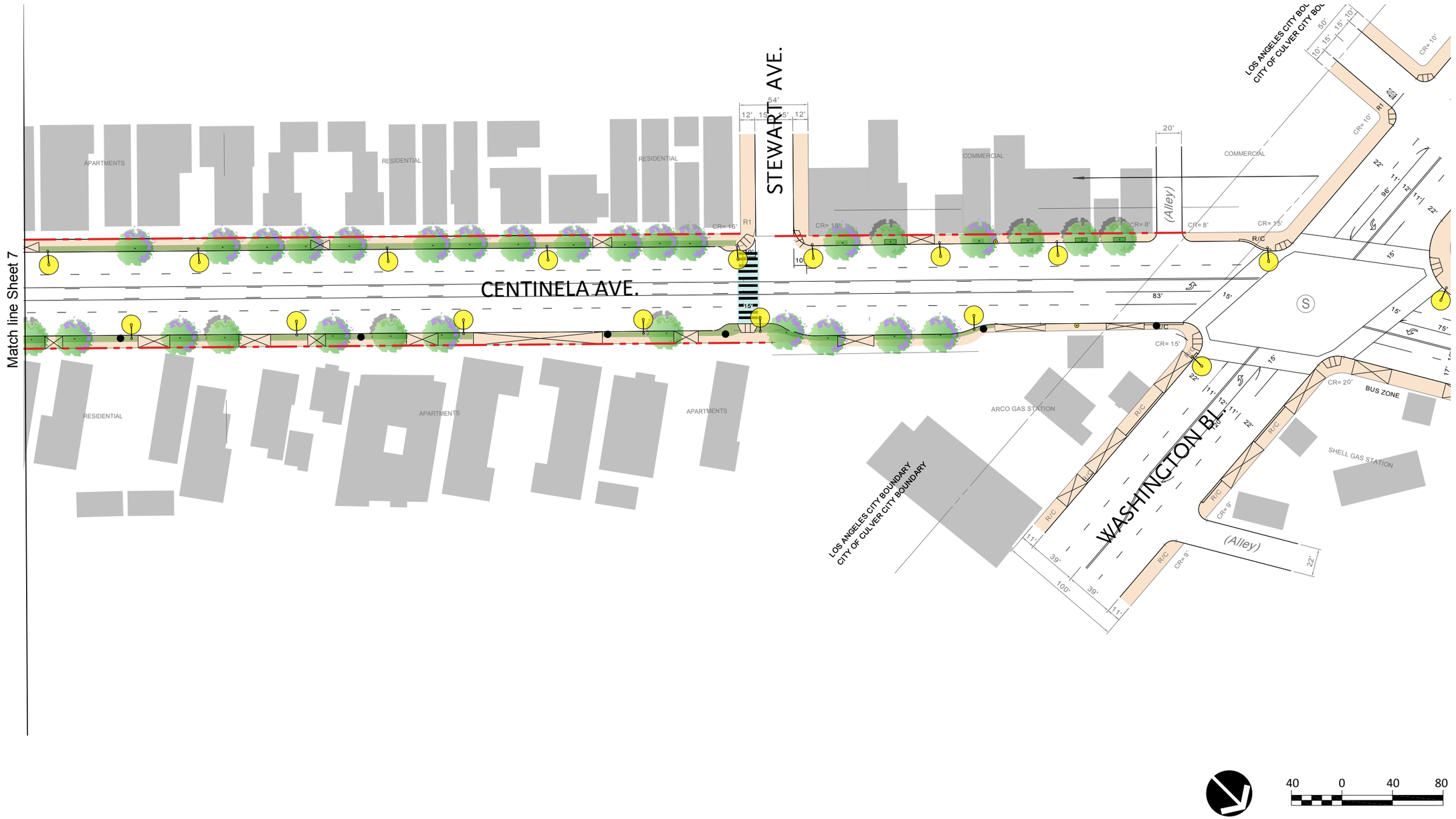
ILLUSTRATIVE STREETSCAPE PLAN SHEET 7



ILLUSTRATIVE STREETSCAPE PLAN SHEET 8



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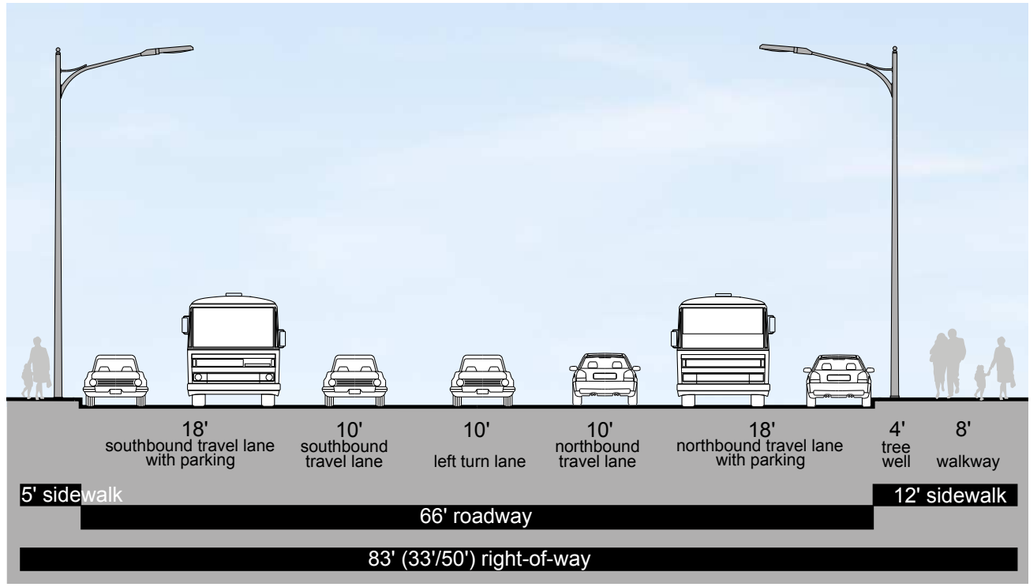
STREET CROSS SECTIONS

From Walsh Ave to Short Ave

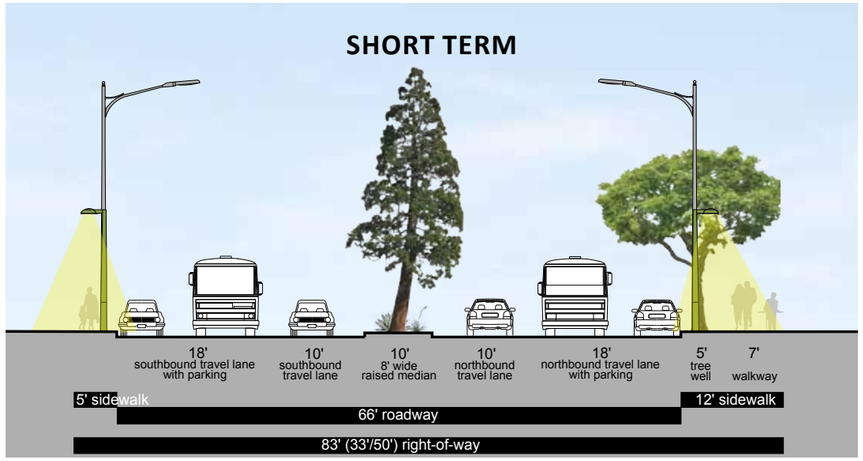
Typical Midblock Location

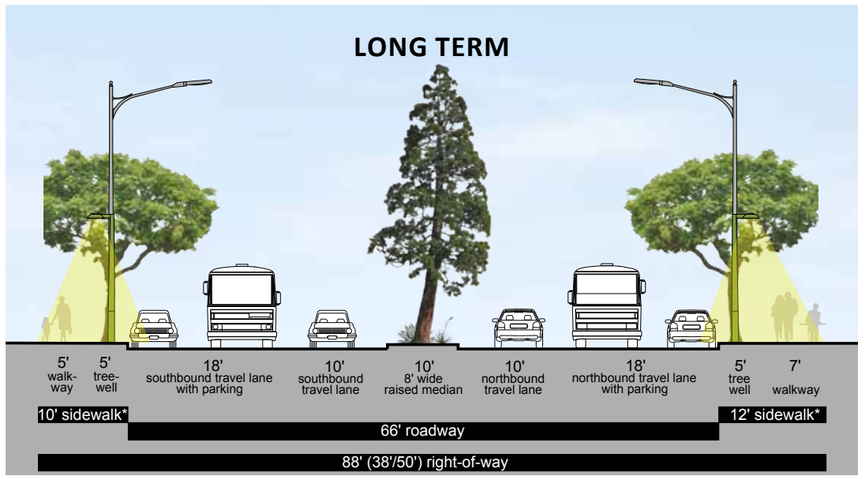
EXISTING



NOTE: All Centinela Avenue cross sections are looking north.

PROPOSED





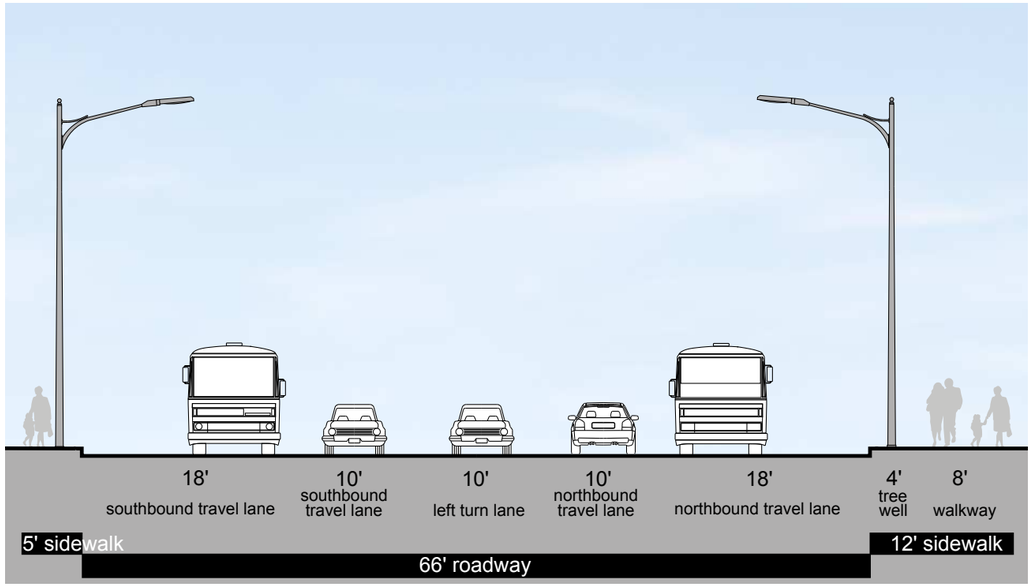
* Street dedications from new development will provide at least 10' wide sidewalks. Existing sidewalks that are wider than 10' will remain.

STREET CROSS SECTIONS

From Walsh Ave to Short Ave

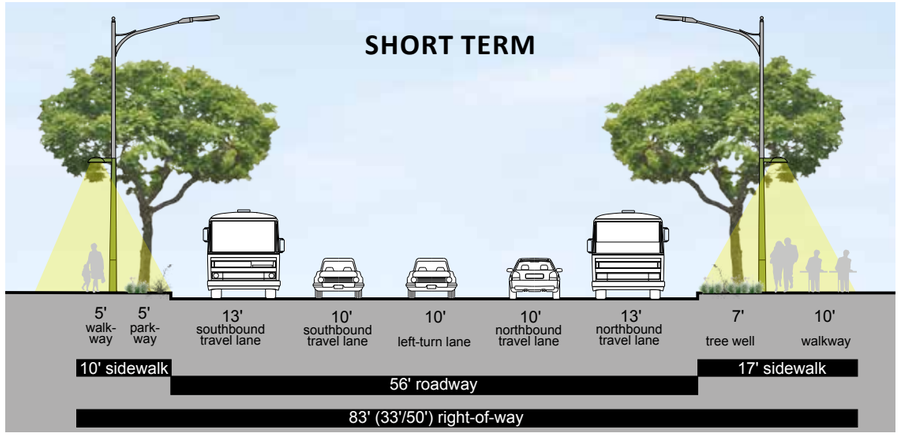
Typical Corner Location

EXISTING

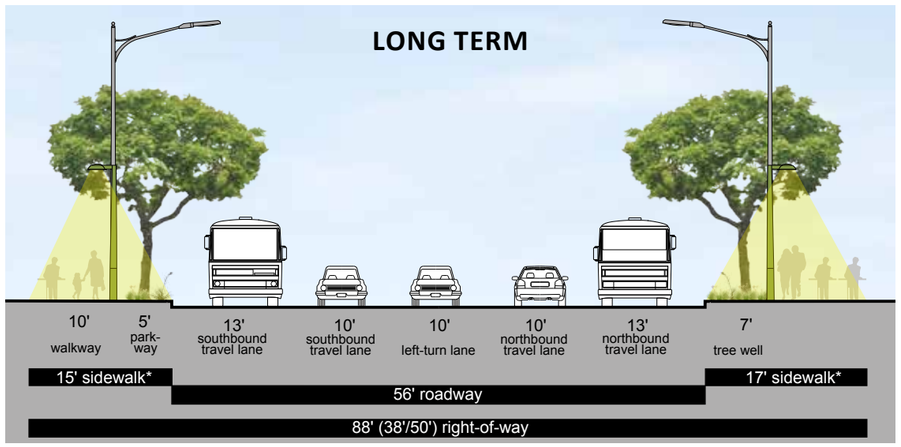


NOTE: All Centinela Avenue cross sections are looking north.

PROPOSED



Proposed in the short term where curb extensions are shown on Sheet 6 of Illustrative Streetscape Plan.



Proposed in the long term where curb extensions are shown on Sheet 6 of Illustrative Streetscape Plan.

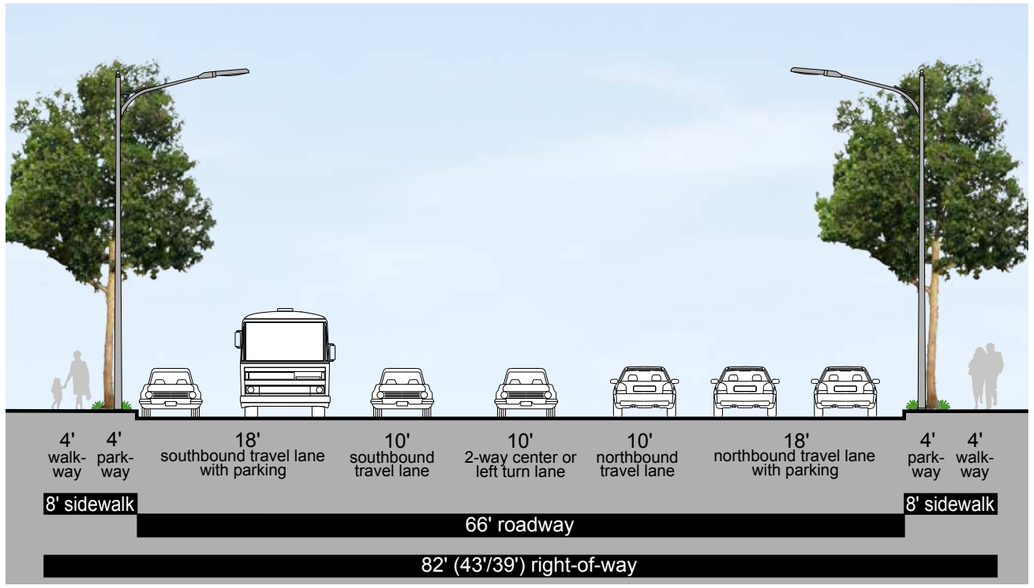
* 10' typical sidewalk + 5' curb extension = 15' sidewalk at curb extension.
Street dedications from new development will provide at least 10' wide sidewalks.
Existing sidewalks wider than 10' will remain, resulting in sidewalks wider than 15' at curb extensions (e.g., the east side of the street shows a 12' existing sidewalk + 5' curb extension = 17' curb extension).

STREET CROSS SECTIONS

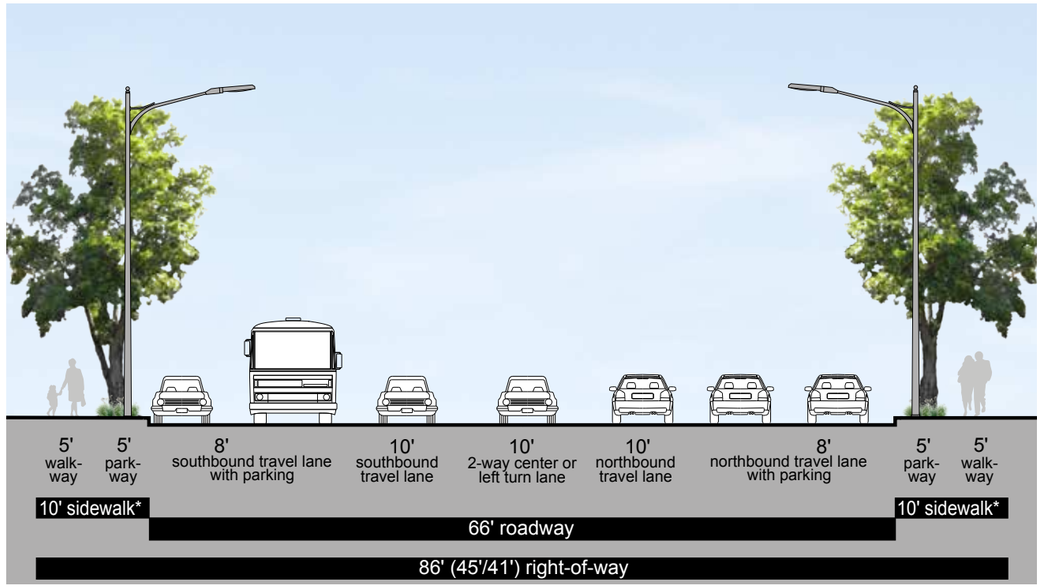
From Short Ave to Stewart St

Typical Midblock Location

EXISTING



PROPOSED



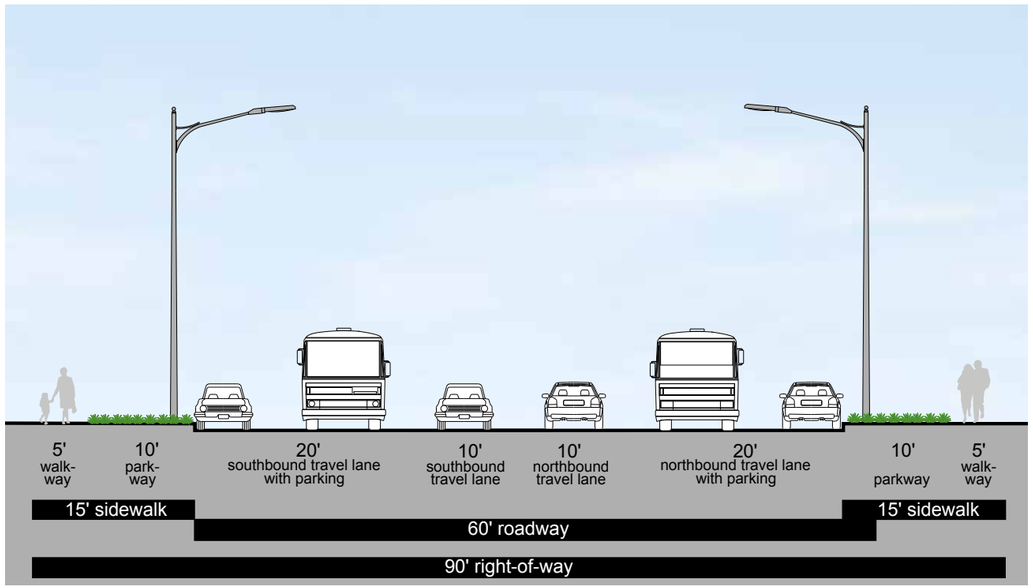
* Street dedications from new development will provide at least 10’ wide sidewalks.

STREET CROSS SECTIONS

From 90 Freeway to Wagner St

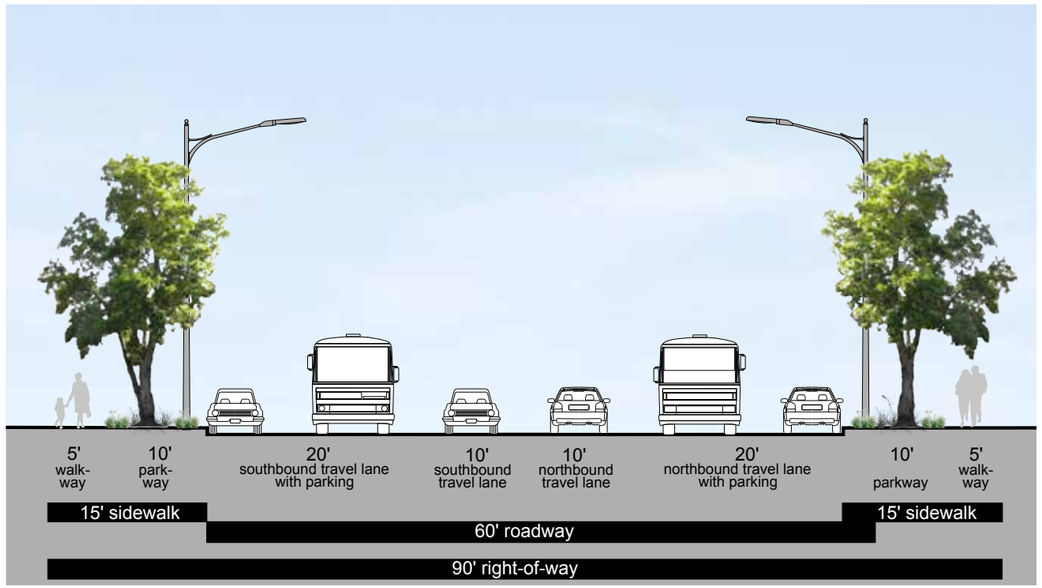
Typical Midblock Location

EXISTING*



* Conditions vary; predominant condition is shown.

PROPOSED



Note: Cross section proposed using existing roadway width. In the long term, the roadway will be widened to add a center turn lane and a narrower parkway.

ILLUSTRATIVE SKETCHES

At Gilmore Ave
Corner Location

EXISTING



Existing view of southwest corner looking south.

PROPOSED



Proposed view of the same location with marked crosswalks, curb extension, a small gathering place, shade trees and pedestrian-scale lights.

ILLUSTRATIVE SKETCHES

Between Greene Ave and Walsh Ave

Midblock Location in the Commercial Area

EXISTING



Existing view of a midblock bus stop location looking north.

PROPOSED



Proposed view of the same location with shade trees and pedestrian-scale lights.

ILLUSTRATIVE SKETCHES

At 90 Freeway
Midblock Location

EXISTING



Existing view north of the 90 Freeway looking north.

PROPOSED



Proposed view of the same location with landscaped medians and street trees.

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5.5 VENICE BOULEVARD

The Mobility Plan 2035 redesignated Venice Boulevard between Lincoln Boulevard and Inglewood Boulevard from Scenic Major Highway Class I (generally a 104-foot right-of-way with an 80-foot wide roadway and 12-foot wide sidewalks and, where required at intersections, 114-foot right-of-way with a 90-foot wide roadway and 12-foot wide sidewalks) to a Boulevard II Divided Street that will maintain its existing dimensions.

Proposed improvements are illustrated in the following subsections:

STREETSCAPE ELEMENTS describes the trees, low-level plants, street lighting and street furniture selected by the community. The community's vision is of a sustainable street that evolves over time to serve the surrounding community. Existing street trees (*Afrocarpus gracilior* or Fern Pine) will remain until UFD determines that they need to be removed, at which time they will be replaced by the trees specified in this plan.

ILLUSTRATIVE STREETSCAPE PLANS show the approximate location of proposed medians, continental crosswalk striping, curb extensions, street trees, tree wells, parkways, pedestrian-scale street lights, bus stop improvements and potential gateway element locations for three options:

1. Reduce vehicle travel lanes from three to two in each direction to accommodate protected bike lanes as proposed by Great Streets
2. Narrow the center median by 2 feet on each side to maintain three travel lanes in each direction and accommodate protected bike lanes
3. Narrow the center median by 2 feet on each side to maintain three travel lanes in each direction, accommodate protected bike lanes, and provide a peak-period bus only lane.

In addition to the specific elements shown on the illustrative plans, trash receptacles and seating shall be provided at the spacing specified in Table 1 in conjunction with a project or may be provided in other locations approved by DPW.

STREET CROSS SECTIONS illustrate the typical existing condition and proposed future conditions in three segments:

- Lincoln Boulevard to Walgrove Avenue
- Walgrove Avenue to Centinela Avenue
- Centinela Avenue to Inglewood Boulevard.

ILLUSTRATIVE SKETCHES show:

- The options described above
- Medians designed to infiltrate stormwater west of Centinela Avenue
- Infill tree planting.

STREETSCAPE ELEMENTS



Preferred Street Tree
Platanus racemosa
California Sycamore*
California native consistent with street trees west of Lincoln Blvd to unify the street.

Type:	Deciduous
Origin:	California
Height:	40 to 50 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Relatively drought tolerant once established in big tree wells (WUCOLS Moderate)
Growth rate:	Fast if adequate soil volume and water



Alternate Street Tree
Platanus x *histanica* (*P. acerifolia*) 'Columbia'
Columbia London Plane*

Type:	Deciduous
Origin:	California
Height:	40 to 50 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30 feet
Flowers:	Inconspicuous
Water:	Relatively drought tolerant once established in big tree wells (WUCOLS Moderate)
Growth rate:	Fast if adequate soil volume and water

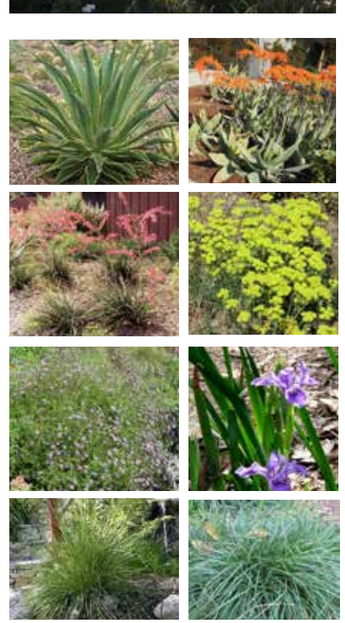


Median Trees
Existing Centinela - Inglewood
Tipuana tipu (Tipu)

Beethoven - Centinela
Hesperocyparis macropcarpa
Monterey Cypress

Type:	Conifer
Origin:	California
Height:	40 to 50 feet
Spread:	20 to 30 feet
Form:	Columnar
Spacing:	30+ feet
Flowers:	Inconspicuous
Water:	Drought tolerant (WUCOLS Low)
Growth rate:	Moderate

*as determined by the Palms Neighborhood Council



Low-Level Plant Palette
Medians:
Existing Centinela - Inglewood
Lantana - yellow trailing
Rosmarinus - shrub form
Festuca glauca

Beethoven - Centinela
Agave desmetiana
Aloe striata
Hesperaloe parviflora
Eriogonum umbellatum
Verbena lilacina 'de la Mina'
Iris douglasiana
Festuca californica
Carex divulsa

* Known reproductive host of the Polyphagus Shot Hole Borer. If pest is not controlled, used alternative species.





Pedestrian Lights
Historic replica street lights and poles with a single luminaire and street lights powered by solar energy if feasible.





Basic Seating
Individual seats in casual groupings, either movable or fixed to the sidewalk.



Upgraded Seating
Artist-designed seating, which would entail a higher capital cost and a long-term maintenance commitment by a BID or Neighborhood Council. Mosaic tile, in particular, requires on-going maintenance and repair.



Bus Shelters
Boulevard shelter in green.





Trash/Recycling Receptacles
Trash/recycling stations with separate trash, recycled paper and recycled bottle receptacles and solar-powered compactors.

Also shown are the solar-powered trash/recycling stations installed by the City to date, which include a single receptacle for all recycling.



Storm Water Collection
Medians and parkways that collect and infiltrate or treat and release runoff from sidewalks and, to the extent feasible, from the street.

At a minimum parkways and medians can have a slight swale that collects and infiltrates runoff from the sidewalk, parkway and median to water trees and low-level planting. If soil, geologic and groundwater conditions allow for additional infiltration, runoff from the street can be infiltrated as well.

ILLUSTRATIVE STREETSCAPE PLAN OPTION 1

This option would involve a vehicle lane reduction in order to accommodate a protected bicycle lane. For longer-term improvements, although not depicted on the following pages, this option could involve curb extensions.

BASE MAP LEGEND

Base map is preliminary Caltrans survey.
Key information from preliminary survey:

- Travel lane
- Left turn lane
- Signalized intersection
- Curb
- Driveway apron
- ADA ramp

Other base map information:

- Building footprint (approximate)

STREETSCAPE PLAN LEGEND

Existing Elements

- Sidewalk
- Tree well - enlarge per standard
- Parkway - modify per standard
- Street trees:
  - *Afrocarpus gracilior* (Fern Pine)
  - other canopy trees / palms
  - *Tipuana Tipu* (Tipu) Centinela Av .- Inglewood Bl.
  - *Eucalyptus/Callistemon* sp. Beethoven Av.- Centinela Av. on medians
- Street light
- Traffic signal
- Driveway to be relocated
- Bus stop with shelter
- Bus stop with bench(es)

Proposed Elements

- Tree well
- Parkway with low-level planting
- Existing median redesigned to infiltrate street run-off if feasible
- Infill street tree:
  - *Plantanus racemosa* (California Sycamore)*
  - *Hespercyparis macrocarpa* (Monterey Cypress) on medians
- Bus stop pedestrian light
- Other pedestrian light
- Corner curb extension for pedestrians/bikes
- Relocated driveway
- Continental striping at existing marked crosswalk
- New crosswalk with continental striping
- Future property line
- Bicycle lane
- Buffer
- Curbside parking
- Potential location of gateway element

* Reproductive host to Polyphagus Shot Hole Borer. Use alternative species if pest is not controlled.



ILLUSTRATIVE STREETSCAPE PLAN SHEET 1

OPTION 1

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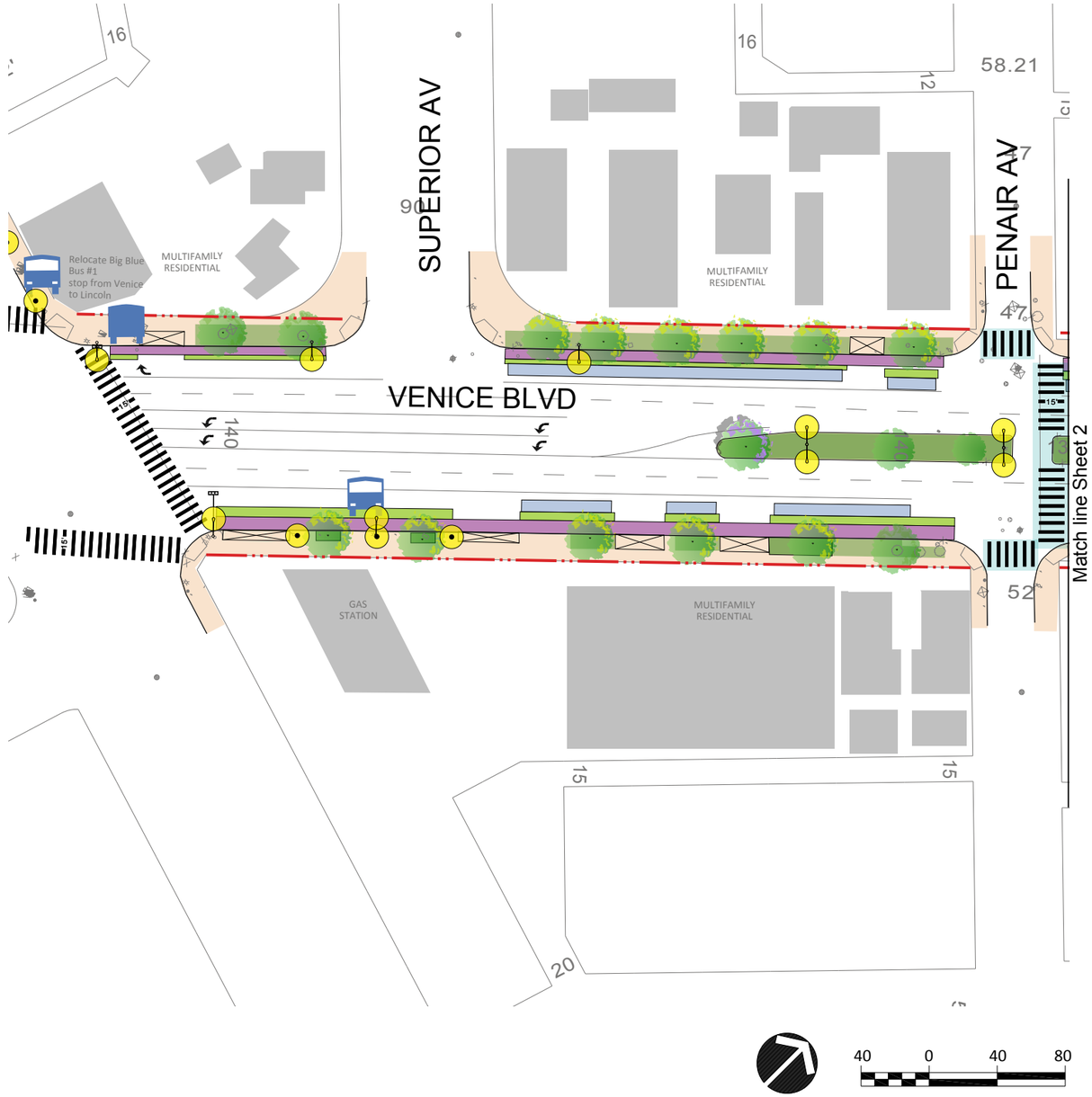
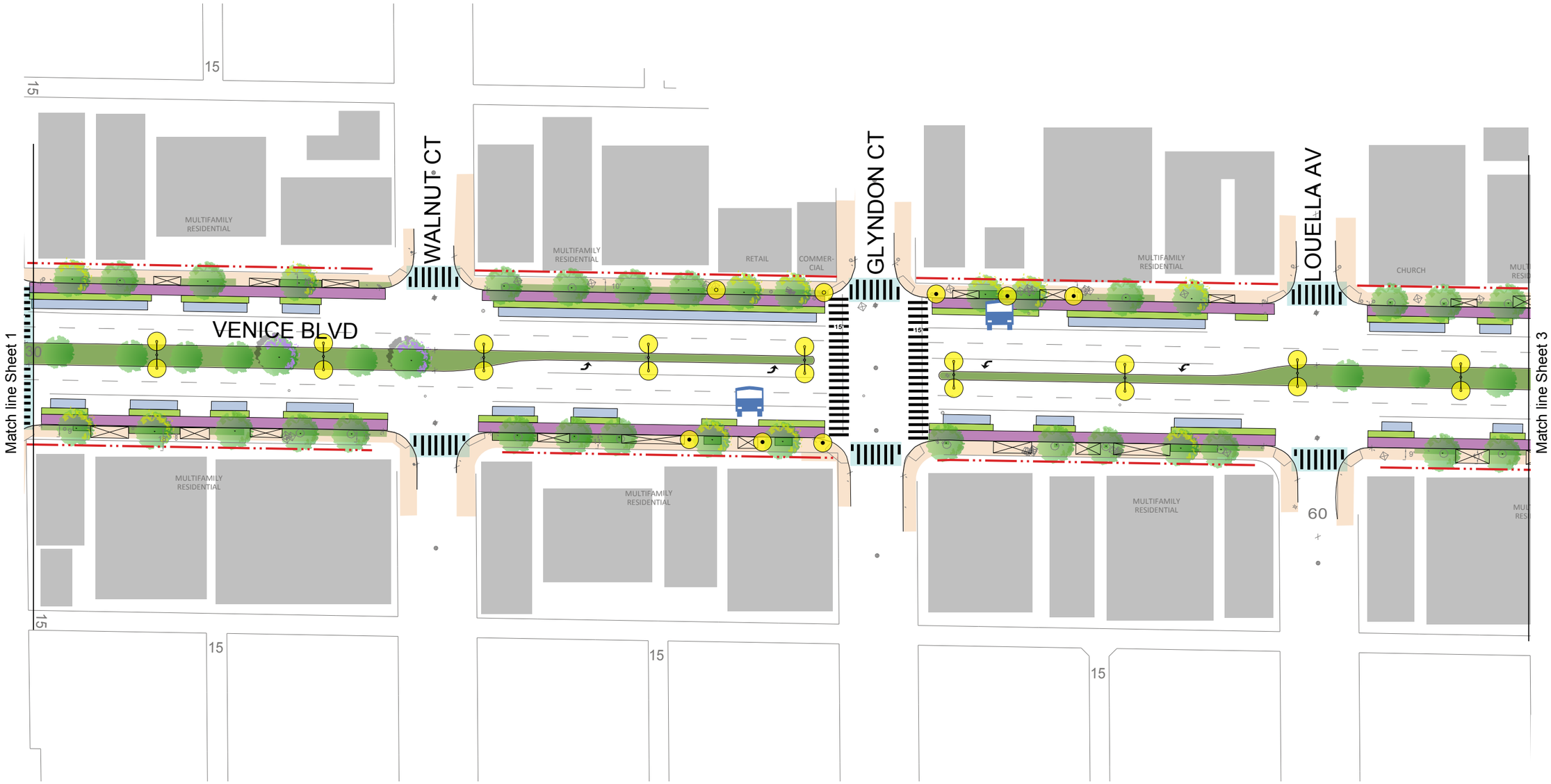


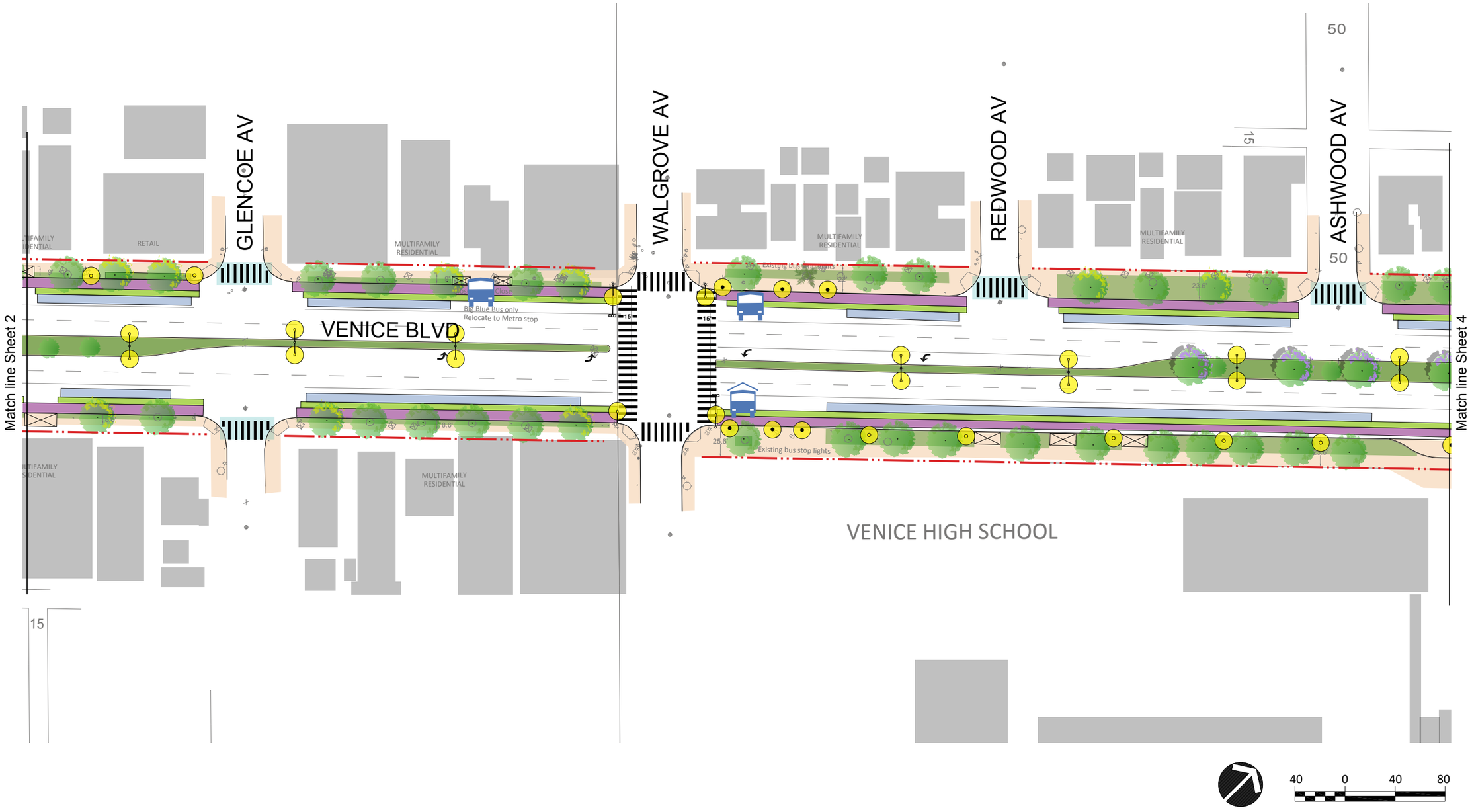
ILLUSTRATIVE STREETSCAPE PLAN SHEET 2

OPTION 1



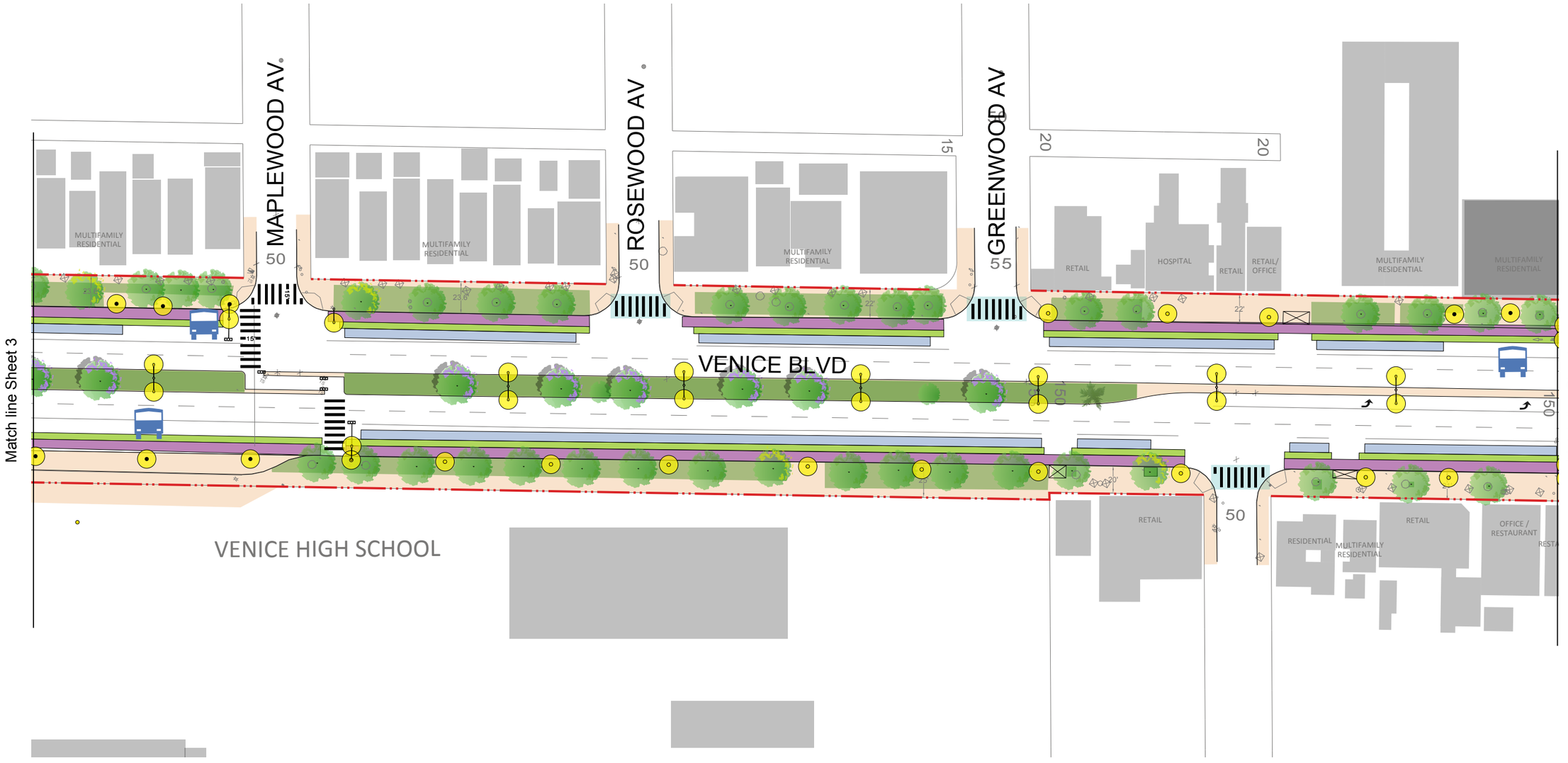
ILLUSTRATIVE STREETSCAPE PLAN SHEET 3

OPTION 1



ILLUSTRATIVE STREETSCAPE PLAN SHEET 4

OPTION 1



ILLUSTRATIVE STREETSCAPE PLAN SHEET 5

OPTION 1



ILLUSTRATIVE STREETSCAPE PLAN SHEET 6

OPTION 1



ILLUSTRATIVE STREETSCAPE PLAN SHEET 7

OPTION 1



ILLUSTRATIVE STREETSCAPE PLAN SHEET 8

OPTION 1



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ILLUSTRATIVE STREETSCAPE PLAN OPTION 2

This option would involve providing a protected bicycle lane, and narrowing the median to accommodate three travel lanes in each direction. For longer-term improvements, this option could involve curb extensions and a peak-hour bus lane (the latter envisioned as a part of Mobility Plan 2035's Transit Enhanced Network).

BASE MAP LEGEND

Base map is preliminary Caltrans survey.
Key information from preliminary survey:

- Travel lane
- Left turn lane
- Signalized intersection
- Curb
- Driveway apron
- ADA ramp

Other base map information:

- Building footprint (approximate)

STREETSCAPE PLAN LEGEND

Existing Elements

- Sidewalk
- Tree well - enlarge per standard
- Parkway - modify per standard
- Street trees:
  - *Afrocarpus gracilior* (Fern Pine)
  - other canopy trees / palms
  - *Tipuana Tipu* (Tipu) Centinela Av .- Inglewood Bl.
  - *Eucalyptus/Callistemon* sp. Beethoven Av.- Centinela Av. on medians
- Street light
- Traffic signal
- Driveway to be relocated
- Bus stop with shelter
- Bus stop with bench(es)

Proposed Elements

- Tree well
- Parkway with low-level planting
- Existing median redesigned to infiltrate street run-off if feasible
- Infill street tree:
  - *Plantanus racemosa* (California Sycamore)*
  - *Hespercyparis macrocarpa* (Monterey Cypress) on medians
- Bus stop pedestrian light
- Other pedestrian light
- Corner curb extension for pedestrians/bikes
- Relocated driveway
- Continental striping at existing marked crosswalk
- New crosswalk with continental striping
- Future property line
- Bicycle lane
- Buffer
- Curbside parking
- Potential location of gateway element

* Reproductive host to Polyphagus Shot Hole Borer. Use alternative species if pest is not controlled.



ILLUSTRATIVE STREETSCAPE PLAN SHEET 1

OPTION 2

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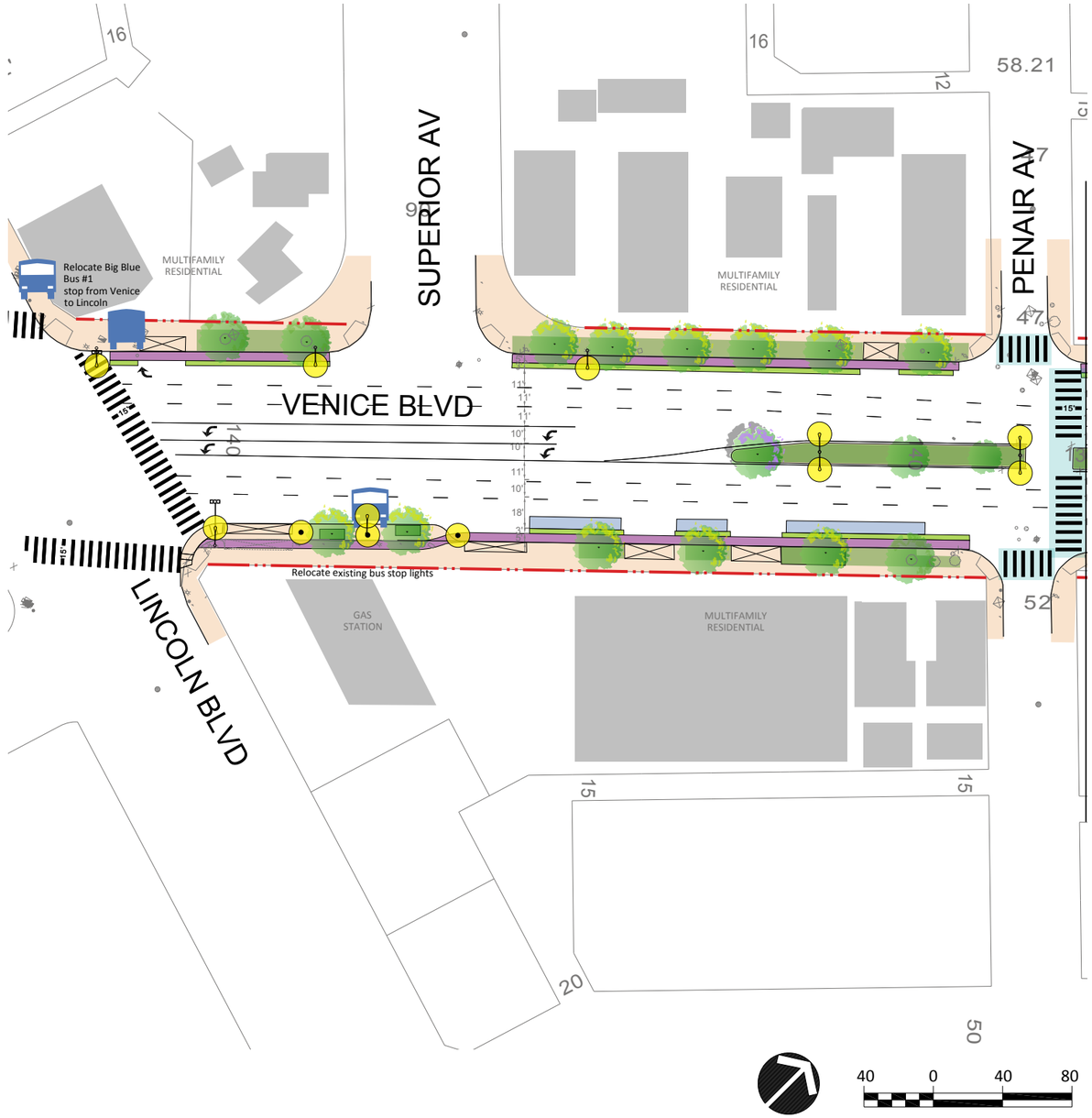
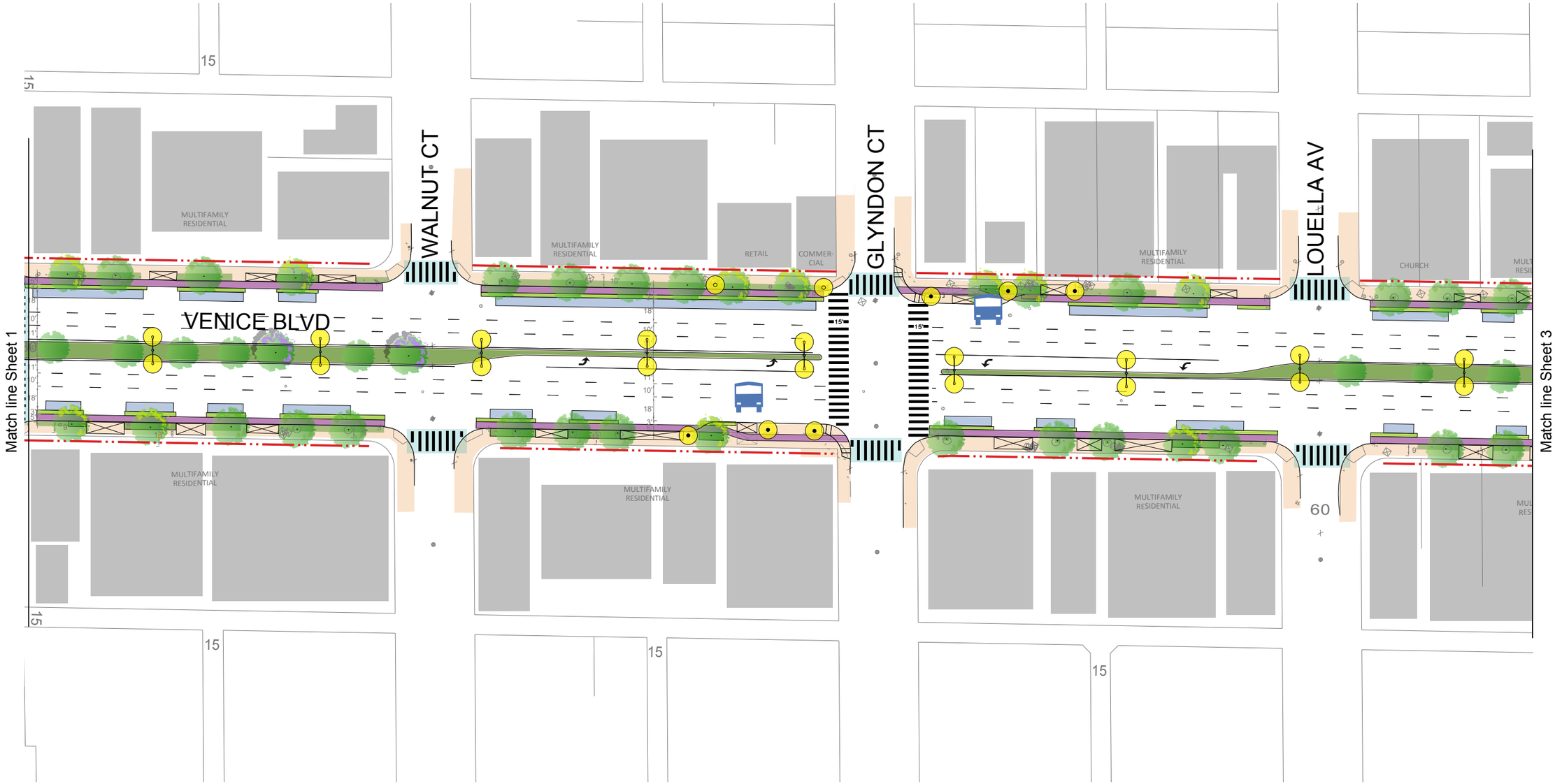


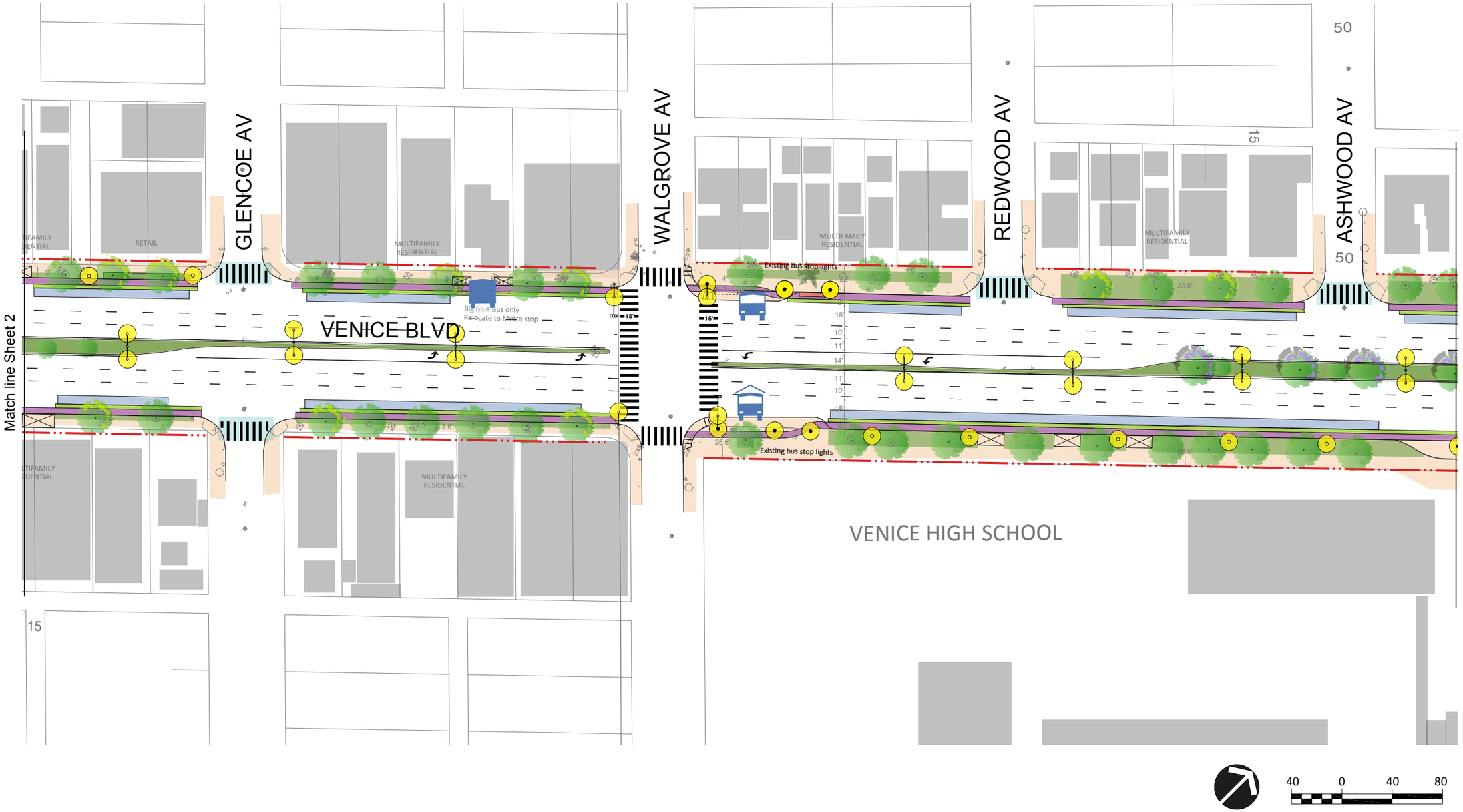
ILLUSTRATIVE STREETSCAPE PLAN SHEET 2

OPTION 2



ILLUSTRATIVE STREETSCAPE PLAN SHEET 3

OPTION 2



ILLUSTRATIVE STREETSCAPE PLAN SHEET 4

OPTION 2



ILLUSTRATIVE STREETSCAPE PLAN SHEET 5

OPTION 2



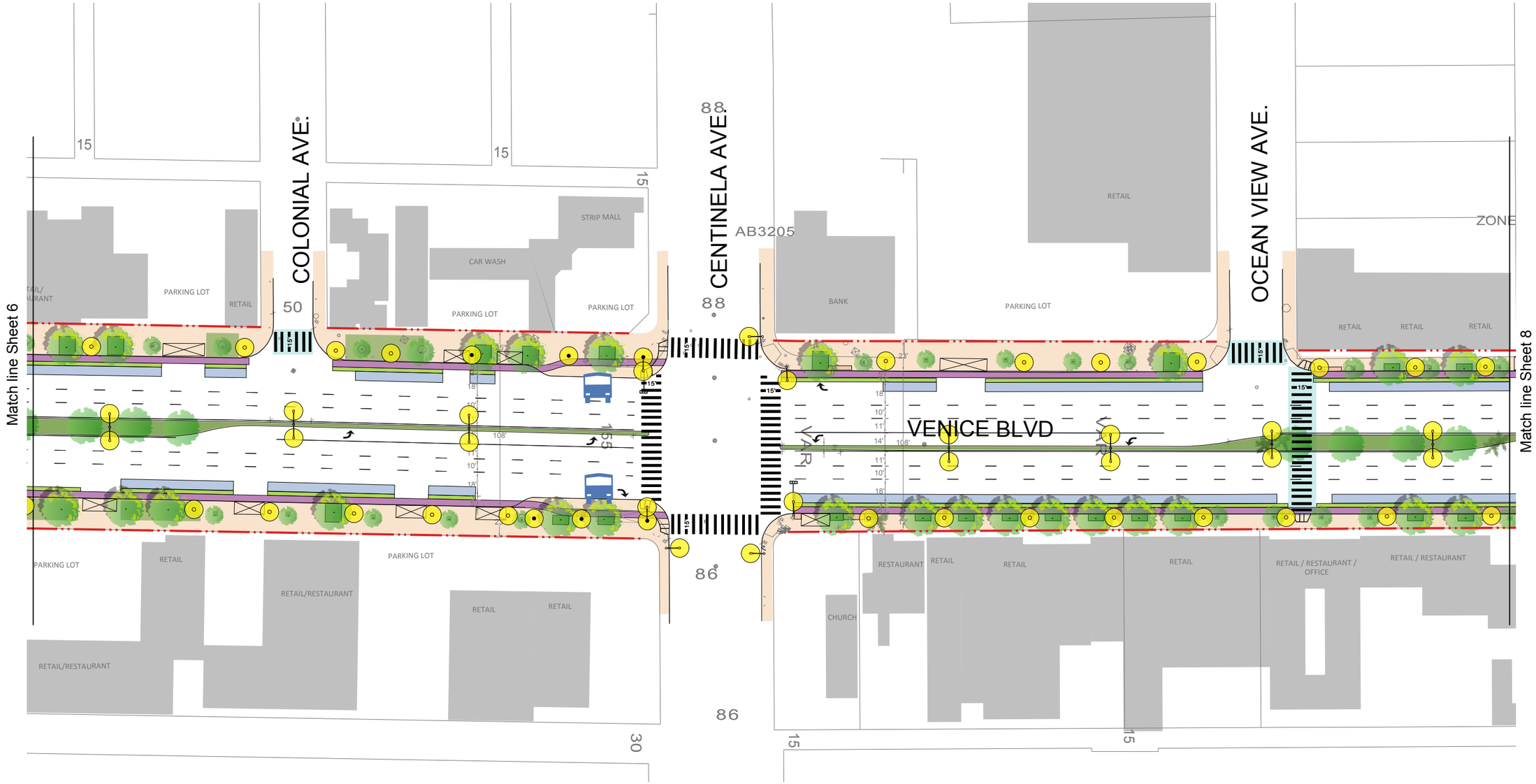
ILLUSTRATIVE STREETSCAPE PLAN SHEET 6

OPTION 2



ILLUSTRATIVE STREETSCAPE PLAN SHEET 7

OPTION 2



ILLUSTRATIVE STREETSCAPE PLAN SHEET 8

OPTION 2



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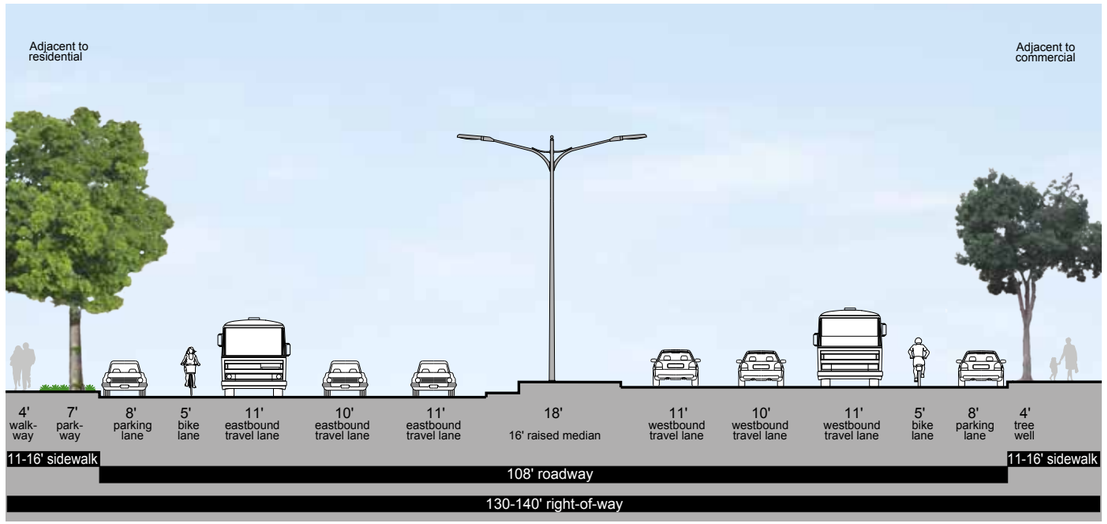
STREET CROSS SECTIONS

From Lincoln Blvd to Walgrove Ave

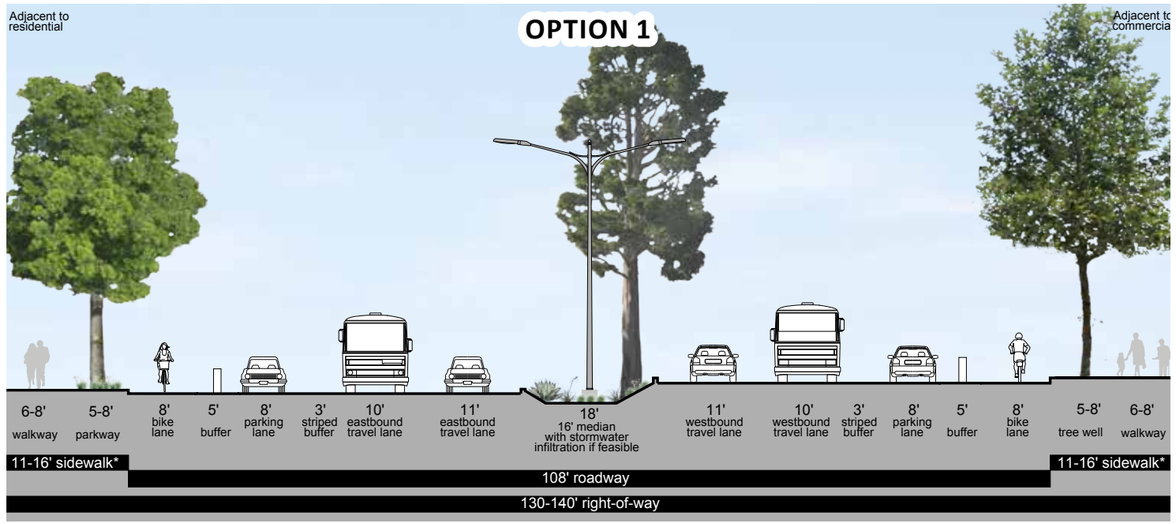
Typical Midblock Location

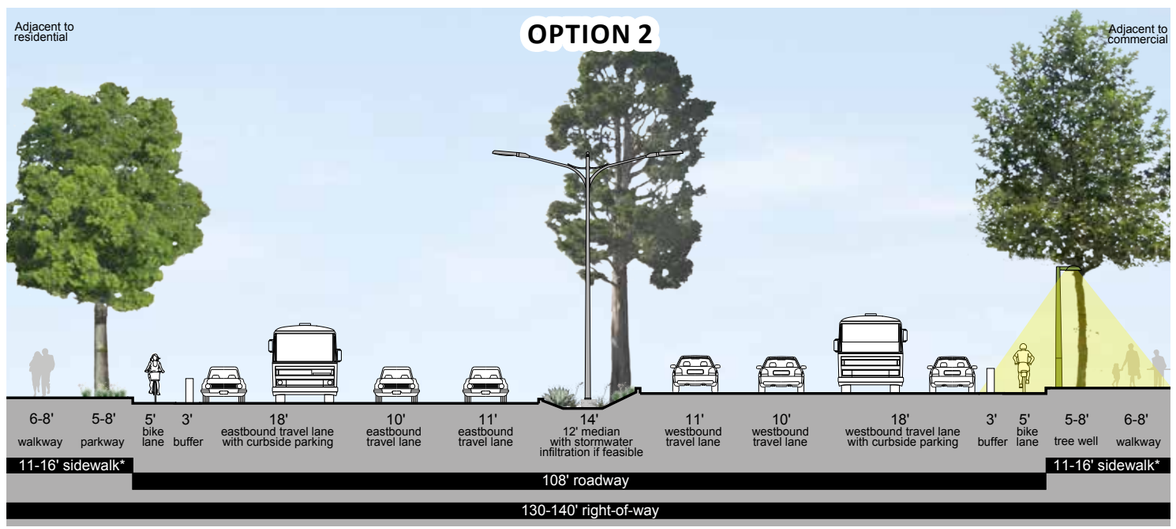
EXISTING



Note: All Venice Blvd cross sections are looking west.

PROPOSED





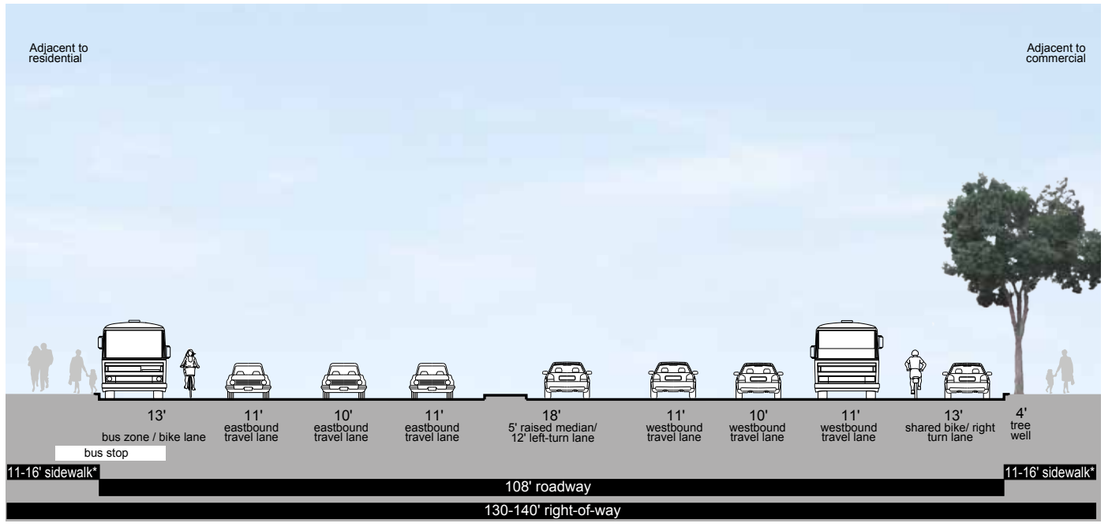
* Street dedications from new development will provide at least 15’ wide sidewalks.

STREET CROSS SECTIONS

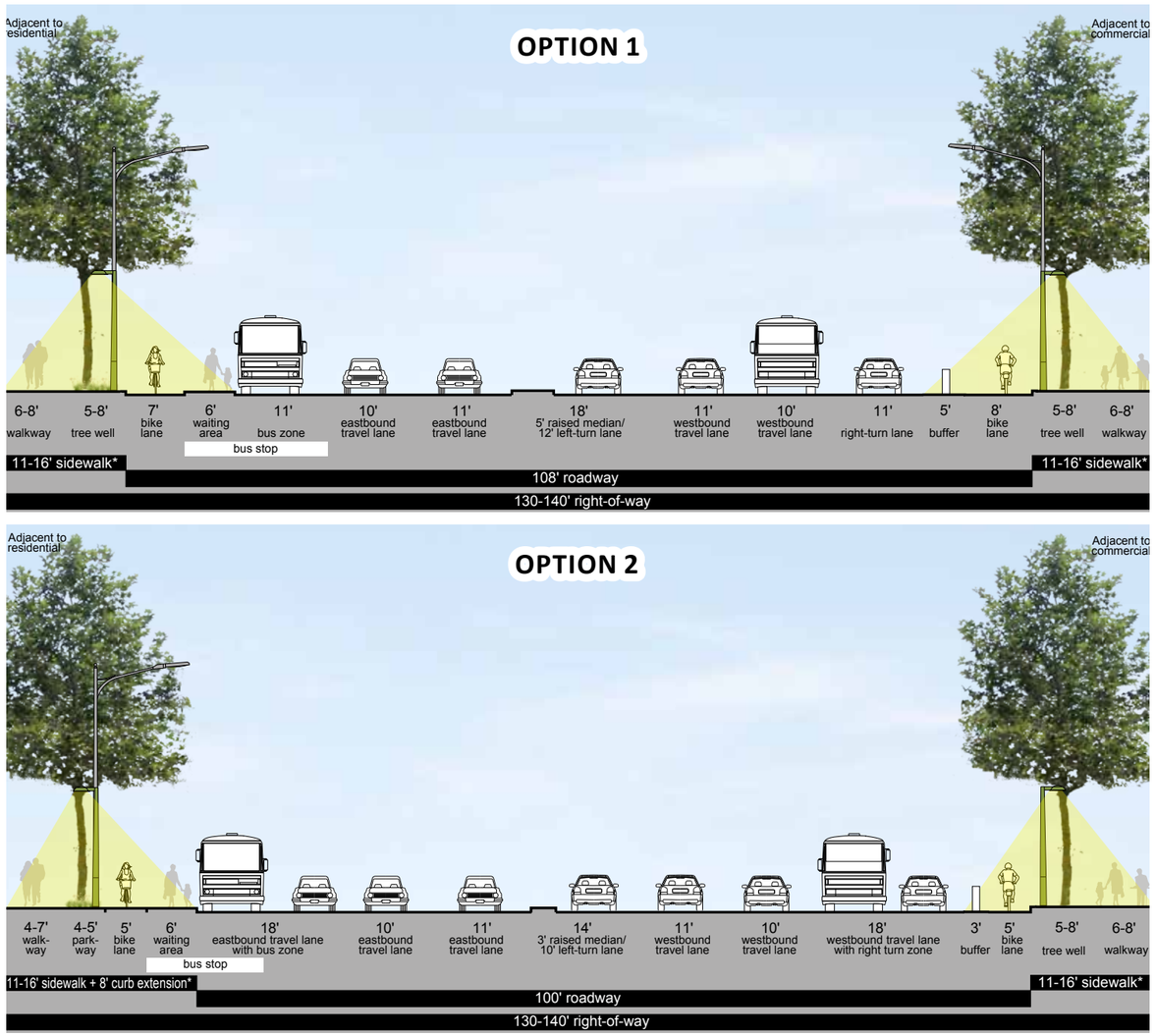
From Lincoln Blvd to Walgrove Ave

Typical Far-side Eastbound Bus Stop at Corner Locations

EXISTING



PROPOSED



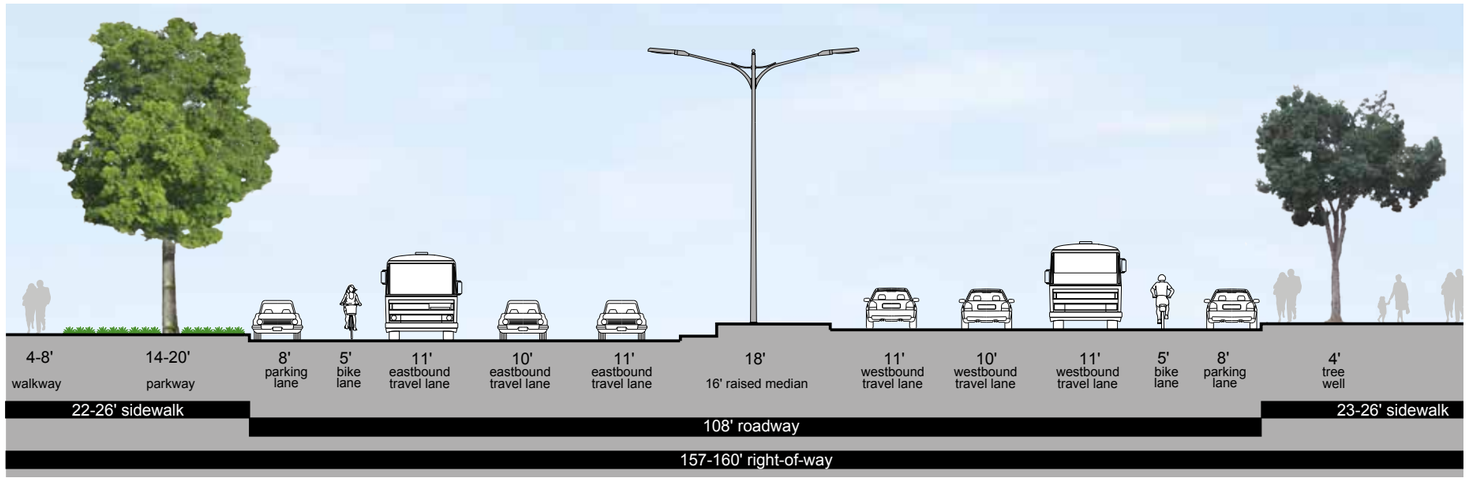
* Street dedications from new development will provide at least 15’ wide sidewalks.

STREET CROSS SECTIONS

From Walgrove Ave to Centinela Ave

Typical Midblock Location

EXISTING

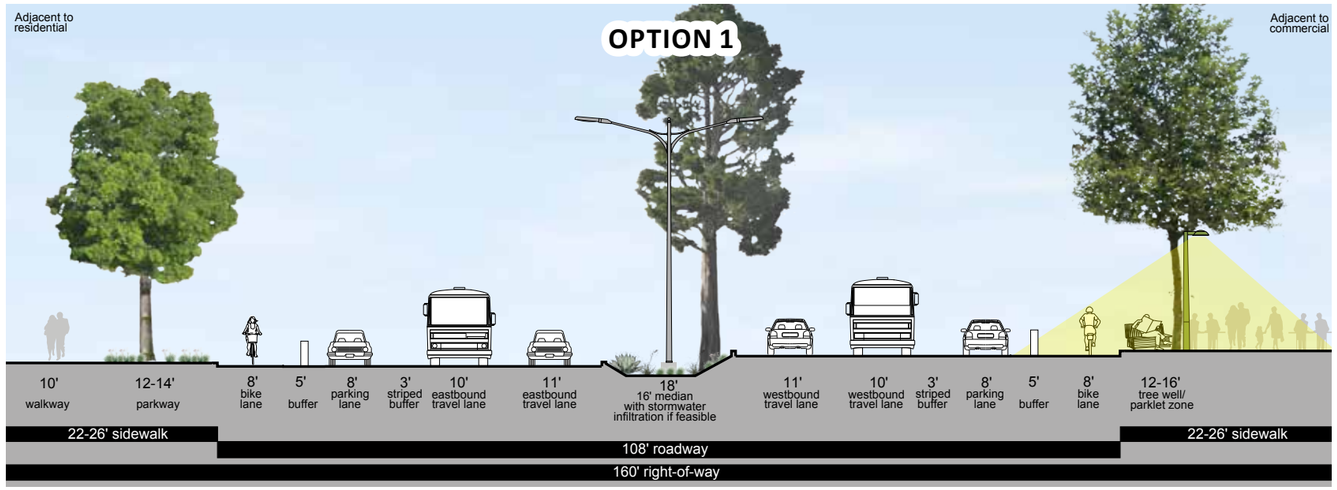


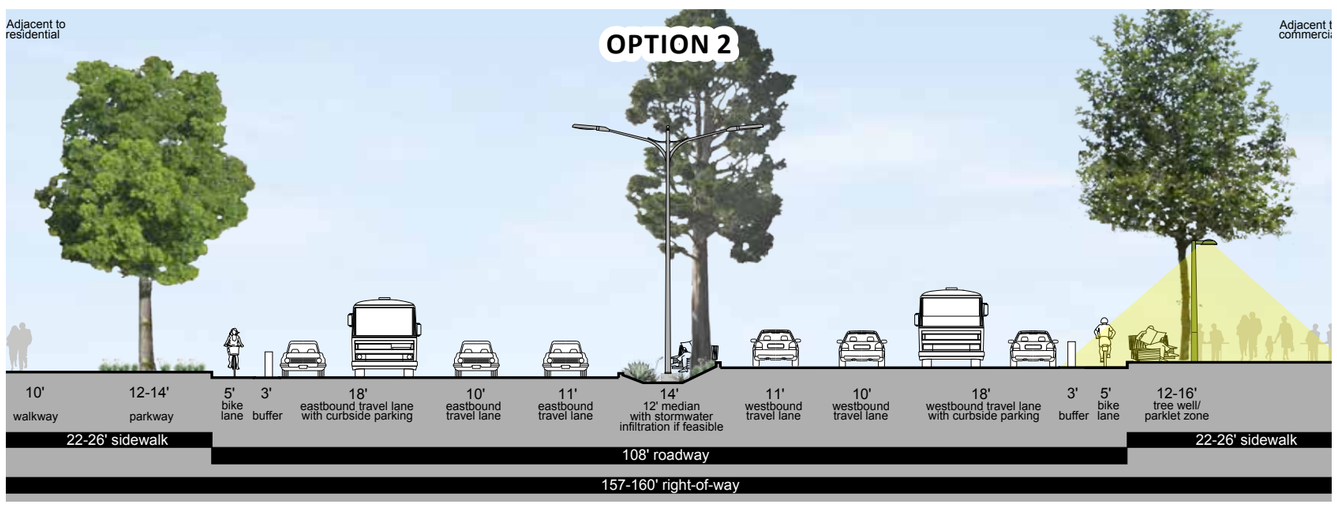
STREET CROSS SECTIONS

From Walgrove Ave to Centinela Ave

Typical Midblock Location

PROPOSED



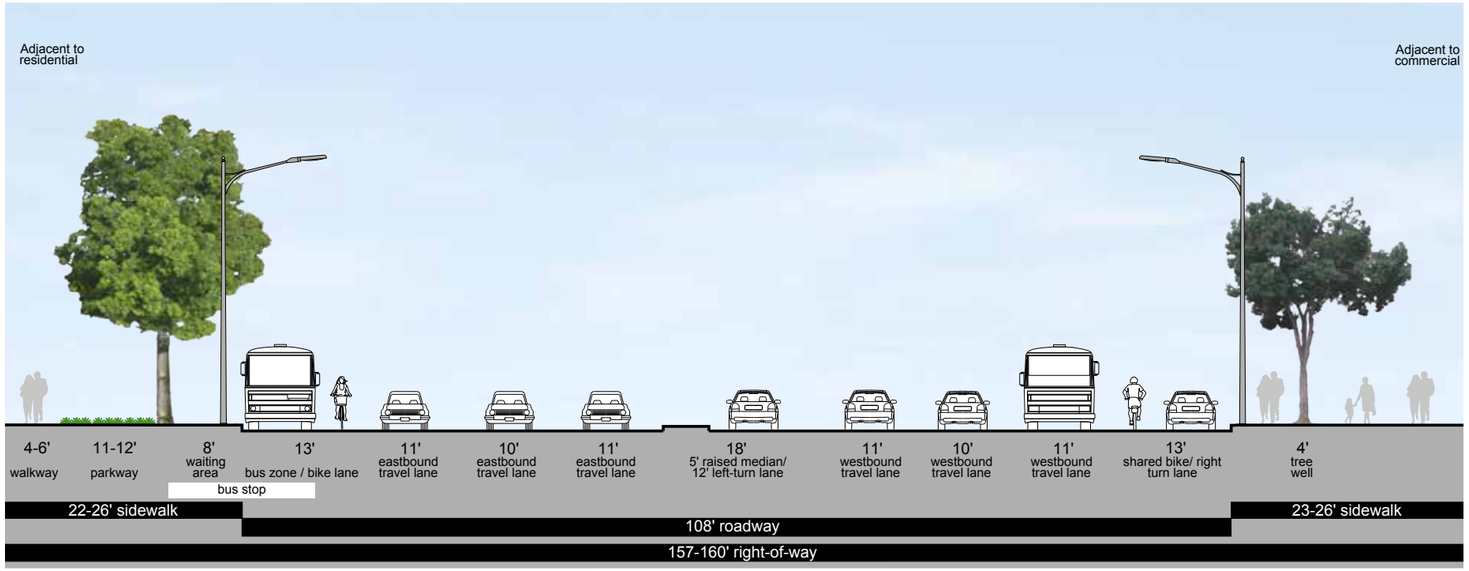


STREET CROSS SECTIONS

From Walgrove Ave to Centinela Ave

Typical Far-side Eastbound Bus Stop at Corner Locations

EXISTING

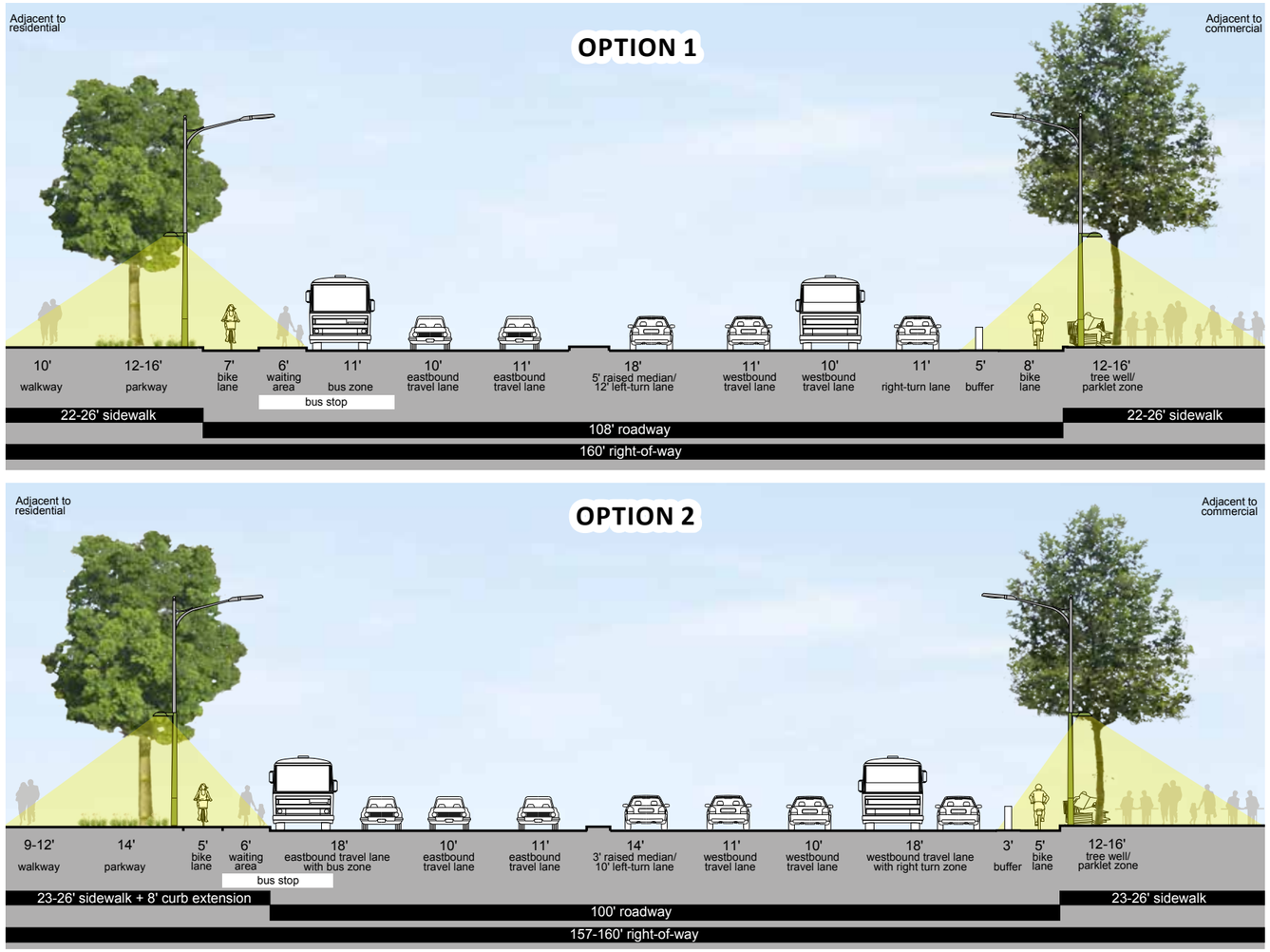


STREET CROSS SECTIONS

From Walgrove Ave to Centinela Ave

Typical Far-side Eastbound Bus Stop at Corner Locations

PROPOSED

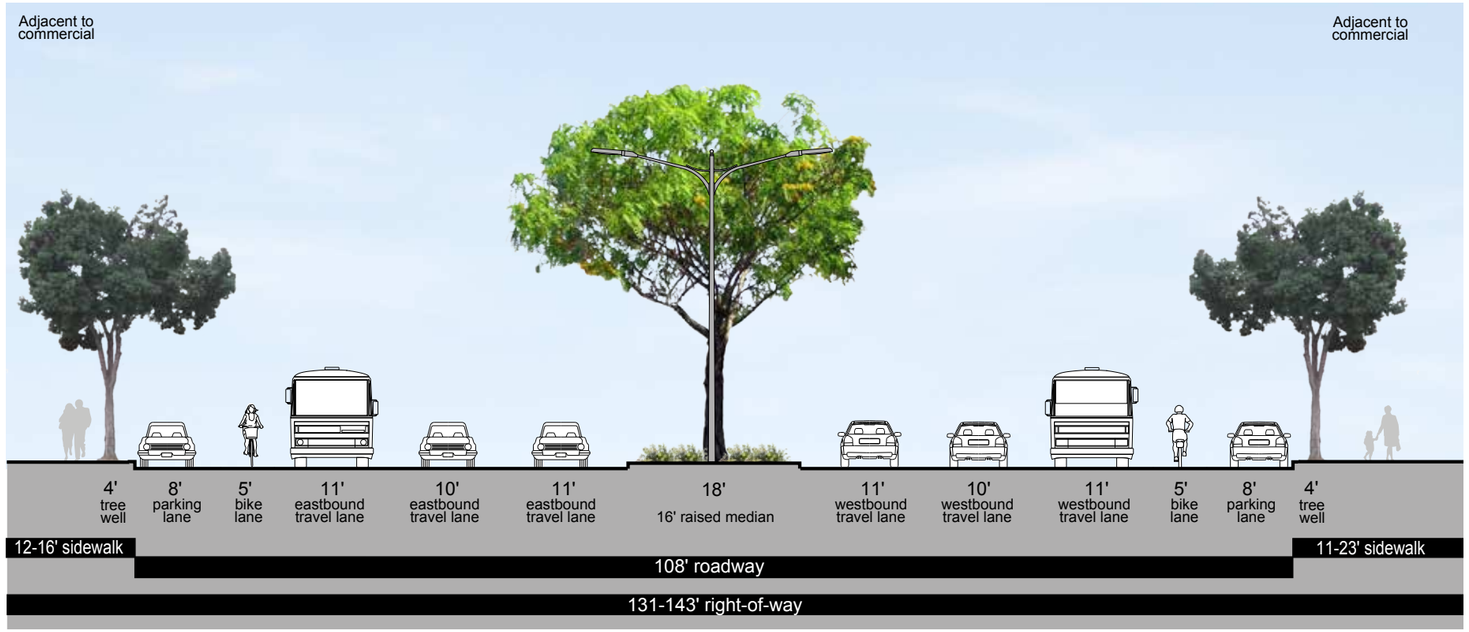


STREET CROSS SECTIONS

From Centinela Ave to Inglewood Blvd

Typical Midblock Location

EXISTING

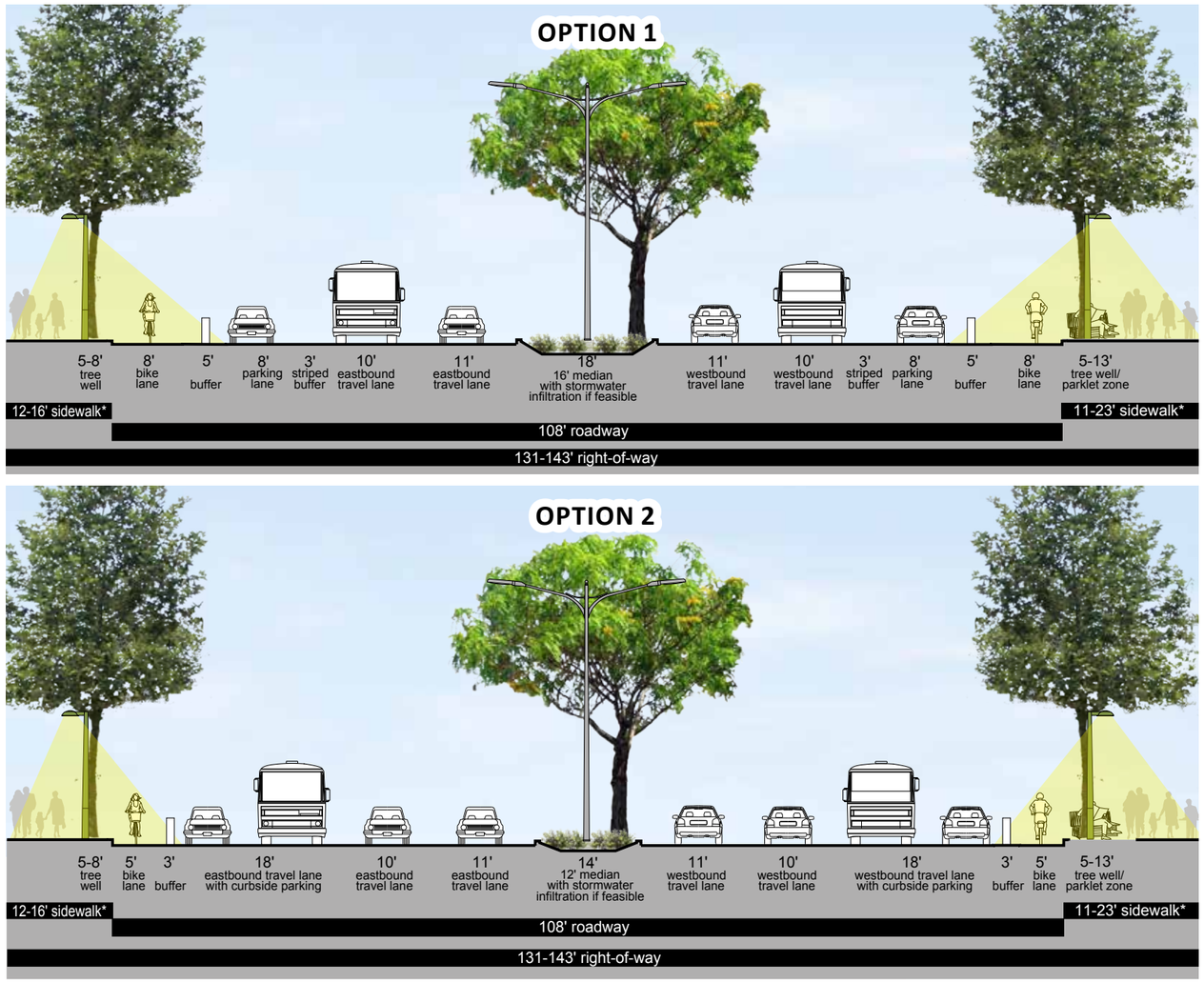


STREET CROSS SECTIONS

From Centinela Ave to Inglewood Blvd

Typical Midblock Location

PROPOSED



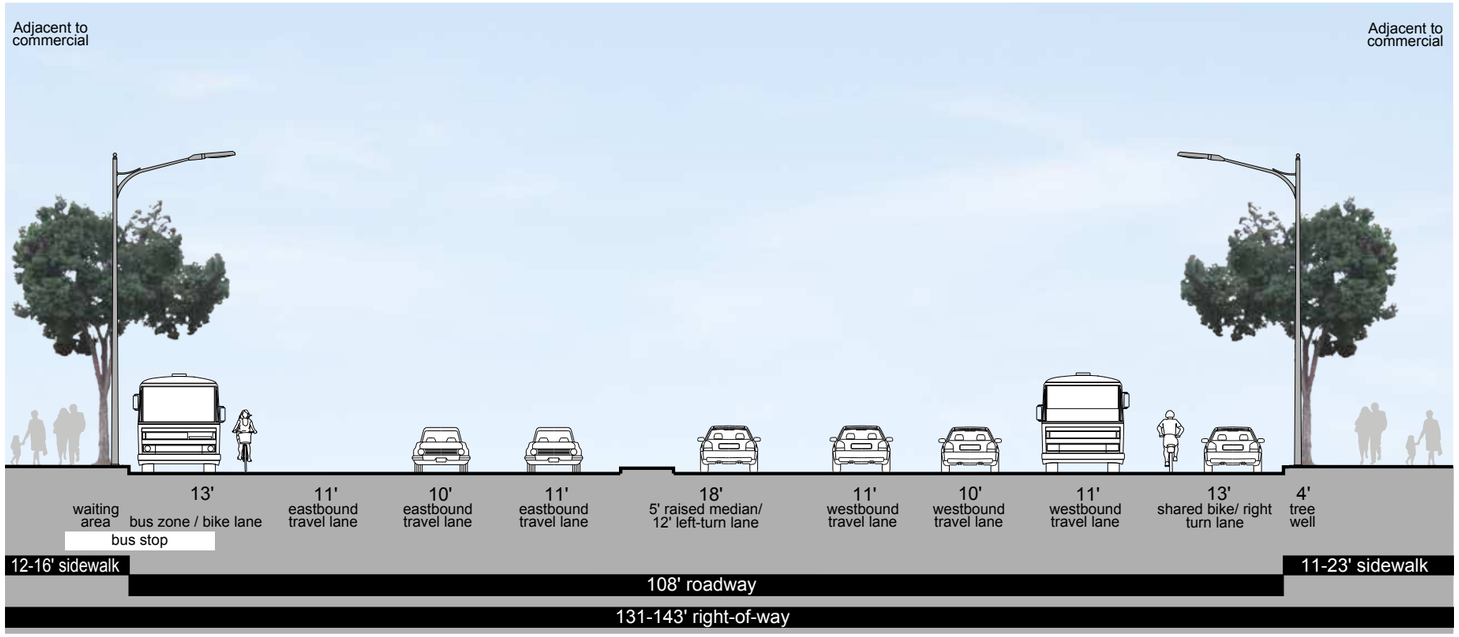
* Street dedications from new development will provide at least 15’ wide sidewalks. Existing sidewalks that are wider than 15’ will remain.

STREET CROSS SECTIONS

From Centinela Ave to Inglewood Blvd

Typical Far-side Eastbound Bus Stop at Corner Locations

EXISTING

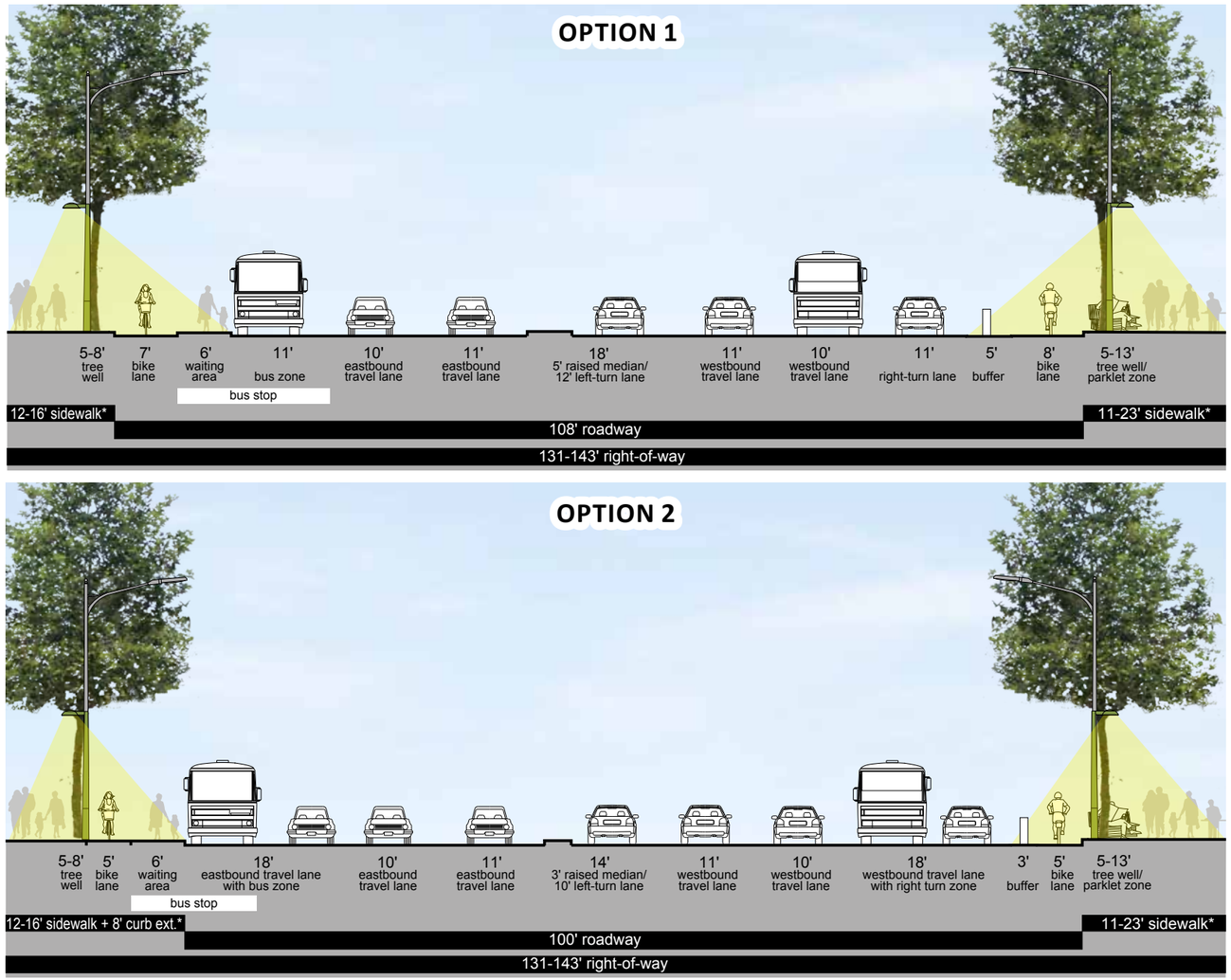


STREET CROSS SECTIONS

From Centinela Ave to Inglewood Blvd

Typical Far-side Eastbound Bus Stop at Corner Locations

PROPOSED



* Street dedications from new development will provide at least 15’ wide sidewalks. Existing sidewalks that are wider than 15’ will remain.

ILLUSTRATIVE SKETCHES

OPTION 1

Between Beethoven Ave and Wade St

Midblock Location

EXISTING



View of existing roadway looking east.

PROPOSED



Protected bicycle lane with a striped buffer and bollards under Option 1.



Protected bicycle lane with a landscaped buffer and bollards under Option 1. A stormwater infiltration buffer should be considered as a potential future upgrade, provided that external funding is obtained to study the feasibility and fund implementation.

ILLUSTRATIVE SKETCHES

OPTION 2

Between Beethoven Ave and Wade St
Midblock Location

EXISTING



View of existing roadway looking east.

PROPOSED



Protected bicycle lane with a striped buffer and bollards under Option 2.



Protected bicycle lane with a landscaped buffer and bollards under Option 2. A stormwater infiltration buffer should be considered as a potential future upgrade, provided that external funding is obtained to study the feasibility and fund implementation.

ILLUSTRATIVE SKETCHES

OPTION 1

Between Grand View Blvd and Centinela Ave

Midblock Location

EXISTING



View of existing sidewalk and roadway looking west.

PROPOSED



Protected bicycle lane with a striped buffer and bollards under Option 1.



Protected bicycle lane with a raised buffer and bollards under Option 1. A raised buffer should be considered as a potential future upgrade, provided that external funding is obtained to study the feasibility and fund implementation.

ILLUSTRATIVE SKETCHES

OPTION 2

Between Grand View Blvd and Centinela Ave

Midblock Location

EXISTING



View of existing sidewalk and roadway looking west.

PROPOSED



Protected bicycle lane with a striped buffer and bollards under Option 2.



Protected bicycle lane with a raised buffer and bollards under Option 2. A raised buffer should be considered as a potential future upgrade, provided that external funding is obtained to study the feasibility and fund implementation.

ILLUSTRATIVE SKETCHES

Between Wade St and Beethoven Ave

Midblock Location

EXISTING



View of existing median looking west.

PROPOSED



Potential median with stormwater infiltration swale and native planting with no irrigation, using existing City of Los Angeles Western Heritage Way stormwater infiltration median as the model.

ILLUSTRATIVE SKETCHES

Between Grand View Blvd and Centinela Ave

Midblock Location

EXISTING



View of sidewalk and roadway looking west.

PROPOSED



Pedestrian amenities such as street trees can enhance the streetscape environment. They can be pruned up above business signs to ensure the visibility of businesses.

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APPENDIX A. WESTSIDE BOULEVARD PLANT PALETTE

The plants listed and illustrated in this Appendix provide a palette for medians, parkways and tree wells on Westside streets. Most have low or very low water use and some are native to California or the Southwest. All are less than 36 inches in height, including flowers. Any of the plant types may be used on medians. Typically parkways and tree wells should use Type 1 and 2 plants that are lower growing.

Each street in the Streetscape Plan has a "short list" of 10 to 12 plants, taken from this palette.

PLANT TYPES

Type 1 - Low-Maintenance, Walkable Plants

These plants require minimal maintenance and are walkable. Table A-1 and Figure A-1 lists and illustrate some examples. Most of the grasses listed do not require mowing. Sedge, Buffalo and Grama Grass can be mowed a few time a year to maintain a lawn-like appearance.

Type 2 - Low-Growing, Low-Maintenance Plants

The low-growing grasses and/or groundcover in Table A-2 and Figure A-2 are not walkable, but require minimal maintenance.

Type 3 - Taller Plants that Require More Maintenance

The plants in Table A-3 and Figure A-3 are reliable drought-tolerant plants - but still less than 3 feet tall - that can be mixed in with plants in Table A-2.

On-Line and Print Resources

The following resources provide images and detailed descriptions of these plants and others:

bewaterwise.com
theodorepayne.org
laspilitas.com
elnativo.com
smggrowers.com
monrovia.com
sunset.com and *Sunset Garden Book*
California Native Plants for the Garden Bornstein et al.

PLANTING AND MAINTENANCE

Preparing the Parkway Soil

Soil preparation is essential to parkway success. Soil preparation saves money in the long run because it reduces the need to replace plants, lowers water use and reduces fertilizer applications. Typical soil preparation steps are:

- Remove all existing turf - let it die and dig it out.
- Remove enough soil to create a slope in the center so water drains to the center and then remove two to three inches more.
- Till the parkway soil to depth of one foot except where there are tree roots.
- Amend it with compost.

Do not plant within three or four feet of a street tree.

Watering A Drought-Tolerant Parkway

Too much water can kill drought-tolerant plants. The best approach is to water only when the soil is dry at a depth of 3" to 4". Or set irrigation at three times a week (30 minutes each time for drip; 9 minutes for spray) to establish the plants (first 3 months) and then once a week from October through March and twice a week from April through September.

Legend for Tables A-1, A-2 and A-3

N = California or Southwest native or cultivar of same
L= Low water use
M = Moderate water use
o.c. = on center
Heights listed in tables include flowers which typically extend above the plants

Photo credits for Figure A-1, A-2, and A-3:
San Marcos Growers
Las Pilitas Nursery
Monrovia Nursery
Mountain States Wholesale Nursery

TABLE A-1 Type 1 Plants - Less than 12 Inches and Walkable

Botanical Name	Common Name	Water Use	Height x Spacing	Notes
Low Water Use/Low or No Mow Turf or Grass-like Perennials				
Buchloe dactyloides UC Verde™	UC Verde™ Buffalo Grass	L	6" x 6"	N, winter dormant (brown)
Bouteloua gracilis 'Hachita'	'Hachita' Blue Grama Grass	L	6" x 6"	N
Carex praegracilis	California Field Sedge	M	6" x 9"+	N, grows in shade or sun
Carex pansa	California Dune Sedge	M	6" x 9"+	N, grows in shade or sun
Low-Growing Perennials (12 inches or less)				
Achillea millifollium and cultivars	Yarrow and cultivars	L	12" x 3'	N, mow 3-4x/year
Chamaemelum nobile	Chamomile	M	8" x 12"	
Dymondia margaretae	Dymondia	L	3" x 6"	Slow growing

FIGURE A-1 Type 1 Plants - Less than 12 Inches and Walkable

Buchloe dactyloides UC Verde™



Bouteloua gracilis 'Hachita'



Carex pansa (*C. praegracilis*)



Achillea millifollium cultivar mowed



Chamomile



Dymondia margaretae



TABLE A-2 Type 2 Plants - Less than 24 Inches Tall Including Flowers

Botanical Name	Common Name	Water Use	Height x Spacing	Notes
Low-Growing Grasses or Grass-like Perennials (18 inches or less)				
Carex divulsa (*C. tumincola*)	Berkeley Sedge	L	12” x 2’	N
Festuca californica & cultivars	California/Idaho Fescue	L	18” x 18”	N
Festuca idahoensis & cultivars	Idaho Fescue	L	12” x 12”	N
Pennisetum alopecuroides ‘Little Bunny’	Little Bunny Fountain Grass	L	12” x 12”	
Sesleria autumnalis	Autumn Moor Grass	M	15” x 2’	
Low-Growing Perennials/Succulents (18 inches or less)				
Achillea millifollium Calif. native cultivars	Yarrow	L	18” x 4’	N, mow 1/yr.
Achillea millifollium non-native cultivars	Yarrow	L	18” x 4’	Mow 1/yr.
Agapanthus orientalis ‘BenFran’	Baby Pete Lily of the Nile	M	18” x 2’	
Aloe ‘Grassy Lassie’	Grassy Lassie Aloe	L	12” x 12”	
Arctotis acaulis ‘Magenta’, ‘Pumpkin Pie’	African Daisy cultivars	L	1-2’ x 3’	
Convolvulus sabatius	Ground Morning Glory	L	2’ x 3’	
Delosperma cooperi	Trailing Ice Plant	L	8” x 15”	
Drosanthemum floribundum	Rosea Ice Plant	L	8” x 15”	
Dudleya hassei	Santa Catalina Live Forever	VL	8” x 18”	N
Erigeron karvinskianus & *E.glaucus*	Santa Barbara & Seaside Daisy	L	12” x 2’	N
Eiriogonum umbellatum	Sulfur Buckwheat	L	12” x 3’	N
Gazania linearis ‘Colorado Gold’	Colorado Gold Gazania (green lvs)	L	6” x 2’	
Gazania rigens leucolaena	Gazania (grayish lvs.)	L	6” x 2’	
Iris douglasiana & ‘Pacific Coast Hybrids’	Douglas & Pacific Coast Iris	L	12” x 18”	N, mix with grasses
Lantana Patriot series cultivars	Dwarf Lantana	L	12” x 15”	
Lessingia filaginifolia ‘Silver Carpet’	Silver Carpet California Aster	L	12” x 4’	N
Monardella villosa	Coyote Mint	VL	15” x 2’	N
Osteospermum fruitcosum	Trailing African Daisy	L	6” x 18”	
Oenothera caespitosa & other species	Tufted evening primrose	L	12” x 2’	N
Rosmarinus officinalis ‘Huntington Carpet’ or other prostrate varieties	Prostrate Rosemary	L	18” x 2’	
Senicio serpens	Blue Chalk Sticks	L	12” x 2’	
Thymus species	Thyme	M	8” x 2’	
Verbena peruviana & hybrids	Verbena	L	6” x 2’	
Vinca minor	Dwarf Periwinkle	M	12” x 4’	Plant in shade
Low-Growing Shrubs (18 inches or less) - all require regular trimming at parkway edges				
Ceanothus 'Centennial' or ‘Heart’s Desire’	Mountain Lilac cultivar	L	18”’ x 4’	N
Cotoneaster dammeri ‘Lowfast’	Groundcover Cotoneaster	L	18” x 4’	
Juniperus horizontalis, J. procumbens var.	Groundcover Juniper varieties	L	18” x 4’	See Sunset for list

TABLE A-3 Type 3 Plants - Less than 26 Inches Tall Including Flowers

Botanical Name	Common Name	Water Use	Height x Spacing	Notes
18” to 36” Tall Grasses				
Carex barbarae	Santa Barbara Sedge	M	2’ x 2’	N
Leymus condensatus ‘Canyon Prince’	Canyon Prince Wild Rye	L	2’ x 3’	N
Muhlenbergia dubia	Pine Muhly	L	2’ x 2’	N (SW)
Pennisetum orientale	Oriental Fountain Grass	L	18” x 18”	
Pennisetum ‘Eaton Canyon’	Dwarf Red Fountain Grass	L	3’ x 3’	
18” to 36” Tall Perennials/Succulents				
Aeonium arboreum ‘ Electra’	Purple Pinwheel Aeoneum	L	2’ x 2’	
Aeonium canariense	Giant Velvet Rose	L	2’ x 2’	
Agapanthus ‘Tinkerbell’	Dwarf Agapanthus cultivar	M	2’ x 18”	
Agave attenuata ‘Kara’s Stripe’, other cultivars	Variegated Fox Tail Agave	L	3’ x 3’	
Agave desmetiana ‘Variegata’	Variegated Smooth Agave			
Aloe maculata, A. striata	Soap Aloe, Coral Aloe	L	3’ x 3’	
Anigozanthos ‘Bush Pearl’, ‘Bush Ranger’ etc.	Kangaroo Paws Bush cultivars	L-M	2’ x 2’	
Hesperaloe parviflora	Red Yucca	L		
Lavandula minutolli	Green Fernleaf Lavender	L	2’ x 2’	
Limonium perezii	Statice	L	2’ x 3’	
Lomondra longifolia ‘Breeze’	Lomondra cultivar	L	3’ x 3’	
Penstemon heterophyllus ‘Margarita BOP’	Foothill Penstemon	L	18” x 18”	N
Phormium ‘Tom Thumb’, ‘Jack Spratt’	Small Flax hybrids	M	2’ x 2’	
Phormium cookianum ‘Cream Delight’	Cream Delight Flax	M	3’ x 3’	
18” to 36” Tall Shrubs				
Arctostaphylos 'Emerald Carpet'	Emerald Carpet Manzanita	L	2’ x 3’	N
Artemisia pycnocephala ‘David’s Choice’	David’s Choice Sandhill Sagebrush	L	2’ x 3’	N
Ceanothus gloriosus 'Anchor Bay'	Pt. Reyes Ceanothus	L	3’ x 6’	N
Cistus salvifolius	Sageleaf Rockrose	L	2’ x 3’	
Lantana montevidensis cultivars	Trailing Lantana	L	2’ x 3’	Cut back yearly
Lantana ‘Gold Rush’, ‘New Gold’	Spreading Lantana	L	2’ x 3’	Monrovia
Mimulus hybrids incl. ‘Jelly Bean Yellow’	Shrubby Monkeyflower hybrids	L	2’ x 3’	N
Rhaphiolepis x *delacourii* ‘Georgia Petite’	Georgia Petite Indian Hawthorne	M	3’ x 4’	
Rosa Flower Carpet varieties	Groundcover Roses	M	2’ x 3’	Monrovia
Salvia apiana var. *compacta*	Compact White Sage	VL	3’ x 4’	N
Salvia ‘Bee’s Bliss’ or ‘Gracias’	Bee’s Bliss or Gracias Sage	L	2’ x 4’	N
Salvia leucantha 'Santa Barbara'	Santa Barbara Sage	L	3’ x 4’	N
Verbena lilacina & V. lilacina ‘De La Mina’	Lilac Verbena	L	3’ x 3’	N

FIGURE A-2 Type 2 Plants - Less than 24 Inches Tall Including Flowers

Carex divulsa



Festuca idahoensis



Sesleria autumnalis



Pennisetum 'Little Bunny"



Achillea cultivars-native



Achillea cultivars-non-native



Agapanthus orientalis 'BenFran'



Aloe 'Grassy Lassie'



Arctotis acaulis 'Magenta'



Arctotis 'Pumpkin Pie'



Convolvulus sabatius



Delosperma cooperi



Drosanthemum floribundum



Dudleya hassei



Erigeron glaucus 'Wayne Roderick'



Eriogonum umbellatum



Gazania linearis



Gazania rigens leucolaena



Iris douglasiana



Lantana 'Patriot Rainbow'



Lessingia filaginifolia 'Silver Carpet'



Mondardella villosa



Osteospermum fruitcosum



Oenothera caespitosa



Rosmarinus officinalis



Senicio serpens



Thymus



Verbena peruviana varieties



Vinca minor



Ceanothus gloriosus 'Heart's Desire



Cotoneaster dammeri



Juniperus horizontalis var.



FIGURE A-3 Type 3 Plants - Less than 26 Inches Tall Including Flowers

Ca Leymus condensatus



Muhlenbergia dubia



Pennisetum orientale



Pennisetum 'Eaton Canyon'



Aeonium arboreum 'Electra'



Aeonium canariense



Agapanthus 'Tinkerbell'



Agave attenuata 'Kara's Stripe'



Agave desmetiana 'Variegata'



Aloe striata



Anigozanthos 'Bush Pearl'



Lavandula minutolli



Hesperaloe parviflora



Limonium perezii



Lomondra 'Breeze'



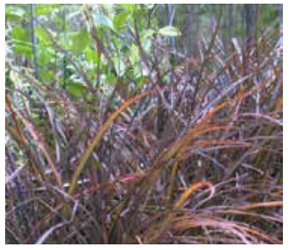
Penstemon heterophyllus



Phormium 'Cream Delight'



Phormium 'Jack Spratt'



Arctostaphylos 'Pacific Mist'



Artemisia 'David's Choice'



Cistus salvifolius



Lantana montevidensis



Lantana 'Gold Rush'



Mimulus 'Jelly Bean Yellow'



Rhaphiolepis 'Georgia Petite'



Red Flower Carpet Rose



Amber Flower Carpet Rose



Salvia apiana var. compacta



Salvia 'Bee's Bliss'



Salvia leucantha 'Santa Barbara'



Verbena lilacina



FIGURE A-4 Examples of Plants by Type in Parkways

Type 1 (Walkable Plants)



Once established, California Beach or Meadow Sedge (*Carex pansa or C. praegracilis*) can be mowed several times a years.



Dymondia (*Dymondia margaritae)* is a low growing, walkable groundcover



UC Verde Buffalo grass (*Buchloe dactyloides* UC Verde™) is a drought-tolerant cultivar of Midwest native Buffalo grass.

Type 2 (Low Growing)



Berkeley Sedge (*Carex divulsa)* requires very little care and less water than California Beach or Meadow Sedge.



Autumn Moor Grass (*Sesleria autumnalis)* - the lower grass in the photo - requires very little care and similar water to the Sedges.



Blue Fescue (*Festuca* cultivars*)* require good drainage and tolerate some shade.



Gazanias are reliable relatively drought-tolerant groundcovers that tolerates light traffic.



Prostrate Rosemary like ‘Huntington Carpet’ needs very little water.



Dwarf Periwinkle (*Vinca minor)* is a good choice for a shady parkway.

Good Examples of Type 3 Parkways: Perennial Gardens







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APPENDIX B. EXISTING CONDITIONS BY STREET SEGMENT

Introduction

This appendix describes existing conditions along each street segment. The description of each segment includes:

- The history of the Streetscape Plan, several of which were initiated by community groups
- Relevant existing plans and programs adopted by the City of Los Angeles through the Department of City Planning
- A brief description of physical characteristics relevant to the Streetscape Plan
- The livability score from the Westside Mobility Plan Existing Conditions Report, the derivation of which is explained on page B-2, for all street segments except Motor Avenue
- Photographs illustrating characteristics relevant to the Streetscape Plan

Street segments are presented in the following sequence:

Boulevard Segment	Page
Pico Green	B-3
Pico Patricia	B-13
Motor Avenue	B-20
Centinela Avenue	B-24
Venice Boulevard	B-30



Westside Mobility Plan Livability Score

The Westside Mobility Plan Existing Conditions Report summaries conditions along each street segment, using a point system based on typical existing characteristics of the roadway, sidewalks, setbacks and street wall that affect livability and are measurable. "Typical" is defined as occurring on "more than 50% of the segment's frontages." Based on these characteristics, the street segment receives a "livability rating", potentially ranging from -10 to +12. The table also shows how the street's Livability Score can be increased by modifying existing conditions to change a -1 rating to a 0 or +1 or a 0 rating to a +1 rating.

The adjacent table explains how the rating system works. For example, a street with adequately wide sidewalks (12-14 feet) receives 0 points, a narrow sidewalk (less than 12 feet) receives -1 point, and a wider than adequate sidewalk receives +1 point. Street trees not more than 50 feet on center along at least 50% of the street frontage receive +1 point, while power poles along at least 50% of the segment receive -1 point. Setback and street wall conditions are included in the livability rating only if the applicable land use comprises at least 15% of the segment frontage.

The Livability Score summary also includes:

1. A representative corridor cross section, including parcels that front the street. The corridor cross sections show the width of the ROW, roadway and sidewalks; the number and type of lanes; power poles; and street trees if there are street trees not more than 50' on center for at least 50% of the block faces along the street segment. The corridor cross sections also show: typical land use, scale of development, both predominant and range if there are some larger-scale buildings; and lot depths, which provide an indication of the potential for future development along the corridor.
2. A representative street cross section from building face to building face. This section has more detailed information for both the typical residential frontage and the typical commercial or industrial frontage along the segment. The typical street cross also indicates the percentage of the street segment's frontage along which each land use occurs. If commercial uses occur only at major intersections and constitute less than 15% of segment length, a typical commercial sidewalk is not shown. The information in the street cross sections include: landscaped medians, the division between walkway and parkway, parkway treatment (planted or paved), species and size of street trees shown in the corridor cross sections, setbacks, and setback treatments.
3. A list of street trees that occur along the street segment.

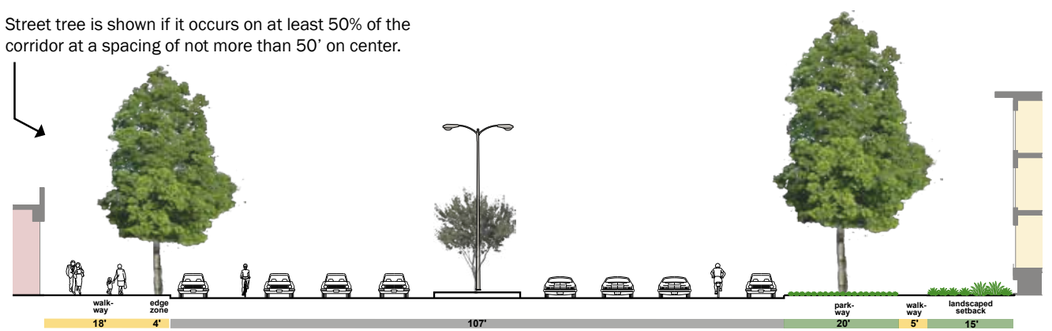
Westside Mobility Plan Boulevard Livability Rating System Legend.

ELEMENT	+1	0	-1
Roadway			
width	<56'	56 - 60'	>60'
continuity of roadway width	few or no variations	infrequent variations	frequent variations
marked crosswalk spacing	<600'	600'	>600'
raised landscaped median	yes	no	NA
bike lanes	yes	no	NA
curbside parking	yes, full time	yes, except peak	no
Sidewalks			
width	>14'	12-14'	<12'
parkway treatment	planted	large tree wells	paved
street trees	<50' o.c.	50' o.c.	>50' o.c.
power poles	NA	no	yes
street lights	decorative ped. &/or cobra	cobra	NA
Setbacks & Street Wall			
residential - setbacks	>20' planted	15-20' planted	parking or <15' planting
commercial - transparency/ entries along sidewalk	>50%	25-50%	<25%
parking along sidewalk	NA	no	yes
Maximum possible points	+12*		-10

* In addition to the above points, an additional point may be added for other pedestrian-oriented improvements that are non-standard and infrequent in the City of Los Angeles, for example, curb extensions at corner and midblock crosswalks, if they are implemented throughout the boulevard segment.

TYPICAL STREET SECTION LEGEND

Street tree is shown if it occurs on at least 50% of the corridor at a spacing of not more than 50' on center.



Landscaped parkways and setbacks are green; paved walkways and parkways are yellow.

B.1 PICO GREEN EXISTING CONDITIONS

Streetscape Plan History

The West Los Angeles Neighborhood Council (WLANC) and Council District 11, with the help of Katherine Spitz Associates, Inc. Landscape Architecture, developed the **Pico Green Master Plan** for the one-mile long segment of Pico Boulevard between the 405 Freeway on the east and the 10 Freeway on the west (also the City Limit with Santa Monica) in 2008. This Streetscape Plan "codifies" the Pico Green Master Plan, making its implementation a condition of approval for all Projects along Pico Boulevard between the 405 Freeway and the 10 Freeway to the west.

Relevant Plans and Programs

Several key plans and programs relevant to the surrounding community along this segment of Pico Boulevard were reviewed to understand the regulatory context for this Streetscape Plan.

Community Plans and Zoning

The land use element of the City's General Plan is composed of 35 distinct community plans, each with its own plan area boundaries. Community plans provide physical growth and development policies for neighborhoods throughout the city and encourage sustainable land use practices, while recognizing the unique character of individual communities.

The Pico Green Streetscape Plan area is entirely within the West Los Angeles Community Plan area. West of Gateway Boulevard, properties abutting the street are designated for Neighborhood Commercial uses and zoned for General Commercial use (C2), with the exception of the triangular lot between Gateway Boulevard and Federal Avenue on the north side, which is designated for Limited Industrial use and zoned for Commercial Manufacturing (CM). East of Gateway Boulevard, properties abutting the street are designated for Light Industrial uses and zoned M2. The urban design policies of the two community plans include the creation of a pedestrian-oriented, visually cohesive, and economically viable neighborhood to the north and south of Pico Boulevard, with Pico Boulevard having a distinct identity as the neighborhood's main corridor and development that visually contributes to a sense of place.

Pico Boulevard is currently designated as a Major Highway Class II and proposed to be an Avenue I by the Mobility Plan 2035. The current designation specifies an 80-foot wide roadway and 12-foot wide sidewalks in a 104-foot wide right-of-way. The proposed designation is for a 70-foot wide roadway and 15-foot sidewalks in a 100-foot wide right-of-way, consistent with the predominant existing condition.

This segment of Pico Boulevard is part of the Transit Enhanced Network (TEN) in the Mobility Plan 2035.

Pico Boulevard from Gateway Boulevard east to Downtown is listed in the City's 2010 Bicycle Plan as a Class II bike route with dedicated bike lanes and in the Mobility Plan 2035 as Deferred Backbone (Post 2035) in the Bikeways - Backbone Network.

West Pico Boulevard Community Design Overlay District

The West Pico Boulevard Community Design Overlay District (CDO) is a Supplemental Use District pursuant to Sections 13.00, 13.07 and 13.08 of the Los Angeles Municipal Code (LAMC) and was established by ordinance (Ordinance No. 175,774) on March 20, 2004. The West Pico Boulevard CDO implements the urban design policies in the community plans by providing "direction for building design, storefront rehabilitation and infill development or remodel of individual projects to reinforce the character and quality of Pico Boulevard by promoting a cohesive development pattern with consistent siting and pedestrian orientation." Since all parcels abutting this segment of Pico Boulevard are zoned Height District 1VL (3 stories and 45-foot height limit), the design standards and guidelines in the CDO focus on low-rise buildings. With respect to streetscape improvements, the CDO specifies that street trees should be planted at "a ratio of one tree for every thirty (30) feet of lot frontage or to the satisfaction of the [Urban Forestry] Division..."

Q conditions, adopted as Ordinance No. 175773, at the same time as the CDO, prohibit pole signs and illuminated architectural canopy signs and prohibit auto sales or rentals that are not within a building, uses requiring a Cafe Entertainment and Shows business permit from the Police Permit Review Panel unless live entertainment and alcohol sale is incidental to food service, certain recycling facilities, swap meets and storage building for household goods on industrially zoned parcels.

The zoning designation within the district is identified through the use of the symbol "CDO" (e.g. C2-1VL-CDO). Projects within the district are subject to the Design Standards and Guidelines set forth in Chapter III of the ordinance, which address site planning, architecture, parking, landscaping and signage, which are in addition to those set forth in the LAMC. Provisions contained in the ordinance that differ from or conflict with those contained in the LAMC shall prevail and supersede the other applicable provisions.

Pursuant to the ordinance, the Department of Building and Safety shall not issue building permits for a Project within the district unless the Project conforms to all of the Development Regulations or a change of use permit for any prohibited use (see Section 5.B of Ordinance No. 171,859).

West Los Angeles Transportation and Mitigation Specific Plan

The West Los Angeles Transportation and Mitigation Specific Plan was adopted by ordinance (Ordinance No. 171,492) in March of 1997. The specific plan encompasses an area that includes all or parts of the Westwood, West Los Angeles, Brentwood-Pacific Palisades, and the Palms-Mar Vista-Del Rey District Plan Areas.

The intent of the specific plan is to provide a mechanism to fund specific transportation improvements associated with transportation impacts generated by new development within the specific plan area. The specific plan establishes Transportation Impact Assessment Fees for new development in the C, M and P zone and requires that new development in the R-3 and less restrictive zones mitigate Significant Transportation Impacts. The specific plan also includes a number of other transportation and transit related policy goals and regulations for the plan area and is administered by the Department of Transportation.

Existing Conditions

East of Gateway Boulevard on the north side of the street and east of the alley Between Purdue and Butler avenues on the south side of the street, parcels fronting Pico Boulevard are zoned [Q]M2-1VL-CDO. Current uses include a Best Buy, veterinary clinic, City Animal Services facility, self storage, restaurants retail and adult entertainment. The triangular lot bounded by Pico Boulevard, Gateway Boulevard and Federal Avenue, which is zoned [Q]CM-1VL-CDO, is improved with a restaurant and retail.

West of Gateway Boulevard on the north side of the street and east of the alley Between Purdue and Butler avenues on the south side of the street, parcels are zoned [Q]C2-1VL-CDO and are occupied by a mix of retail, services, restaurants, car repair and rental, and wholesale supply, as well as a charter school and several residential buildings.

Buildings are one or two stories in height. Most are built to the front property line. However, there are a few strip malls and parking lots along the sidewalk and several new three-to-four story buildings.

According to the CDO, signage in the area is generally out-of-scale with the size of buildings and viewing distances with a concentration of billboards, roof and pole signs, and sign clutter which visually degrade the area's character, with a few exceptions of newer buildings which incorporate pedestrian-oriented signage integrated into their architectural character.

This segment of Pico Boulevard carries between 30,000 and 35,000

vehicles per day. The roadway west of Gateway Boulevard is generally 70 feet wide and sidewalks are 15 feet wide. The roadway east of Gateway Boulevard is generally 75 feet wide with 15-foot wide sidewalks on the south side of the street and 10-foot wide sidewalks on the north side. There is full-time on-street parking, two travel lanes in each direction, and a center turn lane.

The Metro Rail Exposition Corridor (Expo) line is currently under construction. With the completion of the Expo Line. Pico Boulevard east of Gateway Boulevard will be within one-half mile (a 10-minute walk) of the Sepulveda Station and Pico Boulevard west of Gateway Avenue will be within one-half mile of the Bundy Station. This segment of Pico Boulevard is poised to become a walkable shopping street within a transit- oriented district. A one-mile commercial street segment with fixed rail transit stations at each end is an ideal configuration for a walkable shopping street: transit patrons can alight at one station, walk along Pico Boulevard to shop or dine and board at the next station, with only 20 minutes of walking along the way.

At this time few bicyclists use Pico Boulevard, although cycling has increased since 2010. Cyclists typically ride on the sidewalk. The Metro Expo line will include a parallel off-street bicycle facility along the rail line. The bike path and the Expo Line itself are expected to increase bicycle volumes in the area, since cycling is a logical "first mile-last mile" solution for transit patrons in an area with relatively flat topography and year-round mild climate.

The West Los Angeles Community Plan identifies "a lack of defined neighborhood places, the need for improved design quality in commercial places, a deficit of evening street life activities, and the need to maintain neighborhood serving 'mom and pop' uses on Pico Boulevard."

In 2008, with assistance from Council District 11, the West Los Angeles Neighborhood Council (WLANC) hired Katherine Spitz Associates, Inc. Landscape Architecture to assist them and the business and property owners on Pico Boulevard in improving the pedestrian experience and enhance the visual appearance of the corridor between the 405 Freeway and 10 Freeway. A series of public meetings with business and property owners was held in 2008 and 2009 to identify community preferences and priorities and to create a streetscape vision. The vision focused on "greening" the street, both with street trees and median plantings and with increased stormwater infiltration in the parkways and medians.
The Neighborhood Council had already planted street trees - primarily London Plane (*Platanus acerifolia*) along with some California Sycamores (*Platanus racemosa*) - along much of the street and those trees have already transformed the character of the street.

There is up-lifted and deteriorated concrete in some locations along the street. In some areas, the sidewalks are dirty and stained with discarded gum and other debris. Some shop owners maintain notably clean walks in front of their shops, but these are not uniform.
While existing roadway lighting illuminates both the roadway and sidewalk, the sidewalks and storefronts would benefit from additional lower level lighting.

Street furnishings consist of the City's coordinated street furniture program improvements and the City's standardized bus benches. The brown plastic benches, which were the most vandalized elements along the corridor in 2010, have been replaced with somewhat more attractive metal advertising benches. Trash receptacles, which were often found to be over-flowing in 2010, are now better maintained.

The following page is an excerpt from the *Westside Mobility Plan Existing Conditions Report*, 2011, summarizing existing characteristics that affect walkability and livability. Based on the Westside Mobility Plan's evaluation, Pico Boulevard from the 405 Freeway to the 10 Freeway receives a score of -1. The table also shows how the street's Livability Score can be increased from 0 to +5 by making the following changes:

1. Provide marked crosswalks (with traffic control as required) to less than 600 feet apart.
2. Install raised landscaped medians.
3. Replace small tree wells with either large tree wells or continuous parkways.
4. Infill street trees to achieve an average spacing (excluding cross streets and required spacing from intersections and cross streets) of less than 50 feet.
5. Install ornamental street lights and/or pedestrian lights.

A score of +6 corresponds to walkable, livable street, appropriate to a commercial/mixed-use avenue in a transit-oriented district.

The remainder of this section illustrates typical existing conditions along Pico Boulevard between the 405 Freeway and the 10 Freeway.

Current Signalized intersection spacing on Pico Boulevard is as follows:

900 feet	Centinela Avenue to Bundy Drive
1,500 feet	Bundy Drive to Barrington Avenue
1,400 feet	Barrington Avenue to Gateway/Exposition Boulevards
725 feet	Gateway/Exposition Boulevard to Corinth Avenue
360 feet	Corinth Avenue to Sawtelle Boulevard.

There are two existing marked, uncontrolled crosswalks at unsignalized intersections: Granville Avenue and Federal Avenue. These result in the following marked crosswalk spacing:

880 feet	Centinela Avenue to Bundy Drive
900 feet	Bundy Drive to Granville Avenue
560 feet	Granville Avenue to Barrington Avenue
700 feet	Barrington Avenue to Federal Avenue
580 feet	Federal Avenue to Gateway/Exposition Boulevards
760 feet	Gateway/Exposition Boulevard to Corinth Avenue
360 feet	Corinth Avenue to Sawtelle Boulevard.

Livability Score

Pico Boulevard 405 Fwy. - 10 Fwy.



SEGMENT LENGTH

1 miles

LIVABILITY RATING (range: -10 to +12)

-1



Street view.



Sidewalk view.

EXISTING CHARACTERISTICS

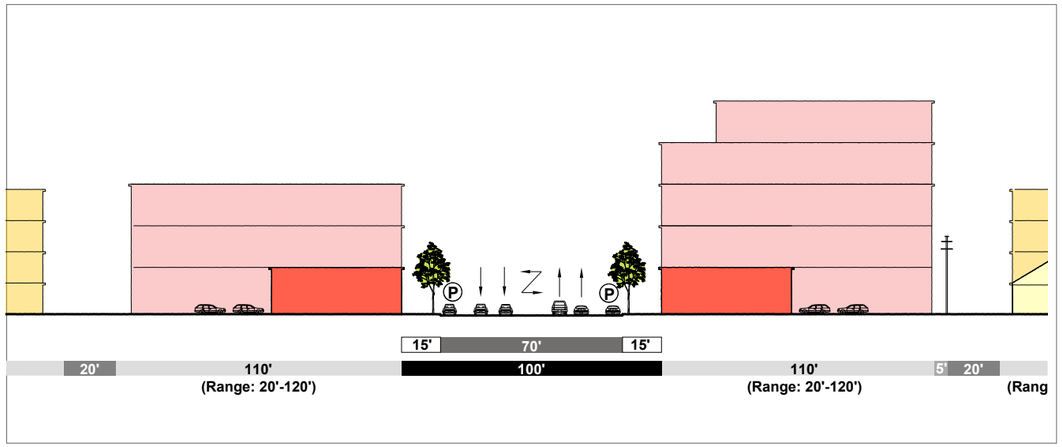
ELEMENT	TYPICAL	OTHER/RANGE	PTs.
Roadway			
width	70’	80’	- 1
continuity of roadway width	some variation		0
marked crosswalk spacing	>600’	300 - 900’	- 1
raised landscaped median	no	--	0
bike lanes	no	--	0
curbside parking	yes		+1
Sidewalks			
width	15’	--	+1
parkway treatment	paved, small tree wells	--	- 1
street trees	>50’ o.c.		-1
power poles	no	in a few locations	0
street lights	cobra	--	0
Setbacks & Street Wall			
residential - setbacks	--	--	NA
commercial - transparency/ entries along sidewalk	>50%		+1
parking at back of sidewalk	no	occasionally	0

Primary Street Tree:
London Plane

Other street trees:
California Sycamore
Ficus



London Plane



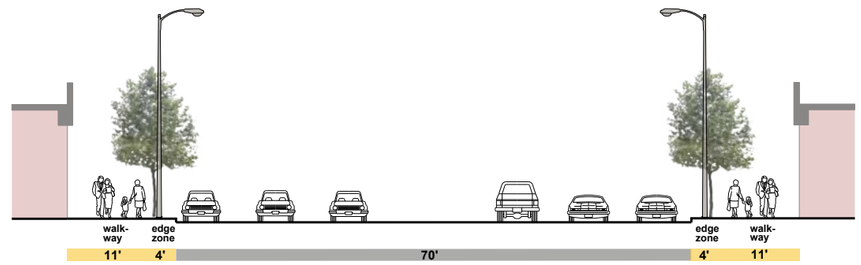
TYPICAL CORRIDOR CROSS SECTION

Source: *Westside Mobility Plan Existing Conditions Report*, 2011

0 60’

98% commercial

2% residential



Typical commercial

TYPICAL STREET CROSS SECTION

0 20’

GATEWAY SEGMENTS



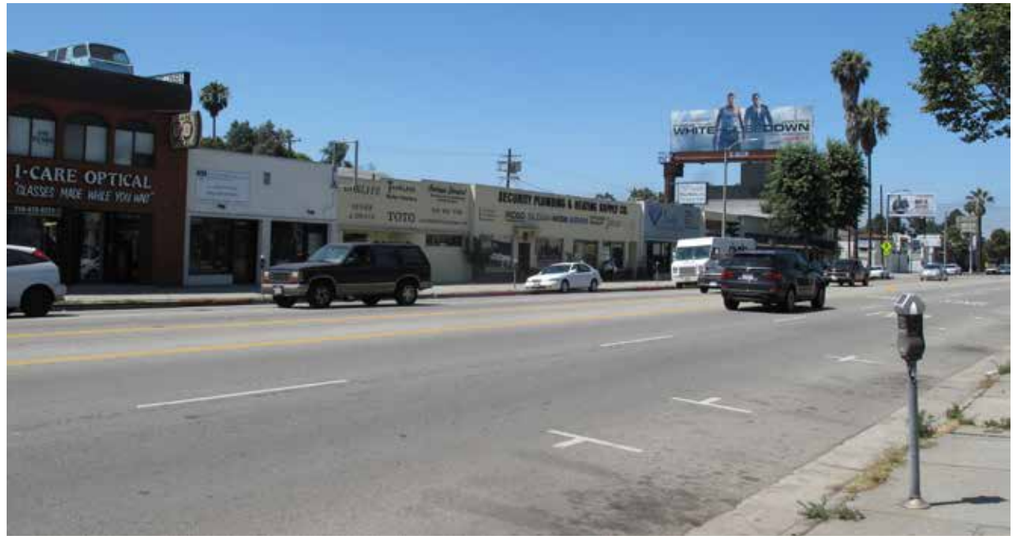
Looking west on Pico Boulevard at Sawtelle Boulevard with older small-scale storefront buildings on the south side and new larger scale development set back from the sidewalk on the north side, and the elevated Expo Line crossing the street.



Looking east on Pico Boulevard at Centinela Boulevard (just east of the 405 Freeway) with older small-scale storefront buildings on the south side and new residential development on the north side..

MIDDLE SEGMENT





The roadway is typically 70 feet wide with two travel lanes and full-time on-street parking in each direction with a continuous center turn lane, which can accommodate medians in some midblock locations. Buildings are typically one or two story commercial storefronts with entrances along the sidewalk and limited parking behind. Some segments have more street trees than others.

OVERALL SIDEWALK CHARACTER



Sidewalks are typically 15 feet wide and can accommodate 1) large tree wells or parkways to support healthy trees that provide more environmental benefits, 2) a walkway and 3) outdoor dining or seating.



Even outdoor dining extends well into the walkway zone can be accommodated, as long as there is a 5-foot wide clear path of travel. On a street like Pico with low to moderate pedestrian volumes, dining activates the street.



Some blocks between Gateway Boulevard and Bundy Avenue have somewhat consistent tree canopy that provides shade and scale.







However, there are as many blocks that have few or no street trees or other pedestrian facilities.

CHARACTER OF DEVELOPMENT



Storefront buildings with local businesses on the north side of the street along much of the street segment west of Federal Avenue.



Similar storefront buildings with local businesses on the south side of the street in the same street segment.



There are some new 45-foot tall buildings, both office and residential.



New four to five story residential development at the west end of the street segment.



A few strip malls and freestanding buildings with parking lots on the side



Best Buy and other large-scale buildings at the east end of the street segment.

STREET CROSSINGS



Crosswalks at signalized intersections are striped with a single white line on either side. Over time they will be converted to the City standard, Continental striping.



Unsignalized and midblock crosswalks are marked with ladder striping. Over time, they too will be converted to Continental striping.



At school crossing crosswalks are painted yellow.



Crosswalks at most unsignalized intersections on Pico Boulevard are unmarked, making it more difficult for pedestrians to cross since a surprising number of motorists appear to be unaware that every corner is a legal crosswalk.



At diagonal street streets (Gateway and Exposition boulevards and Tennessee Place), crossings are longer and less safe for pedestrians due to higher speed turns. These crossings require particular attention.



Several cross streets have atypical concrete crosswalks which read as extensions of the sidewalk and provide a design opportunity.

SIDEWALK ZONES AND PARKWAY TREATMENT



Historically the 15-foot wide sidewalks were divided into wide parkways that could support larger, healthier street trees, and adequate walkways for moderate pedestrian volumes.



Adjacent to new residential development, walkways are overly wide even for high pedestrian volumes and parkways are too narrow to support healthy street trees.



Adjacent to new commercial development, very small (4’ x 4’) tree wells are currently required. In both new configurations, there is little or no opportunity for infiltrating runoff from the sidewalk, so it runs off into the street.



There are a few locations with parkways or big tree wells that have allowed existing trees to be healthier.



In some locations, property owners have paved the tree wells, which is not beneficial for the trees.



In others, property or business owners have planted grasses, perennials or groundcover to add interest.

LONDON PLANE AND CALIFORNIA SYCAMORE TREES





London Plane tree are the predominant species on this segment of Pico Boulevard. London Planes have a strong central leader (trunk) that grows quickly so their canopies can be pruned up above business signs after only a few years, and open canopies that provide dappled light rather than dense shade. Their roots typically do not uplift the sidewalk, especially if they are planted in medium to large tree wells or parkways.

CANOPY PRUNING



These London Planes have been allowed to grow up with a single central leader (or trunk) so the canopy is well above business signs.





Native California Sycamores, a relative of the London Plane, are typically not planted as street trees in the City of Los Angeles because of their size and traditional multi-trunk growth pattern. However, Sycamores naturally have a central leader (trunk) and can be trained to be a straight, columnar tree.



The two trees on the right been headed back so they no longer have central leaders. As a result, they are small, bushy and block business signs.

STREET LIGHTS AND FURNITURE



Standard City street lights illuminate Pico Boulevard.



Standard City bus benches are located at most bus stops.



Standard City bike racks are located throughout the area.



There are a few standard City bus shelters.



There is an advertising kiosk at each end of the street segment.

B.2 PICO PATRICIA EXISTING CONDITIONS

History

The Westside Neighborhood Council (WNC) and Council District 5, with the help of Kathryn Cerra Associates, Landscape Architecture, developed the **Pico Boulevard Beautification Plan: 405 Freeway to Patricia Avenue** in 2010. That plan is available on the WNC's web page at http://www.wncla.org. This Streetscape Plan "codifies" the Pico Boulevard Beautification Plan, making its implementation a condition of approval for all Projects along Pico Boulevard between the 405 Freeway and Patricia Avenue.

Relevant Plans and Programs

Plans and programs relevant to the surrounding community along this segment of Pico Boulevard were reviewed as part of understanding the regulatory context for this Streetscape Plan.

West Los Angeles Community Plan

The land use element for the City's General Plan is composed of thirty-five distinct community plans, each with its own plan area boundaries. Community plans provide physical growth and development policies for the various neighborhoods throughout the city and encourage sustainable land use practices while balancing the unique character of individual communities.

The West Los Angeles Community Plan is generally bound by Centinela Avenue on the west, Wilshire Boulevard and Santa Monica Boulevard to the north, National Boulevard, Pico Boulevard, and Exposition Boulevard to the south, and Durango Avenue, Robertson Boulevard, and Canfield Avenue to the east.

The Mobility Plan 2035 redesignated Pico Boulevard from the I-405 Freeway to Patricia Avenue from the current Major Highway Class II, that is, a 104-foot right-of-way with an 80-foot wide roadway and 12-foot wide sidewalks, to an Avenue I designation, that is, a 100-foot right-of-way with a 70-foot roadway and 15-foot wide sidewalks, consistent with the predominant existing condition. Currently the curb lanes are used as a peak-period travel lanes.

The abutting properties along the segment of Pico Boulevard, from the 405 Freeway to Patricia Avenue, are primarily designated for Neighborhood Commercial uses but also include a number of parcels designated for Light Manufacturing uses around Sepulveda Boulevard, and Community Commercial uses in and around the Westside Pavilion.

Westwood/Pico Neighborhood Overlay District

The Westwood/Pico Neighborhood Overlay District is a Supplemental Use District pursuant to Sections 13.00, 13.07 and 13.08 of the Los Angeles Municipal Code (LAMC). Established by ordinance (Ordinance No. 171,859) in January of 1998, it identifies Westwood Boulevard, on both sides between Missouri Avenue and the alley northerly of Pico Boulevard, Pico Boulevard, on the north side between Bentley Avenue and Patricia Avenue, and the south side between Military Avenue and Patricia Avenue, and Overland Avenue, on the east side between Blythe Avenue and the alley south of Pico Boulevard, as Pedestrian Oriented Streets. Portions of these streets were determined to encompass a variety of commercial uses and activities where a majority of structures are of a similar size and include architectural details which if preserved and enhanced would encourage people in the surrounding neighborhoods to walk and shop along these streets.

The zoning designation within the district is identified through the use of the symbol "POD" (e.g. C2-1VL-POD). Projects within the district are subject to the Development Regulations set forth in Section 5 of the ordinance, which includes regulations regarding building frontages, a list of prohibited uses, setback requirements, parking area screening requirements, landscaping standards, and commercial signage standards that are in addition to those set forth in the LAMC. Provisions contained in the ordinance that differ from or conflict with those contained in the LAMC shall prevail and supersede the other applicable provisions.

Pursuant to the ordinance, the Department of Building and Safety shall not issue building permits for a Project within the district unless the Project conforms to all of the Development Regulations or a change of use permit for any prohibited use (see Section 5.B of Ordinance No. 171,859).

West Los Angeles Transportation and Mitigation Specific Plan

The West Los Angeles Transportation and Mitigation Specific Plan was adopted by ordinance (Ordinance No. 171,492) in March of 1997. The specific plan encompasses an area that includes all or parts of the Westwood, West Los Angeles, Brentwood-Pacific Palisades, and the Palms-Mar Vista-Del Rey District Plan Areas.

The intent of the specific plan is to provide a mechanism to fund specific transportation improvements associated with transportation impacts generated by new development within the specific plan area. The specific plan establishes Transportation Impact Assessment Fees for new development in the C, M and P zone and requires that new development in the R-3 and less restrictive zones mitigate Significant Transportation Impacts. The specific plan also includes a number of other transportation and transit related policy goals and regulations for the plan area and is administered by the Department of Transportation.

As of the time of this streetscape plan preparation, the West Los Angeles Transportation and Mitigation Specific Plan is being updated through the Westside Mobility Plan study and may result in the establishment of new Transportation Impact Assessment Fees and/or update existing fees.

Sepulveda Corridor Specific Plan

The Sepulveda Corridor Specific Plan was adopted in December of 1992 (Ordinance No. 168,329) and subsequently amended in September of 2000 (Ordinance No. 173,455). The plan area consists of an approximately two-block segment on the westerly side of Sepulveda Boulevard between Olympic Boulevard and Pico Boulevard. Development regulations included in the specific plan are minimal and center mostly around floor area provisions for industrial uses within the plan area.

The specific plan was the result of a settlement agreement between the City of Los Angeles and the Southern Pacific Transportation Company as approved by the City Council in 1991, with the intent of establishing a planning tool to facilitate the redevelopment and enhancement of industrial developments and surrounding street improvements along an existing railroad right-of-way.

Existing Conditions

Between the 405 Freeway and Patricia Avenue, Pico Boulevard consists of a mix of uses and varying built form, unified primarily by its constant vehicular flow. Moving eastward from the Freeway, Pico goes through three distinct neighborhood types: industrial and commercial uses between the Freeway and Sepulveda Boulevard, followed by institutional and commercial uses and the Westside Pavilion regional shopping center between Westwood Boulevard and Overland Avenue, and ending at the mostly single-story 'mom and pop' neighborhood shops and restaurants at the easterly end of the Streetscape Plan area.

Pico Boulevard has always been a major east-west corridor linking Los Angeles to Santa Monica and the Pacific Ocean. High traffic continues to move through this corridor which also serves as a surface street alternative to east-west travel on the nearby 10 Freeway. The new Metro Rail Exposition Corridor (Expo) line is currently under construction and will relieve some existing traffic congestion on Pico Boulevard. Furthermore, with the completion of the Expo Line Westwood Station, which will place adjacent shops, restaurants, and commercial services within walking distance, this segment of Pico Boulevard is poised to establish itself as a transit- oriented Westside destination..

PICO PATRICIA

Pico Boulevard is listed on the City's 2010 Bicycle Plan to include a Class II bike route with dedicated bike lanes. However, it is not included on the City's Bicycle Enhanced Network (BEN). The Expo Line Phase 2 bike path (open in 2016) runs along the rail line, a few blocks from Pico Boulevard, providing bicycle access to the area.

The West Los Angeles Community Plan identifies "a lack of defined neighborhood places, the need for improved design quality in commercial places, a deficit of evening street life activities, and the need to maintain neighborhood serving 'mom and pop' uses on Pico Boulevard." Community members have commented on the deteriorated conditions of public sidewalks, lack of street trees, excessive car fumes, vehicle noise, lack of night lighting, and an environment generally not supportive of pedestrian activity.

In 2007, with assistance from Council District 5, the Westside Neighborhood Council (WNC)hired a landscape architectural firm, Kathryn Cerra Associates, to assist them and the business and property owners on Pico Boulevard to improve the pedestrian experience and enhance the visual appearance of the corridor between the 405 Freeway and Patricia Avenue. A series of public meetings with business and property owners was held between 2007 and 2010 to identify community preferences and priorities, and to create the streetscape guidelines identified within this plan for pedestrian enhancements along the segment of Pico Boulevard between the 405 Freeway and Patricia Avenue.

In 2010, when the WNC adopted its plan, the street tree canopy consisted primarily of Ficus (*Ficus microphylla* 'Nitida'), which have been either over-pruned or permitted to grow heavy, thick, and dense. Concerns expressed by community members regarding Ficus trees include: the small figs from the trees stain the sidewalks; on the south side of Pico Boulevard, the shade of the Ficus trees feels dark and blocks light from storefronts. Where Ficus trees are planted in small tree wells, tree roots have lifted paving throughout the corridor, though in 2009 the City replaced some sidewalks on both sides of Pico Boulevard between Patricia Avenue and Parnell Avenue, trimming tree roots and widening tree wells in the process. Since 2010 the WNC has coordinated the planting of new street trees, primarily Evergreen Pear (*Pyrus kawikami)* with some *Pyrus calleryana* 'Aristocrat' west of Overland Avenue.

Replacement of lifted concrete and deteriorated concrete remains incomplete and needs to be extended throughout the entire Streetscape Plan area to make the sidewalks more walkable. In many areas, the sidewalks are dirty and stained. Some shop owners maintain notably clean walks in front of their shops, but these are isolated efforts and not uniform. Storefronts are likewise unevenly maintained.

While existing street lights provide adequate illumination to meet street lighting standards, community members have indicated that additional sidewalk lighting would be appreciated. Street furnishings consist of the City's coordinated street furniture program improvements.

Pico Boulevard, between Patricia Avenue and Overland Avenue, consists primarily of small, one-story commercial "mom and pop" shops and restaurants with a distinct pedestrian-oriented neighborhood village character. Pico Boulevard's small shops have lined this segment of the corridor for generations and many are beloved by their neighboring residential customers.

Building scale changes between Overland Avenue and Westwood Boulevard where the Westside Pavilion dominates the streetscape. The Mexican Fan Palms that lined the Westside Pavilion frontage have been supplemented by new canopy trees, which will provide shade and pedestrian scale as they mature. The sidewalk here is only 10 feet wide in most places and, due in part to the blank facade of the building, the pedestrian way feels narrow and uninviting. Commercial uses across the street from the Westside Pavilion, on the north side of Pico Boulevard, are consistent with the single-story storefront character east of Overland Avenue.

At Midvale Avenue, the street frontage transitions to a less dense collection of commercial stores and restaurants, with more surface parking in front or between buildings than occurs east of Overland Avenue.

Industrial uses begin at Bentley Avenue and continue to the easterly edge of the 405 Freeway, interspersed with commercial and institutional uses. This marks the westerly boundary of the Streetscape Plan area. The pedestrian fabric rapidly deteriorates at Sepulveda Boulevard, with poor quality crosswalks, broken concrete and no sidewalk at all at the northeast side of Sepulveda Boulevard.

The following page is an excerpt from the *Westside Mobility Plan Existing Conditions Report*, 2011, summarizing existing characteristics that affect walkability and livability. Based on the Westside Mobility Plan's evaluation, Pico Boulevard from the 405 Freeway to the 10 Freeway receives a score of -1. The table also shows how the street's Livability Score can be increased to +4 by making the following changes:

1. Provide marked crosswalks (with traffic control as required) to less than 600 feet apart
2. Install raised landscaped medians
3. Replace small tree wells with either large tree wells or continuous parkways
4. Infill street trees to achieve an average spacing (excluding cross streets and required spacing from intersections and cross streets) of less than 50 feet.
5. Install ornamental street lights and/or pedestrian lights.

A score of +6 corresponds to walkable, livable street, appropriate to a commercial/mixed-use avenue in a transit-oriented district.

The remainder of this section illustrates typical existing conditions along Pico Boulevard between the 405 Freeway and the 10 Freeway.

Livability Score

Pico Boulevard

405 Fwy. - Patricia Avenue



SEGMENT LENGTH

1.3 miles

LIVABILITY RATING (range: -10 to +12)

-1



Street view.



Sidewalk view.

EXISTING CHARACTERISTICS

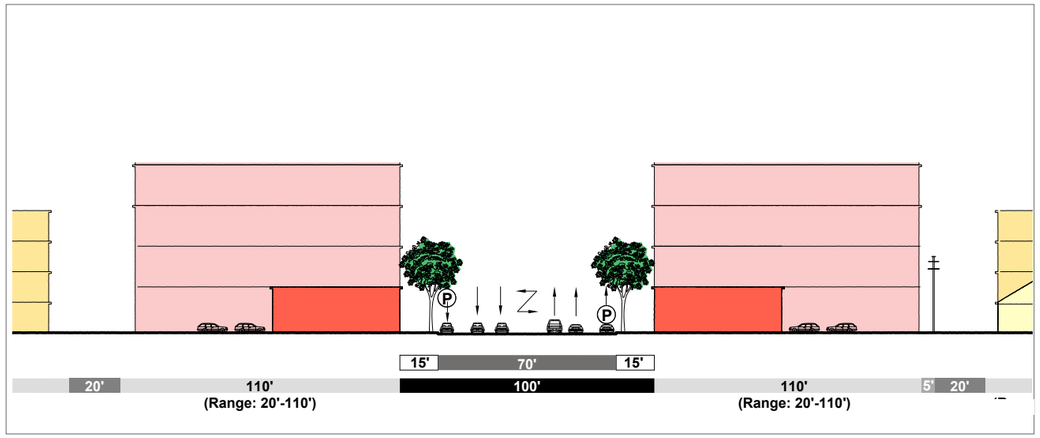
ELEMENT	TYPICAL	OTHER/RANGE	PTs.
Roadway			
width	70’	80’	- 1
continuity of roadway width	some variation		0
marked crosswalk spacing	>600’	300 - 900’	- 1
raised landscaped median	no	--	0
bike lanes	no	--	0
curbside parking	yes, except peak period	--	0
Sidewalks			
width	15’	10’	+1
parkway treatment	paved, small tree wells	--	- 1
street trees	50’ o.c.		0
power poles	no	--	0
street lights	cobra	--	0
Setbacks & Street Wall			
residential - setbacks	--		NA
commercial - transparency/ entries along sidewalk	>50%		+1
parking at back of sidewalk	no	occasionally	0

Primary Street Trees:
Ficus
Evergreen Pear
Aristocrat Pear

Other street trees:
Jacaranda
.



Ficus

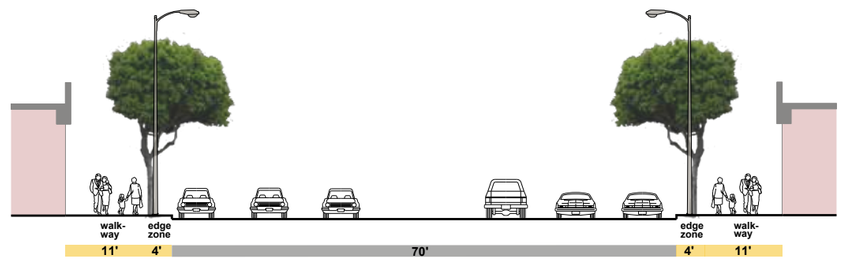


TYPICAL CORRIDOR CROSS SECTION

0 60’

100% commercial

0% residential



Typical commercial

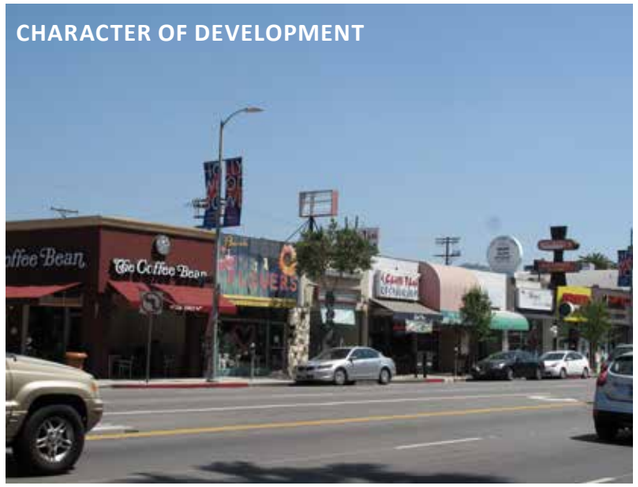
TYPICAL STREET CROSS SECTION

0 20’

Source: *Westside Mobility Plan Existing Conditions Report*, 2011

PICO PATRICIA

CHARACTER OF DEVELOPMENT



Small local stores are located along the street across from Westside Pavilion and on both sides of the street from Overland Avenue to Patricia Avenue.

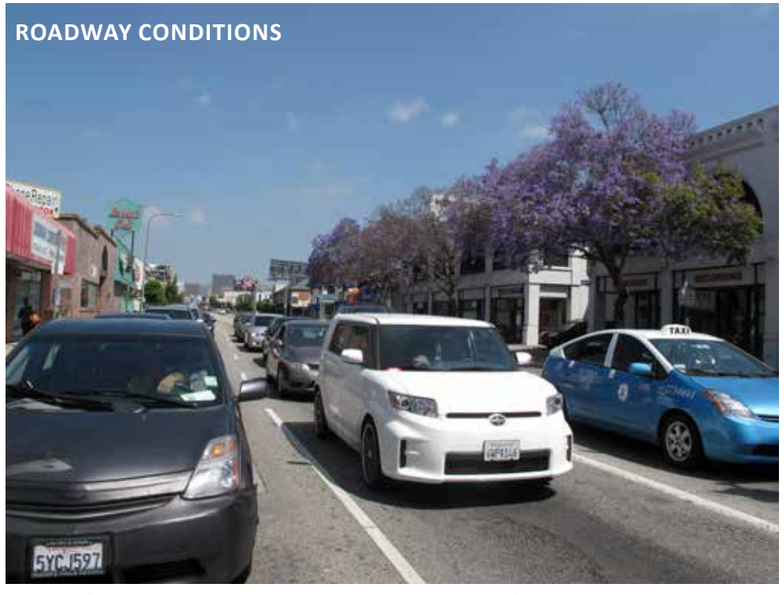


Westside Pavilion lines the south side of Pico Boulevard between Westwood Boulevard and Overland Avenue.

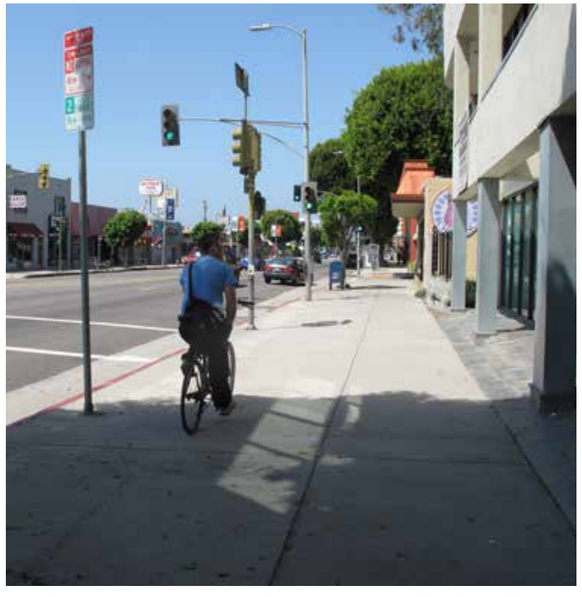


While there are some small scale storefront buildings west of Westwood Boulevard, the scale is generally larger, with more gaps in the street wall (e.g., parking lots). Shops are generally local, community-serving uses.

ROADWAY CONDITIONS



Heavy traffic occurs throughout the day on Pico Boulevard and major cross streets.

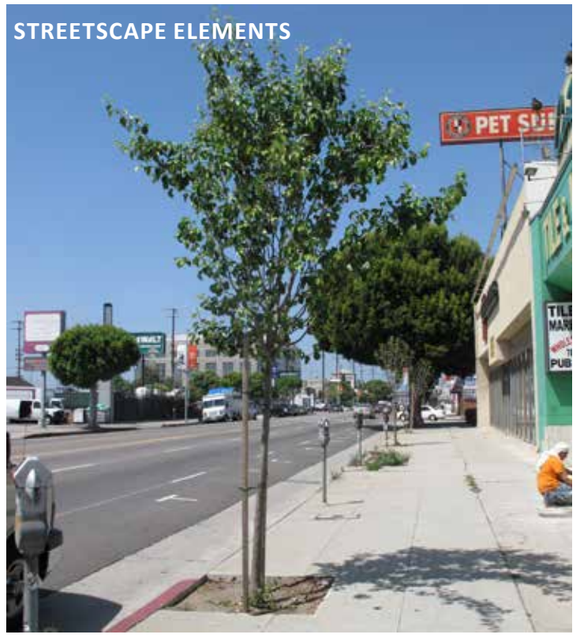


Bicyclists, more common now than in 2010, typically ride on the sidewalk because it is unsafe to ride in the roadway.



The 60 to 80 foot wide roadway would benefit from landscaped medians in the center turn lane where left turns are not required.

STREETSCAPE ELEMENTS



Street trees are now a combination of existing mature Ficus (background) and recently planted Evergreen Pear (foreground) and Aristocrat Pear, along with a mix of other species.



Mexican fan palms are too tall to provide shade and scale for pedestrians. Evergreen and Bradford Pear trees have been planted between to provide shade and scale.







In 2010 merchant-provided trash receptacles overflow with trash (above top left) and brown plastic bus benches were unattractive and grafittied (above bottom left). In 2013 trash receptacles and benches are coordinated and emptied more regularly (above right).



Most of the tree wells that were empty in 2010 have been replanted. In 2013 there are only a few empty tree wells like this one.



There are still segments of the sidewalk than are not well-maintained.



Tree grates, like this one at the northeast corner of Pico Boulevard and Westwood Boulevard, can kill a tree by cutting into the tree's cambium layer.

PICO PATRICIA

FICUS CANOPY



There are a number of Ficus trees on Pico Boulevard that have been severely headed ("butchered").



Once headed, trees will grow back denser - note all the multiple branches sprouting at each cut.



When they grow back, the headed trees will be denser and smaller and will typically block business signs.



When a Ficus is not headed back, it is less dense and can be more easily pruned up above business signs.

FICUS ROOTS



When Ficus are planted in small tree wells, their surface roots will typically uplift the adjacent sidewalk.



The better solution is to provide a continuous parkway, as was done adjacent to the Zev Yaroslavsky Apartments on Pico Boulevard.



If a continuous parkway is not feasible, a bigger tree well, like this one on Pico Boulevard near Patricia Avenue will reduce the amount of sidewalk uplift.

OTHER TREES ON PICO BOULEVARD



Examples of recently planted Evergreen Pear trees, as specified in this Streetscape Plan, east of Overland Avenue.



Examples of recently planted Aristocrat Pear trees west of Overland Avenue.



There is one block face lined with Jacarandas on the north side of Pico Boulevard east of Westwood Boulevard



A few Chinese Flame trees have been planted.

OVERALL SIDEWALK CHARACTER



The sidewalk east of Overland Avenue is typically 15 feet wide, providing room for a walkway, parkway zone with trees, lights and furnishings, and a few tables or chairs.



The sidewalk across from the Westside Pavilion is evolving into a pleasant walking environment.



West of Westwood Boulevard, the sidewalks are narrower but still adequate and have been enhanced with some new furnishings.

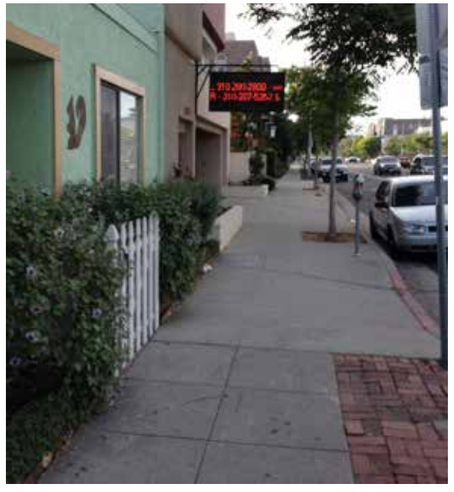
B.2 MOTOR AVENUE EXISTING CONDITIONS

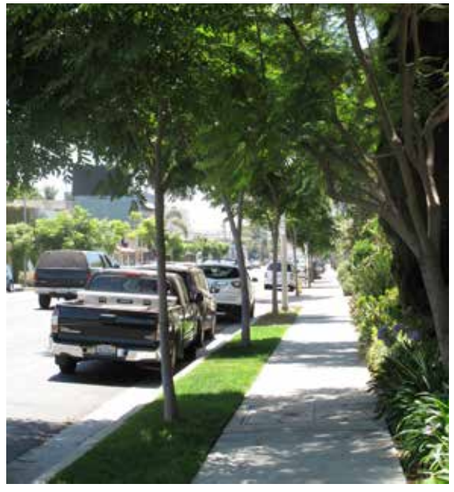
ROADWAY



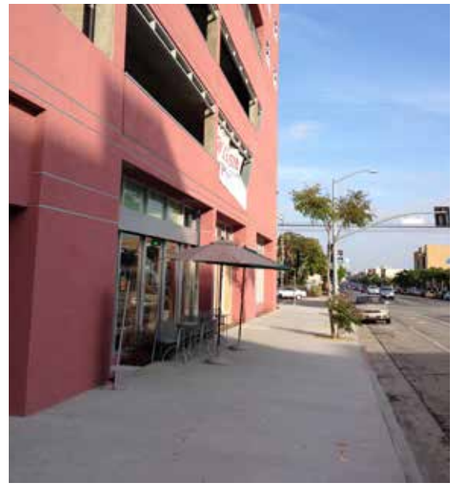
The 62-foot wide roadway accommodates one travel lane, a seven-foot wide bike lane and curbside parking in each direction with a two-way left-turn lane.

SIDEWALKS





Most existing sidewalks are nine feet wide. Those adjacent to commercial or mixed-use development have small tree wells (3.5 feet x 3.5 feet), while those adjacent to residential development have continuous parkways, which allow trees to grow much larger and healthier.



Sidewalks adjacent to recent development are 14 feet wide with the same small tree wells.

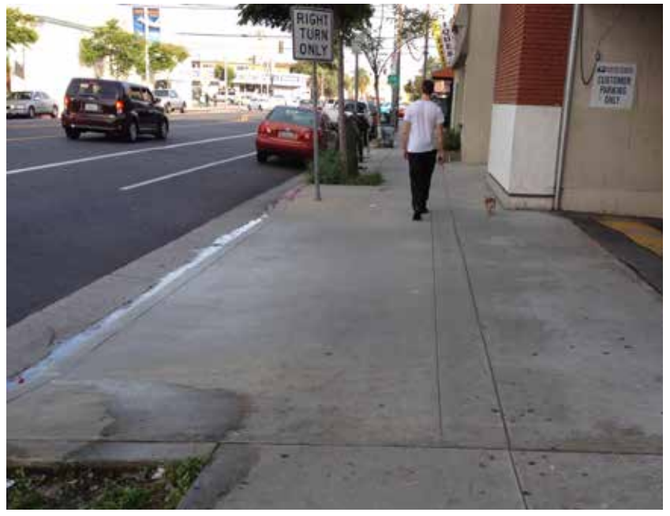
INTERSECTIONS AND CROSSWALKS



The intersection at Venice Blvd was recently restriped with Continental striping.



Narrow sidewalks without corner cuts create a challenge for ADA ramps.



Driveway with slope across walkway, which makes it more difficult to walk.

STREET TREES









Newly planted Chinese Flame street trees in 2009.



The Chinese Flame street trees four years later in 2013.



CHARACTER OF DEVELOPMENT



Motor Avenue has a mix of residential, commercial and mixed-use development, as well as institutional uses including the Post Office, Palms Elementary School, Fire Station 43, IMAN Foundation, Windsor Care Center and private schools.



Older one and two-story commercial and mixed-use buildings.



Older two- to four-story apartment buildings.



A more recent two-story office building with an attractively landscaped setback.





Very recently constructed five- to six-story residential projects. The building on the left has some ground floor space designed for commercial uses and two levels of visible parking. The building on the right is all residential with ground-level parking, of which half is lined with common areas with transparent glazing.

BUS STOPS







Some bus stops have signs and benches. Others have only signs

STREET LIGHTS AND FURNITURE



Street lights are standard LED cobras on concrete poles.



Trash receptacles are maintained by the Motor Ave. BID.

B.4 CENTINELA AVENUE EXISTING CONDITIONS

Livability Score

Centinela Avenue

Del Rey (Washington Blvd. - Jefferson Blvd.)



SEGMENT LENGTH

1.5 miles

LIVABILITY RATING (range: -10 to +12)

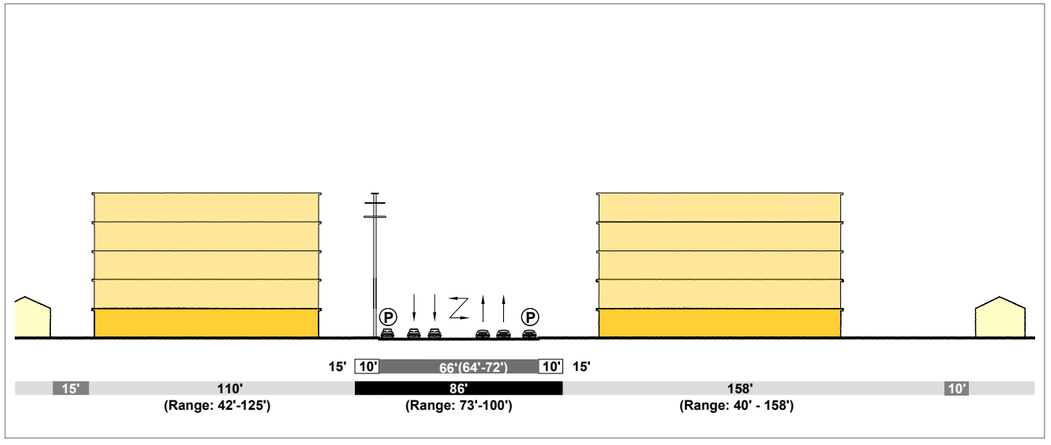
-2



Street view.



Sidewalk view.



TYPICAL CORRIDOR CROSS SECTION

Source: *Westside Mobility Plan Existing Conditions Report*, 2011

EXISTING CHARACTERISTICS

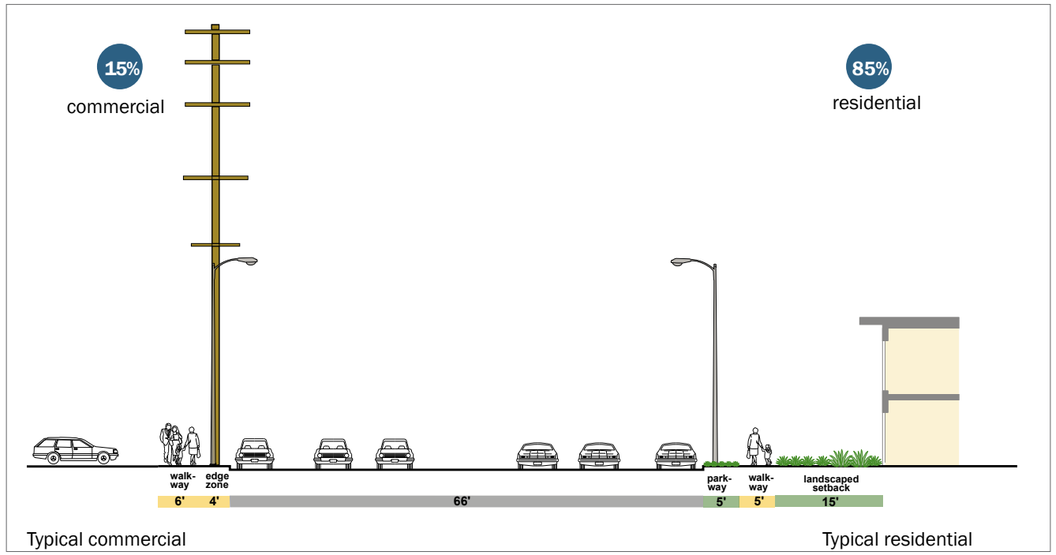
ELEMENT	TYPICAL	OTHER/RANGE	PTs.
Roadway			
width	66’	60 - 70’	-1
continuity of roadway width	some variations	--	0
marked crosswalk spacing	>600’	200 - 2,000	- 1
raised landscaped median	no	--	0
bike lanes	no	--	0
curbside parking	yes, full time	--	+1
Sidewalks			
width	10’	8’, 15’	- 1
parkway treatment	planted	paved	+1
street trees	>50’ o.c.	--	- 1
power poles	yes		- 1
street lights	cobra	--	0
Setbacks & Street Wall			
residential - setbacks	15’ planted	--	0
commercial - transparency/ entries along sidewalk	>25%	--	+1
parking at back of sidewalk	no		0

Primary Street Tree:
Brisbane Box

Other street trees:
London Plane
Crape Myrtle
Bottlebrush



Brisbane Box



TYPICAL STREET CROSS SECTION

0 20’



In the residential district between Washington Boulevard and Short Avenue the roadway is typically 66’ wide with two travel lanes and on-street parking in each direction and a two-way left-turn lane in the center.



In the commercial district between Short Avenue and Culver Boulevard the roadway is 66’ wide with two travel lanes and on-street parking in each direction and left-turn lanes in the center.

BICYCLES ON CENTINELA AVE.



Bicyclists often ride on the sidewalk.



In the mostly residential district between Culver Boulevard and the 90 Freeway the roadway is typically 60’ wide with two travel lanes and on-street parking in each direction.



In the mostly residential district between the 90 Freeway and Jefferson Boulevard the roadway is typically 84’ wide with two full-time travel lanes with on-street parking and three peak-period travel lanes in each direction.

INTERSECTIONS AND CROSSWALKS



With the exception of this marked crosswalk near Marina del Rey Middle School, marked crosswalks are limited to signalized intersection, which are spaced at 800 to 2,000 feet.

SIDEWALKS



Sidewalks adjacent to the storefronts just south of Washington Boulevard are approximately 8’ wide and are paved with small tree wells.



Sidewalks in the residential area between Washington Boulevard and Short Avenue were recently installed in conjunction with roadway widening. They are 10’ wide with 6’wide walkways and 4’ wide parkways. Previously the parkways were wider. Because it is residential, pedestrian volumes are low.



Sidewalks in the shopping district between Short Avenue and Culver Boulevard vary from five to 12 feet wide. In some locations, as in this location on the west side of the street, buildings are set back a few additional feet.



Narrow sidewalks on the east side of the street between Short Avenue and Culver Boulevard.

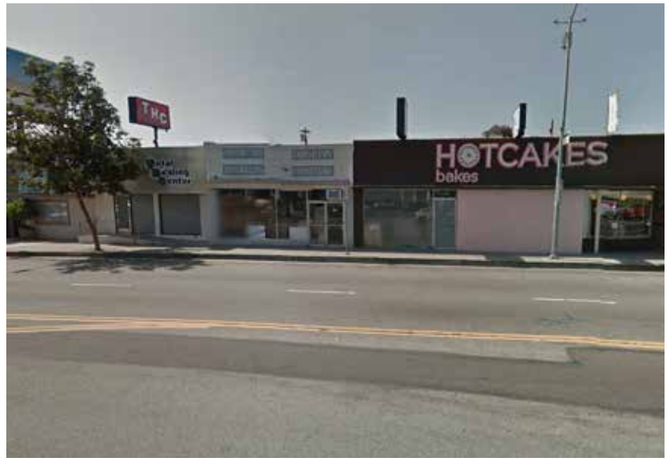


Sidewalks in the residential area between Culver Boulevard and the 90 Freeway are typically 15’ wide with 10’ parkways and 5’ walkways. Some walkways, like this one, are even narrower. Pedestrian volumes are low.



Most sidewalks between the 90 Freeway and Jefferson Boulevard are 15’ wide, but some, like this one in front of Playa Vista Elementary School have been narrowed.

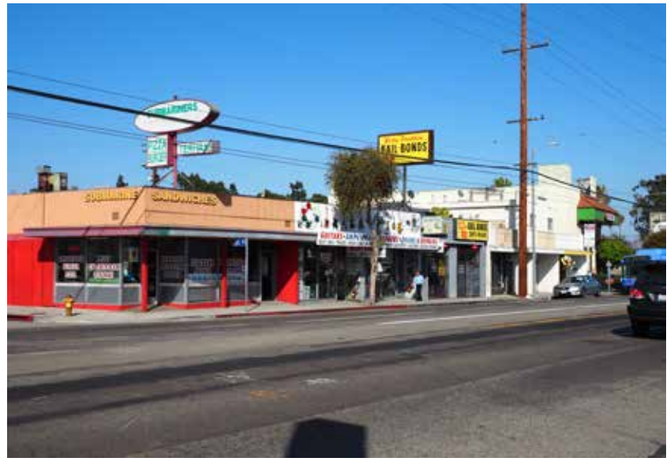
CHARACTER OF DEVELOPMENT



A block of commercial storefront buildings is located just south of Washington Boulevard on the west side of the street. There is a shopping center on the east side. I*mage Source: Google Earth*



The remainder of the street segment between Washington Boulevard and Short Avenue is residential, largely single-family.



Between Short Avenue and Culver Boulevard (three blocks) there are commercial storefront buildings on both sides of the street. They are occupied by restaurants and neighborhood shops and services.



There are a few commercial uses at Braddock Drive and the Police Station and DWP facility are located on the south side of Culver Boulevard.



The remainder of the street segment between Culver Boulevard and the 90 Freeway is a mix of multifamily and single family residential uses.



Between the 90 Freeway and Lucille Street are single-family homes. Between Lucille Street and Jefferson Boulevard are Playa Vista Elementary School and buildings occupied by offices and services. I*mage Source: Google Earth*

STREET TREES



Between Washington Boulevard and Culver Boulevard the primary street tree is the Brisbane Box (*Lophostemon confertus*), which was planted in conjunction with roadway widening.



The Brisbane Box (*Lophostemon confertus*) trees were planted in conjunction with roadway widening.

BUS STOPS



Most bus stops have signs and benches. A few have only signs.



Between Short Avenue and Culver Boulevard there are a few Bottlebrush trees (*Callistimom*).



There is a mix of trees south of the 90 Freeway, including Hong Kong Orchid, Crape Myrtle, and London Plane. I*mage Source: Google Earth*



There is a bus shelter on the southeast corner at Culver Boulevard.

B.5 VENICE BOULEVARD EXISTING CONDITIONS

Livability Score

Venice Boulevard

Inglewood Blvd. - Beethoven St.



SEGMENT LENGTH

0.8 miles

LIVABILITY RATING (range: -10 to +12)

+5



Street view east of Lincoln Boulevard.



Street view west of Lincoln Boulevard

EXISTING CHARACTERISTICS

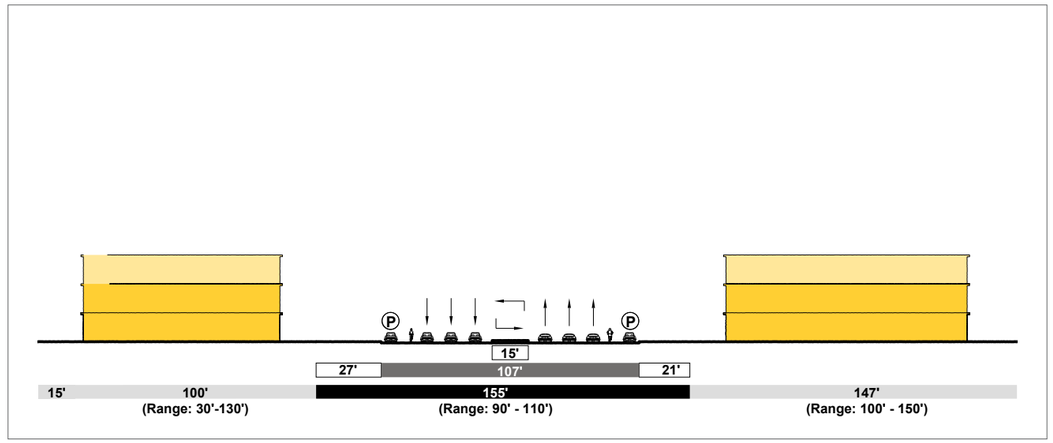
ELEMENT	TYPICAL	OTHER/RANGE	PTs.
Roadway			
width	108’	--	- 1
continuity of roadway width	infrequent variations		+1
marked crosswalk spacing	>600’	750 - 2,160’	- 1
raised landscaped median	yes	--	+1
bike lanes	yes	--	+1
curbside parking	yes - full time	--	+1
Sidewalks			
width	21’	8 - 26’	+1
parkway treatment	planted	--	+1
street trees	50’ o.c.		0
power poles	--	--	0
street lights	cobra	--	0
Setbacks & Street Wall			
residential - setbacks	15’ planted	--	0
commercial - transparency/ entries along sidewalk	>50%	--	+1
parking at back of sidewalk	no	--	0

Primary Street Tree:
Fern Pine

Median trees:
Bottlebrush
Tipu

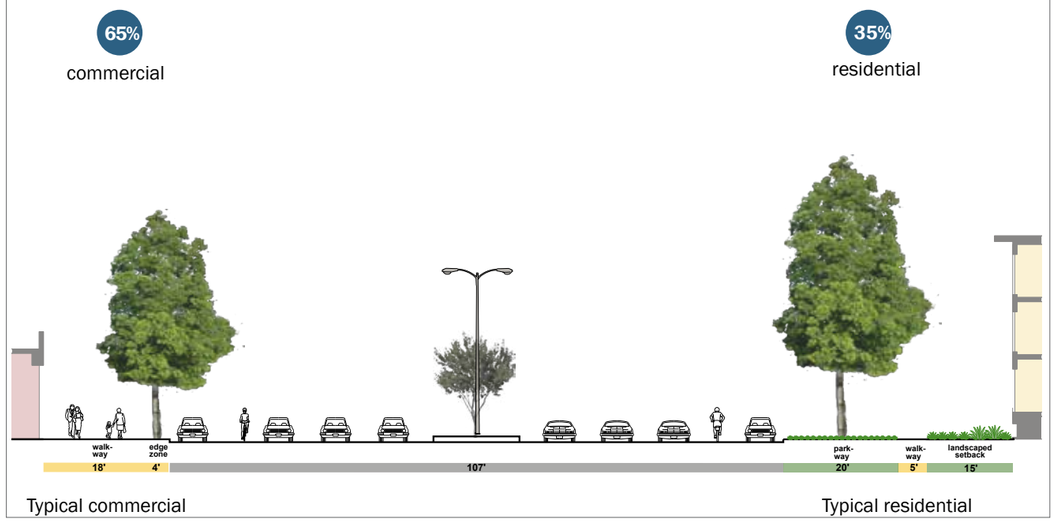


Fern Pine



TYPICAL CORRIDOR CROSS SECTION

0 60’



Typical commercial

Typical residential

TYPICAL STREET CROSS SECTION

0 25’

Source: *Westside Mobility Plan Existing Conditions Report*, 2011

ROADWAY INCLUDING MEDIANS

Beethoven Street to Centinela Avenue (67% Residential/33% Commercial)



The roadway cross section is consistent from Beethoven Street to Inglewood Boulevard: three lanes, a bike lane and on-street parking in each direction. This photo of the eastbound half of the street is looking west.



The raised median is 16 feet wide except at left-turn lanes west of Centinela Avenue.



In some locations west of Centinela Avenue, there is an elevation change of 12 to 22 inches between the two sides of the median, which is accommodated by a low retaining wall..

Centinela Avenue to Inglewood Boulevard (100% Commercial)



This photo is also of the eastbound half of the street looking west.



The raised median is also 16 feet wide except at left-turn lanes east of Centinela Avenue.



Adjacent to left-turn lanes the median narrows from 16 feet to about 6 feet. In some locations it is paved; in others it is not.

SIDEWALKS
Beethoven Street to Centinela Avenue



Sidewalks are 20 to 26 feet wide. Adjacent to residential uses, walkways are typically 4 feet wide and the remainder of the sidewalk is parkway.



In the commercial blocks, the entire sidewalk is paved, except at small tree wells, which are setback from the curb.



Some sidewalks are in very poor condition.

Centinela Avenue to Inglewood Boulevard



West of Centinela Avenue sidewalks are generally narrower, ranging from 8’ to 23’ wide. Buildings are typically setback a few feet even on narrow sidewalks, so there is room for a narrow row of tables.



Sidewalks are entirely paved, except at small tree wells.



CHARACTER OF DEVELOPMENT BETWEEN BEETHOVEN STREET AND CENTINELA AVENUE



A block of storefront buildings between Beethoven Street and Moore Street.



The predominant land use is multifamily residential. The majority of buildings are older with vehicular access from the alley in back, which allows for a continuous walkway and parkway with no vehicular conflicts.



Where there are driveways and parking in front, there are vehicular conflicts, breaks in the parkway, fewer trees and more concrete.

CHARACTER OF DEVELOPMENT BETWEEN CENTINELA AVENUE AND INGLEWOOD BOULEVARD



The majority of buildings in this commercial district are older storefront buildings. *Image source: Google Earth*



There are several strip malls and freestanding buildings with parking lots that front along the street and break up the street wall.



A few storefronts are newer. This one is adjacent to a freestanding building that has a landscaped setback and parking lot along the street.

STREET TREES IN PARKWAYS



Where there are wide parkways, the existing Fern Pines (*Afrocarpus gracilior*) are large and relatively healthy.



Where the turf is no longer irrigated, the trees in large parkways are surviving the drought.

STREET TREES IN TREE WELLS



Where there are small tree wells, the existing Fern Pines (*Afrocarpus gracilior*) are much smaller.







As these photos show, some already small tree wells have been filled with asphalt. Because the tree wells are so small, concrete is sometimes uplifted.

TREES IN MEDIANS

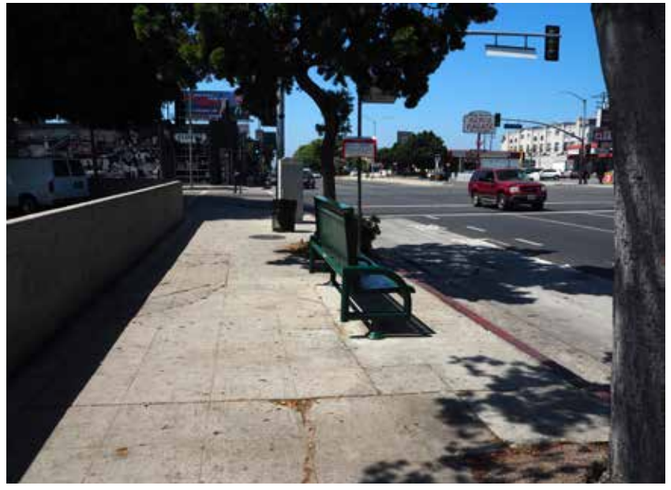


West of Centinela Avenue there is a mix of trees in the median, including Bottle Brush Trees and Eucalyptus.



Tipu trees (*Tipuana tipu*) have been planted in the medians east of Centinela Avenue.

BUS STOPS



Bus stops include signs and benches. Some benches are set a few feet back from the curb.



Other benches are set back at the back of the sidewalk.



Some bus stops are shaded by street trees. Others are not.

STREET LIGHTS AND FURNITURE



Street lights to illuminate the roadway are located in the median, except at intersections where they are on the sidewalks.



Standard City bicycle racks are located throughout the area.

BICYCLISTS ON VENICE BLVD.



While there are standard bike lanes on Venice Boulevard, some riders still feel safer riding on the sidewalks.

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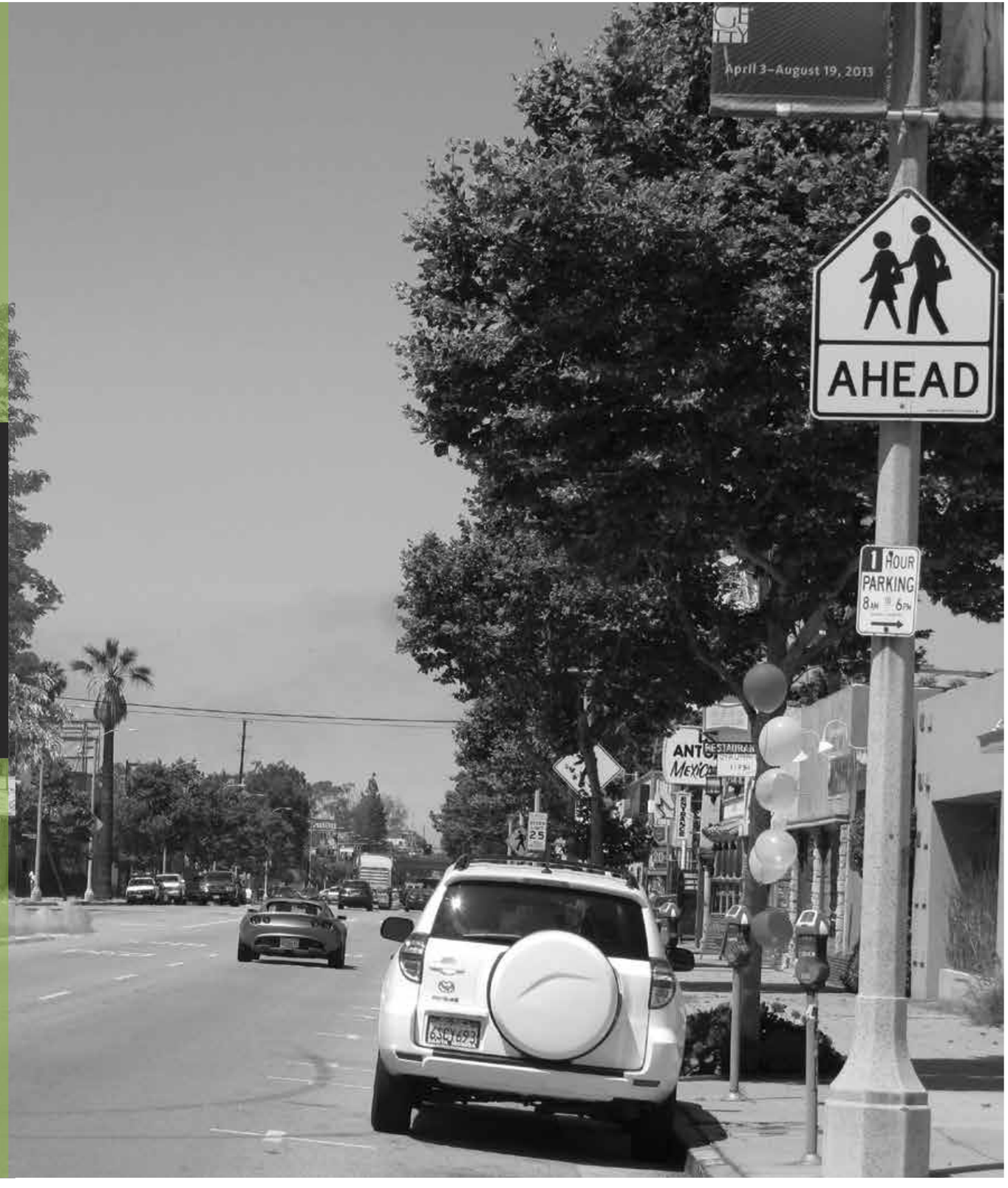
Paper and cover made from recycled content



Clover Road Cut Through Traffic Study

College Township, Centre County, Pennsylvania

March 28, 2017



Clover Road – looking towards Elmwood Street

Submitted By:
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Phone: 814.231.4812

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APPENDICES

Appendix A ..... License Plate Count Data
Appendix B ..... Alternative Concept Plans

EXECUTIVE SUMMARY

General Overview of the Study

- Purpose of the study was to address residents' concerns about traffic which was perceived to be using Clover Road as a short-cut from College Avenue to Elmwood Street and vice versa. College Township requested an investigation of appropriate traffic calming measures to mitigate the cut-through traffic.
- According to residents, the "cut-through" traffic has resulted in increased volumes, increased speeds, and reduced safety of a residential street. Clover Road can be used as a shortcut to and from the Mt. Nittany Expressway via College Ave. The alternative Route is to go out of the way and through a traffic signal.
- Volume data, an origin-destination count, and speed data was collected to verify the presence of cut-through traffic. The license plate origin-destination (O-D) study was performed in order to track vehicles at the intersections, to determine which vehicles traverse the entire length of Clover Road.

List of Study Intersections

The following intersections were analyzed for the study:

- E. College Avenue (SR 0026) at Clover Road (T-588)
- Elmwood St (SR 3010) at Clover Road (T-588)

Possible Mitigative Measures

Several options exist which are feasible mitigations to cut-through traffic. The alternatives primarily fall into the categories of permanent access restriction, temporary (gated) access restriction, and traffic calming along Clover Road. The options are described in further detail under the Suggested Mitigations section of this report. A list is provided in **Table 5** which describes the effectiveness and impact of each alternative. Table 5 is included at the end of the report.

Conclusions

The counted ADT along Clover Road is 414 vehicles per day, with 329 vehicles which were counted during the (8-hour) data collection period for license plate data tracking. Of the 329 vehicles that were manually counted, 141 (42%) were observed to be cut-through trips. Speeding along Clover Road was not determined to be a concern; however, several vehicles were observed to turn from Elmwood Street onto Clover Road at a higher than normal speed, and several vehicles were observed to not fully stop at the Elmwood Street stop sign.

It appears the most effective treatment for prohibiting the cut through with minimal impact to emergency response times, but impact to resident's circulation patterns would be an automatic gate, preferably near the E. College Avenue intersection. Closure of the E. College Avenue or Elmwood Street intersection would also be highly effective; however, this would also impact resident's circulation patterns and emergency response time may be slowed given the neighborhood would be limited to one access point. The alternative with a high potential of limiting cut through with the least impact to residents would be a combination of diverters at the Pikeview Road/ Clover Road and Pikeview Road/ Hillview Road intersections.

If desired by College Township and the residents of Klinger Heights and approved by PennDOT (if applicable by Right-of-Way encroachment), any combination of the suggested mitigations could be implemented along Clover Road.

CLOVER ROAD CUT-THROUGH AND TRAFFIC CALMING STUDY
College Township, Centre County, Pennsylvania

Trans Associates (TA) has completed a traffic engineering study to determine the degree to which vehicular traffic is using a residential street as a shortcut around the intended route which is designed to carry the traffic, and to recommend appropriate mitigations to abate the cut-through traffic. The study was performed along Clover Road, and at the intersections with Elmwood Street and College Avenue within College Township, Centre County, Pennsylvania. See **Figure 1** for a map and an aerial photo of the subject street and intersections.

The following sections of this report contain a project description, data collection, site traffic generation and distribution, projected traffic volumes, analysis, and conclusions and recommendations.

PROJECT DESCRIPTION/DATA COLLECTION/EXISTING ROADWAY DESCRIPTION

Project Description

The purpose of this project is to determine the volume of traffic which is using Clover Road as a cut-through street, and to determine what percentage this volume is compared to the total trip volume along Clover Road. Pending Township acceptance of the analysis, recommend mitigative measures could be implemented, which would reduce or eliminate the amount of cut-through traffic along Clover Road.

Data Collection

TA performed a field reconnaissance of Clover Road along its length and at its terminating intersections with E. College Avenue and with Elmwood Street. An ATR was installed near the middle of the block, and field technicians were posted at the study intersections to tabulate the last 4 digits of vehicle license plates as they turned to or from Clover Road. The technician marked the license plate data as well as a codified number indicating what turn movement was made. If a vehicle was a school bus, it was marked as "SB-XXX" where XXX represented the assigned bus number. Furthermore, indications were made if a vehicle was apparently speeding, or if it failed to stop at the stop sign. The tabulations were broken into 15-minute intervals, as a means of determining when peaks occurred.

The ATR was operational from February 15-22, 2017, and the license plate counts were performed from 7-9 am, 11am-1pm, and 2pm-6pm on February 16, 2017.

The peak hours were based upon volumes of cut-through traffic; as opposed to the traditional method of using the highest intersection volume hour. The peak hours were observed to begin at 7:45 AM for the morning, 12:00 PM for midday, and at 4:15 PM for the evening. The tabulated license plate count data can be found in **Appendix A**. The collected cut-through volumes are presented in **Figures 2-9**.

Existing Roadway Description

Clover Road is a township-owned residential street which runs from E. College Avenue to Elmwood St. It is approximately ¼ mile long, and approximately 17' in paved width. It is designed to provide access from the houses along the street to the larger collector roads and would be classified as a

Suburban Local Street. It is not meant to be a heavily travelled street or to be used as a shortcut for a larger trip.

CUT-TRHOUGH DATA ANALYSIS

Traffic Volumes

Previous claims which were based on data from a movable speed detection sign which was placed along Clover Road in 2016 stated that as much as 700 vehicles per day traveled along the road. The ATR data which was collected in February 2017 indicates that the ADT for Clover Road is approximately 414 vehicles per day; which is substantially lower than the previous estimate.

Throughout the 8 hours of O-D data collection, 229 vehicles were observed to exit or access Clover Road at the College Avenue intersection, 241 vehicles were observed to exit/access at the Elmwood St intersection, and 141 vehicles were observed to traverse both intersections. A duplicate license plate number indicates that a vehicle cut through Clover Road and passed through both study intersections. Thus, 329 vehicles were counted in total (229+241-141). Based on this data, the average cut-through traffic for the hours studied is 141/329 (42.9%). The data was further broken down into peak hour volumes, and the data was also broken down my movement type (described in the next section). The peak hour volumes are summarized below:

- 7:45 AM peak hour – 29 duplicates, 44 vehicles total (66% cut through)
- 12:00 PM peak hour – 14 duplicates, 36 vehicles total (39%) cut through)
- 4:15 PM peak hour – 30 duplicates, 66 vehicles total (45%) cut through

Some of the cut through volumes which were observed included delivery/mail trucks as well as school buses. In addition to cut through traffic, there were instances observed where a resident accessed the street from one end, stopped home, then left from the other end. Trips of this nature were not counted as cut-through trips. Furthermore, there were several unique vehicles which were counted multiple times at each of the intersections. It is presumed that these vehicles were making several trips to either run errands or commute. If a unique vehicle traversed an intersection more than once, it was still counted as an additional vehicle, despite being the same one.

Movement Types

The movements at each of the study intersections were codified as follows:

E. College Ave Intersection		Elmwood St. Intersection	
• Northbound left from Clover Rd	– 1	Westbound right onto Clover Rd	– 1
• Northbound right from Clover Rd	– 2	Southbound left from Clover Rd	– 2
• Eastbound right onto Clover Rd	– 3	Eastbound left onto Clover Rd	– 3
• Westbound left onto Clover Rd	– 4	Southbound right from Clover Rd	– 4
• Northbound thru from Clover Rd	– N		
• Southbound thru onto Clover Rd	– S		

This codification system allowed quick and simple data entry in the field, and allowed the data to be processed to look for patterns. Since the volume and portion of cut-through traffic was desired, a further breakdown of what type of cut-through movements was deemed appropriate. The data was investigated to see that trip paths were commonly being made among vehicles which were traversing Clover Road.

There were some license plate matches which appear to be "impossible" because the same vehicle exited or entered both intersections in the same interval. Upon further inspection of the data, it is

evident that such vehicles left, looped around, and came back. If a vehicle did so, it would be counted three (3) times, but one of those counts would not have a match and would thus be discarded. By discarding the count from the cut-through table, the vehicle appears to make an impossible movement because one of the counts is missing. These such movements could be ignored, or treated as a resident passing by. It does not indicate an error in data collection.

The results of the analysis suggest that the most common cut-through movement is vehicles coming in from eastbound on E. College Avenue, turning right onto Clover Road, then turning left to continue East on Elmwood Street. This pattern is likely due to drivers exiting from Mt. Nittany Expressway that are destined to points east along Elmwood Street and who wish to cut off the triangle formed by driving out to the Elmwood signal on E. College Avenue. The second most common cut-through movement was vehicles coming in from westbound E. College Avenue, turning left onto Clover Road, then turning left to backtrack east onto Elmwood St. This pattern is likely due to vehicles coming in from the Mall area who wish to cut off the triangle formed by driving out to the Elmwood signal on E. College Avenue. This shortcut saves approximately 0.35 miles and typically 1-2 minutes of travel time. Cut-through is most prevalent during the AM and PM peak hours, during which 42% of the total cut-through observations occurred.

A summary of the cut-through data is shown in the tables below. The rows indicate the corresponding College Avenue movement, and the columns indicate the corresponding Elmwood Street movement (movements are described in the beginning of this section of the report). The number shown at the intersection of any particular column and row is the total number of vehicles observed which started with one movement and ended with the other movement during the time period indicated on the table. The data is also summarized in **Figures 2 – 9**, where the odd numbered figures show traffic coming from Elmwood Street, and even numbered figures show traffic coming from E. College Avenue. The width of the movement arrows is proportionate to the volume of the movements; thicker arrows indicate more frequent movements.

Table 1

All Peaks	Elmwood Movement				
College Ave Movement	Right In	Left Out	Left In	Right Out	Total
Left Out	25	0	2	0	27
Right out	14	0	1	0	15
Right In	0	53	0	10	63
Left in	0	23	0	2	25
Thru Out	3	3	1	0	7
Thru In	2	2	0	0	4
Total	44	81	4	12	141

Table 2

7:45 AM	Elmwood Movement				
College Ave Movement	Right In	Left Out	Left In	Right Out	Total
Left out	3	0	0	0	3
Right Out	1	0	0	0	1
Right In	0	11	0	3	14
Left in	0	6	0	1	7
Thru Out	3	0	0	0	3
Thru In	0	1	0	0	1
Total	7	18	0	4	29

Table 3

12:00 PM	Elmwood Movement				
College Ave Movement	Right In	Left Out	Left In	Right Out	Total
Left out	2	0	0	0	2
Right Out	3	0	0	0	3
Right In	0	3	0	0	3
Left in	0	3	0	0	3
Thru Out	0	2	0	0	2
Thru In	1	0	0	0	1
Total	6	8	0	0	14

Table 4

4:15 PM	Elmwood Movement				
College Ave Movement	Right In	Left Out	Left In	Right Out	Total
Left out	5	0	1	0	6
Right Out	2	0	1	0	3
Right In	0	14	0	1	15
Left in	0	6	0	0	6
Thru Out	0	0	0	0	0
Thru In	0	0	0	0	0
Total	7	20	2	1	30

SPEED DATA ANALYSIS

In addition to volume data, the ATR recorded speed data for vehicles traveling along Clover Road. Since the ATR was placed in the middle of the two study intersections, the speeds collected at the ATR should be representative of the running speeds along Clover Road.

The speed data indicates that the 85th percentile speeds along Clover Road are 32 mph traveling northbound, and 30 mph traveling southbound. Approximately 50% of vehicles were traveling above the 25-mph speed limit, albeit by a slight margin. The 85th percentile speeds are within 10 mph of the posted speed limit, and are not deemed to be hazardous or problematic.

As mentioned in the data summary section of this report, the technicians who recorded the license plate data also denoted vehicles which either did not fully stop at the stop sign, or who made a high-speed turn onto Clover Road. No vehicles were observed to roll/run the stop sign or turn abnormally fast at the E. College Avenue intersection. Of the 241 vehicles that were counted at the Elmwood Street intersection during the entire data collection period, 22 (9%) were observed to make high speed turns onto Clover Road, and 4 vehicles (2%) were observed to fail to fully stop at the stop sign. The high-speed turns were made possible by the intersection geometry and the wide turn radius formed by the approach for Hillview Avenue.

OTHER CONSIDERATIONS

It is important to recognize and consider other factors besides the volume of cut-through traffic when evaluating possible mitigations to cut-through traffic. Such considerations include the vehicle types along the route, user safety, impacts of diverted traffic, user approval, and right-of-way. These considerations are described below.

In addition to passenger cars, mail and parcel delivery trucks (UPS, USPS, etc.) utilize Clover Road to drop off packages to residents and continue on their way. School buses were also observed along Clover Road, both to drop off/pick up students and to traverse the street as part of a longer route. If movement restrictions are imposed on Clover Road, provisions should be made to accommodate new stop locations, routing, or turn-around movements for school buses and delivery vehicles.

While emergency responders were not observed along Clover Road, nor are they expected to regularly use Clover Road, access to Clover Road is important so that they may quickly and safely address calls in the neighborhood, or use Clover Road to reduce travel time along their route that could use Clover Road as a short-cut.

Vehicles which are restricted from using Clover Road as a cut-through street, or are restricted from accessing one of the intersections will need to be diverted to another intersection (most likely to the Elmwood Street at E. College Avenue signal or along Pike Street). This means that intersection volumes and delays may increase. Furthermore, residents which are restricted from using one of the access points will be added to the traffic to access the other intersection. Trip lengths and travel time may increase as a result of the added distance and time required to make a U-turn.

Another factor to consider is user approval of any recommended mitigations. While some residents may strongly desire a mitigation, other residents may find it as a major inconvenience to their commute. Residents should be made aware of the potential impacts and unforeseen consequences of any mitigation to cut-through traffic.

Property boundaries would also need to be considered for any reconstruction along Clover Road. Elmwood Street and E. College Avenue are both PennDOT-owned state routes. Thus, PennDOT

approval would need to be granted for any work within their right-of-way. Easements would also be needed for any construction which encroaches onto a resident's property.

ALTERNATIVE TRAFFIC MITIGATIONS INVESTIGATION

There are several feasible mitigations which could be implemented in order to reduce cut-through traffic along Clover Road. Some suggestions are presented in this section of the report.

Permanent Access Restriction at E. College Avenue

Since a majority of the cut-through movements were observed to originate from E. College Avenue, an island and turn restrictions could be implemented at the Clover Road approach, which blocks all entering movements from E. College Avenue with the exception of WB lefts, and all exiting movements. An example would be a bulb-out or curb peninsula which narrows the Clover Road width, with supplementary turn restriction signs placed along E. College Avenue. Such a restriction could remove 95% of the cut-through traffic, while allowing residents to access from E. College Avenue. It would also allow emergency responders to have a secondary access point to the neighborhood. A sample concept can be found in **Figure 1A** in **Appendix B**. An alternative restriction option is to allow only right turns from Clover Road onto W. College Avenue. Such a restriction could remove 89% of cut-through traffic. A sample concept can be found in **Figure 1B** in **Appendix B**.

Another option is to have a full restriction, as implemented along Burrowes Road at Hillcrest Avenue within State College Borough. Such a restriction entails forming a curb and possibly a sidewalk which crosses Clover Road along the shoulder of E. College Avenue. This type of restriction would completely eliminate cut through traffic, but it would also prohibit residents, school buses, and emergency response vehicles from accessing Clover Road from E. College Avenue. In consideration of a permanent access restriction, a turnaround area would need to be designed and constructed. A sample concept can be found in **Figure 2** in **Appendix B**.

Permanent Access Restriction at Elmwood Street

Similar to the recommended restrictions at the E. College Avenue intersection, these measures could be implemented at the intersection with Elmwood Street. An entering only restriction (removing 62% of trips) would be similar in effect to one at E. College Avenue, but there may be a higher inclination for drivers attempting to circumvent the restriction given the lower volumes on Elmwood Street. A "no outlet" sign should be installed at the E. College Avenue intersection, to inform drivers of the restriction. However, this does not remove the traffic using Clover Road as a cut-through travelling from Elmwood Street to E. College Avenue. Additionally, a second expansion of the vegetated area adjacent to Hillview Avenue could restrict entering movements. Thereby, attempting to make the streets one-way directional at the intersection. A sample concept can be found in **Figure 3** in **Appendix B**.

An exiting only cut-through restriction would be less effective (removing 34% of trips) than an entering only restriction, and it poses geometric constraints due to the layout of the intersection and the leg for Hillview Avenue.

A full access restriction would eliminate 100% of cut-through traffic, but it would also restrict access for residents to the intersection. As with the E. College Avenue restriction, "no outlet" warning signs should be placed at the E. College Avenue intersection to inform motorists that the cut-through is no-longer possible. If the intersection was eliminated, the most logical reconfiguration would be to tie Clover Road into Hillcrest Avenue, to form a loop that's isolated from Elmwood Street by a grass

buffer. This option would form a continuous street; thus, U-turns would be unnecessary. A sample concept can be found in **Figure 4** in **Appendix B**.

The intersection could also be reconfigured to align Hillview Avenue at a right angle to Elmwood Street. To accomplish this, a complete new intersection alignment of Hillview Avenue Clover Road and Elmwood Street would need to be designed and constructed. Additionally, a restriction at this location will likely increase the traffic at the intersection of Clover Road and E. College Avenue. In consideration of a permanent access restriction, a turnaround area would need to be designed and constructed.

Traffic Diverters at Pikeview Road and Clover Road

An alternative option to consider would be installation of curbed diverters at the intersection of Pikeview Road and Clover Road. Diverters could also be installed at Pikeview Road and Hillview Avenue or a series or singular traffic calming measure along Pikeview Road or Hillview Avenue to deter cut-through traffic. The diverters would be designed to prevent traffic from being able to travel from Elmwood Street to E. College Avenue. This option would eliminate the need to reconfigure the intersections, while potentially eliminating cut-through traffic. The curbed diverter islands could be made mountable to allow for emergency responders; however, school buses would need to find alternate routes. Sample concepts can be found in **Figure 5A and Figure 5B** in **Appendix B**.

Gated Accesses

A functional alternative to permanent barriers such as curbs would be to install a gate along Clover Road. A gate's primary advantage is that it would eliminate 100% of the cut-through traffic, while providing as-needed temporary access to emergency response vehicles.

A gate could theoretically be placed at any point along Clover Road – at either intersection or midblock. Most logically, the gate would be installed at the intersection of E. College Avenue and Clover Road. The intersection of Clover Road and Elmwood Street is too wide, unless it was redesigned, and anywhere midblock along Clover would create turnaround concerns and would most likely need to be installed on a resident's private property. In consideration of a gated access, a turnaround area would need to be designed and constructed.

Several gate options exist, but they can primarily be summarized as automatic and manual. An automatic gate can be unlocked and opened via a remote control; whereas a manual gate requires a person to physically unlock it and swing it open. An automatic gate would be more expensive to install and maintain, but it would be quicker and easier to operate. Emergency response vehicles would need to be outfitted with emitters. Consideration should be made for any vehicles which need to stop for long enough to actuate the gate. Appropriate signage should be placed to forewarn motorists of the gated restriction. Sample concepts can be found in **Figure 6 and Figure 7** in **Appendix B**.

Traffic Calming

An alternative to direct restriction of access to Clover Road, traffic calming measures could be implemented which would make traversing Clover Road as a shortcut undesirable. The logic behind traffic calming is to reduce speeds and remove the time-saving benefit of using Clover Road instead of other routes. Some calming measures are outlined below.

- Curb bulb-outs could be installed along Clover Road on alternating sides, to form a chicane which would force drivers to maneuver around them at a low speed. The Bulb-outs would

need to be placed so that they do not block access to any resident driveways. A sample concept can be found in **Figure 8** in **Appendix B**.

- Speed humps, speed lumps, or speed pillows could be placed along Clover Road, which would reduce driver speed. Usage of speed lumps or speed pillows would allow emergency responders to drive around them. A sample concept can be found in **Figure 9** in **Appendix B**. The figure shows an illustration of a speed hump, a pair of speed pillows, and a set of speed lumps. The traffic calming techniques should be used consistently, i.e. the design should be all speed humps or pillows or lumps not a combination of the three.
- Small circle at Pikeview Road and Clover Road intersection. A sample concept can be found in **Figure 10** in **Appendix B**.
- Zig-Zag or "Shark's Teeth" (see photos on to right) pavement markings could be placed along the length of Clover Road, which makes the road visually appear to move faster to motorists as they drive along it, causing them to slow down to a comfortable speed. These could be used in conjunction with other alternatives.



Photo 1: Zig-Zag Pavement Markings



Photo 2: Sharks Teeth Pavement Markings

Usage of traffic calming measures would maintain access to Clover Road for residents, delivery vehicles, and school buses, and it should reduce speeds and cut-through volumes along Clover Road if implemented properly. These implementations would not eliminate the cut-through traffic, but may deter some motorists from using it as such.

CONCLUSION AND RECOMMENDATIONS

The data collected and the results of the analyses performed along Clover Road indicates that cut-through traffic accounts for 42.9% of the total traffic along Clover Road during the data collection periods, which occurred during the busiest 8 hours of the day. Given the speed data collected, a speeding problem was not detected along Clover Road, however there were several instances of rolling stops and fast turns observed at the Elmwood Street intersection. The bulk of the cut-through traffic occurred during the AM (7:45-8:45) and PM (4:15-5:15) peak hours, and the most frequent movements were trips entering from E. College Avenue to points east (turning left out) along Elmwood Street.

Several mitigation options were presented in this report, ranging from permanent access restriction, to gated restriction, to traffic calming. Any alteration made to Clover Road will have to consider user impacts, effects of diverted traffic, user safety, property limits, and PennDOT Right-of-Way. TA would like to offer College Township and the residents of Klinger Heights an opportunity to discuss and choose amongst the presented alternatives a desired mitigation prior to moving forward with any design or cost estimation work.

It appears the most effective treatment for prohibiting the cut through with minimal impact to emergency response times, but impact to resident's circulation patterns would be an automatic gate, preferably near the E. College Avenue intersection. Closure of the E. College Avenue or Elmwood Street intersection would also be highly effective, however, this would also impact resident's circulation patterns and emergency response time may be slowed given the neighborhood would be limited to one access point. The alternative with a high potential of limiting cut through with the

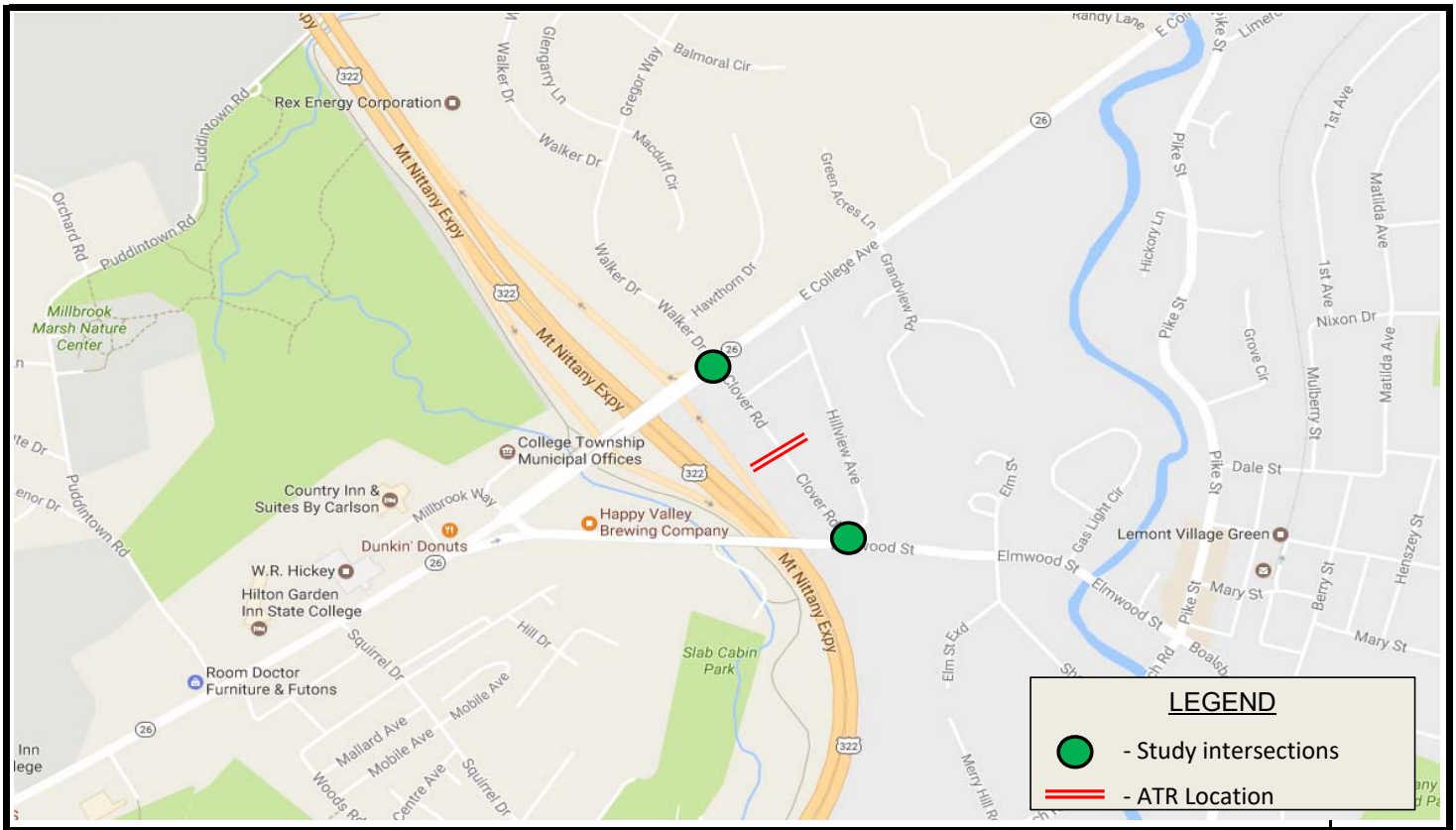
least impact to residents would be a combination of diverters at the Pikeview Road/ Clover Road and Pikeview Road/ Hillview Road intersections.

If desired by College Township and the residents of Klinger Heights and approved by PennDOT (if applicable by Right-of-Way encroachment), any combination of the suggested mitigations could be implemented along Clover Road.

This concludes the investigation of the cut-through traffic along Clover Road within College Township, Centre County, PA.

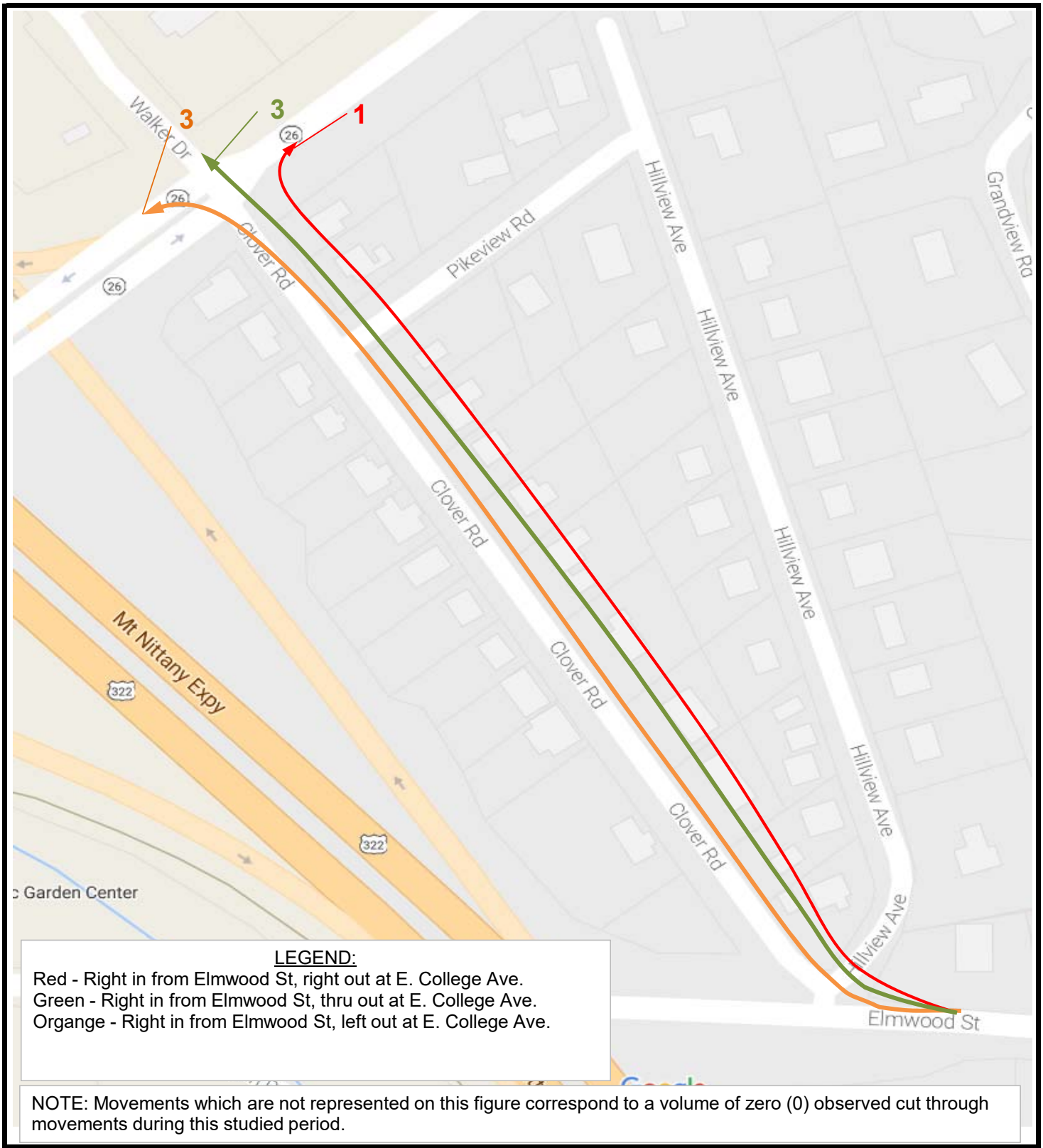
Y:\Active Projects\Colle00 - College Township\17020 - Clover Road Traffic Calming\Report\Report of Findings - V.3.docx

FIGURES





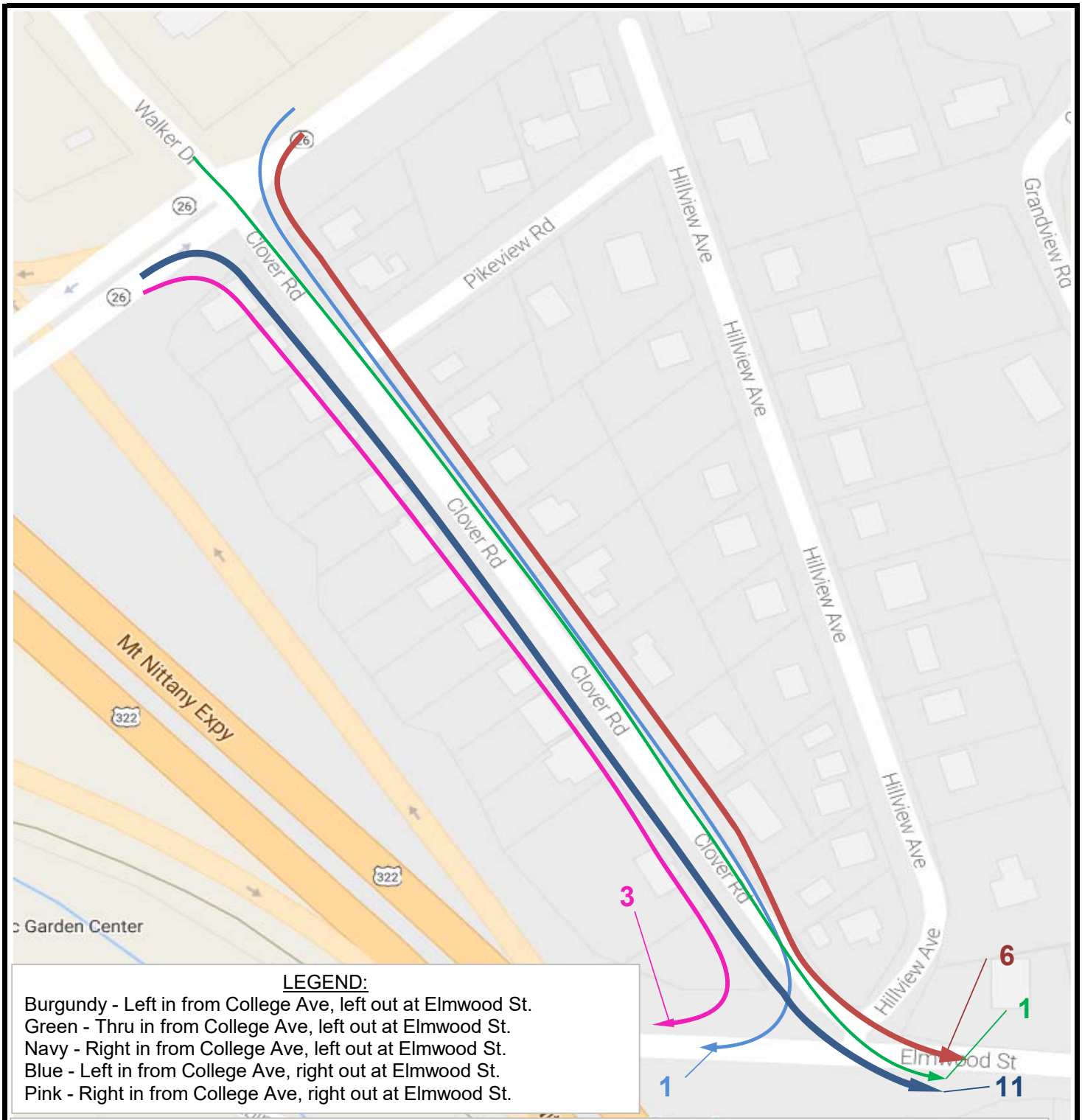
	Poject:		**Figure #**
	Clover Road Traffic Calming Study	Trans ASSOCIATES	1
	Figure Title:		Date:
SCALE: NTS	Location Map		2/24/2017



LEGEND:
Red - Right in from Elmwood St, right out at E. College Ave.
Green - Right in from Elmwood St, thru out at E. College Ave.
Organge - Right in from Elmwood St, left out at E. College Ave.

NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

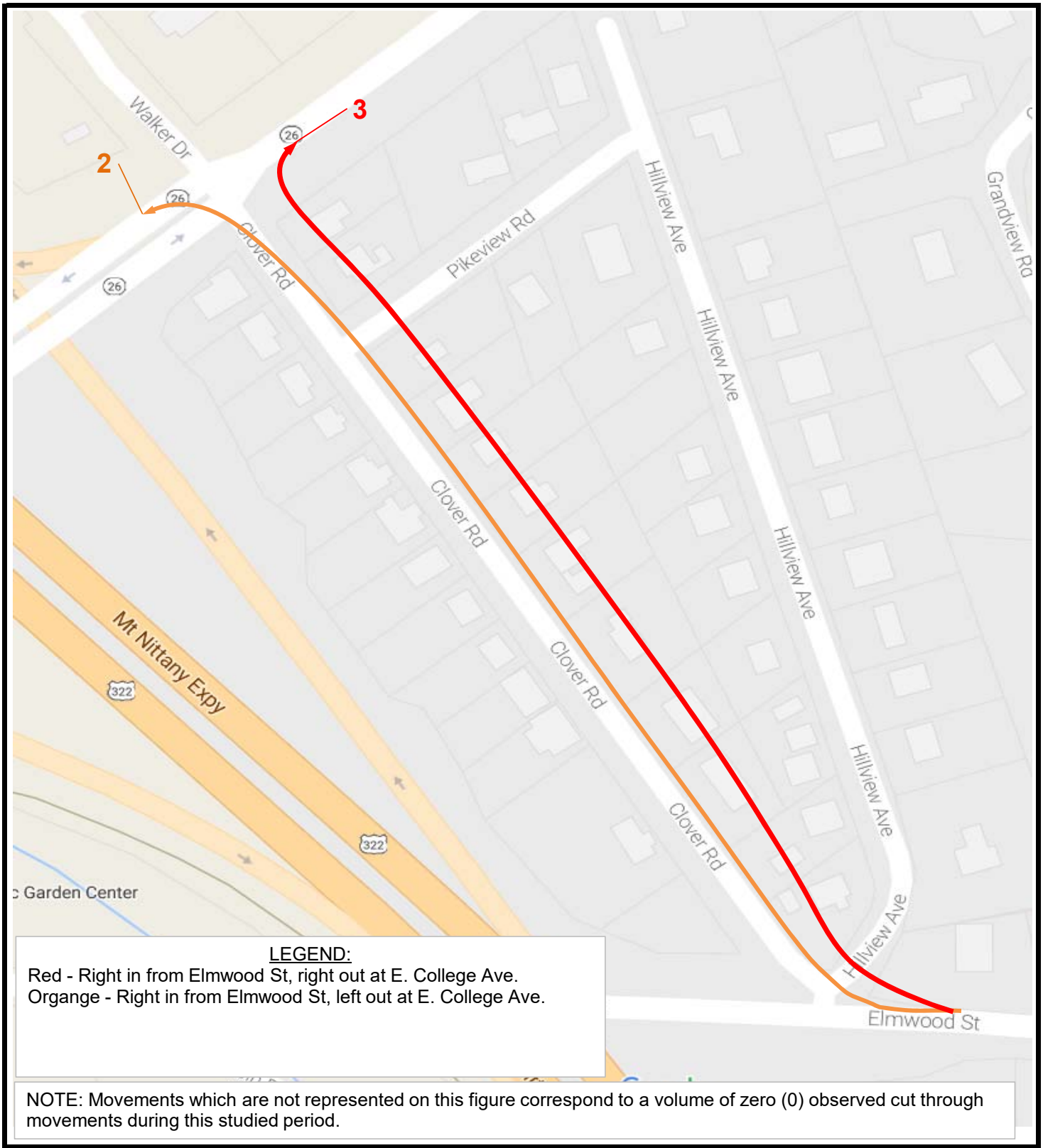
	Poject:		**Figure #**
	Clover Road Traffic Calming Study	Trans ASSOCIATES	**2**
	Figure Title:		Date:
SCALE: NTS	AM Peak Hour Cut-Through from Elmwood St.		2/24/2017



LEGEND:
Burgundy - Left in from College Ave, left out at Elmwood St.
Green - Thru in from College Ave, left out at Elmwood St.
Navy - Right in from College Ave, left out at Elmwood St.
Blue - Left in from College Ave, right out at Elmwood St.
Pink - Right in from College Ave, right out at Elmwood St.

NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

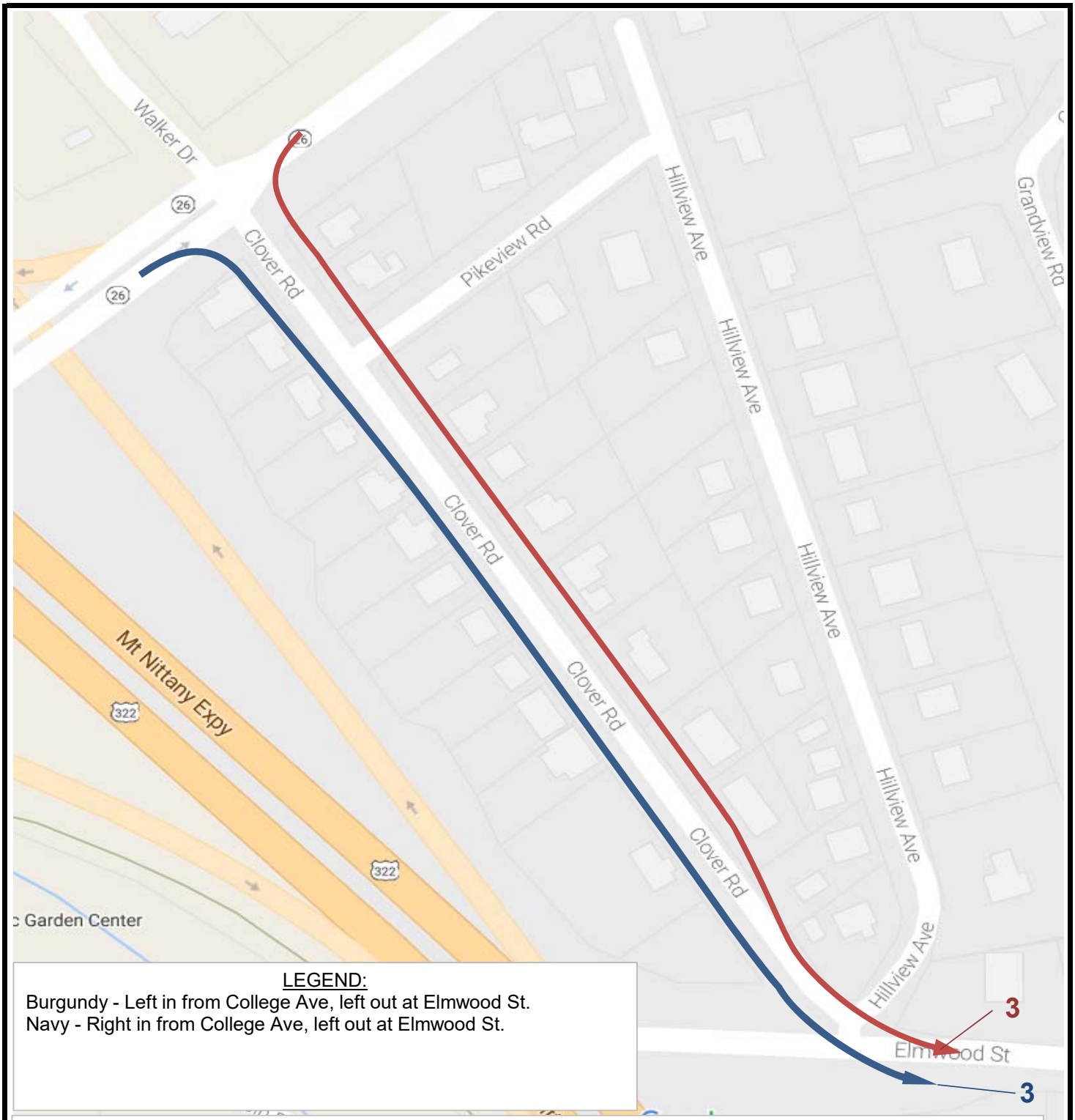
SCALE: NTS	Poject: Clover Road Traffic Calming Study Figure Title: AM Peak Hour Cut-Through from College Ave	Trans ASSOCIATES	Figure # 3 Date: 2/24/2017



LEGEND:
Red - Right in from Elmwood St, right out at E. College Ave.
Organge - Right in from Elmwood St, left out at E. College Ave.

NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

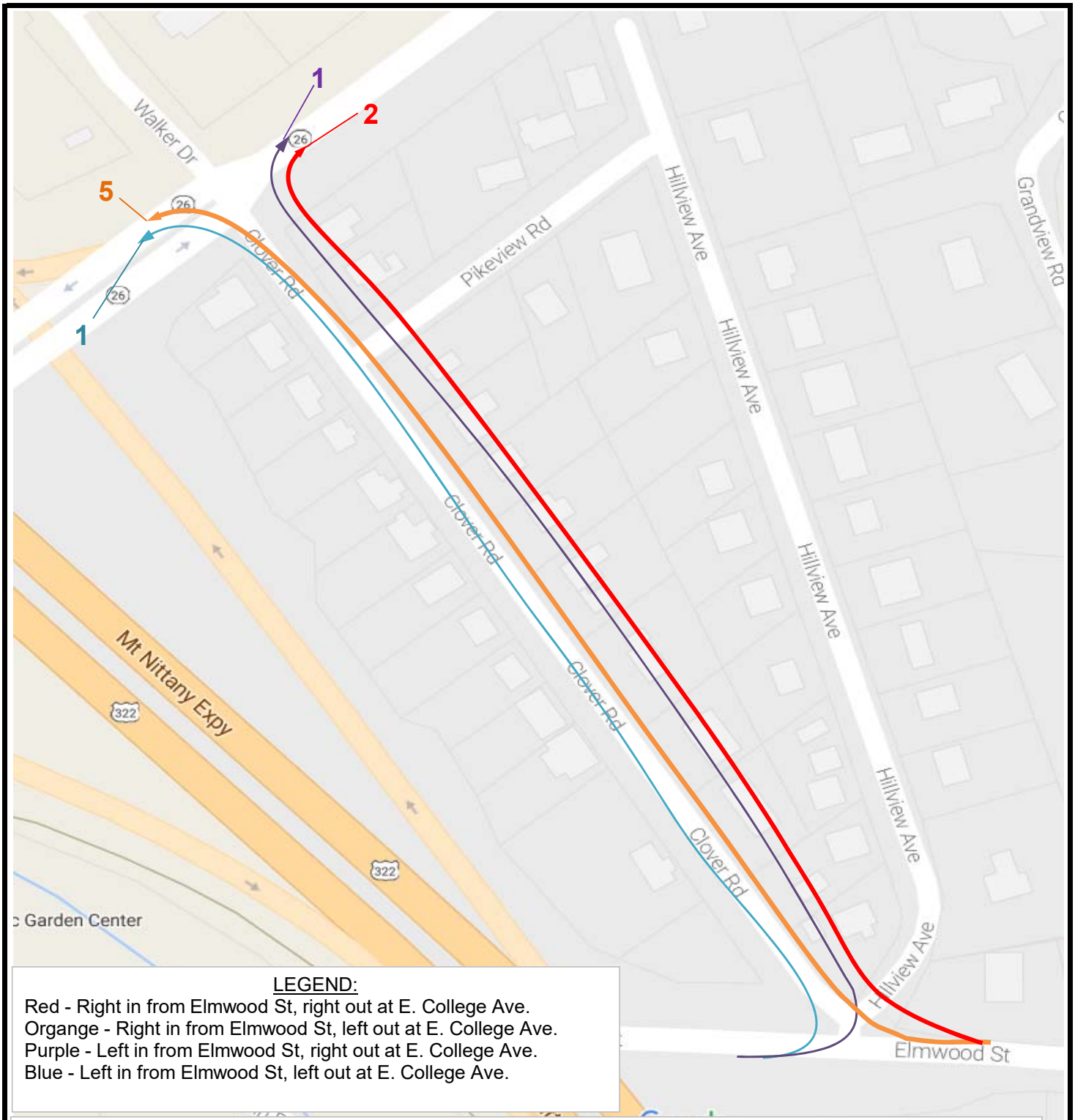
	Poject:		**Figure #**
	Clover Road Traffic Calming Study	Trans ASSOCIATES	4
	Figure Title:		Date:
SCALE: NTS	Mid-day Peak Hour Cut-Through from Elmwood St.		2/24/2017



LEGEND:
Burgundy - Left in from College Ave, left out at Elmwood St.
Navy - Right in from College Ave, left out at Elmwood St.

NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

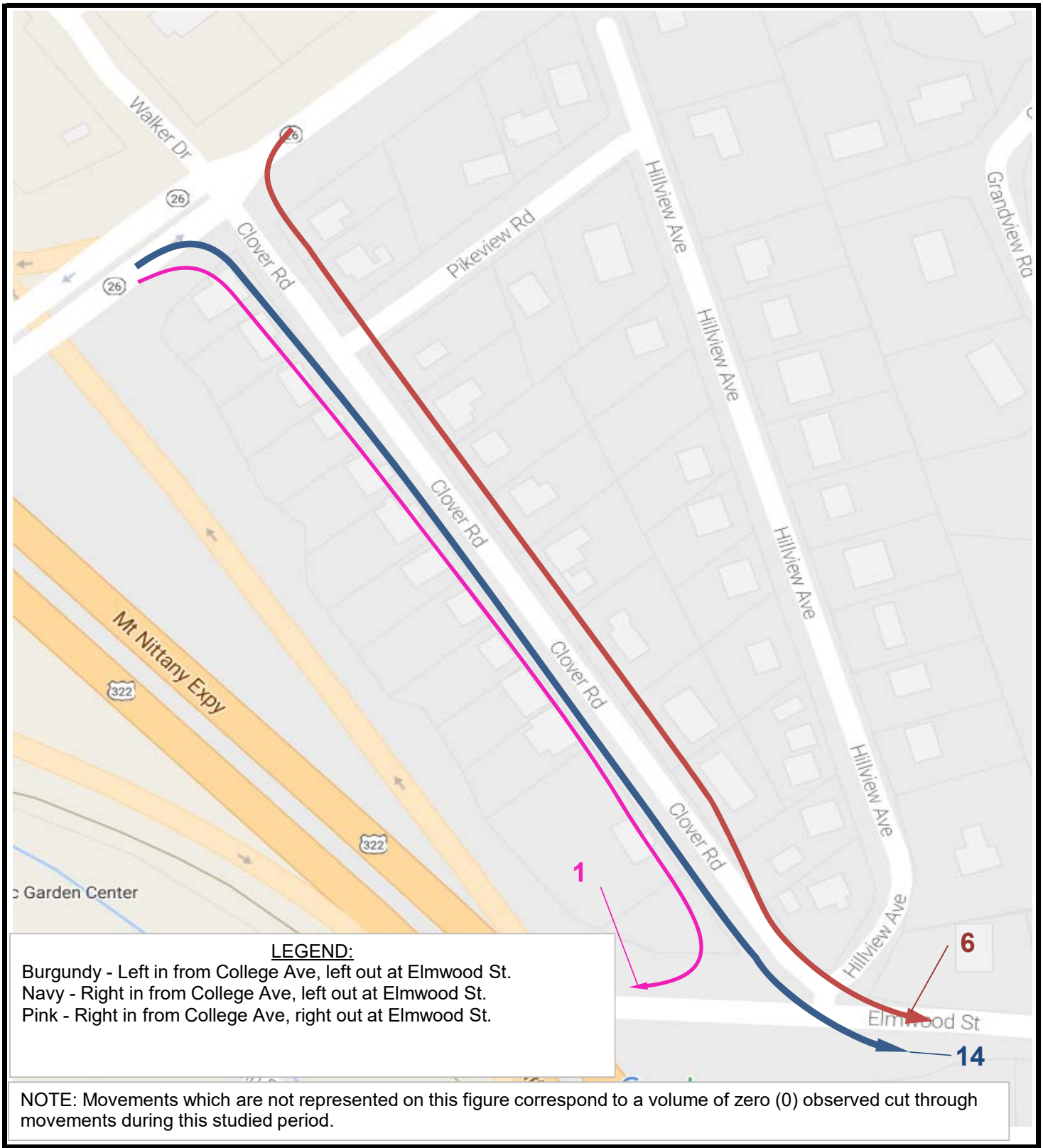
	Poject:		**Figure #**
	Clover Road Traffic Calming Study		**5**
	Figure Title:	Trans ASSOCIATES	Date:
SCALE: NTS	Mid-day Peak Hour Cut-Through from College Ave		2/24/2017



LEGEND:
Red - Right in from Elmwood St, right out at E. College Ave.
Organge - Right in from Elmwood St, left out at E. College Ave.
Purple - Left in from Elmwood St, right out at E. College Ave.
Blue - Left in from Elmwood St, left out at E. College Ave.

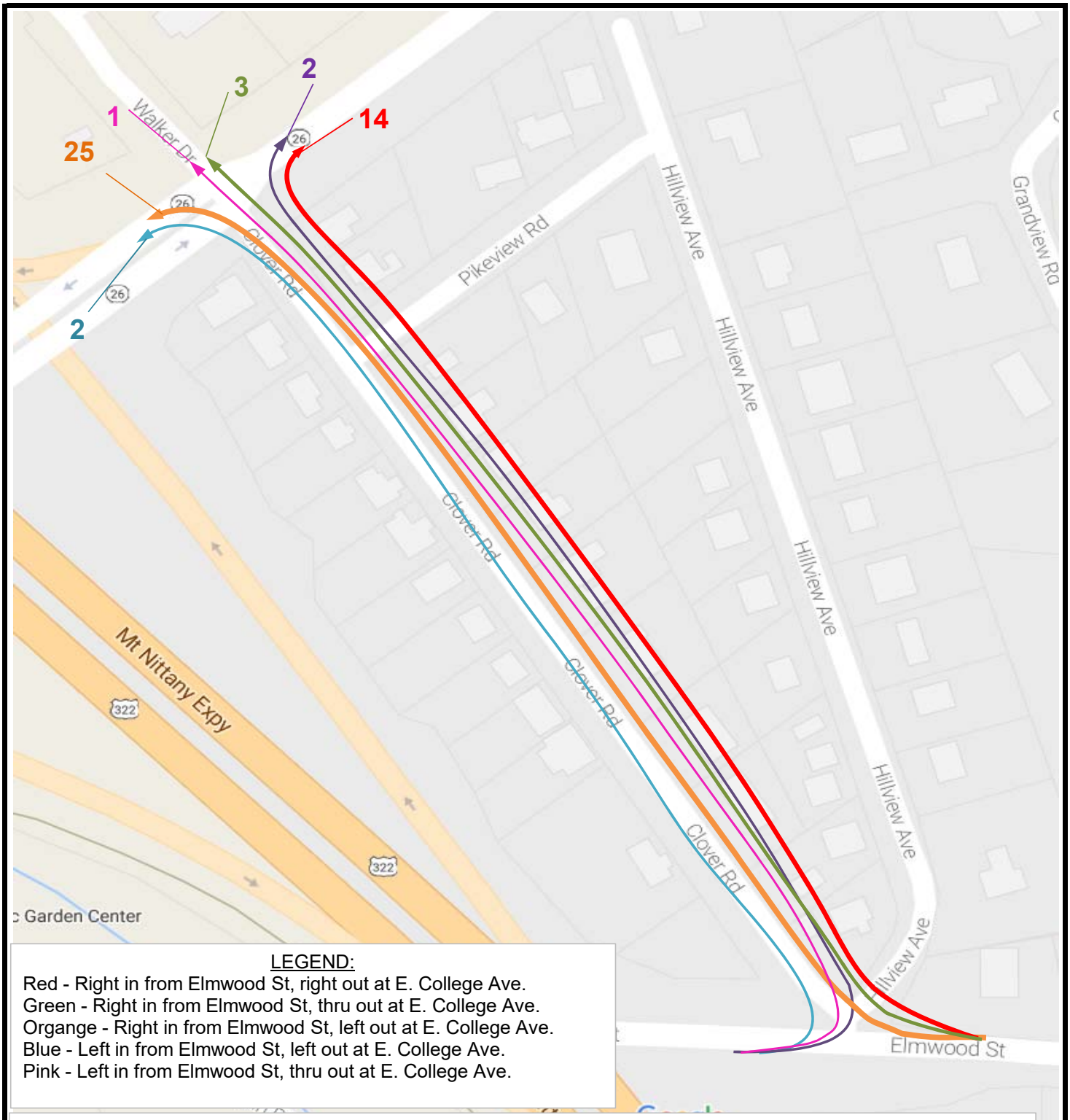
NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

SCALE: NTS	Poject: Clover Road Traffic Calming Study Figure Title: PM Peak Hour Cut-Through from Elmwood St.	Trans ASSOCIATES	**Figure #** 6 Date: 2/24/2017



NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

SCALE: NTS	Poject: Clover Road Traffic Calming Study Figure Title: PM Peak Hour Cut-Through from College Ave	Trans ASSOCIATES	Figure # 7 Date: 2/24/2017

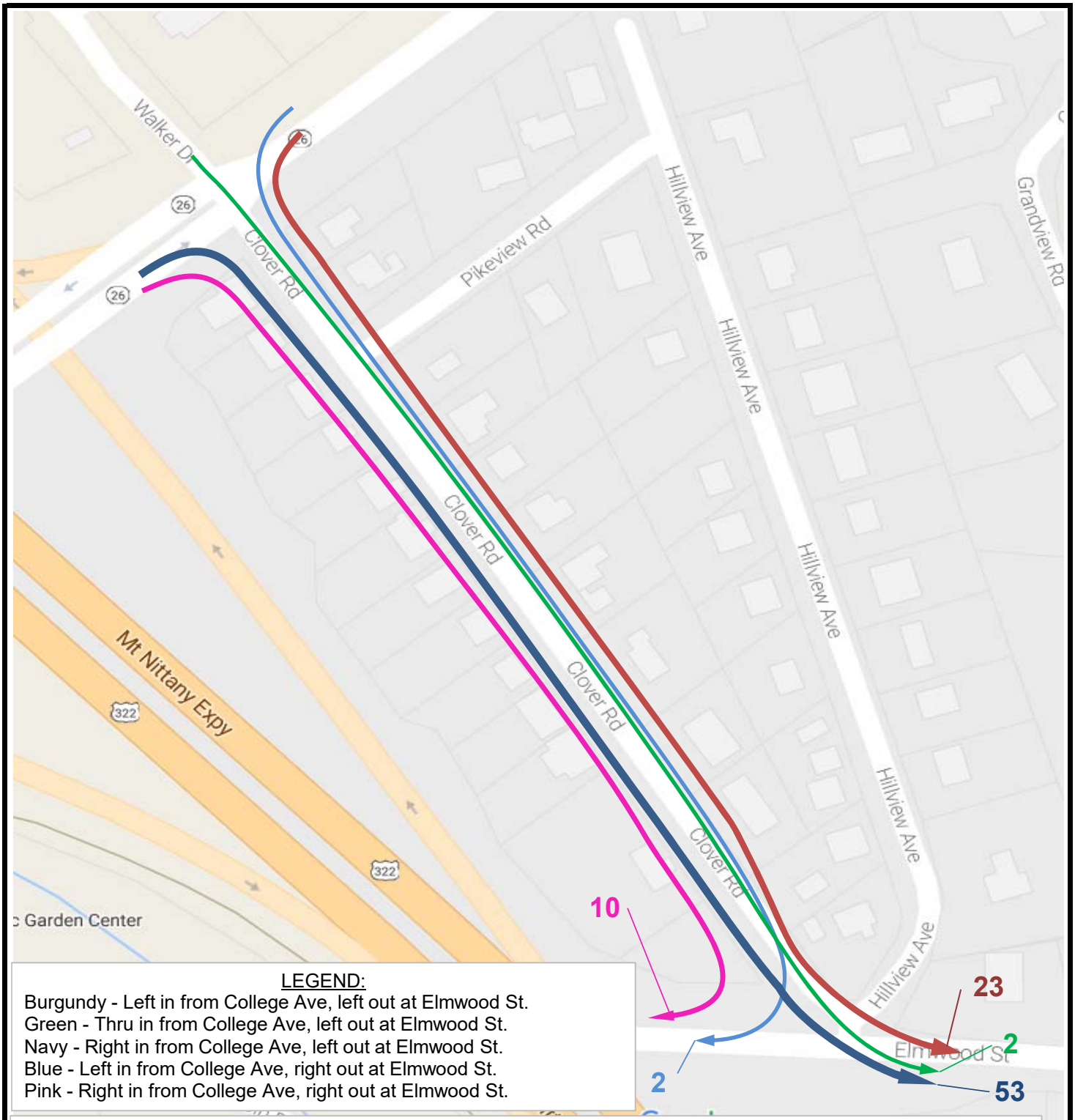


LEGEND:

Red - Right in from Elmwood St, right out at E. College Ave.
Green - Right in from Elmwood St, thru out at E. College Ave.
Organge - Right in from Elmwood St, left out at E. College Ave.
Blue - Left in from Elmwood St, left out at E. College Ave.
Pink - Left in from Elmwood St, thru out at E. College Ave.

NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

SCALE: NTS	Poject: Clover Road Traffic Calming Study Figure Title: Total Peak Hour Cut-Through from Elmwood St.	Trans ASSOCIATES	**Figure #** 8 Date: 2/24/2017



NOTE: Movements which are not represented on this figure correspond to a volume of zero (0) observed cut through movements during this studied period.

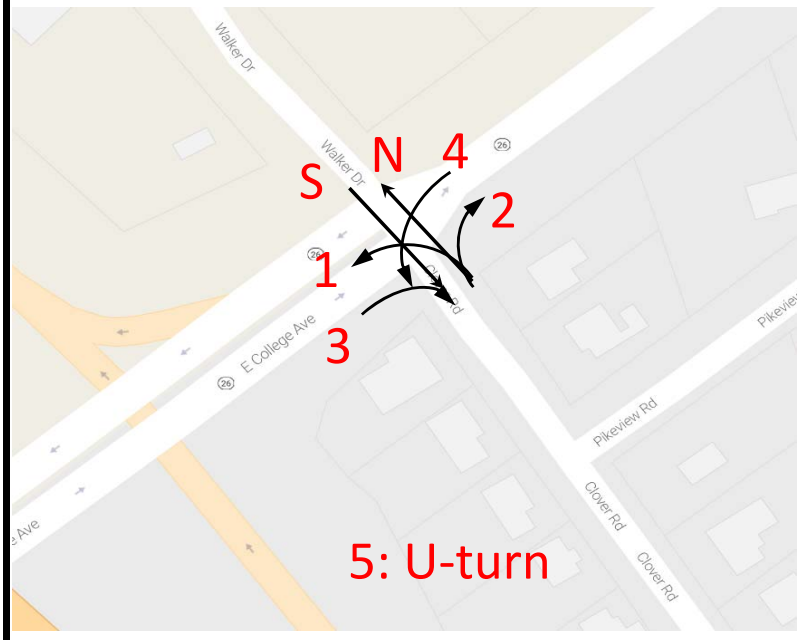
	Poject: Clover Road Traffic Calming Study		**Figure #** 9
SCALE: NTS	Figure Title: Total Peak Hour Cut-Through from College Ave	Trans ASSOCIATES	Date: 2/24/2017

TABLES

TABLE 5
SUMMARY OF ALTERNATIVE CONCEPTS
Clover Road Cut-Through Traffic Study
Colllege Township, Centre County, PA

Concept #	Mitigation Measures	Restriction Type	Description	Estimated Cost	Potential Effectiveness: Speeds	Potential Effectiveness: Cut-through	Impacts To Residents	Impacts to EMS, other vehicles
1A	Bulb-out or island at College Avenue Intersection	Permanent, partial restriction	Concrete or vegetated raised island which blocks exiting traffic at Clover Road on College Avenue and all entering movments but WB lefts from College Avenue	High	Medium	Medium-High - would remove 95% of cut-through traffic	Medium-High	Medium-High
1B	Bulb-out or island at College Avenue Intersection	Permanent, partial restriction	Concrete or vegetated raised island which blocks entering traffic from College Avenue and only allows exiting right turns from Clover Road	High	Medium	Medium-High - would remove 89% of cut-through traffic	Medium-High	Medium-High
2	Street cut-off at College Avenue Intersection	Permanent, full restriction	Concrete or vegetated physical barrier which crosses Clover Road approach, blocking all movements to/from College Avenue	High	Medium	High - would remove 100% of cut-through traffic	High	High
3	Bulb-out or island at Elmwood Street/Pikeview Intersection	Permanent, partial restriction	Concrete or vegetated raised island which blocks exiting traffic at Clover Road and entering traffic at Hillview Avenue on Elmwood Street	High	Medium	Medium - would remove 34% of cut-through traffic	Medium-High	Medium-High
4	Street cut-off at Elmwood Intersection	Permanent, full restriction	Concrete or vegetated physical barrier which crosses Clover Road approach, blocking all movements to/from Elmwood Street	High	Medium	High - would remove 100% of cut-through traffic	High	High
5A and 5B	Traffic Diverters at Pikeview Road/ Clover Road and Pikeview Road/ Hillview Road	Permanent, full restriction	Traffic diverters installed to prevent traffic from being able to travel From E. College Avenue to Elmwood Street	Medium-High	Medium	High - could remove 100% of cut-through traffic	High	Medium-High
6	Gated Access at College Avenue Intersection	Temporary, full restriction	Manual Gate	Medium	Medium	High - would remove 100% of cut-through traffic	High	Medium
7			Automatic Gate	Medium-High	Medium	High - would remove 100% of cut-through traffic	High	Low
8	Chicane Bulb-outs	Traffic Calming	Bulb-out sections of the edge of Clover Road on alternating sides, to create a meandering path down Clover Road	Medium-High	High	Medium	Medium-Low	Medium
9	Speed humps/bumps	Traffic Calming	Placement of either speed humps or speed bumps along Clover Road; potentially midway between ends.	Medium	High	Medium	Low	Medium-Low
10	Small Circle at Pikeview Road/Clover Road	Traffic Calming	Installing a mini vegetated circle within the intersection, to force traffic to circulate around it to proceed through intersection.	Medium	Medium	Low	Low	Low
NA	Pavement markings	Traffic Calming	Sharks Teeth pattern	Low	Medium	Low	Low	Low
			Edge zig-zag pattern	Low	Medium	Low	Low	Low

APPENDIX – A
License Plate Count Data



Notes:
-An asterisk (*) indicates a vehicle which appears to be speeding.
-A pound sign (#) indicates a vehicle which failed to fully stop at a stop sign.
-Numbers beginning with "SB" indicate a school bus.
-The time is marked for each 15-minute interval.

#	Mvt.	LP No.
1	**XXX**	**7:00**
2	1	7752
3	S	6738
4	1	5679
5	4	8731
6	**XXX**	**7:15**
7	1	6390
8	1	0647
9	1	8389
10	1	0825
11	2	3625
12	4	3659
13	1	2495
14	**XXX**	**7:30**
15	2	4481
16	4	SB-310
17	3	1555
18	3	8759
19	1	8837
20	**XXX**	**7:45**
21	3	3641
22	3	8423
23	4	691
24	4	3392
25	3	8601

#	Mvt.	LP No.
26	S	1600
27	3	5009
28	1	FGD
29	4	5418
30	4	7530
31	**XXX**	**8:00**
32	3	8F33
33	3	2335
34	3	4938
35	3	SB-9
36	3	2070
37	3	316
38	3	2700
39	**XXX**	**8:15**
40	2	8429
41	1	1986
42	3	5327
43	3	SB-111
44	4	8965
45	4	9945
46	4	SB-310
47	N	7889
48	3	7373
49	2	3824
50	**XXX**	**8:30**

#	Mvt.	LP No.
51	3	747F
52	N	9977
53	2	9302
54	3	4221
55	1	7399
56	1	5368
57	N	8629
58	**XXX**	**8:45**
59	3	6299
60	1	5003
61	3	8762
62	4	4198
63	3	4074
64	1	7484
65	2	2659
66	1	2573E
67	**XXX**	**11:00**
68	3	6570
69	4	923
70	1	2801
71	2	7447
72	**XXX**	**11:15**
73	1	7103
74	4	6000
75	4	3183

#	Mvt.	LP No.
76	**XXX**	**11:30**
77	1	9971
78	4	5100
79	1	7396
80	2	2700
81	**XXX**	**11:45**
82	2	5866
83	4	7---
84	1	36431
85	3	1028
86	2	2023
87	1	469
88	4	2493
89	3	5079
90	3	2089
91	4	9146
92	3	1321
93	3	4755
94	**XXX**	**12:15**
95	3	7789H
96	3	469
97	3	8377
98	4	2075
99	1	7776
100	3	332

SUMMARY OF COLLECTED LICENSE PLATE DATA

INTERSECTION OF CLOVER ROAD AT E. COLLEGE AVENUE (SR 26)

Trans ASSOCIATES

CONTINUATION OF DATA SHEET - ALL TIMES:

#	Mvt.	LP No.
101	4	343
102	2	7889
103	2	6140
104	3	5245
105	N	7889
106	XXX	12:30
107	3	1165
108	N	8629
109	1	F50
110	4	3995
111	1	5205
112	1	1165
113	N	7499
114	2	5066
115	3	6725
116	3	9308
117	XXX	12:45
118	2	6938
119	1	VCX
120	S	7499
121	XXX	2:00
122	3	2918
123	4	1028
124	3	9588
125	2	3738
126	1	1213
127	2	7398
128	3	7396
129	XXX	2:15
130	4	5817
131	2	1754
132	2	5617
133	XXX	2:30
134	3	332
135	S	0064
136	3	9786
137	3	8914
138	3	48417
139	2	2706
140	XXX	2:45

#	Mvt.	LP No.
141	2	5817
142	4	3253
143	3	----
144	3	2265
145	4	2005
146	3	6485
147	XXX	3:00
148	N	3826
149	3	2267
150	4	7398
151	3	17464
152	4	3503
153	3	7564
154	1	9769
155	3	9613
156	XXX	3:15
157	4	9275
158	3	9536
159	4	1X22
160	1	652
161	3	7151
162	5	6570
163	3	4198
164	1	7953
165	XXX	3:30
166	3	7209
167	3	7279
168	3	2902
169	2	4198
170	2	8318H
171	3	PTK
172	XXX	3:45
173	3	9598
174	5	9769
175	3	7958
176	3	6475
177	N	6996
178	3	1221
179	3	9827
180	3	9342

#	Mvt.	LP No.
181	4	6867
182	3	1028
183	XXX	4:00
184	3	8503J
185	3	1414
186	2	9786
187	3	2316
188	1	7396
189	3	3300
190	2	1321
191	2	9124
192	XXX	4:15
193	3	3166
194	2	535
195	1	7892
196	3	8478
197	3	9715
198	4	295
199	1	8450
200	2	3690
201	4	8429
202	2	X22
203	2	3659
204	1	----
205	XXX	4:30
206	3	9584
207	3	8837
208	2	4472
209	4	6938
210	1	8049
211	3	3630
212	1	1017
213	3	6475
214	3	727
215	4	2928
216	3	2468
217	3	2924
218	3	5699
219	4	2013
220	XXX	4:45

#	Mvt.	LP No.
221	3	7933
222	3	1165
223	1	2005
224	4	5531
225	2	6978
226	3	7396
227	1	67176
228	2	7398
229	4	8318H
230	3	6834
231	XXX	5:00
232	3	5483
233	4	8962
234	4	H726
235	2	9186
236	3	4707
237	4	927
238	4	3984
239	2	6557
240	3	9966
241	3	4920
242	4	0013
243	XXX	5:15
244	3	9058
245	1	4279
246	3	1657
247	3	7498
248	XXX	5:30
249	4	3690
250	1	9111
251	2	5780
252	XXX	5:45
253	3	7889
254	4	3219
255	3	7985
256	2	----
257	N	6996
258	1	----
259	3	8102
260	XXX	6:00

SCALE: NTS

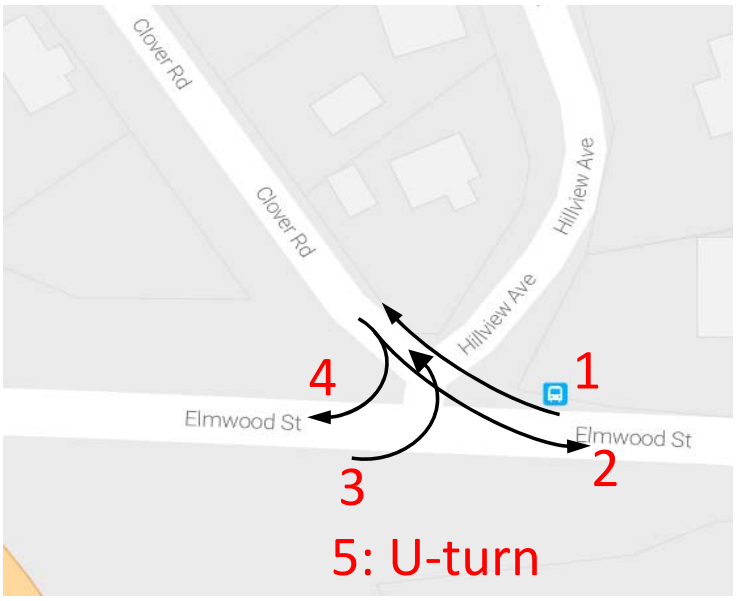
Counter: Will, Jeff

Date: 2/16/2017

Intersection: Clover Rd at E.College Ave

Clover Road Traffic Calming

Trans ASSOCIATES



Notes:
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#	Mvt.	LP No.
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9	1	0647
10	1	8389
11	1	0825
12	2	6694
13	2	3659
14	1	2495
15	**XXX**	**7:30**
16	4	7953
17	2	SB-310
18	2	1555
19	2	8759
20	1	8837
21	4	0469
22	**XXX**	**7:45**
23	2	3641
24	4	4317
25	4	8423
26	2	5605
27	2	0691
28	2	3392
29	2	8601
30	2	1600
31	1	FGD
32	4	5640
33	4	3850
34	4	5418
35	2	7530
36	**XXX**	**8:00**
37	2	8F33
38	2	2335
39	2	4938
40	2	SB-9
41	4	4270
42	2	5881
43	2	5009
44	4	2163
45	2	0316
46	2	2700
47	**XXX**	**8:15**
48	1	1986
49	2	5327
50	4	SB-111
51	2	8965
52	2	9945
53	1	7889
54	2	SB-310
55	2	7373
56	**XXX**	**8:30**
57	4	8914
58	2	747F
59	1	9977
60	1	9302
61	4	4221
62	2	8706
63	1	5368
64	1	8629
65	**XXX**	**8:45**
66	2	6299
67	2	6577
68	1	5003
69	2	8762
70	4	4074
71	4	4198
72	1	7484
73	1	2659
74	1	2573E
75	**XXX**	**11:00**
76	1	5784
77	1	2801
78	1	7447
79	**XXX**	**11:15**
80	1	0469
81	2	0061
82	1	6557
83	2	6570
84	1	9971
85	**XXX**	**11:30**
86	1	5881
87	4	6180
88	1	2700
89	4	5866
90	2	9301
91	1	3431
92	1	2023
93	2	1028
94	**XXX**	**11:45**
95	2	2493
96	2	5079
97	2	2867
98	**XXX**	**12:00**
99	**XXX**	**12:15**
100	2	8377
101	3	8706
102	2	2075
103	1	7776
104	2	4343
105	1	7242
106	1	7889
107	2	5245
108	2	7889
109	**XXX**	**12:30**
110	2	0629

SUMMARY OF COLLECTED LICENSE PLATE DATA

INTERSECTION OF CLOVER ROAD AT ELMWOOD ST. (SR 3010)

Trans ASSOCIATES

CONTINUATION OF DATA SHEET - ALL TIMES:

#	Mvt.	LP No.
111	1	FSD
112	1	5205
113	2	3995
114	1	M5066G
115	2	7499
116	2	6725
117	XXX	**12:45**
118	1	6938
119	1	398 VCX
120	1	7499
121	XXX	**2:00**
122	2	2918
123	1	3738
124	2	9588
125	1	1213
126	3	0194
127	2	0194
128	XXX	**2:15**
129	2	5817
130	1	1754
131	4	606
132	3	0951J
133	3	0705H
134	1	5009
135	3	8914
136	XXX	**2:30**
137	1	0064
138	2	8914
139	2	7936
140	2	9786
141	2	SB-307
142	XXX	**2:45**
143	2	2706
144	2	8914
145	1	5817
146	1	7396
147	2	3253
148	4	NONE
149	1	USPS
150	4	2265
151	XXX	**3:00**
152	2	2005

#	Mvt.	LP No.
153	2	3826
154	4	2700
155	1	SB-82
156	3	9769
157	2	2267
158	2	USPS
159	2	SB-9
160	2	3503
161	2	7564
162	1	7113
163	3	8889
164	XXX	**3:15**
165	4	4198
166	2	9613
167	2	4815
168	3	9972
169	2	2536
170	1	0652
171	2	7151
172	XXX	**3:30**
173	2	6570
174	1	7953
175	2	9240
176	2	9972
177	1	0455
178	2	7279
179	2	2902
180	4	PTK
181	4	SB-115
182	2	7958
183	2	6475
184	2	6996
185	XXX	**3:45**
186	4	1221
187	2	9827
188	1	6185
189	2	9342
190	2	6185
191	2	1028
192	XXX	**4:00**
193	2	8503J
194	1	9786

#	Mvt.	LP No.
195	2	2316
196	2	3300
197	2	1414
198	XXX	**4:15**
199	1	9124
200	3	0535
201	1	7892
202	2	3166
203	1	8450
204	2	8478
205	2	9715
206	1	3659
207	1	3659
208	1	Carmax
209	1	4472
210	XXX	**4:30**
211	2	0469
212	2	8837
213	1	4295
214	3	8049
215	2	6938
216	1	1017
217	2	3630
218	2	6475
219	4	9584
220	2	0727
221	2	2928
222	3	4317
223	4	5780
224	2	2468
225	2	5699
226	XXX	**4:45**
227	2	2013
228	4	8429
229	2	7933
230	1	2005
231	1	6978
232	1	6694
233	1	7176
234	XXX	**5:00**
235	3	8429
236	3	4660

#	Mvt.	LP No.
237	2	6834
238	2	5483
239	1	5780
240	4	8660
241	2	8962
242	3	3850
243	2	H726
244	3	9105
245	2	4707
246	2	0927
247	2	3984
248	1	5605
249	1	4270
250	2	9966
251	2	4920
252	XXX	**5:15**
253	2	9058
254	1	8914
255	3	7399
256	1	4279
257	4	5881
258	2	1657
259	2	6694
260	4	8914
261	3	7103
262	XXX	**5:30**
263	1	0421
264	4	3577
265	2	7889
266	XXX	**5:45**
267	2	3219
268	1	5307
269	**2**	3511
270	2	7985
271	1	4478
272	3	OPT
273	2	6996
274	2	8102
275	XXX	**6:00**

SCALE: NTS

Counter: Melissa Roll

Date: 2/16/2017

Intersection: Clover Rd at College Ave

Clover Road Traffic Calming

Trans ASSOCIATES

APPENDIX – B
Alternative Concept Plans



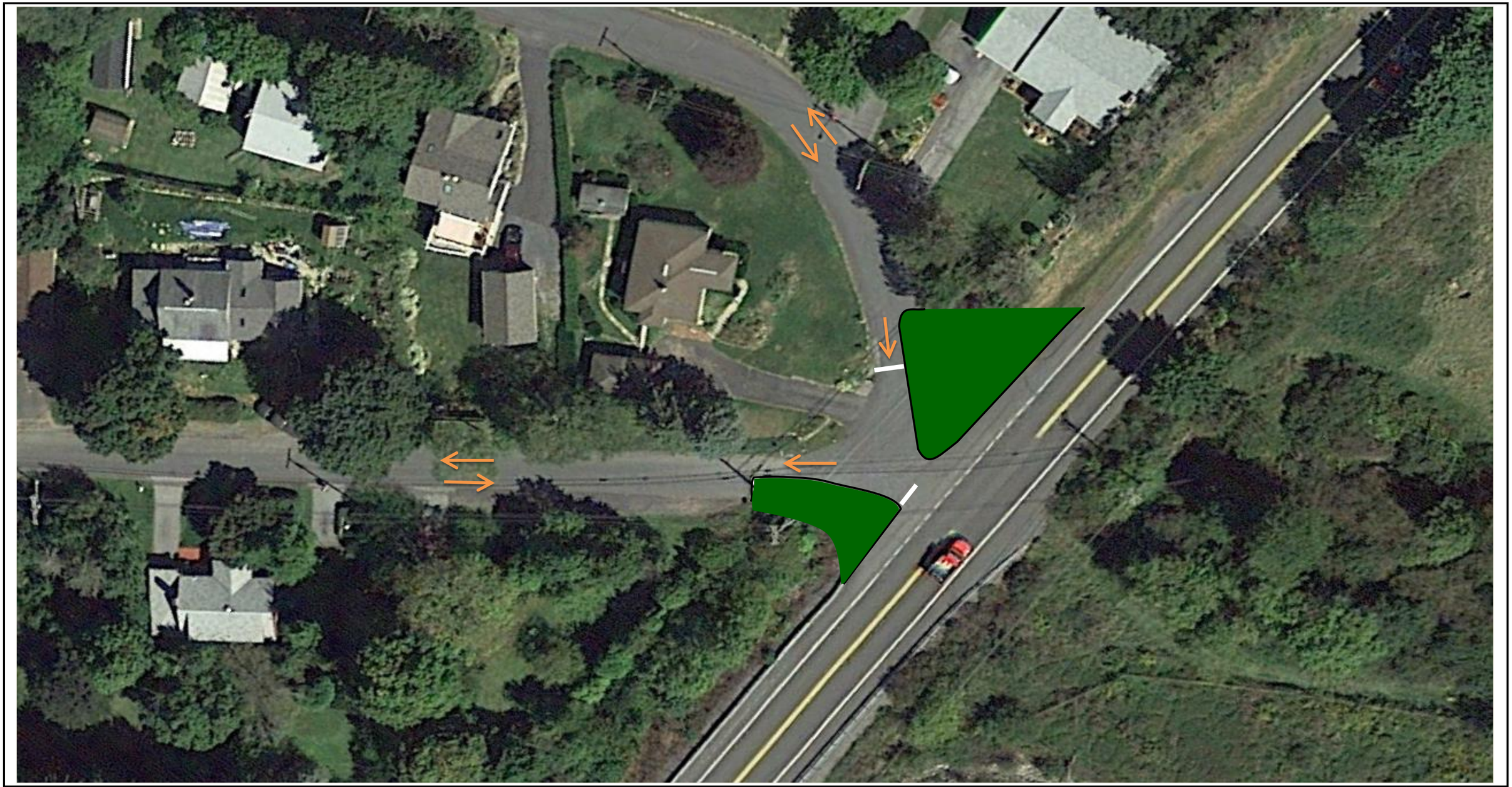
	Project:	Figure Title:			
SCALE: NTS	Clover Road Cut Through Traffic Study	Bulb-out or island at College Avenue Intersection	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1872	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	Figure # 1A



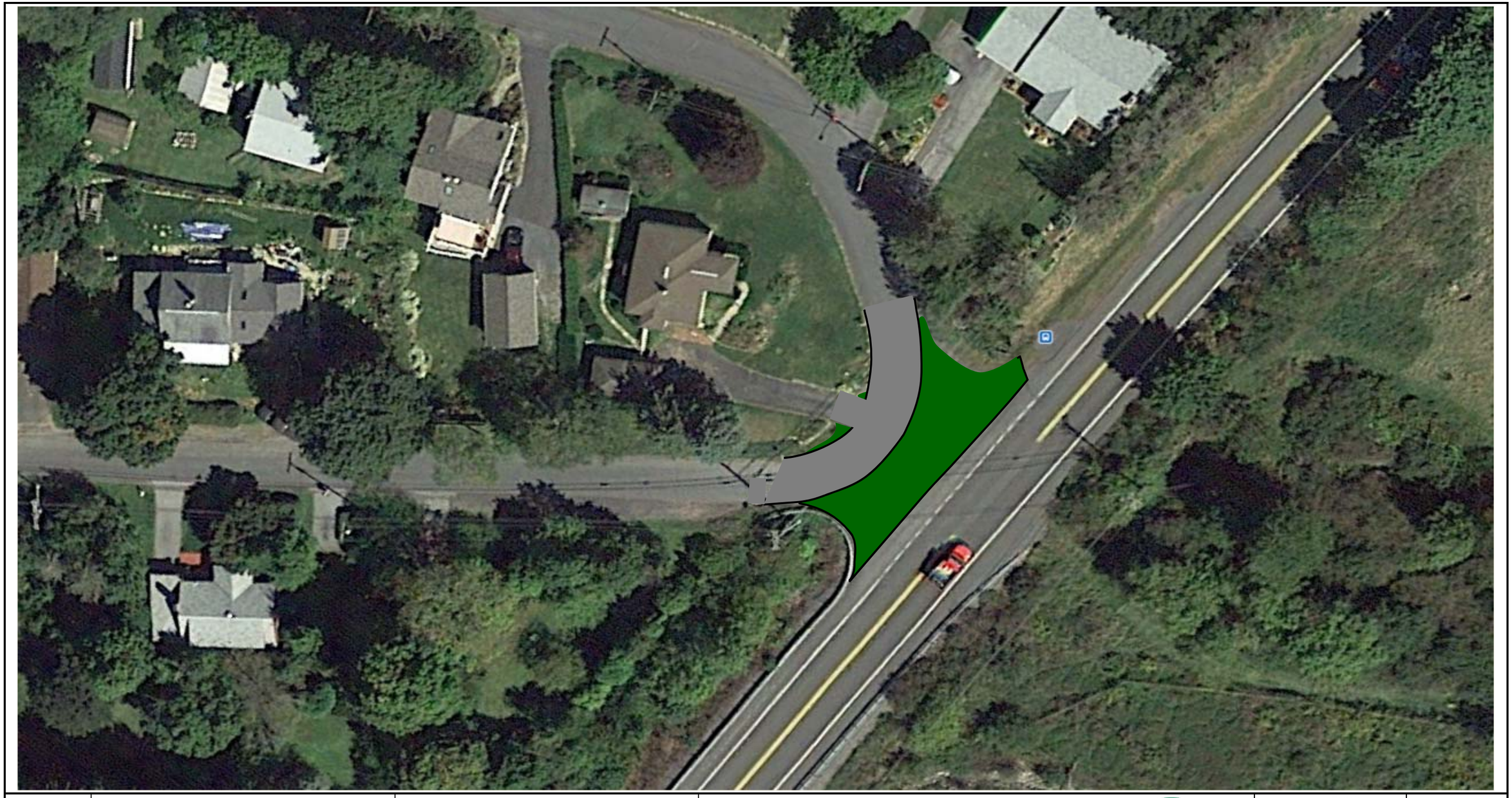
	Project:	Figure Title:			
SCALE: NTS	Clover Road Cut Through Traffic Study	Bulb-out or island at College Avenue Intersection	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1923	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/27/17	Figure # 1B



SCALE: NTS	**Project:** Clover Road Cut Through Traffic Study	**Figure Title:** Street cut-off at College Avenue Intersection	Trans ASSOCIATES	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	**Figure #** 2



SCALE: NTS	**Project:** Clover Road Cut Through Traffic Study	**Figure Title:** Bulb-out or Island at Elmwood Street Intersection	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1875	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	**Figure #** 3



	Project:	Figure Title:			
SCALE: NTS	Clover Road Cut Through Traffic Study	Street cut-off at Elmwood Street Intersection	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1858	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/27/17	Figure # 4



SCALE: NTS	**Project:** Clover Road Cut Through Traffic Study	**Figure Title:** Traffic Diverters	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1875	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	**Figure #** 5A



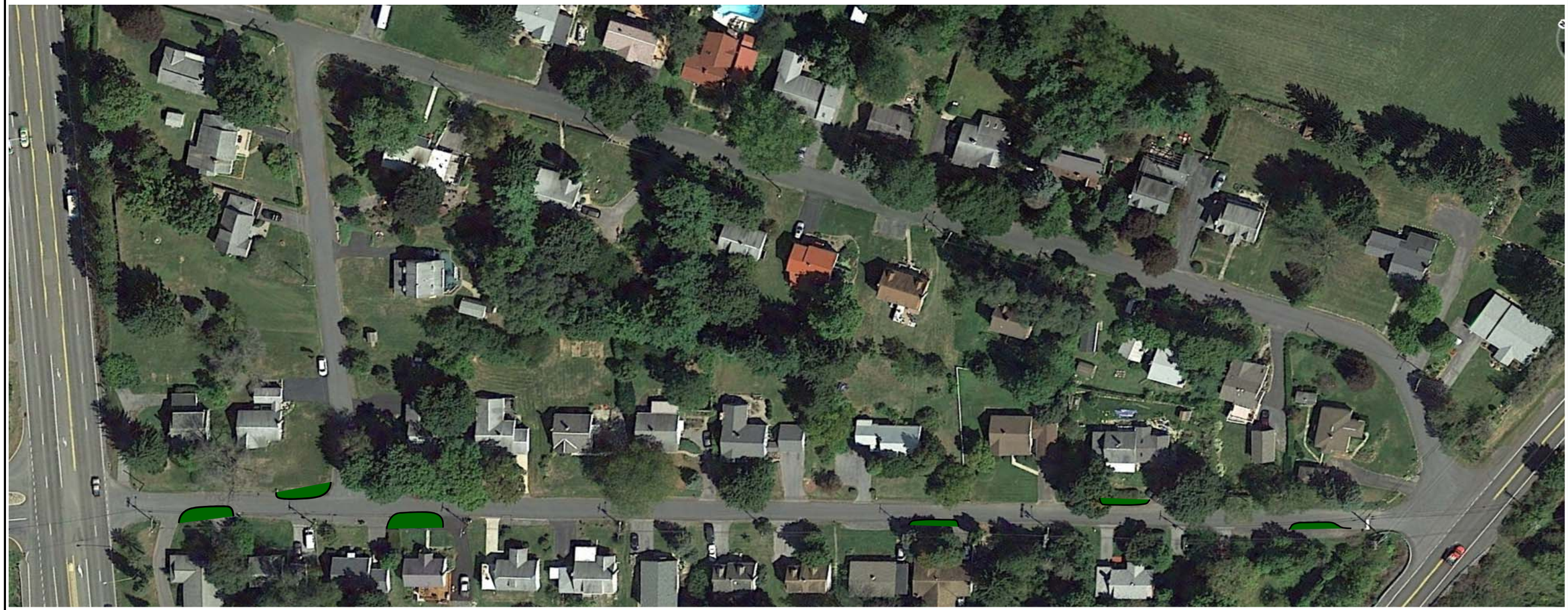
	Project:	Figure Title:			
SCALE: NTS	Clover Road Cut Through Traffic Study	Traffic Diverters	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1925	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	Figure # 5B



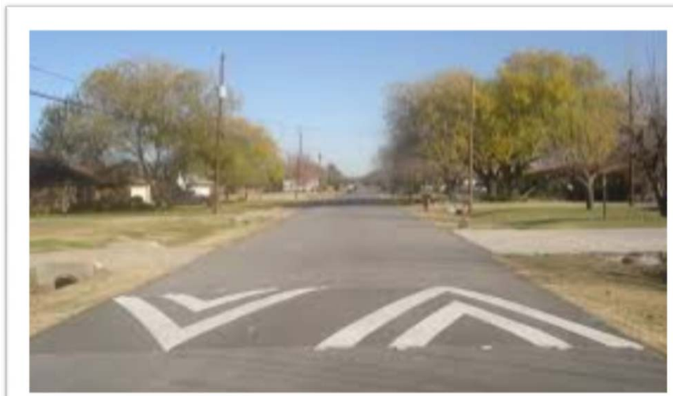
SCALE: NTS	**Project:** Clover Road Cut Through Traffic Study	**Figure Title:** Gated Access at College Avenue Intersection - Manual	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1858	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	**Figure #** 6

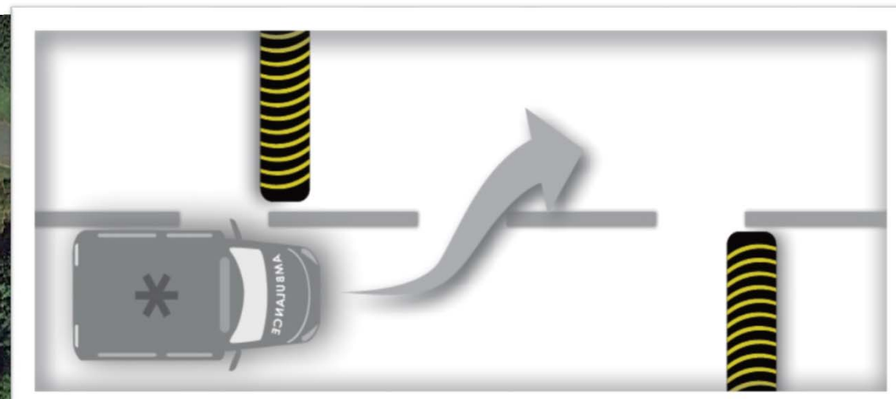


SCALE: NTS	**Project:** Clover Road Cut Through Traffic Study	**Figure Title:** Gated Access at College Avenue Intersection - Automatic	Trans ASSOCIATES	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	**Figure #** 7



	Project:	Figure Title:			
SCALE: NTS	Clover Road Cut Through Traffic Study	Chicane Bulb-outs along Clover Road	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1875	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	Figure # 8

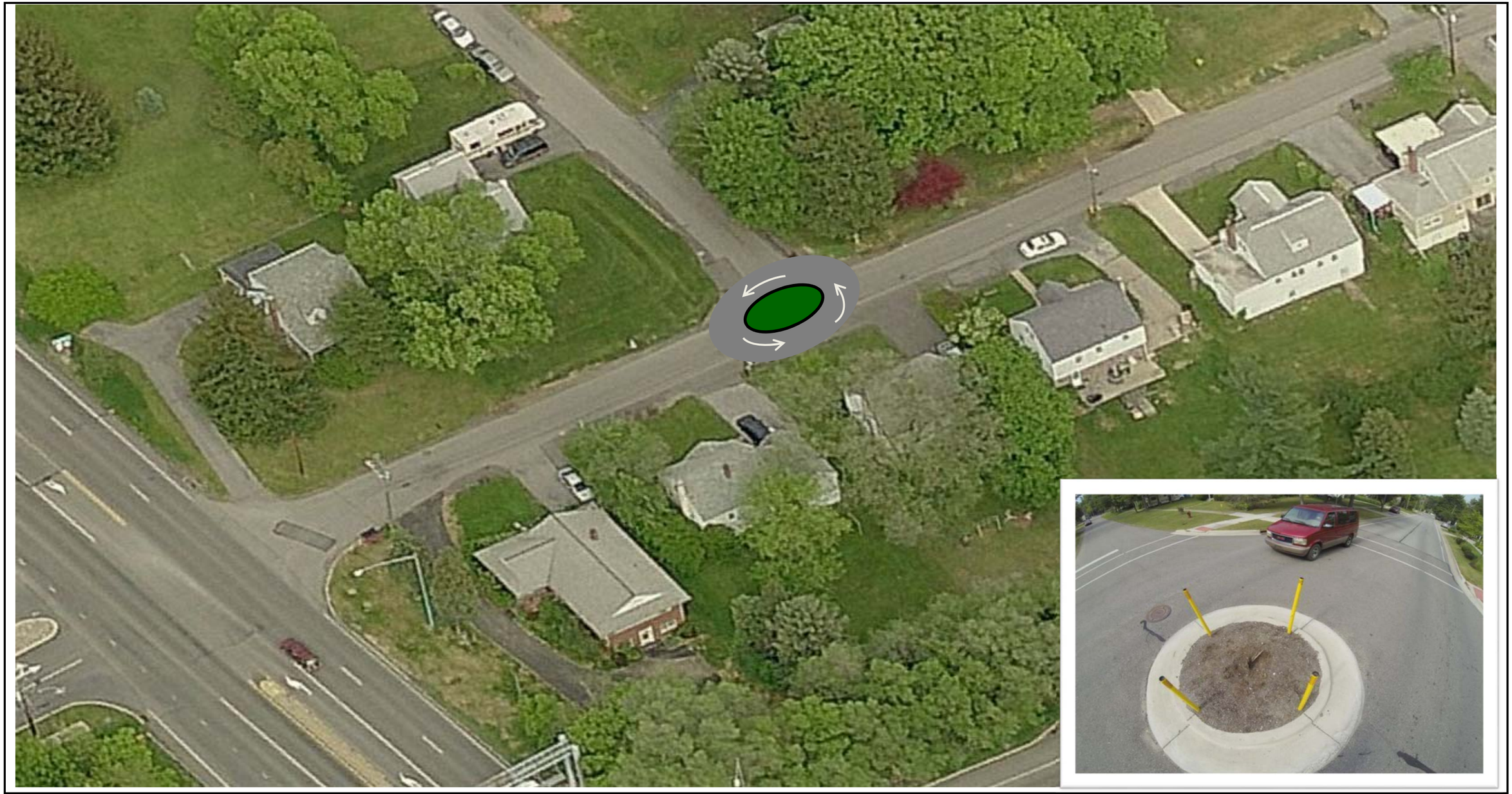








SCALE: NTS	**Project:**	**Figure Title:**	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1858	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17
	Clover Road Cut Through Traffic Study	**Speed Humps, Pillows, or Lumps along Clover Road**			**Figure #** **9**



SCALE: NTS	**Project:** Clover Road Cut Through Traffic Study	**Figure Title:** Small Circle at Clover Road/Pikeview Road	Trans ASSOCIATES	COLLEGE TOWNSHIP Est. 1875	Trans No. J17020 Drawn By: WR Reviewed By: NS Date: 3/23/17	**Figure #** 10

Venice Blvd in Mar Vista
Great Streets and Vision Zero

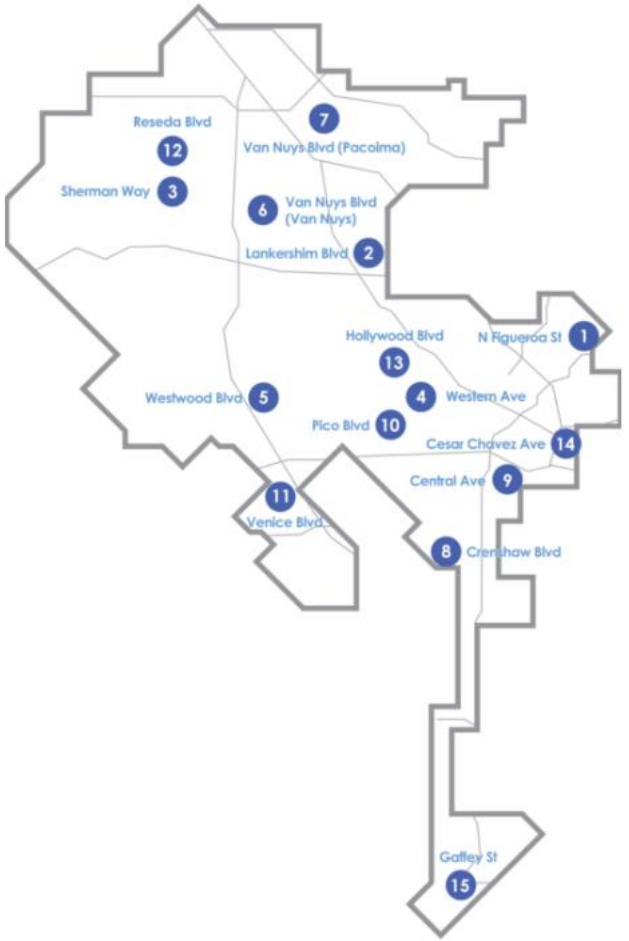
Nat Gale
Los Angeles Department of Transportation

Presentation to the Mar Vista Community Council
July 11, 2017



CITY OF LOS ANGELES
GREAT STREETS INITIATIVE





LADOT

JULY 11, 2017

VENICE BLVD GREAT STREETS
MAR VISTA NEIGHBORHOOD CANVASS

JANUARY 2015





VENICE BLVD
FARMERS MARKET WORKSHOP

JANUARY 2015



VENICE BLVD
FARMERS MARKET WORKSHOP

JANUARY 2015



VENICE BLVD
FARMERS MARKET WORKSHOP

JANUARY 2015



VENICE BLVD MOBILE WORKSHOP

APRIL - MAY 2015

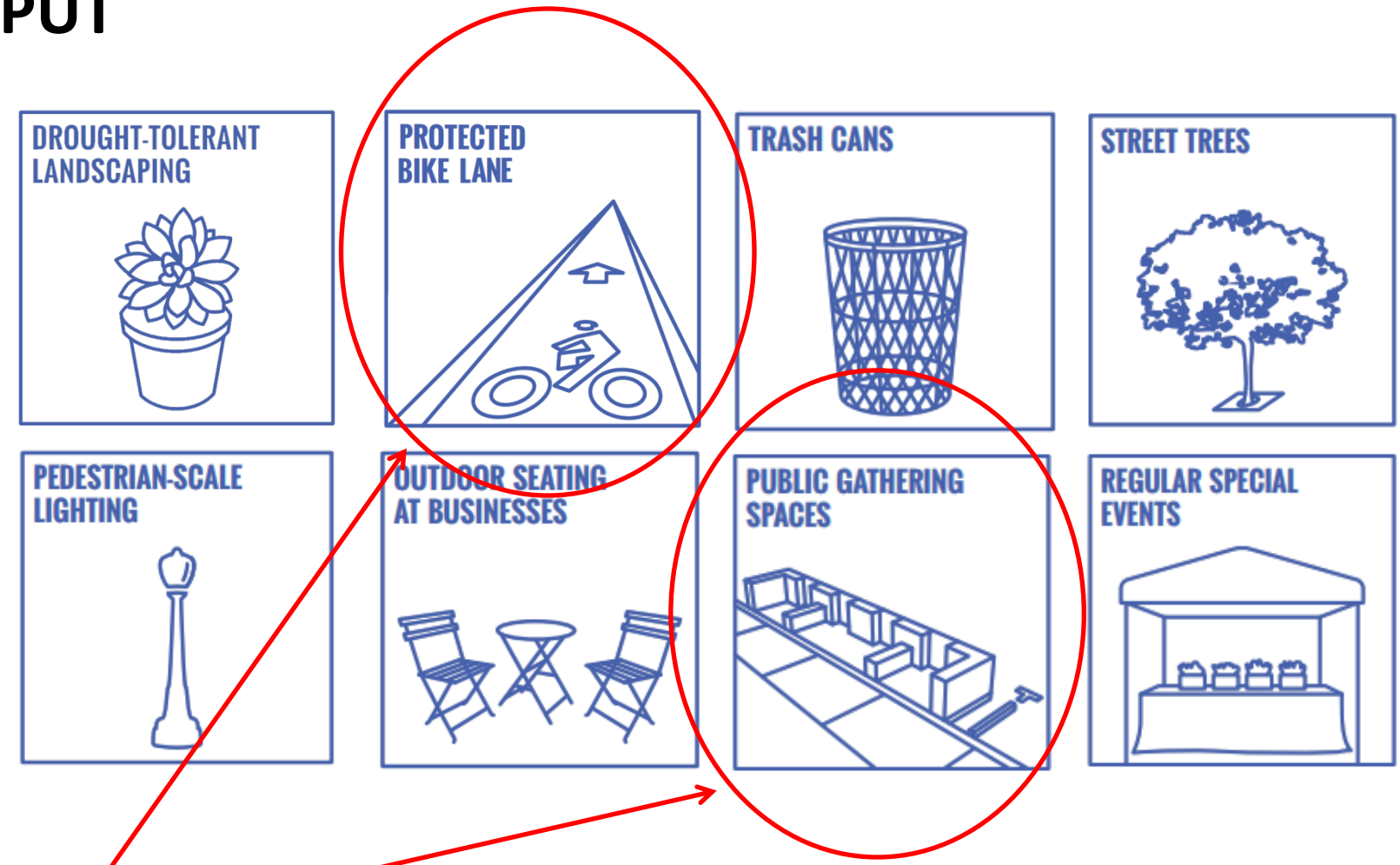


- Venice High School 4/16/15
- Mar Vista Branch Library 4/20/15
- Grand View Market 4/3/15-4/6/15
- Venice Grind 4/6/15-4/12/15
- Farmers Market 4/19/15
- Family Bike Ride & Workshop 5/2/15

RESULTS FROM COMMUNITY INPUT



RESULTS FROM COMMUNITY INPUT



VISION ZERO FOR LOS ANGELES

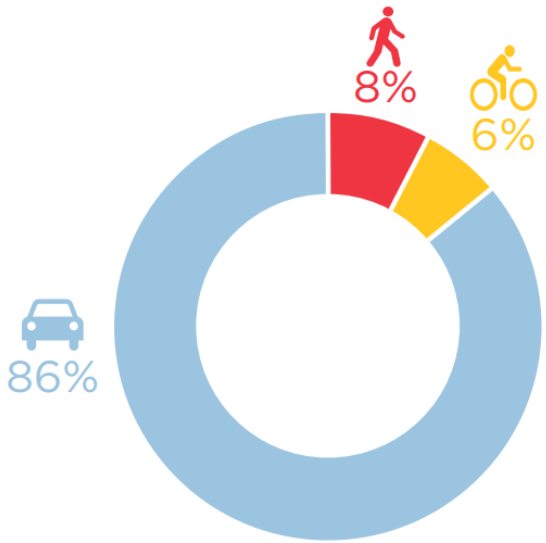
AUGUST 24, 2015



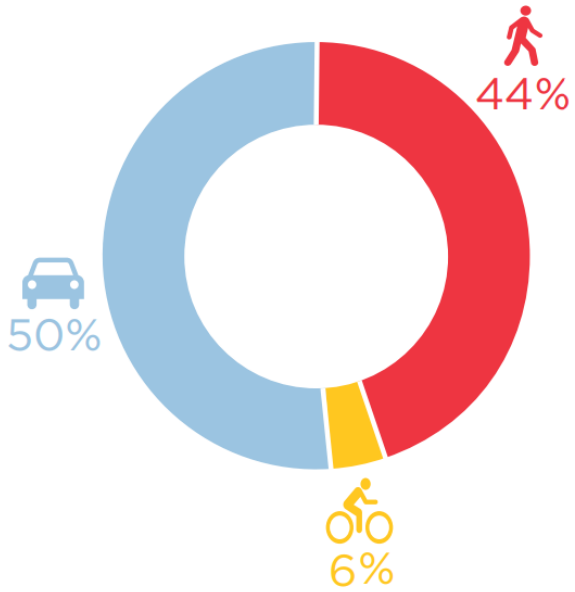
VISION ZERO PRINCIPLE: SPEED KILLS



LOS ANGELES COLLISION LANDSCAPE

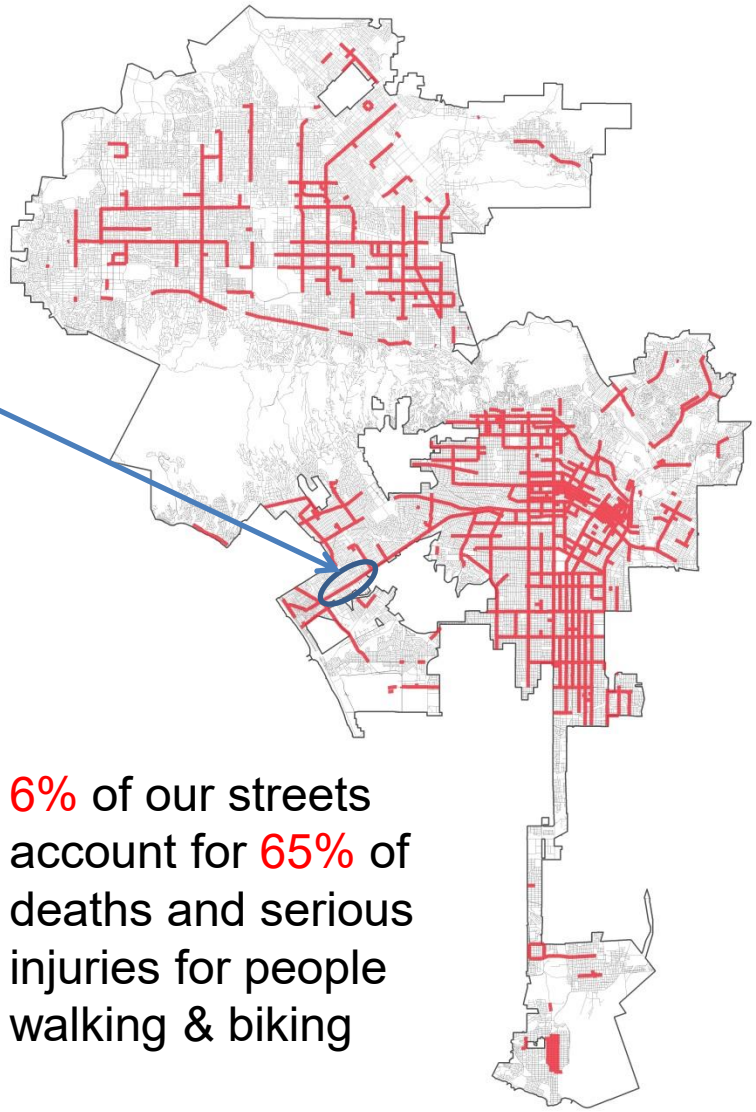


People Involved in Collisions



People Killed in Collisions

Venice Blvd in
Mar Vista



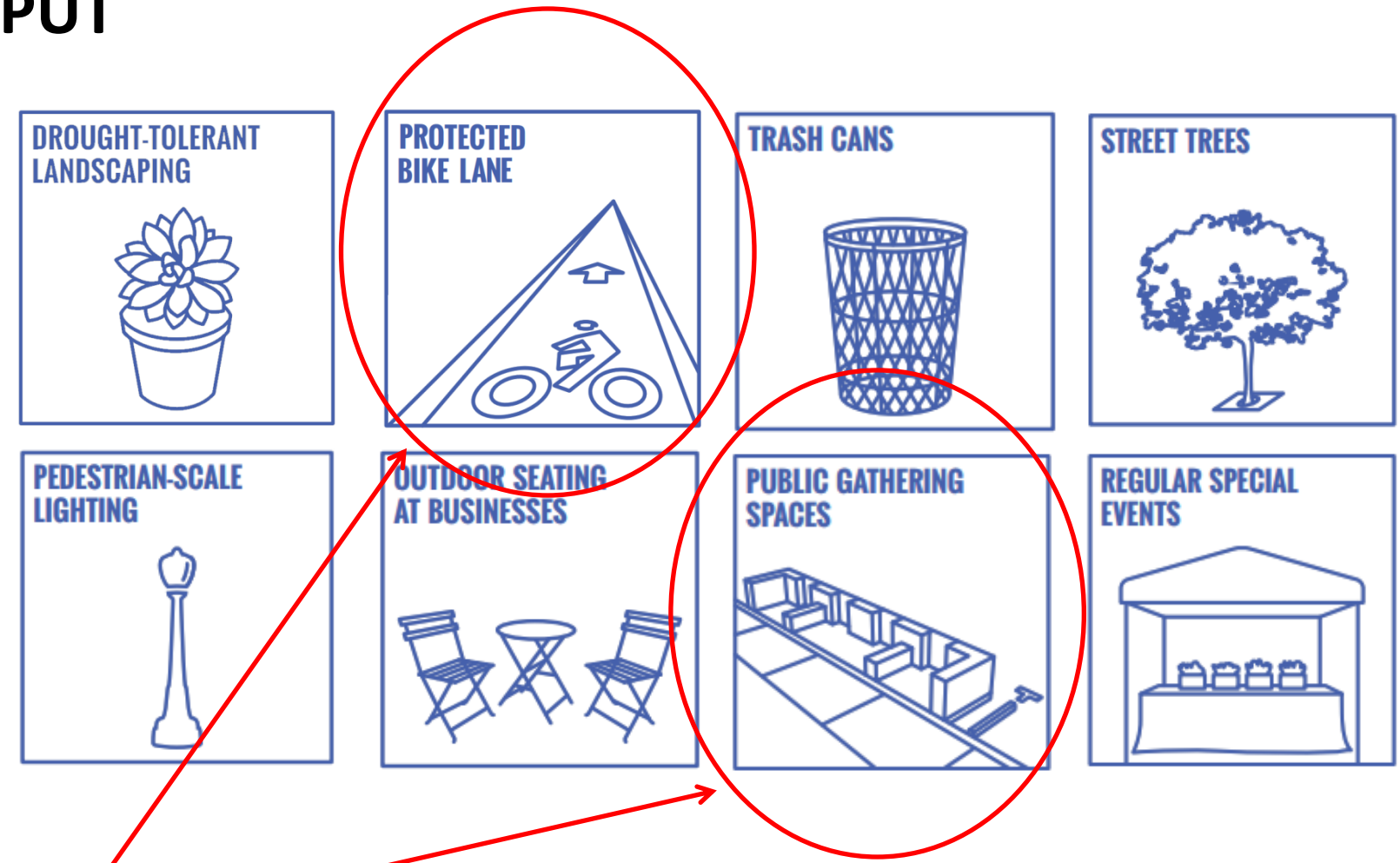
6% of our streets account for 65% of deaths and serious injuries for people walking & biking

Source: 2009 – 2013 SWITRS

VENICE BLVD COLLISION ANALYSIS

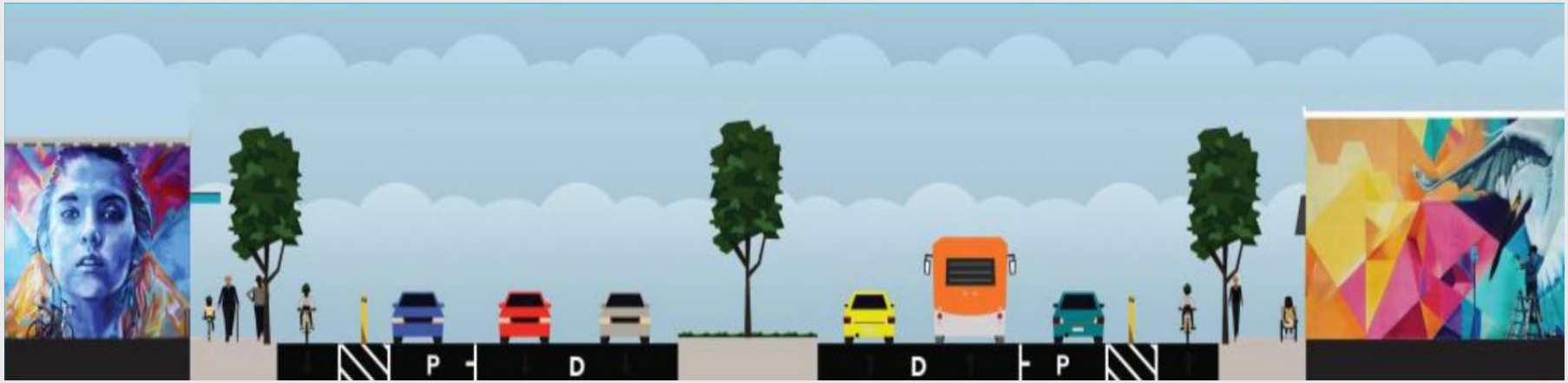


RESULTS FROM COMMUNITY INPUT



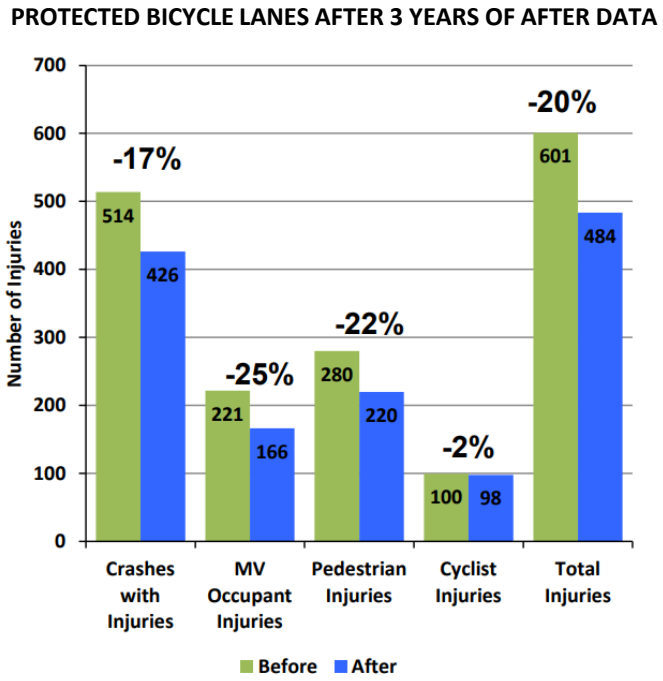
DESIGN PRINCIPLE: IMPROVE SAFETY FOR ALL

- Four new pedestrian crossings with full traffic signals
- Leading Pedestrian Interval (LPI) for safety & visibility
- Signal optimization to balance traffic flow
- Protected bike lane
- Buffer zone and vertical element between bike lane and parked vehicles
- High visibility crosswalks



NEW DESIGN OUTCOME

- Reduce the risk of traffic injury:



Protected bicycle lane projects with 3 years of after data include the following: 9th Ave (16th-31st), 8th Ave (Bank-23rd, 23rd-34th), Broadway (59th-47th, 33rd-26th, 23rd-18th), 1st Avenue (Houston to 34th), 2nd Ave (Houston-34th), Columbus Ave (96th-77th) Note: Only sections of projects that included protected bicycle lanes were analyzed

Source: NYPD AIS/TAMS Crash Database

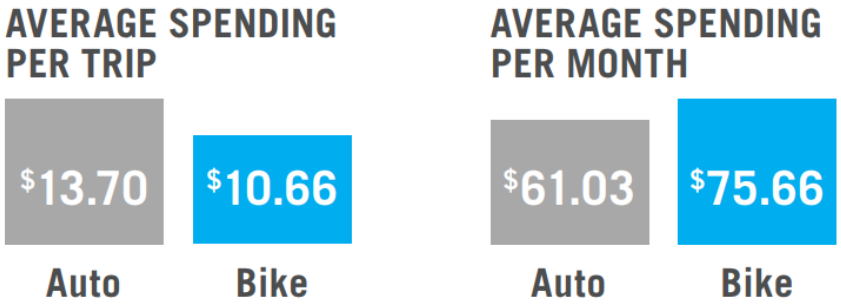
NEW YORK CITY DEPARTMENT OF TRANSPORTATION

NEW DESIGN OUTCOME

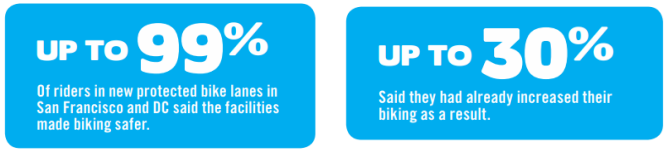
- Increase in sales (Manhattan, NY):



- Bike shopping means smaller trips, more visits (Portland, OR):



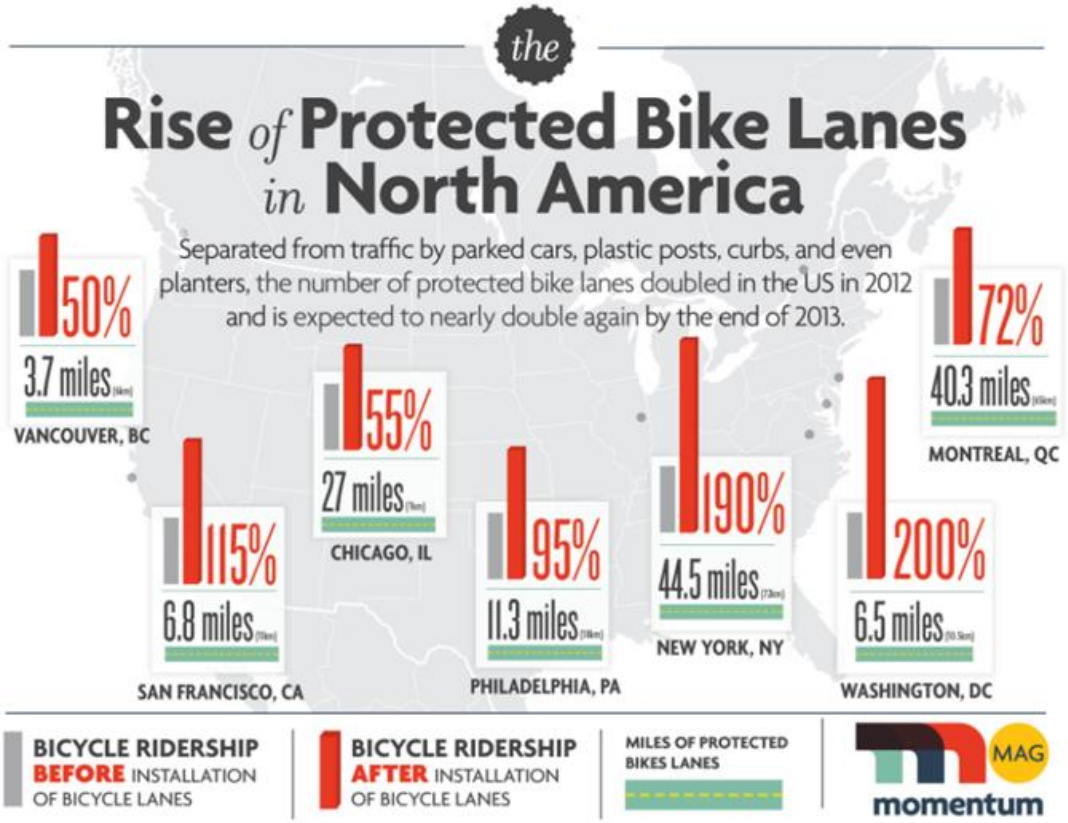
- Safer perspective:



SLIDE SOURCE: PeopleForBikes and Alliance for Biking and Walking, "Protected Bike Lanes Mean Business"

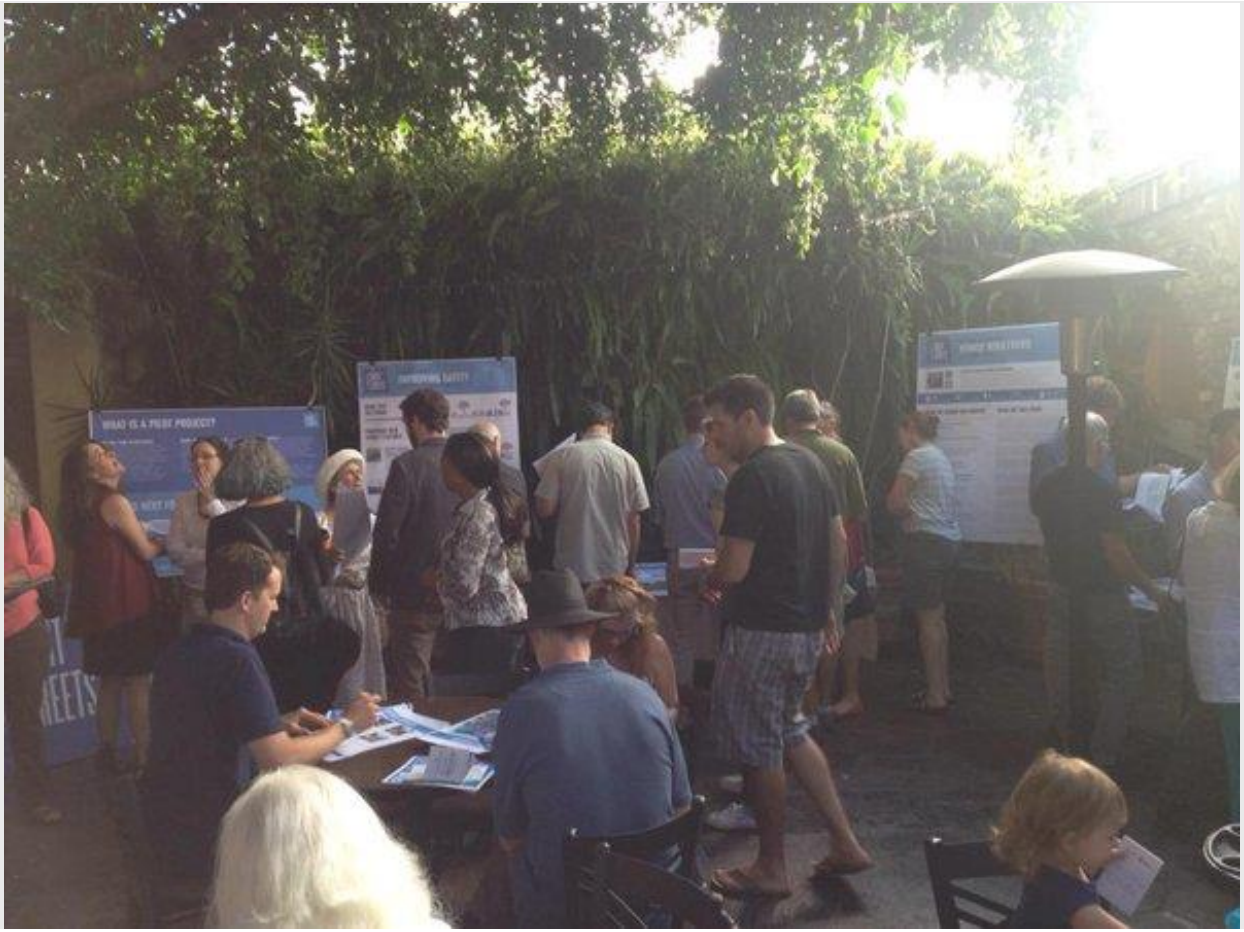
NEW DESIGN OUTCOME

- Bicycle ridership increase:



COMMUNITY OPEN HOUSE CONCEPTUAL DESIGN PRESENTATION

AUGUST 2015



CICLAVIA
CONCEPTUAL DESIGN PRESENTATION

AUGUST 2015



MAKE IT MAR VISTA CHALLENGE GRANT

NOVEMBER 2015

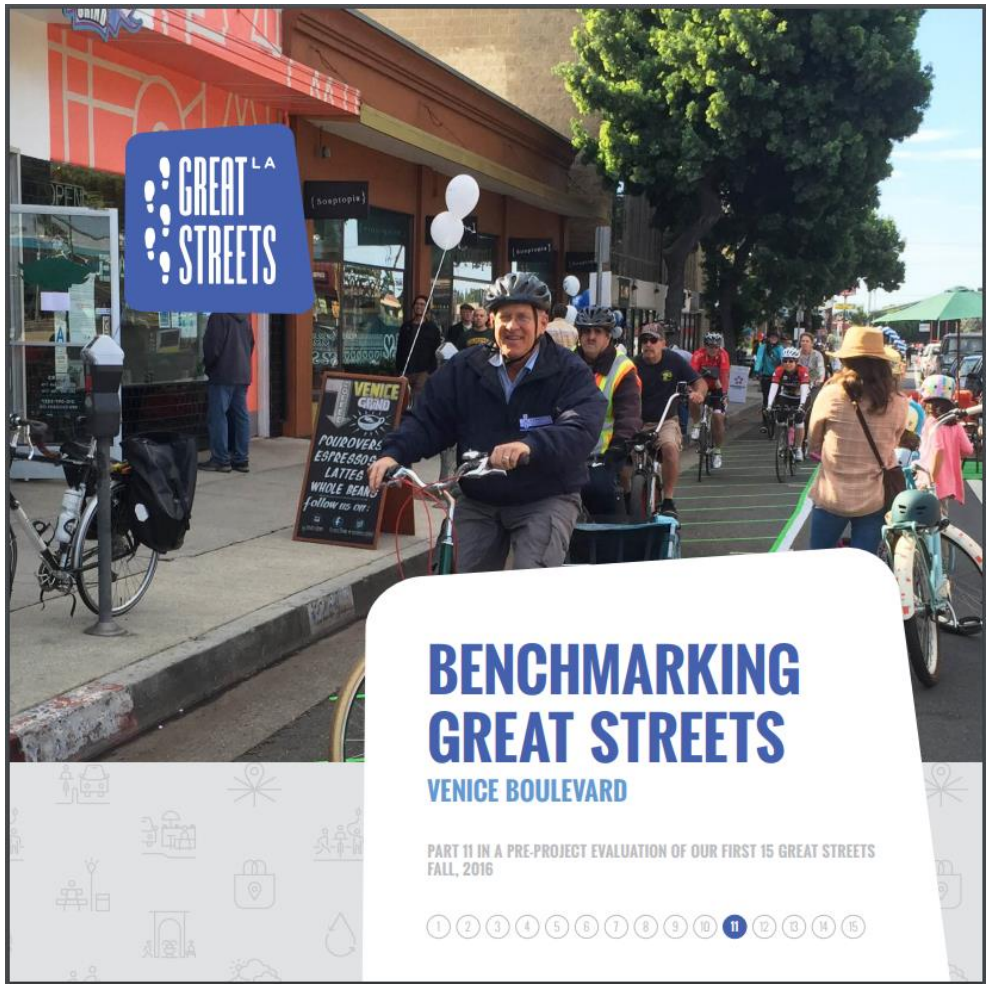


MAKE IT MAR VISTA CHALLENGE GRANT

NOVEMBER 2015

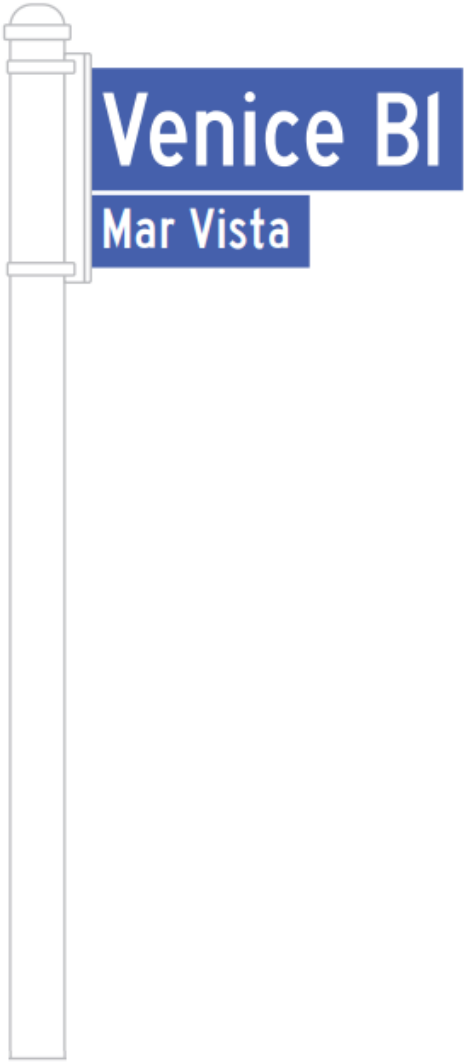


BENCHMARKING
VENICE BLVD GREAT STREET



BENCHMARKING
VENICE BLVD GREAT STREET

- Improved access and mobility
- Increased economic activity
- Enhanced neighborhood character
- Greater community engagement
- Improved environmental resilience
- Safer and secure communities



http://lagreatstreets.org/benchmarking/

BENCHMARKING
VENICE BLVD GREAT STREET



Improved access and mobility
- *e.g. Business Revenue*

Increased economic activity
- *e.g. Traffic Volumes*

Enhanced neighborhood character
- *Neighborhood Perceptions*

Greater community engagement
- *e.g. 311 service requests*

Improved environmental resilience
- *e.g. CalEnvironScreen 2.0*

Safer and secure communities
- *e.g. Crime & collision statistics*

http://lagreatstreets.org/benchmarking/

EXAMPLE DESIGN & ANALYSIS PRECEDENT
VAN NUYS BLVD (PACOIMA)





Analysis of similar projects in Los Angeles led to average of **36.7% reduction in injuries**

VENICE BLVD GREAT STREET PROJECT IMPLEMENTATION

APRIL – MAY 2017

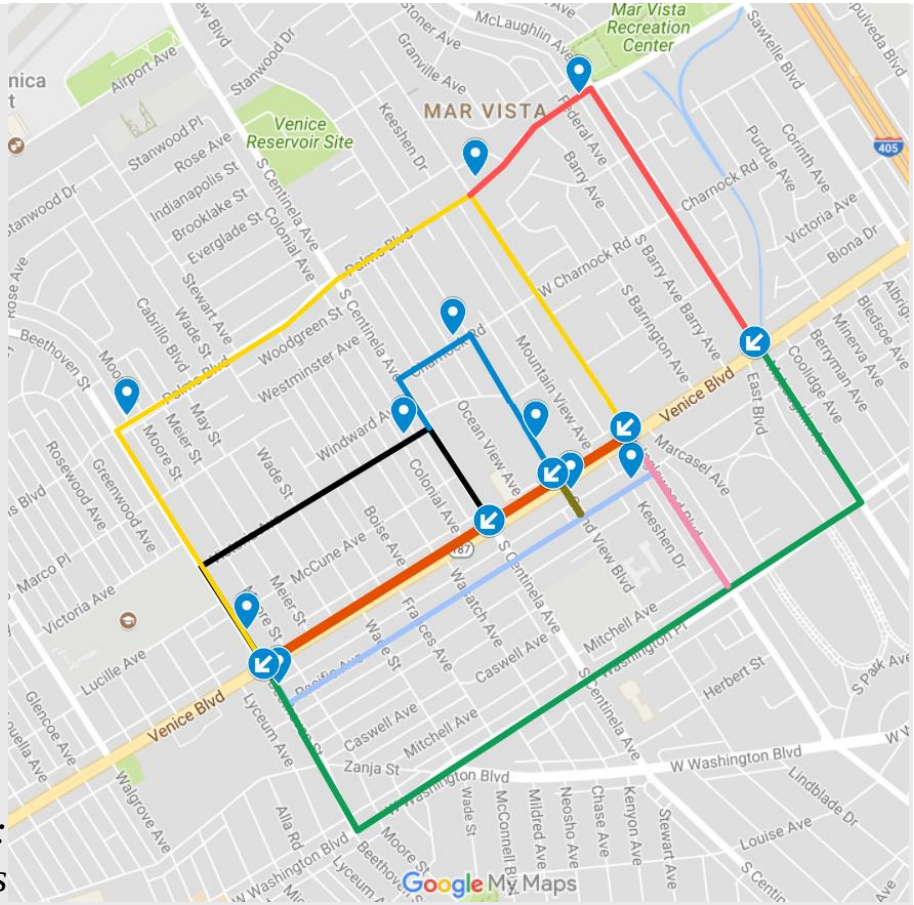




PILOT PROJECT ANALYSIS

- 1, 3, and 6 month data analysis

- Data gathering includes:
  - Vehicle volume
  - Traffic diversion
  - Speed
  - Occupancy
  - Travel-time
  - Ped & Bike Counts



Pictured at right:
Example of data gathering locations

PROJECT COORDINATION & ONGOING OBSERVATIONS

On-Going Coordination

- First Responders (LAFD & LAPD)
- Accessibility Modifications
- Evacuation Route

Design & Operational Observations

- Visibility At Intersections
- Green Paint at Conflict Areas
- On-going Signal Operations & Modifications
- Crosswalk Timing

NEXT STEPS

WHAT:	Venice Blvd Mar Vista Project Open House
WHEN:	Saturday, July 22nd, 2017 1 – 3 PM
WHERE:	Wyndward School Gymnasium 11350 Palms Blvd, Mar Vista, 90066
RSVP:	https://www.veniceblvdmarvista.org/
EMAIL:	ladot.veniceblvdmarvista@lacity.org
CALL:	(424) 625-4290

NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of July 25, 2017
(Information subject to editing)

Safety Study
Reducing Speeding-Related Crashes Involving Passenger Vehicles
NTSB/SS-17/01

This is a synopsis from the NTSB's Safety Study and does not include the Board's rationale for the conclusions and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing.

EXECUTIVE SUMMARY

Speeding – exceeding a speed limit or driving too fast for conditions – is one of the most common factors in motor vehicle crashes in the United States. In this safety study, the National Transportation Safety Board (NTSB) examines causes of and trends in speeding-related passenger vehicle crashes and countermeasures to prevent these crashes.

Why the NTSB Did This Study

From 2005 through 2014, crashes in which a law enforcement officer indicated a vehicle's speed was a factor resulted in 112,580 fatalities, representing 31% of all traffic fatalities. Speeding or speed has been cited as a safety issue, or a causal or contributing factor in 49 major NTSB highway accident investigations since 1967. Although recent speeding-related NTSB investigations have primarily involved large trucks and buses, most speeding-related crashes involve speeding passenger vehicles. In 2014, passenger vehicles constituted 77% of speeding vehicles involved in fatal crashes, and 78% of all speeding-related fatalities involved a speeding passenger vehicle. This study leverages prior NTSB investigations, together with other research, to address the national safety issue of speeding among passenger vehicle drivers.

In this study, the NTSB used a combination of quantitative and qualitative methods to summarize the risks of speeding, describe the scope of the problem, and promote the use of proven and emerging speeding countermeasures. This included a literature survey; analyses of speeding-related crash data; and interviews with national, state, and local traffic safety stakeholders. The stakeholders were representatives from transportation and highway safety agencies, law enforcement agencies, automobile manufacturers, research institutions, advocacy groups, equipment vendors, personal auto insurance providers, and professional associations.

This study assessed speeding among passenger vehicle drivers in a broad sense, as a factor that contributes to crashes and injury severity. Several, of many, potential solutions to the issue of speeding-related crashes are discussed. The solutions do not address every cause of

speeding or type of speeding-related crash, but they are intended to be widely applicable to a significant portion of these crashes.

What the NTSB Found

Speed – and therefore speeding – increases crash risk in two ways: (1) it increases the likelihood of being involved in a crash, and (2) it increases the severity of injuries sustained by all road users in a crash.

The relationship between speed and crash involvement is complex, and it is affected by factors such as road type, driver age, alcohol impairment, and roadway characteristics like curvature, grade, width, and adjacent land use. In contrast, the relationship between speed and injury severity is consistent and direct. Higher vehicle speeds lead to larger changes in velocity in a crash, and these velocity changes are closely linked to injury severity. This relationship is especially critical for pedestrians involved in a motor vehicle crash, due to their lack of protection.

Typically, speed limits are set by statute, but adjustments to statutory speed limits are generally based on the observed operating speeds for each road segment—specifically, the 85th percentile speed of free-flowing traffic. Raising speed limits to match the 85th percentile speed can result in unintended consequences. It may lead to higher operating speeds, and thus a higher 85th percentile speed. In general, there is not strong evidence that the 85th percentile speed within a given traffic flow equates to the speed with the lowest crash involvement rate for all road types. Alternative approaches and expert systems for setting speed limits are available, which incorporate factors such as crash history and the presence of vulnerable road users such as pedestrians.

Speed limits must be enforced to be effective, and data-driven, high-visibility enforcement is an efficient way to use law enforcement resources. The success of data-driven speed enforcement programs depends on the ability to measure and communicate their effectiveness. However, law enforcement reporting of speeding-related crashes is inconsistent, which leads to underreporting of speeding-related crashes. This underreporting leads stakeholders and the public to underestimate the overall scope of speeding as a traffic safety issue nationally and hinders the effective implementation of data-driven speed enforcement programs locally.

Automated speed enforcement (ASE) is also widely acknowledged as an effective countermeasure to reduce speeding-related crashes, fatalities, and injuries. However, only 14 states and the District of Columbia use it. Many states have laws that prohibit or place operational restrictions on ASE, and federal guidelines for ASE are outdated and not well known among ASE program administrators. Point-to-point enforcement, which is based on the average speed of a vehicle between two points, can be used on roadway segments many miles long. This type of ASE has had recent success in other countries, but it is not currently used in the United States.

Vehicle technologies can also be effective at reducing speeding. Intelligent speed adaptation (ISA) uses an onboard global positioning system or road sign-detecting camera to determine the speed limit; it then warns drivers when they exceed the speed limit, or prevents drivers from exceeding the speed limit by electronically limiting the speed of the vehicle. Although passenger vehicle manufacturers are increasingly equipping their vehicles with technologies relevant to speeding, these technologies often are not standard features and require the purchase of certain option packages. New car safety rating systems are one effective way to incentivize the manufacture and purchase of passenger vehicles with advanced safety systems such as ISA.

Finally, the current level of emphasis on speeding as a national traffic safety issue is lower than warranted. Current federal-aid programs do not ensure that states fund speed management activities at a level commensurate with the national impact of speeding on fatalities and injuries. Also, unlike other traffic safety issues with a similar impact (such as alcohol-impaired driving) there are no nationwide programs to increase public awareness of the risks of speeding. Although the US Department of Transportation (DOT) has established a multi-agency team to coordinate speeding-related work throughout the DOT, this team's work plan does not include means to ensure that the planned actions are completed in a timely manner.

FINDINGS

1. Speed increases the likelihood of serious and fatal crash involvement, although the exact relationship is complex due to many factors.

2. Speed increases the injury severity of a crash.

3. Drivers report understanding that speeding is a threat to safety but acknowledge it is a common driving behavior in the United States.

4. The *Manual on Uniform Traffic Control Devices* guidance for setting speed limits in speed zones is based on the 85th percentile speed, but there is not strong evidence that, within a given traffic flow, the 85th percentile speed equates to the speed with the lowest crash involvement rate on all road types.

5. Unintended consequences of the reliance on using the 85th percentile speed for changing speed limits in speed zones include higher operating speeds and new, higher 85th percentile speeds in the speed zones, and an increase in operating speeds outside the speed zones.

6. Expert systems such as USLIMITS2 can improve the setting of speed limits by allowing traffic engineers to systematically incorporate crash statistics and other factors in addition to the 85th percentile speed, and to validate their engineering studies.

7. The safe system approach to setting speed limits in urban areas is an improvement over conventional approaches because it considers the vulnerability of all road users.

8. Speeding-related performance measures are needed to determine the effectiveness of data-driven, high-visibility enforcement programs and to communicate the value of these programs to law enforcement officers and the public.

9. The involvement of speeding passenger vehicles in fatal crashes is underestimated.

10. The lack of consistent law enforcement reporting of speeding-related crashes hinders the effective implementation of data-driven speed enforcement programs.

11. Automated speed enforcement is an effective countermeasure to reduce speeding-related crashes, fatalities, and injuries.

12. The lack of state-level automated speed enforcement (ASE) enabling legislation, and restrictions on the use of ASE in states where legislation exists, have led to underuse of this effective speeding countermeasure.

13. Federal guidelines for automated speed enforcement (ASE) programs do not reflect the latest technologies and operating practices and are not very effective because their existence is not well known among the ASE program administrators.

14. Point-to-point speed enforcement has been shown to be an effective speeding countermeasure internationally, but it is not currently used in the United States.

15. Intelligent speed adaptation is an effective vehicle technology to reduce speeding.

16. New car safety ratings are effective in incentivizing consumers to purchase passenger vehicles with advanced safety systems.

17. Traffic safety campaigns that include highly publicized, increased enforcement can be an effective speeding countermeasure, but their inconsistent and infrequent use by states hinders their effectiveness.

18. The current level of emphasis on speeding as a national traffic safety issue is lower than warranted and insufficient to achieve the goal of zero traffic fatalities in the United States.

19. Current federal-aid programs do not require or incentivize states to fund speed management activities at a level commensurate with the national impact of speeding on fatalities and injuries.

20. The US Department of Transportation (DOT) Speed Management Program Plan identifies important actions to reduce speeding-related fatalities, but the DOT has not tracked or ensured the timely implementation of these actions.

RECOMMENDATIONS

New Recommendations

As a result of this safety study, the National Transportation Safety Board makes the following safety recommendations:

To the US Department of Transportation:

1. Complete the actions called for in your 2014 Speed Management Program Plan, and periodically publish status reports on the progress you have made.

To the National Highway Traffic Safety Administration:

2. Identify speeding-related performance measures to be used by local law enforcement agencies, including—but not limited to—the numbers and locations of speeding-related crashes of different injury severity levels, speeding citations, and warnings, and establish a consistent method for evaluating data-driven, high-visibility enforcement programs to reduce speeding. Disseminate the performance measures and evaluation method to local law enforcement agencies.

3. Identify best practices for communicating with law enforcement officers and the public about the effectiveness of data-driven, high-visibility enforcement programs to reduce speeding, and disseminate the best practices to local law enforcement agencies.

4. Work with the Governors Highway Safety Association, the International Association of Chiefs of Police, and the National Sheriffs' Association to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.

5. Work with the Federal Highway Administration to update the *Speed Enforcement Camera Systems Operational Guidelines* to reflect the latest automated speed enforcement (ASE) technologies and operating practices, and promote the updated guidelines among ASE program administrators.

6. Work with the Federal Highway Administration to assess the effectiveness of point-to-point speed enforcement in the United States and, based on the results of that assessment, update the *Speed Enforcement Camera Systems Operational Guidelines*, as appropriate.

7. Incentivize passenger vehicle manufacturers and consumers to adopt intelligent speed adaptation (ISA) systems by, for example, including ISA in the New Car Assessment Program.

8. Collaborate with other traffic safety stakeholders to develop and implement an ongoing program to increase public awareness of speeding as a national traffic safety issue. The program should include, but not be limited to, initiating an annual enforcement mobilization directed at speeding drivers.

9. Establish a program to incentivize state and local speed management activities.

To the Federal Highway Administration:

10. Revise Section 2B.13 of the *Manual on Uniform Traffic Control Devices* so that the factors currently listed as optional for all engineering studies are required, require that an expert system such as USLIMITS2 be used as a validation tool, and remove the guidance that speed limits in speed zones should be within 5 mph of the 85th percentile speed.

11. Revise Section 2B.13 of the *Manual on Uniform Traffic Control Devices* to, at a minimum, incorporate the safe system approach for urban roads to strengthen protection for vulnerable road users.

12. Work with the National Highway Traffic Safety Administration to update the *Speed Enforcement Camera Systems Operational Guidelines* to reflect the latest automated speed enforcement (ASE) technologies and operating practices, and promote the updated guidelines among ASE program administrators.

13. Work with the National Highway Traffic Safety Administration to assess the effectiveness of point-to-point speed enforcement in the United States and, based on the results of that assessment, update the *Speed Enforcement Camera Systems Operational Guidelines*, as appropriate.

To the seven states prohibiting automated speed enforcement:

14. Amend current laws to authorize state and local agencies to use automated speed enforcement.

To the 28 states without automated speed enforcement laws:

15. Authorize state and local agencies to use automated speed enforcement.

To the 15 states with automated speed enforcement restrictions:

16. Amend current laws to remove operational and location restrictions on the use of automated speed enforcement, except where such restrictions are necessary to align with best practices.

To the Governors Highway Safety Association:

17. Work with the National Highway Traffic Safety Administration, the International Association of Chiefs of Police, and the National Sheriffs' Association to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.

To the International Association of Chiefs of Police:

18. Work with the National Highway Traffic Safety Administration, the Governors Highway Safety Association, and the National Sheriffs' Association to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.

To the National Sheriffs' Association:

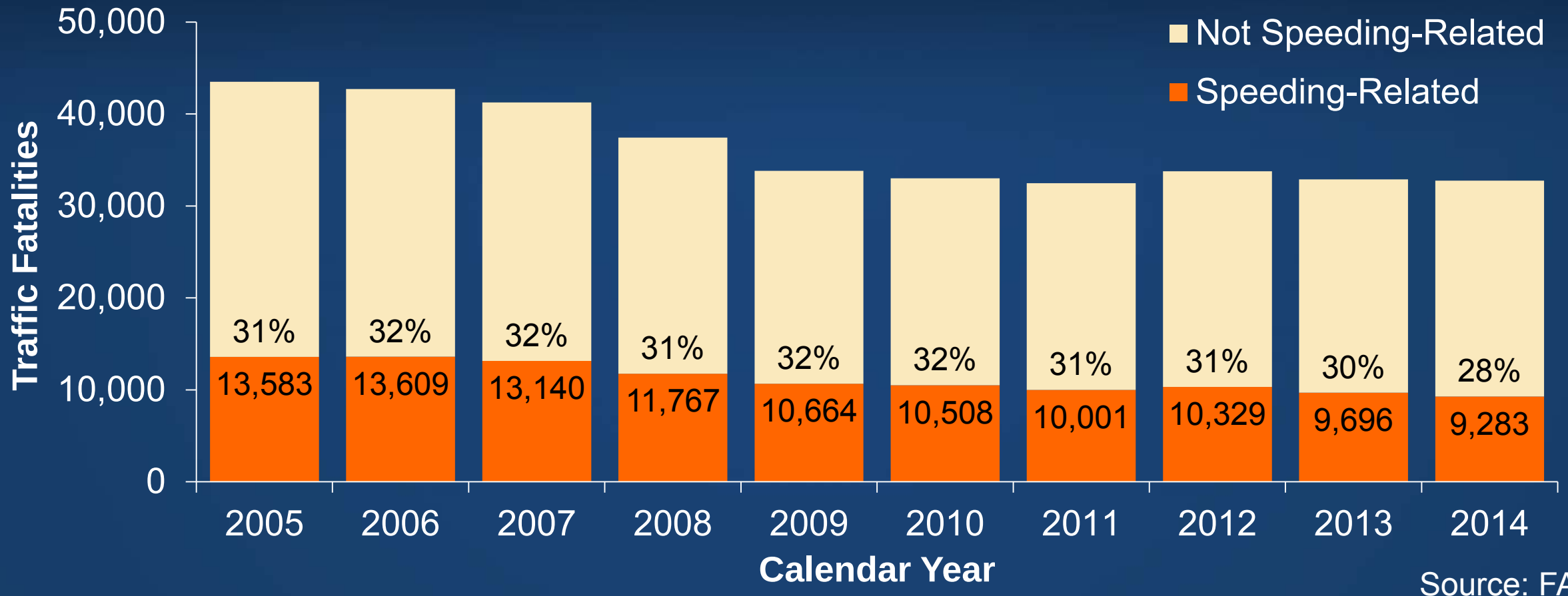
19. Work with the National Highway Traffic Safety Administration, the Governors Highway Safety Association, and the International Association of Chiefs of Police to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.

National Transportation Safety Board

Scope and Risk of Speeding

Ivan Cheung, PhD
Transportation Research Analyst

Speeding-Related Fatalities, 2005-2014



Source: FARS

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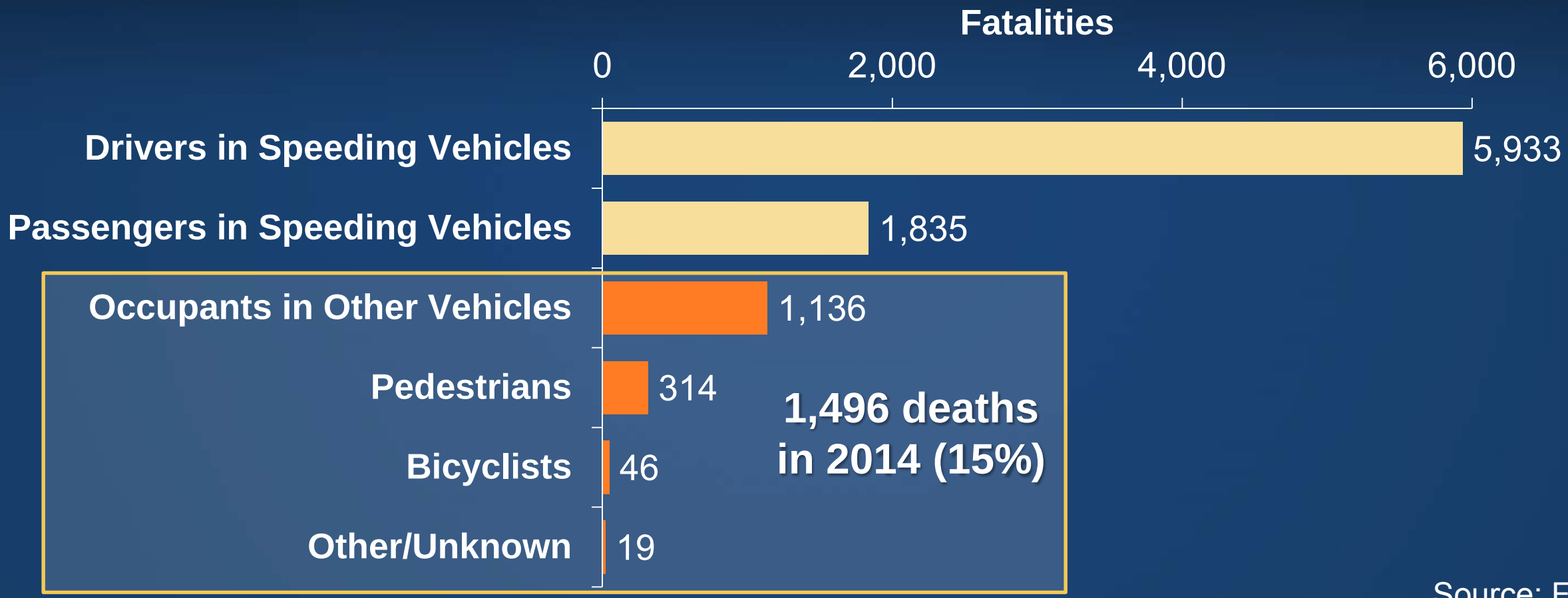
Speeding-Related Fatalities by Person Type, 2014



Source: FARS

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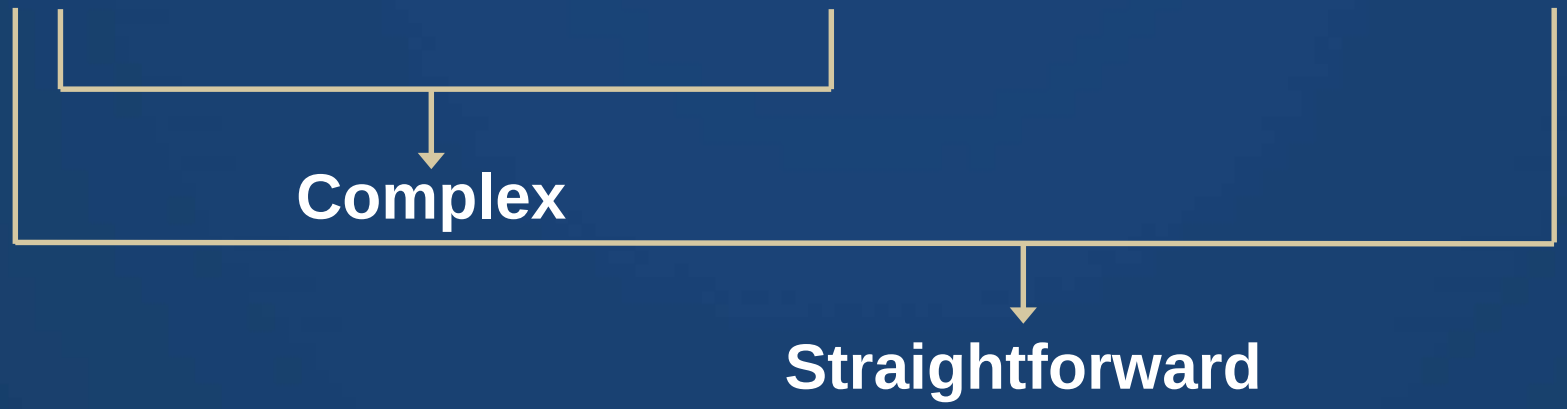
Risk of Speeding

$$\textbf{Risk} = \textbf{Likelihood} \times \textbf{Consequence}$$

$$\textbf{Risk of Speeding} = \textbf{Crash Involvement} \times \textbf{Crash Severity}$$



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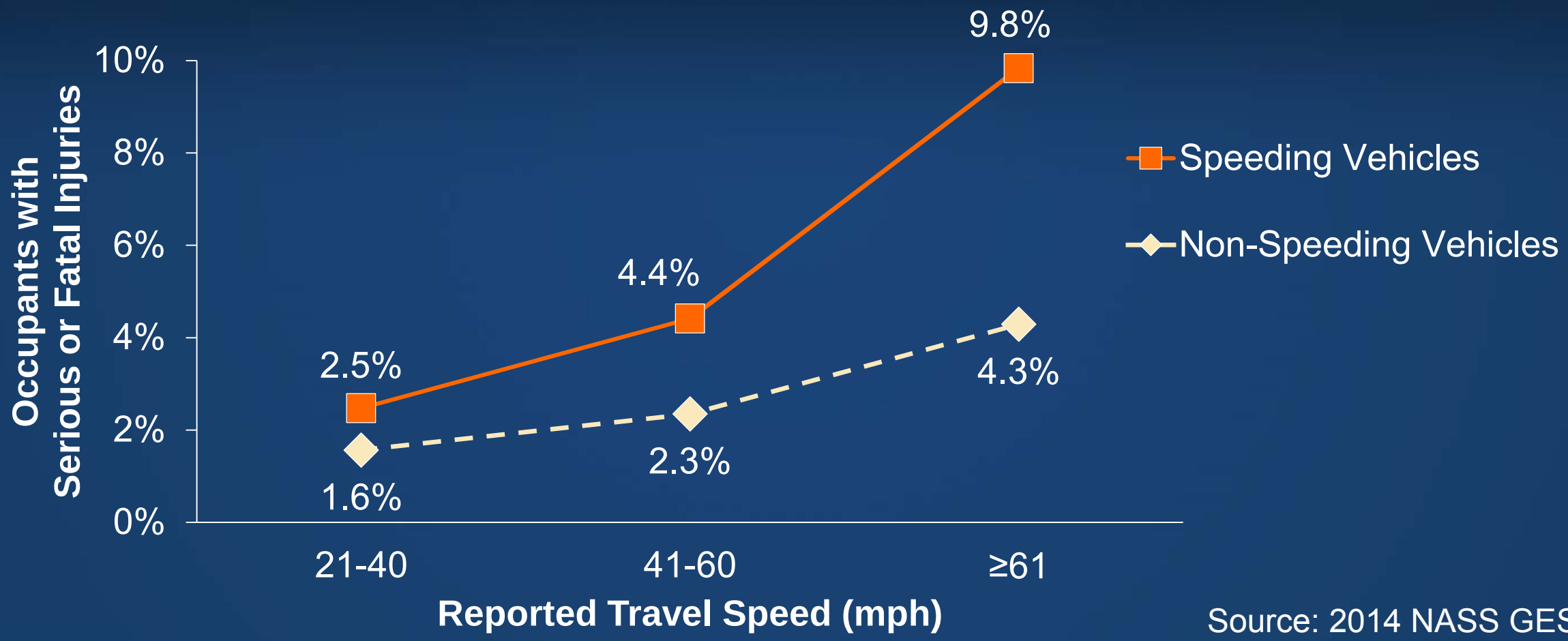
Speed and Passenger Vehicle Occupant Injuries



Source: 2014 NASS GES

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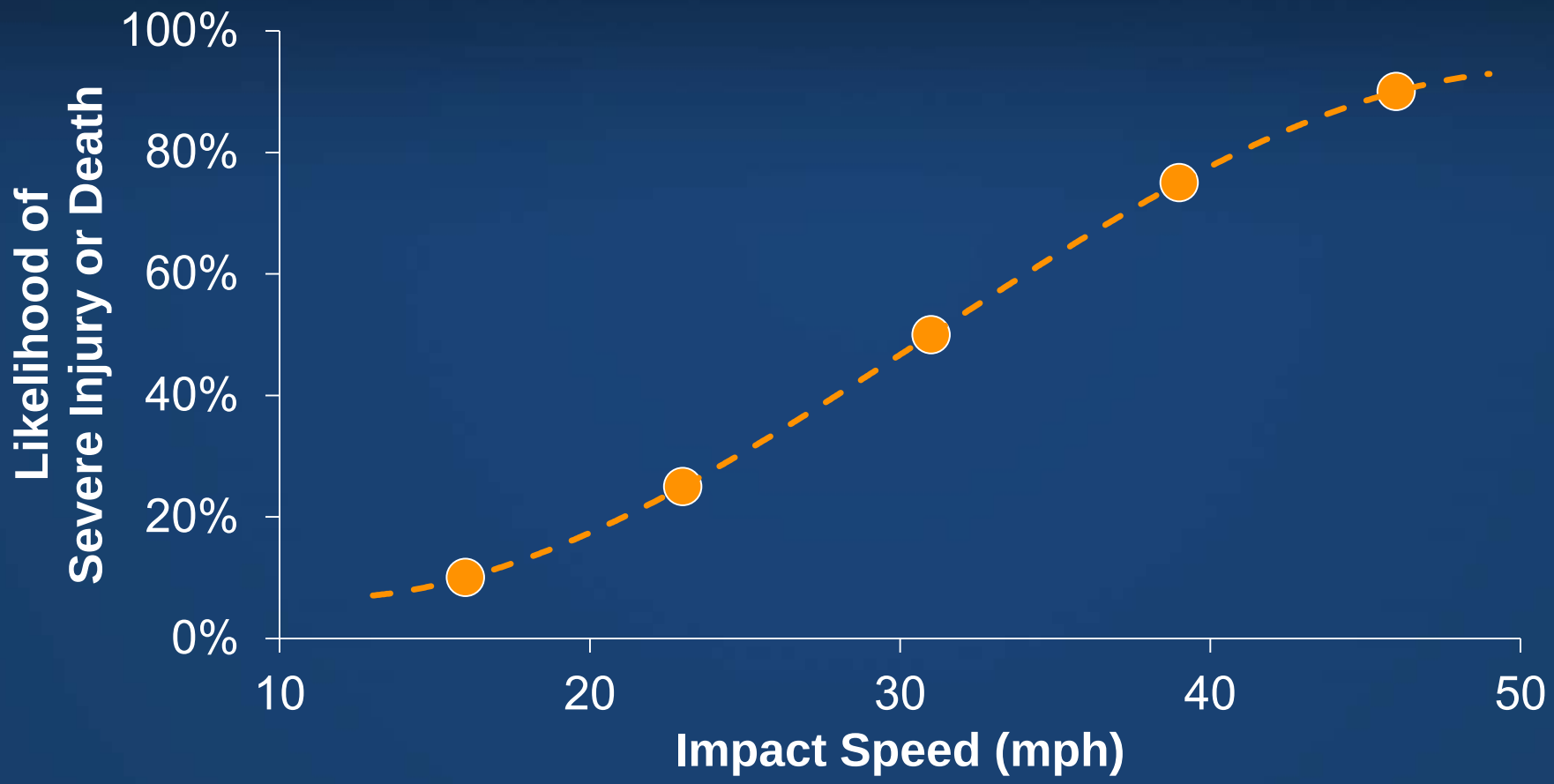
Speed and Pedestrian Injuries



Source: Tefft 2011

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Speed and Crash Involvement

- High speed
  - Reduces available time to receive and process information
  - Increases stopping distance
  - Increases chance of driving off road while negotiating a curve
- Complex relationship
  - Involves many interrelated factors
  - Leads to many misconceptions

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Summary on Scope and Risk

- Speeding increases risk
  - Crash involvement
  - Crash severity
- Speeding contributes to many deaths and injuries
- Key component of “Toward Zero Deaths” goal

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HSIS
Highway Safety Information System

SUMMARY REPORT

Evaluation of Lane Reduction "Road Diet" Measures on Crashes

This Highway Safety Information System (HSIS) summary replaces an earlier one, Evaluation of Lane Reduction "Road Diet" Measures and Their Effects on Crashes and Injuries *(FHWA-HRT-04-082), describing an evaluation of "road diet" treatments in Washington and California cities. This summary reexamines those data using more advanced study techniques and adds an analysis of road diet sites in smaller urban communities in Iowa.*

A *road diet* involves narrowing or eliminating travel lanes on a roadway to make more room for pedestrians and bicyclists.(1) While there can be more than four travel lanes before treatment, road diets are often conversions of four-lane, undivided roads into three lanes—two through lanes plus a center turn lane (see figure 1 and figure 2). The fourth lane may be converted to a bicycle lane, sidewalk, and/or on-street parking. In other words, the existing cross section is reallocated. This was the case with the two sets of treatments in the current study. Both involved conversions of four lanes to three at almost all sites.

Road diets can offer benefits to both drivers and pedestrians. On a four-lane street, speeds can vary between lanes, and drivers must slow or change lanes due to slower vehicles (e.g., vehicles stopped in the left lane waiting to make a left turn). In contrast, on streets with two through lanes plus a center turn lane, drivers' speeds are limited by the speed of the lead vehicle in the through lanes, and through vehicles are separated from left-turning vehicles. Thus, road diets may reduce vehicle speeds and vehicle interactions, which could potentially reduce the number and severity of vehicle-to-vehicle crashes. Road diets can also help pedestrians by creating fewer lanes of traffic to cross and by reducing vehicle speeds. A 2001 study found a reduction in pedestrian crash risk when crossing two- and three-lane roads compared to roads with four or more lanes.(2)

Under most annual average daily traffic (AADT) conditions tested, road diets appeared to have minimal effects on vehicle capacity because left-turning vehicles were moved into a common two-way left-turn lane (TWLTL).(3,4) However, for road diets with AADTs above approximately 20,000 vehicles, there is an increased likelihood that traffic congestion will increase to the point of diverting traffic to alternative routes.

While potential crash-related benefits are cited by road diet advocates, there has been limited research concerning such benefits. Two prior studies were conducted using data from different urbanized areas. The first, conducted by HSIS researchers, used data from treatment sites in eight cities in California and Washington.(5) The second study analyzed data from treatment sites in relatively small towns in Iowa.(6) While the nature of the treatment was the same in both studies (four lanes reduced to three), the settings, analysis methodologies, and results of the studies differed. Using a comparison of treated and matched comparison sites before and after treatment and the development of negative binomial regression models, the earlier HSIS study found a 6 percent reduction in crash frequency per mile and no significant change in crash rates at the California and Washington sites. Using a long-term (23-year) crash history for treated and reference sites and the development of a hierarchical Poisson model in a Bayesian approach, the later Iowa study

The Highway Safety Information System (HSIS) is a multi-State safety database that contains crash, roadway inventory, and traffic volume data for a select group of States. The participating States—California, Illinois, Maine, Michigan, Minnesota, North Carolina, Ohio, Utah, and Washington—were selected based on the quality of their data, the range of data available, and their ability to merge the data from the various files. The HSIS is used by FHWA staff, contractors, university researchers, and others to study current highway safety issues, direct research efforts, and evaluate the effectiveness of accident countermeasures.

U.S. Department of Transportation
Federal Highway Administration

Research, Development, and Technology
Turner-Fairbank Highway Research Center
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Figure 1. Photo. Four-lane configuration before road diet.



Source: Pedestrian Bike Information Center, "Road Diets" training module, 2009.

Figure 2. Photo. Three-lane configuration after road diet.



Source: Pedestrian Bike Information Center, "Road Diets" training module, 2009.

found a 25.2 percent reduction in crash frequency per mile and an 18.8 percent reduction in crash rate. Because of these differences, researchers from the National Cooperative Highway Research Program (NCHRP) 17-25 project team obtained and reanalyzed both data sets using a common methodology.[7] This summary documents the results of that reanalysis.

Methodology

Research Design

The basic objective of this reanalysis effort was to estimate the change in total crashes resulting from the conversions in each of the two databases and to combine these estimates into a crash modification factor (CMF). To do this, the empirical Bayes (EB) methodology described by Hauer was used.[8] A prediction of what would have happened at the treatment sites in the after period without treatment is based on a weighted combination of the following two factors: (1) the frequency of crashes on the treated sites in the before period and (2) the crash-frequency predictions from regression models developed with data from similar untreated reference sites. The prediction of what would have happened without treatment is then compared to what actually happened with treatment to estimate the safety effect of the treatment. The methodology corrects for the regression bias, changes in traffic volume at the treatment sites, and other possible confounding factors as well as provides a method for combining results from different jurisdictions by accounting for differences in crash experience and reporting practice. Details of the methodology are in appendix C of *NCHRP Report 617*.[7]

Databases Used

The two databases used were obtained from the original study authors. Both databases provided data on site characteristics for treatment and comparison or reference sites and on crashes and AADT for both the before and after periods.

The HSIS study database contained data on treatment and comparison sites obtained from local traffic engineers in six cities in California—Mountain View, Oakland, Sacramento, San Francisco, San Leandro, and Sunnyvale—and two cities in Washington—Bellevue and Seattle.[5] The data included 30 treatment sites and 51 reference sites. The reference sites were matched by the local traffic engineer to be similar to the treatment sites in terms of functional class, type of development, speed limit, intersection spacing, and access control.

The Iowa database included data from the original study for 15 treatment and 15 reference sites from U.S. and State routes in small urban towns with an average population of 17,000.[6] These data were supplemented with additional information provided by the Iowa Department of Transportation for 281 similar reference sites.

As noted earlier, the road diet treatment was very similar at the sites in both databases. All 15 of the Iowa treatment sites involved conversion from four lanes to three lanes, with the third lane being a TWLTL. Bike lanes were installed in only one case, and parallel parking was retained for a section within one other site. In the HSIS database, most treatment sites involved the same conversion from four lanes to three lanes as at the Iowa sites. At one site, the after condition included a raised median and left-turn pockets at intersections rather than a TWLTL.

Table 1 provides descriptive characteristics for the treatment and control sites from each database. Crash statistics are also provided. In both data sets, the treatment and reference segments were divided into "homogeneous sites" for analysis purposes, and the average length was approximately 1 mi in all cases. In the Iowa data, the mean AADT for the reference sites was approximately the same as for the treatment sites, and the resulting crashes per mile-year for the reference sites and the before-period treatment sites were very similar. In the HSIS data, the mean AADT and the crashes per mile-year for the reference sites were somewhat higher than for the treatment sites. However, the AADT range in the reference site data included the AADT range in the treatment data, making it suitable for the predictive models produced.

Table 1. Descriptive statistics of evaluation sites

DATABASE/SITE TYPE	CHARACTERISTIC	MEAN	MINIMUM	MAXIMUM
Iowa Treatment (15 sites)	Years before	17.53	11.00	21.00
	Years after	4.47	1.00	11.00
	Crashes/mile-year before	23.74	4.91	56.15
	Crashes/mile-year after	12.19	2.27	30.48
	AADT before	7,987	4,854	11,846
	AADT after	9,212	3,718	13,908
	Average length (mi)	1.02	0.24	1.72
Iowa Reference (296 sites)	Years	21.8	5	23
	Crashes/mile-year	26.8	0.2	173.7
	AADT	8,621	296	27,530
	Average length (mi)	0.99	0.27	3.38
HSIS Treatment (30 sites)	Years before	4.7	1.8	8.5
	Years after	3.5	0.6	8.8
	Crashes/mile-year before	28.57	0.00	111.10
	Crashes/mile-year after	24.07	0.00	107.62
	AADT before	11,928	5,500	24,000
	AADT after	12,790	6,194	26,376
	Average length (mi)	0.84	0.08	2.54
HSIS Reference (51 sites)	Years	7.82	4.50	12.17
	Crashes/mile-year	42.19	5.96	169.73
	AADT	15,208	1,933	26,100
	Average length (mi)	0.95	0.10	3.31

Analysis

As previously noted, one component of the prediction of after-period accident frequencies at the treatment sites without treatment is a regression model developed using data from the untreated reference sites. This model is referred to as a safety performance function (SPF). In this study, generalized linear modeling was used to estimate the SPF coefficients using the software package SAS® and assuming a negative binomial error distribution, all consistent with the state of research in developing these models. Examination of several model forms indicated that the most appropriate and useful models for both databases included AADT and segment length. The final model form and coefficients differed for the two databases. The final model for the Iowa data is shown in equation 1, where a_y is a series of yearly calibration factors developed to account for the safety effect of changes other than AADT (e.g., accident reporting practices, demography, weather).

The final model for the HSIS data is shown in equation 2. The HSIS data did not allow the development of yearly calibration factors.

$$\text{Expected number of accidents per year} = a_y(\text{length})\exp(-8.4439)(\text{AADT})^{1.2917} \quad (1)$$

$$\text{Expected number of accidents per year} = \exp(-3.6323)(\text{length})^{0.7182}(\text{AADT})^{0.5722} \quad (2)$$

Results

The EB evaluation of total crash frequency indicated a statistically significant effect of the road diet treatment in both data sets and when the results are combined. Table 2 shows the results from each of the two studies and the combined results—the CMFs and their standard deviations.

Table 2. Results of the EB analysis for the Iowa and HSIS data concerning 4-lane to 3-lane road diets.[5,6,7]

	CRASH TYPE STUDIED AND ESTIMATED EFFECTS		
STATE/ SITE CHARACTERISTICS	ACCIDENT TYPE	NUMBER OF TREATED SITES	CMF (STANDARD DEVIATION)
Iowa: Predominately U.S. and State routes within small urban areas (average population of 17,000)	Total crashes	15 (15 mi)	0.53 (0.02)
California/Washington: Predominately corridors within suburban areas surrounding larger cities (average population of 269,000)	Total crashes	30 (25 mi)	0.81 (0.03)
All sites	Total crashes	45 (40 mi)	0.71 (0.02)

The Iowa data indicate a 47 percent reduction in total crashes while the HSIS (California and Washington) data indicate a 19 percent decrease—a substantial difference. These reanalysis results also differ from the original Iowa study results (a 25 percent reduction) and from the original HSIS results (a 6 percent reduction). Combining both data sets results in a 29 percent reduction in total crashes.

Discussion and Recommendations

The authors identified two likely reasons the reanalysis differed from the original Iowa results. First, the reanalysis involved a much larger reference group than was available in the original study. Second, while the results of the original study weighted all treatment sites equally regardless of length, the reanalysis results provided more weight to longer sites. While not stated in the reanalysis report, the difference in the two analyses of the HSIS data could have resulted from the use of improved methodology (the EB method) in the reanalysis effort. This methodology made it possible to use all 30 treatment sites and 51 reference sites. In the original study, data from only 11 treatment sites and 24 reference sites were used, with the remaining sites being omitted due to small sample sizes of crashes because of short segment lengths, short data periods, or low average daily traffic.

Of more importance than the differences between the original and current study efforts are the differences between the Iowa and HSIS treatment effects estimated in the reanalysis effort. These differences may be a function of traffic volumes and characteristics of the urban environments where the road diets were implemented. The sites in Iowa ranged in AADT from 3,718 to 13,908 and were predominately on U.S. or State routes passing through small urban towns with an average population of 17,000. The sites in Washington and California ranged in AADT from 6,194 to 26,376 and were predominately on corridors in suburban environments that surrounded larger cities with an average population of 269,000. In addition, based on a separate study of one site in Iowa, there appeared to be a traffic calming effect that resulted in a 4–5 mi/h reduction in 85th percentile free-flow speed and a 30 percent reduction in the percentage of vehicles traveling more than 5 mi/h over the speed limit (i.e., vehicles traveling 35 mi/h or higher).[9] The reanalysis authors speculated that while there could have been significant differences in speeds between the rural U.S. or State highway approaching a small town and the road diet section, this calming effect would be less likely in the larger cities in the HSIS study, where the approaching speed limits (and traffic speeds) might have been lower before treatment.

Given these differences, it is recommended that the choice of which CMF to use should be based on the characteristics of the site being considered. If the proposed treatment site is more like the Iowa sites (i.e., U.S. or State routes with moderate AADTs in small urban areas), then the 47 percent reduction found in Iowa should be used. If the treatment site is part of a corridor in a suburban area of a larger city, then the 19 percent reduction should be used. If the proposed site matches neither of these site types, then the combined 29 percent reduction is most appropriate.

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FOR MORE INFORMATION

The research combining both databases was conducted by Bhagwant Persaud and Craig Lyon of Ryerson University, Toronto, Canada, as part of *NCHRP Report 617*.[7] The full study and appendix C can be downloaded from the Web address shown in the reference list. References to the initial studies that generated the two databases are also included in that list.[5,6] For more information about HSIS, contact Carol Tan, HSIS Program Manager, HRDS, (202) 493-3315, carol.tan@dot.gov.

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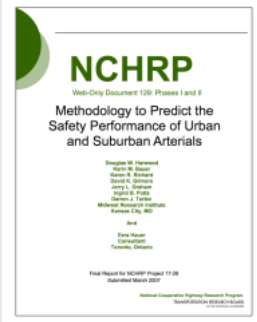

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ACKNOWLEDGMENT

This work was sponsored by the American Association of State Highway and Transportation Officials (AASHTO), in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program (NCHRP), which is administered by the Transportation Research Board (TRB) of the National Academies.

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PREFACE

This Final Report for Phases I and II is submitted by Midwest Research Institute (MRI) in accordance with the contractual requirements of NCHRP Project 17-26, *Methodology to Predict the Safety Performance of Urban and Suburban Arterials*. This report was prepared by Mr. Douglas W. Harwood, Ms. Karin M. Bauer, Ms. Karen R. Richard, Mr. David K. Gilmore, Mr. Jerry L. Graham, Ms. Ingrid B. Potts, and Dr. Darren J. Torbic of Midwest Research Institute, and Dr. Ezra Hauer.

This report covers the original scope of the research which addresses the preparation of a draft chapter on urban and suburban arterials for the forthcoming *Highway Safety Manual* (HSM). A recent addition to the project scope of work involves the development of a safety prediction methodology for collisions involving pedestrians on urban and suburban arterials. That work is currently underway in Phase III of the project and will be reported separately. The draft HSM chapter presented in Appendix B of this report will be revised when the pedestrian safety methodology is available.

Sincerely,

Midwest Research Institute

Douglas W. Harwood
Principal Traffic Engineer

Approved:

Robert G. Barton, Ph.D.
Director
Engineering Division

March 2007

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CHAPTER 1. INTRODUCTION

BACKGROUND

The Transportation Research Board (TRB) and the American Association of State Highway and Transportation Officials (AASHTO) have begun a major initiative to develop a *Highway Safety Manual* (HSM). The HSM began from recognition of the need that, for safety to receive proper consideration in the highway project development process, analysts needed tools to make quantitative statements about the safety effects of proposed projects or design alternatives.

Most of the potential impacts of highway projects other than safety (e.g., traffic operations, air quality, noise, wetlands, construction cost) are addressed in quantitative fashion during the design process. However, while the accident history of the site may be documented quantitatively, most safety assessments of proposed projects are qualitative in nature and do not include explicit estimates of the likely safety effects of the project. Even when an attempt to develop quantitative estimates of safety effects is made, the accuracy of those estimates is limited by the lack of reliable tools for preparing such estimates. It is a concern that, when accurate traffic operational and environmental assessments are available, these factors may receive more weight in the decision making process, to the detriment of safety.

The HSM initiative grew out of the recognition that safety analysts need methodologies to predict safety similar to the quantitative methodologies that traffic operations engineers have available to assess capacity and level of service from specific traffic operational service measures using the *Highway Capacity Manual* (HCM) (*1*). The HSM initiative began with a conference session at the TRB annual meeting in January 1999 to explore the role of safety in the HCM. The consensus of the speakers at that session was that the HCM was already complex enough without trying to address safety and that a separate stand-alone document was needed. A workshop sponsored by TRB and FHWA was then held in Irvine, California, in December 1999 to consider the need for an HSM and develop a scope for a potential first edition. The Irvine workshop led to two specific initiatives: the formation of a TRB Joint Subcommittee on the Development of the Highway Safety Manual and the conduct of NCHRP Project 17-18(4) to prepare a detailed outline, a strategic plan, and a prototype chapter for the HSM. The TRB Joint Subcommittee has now become the TRB Task Force on Development of the Highway Safety Manual and may, in the future, be recognized as a full TRB Committee. AASHTO has formed a Joint Task Force to review and approve the HSM for publication.

The HSM will be targeted primarily to those on the front line of daily decision making in state highway agencies, and in local agencies including cities, counties, and metropolitan planning organizations (MPOs). These include analysts evaluating the potential effects of proposed improvement projects and those conducting planning, design, or operational studies.

The TRB Task Force has reviewed and approved a draft outline for the HSM, working from recommendations presented in *Development of a Highway Safety Manual* (*2*). The key components of the HSM will be:

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Thus, the HSM, as it has evolved, will be broader than simply providing quantitative safety prediction methodologies, but the methodologies in HSM Part III will still be the centerpiece of the HSM.

HSM Part III will consist of chapters that provide safety prediction methodologies for specific types of highway facilities. The TRB Task Force plans that the first edition of the HSM should include safety prediction methodologies for rural two-lane highways, rural multilane highways, and urban and suburban arterials. These methodologies would address the safety performance of both roadway segments and at-grade intersections on these facility types. A prototype chapter on rural two-lane highways for use in HSM Part III has already been developed to illustrate the potential format and scope for such chapters (*2*). This report presents research results which document the development of a draft HSM chapter presenting a safety prediction methodology for urban and suburban arterials. This is the first safety prediction methodology developed specifically for the HSM.

RESEARCH OBJECTIVE AND SCOPE

The objective of the research is to develop a methodology that predicts the safety performance of the various elements (e.g., lane width, shoulder width, use of curbs) considered in planning of nonlimited-access urban and suburban arterials. This methodology will be suitable for incorporation as a chapter in Part III of the HSM.

The scope of the research includes definition of the structure and content of the safety prediction methodology, obtaining the data best suited to development of the methodology, analyzing those data to develop valid statistical models of specific aspects of safety performance of urban and suburban arterials, fitting those models together into a comprehensive methodology, testing, and validating that methodology, and preparing a chapter that presents the model to users.

The urban and suburban arterials to be considered in the research potentially include all highway facilities in urban areas, other than freeways, that serve the primary function of serving through traffic movements. Highways which provide access to adjacent land as a primary or substantial function will not be considered. Although mobility is the primary function of an arterial, and the access function is less important than on collector or local roads, direct access to arterial facilities will play an important role in defining their safety performance. Thus, the relationship to safety of driveways, median openings, and median treatments on arterials will be a key consideration in the research.

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ORGANIZATION OF THIS REPORT

This report presents the results of the literature review, the survey of potential HSM users, the recommended structure of the safety prediction methodology, and the recommended work plan for the methodology development.

The remainder of the report is organized as follows. Chapter 2 presents information related to the safety performance of urban and suburban arterials, including the results of the literature review and an HSM user survey. Chapter 3 summarizes the recommended structure for the safety prediction methodology. Chapter 4 presents the development of the project database. Chapter 5 documents the development of the base models and adjustment factors used in the HSM methodology, while Chapter 6 documents the accident modification factors (AMFs) used in the methodology. The HSM methodology is summarized in Chapter 7. Chapter 8 presents the results of a validation study in which the safety prediction methodology was applied to sites in jurisdictions other than those used in its development. Chapter 9 presents the conclusions and recommendations of the research.

Appendix A presents the results of the survey of state and local highway agencies, MPOs, and TRB Task Force members. Appendix B presents a draft of HSM Chapter 10 which incorporates the safety prediction methodology.

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CHAPTER 2. SAFETY PERFORMANCE OF URBAN AND SUBURBAN ARTERIALS

This section of the report summarizes the safety performance of urban and suburban arterials by presenting the results of the literature review, and a survey of potential HSM users.

LITERATURE REVIEW

The results of the literature review presented here include the safety effects of lane width, shoulder width, horizontal curves, access features, and intersections on urban and suburban arterials. The literature focuses on results that have been reported, but does not address the many potentially relevant issues that have not been previously investigated. The literature review presents the results of each relevant study, but is not intended to provide a detailed critique of the methodology for each study. Many of the studies in the literature, particularly older studies, have methodological problems that should discourage reliance on their results, especially if results of better designed research are available. Methodological concerns of the this type were addressed in the assessment of the literature for the development of accident modification factors (AMFs) that is presented in Chapter 6 of this report.

Lane Width

Lane widths on urban and suburban arterials typically vary from 3.0 to 3.6 m (10 to 12 ft) (*3*). Lane widths of 3.0 m (10 ft) are sometimes used in highly restricted areas having little or no truck traffic. Lane widths of 3.3 m (11 ft) are used quite extensively for urban arterial street design, and lane widths of 3.6 m (12 ft) are desirable on higher speed, free-flowing, principal arterials.

A key aspect in the selection of the appropriate lane width on an urban or suburban arterial is safety. There are many reasons that might lead designers to consider the use of lanes narrower than 3.6 m (12 ft) on urban and suburban arterials. These include the desire to reduce pedestrian crossing distances; the desire to provide space for other roadway features such as medians, bicycle lanes, and curb parking; and the desire to provide space for roadside features such as sidewalks and clear zones and to minimize interference with existing roadside development. The benefits of these other features are substantial, and the decision to use narrower lanes might be an easy one, were it not for concern that provision of lanes narrower than 3.6 m (12 ft) would be accompanied by a reduction in safety. Therefore, an understanding of the relationship between lane width and safety is central to design decision making concerning urban and suburban arterials.

In a recent review of lane width and safety issues, Hauer (*4*) has indicated that there are two principal aspects to the potential link between lane width and safety:

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- Wider lanes increase the average separation between vehicles moving in adjacent lanes and, therefore, may provide a wider buffer to accommodate small random deviations from their intended paths.
- Wider lanes may provide more room for corrective maneuvers by drivers in near-accident circumstances.

The possible safety effects of each of these potential linkages are discussed below. The following discussion is adapted from Hauer (*4*), but includes additional insights.

Hauer (*4*) states that the first possible linkage between lane width and safety is that, as lane width increases, so does the average separation between vehicles moving in adjacent lanes, in either the same direction or in opposite directions. This may provide a wider buffer to accommodate the small random deviations of vehicles from their intended paths. The research team for the current research believes that a wider buffer should also accommodate larger deviations that may occur if drivers are inattentive. However, Hauer (*4*) considers that it is also likely that wider lanes also induce faster travel speeds which may increase accident risk and is likely to increase accident severity. The 1985 edition of the HCM (*5*) suggested that wider lanes on multilane highways also increase capacity and, therefore, reduce following distances; however, HCM editions since 1985 (*1,6*) have indicated that wider lanes on multilane highways increase free-flow speeds, but do not increase capacity and, therefore, do not reduce vehicle headways.

The second possible linkage of lane width and safety noted by Hauer (*4*) is that wider lanes may provide more room for drivers to make corrective maneuvers in near-accident situations related to driver inattention. Specifically, the research team notes that, where lanes are wider, vehicles have the opportunity to travel at a greater separation from the edge of the traveled way and, thus, may be less likely to leave the roadway and run onto the roadside. Hauer (*4*) states that, for the driver of a vehicle in a narrow lane, a moment's inattention may result in the vehicle entering an adjacent lane or the roadside. Thus, the research team notes that wider lanes would be expected to increase the likelihood that inattentive drivers will recover before leaving their lane or entering the roadside. However, the likelihood of a reportable accident resulting from a roadside encroachment is largely a function of the design quality of the roadside. Where a wide paved shoulder is present, a roadside encroachment may have virtually no consequence; where there is a pavement edge drop-off, a poor shoulder, a curb at the edge of the traveled way, or steep slopes or substantial objects exist beyond the edge of the traveled way, a reportable accident, and possibly a severe accident, may result. This indicates that the safety effects of lane width may be difficult to quantify independently of shoulder and roadside design factors.

Hauer (*4*) indicates that the linkages described above are sufficiently complex that they do not indicate conceptually what the relationship between lane width and safety should be. This review of the literature begins with a discussion of the relationship between lane width and safety on urban and suburban arterials for motor vehicles, followed by discussions of safety-related lane width issues concerning pedestrians and bicyclists.

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Motor Vehicle Collisions

The relationship between lane width and safety has been studied extensively in the rural environment. An expert panel (*7*) recently reviewed the literature on safety for lane widths on rural two-lane highways for the FHWA Interactive Highway Safety Design Model (IHSDM). This panel concluded that the most credible studies of lane width on rural two-lane highways were those by Griffin and Mak (*8*) for low-volume roads and by Zegeer et al. (*9*) for higher volume roads. Figure 1 presents the AMFs developed by the IHSDM expert panel (*7*) based on these past studies. The nominal or base condition for any AMF corresponds to an AMF value of 1.0. In the case of lane width, as shown in Figure 1, the nominal or base condition is a lane width of 3.6 m (12 ft). An AMF value greater than 1.0 represents a condition for which more accidents are expected than for the nominal or base condition. An AMF value less than 1.0 represents a condition for which fewer accidents are expected than for the nominal or base condition. An alternative name for AMF is crash reduction factor (CRF), although CRFs are typically expressed as percentage reductions in accident frequency rather than as multiplicative factors. Another expert panel in a later research study (*10*) concluded that the AMFs for rural two-lane highways shown in Figure 1 are also the best available estimates for rural multilane highways.

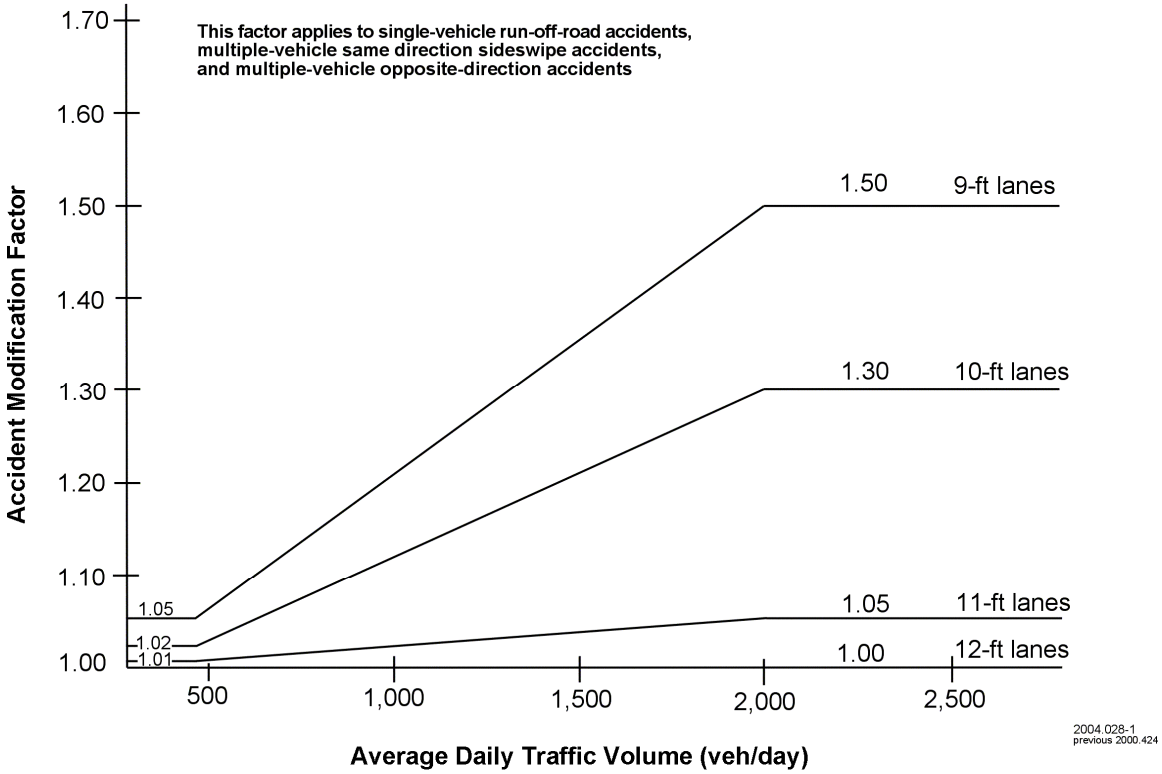

Figure 1. Lane width AMF for two-lane highways from IHSDM crash prediction module (7).

Only a few studies have researched the relationship between lane width and safety in the urban environment. Hauer (*11*) developed six statistical models to predict the nonintersection accident frequency of urban four-lane undivided roads. Separate models were developed for

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"off-the-road" and "on-the-road" property-damage-only (PDO), injury, and total accidents. From the three statistical models for "off-the-road" accidents, Hauer concluded that if accident frequency is influenced by lane width, it is not discernable. From the three statistical models for "on-the-road" accidents, lane width was found to be associated with PDO accidents but not with injury accidents. In the PDO model, wider lanes result in larger accident frequencies. However, Hauer notes that the relationship is weak, and lane width is only included in the model because of the traditional interest in this variable.

In 2001, Strathman et al. (*12*) analyzed design attributes and crash frequencies on the Oregon state highway system. The analysis differentiated the crash frequencies according to functional classification (freeway vs. nonfreeway) and location (urban vs. nonurban). Strathman et al. did not find any relationship between lane width and accident frequency.

Hadi et al. (*13*) developed negative binomial regression equations to estimate the safety effects of various cross-sectional elements for a number of different highway types. Hadi et al. found significant relationships between lane width and crash rates for undivided highways and urban freeways. Hadi considered both total and midblock crash rates, including crashes for each roadway type considered. In general, widening lane widths up to 3.6 m (12 ft) and 4.0 m (13 ft) would be expected to decrease crash rates on two-lane urban roads and four-lane urban undivided roadways, respectively. Figure 2 illustrates the potential benefits of lane widening for four roadway classes, including four-lane urban undivided highways.

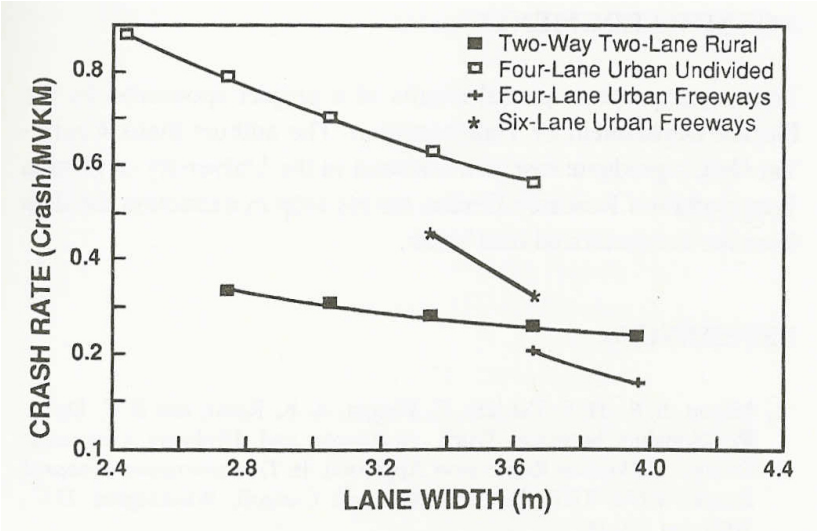

Figure 2. Effect of lane width on midblock crash rates (13).

Harwood (*14*) conducted research to determine the effectiveness of various alternative strategies for reallocating the use of street width on urban arterials without changing the total curb-to-curb width. The research addressed urban arterial streets with curb-and-gutter cross sections and speeds of 72 km/h (45 mph) or less. Harwood indicated that the preferred lane width for urban arterial streets under most circumstances is 3.3 or 3.6 m (11 or 12 ft). However, constraints on street widening do not always permit the use of lanes that wide, and under some

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situations, traffic operational benefits, traffic safety benefits, or both can be obtained from the use of narrower lanes.

Commercial buses operate frequently on many urban and suburban arterials. Traffic accidents involving buses result in about 35,000 injuries annually in the United States, as noted by Zegeer et al. (*15*). Zegeer et al. described bus and motor vehicle accident characteristics and recommended several highway improvements to reduce the number and severity of bus-related highway crashes. One of the recommendations concerned lane widths along urban streets. Zegeer et al. note that a primary transit bus accident type involves sideswipe collisions between buses and other motor vehicles. Because of the wider dimensions on buses, it is important that lane widths be adequate to minimize the chance for sideswipe collisions. With narrower lanes, the potential for sideswipe accidents increases. Therefore, Zegeer et al. recommended that along major arterials where buses and other large trucks are likely to operate, consideration should be given to providing lane widths of 3.6 m (12 ft), where possible, or at least 3.3 m (11 ft). This will increase the lateral spacing between buses and other motor vehicles, reducing the potential for accidents.

Recent research by Potts et al. (*16*) using the same database assembled for this report investigated the relationship between lane width and safety for midblock roadway segments and for intersection approaches on urban and suburban arterials. The research by Potts et al. found no indication of a consistent relationship between lane width and safety; except for a possible indication that accident frequencies may be higher on four-lane undivided arterials with 2.7 to 3.0 m (9 to 10 ft) lanes than on four-lane undivided arterials with 3.3 to 3.6 m (11 to 12 ft) lanes. This finding is in general agreement with the relationship developed by Hadi et al. (*13*) shown in Figure 2.

Pedestrian Collisions

No studies have been found that have used accident data to document the pedestrian safety implications of lane width. However, it may be reasoned that as crossing distances increase, pedestrian exposure time to motor vehicle traffic increases, increasing the potential of vehicle-pedestrian conflicts, and lane width can both directly and indirectly affect pedestrian crossing distance. As crossing distances increase, it may also be more difficult for pedestrians to judge the adequacy of gaps in traffic. It is also possible that as crossing distances increase, pedestrians compensate through greater attention to crossing safety. However, there is no research at present that explicitly addresses these issues.

Many countermeasures designed to improve pedestrian safety involve narrowing lanes to reduce vehicle speeds and enhance pedestrian mobility and safety. For example, curb extensions may be used at midblock locations to decrease pedestrian crossing distances and vehicle speeds. Chu and Baltes (*17*) studied midblock crossing difficulty as perceived by pedestrians and found that pedestrians perceive midblock street crossing to be more difficult with wider crossing distance. Other design features such as raised medians or refuge islands may also be used to reduce lane widths and/or crossing distances for pedestrians at both midblock and intersection

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locations. Curb extensions and other traffic calming measures may not be appropriate on major collector and arterial streets.

Zegeer et al. (*18*) performed a recent analysis of safety at marked and unmarked crosswalks. That study addressed the number of lanes that pedestrians needed to cross, but neither lane width nor crossing distance was considered explicitly.

Lane width may also affect a pedestrian's walking experience along a roadway. The width of travel lanes ultimately impacts the amount of space within the right-of-way for use by other modes (e.g., pedestrians and bicyclists). Space within the right-of-way may be designated for use by different modes of travel, and space may also be allocated as a buffer to separate modes or to provide a recovery for errant vehicles. Landis et al. (*19*) developed a pedestrian level of service model; this model does not deal with level of service in the same sense as that term is defined in the HCM (*1*) but, rather, is intended to quantify pedestrians' perception of safety and comfort in the roadside environment. The model quantifies how well roadways accommodate pedestrian travel along the roadway segment. Landis et al. found that a pedestrian's sense of safety and comfort is strongly influenced by the presence of a sidewalk and lateral separation relative to the motor vehicle traffic. In general, as the lateral separation increases, the pedestrian's sense of comfort or safety also increases. The elements in the final pedestrian level of service model related to lateral separation include:

- Width of outside lane
- Width of shoulder or bicycle lane
- Presence of on-street parking
- Buffer width (distance between edge of pavement and sidewalk)
- Presence and width of sidewalk

Thus, lane width (and shoulder width) is treated as explicit factors in the assessment of pedestrian safety and comfort. Earlier work by Dixon (*20*) to develop a pedestrian level of service methodology also incorporated lateral separation elements such as buffer space and pedestrian crossing widths.

Bicycle Collisions

No studies have been found that have used accident data to document bicycle safety implications of lane width. However, several studies indirectly addressed bicycle safety issues related to lane width by investigating the impacts of various types of bicycle facilities on surrogate measures of safety, such as motor vehicle speeds and lateral positioning. For the safety of bicyclists, the most advantageous facility is one that provides the greatest separation from motor vehicle traffic to allow for more reaction time to turning or entering vehicles into the traffic stream and to protect bicyclists from wind blasts and other effects from high volumes or high speeds of traffic (*21*).

McHenry and Wallace (*22*) studied the effects of different widths of wide curb lanes (WCLs) and the addition of bicycle lanes (BLs) in suburban settings. They determined that the

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optimal width for a WCL was 4.6 m (15 ft) and that BLs had advantages over WCLs such as less vehicle encroachment, lower vehicle displacement when passing a bicycle, and less variation in the lateral position of the vehicle and the bicycle.

In an evaluation of shared-use facilities, Harkey et al. (*21*) evaluated the impact of WCLs, BLs, and paved shoulders on motor vehicle and bicycle traffic. The principal findings included:

- On average, motorists positioned their vehicle approximately 2.0 m (6.4 ft) from a bicyclist in a WCL, 1.9 m (6.0 ft) from a bicyclist on a paved shoulder, and approximately 1.8 m (5.9 ft) from a bicyclist in a BL. Thus, the separation distance between bicyclists and motorists does not vary significantly by facility type.
- The distance between the bicyclist and the edge of roadway was considerably less along WCLs [0.43 m (1.4 ft)] compared to 0.73 m (2.4 ft) along facilities with paved shoulders or BLs.
- Motor vehicles moved to the left about 0.43 m (1.4 ft) further when passing a bicyclist on a WCL compared to paved shoulder and BL facilities.
- Encroachment into the adjacent lane to the left by motor vehicles when passing a bicycle was greater on WCLs (22.3 percent) than along BLs or paved shoulders (8.9 percent).

In similar research, Jilla (*23*) found that cars on narrow roads not only drifted toward the centerline when approaching bicyclists but also that motor vehicle speeds dropped. Bicyclists actually had a greater effect on the lateral position and speed of a vehicle than did other motor vehicles in the opposing lanes. Kroll and Ramey (*24*) found that the distance between passing motor vehicles and bicycles was more a function of a motorist's available travel space and not whether a BL was present. Based on their findings, Kroll and Ramey recommended that BLs be included when travel space is less than 4.6 m (15 ft). The overall conclusion of research conducted by Hunter et al. (*25*) was that both WCL and BL facilities can improve the safety and operations of bicycle traffic.

Several studies have been conducted, and different models developed, to measure the level of service that individual roads provide to bicyclists. As in the case of pedestrian level of service discussed above, the bicycle level of service concept departs from the traditional definition of level of service in the HCM (*1*) and is intended to characterize bicyclists' perceived level of safety and comfort, and not necessarily operational measures.

An early attempt to develop a bicycle level of service methodology was made in 1987 by Davis (*26*) at Auburn University. In this methodology each road segment and adjoining intersections were evaluated using a bicycle safety index rating (BSIR). The BSIR was found by calculating weighted averages of the following indexes:

- Roadway Segment Index (RSI)
  - ADT
  - Number of lanes
  - Speed limit

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  - Width of outside traffic lane
  - Pavement factors
  - Location factors
- Intersection Evaluation Index (IEI)
  - Cross street volume
  - Traffic volume on route being indexed
  - Geometric factors
  - Signalization factor

Several counties in the state of Florida have used the Davis model, or variations of it, when rating the roads within their jurisdiction for bicycle LOS. It was this effort that led to Florida's roadway condition index (RCI).

Dixon (*20*) created a methodology to establish a point system by which Gainesville, Florida, could measure the LOS of the city's bicycle facilities. The factors incorporated into this approach included:

- Type of bicycle facility being provided
- Frequency of conflicts experienced by the bicyclist on the road
- Speed differential between bicyclist and motorist
- Motor vehicle LOS
- Maintenance problems of the road
- Availability of multimodal support for bicyclists

Landis et al. (*27*) focused upon creating a transferable model to determine bicycle level of service (BLOS) that could be applied in any metropolitan area. The BLOS is not a measure of capacity or level of operational service but is instead a measure of the comfort of the user within the roadway. The results are based exclusively upon human reactions to measurable traffic stimuli. In an effort to mathematically express the traffic conditions that affect bicyclist's perceptions, a model was created using the following variables:

- Per-lane traffic volume
- Traffic speed
- Traffic mix
- Cross-traffic generation
- Pavement surface condition
- Available roadway width for bicycling

Another measure of the suitability of roadways is the Bicycle Compatibility Index (BCI), developed for FHWA by Harkey et al. (*28*). The BCI is emerging as a useful measure for rating roadways with various types of bicycle facilities because of its broad applicability to a variety of locations and situations. It is intended to evaluate both urban and suburban roadways on their ability to accommodate motorists and bicyclists. The BCI model, presented in Table 1, incorporates a specific factor for curb lane width.

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In summary, both of the two most widely used bicycle indices for urban and suburban arterials, the BLOS and the BCI, are directly sensitive to curb lane width. Neither the BCI nor the BLOS purports to represent a direct relationship to accident frequency.

TABLE 1. Bicycle Compatibility Index (BCI) model (*28*).

BCI = 3.67 – 0.966**BL** – 0.125**BLW** – 0.152**CLW** + 0.002**CLV** + 0.0004O**LV** + 0.035 **SPD** + 0.506**PKG** – 0.264**AREA** + **AF**

where:

BL = presence of a bicycle lane or paved shoulder ≥ 3.0 ft
no = 0
yes = 1

BLW = bicycle lane for paved shoulder width
ft (to the nearest tenth)

CLW = curb lane width
ft (to the nearest tenth)

CLV = curb lane volume
Vph in one direction

OLV = other lane(s) volume – same direction
Vph

SPD = 85th percentile speed of traffic
mi/h

PKG = presence of a parking lane with more than 30 percent occupancy
no = 0
yes = 1

AREA = type of roadside development
residential = 1
other type = 0

AF = $f_t + f_p + f_{rt}$

where:

f_t = adjustment factor for truck volumes (see below)

f_p = adjustment factor for parking turnover (see below)

f_{rt} = adjustment factor for right-turn volumes (see below)

Adjustment factors

Hourly curb lane large truck volume[a]	f_t	Parking time limit (min)	f_p
≥ 120	0.5	≤ 15	0.6
60 – 119	0.4	16 – 30	0.5
30 – 59	0.3	31 – 60	0.4
20 – 29	0.2	61 – 120	0.3
10 – 19	0.1	121 – 240	0.2
< 10	0.0	241 – 480	0.1
		> 480	0.0

Hourly right turn volume[b]	f_{rt}
≥ 270	0.1
< 270	0.0

[a] Large trucks are defined as all vehicles with six or more tires.
[b] Includes total number of right turns into driveways or minor intersections along a roadway segment.

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Shoulder Width and Curbs

Shoulders are desirable on all types of highways, including urban and suburban arterials. Shoulders serve multiple functions (*3,29*). For example, shoulders can:

- Enhance the controllability of vehicles that stray from the traveled way
- Accommodate stopped vehicles so that they do not encroach on the traveled way
- Make maintenance work easier (e.g., provide storage space for plowed snow)
- Facilitate access by emergency vehicles
- Provide space for slower vehicles to maneuver to allow faster vehicles to pass
- Serve as speed-change lanes for vehicles turning into driveways
- Provide space for pedestrians to walk where no sidewalks are present
- Provide space for bicyclists to ride where allowed by law
- Protect the structural integrity of the pavement

Roadways with shoulders provide open drainage arrangements where water can run off the traveled way onto the shoulder and then into a roadside ditch. Shoulders are typically provided on arterial roadways that enter developed areas from rural areas and on roadways with higher speeds. Despite the many advantages of shoulders, their use is generally limited on urban and suburban arterials because of restricted right-of-way and the necessity of using the available right-of-way for travel lanes. On many urban and suburban arterials, particularly where traffic speeds are low, a curb-and-gutter cross section that provides a closed drainage system is used. Curbs also provide a means for controlling access in heavily developed areas.

Even with these numerous advantages, the net safety benefit afforded by shoulders is difficult to ascertain because the net safety benefit of shoulders is due to the sum of several possibly opposite tendencies (*29*). For example, shoulders provide a fairly even and obstacle free surface where drivers of stray vehicles can regain control, recover from error, and resume normal travel. This should enhance safety. On the other hand, full shoulders also induce some amount of voluntary stopping (*30*), and vehicles stopped on shoulders pose a substantial risk of collisions with other vehicles. There is also the possibility that the presence of wider shoulders increases travel speeds, and even small increments of change in the mean speed may have noticeable effects on accident severity. In addition, the provision of wider shoulders may lead to steeper side slopes or back slopes, and the provision of wide shoulders may induce their occasional use as a travel lane. Thus, it is difficult to determine whether the combination of these conflicting tendencies benefits safety or is detrimental to it.

The relationship between shoulder width and safety has been studied extensively in the rural environment. An expert panel (*7*) recently reviewed the literature on safety for shoulder widths on rural two-lane highways for the IHSDM. The panel concluded that the most credible studies of shoulder width on rural two-lane highways were those by Zegeer et al. (*31*) for low-volume roads and another study by Zegeer et al. (*9*) for higher volume roads. Figure 3 presents the AMFs developed by the expert panel (*7*) based on these past studies. Another expert panel in a later research study (*10*) concluded that the AMFs for rural two-lane highways shown in Figure 3 are also the best available estimates for rural multilane highways.

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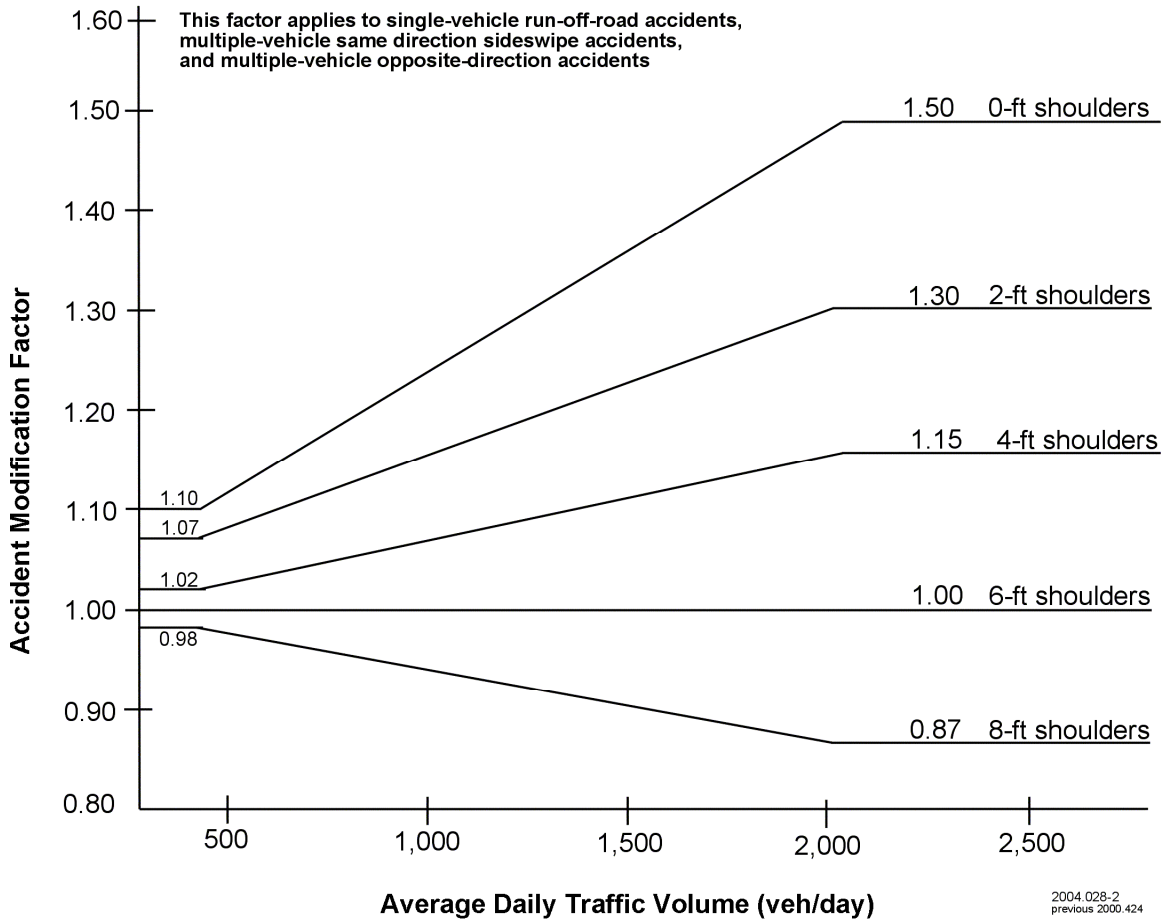

Figure 3. Shoulder width AMF for two-lane highways from IHSDM crash prediction module (7).

Hauer (*11*) developed several statistical models to estimate the frequency of nonintersection accidents on urban, four-lane, undivided roadways. Based upon models to predict "off-the-road" PDO, injury, and total accidents, Hauer concluded that the presence of a curb increases the likelihood of an accident compared to a flush shoulder. In addition, wider shoulders are expected to increase the number of "off-the-road" accidents. Based upon models to predict "on-the-road" accidents for the three severity types, Hauer concluded that wider shoulders are associated with more "on-the-road" injury accidents, while the relationship with PDO accidents is unclear, but Hauer notes that taking into consideration both shoulder type and width, the relationship of shoulders and safety is of marginal importance. Strathman et al. (*12*) also found the relationship between shoulder width and accident frequency to be insignificant.

Hadi et al. (*13*) developed negative binomial regression equations to estimate the safety effects of various cross-sectional elements for a number of different highway types. Hadi et al. found that the safety significance of outside total shoulder width, paved shoulder, and unpaved shoulder widths depends on the highway type. Figure 4 shows the degree to which Hadi et al. found increasing shoulders are expected to reduce the crash rates for the respective highway types.

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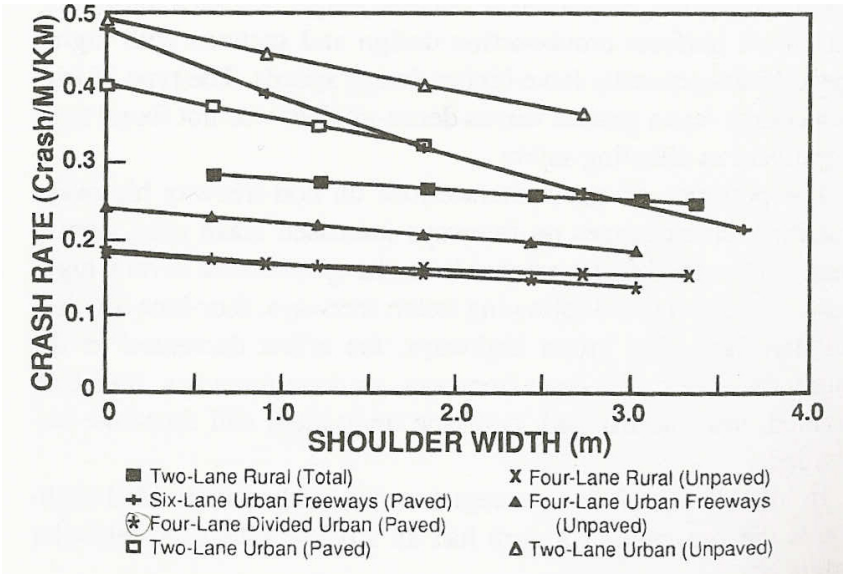

Figure 4. Effect of shoulder width on midblock crash rates (13).

Harwood (*32*) investigated and compared the safety, operational, and cost characteristics of selected multilane design alternatives for suburban highways. Harwood's finding in this study pertain to: roads with ADT greater than 7,000 veh/day, speed limit between 56 and 80 km/h (35 and 50 mph), and spacing between signalized intersections greater than 0.4 km (0.25 mi), driveway access from abutting properties, and no curb parking. Harwood concluded that the effect of providing full shoulders instead of a curb-and-gutter cross section decreases the accident rate by 10 percent. However, the safety effect of shoulders should depend on the roadside beyond the shoulder, and this factor was not taken into account within the analysis.

In their study of commercial bus accident characteristics and roadway treatments, Zegeer et al. (*15*) note that in suburban areas, some accidents occur when buses stop in the travel lane to pick up or drop off passengers, resulting in rear-end collisions. Zegeer et al. noted that such accidents could be reduced by providing paved shoulders of 2.4 to 3.6 m (8 to 12 ft) along such bus routes to allow buses to pull out of the through lane and onto the shoulder to pick up and unload passengers. Where continuous paved shoulders are not feasible, a paved pull-off lane at the bus stop should be considered. Such pull-off lanes are particularly important at locations where sight distance is severely limited.

There are no reliable studies in the literature that document the differences in safety between arterial roadways with shoulders and those with curb-and-gutter cross sections.

Horizontal Curves

Studies on rural highways have consistently shown that horizontal curves experience higher accident frequencies and greater accident severities than tangents (*33*). These higher

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accident frequencies and severities are not surprising given that curves require drivers not only to perceive a change in the roadway alignment but also to make necessary braking and steering adjustments. However, most of these studies address horizontal curves on rural roads.

Only one study has explicitly addressed the effects of horizontal curvature on urban arterials. Research by Hauer (*11*) concerning urban four-lane undivided arterials found that on-road accident frequencies on horizontal curves with radii greater than or equal to 103 m (337 ft) were lower than for comparable tangent sections of roadway. Figure 5 illustrates this relationship with the horizontal axis expressed as degree of curvature per 30 m (100 ft); the factor on the vertical axis represents the accident frequency relative to a tangent roadway. Hauer acknowledges that this relationship is counterintuitive and could represent a surrogate effect. While Hauer considers this relationship to be unresolved, he has encouraged consideration of the possibility—given the low proportion of single-vehicle accidents on arterials—that such an unexpected relationship could be correct.

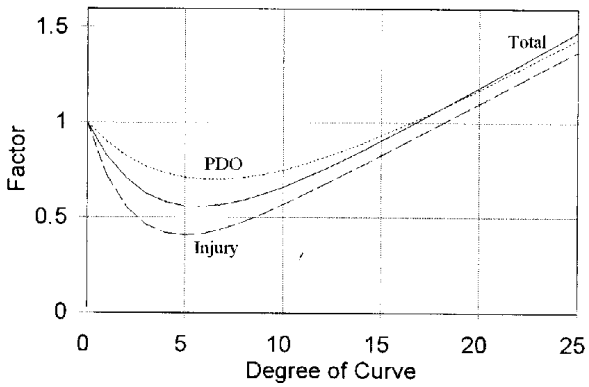

Figure 5. Relationship between on-road accidents and degree of curve for four-lane undivided urban arterials (11).

The remainder of the safety review of horizontal curves focuses on findings for curves on rural roadways, since there is no other research that directly concerns curves on urban roadways. Researchers have focused on both operational measures (i.e., design and operating speeds, speed change, lateral placement, and encroachments) and geometric measures (i.e., degree of curvature, length of curve, preceding tangent length, and roadway and shoulder widths) for horizontal curves. The applicability of these findings to urban arterials needs further assessment.

Operational Measures

Several studies have been conducted to evaluate the relationship between operating speed and accident experience at horizontal curves on two-lane rural highways. Two studies were conducted in the 1970s by Taylor et al. (*34*) and Stimpson et al. (*35*). Both evaluated the use of operational measures to compare the safety effectiveness of alternative delineation treatments. In the 1980s, FHWA sponsored studies by Datta et al. (*36*) and Terhune and Parker (*37*) to identify

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and evaluate various accident surrogates. Zegeer et al. (*38*) completed a study in 1990 which also considered the possible relationship between speed and accidents on horizontal curves. Finally, Anderson and Krammes (*39*) evaluated the use of speed reduction as a surrogate for accident experience at horizontal curves on rural two-lane highways. Each of these studies is discussed below in more detail.

Taylor et al. (*34*) evaluated the use of two operational measures, speed, and lateral placement, to compare the safety effectiveness of alternative delineation treatments. A sample of nine horizontal curves throughout Pennsylvania was selected. They measured speed and lateral placement at both the midpoint of the curve and the estimated point of curvature. A regression analysis indicated a "fairly strong correlation between accident rates and the variance of lateral placement." Although there appeared to be no correlation between accident rates and speed change from the beginning to the midpoint of the curve, their data did support the hypothesis that accident rates are correlated with deceleration rates on horizontal curves.

Stimpson et al. (*35*) performed correlation and stepwise multiple linear regression analyses of accident surrogates for tangent and winding alignments, and isolated horizontal curves. Unfortunately, the sample size (20 isolated horizontal curves and 78 accidents at those curves) was too small to produce conclusive results. For the tangent and winding alignments, however, they found lateral placement measures to be the best predictors of accident potential.

Datta et al. (*36*) conducted the first of two FHWA accident surrogate studies. They selected three highway situations to study: isolated curves on rural two-lane roads, signalized intersections on rural two-lane roads, and undivided two-lane tangent sections within urbanized areas. For the rural isolated horizontal curves, they studied both operational measures (encroachments and speed reduction) and nonoperational measures (degree of curvature; grade; shoulder width; distance since last traffic event requiring the driver to adjust speed or path; superelevation; roadside slope; and type, location and frequency of fixed objects). They used data from 25 curve sites in Michigan. They performed stepwise regression on all the sites and for subsets of sites with similar sight distance, grade, driveway density, and posted speed limits. They also evaluated accident rates for the inside lane, outside lane, and both lanes combined. The only variable that was statistically correlated with total accident rate was degree of curvature. However, using a subset of 15 curves with few driveways and a speed limit greater than or equal to 45 mph, they found a strong surrogate measure for outside lane accident rate. This model used the independent variables "distance to last traffic event on the outside lane" and "speed differential between the approach speed and curve midpoint speed for traffic in the outside lane" and resulted in a coefficient of determination (R^2) of 0.81.

Terhune and Parker (*37*) evaluated the surrogate measures identified by Datta et al. Their database consisted of 78 isolated horizontal curves in New York. They tested the Datta et al. equation for outside lane accident rates as a function of distance since last traffic event and speed differential and found an R^2 of only 0.01, compared with the R^2 of 0.81 in the study by Datta et al.

Zegeer et al. (*38*) conducted a study of the types of crashes that occur on rural two-lane curves. They studied police accident reports for 104 fatal and 104 nonfatal accidents on

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horizontal curves on two-lane rural highways in North Carolina. They found that 'the estimated speed prior to fatal crashes was much higher than to nonfatals." They concluded that "speed is a definite factor, perhaps in both the occurrence and also the severity of crashes on curves."

Using a speed-profile model, Anderson and Krammes (*39*) estimated the reduction in 85th percentile speeds from the approach tangent to the midpoint of 1,126 horizontal curve sites on rural two-lane highways in three states. The results suggested that estimated speed reduction is a useful measure that helps explain how accident experience at horizontal curves on rural two-lane highways varies with degree of curvature. Horizontal curves that require speed reductions have higher accident rates than curves that do not require speed reductions. Results of the analyses suggested that mean accident rate increases approximately linearly with the mean speed reduction.

As part of a large study of design consistency on two-lane roads for FHWA, Fitzpatrick et al. (*40*) developed a speed-prediction equation for horizontal alignments for use in assessing a design consistency on two-lane rural highways. Three years of accident data from over 5,000 horizontal curves were modeled as a function of log (AADT), log (curve length), and speed reduction. The following Poisson model suggested a strong relationship between speed reduction and accident frequency at horizontal curves:

$$Y = \exp(-0.8571)\ MVKT\ \exp(0.0780\ SR) \qquad \textbf{(1)}$$

where:

Y	=	number of accidents that occurred on the horizontal curve during a 3-year period
MVKT	=	exposure (million veh-km of travel for a 3-year period)
SR	=	speed reduction at horizontal curve from preceding tangent or curve (km/h)

The model indicates that the greater the speed reduction required by a horizontal curve, the greater its potential for accident experience. Fitzpatrick et al. concluded that speed reduction appears very promising as a design-consistency measure.

In response to a provision in the Surface Transportation Assistance Act of 1982, the National Research Council assembled a committee to conduct a study of the safety cost-effectiveness of geometric design standards for resurfacing, restoration, and rehabilitation (RRR) projects on existing highways (*41*). Regarding speed on curves, the committee recommended that highway agencies "evaluate the reconstruction of horizontal curves when the design speed of the existing curve is more than 24 km/h (15 mph) below the running speeds of approaching vehicles and the average daily traffic volume is greater than 750 vehicles per day."

Leisch and Leisch (*42*) presented a new concept in the definition and application of design speed, known as the "10-mph rule," which addressed the problem of the tendency of the driver to continually accelerate and decelerate due to inconsistencies in highway alignment. They state that "a reduction in design speed should be avoided if possible, but if it is required, it should

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be no more than 15 km/h (10 mph)" and that "within a given design speed, potential automobile speeds along the highway normally should vary no more than 15 km/h (10 mph)."

Choueiri and Lamm (*43*) recommended a method of evaluating designs based on ranges of change in 85th percentile speed. They recommend rating a design as follows:

Speed Range	Design Safety Level
$\Delta V_{85} \leq 6$ mph	good
6 mph $< \Delta V_{85} \leq 12$ mph	fair
$\Delta V_{85} > 12$ mph	poor

Geometric Measures

Glennon et al. (*44*) developed a discriminate analysis model to use in identifying horizontal curves with high accident potential. The model is based on geometric, traffic, and roadside conditions and was derived using data from 298 curve sections. They found that curves with higher degrees of curvature, greater curve length, more hazardous roadsides, lower skid resistance, and/or more narrow shoulders have a greater likelihood of being a high-accident location.

Zegeer et al. (*38*) evaluated the relationships between horizontal curve features and accident experience. They developed cross-sectional models that were then used to quantify the effects on accidents resulting from curve flattening, curve widening, adding a spiral, improving deficient superelevation, and clearing the roadside. Their database consisted of 10,900 curves in the state of Washington. Statistical models indicated that accident rates increased with sharper curves, narrower lane width, lack of spiral transitions, and inadequate superelevation. Based on predictive models they developed, Zegeer et al. estimated the effects of several curve improvements on accident experience as follows:

- *Curve flattening* reduces crash frequency by as much as 80 percent, depending on the central angle and amount of flattening.
- *Widening lanes* on horizontal curves is expected to reduce accidents by up to 21 percent for 1.2 m (4 ft) of lane widening.
- *Widening paved shoulders* can reduce accidents by as much as 33 percent for 3 m (10 ft) of widening.
- *Adding unpaved shoulders* is expected to reduce accidents by up to 29 percent for 3 m (10 ft) of widening.
- *Adding a spiral* to a new or existing curve will reduce total curve accidents by approximately 5 percent.
- *Improving superelevation* can significantly reduce curve accidents where there is a superelevation deficiency. An improvement of 0.02 would be expected to yield an accident reduction of 10 to 11 percent.

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Most safety researchers have long supposed that sharp horizontal curves are likely to have higher accident rates when preceded by long tangent sections of roadway than when preceded by short tangents or another horizontal curve. However, there has been little hard evidence to support this idea. Potts et al. (*45*) used data from the FHWA Highway Safety Information System (HSIS) on the safety performance of horizontal curves and their preceding tangents on rural two-lane highways to investigate this issue. Specifically, the study examined whether the accident rate of a horizontal curve increases with preceding tangent length and how that effect varies with horizontal curve radius. The researchers found that the accident rate on a horizontal curve appears to be influenced by the length of the approach tangent only for two limited situations:

- horizontal curves with radii of 200 m (656 ft) or less and having approach tangents in the range from 300 to 500 m (984 to 1,640 ft)
- horizontal curves with radii of 200 to 340 m (656 to 1,115 ft) and having approach tangents in the range of 150 to 300 m (492 to 984 ft)

For horizontal curves with radii of 200 m (656 ft) or less, the accident rate for curves with approach tangents in the range of lengths from 300 to 500 m (984 to 1,640 ft) was found to be approximately 50 percent higher than for curves with other approach tangent lengths. For horizontal curves with radii of 200 m to 340 m (656 to 1,115 ft), the accident rate for curves with approach tangents in the range of lengths from 150 to 300 m (492 to 984 ft) was found to be approximately 10 percent higher than for curves with other approach tangent lengths.

Harwood et al. (*7*) developed an algorithm for predicting the safety performance of a rural two-lane highway. The accident prediction algorithm consists of base models and accident modification factors for both roadway segments and at-grade intersections on rural two-lane highways. The nominal or base condition for horizontal alignment is a tangent roadway section. An accident modification factor (AMF) was developed, based on research by Zegeer et al. (*38*) discussed above, to represent the manner in which accident experience of curved alignments differs from that of tangents. The accident modification factor is a function of the length of the curve, the radius of the curve, and the presence or absence of a spiral:

$$AMF = \frac{1.55L_c + \frac{80.2}{R} - 0.012S}{1.55L_c} \quad \textbf{(2)}$$

where:

L_c = length of horizontal curve (mi)
R = radius of curvature (ft)
S = 1 if spiral transition curve is present
0 if spiral transition curve is not present

An expert panel in later research (*10*) considered the applicability of Equation (2) to multilane highways and recommended that, for application in IHSDM, the AMF be increased by

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20 percent for sharper horizontal curves [radius of 305 m (1,000 ft) or less] and that the AMF be decreased by 20 percent on flatter horizontal curves [radius of 488 m (1,600 ft) or more].

Access Features

The literature suggests a strong relationship between accident rates and various forms of access management. In fact, research shows that access managed roadways have between 50 and 65 percent fewer accidents than roadways with no access management (*46*). This section presents the results of research studies that have looked at the relationship of safety to access in terms of (a) general degree of access control, (b) access spacing, and (c) driveways located near intersections.

Degree of Access Control

Several studies have been conducted to evaluate the safety effectiveness of access management.

The Colorado Department of Transportation has demonstrated the safety benefits of access control on urban arterials (*47*). The results of this project showed that access controlled arterials have accident rates ranging from 27 to 69 percent of arterials without access control.

Flora and Keitt (*48*) examined the effect of general levels of access control on urban arterials. Table 2 presents urban arterial accident rates as a function of level of access control, as found by Flora and Keitt. Accident rates for each level of access control are presented in the table; each accident rate is also expressed as a percentage of the accident rate for arterials with no access control.

TABLE 2. Urban arterial accident rates as a function of level of access control (*48*)

Level of access control	Number of accidents per 100 million veh-km			
	Total		Fatal	
None	329	(100%)	2.50	(100%)
Partial	310	(94%)	2.80	(112%)
Full	116	(35%)	1.25	(50%)

Gattis and Hutchison (*49*) compared three urban arterial roadways in Springfield, Missouri, to determine the relationship between safety and access control. Each roadway had similar lengths, posted speed limits, volumes, and abutting land uses but different levels of access control. The roadway with the highest level of access management (nontraversable median and greater access spacing) was found to have a lower crash rate than the other two roadway sections with a center turn lane. A comparison of the two center turn lane roadways found that an increase in driveways spacing did not correspond to a lower crash rate.

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Access Spacing (Driveway Density)

Over the past 50 years, many studies have documented how accidents increase with decreasing access spacing. In a recent paper on access spacing and safety, Levinson and Gluck (50) prepared a chronology of accident studies, conducted between 1952 and 1997, related to access spacing. Table 3 presents the chronology of studies.

In the study conducted by Lall et al. (*71*), an accident analysis was conducted on a 47-km (29-mi) segment of the Oregon Coast Highway (US 101) to evaluate the relationship between accident frequency and access density. Results of the research showed a direct relationship between access density and accident frequency and severity. Figure 6 illustrates the relationship between accident rate and access density that was found in the Oregon study, with a breakpoint at around 30 access points per km (50 access points per mi).

TABLE 3. Chronology of accident studies related to access spacing (*50*)

Study No.	Year	Description	Findings	Source
1	1952	McMonagle, Michigan	An increase from 0 to 4 or more roadside features per 1,000 ft increases accidents/million VMT from 3.37 to 13.48	(*51*)
2	1953	Staffield, Minnesota	Roadways with more than 20 access points per mile had more than double the rates of roads with less than 4 access points per mile	(*52*)
3	1957	Schoppert, Ohio	The number of access points along rural two-lane highways is a reasonably good predictor of potential accidents within an ADT group	(*53*)
4	1959	Head, Oregon	Accident rates increased as the number of commercial driveways and/or commercial units per mile increased	(*54*)
5	1967	Cribbins et al., North Carolina (92 roadway sections)	Accident and injury rates on multilane divided highways increased as the number of access points and their traffic volumes increased	(*55*)
6	1967	Mulinazzi and Michael, Indiana (100 roadway sections)	The number of medium and heavy volume commercial driveways per mi was significantly related to the accident rates for sections with less than 5,800 ADT	(*56*)
7	1970	Dart and Mann, Louisiana	Accident rates doubled as the traffic conflicts increased ten times	(*57*)
8	1970	Cirillo, Interstate System Accident Research	As intersections/per mi increased from 1 to 15, accident rates increased 4 to 5 times on urban highways and 2 to 3 times on rural highways. As business access points/per mi increased from 1 to 40, accident rates doubled	(*58*)
9	1973	McGuirk, Indiana (63 mi)	Accidents per mile may decrease when the number of commercial driveways, traffic volumes, or travel lanes is reduced	(*59*)
10	1974	Uckotter, Indiana (14 roadway sections)	Regression equations produced counter intuitive results	(*60*)

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TABLE 3. Chronology of accident studies related to access spacing (*50*) (Continued)

Study No.	Year	Description	Findings	Source
11	1975	Glennon et al., Azzeh et al.	An increase from low to high driveway frequency doubles annual accident frequency. An increase from low to high volumes (over 15,000 ADT) triples annual accidents	(*61,62,63*)
12	1985	Arapahoe and Parker Roads, Denver (4.35 and 5.16 mi)	Two highly access managed roads had about 40% the accident rate of roads with frequent access	(*47*)
13	1986	Waushara County, Wisconsin	Annual accidents per mile for access spacing less than 300 ft was about 2 to 3 times greater than for longer spacing	(*64*)
14	1992-1993	Sokolow et al., Long et al., Florida	Accident rates doubled when driveways exceeded 20 per mile (Sokolow) Accident rates increased 70% as driveways per mile increased from less than 13 to more than 20. It was estimated that one driveway adds 0.02 crashes per year.	(*65,66*)
15	1993	British Columbia (176 roadways sections, 465 mi)	Accident rates increased as access density increased. Each business access impacted accident rates at about 50% of public roadway intersections	(*67*)
16	1993	Millard, Florida	Doubling access points from 20 to 40 per mile doubled the accident rate. Doubling signals from 2 to 4 per mile, more than doubled the accident rate	(*68*)
17	1994	Michigan	Midblock accident rates generally increased as the number of intersections per mile (including driveways) and the number of lanes increased	(*69*)
18	1995	Fitzpatrick and Balke, Texas	Total and midblock accidents generally increased as driveways became more numerous	(*70*)
19	1995	Lall et al., Oregon (US 101—29 mi)	Accidents per mile and driveways per mile followed similar patterns (except for roadways sections with a nontraversable median)	(*71*)
20	1996	Norwalk-Wilton, Connecticut (Route 7)	Accident rate per mile increased along roadway carrying 20,000 to 25,000 vehicles per day as access density increased	(*72*)
21	1996	Garber and White, Virginia (10 mi, 30 locations)	Multiple regression analysis assessed effects of ADT/lane, average speed, number of access points, left-turn lane availability, average access spacing and average difference in access spacing	(*73*)
22	1997	Australia	Each additional driveway per km increased accident rates about 1.5% for two-lane roadways and 2.5% for four-lane roadways	(*74*)

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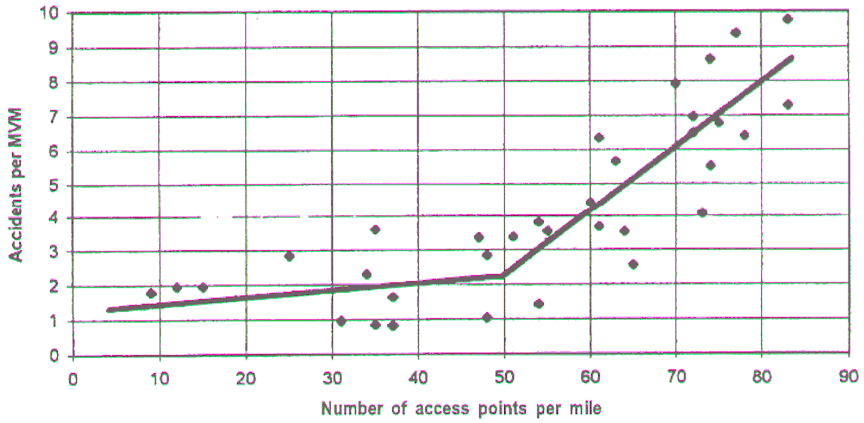

Figure 6. Density of accidents and access points on urban arterials (69).

Li (*67*) conducted a study of the relationship between safety and access density. Li found a clear relationship between increased number of access points (minor intersections or driveways) and accident rate. Figure 7 shows the relationship between accident rate and unsignalized intersection density on four-lane urban highways. Figure 8 illustrates the relationship between accident rate and business access density on four-lane urban highways.

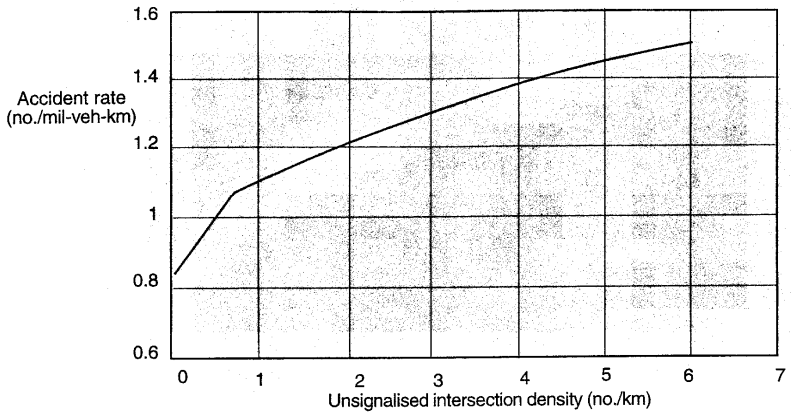

Figure 7. Estimated relationship between accident rate and unsignalized intersection density on four-lane urban highways (67).

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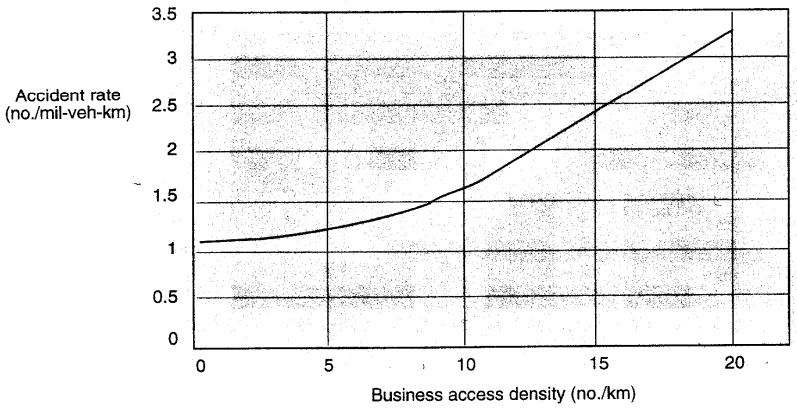

Figure 8. Estimated relationship between accident rate and business access density on four-lane urban highways (67).

A study was conducted for the Minnesota Department of Transportation to determine the relationship between access management and safety (*75*). Data were collected from a representative random sample of urban and rural roadway segments on Minnesota's state highway system. The data included 432 roadway segments, 1,231 km (765 mi) of roadway, over 9,000 access points and nearly 14,000 crashes (over the 3-year period 1994-1996). The roadway segments were divided into 11 roadway segment categories (5 rural and 6 urban) depending on number of lanes, presence of left-turn lanes, and whether the roadway segment was considered an expressway. A positive relationship between access density and crash rates was observed in 10 of the 11 highway categories. Analysis of the crash data in each of the roadway categories revealed that roadway segments with the highest crash rates have high levels of access density and segments with the lowest crash rates have low levels of access density.

NCHRP Report 420 (*76*) reports on a comprehensive safety analysis to investigate the relationship between access spacing and accidents. Accident data from 264 roadway segments, including 170 urban roadways, from five states were analyzed. Results of the analysis showed that each access point (or driveway) increases the annual accident rate by about 0.07 to 0.11 accidents per million veh-km (0.11 to 0.18 accidents per million veh-mi) of travel on undivided highways and by 0.06 to 0.08 accidents per million veh-km (0.09 to 0.13 accidents per million veh-mi) of travel on highways with two-way-left-turn lanes or nontraversable medians.

While nearly all studies have concluded that increased driveway density has a negative effect on safety, not all studies agree on the shape of this relationship. That is, some studies suggest that accident rate increases linearly with access point density, while other studies have found the increase to be more than linear. Some studies claim that accident rate increases with the square root of access point density. After reviewing a number of studies evaluating the relationship between driveway density and safety, Hauer (*77*) suggests that the linear assumption may be best supported.

No studies were found that address the effect of driveway traffic volumes on the frequency of driveway-related accidents.

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Driveways Located Near Intersections

Another safety issue related to driveways is their location relative to intersections. It has been suggested that locating driveways away from intersections reduces the number of conflicts and provides more time and space for vehicles to turn or merge safely across lanes (*78*).

Box (*79*) analyzed over 15,000 accidents in two Illinois suburbs to determine the effect of intersections on driveway accidents. Driveway accidents related to intersections were found to represent 1.2 percent of total accidents in one suburb and 2.0 percent of total accidents in the other suburb. The research results support access management policies that restrict driveways from being located within some minimum distance of an intersection. Box recommended driveway spacing guidelines as presented in the ITE *Guidelines for Driveway Location and Design* (*80*).

Intersections

Intersections are one of the most complex areas or locations on the highway system. The complexity arises because motorists and other highway users, such as pedestrians and bicyclists, must share the right of way through intersections, and as a result, conflicts occur among users as they cross paths. In addition, various geometric design and traffic control features may be implemented at intersections, adding to the complexity. Statistics indicating the nature of the safety problem at intersections are presented followed by information on the safety effects of a number of intersection geometric design and traffic control features, including:

- Left-turn lanes
- Right-turn lanes
- Channelization
- Intersection skew angle
- Sight distance
- Approach width
- Number of approach lanes
- Median type and width
- Pedestrian facilities
- Bicycle facilities

Research results are reported for both urban and rural areas to provide a comparative perspective of intersection safety conditions.

Much of this section on intersections comes from a recent study conducted by Harwood et al. (*81*) which included a comprehensive literature review on the safety effects of a wide variety of geometric design, traffic, and control elements for at-grade intersections. This review focuses on the safety efforts of geometric design elements of at-grade intersections.

b

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Left-Turn Lanes

Installation of left-turn lanes has been the focus of many research studies. Various safety-related impacts have been documented depending upon the type of intersection (signalized, unsignalized, four-leg, etc.) where the left-turn treatment was implemented, the location of the intersection (urban or rural), as well as the different types and/or severity of accidents. Results from studies conducted in urban areas are presented first, followed by research results from rural areas.

Harwood et al. (*81*) conducted the most recent and extensive investigation into the safety effectiveness of geometric design improvements at intersections, including the installation of left-turn lanes at urban intersections. Harwood et al. performed a before-after evaluation of the safety effects of providing left-turn lanes for at-grade intersections. Geometric design, traffic control, traffic volume, and accident data were collected at 100 urban intersections where at least one left-turn lane had been installed. Data were also collected at 100 intersections that exhibited similar characteristics to the improved sites but did not have left-turn lanes installed. Three contrasting approaches to before-after evaluations were used to evaluate the safety effectiveness of left-turn lane improvements: the yoked comparison or matched-pair approach, the comparison group approach, and the empirical Bayes (EB) approach.

Harwood et al. (*81*) concluded that left-turn lanes are effective in improving safety at signalized and unsignalized intersections in urban areas. At urban unsignalized intersections, installation of a left-turn lane on one approach would be expected to reduce total intersection accidents by 27 percent for four-leg intersections and by 33 percent for three-leg intersections. At four-leg urban signalized intersections, installation of a left-turn lane on one approach would be expected to reduce accidents by 10 percent. Installation of left-turn lanes on both major-road approaches to a four-leg intersection would be expected to increase, but not quite double, the resulting effectiveness measures for total intersection accidents. Table 4 presents the recommended accident modification factors (AMFs) for the installation of left-turn lanes on major-road approaches to urban intersections.

TABLE 4. AMFs for installation of left-turn lanes at urban intersections (*81*)

Intersection type	Intersection traffic control	Number of major-road approaches on which left-turn lanes are installed	
		One approach	Both approaches
Three-leg intersection	STOP sign[a]	0.67	–
	Traffic signal	0.93	–
Four-leg intersection	STOP sign[a]	0.73	0.53
	Traffic signal	0.90	0.81

[a] STOP signs on minor-road approach(es).

McCoy and Malone (*82*) analyzed the accident experience at signalized and unsignalized intersections on urban, four-lane roadways in Nebraska to assess the safety effects of left-turn lanes. McCoy and Malone concluded that left-turn lanes at intersections on urban, four-lane roadways significantly reduce rear-end, sideswipe, and left-turn accidents; however, on the uncontrolled approaches of intersections on urban undivided roadways, left-turn lanes

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significantly increase right-angle accidents, as well as reduce rear-end, sideswipe, and left-turn accidents.

Based upon research by McFarland (*83*), Hauer (*84*) examined the ways in which the use of intersections by older persons, both as pedestrians and as drivers, could be made safer and easier. Hauer concluded that the provision of left-turn channelization at unsignalized intersections reduced accidents by 70 and 65 percent in urban and suburban areas, respectively, when combined with curb or raised bars. When channelization was painted at unsignalized intersections, accidents decreased by 15 and 30 percent, respectively, in urban and suburban areas. In general, Hauer concluded that adding left-turn lanes reduced accidents by varying amounts depending upon the type of intersection, whether it was signalized or unsignalized, and whether the intersection was urban, suburban, or rural.

Lacy (*85*) found that left-turn lanes, when coupled with several other safety improvements, reduced accident frequency by 35 percent and accident severity by 80 percent at urban intersections.

Not all studies, however, have shown that left-turn lanes are associated with reduced accidents. Bauer and Harwood (*86,87*) developed several statistical models to predict accidents for at-grade intersections. In the model development, left-turn channelization was found to significantly increase total accidents and fatal and injury accidents at urban, three-leg, stop-controlled intersections. However, left-turn channelization was found not to significantly affect total and fatal and injury accidents at urban, four-leg, stop-controlled intersections, nor at urban, four-leg, signalized intersections. Poch and Mannering (*88*) developed accident prediction models using negative binomial distributions based upon data from 63 urban intersections in Washington. The models indicated that approaches with a designated left-turn lane, a through lane, and a shared through-right-turn lane had more rear-end accidents than those with other conditions. Likewise, David and Norman (*89*) investigated the motor vehicle accident relationship with geometric and traffic features at intersections. They determined that for average daily traffic (ADT) volumes between 10,000 and 20,000 veh/day, four-leg intersections with opposing left-turn lanes had more accidents than those without. The concerns raised by these studies have largely been resolved by the Harwood et al. (*81*) study, which found that left-turn lanes have a definite positive effect on safety.

The Harwood et al. (*81*) study also evaluated the safety effects of providing left-turn lanes for rural at-grade intersections. This study concluded that the installation of a single left-turn lane on a major-road approach would be expected to reduce accidents at rural unsignalized intersections by 28 percent for four-leg intersections and by 44 percent for three-leg intersections. Table 5 presents the recommended AMFs for the installation of left-turn lanes on major-road approaches to rural intersections.

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TABLE 5. AMFs for installation of left-turn lanes at rural intersections (*81*)

Intersection type	Intersection traffic control	Number of major-road approaches on which left-turn lanes are installed	
		One approach	Both approaches
Three-leg intersection	STOP sign[a]	0.56	–
	Traffic signal	0.85	–
Four-leg intersection	STOP sign[a]	0.72	0.52
	Traffic signal	0.82	0.67

[a] STOP signs on minor-road approach(es).

Other studies document the safety effectiveness of left-turn lanes based upon data from both urban and rural intersections or, in some cases, do not distinguish whether the results pertained to urban or rural intersections. NCHRP Report 420 (*76*) reported accident rate reductions ranging from 18 to 77 percent due to the installation of left-turn lanes based upon a review of previous research by the New Jersey Department of Transportation (*90*), Griewe (*91*), Agent (*92*), Ben-Yakov and Craus (*93*), Craus and Mahalel (*94*), Tamburri and Hammer (*95*), and Wilson et al. (*96*). Maze et al. (*97*) developed a model that predicted a reduction in left-turn accident rate of 6 percent due to the installation of a left-turn lane with permitted signal phasing and a reduction of approximately 35 percent from the installation of a left-turn lane with protected/permitted signal phasing. Foody and Richardson (*98*) found that accident rates decreased by 38 percent with the addition of a left-turn lane at signalized intersections and by 76 percent at unsignalized intersections.

An issue in the design of left-turn channelization is the restriction in sight distance that opposing left-turn vehicles cause one another. A potentially effective countermeasure for safety problems where opposing left-turn lanes are present is to eliminate the sight restrictions by offsetting the left-turn lanes. Harwood et al. (*99*) reviewed the safety performance of a limited set of tapered and parallel offset left-turn lanes and found no safety problems. Both McCoy et al. (*100*) and Joshua and Saka (*101*) developed procedures to compute the amount of offset required to clear sight lines. However, no evaluations of the accident reduction effectiveness of offset left-turn lanes have been found.

Table 6 summarizes the results of those studies that provided quantitative estimates of the effectiveness of installing left-turn lanes at intersections.

Right-Turn Lanes

It is generally accepted that the installation of right-turn lanes improves safety for motor vehicles, but only a limited number of quantitative estimates are available to demonstrate this. The research findings that are available are summarized below. Research findings related to channelized right-turn lanes are included.

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TABLE 6. Summary of research results concerning the safety effectiveness of installing left-turn lanes [adapted from Harwood et al. (*81*)]

Source	Percentage change in accident frequency for addition of a LTL		Conditions/comments	Area type		
	Total intersection accidents	Left-turn accidents		Urban/suburban	Rural	Combination or unknown
Harwood et al. (*81*)	–7 to –33	–	LTL on one major-road approach	X		
	–19 to –47	–	LTLs on two major-road approaches	X		
	–15 to –44	–	LTL on one major-road approach		X	
	–33 to –48	–	LTLs on two major-road approaches		X	
Harwood et al. (*7*)	–18 to –24	–	Two-lane highway; LTL on one major-road approach		X	
	–32 to –42	–	Two-lane highway; LTLs on two major-road approaches		X	
Vogt (*102*)	–38	–	LTL at four-leg rural intersection with four-lane major road and two-lane minor road		X	
Maze et al. (*97*)	–6	–	Signalized intersection; LTL with permitted phasing			X
	–35	–	Signalized intersection; LTL with protected/permitted phasing			X
New Jersey Department of Transportation (*90*)	–35 to –51	–	LTL installation along Route 130 in New Jersey			X
Griewe (*91*)	–58	–6	Eight LTLs added by restriping			X
Agent (*92*)	–77	–	Unsignalized intersection			X
	–54	–	Signalized intersection			X
Ben-Yakov and Craus (*93*)/Craus and Mahalel (*94*)	–38	–	LTL installation			X
McFarland (*83*)	–70	–	LTL with curbed median	X		
	–65	–	LTL with curbed median	X		
	–60	–	LTL with curbed median		X	
	–15	–	LTL with painted median	X		

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TABLE 6. Summary of research results concerning the safety effectiveness of installing left-turn lanes [adapted from Harwood et al. (*81*)] (Continued)

Source	Percentage change in accident frequency for addition of a LTL		Conditions/comments	Area type		
	Total intersection accidents	Left-turn accidents		Urban/suburban	Rural	Combination or unknown
	–30	–	LTL with painted median	X		
	–50	–	LTL with painted median		X	
	–36	–	Signalized intersection with LTL and exclusive phase			X
	–15	–	Signalized intersection with LTL but no exclusive phase			X
Foody and Richardson (*98*)	–38	–	Signalized intersection			X
	–76	–	Unsignalized intersection			X
Dale (*103*)	–20	–	Two-lane highway intersection; installation of signal with LTL		X	
Lacy (*85*)	–35	–	Installation of LTL with other improvements	X		
Tamburri and Hammer (*95*)/Wilson et al. (*96*)	–18	–	Unsignalized intersection			X

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In their investigation of geometric design improvements for at-grade intersections, Harwood et al. (*81*) investigated the safety effectiveness of right-turn lanes. Data were collected at 100 intersections where a right-turn lane had been installed and 100 intersections that exhibited similar characteristics to the improved sites but did not have right-turn lanes installed. Harwood et al. concluded that right-turn lanes are effective in improving safety at signalized and unsignalized intersections in both urban and rural areas. Installation of a single right-turn lane on a major-road approach would be expected to reduce total accidents at urban signalized intersections by 4 percent and total intersection accidents at rural unsignalized intersections by 14 percent. Right-turn lane installation reduced accidents on individual approaches to four-leg intersections by 18 percent at urban signalized intersections and by 27 percent at rural unsignalized intersections. Limited results were found for right-turn lane installation at three-leg intersections. Installation of right-turn lanes on both major-road approaches to four-leg intersections would be expected to increase, but not quite double, the resulting effectiveness measures for total intersection accidents. Table 7 presents the recommended AMFs for the installation of right-turn lanes on major-road approaches to both urban and rural intersections.

TABLE 7. AMFs for right-turn lanes at urban and rural intersections (*81*)

Intersection traffic control	Number of major-road approaches on which right-turn lanes are installed	
	One approach	Both approaches
STOP sign[a]	0.86	0.74
Traffic Signal	0.96	0.92

[a] STOP signs on minor-road approach(es).

Bauer and Harwood (*86,87*) developed several statistical models to predict accidents for at-grade urban and rural intersections. The models for urban, four-leg and three-leg, stop-controlled intersections indicated that accidents increase when right-turn lanes are present. Similarly, the presence of right-turn channelization at urban, four-leg, signalized intersections is expected to increase accidents. On the other hand, the models for rural, four-leg, stop-controlled intersections indicate that accidents decrease when right-turn lanes are present. At rural, three-leg, stop-controlled intersections, total intersections accidents are expected to decrease with the presence of right-turn lines, while fatal and injury accidents are expected to increase with the presence of right-turn lanes.

Dixon et al. (*104*) analyzed the crash history at 17 signalized intersections with various right-turn treatments in Cobb County, Georgia, to identify the effects of those right-turn treatments on right-turn crashes. The intersections were located on both major and minor urban arterials. The analysis was based strictly upon crash frequencies over a two-year period and did not include exposure data related to traffic volumes. Dixon et al. noted the following general findings, indicating that they merit future research:

- The use of a traffic island appears to reduce the number of right-angle crashes
- The addition of an exclusive right-turn lane appears to correspond to elevated sideswipe crashes

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- The addition of an exclusive lane on the cross street for right-turning vehicles (i.e., an acceleration lane) does not appear to reduce the number of rear-end crashes when no additional control is implemented

In another study focusing on the safety of rural two-lane highways, Vogt and Bared (*105*) modeled accidents for three-leg unsignalized intersections and found that the presence of a right-turn lane was associated with an increase in intersection-related accidents by 27 percent.

In developing guidelines for channelized right-turn lanes at unsignalized intersections on rural two-lane highways, McCoy et al. (*106*) evaluated the safety effects of channelized right-turn lanes. An analysis of the accident history at 89 rural intersections with and without channelized right-turn lanes over a five-year period found no effect of channelized right-turn lanes on the frequency, severity, or types of accidents that occur on approaches to unsignalized intersections. Thus, based upon the accident analysis, it was concluded that channelized right-turn lanes do not provide the road user with any safety benefits or disbenefits. There are no comparable findings available for channelized right turns on urban arterials.

Finally, Staplin et al. (*107*) conducted an accident analysis to examine the problems that older drivers have in intersection areas. Approximately 700 accident records were reviewed during the analysis. In general, the accident analysis did not find right-turn lanes to be a safety issue for older drivers.

Channelization

Four functional objectives form the basis for channelization design concepts:

- Limiting the points of conflict
- Limiting the complexity of the conflict area
- Limiting the conflict frequency
- Limiting the conflict severity

A variety of measures such as designation and arrangement of traffic lanes, traffic islands, median dividers, and various signs, signals, and markings may be used for channelization purposes.

In general, studies indicate that channelization improves safety in urban and suburban areas. David and Norman (*89*) found that raised pavement markings tended to decrease accidents, especially at three-leg intersections. Exnicios (*108*) determined that several safety measures, including channelization, resulted in a 31 percent reduction in total accidents (over two years), a 58 percent reduction in total accidents (over one year), and a 100 percent reduction in total accidents (over 26 months) at several suburban intersections located in or near several metropolitan areas. Rowan and Williams (*109*) found accident rates, personal injuries, and rear-end type accidents were reduced due to the introduction of channelization at intersections in northwest Houston.

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In studies for which the area type could not be determined or where the area type was most likely rural, Washington et al. (*110*), Forrestel (*111*), and Templer (*112*) found that intersection approaches with raised medians had lower accident rates than intersection approaches without raised medians.

Intersection Skew Angle

The angle between the legs of an intersection, particularly whether the legs intersect at a right or an oblique angle, has long been considered to affect the safety performance of the intersection. Several studies have investigated the safety impact of angle of intersection, but all of the studies were conducted in rural areas. McCoy et al. (*113*) found that accidents at rural two-way stop-controlled intersections increase with increasing skew angle. Hanna et al. (*114*) found a difference in the safety performance between three-leg T intersections and three-leg Y intersections, which represents an effect of the angle of the intersection. Harwood et al. (*81*) developed AMFs for intersection skew angle as part of algorithms to predict the expected safety performance of rural two-lane highways. For a three-leg stop-controlled intersection, the AMF was calculated as:

$$\text{AMF} = \exp(0.0040\ SKEW) \quad \textbf{(3)}$$

For a four-leg stop-controlled intersection, the AMF was calculated as:

$$\text{AMF} = \exp(0.0054\ SKEW) \quad \textbf{(4)}$$

where:

SKEW = intersection skew angle (degrees), expressed as the absolute value of the difference between 90 degrees and the actual intersection angle.

Sight Distance

Sight distance is the distance ahead or along an intersecting roadway that a driver can see from any location on the roadway. Provision of adequate sight distance is fundamental to the design of roads and intersections for safe operation. Three types of sight distance are particularly critical to the safe operation of at-grade intersections: intersection sight distance, stopping sight distance, and sight distance to traffic control devices. Several studies have addressed the safety effects of sight distance at intersections, but only one study addressed sight distance in the urban environment.

David and Norman (*89*) studied the safety effects of intersection sight distance, based upon data from urban intersections where foliage and buildings obstructed the view of the intersections. In general, David and Norman found that within specific ADT levels, the reduction in accident experience from a sight distance improvement was highest for intersection approaches whose initial sight distance was lowest. In other studies of intersection sight distance

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in rural environments, Hanna et al. (*114*) found that intersections with poor sight distance had an observed accident rate of 1.33 accidents per million entering vehicles, where intersections as a whole had an accident rate of 1.13 accidents per million entering vehicles. Mitchell found that total intersection accidents were reduced by 67 percent when intersection sight distance obstructions were removed.

In a study of stopping sight distance, Fambro et al. (*115*) found that accident rates were high for intersections located on crest vertical curves with limited sight distance.

No studies were found on the safety effects of limited sight distance to traffic control devices.

The expert panel of safety researchers evaluated the effects of intersection sight distance on intersection-related accidents (*7*). The AMFs, established by the expert panel for intersection sight distance at intersections with stop control on the minor legs, are as follows:

- 1.05 if sight distance is limited in one quadrant of the intersection
- 1.10 if sight distance is limited in two quadrants of the intersection
- 1.15 if sight distance is limited in three quadrants of the intersection
- 1.20 if sight distance is limited in four quadrants of the intersection

Sight distance in a quadrant of an intersection is considered limited if the available sight distance is less that the sight distance specified by AASHTO policy for a design speed of 20 km/h (12 mph) less than the major-road design speed and the sight distance restrictions are due to roadway alignment and/or terrain.

Approach Width

The width of an intersection approach includes the combined widths of the approach lanes, and in some cases, the width of the shoulder. Bauer and Harwood (*86,87*) and Lacy (*85*) found that increasing the approach width to an intersection was associated with reduced the accident rate along the approach. Bauer and Harwood (*86,87*) found that increasing the lane width at both unsignalized and signalized intersections in urban areas tends to decrease accidents, while at rural unsignalized intersections increasing the shoulder width tends to decrease accidents. Lacy (*85*) found that widening the approaches, combined with other safety improvements, decreased accident frequency by 35 percent and accident severity by 80 percent. On the other hand, David and Norman (*89*) did not find any evidence that incremental changes in lane or shoulder width near intersections affects accident rates.

Number of Approach Lanes

The number of lanes on an intersection approach is determined primarily by traffic demand and the desired level of service. Intuitively, one might assume that the number of accidents is proportional to the number of lanes (i.e., as the number of lanes increases so would

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the total number of accidents, since the potential number of conflicts would appear to increase.). However, at unsignalized intersections in both urban and rural areas, Bauer and Harwood (*86,87*) found that accidents tended to be higher on facilities with one approach lane and accidents tended to be lower at intersections with two or more lanes. The opposite appears to be the case for urban, four-leg, signalized intersections. David and Norman (*89*) also indicated that accident frequencies can be reduced by adding through lanes at urban/suburban intersections with total entering volumes less than 10,000 veh/day. It should be noted that with a demand-related design parameter such as number of lanes, it is difficult to assess directly whether any observed safety effects are due to the number of lanes or to the traffic volume on the approach.

Median Type and Width

The width of a divided highway median influences the safety performance of intersections on that highway. At both unsignalized and signalized intersections in urban and suburban areas, Harwood et al. (*99*) found that accident frequencies tended to increase with increasing median width. In contrast, accident frequencies at rural four-leg signalized intersections decrease as median width increases. Similar results for rural divided highway intersections were found by Priest (*116*) in that intersection accident frequencies decrease as the median with increases, except at very low volumes. Van Maren (*117*) did not find any statistically significant relationship between median width and intersection accident rate.

Pedestrian Facilities

Along urban and suburban arterials, pedestrian safety at intersections is an important issue. The pedestrian safety performance of an intersection is most directly related to the geometric design of each location; with the required crossing distance being the most significant design feature. No studies have been found that have used crash data to document the pedestrian safety implications of crossing distance and lane width. However, it may be reasoned that as crossing distances increase, pedestrian exposure time to motor vehicle traffic increases, increasing the potential of vehicle-pedestrian conflicts, and lane width can both directly and indirectly affect pedestrian crossing distance.

Several studies have been conducted to determine at what width the intersection crossing distance becomes excessive for pedestrians. The *Florida Pedestrian Planning and Design Handbook* (*118*) recommends medians at intersections whenever the crossing distance exceeds 18 m (60 ft) to provide a refuge for slow or late crossing pedestrians. This implies the maximum desirable pedestrian crossing distance is 18 m (60 ft). Similarly, Pietrucha and Opiela (*119*) recommended that pedestrian refuge islands be provided when crossing distances exceed 23 m (75 ft). Many of the countermeasures recommended to improve pedestrian safety at intersections involve reducing crossing distances, which in some cases could involve narrowing lanes.

Crossing intersections is particularly difficult for pedestrians with vision impairments. These difficulties arise because of quieter cars, right turn on red (which masks the beginning of

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the through phase), continuous right-turn movements associated with channelized right turns, complex intersection geometry, wide streets, and complex signal operations.

Bicycle Facilities

There are several key factors that impact the safety of bicyclists at intersections: bicycle and motor vehicle weaving, lane widths, providing bicycle facilities through the intersection proper, and bicyclists making left turns. For intersections that include right-turn lanes or channelized right-turn lanes, there appears to be an inherent risk to bicyclists because motor vehicles entering the turn lane must weave across the path of bicycles traveling straight through the intersection, but no studies based upon crash history are available to support this presumption. This same type of conflict also occurs between through bicyclists and right-turn vehicles at conventional intersections.

One of the most difficult maneuvers facing bicyclists at intersections is making a left turn at four-leg intersections. Because bicycle users are often to the right of through traffic as they approach the intersection, it is difficult to weave across these through moving vehicles in order to execute their left turn. Research was conducted by Hunter (*120*) that investigated the use of "bike boxes" which are right-angle extensions to bike lanes at the head of the intersection that allow left-turning bicyclists to move to the head of the traffic queue on red traffic signals and then proceed in front of vehicle traffic when the traffic signal changes to green. Hunter noted that the rate of conflicts between bicycles and motor vehicles changed little with the installation of the bike boxes and that no conflicts took place while using the bike box as intended.

The amount of lane width or right-of-way space provided for bicyclists through intersections influences bicyclists' perceived level of safety. The overall conclusion of research conducted by Hunter et al. (*121*) was that both wide curb lane and bicycle lane facilities can improve the safety of bicycle traffic because of the space given for their exclusive use. As these facilities approach intersections there are no universal standards as to how they should be treated through the intersection proper; yet it can be reasoned that providing these continued facilities for bicyclists would enhance the intersections safety performance.

HSM USER SURVEY

A survey was conducted as part of the research to obtain assessments from potential HSM users concerning the following issues as related to the HSM chapter on urban and suburban arterials:

- usefulness of potential HSM applications
- current safety prediction methods
- priorities for candidate input variables to the HSM safety prediction methodology
- priorities for candidate output variables for the HSM safety prediction methodology (i.e., safety measures of effectiveness)

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- data availability from specific highway agencies for the research

The survey questionnaire used to address these issues and the results obtained are presented in Appendix A. These survey results were used in planning the structure of the HSM methodology and the work plan for its development.

The mailing list for the survey included:

- 50 state highway agencies
- 100 local highway agencies
- 100 MPOs
- 28 TRB Task Force members

Thus, a total of 278 survey questionnaires were mailed.

Tables 8 and 9 summarize the number of survey responses received from various agencies. Of the 278 surveys that were mailed out, 109 responses were received, for an overall response rate of 39 percent. The highest response rate was received from state highway agencies (74 percent), followed by TRB task force members (68 percent), MPOs (33 percent), and local agencies (20 percent). Overall, the responses received include representatives from 41 state highway agencies, 23 local highway agencies, 33 MPOs, three other government agencies, five consulting firms, and four university/research agencies.

TABLE 8. Response rate for the HSM User Survey

Agency/organization type	Number of questionnaires mailed	Number of responses received	Response rate (%)
State highway agencies	50	37	74.0
Local highway agencies	100	20	20.0
MPOs	100	33	33.0
TRB Task Force	28	19	67.9
TOTAL	278	109	39.2

TABLE 9. Types of organizations responding for the HSM User Survey

Agency/organization type	Number (percentage) of responses
State highway agency	41 (37.6)
Local highway agency	23 (21.1)
MPO	33 (30.3)
Other Government Agency	3 (2.7)
Consulting firm	5 (4.6)
University/research agency	4 (3.7)
TOTAL	109

NOTE: Number of responses for some agency/organization types exceeds the value shown in Table 12 because some TRB Task Force members also represent that agency/organization type.

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Through this report, we have referred to the survey as the HSM user survey. The state highway agencies, local highway agencies, and MPOs to whom the survey was sent all represent potential users of the HSM methodology. While the TRB Task Force members have specific responsibilities for guiding HSM development, they are also potential HSM users. All of the tables in Appendix A show the responses from each group of survey respondents separately, since each group has different responsibilities and perspectives.

Survey respondents were asked to rate the usefulness of six potential applications of a quantitative safety prediction procedure for urban and suburban arterials. Each group of respondents indicated that forecasting the safety effectiveness for a proposed improvement project on an existing arterial was the most important application. The other two applications of the HSM methodology that were most frequently cited by users were forecasting the future change in safety performance that may occur on an existing facility as traffic volumes grow and forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (i.e., for development impact studies or driveway permit requests).

Survey respondents were also asked whether they were currently using, or developing, any methods to predict or estimate the safety performance of urban and suburban arterials. Only 4 percent of responding agencies indicated that they currently employ any sort of safety prediction methodology. However, the general lack of current safety prediction methodologies indicates a definite need for the HSM.

Detailed ratings and rankings of candidate input variables and suggestions for additional input variables are presented in Appendix A. The input variables included in the HSM methodology are identified in Chapter 7 of this report.

The output variables or safety measures of effectiveness to be estimated by the safety prediction methodologies in the first edition of the HSM, as identified by the TRB Task Force, are:

- annual accident or crash frequency for a roadway segment or intersection
- crash severity distribution (percentage of crashes by severity level)
- crash type distribution (percentage of crashes by collision type)

A number of additional output variables were suggested by survey respondents. All of the potential output variables are identified in Appendix A and specific output variables that were suggested with some frequency are discussed in Chapter 3 of this report.

Survey responses concerning data availability from highway agencies are presented in Appendix A. Follow-up contacts with the most promising agencies were made to select the highway agencies whose data were used to assemble the safety database used in the research.

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CHAPTER 3

RECOMMENDED STRUCTURE FOR SAFETY PREDICTION METHODOLOGY

The key elements of the structure for the safety prediction methodology that will be developed for urban and suburban arterials include:

- potential applications or uses of the methodology
- input variables
- output variables (safety measures of effectiveness)
- arterial components to be modeled separately
- prediction methodology for each arterial component

Each of these elements is discussed below.

POTENTIAL APPLICATIONS OR USES OF THE METHODOLOGY

The specific applications that the HSM safety prediction methodology should be designed to address were assessed in the early stages of the research. These potential applications include:

- estimating the current safety performance for an existing arterial for which accident history data are not available or are not considered reliable
- estimating the safety performance for an existing arterial combining model predictions and actual, reliable accident history data
- forecasting the future change in safety performance that may occur on an existing facility as traffic volumes grow
- forecasting the safety effectiveness for a proposed improvement project on an existing arterial, including major reconstruction, access management, or signal enhancement projects
- forecasting the safety performance of a new arterial that has not yet been constructed
- forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (e.g., for development impact studies or driveway permit requests)

Each of these applications will impose slightly different demands on the safety prediction methodology and require slightly different capabilities; some applications are more suited than others for planning, design, and operational analyses.

HSM users were asked in the survey conducted in Task 3 of the research to rank these applications in order of importance. The survey results are presented in Table A-3 in Appendix A

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of this report. The potential HSM applications, in descending order of importance, giving equal weight to the responses from each of the four categories of survey respondents, are as follows:

1. forecasting the safety effectiveness for a proposed improvement project on an existing arterial, including both major reconstruction and access management projects
2. forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (e.g., for development impact studies or driveway permit requests)
3. forecasting the future change in safety performance that may occur on an existing facility as traffic volumes grow
4. estimating the safety performance for an existing arterial combining model predictions and actual, reliable accident history data
5. forecasting the safety performance of a new arterial that has not yet been constructed
6. estimating the current safety performance for an existing arterial for which accident history data are not available or are not considered reliable

The second and third ranked HSM applications were rated nearly equally, with Application 2 rated higher by state highway agencies, local highway agencies, and the TRB Task Force and Application 3 ranked higher by MPOs.

It will be desirable for the HSM methodology to serve as many of the applications listed above as possible but, clearly, the highest priority should be assigned to estimating the safety effects of proposed improvement projects (Application 1). It is likely that any methodology that serves this application well would also be capable of meeting the needs of Applications 3 through 6. It would also be desirable if the methodology developed were also capable of serving the second priority, forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (Application 2).

CANDIDATE INPUT VARIABLES

The survey of potential HSM users conducted as part of the research asked respondents to rate the importance to their agency of various candidate input variables for the HSM safety prediction methodology for urban and suburban arterials. Tables 10 and 11 present lists of the candidate input variables included in the survey for roadway segments and intersections, respectively. The candidate input variables were rated by survey respondents on a scale from 1 to 5 for their potential inclusion in the safety prediction methodology, with 1 representing the lowest priority and 5 representing the highest priority. The complete results of the survey, including the ratings of candidate input variables, are presented in Appendix A of this report. The rankings of candidate input variables by the survey respondents were one factor in recommending variables for data collection for the project database in Chapter 4 of this report. The tables of candidate input variables for specific roadway segment and intersection types in Chapter 4 show the mean ratings and rankings for those variables from the HSM user survey.

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TABLE 10. Candidate input variables for roadway segments included in HSM User Survey

Bicycle facilities
Bicycle volumes
Delineation
Design or posted speed
Grades
Horizontal curves
Lane widths
Lighting
Median type
Median width
Number and type of driveways
Number and type of median openings
Number of through lanes
Older drivers/driver population characteristics
One-way vs. two-way operation
Pavement friction
Pedestrian facilities
Pedestrian volumes
Presence of curb parking
Presence of frontage roads
Presence of reversible lanes
Roadside design/clear zones/roadside objects
Segment length
Shoulder width/curb type
Spacing between driveways
Spacing between signals
Speed variance
Traffic volume (AADT) (veh/day)
Traffic volume in peak period (veh/h)
Traffic volumes for individual driveways
Transit facilities
Vehicle mix (e.g., percent trucks)
Vehicle speed in off-peak periods
Vehicle speed in peak periods
Vertical curves

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TABLE 11. Candidate input variables for intersections included in HSM User Survey

Approach speed in off-peak periods
Approach speed in peak periods
Bicycle facilities
Bicycle volumes
Curb parking on approaches
Grade of approaches
Horizontal alignment of approaches
Intersection skew angle
Lane widths on approaches
Level of Service (LOS)
Lighting
Median type/presence of median
Number and length of added through lanes
Number of intersection legs
Number of through lanes on approaches
Older drivers/driver population characteristics
Pedestrian facilities
Pedestrian volumes
Presence of median refuge area for pedestrians
Presence of right-turn lanes
Presence/number of left-turn lanes
Shoulder/curb type on approaches
Shoulder/curb width on approaches
Signal phasing (e.g., left-turn phasing)
Signal timing
Signal visibility
Spacing between intersections and nearby driveways
Traffic volumes (AADT) for major- and minor-road legs (veh/day)
Traffic volumes in peak period (veh/h)
Transit facilities
Type of left-turn channelization (painted vs. curb)
Type of traffic control
Vehicle mix (e.g., percent trucks)

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It is not clear that all of the variables identified in Tables 10 and 11 can be included explicitly in the HSM methodology. Variables included in the methodology would need to have known relationships to safety or relationships that could be established as part of the research. Most of these variables were included in the data collection for the project database so that their appropriateness for inclusion in the methodology could be examined. Variables not included in the methodology for the first edition of the HSM can be considered further for later editions.

There are limited data available for some variables, such that their consideration would have required a data collection effort beyond the scope of the current study. The variables that it was decided could not be addressed in the methodology for urban and suburban arterials in the HSM first edition were:

- Adjacent land use—it was decided not to include an explicit variable for adjacent land use because land use is addressed through the driveway type variable introduced in Chapter 5.
- Bicycle facilities—the overall level of vehicle-bicycle collisions is addressed in the methodology and data on bicycle facilities have been collected, but it was decided that the resources of the project were not sufficient to model the safety effects of specific design features on bicycle facilities.
- Driveway volumes—the collection of traffic volume data in the field at individual driveways was considered, but was found to be beyond the resources of the project.
- Multiple turn lanes—multiple turn lane (i.e., double right-turn lanes and double or triple left-turn lanes) have been noted in the field where present. However, collection of sufficient data to evaluate their safety effects would be beyond the resources of this project.
- Presence of channelized right-turn lanes—the evaluation of the safety effectiveness of channelized right-turn lanes would have required data collection beyond the scope of the current project. Channelized right-turn lanes are being considered in ongoing research in NCHRP Project 3-72 and 3-78 and further research on this topic is under consideration. If the results of these research projects appear promising, they should be considered for inclusion in the HSM methodology.
- Roundabouts—a decision was reached not to collect data on roundabouts. The safety effectiveness of roundabouts is being investigated in NCHRP Project 3-65 and results from that project might be considered for incorporation in the HSM methodology when that project is complete.
- School zones—no safety effectiveness estimates for school zones are available; it is recommended that this issue be addressed in the second edition of the HSM or beyond.
- Sight distance—the collection of data on intersection sight distance, particularly for turning and crossing maneuvers at unsignalized intersections was considered, but was found to be beyond the resources of the project.

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- Traffic volumes by time of day and turning movement counts—data on traffic volumes by time of day on roadway segments and at intersections and turning movement counts at intersections were not available for most of the study sites. The collection of these data in the field was considered, but was found to be beyond the resources of the project.

The best variable representing daily traffic volumes for use in the research would be the annual average daily traffic volume (AADT), which is typically derived from combining counts made at several times of the year or by adjusting a one-time count with seasonal factors from a continuous counting station. However, AADT data were not always available for the sites considered in this study and will not always be available to the users of the safety prediction methodology developed here. Therefore, in the methodology presented in this report, we have consistently referred to the average daily traffic volume (ADT), not the AADT. The ADT data used in this research are equivalent in quality to the data that are likely to be used in implementing the safety prediction methodology.

Modeling of the safety effects of pedestrian facilities was initially considered to be beyond the resources of this project. However, a decision was reached by NCHRP to expand the project scope to include the development of a pedestrian safety methodology. That work is currently underway and will be added to the methodology for the first edition HSM when complete.

OUTPUT VARIABLES

The output variables or measures of effectiveness for the safety prediction methodology will include the three safety measures of effectiveness that have been approved by the TRB Task Force. These are:

- expected total accident or crash frequency
- expected crash frequency distribution by crash severity level
- expected crash frequency distribution by crash type

The output variables or measures of effectiveness are dependent variables whose values would be estimated by the safety prediction methodology.

The survey asked potential HSM users whether there are other output variables or measures of effectiveness that should be considered. The full set of responses to this survey question is presented in Table A-11 in Appendix A of this report. That table shows that there were four additional output variables that were identified as desirable output variables or measures of effectiveness based on the survey responses. These are:

- expected accident/crash rate
- combination of expected accident/crash severity and type distribution
- expected accident/crash distribution by time of day

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- expected accident/crash reduction factors based on improvement type (i.e., AMFs)

Each of these additional output variables is discussed briefly below.

Accident/Crash Rate as an Output Variable

Nearly 13 percent of respondents recommended that accident/crash rate be considered as an output variable. The traditional accident rate measures to be considered are:

- accidents per million veh-mi of travel for roadway segments
- accidents per million entering vehicles for intersections

In the past, accident rate measures like those shown above were used extensively in safety modeling. The use of accident rate measures has been largely discontinued for two reasons:

- accident rate measures cannot be reliably predicted because they incorporate the implicit assumption that accident frequency varies linearly with traffic volume when, in fact, accident frequency in most cases has a nonlinear relationship with traffic volume
- accident rate measures, even if derived correctly using a nonlinear relationship between accident frequency and traffic volume, appear to suggest to naïve users that the change in accident frequency resulting from a given change in traffic volume will be linear

Based on the first bullet item presented above, it is recommended that the dependent variable for safety prediction models should be accident frequency, not accident rate, and that traffic volume be considered as an independent variable in the prediction model rather than as part of the dependent variable. With this approach, the effect of traffic volume on accident frequency can take any functional form that best suits the data; in most cases, this functional form will be nonlinear.

Given that the safety prediction models will estimate accident frequency, as recommended by the TRB Task Force, it is still possible to express the predicted accident frequency as an accident rate by dividing the accident frequency by an exposure measure such as million veh-mi of travel for segments or million entering vehicles for intersections. There is both an advantage and a disadvantage to doing this. The advantage is that the accident rate, expressed in this manner, represents something useful and important—the risk to an individual motorist of traveling through the segment or intersection in its current condition and traffic volume level. Accident rates can, thus, be used to compare the risks of travel between sites to determine the sites at which travel is most safe and least safe. The disadvantage is that, as noted above, accident rate measures may suggest to naïve users that a change in traffic volume (e.g., traffic volume growth over time) will have a linear or proportional effect on accident frequency; there is clear evidence that such effects are usually nonlinear.

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On balance, it is recommended that the HSM provide procedures to express the safety prediction results as accident rates, as well as accident frequencies, so that the relative risks of travel through various sites can be explicitly compared, but that a caveat against assuming that accident frequency varies linearly with traffic volume be stated clearly at appropriate locations in the HSM.

To summarize, we recommend the following policy for consideration by the NCHRP project panel and the TRB Task Force:

- all HSM safety prediction models should predict accident frequencies, not accident rates
- where appropriate, the HSM should provide procedures to enable users to compute accident rates per million veh-mi for segments and per million entering vehicles for intersections
- wherever procedures to compute accident rates are provided, the HSM should state that accident rates should be used to compare the relative risks of travel through specific segments and intersections, but should not be used to predict the effect of changes in traffic volume on accident frequency. In other words, it should be clearly stated that it should not be presumed that the accident rate will remain unchanged if the traffic volume changes.

Accident/Crash Distribution by Time of Day

Consideration was given to whether safety predictions should be made for a full 24-hr day or for separate periods within the day. Two distinct sets of contrasting periods with a 24-hr day are of potential interest:

- Peak traffic periods vs. off-peak periods
- Daytime vs. nighttime periods

Separate modeling of peak and off-peak periods requires accident and traffic data to be available separately for these periods. Accident records normally indicate the time of day at which the accident occurred, so separating accidents by time of day is not typically an issue, although the specific times considered to be the peak period may vary between locations and between metropolitan areas. However, most sites with available ADT estimates do not have peak period traffic volumes available. Furthermore, even where traffic volume data for the peak period are available, modeling to predict peak-period accident frequency is not always successful because of the smaller sample size of accidents. Initial efforts in this project did not indicate that satisfactory models of peak vs. off-peak traffic periods could be developed without extensive additional data collection. Therefore, consideration of this issue has been deferred to a later edition of the HSM.

Separate accident predictions for daytime and nighttime accidents are useful particularly in estimating the potential effectiveness of lighting as a countermeasure. The safety effectiveness

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of lighting would typically be expressed as a combination of the expected annual nighttime accident frequency for a location and the AMF for lighting expressed as a proportional change in nighttime accident frequency. Formal models for predicting nighttime accident frequencies would require a substantial number of locations for which hourly traffic volume counts are available. Hourly counts are needed because the hours during which daytime and nighttime conditions occur vary by season of the year (and by latitude). It does not appear feasible to conduct an extensive program of hourly traffic counting in Project 17-26, so the research team recommends a simpler approach to estimation of nighttime accident frequencies based on proportions of daytime and nighttime accidents from a substantial number of similar sites. The distribution of daytime vs. nighttime accidents is used in conjunction with the AMF for lighting in the HSM methodology.

Accident/Crash Reduction Factors Based on Improvement Type

Accident/crash reduction factors (i.e., AMFs) for specific improvement types will have a key role in the safety prediction methodology, but they are not output variables. However, if the safety prediction methodology is applied to determine the accident frequency for two alternatives, one with and one without a specific improvement, then the difference in accident frequency, representing the expected safety benefit of the improvement, can be considered as an output of the methodology.

ARTERIAL COMPONENTS TO BE MODELED SEPARATELY

It is likely that the most effective approach to development of a safety prediction methodology will be to model the safety performance of different arterial components separately. The safety prediction algorithm for rural two-lane highways, used in the HSM prototype chapter, used separate models for roadway segments and at-grade intersections (*2*). The overall safety prediction for a highway segment was obtained by making separate safety predictions for each individual roadway segment and each at-grade intersection with the analysis boundaries or project limits of interest. The safety prediction modeling for at-grade intersections included accidents that occurred at the intersection (within the curb line limits) and intersection-related accidents that occurred within 76 m (250 ft) of the intersection (which included nearly all intersection-related accidents on rural two-lane highways). Roadway segments were defined as continuous segments that were homogeneous with respect to the model input variables. The safety prediction modeling for roadway segments included all accidents not attributable to a specific intersection.

The concept of modeling and predicting accidents separately for roadway segments and intersections that was used for rural two-lane highways has also been applied to urban and suburban arterials. The input variables that are potentially applicable to roadway segments and intersections are quite distinct. Thus, it seems appropriate to use the same component-based or building-block approach for urban and suburban arterials as was used for rural two-lane highways. The distance of 76 m (250 ft) used to select intersection-related accidents appears to be appropriate for unsignalized intersections and most signalized intersections on urban and

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suburban arterials. In jurisdictions that routinely experience vehicle queues longer than 76 m (250 ft) at signalized intersections, an adjustment to the predicted accident frequencies can be made by way of the calibration process.

A key difference between the rural two-lane highway methodology and the urban and suburban arterial methodology is the treatment of driveway accidents. In the rural two-lane highway methodology, the influence of driveways was handled through an AMF representing the safety effect of driveway density (driveways per mile). No distinction between types of driveways was made in the rural two-lane highway methodology. Driveway-related collisions are a more substantial percentage of the accident frequency of urban and suburban arterials than for rural two-lane highways. For this reason, the effects of individual driveways are considered separately and the overall driveway-related accident frequency is the sum of the collision frequencies for the individual driveways. The collision frequencies for individual driveways are a function of the type of land use served by the driveway and the roadway type on which the driveway is located.

For driveways on divided arterials, we hope to include a factor that distinguishes between driveways located at a median opening and driveways not located at a median opening (i.e., right-in, right-out operation). This factor is still under development.

SAFETY PREDICTION METHODOLOGY FOR EACH ARTERIAL COMPONENT

Two alternative modeling approaches were initially considered for development of the HSM methodology:

- safety prediction directly with a regression model
- safety prediction with a combination of a base regression model and AMFs, as was done for the IHSDM crash prediction model for two-lane highways and the HSM prototype chapter

Each approach and its strengths and weaknesses is described below.

The latter approach was selected as the preferred approach for the HSM methodology for urban and suburban arterials.

Safety Prediction Directly With a Regression Model

Safety prediction directly with a regression model is the traditional approach to safety modeling. Regression models for safety prediction typically have the following forms for roadway segments and intersections, respectively:

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Roadway Segments

$$N_{br} = \text{EXPO} \exp(b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_n X_n) \quad (5)$$

or

$$N_{br} = \exp(b_0 + b_1 \ln \text{ADT} + b_2 \ln L + b_3 X_3 + \ldots + b_n X_n) \quad (6)$$

where:

N_{br} = predicted accident frequency per year for a given roadway segment
EXPO = exposure in million veh-mi of travel per year = (ADT)(365)(L)(10^{-6})
ADT = average daily traffic volume (veh/day) for roadway segment
L = length of roadway segment (mi)
$b_0,\ldots,b_n$ = regression coefficients determined by model fitting
$X_1,\ldots,X_n$ = roadway segment characteristics

Intersections

$$N_{bi} = \exp(b_0 + b_1 \ln \text{ADT}_{maj} + b_2 \ln \text{ADT}_{min} + b_3 X_3 + \ldots + b_n X_n) \quad (7)$$

where:

N_{bi} = predicted accident frequency per year for a given intersection
ADT_{maj} = average daily traffic volume (veh/day) on the major road
ADT_{min} = average daily traffic volume (veh/day) on the minor road
$X_3,\ldots,X_n$ = intersection characteristics

The major advantage of regression models is that they are relatively easy to develop and apply. The major disadvantage of regression models is that their coefficients do not always represent the independent effects of the variables with which they are associated. Consider, for example, a term, b_2X_2, from Equation (5) above. If X_2 represents the lane width of a roadway section, then coefficient b_2 purports to represent the sensitivity of safety to changes in lane width. In some regression models, b_2 may, in fact, represent the sensitivity of safety to lane width well, but in other cases the value of b_2 may be influenced not only by lane width, but also by other variables, not included in the model, that are statistically correlated with lane width. Thus, if the presence of narrow lanes is correlated with the presence of narrow shoulders and poor roadsides, the value of the coefficient, b_2, may well overstate the actual effect of lane width on safety. Another disadvantage of regression model approaches is that the values of regression coefficients may vary substantially between jurisdictions.

Regression models often are good tools for predicting total accident frequency, although this may arise from multicollinearity between included and omitted variables. The weakness described above only applies to the use of individual regression coefficients to represent the independent effects of the specific variables with which they are associated, not the ability of the

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overall regression model to provide a good estimate of accident frequency for a particular facility. This weakness of regression models does not mean that they cannot be used, but only that they must be used cautiously. If a regression coefficient is used to represent the effect of, say, lane width, it is important that the effect implied by that coefficient be verified as reasonably in accordance with current knowledge about the safety effect of lane width.

Safety Prediction With a Combination of a Base Regression Model and AMFs

In the rural two-lane highway crash prediction algorithm developed for IHSDM and also used in the HSM prototype chapter, a new approach was developed to overcome the weaknesses of regression models discussed above. This approach combined a base regression model with a series of AMFs representing the effects of individual geometric design or traffic control features. This approach is represented by the following equation:

$$N = N_{base} (AMF_1 \, AMF_2 \ldots AMF_n) \quad \textbf{(8)}$$

where:

N = predicted accident frequency per year for a given roadway segment or intersection
N_{base} = accident frequency per year predicted by base model for actual ADT under nominal or base conditions
$AMF_1,\ldots,AMF_n$ = accident modification factors to convert accident frequencies from nominal or base conditions for specific site characteristics to actual conditions

In this approach, a regression model like Equations (5) through (7) is used as a base model. The model is used to predict the safety performance of a roadway or intersection with the same ADT as the site of interest, but with nominal or base values of other variables. For example, the lane width variable in the base model might be set equal to 3.6 m (12 ft), the shoulder width variable equal to 1.8 m (6 ft), and the driveway density variable set equal to zero (no driveways). This provides a reliable overall safety prediction for a nominal or "ideal" facility. Then, AMFs for geometric design and traffic control variables of interest are developed to represent the best-known effects of these variables. For example, the AMF for lane width would not be based on the regression coefficient for lane width in the base model, but rather would represent the known effect of lane widths from the best available studies. For example, the AMF for a 3-m (10-ft) lane width would be determined as the ratio between the accident frequency for 3-m (10-ft) lanes and the accident frequency for the nominal lane width of 3.6 m (12 ft), based on the results of the best available research. This ensures that the sensitivity of safety to lane width in the prediction methodology is based on the current state of knowledge about lane width and not on a regression coefficient that may not match the known sensitivity of safety to lane width.

Depending on the research on which they are based, AMFs may reflect an effect on total crash frequency or on a particular crash severity level or crash type. For example, Figure 3,

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presented in Chapter 2 of this report, illustrates the AMFs for shoulder width in the IHSDM crash prediction methodology. This AMF applies to single-vehicle run-off-road, multiple-vehicle same direction sideswipe, and multiple-vehicle opposite direction accidents (collectively known as related accidents), and not to total accident frequency. However, it can be converted to an AMF for total crash frequency if the proportion of these related accident types in total accidents is known. An AMF value greater than 1.0 indicates that a particular shoulder width is associated with an accident frequency higher than the nominal shoulder width of 1.8 m (6 ft). For example, the AMF of 1.30 for 0.6-m (2-ft) shoulders means that 0.6-m (2-ft) shoulders would be expected to experience 30 percent more accidents than 1.8-m (6-ft) shoulders. An AMF value less than 1.0 indicates that a particular shoulder width is associated with an accident frequency lower than the nominal shoulder width of 1.8 m (6 ft). For example, the AMF of 0.87 for 2.4-m (8-ft) shoulders means that 2.4-m (8-ft) shoulders would be expected to experience 13 percent fewer accidents than 1.8-m (6-ft) shoulders. These AMF apply to specific types of related accidents that are defined in Figures 1 and 3. It should also be noted that the AMFs shown for lane and shoulder widths in Figures 1 and 3 are applicable to rural two-lane highways and are not being proposed for application to urban and suburban arterials.

Ideally, AMFs should be based on the results of well-designed before-after studies. However, since only a limited number of well-designed before-after studies have been conducted, many AMFs are necessarily based on regression coefficients.

STATISTICAL MODELING APPROACH

Regression models were developed for use as base models for the HSM methodology. This section describes the statistical modeling approach that was used. The regression models developed with this approach are presented in Chapter 5 of this report.

Roadway Segment and Intersection Models

Roadway segment and intersection models for collision types other than driveway-related collisions were developed initially in the forms shown in Equations (6) and (7). Functional relationships between expected number of roadway or intersection accidents and explanatory variables, including ADT and roadway segment or intersection characteristics, were developed using a stepwise multiple regression approach, assuming a negative binomial (NB) error distribution of accident frequencies. Models were developed individually within each state and for combined states, separately for each roadway type, intersection type, and collision type. A backwards stepwise regression procedure was used to select those independent variables that contribute significantly to the model under consideration, starting with all variables, and excluding, one at a time, the variables for which the significance level was above 0.20. Other criteria used in the final variable selection included whether the statistical algorithm converged; whether the coefficient of a particular continuous variable was in the anticipated direction; and whether the effect of a categorical variable with ordinal levels was monotonic over the levels of that variable.

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The concern about the direction of the effect for continuous or ordinal categorical variables is a key consideration in developing useful models for engineering applications. Regression analysis provides no assurance that the values of the fitted regression coefficients represent cause-and-effect relationships of specific independent variables to safety. Thus, each regression result was reviewed to assess whether the results obtained were consistent with existing knowledge about the effect of that variable. Anomalous relationships, such as coefficients with an opposite sign to that expected, can result when variables in the model correlate with variables not included in the model. Where such anomalous relationships were found, the variable in question was excluded from further modeling for the roadway or intersection type in question. This approach provided assurance that the resulting models were not only statistically significant, but were also meaningful in engineering terms.

In all models developed for nondriveway collisions on roadway segments, the coefficient for segment length [b_2 in Equation (6)] was assumed to be equal to 1.0. Previous modeling efforts for total accident frequencies on arterials have reported coefficients for segment length other than 1.0. Since there is no inherent reason that safety should not be proportional to length, such results are presumed to result from close spacing between intersections, which is correlated with short segment lengths, and from the presence of multiple driveways. In the present study, with all intersection- and driveway-related collisions removed from roadway segment modeling, there is no theoretical reason that segment length should not have a linear relationship to safety. Therefore, the coefficient for segment length was forced to be 1.0 in all cases.

To develop regression models for the data from individual states, the GENMOD procedure of SAS (*122*) was used to estimate model coefficients, over dispersion, the standard error of each estimate, and their significance level (p-value). This procedure fits a generalized linear model to the data by maximum likelihood estimation of the regression and over dispersion parameters; an NB error structure of accident counts is assumed. For each final model selected, a likelihood ratio test statistic, R^2_{LR}, was calculated (*123*). This statistic is a function of the log-likelihood of the full model (including the selected parameters) and that of the intercept-only model and sample size. As such, it is a measure, on a scale of 0 to 1, of how much better the full model is than the intercept-only model. Thus one looks for values above zero; naturally, higher values of R^2_{LR} indicate a greater improvement, although this statistic is constrained mathematically such that it cannot reach a value of 1. Thus, the definition of R^2_{LR} differs from the conventional definition of R^2. In ordinary least squares regression, R^2 represents the proportion of the variation in the dependent variable that is explained by the regression model. In the present study, R^2_{LR} represents the improvement of the model in comparison to an intercept-only model. Thus, even very low values of R^2_{LR} indicate that the model including one or more independent variables fits the data better than an intercept-only model. Thus, there is a good case for using NB models with low values of R^2_{LR} if the model includes effects of independent variables that make sense in engineering terms.

In developing regression models from the combined data from more than one state, a slightly different modeling approach was used. In this case, it was assumed that the two states provide a random sample of data from the pool of all states. Thus, state was included in the NB regression as a random factor rather than a fixed factor like other variables. This approach allows one to estimate the effect of each fixed effect while controlling for the random state effect. All

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other variable and model selection criteria were kept identical to those used in the individual state modeling approach.

To develop models from combined state data, the GLIMMIX procedure of SAS (*124*) was used to estimate model coefficients, over dispersion, the standard error of each estimate, and their significance level (p-value), assuming an NB accident distribution and a random error structure within and between states. All regression and over dispersion parameters were estimated by maximum likelihood method. Again, for each final model selected, a likelihood ratio test statistic, R^2_{LR}, was calculated. When estimating generalized linear mixed models, this statistic is a measure, on a scale of 0 to 1, of how much better the full model, including the random state effect, is than the intercept-only model. In some cases, the log-likelihoods of the full and intercept models were mathematically too close to compute an R^2_{LR} value during the iterative model process. In those cases and when the regression coefficients were sensible, then the full model was selected over the intercept-only model and an R^2_{LR} value could simply not be reported.

The HSM methodology was developed in the form illustrated in Equation (8). In this approach, all independent variables other than traffic volume were represented by AMFs whose development is discussed in Chapter 6 of this report. Therefore, to obtain a model appropriate to estimate N_{base}, each regression model was reduced to an ADT-only model by substituting nominal or base values of the other independent variables.

Driveway Models

Functional relationships between expected number of driveway-related collisions and explanatory variables, including ADT and roadway segment characteristics, were developed using a sequence of models as shown in Equations (9) through (13).

$$N_{brdway} = a\left(\frac{ADT}{10{,}000}\right)^b \quad (9)$$

$$N_{brdway} = a\left(\frac{ADT}{10{,}000}\right)^b L^c \quad (10)$$

$$N_{brdway} = a\left(\frac{ADT}{10{,}000}\right)^b n^c \quad (11)$$

$$N_{brdway} = a\left(\frac{ADT}{10{,}000}\right)^b \sum_{i=1}^{7} c_i n_i \quad (12)$$

$$N_{brdway} = a\left(\frac{ADT}{10{,}000}\right)^b e^{\left(\frac{ADT}{1000}\right)} \sum_{i=1}^{7} c_i n_i \quad (13)$$

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where:

N_{brdwy}	=	predicted frequency per year of driveway-related collisions for a given roadway segment
n	=	total number of driveways on roadway segment
n_i	=	total number of driveways of type i on roadway segment
a, b, c, c_i, d	=	regression coefficients

The assumption was made that the accident counts in each of the five years come from a multinomial distribution with an NB error structure. Regression parameters and the over dispersion parameter were estimated by maximum likelihood. Thus, in all initial models, a separate intercept was estimated for each single year; these estimates were then simply averaged for the final models shown in Table 43 in Chapter 5.

The models represented by Equations (9) through (13) and an intercept-only model were applied to the yearly data, separately for each roadway type and collision type. A number of options were investigated and at each step, the log-likelihoods of two competing models were compared and the best model selected, assuming that the final model is meaningful in engineering terms. The various approaches include the following:

- In all regression models, driveway-related collisions are estimated relative to minor residential driveway-related collisions to express the main modeling idea that under identical conditions, a driveway of type i will have c_i times the number of collisions on a minor residential driveway (base case). Thus the coefficient of minor residential driveways is always set to 1.
- All models were restricted to having driveway coefficients, c_i, equal to 1 or higher. In those cases were the accident data were too sparse across the various cells defined by the model parameters (e.g., model did not converge), those coefficients were constrained to 1 and the remaining coefficients were estimated by maximum likelihood.
- The potential for a straight proportional effect of some parameters (e.g., ADT) on the number of collision was investigated; this was achieved by setting that parameter to 1. If setting a particular coefficient to 1 provided a better fitting model than estimating the coefficient, than the coefficient was set to 1.
- The additional effect of other parameters such as speed limit category, on-street parking, lane with (categorical), and shoulder width (categorical) was investigated. In most cases, no systematic pattern of difference between levels of a parameter were found; these parameters were therefore not included in any of the final models.

The final model form selected was of the type shown in Equation 12 since it provided some consistency across all roadway and collision types. Coefficients of that model could be set to 1, obtained through maximum likelihood estimation, or simply constrained to 1 due to sparse data.

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CALIBRATION FACTORS FOR APPLICATION OF THE PREDICTION METHODOLOGY BY SPECIFIC HIGHWAY AGENCIES

The prediction methodology is likely to include regression models for use to directly predict safety performance of specific arterial components or as base models in a base-model-plus-AMF methodology. It is our intention that each regression model should be developed with the best available data set suited to that particular model. It might be desirable if each highway agency that uses the safety prediction methodology were to refit the models with their own data but, in most cases, this is unlikely to occur. It is unlikely that most agencies that want to use the model will have available the resources, expertise, and data to develop such models themselves. Therefore, most users of the safety prediction methodology can expect to be using regression models developed with data from other jurisdictions.

A calibration factor can be included in models like Equations (5) through (7) to allow a highway agency to compensate for the use of data from other jurisdictions in the development of the model. Such calibration factors are incorporated in the IHSDM crash prediction methodology for rural two-lane highways. Equation (8) can be recast as follows to incorporate a calibration factor:

$$N = N_{base}\, C\,(AMF_1\, AMF_2 \ldots AMF_n) \qquad \textbf{(14)}$$

where:

C = calibration factor to convert predicted accident frequency to local conditions

A calibration procedure is presented by Harwood et al. (*7*). A similar calibration approach used for rural two-lane highways is potentially applicable to urban and suburban arterials, as well. The calibration procedure should involve:

1. Selecting a set of urban and suburban arterials with specified characteristics in the jurisdiction of interest.
2. Applying the safety prediction model to those arterials to estimate the predicted accident frequency for a particular time period.
3. Obtaining actual accident history data for the selected sites for the same time period.
4. Determining the calibration factor as the ratio of the observed accident frequency divided by the predicted accident frequency.

The calibration procedure can be developed with different levels of detail depending upon which characteristics the user chooses to consider in Step 1. This allows the calibration procedure to be adapted to highway agencies with varying accident records systems. Consideration is currently being given in NCHRP Project 17-36 to developing a common calibration procedure that can be applied to all of the HSM prediction methodologies.

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PREDICTIONS FOR ACCIDENT SEVERITY AND ACCIDENT TYPE

In the HSM methodology for urban and suburban arterials, base models are provided for total accidents, as well as components of total accidents by accident severity level. The models for individual accident severity levels address fatal-and-injury accidents and property-damage-only accidents. Since the models for total accidents, fatal-and-injury accidents, and property-damage-only accidents are developed separately, there is no assurance that the predicted accident frequencies for the two severity-level components will add up to the predicted total accident frequency. Therefore, the predicted value of total accident frequency is treated as the primary predicted value and the relative predicted values for fatal-and-injury and property-damage-only accidents are used to proportion the total accident frequency prediction into severity level components.

For roadway segments, accident frequency estimates are made for five accident types:

- multiple-vehicle nondriveway collisions
- single-vehicle accidents
- driveway-related collisions
- vehicle-pedestrian collisions
- vehicle-bicycle collisions

The same accident types are used for intersections, except that driveway-related collisions are not applicable for intersections and are omitted. Multiple-vehicle nondriveway collisions and driveway-related collisions are predicted by base regression models in most cases; in a few cases where single-vehicle accidents are sparse, base models could not be developed, and single-vehicle accidents are predicted by factors that represent the average proportion of single-vehicle accidents relative to multiple-vehicle nondriveway collisions. Vehicle-pedestrian and vehicle-bicycle collisions are, in all cases, predicted by factors that represent their average frequency in proportion to other accident types.

Tables are provided as part of the methodology to break down the multiple-vehicle nondriveway collisions by manner of collision and the single-vehicle accidents by object struck. These tables represent average proportions for each roadway type.

CONSIDERING OBSERVED ACCIDENT HISTORY DATA IN THE SAFETY PREDICTION METHODOLOGY

The safety prediction methodology should be capable of estimating the expected accident frequency for an urban or suburban arterial in the absence of any actual observed accident history data for that specific arterial roadway. This makes it possible to apply the safety prediction methodology to planned roadways that have not yet been constructed and to sites for which reliable observed accident history data are not available. However, when observed accident history data are available for the site in question, their use, together with the model predictions, results in a more reliable estimate of expected accident frequency than could be

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obtained with either the observed accident history data or the model predictions alone. The accepted statistical approach to combining observed accident history data and model predictions of accident frequencies is known as the Empirical Bayes (EB) procedure. If observed accident history data were used by themselves, they would be potentially biased due to regression to the mean; the EB approach compensates for regression to the mean and allows the two available pieces of information—the observed accident frequency and the predicted accident frequency—to be combined as a weighted average.

The EB approach has been developed to its current state by Hauer, as presented in his book, *Observational Before-After Studies in Road Safety* (*125*); the application of the EB approach to HSM safety prediction models is illustrated in the IHSDM crash prediction methodology for rural two-lane highways developed by Harwood et al. (*7*) and in the HSM prototype chapter. This same procedure, with minor changes, can be applied in the safety prediction methodology for urban and suburban arterials to ensure that full advantage is taken of the valuable information represented by the observed accident frequency for the site being analyzed.

Specifically, the expected accident frequency for any site can be determined by combining the predicted and observed accident frequencies in the following manner (*7*):

$$E_p = (w)\ N + (1\text{-}w)\ O \qquad \textbf{(15)}$$

where:

E_p = expected accident frequency based on a weighted average of N and O
w = a weight factor defined below in Equation (16)
N = number of accidents predicted by a safety prediction model such as Equation (9) during a specified time period
O = number of accidents observed during the same time period as N

The weight placed on the predicted accident frequency is determined in the EB procedure:

$$w = \frac{1}{1 + k\ (N)} \qquad \textbf{(16)}$$

where:

k = over dispersion parameter of the accident prediction model

Because the HSM methodology presented in Chapter 7 of this report uses separate base models for multiple-vehicle nondriveway, single-vehicle, and driveway-related collisions, two additional issues must be considered. Furthermore, observed accident data are often available only for a combined set of roadway segments and intersections to which several different base models may apply. First, the over dispersion parameter, k, in the denominator of Equation (16) is not uniquely defined, because two or more base models with different over dispersion parameters must be considered. Second, it cannot be assumed, as is normally done, that the expected numbers of accidents for different collision types and different site types are statistically

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correlated with one another. Rather, an estimate of expected accident frequency should be computed based on the assumption that the various roadway segments and intersections are statistically independent ($\rho=0$) and on the alternative assumption that they are perfectly correlated ($\rho=1$). The expected accident frequency is then estimated as the average of the estimates for $\rho=0$ and $\rho=1$. The following equations implement this approach:

$$N_{tot} = \sum_{j=1}^{5} N_{rmj} + \sum_{j=1}^{5} N_{rsj} + \sum_{j=1}^{5} N_{rdj} + \sum_{j=1}^{4} N_{imj} + \sum_{j=1}^{4} N_{isj} \quad \textbf{(17)}$$

$$O_{tot} = \sum_{j=1}^{5} O_{rmj} + \sum_{j=1}^{5} O_{rsj} + \sum_{j=1}^{5} N_{rdj} + \sum_{j=1}^{4} O_{imj} + \sum_{j=1}^{4} O_{isj} \quad \textbf{(18)}$$

$$N_{w0} = \sum_{j=1}^{5} k_{rmj} N_{rmj}^2 + \sum_{j=1}^{5} k_{rsj} N_{rsj}^2 + \sum_{j=1}^{5} k_{rdj} N_{rdj}^2 + \sum_{j=1}^{4} k_{imj} N_{imj}^2 + \sum_{j=1}^{4} k_{isj} N_{isj}^2 \quad \textbf{(19)}$$

$$N_{w1} = \sum_{j=1}^{5} \sqrt{k_{rmj} N_{rmj}} + \sum_{j=1}^{5} \sqrt{k_{rsj} N_{isj}} + \sum_{j=1}^{5} \sqrt{k_{rdj} N_{rdj}} + \sum_{j=1}^{4} \sqrt{k_{imj} N_{imj}} + \sum_{j=1}^{4} \sqrt{k_{isj} N_{isj}} \quad \textbf{(20)}$$

$$w_0 = \frac{1}{1 + \frac{N_{w0}}{N_{tot}}} \quad \textbf{(21)}$$

$$E_0 = w_0 N_{tot} + (1 - w_0) O_{tot} \quad \textbf{(22)}$$

$$w_1 = \frac{1}{1 + \frac{N_{w1}}{N_{tot}}} \quad \textbf{(23)}$$

$$E_1 = w_1 N_{tot} + (1 - w_1) O_{tot} \quad \textbf{(24)}$$

$$E_{comb} = \frac{E_0 + E_1}{2} \quad \textbf{(25)}$$

where:

N_{rmj} = Predicted number of multiple-vehicle nondriveway collisions for roadway segments of type j, j=1,..,5

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N_{rsj} = Predicted number of single-vehicle collisions for roadway segments of type j
N_{rdj} = Predicted number of driveway-related collisions for roadway segments of type j
N_{imj} = Predicted number of multiple-vehicle collisions for intersections of type j, j=1,..,4
N_{isj} = Predicted number of single-vehicle collisions for intersections of type j
O_{rmj} = Observed number of multiple-vehicle nondriveway collisions for roadway segments of type j
O_{rsj} = Observed number of single-vehicle collisions for roadway segments of type j
O_{rdj} = Observed number of driveway-related collisions for roadway segments of type j
O_{imj} = Observed number of multiple-vehicle collisions for intersections of type j
O_{isj} = Observed number of single-vehicle collisions for intersections of type j
k_{rmj} = Overdispersion parameter for multiple-vehicle nondriveway collisions for roadway segments of type j
k_{rsj} = Overdispersion parameter for single-vehicle collisions for roadway segments of type j
k_{rdj} = Overdispersion parameter for driveway-related collisions for roadway segments of type j
k_{imj} = Overdispersion parameter for multiple-vehicle collisions for intersections of type j
k_{isj} = Overdispersion parameter for single-vehicle collisions for intersections of type j
w_0 = weight placed on predicted accident frequency when accident frequencies for different roadway elements are statistically independent (ρ=0)
w_1 = weight placed on predicted accident frequency when accident frequencies for different roadway elements are perfectly correlated (ρ=1)
E_0 = expected accident frequency based on the assumption that different roadway elements are statistically independent (ρ=0)
E_1 = expected accident frequency based on the assumption that different roadway elements are perfectly correlated (ρ=1)
E_{comb} = expected accident frequency of combined sites including two or more roadway segments or intersections

For roadway segments, Hauer (*126*) has recommended that the over dispersion parameter, k, be estimated so that it applies to a unit length of roadway segment; thus, the over dispersion parameter, k_i, for a roadway segment, i, of length L_i would be $k_i=k/L_i$. Miaou and Lord (*127*) suggest that k itself be modeled as a function of traffic volume and other variables. However, the research team used the more conventional approach in developing NB models using a single common over dispersion parameter for all sites, thus making the assumption that the over dispersion parameter does not vary from site to site within a given roadway type, regardless of their length. This approach, expressed mathematically as $k_i = k$ for all L_i, is at one end of the bracketing assumptions about the over dispersion parameter, the other end being

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Hauer's assumption that $k_i = k/L_i$. Hauer (*126*) indicates that the correct value may, in fact, be somewhere in between these two assumptions.

An alternative procedure for combining predicted and observed accident frequencies is the full Bayes procedure. The full Bayes procedure has the advantage of using a distribution of prior probabilities rather than a point estimate as used in the EB approach. However, the full Bayes procedure is computationally more difficult to apply than the EB procedure and would be difficult for the HSM to use in incorporating actual observed accident history data into the analysis of a specific site since the observed accident history data for a site are available only to the user of the HSM methodology, not to the researchers who develop the methodology. Because of its computational simplicity and wider application, the EB approach is recommended for use in the HSM methodology.

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CHAPTER 4.

DEVELOPMENT OF PROJECT DATABASE

This section of the report describes the project database that was analyzed in the development of the HSM methodology for urban and suburban arterials.

PARTICIPATING HIGHWAY AGENCIES

The project database was developed for arterial roadways and intersections under the jurisdiction of eight highway agencies. Data for roadway segments were obtained for arterial roadways under the jurisdiction of:

- Minnesota Department of Transportation
- Hennepin County, Minnesota
- Ramsey County, Minnesota
- Michigan Department of Transportation
- Oakland County, Michigan
- Washington State Department of Transportation

Data for intersections were obtained for roadway segments under the jurisdiction of:

- Minnesota Department of Transportation
- City of Charlotte, North Carolina
- Florida Department of Transportation

The data from Minnesota, Michigan, and North Carolina were used in developing the HSM methodology. The data from Washington and Florida were used in validating the methodology.

SITE SELECTION FOR ROADWAY SEGMENTS

Based on project priorities and a preliminary review of the available sites, a decision was reached to focus the analysis on five types of roadway segments:

- two-lane undivided arterials (2U)
- three-lane arterials including a center TWLTL (3T)
- four-lane undivided arterials (4U)
- four-lane divided arterials (4D)
- five-lane arterials including a center TWLTL (5T)

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In Minnesota, urban and suburban arterial roadway segments of these types were selected on state routes under the jurisdiction of the Minnesota Department of Transportation and on county roads in Hennepin and Ramsey Counties. Most of the state highway routes and all of the county roads that were studied were located in the Twin Cities metropolitan area. A few urban and suburban state routes outside the Twin Cities metropolitan area were included where necessary to obtain a sufficient number of sites.

Study sites in Minnesota were identified through review of roadway inventory files obtained from the FHWA Highway Safety Information System (HSIS), from videolog review, from field visits to sites, and from suggestions from the participating highway agencies. All candidate sites were reviewed on videolog or visited in the field to verify their suitability.

Study sites in Oakland County, Michigan, were chosen primarily on county roads and city streets, although a few roadway segments on state highways in Oakland County were also selected. Initial site selections were made from an inventory of arterial roadway segments maintained by the Traffic Improvement Association of Oakland County. All candidate sites were then visited in the field to verify their suitability.

The project database used for roadway segment model development was divided into individual blocks where each block began and ended at public road intersections along the arterials being studied. The database included 4,255 blocks; 2,436 in Minnesota and 1,819 in Michigan. The individual blocks ranged in length from 0.06 to 2.28 km (0.04 to 1.42 mi). The total length of all blocks considered in the study was 890.2 km (553.3 mi), 489.0 km (303.9 mi) in Minnesota, and 473.7 km (294.4 mi) in Michigan. The average block length was 0.19 km (0.12 mi) in Minnesota and 0.23 km (0.14 mi) in Michigan. Table 12 summarizes the number of blocks for each roadway type included in the project database. Table 13 presents a comparable summary of the total length of roadway segment used for model development.

TABLE 12. Summary of number of study sites for individual blocks on arterial roadway segments

Roadway type	Number of study sites		
	Minnesota	Michigan	Total
2U	577	590	1,167
3T	380	100	480
4U	741	440	1,181
4D	540	140	680
5T	198	549	747
Total	2,436	1,819	4,255

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TABLE 13. Summary of total length of study sites for arterial roadway segments

Roadway type	Length of study sites (mi)		
	Minnesota	Michigan	Total
2U	77.6	88.1	165.7
3T	45.4	14.3	59.7
4U	77.9	37.6	115.5
4D	80.5	29.6	110.1
5T	22.5	79.8	102.3
Total	303.9	249.4	553.3

SITE SELECTION FOR INTERSECTIONS

The intersection analysis focused on four types of at-grade intersections:

- three-leg intersections with STOP control on the minor-road approach (3ST)
- three-leg signalized intersections (3SG)
- four-leg intersections with STOP control on the minor-road approaches (4ST)
- four-leg signalized intersections (4SG)

In Minnesota, intersections on urban and suburban arterials were selected on state routes under the jurisdiction of the Minnesota Department of Transportation. All of the intersections studied were located in the Twin Cities metropolitan area. Study intersections in Minnesota were identified through review of HSIS roadway inventory files, from videolog review, or from field visits to sites. All candidate sites were reviewed on videolog or in the field to verify their suitability.

Study intersections in Charlotte, North Carolina, were selected on recommendations by the City traffic engineering staff and from field review. The City also provided aerial photographs of the candidate sites. The suitability of each intersection for inclusion in the study was verified from the review of the aerial photograph and/or from a field visit.

The project database included 363 intersections, 182 in Minnesota, and 181 in North Carolina. The number of intersections of each type is summarized in Table 14. The table includes only intersections for which accident, major-road traffic volume, minor-road traffic volume, and site geometric data were available. Candidate sites for which minor-road traffic volume or geometric design data were not available have been excluded from the table.

TABLE 14. Summary of number of study intersections

Intersection type	Number of study intersections		
	Minnesota	North Carolina	Total
3ST	36	47	83
3SG	34	42	96
4ST	48	48	76
4SG	64	44	108
Total	182	181	363

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DATA COLLECTION

Several types of data were collected for each study site including site characteristics and accident data. The collection of each of these types of data for both roadway segments and intersections is addressed below.

Site Characteristics Data for Roadway Segments

Site characteristics data obtained for roadway segments included geometric design, traffic control, and traffic volume data. Sources of site characteristics data for roadway segments included existing roadway inventory files, videologs, aerial photographs, and field visits. Data from roadway inventory files, videologs, and aerial photographs were used where available and were verified in the field where possible.

Table 15 lists all of the site characteristics data elements included in the project database for roadway segments and identifies the source of each data element. As shown in the table, most of the data elements were obtained from field or videolog review. For roadway segments, most of the sites in Minnesota and all of the sites in Oakland County, Michigan, were reviewed in the field. Videolog review was used for selected sites in Minnesota.

The data elements obtained for the study sites are intentionally broader than needed for the initial project analyses. For example, the additional data gathered on pedestrian facilities should also be useful for the planned pedestrian safety modeling activities to be conducted as part of this same project.

Driveway locations, driveway types, median opening locations, median opening types, horizontal curve locations, horizontal curve radii, and horizontal curve locations were determined from review of aerial photographs.

Driveway types were classified into seven categories:

- Major commercial driveways
- Minor commercial driveways
- Major industrial/institutional driveways
- Major residential driveways
- Minor residential driveways
- Other driveways

Major driveways are those that serve sites with 50 or more parking spaces. Minor driveways are those that serve sites with less than 50 parking spaces. Commercial driveways provide access to establishments that serve retail customers. Residential driveways serve single- and multiple-family dwellings. Industrial/institutional driveways serve factories, warehouses, schools, hospitals, churches, public facilities, and other places of employment.

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TABLE 15. Site characteristics data obtained for roadway segments on urban and suburban arterials

Data element	Description of data element	Primary source
Beginning landmark	Name of intersecting street or other landmark at beginning of block	Highway agency data or field review
Beginning milepost	Milepost or log mileage at beginning of block to tie field locations to accident data	Highway agency data
Bicycle route (marked)	Presence of bicycle route marked by signs	Field or videolog review
Bicycle facilities	Presence of bicycle facilities including sidepath, marked bicycle lane, or wide curb lane	Field or videolog review
Driveway locations	Location of driveway (side of road and distance from beginning of block)	Aerial photograph and field review
Driveway types	Each driveway was classified into one of seven categories (see accompanying text)	Aerial photograph and field review
Ending landmark	Name of intersecting street or other landmark at end of block	Highway agency data or field review
Ending milepost	Milepost or log mileage at end of block to tie field locations to accident data	Highway agency data
Grade	Roadway grade within block (level, moderate, or steep)	Field or videolog review
Horizontal curve length	Length of horizontal curve (mi) computed from beginning and ending locations	Computed
Horizontal curve location	Distance of beginning and end of horizontal curve from beginning of block (mi)	Aerial photographs
Horizontal curve radius	Radius of horizontal curve (ft) measured on aerial photograph	Aerial photographs
Intersections	A basic data set was collected for the intersections at each end of each block including number of legs, side of road (for three-leg intersections), traffic control device, and type of pedestrian facilities (if any). This data set is less extensive than the data collected for the full intersection study sites.	Field or videolog review
Lane width	Width of through lanes (ft) not including gutters. Measured at first block in a series of consecutive blocks and points of change. Lane width is averaged over multiple lanes where present.	Field measurement

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TABLE 15. Site characteristics data obtained for roadway segments on urban and suburban arterials (Continued)

Data element	Description of data element	Primary source
Length of site	Length of site (mi) from beginning landmark to end landmark. Measured from center of intersection where intersections are site boundaries.	Highway agency data
Lighting	Presence of street lighting (none, intersection only, or continuous lighting along street) and presence of other ambient lighting	Field review
Median opening location	Distance of median opening from beginning of block (mi). Applicable to divided streets only.	Aerial photograph or field review
Median opening type	Type of median opening (conventional/directional)	Aerial photograph or field review
Median type	Presence and type of median (none, raised, depressed, flush)	Field or videolog review
On-street parking	Presence and type of on-street parking (none, parallel parking, angle parking)	Field or videolog review
Pedestrian crosswalk (midblock)	Location and type of midblock crosswalk (if any)	Field or videolog review
Roadside hazard rating	Rating on 1 to 7 scale (see accompanying text)	Field or videolog review
Roadway type	Number of through lanes and divided undivided (2U, 3T, 4U, 4D, or 5T as defined earlier in this chapter.	Field or videolog review
Route number or street name	Route number or street name for arterial used to tie field locations to accident data	Highway agency data
Shoulder type	Type of shoulder (paved, gravel, turf, composite) and presence/absence of curb. Determined separately for each side of the road.	Field or videolog review
Shoulder width	Width of shoulder (ft). Determined separately for each side of the road. Entered as zero for curbed sections.	Field measurement
Sidewalks	Presence/absence of sidewalk. Determined separately for each site of the road.	Field or videolog review
Speed limit	Posted speed limit (mph) or speed limit applicable under state law	Field or videolog review
Traffic volume	ADTs for each year of study period. Interpolated between count years when not available for every year.	Highway agency data

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Roadside hazards are rated on a 1 to 7 scale developed by Zegeer et al (*9*) with 1 representing the best-designed roadside and 7 representing a poorly-designed roadside.

Site Characteristics Data for Intersections

Site characteristics data obtained for intersections included geometric design, traffic control, and traffic volume data. Sources of site characteristics data for intersections included existing roadway inventory files, aerial photographs, and field visits. All of the primary study intersections were visited in the field, including the intersections in both Minnesota and North Carolina.

Table 16 lists all of the site characteristics data elements included in the project database for intersections and identifies the source of each data element. The table is subdivided into sections for data elements applicable to:

- the intersection as a whole
- individual intersection approaches
- pedestrian facilities on individual intersection approaches
- bicycle facilities on individual intersection approaches

As shown in the table, most of the data elements were obtained from field review. Where highway agency data were used, they were confirmed during the field review.

The data elements obtained for the study intersections are intentionally broader in scope than needed for the initial project analyses. For example, the data should also be useful for the planned pedestrian safety modeling activities to be conducted as part of this same project.

ACCIDENT DATA

Accident data were obtained from the participating highway agencies for the study sites under their jurisdiction. The accident study period for each site type and jurisdiction were as follows:

- Minnesota roadway segments, 1998-2002
- Michigan roadway segments, 1999-2003
- Minnesota intersections, 1998-2002
- North Carolina intersections, 1997-2003

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TABLE 16. Site characteristics data obtained for intersections on urban and suburban arterials

Data element	Description of data element	Primary source
Data for Intersection as a Whole		
Angle of intersection	Angle between intersecting streets (90° for right-angle intersections; less than 90° for skewed intersections)	Aerial photographs or field review
Character of development	Type of surrounding land use (central business district, outlying commercial, industrial mixed, residential, undeveloped)	Field review
Intersection type	Number of intersection legs and type of traffic control (3ST, 3SG, 4ST, and 4SG as defined earlier in this chapter)	Field review
Level of pedestrian activity	Level of pedestrian activity at intersection based on observed number of pedestrians and adjacent development (low, moderate, high)	Field review
Lighting	Presence of street lighting (none, intersection only, lighting along street) and presence of other ambient lighting	Field review
Milepost or node number	Milepost or node number to tie field locations to accident data	Highway agency data
Number of intersection legs	Number of legs at the intersection (3 or 4)	Field review
Route number or street name	Route number or street name used with milepost to tie field locations to accident data	Highway agency data
Traffic volume for major road	Two-way traffic volume (ADT) on the major road at the intersection. If the traffic volumes for the two major-road legs differ, the larger volume is used.	Highway agency data
Traffic volume for minor road	Two-way traffic volume (ADT) on the minor road at the intersection. If there are two minor road legs and the traffic volumes on those legs differ, the larger volume is used.	Highway agency data
Data for Individual Intersection Approaches		
Advance warning signs	Presence of advance warning signs such as crossroad, STOP ahead, or signal ahead	Field review
Approach grade	Grade of approach (level, moderate upgrade, steep upgrade, moderate downgrade, steep downgrade	Field review
Crest/sag vertical curve	Presence of crest or sag vertical curve on approach within 76 m (250 ft) of the intersection	Field review

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TABLE 16. Site characteristics data obtained for intersections on urban and suburban arterials (Continued)

Data element	Description of data element	Primary source
Divided/undivided	Presence/absence of median intersection approach	Field review
Horizontal alignment	Presence of horizontal curve on intersection approach within 76 m (250 ft) of intersection (tangent, gentle curve, moderate curve, sharp curve)	Field review
Lane width-right lane	Lane width of rightmost through traffic lane not including gutters	Field measurement
Lane width-left lane	Lane width of leftmost through traffic lane for approaches with two or more through lanes	Field measurement
Lane width-middle lane	Lane width of middle through traffic lane for approaches with three through lanes	Field measurement
Lane width-left-turn lane	Lane width for left-turn lane (ft)	Field measurement
Lane width-right-turn lane	Lane width for right-turn lane (ft)	Field measurement
Left-turn prohibition	Left turns prohibited by sign (no sites with left-turn prohibitions were included)	Field review
Left-turn phasing	Presence of exclusive left-turn signal phasing (none, protected, protected/permitted). Applicable only to signalized intersections.	Field review
Median width	Width of median (ft) on intersection approach. Recorded as zero for undivided roadways.	Field measurement
Median type	Presence and type of median on intersection approach (none, raised, depressed, flush)	Field review
Number of through lanes	Number of through traffic lanes on intersection approach	Field review
Number of left-turn lanes	Number of left-turn lanes on intersection approach	Field review
Number of right-turn lanes	Number of right-turn lanes on intersection approach	Field review
Number of driveways	Number of driveways on both sides of the road within 76 m (250 ft) of the intersection	Field review
Type of driveways	Predominant driveway type on the intersection approach (see accompanying text)	Field review
One-way/two-way operation	Type of traffic operation on intersection leg containing the approach (one-way vs. two-way). No sites with one-way approaches were included.	Field review
On-street parking	Presence of on-street parking on the approach within 76 m (250 ft) of the intersection	Field review
Posted speed limit	Posted speed limit (mph) or speed limit applicable under state law on the intersection approach	Field review

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TABLE 16. Site characteristics data obtained for intersections on urban and suburban arterials (Continued)

Data element	Description of data element	Primary source
Route number or street name	Route number or street name of the intersection approach	Field review
Right turn on red	Presence of right turn on red from the intersection approach	Field review
Shoulder type	Type of shoulder on the intersection approach (paved, gravel, turf, or composite) and presence/absence of curb. Determined for right side of road only.	Field review
Shoulder width	Width of shoulder (ft) on right side of intersection approach. Entered as zero for curbed sections.	Field review.
Signal visibility from approach	Indicator of whether signal is visible to approaching traffic	Field review
Traffic control	Type of traffic control on the intersection approach	Field review
Transit stop locations	Locations of transit stops on the intersection approach or on the departing roadway beyond the intersection (none, rear side, far side, both)	Field review
Type of intersection leg	Classification of intersection leg as major road or minor road. At STOP-controlled intersections, the uncontrolled approaches are considered to be the major road. At signalized intersections, the higher volume road is considered to be the major road.	Field review and highway agency
Type of left-turn treatment	Configuration of left-turn lane on the intersection approach (none, painted, curbed, offset)	Field review
Type of right-turn treatment	Configuration of right-turn lane on the intersection approach (none, right-turn lane only, channelizing island only, right-turn lane, and channelizing island	Field review
Data for Pedestrian Facilities on Individual Intersection Approaches		
Pedestrian signals	Presence of pedestrian signals for crossing the intersection approach. Applicable to signalized intersections only.	Field review
Special pedestrian signal features	Presence of special pedestrian signal features including pushbutton actuation and countdown signals	Field review
Marked crosswalk	Presence of marked crosswalk for crossing the intersection approach	Field review

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TABLE 16. Site characteristics data obtained for intersections on urban and suburban arterials (Continued)

Data element	Description of data element	Primary source
Pedestrian refuge area	Presence of pedestrian refuge area in the median for pedestrians crossing the leg containing the intersection approach	Field review
Pedestrian crossing distance	Length of pedestrian path (ft) for crossing the leg containing the intersection approach. Measured as two separate distances if a refuge area is present.	Field review
Pedestrian crossing prohibition	Presence of signs or barriers to prevent legal crossing of the intersection approach by pedestrians	Field review
Sidewalks	Presence of sidewalks on the leg containing the intersection approach. Determined separately for the left and right sides of the road.	Field review
Sidewalk curb ramps	Presence and type of sidewalk curb ramps for pedestrians crossing the leg containing the intersection approach (none, perpendicular, parallel, diagonal). Determined separately for the corners on the left and right side of the road.	Field review
Data for Bicycle Facilities on Individual Intersection Approaches		
Marked bicycle lane	Presence of marked bicycle lane on intersection approach	Field review
Wide curb lane	Presence of wide curb lane on intersection approach defined as a right lane over 16 ft in length	Field review
Parallel bike path	Presence of a side path for bicycles along the intersection approach	Field review

The study period for each agency was five years, except that for North Carolina intersections the study period was seven years. The entire computerized record for each crash during the study period for each agency was obtained. No attempt was made to impose *a priori* restrictions on which accident characteristics might be of interest.

Each accident in the project database was assigned to a particular roadway segment or intersection. The criteria used to make this assignment, which are the same as those used in the FHWA IHSDM (*7*), are illustrated in Figure 9. These criteria are as follows:

- Accidents classified by the investigating officer or accident coder as "at intersection" (i.e., within the curbline limits of the intersection) were assigned to the intersection.

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- Accidents on an intersection leg within 76 m (250 ft) of the intersection were assigned to the intersection if they were classified by the investigating office or accident coder as "intersection related"; otherwise, they were assigned to the roadway segment that contains the intersection leg. For example, driveway-related collisions would not be considered as "intersection related."
- Accidents more than 76 m (250 ft) from the intersection were assigned to the roadway segment on which they occurred.

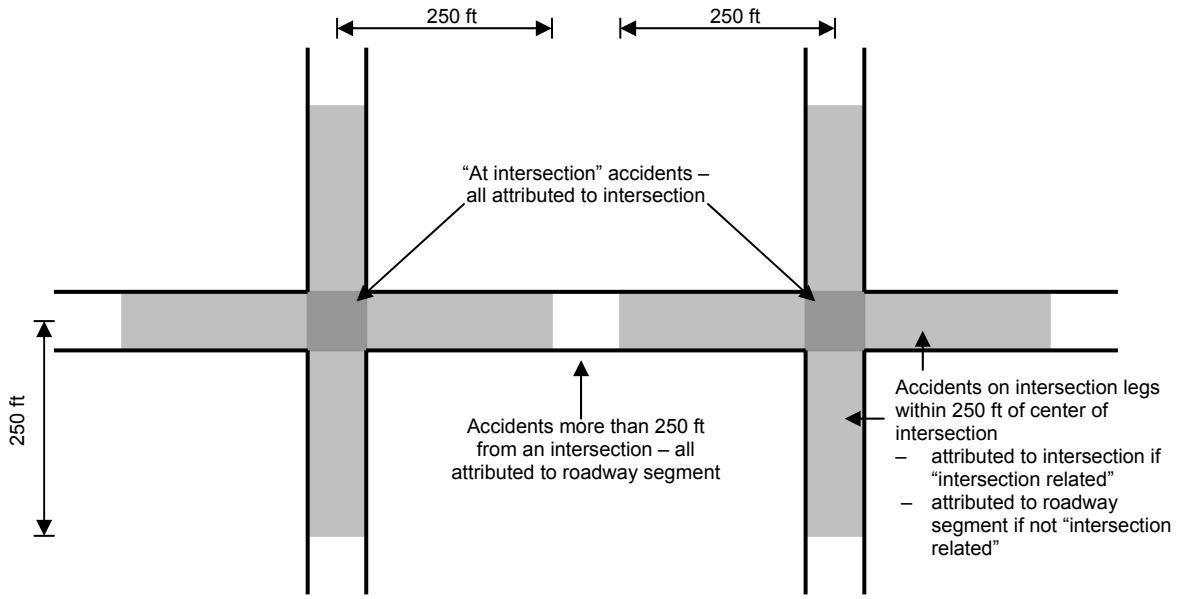

Figure 9. Assignment of accidents to roadway segments and intersections

The objective of these criteria was to attribute to the roadway segment all accidents that would have occurred had the intersection not been present; the accidents attributed to the intersection are those that occurred only because the intersection was present.

All "at-intersection" accidents were attributed to the intersection. A case could be made that single-vehicle accidents within the curbline limits of an intersection (i.e., running off the road and hitting a utility pole) might better be attributed to the adjacent roadway segment because they might have occurred even if the intersection were not present. However, a case can also be made that single-vehicle accidents at an intersection may involve a single-vehicle avoiding a multiple-vehicle collision and, thus, may be related to the intersection. Vogt and Bared (*105*) considered this issue for IHSDM and found that attributing all "at-intersection" accidents to the intersection worked best.

Accidents within 76 m (250 ft) of the intersection may be attributed to either the intersection or the roadway segment that contains the intersection leg based on whether the accident is classified as "intersection related." The available databases include only public-road accidents; therefore, accidents on private property within 76 m (250 ft) of an intersection would

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not be attributed to either the intersection or a roadway segment. Where two intersections are less than 152 m (500 ft) apart, intersection-related accidents were generally attributed to the closest intersection. However, if all accident-involved vehicles were traveling away from one intersection and toward another closely-spaced intersection, the accident was attributed to the intersection the vehicles were traveling toward.

These criteria were applied as rigorously as possible given the nature of each agency's database. The only exception to these criteria was that, for intersection accidents in Charlotte, North Carolina, there were no explicit data on the distance from the site of each accident to the intersection, so some "intersection-related" accidents beyond 76 m (250 ft) from the intersection may have been included.

Driveway-related collisions on roadway segments were also modeled separately from other multiple-vehicle collisions. Driveway-related collisions are those identified by the investigating officer or accident coder as related to the operation of driveway and typically involve one or more vehicles entering or leaving a driveway.

The accident data set for the project included 43,798 accidents for all study jurisdictions combined, 32,277 for roadway segments, and 11,521 for intersections. Table 17 presents the distribution of roadway segment accidents by roadway type and jurisdiction. Table 18 presents comparable data for intersections.

TABLE 17. Distribution of roadway segment accidents by roadway type and jurisdiction

Roadway type	Number of accidents in five-year study period		
	Minnesota[a]	Michigan[b]	Combined
2U	1,539	4,069	5,608
3T	1,184	940	2,124
4U	2,955	2,795	5,750
4D	3,154	1,531	4,685
5T	974	13,136	14,110
Total	9,806	22,471	32,277

[a] 1998-2002.
[b] 1999-2003.

TABLE 18. Distribution of intersection accidents by intersection type and jurisdiction

Intersection type	Number of accidents in five-year study period		
	Minnesota[a]	North Carolina[b]	Combined
3ST	161	896	1,057
3SG	602	2,404	3,006
4ST	382	1,038	1,420
4SG	1,516	4,522	6,038
Total	2,661	8,860	11,521

[a] 1998-2002.
[b] 1997-2003.

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Table 19 summarizes the number of roadway segment sites (blocks) and their total length, average traffic volume, total exposure (million veh-mi of travel), total number of accidents, and average accident rate.

Table 20 presents summary accident distribution data for roadway segments by roadway type and jurisdiction. In the table, accidents are broken down into five collision types which were addressed separately in project analyses: multiple-vehicle nondriveway collisions; single-vehicle collisions; driveway-related collisions; vehicle-pedestrian collisions; and vehicle-bicycle collisions. Tables 21 and 22 present the distribution of the multiple-vehicle nondriveway collisions and single-vehicle collisions by collision type.

Tables 23 through 26 present comparable data to Tables 19 through 22 for intersection accidents. In Table 23 for intersections, the exposure measure is million entering vehicles. In Table 24 for intersections, the category of driveway-related collisions is not relevant and is, therefore, omitted.

TABLE 19. Summary of roadway segment accident and exposure data

Roadway type	Number of blocks	Total length (mi)	Average ADT (veh/day)	Total exposure (10^6 veh-mi)[a]	Total number of accidents[a]	Average accident rate (per 10^6 veh-mi)
MINNESOTA						
2U	577	77.57	9,376	1,327.2	7,539	1.16
3T	380	45.40	10,806	895.3	1,184	1.32
4U	742	78.00	13,534	1,926.5	2,955	1.53
4D	540	80.47	22,260	3,268.9	3,154	0.96
5T	205	23.57	15,013	645.8	974	1.51
MICHIGAN						
2U	590	88.06	13,246	2,128.9	4,069	1.91
3T	100	14.27	14,846	386.6	940	2.43
4U	440	37.60	21,259	1,458.8	2,795	1.92
4D	140	29.62	17,784	961.4	1,531	1.59
5T	549	79.82	29,703	4,326.8	13,136	3.04
COMBINED						
2U	1,167	165.63	11,434	3,456.1	5,608	1.62
3T	480	59.67	11,772	1,281.9	2,124	1.66
4U	1,182	115.60	16,046	3,385.3	5,750	1.70
4D	680	110.09	21,056	4,230.3	4,685	1.11
5T	754	103.39	26,354	4,972.6	14,110	2.84

[a] In five-year period.

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TABLE 20. Roadway segment accident distribution by roadway type and jurisdiction

Roadway type	Number (percentage) of accidents in five years											
	Multiple-vehicle nondriveway collisions		Single-vehicle collisions		Driveway-related collisions		Vehicle-pedestrian collisions		Vehicle-bicycle collisions		Total	
MINNESOTA												
2U	727	(47.2)	514	(33.4)	256	(16.6)	27	(1.8)	15	(1.0)	1,539	(100.0)
3T	700	(59.1)	176	(14.9)	272	(23.0)	20	(1.7)	16	(1.4)	1,184	(100.0)
4U	1,748	(59.2)	488	(16.5)	589	(19.9)	75	(2.5)	55	(1.9)	2,955	(100.0)
4D	2,443	(77.5)	452	(14.3)	187	(5.9)	38	(1.2)	34	(1.1)	3,151	(100.0)
5T	511	(52.5)	102	(10.5)	329	(33.8)	20	(2.1)	12	(1.2)	974	(100.0)
MICHIGAN												
2U	2,310	(56.8)	1,031	(25.3)	693	(17.0)	14	(0.3)	21	(0.5)	4,069	(100.0)
3T	636	(67.7)	73	(7.8)	228	(24.3)	1	(0.1)	2	(0.2)	940	(100.0)
4U	1,754	(62.8)	225	(8.1)	767	(27.4)	22	(0.8)	27	(1.0)	2,765	(100.0)
4D	1,066	(69.6)	197	(12.9)	244	(15.9)	9	(0.6)	15	(1.0)	1,531	(100.0)
5T	8,681	(66.1)	819	(6.2)	3,556	(27.1)	46	(0.4)	34	(0.3)	13,136	(100.0)
COMBINED												
2U	3,037	(54.2)	1,545	(27.5)	949	(16.9)	41	(0.7)	36	(0.6)	5,608	(100.0)
3T	1,336	(62.9)	249	(11.7)	500	(23.5)	21	(1.0)	18	(0.8)	2,124	(100.0)
4U	3,502	(60.9)	713	(12.4)	1,355	(23.6)	97	(1.7)	82	(1.4)	5,750	(100.0)
4D	3,509	(74.9)	649	(13.9)	431	(9.2)	47	(1.0)	49	(1.0)	4,685	(100.0)
5T	9,192	(65.1)	921	(6.5)	3,885	(27.5)	66	(0.5)	46	(0.3)	14,110	(100.0)

NOTE: Numbers in parentheses are row percentages.

TABLE 21. Distribution of manner of collision for multiple-vehicle nondriveway collisions on roadway segments for Minnesota and Michigan combined

Collision type	Percentage of accidents for each roadway type				
	2U	3T	4U	4D	5T
Rear-end	67.0	64.7	49.9	67.8	59.0
Head-on	4.7	3.7	4.3	1.3	5.3
Angle	10.7	15.0	17.2	10.0	17.0
Sideswipe, same direction	6.8	6.3	16.3	11.2	13.0
Sideswipe, opposite direction	5.8	2.1	2.8	1.3	2.4
Other multiple-vehicle collisions	5.0	8.2	9.5	8.4	3.3

TABLE 22. Distribution of collision type for single-vehicle collisions on roadway segments for Minnesota and Michigan combined

Collision type	Percentage of accidents by roadway type				
	2U	3T	4U	4D	5T
Collision with parked vehicle	37.7	16.5	43.5	11.9	25.6
Collision with animal	14.4	25.6	3.5	12.8	17.6
Collision with fixed object	20.4	28.9	25.8	30.2	23.5
Collision with other object	14.6	13.6	18.0	23.0	19.6
Other single-vehicle collision	1.0	0.6	3.9	5.1	4.9
Noncollision	11.9	14.8	5.3	17.0	8.8

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TABLE 23. Summary of intersection accident and exposure data

Intersection type	Number of intersections	Average major-road ADT (veh/day)	Average minor-road ADT (veh/day)	Total exposure (10^6 entering vehs)[a]	Total number of accidents[a]	Average accident rate (per 10^6 entering vehs)
MINNESOTA						
3ST	36	16,523	1,157	1,161.6	161	0.14
3SG	34	24,597	5,331	1,857.0	602	0.32
4ST	48	17,868	956	1,648.9	382	0.23
4SG	64	21,270	5,502	3,127.0	1,516	0.48
NORTH CAROLINA						
3ST	47	12,691	2,173	1,784.9	896	0.50
3SG	42	21,354	3,908	2,710.9	2,404	0.89
4ST	48	14,074	1,409	1,898.8	1,038	0.55
4SG	44	20,796	9,133	3,364.6	4,522	1.34
COMBINED						
3ST	83	14,356	1,854	2,946.6	1,057	0.36
3SG	76	22,938	4,507	4,568.0	3,006	0.66
4ST	96	15,655	1,220	3,547.8	1,420	0.40
4SG	108	20,804	7,058	6,491.6	6,038	0.93

[a] In five-year period for Minnesota and in a seven-year period for Charlotte.

TABLE 24. Intersection accident distribution by intersection type and jurisdiction

Intersection type	Number (percentage) of accidents				
	Multiple-vehicle collisions	Single-vehicle collisions	Vehicle-pedestrian collisions	Vehicle-bicycle collisions	Total
MINNESOTA[a]					
3ST	140 (87.0)	19 (11.8)	1 (0.6)	1 (0.6)	161 (100.0)
3SG	547 (90.9)	44 (7.3)	2 (0.3)	9 (1.5)	602 (100.0)
4ST	318 (83.2)	50 (13.1)	10 (2.6)	4 (1.0)	382 (100.0)
4SG	1,327 (87.5)	125 (8.2)	34 (2.2)	30 (2.0)	1,516 (100.0)
NORTH CAROLINA[b]					
3ST	785 (87.6)	102 (11.4)	8 (0.9)	1 (0.1)	896 (100.0)
3SG	2,251 (93.6)	128 (5.3)	15 (0.6)	10 (0.4)	2,404 (100.0)
4ST	946 (91.1)	85 (8.2)	5 (0.5)	2 (0.2)	1,038 (100.0)
4SG	4,295 (95.0)	162 (3.6)	49 (1.1)	16 (0.4)	4,522 (100.0)
COMBINED					
3ST	925 (87.5)	121 (11.4)	9 (0.9)	2 (0.2)	1,057 (100.0)
3SG	2,798 (93.1)	172 (5.7)	17 (0.6)	19 (0.6)	3,006 (100.0)
4ST	1,264 (89.0)	135 (9.5)	15 (1.1)	6 (0.4)	1,420 (100.0)
4SG	5,622 (93.1)	287 (4.8)	83 (1.4)	46 (0.8)	6,038 (100.0)

[a] Includes five years of accident data.
[b] Includes seven years of accident data.
NOTE: Numbers in parentheses are row percentages.

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TABLE 25. Distribution of manner of collision for multiple-vehicle intersection collisions in Minnesota and North Carolina combined

Collision type	Percentage of accidents for each intersection type			
	3ST	3SG	4ST	4SG
Rear-end	48.5	51.7	42.5	50.7
Head-on	0.5	0.6	0.9	0.7
Angle	38.1	33.0	44.8	34.4
Sideswipe, same direction	7.7	10.2	6.1	9.2
Sideswipe, opposite direction	0.4	0.4	0.8	0.4
Other multiple-vehicle collisions	4.8	4.1	4.9	4.7

TABLE 26. Distribution of collision type for single-vehicle accidents in Minnesota and North Carolina combined

Collision type	Percentage of accidents by intersection type			
	3ST	3SG	4ST	4SG
Collision with parked vehicle	0.0	1.2	4.4	4.9
Collision with animal	6.6	2.9	1.5	1.7
Collision with fixed object	14.0	28.5	10.4	24.7
Collision with other object	5.8	8.1	5.2	15.0
Other single-vehicle collision	20.7	12.2	40.0	24.0
Noncollision	52.9	47.1	38.5	29.6

Table 27 summarizes the independent variables that were included in the definition of roadway segment and intersection types or considered in the development of the base models for roadway segments or intersections presented in Chapter 5 of this report. Other variables of interest that were included in the project database (see Tables 15 and 16) may not have varied sufficiently within individual roadway segment or intersection types to be suitable for modeling.

Tables 28 and 29 present descriptive statistics for continuous and categorical independent variables, respectively, considered in modeling of roadway segments. Tables 30 and 31 present descriptive statistics for continuous and categorical variables, respectively, considered in modeling of intersections.

VALIDATION DATA

A validation data set has been developed with data for roadway segments from the Washington State DOT and data for intersections from the Florida DOT. The validation work based on these datasets is described in Chapter 8 of this report.

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TABLE 27. Variables considered in safety prediction modeling

Variable	Multiple-vehicle nondriveway collisions	Single-vehicle collisions	Driveway-related accidents
Roadway Segments			
Traffic volume (ADT)	✓	✓	✓
Segment length	✓	✓	✓
Number of through lanes	✓	✓	✓
Presence of median	✓	✓	✓
Presence of TWLTL	✓	✓	
Lane width	✓	✓	✓
Shoulder width	✓	✓	
Shoulder type	✓	✓	
On-street parking	✓	✓	
Roadside hazard rating	✓	✓	
Speed category	✓	✓	
Number of driveways			✓
Driveway types			✓
Driveway density			✓
Intersections			
Number of legs	✓	✓	
Type of traffic control	✓	✓	
Major-road ADT	✓	✓	
Minor-road ADT	✓	✓	
Left-turn phasing	✓	✓	
Speed category	✓	✓	
Lane width	✓	✓	
Skew angle	✓	✓	
Character of development	✓	✓	

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TABLE 28. Descriptive statistics for continuous variables for roadway segments

Variable/statistic	Minnesota					Michigan				
	2U	3T	4U	4D	5T	2U	3T	4U	4D	5T
ADT (veh/day)										
Mean	9,376	10,806	13,534	22,260	15,013	13,246	14,846	21,259	17,784	29,703
Median	8,607	10,226	13,787	18,986	14,979	13,666	14,303	21,180	24,232	27,775
Standard deviation	207	211	226	473	353	282	862	343	1,066	448
Minimum	715	3,437	1,361	949	5,685	2,389	2,644	9,401	4,793	6,273
Maximum	27,012	27,012	39,516	55,232	27,842	32,571	32,902	40,045	65,912	53,781
Shoulder width (ft)										
Mean	4.31	2.42	0.49	2.47	0.47	4.20	2.12	0.05	0.13	0.38
Median	3.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
Standard deviation	0.24	0.22	0.08	0.22	0.11	0.15	0.35	0.01	0.05	0.07
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	12.00	13.00	10.00	13.00	8.00	13.00	14.00	3.00	3.00	12.00
Roadside hazard rating (1 to 7 scale)										
Mean	3.2	3.9	4.0	3.5	3.9	3.1	3.2	3.7	2.8	2.3
Median	3.0	4.0	4.0	4.0	4.0	3.0	3.0	3.5	3.0	2.0
Standard deviation	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0
Minimum	1.0	1.0	1.5	1.0	2.0	1.0	1.0	1.0	1.0	1.0
Maximum	6.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Number of driveways[a]										
Mean	3.0	4.7	3.9	1.0	6.0	4.3	3.9	4.9	3.5	5.9
Median	2.0	3.0	2.0	0.0	3.0	3.0	3.0	4.0	2.0	4.0
Standard deviation	0.2	0.6	0.3	0.1	1.5	0.2	0.3	0.2	0.4	0.2
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum	30.0	37.0	63.0	14.0	20.0	40.0	18.0	29.0	36.0	37.0
Driveway density (driveways/mi)[a]										
Mean	25.7	34.9	36.3	8.7	31.2	32.6	39.4	61.3	27.9	43.4
Median	16.8	24.7	29.3	0.0	22.1	23.3	29.8	58.8	17.2	37.0
Standard deviation	1.4	3.1	1.9	1.2	6.2	1.4	3.5	1.8	2.9	1.5
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum	119.0	148.0	175.0	114.8	82.3	322.0	156.5	196.7	188.7	241.9

[a] Includes driveways on both sides of the roadway.

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TABLE 29. Percentage of roadway segments in specific categories by state and roadway type

Variable/category	Minnesota					Michigan				
	2U	3T	4U	4D	5T	2U	3T	4U	4D	5T
On-street parking										
None	73	79	65	90	97	95	97	91	100	99
One Side	< 1	9	6	3	< 1	2	3	5		1
Both Sides	27	12	29	7	2	4		4		
Speed category										
Low (30 mph or less)	58	71	87	42	79	39	66	85	33	17
Intermediate (35 - 45 mph)	36	26	13	49	18	46	26	13	67	66
High (50 mph or more)	6	3	< 1	9	3	15	8	2		17
Lane width[a]										
9 ft or less			4			10	27	22	9	
10 ft	6	12	33	1		14	22	38	7	3
11 ft	5	4	28	25	31	39	10	33	49	64
12 ft	43	57	21	34	69	25	28	6	24	20
13 ft or more	46	27	14	40		12	13		11	13
Shoulder width/type[a]										
Curb	38	55	94	72	89	18	66	98	96	94
No Shoulder	7	7		1		9	5			
1-3 ft	7	5		1		25	6	2	4	3
4-6 ft	12	15	1	1	9	11	2			
7-9 ft	22	13	2	11	1	29	12			3
10+ ft	14	5	3	14		8	9			1

[a] For sites where lane or shoulder widths were measured.

TABLE 30. Descriptive statistics for continuous variables for intersections

Variable/statistic	Minnesota				North Carolina			
	3ST	3SG	4ST	4SG	3ST	3SG	4ST	4SG
Major-road ADT (veh/day)								
Mean	15,789	24,730	17,868	21,369	12,691	21,354	14,074	20,796
Median	15,123	20,975	13,689	20,130	10,431	21,275	14,549	16,934
Standard deviation	1,450	2,028	1,533	1,214	1,389	1,301	1,195	1,584
Minimum	3,471	7,983	4,484	4,550	732	6,555	366	5,572
Maximum	45,662	58,056	46,784	67,636	34,130	43,413	33,947	51,031
Minor-road ADT (veh/day)								
Mean	1,157	5,331	956	5,502	2,173	3,908	1,409	9,133
Median	605	3,842	605	4,273	1,190	3,176	641	7,949
Standard deviation	266	710	143	634	306	397	232	1,063
Minimum	84	599	556	222	183	758	92	686
Maximum	9,080	16,325	5,664	22,464	9,242	10,466	5,856	33,392

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TABLE 31. Percentage of intersections in specific categories by state and intersection type

	Minnesota				North Carolina			
	3ST	3SG	4ST	4SG	3ST	3SG	4ST	4SG
Speed category								
Low (30 mph or less)	38	42	60	67	57	50	60	57
Intermediate (35 to 45 mph)	35	25	25	12	40	40	35	34
High (50 mph or more)	28	33	15	21	2	10	4	9
Left-turn signal phasing for major road approaches								
Protected		53		34		38		48
Protected/permissive		28		28		26		20
None		19		37		36		32
Intersection angle								
80 degrees or more	85	83	85	94	72	88	88	91
Less than 80 degrees	15	17	15	6	28	12	13	9
Character development								
Commercial	28	47	34	75	13	31	6	52
Industrial/institutional		8	2	3	9	5	17	7
Mixed	10	8	17	12	2	5		5
Residential	45	17	34	1	74	57	75	30
Other	18	19	13	9	2	2	2	7

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CHAPTER 5.

BASE MODELS AND ADJUSTMENT FACTORS

This chapter presents the base models and adjustment factors developed for the HSM safety prediction methodology for urban and suburban arterials. Base models and adjustment factors for both roadway segments and intersections are presented. Chapter 7 shows how these base models and adjustment factors are incorporated in the HSM methodology.

ROADWAY SEGMENTS

Base models and adjustment factors for roadway segments are presented for multiple-vehicle nondriveway collisions, single-vehicle collisions, driveway-related collisions, vehicle-pedestrian collisions, and vehicle-bicycle collisions. The five types of roadway segments considered are those identified in Chapter 4 of this report:

- two-lane undivided arterials (2U)
- three-lane arterials including a center TWLTL (3T)
- four-lane undivided arterials (4U)
- four-lane divided arterials (4D)
- five-lane arterials including a center TWLTL (5T)

Multiple-Vehicle Nondriveway Collisions

Negative binomial regression models for multiple-vehicle nondriveway collisions were initially developed in the form shown below:

$$N_{brmv} = \exp (a + b \ln ADT + \ln L + c\, SW + d\, OSP) \quad \textbf{(26)}$$

where:

N_{brmv}	=	predicted number of multiple-vehicle nondriveway collisions per year for nominal or base conditions
ADT	=	average daily traffic volume (veh/day) on roadway segment
L	=	length of roadway segment (mi)
SW	=	shoulder width (ft); average shoulder width if the two directions of travel differ
OSP	=	on-street parking factor (= 0 if curb parking is present on either side of street; = 1 if curb parking is not present)
a,b,c,d	=	regression coefficients

The independent variables included in these models, when statistically significant, in addition to ADT, which was always included, are:

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- shoulder width
- on-street parking

In most cases, ADT and the other independent variables are significant at the 5-percent significance level or better.

The model coefficients are presented in Tables 32 and 33 for roadway segments in Minnesota and Michigan, respectively.

Additional variables that were considered in the development of the models shown in Tables 32 and 33 included:

- lane width
- speed category (low, intermediate, high)

No consistent relationship was found between lane width and safety (*16*). Therefore, lane width was not included in the model form shown in Equation (26).

TABLE 32. Initial models for multiple-vehicle nondriveway collisions on Minnesota roadway segments

		Regression coefficient (standard error)									
Road type	No. of sites	Intercept (a)		ADT (b)		Shoulder width (c)		On-street parking (d)		Over-dispersion parameter (k)	R^2_{LR}
Total accidents											
2U	577	–12.85	(1.36)	1.55	(0.15)	–0.04	(0.01)	–0.84	(0.16)	0.81	0.26
3T	380	–12.85	(2.34)	1.52	(0.25)	–0.09	(0.02)			0.74	0.17
4U	742	–14.39	(1.10)	1.67	(0.11)	–0.08	(0.02)			0.76	0.26
4D	540	–12.70	(1.23)	1.47	(0.12)	–0.07	(0.01)			0.74	0.29
5T	205	–8.21	(3.31)	1.01	(0.34)	–0.30	(0.10)			0.80	0.16
Fatal-and-injury accidents											
2U	577	–11.39	(1.93)	1.20	(0.21)	–0.04	(0.02)			1.15	0.07
3T	380	–13.90	(3.24)	1.50	(0.35)	–0.08	(0.03)			0.65	0.10
4U	742	–13.29	(1.46)	1.43	(0.15)	–0.06	(0.03)			0.72	0.12
4D	540	–13.90	(1.70)	1.48	(0.17)	–0.07	(0.02)			0.92	0.18
5T	205	–9.70	(3.87)	1.03	(0.40)	–0.24	(0.13)			0.24	0.11
Property-damage-only accidents											
2U	577	–14.45	(1.59)	1.70	(0.17)	–0.05	(0.02)	–0.95	(0.18)	0.78	0.25
3T	380	–12.82	(2.56)	1.48	(0.27)	–0.09	(0.02)			0.77	0.15
4U	742	–15.87	(1.38)	1.79	(0.14)	–0.09	(0.03)			0.97	0.22
4D	540	–12.92	(1.33)	1.45	(0.13)	–0.07	(0.01)			0.80	0.26
5T	205	–7.91	(3.80)	0.94	(0.39)	–0.31	(0.11)			0.94	0.12

NOTE: Models are in the form shown in Equation (26).

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TABLE 33. Initial models for multiple-vehicle nondriveway collisions on Michigan roadway segments

Road type	No. of sites	Regression coefficient (standard error)								Over-dispersion parameter (k)	R^2_{LR}
		Intercept (a)		ADT (b)		Shoulder width (c)		On-street parking (d)			
Total accidents											
2U	590	–14.75	(0.88)	1.73	(0.09)	–0.02	(0.01)			0.61	
3T	115	–10.03	(1.39)	1.29	(0.15)	–0.04	(0.02)			0.44	
4U	471	–5.23	(1.32)	0.79	(0.13)	–0.31	(0.14)	–0.29	(0.18)	0.67	0.09
4D	140	–8.84	(1.89)	1.11	(0.19)					0.92	
5T	562	–8.68	(1.08)	1.14	(0.11)	–0.08	(0.02)			0.73	0.18
Fatal-and-injury accidents											
2U	590	–17.11	(1.31)	1.81	(0.13)					0.43	0.30
3T	115	–14.81	(2.73)	1.59	(0.28)					0.47	0.33
4U	471	–7.82	(1.98)	0.88	(0.20)					0.88	0.04
4D	140	–8.13	(2.28)	0.88	(0.27)					0.82	0.10
5T	562	–9.60	(1.26)	1.09	(0.12)	–0.07	(0.03)			0.64	0.13
Property-damage-only accidents											
2U	590	–14.51	(0.95)	1.68	(0.10)	–0.02	(0.01)			0.67	0.36
3T	115	–9.64	(1.42)	1.23	(0.15)	–0.06	(0.02)			0.43	0.41
4U	471	–5.39	(1.42)	0.78	(0.14)	–0.38	(0.14)	–0.38	(0.19)	0.70	0.08
4D	140	–9.91	(1.96)	1.20	(0.20)					0.90	0.22
5T	562	–9.02	(1.12)	1.15	(0.11)	–0.08	(0.02)			0.76	0.17

NOTE: Models are in the form shown in Equation (26); all sites are located in Oakland County, MI.

The investigation of the effect of speed on safety on urban and suburban arterials considered three speed categories based on posted speed limit: low speed [48 km/h (30 mph) or less]; intermediate speed [56 to 72 km/h (35 to 45 mph)]; and high speed [80 km/h (50 mph) or more]. There was a statistically significant relationship between these speed categories and safety in a number of regression models but, in nearly all cases, this relationship was in the opposite direction to that expected (i.e., higher accident frequencies on low-speed than on high-speed arterials). Several alternative modeling approaches to obtain a speed effect that was not counterintuitive were tried, but none were successful. These alternative modeling approaches focused on identifying other independent variables that might be correlated with speed and might explain the counterintuitive speed effect that was found. One hypothesis investigated was that driveways within a roadway segment might create sufficient turbulence in traffic flow to affect multiple-vehicle nondriveway collisions. Therefore, variables representing number of driveways and driveway density were introduced into the models, but counterintuitive speed effects were still obtained. Because the effect of the speed categories on safety was opposite to the direction expected and because the consideration of speed category typically increased R^2_{LR} for the models by only about 0.01, a decision was reached not to include speed category in the models. The relationship of speed and safety merits further investigation for future HSM editions.

Figure 10 illustrates the regression relationship presented on the first line of Table 33 on a scatter plot of the data from which it was developed. Both the plotted curve and the observed

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data points represent a two-lane undivided arterial with zero shoulder width (e.g., a curb-and-gutter cross section) and no on-street parking.

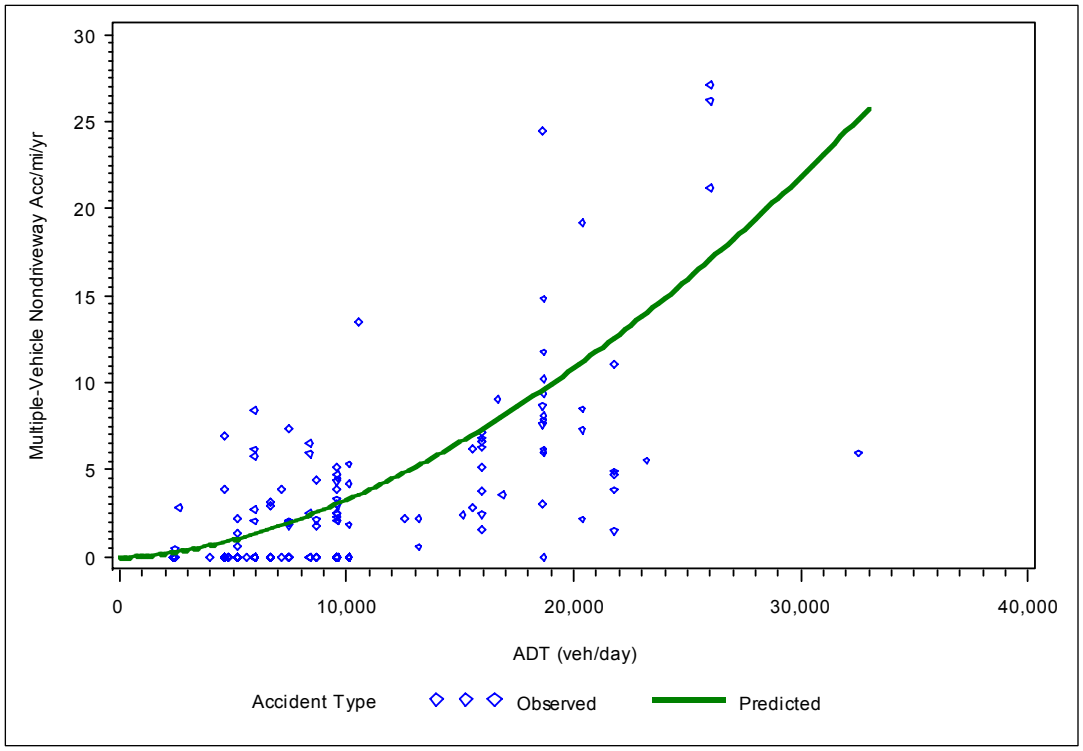

Figure 10. Example of regression relationship and observed data for two-lane roadways in Michigan with no shoulder and no on-street parking.

Table 34 presents comparable models to Tables 32 and 33 for the Minnesota and Michigan data combined. These models are in the same form as Equation (26), but were developed with a random state effect as explained in Chapter 3 of this report. Table 34 includes the magnitude of the variance of the state effect.

For application in the HSM methodology, the regression models for multiple-vehicle collisions shown in Table 34 were converted to nominal or base conditions and reduced to the form shown below:

$$N_{brmv} = \exp(a + b \ln ADT + \ln L) \quad \textbf{(27)}$$

The nominal or base conditions include shoulder width of 1.8 m (6 ft) and no on-street parking. The random state effect combines the data for Minnesota and Michigan. Adjustment of the models for application in other states or in other years than those used in model development will be addressed through the calibration process. Table 35 presents the coefficients for the reduced models in the form shown in Equation (27). These models are illustrated in Figures 11 through 13.

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TABLE 34. Initial models for multiple-vehicle nondriveway collisions on roadway segments for Minnesota and Michigan combined

Roadway type	Number of sites	Regression coefficient (standard error)								State variance	Overdispersion parameter (k)	R_{LR}^2
		Intercept (a)		ADT (b)		Shoulder width (c)		Curb parking (d)				
Total accidents												
2U	1,167	–13.82	(0.84)	1.68	(0.08)	–0.03	(0.01)	–0.75	(0.12)	0.17	0.84	0.37
3T	480	–11.48	(1.32)	1.41	(0.13)	–0.07	(0.02)			0.24	0.66	0.46
4U	1,182	–10.84	(0.92)	1.33	(0.09)	–0.08	(0.02)	–0.18	(0.09	0.04	1.01	0.31
4D	680	–11.47	(1.17)	1.36	(0.12)	–0.07	(0.02)			0.03	1.32	0.35
5T	754	–9.39	(1.09)	1.17	(0.10)	–0.09	(0.02)			0.36	0.81	0.39
Fatal-and-injury accidents												
2U	1,167	–15.59	(1.10)	1.66	(0.12)	–0.03	(0.01)			0.03	0.65	0.02
3T	480	–15.71	(1.91)	1.69	(0.20)	–0.04	(0.02)			0.00	0.59	0.13
4U	1,182	–11.61	(1.08)	1.25	(0.11)	–0.06	(0.03)			0.00	0.99	0.13
4D	680	–11.96	(1.40)	1.28	(0.14)	–0.06	(0.02)			0.02	1.31	0.24
5T	754	–10.24	(1.17)	1.12	(0.11)	–0.08	(0.03)			0.23	0.62	0.23
Property-damage-only accidents												
2U	1,167	–14.08	(0.92)	1.69	(0.09)	–0.03	(0.01)	–0.86	(0.13)	0.25	0.87	0.33
3T	480	–11.01	(1.36)	1.33	(0.14)	–0.08	(0.02)			0.37	0.59	0.47
4U	1,182	–11.61	(1.01)	1.38	(0.10)	–0.10	(0.03)	–0.24	(0.10)	0.05	1.08	0.29
4D	680	–11.94	(1.25)	1.38	(0.12)	–0.07	(0.02)			0.11	1.34	0.41
5T	754	–9.66	(1.16)	1.17	(0.11)	–0.09	(0.03)			0.43	0.88	0.35

NOTE: Models are in the form shown in Equation (26).

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TABLE 35. Base models for multiple-vehicle nondriveway collisions on roadway segments

Road type	Regression coefficients: Intercept (a)	Regression coefficients: ADT (b)	Overdispersion parameter (k)
Total accidents			
2U	–14.75	1.68	0.84
3T	–11.92	1.41	0.66
4U	–11.53	1.33	1.01
4D	–11.88	1.36	1.32
5T	–9.93	1.17	0.81
Fatal-and-injury accidents			
2U	–15.75	1.66	0.65
3T	–15.97	1.69	0.59
4U	–11.98	1.25	0.99
4D	–12.30	1.28	1.31
5T	–10.70	1.12	0.62
Property-damage-only accidents			
2U	–15.15	1.69	0.87
3T	–11.47	1.33	0.59
4U	–12.43	1.38	1.08
4D	–12.35	1.38	1.34
5T	–10.20	1.17	0.88

NOTE: Models are in the form shown in Equation (27).

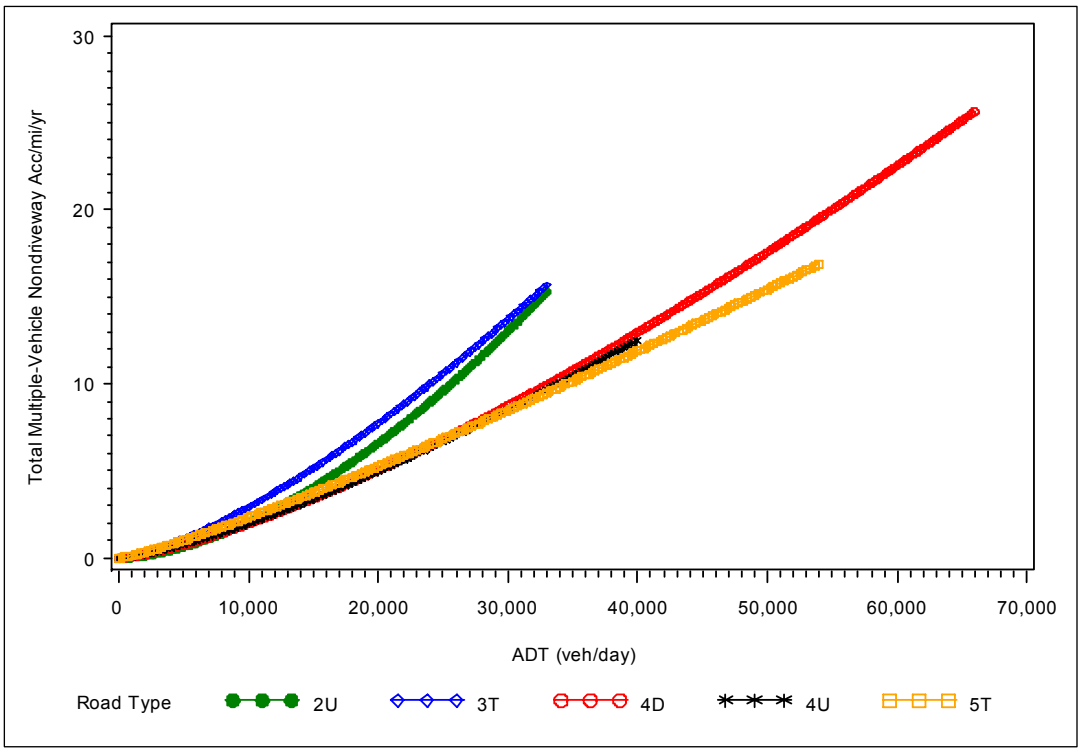

Figure 11. Plots for base models for total multiple-vehicle nondriveway collisions on roadway segments by roadway type.

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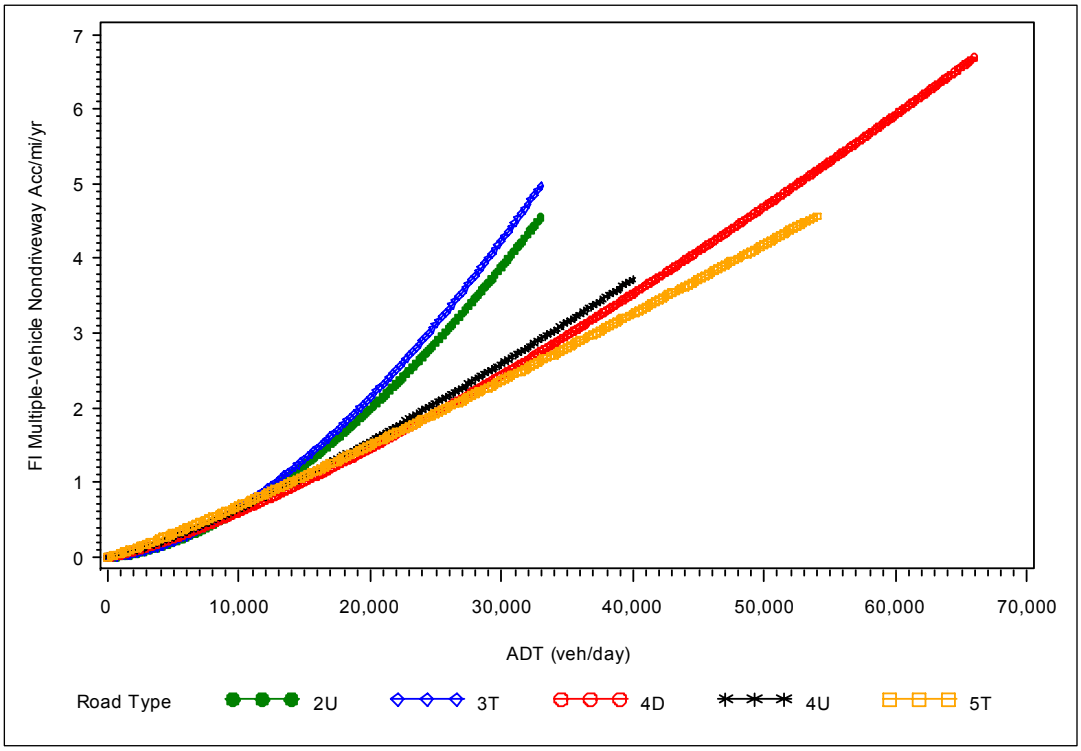

Figure 12. Plots for base models for fatal-and-injury multiple-vehicle nondriveway collisions on roadway segments by roadway type.

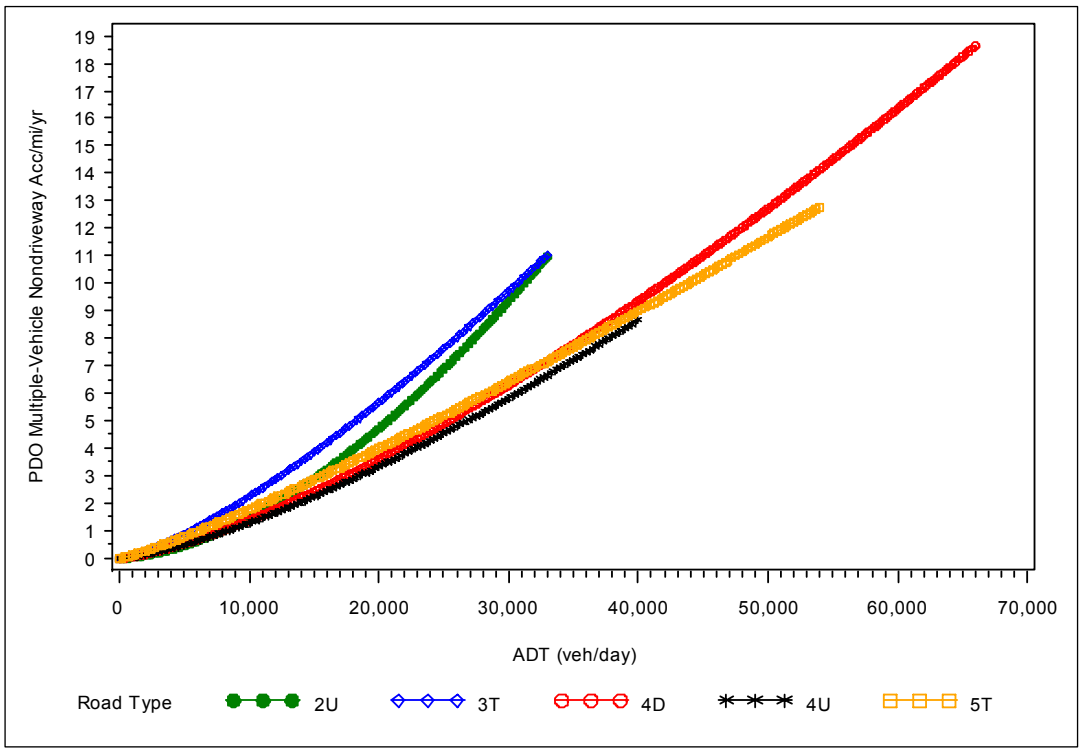

Figure 13. Plots for base models for property-damage-only multiple-vehicle nondriveway collisions on roadway segments by roadway type.

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The values of R^2_{LR} for the base models, which represent the improvement of the model over an intercept-only model, range from 0.10 to 0.37. The only models with relatively low values of R^2_{LR} are those for fatal-and-injury accidents on roadway types with relatively few accidents.

The severity distribution for multiple-vehicle nondriveway collisions is shown in Table 36 based on combined data for Minnesota and Michigan.

TABLE 36. Severity distribution of multiple-vehicle collisions for roadway segments

Road type	No. of sites	Percentage of total accidents	
		Fatal and injury	Property damage only
Minnesota sites			
2U	577	29.4	70.6
3T	380	29.5	70.5
4U	742	30.7	69.3
4D	540	36.3	63.7
5T	205	30.6	69.4
Michigan sites			
2U	590	24.7	75.3
3T	115	20.4	79.6
4U	471	25.6	74.4
4D	140	19.4	80.6
5T	562	23.0	77.0
Combined sites			
2U	1,167	27.1	72.9
3T	495	25.0	75.0
4U	1,213	28.1	71.9
4D	680	27.9	72.1
5T	767	26.8	73.2

Single-Vehicle Collisions

Negative binomial regression models for single-vehicle collisions were initially developed in the form shown below:

$$N_{brsv} = \exp (a + b \ln ADT + \ln L + c\, SW + d\, OSP + e\, RHR) \quad \textbf{(28)}$$

where:

N_{brsv} = predicted number of single-vehicle collisions per year for nominal for base conditions
RHR = roadside hazard rating for roadway segment (1 to 7 scale); average roadside hazard rating if the roadsides for the two directions of travel differ
a,...,e = regression coefficients

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The independent variables included in these models, when statistically significant, in addition to ADT, which was always included, are:

- shoulder width
- on-street parking
- roadside hazard rating

The model coefficients are presented in Tables 37 and 38 for roadway segments in Minnesota and Michigan, respectively. As in the case of multiple-vehicle nondriveway collisions, no statistically significant effect was found for lane width and only counterintuitive effects were found for speed category.

Table 39 presents comparable models to Tables 37 and 38 for the Minnesota and Michigan data combined. These models are in the same form as Equation (28), but were developed with a random state effect as explained in Chapter 3 of this report. Table 39 includes the magnitude of the variance for the state effect.

For application in the HSM methodology, the regression models for single-vehicle collisions were converted to nominal or base conditions and reduced to the form shown below:

$$N_{brsv} = \exp (a + b \ln ADT + \ln L) \quad \textbf{(29)}$$

The nominal or base conditions include shoulder width of 1.8 m (6 ft), no on-street parking, and a roadside hazard rating of 3. Table 40 presents the coefficients for these reduced models. These models are illustrated in Figures 14 through 16.

Statistically significant models for single-vehicle collisions were not found for all cases. Where no formal model is available, single-vehicle collisions can be estimated by a multiplicative factor as a proportion of multiple-vehicle nondriveway collisions, as follows:

$$N_{brsv} = N_{brmv} f_{rsv} \quad \textbf{(30)}$$

where:

f_{rsv} = factor for single-vehicle collisions on a roadway segment as a proportion of multiple-vehicle nondriveway collisions

Table 41 presents values of f_{rsv} that can be applied where no model for single-vehicle collisions is available. A value for f_{rsv} equal to 0.24 implies that the average frequency of single collisions is 24 percent of the average frequency of multiple-vehicle nondriveway collisions. The magnitude of the values in Table 41 is such that the use of predictive models in the form of Equation (29) would be preferable to the use of tabulated values like those in Table 41. While the values of R^2_{LR} for the models presented in Tables 39 and 40 are quite low, use of these models allows single-vehicle collision frequencies to vary as a function of ADT. If factors like those shown in Table 41 were used, that ADT dependency would be lost. Therefore, a decision was reached to use the models shown in Tables 39 and 40 in the HSM methodology.

The severity distribution for single-vehicle collisions on roadway segments is presented in Table 42.

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TABLE 37. Initial models for single-vehicle collisions on Minnesota roadway segments

Road type	No. of sites	Regression coefficient (standard error) Intercept (a)	ADT (b)	Shoulder width (c)	On-street parking (d)	Roadside hazard rating (e)	Over-dispersion parameter (k)	R^2_{LR}
Total accidents								
2U	577	–3.35 (0.95)	0.43 (0.11)		–0.99 (0.17)	0.13 (0.05)	0.77	0.16
3T	380	–5.10 (2.18)	0.52 (0.24)				1.36	0.01
4U	742	–8.44 (1.30)	0.91 (0.14)		–0.73 (0.12)	0.12 (0.05)	0.64	0.14
4D	540	–6.10 (1.16)	0.60 (0.11)		–0.38 (0.20)	0.19 (0.05)	0.65	0.08
5T	205	–6.93 (3.15)	0.71 (0.33)				0.75	0.02
Fatal-and-injury accidents								
2U	577							
3T	380							
4U	742							
4D	540	–8.42 (1.79)	0.66 (0.17)			0.23 (0.07)	0.26	0.04
5T	205							
Property-damage-only accidents								
2U	577	–4.74 (1.06)	0.56 (0.12)		–1.11 (0.18)	0.14 (0.06)	0.74	0.17
3T	380	–6.97 (2.57)	0.68 (0.28)				1.71	0.02
4U	742	–9.48 (1.52)	0.99 (0.16)		–0.75 (0.14)	0.12 (0.05)	0.79	0.12
4D	540	–6.26 (1.34)	0.59 (0.13)		–0.48 (0.23)	0.18 (0.06)	0.82	0.06
5T	205	–7.07 (3.81)	0.69 (0.40)				1.10	0.02

NOTE: Models are in the form shown in Equation (28).

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TABLE 38. Initial models for single-vehicle collisions on Michigan roadway segments

Road type	No. of sites	Regression coefficient (standard error) Intercept (a)	ADT (b)	Shoulder width (c)	On-street parking (d)	Roadside hazard rating (e)	Over-dispersion parameter (k)	R^2_{LR}
Total accidents								
2U	590	–4.99 (0.83)	0.61 (0.09)				0.64	0.08
3T	115	–4.59 (2.22)	0.48 (0.23)				0.57	0.04
4U	471							
4D	140							
5T	562	–4.52 (1.25)	0.51 (0.12)	–0.05 (0.03)			0.47	0.03
Fatal-and-injury accidents								
2U	590	–3.95 (1.34)	0.32 (0.14)				0.11	0.01
3T	115	–11.04 (4.88)	1.01 (0.50)				0.65	0.05
4U	471							
4D	140							
5T	562							
Property-damage-only accidents								
2U	590	–5.60 (0.90)	0.66 (0.09)				0.69	0.08
3T	115	–3.48 (2.12)	0.34 (0.25)				0.62	0.02
4U	471							
4D	140							
5T	562	–5.66 (1.35)	0.60 (0.13)	–0.05 (0.03)			0.51	0.04

NOTE: Models are in the form shown in Equation (28); all sites are located in Oakland County, MI.

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TABLE 39. Initial models for single-vehicle collisions on roadway segments in Minnesota and Michigan combined

Road type	Number of sites	Regression coefficient (standard error) Intercept (a)	AADT (b)	Curb parking (c) None	On-street parking (d)	State variance	Over-dispersion parameter (k)	R^2_{LR}
Total accidents								
2U	1,167	–4.37 (0.72)	0.56 (0.07)	–0.74 (0.12)	0.11 (0.03)	0.14	0.83	0.13
3T	495	–5.26 (1.74)	0.54 (0.19)			0.00	1.37	0.05
4U	1,213	–7.14 (1.16)	0.81 (0.12)	–0.75 (0.11)		0.04	0.91	0.10
4D	680	–4.30 (1.07)	0.47 (0.10)	–0.41 (0.21)	0.12 (0.04)	0.17	0.86	0.19
5T	767	–5.05 (1.19)	0.54 (0.12)			0.11	0.52	
Fatal-and-injury accidents								
2U	1,167	–3.32 (1.03)	0.23 (0.11)	–0.29 (0.21)	0.11 (0.03)	0.14	0.83	0.13
3T	495	–5.89 (2.64)	0.47 (0.28)			0.00	1.37	0.05
4U	1,213	–6.60 (1.83)	0.61 (0.19)	–0.67 (0.18)		0.04	0.91	0.10
4D	680	–8.47 (1.57)	0.66 (0.15)		0.12 (0.04)	0.17	0.86	0.19
5T	767	–4.66 (1.71)	0.35 (0.17)			0.11	0.52	
Property-damage-only accidents								
2U	1,167	–5.30 (0.79)	0.64 (0.08)	–0.85 (0.13)	0.12 (0.04)	0.17	0.87	0.17
3T	495	–5.81 (2.06)	0.56 (0.22)			0.00	1.93	0.06
4U	1,213	–7.61 (1.27)	0.84 (0.13)	–0.79 (0.12)		0.02	0.97	0.08
4D	680	–4.16 (1.22)	0.45 (0.11)	–0.51 (0.24)	0.10 (0.05)	0.29	1.06	0.17
5T	767	–6.06 (1.31)	0.61 (0.13)			0.16	0.55	

NOTE: Models are in the form shown in Equation (28).

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TABLE 40. Base models for single-vehicle collisions on roadway segments

Road type	Regression coefficients: Intercept (a)	Regression coefficients: ADT (b)	Overdispersion parameter (k)
Total accidents			
2U	–5.00	0.56	0.83
3T	–5.26	0.54	1.37
4U	–7.89	0.81	0.91
4D	–4.59	0.47	0.86
5T	–5.05	0.54	0.52
Fatal-and-injury accidents			
2U	–3.49	0.23	0.50
3T	–5.89	0.47	1.06
4U	–7.27	0.61	0.54
4D	–8.25	0.66	0.28
5T	–4.66	0.35	0.36
Property-damage-only accidents			
2U	–6.04	0.64	0.87
3T	–5.81	0.56	1.93
4U	–8.40	0.84	0.97
4D	–4.58	0.45	1.06
5T	–6.06	0.61	0.55

NOTE: Models are in the form shown in Equation (29).

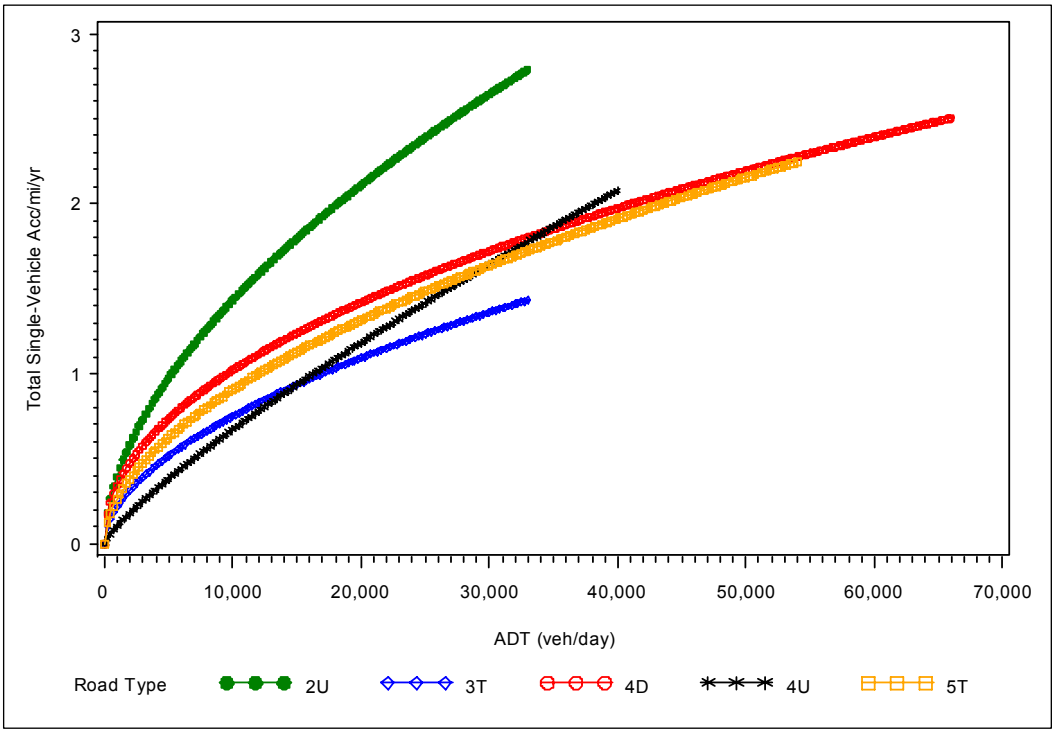

Figure 14. Plots for base models for total single-vehicle collisions on roadway segments by roadway type.

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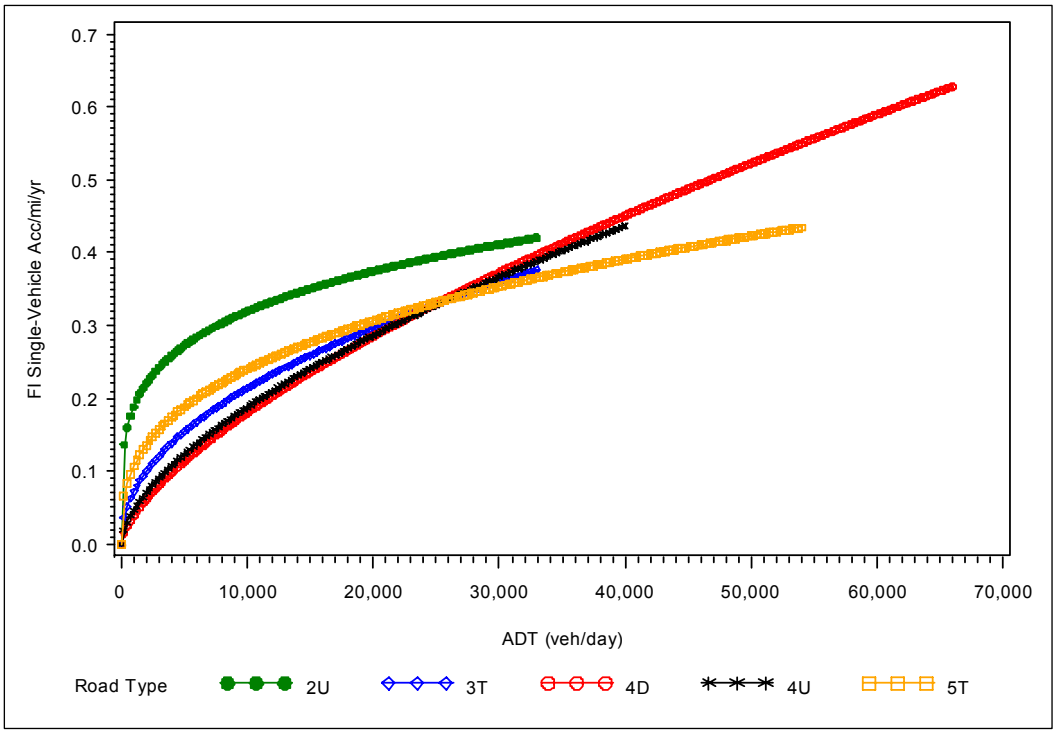

Figure 15. Plots for base models for fatal-and-injury single-vehicle collisions on roadway segments by roadway type.

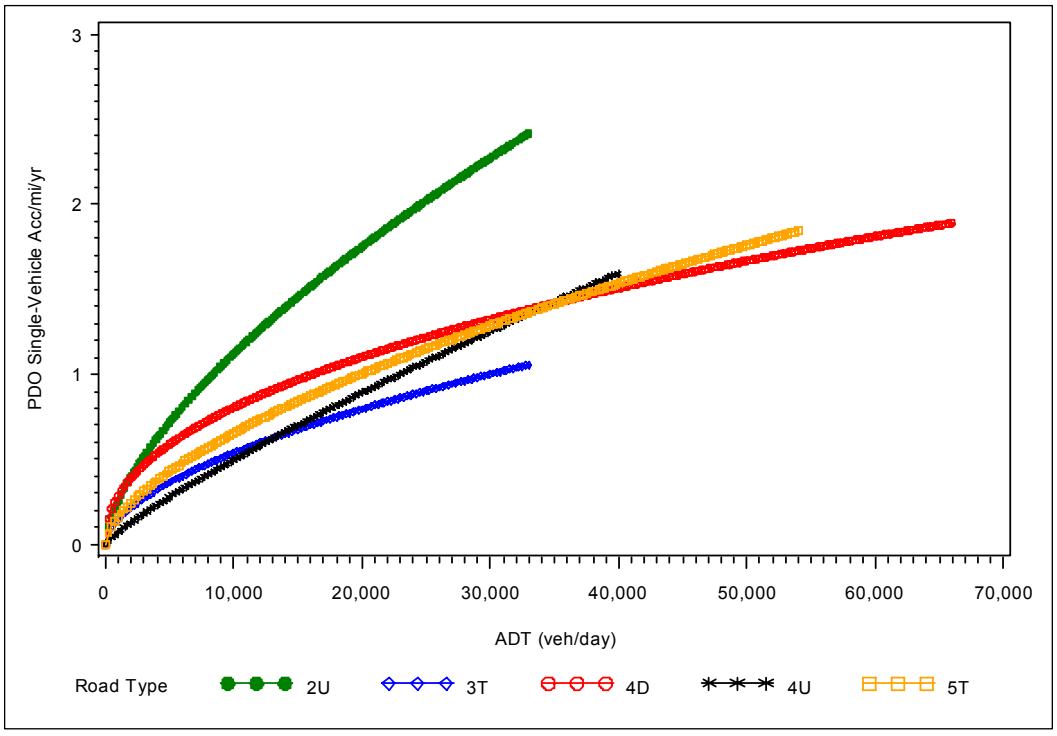

Figure 16. Plots for base models for property-damage-only single-vehicle collisions on roadway segments by roadway type.

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TABLE 41. Single-vehicle collision factors for roadway segments

Road type	Single-vehicle collision factor (f_{rsv})		
	Minnesota	Michigan	Combined
Total accidents			
2U	0.41	0.17	0.29
3T	0.19	0.31	0.25
4U	0.20	0.10	0.15
4D	0.15	0.16	0.16
5T	0.17	0.09	0.13
Fatal-and-injury accidents			
2U	0.37	0.23	0.30
3T	0.18	0.12	0.15
4U	0.17	0.10	0.14
4D	0.13	0.12	0.13
5T	0.19	0.07	0.13
Property-damage-only accidents			
2U	0.43	0.33	0.38
3T	0.20	0.10	0.15
4U	0.21	0.12	0.17
4D	0.17	0.16	0.17
5T	0.17	0.09	0.13

TABLE 42. Severity distribution of single-vehicle collisions for roadway segments

Road type	No. of sites	Percentage of total accidents	
		Fatal and injury	Property damage only
Minnesota sites			
2U	577	24.3	75.7
3T	380	27.3	72.7
4U	742	25.3	74.7
4D	540	29.5	70.5
5T	205	31.9	68.1
Michigan sites			
2U	590	16.4	83.6
3T	115	25.3	74.7
4U	471	21.5	78.5
4D	140	14.2	85.8
5T	562	16.8	83.2
Combined sites			
2U	1,167	20.4	79.6
3T	495	26.3	73.7
4U	1,213	23.4	76.6
4D	680	21.8	78.2
5T	767	24.4	75.6

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Driveway-Related Collisions

The models presented above for multiple-vehicle collisions addressed only collisions that were not related to driveways. Driveway-related accidents are also generally multiple-vehicle collisions, but are addressed separately because the frequency of driveway-related accidents on an arterial roadway segment depends on the number and type of driveways.

Seven specific driveway types were considered in modeling: These are:

- Major commercial driveways
- Minor commercial driveways
- Major industrial/institutional driveways
- Minor industrial/institutional driveways
- Major residential driveways
- Minor residential driveways
- Other driveways

Major driveways are those that serve sites with 50 or more parking spaces. Minor driveways are those that serve sites with less than 50 parking spaces. Commercial driveways provide access to establishments that serve retail customers. Residential driveways serve single- and multiple-family dwellings. Industrial/institutional driveways serve factories, warehouses, schools, hospitals, churches, offices, public facilities, and other places of employment.

The modeling of driveway-related collisions was based on the driveway types listed above. Driveway volume was not considered in modeling for two reasons. First, no data on driveway volumes were available for the study sites. Second, even if a model with driveway volumes had been developed, driveway volumes are seldom available to highway agencies that will use the HSM. It would not be desirable to create an HSM methodology that cannot be applied by most users.

The base models for driveway-related collisions are of the form:

$$N_{brdwy} = a(ADT/10{,}000)^b (c\ D_{majc} + d\ D_{minc} + e\ D_{maji} + f\ D_{mini} + g\ D_{majr} + h\ D_{minr} + i\ D_{oth}) \quad \textbf{(31)}$$

where:

N_{brdwy}	=	predicted number of driveway-related collisions per year on a roadway segment
D_{majc}	=	number of major commercial driveways within the roadway segment
D_{minc}	=	number of minor commercial driveways within the roadway segment
D_{maji}	=	number of major industrial/institutional driveways
D_{mini}	=	number of minor industrial/institutional driveways
D_{majr}	=	number of major residential driveways
D_{minr}	=	number of minor residential driveways
D_{oth}	=	number of other driveways
a, ..., i	=	regression coefficients

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Table 43 presents values for model coefficient a, which represents the intercept; coefficient b, which represents the exponent of the traffic volume factor; and coefficients c through i, that are proportional to the average annual accident frequencies for driveways of specific types. The factors in Table 43 were derived with multinomial regression from Minnesota data. The model form shown in Equation (31), confirmed by the models shown in Table 43, indicates that collision frequency for a driveway depends on the traffic volume on the arterial. The collision frequency for a driveway should also logically depend on the driveway volume. However, because no driveway volume data are available, the effect of driveway volume is represented indirectly by the major and minor driveway categories. For example, the comparison between major and minor commercial driveways and major and minor industrial driveways for two-lane arterials in Table 43 indicates that, on the average, major driveways experience 5.3 times as many accidents as minor driveways. As explained in Chapter 3 of this report, the modeling approach used for driveway accidents constrained the value of the regression coefficients, c through i, to be not less than 1. In those cases where the accident data were too sparse for the model to converge, the value of the coefficient was set equal to 1.

The model shown in Table 43 for two-lane undivided arterials appears relatively good except for the coefficient for major residential driveways (*g*), which was not able to be fit due to scarcity of data. This coefficient was estimated as 5.3 times the coefficient for minor residential driveways, based on the average noted above.

The models for four-lane undivided and four-lane divided arterials in Table 43 appear to provide a reasonable representation of the effect of ADT on driveway accidents, but have some inconsistent coefficient values (e.g., accident frequencies for minor commercial driveways that are greater than those for major commercial driveways). A decision was reached to use the intercept and ADT coefficients derived from the data and to assume that the coefficients for individual driveway types were proportional to those for two-lane undivided arterials.

The driveway coefficients for four-lane divided highways are relatively low. Particularly for minor driveways, these probably represent driveways that are not opposite a median opening which, therefore, have right-in, right-out operation. No formal adjustment for the presence or absence of a median opening at a driveway on a divided highway has yet been developed, but this is being considered.

The models for three-lane arterials with center two-way left lanes, and especially for five-lane arterials with center two-way left-turn lanes, each fit the data poorly, had inconsistent coefficients, or both. It was decided that the available data were not sufficient to support models for these roadway type, so models were derived from those from the equivalent undivided facilities using an interim AMF of 0.65 for two-way left-turn lanes.

The coefficients of the models shown in Equation (31) have been modified as shown above and have been recast by multiplying coefficients *c* through *i* by coefficient *a* from Equation (31), and normalizing all of the coefficients to an ADT of 15,000 veh/day, which is close to the average ADT for all five roadway types. In this form, the coefficients N_j shown in

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TABLE 43. Initial models for driveway-related collisions based on Minnesota data

Road type	Total number of driveways	Regression coefficients for intercept, traffic volume, and specific driveway types									Over-dispersion parameter (k)
		Intercept (a)	ADT (b)	Major commercial (c)	Minor commercial (d)	Major industrial/ institutional (e)	Minor industrial/ institutional (f)	Major residential (g)	Minor residential (h)	Other (i)	
2U	1,193	0.0165	1.000	10.18	3.25	11.07	1.47	1.00	1.00	1.63	0.81
3T	651	0.0025	1.000	28.14	46.75	19.47	10.28	64.89	1.00	17.99	1.10
4U	1,442	0.0123	1.172	3.56	4.21	22.35	1.77	2.43	1.00	0.00	0.81
4D	236	0.0033	1.106	7.45	8.88	1.00	1.00	1.00	1.00	1.00	1.39
5T	103	0.0165	2.053	4.48	1.00	1.00	1.00	1.00	1.00	1.00	0.10

NOTE: Models are in the form shown in Equation (31). Coefficients c through g and i are expressed in a form proportional to coefficient h. Thus, a coefficient value of 1.0 means the accident frequency for the driveway type in question did not differ from the accident frequency for minor residential driveways.

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Table 44 each represent the average number of accidents per driveway per year for specific driveway types, an arterial of the specified type for an ADT of 15,000 veh/day. The normalization or centering to an ADT of 15,000 veh/day was done to facilitate comparisons between values of the driveway coefficients across roadway types. Equation (32) can be used to estimate the total driveway-related accident frequency per year for any specific mix of driveway types on a specific roadway type at any specific ADT level:

$$N_{brdwy} = \sum_{\text{all driveway types}} n_j \, N_j \left(\frac{ADT}{15{,}000} \right)^b \quad \textbf{(32)}$$

where:

n_j = number of driveways of type j within the roadway segment
N_j = base number of accidents per driveway per year for driveway type j from Table 44

The severity proportions shown in Table 44 can be used to subdivide N_{brdwy} into components for fatal-and-injury and property-damage-only accidents.

TABLE 44. Driveway factors for Minnesota roadway segments

	Roadway type				
Driveway type	Two-lane undivided	Three-lane with TWLTL	Four-lane undivided	Four-lane divided	Five-lane with TWLTL
Average annual accident frequency per driveway (N_j)					
Major commercial	0.252	0.164	0.202	0.053	0.131
Minor commercial	0.080	0.052	0.064	0.017	0.042
Major industrial/institutional	0.274	0.178	0.220	0.057	0.143
Minor industrial/institutional	0.036	0.024	0.029	0.008	0.019
Major residential	0.132	0.086	0.106	0.028	0.069
Minor residential	0.025	0.016	0.020	0.005	0.013
Other	0.040	0.026	0.032	0.008	0.021
ADT coefficient (b)					
All driveways	1.000	1.000	1.172	1.106	1.172
Proportion of fatal-and-injury accidents (f_{dwy})					
All driveways	0.323	0.243	0.342	0.284	0.269
Proportion of property-damage-only accidents					
All driveways	0.677	0.757	0.658	0.716	0.731

NOTE: Major driveways are those that serve sites with 50 or more parking spaces. Minor driveways are those that serve sites with less than 50 parking spaces.

Vehicle-Pedestrian Collisions

Table 45 presents adjustment factors for the average frequency of vehicle-pedestrian collisions on arterial roadway segments. The table includes values for Minnesota, Michigan, and both data sets combined. Accident counts for multiple-vehicle nondriveway collisions, single-vehicle collisions, and driveway-related collisions can be multiplied by the factor shown in Table 45 to reflect the average frequency of vehicle-pedestrian collisions on arterial roadway segments. The factors in Table 45 incorporate vehicle-pedestrian collisions, as well as any bicycle-pedestrian collisions that may have occurred.

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TABLE 45. Pedestrian safety adjustment factors for roadway segments in Minnesota and Michigan

Road type	Pedestrian safety adjustment factor (f_{pedr})		
	Minnesota	Michigan	Combined
2U	0.018	0.003	0.011
3T	0.017	0.001	0.009
4U	0.027	0.008	0.017
4D	0.012	0.006	0.009
5T	0.021	0.004	0.012

The pedestrian factors in Table 45 for Minnesota and Michigan differ substantially. This probably implies that the pedestrian volumes are greater on the roadway segments studied in Minnesota than in the area studied in Michigan, although there are no data available to demonstrate this. Table 46 suggests a combined table for use in the HSM methodology based on the assumption that the Minnesota data represent a mix of urban and suburban conditions, while the Michigan data are nearly entirely suburban.

Table 46 will eventually be replaced with a pedestrian safety prediction methodology which is under development in a newly-added portion of NCHRP Project 17-26.

TABLE 46. Pedestrian safety adjustment factors for urban and suburban areas

Road type	Pedestrian safety adjustment factor (f_{pedr})	
	Urban	Suburban
2U	0.033	0.003
3T	0.034	0.001
4U	0.045	0.008
4D	0.019	0.006
5T	0.039	0.004

NOTE: These factors apply to the methodology for predicting total accidents (all severity levels combined). All vehicle-pedestrian collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

Vehicle-Bicycle Collisions

Table 47 presents adjustment factors for the average frequency of vehicle-bicycle collisions on arterial roadway segments. The table includes values for Minnesota, Michigan, and both data sets combined. The factors shown in Table 47 are multiplied by the frequency of all other collision types, except vehicle-pedestrian collisions, to estimate the average frequency of vehicle-bicycle collisions.

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TABLE 47. Bicycle safety adjustment factors for roadway segments

Road type	Bicycle safety adjustment factor (f_{biker})		
	Minnesota	Michigan	Combined
2U	0.010	0.005	0.008
3T	0.014	0.002	0.008
4U	0.019	0.010	0.015
4D	0.011	0.011	0.011
5T	0.013	0.003	0.008

Analogous to the discussion of the pedestrian factors in Table 45, the bicycle factors in Table 47 differ substantially between Minnesota and Michigan. This may reflect more bicycling in Minnesota than in Michigan. Table 48 has been developed in a manner analogous to Table 46 on the assumption that the Minnesota data represent a mix of urban and suburban conditions, while the Michigan data are nearly entirely suburban.

Table 48 is intended for use in the HSM methodology for the first edition, as there is no work currently planned for a bicycle safety prediction methodology analogous to the pedestrian safety prediction methodology currently under development.

TABLE 48. Bicycle safety adjustment factors for roadway segments in urban and suburban areas

Road type	Bicycle safety adjustment factor (f_{biker})	
	Urban	Suburban
2U	0.015	0.005
3T	0.026	0.002
4U	0.029	0.010
4D	0.011	0.011
5T	0.023	0.003

NOTE: These factors apply to the methodology for predicting total accidents (all severity levels combined). All vehicle-bicycle collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

INTERSECTIONS

Base models and adjustment factors for intersections are presented for multiple-vehicle collisions, single-vehicle collisions, vehicle-pedestrian collisions, and vehicle-bicycle collisions. The four types of intersections considered are those identified in Chapter 4 of this report:

- three-leg intersections with STOP control on the minor-road approach (3ST)
- three-leg signalized intersections (3SG)
- four-leg intersections with STOP control on the minor-road approaches (4ST)
- four-leg signalized intersections (4SG)

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Multiple-Vehicle Collisions

Negative binomial regression models for multiple-vehicle collisions were developed in the form shown below:

$$N_{bimv} = \exp (a + b \ln ADT_{maj} + c \ln ADT_{min}) \quad \textbf{(33)}$$

where:

N_{bimv} = predicted number of multiple-vehicle collisions per year for nominal or base conditions
ADT_{maj} = average daily traffic volume (veh/day) for major road
ADT_{min} = average daily traffic volume (veh/day) for minor road
a, b, c = regression coefficients

No independent variables other than major- and minor-road traffic volume were statistically significant. The model coefficients are presented in Tables 49 and 50. Some models with significance levels that exceed 0.20 were used because no better model was available. Such cases are identified in the Notes column of each table.

TABLE 49. Initial models for multiple-vehicle collisions at Minnesota intersections

Intersection type	No. of sites	Regression coefficient (standard error) Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	Over-dispersion parameter (k)	R^2_{LR}	Notes
Total accidents							
3ST	40	–21.27 (5.05)	1.70 (0.42)	0.65 (0.28)	1.10	0.37	
3SG	36	–11.74 (2.79)	1.14 (0.25)	0.17 (0.12)	0.41	0.38	
4ST	48	–10.39 (2.09)	0.93 (0.17)	0.24 (0.15)	0.20	0.42	
4SG	67	–8.44 (2.08)	0.81 (0.22)	0.22 (0.08)	0.51	0.32	
Fatal-and-injury accidents							
3ST	40	–18.45 (5.34)	1.38 (0.44)	0.54 (0.30)	0.85	0.26	
3SG	36	–10.71 (2.74)	0.98 (0.25)	0.12 (0.12)	0.26	0.34	0.30[a]
4ST	48	–12.55 (2.68)	0.96 (0.22)	0.36 (0.19)	0.17	0.34	
4SG	67	–12.66 (2.20)	1.10 (0.23)	0.25 (0.08)	0.36	0.41	
Property-damage-only accidents							
3ST	40	–23.47 (6.11)	1.87 (0.52)	0.67 (0.31)	1.26	0.34	
3SG	36	–12.46 (3.04)	1.16 (0.28)	0.18 (0.13)	0.46	0.35	
4ST	48	–9.51 (2.51)	0.87 (0.21)	0.13 (0.19)	0.29	0.29	0.49[a]
4SG	67	–7.56 (2.14)	1.69 (0.23)	0.21 (0.09)	0.55	0.25	

[a] Minor-road ADT significance level.

NOTE: All models are in the form shown in Equation (33).

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TABLE 50. Initial models for multiple-vehicle collisions at North Carolina intersections

Intersection type	No. of sites	Regression coefficient (standard error) Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	Over-dispersion parameter (k)	R^2_{LR}	Notes
Total accidents							
3ST	47	–12.22 (1.54)	1.08 (0.14)	0.37 (0.14)	0.51	0.65	
3SG	42	–11.68 (3.67)	1.05 (0.32)	0.39 (0.24)	0.87	0.24	
4ST	48	–7.95 (1.49)	0.76 (0.15)	0.26 (0.13)	0.66	0.40	
4SG	44	–13.69 (2.64)	1.38 (0.28)	0.28 (0.17)	0.69	0.44	
Fatal-and-injury accidents							
3ST	47	–13.11 (2.09)	1.18 (0.19)	0.22 (0.16)	0.55	0.54	
3SG	42	–10.60 (3.33)	0.99 (0.29)	0.21 (0.22)	0.67	0.22	0.35[a]
4ST	48	–10.23 (2.00)	0.90 (0.21)	0.25 (0.15)	0.79	0.36	
4SG	44	–13.04 (2.27)	1.33 (0.24)	0.15 (0.14)	0.46	0.46	0.29[a]
Property-damage-only accidents							
3ST	47	–14.45 (1.85)	1.15 (0.16)	0.50 (0.14)	0.47	0.64	
3SG	42	–13.40 (3.58)	1.10 (0.31)	0.49 (0.23)	0.77	0.28	
4ST	48	–8.07 (1.49)	0.71 (0.15)	0.26 (0.11)	0.51	0.41	
4SG	44	–14.87 (2.46)	1.39 (0.26)	0.36 (0.16)	0.60	0.50	

[a] Minor-road ADT significance level.

NOTE: All models are in the form shown in Equation (33); all intersections are located in Charlotte, NC.

Table 51 presents comparable models to Tables 49 and 50 for the Minnesota and North Carolina data combined. These models are in the same form as Equation (33), but were developed with a random state effect as explained in Chapter 3 of this report. Table 51 includes the magnitude of the variance for the state effect. These models are illustrated in Figures 17 through 19. The plots for all intersection types are based on an assumed value of 3,000 veh/day for minor-road traffic volume.

TABLE 51. Base models for multiple-vehicle collisions at intersections in Minnesota and North Carolina combined

Intersection Types	Number of Sites	Regression coefficient (standard error) Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	State variance	Over-dispersion parameter (k)	R_{LR}^2
Total accidents							
3ST	97	–13.39 1.81	1.11 0.16	0.41 0.13	0.57	0.80	0.46
3SG	78	–11.63 1.73	1.11 0.15	0.26 0.09	0.52	0.33	0.53
4ST	96	–8.97 1.26	0.82 0.11	0.25 0.09	0.37	0.40	0.53
4SG	111	–10.63 1.44	1.07 0.14	0.23 0.06	0.44	0.39	0.61
Fatal-and-injury accidents							
3ST	97	–14.04 2.15	1.16 0.18	0.30 0.14	0.67	0.69	0.40
3SG	78	–11.08 1.85	1.02 0.17	0.17 0.10	0.42	0.30	0.48
4ST	96	–11.20 1.66	0.93 0.15	0.28 0.10	0.53	0.48	0.43
4SG	111	–12.78 1.50	1.18 0.15	0.22 0.07	0.58	0.33	0.56
Property-damage-only accidents							
3ST	97	–15.41 2.04	1.20 0.18	0.51 0.14	0.44	0.77	0.30
3SG	78	–12.74 1.88	1.14 0.17	0.30 0.10	0.57	0.36	0.50
4ST	96	–8.81 1.33	0.77 0.12	0.23 0.09	0.28	0.40	0.43
4SG	111	–10.66 1.52	1.02 0.15	0.24 0.07	0.38	0.44	0.58

NOTE: All models are in the form shown in Equation (33).

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The values of R^2_{LR} for the models shown in Table 51 are relatively high, with the proportion in the variation in accident frequency explained by the models ranging from 0.30 to 0.61.

The severity distribution for multiple-vehicle intersection collisions is shown in Table 52 based on combined data for Minnesota and North Carolina.

TABLE 52. Severity distribution of multiple-vehicle collisions for intersections

Intersection type	No. of sites	Percentage of total accidents	
		Fatal and injury	Property damage only
Minnesota sites			
3ST	40	35.0	65.0
3SG	36	37.2	62.8
4ST	48	35.2	64.8
4SG	67	32.9	67.1
Michigan sites			
3ST	47	36.9	63.1
3SG	42	34.2	65.8
4ST	48	41.5	58.5
4SG	44	33.6	66.4
Combined sites			
3ST	87	36.0	64.0
3SG	78	35.7	64.3
4ST	96	38.4	61.6
4SG	111	33.3	66.7

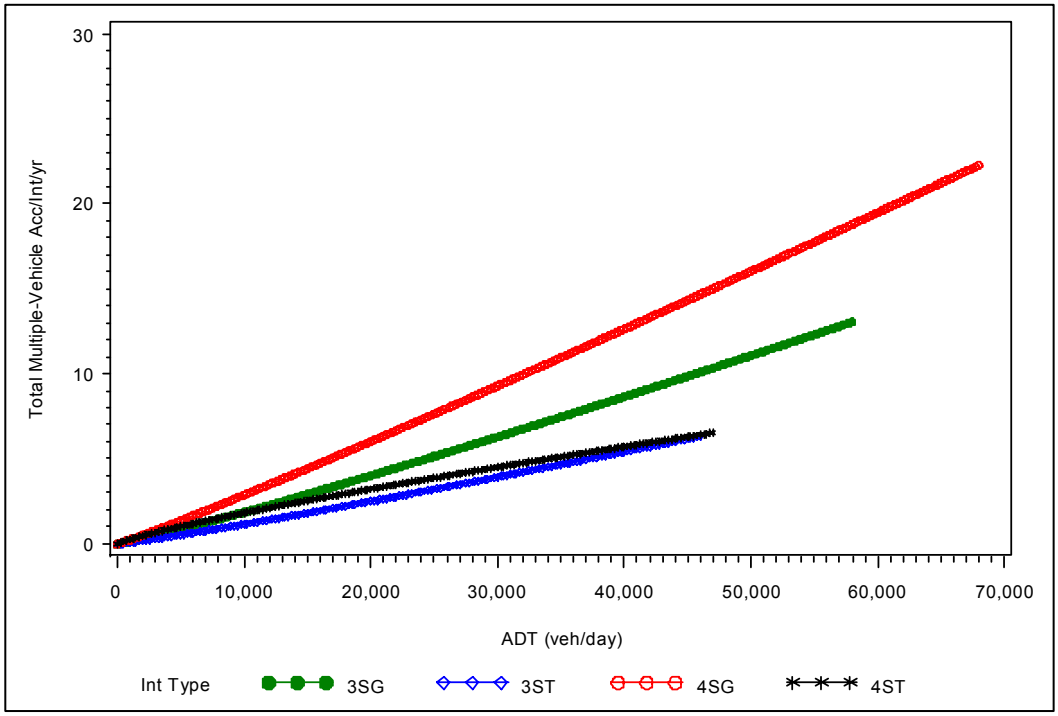

Figure 17. Plots for base models for total multiple-vehicle collisions at intersections by intersection type.

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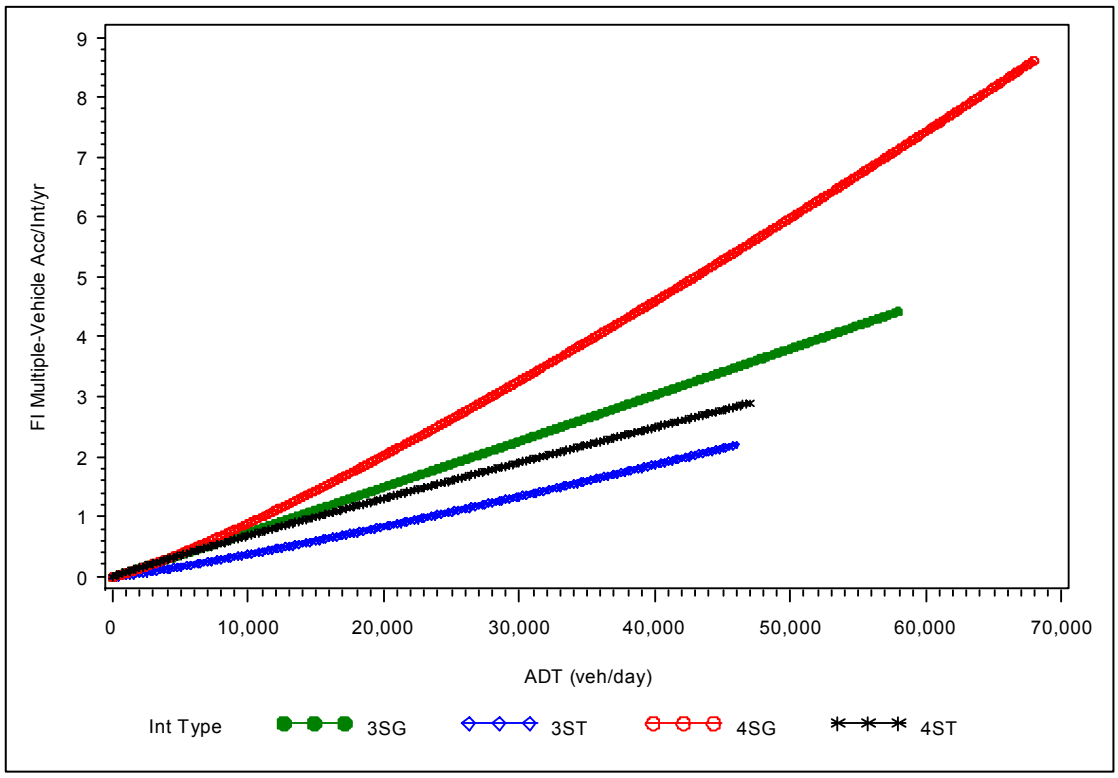

Figure 18. Plots for base models for fatal-and-injury multiple-vehicle collisions at intersections by intersection type.

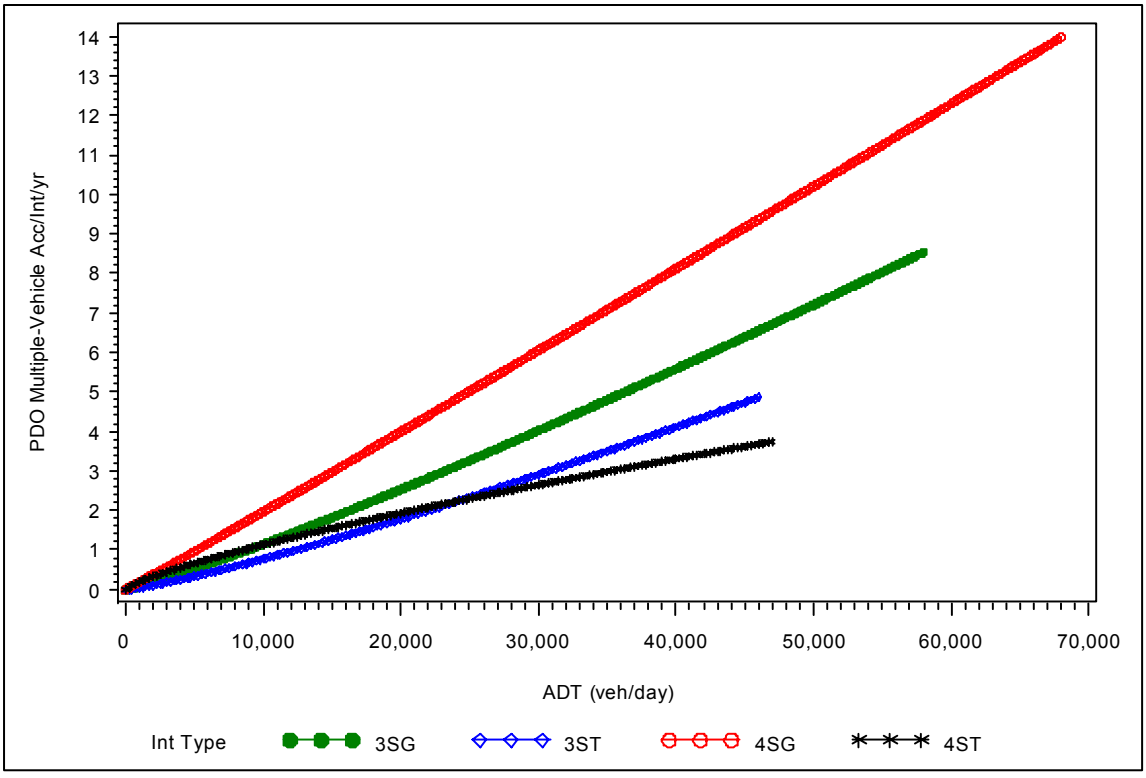

Figure 19. Plots for base models for property-damage-only multiple-vehicle collisions at intersections by intersection type.

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Single-Vehicle Collisions

Negative binomial regression models for single-vehicle collisions were initially developed in the form shown below:

$$N_{bisv} = \exp (a + b \ln ADT_{maj} + c \ln ADT_{min}) \quad \textbf{(34)}$$

where:

N_{bisv} = predicted number of single-vehicle collisions per year for nominal or base conditions
a,b,c = regression coefficients

No independent variables other than major- and minor-road traffic volume were statistically significant for single-vehicle collisions except for one model where intersection skew angle was statistically significant.

The model coefficients are presented in Tables 53 and 54 for Minnesota and North Carolina, respectively.

Table 55 presents comparable models to Tables 53 and 54 for the Minnesota and North Carolina data combined. These models are in the same form as Equation (34), but were developed with a random state effect as explained in Chapter 3 of this report. Table 55 includes the magnitude of the variance for the state effect. These models are illustrated in Figures 20 through 22. The plots for all intersection types are based on an assumed value of 3,000 veh/day for minor-road traffic volume.

Statistically significant models for single-vehicle collisions were found for all but one case. Where no formal model is available, single-vehicle collisions can be estimated by a multiplicative factor as a proportion of multiple-vehicle collisions, as follows:

$$N_{bisv} = N_{bimv} f_{isv} \quad \textbf{(35)}$$

where:

f_{isv} = factor for single-vehicle collisions at intersections as a proportion of multiple-vehicle collisions

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TABLE 53. Initial models for single-vehicle collisions at Minnesota intersections

Intersection type	No. of sites	Regression coefficient (standard error) Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	Over-dispersion parameter (k)	R^2_{LR}	Notes
Total accidents							
3ST	40						
3SG	36	–12.75 (4.00)	0.74 (0.37)	0.47 (0.19)	0.18	0.27	
4ST	48	–16.29 (4.03)	1.07 (0.34)	0.62 (0.26)	0.31	0.26	[a]
4SG	67	–8.34 (2.59)	0.46 (0.26)	0.35 (0.11)	0.30	0.22	
Fatal-and-injury accidents							
3ST	40						
3SG	36						
4ST	48	–18.26 (5.66)	1.18 (0.48)	0.60 (0.37)	0.15	0.21	[a]
4SG	67	–13.42 (4.00)	0.85 (0.41)	0.32 (0.18)	0.09	0.15	
Property-damage-only accidents							
3ST	40						
3SG	36	–12.51 (5.14)	0.89 (0.47)	0.21 (0.24)	0.42	0.12	0.36[b]
4ST	48	–14.94 (4.41)	0.92 (0.37)	0.56 (0.28)	0.14	0.16	
4SG	67	–7.07 (2.78)	0.31 (0.29)	0.33 (0.12)	0.28	0.17	0.27[c]

[a] Initial model contained a statistically significant effect of intersection skew angle; this base model incorporates the coefficient for a right-angle intersection.

[b] Minor-road ADT significance level if greater than 0.20.

[c] Major-road ADT significance level if greater than 0.20.

NOTE: All models are in the form shown in Equation (34).

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TABLE 54. Initial models for single-vehicle collisions at North Carolina intersections

Intersection type	No. of sites	Regression coefficient (standard error) Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	Over-dispersion parameter (k)	R^2_{LR}	Notes
Total accidents							
3ST	47	–6.11 (2.04)	0.21 (0.21)	0.40 (0.24)	1.11	0.12	0.31[a]
3SG	42	–6.89 (3.90)	0.28 (0.36)	0.40 (0.22)	0.53	0.09	0.43[a]
4ST	48						
4SG	44	–11.33 (2.07)	1.03 (0.21)	0.05 (0.12)	0.11	0.39	0.64[b]
Fatal-and-injury accidents							
3ST	47						
3SG	42	–8.93 (6.12)	0.45 (0.58)	0.26 (0.33)	0.64	0.03	0.44[a], 0.43[b]
4ST	48						
4SG	44	–6.65 (3.26)	0.30 (0.35)	0.18 (0.22)	0.03	0.05	0.38[a], 0.41[b]
Property-damage-only accidents							
3ST	47	–8.39 (2.33)	0.33 (0.22)	0.50 (0.23)	0.93	0.17	
3SG	42	–7.12 (4.16)	0.22 (0.37)	0.47 (0.25)	0.57	0.09	0.56[a]
4ST	48	–5.43 (2.16)	0.25 (0.22)	0.19 (0.17)	0.49	0.07	0.26[a], 0.28[b]
4SG	44	–14.29 (2.66)	1.32 (0.27)	0.03 (0.14)	0.21	0.39	0.85[b]

[a] Major-road ADT significance level if greater than 0.20.
[b] Minor-road ADT significance level if greater than 0.20.

NOTE: All models are in the form shown in Equation (34); all intersections are located in Charlotte, NC.

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TABLE 55. Base models for single-vehicle collisions at intersections in Minnesota and North Carolina combined

Intersection types	Number of sites	Regression coefficient (standard error) Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	State variance	Over-dispersion parameter (k)	R_{LR}^2	Notes
Total accidents								
3ST	97	–6.84 (2.07)	0.16 (0.19)	0.51 (0.18)	0.30	1.14	0.16	0.40[a]
3SG	78	–8.52 (2.59)	0.42 (0.24)	0.40 (0.15)	0.20	0.36	0.15	
4ST	96	–5.40 (1.82)	0.33 (0.17)	0.12 (0.14)	0.02	0.65		0.41[b]
4SG	111	–9.85 (1.85)	0.68 (0.19)	0.27 (0.08)	< 0.01	0.36		
Fatal-and-injury accidents								
3ST	97							
3SG	78	–9.25 (3.81)	0.27 (0.36)	0.51 (0.22)	< 0.01	0.24		0.46[a]
4ST	96							
4SG	111	–8.89 (2.62)	0.43 (0.27)	0.29 (0.13)	< 0.01	0.09		
Property-damage-only accidents								
3ST	97	–8.39 (2.45)	0.25 (0.22)	0.55 (0.20)	0.30	1.29		0.27[a]
3SG	78	–8.58 (3.10)	0.45 (0.29)	0.33 (0.17)	0.32	0.53	0.09	
4ST	96	–7.11 (2.17)	0.36 (0.20)	0.25 (0.15)	0.03	0.54		
4SG	111	–10.98 (2.11)	0.78 (0.22)	0.25 (0.10)	< 0.01	0.44		

[a] Major-road ADT significance level if greater than 0.20.
[b] Minor-road ADT significance level if greater than 0.20.

NOTE: All models are in the form shown in Equation (34).

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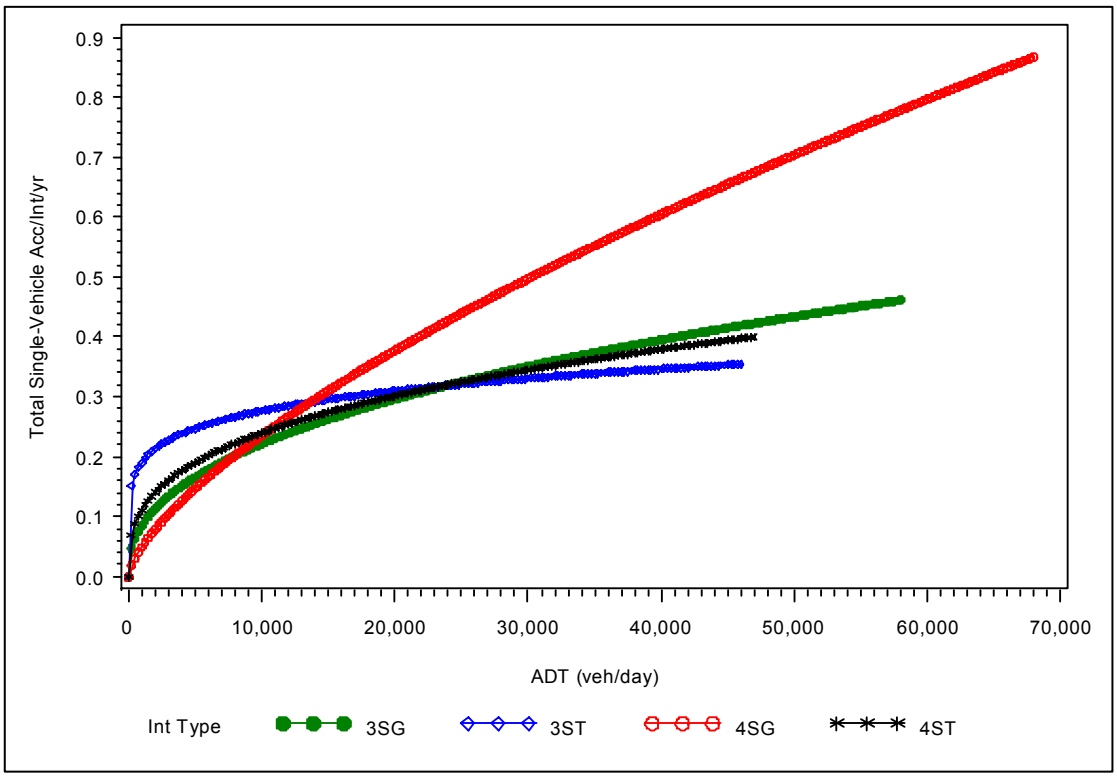

Figure 20. Plots for base models for total single-vehicle collisions at intersections by intersection type.

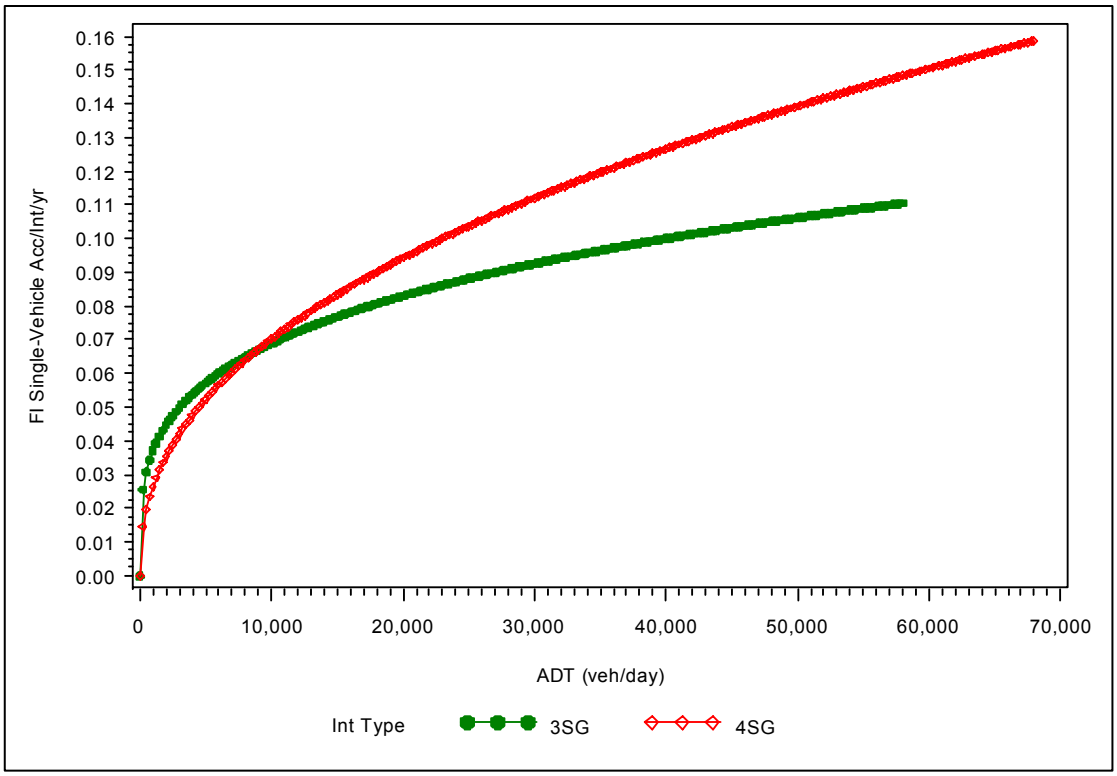

Figure 21. Plots for base models for fatal-and-injury single-vehicle collisions at intersections by intersection type.

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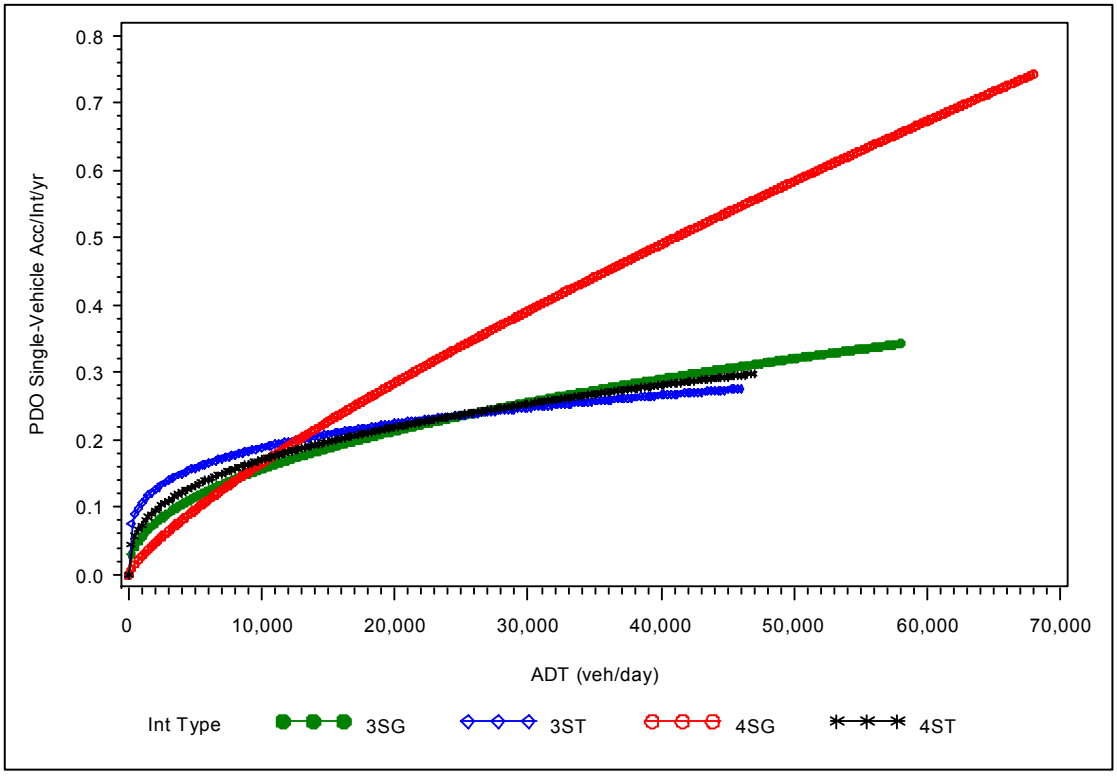

Figure 22. Plots for base models for property-damage-only single-vehicle collisions at intersections by intersection type.

Table 56 presents values of f_{isv} that can be applied where no model for single-vehicle collisions is available. The values of f_{isv} in Table 56 are smaller than the values of f_{rsv} in Table 41, so the use of tabulated factors appears even more appropriate for intersections than for roadway segments. This approach is definitely needed for fatal and injury accidents at three- and four-leg stop-controlled intersections, because no models were obtained for these cases in Table 55.

TABLE 56. Single-vehicle collision factors for intersections

Intersection type	Single-vehicle accident factor (f_{isv})		
	Minnesota	North Carolina	Combined
Total accidents			
3ST	0.12	0.12	0.12
3SG	0.07	0.05	0.06
4ST	0.14	0.08	0.11
4SG	0.09	0.04	0.07
Fatal-and-injury accidents			
3ST	0.13	0.10	0.12
3SG	0.07	0.04	0.06
4ST	0.16	0.07	0.12
4SG	0.07	0.03	0.05
Property-damage-only accidents			
3ST	0.12	0.13	0.13
3SG	0.08	0.06	0.07
4ST	0.12	0.09	0.11
4SG	0.10	0.04	0.07

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The severity distribution for single-vehicle collisions at intersections is presented in Table 57.

TABLE 57. Severity distribution of single-vehicle collisions for intersections

Intersection type	No. of sites	Percentage of total accidents	
		Fatal and injury	Property damage only
Minnesota sites			
3ST	40	36.8	63.2
3SG	36	39.1	60.9
4ST	48	42.0	58.0
4SG	67	24.8	75.2
Michigan sites			
3ST	47	30.4	69.6
3SG	42	22.7	77.3
4ST	48	36.5	63.5
4SG	44	24.1	75.9
Combined sites			
3ST	87	33.6	66.4
3SG	78	30.9	69.1
4ST	96	39.2	60.8
4SG	111	24.4	75.6

Vehicle-Pedestrian Collisions

Table 58 presents adjustment factors for the average frequency of vehicle-pedestrian collisions at arterial intersections. The table includes values for Minnesota, North Carolina, and both data sets combined. The accident counts reflect the average frequency of vehicle-pedestrian collisions at intersections. The factors in Table 58 incorporate vehicle-pedestrian collisions and any bicycle-pedestrian collisions that occur. Both the Minnesota and North Carolina data represent a mix of urban and suburban conditions. It is recommended that the combined column shown in Table 58 be used in the initial HSM methodology for both urban and suburban conditions.

Table 58 will eventually be replaced with a pedestrian safety prediction methodology which is just beginning development in a newly-added portion of NCHRP Project 17-26.

TABLE 58. Pedestrian safety adjustment factors for intersections

Intersection type	Pedestrian safety adjustment factor (f_{pedi})		
	Minnesota	North Carolina	Combined
3ST	0.006	0.009	0.008
3SG	0.003	0.006	0.005
4ST	0.027	0.005	0.016
4SG	0.023	0.011	0.017

NOTE: These factors apply to the methodology for predicting total accidents (all severity levels combined). All vehicle-pedestrian collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

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Vehicle-Bicycle Collisions

Table 59 presents adjustment factors for the average frequency of vehicle-bicycle collisions at arterial intersections. The table includes values for Minnesota, North Carolina, and both data sets combined. The factor shown in Table 59 is multiplied by the frequency of all other accident types to estimate the average frequency of vehicle-bicycle collisions.

The values of f_{pedi} and f_{bikei} have been determined consistently so that, together, they account for the average frequency of vehicle-pedestrian and vehicle-bicycle collisions on arterial intersections of various types. Both the Minnesota and North Carolina data represent a mix of urban and suburban conditions. It is recommended that the combined column shown in Table 59 be used in the HSM methodology for both urban and suburban conditions.

Table 59 is intended for use in HSM methodology, as there is no current plan for a bicycle safety prediction methodology analogous to the pedestrian safety prediction methodology currently under development.

TABLE 59. Bicycle safety adjustment factor for intersections

Intersection type	Bicycle safety adjustment factor (f_{bikei})		
	Minnesota	North Carolina	Combined
3ST	0.006	0.001	0.004
3SG	0.015	0.004	0.010
4ST	0.010	0.002	0.006
4SG	0.021	0.004	0.013

NOTE: These factors apply to the methodology for predicting total accidents (all severity levels combined). All vehicle-bicycle collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

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CHAPTER 6.

ACCIDENT MODIFICATION FACTORS

This chapter presents the accident modification factors (AMFs) developed for use in the HSM methodology for urban and suburban arterials and explains the derivation of these AMFs.

The AMFs for use in the HSM methodology were chosen by an expert panel convened jointly by the research team for the current project and NCHRP Project 17-25, *Crash Reduction Factors for Traffic Engineering and ITS Improvements*. The expert panel included members of both research teams and other invited researchers and practitioners. The members of the expert panel included:

- James Bonneson, Texas Transportation Institute
- Forest M. Council, BMI-SG/VHB
- Kim Eccles, BMI-SG/VHB
- David Harkey, Highway Safety Research Center, University of North Carolina
- Douglas W. Harwood, Midwest Research Institute
- Ezra Hauer, Consultant
- Bhagwant Persaud, Ryerson University
- Stan Polanis, City of Winston-Salem, North Carolina
- Ragahavan Srinivasan, Highway Safety Research, University of North Carolina
- Thomas Welch, Iowa Department of Transportation

The expert panel assessed the literature for a broad range of design and traffic control elements for urban and suburban arterials and made recommendations concerning:

- which design and traffic control elements have safety effects that are sufficiently well understood to be used as AMFs in the HSM methodology
- for those design and traffic control elements whose safety effects are well understood, which sources in the literature best document those safety effects, and form the basis for a reliable AMF

The process used by the expert panel to assess AMFs was as follows:

- a comprehensive search and review of literature related to potential AMFs was conducted.
- a notebook containing extracts from all relevant literature was assembled and was reviewed by individual expert panel members.
- the expert panel was convened and each AMF and each study related to that AMF were reviewed and discussed

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- Based on the review and discussion at the meeting, the expert panel reached consensus and selected one or more studies as providing the most credible AMF, which was recommended for potential use in the HSM. Criteria considered by the expert panel in assessing studies as potential sources of AMFs included quality of documentation; sample size; study design, including compensation for regression to the mean; and standard error or goodness of fit.

In some cases, further analyses were conducted by the research team to further develop the expert panel's selection of AMFs.

The recommended AMFs for roadway segments and intersections are presented below.

ROADWAY SEGMENTS

Recommended AMFs for roadway segments presented below include:

- on-street parking
- roadside fixed objects
- lighting

It was originally intended to include an AMF for median width on arterial roadway segments based on the results of Kniuman et al. (*128*) and Hadi (*13*). However, on further consideration of this issue, the research team decided that a satisfactory AMF could not be developed for median width on roadway segments.

The AMFs for roadway segments are presented below.

On-Street Parking (AMF_{1r})

An AMF for on-street parking was developed from recent work by Bonneson (*129*) for TexDOT. Bonneson formulated an AMF for on-street parking as follows:

$$AMF_{1r} = 1 + p_{pk} \, (f_{pk} - 1) \quad \textbf{(36)}$$

$$f_{pk} = (1.10 + 0.365 \, I_{cs} + 0.609 \, p_{b/0}) \, [(f_{ap/pp} - 1.0) \, p_{ap} + 1.0] \quad \textbf{(37)}$$

where:

AMF_{1r}	=	accident modification factor for on-street parking
p_{pk}	=	proportion of curb length with on-street parking (= 0.5 L_{pk}/L)
L_{pk}	=	curb length with on-street parking (mi)
L	=	roadway segment length (mi)
I_{cs}	=	indicator variable for cross-section (= 1 for two-lane street; 0 otherwise)

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$P_{b/0}$ = for that part of the street with parking, the proportion that has business or office as adjacent land use
$f_{ap/pp}$ = ratio of crashes on streets with angle parking to crashes on streets with parallel parking
P_{ap} = for that part of the street with parking, the proportion with angle parking

Bonneson has derived the value of 2.34 for $f_{ap/pp}$.

Based on Equation (37), Table 60 presents computed values for f_{pk} for various types of sites. The values of f_{pk} can be used in Equation (36) to determine an AMF value for on-street parking. The value of p_{pk} in Equation (36) represents the proportion of curb length with on-street parking; since on-street parking may be permitted on one or both sides of the street, the maximum length of curb parking (L_{pk}) used in determining P_{pk} for any site is twice the roadway segment length (L). Table 60 shows the AMF value that would apply if on-street parking were permitted on both sides of the street throughout a site (i.e., $P_{pk} = 1.0$).

Roadside Fixed Objects (AMF_{2r})

The expert panel decided that the best source of information on the safety effects of roadside obstacles was the model for prediction of utility pole accidents developed by Zegeer and Cynecki (*130*). The Zegeer and Cynecki model for utility pole accidents is:

$$N_{fo} = \frac{9.84 \times 10^{-5}\ ADT + 0.0354\ D_{fo}}{O_{fo}^{0.6}} - 0.04 \qquad \textbf{(38)}$$

where:

N_{fo} = predicted number of fixed object accidents per mi per year
ADT = average daily traffic volume (veh/day)
D_{fo} = fixed object density (objects/mi)
O_{fo} = fixed object offset (distance from edge of traveled way to objects) (ft)

The expert panel decided that the safety effect of utility poles in the Zegeer and Cynecki model could be used, as well, to represent the safety effect of other roadside fixed objects with the same density and offset.

The dashed lines in Figure 23 illustrate the relationships between fixed objects accidents and fixed object density represented by the Zegeer and Cynecki model. The figure shows one concern with the Zegeer and Cynecki model that is potentially inconsistent with theory. The dashed lines in the figure show a non-zero y-intercept, such that a non-zero number of fixed object accidents is predicted even when the fixed object density is zero. A further consideration is that there should be a theoretical upper limit on fixed object density at which the fixed objects are so close together that they no longer have independent effects on safety. In other words, if two fixed objects are very close together, they might be better counted as one fixed object rather than two.

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TABLE 60. Determination of the accident modification factor for on-street parking for specific types of roadway segments

Roadway cross section	Land use	Type of parking	I_{cs}	$P_{b/0}$	$f_{ap/pp}$	P_{ap}	f_{pk} [a]	P_{pk}	AMF_{1r} [b]
Multilane	Residential	Parallel	0	0.0	2.34	0.0	1.100	1.0	1.00
	Commercial/industrial	Parallel	0	1.0	2.34	0.0	1.709	1.0	1.709
Two-lane	Residential	Parallel	1	0.0	2.34	0.0	1.465	1.0	1.465
	Commercial/industrial	Parallel	1	1.0	2.34	0.0	2.074	1.0	2.074
Multilane	Residential	Angle	0	0.0	2.34	1.0	2.574	1.0	2.574
	Commercial/industrial	Angle	0	1.0	2.34	1.0	3.999	1.0	3.999
Two-lane	Residential	Angle	1	0.0	2.34	1.0	3.428	1.0	3.428
	Commercial/industrial	Angle	1	1.0	2.34	1.0	4.853	1.0	4.853

[a] Determined with Equation (37).
[b] Determined with Equation (36).

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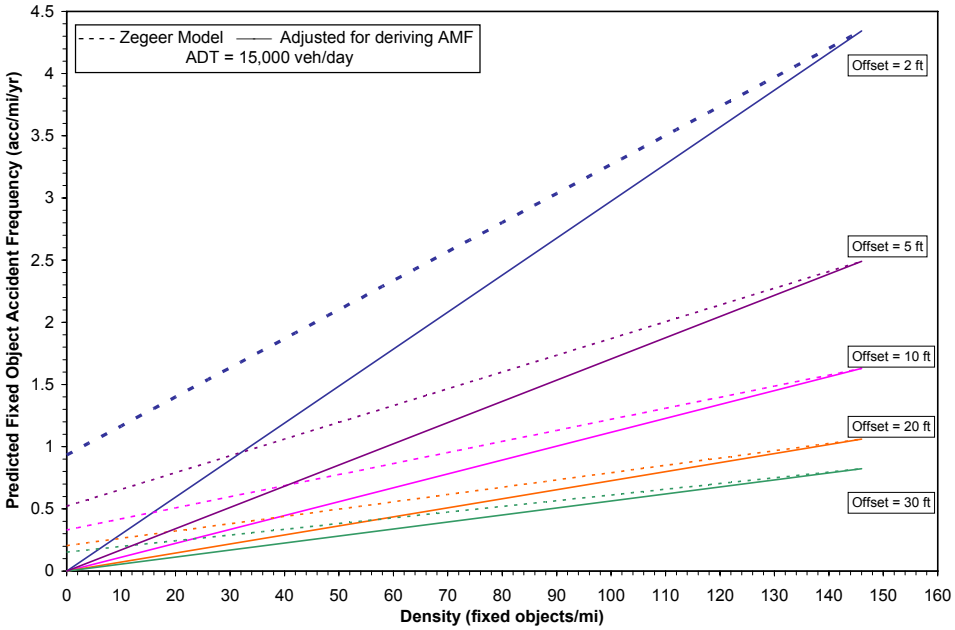

Figure 23. Relationships of fixed-object collisions to fixed-object density and offset [adapted from Zegeer and Cynecki (130)].

The maximum utility pole density for any site in the Zegeer and Cynecki study is 90.7 objects/km (146 objects/mi) for both sides of the road combined, which corresponds to an average spacing between objects of 22 m (72 ft); it would not seem appropriate to assume any closer object spacing in applying the Zegeer and Cynecki results. The points at the right end of each line in Figure 23 represents this maximum value of fixed object density. The dashed lines in Figure 23 are based on the Zegeer and Cynecki model. The dashed lines have nonzero values for the y-intercept. It would be more consistent with theory for the lines in the figure to pass through the origin than through a nonzero intercept. The solid lines in Figure 23 show this more consistent relationship which has been used in developing the AMF.

An AMF for fixed object density and offset can be represented as the ratio of the predicted fixed object accidents for the actual fixed object density and offset on a roadway segment to the predicted fixed object collisions for a typical average fixed object density for urban roads (24.8 fixed objects/km or 40 fixed objects/mi) and a typical average offset for fixed objects on urban roads (1.5 m or 5 ft). Ignoring the 0.04 term in Equation (38), which makes a minimal contribution to the estimate, this AMF can be represented by:

$$AMF_{2r} = \frac{\left((9.84 \times 10^{-5}\ ADT + 0.0354\ (105.6) / O_{fo}^{0.6}\right)\left(\frac{D_{fo}}{105.6}\right)}{\left((9.84 \times 10^{-5}\ ADT + 0.0354\ (105.6) / 5^{0.6}\right)\left(\frac{40}{105.6}\right)} \quad \textbf{(39)}$$

The ADT term in Equation (39) has very little influence on the value of AMF_{2r}. All of Equation (34) except the D_{fo} term can be reduced to a factor (f_{offset}) that is a factor of fixed object offset alone (see Table 61). The AMF as shown in Equation (39) applies to fixed-object

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accidents, which constitute the proportion of total accidents (excluding vehicle-pedestrian and vehicle-bicycle collisions) shown in Table 62. Thus, the AMF for roadside fixed objects for application in the HSM methodology can be represented as:

$$AMF_{2r} = f_{offset}\, D_{fo}\, p_{fo} + (1 - p_{fo}) \quad \textbf{(40)}$$

where:

f_{offset} = fixed-object offset factor from Table 61
p_{fo} = fixed-object collisions as a proportion of total accidents from Table 62

TABLE 61. Fixed-object offset factor (f_{offset})

Offset to fixed objects (O_{fo}) (ft)	Fixed-object offset factor (f_{offset})
2	0.232
5	0.133
10	0.087
15	0.068
20	0.057
25	0.049
30	0.044

TABLE 62. Proportion of fixed-object collisions (p_{fo})

Road type	Proportion of fixed-object collisions (p_{fo})
2U	0.059
3T	0.034
4U	0.037
4D	0.036
5T	0.016

In estimating the density of fixed objects, point objects that are within 22 m (72 ft) of one another longitudinally along the road should be counted as a single object. Continuous objects that are not behind point objects should be counted as one point object for each 22 m (72 ft) of length. Only point or continuous objects within the offset distance used to derive the value of f_{offset} should be used in determining D_{fo} and only objects of 100 mm (4 in) or more in diameter and are not of breakaway design should be counted.

Lighting (AMF_{3r})

The AMF for lighting is derived from the work of Elvik and Vaa (*131*) who combined the results of 38 international studies through meta analysis and found the following accident reductions for lighting of roadway segments that had not previously been lighted:

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Accident severity level	Best estimate of nighttime accident reduction
Fatal	64%
Injury	28%
Property-damage-only	17%

Table 63 illustrates the derivation of an AMF for total accidents based on these estimates using crash distribution data for Minnesota and Michigan combined. The AMFs for the individual road types are so similar that a single combined AMF of 0.96 for all road types seems appropriate. In other words, installation of lighting appears to reduce roadway segment accidents by approximately 4 percent.

TABLE 63. Example of computing the AMF for lighting of roadway segments

Road type	AMF by accident severity level[a]			Proportion of total nighttime accidents[b]			AMF for nighttime accidents[c]	Proportion of accidents that occur at night[b]	AMF for total accidents (AMF_{3r})
	Fatal	Injury	PDO	Fatal	Injury	PDO			
2U	0.360	0.720	0.830	0.008	0.240	0.750	0.798	0.266	0.946
3T	0.360	0.720	0.830	0.030	0.300	0.670	0.783	0.279	0.939
4U	0.360	0.720	0.830	0.001	0.290	0.709	0.797	0.230	0.953
4D	0.360	0.720	0.830	0.001	0.290	0.709	0.797	0.204	0.959
5T	0.360	0.720	0.830	0.001	0.273	0.726	0.800	0.391	0.922

[a] Based on Elvik and Vaa (*131*).
[b] Based on combined data for unlighted roadway segments in Minnesota and Michigan.
[c] Weighted average of Elvik and Vaa estimates for all severity levels combined.

Because the crash distribution estimates shown in Table 63 may vary among jurisdictions, it is recommended that, whenever possible, the lighting AMF should be computed explicitly for each jurisdiction that applies the HSM. The lighting AMF can be computed as:

$$AMF_{3r} = 1 - \left[(1 - 0.36\,p_{fnr} - 0.72\,p_{inr} - 0.83\,p_{nr})\;p_{nr}\right] \quad \textbf{(41)}$$

where:

p_{fnr} = proportion of total nighttime accidents for unlighted roadway segments that involve a fatality
p_{inr} = proportion of total nighttime accidents for unlighted roadway segments that involve only a nonfatal injury
p_{pnr} = proportion of total nighttime accidents for unlighted roadway segments that involve property damage only
p_{nr} = proportion of total accidents for unlighted roadway segments that occur at night

When estimates of p_{fnr}, p_{inr}, p_{pnr}, and p_{nr} are not available for a jurisdiction, then the values presented in Table 63 should be used as defaults.

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INTERSECTIONS

Recommended AMFs for intersections presented below include:

- left-turn lanes
- left-turn signal phasing
- right-turn lanes
- right turn on red
- lighting

The expert panel recommended the inclusion of all of these AMFs. The inclusion of an AMF for red-light cameras was designated as optional. The research team decided to include this AMF based on comments from the TRB Task Force.

The AMFs for intersections are presented below.

Left-Turn Lanes (AMF_{1i})

AMFs for left-turn lanes at intersections are based on the work of Harwood et al. (*81*). The values of the recommended AMFs have been presented earlier in Table 4. These AMFs apply to left-turn lanes installed on major-road intersection approaches. The AMF for left-turn lanes does not include consideration of left-turn lane length. The safety effect of left-turn lane lengths has not been documented and, in any case, is probably dependent on hourly or shorter-term traffic volumes which are not likely to be available, in most cases.

Left-Turn Signal Phasing (AMF_{2i})

The expert panel decided to adopt the AMFs derived by Hauer (*132*) with adjustments to the AMFs for the converting permissive to protected/permissive phasing and converting protected/permissive to protected phasing based on the findings of Lyon et al. (*133*). Table 64 presents the recommended AMFs. These AMFs are applicable only to signalized intersections. It should be noted that the research indicated no difference in safety between protected/permissive or permissive/protected operation.

Right-Turn Lanes (AMF_{3i})

AMFs for right-turn lanes are based on the work of Harwood et al. (*81*). The values recommended have been presented earlier in Table 7. These AMFs apply to right-turn lanes installed on major-road intersection approaches.

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TABLE 64. AMFs for left-turn signal phasing

Original left-turn phasing	Modified left-turn phasing	Accident type	AMF for specific accident type	Proportion of specified accident type	AMF for total accidents (AMF_{2i})
Permissive	Protected	Left turn	0.30[a]	0.09	0.937
		Other	1.00[b]	0.91	
Permissive	Protective/ permissive or permissive/ protected	Left turn	0.84	0.09	0.986
		Other	1.00[b]	0.91	
Protected/ permissive or permissive/ protected	Protected	Left turn	0.36	0.09	0.942
		Other	1.00[b]	0.91	
Lagging	Leading	Left turn	1.00	0.09	1.000

[a] Most likely depends on number of opposing lanes.
[b] Insufficient and contradictory evidence.

Right Turn on Red (AMF_{4i})

The AMF for prohibiting right-turn-on-red (RTOR) operation at signals is based on the work of Clark (*134*). The Clark study was reviewed by Bahar et al. (*135*) in the interim report of NCHRP Project 17-27. Bahar et al. noted that Clark's results can be expressed as AMFs of 1.13 for South Carolina data and 1.05 for Alabama data for permitting RTOR, with a combined AMF of 1.067. If RTOR is permitted on a single approach to a four-leg signalized intersection, the AMF would be $1.067^{0.25}$, or 1.016. This AMF applies to total intersection accidents.

In the HSM methodology, it is more useful to present an AMF for prohibiting RTOR, since permitting RTOR is the default condition under existing state laws. The AMF for prohibiting RTOR on a single approach to a signalized intersection would be 1/1.064 = 0.984. Since RTOR may be prohibited for several approaches to a given intersection, the AMF can be expressed as:

$$AMF_{4i} = (0.984)^{nprohib} \quad \textbf{(42)}$$

where:

n^{prohib} = number of signalized intersection approaches for which RTOR is prohibited

Since AMF_{4i} is applied in the HSM methodology to intersection accidents excluding vehicle-pedestrian and vehicle-bicycle collisions, the expert panel recommended that the AMF in Equation (42) be reviewed to determine whether part of the safety benefit included was a reduction in vehicle-pedestrian collisions that should be considered not in this AMF, but in the pedestrian safety prediction methodology currently under development. It was found that a

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portion of the safety benefit represented by Equation (42) was due to reduction of collisions between right-turning vehicles and pedestrians, but that the proportion was so small that the value 0.984 did not change (i.e., the effect was in the fourth significant digit). Therefore, Equation (42) was not changed.

Lighting (AMF_{5i})

The AMF for intersection lighting is derived from the work of Elvik and Vaa (*131*) for roadway segments, discussed above. The expert panel decided that the effectiveness measures for roadway segments were the best available information to apply to intersections. Table 65 illustrates the derivation of the AMF for intersection lighting using crash distribution data for Minnesota and North Carolina combined.

Because the crash distribution estimates shown in Table 65 may vary among jurisdictions, it is recommended that, whenever possible, the lighting AMF should be computed explicitly for each jurisdiction that applies the HSM. The lighting AMF can be computed as:

$$AMF_{5i} = 1 - [(1 - 0.36\,p_{fni} - 0.72\,p_{ini} - 0.83\,p_{pni})\,p_{ni}] \quad \textbf{(43)}$$

where:

- p_{fni} = proportion of total nighttime accidents for unlighted intersections that involve a fatality
- p_{ini} = proportion of total nighttime accidents for unlighted intersections that involve only a nonfatal injury
- p_{pni} = proportion of total nighttime accidents for unlighted intersections that involve property damage only
- p_{ni} = proportion of total accidents for unlighted intersections that occur at night

When estimates of p_{fni}, p_{ini}, p_{pni}, and p_{ni} are not available for a jurisdiction, then the values presented in Table 65 should be used as defaults.

TABLE 65. Example of computing the AMF for lighting of intersections

Intersection type	AMF by accident severity level[a]			Proportion of total nighttime accidents[b]			AMF for nighttime accidents[c]	Proportion of accidents that occur at night[b]	AMF for total accidents (AMF_{5i})
	Fatal	Injury	PDO	Fatal	Injury	PDO			
3ST	0.360	0.720	0.830	0.001	0.334	0.665	0.793	0.192	0.960
3SG	0.360	0.720	0.830	0.001	0.393	0.606	0.786	0.206	0.956
4ST	0.360	0.720	0.830	0.040	0.360	0.600	0.772	0.191	0.956
4SG	0.360	0.720	0.830	0.003	0.328	0.670	0.793	0.200	0.959

[a] Based on Elvik and Vaa (*131*) findings for roadway segments.
[b] Based on combined data for unlighted intersections in Minnesota and North Carolina.
[c] Weighted average of Elvik and Vaa estimates for all severity levels combined.

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CHAPTER 7.

SUMMARY OF HSM METHODOLOGY

This chapter summarizes the HSM methodology for urban and suburban arterials by putting together the building blocks of the methodology whose development was documented in Chapters 5 and 6. The methodology presented here is summarized in the draft version of HSM Chapter 10 presented in Appendix B of this report.

OVERALL STRUCTURE OF METHODOLOGY

The overall structure of the methodology is to make safety predictions for individual arterial roadway segments and intersections and to combine these predictions in the following manner across all roadway segments and intersections that make up an arterial road section or project of interest:

$$N_t = \sum_{\text{all segments}} N_{rs} + \sum_{\text{all intersections}} N_{int} \quad \textbf{(44)}$$

where:

N_t = predicted accident frequency for an entire project or an extended highway section;
N_{rs} = predicted number of total roadway segment accidents per year;
N_{int} = predicted number of total intersection-related accidents per year

DEFINITION OF ROADWAY SEGMENTS AND INTERSECTIONS

Roadway segments and intersections are defined in a manner similar to the prototype chapter for two-lane highways.

Roadway segment models are used to predict all accidents that occur on portions of roadway segments that are more than 76 m (250 ft) from an intersection and nonintersection-related accidents that occur on portions of roadway segments that are within 76 m (250 ft) of an intersection. Each roadway segment should be generally homogeneous with respect to:

- Average daily traffic volume (veh/day)
- Number of through lanes
- Presence/type of median
- Presence/type of on-street parking
- Roadside fixed object density

Also, a new roadway segment should start at any of the following locations:

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- Intersection (use center of intersection as segment boundary)
- Beginning or end of a horizontal curve

Intersection models are used to predict all intersection-related accidents that occur within 76 m (250 ft) of a particular intersection.

ROADWAY SEGMENT METHODOLOGY

General Form of Roadway Segment Methodology

Safety predictions for a particular roadway segment will be developed as a combination of base models, calibration factors, and accident modification factors (AMFs) using the following general approach:

$$N_{rs} = (N_{br} + N_{pedr} + N_{biker})\, C_r \quad \textbf{(45)}$$

$$N_{br} = N_{brbase}\, (AMF_{1r}\, AMF_{2r}\, AMF_{3r}) \quad \textbf{(46)}$$

where:

N_{rs}	=	predicted number of total roadway segment accidents per year
N_{br}	=	predicted number of roadway segment accidents per year excluding vehicle-pedestrian and vehicle-bicycle collisions
N_{brbase}	=	predicted number of total roadway segment accidents per year for nominal or base conditions excluding vehicle-pedestrian and vehicle-bicycle collisions
N_{pedr}	=	predicted number of vehicle-pedestrian collisions per year
N_{biker}	=	predicted number of vehicle-bicycle collisions per year
$AMF_{1r} \ldots AMF_{3r}$	=	accident modification factors for roadway segments
C_r	=	calibration factor for roadway segments developed for use for a particular geographical area [see Equation (59)]

Types of Roadway Segments Considered

The safety prediction methodology addresses five types of roadway segments:

- Two-lane undivided arterials (2U)
- Three-lane arterials including a center TWLTL (3T)
- Four-lane undivided arterials (4U)
- Four-lane divided arterials (i.e., including a raised or depressed median) (4D)
- Five-lane arterials including a center TWLTL (5T)

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The procedures for four-lane arterials may also be applied to six-lane arterials. A review of literature by an expert panel for NCHRP Projects 17-25 and 17-26 did not find any indication of safety differences between four- and six-lane arterials.

Base Models and Adjustment Factors for Roadway Segments (N_{brmv}, N_{brsv}, N_{brdwy}, N_{pedr}, and N_{biker})

Base models are used for roadway segments to make separate predictions for multiple-vehicle nondriveway collisions, single-vehicle collision and noncollision accidents, and driveway-related collisions. Tabulated factors are used instead of base models to account for pedestrian and bicycle collisions. The tabulated pedestrian factors will eventually be replaced with a pedestrian safety prediction methodology that is under development in a recently added portion of NCHRP Project 17-26.

Equation (45) shows that total roadway segment accidents are determined as the sum of three components: N_{br}, N_{pedr}, and N_{biker}. The following equation shows that the base model portion of N_{br}, designated as N_{brbase}, is further broken down into three components:

$$N_{brbase} = N_{brmv} + N_{brsv} + N_{brdwy} \quad \textbf{(47)}$$

where:

N_{brmv} = predicted number of multiple-vehicle nondriveway collisions per year for nominal or base conditions
N_{brsv} = predicted number of single-vehicle collisions per year for nominal or base conditions
N_{brdwy} = predicted number of driveway-related collisions per year

Thus, base models and adjustment factors are applied to determine five components of total roadway segment accident experience corresponding to five accident types of interest: N_{brmv}, N_{brsv}, N_{brdwy}, N_{pedr}, and N_{biker}.

Base Models for Multiple-Vehicle Nondriveway Collisions on Roadway Segments (N_{brmv})

Base models for multiple-vehicle nondriveway collisions on roadway segments are applied as follows:

$$N_{brmv} = \exp (a + b \ln ADT + \ln L) \quad \textbf{(48)}$$

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where:

ADT = average daily traffic volume (veh/day) on roadway segment
L = length of roadway segment (mi)
a,b = regression coefficients

Table 66 presents the values of the coefficients a and b used in applying Equation (48).

TABLE 66. Base models for multiple-vehicle nondriveway collisions on roadway segments

Road type	Coefficients used in Equation (48)		Overdispersion parameter
	Intercept (a)	ADT (b)	(k)
Total accidents			
2U	–14.75	1.68	0.84
3T	–11.92	1.41	0.66
4U	–11.53	1.33	1.01
4D	–11.88	1.36	1.32
5T	–9.93	1.17	0.81
Fatal-and-injury accidents			
2U	–15.75	1.66	0.65
3T	–15.97	1.69	0.59
4U	–11.98	1.25	0.99
4D	–12.30	1.28	1.31
5T	–10.70	1.12	0.62
Property-damage-only accidents			
2U	–15.15	1.69	0.87
3T	–11.47	1.33	0.59
4U	–12.43	1.38	1.08
4D	–12.35	1.38	1.34
5T	–10.20	1.17	0.88

Equation (48) is first applied to determine N_{brmv} using the coefficients for total accidents in Table 66. The values of $N'_{brmv(FI)}$ and $N'_{brmv(PDO)}$ are then determined with Equation (48) using the coefficients for fatal-and-injury and property-damage-only accidents, respectively, in Table 66. The following adjustments are made to the values of $N'_{brmv(FI)}$ and $N'_{brmv(PDO)}$ to ensure that they sum to N_{brmv}:

$$N_{brmv(FI)} = N_{brmv}\left(\frac{N'_{brmv(FI)}}{N'_{brmv(FI)} + N'_{brmv(PDO)}}\right) \quad \textbf{(49)}$$

$$N_{brmv(PDO)} = N_{brmv} - N_{brmv(FI)} \quad \textbf{(50)}$$

The percentages in Table 67 are used to break down $N_{brmv(FI)}$ and $N_{brmv(PDO)}$ by collision type. The distributions shown in Table 67 are based on observed collision data for all study sites

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in Minnesota and Michigan. The overall distributions are used in the HSM methodology and are not predicted based on the characteristics of the specific site being evaluated.

TABLE 67. Distribution of multiple-vehicle nondriveway collisions for roadway segments by collision type

Collision type	Proportion of accidents by severity level for specific road types									
	2U		3T		4U		4D		5T	
	FI	PDO	FI	PDO	FI	PDO	FI	PDO	FI	PDO
Rear-end collision	0.665	0.671	0.708	0.628	0.602	0.461	0.778	0.632	0.670	0.566
Head-on collision	0.096	0.030	0.070	0.027	0.085	0.028	0.025	0.008	0.090	0.042
Angle collision	0.106	0.107	0.140	0.153	0.185	0.167	0.093	0.104	0.160	0.173
Sideswipe, same direction	0.023	0.084	0.006	0.081	0.057	0.203	0.036	0.146	0.035	0.159
Sideswipe, opposite direction	0.062	0.057	0.018	0.022	0.021	0.031	0.005	0.016	0.019	0.025
Other multiple-vehicle collisions	0.048	0.051	0.058	0.089	0.053	0.110	0.063	0.094	0.026	0.035

Base Models for Single-Vehicle Collisions for Roadway Segments (N_{brsv})

Base models for single-vehicle collisions for roadway segments are applied as follows:

$$N_{brsv} = \exp(a + b \ln ADT + \ln L) \quad \textbf{(51)}$$

Table 68 presents the values of the coefficients and factors used in Equation (51) for each roadway type. Equation (51) is first applied to determine N_{brsv} using the coefficients for total accidents in Table 69. The values of $N'_{brsv(FI)}$ and $N'_{brsv(PDO)}$ are then determined with Equation (51) using the coefficients for fatal-and-injury and property-damage-only accidents, respectively, in Table 68. The following adjustments are made to the values of $N'_{brsv(FI)}$ and $N'_{brsv(PDO)}$ to assure that they sum to N_{brsv}:

$$N_{brsv(FI)} = N_{brsv} \left(\frac{N'_{brsv(FI)}}{N'_{brsv(FI)} + N'_{brsv(PDO)}} \right) \quad \textbf{(52)}$$

$$N_{brsv(PDO)} = N_{brsv} - N_{brmv(FI)} \quad \textbf{(53)}$$

The percentages in Table 69 are used to break down $N_{brsv(FI)}$ and $N_{brsv(PDO)}$ by accident type. The distributions shown in Table 69 are based on observed collision data for all study sites in Minnesota and Michigan. The overall distributions are used in the HSM methodology and are not predicted based on the characteristics of the specific site being evaluated.

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TABLE 68. Base models for single-vehicle collisions on roadway segments

Road type	Coefficients used in Equation (51)		Overdispersion parameter
	Intercept (a)	ADT (b)	(k)
Total accidents			
2U	–5.00	0.56	0.81
3T	–5.26	0.54	1.37
4U	–7.89	0.81	0.91
4D	–4.59	0.47	0.86
5T	–5.05	0.54	0.52
Fatal-and-injury accidents			
2U	–3.49	0.23	0.50
3T	–5.89	0.47	1.06
4U	–7.27	0.61	0.54
4D	–8.25	0.66	0.28
5T	–4.66	0.35	0.36
Property-damage-only accidents			
2U	–6.04	0.64	0.87
3T	–5.81	0.56	1.93
4U	–8.40	0.84	0.97
4D	–4.58	0.45	1.06
5T	–6.06	0.61	0.55

TABLE 69. Distribution of single-vehicle collisions for roadway segments by collision type

Collision type	Proportion of accidents by severity level for specific road types									
	2U		3T		4U		4D		5T	
	FI	PDO	FI	PDO	FI	PDO	FI	PDO	FI	PDO
Collision with parked vehicle	0.164	0.443	0.143	0.173	0.285	0.484	0.061	0.144	0.267	0.250
Collision with animal	0.033	0.179	0.082	0.323	0.008	0.044	0.023	0.172	0.033	0.236
Collision with fixed object	0.327	0.166	0.367	0.260	0.324	0.236	0.385	0.264	0.233	0.236
Collision with other object	0.230	0.120	0.184	0.118	0.236	0.162	0.205	0.241	0.167	0.208
Other single-vehicle collision	0.000	0.013	0.000	0.008	0.033	0.041	0.076	0.041	0.067	0.042
Noncollision	0.246	0.079	0.224	0.118	0.114	0.033	0.250	0.138	0.233	0.028

Base Models for Multiple-Vehicle Driveway-Related Collisions (N_{brdwy})

The models presented above for multiple-vehicle collisions addressed only collisions that are not related to driveways. Driveway-related accidents are also generally multiple-vehicle collisions, but are addressed separately because the frequency of driveway-related accidents on a roadway segment depends on the number and type of driveways.

The total number of driveway-related collisions within a roadway segment is determined as:

$$N_{brdwy} = \sum_{\text{all driveway types}} n_j N_j \left(\frac{ADT}{15{,}000}\right)^b \quad \textbf{(54)}$$

where:

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N_j = number of accidents per year for an individual driveway of driveway type j from Table 70.
n_j = number of driveways within roadway segment of driveway type j
b = coefficient for traffic volume adjustment from Table 70

The N_j term in Equation (54) includes all driveways on both sides of the road.

Seven specific driveway types have been considered in modeling. These are:

- Major commercial driveways
- Minor commercial driveways
- Major industrial/institutional driveways
- Minor industrial/institutional driveways
- Major residential driveways
- Minor residential driveways
- Other driveways

Major driveways are those that serve sites with 50 or more parking spaces. Minor driveways are those that serve sites with less than 50 parking spaces. Commercial driveways provide access to establishments that serve retail customers. Residential driveways serve single- and multiple-family dwellings. Industrial/institutional driveways serve factories, warehouses, schools, hospitals, churches, public facilities, and other places of employment.

Driveway-related collisions can be broken down by severity level as follows:

$$N_{brdwy(FI)} = N_{brdwy}\, f_{dwy} \quad \textbf{(55)}$$

$$N_{brdwy(PDO)} = N_{brdwy} - N_{brdwy(FI)} \quad \textbf{(56)}$$

The values of N_j and f_{dwy} are shown in Table 70.

Adjustment Factor to Estimate Vehicle-Pedestrian Collisions (N_{pedr})

The number of vehicle-pedestrian collisions per year for a roadway segment is estimated as:

$$N_{pedr} = N_{br}\, f_{pedr} \quad \textbf{(57)}$$

where:

f_{pedr} = pedestrian safety adjustment factor.

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TABLE 70. Driveway factors for roadway segments

Driveway type	Coefficients for specific roadway types				
	Two-lane undivided	Three-lane with TWLTL	Four-lane undivided	Four-lane divided	Five-lane with TWLTL
Number of driveway-related collisions per driveway per year (N_j)					
Major commercial	0.252	0.164	0.202	0.053	0.131
Minor commercial	0.080	0.052	0.064	0.017	0.042
Major industrial/institutional	0.274	0.178	0.220	0.057	0.143
Minor industrial/institutional	0.036	0.024	0.029	0.008	0.019
Major residential	0.132	0.086	0.106	0.028	0.069
Minor residential	0.025	0.016	0.020	0.005	0.013
Other	0.040	0.026	0.032	0.008	0.021
Regression coefficient for ADT (b)					
All driveways	1.000	1.000	1.172	1.106	1.172
Proportion of fatal-and-injury accidents (f_{dwy})					
All driveways	0.323	0.243	0.342	0.284	0.269
Proportion of property-damage-only accidents					
All driveways	0.677	0.757	0.658	0.716	0.731

NOTE: Includes only unsignalized driveways; signalized driveways are analyzed as signalized intersections. Major driveways serve 50 or more parking spaces; minor driveways serve less than 50 parking spaces.

Table 71 presents the values of f_{pedr} for use in Equation (57). All vehicle-pedestrian collisions are considered to be fatal-and-injury accidents.

TABLE 71. Pedestrian safety adjustment factors for urban and suburban areas

Road type	Pedestrian safety adjustment factor (f_{pedr})	
	Urban	Suburban
2U	0.033	0.003
3T	0.034	0.001
4U	0.045	0.008
4D	0.019	0.006
5T	0.039	0.004

Note: These factors apply to the methodology for predicting total accidents (all severity levels combined). All pedestrian collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

Table 71 will eventually be replaced with a pedestrian safety prediction methodology which is under development in Phase III of NCHRP Project 17-26.

Adjustment Factor to Estimate Vehicle-Bicycle Collisions (N_{biker})

The number of vehicle-bicycle collisions per year for a roadway segment is estimated as:

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$$N_{biker} = N_{br} f_{biker} \quad (58)$$

where:

f_{biker} = bicycle safety adjustment factor.

Table 72 presents the values of f_{biker} for use in Equation (58). All vehicle-bicycle collisions are considered to be fatal-and-injury accidents.

TABLE 72. Bicycle safety adjustment factors (f_{biker}) for roadway segments

Road type	Bicycle safety adjustment factor (f_{biker})	
	Urban	Suburban
2U	0.015	0.005
3T	0.026	0.002
4U	0.029	0.010
4D	0.011	0.011
5T	0.023	0.003

Calibration Factor for Roadway Segments (C_r)

The calibration factor (C_r) in Equation (45) is intended to be developed for specific roadway segment types by each agency using the HSM methodologies. Typically, new calibration factors are determined for each year of data.

The calibration factor is needed because the base models are developed from data for particular highway agencies (in this case, highway agencies in Minnesota and Michigan), while the HSM methodology may be applied by a highway agency in any part of the U.S. The calibration process is intended to compensate for differences in climate, driver population, and (in the case of rural methodologies) animal population in different regions of the U.S. Calibration also adapts the methodologies to years other than the years for which the models were developed.

The calibration process can generally be implemented by identifying a set of sites whose characteristics are similar to the nominal or base conditions. The HSM methodology is then applied to the site, accident history data are obtained for the site, and the calibration factor is determined as the ratio of observed accidents to predicted accidents, as follows:

$$C_r = \frac{\text{Observed accident count for a group of roadway segments}}{\text{Predicted accident count for the same group of roadway segments}} \quad (59)$$

The description of the calibration process presented in the prototype chapter can be rewritten and simplified. It is likely that a single calibration process can be provided for HSM Chapters 8, 9, and 10. Potentially, this process would need to appear only once in the HSM and could be referred to from other chapters.

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Accident Modification Factors

The safety prediction methodology for arterial roadway segments will include up to four accident modification factors (AMFs):

- on-street parking
- roadside fixed objects/roadside hazard rating
- lighting

The AMFs were developed based on assessments made by an expert panel convened jointly by NCHRP Projects 17-25 and 17-26. Each of these AMFs is discussed below.

On-Street Parking (AMF_{1r})

The AMF for on-street parking is based on recent work by Bonneson (*129*) for TexDOT. The AMF is determined as:

$$AMF_{1r} = 1 + p_{pk} (f_{pk} - 1) \quad \textbf{(60)}$$

where:

f_{pk} = factor from Table 73
p_{pk} = proportion of curb length with on-street parking = $(0.5\ L_{pk}/L)$
L_{pk} = curb length with on-street parking (mi)

Table 73 is based on Table 60. The two-lane values from Table 60 have been applied to all road types with two through lanes (2U and 3T) and the multilane values have been applied to all road types with more than two through lanes (4U, 4D, and 5T).

TABLE 73. Values of f_{pk} used in determining the accident modification factor for on-street parking

	Type of parking and land use			
	Parallel parking		Angle parking	
Road type	Residential/other	Commercial or industrial/institutional	Residential/other	Commercial or industrial/institutional
2U	1.465	2.074	3.428	4.853
3T	1.465	2.074	3.428	4.853
4U	1.100	1.709	2.574	3.999
4D	1.100	1.709	2.574	3.999
5T	1.100	1.709	2.574	3.999

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Roadside Fixed Objects (AMF_{2r})

An AMF for roadside fixed objects has been adapted from the work of Zegeer and Cynecki (*130*) on predicting utility pole accidents. The AMF is determined with the following equation:

$$AMF_{2r} = f_{offset}\, D_{fo}\, p_{fo} + (1 - p_{fo}) \quad \textbf{(61)}$$

where:

f_{offset} = fixed-object offset factor from Table 74
D_{fo} = fixed-object density (fixed objects/mi)
p_{fo} = fixed-object collisions as a proportion of total accidents from Table 75

This AMF applies to total roadway segment accidents.

TABLE 74. Fixed-object offset factor (f_{offset})

Offset to fixed objects (O_{fo}) (ft)	Fixed-object offset factor (f_{offset})
2	0.232
5	0.133
10	0.087
15	0.068
20	0.057
25	0.049
30	0.044

TABLE 75. Proportion of fixed-object collisions (p_{fo})

Road type	Proportion of fixed-object collisions (p_{fo})
2U	0.059
3T	0.034
4U	0.037
4D	0.036
5T	0.016

In estimating the density of fixed objects (D_{fo}), point objects that are within 21 m (70 ft) of one another longitudinally along the road should be counted as a single object. This distance of 21 m (70 ft) is rounded from the distance of 22 m (72 ft) shown in Section 5 of this report. Continuous objects that are not behind point objects should be counted as one point object for each 21 m (70 ft) of length. Only point or continuous objects within the offset distance used to derive the value of f_{offset} should be used in determining D_{fo}.

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Lighting (AMF_{3r})

Based on the work of Elvik and Vaa (*131*), the AMF for lighting of roadway segments that have not previously been lighted is determined as:

$$AMF_{3r} = 1 - \left((1 - 0.36\ p_{fnr} - 0.72\ p_{inr} - 0.83\ p_{pnr})\ p_{nr}\right) \quad \textbf{(62)}$$

where:

p_{fnr} = proportion of total nighttime accidents for unlighted roadway segments that involve a fatality
p_{inr} = proportion of total nighttime accidents for unlighted roadway segments that involve only a nonfatal injury
p_{pnr} = proportion of total nighttime accidents for unlighted roadway segments that involve property damage only
p_{nr} = proportion of total accidents for unlighted roadway segments that occur at night

This AMF applies to total roadway segment accidents. Table 76 presents default values for the nighttime accident proportions p_{fnr}, p_{inr}, p_{pnr}, and p_{nr}.

TABLE 76. Nighttime accident proportions for unlighted roadway segments

Road type	Proportion of total nighttime accidents by severity level[a]			Proportion of accidents that occur at night[a]
	Fatal p_{fnr}	Injury p_{inr}	PDO p_{pnr}	p_{nr}
2U	0.008	0.240	0.750	0.266
3T	0.030	0.300	0.670	0.279
4U	0.001	0.290	0.709	0.230
4D	0.001	0.290	0.709	0.204
5T	0.001	0.273	0.726	0.391

[a] Based on combined data for Minnesota and Michigan.
NOTE: HSM users are encouraged to replace these estimates with locally derived values.

INTERSECTION METHODOLOGY

General Form of Intersection Methodology

Safety predictions for a particular intersection will be developed as a combination of base models, calibration factors, and accident modification factors (AMFs) using the following general approach:

$$N_{int} = (N_{bi} + N_{pedi} + N_{bikei})\ C_i \quad \textbf{(63)}$$

$$N_{bi} = N_{bibase}\ (AMF_{1i}\ AMF_{2i}\ AMF_{3i}\ AMF_{4i}\ AMF_{5i}) \quad \textbf{(64)}$$

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where:

N_{int}	=	predicted number of total intersection-related accidents per year after application of accident modification factors
N_{bi}	=	predicted number of total intersection-related accidents per year (excluding vehicle-pedestrian and vehicle-bicycle collisions)
N_{bibase}	=	predicted number of total intersection-related accidents per year for nominal or base conditions (excluding vehicle-pedestrian and vehicle-bicycle collisions)
N_{pedi}	=	predicted number of vehicle-pedestrian collisions per year
N_{bikei}	=	predicted number of vehicle-bicycle collisions per year
C_i	=	calibration factor for at-grade intersections developed for use for a particular geographical area [see Equation (75)]
$AMF_{1i} \ldots AMF_{5i}$	=	accident modification factors for intersections

Types of Intersections Considered

The safety prediction methodology addresses four types of intersections on arterial roadways:

- Three-leg intersections with STOP control on the minor-road approach (3ST)
- Three-leg signalized intersections (3SG)
- Four-leg intersections with STOP control on the minor-road approach (4ST)
- Four-leg signalized intersections (4SG)

Base Models and Adjustment Factors for Intersections (N_{bimv}, N_{bisv}, N_{pedi}, and N_{bikei})

Base models are used to make predictions for multiple-vehicle intersection-related accidents. Single-vehicle accidents constitute a relatively small proportion of the accidents at intersections; statistically significant base models were developed in some cases, but a decision may be reached to predict single-vehicle collisions for most intersections with tabulated factors based on the average proportion of accidents. Tabulated factors are also used to account for pedestrian and bicycle collisions. The tabulated pedestrian factors will eventually be replaced with a pedestrian safety prediction methodology that is under development in Phase III of NCHRP Project 17-26.

Equation (63) shows that total intersection accidents are determined as the sum of three components: N_{bi}, N_{pedi}, and N_{bikei}. The following equation shows that the base model portion of N_{bi} designated as N_{bibase}, is further broken down into two components:

$$N_{bibase} = N_{bimv} + N_{bisv} \quad \textbf{(65)}$$

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where:

N_{bimv} = predicted number of multiple-vehicle collisions per year for nominal or base conditions
N_{bisv} = predicted number of single-vehicle collisions per year for nominal or base conditions

Thus, the base models and adjustment factors are applied to determine four components of total intersection accident experience: N_{bimv}, N_{bisv}, N_{pedi}, and N_{bikei}.

Base Models for Multiple-Vehicle Collisions (N_{bimv})

Base models for multiple-vehicle intersection-related collisions are applied as follows:

$$N_{bimv} = \exp (a + b \ln ADT_{maj} + c \ln ADT_{min}) \quad \textbf{(66)}$$

where:

ADT_{maj} = average daily traffic volume (veh/day) for major road
ADT_{min} = average daily traffic volume (veh/day) for minor road
a, b, c = regression coefficients

Table 77 presents the values of the coefficients a, b, and c used in applying Equation (66).

TABLE 77. Base models for multiple-vehicle collisions at intersections

Intersection types	Coefficients used in Equation (66)			Overdispersion parameter
	Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	(k)
Total accidents				
3ST	–13.39	1.11	0.41	0.80
3SG	–11.63	1.11	0.26	0.33
4ST	–8.97	0.82	0.25	0.40
4SG	–10.63	1.07	0.23	0.39
Fatal-and-injury accidents				
3ST	–14.04	1.16	0.30	0.69
3SG	–11.08	1.02	0.17	0.30
4ST	–11.20	0.93	0.28	0.48
4SG	–12.78	1.18	0.22	0.33
Property-damage-only accidents				
3ST	–15.41	1.20	0.51	0.77
3SG	–12.74	1.14	0.30	0.36
4ST	–8.81	0.77	0.23	0.40
4SG	–10.66	1.02	0.24	0.44

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Equation (66) is first applied to determine N_{bimv} using the coefficients for total accidents in Table 77. The values of $N'_{bimv(FI)}$ and $N'_{bimv(PDO)}$ are then determined with Equation (66) using the coefficients for fatal-and-injury and property-damage-only accidents, respectively, in Table 77. The following adjustments are made to the values of $N'_{bimv(FI)}$ and $N'_{bimv(PDO)}$ to assure that they sum to N_{bimv}:

$$N_{bimv(FI)} = N_{bimv} \left(\frac{N'_{bimv(FI)}}{N'_{bimv(FI)} + N'_{bimv(PDO)}} \right) \quad \textbf{(67)}$$

$$N_{bimv(PDO)} = N_{bimv} - N_{bimv(FI)} \quad \textbf{(68)}$$

The percentages in Table 78 are used to break down $N_{bimv(FI)}$ and $N_{bimv(PDO)}$ by manner of collision. The distributions shown in Table 78 are based on observed collision data for all study sites in Minnesota and North Carolina. The overall distributions are used in the HSM methodology and are not predicted based on the characteristics of the specific site being evaluated.

TABLE 78. Distribution of multiple-vehicle collisions for intersections by collision type

Collision type	Proportion of accidents by severity level for specific intersection types							
	3ST		3SG		4ST		4SG	
	FI	PDO	FI	PDO	FI	PDO	FI	PDO
Rear-end collision	0.494	0.481	0.530	0.511	0.422	0.428	0.506	0.507
Head-on collision	0.009	0.003	0.010	0.004	0.016	0.005	0.012	0.004
Angle collision	0.429	0.353	0.387	0.300	0.522	0.398	0.421	0.305
Sideswipe, same direction	0.044	0.095	0.049	0.129	0.026	0.084	0.029	0.123
Sideswipe, opposite direction	0.000	0.007	0.004	0.004	0.006	0.009	0.003	0.005
Other multiple-vehicle collisions	0.024	0.061	0.020	0.052	0.008	0.076	0.029	0.056

Base Models for Single-Vehicle Collisions (N_{bisv})

Base models for single-vehicle collisions at intersections are applied as follows:

$$N_{bisv} = \exp (a + b \ln ADT_{maj} + c \ln ADT_{min}) \quad \textbf{(69)}$$

Table 79 presents the values of the coefficients and factors used in Equation (69) for each roadway type. Equation (69) is first applied to determine N_{bisv} using the coefficients for total accidents in Table 79. The values of $N'_{bisv(FI)}$ and $N'_{bisv(PDO)}$ are then determined with Equation (69) using the coefficients for fatal-and-injury and property-damage-only accidents, respectively, in Table 79. The following adjustments are made to the values of $N'_{bisv(FI)}$ and $N'_{bisv(PDO)}$ to assure that they sum to N_{bisv}:

$$N_{bisv(FI)} = N_{bisv} \left(\frac{N'_{bisv(FI)}}{N'_{bisv(FI)} + N'_{bisv(PDO)}} \right) \quad \textbf{(70)}$$

$$N_{bisv(PDO)} = N_{bisv} - N_{bimv(FI)} \quad \textbf{(71)}$$

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Since there are no models for fatal-and-injury accidents at three- and four-leg STOP-controlled intersections in Table 79, Equation (69) must be replaced with the following equation in these cases:

$$N_{bisv(FI)} = N_{bisv} f_{bisv} \quad \textbf{(72)}$$

where:

f_{bisv} = proportion of fatal-and-injury accidents for combined sites from Table 57

TABLE 79. Base models for single-vehicle collisions at intersections

Intersection type	Coefficients used in Equation (69)			Overdispersion parameter
	Intercept (a)	ADT_{maj} (b)	ADT_{min} (c)	(k)
Total accidents				
3ST	–6.84	0.16	0.51	1.14
3SG	–8.52	0.42	0.40	0.36
4ST	–5.40	0.33	0.12	0.65
4SG	–9.85	0.68	0.27	0.36
Fatal-and-injury accidents				
3ST				
3SG	–9.25	0.27	0.51	0.24
4ST				
4SG	–8.89	0.43	0.29	0.09
Property-damage-only accidents				
3ST	–8.39	0.25	0.55	1.29
3SG	–8.58	0.45	0.33	0.53
4ST	–7.11	0.36	0.25	0.54
4SG	–10.98	0.78	0.25	0.44

The percentages in Table 80 are used to break down $N_{bisv(FI)}$ and $N_{bisv(PDO)}$ by collision type. The distributions shown in Table 80 are based on observed collision data for all study sites in Minnesota and North Carolina. The overall distributions are used in the HSM methodology and are not predicted based on the characteristics of the specific site being evaluated.

TABLE 80. Distribution of single-vehicle collisions for intersections by collision type

Collision type	Proportion of accidents by severity level for specific intersection types							
	3ST		3SG		4ST		4SG	
	FI	PDO	FI	PDO	FI	PDO	FI	PDO
Collision with parked vehicle	0.000	0.016	0.000	0.000	0.000	0.065	0.019	0.060
Collision with animal	0.022	0.031	0.026	0.084	0.000	0.023	0.000	0.024
Collision with fixed object	0.156	0.331	0.132	0.145	0.141	0.282	0.038	0.145
Collision with other object	0.067	0.087	0.000	0.084	0.056	0.181	0.019	0.072
Other single-vehicle collision	0.276	0.071	0.105	0.253	0.451	0.171	0.442	0.374
Noncollision	0.479	0.464	0.737	0.434	0.352	0.278	0.482	0.325

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Adjustment Factor to Estimate Vehicle-Pedestrian Collisions (N_{pedi})

The number of vehicle-pedestrian collisions per year for an intersection is estimated as:

$$N_{pedi} = N_{bi} f_{pedi} \quad \textbf{(73)}$$

where:

f_{pedi} = pedestrian safety adjustment factor.

Table 81 presents the values of f_{pedi} for use in Equation (73). All vehicle-pedestrian collisions are considered to be fatal-and-injury accidents.

Table 81 will eventually be replaced with a pedestrian safety prediction methodology which is under development in Phase III of NCHRP Project 17-26.

TABLE 81. Pedestrian safety adjustment factors for intersections

Intersection type	Pedestrian safety adjustment factor (f_{pedi})
3ST	0.008
3SG	0.005
4ST	0.016
4SG	0.017

NOTE: These factors apply to the methodology for predicting total accidents (all severity levels combined). All pedestrian collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

Adjustment Factor to Estimate Vehicle-Bicycle Collisions (N_{bikei})

The number of vehicle-bicycle collisions per year for an intersection is estimated as:

$$N_{bikei} = N_{br} f_{bikei} \quad \textbf{(74)}$$

where:

f_{bikei} = bicycle safety adjustment factor.

Table 82 presents the values of f_{bikei} for use in Equation (74). All vehicle-bicycle collisions are considered to be fatal-and-injury accidents.

Table 82 is intended for use in HSM Chapter 10, as there is no current plan for a bicycle safety prediction methodology analogous to the pedestrian safety prediction methodology currently under development.

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TABLE 82. Bicycle safety adjustment factors for intersections

Intersection type	Bicycle safety adjustment factor (f_{bikei})
3ST	0.004
3SG	0.010
4ST	0.006
4SG	0.013

NOTE: These factors apply to the methodology for predicting total accidents (all severity levels combined). All pedestrian collisions resulting from this adjustment factor should be treated as fatal-and-injury accidents and none as property-damage-only accidents.

Calibration Factor (C_i)

The calibration factor (C_i) in Equation (63) is intended to be developed for specific intersection types by each agency using the HSM methodologies. Typically, new calibration factors are determined for each year of data.

The calibration factor is needed because the base models are developed from data for particular highway agencies (in this case, highway agencies in Minnesota and North Carolina), while the HSM methodology may be applied by a highway agency in any part of the U.S. The calibration process is intended to compensate for differences in climate, driver, population, and (in the case of rural methodologies) animal population in different regions of the U.S.

The calibration process can generally be implemented by identifying a set of sites whose characteristics are similar to the nominal or base conditions. The HSM methodology is then applied to the site, accident history data are obtained for the site, and the calibration factor is determined as the ratio of observed accidents to predicted accidents, as follows:

$$C_i = \frac{\text{Observed accident count for a group of intersections}}{\text{Predicted accident count for the same group of intersections}} \quad \textbf{(75)}$$

The description of the calibration process presented in the prototype chapter can be rewritten and simplified. It is likely that a single calibration process can be provided for HSM Chapters 8, 9, and 10. Potentially, this process would need to appear only once in the HSM and could be referred to from other chapters.

Accident Modification Factors

The safety prediction methodology for arterial intersections will include up to five AMFs:

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- left-turn lanes
- left-turn signal phasing
- right-turn lanes
- right-turn on red
- lighting

These AMFs were developed based on assessments made by an expert panel convened jointly by NCHRP Projects 17-25 and 17-26. Each of these AMFs is discussed below.

Left-Turn Lanes (AMF_{1i})

The AMF for left-turn lanes at intersections on urban and suburban arterials based on a before-after study performed for FHWA by Harwood et al. (*81*) is presented in Table 83. This AMF applies to total intersection accidents.

TABLE 83. AMFs for left-turn lanes at intersections on urban and suburban arterials (*81*)

Type of traffic control	Number of major-road approaches on which left-turn lanes are provided	
	One approach	Two approaches
THREE-LEG INTERSECTIONS		
Two-way STOP control	0.67	–
Signal Control	0.93	–
FOUR-LEG INTERSECTIONS		
Two-way STOP control	0.73	0.53
Signal control	0.90	0.81

Left-Turn Signal Phasing (AMF_{2i})

The AMF for left-turn signal phasing is based on the results of work by Hauer (*132*), as modified in a recent study by Lyon et al (*133*). Types of left-turn signal phasing considered include permissive, protected/permissive, permissive/protected, and protected. The AMF values are presented in Table 84. This AMF applies to total intersection accidents and is applicable only to signalized intersections. The base condition for the AMF is permissive left-turn signal phasing, which corresponds to an AMF value of 1.00. An AMF value of 1.00 should always be used for unsignalized intersections.

The AMF values in Table 84 are based on the research results presented in Table 64.

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TABLE 84. AMFs for left-turn signal phasing at signalized intersections

Type of left-turn signal phasing	AMF_{2i}
Permissive	1.00
Protected/permissive or permissive/protected	0.99
Protected	0.94

NOTE: Use AMF_{2i} = 1.00 for all unsignalized intersections.

Right-Turn Lanes (AMF_{3i})

The AMF for right-turn lanes at intersections on urban and suburban arterials based on a before-after study performed for FHWA by Harwood et al. (*81*) is presented in Table 85. This AMF applies to total intersection accidents.

TABLE 85. AMFs for right-turn lanes at intersections on urban and suburban arterials (*81*)

	Number of major-road approaches on which right-turn lanes are provided	
Type of traffic control	One approach	Two approaches
Two-way STOP control	0.86	0.74
Signal control	0.96	0.92

Right Turn On Red (AMF_{4i})

The AMF for prohibiting right turn on red on one or more approaches to a signalized intersection has been derived from a study by Clark (*134*). The AMF is determined as:

$$AMF_{4i} = (0.984)^{nprohib} \quad \textbf{(76)}$$

where:

nprohib = number of signalized intersection approaches for which right turn on red is prohibited

This AMF applies to total intersection accidents. The AMF is applicable only to signalized intersections. An AMF value of 1.00 should be used for unsignalized intersections.

Lighting (AMF_{5i})

The AMF for lighting of intersections has been derived from an evaluation of roadway segment lighting by Elvik and Vaa (*131*). The AMF for intersections that have not previously been lighted is determined as:

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$$AMF_{5i} = 1 - [(1 - 0.36\ P_{fni} - 0.72\ p_{ini} - 0.83\ p_{pni})\ p_{ni}] \quad \textbf{(77)}$$

where:

p_{fni} = proportion of total nighttime accidents for unlighted intersections that involve a fatality
p_{ini} = proportion of total nighttime accidents for unlighted intersections that involve only a nonfatal injury
p_{pni} = proportion of total nighttime accidents for unlighted intersections that involve property damage only
p_{ni} = proportion of total accidents for unlighted intersections that occur at night

This AMF applies to total intersection accidents. Table 86 presents default values for the nighttime accident proportions p_{fni}, p_{ini}, p_{pni}, and p_{ni}.

TABLE 86. Nighttime accident proportions for unlighted intersections

Intersection type	Proportion of total nighttime accidents by severity level[a]			Proportion of accidents that occur at night[a]
	Fatal p_{fni}	Injury p_{ini}	PDO p_{pni}	p_{ni}
3ST	0.001	0.334	0.665	0.192
3SG	0.001	0.393	0.606	0.206
4ST	0.040	0.360	0.600	0.191
4SG	0.003	0.328	0.670	0.200

[a] Based on combined data for Minnesota and North Carolina.
NOTE: HSM users are encouraged to replace these estimates with locally derived values.

COMBINING PREDICTED AND OBSERVED ACCIDENT COUNTS

The methodology presented above is suitable for predicting accident counts for roadway segments and intersections on urban and suburban arterials. Where observed accident history data are available, the predicted and observed accident counts can be combined using the Empirical Bayes (EB) method presented earlier in this report [see Equations (15) and (16)]. Special EB procedures apply for this HSM methodology because of the use of multiple base models with different over dispersion parameters; these special procedures are shown in Equations (17) to (25). It is likely that the EB method could be presented in just one place in HSM Part III and then referred to from other Part III chapters. It is recommended that the EB method be applied to individual roadway segments and intersections [i.e., to the individual values of N_{rs} and N_{int} before application of Equation (44)] whenever the observed accident count data are sufficiently disaggregated to support this. However, it is expected that, in many cases, accident data will be available for the project as a whole rather than for individual roadway segments and intersections. In this case, the EB method should be applied to an arterial facility or improvement project as a whole using Equations (17) to (25).

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WORKSHEETS AND PRECISION IN COMPUTATIONS

The draft version of HSM Chapter 10 presented in Appendix B of this report includes seven worksheets for applying the methodology. These are:

- safety prediction worksheet for a roadway segment
- safety prediction worksheet for an intersection
- safety prediction worksheet for an entire facility or project without observed accident data
- safety prediction worksheet to incorporate observed accident data for a single roadway segment
- safety prediction worksheet to incorporate observed accident data for a single intersection
- safety prediction worksheet to incorporate observed accident frequencies for a facility or project with site-specific accident data
- safety prediction worksheet to incorporate observed accident frequencies for a facility or project without site-specific accident data

All computations of accident frequencies within these worksheets are conducted with values expressed to three decimal places. It should not be envisioned that the methodology is accurate to three decimal places, but this level of precision is needed for consistency in computations. It is recommended that, in the last stage of computations, final estimates of predicted accident frequency should be rounded to one decimal place.

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CHAPTER 8.

VALIDATION OF THE HSM METHODOLOGY

This chapter presents the validation of the HSM methodology documented in Chapter 7 and in Appendix B. The validation was conducted by applying the HSM methodology to arterial roadway segments in Washington and arterial intersections in Florida and comparing the safety predictions obtained from the methodology to observed accident frequencies for the Washington and Florida sites. The validation studies for roadway segments and for intersections are each discussed below.

ROADWAY SEGMENT VALIDATION STUDY

The HSM methodology for roadway segments was validated through application to a set of arterial segment sites under the jurisdiction of the Washington State Department of Transportation. As in the project database described in Chapter 4, the validation database for roadway segments consisted of individual blocks from one public road intersection to the next along urban and suburban arterial highways and streets. All of the sites were located in the Seattle-Tacoma-Olympia area in King, Pierce, Snohomish, and Thurston counties. The roadway segment validation data set consisted of 864 blocks including 143.0 mi of roadway. The average block length in the dataset is 0.17 mi. These roadways experience a total of 6,422 accidents in a 3-year period.

Table 87 summarizes the roadway segment validation sites and includes the number of blocks, total length, average ADT, total exposure, total number of accidents, and average accident rate for each roadway type. The ADT, exposure, accident frequency, and accident rate data represent a 3-year period from 2002 to 2004. Table 88 summarizes the ADT distribution for the validation sites in each roadway type.

TABLE 87. Summary of roadway segment accident and exposure data for Washington validation dataset

Roadway type	Number of sites	Total length (mi)	Average ADT (veh/day)	Total exposure (10^6 veh-mi)[a]	Observed total number of accidents[a]	Average accident rate (per 10^6 veh-mi)
2U	286	59.9	13,416	948.7	1,220	1.29
3T	47	6.0	16,146	111.9	190	1.70
4U	106	12.5	24,975	334.5	527	1.58
4D	54	10.9	29,382	396.8	408	1.03
5T	371	53.7	30,359	1,759.6	4,077	2.32

[a] In 3-year period.

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TABLE 88. Descriptive statistics for roadway segment traffic volumes in Washington validation dataset

ADT statistic (veh/day)	Roadway type				
	2U	3T	4U	4D	5T
Mean	13,416	16,146	24,975	29,382	30,359
Median	13,580	15,986	25,852	26,591	30,116
Standard deviation	329	690	656	1,025	337
Minimum	3,081	9,378	6,644	17,463	10,582
Maximum	27,599	26,102	35,930	49,538	43,926

Roadway segment characteristics and traffic volumes to apply the HSM methodology were obtained from roadway inventory files maintained by the Washington State Department of Transportation and from review of videologs. Crash data were obtained from the FHWA HSIS.

Validation Procedure

The first step in applying the HSM methodology to the Washington sites was to calibrate the methodology to Washington conditions, which should also be the first step for any agency using the HSM methodology. The HSM methodology was applied to each site and year and a yearly calibration factor was computed for each roadway type as the ratio of the total observed accident frequency to the total predicted accident frequency for that roadway type. The calibration factors (C_r) determined from the Washington data were:

Roadway type	Calibration factor (C_r) for total accidents by analysis year			
	2002	2003	2004	Average
2U	0.93	0.82	0.86	0.87
3T	0.74	1.08	1.01	0.94
4U	1.26	1.20	1.04	1.17
4D	1.15	0.95	0.96	1.02
5T	1.59	1.49	1.45	1.51

These calibration factors indicate that, except for 5T roadways, the average accident frequency at the Washington sites is relatively close to the average accident frequency at comparable Minnesota and Michigan sites from which the HSM methodology was derived. It is also evident that there can be substantial variation in the calibration factor from one year to the next for the same set of sites. Similar calibration factors were developed for fatal-and-injury and property-damage-only accidents.

In one sense, the calibration process assures reasonable overall validation results because the total predicted and observed accident frequencies for each roadway type are forced to be equal over the 3-year period. On the other hand, a calibration process of this type is essential when the HSM methodology is applied in any new jurisdiction. And, ultimately, the validation should be judged on the basis of agreement between predicted and observed accident frequencies

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for individual sites over several years and not for a group of sites as a whole. Calibration using only part of the validation dataset was tried, but the available sample sizes appeared too small to permit this. Therefore, calibration was performed with the entire validation data set.

The HSM methodology was then reapplied to each of the Washington sites, separately for each year, incorporating the appropriate yearly calibration factor, C_r. The predicted accident frequency for the 3-year period at each site was then compared to the observed accident frequency for the same 3-year period. The validation results are presented below.

Validation Results

Figures 24 through 28 show for the five roadway types, plots of the predicted and observed accident frequencies for each site normalized for site lengths and duration of study period (acc/mi/yr). The line of equality which would represent perfect agreement between predicted and observed accident frequencies is shown on each plot.

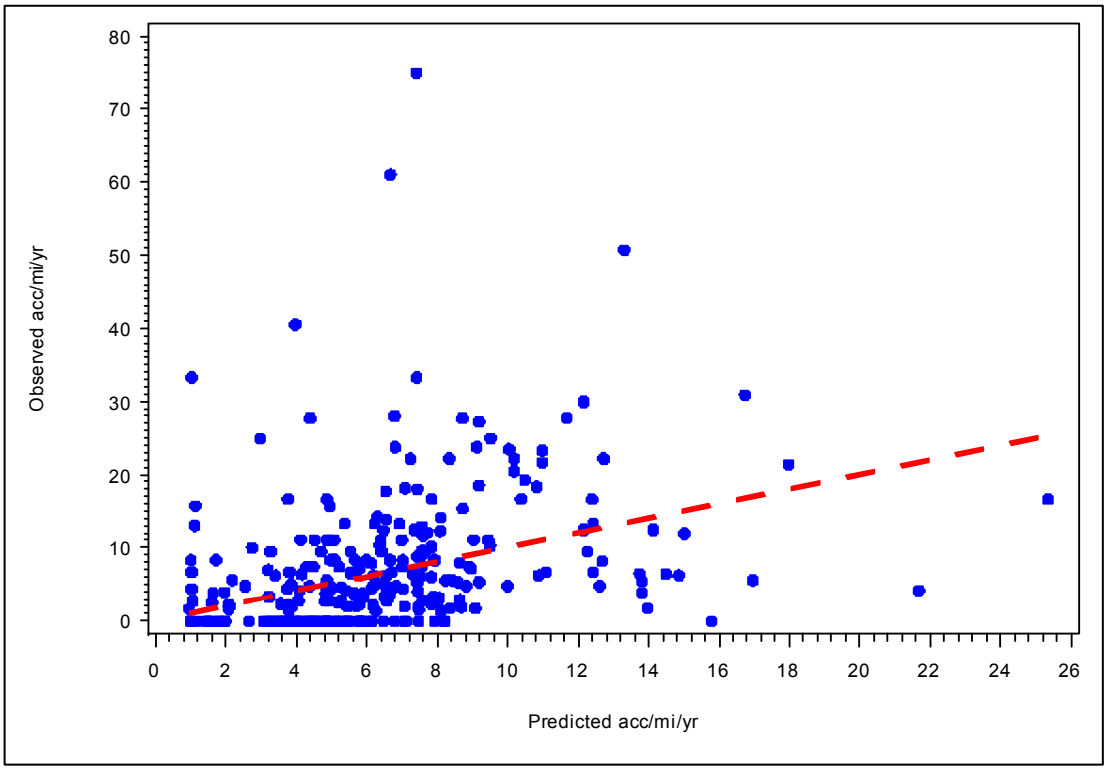

Figure 24. Comparison of total observed vs. predicted accident frequencies for 2U roadway segments in Washington

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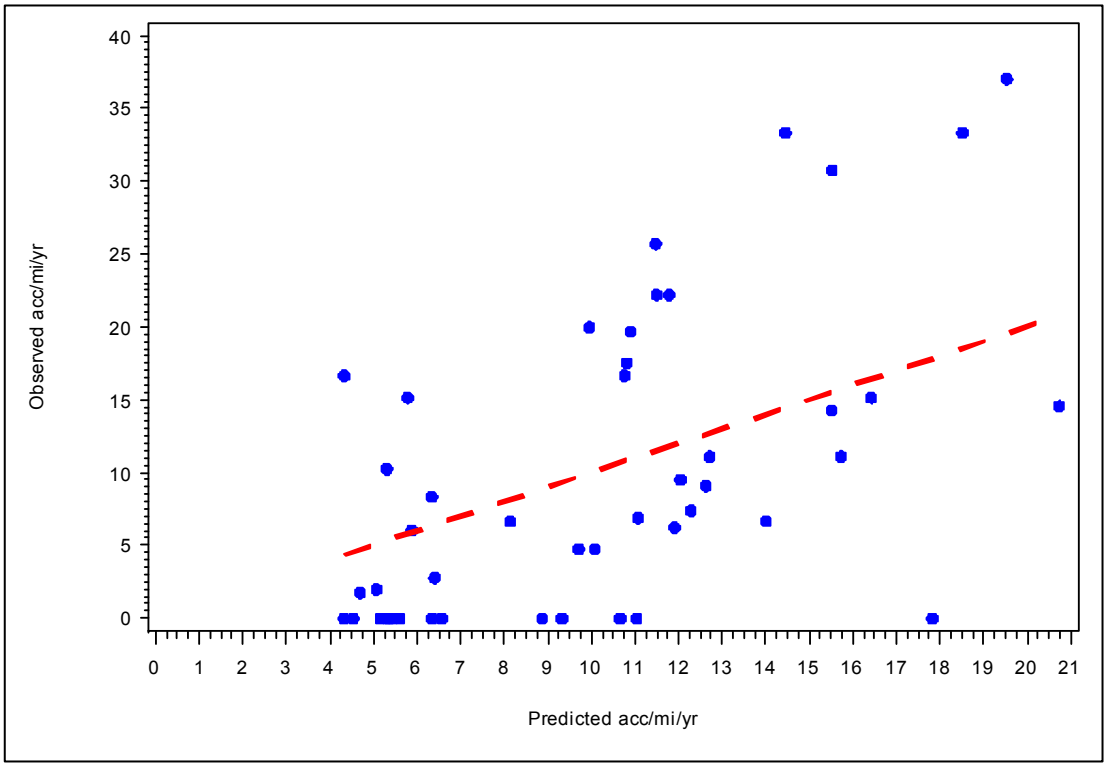

Figure 25. Comparison of total observed vs. predicted accident frequencies for 3T roadway segments in Washington

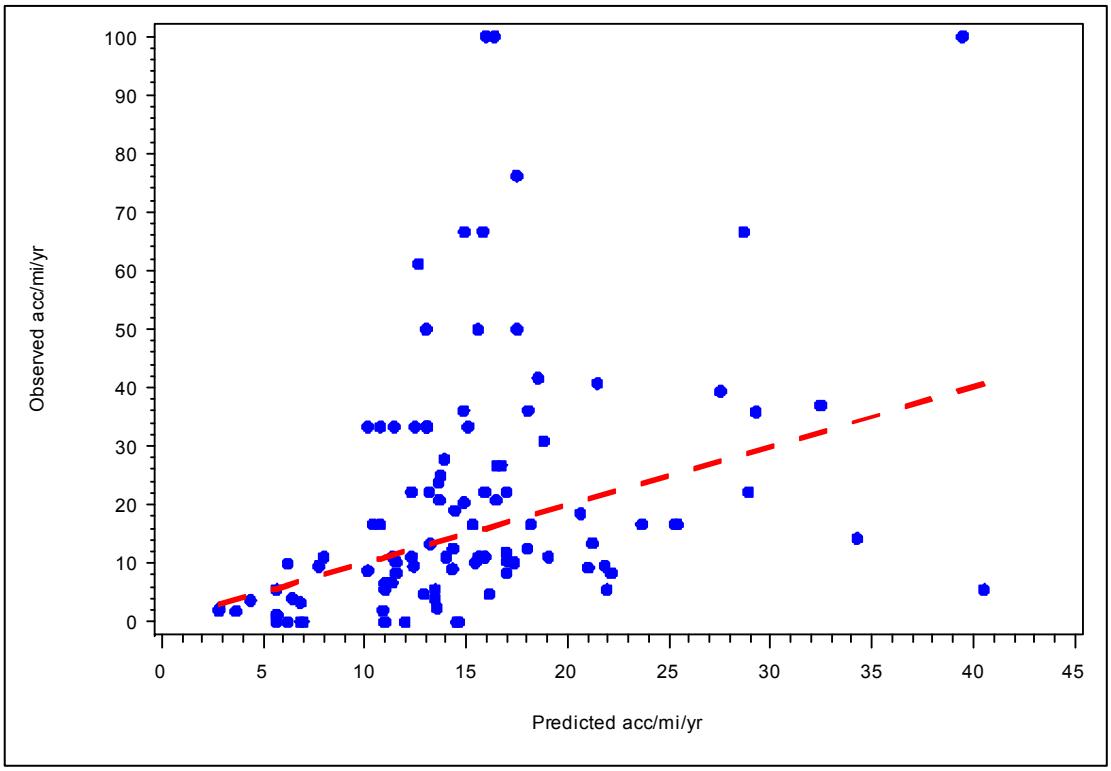

Figure 26. Comparison of total observed vs. predicted accident frequencies for 4U roadway segments in Washington

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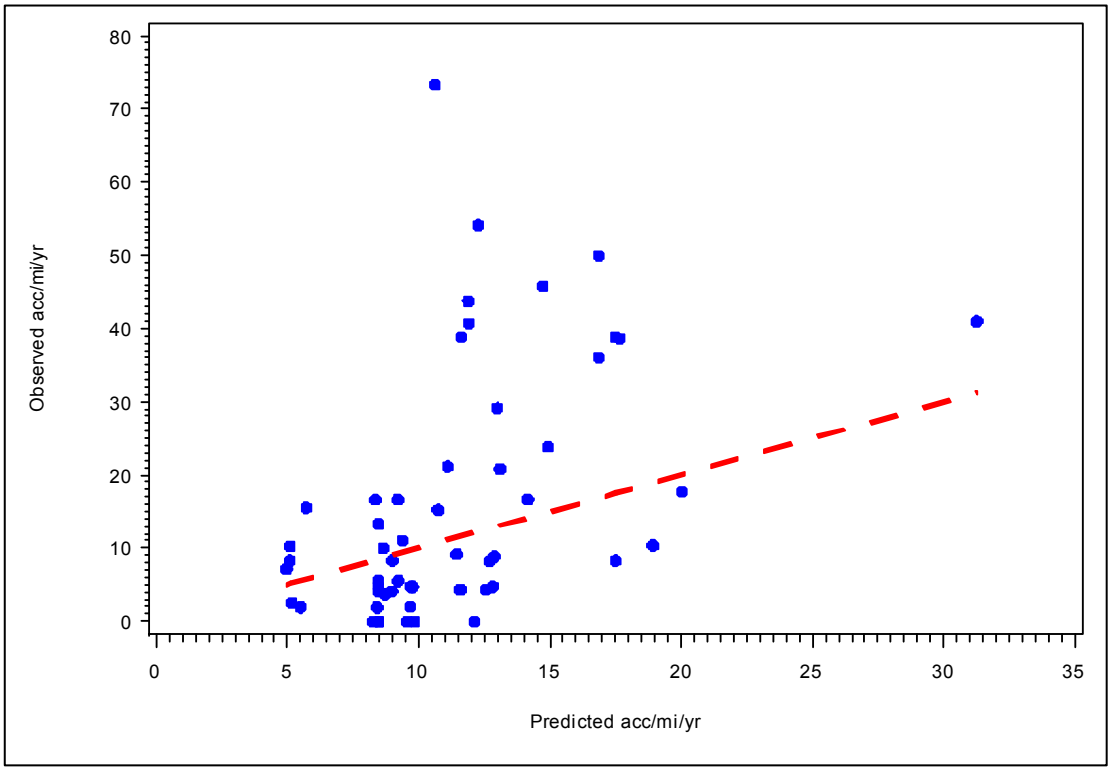

Figure 27. Comparison of total observed vs. predicted accident frequencies for 4D roadway segments in Washington

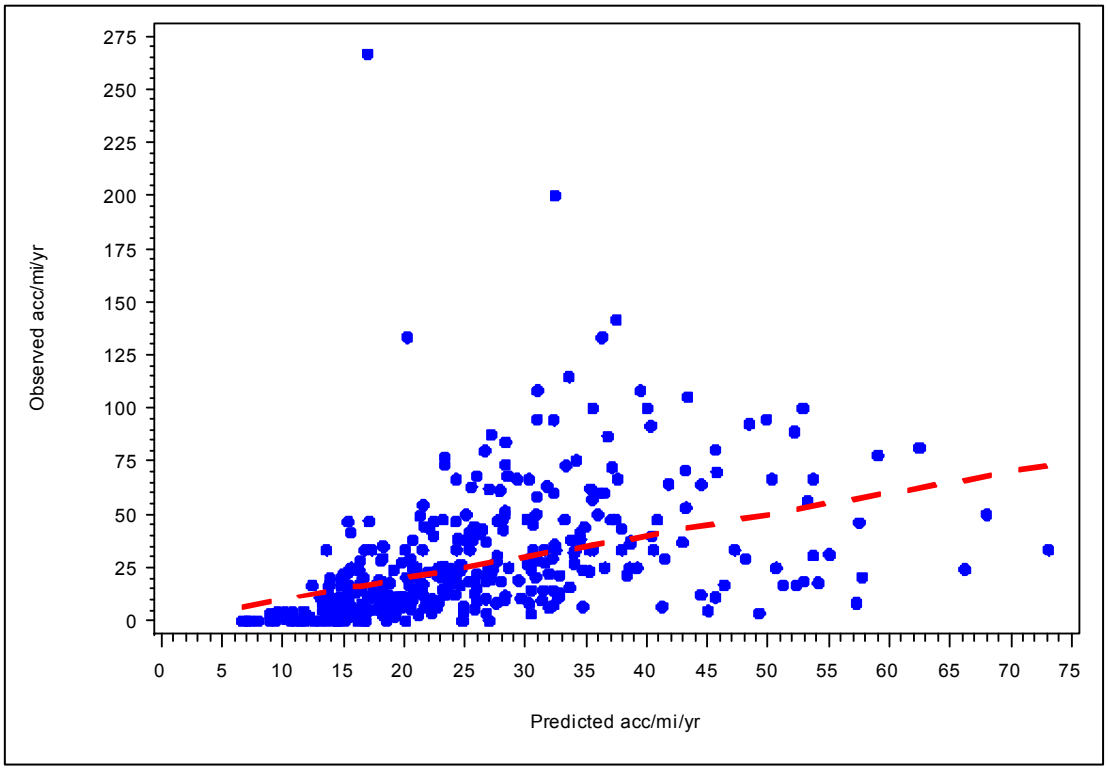

Figure 28. Comparison of total observed vs. predicted accident frequencies for 5T roadway segments in Washington

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In reviewing the scatter plots, it should be recognized that perfect agreement between predicted and observed accident frequencies should not be expected, no matter how good the HSM methodology is. The predicted accident frequencies, at their best, represent an estimate of the long-term average accident frequency for similar sites. The observed accident frequency is simply one observation from a random process whose mean is estimated by the predicted accident frequency. There is no reason to expect that one observation from a random process should exactly equal the long-term mean.

The plots in Figures 24 through 28 each show a fair amount of spread around their line of equality. A few general comments about these plots are made.

- As in all observational studies, each group of roadway segments exhibits a number of extreme observed values. For example, an individual roadway segment may experience an unusually high number of accidents of any or all types; or a very short roadway segment may experience a relatively small number of accidents that, when expressed on a per-mile basis, corresponds to an unusually high accident frequency. Thus, there is inherently greater variability in the observed accident frequencies than in the predicted accident frequencies.
- The methodology cannot predict an accident frequency of zero because each SPF has a positive intercept. This is reasonable because no site can ever be expected to be accident-free in the long term. However, in any given time period, it is reasonable to expect that many sites, particularly lower volume sites, will experience zero observed accidents.
- For the sites with zero observed accident frequencies (i.e., points corresponding to zero on the y-axis), each plot shows a wide range of predicted accident frequencies on the x-axis. For example, in Figure 24 (2U roadway segments), the predicted total accident frequencies for sites with zero observed total accidents range from 1 to 15.8 acc/mi/yr. Similarly, in Figure 28 (5T roadway segments), predicted total accident frequencies for sites with zero observed total accidents range from 6.7 to 27.1 acc/mi/yr. This wide range simply reflects the variety in site characteristics of sites that, by chance, experienced no observed accidents over the 3-year period.

To assess the predictive capability of the methodology, a number of measures of the level of agreement between predicted and observed accident frequencies have been derived. These are:

- mean absolute error
- ratio of observed to predicted value (minimum, median, and maximum)
- Pearson correlation coefficient (lower and upper 95-percent confidence limits)
- percent of over- and underpredicted values
- average probability of more extreme accident frequency
- percentage of extreme observations at the 5-percent significance level

Table 89 presents the values of these validation measures for the Washington dataset. The first column in the table identifies the roadway type for the sites in question. The second and third columns provide sample size and average observed accident frequency (acc/mi/yr) for each roadway and accident type. The fourth through thirteenth columns of the table present the individual validation measures listed above. Each of these measures is discussed below.

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TABLE 89. Validation measures for Washington roadway segments

Roadway type	Number of sites	Mean observed accident frequency (acc/mi/yr)	MAE[a] (acc/mi/yr)	Ratio of observed/predicted accident frequency			Pearson correlation coefficient		Percent over-predicted	Percent under-predicted	Average probability of more extreme accident frequency	Percent of extreme observations at 5% significance level
				Minimum	Median	Maximum	Lower 95% confidence limit	Upper 95% confidence limit				
Total accidents												
2U	286	7.39	5.69	0	0.75	32.15	0.53	0.68	59	41	0.27	5.6
3T	47	10.00	7.08	0	0.70	3.84	0.59	0.85	66	34	0.28	2.1
4U	106	20.73	13.20	0	0.88	6.25	0.51	0.74	56	44	0.27	4.7
4D	54	16.08	10.90	0	0.90	6.89	0.52	0.81	52	48	0.27	5.6
5T	371	28.43	17.25	0	0.79	15.66	0.62	0.73	62	38	0.23	5.9
Fatal-and-injury accidents												
2U	286	3.03	2.92	0	0.40	13.44	0.51	0.66	66	34	0.25	4.2
3T	47	4.09	3.51	0	0.57	9.95	0.56	0.84	64	36	0.29	2.1
4U	106	7.69	5.68	0	0.83	9.30	0.47	0.71	59	41	0.31	0.9
4D	54	5.65	5.08	0	0.57	5.80	0.48	0.79	57	43	0.26	3.7
5T	371	11.57	7.89	0	0.77	14.83	0.58	0.70	60	40	0.28	3.8
Property-damage-only accidents												
2U	286	4.36	3.66	0	0.69	58.86	0.48	0.64	61	39	0.26	7.7
3T	47	5.91	4.77	0	0.65	3.19	0.50	0.82	64	36	0.28	4.3
4U	106	13.04	10.09	0	0.91	6.65	0.44	0.70	53	47	0.25	3.8
4D	54	10.42	7.10	0	1.00	8.92	0.47	0.79	48	52	0.27	9.3
5T	371	16.86	11.05	0	0.72	16.29	0.60	0.71	62	38	0.23	7.8

[a] Mean absolute error.

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Better agreement than shown in Figures 24 through 28 and Table 89 could have been obtained if the Empirical Bayes approach presented in Chapters 4 and 7, which is part of the recommended prediction methodology, had been used. The EB approach estimates the expected accident frequency as a weighted average of the predicted and observed accident frequencies. However, the EB approach was not used in the validation study; since the purpose of the validation study is to compare the predicted and observed values, it seemed inappropriate to move the predicted value toward the observed value by averaging them.

Mean Absolute Error (MAE)

The mean absolute error (MAE) is based on the absolute differences between predicted and observed accident frequencies (acc/mi/yr) and is computed as:

$$MAE = \frac{1}{n}\sum_{i=1}^{n} \left|N_i - O_i\right| \qquad \textbf{(78)}$$

where N_i and O_i are the predicted and observed accident frequencies for site i and n is the validation sample size.

MAE is measured on the same scale as the original data, with smaller values indicating better predictive capability of the model. MAE is based on the absolute value of the differences between N_i and O_i, because positive and negative differences would cancel one another if the absolute value were not taken. Because the MAE is based on absolute differences, it does not provide an overall indication of whether the methodology over- or underpredicts, on average. The MAE measure, as all means, is very sensitive to large differences. Furthermore, differences of equal magnitude contribute equally to the MAE, whether these differences are observed at a low or high accident frequency (e.g., a difference of 2 vs. 1 or 31 vs. 30 yields the same difference of 1 acc/mi/yr).

A comparison of the mean observed accident frequencies and the MAE in Table 89 shows that the absolute errors in predictions are relatively high in each roadway category and for each accident type. One can interpret the MAE as an estimate of the standard deviation in accident frequencies and thus compare the square of the MAE (equivalent to the variance) to the mean accident frequency since accident frequencies are assumed to be NB distributed. The over dispersion in accident data will account for some of the discrepancy between these two measures, but not all.

The large mean absolute errors are also a reflection of the sensitivity of the mean to extreme values. This is illustrated in Figures 29 and 30 which show the variation of absolute errors [$|N_i - O_i|$] for total accidents for four-lane undivided and four-lane divided roadway segments, respectively, over the range of predicted accident frequencies. In Figure 29, although the absolute errors range up to 84 total acc/mi/yr, a large percentage of the errors (89 percent) are below 23 total acc/mi/yr. Similarly, in Figure 30, although the absolute errors range up to 63 total acc/mi/yr, a large percentage of the errors (87 percent) are below 21 total acc/mi/yr.

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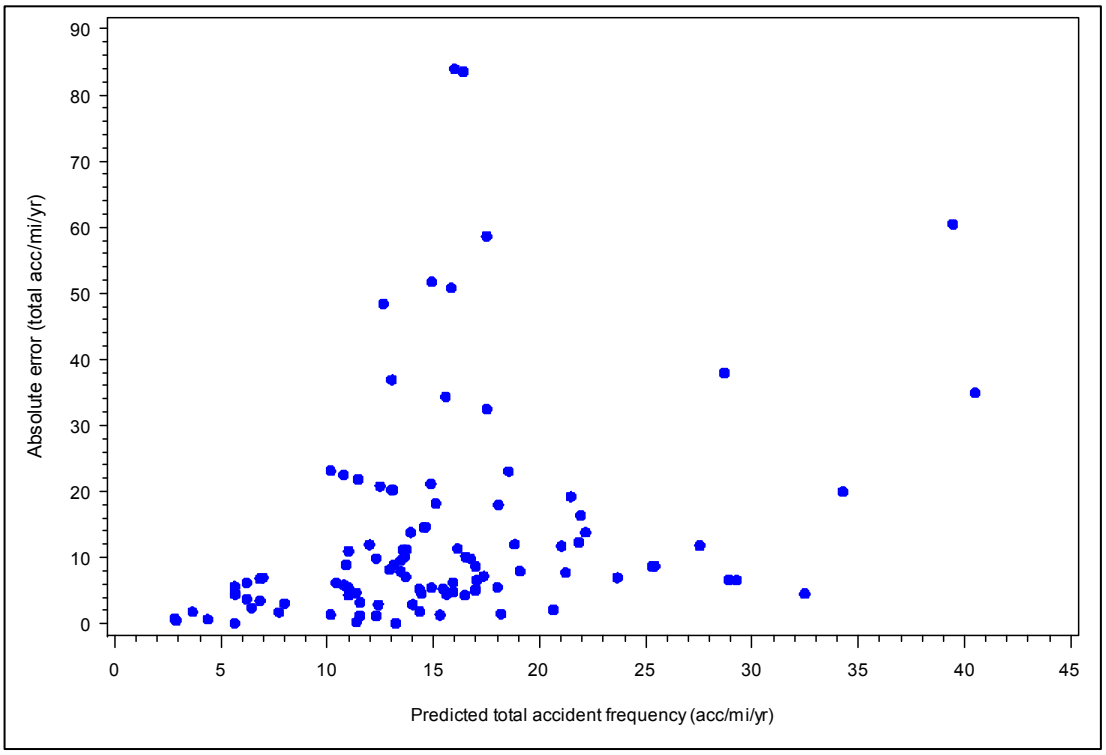

Figure 29. Variation of absolute error with predicted total accident frequency for 4U roadway segments in Washington

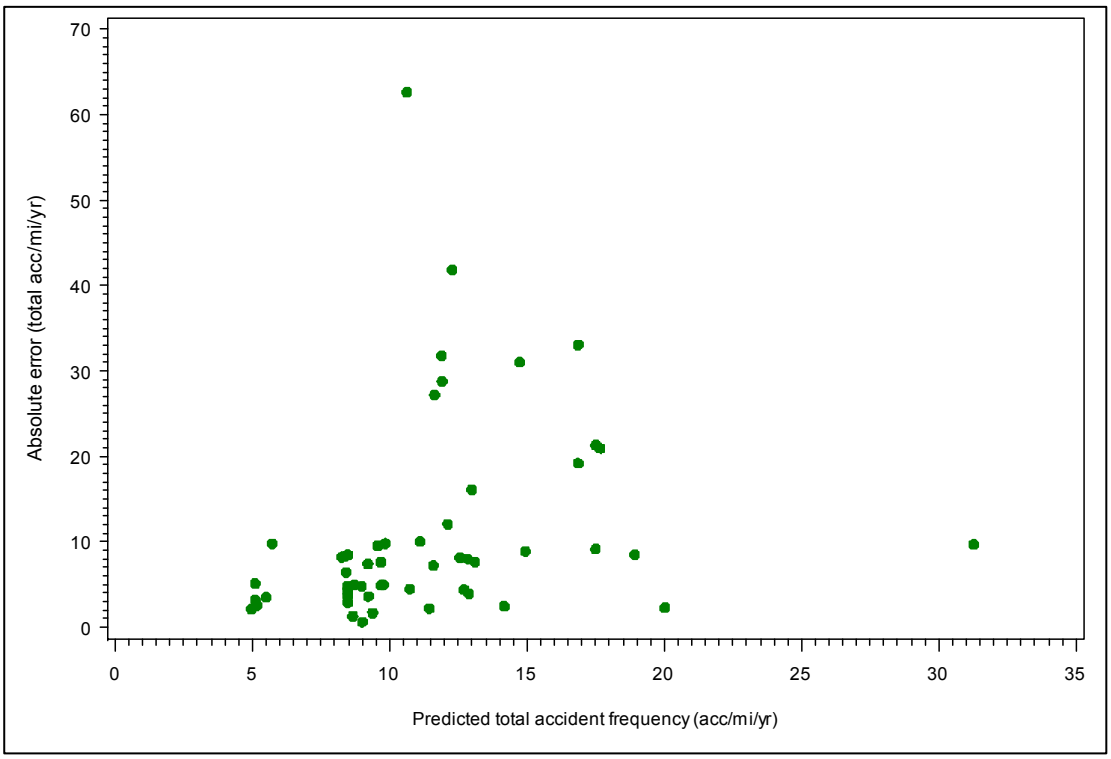

Figure 30. Variation of absolute error with predicted total accident frequency for 4D roadway segments in Washington

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Some of the points in the upper range of absolute error in Figures 29 and 30 are clearly outliers, with very high observed accident frequencies and/or very short segment lengths. Accident patterns at several outlier sites have been reviewed. However, no outliers were removed from the data because, as discussed later in this section, the overall percentage of extreme observations was not higher than expected.

Ratio of Observed to Predicted Value

For each site, the ratio of observed to predicted accident frequency (R_i) is computed as O_i/N_i. The minimum, maximum, and median ratios across all sites of a given roadway type are then tabulated to summarize the distribution of the ratios. Because the distribution of these ratios is not symmetrical, the median is a more appropriate statistic than the mean to represent the central tendency of the data. Although an individual site ratio provides an indication of overprediction ($R_i < 1$) or underprediction ($R_i > 1$) at that particular site, the mean ratio is a biased estimate because overpredicted ratios are bounded by 0 and 1 while underpredicted ratios are only bounded by 1 on the low end and do not have an upper bound.

Minimum, median, and maximum ratios are shown in Table 89. The minimum in all cases is zero since at least one site in each category experienced no accidents over the 3-year validation period. Although the maximum ratios are quite high, especially for 2U and 5T roadways, the median ratio is the most interesting statistic to summarize these results. Except for property-damage-only accidents on 4D roadways (ratio=1.00), the median ratio is at most 0.91, an indication that for half the sites in each roadway category, the methodology overpredicts, which is to be expected for NB distributions. This finding is also in line with the percent of overpredicted results shown in the tenth column of Table 89.

Figures 31 and 32 illustrate the observed/predicted ratio as it varies with predicted accident frequency (acc/site/year) for 4U and 4D roadway segments, respectively. It is clear from these plots that the ratio varies most when the predicted accident frequency is low. For example, in Figure 31, the ratio of observed to predicted accident frequencies varies between 0 and 6.25 for predicted accident frequencies below 2.25 acc/site/yr. However, for predicted accident frequencies above 2.25 acc/site/yr, the ratio varies between 0 and 1.64. Similarly, as shown in Figure 32, the ratio varies only between 0 and 6.89 for predicted accident frequencies below 2.08 acc/site/yr, while for predicted accident frequencies above 2.08 acc/site/yr, the ratio varies between 0.21 and 2.19.

For predicted accident frequencies above 4 acc/site/yr at 4U roadways, the ratio varies between 0.7 and 1.6 (Figure 31). For predicted accident frequencies above 5 acc/site/yr at 4D roadways, the ratio varies between 0.3 and 1.6 (Figure 32).

The plots in Figures 31 and 32 illustrate a fundamental issue in the validation results. The plots illustrate that, for sites with high predicted accident frequencies, the observed and predicted accident frequencies agree quite well. However, for sites with low predicted accident frequencies, the observed accident frequencies vary widely in relative terms; in this case, the observed accident frequency can be relatively low or relatively high. This finding is illustrated

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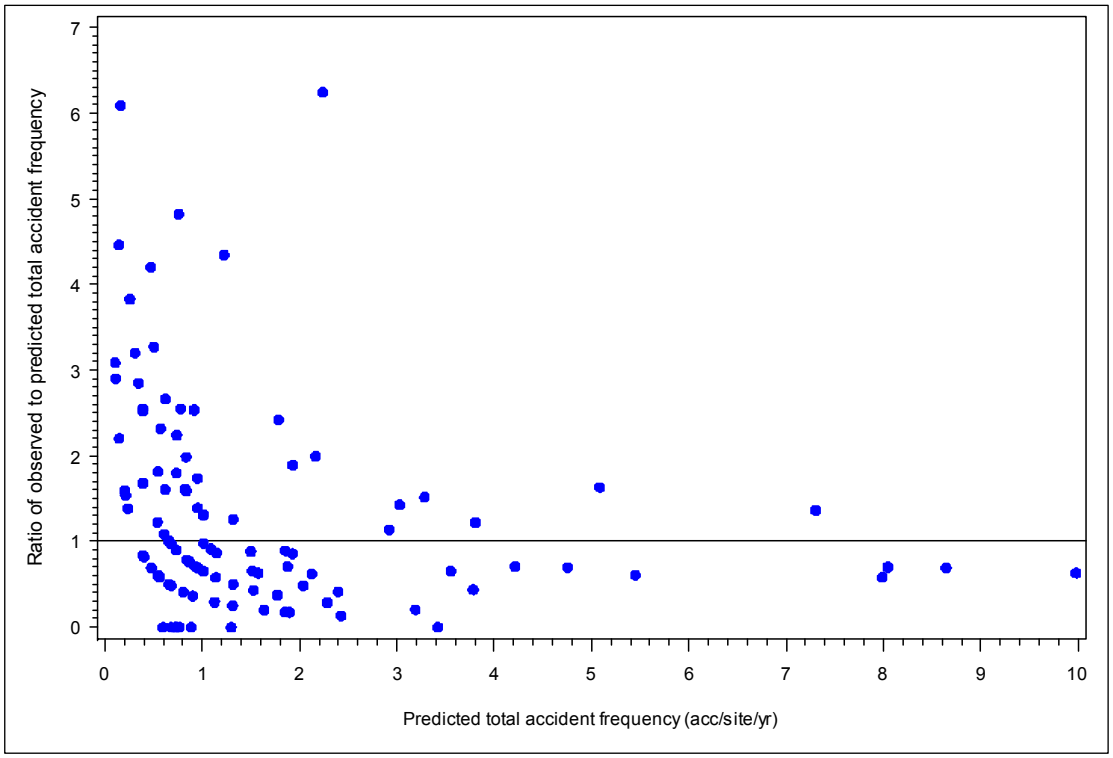

Figure 31. Variation of ratio of observed to predicted total accident frequency with predicted accident frequency for 4U roadway segments in Washington

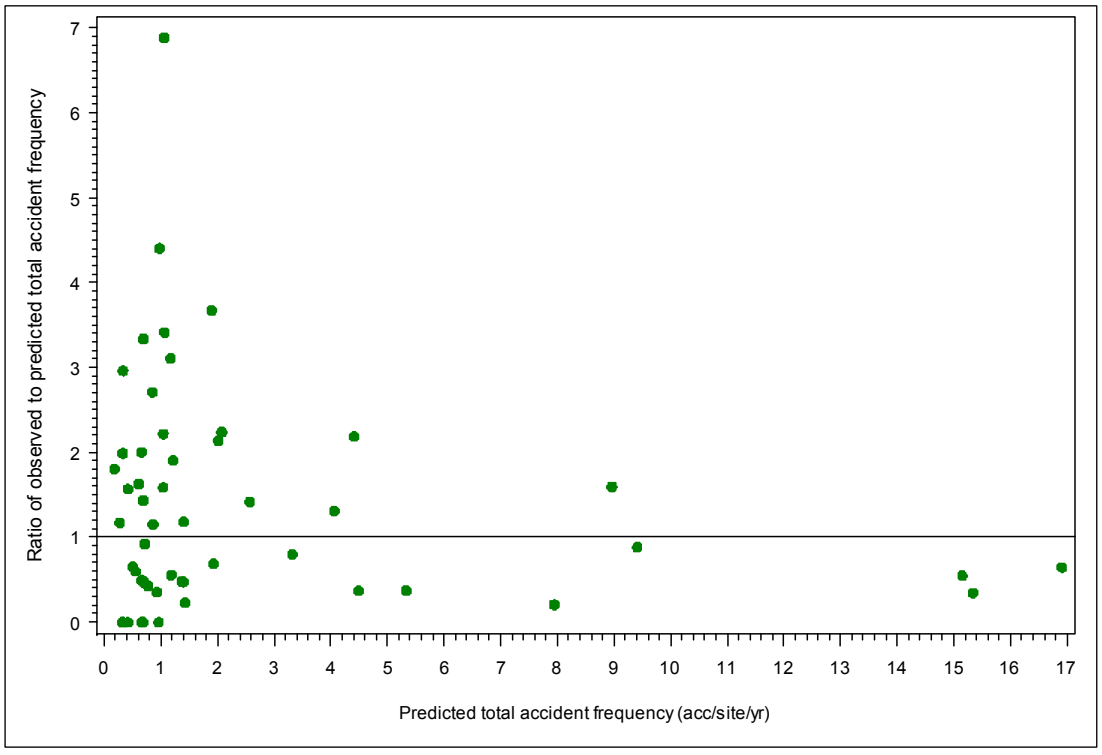

Figure 32. Variation of ratio of observed to predicted total accident frequency with predicted accident frequency for 4D roadway segments in Washington

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by the large vertical range of data on the left side of the plots in Figures 31 and 32 and the limited vertical range of data on the right side of the same plots. In part, this result simply reflects the mathematics of small numbers; when the predicted value is low, even variations in observed accident frequency that are small in absolute terms may be large in relative terms. However, it is also likely that this represents an effect of variables that are not part of the predictive methodology. Driver behavioral variables, such as alcohol and safety belt usage, undoubtedly vary unevenly over the road network and such site-to-site variations are not accounted for by the HSM methodology. Clearly, the relative effect of such variations is greater at sites with low predicted accident frequencies than at sites high predicted accident frequencies.

Pearson Correlation Coefficient

The Pearson correlation coefficient, r, is a statistic that measures the correlation or degree of linear relationship between the observed and predicted accident frequencies (acc/site/year) and is calculated as:

$$r = \frac{\sum_{i=1}^{n} \left(O_i - \overline{O}\right)\left(N_i - \overline{N}\right)}{\sqrt{\sum_{i=1}^{n} \left(O_i - \overline{O}\right)^2 \sum_{i=1}^{n} \left(N_i - \overline{N}\right)^2}} \quad \textbf{(79)}$$

where $\overline{N}$ and $\overline{O}$ represent the mean predicted and observed accident frequencies, respectively.

A value close to 1.0 for the correlation coefficient would indicate nearly perfect agreement between the observed and predicted accident frequencies, indicating that the methodology would have excellent predictive performance. A value close to zero for the correlation coefficient would indicate very poor predictive performance of the methodology. Thus, the correlation coefficient provides a measure of how tightly the points in Figures 24 through 28 fit around a straight line, but not necessarily the line of equality drawn in each figure. To best account for the effect of sample size on the correlation coefficient, the lower and upper 95-percent confidence limits for the correlation coefficient, rather than the correlation coefficient itself, are presented in Table 89. All of the correlation coefficients presented in Table 89 are significantly different from zero at the 95-percent confidence level, indicating that predicted and observed accident frequencies are significantly correlated. The correlation coefficients are relatively high as confirmed by their 95-percent confidence intervals. For total accidents, the lower 95-percent confidence limit of the correlation coefficient varies between 0.51 and 0.62, while the upper 95-percent confidence limit varies between 0.68 and 0.85, across the five roadway types. Obviously, the roadway groups with the smallest sample sizes (3T and 4D) produce the widest confidence interval for the correlation coefficient. Similar patterns are shown for fatal-and-injury and property-damage-only accidents.

The correlation coefficients are, in a sense, expected to be relatively high since both observed and predicted accident frequencies are 3-year averages. If one were to compare the three yearly observed accident frequencies (these are simply three observations from a NB distribution) to the three predicted accident frequencies (these show very little variability, if any, due to minor year-to-year variations in ADT only), then the correlation between observed and predicted would be expected to be lower. An extreme case would be to correlate an almost

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constant predicted accident frequency of one or many sites with the same ADT but many years of accident data to the observed accident frequencies—in that case, the correlation coefficient should be close zero for all practical purposes.

The values of correlation coefficients, in the overall range from 0.51 to 0.85, are consistent with a methodology based on SPFs that are statistically significant, but vary in their goodness of fit (see Chapter 5).

Percent of Overpredicted and Underpredicted Values

The percentage of values that are either overpredicted or underpredicted, calculated by summing counts of positive or negative errors across sites and dividing by the total validation sample size, provides another measure of the predictive capability of the methodology. Since these values are complements of each other, the larger of the two percentages indicates systematic over- or underprediction of the methodology. A 50/50 split of these percentages would be a desirable result. The percentage of overpredicted or underpredicted values is simply equivalent to counting how many points are below or above the line of equality in Figures 24 through 28. As such, these percentages do not provide a measure of the error in prediction as does the MAE, but rather some measure of overall tendency for over- or underprediction.

In all but one case (property-damage-only accidents on 4D roadways with 52 percent underprediction), the methodology slightly overpredicts average accident frequencies, with 52 to 66 percent of sites having predicted accident frequencies to exceed their observed accident frequencies. This is to be expected based on the theoretical behavior of the NB distribution of accident frequencies. These percentages are consistent with the median ratios of observed to predicted accident frequencies discussed above.

Likelihood of Extreme Observed Accident Frequencies

Consideration of the likelihood of extreme observed accident frequencies, either high or low, is a method that directly takes into account the parameters of the NB distribution (i.e., mean and over dispersion) of accident frequencies at a particular type of roadway segment. The observed accident frequency for a given collision type (i.e., multiple-vehicle nondriveway, single-vehicle, or driveway accident) on a roadway segment is assumed to come from a distribution that has been modeled by means of an SPF (i.e., an NB regression model). This applies to total accidents, fatal and injury accidents, and PDO accidents.

Equations (45), (46), and (47) from Chapter 7 used in the methodology to predict N_{rs}, the average number of roadway segment accidents per year, can be rewritten as:

$$N_{rs} = (N_{brmv} + N_{brsv} + N_{brdwy})\ AMF_{1r}AMF_{2r}AMF_{3r}\ (1 + f_{pedr} + f_{biker})\ C_r \quad \textbf{(80)}$$

For discussion purposes, this can be further simplified to read:

$$N_{rs} = (N_{brmv} + N_{brsv} + N_{brdwy})\ A \quad \textbf{(81)}$$

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where $$A = AMF_{1r}AMF_{2r}AMF_{3r}\,(1 + f_{pedr} + f_{biker})\,C_r \quad \textbf{(82)}$$

Let the total number of *observed* accidents, O_i, of a given type (total, fatal and injury, or PDO) on a roadway segment, i, during the 3-year period, be represented by:

$$O_i = O_{mv,i} + O_{sv,i} + O_{dwy,i} + O_{ped,i} + O_{bike,i} \quad \textbf{(83)}$$

where $O_{mv,i}$, $O_{sv,i}$, $O_{dwy,i}$, $O_{ped,i}$, and $O_{bike,i}$ are the observed 3-year multiple-vehicle nondriveway, single-vehicle, driveway, pedestrian, and bicycle accident frequencies, respectively, at site i.

The likelihood of observing O_i accidents is then computed under the assumption that $O_{mv,i}$, is an observation from a NB distribution with mean μ_1 and over dispersion parameter k_1; $O_{sv,i}$, is an observation from a NB distribution with mean μ_2 and over dispersion parameter k_2; and $O_{dwy,i}$ is an observation from a NB distribution with mean μ_3 and over dispersion parameter k_3. The means μ_1, μ_2, and μ_3 are simply the 3-year sums of the respective yearly SPF values calculated for the site-specific ADT and segment length. These SPFs along with their respective over dispersion parameters are presented in Tables 30, 35, and 38 for multiple-vehicle nondriveway, single-vehicle, and driveway-related collisions, respectively.

Based on Equation (83), the likelihood of observing O_i or fewer accidents at site i can then be written as:

$$p_i = \text{prob}\{\text{Total number of accidents } \le O_i\} \quad \textbf{(84)}$$

or

$$p_i = \text{prob}\{(MV_i + SV_i + DWY_i)\,A \le O_i\} \quad \textbf{(85)}$$

or

$$p_i = \text{prob}\{(MV_i + SV_i + DWY_i) \le B\} \quad \textbf{(86)}$$

where $$B = \text{floor}(O_i/A), \text{ the largest integer} \le (O_i/A) \quad \textbf{(87)}$$

Note that, in Equation (85), the coefficient A is based on the average yearly calibration factor, C_r, as shown earlier in this chapter. Expanding Equation (85) to yearly terms, each with a yearly calibration factor, would add an unnecessary level of complexity to the calculations of the probabilities, p_i.

Assuming that MV, SV, and DWY accident frequencies are independent random variables, Equation (86) can be written as:

$$p_i = \sum_{x=0}^{B} \sum_{y=0}^{B-x} \sum_{z=0}^{B-x-y} f_{MVi}(x)\, f_{SVi}(y)\, f_{DWYi}(z) \quad \textbf{(88)}$$

where $f_{MVi}(x)$ is the probability distribution function for a NB with mean μ_1 and over dispersion parameter k_1; $f_{SVi}(y)$ and $f_{DWYi}(z)$ are defined similarly; and values of x, y, and z = 0, 1, 2, …, B. If $p_i \ge 0.5$, then p_i was calculated as $1\text{-}p_i$. This approach is equivalent to calculating the area under the cumulative distribution curve at either low or high tail of the distribution.

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Two final single-value criteria to assess how well the observed accident frequencies can be estimated by the proposed methodology are then proposed:

- Mean probability, the average across all segments of a given roadway type for a particular accident type (i.e., total, FI, and PDO). On average, the mean would be close to 0.25 if the methodology is to fit the observed data reasonably well.
- The percent of sites with observed accident frequencies outside the upper and lower 2.5-percentile of the theoretical distribution. This value is calculated as:

$$Pct_{Unlikely} = 100\ [\text{Number of sites where } p_i \leq 0.025)/\text{Total number of sites}] \quad \textbf{(89)}$$

On average, the value of $Pct_{Unlikely}$ would be close to 5 percent if the methodology is to fit the observed data reasonably well, since one would expect, on average, that 5 percent of the observed values be outside the middle 95 percent of the distribution.

Figures 33 through 35 illustrate the distribution of the individual p_i values, separately for each accident type, in the form of side-by-side box plots for each roadway type. The dot in each box indicates the mean probability for a given roadway type, while the horizontal line in each box indicates the median. The shaded box represents the middle 50 percent of the distribution; the width of each box is proportional to the number of roadway segments of a specific type. The whiskers simply connect a box to the highest and lowest p_i values. Three horizontal reference lines are drawn: one at 0.25, the expected median probability; the others at 0.125 and 0.375 to mark the 25th- and 75th-percentiles of the theoretical distribution.

The average probabilities for all roadway types for total accident frequencies are all very close to the theoretically expected value of 0.25, ranging between 0.23 and 0.28, as shown in Table 89. Furthermore, one would theoretically expect the middle 50 percent of the estimated probabilities, p_i, to be between 0.125 and 0.375 (i.e., 0.25±0.25/2). This is consistent with the information shown in the box plots in Figure 33 where the shaded box falls, for all practical purposes, between the dashed lines drawn at 0.125 and 0.375 for each roadway type. The most extreme observations, i.e., those with less than a 5-percent chance of being observed, given the prediction model used, occur less than 5.9 percent of the time as shown in the last column of Table 89.

Figure 34 and Table 89 show that the average probabilities for all roadway types except 2U, for fatal-and-injury accident frequencies are slightly above the theoretically expected value of 0.25, ranging between 0.25 and 0.31. In this case, the middle 50 percent of the estimated probabilities are slightly elevated and outside the 0.125 and 0.375 band, except for 2U roadways. Therefore, the most extreme observations occur less than 4.2 percent of the time as shown in the last column of Table 89.

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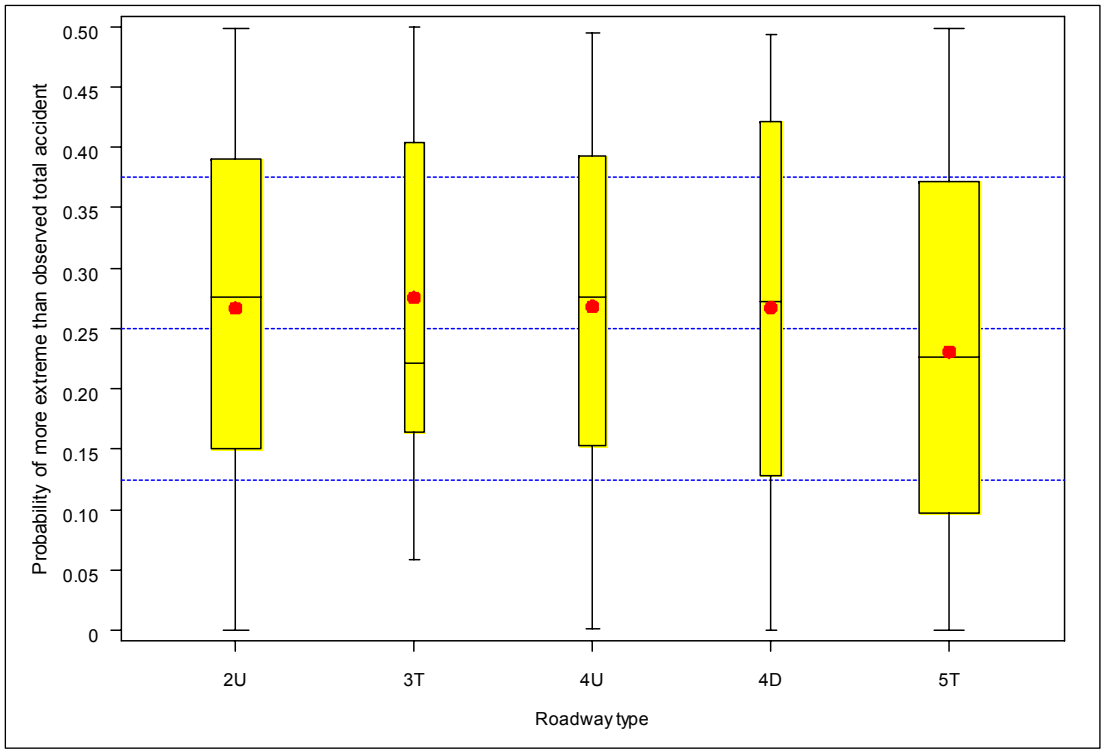

Figure 33. Distribution of probabilities of observing a more extreme total accident count than the observed count on roadway segments in Washington

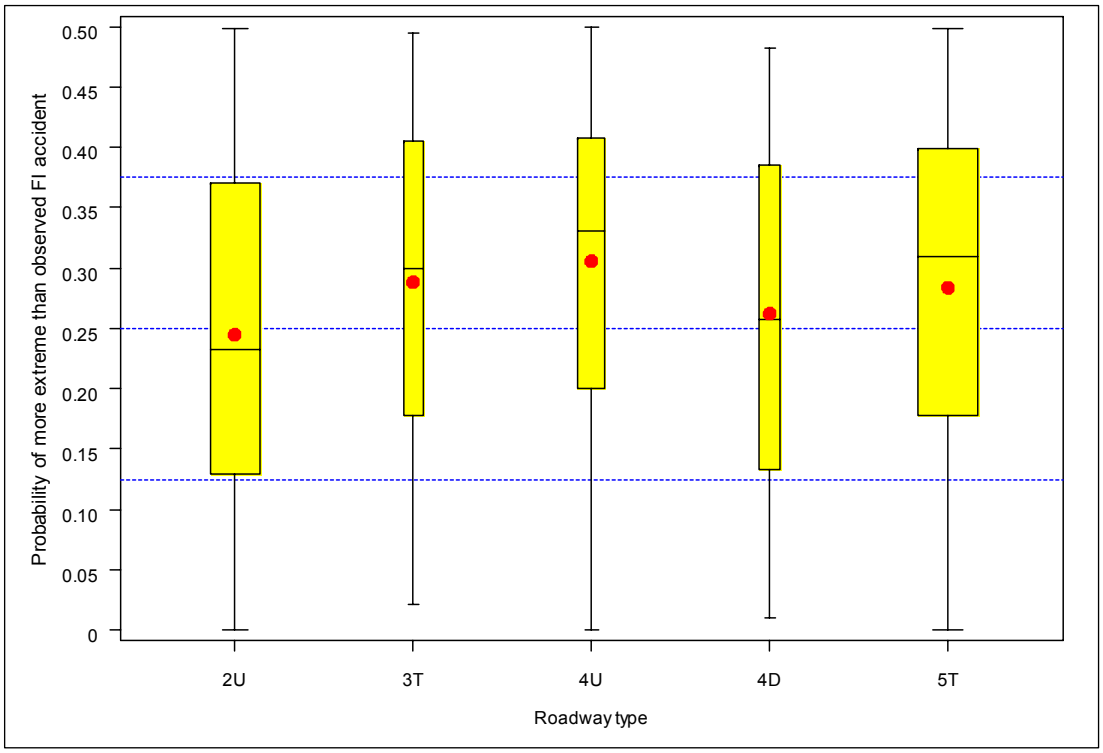

Figure 34. Distribution of probabilities of observing a more extreme FI accident count than the observed count on roadway segments in Washington

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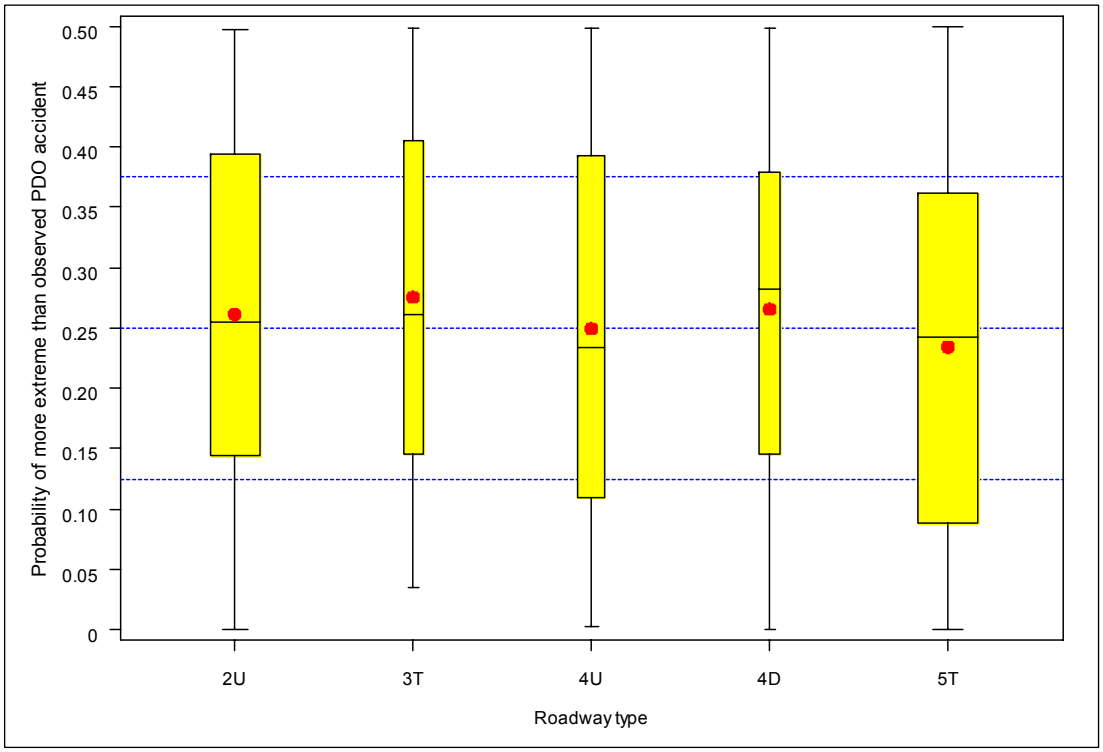

Figure 35. Distribution of probabilities of observing a more extreme PDO accident count than the observed count on roadway segments in Washington

Figure 35 and Table 89 show that the average probabilities for all roadway types for property-damage-only accident frequencies are all close to the theoretically expected value of 0.25, ranging between 0.23 and 0.28. In this case, the middle 50 percent of the estimated probabilities fall, for all practical purposes, inside the 0.125 and 0.375 band. The most extreme observations occur less than 9.3 percent of the time as shown in the last column of Table 89. These percentages are slightly elevated as compared to 5 percent for 2U, 4D, and 5T roadways, indicating that a few sites in these roadway categories experienced either unusually low or unusually high accident frequencies given the prediction model used.

For all three accident types, these results support the conclusion that the methodology has acceptable predictive capability across all roadway types considered. Specifically, the average probability of predicting a more extreme accident frequency is consistently close to the expected value of 0.25. The percent of extreme observations is generally below or only slightly above the expected value of 5 percent. The results indicate that the NB distribution was an appropriate choice for the modeling effort and that the SPF parameters estimated from the Minnesota and Michigan data combined with the HSM methodology as a whole are applicable to the validation dataset.

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Summary of Roadway Segment Validation

The HSM methodology developed from the Minnesota and Michigan data shows good overall predictive performance when calibrated and applied to a new dataset from Washington State. This is evidenced by the relatively good fit of the empirical distribution of the Washington State data to the theoretical distribution derived from the Minnesota and Michigan data. On average, the prediction errors of the methodology are larger than we would like, but the relative magnitude of the prediction error appears to be strongly influenced by the magnitude of the predicted accident frequency.

For sites for which the methodology predicts relatively high accident frequencies, the predictions are quite accurate in relative terms (see the left end of the plots in Figures 31 and 32). For sites for which the methodology predicts low accident frequencies, the predictions are less accurate in relative terms. In other words, some sites with low predicted accident frequencies also have low observed accident frequencies, but other sites with low predicted accident frequencies have high observed accident frequencies.

It should be recognized that the purpose of the HSM methodology is to predict the effect of engineering factors on safety. The methodology does not incorporate the effect of driver behavioral factors, such as alcohol or safety belt usage, because the prediction of behavioral effects was not within the scope of the research and because no site-specific data on behavioral factors were available for use in the research even if the evaluation of behavioral factors had been desired.

The accuracy of the procedure for sites with high predicted accident frequencies is a valuable result, because it is precisely at sites with high accident frequencies that the accuracy of the methodology is most important. (If the opposite were true and the methodology were most accurate for sites with low accident frequencies, it would be more difficult to justify the use of the methodology.) While there is no formal way to separate the influences of engineering and behavioral factors on observed accident frequencies, the relative accuracy of the procedure for sites with high predicted accident frequencies suggests that the methodology does reasonably well in assessing the safety effects of engineering factors and that, where low accident frequencies are predicted, but high accident frequencies are observed, this may be explained by behavioral factors.

INTERSECTION VALIDATION STUDY

The HSM methodology for intersections was validated through application to a set of signalized intersections on arterials under the jurisdiction of the Florida Department of Transportation. The intersection validation dataset included 454 four-leg signalized intersections. The intersection characteristics and crash database for these sites was assembled by Abdel-Aty et al. (*136*) for the Florida Department of Transportation.

Tables 90 and 91 summarize the characteristics of the Florida intersection validation set. Florida accidents are reported in two different levels of detail. A long-form accident report is

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used for all fatal and injury accidents and for property-damage-only crashes that meet several established criteria. A short form is used for all other property-damage-only accidents. Since reporting levels for short-form accidents are likely to vary widely, only accidents reported on the long form were considered in the validation study. The 454 intersections experienced 3,702 accidents reported on the long form in a 2-year period including 2000 and 2001. The Florida intersections are located in Brevard, Hillsborough, Miami-Dade, Orange, and Seminole Counties.

TABLE 90. Summary of intersection accident and exposure data for Florida validation dataset

Average major-road ADT (veh/day)	Average minor-road ADT (veh/day)	Total exposure (10^6 veh-mi)[a]	Total number of accidents[a]	Average accident rate (per 10^6 veh-mi)
21,828	11,038	10,892.6	3,702	0.34

NOTE: Based on 454 four-leg signalized intersections.
[a] In 2-year period.

TABLE 91. Descriptive statistics for intersection traffic volumes in Florida validation dataset

ADT statistic (veh/day)	Major-road ADT	Minor-road ADT
Mean	21,828	11,038
Median	18,498	8,277
Standard deviation	606	413
Minimum	2,214	251
Maximum	67,521	64,392

NOTE: Based on 454 four-leg signalized intersections.

The Florida intersection data set is not as suitable for validation purposes as the Washington roadway segment dataset because only two years of crash data are available and because the crash counts for those two years are combined and cannot be separated. Thus, for the Florida intersection validation study, calibration was performed for both years of crash data combined rather than separately for each year.

Validation Procedure

The first step in applying the HSM methodology to the Florida intersection sites was to calibrate the methodology to Florida conditions. The HSM methodology was applied to each intersection and a calibration factor was computed as the ratio of the total observed accident frequency to the total predicted accident frequency for all 454 four-leg signalized intersections. The calibration factor (C_i) determined from this process for Florida intersections was 0.56. This calibration factor indicates that the average accident frequency for the Florida intersections is about half that of the Minnesota and North Carolina intersections from which the HSM methodology was derived.

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The HSM methodology was then reapplied to each of the Florida intersections incorporating the calibration factor, C_i. The predicted accident frequency for a 2-year period at each intersection was then compared to the observed accident frequency for the same 2-year period. The validation results are presented below.

Validation Results

The approach used to validate the intersection prediction methodology is identical to that used for roadway segments. Figure 36 shows a plot of the predicted and observed total accident frequencies for each Florida intersection (acc/int/yr). The line of equality which would represent perfect agreement between the predicted and observed accident frequencies is also shown.

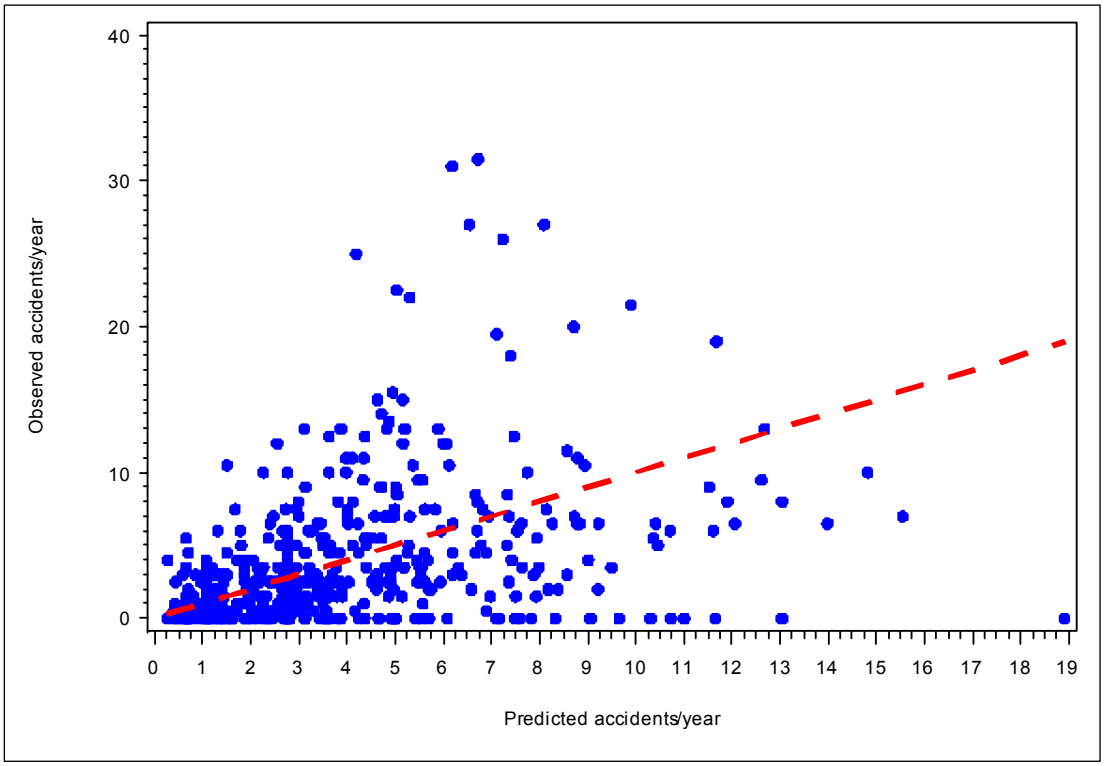

Figure 36. Comparison of total observed vs. predicted accident frequencies at four-leg signalized intersections in Florida

As in the roadway segment validation, a number of measures of the level of agreement between the predicted and observed accident frequencies were derived. Table 92 presents the values of these measures for the intersection validation study.

For total and fatal-and-injury accidents, the mean absolute error is relatively high compared to the mean accident frequency if one compares the square of MAE with the mean, as was the case for the Washington roadway segments. The methodology on average, overpredicts accident frequencies, as is expected given the nature of the data to which the NB distribution is

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TABLE 92. Validation measures for Florida intersections

Accident severity level	Mean accident frequency (acc/yr)[a]	MAE (acc/yr)[b]	Ratio of observed/predicted accident frequency			Pearson correlation coefficient		Percent over-predicted	Percent under-predicted	Average probability of more extreme accident frequency	Percent of extreme observations at 5% significance level
			Minimum	Median	Maximum	Lower 95% confidence limit	Upper 95% confidence limit				
Total	4.08	3.08	0	0.73	14.40	0.27	0.43	58	42	0.18	22
Fatal and injury	2.44	2.13	0	0.78	10.71	0.13	0.30	56	44	0.18	19
Property damage only	1.63	1.32	0	0.67	20.80	0.35	0.50	63	37	0.18	25

NOTE: Based on 454 four-leg signalized intersections.

[a] Mean observed and predicted accident frequencies are equal as a result of calibration.

[b] Mean absolute error.

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applied. This is supported by the percentage of overpredicted values, ranging from 56 to 63 percent across the three accident severity levels; These percentages of overpredicted values are similar to those for the Washington roadway segments.

Figure 37 presents the variation of ratio of observed to predicted accident frequency for the Florida intersections in comparison to the predicted accident frequency. As in the case of the Washington roadway segments, there is much less scatter at higher predicted accident frequencies (the right side of the plot) than at lower predicted accident frequencies (the left side of the plot). However, the points on the right side of the plot appear to be more consistently below the line representing a ratio of 1.0 (i.e., generally overpredicted) than was the case for the Washington data.

Although significantly different from zero, the correlation coefficient between predicted and observed accident frequencies are lower than for the Washington roadway segment dataset, with upper confidence limits of the coefficient ranging from 0.3 to 0.5.

The last two columns in Table 92 indicate the relatively poor predictive capability of the methodology based on this intersection dataset. This fact is further supported by the box plots of the distribution of the probability, p_i, of observing more extreme accident frequencies than those observed shown in Figure 38. It is clear that the middle 50 percent of the distribution is not contained within the 0.125 to 0.375 probability band for either accident type. The mean probability is 0.18 for all three accident type, markedly below the expected value of 0.25. Furthermore, as shown in the last column of Table 92, the most extreme observations occur between 19 and 25 percent of the time, which is substantially higher than the expected value of 5 percent.

Summary of Intersection Validation

The results of the validation study for Florida intersections are less promising than the results presented above for Washington roadway segments. While the roadway segment validation suggests that the HSM methodology provides results for Washington roadway segments that are consistent with the Minnesota and Michigan roadway segments from which the methodology was developed, the same cannot be said for the Florida intersections. The authors believe that this may arise more from the nature of the Florida dataset than from an inherent weakness of the HSM intersection methodology, but this cannot be proven from the available results. It is recommended that an alternative dataset be sought for intersection validation.

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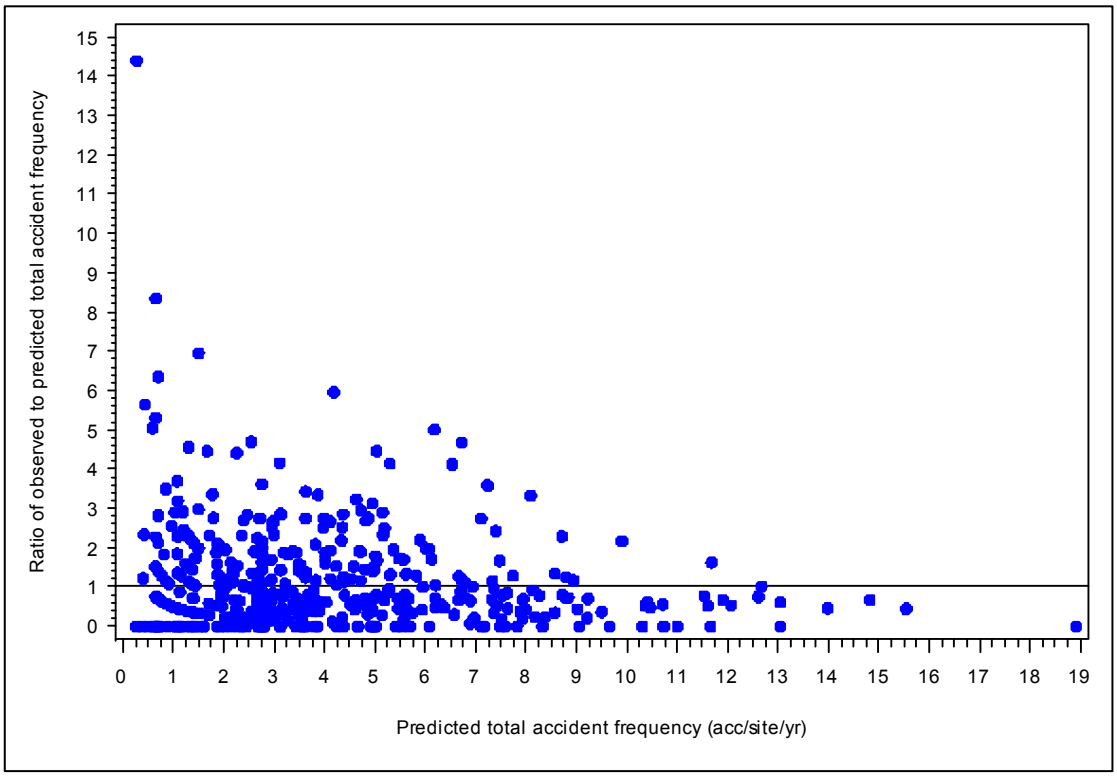

Figure 37. Variation of ratio of observed to predicted accident frequency for 4SG intersections in Florida

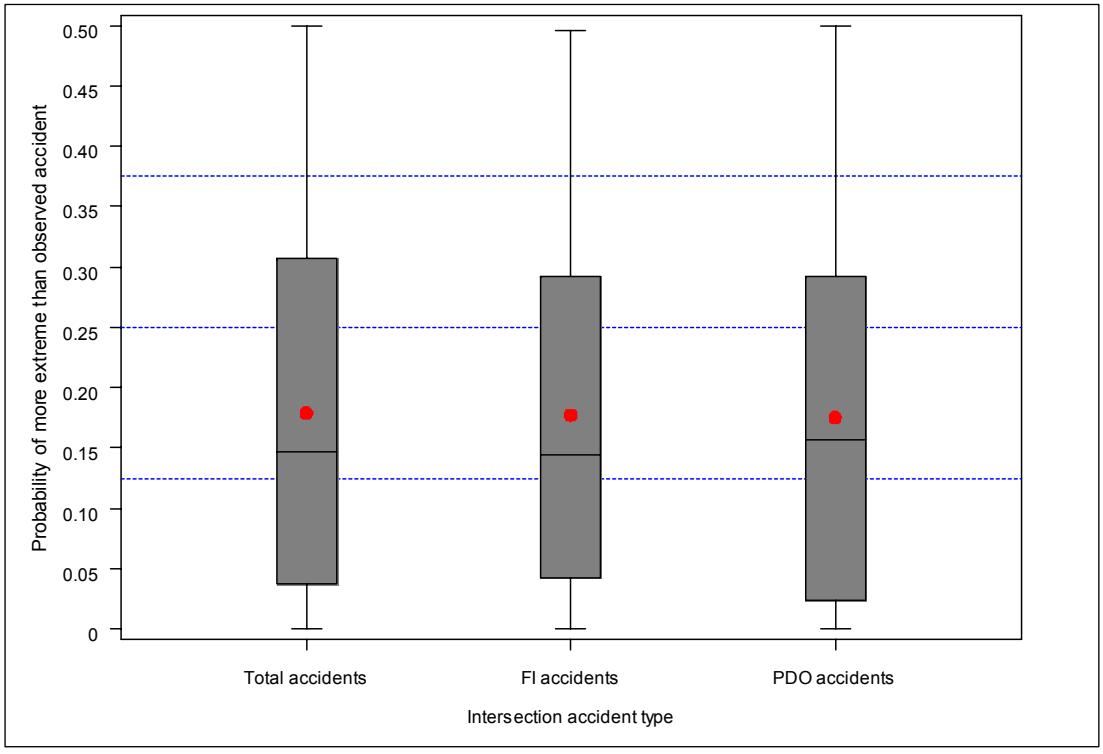

Figure 38. Distribution of probabilities of observing a more extreme accident count than the observed count at four-leg signalized intersections in Florida

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CHAPTER 9.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations have been developed in this research:

1. The forthcoming *Highway Safety Manual* (HSM) can serve as a valuable tool to assist highway agencies in estimating the safety performance of specific roads. The safety effectiveness of planned projects for specific roads can be estimated by applying the HSM methodologies to the conditions before and after the project.
2. The research presented in this report has developed and demonstrated a safety prediction methodology for urban and suburban arterials suitable for incorporation in the HSM.
3. The safety prediction methodology for urban and suburban arterials uses a "building block" approach. Separate predictions of safety performance are made for the individual roadway segments and intersections that constitute a roadway or project of interest. Those separate predictions are summed over all of the segments and intersections that make up the roadway or project. For each individual roadway segment or intersection, predictions of safety performance are made for multiple-vehicle nondriveway collisions, single-vehicle collisions, driveway-related collisions, vehicle-pedestrian collisions, and vehicle-bicycle collisions and are then combined to estimate the safety performance of the roadway segment or intersection.
4. The safety prediction methodology incorporates base models that account for the effects of traffic volume levels on safety and accident modification factors (AMFs) that account for the safety effects of on-street parking, roadside fixed objects, shoulder width, and lighting for roadway segments, and left-turn lanes, left-turn signal phasing, right-turn lanes, right turn on red, red light cameras, and lighting for intersections.
5. The safety prediction methodology has been developed with data for roadway segments in Minnesota and Michigan and intersections in Minnesota and North Carolina. The methodology includes a calibration procedure to adjust the methodology to local conditions in each geographical area to which it is applied. A calibration procedure has been recommended, but further efforts are underway in NCHRP Project 17-36 to develop a common calibration procedure for all of the HSM prediction methodologies.
6. The safety prediction methodology for vehicle-pedestrian collisions presented in this report is preliminary. A more complete pedestrian safety prediction methodology is currently under development in Phase III of NCHRP Project 17-26 and will be incorporated in the HSM methodology when development and testing is complete.

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7. The safety prediction methodology for roadway segments has been validated using data for arterial roadway segments in Washington. The validation results indicate that the HSM methodology is most accurate for sites where the predicted accident frequency is high. The HSM methodology provides less accurate predictions for sites with low predicted accident frequencies where factors not incorporated in the methodology, such as driver behavioral factors, may have a stronger relative influence on observed accident frequencies.
8. The safety prediction model for intersections has been validated using data for arterial intersections in Florida. The results of the validation study indicate that the intersection methodology is less accurate than the roadway segment methodology. However, this result may reflect limitations of the validation dataset rather than weakness of the safety prediction methodology. Additional validation with a different dataset would be desirable.
9. The safety prediction methodology presented in this report, with the planned improvements to the pedestrian safety prediction methodology, appears suitable for incorporation in the first edition of the HSM. Further validation of the intersection methodology may be desirable. The roadway segment and intersection methodologies in the draft of HSM Chapter 10 should be reviewed for consistency with the other methodologies planned for incorporation in the first HSM edition. The HSM will be maintained and updated over time.
10. The safety prediction models presented in this report should be incorporated into the first edition of the HSM as part of the HSM production work in NCHRP Project 17-36, with further modifications as needed.
11. The HSM needs to explain the limitations of the safety prediction methodology, including the methodology's focus on engineering factors. It should be clearly noted that the HSM prediction methodologies have not been developed to address site-by-site variations in driver behavioral factors.
12. Future research needs to improve the HSM methodology in future editions of the HSM include refining the current base models and AMFs and incorporating models or factors for the effect on safety of traffic speed on roadway segments and intersection approaches, multiple turn lanes at intersections, channelized right turns at intersections, sight distance at intersections, roundabouts, and school zones.
13. Further development of the factors for driveway safety would be desirable including the incorporation of factors to distinguish between the safety performance of driveways on divided arterials with and without median openings.
14. Future research is needed on the effect of bicycle facilities on vehicle-bicycle collisions, similar to the research that is currently underway on the effect of pedestrian facilities on vehicle-pedestrian collisions.

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Appendix A

Survey Results

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SURVEY RESULTS

This appendix presents the results of the survey of potential HSM users that was conducted as part of the research. The purpose of this survey was to obtain an assessment of potential user needs for the safety prediction methodology for urban and suburban arterials.

SURVEY QUESTIONNAIRE

Figure A-1 presents a copy of the questionnaire that was used to conduct the survey. The survey was sent to recipients by both mail and e-mail. Responses were returned by mail, e-mail, and fax.

SURVEY RECIPIENTS

The mailing list for the survey included:

- 50 state highway agencies
- 100 local highway agencies
- 100 metropolitan planning organizations (MPOs)
- 28 TRB task force members

Thus, a total of 278 survey questionnaires were mailed.

The state highway agency surveys were sent to the state safety or traffic engineer; for state highway agencies represented on the AASHTO Standing Committee on Highway Traffic Safety, the survey was sent to the committee member.

The local agency surveys were sent to traffic engineers in city or urban/suburban county agencies throughout the U.S. that were members of the ITE Urban Traffic Engineers Council; the local agencies were selected to include one to four agencies in each state depending on the size of the state.

The MPOs to whom the survey was sent were selected from the web site of the Association of Metropolitan Planning Organizations. From one to four MPOs were selected in each state, depending upon the size of the state.

The survey was also sent to the members of the TRB Task Force on Developments of the Highway Safety Manual. The task force members represent a broad range of researchers and practitioners and their views are very relevant because the task force has the responsibility to approve all HSM materials prior to publication.

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SURVEY ON PREDICTION OF THE SAFETY PERFORMANCE FOR URBAN AND SUBURBAN ARTERIALS
NCHRP Project 17-26

The Transportation Research Board (TRB) and the National Cooperative Highway Research Program (NCHRP), which is managed by TRB and cosponsored by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO), are working to create a *Highway Safety Manual* (HSM). The HSM will organize knowledge about highway safety for application by highway agencies and will include procedures to predict the quantitative safety performance of highways and streets, much as the *Highway Capacity Manual* (HCM) predicts the quantitative traffic operational performance of highways and streets.

In NCHRP Project 17-26, Midwest Research Institute (MRI) is working to develop a methodology to predict the safety performance of urban and suburban arterials that can be used in the HSM chapter on urban and suburban arterials. The purpose of this survey is to obtain your views on the scope and content of the methodology and to identify sources of data that may be useful in developing the methodology. Your response to the following questions would be appreciated.

1. What type of organization do you represent?
   ___State highway agency
   ___County highway agency
   ___City/municipal highway agency
   ___Metropolitan planning organization
   ___Other government agency
   ___Consulting firm
   ___University/research agency
   ___Other private sector organization

***HIGHWAY SAFETY MANUAL* APPLICATIONS**

2. Please rate the potential usefulness to your agency for each of the following potential applications of a quantitative safety prediction procedure for urban and suburban arterials (i.e., which applications would be most useful to your agency)? [Rating 5=high priority (very useful); 1=low priority (not needed)] Please do not assign the same priority to every application; your thoughtful assessment of which applications would be most useful to your agency would be very helpful.

   ___ estimating the current safety performance for an existing arterial for which accident history data are not available or are not considered reliable

Figure A-1. Questionnaire Used for Survey

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___ estimating the safety performance for an existing arterial combining model predictions and actual, reliable accident history data

___ forecasting the future change in safety performance that may occur on an existing facility as traffic volumes grow

___ forecasting the safety effectiveness for a proposed improvement project on an existing arterial

___ forecasting the safety performance of a new arterial that has not yet been constructed

___ forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (i.e., for development impact studies or driveway permit requests)

CURRENT SAFETY PREDICTION METHODS

3. Does your agency use, or are you developing, any statistical models or other methods to predict or estimate the safety performance of particular urban and suburban arterials?
___ YES ___ NO

If YES, please describe or attach a copy of your agency's models or methodology:

INPUT VARIABLES TO THE PREDICTION METHODOLOGY

In developing the prediction methodology, candidate input variables will be selected based on a literature review of the relationships of specific variables to safety, statistical relationships developed as part of the research, and the priorities of potential HSM users. Therefore, we would appreciate your assessments to, if you had your choice, which variables should be included in the safety prediction methodology for urban and suburban arterials in the first edition of the HSM. Please rate the following variables in terms of their potential value to your agency for inclusion in the prediction methodology for urban and suburban arterials [5=high priority; 1=low priority]. Please use the full range of ratings from 1 to 5 so that your ratings are useful in setting overall priorities; if your assessment is that a particular input variable is not needed in the first edition HSM, please use a rating of 1. In establishing the ratings, please do *not* consider the availability of data in your agency's databases.

Figure A-1. Questionnaire Used for Survey (Continued)

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Candidate Input Variables for Roadway Segments Between Intersections

_____ bicycle facilities
___ bicycle volumes
___ delineation
___ design or posted speed
___ grades
___ horizontal curves
___ lane widths
___ lighting
___ median type
___ median width
___ number and type of median openings
___ number and type of driveways
___ number of through lanes
___ older drivers/driver population characteristics
___ one-way vs. two-way operation
___ pavement friction
___ pedestrian facilities
___ pedestrian volumes
___ presence of curb parking
___ presence of frontage roads
___ presence of reversible lanes
___ roadside design/clear zones/roadside objects
___ segment length
___ shoulder width/curb type
___ spacing between driveways
___ spacing between signals
___ speed variance
___ traffic volume (AADT) (veh/day)
___ traffic volume in peak period (veh/hr)
___ traffic volumes for individual driveways
___ transit facilities
___ vehicle mix (e.g., percent trucks)
___ vehicle speed in peak periods
___ vehicle speed in off-peak periods
___ vertical curves

Candidate Input Variables for At-Grade Intersections

___ approach speed in peak periods
___ approach speed in off-peak periods
___ bicycle facilities
___ bicycle volumes
___ curb parking on intersection approaches

Figure A-1. Questionnaire Used for Survey (Continued)

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___ grade of intersection approaches
___ horizontal alignment of intersection approaches
___ intersection sight distance
___ intersection skew angle
___ lanes widths on intersection approaches
___ lighting
___ level of service (LOS)
___ median type/presence of median
___ number of intersection legs
___ number of through lanes on intersection approaches
___ number and length of added through lanes at intersections
___ older drivers/driver population
___ pedestrian facilities
___ pedestrian volumes
___ presence/number of left-turn lanes
___ presence of median refuge area for pedestrians
___ presence of right-turn lanes
___ shoulder/curb type on intersection approaches
___ shoulder/curb width on intersection approaches
___ signal phasing (e.g., left-turn phasing)
___ signal timing
___ signal visibility
___ spacing between intersection and nearby driveways
___ type of traffic control
___ traffic volumes (AADTs) for major- and minor-road legs (veh/day)
___ traffic volumes in peak period for major- and minor-road legs (veh/hr)
___ transit facilities
___ type of left-turn channelization (painted vs. raised curb)
___ vehicle mix (e.g., percent trucks)

4. Are there other potential input variables, not listed above, that you think should have a high priority for inclusion in the safety prediction methodology for urban and suburban arterials?

SAFETY MEASURES OF EFFECTIVENESS TO BE PREDICTED

5. The safety measures of effectiveness to be estimated by the safety prediction methodologies in the first edition of the *Highway Safety Manual* are:

- annual accident or crash frequency for a roadway segment or intersection

Figure A-1. Questionnaire Used for Survey (Continued)

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- crash severity distribution (percentage of crashes by severity level)
- crash type distribution (percentage of crashes by collision type)

Are there any additional measures of safety effectiveness that you currently use or that you recommend for estimation by prediction models in the HSM?

DATA AVAILABILITY

The data availability questions are directed specifically to representatives of public agencies that operate and maintain roadways. Respondents from other types of organizations may skip Questions 7 through 9.

6. For the urban and suburban arterials under your agency's jurisdiction, does your agency have computerized files of:

Accident data (i.e., records for each individual crash)	____YES ____NO
Roadway segment inventory data (i.e., geometrics and traffic control for roadway segments between intersections)	____YES ____NO
Intersection inventory (i.e., geometrics and and traffic control for each individual intersection)	____YES ____NO

7. In your agency's computerized accident data, can driveway-related crashes be distinguished from other non-intersection crashes? ____YES ____NO

8. Do your agency's computerized data files use a common location reference system to allow direct linking of :

Individual accident records to the inventory data for the roadway segment on which the accident occurred	____YES ____NO
Individual accident records to the inventory data for the intersection at which the accident or the intersection to which the accident is related	____YES ____NO

Figure A-1. Questionnaire Used for Survey (Continued)

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CONTACT PERSON

9. May we have the name of an individual in your agency that we can contact for further information, if necessary?

Name _____
Title _____
Agency _____
Address _____
_____
_____
Phone _____ Fax _____ e-mail _____

THANK YOU FOR YOUR ASSISTANCE. Please send the completed questionnaire by September 30, 2003, to:

Mr. Douglas W. Harwood
Principal Traffic Engineer
Midwest Research Institute
425 Volker Boulevard
Kansas City, MO 64110
Phone: (816) 753-7600, x 1571 Fax: (816) 561-6557
e-mail: 0Hdharwood@mriresearch.org

Figure A-1. Questionnaire Used for Survey (Continued)

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RESPONSE RATE

Tables A-1 and A-2 summarize the number of survey responses received from various agencies. Of the 278 surveys that were mailed out, 109 responses have been received, for an overall response rate of 39 percent. The highest response rate was received from state highway agencies (74 percent), followed by TRB task force members (68 percent), MPOs (33 percent), and local agencies (20 percent). Overall, the responses received include representatives from 41 state highway agencies, 23 local highway agencies, 33 MPOs, three other government agencies, five consulting firms, and four university/research agencies.

HIGHWAY SAFETY MANUAL APPLICATIONS

In Question 2, were asked to rate the usefulness of six potential applications of a quantitative safety prediction procedure for urban and suburban arterials. Table A-3 summarizes the responses received to this question. Each group of respondents indicated that forecasting the safety effectiveness for a proposed improvement project on an existing arterial was the most important application. The other two applications of the HSM methodology that were most frequently cited by users were forecasting the future change in safety performance that may occur on an existing facility as traffic volumes grow and forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (i.e., for development impact studies or driveway permit requests).

CURRENT SAFETY PREDICTION METHODS

In Question 3, agencies were asked whether they were currently using, or developing, any methods to predict or estimate the safety performance of urban and suburban arterials. Table A-4 summarizes the responses to this question. Only 4 percent of responding agencies indicated that they currently employ any sort of safety prediction methodology. Follow-up contacts are being made with those agencies to determine the specific types of prediction methodologies being used. However, the general lack of current safety prediction methodologies indicates definite need for the HSM.

INPUT VARIABLES TO THE SAFETY PREDICTION METHODOLOGY

In Question 4, agencies were given the opportunity to rank two sets of input variables according to perceived importance of those variables in the safety prediction methodology for urban and suburban arterials. The ranking included a variable set for roadway segments and a variable set for intersections.

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Table A-1. Response Rate for the Survey

Agency/organization type	Number of questionnaires mailed	Number of responses received	Response rate (%)
State highway agencies	50	37	74.0
Local highway agencies	100	20	20.0
MPOs	100	33	33.0
TRB Task Force	28	19	67.9
TOTAL	278	109	39.2

Table A-2. Types of Organizations Responding for the Survey

Agency/organization type	Number (percentage) of responses
State highway agency	41 (37.6)
Local highway agency	23 (21.1)
MPO	33 (30.3)
Other Government Agency	3 (2.7)
Consulting firm	5 (4.6)
University/research agency	4 (3.7)
TOTAL	109

NOTE: Number of responses for some agency/organization types exceeds the value shown in Table A-1 because some TRB task force members also represent that agency/organization type.

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Table A-3. Assessment of Priority Ratings for Specific HSM Applications to Urban and Suburban Arterials

Application type	State highway agencies			Local highway agencies			MPOs			TRB Task Force		
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Estimating the current safety performance for an existing arterial for which accident history data are not available or are not considered reliable	2.8	1	5	2.4	1	5	3.6	1	5	2.6	1	5
Estimating the safety performance for an existing arterial combining model predictions and actual, reliable accident history data	3.7	1	5	3.6	1	5	3.6	2	5	2.9	1	5
Forecasting the future change in safety performance that may occur on an existing facility as traffic volumes grow	3.7	1	5	3.6	1	5	4.0	1	5	4.0	2	5
Forecasting the safety effectiveness for a proposed improvement project on an existing arterial	4.5	3	5	4.5	3	5	4.1	1	5	4.6	3	5
Forecasting the safety performance of a new arterial that has not yet been constructed	3.1	1	5	2.8	1	5	2.9	1	5	3.4	1	5
Forecasting the effect on safety of new driveways or new development that may be proposed along an existing arterial (i.e., for development impact studies or driveway permit requests)	3.8	1	5	4.2	1	5	3.3	1	5	4.1	2	5

NOTE: Priority ratings are on a scale from 1 to 5 (1 = lowest priority; 5 = highest priority).

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Table A-4. Use of Existing Safety Prediction Methods by Highway Agencies and MPOs

Agency/organization type	Number (percentage) of agencies with safety prediction methodologies used or under development	
	Yes	No
State highway agencies	2 (5.4)	35 (94.6)
Local highway agencies	1 (5.0)	19 (95.0)
MPOs	1 (3.0)	32 (97.0)
TOTAL	4 (4.4)	86 (95.6)

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Table A-5 presents the priority ranking of these input variable sets by state highway agencies. The potential input variables are arranged in descending order of priority ranking by the respondents; thus, the highest ranked variables are presented first. The highest ranked input variables by state highway agencies for roadway segments include:

- Traffic volume (AADT) (veh/day)
- Design or posted speed
- Lane widths
- Number of through lanes4
- Number and type of driveways

The highest ranked input variables by state highway agencies for intersections include:

- Intersection sight distance
- Type of traffic control
- Traffic volumes (AADT) for major- and minor-road legs (veh/day)
- Intersection skew angle
- Number of intersection legs

Tables A-6, A-7, and A-8 present comparable rankings of potential input variables for local highway agencies, MPOs, and TRB task force members, respectively.

Table A-9 presents a summary of the ranking of the potential input variables by all four types of respondents.

In Question 5, agencies were also asked to identify additional variables, not listed in the survey, that they felt should be included into the safety prediction methodology for urban and suburban arterials. Table A-10 summarizes the additional candidate input variables identified by surveyed agencies. The table shows the number of respondents that mentioned each variable and the percentage of total survey respondents that they represent. It should be noted that even those additional input variables mentioned most frequently were cited by less than 5 percent of the surveyed respondents. Some of the additional variables identified in Table A-10 were, in fact, included in the survey questionnaire, but in a different form.

SAFETY MEASURES OF EFFECTIVENESS TO BE PREDICTED

The safety measures of effectiveness to be estimated by the safety prediction methodologies in the first edition of the HSM are:

- annual accident or crash frequency for a roadway segment or intersection
- crash severity distribution (percentage of crashes by severity level)
- crash type distribution (percentage of crashes by collision type)

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Table A-5. Candidate Input Variables in Descending Priority Order as Ranked by State Highway Agencies

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
ROADWAY SEGMENTS				
Traffic volume (AADT) (veh/day)	4.5	2	5	1
Design or posted speed	4.3	3	5	2
Lane widths	4.2	2	5	3
Number of through lanes	4.2	1	5	3
Number and type of driveways	4.1	2	5	5
Traffic volume in peak period (veh/h)	4.1	2	5	5
Horizontal curves	3.9	1	5	7
Number and type of median openings	3.9	2	5	7
Roadside design/clear zones/roadside objects	3.9	1	5	7
Median width	3.8	2	5	10
Shoulder width/curb type	3.8	2	5	10
Spacing between signals	3.8	2	5	10
Vertical curves	3.7	2	5	13
Grades	3.6	1	5	14
Segment length	3.6	1	5	14
Lighting	3.5	1	5	16
Median type	3.5	1	5	16
Spacing between driveways	3.5	2	5	16
Speed variance	3.4	1	5	19
Vehicle mix (e.g., percent trucks)	3.4	1	5	19
Vehicle speed in off-peak periods	3.4	2	5	19
Vehicle speed in peak periods	3.4	2	5	19
One-way vs. two-way operation	3.3	1	5	23
Presence of curb parking	3.3	1	5	23
Delineation	2.9	1	5	25
Presence of frontage roads	2.9	1	5	25
Pedestrian volumes	2.8	1	5	27
Pedestrian facilities	2.7	1	5	28
Presence of reversible lanes	2.7	1	5	28
Traffic volumes for individual driveways	2.7	1	5	28
Pavement friction	2.6	1	5	31
Older drivers/driver population characteristics	2.4	1	4	32
Bicycle volumes	2.2	1	4	33
Bicycle facilities	2.1	1	4	34
Transit facilities	2.1	1	5	34

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Table A-5. Candidate Input Variables in Descending Priority Order as Ranked by State Highway Agencies (Continued)

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
INTERSECTIONS				
Intersection sight distance	4.5	2	5	1
Type of traffic control	4.5	3	5	1
Traffic volumes (AADT) for major- and minor-road legs (veh/day)	4.4	2	5	3
Intersection skew angle	4.2	2	5	4
Number of intersection legs	4.2	3	5	4
Presence/number of left-turn lanes	4.2	1	5	4
Signal phasing (e.g., left-turn phasing)	4.2	1	5	4
Traffic volumes in peak period (veh/h)	4.2	2	5	4
Lane widths on approaches	4.1	2	5	9
Number of through lanes on approaches	4.1	2	5	9
Horizontal alignment of approaches	4.0	2	5	11
Presence of right-turn lanes	4.0	2	5	11
Number and length of added through lanes	3.9	3	5	13
Signal visibility	3.9	1	5	13
Signal timing	3.8	1	5	15
Spacing between intersections and nearby driveways	3.8	2	5	15
Level of Service (LOS)	3.7	1	5	17
Approach speed in peak periods	3.6	2	5	18
Lighting	3.6	2	5	18
Median type/presence of median	3.6	2	5	18
Approach speed in off-peak periods	3.5	2	5	21
Curb parking on approaches	3.5	1	5	21
Grade of approaches	3.5	1	5	21
Presence of median refuge area for pedestrians	3.4	1	5	24
Vehicle mix (e.g., percent trucks)	3.2	1	5	25
Shoulder/curb width on approaches	3.1	1	5	26
Pedestrian volumes	3.0	1	5	27
Pedestrian facilities	2.8	1	5	28
Shoulder/curb type on approaches	2.8	1	4	28
Type of left-turn channelization (painted vs. curb)	2.8	1	5	28
Bicycle facilities	2.4	1	4	31
Bicycle volumes	2.4	1	4	31
Older drivers/driver population characteristics	2.4	1	4	31
Transit facilities	2.1	1	4	34

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Table A-6. Candidate Input Variables in Descending Priority Order as Ranked by Local Highway Agencies

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
ROADWAY SEGMENTS				
Traffic volume in peak period (veh/h)	4.5	3	5	1
Traffic volume (AADT) (veh/day)	4.2	3	5	2
Horizontal curves	3.9	1	5	3
Number and type of driveways	3.9	2	5	3
Design or posted speed	3.8	2	5	5
Lane widths	3.7	1	5	6
Number and type of median openings	3.7	1	5	6
Vertical curves	3.7	1	5	6
Spacing between signals	3.6	1	5	9
Spacing between driveways	3.5	2	5	10
Grades	3.4	1	5	11
Number of through lanes	3.4	1	5	11
One-way vs. two-way operation	3.4	1	5	11
Delineation	3.3	1	5	14
Median type	3.3	1	5	14
Vehicle speed in peak periods	3.3	2	5	14
Lighting	3.2	1	4	17
Presence of curb parking	3.2	1	5	17
Vehicle mix (e.g., percent trucks)	3.1	1	4	19
Vehicle speed in off-peak periods	3.0	1	5	20
Pedestrian volumes	2.9	1	5	21
Roadside design/clear zones/roadside objects	2.9	1	4	21
Median width	2.8	1	5	23
Pedestrian facilities	2.8	1	5	23
Speed variance	2.8	1	5	23
Traffic volumes for individual driveways	2.8	1	5	23
Bicycle facilities	2.7	1	5	27
Shoulder width/curb type	2.7	1	5	27
Presence of frontage roads	2.6	1	5	29
Presence of reversible lanes	2.6	1	5	29
Transit facilities	2.6	1	4	29
Segment length	2.4	1	5	32
Bicycle volumes	2.3	1	5	33
Pavement friction	2.3	1	4	33
Older drivers/driver population characteristics	1.9	1	3	35

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Table A-6. Candidate Input Variables in Descending Priority Order as Ranked by Local Highway Agencies (Continued)

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
INTERSECTIONS				
Signal phasing (e.g., left-turn phasing)	4.5	2	5	1
Traffic volumes for peak period (veh/h)	4.4	3	5	2
Intersection sight distance	4.3	2	5	3
Presence/number of left-turn lanes	4.2	3	5	4
Signal timing	4.2	2	5	4
Signal visibility	4.2	2	5	4
Spacing between intersections and nearby driveways	4.2	3	5	4
Type of traffic control	4.2	3	5	4
Traffic volumes (AADT) for major- and minor-road legs (veh/day)	3.9	2	5	9
Horizontal alignment of approaches	3.8	2	5	10
Number of intersection legs	3.8	2	5	10
Intersection of skew angle	3.7	2	5	12
Median type/presence of median	3.7	1	5	12
Level of Service (LOS)	3.6	1	5	14
Number and length of added through lanes	3.6	2	5	14
Number of through lanes on approaches	3.6	2	5	14
Presence of right-turn lanes	3.6	2	5	14
Lane widths on approaches	3.5	1	5	18
Approach speed in peak periods	3.4	2	5	19
Curb parking on approaches	3.4	1	5	19
Grade of approaches	3.3	1	5	21
Lighting	3.3	2	5	21
Approach speed in off-peak periods	3.1	2	4	23
Type of left-turn channelization (painted vs. curb)	3.1	1	5	23
Presence of median refuge area for pedestrians	2.9	1	5	25
Pedestrian facilities	2.8	1	5	26
Pedestrian volumes	2.8	1	4	26
Shoulder/curb width on approaches	2.7	1	5	28
Shoulder/curb type on approaches	2.6	1	5	29
Transit facilities	2.6	1	4	29
Vehicle mix (e.g., percent trucks)	2.6	1	4	29
Bicycle facilities	2.5	1	4	32
Bicycle volumes	2.3	1	4	33
Older drivers/driver population characteristics	1.7	1	3	34

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Table A-7. Candidate Input Variables in Descending Priority Order as Ranked by Metropolitan Planning Organizations

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
ROADWAY SEGMENTS				
Traffic volume in peak period (veh/day)	4.4	2	5	1
Design or posted speed	4.2	1	5	2
Lane widths	4.2	2	5	2
Traffic volume (AADT) (veh/day)	4.2	2	5	2
Number of through lanes	3.8	1	5	5
Spacing between signals	3.7	1	5	6
Vehicle speed in peak periods	3.7	1	5	6
Number and type of driveways	3.6	2	5	8
Shoulder width/curb type	3.6	1	5	8
Spacing between driveways	3.6	1	5	8
Speed variance	3.6	1	5	8
One-way vs. two-way operation	3.5	1	5	12
Vehicle speed in off-peak periods	3.5	1	5	12
Horizontal curves	3.4	1	5	14
Lighting	3.4	1	5	14
Median type	3.4	1	5	14
Vehicle mix (e.g., percent trucks)	3.4	1	5	14
Pedestrian facilities	3.3	1	5	18
Presence of curb parking	3.3	1	5	18
Vehicle curves	3.2	1	5	20
Grades	3.1	1	5	21
Number and type of median openings	3.1	1	5	21
Transit facilities	3.1	1	5	21
Delineation	3.0	1	5	24
Pedestrian volumes	3.0	1	5	24
Bicycle facilities	2.8	1	5	26
Older drivers/driver population characteristics	2.8	1	5	26
Roadside design/clear zones/roadside objects	2.8	1	5	26
Segment length	2.8	1	5	26
Traffic volumes for individual driveways	2.8	1	5	26
Median width	2.7	1	5	31
Bicycle volumes	2.6	1	5	32
Presence of frontage roads	2.4	1	5	33
Presence of reversible lanes	2.3	1	5	34
Pavement friction	2.1	1	4	35

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Table A-7. Candidate Input Variables in Descending Priority Order as Ranked by Metropolitan Planning Organizations (Continued)

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
INTERSECTIONS				
Traffic volumes in peak period (veh/h)	4.3	2	5	1
Level of Service (LOS)	4.2	1	5	2
Presence/number of left-turn lanes	4.2	1	5	2
Type of traffic control	4.2	2	5	2
Traffic volumes (AADT) for major- and minor-road legs (veh/day)	4.1	2	5	5
Intersection sight distance	4.0	1	5	6
Number of through lanes on approaches	3.9	1	5	7
Signal phasing (e.g., left-turn phasing)	3.9	1	5	7
Signal timing	3.9	1	5	7
Lane widths on intersection approaches	3.8	1	5	10
Presence of right-turn lanes	3.8	1	5	10
Approach speed in peak periods	3.7	1	5	12
Number of intersection legs	3.7	1	5	12
Signal visibility	3.7	1	5	12
Spacing between intersections and nearby driveways	3.7	1	5	12
Number and length of added through lanes	3.6	1	5	16
Presence of median refuge area for pedestrians	3.6	1	5	16
Approach speed in off-peak periods	3.4	1	5	18
Curb parking on intersection approaches	3.4	1	5	18
Pedestrian facilities	3.4	1	5	18
Horizontal alignment of intersection approaches	3.3	1	5	21
Intersection skew angle	3.3	1	5	21
Lighting	3.3	1	5	21
Grade of intersection approaches	3.2	1	5	24
Median type/presence of median	3.2	1	5	24
Vehicle mix (e.g., percent trucks)	3.2	1	5	24
Pedestrian volumes	3.1	1	5	27
Transit facilities	3.1	1	5	27
Bicycle facilities	3.0	1	5	29
Type of left-turn channelization (painted vs. curb)	2.9	1	5	30
Shoulder/curb width on approaches	2.8	1	5	31
Shoulder/curb type on approaches	2.7	1	5	32
Older drivers/driver population characteristics	2.7	1	5	32
Bicycle volumes	2.6	1	5	34

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Table A-8. Candidate Input Variables in Descending Priority Order as Ranked by TRB Task Force Members

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
ROADWAY SEGMENTS				
Traffic volume (AADT) (veh/day)	4.4	1	5	1
Number of through lanes	4.3	2	5	2
Number and type of driveways	4.2	1	5	3
Design or posted speed	4.1	1	5	4
Lane widths	4.1	1	5	4
Traffic volume in peak period (veh/day)	4.1	2	5	4
Number and type of median openings	3.9	2	5	7
Spacing between driveways	3.9	1	5	7
Horizontal curves	3.8	2	5	9
Shoulder width/curb type	3.8	1	5	9
Lighting	3.7	1	5	11
Median type	3.7	1	5	11
Median width	3.7	1	5	11
Presence of curb parking	3.7	1	5	11
One-way vs. two-way operation	3.6	1	5	15
Segment length	3.6	1	5	15
Spacing between signals	3.6	1	5	15
Roadside design/clear zones/roadside objects	3.5	1	5	18
Grades	3.4	2	5	19
Speed variance	3.3	1	5	20
Vertical curves	3.3	1	5	20
Vehicle mix (e.g., percent trucks)	3.2	1	5	22
Vehicle speed in peak periods	3.2	1	4	22
Pedestrian volumes	3.1	1	5	24
Vehicle speed in off-peak periods	3.1	1	5	24
Pedestrian facilities	2.9	1	5	26
Presence of frontage roads	2.7	1	5	27
Transit facilities	2.7	1	5	27
Delineation	2.6	1	5	29
Traffic volumes for individual driveways	2.6	1	5	29
Pavement friction	2.5	1	4	31
Presence of reversible lanes	2.4	1	5	32
Older drivers/driver population characteristics	2.3	1	5	33
Bicycle volumes	2.2	1	5	34

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Table A-8. Candidate Input Variables in Descending Priority Order as Ranked by TRB Task Force Members (Continued)

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
Bicycle facilities	2.1	1	4	35
INTERSECTIONS				
Presence/number of left-turn lanes	4.7	2	5	1
Intersection sight distance	4.4	1	5	2
Number of intersection legs	4.4	3	5	2
Type of traffic control	4.4	1	5	2
Traffic volumes (AADT) for major- and minor-road legs (veh/day)	4.4	2	5	2
Presence of right-turn lanes	4.3	2	5	6
Signal phasing (e.g., left-turn phasing)	4.3	1	5	6
Horizontal alignment of intersection approaches	4.2	2	5	8
Intersection skew angle	4.2	2	5	8
Number of through lanes on approaches	4.2	2	5	8
Number and length of added through lanes	4.1	2	5	11
Traffic volumes in peak period (veh/h)	4.1	2	5	11
Signal timing	3.9	2	5	13
Spacing between intersections and nearby driveways	3.9	2	5	13
Lane widths on intersection approaches	3.8	2	5	15
Lighting	3.8	1	5	15
Signal visibility	3.7	1	5	17
Level of Service (LOS)	3.6	1	5	18
Median type/presence of median	3.6	2	5	18
Curb parking on intersection approaches	3.5	1	5	20
Grade of intersection approaches	3.5	2	5	20
Vehicle mix (e.g., percent trucks)	3.4	1	5	22
Approach speed in peak periods	3.3	1	5	23
Pedestrian facilities	3.3	1	5	23
Pedestrian volumes	3.3	1	5	23
Presence of median refuge area for pedestrians	3.3	1	5	23
Type of left-turn channelization (painted vs. curb)	3.2	1	5	27
Approach speed in off-peak periods	3.1	1	5	28
Shoulder/curb type on approaches	3.1	1	5	28
Shoulder/curb width on approaches	3.1	1	5	28

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Table A-8. Candidate Input Variables in Descending Priority Order as Ranked by TRB Task Force Members (Continued)

Candidate input variable	Priority rating			Rank order
	Avg	Min	Max	
Transit facilities	2.6	1	4	31
Older drivers/driver population characteristics	2.5	1	5	32
Bicycle facilities	2.4	1	5	33
Bicycle volumes	2.3	1	4	34

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Table A-9. Summary of Priority Ratings of Candidate Input Variables

Candidate input variable	Average priority rating				Rank order			
	State	Local	MPO	Task force	State	Local	MPO	Task force
ROADWAY SEGMENTS								
Bicycle facilities	2.1	2.7	2.8	2.1	34	27	26	35
Bicycle volumes	2.2	2.3	2.6	2.2	33	33	32	34
Delineation	2.9	3.3	3.0	2.6	25	14	24	29
Design or posted speed	4.3	3.8	4.2	4.1	2	5	2	4
Grades	3.6	3.4	3.1	3.4	14	11	21	19
Horizontal curves	3.9	3.9	3.4	3.8	7	3	14	9
Lane widths	4.2	3.7	4.2	4.1	3	6	2	4
Lighting	3.5	3.2	3.4	3.7	16	17	14	11
Median type	3.5	3.3	3.4	3.7	16	14	14	11
Median width	3.8	2.8	2.7	3.7	10	23	31	11
Number and type of median openings	3.9	3.7	3.1	3.9	7	6	21	7
Number and type of driveways	4.1	3.9	3.6	4.2	5	3	8	3
Number of through lanes	4.2	3.4	3.8	4.3	3	11	5	2
Older drivers/driver population characteristics	2.4	1.9	2.8	2.3	32	35	26	33
One-way vs. two-way operation	3.3	3.4	3.5	3.6	23	11	12	15
Pavement friction	2.6	2.3	2.1	2.5	31	33	35	31
Pedestrian facilities	2.7	2.8	3.3	2.9	28	23	18	26
Pedestrian volumes	2.8	2.9	3.0	3.1	27	21	24	24
Presence of curb parking	3.3	3.2	3.3	3.7	23	17	18	11
Presence of frontage roads	2.9	2.6	2.4	2.7	25	29	33	27
Presence of reversible lanes	2.7	2.6	2.3	2.4	28	29	34	32
Roadside design/clear zones/ roadside objects	3.9	2.9	2.8	3.5	7	21	26	18
Segment length	3.6	2.4	2.8	3.6	14	32	26	15
Shoulder width/curb type	3.8	2.7	3.6	3.8	10	27	8	9
Spacing between driveways	3.5	3.5	3.6	3.9	16	10	8	7

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Table A-9. Summary of Priority Ratings of Candidate Input Variables (Continued)

Candidate input variable	Average priority rating				Rank order			
	State	Local	MPO	Task force	State	Local	MPO	Task force
ROADWAY SEGMENTS (Continued)								
Spacing between signals	3.8	3.6	3.7	3.6	10	9	6	15
Speed variance	3.4	2.8	3.6	3.3	19	23	8	20
Traffic volume (AADT) (veh/day)	4.5	4.2	4.2	4.4	1	2	2	1
Traffic volume in peak period (veh/h)	4.1	4.5	4.4	4.1	5	1	1	4
Traffic volumes for individual driveways	2.7	2.8	2.8	2.6	28	23	26	29
Transit facilities	2.1	2.6	3.1	2.7	34	29	21	27
Vehicle mix (e.g., percent trucks)	3.4	3.1	3.4	3.2	19	19	14	22
Vehicle speed in peak period	3.4	3.3	3.7	3.2	19	14	6	22
Vehicle speed in off-peak periods	3.4	3.0	3.5	3.1	19	20	12	24
Vertical curves	3.7	3.7	3.2	3.3	13	6	20	20
INTERSECTIONS								
Approach speed in peak periods	3.6	3.4	3.7	3.3	18	19	12	23
Approach speed in off-peak periods	3.5	3.1	3.4	3.1	21	23	18	28
Bicycle facilities	2.4	2.5	3.0	2.4	31	32	29	33
Bicycle volumes	2.4	2.3	2.6	2.3	31	33	34	34
Curb parking on approaches	3.5	3.4	3.4	3.5	21	19	18	20
Grade of approaches	3.5	3.3	3.2	3.5	21	21	24	20
Horizontal alignment of approaches	4.0	3.8	3.3	4.2	11	10	21	8
Intersection sight distance	4.5	4.3	4.0	4.4	1	3	6	2
Intersection skew angle	4.2	3.7	3.3	4.2	4	12	21	8
Lane widths on approaches	4.1	3.5	3.8	3.8	9	18	10	15
Lighting	3.6	3.3	3.3	3.8	18	21	21	15
Level of Service (LOS)	3.7	3.6	4.2	3.6	17	14	2	18
Median type/presence of median	3.6	3.7	3.2	3.6	18	12	24	18
Number of intersection legs	4.2	3.8	3.7	4.4	4	10	12	2
Number of through lanes on approaches	4.1	3.6	3.9	4.2	9	14	7	8

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Table A-9. Summary of Priority Ratings of Candidate Input Variables (Continued)

Candidate input variable	Average priority rating				Rank order			
	State	Local	MPO	Task force	State	Local	MPO	Task force
INTERSECTIONS (Continued)								
Number and length of added through lanes	3.9	3.6	3.6	4.1	13	14	16	11
Older drivers/driver population characteristics	2.4	1.7	2.7	2.5	31	34	32	32
Pedestrian facilities	2.8	2.8	3.4	3.3	28	26	18	23
Pedestrian volumes	3.0	2.8	3.1	3.3	27	26	27	23
Presence/number of left-turn curves	4.2	4.2	4.2	4.7	4	4	2	1
Presence of median refuge area for pedestrians	3.4	2.9	3.6	3.3	24	25	16	23
Presence of right-turn lanes	4.0	3.6	3.8	4.3	11	14	10	6
Shoulder/curb type on approaches	2.8	2.6	2.7	3.1	28	29	32	28
Shoulder/curb width on approaches	3.1	2.7	2.8	3.1	26	28	31	28
Signal phasing (e.g., left-turn phasing)	4.2	4.5	3.9	4.3	4	1	7	6
Signal timing	3.8	4.2	3.9	3.9	15	4	7	13
Signal visibility	3.9	4.2	3.7	3.7	13	4	12	17
Spacing between intersections and nearby driveways	3.8	4.2	3.7	3.9	15	4	12	13
Type of traffic control	4.5	4.2	4.2	4.4	1	4	2	2
Traffic volumes (AADTs) for major- and minor road legs (veh/day)	4.4	3.9	4.1	4.4	3	9	5	2
Traffic volumes in peak period (veh/h)	4.2	4.4	4.3	4.1	4	2	1	11
Transit facilities	2.1	2.6	3.1	2.6	34	29	27	31
Type of left-turn channelization (painted or curb)	2.8	3.1	2.9	3.2	28	23	30	27
Vehicle mix (e.g., percent trucks)	3.2	2.6	3.2	3.4	25	29	24	22

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Table A-10. Additional Candidate Input Variables in Descending Priority Order as Recommended by Those Surveyed

Additional input variable	Number of respondents citing the additional input variable (by respondent type)				Total	Percent of all respondents
	State	Local	MPO	Task Force		
Adjacent land use			2	3	5	4.6
Weather conditions	1	1	1	2	5	4.6
Accident history	4				4	3.7
Roundabouts	3			1	4	3.7
School zones	1		2	1	4	3.7
Multiple turn lanes			1	2	3	2.8
Presence of channelized right turn lanes	1			2	3	2.8
Road hierarchy/classification			1	2	3	2.8
Advanced warning	1			1	2	1.8
Bus turnouts/priority			2		2	1.8
Driveways per mile		1		1	2	1.8
Enforcement presence/activity levels			1	1	2	1.8
Left-turn volume				2	2	1.8
Location of signal heads (mast arm vs. pedestal)	1	1			2	1.8
Percent of vehicles turning at an intersection	1			1	2	1.8
Queue and storage lengths	1		1		2	1.8
Rumble strips	2				2	1.8
Signal phasing sequence		1		1	2	1.8
Accident rates for similar facilities	1				1	0.9
Cameras (red light and speed)	1				1	0.9
Detection of platoons	1				1	0.9
Frequency of unsignalized intersections				1	1	0.9
Input from other software packages	1				1	0.9
Inter-green interval				1	1	0.9
Intersection conflicts (including ped/bike)				1	1	0.9
Intersection leg offset				1	1	0.9
Median openings per mile		1			1	0.9
Median widths for intersections				1	1	0.9
Number of overhead signal heads				1	1	0.9

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Table A-10. Additional Candidate Input Variables in Descending Priority Order as Recommended by Those Surveyed (Continued)

Additional input variable	Number of respondents citing the additional input variable (by respondent type)				Total	Percent of all respondents
	State	Local	MPO	Task Force		
Pavement markings through the intersection	1				1	0.9
Pedestrian signals	1				1	0.9
Right turn on red prohibited	1				1	0.9
Sidewalks			1		1	0.9
Signal coordination	1				1	0.9
Signals per mile		1			1	0.9
Spatial variables			1		1	0.9
Toll booths			1		1	0.9
Turn restrictions				1	1	0.9
TWTL or special purpose lanes				1	1	0.9
Underpass or tunnel approaches and facilities		1			1	0.9
TOTAL	25	7	14	28	74	

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In Question 6, agencies were asked to provide any additional measures of safety effectiveness that they currently utilize or recommend utilizing in the safety prediction methodologies other than the three listed above. The suggestions made are summarized in Table A-11. The table shows the number of respondents that mentioned each variable and the percentage of total survey respondents that they represent. It can clearly be seen that the measure accident/crash rate is mentioned most often (13 percent of respondents), but even this is not a significant demand. In addition, some of the proposed measures closely resemble those measures of safety effectiveness currently used in the safety prediction methodology in the first edition of the HSM.

DATA AVAILABILITY

The survey questions related to data availability were directed only to representatives of public agencies that operate and maintain roadways (i.e., state and local highway agencies).

In Question 7, agencies were asked whether they had electronic accident data, roadway segment inventory data, and intersection inventory data files available within their jurisdiction. Table A-12 summarizes the number of affirmative responses received from those surveyed. This table also provides a column presenting the number of agencies that have all three types of data available. Contacts have been made to those agencies that indicated that they possess computerized data files for each data type to determine if such data would be useful for model development in this research.

Question 8 was a follow-up to the question found above dealing with accident data. Agencies were asked if driveway-related crashes could be distinguished from other nonintersection crashes in their computerized files. The responses to this question are summarized in Table A-13. Fifty percent of agencies responding indicated that driveway-related crashes were distinguishable within their computerized data files.

In Question 9, agencies were again referred to previous questions to find out if they had the ability to link computerized accident data to inventory data for the roadway segment on which the accident occurred, or the intersection to which the accident was related. Table A-14 summarizes the responses to this question. The capability to link accidents to the location at which they occurred is of critical importance for modeling to create a safety in creating a prediction methodology. However, only 18 percent of respondents indicated that both roadway segment and intersection data can be linked to accident data.

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Table A-11. Additional Measures of Safety Effectiveness in Descending Priority Order as Recommended by Those Surveyed

Additional Measures of Safety Effectiveness	Number of respondents citing the additional input variable (by respondent type)				Total	Percent of all respondents
	State	Local	MPO	Task Force		
Accident/crash rate	6	6	1	1	14	12.8
Combination of crash severity and type distribution	3				3	2.8
Crash distribution by TOD	1	1	1		3	2.8
Crash reduction factors based on improvement	1	1	1		3	2.8
Actual crash frequency vs. average crash frequency	2				2	1.8
Crash distribution by pavement surface condition		1	1		2	1.8
Crash distribution by weather	1		1		2	1.8
Crash distribution by vehicle type			2		2	1.8
Economic loss/ cost-benefit analysis	1	1			2	1.8
Annual injury and fatality accident/crash frequency				1	1	0.9
Capacity/LOS vs. safety	1				1	0.9
Crash cause		1			1	0.9
Crash distribution by light conditions			1		1	0.9
Crash rate by measure of exposure	1				1	0.9
Crash type distribution by mode (i.e., auto, bike, ped)	1				1	0.9
Index for defining a problem			1		1	0.9
Index for type distribution for functional class			1		1	0.9
Index for nominalizing crashes to rank intersections	1				1	0.9
Work zone crash rates	1				1	0.9
TOTAL	20	11	10	2	43	

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Table A-12. Availability of Highway Agency Computerized Data Files for Urban and Suburban Arterials

Agency/organization type	Number (percentage) of agencies with computerized files available			
	Accident data	Roadway segment inventory data	Intersection inventory data	All three data types
State highway agencies	36 (97.3)	24 (64.9)	13 (35.1)	12 (32.4)
Local highway agencies	13 (65.0)	8 (40.0)	9 (45.0)	5 (25.0)
TOTAL	49 (86.0)	32 (56.1)	22 (38.6)	17 (29.8)

Table A-13. Ability of Highway Agency Accident Data to Distinguish Driveway-Related Non-intersection Accidents

Agency/organization type	Number (percentage) of agencies with accident data that identify driveway-related accidents	
	Yes	No
State highway agencies	20 (54.1)	17 (45.9)
Local highway agencies	8 (42.1)	11 (57.9)
TOTAL	28 (50.0)	28 (50.0)

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Table A-14. Ability of Highway Agencies to Link Roadway Segment and Intersection Inventory Data Files to Accident Data

Agency/ organization type	Number (percentage) of agencies with inventory data files that can be linked to accident data					
	Roadway segments		Intersections		Both roadway segments and intersections	
	Yes	No	Yes	No	Yes	No
State highway agencies	21 (56.8)	16 (43.2)	10 (27.0)	27 (73.0)	9 (24.1)	28 (75.9)
Local highway agencies	1 (5.3)	18 (94.7)	4 (21.1)	15 (78.9)	1 (5.3)	18 (94.7)
TOTAL	22 (39.3)	34 (60.7)	14 (25.0)	42 (75.0)	10 (17.9)	46 (82.1)

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Appendix B

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
SWUTC/00/167707-1		

4. Title and Subtitle	5. Report Date
Comprehensive Engineering Approach to Achieving Safe Neighborhoods	September 2000
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
James A. Bonneson, Angelia H. Parham and Karl Zimmerman	Research Report 167707-1

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Texas Transportation Institute Texas A&M University System College Station, Texas 77843-3135	11. Contract or Grant No. 10727

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Southwest Region University Transportation Center Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135	14. Sponsoring Agency Code

15. Supplementary Notes

Supported by general revenues from the State of Texas.

16. Abstract

Steady increases in travel demand coupled with minimal increases in arterial street capacity have led to an increase in traffic-related safety problems in residential neighborhoods. These problems stem from the significant number of motorists that divert from the arterial to the residential street system in an effort to avoid arterial-related delays. Diverted motorists add to neighborhood traffic volumes and increase crash exposure for pedestrians, bicyclists, and other vehicles. In addition, diverted motorists often drive at excessive speed which increases both the potential for a crash and its severity.

The objective of this research was to develop guidelines for the use of both neighborhood traffic management and corridor traffic management techniques for improving safety in residential neighborhoods. The focus of this research is on neighborhood and corridor traffic management techniques that have the potential to reduce speed or cut-through volume on the local street system. The approach taken to conduct this research was to develop as much of the guideline material through a synthesis of the literature and to supplement this synthesis with some investigative research in areas where information was lacking.

A model was developed for this research that can predict the percent of arterial drivers that cut-through the adjacent neighborhood streets. The data used to develop this model were obtained from extensive simulations of a typical city street system that includes arterial, collector, and local streets. The model variables include average arterial travel speed, signal density (in signals per mile), and the degree of saturation of the signalized intersections on the arterial. Percent cut-through traffic was found to range from 0.0 to 30 percent of the arterial volume, with the higher percentage associated with oversaturated signalized intersections.

Several recommendations for future research in the area of traffic management techniques were developed. Fundamentally, it is recommended that additional research be conducted on the effectiveness of alternative traffic management techniques. For neighborhood traffic management techniques, before-and-after data are needed to assess technique effectiveness in terms of volume reduction, speed reduction, and crash reduction. For corridor traffic management, further research efforts are necessary to verify the accuracy of the cut-through traffic prediction model developed for this research.

17. Key Words	18. Distribution Statement
Traffic Calming, Route Modification, Neighborhood Traffic Management, Corridor Traffic Management, Cut-Through Traffic, Livable Streets	No Restrictions. This document is available to the public through N National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

19. Security Classif.(of this report)	20. Security Classif.(of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	62	

COMPREHENSIVE ENGINEERING APPROACH TO ACHIEVING SAFE NEIGHBORHOODS

FINAL REPORT

for

Research Project No. 167707

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

TEXAS TRANSPORTATION INSTITUTE
THE TEXAS A&M UNIVERSITY SYSTEM

by

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September 2000

ABSTRACT

Steady increases in travel demand coupled with minimal increases in arterial street capacity have led to an increase in traffic-related safety problems in residential neighborhoods. These problems stem from the significant number of motorists that divert from the arterial to the residential street system in an effort to avoid arterial-related delays. Diverted motorists add to neighborhood traffic volumes and increase crash exposure for pedestrians, bicyclists, and other vehicles. In addition, diverted motorists often drive at excessive speed which increases both the potential for a crash and its severity.

The objective of this research was to develop guidelines for the use of both neighborhood traffic management and corridor traffic management techniques for improving safety in residential neighborhoods. The focus of this research is on neighborhood and corridor traffic management techniques that have the potential to reduce speed or cut-through volume on the local street system. The approach taken to conduct this research was to develop as much of the guideline material through a synthesis of the literature and to supplement this synthesis with some investigative research in areas where information was lacking.

A model was developed for this research that can predict the percent of arterial drivers that cut-through the adjacent neighborhood streets. The data used to develop this model were obtained from extensive simulations of a typical city street system that includes arterial, collector, and local streets. The model variables include average arterial travel speed, signal density (in signals per mile), and the degree of saturation of the signalized intersections on the arterial. Percent cut-through traffic was found to range from 0.0 to 30 percent of the arterial volume, with the higher percentage associated with oversaturated signalized intersections.

Several recommendations for future research in the area of traffic management techniques were developed. Fundamentally, it is recommended that additional research be conducted on the effectiveness of alternative traffic management techniques. For neighborhood traffic management techniques, before-and-after data are needed to assess technique effectiveness in terms of volume reduction, speed reduction, and crash reduction. For corridor traffic management, further research efforts are necessary to verify the accuracy of the cut-through traffic prediction model developed for this research.

EXECUTIVE SUMMARY

Steady increases in travel demand coupled with minimal increases in arterial street capacity have led to an increase in traffic-related safety problems in residential neighborhoods. These problems stem from the significant number of motorists that divert from the arterial to the residential street system in an effort to avoid arterial-related delays. Diverted motorists add to neighborhood traffic volumes and increase crash exposure for pedestrians, bicyclists, and other vehicles. In addition, diverted motorists often drive at excessive speed which increases both the potential for a crash and its severity.

The objective of this research was to develop guidelines for the use of both neighborhood traffic management and corridor traffic management techniques for improving safety in residential neighborhoods. The guidelines would provide a framework for evaluating the effectiveness of a traffic management plan developed for a specified neighborhood and associated street system. This framework would allow for an evaluation of alternative techniques on a consistent basis.

The focus of this research is on neighborhood and corridor traffic management techniques that have the potential to reduce speed or cut-through volume on the local street system. The techniques considered for neighborhood traffic management are limited to those commonly deployed on residential streets by city agencies. Such techniques include: street closures, speed humps, traffic circles, and roadway narrowings. Techniques considered for corridor traffic management are limited to those that increase arterial travel speed. Such techniques include: signalization improvements, geometric improvements, and access management.

The approach taken to conduct this research was to develop as much of the guideline material through a synthesis of the literature and to supplement this synthesis with some investigative research in areas where information was lacking. Some information was found in the literature for the more common neighborhood traffic management devices. However, no information was found that described the effect of arterial operations on the number of drivers that might divert from the arterial through the adjacent neighborhood. Based on this finding, research was conducted to develop a relationship between arterial travel speed and the percent of drivers that cut-through adjacent neighborhoods.

The synthesis of neighborhood traffic management techniques focused on three measures of effectiveness: volume reduction, speed reduction, and crash reduction. Average reductions (expressed as a percentage) were obtained from two sources that reflect conditions on several hundred city streets. Three management techniques that had been used most, as reported in these studies, include speed humps, traffic circles, and speed tables. These devices were found to reduce street volumes from 5 to 25 percent. The reduced speeds from 15 to 20 percent and crash rates from 4 to 15 percent, depending on the device.

A model was developed for this research that can predict the percent of arterial drivers that cut-through the adjacent neighborhood streets. The data used to develop this model were obtained from extensive simulations of a typical city street system that includes

arterial, collector, and local streets. The model variables include average arterial travel speed, signal density (in signals per mile), and the degree of saturation of the signalized intersections on the arterial. Percent cut-through traffic was found to range from 0.0 to 30 percent of the arterial volume, with the higher percentage associated with oversaturated signalized intersections.

A sensitivity analysis using this model indicated that the percent cut-through traffic decreased rapidly with increasing arterial travel speed. The percentage of cut-through traffic also decreased with an increase in signal density. This latter trend may appear counterintuitive; however, further analysis indicated that it actually reflected an increase in delay on a "per signal" basis. Hence, it was concluded that percentage of cut-through traffic increases with an increase in delay per signal.

The sensitivity analysis also revealed that there is the possibility of a threshold arterial travel speed associated with no cut-through traffic. If arterial travel speed could be maintained at this threshold (or higher), cut-through traffic would essentially disappear. This threshold was found to equate to an average arterial travel speed that is about 50 percent of the free-flow speed. Thus, when average speeds are one-half of the free-flow speed or less, drivers will likely cut-through the neighborhood adjacent to the arterial.

Several recommendations for future research in the area of traffic management techniques were developed. Fundamentally, it is recommended that additional research be conducted on the effectiveness of alternative traffic management techniques. The existing body of knowledge is based on informal studies conducted by agency staff for the purpose of assessing the effect at a given street location. Such studies rarely record all of the relevant data or control for area-wide influences. The result is considerable variability in the reported effectiveness of any given technique.

For neighborhood traffic management techniques, before-and-after data are needed to assess technique effectiveness in terms of volume reduction, speed reduction, and crash reduction. Studies that quantify the level of volume reduction should also report the "connectivity" (i.e., number of street segments per intersection or cul-de-sac) or a similar measure that provides some indication of the availability of alternate routes. Studies that quantify speed reductions should also report: (1) the location of the measurement relative to the location of the technique, (2) the distance to other techniques, and (3) the geometry of the device, if a device is used. Studies that quantify crash reduction should include traffic volume so that crash *rate* reduction can be computed. Crash rate is defined as the number of crashes per million vehicles. It was shown in this research that crash rate reduction is a much more accurate method of evaluating a technique's ability to improve safety.

For corridor traffic management, further research efforts are necessary to verify the accuracy of the cut-through traffic prediction model developed for this research and the findings associated with a sensitivity analysis of this model. Specifically, additional research is needed to:

1. Verify the existence of a threshold travel speed above which there would be no cut-through traffic,
2. Expand the model to include sensitivities to a wider range of factors (e.g., size of the neighborhood, density and connectivity of the local street system, and application of specific route modification and calming devices), and
3. Validate the model using real-world data.

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ACKNOWLEDGMENTS

This publication was developed as part of the University Transportation Centers Program which is funded 50 percent with general revenue funds from the State of Texas.

This research project was sponsored by the Southwest Region University Transportation Center at the Texas A&M University. The research was performed by Dr. James A. Bonneson, Ms. Angelia H. Parham, and Mr. Karl Zimmerman with the Design and Operations Division of the Texas Transportation Institute. The researchers would like to acknowledge the support and guidance provided by Dr. Joseph Blaschke, President, Transportation Engineering Analysts. Dr. Blaschke served as the Project Monitor.

DISCLAIMER

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Chapter 1
INTRODUCTION

OVERVIEW

Background

Steady increases in travel demand coupled with minimal increases in arterial street capacity have led to an increase in traffic-related safety problems in residential neighborhoods. These problems stem from the significant number of motorists that divert from the arterial to the residential street system in an effort to avoid arterial-related delays. Diverted motorists add to neighborhood traffic volumes and increase crash exposure for pedestrians, bicyclists, and other vehicles. In addition, diverted motorists often drive at excessive speed which increases both the potential for a crash and its severity.

Some indication of the extent of the safety problem in residential neighborhoods is provided in Table 1. The data shown in this table indicate that most fatal crashes occur on minor arterials. However, an analysis of crash *rate* (i.e., crash frequency "normalized" by the amount of travel) indicates that local streets have the poorest safety record. These data indicate that the probability of a fatal crash on a local street is almost three times greater than that for an interstate highway. This trend is likely due to the high probability that one of the participants in a local-street crash is a pedestrian or bicyclist.

TABLE 1 Comparison of crash rates by roadway classification in urban areas (*1*)

Roadway Classification	Fatal Crashes	Vehicle-Miles Traveled (millions)	Crash Rate (crashes per 100 million vehicle-miles)
Interstate	1,791	285,325	0.6
Other Freeway	1,619	128,242	1.3
Minor Arterial	5,081	338,987	1.5
Major Collector	3,171	240,402	1.3
Collector	1,149	107,272	1.1
Local Roads/Streets	**2,928**	**188,365**	**1.6**
Unknown	27	--	--
Total	15,766	1,288,593	1.2

Excessive speed is a major contributing factor in crashes of all types. In fact, excessive speed was a contributing factor in 30 percent of all fatal crashes in 1997 (*2*). Excessive speed has serious consequences for pedestrians. The likelihood of a pedestrian being hit by a vehicle increases with speed. Motorists traveling at high speeds are less likely to see a pedestrian and, if they see the pedestrian, are less likely to be able to stop in time to avoid hitting the pedestrian.

Finally, the severity of a crash increases sharply with speed to the extent that pedestrians struck at speeds of 35 mi/h or more rarely survive (*3*).

Many of the pedestrians in neighborhoods are children. In 1997, 30 percent of the 5 to 9-year-old children who died in car crashes were pedestrians (*4*). Additionally, nearly one-third of the bicyclists killed in motor vehicle crashes in 1997 were between 5 and 15 years old (*5*).

Studies of child-involved crashes in New South Wales, Australia (as reported in Reference *2*), show that about 25-30 percent of all crashes occur on local neighborhood streets. Eighty percent of pedestrian-involved crashes with children under the age of 10 occurred within one-half mile of their home.

Studies in England, the Netherlands, Germany, and Sweden (as reported in Reference *2*) have compared child-involved crash rates in newly-constructed residential areas with those in older areas. These studies indicate that newly-constructed areas have crash rates two to five times lower than the older areas. The lower crash rates were explained by the following factors:

- Through traffic is often heavy in old areas, and the street network is more complex. New areas have a more differentiated street network according to traffic function in order to discourage or eliminate cut-through traffic. Also, some new streets include cul-de-sacs.

- Older areas often include mixed activities, resulting in some on-street parking. The older areas often lack playgrounds, so children use the streets for playing, biking, and other recreational activities.

- New areas have access to numerous playgrounds and green areas that are free from motor vehicle traffic. There are often separated walkways and bicycle paths that lead to school and to other activities of interest for children.

Finally, Jacobsen *et al.* (*5*) note that "society cannot adapt children to traffic; society has to adapt traffic to children." The study emphasizes that the nature of children prevents them from handling the demands of traffic and that speed is a strong risk factor for child pedestrian injury.

Methods of Managing Traffic to Improve Safety

Numerous engineering techniques have been used to manage traffic on neighborhood streets. These techniques are intended to provide a safe environment for both pedestrians and motorists by minimizing the number of diverted (or "cut-through") vehicles and by maintaining safe vehicle speeds. These techniques can be grouped into two categories, depending on their intended area of impact. The first category includes techniques used for neighborhood traffic management (NTM); these techniques are intended for direct application to the affected residential streets. The second category includes techniques used for corridor traffic management (CTM); these techniques indirectly address the problems associated with cut-through traffic by reducing the incentive to divert. Techniques that may be used for NTM and CTM are illustrated in Figure 1.

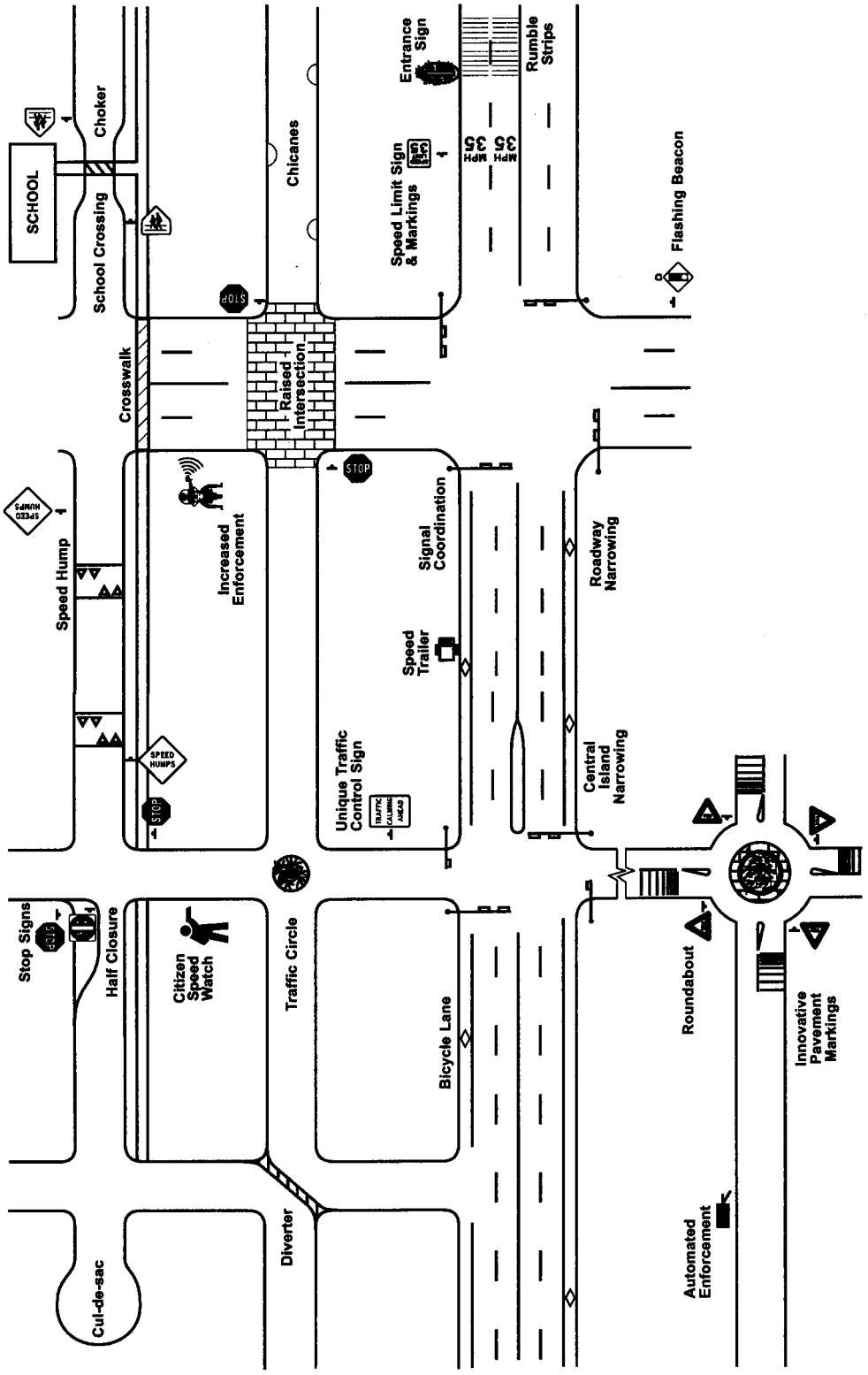


Figure 1. Illustration of speed management techniques.

Neighborhood Traffic Management Techniques

Neighborhood traffic management techniques are designed to improve safety, provide a greater sense of security, and increase neighborhood livability. These techniques generally focused on *reducing* speed and volume at a specific neighborhood location. They include "traffic calming" techniques, traffic control devices, and enforcement activities. NTM techniques are often used in area-wide applications as part of a comprehensive "traffic management program." Although many traffic management programs address only neighborhood concerns, they may be expanded to include higher-speed and higher-volume streets (such as collectors or arterials).

There are numerous NTM techniques available for consideration; they range in their level of "presence" (or impact) on the street system. Less restrictive NTM techniques include speed zoning and innovative pavement markings. More restrictive techniques include one-way streets, stop signs, speed humps, and enforcement. The effectiveness of these techniques (in terms of a lasting speed and/or volume reduction) is not known with certainty; however, there is evidence that each technique can have a small positive effect.

Corridor Traffic Management Techniques

CTM techniques offer a system-wide approach to mitigating the diversion problem by reducing the incentive to divert. These techniques focus on *improving* the operation of the arterials adjacent to the neighborhood. Maintenance of an "acceptable" travel time on the arterial street system surrounding the neighborhood should reduce volume (and possibly speed) by reducing the attractiveness of the cut-through route. CTM techniques include: improved signal coordination, increased arterial through movement capacity, and reduced access-point density along the arterial.

In spite of their potential to improve neighborhood safety, CTM techniques have received less attention from transportation agencies than other techniques. This trend may be due to the means by which the problems come to the public transportation agencies. Citizen groups tend to advocate specific solutions to specific problems as opposed to improvements to the adjacent arterial street systems. This trend may also be due to the urban planning origins of traffic management. Urban planning professionals tend to consider factors that increase speeds in urban areas (even if it is the speed on an arterial street) as inappropriate. Hence, the vast number of traffic management techniques appear to be oriented toward speed reduction.

Question of Effectiveness

The effectiveness of most NTM techniques is not well known, although they tend to be more frequently applied than CTM techniques. It is likely that NTM techniques have received more attention because they are a highly visible, immediate, and a direct treatment of a specific problem. CTM techniques have not received as much attention possibly due to their lower visibility, slower maturity, and more subtle effect on cut-through volume on a given street. However, it is speculated that the CTM category may offer a more cost-effective and lasting solution under some conditions. Based on this assessment, it was determined that research was needed to develop quantitative guidelines describing the use and effectiveness of alternative techniques.

OBJECTIVE AND SCOPE

The objective of this research was to develop guidelines for the use of both neighborhood traffic management and corridor traffic management techniques for improving safety in residential neighborhoods. The guidelines would provide a framework for evaluating the effectiveness of a traffic management plan developed for a specified neighborhood and associated street system. This framework would also allow for evaluation and comparison of alternative techniques on a consistent basis.

The focus of this research is on neighborhood and corridor traffic management techniques that have the potential to reduce speed or cut-through volume on the local street system. The techniques considered for neighborhood traffic management are limited to those commonly deployed on residential streets by city agencies. Techniques considered for corridor traffic management are limited to those that increase arterial travel speed through capacity increases or signal timing changes that improve progression.

The guidelines described in this document are intended for application to urban settings where there is a mature street system that is functionally complete. The street segments that comprise this system should have an arrangement and length that is consistent with the hierarchy of movement, as described in the AASHTO publication *A Policy on Geometric Design of Highways and Streets* (*6*).

CONCEPTS AND DEFINITIONS

The objectives of a traffic management program are to reduce traffic volumes or maintain reasonable speeds on the residential streets within a neighborhood. A wide range of techniques can be used to achieve this objective. Most of these techniques can be categorized in terms of their effect on drivers. These effects can be described as "traffic calming," "route modification," or "regulatory."

The concept of traffic calming has been defined in several different ways. One of the more widely accepted definitions is that coined by Lockwood (*7*). His definition is as follows:

> "Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users (*7*)."

Based on this definition, traffic calming techniques rely on the laws of physics to slow traffic down. They are self-enforcing and do not explicitly reroute drivers.

Route modification techniques are intended to reduce traffic volume on selected streets by using some type of traffic restriction or by making operational improvements to alternative routes. Traffic restrictions include lane closure, turn movement prohibition, or diverters. Improvements to alternative routes include realignment, increased capacity, or improved traffic progression.

Alternative routes would typically be those of the arterial classification that are intended to provide for through traffic movements.

Finally, regulatory techniques are intended to reinforce safe and legal driving practices through the implementation and enforcement of traffic control devices. These techniques include speed limit signing, Stop or Yield control devices, and pedestrian crosswalks all of which are combined with a routine system of enforcement.

Chapter 2

NEIGHBORHOOD TRAFFIC MANAGEMENT TECHNIQUES

OVERVIEW

Historically, transportation engineers have focused on providing motorists with high-capacity, high-speed roadways. This focus is reflected even in the design of residential streets in terms of generous cross sections, infrequent horizontal curves, and ample sight distances. Unfortunately, the needs of pedestrians and bicyclists have not received a similar level of attention. This deficiency is most prevalent in neighborhoods where residents are demanding "livable neighborhoods." These residents want neighborhood streets that have low vehicular volumes and speeds such that a serene and safe environment is sustained throughout the day.

Neighborhood traffic management techniques have become an increasing popular method for providing family-friendly streets. This trend is partly due to the proliferation of citizen groups that have organized to restore the integrity of their neighborhoods. These groups tend to be well organized and vocal in advocating speed-reduction or street-closure options on their affected street. The trend is also a result of agency recognition of the limited ability of "spot" treatments (e.g., adding a speed limit sign) to solve neighborhood traffic problems. It is now generally recognized that a neighborhood-wide solution is necessary to preclude "shifting" the problem (i.e., diverting traffic) to an adjacent neighborhood street.

Objective and Goals

Neighborhood traffic management has the overall objective of maintaining neighborhood livability by regulating vehicular volume and speed within the neighborhood street system. Consistent with this objective, neighborhood traffic management programs have the following goals:

1. Minimize the volume of cut-through traffic on neighborhood streets,
2. Maintain safe speeds on neighborhood streets, and
3. Minimize conflicts between vehicles and pedestrians and between vehicles and bicycles.

Achieving the first goal is likely to increase the odds of achieving the other two goals. However, any effort to minimize cut-through traffic must consider the entire neighborhood street system and treatments thereon in order to preclude the shifting of traffic to an adjacent local street.

Common Techniques

Most traffic management techniques have some ability to reduce the volume and speed of vehicular traffic on the local street. All of them tend to be associated with a reduction in the frequency and severity of crashes. In general, a given technique will have a primary effect (e.g., volume reduction) for which it is typically selected and one or more secondary effects. Many of the techniques currently used are listed in Table 2. The techniques listed in this table are described more fully in the appendix.

TABLE 2 List of neighborhood traffic management techniques

Category	Technique	Primary Measure of Effectiveness
Route Modification Devices	Full closures	Volume reduction
	Half closures	Volume reduction
	Diagonal diverters	Volume reduction
	Semi-diverters	Volume reduction
	Median barriers	Volume reduction
	Forced turn islands	Volume reduction
Traffic Calming Devices	Speed humps	Speed reduction
	Speed tables	Speed reduction
	Raised intersections	Speed reduction
	Speed cushions	Speed reduction
	Traffic circles	Speed reduction
	Central island narrowings	Volume reduction
	Roundabouts	Speed reduction
	Roadway narrowing	Volume reduction
	Chicanes	Speed reduction
	Neckdowns	Volume reduction
	Chokers	Volume reduction
Regulatory Measures	Speed trailers	Speed reduction
	Speed limit signs and markings	Speed reduction
	Increased enforcement	Speed reduction
	Citizen watch programs	Speed reduction
	Automated enforcement	Speed reduction
	Bicycle lanes and paths	Crash reduction
	High visibility crosswalks and wider sidewalk areas	Crash reduction
	Innovative pavement markings	Crash reduction
	Turn or through traffic prohibition signing	Volume reduction

The techniques listed in Table 2 as being in the "traffic calming" and "route modification" categories represent physical objects applied at a point on the roadway for the purpose of affecting driver behavior in the immediate vicinity of that point in a self-enforcing manner. Because of this characteristic, these techniques are also referred to as "devices."

Related Issues

Development and Implementation Policies

The goal in developing a neighborhood traffic management program is to produce an integrated set of policies, objectives, and procedures that will include the program's vision, a set of guidelines, and the policy basis for making future decisions. Achieving this goal will provide consistency in addition to the political and technical framework for making decisions. This

requires that thought be given to the problems that the program is designed to solve and what mechanisms will be used to solve them. Successful programs are structured to allow citizens and elected officials to be comfortable in moving projects forward but are also flexible enough to adjust to challenges of individual projects. The types of policy issues that need to be considered during program development are listed in Table 3.

TABLE 3 Typical procedures and issues considered in developing a neighborhood traffic management program (*4*)

Procedure	Issues to be Considered/Corollary Issues
How to handle project requests.	If program is reactive, who can submit a request? Are there pre-submittal requirements? Is there a time limit for reconsideration? How will incident related or other special requests be handled?
Evaluation and ranking of projects.	Will objective criteria be used? Do these criteria reasonably represent the nature and extent of the problem? Does the evaluation adequately rank the severity of the problem? Is there a minimum score for eligibility for a project? Are there different minimums for different types of project solutions? Will the potential project list(s) rank projects city-wide or within specific boundaries (e.g., political boundaries, neighborhood association boundaries, geographic boundaries)?
Project selection procedure.	How are projects selected (e.g., by a prioritized list, elected officials, neighborhood associations)?
Public notification and involvement.	How will initial resident support for the project be determined? How much support is needed for the project to proceed? What citizen/resident notification method(s) will be used? How far away from the project street will residents be notified about the project? How will citizen/resident communications and involvement be handled throughout the project? Will businesses, the transit provider(s), the emergency response and other service providers be included? How will the project design be determined? Will City Council or other elected officials need to approve the project?
Construction.	Will construction be completed by outside contractors or on-staff crews? Will temporary techniques be used as an interim measure pending final construction?
Ongoing program evaluation.	How will project results be reviewed and on what time frame? How is political support assessed and retained? How are resident and citizen satisfaction assessed and retained? How and who will keep the inventory of techniques used?

Public Involvement

Effective public involvement is critical to the success of a neighborhood traffic management program because residents are generally the first to recognize problem areas. Most residents have some sense of ownership of the street space in front of their house, even though they know that the street is public property. Nearly everyone in a neighborhood feels strongly that they should have a voice in what happens on their street. Therefore, it is critical to involve the public in the decision making process, although this process is time consuming and often frustrating.

The public involvement process should balance the public's desires with the need for a project that is safe, does not negatively affect the overall transportation system, and can be constructed for a reasonable cost. However, the way that local residents perceive traffic safety problems and their solutions may be very different from the way the problems and solutions are perceived by a traffic engineer. The traffic engineer must be able to recognize these differences and be able to use neighborhood input without compromising engineering judgement.

Legal Issues

Concern about increased liability risk from implementation of neighborhood traffic management techniques is partially due to the lack of standards for their construction. Because such standards are lacking, the best way for a jurisdiction to protect itself from legal challenges is to develop a rational, well-thought-out program for the planning and implementation process. Formally adopted program policies limit a jurisdiction's exposure to tort liability suits by showing that the jurisdiction's actions were not arbitrary, capricious, or unreasonable. Project files should also document the activities and decisions made during the project.

Local jurisdictions are often concerned about the additional risk they accept by developing a neighborhood traffic management program. This concern is valid; however, the jurisdiction can protect itself by periodically inspecting the physical elements of the traffic calming measure. According to Ewing *et al.* (*8*), "You have little or no exposure, provided your traffic calming measures are well-designed, well-signed, well-lighted, and well-documented."

The issue of government liability always surfaces in discussions of neighborhood traffic management. However, lawsuits and damage claims are not as prevalent as is commonly assumed. A survey of nearly 50 cities and counties by Ewing (*9*) found that many have had no legal problems at all, and the others have experienced more threats than legal actions.

The legal issues associated with implementing a neighborhood traffic management program include statutory authority, constitutionality, and tort liability. A jurisdiction must have adequate authority to implement neighborhood traffic management techniques. The jurisdiction must also respect the constitutional rights of affected landowners and roadway users. Finally, the jurisdiction has responsibility to minimize the risk to roadway users. Parham *et al.* (*10*) indicate that tort liability is generally the issue that concerns local jurisdictions the most.

Emergency Response Issues

Emergency response agencies have become more concerned and vocal as neighborhood traffic management programs have become more common. Many projects have been postponed or stopped because an agreement could not be reached with emergency response agencies.

Opposition from fire-and-rescue services can be a major obstacle to neighborhood traffic management. Neighborhood traffic management techniques that are effective in slowing or diverting automobiles have the same, or even greater, effect on fire or rescue vehicles. The biggest challenges are to keep the effect on emergency vehicle response times within acceptable limits and to find new ways of slowing and diverting automobiles without substantially impeding emergency response vehicles.

Several agencies have performed controlled tests of selected traffic calming devices to quantify the delay they produce. During these tests, multiple runs were made with multiple vehicles driven by multiple drivers in order to estimate travel time as a result of the device. These travel times were then compared with travel times on streets without traffic calming devices. Results of several tests have been reported by Ewing (*9*). These results were averaged for several common traffic calming techniques and are listed in Table 4.

TABLE 4 Emergency vehicle delays due to selected traffic calming devices

Traffic Calming Device	Delay to Listed Emergency Vehicles (seconds)[1]			
	Fire Engine	Custom Rescue Vehicle	Ladder Truck	Ambulance with patient
12-ft speed hump	5.1	--	5.0	9.7
14-ft speed hump	5.2	2.9	6.6	--
22-ft speed table	3.0	0.3	8.3	--
16 to 25-ft traffic circle	6.2	3.1	6.9	--

Notes:
1- Based on data reported in Table 7.3 of Reference *9*.

Based on an examination of the test data, Ewing (*9*) offered the following observations:

1. The delay is almost always less than 10 seconds, regardless of the traffic calming device or fire-rescue vehicle tested.
2. Traffic circles appear to create longer delays than speed humps.
3. The delay to fire engines will likely be incurred for all emergency calls as fire engines are generally included in all emergencies.

TECHNIQUE EFFECTIVENESS

The objective of neighborhood traffic management is to provide a safe environment by reducing the speed and volume of traffic to acceptable levels. Neighborhood traffic management techniques are often reported to reduce the number of crashes on treated residential streets. For example, a report by Geddes *et al.* (*11*) that summarized the findings of 43 safety studies indicated that collision frequency declined an average of 80 percent with a range of 8 to100 percent.

This section summarizes a review of the literature on the effectiveness of alternative neighborhood traffic management techniques. The measures of effectiveness include volume reduction, speed reduction, and crash frequency reduction. The discussion of techniques is separated into two categories: (1) route modification and traffic calming techniques and (2) regulatory techniques. Techniques in the first category tend to represent specific devices with physical elements that are self-enforcing whereas those in the second category represent the application of traffic controls and require some level of law enforcement.

Route Modification and Traffic Calming Techniques

Case study findings reported by Ewing (*9*) provide the most recent, comprehensive look at the effectiveness of individual neighborhood traffic management techniques. Average reductions in volume, speed, and crashes are shown in Table 5. The data in this table that are attributed to Ewing (*9*) reflect measurements at 378 locations in 11 U.S. cities. Sample sizes underlying each average vary from 3 to 179 locations with an average of 38 locations.

TABLE 5 Effectiveness of selected neighborhood traffic management techniques

Category	Technique	Primary Measure of Effectiveness	Percent Reduction In...			Ref.
			Volume	Speed	Crashes	
Route Modification Devices	Full closures (1 to 4 blocks away)	Volume reduction	44	--	--	9
	Half closures (1 to 4 blocks away)	Volume reduction	42	19	--	9
	Diagonal diverters	Volume reduction	35	4	--	9
Traffic Calming Devices	Speed humps	Speed reduction	18 to 22	22 to 23	13 to 40	9
	Speed tables	Speed reduction	12	18	45	9
	Raised intersections	Speed reduction	--	1	--	9
	Traffic circles	Speed reduction	5	11	28	9
	Roadway narrowing	Volume reduction	10	4	--	9
	Chokers	Volume reduction	20	14	--	9
Regulatory Measures	Speed trailers	Speed reduction	9	7	10	12
	Speed limit signs and markings	Speed reduction	4	7	3	12
	Increased enforcement	Speed reduction	8	28	28	12

Volume changes resulting from the application of a technique can vary with the degree of speed reduction and with the presence of attractive alternate routes. A case study reported by Ewing (*9*) illustrates this concept. Two identical streets were both treated with a series of 12-ft speed humps located at comparable spacings. One street did not have a convenient alternative route; the other street had a good alternative route. Speed reductions were nearly the same on both streets. However, only the street with an alternate route experienced a volume reduction. The statistics associated with this case study are listed in Table 6.

TABLE 6 Effect of alternate route availability on volume change (*9*) [1]

Parallel Route?	Speed Reduction [2]			Volume Reduction [2]		
	Before	After	% Change	Before	After	% Change
No	36	25	30.6%	2,456	2,593	-5.6%
Yes	37	27	27.0%	1,472	1,071	27.2%

Notes:
1 - 12-ft speed humps at 500 to 580-ft spacing.
2 - negative changes denote an *increase* rather than a reduction.

The speed reduction associated with a given technique can vary depending on the spacing between such techniques. Data reported by Ewing (*9*) for speed humps, indicate that speeds tend to increase with distance between techniques. An examination of the data indicates that the percentage speed reduction decreases about 2 percent for every 100 ft increase in spacing. For example, speed humps located about 200 ft apart were found to reduce speeds by 33 percent; those located about 400 ft apart were found to reduce speeds by only 29 percent.

Crash frequency reductions reported by Ewing (*9*) (and listed in Table 5) were examined to determine the possible influence of volume. As noted previously, a significant portion of the crash frequency reduction is often due to volume reduction rather than an increase in safety as a result of the traffic management technique. A subset of the data provided by Ewing (*9*) was found to have both volume *and* crash data (i.e., 33 speed humps, 6 speed tables, and 15 traffic circles). Linear regression was used to examine this data to determine the change in crash rate for the "before" and "after" scenarios. The resulting relationships are shown in Column 2 of Table 7.

TABLE 7 Effectiveness of three traffic calming devices

Traffic Calming Device	Crash Rate Equation [a]	R^2	Effective Crash Rate Reduction Percent	Reported Crash Freq. Reduction Percent
Speed Humps	y = 0.8459 x	0.49	15 %	13 to 40 %
22-ft Speed Tables	y = 0.9594 x	0.21	4 %	45 %
Traffic Circles	y = 0.9413 x	0.96	6 %	28 %

Notes:
a - y = crash rate after installation; x = crash rate after installation (crashes per million vehicles).

The regression relationships were used to compute the effective crash rate reduction percentages (i.e., percent reduction = (x - y) / x * 100). These percentages are shown in Column 4 of Table 7. The last column of Table 7 lists the crash frequency reduction percentages reported by Ewing (*9*) and listed in Table 5. Comparison of the percentages in the last two columns provides convincing evidence that volume reduction associated with the implementation of a traffic calming device is the primary reason that crash frequency decreases. Hence, actual improvements to the *safety* of a street treated with one or more techniques are likely to be small (as reflected by a reduction in crash rate of only 4 to 15 percent).

Regulatory Techniques

There is limited evidence available on the effectiveness of regulatory techniques. However, these activities cannot be dismissed because there have been successes. Average reductions in volume, speed, and crash frequency for three techniques are listed in Table 5, as reported in Reference *12*.

Targeted enforcement activities have been successful in reducing speed; however, continued enforcement is required to sustain acceptable levels of speed reduction. There is also some doubt about the cost-effectiveness of these activities. Data reported by Ewing (*9*) for one city indicate that targeted enforcement has a net annual cost of more than $150,000 (= salary less revenue from fines). This cost was found to be about five times that associated with speed humps.

Neighborhood speed watch programs have varying results. Such programs serve to involve and educate residents on the true nature and extent of the problem. However, in a review of the effectiveness of three programs, Ewing (*9*) found that actual speed reductions were negligible. Some neighborhood speed watch programs continue to focus on reducing speeding through newsletter publications.

Photo-radar speed enforcement has been found to yield sustained speed reductions over time. However, because of its operating expense, photo-radar is only cost-effective on high-volume streets that have both excessive speed and safety problems and which are also the least amenable to the use of other techniques.

Chapter 3
CORRIDOR TRAFFIC MANAGEMENT TECHNIQUES

OVERVIEW

Corridor operating efficiency and safety are at the heart of urban traffic operations. Arterial streets carry the bulk of the traffic in urban areas which has made them the focus of considerable research through the years. Corridor traffic management provides for the safe and efficient travel of all motorists along and in the immediate vicinity of the arterial street, including the adjacent collector and local street system. This chapter describes corridor management techniques that are intended to minimize the volume of traffic that diverts through neighborhoods. This goal is achieved by maintaining a high travel speed along the arterial street such that diversion through a neighborhood is an unattractive alternative.

Objective and Goals

Corridor traffic management has the overall objective of ensuring that the corridor street system is functionally balanced and that all streets in the system provide an acceptable quality of traffic service. The goals of a corridor traffic management program include:

1. Minimize travel time to through vehicles on arterial streets.
2. Minimize neighborhood intrusion by providing a hierarchy of local, collector, and arterial streets.
3. Minimize conflicts between vehicles and other travel modes.

The ultimate goal of corridor traffic management is to preserve or improve the mobility function of the arterial (or pair of arterials) in a corridor. Mobility is usually associated with high speeds and shorter travel times, lower delay, and fewer stops, which are all objectives of corridor traffic management. Safety is also a concern, and reduction in crash rate is another objective.

As traffic demands continue to grow and arterial streets become more congested, some drivers seek alternative routes in hope of reducing their travel time. However, problems can occur when the alternative routes include neighborhood streets. Smith, *et al.* (*13*) aptly phrased the principal problem with flow in traffic networks:

> "Many motorists simply regard any street in any location as, first and foremost, a place to drive. Further, they have certain expectations as to how a street system should operate, and if the street becomes congested beyond their tolerance, they will seek other paths."

Unfortunately, the criteria used by a driver when selecting the "other path" has no bearing on the roadway's functional classification. The result is that drivers use local streets for high-speed through trips instead of low-speed property access. This problem is illustrated in Figure 2. The street system shown in this figure offered several alternative paths for trips between downtown Atlanta, Georgia, and Harmony Grove Road. Unfortunately, many drivers chose to

avoid the delay at the signalized intersection of Harmony Grove Road and U.S. 29 by using the residential streets (i.e., Braden Dr. and Kenvilla Drive).

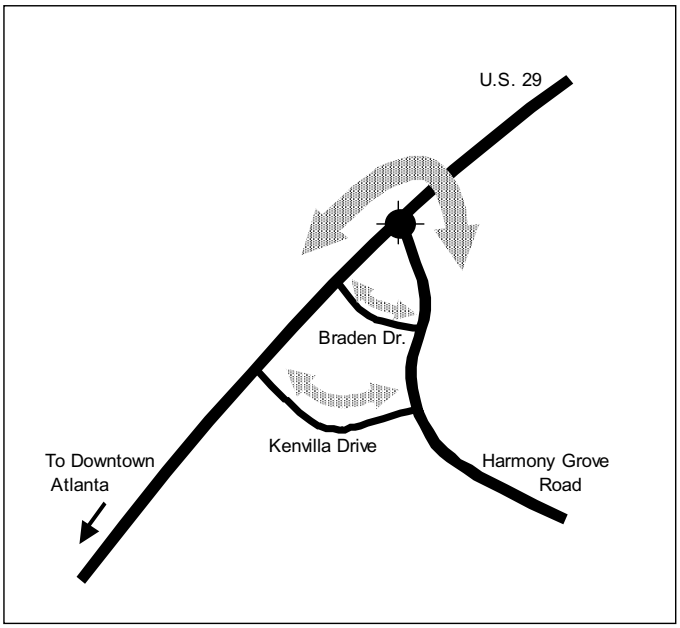


Figure 2. Example of alternative routes that lead to cut-through traffic.

To prevent the misuse of the local street system, the traffic engineer should set a goal of minimizing delay and travel time along the arterial streets that bound the neighborhood. To achieve this goal, the arterial should have its signal timing plan periodically reviewed and updated to insure that the arterial continues to provide an adequate level of service to motorists. Occasional physical improvements to the intersections (e.g., add a turn bay) may also be needed to accommodate changing traffic patterns.

Common Techniques

Corridor traffic management techniques are focused on increasing arterial travel speed such that the arterial remains attractive to through drivers. Travel speed can be improved using one or more of the following techniques: signalization improvements, geometric improvements, or access management. All three techniques are intended for application to the arterial street (or streets) within the corridor. Each of these techniques is briefly described in this section.

Signalization Improvements

The signalized intersections and their associated spacing along the arterial street dictate the level of service provided by the arterial. Because of their significant influence on operations, the control mode and controller settings at each intersection should be adapted to traffic volumes and patterns that occur throughout the day. Signalization improvements include: optimize signal

phase durations, coordinate through phases, improve progression bandwidth, remove signals that are unwarranted, and provide traffic-responsive operation.

Geometric Improvements

Geometric improvements can also increase arterial capacity. These improvements may include: adding turn lanes, adding through lanes, or converting the street to one-way operation. Geometric improvements tend to be more difficult and costly to install than traffic signal improvements. They may also be much more permanent. However, they have the potential to offer greater capacity gains than any other improvement technique.

Access Management

Access management reflects a system-wide application of techniques aimed at mitigating the negative effects of access points located along the arterial. The number, spacing, and design of these access points are highly correlated with corridor operations. More frequent access points result in lower travel speeds. Access management techniques include: changing the median type, introducing turn prohibitions, and reducing the total number of access points along the arterial. The objective of these techniques is to minimize delays to through vehicles due to left or right-turn maneuvers from the arterial.

Related Issues

Corridor Preservation

Corridor preservation seeks to protect the corridor street system from disruption due to new development. It is not a traffic engineering tool; rather, it is a legislative and policy basis for access management and allows for planned geometric improvements to the arterial street system. Corridor preservation represents the planing element of a corridor traffic management plan.

Arterial Traffic Calming

Brindle (*14*) classifies traffic management programs into three different levels, each one broader in scope than the other. Level 1 is effectively neighborhood traffic management as it relates to the residential application of route modification, traffic calming, or regulatory techniques. Level 2 is effectively arterial traffic calming. Level 3 involves area-wide or metropolitan traffic management. It relies on a variety of demand-reduction policies, pricing policies, land-use policies, and other high-level decisions that can influence driver mode and route choice. Level 3 traffic management is largely outside the scope of this report.

Pline (*15*) indicates that the purpose of arterial traffic calming is to improve the environment around the arterial for all users and to "adapt the arterial to the town." One objective of arterial traffic calming is to limit excessive arterial speeds, but not at the expense of increased delay or reduced capacity. A second objective of arterial traffic calming is to avoid the diversion of traffic to the local street system. The second objective may be at odds with the first objective

because reduced arterial speeds are very likely to increase the volume of diverted traffic, especially if alternative routes through the neighborhood exist.

TECHNIQUE EFFECTIVENESS

The goals of corridor traffic management offer some insight into the measures of effectiveness that can be used to assess alternative management techniques. One goal is to minimize arterial travel time. A second goal is to minimize the number of vehicles that divert through the neighborhoods adjacent to the arterial street. Based on this assessment, two measures of effectiveness are identified: volume reduction on neighborhood streets and speed increase on the arterial street.

Measures of Effectiveness

Volume Reduction on Neighborhood Streets

The three corridor management techniques described in a previous section (i.e., signalization improvements, geometric improvements, and access management) are intended to directly improve arterial travel speed. In turn, these improvements may affect the volume of cut-through traffic in a neighborhood.

Savage *et al.* (*16*), present a series of "toolboxes" for dealing with residential traffic problems. They acknowledge that one approach to neighborhood cut-through traffic "may be to improve the arterials and attract drivers back to the through streets." However, nothing more is said about how to achieve this goal. A similar acknowledgment is provided in the *Traffic Engineering Handbook* (*15*).

Fisher (*17, 18*) outlines a "carrot and stick" approach used by the City of Los Angeles in dealing with residential cut-through traffic. The concept behind this approach is to make the arterial more attractive that the local streets. This is accomplished by providing ample left-turn capacity (via phasing and turn bays) at the arterial-to-arterial intersections. In contrast, the turn phase is intentionally very short at the arterial-collector intersections. This approach tends to make travel along the major streets more attractive, while discouraging cut-through traffic at collector street intersections. This concept is shown in Figure 3. Fisher reports that this system works "reasonably well," although quantitative information was not provided.

There are a few publications that define acceptable levels of neighborhood traffic volume. For example, Spitz (*19*) has proposed a range of volume levels for different degrees of acceptability. These levels are shown in Table 8.

Appleyard (*20*) suggests a maximum local street traffic volume of 500 to 800 veh/d. This maximum is consistent with the "good" and "acceptable" ranges in Table 8. Collectively, these values suggest that, for an arterial improvement to be considered "effective," neighborhood street volumes should be reduced to below 1,500 veh/d and preferably below 1,200 veh/d.

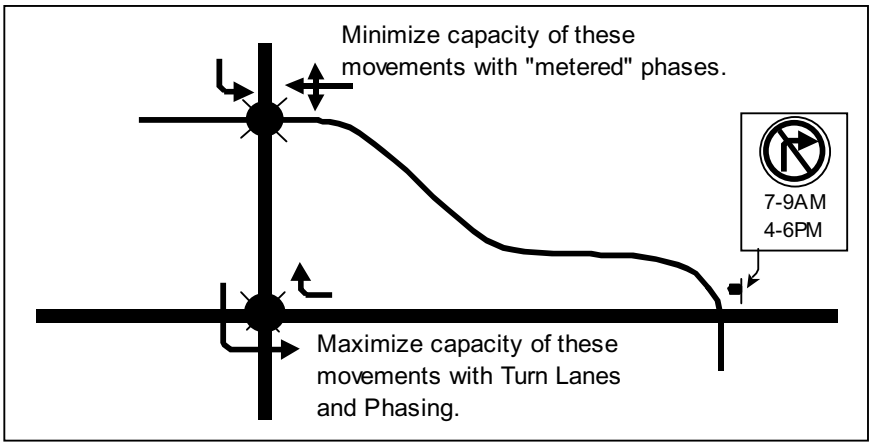


Figure 3. Signalization and geometric improvements that reduces cut-through volume.

TABLE 8 Acceptable levels of local street traffic volume (*19*)

Traffic Volume or Flow Rate Range		Acceptability
Daily Volume (veh/d)	**Flow Rate (veh/m)**	
0 to 300	0 to 0.5	Excellent
300 to 600	0.5 to 1.0	Good
600 to 1,200	1.0 to 2.0	Acceptable
Over 1,200	Over 2.0	Poor

Speed Increase on the Arterial Street

Procedures in the *Highway Capacity Manual* (*21*) (*HCM*) can be used to determine the effectiveness of capacity improvements on arterial streets. These improvements are directed to the capacity of the arterial through movements. They can be the result of changes in signalization or the addition of traffic lanes. The effectiveness of the improvement is assessed in terms of the increase in average travel speed.

The *HCM* defines travel speeds that reflect acceptable levels of service for an urban street. These level-of-service thresholds are listed in Table 9. These thresholds are expressed as a percentage of the free-flow speed. Free-flow speed reflects vehicle speeds when traffic volumes are relatively light such that the speed limit, the street's geometry, and its immediate environment are the only factors that influence a driver's speed choice.

Effectiveness of Individual Techniques

This section describes the effectiveness of selected corridor traffic management techniques. These techniques include signal coordination and capacity improvements.

TABLE 9 Relationship between free flow speed and level of service (*21*)

Travel Speed (as a percent of free flow speed)	Operating Conditions	Level of Service
90 to 100 %	Free Flow	A
70 to 89 %	Unimpeded	B
50 to 69 %	Stable	C
40 to 49 %	Periodically Unstable	D
33 to 39 %	Unstable	E
< 33 %	Congested	F

Signal Coordination

Poor progression on an arterial can be due to sub-optimal timing, but it can also be due to poor or uneven signal spacing. In general, good arterial progression can be maintained as long as signal spacing is uniform and the sum of the travel time in both directions is equal to a multiple of the cycle length. In contrast, an arterial with poor signal spacing can almost never have good two-way progression, regardless of the signal timing.

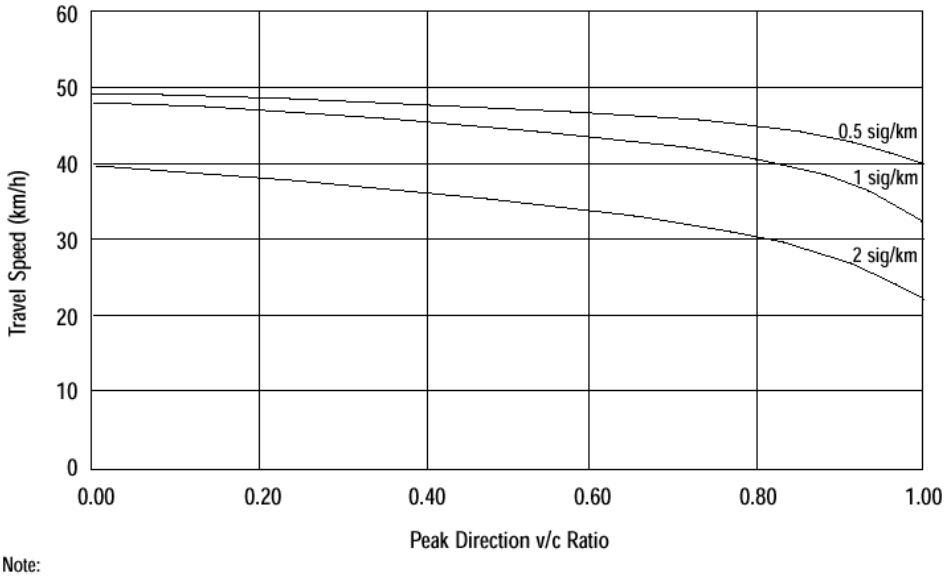
The benefits of signal coordination have been demonstrated in two recent state-wide traffic signal optimization projects. These two projects are California's Fuel-Efficient Traffic Signal Management Program (FETSIM) (*22*) and Texas' Traffic Light Synchronization Program (TLS) (*23*). The FETSIM program involved about 2,500 signals while the TLS program included 1,600 signals. The results of each program are summarized in Table 10. The results are generally similar overall; however, the TLS program has considerable variation for individual systems and intersections.

TABLE 10 Effectiveness of signal coordination and signal timing adjustment

Project	Signal Improvement	Equipment	Reduction Percentage (%)			Sample Size
			Delay	Stops	Fuel Use	
TLS (*23*)	Timing adjustment only	Existing	55	26	34	10
		New	31	13	11	147
	Coordination only	Existing	60	29	31	60
		New	29	16	14	201
	Both	Any	14	28	11	1,606
FETSIM (*22*)	Both	Any	14	13	9	2,500

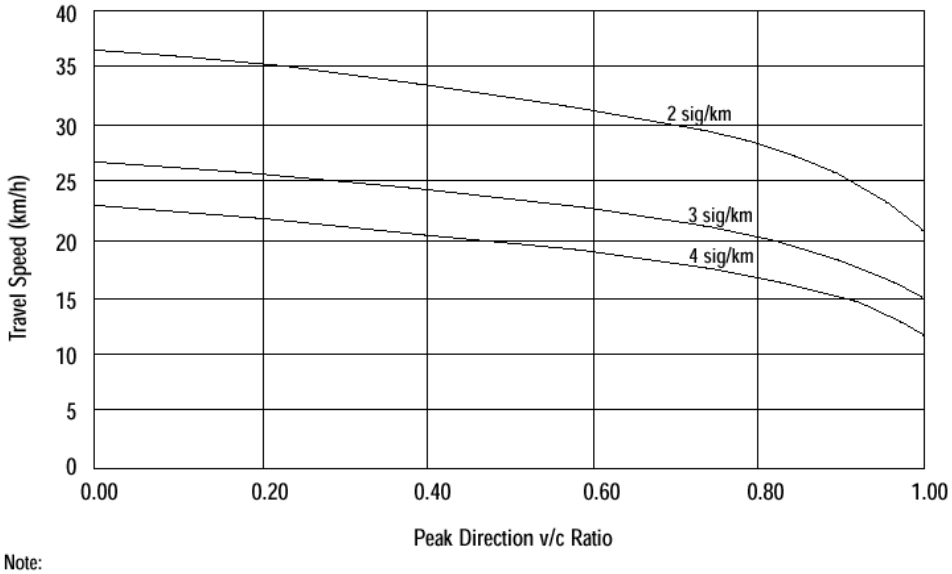
Capacity Improvements

Capacity improvements include changes to arterial geometry (e.g., add lanes) or the timing of the through movement at each traffic signal. The effectiveness of these improvements is difficult to generalize, since the same improvement may perform very differently under different conditions. Figures provided in Chapter 10 of the *HCM* provide some indication of the effect of a change in capacity (via a change in the volume-to-capacity *v/c* ratio) on average travel speed. Two of these figures are reproduced in this report as Figures 4a and 4b. The three trend lines in each figure reflect different signal spacings, as expressed in terms of "signals per kilometer." For reference purposes, Figure 4a is illustrative of a "Class II" street, as defined in the *HCM* and Figure 4b is illustrative of a "Class III" street.



Note:
Assumptions: 65 km/h midblock free-flow speed, 10 km length, 120 s cycle length, 0.45 g/C, arrival type 3, isolated intersections, adjusted saturation flow rate of 1700 veh/h, 2 through lanes, analysis time period of 0.25 h, pretimed signal operation.

a. Average travel speed for suburban arterials with a speed limit of 40 or 45 mi/h (Class II).



Note:
Assumptions: 55 km/h midblock free-flow speed, 10 km length, 120 s cycle length, 0.45 g/C, arrival type 3, isolated intersections, adjusted saturation flow rate of 1700 veh/h, 2 through lanes, analysis time period of 0.25 h, pretimed signal operation.

b. Average travel speed for suburban arterials with a speed limit of 30 or 35 mi/h (Class III).

Figure 4. Effect of volume, capacity, signal spacing, and speed limit on average travel speed.

Chapter 4

DEVELOPMENT OF A CUT-THROUGH TRAFFIC PREDICTION MODEL

OVERVIEW

Excessive traffic on residential streets is often a result of non-local (or "through") drivers diverting from the adjacent arterial street system in an attempt to reduce their travel time. Neighborhood traffic management techniques (e.g., closures, diverters, turn prohibition) have traditionally been used in a reactive manner to prevent drivers from diverting through the neighborhood. Some success has been achieved from this practice; however, several engineers (*16, 17*) have pointed out that improving arterial operations can offer a proactive approach that is intended to preclude through driver diversion.

This chapter describes a relationship between diverted (or cut-through) traffic volume and arterial street performance. The relationship was developed using simulation modeling of a street network consisting of arterials, collectors, and local streets. The relationship can be used by engineers to predict the benefit of arterial improvements in terms of reducing cut-through volume. It can also be used to compare alternative improvements or to justify the cost of an improvement.

TRAFFIC SIMULATION PROCESS

Simulation Model Selection

Generally, there are two types of transportation models: planning and operational. Planning models follow the "4 Step" process of trip generation, trip distribution, mode split, and network assignment. These models are intended to provide an estimate of future daily traffic demands on the major streets within a metropolitan area. Street capacity and intersection delay are modeled in a very approximate manner that is consistent with the precision needed for planning applications. On the other hand, operational models provide a very detailed view of the operation of one street or a small network of streets. In these models, the interaction between individual drivers and roadway elements (signs, signals, lane assignments, and so on) is of primary importance. Operational models can provide very detailed information about the performance of selected traffic lanes and intersection approaches as they are affected by signal timing, intersection geometry, vehicle mix, and speed limit.

It was determined that elements of both planning and operations models would be needed to develop a relationship between arterial performance and cut-through volume. Specifically, what was needed was a traffic simulation model that could assign trips to a street network (thus allowing route changes to be modeled) *and* analyze operational effects of various types of geometric features and signal settings. The model chosen was Integration. It is a deterministic simulation model developed by Van Aerde (*24*). Integration is capable of modeling the operation of signalized and unsignalized intersections, turn lanes, and queue spillback. It can also model driver response to control devices and other delay sources through its use of an origin-destination-based traffic assignment module.

As with any model, Integration has some limitations. First, Integration uses a speed-density model requiring the definition of free-flow speed, speed at capacity, capacity, and jam density for each street segment. Unfortunately, little information is available regarding the value of these parameters for interrupted flow (i.e., signalized street systems), especially for local streets. Therefore, they must be estimated based on experience and judgement.

Second, Integration cannot optimize coordinated signal systems during the simulation. It has the capability to optimize the signal timing of individual intersections during the simulation; however, this capability is not extended to signal offset optimization. Offsets and timing plans that promote good progression must be developed by the analyst (for different times of day) and provided as input to the simulation model prior to its execution.

Finally, modeling left-turn bay lengths and left-turn driver behavior under congested conditions is also a problem for Integration. Integration does not allow drivers to "look ahead" more than one street segment at a time. Thus, the simulated driver makes decisions about lane choice based only on traffic conditions on the upstream segment. This decision making causes problems when the left-turn bay overflows to the extent that the queue spills back into the upstream segment. Integration "instructs" all drivers on the upstream segment to avoid the queue and enter the "problem" segment in an adjacent through lane. The problem is that drivers intending to turn left from the problem segment are now unable to get into the overflowing left-turn bay. Integration instructs these left-turn drivers to block the adjacent through lane until they can enter the left-turn bay (which may not happen). In the "real-world," these left-turn drivers would have joined the queue on the upstream segment.

In spite of these limitations, Integration provided the best mixture of detailed operational analysis and modeling of driver route-choice.

Scope of Simulation

Several factors were identified as possibly having an influence on, or being related to, the volume of cut-through traffic in the simulated street system. These factors are listed in Table 11. Because of limited project resources, only those factors indicated by check ( ) were investigated in this research.

As noted in Table 11, several items were not investigated during the simulation effort that may have considerable bearing on cut-through traffic. One of the most important of these items was the investigation of the effect of individual neighborhood traffic management techniques. However, any factorial evaluation of all reasonable combinations of technique and spacing-between-techniques would require an analysis effort that greatly exceeded the project resources. Also, for many techniques, there is insufficient data available regarding its effect on traffic speed. The density and connectivity of the local street system was another important variable that could not be covered in this research because of limited resources.

TABLE 11 Factors related to cut-through volume on local streets

Category	Factors Related to Cut-Through Volume	Factors Investigated
Travel Time	Total Trip Length	
	Travel Speed/Delay	
Arterial Street Conditions	Signal Operations	
	Cross section (e.g., number of through and turn lanes)	
	Traffic Demand	
Neighborhood Street Conditions	Network Density (Street Spacing)	
	Operating Speed	
	Traffic Control	
	Neighborhood Traffic Management Techniques	
	Network Connectivity (Street Configuration)	

Note:
- denotes factors explicitly evaluated in traffic simulation process.

Finally, limited resources precluded an investigation of the effects of a wide range of signal timing plans. The effects of signal timing on arterial operations are well known, but the effect on neighborhood cut-through traffic is not. The "aging" of signal timing plans may have an incremental, progressive effect that gradually increases the volume of cut-through traffic.

The factors identified in Table 11 were examined using simulation in order to quantify their effect on the volume of cut-through traffic. In order to make this measure of effectiveness more interpretable, it was expressed as a percentage of the arterial traffic entering the street network that bounds the neighborhood. Thus, the percent of cut-through traffic represents the measure of effectiveness developed from the simulation analysis. This measure was computed using the following equation:

$$\%CT = \frac{V_E - V_L}{V_T} \times 100 \quad \textbf{(1)}$$

where:

$\%CT$ = percent cut through traffic, percent;
V_E = total number of vehicles exiting neighborhood streets (i.e., the collector and local streets) and entering the arterial streets, veh/h;
V_L = total number of local vehicles exiting neighborhood street, veh/h; and
V_T = total number of vehicles entering the arterial street system that bounds the subject neighborhood, veh/h.

Simulated Traffic Network

The network used in this analysis was a 1/4 mile by 1/4 mile grid bounded by arterial streets, as shown in Figure 5. The arterial streets had four through traffic lanes (two lanes each direction) and a free-flow speed of 40 mi/h. In the "base condition," the arterial-arterial and arterial-collection intersections were signalized. The characteristics of this arterial are consistent with the Class II criteria defined in Chapter 11 of the *HCM* (*21*).

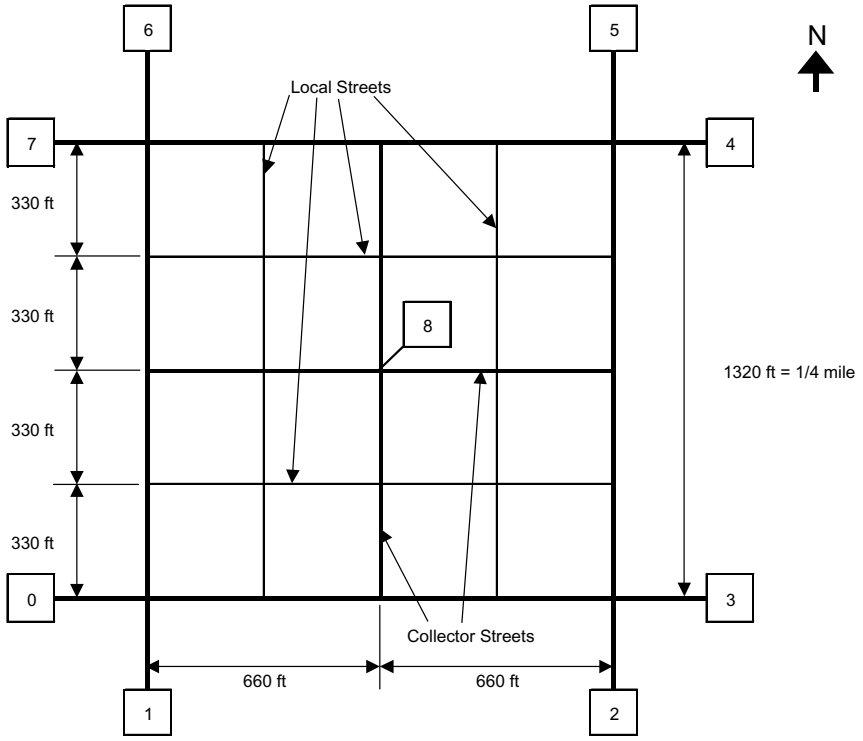


Figure 5. Simulated traffic network.

Street Spacing and Speed

Local and collector streets were located as shown in Figure 5. Collector streets are parallel to and 1/8 mi from the arterial streets. Local streets are parallel to and 1/16 mi from the nearest arterial street. Each collector street had two through traffic lanes and a free-flow speed of 30 mi/h. Local streets were spaced halfway between the collector and arterial. Each local street had two through traffic lanes and a free-flow speed of 20 mi/h.

Traffic Control

The traffic control conditions for each intersection are shown in Table 12. The Arterial-Collector intersection was signalized for the "base condition"; however, two-way stop control was substituted for a series of simulations intended to evaluate the effect of signal spacing on cut-through volume.

TABLE 12 Traffic control at intersections

Intersection Type	Control
Arterial-Arterial	Signal
Arterial-Collector	Two-way stop or Signal
Arterial-Local	Two-way stop (local)
Collector-Collector	All-way stop
Collector-Local	Two-way stop (local)
Local-Local	Alternating yield

All signalized intersections were provided with left-turn lanes. To avoid some of the problems associated with driver "look ahead" behavior (as noted in the section titled Simulation Model Selection), the turn lanes were extended to the next upstream intersection (in this case, 330 ft). Signal operation included protected-permitted left-turn phasing.

Trip Distribution

In order to use Integration, an origin-destination-based trip assignment was needed. The network being analyzed had eight origin-destination zones for arterial traffic plus a ninth origin-destination zone for local traffic. The origin-designation zones are indicated by number in Figure 5.

Because these zones both produced and attracted trips, a method was needed to initially distribute trips among the zones. The distribution method used was a doubly-constrained gravity model. This model has two constraints. First, total productions must equal total attractions. Second, the "cost" (i.e., travel time) of making the trip must also be reflected in the distribution, with fewer trips being distributed to the more "expensive" routes.

As a first step in the trip distribution process, a distribution of background traffic was assumed. This distribution was based on an assumed orientation of the simulated network relative to the central business district (CBD) of a large city. Specifically, it was assumed that the simulated network was south of the CBD. It was also assumed that traffic flows reflected the afternoon peak hour. Based on these assumptions, it was rationalized that 36 percent of all traffic flowing into the network would be traveling south, 24 percent would flow north, and 20 percent would flow both east and west. Each of these percentages was split evenly among the two external nodes on the corresponding side of the network. The result of this distribution is shown in Figure 6.

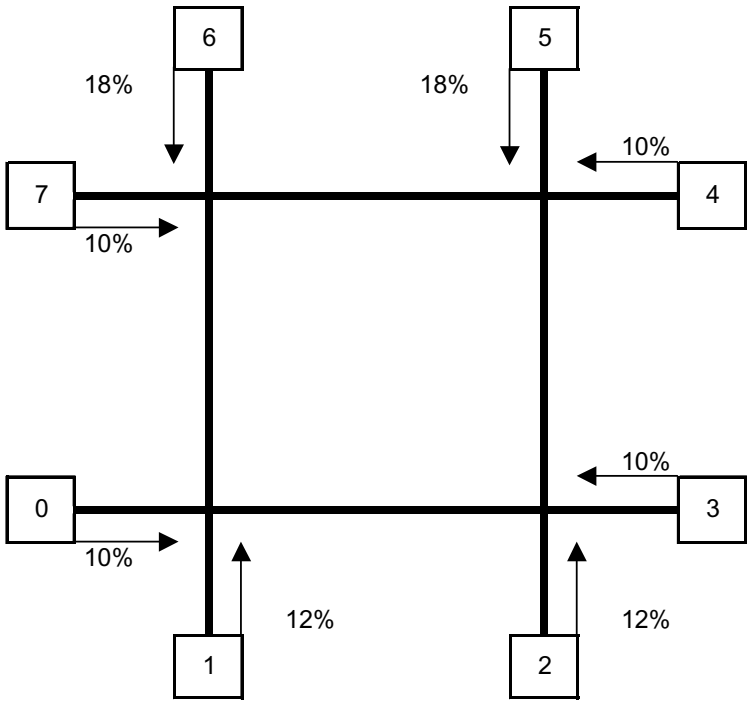


Figure 6. Distribution of trip origins by zone.

Next, impedance factors were created to account for the relative attractiveness of the various destination zones. These impedances were subjectively determined and intended to reflect the relative delay at each intersection associated with a particular turn movement. The impedances used were 5, 10, and 15 for the through, right-turn, and left-turn movements, respectively.

The impedances were created to assign a "cost" for each possible traffic movement on the arterial streets within the network. For instance, a vehicle traveling from Zone 1 to Zone 3 would have a right turn at the first arterial intersection encountered and then travel through at the second intersection. The total impedance for this trip is 15 (= 10 + 5). The impedances used in trip distribution are shown in Figure 7.

Origin Zone	Destination Zone							
	0	1	2	3	4	5	6	7
0		10	15	10	35	30	25	20
1	20		20	15	30	35	10	25
2	25	40		10	25	10	35	30
3	10	25	20		20	15	30	35
4	35	30	25	40		10	35	30
5	30	35	10	25	20		20	15
6	25	10	35	30	25	40		10
7	20	15	30	35	10	25	20	

Figure 7. Impedance values for each origin-destination pair.

Figure 8 illustrates the results of the trip distribution process when the total traffic demand on the arterial streets is 175 veh/h/ln. Other values were obtained for other traffic volumes; however, the relative magnitudes shown in Figure 8 were maintained.

Origin Zone	Destination Zone							
	0	1	2	3	4	5	6	7
0		76	56	45	14	18	27	22
1	37		61	44	25	23	97	26
2	32	32		72	33	90	54	41
3	60	37	49		31	44	46	26
4	22	40	51	17		83	29	22
5	35	47	174	37	53		69	60
6	45	176	99	63	45	31		95
7	30	62	62	29	60	26	38	

Figure 8. Sample origin-destination matrix for a lane volume of 175 veh/h/ln.

The gravity model used in the distribution process was found to yield a constant percentage of vehicles that effectively travel "diagonally" through the network (e.g., from Zone 6 to Zone 2). Diagonally oriented vehicles were the most likely vehicles to cut-through the neighborhood in order to avoid delays along the arterial. In order to fully evaluate the effect of arterial operations on the volume of cut-through drivers, the origin-destination matrix produced by the gravity model was adjusted slightly to achieve a desired percentage of cut-through vehicles.

Local Traffic Demand

The area bounded by the arterial streets was assumed to be residential, with a housing density of 10 dwelling units per acre. This density is estimated to be about one-half of the maximum density that can be supported by the street network. Procedures described by Ewing (*9*) were used to estimate the peak hour trip production for this size network. Based on this analysis, 640 total trips were estimated with 60% (384 trips) inbound during the peak hour and 40% (256 trips) outbound. This volume was added to the arterial traffic volumes obtained from the gravity model.

Unlike the arterial trips, local trips were distributed evenly to all of the external destinations. The total amount of local volume was relatively small compared to the arterial volume. In fact, the addition of local traffic to the network had very little effect on the volume of cut-through traffic. To simplify the modeling process, all local traffic was assumed to originate at Zone 8.

Geometric and Operational Variations to the Network

Figure 9 lists the various operational and geometric factors that were varied during this analysis. Each combination of free-flow speed and traffic control was individually simulated for each signal density, demand level, and diagonal percentage. The signal density was varied by

adding signals to the arterial-collector intersections. All-way stop control was used at every collector-collector, collector-local, and local-local intersection.

Demand Level (veh/h/ln)	Total Arterial Volume (veh/h)
100	1400
175	2800
250	4200
325	5600
450	8400

Diagonal Percentage
14
19
23
27

Signal Density:	8 signals/mile (signals at arterial-arterial and arterial-collector intersections) 4 signals/mile (signals at arterial-arterial intersections)

The following factors were evaluated for each signal density, demand level, and diagonal percentage combination:

Factor	Base Condition	Change in Factor
Arterial Street Free-Flow Speed	40 mi/h	+ 5 mi/h
		- 5 mi/h
Collector Street Free-Flow Speed	30 mi/h	+ 5 mi/h
		- 5 mi/h
Local Street Free-Flow Speed	20 mi/h	+ 5 mi/h
		- 5 mi/h
Collector streets	Collector streets at 1/8 mi.	Collectors become local streets (20 mi/h free-flow speed) and alternating Yield control.
Local & Collector Street Control	Two-way stop and Yield controls.	All-way stop control.

Figure 9. Network operational and geometric factors investigated.

DATA ANALYSIS AND RESULTS

Simulation Data

A total of 360 simulation runs were performed to investigate all of the combinations shown in Figure 9. From the output of each run, the total number of vehicles exiting the neighborhood (i.e., entering the arterial from a local or collector street) was collected. This data was used with Equation 1 to compute the percent cut-through traffic. Visual inspection of the simulation in progress showed that exiting vehicles sometimes re-entered the neighborhood, but the number of double-entry vehicles was very small. Also collected from the output of each run was the travel time and average travel speed on the arterial streets.

A comparison of average lane volumes and travel speed for the base condition with "8 sig/mi" density is shown in Figure 10. The trends for the other factor combinations were similar. The travel speeds are closely grouped for lane volumes up to 325 veh/h/ln, then they diverge for higher volumes. The divergence is because the higher diagonal percentages (23% and

27%) had larger left-turn delays at the higher volume levels than the lower diagonal percentages. Lane volumes of 450 veh/h/ln generally resulted in congestion for one or more movements at the arterial-arterial signalized intersections.

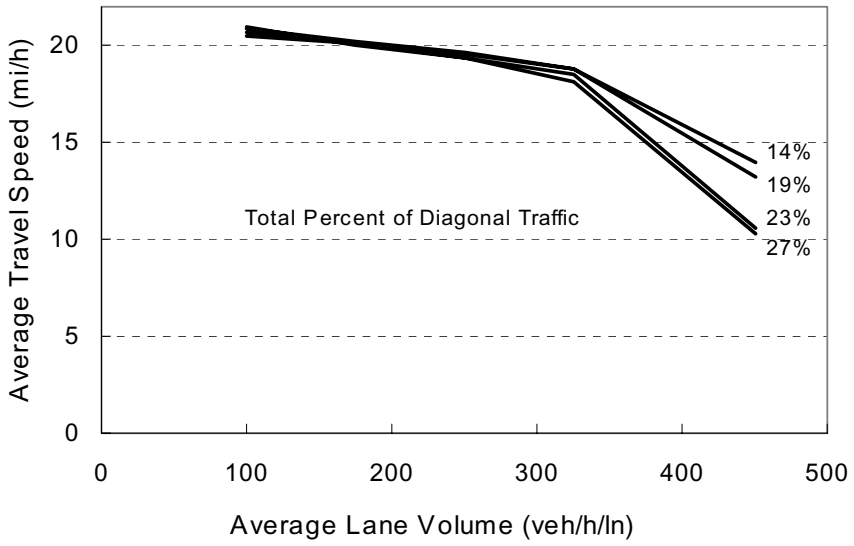


Figure 10. Average travel speed as a function of lane volume and diagonal percentage.

Further analysis of the data revealed that signal density has a significant effect on travel speed. This effect is illustrated in Figure 11. The *HCM* (*21*) levels of service for a Class II street are superimposed on the figure for reference.

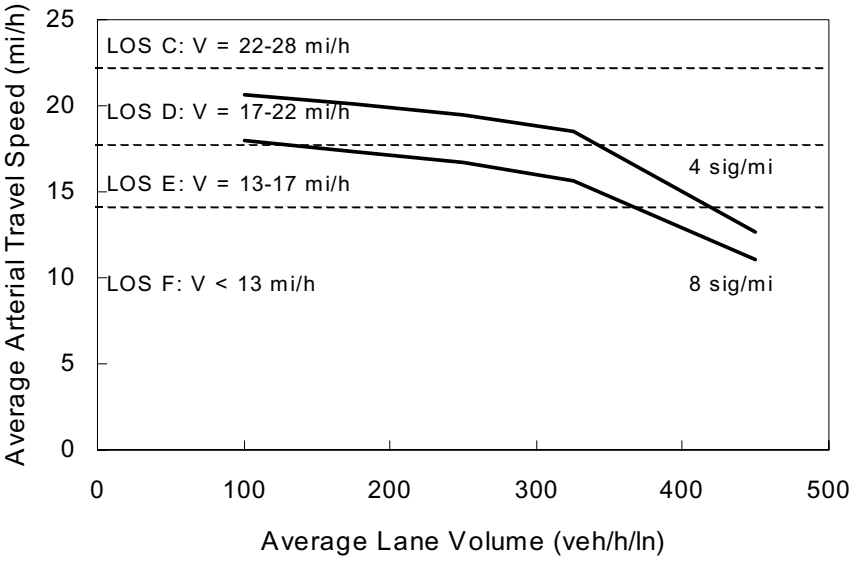


Figure 11. Average travel speed as a function of lane volume and signal density.

The percent of cut-through traffic for the base condition and "8 sig/mi" density are shown in Figure 12. In general, the amount of cut-through traffic increases as the average lane volume increases and as the diagonal percentage increases. An examination of the cut-through percentage for other factor combinations indicated similar trends; however, the specific percentage for a given lane volume and diagonal traffic level was found to vary by ± 5 percent.

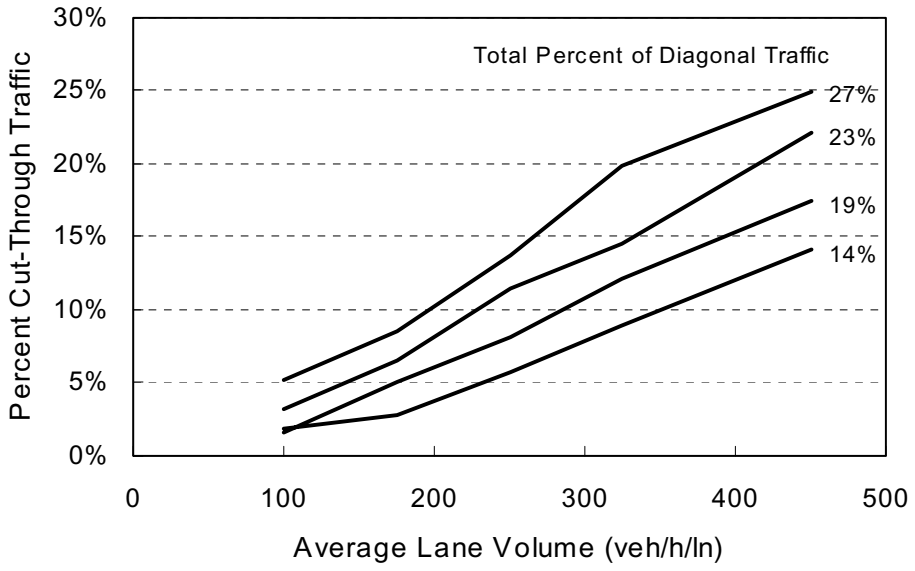


Figure 12. Cut-through percentage compared to average lane volume for base condition.

A plot of all 360 data points is shown in Figure 13. Examination of this figure indicated the existence of three regions. One region includes data for a density of 4 sig/mi and lane volumes at or below 325 veh/h/ln. A second region includes data for a density of 8 sig/mi and lane volumes at or below 325 veh/h/ln. A third region includes data for all densities and lane volumes above 325 veh/h/ln. As noted previously, lane volumes in excess of 325 veh/h/ln were typically oversaturated at the arterial-arterial intersections. It was also noted that the percent of cut-through traffic had a minimum value of 12 percent during oversaturated conditions.

An interesting trend can be observed in the data shown in Figure 13. For a given travel speed, the lower signal density is associated with a larger cut-through traffic percentage than the higher signal density. This trend would seem counterintuitive because more frequent signals would logically be more unattractive and would encourage more diversion. However, the fact that the travel time is the same indicates that the delay at each signal is higher for the "4 sig/mi" density. To illustrate, consider an arterial with a free-flow speed of 40 mi/h (travel time is 90 s/mi). An average travel speed of 18 mi/h equates to a 200 s/mi travel time. The difference in travel time of 110 s/mi must be divided evenly among the signalized intersections. This equates to 27.5 s/veh for a "4 sig/mi" density and 13.7 s/veh for an "8 sig/mi" density. Intuitively, drivers are more likely to divert to avoid the lengthy queues associated with the "4 sig/mi" density.

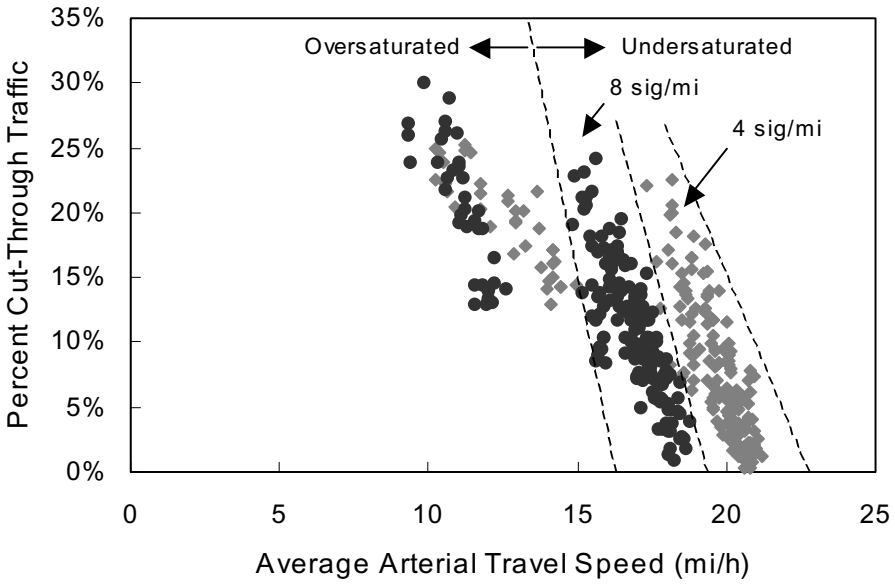


Figure 13. Percent cut-through traffic compared to average arterial travel speed.

Analysis Results

Based on the examination of the simulation data, a model for predicting cut-through traffic percentage was defined. It was then calibrated using regression analysis. This analysis yielded the following equation:

$$\%CT = 51.42 - 0.101V^2 + 0.017S^2 - 13.95D - 0.00069(V \cdot S)^2 \quad (2)$$

where:

%CT = percent of cut-through traffic based on total arterial traffic;
V = average arterial travel speed, mi/h;
S = signal density, sig/mi; and
D = indicator variable (0.0 if system is undersaturated; otherwise 1.0).

The quality of the model fit to the data was quite good, as indicated by an R^2 value of 0.81. The predicted relationship between the percent cut-through traffic, speed, and signal density is illustrated in Figure 14.

It should be noted that Equation 2 is valid only for four-lane arterial streets with a free-flow speed of about 30 to 50 mi/h and signal densities of 4 to 6 sig/mi. The precision of the model prediction will decrease for conditions that significantly deviate from the calibration conditions.

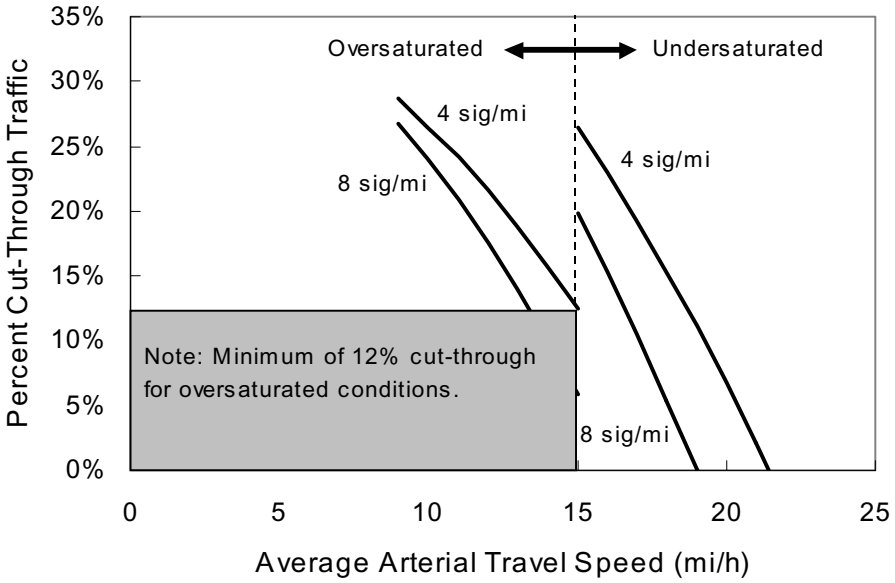


Figure 14. Predicted cut-through traffic percentage as a function of speed and signal density.

The variables in the prediction model (i.e., Equation 2) include average arterial travel speed, signal density, and degree of saturation. A term that accounts for the interaction between these two variables is also included in the model. Average arterial travel speed is the total distance traveled divided by total travel time (including stopped time). This variable is equivalent to the arterial travel speed used in Chapter 11 of the *HCM* (*21*).

The interaction term included in Equation 2 is highly significant, in spite of the very small coefficient. This term reflects the increased influence of speed at higher signal densities. Neither the arterial demand level nor the proportion of diagonal traffic was found to be significant.

Equation 2 accounts for the effect of arterial travel speed and signal density on percent cut-through for the base condition, as described in Figure 9. The results from the other investigation of the other factors listed in Figure 9 are provided in Table 13. The values listed in the last column of this table represent adjustments to the percent cut-through obtained from Equation 2. Specifically, they would be added to the value of *%CT* (negative values would be subtracted). It should be noted that the adjustments associated with each factors reflect relatively modest changes in the percent of cut-through traffic.

The adjustments in Table 13 suggest that changes in local street speed limits have a relatively small effect on the percentage of cut-through traffic. These data indicate that reducing local street speeds by 5 mi/h may reduce traffic volumes only 1 to 1.5 percent. This small amount of reduction would probably not be noticeable to local residents.

TABLE 13 Adjustments to Equation 2 to account for selected factors

Factor	Change in Factor	Change in Percent Cut-Through [1]
Local Street Free Flow Speed	+ 5 mi/h	+ 1.15%
	- 5 mi/h	- 1.2%
Collector Street Free Flow Speed	+ 5 mi/h	+ 1.16%
	- 5 mi/h	- 1.23%
No Collector Streets	- 10 mi/h to collector free flow speed and change collector street traffic control to alternating yield	- 1.92%
Local Street Traffic Control	All-way stop at all intersections	- 0.55%

Note:
1 - percentages listed are added to (negative values are subtracted from) the value obtained from Equation 2.

There is some debate in the literature as to the effectiveness of using all-way stop control to control speeds and discourage through traffic. In this study, all-way stop control reduced traffic volume only about 0.55 percent. This finding demonstrates that, within the limitations of this study, all-way stop control is not effective at altering driver behavior and therefore is not an effective neighborhood traffic management technique.

Sensitivity Analysis

Effect of Oversaturation at Arterial Intersections

The calibrated model was used to develop Figure 15 for undersaturated conditions and Figure 16 for oversaturated conditions. A comparison of these two figures suggests that higher cut-through volumes will occur for undersaturated conditions for the same signal density and speed. However, it should be remembered that travel speeds during oversaturated conditions tend to be considerably lower than those during undersaturated conditions. In fact, the data suggest that oversaturated conditions are associated with about a 6 mi/h speed drop for the same signal spacing.

It has long been known that oversaturation has a detrimental effect on arterial operations, and it is generally recognized that oversaturated arterials tend to aggravate cut-through problems. The results of this study indicate quantitatively that this problem can occur, and that oversaturated arterial intersections can increase cut-through traffic 10 to 15 percent above that due to other factors.

Even though Figure 16 shows curves for 0.0 and 10 percent cut-through traffic, the amount of cut-through traffic in oversaturated conditions was never found to be less than 12 percent. Therefore, a 12 percent cut-through is likely to represent a minimum value for oversaturated conditions. Also, travel speeds are likely to be limited to a maximum of 15 mi/h for oversaturated conditions.

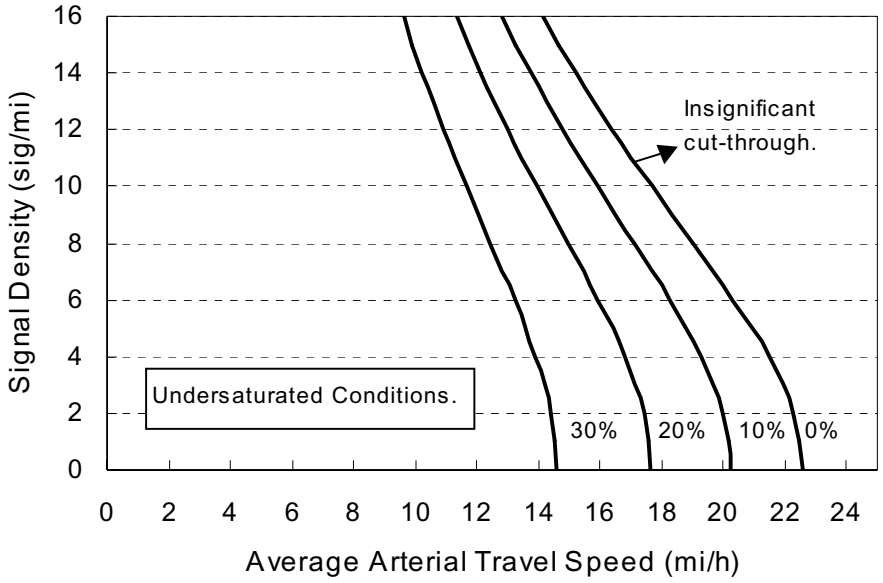


Figure 15. Predicted cut-through traffic percentage for undersaturated operating conditions.

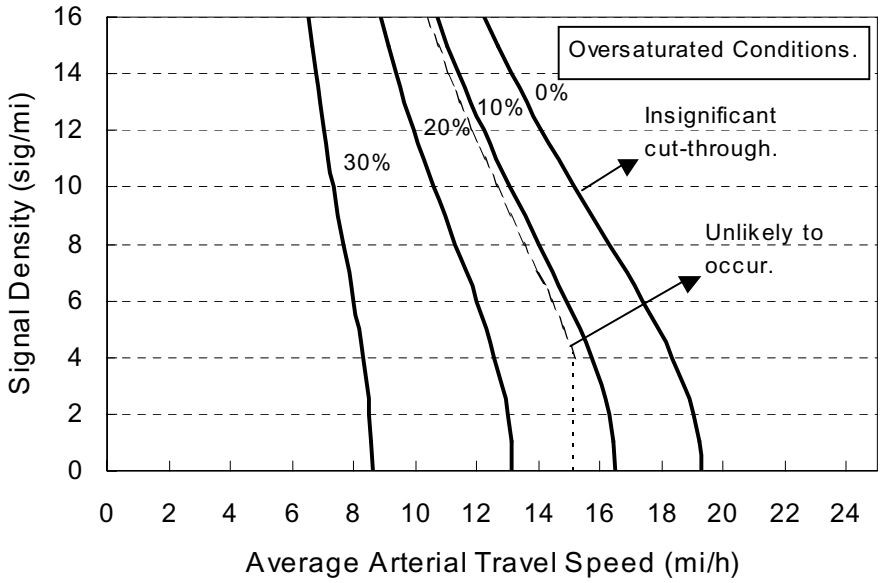


Figure 16. Predicted cut-through traffic percentage for oversaturated operating conditions.

Threshold Speed Associated with No Diversion

The 0.0-percent trend line in Figure 15 suggests that there is the possibility of a threshold arterial travel speed associated with no cut-through traffic. If arterial travel speed could be maintained at this threshold (or higher), cut-through traffic would essentially disappear. Although this speed varies with signal density, it is somewhere around the level of service C to D boundary, as defined in Chapter 11 of the *HCM* (*21*).

Example Applications

This section describes two example applications of the cut-through prediction model (i.e., Equation 2 combined with Table 13). The traffic signal density is determined from inspection of the street network. Average arterial travel speed can be determined using field measurements or estimated using the procedures in Chapter 11 of the *HCM*. Also, if a desired percentage of cut-through traffic is specified, the required average travel speed to yield this percentage can be found by solving for *V*. The following examples illustrate the usefulness of the cut-through prediction model.

Example 1

A neighborhood, shown in Figure 17, is surrounded by four, four-lane, Class III arterials. Each arterial has a free-flow speed of 35 mi/h. The entering arterial traffic volumes during the peak hour are also shown in the figure. The system is operating in an undersaturated condition. There is an average of 6 sig/mi on each arterial street, and the average arterial delay per signal is 15 s/veh. The engineer desires to estimate the cut-through volume that could be expected in the neighborhood.

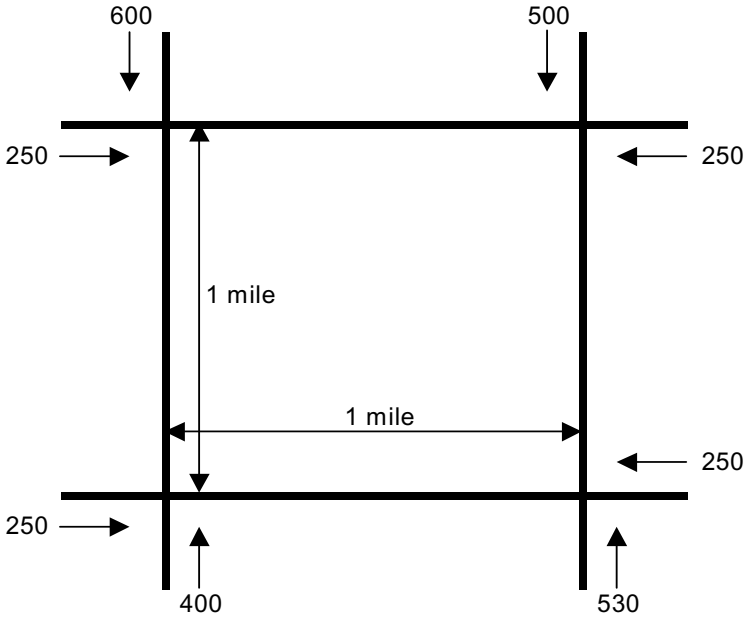


Figure 17. Street network and traffic volumes for Examples 1 and 2.

First, the average arterial travel speed must be determined. The *HCM*'s expression for average travel speed (i.e., Eq. 11-1) is used for this purpose. The form of the equation is:

$$V = \frac{3600 \cdot L}{\left[(RT \cdot L) + \sum d_i\right]} \quad (3)$$

where:

V = average arterial travel speed, mi/h;
L = length of study area, mi;
RT = running time per mile (from Table 11-4 of the *HCM* (*21*)), s/mi ; and
d_i = approach control delay at intersection i, s/veh.

At a free-flow speed of 35 mi/h and signal spacing of 0.17 mi, Table 11-4 of the *HCM* indicates that the running time for a Class III street would be 133 s/mi. Solving Equation 3 for V yields an average travel speed of 16.15 mi/h. Therefore, using Equation 1, with V = 16.15 mi/h, S = 6 sig/mi, and D = 0 (i.e., undersaturated):

$$\%CT = 51.42 - 0.101\,(16.15)^2 + 0.017\,(6)^2 - 13.95\,(0) - 0.00069\,(16.15 \cdot 6)^2$$
$$\%CT = 19.2\% \quad (4)$$

From Figure 17, the total entering volume is 2,830 veh/h. Therefore, the total cut-through volume would be 544 veh/h (= 2830 * 0.192).

Example 2

Signal coordination improvements are planned for the network in Example 1. Thus, the traffic engineer desires to estimate the target average arterial delay per signal needed to eliminate cut-through traffic.

To determine the necessary delay per signal for 0.0% cut-through traffic, the average travel speed corresponding to this level of cut-through activity must be found. Because the total cut-through percentage, the signal density, and operating conditions (undersaturated) are known, it is possible to solve for the average arterial travel speed using Equation 2. The solution process is demonstrated in the following computations:

$$0 = 51.42 - 0.101\,V^2 + 0.017\,(6)^2 - 13.95\,(0) - 0.00069\,(V \cdot 6)^2$$
$$52.032 = 0.12584\,V^2 \quad (5)$$
$$V = 20.3 \text{ mi/h}$$

Substituting the travel speed of 20.3 mi/h (= 177 s/mi) in Equation 3 along with a running time of 133 s/mi (based on Table 11-4 of the *HCM*), yields a total approach control delay of 44 s/veh. Dividing this delay evenly among the six signals equates to an average approach delay of 7.4 s/veh.

Therefore, cut-through traffic can be eliminated by reducing the through delay at each intersection by about 7.6 s/veh (= 15 - 7.4), relative to the existing delay of 15 s/veh. Whether the signal timing could be modified to produce such low delays is doubtful as 15 s/veh is indicative of fairly good signal timing. The irony here is that the individual signalized intersection approaches are operating at a level of service "B" (based on the level of service definitions in Chapter 9 of the *HCM* (*21*)). However, the frequent occurrence of signals along the arterial results in a relatively "slow" trip for the through driver. The likely result of this frequent spacing will be considerable diversion through the adjacent neighborhood.

Chapter 5
CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The objective of this research was to develop guidelines for the use of both Neighborhood Traffic Management and Corridor Traffic Management techniques for improving safety in residential neighborhoods. These guidelines were developed by synthesizing the available literature and supplementing this information with some focused research into the effect of arterial operation on neighborhood traffic volume. This section summarizes the guidelines developed from this research.

Neighborhood Traffic Management Techniques

Neighborhood traffic management techniques have been used successfully in many communities through the world. However, as indicated in this report, defensible data are available for only a few techniques. Based on an analysis of this data, typical volume, speed, and crash frequency reductions have been developed for three techniques. These reductions are listed in Table 14.

TABLE 14 Expected effectiveness of selected traffic calming devices

Traffic Calming Device	Expected Volume Reduction (%) [1]	Expected Speed Reduction (%)	Expected Crash Rate Reduction	Design Speed of Device
Speed humps	10 to 25	20	15 %	15-20 mi/h
Traffic circles	5 to 20	15	6 %	20-25 mi/h
Speed tables	5 to 15	15	4 %	25-30 mi/h

Note:
1 - The larger value listed is likely to be found when alternative routes exist.

Corridor Traffic Management Techniques

Traffic engineers have a wide range of corridor traffic management techniques to consider when attempting to improve neighborhood traffic conditions. These techniques include: signal timing adjustments, geometric adjustments, and access management techniques. Individually or in combination, these measures do a reasonably good job of improving arterial traffic conditions. Unfortunately, there appears to be no quantitative information reported in the literature about the effect of these improvements on the number of drivers diverting to local streets.

The model developed for this research represents a first attempt to provide a method to explain and predict neighborhood cut-through traffic based on arterial operating conditions. The model is represented by Equation 2 and the adjustment factors in Table 13. It has several promising features. First, it is relatively simple to use. Second, it is compatible with the analysis

procedures in Chapter 11 of the *HCM* (*21*). Third, it can provide some indication about the magnitude of traffic that will cut-through a neighborhood.

A sensitivity analysis of the model revealed that there is the possibility of a threshold arterial travel speed associated with no cut-through traffic. If arterial travel speed could be maintained at this threshold (or higher), cut-through traffic would essentially disappear. Although this speed varies with signal density, it is somewhere around the level of service C to D boundary, as defined in Chapter 11 of the *HCM* (*21*). This boundary equates to an average arterial travel speed that is about 50 percent of the free-flow speed. Thus, when average speeds are one-half of the free-flow speed or less, drivers will likely cut-through the neighborhood adjacent to the arterial. The percentage of arterial drivers that cut-through will increase as the arterial travel speed decreases.

RECOMMENDATIONS

Several recommendations for future research in the area of traffic management techniques were developed for this research. Fundamentally, it is recommended that additional research be conducted on the effectiveness of alternative traffic management techniques. The existing body of knowledge is based on informal studies conducted by agency staff for the purpose of assessing the effect at a given street location. Such studies rarely record all of the relevant data or control for area-wide influences. The result is considerable variability in the reported effectiveness of any given technique.

Neighborhood Traffic Management Techniques

A wide range of neighborhood traffic management techniques are in use throughout the world. However, more data are needed to accurately quantify the effectiveness for most techniques. In addition, more precision in the study process is required. Specifically, the location of the technique relative to where measurements are taken and the period of time before and after measurement are essential to the evaluation of effectiveness. Recommended methods for quantifying this effectiveness for three measures are described in this section.

Volume Reduction

The amount of traffic volume on a given residential street is highly dependent on the capacity and orientation of the surrounding street network. The availability of alternative routes around a neighborhood can have as much of an impact on residential street volume as the type and spacing of traffic management techniques deployed in the neighborhood. Studies that quantify the level of volume reduction should also report the "connectivity" (i.e., number of street segments per intersection or cul-de-sac) or a similar measure that provides some indication of the availability of alternate routes.

Speed Reduction

The magnitude of speed reduction resulting a from a given technique depends primarily on its geometry (if it is a traffic calming device) and the spacing between it and other techniques. Device geometry (e.g., length and height of a speed hump) is highly correlated with the speeds at which motorists will cross the device. Spacing determines the extent to which motorists might speed up between the various techniques, if they are so inclined. Unfortunately, in many before-and-after studies of speed reduction techniques, it is unclear where speed measurements were taken in relation to the location of the technique. In many instances, drivers slow only in the vicinity of the technique and return to a desired speed at some point downstream of it. Studies that quantify speed reductions should also report: (1) the location of the measurement relative to the location of the technique, (2) the distance to other techniques, and (3) the geometry of the device, if a device is used.

Crash Reduction

Neighborhood traffic management techniques are often reported to reduce the number of crashes on treated residential streets. However, reported crash reductions must be evaluated cautiously because a technique's true impact on crash potential is often skewed by its effect on traffic volume. The observed crash frequency reduction associated with a given technique may be attributable to a corresponding reduction in traffic volume. In extreme cases, the roadway may be *less* safe after the technique is introduced, and yet crash frequency is reduced because of a reduction in volume. Studies that quantify crash reduction should include the measurement of traffic volume and use this data to compute the crash *rate* reduction. Crash rate is defined as the number of crashes per million vehicles.

Corridor Traffic Management Techniques

Literally volumes of material have been written on the subject of corridor traffic management during the last half century. Many of these reports describe various techniques or combinations of techniques and report on their effectiveness (or lack thereof) to improve arterial operations. However, a review of this information also indicates two problems. One problem is that it is very difficult to accurately extrapolate a technique's effectiveness (as observed at one location) to other locations. This problem stems from the wide range of variables that affect arterial operation and the likelihood that conditions will vary widely from one arterial to another.

Another problem is the lack of information on the effects of arterial improvements on the operation of adjacent local streets. Logically, there should be some connection between the operation of the two types of roadways. However, it is usually assumed that there are no operational problems on the local streets and that this operation will be unchanged by a change in arterial operation. In short, the effect of a change in arterial street operation on neighborhood street operation is currently unknown with the exception of the model developed for this research.

Further research efforts are necessary to verify the accuracy of the model developed for this research. Additional research is also needed to verify the findings associated with a sensitivity analysis of this model. This research should:

1. Verify the existence of a threshold travel speed above which there would be no cut-through traffic,
2. Expand the model to include sensitivities to a wider range of factors (e.g., size of the neighborhood, density and connectivity of the local street system, and application of specific route modification and calming devices), and
3. Validate the model using real-world data.

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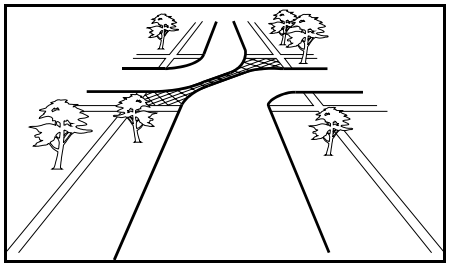
APPENDIX

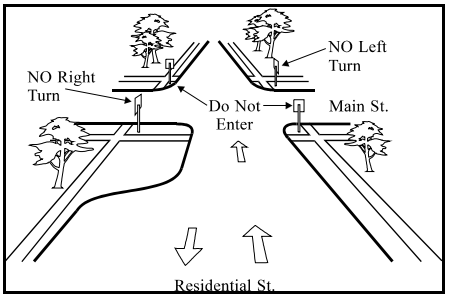
Neighborhood Traffic Management Techniques

NEIGHBORHOOD TRAFFIC MANAGEMENT TECHNIQUES

Route Modification Techniques

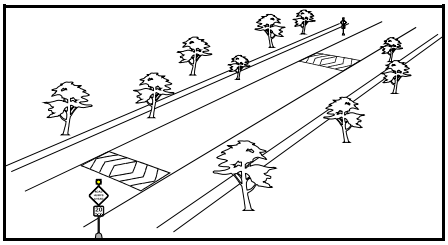


Full closures completely close the roadway to through traffic at one end or at a midblock location using diagonal diverters, cul-de-sacs, or signing. Key advantages include reducing traffic volume and the number of conflict points while still allowing bicycle and pedestrian access. Key disadvantages include restricting emergency vehicle and transit access, increasing trip length, and possibly being unsightly.

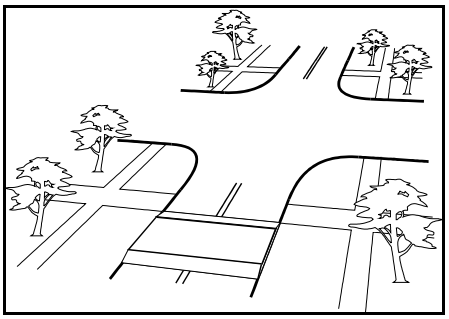


Half closures limit access to or from a roadway through the use of semi-diverters, median barriers, exclusion lanes, or forced-turn barriers. Key advantages are reducing through traffic, providing for bicyclists and pedestrians, and appearing attractive if landscaped. Key disadvantages are increasing emergency response time, less than 100 percent compliance, and additional maintenance requirements if landscaped.

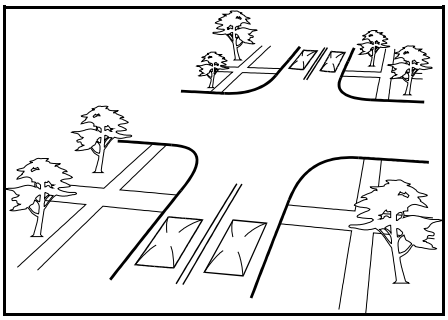
Traffic Calming Techniques



Speed humps are raised areas in the roadway pavement perpendicular to the traffic flow. Key advantages are reducing speed, not affecting intersection operations, and being inexpensive to install. Key disadvantages are increasing emergency vehicle response times and possibly shifting traffic to parallel streets.

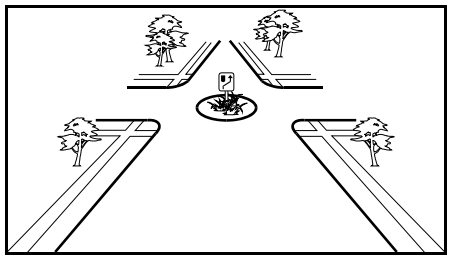


Speed tables are elevated plateaus in the roadway with descending ramps on each side. Raised intersections elevate the entire intersection above the normal roadway surface.

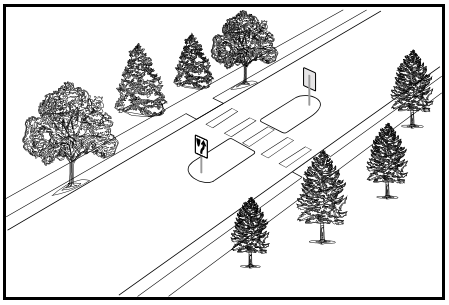


Speed cushions are smaller raised areas within a traffic lane. Key advantages of speed tables, raised intersections, and speed cushions are reducing speed, drawing attention to intersection and pedestrian areas, flexibility for use on higher or lower volume streets, and the potential to be aesthetically pleasing.

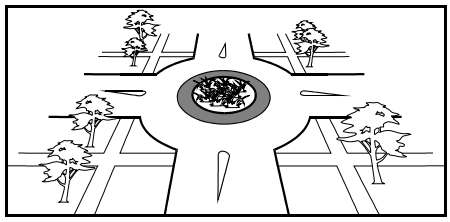
Key disadvantages are the expense to construct and maintain, the affect on emergency vehicle response times, and the additional signage and driver education required.



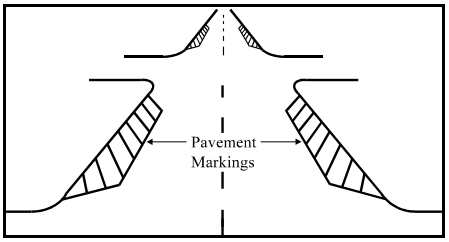
Traffic circles are small circular islands placed in the center of existing local intersections. Key advantages are reducing vehicle speeds, improving safety conditions, and the potential to be visually attractive when landscaped and maintained. Key disadvantages are adding a potential hazard to the middle of the roadway, increasing emergency vehicle response times, and impeding unfamiliar drivers, especially when making a left turn.



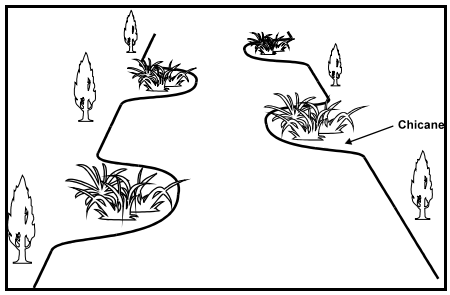
Central island narrowings are used in the center of the roadway to provide refuge to pedestrians during the crossing maneuver. Key advantages are creating a refuge so pedestrians can cross half the street at a time and making pedestrian crossings more visible to drivers. Key disadvantages include the potential to: give pedestrians a false sense of security, create potential crash obstacles for drivers, and create problems for street-sweeping or snow-plowing efforts.



Roundabouts are raised islands that create a circular one-way flow of traffic. Key advantages are reducing speeds, reducing the number of conflict points at the intersection, increasing capacity, providing an orderly and continuous flow of traffic, and being effective at multi-leg intersections. Key disadvantages are being restrictive for some larger emergency and service vehicles unless mountable, requiring pedestrians and bicyclists to adjust to less traditional crossing patterns, and causing some reduced aesthetic value due to safety signage.

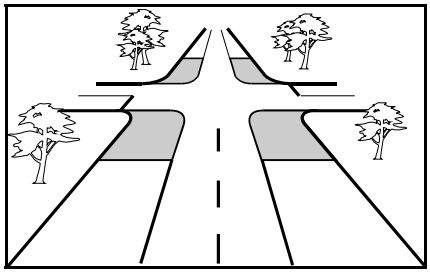


Roadway narrowing techniques narrow the roadway for a continuous length using geometric features, pavement markings, or landscaping. Key advantages are providing continuous, visual channelization, quick installation, and being inexpensive to install. Key disadvantages are requiring regular maintenance, increasing the cost of roadway resurfacing, and the potential to be expensive to install, depending upon the technique.

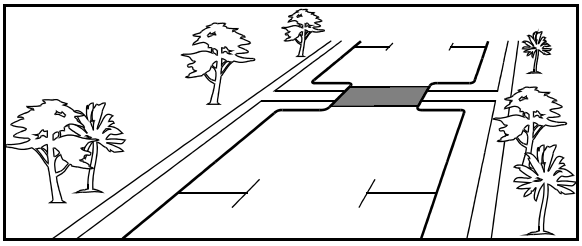


Chicanes are devices that alter the linear progression of a vehicle so that the driver must change paths to avoid the device. Key advantages are reducing speeds at the chicane

(or on the entire street length if installed in series) and reducing cut-through volumes. Key disadvantages are requiring high initial costs, restricting emergency and service vehicles, and creating potential crash obstacles for drivers.



Neckdown



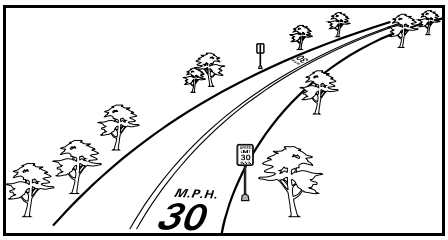
Choker

Neckdowns and chokers are constrictions of the roadway to reduce the width of the traveled path. Neckdowns are located at intersections, and chokers are located midblock. Key advantages are shortening the crossing time for pedestrians, making pedestrian crossings more visible to drivers, and not slowing emergency vehicles. Key disadvantages are that they may: require some parking removal, give pedestrians a false sense of security, and create potential crash obstacles for drivers.

Regulatory Techniques



Speed trailers are mobile roadside devices that use a radar device to detect the speed of approaching vehicles. The devices display the speed limit and the speed of approaching vehicles. Key advantages are educating the public of posted and excessive speeds, serving as a good educational and public relations tool, and the ability to easily move them from one location to another. Key disadvantages are that they do not appear effective in reducing speeds after the trailer is removed, have limited effectiveness unless combined with enforcement, and have limited effectiveness on multi-lane roadways.



Speed limit signs display the speed limit established by law or by regulation. Speed limit pavement markings may be used to reinforce the message. Key advantages are that signs are well recognized and understood, pavement markings reinforce speed limit signs, and both are inexpensive to install. Key disadvantages are that speed limit signs have significant non-compliance rates, speed limit pavement markings are proven not to be effective, and speed limit pavement markings may cause concern regarding conspicuity and legibility.

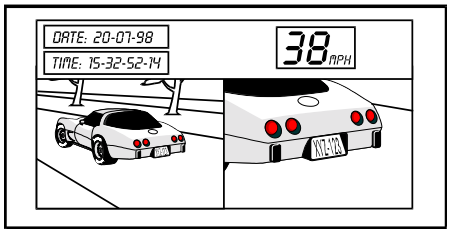


Increased enforcement (conventional) increases the use of conventional enforcement to reduce speeds in target areas. Key advantages are reducing

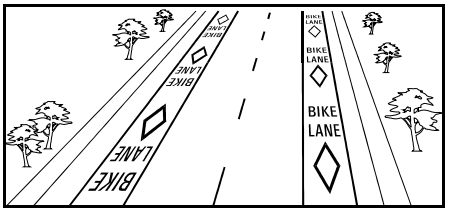
speeds during enforcement period, increasing driver awareness of speeding, and making response quick and effective. Key disadvantages are requiring regular long-term enforcement to gain long-term benefits and being costly for law enforcement agencies.



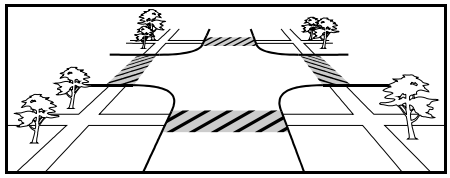
Citizen speed watch programs are public awareness programs involving residents, agency staff and motorists. Residents are trained to operate equipment to monitor and record vehicle speeds. Key advantages are serving as an effective public relations and educational tool, making neighbors feel that they are part of the solution for speeding problems, and the long-term effects that are possible due to resident interaction. Key disadvantages are that the programs are very labor intensive and that they are not an enforcement tool.



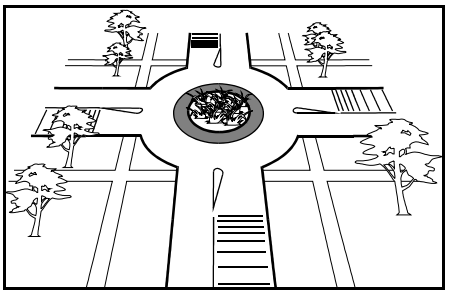
Automated enforcement uses a radar device, processing unit, and camera to record vehicle speeds and to photograph those vehicles exceeding the speed limit. Key advantages are detecting and recording information about a large number of speeders, providing enforcement in areas where roadway geometry makes it difficult for police officers, and targeting speeders objectively. Key disadvantages are allowing impaired or unsafe drivers to remain on the road (because no traffic stop is made), the possibility of being a less effective learning tool than if the violator were stopped and given a citation immediately, and not allowing an officer to give discretion for an emergency situation.



Bicycle lanes and paths are used to accommodate bicyclists. Techniques include shared lanes, bike lanes, bike paths, or bicycle routes. Key advantages are encouragement of non-motorist travel and a better defined area where bicyclists are expected to travel. A key disadvantage of bicycle lanes or paths is the potential to create additional conflicts between vehicles and bicycles.



Higher visibility crosswalks attract additional attention to pedestrian areas. Wider sidewalk areas provide additional pedestrian space and streetscaping space off of the roadway. Key advantages are that higher visibility crosswalks provide more visibility to drivers than standard crosswalks, and wider sidewalks provide additional space for pedestrians and street furniture and can improve the aesthetics of the area. Key disadvantages are that higher visibility crosswalks may provide a false sense of security to pedestrians; they also require consideration of the effect of the materials on the vehicle tires. Both higher visibility crosswalks and wider sidewalk areas may require increased construction and maintenance costs.



Innovative pavement markings are used to give drivers the illusion that are traveling faster than they really are. Key advantages are serving to reduce traffic speeds and crashes by warning or alerting drivers to an upcoming situation (by causing drivers to perceive that they are traveling too fast) and possibly giving drivers a heightened sense of awareness so they are better prepared to avoid a crash even if vehicle speeds are not reduced. Key disadvantages are the more research is needed to verify the use of these patterns along with the expense to maintain the complex marking patterns.

A Letter from Mike Bonin: Mar Vista's Main Street

A Letter from Mike Bonin: Mar Vista's Main Street

Great letter from Councilmember Mike Bonin on the progress were making on Venice Blvd:

Dear Friends,

The results are in: Mar Vista wants its Great Street to be a Main Street, not a freeway.

After Mayor Garcetti and I announced Venice Boulevard in Mar Vista would be the local Great Street selection, we spent a year conducting remarkably extensive outreach, surveying neighbors online, at the Farmers Market, at local shops, churches, schools, and even at their front doors. The feedback was extensive and the message is clear: Mar Vistans want Venice Boulevard to be safer, calmer, and a central gathering spot for the neighborhood.

We listened, and we put our team to work to design a Venice Boulevard that can be the heart of the neighborhood, instead of a high-speed roadway that divides it. On August 6, the team unveiled a series of proposed design changes that we can test as a pilot project, which you can see below.

By enormous margins, neighbors said they wanted:

- *More mid-block pedestrian crossings, so it is easier to walk from one side of the street to the other;*
- *Shorter, safer pedestrian crossings;*
- *Opportunities for public gathering spaces such as parklets, sidewalk seating, and plazas;*
- *Safer bikeways;*
- *Improved amenities, like street furniture and trash bins;*
- *Drought tolerant landscaping; and*
- *Murals and community art.*

Those are some dramatic, exciting improvements, and we'll need to use some of the space usually reserved for automobile traffic to get it done. That's the kind of thing you deserve to see, feel and experience before we do anything permanent, so we're proposing a pilot program, with temporary or "pop up" installations. We can keep what we love, improve what we can, and remove what we dislike.

Please take a moment to check-out the pilot concept below, and please fill out the survey at the bottom of this page when you're done and let us know what you think. This has been and will continue to be a neighborhood-driven process.

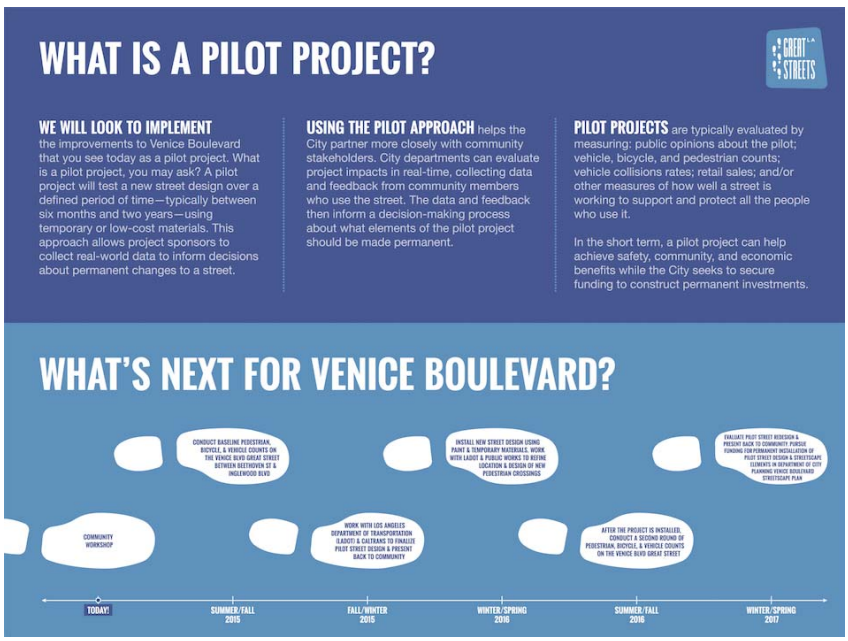
Thank you for your thoughts, your energy, and your dedication to the neighborhood.

Regards,

Mike


Eric
Garcetti
#lamayor
MIKE BONIN
L.A. CITY COUNCILMEMBER
-NEIGHBORHOODS FIRST-


GREAT STREETS L.A
A VISION FOR
VENICE BOULEVARD
ACTING ON FEEDBACK FROM THE COMMUNITY, we redesigned Venice Boulevard to create more public gathering spaces, make it safer and easier for people to walk and cross the street, and increase protection for people who walk and bike.
THE OBJECTIVE was to unify the north and south sides of the street and to make Venice Boulevard feel like a neighborhood street—friendly to children, families, seniors, and small local businesses.


WHAT IS A PILOT PROJECT?
GREAT STREETS L.A
WE WILL LOOK TO IMPLEMENT the improvements to Venice Boulevard that you see today as a pilot project. What is a pilot project, you may ask? A pilot project will test a new street design over a defined period of time—typically between six months and two years—using temporary or low-cost materials. This approach allows project sponsors to collect real-world data to inform decisions about permanent changes to a street.
USING THE PILOT APPROACH helps the City partner more closely with community stakeholders. City departments can evaluate project impacts in real-time, collecting data and feedback from community members who use the street. The data and feedback then inform a decision-making process about what elements of the pilot project should be made permanent.
PILOT PROJECTS are typically evaluated by measuring: public opinions about the pilot; vehicle, bicycle, and pedestrian counts; vehicle collisions rates; retail sales; and/or other measures of how well a street is working to support and protect all the people who use it.
In the short term, a pilot project can help achieve safety, community, and economic benefits while the City seeks to secure funding to construct permanent investments.
WHAT'S NEXT FOR VENICE BOULEVARD?
CONDUCT BASELINE PEDESTRIAN, BICYCLE, & VEHICLE COUNTS ON THE VENICE BLVD GREAT STREET BETWEEN BEETHOVEN ST & INGLEWOOD BLVD
INSTALL NEW STREET DESIGN USING PAINT & TEMPORARY MATERIALS. WORK WITH LADOT & PUBLIC WORKS TO REFINE LOCATION & DESIGN OF NEW PEDESTRIAN CROSSINGS
EVALUATE PILOT STREET REDESIGN & PRESENT BACK TO COMMUNITY. PURSUE FUNDING FOR PERMANENT INSTALLATION OF PILOT STREET DESIGN & STREETSCAPE ELEMENTS IN DEPARTMENT OF CITY PLANNING VENICE BOULEVARD STREETSCAPE PLAN
COMMUNITY WORKSHOP
WORK WITH LOS ANGELES DEPARTMENT OF TRANSPORTATION (LADOT) & CALTRANS TO FINALIZE PILOT STREET DESIGN & PRESENT BACK TO COMMUNITY
AFTER THE PROJECT IS INSTALLED, CONDUCT A SECOND ROUND OF PEDESTRIAN, BICYCLE, & VEHICLE COUNTS ON THE VENICE BLVD GREAT STREET
TODAY!
SUMMER/FALL 2015
FALL/WINTER 2015
WINTER/SPRING 2016
SUMMER/FALL 2016
WINTER/SPRING 2017

GREAT STREETS LA

INVESTING IN MAR VISTA'S VENICE BOULEVARD AS A GREAT STREET



ACTING ON FEEDBACK FROM THE COMMUNITY, we redesigned Venice Boulevard to create more public gathering spaces, make it safer and easier for people to walk and cross the street, and increase protection for people who walk and bike. The objective was to unify the north and south sides of the street and to make Venice Boulevard feel like a neighborhood street—friendly to children, families, seniors, and small local businesses.

442 Community surveys | **4** Public workshops | **3** Outreach displays | **2** Walks/bike rides | Regular attendance at Mar Vista Community Council

WHAT WE HEARD YOU WANTED

- A safer Venice Boulevard for everyone
- More frequent, safer crossings
- Drought-tolerant landscaping & median enhancements
- Trash bins & general streetscape additions
- Gathering spaces (parklets, sidewalk seating, plazas)
- Enhanced transit stops & bus-only lanes
- Protected bikeways & more bike parking
- Community art that reflects Mar Vista's unique character
- On-street parking

WHAT WE WILL PILOT

By repurposing one driving lane in each direction, we will increase space between moving cars and the sidewalk, shorten the distance people have to walk when crossing the street, make it safer to drive or bike around buses, and add more room between bikes and cars.

As part of this Venice Blvd Great Streets Plan, we will add four enhanced pedestrian crossings to better link the north and south sides of Venice Blvd. Currently only five pedestrian crossings exist between Beethoven St and Inglewood Blvd.

The Department of City Planning's Venice Blvd Streetscape Plan details recommendations for drought-tolerant landscaping. In accordance with Mayoral Executive Directive 5, we will explore opportunities to convert City medians to low-water use landscaping.

In accordance with the Department of City Planning's Venice Blvd Streetscape Plan, we will explore opportunities for street amenity additions and upgrades including landscaping, street furniture, and trash bins.

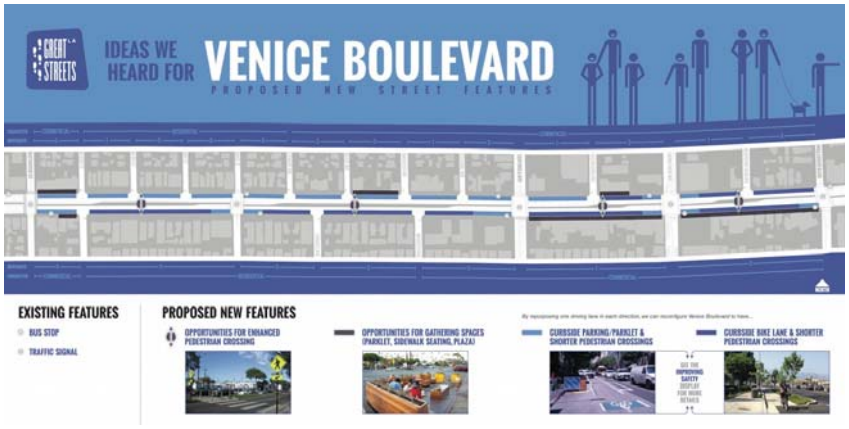
This Venice Blvd Great Streets Plan will facilitate new parklets. The City will work with community sponsors to apply for parklets through the LADOT People Street program.

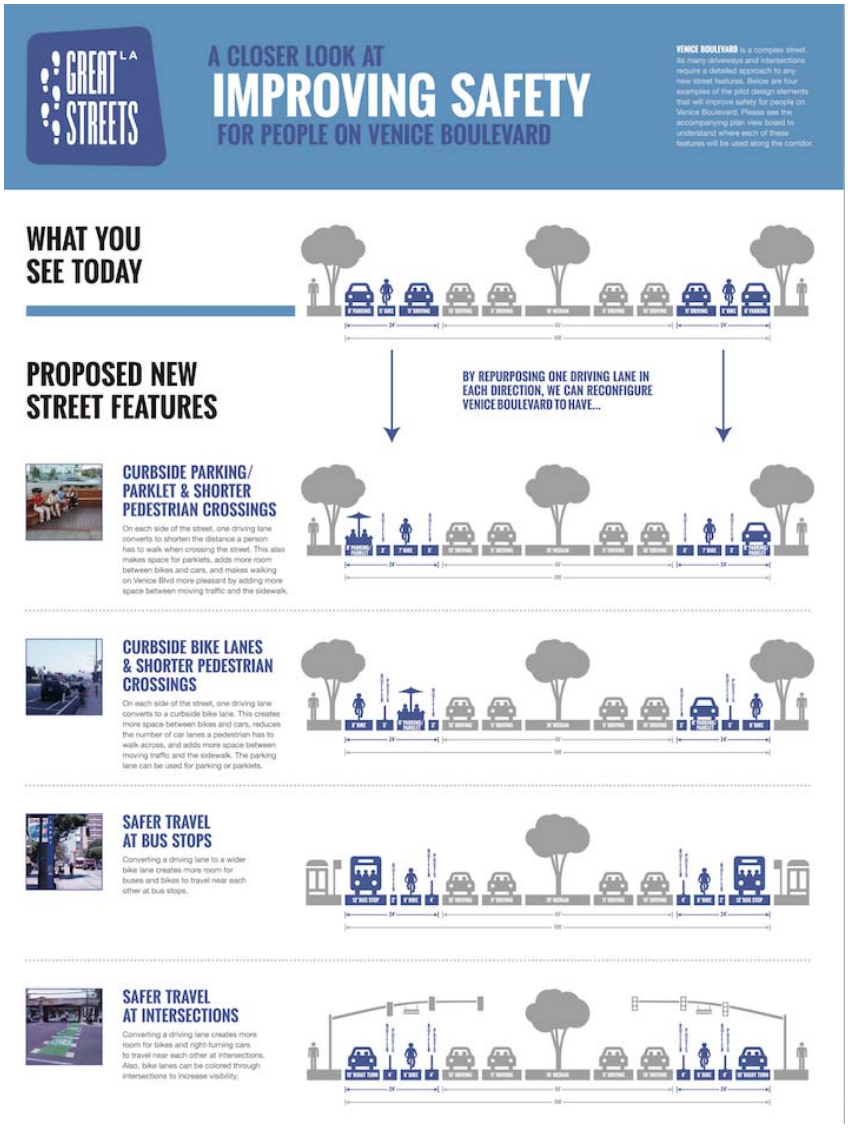
In accordance with the Department of City Planning's Venice Blvd Streetscape Plan, we will further study opportunities for long-term transit service improvements like bus-only lanes and enhanced passenger amenities.

As part of this Venice Blvd Great Streets Plan, we will add buffered and protected bike lanes from Beethoven St to Inglewood Blvd to make bicycling convenient and safe for people of all abilities.

The Great Streets team and Council District 11 will partner with property owners on murals reflecting Mar Vista's history and culture. We will use new pedestrian space in parklets, plazas, and other public spaces for community art projects.

The street designs proposed in this Venice Blvd Great Streets Plan will maintain on-street parking on both sides of the street.





Posted by Justin Pascone

www.dot.ca.gov/trafficops/census/volumes2016/Route180-197.html

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2016 Traffic Volumes (for ALL vehicles on CA State Highways)

2016 Volumes Home View

Return to Census Program or Jump to 2011 | 2012 | 2013 | 2014 | 2015 | 2016

Dist	Rte	CO	Post Mile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
07	187	LA	3.5	LOS ANGELES, JCT. RTE. 1				3850	43000	40500
07	187	LA	4.78	LOS ANGELES, CENTINELA AVENUE	4250	49500	46500	4300	52000	49000
07	187	LA	5.832	LOS ANGELES, JCT. RTE. 405	4300	52000	49000	6500	75000	70000
07	187	LA	5.91	LOS ANGELES, SEPULVEDA BOULEVARD	6500	75000	70000	5100	57000	53000
07	187	LA	6.007	LOS ANGELES, BENTLEY AVENUE	5100	57000	53000	7000	74000	69000
07	187	LA	6.62	LOS ANGELES, OVERLAND AVENUE	7000	74000	69000	6200	64000	60000
07	187	LA	6.763	LOS ANGELES, MENTONE AVENUE	6200	64000	60000	6200	64000	60000
07	187	LA	7.634	LOS ANGELES, CULVER BOULEVARD	6200	64000	60000	6900	72000	67000
07	187	LA	8.639	LOS ANGELES, LA CIENEGA BOULEVARD	5800	60000	56000	4700	47500	44500
07	187	LA	8.802	LOS ANGELES, JCT. RTE. 10	4700	47500	44500	6000	59000	55000
07	187	LA	8.905	LOS ANGELES, CADILLAC AVENUE	6000	59000	55000			

Legislation
Funding
Guidance
Resources

State Coordinator and FHWA Division Coordinator

Each State has a Bicycle and Pedestrian Coordinator, and each FHWA Division office has a point of contact.

FHWA Headquarters Contact

For more information, please contact **Gary Jensen**, 202-366-2048.

FHWA Supports:

PBIC

PEDSAFE

BIKESAFE

Accommodating Bicycle and Pedestrian Travel: A Recommended Approach

On this page:

- Purpose
- Introduction
- The Challenge: Balancing Competing Interests
- Policy Statement
- Policy Approach
- Applying Engineering Judgement to Roadway Design
- Actions
- Conclusion
- Further Information and Resources
  - General Design Resources
  - Pedestrian Facility Design Resources
  - Bicycle Facility Design Resources
  - Bicycle and Pedestrian Design Resources
  - Traffic Calming Design Resources
  - ADA Related Design Resources
  - Trail Design Resources

Purpose

Accommodating Bicycle and Pedestrian Travel: A Recommended Approach is a policy statement adopted by the United States Department of Transportation. USDOT hopes that public agencies, professional associations, advocacy groups, and others adopt this approach as a way of committing themselves to integrating bicycling and walking into the transportation mainstream.

The Design Guidance incorporates three key principles:

a. a policy statement that **bicycling and walking facilities will be incorporated into all transportation projects** unless exceptional circumstances exist;

b. an approach to achieving this policy that has already worked in State and local agencies; and

c. a series of action items that a public agency, professional association, or advocacy group can take to achieve the overriding goal of improving conditions for bicycling and walking.

The Policy Statement was drafted by the U.S. Department of Transportation in response to Section 1202 (b) of the Transportation Equity Act for the 21st Century (TEA-21) with the input and assistance of public agencies, professional associations and advocacy groups.

Introduction

Bicycling and walking issues have grown in significance throughout the 1990s. As the new millennium dawns public agencies and public interest groups alike are striving to define the most appropriate way in which to accommodate the two modes within the overall transportation system so that those who walk or ride bicycles can safely, conveniently, and comfortably access every destination within a community.

Public support and advocacy for improved conditions for bicycling and walking has created a widespread acceptance that more should be done to enhance the safety, comfort, and convenience of the nonmotorized traveler. Public opinion surveys throughout the 1990s have demonstrated strong support for increased planning, funding and implementation of shared use paths, sidewalks and on-street facilities.

At the same time, public agencies have become considerably better equipped to respond to this demand. Research and practical experience in designing facilities for bicyclists and pedestrians has generated numerous national, State and local design manuals and resources. An increasing number of professional planners and engineers are familiar with this material and are applying this knowledge in towns and cities across the country.

The 1990 Americans with Disabilities Act, building on an earlier law requiring curb ramps in new, altered, and existing sidewalks, added impetus to improving conditions for sidewalk users. People with disabilities rely on the pedestrian and transit infrastructure, and the links between them, for access and mobility.

Congress and many State legislatures have made it considerably easier in recent years to fund nonmotorized projects and

programs (for example, the Intermodal Surface Transportation Efficiency Act and the Transportation Equity Act for the 21st Century), and a number of laws and regulations now mandate certain planning activities and design standards to guarantee the inclusion of bicyclists and pedestrians.

Despite these many advances, injury and fatality numbers for bicyclists and pedestrians remain stubbornly high, levels of bicycling and walking remain frustratingly low, and most communities continue to grow in ways that make travel by means other than the private automobile quite challenging. Failure to provide an accessible pedestrian network for people with disabilities often requires the provision of costly paratransit service. Ongoing investment in the Nation's transportation infrastructure is still more likely to overlook rather than integrate bicyclists and pedestrians.

In response to demands from user groups that every transportation project include a bicycle and pedestrian element, Congress asked the Federal Highway Administration (FHWA) to study various approaches to accommodating the two modes. The Transportation Equity Act for the 21st Century (TEA-21) instructs the Secretary to work with professional groups such as AASHTO, ITE, and other interested parties to recommend policies and standards that might achieve the overall goal of fully integrating bicyclists and pedestrians into the transportation system.

TEA-21 also says that, "Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation projects, except where bicycle and pedestrian use are not permitted." (Section 1202)

In August 1998, FHWA convened a Task Force comprising representatives from FHWA, AASHTO, ITE, bicycle and pedestrian user groups, State and local agencies, the U.S. Access Board and representatives of disability organizations to seek advice on how to proceed with developing this guidance. The Task Force reviewed existing and proposed information on the planning and technical design of facilities for bicyclists and pedestrians and concluded that these made creation of another design manual unnecessary. For example, AASHTO published a bicycle design manual in 1999 and is working on a pedestrian facility manual.

The area where information and guidance was most lacking was in determining when to include designated or special facilities for bicyclists and pedestrians in transportation projects. There can also be uncertainty about the type of facility to provide, and the design elements that are required to ensure accessibility.

For example, when a new suburban arterial road is planned and designed, what facilities for bicyclists and pedestrians should be provided? The task force felt that once the decision to provide a particular facility was made, the specific information on designing that facility is generally available. However, the decision on whether to provide sidewalks on neither, one or both sides of the road, or a shoulder, striped bike lane, wide outside lane or separate trail for bicyclists is usually made with little guidance or help.

After a second meeting with the Task Force in January 1999, FHWA agreed to develop a **Policy Statement on Accommodating Bicyclists and Pedestrians in Transportation Projects** to guide State and local agencies in answering these questions. Task Force members recommended against trying to create specific warrants for different facilities (warrants leave little room for engineering judgement and have often been used to avoid providing facilities for bicycling and walking). Instead, the purpose of the Policy Statement is to provide a recommended approach to the accommodation of bicyclists and pedestrians that can be adopted by State and local agencies (as well as professional societies and associations, advocacy groups, and Federal agencies) as a commitment to developing a transportation infrastructure that is safe, convenient, accessible, and attractive to motorized AND nonmotorized users alike. The Policy Statement has four elements:

a. an acknowledgment of the issues associated with balancing the competing interests of motorized and nonmotorized users;
b. a recommended policy approach to accommodating bicyclists and pedestrians (including people with disabilities) that can be adopted by an agency or organizations as a statement of policy to be implemented or a target to be reached in the future;
c. a list of recommended actions that can be taken to implement the solutions and approaches described above; and
d. further information and resources on the planning, design, operation, and maintenance of facilities for bicyclists and pedestrians.

SEC. 1202. BICYCLE TRANSPORTATION AND PEDESTRIAN WALKWAYS.

(b) Design Guidance.-

(1) In general.-In implementing section 217(g) of title 23, United States Code, the Secretary, in cooperation with the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and other interested organizations, shall develop guidance on the various approaches to accommodating bicycles and pedestrian travel.

(2) Issues to be addressed. -The guidance shall address issues such as the level and nature of the demand, volume, and speed of motor vehicle traffic, safety, terrain, cost, and sight distance.

(3) Recommendations. -The guidance shall include recommendations on amending and updating the policies of the American Association of State Highway and Transportation Officials relating to highway and street design standards to accommodate bicyclists and pedestrians.

(4) Time period for development. -The guidance shall be developed within 18 months after the date of enactment of this Act.

The Challenge: Balancing Competing Interests

For most of the second half of the 20th Century, the transportation, traffic engineering and highway professions in the United States were synonymous. They shared a singular purpose: building a transportation system that promoted the safety, convenience and comfort of motor vehicles. The post-war boom in car and home ownership, the growth of suburban America, the challenge of completing the Interstate System, and the continued availability of cheap gasoline all fueled the development of a transportation infrastructure focused almost exclusively on the private motor car and commercial truck.

Initially, there were few constraints on the traffic engineer and highway designer. Starting at the centerline, highways were developed according to the number of motor vehicle travel lanes that were needed well into the future, as well as providing

space for breakdowns. Beyond that, facilities for bicyclists and pedestrians, environmental mitigation, accessibility, community preservation, and aesthetics were at best an afterthought, often simply overlooked, and, at worst, rejected as unnecessary, costly, and regressive. Many States passed laws preventing the use of State gas tax funds on anything other than motor vehicle lanes and facilities. The resulting highway environment discourages bicycling and walking and has made the two modes more dangerous. Further, the ability of pedestrians with disabilities to travel independently and safely has been compromised, especially for those with vision impairments.

Over time, the task of designing and building highways has become more complex and challenging. Traffic engineers now have to integrate accessibility, utilities, landscaping, community preservation, wetland mitigation, historic preservation, and a host of other concerns into their plans and designs - and yet they often have less space and resources within which to operate and traffic volumes continue to grow.

The additional "burden" of having to find space for pedestrians and bicyclists was rejected as impossible in many communities because of space and funding constraints and a perceived lack of demand. There was also anxiety about encouraging an activity that many felt to be dangerous and fraught with liability issues. Designers continued to design from the centerline out and often simply ran out of space before bike lanes, paved shoulders, sidewalks and other "amenities" could be included.

By contrast, bicycle and pedestrian user groups argue the roadway designer should design highways from the right-of-way limits in, rather than the centerline out. They advocate beginning the design of a highway with the sidewalk and/or trail, including a buffer before the paved shoulder or bike lane, and then allocating the remaining space for motor vehicles. Through this approach, walking and bicycling are positively encouraged, made safer, and included as a critical element in every transportation project rather than as an afterthought in a handful of unconnected and arbitrary locations within a community.

Retrofitting the built environment often provides even more challenges than building new roads and communities: space is at a premium and there is a perception that providing better conditions for bicyclists and pedestrians will necessarily take away space or convenience from motor vehicles.

During the 1990s, Congress spearheaded a movement towards a transportation system that favors people and goods over motor vehicles with passage of the Intermodal Surface Transportation Efficiency Act (1991) and the Transportation Equity Act for the 21st Century (1998). The call for more walkable, liveable, and accessible communities, has seen bicycling and walking emerge as an "indicator species" for the health and well-being of a community. People want to live and work in places where they can safely and conveniently walk and/or bicycle and not always have to deal with worsening traffic congestion, road rage and the fight for a parking space. Vice President Gore launched a Livability Initiative in 1999 with the ironic statement that "a gallon of gas can be used up just driving to get a gallon of milk."

The challenge for transportation planners, highway engineers and bicycle and pedestrian user groups, therefore, is to balance their competing interest in a limited amount of right-of-way, and to develop a transportation infrastructure that provides access for all, a real choice of modes, and safety in equal measure for each mode of travel.

This task is made more challenging by the widely divergent character of our nation's highways and byways. Traffic speeds and volumes, topography, land use, the mix of road users, and many other factors mean that a four-lane highway in rural North Carolina cannot be designed in the same way as a four-lane highway in New York City, a dirt road in Utah or an Interstate highway in Southern California. In addition, many different agencies are responsible for the development, management, and operation of the transportation system.

In a recent memorandum transmitting Program Guidance on bicycle and pedestrian issues to FHWA Division Offices, the Federal Highway Administrator wrote that "We expect every transportation agency to make accommodation for bicycling and walking a routine part of their planning, design, construction, operations and maintenance activities." The Program Guidance itself makes a number of clear statements of intent:

- Congress clearly intends for bicyclists and pedestrians to have safe, convenient access to the transportation system and sees every transportation improvement as an opportunity to enhance the safety and convenience of the two modes.
- "Due consideration" of bicycle and pedestrian needs should include, at a minimum, a presumption that bicyclists and pedestrians will be accommodated in the design of new and improved transportation facilities.
- To varying extents, bicyclists and pedestrians will be present on all highways and transportation facilities where they are permitted and it is clearly the intent of TEA-21 that all new and improved transportation facilities be planned, designed and constructed with this fact in mind.
- The decision not to accommodate [bicyclists and pedestrians] should be the exception rather than the rule. There must be exceptional circumstances for denying bicycle and pedestrian access either by prohibition or by designing highways that are incompatible with safe, convenient walking and bicycling.

The Program Guidance defers a suggested definition of what constitutes "exceptional circumstances" until this Policy Statement is completed. However, it does offer interim guidance that includes controlled access highways and projects where the cost of accommodating bicyclists and pedestrians is high in relation to the overall project costs and likely level of use by nonmotorized travelers.

Providing access for people with disabilities is a civil rights mandate that is not subject to limitation by project costs, levels of use, or "exceptional circumstances". While the Americans with Disabillities Act doesn't require pedestrian facilities in the absence of a pedestrian route, it does require that pedestrian facilities, when newly constructed or altered, be accessible.

Policy Statement

1. Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:

- bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be

necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.

- the cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.
- where sparsity of population or other factors indicate an absence of need. For example, the Portland Pedestrian Guide requires "all construction of new public streets" to include sidewalk improvements on both sides, unless the street is a cul-de-sac with four or fewer dwellings or the street has severe topographic or natural resource constraints.

2. In rural areas, paved shoulders should be included in all new construction and reconstruction projects on roadways used by more than 1,000 vehicles per day, as in States such as Wisconsin. Paved shoulders have safety and operational advantages for all road users in addition to providing a place for bicyclists and pedestrians to operate.

Rumble strips are not recommended where shoulders are used by bicyclists unless there is a minimum clear path of four feet in which a bicycle may safely operate.

3. Sidewalks, shared use paths, street crossings (including over- and undercrossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated and maintained so that all pedestrians, including people with disabilities, can travel safely and independently.

4. The design and development of the transportation infrastructure shall improve conditions for bicycling and walking through the following additional steps:

- planning projects for the long-term. Transportation facilities are long-term investments that remain in place for many years. The design and construction of new facilities that meet the criteria in item 1) above should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements. For example, a bridge that is likely to remain in place for 50 years, might be built with sufficient width for safe bicycle and pedestrian use in anticipation that facilities will be available at either end of the bridge even if that is not currently the case
- addressing the need for bicyclists and pedestrians to cross corridors as well as travel along them. Even where bicyclists and pedestrians may not commonly use a particular travel corridor that is being improved or constructed, they will likely need to be able to cross that corridor safely and conveniently. Therefore, the design of intersections and interchanges shall accommodate bicyclists and pedestrians in a manner that is safe, accessible and convenient.
- getting exceptions approved at a senior level. Exceptions for the non-inclusion of bikeways and walkways shall be approved by a senior manager and be documented with supporting data that indicates the basis for the decision.
- designing facilities to the best currently available standards and guidelines. The design of facilities for bicyclists and pedestrians should follow design guidelines and standards that are commonly used, such as the AASHTO *Guide for the Development of Bicycle Facilities*, AASHTO's *A Policy on Geometric Design of Highways and Streets,* and the ITE Recommended Practice "*Design and Safety of Pedestrian Facilities*".

Policy Approach

"Rewrite the Manuals" Approach

Manuals that are commonly used by highway designers covering roadway geometrics, roadside safety, and bridges should incorporate design information that integrates safe and convenient facilities for bicyclists and pedestrians -- including people with disabilities - into all new highway construction and reconstruction projects.

In addition to incorporating detailed design information - such as the installation of safe and accessible crossing facilities for pedestrians, or intersections that are safe and convenient for bicyclists - these manuals should also be amended to provide flexibility to the highway designer to develop facilities that are in keeping with transportation needs, accessibility, community values, and aesthetics. For example, the Portland Pedestrian Design Guide (June 1998) applies to every project that is designed and built in the city, but the Guide also notes that:

> "Site conditions and circumstances often make applying a specific solution difficult. The Pedestrian Design Guide should reduce the need for ad hoc decision by providing a published set of guidelines that are applicable to most situations. Throughout the guidelines, however, care has been taken to provide flexibility to the designer so she or he can tailor the standards to unique circumstances. Even when the specific guideline cannot be met, the designer should attempt to find the solution that best meets the pedestrian design principles described [on the previous page]"

In the interim, these manuals may be supplemented by stand-alone bicycle and pedestrian facility manuals that provide detailed design information addressing on-street bicycle facilities, fully accessible sidewalks, crosswalks, and shared use paths, and other improvements.

Examples: Florida DOT has integrated bicycle and pedestrian facility design information into its standard highway design manuals and New Jersey DOT is in the process of doing so. Many States and localities have developed their own bicycle and pedestrian facility design manuals, some of which are listed in the final section of this document.

Applying Engineering Judgement to Roadway Design

In rewriting manuals and developing standards for the accommodation of bicyclists and pedestrians, there is a temptation to adopt "typical sections" that are applied to roadways without regard to travel speeds, lane widths, vehicle mix, adjacent land uses, traffic volumes and other critical factors. This approach can lead to inadequate provision on major roads (e.g. a four foot bike lane or four foot sidewalk on a six lane high-speed urban arterial) and the over-design of local and neighborhood streets (e.g. striping bike lanes on low volume residential roads) , and leaves little room for engineering judgement.

After adopting the policy that bicyclists and pedestrians (including people with disabilities) will be fully integrated into the transportation system, State and local governments should encourage engineering judgement in the application of the range of available treatments.

For example:

- Collector and arterial streets shall typically have a minimum of a four foot wide striped bicycle lane, however wider lanes are often necessary in locations with parking, curb and gutter, heavier and/or faster traffic.
- Collector and arterial streets shall typically have a minimum of a five foot sidewalk on both sides of the street, however wider sidewalks and landscaped buffers are necessary in locations with higher pedestrian or traffic volumes, and/or higher vehicle speeds. At intersections, sidewalks may need to be wider to accommodate accessible curb ramps.
- Rural arterials shall typically have a minimum of a four foot paved shoulder, however wider shoulders (or marked bike lanes) and accessible sidewalks and crosswalks are necessary within rural communities and where traffic volumes and speeds increase.

This approach also allows the highway engineer to achieve the performance goal of providing safe, convenient, and comfortable travel for bicyclists and pedestrians by other means. For example, if it would be inappropriate to add width to an existing roadway to stripe a bike lane or widen a sidewalk, traffic calming measures can be employed to reduce motor vehicle speeds to levels more compatible with bicycling and walking.

Actions

The United States Department of Transportation encourages States, local governments, professional associations, other government agencies and community organizations to adopt this Policy Statement as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. By so doing, the organization or agency should explicitly adopt one, all, or a combination of the various approaches described above AND should be committed to taking some or all of the actions listed below as appropriate for their situation.

a. Define the exceptional circumstances in which facilities for bicyclists and pedestrians will NOT be required in all transportation projects.

b. Adopt new manuals, or amend existing manuals, covering the geometric design of streets, the development of roadside safety facilities, and design of bridges and their approaches so that they comprehensively address the development of bicycle and pedestrian facilities as an integral element of the design of all new and reconstructed roadways.

c. Adopt stand-alone bicycle and pedestrian facility design manuals as an interim step towards the adoption of new typical sections or manuals covering the design of streets and highways.

d. Initiate an intensive re-tooling and re-education of transportation planners and engineers to make them conversant with the new information required to accommodate bicyclists and pedestrians. Training should be made available for, if not required of, agency traffic engineers and consultants who perform work in this field.

Conclusion

There is no question that conditions for bicycling and walking need to be improved in every community in the United States; it is no longer acceptable that 6,000 bicyclists and pedestrians are killed in traffic every year, that people with disabilities cannot travel without encountering barriers, and that two desirable and efficient modes of travel have been made difficult and uncomfortable.

Every transportation agency has the responsibility and the opportunity to make a difference to the bicycle-friendliness and walkability of our communities. The design information to accommodate bicyclists and pedestrians is available, as is the funding. The United States Department of Transportation is committed to doing all it can to improve conditions for bicycling and walking and to make them safer ways to travel.

Further Information and Resources

General Design Resources

A Policy on Geometric Design of Highways and Streets, 1994 (The Green Book). American Association of State Highway and Transportation Officials (AASHTO), P.O. Box 96716, Washington, DC, 20090-6716, Phone: (888) 227-4860.

Highway Capacity Manual, Special Report 209, 1994. Transportation Research Board, Box 289, Washington, DC 20055, Phone: (202) 334-3214. Next Edition: FHWA Research Program project has identified changes to HCM related to bicycle and pedestrian design.

Manual on Uniform Traffic Control Devices, 1988. Federal Highway Administration (FHWA), Superintendent of Documents. P.O. Box 371954, Pittsburgh, PA 15250-7954. Next Edition: 2000, will incorporate changes to Part IX that will soon be subject of Notice of Proposed Rulemaking.

Flexibility in Highway Design, 1997. FHWA. HEP 30, 400 Seventh Street SW, Washington, DC 20590.

Pedestrian Facility Design Resources

Design and Safety of Pedestrian Facilities, A Recommended Practice, 1998. Institute of Transportation Engineers, 525 School Street, S.W, Suite 410, Washington, DC 20024-2729, Phone: (202) 554-8050.

Pedestrian Compatible Roadways-Planning and Design Guidelines, 1995. Bicycle / Pedestrian Transportation Master Plan, Bicycle and Pedestrian Advocate, New Jersey Department of Transportation, 1035 Parkway Avenue, Trenton, NJ 08625, Phone: (609) 530-4578.

Improving Pedestrian Access to Transit: An Advocacy Handbook, 1998. Federal Transit Administration / WalkBoston. NTIS, 5285 Port Royal Road, Springfield, VA 22161.

Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas, Report No. 294A, Transportation Research Board, Box 289, Washington, DC 20055, Phone: (202) 334-3214.

Pedestrian Facilities Guidebook, 1997. Washington State Department of Transportation, Bicycle and Pedestrian Program, P.O. Box 47393, Olympia, WA 98504.

Portland Pedestrian Design Guide, 1998. Portland Pedestrian Program, 1120 SW Fifth Ave, Room 802; Portland, OR 97210. (503) 823-7004.

* *Implementing Pedestrian Improvements at the Local Level,* 1999. FHWA, HSR 20, 6300 Georgetown Pike, McLean, VA .

* AASHTO *Guide to the Development of Pedestrian Facilities,* 2000. AASHTO. (currently under discussion)

Bicycle Facility Design Resources

Guide for the Development of Bicycle Facilities, 1999., American Association of State Highway and Transportation Officials (AASHTO), P.O. Box 96716, Washington, DC, 20090-6716, Phone: (888) 227-4860.

Implementing Bicycle Improvements at the Local Level, (1998), FHWA, HSR 20, 6300 Georgetown Pike, McLean, VA .

Bicycle Facility Design Standards, 1998. City of Philadelphia Streets Department, 1401 JFK Boulevard, Philadelphia, PA 19103.

Selecting Roadway Design Treatments to Accommodate Bicyclists, 1993. FHWA, R&T Report Center, 9701 Philadelphia Ct, Unit Q; Lanham, MD 20706. (301) 577-1421 (fax only)

North Carolina Bicycle Facilities Planning and Design Guidelines, 1994. North Carolina DOT, P.O. Box 25201, Raleigh, NC 27611. (919) 733-2804.

Bicycle Facility Planning, 1995. Pinsof & Musser. American Planning Association, Planning Advisory Service Report # 459. American Planning Association, 122 S. Michigan Ave, Suite 1600; Chicago, IL 60603.

Florida Bicycle Facilities Planning and Design Manual, 1994. Florida DOT, Pedestrian and Bicycle Safety Office, 605 Suwannee Street, Tallahassee, FL 32399.

Evaluation of Shared-use Facilities for Bicycles and Motor Vehicles, 1996. Florida DOT, Pedestrian and Bicycle Safety Office, 605 Suwannee Street, Tallahassee, FL 32399.

Bicycle and Pedestrian Design Resources

Oregon Bicycle and Pedestrian Plan, 1995. Oregon Department of Transportation, Bicycle and Pedestrian Program, Room 210, Transportation Building, Salem, OR 97310, Phone: (503) 986-3555

Improving Conditions for Bicyclists and Pedestrians, A Best Practices Report, 1998. FHWA, HEP 10, 400 Seventh Street SW, Washington, DC 20590.

Traffic Calming Design Resources

Traffic Calming: State of the Practice. 1999. Institute of Transportation Engineers, 525 School Street, SW, Suite 410; Washington, DC 20024.

Florida Department of Transportation's Roundabout Guide. Florida Department of Transportation, 605 Suwannee St., MS-82, Tallahassee, FL 23299-0450.

National Bicycling and Walking Study. Case Study # 19, Traffic Calming and Auto-Restricted Zones and other Traffic Management Techniques-Their Effects on Bicycling and Pedestrians, Federal Highway Administration (FHWA).

Traffic Calming (1995), American Planning Association, 122 South Michigan Avenue, Chicago, IL 60603

Traditional Neighborhood Development Street Design Guidelines, 1997. Proposed Recommended Practice, Institute of Transportation Engineers, 525 School Street, SW, Suite 410; Washington, DC 20024.

Making Streets that Work, City of Seattle, 600 Fourth Ave., 12th Floor, Seattle, WA 98104-1873, Phone: (206) 684-4000, Fax: (206) 684-5360.

Traffic Control Manual for In-Street Work, 1994. Seattle Engineering Department, City of Seattle, 600 4th Avenue, Seattle, WA 98104-6967, Phone: (206) 684-5108.

ADA-related Design Resources

Accessible Pedestrian Signals, 1998. U.S. Access Board 1331 F Street NW, Suite 1000; Washington, DC 20004. (800) 872-2253.

*Accessible Rights of Way: A Design Manual,*1999. U.S. Access Board, 1331 F Street NW, Suite 1000; Washington, DC 20004. (800) 872-2253.

Designing Sidewalks and Trails for Access, Part One. 1999. FHWA, HEPH-30, 400 Seventh Street SW, Washington, DC 20590.

ADA Accessibility Guidelines for Buildings and Facilities, 1998 (ADAAG). U.S. Access Board, 1331 F Street NW, Suite 1000; Washington, DC 20004. (800) 872-2253.

Uniform Federal Accessibility Standards, 1984 (UFAS), available from the U.S. Access Board, 1331 F Street NW, Suite 1000; Washington, DC 20004. (800) 872-2253

Universal Access to Outdoor Recreation: A Design Guide, 1993. PLAE, Inc, MIG Communications, 1802 Fifth Street, Berkeley, CA 94710. (510) 845-0953.

Recommended Street Design Guidelines for People Who Are Blind or Visually Impaired. American Council of the Blind, 1155 15th Street NW, Suite 720; Washington, DC 20005. (202) 467-5081.

Trail Design Resources

Trails for the 21st Century, 1993. Rails to Trails Conservancy, 1100 17th Street NW, 10th Floor, Washington DC 20036. (202) 331-9696.

Greenways: A Guide to Planning, Design, and Development, 1993. The Conservation Fund. Island Press, 1718 Connecticut Ave NW, Suite 300; Washington, DC 20009.

Trail Intersection Design Guidelines, 1996. Florida Department of Transportation, 605 Suwannee St., MS-82, Tallahassee, FL 23299-0450.

* Indicates publication not yet available

Americans with Disabilities Act (ADA) Standards

Adopted by the U.S. Department of Justice (2010) and the U.S. Department of Transportation (2006)

About this Edition of the ADA Standards

The ADA Standards are issued by the Department of Justice (DOJ) and the Department of Transportation (DOT) and apply to facilities covered by the ADA in new construction and alterations. DOJ's 2010 ADA Standards apply to all facilities covered by the ADA, except public transportation facilities, which are subject to DOT's 2006 ADA Standards.

Both standards are very similar and are closely based on the Board's ADA Accessibility Guidelines (ADAAG). However, each contains a few unique provisions, which are noted in this edition of the standards.

Department of Justice ADA Standards (2010)

DOJ's ADA standards (2010) became mandatory on March 15, 2012. They include additional provisions concerning:

- Assembly Areas (221)
- Medical Care Facilities (section 223)
- Places of Lodging (sections 224)
- Housing at Places of Education (224 and 233)
- Detention and Correctional Facilities (section 232)
- Social Service Center Establishments (233)
- Residential Dwelling Units (section 233)

DOJ’s standards are also available on DOJ’s website at www.ada.gov.

Department of Transportation ADA Standards for Transportation Facilities (2006)

DOT’s ADA standards (2006) apply to facilities used by state and local governments to provide designated public transportation services, including bus stops and stations, and rail stations.

They include unique provisions concerning:

- Location of Accessible Routes (206.3)
- Detectable Warnings on Curb Ramps (406.8)
- Bus Boarding and Alighting Areas (810.2.2)
- Rail Station Platforms (810.5.3)

DOJ's 2010 ADA Standards for Accessible Design

Overview

The Department of Justice published revised regulations for Titles II and III of the Americans with Disabilities Act of 1990 "ADA" in the *Federal Register* on September 15, 2010. These regulations adopted revised, enforceable accessibility standards called the 2010 ADA Standards for Accessible Design "2010 Standards" or "Standards". The 2010 Standards set minimum requirements – both scoping and technical – for newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities.

Adoption of the 2010 Standards also establishes a revised reference point for Title II entities that choose to make structural changes to existing facilities to meet their program accessibility requirements; and it establishes a similar reference for Title III entities undertaking readily achievable barrier removal.

The Department is providing this document with the official 2010 Standards in one publication. The document includes:

- The 2010 Standards for State and local governments, which consist of the Title II regulations at 28 CFR 35.151 and the 2004 ADAAG at 36 CFR part 1191, appendices B and D;

- The 2010 Standards for public accommodations and commercial facilities, which consist of the Title III regulations at 28 CFR part 36, subpart D, and the 2004 ADAAG at 36 CFR part 1191, appendices B and D.

The Department has assembled into a separate publication the revised regulation guidance that applies to the Standards. The Department included guidance in its revised ADA regulations published on September 15, 2010. This guidance provides detailed information about the Department's adoption of the 2010 Standards including changes to the Standards, the reasoning behind those changes, and responses to public comments received on these topics. The document, Guidance on the 2010 ADA Standards for Accessible Design, can be downloaded from www.ADA.gov.

For More Information

For information about the ADA, including the revised 2010 ADA regulations, please visit the Department's website www.ADA.gov; or, for answers to specific questions, call the toll-free ADA Information Line at 800-514-0301 (Voice) or 800-514-0383 (TTY).

2010 STANDARDS FOR STATE AND LOCAL GOVERNMENT FACILITIES: TITLE II

State and local government facilities must follow the requirements of the 2010 Standards, including both the Title II regulations at 28 CFR 35.151; and the 2004 ADAAG at 36 CFR part 1191, appendices B and D.



In the few places where requirements between the two differ, the requirements of 28 CFR 35.151 prevail.

Compliance Date for Title II

If the start date for construction is on or after March 15, 2012, all newly constructed or altered State and local government facilities must comply with the 2010 Standards. Before that date, the 1991 Standards (without the elevator exemption), the UFAS, or the 2010 Standards may be used for such projects when the start of construction commences on or after September 15, 2010.

28 CFR 35.151 New construction and alterations

(a) Design and construction.

(1) Each facility or part of a facility constructed by, on behalf of, or for the use of a public entity shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by individuals with disabilities, if the construction was commenced after January 26, 1992.

(2) Exception for structural impracticability.

(i) Full compliance with the requirements of this section is not required where a public entity can demonstrate that it is structurally impracticable to meet the requirements. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features.

(ii) If full compliance with this section would be structurally impracticable, compliance with this section is required to the extent that it is not structurally impracticable. In that case, any portion of the facility that can be made accessible shall be made accessible to the extent that it is not structurally impracticable.

(iii) If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would be structurally impracticable, accessibility shall nonetheless be ensured to persons with other types of disabilities, (e.g., those who use crutches or who have sight, hearing, or mental impairments) in accordance with this section.

(b) Alterations.

(1) Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992.

(2) The path of travel requirements of § 35.151(b)(4) shall apply only to alterations undertaken solely for purposes other than to meet the program accessibility requirements of § 35.150.

(3)

(i) Alterations to historic properties shall comply, to the maximum extent feasible, with the provisions applicable to historic properties in the design standards specified in § 35.151(c).

(ii) If it is not feasible to provide physical access to an historic property in a manner that will not threaten or destroy the historic significance of the building or facility, alternative methods of access shall be provided pursuant to the requirements of § 35.150.

(4) Path of travel. An alteration that affects or could affect the usability of or access to an area of a facility that contains a primary function shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the altered area and the restrooms, telephones, and drinking fountains serving the altered area are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, unless the cost and scope of such alterations is disproportionate to the cost of the overall alteration.

(i) Primary function. A “primary function” is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public entity using the facility are carried out.

(A) Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, and corridors are not areas containing a primary function. Restrooms are not areas containing a primary function unless the provision of restrooms is a primary purpose of the area, e.g., in highway rest stops.

(B) For the purposes of this section, alterations to windows, hardware, controls, electrical outlets, and signage shall not be deemed to be alterations that affect the usability of or access to an area containing a primary function.

(ii) A “path of travel” includes a continuous, unobstructed way of pedestrian passage by means of which the altered area may be approached, entered, and exited, and which connects the altered area with an exterior approach (including sidewalks, streets, and parking areas), an entrance to the facility, and other parts of the facility.

(A) An accessible path of travel may consist of walks and sidewalks, curb ramps and other interior or exterior pedestrian ramps; clear floor paths through lobbies, corridors, rooms, and other improved areas; parking access aisles; elevators and lifts; or a combination of these elements.

(B) For the purposes of this section, the term “path of travel” also includes the restrooms, telephones, and drinking fountains serving the altered area.

(C) **Safe harbor.** If a public entity has constructed or altered required elements of a path of travel in accordance with the specifications in either the 1991 Standards or the Uniform Federal Accessibility Standards before March 15, 2012, the public entity is not required to retrofit such elements to reflect incremental changes in the 2010 Standards solely because of an alteration to a primary function area served by that path of travel.

(iii) Disproportionality.

(A) Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20 % of the cost of the alteration to the primary function area.

(B) Costs that may be counted as expenditures required to provide an accessible path of travel may include:

(1) Costs associated with providing an accessible entrance and an accessible route to the altered area, for example, the cost of widening doorways or installing ramps;

(2) Costs associated with making restrooms accessible, such as installing grab bars, enlarging toilet stalls, insulating pipes, or installing accessible faucet controls;

(3) Costs associated with providing accessible telephones, such as relocating the telephone to an accessible height, installing amplification devices, or installing a text telephone (TTY); and

(4) Costs associated with relocating an inaccessible drinking fountain.

(iv) Duty to provide accessible features in the event of disproportionality.

(A) When the cost of alterations necessary to make the path of travel to the altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the extent that it can be made accessible without incurring disproportionate costs.

(B) In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access, in the following order—

(1) An accessible entrance;
(2) An accessible route to the altered area;
(3) At least one accessible restroom for each sex or a single unisex restroom;
(4) Accessible telephones;
(5) Accessible drinking fountains; and
(6) When possible, additional accessible elements such as parking, storage, and alarms.

(v) Series of smaller alterations.

(A) The obligation to provide an accessible path of travel may not be evaded by performing a series of small alterations to the area served by a single path of travel if those alterations could have been performed as a single undertaking.

(B)

(1) If an area containing a primary function has been altered without providing an accessible path of travel to that area, and

subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to the primary function areas on that path of travel during the preceding three-year period shall be considered in determining whether the cost of making that path of travel accessible is disproportionate.

(2) Only alterations undertaken on or after March 15, 2011, shall be considered in determining if the cost of providing an accessible path of travel is disproportionate to the overall cost of the alterations.

(c) Accessibility standards and compliance date.

(1) If physical construction or alterations commence after July 26, 1992, but prior to the September 15, 2010, then new construction and alterations subject to this section must comply with either the UFAS or the 1991 Standards except that the elevator exemption contained at section 4.1.3(5) and section 4.1.6(1)(k) of the 1991 Standards shall not apply. Departures from particular requirements of either standard by the use of other methods shall be permitted when it is clearly evident that equivalent access to the facility or part of the facility is thereby provided.

(2) If physical construction or alterations commence on or after September 15, 2010, and before March 15, 2012, then new construction and alterations subject to this section may comply with one of the following: the 2010 Standards, UFAS, or the 1991 Standards except that the elevator exemption contained at section 4.1.3(5) and section 4.1.6(1)(k) of the 1991 Standards shall not apply. Departures from particular requirements of either standard by the use of other methods shall be permitted when it is clearly evident that equivalent access to the facility or part of the facility is thereby provided.

(3) If physical construction or alterations commence on or after March 15, 2012, then new construction and alterations subject to this section shall comply with the 2010 Standards.

(4) For the purposes of this section, ceremonial groundbreaking or razing of structures prior to site preparation do not commence physical construction or alterations.

(5) Noncomplying new construction and alterations.

(i) Newly constructed or altered facilities or elements covered by §§ 35.151(a) or (b) that were constructed or altered before March 15, 2012,

and that do not comply with the 1991 Standards or with UFAS shall before March 15, 2012, be made accessible in accordance with either the 1991 Standards, UFAS, or the 2010 Standards.

(ii) Newly constructed or altered facilities or elements covered by §§ 35.151(a) or (b) that were constructed or altered before March 15, 2012 and that do not comply with the 1991 Standards or with UFAS shall, on or after March 15, 2012, be made accessible in accordance with the 2010 Standards.

Appendix to 35.151(c)

Compliance Date for New Construction or Alterations	Applicable Standards
Before September 15, 2010	1991 Standards or UFAS
On or after September 15, 2010, and before March 15, 2012	1991 Standards, UFAS, or 2010 Standards
On or after March 15, 2012	2010 Standards

(d) Scope of coverage. The 1991 Standards and the 2010 Standards apply to fixed or built-in elements of buildings, structures, site improvements, and pedestrian routes or vehicular ways located on a site. Unless specifically stated otherwise, the advisory notes, appendix notes, and figures contained in the 1991 Standards and the 2010 Standards explain or illustrate the requirements of the rule; they do not establish enforceable requirements.

(e) Social service center establishments. Group homes, halfway houses, shelters, or similar social service center establishments that provide either temporary sleeping accommodations or residential dwelling units that are subject to this section shall comply with the provisions of the 2010 Standards applicable to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

(1) In sleeping rooms with more than 25 beds covered by this section, a minimum of 5% of the beds shall have clear floor space complying with section 806.2.3 of the 2010 Standards.

(2) Facilities with more than 50 beds covered by this section that provide common use bathing facilities, shall provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat, and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower shall be provided for each group.

(f) Housing at a place of education. Housing at a place of education that is subject to this section shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806 subject to the following exceptions. For the purposes of the application of this section, the term "sleeping room" is intended to be used interchangeably with the term "guest room" as it is used in the transient lodging standards.

(1) Kitchens within housing units containing accessible sleeping rooms with mobility features (including suites and clustered sleeping rooms) or on floors containing accessible sleeping rooms with mobility features shall provide turning spaces that comply with section 809.2.2 of the 2010 Standards and kitchen work surfaces that comply with section 804.3 of the 2010 Standards.

(2) Multi-bedroom housing units containing accessible sleeping rooms with mobility features shall have an accessible route throughout the unit in accordance with section 809.2 of the 2010 Standards.

(3) Apartments or townhouse facilities that are provided by or on behalf of a place of education, which are leased on a year-round basis exclusively to graduate students or faculty, and do not contain any public use or common use areas available for educational programming, are not subject to the transient lodging standards and shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

(g) Assembly areas. Assembly areas subject to this section shall comply with the provisions of the 2010 Standards applicable to assembly areas, including, but not limited to, sections 221 and 802. In addition, assembly areas shall ensure that—

(1) In stadiums, arenas, and grandstands, wheelchair spaces and companion seats are dispersed to all levels that include seating served by an accessible route;

(2) Assembly areas that are required to horizontally disperse wheelchair spaces and companion seats by section 221.2.3.1 of the 2010 Standards and have seating encircling, in whole or in part, a field of play or performance area shall disperse

wheelchair spaces and companion seats around that field of play or performance area;

(3) Wheelchair spaces and companion seats are not located on (or obstructed by) temporary platforms or other movable structures, except that when an entire seating section is placed on temporary platforms or other movable structures in an area where fixed seating is not provided, in order to increase seating for an event, wheelchair spaces and companion seats may be placed in that section. When wheelchair spaces and companion seats are not required to accommodate persons eligible for those spaces and seats, individual, removable seats may be placed in those spaces and seats;

(4) Stadium-style movie theaters shall locate wheelchair spaces and companion seats on a riser or cross-aisle in the stadium section that satisfies at least one of the following criteria—

(i) It is located within the rear 60% of the seats provided in an auditorium; or

(ii) It is located within the area of an auditorium in which the vertical viewing angles (as measured to the top of the screen) are from the 40th to the 100th percentile of vertical viewing angles for all seats as ranked from the seats in the first row (1st percentile) to seats in the back row (100th percentile).

(h) Medical care facilities. Medical care facilities that are subject to this section shall comply with the provisions of the 2010 Standards applicable to medical care facilities, including, but not limited to, sections223 and 805. In addition, medical care facilities that do not specialize in the treatment of conditions that affect mobility shall disperse the accessible patient bedrooms required by section 223.2.1 of the 2010 Standards in a manner that is proportionate by type of medical specialty.

(i) Curb ramps.

(1) Newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway.

(2) Newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads, or highways.

(j) Facilities with residential dwelling units for sale to individual owners.

(1) Residential dwelling units designed and constructed or altered by public entities that will be offered for sale to individuals shall comply with the requirements for residential facilities in the 2010 Standards including sections 233 and 809.

(2) The requirements of paragraph (1) also apply to housing programs that are operated by public entities where design and construction of particular residential dwelling units take place only after a specific buyer has been identified. In such programs, the covered entity must provide the units that comply with the requirements for accessible features to those pre-identified buyers with disabilities who have requested such a unit.

(k) Detention and correctional facilities.

(1) New construction of jails, prisons, and other detention and correctional facilities shall comply with the 2010 Standards except that public entities shall provide accessible mobility features complying with section 807.2 of the 2010 Standards for a minimum of 3%, but no fewer than one, of the total number of cells in a facility. Cells with mobility features shall be provided in each classification level.

(2) Alterations to detention and correctional facilities. Alterations to jails, prisons, and other detention and correctional facilities shall comply with the 2010 Standards except that public entities shall provide accessible mobility features complying with section 807.2 of the 2010 Standards for a minimum of 3%, but no fewer than one, of the total number of cells being altered until at least 3%, but no fewer than one, of the total number of cells in a facility shall provide mobility features complying with section 807.2. Altered cells with mobility features shall be provided in each classification level. However, when alterations are made to specific cells, detention and correctional facility operators may satisfy their obligation to provide the required number of cells with mobility features by providing the required mobility features in substitute cells (cells other than those where alterations are originally planned), provided that each substitute cell—

(i) Is located within the same prison site;

(ii) Is integrated with other cells to the maximum extent feasible;

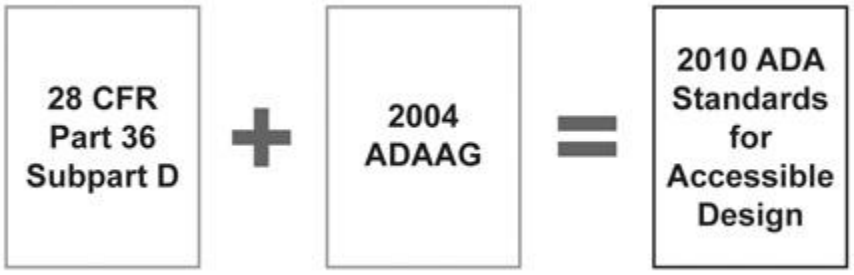
(iii) Has, at a minimum, equal physical access as the altered cells to areas used by inmates or detainees for visitation, dining, recreation, educational programs, medical services, work programs, religious services, and participation in other programs that the facility offers to inmates or detainees; and,

(iv) If it is technically infeasible to locate a substitute cell within the same prison site, a substitute cell must be provided at another prison site within the corrections system.

(3) With respect to medical and long-term care facilities in jails, prisons, and other detention and correctional facilities, public entities shall apply the 2010 Standards technical and scoping requirements for those facilities irrespective of whether those facilities are licensed.

2010 STANDARDS FOR PUBLIC ACCOMMODATIONS AND COMMERCIAL FACILITIES: TITLE III

Public accommodations and commercial facilities must follow the requirements of the 2010 Standards, including both the Title III regulations at 28 CFR part 36, subpart D; and the 2004 ADAAG at 36 CFR part 1191, appendices B and D.



In the few places where requirements between the two differ, the requirements of 28 CFR part 36, subpart D prevail.

Compliance Date for Title III

The compliance date for the 2010 Standards for new construction and alterations is determined by:

- the date the last application for a building permit or permit extension is certified to be complete by a State, county, or local government;
- the date the last application for a building permit or permit extension is received by a State, county, or local government, where the government does not certify the completion of applications; or
- the start of physical construction or alteration, if no permit is required.

If that date is on or after March 15, 2012, then new construction and alterations must comply with the 2010 Standards. If that date is on or after September 15, 2010, and before March 15, 2012, then new construction and alterations must comply with either the 1991 or the 2010 Standards.

28 CFR part 36, subpart D – New Construction and Alterations

§36.401 New construction.

(a) General.

(1) Except as provided in paragraphs (b) and (c) of this section, discrimination for purposes of this part includes a failure to design and construct facilities for first occupancy after January 26, 1993, that are readily accessible to and usable by individuals with disabilities.

(2) For purposes of this section, a facility is designed and constructed for first occupancy after January 26, 1993, only –

(i) If the last application for a building permit or permit extension for the facility is certified to be complete, by a State, County, or local government after January 26, 1992 (or, in those jurisdictions where the government does not certify completion of applications, if the last application for a building permit or permit extension for the facility is received by the State, County, or local government after January 26, 1992); and

(ii) If the first certificate of occupancy for the facility is issued after January 26, 1993.

(b) Commercial facilities located in private residences.

(1) When a commercial facility is located in a private residence, the portion of the residence used exclusively as a residence is not covered by this subpart, but that portion used exclusively in the operation of the commercial facility or that portion used both for the commercial facility and for residential purposes is covered by the new construction and alterations requirements of this subpart.

(2) The portion of the residence covered under paragraph (b)(1) of this section extends to those elements used to enter the commercial facility, including the homeowner´s front sidewalk, if any, the door or entryway, and hallways; and those portions of the residence, interior or exterior, available to or used by employees or visitors of the commercial facility, including restrooms.

(c) Exception for structural impracticability.

(1) Full compliance with the requirements of this section is not required where an entity can demonstrate that it is structurally impracticable to meet the requirements. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features.

(2) If full compliance with this section would be structurally impracticable, compliance with this section is required to the extent that it is not structurally impracticable. In that case, any portion of the facility that can be made accessible shall be made accessible to the extent that it is not structurally impracticable.

(3) If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would be structurally impracticable, accessibility shall nonetheless be ensured to persons with other types of disabilities (e.g., those who use crutches or who have sight, hearing, or mental impairments) in accordance with this section.

(d) Elevator exemption.

(1) For purposes of this paragraph (d) –

(i) Professional office of a health care provider means a location where a person or entity regulated by a State to provide professional services related to the physical or mental health of an individual makes such services available to the public. The facility housing the "professional office of a health care provider" only includes floor levels housing at least one health care provider, or any floor level designed or intended for use by at least one health care provider.

(ii) Shopping center or shopping mall means –

(A) A building housing five or more sales or rental establishments; or

(B) A series of buildings on a common site, either under common ownership or common control or developed either as one project or as a series of related projects, housing five or more sales or rental establishments. For purposes of this section, places of public accommodation of the types listed in paragraph (5) of the definition of "place of public accommodation" in section § 36.104 are considered sales or rental establishments. The facility housing a "shopping center or shopping mall" only includes floor levels housing at least one sales or rental establishment, or any floor level designed or intended for use by at least one sales or rental establishment.

(2) This section does not require the installation of an elevator in a facility that is less than three stories or has less than 3000 square feet per story, except with respect to any facility that houses one or more of the following:

(i) A shopping center or shopping mall, or a professional office of a health care provider.

(ii) A terminal, depot, or other station used for specified public transportation, or an airport passenger terminal. In such a facility, any area housing passenger services, including boarding and debarking, loading and unloading, baggage claim, dining facilities, and other common areas open to the public, must be on an accessible route from an accessible entrance.

(3) The elevator exemption set forth in this paragraph (d) does not obviate or limit, in any way the obligation to comply with the other accessibility requirements established in paragraph (a) of this section. For example, in a facility that houses a shopping center or shopping mall, or a professional office of a health care provider, the floors that are above or below an accessible ground floor and that do not house sales or rental establishments or a professional office of a health care provider, must meet the requirements of this section but for the elevator.

§36.402 Alterations.

(a) General.

(1) Any alteration to a place of public accommodation or a commercial facility, after January 26, 1992, shall be made so as to ensure that, to the maximum extent feasible, the altered portions of the facility are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs.

(2) An alteration is deemed to be undertaken after January 26, 1992, if the physical alteration of the property begins after that date.

(b) Alteration. For the purposes of this part, an alteration is a change to a place of public accommodation or a commercial facility that affects or could affect the usability of the building or facility or any part thereof.

(1) Alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, changes or rearrangement in structural parts or elements, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, asbestos removal, or changes to mechanical and electrical systems are not alterations unless they affect the usability of the building or facility.

(2) If existing elements, spaces, or common areas are altered, then each such altered element, space, or area shall comply with the applicable provisions of appendix A to this part.

(c) To the maximum extent feasible. The phrase "to the maximum extent feasible," as used in this section, applies to the occasional case where the nature of an existing facility makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alteration shall provide the maximum physical accessibility feasible. Any altered features of the facility that can be made accessible shall be made accessible. If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would not be feasible, the facility shall be

made accessible to persons with other types of disabilities (e.g., those who use crutches, those who have impaired vision or hearing, or those who have other impairments).

§36.403 Alterations: Path of travel.

(a) General.

(1) An alteration that affects or could affect the usability of or access to an area of a facility that contains a primary function shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the altered area and the restrooms, telephones, and drinking fountains serving the altered area, are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, unless the cost and scope of such alterations is disproportionate to the cost of the overall alteration.

(2) If a private entity has constructed or altered required elements of a path of travel at a place of public accommodation or commercial facility in accordance with the specifications in the 1991 Standards, the private entity is not required to retrofit such elements to reflect the incremental changes in the 2010 Standards solely because of an alteration to a primary function area served by that path of travel.

(b) Primary function. A "primary function" is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the customer services lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the facility are carried out. Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors, and restrooms are not areas containing a primary function.

(c) Alterations to an area containing a primary function.

(1) Alterations that affect the usability of or access to an area containing a primary function include, but are not limited to –

(i) Remodeling merchandise display areas or employee work areas in a department store;

(ii) Replacing an inaccessible floor surface in the customer service or employee work areas of a bank;

(iii) Redesigning the assembly line area of a factory; or

(iv) Installing a computer center in an accounting firm.

(2) For the purposes of this section, alterations to windows, hardware, controls, electrical outlets, and signage shall not be deemed to be alterations that affect the usability of or access to an area containing a primary function.

(d) Landlord/tenant: If a tenant is making alterations as defined in § 36.402 that would trigger the requirements of this section, those alterations by the tenant in areas that only the tenant occupies do not trigger a path of travel obligation upon the landlord with respect to areas of the facility under the landlord´s authority, if those areas are not otherwise being altered.

(e) Path of travel.

(1) A "path of travel" includes a continuous, unobstructed way of pedestrian passage by means of which the altered area may be approached, entered, and exited, and which connects the altered area with an exterior approach (including sidewalks, streets, and parking areas), an entrance to the facility, and other parts of the facility.

(2) An accessible path of travel may consist of walks and sidewalks, curb ramps and other interior or exterior pedestrian ramps; clear floor paths through lobbies, corridors, rooms, and other improved areas; parking access aisles; elevators and lifts; or a combination of these elements.

(3) For the purposes of this part, the term "path of travel" also includes the restrooms, telephones, and drinking fountains serving the altered area.

(f) Disproportionality.

(1) Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20% of the cost of the alteration to the primary function area.

(2) Costs that may be counted as expenditures required to provide an accessible path of travel may include:

(i) Costs associated with providing an accessible entrance and an accessible route to the altered area, for example, the cost of widening doorways or installing ramps;

(ii) Costs associated with making restrooms accessible, such as installing grab bars, enlarging toilet stalls, insulating pipes, or installing accessible faucet controls;

(iii) Costs associated with providing accessible telephones, such as relocating the telephone to an accessible height, installing amplification devices, or installing a text telephone (TTY);

(iv) Costs associated with relocating an inaccessible drinking fountain.

(g) Duty to provide accessible features in the event of disproportionality.

(1) When the cost of alterations necessary to make the path of travel to the altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the extent that it can be made accessible without incurring disproportionate costs.

(2) In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access, in the following order:

(i) An accessible entrance;

(ii) An accessible route to the altered area;

(iii) At least one accessible restroom for each sex or a single unisex restroom;

(iv) Accessible telephones;

(v) Accessible drinking fountains; and

(vi) When possible, additional accessible elements such as parking, storage, and alarms.

(h) Series of smaller alterations.

(1) The obligation to provide an accessible path of travel may not be evaded by performing a series of small alterations to the area served by a single path of travel if those alterations could have been performed as a single undertaking.

(2)

(i) If an area containing a primary function has been altered without providing an accessible path of travel to that area, and subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to the primary function areas on that path of travel during the preceding three year period shall be considered in determining whether the cost of making that path of travel accessible is disproportionate.

(ii) Only alterations undertaken after January 26, 1992, shall be considered in determining if the cost of providing an accessible path of travel is disproportionate to the overall cost of the alterations.

§36.404 Alterations: Elevator exemption.

(a) This section does not require the installation of an elevator in an altered facility that is less than three stories or has less than 3,000 square feet per story, except with respect to any facility

that houses a shopping center, a shopping mall, the professional office of a health care provider, a terminal, depot, or other station used for specified public transportation, or an airport passenger terminal.

(1) For the purposes of this section, professional office of a health care provider means a location where a person or entity regulated by a State to provide professional services related to the physical or mental health of an individual makes such services available to the public. The facility that houses a professional office of a health care provider only includes floor levels housing by at least one health care provider, or any floor level designed or intended for use by at least one health care provider.

(2) For the purposes of this section, shopping center or shopping mall means –

(i) A building housing five or more sales or rental establishments; or

(ii) A series of buildings on a common site, connected by a common pedestrian access route above or below the ground floor, that is either under common ownership or common control or developed either as one project or as a series of related projects, housing five or more sales or rental establishments. For purposes of this section, places of public accommodation of the types listed in paragraph (5) of the definition of place of public accommodation in § 36.104 are considered sales or rental establishments. The facility housing a "shopping center or shopping mall" only includes floor levels housing at least one sales or rental establishment, or any floor level designed or intended for use by at least one sales or rental establishment.

(b) The exemption provided in paragraph (a) of this section does not obviate or limit in any way the obligation to comply with the other accessibility requirements established in this subpart. For example, alterations to floors above or below the accessible ground floor must be accessible regardless of whether the altered facility has an elevator.

§36.405 Alterations: Historic preservation.

(a) Alterations to buildings or facilities that are eligible for listing in the National Register of Historic Places under the National Historic Preservation Act (16 U.S.C. 470 *et seq.*) or are designated as historic under State or local law, shall comply to the maximum extent feasible with this part.

(b) If it is determined that it is not feasible to provide physical access to an historic property that is a place of public accommodation in a manner that will not threaten or destroy the historic significance of the building or the facility, alternative methods of access shall be provided pursuant to the requirements of subpart C of this part.

§36.406 Standards for new construction and alterations.

(a) Accessibility standards and compliance date.

(1) New construction and alterations subject to §§ 36.401 or 36.402 shall comply with the 1991 Standards if the date when the last application for a building permit or permit extension is certified to be complete by a State, county, or local government (or, in those jurisdictions where the government does not certify completion of applications, if the date when the last application for a building permit or permit extension is received by the State, county, or local government) is before September 15, 2010, or if no permit is required, if the start of physical construction or alterations occurs before September 15, 2010.

(2) New construction and alterations subject to §§ 36.401 or 36.402 shall comply either with the 1991 Standards or with the 2010 Standards if the date when the last application for a building permit or permit extension is certified to be complete by a State, county, or local government (or, in those jurisdictions where the government does not certify completion of applications, if the date when the last application for a building permit or permit extension is received by the State, county, or local government) is on or after September 15, 2010, and before March 15, 2012, or if no permit is required, if the start of physical construction or alterations occurs on or after September 15, 2010, and before March 15, 2012.

(3) New construction and alterations subject to §§ 36.401 or 36.402 shall comply with the 2010 Standards if the date when the last application for a building permit or permit extension is certified to be complete by a State, county, or local government (or, in those jurisdictions where the government does not certify completion of applications, if the date when the last application for a building permit or permit extension is received by the State, county, or local government) is on or after March 15, 2012, or if no permit is required, if the start of physical construction or alterations occurs on or after March 15, 2012.

(4) For the purposes of this section, "start of physical construction or alterations" does not mean ceremonial groundbreaking or razing of structures prior to site preparation.

(5) Noncomplying new construction and alterations.

(i) Newly constructed or altered facilities or elements covered by §§ 36.401 or 36.402 that were constructed or altered before March 15, 2012 and that do not comply with the 1991 Standards shall, before March 15, 2012, be made accessible in accordance with either the 1991 Standards or the 2010 Standards.

(ii) Newly constructed or altered facilities or elements covered by §§ 36.401 or 36.402 that were constructed or altered before March 15, 2012 and that do not comply with the 1991 Standards shall, on or after March 15, 2012, be made accessible in accordance with the 2010 Standards.

Appendix to 36.406(a)

Compliance Dates for New Construction and Alterations	Applicable Standards
On or after January 26, 1993 and before September 15, 2010	**1991 Standards**
On or after September 15, 2010, and before March 15, 2012	**1991 Standards or 2010 Standards**
On or after March 15, 2012	**2010 Standards**

(b) Scope of coverage. The 1991 Standards and the 2010 Standards apply to fixed or built-in elements of buildings, structures, site improvements, and pedestrian routes or vehicular ways located on a site. Unless specifically stated otherwise, advisory notes, appendix notes, and figures contained in the 1991 Standards and 2010 Standards explain or illustrate the requirements of the rule; they do not establish enforceable requirements.

(c) Places of lodging. Places of lodging subject to this part shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806 of the 2010 Standards.

(1) Guest rooms. Guest rooms with mobility features in places of lodging subject to the transient lodging requirements of 2010 Standards shall be provided as follows –

(i) Facilities that are subject to the same permit application on a common site that each have 50 or fewer guest rooms may be combined for the purposes of determining the required number of accessible rooms and type of accessible bathing facility in accordance with table 224.2 to section 224.2 of the 2010 Standards.

(ii) Facilities with more than 50 guest rooms shall be treated separately for the purposes of determining the required number of accessible rooms and type of

accessible bathing facility in accordance with table 224.2 to section 224.2 of the 2010 Standards.

(2) Exception. Alterations to guest rooms in places of lodging where the guest rooms are not owned or substantially controlled by the entity that owns, leases, or operates the overall facility and the physical features of the guest room interiors are controlled by their individual owners are not required to comply with § 36.402 or the alterations requirements in section 224.1.1 of the 2010 Standards.

(3) Facilities with residential units and transient lodging units. Residential dwelling units that are designed and constructed for residential use exclusively are not subject to the transient lodging standards.

(d) Social service center establishments. Group homes, halfway houses, shelters, or similar social service center establishments that provide either temporary sleeping accommodations or residential dwelling units that are subject to this part shall comply with the provisions of the 2010 Standards applicable to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

(1) In sleeping rooms with more than 25 beds covered by this part, a minimum of 5% of the beds shall have clear floor space complying with section 806.2.3 of the 2010 Standards.

(2) Facilities with more than 50 beds covered by this part that provide common use bathing facilities shall provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat, and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower shall be provided for each group.

(e) Housing at a place of education. Housing at a place of education that is subject to this part shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806, subject to the following exceptions. For the purposes of the application of this section, the term "sleeping room" is intended to be used interchangeably with the term "guest room" as it is used in the transient lodging standards.

(1) Kitchens within housing units containing accessible sleeping rooms with mobility features (including suites and clustered sleeping rooms) or on floors containing accessible sleeping rooms with mobility features shall provide turning spaces that comply with section 809.2.2 of the 2010 Standards and kitchen work surfaces that comply with section 804.3 of the 2010 Standards.

(2) Multi-bedroom housing units containing accessible sleeping rooms with mobility features shall have an accessible route throughout the unit in accordance with section 809.2 of the 2010 Standards.

(3) Apartments or townhouse facilities that are provided by or on behalf of a place of education, which are leased on a year-round basis exclusively to graduate students or faculty and do not contain any public use or common use areas available for educational programming, are not subject to the transient lodging standards and shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

(f) Assembly areas. Assembly areas that are subject to this part shall comply with the provisions of the 2010 Standards applicable to assembly areas, including, but not limited to, sections221 and 802. In addition, assembly areas shall ensure that –

(1) In stadiums, arenas, and grandstands, wheelchair spaces and companion seats are dispersed to all levels that include seating served by an accessible route;

(2) In assembly areas that are required to horizontally disperse wheelchair spaces and companion seats by section 221.2.3.1 of the 2010 Standards and that have seating encircling, in whole or in part, a field of play or performance, wheelchair spaces and companion seats are dispersed around that field of play or performance area;

(3) Wheelchair spaces and companion seats are not located on (or obstructed by) temporary platforms or other movable structures, except that when an entire seating section is placed on temporary platforms or other movable structures in an area where fixed seating is not provided, in order to increase seating for an event, wheelchair spaces and companion seats may be placed in that section. When wheelchair spaces and companion seats are not required to accommodate persons eligible for those spaces and seats, individual, removable seats may be placed in those spaces and seats;

(4) In stadium-style movie theaters, wheelchair spaces and companion seats are located on a riser or cross-aisle in the stadium section that satisfies at least one of the following criteria –

(i) It is located within the rear 60% of the seats provided in an auditorium; or

(ii) It is located within the area of an auditorium in which the vertical viewing angles (as measured to the top of the screen) are from the 40th to the 100th percentile of vertical viewing angles for all seats as ranked from the seats in the first row (1st percentile) to seats in the back row (100th percentile).

(g) Medical care facilities. Medical care facilities that are subject to this part shall comply with the provisions of the 2010 Standards applicable to medical care facilities, including, but not

limited to, sections223 and 805. In addition, medical care facilities that do not specialize in the treatment of conditions that affect mobility shall disperse the accessible patient bedrooms required by section 223.2.1 of the 2010 Standards in a manner that is proportionate by type of medical specialty.

§§36.407 – 36.499 [Reserved]

2010 STANDARDS FOR TITLES II AND III FACILITIES: 2004 ADAAG

The following section applies to ***both*** State and local government facilities (Title II) and public accommodations and commercial facilities (Title III). The section consists of (ADA) Chapters 1 and 2 and Chapters 3 through 10, of the 2004 ADAAG (36 CFR part 1191, appendices B and D, adopted as part of both the Title II and Title III 2010 Standards).

State and local government facilities must follow the requirements of the 2010 Standards, including both the Title II regulations at 28 CFR 35.151; and the 2004 ADAAG at 36 CFR part 1191, appendices B and D.

Public accommodations and commercial facilities must follow the requirements of the 2010 Standards, including both the Title III regulations at 28 CFR part 36, subpart D; and the 2004 ADAAG at 36 CFR part 1191, appendices B and D.

In the few places where requirements between the regulation and the 2004 ADAAG differ, the requirements of 28 CFR 35.151 or 28 CFR part 36, subpart D, prevail.

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ADA CHAPTER 1: APPLICATION AND ADMINISTRATION

101 Purpose

101.1 General. This document contains scoping and technical requirements for *accessibility* to *sites*, *facilities*, *buildings*, and *elements* by individuals with disabilities. The requirements are to be applied during the design, construction, *additions* to, and *alteration* of *sites*, *facilities*, *buildings*, and *elements* to the extent required by regulations issued by Federal agencies under the Americans with Disabilities Act of 1990 (ADA).

> **Advisory 101.1 General.** In addition to these requirements, covered entities must comply with the regulations issued by the Department of Justice and the Department of Transportation under the Americans with Disabilities Act. There are issues affecting individuals with disabilities which are not addressed by these requirements, but which are covered by the Department of Justice and the Department of Transportation regulations.

101.2 Effect on Removal of Barriers in Existing Facilities. This document does not address existing *facilities* unless *altered* at the discretion of a covered entity. The Department of Justice has authority over existing *facilities* that are subject to the requirement for removal of barriers under title III of the ADA. Any determination that this document applies to existing *facilities* subject to the barrier removal requirement is solely within the discretion of the Department of Justice and is effective only to the extent required by regulations issued by the Department of Justice.

102 Dimensions for Adults and Children

The technical requirements are based on adult dimensions and anthropometrics. In addition, this document includes technical requirements based on children's dimensions and anthropometrics for drinking fountains, water closets, toilet compartments, lavatories and sinks, dining surfaces, and work surfaces.

103 Equivalent Facilitation

Nothing in these requirements prevents the use of designs, products, or technologies as alternatives to those prescribed, provided they result in substantially equivalent or greater *accessibility* and usability.

> **Advisory 103 Equivalent Facilitation.** The responsibility for demonstrating equivalent facilitation in the event of a challenge rests with the covered entity. With the exception of transit facilities, which are covered by regulations issued by the Department of Transportation, there is no process for certifying that an alternative design provides equivalent facilitation.

104 Conventions

104.1 Dimensions. Dimensions that are not stated as "maximum" or "minimum" are absolute.

104.1.1 Construction and Manufacturing Tolerances. All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points.

Advisory 104.1.1 Construction and Manufacturing Tolerances. Conventional industry tolerances recognized by this provision include those for field conditions and those that may be a necessary consequence of a particular manufacturing process. Recognized tolerances are not intended to apply to design work.

It is good practice when specifying dimensions to avoid specifying a tolerance where dimensions are absolute. For example, if this document requires "1½ inches," avoid specifying "1½ inches plus or minus X inches."

Where the requirement states a specified range, such as in Section 609.4 where grab bars must be installed between 33 inches and 36 inches above the floor, the range provides an adequate tolerance and therefore no tolerance outside of the range at either end point is permitted.

Where a requirement is a minimum or a maximum dimension that does not have two specific minimum and maximum end points, tolerances may apply. Where an element is to be installed at the minimum or maximum permitted dimension, such as "15 inches minimum" or "5 pounds maximum", it would not be good practice to specify "5 pounds (plus X pounds) or 15 inches (minus X inches)." Rather, it would be good practice to specify a dimension less than the required maximum (or more than the required minimum) by the amount of the expected field or manufacturing tolerance and not to state any tolerance in conjunction with the specified dimension.

Specifying dimensions in design in the manner described above will better ensure that facilities and elements accomplish the level of accessibility intended by these requirements. It will also more often produce an end result of strict and literal compliance with the stated requirements and eliminate enforcement difficulties and issues that might otherwise arise. Information on specific tolerances may be available from industry or trade organizations, code groups and building officials, and published references.

104.2 Calculation of Percentages. Where the required number of *elements* or *facilities* to be provided is determined by calculations of ratios or percentages and remainders or fractions result, the next greater whole number of such *elements* or *facilities* shall be provided. Where the determination of the required size or dimension of an *element* or *facility* involves ratios or percentages, rounding down for values less than one half shall be permitted.

104.3 Figures. Unless specifically stated otherwise, figures are provided for informational purposes only.

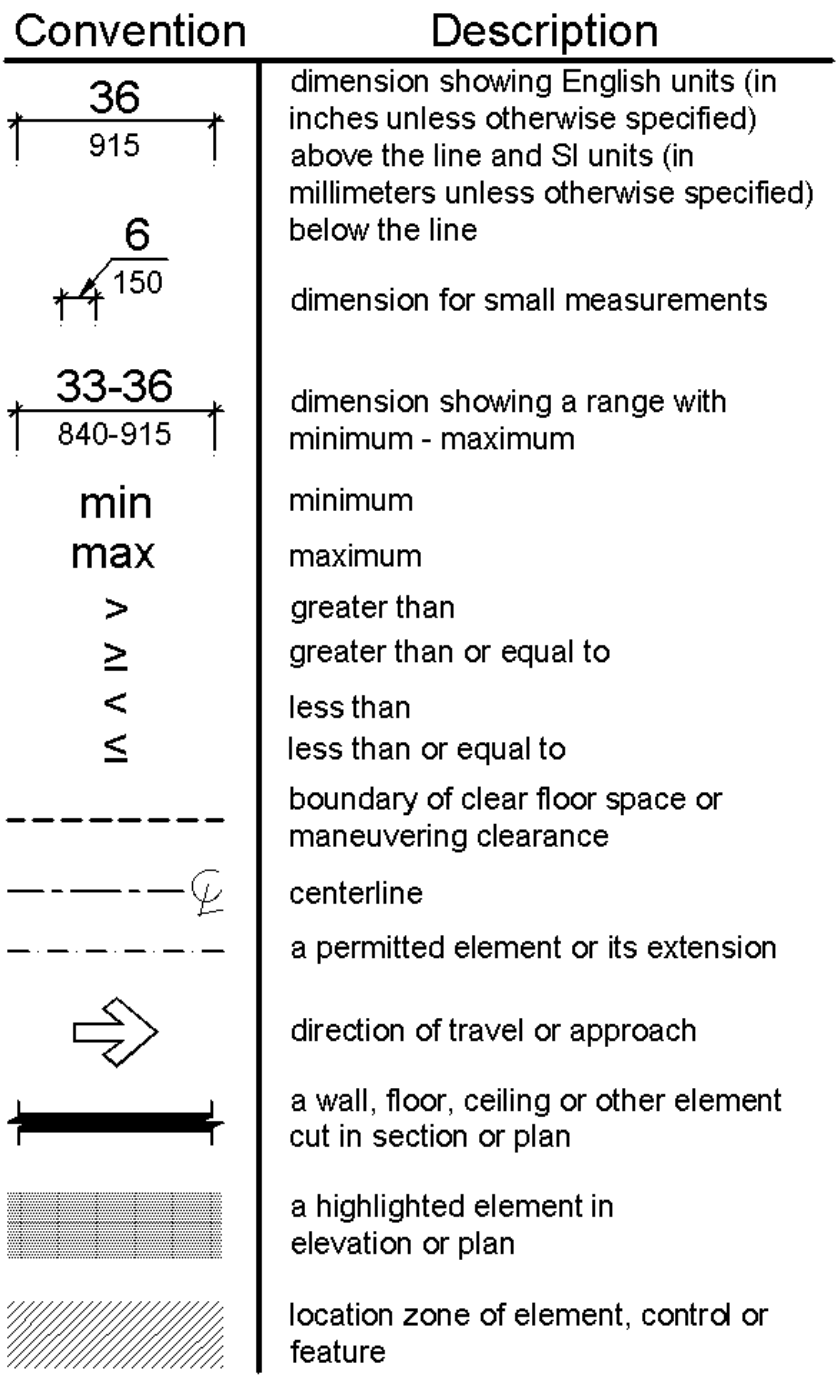


Figure 104
Graphic Convention for Figures

105 Referenced Standards

105.1 General. The standards listed in 105.2 are incorporated by reference in this document and are part of the requirements to the prescribed extent of each such reference. The Director of the Federal Register has approved these standards for incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the referenced standards may be inspected at the Architectural and Transportation Barriers Compliance Board, 1331 F Street, NW, Suite 1000, Washington, DC 20004; at the Department of Justice, Civil Rights Division, Disability Rights Section, 1425 New York Avenue, NW, Washington, DC; at the Department of Transportation, 400 Seventh Street, SW, Room 10424, Washington DC; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

105.2 Referenced Standards. The specific edition of the standards listed below are referenced in this document. Where differences occur between this document and the referenced standards, this document applies.

105.2.1 ANSI/BHMA. Copies of the referenced standards may be obtained from the Builders Hardware Manufacturers Association, 355 Lexington Avenue, 17th floor, New York, NY 10017 (http://www.buildershardware.com).

ANSI/BHMA A156.10-1999 American National Standard for Power Operated Pedestrian Doors (see 404.3).

ANSI/BHMA A156.19-1997 American National Standard for Power Assist and Low Energy Power Operated Doors (see 404.3, 408.3.2.1, and 409.3.1).

ANSI/BHMA A156.19-2002 American National Standard for Power Assist and Low Energy Power Operated Doors (see 404.3, 408.3.2.1, and 409.3.1).

Advisory 105.2.1 ANSI/BHMA. ANSI/BHMA A156.10-1999 applies to power operated doors for pedestrian use which open automatically when approached by pedestrians. Included are provisions intended to reduce the chance of user injury or entrapment.

ANSI/BHMA A156.19-1997 and A156.19-2002 applies to power assist doors, low energy power operated doors or low energy power open doors for pedestrian use not provided for in ANSI/BHMA A156.10 for Power Operated Pedestrian Doors. Included are provisions intended to reduce the chance of user injury or entrapment.

105.2.2 ASME. Copies of the referenced standards may be obtained from the American Society of Mechanical Engineers, Three Park Avenue, New York, New York 10016 (http://www.asme.org).

ASME A17.1- 2000 Safety Code for Elevators and Escalators, including ASME A17.1a-2002 Addenda and ASME A17.1b-2003 Addenda (see 407.1, 408.1, 409.1, and 810.9).

ASME A18.1-1999 Safety Standard for Platform Lifts and Stairway Chairlifts, including ASME A18.1a-2001 Addenda and ASME A18.1b-2001 Addenda (see 410.1).

ASME A18.1-2003 Safety Standard for Platform Lifts and Stairway Chairlifts, (see 410.1).

Advisory 105.2.2 ASME. ASME A17.1-2000 is used by local jurisdictions throughout the United States for the design, construction, installation, operation, inspection, testing, maintenance, alteration, and repair of elevators and escalators. The majority of the requirements apply to the operational machinery not seen or used by elevator passengers. ASME A17.1 requires a two-way means of emergency communications in passenger elevators. This means of communication must connect with emergency or authorized personnel and not an automated answering system. The communication system must be push button activated. The activation button must be permanently identified with the word "HELP." A visual indication acknowledging the establishment of a communications link to authorized personnel must be provided. The visual indication must remain on until the call is terminated by authorized personnel. The building location, the elevator car number, and the need for assistance must be provided to authorized personnel answering the emergency call. The use of a handset by the communications system is prohibited. Only the authorized personnel answering the call can terminate the call. Operating instructions for the communications system must be provided in the elevator car.

The provisions for escalators require that at least two flat steps be provided at the entrance and exit of every escalator and that steps on escalators be demarcated by yellow lines 2 inches wide maximum along the back and sides of steps.

ASME A18.1-1999 and ASME A18.1-2003 address the design, construction, installation, operation, inspection, testing, maintenance and repair of lifts that are intended for transportation of persons with disabilities. Lifts are classified as: vertical platform lifts, inclined platform lifts, inclined stairway chairlifts, private residence vertical platform lifts, private residence inclined platform lifts, and private residence inclined stairway chairlifts.

This document does not permit the use of inclined stairway chairlifts which do not provide platforms because such lifts require the user to transfer to a seat.

ASME A18.1 contains requirements for runways, which are the spaces in which platforms or seats move. The standard includes additional provisions for runway enclosures, electrical equipment and wiring, structural support, headroom clearance (which is 80 inches minimum), lower level access ramps and pits. The enclosure walls not used for entry or exit are required to have a grab bar the full length of the wall on platform lifts. Access ramps are required to meet requirements similar to those for ramps in Chapter 4 of this document.

Each of the lift types addressed in ASME A18.1 must meet requirements for capacity, load, speed, travel, operating devices, and control equipment. The maximum permitted height for operable parts is consistent with Section 308 of this document. The standard also addresses attendant operation. However, Section 410.1 of this document does not permit attendant operation.

105.2.3 ASTM. Copies of the referenced standards may be obtained from the American Society for Testing and Materials, 100 Bar Harbor Drive, West Conshohocken, Pennsylvania 19428 (http://www.astm.org).

ASTM F 1292-99 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment (see 1008.2.6.2).

ASTM F 1292-04 Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment (see 1008.2.6.2).

ASTM F 1487-01 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use (see 106.5).

ASTM F 1951-99 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment (see 1008.2.6.1).

Advisory 105.2.3 ASTM. ASTM F 1292-99 and ASTM F 1292-04 establish a uniform means to measure and compare characteristics of surfacing materials to determine whether materials provide a safe surface under and around playground equipment. These standards are referenced in the play areas requirements of this document when an accessible surface is required inside a play area use zone where a fall attenuating surface is also required. The standards cover the minimum impact attenuation requirements, when tested in accordance with Test Method F 355, for surface systems to be used under and around any piece of playground equipment from which a person may fall.

ASTM F 1487-01 establishes a nationally recognized safety standard for public playground equipment to address injuries identified by the U.S. Consumer Product Safety Commission. It defines the use zone, which is the ground area beneath and immediately adjacent to a play structure or play equipment designed for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting a play structure or equipment. The play areas requirements in this document reference the ASTM F 1487 standard when defining accessible routes that overlap use zones requiring fall attenuating surfaces. If the use zone of a playground is not entirely surfaced with an accessible material, at least one accessible route within the use zone must be provided from the perimeter to all accessible play structures or components within the playground.

ASTM F 1951-99 establishes a uniform means to measure the characteristics of surface systems in order to provide performance specifications to select materials for use as an accessible surface under and around playground equipment. Surface materials that comply with this standard and are located in the use zone must also comply with ASTM F 1292. The test methods in this standard address access for children and adults who may traverse the surfacing to aid children who are playing. When a surface is tested it must have an average work per foot value for straight propulsion and for turning less than the average work per foot values for straight propulsion and for turning, respectively, on a hard, smooth surface with a grade of 7% (1:14).

105.2.4 ICC/IBC. Copies of the referenced standard may be obtained from the International Code Council, 5203 Leesburg Pike, Suite 600, Falls Church, Virginia 22041 (www.iccsafe.org).

International Building Code, 2000 Edition (see 207.1, 207.2, 216.4.2, 216.4.3, and 1005.2.1).

International Building Code, 2001 Supplement (see 207.1 and 207.2).

International Building Code, 2003 Edition (see 207.1, 207.2, 216.4.2, 216.4.3, and 1005.2.1).

Advisory 105.2.4 ICC/IBC. International Building Code (IBC)-2000 (including 2001 Supplement to the International Codes) and IBC-2003 are referenced for means of egress, areas of refuge, and railings provided on fishing piers and platforms. At least one accessible means of egress is required for every accessible space and at least two accessible means of egress are required where more than one means of egress is required. The technical criteria for accessible means of egress allow the use of exit stairways and evacuation elevators when provided in conjunction with horizontal exits or areas of refuge. While typical elevators are not designed to be used during an emergency evacuation, evacuation elevators are designed with standby power and other features according to the elevator safety standard and can be used for the evacuation of individuals with disabilities. The IBC also provides requirements for areas of refuge, which are fire-rated spaces on levels above or below the exit discharge levels where people unable to use stairs can go to register a call for assistance and wait for evacuation.

The recreation facilities requirements of this document references two sections in the IBC for fishing piers and platforms. An exception addresses the height of the railings, guards, or handrails where a fishing pier or platform is required to include a guard, railing, or handrail higher than 34 inches (865 mm) above the ground or deck surface.

105.2.5 NFPA. Copies of the referenced standards may be obtained from the National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02169-7471, (http://www.nfpa.org).

NFPA 72 National Fire Alarm Code, 1999 Edition (see 702.1 and 809.5.2).

NFPA 72 National Fire Alarm Code, 2002 Edition (see 702.1 and 809.5.2).

Advisory 105.2.5 NFPA. NFPA 72-1999 and NFPA 72-2002 address the application, installation, performance, and maintenance of protective signaling systems and their components. The NFPA 72 incorporates Underwriters Laboratory (UL) 1971 by reference. The standard specifies the characteristics of audible alarms, such as placement and sound levels. However, Section 702 of these requirements limits the volume of an audible alarm to 110 dBA, rather than the maximum 120 dBA permitted by NFPA 72-1999.

NFPA 72 specifies characteristics for visible alarms, such as flash frequency, color, intensity, placement, and synchronization. However, Section 702 of this document requires that visual alarm appliances be permanently installed. UL 1971 specifies intensity dispersion requirements for visible alarms. In particular, NFPA 72 requires visible alarms to have a light source that is clear or white and has polar dispersion complying with UL 1971.

106 Definitions

106.1 General. For the purpose of this document, the terms defined in 106.5 have the indicated meaning.

> **Advisory 106.1 General.** Terms defined in Section 106.5 are italicized in the text of this document.

106.2 Terms Defined in Referenced Standards. Terms not defined in 106.5 or in regulations issued by the Department of Justice and the Department of Transportation to implement the Americans with Disabilities Act, but specifically defined in a referenced standard, shall have the specified meaning from the referenced standard unless otherwise stated.

106.3 Undefined Terms. The meaning of terms not specifically defined in 106.5 or in regulations issued by the Department of Justice and the Department of Transportation to implement the Americans with Disabilities Act or in referenced standards shall be as defined by collegiate dictionaries in the sense that the context implies.

106.4 Interchangeability. Words, terms and phrases used in the singular include the plural and those used in the plural include the singular.

106.5 Defined Terms.

Accessible. A *site*, *building*, *facility*, or portion thereof that complies with this part.

Accessible Means of Egress. A continuous and unobstructed way of egress travel from any point in a *building* or *facility* that provides an *accessible* route to an area of refuge, a horizontal exit, or a *public way*.

Addition. An expansion, extension, or increase in the gross floor area or height of a *building* or *facility*.

Administrative Authority. A governmental agency that adopts or enforces regulations and guidelines for the design, construction, or *alteration* of *buildings* and *facilities*.

Alteration. A change to a *building* or *facility* that affects or could affect the usability of the *building* or *facility* or portion thereof. *Alterations* include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, resurfacing of *circulation paths* or *vehicular ways*, changes or rearrangement of the structural parts or *elements*, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, or changes to mechanical and electrical systems are not *alterations* unless they affect the usability of the *building* or *facility*.

Amusement Attraction. Any *facility*, or portion of a *facility*, located within an amusement park or theme park which provides amusement without the use of an amusement device. *Amusement attractions* include, but are not limited to, fun houses, barrels, and other attractions without seats.

Amusement Ride. A system that moves persons through a fixed course within a defined area for the purpose of amusement.

Amusement Ride Seat. A seat that is built-in or mechanically fastened to an *amusement ride* intended to be occupied by one or more passengers.

Area of Sport Activity. That portion of a room or *space* where the play or practice of a sport occurs.

Assembly Area. A *building* or *facility*, or portion thereof, used for the purpose of entertainment, educational or civic gatherings, or similar purposes. For the purposes of these requirements, *assembly areas* include, but are not limited to, classrooms, lecture halls, courtrooms, public meeting rooms, public hearing rooms, legislative chambers, motion picture houses, auditoria, theaters, playhouses, dinner theaters, concert halls, centers for the performing arts, amphitheaters, arenas, stadiums, grandstands, or convention centers.

Assistive Listening System (ALS). An amplification system utilizing transmitters, receivers, and coupling devices to bypass the acoustical *space* between a sound source and a listener by means of induction loop, radio frequency, infrared, or direct-wired equipment.

Boarding Pier. A portion of a pier where a boat is temporarily secured for the purpose of embarking or disembarking.

Boat Launch Ramp. A sloped surface designed for launching and retrieving trailered boats and other water craft to and from a body of water.

Boat Slip. That portion of a pier, main pier, finger pier, or float where a boat is moored for the purpose of berthing, embarking, or disembarking.

Building. Any structure used or intended for supporting or sheltering any use or occupancy.

Catch Pool. A pool or designated section of a pool used as a terminus for water slide flumes.

Characters. Letters, numbers, punctuation marks and typographic symbols.

Children's Use. Describes *spaces* and *elements* specifically designed for use primarily by people 12 years old and younger.

Circulation Path. An exterior or interior way of passage provided for pedestrian travel, including but not limited to, *walks*, hallways, courtyards, elevators, platform lifts, *ramps*, stairways, and landings.

Closed-Circuit Telephone. A telephone with a dedicated line such as a house phone, courtesy phone or phone that must be used to gain entry to a *facility*.

Common Use. Interior or exterior *circulation paths*, rooms, *spaces*, or *elements* that are not for *public use* and are made available for the shared use of two or more people.

Cross Slope. The slope that is perpendicular to the direction of travel (see *running slope*).

Curb Ramp. A short *ramp* cutting through a curb or built up to it.

Detectable Warning. A standardized surface feature built in or applied to walking surfaces or other *elements* to warn of hazards on a *circulation path*.

Element. An architectural or mechanical component of a *building*, *facility*, *space*, or *site*.

Elevated Play Component. A *play component* that is approached above or below grade and that is part of a composite play structure consisting of two or more *play components* attached or functionally linked to create an integrated unit providing more than one play activity.

Employee Work Area. All or any portion of a *space* used only by employees and used only for work. Corridors, toilet rooms, kitchenettes and break rooms are not *employee work areas*.

Entrance. Any access point to a *building* or portion of a *building* or *facility* used for the purpose of entering. An *entrance* includes the approach *walk*, the vertical access leading to the *entrance* platform, the *entrance* platform itself, vestibule if provided, the entry door or gate, and the hardware of the entry door or gate.

Facility. All or any portion of *buildings*, structures, *site* improvements, *elements*, and pedestrian routes or *vehicular ways* located on a *site*.

Gangway. A variable-sloped pedestrian walkway that links a fixed structure or land with a floating structure. *Gangways* that connect to vessels are not addressed by this document.

Golf Car Passage. A continuous passage on which a motorized golf car can operate.

Ground Level Play Component. A *play component* that is approached and exited at the ground level.

Key Station. Rapid and light rail stations, and commuter rail stations, as defined under criteria established by the Department of Transportation in 49 CFR 37.47 and 49 CFR 37.51, respectively.

Mail Boxes. Receptacles for the receipt of documents, packages, or other deliverable matter. *Mail boxes* include, but are not limited to, post office boxes and receptacles provided by commercial mail-receiving agencies, apartment *facilities*, or schools.

Marked Crossing. A crosswalk or other identified path intended for pedestrian use in crossing a *vehicular way*.

Mezzanine. An intermediate level or levels between the floor and ceiling of any *story* with an aggregate floor area of not more than one-third of the area of the room or *space* in which the level or levels are located. *Mezzanines* have sufficient elevation that *space* for human occupancy can be provided on the floor below.

Occupant Load. The number of persons for which the means of egress of a *building* or portion of a *building* is designed.

Operable Part. A component of an *element* used to insert or withdraw objects, or to activate, deactivate, or adjust the *element*.

Pictogram. A pictorial symbol that represents activities, *facilities*, or concepts.

Play Area. A portion of a *site* containing *play components* designed and constructed for children.

Play Component. An *element* intended to generate specific opportunities for play, socialization, or learning. *Play components* are manufactured or natural; and are stand-alone or part of a composite play structure.

Private Building or Facility. A place of public accommodation or a commercial *building* or *facility* subject to title III of the ADA and 28 CFR part 36 or a transportation *building* or *facility* subject to title III of the ADA and 49 CFR 37.45.

Public Building or Facility. A *building* or *facility* or portion of a *building* or *facility* designed, constructed, or *altered* by, on behalf of, or for the use of a public entity subject to title II of the ADA and 28 CFR part 35 or to title II of the ADA and 49 CFR 37.41 or 37.43.

Public Entrance. An *entrance* that is not a *service entrance* or a *restricted entrance*.

Public Use. Interior or exterior rooms, *spaces*, or *elements* that are made available to the public. *Public use* may be provided at a *building* or *facility* that is privately or publicly owned.

Public Way. Any street, alley or other parcel of land open to the outside air leading to a public street, which has been deeded, dedicated or otherwise permanently appropriated to the public for *public use* and which has a clear width and height of not less than 10 feet (3050 mm).

Qualified Historic Building or Facility. A *building* or *facility* that is listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate State or local law.

Ramp. A walking surface that has a *running slope* steeper than 1:20.

Residential Dwelling Unit. A unit intended to be used as a residence, that is primarily long-term in nature. *Residential dwelling units* do not include *transient lodging*, inpatient medical care, licensed long-term care, and detention or correctional *facilities*.

Restricted Entrance. An *entrance* that is made available for *common use* on a controlled basis but not *public use* and that is not a *service entrance*.

Running Slope. The slope that is parallel to the direction of travel (see *cross slope*).

Self-Service Storage. *Building* or *facility* designed and used for the purpose of renting or leasing individual storage *spaces* to customers for the purpose of storing and removing personal property on a self-service basis.

Service Entrance. An *entrance* intended primarily for delivery of goods or services.

Site. A parcel of land bounded by a property line or a designated portion of a public right-of-way.

Soft Contained Play Structure. A play structure made up of one or more *play components* where the user enters a fully enclosed play environment that utilizes pliable materials, such as plastic, netting, or fabric.

Space. A definable area, such as a room, toilet room, hall, *assembly area*, *entrance*, storage room, alcove, courtyard, or lobby.

Story. That portion of a *building* or *facility* designed for human occupancy included between the upper surface of a floor and upper surface of the floor or roof next above. A *story* containing one or more *mezzanines* has more than one floor level.

Structural Frame. The columns and the girders, beams, and trusses having direct connections to the columns and all other members that are essential to the stability of the *building* or *facility* as a whole.

Tactile. An object that can be perceived using the sense of touch.

Technically Infeasible. With respect to an *alteration* of a *building* or a *facility*, something that has little likelihood of being accomplished because existing structural conditions would require removing or *altering* a load-bearing member that is an essential part of the *structural frame*; or because other existing physical or *site* constraints prohibit modification or *addition* of *elements*, *spaces*, or features that are in full and strict compliance with the minimum requirements.

Teeing Ground. In golf, the starting place for the hole to be played.

Transfer Device. Equipment designed to facilitate the transfer of a person from a wheelchair or other mobility aid to and from an *amusement ride seat*.

Transient Lodging. A *building* or *facility* containing one or more guest room(s) for sleeping that provides accommodations that are primarily short-term in nature. *Transient lodging* does not include *residential dwelling units* intended to be used as a residence, inpatient medical care *facilities*, licensed long-term care *facilities*, detention or correctional *facilities*, or *private buildings or facilities* that contain not more than five rooms for rent or hire and that are actually occupied by the proprietor as the residence of such proprietor.

Transition Plate. A sloping pedestrian walking surface located at the end(s) of a *gangway*.

TTY. An abbreviation for teletypewriter. Machinery that employs interactive text-based communication through the transmission of coded signals across the telephone network. *TTYs* may include, for example, devices known as TDDs (telecommunication display devices or telecommunication devices for deaf persons) or computers with special modems. *TTYs* are also called text telephones.

Use Zone. The ground level area beneath and immediately adjacent to a play structure or play equipment that is designated by ASTM F 1487 (incorporated by reference, see “Referenced Standards” in Chapter 1) for unrestricted circulation around the play equipment and where it is predicted that a user would land when falling from or exiting the play equipment.

Vehicular Way. A route provided for vehicular traffic, such as in a street, driveway, or parking *facility*.

Walk. An exterior prepared surface for pedestrian use, including pedestrian areas such as plazas and courts.

Wheelchair Space. *Space* for a single wheelchair and its occupant.

Work Area Equipment. Any machine, instrument, engine, motor, pump, conveyor, or other apparatus used to perform work. As used in this document, this term shall apply only to equipment that is permanently installed or built-in in *employee work areas*. *Work area equipment* does not include passenger elevators and other accessible means of vertical transportation.

ADA CHAPTER 2: SCOPING REQUIREMENTS

201 Application

201.1 Scope. All areas of newly designed and newly constructed *buildings* and *facilities* and *altered* portions of existing *buildings* and *facilities* shall comply with these requirements.

> **Advisory 201.1 Scope.** These requirements are to be applied to all areas of a facility unless exempted, or where scoping limits the number of multiple elements required to be accessible. For example, not all medical care patient rooms are required to be accessible; those that are not required to be accessible are not required to comply with these requirements. However, common use and public use spaces such as recovery rooms, examination rooms, and cafeterias are not exempt from these requirements and must be accessible.

201.2 Application Based on Building or Facility Use. Where a *site*, *building*, *facility*, room, or *space* contains more than one use, each portion shall comply with the applicable requirements for that use.

201.3 Temporary and Permanent Structures. These requirements shall apply to temporary and permanent *buildings* and *facilities*.

> **Advisory 201.3 Temporary and Permanent Structures.** Temporary buildings or facilities covered by these requirements include, but are not limited to, reviewing stands, temporary classrooms, bleacher areas, stages, platforms and daises, fixed furniture systems, wall systems, and exhibit areas, temporary banking facilities, and temporary health screening facilities. Structures and equipment directly associated with the actual processes of construction are not required to be accessible as permitted in 203.2.

202 Existing Buildings and Facilities

202.1 General. *Additions* and *alterations* to existing *buildings* or *facilities* shall comply with 202.

202.2 Additions. Each *addition* to an existing *building* or *facility* shall comply with the requirements for new construction. Each *addition* that affects or could affect the usability of or access to an area containing a primary function shall comply with 202.4.

202.3 Alterations. Where existing *elements* or *spaces* are *altered*, each *altered element* or *space* shall comply with the applicable requirements of Chapter 2.

EXCEPTIONS: 1. Unless required by 202.4, where *elements* or *spaces* are *altered* and the *circulation path* to the *altered element* or *space* is not *altered*, an *accessible* route shall not be required.

2. In *alterations*, where compliance with applicable requirements is *technically infeasible*, the *alteration* shall comply with the requirements to the maximum extent feasible.

3. *Residential dwelling units* not required to be *accessible* in compliance with a standard issued pursuant to the Americans with Disabilities Act or Section 504 of the Rehabilitation Act of 1973, as amended, shall not be required to comply with 202.3.

Advisory 202.3 Alterations. Although covered entities are permitted to limit the scope of an alteration to individual elements, the alteration of multiple elements within a room or space may provide a cost-effective opportunity to make the entire room or space accessible. Any elements or spaces of the building or facility that are required to comply with these requirements must be made accessible within the scope of the alteration, to the maximum extent feasible. If providing accessibility in compliance with these requirements for people with one type of disability (e.g., people who use wheelchairs) is not feasible, accessibility must still be provided in compliance with the requirements for people with other types of disabilities (e.g., people who have hearing impairments or who have vision impairments) to the extent that such accessibility is feasible.

202.3.1 Prohibited Reduction in Access. An *alteration* that decreases or has the effect of decreasing the *accessibility* of a *building* or *facility* below the requirements for new construction at the time of the *alteration* is prohibited.

202.3.2 Extent of Application. An *alteration* of an existing *element*, *space*, or area of a *building* or *facility* shall not impose a requirement for *accessibility* greater than required for new construction.

202.4 Alterations Affecting Primary Function Areas. In addition to the requirements of 202.3, an *alteration* that affects or could affect the usability of or access to an area containing a primary function shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the *altered* area, including the rest rooms, telephones, and drinking fountains serving the *altered* area, are readily *accessible* to and usable by individuals with disabilities, unless such *alteration*s are disproportionate to the overall *alterations* in terms of cost and scope as determined under criteria established by the Attorney General. In existing transportation *facilities*, an area of primary function shall be as defined under regulations published by the Secretary of the Department of Transportation or the Attorney General.

EXCEPTION: *Residential dwelling units* shall not be required to comply with 202.4.

Advisory 202.4 Alterations Affecting Primary Function Areas. An area of a building or facility containing a major activity for which the building or facility is intended is a primary function area. Department of Justice ADA regulations state, “Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20% of the cost of the alteration to the primary function area.” (28 CFR 36.403 (f)(1)). See also Department of Transportation ADA regulations, which use similar concepts in the context of public sector transportation facilities (49 CFR 37.43 (e)(1)).

There can be multiple areas containing a primary function in a single building. Primary function areas are not limited to public use areas. For example, both a bank lobby and the bank’s employee areas such as the teller areas and walk-in safe are primary function areas.

Advisory 202.4 Alterations Affecting Primary Function Areas (Continued). Also, mixed use facilities may include numerous primary function areas for each use. Areas containing a primary function do not include: mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors, or restrooms.

202.5 Alterations to Qualified Historic Buildings and Facilities. *Alterations* to a *qualified historic building or facility* shall comply with 202.3 and 202.4.

EXCEPTION: Where the State Historic Preservation Officer or Advisory Council on Historic Preservation determines that compliance with the requirements for *accessible* routes, *entrances*, or toilet *facilities* would threaten or destroy the historic significance of the *building* or *facility*, the exceptions for *alterations* to *qualified historic buildings or facilities* for that *element* shall be permitted to apply.

Advisory 202.5 Alterations to Qualified Historic Buildings and Facilities Exception. State Historic Preservation Officers are State appointed officials who carry out certain responsibilities under the National Historic Preservation Act. State Historic Preservation Officers consult with Federal and State agencies, local governments, and private entities on providing access and protecting significant elements of qualified historic buildings and facilities. There are exceptions for alterations to qualified historic buildings and facilities for accessible routes (206.2.1 Exception 1 and 206.2.3 Exception 7); entrances (206.4 Exception 2); and toilet facilities (213.2 Exception 2). When an entity believes that compliance with the requirements for any of these elements would threaten or destroy the historic significance of the building or facility, the entity should consult with the State Historic Preservation Officer. If the State Historic Preservation Officer agrees that compliance with the requirements for a specific element would threaten or destroy the historic significance of the building or facility, use of the exception is permitted. Public entities have an additional obligation to achieve program accessibility under the Department of Justice ADA regulations. See 28 CFR 35.150. These regulations require public entities that operate historic preservation programs to give priority to methods that provide physical access to individuals with disabilities. If alterations to a qualified historic building or facility to achieve program accessibility would threaten or destroy the historic significance of the building or facility, fundamentally alter the program, or result in undue financial or administrative burdens, the Department of Justice ADA regulations allow alternative methods to be used to achieve program accessibility. In the case of historic preservation programs, such as an historic house museum, alternative methods include using audio-visual materials to depict portions of the house that cannot otherwise be made accessible. In the case of other qualified historic properties, such as an historic government office building, alternative methods include relocating programs and services to accessible locations. The Department of Justice ADA regulations also allow public entities to use alternative methods when altering qualified historic buildings or facilities in the rare situations where the State Historic Preservation Officer determines that it is not feasible to provide physical access using the exceptions permitted in Section 202.5 without threatening or destroying the historic significance of the building or facility. See 28 CFR 35.151(d).

Advisory 202.5 Alterations to Qualified Historic Buildings and Facilities Exception (Continued). The AccessAbility Office at the National Endowment for the Arts (NEA) provides a variety of resources for museum operators and historic properties including: the Design for Accessibility Guide and the Disability Symbols. Contact NEA about these and other resources at (202) 682-5532 or www.arts.gov.

203 General Exceptions

203.1 General. *Sites, buildings, facilities,* and *elements* are exempt from these requirements to the extent specified by 203.

203.2 Construction Sites. Structures and *sites* directly associated with the actual processes of construction, including but not limited to, scaffolding, bridging, materials hoists, materials storage, and construction trailers shall not be required to comply with these requirements or to be on an *accessible* route. Portable toilet units provided for use exclusively by construction personnel on a construction *site* shall not be required to comply with 213 or to be on an *accessible* route.

203.3 Raised Areas. Areas raised primarily for purposes of security, life safety, or fire safety, including but not limited to, observation or lookout galleries, prison guard towers, fire towers, or life guard stands shall not be required to comply with these requirements or to be on an *accessible* route.

203.4 Limited Access Spaces. *Spaces* accessed only by ladders, catwalks, crawl *spaces*, or very narrow passageways shall not be required to comply with these requirements or to be on an *accessible* route.

203.5 Machinery Spaces. *Spaces* frequented only by service personnel for maintenance, repair, or occasional monitoring of equipment shall not be required to comply with these requirements or to be on an *accessible* route. Machinery *spaces* include, but are not limited to, elevator pits or elevator penthouses; mechanical, electrical or communications equipment rooms; piping or equipment catwalks; water or sewage treatment pump rooms and stations; electric substations and transformer vaults; and highway and tunnel utility *facilities*.

203.6 Single Occupant Structures. Single occupant structures accessed only by passageways below grade or elevated above standard curb height, including but not limited to, toll booths that are accessed only by underground tunnels, shall not be required to comply with these requirements or to be on an *accessible* route.

203.7 Detention and Correctional Facilities. In detention and correctional *facilities*, *common use* areas that are used only by inmates or detainees and security personnel and that do not serve holding cells or housing cells required to comply with 232, shall not be required to comply with these requirements or to be on an *accessible* route.

203.8 Residential Facilities. In residential *facilities*, *common use* areas that do not serve *residential dwelling units* required to provide mobility features complying with 809.2 through 809.4 shall not be required to comply with these requirements or to be on an *accessible* route.

203.9 Employee Work Areas. *Spaces* and *elements* within *employee work areas* shall only be required to comply with 206.2.8, 207.1, and 215.3 and shall be designed and constructed so that individuals with disabilities can approach, enter, and exit the *employee work area*. *Employee work areas*, or portions of *employee work areas*, other than raised courtroom stations, that are less than 300 square feet (28 m^2) and elevated 7 inches (180 mm) or more above the finish floor or ground where the elevation is essential to the function of the *space* shall not be required to comply with these requirements or to be on an *accessible* route.

> **Advisory 203.9 Employee Work Areas.** Although areas used exclusively by employees for work are not required to be fully accessible, consider designing such areas to include non-required turning spaces, and provide accessible elements whenever possible. Under the ADA, employees with disabilities are entitled to reasonable accommodations in the workplace; accommodations can include alterations to spaces within the facility. Designing employee work areas to be more accessible at the outset will avoid more costly retrofits when current employees become temporarily or permanently disabled, or when new employees with disabilities are hired. Contact the Equal Employment Opportunity Commission (EEOC) at www.eeoc.gov for information about title I of the ADA prohibiting discrimination against people with disabilities in the workplace.

203.10 Raised Refereeing, Judging, and Scoring Areas. Raised structures used solely for refereeing, judging, or scoring a sport shall not be required to comply with these requirements or to be on an *accessible* route.

203.11 Water Slides. Water slides shall not be required to comply with these requirements or to be on an *accessible* route.

203.12 Animal Containment Areas. Animal containment areas that are not for *public use* shall not be required to comply with these requirements or to be on an *accessible* route.

> **Advisory 203.12 Animal Containment Areas.** Public circulation routes where animals may travel, such as in petting zoos and passageways alongside animal pens in State fairs, are not eligible for the exception.

203.13 Raised Boxing or Wrestling Rings. Raised boxing or wrestling rings shall not be required to comply with these requirements or to be on an *accessible* route.

203.14 Raised Diving Boards and Diving Platforms. Raised diving boards and diving platforms shall not be required to comply with these requirements or to be on an *accessible* route.

204 Protruding Objects

204.1 General. Protruding objects on *circulation paths* shall comply with 307.

EXCEPTIONS: 1. Within *areas of sport activity*, protruding objects on *circulation paths* shall not be required to comply with 307.

2. Within *play areas*, protruding objects on *circulation paths* shall not be required to comply with 307 provided that ground level *accessible* routes provide vertical clearance in compliance with 1008.2.

205 Operable Parts

205.1 General. *Operable parts* on *accessible elements, accessible* routes, and in *accessible* rooms and *spaces* shall comply with 309.

EXCEPTIONS: 1. *Operable parts* that are intended for use only by service or maintenance personnel shall not be required to comply with 309.

2. Electrical or communication receptacles serving a dedicated use shall not be required to comply with 309.

3. Where two or more outlets are provided in a kitchen above a length of counter top that is uninterrupted by a sink or appliance, one outlet shall not be required to comply with 309.

4. Floor electrical receptacles shall not be required to comply with 309.

5. HVAC diffusers shall not be required to comply with 309.

6. Except for light switches, where redundant controls are provided for a single *element*, one control in each *space* shall not be required to comply with 309.

7. Cleats and other boat securement devices shall not be required to comply with 309.3.

8. Exercise machines and exercise equipment shall not be required to comply with 309.

Advisory 205.1 General. Controls covered by 205.1 include, but are not limited to, light switches, circuit breakers, duplexes and other convenience receptacles, environmental and appliance controls, plumbing fixture controls, and security and intercom systems.

206 Accessible Routes

206.1 General. *Accessible* routes shall be provided in accordance with 206 and shall comply with Chapter 4.

206.2 Where Required. *Accessible* routes shall be provided where required by 206.2.

206.2.1 Site Arrival Points. At least one *accessible* route shall be provided within the *site* from *accessible* parking *spaces* and *accessible* passenger loading zones; public streets and sidewalks; and public transportation stops to the *accessible building* or *facility entrance* they serve.

EXCEPTIONS: 1. Where exceptions for *alterations* to *qualified historic buildings or facilities* are permitted by 202.5, no more than one *accessible* route from a *site* arrival point to an *accessible entrance* shall be required.

2. An *accessible* route shall not be required between *site* arrival points and the *building* or *facility entrance* if the only means of access between them is a *vehicular way* not providing pedestrian access.

Advisory 206.2.1 Site Arrival Points. Each site arrival point must be connected by an accessible route to the accessible building entrance or entrances served. Where two or more similar site arrival points, such as bus stops, serve the same accessible entrance or entrances, both bus stops must be on accessible routes. In addition, the accessible routes must serve all of the accessible entrances on the site.

Advisory 206.2.1 Site Arrival Points Exception 2. Access from site arrival points may include vehicular ways. Where a vehicular way, or a portion of a vehicular way, is provided for pedestrian travel, such as within a shopping center or shopping mall parking lot, this exception does not apply.

206.2.2 Within a Site. At least one *accessible* route shall connect *accessible buildings*, *accessible facilities*, *accessible elements*, and *accessible spaces* that are on the same *site*.

EXCEPTION: An *accessible* route shall not be required between *accessible buildings*, *accessible facilities, accessible elements,* and *accessible spaces* if the only means of access between them is a *vehicular way* not providing pedestrian access.

Advisory 206.2.2 Within a Site. An accessible route is required to connect to the boundary of each area of sport activity. Examples of areas of sport activity include: soccer fields, basketball courts, baseball fields, running tracks, skating rinks, and the area surrounding a piece of gymnastic equipment. While the size of an area of sport activity may vary from sport to sport, each includes only the space needed to play. Where multiple sports fields or courts are provided, an accessible route is required to each field or area of sport activity.

206.2.3 Multi-Story Buildings and Facilities. At least one *accessible* route shall connect each *story* and *mezzanine* in multi-*story buildings* and *facilities*.

EXCEPTIONS: 1. In *private buildings or facilities* that are less than three *stories* or that have less than 3000 square feet (279 m^2) per *story*, an *accessible* route shall not be required to connect *stories* provided that the *building* or *facility* is not a shopping center, a shopping mall, the professional office of a health care provider, a terminal, depot or other station used for specified public transportation, an airport passenger terminal, or another type of *facility* as determined by the Attorney General.

2. Where a two *story public building or facility* has one *story* with an *occupant load* of five or fewer persons that does not contain *public use space*, that *story* shall not be required to be connected to the *story* above or below.

3. In detention and correctional *facilities*, an *accessible* route shall not be required to connect *stories* where cells with mobility features required to comply with 807.2, all *common use* areas serving cells with mobility features required to comply with 807.2, and all *public use* areas are on an *accessible* route.

4. In residential *facilities,* an *accessible* route shall not be required to connect *stories* where *residential dwelling units* with mobility features required to comply with 809.2 through 809.4, all *common use* areas serving *residential dwelling units* with mobility features required to comply with 809.2 through 809.4, and *public use* areas serving *residential dwelling units* are on an *accessible* route.

5. Within multi-*story transient lodging* guest rooms with mobility features required to comply with 806.2, an *accessible* route shall not be required to connect *stories* provided that *spaces* complying with 806.2 are on an *accessible* route and sleeping accommodations for two persons minimum are provided on a *story* served by an accessible route.

6. In air traffic control towers, an *accessible* route shall not be required to serve the cab and the floor immediately below the cab.

7. Where exceptions for *alterations* to *qualified historic buildings or facilities* are permitted by 202.5, an *accessible* route shall not be required to *stories* located above or below the *accessible story*.

Advisory 206.2.3 Multi-Story Buildings and Facilities. Spaces and elements located on a level not required to be served by an accessible route must fully comply with this document. While a mezzanine may be a change in level, it is not a story. If an accessible route is required to connect stories within a building or facility, the accessible route must serve all mezzanines.

Advisory 206.2.3 Multi-Story Buildings and Facilities Exception 4. Where common use areas are provided for the use of residents, it is presumed that all such common use areas "serve" accessible dwelling units unless use is restricted to residents occupying certain dwelling units. For example, if all residents are permitted to use all laundry rooms, then all laundry rooms "serve" accessible dwelling units. However, if the laundry room on the first floor is restricted to use by residents on the first floor, and the second floor laundry room is for use by occupants of the second floor, then first floor accessible units are "served" only by laundry rooms on the first floor. In this example, an accessible route is not required to the second floor provided that all accessible units and all common use areas serving them are on the first floor.

206.2.3.1 Stairs and Escalators in Existing Buildings. In *alterations* and *additions*, where an escalator or stair is provided where none existed previously and major structural modifications are necessary for the installation, an *accessible* route shall be provided between the levels served by the escalator or stair unless exempted by 206.2.3 Exceptions 1 through 7.

206.2.4 Spaces and Elements. At least one *accessible* route shall connect *accessible building* or *facility entrances* with all *accessible spaces* and *elements* within the *building* or *facility* which are otherwise connected by a *circulation path* unless exempted by 206.2.3 Exceptions 1 through 7.

EXCEPTIONS: 1. Raised courtroom stations, including judges' benches, clerks' stations, bailiffs' stations, deputy clerks' stations, and court reporters' stations shall not be required to provide vertical access provided that the required clear floor *space*, maneuvering *space*, and, if appropriate, electrical service are installed at the time of initial construction to allow future installation of a means of vertical access complying with 405, 407, 408, or 410 without requiring substantial reconstruction of the *space*.

2. In *assembly areas* with fixed seating required to comply with 221, an *accessible* route shall not be required to serve fixed seating where *wheelchair spaces* required to be on an *accessible* route are not provided.

3. *Accessible* routes shall not be required to connect *mezzanines* where *buildings* or *facilities* have no more than one story. In addition, *accessible* routes shall not be required to connect stories or *mezzanines* where multi-story *buildings* or *facilities* are exempted by 206.2.3 Exceptions 1 through 7.

Advisory 206.2.4 Spaces and Elements. Accessible routes must connect all spaces and elements required to be accessible including, but not limited to, raised areas and speaker platforms.

Advisory 206.2.4 Spaces and Elements Exception 1. The exception does not apply to areas that are likely to be used by members of the public who are not employees of the court such as jury areas, attorney areas, or witness stands.

206.2.5 Restaurants and Cafeterias. In restaurants and cafeterias, an *accessible* route shall be provided to all dining areas, including raised or sunken dining areas, and outdoor dining areas.

EXCEPTIONS: 1. In *buildings or facilities* not required to provide an *accessible* route between *stories*, an *accessible* route shall not be required to a *mezzanine* dining area where the *mezzanine* contains less than 25 percent of the total combined area for seating and dining and where the same decor and services are provided in the *accessible* area.

2. In *alterations*, an *accessible* route shall not be required to existing raised or sunken dining areas, or to all parts of existing outdoor dining areas where the same services and decor are provided in an *accessible space* usable by the public and not restricted to use by people with disabilities.

3. In sports *facilities,* tiered dining areas providing seating required to comply with 221 shall be required to have *accessible* routes serving at least 25 percent of the dining area provided that *accessible* routes serve seating complying with 221 and each tier is provided with the same services.

Advisory 206.2.5 Restaurants and Cafeterias Exception 2. Examples of “same services” include, but are not limited to, bar service, rooms having smoking and non-smoking sections, lotto and other table games, carry-out, and buffet service. Examples of “same decor” include, but are not limited to, seating at or near windows and railings with views, areas designed with a certain theme, party and banquet rooms, and rooms where entertainment is provided.

206.2.6 Performance Areas. Where a *circulation path* directly connects a performance area to an assembly seating area, an *accessible* route shall directly connect the assembly seating area with the performance area. An *accessible* route shall be provided from performance areas to ancillary areas or *facilities* used by performers unless exempted by 206.2.3 Exceptions 1 through 7.

206.2.7 Press Boxes. Press boxes in *assembly areas* shall be on an *accessible* route.

EXCEPTIONS: 1. An *accessible* route shall not be required to press boxes in bleachers that have points of entry at only one level provided that the aggregate area of all press boxes is 500 square feet (46 m^2) maximum.

2. An *accessible* route shall not be required to free-standing press boxes that are elevated above grade 12 feet (3660 mm) minimum provided that the aggregate area of all press boxes is 500 square feet (46 m^2) maximum.

Advisory 206.2.7 Press Boxes Exception 2. Where a facility contains multiple assembly areas, the aggregate area of the press boxes in each assembly area is to be calculated separately. For example, if a university has a soccer stadium with three press boxes elevated 12 feet (3660 mm) or more above grade and each press box is 150 square feet (14 m^2), then the aggregate area of the soccer stadium press boxes is less than 500 square feet (46 m^2) and Exception 2 applies to the soccer stadium. If that same university also has a football stadium with two press boxes elevated 12 feet (3660 mm) or more above grade and one press box is 250 square feet (23 m^2), and the second is 275 square feet (26 m^2), then the aggregate area of the football stadium press boxes is more than 500 square feet (46 m^2) and Exception 2 does not apply to the football stadium.

206.2.8 Employee Work Areas. *Common use circulation paths* within *employee work areas* shall comply with 402.

EXCEPTIONS: 1. *Common use circulation paths* located within *employee work areas* that are less than 1000 square feet (93 m^2) and defined by permanently installed partitions, counters, casework, or furnishings shall not be required to comply with 402.

2. *Common use circulation paths* located within *employee work areas* that are an integral component of *work area equipment* shall not be required to comply with 402.

3. *Common use circulation paths* located within exterior *employee work areas* that are fully exposed to the weather shall not be required to comply with 402.

Advisory 206.2.8 Employee Work Areas Exception 1. Modular furniture that is not permanently installed is not directly subject to these requirements. The Department of Justice ADA regulations provide additional guidance regarding the relationship between these requirements and elements that are not part of the built environment. Additionally, the Equal Employment Opportunity Commission (EEOC) implements title I of the ADA which requires non-discrimination in the workplace. EEOC can provide guidance regarding employers' obligations to provide reasonable accommodations for employees with disabilities.

Advisory 206.2.8 Employee Work Areas Exception 2. Large pieces of equipment, such as electric turbines or water pumping apparatus, may have stairs and elevated walkways used for overseeing or monitoring purposes which are physically part of the turbine or pump. However, passenger elevators used for vertical transportation between stories are not considered "work area equipment" as defined in Section 106.5.

206.2.9 Amusement Rides. *Amusement rides* required to comply with 234 shall provide *accessible* routes in accordance with 206.2.9. *Accessible* routes serving *amusement rides* shall comply with Chapter 4 except as modified by 1002.2.

206.2.9.1 Load and Unload Areas. Load and unload areas shall be on an *accessible* route. Where load and unload areas have more than one loading or unloading position, at least one loading and unloading position shall be on an *accessible* route.

206.2.9.2 Wheelchair Spaces, Ride Seats Designed for Transfer, and Transfer Devices. When *amusement rides* are in the load and unload position, *wheelchair spaces* complying with 1002.4, *amusement ride seats* designed for transfer complying with 1002.5, and *transfer devices* complying with 1002.6 shall be on an *accessible* route.

206.2.10 Recreational Boating Facilities. *Boat slips* required to comply with 235.2 and *boarding piers* at *boat launch ramps* required to comply with 235.3 shall be on an *accessible* route. *Accessible* routes serving recreational boating *facilities* shall comply with Chapter 4, except as modified by 1003.2.

206.2.11 Bowling Lanes. Where bowling lanes are provided, at least 5 percent, but no fewer than one of each type of bowling lane, shall be on an *accessible* route.

206.2.12 Court Sports. In court sports, at least one *accessible* route shall directly connect both sides of the court.

206.2.13 Exercise Machines and Equipment. Exercise machines and equipment required to comply with 236 shall be on an *accessible* route.

206.2.14 Fishing Piers and Platforms. Fishing piers and platforms shall be on an *accessible* route. *Accessible* routes serving fishing piers and platforms shall comply with Chapter 4 except as modified by 1005.1.

206.2.15 Golf Facilities. At least one *accessible* route shall connect *accessible elements* and *spaces* within the boundary of the golf course. In addition, *accessible* routes serving golf car rental areas; bag drop areas; course weather shelters complying with 238.2.3; course toilet rooms; and practice putting greens, practice *teeing grounds*, and teeing stations at driving ranges complying with 238.3 shall comply with Chapter 4 except as modified by 1006.2.

EXCEPTION: *Golf car passages* complying with 1006.3 shall be permitted to be used for all or part of *accessible* routes required by 206.2.15.

206.2.16 Miniature Golf Facilities. Holes required to comply with 239.2, including the start of play, shall be on an *accessible* route. *Accessible* routes serving miniature golf *facilities* shall comply with Chapter 4 except as modified by 1007.2.

206.2.17 Play Areas. *Play areas* shall provide *accessible* routes in accordance with 206.2.17. *Accessible* routes serving *play areas* shall comply with Chapter 4 except as modified by 1008.2.

206.2.17.1 Ground Level and Elevated Play Components. At least one *accessible* route shall be provided within the *play area*. The *accessible* route shall connect *ground level play components* required to comply with 240.2.1 and *elevated play components* required to comply with 240.2.2, including entry and exit points of the *play components*.

206.2.17.2 Soft Contained Play Structures. Where three or fewer entry points are provided for *soft contained play structures*, at least one entry point shall be on an *accessible* route. Where

four or more entry points are provided for *soft contained play structures*, at least two entry points shall be on an *accessible* route.

206.3 Location. *Accessible* routes shall coincide with or be located in the same area as general *circulation paths*. Where *circulation paths* are interior, required *accessible* routes shall also be interior.

Advisory 206.3 Location. The accessible route must be in the same area as the general circulation path. This means that circulation paths, such as vehicular ways designed for pedestrian traffic, walks, and unpaved paths that are designed to be routinely used by pedestrians must be accessible or have an accessible route nearby. Additionally, accessible vertical interior circulation must be in the same area as stairs and escalators, not isolated in the back of the facility.

Note to Reader: The Department of Transportation's ADA standards include additional requirements for the location of accessible routes:

206.3 Location. Accessible routes shall coincide with, or be located in the same area as general circulation paths. Where circulation paths are interior, required accessible routes shall also be interior. *Elements such as ramps, elevators, or other circulation devices, fare vending or other ticketing areas, and fare collection areas shall be placed to minimize the distance which wheelchair users and other persons who cannot negotiate steps may have to travel compared to the general public.*

206.4 Entrances. *Entrances* shall be provided in accordance with 206.4. *Entrance* doors, doorways, and gates shall comply with 404 and shall be on an *accessible* route complying with 402.

EXCEPTIONS: 1. Where an *alteration* includes *alterations* to an *entrance*, and the *building* or *facility* has another *entrance* complying with 404 that is on an *accessible* route, the *altered entrance* shall not be required to comply with 206.4 unless required by 202.4.

2. Where exceptions for *alterations* to *qualified historic buildings or facilities* are permitted by 202.5, no more than one *public entrance* shall be required to comply with 206.4. Where no *public entrance* can comply with 206.4 under criteria established in 202.5 Exception, then either an unlocked *entrance* not used by the public shall comply with 206.4; or a locked *entrance* complying with 206.4 with a notification system or remote monitoring shall be provided.

206.4.1 Public Entrances. In addition to *entrances* required by 206.4.2 through 206.4.9, at least 60 percent of all *public entrances* shall comply with 404.

206.4.2 Parking Structure Entrances. Where direct access is provided for pedestrians from a parking structure to a *building* or *facility entrance*, each direct access to the *building* or *facility entrance* shall comply with 404.

206.4.3 Entrances from Tunnels or Elevated Walkways. Where direct access is provided for pedestrians from a pedestrian tunnel or elevated walkway to a *building* or *facility*, at least one direct *entrance* to the *building* or *facility* from each tunnel or walkway shall comply with 404.

206.4.4 Transportation Facilities. In addition to the requirements of 206.4.2, 206.4.3, and 206.4.5 through 206.4.9, transportation *facilities* shall provide *entrances* in accordance with 206.4.4.

206.4.4.1 Location. In transportation *facilities*, where different *entrances* serve different transportation fixed routes or groups of fixed routes, at least one *public entrance* serving each fixed route or group of fixed routes shall comply with 404.

EXCEPTION: *Entrances* to *key stations* and existing intercity rail stations retrofitted in accordance with 49 CFR 37.49 or 49 CFR 37.51 shall not be required to comply with 206.4.4.1.

206.4.4.2 Direct Connections. Direct connections to other *facilities* shall provide an *accessible* route complying with 404 from the point of connection to boarding platforms and all transportation system *elements* required to be *accessible*. Any *elements* provided to facilitate future direct connections shall be on an *accessible* route connecting boarding platforms and all transportation system *elements* required to be *accessible*.

EXCEPTION: In *key stations* and existing intercity rail stations, existing direct connections shall not be required to comply with 404.

206.4.4.3 Key Stations and Intercity Rail Stations. *Key stations* and existing intercity rail stations required by Subpart C of 49 CFR part 37 to be *altered*, shall have at least one *entrance* complying with 404.

206.4.5 Tenant Spaces. At least one *accessible entrance* to each tenancy in a *facility* shall comply with 404.

EXCEPTION: *Self-service storage facilities* not required to comply with 225.3 shall not be required to be on an accessible route.

206.4.6 Residential Dwelling Unit Primary Entrance. In *residential dwelling units*, at least one primary *entrance* shall comply with 404. The primary *entrance* to a *residential dwelling unit* shall not be to a bedroom.

206.4.7 Restricted Entrances. Where *restricted entrances* are provided to a *building* or *facility*, at least one *restricted entrance* to the *building* or *facility* shall comply with 404.

206.4.8 Service Entrances. If a *service entrance* is the only *entrance* to a *building* or to a tenancy in a *facility*, that *entrance* shall comply with 404.

206.4.9 Entrances for Inmates or Detainees. Where *entrances* used only by inmates or detainees and security personnel are provided at judicial *facilities,* detention *facilities,* or correctional *facilities*, at least one such *entrance* shall comply with 404.

206.5 Doors, Doorways, and Gates. Doors, doorways, and gates providing user passage shall be provided in accordance with 206.5.

206.5.1 Entrances. Each *entrance* to a *building* or *facility* required to comply with 206.4 shall have at least one door, doorway, or gate complying with 404.

206.5.2 Rooms and Spaces. Within a *building* or *facility*, at least one door, doorway, or gate serving each room or *space* complying with these requirements shall comply with 404.

206.5.3 Transient Lodging Facilities. In *transient lodging facilities*, *entrances,* doors, and doorways providing user passage into and within guest rooms that are not required to provide mobility features complying with 806.2 shall comply with 404.2.3.

EXCEPTION: Shower and sauna doors in guest rooms that are not required to provide mobility features complying with 806.2 shall not be required to comply with 404.2.3.

206.5.4 Residential Dwelling Units. In *residential dwelling units* required to provide mobility features complying with 809.2 through 809.4, all doors and doorways providing user passage shall comply with 404.

206.6 Elevators. Elevators provided for passengers shall comply with 407. Where multiple elevators are provided, each elevator shall comply with 407.

EXCEPTIONS: 1. In a *building* or *facility* permitted to use the exceptions to 206.2.3 or permitted by 206.7 to use a platform lift, elevators complying with 408 shall be permitted.

2. Elevators complying with 408 or 409 shall be permitted in multi-*story residential dwelling units*.

206.6.1 Existing Elevators. Where *elements* of existing elevators are *altered*, the same *element* shall also be *altered* in all elevators that are programmed to respond to the same hall call control as the *altered* elevator and shall comply with the requirements of 407 for the *altered element*.

206.7 Platform Lifts. Platform lifts shall comply with 410. Platform lifts shall be permitted as a component of an *accessible* route in new construction in accordance with 206.7. Platform lifts shall be permitted as a component of an *accessible* route in an existing *building* or *facility*.

206.7.1 Performance Areas and Speakers' Platforms. Platform lifts shall be permitted to provide *accessible* routes to performance areas and speakers' platforms.

206.7.2 Wheelchair Spaces. Platform lifts shall be permitted to provide an *accessible* route to comply with the *wheelchair space* dispersion and line-of-sight requirements of 221 and 802.

206.7.3 Incidental Spaces. Platform lifts shall be permitted to provide an *accessible* route to incidental *spaces* which are not *public use spaces* and which are occupied by five persons maximum.

206.7.4 Judicial Spaces. Platform lifts shall be permitted to provide an *accessible* route to: jury boxes and witness stands; raised courtroom stations including, judges' benches, clerks' stations, bailiffs' stations, deputy clerks' stations, and court reporters' stations; and to depressed areas such as the well of a court.

206.7.5 Existing Site Constraints. Platform lifts shall be permitted where existing exterior *site* constraints make use of a *ramp* or elevator infeasible.

Advisory 206.7.5 Existing Site Constraints. This exception applies where topography or other similar existing site constraints necessitate the use of a platform lift as the only feasible alternative. While the site constraint must reflect exterior conditions, the lift can be installed in the interior of a building. For example, a new building constructed between and connected to two existing buildings may have insufficient space to coordinate floor levels and also to provide ramped entry from the public way. In this example, an exterior or interior platform lift could be used to provide an accessible entrance or to coordinate one or more interior floor levels.

206.7.6 Guest Rooms and Residential Dwelling Units. Platform lifts shall be permitted to connect levels within *transient lodging* guest rooms required to provide mobility features complying with 806.2 or *residential dwelling units* required to provide mobility features complying with 809.2 through 809.4.

206.7.7 Amusement Rides. Platform lifts shall be permitted to provide *accessible* routes to load and unload areas serving *amusement rides*.

206.7.8 Play Areas. Platform lifts shall be permitted to provide *accessible* routes to *play components* or *soft contained play structures*.

206.7.9 Team or Player Seating. Platform lifts shall be permitted to provide *accessible* routes to team or player seating areas serving *areas of sport activity*.

Advisory 206.7.9 Team or Player Seating. While the use of platform lifts is allowed, ramps are recommended to provide access to player seating areas serving an area of sport activity.

206.7.10 Recreational Boating Facilities and Fishing Piers and Platforms. Platform lifts shall be permitted to be used instead of *gangways* that are part of *accessible* routes serving recreational boating *facilities* and fishing piers and platforms.

206.8 Security Barriers. Security barriers, including but not limited to, security bollards and security check points, shall not obstruct a required *accessible* route or *accessible means of egress*.

EXCEPTION: Where security barriers incorporate *elements* that cannot comply with these requirements such as certain metal detectors, fluoroscopes, or other similar devices, the *accessible* route shall be permitted to be located adjacent to security screening devices. The *accessible* route shall permit persons with disabilities passing around security barriers to maintain visual contact with their personal items to the same extent provided others passing through the security barrier.

207 Accessible Means of Egress

207.1 General. Means of egress shall comply with section 1003.2.13 of the International Building Code (2000 edition and 2001 Supplement) or section 1007 of the International Building Code (2003 edition) (incorporated by reference, see “Referenced Standards” in Chapter 1).

EXCEPTIONS: 1. Where means of egress are permitted by local *building* or life safety codes to share a common path of egress travel, *accessible means of egress* shall be permitted to share a common path of egress travel.

2. Areas of refuge shall not be required in detention and correctional *facilities*.

207.2 Platform Lifts. Standby power shall be provided for platform lifts permitted by section 1003.2.13.4 of the International Building Code (2000 edition and 2001 Supplement) or section 1007.5 of the International Building Code (2003 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1) to serve as a part of an *accessible means of egress*.

208 Parking Spaces

208.1 General. Where parking *spaces* are provided, parking *spaces* shall be provided in accordance with 208.

EXCEPTION: Parking *spaces* used exclusively for buses, trucks, other delivery vehicles, law enforcement vehicles, or vehicular impound shall not be required to comply with 208 provided that lots accessed by the public are provided with a passenger loading zone complying with 503.

208.2 Minimum Number. Parking *spaces* complying with 502 shall be provided in accordance with Table 208.2 except as required by 208.2.1, 208.2.2, and 208.2.3. Where more than one parking *facility* is provided on a *site*, the number of *accessible spaces* provided on the *site* shall be calculated according to the number of *spaces* required for each parking *facility*.

Table 208.2 Parking Spaces

Total Number of Parking Spaces Provided in Parking Facility	Minimum Number of Required Accessible Parking Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
1001 and over	20, plus 1 for each 100, or fraction thereof, over 1000

Advisory 208.2 Minimum Number. The term “parking facility” is used Section 208.2 instead of the term “parking lot” so that it is clear that both parking lots and parking structures are required to comply with this section. The number of parking spaces required to be accessible is to be calculated separately for each parking facility; the required number is not to be based on the total number of parking spaces provided in all of the parking facilities provided on the site.

208.2.1 Hospital Outpatient Facilities. Ten percent of patient and visitor parking *spaces* provided to serve hospital outpatient *facilities* shall comply with 502.

Advisory 208.2.1 Hospital Outpatient Facilities. The term “outpatient facility” is not defined in this document but is intended to cover facilities or units that are located in hospitals and that provide regular and continuing medical treatment without an overnight stay. Doctors' offices, independent clinics, or other facilities not located in hospitals are not considered hospital outpatient facilities for purposes of this document.

208.2.2 Rehabilitation Facilities and Outpatient Physical Therapy Facilities. Twenty percent of patient and visitor parking *spaces* provided to serve rehabilitation *facilities* specializing in treating conditions that affect mobility and outpatient physical therapy *facilities* shall comply with 502.

Advisory 208.2.2 Rehabilitation Facilities and Outpatient Physical Therapy Facilities. Conditions that affect mobility include conditions requiring the use or assistance of a brace, cane, crutch, prosthetic device, wheelchair, or powered mobility aid; arthritic, neurological, or orthopedic conditions that severely limit one's ability to walk; respiratory diseases and other conditions which may require the use of portable oxygen; and cardiac conditions that impose significant functional limitations.

208.2.3 Residential Facilities. Parking *spaces* provided to serve residential *facilities* shall comply with 208.2.3.

208.2.3.1 Parking for Residents. Where at least one parking *space* is provided for each *residential dwelling unit*, at least one parking *space* complying with 502 shall be provided for each *residential dwelling unit* required to provide mobility features complying with 809.2 through 809.4.

208.2.3.2 Additional Parking Spaces for Residents. Where the total number of parking *spaces* provided for each *residential dwelling unit* exceeds one parking *space* per *residential dwelling unit*, 2 percent, but no fewer than one *space,* of all the parking *spaces* not covered by 208.2.3.1 shall comply with 502.

208.2.3.3 Parking for Guests, Employees, and Other Non-Residents. Where parking spaces are provided for persons other than residents, parking shall be provided in accordance with Table 208.2.

208.2.4 Van Parking Spaces. For every six or fraction of six parking *spaces* required by 208.2 to comply with 502, at least one shall be a van parking *space* complying with 502.

208.3 Location. Parking *facilities* shall comply with 208.3

208.3.1 General. Parking *spaces* complying with 502 that serve a particular *building* or *facility* shall be located on the shortest *accessible* route from parking to an *entrance* complying with 206.4. Where parking serves more than one *accessible entrance*, parking *spaces* complying with 502 shall be dispersed and located on the shortest *accessible* route to the *accessible entrances*. In parking *facilities* that do not serve a particular *building* or *facility*, parking *spaces* complying with 502 shall be located on the shortest *accessible* route to an *accessible* pedestrian *entrance* of the parking *facility*.

EXCEPTIONS: 1. All van parking *spaces* shall be permitted to be grouped on one level within a multi-*story* parking *facility*.

2. Parking *spaces* shall be permitted to be located in different parking *facilities* if substantially equivalent or greater *accessibility* is provided in terms of distance from an *accessible entrance* or *entrances*, parking fee, and user convenience.

Advisory 208.3.1 General Exception 2. Factors that could affect "user convenience" include, but are not limited to, protection from the weather, security, lighting, and comparative maintenance of the alternative parking site.

208.3.2 Residential Facilities. In residential *facilities* containing *residential dwelling units* required to provide mobility features complying with 809.2 through 809.4, parking *spaces* provided in accordance with 208.2.3.1 shall be located on the shortest *accessible* route to the *residential dwelling unit entrance* they serve. *Spaces* provided in accordance with 208.2.3.2 shall be dispersed throughout all types of parking provided for the *residential dwelling units*.

EXCEPTION: Parking *spaces* provided in accordance with 208.2.3.2 shall not be required to be dispersed throughout all types of parking if substantially equivalent or greater *accessibility* is provided in terms of distance from an *accessible entrance*, parking fee, and user convenience.

Advisory 208.3.2 Residential Facilities Exception. Factors that could affect "user convenience" include, but are not limited to, protection from the weather, security, lighting, and comparative maintenance of the alternative parking site.

209 Passenger Loading Zones and Bus Stops

209.1 General. Passenger loading zones shall be provided in accordance with 209.

209.2 Type. Where provided, passenger loading zones shall comply with 209.2.

209.2.1 Passenger Loading Zones. Passenger loading zones, except those required to comply with 209.2.2 and 209.2.3, shall provide at least one passenger loading zone complying with 503 in every continuous 100 linear feet (30 m) of loading zone *space*, or fraction thereof.

209.2.2 Bus Loading Zones. In bus loading zones restricted to use by designated or specified public transportation vehicles, each bus bay, bus stop, or other area designated for lift or *ramp* deployment shall comply with 810.2.

Advisory 209.2.2 Bus Loading Zones. The terms “designated public transportation” and “specified public transportation” are defined by the Department of Transportation at 49 CFR 37.3 in regulations implementing the Americans with Disabilities Act. These terms refer to public transportation services provided by public or private entities, respectively. For example, designated public transportation vehicles include buses and vans operated by public transit agencies, while specified public transportation vehicles include tour and charter buses, taxis and limousines, and hotel shuttles operated by private entities.

209.2.3 On-Street Bus Stops. On-street bus stops shall comply with 810.2 to the maximum extent practicable.

209.3 Medical Care and Long-Term Care Facilities. At least one passenger loading zone complying with 503 shall be provided at an *accessible entrance* to licensed medical care and licensed long-term care *facilities* where the period of stay exceeds twenty-four hours.

209.4 Valet Parking. Parking *facilities* that provide valet parking services shall provide at least one passenger loading zone complying with 503.

209.5 Mechanical Access Parking Garages. Mechanical access parking garages shall provide at least one passenger loading zone complying with 503 at vehicle drop-off and vehicle pick-up areas.

210 Stairways

210.1 General. Interior and exterior stairs that are part of a means of egress shall comply with 504.

EXCEPTIONS: 1. In detention and correctional *facilities*, stairs that are not located in *public use* areas shall not be required to comply with 504.

2. In *alterations*, stairs between levels that are connected by an *accessible* route shall not be required to comply with 504, except that handrails complying with 505 shall be provided when the stairs are *altered*.

3. In *assembly areas*, aisle stairs shall not be required to comply with 504.

4. Stairs that connect *play components* shall not be required to comply with 504.

Advisory 210.1 General. Although these requirements do not mandate handrails on stairs that are not part of a means of egress, State or local building codes may require handrails or guards.

211 Drinking Fountains

211.1 General. Where drinking fountains are provided on an exterior *site*, on a floor, or within a secured area they shall be provided in accordance with 211.

EXCEPTION: In detention or correctional *facilities*, drinking fountains only serving holding or housing cells not required to comply with 232 shall not be required to comply with 211.

211.2 Minimum Number. No fewer than two drinking fountains shall be provided. One drinking fountain shall comply with 602.1 through 602.6 and one drinking fountain shall comply with 602.7.

EXCEPTION: Where a single drinking fountain complies with 602.1 through 602.6 and 602.7, it shall be permitted to be substituted for two separate drinking fountains.

211.3 More Than Minimum Number. Where more than the minimum number of drinking fountains specified in 211.2 are provided, 50 percent of the total number of drinking fountains provided shall comply with 602.1 through 602.6, and 50 percent of the total number of drinking fountains provided shall comply with 602.7.

EXCEPTION: Where 50 percent of the drinking fountains yields a fraction, 50 percent shall be permitted to be rounded up or down provided that the total number of drinking fountains complying with 211 equals 100 percent of drinking fountains.

212 Kitchens, Kitchenettes, and Sinks

212.1 General. Where provided, kitchens, kitchenettes, and sinks shall comply with 212.

212.2 Kitchens and Kitchenettes. Kitchens and kitchenettes shall comply with 804.

212.3 Sinks. Where sinks are provided, at least 5 percent, but no fewer than one, of each type provided in each *accessible* room or *space* shall comply with 606.

EXCEPTION: Mop or service sinks shall not be required to comply with 212.3.

213 Toilet Facilities and Bathing Facilities

213.1 General. Where toilet *facilities* and bathing *facilities* are provided, they shall comply with 213. Where toilet *facilities* and bathing *facilities* are provided in *facilities* permitted by 206.2.3 Exceptions 1 and 2 not to connect *stories* by an *accessible* route, toilet *facilities* and bathing *facilities* shall be provided on a *story* connected by an *accessible* route to an *accessible entrance*.

213.2 Toilet Rooms and Bathing Rooms. Where toilet rooms are provided, each toilet room shall comply with 603. Where bathing rooms are provided, each bathing room shall comply with 603.

EXCEPTIONS: 1. In *alterations* where it is *technically infeasible* to comply with 603, *altering* existing toilet or bathing rooms shall not be required where a single unisex toilet room or bathing room complying with 213.2.1 is provided and located in the same area and on the same floor as existing inaccessible toilet or bathing rooms.

2. Where exceptions for *alterations* to *qualified historic buildings or facilities* are permitted by 202.5, no fewer than one toilet room for each sex complying with 603 or one unisex toilet room complying with 213.2.1 shall be provided.

3. Where multiple single user portable toilet or bathing units are clustered at a single location, no more than 5 percent of the toilet units and bathing units at each cluster shall be required to comply with 603. Portable toilet units and bathing units complying with 603 shall be identified by the International Symbol of *Accessibility* complying with 703.7.2.1.

4. Where multiple single user toilet rooms are clustered at a single location, no more than 50 percent of the single user toilet rooms for each use at each cluster shall be required to comply with 603.

Advisory 213.2 Toilet Rooms and Bathing Rooms. These requirements allow the use of unisex (or single-user) toilet rooms in alterations when technical infeasibility can be demonstrated. Unisex toilet rooms benefit people who use opposite sex personal care assistants. For this reason, it is advantageous to install unisex toilet rooms in addition to accessible single-sex toilet rooms in new facilities.

Advisory 213.2 Toilet Rooms and Bathing Rooms Exceptions 3 and 4. A "cluster" is a group of toilet rooms proximate to one another. Generally, toilet rooms in a cluster are within sight of, or adjacent to, one another.

213.2.1 Unisex (Single-Use or Family) Toilet and Unisex Bathing Rooms. Unisex toilet rooms shall contain not more than one lavatory, and two water closets without urinals or one water closet and one urinal. Unisex bathing rooms shall contain one shower or one shower and one bathtub, one lavatory, and one water closet. Doors to unisex toilet rooms and unisex bathing rooms shall have privacy latches.

213.3 Plumbing Fixtures and Accessories. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with 213.2 shall comply with 213.3.

213.3.1 Toilet Compartments. Where toilet compartments are provided, at least one toilet compartment shall comply with 604.8.1. In addition to the compartment required to comply with 604.8.1, at least one compartment shall comply with 604.8.2 where six or more toilet compartments are provided, or where the combination of urinals and water closets totals six or more fixtures.

Advisory 213.3.1 Toilet Compartments. A toilet compartment is a partitioned space that is located within a toilet room, and that normally contains no more than one water closet. A toilet compartment may also contain a lavatory. A lavatory is a sink provided for hand washing. Full-height partitions and door assemblies can comprise toilet compartments where the minimum required spaces are provided within the compartment.

213.3.2 Water Closets. Where water closets are provided, at least one shall comply with 604.

213.3.3 Urinals. Where more than one urinal is provided, at least one shall comply with 605.

213.3.4 Lavatories. Where lavatories are provided, at least one shall comply with 606 and shall not be located in a toilet compartment.

213.3.5 Mirrors. Where mirrors are provided, at least one shall comply with 603.3.

213.3.6 Bathing Facilities. Where bathtubs or showers are provided, at least one bathtub complying with 607 or at least one shower complying with 608 shall be provided.

213.3.7 Coat Hooks and Shelves. Where coat hooks or shelves are provided in toilet rooms without toilet compartments, at least one of each type shall comply with 603.4. Where coat hooks or shelves are provided in toilet compartments, at least one of each type complying with 604.8.3 shall be provided in toilet compartments required to comply with 213.3.1. Where coat hooks or shelves

are provided in bathing *facilities*, at least one of each type complying with 603.4 shall serve fixtures required to comply with 213.3.6.

214 Washing Machines and Clothes Dryers

214.1 General. Where provided, washing machines and clothes dryers shall comply with 214.

214.2 Washing Machines. Where three or fewer washing machines are provided, at least one shall comply with 611. Where more than three washing machines are provided, at least two shall comply with 611.

214.3 Clothes Dryers. Where three or fewer clothes dryers are provided, at least one shall comply with 611. Where more than three clothes dryers are provided, at least two shall comply with 611.

215 Fire Alarm Systems

215.1 General. Where fire alarm systems provide audible alarm coverage, alarms shall comply with 215.

EXCEPTION: In existing *facilities*, visible alarms shall not be required except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.

Advisory 215.1 General. Unlike audible alarms, visible alarms must be located within the space they serve so that the signal is visible. Facility alarm systems (other than fire alarm systems) such as those used for tornado warnings and other emergencies are not required to comply with the technical criteria for alarms in Section 702. Every effort should be made to ensure that such alarms can be differentiated in their signal from fire alarms systems and that people who need to be notified of emergencies are adequately safeguarded. Consult local fire departments and prepare evacuation plans taking into consideration the needs of every building occupant, including people with disabilities.

215.2 Public and Common Use Areas. Alarms in *public use* areas and *common use* areas shall comply with 702.

215.3 Employee Work Areas. Where *employee work areas* have audible alarm coverage, the wiring system shall be designed so that visible alarms complying with 702 can be integrated into the alarm system.

215.4 Transient Lodging. Guest rooms required to comply with 224.4 shall provide alarms complying with 702.

215.5 Residential Facilities. Where provided in *residential dwelling units* required to comply with 809.5, alarms shall comply with 702.

216 Signs

216.1 General. Signs shall be provided in accordance with 216 and shall comply with 703.

EXCEPTIONS: 1. *Building* directories, menus, seat and row designations in *assembly areas*, occupant names, *building* addresses, and company names and logos shall not be required to comply with 216.
2. In parking *facilities*, signs shall not be required to comply with 216.2, 216.3, and 216.6 through 216.12.
3. Temporary, 7 days or less, signs shall not be required to comply with 216.
4. In detention and correctional *facilities*, signs not located in *public use* areas shall not be required to comply with 216.

216.2 Designations. Interior and exterior signs identifying permanent rooms and *spaces* shall comply with 703.1, 703.2, and 703.5. Where *pictograms* are provided as designations of permanent interior rooms and *spaces*, the *pictograms* shall comply with 703.6 and shall have text descriptors complying with 703.2 and 703.5.

EXCEPTION: Exterior signs that are not located at the door to the *space* they serve shall not be required to comply with 703.2.

Advisory 216.2 Designations. Section 216.2 applies to signs that provide designations, labels, or names for interior rooms or spaces where the sign is not likely to change over time. Examples include interior signs labeling restrooms, room and floor numbers or letters, and room names. Tactile text descriptors are required for pictograms that are provided to label or identify a permanent room or space. Pictograms that provide information about a room or space, such as “no smoking,” occupant logos, and the International Symbol of Accessibility, are not required to have text descriptors.

216.3 Directional and Informational Signs. Signs that provide direction to or information about interior *spaces* and *facilities* of the *site* shall comply with 703.5.

Advisory 216.3 Directional and Informational Signs. Information about interior spaces and facilities includes rules of conduct, occupant load, and similar signs. Signs providing direction to rooms or spaces include those that identify egress routes.

216.4 Means of Egress. Signs for means of egress shall comply with 216.4.

216.4.1 Exit Doors. Doors at exit passageways, exit discharge, and exit stairways shall be identified by *tactile* signs complying with 703.1, 703.2, and 703.5.

Advisory 216.4.1 Exit Doors. An exit passageway is a horizontal exit component that is separated from the interior spaces of the building by fire-resistance-rated construction and that leads to the exit discharge or public way. The exit discharge is that portion of an egress system between the termination of an exit and a public way.

216.4.2 Areas of Refuge. Signs required by section 1003.2.13.5.4 of the International Building Code (2000 edition) or section 1007.6.4 of the International Building Code (2003 edition) (incorporated by reference, see “Referenced Standards” in Chapter 1) to provide instructions in areas of refuge shall comply with 703.5.

216.4.3 Directional Signs. Signs required by section 1003.2.13.6 of the International Building Code (2000 edition) or section 1007.7 of the International Building Code (2003 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1) to provide directions to *accessible means of egress* shall comply with 703.5.

216.5 Parking. Parking *spaces* complying with 502 shall be identified by signs complying with 502.6.
EXCEPTIONS: 1. Where a total of four or fewer parking *spaces*, including *accessible* parking *spaces*, are provided on a *site*, identification of *accessible* parking *spaces* shall not be required.
2. In residential *facilities*, where parking *spaces* are assigned to specific *residential dwelling units*, identification of *accessible* parking *spaces* shall not be required.

216.6 Entrances. Where not all *entrances* comply with 404, *entrances* complying with 404 shall be identified by the International Symbol of *Accessibility* complying with 703.7.2.1. Directional signs complying with 703.5 that indicate the location of the nearest *entrance* complying with 404 shall be provided at *entrances* that do not comply with 404.

> **Advisory 216.6 Entrances.** Where a directional sign is required, it should be located to minimize backtracking. In some cases, this could mean locating a sign at the beginning of a route, not just at the inaccessible entrances to a building.

216.7 Elevators. Where existing elevators do not comply with 407, elevators complying with 407 shall be clearly identified with the International Symbol of *Accessibility* complying with 703.7.2.1.

216.8 Toilet Rooms and Bathing Rooms. Where existing toilet rooms or bathing rooms do not comply with 603, directional signs indicating the location of the nearest toilet room or bathing room complying with 603 within the *facility* shall be provided. Signs shall comply with 703.5 and shall include the International Symbol of *Accessibility* complying with 703.7.2.1. Where existing toilet rooms or bathing rooms do not comply with 603, the toilet rooms or bathing rooms complying with 603 shall be identified by the International Symbol of *Accessibility* complying with 703.7.2.1. Where clustered single user toilet rooms or bathing *facilities* are permitted to use exceptions to 213.2, toilet rooms or bathing *facilities* complying with 603 shall be identified by the International Symbol of *Accessibility* complying with 703.7.2.1 unless all toilet rooms and bathing *facilities* comply with 603.

216.9 TTYs. Identification and directional signs for public *TTYs* shall be provided in accordance with 216.9.

216.9.1 Identification Signs. Public *TTYs* shall be identified by the International Symbol of *TTY* complying with 703.7.2.2.

216.9.2 Directional Signs. Directional signs indicating the location of the nearest public *TTY* shall be provided at all banks of public pay telephones not containing a public *TTY*. In addition, where signs provide direction to public pay telephones, they shall also provide direction to public *TTYs*. Directional signs shall comply with 703.5 and shall include the International Symbol of *TTY* complying with 703.7.2.2.

216.10 Assistive Listening Systems. Each *assembly area* required by 219 to provide *assistive listening systems* shall provide signs informing patrons of the availability of the *assistive listening system*. Assistive listening signs shall comply with 703.5 and shall include the International Symbol of Access for Hearing Loss complying with 703.7.2.4.

EXCEPTION: Where ticket offices or windows are provided, signs shall not be required at each *assembly area* provided that signs are displayed at each ticket office or window informing patrons of the availability of *assistive listening systems*.

216.11 Check-Out Aisles. Where more than one check-out aisle is provided, check-out aisles complying with 904.3 shall be identified by the International Symbol of *Accessibility* complying with 703.7.2.1. Where check-out aisles are identified by numbers, letters, or functions, signs identifying check-out aisles complying with 904.3 shall be located in the same location as the check-out aisle identification.

EXCEPTION: Where all check-out aisles serving a single function comply with 904.3, signs complying with 703.7.2.1 shall not be required.

216.12 Amusement Rides. Signs identifying the type of access provided on *amusement rides* shall be provided at entries to queues and waiting lines. In addition, where *accessible* unload areas also serve as *accessible* load areas, signs indicating the location of the *accessible* load and unload areas shall be provided at entries to queues and waiting lines.

Advisory 216.12 Amusement Rides. Amusement rides designed primarily for children, amusement rides that are controlled or operated by the rider, and amusement rides without seats, are not required to provide wheelchair spaces, transfer seats, or transfer systems, and need not meet the sign requirements in 216.12. The load and unload areas of these rides must, however, be on an accessible route and must provide turning space.

217 Telephones

217.1 General. Where coin-operated public pay telephones, coinless public pay telephones, public *closed-circuit telephones*, public courtesy phones, or other types of public telephones are provided, public telephones shall be provided in accordance with 217 for each type of public telephone provided. For purposes of this section, a bank of telephones shall be considered to be two or more adjacent telephones.

Advisory 217.1 General. These requirements apply to all types of public telephones including courtesy phones at airports and rail stations that provide a free direct connection to hotels, transportation services, and tourist attractions.

217.2 Wheelchair Accessible Telephones. Where public telephones are provided, wheelchair *accessible* telephones complying with 704.2 shall be provided in accordance with Table 217.2.

EXCEPTION: Drive-up only public telephones shall not be required to comply with 217.2.

Table 217.2 Wheelchair Accessible Telephones

Number of Telephones Provided on a Floor, Level, or Exterior Site	Minimum Number of Required Wheelchair Accessible Telephones
1 or more single units	1 per floor, level, and exterior *site*
1 bank	1 per floor, level, and exterior *site*
2 or more banks	1 per bank

217.3 Volume Controls. All public telephones shall have volume controls complying with 704.3.

217.4 TTYs. *TTYs* complying with 704.4 shall be provided in accordance with 217.4.

Advisory 217.4 TTYs. Separate requirements are provided based on the number of public pay telephones provided at a bank of telephones, within a floor, a building, or on a site. In some instances one TTY can be used to satisfy more than one of these requirements. For example, a TTY required for a bank can satisfy the requirements for a building. However, the requirement for at least one TTY on an exterior site cannot be met by installing a TTY in a bank inside a building. Consideration should be given to phone systems that can accommodate both digital and analog transmissions for compatibility with digital and analog TTYs.

217.4.1 Bank Requirement. Where four or more public pay telephones are provided at a bank of telephones, at least one public *TTY* complying with 704.4 shall be provided at that bank.

EXCEPTION: *TTYs* shall not be required at banks of telephones located within 200 feet (61 m) of, and on the same floor as, a bank containing a public *TTY*.

217.4.2 Floor Requirement. *TTYs* in *public buildings* shall be provided in accordance with 217.4.2.1. *TTYs* in *private buildings* shall be provided in accordance with 217.4.2.2.

217.4.2.1 Public Buildings. Where at least one public pay telephone is provided on a floor of a *public building*, at least one public *TTY* shall be provided on that floor.

217.4.2.2 Private Buildings. Where four or more public pay telephones are provided on a floor of a *private building*, at least one public *TTY* shall be provided on that floor.

217.4.3 Building Requirement. *TTYs* in *public buildings* shall be provided in accordance with 217.4.3.1. *TTYs* in *private buildings* shall be provided in accordance with 217.4.3.2.

217.4.3.1 Public Buildings. Where at least one public pay telephone is provided in a *public building*, at least one public *TTY* shall be provided in the *building*. Where at least one public pay telephone is provided in a *public use* area of a *public building*, at least one public *TTY* shall be provided in the *public building* in a *public use* area.

217.4.3.2 Private Buildings. Where four or more public pay telephones are provided in a *private building*, at least one public *TTY* shall be provided in the *building*.

217.4.4 Exterior Site Requirement. Where four or more public pay telephones are provided on an exterior *site*, at least one public *TTY* shall be provided on the *site*.

217.4.5 Rest Stops, Emergency Roadside Stops, and Service Plazas. Where at least one public pay telephone is provided at a public rest stop, emergency roadside stop, or service plaza, at least one public *TTY* shall be provided.

217.4.6 Hospitals. Where at least one public pay telephone is provided serving a hospital emergency room, hospital recovery room, or hospital waiting room, at least one public *TTY* shall be provided at each location.

217.4.7 Transportation Facilities. In transportation *facilities*, in addition to the requirements of 217.4.1 through 217.4.4, where at least one public pay telephone serves a particular *entrance* to a bus or rail *facility*, at least one public *TTY* shall be provided to serve that *entrance*. In airports, in addition to the requirements of 217.4.1 through 217.4.4, where four or more public pay telephones are located in a terminal outside the security areas, a concourse within the security areas, or a baggage claim area in a terminal, at least one public *TTY* shall be provided in each location.

217.4.8 Detention and Correctional Facilities. In detention and correctional *facilities*, where at least one pay telephone is provided in a secured area used only by detainees or inmates and security personnel, at least one *TTY* shall be provided in at least one secured area.

217.5 Shelves for Portable TTYs. Where a bank of telephones in the interior of a *building* consists of three or more public pay telephones, at least one public pay telephone at the bank shall be provided with a shelf and an electrical outlet in accordance with 704.5.

EXCEPTIONS: 1. Secured areas of detention and correctional *facilities* where shelves and outlets are prohibited for purposes of security or safety shall not be required to comply with 217.5.

2. The shelf and electrical outlet shall not be required at a bank of telephones with a *TTY*.

218 Transportation Facilities

218.1 General. Transportation *facilities* shall comply with 218.

218.2 New and Altered Fixed Guideway Stations. New and *altered* stations in rapid rail, light rail, commuter rail, intercity rail, high speed rail, and other fixed guideway systems shall comply with 810.5 through 810.10.

218.3 Key Stations and Existing Intercity Rail Stations. *Key stations* and existing intercity rail stations shall comply with 810.5 through 810.10.

218.4 Bus Shelters. Where provided, bus shelters shall comply with 810.3.

218.5 Other Transportation Facilities. In other transportation *facilities*, public address systems shall comply with 810.7 and clocks shall comply with 810.8.

219 Assistive Listening Systems

219.1 General. *Assistive listening systems* shall be provided in accordance with 219 and shall comply with 706.

219.2 Required Systems. In each *assembly area* where audible communication is integral to the use of the *space*, an *assistive listening system* shall be provided.

EXCEPTION: Other than in courtrooms, *assistive listening systems* shall not be required where audio amplification is not provided.

219.3 Receivers. Receivers complying with 706.2 shall be provided for *assistive listening systems* in each *assembly area* in accordance with Table 219.3. Twenty-five percent minimum of receivers provided, but no fewer than two, shall be hearing-aid compatible in accordance with 706.3.

EXCEPTIONS: 1. Where a *building* contains more than one *assembly area* and the *assembly areas* required to provide *assistive listening systems* are under one management, the total number of required receivers shall be permitted to be calculated according to the total number of seats in the *assembly areas* in the *building* provided that all receivers are usable with all systems.

2. Where all seats in an *assembly area* are served by an induction loop *assistive listening system*, the minimum number of receivers required by Table 219.3 to be hearing-aid compatible shall not be required to be provided.

Table 219.3 Receivers for Assistive Listening Systems

Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of Required Receivers Required to be Hearing-aid Compatible
50 or less	2	2
51 to 200	2, plus 1 per 25 seats over 50 seats[1]	2
201 to 500	2, plus 1 per 25 seats over 50 seats[1]	1 per 4 receivers[1]
501 to 1000	20, plus 1 per 33 seats over 500 seats[1]	1 per 4 receivers[1]
1001 to 2000	35, plus 1 per 50 seats over 1000 seats[1]	1 per 4 receivers[1]
2001 and over	55 plus 1 per 100 seats over 2000 seats[1]	1 per 4 receivers[1]

1. Or fraction thereof.

220 Automatic Teller Machines and Fare Machines

220.1 General. Where automatic teller machines or self-service fare vending, collection, or adjustment machines are provided, at least one of each type provided at each location shall comply with 707. Where bins are provided for envelopes, waste paper, or other purposes, at least one of each type shall comply with 811.

> **Advisory 220.1 General.** If a bank provides both interior and exterior ATMs, each such installation is considered a separate location. Accessible ATMs, including those with speech and those that are within reach of people who use wheelchairs, must provide all the functions provided to customers at that location at all times. For example, it is unacceptable for the accessible ATM only to provide cash withdrawals while inaccessible ATMs also sell theater tickets.

221 Assembly Areas

221.1 General. *Assembly areas* shall provide *wheelchair spaces*, companion seats, and designated aisle seats complying with 221 and 802. In addition, lawn seating shall comply with 221.5.

221.2 Wheelchair Spaces. *Wheelchair spaces* complying with 221.2 shall be provided in *assembly areas* with fixed seating.

221.2.1 Number and Location. *Wheelchair spaces* shall be provided complying with 221.2.1.

221.2.1.1 General Seating. *Wheelchair spaces* complying with 802.1 shall be provided in accordance with Table 221.2.1.1.

Table 221.2.1.1 Number of Wheelchair Spaces in Assembly Areas

Number of Seats	Minimum Number of Required Wheelchair Spaces
4 to 25	1
26 to 50	2
51 to 150	4
151 to 300	5
301 to 500	6
501 to 5000	6, plus 1 for each 150, or fraction thereof, between 501 through 5000
5001 and over	36, plus 1 for each 200, or fraction thereof, over 5000

221.2.1.2 Luxury Boxes, Club Boxes, and Suites in Arenas, Stadiums, and Grandstands. In each luxury box, club box, and suite within arenas, stadiums, and grandstands, *wheelchair spaces* complying with 802.1 shall be provided in accordance with Table 221.2.1.1.

Advisory 221.2.1.2 Luxury Boxes, Club Boxes, and Suites in Arenas, Stadiums, and Grandstands. The number of wheelchair spaces required in luxury boxes, club boxes, and suites within an arena, stadium, or grandstand is to be calculated box by box and suite by suite.

221.2.1.3 Other Boxes. In boxes other than those required to comply with 221.2.1.2, the total number of *wheelchair spaces* required shall be determined in accordance with Table 221.2.1.1. *Wheelchair spaces* shall be located in not less than 20 percent of all boxes provided. *Wheelchair spaces* shall comply with 802.1.

Advisory 221.2.1.3 Other Boxes. The provision for seating in "other boxes" includes box seating provided in facilities such as performing arts auditoria where tiered boxes are designed for spatial and acoustical purposes. The number of wheelchair spaces required in boxes covered by 221.2.1.3 is calculated based on the total number of seats provided in these other boxes. The resulting number of wheelchair spaces must be located in no fewer than 20% of the boxes covered by this section. For example, a concert hall has 20 boxes, each of which contains 10 seats, totaling 200 seats. In this example, 5 wheelchair spaces would be required, and they must be placed in at least 4 of the boxes. Additionally, because the wheelchair spaces must also meet the dispersion requirements of 221.2.3, the boxes containing these wheelchair spaces cannot all be located in one area unless an exception to the dispersion requirements applies.

221.2.1.4 Team or Player Seating. At least one *wheelchair space* complying with 802.1 shall be provided in team or player seating areas serving *areas of sport activity*.

EXCEPTION: *Wheelchair spaces* shall not be required in team or player seating areas serving bowling lanes not required to comply with 206.2.11.

221.2.2 Integration. *Wheelchair spaces* shall be an integral part of the seating plan.

Advisory 221.2.2 Integration. The requirement that wheelchair spaces be an "integral part of the seating plan" means that wheelchair spaces must be placed within the footprint of the seating area. Wheelchair spaces cannot be segregated from seating areas. For example, it would be unacceptable to place only the wheelchair spaces, or only the wheelchair spaces and their associated companion seats, outside the seating areas defined by risers in an assembly area.

221.2.3 Lines of Sight and Dispersion. *Wheelchair spaces* shall provide lines of sight complying with 802.2 and shall comply with 221.2.3. In providing lines of sight, *wheelchair spaces* shall be dispersed. *Wheelchair spaces* shall provide spectators with choices of seating locations and viewing angles that are substantially equivalent to, or better than, the choices of seating locations and

viewing angles available to all other spectators. When the number of *wheelchair spaces* required by 221.2.1 has been met, further dispersion shall not be required.

EXCEPTION: *Wheelchair spaces* in team or player seating areas serving *areas of sport activity* shall not be required to comply with 221.2.3.

Advisory 221.2.3 Lines of Sight and Dispersion. Consistent with the overall intent of the ADA, individuals who use wheelchairs must be provided equal access so that their experience is substantially equivalent to that of other members of the audience. Thus, while individuals who use wheelchairs need not be provided with the best seats in the house, neither may they be relegated to the worst.

221.2.3.1 Horizontal Dispersion. *Wheelchair spaces* shall be dispersed horizontally.

EXCEPTIONS: 1. Horizontal dispersion shall not be required in *assembly areas* with 300 or fewer seats if the companion seats required by 221.3 and *wheelchair spaces* are located within the 2nd or 3rd quartile of the total row length. Intermediate aisles shall be included in determining the total row length. If the row length in the 2nd and 3rd quartile of a row is insufficient to accommodate the required number of companion seats and *wheelchair spaces*, the additional companion seats and *wheelchair spaces* shall be permitted to be located in the 1st and 4th quartile of the row.

2. In row seating, two *wheelchair spaces* shall be permitted to be located side-by-side.

Advisory 221.2.3.1 Horizontal Dispersion. Horizontal dispersion of wheelchair spaces is the placement of spaces in an assembly facility seating area from side-to-side or, in the case of an arena or stadium, around the field of play or performance area.

221.2.3.2 Vertical Dispersion. *Wheelchair spaces* shall be dispersed vertically at varying distances from the screen, performance area, or playing field. In addition, *wheelchair spaces* shall be located in each balcony or *mezzanine* that is located on an *accessible* route.

EXCEPTIONS: 1. Vertical dispersion shall not be required in *assembly areas* with 300 or fewer seats if the *wheelchair spaces* provide viewing angles that are equivalent to, or better than, the average viewing angle provided in the *facility*.

2. In bleachers, *wheelchair spaces* shall not be required to be provided in rows other than rows at points of entry to bleacher seating.

Advisory 221.2.3.2 Vertical Dispersion. When wheelchair spaces are dispersed vertically in an assembly facility they are placed at different locations within the seating area from front-to-back so that the distance from the screen, stage, playing field, area of sports activity, or other focal point is varied among wheelchair spaces.

Advisory 221.2.3.2 Vertical Dispersion Exception 2. Points of entry to bleacher seating may include, but are not limited to, cross aisles, concourses, vomitories, and entrance ramps and stairs. Vertical, center, or side aisles adjoining bleacher seating that are stepped or tiered are not considered entry points.

Note to Reader: The Department of Justice's revised ADA title II regulation (35.151(g)) and title III regulation (36.406(f)) at **www.ada.gov** require the following:

Assembly areas. Assembly areas that are subject to this part [of the title III regulation or to this section of the title II regulation] shall comply with the provisions of the 2010 Standards applicable to assembly areas, including, but not limited to, sections 221 and 802. In addition, assembly areas shall ensure that --

(1) In stadiums, arenas, and grandstands, wheelchair spaces and companion seats are dispersed to all levels that include seating served by an accessible route;

(2) Assembly areas that are required to horizontally disperse wheelchair spaces and companion seats by section 221.2.3.1 of the 2010 Standards and have seating encircling, in whole or in part, a field of play or performance area shall disperse wheelchair spaces and companion seats around that field of play or performance area;

(3) Wheelchair spaces and companion seats are not located on (or obstructed by) temporary platforms or other movable structures, except that when an entire seating section is placed on temporary platforms or other movable structures in an area where fixed seating is not provided, in order to increase seating for an event, wheelchair spaces and companion seats may be placed in that section. When wheelchair spaces and companion seats are not required to accommodate persons eligible for those spaces and seats, individual, removable seats may be placed in those spaces and seats;

(4) Stadium-style movie theaters shall locate wheelchair spaces and companion seats on a riser or cross-aisle in the stadium section that satisfies at least one of the following criteria -- (i) It is located within the rear 60% of the seats provided in an auditorium; or

(ii) It is located within the area of an auditorium in which the vertical viewing angles (as measured to the top of the screen) are from the 40th to the 100th percentile of vertical viewing angles for all seats as ranked from the seats in the first row (1st percentile) to seats in the back row (100th percentile).

221.3 Companion Seats. At least one companion seat complying with 802.3 shall be provided for each *wheelchair space* required by 221.2.1.

221.4 Designated Aisle Seats. At least 5 percent of the total number of aisle seats provided shall comply with 802.4 and shall be the aisle seats located closest to *accessible* routes.

EXCEPTION: Team or player seating areas serving *areas of sport activity* shall not be required to comply with 221.4.

Advisory 221.4 Designated Aisle Seats. When selecting which aisle seats will meet the requirements of 802.4, those aisle seats which are closest to, not necessarily on, accessible routes must be selected first. For example, an assembly area has two aisles (A and B) serving seating areas with an accessible route connecting to the top and bottom of Aisle A only. The aisle seats chosen to meet 802.4 must be those at the top and bottom of Aisle A, working toward the middle. Only when all seats on Aisle A would not meet the five percent minimum would seats on Aisle B be designated.

221.5 Lawn Seating. Lawn seating areas and exterior overflow seating areas, where fixed seats are not provided, shall connect to an *accessible* route.

222 Dressing, Fitting, and Locker Rooms

222.1 General. Where dressing rooms, fitting rooms, or locker rooms are provided, at least 5 percent, but no fewer than one, of each type of use in each cluster provided shall comply with 803.

EXCEPTION: In *alterations*, where it is *technically infeasible* to provide rooms in accordance with 222.1, one room for each sex on each level shall comply with 803. Where only unisex rooms are provided, unisex rooms shall be permitted.

Advisory 222.1 General. A "cluster" is a group of rooms proximate to one another. Generally, rooms in a cluster are within sight of, or adjacent to, one another. Different styles of design provide users varying levels of privacy and convenience. Some designs include private changing facilities that are close to core areas of the facility, while other designs use space more economically and provide only group dressing facilities. Regardless of the type of facility, dressing, fitting, and locker rooms should provide people with disabilities rooms that are equally private and convenient to those provided others. For example, in a physician's office, if people without disabilities must traverse the full length of the office suite in clothing other than their street clothes, it is acceptable for people with disabilities to be asked to do the same.

222.2 Coat Hooks and Shelves. Where coat hooks or shelves are provided in dressing, fitting or locker rooms without individual compartments, at least one of each type shall comply with 803.5. Where coat hooks or shelves are provided in individual compartments at least one of each type complying with 803.5 shall be provided in individual compartments in dressing, fitting, or locker rooms required to comply with 222.1.

223 Medical Care and Long-Term Care Facilities

223.1 General. In licensed medical care *facilities* and licensed long-term care *facilities* where the period of stay exceeds twenty-four hours, patient or resident sleeping rooms shall be provided in accordance with 223.

EXCEPTION: Toilet rooms that are part of critical or intensive care patient sleeping rooms shall not be required to comply with 603.

Note to Reader: The Department of Justice's ADA standards exceed the following advisory note (Advisory 223.1) and require accessible patient bedrooms to be dispersed proportionately by medical specialty in medical care facilities that do not specialize in the treatment of conditions that affect mobility (see 223.2.1 below).

Advisory 223.1 General. Because medical facilities frequently reconfigure spaces to reflect changes in medical specialties, Section 223.1 does not include a provision for dispersion of accessible patient or resident sleeping rooms. The lack of a design requirement does not mean that covered entities are not required to provide services to people with disabilities where accessible rooms are not dispersed in specialty areas. Locate accessible rooms near core areas that are less likely to change over time. While dispersion is not required, the flexibility it provides can be a critical factor in ensuring cost effective compliance with applicable civil rights laws, including titles II and III of the ADA and Section 504 of the Rehabilitation Act of 1973, as amended.

Advisory 223.1 General (Continued). Additionally, all types of features and amenities should be dispersed among accessible sleeping rooms to ensure equal access to and a variety of choices for all patients and residents.

223.1.1 Alterations. Where sleeping rooms are *altered* or *added*, the requirements of 223 shall apply only to the sleeping rooms being *altered* or *added* until the number of sleeping rooms complies with the minimum number required for new construction.

Advisory 223.1.1 Alterations. In alterations and additions, the minimum required number is based on the total number of sleeping rooms altered or added instead of on the total number of sleeping rooms provided in a facility. As a facility is altered over time, every effort should be made to disperse accessible sleeping rooms among patient care areas such as pediatrics, cardiac care, maternity, and other units. In this way, people with disabilities can have access to the full-range of services provided by a medical care facility.

223.2 Hospitals, Rehabilitation Facilities, Psychiatric Facilities and Detoxification Facilities. Hospitals, rehabilitation *facilities*, psychiatric *facilities* and detoxification *facilities* shall comply with 223.2.

223.2.1 Facilities Not Specializing in Treating Conditions That Affect Mobility. In *facilities* not specializing in treating conditions that affect mobility, at least 10 percent, but no fewer than one, of the patient sleeping rooms shall provide mobility features complying with 805.

Note to Reader: The Department of Justice's revised ADA title II regulation (35.151(h)) and title III regulation (36.406(g)) at **www.ada.gov** require the following:

Medical care facilities. Medical care facilities that are subject to this part [of the title III regulation or to this section of the title II regulation] shall comply with the provisions of the 2010 Standards applicable to medical care facilities, including, but not limited to, sections 223 and 805. In addition, medical care facilities that do not specialize in the treatment of conditions that affect mobility shall disperse the accessible patient bedrooms required by section 223.2.1 of the 2010 Standards in a manner that is proportionate by type of medical specialty.

223.2.2 Facilities Specializing in Treating Conditions That Affect Mobility. In *facilities* specializing in treating conditions that affect mobility, 100 percent of the patient sleeping rooms shall provide mobility features complying with 805.

Advisory 223.2.2 Facilities Specializing in Treating Conditions That Affect Mobility. Conditions that affect mobility include conditions requiring the use or assistance of a brace, cane, crutch, prosthetic device, wheelchair, or powered mobility aid; arthritic, neurological, or orthopedic conditions that severely limit one's ability to walk; respiratory diseases and other conditions which may require the use of portable oxygen; and cardiac conditions that impose significant functional limitations. Facilities that may provide treatment for, but that do not specialize in treatment of such conditions, such as general rehabilitation hospitals, are not subject to this requirement but are subject to Section 223.2.1.

223.3 Long-Term Care Facilities. In licensed long-term care *facilities*, at least 50 percent, but no fewer than one, of each type of resident sleeping room shall provide mobility features complying with 805.

224 Transient Lodging Guest Rooms

224.1 General. *Transient lodging facilities* shall provide guest rooms in accordance with 224.

> **Advisory 224.1 General.** Certain facilities used for transient lodging, including time shares, dormitories, and town homes may be covered by both these requirements and the Fair Housing Amendments Act. The Fair Housing Amendments Act requires that certain residential structures having four or more multi-family dwelling units, regardless of whether they are privately owned or federally assisted, include certain features of accessible and adaptable design according to guidelines established by the U.S. Department of Housing and Urban Development (HUD). This law and the appropriate regulations should be consulted before proceeding with the design and construction of residential housing.

224.1.1 Alterations. Where guest rooms are *altered* or *added*, the requirements of 224 shall apply only to the guest rooms being *altered* or *added* until the number of guest rooms complies with the minimum number required for new construction.

> **Advisory 224.1.1 Alterations.** In alterations and additions, the minimum required number of accessible guest rooms is based on the total number of guest rooms altered or added instead of the total number of guest rooms provided in a facility. Typically, each alteration of a facility is limited to a particular portion of the facility. When accessible guest rooms are added as a result of subsequent alterations, compliance with 224.5 (Dispersion) is more likely to be achieved if all of the accessible guest rooms are not provided in the same area of the facility.

224.1.2 Guest Room Doors and Doorways. *Entrances,* doors, and doorways providing user passage into and within guest rooms that are not required to provide mobility features complying with 806.2 shall comply with 404.2.3.

EXCEPTION: Shower and sauna doors in guest rooms that are not required to provide mobility features complying with 806.2 shall not be required to comply with 404.2.3.

> **Advisory 224.1.2 Guest Room Doors and Doorways.** Because of the social interaction that often occurs in lodging facilities, an accessible clear opening width is required for doors and doorways to and within all guest rooms, including those not required to be accessible. This applies to all doors, including bathroom doors, that allow full user passage. Other requirements for doors and doorways in Section 404 do not apply to guest rooms not required to provide mobility features.

224.2 Guest Rooms with Mobility Features. In *transient lodging facilities*, guest rooms with mobility features complying with 806.2 shall be provided in accordance with Table 224.2.

Table 224.2 Guest Rooms with Mobility Features

Total Number of Guest Rooms Provided	Minimum Number of Required Rooms Without Roll-in Showers	Minimum Number of Required Rooms With Roll-in Showers	Total Number of Required Rooms
1 to 25	1	0	1
26 to 50	2	0	2
51 to 75	3	1	4
76 to 100	4	1	5
101 to 150	5	2	7
151 to 200	6	2	8
201 to 300	7	3	10
301 to 400	8	4	12
401 to 500	9	4	13
501 to 1000	2 percent of total	1 percent of total	3 percent of total
1001 and over	20, plus 1 for each 100, or fraction thereof, over 1000	10, plus 1 for each 100, or fraction thereof, over 1000	30, plus 2 for each 100, or fraction thereof, over 1000

224.3 Beds. In guest rooms having more than 25 beds, 5 percent minimum of the beds shall have clear floor *space* complying with 806.2.3.

224.4 Guest Rooms with Communication Features. In *transient lodging facilities*, guest rooms with communication features complying with 806.3 shall be provided in accordance with Table 224.4.

Table 224.4 Guest Rooms with Communication Features

Total Number of Guest Rooms Provided	Minimum Number of Required Guest Rooms With Communication Features
2 to 25	2
26 to 50	4
51 to 75	7
76 to 100	9
101 to 150	12

Table 224.4 Guest Rooms with Communication Features

Total Number of Guest Rooms Provided	Minimum Number of Required Guest Rooms With Communication Features
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1000	5 percent of total
1001 and over	50, plus 3 for each 100 over 1000

224.5 Dispersion. Guest rooms required to provide mobility features complying with 806.2 and guest rooms required to provide communication features complying with 806.3 shall be dispersed among the various classes of guest rooms, and shall provide choices of types of guest rooms, number of beds, and other amenities comparable to the choices provided to other guests. Where the minimum number of guest rooms required to comply with 806 is not sufficient to allow for complete dispersion, guest rooms shall be dispersed in the following priority: guest room type, number of beds, and amenities. At least one guest room required to provide mobility features complying with 806.2 shall also provide communication features complying with 806.3. Not more than 10 percent of guest rooms required to provide mobility features complying with 806.2 shall be used to satisfy the minimum number of guest rooms required to provide communication features complying with 806.3.

Advisory 224.5 Dispersion. Factors to be considered in providing an equivalent range of options may include, but are not limited to, room size, bed size, cost, view, bathroom fixtures such as hot tubs and spas, smoking and nonsmoking, and the number of rooms provided.

Note to Reader: The Department of Justice's revised ADA title III regulation (36.406(c)) at **www.ada.gov** requires the following:

Places of lodging. Places of lodging subject to this part [of the title III regulation] shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806.
(1) Guest rooms. Guest rooms with mobility features in places of lodging subject to the transient lodging requirements of 2010 Standards shall be provided as follows--
(i) Facilities that are subject to the same permit application on a common site that each have 50 or fewer guest rooms may be combined for the purposes of determining the required number of accessible rooms and type of accessible bathing facility in accordance with table 224.2 to section 224.2 of the 2010 Standards.
(ii) Facilities with more than 50 guest rooms shall be treated separately for the purposes of determining the required number of accessible rooms and type of accessible bathing facility in accordance with table 224.2 to section 224.2 of the 2010 Standards.

(2) Exception. Alterations to guest rooms in places of lodging where the guest rooms are not owned or substantially controlled by the entity that owns, leases, or operates the overall facility and the physical features of the guest room interiors are controlled by their individual owners are not required to comply with § 36.402 or the alterations requirements in section 224.1.1 of the 2010 Standards.

(3) Facilities with residential units and transient lodging units. Residential dwelling units that are designed and constructed for residential use exclusively are not subject to the transient lodging standards.

The Department of Justice's revised ADA title II regulation (35.151(f)) and title III regulation (36.406(e)) at **www.ada.gov** require the following:

Housing at a place of education. Housing at a place of education that is subject to this part [of the title III regulation or to this section of the title II regulation] shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806, subject to the following exceptions. For the purposes of the application of this section, the term "sleeping room" is intended to be used interchangeably with the term "guest room" as it is used in the transient lodging standards.

(1) Kitchens within housing units containing accessible sleeping rooms with mobility features (including suites and clustered sleeping rooms) or on floors containing accessible sleeping rooms with mobility features shall provide turning spaces that comply with section 809.2.2 of the 2010 Standards and kitchen work surfaces that comply with section 804.3 of the 2010 Standards.

(2) Multi-bedroom housing units containing accessible sleeping rooms with mobility features shall have an accessible route throughout the unit in accordance with section 809.2 of the 2010 Standards.

(3) Apartments or townhouse facilities that are provided by or on behalf of a place of education, which are leased on a year-round basis exclusively to graduate students or faculty and do not contain any public use or common use areas available for educational programming, are not subject to the transient lodging standards and shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

The Department of Justice's title II and title III regulations include requirements for social service center establishments which are noted in section 233 (Residential Facilities).

225 Storage

225.1 General. Storage *facilities* shall comply with 225.

225.2 Storage. Where storage is provided in accessible *spaces*, at least one of each type shall comply with 811.

Advisory 225.2 Storage. Types of storage include, but are not limited to, closets, cabinets, shelves, clothes rods, hooks, and drawers. Where provided, at least one of each type of storage must be within the reach ranges specified in 308; however, it is permissible to install additional storage outside the reach ranges.

225.2.1 Lockers. Where lockers are provided, at least 5 percent, but no fewer than one of each type, shall comply with 811.

Advisory 225.2.1 Lockers. Different types of lockers may include full-size and half-size lockers, as well as those specifically designed for storage of various sports equipment.

225.2.2 Self-Service Shelving. Self-service shelves shall be located on an *accessible* route complying with 402. Self-service shelving shall not be required to comply with 308.

Advisory 225.2.2 Self-Service Shelving. Self-service shelves include, but are not limited to, library, store, or post office shelves.

225.3 Self-Service Storage Facilities. *Self-service storage facilities* shall provide individual *self-service storage spaces* complying with these requirements in accordance with Table 225.3.

Table 225.3 Self-Service Storage Facilities

Total Spaces in Facility	Minimum Number of Spaces Required to be Accessible
1 to 200	5 percent, but no fewer than 1
201 and over	10, plus 2 percent of total number of units over 200

Advisory 225.3 Self-Service Storage Facilities. Although there are no technical requirements that are unique to self-service storage facilities, elements and spaces provided in facilities containing self-service storage spaces required to comply with these requirements must comply with this document where applicable. For example: the number of storage spaces required to comply with these requirements must provide Accessible Routes complying with Section 206; Accessible Means of Egress complying with Section 207; Parking Spaces complying with Section 208; and, where provided, other public use or common use elements and facilities such as toilet rooms, drinking fountains, and telephones must comply with the applicable requirements of this document.

225.3.1 Dispersion. Individual *self-service storage spaces* shall be dispersed throughout the various classes of *spaces* provided. Where more classes of *spaces* are provided than the number required to be *accessible*, the number of *spaces* shall not be required to exceed that required by Table 225.3. *Self-service storage spaces* complying with Table 225.3 shall not be required to be dispersed among *buildings* in a multi-*building facility*.

226 Dining Surfaces and Work Surfaces

226.1 General. Where dining surfaces are provided for the consumption of food or drink, at least 5 percent of the seating *spaces* and standing *spaces* at the dining surfaces shall comply with 902. In addition, where work surfaces are provided for use by other than employees, at least 5 percent shall comply with 902.

EXCEPTIONS: 1. Sales counters and service counters shall not be required to comply with 902.

2. Check writing surfaces provided at check-out aisles not required to comply with 904.3 shall not be required to comply with 902.

> **Advisory 226.1 General.** In facilities covered by the ADA, this requirement does not apply to work surfaces used only by employees. However, the ADA and, where applicable, Section 504 of the Rehabilitation Act of 1973, as amended, provide that employees are entitled to "reasonable accommodations." With respect to work surfaces, this means that employers may need to procure or adjust work stations such as desks, laboratory and work benches, fume hoods, reception counters, teller windows, study carrels, commercial kitchen counters, and conference tables to accommodate the individual needs of employees with disabilities on an "as needed" basis. Consider work surfaces that are flexible and permit installation at variable heights and clearances.

226.2 Dispersion. Dining surfaces and work surfaces required to comply with 902 shall be dispersed throughout the *space* or *facility* containing dining surfaces and work surfaces.

227 Sales and Service

227.1 General. Where provided, check-out aisles, sales counters, service counters, food service lines, queues, and waiting lines shall comply with 227 and 904.

227.2 Check-Out Aisles. Where check-out aisles are provided, check-out aisles complying with 904.3 shall be provided in accordance with Table 227.2. Where check-out aisles serve different functions, check-out aisles complying with 904.3 shall be provided in accordance with Table 227.2 for each function. Where check-out aisles are dispersed throughout the *building* or *facility*, check-out aisles complying with 904.3 shall be dispersed.

EXCEPTION: Where the selling *space* is under 5000 square feet (465 m^2) no more than one check-out aisle complying with 904.3 shall be required.

Table 227.2 Check-Out Aisles

Number of Check-Out Aisles of Each Function	Minimum Number of Check-Out Aisles of Each Function Required to Comply with 904.3
1 to 4	1
5 to 8	2
9 to 15	3
16 and over	3, plus 20 percent of additional aisles

227.2.1 Altered Check-Out Aisles. Where check-out aisles are *altered*, at least one of each check-out aisle serving each function shall comply with 904.3 until the number of check-out aisles complies with 227.2.

227.3 Counters. Where provided, at least one of each type of sales counter and service counter shall comply with 904.4. Where counters are dispersed throughout the *building* or *facility*, counters complying with 904.4 also shall be dispersed.

Advisory 227.3 Counters. Types of counters that provide different services in the same facility include, but are not limited to, order, pick-up, express, and returns. One continuous counter can be used to provide different types of service. For example, order and pick-up are different services. It would not be acceptable to provide access only to the part of the counter where orders are taken when orders are picked-up at a different location on the same counter. Both the order and pick-up section of the counter must be accessible.

227.4 Food Service Lines. Food service lines shall comply with 904.5. Where self-service shelves are provided, at least 50 percent, but no fewer than one, of each type provided shall comply with 308.

227.5 Queues and Waiting Lines. Queues and waiting lines servicing counters or check-out aisles required to comply with 904.3 or 904.4 shall comply with 403.

228 Depositories, Vending Machines, Change Machines, Mail Boxes, and Fuel Dispensers

228.1 General. Where provided, at least one of each type of depository, vending machine, change machine, and fuel dispenser shall comply with 309.

EXCEPTION: Drive-up only depositories shall not be required to comply with 309.

Advisory 228.1 General. Depositories include, but are not limited to, night receptacles in banks, post offices, video stores, and libraries.

228.2 Mail Boxes. Where *mail boxes* are provided in an interior location, at least 5 percent, but no fewer than one, of each type shall comply with 309. In residential *facilities*, where *mail boxes* are provided for each *residential dwelling unit*, *mail boxes* complying with 309 shall be provided for each *residential dwelling unit* required to provide mobility features complying with 809.2 through 809.4.

229 Windows

229.1 General. Where glazed openings are provided in *accessible* rooms or *spaces* for operation by occupants, at least one opening shall comply with 309. Each glazed opening required by an *administrative authority* to be operable shall comply with 309.

EXCEPTION: 1. Glazed openings in *residential dwelling units* required to comply with 809 shall not be required to comply with 229.

2. Glazed openings in guest rooms required to provide communication features and in guest rooms required to comply with 206.5.3 shall not be required to comply with 229.

230 Two-Way Communication Systems

230.1 General. Where a two-way communication system is provided to gain admittance to a *building* or *facility* or to restricted areas within a *building* or *facility*, the system shall comply with 708.

> **Advisory 230.1 General.** This requirement applies to facilities such as office buildings, courthouses, and other facilities where admittance to the building or restricted spaces is dependent on two-way communication systems.

231 Judicial Facilities

231.1 General. Judicial *facilities* shall comply with 231.

231.2 Courtrooms. Each courtroom shall comply with 808.

231.3 Holding Cells. Where provided, central holding cells and court-floor holding cells shall comply with 231.3.

231.3.1 Central Holding Cells. Where separate central holding cells are provided for adult male, juvenile male, adult female, or juvenile female, one of each type shall comply with 807.2. Where central holding cells are provided and are not separated by age or sex, at least one cell complying with 807.2 shall be provided.

231.3.2 Court-Floor Holding Cells. Where separate court-floor holding cells are provided for adult male, juvenile male, adult female, or juvenile female, each courtroom shall be served by one cell of each type complying with 807.2. Where court-floor holding cells are provided and are not separated by age or sex, courtrooms shall be served by at least one cell complying with 807.2. Cells may serve more than one courtroom.

231.4 Visiting Areas. Visiting areas shall comply with 231.4.

231.4.1 Cubicles and Counters. At least 5 percent, but no fewer than one, of cubicles shall comply with 902 on both the visitor and detainee sides. Where counters are provided, at least one shall comply with 904.4.2 on both the visitor and detainee sides.

EXCEPTION: The detainee side of cubicles or counters at non-contact visiting areas not serving holding cells required to comply with 231 shall not be required to comply with 902 or 904.4.2.

231.4.2 Partitions. Where solid partitions or security glazing separate visitors from detainees at least one of each type of cubicle or counter partition shall comply with 904.6.

232 Detention Facilities and Correctional Facilities

232.1 General. *Buildings*, *facilities*, or portions thereof, in which people are detained for penal or correction purposes, or in which the liberty of the inmates is restricted for security reasons shall comply with 232.

Advisory 232.1 General. Detention facilities include, but are not limited to, jails, detention centers, and holding cells in police stations. Correctional facilities include, but are not limited to, prisons, reformatories, and correctional centers.

Note to Reader: The Department of Justice's revised ADA title II regulation (35.151)(k)) at **www.ada.gov** requires the following:

Detention and correctional facilities. (1) New construction of jails, prisons, and other detention and correctional facilities shall comply with the 2010 Standards except that public entities shall provide accessible mobility features complying with section 807.2 of the 2010 Standards for a minimum of 3%, but no fewer than one, of the total number of cells in a facility. Cells with mobility features shall be provided in each classification level.

(2) Alterations to detention and correctional facilities. Alterations to jails, prisons, and other detention and correctional facilities shall comply with the 2010 Standards except that public entities shall provide accessible mobility features complying with section 807.2 of the 2010 Standards for a minimum of 3%, but no fewer than one, of the total number of cells being altered until at least 3%, but no fewer than one, of the total number of cells in a facility shall provide mobility features complying with section 807.2. Altered cells with mobility features shall be provided in each classification level. However, when alterations are made to specific cells, detention and correctional facility operators may satisfy their obligation to provide the required number of cells with mobility features by providing the required mobility features in substitute cells (cells other than those where alterations are originally planned), provided that each substitute cell—
(i) Is located within the same prison site;
(ii) Is integrated with other cells to the maximum extent feasible;
(iii) Has, at a minimum, equal physical access as the altered cells to areas used by inmates or detainees for visitation, dining, recreation, educational programs, medical services, work programs, religious services, and participation in other programs that the facility offers to inmates or detainees; and,
(iv) If it is technically infeasible to locate a substitute cell within the same prison site, a substitute cell must be provided at another prison site within the corrections system.

(3) With respect to medical and long-term care facilities in jails, prisons, and other detention and correctional facilities, public entities shall apply the 2010 Standards technical and scoping requirements for those facilities irrespective of whether those facilities are licensed.

232.2 General Holding Cells and General Housing Cells. General holding cells and general housing cells shall be provided in accordance with 232.2.

EXCEPTION: *Alterations* to cells shall not be required to comply except to the extent determined by the Attorney General.

Advisory 232.2 General Holding Cells and General Housing Cells. Accessible cells or rooms should be dispersed among different levels of security, housing categories, and holding classifications (e.g., male/female and adult/juvenile) to facilitate access. Many detention and correctional facilities are designed so that certain areas (e.g., "shift" areas) can be adapted to serve as different types of housing according to need. For example, a shift area serving as a medium-security housing unit might be redesignated for a period of time as a high-security housing unit to meet capacity needs. Placement of accessible cells or rooms in shift areas may allow additional flexibility in meeting requirements for dispersion of accessible cells or rooms.

Advisory 232.2 General Holding Cells and General Housing Cells Exception. Although these requirements do not specify that cells be accessible as a consequence of an alteration, title II of the ADA requires that each service, program, or activity conducted by a public entity, when viewed in its entirety, be readily accessible to and usable by individuals with disabilities. This requirement must be met unless doing so would fundamentally alter the nature of a service, program, or activity or would result in undue financial and administrative burdens.

232.2.1 Cells with Mobility Features. At least 2 percent, but no fewer than one, of the total number of cells in a *facility* shall provide mobility features complying with 807.2.

232.2.1.1 Beds. In cells having more than 25 beds, at least 5 percent of the beds shall have clear floor *space* complying with 807.2.3.

232.2.2 Cells with Communication Features. At least 2 percent, but no fewer than one, of the total number of general holding cells and general housing cells equipped with audible emergency alarm systems and permanently installed telephones within the cell shall provide communication features complying with 807.3.

232.3 Special Holding Cells and Special Housing Cells. Where special holding cells or special housing cells are provided, at least one cell serving each purpose shall provide mobility features complying with 807.2. Cells subject to this requirement include, but are not limited to, those used for purposes of orientation, protective custody, administrative or disciplinary detention or segregation, detoxification, and medical isolation.

EXCEPTION: *Alterations* to cells shall not be required to comply except to the extent determined by the Attorney General.

232.4 Medical Care Facilities. Patient bedrooms or cells required to comply with 223 shall be provided in addition to any medical isolation cells required to comply with 232.3.

232.5 Visiting Areas. Visiting areas shall comply with 232.5.

232.5.1 Cubicles and Counters. At least 5 percent, but no fewer than one, of cubicles shall comply with 902 on both the visitor and detainee sides. Where counters are provided, at least one shall comply with 904.4.2 on both the visitor and detainee or inmate sides.

EXCEPTION: The inmate or detainee side of cubicles or counters at non-contact visiting areas not serving holding cells or housing cells required to comply with 232 shall not be required to comply with 902 or 904.4.2.

232.5.2 Partitions. Where solid partitions or security glazing separate visitors from detainees or inmates at least one of each type of cubicle or counter partition shall comply with 904.6.

233 Residential Facilities

233.1 General. *Facilities* with *residential dwelling units* shall comply with 233.

Advisory 233.1 General. Section 233 outlines the requirements for residential facilities subject to the Americans with Disabilities Act of 1990. The facilities covered by Section 233, as well as other facilities not covered by this section, may still be subject to other Federal laws such as the Fair Housing Act and Section 504 of the Rehabilitation Act of 1973, as amended. For example, the Fair Housing Act requires that certain residential structures having four or more multi-family dwelling units, regardless of whether they are privately owned or federally assisted, include certain features of accessible and adaptable design according to guidelines established by the U.S. Department of Housing and Urban Development (HUD). These laws and the appropriate regulations should be consulted before proceeding with the design and construction of residential facilities.

Residential facilities containing residential dwelling units provided by entities subject to HUD's Section 504 regulations and residential dwelling units covered by Section 233.3 must comply with the technical and scoping requirements in Chapters 1 through 10 included this document. Section 233 is not a stand-alone section; this section only addresses the minimum number of residential dwelling units within a facility required to comply with Chapter 8. However, residential facilities must also comply with the requirements of this document. For example: Section 206.5.4 requires all doors and doorways providing user passage in residential dwelling units providing mobility features to comply with Section 404; Section 206.7.6 permits platform lifts to be used to connect levels within residential dwelling units providing mobility features; Section 208 provides general scoping for accessible parking and Section 208.2.3.1 specifies the required number of accessible parking spaces for each residential dwelling unit providing mobility features; Section 228.2 requires mail boxes to be within reach ranges when they serve residential dwelling units providing mobility features; play areas are addressed in Section 240; and swimming pools are addressed in Section 242. There are special provisions applicable to facilities containing residential dwelling units at: Exception 3 to 202.3; Exception to 202.4; 203.8; and Exception 4 to 206.2.3.

233.2 Residential Dwelling Units Provided by Entities Subject to HUD Section 504 Regulations. Where *facilities* with *residential dwelling units* are provided by entities subject to regulations issued by the Department of Housing and Urban Development (HUD) under Section 504 of the Rehabilitation Act

of 1973, as amended, such entities shall provide *residential dwelling units* with mobility features complying with 809.2 through 809.4 in a number required by the applicable HUD regulations. *Residential dwelling units* required to provide mobility features complying with 809.2 through 809.4 shall be on an *accessible* route as required by 206. In addition, such entities shall provide *residential dwelling units* with communication features complying with 809.5 in a number required by the applicable HUD regulations. Entities subject to 233.2 shall not be required to comply with 233.3.

Advisory 233.2 Residential Dwelling Units Provided by Entities Subject to HUD Section 504 Regulations. Section 233.2 requires that entities subject to HUD's regulations implementing Section 504 of the Rehabilitation Act of 1973, as amended, provide residential dwelling units containing mobility features and residential dwelling units containing communication features complying with these regulations in a number specified in HUD's Section 504 regulations. Further, the residential dwelling units provided must be dispersed according to HUD's Section 504 criteria. In addition, Section 233.2 defers to HUD the specification of criteria by which the technical requirements of this document will apply to alterations of existing facilities subject to HUD's Section 504 regulations.

233.3 Residential Dwelling Units Provided by Entities Not Subject to HUD Section 504 Regulations. *Facilities* with *residential dwelling units* provided by entities not subject to regulations issued by the Department of Housing and Urban Development (HUD) under Section 504 of the Rehabilitation Act of 1973, as amended, shall comply with 233.3.

233.3.1 Minimum Number: New Construction. Newly constructed *facilities* with *residential dwelling units* shall comply with 233.3.1.

EXCEPTION: Where *facilities* contain 15 or fewer *residential dwelling units*, the requirements of 233.3.1.1 and 233.3.1.2 shall apply to the total number of *residential dwelling units* that are constructed under a single contract, or are developed as a whole, whether or not located on a common *site*.

233.3.1.1 Residential Dwelling Units with Mobility Features. In *facilities* with *residential dwelling units*, at least 5 percent, but no fewer than one unit, of the total number of *residential dwelling units* shall provide mobility features complying with 809.2 through 809.4 and shall be on an *accessible* route as required by 206.

233.3.1.2 Residential Dwelling Units with Communication Features. In *facilities* with *residential dwelling units*, at least 2 percent, but no fewer than one unit, of the total number of *residential dwelling units* shall provide communication features complying with 809.5.

233.3.2 Residential Dwelling Units for Sale. *Residential dwelling units* offered for sale shall provide *accessible* features to the extent required by regulations issued by Federal agencies under the Americans with Disabilities Act or Section 504 of the Rehabilitation Act of 1973, as amended.

Advisory 233.3.2 Residential Dwelling Units for Sale. A public entity that conducts a program to build housing for purchase by individual home buyers must provide access according to the requirements of the ADA regulations and a program receiving Federal financial assistance must comply with the applicable Section 504 regulation.

Note to Reader: The Department of Justice's revised ADA title II regulation (35.151)(j)) at **www.ada.gov** requires the following:

Facilities with residential dwelling units for sale to individual owners.

(1) Residential dwelling units designed and constructed or altered by public entities that will be offered for sale to individuals shall comply with the requirements for residential facilities in the 2010 Standards including sections 233 and 809.

(2) The requirements of paragraph (1) also apply to housing programs that are operated by public entities where design and construction of particular residential dwelling units takes place only after a specific buyer has been identified. In such programs, the covered entity must provide the units that comply with the requirements for accessible features to those pre-identified buyers with disabilities who have requested such a unit.

233.3.3 Additions. Where an *addition* to an existing *building* results in an increase in the number of *residential dwelling units,* the requirements of 233.3.1 shall apply only to the *residential dwelling units* that are *added* until the total number of *residential dwelling units* complies with the minimum number required by 233.3.1. *Residential dwelling units* required to comply with 233.3.1.1 shall be on an *accessible* route as required by 206.

233.3.4 Alterations. *Alterations* shall comply with 233.3.4.

EXCEPTION: Where compliance with 809.2, 809.3, or 809.4 is *technically infeasible*, or where it is *technically infeasible* to provide an *accessible* route to a *residential dwelling unit*, the entity shall be permitted to *alter* or construct a comparable *residential dwelling unit* to comply with 809.2 through 809.4 provided that the minimum number of *residential dwelling units* required by 233.3.1.1 and 233.3.1.2, as applicable, is satisfied.

Advisory 233.3.4 Alterations Exception. A substituted dwelling unit must be comparable to the dwelling unit that is not made accessible. Factors to be considered in comparing one dwelling unit to another should include the number of bedrooms; amenities provided within the dwelling unit; types of common spaces provided within the facility; and location with respect to community resources and services, such as public transportation and civic, recreational, and mercantile facilities.

233.3.4.1 Alterations to Vacated Buildings. Where a *building* is vacated for the purposes of *alteration*, and the *altered building* contains more than 15 *residential dwelling units*, at least 5 percent of the *residential dwelling units* shall comply with 809.2 through 809.4 and shall be on an *accessible* route as required by 206. In addition, at least 2 percent of the *residential dwelling units* shall comply with 809.5.

Advisory 233.3.4.1 Alterations to Vacated Buildings. This provision is intended to apply where a building is vacated with the intent to alter the building. Buildings that are vacated solely for pest control or asbestos removal are not subject to the requirements to provide residential dwelling units with mobility features or communication features.

233.3.4.2 Alterations to Individual Residential Dwelling Units. In individual *residential dwelling units*, where a bathroom or a kitchen is substantially *altered*, and at least one other room is *altered*, the requirements of 233.3.1 shall apply to the *altered residential dwelling units* until the total number of *residential dwelling units* complies with the minimum number required by 233.3.1.1 and 233.3.1.2. *Residential dwelling units* required to comply with 233.3.1.1 shall be on an *accessible* route as required by 206.

EXCEPTION: Where *facilities* contain 15 or fewer r*esidential dwelling units*, the requirements of 233.3.1.1 and 233.3.1.2 shall apply to the total number of *residential dwelling units* that are *altered* under a single contract, or are developed as a whole, whether or not located on a common *site*.

Advisory 233.3.4.2 Alterations to Individual Residential Dwelling Units. Section 233.3.4.2 uses the terms "substantially altered" and "altered." A substantial alteration to a kitchen or bathroom includes, but is not limited to, alterations that are changes to or rearrangements in the plan configuration, or replacement of cabinetry. Substantial alterations do not include normal maintenance or appliance and fixture replacement, unless such maintenance or replacement requires changes to or rearrangements in the plan configuration, or replacement of cabinetry. The term "alteration" is defined both in Section 106 of these requirements and in the Department of Justice ADA regulations.

233.3.5 Dispersion. *Residential dwelling units* required to provide mobility features complying with 809.2 through 809.4 and *residential dwelling units* required to provide communication features complying with 809.5 shall be dispersed among the various types of *residential dwelling units* in the *facility* and shall provide choices of *residential dwelling units* comparable to, and integrated with, those available to other residents.

EXCEPTION: Where multi-*story residential dwelling units* are one of the types of *residential dwelling units* provided, one-*story residential dwelling units* shall be permitted as a substitute for multi-*story residential dwelling units* where equivalent *spaces* and amenities are provided in the one-*story residential dwelling unit*.

Note to Reader: The Department of Justice's revised ADA title II regulation (35.151(e)) and title III regulation (36.406(d)) at **www.ada.gov** require the following:

Social service center establishments. Group homes, halfway houses, shelters, or similar social service center establishments that provide either temporary sleeping accommodations or residential dwelling units that are subject to this part [of the title III regulation or to this section of the title II regulation] shall comply with the provisions of the 2010 Standards applicable to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

(1) In sleeping rooms with more than 25 beds covered by this part [of the title III regulation or to this section of the title II regulation], a minimum of 5% of the beds shall have clear floor space complying with section 806.2.3 of the 2010 Standards.

(2) Facilities with more than 50 beds covered by this part [of the title III regulation or to this section of the title II regulation] that provide common use bathing facilities shall provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat, and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower shall be provided for each group.

The Department of Justice's revised ADA title II regulation (35.151(f)) and title III regulation (36.406(e)) at **www.ada.gov** require the following:

Housing at a place of education. Housing at a place of education that is subject to this part [of the title III regulation or to this section of the title II regulation] shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806, subject to the following exceptions. For the purposes of the application of this section, the term "sleeping room" is intended to be used interchangeably with the term "guest room" as it is used in the transient lodging standards.

(1) Kitchens within housing units containing accessible sleeping rooms with mobility features (including suites and clustered sleeping rooms) or on floors containing accessible sleeping rooms with mobility features shall provide turning spaces that comply with section 809.2.2 of the 2010 Standards and kitchen work surfaces that comply with section 804.3 of the 2010 Standards.

(2) Multi-bedroom housing units containing accessible sleeping rooms with mobility features shall have an accessible route throughout the unit in accordance with section 809.2 of the 2010 Standards.

(3) Apartments or townhouse facilities that are provided by or on behalf of a place of education, which are leased on a year-round basis exclusively to graduate students or faculty and do not contain any public use or common use areas available for educational programming, are not subject to the transient lodging standards and shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

234 Amusement Rides

234.1 General. A*musement rides* shall comply with 234.

EXCEPTION: Mobile or portable *amusement rides* shall not be required to comply with 234.

Advisory 234.1 General. These requirements apply generally to newly designed and constructed amusement rides and attractions. A custom designed and constructed ride is new upon its first use, which is the first time amusement park patrons take the ride. With respect to amusement rides purchased from other entities, new refers to the first permanent installation of the ride, whether it is used off the shelf or modified before it is installed. Where amusement rides are moved after several seasons to another area of the park or to another park, the ride would not be considered newly designed or newly constructed.

Some amusement rides and attractions that have unique designs and features are not addressed by these requirements. In those situations, these requirements are to be applied to the extent possible. An example of an amusement ride not specifically addressed by these requirements includes "virtual reality" rides where the device does not move through a fixed course within a defined area. An accessible route must be provided to these rides. Where an attraction or ride has unique features for which there are no applicable scoping provisions, then a reasonable number, but at least one, of the features must be located on an accessible route. Where there are appropriate technical provisions, they must be applied to the elements that are covered by the scoping provisions.

Advisory 234.1 General Exception. Mobile or temporary rides are those set up for short periods of time such as traveling carnivals, State and county fairs, and festivals. The amusement rides that are covered by 234.1 are ones that are not regularly assembled and disassembled.

234.2 Load and Unload Areas. Load and unload areas serving *amusement rides* shall comply with 1002.3.

234.3 Minimum Number. *Amusement rides* shall provide at least one *wheelchair space* complying with 1002.4, or at least one *amusement ride seat* designed for transfer complying with 1002.5, or at least one *transfer device* complying with 1002.6.

EXCEPTIONS: 1. *Amusement rides* that are controlled or operated by the rider shall not be required to comply with 234.3.

2. *Amusement rides* designed primarily for children, where children are assisted on and off the ride by an adult, shall not be required to comply with 234.3.

3. *Amusement rides* that do not provide *amusement ride seats* shall not be required to comply with 234.3.

Advisory 234.3 Minimum Number Exceptions 1 through 3. Amusement rides controlled or operated by the rider, designed for children, or rides without ride seats are not required to comply with 234.3. These rides are not exempt from the other provisions in 234 requiring an accessible route to the load and unload areas and to the ride. The exception does not apply to those rides where patrons may cause the ride to make incidental movements, but where the patron otherwise has no control over the ride.

Advisory 234.3 Minimum Number Exception 2. The exception is limited to those rides designed "primarily" for children, where children are assisted on and off the ride by an adult. This exception is limited to those rides designed for children and not for the occasional adult user. An accessible route to and turning space in the load and unload area will provide access for adults and family members assisting children on and off these rides.

234.4 Existing Amusement Rides. Where existing *amusement rides* are *altered*, the *alteration* shall comply with 234.4.

Advisory 234.4 Existing Amusement Rides. Routine maintenance, painting, and changing of theme boards are examples of activities that do not constitute an alteration subject to this section.

234.4.1 Load and Unload Areas. Where load and unload areas serving existing *amusement rides* are newly designed and constructed, the load and unload areas shall comply with 1002.3.

234.4.2 Minimum Number. Where the structural or operational characteristics of an *amusement ride* are *altered* to the extent that the *amusement ride*'s performance differs from that specified by the manufacturer or the original design, the *amusement ride* shall comply with 234.3.

235 Recreational Boating Facilities

235.1 General. Recreational boating *facilities* shall comply with 235.

235.2 Boat Slips. *Boat slips* complying with 1003.3.1 shall be provided in accordance with Table 235.2. Where the number of *boat slips* is not identified, each 40 feet (12 m) of *boat slip* edge provided along the perimeter of the pier shall be counted as one *boat slip* for the purpose of this section.

Table 235.2 Boat Slips

Total Number of Boat Slips Provided in Facility	Minimum Number of Required Accessible Boat Slips
1 to 25	1
26 to 50	2
51 to 100	3
101 to 150	4
151 to 300	5
301 to 400	6
401 to 500	7
501 to 600	8

Table 235.2 Boat Slips

Total Number of Boat Slips Provided in Facility	Minimum Number of Required Accessible Boat Slips
601 to 700	9
701 to 800	10
801 to 900	11
901 to 1000	12
1001 and over	12, plus 1 for every 100, or fraction thereof, over 1000

Advisory 235.2 Boat Slips. The requirement for boat slips also applies to piers where boat slips are not demarcated. For example, a single pier 25 feet (7620 mm) long and 5 feet (1525 mm) wide (the minimum width specified by Section 1003.3) allows boats to moor on three sides. Because the number of boat slips is not demarcated, the total length of boat slip edge (55 feet, 17 m) must be used to determine the number of boat slips provided (two). This number is based on the specification in Section 235.2 that each 40 feet (12 m) of boat slip edge, or fraction thereof, counts as one boat slip. In this example, Table 235.2 would require one boat slip to be accessible.

235.2.1 Dispersion. *Boat slips* complying with 1003.3.1 shall be dispersed throughout the various types of *boat slips* provided. Where the minimum number of *boat slips* required to comply with 1003.3.1 has been met, no further dispersion shall be required.

Advisory 235.2.1 Dispersion. Types of boat slips are based on the size of the boat slips; whether single berths or double berths, shallow water or deep water, transient or longer-term lease, covered or uncovered; and whether slips are equipped with features such as telephone, water, electricity or cable connections. The term “boat slip” is intended to cover any pier area other than launch ramp boarding piers where recreational boats are moored for purposes of berthing, embarking, or disembarking. For example, a fuel pier may contain boat slips, and this type of short term slip would be included in determining compliance with 235.2.

235.3 Boarding Piers at Boat Launch Ramps. Where *boarding piers* are provided at *boat launch ramps*, at least 5 percent, but no fewer than one, of the *boarding piers* shall comply with 1003.3.2.

236 Exercise Machines and Equipment

236.1 General. At least one of each type of exercise machine and equipment shall comply with 1004.

Advisory 236.1 General. Most strength training equipment and machines are considered different types. Where operators provide a biceps curl machine and cable-cross-over machine, both machines are required to meet the provisions in this section, even though an individual may be able to work on their biceps through both types of equipment.

Similarly, there are many types of cardiovascular exercise machines, such as stationary bicycles, rowing machines, stair climbers, and treadmills. Each machine provides a cardiovascular exercise and is considered a different type for purposes of these requirements.

237 Fishing Piers and Platforms

237.1 General. Fishing piers and platforms shall comply with 1005.

238 Golf Facilities

238.1 General. Golf *facilities* shall comply with 238.

238.2 Golf Courses. Golf courses shall comply with 238.2.

238.2.1 Teeing Grounds. Where one *teeing ground* is provided for a hole, the *teeing ground* shall be designed and constructed so that a golf car can enter and exit the *teeing ground*. Where two *teeing grounds* are provided for a hole, the forward *teeing ground* shall be designed and constructed so that a golf car can enter and exit the *teeing ground*. Where three or more *teeing grounds* are provided for a hole, at least two *teeing grounds*, including the forward *teeing ground*, shall be designed and constructed so that a golf car can enter and exit each *teeing ground*.

EXCEPTION: In existing golf courses, the forward *teeing ground* shall not be required to be one of the *teeing grounds* on a hole designed and constructed so that a golf car can enter and exit the *teeing ground* where compliance is not feasible due to terrain.

238.2.2 Putting Greens. Putting greens shall be designed and constructed so that a golf car can enter and exit the putting green.

238.2.3 Weather Shelters. Where provided, weather shelters shall be designed and constructed so that a golf car can enter and exit the weather shelter and shall comply with 1006.4.

238.3 Practice Putting Greens, Practice Teeing Grounds, and Teeing Stations at Driving Ranges. At least 5 percent, but no fewer than one, of practice putting greens, practice *teeing grounds*, and teeing stations at driving ranges shall be designed and constructed so that a golf car can enter and exit the practice putting greens, practice *teeing grounds*, and teeing stations at driving ranges.

239 Miniature Golf Facilities

239.1 General. Miniature golf *facilities* shall comply with 239.

239.2 Minimum Number. At least 50 percent of holes on miniature golf courses shall comply with 1007.3.

Advisory 239.2 Minimum Number. Where possible, providing access to all holes on a miniature golf course is recommended. If a course is designed with the minimum 50 percent accessible holes, designers or operators are encouraged to select holes which provide for an equivalent experience to the maximum extent possible.

239.3 Miniature Golf Course Configuration. Miniature golf courses shall be configured so that the holes complying with 1007.3 are consecutive. Miniature golf courses shall provide an *accessible* route from the last hole complying with 1007.3 to the course *entrance* or exit without requiring travel through any other holes on the course.

EXCEPTION: One break in the sequence of consecutive holes shall be permitted provided that the last hole on the miniature golf course is the last hole in the sequence.

Advisory 239.3 Miniature Golf Course Configuration. Where only the minimum 50 percent of the holes are accessible, an accessible route from the last accessible hole to the course exit or entrance must not require travel back through other holes. In some cases, this may require an additional accessible route. Other options include increasing the number of accessible holes in a way that limits the distance needed to connect the last accessible hole with the course exit or entrance.

240 Play Areas

240.1 General. *Play areas* for children ages 2 and over shall comply with 240. Where separate *play areas* are provided within a *site* for specific age groups, each *play area* shall comply with 240.

EXCEPTIONS: 1. *Play areas* located in family child care *facilities* where the proprietor actually resides shall not be required to comply with 240.

2. In existing *play areas*, where *play components* are relocated for the purposes of creating safe *use zones* and the ground surface is not *altered* or extended for more than one *use zone*, the *play area* shall not be required to comply with 240.

3. *Amusement attractions* shall not be required to comply with 240.

4. Where *play components* are *altered* and the ground surface is not *altered*, the ground surface shall not be required to comply with 1008.2.6 unless required by 202.4.

Advisory 240.1 General. Play areas may be located on exterior sites or within a building. Where separate play areas are provided within a site for children in specified age groups (e.g., preschool (ages 2 to 5) and school age (ages 5 to 12)), each play area must comply with this section. Where play areas are provided for the same age group on a site but are geographically separated (e.g., one is located next to a picnic area and another is located next to a softball field), they are considered separate play areas and each play area must comply with this section.

240.1.1 Additions. Where *play areas* are designed and constructed in phases, the requirements of 240 shall apply to each successive *addition* so that when the *addition* is completed, the entire *play area* complies with all the applicable requirements of 240.

Advisory 240.1.1 Additions. These requirements are to be applied so that when each successive addition is completed, the entire play area complies with all applicable provisions. For example, a play area is built in two phases. In the first phase, there are 10 elevated play components and 10 elevated play components are added in the second phase for a total of 20 elevated play components in the play area. When the first phase was completed, at least 5 elevated play components, including at least 3 different types, were to be provided on an accessible route. When the second phase is completed, at least 10 elevated play components must be located on an accessible route, and at least 7 ground level play components, including 4 different types, must be provided on an accessible route. At the time the second phase is complete, ramps must be used to connect at least 5 of the elevated play components and transfer systems are permitted to be used to connect the rest of the elevated play components required to be located on an accessible route.

240.2 Play Components. Where provided, *play components* shall comply with 240.2.

240.2.1 Ground Level Play Components. *Ground level play components* shall be provided in the number and types required by 240.2.1. *Ground level play components* that are provided to comply with 240.2.1.1 shall be permitted to satisfy the additional number required by 240.2.1.2 if the minimum required types of *play components* are satisfied. Where two or more required *ground level play components* are provided, they shall be dispersed throughout the *play area* and integrated with other *play components*.

Advisory 240.2.1 Ground Level Play Components. Examples of ground level play components may include spring rockers, swings, diggers, and stand-alone slides. When distinguishing between the different types of ground level play components, consider the general experience provided by the play component. Examples of different types of experiences include, but are not limited to, rocking, swinging, climbing, spinning, and sliding.

A spiral slide may provide a slightly different experience from a straight slide, but sliding is the general experience and therefore a spiral slide is not considered a different type of play component from a straight slide.

Ground level play components accessed by children with disabilities must be integrated into the play area. Designers should consider the optimal layout of ground level play components accessed by children with disabilities to foster interaction and socialization among all children. Grouping all ground level play components accessed by children with disabilities in one location is not considered integrated.

Where a stand-alone slide is provided, an accessible route must connect the base of the stairs at the entry point to the exit point of the slide. A ramp or transfer system to the top of the slide is not required. Where a sand box is provided, an accessible route must connect to the border of the sand box. Accessibility to the sand box would be enhanced by providing a transfer system into the sand or by providing a raised sand table with knee clearance complying with 1008.4.3.

Advisory 240.2.1 Ground Level Play Components (Continued). Ramps are preferred over transfer systems since not all children who use wheelchairs or other mobility devices may be able to use, or may choose not to use, transfer systems. Where ramps connect elevated play components, the maximum rise of any ramp run is limited to 12 inches (305 mm). Where possible, designers and operators are encouraged to provide ramps with a slope less than the 1:12 maximum. Berms or sculpted dirt may be used to provide elevation and may be part of an accessible route to composite play structures.

Platform lifts are permitted as a part of an accessible route. Because lifts must be independently operable, operators should carefully consider the appropriateness of their use in unsupervised settings.

240.2.1.1 Minimum Number and Types. Where *ground level play components* are provided, at least one of each type shall be on an *accessible* route and shall comply with 1008.4.

240.2.1.2 Additional Number and Types. Where *elevated play components* are provided, *ground level play components* shall be provided in accordance with Table 240.2.1.2 and shall comply with 1008.4.

EXCEPTION: If at least 50 percent of the *elevated play components* are connected by a *ramp* and at least 3 of the *elevated play components* connected by the *ramp* are different types of *play components*, the *play area* shall not be required to comply with 240.2.1.2.

Table 240.2.1.2 Number and Types of Ground Level Play Components Required to be on Accessible Routes

Number of Elevated Play Components Provided	Minimum Number of Ground Level Play Components Required to be on an Accessible Route	Minimum Number of Different Types of Ground Level Play Components Required to be on an Accessible Route
1	Not applicable	Not applicable
2 to 4	1	1
5 to 7	2	2
8 to 10	3	3
11 to 13	4	3
14 to 16	5	3
17 to 19	6	3
20 to 22	7	4
23 to 25	8	4
26 and over	8, plus 1 for each additional 3, or fraction thereof, over 25	5

Advisory 240.2.1.2 Additional Number and Types. Where a large play area includes two or more composite play structures designed for the same age group, the total number of elevated play components on all the composite play structures must be added to determine the additional number and types of ground level play components that must be provided on an accessible route.

240.2.2 Elevated Play Components. Where *elevated play components* are provided, at least 50 percent shall be on an *accessible* route and shall comply with 1008.4.

Advisory 240.2.2 Elevated Play Components. A double or triple slide that is part of a composite play structure is one elevated play component. For purposes of this section, ramps, transfer systems, steps, decks, and roofs are not considered elevated play components. Although socialization and pretend play can occur on these elements, they are not primarily intended for play.

Some play components that are attached to a composite play structure can be approached or exited at the ground level or above grade from a platform or deck. For example, a climber attached to a composite play structure can be approached or exited at the ground level or above grade from a platform or deck on a composite play structure.

Play components that are attached to a composite play structure and can be approached from a platform or deck (e.g., climbers and overhead play components) are considered elevated play components. These play components are not considered ground level play components and do not count toward the requirements in 240.2.1.2 regarding the number of ground level play components that must be located on an accessible route.

241 Saunas and Steam Rooms

241 General. Where provided, saunas and steam rooms shall comply with 612.

EXCEPTION: Where saunas or steam rooms are clustered at a single location, no more than 5 percent of the saunas and steam rooms, but no fewer than one, of each type in each cluster shall be required to comply with 612.

242 Swimming Pools, Wading Pools, and Spas

242.1 General. Swimming pools, wading pools, and spas shall comply with 242.

242.2 Swimming Pools. At least two *accessible* means of entry shall be provided for swimming pools. *Accessible* means of entry shall be swimming pool lifts complying with 1009.2; sloped entries complying with 1009.3; transfer walls complying with 1009.4; transfer systems complying with 1009.5; and pool stairs complying with 1009.6. At least one *accessible* means of entry provided shall comply with 1009.2 or 1009.3.

EXCEPTIONS: 1. Where a swimming pool has less than 300 linear feet (91 m) of swimming pool wall, no more than one *accessible* means of entry shall be required provided that the *accessible* means of entry is a swimming pool lift complying with 1009.2 or sloped entry complying with 1009.3.

2. Wave action pools, leisure rivers, sand bottom pools, and other pools where user access is limited to one area shall not be required to provide more than one *accessible* means of entry provided that the *accessible* means of entry is a swimming pool lift complying with 1009.2, a sloped entry complying with 1009.3, or a transfer system complying with 1009.5.

3. *Catch pools* shall not be required to provide an *accessible* means of entry provided that the *catch pool* edge is on an *accessible* route.

Advisory 242.2 Swimming Pools. Where more than one means of access is provided into the water, it is recommended that the means be different. Providing different means of access will better serve the varying needs of people with disabilities in getting into and out of a swimming pool. It is also recommended that where two or more means of access are provided, they not be provided in the same location in the pool. Different locations will provide increased options for entry and exit, especially in larger pools.

Advisory 242.2 Swimming Pools Exception 1. Pool walls at diving areas and areas along pool walls where there is no pool entry because of landscaping or adjacent structures are to be counted when determining the number of accessible means of entry required.

242.3 Wading Pools. At least one *accessible* means of entry shall be provided for wading pools. *Accessible* means of entry shall comply with sloped entries complying with 1009.3.

242.4 Spas. At least one *accessible* means of entry shall be provided for spas. *Accessible* means of entry shall comply with swimming pool lifts complying with1009.2; transfer walls complying with 1009.4; or transfer systems complying with 1009.5.

EXCEPTION: Where spas are provided in a cluster, no more than 5 percent, but no fewer than one, spa in each cluster shall be required to comply with 242.4.

243 Shooting Facilities with Firing Positions

243.1 General. Where shooting *facilities* with firing positions are designed and constructed at a *site*, at least 5 percent, but no fewer than one, of each type of firing position shall comply with 1010.

CHAPTER 3: BUILDING BLOCKS

301 General

301.1 Scope. The provisions of Chapter 3 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

302 Floor or Ground Surfaces

302.1 General. Floor and ground surfaces shall be stable, firm, and slip resistant and shall comply with 302.

EXCEPTIONS: 1. Within animal containment areas, floor and ground surfaces shall not be required to be stable, firm, and slip resistant.

2. *Areas of sport activity* shall not be required to comply with 302.

> **Advisory 302.1 General.** A stable surface is one that remains unchanged by contaminants or applied force, so that when the contaminant or force is removed, the surface returns to its original condition. A firm surface resists deformation by either indentations or particles moving on its surface. A slip-resistant surface provides sufficient frictional counterforce to the forces exerted in walking to permit safe ambulation.

302.2 Carpet. Carpet or carpet tile shall be securely attached and shall have a firm cushion, pad, or backing or no cushion or pad. Carpet or carpet tile shall have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. Pile height shall be ½ inch (13 mm) maximum. Exposed edges of carpet shall be fastened to floor surfaces and shall have trim on the entire length of the exposed edge. Carpet edge trim shall comply with 303.

> **Advisory 302.2 Carpet.** Carpets and permanently affixed mats can significantly increase the amount of force (roll resistance) needed to propel a wheelchair over a surface. The firmer the carpeting and backing, the lower the roll resistance. A pile thickness up to ½ inch (13 mm) (measured to the backing, cushion, or pad) is allowed, although a lower pile provides easier wheelchair maneuvering. If a backing, cushion or pad is used, it must be firm. Preferably, carpet pad should not be used because the soft padding increases roll resistance.

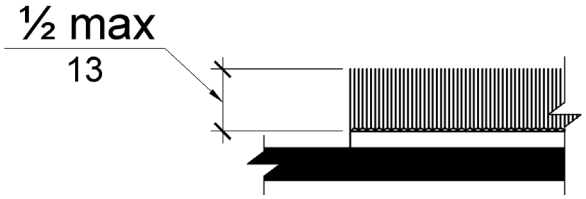


Figure 302.2
Carpet Pile Height

302.3 Openings. Openings in floor or ground surfaces shall not allow passage of a sphere more than ½ inch (13 mm) diameter except as allowed in 407.4.3, 409.4.3, 410.4, 810.5.3 and 810.10. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

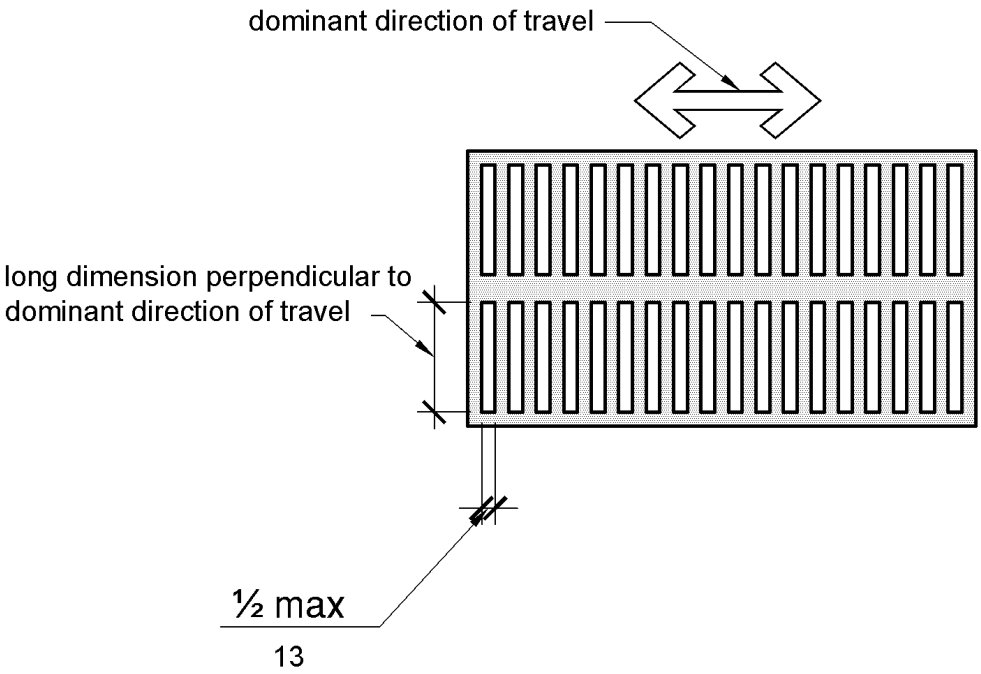


Figure 302.3
Elongated Openings in Floor or Ground Surfaces

303 Changes in Level

303.1 General. Where changes in level are permitted in floor or ground surfaces, they shall comply with 303.

EXCEPTIONS: 1. Animal containment areas shall not be required to comply with 303.

2. *Areas of sport activity* shall not be required to comply with 303.

303.2 Vertical. Changes in level of ¼ inch (6.4 mm) high maximum shall be permitted to be vertical.

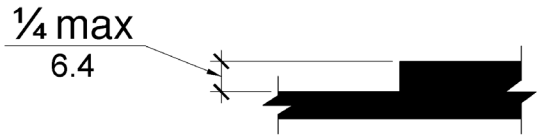


Figure 303.2
Vertical Change in Level

303.3 Beveled. Changes in level between ¼ inch (6.4 mm) high minimum and ½ inch (13 mm) high maximum shall be beveled with a slope not steeper than 1:2.

> **Advisory 303.3 Beveled.** A change in level of ½ inch (13 mm) is permitted to be ¼ inch (6.4 mm) vertical plus ¼ inch (6.4 mm) beveled. However, in no case may the combined change in level exceed ½ inch (13 mm). Changes in level exceeding ½ inch (13 mm) must comply with 405 (Ramps) or 406 (Curb Ramps).

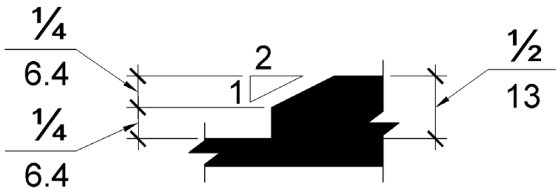


Figure 303.3
Beveled Change in Level

303.4 Ramps. Changes in level greater than ½ inch (13 mm) high shall be *ramped*, and shall comply with 405 or 406.

304 Turning Space

304.1 General. Turning *space* shall comply with 304.

304.2 Floor or Ground Surfaces. Floor or ground surfaces of a turning *space* shall comply with 302. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

> **Advisory 304.2 Floor or Ground Surface Exception.** As used in this section, the phrase "changes in level" refers to surfaces with slopes and to surfaces with abrupt rise exceeding that permitted in Section 303.3. Such changes in level are prohibited in required clear floor and ground spaces, turning spaces, and in similar spaces where people using wheelchairs and other mobility devices must park their mobility aids such as in wheelchair spaces, or maneuver to use elements such as at doors, fixtures, and telephones. The exception permits slopes not steeper than 1:48.

304.3 Size. Turning *space* shall comply with 304.3.1 or 304.3.2.

304.3.1 Circular Space. The turning *space* shall be a *space* of 60 inches (1525 mm) diameter minimum. The *space* shall be permitted to include knee and toe clearance complying with 306.

304.3.2 T-Shaped Space. The turning *space* shall be a T-shaped *space* within a 60 inch (1525 mm) square minimum with arms and base 36 inches (915 mm) wide minimum. Each arm of the T shall be clear of obstructions 12 inches (305 mm) minimum in each direction and the base shall be clear of

obstructions 24 inches (610 mm) minimum. The *space* shall be permitted to include knee and toe clearance complying with 306 only at the end of either the base or one arm.

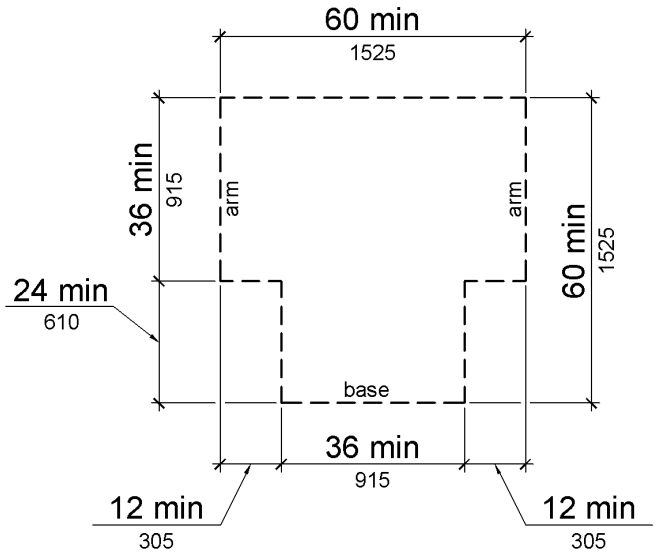


Figure 304.3.2
T-Shaped Turning Space

304.4 Door Swing. Doors shall be permitted to swing into turning *spaces*.

305 Clear Floor or Ground Space

305.1 General. Clear floor or ground *space* shall comply with 305.

305.2 Floor or Ground Surfaces. Floor or ground surfaces of a clear floor or ground *space* shall comply with 302. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

305.3 Size. The clear floor or ground *space* shall be 30 inches (760 mm) minimum by 48 inches (1220 mm) minimum.

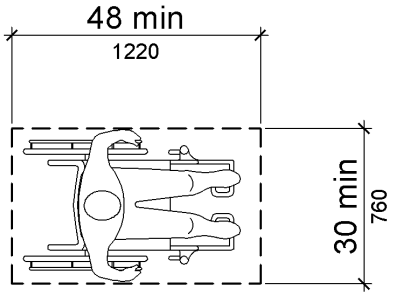


Figure 305.3
Clear Floor or Ground Space

305.4 Knee and Toe Clearance. Unless otherwise specified, clear floor or ground *space* shall be permitted to include knee and toe clearance complying with 306.

305.5 Position. Unless otherwise specified, clear floor or ground *space* shall be positioned for either forward or parallel approach to an *element*.

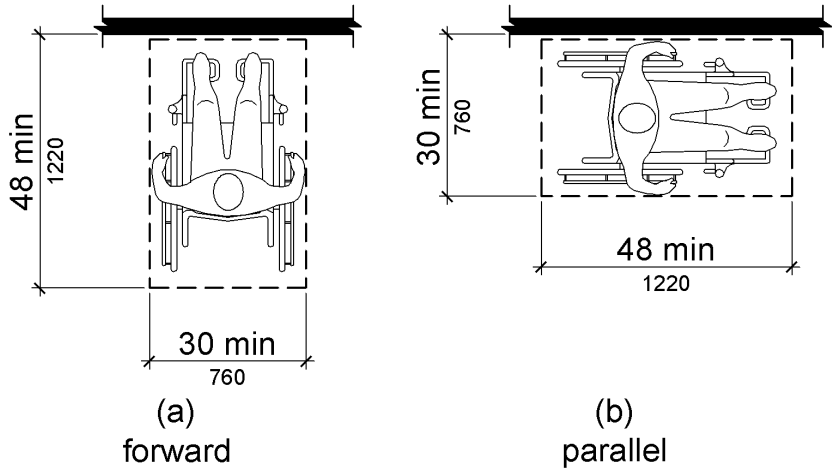


Figure 305.5
Position of Clear Floor or Ground Space

305.6 Approach. One full unobstructed side of the clear floor or ground *space* shall adjoin an *accessible* route or adjoin another clear floor or ground *space*.

305.7 Maneuvering Clearance. Where a clear floor or ground *space* is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearance shall be provided in accordance with 305.7.1 and 305.7.2.

305.7.1 Forward Approach. Alcoves shall be 36 inches (915 mm)wide minimum where the depth exceeds 24 inches (610 mm).

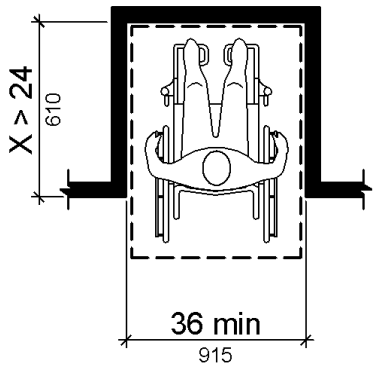


Figure 305.7.1
Maneuvering Clearance in an Alcove, Forward Approach

305.7.2 Parallel Approach. Alcoves shall be 60 inches (1525 mm) wide minimum where the depth exceeds 15 inches (380 mm).

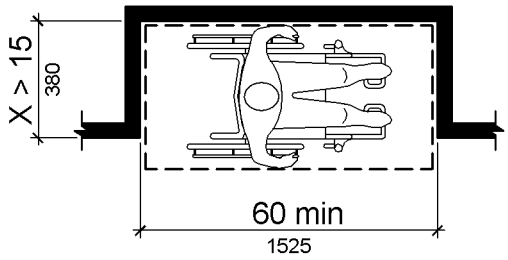


Figure 305.7.2
Maneuvering Clearance in an Alcove, Parallel Approach

306 Knee and Toe Clearance

306.1 General. Where *space* beneath an *element* is included as part of clear floor or ground *space* or turning *space*, the *space* shall comply with 306. Additional *space* shall not be prohibited beneath an *element* but shall not be considered as part of the clear floor or ground *space* or turning *space*.

Advisory 306.1 General. Clearances are measured in relation to the usable clear floor space, not necessarily to the vertical support for an element. When determining clearance under an object for required turning or maneuvering space, care should be taken to ensure the space is clear of any obstructions.

306.2 Toe Clearance.

306.2.1 General. *Space* under an *element* between the finish floor or ground and 9 inches (230 mm) above the finish floor or ground shall be considered toe clearance and shall comply with 306.2.

306.2.2 Maximum Depth. Toe clearance shall extend 25 inches (635 mm) maximum under an *element*.

306.2.3 Minimum Required Depth. Where toe clearance is required at an *element* as part of a clear floor *space*, the toe clearance shall extend 17 inches (430 mm) minimum under the *element*.

306.2.4 Additional Clearance. *Space* extending greater than 6 inches (150 mm) beyond the available knee clearance at 9 inches (230 mm) above the finish floor or ground shall not be considered toe clearance.

306.2.5 Width. Toe clearance shall be 30 inches (760 mm) wide minimum.

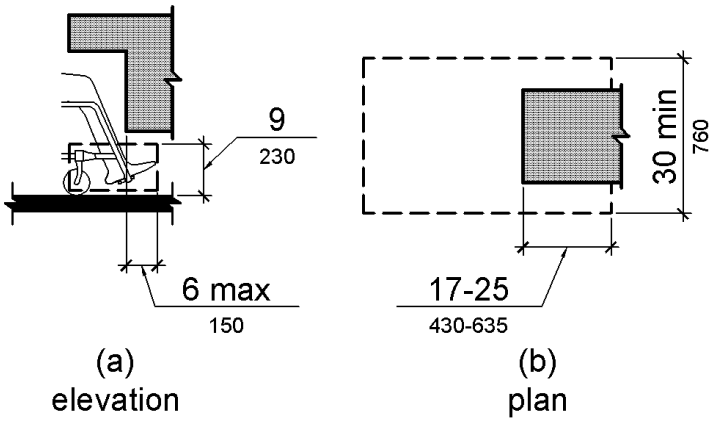


Figure 306.2
Toe Clearance

306.3 Knee Clearance.

306.3.1 General. *Space* under an *element* between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground shall be considered knee clearance and shall comply with 306.3.

306.3.2 Maximum Depth. Knee clearance shall extend 25 inches (635 mm) maximum under an *element* at 9 inches (230 mm) above the finish floor or ground.

306.3.3 Minimum Required Depth. Where knee clearance is required under an *element* as part of a clear floor *space*, the knee clearance shall be 11 inches (280 mm) deep minimum at 9 inches (230 mm) above the finish floor or ground, and 8 inches (205 mm) deep minimum at 27 inches (685 mm) above the finish floor or ground.

306.3.4 Clearance Reduction. Between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground, the knee clearance shall be permitted to reduce at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height.

306.3.5 Width. Knee clearance shall be 30 inches (760 mm) wide minimum.

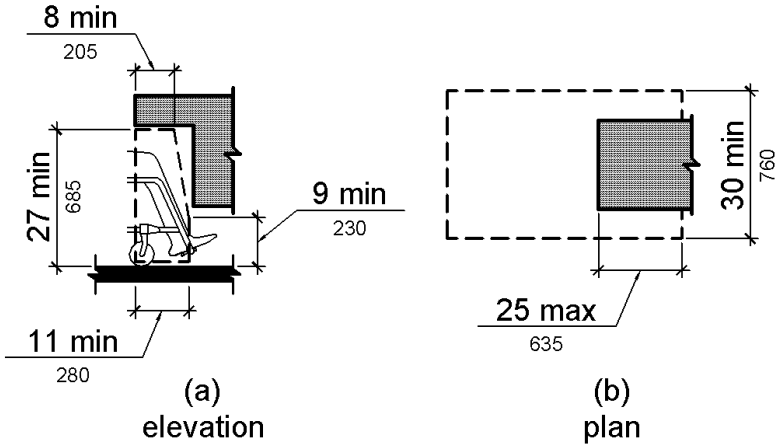


Figure 306.3
Knee Clearance

307 Protruding Objects

307.1 General. Protruding objects shall comply with 307.

307.2 Protrusion Limits. Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the finish floor or ground shall protrude 4 inches (100 mm) maximum horizontally into the *circulation path*.

EXCEPTION: Handrails shall be permitted to protrude 4½ inches (115 mm) maximum.

Advisory 307.2 Protrusion Limits. When a cane is used and the element is in the detectable range, it gives a person sufficient time to detect the element with the cane before there is body contact. Elements located on circulation paths, including operable elements, must comply with requirements for protruding objects. For example, awnings and their supporting structures cannot reduce the minimum required vertical clearance. Similarly, casement windows, when open, cannot encroach more than 4 inches (100 mm) into circulation paths above 27 inches (685 mm).

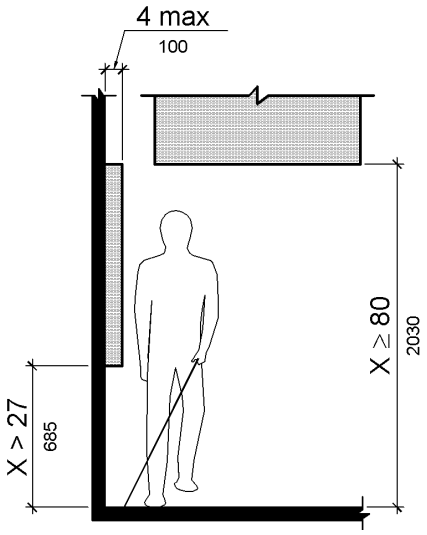


Figure 307.2
Limits of Protruding Objects

307.3 Post-Mounted Objects. Free-standing objects mounted on posts or pylons shall overhang *circulation paths* 12 inches (305 mm) maximum when located 27 inches (685 mm) minimum and 80 inches (2030 mm) maximum above the finish floor or ground. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (685 mm) maximum or 80 inches (2030 mm) minimum above the finish floor or ground.

EXCEPTION: The sloping portions of handrails serving stairs and *ramps* shall not be required to comply with 307.3.

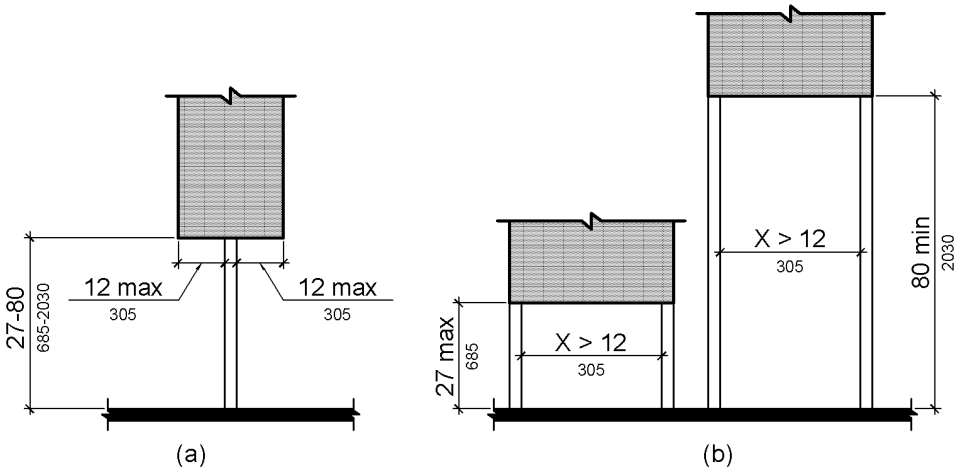


Figure 307.3
Post-Mounted Protruding Objects

307.4 Vertical Clearance. Vertical clearance shall be 80 inches (2030 mm) high minimum. Guardrails or other barriers shall be provided where the vertical clearance is less than 80 inches (2030 mm) high. The leading edge of such guardrail or barrier shall be located 27 inches (685 mm) maximum above the finish floor or ground.

EXCEPTION: Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the finish floor or ground.

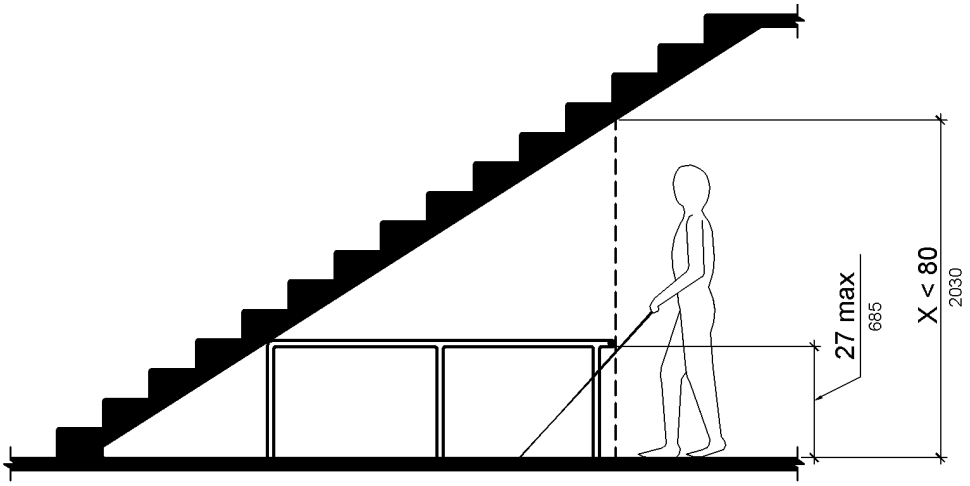


Figure 307.4
Vertical Clearance

307.5 Required Clear Width. Protruding objects shall not reduce the clear width required for *accessible* routes.

308 Reach Ranges

308.1 General. Reach ranges shall comply with 308.

Advisory 308.1 General. The following table provides guidance on reach ranges for children according to age where building elements such as coat hooks, lockers, or operable parts are designed for use primarily by children. These dimensions apply to either forward or side reaches. Accessible elements and operable parts designed for adult use or children over age 12 can be located outside these ranges but must be within the adult reach ranges required by 308.

Children's Reach Ranges			
Forward or Side Reach	**Ages 3 and 4**	**Ages 5 through 8**	**Ages 9 through 12**
High (maximum)	36 in (915 mm)	40 in (1015 mm)	44 in (1120 mm)
Low (minimum)	20 in (510 mm)	18 in (455 mm)	16 in (405 mm)

308.2 Forward Reach.

308.2.1 Unobstructed. Where a forward reach is unobstructed, the high forward reach shall be 48 inches (1220 mm) maximum and the low forward reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

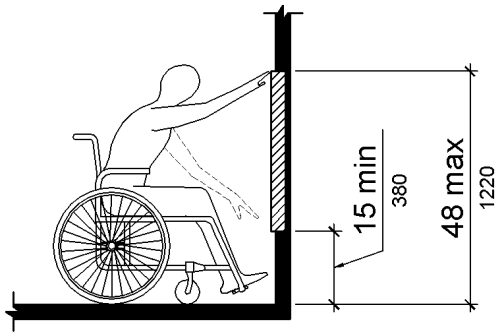


Figure 308.2.1
Unobstructed Forward Reach

308.2.2 Obstructed High Reach. Where a high forward reach is over an obstruction, the clear floor *space* shall extend beneath the *element* for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 48 inches (1220 mm) maximum where the reach depth is 20 inches (510 mm) maximum. Where the reach depth exceeds 20 inches (510 mm), the high forward reach shall be 44 inches (1120 mm) maximum and the reach depth shall be 25 inches (635 mm) maximum.

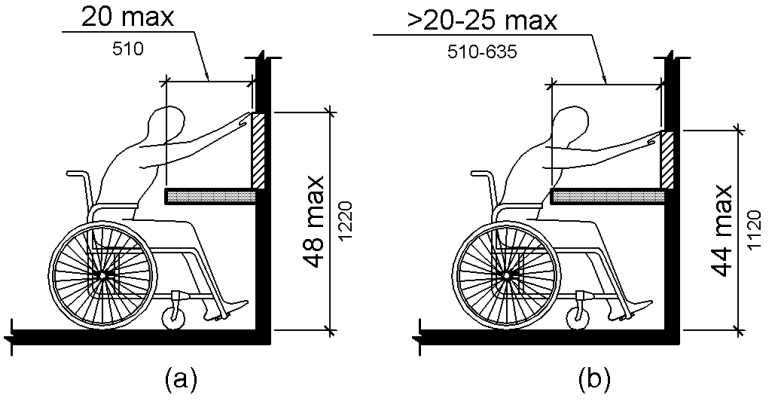


Figure 308.2.2
Obstructed High Forward Reach

308.3 Side Reach.

308.3.1 Unobstructed. Where a clear floor or ground *space* allows a parallel approach to an *element* and the side reach is unobstructed, the high side reach shall be 48 inches (1220 mm)

maximum and the low side reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

EXCEPTIONS: 1. An obstruction shall be permitted between the clear floor or ground *space* and the *element* where the depth of the obstruction is 10 inches (255 mm) maximum.

2. *Operable parts* of fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the *vehicular way* where fuel dispensers are installed on existing curbs.

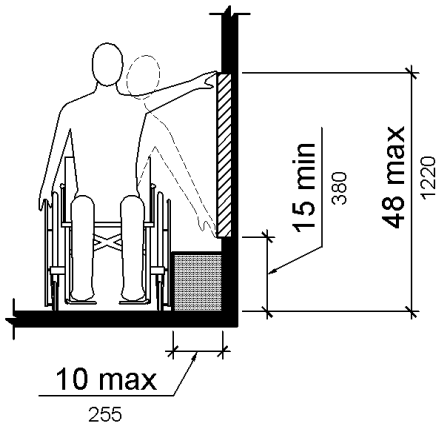


Figure 308.3.1
Unobstructed Side Reach

308.3.2 Obstructed High Reach. Where a clear floor or ground *space* allows a parallel approach to an *element* and the high side reach is over an obstruction, the height of the obstruction shall be 34 inches (865 mm) maximum and the depth of the obstruction shall be 24 inches (610 mm) maximum. The high side reach shall be 48 inches (1220 mm) maximum for a reach depth of 10 inches (255 mm) maximum. Where the reach depth exceeds 10 inches (255 mm), the high side reach shall be 46 inches (1170 mm) maximum for a reach depth of 24 inches (610 mm) maximum.

EXCEPTIONS: 1. The top of washing machines and clothes dryers shall be permitted to be 36 inches (915 mm) maximum above the finish floor.

2. *Operable parts* of fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the *vehicular way* where fuel dispensers are installed on existing curbs.

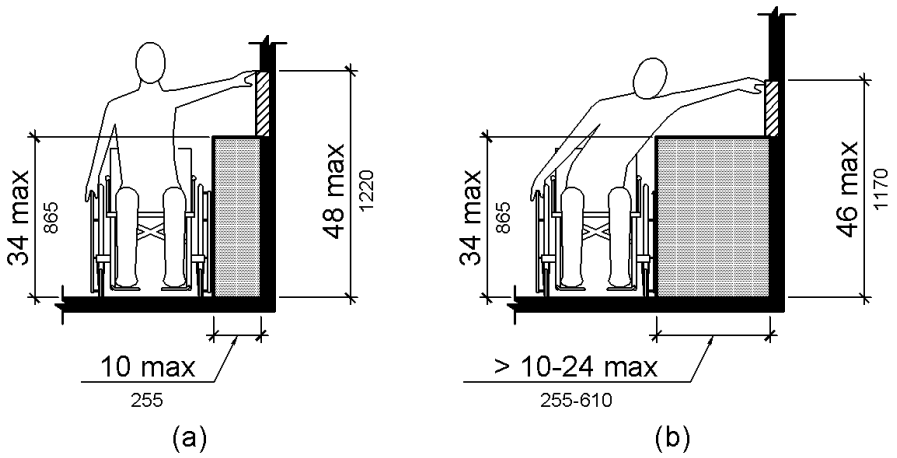


Figure 308.3.2
Obstructed High Side Reach

309 Operable Parts

309.1 General. *Operable parts* shall comply with 309.

309.2 Clear Floor Space. A clear floor or ground *space* complying with 305 shall be provided.

309.3 Height. *Operable parts* shall be placed within one or more of the reach ranges specified in 308.

309.4 Operation. *Operable parts* shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate *operable parts* shall be 5 pounds (22.2 N) maximum.

EXCEPTION: Gas pump nozzles shall not be required to provide *operable parts* that have an activating force of 5 pounds (22.2 N) maximum.

CHAPTER 4: ACCESSIBLE ROUTES

401 General

401.1 Scope. The provisions of Chapter 4 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

402 Accessible Routes

402.1 General. *Accessible* routes shall comply with 402.

402.2 Components. *Accessible* routes shall consist of one or more of the following components: walking surfaces with a *running slope* not steeper than 1:20, doorways, *ramps*, *curb ramps* excluding the flared sides, elevators, and platform lifts. All components of an *accessible* route shall comply with the applicable requirements of Chapter 4.

> **Advisory 402.2 Components.** Walking surfaces must have running slopes not steeper than 1:20, see 403.3. Other components of accessible routes, such as ramps (405) and curb ramps (406), are permitted to be more steeply sloped.

403 Walking Surfaces

403.1 General. Walking surfaces that are a part of an *accessible* route shall comply with 403.

403.2 Floor or Ground Surface. Floor or ground surfaces shall comply with 302.

403.3 Slope. The *running slope* of walking surfaces shall not be steeper than 1:20. The *cross slope* of walking surfaces shall not be steeper than 1:48.

403.4 Changes in Level. Changes in level shall comply with 303.

403.5 Clearances. Walking surfaces shall provide clearances complying with 403.5.

EXCEPTION: Within *employee work area*s, clearances on *common use circulation path*s shall be permitted to be decreased by *work area equipment* provided that the decrease is essential to the function of the work being performed.

403.5.1 Clear Width. Except as provided in 403.5.2 and 403.5.3, the clear width of walking surfaces shall be 36 inches (915 mm) minimum.

EXCEPTION: The clear width shall be permitted to be reduced to 32 inches (815 mm) minimum for a length of 24 inches (610 mm) maximum provided that reduced width segments are separated by segments that are 48 inches (1220 mm) long minimum and 36 inches (915 mm) wide minimum.

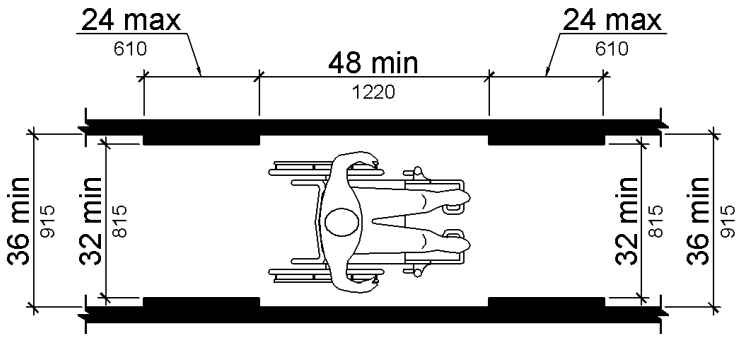


Figure 403.5.1
Clear Width of an Accessible Route

403.5.2 Clear Width at Turn. Where the *accessible* route makes a 180 degree turn around an *element* which is less than 48 inches (1220 mm) wide, clear width shall be 42 inches (1065 mm) minimum approaching the turn, 48 inches (1220 mm) minimum at the turn and 42 inches (1065 mm) minimum leaving the turn.

EXCEPTION: Where the clear width at the turn is 60 inches (1525 mm) minimum compliance with 403.5.2 shall not be required.

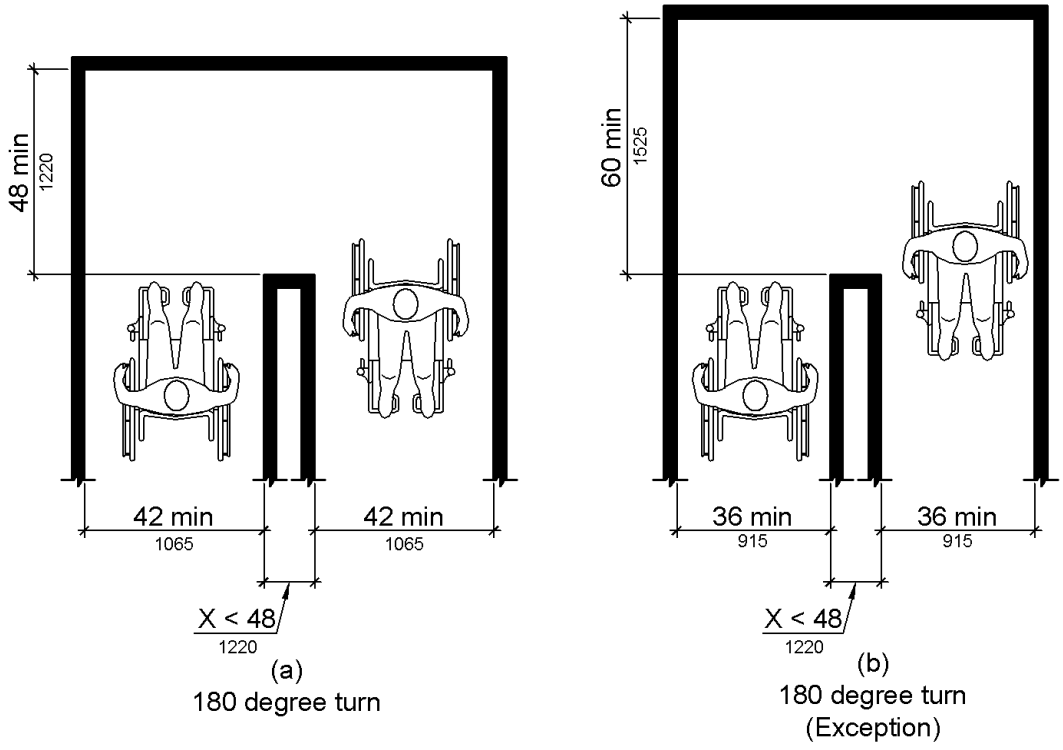


Figure 403.5.2
Clear Width at Turn

403.5.3 Passing Spaces. An *accessible* route with a clear width less than 60 inches (1525 mm) shall provide passing *spaces* at intervals of 200 feet (61 m) maximum. Passing *spaces* shall be either: a *space* 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or, an intersection of two walking surfaces providing a T-shaped *space* complying with 304.3.2 where the base and arms of the T-shaped *space* extend 48 inches (1220 mm) minimum beyond the intersection.

403.6 Handrails. Where handrails are provided along walking surfaces with *running slopes* not steeper than 1:20 they shall comply with 505.

> **Advisory 403.6 Handrails.** Handrails provided in elevator cabs and platform lifts are not required to comply with the requirements for handrails on walking surfaces.

404 Doors, Doorways, and Gates

404.1 General. Doors, doorways, and gates that are part of an *accessible* route shall comply with 404.
EXCEPTION: Doors, doorways, and gates designed to be operated only by security personnel shall not be required to comply with 404.2.7, 404.2.8, 404.2.9, 404.3.2 and 404.3.4 through 404.3.7.

> **Advisory 404.1 General Exception.** Security personnel must have sole control of doors that are eligible for the Exception at 404.1. It would not be acceptable for security personnel to operate the doors for people with disabilities while allowing others to have independent access.

404.2 Manual Doors, Doorways, and Manual Gates. Manual doors and doorways and manual gates intended for user passage shall comply with 404.2.

404.2.1 Revolving Doors, Gates, and Turnstiles. Revolving doors, revolving gates, and turnstiles shall not be part of an *accessible* route.

404.2.2 Double-Leaf Doors and Gates. At least one of the active leaves of doorways with two leaves shall comply with 404.2.3 and 404.2.4.

404.2.3 Clear Width. Door openings shall provide a clear width of 32 inches (815 mm) minimum. Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees. Openings more than 24 inches (610 mm) deep shall provide a clear opening of 36 inches (915 mm) minimum. There shall be no projections into the required clear opening width lower than 34 inches (865 mm) above the finish floor or ground. Projections into the clear opening width between 34 inches (865 mm) and 80 inches (2030 mm) above the finish floor or ground shall not exceed 4 inches (100 mm).

EXCEPTIONS: 1. In *alterations*, a projection of 5/8 inch (16 mm) maximum into the required clear width shall be permitted for the latch side stop.

2. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the finish floor or ground.

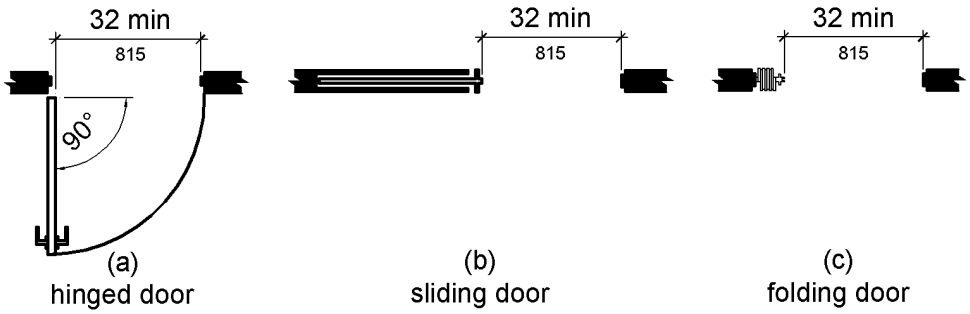


Figure 404.2.3
Clear Width of Doorways

404.2.4 Maneuvering Clearances. Minimum maneuvering clearances at doors and gates shall comply with 404.2.4. Maneuvering clearances shall extend the full width of the doorway and the required latch side or hinge side clearance.

EXCEPTION: Entry doors to hospital patient rooms shall not be required to provide the clearance beyond the latch side of the door.

404.2.4.1 Swinging Doors and Gates. Swinging doors and gates shall have maneuvering clearances complying with Table 404.2.4.1.

Table 404.2.4.1 Maneuvering Clearances at Manual Swinging Doors and Gates

Type of Use		Minimum Maneuvering Clearance	
Approach Direction	**Door or Gate Side**	**Perpendicular to Doorway**	**Parallel to Doorway (beyond latch side unless noted)**
From front	Pull	60 inches (1525 mm)	18 inches (455 mm)
From front	Push	48 inches (1220 mm)	0 inches (0 mm)[1]
From hinge side	Pull	60 inches (1525 mm)	36 inches (915 mm)
From hinge side	Pull	54 inches (1370 mm)	42 inches (1065 mm)
From hinge side	Push	42 inches (1065 mm)[2]	22 inches (560 mm)[3]
From latch side	Pull	48 inches (1220 mm)[4]	24 inches (610 mm)
From latch side	Push	42 inches (1065 mm)[4]	24 inches (610 mm)

1. Add 12 inches (305 mm) if closer and latch are provided.
2. Add 6 inches (150 mm) if closer and latch are provided.
3. Beyond hinge side.
4. Add 6 inches (150 mm) if closer is provided.

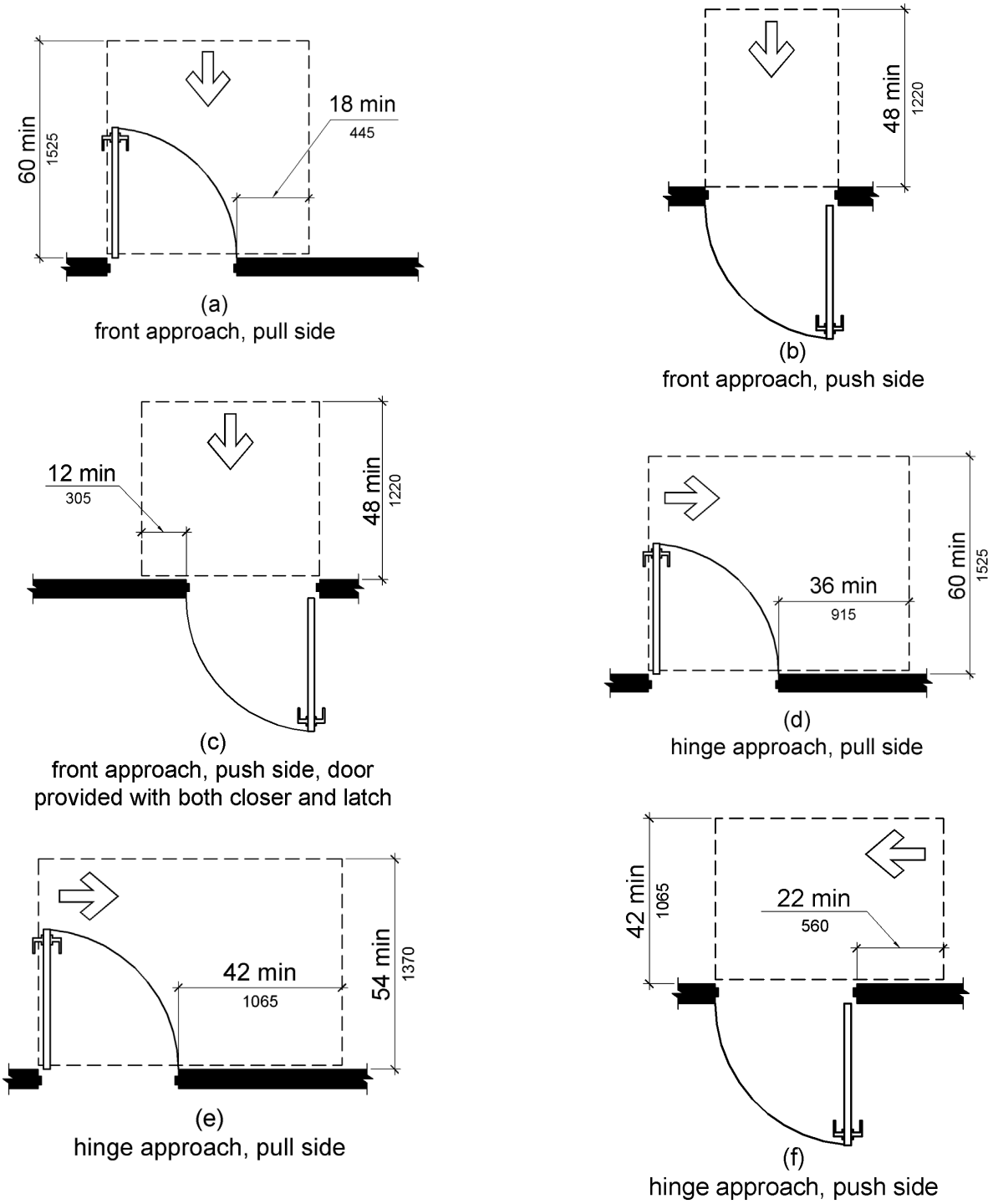


Figure 404.2.4.1
Maneuvering Clearances at Manual Swinging Doors and Gates

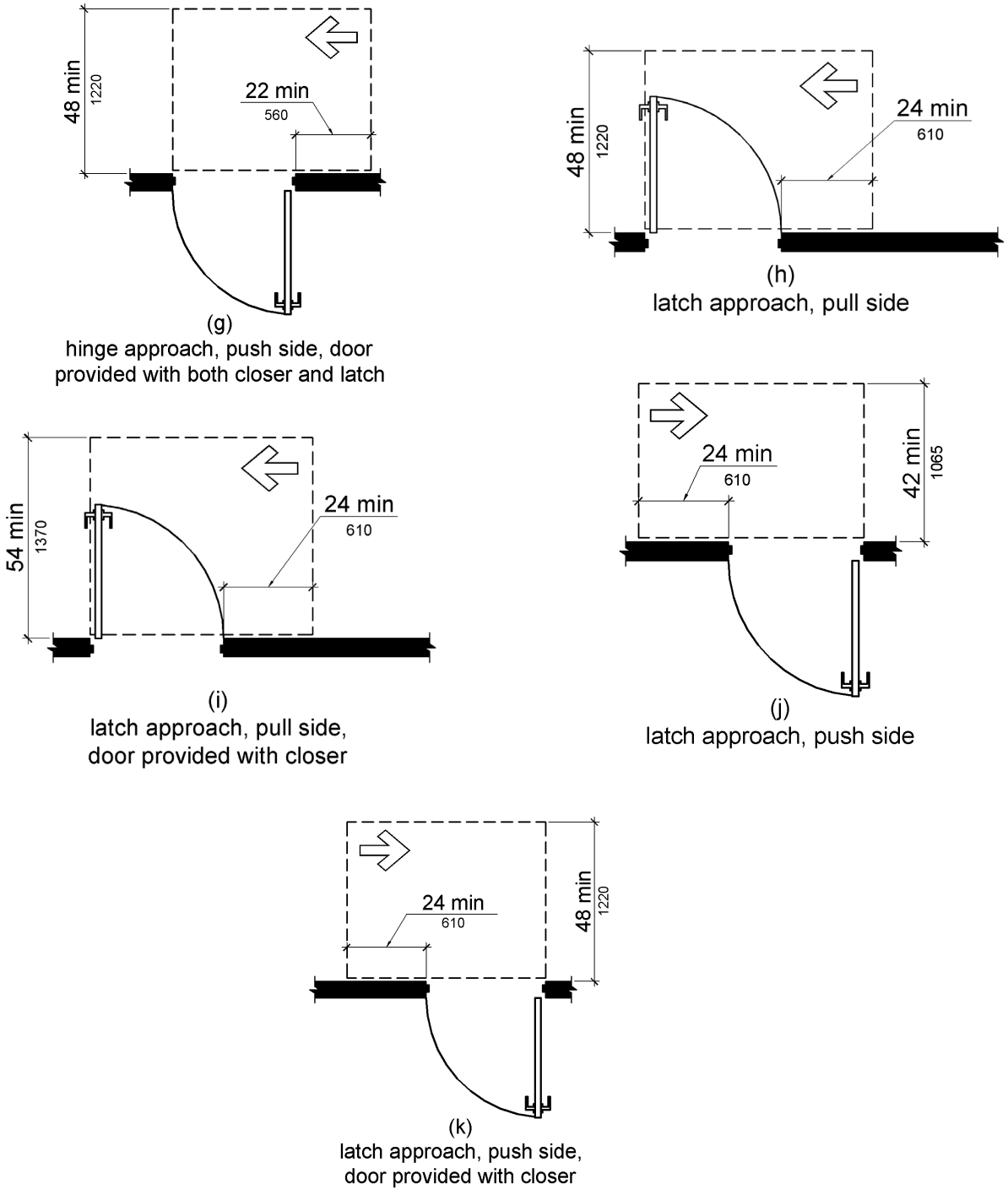


Figure 404.2.4.1
Maneuvering Clearances at Manual Swinging Doors and Gates

404.2.4.2 Doorways without Doors or Gates, Sliding Doors, and Folding Doors. Doorways less than 36 inches (915 mm) wide without doors or gates, sliding doors, or folding doors shall have maneuvering clearances complying with Table 404.2.4.2.

Table 404.2.4.2 Maneuvering Clearances at Doorways without Doors or Gates, Manual Sliding Doors, and Manual Folding Doors

	Minimum Maneuvering Clearance	
Approach Direction	**Perpendicular to Doorway**	**Parallel to Doorway (beyond stop/latch side unless noted)**
From Front	48 inches (1220 mm)	0 inches (0 mm)
From side[1]	42 inches (1065 mm)	0 inches (0 mm)
From pocket/hinge side	42 inches (1065 mm)	22 inches (560 mm)[2]
From stop/latch side	42 inches (1065 mm)	24 inches (610 mm)

1. Doorway with no door only.
2. Beyond pocket/hinge side.

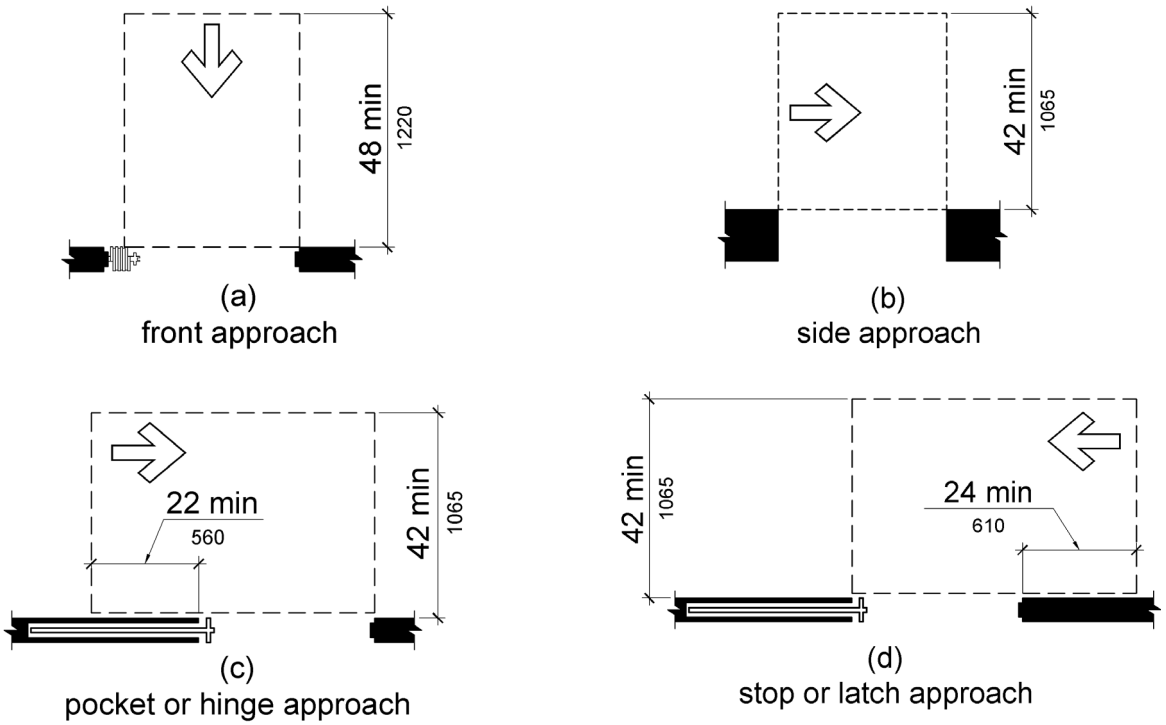


Figure 404.2.4.2
Maneuvering Clearances at Doorways without Doors, Sliding Doors, Gates, and Folding Doors

404.2.4.3 Recessed Doors and Gates. Maneuvering clearances for forward approach shall be provided when any obstruction within 18 inches (455 mm) of the latch side of a doorway projects more than 8 inches (205 mm) beyond the face of the door, measured perpendicular to the face of the door or gate.

Advisory 404.2.4.3 Recessed Doors and Gates. A door can be recessed due to wall thickness or because of the placement of casework and other fixed elements adjacent to the doorway. This provision must be applied wherever doors are recessed.

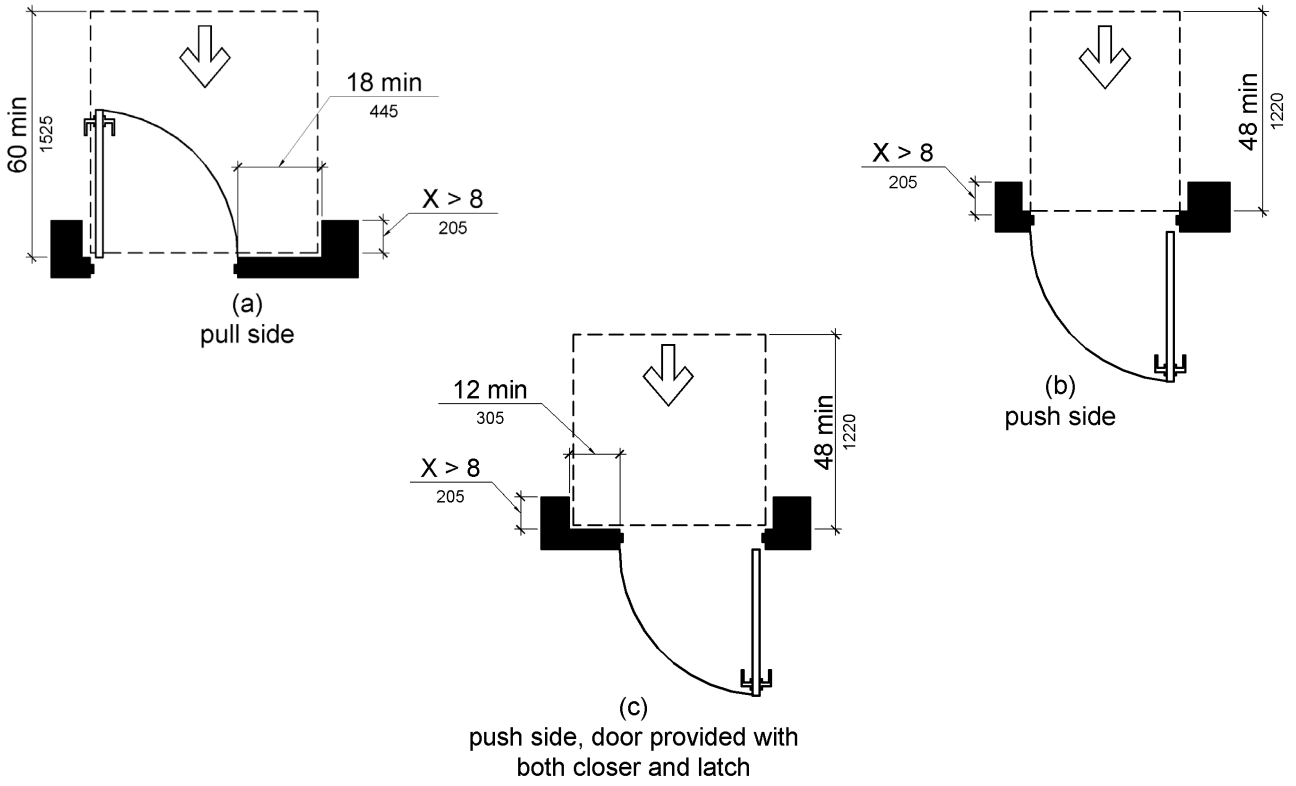


Figure 404.2.4.3
Maneuvering Clearances at Recessed Doors and Gates

404.2.4.4 Floor or Ground Surface. Floor or ground surface within required maneuvering clearances shall comply with 302. Changes in level are not permitted.

EXCEPTIONS: 1. Slopes not steeper than 1:48 shall be permitted.

2. Changes in level at thresholds complying with 404.2.5 shall be permitted.

404.2.5 Thresholds. Thresholds, if provided at doorways, shall be ½ inch (13 mm) high maximum. Raised thresholds and changes in level at doorways shall comply with 302 and 303.

EXCEPTION: Existing or *altered* thresholds ¾ inch (19 mm) high maximum that have a beveled edge on each side with a slope not steeper than 1:2 shall not be required to comply with 404.2.5.

404.2.6 Doors in Series and Gates in Series. The distance between two hinged or pivoted doors in series and gates in series shall be 48 inches (1220 mm) minimum plus the width of doors or gates swinging into the *space*.

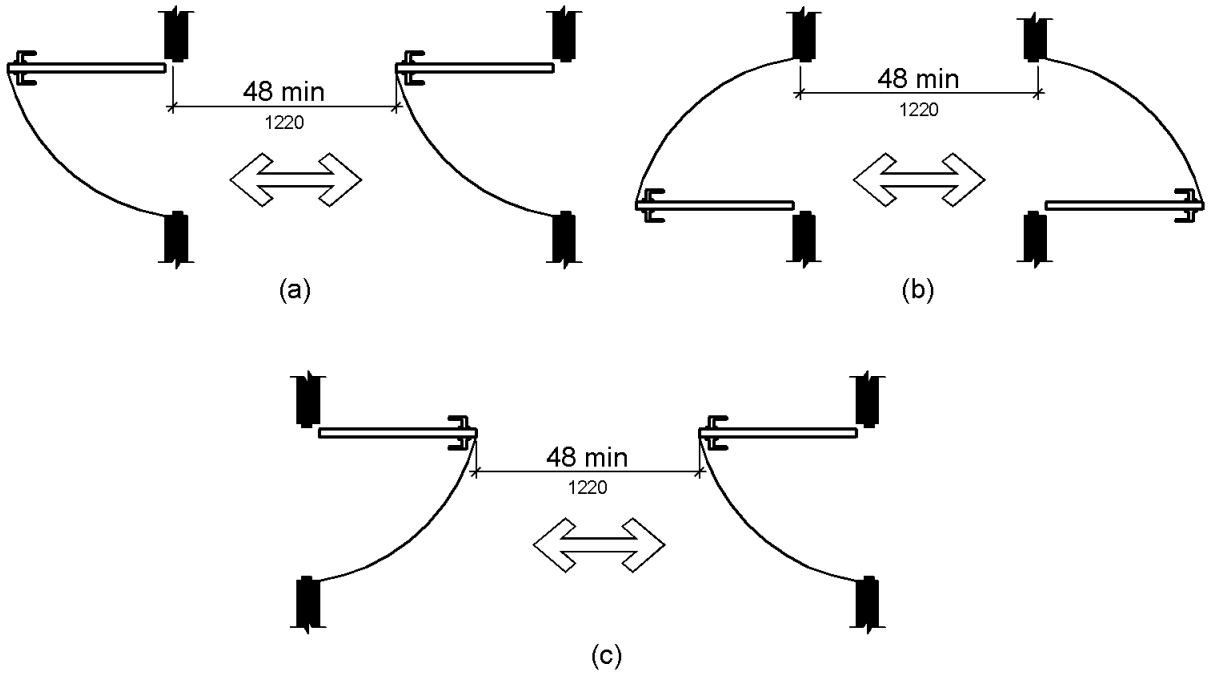


Figure 404.2.6
Doors in Series and Gates in Series

404.2.7 Door and Gate Hardware. Handles, pulls, latches, locks, and other *operable parts* on doors and gates shall comply with 309.4. *Operable parts* of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

EXCEPTIONS: 1. Existing locks shall be permitted in any location at existing glazed doors without stiles, existing overhead rolling doors or grilles, and similar existing doors or grilles that are designed with locks that are activated only at the top or bottom rail.

2. Access gates in barrier walls and fences protecting pools, spas, and hot tubs shall be permitted to have *operable parts* of the release of latch on self-latching devices at 54 inches (1370 mm) maximum above the finish floor or ground provided the self-latching devices are not also self-locking devices and operated by means of a key, electronic opener, or integral combination lock.

Advisory 404.2.7 Door and Gate Hardware. Door hardware that can be operated with a closed fist or a loose grip accommodates the greatest range of users. Hardware that requires simultaneous hand and finger movements require greater dexterity and coordination, and is not recommended.

404.2.8 Closing Speed. Door and gate closing speed shall comply with 404.2.8.

404.2.8.1 Door Closers and Gate Closers. Door closers and gate closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.

404.2.8.2 Spring Hinges. Door and gate spring hinges shall be adjusted so that from the open position of 70 degrees, the door or gate shall move to the closed position in 1.5 seconds minimum.

404.2.9 Door and Gate Opening Force. Fire doors shall have a minimum opening force allowable by the appropriate *administrative authority*. The force for pushing or pulling open a door or gate other than fire doors shall be as follows:

1. Interior hinged doors and gates: 5 pounds (22.2 N) maximum.
2. Sliding or folding doors: 5 pounds (22.2 N) maximum.

These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door or gate in a closed position.

Advisory 404.2.9 Door and Gate Opening Force. The maximum force pertains to the continuous application of force necessary to fully open a door, not the initial force needed to overcome the inertia of the door. It does not apply to the force required to retract bolts or to disengage other devices used to keep the door in a closed position.

404.2.10 Door and Gate Surfaces. Swinging door and gate surfaces within 10 inches (255 mm) of the finish floor or ground measured vertically shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16 inch (1.6 mm) of the same plane as the other. Cavities created by added kick plates shall be capped.

EXCEPTIONS: 1. Sliding doors shall not be required to comply with 404.2.10.

2. Tempered glass doors without stiles and having a bottom rail or shoe with the top leading edge tapered at 60 degrees minimum from the horizontal shall not be required to meet the 10 inch (255 mm) bottom smooth surface height requirement.

3. Doors and gates that do not extend to within 10 inches (255 mm) of the finish floor or ground shall not be required to comply with 404.2.10.

4. Existing doors and gates without smooth surfaces within 10 inches (255 mm) of the finish floor or ground shall not be required to provide smooth surfaces complying with 404.2.10 provided that if added kick plates are installed, cavities created by such kick plates are capped.

404.2.11 Vision Lights. Doors, gates, and side lights adjacent to doors or gates, containing one or more glazing panels that permit viewing through the panels shall have the bottom of at least one glazed panel located 43 inches (1090 mm) maximum above the finish floor.

EXCEPTION: Vision lights with the lowest part more than 66 inches (1675 mm) from the finish floor or ground shall not be required to comply with 404.2.11.

404.3 Automatic and Power-Assisted Doors and Gates. Automatic doors and automatic gates shall comply with 404.3. Full-powered automatic doors shall comply with ANSI/BHMA A156.10 (incorporated

by reference, see “Referenced Standards” in Chapter 1). Low-energy and power-assisted doors shall comply with ANSI/BHMA A156.19 (1997 or 2002 edition) (incorporated by reference, see “Referenced Standards” in Chapter 1).

404.3.1 Clear Width. Doorways shall provide a clear opening of 32 inches (815 mm) minimum in power-on and power-off mode. The minimum clear width for automatic door systems in a doorway shall be based on the clear opening provided by all leaves in the open position.

404.3.2 Maneuvering Clearance. Clearances at power-assisted doors and gates shall comply with 404.2.4. Clearances at automatic doors and gates without standby power and serving an *accessible means of egress* shall comply with 404.2.4.

EXCEPTION: Where automatic doors and gates remain open in the power-off condition, compliance with 404.2.4 shall not be required.

404.3.3 Thresholds. Thresholds and changes in level at doorways shall comply with 404.2.5.

404.3.4 Doors in Series and Gates in Series. Doors in series and gates in series shall comply with 404.2.6.

404.3.5 Controls. Manually operated controls shall comply with 309. The clear floor *space* adjacent to the control shall be located beyond the arc of the door swing.

404.3.6 Break Out Opening. Where doors and gates without standby power are a part of a means of egress, the clear break out opening at swinging or sliding doors and gates shall be 32 inches (815 mm) minimum when operated in emergency mode.

EXCEPTION: Where manual swinging doors and gates comply with 404.2 and serve the same means of egress compliance with 404.3.6 shall not be required.

404.3.7 Revolving Doors, Revolving Gates, and Turnstiles. Revolving doors, revolving gates, and turnstiles shall not be part of an *accessible* route.

405 Ramps

405.1 General. *Ramps* on *accessible* routes shall comply with 405.

EXCEPTION: In *assembly areas*, aisle *ramps* adjacent to seating and not serving *elements* required to be on an *accessible* route shall not be required to comply with 405.

405.2 Slope. *Ramp* runs shall have a *running slope* not steeper than 1:12.

EXCEPTION: In existing *sites*, *buildings*, and *facilities*, *ramps* shall be permitted to have *running slopes* steeper than 1:12 complying with Table 405.2 where such slopes are necessary due to *space* limitations.

Table 405.2 Maximum Ramp Slope and Rise for Existing Sites, Buildings, and Facilities

Slope[1]	Maximum Rise
Steeper than 1:10 but not steeper than 1:8	3 inches (75 mm)
Steeper than 1:12 but not steeper than 1:10	6 inches (150 mm)

1. A slope steeper than 1:8 is prohibited.

Advisory 405.2 Slope. To accommodate the widest range of users, provide ramps with the least possible running slope and, wherever possible, accompany ramps with stairs for use by those individuals for whom distance presents a greater barrier than steps, e.g., people with heart disease or limited stamina.

405.3 Cross Slope. *Cross slope* of *ramp* runs shall not be steeper than 1:48.

Advisory 405.3 Cross Slope. Cross slope is the slope of the surface perpendicular to the direction of travel. Cross slope is measured the same way as slope is measured (i.e., the rise over the run).

405.4 Floor or Ground Surfaces. Floor or ground surfaces of *ramp* runs shall comply with 302. Changes in level other than the *running slope* and *cross slope* are not permitted on *ramp* runs.

405.5 Clear Width. The clear width of a *ramp* run and, where handrails are provided, the clear width between handrails shall be 36 inches (915 mm) minimum.

EXCEPTION: Within *employee work area*s, the required clear width of *ramps* that are a part of *common use circulation path*s shall be permitted to be decreased by *work area equipment* provided that the decrease is essential to the function of the work being performed.

405.6 Rise. The rise for any *ramp* run shall be 30 inches (760 mm) maximum.

405.7 Landings. *Ramps* shall have landings at the top and the bottom of each *ramp* run. Landings shall comply with 405.7.

Advisory 405.7 Landings. Ramps that do not have level landings at changes in direction can create a compound slope that will not meet the requirements of this document. Circular or curved ramps continually change direction. Curvilinear ramps with small radii also can create compound cross slopes and cannot, by their nature, meet the requirements for accessible routes. A level landing is needed at the accessible door to permit maneuvering and simultaneously door operation.

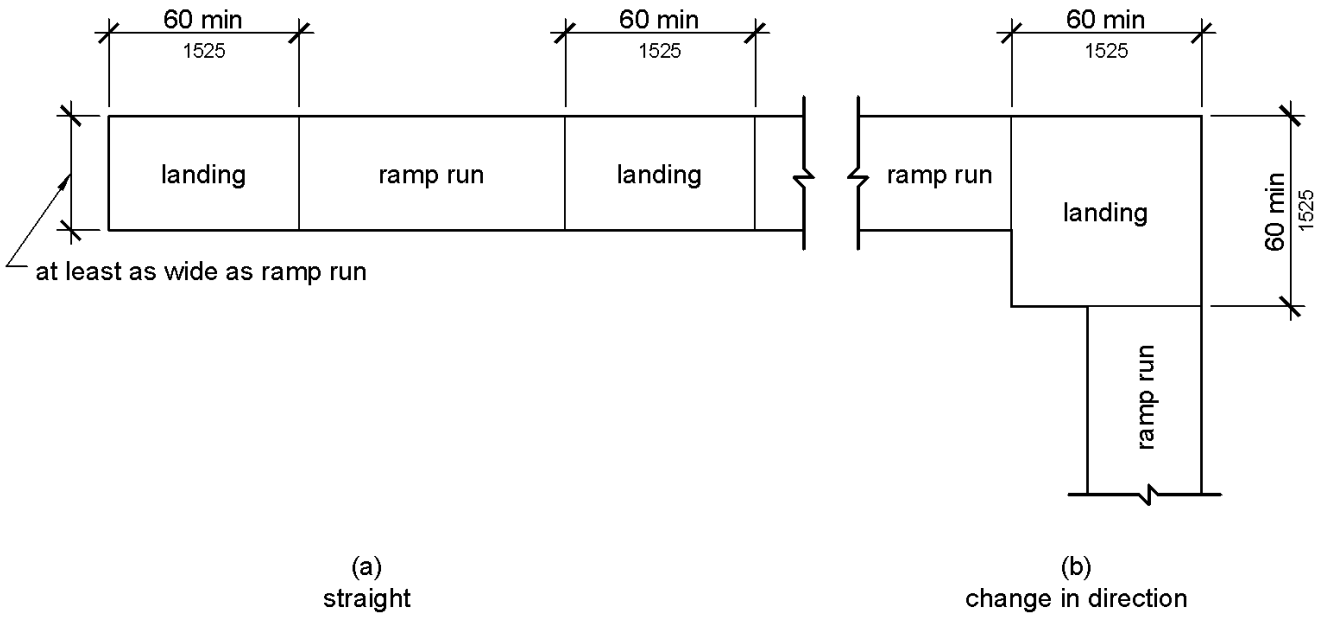


Figure 405.7
Ramp Landings

405.7.1 Slope. Landings shall comply with 302. Changes in level are not permitted.
EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

405.7.2 Width. The landing clear width shall be at least as wide as the widest *ramp* run leading to the landing.

405.7.3 Length. The landing clear length shall be 60 inches (1525 mm) long minimum.

405.7.4 Change in Direction. *Ramps* that change direction between runs at landings shall have a clear landing 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum.

405.7.5 Doorways. Where doorways are located adjacent to a *ramp* landing, maneuvering clearances required by 404.2.4 and 404.3.2 shall be permitted to overlap the required landing area.

405.8 Handrails. *Ramp* runs with a rise greater than 6 inches (150 mm) shall have handrails complying with 505.
EXCEPTION: Within *employee work area*s, handrails shall not be required where *ramps* that are part of *common use circulation path*s are designed to permit the installation of handrails complying with 505. *Ramps* not subject to the exception to 405.5 shall be designed to maintain a 36 inch (915 mm) minimum clear width when handrails are installed.

405.9 Edge Protection. Edge protection complying with 405.9.1 or 405.9.2 shall be provided on each side of *ramp* runs and at each side of *ramp* landings.

EXCEPTIONS: 1. Edge protection shall not be required on *ramps* that are not required to have handrails and have sides complying with 406.3.
2. Edge protection shall not be required on the sides of *ramp* landings serving an adjoining *ramp* run or stairway.
3. Edge protection shall not be required on the sides of *ramp* landings having a vertical drop-off of ½ inch (13 mm) maximum within 10 inches (255 mm) horizontally of the minimum landing area specified in 405.7.

405.9.1 Extended Floor or Ground Surface. The floor or ground surface of the *ramp* run or landing shall extend 12 inches (305 mm) minimum beyond the inside face of a handrail complying with 505.

Advisory 405.9.1 Extended Floor or Ground Surface. The extended surface prevents wheelchair casters and crutch tips from slipping off the ramp surface.

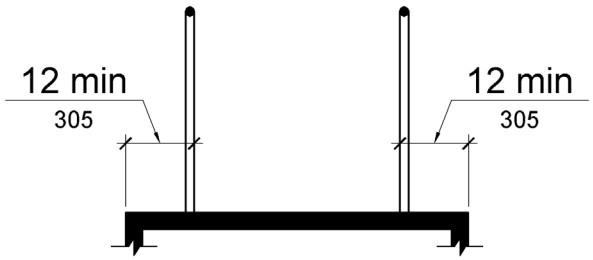


Figure 405.9.1
Extended Floor or Ground Surface Edge Protection

405.9.2 Curb or Barrier. A curb or barrier shall be provided that prevents the passage of a 4 inch (100 mm) diameter sphere, where any portion of the sphere is within 4 inches (100 mm) of the finish floor or ground surface.

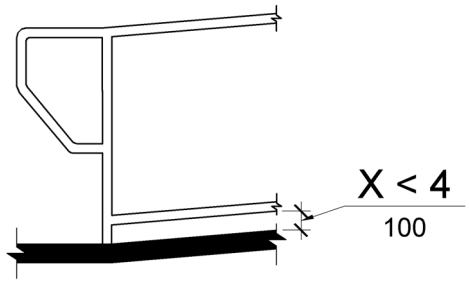


Figure 405.9.2
Curb or Barrier Edge Protection

405.10 Wet Conditions. Landings subject to wet conditions shall be designed to prevent the accumulation of water.

406 Curb Ramps

406.1 General. *Curb ramps* on *accessible* routes shall comply with 406, 405.2 through 405.5, and 405.10.

406.2 Counter Slope. Counter slopes of adjoining gutters and road surfaces immediately adjacent to the *curb ramp* shall not be steeper than 1:20. The adjacent surfaces at transitions at *curb ramps* to *walks*, gutters, and streets shall be at the same level.

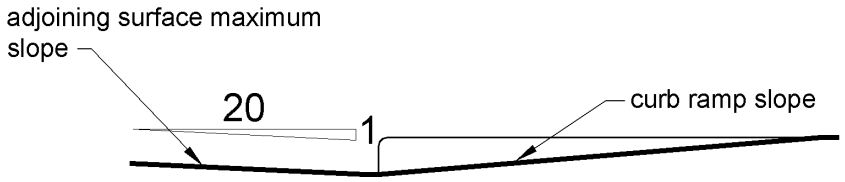


Figure 406.2
Counter Slope of Surfaces Adjacent to Curb Ramps

406.3 Sides of Curb Ramps. Where provided, *curb ramp* flares shall not be steeper than 1:10.

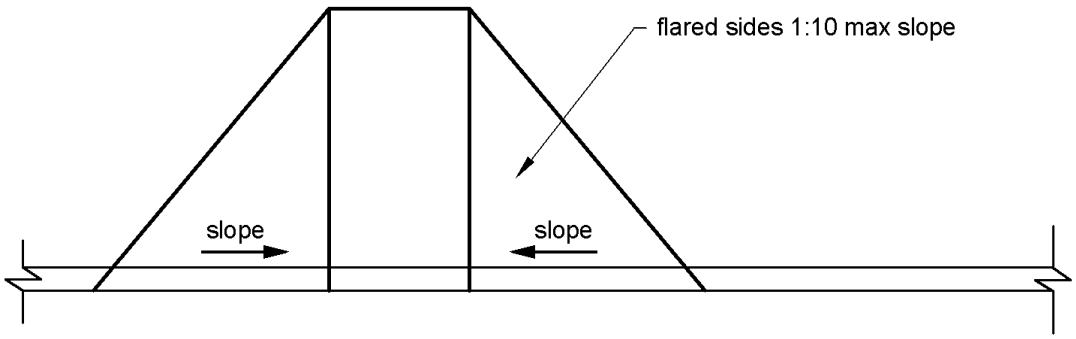


Figure 406.3
Sides of Curb Ramps

406.4 Landings. Landings shall be provided at the tops of *curb ramp*s. The landing clear length shall be 36 inches (915 mm) minimum. The landing clear width shall be at least as wide as the *curb ramp*, excluding flared sides, leading to the landing.

EXCEPTION: In *alterations*, where there is no landing at the top of *curb ramps*, *curb ramp* flares shall be provided and shall not be steeper than 1:12.

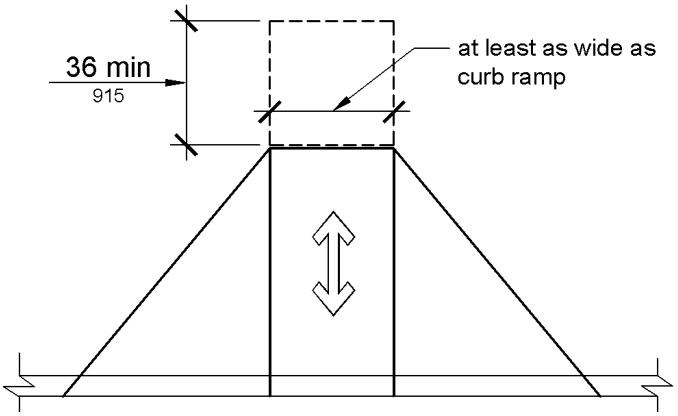


Figure 406.4
Landings at the Top of Curb Ramps

406.5 Location. *Curb ramps* and the flared sides of *curb ramps* shall be located so that they do not project into vehicular traffic lanes, parking *spaces*, or parking access aisles. *Curb ramps* at *marked crossings* shall be wholly contained within the markings, excluding any flared sides.

406.6 Diagonal Curb Ramps. Diagonal or corner type *curb ramps* with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. The bottom of diagonal *curb ramps* shall have a clear *space* 48 inches (1220 mm) minimum outside active traffic lanes of the roadway. Diagonal *curb ramps* provided at *marked crossings* shall provide the 48 inches (1220 mm) minimum clear *space* within the markings. Diagonal *curb ramps* with flared sides shall have a segment of curb 24 inches (610 mm) long minimum located on each side of the *curb ramp* and within the *marked crossing*.

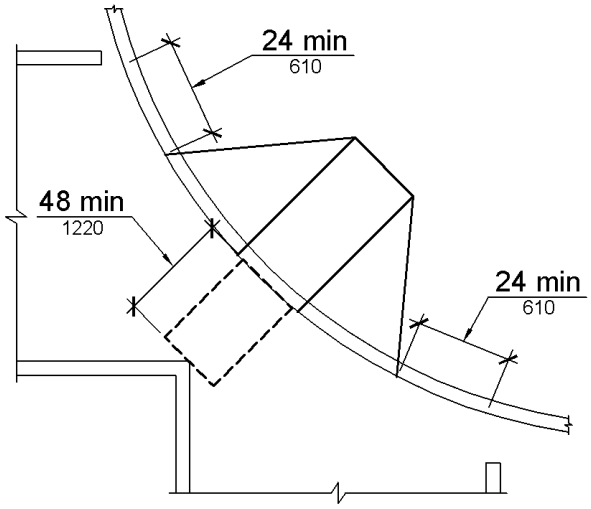


Figure 406.6
Diagonal or Corner Type Curb Ramps

406.7 Islands. Raised islands in crossings shall be cut through level with the street or have *curb ramps* at both sides. Each *curb ramp* shall have a level area 48 inches (1220 mm) long minimum by 36 inches (915 mm) wide minimum at the top of the *curb ramp* in the part of the island intersected by the crossings. Each 48 inch (1220 mm) minimum by 36 inch (915 mm) minimum area shall be oriented so that the 48 inch (1220 mm) minimum length is in the direction of the *running slope* of the *curb ramp* it serves. The 48 inch (1220 mm) minimum by 36 inch (915 mm) minimum areas and the *accessible* route shall be permitted to overlap.

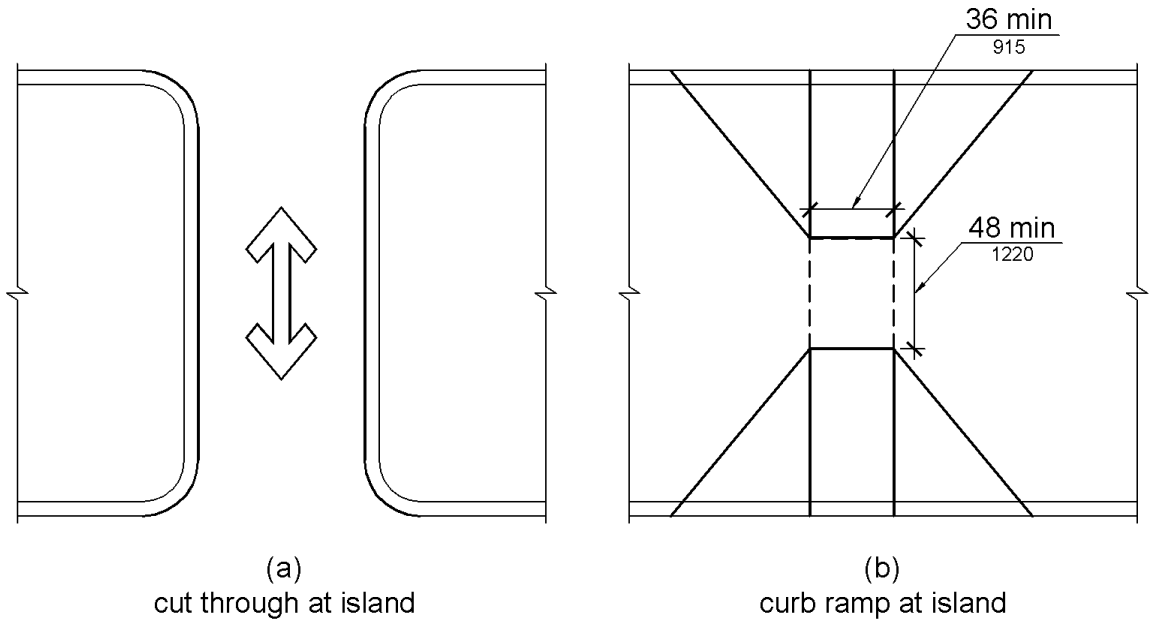


Figure 406.7
Islands in Crossings

Note to Reader: The Department of Transportation's ADA standards require detectable warnings on curb ramps:

406.8 Detectable Warnings. A curb ramp shall have a detectable warning complying with 705. The detectable warning shall extend the full width of the curb ramp (exclusive of flared sides) and shall extend either the full depth of the curb ramp or 24 inches (610 mm) deep minimum measured from the back of the curb on the ramp surface.

407 Elevators

407.1 General. Elevators shall comply with 407 and with ASME A17.1 (incorporated by reference, see "Referenced Standards" in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.

Advisory 407.1 General. The ADA and other Federal civil rights laws require that accessible features be maintained in working order so that they are accessible to and usable by those people they are intended to benefit. Building owners should note that the ASME Safety Code for Elevators and Escalators requires routine maintenance and inspections. Isolated or temporary interruptions in service due to maintenance or repairs may be unavoidable; however, failure to take prompt action to effect repairs could constitute a violation of Federal laws and these requirements.

407.2 Elevator Landing Requirements. Elevator landings shall comply with 407.2.

407.2.1 Call Controls. Where elevator call buttons or keypads are provided, they shall comply with 407.2.1 and 309.4. Call buttons shall be raised or flush.

EXCEPTION: Existing elevators shall be permitted to have recessed call buttons.

407.2.1.1 Height. Call buttons and keypads shall be located within one of the reach ranges specified in 308, measured to the centerline of the highest *operable part*.

EXCEPTION: Existing call buttons and existing keypads shall be permitted to be located at 54 inches (1370 mm) maximum above the finish floor, measured to the centerline of the highest *operable part*.

407.2.1.2 Size. Call buttons shall be ¾ inch (19 mm) minimum in the smallest dimension.

EXCEPTION: Existing elevator call buttons shall not be required to comply with 407.2.1.2.

407.2.1.3 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided at call controls.

Advisory 407.2.1.3 Clear Floor or Ground Space. The clear floor or ground space required at elevator call buttons must remain free of obstructions including ashtrays, plants, and other decorative elements that prevent wheelchair users and others from reaching the call buttons. The height of the clear floor or ground space is considered to be a volume from the floor to 80 inches (2030 mm) above the floor. Recessed ashtrays should not be placed near elevator call buttons so that persons who are blind or visually impaired do not inadvertently contact them or their contents as they reach for the call buttons.

407.2.1.4 Location. The call button that designates the up direction shall be located above the call button that designates the down direction.

EXCEPTION: Destination-oriented elevators shall not be required to comply with 407.2.1.4.

Advisory 407.2.1.4 Location Exception. A destination-oriented elevator system provides lobby controls enabling passengers to select floor stops, lobby indicators designating which elevator to use, and a car indicator designating the floors at which the car will stop. Responding cars are programmed for maximum efficiency by reducing the number of stops any passenger experiences.

407.2.1.5 Signals. Call buttons shall have visible signals to indicate when each call is registered and when each call is answered.

EXCEPTIONS: 1. Destination-oriented elevators shall not be required to comply with 407.2.1.5 provided that visible and audible signals complying with 407.2.2 indicating which elevator car to enter are provided.

2. Existing elevators shall not be required to comply with 407.2.1.5.

407.2.1.6 Keypads. Where keypads are provided, keypads shall be in a standard telephone keypad arrangement and shall comply with 407.4.7.2.

407.2.2 Hall Signals. Hall signals, including in-car signals, shall comply with 407.2.2.

407.2.2.1 Visible and Audible Signals. A visible and audible signal shall be provided at each hoistway entrance to indicate which car is answering a call and the car's direction of travel. Where in-car signals are provided, they shall be visible from the floor area adjacent to the hall call buttons.

EXCEPTIONS: 1. Visible and audible signals shall not be required at each destination-oriented elevator where a visible and audible signal complying with 407.2.2 is provided indicating the elevator car designation information.

2. In existing elevators, a signal indicating the direction of car travel shall not be required.

407.2.2.2 Visible Signals. Visible signal fixtures shall be centered at 72 inches (1830 mm) minimum above the finish floor or ground. The visible signal *elements* shall be 2-½ inches (64 mm) minimum measured along the vertical centerline of the *element*. Signals shall be visible from the floor area adjacent to the hall call button.

EXCEPTIONS: 1. Destination-oriented elevators shall be permitted to have signals visible from the floor area adjacent to the hoistway entrance.

2. Existing elevators shall not be required to comply with 407.2.2.2.

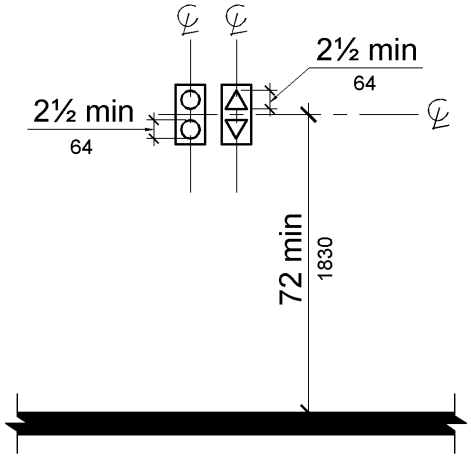


Figure 407.2.2.2
Visible Hall Signals

407.2.2.3 Audible Signals. Audible signals shall sound once for the up direction and twice for the down direction, or shall have verbal annunciators that indicate the direction of elevator car travel. Audible signals shall have a frequency of 1500 Hz maximum. Verbal annunciators shall have a frequency of 300 Hz minimum and 3000 Hz maximum. The audible signal and verbal annunciator shall be 10 dB minimum above ambient, but shall not exceed 80 dB, measured at the hall call button.

EXCEPTIONS: 1. Destination-oriented elevators shall not be required to comply with 407.2.2.3 provided that the audible tone and verbal announcement is the same as those given at the call button or call button keypad.

2. Existing elevators shall not be required to comply with the requirements for frequency and dB range of audible signals.

407.2.2.4 Differentiation. Each destination-oriented elevator in a bank of elevators shall have audible and visible means for differentiation.

407.2.3 Hoistway Signs. Signs at elevator hoistways shall comply with 407.2.3.

407.2.3.1 Floor Designation. Floor designations complying with 703.2 and 703.4.1 shall be provided on both jambs of elevator hoistway entrances. Floor designations shall be provided in both *tactile characters* and braille. *Tactile characters* shall be 2 inches (51 mm) high minimum. A *tactile* star shall be provided on both jambs at the main entry level.

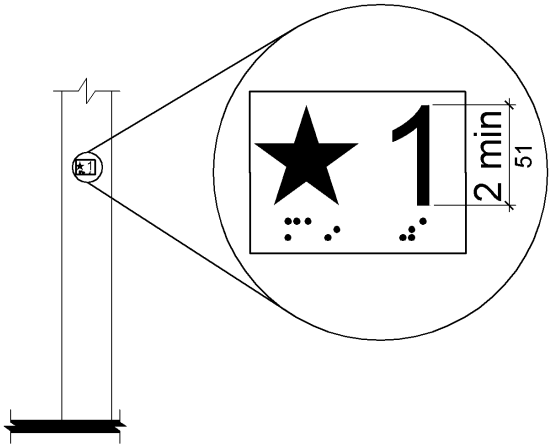


Figure 407.2.3.1
Floor Designations on Jambs of Elevator Hoistway Entrances

407.2.3.2 Car Designations. Destination-oriented elevators shall provide *tactile* car identification complying with 703.2 on both jambs of the hoistway immediately below the floor designation. Car designations shall be provided in both *tactile characters* and braille. *Tactile characters* shall be 2 inches (51 mm) high minimum.

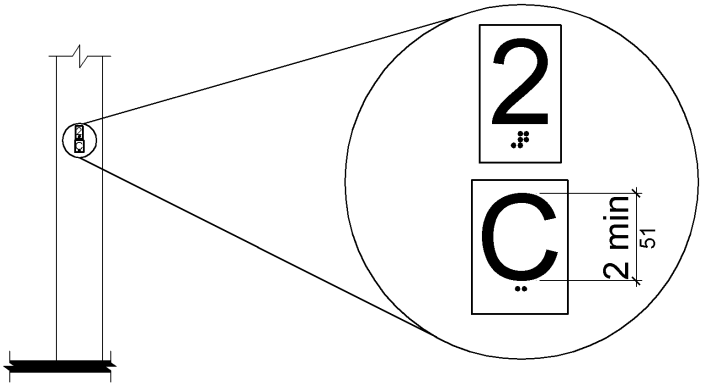


Figure 407.2.3.2
Car Designations on Jambs of Destination-Oriented Elevator Hoistway Entrances

407.3 Elevator Door Requirements. Hoistway and car doors shall comply with 407.3.

407.3.1 Type. Elevator doors shall be the horizontal sliding type. Car gates shall be prohibited.

407.3.2 Operation. Elevator hoistway and car doors shall open and close automatically.
EXCEPTION: Existing manually operated hoistway swing doors shall be permitted provided that they comply with 404.2.3 and 404.2.9. Car door closing shall not be initiated until the hoistway door is closed.

407.3.3 Reopening Device. Elevator doors shall be provided with a reopening device complying with 407.3.3 that shall stop and reopen a car door and hoistway door automatically if the door becomes obstructed by an object or person.
EXCEPTION: Existing elevators with manually operated doors shall not be required to comply with 407.3.3.

407.3.3.1 Height. The device shall be activated by sensing an obstruction passing through the opening at 5 inches (125 mm) nominal and 29 inches (735 mm) nominal above the finish floor.

407.3.3.2 Contact. The device shall not require physical contact to be activated, although contact is permitted to occur before the door reverses.

407.3.3.3 Duration. Door reopening devices shall remain effective for 20 seconds minimum.

407.3.4 Door and Signal Timing. The minimum acceptable time from notification that a car is answering a call or notification of the car assigned at the means for the entry of destination information until the doors of that car start to close shall be calculated from the following equation:

T = D/(1.5 ft/s) or T = D/(455 mm/s) = 5 seconds minimum where T equals the total time in seconds and D equals the distance (in feet or millimeters) from the point in the lobby or corridor 60 inches (1525 mm) directly in front of the farthest call button controlling that car to the centerline of its hoistway door.

EXCEPTIONS: 1. For cars with in-car lanterns, T shall be permitted to begin when the signal is visible from the point 60 inches (1525 mm) directly in front of the farthest hall call button and the audible signal is sounded.
2. Destination-oriented elevators shall not be required to comply with 407.3.4.

407.3.5 Door Delay. Elevator doors shall remain fully open in response to a car call for 3 seconds minimum.

407.3.6 Width. The width of elevator doors shall comply with Table 407.4.1.
EXCEPTION: In existing elevators, a power-operated car door complying with 404.2.3 shall be permitted.

407.4 Elevator Car Requirements. Elevator cars shall comply with 407.4.

407.4.1 Car Dimensions. Inside dimensions of elevator cars and clear width of elevator doors shall comply with Table 407.4.1.
EXCEPTION: Existing elevator car configurations that provide a clear floor area of 16 square feet (1.5 m^2) minimum and also provide an inside clear depth 54 inches (1370 mm) minimum and a clear width 36 inches (915 mm) minimum shall be permitted.

Table 407.4.1 Elevator Car Dimensions

	Minimum Dimensions			
Door Location	**Door Clear Width**	**Inside Car, Side to Side**	**Inside Car, Back Wall to Front Return**	**Inside Car, Back Wall to Inside Face of Door**
Centered	42 inches (1065 mm)	80 inches (2030 mm)	51 inches (1295 mm)	54 inches (1370 mm)
Side (off-centered)	36 inches (915 mm)[1]	68 inches (1725 mm)	51 inches (1295 mm)	54 inches (1370 mm)
Any	36 inches (915 mm)[1]	54 inches (1370 mm)	80 inches (2030 mm)	80 inches (2030 mm)
Any	36 inches (915 mm)[1]	60 inches (1525 mm)[2]	60 inches (1525 mm)[2]	60 inches (1525 mm)[2]

1. A tolerance of minus 5/8 inch (16 mm) is permitted.
2. Other car configurations that provide a turning *space* complying with 304 with the door closed shall be permited.

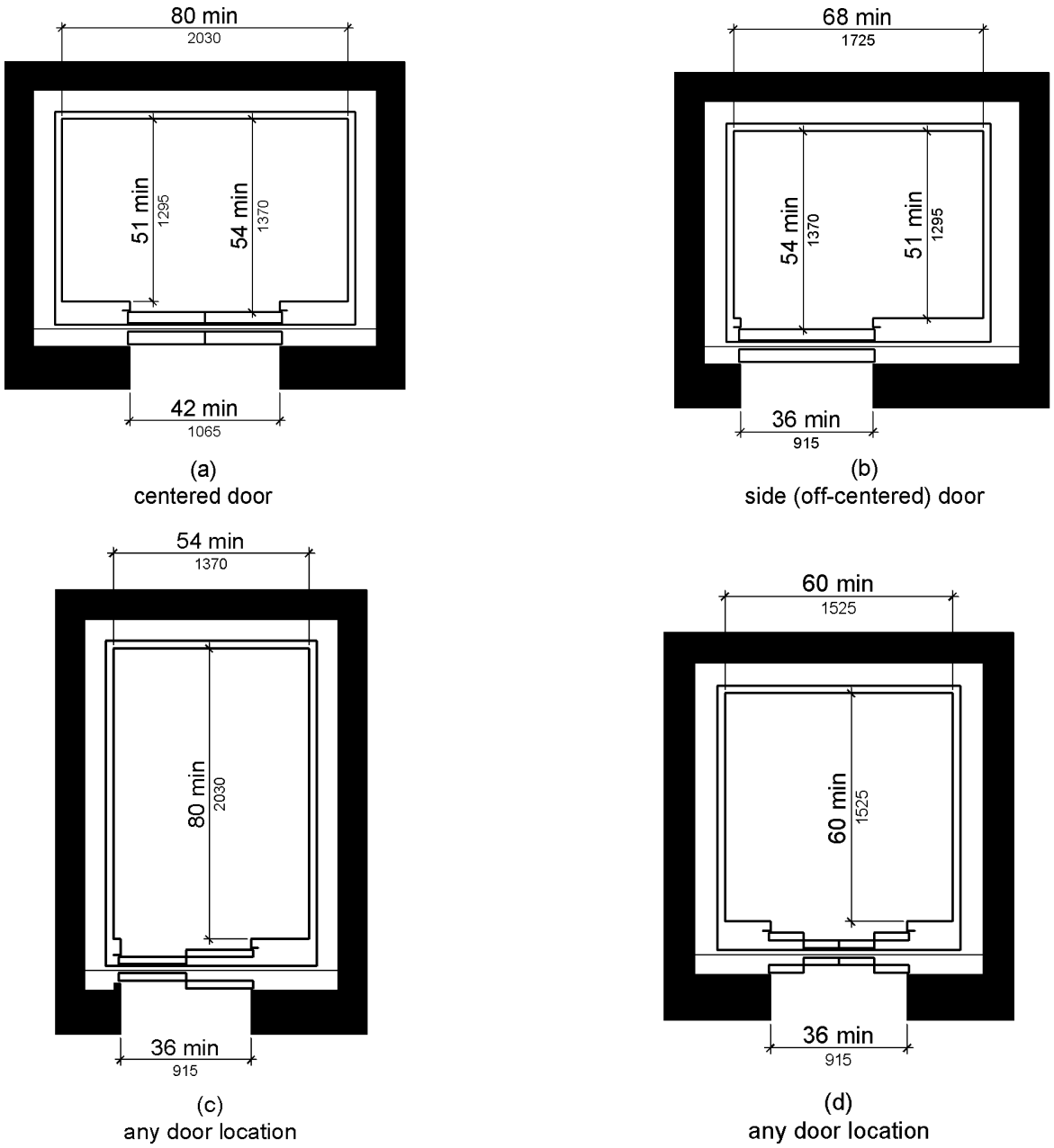
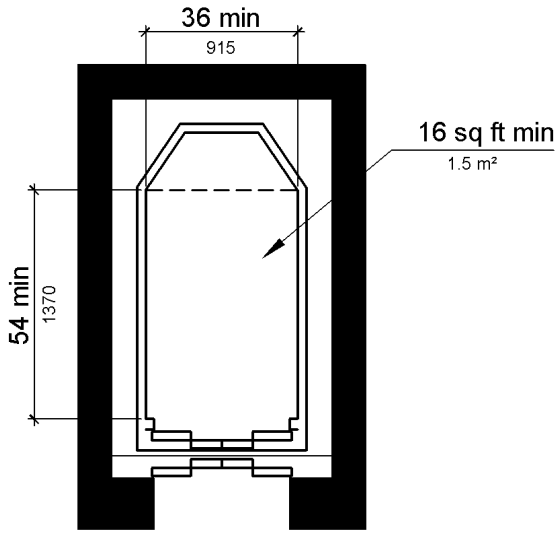


Figure 407.4.1
Elevator Car Dimensions



(e)
Exception
existing elevator car configuration

Figure 407.4.1
Elevator Car Dimensions

407.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with 302 and 303.

407.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing shall be 1¼ inch (32 mm) maximum.

407.4.4 Leveling. Each car shall be equipped with a self-leveling feature that will automatically bring and maintain the car at floor landings within a tolerance of ½ inch (13 mm) under rated loading to zero loading conditions.

407.4.5 Illumination. The level of illumination at the car controls, platform, car threshold and car landing sill shall be 5 foot candles (54 lux) minimum.

407.4.6 Elevator Car Controls. Where provided, elevator car controls shall comply with 407.4.6 and 309.4.

EXCEPTION: In existing elevators, where a new car operating panel complying with 407.4.6 is provided, existing car operating panels shall not be required to comply with 407.4.6.

407.4.6.1 Location. Controls shall be located within one of the reach ranges specified in 308.

EXCEPTIONS: 1. Where the elevator panel serves more than 16 openings and a parallel approach is provided, buttons with floor designations shall be permitted to be 54 inches (1370 mm) maximum above the finish floor.

2. In existing elevators, car control buttons with floor designations shall be permitted to be located 54 inches (1370 mm) maximum above the finish floor where a parallel approach is provided.

407.4.6.2 Buttons. Car control buttons with floor designations shall comply with 407.4.6.2 and shall be raised or flush.

EXCEPTION: In existing elevators, buttons shall be permitted to be recessed.

407.4.6.2.1 Size. Buttons shall be 3/4 inch (19 mm) minimum in their smallest dimension.

407.4.6.2.2 Arrangement. Buttons shall be arranged with numbers in ascending order. When two or more columns of buttons are provided they shall read from left to right.

407.4.6.3 Keypads. Car control keypads shall be in a standard telephone keypad arrangement and shall comply with 407.4.7.2.

407.4.6.4 Emergency Controls. Emergency controls shall comply with 407.4.6.4.

407.4.6.4.1 Height. Emergency control buttons shall have their centerlines 35 inches (890 mm) minimum above the finish floor.

407.4.6.4.2 Location. Emergency controls, including the emergency alarm, shall be grouped at the bottom of the panel.

407.4.7 Designations and Indicators of Car Controls. Designations and indicators of car controls shall comply with 407.4.7.

EXCEPTION: In existing elevators, where a new car operating panel complying with 407.4.7 is provided, existing car operating panels shall not be required to comply with 407.4.7.

407.4.7.1 Buttons. Car control buttons shall comply with 407.4.7.1.

407.4.7.1.1 Type. Control buttons shall be identified by *tactile characters* complying with 703.2.

407.4.7.1.2 Location. Raised *character* and braille designations shall be placed immediately to the left of the control button to which the designations apply.

EXCEPTION: Where *space* on an existing car operating panel precludes *tactile* markings to the left of the controls, markings shall be placed as near to the control as possible.

407.4.7.1.3 Symbols. The control button for the emergency stop, alarm, door open, door close, main entry floor, and phone, shall be identified with *tactile* symbols as shown in Table 407.4.7.1.3.

Table 407.4.7.1.3 Elevator Control Button Identification

Control Button	Tactile Symbol	Braille Message
Emergency Stop		“ST”OP Three cells
Alarm		AL“AR”M Four cells
Door Open		OP“EN” Three cells
Door Close		CLOSE Five cells
Main Entry Floor		MA“IN” Three cells
Phone		PH“ONE” Four cells

407.4.7.1.4 Visible Indicators. Buttons with floor designations shall be provided with visible indicators to show that a call has been registered. The visible indication shall extinguish when the car arrives at the designated floor.

407.4.7.2 Keypads. Keypads shall be identified by *characters* complying with 703.5 and shall be centered on the corresponding keypad button. The number five key shall have a single raised dot. The dot shall be 0.118 inch (3 mm) to 0.120 inch (3.05 mm) base diameter and in other aspects comply with Table 703.3.1.

407.4.8 Car Position Indicators. Audible and visible car position indicators shall be provided in elevator cars.

407.4.8.1 Visible Indicators. Visible indicators shall comply with 407.4.8.1.

407.4.8.1.1 Size. *Characters* shall be ½ inch (13 mm) high minimum.

407.4.8.1.2 Location. Indicators shall be located above the car control panel or above the door.

407.4.8.1.3 Floor Arrival. As the car passes a floor and when a car stops at a floor served by the elevator, the corresponding *character* shall illuminate.

EXCEPTION: Destination-oriented elevators shall not be required to comply with 407.4.8.1.3 provided that the visible indicators extinguish when the call has been answered.

407.4.8.1.4 Destination Indicator. In destination-oriented elevators, a display shall be provided in the car with visible indicators to show car destinations.

407.4.8.2 Audible Indicators. Audible indicators shall comply with 407.4.8.2.

407.4.8.2.1 Signal Type. The signal shall be an automatic verbal annunciator which announces the floor at which the car is about to stop.

EXCEPTION: For elevators other than destination-oriented elevators that have a rated speed of 200 feet per minute (1 m/s) or less, a non-verbal audible signal with a frequency of 1500 Hz maximum which sounds as the car passes or is about to stop at a floor served by the elevator shall be permitted.

407.4.8.2.2 Signal Level. The verbal annunciator shall be 10 dB minimum above ambient, but shall not exceed 80 dB, measured at the annunciator.

407.4.8.2.3 Frequency. The verbal annunciator shall have a frequency of 300 Hz minimum to 3000 Hz maximum.

407.4.9 Emergency Communication. Emergency two-way communication systems shall comply with 308. *Tactile* symbols and *characters* shall be provided adjacent to the device and shall comply with 703.2.

408 Limited-Use/Limited-Application Elevators

408.1 General. Limited-use/limited-application elevators shall comply with 408 and with ASME A17.1 (incorporated by reference, see “Referenced Standards” in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.

408.2 Elevator Landings. Landings serving limited-use/limited-application elevators shall comply with 408.2.

408.2.1 Call Buttons. Elevator call buttons and keypads shall comply with 407.2.1.

408.2.2 Hall Signals. Hall signals shall comply with 407.2.2.

408.2.3 Hoistway Signs. Signs at elevator hoistways shall comply with 407.2.3.1.

408.3 Elevator Doors. Elevator hoistway doors shall comply with 408.3.

408.3.1 Sliding Doors. Sliding hoistway and car doors shall comply with 407.3.1 through 407.3.3 and 408.4.1.

408.3.2 Swinging Doors. Swinging hoistway doors shall open and close automatically and shall comply with 404, 407.3.2 and 408.3.2.

408.3.2.1 Power Operation. Swinging doors shall be power-operated and shall comply with ANSI/BHMA A156.19 (1997 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1).

408.3.2.2 Duration. Power-operated swinging doors shall remain open for 20 seconds minimum when activated.

408.4 Elevator Cars. Elevator cars shall comply with 408.4.

408.4.1 Car Dimensions and Doors. Elevator cars shall provide a clear width 42 inches (1065 mm) minimum and a clear depth 54 inches (1370 mm) minimum. Car doors shall be positioned at the narrow ends of cars and shall provide 32 inches (815 mm) minimum clear width.

EXCEPTIONS: 1. Cars that provide a clear width 51 inches (1295 mm) minimum shall be permitted to provide a clear depth 51 inches (1295 mm) minimum provided that car doors provide a clear opening 36 inches (915 mm) wide minimum.

2. Existing elevator cars shall be permitted to provide a clear width 36 inches (915 mm) minimum, clear depth 54 inches (1370 mm) minimum, and a net clear platform area 15 square feet (1.4 m^2) minimum.

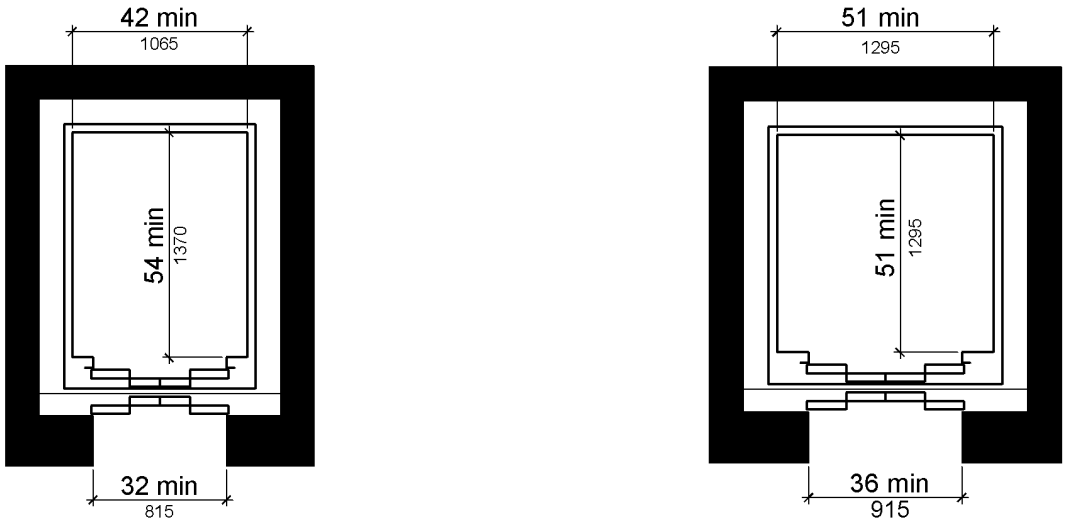


Figure 408.4.1
Limited-Use/Limited-Application (LULA) Elevator Car Dimensions

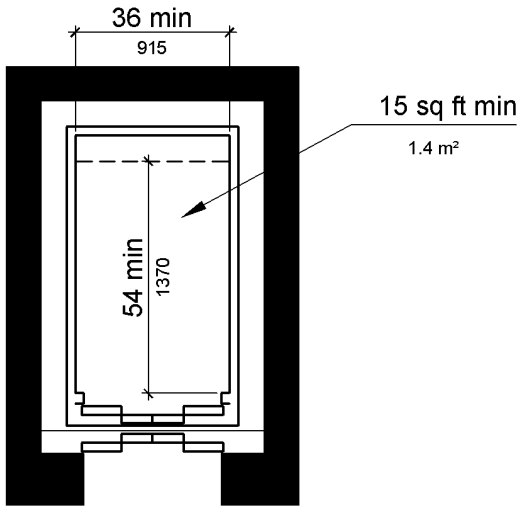


Figure 408.4.1
Limited-Use/Limited-Application (LULA) Elevator Car Dimensions

408.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with 302 and 303.

408.4.3 Platform to Hoistway Clearance. The platform to hoistway clearance shall comply with 407.4.3.

408.4.4 Leveling. Elevator car leveling shall comply with 407.4.4.

408.4.5 Illumination. Elevator car illumination shall comply with 407.4.5.

408.4.6 Car Controls. Elevator car controls shall comply with 407.4.6. Control panels shall be centered on a side wall.

408.4.7 Designations and Indicators of Car Controls. Designations and indicators of car controls shall comply with 407.4.7.

408.4.8 Emergency Communications. Car emergency signaling devices complying with 407.4.9 shall be provided.

409 Private Residence Elevators

409.1 General. Private residence elevators that are provided within a *residential dwelling unit* required to provide mobility features complying with 809.2 through 809.4 shall comply with 409 and with ASME A17.1 (incorporated by reference, see “Referenced Standards” in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.

409.2 Call Buttons. Call buttons shall be ¾ inch (19 mm) minimum in the smallest dimension and shall comply with 309.

409.3 Elevator Doors. Hoistway doors, car doors, and car gates shall comply with 409.3 and 404.

EXCEPTION: Doors shall not be required to comply with the maneuvering clearance requirements in 404.2.4.1 for approaches to the push side of swinging doors.

409.3.1 Power Operation. Elevator car and hoistway doors and gates shall be power operated and shall comply with ANSI/BHMA A156.19 (1997 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1). Power operated doors and gates shall remain open for 20 seconds minimum when activated.

EXCEPTION: In elevator cars with more than one opening, hoistway doors and gates shall be permitted to be of the manual-open, self-close type.

409.3.2 Location. Elevator car doors or gates shall be positioned at the narrow end of the clear floor *spaces* required by 409.4.1.

409.4 Elevator Cars. Private residence elevator cars shall comply with 409.4.

409.4.1 Inside Dimensions of Elevator Cars. Elevator cars shall provide a clear floor *space* of 36 inches (915 mm) minimum by 48 inches (1220 mm) minimum and shall comply with 305.

409.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with 302 and 303.

409.4.3 Platform to Hoistway Clearance. The clearance between the car platform and the edge of any landing sill shall be 1½ inch (38 mm) maximum.

409.4.4 Leveling. Each car shall automatically stop at a floor landing within a tolerance of ½ inch (13 mm) under rated loading to zero loading conditions.

409.4.5 Illumination Levels. Elevator car illumination shall comply with 407.4.5.

409.4.6 Car Controls. Elevator car control buttons shall comply with 409.4.6, 309.3, 309.4, and shall be raised or flush.

409.4.6.1 Size. Control buttons shall be 3/4 inch (19 mm) minimum in their smallest dimension.

409.4.6.2 Location. Control panels shall be on a side wall, 12 inches (305 mm) minimum from any adjacent wall.

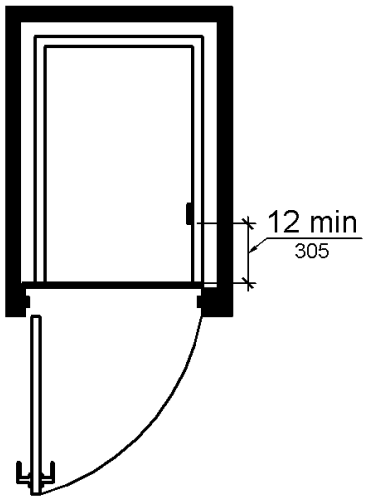


Figure 409.4.6.2
Location of Private Residence Elevator Control Panel

409.4.7 Emergency Communications. Emergency two-way communication systems shall comply with 409.4.7.

409.4.7.1 Type. A telephone and emergency signal device shall be provided in the car.

409.4.7.2 Operable Parts. The telephone and emergency signaling device shall comply with 309.3 and 309.4.

409.4.7.3 Compartment. If the telephone or device is in a closed compartment, the compartment door hardware shall comply with 309.

409.4.7.4 Cord. The telephone cord shall be 29 inches (735 mm) long minimum.

410 Platform Lifts

410.1 General. Platform lifts shall comply with ASME A18.1 (1999 edition or 2003 edition) (incorporated by reference, see “Referenced Standards” in Chapter 1). Platform lifts shall not be attendant-operated and shall provide unassisted entry and exit from the lift.

Advisory 410.1 General. Inclined stairway chairlifts and inclined and vertical platform lifts are available for short-distance vertical transportation. Because an accessible route requires an 80 inch (2030 mm) vertical clearance, care should be taken in selecting lifts as they may not be equally suitable for use by people using wheelchairs and people standing. If a lift does not provide 80 inch (2030 mm) vertical clearance, it cannot be considered part of an accessible route in new construction.

The ADA and other Federal civil rights laws require that accessible features be maintained in working order so that they are accessible to and usable by those people they are intended to benefit. Building owners are reminded that the ASME A18 Safety Standard for Platform Lifts and Stairway Chairlifts requires routine maintenance and inspections. Isolated or temporary interruptions in service due to maintenance or repairs may be unavoidable; however, failure to take prompt action to effect repairs could constitute a violation of Federal laws and these requirements.

410.2 Floor Surfaces. Floor surfaces in platform lifts shall comply with 302 and 303.

410.3 Clear Floor Space. Clear floor *space* in platform lifts shall comply with 305.

410.4 Platform to Runway Clearance. The clearance between the platform sill and the edge of any runway landing shall be 1¼ inch (32 mm) maximum.

410.5 Operable Parts. Controls for platform lifts shall comply with 309.

410.6 Doors and Gates. Platform lifts shall have low-energy power-operated doors or gates complying with 404.3. Doors shall remain open for 20 seconds minimum. End doors and gates shall provide a clear width 32 inches (815 mm) minimum. Side doors and gates shall provide a clear width 42 inches (1065 mm) minimum.

EXCEPTION: Platform lifts serving two landings maximum and having doors or gates on opposite sides shall be permitted to have self-closing manual doors or gates.

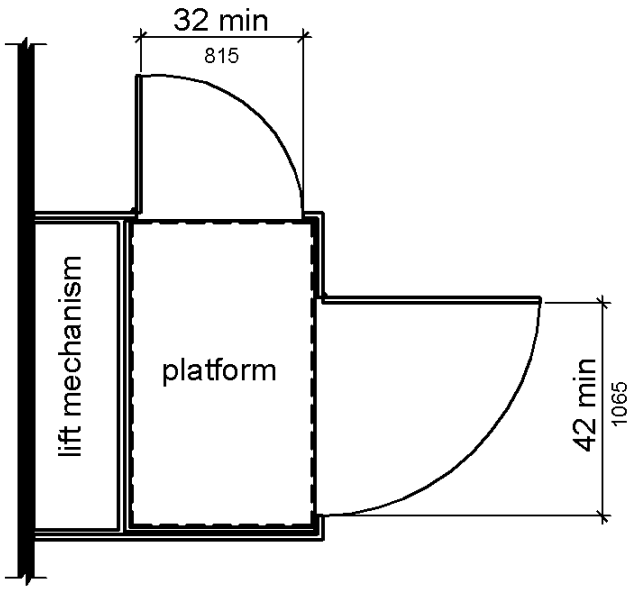


Figure 410.6
Platform Lift Doors and Gates

CHAPTER 5: GENERAL SITE AND BUILDING ELEMENTS

501 General

501.1 Scope. The provisions of Chapter 5 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

502 Parking Spaces

502.1 General. Car and van parking *spaces* shall comply with 502. Where parking *spaces* are marked with lines, width measurements of parking *spaces* and access aisles shall be made from the centerline of the markings.

EXCEPTION: Where parking *spaces* or access aisles are not adjacent to another parking *space* or access aisle, measurements shall be permitted to include the full width of the line defining the parking *space* or access aisle.

502.2 Vehicle Spaces. Car parking *spaces* shall be 96 inches (2440 mm) wide minimum and van parking *spaces* shall be 132 inches (3350 mm) wide minimum, shall be marked to define the width, and shall have an adjacent access aisle complying with 502.3.

EXCEPTION: Van parking *spaces* shall be permitted to be 96 inches (2440 mm) wide minimum where the access aisle is 96 inches (2440 mm) wide minimum.

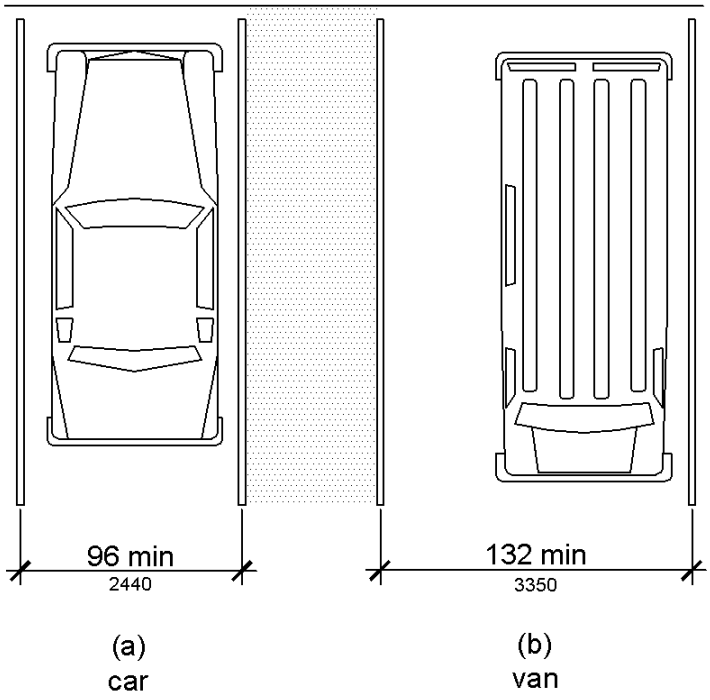


Figure 502.2
Vehicle Parking Spaces

502.3 Access Aisle. Access aisles serving parking *spaces* shall comply with 502.3. Access aisles shall adjoin an *accessible* route. Two parking *spaces* shall be permitted to share a common access aisle.

Advisory 502.3 Access Aisle. Accessible routes must connect parking spaces to accessible entrances. In parking facilities where the accessible route must cross vehicular traffic lanes, marked crossings enhance pedestrian safety, particularly for people using wheelchairs and other mobility aids. Where possible, it is preferable that the accessible route not pass behind parked vehicles.

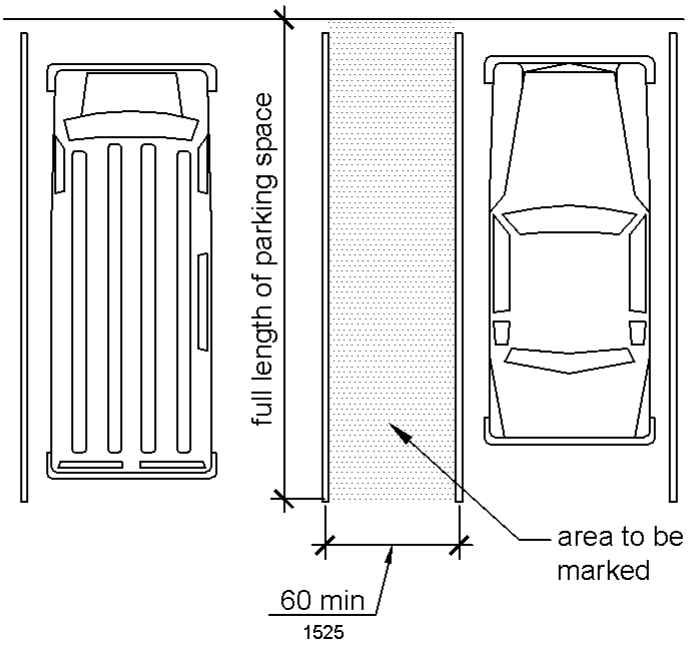


Figure 502.3
Parking Space Access Aisle

502.3.1 Width. Access aisles serving car and van parking *spaces* shall be 60 inches (1525 mm) wide minimum.

502.3.2 Length. Access aisles shall extend the full length of the parking *spaces* they serve.

502.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

Advisory 502.3.3 Marking. The method and color of marking are not specified by these requirements but may be addressed by State or local laws or regulations. Because these requirements permit the van access aisle to be as wide as a parking space, it is important that the aisle be clearly marked.

502.3.4 Location. Access aisles shall not overlap the *vehicular way*. Access aisles shall be permitted to be placed on either side of the parking *space* except for angled van parking *spaces* which shall have access aisles located on the passenger side of the parking *spaces*.

Advisory 502.3.4 Location. Wheelchair lifts typically are installed on the passenger side of vans. Many drivers, especially those who operate vans, find it more difficult to back into parking spaces than to back out into comparatively unrestricted vehicular lanes. For this reason, where a van and car share an access aisle, consider locating the van space so that the access aisle is on the passenger side of the van space.

502.4 Floor or Ground Surfaces. Parking *spaces* and access aisles serving them shall comply with 302. Access aisles shall be at the same level as the parking *spaces* they serve. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

Advisory 502.4 Floor or Ground Surfaces. Access aisles are required to be nearly level in all directions to provide a surface for wheelchair transfer to and from vehicles. The exception allows sufficient slope for drainage. Built-up curb ramps are not permitted to project into access aisles and parking spaces because they would create slopes greater than 1:48.

502.5 Vertical Clearance. Parking *spaces* for vans and access aisles and vehicular routes serving them shall provide a vertical clearance of 98 inches (2490 mm) minimum.

Advisory 502.5 Vertical Clearance. Signs provided at entrances to parking facilities informing drivers of clearances and the location of van accessible parking spaces can provide useful customer assistance.

502.6 Identification. Parking *space* identification signs shall include the International Symbol of *Accessibility* complying with 703.7.2.1. Signs identifying van parking *spaces* shall contain the designation “van accessible.” Signs shall be 60 inches (1525 mm) minimum above the finish floor or ground surface measured to the bottom of the sign.

Advisory 502.6 Identification. The required “van accessible” designation is intended to be informative, not restrictive, in identifying those spaces that are better suited for van use. Enforcement of motor vehicle laws, including parking privileges, is a local matter.

502.7 Relationship to Accessible Routes. Parking *spaces* and access aisles shall be designed so that cars and vans, when parked, cannot obstruct the required clear width of adjacent *accessible* routes.

Advisory 502.7 Relationship to Accessible Routes. Wheel stops are an effective way to prevent vehicle overhangs from reducing the clear width of accessible routes.

503 Passenger Loading Zones

503.1 General. Passenger loading zones shall comply with 503.

503.2 Vehicle Pull-Up Space. Passenger loading zones shall provide a vehicular pull-up *space* 96 inches (2440 mm) wide minimum and 20 feet (6100 mm) long minimum.

503.3 Access Aisle. Passenger loading zones shall provide access aisles complying with 503 adjacent to the vehicle pull-up space. Access aisles shall adjoin an *accessible* route and shall not overlap the *vehicular way*.

503.3.1 Width. Access aisles serving vehicle pull-up *spaces* shall be 60 inches (1525 mm) wide minimum.

503.3.2 Length. Access aisles shall extend the full length of the vehicle pull-up *spaces* they serve.

503.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

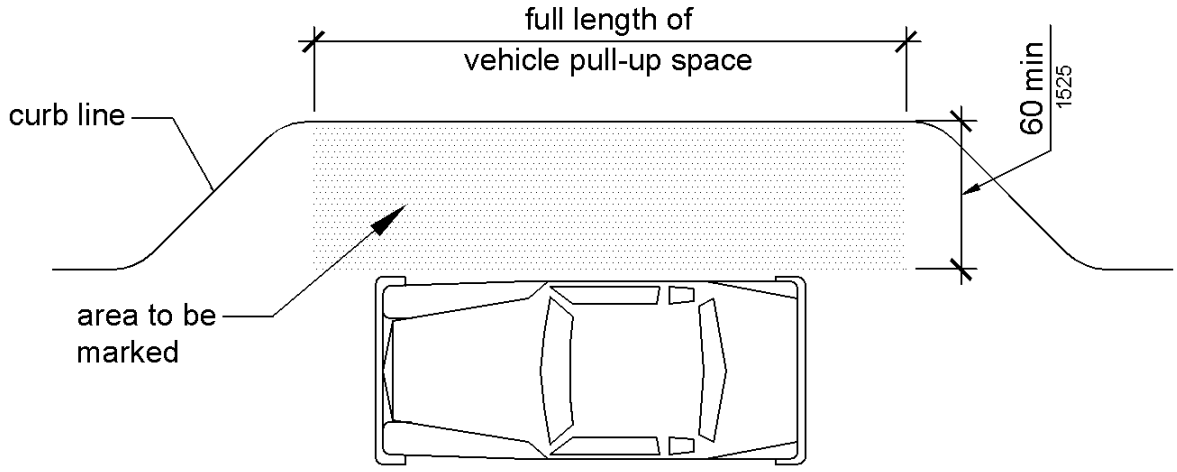


Figure 503.3
Passenger Loading Zone Access Aisle

503.4 Floor and Ground Surfaces. Vehicle pull-up *spaces* and access aisles serving them shall comply with 302. Access aisles shall be at the same level as the vehicle pull-up *space* they serve. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

503.5 Vertical Clearance. Vehicle pull-up *spaces*, access aisles serving them, and a vehicular route from an *entrance* to the passenger loading zone, and from the passenger loading zone to a vehicular exit shall provide a vertical clearance of 114 inches (2895 mm) minimum.

504 Stairways

504.1 General. Stairs shall comply with 504.

504.2 Treads and Risers. All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be 4 inches (100 mm) high minimum and 7 inches (180 mm) high maximum. Treads shall be 11 inches (280 mm) deep minimum.

504.3 Open Risers. Open risers are not permitted.

504.4 Tread Surface. Stair treads shall comply with 302. Changes in level are not permitted.
EXCEPTION: Treads shall be permitted to have a slope not steeper than 1:48.

> **Advisory 504.4 Tread Surface.** Consider providing visual contrast on tread nosings, or at the leading edges of treads without nosings, so that stair treads are more visible for people with low vision.

504.5 Nosings. The radius of curvature at the leading edge of the tread shall be ½ inch (13 mm) maximum. Nosings that project beyond risers shall have the underside of the leading edge curved or beveled. Risers shall be permitted to slope under the tread at an angle of 30 degrees maximum from vertical. The permitted projection of the nosing shall extend 1½ inches (38 mm) maximum over the tread below.

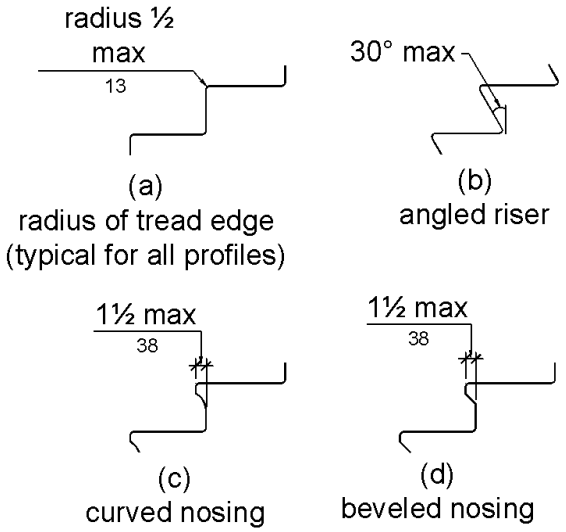


Figure 504.5
Stair Nosings

504.6 Handrails. Stairs shall have handrails complying with 505.

504.7 Wet Conditions. Stair treads and landings subject to wet conditions shall be designed to prevent the accumulation of water.

505 Handrails

505.1 General. Handrails provided along walking surfaces complying with 403, required at *ramps* complying with 405, and required at stairs complying with 504 shall comply with 505.

> **Advisory 505.1 General.** Handrails are required on ramp runs with a rise greater than 6 inches (150 mm) (see 405.8) and on certain stairways (see 504). Handrails are not required on walking surfaces with running slopes less than 1:20. However, handrails are required to comply with 505 when they are provided on walking surfaces with running slopes less than 1:20 (see 403.6). Sections 505.2, 505.3, and 505.10 do not apply to handrails provided on walking surfaces with running slopes less than 1:20 as these sections only reference requirements for ramps and stairs.

505.2 Where Required. Handrails shall be provided on both sides of stairs and *ramps*.

EXCEPTION: In *assembly areas*, handrails shall not be required on both sides of aisle *ramps* where a handrail is provided at either side or within the aisle width.

505.3 Continuity. Handrails shall be continuous within the full length of each stair flight or *ramp* run. Inside handrails on switchback or dogleg stairs and *ramps* shall be continuous between flights or runs.

EXCEPTION: In *assembly areas*, handrails on *ramps* shall not be required to be continuous in aisles serving seating.

505.4 Height. Top of gripping surfaces of handrails shall be 34 inches (865 mm) minimum and 38 inches (965 mm) maximum vertically above walking surfaces, stair nosings, and *ramp* surfaces. Handrails shall be at a consistent height above walking surfaces, stair nosings, and *ramp* surfaces.

> **Advisory 505.4 Height.** The requirements for stair and ramp handrails in this document are for adults. When children are the principal users in a building or facility (e.g., elementary schools), a second set of handrails at an appropriate height can assist them and aid in preventing accidents. A maximum height of 28 inches (710 mm) measured to the top of the gripping surface from the ramp surface or stair nosing is recommended for handrails designed for children. Sufficient vertical clearance between upper and lower handrails, 9 inches (230 mm) minimum, should be provided to help prevent entrapment.

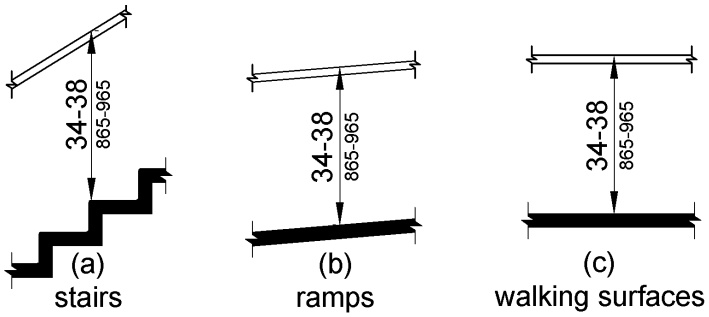


Figure 505.4
Handrail Height

505.5 Clearance. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1½ inches (38 mm) minimum.

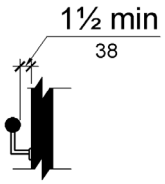


Figure 505.5
Handrail Clearance

505.6 Gripping Surface. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20 percent of their length. Where provided, horizontal projections shall occur 1½ inches (38 mm) minimum below the bottom of the handrail gripping surface.

EXCEPTIONS: 1. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.

2. The distance between horizontal projections and the bottom of the gripping surface shall be permitted to be reduced by 1/8 inch (3.2 mm) for each ½ inch (13 mm) of additional handrail perimeter dimension that exceeds 4 inches (100 mm).

Advisory 505.6 Gripping Surface. People with disabilities, older people, and others benefit from continuous gripping surfaces that permit users to reach the fingers outward or downward to grasp the handrail, particularly as the user senses a loss of equilibrium or begins to fall.

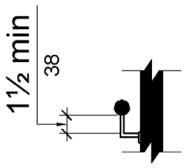


Figure 505.6
Horizontal Projections Below Gripping Surface

505.7 Cross Section. Handrail gripping surfaces shall have a cross section complying with 505.7.1 or 505.7.2.

505.7.1 Circular Cross Section. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1¼ inches (32 mm) minimum and 2 inches (51 mm) maximum.

505.7.2 Non-Circular Cross Sections. Handrail gripping surfaces with a non-circular cross section shall have a perimeter dimension of 4 inches (100 mm) minimum and 6¼ inches (160 mm) maximum, and a cross-section dimension of 2¼ inches (57 mm) maximum.

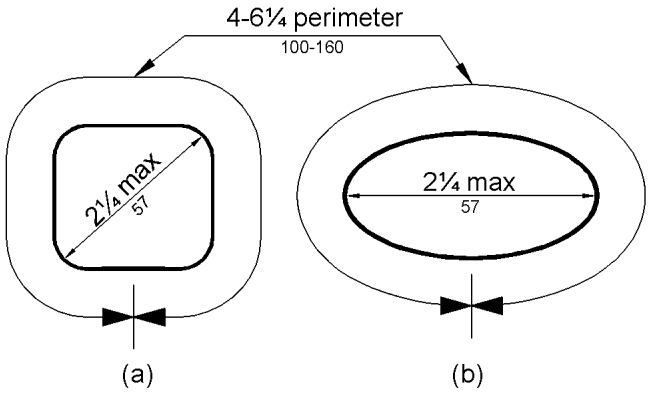


Figure 505.7.2
Handrail Non-Circular Cross Section

505.8 Surfaces. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive *elements* and shall have rounded edges.

505.9 Fittings. Handrails shall not rotate within their fittings.

505.10 Handrail Extensions. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and *ramp* runs in accordance with 505.10.

EXCEPTIONS: 1. Extensions shall not be required for continuous handrails at the inside turn of switchback or dogleg stairs and *ramps*.

2. In *assembly areas*, extensions shall not be required for *ramp* handrails in aisles serving seating where the handrails are discontinuous to provide access to seating and to permit crossovers within aisles.

3. In *alterations*, full extensions of handrails shall not be required where such extensions would be hazardous due to plan configuration.

505.10.1 Top and Bottom Extension at Ramps. *Ramp* handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent *ramp* run.

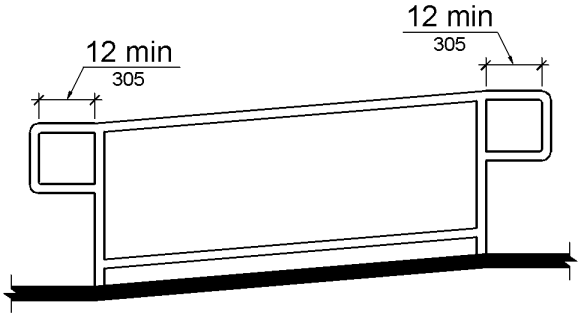


Figure 505.10.1
Top and Bottom Handrail Extension at Ramps

505.10.2 Top Extension at Stairs. At the top of a stair flight, handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beginning directly above the first riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

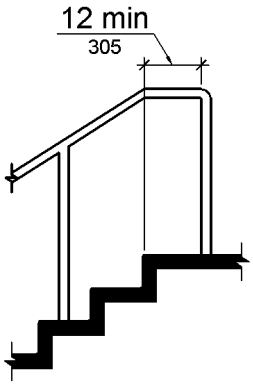
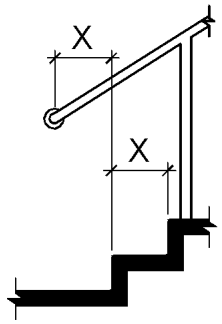


Figure 505.10.2
Top Handrail Extension at Stairs

505.10.3 Bottom Extension at Stairs. At the bottom of a stair flight, handrails shall extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. Extension shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.



Note: X = tread depth

Figure 505.10.3
Bottom Handrail Extension at Stairs

CHAPTER 6: PLUMBING ELEMENTS AND FACILITIES

601 General

601.1 Scope. The provisions of Chapter 6 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

602 Drinking Fountains

602.1 General. Drinking fountains shall comply with 307 and 602.

602.2 Clear Floor Space. Units shall have a clear floor or ground *space* complying with 305 positioned for a forward approach and centered on the unit. Knee and toe clearance complying with 306 shall be provided.

EXCEPTION: A parallel approach complying with 305 shall be permitted at units for *children's use* where the spout is 30 inches (760 mm) maximum above the finish floor or ground and is 3½ inches (90 mm) maximum from the front edge of the unit, including bumpers.

602.3 Operable Parts. *Operable parts* shall comply with 309.

602.4 Spout Height. Spout outlets shall be 36 inches (915 mm) maximum above the finish floor or ground.

602.5 Spout Location. The spout shall be located 15 inches (380 mm) minimum from the vertical support and 5 inches (125 mm) maximum from the front edge of the unit, including bumpers.

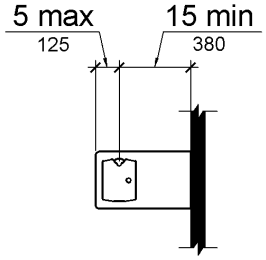


Figure 602.5
Drinking Fountain Spout Location

602.6 Water Flow. The spout shall provide a flow of water 4 inches (100 mm) high minimum and shall be located 5 inches (125 mm) maximum from the front of the unit. The angle of the water stream shall be measured horizontally relative to the front face of the unit. Where spouts are located less than 3 inches (75 mm) of the front of the unit, the angle of the water stream shall be 30 degrees maximum. Where spouts are located between 3 inches (75 mm) and 5 inches (125 mm) maximum from the front of the unit, the angle of the water stream shall be 15 degrees maximum.

Advisory 602.6 Water Flow. The purpose of requiring the drinking fountain spout to produce a flow of water 4 inches (100 mm) high minimum is so that a cup can be inserted under the flow of water to provide a drink of water for an individual who, because of a disability, would otherwise be incapable of using the drinking fountain.

602.7 Drinking Fountains for Standing Persons. Spout outlets of drinking fountains for standing persons shall be 38 inches (965 mm) minimum and 43 inches (1090 mm) maximum above the finish floor or ground.

603 Toilet and Bathing Rooms

603.1 General. Toilet and bathing rooms shall comply with 603.

603.2 Clearances. Clearances shall comply with 603.2.

603.2.1 Turning Space. Turning *space* complying with 304 shall be provided within the room.

603.2.2 Overlap. Required clear floor *spaces*, clearance at fixtures, and turning *space* shall be permitted to overlap.

603.2.3 Door Swing. Doors shall not swing into the clear floor *space* or clearance required for any fixture. Doors shall be permitted to swing into the required turning *space*.

EXCEPTIONS: 1. Doors to a toilet room or bathing room for a single occupant accessed only through a private office and not for *common use* or *public use* shall be permitted to swing into the clear floor *space* or clearance provided the swing of the door can be reversed to comply with 603.2.3.

2. Where the toilet room or bathing room is for individual use and a clear floor *space* complying with 305.3 is provided within the room beyond the arc of the door swing, doors shall be permitted to swing into the clear floor *space* or clearance required for any fixture.

Advisory 603.2.3 Door Swing Exception 1. At the time the door is installed, and if the door swing is reversed in the future, the door must meet all the requirements specified in 404. Additionally, the door swing cannot reduce the required width of an accessible route. Also, avoid violating other building or life safety codes when the door swing is reversed.

603.3 Mirrors. Mirrors located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 40 inches (1015 mm) maximum above the finish floor or ground. Mirrors not located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 35 inches (890 mm) maximum above the finish floor or ground.

Advisory 603.3 Mirrors. A single full-length mirror can accommodate a greater number of people, including children. In order for mirrors to be usable by people who are ambulatory and people who use wheelchairs, the top edge of mirrors should be 74 inches (1880 mm) minimum from the floor or ground.

603.4 Coat Hooks and Shelves. Coat hooks shall be located within one of the reach ranges specified in 308. Shelves shall be located 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the finish floor.

604 Water Closets and Toilet Compartments

604.1 General. Water closets and toilet compartments shall comply with 604.2 through 604.8.

EXCEPTION: Water closets and toilet compartments for *children's use* shall be permitted to comply with 604.9.

604.2 Location. The water closet shall be positioned with a wall or partition to the rear and to one side. The centerline of the water closet shall be 16 inches (405 mm) minimum to 18 inches (455 mm) maximum from the side wall or partition, except that the water closet shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum from the side wall or partition in the ambulatory *accessible* toilet compartment specified in 604.8.2. Water closets shall be arranged for a left-hand or right-hand approach.

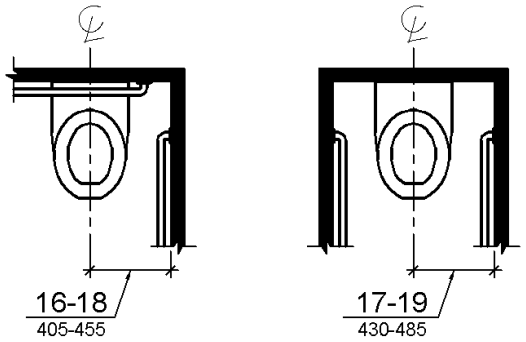


Figure 604.2
Water Closet Location

604.3 Clearance. Clearances around water closets and in toilet compartments shall comply with 604.3.

604.3.1 Size. Clearance around a water closet shall be 60 inches (1525 mm) minimum measured perpendicular from the side wall and 56 inches (1420 mm) minimum measured perpendicular from the rear wall.

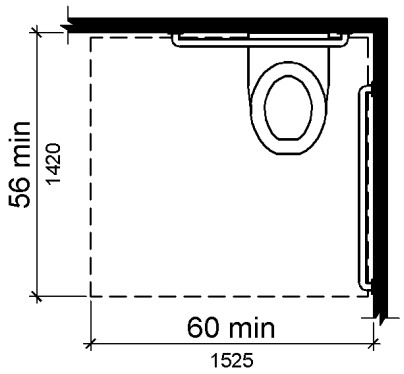


Figure 604.3.1
Size of Clearance at Water Closets

604.3.2 Overlap. The required clearance around the water closet shall be permitted to overlap the water closet, associated grab bars, dispensers, sanitary napkin disposal units, coat hooks, shelves, *accessible* routes, clear floor *space* and clearances required at other fixtures, and the turning *space*. No other fixtures or obstructions shall be located within the required water closet clearance.

EXCEPTION: In *residential dwelling units*, a lavatory complying with 606 shall be permitted on the rear wall 18 inches (455 mm) minimum from the water closet centerline where the clearance at the water closet is 66 inches (1675 mm) minimum measured perpendicular from the rear wall.

Advisory 604.3.2 Overlap. When the door to the toilet room is placed directly in front of the water closet, the water closet cannot overlap the required maneuvering clearance for the door inside the room.

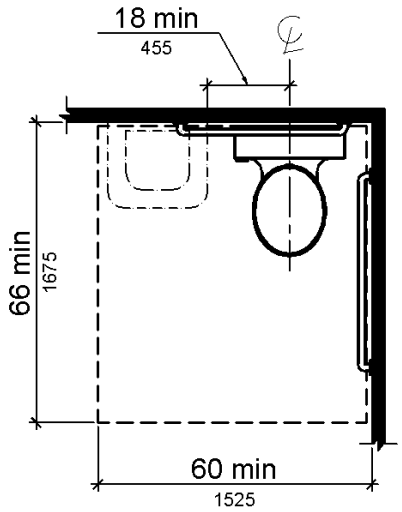


Figure 604.3.2 (Exception)
Overlap of Water Closet Clearance in Residential Dwelling Units

604.4 Seats. The seat height of a water closet above the finish floor shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum measured to the top of the seat. Seats shall not be sprung to return to a lifted position.

EXCEPTIONS: 1. A water closet in a toilet room for a single occupant accessed only through a private office and not for *common use* or *public use* shall not be required to comply with 604.4.

2. In *residential dwelling units*, the height of water closets shall be permitted to be 15 inches (380 mm) minimum and 19 inches (485 mm) maximum above the finish floor measured to the top of the seat.

604.5 Grab Bars. Grab bars for water closets shall comply with 609. Grab bars shall be provided on the side wall closest to the water closet and on the rear wall.

EXCEPTIONS: 1. Grab bars shall not be required to be installed in a toilet room for a single occupant accessed only through a private office and not for *common use* or *public use* provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 604.5.

2. In *residential dwelling units*, grab bars shall not be required to be installed in toilet or bathrooms provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 604.5.

3. In detention or correction *facilities*, grab bars shall not be required to be installed in housing or holding cells that are specially designed without protrusions for purposes of suicide prevention.

Advisory 604.5 Grab Bars Exception 2. Reinforcement must be sufficient to permit the installation of rear and side wall grab bars that fully meet all accessibility requirements including, but not limited to, required length, installation height, and structural strength.

604.5.1 Side Wall. The side wall grab bar shall be 42 inches (1065 mm) long minimum, located 12 inches (305 mm) maximum from the rear wall and extending 54 inches (1370 mm) minimum from the rear wall.

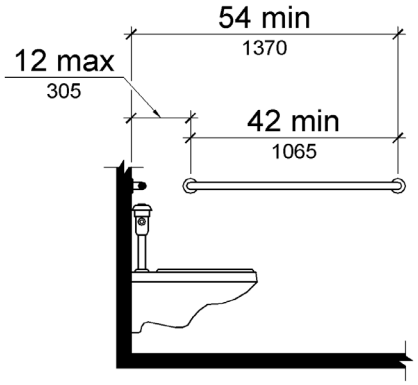


Figure 604.5.1
Side Wall Grab Bar at Water Closets

604.5.2 Rear Wall. The rear wall grab bar shall be 36 inches (915 mm) long minimum and extend from the centerline of the water closet 12 inches (305 mm) minimum on one side and 24 inches (610 mm) minimum on the other side.

EXCEPTIONS: 1. The rear grab bar shall be permitted to be 24 inches (610 mm) long minimum, centered on the water closet, where wall *space* does not permit a length of 36 inches (915 mm) minimum due to the location of a recessed fixture adjacent to the water closet.

2. Where an *administrative authority* requires flush controls for flush valves to be located in a position that conflicts with the location of the rear grab bar, then the rear grab bar shall be permitted to be split or shifted to the open side of the toilet area.

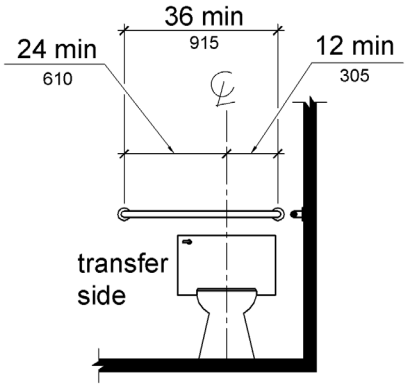


Figure 604.5.2
Rear Wall Grab Bar at Water Closets

604.6 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309. Flush controls shall be located on the open side of the water closet except in ambulatory *accessible* compartments complying with 604.8.2.

Advisory 604.6 Flush Controls. If plumbing valves are located directly behind the toilet seat, flush valves and related plumbing can cause injury or imbalance when a person leans back against them. To prevent causing injury or imbalance, the plumbing can be located behind walls or to the side of the toilet; or if approved by the local authority having jurisdiction, provide a toilet seat lid.

604.7 Dispensers. Toilet paper dispensers shall comply with 309.4 and shall be 7 inches (180 mm) minimum and 9 inches (230 mm) maximum in front of the water closet measured to the centerline of the dispenser. The outlet of the dispenser shall be 15 inches (380 mm) minimum and 48 inches (1220 mm) maximum above the finish floor and shall not be located behind grab bars. Dispensers shall not be of a type that controls delivery or that does not allow continuous paper flow.

Advisory 604.7 Dispensers. If toilet paper dispensers are installed above the side wall grab bar, the outlet of the toilet paper dispenser must be 48 inches (1220 mm) maximum above the finish floor and the top of the gripping surface of the grab bar must be 33 inches (840 mm) minimum and 36 inches (915 mm) maximum above the finish floor.

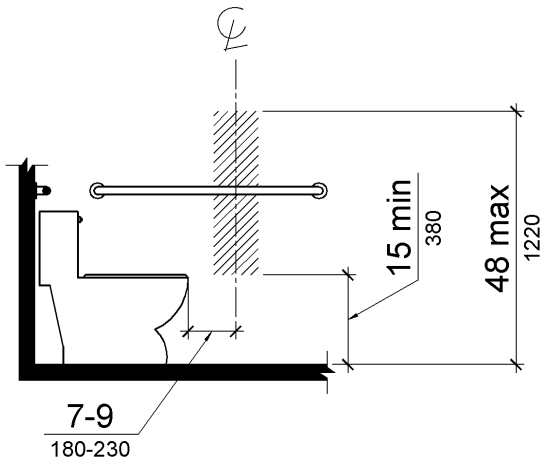


Figure 604.7
Dispenser Outlet Location

604.8 Toilet Compartments. Wheelchair *accessible* toilet compartments shall meet the requirements of 604.8.1 and 604.8.3. Compartments containing more than one plumbing fixture shall comply with 603. Ambulatory *accessible* compartments shall comply with 604.8.2 and 604.8.3.

604.8.1 Wheelchair Accessible Compartments. Wheelchair *accessible* compartments shall comply with 604.8.1.

604.8.1.1 Size. Wheelchair *accessible* compartments shall be 60 inches (1525 mm) wide minimum measured perpendicular to the side wall, and 56 inches (1420 mm) deep minimum for wall hung water closets and 59 inches (1500 mm) deep minimum for floor mounted water closets measured perpendicular to the rear wall. Wheelchair *accessible* compartments for *children's use* shall be 60 inches (1525 mm) wide minimum measured perpendicular to the side wall, and 59 inches (1500 mm) deep minimum for wall hung and floor mounted water closets measured perpendicular to the rear wall.

Advisory 604.8.1.1 Size. The minimum space required in toilet compartments is provided so that a person using a wheelchair can maneuver into position at the water closet. This space cannot be obstructed by baby changing tables or other fixtures or conveniences, except as specified at 604.3.2 (Overlap). If toilet compartments are to be used to house fixtures other than those associated with the water closet, they must be designed to exceed the minimum space requirements. Convenience fixtures such as baby changing tables must also be accessible to people with disabilities as well as to other users. Toilet compartments that are designed to meet, and not exceed, the minimum space requirements may not provide adequate space for maneuvering into position at a baby changing table.

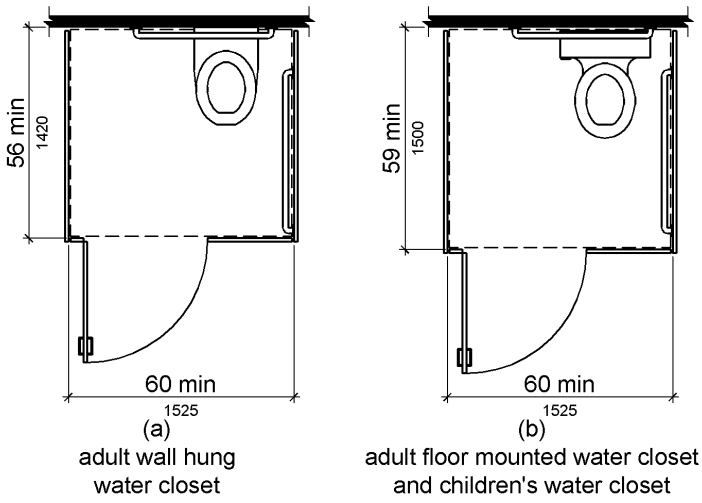


Figure 604.8.1.1
Size of Wheelchair Accessible Toilet Compartment

604.8.1.2 Doors. Toilet compartment doors, including door hardware, shall comply with 404 except that if the approach is to the latch side of the compartment door, clearance between the door side of the compartment and any obstruction shall be 42 inches (1065 mm) minimum. Doors shall be located in the front partition or in the side wall or partition farthest from the water closet. Where located in the front partition, the door opening shall be 4 inches (100 mm) maximum from the side wall or partition farthest from the water closet. Where located in the side wall or partition, the door opening shall be 4 inches (100 mm) maximum from the front partition. The door shall be self-closing. A door pull complying with 404.2.7 shall be placed on both sides of the door near the latch. Toilet compartment doors shall not swing into the minimum required compartment area.

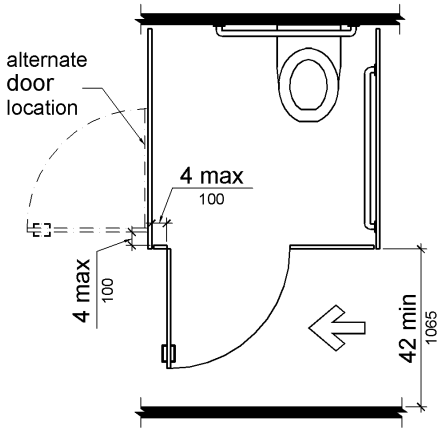


Figure 604.8.1.2
Wheelchair Accessible Toilet Compartment Doors

604.8.1.3 Approach. Compartments shall be arranged for left-hand or right-hand approach to the water closet.

604.8.1.4 Toe Clearance. The front partition and at least one side partition shall provide a toe clearance of 9 inches (230 mm) minimum above the finish floor and 6 inches (150 mm) deep minimum beyond the compartment-side face of the partition, exclusive of partition support members. Compartments for *children's use* shall provide a toe clearance of 12 inches (305 mm) minimum above the finish floor.

EXCEPTION: Toe clearance at the front partition is not required in a compartment greater than 62 inches (1575 mm) deep with a wall-hung water closet or 65 inches (1650 mm) deep with a floor-mounted water closet. Toe clearance at the side partition is not required in a compartment greater than 66 inches (1675 mm) wide. Toe clearance at the front partition is not required in a compartment for *children's use* that is greater than 65 inches (1650 mm) deep.

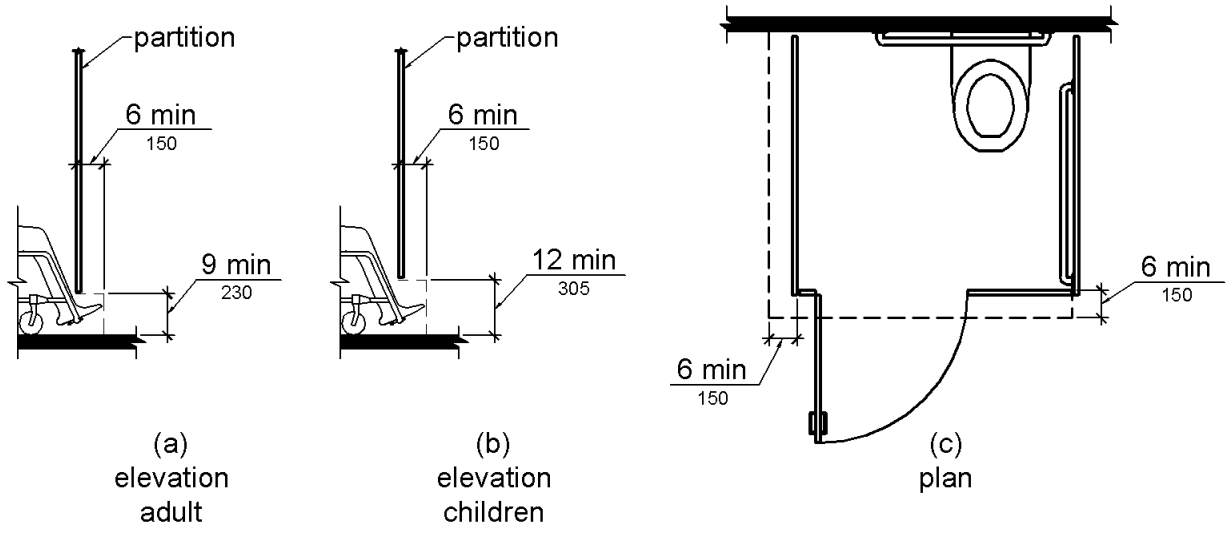


Figure 604.8.1.4
Wheelchair Accessible Toilet Compartment Toe Clearance

604.8.1.5 Grab Bars. Grab bars shall comply with 609. A side-wall grab bar complying with 604.5.1 shall be provided and shall be located on the wall closest to the water closet. In addition, a rear-wall grab bar complying with 604.5.2 shall be provided.

604.8.2 Ambulatory Accessible Compartments. Ambulatory *accessible* compartments shall comply with 604.8.2.

604.8.2.1 Size. Ambulatory *accessible* compartments shall have a depth of 60 inches (1525 mm) minimum and a width of 35 inches (890 mm) minimum and 37 inches (940 mm) maximum.

604.8.2.2 Doors. Toilet compartment doors, including door hardware, shall comply with 404, except that if the approach is to the latch side of the compartment door, clearance between the door side of the compartment and any obstruction shall be 42 inches (1065 mm) minimum. The door shall be self-closing. A door pull complying with 404.2.7 shall be placed on both sides of the door near the latch. Toilet compartment doors shall not swing into the minimum required compartment area.

604.8.2.3 Grab Bars. Grab bars shall comply with 609. A side-wall grab bar complying with 604.5.1 shall be provided on both sides of the compartment.

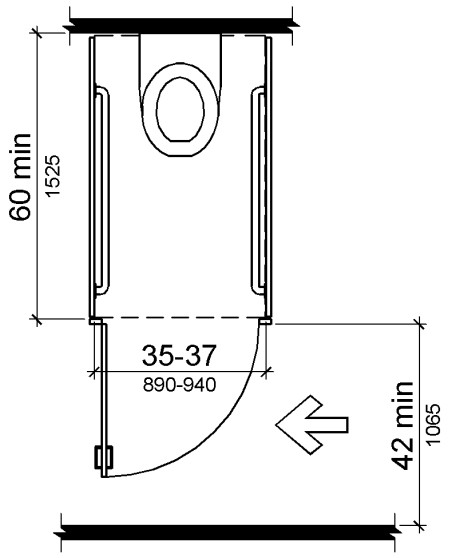


Figure 604.8.2
Ambulatory Accessible Toilet Compartment

604.8.3 Coat Hooks and Shelves. Coat hooks shall be located within one of the reach ranges specified in 308. Shelves shall be located 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the finish floor.

604.9 Water Closets and Toilet Compartments for Children's Use. Water closets and toilet compartments for *children's use* shall comply with 604.9.

Advisory 604.9 Water Closets and Toilet Compartments for Children's Use. The requirements in 604.9 are to be followed where the exception for children's water closets in 604.1 is used. The following table provides additional guidance in applying the specifications for water closets for children according to the age group served and reflects the differences in the size, stature, and reach ranges of children ages 3 through 12. The specifications chosen should correspond to the age of the primary user group. The specifications of one age group should be applied consistently in the installation of a water closet and related elements.

Advisory Specifications for Water Closets Serving Children Ages 3 through 12			
	Ages 3 and 4	**Ages 5 through 8**	**Ages 9 through 12**
Water Closet Centerline	12 inches (305 mm)	12 to 15 inches (305 to 380 mm)	15 to 18 inches (380 to 455 mm)
Toilet Seat Height	11 to 12 inches (280 to 305 mm)	12 to 15 inches (305 to 380 mm)	15 to 17 inches (380 to 430 mm)
Grab Bar Height	18 to 20 inches (455 to 510 mm)	20 to 25 inches (510 to 635 mm)	25 to 27 inches (635 to 685 mm)
Dispenser Height	14 inches (355 mm)	14 to 17 inches (355 to 430 mm)	17 to 19 inches (430 to 485 mm)

604.9.1 Location. The water closet shall be located with a wall or partition to the rear and to one side. The centerline of the water closet shall be 12 inches (305 mm) minimum and 18 inches (455 mm) maximum from the side wall or partition, except that the water closet shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum from the side wall or partition in the ambulatory *accessible* toilet compartment specified in 604.8.2. Compartments shall be arranged for left-hand or right-hand approach to the water closet.

604.9.2 Clearance. Clearance around a water closet shall comply with 604.3.

604.9.3 Height. The height of water closets shall be 11 inches (280 mm) minimum and 17 inches (430 mm) maximum measured to the top of the seat. Seats shall not be sprung to return to a lifted position.

604.9.4 Grab Bars. Grab bars for water closets shall comply with 604.5.

604.9.5 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309.2 and 309.4 and shall be installed 36 inches (915 mm) maximum above the finish floor. Flush controls shall be located on the open side of the water closet except in ambulatory *accessible* compartments complying with 604.8.2.

604.9.6 Dispensers. Toilet paper dispensers shall comply with 309.4 and shall be 7 inches (180 mm) minimum and 9 inches (230 mm) maximum in front of the water closet measured to the centerline of the dispenser. The outlet of the dispenser shall be 14 inches (355 mm) minimum and 19 inches (485 mm) maximum above the finish floor. There shall be a clearance of 1½ inches (38 mm) minimum below the grab bar. Dispensers shall not be of a type that controls delivery or that does not allow continuous paper flow.

604.9.7 Toilet Compartments. Toilet compartments shall comply with 604.8.

605 Urinals

605.1 General. Urinals shall comply with 605.

> **Advisory 605.1 General.** Stall-type urinals provide greater accessibility for a broader range of persons, including people of short stature.

605.2 Height and Depth. Urinals shall be the stall-type or the wall-hung type with the rim 17 inches (430 mm) maximum above the finish floor or ground. Urinals shall be 13½ inches (345 mm) deep minimum measured from the outer face of the urinal rim to the back of the fixture.

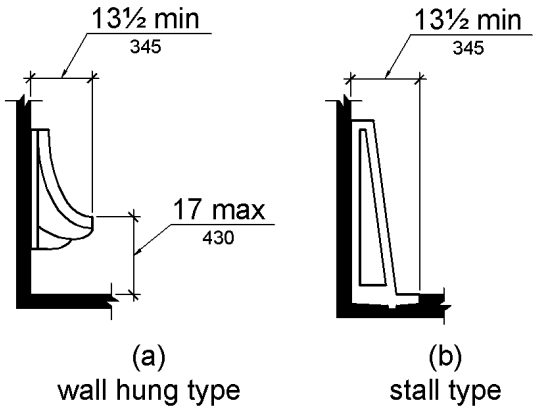


Figure 605.2
Height and Depth of Urinals

605.3 Clear Floor Space. A clear floor or ground *space* complying with 305 positioned for forward approach shall be provided.

605.4 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309.

606 Lavatories and Sinks

606.1 General. Lavatories and sinks shall comply with 606.

> **Advisory 606.1 General.** If soap and towel dispensers are provided, they must be located within the reach ranges specified in 308. Locate soap and towel dispensers so that they are conveniently usable by a person at the accessible lavatory.

606.2 Clear Floor Space. A clear floor *space* complying with 305, positioned for a forward approach, and knee and toe clearance complying with 306 shall be provided.

EXCEPTIONS: 1. A parallel approach complying with 305 shall be permitted to a kitchen sink in a *space* where a cook top or conventional range is not provided and to wet bars.

2. A lavatory in a toilet room or bathing *facility* for a single occupant accessed only through a private office and not for *common use* or *public use* shall not be required to provide knee and toe clearance complying with 306.

3. In *residential dwelling units*, cabinetry shall be permitted under lavatories and kitchen sinks provided that all of the following conditions are met:

(a) the cabinetry can be removed without removal or replacement of the fixture;

(b) the finish floor extends under the cabinetry; and

(c) the walls behind and surrounding the cabinetry are finished.

4. A knee clearance of 24 inches (610 mm) minimum above the finish floor or ground shall be permitted at lavatories and sinks used primarily by children 6 through 12 years where the rim or counter surface is 31 inches (785 mm) maximum above the finish floor or ground.

5. A parallel approach complying with 305 shall be permitted to lavatories and sinks used primarily by children 5 years and younger.

6. The dip of the overflow shall not be considered in determining knee and toe clearances.

7. No more than one bowl of a multi-bowl sink shall be required to provide knee and toe clearance complying with 306.

606.3 Height. Lavatories and sinks shall be installed with the front of the higher of the rim or counter surface 34 inches (865 mm) maximum above the finish floor or ground.

EXCEPTIONS: 1. A lavatory in a toilet or bathing *facility* for a single occupant accessed only through a private office and not for *common use* or *public use* shall not be required to comply with 606.3.

2. In *residential dwelling unit* kitchens, sinks that are adjustable to variable heights, 29 inches (735 mm) minimum and 36 inches (915 mm) maximum, shall be permitted where rough-in plumbing permits connections of supply and drain pipes for sinks mounted at the height of 29 inches (735 mm).

606.4 Faucets. Controls for faucets shall comply with 309. Hand-operated metering faucets shall remain open for 10 seconds minimum.

606.5 Exposed Pipes and Surfaces. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks.

607 Bathtubs

607.1 General. Bathtubs shall comply with 607.

607.2 Clearance. Clearance in front of bathtubs shall extend the length of the bathtub and shall be 30 inches (760 mm) wide minimum. A lavatory complying with 606 shall be permitted at the control end of the clearance. Where a permanent seat is provided at the head end of the bathtub, the clearance shall extend 12 inches (305 mm) minimum beyond the wall at the head end of the bathtub.

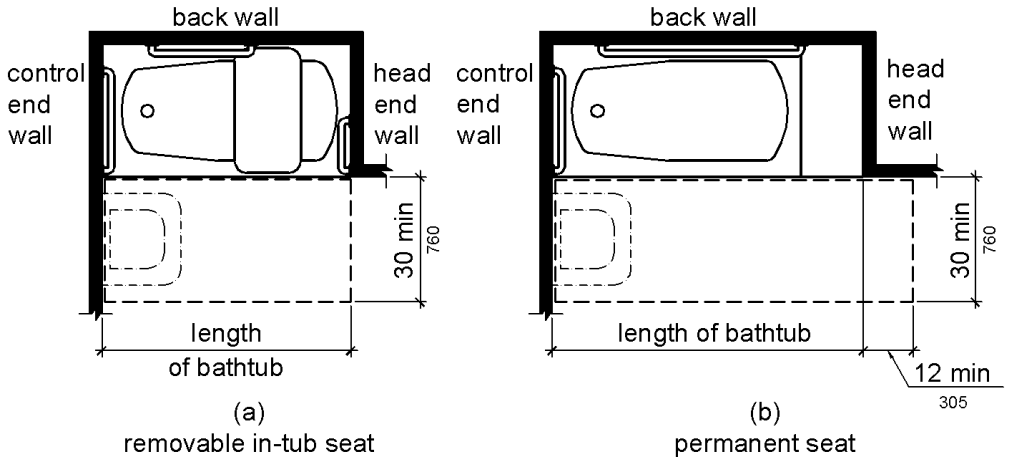


Figure 607.2
Clearance for Bathtubs

607.3 Seat. A permanent seat at the head end of the bathtub or a removable in-tub seat shall be provided. Seats shall comply with 610.

607.4 Grab Bars. Grab bars for bathtubs shall comply with 609 and shall be provided in accordance with 607.4.1 or 607.4.2.

EXCEPTIONS: 1. Grab bars shall not be required to be installed in a bathtub located in a bathing *facility* for a single occupant accessed only through a private office and not for *common use* or *public use* provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 607.4.

2. In *residential dwelling units*, grab bars shall not be required to be installed in bathtubs located in bathing *facilities* provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 607.4.

607.4.1 Bathtubs With Permanent Seats. For bathtubs with permanent seats, grab bars shall be provided in accordance with 607.4.1.

607.4.1.1 Back Wall. Two grab bars shall be installed on the back wall, one located in accordance with 609.4 and the other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar shall be installed 15 inches (380 mm) maximum from the head end wall and 12 inches (305 mm) maximum from the control end wall.

607.4.1.2 Control End Wall. A grab bar 24 inches (610 mm) long minimum shall be installed on the control end wall at the front edge of the bathtub.

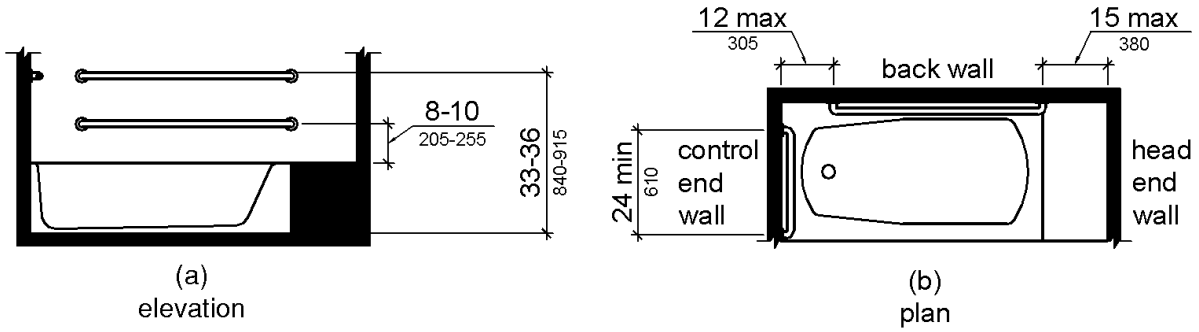


Figure 607.4.1
Grab Bars for Bathtubs with Permanent Seats

607.4.2 Bathtubs Without Permanent Seats. For bathtubs without permanent seats, grab bars shall comply with 607.4.2.

607.4.2.1 Back Wall. Two grab bars shall be installed on the back wall, one located in accordance with 609.4 and other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar shall be 24 inches (610 mm) long minimum and shall be installed 24 inches (610 mm) maximum from the head end wall and 12 inches (305 mm) maximum from the control end wall.

607.4.2.2 Control End Wall. A grab bar 24 inches (610 mm) long minimum shall be installed on the control end wall at the front edge of the bathtub.

607.4.2.3 Head End Wall. A grab bar 12 inches (305 mm) long minimum shall be installed on the head end wall at the front edge of the bathtub.

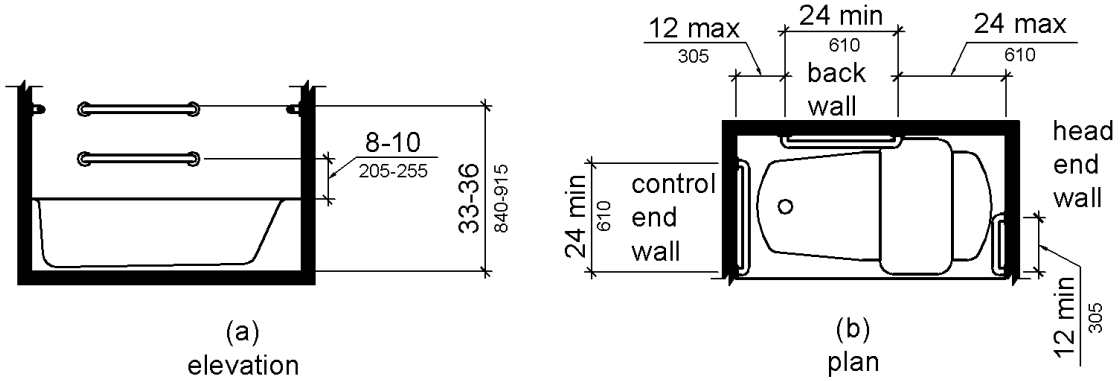


Figure 607.4.2
Grab Bars for Bathtubs with Removable In-Tub Seats

607.5 Controls. Controls, other than drain stoppers, shall be located on an end wall. Controls shall be between the bathtub rim and grab bar, and between the open side of the bathtub and the centerline of the width of the bathtub. Controls shall comply with 309.4.

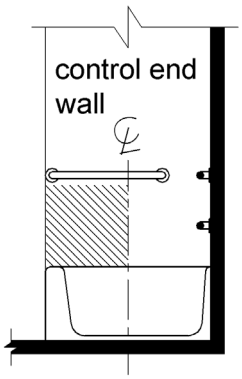


Figure 607.5
Bathtub Control Location

607.6 Shower Spray Unit and Water. A shower spray unit with a hose 59 inches (1500 mm) long minimum that can be used both as a fixed-position shower head and as a hand-held shower shall be provided. The shower spray unit shall have an on/off control with a non-positive shut-off. If an adjustable-height shower head on a vertical bar is used, the bar shall be installed so as not to obstruct the use of grab bars. Bathtub shower spray units shall deliver water that is 120°F (49°C) maximum.

> **Advisory 607.6 Shower Spray Unit and Water.** Ensure that hand-held shower spray units are capable of delivering water pressure substantially equivalent to fixed shower heads.

607.7 Bathtub Enclosures. Enclosures for bathtubs shall not obstruct controls, faucets, shower and spray units or obstruct transfer from wheelchairs onto bathtub seats or into bathtubs. Enclosures on bathtubs shall not have tracks installed on the rim of the open face of the bathtub.

608 Shower Compartments

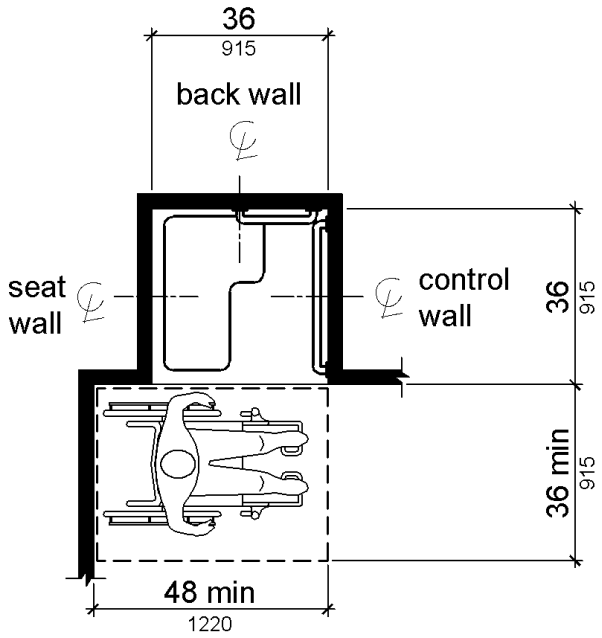
608.1 General. Shower compartments shall comply with 608.

> **Advisory 608.1 General.** Shower stalls that are 60 inches (1525 mm) wide and have no curb may increase the usability of a bathroom because the shower area provides additional maneuvering space.

608.2 Size and Clearances for Shower Compartments. Shower compartments shall have sizes and clearances complying with 608.2.

608.2.1 Transfer Type Shower Compartments. Transfer type shower compartments shall be 36 inches (915 mm) by 36 inches (915 mm) clear inside dimensions measured at the center points of opposing sides and shall have a 36 inch (915 mm) wide minimum entry on the face of the shower

compartment. Clearance of 36 inches (915 mm) wide minimum by 48 inches (1220 mm) long minimum measured from the control wall shall be provided.



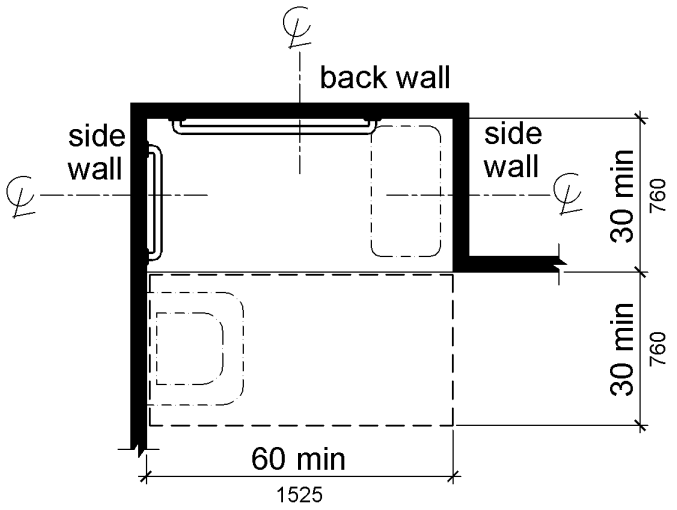
Note: inside finished dimensions measured at the center points of opposing sides

Figure 608.2.1
Transfer Type Shower Compartment Size and Clearance

608.2.2 Standard Roll-In Type Shower Compartments. Standard roll-in type shower compartments shall be 30 inches (760 mm) wide minimum by 60 inches (1525 mm) deep minimum clear inside dimensions measured at center points of opposing sides and shall have a 60 inches (1525 mm) wide minimum entry on the face of the shower compartment.

608.2.2.1 Clearance. A 30 inch (760 mm) wide minimum by 60 inch (1525 mm) long minimum clearance shall be provided adjacent to the open face of the shower compartment.

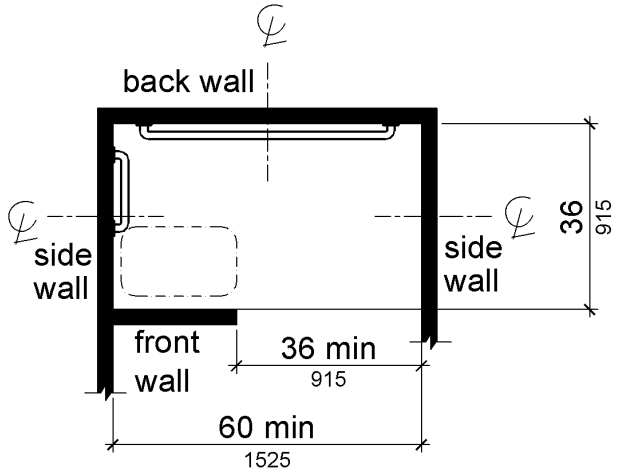
EXCEPTION: A lavatory complying with 606 shall be permitted on one 30 inch (760 mm) wide minimum side of the clearance provided that it is not on the side of the clearance adjacent to the controls or, where provided, not on the side of the clearance adjacent to the shower seat.



Note: inside finished dimensions measured at the center points of opposing sides

Figure 608.2.2
Standard Roll-In Type Shower Compartment Size and Clearance

608.2.3 Alternate Roll-In Type Shower Compartments. Alternate roll-in type shower compartments shall be 36 inches (915 mm) wide and 60 inches (1525 mm) deep minimum clear inside dimensions measured at center points of opposing sides. A 36 inch (915 mm) wide minimum entry shall be provided at one end of the long side of the compartment.



Note: inside finished dimensions measured at the center points of opposing sides

Figure 608.2.3
Alternate Roll-In Type Shower Compartment Size and Clearance

608.3 Grab Bars. Grab bars shall comply with 609 and shall be provided in accordance with 608.3. Where multiple grab bars are used, required horizontal grab bars shall be installed at the same height above the finish floor.

EXCEPTIONS: 1. Grab bars shall not be required to be installed in a shower located in a bathing *facility* for a single occupant accessed only through a private office, and not for *common use* or *public use* provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 608.3.

2. In *residential dwelling units*, grab bars shall not be required to be installed in showers located in bathing *facilities* provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 608.3.

608.3.1 Transfer Type Shower Compartments. In transfer type compartments, grab bars shall be provided across the control wall and back wall to a point 18 inches (455 mm) from the control wall.

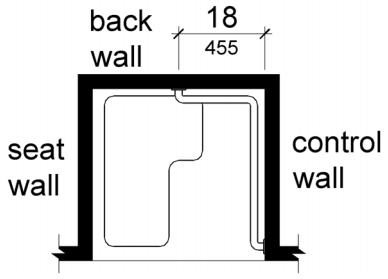


Figure 608.3.1
Grab Bars for Transfer Type Showers

608.3.2 Standard Roll-In Type Shower Compartments. Where a seat is provided in standard roll-in type shower compartments, grab bars shall be provided on the back wall and the side wall opposite the seat. Grab bars shall not be provided above the seat. Where a seat is not provided in standard roll-in type shower compartments, grab bars shall be provided on three walls. Grab bars shall be installed 6 inches (150 mm) maximum from adjacent walls.

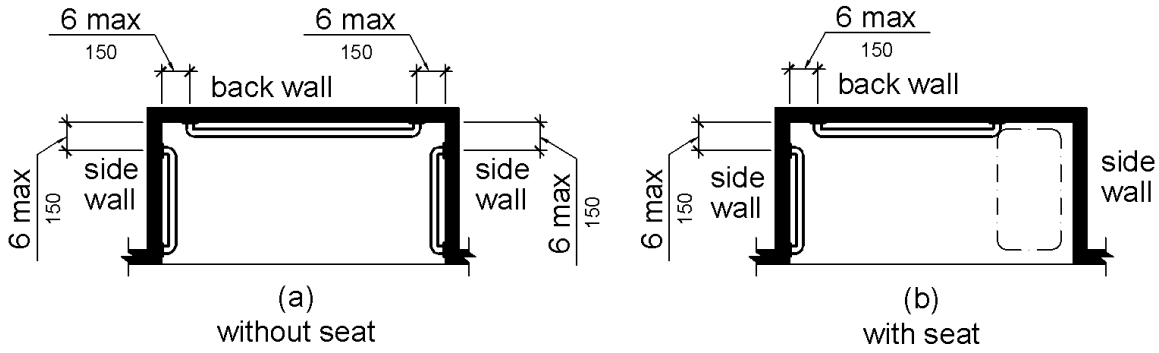


Figure 608.3.2
Grab Bars for Standard Roll-In Type Showers

608.3.3 Alternate Roll-In Type Shower Compartments. In alternate roll-in type shower compartments, grab bars shall be provided on the back wall and the side wall farthest from the compartment entry. Grab bars shall not be provided above the seat. Grab bars shall be installed 6 inches (150 mm) maximum from adjacent walls.

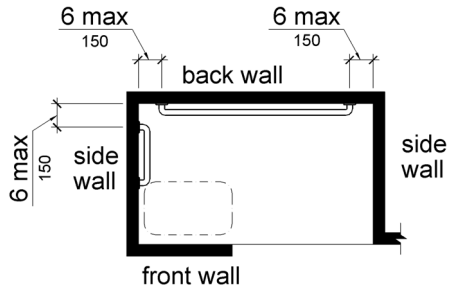


Figure 608.3.3
Grab Bars for Alternate Roll-In Type Showers

608.4 Seats. A folding or non-folding seat shall be provided in transfer type shower compartments. A folding seat shall be provided in roll-in type showers required in *transient lodging* guest rooms with mobility features complying with 806.2. Seats shall comply with 610.

EXCEPTION: In *residential dwelling units*, seats shall not be required in transfer type shower compartments provided that reinforcement has been installed in walls so as to permit the installation of seats complying with 608.4.

608.5 Controls. Controls, faucets, and shower spray units shall comply with 309.4.

608.5.1 Transfer Type Shower Compartments. In transfer type shower compartments, the controls, faucets, and shower spray unit shall be installed on the side wall opposite the seat 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the shower floor and shall be located on the control wall 15 inches (380 mm) maximum from the centerline of the seat toward the shower opening.

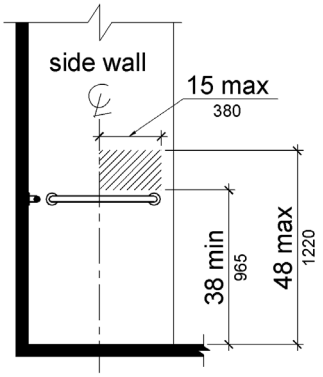


Figure 608.5.1
Transfer Type Shower Compartment Control Location

608.5.2 Standard Roll-In Type Shower Compartments. In standard roll-in type shower compartments, the controls, faucets, and shower spray unit shall be located above the grab bar, but no higher than 48 inches (1220 mm) above the shower floor. Where a seat is provided, the controls, faucets, and shower spray unit shall be installed on the back wall adjacent to the seat wall and shall be located 27 inches (685 mm) maximum from the seat wall.

Advisory 608.5.2 Standard Roll-in Type Shower Compartments. In standard roll-in type showers without seats, the shower head and operable parts can be located on any of the three walls of the shower without adversely affecting accessibility.

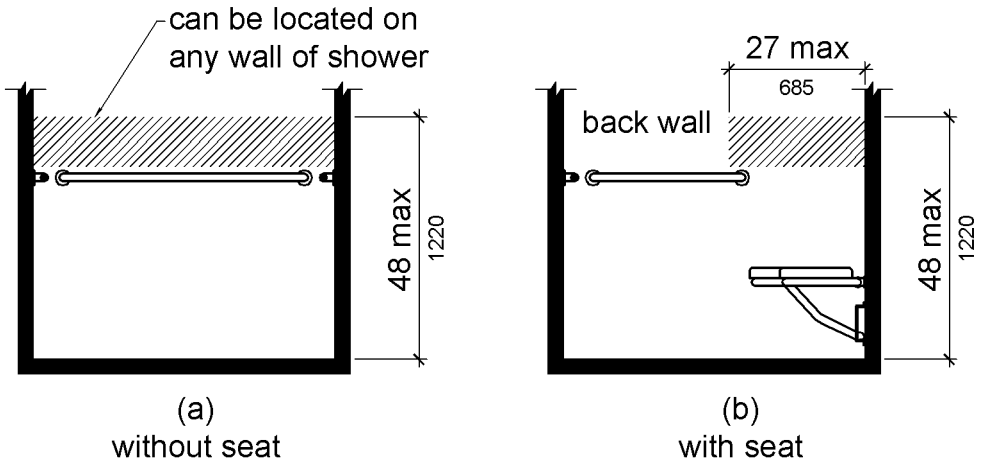


Figure 608.5.2
Standard Roll-In Type Shower Compartment Control Location

608.5.3 Alternate Roll-In Type Shower Compartments. In alternate roll-in type shower compartments, the controls, faucets, and shower spray unit shall be located above the grab bar, but no higher than 48 inches (1220 mm) above the shower floor. Where a seat is provided, the controls, faucets, and shower spray unit shall be located on the side wall adjacent to the seat 27 inches (685 mm) maximum from the side wall behind the seat or shall be located on the back wall opposite the seat 15 inches (380 mm) maximum, left or right, of the centerline of the seat. Where a seat is not provided, the controls, faucets, and shower spray unit shall be installed on the side wall farthest from the compartment entry.

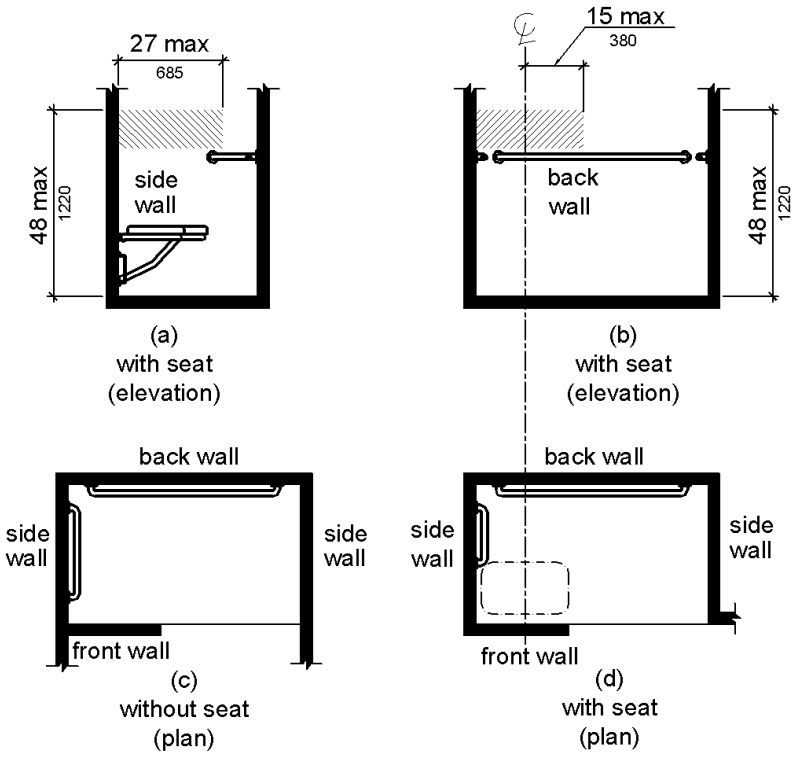


Figure 608.5.3
Alternate Roll-In Type Shower Compartment Control Location

608.6 Shower Spray Unit and Water. A shower spray unit with a hose 59 inches (1500 mm) long minimum that can be used both as a fixed-position shower head and as a hand-held shower shall be provided. The shower spray unit shall have an on/off control with a non-positive shut-off. If an adjustable-height shower head on a vertical bar is used, the bar shall be installed so as not to obstruct the use of grab bars. Shower spray units shall deliver water that is 120°F (49°C) maximum.

EXCEPTION: A fixed shower head located at 48 inches (1220 mm) maximum above the shower finish floor shall be permitted instead of a hand-held spray unit in *facilities* that are not medical care *facilities*, long-term care *facilities*, *transient lodging* guest rooms, or *residential dwelling units*.

Advisory 608.6 Shower Spray Unit and Water. Ensure that hand-held shower spray units are capable of delivering water pressure substantially equivalent to fixed shower heads.

608.7 Thresholds. Thresholds in roll-in type shower compartments shall be ½ inch (13 mm) high maximum in accordance with 303. In transfer type shower compartments, thresholds ½ inch (13 mm) high maximum shall be beveled, rounded, or vertical.

EXCEPTION: A threshold 2 inches (51 mm) high maximum shall be permitted in transfer type shower compartments in existing *facilities* where provision of a ½ inch (13 mm) high threshold would disturb the structural reinforcement of the floor slab.

608.8 Shower Enclosures. Enclosures for shower compartments shall not obstruct controls, faucets, and shower spray units or obstruct transfer from wheelchairs onto shower seats.

609 Grab Bars

609.1 General. Grab bars in toilet *facilities* and bathing *facilities* shall comply with 609.

609.2 Cross Section. Grab bars shall have a cross section complying with 609.2.1 or 609.2.2.

609.2.1 Circular Cross Section. Grab bars with circular cross sections shall have an outside diameter of 1¼ inches (32 mm) minimum and 2 inches (51 mm) maximum.

609.2.2 Non-Circular Cross Section. Grab bars with non-circular cross sections shall have a cross-section dimension of 2 inches (51 mm) maximum and a perimeter dimension of 4 inches (100 mm) minimum and 4.8 inches (120 mm) maximum.

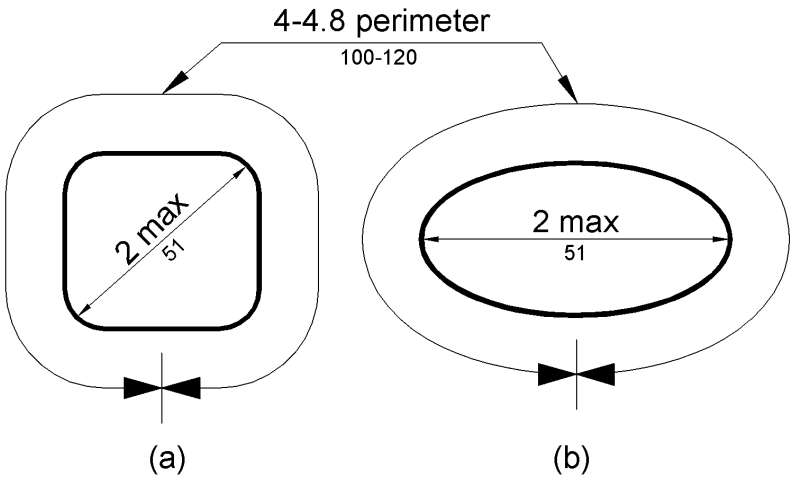


Figure 609.2.2
Grab Bar Non-Circular Cross Section

609.3 Spacing. The *space* between the wall and the grab bar shall be 1½ inches (38 mm). The *space* between the grab bar and projecting objects below and at the ends shall be 1½ inches (38 mm) minimum. The *space* between the grab bar and projecting objects above shall be 12 inches (305 mm) minimum.

EXCEPTION: The *space* between the grab bars and shower controls, shower fittings, and other grab bars above shall be permitted to be 1½ inches (38 mm) minimum.

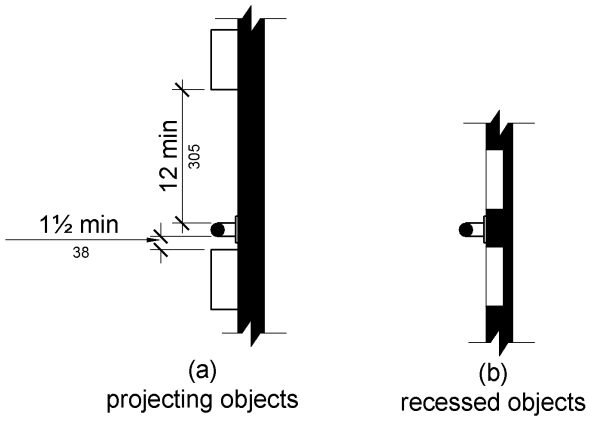


Figure 609.3
Spacing of Grab Bars

609.4 Position of Grab Bars. Grab bars shall be installed in a horizontal position, 33 inches (840 mm) minimum and 36 inches (915 mm) maximum above the finish floor measured to the top of the gripping surface, except that at water closets for *children's use* complying with 604.9, grab bars shall be installed in a horizontal position 18 inches (455 mm) minimum and 27 inches (685 mm) maximum above the finish floor measured to the top of the gripping surface. The height of the lower grab bar on the back wall of a bathtub shall comply with 607.4.1.1 or 607.4.2.1.

609.5 Surface Hazards. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive *elements* and shall have rounded edges.

609.6 Fittings. Grab bars shall not rotate within their fittings.

609.7 Installation. Grab bars shall be installed in any manner that provides a gripping surface at the specified locations and that does not obstruct the required clear floor *space*.

609.8 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the grab bar, fastener, mounting device, or supporting structure.

610 Seats

610.1 General. Seats in bathtubs and shower compartments shall comply with 610.

610.2 Bathtub Seats. The top of bathtub seats shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the bathroom finish floor. The depth of a removable in-tub seat shall be 15 inches (380 mm) minimum and 16 inches (405 mm) maximum. The seat shall be capable of secure placement. Permanent seats at the head end of the bathtub shall be 15 inches (380 mm) deep minimum and shall extend from the back wall to or beyond the outer edge of the bathtub.

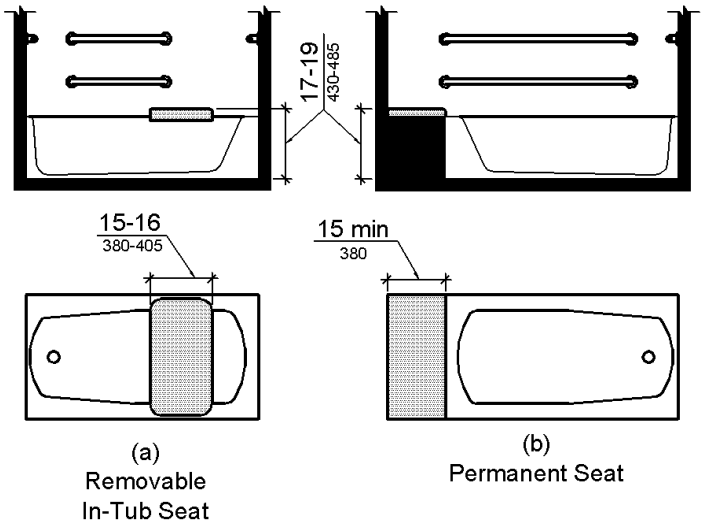


Figure 610.2
Bathtub Seats

610.3 Shower Compartment Seats. Where a seat is provided in a standard roll-in shower compartment, it shall be a folding type, shall be installed on the side wall adjacent to the controls, and shall extend from the back wall to a point within 3 inches (75 mm) of the compartment entry. Where a seat is provided in an alternate roll-in type shower compartment, it shall be a folding type, shall be installed on the front wall opposite the back wall, and shall extend from the adjacent side wall to a point within 3 inches (75 mm) of the compartment entry. In transfer-type showers, the seat shall extend from the back wall to a point within 3 inches (75 mm) of the compartment entry. The top of the seat shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the bathroom finish floor. Seats shall comply with 610.3.1 or 610.3.2.

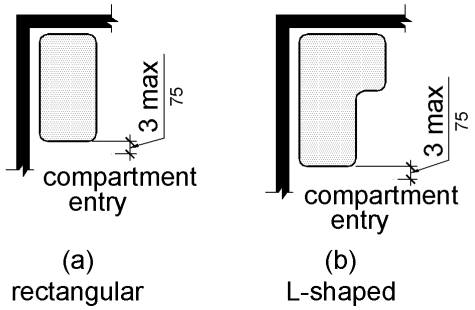


Figure 610.3
Extent of Seat

610.3.1 Rectangular Seats. The rear edge of a rectangular seat shall be 2½ inches (64 mm) maximum and the front edge 15 inches (380 mm) minimum and 16 inches (405 mm) maximum from

the seat wall. The side edge of the seat shall be 1½ inches (38 mm) maximum from the adjacent wall.

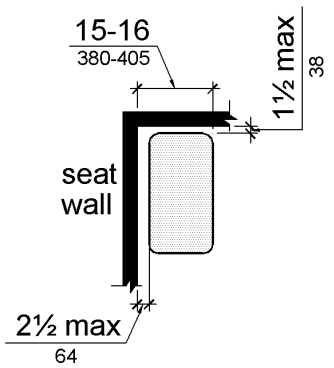


Figure 610.3.1
Rectangular Shower Seat

610.3.2 L-Shaped Seats. The rear edge of an L-shaped seat shall be 2½ inches (64 mm) maximum and the front edge 15 inches (380 mm) minimum and 16 inches (405 mm) maximum from the seat wall. The rear edge of the "L" portion of the seat shall be 1½ inches (38 mm) maximum from the wall and the front edge shall be 14 inches (355 mm) minimum and 15 inches (380 mm) maximum from the wall. The end of the "L" shall be 22 inches (560 mm) minimum and 23 inches maximum (585 mm) from the main seat wall.

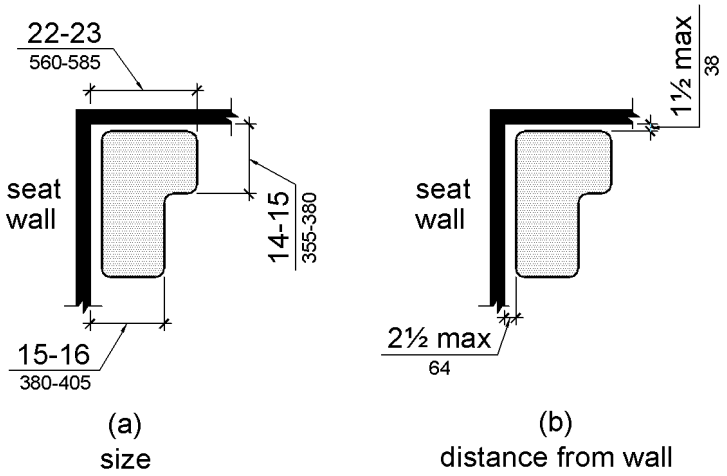


Figure 610.3.2
L-Shaped Shower Seat

610.4 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener, mounting device, or supporting structure.

611 Washing Machines and Clothes Dryers

611.1 General. Washing machines and clothes dryers shall comply with 611.

611.2 Clear Floor Space. A clear floor or ground *space* complying with 305 positioned for parallel approach shall be provided. The clear floor or ground *space* shall be centered on the appliance.

611.3 Operable Parts. *Operable parts*, including doors, lint screens, and detergent and bleach compartments shall comply with 309.

611.4 Height. Top loading machines shall have the door to the laundry compartment located 36 inches (915 mm) maximum above the finish floor. Front loading machines shall have the bottom of the opening to the laundry compartment located 15 inches (380 mm) minimum and 36 inches (915 mm) maximum above the finish floor.

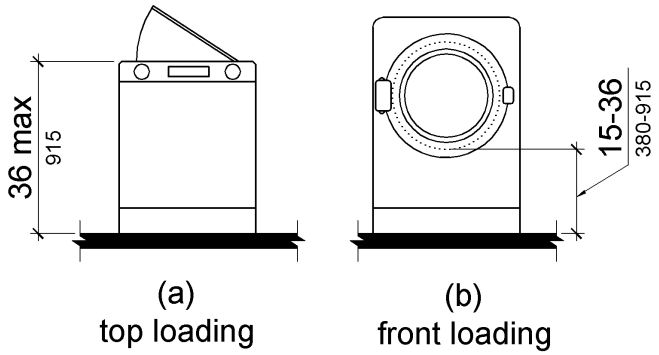


Figure 611.4
Height of Laundry Compartment Opening

612 Saunas and Steam Rooms

612.1 General. Saunas and steam rooms shall comply with 612.

612.2 Bench. Where seating is provided in saunas and steam rooms, at least one bench shall comply with 903. Doors shall not swing into the clear floor *space* required by 903.2.

EXCEPTION: A readily removable bench shall be permitted to obstruct the turning *space* required by 612.3 and the clear floor or ground *space* required by 903.2.

612.3 Turning Space. A turning *space* complying with 304 shall be provided within saunas and steam rooms.

CHAPTER 7: COMMUNICATION ELEMENTS AND FEATURES

701 General

701.1 Scope. The provisions of Chapter 7 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

702 Fire Alarm Systems

702.1 General. Fire alarm systems shall have permanently installed audible and visible alarms complying with NFPA 72 (1999 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1), except that the maximum allowable sound level of audible notification appliances complying with section 4-3.2.1 of NFPA 72 (1999 edition) shall have a sound level no more than 110 dB at the minimum hearing distance from the audible appliance. In addition, alarms in guest rooms required to provide communication features shall comply with sections 4-3 and 4-4 of NFPA 72 (1999 edition) or sections 7.4 and 7.5 of NFPA 72 (2002 edition).

EXCEPTION: Fire alarm systems in medical care *facilities* shall be permitted to be provided in accordance with industry practice.

703 Signs

703.1 General. Signs shall comply with 703. Where both visual and *tactile characters* are required, either one sign with both visual and *tactile characters*, or two separate signs, one with visual, and one with *tactile characters*, shall be provided.

703.2 Raised Characters. Raised *characters* shall comply with 703.2 and shall be duplicated in braille complying with 703.3. Raised *characters* shall be installed in accordance with 703.4.

> **Advisory 703.2 Raised Characters.** Signs that are designed to be read by touch should not have sharp or abrasive edges.

703.2.1 Depth. Raised *characters* shall be 1/32 inch (0.8 mm) minimum above their background.

703.2.2 Case. *Characters* shall be uppercase.

703.2.3 Style. *Characters* shall be sans serif. *Characters* shall not be italic, oblique, script, highly decorative, or of other unusual forms.

703.2.4 Character Proportions. *Characters* shall be selected from fonts where the width of the uppercase letter "O" is 55 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

703.2.5 Character Height. *Character* height measured vertically from the baseline of the *character* shall be 5/8 inch (16 mm) minimum and 2 inches (51 mm) maximum based on the height of the uppercase letter "I".

EXCEPTION: Where separate raised and visual *characters* with the same information are provided, raised *character* height shall be permitted to be ½ inch (13 mm) minimum.

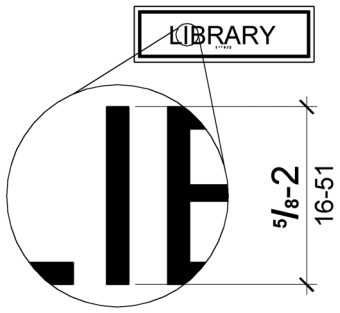


Figure 703.2.5
Height of Raised Characters

703.2.6 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the *character*.

703.2.7 Character Spacing. *Character* spacing shall be measured between the two closest points of adjacent raised *characters* within a message, excluding word *spaces*. Where *characters* have rectangular cross sections, spacing between individual raised *characters* shall be 1/8 inch (3.2 mm) minimum and 4 times the raised *character* stroke width maximum. Where *characters* have other cross sections, spacing between individual raised *characters* shall be 1/16 inch (1.6 mm) minimum and 4 times the raised *character* stroke width maximum at the base of the cross sections, and 1/8 inch (3.2 mm) minimum and 4 times the raised *character* stroke width maximum at the top of the cross sections. *Characters* shall be separated from raised borders and decorative *elements* 3/8 inch (9.5 mm) minimum.

703.2.8 Line Spacing. Spacing between the baselines of separate lines of raised *characters* within a message shall be 135 percent minimum and 170 percent maximum of the raised *character* height.

703.3 Braille. Braille shall be contracted (Grade 2) and shall comply with 703.3 and 703.4.

703.3.1 Dimensions and Capitalization. Braille dots shall have a domed or rounded shape and shall comply with Table 703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.

Table 703.3.1 Braille Dimensions

Measurement Range	Minimum in Inches Maximum in Inches
Dot base diameter	0.059 (1.5 mm) to 0.063 (1.6 mm)
Distance between two dots in the same cell[1]	0.090 (2.3 mm) to 0.100 (2.5 mm)
Distance between corresponding dots in adjacent cells[1]	0.241 (6.1 mm) to 0.300 (7.6 mm)
Dot height	0.025 (0.6 mm) to 0.037 (0.9 mm)
Distance between corresponding dots from one cell directly below[1]	0.395 (10 mm) to 0.400 (10.2 mm)

1. Measured center to center.

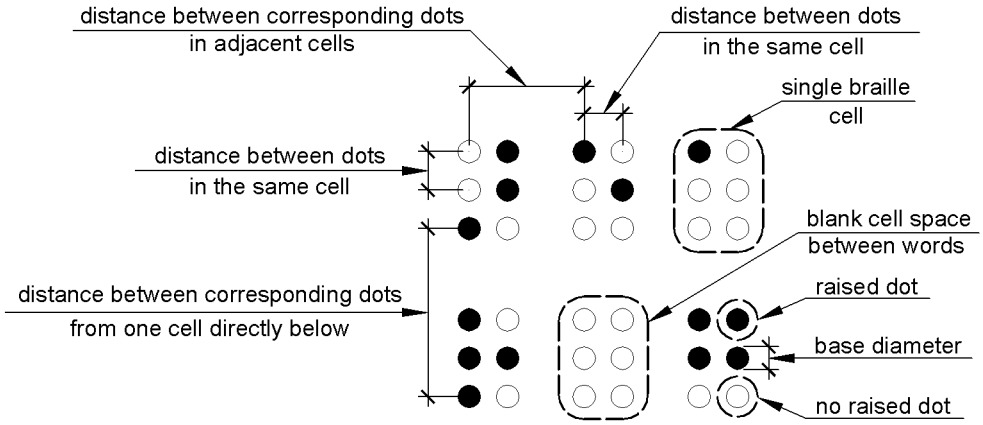


Figure 703.3.1
Braille Measurement

703.3.2 Position. Braille shall be positioned below the corresponding text. If text is multi-lined, braille shall be placed below the entire text. Braille shall be separated 3/8 inch (9.5 mm) minimum from any other *tactile characters* and 3/8 inch (9.5 mm) minimum from raised borders and decorative *elements*.

EXCEPTION: Braille provided on elevator car controls shall be separated 3/16 inch (4.8 mm) minimum and shall be located either directly below or adjacent to the corresponding raised *characters* or symbols.

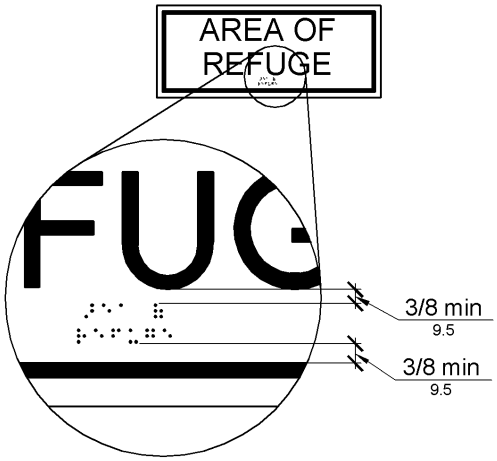


Figure 703.3.2
Position of Braille

703.4 Installation Height and Location. Signs with *tactile characters* shall comply with 703.4.

703.4.1 Height Above Finish Floor or Ground. *Tactile characters* on signs shall be located 48 inches (1220 mm) minimum above the finish floor or ground surface, measured from the baseline of the lowest *tactile character* and 60 inches (1525 mm) maximum above the finish floor or ground surface, measured from the baseline of the highest *tactile character*.

EXCEPTION: *Tactile characters* for elevator car controls shall not be required to comply with 703.4.1.

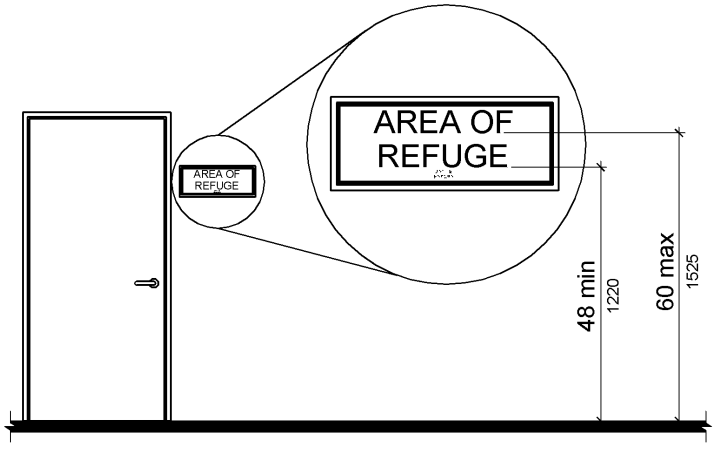


Figure 703.4.1
Height of Tactile Characters Above Finish Floor or Ground

703.4.2 Location. Where a *tactile* sign is provided at a door, the sign shall be located alongside the door at the latch side. Where a *tactile* sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where a *tactile* sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door. Where there is no wall *space* at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing *tactile characters* shall be located so that a clear floor *space* of 18 inches (455 mm) minimum by 18 inches (455 mm) minimum, centered on the *tactile characters*, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

EXCEPTION: Signs with *tactile characters* shall be permitted on the push side of doors with closers and without hold-open devices.

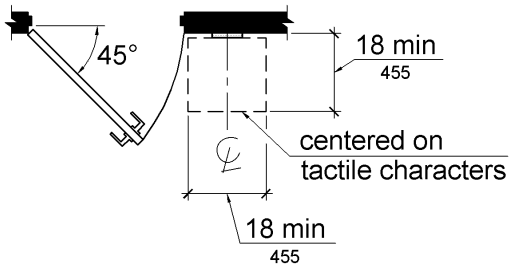


Figure 703.4.2
Location of Tactile Signs at Doors

703.5 Visual Characters. Visual *characters* shall comply with 703.5.

EXCEPTION: Where visual *characters* comply with 703.2 and are accompanied by braille complying with 703.3, they shall not be required to comply with 703.5.2 through 703.5.9.

703.5.1 Finish and Contrast. *Characters* and their background shall have a non-glare finish. *Characters* shall contrast with their background with either light *characters* on a dark background or dark *characters* on a light background.

Advisory 703.5.1 Finish and Contrast. Signs are more legible for persons with low vision when characters contrast as much as possible with their background. Additional factors affecting the ease with which the text can be distinguished from its background include shadows cast by lighting sources, surface glare, and the uniformity of the text and its background colors and textures.

703.5.2 Case. *Characters* shall be uppercase or lowercase or a combination of both.

703.5.3 Style. *Characters* shall be conventional in form. *Characters* shall not be italic, oblique, script, highly decorative, or of other unusual forms.

703.5.4 Character Proportions. *Characters* shall be selected from fonts where the width of the uppercase letter “O” is 55 percent minimum and 110 percent maximum of the height of the uppercase letter “I”.

703.5.5 Character Height. Minimum *character* height shall comply with Table 703.5.5. Viewing distance shall be measured as the horizontal distance between the *character* and an obstruction preventing further approach towards the sign. *Character* height shall be based on the uppercase letter "I".

Table 703.5.5 Visual Character Height

Height to Finish Floor or Ground From Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	less than 72 inches (1830 mm)	5/8 inch (16 mm)
	72 inches (1830 mm) and greater	5/8 inch (16 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 72 inches (1830 mm)
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	less than 180 inches (4570 mm)	2 inches (51 mm)
	180 inches (4570 mm) and greater	2 inches (51 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 180 inches (4570 mm)
greater than 120 inches (3050 mm)	less than 21 feet (6400 mm)	3 inches (75 mm)
	21 feet (6400 mm) and greater	3 inches (75 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)

703.5.6 Height From Finish Floor or Ground. Visual *characters* shall be 40 inches (1015 mm) minimum above the finish floor or ground.

EXCEPTION: Visual *characters* indicating elevator car controls shall not be required to comply with 703.5.6.

703.5.7 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 30 percent maximum of the height of the *character*.

703.5.8 Character Spacing. *Character* spacing shall be measured between the two closest points of adjacent *characters*, excluding word *spaces*. Spacing between individual *characters* shall be 10 percent minimum and 35 percent maximum of *character* height.

703.5.9 Line Spacing. Spacing between the baselines of separate lines of *characters* within a message shall be 135 percent minimum and 170 percent maximum of the *character* height.

703.6 Pictograms. *Pictograms* shall comply with 703.6.

703.6.1 Pictogram Field. *Pictograms* shall have a field height of 6 inches (150 mm) minimum. *Characters* and braille shall not be located in the *pictogram* field.

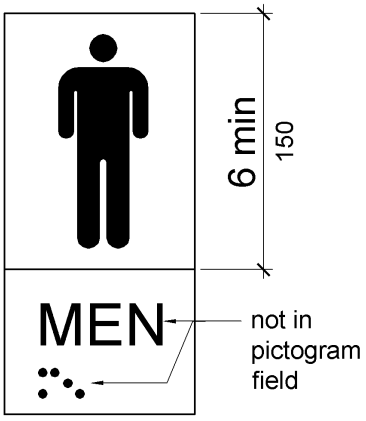


Figure 703.6.1
Pictogram Field

703.6.2 Finish and Contrast. *Pictograms* and their field shall have a non-glare finish. *Pictograms* shall contrast with their field with either a light *pictogram* on a dark field or a dark *pictogram* on a light field.

A703.6.2 Finish and Contrast. Signs are more legible for persons with low vision when characters contrast as much as possible with their background. Additional factors affecting the ease with which the text can be distinguished from its background include shadows cast by lighting sources, surface glare, and the uniformity of the text and background colors and textures.

703.6.3 Text Descriptors. *Pictograms* shall have text descriptors located directly below the *pictogram* field. Text descriptors shall comply with 703.2, 703.3 and 703.4.

703.7 Symbols of Accessibility. Symbols of *accessibility* shall comply with 703.7.

703.7.1 Finish and Contrast. Symbols of *accessibility* and their background shall have a non-glare finish. Symbols of *accessibility* shall contrast with their background with either a light symbol on a dark background or a dark symbol on a light background.

Advisory 703.7.1 Finish and Contrast. Signs are more legible for persons with low vision when characters contrast as much as possible with their background. Additional factors affecting the ease with which the text can be distinguished from its background include shadows cast by lighting sources, surface glare, and the uniformity of the text and background colors and textures.

703.7.2 Symbols.

703.7.2.1 International Symbol of Accessibility. The International Symbol of *Accessibility* shall comply with Figure 703.7.2.1.



Figure 703.7.2.1
International Symbol of Accessibility

703.7.2.2 International Symbol of TTY. The International Symbol of *TTY* shall comply with Figure 703.7.2.2.

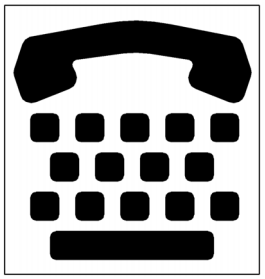


Figure 703.7.2.2
International Symbol of TTY

703.7.2.3 Volume Control Telephones. Telephones with a volume control shall be identified by a *pictogram* of a telephone handset with radiating sound waves on a square field such as shown in Figure 703.7.2.3.



Figure 703.7.2.3
Volume Control Telephone

703.7.2.4 Assistive Listening Systems. *Assistive listening systems* shall be identified by the International Symbol of Access for Hearing Loss complying with Figure 703.7.2.4.



Figure 703.7.2.4
International Symbol of Access for Hearing Loss

704 Telephones

704.1 General. Public telephones shall comply with 704.

704.2 Wheelchair Accessible Telephones. Wheelchair *accessible* telephones shall comply with 704.2.

704.2.1 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided. The clear floor or ground *space* shall not be obstructed by bases, enclosures, or seats.

Advisory 704.2.1 Clear Floor or Ground Space. Because clear floor and ground space is required to be unobstructed, telephones, enclosures and related telephone book storage cannot encroach on the required clear floor or ground space and must comply with the provisions for protruding objects. (See Section 307).

704.2.1.1 Parallel Approach. Where a parallel approach is provided, the distance from the edge of the telephone enclosure to the face of the telephone unit shall be 10 inches (255 mm) maximum.

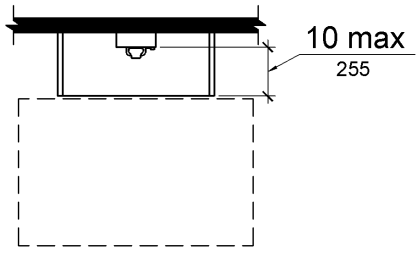


Figure 704.2.1.1
Parallel Approach to Telephone

704.2.1.2 Forward Approach. Where a forward approach is provided, the distance from the front edge of a counter within the telephone enclosure to the face of the telephone unit shall be 20 inches (510 mm) maximum.

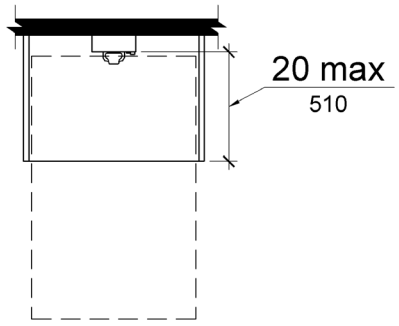


Figure 704.2.1.2
Forward Approach to Telephone

704.2.2 Operable Parts. *Operable parts* shall comply with 309. Telephones shall have push-button controls where such service is available.

704.2.3 Telephone Directories. Telephone directories, where provided, shall be located in accordance with 309.

704.2.4 Cord Length. The cord from the telephone to the handset shall be 29 inches (735 mm) long minimum.

704.3 Volume Control Telephones. Public telephones required to have volume controls shall be equipped with a receive volume control that provides a gain adjustable up to 20 dB minimum. For incremental volume control, provide at least one intermediate step of 12 dB of gain minimum. An automatic reset shall be provided.

Advisory 704.3 Volume Control Telephones. Amplifiers on pay phones are located in the base or the handset or are built into the telephone. Most are operated by pressing a button or key. If the microphone in the handset is not being used, a mute button that temporarily turns off the microphone can also reduce the amount of background noise which the person hears in the earpiece. If a volume adjustment is provided that allows the user to set the level anywhere from the base volume to the upper requirement of 20 dB, there is no need to specify a lower limit. If a stepped volume control is provided, one of the intermediate levels must provide 12 dB of gain. Consider compatibility issues when matching an amplified handset with a phone or phone system. Amplified handsets that can be switched with pay telephone handsets are available. Portable and in-line amplifiers can be used with some phones but are not practical at most public phones covered by these requirements.

704.4 TTYs. *TTY*s required at a public pay telephone shall be permanently affixed within, or adjacent to, the telephone enclosure. Where an acoustic coupler is used, the telephone cord shall be sufficiently long to allow connection of the *TTY* and the telephone receiver.

Advisory 704.4 TTYs. Ensure that sufficient electrical service is available where TTYs are to be installed.

704.4.1 Height. When in use, the touch surface of *TTY* keypads shall be 34 inches (865 mm) minimum above the finish floor.

EXCEPTION: Where seats are provided, *TTYs* shall not be required to comply with 704.4.1.

Advisory 704.4.1 Height. A telephone with a TTY installed underneath cannot also be a wheelchair accessible telephone because the required 34 inches (865 mm) minimum keypad height can causes the highest operable part of the telephone, usually the coin slot, to exceed the maximum permitted side and forward reach ranges. (See Section 308).

Advisory 704.4.1 Height Exception. While seats are not required at TTYs, reading and typing at a TTY is more suited to sitting than standing. Facilities that often provide seats at TTY's include, but are not limited to, airports and other passenger terminals or stations, courts, art galleries, and convention centers.

704.5 TTY Shelf. Public pay telephones required to accommodate portable *TTYs* shall be equipped with a shelf and an electrical outlet within or adjacent to the telephone enclosure. The telephone handset shall be capable of being placed flush on the surface of the shelf. The shelf shall be capable of accommodating a *TTY* and shall have 6 inches (150 mm) minimum vertical clearance above the area where the *TTY* is to be placed.

705 Detectable Warnings

705.1 General. *Detectable warnings* shall consist of a surface of truncated domes and shall comply with 705.

705.1.1 Dome Size. Truncated domes in a *detectable warning* surface shall have a base diameter of 0.9 inch (23 mm) minimum and 1.4 inches (36 mm) maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2 inch (5.1 mm).

705.1.2 Dome Spacing. Truncated domes in a *detectable warning* surface shall have a center-to-center spacing of 1.6 inches (41 mm) minimum and 2.4 inches (61 mm) maximum, and a base-to-base spacing of 0.65 inch (17 mm) minimum, measured between the most adjacent domes on a square grid.

705.1.3 Contrast. *Detectable warning* surfaces shall contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light.

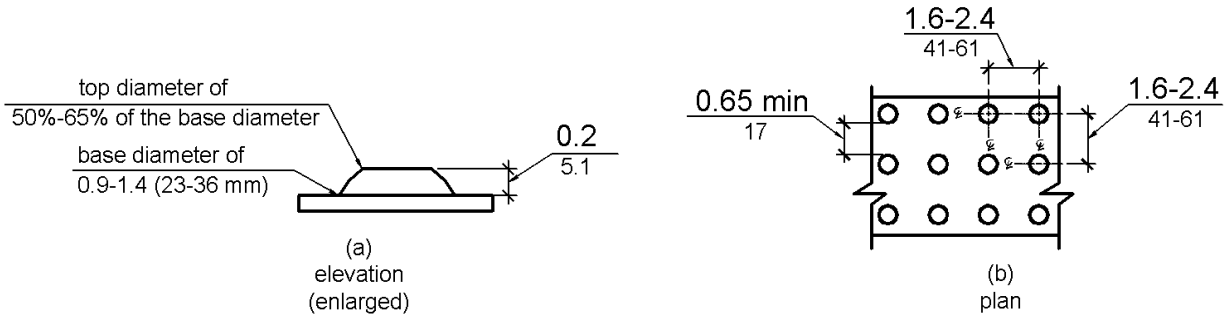


Figure 705.1
Size and Spacing of Truncated Domes

705.2 Platform Edges. *Detectable warning* surfaces at platform boarding edges shall be 24 inches (610 mm) wide and shall extend the full length of the *public use* areas of the platform.

706 Assistive Listening Systems

706.1 General. *Assistive listening systems* required in *assembly areas* shall comply with 706.

> **Advisory 706.1 General.** Assistive listening systems are generally categorized by their mode of transmission. There are hard-wired systems and three types of wireless systems: induction loop, infrared, and FM radio transmission. Each has different advantages and disadvantages that can help determine which system is best for a given application. For example, an FM system may be better than an infrared system in some open-air assemblies since infrared signals are less effective in sunlight. On the other hand, an infrared system is typically a better choice than an FM system where confidential transmission is important because it will be contained within a given space.
>
> The technical standards for assistive listening systems describe minimum performance levels for volume, interference, and distortion. Sound pressure levels (SPL), expressed in decibels, measure output sound volume. Signal-to-noise ratio (SNR or S/N), also expressed in decibels, represents the relationship between the loudness of a desired sound (the signal) and the background noise in a space or piece of equipment. The higher the SNR, the more intelligible the signal. The peak clipping level limits the distortion in signal output produced when high-volume sound waves are manipulated to serve assistive listening devices.
>
> Selecting or specifying an effective assistive listening system for a large or complex venue requires assistance from a professional sound engineer. The Access Board has published technical assistance on assistive listening devices and systems.

706.2 Receiver Jacks. Receivers required for use with an *assistive listening system* shall include a 1/8 inch (3.2 mm) standard mono jack.

706.3 Receiver Hearing-Aid Compatibility. Receivers required to be hearing-aid compatible shall interface with telecoils in hearing aids through the provision of neckloops.

> **Advisory 706.3 Receiver Hearing-Aid Compatibility.** Neckloops and headsets that can be worn as neckloops are compatible with hearing aids. Receivers that are not compatible include earbuds, which may require removal of hearing aids, earphones, and headsets that must be worn over the ear, which can create disruptive interference in the transmission and can be uncomfortable for people wearing hearing aids.

706.4 Sound Pressure Level. *Assistive listening systems* shall be capable of providing a sound pressure level of 110 dB minimum and 118 dB maximum with a dynamic range on the volume control of 50 dB.

706.5 Signal-to-Noise Ratio. The signal-to-noise ratio for internally generated noise in *assistive listening systems* shall be 18 dB minimum.

706.6 Peak Clipping Level. Peak clipping shall not exceed 18 dB of clipping relative to the peaks of speech.

707 Automatic Teller Machines and Fare Machines

> **Advisory 707 Automatic Teller Machines and Fare Machines.** Interactive transaction machines (ITMs), other than ATMs, are not covered by Section 707. However, for entities covered by the ADA, the Department of Justice regulations that implement the ADA provide additional guidance regarding the relationship between these requirements and elements that are not directly addressed by these requirements. Federal procurement law requires that ITMs purchased by the Federal government comply with standards issued by the Access Board under Section 508 of the Rehabilitation Act of 1973, as amended. This law covers a variety of products, including computer hardware and software, websites, phone systems, fax machines, copiers, and similar technologies. For more information on Section 508 consult the Access Board's website at www.access-board.gov.

707.1 General. Automatic teller machines and fare machines shall comply with 707.

> **Advisory 707.1 General.** If farecards have one tactually distinctive corner they can be inserted with greater accuracy. Token collection devices that are designed to accommodate tokens which are perforated can allow a person to distinguish more readily between tokens and common coins. Place accessible gates and fare vending machines in close proximity to other accessible elements when feasible so the facility is easier to use.

707.2 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided.

EXCEPTION: Clear floor or ground *space* shall not be required at drive-up only automatic teller machines and fare machines.

707.3 Operable Parts. *Operable parts* shall comply with 309. Unless a clear or correct key is provided, each *operable part* shall be able to be differentiated by sound or touch, without activation.

EXCEPTION: Drive-up only automatic teller machines and fare machines shall not be required to comply with 309.2 and 309.3.

707.4 Privacy. Automatic teller machines shall provide the opportunity for the same degree of privacy of input and output available to all individuals.

Advisory 707.4 Privacy. In addition to people who are blind or visually impaired, people with limited reach who use wheelchairs or have short stature, who cannot effectively block the ATM screen with their bodies, may prefer to use speech output. Speech output users can benefit from an option to render the visible screen blank, thereby affording them greater personal security and privacy.

707.5 Speech Output. Machines shall be speech enabled. Operating instructions and orientation, visible transaction prompts, user input verification, error messages, and all displayed information for full use shall be *accessible* to and independently usable by individuals with vision impairments. Speech shall be delivered through a mechanism that is readily available to all users, including but not limited to, an industry standard connector or a telephone handset. Speech shall be recorded or digitized human, or synthesized.

EXCEPTIONS: 1. Audible tones shall be permitted instead of speech for visible output that is not displayed for security purposes, including but not limited to, asterisks representing personal identification numbers.

2. Advertisements and other similar information shall not be required to be audible unless they convey information that can be used in the transaction being conducted.

3. Where speech synthesis cannot be supported, dynamic alphabetic output shall not be required to be audible.

Advisory 707.5 Speech Output. If an ATM provides additional functions such as dispensing coupons, selling theater tickets, or providing copies of monthly statements, all such functions must be available to customers using speech output. To avoid confusion at the ATM, the method of initiating the speech mode should be easily discoverable and should not require specialized training. For example, if a telephone handset is provided, lifting the handset can initiate the speech mode.

707.5.1 User Control. Speech shall be capable of being repeated or interrupted. Volume control shall be provided for the speech function.

EXCEPTION: Speech output for any single function shall be permitted to be automatically interrupted when a transaction is selected.

707.5.2 Receipts. Where receipts are provided, speech output devices shall provide audible balance inquiry information, error messages, and all other information on the printed receipt necessary to complete or verify the transaction.

EXCEPTIONS: 1. Machine location, date and time of transaction, customer account number, and the machine identifier shall not be required to be audible.

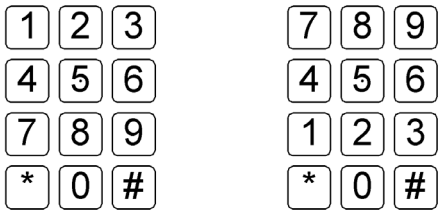
2. Information on printed receipts that duplicates information available on-screen shall not be required to be presented in the form of an audible receipt.
3. Printed copies of bank statements and checks shall not be required to be audible.

707.6 Input. Input devices shall comply with 707.6.

707.6.1 Input Controls. At least one *tactilely* discernible input control shall be provided for each function. Where provided, key surfaces not on active areas of display screens, shall be raised above surrounding surfaces. Where membrane keys are the only method of input, each shall be *tactilely* discernable from surrounding surfaces and adjacent keys.

707.6.2 Numeric Keys. Numeric keys shall be arranged in a 12-key ascending or descending telephone keypad layout. The number five key shall be *tactilely* distinct from the other keys.

Advisory 707.6.2 Numeric Keys. Telephone keypads and computer keyboards differ in one significant feature, ascending versus descending numerical order. Both types of keypads are acceptable, provided the computer-style keypad is organized similarly to the number pad located at the right on most computer keyboards, and does not resemble the line of numbers located above the computer keys.



(a) 12-key ascending (b) 12-key descending

Figure 707.6.2
Numeric Key Layout

707.6.3 Function Keys. Function keys shall comply with 707.6.3.

707.6.3.1 Contrast. Function keys shall contrast visually from background surfaces. *Characters* and symbols on key surfaces shall contrast visually from key surfaces. Visual contrast shall be either light-on-dark or dark-on-light.

EXCEPTION: *Tactile* symbols required by 707.6.3.2 shall not be required to comply with 707.6.3.1.

707.6.3.2 Tactile Symbols. Function key surfaces shall have *tactile* symbols as follows: Enter or Proceed key: raised circle; Clear or Correct key: raised left arrow; Cancel key: raised letter ex; Add Value key: raised plus sign; Decrease Value key: raised minus sign.

707.7 Display Screen. The display screen shall comply with 707.7.

EXCEPTION: Drive-up only automatic teller machines and fare machines shall not be required to comply with 707.7.1.

707.7.1 Visibility. The display screen shall be visible from a point located 40 inches (1015 mm) above the center of the clear floor *space* in front of the machine.

707.7.2 Characters. *Characters* displayed on the screen shall be in a sans serif font. *Characters* shall be 3/16 inch (4.8 mm) high minimum based on the uppercase letter "I". *Characters* shall contrast with their background with either light *characters* on a dark background or dark *characters* on a light background.

707.8 Braille Instructions. Braille instructions for initiating the speech mode shall be provided. Braille shall comply with 703.3.

708 Two-Way Communication Systems

708.1 General. Two-way communication systems shall comply with 708.

> **Advisory 708.1 General.** Devices that do not require handsets are easier to use by people who have a limited reach.

708.2 Audible and Visual Indicators. The system shall provide both audible and visual signals.

> **Advisory 708.2 Audible and Visual Indicators.** A light can be used to indicate visually that assistance is on the way. Signs indicating the meaning of visual signals should be provided.

708.3 Handsets. Handset cords, if provided, shall be 29 inches (735 mm) long minimum.

708.4 Residential Dwelling Unit Communication Systems. Communications systems between a *residential dwelling unit* and a *site*, *building*, or floor *entrance* shall comply with 708.4.

708.4.1 Common Use or Public Use System Interface. The *common use* or *public use* system interface shall include the capability of supporting voice and *TTY* communication with the *residential dwelling unit* interface.

708.4.2 Residential Dwelling Unit Interface. The *residential dwelling unit* system interface shall include a telephone jack capable of supporting voice and *TTY* communication with the *common use* or *public use* system interface.

CHAPTER 8: SPECIAL ROOMS, SPACES, AND ELEMENTS

801 General

801.1 Scope. The provisions of Chapter 8 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

> **Advisory 801.1 Scope.** Facilities covered by these requirements are also subject to the requirements of the other chapters. For example, 806 addresses guest rooms in transient lodging facilities while 902 contains the technical specifications for dining surfaces. If a transient lodging facility contains a restaurant, the restaurant must comply with requirements in other chapters such as those applicable to certain dining surfaces.

802 Wheelchair Spaces, Companion Seats, and Designated Aisle Seats

802.1 Wheelchair Spaces. *Wheelchair spaces* shall comply with 802.1.

802.1.1 Floor or Ground Surface. The floor or ground surface of *wheelchair spaces* shall comply with 302. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

802.1.2 Width. A single *wheelchair space* shall be 36 inches (915 mm) wide minimum Where two adjacent *wheelchair spaces* are provided, each *wheelchair space* shall be 33 inches (840 mm) wide minimum.

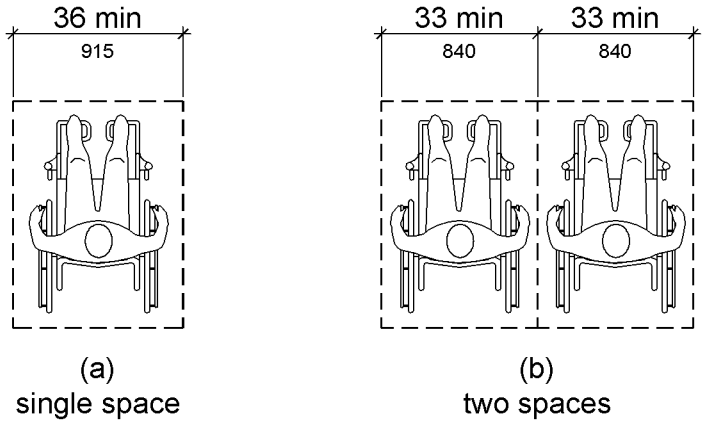


Figure 802.1.2
Width of Wheelchair Spaces

802.1.3 Depth. Where a *wheelchair space* can be entered from the front or rear, the *wheelchair space* shall be 48 inches (1220 mm) deep minimum. Where a *wheelchair space* can be entered only from the side, the *wheelchair space* shall be 60 inches (1525 mm) deep minimum.

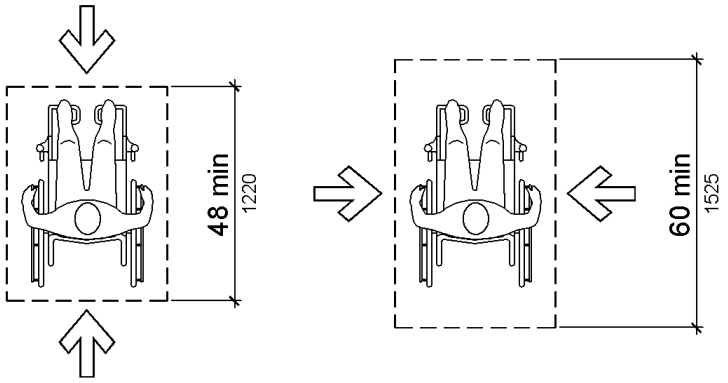


Figure 802.1.3
Depth of Wheelchair Spaces

802.1.4 Approach. *Wheelchair spaces* shall adjoin *accessible* routes. *Accessible* routes shall not overlap *wheelchair spaces*.

Advisory 802.1.4 Approach. Because accessible routes serving wheelchair spaces are not permitted to overlap the clear floor space at wheelchair spaces, access to any wheelchair space cannot be through another wheelchair space.

802.1.5 Overlap. *Wheelchair spaces* shall not overlap *circulation paths*.

Advisory 802.1.5 Overlap. The term “circulation paths” used in Section 802.1.5 means aisle width required by applicable building or life safety codes for the specific assembly occupancy. Where the circulation path provided is wider than the required aisle width, the wheelchair space may intrude into that portion of the circulation path that is provided in excess of the required aisle width.

802.2 Lines of Sight. Lines of sight to the screen, performance area, or playing field for spectators in *wheelchair spaces* shall comply with 802.2.

802.2.1 Lines of Sight Over Seated Spectators. Where spectators are expected to remain seated during events, spectators in *wheelchair spaces* shall be afforded lines of sight complying with 802.2.1.

802.2.1.1 Lines of Sight Over Heads. Where spectators are provided lines of sight over the heads of spectators seated in the first row in front of their seats, spectators seated in *wheelchair spaces* shall be afforded lines of sight over the heads of seated spectators in the first row in front of *wheelchair spaces*.

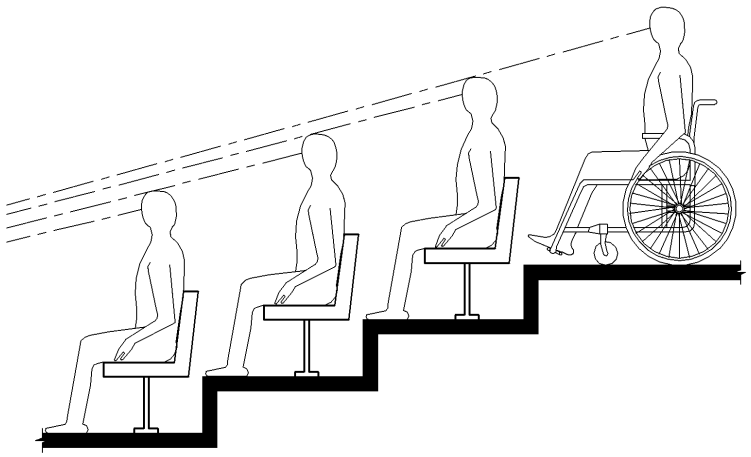


Figure 802.2.1.1
Lines of Sight Over the Heads of Seated Spectators

802.2.1.2 Lines of Sight Between Heads. Where spectators are provided lines of sight over the shoulders and between the heads of spectators seated in the first row in front of their seats, spectators seated in *wheelchair spaces* shall be afforded lines of sight over the shoulders and between the heads of seated spectators in the first row in front of *wheelchair spaces*.

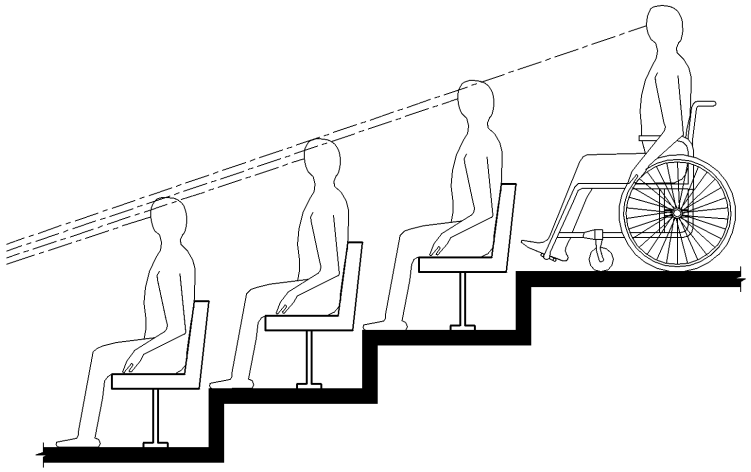


Figure 802.2.1.2
Lines of Sight Between the Heads of Seated Spectators

802.2.2 Lines of Sight Over Standing Spectators. Where spectators are expected to stand during events, spectators in *wheelchair spaces* shall be afforded lines of sight complying with 802.2.2.

802.2.2.1 Lines of Sight Over Heads. Where standing spectators are provided lines of sight over the heads of spectators standing in the first row in front of their seats, spectators seated in

wheelchair spaces shall be afforded lines of sight over the heads of standing spectators in the first row in front of *wheelchair spaces*.

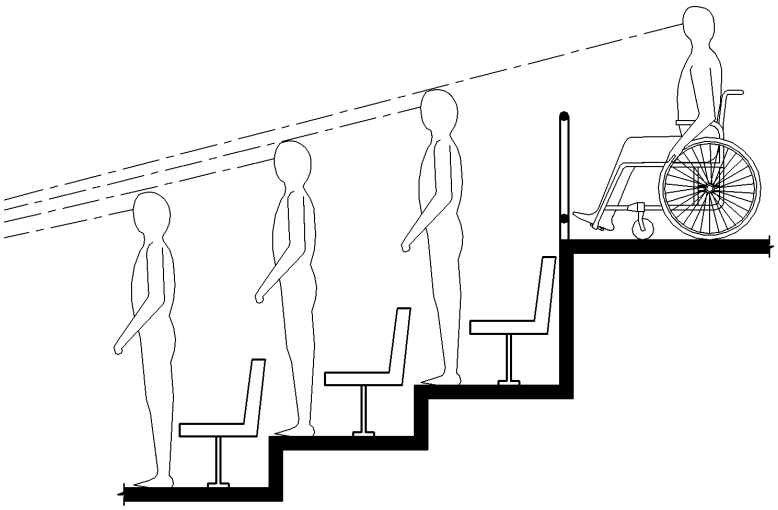


Figure 802.2.2.1
Lines of Sight Over the Heads of Standing Spectators

802.2.2.2 Lines of Sight Between Heads. Where standing spectators are provided lines of sight over the shoulders and between the heads of spectators standing in the first row in front of their seats, spectators seated in *wheelchair spaces* shall be afforded lines of sight over the shoulders and between the heads of standing spectators in the first row in front of *wheelchair spaces*.

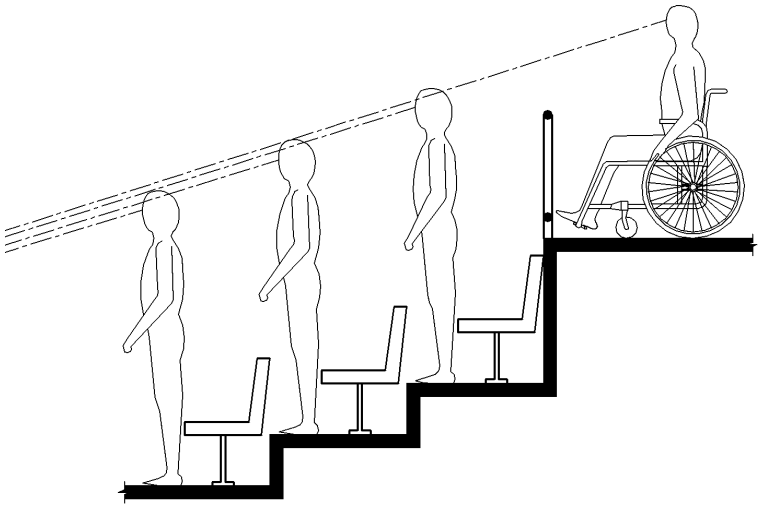


Figure 802.2.2.2
Lines of Sight Between the Heads of Standing Spectators

802.3 Companion Seats. Companion seats shall comply with 802.3.

802.3.1 Alignment. In row seating, companion seats shall be located to provide shoulder alignment with adjacent *wheelchair spaces*. The shoulder alignment point of the *wheelchair space* shall be measured 36 inches (915 mm) from the front of the *wheelchair space*. The floor surface of the companion seat shall be at the same elevation as the floor surface of the *wheelchair space*.

802.3.2 Type. Companion seats shall be equivalent in size, quality, comfort, and amenities to the seating in the immediate area. Companion seats shall be permitted to be movable.

802.4 Designated Aisle Seats. Designated aisle seats shall comply with 802.4.

802.4.1 Armrests. Where armrests are provided on the seating in the immediate area, folding or retractable armrests shall be provided on the aisle side of the seat.

802.4.2 Identification. Each designated aisle seat shall be identified by a sign or marker.

Advisory 802.4.2 Identification. Seats with folding or retractable armrests are intended for use by individuals who have difficulty walking. Consider identifying such seats with signs that contrast (light-on-dark or dark-on-light) and that are also photo luminescent.

803 Dressing, Fitting, and Locker Rooms

803.1 General. Dressing, fitting, and locker rooms shall comply with 803.

Advisory 803.1 General. Partitions and doors should be designed to ensure people using accessible dressing and fitting rooms privacy equivalent to that afforded other users of the facility. Section 903.5 requires dressing room bench seats to be installed so that they are at the same height as a typical wheelchair seat, 17 inches (430 mm) to 19 inches (485 mm). However, wheelchair seats can be lower than dressing room benches for people of short stature or children using wheelchairs.

803.2 Turning Space. Turning *space* complying with 304 shall be provided within the room.

803.3 Door Swing. Doors shall not swing into the room unless a clear floor or ground *space* complying with 305.3 is provided beyond the arc of the door swing.

803.4 Benches. A bench complying with 903 shall be provided within the room.

803.5 Coat Hooks and Shelves. Coat hooks provided within the room shall be located within one of the reach ranges specified in 308. Shelves shall be 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the finish floor or ground.

804 Kitchens and Kitchenettes

804.1 General. Kitchens and kitchenettes shall comply with 804.

804.2 Clearance. Where a pass through kitchen is provided, clearances shall comply with 804.2.1. Where a U-shaped kitchen is provided, clearances shall comply with 804.2.2.

EXCEPTION: *Spaces* that do not provide a cooktop or conventional range shall not be required to comply with 804.2.

Advisory 804.2 Clearance. Clearances are measured from the furthest projecting face of all opposing base cabinets, counter tops, appliances, or walls, excluding hardware.

804.2.1 Pass Through Kitchen. In pass through kitchens where counters, appliances or cabinets are on two opposing sides, or where counters, appliances or cabinets are opposite a parallel wall, clearance between all opposing base cabinets, counter tops, appliances, or walls within kitchen work areas shall be 40 inches (1015 mm) minimum. Pass through kitchens shall have two entries.

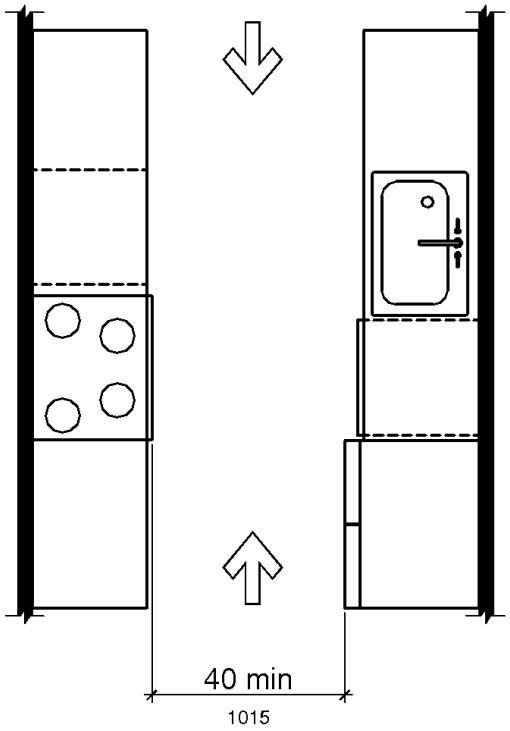


Figure 804.2.1
Pass Through Kitchens

804.2.2 U-Shaped. In U-shaped kitchens enclosed on three contiguous sides, clearance between all opposing base cabinets, counter tops, appliances, or walls within kitchen work areas shall be 60 inches (1525 mm) minimum.

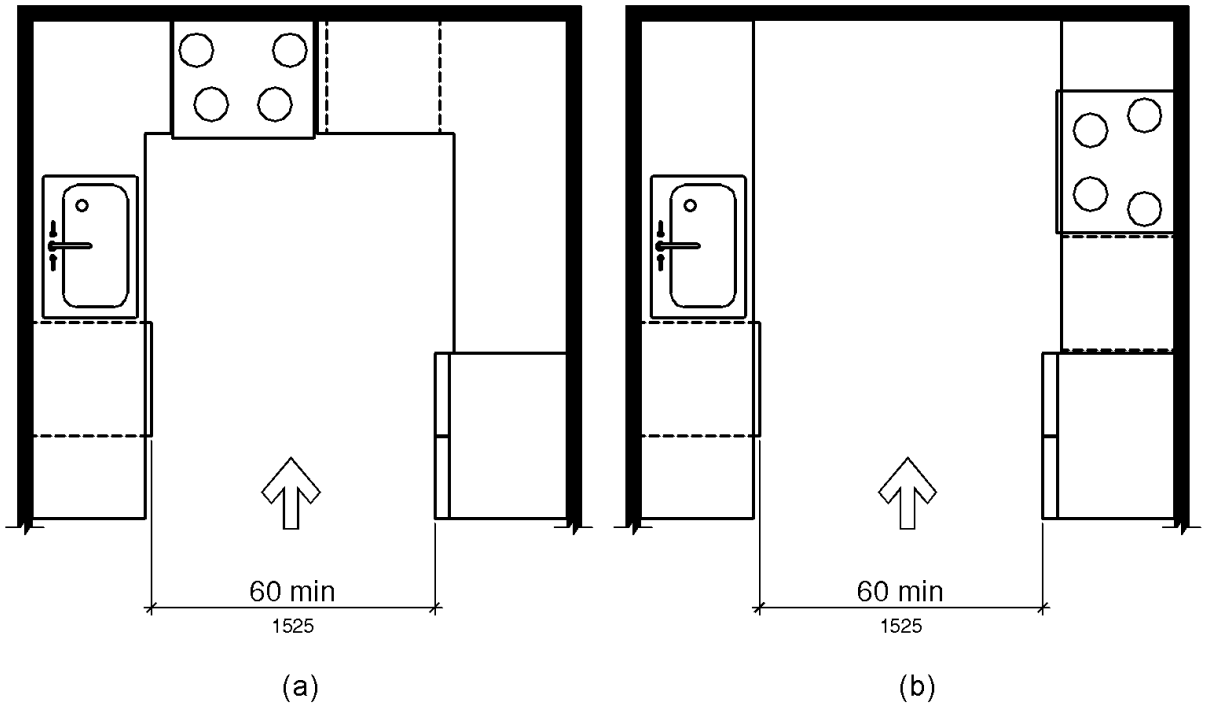


Figure 804.2.2
U-Shaped Kitchens

804.3 Kitchen Work Surface. In *residential dwelling units* required to comply with 809, at least one 30 inches (760 mm) wide minimum section of counter shall provide a kitchen work surface that complies with 804.3.

804.3.1 Clear Floor or Ground Space. A clear floor *space* complying with 305 positioned for a forward approach shall be provided. The clear floor or ground *space* shall be centered on the kitchen work surface and shall provide knee and toe clearance complying with 306.

EXCEPTION: Cabinetry shall be permitted under the kitchen work surface provided that all of the following conditions are met:
(a) the cabinetry can be removed without removal or replacement of the kitchen work surface;
(b) the finish floor extends under the cabinetry; and
(c) the walls behind and surrounding the cabinetry are finished.

804.3.2 Height. The kitchen work surface shall be 34 inches (865 mm) maximum above the finish floor or ground.

EXCEPTION: A counter that is adjustable to provide a kitchen work surface at variable heights, 29 inches (735 mm) minimum and 36 inches (915 mm) maximum, shall be permitted.

804.3.3 Exposed Surfaces. There shall be no sharp or abrasive surfaces under the work surface counters.

804.4 Sinks. Sinks shall comply with 606.

804.5 Storage. At least 50 percent of shelf *space* in storage *facilities* shall comply with 811.

804.6 Appliances. Where provided, kitchen appliances shall comply with 804.6.

804.6.1 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided at each kitchen appliance. Clear floor or ground *spaces* shall be permitted to overlap.

804.6.2 Operable Parts. All appliance controls shall comply with 309.

EXCEPTIONS: 1. Appliance doors and door latching devices shall not be required to comply with 309.4.

2. Bottom-hinged appliance doors, when in the open position, shall not be required to comply with 309.3.

804.6.3 Dishwasher. Clear floor or ground *space* shall be positioned adjacent to the dishwasher door. The dishwasher door, in the open position, shall not obstruct the clear floor or ground *space* for the dishwasher or the sink.

804.6.4 Range or Cooktop. Where a forward approach is provided, the clear floor or ground *space* shall provide knee and toe clearance complying with 306. Where knee and toe *space* is provided, the underside of the range or cooktop shall be insulated or otherwise configured to prevent burns, abrasions, or electrical shock. The location of controls shall not require reaching across burners.

804.6.5 Oven. Ovens shall comply with 804.6.5.

804.6.5.1 Side-Hinged Door Ovens. Side-hinged door ovens shall have the work surface required by 804.3 positioned adjacent to the latch side of the oven door.

804.6.5.2 Bottom-Hinged Door Ovens. Bottom-hinged door ovens shall have the work surface required by 804.3 positioned adjacent to one side of the door.

804.6.5.3 Controls. Ovens shall have controls on front panels.

804.6.6 Refrigerator/Freezer. Combination refrigerators and freezers shall have at least 50 percent of the freezer *space* 54 inches (1370 mm) maximum above the finish floor or ground. The clear floor or ground *space* shall be positioned for a parallel approach to the *space* dedicated to a refrigerator/freezer with the centerline of the clear floor or ground *space* offset 24 inches (610 mm) maximum from the centerline of the dedicated *space*.

805 Medical Care and Long-Term Care Facilities

805.1 General. Medical care *facility* and long-term care *facility* patient or resident sleeping rooms required to provide mobility features shall comply with 805.

805.2 Turning Space. Turning *space* complying with 304 shall be provided within the room.

805.3 Clear Floor or Ground Space. A clear floor *space* complying with 305 shall be provided on each side of the bed. The clear floor *space* shall be positioned for parallel approach to the side of the bed.

805.4 Toilet and Bathing Rooms. Toilet and bathing rooms that are provided as part of a patient or resident sleeping room shall comply with 603. Where provided, no fewer than one water closet, one lavatory, and one bathtub or shower shall comply with the applicable requirements of 603 through 610.

806 Transient Lodging Guest Rooms

806.1 General. *Transient lodging* guest rooms shall comply with 806. Guest rooms required to provide mobility features shall comply with 806.2. Guest rooms required to provide communication features shall comply with 806.3.

806.2 Guest Rooms with Mobility Features. Guest rooms required to provide mobility features shall comply with 806.2.

> **Advisory 806.2 Guest Rooms.** The requirements in Section 806.2 do not include requirements that are common to all accessible spaces. For example, closets in guest rooms must comply with the applicable provisions for storage specified in scoping.

806.2.1 Living and Dining Areas. Living and dining areas shall be *accessible*.

806.2.2 Exterior Spaces. Exterior *spaces*, including patios, terraces and balconies, that serve the guest room shall be *accessible*.

806.2.3 Sleeping Areas. At least one sleeping area shall provide a clear floor *space* complying with 305 on both sides of a bed. The clear floor *space* shall be positioned for parallel approach to the side of the bed.

EXCEPTION: Where a single clear floor *space* complying with 305 positioned for parallel approach is provided between two beds, a clear floor or ground *space* shall not be required on both sides of a bed.

806.2.4 Toilet and Bathing Facilities. At least one bathroom that is provided as part of a guest room shall comply with 603. No fewer than one water closet, one lavatory, and one bathtub or shower shall comply with applicable requirements of 603 through 610. In addition, required roll-in shower compartments shall comply with 608.2.2 or 608.2.3. Toilet and bathing fixtures required to comply with 603 through 610 shall be permitted to be located in more than one toilet or bathing area, provided that travel between fixtures does not require travel between other parts of the guest room.

806.2.4.1 Vanity Counter Top Space. If vanity counter top *space* is provided in non-accessible guest toilet or bathing rooms, comparable vanity counter top *space*, in terms of size and proximity to the lavatory, shall also be provided in *accessible* guest toilet or bathing rooms.

> **Advisory 806.2.4.1 Vanity Counter Top Space**. This provision is intended to ensure that accessible guest rooms are provided with comparable vanity counter top space.

806.2.5 Kitchens and Kitchenettes. Kitchens and kitchenettes shall comply with 804.

806.2.6 Turning Space. Turning *space* complying with 304 shall be provided within the guest room.

806.3 Guest Rooms with Communication Features. Guest rooms required to provide communication features shall comply with 806.3.

> **Advisory 806.3 Guest Rooms with Communication Features.** In guest rooms required to have accessible communication features, consider ensuring compatibility with adaptive equipment used by people with hearing impairments. To ensure communication within the facility, as well as on commercial lines, provide telephone interface jacks that are compatible with both digital and analog signal use. If an audio headphone jack is provided on a speaker phone, a cutoff switch can be included in the jack so that insertion of the jack cuts off the speaker. If a telephone-like handset is used, the external speakers can be turned off when the handset is removed from the cradle. For headset or external amplification system compatibility, a standard subminiature jack installed in the telephone will provide the most flexibility.

806.3.1 Alarms. Where emergency warning systems are provided, alarms complying with 702 shall be provided.

806.3.2 Notification Devices. Visible notification devices shall be provided to alert room occupants of incoming telephone calls and a door knock or bell. Notification devices shall not be connected to visible alarm signal appliances. Telephones shall have volume controls compatible with the telephone system and shall comply with 704.3. Telephones shall be served by an electrical outlet complying with 309 located within 48 inches (1220 mm) of the telephone to facilitate the use of a *TTY*.

807 Holding Cells and Housing Cells

807.1 General. Holding cells and housing cells shall comply with 807.

807.2 Cells with Mobility Features. Cells required to provide mobility features shall comply with 807.2.

807.2.1 Turning Space. Turning *space* complying with 304 shall be provided within the cell.

807.2.2 Benches. Where benches are provided, at least one bench shall comply with 903.

807.2.3 Beds. Where beds are provided, clear floor *space* complying with 305 shall be provided on at least one side of the bed. The clear floor *space* shall be positioned for parallel approach to the side of the bed.

807.2.4 Toilet and Bathing Facilities. Toilet *facilities* or bathing *facilities* that are provided as part of a cell shall comply with 603. Where provided, no fewer than one water closet, one lavatory, and one bathtub or shower shall comply with the applicable requirements of 603 through 610.

Advisory 807.2.4 Toilet and Bathing Facilities. In holding cells, housing cells, or rooms required to be accessible, these requirements do not require a separate toilet room.

807.3 Cells with Communication Features. Cells required to provide communication features shall comply with 807.3.

807.3.1 Alarms. Where audible emergency alarm systems are provided to serve the occupants of cells, visible alarms complying with 702 shall be provided.

EXCEPTION: Visible alarms shall not be required where inmates or detainees are not allowed independent means of egress.

807.3.2 Telephones. Telephones, where provided within cells, shall have volume controls complying with 704.3.

808 Courtrooms

808.1 General. Courtrooms shall comply with 808.

808.2 Turning Space. Where provided, areas that are raised or depressed and accessed by *ramps* or platform lifts with entry *ramps* shall provide unobstructed turning *space* complying with 304.

808.3 Clear Floor Space. Each jury box and witness stand shall have, within its defined area, clear floor *space* complying with 305.

EXCEPTION: In *alterations*, *wheelchair spaces* are not required to be located within the defined area of raised jury boxes or witness stands and shall be permitted to be located outside these *spaces* where *ramp* or platform lift access poses a hazard by restricting or projecting into a means of egress required by the appropriate *administrative authority*.

808.4 Judges' Benches and Courtroom Stations. Judges' benches, clerks' stations, bailiffs' stations, deputy clerks' stations, court reporters' stations and litigants' and counsel stations shall comply with 902.

809 Residential Dwelling Units

809.1 General. *Residential dwelling units* shall comply with 809. *Residential dwelling units* required to provide mobility features shall comply with 809.2 through 809.4. *Residential dwelling units* required to provide communication features shall comply with 809.5.

809.2 Accessible Routes. *Accessible* routes complying with Chapter 4 shall be provided within *residential dwelling units* in accordance with 809.2.

EXCEPTION: *Accessible* routes shall not be required to or within unfinished attics or unfinished basements.

809.2.1 Location. At least one *accessible* route shall connect all *spaces* and *elements* which are a part of the *residential dwelling unit*. Where only one *accessible* route is provided, it shall not pass through bathrooms, closets, or similar *spaces*.

809.2.2 Turning Space. All rooms served by an *accessible* route shall provide a turning *space* complying with 304.

EXCEPTION: Turning *space* shall not be required in exterior *spaces* 30 inches (760 mm) maximum in depth or width.

Advisory 809.2.2 Turning Space. It is generally acceptable to use required clearances to provide wheelchair turning space. For example, in kitchens, 804.3.1 requires at least one work surface with clear floor space complying with 306 to be centered beneath. If designers elect to provide clear floor space that is at least 36 inches (915 mm) wide, as opposed to the required 30 inches (760 mm) wide, that clearance can be part of a T-turn, thereby maximizing efficient use of the kitchen area. However, the overlap of turning space must be limited to one segment of the T-turn so that back-up maneuvering is not restricted. It would, therefore, be unacceptable to use both the clearances under the work surface and the sink as part of a T-turn. See Section 304.3.2 regarding T-turns.

809.3 Kitchen. Where a kitchen is provided, it shall comply with 804.

809.4 Toilet Facilities and Bathing Facilities. At least one bathroom shall comply with 603. No fewer than one of each type of fixture provided shall comply with applicable requirements of 603 through 610. Toilet and bathing fixtures required to comply with 603 through 610 shall be located in the same toilet and bathing area, such that travel between fixtures does not require travel between other parts of the *residential dwelling unit*.

Advisory 809.4 Toilet Facilities and Bathing Facilities. In an effort to promote space efficiency, vanity counter top space in accessible residential dwelling units is often omitted. This omission does not promote equal access or equal enjoyment of the unit. Where comparable units have vanity counter tops, accessible units should also have vanity counter tops located as close as possible to the lavatory for convenient access to toiletries.

809.5 Residential Dwelling Units with Communication Features. *Residential dwelling units* required to provide communication features shall comply with 809.5.

809.5.1 Building Fire Alarm System. Where a *building* fire alarm system is provided, the system wiring shall be extended to a point within the *residential dwelling unit* in the vicinity of the *residential dwelling unit* smoke detection system.

809.5.1.1 Alarm Appliances. Where alarm appliances are provided within a *residential dwelling unit* as part of the *building* fire alarm system, they shall comply with 702.

809.5.1.2 Activation. All visible alarm appliances provided within the *residential dwelling unit* for *building* fire alarm notification shall be activated upon activation of the *building* fire alarm in the portion of the *building* containing the *residential dwelling unit*.

809.5.2 Residential Dwelling Unit Smoke Detection System. *Residential dwelling unit* smoke detection systems shall comply with NFPA 72 (1999 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1).

809.5.2.1 Activation. All visible alarm appliances provided within the *residential dwelling unit* for smoke detection notification shall be activated upon smoke detection.

809.5.3 Interconnection. The same visible alarm appliances shall be permitted to provide notification of *residential dwelling unit* smoke detection and *building* fire alarm activation.

809.5.4 Prohibited Use. Visible alarm appliances used to indicate *residential dwelling unit* smoke detection or *building* fire alarm activation shall not be used for any other purpose within the *residential dwelling unit*.

809.5.5 Residential Dwelling Unit Primary Entrance. Communication features shall be provided at the *residential dwelling unit* primary *entrance* complying with 809.5.5.

809.5.5.1 Notification. A hard-wired electric doorbell shall be provided. A button or switch shall be provided outside the *residential dwelling unit* primary *entrance*. Activation of the button or switch shall initiate an audible tone and visible signal within the *residential dwelling unit*. Where visible doorbell signals are located in sleeping areas, they shall have controls to deactivate the signal.

809.5.5.2 Identification. A means for visually identifying a visitor without opening the *residential dwelling unit* entry door shall be provided and shall allow for a minimum 180 degree range of view.

Advisory 809.5.5.2 Identification. In doors, peepholes that include prisms clarify the image and should offer a wide-angle view of the hallway or exterior for both standing persons and wheelchair users. Such peepholes can be placed at a standard height and permit a view from several feet from the door.

809.5.6 Site, Building, or Floor Entrance. Where a system, including a closed-circuit system, permitting voice communication between a visitor and the occupant of the *residential dwelling unit* is provided, the system shall comply with 708.4.

810 Transportation Facilities

810.1 General. Transportation *facilities* shall comply with 810.

810.2 Bus Boarding and Alighting Areas. Bus boarding and alighting areas shall comply with 810.2.

Advisory 810.2 Bus Boarding and Alighting Areas. At bus stops where a shelter is provided, the bus stop pad can be located either within or outside of the shelter.

810.2.1 Surface. Bus stop boarding and alighting areas shall have a firm, stable surface.

810.2.2 Dimensions. Bus stop boarding and alighting areas shall provide a clear length of 96 inches (2440 mm) minimum, measured perpendicular to the curb or vehicle roadway edge, and a clear width of 60 inches (1525 mm) minimum, measured parallel to the vehicle roadway.

Note to Reader: The Department of Transportation's ADA standards indicate that compliance is required to the extent construction specifications are within a public entity's control:

810.2.2 Dimensions. Bus boarding and alighting areas shall provide a clear length of 96 inches (2440 mm), measured perpendicular to the curb or vehicle roadway edge, and a clear width of 60 inches (1525 mm), measured parallel to the vehicle roadway. *Public entities shall ensure that the construction of bus boarding and alighting areas comply with 810.2.2, to the extent the construction specifications are within their control.*

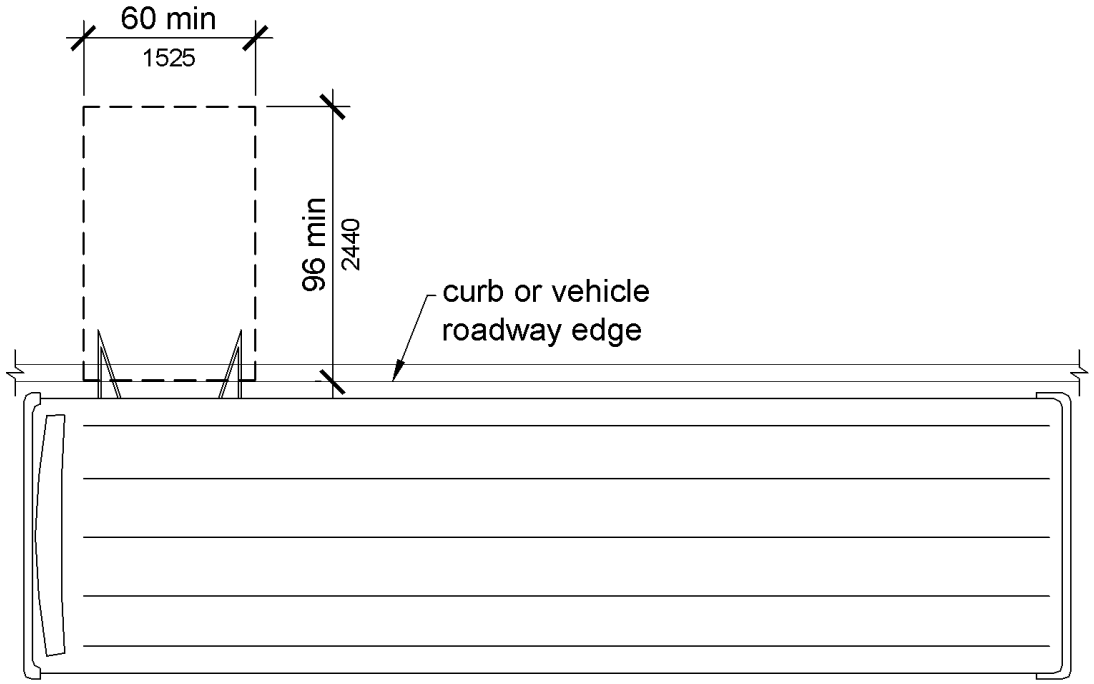


Figure 810.2.2
Dimensions of Bus Boarding and Alighting Areas

810.2.3 Connection. Bus stop boarding and alighting areas shall be connected to streets, sidewalks, or pedestrian paths by an *accessible* route complying with 402.

810.2.4 Slope. Parallel to the roadway, the slope of the bus stop boarding and alighting area shall be the same as the roadway, to the maximum extent practicable. Perpendicular to the roadway, the slope of the bus stop boarding and alighting area shall not be steeper than1:48.

810.3 Bus Shelters. Bus shelters shall provide a minimum clear floor or ground *space* complying with 305 entirely within the shelter. Bus shelters shall be connected by an *accessible* route complying with 402 to a boarding and alighting area complying with 810.2.

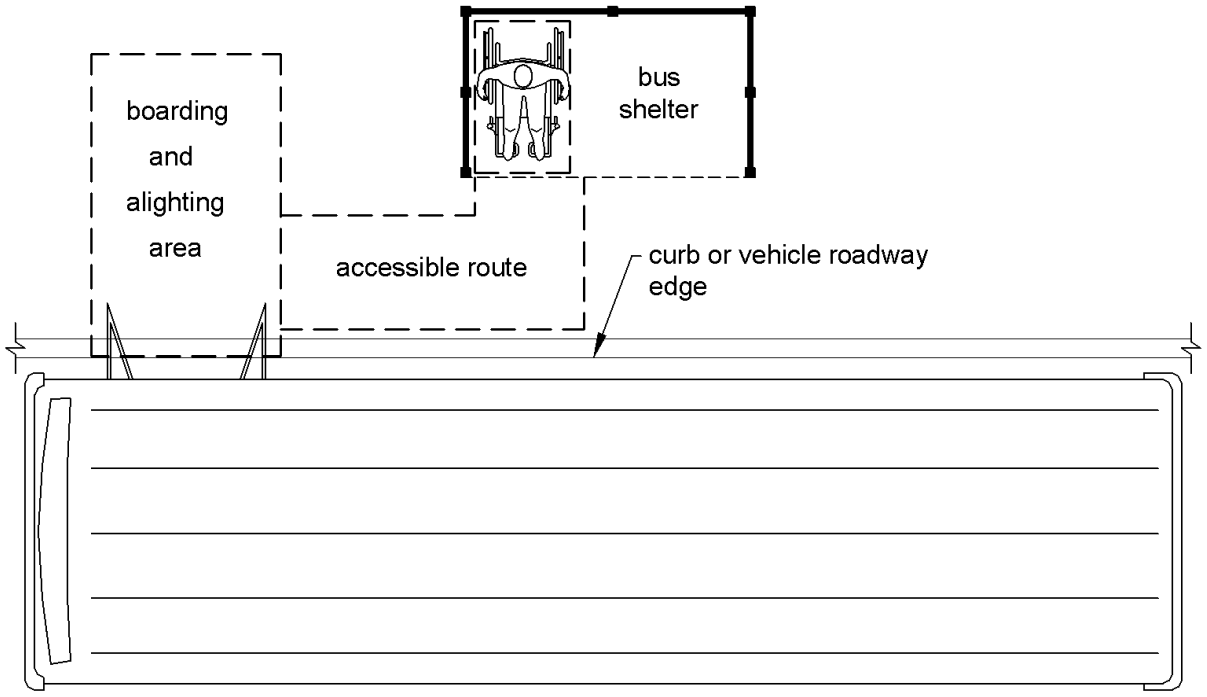


Figure 810.3
Bus Shelters

810.4 Bus Signs. Bus route identification signs shall comply with 703.5.1 through 703.5.4, and 703.5.7 and 703.5.8. In addition, to the maximum extent practicable, bus route identification signs shall comply with 703.5.5.

EXCEPTION: Bus schedules, timetables and maps that are posted at the bus stop or bus bay shall not be required to comply.

810.5 Rail Platforms. Rail platforms shall comply with 810.5.

810.5.1 Slope. Rail platforms shall not exceed a slope of 1:48 in all directions.

EXCEPTION: Where platforms serve vehicles operating on existing track or track laid in existing roadway, the slope of the platform parallel to the track shall be permitted to be equal to the slope (grade) of the roadway or existing track.

810.5.2 Detectable Warnings. Platform boarding edges not protected by platform screens or guards shall have *detectable warnings* complying with 705 along the full length of the *public use* area of the platform.

810.5.3 Platform and Vehicle Floor Coordination. Station platforms shall be positioned to coordinate with vehicles in accordance with the applicable requirements of 36 CFR Part 1192. Low-level platforms shall be 8 inches (205 mm) minimum above top of rail.

EXCEPTION: Where vehicles are boarded from sidewalks or street-level, low-level platforms shall be permitted to be less than 8 inches (205 mm).

Note to Reader: The Department of Transportation's ADA standards note permitted alternatives where compliance is not operationally or structurally feasible in light rail, commuter rail, or intercity rail systems:

810.5.3 Platform and Vehicle Floor Coordination. Station platforms shall be positioned to coordinate with vehicles in accordance with the applicable requirements of 36 CFR part 1192. Low-level platforms shall be 8 inches (205 mm) minimum above top of rail. *In light rail, commuter rail, and intercity rail systems where it is not operationally or structurally feasible to meet the horizontal gap or vertical difference requirements of part 1192 or 49 CFR part 38, mini-high platforms, car-borne or platform-mounted lifts, ramps or bridge plates or similarly manually deployed devices, meeting the requirements of 49 CFR part 38, shall suffice.*

EXCEPTION: Where vehicles are boarded from sidewalks or street- level, low-level platforms shall be permitted to be less than 8 inches (205 mm).

Advisory 810.5.3 Platform and Vehicle Floor Coordination. The height and position of a platform must be coordinated with the floor of the vehicles it serves to minimize the vertical and horizontal gaps, in accordance with the ADA Accessibility Guidelines for Transportation Vehicles (36 CFR Part 1192). The vehicle guidelines, divided by bus, van, light rail, rapid rail, commuter rail, intercity rail, are available at www.access-board.gov. The preferred alignment is a high platform, level with the vehicle floor. In some cases, the vehicle guidelines permit use of a low platform in conjunction with a lift or ramp. Most such low platforms must have a minimum height of eight inches above the top of the rail. Some vehicles are designed to be boarded from a street or the sidewalk along the street and the exception permits such boarding areas to be less than eight inches high.

810.6 Rail Station Signs. Rail station signs shall comply with 810.6.

EXCEPTION. Signs shall not be required to comply with 810.6.1 and 810.6.2 where audible signs are remotely transmitted to hand-held receivers, or are user- or proximity-actuated.

Advisory 810.6 Rail Station Signs Exception. Emerging technologies such as an audible sign systems using infrared transmitters and receivers may provide greater accessibility in the transit environment than traditional Braille and raised letter signs. The transmitters are placed on or next to print signs and transmit their information to an infrared receiver that is held by a person. By scanning an area, the person will hear the sign. This means that signs can be placed well out of reach of Braille readers, even on parapet walls and on walls beyond barriers. Additionally, such signs can be used to provide wayfinding information that cannot be efficiently conveyed on Braille signs.

810.6.1 Entrances. Where signs identify a station or its *entrance*, at least one sign at each *entrance* shall comply with 703.2 and shall be placed in uniform locations to the maximum extent practicable. Where signs identify a station that has no defined *entrance*, at least one sign shall comply with 703.2 and shall be placed in a central location.

810.6.2 Routes and Destinations. Lists of stations, routes and destinations served by the station which are located on boarding areas, platforms, or *mezzanines* shall comply with 703.5. At least one *tactile* sign identifying the specific station and complying with 703.2 shall be provided on each platform or boarding area. Signs covered by this requirement shall, to the maximum extent practicable, be placed in uniform locations within the system.

EXCEPTION: Where sign *space* is limited, *characters* shall not be required to exceed 3 inches (75 mm).

Advisory 810.6.2 Routes and Destinations. Route maps are not required to comply with the informational sign requirements in this document.

810.6.3 Station Names. Stations covered by this section shall have identification signs complying with 703.5. Signs shall be clearly visible and within the sight lines of standing and sitting passengers from within the vehicle on both sides when not obstructed by another vehicle.

Advisory 810.6.3 Station Names. It is also important to place signs at intervals in the station where passengers in the vehicle will be able to see a sign when the vehicle is either stopped at the station or about to come to a stop in the station. The number of signs necessary may be directly related to the size of the lettering displayed on the sign.

810.7 Public Address Systems. Where public address systems convey audible information to the public, the same or equivalent information shall be provided in a visual format.

810.8 Clocks. Where clocks are provided for use by the public, the clock face shall be uncluttered so that its *elements* are clearly visible. Hands, numerals and digits shall contrast with the background either light-on-dark or dark-on-light. Where clocks are installed overhead, numerals and digits shall comply with 703.5.

810.9 Escalators. Where provided, escalators shall comply with the sections 6.1.3.5.6 and 6.1.3.6.5 of ASME A17.1 (incorporated by reference, see “Referenced Standards” in Chapter 1) and shall have a clear width of 32 inches (815 mm) minimum.

EXCEPTION: Existing escalators in *key stations* shall not be required to comply with 810.9.

810.10 Track Crossings. Where a *circulation path* serving boarding platforms crosses tracks, it shall comply with 402.

EXCEPTION: Openings for wheel flanges shall be permitted to be 2½ inches (64 mm) maximum.

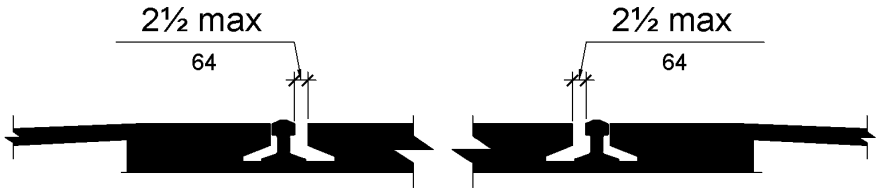


Figure 810.10 (Exception)
Track Crossings

811 Storage

811.1 General. Storage shall comply with 811.

811.2 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided.

811.3 Height. Storage *elements* shall comply with at least one of the reach ranges specified in 308.

811.4 Operable Parts. *Operable parts* shall comply with 309.

CHAPTER 9: BUILT-IN ELEMENTS

901 General

901.1 Scope. The provisions of Chapter 9 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

902 Dining Surfaces and Work Surfaces

902.1 General. Dining surfaces and work surfaces shall comply with 902.2 and 902.3.

EXCEPTION: Dining surfaces and work surfaces for *children's use* shall be permitted to comply with 902.4.

> **Advisory 902.1 General.** Dining surfaces include, but are not limited to, bars, tables, lunch counters, and booths. Examples of work surfaces include writing surfaces, study carrels, student laboratory stations, baby changing and other tables or fixtures for personal grooming, coupon counters, and where covered by the ABA scoping provisions, employee work stations.

902.2 Clear Floor or Ground Space. A clear floor *space* complying with 305 positioned for a forward approach shall be provided. Knee and toe clearance complying with 306 shall be provided.

902.3 Height. The tops of dining surfaces and work surfaces shall be 28 inches (710 mm) minimum and 34 inches (865 mm) maximum above the finish floor or ground.

902.4 Dining Surfaces and Work Surfaces for Children's Use. *Accessible* dining surfaces and work surfaces for *children's use* shall comply with 902.4.

EXCEPTION: Dining surfaces and work surfaces that are used primarily by children 5 years and younger shall not be required to comply with 902.4 where a clear floor or ground *space* complying with 305 positioned for a parallel approach is provided.

902.4.1 Clear Floor or Ground Space. A clear floor *space* complying with 305 positioned for forward approach shall be provided. Knee and toe clearance complying with 306 shall be provided, except that knee clearance 24 inches (610 mm) minimum above the finish floor or ground shall be permitted.

902.4.2 Height. The tops of tables and counters shall be 26 inches (660 mm) minimum and 30 inches (760 mm) maximum above the finish floor or ground.

903 Benches

903.1 General. Benches shall comply with 903.

903.2 Clear Floor or Ground Space. Clear floor or ground *space* complying with 305 shall be provided and shall be positioned at the end of the bench seat and parallel to the short axis of the bench.

903.3 Size. Benches shall have seats that are 42 inches (1065 mm) long minimum and 20 inches (510 mm) deep minimum and 24 inches (610 mm) deep maximum.

903.4 Back Support. The bench shall provide for back support or shall be affixed to a wall. Back support shall be 42 inches (1065 mm) long minimum and shall extend from a point 2 inches (51 mm) maximum above the seat surface to a point 18 inches (455 mm) minimum above the seat surface. Back support shall be 2½ inches (64 mm) maximum from the rear edge of the seat measured horizontally.

Advisory 903.4 Back Support. To assist in transferring to the bench, consider providing grab bars on a wall adjacent to the bench, but not on the seat back. If provided, grab bars cannot obstruct transfer to the bench.

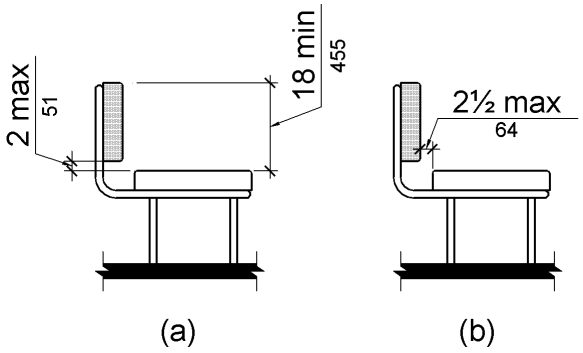


Figure 903.4
Bench Back Support

903.5 Height. The top of the bench seat surface shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the finish floor or ground.

903.6 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener, mounting device, or supporting structure.

903.7 Wet Locations. Where installed in wet locations, the surface of the seat shall be slip resistant and shall not accumulate water.

904 Check-Out Aisles and Sales and Service Counters

904.1 General. Check-out aisles and sales and service counters shall comply with the applicable requirements of 904.

904.2 Approach. All portions of counters required to comply with 904 shall be located adjacent to a walking surface complying with 403.

Advisory 904.2 Approach. If a cash register is provided at the sales or service counter, locate the accessible counter close to the cash register so that a person using a wheelchair is visible to sales or service personnel and to minimize the reach for a person with a disability.

904.3 Check-Out Aisles. Check-out aisles shall comply with 904.3.

904.3.1 Aisle. Aisles shall comply with 403.

904.3.2 Counter. The counter surface height shall be 38 inches (965 mm) maximum above the finish floor or ground. The top of the counter edge protection shall be 2 inches (51 mm) maximum above the top of the counter surface on the aisle side of the check-out counter.

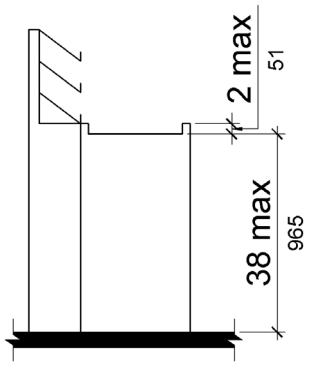


Figure 904.3.2
Check-Out Aisle Counters

904.3.3 Check Writing Surfaces. Where provided, check writing surfaces shall comply with 902.3.

904.4 Sales and Service Counters. Sales counters and service counters shall comply with 904.4.1 or 904.4.2. The *accessible* portion of the counter top shall extend the same depth as the sales or service counter top.

EXCEPTION: In *alterations*, when the provision of a counter complying with 904.4 would result in a reduction of the number of existing counters at work stations or a reduction of the number of existing *mail boxes*, the counter shall be permitted to have a portion which is 24 inches (610 mm) long minimum complying with 904.4.1 provided that the required clear floor or ground *space* is centered on the *accessible* length of the counter.

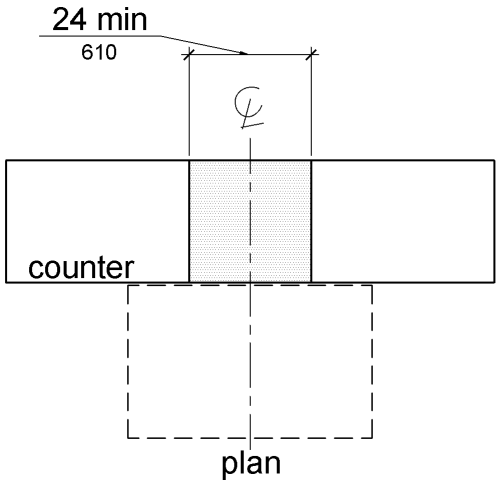


Figure 904.4 (Exception)
Alteration of Sales and Service Counters

904.4.1 Parallel Approach. A portion of the counter surface that is 36 inches (915 mm) long minimum and 36 inches (915 mm) high maximum above the finish floor shall be provided. A clear floor or ground *space* complying with 305 shall be positioned for a parallel approach adjacent to the 36 inch (915 mm) minimum length of counter.

EXCEPTION: Where the provided counter surface is less than 36 inches (915 mm) long, the entire counter surface shall be 36 inches (915 mm) high maximum above the finish floor.

904.4.2 Forward Approach. A portion of the counter surface that is 30 inches (760 mm) long minimum and 36 inches (915 mm) high maximum shall be provided. Knee and toe *space* complying with 306 shall be provided under the counter. A clear floor or ground *space* complying with 305 shall be positioned for a forward approach to the counter.

904.5 Food Service Lines. Counters in food service lines shall comply with 904.5.

904.5.1 Self-Service Shelves and Dispensing Devices. Self-service shelves and dispensing devices for tableware, dishware, condiments, food and beverages shall comply with 308.

904.5.2 Tray Slides. The tops of tray slides shall be 28 inches (710 mm) minimum and 34 inches (865 mm) maximum above the finish floor or ground.

904.6 Security Glazing. Where counters or teller windows have security glazing to separate personnel from the public, a method to facilitate voice communication shall be provided. Telephone handset devices, if provided, shall comply with 704.3.

Advisory 904.6 Security Glazing. Assistive listening devices complying with 706 can facilitate voice communication at counters or teller windows where there is security glazing which promotes distortion in audible information. Where assistive listening devices are installed, place signs complying with 703.7.2.4 to identify those facilities which are so equipped. Other voice communication methods include, but are not limited to, grilles, slats, talk-through baffles, intercoms, or telephone handset devices.

CHAPTER 10: RECREATION FACILITIES

1001 General

1001.1 Scope. The provisions of Chapter 10 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

> **Advisory 1001.1 Scope.** Unless otherwise modified or specifically addressed in Chapter 10, all other ADAAG provisions apply to the design and construction of recreation facilities and elements. The provisions in Section 1001.1 apply wherever these elements are provided. For example, office buildings may contain a room with exercise equipment to which these sections would apply.

1002 Amusement Rides

1002.1 General. *Amusement rides* shall comply with 1002.

1002.2 Accessible Routes. *Accessible* routes serving *amusement rides* shall comply with Chapter 4.
EXCEPTIONS: 1. In load or unload areas and on *amusement rides*, where compliance with 405.2 is not structurally or operationally feasible, *ramp* slope shall be permitted to be 1:8 maximum.
2. In load or unload areas and on *amusement rides*, handrails provided along walking surfaces complying with 403 and required on *ramps* complying with 405 shall not be required to comply with 505 where compliance is not structurally or operationally feasible.

> **Advisory 1002.2 Accessible Routes Exception 1.** Steeper slopes are permitted on accessible routes connecting the amusement ride in the load and unload position where it is "structurally or operationally infeasible." In most cases, this will be limited to areas where the accessible route leads directly to the amusement ride and where there are space limitations on the ride, not the queue line. Where possible, the least possible slope should be used on the accessible route that serves the amusement ride.

1002.3 Load and Unload Areas. A turning *space* complying with 304.2 and 304.3 shall be provided in load and unload areas.

1002.4 Wheelchair Spaces in Amusement Rides. *Wheelchair spaces* in *amusement rides* shall comply with 1002.4.

1002.4.1 Floor or Ground Surface. The floor or ground surface of *wheelchair spaces* shall be stable and firm.

1002.4.2 Slope. The floor or ground surface of *wheelchair spaces* shall have a slope not steeper than 1:48 when in the load and unload position.

1002.4.3 Gaps. Floors of *amusement rides* with *wheelchair spaces* and floors of load and unload areas shall be coordinated so that, when *amusement rides* are at rest in the load and unload

position, the vertical difference between the floors shall be within plus or minus 5/8 inches (16 mm) and the horizontal gap shall be 3 inches (75 mm) maximum under normal passenger load conditions.

EXCEPTION: Where compliance is not operationally or structurally feasible, *ramps*, bridge plates, or similar devices complying with the applicable requirements of 36 CFR 1192.83(c) shall be provided.

Advisory 1002.4.3 Gaps Exception. 36 CFR 1192.83(c) ADA Accessibility Guidelines for Transportation Vehicles - Light Rail Vehicles and Systems - Mobility Aid Accessibility is available at www.access-board.gov. It includes provisions for bridge plates and ramps that can be used at gaps between wheelchair spaces and floors of load and unload areas.

1002.4.4 Clearances. Clearances for *wheelchair spaces* shall comply with 1002.4.4.

EXCEPTIONS: 1. Where provided, securement devices shall be permitted to overlap required clearances.

2. *Wheelchair spaces* shall be permitted to be mechanically or manually repositioned.

3. *Wheelchair spaces* shall not be required to comply with 307.4.

Advisory 1002.4.4 Clearances Exception 3. This exception for protruding objects applies to the ride devices, not to circulation areas or accessible routes in the queue lines or the load and unload areas.

1002.4.4.1 Width and Length. *Wheelchair spaces* shall provide a clear width of 30 inches (760 mm) minimum and a clear length of 48 inches (1220 mm) minimum measured to 9 inches (230 mm) minimum above the floor surface.

1002.4.4.2 Side Entry. Where *wheelchair spaces* are entered only from the side, *amusement rides* shall be designed to permit sufficient maneuvering clearance for individuals using a wheelchair or mobility aid to enter and exit the ride.

Advisory 1002.4.4.2 Side Entry. The amount of clear space needed within the ride, and the size and position of the opening are interrelated. A 32 inch (815 mm) clear opening will not provide sufficient width when entered through a turn into an amusement ride. Additional space for maneuvering and a wider door will be needed where a side opening is centered on the ride. For example, where a 42 inch (1065 mm) opening is provided, a minimum clear space of 60 inches (1525 mm) in length and 36 inches (915mm) in depth is needed to ensure adequate space for maneuvering.

1002.4.4.3 Permitted Protrusions in Wheelchair Spaces. Objects are permitted to protrude a distance of 6 inches (150 mm) maximum along the front of the *wheelchair space*, where located 9 inches (230 mm) minimum and 27 inches (685 mm) maximum above the floor or ground surface of the *wheelchair space*. Objects are permitted to protrude a distance of 25 inches (635 mm) maximum along the front of the *wheelchair space*, where located more than 27 inches (685 mm) above the floor or ground surface of the *wheelchair space*.

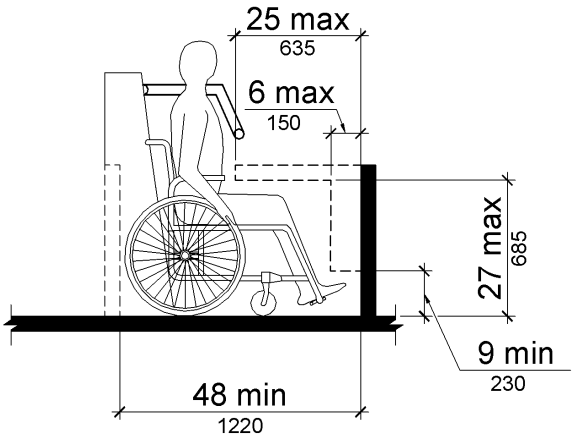


Figure 1002.4.4.3
Protrusions in Wheelchair Spaces in Amusement Rides

1002.4.5 Ride Entry. Openings providing entry to *wheelchair spaces* on *amusement rides* shall be 32 inches (815 mm) minimum clear.

1002.4.6 Approach. One side of the *wheelchair space* shall adjoin an *accessible* route when in the load and unload position.

1002.4.7 Companion Seats. Where the interior width of the *amusement ride* is greater than 53 inches (1345 mm), seating is provided for more than one rider, and the wheelchair is not required to be centered within the *amusement ride*, a companion seat shall be provided for each *wheelchair space*.

1002.4.7.1 Shoulder-to-Shoulder Seating. Where an *amusement ride* provides shoulder-to-shoulder seating, companion seats shall be shoulder-to-shoulder with the adjacent *wheelchair space*.

EXCEPTION: Where shoulder-to-shoulder companion seating is not operationally or structurally feasible, compliance with this requirement shall be required to the maximum extent practicable.

1002.5 Amusement Ride Seats Designed for Transfer. *Amusement ride seats* designed for transfer shall comply with 1002.5 when positioned for loading and unloading.

Advisory 1002.5 Amusement Ride Seats Designed for Transfer. The proximity of the clear floor or ground space next to an element and the height of the element one is transferring to are both critical for a safe and independent transfer. Providing additional clear floor or ground space both in front of and diagonal to the element will provide flexibility and will increase usability for a more diverse population of individuals with disabilities. Ride seats designed for transfer should involve only one transfer. Where possible, designers are encouraged to locate the ride seat no higher than 17 to 19 inches (430 to 485 mm) above the load and unload surface. Where greater distances are required for transfers, providing gripping surfaces, seat padding, and avoiding sharp objects in the path of transfer will facilitate the transfer.

1002.5.1 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided in the load and unload area adjacent to the *amusement ride seats* designed for transfer.

1002.5.2 Transfer Height. The height of *amusement ride seats* designed for transfer shall be 14 inches (355 mm) minimum and 24 inches (610 mm) maximum measured from the surface of the load and unload area.

1002.5.3 Transfer Entry. Where openings are provided for transfer to *amusement ride seats*, the openings shall provide clearance for transfer from a wheelchair or mobility aid to the *amusement ride seat*.

1002.5.4 Wheelchair Storage Space. Wheelchair storage *spaces* complying with 305 shall be provided in or adjacent to unload areas for each required *amusement ride seat* designed for transfer and shall not overlap any required means of egress or *accessible* route.

1002.6 Transfer Devices for Use with Amusement Rides. *Transfer devices* for use with *amusement rides* shall comply with 1002.6 when positioned for loading and unloading.

Advisory 1002.6 Transfer Devices for Use with Amusement Rides. Transfer devices for use with amusement rides should permit individuals to make independent transfers to and from their wheelchairs or mobility devices. There are a variety of transfer devices available that could be adapted to provide access onto an amusement ride. Examples of devices that may provide for transfers include, but are not limited to, transfer systems, lifts, mechanized seats, and custom designed systems. Operators and designers have flexibility in developing designs that will facilitate individuals to transfer onto amusement rides. These systems or devices should be designed to be reliable and sturdy.

Designs that limit the number of transfers required from a wheelchair or mobility device to the ride seat are encouraged. When using a transfer device to access an amusement ride, the least number of transfers and the shortest distance is most usable. Where possible, designers are encouraged to locate the transfer device seat no higher than 17 to 19 inches (430 to 485 mm) above the load and unload surface. Where greater distances are required for transfers, providing gripping surfaces, seat padding, and avoiding sharp objects in the path of transfer will facilitate the transfer. Where a series of transfers are required to reach the amusement ride seat, each vertical transfer should not exceed 8 inches (205 mm).

1002.6.1 Clear Floor or Ground Space. A clear floor or ground *space* complying with 305 shall be provided in the load and unload area adjacent to the *transfer device*.

1002.6.2 Transfer Height. The height of *transfer device* seats shall be 14 inches (355 mm) minimum and 24 inches (610 mm) maximum measured from the load and unload surface.

1002.6.3 Wheelchair Storage Space. Wheelchair storage *spaces* complying with 305 shall be provided in or adjacent to unload areas for each required *transfer device* and shall not overlap any required means of egress or *accessible* route.

1003 Recreational Boating Facilities

1003.1 General. Recreational boating *facilities* shall comply with 1003.

1003.2 Accessible Routes. *Accessible* routes serving recreational boating *facilities*, including *gangways* and floating piers, shall comply with Chapter 4 except as modified by the exceptions in 1003.2.

1003.2.1 Boat Slips. *Accessible* routes serving *boat slips* shall be permitted to use the exceptions in 1003.2.1.

EXCEPTIONS: 1. Where an existing *gangway* or series of *gangways* is replaced or *altered*, an increase in the length of the *gangway* shall not be required to comply with 1003.2 unless required by 202.4.

2. *Gangways* shall not be required to comply with the maximum rise specified in 405.6.

3. Where the total length of a *gangway* or series of *gangways* serving as part of a required *accessible* route is 80 feet (24 m) minimum, *gangways* shall not be required to comply with 405.2.

4. Where *facilities* contain fewer than 25 *boat slips* and the total length of the *gangway* or series of *gangways* serving as part of a required *accessible* route is 30 feet (9145 mm) minimum, *gangways* shall not be required to comply with 405.2.

5. Where *gangways* connect to *transition plates*, landings specified by 405.7 shall not be required.

6. Where *gangways* and *transition plates* connect and are required to have handrails, handrail extensions shall not be required. Where handrail extensions are provided on *gangways* or *transition plates*, the handrail extensions shall not be required to be parallel with the ground or floor surface.

7. The *cross slope* specified in 403.3 and 405.3 for *gangways*, *transition plates*, and floating piers that are part of *accessible* routes shall be measured in the static position.

8. Changes in level complying with 303.3 and 303.4 shall be permitted on the surfaces of *gangways* and *boat launch ramps*.

Advisory 1003.2.1 Boat Slips Exception 3. The following example shows how exception 3 would be applied: A gangway is provided to a floating pier which is required to be on an accessible route. The vertical distance is 10 feet (3050 mm) between the elevation where the gangway departs the landside connection and the elevation of the pier surface at the lowest water level. Exception 3 permits the gangway to be 80 feet (24 m) long. Another design solution would be to have two 40 foot (12 m) plus continuous gangways joined together at a float, where the float (as the water level falls) will stop dropping at an elevation five feet below the landside connection. The length of transition plates would not be included in determining if the gangway(s) meet the requirements of the exception.

1003.2.2 Boarding Piers at Boat Launch Ramps. *Accessible* routes serving *boarding piers* at *boat launch ramps* shall be permitted to use the exceptions in 1003.2.2.

EXCEPTIONS: 1. *Accessible* routes serving floating *boarding piers* shall be permitted to use Exceptions 1, 2, 5, 6, 7 and 8 in 1003.2.1.

2. Where the total length of the *gangway* or series of *gangways* serving as part of a required *accessible* route is 30 feet (9145 mm) minimum, *gangways* shall not be required to comply with 405.2.

3. Where the *accessible* route serving a floating *boarding pier* or skid pier is located within a *boat launch ramp*, the portion of the *accessible* route located within the *boat launch ramp* shall not be required to comply with 405.

1003.3 Clearances. Clearances at *boat slips* and on *boarding piers* at *boat launch ramps* shall comply with 1003.3.

Advisory 1003.3 Clearances. Although the minimum width of the clear pier space is 60 inches (1525 mm), it is recommended that piers be wider than 60 inches (1525 mm) to improve the safety for persons with disabilities, particularly on floating piers.

1003.3.1 Boat Slip Clearance. *Boat slips* shall provide clear pier *space* 60 inches (1525 mm) wide minimum and at least as long as the *boat slips*. Each 10 feet (3050 mm) maximum of linear pier edge serving *boat slips* shall contain at least one continuous clear opening 60 inches (1525 mm) wide minimum.

EXCEPTIONS: 1. Clear pier *space* shall be permitted to be 36 inches (915 mm) wide minimum for a length of 24 inches (610 mm) maximum, provided that multiple 36 inch (915 mm) wide segments are separated by segments that are 60 inches (1525 mm) wide minimum and 60 inches (1525 mm) long minimum.

2. Edge protection shall be permitted at the continuous clear openings, provided that it is 4 inches (100 mm) high maximum and 2 inches (51 mm) wide maximum.

3. In existing piers, clear pier *space* shall be permitted to be located perpendicular to the *boat slip* and shall extend the width of the *boat slip*, where the *facility* has at least one *boat slip* complying with 1003.3, and further compliance with 1003.3 would result in a reduction in the number of *boat slips* available or result in a reduction of the widths of existing slips.

Advisory 1003.3.1 Boat Slip Clearance Exception 3. Where the conditions in exception 3 are satisfied, existing facilities are only required to have one accessible boat slip with a pier clearance which runs the length of the slip. All other accessible slips are allowed to have the required pier clearance at the head of the slip. Under this exception, at piers with perpendicular boat slips, the width of most "finger piers" will remain unchanged. However, where mooring systems for floating piers are replaced as part of pier alteration projects, an opportunity may exist for increasing accessibility. Piers may be reconfigured to allow an increase in the number of wider finger piers, and serve as accessible boat slips.

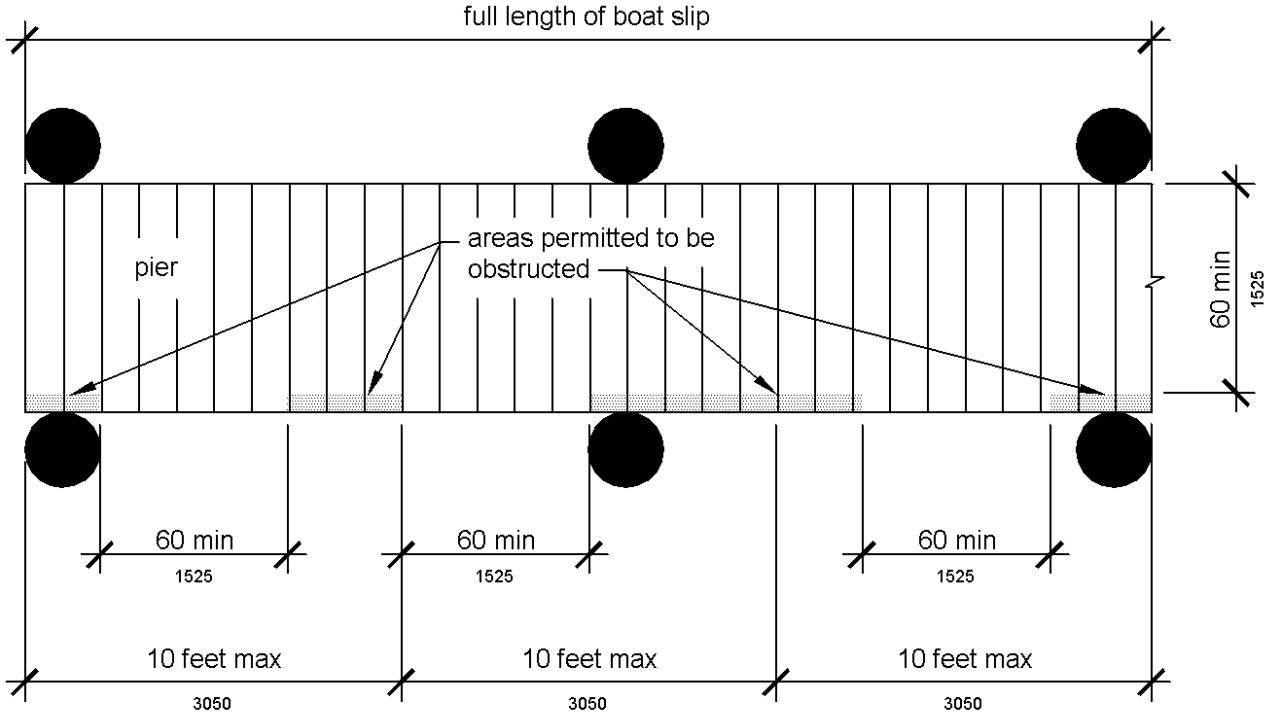


Figure 1003.3.1
Boat Slip Clearance

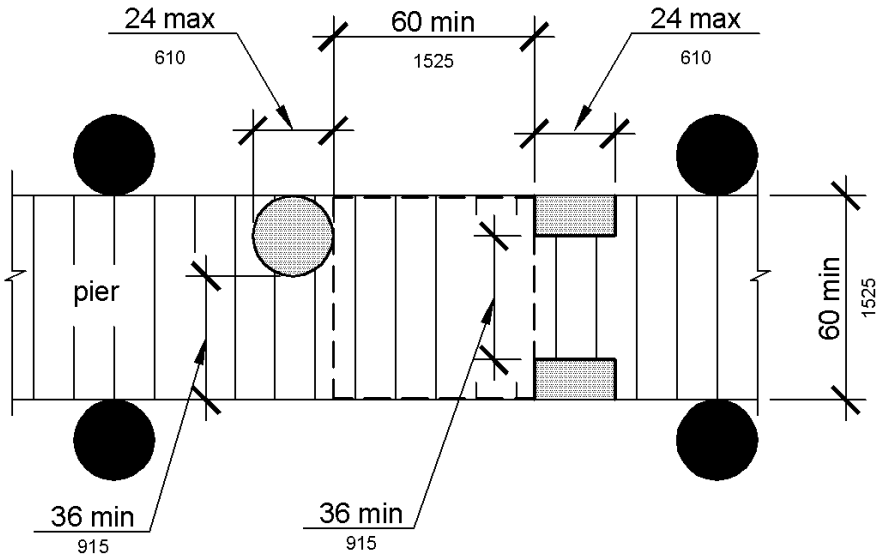


Figure 1003.3.1 (Exception 1)
Clear Pier Space Reduction at Boat Slips

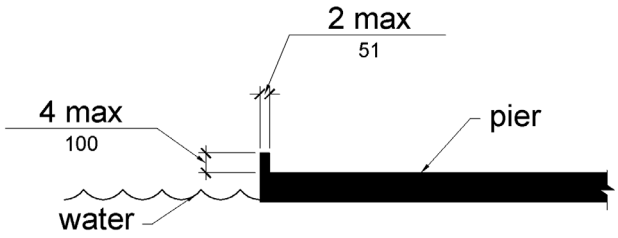


Figure 1003.3.1 (Exception 2)
Edge Protection at Boat Slips

1003.3.2 Boarding Pier Clearances. *Boarding piers* at *boat launch ramps* shall provide clear pier *space* 60 inches (1525 mm) wide minimum and shall extend the full length of the *boarding pier*. Every 10 feet (3050 mm) maximum of linear pier edge shall contain at least one continuous clear opening 60 inches (1525 mm) wide minimum.

EXCEPTIONS: 1. The clear pier *space* shall be permitted to be 36 inches (915 mm) wide minimum for a length of 24 inches (610 mm) maximum provided that multiple 36 inch (915 mm) wide segments are separated by segments that are 60 inches (1525 mm) wide minimum and 60 inches (1525 mm) long minimum.

2. Edge protection shall be permitted at the continuous clear openings provided that it is 4 inches (100 mm) high maximum and 2 inches (51 mm) wide maximum.

Advisory 1003.3.2 Boarding Pier Clearances. These requirements do not establish a minimum length for accessible boarding piers at boat launch ramps. The accessible boarding pier should have a length at least equal to that of other boarding piers provided at the facility. If no other boarding pier is provided, the pier would have a length equal to what would have been provided if no access requirements applied. The entire length of accessible boarding piers would be required to comply with the same technical provisions that apply to accessible boat slips. For example, at a launch ramp, if a 20 foot (6100 mm) long accessible boarding pier is provided, the entire 20 feet (6100 mm) must comply with the pier clearance requirements in 1003.3. Likewise, if a 60 foot (18 m) long accessible boarding pier is provided, the pier clearance requirements in 1003.3 would apply to the entire 60 feet (18 m).

The following example applies to a boat launch ramp boarding pier: A chain of floats is provided on a launch ramp to be used as a boarding pier which is required to be accessible by 1003.3.2. At high water, the entire chain is floating and a transition plate connects the first float to the surface of the launch ramp. As the water level decreases, segments of the chain end up resting on the launch ramp surface, matching the slope of the launch ramp.

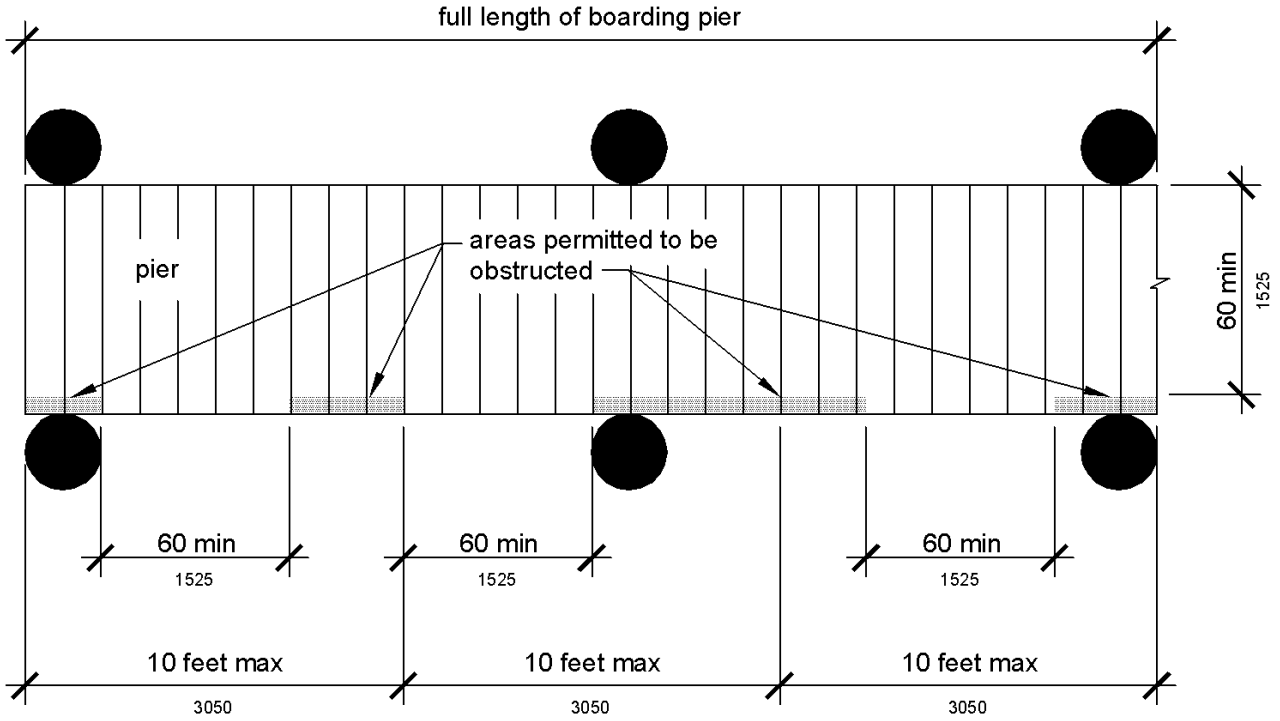


Figure 1003.3.2
Boarding Pier Clearance

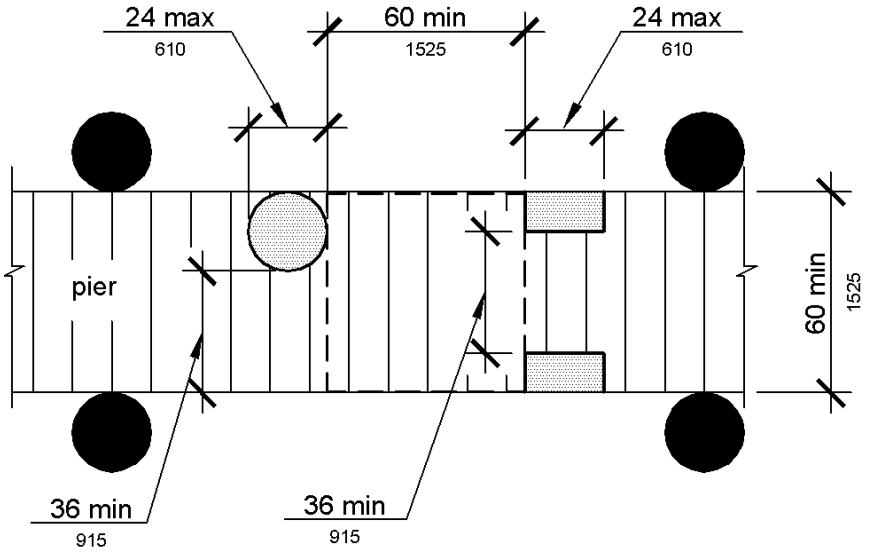


Figure 1003.3.2 (Exception 1)
Clear Pier Space Reduction at Boarding Piers

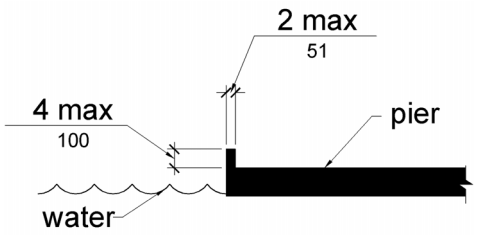


Figure 1003.3.2 (Exception 2)
Edge Protection at Boarding Piers

1004 Exercise Machines and Equipment

1004.1 Clear Floor Space. Exercise machines and equipment shall have a clear floor *space* complying with 305 positioned for transfer or for use by an individual seated in a wheelchair. Clear floor or ground *spaces* required at exercise machines and equipment shall be permitted to overlap.

Advisory 1004.1 Clear Floor Space. One clear floor or ground space is permitted to be shared between two pieces of exercise equipment. To optimize space use, designers should carefully consider layout options such as connecting ends of the row and center aisle spaces. The position of the clear floor space may vary greatly depending on the use of the equipment or machine. For example, to provide access to a shoulder press machine, clear floor space next to the seat would be appropriate to allow for transfer. Clear floor space for a bench press machine designed for use by an individual seated in a wheelchair, however, will most likely be centered on the operating mechanisms.

1005 Fishing Piers and Platforms

1005.1 Accessible Routes. *Accessible* routes serving fishing piers and platforms, including *gangways* and floating piers, shall comply with Chapter 4.

EXCEPTIONS: 1. *Accessible* routes serving floating fishing piers and platforms shall be permitted to use Exceptions 1, 2, 5, 6, 7 and 8 in 1003.2.1.

2. Where the total length of the *gangway* or series of *gangways* serving as part of a required *accessible* route is 30 feet (9145 mm) minimum, *gangways* shall not be required to comply with 405.2.

1005.2 Railings. Where provided, railings, guards, or handrails shall comply with 1005.2.

1005.2.1 Height. At least 25 percent of the railings, guards, or handrails shall be 34 inches (865 mm) maximum above the ground or deck surface.

EXCEPTION: Where a guard complying with sections 1003.2.12.1 and 1003.2.12.2 of the International Building Code (2000 edition) or sections 1012.2 and 1012.3 of the International Building Code (2003 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1) is provided, the guard shall not be required to comply with 1005.2.1.

1005.2.1.1 Dispersion. Railings, guards, or handrails required to comply with 1005.2.1 shall be dispersed throughout the fishing pier or platform.

Advisory 1005.2.1.1 Dispersion. Portions of the railings that are lowered to provide fishing opportunities for persons with disabilities must be located in a variety of locations on the fishing pier or platform to give people a variety of locations to fish. Different fishing locations may provide varying water depths, shade (at certain times of the day), vegetation, and proximity to the shoreline or bank.

1005.3 Edge Protection. Where railings, guards, or handrails complying with 1005.2 are provided, edge protection complying with 1005.3.1 or 1005.3.2 shall be provided.

Advisory 1005.3 Edge Protection. Edge protection is required only where railings, guards, or handrails are provided on a fishing pier or platform. Edge protection will prevent wheelchairs or other mobility devices from slipping off the fishing pier or platform. Extending the deck of the fishing pier or platform 12 inches (305 mm) where the 34 inch (865 mm) high railing is provided is an alternative design, permitting individuals using wheelchairs or other mobility devices to pull into a clear space and move beyond the face of the railing. In such a design, curbs or barriers are not required.

1005.3.1 Curb or Barrier. Curbs or barriers shall extend 2 inches (51 mm) minimum above the surface of the fishing pier or platform.

1005.3.2 Extended Ground or Deck Surface. The ground or deck surface shall extend 12 inches (305 mm) minimum beyond the inside face of the railing. Toe clearance shall be provided and shall

be 30 inches (760 mm) wide minimum and 9 inches (230 mm) minimum above the ground or deck surface beyond the railing.

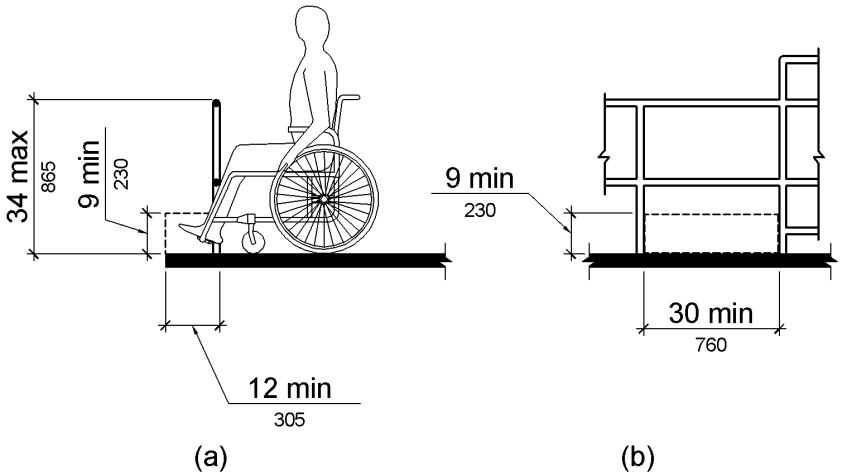


Figure 1005.3.2
Extended Ground or Deck Surface at Fishing Piers and Platforms

1005.4 Clear Floor or Ground Space. At each location where there are railings, guards, or handrails complying with 1005.2.1, a clear floor or ground *space* complying with 305 shall be provided. Where there are no railings, guards, or handrails, at least one clear floor or ground *space* complying with 305 shall be provided on the fishing pier or platform.

1005.5 Turning Space. At least one turning *space* complying with 304.3 shall be provided on fishing piers and platforms.

1006 Golf Facilities

1006.1 General. Golf *facilities* shall comply with 1006.

1006.2 Accessible Routes. *Accessible* routes serving *teeing grounds*, practice *teeing grounds*, putting greens, practice putting greens, teeing stations at driving ranges, course weather shelters, golf car rental areas, bag drop areas, and course toilet rooms shall comply with Chapter 4 and shall be 48 inches (1220 mm) wide minimum. Where handrails are provided, *accessible* routes shall be 60 inches (1525 mm) wide minimum.

EXCEPTION: Handrails shall not be required on golf courses. Where handrails are provided on golf courses, the handrails shall not be required to comply with 505.

Advisory 1006.2 Accessible Routes. The 48 inch (1220 mm) minimum width for the accessible route is necessary to ensure passage of a golf car on either the accessible route or the golf car passage. This is important where the accessible route is used to connect the golf car rental area, bag drop areas, practice putting greens, practice teeing grounds, course toilet rooms, and course weather shelters. These are areas outside the boundary of the golf course, but are areas where an individual using an adapted golf car may travel. A golf car passage may not be substituted for other accessible routes to be located outside the boundary of the course. For example, an accessible route connecting an accessible parking space to the entrance of a golf course clubhouse is not covered by this provision.

Providing a golf car passage will permit a person that uses a golf car to practice driving a golf ball from the same position and stance used when playing the game. Additionally, the space required for a person using a golf car to enter and maneuver within the teeing stations required to be accessible should be considered.

1006.3 Golf Car Passages. *Golf car passages* shall comply with 1006.3.

1006.3.1 Clear Width. The clear width of *golf car passages* shall be 48 inches (1220 mm) minimum.

1006.3.2 Barriers. Where curbs or other constructed barriers prevent golf cars from entering a fairway, openings 60 inches (1525 mm) wide minimum shall be provided at intervals not to exceed 75 yards (69 m).

1006.4 Weather Shelters. A clear floor or ground *space* 60 inches (1525 mm) minimum by 96 inches (2440 mm) minimum shall be provided within weather shelters.

1007 Miniature Golf Facilities

1007.1 General. Miniature golf *facilities* shall comply with 1007.

1007.2 Accessible Routes. *Accessible* routes serving holes on miniature golf courses shall comply with Chapter 4. *Accessible* routes located on playing surfaces of miniature golf holes shall be permitted to use the exceptions in 1007.2.

EXCEPTIONS: 1. Playing surfaces shall not be required to comply with 302.2.

2. Where *accessible* routes intersect playing surfaces of holes, a 1 inch (25 mm) maximum curb shall be permitted for a width of 32 inches (815 mm) minimum.

3. A slope not steeper than 1:4 for a 4 inch (100 mm) maximum rise shall be permitted.

4. *Ramp* landing slopes specified by 405.7.1 shall be permitted to be 1:20 maximum.

5. *Ramp* landing length specified by 405.7.3 shall be permitted to be 48 inches (1220 mm) long minimum.

6. *Ramp* landing size specified by 405.7.4 shall be permitted to be 48 inches (1220 mm) minimum by 60 inches (1525 mm) minimum.

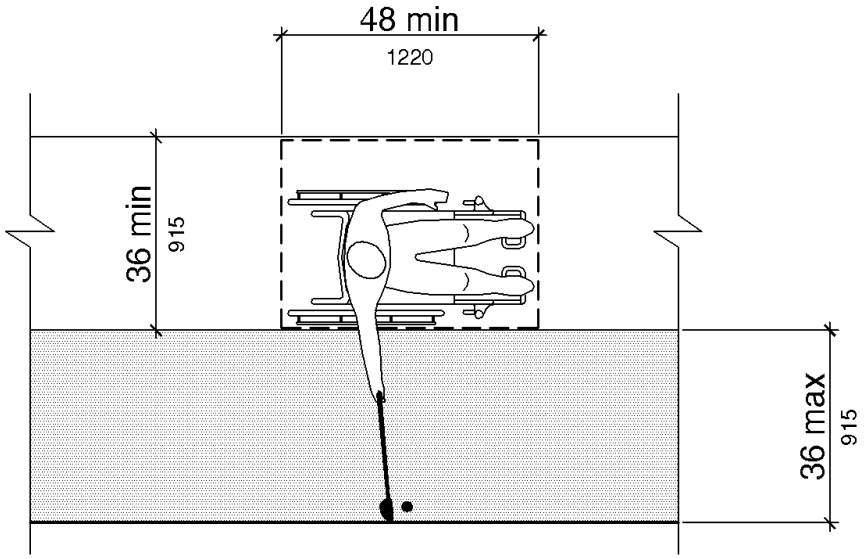
7. Handrails shall not be required on holes. Where handrails are provided on holes, the handrails shall not be required to comply with 505.

1007.3 Miniature Golf Holes. Miniature golf holes shall comply with 1007.3.

1007.3.1 Start of Play. A clear floor or ground *space* 48 inches (1220 mm) minimum by 60 inches (1525 mm) minimum with slopes not steeper than 1:48 shall be provided at the start of play.

1007.3.2 Golf Club Reach Range Area. All areas within holes where golf balls rest shall be within 36 inches (915 mm) maximum of a clear floor or ground *space* 36 inches (915 mm) wide minimum and 48 inches (1220 mm) long minimum having a *running slope* not steeper than 1:20. The clear floor or ground *space* shall be served by an *accessible* route.

Advisory 1007.3.2 Golf Club Reach Range Area. The golf club reach range applies to all holes required to be accessible. This includes accessible routes provided adjacent to or, where provided, on the playing surface of the hole.



Note: Running Slope of Clear Floor or Ground Space Not Steeper Than 1:20

Figure 1007.3.2
Golf Club Reach Range Area

1008 Play Areas

1008.1 General. *Play areas* shall comply with 1008.

1008.2 Accessible Routes. *Accessible* routes serving *play areas* shall comply with Chapter 4 and 1008.2 and shall be permitted to use the exceptions in 1008.2.1 through 1008.2.3. Where *accessible* routes serve *ground level play components*, the vertical clearance shall be 80 inches high (2030 mm) minimum.

1008.2.1 Ground Level and Elevated Play Components. *Accessible* routes serving *ground level play components* and *elevated play components* shall be permitted to use the exceptions in 1008.2.1.

EXCEPTIONS: 1. Transfer systems complying with 1008.3 shall be permitted to connect *elevated play components* except where 20 or more *elevated play components* are provided no more than 25 percent of the *elevated play components* shall be permitted to be connected by transfer systems.

2. Where transfer systems are provided, an *elevated play component* shall be permitted to connect to another *elevated play component* as part of an *accessible* route.

1008.2.2 Soft Contained Play Structures. *Accessible* routes serving *soft contained play structures* shall be permitted to use the exception in 1008.2.2.

EXCEPTION: Transfer systems complying with 1008.3 shall be permitted to be used as part of an *accessible* route.

1008.2.3 Water Play Components. *Accessible* routes serving water *play components* shall be permitted to use the exceptions in 1008.2.3.

EXCEPTIONS: 1. Where the surface of the *accessible* route, clear floor or ground *spaces*, or turning *spaces* serving water *play components* is submerged, compliance with 302, 403.3, 405.2, 405.3, and 1008.2.6 shall not be required.

2. Transfer systems complying with 1008.3 shall be permitted to connect *elevated play components* in water.

Advisory 1008.2.3 Water Play Components. Personal wheelchairs and mobility devices may not be appropriate for submerging in water when using play components in water. Some may have batteries, motors, and electrical systems that when submerged in water may cause damage to the personal mobility device or wheelchair or may contaminate the water. Providing an aquatic wheelchair made of non-corrosive materials and designed for access into the water will protect the water from contamination and avoid damage to personal wheelchairs.

1008.2.4 Clear Width. *Accessible* routes connecting *play components* shall provide a clear width complying with 1008.2.4.

1008.2.4.1 Ground Level. At ground level, the clear width of *accessible* routes shall be 60 inches (1525 mm) minimum.

EXCEPTIONS: 1. In *play areas* less than 1000 square feet (93 m^2), the clear width of *accessible* routes shall be permitted to be 44 inches (1120 mm) minimum, if at least one turning *space* complying with 304.3 is provided where the restricted *accessible* route exceeds 30 feet (9145 mm) in length.

2. The clear width of *accessible* routes shall be permitted to be 36 inches (915 mm) minimum for a distance of 60 inches (1525 mm) maximum provided that multiple reduced width segments are separated by segments that are 60 inches (1525 mm) wide minimum and 60 inches (1525 mm) long minimum.

1008.2.4.2 Elevated. The clear width of *accessible* routes connecting *elevated play components* shall be 36 inches (915 mm) minimum.

EXCEPTIONS: 1. The clear width of *accessible* routes connecting *elevated play components* shall be permitted to be reduced to 32 inches (815 mm) minimum for a distance of 24 inches (610 mm) maximum provided that reduced width segments are separated by segments that are 48 inches (1220 mm) long minimum and 36 inches (915 mm) wide minimum.
2. The clear width of transfer systems connecting *elevated play components* shall be permitted to be 24 inches (610 mm) minimum.

1008.2.5 Ramps. Within *play areas*, *ramps* connecting *ground level play components* and *ramps* connecting *elevated play components* shall comply with 1008.2.5.

1008.2.5.1 Ground Level. *Ramp* runs connecting *ground level play components* shall have a *running slope* not steeper than 1:16.

1008.2.5.2 Elevated. The rise for any *ramp* run connecting *elevated play components* shall be 12 inches (305 mm) maximum.

1008.2.5.3 Handrails. Where required on *ramps* serving *play components*, the handrails shall comply with 505 except as modified by 1008.2.5.3.
EXCEPTIONS: 1. Handrails shall not be required on *ramps* located within ground level *use zones*.
2. Handrail extensions shall not be required.

1008.2.5.3.1 Handrail Gripping Surfaces. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 0.95 inch (24 mm) minimum and 1.55 inches (39 mm) maximum. Where the shape of the gripping surface is non-circular, the handrail shall provide an equivalent gripping surface.

1008.2.5.3.2 Handrail Height. The top of handrail gripping surfaces shall be 20 inches (510 mm) minimum and 28 inches (710 mm) maximum above the *ramp* surface.

1008.2.6 Ground Surfaces. Ground surfaces on *accessible* routes, clear floor or ground *spaces*, and turning *spaces* shall comply with 1008.2.6.

Advisory 1008.2.6 Ground Surfaces. Ground surfaces must be inspected and maintained regularly to ensure continued compliance with the ASTM F 1951 standard. The type of surface material selected and play area use levels will determine the frequency of inspection and maintenance activities.

1008.2.6.1 Accessibility. Ground surfaces shall comply with ASTM F 1951 (incorporated by reference, see “Referenced Standards” in Chapter 1). Ground surfaces shall be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F 1951.

1008.2.6.2 Use Zones. Ground surfaces located within *use zones* shall comply with ASTM F 1292 (1999 edition or 2004 edition) (incorporated by reference, see “Referenced Standards” in Chapter 1).

1008.3 Transfer Systems. Where transfer systems are provided to connect to *elevated play components*, transfer systems shall comply with 1008.3.

Advisory 1008.3 Transfer Systems. Where transfer systems are provided, consideration should be given to the distance between the transfer system and the elevated play components. Moving between a transfer platform and a series of transfer steps requires extensive exertion for some children. Designers should minimize the distance between the points where a child transfers from a wheelchair or mobility device and where the elevated play components are located. Where elevated play components are used to connect to another elevated play component instead of an accessible route, careful consideration should be used in the selection of the play components used for this purpose.

1008.3.1 Transfer Platforms. Transfer platforms shall be provided where transfer is intended from wheelchairs or other mobility aids. Transfer platforms shall comply with 1008.3.1.

1008.3.1.1 Size. Transfer platforms shall have level surfaces 14 inches (355 mm) deep minimum and 24 inches (610 mm) wide minimum.

1008.3.1.2 Height. The height of transfer platforms shall be 11 inches (280 mm) minimum and 18 inches (455 mm) maximum measured to the top of the surface from the ground or floor surface.

1008.3.1.3 Transfer Space. A transfer *space* complying with 305.2 and 305.3 shall be provided adjacent to the transfer platform. The 48 inch (1220 mm) long minimum dimension of the transfer *space* shall be centered on and parallel to the 24 inch (610 mm) long minimum side of the transfer platform. The side of the transfer platform serving the transfer *space* shall be unobstructed.

1008.3.1.4 Transfer Supports. At least one means of support for transferring shall be provided.

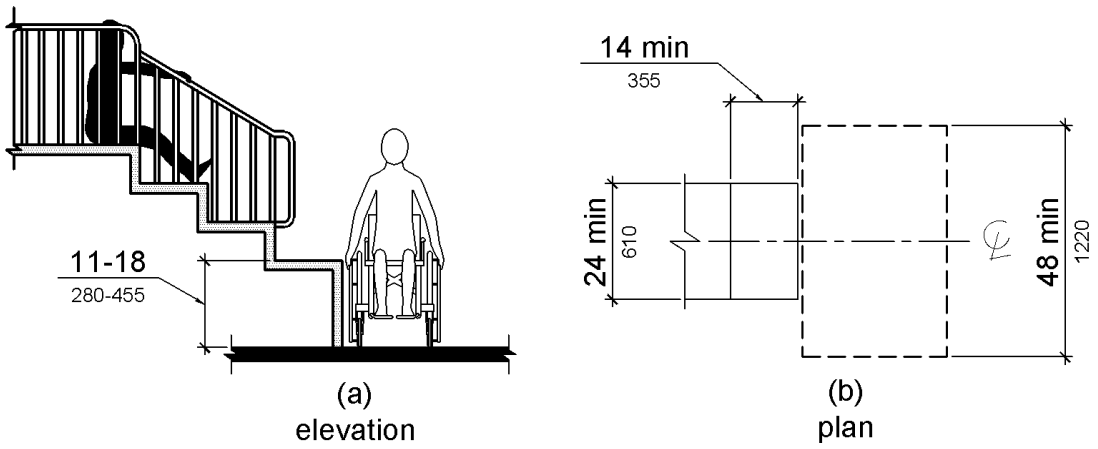


Figure 1008.3.1
Transfer Platforms

1008.3.2 Transfer Steps. Transfer steps shall be provided where movement is intended from transfer platforms to levels with *elevated play components* required to be on *accessible* routes. Transfer steps shall comply with 1008.3.2.

1008.3.2.1 Size. Transfer steps shall have level surfaces 14 inches (355 mm) deep minimum and 24 inches (610 mm) wide minimum.

1008.3.2.2 Height. Each transfer step shall be 8 inches (205 mm) high maximum.

1008.3.2.3 Transfer Supports. At least one means of support for transferring shall be provided.

Advisory 1008.3.2.3 Transfer Supports. Transfer supports are required on transfer platforms and transfer steps to assist children when transferring. Some examples of supports include a rope loop, a loop type handle, a slot in the edge of a flat horizontal or vertical member, poles or bars, or D rings on the corner posts.

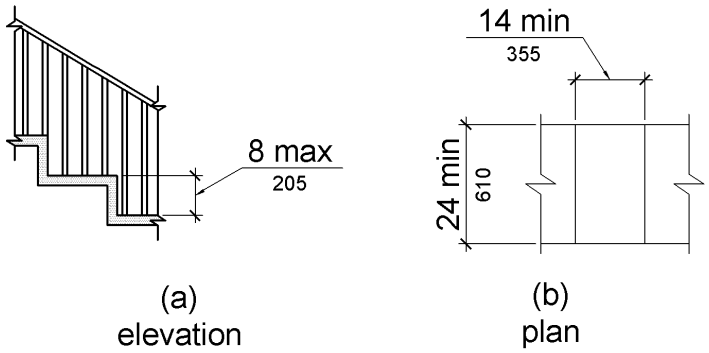


Figure 1008.3.2
Transfer Steps

1008.4 Play Components. *Ground level play components* on *accessible* routes and *elevated play components* connected by *ramps* shall comply with 1008.4.

1008.4.1 Turning Space. At least one turning *space* complying with 304 shall be provided on the same level as *play components*. Where swings are provided, the turning *space* shall be located immediately adjacent to the swing.

1008.4.2 Clear Floor or Ground Space. Clear floor or ground *space* complying with 305.2 and 305.3 shall be provided at *play components*.

Advisory 1008.4.2 Clear Floor or Ground Space. Clear floor or ground spaces, turning spaces, and accessible routes are permitted to overlap within play areas. A specific location has not been designated for the clear floor or ground spaces or turning spaces, except swings, because each play component may require that the spaces be placed in a unique location. Where play components include a seat or entry point, designs that provide for an unobstructed transfer from a wheelchair or other mobility device are recommended. This will enhance the ability of children with disabilities to independently use the play component.

When designing play components with manipulative or interactive features, consider appropriate reach ranges for children seated in wheelchairs. The following table provides guidance on reach ranges for children seated in wheelchairs. These dimensions apply to either forward or side reaches. The reach ranges are appropriate for use with those play components that children seated in wheelchairs may access and reach. Where transfer systems provide access to elevated play components, the reach ranges are not appropriate.

Children's Reach Ranges

Forward or Side Reach	Ages 3 and 4	Ages 5 through 8	Ages 9 through 12
High (maximum)	36 in (915 mm)	40 in (1015 mm)	44 in (1120 mm)
Low (minimum)	20 in (510 mm)	18 in (455 mm)	16 in (405 mm)

1008.4.3 Play Tables. Where play tables are provided, knee clearance 24 inches (610 mm) high minimum, 17 inches deep (430 mm) minimum, and 30 inches (760 mm) wide minimum shall be provided. The tops of rims, curbs, or other obstructions shall be 31 inches (785 mm) high maximum.

EXCEPTION: Play tables designed and constructed primarily for children 5 years and younger shall not be required to provide knee clearance where the clear floor or ground *space* required by 1008.4.2 is arranged for a parallel approach.

1008.4.4 Entry Points and Seats. Where *play components* require transfer to entry points or seats, the entry points or seats shall be 11 inches (280 mm) minimum and 24 inches (610 mm) maximum from the clear floor or ground *space*.

EXCEPTION: Entry points of slides shall not be required to comply with 1008.4.4.

1008.4.5 Transfer Supports. Where *play components* require transfer to entry points or seats, at least one means of support for transferring shall be provided.

1009 Swimming Pools, Wading Pools, and Spas

1009.1 General. Where provided, pool lifts, sloped entries, transfer walls, transfer systems, and pool stairs shall comply with 1009.

1009.2 Pool Lifts. Pool lifts shall comply with 1009.2.

Advisory 1009.2 Pool Lifts. There are a variety of seats available on pool lifts ranging from sling seats to those that are preformed or molded. Pool lift seats with backs will enable a larger population of persons with disabilities to use the lift. Pool lift seats that consist of materials that resist corrosion and provide a firm base to transfer will be usable by a wider range of people with disabilities. Additional options such as armrests, head rests, seat belts, and leg support will enhance accessibility and better accommodate people with a wide range of disabilities.

1009.2.1 Pool Lift Location. Pool lifts shall be located where the water level does not exceed 48 inches (1220 mm).

EXCEPTIONS: 1. Where the entire pool depth is greater than 48 inches (1220 mm), compliance with 1009.2.1 shall not be required.

2. Where multiple pool lift locations are provided, no more than one pool lift shall be required to be located in an area where the water level is 48 inches (1220 mm) maximum.

1009.2.2 Seat Location. In the raised position, the centerline of the seat shall be located over the deck and 16 inches (405 mm) minimum from the edge of the pool. The deck surface between the centerline of the seat and the pool edge shall have a slope not steeper than 1:48.

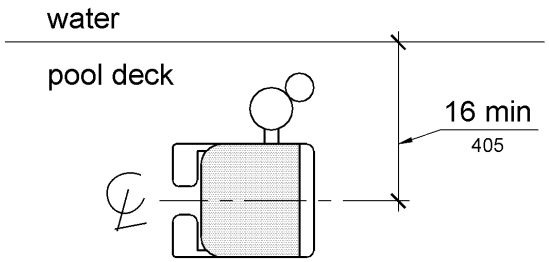


Figure 1009.2.2
Pool Lift Seat Location

1009.2.3 Clear Deck Space. On the side of the seat opposite the water, a clear deck *space* shall be provided parallel with the seat. The *space* shall be 36 inches (915 mm) wide minimum and shall extend forward 48 inches (1220 mm) minimum from a line located 12 inches (305 mm) behind the rear edge of the seat. The clear deck *space* shall have a slope not steeper than 1:48.

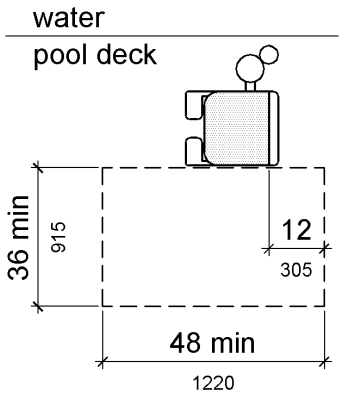


Figure 1009.2.3
Clear Deck Space at Pool Lifts

1009.2.4 Seat Height. The height of the lift seat shall be designed to allow a stop at 16 inches (405 mm) minimum to 19 inches (485 mm) maximum measured from the deck to the top of the seat surface when in the raised (load) position.

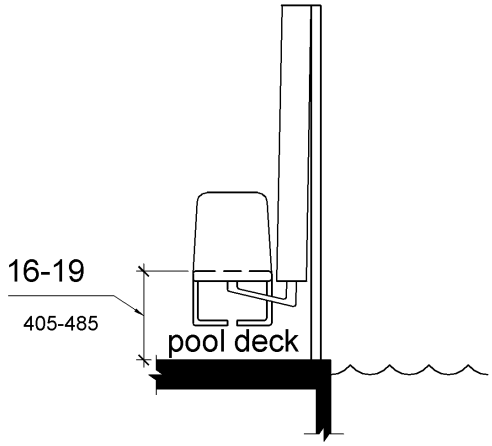


Figure 1009.2.4
Pool Lift Seat Height

1009.2.5 Seat Width. The seat shall be 16 inches (405 mm) wide minimum.

1009.2.6 Footrests and Armrests. Footrests shall be provided and shall move with the seat. If provided, the armrest positioned opposite the water shall be removable or shall fold clear of the seat when the seat is in the raised (load) position.

EXCEPTION: Footrests shall not be required on pool lifts provided in spas.

1009.2.7 Operation. The lift shall be capable of unassisted operation from both the deck and water levels. Controls and operating mechanisms shall be unobstructed when the lift is in use and shall comply with 309.4.

Advisory 1009.2.7 Operation. Pool lifts must be capable of unassisted operation from both the deck and water levels. This will permit a person to call the pool lift when the pool lift is in the opposite position. It is extremely important for a person who is swimming alone to be able to call the pool lift when it is in the up position so he or she will not be stranded in the water for extended periods of time awaiting assistance. The requirement for a pool lift to be independently operable does not preclude assistance from being provided.

1009.2.8 Submerged Depth. The lift shall be designed so that the seat will submerge to a water depth of 18 inches (455 mm) minimum below the stationary water level.

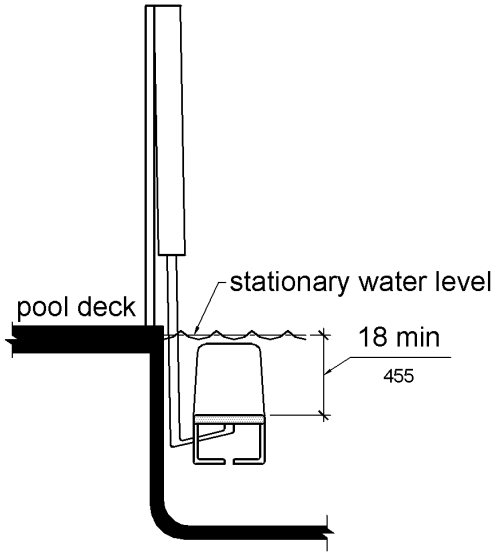


Figure 1009.2.8
Pool Lift Submerged Depth

1009.2.9 Lifting Capacity. Single person pool lifts shall have a weight capacity of 300 pounds. (136 kg) minimum and be capable of sustaining a static load of at least one and a half times the rated load.

Advisory 1009.2.9 Lifting Capacity. Single person pool lifts must be capable of supporting a minimum weight of 300 pounds (136 kg) and sustaining a static load of at least one and a half times the rated load. Pool lifts should be provided that meet the needs of the population they serve. Providing a pool lift with a weight capacity greater than 300 pounds (136 kg) may be advisable.

1009.3 Sloped Entries. Sloped entries shall comply with 1009.3.

Advisory 1009.3 Sloped Entries. Personal wheelchairs and mobility devices may not be appropriate for submerging in water. Some may have batteries, motors, and electrical systems that when submerged in water may cause damage to the personal mobility device or wheelchair or may contaminate the pool water. Providing an aquatic wheelchair made of non-corrosive materials and designed for access into the water will protect the water from contamination and avoid damage to personal wheelchairs or other mobility aids.

1009.3.1 Sloped Entries. Sloped entries shall comply with Chapter 4 except as modified in 1009.3.1 through 1009.3.3.

EXCEPTION: Where sloped entries are provided, the surfaces shall not be required to be slip resistant.

1009.3.2 Submerged Depth. Sloped entries shall extend to a depth of 24 inches (610 mm) minimum and 30 inches (760 mm) maximum below the stationary water level. Where landings are required by 405.7, at least one landing shall be located 24 inches (610 mm) minimum and 30 inches (760 mm) maximum below the stationary water level.

EXCEPTION: In wading pools, the sloped entry and landings, if provided, shall extend to the deepest part of the wading pool.

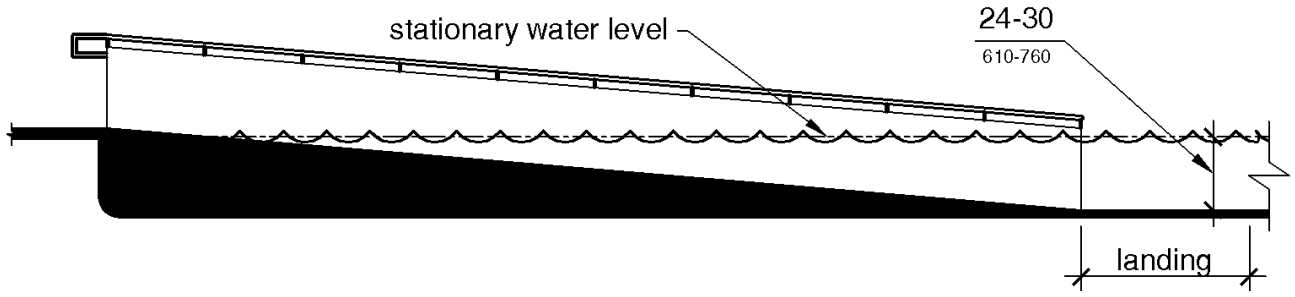


Figure 1009.3.2
Sloped Entry Submerged Depth

1009.3.3 Handrails. At least two handrails complying with 505 shall be provided on the sloped entry. The clear width between required handrails shall be 33 inches (840 mm) minimum and 38 inches (965 mm) maximum.

EXCEPTIONS: 1. Handrail extensions specified by 505.10.1 shall not be required at the bottom landing serving a sloped entry.

2. Where a sloped entry is provided for wave action pools, leisure rivers, sand bottom pools, and other pools where user access is limited to one area, the handrails shall not be required to comply with the clear width requirements of 1009.3.3.

3. Sloped entries in wading pools shall not be required to provide handrails complying with 1009.3.3. If provided, handrails on sloped entries in wading pools shall not be required to comply with 505.

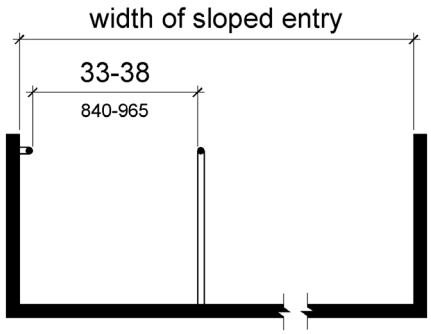


Figure 1009.3.3
Handrails for Sloped Entry

1009.4 Transfer Walls. Transfer walls shall comply with 1009.4.

1009.4.1 Clear Deck Space. A clear deck *space* of 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum with a slope not steeper than 1:48 shall be provided at the base of the transfer wall. Where one grab bar is provided, the clear deck *space* shall be centered on the grab bar. Where two grab bars are provided, the clear deck *space* shall be centered on the clearance between the grab bars.

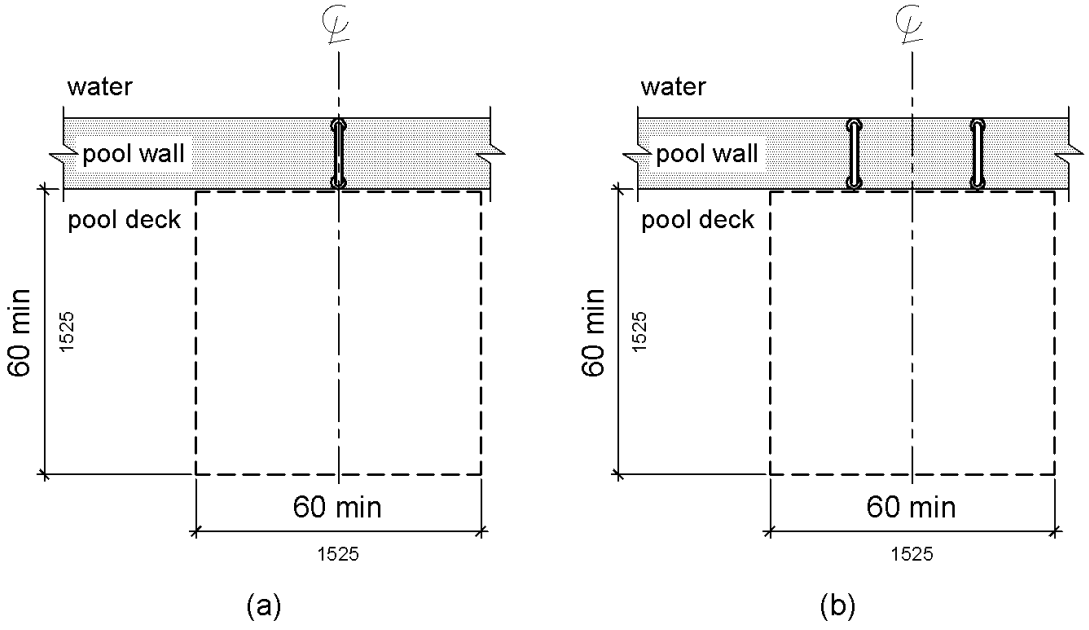


Figure 1009.4.1
Clear Deck Space at Transfer Walls

1009.4.2 Height. The height of the transfer wall shall be 16 inches (405 mm) minimum and 19 inches (485 mm) maximum measured from the deck.

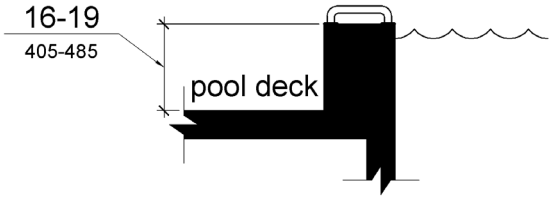


Figure 1009.4.2
Transfer Wall Height

1009.4.3 Wall Depth and Length. The depth of the transfer wall shall be 12 inches (305 mm) minimum and 16 inches (405 mm) maximum. The length of the transfer wall shall be 60 inches (1525 mm) minimum and shall be centered on the clear deck *space*.

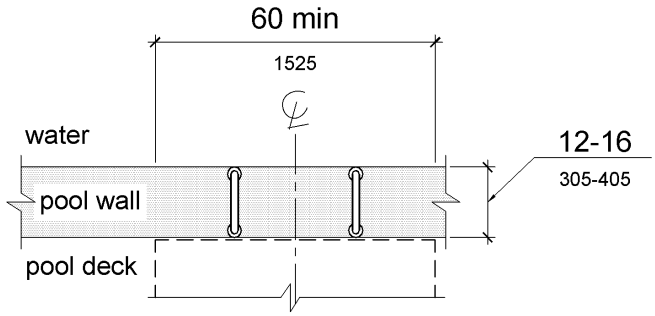


Figure 1009.4.3
Depth and Length of Transfer Walls

1009.4.4 Surface. Surfaces of transfer walls shall not be sharp and shall have rounded edges.

1009.4.5 Grab Bars. At least one grab bar complying with 609 shall be provided on the transfer wall. Grab bars shall be perpendicular to the pool wall and shall extend the full depth of the transfer wall. The top of the gripping surface shall be 4 inches (100 mm) minimum and 6 inches (150 mm) maximum above transfer walls. Where one grab bar is provided, clearance shall be 24 inches (610 mm) minimum on both sides of the grab bar. Where two grab bars are provided, clearance between grab bars shall be 24 inches (610 mm) minimum.

EXCEPTION: Grab bars on transfer walls shall not be required to comply with 609.4.

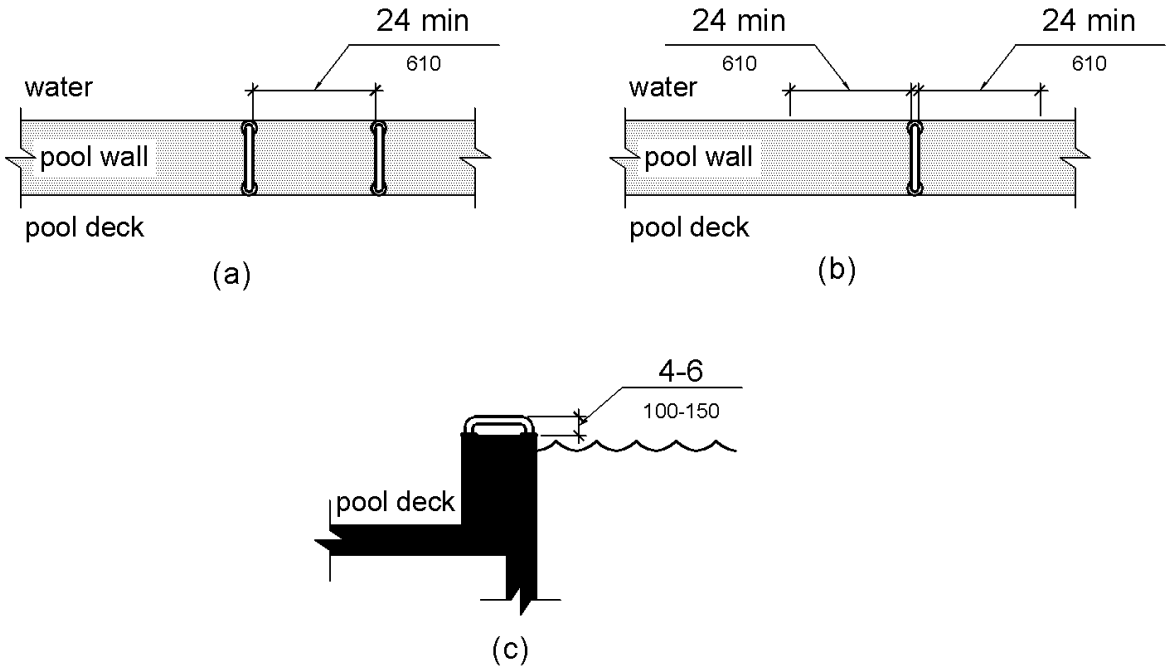


Figure 1009.4.5
Grab Bars for Transfer Walls

1009.5 Transfer Systems. Transfer systems shall comply with 1009.5.

1009.5.1 Transfer Platform. A transfer platform shall be provided at the head of each transfer system. Transfer platforms shall provide 19 inches (485 mm) minimum clear depth and 24 inches (610 mm) minimum clear width.

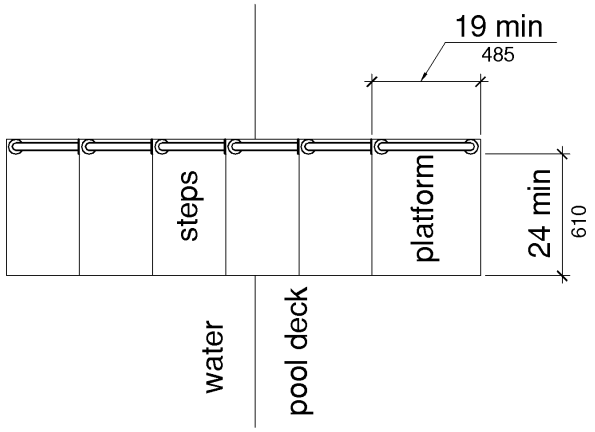


Figure 1009.5.1
Size of Transfer Platform

1009.5.2 Transfer Space. A transfer *space* of 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum with a slope not steeper than 1:48 shall be provided at the base of the transfer platform surface and shall be centered along a 24 inch (610 mm) minimum side of the transfer platform. The side of the transfer platform serving the transfer *space* shall be unobstructed.

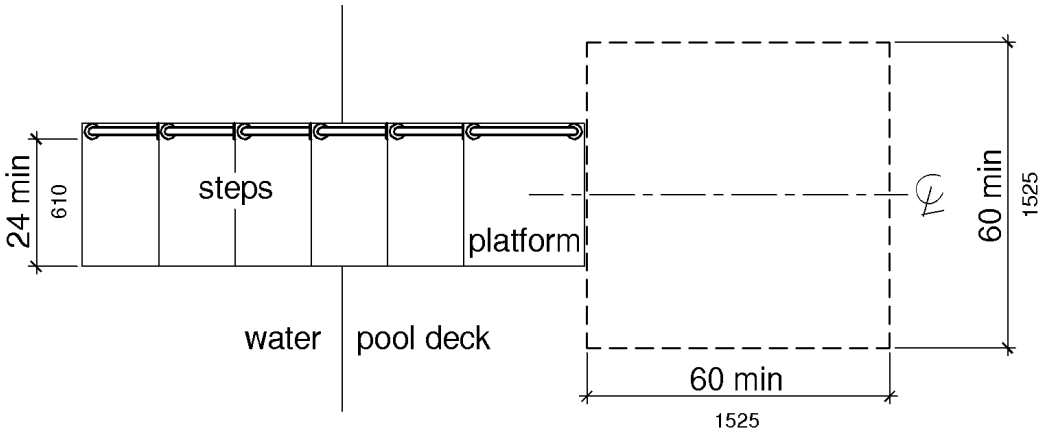


Figure 1009.5.2
Clear Deck Space at Transfer Platform

1009.5.3 Height. The height of the transfer platform shall comply with 1009.4.2.

1009.5.4 Transfer Steps. Transfer step height shall be 8 inches (205 mm) maximum. The surface of the bottom tread shall extend to a water depth of 18 inches (455 mm) minimum below the stationary water level.

Advisory 1009.5.4 Transfer Steps. Where possible, the height of the transfer step should be minimized to decrease the distance an individual is required to lift up or move down to reach the next step to gain access.

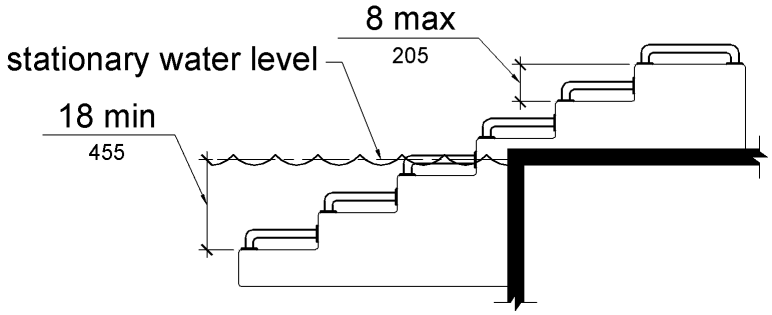


Figure 1009.5.4
Transfer Steps

1009.5.5 Surface. The surface of the transfer system shall not be sharp and shall have rounded edges.

1009.5.6 Size. Each transfer step shall have a tread clear depth of 14 inches (355 mm) minimum and 17 inches (430 mm) maximum and shall have a tread clear width of 24 inches (610 mm) minimum.

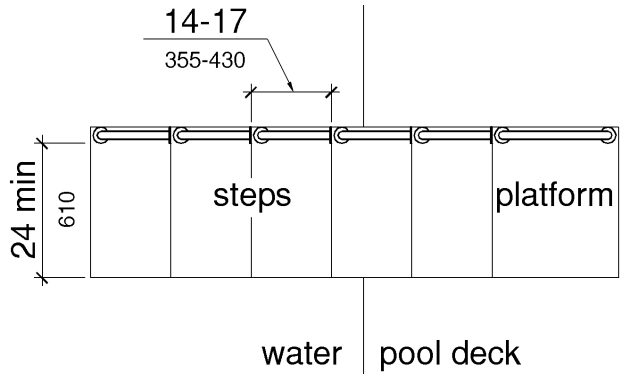


Figure 1009.5.6
Size of Transfer Steps

1009.5.7 Grab Bars. At least one grab bar on each transfer step and the transfer platform or a continuous grab bar serving each transfer step and the transfer platform shall be provided. Where a grab bar is provided on each step, the tops of gripping surfaces shall be 4 inches (100 mm) minimum and 6 inches (150 mm) maximum above each step and transfer platform. Where a continuous grab bar is provided, the top of the gripping surface shall be 4 inches (100 mm) minimum and 6 inches (150 mm) maximum above the step nosing and transfer platform. Grab bars shall comply with 609 and be located on at least one side of the transfer system. The grab bar located at the transfer platform shall not obstruct transfer.

EXCEPTION: Grab bars on transfer systems shall not be required to comply with 609.4.

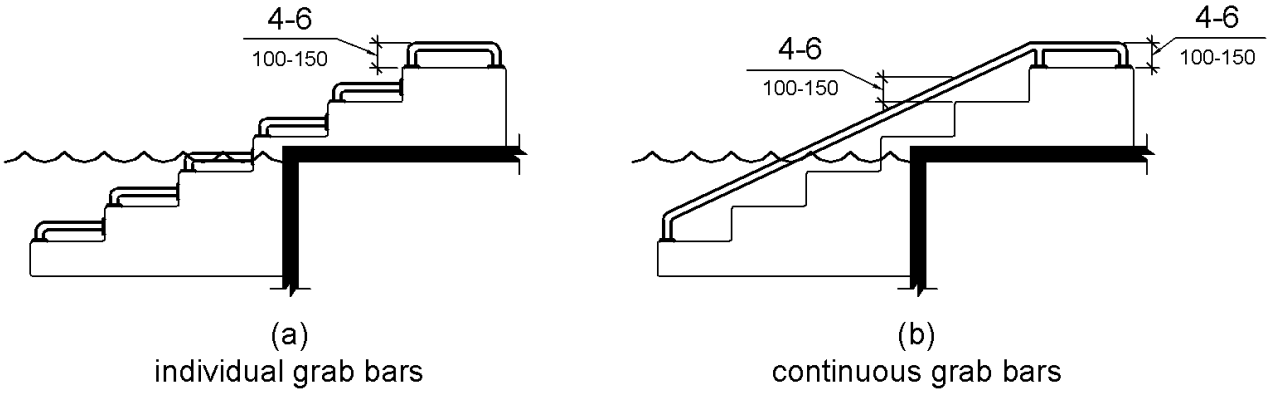


Figure 1009.5.7
Grab Bars

1009.6 Pool Stairs. Pool stairs shall comply with 1009.6.

1009.6.1 Pool Stairs. Pool stairs shall comply with 504.
EXCEPTION: Pool step riser heights shall not be required to be 4 inches (100 mm) high minimum and 7 inches (180 mm) high maximum provided that riser heights are uniform.

1009.6.2 Handrails. The width between handrails shall be 20 inches (510 mm) minimum and 24 inches (610 mm) maximum. Handrail extensions required by 505.10.3 shall not be required on pool stairs.

1010 Shooting Facilities with Firing Positions

1010.1 Turning Space. A circular turning *space* 60 inches (1525 mm) diameter minimum with slopes not steeper than 1:48 shall be provided at shooting facilities with firing positions.

SHAPING SUCCESS

DESIGNING THE FUTURE OF QUEENSBURY

TOWN OF QUEENSBURY
COMPREHENSIVE PLAN















Adopted
August 6, 2007

Landscape Architects, Architects,
Engineers and Planners, P.C.

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Town of Queensbury, New York
2007 Comprehensive Plan

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Introduction

On many levels, the Town of Queensbury is a success story. From the rural beauty of the Adirondacks to the quiet neighborhoods to the buzz of commercial and industrial activity – Queensbury is in demand as a place to live, work and play. The community is in a truly enviable position in upstate New York.

However, this success has exacted a price. Traffic congestion is an increasing problem and it has become difficult to walk in many parts of the town. Large parking lots have changed the natural environment. The sprawl of malls, shopping centers, and subdivisions has reshaped the community's traditional rural character.

To balance growth and character, in 2005 the Town of Queensbury decided to reexamine its vision for the future and map out a path to achieve that vision. The exercise took the form of updating the 1998 Comprehensive Land Use Plan. The operating principle behind this plan has come to be known as "Shaping Success." This concept recognizes the town's economic vitality and quality of life as well as recognizing that the form of these achievements needs improvement. The goal is to devise a plan that moves Queensbury closer to what the community desires: economic health, walkability, environmental protection and good quality of life issues.

The Comprehensive Planning Process

Similar to families planning to buy a house or take a vacation, or just as businesses plan for profit and growth, communities must plan as well. Community plans include factors such as population growth, economic growth, roads, community character, property values, tax base, schools, environmental protection, transit, recreation, pedestrian safety, sewage disposal, and water supply. These are some of the "ingredients" of a comprehensive plan.

Current State
> Understanding today
> Likes and assets
> Measuring concerns

Desired State
> What does the community want for its future?
> What is the vision?

Achieving the Vision
> Programs, policies & tools
> Implementation plan

The comprehensive planning process begins by understanding the present issues and conditions, gauging the likes and dislikes of the community, and measuring their concerns. Once these issues have been clearly identified, the plan looks ahead and asks what the community wants to see in the future. What is its vision for itself? Lastly, the Comprehensive Plan lays out the way to achieve this vision and creates an action plan for implementation. The plan to get from "here" to "there" may include devising new policies, incentives and / or regulatory revisions.

The Town of Queensbury began the comprehensive planning process early in 2005. The town hired Saratoga Associates to assist the Planning Ordinance Review Committee (PORC). The PORC, working with the town's community development department, was made up of current planning and zoning board members. The PORC held committee meetings throughout the comprehensive planning process. All committee meetings were open to the public and a portion of the agenda at each meeting was devoted to public comment.





Community members expressed their vision for the future of Queensbury during a series of public meetings and workshops

In addition to the PORC meetings, the committee reached out to the public on other occasions. The results of the public meetings described below can be found in Appendix D of this plan.

Issues Identification Workshop – This workshop introduced the community to the comprehensive planning process. In addition, participants worked together to define the town's strengths and identify issues that should be addressed in the plan. Over 35 people attended this workshop in October 2005.

Visioning Workshop - Participants were asked to take part in an image preference evaluation. Thirty-three images were shown illustrating various styles and types of commercial development, housing, streetscape and public spaces. Participants were given a scorecard and asked to rate each image on a scale of 1 to 7. A score of 1 indicated that the image was undesirable or inappropriate while a score of 7 indicated that the image was very desirable or appropriate for Queensbury. A facilitator initiated a discussion about the positive and negative design characteristics of each image with the participants. Later in the meeting, attendees were divided into groups to brainstorm ideas for the town and draw them on Queensbury maps. A facilitator worked with each group, and reported the group's ideas to the entire workshop audience at the end of the evening. Approximately 57 people attended this workshop in November 2005.



The Focus Groups allowed the public to concentrate on specific topics: housing & neighborhoods, protection of special places, economic development, and commercial development.

Focus Groups – Although similar to the visioning workshop, the four focus groups allowed the public to concentrate their concerns and desires. The focus group topics were "Protection of Special Places & Resources" and "Housing & Neighborhoods" held in December 2005, and "Commercial Development" and "Economic Development" in January 2006. After an introduction to the topic participants were divided into smaller groups to discuss the topics in detail and brainstorm ways to relate them to Queensbury. Facilitator's results of each group were reported back to the audience at the end of each meeting.

First Townwide Meeting – The purpose of this townwide meeting was to solicit public input about conceptual plan recommendations. Potential recommendations were presented by topic area. After the presentation of one or two topic areas, the facilitator paused and solicited feedback from the public. An audience count found 77 people in attendance.

Second Townwide Meeting – The purpose of this meeting was to review the important and potentially controversial pieces of the draft plan and allow the public to comment. Public turnout was only about 20 residents and landowners. However, the small size of the group allowed the members of the Planning and Ordinance Review Committee to constructively engage the community. Questions were answered and a series of issues resulted that the Committee dealt with at its regularly scheduled meeting later in the month.

The information obtained from the public meetings and workshops was invaluable during the planning process. In addition, the written comments and email messages received from stakeholders became part of the discussion while crafting the plan recommendations.

Vision and goals

Vision without action is a daydream. Action without vision is a nightmare.
Japanese Proverb

There are two extremes to poor planning. Some communities dream about what they could be, but never muster the resources or political will to move toward that dream. Others try to act – without a vision – and find themselves dissatisfied with the result.

The Queensbury community, in devising its plan began with a vision for the future – a guiding statement from which goals and recommendations flow and against which all actions must be tested.

Queensbury's Comprehensive Vision

> The Town of Queensbury is a beautiful community in the foothills of the Adirondack Mountains, with panoramic mountain views, a thriving business base and independent citizens who live in harmony with nature, value open space, and welcome visitors who come to recreate.
>
> A good place to live, the Town of Queensbury offers an excellent quality of life for families, that features public safety, clean water, pure air, a variety of housing options, excellent schools, a growing library, state-of-the-art health care facilities, community-minded businesses of all sizes from all sectors, parks, bike paths and an impressive array of museums, arts organizations and historic preservation initiatives.
>
> As a community, we strive to protect and encourage neighborhoods that promote relationships, healthy lifestyles and community involvement. We endeavor to balance the needs of our growing community with local and regional economic development initiatives, which can support our town-wide goals.

Queensbury's Comprehensive Plan Goals

From the vision statement flows a number of goals that the community sets for itself as a way to achieve that vision. They are listed below in no particular priority.

Protect important natural areas and viewsheds in the town, especially unique landforms, ridges, and slopes. Promote the protection of natural resources such as the water, air, Critical Environmental Areas and wetlands.

Increasing development in Queensbury does not have to equal a loss of open space, views, or community character. Cutting-edge planning techniques allow communities to experience economic development without losing the features that make them distinctive. In fact, protecting and enhancing natural resources and viewsheds is economically beneficial as well as environmentally sound. The open spaces and scenic vistas that make Queensbury unique can be preserved and used as an asset to continue to attract residents and businesses and preserve the quality of life of existing residents.

Design standards can help rebuild community character and create pedestrian friendly places.





(Top) Developers retrofitted a strip mall in Mashpee, Mass. to create a new town center. (Bottom) In Lee, Mass. developers created a new pedestrian-friendly outlet mall that fit the traditional character of the Berkshires.

Develop an economic program that reflects the community's land use goals while keeping up its tax base and job opportunities.

Queensbury has all the ingredients for continued economic success. The town's success so far means that it can focus its efforts to attract businesses that contribute to the community's vision for its future. A municipal or regional economic program should not allow every project into town, but only quality projects that invest in Queensbury over the long-term and reflect the goals of the Comprehensive Plan.

Maintain safe and stable neighborhoods for all residents.

People want to live in neighborhoods – and residents are Queensbury's most important assets. By definition, neighborhoods are districts or areas with a distinctive characteristic and a place where there is friendliness between its residents. Maintaining safe and stable neighborhoods includes factors such as increased walkability, affordability, and access to local services.

Create design standards for architecture and site layout that move the town towards realizing its vision.

The look, feel and functioning of a community directly impacts its long-term viability. Quality businesses and skilled workers want to be in distinctive

places. Architectural design and site layout standards are one of the most effective tools that municipalities have to ensure they remain interesting places to live, work, and play. Queensbury, a highly desirable community, will have little problem finding quality developers willing to invest in maintaining a distinctive character. They recognize that such a strategy only protects their investment.

Promote pedestrian and bicycle friendly residential and commercial design for new and redevelopment projects. Rebalance design, in general, to concentrate on people and walking rather than cars and parking lots.

Pedestrian-oriented design strengthens the fabric of communities and maintains a quality of life that is attractive to residents and visitors alike. Non-walkable communities are increasingly becoming a health issue in this country as our citizens gets heavier and heavier. Constructing areas that focus on walking and biking, rather than purely on driving, relieves traffic congestion and makes a community safer. This, in turn, helps the municipality to attract residents, visitors, jobs and development. The existing north-south bike path is a first step towards achieving this goal and a great foundation for building more connections throughout the town.

Expand the network of bicycle and pedestrian trails. Increase public access to other recreational areas.

Natural amenities such as open space and waterfronts are in high demand for residential development. However there is not enough waterfront or nature preserve to border everyone's property. Linking people to natural amenities, including the Rush Pond area, Glen Lake, Sunnyside Lake, Lake George and the Hudson River, will help to attract new businesses and residents as well as boost some areas of tourism. This network will help increase the pedestrian connectivity between existing neighborhoods, which residents describe as very important.

Require more connections within and between residential neighborhoods and commercial corridors.

The suburban pattern of dead-end streets and isolated residential subdivisions feed all traffic onto major roads causing congestion. Opening up connections in different places offers a way to lessen congestion, especially for local residents. In addition, the more interconnected the network, the easier it is for people to use alternative ways of getting around such as walking or biking. Creating these connections will allow neighbors to meet, will create safe and

efficient ways to and from commercial areas, and will increase the quality of life for residents.

Create mixed-use neighborhood commercial centers.
Access to services is an important factor in quality of life. As communities such as Queensbury grow, the need for such neighborhood commercial areas grows. Residents who must get in their car to buy a gallon of milk or get a cup of coffee add to local traffic congestion and regional air pollution. It costs community members time and increases aggravation. Having such services within a walk or short drive will increase quality of life dramatically.

Eliminate the visual clutter of signs in commercial corridors.
Community residents have called signage in commercial areas of Queensbury "stressful". Very quickly in dense commercial areas, signs get out of control, as businesses feel they must fight harder and harder for visibility. Sign design guidelines that control the size, height, lighting, location, and overall appearance of signs used on storefronts and for general advertisement purposes (billboards) can reduce this visual clutter – making the community a more pleasant place to visit and live.

Establish a clear, predictable and timely review process that makes it easy for applicants to understand and adhere to community design standards. Enforce these standards vigorously.
Clear, strong, and evenly enforced rules benefit many sectors of the community. Communities and their residents benefit from the certainty that clear, well-enforced development rules offer. At the same time, developers save time and money if they know upfront what a community demands of them, rather than going back and forth with planning and zoning boards for approvals. Clear standards also help the approval process by eliminating the need for interpretation or personal opinions on development projects that may differ from the overall goal of the community or the developer.

Work with the public school districts that serve Queensbury as well as Adirondack Community College to secure and enhance the educational opportunities that contribute to the town's success.
A strong economy demands an educated workforce. Colleges and public schools provide the skills that people need to hold quality jobs in today's economy. Queensbury is fortunate to have Adirondack Community College. By offering a superior education at a fraction of the cost of private or state

schools, Adirondack Community College provides an important service to new students as well as working residents wishing to enhance their careers. In addition, these collegiate institutions are drivers of the micro-economy around them. Many communities find that bringing institutional services, such as bookstores and food sales off campus, into the community benefits local merchants from the increase in customers and local residents by increased variety.

Encourage inter-municipal cooperation on issues of joint concern, such as: efficient cost-effective delivery of services, environmental protection, and regional economic development initiatives.

Economic development and environmental protection are not issues that can be practically tackled by individual municipalities. With its proximity to both the Capital District and the Adirondack Park, Queensbury is in a potential leadership position to work on both issues with surrounding communities. Realizing that regional partnerships is one of the most beneficial and practical ways to stabilize municipalities and secure their future is a first key step towards realizing the community's goal of a better, improved Queensbury.

Planning Recommendations

A. Neighborhoods

New homes, new subdivisions and new neighborhoods are the most visible aspect of Queensbury's growth. From 1990 to 2000, the number of homes in Queensbury grew 16 percent, much higher than the state's 7 percent growth rate or Warren County's 10 percent rate. From 2000 to 2005, the median price of homes jumped 64 percent in Queensbury.[1]

Creating housing choice is an important part of creating a vibrant community. Different people require different housing types, especially as the population ages and the workforce demographic shifts. In communities this often means encouraging diversity in terms of unit size, pedestrian amenities, nearby services, and prices.

The recommendations in this chapter focus on the following community goals.

- Promote pedestrian and bicycle friendly residential design for new and redevelopment projects.
- Require more connections within and between residential neighborhoods.
- Maintain safe and stable neighborhoods for all residents.

Queensbury has different residential areas. Some, around the town's border with Glens Falls, are dense and reflect urban neighborhood characteristics. Others, throughout the center of the town, are more suburban in nature. Finally, there are areas in the west and north that retain a rural look.

Three residential areas of Queensbury today



Dense



Surburban



Rural

[1] See Appendix A - Inventory for a more complete picture of changes in Queensbury housing.

For planning purposes, the town was divided into three planning areas that reflect these current characteristics. *Neighborhood residential* areas surround the border with Glens Falls with denser neighborhoods. *Moderate residential* is essentially the next ring out. Its growth reflects a more suburban pattern of development – heavily reliant on the automobile. The *Rural Residential* areas occupy the western and northern parts of town – areas that still reflect the rural heritage and natural environment. These planning areas are illustrated on the Planning Recommendations Map.

The recommendations for Queensbury neighborhoods are, therefore, divided into three categories, one for each planning area described above.

Neighborhood Residential Planning Area

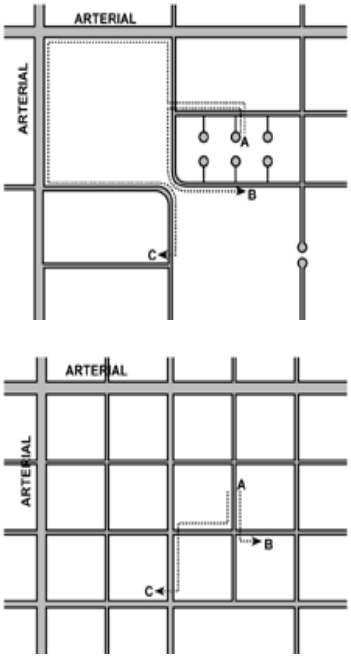
The Neighborhood Residential Planning Area surrounds the town's border with Glens Falls, extends east to the Kingsbury town line just south of the Warren County Airport, and goes west to the Adirondack Northway (I-87). The planning area is mostly within already designated water districts and partly within existing sewer districts. Density and walkability characterize much of this area.

There is little room within the planning area for new large-scale development, so these recommendations apply to individual home constructions and major renovations and redevelopments, as well as new housing subdivisions.

Recommendation A.1

The existing street grid pattern should be strengthened in the neighborhood residential planning area.

Since the creation of communities, grid patterns have proven a most efficient way to organize transportation. This is especially true in denser areas, where the grid creates connections between different neighborhoods and serves many purposes. Walking is more interesting when pedestrians can vary routes. Residents who walk get to know those in their neighborhood, therefore building a safer community. School children can find safe ways to schools, recreational activities and their friends without having to walk or bike along major arterials. A street grid tends to calm traffic in the neighborhoods as drivers slow down at repeated intersections. In cases of an emergency, buildings have more than one avenue of access. Travel distances for cars are reduced and traffic congestion is eased.



(Top) Travel distances increase, congestion grows as all traffic funnels onto major roads and safety declines with isolated subdivisions and dead-end streets.
(Bottom) A traditional grid pattern allows for more direct connections to places and more alternative routes for drivers and emergency vehicles.

Recommendation A.2

In neighborhood residential areas, allow two-family homes in neighborhoods and multifamily dwellings where appropriate in scale or form, mostly likely along the major roads. Allow in-law apartments in neighborhood residential areas.

This area is the most connected to public water and sewer, so the community should encourage density here. Density, if done well, offers the housing choice that is an important driver of vibrant communities.

Increased density should not fundamentally alter the current characteristics of the neighborhood. Only one- or two-family homes should be allowed on most residential streets. Simple design standards will reinforce the walkability of the area and protect the existing 'look and feel' of the neighborhoods. In addition to requiring sidewalks, the code might require new homes build garages behind or to the side of residences, and set build-to lines. Multifamily dwellings should be allowed only on bigger streets and the design standards should mirror those found in the Main Street Plan.

In-law apartments carved out of a home or garage help keep extended families together, and continue to stabilize a healthy neighborhood. Today, many seniors prefer to age in the communities where they spent most of their lives. However, a large home on a suburban lot might require too much upkeep for an empty nester and be too isolating, as aging homeowners need to curtail car use.

Recommendation A.3

In the neighborhood planning area, require developers to provide parks, trail connections and other greenway features in significant subdivisions.

A pocket park offers a small open-space/recreational amenity that is more passive in nature and designed to serve a specific residential development or neighborhood. The park may have a few benches or a small playground, but it is not designed for activities such as ball playing. Its role is more as a meeting place serving residents in a quarter to a half-mile radius. The park's size could range from ½ acre to two acres.

The pocket park should be well connected to the neighborhood via sidewalks and may provide entry to a townwide trail system. No provision for automobile parking is required – or even desired. The pocket park should be visible from nearby residents or other users for greater security.

Moderate Density Residential Planning Area

The Moderate Density Residential Planning Area occupies the middle portion of the town. It arcs around the Traditional Neighborhood Planning Area from the Hudson River to the Kingsbury line. It extends out just past West Mountain Road to the west and just north of Glen and Sunnyside Lakes.

Houses in this area, as well as the size of the lots on which they sit, can be described as suburban. Many have beautiful views and continue to be in quiet neighborhoods. Much of the area is served by public water; public sewer is also available. However, substantial portions of the area have neither.

Most residents depend on their automobile to get anywhere – near or far. Most residential developments are isolated from one another and often from neighboring commercial developments as well. Without that connectivity, each residential or commercial subdivision dumps all of its traffic onto a handful of large collector roads, contributing to major traffic congestion. Walking is often difficult because of traffic, lack of sidewalks and other safety concerns.

Recommendation A.4

In the moderate density residential planning areas, require new subdivisions to make or plan for connections to adjacent properties, and develop a plan to increase automotive and pedestrian connections between existing subdivisions.

The advantages of greater connectivity are numerous for both cars and pedestrians. These include:

- Reducing traffic on major roads
- Providing more direct driving and walking routes
- Improving emergency vehicle access
- Reducing infrastructure and public service costs
- Allowing walkers and bikers a variety of safe routes, not on major roads

New subdivisions should be required to create road connections to neighboring projects. If that is not practical, new subdivisions should provide for future road connections by preserving a right of way.

The Missing Link

In this example, a suburban student must take the long way around, probably by bus, to get to school. With one simple connection, the trip becomes a short drive – or even safely walkable – for lots of students.



One way to achieve this goal is for the town to adopt an Official Map marking existing and future streets, highways, parks, drainage, and other physical features. Provided for by NY State Law, the Official map provides a foundation for the town to base decisions and policies such as preserving rights of way in subdivisions, providing appropriate locations for parks, drainage facilities, or providing new roads. Developers must adhere to the official map when planning new projects and provide for roads or rights-of-way for future roads.

Any new automobile connections must be accompanied by specific and extensive traffic calming interventions to mitigate the possibility of increased traffic on some residential streets. Such techniques would include but are not limited to keeping streets narrow, providing traffic bumps, pedestrian islands, crosswalks, curves, bike lanes, and, of course, sidewalks. Without such mitigating interventions, automobile connections should be minimized. Cooperation with highway and fire departments is necessary to accomplish these goals.

Despite the advantages that connections bring, it is not practical or even necessary to force every residential subdivision to open up roads to its neighbors. Rather, it is important to establish the right connections between the right places. Sometimes those connections might not even be for cars. Pedestrian and bike connections can achieve many connectivity goals at a fraction of the cost. The town planning staff should create a plan that maps out possible ways to connect existing subdivisions.





(Top) A pedestrian connection bridges two project areas on Bay Road, Queensbury.
(Bottom) A pedestrian path between two houses adds a link to the local street grid in Saratoga Springs.

Recommendation A.5
Developers should be required to provide sidewalks in all new subdivisions in the Neighborhood Residential planning areas. Sidewalks should be encouraged in all other residential areas where conservation subdivision design is required. The town should install sidewalks as it rebuilds roads in the moderate density residential area.
As described above, sidewalks are an important amenity desired by residents. It is not practical to retrofit them into existing subdivisions. However, new subdivisions and road reconstruction could provide ways to achieve large portions of a pedestrian network that will start to interconnect with each other over time.

The Town of Queensbury should prioritize which existing roads should be retrofitted with sidewalks. Priorities should include: routes to school, roads with heavy traffic, and roads near natural pedestrian amenities (e.g. shopping). The New York State Department of Health estimates that one-in-three children are obese or overweight. New federal guidelines urge children to exercise 60 minutes per day, yet fewer than one-in-four kids get even 20 minutes – and about another quarter report no significant physical activity per day.

One source for information to encourage children to walk to school is the National Safe Routes to School Program. The program promotes walking and biking to school through four programmatic approaches – the construction of new sidewalks is part of only one avenue. The *Encouragement Approach* uses events and contests to entice students to walk and bike. The *Education Approach* teaches students important safety skills. The *Engineering Approach* focuses on creating physical improvements around schools, reducing vehicular speeds and establishing safer crosswalks and pathways. The *Enforcement Approach* ensures drivers obey traffic laws.

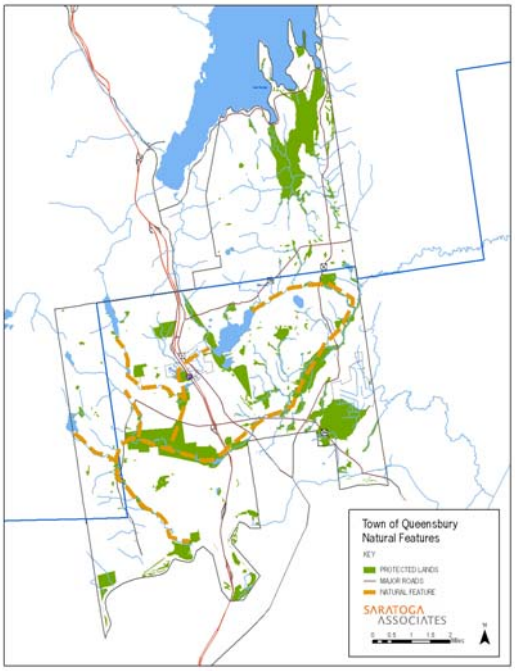
Recommendation A.6

In the residential planning area, all new residential subdivisions should be required to be conservation subdivisions – an improved form of cluster design.

The advantages of a conservation subdivision coincide closely with goals described by the Queensbury community. Large swaths of meaningful open space are preserved for the community. In general, some of conservation subdivision advantages include:

- Open space conservation for the community
- Natural resource protection
- Reduction in construction costs by minimizing road and utility infrastructure requirements
- Reduction in amount of impervious surface, which leads to reduced stormwater runoff, better stream protection, and easier compliance to federal and state rules.

Unlike a traditional clustered subdivision, when designing a conservation subdivision, a planner or landscape architect first identifies the areas to be preserved. As stipulated in the current town rules, environmentally sensitive areas, such as wetlands or steep slopes, will not be counted in a projects density calculation. At a minimum these open space conservation areas should comprise 50 percent of the entire subdivision and be largely contiguous. In order to make the conservation areas across the town, they need to be organized. In Queensbury, designers can organize and site plan reviewers can test open space along the following possible themes:



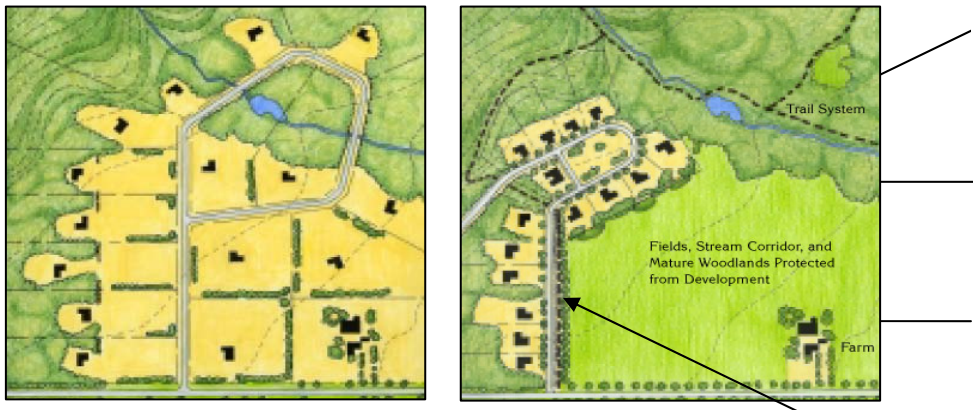
- The network of water-related features in the central part of town. (This is more fully described the Natural Environment chapter and outlined to the right.)
- Open space priorities described in the Town's Open Space Plan.
- Other town recognized parks, recreation areas, trails, etc.
- Rural, lake or other stream vistas

With those conservation areas set aside, the second step in designing a conservation subdivision involves laying out house locations to maximize the

value of the project to the homeowners and the community. Homeowners in the subdivision will want to enjoy the scenic vistas or privacy of wooded areas. The public may want their viewscapes maintained, trails preserved or waterways buffered.

Next the roads and trails are laid out with an eye to minimizing the amount of expensive and environmentally unfriendly roads as well as utility and other infrastructure runs. Finally lot lines are drawn.

Conservation Subdivision Design



A conservation subdivision can be organized around and protect a townwide network of water features.

A conservation subdivision requires smaller lots, but allows all homeowners to enjoy the conserved lands and /or views.

A conservation subdivision preserves the town's rural character from the public road.

A conservation subdivision requires less roads and infrastructure and is less expensive to build.

A comparison of a conventional subdivision (left) with a conservation subdivision (right). In both cases, a total of 16 residential lots were created. A conservation easement ensures that the open land preserved as part of the conservation subdivision (right) cannot be further subdivided or developed in the future. *Source: Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks (1996) by Randall Arendt.*

Conserved areas could be conveyed to and managed by the Town, or could be managed by a homeowners association, which could ideally allow for public access. Alternatively, the lands might be part of private lots, with conservation easements. These may or may not allow for public access, but will require the land remain undeveloped. Important lands can be deeded to the town for preservation and public enjoyment.

Recommendation A.7

In the moderate density residential area, maintain a moderate density of one unit for every two acres. Provide a density bonus for developers who connect their projects to public water and sewer.

The density of the planning area should be one unit for every two net developable acres where public sewer and water are not present. This aids in the safe and efficient operation of septic systems.

In locations where public sewer and water do exist, one unit per acre would be appropriate. Rather than create another zoning district, which would shift with the growth of the sewer system, developers able to connect to water and sewer (or who pay to run the pipes to their project) would be awarded a density bonus that allows them to develop up to a total density of one unit per acre. It is an incentive program. Developers that do not want to connect to the sewer and water infrastructure do not have to, but they are limited to one unit per two acres. Having more homes to sell will reward those that choose to connect to public water and sewer. The bonus is made more enticing because, with the required conservation subdivision design, the cost of laying the pipes within the project is minimized.

Rural Residential Planning Area

The rest of the town falls into the third area, known as the Rural Residential Planning Area. This planning area reflects a more rural feel with larger lots, open space, scenic vistas, and thick vegetative buffers. Most of it is located within the Adirondack Park. This portion of the community is highly valued for its rural character, which not only contributes to the high quality of life for town residents, but also makes it economically attractive to visitors. The goal of these recommendations is to perpetuate the connection residents have with their natural surroundings and protect the rural landscape.

Recommendation A.8

Maintain a rural density in the rural residential planning area. Provide density bonuses for certain community amenities.

In the Rural Residential Planning Area, densities should be one house per ten acres. However, multiunit developments that use conservation subdivision design (required under Recommendation A7.) may increase density to one house per five acres. A density limit will be set at three dwelling units per ten acres when designed with a conservation subdivision and amenities are provided, such as public access to open space.

Recommendation A.9

Require conservation subdivision design for multi-unit projects that organizes open space around the protection of rural character in the rural residential planning area.

As described in the Moderate Residential section, conservation subdivisions allow developers to maximize return, homeowners to maximize quality of

life and long-term value and the community to protect special resources. In the Rural Residential Planning Area, an important organizing factor for the preserved areas of a conservation subdivision could be the protection of rural character. Each conservation subdivision in this residential area will be required to retain a minimum of two thirds of the property as permanent open space to enhance the rural nature of its surroundings.

Recommendation A.10
In the rural residential planning area, provide guidance to developers and planning board members so that the goal of site plan review for multi-unit residential development is the protection of rural character Enact zoning regulation for individual home that specify such things as setbacks and general lot locations, which will preserve rural character. Clearly define in the zoning code what constitutes unbuildable land.
All homes should undergo a site design process and the planning board should work with the builders to achieve the following goals:

- Minimize impact on rural characteristics such as fields and forests
- Protect the views of the public
- Protect the privacy of neighbors
- Conserve existing land forms and features and minimize grading / filling
- Preserve existing woodlands as buffers from public roads and neighbors
- Create buffers of native vegetation to protect views from public roads
- Preserve mature trees
- Minimize the impact of off-street parking, garages, and carports
- Restrict building on steep slopes
- Avoid locating structures that create a silhouette against the sky when viewed from public ways
- Roof ridgelines should generally follow the slope of the terrain

Recommendation A11
Responsible and appropriately scaled composting of appropriate organic waste materials should be encouraged in all residential areas.
Composting of organic waste is a responsible way for property owners to reduce their solid waste disposal costs and also create their own valuable mulch and soil amendment. Residential composting efforts should be encouraged in a manner that is not detrimental to adjacent property owners or the neighborhood.

Recommendation A 12

The Planning Board should require detailed Good Neighbor Plans for commercial projects.

Currently the Planning Board may ask applicants to submit a Good Neighbor Plan. This should be required of all commercial projects. The ordinance should be reviewed to include a greater range of quality of life issues (such as noise and light) in the plan. The goal of this plan is to make sure that some seemingly incompatible uses can actually work together. However, the Planning Board and town staff need to make sure that plans are created and enforced.

Recommendation A13

The Town Board should evaluate creating a one thousand (1,000) foot buffer zone along the Adirondack Northway (I-87) within which new residential subdivisions would be prohibited.

Residential development in close proximity to the Northway is generally considered to be unsafe and unhealthy (especially for children), and exposes those living there to noise, hydrocarbon pollutants, dust, other particulates, vibration and potential hazardous material situations.

Minimizing the Visual Impact of Buildings



Provide Buffering from Public Roads
A thick vegetative screen can hide limited development and help maintain a community's rural character.



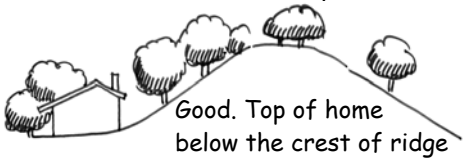


Good. Home hugs terrain.

Roof ridgelines should follow the slope of the terrain
Houses should hug the landscape and follow the terrain. This will help them keep a low profile and reduce their visual impact from a distance.



Bad. Home stands up and out.



Good. Top of home below the crest of ridge



Bad. Home visible against sky

Avoid creating a silhouette
Structures should be kept off of ridgelines and slopes where they might create a silhouette against the sky.

B. Natural Environment

Reconnecting the residents of Queensbury with the natural environment has been an important issue raised repeatedly during public meetings. The desire has been described in terms of maintaining rural character, protecting views, and preserving the quality of air and water. Environmental sustainability goes hand-in-hand with economic sustainability. Factors such as quality-of-life, property values, commercial desirability and tourism are directly related to environmental protection.

The recommendations in this chapter focus on the following community goals:

- Protect important natural areas and viewsheds in the town, especially unique landforms such as ridges and slopes. Promote the protection of natural resources such as the water, air, Critical Environmental Areas and wetlands.
- Expand the network of bicycle and pedestrian trails. Increase public access to recreational areas.

Recommendation B.1

Use water and other townwide natural features as an organizing theme for development.

The Town of Queensbury hosts an extensive water and wetland network. These play important environmental roles (e.g. drinking water, flood control or wildlife habitat) as well as important economic and social roles (e.g. tourism or recreation). Some areas, such as wetlands and stream corridors, may be protected by building restrictions. While seeming like a limiting factor, such rules force a community to think about economic, environmental and social values over the long term.

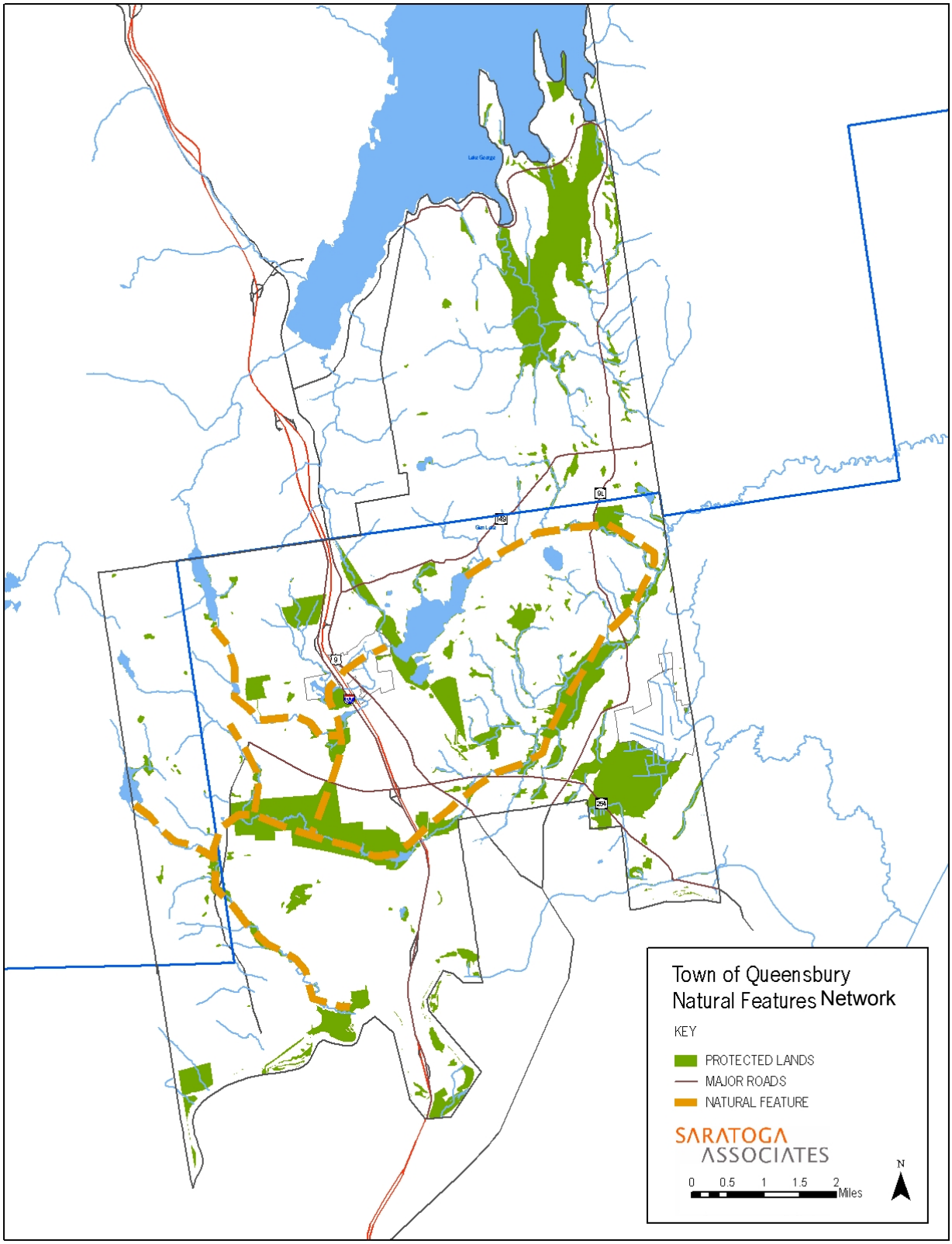
In Queensbury, the community has already discussed and described the importance of these features in its 2003 Open Space Plan, which is included as Appendix B of this document. That plan recognizes that “open spaces are an important part of the history, culture, and character of the town.” Much of the natural features network shown on the following page mirrors closely the Open Space Opportunities described in the Open Space plan. The following areas within Queensbury are part of this network:

- City of Glens Falls Reservoir and Watershed
- Rush Pond Area
- Halfway Brook

- Glen Lake Fen, Glen Lake and Sunnyside Lake
- Big Cedar Swamp Area

Recommendation B2
Amend all local storm water management regulations to address the impacts of both post-development run-off volumes and types.

Current storm water regulations require that post development run-off volumes not exceed those found in the pre-development conditions. This does not address, however, the potential adverse effects of changes in the type of run-off – for example sheet flow versus point flow. Changes in the type of post-development run-off can create as adverse impacts as increases in the volume of run-off.


Town of Queensbury
Natural Features Network
KEY
PROTECTED LANDS
MAJOR ROADS
NATURAL FEATURE
SARATOGA ASSOCIATES
0 0.5 1 1.5 2 Miles
N

As shown on the map, these features form a natural "network". This network could serve as an organizing element across the town and give officials on the planning boards, town staff, and developers a common theme for the design of conservation subdivisions and other community amenities. It would guide the zoning board as to whether certain variance requests are appropriate. This does not mean that a network of trails should link these features, though that is an option and is already happening in some places. Rather, the natural network shown on the previous page provides a backbone along which development can be organized.

How might this work? Take the example of a residential project that is designed along conservation subdivision[2] guidelines. Within such a subdivision, important environmental features are identified and protected. Too often, however, the conservation designer of each project decides on important features on their particular site in isolation. A common natural features network allows designers to consider town-wide environmental concerns and not just focus on site-specific features. In Queensbury, such enhancements might include, but are not limited to, putting open space directly along natural features to buffer them or using the open space to provide a view of the natural feature from public ways.

Recommendation B.2
Establish an open space preservation program.
Stemming directly from the previous recommendation, as well as Queensbury's 2003 Open Space Plan, the town should develop a long-term open space preservation program. Such a plan could consist of two phases. Phase 1 would provide the Town with a complete inventory of its farmland and open space resources leading to the creation of the *Lands of Conservation Interest* Map. Phase 2 would focus on developing a local, long-term preservation mechanism utilizing techniques such as outright acquisition, purchase of development rights (PDR), and donation of land or conservation easements. The Open Space Committee would implement the plan.

The Phase 1 *Lands of Conservation Interest* map would build on the work done in the 2003 Open Space Plan and create a map of the community's open

[2] A conservation subdivision design requires identifying important environmental features (open space, scenic views, shorelines, etc.) first and clustering structures to protect those. See page 21 for a full description.

space. It would show the location of various categories of open space in the community, how those resources relate to one another as a network of open lands, and the relationship to developed areas of the community. Opportunities for linkages in the form of paths and trails through the community are also described.

As a tool, the *Lands of Conservation Interest* map can assist the Town Planning Board, developers and the public in guiding growth in a manner consistent with the Town's Comprehensive Plan by providing improved knowledge about a site that will be developed: What are the open space resources on the particular site? Where are these resources located? And how do they relate to the larger open space and recreational vision for the Town? This information can be used to guide the project design and approval process in ways that are more sensitive to the unique features present on the proposed development site.

Once important land is identified, Phase 2 of the program would require a commitment to conservation. Outright town purchase of land is one option, especially when public access is desired. Another technique for large-scale preservation is the Purchase of Development Rights (PDR). Under a PDR program, the town would purchase the development value of specific parcels of land from willing landowners. The cost of doing this depends on the specific parcel. It is calculated by determining the current appraised value of the property and its appraised value as open or agricultural land without development potential (i.e. with the development rights extinguished). The difference between these two is the value (cost) of the development rights. Conservation easements are utilized to ensure that once the development rights have been extinguished, the land remains undeveloped in the future.

In addition to outright acquisition or PDR, other techniques could be included in this program, such as: donation of conservation easements (perhaps through increased educational efforts in partnership with a local land trust), or a term easement / tax abatement program (a means of conserving, for a period of years, smaller "open space" parcels - the longer the agreed-to term of the easement, the greater the tax abatement).

Recommendation B.3
Consider the creation of a town fund for open space conservation.

Most of the community benefits outlined in Recommendation B2 will not be free. Many communities create a fund to pay for open space preservation. Several avenues exist to get money into that fund above and beyond money raised through grants that are typically targeted for particular parcels.

The quickest and least complicated method is to set aside generals funds on an annual basis. Communities also issue bonds to purchase land or conservation easements. For example, in Saratoga Springs, New York, voters approved a $5 million bond to fund open space conservation – a tax increase of $35.75 per year on the average house. Finally, residents can vote to raise money through a real estate transfer fee. This system imposes a small fee on real estate sales; that money is dedicated to open space preservation. This situation is particularly elegant given that development funds the preservation of rural character. At this time, the state legislature must pass a bill allowing each community to put the matter before the voters.

Many communities find that an investment in open space pays over the long term. Studies show that for every dollar raised in property tax, residential land uses $1.15 in services, while open space only costs $0.59. These figures are national averages and show the relative expense of developed lands.

Recommendation B.4
Expand the network of non-vehicular trails and connection, for example the Rush Pond trail system development plan. This recommendation echoes portions of the Town's 2003 Open Space Plan and endorses those previous findings.

Open spaces and natural resources such as wetlands and stream corridors contribute to the quality of life in a community and also serve an important function in maintaining a healthy environment by providing wildlife corridors, flood control, and buffers to sensitive areas. Access to these areas is an important recreational amenity for town residents and visitors. Queensbury already has an excellent non-vehicular path running north and south. Other paths should be developed off of this spine to allow a more comprehensive access to natural areas and recreational trails.



The Rush Pond area provides an opportunity to expand the trail network in Queensbury – an important environmental and economic asset.

A trail system for pedestrians and bikes is under development for the Rush Pond Area – an opportunity recognized in the 2003 Open Space Plan, which urged an interpretative trail system linked to the school campus. The four proposed phases of the project include linking Fox Farm Road to Gurney

Lane, and then connecting to the existing bike north/south bike path. The third phase pushes a network of pedestrian trails into nearby neighborhoods and, finally, uses the Niagara Mohawk right of way to link the Rush Pond area to the southern part of town.

At public meetings, residents also spoke of the need to map out and create an east/west bike and pedestrian trail across the town. Another proposal includes creating a canoe trail along Halfway Brook from the town's east border to the Glens Falls watershed area. Although some of the brook may not be navigable now, it should be investigated. Many communities find rediscovering their waterways economically and environmentally valuable.

In addition, the 2003 Open Space Plan and the 1998 Comprehensive Land Use Plan recognize Big Cedar Swamp and the Lake George Wild Forest Area as opportunities for passive recreation. According to the 2003 Open Space Plan, the 900-acre Big Cedar Swamp wetland supports more than 149 species of plants and animals, five of which are designated species of special concern by the New York State Department of Environmental Conservation. The previous plans envisioned a nature trail and boardwalk that could serve as a learning opportunity. The Lake George Wild Forest Area is ecologically significant as well with large areas of wetlands, marshes and species of biological significance. Public access, with sensitivity to the ecosystem, is encouraged. Access to Dunham's Bay, Lake George, and Sandy Bay are possible through coordination with New York State. Partners, such as adjoining landowners and conservation organizations, should be asked to participate in the preservation of these areas.

Recommendation B.5
Work with the City of Glens Falls to investigate avenues to develop an appropriate land use management plan for the Glens Falls watershed areas.
Glens Falls, which was part of Queensbury until 1908, owns approximately 4,000 acres in the Luzerne Mountain ridges and around its reservoirs. These properties serve as a protective buffer for the water bodies that are part of the city's water supply system. The upper watershed area includes several ponds and impoundments surrounded by forests. City ownership has protected this area of natural beauty as an important amenity for area residents. It has become a *de facto* nature preserve.

Already the two municipalities have joined together to seek state funds to develop a management plan. Whether or not that effort to raise funds proves successful, Queensbury and Glens Falls should continue working on such joint investigations and planning in the watershed area.

Discussions between Queensbury, the City of Glens Falls and other interested parties should continue to focus on protecting the water supply as well as future land use management options for the land as a passive recreation area.

Recommendation B.6
Conduct research to re-evaluate the environmental health of Glen and Sunnyside Lakes. Determine a fiscally prudent course of action to correct any problems.
The town should re-examine the health of Glen and Sunnyside lakes to assure that recent development or aging septic systems have not impacted water quality. In 1998, the Glen Lake Watershed Management Plan determined that Glen Lake, by and large, was in acceptable environmental health. However, they also found that domestic wastes were reaching the lake from some residences. In addition, stormwater runoff nutrient had reached a level of concern. Both lakes should be investigated as to their health and required corrective action related. If quality has become unacceptable, then remediation needs to take place. Remediation could include, but is not limited to, restricting development, restricting sources of non-point source pollution, requiring septic system upgrades, extending sewer lines to these areas, etc.


Sunnyside Lake

The Town of Queensbury already has regulations in place for shoreline setbacks; however natural buffers should also be required. Natural buffers include indigenous vegetation to reduce the amounts of runoff into surface water and to further stabilize the shoreline from erosion. The buffers would also serve as a natural screen between homeowners and visitors.

Recommendation B.7
The Town Board should reactivate the dormant Open Space Committee or create a new advisory committee to manage certain recommendations of this comprehensive plan and the Town's Open Space plan.

Re-establishing some form of a Conservation or Open Space Committee would help Queensbury fill the critical niche of promoting collaboration and coordination that links complementary programs and people at the local level.

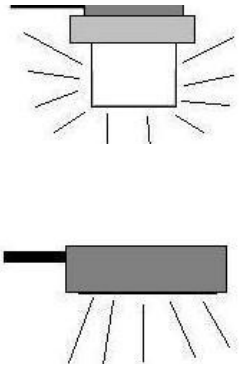


Visual access to the water preserves the rural character for all residents.

The committee members, at various times, would act as facilitators and educators. As facilitators, committee members would provide administration and expertise in order to assist others in achieving their environmental goals in the community. As educators, committee members will provide outreach to the public and stakeholders, and explain the costs and benefits of environmental programs in terms of environmental principals, community goals, and resources. Furthermore, committee members would identify and publicize other environmental issues and meaningful opportunities for local action. Working with the Town Board, they would seek funding for open space efforts.

Recommendation B.8
Create a waterfront overlay district to govern residential development along the shores of Queensbury's lakes and ponds.
Part of the character of any community, which is endowed with such grand natural resources as Lake George, Glen Lake and Sunnyside Lake, is a view of the lake. Unfortunately, public access to the lakes, both physical and visual, is often lost as landowners develop bigger and bigger homes on the waterfront. This is the case in Queensbury.

Lighting Fixture Basics



A bad fixture (top) allows light to trespass onto neighboring properties and escape upwards causing glare in the night sky. A good fixture (bottom) prevents light from escaping and focuses it where it is needed.

Before granting permits along the water's edge, the planning board should have a set of rules in the code to measure the quality of the development. It should take into account such things as the following:

> Protect water quality
> Promote walkability
> Reduce visual shoreline clutter from the water
> Preserve water views from public ways
> Preserve open space
> Protect the environment

Recommendation B.9
Require all new and replacement lights conform to "dark sky standards." Existing fixtures will have to be replaced after a 7-year amortization period.
There are many needs for lighting in our communities including yards, driveways, sidewalks, roads, parking lots and buildings. However, the impacts of this lighting often extend beyond the boundaries of what needs to

be illuminated. The lighting that "trespasses" onto other properties causes glare for neighbors, wastes energy and blots out stars in the night sky. In terms of business lighting, the desire for increasing visibility can also cause a "light war" where competing businesses need big and showy displays to remain visible in a cluttered commercial landscape.

New England Light Pollution Advisory Group and the International Dark-Sky Association describe four distinct guidelines for good lighting.

- Provide adequate light for the intended task, but never over-light.
- Use fully shielded fixtures to keep light in the intended area.
- Install lights correctly to maximize their effectiveness on the targeted property and minimize adverse effects on neighbors.
- Use high-efficiency lamps.

The Town of Queensbury already has basic guidelines in its code for good lighting. This recommendation calls for revising those as needed and extending them across all land uses. New fixtures must comply with dark sky standards. All replacement fixtures must comply with dark sky standards. Existing, non-compliant fixtures should be re-aimed to minimize upward glow and trespassing glare. All existing, non-compliant fixtures should be replaced after a seven-year amortization period.



The energy wasted by bad outdoor lighting becomes evident in this nighttime satellite picture.
(Source: International Dark Sky Association)

Recommendation B.10

Incorporate green policies into as many aspects of Queensbury town business as possible making the community an environmental role model.

Individuals, businesses and municipalities find that incorporating environmentally friendly policies into their day-to-day operations saves money as well as reduces energy consumption and pollution. Going green is often good for the town coffers as well as the town's environment. The Town Board, perhaps through a Conservation Committee, should investigate and adopt policies that reduce consumption, waste and energy usage. As with any plan, goals (such as energy reduction targets) should be set to measure implementation success. Some possible policies that other communities have adopted include the following.

- Buy hybrid powered cars and vans for town business
- Install energy efficient fixtures in town hall
- Purchase 100% post-consumer waste recycled paper products
- Require new construction and rehabilitation projects be LEED-certified[3]
- Determine which toxic chemicals used by various town departments could have a more benign (and often more cost-effective) substitute
- Research and determine ways to reduce water usage at all town facilities and parks
- Investigate ways to fund the installation of solar panels on town buildings and reduce energy consumption and costs
- Find ways to recognize and reward town employees who find ways to save money by instituting environmentally friendly policies
- Research ways to encourage new private construction to become more environmentally friendly

[3] LEED certification indicates that the construction of a building is done in an environmentally-friendly manner both in terms of materials used as well as long-term maintenance.

Recommendation B 11

Make more locations along water accessible to the public.

Access to water is an important asset to the residents of Queensbury, however private development has made it more difficult. Particular locations along water routes or on lakes and ponds should be made more accessible to the public, including consideration for public beaches. The Town's 2003 Open Space Plan (attached under separate cover in its entirety as Appendix B) recommended investigating opening more public access to Lake George at Dunham's Bay and Sandy Bay. Public access along the banks of Halfway Brook, as well as the possibility of a water trail on the Brook should also be investigated.



Private beach along Lake George.

Recommendation B 12

Noise should be an important factor in zoning rules.

Noise is an important quality of life issue that deserves the attention of the community. Noise can be generated by things like cars, radios, truck brakes, and commercial establishments. The town should consider enacting a noise ordinance. In addition, the Planning Board should consider noise as a quality of life issue when reviewing applications.

This should be one important criteria as applicants must face review under the Town's Good Neighbor Plan.

Recommendation B 13

The Board of Health should investigate the feasibility of requiring a septic system test when properties in Critical Environmental Areas change hands.

The integrity of septic systems is crucial in protecting water quality in Critical Environmental Areas. The Town should investigate whether it is practical (fiscally and environmentally) to require some kind of septic system test at the time properties in Critical Environmental Areas are transferred from one owner to another. The goal is to make sure that these systems will provide adequate environmental protection in these areas.

Recommendation B14

Add additional protection to Critical Environmental Areas by requiring site plan review by the Planning Board for all uses that either involve the expansion or relocation of a structure, any decrease in permeable area, or any increase in floor area ratio.

The current level of regulatory review is not adequately protecting the environmental resources the CEAs are intended to defend.

C. Neighborhood Commercial Centers

Neighborhood commercial areas provide for the every day needs of nearby residents. They provide these services in a structure and with a site layout that is compatible with surrounding areas. Small retail stores and services are encouraged to locate within these nodes. Building footprints and overall square footage remain low and buildings will be no higher than two stories.



Design standards should reflect the character of the surrounding area, either an Adirondack theme or an urbanized Glens Falls theme.

The four areas that fall under the category of Neighborhood Commercial Centers are the:

- Intersection of Bay Road and Route 149
- Intersection of Ridge Road and Route 149
- Intersection of Aviation Road and Dixon Avenue and within walking distance of the Queensbury School Campus
- Intersection of Ridge Road and Sunnyside Road at Oneida Corners.

This chapter's recommendations are guided by the following goal:

- Create mixed-use neighborhood commercial centers.

Recommendation C.1

Review and improve design guidelines in design areas

Design guidelines have been established for the two Neighborhood Commercial Centers on Route 149 to promote an Adirondack style of development. This includes façades of stone or log and pitched roofs. Outside lighting should point down and not stray beyond the borders of the property. Signage should be subdued and not interfere with the rural character. Building heights should be limited to three stories.



The brand new office complex in the Aviation Neighborhood Commercial Center offers good ideas for other new development in the areas. Parking is behind the building. The front door opens to the street. A sidewalk will be installed.

The third Neighborhood Commercial Center, at Aviation Road and Dixon Avenue, has a denser setting. Buildings should top out at two stories. Their design should more reflect their location closer to the center of town and Glens Falls. Parking lots should be behind buildings. Sidewalks linking the shops to the school should be installed and well-maintained. The recently constructed office complex offers an example of the size and style of buildings appropriate to the area.

The fourth Neighborhood Commercial Center is located at Oneida Corners, the intersection of Ridge Road and Sunnyside Road. Local history is the organizing factor in this area. The town is currently considering establishing the Oneida Historic & Cultural Center in this area. The design of the rest of

the areas should reinforce this historic nature. Buildings should address the street and have sidewalks to increase walkability.

Recommendation C.2
Implement pedestrian safety measures
Three of the four Neighborhood Commercial Centers are located in rural areas, where the installation of large sidewalk networks is unlikely. However, each Neighborhood Commercial Center should be walkable within its own boundaries. Prominent crosswalks located at appropriate intersections, especially as the areas continue to build out, will allow this to be achieved. Parking lots should be behind buildings and within them pedestrian walkways and other such improvements should be required. In addition, smaller buildings should be oriented to the street.



Design standards in Neighborhood Commercial Areas should ensure that signs, lights and buildings are appropriate to the residential neighborhood character.

The fourth Neighborhood Commercial Center on Aviation Road is in a dense residential setting. Plus, it is located within walking distance to the schools. Therefore it should have sidewalks within the Neighborhood Commercial Center, immediately around it, and completely connecting it to the school campus for student safety reasons.

Future planning of trail networks should look for ways to link all of the Neighborhood Commercial Centers to surrounding residential areas as well as the rest of the town. This can be achieved through a combination of sidewalks, paved paths and nature trails.

Recommendation C.3
Create a Neighborhood Commercial Floating District.
The creation of a Neighborhood Commercial Floating District will allow the town to address the future needs of residents as residential areas continue to grow. The floating district will allow flexibility to create new neighborhood commercial centers where previously they would have not been feasible. The same design standards and guidelines would be applied within these districts to retain a sense of uniformity as well as safety and aesthetics.

D. Commercial Corridors

The commercial activity in Queensbury is clearly a success story. The retail and office establishments generate sales tax revenues with relatively few services required from the town. They provide jobs and services to local residents and attract visitors with their disposable income. Queensbury has become a valuable place for the private sector to invest.

At the same time, this success has exacted a price on the community. Traffic congestion is an increasing problem and it has become difficult to walk in many parts of the town. Large parking lots have changed the natural environment. And the growth of buildings, malls and shopping centers have dramatically altered the community's character.

The Town of Queensbury is a very desirable location for commerce. Establishments come here because there is a strong market and they are able to generate revenue. The money made in the private sector translates into significant revenues for public sector operations. Warren County has the highest sales tax revenue per capita in all of New York State. In addition to a strong revenue stream, the town can leverage that desirability and use it to reshape its commercial corridors. In essence the town now has the upper hand. If Queensbury asks for a higher standard of commercial development, developers will adhere. It should also be noted that certain uses, incompatible with its goal and surrounding neighborhoods, will not be allowed in certain commercial areas.

The look of a community is fundamentally crucial to its economic success and the quality of life of its residents. As the commercial districts are the most visible face of the town, it is these areas that require the greatest attention in terms of creating a "look and feel" for the community. Residents have stressed the desire that commercial areas be walkable and better reflect the Queensbury character.

At the same time Queensbury asks for higher standards in terms of community design, it can allow market forces to dictate the uses in these areas. This kind of form-based zoning is more efficient since the community need only establish and administer broad categories of uses allowed within the commercial corridors. It is also friendlier to business since they can understand before they spend any money exactly the form their buildings and site design must take – and then not worry that a particular use be allowed or restricted forever.

Each corridor covered in this section has a distinct set of factors influencing it. Route 9 North is populated largely by outlet malls and is an important rural route to Vermont. It also hosts county facilities. Route 9 South and Quaker Road West are the focus of very intensive development with large malls and shopping centers surrounded by acres of parking lots. Bay Road and Quaker Road East are less dense and have a different flavor.

The recommendations presented here focus on the following goals:

- Create design standards for architecture and site layout that move the town towards realizing its vision.
- Require pedestrian and bicycle friendly residential and commercial design for new and redevelopment projects. Rebalance design, in general, to concentrate on people and walking rather than cars and parking lots.
- Require more connections within and between residential neighborhoods and commercial corridors.
- Eliminate the visual clutter of commercial corridor signage
- Develop an economic program that reflects the community's land use goals while keeping up its tax and job base.

Recommendation D.1

Require large new commercial development and major redevelopment projects to be walkable and built to "town center" scale.

Communities need not sacrifice their small town character and identity to attract a commercial tax base. Design guidelines should be instituted to make sure that buildings, streets, sidewalks and parking areas are appropriately sized, landscaped and laid out. In the end, property owners and businesses find that creative planning to protect community character raises the value of their investment by making them stand out in the marketplace.

Commercial developments should be built or rebuilt with streets that connect to the surrounding residential and retail areas. Along with these vehicular ways, sidewalk networks should be extensive throughout commercial areas. Large parking lots are discouraged. Rather, parking should be scattered behind and on the side of development parcels instead of in front, facing an external street.

Enhancing the shopping experience





Mashpee Commons
Mashpee, Massachusetts
Developers transformed a strip mall into a town center for the community and a lucrative retail destination for chain and local stores.





Lee Outlets
Lee, Massachusetts
In creating a walkable shopping experience, designers used the scale and design of a Berkshire village as the setting for an outlet mall.

Source: Site drawings from company websites. Photos: Saratoga Associates.

Two developments in Massachusetts provide examples of how communities have allowed creative developers to build pedestrian friendly shopping districts. These examples provide illustrations of site design. Mashpee Commons in Cape Cod and the Prime Outlets in Lee put pedestrians ahead of automobiles. They are designed to make shopping by foot easy and pleasurable. Built over an old strip mall, Mashpee Commons creates a new downtown for a community that had no center. The outlet “mall” in Lee is designed to mimic a New England Village. Parking is allowed on the streets and in smaller lots scattered around the development.

The Mashpee Commons project is the most famous. The 30-acre parcel contains 100,000 square feet of retail space, about 25,000 square feet of restaurant space, 36,000 square feet of offices and a 13,000 square foot theater. Different size shops and restaurants are built right up to the sidewalk. Over 800 parking spaces are spread amongst "on-street" parking places in front of the establishments or in a series of smaller lots that ring the development.

Customers can find most of the national chain stores available at typical malls and strip centers, such as Star Market, Stop and Shop, CVS, Banana Republic and Talbots. The developers try to reserve one third of the space allocated to national chains, another third to regional retailers and the rest are local "mom and pop" operations.

The design code for the project also enhances walkability. All new buildings must come up to the sidewalk with front doors and major windows addressing the street and not the parking lots. On street parking is allowed within the development and combined with street trees create a pedestrian friendly envelope for shoppers meandering along the sidewalk. The project has become so successful that, according to the developer's planner, it has convinced some chain stores to look beyond suburban malls for their customers.

Recommendation D.2
Establish architectural standards that require new buildings to move toward the creation of a distinctive Queensbury community.
The Town should be clear from the beginning of the development process what is expected of the developer regarding building design. Given the size and diverse nature of Queensbury, the community should consider two different characters. The northern, more rural parts could reflect the Adirondack nature of the region. The southern portions and more developed corridors should reflect the look of Glens Falls.

Examples of Architectural Standards in upstate New York







(Top left) Dunkin Donuts in Rensselaer,

(Top right) Gas station in Saratoga Springs

(Left) Rite Aid Pharmacy in Lake Placid with an "Adirondack Style."

Building height restrictions will also vary by commercial neighborhood. In some places, such as Main Street, minimum heights will also be established for new buildings.

Route 9 North – one to two stories

Route 9 South – one to four stories

Quaker Road West – one to three stories

Quaker Road East – one to five stories (depending on location with an eye toward blocking large industrial uses behind them)

Bay Road – one to two stories

Main Street Buildings must be a minimum of two stories and a maximum of three stories.

Dix Avenue – two to three stories

Recommendation D.3

Parking lots should be placed behind buildings so that buildings address the streets. Eliminate minimum parking requirements and require shared parking. Require vehicular and pedestrians connections between adjoining projects and establishments.

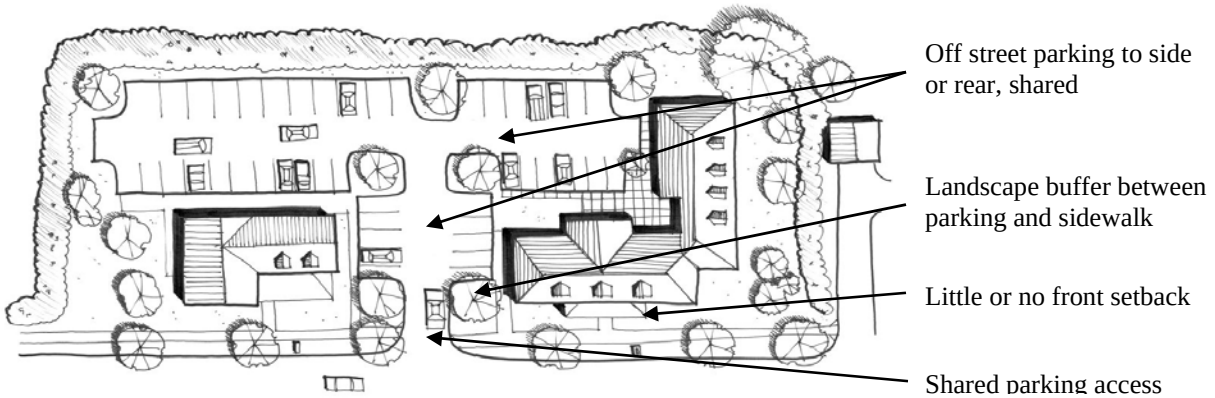
Refocusing commercial activity as a relationship between people and stores rather than cars and stores is the main objective of this recommendation. Parking lots in front of commercial and multi-unit residential structures strip a community of the character found in its buildings. In addition, large asphalt areas make it uncomfortable for pedestrians to walk from shop to shop and destroy the distinctiveness of the shopping experience.

Rather than demand minimum spaces for commercial developments, parking regulations should discourage large parking lots that remain empty most of the time. The rules should also make shared parking mandatory whenever possible. Shared parking lots are crucial to reducing the number of curb cuts, which create pedestrian/vehicle and vehicle/vehicle points of conflict.

Shared parking allows adjacent property owners share their parking lots and reduce the overall number of spaces. Shared parking is not a new concept, having been used extensively in traditional commercial nodes and downtown settings for decades. Today it is being used more and more in new developments to better manage road access, traffic congestion and accident rates.

The most effective way for a town such as Queensbury to achieve shared parking is through a contractual arrangement between adjacent property owners. As part of the review process, Queensbury will have to make sure that the first property owner to develop provides an easement that spells out the parking requirements when an adjacent property is developed. After redevelopment has reshaped many commercial areas, the town may want to consider creating parking districts where all users have access to all spaces and not just those on adjoining parcels.

In addition to shared parking, the town should limit the number of curb cuts on major roads. This helps avoid excessive turning motions that snarl traffic and create increased chances for accidents.

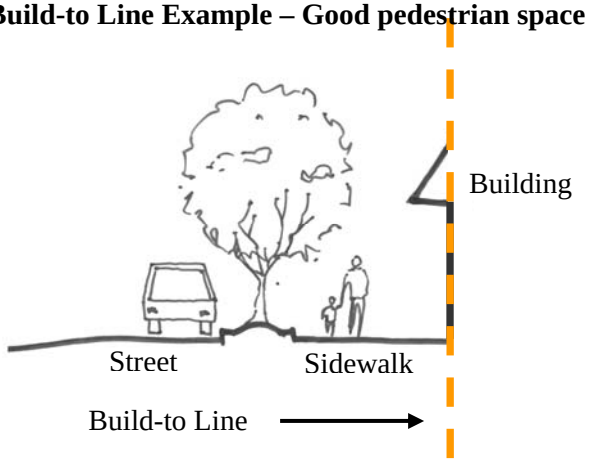


Recommendation D.4

Regulate the outdoor display of merchandise on landscaped areas within 50' of the edge of the paved surfaces of Route 9 and Route 254.

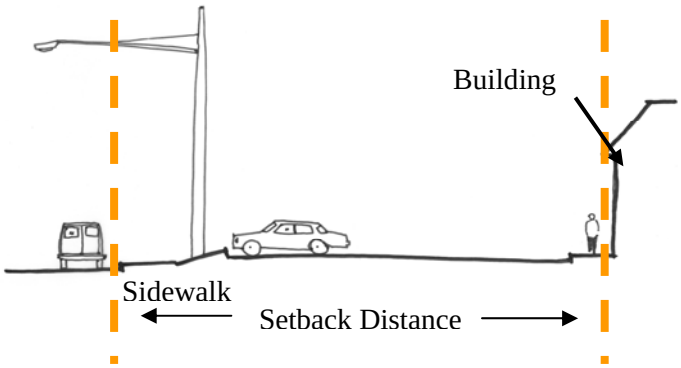
Disorderly or improperly placed outdoor merchandise displays can harm property values, create an unattractive and business climate, and threaten the public health, safety and welfare when it affects the visibility of traffic on the main roads and in individual driveways

Build-to Line Example – Good pedestrian space





Setback Example – Poor pedestrian space





Recommendation D.5

In the Bay Road Professional Office and Quaker Road East Commercial Areas parking should remain behind buildings, but setbacks should reflect the more rural nature of the areas.

These two areas are less dense and the standards imposed on these areas should reflect that. Parking lots should remain behind buildings, but the setback would be larger allowing for green space in front of buildings. Sidewalks would neither run directly along the road nor in front of buildings. Instead it would take the form of a rural path. Rather than concrete, the path could be asphalt, which has a more rural character. The path would run in front of buildings and connect to other pedestrian networks.





Buffered setbacks can preserve rural character and provide an opportunity to create pedestrian paths. Above are two illustrations from Saratoga Springs of how two hundred feet of wooded buffering can hide a major development, which can be seen below.



Recommendation D.6

Implement the design recommendations of the Main Street Plan. Continue the same design theme along Dix Avenue in southeastern Queensbury.

Queensbury has already gone through the process of developing a Main Street Redevelopment Plan. Improvements to the State Route 254 Corridor, or Main St., were established to create a clearly visible gateway to the Town of Queensbury.

The major elements of the design portions of the plan, which are already laid out in the zoning code, include making it a more pedestrian friendly environment with a continuous sidewalk system, crosswalks at key intersections, vegetated medians and turning lanes where appropriate. The initiatives include street trees, ornamental plantings and buffers, street furniture, different pavement textures, and properly scaled ornamental lighting. Existing buildings will be replaced over time and will be constructed along a "build-to" line that will bring them closer to the road. Two and three story brick faced buildings will evoke the upstate New York Main Street style and create a distinctive shopping experience.

Dix Avenue forms another, less utilized, eastern gateway to Queensbury. Here, too, the opportunity exists to create a distinctive experience along a main road. The goal is to create a commercial center that could serve the densely settled neighborhoods as well as nearby industrial and office uses. It would help create a vibrant neighborhood in this corner of Queensbury as the

town seeks to attract industrial and high-tech establishments to the surrounding industrially-zoned land.

Recommendation D.7

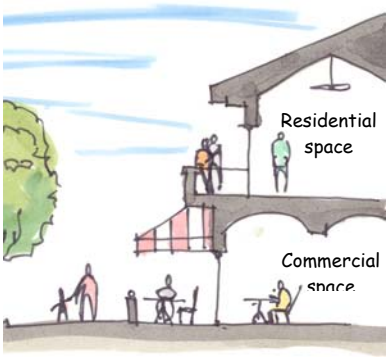
Alleviate the impacts of minimum lot requirements for commercial and office uses by adjusting setbacks.

In an effort to ease traffic, many communities mistakenly try to spread uses out. That ends up being counterproductive, as it requires shoppers to drive rather than walk between uses. In commercial corridors as intensively developed as those in Queensbury, the goal of creating walkability is best served by increasing density. Allowing more buildings in commercial areas will help reduce demand for them in residential and rural areas. Making the side setback requirements more lenient will allow for the desired commercial and office development in this area.

Recommendation D.8

Allow the Commercial Mixed-Use Areas on Main Street and Dix Avenue to host denser and more varied housing than is found in other parts of Queensbury. However, residential uses should not be allowed on the first floors of buildings along streets.

Offering housing in the traditionally commercial core will more efficiently use the land there. And a variety of uses – residential commercial, open space and institutional – is vital to any vibrant community. Such a community provides opportunity and convenience. A mixed-use community enables a resident to walk from their home to the corner to pick up some bread, grab a cup of coffee, or rent a movie. It increases the customer base for shops and services in the districts. This also offers a chance vary the style and price of housing in the Town of Queensbury. These areas would provide an opportunity for housing in the form of apartments or multi-family housing. These smaller units, located close to services and the Northway, might be attractive to the technology workers the region hopes to attract. It also allows the opportunity for seniors to remain in the community and age in place, especially as walking becomes more important to them than driving. Since much of the land in these corridors is occupied with commerce now that the transition to a more pedestrian friendly environment can occur as infill. By controlling the size and design of the commercial establishments, less land need be wasted on buffering between uses; in fact, some housing styles will mesh nicely with the commerce. Housing styles that would be appropriate to



Mixed-use districts benefit from a variety of uses within as well as between buildings.

this area include apartment buildings and townhouses comprising four or more units per structure. Single-family homes are not appropriate.

However, it is important to ensure that residential uses do not swamp and push out commercial uses. Therefore, in these mixed-use commercial areas, residential uses should be restricted to buildings behind commercial buildings or on floors above retail and office space. Only commercial uses can occupy the first floor of buildings that front both public and private streets. Residential uses should not be allowed to overrun mixed-use areas.

Recommendation D.9
Maintain, or create as needed, appropriate buffers between Mixed-Use areas and residential neighborhoods near them.
By its very nature, the current intense development in the Commercial Mixed-Use areas is not a good neighbor to many of Queensbury's housing areas. Adequate buffering should be maintained between these uses for the near future. However, as many pedestrian and vehicular connections as possible should be opened up between commercial and neighborhood areas.

Eventually, if development goes as planned, many of buffers may become unnecessary. As residential uses thin out the intensity of the commercial areas, some buffers might fill in and weave together the two communities.

Recommendation D.10
Revise sign regulations to reduce the number and size of signs in commercial areas. The regulations can vary depending on the neighborhood or commercial area within the community. Enforce the standards vigorously.
Signs in retail areas get out of control when businesses feel they have to be bigger and brighter just to be seen above the din of visual clutter. If a good set of rules is created and then enforced both businesses and the community benefit. Businesses can be assured that their message gets out and the community moves toward realizing its vision as a distinctive place.

The sign rules should emphasize the following:
- Limiting the size of signs
- Requiring lower signs, for example, monument signs
- Limiting the number of signs per establishment
- Controlling temporary signs
- No electronic signs or message boards

Many communities preserve character by controlling signs











E. Industrial Corridors / Economic Development

The economic stability of Queensbury is essential to the community's desire to reshape its character to reflect its role in the region, not only geographically but economically as well. With the designation of Empire Zones in and around Queensbury there is an opportunity to gain momentum to realize this vision of a substantial industrial sector.

By reorganizing and focusing industrial development in and around particular areas of the town, a more stable and effective role it will play in the future of Queensbury. This will be achieved with the following goal:

> Develop an economic program that reflects the community's land use goals while keeping up its tax base and job opportunities.

Recommendation E.1

Focus industrial businesses in and around the four, recently designated Empire Zones, and the Warren County Airport.

These areas tend to be the most attractive to businesses because of the tax incentives. The Empire Zones are located along the periphery of the Glens Falls border. Spin-off or related businesses may find it advantageous to be located in these areas, even if they are not directly in an Empire Zone. Transportation, air, rail and road, is already along well-established routes connecting all of these locations. Focusing industrial development within the Empire Zones and the Warren County Airport should result in the phasing out of industrial and large-scale uses in other parts of the town.

Recommendation E.2

Allow large-scale office and limited commercial uses in light industrial areas.

The shape of industry in upstate New York in general and the Capital District in particular is changing. No longer are cities and towns "industrial centers," rather they are emerging as hubs of communication, technology and business. Introducing non-industrial uses in these areas will help to grow and solidify the region as well as diversify the economic base. Office uses of any size can go hand-in-hand with light industrial uses – serving a community by creating good paying jobs and enlarging the tax base.

Retail uses can also play a limited role in industrial areas by providing services to operations and/or workers. Retail uses should be limited in size

and scope. For example, dry cleaners, restaurants, and small convenience stores appropriately fill this role, which is just to service the industrial areas. Under no circumstances should large amounts of industrially-zoned land be used for retail or other purposes.

Recommendation E.3
Secure public access to the waterfront as owners change in industrial areas.
While the evolution of industry can be traumatic for workers, it can hold benefits. Industrial land along waterfronts can now be secured for eventual public access. The Hudson River is a valuable asset that has historically been the focus of industrial development. Increasing public access raises quality of life, which is key in continuing to attract business and tourists.


Industrial areas should have paved pedestrian pathways rather than typical sidewalks.

Recommendation E.4
Set site plan review and architectural design standards for industrial areas.
Simple site layout, landscaping requirements and signage improvements would go a long way in make the area more attractive to more businesses. The goal, as in commercial areas, is to ensure the look of the community and let the market decide what industrial uses should inhabit these areas. In areas where industrial uses adjoin residential areas or important environmental areas, substantial landscaped buffers should be used to shield these areas from any adverse noise, light, dust, or odors that may be associated with industrial uses. Public and private roads in industrial areas should have sidewalks and bicycle lanes. They may be "paved pathways" rather than typical sidewalks since heavy foot traffic is not likely, however a pedestrian connection should be included in all areas within these zones.

As the upstate economy moves away from traditional manufacturing it is important to set the stage to attract higher technology operations. The design of new buildings should reflect, though not necessarily mimic, those found in nearby commercial areas, such as Dix Avenue. Buildings can be three to four stories in height.

Recommendation E.5
Institute a brownfields program to reclaim contaminated land or land perceived to be contaminated.
New York State and the federal government offer funding for communities to investigate contamination and plan for the reinvestment in industrial areas. Queensbury should continue to secure funding to inventory and evaluate

areas that no longer serve industrial purposes. A town brownfields program should be developed to track land and get it back into an economically productive use as soon as possible.

Recommendation E.6
Evaluate the extension of sewer lines to all industrial zones.
Focusing industrial development in and around the Empire Zones and the Airport makes it clear that these areas can be hooked up to the existing sewer and water districts, if they are not already connected. Industrial developments should not be dependent upon on-site septic systems or wells as this can have detrimental effects to the surrounding environment. Leaking septic tanks can reach drinking water and waterbodies in the surrounding area, in particular the Hudson River, and cleanup can be costly.

Recommendation E.7
Increase broadband access in the community
Communications is integral to all sectors of today's economy. Efforts to attract new business, especially those that might spin-off from the Capital Region's technology initiatives, require a wired community. The Internet is but one method of telecommunications, which must be investigated and planned for if Queensbury is retain and enhance its industrial base. Provision of increased communications technology can be a public venture, a private venture or a public-private partnership. The town should create a technology plan for the Town and integrate it into the municipal and regional economic development strategy.

Recommendation E.8
Create shovel-ready sites to allow for streamlined industrial permitting.
As in other areas, Queensbury needs to make it easy for developers to give the community what it wants. In light-industrials areas, the goal is to create well-paying office and industrial jobs. The town should work with regional and state economic development organizations to provide "shovel-ready" sites for potential users.

New York State certifies sites as shovel ready. Certification involves a certain amount of upfront investigation and pre-permitting to remove obstacles that can delay or derail a project. Developing land takes time, and time is money. A shovel-ready site that has already undergone wetlands and

archeological investigation, engineering studies, and other pre-permitting activities is much easier for a community to market.

Recommendation E9
Ensure that land use regulations for the lands surrounding the Floyd Bennett Memorial Airport support the airport's continued growth and operations.

Currently, most of the land south of the airport is zoned Light Industrial or Land Conservation, with some 1-acre residential along Queensbury Avenue. The light industrial and open space uses are most compatible with airport operations. The airport's primary runway is oriented in a north-south alignment, meaning that the majority of our aircraft operations will put the pilots over the areas north and south of the field. FAA guidelines for land use planning around airports discourage residential uses around areas of aircraft traffic.

The Economic Development Corporation of Warren County has made the airport one of its top priorities, as an airport is crucial to attracting businesses to the area. Aviation on a national level is also growing, and the FAA is forecasting the fastest growth in aviation over the next decade to be in the area of corporate jets, which the airport currently serves.

Recommendation E10
The Town should systematically review the both the capacity and impacts of existing public infrastructure Town-wide in order to have a more accurate understanding of the opportunities and limitations for future development town-wide.

F. Historic & Cultural Places

The history and culture of a community are vital to its future. Historic sites such as homes, barns, burial grounds and commercial buildings give a community its character. Protecting important places and weaving them into a plan for the community's future helps a town remain distinctive and desirable. History is an important economic and marketing opportunity.

"Historic preservation is simply having the good sense to hang on to something… [And] instead of asking, 'Is this building historic?' it may make more sense to ask, 'Is this building worth saving?'"[4]

The recommendations in this chapter focus on the following goal:

> Protect historic places and plan for their roles in achieving the community vision.

Recommendation F.1

Work with the Town Historian to complete a town-wide inventory of historic and cultural resources.

The Town Historian currently maintains a listing of historic resources within the community. The inventory should be enhanced, as Queensbury is rich in history. The benefits of this inventory are numerous. First, it provides a basis for determining which assets truly contribute to community character and should be saved. These will prove economically valuable for tourism, as well as creating the distinctiveness that attracts quality businesses and a skilled workforce. Second, it provides a way to identify sites that may be eligible for listing on the National Historic Register. Any involvement in the State or National Register of Historic Places or in a historic district should be voluntary, although having this type of designation can offer financial opportunities to both the municipality and the property owner. Finally, it gives developers a clear sense of community priorities. By designating which these assets in mind, they can maximize the value of their projects in a minimum amount of time.



Historic sites add valuable community character.

An area bearing particular attention might be the site of Fort Williams and Oneida Corners. Queensbury should support the Town Historian's

[4] National Trust for Historic Preservation. http://www.nationaltrust.org/primer/historic.html

investigation into the possibility of historic district designation for these areas, which are near the intersection of Route 9 and Route 149.

Recommendation F.2
Examine the possibility of becoming a Certified Local Government and look for ways to gain federal support for preservation efforts. Become a foundation for historically-based tourism and business development.
In return for becoming a Certified Local Government, and this commitment to historic preservation, the Park Service, through the NYS Historic Preservation Offices, provides technical and financial assistance to municipalities while allowing for a combination between historic preservation, land use decisions and planning for the community.[5] Another incentive for participating in the program is the pool of matching grant funds set aside to fund preservation projects such as "historic theme or context studies, cultural resource inventories, assessments of properties to determine their eligibility… building reuse and feasibility studies, design guidelines and conservation ordinances, and publications to educate the public about the benefits of historic preservation".[6] To date approximately $40 million has been allocated through Historic Preservation Fund grants since the Certified Local Government program was established in 1985. Over twelve hundred local governments have benefited and continue to participate in the preservation efforts.

[5] Certified Local Government Program. http://www.cr.nps.gov/hps/clg/
[6] Certified Local Government Program. http://www.cr.nps.gov/hps/clg/clg_p.htm

G. Enforcement and Administration

Effective enforcement and efficient administration are vital to the success of a comprehensive plan. This does not mean rules have to be draconian. Rather, regulations must be predictable and fairly applied. Businesses, individual and their communities thrive in stable environments. Investment becomes tricky when rules change from one applicant to the next. A community's long-term vision is only realized when elected officials and town staff rigidly remain on the path set out by the Comprehensive Plan.

The recommendations in this chapter focus on the following community goal:

> Establish a clear, predictable and timely review process that makes it easy for applicants to understand and adhere to community design standards. Enforce those standards vigorously.

Recommendation G.1

Consolidate the number of zoning districts.

The Town of Queensbury has almost thirty different zoning districts in its code. In addition, a handful of Planned Unit Developments[7] have land-use rules of their own. This large number of districts makes administration difficult and creates patchwork communities detrimental to character, traffic and other important aspects of a town's quality of life.

In Queensbury, experience indicates that the number of zoning districts should ultimately be cut at least in half. Consolidating zones within particular uses can likely accomplish this. For example, Queensbury code provides for four industrial zoning districts: Commercial Industrial, Light Industrial, Veteran's Field Light Industrial and Heavy Industrial. The first three allow virtually identical uses. It is likely that two industrial categories would be sufficient to accomplish town goals. Similar evaluations should be undertaken for all zoning districts.

[7] Planned Unit Developments, or PUDs, allow land to be developed in a more flexible fashion, generally leaving the underlying zoning in place. A PUD takes a big picture approach to development in order to take advantage of design and other opportunities

Recommendation G.2

Create a "smart growth" checklist or scorecard to help planning board members, developers and the public remember the community's vision and the tools in place to achieve it.

A scorecard or checklist can be a constant reminder and guide to what is required as a standard and what is preferred as a guideline. It could be a formal document that the planning board fills out together to "grade" a project. Or it could be something that individual members use for each project as a guide to smart growth and the community's vision. As a public document, it would be available to developers to see the criteria, but they would not be the ones filling it out. It is a document to spark discussion amongst planning board members.

The scorecard/checklist could include the following categories:

> Located near infrastructure
> Promotes walkability
> Reflects appropriate design/history
> Attracts high-quality jobs
> Promotes a mix of uses
> Provides housing options
> Preserves open space
> Protects the environment
> Provides community amenities

Recommendation G.3

Zoning and subdivision regulations should make it easy for landowners and developers to give the community what it wants.

Contrary to popular belief, developers do not cause sprawl. Most of the fault for inefficient suburban design lies with zoning laws and the poor administration of the rules. Communities often say they want things like pedestrian friendly shopping districts or buildings that reinforce community character. However, outdated rules designed to overly separate uses and cater to cars result in just the opposite.

The Town of Queensbury should revise its code to reflect the community's vision. The code should be clear and comprehensive so developers and landowners understand exactly what is required of them. Those who wish to invest in the community with projects that reflect the community's vision should be rewarded with an expedited review process. (Expedited review is valuable to developers in tune with regional business cycles.) Ambiguity and too much discretion in zoning code and subdivision regulation allow developers to push for "lowest common denominator" projects that they could build almost anywhere. Most quality developers will recognize that

predictable zoning protects their investment over the long term. Queensbury is so successful as a commercial and residential destination that it need not compromise values to attract developers.

Recommendation G.4
Rezoning should be rare and only take place if it forwards the goals of the Comprehensive Plan.
A proper community plan and subsequent zoning / subdivision rules should make the need to rezone a rarity, if not practically eliminate it. Extensive rezoning creates instability in a community – businesses and homeowners never know what will crop up next to them. In addition, zoning changes quickly derail progress toward a community's vision.

Rezoning, should it need to take place, should only happen if it furthers the goals of the Comprehensive Plan or after the community decides it needs to revisit the plan. All changes, by state law, need to reflect the community's comprehensive plan.

Recommendation G.5
Variances should be rare.
Zoning rules supposedly provide for the uniform application of adopted standards that will move the community toward its vision. However, while all land in a zoning district is theoretically held to the same standards, the reality is that no two pieces of land are exactly the same. A variance is a way to provide relief from one or more requirements in limited circumstances on particular pieces of land.

Variances should be granted sparingly because they are permanent and run with the land, not limited to a particular landowner. Also, the zoning board needs to remember that variances set precedence. Under similar circumstances, the board must grant similar variances. The cumulative effect of granting variances can quickly undermine the zoning ordinance and the community's vision as established in the Comprehensive Plan.

There are two types of variances – area variances and use variances. A use variances permits a use for the land that is otherwise not allowed by zoning. An area variance permits a use that is allowed, but that does not meet dimensional requirements such as setback, height or area.

To obtain a use variance, an applicant must demonstrate that the zoning causes an unnecessary hardship. Proving that hardship requires meeting four conditions.

1. The owner cannot realize a reasonable return on the property as zoned. This lack of return must be substantial and must be proven with competent financial evidence. It does not matter if the desired use is more profitable than the allowed use. Landowners are only entitled to a reasonable return.
2. The hardship must be unique to the individual property, not a substantial portion of the zoning district. If the hardship applies to a whole neighborhood, then the answer is for the Town Board to change the zoning.
3. Granting the variance cannot alter the essential character of the neighborhood.
4. The hardship is not self-created. For example, if a developer buys land zoned residential, but wants to build a commercial structure, he cannot argue that the zoning is creating a hardship for him.

Obtaining an area variance is easier. Rather than prove an entire set of conditions, a zoning board of appeals need only demonstrate in its findings that the members considered each of the following questions in terms of the health, safety and welfare of the neighborhood or community when making its rational decision.

1. Will the area variance produce an undesirable change in the neighborhoods character or be a detriment to nearby properties?
2. Can the benefit sought by the applicant be achieved by some method other than pursuing the area variance?
3. Is variance substantial?
4. Will the proposed variance have an adverse impact on the physical or environmental conditions of the surrounding neighborhood or district?
5. Is the hardship self-created? This question shall be considered during discussions, but it does not preclude granting the variance.

In the case of both variances, state law requires that the zoning board grant the minimum variance necessary and must at the same time preserve and protect the character of the neighborhood and the health, safety and welfare of the community. Variances may be granted with stipulations set by the Zoning Board of Appeals, such as requiring landscaping to mitigate the impact of the variance on the neighborhood. Indeed, protecting community

character is one of the most important reasons for imposing conditions upon the granting of a variance. However, zoning boards may not impose conditions unrelated to the variance on a project.[8]

Recommendation G.6
Increase the enforceability of the zoning code and subdivision regulations.
Zoning and land-use regulations should be clear enough that landowners understand what is required of them. The penalties for not following the rules should also be clear to town enforcement officials and, if needed, judicial reviewers. In Queensbury, the staff has reported that penalties for some rules make their enforcement impossible. The benefits of a stable planning environment will be lost if zoning regulations cannot be vigorously enforced.

Recommendation G.7
Review this Comprehensive Plan regularly.
This Comprehensive Plan is a living document. A Comprehensive Plan should serve as a guide for future action by public and private entities in the Town. As with any planning document, this plan should be reviewed regularly to determine if the goals and recommendations found within continue to be relevant based on changing circumstances, and updated as needed.

The Town Board should review Comprehensive Plans at least annually to ensure that the vision remains the same and that the implementation stays on track. Communities should formally review and update (or rewrite as needed) their Comprehensive Plans every five years.

[8] This section was adapted from *Variances: Basic Tools and Techniques*, published online by the Pace Law School. www.law.pace.edu/landuse/varia.html

Los Angeles City Council, **Journal/Council Proceeding**
Wednesday, August 31, 2016
JOHN FERRARO COUNCIL CHAMBER ROOM 340, CITY HALL 200 NORTH SPRING STREET, LOS ANGELES, CA 90012 - 10:15 AM

SPECIAL COUNCIL MEETING

(For further details see Official Council Files)

(For communications referred by the President see Referral Memorandum)

ROLL CALL

Members Present: Blumenfield, Bonin, Buscaino, Englander, Fuentes, Harris-Dawson, Huizar, Koretz, Krekorian, Martinez, O'Farrell, Price and President Wesson (13); Absent: Cedillo and Ryu (2)

Items for which Public Hearings Have Been Held

ITEM NO. (46)

16-0147

CD 11 TRANSPORTATION COMMITTEE REPORT relative to the relinquishment of certain portions of State Route 187 (Venice Boulevard) in the City of Los Angeles.

Recommendations for Council action, SUBJECT TO THE APPROVAL OF THE MAYOR:

1. FIND that the relinquishment of Venice Boulevard (State Route 187) from Lincoln Boulevard to Cadillac Avenue to the California Department of Transportation (Caltrans) is in the best interest of the City.

2. APPROVE the relinquishment as detailed in the August 22, 2016 Joint Los Angeles Department of Transportation (LADOT) and Bureau of Engineering (BOE), attached to the Council file.

3. APPROVE and AUTHORIZE the Mayor to execute District Agreement No 07-5097 with Caltrans, subject to review by the City Attorney as to form and legality, for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue.

4. AUTHORIZE the Director of the Office of Accounting, Board of Public Works (BPW), to receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue and to deposit said funds as follows:

a. $13,000,000 into the Subventions and Grants Fund No. 305/50, and appropriated into a new account within the Fund entitled Venice Boulevard Relinquishment.

b. $1,500,000 into the Transportation Trust Fund No. 655/94, and appropriated into a new account within the Fund entitled Venice Boulevard Great Streets Improvements.

5. AUTHORIZE the LADOT to issue non-participating change orders as part of ongoing transportation construction contracts in order to expedite the construction and enhance safety at five intersections along the Great Street section of Venice Boulevard.

6. AUTHORIZE the Director of the Office of Accounting, BPW, to make any technical accounting corrections or clarifications to the above instructions in order to effectuate the intent of the Mayor and City Council.

7. RECEIVE and FILE Motion (Bonin - O'Farrell) relative to the relinquishment of certain portions of State Routes 187 (Venice Boulevard) and 1 (Lincoln Boulevard) in the City of Los Angeles.

Fiscal Impact Statement: The LADOT and BOE report that the City will receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue. A minimum estimated amount of $7,000,000 in improvements along Venice Boulevard would remain to be addressed. It is anticipated that the additional funds could be secured by pursuing outside grant funding opportunities.

Community Impact Statement: None submitted.

(Public Works and Gang Reduction Committee waived consideration of the above matter)

ADOPTED

MOTION (BONIN - WESSON - ENGLANDER)

Recommendation for Council action, SUBJECT TO THE APPROVAL OF THE MAYOR:

AMEND to adopt an additional recommendation, as follows:

ADOPT the accompaying resolution, as required by Section 73 of the Streets and Highway Code, that would relinquish Venice Boulevard between Lincoln Boulevard and Cadillac Avenue (State Route 187 PM 3.5-PM 8.8) to the City of Los Angeles and facilitate the California Transportation Commission to allocate $14,500,000 to the City as the

cost of relinquishment.

Adopted as Amended - TO THE MAYOR URGENT FORTHWITH, (13); Absent: Cedillo, Ryu (2)

Whereupon the Council did adjourn.

ATTEST: Holly L. Wolcott, CITY CLERK

By:

Council Clerk PRESIDENT OF THE CITY COUNCIL

Landscape and Urban Planning 171 (2018) 88–97

Contents lists available at ScienceDirect

Landscape and Urban Planning

journal homepage: www.elsevier.com/locate/landurbplan

Research paper

An economic analysis of complete streets policies

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ARTICLE INFO

Keywords:
Complete Streets
Hedonics
Community design features
Difference-in-differences propensity score matching

ABSTRACT

This paper tests whether adoption of a Complete Streets policy (a transport policy and design approach that requires streets to be designed and operated to allow equal access to all people and major forms of transportation, rather than just motor vehicles) has amenity value for local residents by analyzing the link between Complete Streets policy adoption and house prices using a difference-in-differences matching procedure (DIDMP). We employ this DIDMP because commonly employed least-squares-regression techniques may fail to fully account for selection effects. We show that commonly employed least-squares-regression techniques generally overestimate the effect of a Complete Streets policy and using DIDMP we find that Complete Streets policy adoption had no statistically significant effect on house prices.

1. Introduction

In 2005, a coalition of advocacy and trade groups including the American Public Transportation Association and the National Association of Realtors founded the National Complete Streets Coalition (NCSC). The NCSC aimed to advance so-called “Complete Streets,” a transport policy and design approach that requires streets to be designed and operated to allow equal access to all people and major forms of transportation, rather than just motor vehicles. As of January 1, 2017, 1232 jurisdictions in the United States, including 955 municipalities, had adopted a Complete Streets policy (NCSC, 2017).

The design principles of Complete Streets include pedestrian infrastructure, traffic calming, and bicycle and public transit accommodations. These Complete Streets are defined as “[streets] designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities,” and are meant to optimize and improve the ability, safety and ease of travel, shopping and other activities in the area (NCSC, 2016).

The most important components of Complete Streets include, “sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, and roundabouts” (NCSC, 2016). Generally, Complete Streets components can include any type of additional road alteration or modified architecture that provides safety or increased accessibility for the user. To put it very simply, an “incomplete” street would be defined as one designed only for use by motor vehicles and is not safely accessible for anything or anyone else.

These complete streets are then realized through planning and execution by government organizations and engineers who design, build, and maintain these newly completed streets. Municipal governments typically commit to a Complete Streets policy via a resolution or ordinance. Following policy adoption, municipal officials often outline more detailed plans to implement the Complete Streets vision. In many cases, this takes the form of modifications to transportation plans. In other cases, town planners and public works officials simply modify future road projects to conform to the principles of Complete Streets.

The claimed benefits of these Complete Streets policies include increased safety, physical activity, and health (NCSC, 2016). Public transportation options also improve due to improved access and better planning. As a result of increased public transportation use, gas and oil consumption fall. However, there are no rigorous assessments of the value of Complete Streets policies. Because the costs associated with planning, logistics, and execution of pedestrian- and transit-oriented development are high and require continued commitment, evidence of benefits helps support expenditures on pedestrian- and transit-oriented development. Consequently, this paper attempts to assess the benefits of Complete Streets policy adoption using municipality-level data from New Jersey and New York. To capture these benefits/amenities, we follow the well-established practice of valuing amenities by observing differences in house prices.

This practice, first described in Rosen (1974), describes houses (and indeed all differentiated products) using their measured characteristics. These characteristics include property (e.g., acreage), neighborhood/environmental dimensions (e.g., school quality or percentage commercial tax base), and broader location variables (distance to the CBD).

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https://doi.org/10.1016/j.landurbplan.2017.11.004
Received 16 August 2016; Received in revised form 6 November 2017; Accepted 8 November 2017
Available online 22 November 2017
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Under competitive conditions, consumer and producer location decisions alter prices to ration the more desirable locations/characteristics. Consequently, house prices reflect the values consumers attach to each of the dimensions of the good and multivariate techniques allow us to identify the value of each dimension.

For instance, we may infer the value of increases in school quality using house price differences across school districts while controlling for other factors that affect house prices (Dhar & Ross, 2010). Similarly, we may value pedestrian- and transit-oriented development by examining house price differences across locations with more (or less) access to these developments (Bartholomew & Ewing, 2011). This paper tests whether adoption of a Complete Streets policy affects house prices using a difference-in-differences matching procedure (DIDMP) developed in Heckman, Ichimura, and Todd (1997) and Heckman, Ichimura, Smith, and Todd (1998).

We employ this DIDMP because commonly employed least-squares-regression techniques may fail to fully account for selection effects. More precisely, least-squares regression techniques assume that: 1) the covariates used to control for selection effects show similar distributions for treated and untreated observations; and 2) the relation between the covariates and outcomes is linear. As these assumptions are likely violated in observational data, we employ this differences-in-differences matching procedure (DIDMP). We show that in the case of Complete Streets policy adoption the covariates used to control for selection are not similarly distributed for treated and untreated observations and that commonly employed least-squares-regression techniques generally overestimate the effect of Complete Streets policies. Using DIDMP, we find that Complete Streets policy adoption had no significant effect on house prices.

2. Literature review

While there are no evaluations of the economic effects of Complete Streets, a series of papers evaluate the economic effects of some of the design elements and ideas embodied in Complete Streets. Because design characteristics, like other characteristics of real estate, are capitalized into house prices, the literature imputes the value of design characteristics by examining changes in house prices (i.e., hedonics) (Rosen, 1974). The recent literature on the value of design characteristics falls rather neatly into two groups: direct assessments of the value of design elements and assessments of the interaction between design elements and transit-oriented development (TOD) (Bartholomew & Ewing, 2011).

Many of the direct assessments of the value of design elements are analyses of the effect new urbanism or neo-traditional development (Dong, 2015; Guttery 2002; Plaut & Boarnet, 2003; Ryan & Weber, 2007; Song & Knaap, 2003; Song & Quercia, 2008; Tu & Eppli, 2001). This new urbanism seeks to build communities that have: 1) walkable streets; 2) public spaces surrounded by high-density development; 3) a variety of housing options; and 4) little physical separation between residential and commercial uses. To identify the effect of new urbanist design on house prices, Tu and Eppli (2001) compare house prices in new urbanist and conventional developments for three market areas and find houses in the new urbanist communities show significantly higher prices.

Song and Knaap (2003) use a somewhat more sophisticated approach to disaggregate the impact of new urbanist design on house prices. They consider the separate effects of street design and circulation systems, density, land-use mix (e.g., single-family residential versus other residential), accessibility to parks and commercial uses, transportation mode choice, and pedestrian walkability. Results show that some features of new urbanist development raise house prices (e.g., interconnected streets, shorter blocks, accessibility to light rail, walkability, and shorter distances to parks).

However, consumers also valued some features that were inconsistent with new urbanist design (e.g., cul-de-sac locations, neighborhoods with fewer connections to other locations, single-family homes as the dominant use, low population and housing-unit density, and longer distances to commercial locations). Because some of the valued attributes (e.g., interconnected streets) cannot be increased without decreasing other valued attributes (e.g., cul-de-sac locations), they compare price effects for the mean values of the design features for Washington County with the price effects for the mean values for a prototypical new urbanist development and find a $24,255 premium for the new urbanist development.

Consistent with Song and Knaap (2003), Plaut and Boarnet (2003) also show a premium for new urbanist development. Ryan and Weber (2007) compare traditional neighborhood designs (TND), enclave (or self-contained) development, and infill (or scattered site) development in high-poverty areas. TND is like new urbanism in that it seeks to replicate the design features of the surrounding neighborhood (e.g., interconnected street grids and street-facing housing). They find that infill development commands a value premium (based on assessed values) over TND and enclaves.

Further, Ryan and Weber (2007) suggest that separate evaluations of new urbanist design attributes may be misleading because the implicit prices of the design attributes vary across different neighborhoods. Indeed, Song and Quercia (2008) show that buyers in middle- and outer-ring suburbs place higher values on larger lots and lower density than consumers in inner-ring suburbs and the urban core. Similarly, buyers in the urban core are willing to pay more for properties with good external connectivity and increased pedestrian access to bus stops while these same attributes decrease prices in middle-ring suburbs.

There is also evidence that these “smart” land use patterns show less sensitivity to market downturns. Dong (2015) shows that housing units with both “smart” land use patterns (i.e., high residential densities, high proportions of multi-family homes, and mixed land uses) and wider transit options (i.e., accessibility to light rail and bike routes) held their value better than housing units without both smart land use and wider transit options (or just smart land use).

Like new urbanism, LEED (Leadership in Energy and Environmental Design) certification (offered by the U.S. Green Building Council) aims to encourage smart land-use patterns. The Council offers certification of both individual buildings as well as neighborhoods using a point system that values green construction, sustainable sites, as well as some elements of new urbanism at the neighborhood level. Freybote, Sun, and Yang (2015) find that while LEED building certification raises house prices by about 3.6%, neighborhood certification has no effect on house prices.

In addition to assessments of the value of new urbanist design, the literature also assesses the value of street layout (Matthews & Turnbull, 2007), trees and tree placement (Donovan & Butry, 2010; Netusil, Levin, Shandas, & Hart, 2014; Pandit, Polykov, Sorada, & Moran, 2013), walkability (Boyle, Barrilleaux, & Scheller, 2014; Dong, 2015; Li et al., 2015; Pivo & Fisher, 2011), and bicycle paths (Krizek, 2006).

Donovan and Butry (2010) assess the value of trees planted between the road and sidewalk (i.e., the parking strip) and find that, after controlling for housing characteristics and spatial dependencies, the two tree variables (number of trees and canopy cover) added on average about $8900 to the house price (about 3%). Pandit et al. (2013) use a similar design and find that broadleaf trees planted in the parking strip increased housing values about 4%. By contrast, broadleaf trees planted elsewhere and palm trees had no impact on housing values. Netusil et al. (2014) find similar effects.

To assess the effect of walkability on property values, Pivo and Fisher (2011) measure walkability by constructing an index (for each address) that is a declining function of distances to educational, retail, recreational, food, and entertainment destinations. They find that a one standard-deviation increase in the walk score is associated with a 20% increase in market value for office and retail properties.

Similarly, Li et al. (2015) measure walkability using sidewalk

density (SWD) and an index constructed as a declining function of distance to amenities (SWSS). The most walkable neighborhoods show the largest impact on property prices. In these neighborhoods, a one percent increase in SSWS produces about a $1300 increase in house prices. For the least walkable neighborhoods, a one percent increase in SSWS produces about a $30 reduction in house prices. SWD produces similar results.

Boyle et al. (2014), however, cast doubt on the inference that walkability causes higher housing prices. They show that, consistent with earlier research, walk score has a significant positive effect on house prices. However, adding controls for neighborhood fixed effects eliminates the statistical significance of walk score. Thus, within a given neighborhood, more walkable properties do not command higher prices. This suggests that unmeasured neighborhood-level amenities (associated with walkability) are driving the observed relation between walkability and housing prices.

While Matthews and Turnbull (2007) assess the effect of street layout on house prices, their measures of street layout resemble the walkability measures discussed above. Their measures of street access are designed to capture access to all locations in the neighborhood from a given location. They find that older neighborhoods with a grid street pattern show higher values with increases in street access while newer neighborhoods (laid out in a curvilinear cul-de-sac street pattern) show lower values with increases in street access.

Like street layout, the effect of bike trails on house prices depends on context. Krizek (2006) finds that moving a home 400 m closer to a roadside bike trail reduces the house sale price by about $2300, but moving the same distance closer to an off-street bike trail raises the house sale price by about $500.

A series of papers that assess the impact of transit oriented development (TOD) on house prices suggest that the effect is mediated by other design elements. Bowes and Ihlanfeldt (2001) find that transit stations built with parking lots (i.e., park and ride) decrease residential property prices about 1.4% for homes located in within one-half to a mile of the station (relative to stations without lots, i.e., walk and ride). Similarly, Kahn (2007) finds that walk-and-ride stations show a 3% increase in home prices while park-and-ride stations show no effect (relative to similar census tracts that did not receive a transit station).

Duncan (2011) examines the same link using data on condominium sales. To gauge design characteristics of stations, Duncan uses density of street intersections and the density of employment in services (i.e., entertainment, food, and retail). Defining “good” pedestrian neighborhoods as neighborhoods at the 75th%ile on these density measures, he finds that locating a train station in a good pedestrian neighborhood produces a premium of about 15% (roughly $20,000) relative to condos without station access. By contrast, locating a station in a poor pedestrian neighborhood (25th percentile) produces a discount of about 11%.

Atkinson-Palumbo (2010) uses a different set of variables to capture station-area design characteristics (and a different location) but shows similar results. Train stations in mixed-use neighborhoods (characterized by walk-and-ride stations) show a 6% premium for single-family homes and a 20% increase for condos. Zoning changes designed to advance a transit-oriented environment produced an additional premium of 37% for condos. Thus, across the new urbanist and the transit-oriented development evaluations, we see substantial positive impacts from design features. However, the impact of these design features often depends on other contextual elements.

In sum, evidence suggests that design characteristics including elements of new urbanism walkability, street layouts, location and existence of street trees, and design and location of transit stations have a positive effect on property values. Because Complete Streets overlaps with some of these elements, this implies that Complete Streets commitments by municipalities likely raise property values. We test this conjecture. We also explore potential bias from statistical procedures typically used to assess the value of design characteristics (e.g., new urbanism, walkability) and transit-oriented development.

This potential bias stems from an empirical strategy that attempts to isolate the effects of the design characteristics by using least-squares-regression techniques and including housing and community characteristics as covariates to control for omitted-variable bias or selection effects (Atkinson-Palumbo, 2010; Bowes & Ihlanfeldt, 2001; Boyle et al., 2014; Donovan & Butry, 2010; Duncan, 2011; Freybote et al., 2015; Guttery 2002; Krizek, 2006; Li et al., 2015; Matthews & Turnbull, 2007; Netusil et al., 2014; Pandit et al., 2013; Pivo & Fisher, 2011; Ryan & Weber, 2007; Song & Knaap, 2003; Song & Quercia, 2008; Tu & Eppli, 2001).

Imbens (2015) shows that least-squares regression techniques rely on two key assumptions. First, the covariates used to control for selection effects must have similar distributions for treated and untreated observations. (If this is not the case, selection bias results from the fact that some treated observations have no comparable untreated observations and some untreated observations have no comparable treated observations.) Second, the relation between the covariates and outcomes must be linear. These assumptions are likely violated in evaluations of the effect of design elements that employ non-experimental data (i.e., treated and untreated groups are not randomly assigned). In such cases, the difference in the average values of the covariates for treated and untreated groups may be large. Consequently, this paper attempts to employ a method that better controls for issues related to selection or evaluation bias: a difference-in-differences matching procedure developed in Heckman et al. (1997) and Heckman et al. (1998) and employed in Romero (2009).

3. Data and methods

When treated and untreated cases are not randomly assigned, simple comparisons of municipalities that do not adopt Complete Streets policies with municipalities that adopt are likely misleading because differences in community characteristics and the trend in house prices may cause changes in the probability of adoption and the outcome (house prices). That is, we may infer that the Complete Streets policy caused the difference in house prices when, in fact, a series of community characteristics or house price trends are causing both the higher house prices and the adoption of a Complete Streets policy. Thus, we must control for this so-called selection bias.

Heckman et al. (1997) shows that selection or evaluation bias follows from three sources. First, for some treated observations, there are no comparable untreated observations and for some untreated observations there are no comparable treated observations. Second, the observable factors that determine treatment status may not be distributed equally across treated and untreated groups. Third, unobservable factors that determine treatment status may vary across treated and untreated groups.

Propensity score matching, a procedure first developed by Rosenbaum and Rubin (1983) and employed in a series of recent papers in the urban economics literature (Bento, Towe, & Geoghegan, 2007; Deng, McMillen, & Sing, 2012; O’Keefe, 2004; Romero, 2009), is an effective method to reduce bias of the first two types. We may think of the propensity score as an advanced matching technique. In cases where a series of factors determine treatment (i.e., Complete Streets policy adoption), it becomes more difficult to find exact matches for the treated group. By collapsing these determinants into a single score, propensity scores solve this dimensionality problem. Rosenbaum and Rubin (1983) show that at any value of the propensity score the difference between the outcomes for treated and untreated groups is an unbiased estimate of the treatment effect as long as assignment to treatment is associated only with the observable pre-intervention variables.

To reduce the third source of bias, Heckman et al. (1997) and Heckman et al. (1998) propose a difference-in-differences extension of this matching procedure and show that the estimator is effective in eliminating bias when the bias follows from temporally-invariant

omitted variables. The estimator calculates the change in the outcome variable for each observation (i.e., municipality) between the pre-period (prior to treatment) and the post-period (after treatment) and then makes comparisons across treated and untreated groups conditioned on the variables that determine selection into treatment. That is, it calculates the pre-period/post-period difference for each observation and then compares these differences across treated and untreated groups conditioned on the variables that determine selection into treatment, hence difference in differences.

This estimator estimates the difference in the expected outcome with and without treatment for the participants (i.e., municipalities) that actually receive treatment (i.e., average treatment effect on the treated). Following Heckman et al. (1997), we may express the estimator as follows:

$$\mathrm{CS}(X) = E(Y^1_{1t} - Y^0_{1t'} \mid X,\ \mathrm{CS} = 1) - E(Y^0_{0t} - Y^0_{0t'} \mid X,\ \mathrm{CS} = 0) \quad (1)$$

where Y is the outcome variable, the superscript 1 indicates treated status, the superscript 0 indicates untreated status, the subscript 1 indicates membership in the treated group, the subscript 0 indicates membership in the untreated group, X is the set of conditioning variables that determine assignment to treatment, t is a time after the treatment, and t' is a time before treatment. The identifying assumption of Eq. (1) is:

$$E(Y^0_{1t} - Y^0_{1t'} \mid X,\ \mathrm{CS} = 1) = E(Y^0_{0t} - Y^0_{0t'} \mid X,\ \mathrm{CS} = 0) \quad (2)$$

That is, the expected change in the outcome variable over the period for across treated and untreated groups (conditioned on X) is the same across treated and untreated groups in the absence of treatment. Smith and Todd (2005) show that this difference-in-differences matching estimator performs substantially better than corresponding cross-sectional matching estimators.

However, a number of conditions must hold for propensity score matching procedures to produce reliable estimates. First, matching requires a rich array of conditioning variables (Heckman et al., 1998). Second, the same data sources must be used for treated and untreated groups (Heckman et al., 1998). Third, for all conditioning variables, there is a positive probability of receiving the treatment and a positive probability of not receiving treatment (i.e., $0 < \Pr(\mathrm{CS} = 1 \mid X) < 1$). Fourth, matching must only occur over a region of common support (i.e., an overlap in the range of propensity scores across treated and untreated groups) (Heckman et al., 1998). That is, valid inferences regarding treatment effects for treated observations require untreated observations with a similar propensity score.

To estimate Eq. (1), we first develop our set of conditioning variables and then estimate the average treatment effect on the treated (ATET) using the *teffects psmatch* command in Stata (Stata Corporation, 2015). This procedure estimates the propensity score using the conditioning variables, matches treated and untreated observations based on the propensity score, and then estimates the treatment effect accounting for the fact that the propensity score is an estimate.

To develop our set of conditioning variables, we hypothesize that Complete Streets policy adoption decisions at the municipal level are a function of municipality characteristics and the pre-period trend in house prices. To measure municipality characteristics, we assembled data for the 324 boroughs and cities in the State of New Jersey from the 2010 American Community Survey (ACS) and for the 601 villages and cities in the State of New York (U.S. Census Bureau, 2016). (Townships in the State of New Jersey and towns in the State of New York are not included in the ACS.) This data was then joined to a set of distance variables (calculated using ArcGIS), municipal tax base data, average municipal house price sales data, and a list of New Jersey and New York municipalities that adopted a Complete Streets policy from 2008 to 2015. (No adoptions occurred prior to 2008.)

New Jersey municipal tax base data is from the New Jersey Department of Community Affairs (2016) and average municipal house price data is from the New Jersey Department of the Treasury (2016). For New York, municipal tax base data is from the New York State Department of Taxation and Finance and average municipal house price data is from the New York State Office of Real Property Tax Services (2017). Data on Complete Streets policy adoptions is from three sources: The National Complete Streets Coalition, The Department of Transportation for the State of New York, and the New Jersey Bicycle and Pedestrian Resource Center. We used the National Complete Streets Coalition as the primary resource and cross-checked the data against the other two sources.

While tax base data is available for every New Jersey municipality, only 275 cities and villages report tax base data to the State of New York. We drop New York City from the analysis as the real estate transaction data is compiled by the city (rather than the state) using different definitions. We also drop all municipalities with a 2010 population below 1500 and all municipalities that adopt a Complete Streets policy in the period after 2013 or before 2009. These small municipalities have a relatively small number of houses sold in a given year, and consequently, average house sale prices can change significantly across years for reasons unrelated to economic conditions. Following these changes, we have 84 treated and 334 untreated municipalities in our data. We lose three additional municipalities because of missing house price data (one treated and two untreated).

Because Complete Streets is likely a normal good, municipalities with higher median household income (*Income*) should be more likely to adopt a Complete Streets policy. For similar reasons, municipalities with higher house prices (*House Price in 2009*) may be more likely to adopt. We include the pre-period (2008–09) proportional change in house prices (*House Price Appreciation 2008–2009*); municipalities with larger increases (or smaller decreases) in house prices may see less need to make planning changes of this sort. Higher population density (*Density*) may cause higher demand for design changes that increase the feasibility or desirability of modes of travel other than cars (i.e., Complete Streets). Similarly, municipalities in which residents already rely heavily on cars for commuting are less likely to adopt a Complete Streets policy and we therefore expect that when the ratio of car commutes to total commutes (*Car Ratio*) is high, Complete Streets policy adoption is less likely. Because Complete Streets requires design changes, larger municipalities *(Population)* are more likely to have personnel capable of making such changes.

We include the ratio of the commercial tax base to the total tax base (*Commercial Tax Base*) because walkability may be more important to merchants who wish to create appealing locations to attract shoppers. Another possibility is that municipalities with a higher percentage of their tax base in commercial use attract more non-resident automobile and truck traffic and municipalities react to the increased non-resident traffic by adopting a Complete Streets policy to control disamenities associated with the traffic.

Because distance from a major metropolitan area likely influences a host of commuting and design-related decisions, it may also affect decisions to adopt a Complete Streets policy. We capture the effect of such distance using both the distance from municipality i to New York City (*NYC Distance*) and Philadelphia (*PHL Distance*). We also create a variable designed to capture distance from the corridor that connects Philadelphia and New York City (*NYCPHL*). *NYCPHL* is the square root of the sum of the squared distances from the municipality to Philadelphia and New York City. Properties directly on the corridor tend to have disamenities associated with population density (e.g., traffic congestion, school quality, etc.) and this may alter the calculation regarding the perceived net benefits of adopting a Complete Streets policy.

We also experimented with additional controls including a dummy variable to indicate whether municipality i is in a county that adopted a Complete Streets policy, a dummy to indicate coastal location, a dummy for municipalities located in the State of New York, and measures of the age of the housing stock. None were statistically significant.

Table 1
Complete Streets Policy Adoptions by New Jersey Municipalities by Year 2009–2015.

Year	All NJ Municipalities	NJ Data	All NY Municipalities	NY Data
2008	0	0	1	0
2009	1	0	0	0
2010	7	4	8	4
2011	16	10	11	2
2012	41	28	16	6
2013	30	21	21	9
2014	24	0	22	0
2015	8	0	2	0
2016	8	0	7	0
Total	135	63	88	21

Notes: For both New Jersey and New York, we drop municipalities that adopted prior to 2010 and after 2013 as well as municipalities with a population under 1500. In addition, because the American Community Survey does not include townships in the State of New Jersey or towns in the State of New York, we drop these municipalities. Some New York villages do not report tax base data. We drop these municipalities as well. Seven municipalities were dropped from the column 4 count ("All NY Municipalities") because of incomplete or unclear documentation, 6 of these 7 would have been excluded from the column 5 count for other reasons. Adoptions were identified using NCSC (2017) https://smartgrowthamerica.org/app/uploads/2017/06/best-complete-streets-policies-of-2016-1.pdf and cross-checked against the New York State Department of Transportation website https://www.dot.ny.gov/programs/completestreets and the New Jersey Bicycle and Pedestrian Center website http://njbikeped.org/complete-streets-2/

We dropped these variables because Imbens (2004) explains that irrelevant covariates may introduce noise into the treatment effect estimates and thereby eliminate any reduction in bias achieved by their inclusion. We then regress (using probit) the dummy for Complete Streets policy adoption on these municipality characteristics and the pre-period change in house prices.

$$CS\ ADOPT_{\mathrm{i}} = X_i\,\Gamma + \varepsilon_i, \tag{3}$$

where i indexes municipality, X_{i} is a vector of variables that reflect municipality characteristics and the pre-period change in house prices for municipality i.

Table 1 reports Complete Streets policy adoptions for New Jersey and New York municipalities by year. From column 2 of Table 1, we see that 135 (of 566) municipalities in the State of New Jersey adopted a Complete Streets policy through the end of 2016. In addition, 8 of the 21 counties and the State Department of Transportation also adopted a Complete Streets policy by the end of 2016 (not shown in the table). We drop municipalities that adopted a Complete Streets policy from 2013 to 2015 from the analysis to ensure that we have a sufficient time period following adoption to track changes in house prices.

Of the 135 New Jersey municipalities that adopted, 72 adoptions occur either in townships, in municipalities with population levels under 1500, or outside of the 2010–2013 study period. Consequently, we have 63 treated municipalities in New Jersey (as reported in column 3). From column 3 of Table 1, we see that 88 (of 1533) municipalities in the State of New York adopted Complete Streets through the end of 2016. (We found reports that 7 additional municipalities adopted, but the documentation was incomplete or unclear. Only 1 of these adoptions could have been included in the final data set.) In addition, 10 of the 57 counties and the State Department of Transportation also adopted a Complete Streets policy by the end of 2016 (not shown in the table). Of the 88 confirmed adoptions, 67 occur either in towns, in municipalities with population levels under 1500, outside of the 2010–2013 study period, or in municipalities that did not report tax base data to the state. Consequently, we have 21 treated municipalities in New York (as reported in column 5).

Of the 84 boroughs and cities we analyze, 81 municipalities adopted a Complete Streets policy via resolution (i.e., an act or regulation of the governing body of any municipality required to be reduced to writing, but which may be finally passed at the meeting at which it is introduced). The remaining three municipalities adopted via an ordinance. We then code a dummy variable to take the value of 1 for all municipalities that adopted a Complete Streets policy from 2010 to 2013 and merge this data with the data described above creating a data set with 418 observations. Thus, 20% of the sample adopted a Complete Streets policy (84/418).

We were able to discover, either through web searches or conversations with municipal officials, that many municipalities have incorporated Complete Streets into their transportation plans. However, we also discovered that many municipalities do not have transportation plans.

To better understand the implementation of Complete Streets, we spoke to a series of town planners, engineers, and public works officials in municipalities that adopted Complete Streets policies. All those we spoke to incorporated Complete Streets design features where possible. However, existing street design features and resident preferences can, at times, cause town planners, engineers, and public works officials to build in a manner that is not entirely consistent with their interpretation of Complete Streets principles. For instance, one town engineer removed a planned bike lane after residents objected that it would make on-street parking more difficult. In another municipality, a town planner reported that he dropped some Complete Streets design features from road projects if the design feature raised costs more than 20%. Still, our conversations suggested that such deviations were the exception rather than the rule.

To estimate the treatment effect for Complete Streets policy adoption, we estimate a propensity score using conditioning variables in a procedure that matches treated and untreated observations based on the propensity score and then estimates the treatment effect accounting for the fact that the propensity score is an estimate. The outcome variable is the change in the average municipal residential sales price. The outcome data for the State of New Jersey are from the Department of the Treasury Taxation Division for years 2008 through 2016. New Jersey classifies taxable real property into: vacant land; residential (four families or less); farm (regular); farm (qualified); commercial; industrial; and apartment (five or more families). The State includes only arms-length transactions in the calculation. Our data includes only single-family homes (detached and attached as well as condominiums).

The outcome data for the State of New York is from the New York State Office of Real Property Tax Services database of all real-estate transactions in the state. We sorted this data by year and calculated averages at the municipal level to match the definitions of the New Jersey residential sales data described above. For both the New York and New Jersey data, we convert the nominal values to 2010 dollars using the housing CPI for the New York/New Jersey region.

4. Results

Table 2 reports means and standard deviations for the data we used to determine the propensity scores (i.e., the conditioning variables). Column 1 reports means and standard deviations of the conditioning variables for the entire sample while columns 2 and 3 report means and standard deviations for the subsamples of adopters and non-adopters. Because some variables are missing observations, we report the number of observations for each variable. The final column of Table 2 shows the difference in the mean value between adopters and non-adopters. Directly below this difference, we report, in parentheses, the t-statistic for a test of the difference in the means for the subsamples of adopters and non-adopters.

Across all municipalities, average population is 14,110, average median family income is about $66,350, and population density is about 6.3 people per acre. Eighty-three percent of commutes are via car and the average municipality is about 90 miles from New York City and 116 miles from Philadelphia. The average house price is $342,692 (2010 dollars) and the average municipality has about 13.5% of its tax

Table 2
Means and Standard Deviations for Complete Streets Policy Adopters and Non-Adopters.

	Full	Adopters	Non-Adopters	Difference
Population (in thousands)	14.11	29.75	10.18	19.57***
	(26.18)	(46.85)	(15.30)	(3.78)
	n = 418	n = 84	n = 334	
Car Ratio	0.829	0.769	0.844	−0.0745***
	(0.109)	(0.134)	(0.096)	(4.80)
	n = 418	n = 84	n = 334	
Income (in thousands)	66.35	66.39	66.34	0.0553
	(30.58)	(30.04)	(30.75)	(0.015)
	n = 418	n = 84	n = 334	
Density	6.34	8.77	5.73	3.03***
	(7.72)	(10.51)	(6.73)	(2.52)
	n = 418	n = 84	n = 334	
Income * Density	395.17	562.47	353.09	209.38***
	(434.35)	(612.79)	(365.81)	(3.00)
	n = 418	n = 84	n = 334	
NYC Distance	90.47	70.16	95.57	−25.41***
	(84.34)	(72.50)	(86.41)	(2.76)
	n = 418	n = 84	n = 334	
PHL Distance	116.04	94.79	121.38	−26.59***
	(82.34)	(70.75)	(84.26)	(2.96)
	n = 418	n = 84	n = 334	
NYC PHL	153.79	125.04	161.02	−35.98***
	(109.02)	(92.27)	(111.81)	(3.05)
	n = 418	n = 84	n = 334	
Commercial Tax Base	0.135	0.180	0.124	0.0561***
	(0.088)	(0.111)	(0.077)	(4.37)
	n = 418	n = 84	n = 334	
House Price in 2009 (in thousands)	342.69	370.13	335.87	34.26
	(336.34)	(239.31)	(356.35)	(1.05)
	n = 417	n = 84	n = 334	
House Price Appreciation 2008–2009	−0.0364	−0.0657	−0.0291	−0.0365***
	(0.122)	(0.0859)	(0.128)	(3.10)
	n = 415	n = 83	n = 332	

* = Significant at 0.10; ** = Significant at 0.05; *** = Significant at 0.01.
Population population for municipality i in 2010 (measured in thousands).
Car Ratio: the ratio (proportion) of workers who travel to work by car relative to workers traveling to work by all modes of travel for municipality i in 2010.
Median Income: median household income for municipality i in 2010 (measured in thousands of dollars).
Density: population density per acre of land for municipality i in 2010.
Income * Density: interaction of Median Income and Density for municipality i.
NYC Distance: distance from municipality i to New York City (in miles).
PHL Distance: distance from municipality i to Philadelphia (in miles).
NYC PHL = $[(\text{Distance to NYC})^2 + (\text{Distance to Philadelphia})^2]^{1/2}$ for municipality i.
Commercial Tax Base: ratio of the commercial tax base to the total base for municipality i in 2009.
House Price in 2009: real average home sale price for municipality i in 2009 (2010 dollars converted using the CPI for housing for Northern New Jersey and New York).
House Price Appreciation 2008–2009: the real average home sale price for municipality i in 2009 less the real average home sale price for municipality i in 2008 divided by the real average home sale price for municipality i in 2008.

Table 3
Probit Regression Results for Complete Streets Policy Adoption.

	Adoption of Complete Streets Policy
Population (in thousands)	0.00410***
	(0.00149)
Car Ratio	−0.518**
	(0.217)
Income (in thousands)	−0.00155
	(0.00113)
Density	−0.0331***
	(0.00976)
Income * Density	0.000715***
	(0.000186)
NYC Distance	0.00939***
	(0.00258)
PHL Distance	0.00693***
	(0.00233)
NYC PHL	−0.0120***
	(0.0035)
Commercial Tax Base	0.970***
	(0.248)
House Price in 2009	0.000033
	(0.000066)
House Price Appreciation 2008–2009	−0.371**
	(0.174)
Pseudo R2	0.23
Wald Chi2	48.80
Observations	415

* = Significant at 0.10; ** = Significant at 0.05; *** = Significant at 0.01.
Dependent Variable: dummy variable that equals 1 if municipality i adopted a Complete Streets policy in the years 2010–2013, and 0 otherwise.
Heteroskedastic Robust Standard Errors in Parentheses. Parameter estimates are marginal effects.

base as commercial property. We can also see from Table 2 that every conditioning variable (save house prices and income) is significantly different across the adopter and non-adopter subsamples. Population, population density, the income-density interaction, and the commercial tax base are significantly higher in municipalities that adopted a Complete Streets policy (compared to municipalities that did not adopt) while the proportion of commutes by car, the distance to New York, the distance to Philadelphia, the distance to the New York-Philadelphia corridor, and the pre-period house price appreciation are significantly lower. As noted above, these differences are a source of bias if we attempt to identify the effect of treatment (i.e., Complete Streets policy adoption) on outcomes using regressions that control for selection by adding these variables to a multiple regression.

Table 3 reports the results of the probit analysis that predicts selection into Complete Streets policy adoption. The parameter estimates show the amount that the dependent variable (conditional probability of adopting a Complete Streets policy) changes when you change the value of one of the dependent variables, holding the other dependent variables constant (i.e., marginal values). While these probit results are reported separately, we use a procedure in Stata (*teffects psmatch*) that estimates the propensity scores from the model above, creates pairs using the propensity score and then estimates the treatment effect. This procedure has the advantage of producing estimates of the treatment effect that account for the fact that the propensity score is an estimate (Abadie & Imbens, 2011; Stata Corporation, 2015).

In addition, we check the model to ensure that it meets the balancing property using *pscore* in Stata. The test ensures that observations with the same propensity score have the same distribution of observable covariates independent of treatment status (Imbens, 2004). More specifically, *pscore* estimates the propensity score using the prescribed model and then subdivides the population into "blocks" (typically 5 quintiles). It then requires that the covariates for each block are balanced. The interaction term in the model was added to meet this balancing requirement.

Most important, a series of variables that show significant differences across the subsamples reported in Table 2 also show significant effects on the probability of adopting a Complete Streets policy. Failure to account for these differences may then distort the estimate of the treatment effect. Comparing across Tables 2 and 3, we see that *Population*, *Car Ratio*, *Density*, *Income * Density*, *NYC Distance*, *PHL Distance*, *NYCPHL*, *Commercial Tax Base,* and *House Price Appreciation 2008–2009* show significant effects on the probability of adopting a Complete Streets policy and show significantly different averages across adopters and non-adopters.

The results show that if population increases by one thousand, the probability of adoption rises by 0.4%. Increasing the percentage of total commuting trips that are car commutes by 10 percentage-points reduces the probability of adopting a Complete Streets policy by 5.2%. Surprisingly, population density reduces the probability of Complete

Streets policy adoption. However, we find that higher levels of median income reduce the negative effect of density on the probability of adoption. If we consider an increase of one person per acre in density for a municipality with median income of $40,000, the probability of adoption falls by 0.45%. By contrast, an increase of one person per acre in density for a municipality with median income of $80,000 increases the probability of Complete Streets policy adoption by 2.41%. An additional mile of distance from New York City increases the probability that the municipality adopts by 0.94% while an additional mile of distance from Philadelphia increases the probability by 0.69%. By contrast, a one-unit increase in our measure of distance from the New York to Philadelphia corridor reduced the probability that a municipality would adopt a Complete Streets policy by 1.2%. Finally, a one percentage-point increase in the ratio of the commercial to total tax base increases the probability of adopting by 0.97%.

Following the calibration and estimation of the propensity score model we identify a region of common support. Here, we must ensure that there is an overlap in the range of propensity scores across treated (Complete Streets policy adopters) and untreated (Complete Streets policy non-adopters) groups (Caliendo & Kopeinig, 2008; Garrido et al., 2014; Heckman et al., 1998). Caliendo and Kopeinig (2008) argue that the most straightforward method to ensure common support is "visual analysis of the density distribution of the propensity scores" for treated and untreated groups. Fig. 1 and subsequent investigation reveal that few untreated municipalities are present for municipalities with propensity scores above 0.44. Similarly, few treated municipalities are present for municipalities below 0.02. Consequently, we chose 0.02–0.44 as our range of common support and drop observations outside this range from the analysis (Caliendo & Kopeinig, 2008). This trimming of the data set reduces the number of observations from 415 to 350.

To ensure high-quality matches across treated and untreated groups, we vary the caliper and the number of matches for each treated observation. In the first case, we use nearest neighbor matching of 1 ($nn = 1$) and require that matches have propensity score differences of less than 0.01 (i.e, caliper = 0.01). In the second case, we expand the number of nearest neighbor matches to 3 ($nn = 3$) and require that matches have propensity score differences of less than 0.02 (i.e, caliper = 0.02). For a third and final case, we expand the number of nearest neighbor matches to 5 ($nn = 5$) and require that matches have propensity score differences of less than 0.025 (i.e, caliper = 0.025).

Following Heckman et al. (1997) and Heckman et al. (1998), we estimate the average treatment effect on the treated (ATET). ATET is defined as the difference between the expected outcome values with and without treatment for those who actually receive treatment (Caliendo & Kopeinig, 2008). Estimating propensity scores and treatment effects using separate procedures fails to account for the fact that the propensity score is an estimate and distorts standard errors for the treatment effect estimate (Abadie & Imbens, 2016). Consequently, we employ the *teffects psmatch* command in Stata that calculates standard errors consistent with the procedure in Abadie and Imbens (2016) (Stata Corporation, 2015).

Table 4 reports the results for the treatment effect of Complete Streets policy adoption on the outcome of change in average municipal house price. For reference, we report ordinary least squares (OLS) regression results in column 1, 2, and 3. The OLS regressions regress change in real house price, where change is Price t − Price 2009 and t is either 2014, 2015, or 2106, on the dummy for Complete Streets policy adoption and the covariates that appear in Table 2. To save space, we simply report the coefficient estimate for the Complete Streets policy dummy. Column 1 of Table 4 reports the results of an OLS regression on changes in real house prices using the entire sample ($n = 415$), while Column 2 runs the same procedure but drops all observations outside the region of common support ($0.02 <$ propensity score < 0.44, $n = 350$). Column 3 repeats the procedure in column 2 but drops all treated observations that had no match within a caliper of 0.01.

Columns 4–6 of Table 4 report the results for the treatment effect (Complete Streets policy adoption) from the difference-in-differences matching procedure (DIDMP). In column 4, we report treatment effects for the change in the outcome variable (average municipal house price), where change is Price t − Price 2009, t is either 2014, 2015, or 2016, and the propensity score matching procedure employs nearest-neighbor matching of 1 ($nn = 1$) and a caliper of 0.01. The sample is identical to column 3 but the procedure is different. Column 5 reports treatment effects for the same outcomes as column 4 with nearest-neighbor matching of 3 ($nn = 3$) and a caliper of 0.02, while column 6 reports treatment effects when $nn = 5$ and the caliper is 0.025.

The OLS estimates reported in column 1 of Table 4 (OLS, full sample) suggest that Complete Streets policy adoption causes house prices to rise over the period 2009-14 by about $16,580 or 4.8% ($p = 0.012$). The column 1 OLS estimates for 2009–2015 and 2009–2016 are lower than the 2009-14 estimates and neither are statistically significant ($\beta = -\$5280$, $p = 0.48$ and $\beta = \$2900$, $p = 0.72$). From column 4 of Table 4 ($nn = 1$ and caliper = 0.01), we

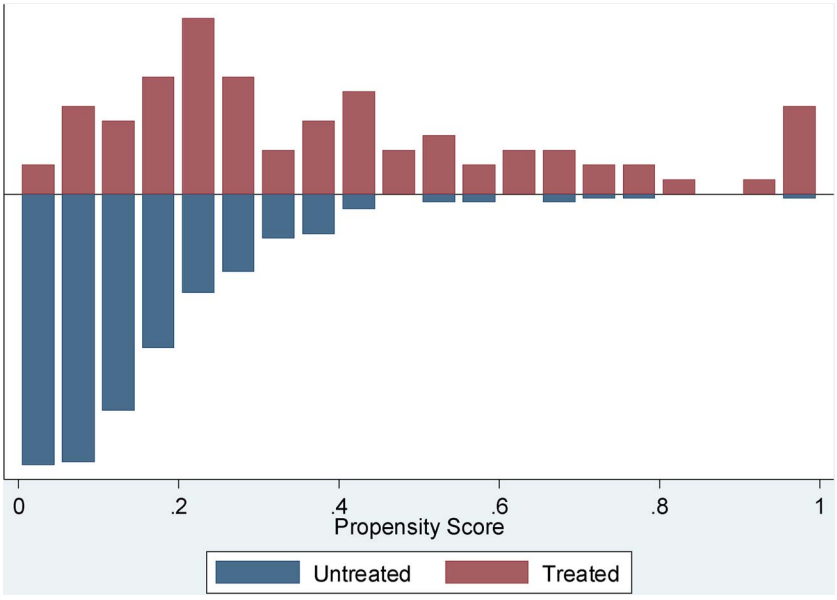

Fig. 1. Distribution of Propensity Scores across Treated (Complete Streets Policy Adopters) and Untreated (Complete Streets Policy Non-Adopters).

Table 4
Estimates of Complete Streets Policy Treatment Effect on House Prices.

Dependent Variable	OLS (Price t − Price 2009) Full sample 1	OLS (Price t − Price 2009) Region of Common Support 2	OLS (Price t − Price 2009) Region of Common Support and no unmatched treated 3	DIDMP (Price t − Price 2009) nn = 1 caliper = 0.01 4	DIDMP (Price t − Price 2009) nn = 3 caliper = 0.02 5	DIDMP (Price t − Price 2009) nn = 5 caliper = 0.025 6
House Price Change 2009–2014	16.58***	7.55	9.48	13.58	10.11	2.66
	(6.56)	(6.92)	(7.32)	(9.34)	(8.63)	(8.41)
House Price Change 2009–2015	−5.82	−11.49	−11.44	−7.23	−11.11	−7.63
	(8.16)	(7.97)	(8.19)	(10.70)	(10.13)	(9.52)
House Price Change 2009–2016	2.90	−4.22	−3.33	−9.95	5.49	−6.22
	(8.17)	(7.79)	(8.20)	(10.18)	(9.72)	(9.17)
n	412	350	342	342	341	340

* = Significant at 0.10; ** = Significant at 0.05; *** = Significant at 0.01. (No estimates are significant at the 0.1 or 0.05 levels.)
Column 1 (OLS): we regress change in real house price for the periods 2009–2014, 2009–2015, and 2009–2016 on the dummy for Complete Streets adoption and the covariates that appear in Table 2. The reported parameter estimate is the treatment effect of Complete Streets adoption. Robust standard errors appear below the estimate in parentheses.
Column 2 (OLS): duplicates the procedure reported in column 1 but drops all observations outside of the region of common support (propensity score < 0.02 and propensity score > 0.44).
Column 3 (OLS): duplicates the procedure reported in column 1 but drops all observations outside of the region of common support (propensity score < 0.02 and propensity score > 0.44) and all treated observations (i.e., Complete Streets adopters) that did not have an untreated observation within the 0.01 caliper.
Column 4–Difference-in-Differences Matching Procedure (DIDMP): we use teffects psmatch to estimate treatment effects (Complete Streets adoption) on the outcome variable (change in real house price for the periods 2009–2014, 2009–2015, and 2009–2016) conditional on the covariates that appear in Table 2.We use nearest neighbor matching (i.e., nn = 1) with a caliper of 0.01. Standard errors in parentheses.
Column 5 (DIDMP): duplicates the procedure reported in column 4 but uses nn = 3 and a caliper of 0.02.
Column 6 (DIDMP): duplicates the procedure reported in column 4 but uses nn = 5 and a caliper of 0.025.

see that the treatment effect estimate for Complete Streets policy adoption is $13,580 for 2009–2014, −$7230 for 2009–2015, and −$9950 for 2009–2016. None of the estimates are statistically significant and, in every case, the estimate is lower than the OLS estimates in column 1.

To gain a more detailed picture of the effect of adopting a Complete Streets policy, we increase the number of matches for each treated municipality and the caliper. From column 5 of Table 4 (nn = 3 and caliper = 0.02), we see that the treatment effect estimate for Complete Streets policy adoption is $10,110 for 2009–2014, −$11,110 for 2009–2015, and $5490 for 2009–2016. In the final column of Table 4 (nn = 5 and caliper = 0.025), the treatment effect estimate for Complete Streets policy adoption is $2660 for 2009–2014, −$7630 for 2009–2015, and −$6220 for 2009–2016. Like column 4, none of the estimates in columns 5 and 6 are statistically significant. Comparing column 1 with columns 4, 5, and 6, we see that the estimates for the effect of Complete Streets policy adoption for a given time frame using OLS (column 1) are larger in 8 of the 9 comparisons than the estimates from the DIDMP procedure.

This suggests that for this data the OLS estimates produce an upward bias in the true treatment effect. The OLS estimates presuppose that the covariates used to control for selection effects show similar distributions for treated and untreated observations. From Table 2, we can see that this is not the case. These Table 2 differences imply that Complete Streets policy adopters have characteristics that make them much more likely to adopt such policies. Heckman et al. (1997) shows that selection or evaluation bias occurs because some treated observations have no comparable untreated observations and some untreated observations have no comparable treated observations.

Thus, one way to mitigate this bias is to examine only observations within the region of common support. Within this region, treated municipalities (Complete Streets policy adopters) have untreated municipalities (Complete Streets policy non-adopters) with similar probabilities of adopting Complete Streets policies *ex ante*. To see that observations outside of this region of common support are an important source of bias, we repeat the OLS procedure from column 1 of Table 4 but drop all observations outside the region of common support (0.02 < propensity score < 0.44, n = 350). We report these results in column 2 of Table 4. Column 3 repeats the procedure in column 2 but also drops all treated observations that had no match within a caliper of 0.01.

In each case, the results reported in columns 2 and 3 are lower than in column 1. These changes are not simply the result of reduction in sample size. If we instead reduce the number of observations from the column 1 level (n = 412) to the column 3 level (n = 342) by randomly deleting observations based of the first letter of the municipality name, we generate estimates that are nearly the same as the column 1 estimates. For instance, the estimate in column 1, row 1 of 16.58 rises slightly to 17.60 (p = 0.01). In addition, each of these estimates is higher than the column 2 and column 3 estimates. Finally, we note that the column 2 and 3 estimates show no systematic differences with the DIDMP estimates in columns 4–6.

As a post-estimation check, Tables 5a and 5b report covariate means and standard deviations for the matched samples that support the

Table 5a
Means and Standard Deviations for Matched Sample (nn = 1 and caliper = 0.01).

	Adopters	Non-Adopters	Difference
Population (in thousands)	13.69	11.02	2.66
	(13.51)	(9.41)	(1.07)
Car Ratio	0.826	0.832	−0.006
	(0.090)	(0.069)	(0.393)
Income (in thousands)	66.01	65.27	0.74
	(24.44)	(25.19)	(0.136)
Density	7.54	6.71	0.83
	(12.46)	(4.55)	(0.423)
Income * Density	448.1	433.1	15.31
	(538.0)	(310.7)	(0.164)
NYC Distance	79.97	65.12	14.84
	(81.48)	(59.72)	(0.968)
PHL Distance	102.34	80.77	21.57
	(79.82)	(60.69)	(1.41)
NYC PHL	136.78	111.96	24.82
	(105.51)	(73.70)	(1.27)
Commercial Tax Base	0.152	0.132	0.02
	(0.078)	(0.07)	(1.26)
House Price in 2009 (in thousands)	340.7	308.6	32.07
	(179.24)	(224.52)	(0.715)
House Price Appreciation 2008–2009	−0.0688	−0.0865	0.017
	(0.0982)	(0.0805)	(0.911)
Propensity Score	0.2136	0.2127	0.0009
	(0.092)	(0.096)	
N	47	38	

Table 5b
Means and Standard Deviations for Matched Sample (nn = 3 and caliper = 0.02).

	Adopters	Non-Adopters	Difference
Population (in thousands)	12.57	10.89	1.69
	(11.27)	(10.43)	(0.849)
Car Ratio	0.829	0.825	0.0047
	(0.0877)	(0.111)	(0.269)
Income (in thousands)	66.57	65.57	1.00
	(24.41)	(28.87)	(0.212)
Density	7.14	7.27	−0.128
	(12.29)	(9.92)	(−0.0617)
Income * Density	435.5	441.9	−6.46
	(536.5)	(504.2)	(0.068)
NYC Distance	81.47	78.51	2.95
	(81.72)	(82.02)	(0.200)
PHL Distance	102.9	104.6	1.65
	(80.60)	(75.31)	(0.112)
NYC PHL	138.1	136.9	1.20
	(106.3)	(103.63)	(0.063)
Commercial Tax Base	0.152	0.151	0.001
	(0.0116)	(0.0088)	(0.072)
House Price in 2009 (in thousands)	342.5	338.7	3.76
	(180.8)	(277.2)	(0.095)
House Price Appreciation 2008–2009	−0.0715	−0.0666	0.0049
	(0.0976)	(0.0921)	(0.286)
Propensity Score	0.214	0.207	0.0066
	(0.093)	(0.096)	
N	46	91	

analyses reported in columns 4 and 5 of Table 4. From Table 5a, we see that subject to the conditions outlined above ($nn = 1$ and caliper = 0.01) there were 47 matches. There were only 38 control municipalities used in the matching procedure because 9 of the municipalities served as a match/control for more than one treated municipality. This implies that 36 of the 83 municipalities that adopted a Complete Streets policy 2010–2013 were not matched. Of these 36 unmatched cities and boroughs, 29 had propensity scores outside of the region of common support while 7 had propensity scores inside the region but had no untreated municipalities with a propensity score within 0.01. For the matched municipalities, the propensity score predicting adoption of a Complete Streets policy is nearly the same across treated and untreated groups and conditioning variables show no statistically significant differences across treated and untreated groups. If we instead double count municipalities that serve as a control for more than one treated municipality so that $n = 47$ for both the treated and untreated groups, we reach the same conclusion.

From Table 5b, we see that subject to the conditions outlined above ($nn = 3$ and caliper = 0.02) there were 46 treated observations that could be matched and 91 untreated observations served as controls. (The procedure allows untreated observations to serve as controls for multiple treated observations.) The matches here are a bit better than in Table 5a. Once again, the propensity score that predicts adoption of a Complete Streets policy is nearly the same across treated and untreated groups and conditioning variables show no significant differences across treated and untreated groups.

Ideally, we would also test for variations in the treatment level. As noted above, we include as treated observations municipalities that adopted a Complete Streets policy in 2010, 2011, 2012 and 2013. As our outcome measure is change in house prices 2009–2014, 2009–2015, and 2009–2016, later adopters may show smaller effects from a Complete Streets policy simply because less time elapses from the adoption date to the post-period measurement date. Unfortunately, the supporting theory for measuring heterogeneous treatment effects in propensity score matching does not yet exist (Abadie & Imbens, 2016).

However, we may check whether the inability to measure treatment levels likely compromises our results by: 1) examining the correlation coefficient between our three change-in-house-price variables and a variable designed to capture treatment level for the treated portion of our 47 matched pairs; and 2) adding this treatment level variable to the OLS specification reported column 2 of Table 4. To capture differences in treatment levels, we create *CS_Level*, where *CS_Level* is the number of years that elapse between adoption of the Complete Streets policy and year t when we measure house price ($t = 2014$, 2015, or 2016).

Correlation coefficients between *CS_Level* and change in house prices 2009–2014, 2009–2015, and 2009–2016 are all positive, quantitatively small, and statistically insignificant ($r = 0.090$, $p = 0.55$; $r = 0.028$, $p = 0.85$; and $r = 0.055$, $p = 0.71$, respectively). Adding the treatment level variable to Table 4, column 2 specification also yields statistically insignificant estimates ($\beta = -855$, $p = 0.86$; $\beta = -2364$, $p = 0.64$; and $\beta = -1285$, $p = 0.83$, respectively). This suggests that longer duration with a Complete Streets policy in effect is not associated with positive changes in house prices and adding treatment level to our analysis is unlikely to change the conclusion that adopting a Complete Streets policy has no effect on house prices.

5. Conclusion

In 2005, a coalition of advocacy and trade groups including the American Public Transportation Association and the National Association of Realtors launched Complete Streets. The coalition aimed to advance a transport policy and design approach that requires streets to be designed and operated to allow equal access to all people and major forms of transportation, rather than just motor vehicles. The design principles include pedestrian infrastructure, traffic calming, and bicycle and public transit accommodations. The costs associated with planning, logistics, and execution of these principles are significant and take continued commitments to maintain. However, the literature includes no analysis of the benefits of this program.

This paper tests whether adoption of a Complete Streets policy has amenity value for local residents by analyzing the link between Complete Streets policy adoption and house prices using a difference-in-differences matching procedure (DIDMP) developed in Heckman et al. (1997) and Heckman et al. (1998). The estimator calculates the change in the outcome variable (house prices) for each observation (i.e., municipality) between the pre-period (prior to treatment) and the post-period (after treatment) and then makes comparisons across treated and untreated groups conditioned on the variables that determine selection into treatment. To determine selection into treatment (i.e., a Complete Streets policy), the analysis uses municipality characteristics and pre-period house price changes to estimate propensity scores.

The results indicate that Complete Streets policy adoption has no effect on house prices and therefore we are unable to find a positive amenity value from a municipality-level commitment to Complete Streets. This failure to find an effect may follow from: 1) low or zero values that residents attach to the design changes from Complete Streets; 2) costly design changes that are associated with Complete Streets; 3) town planners or public works departments that simply ignore the Complete Streets policy; or 4) low frequency of road construction projects. If the Complete Streets design changes are costly, the costs must be recouped in form of higher property taxes. The higher property taxes may then reduce house prices. Thus, the effect of the higher taxes may cancel the amenity value of Complete Streets policy adoption.

While it is also possible that town planners and public works departments fail to implement the policy, we spoke with a series of town planners, engineers, and public works officials in municipalities that adopted a Complete Streets policy and found no evidence the policy was ignored. Alternatively, residents may have difficulty valuing the commitment to Complete Streets and instead wait to see evidence of actual changes in the streetscape. In such cases, resident values may change only after a long lag. Thus, even over the time frame examined in this study (up to 7 years following adoption), an insufficient number of design changes occurred, and as a consequence, house prices did not

show statistically significant changes from adopting a Complete Streets policy. Finally, it is also possible that Complete Streets confers benefits that are not reflected in property values. For instance, residents may not perceive or may not value incremental improvements in air quality associated with a Complete Streets policy or they may underestimate the health benefits of increased pedestrian activity.

This paper also compares results from standard OLS regression methods commonly employed in the land use and urban planning literature to control for selection effects with a DIDMP. We find that for this data the standard OLS regression methods commonly employed in the land use and urban planning literature to control for selection effects produce biased estimates. Our estimated effects of Complete Streets policy adoption using a DIDMP are lower in 8 of 9 comparisons than estimates from a standard OLS procedure that controls for selection effects by adding conditioning variables as covariates in a single-equation model. This bias is at least partly caused by treated observations that have no comparable untreated observations in the data (and vice versa). Repeating the standard OLS procedure using only treated observations (Complete Streets policy adopters) that have comparable untreated observations in the data (and vice versa) reduces the estimated effect of Complete Streets policy adoption in each case (compared to the full sample). As mismatches between treated and untreated observations of this type are likely common, researchers should use caution in relying exclusively on OLS in the presence of selection effects.

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Chronic Obstructive Pulmonary Disease and Long-Term Exposure to Traffic-related Air Pollution

A Cohort Study

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***Rationale*: Short-term exposure to air pollution has been associated with exacerbation of chronic obstructive pulmonary disease (COPD), whereas the role of long-term exposures on the development of COPD is not yet fully understood.**

***Objectives*: We assessed the effect of exposure to traffic-related air pollution over 35 years on the incidence of COPD in a prospective cohort study.**

***Methods*: We followed 57,053 participants in the Danish Diet, Cancer, and Health cohort in the Hospital Discharge Register for their first hospital admission for COPD between 1993 and 2006. We estimated the annual mean levels of nitrogen dioxide (NO_2) and nitrogen oxides (NO_x) at all residential addresses of the cohort participants since 1971 to an event or 2006 and used indicators of traffic near the residential address at recruitment. We assessed the association between exposure to air pollution and COPD incidence by Cox regression analyses for the full cohort, and for participants with and without comorbid conditions, including asthma, diabetes, or cardiovascular disease.**

***Measurements and Main Results*: A first hospital admission for COPD was recorded for 1,786 (3.4%) of 52,799 eligible subjects between recruitment (1993–1997) and 2006. COPD incidence was associated with the 35-year mean NO_2 level (hazard ratio, 1.08; 95% confidence interval, 1.02–1.14, per interquartile range of 5.8 $\mu g/m^3$), with stronger associations in subjects with diabetes (1.29; 1.05–1.50) and asthma (1.19; 1.03–1.38).**

***Conclusions*: Long-term exposure to traffic-related air pollution may contribute to the development of COPD with possibly enhanced susceptibility in people with diabetes and asthma.**

Keywords: COPD; air pollution; hospital admission; asthma; diabetes

AT A GLANCE COMMENTARY

Scientific Knowledge on the Subject

Short-term exposure to air pollution has been associated with exacerbation of chronic obstructive pulmonary disease (COPD). The role of long-term exposures on the development of COPD is not yet fully understood, due in part to the lack of prospective cohort data.

What This Study Adds to the Field

We found positive association between first-ever hospital admission for COPD and 35-year accumulated exposure to traffic-related air pollution at home address. This study adds to the evidence that air pollution may contribute to the development of COPD, using several novel approaches: use of 35 years accumulated exposure of modeled levels of NO_2, use of objective measure of COPD incidence in terms of the first-ever hospital admission for COPD, and assessment of the role of comorbid conditions (asthma and diabetes) in modifying the effect of air pollution on COPD.

Chronic obstructive pulmonary disease (COPD) is a progressive inflammatory condition of the airways, pulmonary vessels, and lung parenchyma, which is projected to be the third leading cause of death and the fifth leading cause of disability by 2020 (1–3). Cigarette smoking is responsible for the vast majority of COPD, but it does not explain the increasing prevalence worldwide, and occupational and environmental factors are increasingly believed to play important roles (1). With rapid urbanization of the world population, a better understanding of the harmful effects of exposure to urban air pollution, mainly from traffic, on COPD is important for urban planning, transport legislation, patient management, and prevention. Compelling epidemiological evidence has established that exposure over several days to elevated levels of air pollution exacerbates preexisting COPD, resulting in increased morbidity and mortality (4). Solid evidence is lacking, however, for the role of low-level exposure to air pollution in urban environments over years or decades in the development and progression of COPD, due in part to the limited number of prospective cohort studies addressing this problem (1–3).

The plausible biological mechanism of air pollution damage to the lungs involves a local inflammatory response in the lung tissues with a secondary systemic inflammatory response (5). Repetition of this inhalation injury is believed to be central to the effects of long-term exposure to air pollution and to the chronic and progressive nature of COPD (3). This mechanism seems to be well supported by the studies linking COPD to long-term exposure to indoor air pollution from solid fuel (wood smoke) used for cooking and heating in developing countries (6). However, the epidemiological evidence supporting the notion that chronic exposure to traffic-related air pollution can cause COPD is still limited. Long-term exposure to traffic-related air pollution has been associated with overall and cardiopulmonary mortality (7) and COPD mortality (8), which was recently confirmed in a study with multipollutant models and improved control for occupational exposures (9). Several studies have reported links between high levels of air pollution and the prevalence of COPD (10–12), and none to date have studied COPD incidence. Impaired lung function, an

(*Received in original form June 19, 2010; accepted in final form September 23, 2010*)

Supported by The Danish Research Council.

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This article has an online supplement, which is accessible from this issue's table of contents at www.atsjournals.org

Am J Respir Crit Care Med Vol 183. pp 455–461, 2011
Originally Published in Press as DOI: 10.1164/rccm.201006-0937OC on September 24, 2010
Internet address: www.atsjournals.org

important measure of respiratory health and a predictor of COPD mortality and morbidity (13), has been associated with long-term exposures to air pollution (11, 13, 14), but two recent studies failed to replicate this finding (15, 16). Most previous studies were, however, cross-sectional, with an intrinsic inability to separate the timing of exposure and effect, preventing inferences about causality. Two recent longitudinal cohort studies associated improvements in air pollution levels with attenuated lung function decline (17) and reduced rates of respiratory symptoms (18), providing more clues about the dynamics behind long-term air pollution exposures and development of chronic respiratory disease.

We studied the effect of exposure to traffic-related air pollution over several decades on the incidence of COPD, defined as first-ever hospital admission for COPD, in a prospective cohort of 57,053 Danish adults with detailed residential address history and information on comorbidity, including asthma, cardiovascular disease, and diabetes. Exposure to air pollution at each residential address was assessed individually for up to 35 years in a validated dispersion model based on detailed traffic, geographical, and meteorological data, emission factors, and registers covering the whole of Denmark.

METHODS

Design and Health Outcome

We used the cohort of the Danish Diet, Cancer, and Health study consisting of 57,053 people aged 50 to 64 years who lived in Copenhagen or Aarhus between 1993 and 1997 (19). A self-administered questionnaire at baseline (1993–1997) elicited information on smoking and dietary habits, education, occupational history, and lifestyle. Using the unique personal identification numbers, we linked the cohort to: the Danish Hospital Discharge Register, dating back to 1976, to identify hospital admissions using primary discharge diagnoses for COPD (International Classification of Diseases, 10th revision: J40–44) asthma (J45–46), ischemic heart disease (I20–25), other heart disease (I42–50), stroke (I60–63), and diabetes (E10–14); the Central Population Registry to obtain date of death or emigration and detailed residential address history (1971–2006); and the Danish Address Database to obtain geographical coordinates. The incidence (date of first admission) of COPD between baseline and 27 June 2006 was the main outcome. Comorbidity (with asthma, ischemic heart disease, other heart disease, stroke, or diabetes) was defined as at least one hospital admission for the specified diagnosis any time between 1976 and 2006.

Exposure Assessment

Exposure was assessed from the residential address history of each cohort member since 1971, which was used to model outdoor levels of nitrogen dioxide (NO_2) and nitrogen oxides (NO_x) with the Danish AirGIS dispersion modeling system (20), described in detail in the online data supplement. Annual mean NO_2 and NO_x levels were calculated at the available addresses of cohort members with an 80% or more complete residential history (97.6% of the cohort). Missing values, due to missing address or missing geographical coordinates, were substituted by the levels calculated for the preceding address, or when the first address was missing, for the subsequent address. We thus obtained a complete series of annual mean NO_2 and NO_x concentrations at the residential addresses of each cohort member since 1971. We defined three proxies of long-term exposure to air pollution: 35-, 25-, and 15-year time-weighted mean NO_2 and NO_x levels, from 1971, 1981, and 1991, respectively, until the end of follow-up (admission for COPD, death, emigration, or 27 June 2006), to assess the effect of different lengths of exposure on COPD incidence.

We also defined two air pollution proxies based on traffic data at the residential address at recruitment (1993–1997): the presence of a major road (density $\geq$ 10,000 vehicles/d) within a 50 m radius, and traffic load, defined as the total number of kilometers driven by vehicles within a 200 m radius.

Statistical Methods

We used a Cox proportional hazards model to study association between COPD incidence and exposure to air pollution, with age as the underlying time, left truncation at age at recruitment, and right censoring at age at admission for COPD, death, emigration, or 27 June 2006. The effects of different air pollution proxies were evaluated in separate models, with adjustment for *a priori*–defined confounders, in three steps: (*1*) age; (*2*) also including smoking status, duration, and intensity, and environmental tobacco smoke (ETS); and (*3*) also including occupational exposure, body mass index, educational level, and fruit consumption, all defined as shown in Table 1. We also evaluated other confounders, including sex, alcohol consumption, physical activity, and vegetable consumption. Levels of NO_2 and NO_x were log-transformed, modeled as time-dependent variables, and the estimates are reported per interquartile range increase. Smoking intensity was calculated by equating a cigarette to 1 g, a cheroot or a pipe to 3 g, and a cigar to 5 g of tobacco. Occupational exposure was defined as a minimum of 1 year employment in: mining; electroplating; shoe or leather manufacture; welding; painting; steel mill; shipyard; construction (roof, asphalt, or demolition); truck, bus, or taxi driver; asbestos or cement manufacture; asbestos insulation; glass, china, or pottery manufacture; butcher; auto mechanic; waiter; or cook; and reflects occupation earlier related to chronic lung disease, with focus on lung cancer, as this cohort was designed primarily to study cancer. ETS is an indicator of exposure to second-hand smoke at home or work for minimum 4 h/d. The potential effect modifiers of an association between a traffic proxy and COPD incidence, in terms of baseline characteristics and comorbid conditions, were evaluated by introducing interaction terms into the model, and were tested by Wald test. The results are presented as hazard ratios (HR) with 95% confidence intervals, estimated with Proc PHREG, SAS 9.2.

Relevant Danish ethical committees and data protection agencies approved the study, and written informed consent was obtained from all participants.

RESULTS

Of the 57,053 cohort members, we excluded 571 with a cancer diagnosed before baseline, 476 admitted to hospital for COPD before baseline, 951 with missing residential address at recruitment, 779 with missing information on covariates, and 1,477 for whom less than 80% of residential address history was available from 1971 until the end of follow-up. Of the 52,799 remaining subjects, 1,786 (3.4%) were admitted to the hospital for COPD for the first time between baseline and 27 June 2006, with an average follow-up of 9.9 years. The overall incidence rate was 3.4 cases per 1,000 person-years. The distribution of baseline covariates and comorbid conditions is shown in Table 1.

The distribution of traffic proxies is shown in Table 2. The estimated 35-year mean levels of NO_2 and NO_x at residential addresses varied widely (Figure 1). The Spearman rank correlation coefficient (r_s) between the 35- and 25-year mean NO_2/NO_x was 0.98/0.97, r_s between the 35- and the 15-year levels was 0.92/0.90, and between 25- and 15-years was 0.96/0.95. The 35-year mean NO_2 and NO_x levels were highly correlated (0.91). Traffic load within 200 m and living within 50 m of a major road at recruitment address were moderately correlated with the 35-year mean NO_2 and NO_x levels, with r_s of 0.49/0.45 and 0.53/0.45, respectively, and even more weakly correlated with the estimated 1-year mean NO_2 and NO_x levels at the baseline (1993–1997) with r_s of 0.37/0.30 and 0.36/0.39, respectively.

We found significant positive associations between all air pollution proxies and COPD incidence in a model adjusted for age (Table 3). The HRs were attenuated after adjustment for smoking but were significant for 35-year exposure to NO_2 and NO_x and for 25-year exposure to NO_2, whereas HRs related for 15-year exposure, a major road within 50 m, or traffic load within 200 m did not retain statistical significance. After further

TABLE 1. CHARACTERISTICS OF DIET, CANCER, AND HEALTH COHORT (*N* = 52,799) BY INCIDENT CHRONIC OBSTRUCTIVE PULMONARY DISEASE STATUS AT FOLLOW-UP

	Total (*n* = 52,799)	No COPD (*n* = 51,013)	COPD (*n* = 1,786)	*P* Value*
Baseline cohort covariates				
Median (IQR) age, yr	56.1 (7.6)	56.0 (7.4)	58.8 (7.7)	<0.001
Males, n (%)	25,066 (47.5)	24,269 (47.6)	797 (44.6)	<0.001
Never smoked, n (%)	18,904 (35.8)	18,781 (36.8)	123 (6.9)	<0.001
Previously smoked, n (%)	14,986 (28.4)	14,672 (28.8)	314 (17.6)	
Currently smoke, n (%)	18,909 (35.8)	17,560 (34.4)	1,349 (75.5)	
Median (IQR) smoking duration, yr	32.0 (18.0)	32.0 (18.0)	39.0 (9.0)	<0.001
Median (IQR) smoking intensity, g/d	6.0 (18.0)	5.0 (18.0)	15.0 (12.0)	<0.001
Environmental tobacco smoke, n (%)	33,754 (63.9)	32,162 (63.0)	1,592 (89.1)	<0.001
Median (IQR) body mass index, kg/m^2	25.5 (4.9)	25.5 (4.9)	25.0 (5.8)	<0.001
< 8 yr of education, n (%)	17,343 (32.9)	16,471 (32.3)	872 (48.9)	<0.001
8–10 yr of education, n (%)	24,422 (46.2)	23,721 (46.5)	701 (39.2)	
⩾ 10 yr of education, n (%)	11,034 (20.9)	10,821 (21.2)	213 (11.9)	
Occupational exposure, n (%)	14,701 (27.8)	14,038 (27.5)	663 (37.1)	<0.001
Median (IQR) fruit intake, g/d	145.7 (165.4)	146.7 (165.8)	120.0 (144.4)	<0.001
Comorbidities (ICD-10 Code)				
Asthma (J45–46), n (%)	1,171 (2.2)	874 (1.7)	297 (16.6)	<0.001
Ischemic heart disease (I20–25), n (%)	5,493 (10.4)	5,151 (10.1)	342 (19.1)	<0.001
Other heart disease (I42–I50), n (%)	5,706 (10.8)	5,351 (10.5)	355 (19.9)	<0.001
Stroke (I60–I63), n (%)	2,706 (5.1)	2,559 (5.0)	147 (8.2)	<0.001
Diabetes (E10–14), n (%)	2,141 (4.1)	2,021 (4.0)	120 (6.7)	<0.001

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; ICD-10 = International Classification of Diseases, 10th revision; IQR = interquartile range.

* For Kruskal-Wallis test or χ^2 test comparing two/three groups between "No COPD" and "COPD" columns.

adjustment for occupation, educational level, body mass index, and fruit intake, significant associations with COPD incidence remained for the 35- and 25-year mean levels of NO_2 (1.08; 1.02–1.14 and 1.07; 1.01–1.13) and 35-year mean level of NO_x (1.05; 1.01–1.10), whereas weak positive associations were observed with the 25-year mean level of NO_x, 15-year mean levels of NO_2 and NO_x, and baseline residence traffic proxies. The associations with NO_2 were stronger than those with NO_x. Additional adjustment for sex, physical activity, alcohol consumption, and vegetable consumption did not substantially change the risk estimates.

We found slightly stronger associations between 35-year mean NO_2 level and COPD incidence among men, people eating less than 240 g/d of fruit, and obese patients, although no significant modification of the effect of NO_2 was observed by any of the baseline characteristics (Table 4).

We detected modifications of borderline significance of the association between NO_2 levels and COPD by asthma (Wald test for interaction $P = 0.10$) and diabetes ($P = 0.08$) (Table 4). In patients with COPD with ischemic, other heart disease, or stroke, the associations with NO_2 levels were slightly stronger than in people without these comorbid conditions, but not significantly different.

DISCUSSION

Our investigation resulted in two novel findings. First, we found positive associations between 35-year exposure to NO_2 and

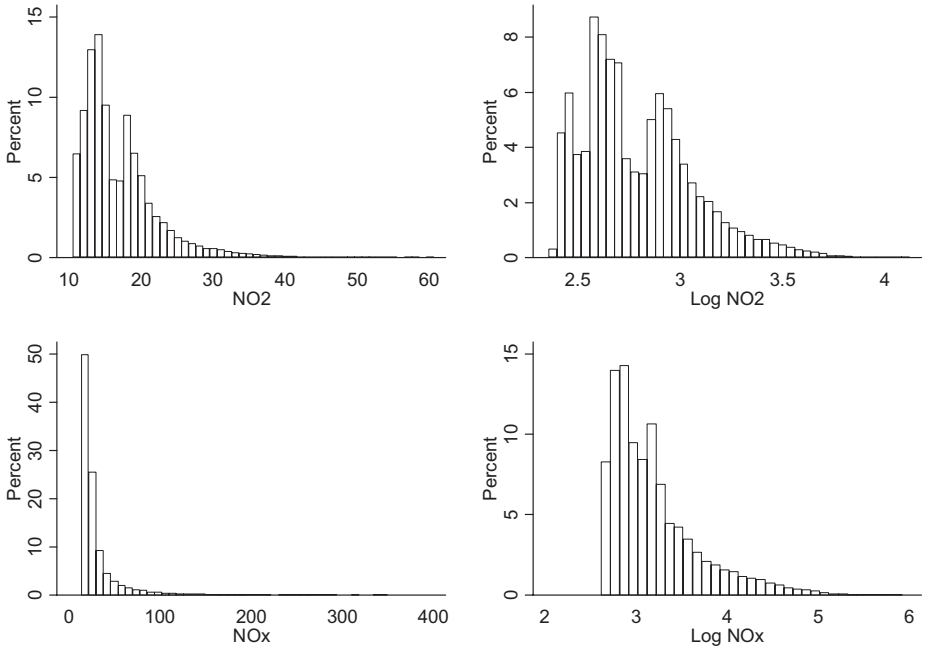

Figure 1. Distribution of 35-year accumulated mean levels of nitrogen dioxide (NO_2) and nitrogen oxides (NO_x) at residences of 52,799 Diet, Cancer, and Health cohort members (*left panels*, original; *right panels*, log-transformed).

TABLE 2. DESCRIPTION OF PROXIES OF EXPOSURE TO AIR POLLUTION IN THE DIET, CANCER, AND HEALTH COHORT (*N* = 52,799), TOTAL AND BY INCIDENT CHRONIC OBSTRUCTIVE PULMONARY DISEASE STATUS AT FOLLOW-UP

		Total (*n* = 52,799)			COPD (*n* = 1,786)		
Length of Exposure*	Air Pollution Proxy	Mean (SD)	Median	IQR	Mean (SD)	Median	IQR
35 yr (1971-)	NO_2, μg/m³	17.0 (5.2)	15.3	5.8	18.1 (5.6)	16.8	6.6
	NO_x, μg/m³	28.2 (21.0)	21.6	12.4	31.5 (23.3)	23.5	16.2
25 yr (1981-)	NO_2, μg/m³	17.8 (6.0)	15.5	6.4	19.3 (6.5)	17.6	7.2
	NO_x, μg/m³	29.4 (24.1)	21.5	12.6	33.2 (27.3)	24.2	16.9
15 yr (1991-)	NO_2, μg/m³	17.1 (6.3)	14.5	6.3	18.7 (6.9)	16.9	7.5
	NO_x, μg/m³	27.8 (24.7)	19.3	11.6	31.9 (28.2)	22.6	16.6
1 yr mean (baseline)	Traffic load† 200 m (10^3 vehicle km/d)	4.7 (5.4)	2.6	5.8	5.3 (5.7)	3.5	6.5
	Major road‡ 50 m n (%)		4,310 (8.2)			187 (10.5)	

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; IQR = interquartile range; NO_2 = nitrogen dioxide; NO_x = nitrogen oxides; SD = standard deviation.

* 35, 25, and 15 yr defined as weighted mean of annual NO_2 and NO_x concentrations from 1971, 1981, and 1991, respectively, until event, censoring, or 27 June 2006.

† Total number of kilometers traveled within 200 m (sum of product of street length and traffic density for each road).

‡ Road with annual traffic density of 10,000 vehicles or more.

NO_x at residential addresses and the incidence of COPD, defined as first-ever hospital admission for COPD, in a cohort of elderly Danish adults. Second, the effect of air pollution was strongest in people with diabetes and asthma.

This is the first study to relate the incidence of COPD, assessed as first hospital admission, to long-term exposure to air pollution. Our results are in agreement with those of cross-sectional studies that linked long-term exposure to air pollution to a self-reported diagnosis of COPD (10–12) and decreased lung function (11, 14). The results of our study, with detailed assessment of long-term exposure before hospital admission for COPD, together with the finding that reductions in air pollution over time contribute to improving lung function and respiratory symptoms (17, 18), and studies in which chronic exposure to air pollution was identified as a risk factor in mortality from respiratory conditions including COPD mortality (7–9), strengthen the conclusion that air pollution is a causal agent in development of COPD.

The strongest association with COPD incidence was found with the longest exposure (Table 3), reinforcing the conclusion that exposure over a long period, perhaps over a whole life, is relevant for the development of chronic lung diseases such as COPD. Our results are not directly comparable to those of other studies, in which a variety of surrogates for air pollution and exposure windows were used. Because of the absence of historical address data, most studies used single-year air pollution proxies assessed at the residential address at the time of the event, including modeled NO_2 (12) or traffic density (12, 14, 15). Schikowski and colleagues reported a stronger association with the prevalence of COPD with 5-year than with 1-year NO_2 means (11). Karakatsani and colleagues found an effect of 5-year but none of 20-year mean air pollution levels but attributed this finding to possible bias in self-reported address history (10). A longitudinal study with 9-year follow-up (16) and Gotschi and colleagues found no association between lung function and modeled NO_2 (15). Some of the discrepancies in the reported effects of exposure to air pollution on COPD and lung function might be not only due to the variable, often short periods of exposure assessment. It has recently been suggested that assessment of lung function by the usual FEV_1 or the ratio to FVC without measurement after administration of a bronchodilator is insufficiently sensitive to detect COPD incidence in epidemiological studies (21).

TABLE 3. ASSOCIATION BETWEEN TRAFFIC-RELATED AIR POLLUTION AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE INCIDENCE (*N* = 1,797) AMONG 52,799 DIET, CANCER, AND HEALTH COHORT PARTICIPANTS

	Adjusted for Age	Adjusted for Age, Smoking Status, Duration, Intensity, and Environmental Tobacco Smoke	Fully Adjusted*
35-yr mean (1971 to event, censoring, or 27 June 2006)			
NO_2,† μg/m³	1.22 (1.15–1.29)	1.08 (1.02–1.14)	1.08 (1.02–1.14)
NO_x,† μg/m³	1.16 (1.11–1.22)	1.05 (1.01–1.10)	1.05 (1.01–1.10)
25-yr mean (1981 to event, censoring, or 27 June 2006)			
NO_2,† μg/m³	1.20 (1.13–1.27)	1.06 (1.01–1.13)	1.07 (1.01–1.13)
NO_x,† μg/m³	1.14 (1.09–1.19)	1.04 (0.99–1.09)	1.04 (0.99–1.09)
15-yr mean (1991 to event, censoring, or 27 June 2006)			
NO_2,† μg/m³	1.18 (1.11–1.24)	1.05 (0.99–1.11)	1.05 (1.00–1.11)
NO_x,† μg/m³	1.12 (1.07–1.17)	1.03 (0.99–1.08)	1.03 (0.97–1.09)
1-yr mean at cohort baseline (1993–1997)			
Major road‡ within 50 m	1.25 (1.07–1.45)	1.05 (0.90–1.22)	1.04 (0.89–1.21)
Traffic load§ within 200 m	1.10 (1.06–1.14)	1.01 (0.98–1.05)	1.01 (0.97–1.05)

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; CI = confidence interval; HR = hazard ratio; NO_2 = nitrogen dioxide; NO_x = nitrogen oxides.

Data are presented as HR (95% CI).

* Adjusted for smoking status, smoking duration, smoking intensity, environmental tobacco smoke, body mass index, educational level, occupational exposure, and fruit consumption.

† Linear trend per interquartile range.

‡ Road with annual traffic density of 10,000 vehicles or more.

§ Total number of kilometers traveled within 200 m (sum of product of street length and traffic density for each road).

TABLE 4. MODIFICATION OF ASSOCIATIONS BETWEEN NO_2 AND COPD INCIDENCE (N = 1,797) BY BASELINE CHARACTERISTICS AND COMORBID CONDITIONS OF 52,799 DIET, CANCER, AND HEALTH COHORT PARTICIPANTS

Covariate Comorbid Condition	Covariate Levels	No. of Cases	Incident Rate*	HR (95% CI)	*P* Value†
Sex	Male	797	3.2	1.07 (0.98–1.16)	
	Female	989	3.6	1.05 (0.97–1.13)	0.81
Smoking status	Currently smoke	1,349	7.1	1.06 (0.81–1.31)	
	Previously smoked	314	2.1	1.14 (0.87–1.42)	
	Never smoked	123	0.6	1.10 (0.86–1.33)	0.78
Occupational exposure	Yes	663	4.5	1.08 (0.98–1.19)	
	No	1,123	2.9	1.07 (1.00–1.15)	0.96
Educational level	< 8 yr	872	5.0	1.08 (1.00–1.18)	
	8–10 yr	701	2.9	1.07 (0.97–1.17)	
	⩾ 10 yr	213	1.9	1.08 (0.91–1.29)	0.94
Fruit consumption	< 240 g	1,445	3.7	1.09 (1.02–1.15)	
	⩾ 240 g	339	2.6	1.04 (0.91–1.19)	0.55
Body mass index	Underweight (< 18.5 kg/m^2)	48	12.8	1.01 (0.69–1.49)	
	Normal (18.5–24 kg/m^2)	841	3.7	1.03 (0.95–1.13)	
	Overweight (25–29 kg/m^2)	624	2.9	1.04 (0.95–1.15)	
	Obese(⩾ 30 kg/m^2)	273	3.6	1.21 (1.05–1.40)	0.34
Asthma	Has COPD	297	29.3	1.19 (1.03–1.38)	
	No COPD	1,489	2.9	1.05 (0.98–1.12)	0.10
Ischemic heart disease	Has COPD	342	6.4	1.10 (0.96–1.26)	
	No COPD	1,444	3.1	1.08 (1.01–1.15)	0.81
Other heart disease	Has COPD	355	6.4	1.11 (0.98–1.26)	
	No COPD	1,431	3.1	1.07 (1.00–1.13)	0.57
Stroke	Has COPD	147	5.6	1.10 (0.85–1.35)	
	No COPD	1,639	3.3	1.08 (1.02–1.14)	0.85
Diabetes	Has COPD	120	11.0	1.29 (1.05–1.50)	
	No COPD	1,666	3.3	1.06 (1.00–1.13)	0.08

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; CI = confidence interval; HR = hazard ratio; NO_2 = nitrogen dioxide.

Associations adjusted for smoking status, smoking duration, smoking intensity, body mass index, educational level, occupational exposure, and fruit consumption. NO_2 per interquartile range (5.8 μg/m^3) of 35-yr mean, 1971 to end of follow-up.

* Crude incident rate per 1,000 person-years.

† For Wald test for interaction.

COPD is a chronic disease of complex phenotype and recurring symptoms, and it is difficult to define its onset, as well as its presence or absence at some point of time. Studies of air pollution and COPD prevalence (10–12) used self-reported symptoms or diagnosis of COPD, which are subject to recall and information bias. The use of the first-ever hospital admission for COPD, assessed objectively from nationwide register, is thus appealing, and facilitates the first data on COPD incidence with respect to air pollution. However, as only a fraction of patients with COPD are hospitalized, and COPD is often undiagnosed for many years, the first-ever hospital admission for COPD is not likely an accurate marker of COPD incidence and underrepresents the real COPD burden. Rather, COPD admission should be regarded as hallmark of progression of preexisting COPD into a more severe stage. A Danish study revealed that the patients admitted acutely because of a COPD exacerbation had an FEV_1 of approximately 30% to 40% of the predicted value in their stable condition, corresponding to Global Initiative for Chronic Obstructive Lung Disease (GOLD) standard stage 3 and 4 (22). Thus, our study examines the onset of more severe COPD, and likely represents patients with severe disease. Still, our study design with air pollution exposure information available up to 35 years before hospital admission for COPD, even if the real onset of COPD occurred several years before hospital admission, justifies the incidence interpretation of our results and facilitates inferences about causality.

Our findings corroborate the postulated biological mechanism whereby repeated inhalation injury of lung tissues by long-term exposure to air pollution contributes to progression and development of COPD, implying that the longer the exposure, the higher the risk for COPD (3). Similarly, a recent study of the effect of smoking on the development of COPD over 25 years showed that the longer people smoke, the higher their risk for COPD (23).

We found that the traffic-related air pollutants NO_2 and NO_x are relevant for COPD development, NO_2 having the strongest effect. NO_2 is an airway irritant, which even at the low concentrations found in everyday life can cause respiratory tract infections by interacting with the immune system and may play a role in lung inflammation (24). We cannot conclude from our study that NO_2 is of pathological significance in COPD or just an indicator of other harmful pollutants originating from traffic, especially particles. The biological effects of NO_2 are uncertain and controversial, with limited experimental evidence supporting the notion that long-term exposures can cause COPD (25), whereas the role of particles seems to be better understood. The particles deposited in the airways can trigger a local inflammatory response in lung tissue and also a systemic inflammatory response (3, 5). As gases and particles from motor vehicle emissions are mixed in urban air, the harmful effects after inhalation might represent the synergistic effect of the effect of several pollutants. In any case, sufficient data (8, 9, 12, 14, 17, 18), including the results of this study, provide evidence that traffic-related urban air pollution contributes to the development of COPD and that reductions in traffic emissions would be beneficial for public health.

Smoking is the main risk factor for COPD (1), as corroborated by our study (Table 1), and the effect of air pollution could be biased by inadequate adjustment for smoking. We adjusted our results for smoking status, intensity, and duration, and ETS, each of which is an independent predictor of COPD, and showed that smoking explains some of the association observed in the unadjusted model (Table 3). Furthermore, we found no evidence that the association between exposure to

NO_2 and COPD was modified by smoking status, as exposure estimate for nonsmokers was similar to that of the rest of the cohort (Table 4). This result refutes the possibility that the observed effect of air pollution is due to residual confounding by smoking, and supports the idea that recurrent inflammatory processes induced by air pollution contribute to the development of COPD, irrespective of smoking (1, 3, 5, 24). Furthermore, the risk estimates associated with exposure to NO_2 were similar for people with and without occupational exposure associated with lung disease, obviating the conclusion that the observed effect of air pollution was due to residual confounding by occupational exposure. Given the ubiquitous nature of air pollution, our findings support those of a recent review, which found that the burden of COPD among nonsmokers is much greater than previously believed and that environmental factors such as air pollution probably play an important role (1).

Our results suggest that the effect of NO_2 on COPD is modified by diabetes and asthma, as patients with these conditions had HRs five and four times larger, respectively, than the rest of the cohort (Table 4). COPD and comorbid conditions are chronic diseases with probable onset before hospital admission. We thus cannot infer which specific tissues were affected first, and which disease was a secondary complication, although the most ($> 92\%$) hospital admissions for comorbid conditions occurred before the admission for COPD. Our results suggest that people with asthma or diabetes are more vulnerable to the effects of air pollution, leading to increased risk of COPD. Diabetes was recently linked to air pollution in a study showing that particles exacerbate insulin resistance by enhancing inflammation in adipose tissue, and air pollution–induced systemic inflammatory response was considered a possible link between diabetes and lung inflammation (26). Our finding that the strongest association between exposure to NO_2 and COPD was in obese patients (Table 4) supports this mechanism. Asthma, which is associated with both air pollution (27) and an increased risk for COPD (28), has many common risk factors and features with COPD, such as hyperactivity and inflammation (3). It is plausible that airflow obstruction and hyperresponsiveness in people with asthma, or systemic inflammation in people with diabetes, can lead to increased susceptibility of the lung to air pollution, resulting in airway inflammation and progression of COPD (3, 25).

The main strength of this study is the objective definition of incidence of COPD as the first admission for this condition in the Danish Hospital Discharge Register, a nationwide register of routinely collected data with no loss to follow-up. Hospital admission for COPD was evaluated to be a reliable outcome in a previous Danish cohort, as lung function and respiratory symptoms were strong predictors (29). Another strength of this study is the large prospective cohort with address history and information on potential confounders collected before admission for COPD. As the Danish Diet, Cancer, and Health cohort was not originally designed to study COPD or air pollution, and COPD incidence, vital status, and the information on addresses used in modeling air pollution were obtained from the reliable population-based registries, the possibility of information or recall bias with respect to health outcome or differential bias with respect to exposure is minimal.

The weakness of our study is that our primary outcome was hospital admission for COPD as primary diagnosis and not the COPD diagnosis as confirmed by spirometry, making the association between exposure to air pollution and COPD indirect. However, hospitals in Denmark hold a strong tradition of performing spirometry before discharging of patients with COPD, but spirometry records are not routinely available in the hospital register and could not be assessed for purpose of this study (30). Furthermore, the coding of COPD diagnoses in the Danish hospital register are not done by administrators, but by doctors, usually at the specialist level, which, together with the fact that spirometry is routinely performed at hospitalization, minimizes the diagnosis misclassification and the possibility that patients admitted to hospital for CODP were not real COPD cases (30). Another weakness of this study is the lack of lung function measurements in our cohort, which would be relevant to associate to long-term accumulated air pollution. Finally, the weakness of this study is that despite sufficiently large cohort and long follow-up, we detected effects of weak or borderline significance, calling for caution in interpreting the strength of reported associations and replication of these results by other studies.

The dispersion models we used to assess NO_2 and NO_x levels at the addresses of study participants have been validated (31, 32) and applied in Denmark (33, 34) and the United States (35). Although modeled concentrations are only surrogates of real exposures and are inevitably associated with some exposure misclassification, this is likely to be nondifferential with respect to development of COPD. A previous comparison of measured NO_2 concentrations with those calculated from a Danish dispersion model showed that misclassification was primarily of the Berkson type, typically associated with exposures predicted from the model (33, 34). This type of error is not expected to bias the estimates, although it may decrease their precision (34). A further limitation of the exposure assessment method is that we assessed only outdoor concentrations and lacked information on work address, commuting habits, and personal activities.

In conclusion, we report an association between long-term exposure to traffic-related air pollution and the incidence of COPD. The effect of air pollution appears to be amplified by coexisting diabetes or asthma but is not limited to these vulnerable subpopulations.

Author Disclosure: Z.J.A. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. M.H. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. S.S.J. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. M.K. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. S.L. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. M.S. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. A.T. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. K.O. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript. O.R.-N. is employed by the Danish Cancer Society as the head of the research department.

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An Evaluation of "Road Diet" Projects on Five Lane and Larger Roadways

Introduction

"Road Diets," or road lane reallocations, have been increasingly utilized by agencies to improve roadway safety, multi-modal accessibility, and traffic operations in a cost-effective manner. Agencies have also implemented these projects as a tool for stimulating the local economy and achieving broader environmental goals. To-date, the majority of road diets have been implemented on low to moderately-trafficked four-lane bi-directional roadways, converting these to three lane cross-sections (two through lanes and center turn-lane). These often utilize the additional space from this conversion for on-street parking, bike lanes, or other uses increasing the overall utility of the roadway. In the correct context, four to three lane road diet projects have shown to have substantial benefits, including vehicle collision reductions, reduction in speeding, traffic flow improvement, and increased bicycle and pedestrian safety, to name a few (K. Knapp et al., 2014).

While there have been many studies on the characteristics that make a roadway a good candidate for four to three-lane road diets, as well as post-implementation evaluations showing their positive impacts on safety, multi-modal accessibility, and traffic operations, little research exists that evaluates the potential benefits of road lane reallocations on bi-directional roadways with more than four lanes. This is not due to a lack of interest; a demand for such information has been indicated by several agencies and organizations studying and implementing these types of conversions such as the National Association of City Transportation Officials (NACTO) and its member cities. Resources providing design guidance, implementation strategies, and estimated benefits would be beneficial to many cities studying roadway space reallocations on roads over four lanes.

An Evaluation of "Road Diet" Projects on Five Lane and Larger Roadways

This research strives to understand how roadway lane reallocation projects on five lane and greater roadways affect roadway safety, operations, and multimodal accessibility. The strategies employed to achieve these goals will be to first, evaluate existing literature on the subject, and second, evaluate examples of five-lane or greater road lane reallocations from around the United States as case studies, studying changes in safety conditions, traffic operations, and multimodal use between before and after designs. The final document provides a useful resource for agencies studying the potential application of road diets on five lane and greater roadways, and recommends future areas of research to better understand the effects on safety, operations, and multimodal use.

Since existing literature mainly concentrates on four to three-lane road diets, the literature review will seek to understand the general lessons-learned from such road-diets that could be applied to road lane reallocations on roadways five lanes and greater. The evaluation of road lane reallocation case studies reviews common types of roadway analyses conducted by implementing agencies on roadway reallocation projects to serve as indicators of corridor safety, traffic operations, and multimodal performance before and after the project. Examples of these analyses include, but are not limited to, before and after crash data as an indicator of roadway safety, Bicycle and Pedestrian Level of Service analyses (BLOS and PLOS) as an indicator of multimodal accessibility, and Level of Service analysis (LOS) as an indicator of traffic operations performance. Because road lane reallocation projects can also be sensitive projects politically, the research also investigates the public outreach processes and qualitative surveys that took place during project development.

Literature Review

Studies specifically looking at the safety, operational, and multimodal impacts of roadway lane reconfigurations on roadways five lanes or greater have not been conducted to date. For this reason, this study focuses on reviewing the extensive body of existing literature on 4 lane to 3 lane road diets to see where lessons from this research can be applied to roadways of five lanes or greater. In addition, this study reviews literature on roadway operational characteristics and safety countermeasures applicable to roadways five lanes or greater to see what lessons and guidelines can be applied in this context.

Applicable traffic safety countermeasures

Existing literature on four to three-lane road diets revealed many safety benefits that likely would apply to lane reconfiguration projects on five-lane or greater roadways. The following sections describe these benefits and in what contexts they would apply on five-lane or larger roadways.

Reduce incidence for rear-end crashes with left-turning traffic: Several studies have shown that the addition of a two way left turn lane (TWTL) to the roadway removes mid-block left-turning cars from the traffic stream reducing the chance of rear-end collisions (D. W. Harwood, 1990), (Hovey, Chowdhury, Zhou, & Fries, 2009). This benefit would be applicable to five lane or greater road reconfigurations where a TWTL is added by repurposing through lanes.

Slow Traffic: Studies have indicated that four to three lane road diets reduce the speed of traffic owing to the concept that reducing through traffic to one lane in each direction limits traffic speeds to that of the leading vehicle. Reduced traffic speeds lead to reductions in crash severity for both vehicle on vehicle and vehicle on non-vehicle collisions (Stamatladis, Kirk, Wang, Cull, & Agarwal, 2011), (K. Knapp et al., 2014). This benefit could be applicable to five to three lane

road reconfigurations since through lanes are reduced to one lane in either direction, but it's unclear whether this benefit would apply to reconfigurations where two or more through lanes are maintained in either direction.

Reduce the potential for sideswipe crashes: Reducing the number of lanes has been shown to reduce opportunities for vehicles changing lanes (also known as weaving), and the conflict points between changing vehicles (K. Knapp et al., 2014). While it's generally understood that roadways with fewer lanes have fewer crashes associated with sideswipes, the magnitude of improved safety as a result of removing through lanes is unclear but likely depends on before/after configurations and congestion levels (Kononov, Bailey, & Allery, 2008), (D. W. Harwood, 1990).

Add Bicycle Facilities: Adding bicycle facilities has been shown to improve safety for non-motorized users along a roadway (Jensen, 2008), (L. Chen et al., 2012). Traditional four to three lane road diets often have the added benefit of adding bicycle lanes along a roadway. Lane reallocations on five lane and greater roadways can also include bike lanes, with sufficient roadway width often available for adding buffered bike lanes or separated bike lanes. Buffered bike lanes are designed and operate like standard bike lanes except they have a painted buffer from traffic, on-street parking, or both. Separated bike lanes are separated from vehicular traffic by both a horizontal buffer and vertical element like parking, flex-post bollards, or concrete curb (Goodman et al., 2015). Both have been shown to provide additional safety and comfort benefits for bicyclists, especially on higher volume and speed roadways (Monsere, Dill, Clifton, & McNeil, 2014).

Pedestrian benefits: Four to three lane road diets have been shown to benefit pedestrian safety in several ways. They reduce the effective distance and number of vehicular lanes a pedestrian

has to cross, they allow for median pedestrian refuges at midblock crossings along some corridors, and they can slow vehicle speeds reducing potential crash risk and severity (K. Knapp et al., 2014), (Zegeer, Stewart, Huang, & Lagerwey, 2001). The addition of bike lanes or on-street parking creating greater lateral separation from moving vehicles has also been shown to increase pedestrian comfort (D. Harwood et al., 2007). All of these benefits are transferrable to road lane reallocations on five lane or greater roadways.

Reduction in conflict points: Traditional four to three lane road diets reduce the number of potential vehicular conflict points on a roadway, as shown in **Figure 1** (Knapp et al., 2014), (Stamatladis et al., 2011). Reducing the number of lanes on a roadway five lanes or greater also has this effect.

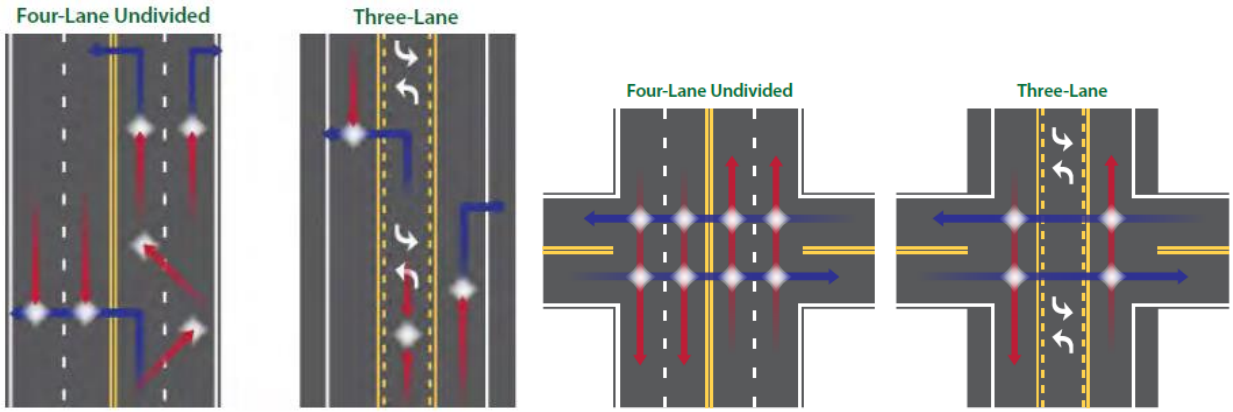

Figure 1: Representation of conflict point reduction on four to three lane road diets (K. Knapp et al., 2014)

Side street traffic crossing: One noted benefit of four to three lane road diet projects is the benefit to left-turning traffic at unsignalized side streets and driveways. The addition of a two-way center turn lane (TWTL) provides an opportunity for turning vehicles to cross the roadway in two stages and the reduction in the number of lanes increases a turning driver's ability to see oncoming traffic and, in theory, find a gap in traffic to cross (Kirk, 2014), (Stamatladis et al.,

2011). This benefit would also likely be applicable to projects on five lane and greater roads that add TWTLs and/or reduce the number of traffic lanes.

Improved sight distance: The reduction in the number of lanes on four to three lane road diets has been shown to improve the sight distance for turning vehicles by reducing the potential for a vehicle on an inside lane blocking the view of vehicles or other roadway users further from the roadway's edge. This benefit would likely be applicable to road lane reallocations that add TWTLs and/or reduce the number of traffic lanes on roadways five lanes or greater as well. **Figure 2** below shows how four to three lane road diets improve sight distance.

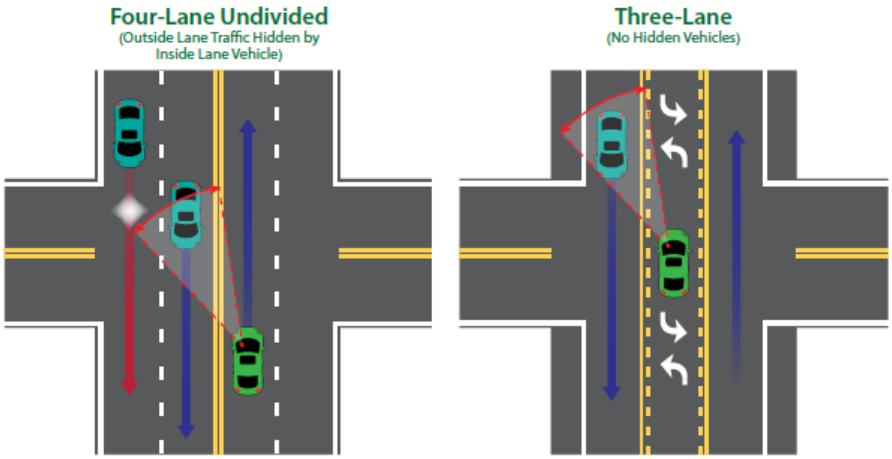

Figure 2: Representation of sight line improvement on four to three lane road diets (K. Knapp et al., 2014)

Adjusting lanes to appropriate widths: Lane widths along a road can have significant impacts on safety and operations depending on the operational characteristics and context of a corridor (Potts, Harwood, & Richard, 2007), (Petritsch & PTOE, 2009), (D. Harwood et al., 2007). Road lane reductions and reallocations often have the potential to adjust existing lanes that are deemed too wide for the context, or widen lanes that are deemed too small for the context. This is true of both four to three lane road diets and lane reallocations on roadways five lanes or more.

Applicable traffic operations improvements

Existing literature on four to three-lane road diets also indicated many operational benefits that could apply to lane reconfiguration projects on five-lane or greater roadways. The following bullets describe these benefits, to what contexts they would apply on five-lane or larger roadways, and provide the source(s) they originated from:

Reduced delays as a result of reduced weaving: On streets with high volumes of left turning vehicles and no TWTL, inside lanes often function as de-facto turn lanes, with many through vehicles avoiding them because of the presence of queued vehicles. As discussed above, adding a TWTL removes left-turning traffic from through lanes, freeing up a lane's worth of roadway width that can be utilized for bike lanes, parking, etc. In some cases, adding the TWTL has shown to improve traffic flows due to a reduction in lane weaving (K. Knapp et al., 2014), (Stamatladis et al., 2011).

Reduced side street delays: As mentioned above, The addition of the TWTL provides an opportunity for turning vehicles to cross the roadway in two stages and the reduction in the number of lanes increases a turning driver's ability to see oncoming traffic and, in theory, find a gap in traffic to cross (Kirk, 2014), (Stamatladis et al., 2011). This has been shown to both increase safety and reduce delay for vehicles exiting side streets and driveways.

Bus pullouts: One of the cited disadvantages of four to three lane road diets can be delays as a result of stopped traffic (such as busses) in the through lane (Rosales & Brinckerhoff, 2006). On five lane or greater road lane reallocations, this is may be a non-issue either because there is more than one through lane in either direction or there is room for a bus pullout to be nested within the bike lane or parking lane (see **Figure 3** below for example).



Figure 3: A bus stop/separated bike lane mixing zone on Milwaukee Ave. in Chicago (Vance, 2013)

Wider effective turn radii at intersections: bike lanes or parking lane buffers allow for effectively wider turning geometries at intersections, facilitating turning movements and reducing the necessary curb radius. This is particularly helpful for vehicles with large turning radii like trucks and busses (K. Knapp et al., 2014).

Driveways: Improvements to driveways in conjunction with road lane reallocations can help to improve both traffic flow (Gluck, Levinson, & Stover, 1999) and safety (D. Harwood et al., 2007). Taking measures to formalize driveway entrances and consolidate driveways among multiple properties can help to reduce the overall number of ingress/egress points and increase their spacing, improving traffic operations on road lane reallocation projects of all types.

Signal optimization: One study showed that signal optimization along traditional four to three lane road diets can mitigate the effects of delay as a result of capacity reduction (K. K. Knapp, Giese, & Lee, 2003). Such treatments should generally be applicable to lane reconfiguration projects on roadways five lanes or greater.

Potential Consequences

While the list of potential benefits resulting from road lane reallocation projects is great, there are a number of cautions and potential consequences that should be considered as well.

Freight and bus operations: Project development should consider whether the corridor is part of a transit line or freight corridor and how impacts to traffic operations will affect the movement of large trucks and busses. A project that increases vehicle travel time along the corridor could impact freight and bus reliability (K. Knapp et al., 2014). However, as discussed above, road reallocation projects can have benefits for freight and bus operations as well.

Functional classification and network designation: Projects should consider impacts on the functional classification network to ensure that changes to specific corridors don't induce wider transportation system impacts. Similar considerations should be taken into account if the corridor is part of a larger network such as the state or US highway system (Taylor, 2014).

Intersection Level of Service and stacking: One common area of concern in implementing road lane reallocation projects is intersection Level of Service. Intersections with high volumes of turning traffic should be studied carefully as these can substantially impact operations on corridors with road lane reallocation projects. Also, corridor segments with short-spaced, high-volume signalized intersections could experience intersection stacking, where traffic backs up across intersections (Sprague, 2015a). However, lane reallocation projects on five lane or greater roadways may not be as susceptible to these issues due to the possibility of reallocating space from bike lane or parking for dedicated turn lanes at intersections.

Case Study Findings

Table 1 below provides a list of completed and proposed road lane reallocation projects on five lane or greater roadways that were studied for this report. The investigations were conducted by

collecting articles and presentations, reviewing technical documents such as traffic analysis and striping plans, and discussion with implementing agency representatives. This study investigates projects that had readily available data, are located in urban areas, are over .5mi in length, and were completed within the last 10 years. As **Table 1** indicates, he projects reviewed ranged across 9 mid-sized to large cities, on five-lane to nine-lane roads ranging from 7,000 average vehicles per day to 45,000 average vehicles per day. Most roadways reviewed are classified as collector or arterial roadways. Common design elements among many of the projects reviewed include center turn lanes, pedestrian safety features such as mid-block crossing islands, bulb-outs, and traffic calming, and all projects add or improve bike lanes.

The purpose of these case studies is to identify common trends in network operations and safety impacts as well as design characteristics among these projects that could be the subject of future, more detailed investigations. The following sections present the major impacts that emerged from the review of the case studies. A separate appendix document provides detailed analyses of the projects highlighted in **Table 1**.

Status	Year	State	City	Street	Miles	Owner	ADT	Width	Lanes Before	Lanes After
Completed	2015	CA	Los Angeles	Venice Blvd.	0.8	City	45k	100'	7	5
Completed	2015	TN	Memphis	US 51, Danny Thomas Blvd	1.9	TDOT	20k	87'	7	5
Completed	2015	TN	Chattanooga	Broad	0.8	City	8.1K	96'	6	4
In Progress	2015	GA	Atlanta	Peachtree Rd.	2.8	GDOT	40k	60'	6	5-6
Completed	2015	UT	Salt Lake City	200 West	1.5	City	15-30k	88'	5	3
In Progress	2015	CA	Oakland	Telegraph	0.6	City	10-15k	67'	5	3
Proposed	2015	SC	Columbia	Farrow	1.8	SCDOT	13.7K	64'	5	3
Proposed	2015	SC	Columbia	Sumter	0.9	SCDOT	8.2K	78'	5	3
Completed	2014	CA	Oakland	E 12th St.	1.4	City	10-15k	74'	6	4
Completed	2014	UT	Salt Lake City	300 South	1.4	City	10-15k	70-90'	5	3
Proposed	2014	CA	Los Angeles	Figueroa	5.1	City	25K	58'	5	3
Completed	2013	CA	Los Angeles	Colorado	3	City	34K*	94'	7	5
Completed	2013	GA	Atlanta	Ponce de Leon	1	GDOT	35k	68'	7	5
Completed	2013	OR	Portland	Multnomah	0.8	City	10K	59'	5	3
Completed	2012	TX	Austin	Shoal Creek	1.2	City	7.5k	60'	5	3
Completed	2012	TX	Austin	Harris Ridge	0.75	City	6k	60'	5	3

Status	Year	State	City	Street	Miles	Owner	ADT	Width	Lanes Before	Lanes After
Completed	2011	DC	Washington	Pennsylvania Ave	1	City	35k	100'	9	7
Completed	2010	NC	Charlotte	East Blvd	0.7	City	18.8k	70'	5	3
Completed	2009	TX	Austin	Dean Keeton	1	City	13.5k	78'	6	4
*Indicates Average Weekday Traffic										

Table 1: *5 lane and greater lane reallocation projects reviewed for the report. Highlighted rows are projects included as case studies. Data sources include project analyses referenced in this report, as well as ADT data, historical photos, and measurements obtained from Google Earth.*

Impacts to Corridor Operations

One of the common goals of agencies implementing lane reallocation projects is to encourage travel by non-motorized modes of traffic. However, a common concern are the potential impacts of these projects on vehicular traffic operations. This research investigated the operational impacts of 5+ lane reallocation projects on both motorized and non-motorized roadway users.

Mode shift from single-occupancy vehicles to other modes can be an indicator of how effective a project is in achieving this goal. Measuring mode shift is often done through user counts over a period of time. While before and after counts are a commonly-used measure for meeting mode shift goals, it is unclear whether changes in user counts indicate actual shifts from motor vehicle travel to other modes as a result of a roadway reallocation project, or whether this indicates other factors such as changes in travel patterns and/or exogenous influences (such as increases in fuel price).

Pennsylvania Avenue and Multnomah Street both showed an increase in bicycle ridership after completion of the road lane reallocations on these corridors. While no significant impacts to corridor travel time were observed, there were significant decreases in motor-vehicle traffic volumes for both corridors. However, the traffic operations studies conducted after the Ponce de Leon Avenue and East Boulevard projects show no significant impacts to traffic throughput or

travel time speed. This conflicting evidence may indicate that motor vehicle reductions and/or bicycle ridership increases signify a shift in vehicle and bike travel patterns rather than mode shift. More information on these studies is presented in the following sections.

Pennsylvania Avenue – Washington, DC

Pennsylvania Ave is an iconic corridor in Washington DC connecting parks, museums, and governmental buildings in the center of the City. In 2010, the City of Washington reconfigured the roadway to install bi-directional buffered bike lanes in the center of the roadway for the segment of the road that connects the US Senate building to the White House (3rd St. NW to 15th St. NW). This reconfiguration resulted in the loss of two vehicular travel lanes to accommodate the width needed for bicycle facilities. Prior to the installation of bike lanes, the corridor had an ADT of about 35,000 cars per day.

Following the roadway reconfiguration, DDOT conducted a robust evaluation of the project conducting surveys asking local businesses, residents, and corridor users their opinions on the new roadway configuration, surveys evaluating user comprehension of the new bikeway traffic control devices, bicycle and pedestrian analyses, and vehicular level of service and volume analysis (Parks et al., 2012). The study indicated that vehicle Level of Service on Pennsylvania Avenue wasn't significantly affected. However, motor vehicle volumes showed a decrease of 15%-21% as a result of the project (Parks et al., 2012). In addition, bicycle ridership along the corridor showed a substantial increase from before the reconfiguration to after. Bicycle counts were conducted for the AM peak and the PM peak, and all count locations showed a 221-315 percent increase in bicycle ridership from before to after conditions (Parks et al., 2012).

Multnomah Avenue – Portland, OR

The city of Portland initiated a road lane reallocation project on Multnomah Street as a pilot project to create a "main street" for the Lloyd District ("NE Multnomah Street Pilot Project,"

n.d.). The pilot project included NE Multnomah St. from NE 16th Ave. to NE Wheeler St as well as several blocks of Holladay St, which runs parallel to NE Multnomah. The majority of Multnomah was converted from four lanes with a center turn lane and approximately 4.5' bike lanes to 3 lanes with a center turn lane, separated bike lanes, and on-street parking on one side of the street. Pedestrian refuge islands were also installed intermittently along the corridor.

The project was one of the focus corridors in the 2014 study *Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the US* (Monsere et al., 2014). The study included resident surveys, bicyclist surveys, video collection and review, count data analysis, and an economic impact analysis. Bicycle ridership data from the study and vehicular ADT data were collected before and after the project. The counts showed that on the corridor, ADT decreased from 10,000 to 7,600 vehicles and bicycle ridership increased by 68% one year after installation (Monsere et al., 2014).

Ponce de Leon Avenue – Atlanta, GA

Ponce de Leon Ave. is classified as a principal arterial providing an important east/west connection in the Midtown neighborhood of Atlanta. The approximately two-mile section between Juniper St and Moreland Dr. underwent a road lane reconfiguration in 2013 to convert two of the through lanes into four through lanes with a center two-way turn lane (TWTL) and buffered bike lanes on a one-mile portion. GDOT conducted post-project traffic and safety evaluations of the Ponce de Leon project and found indications that traffic flow along the corridor have improved (Heath, 2015). As **Figure 4** shows, peak and average vehicular volumes in 2014 and 2015 have increased by approximately 500 vehicles. **Figure 5** shows that in 2014, peak travel time speeds have been minimally impacted, if not improved along the corridor.

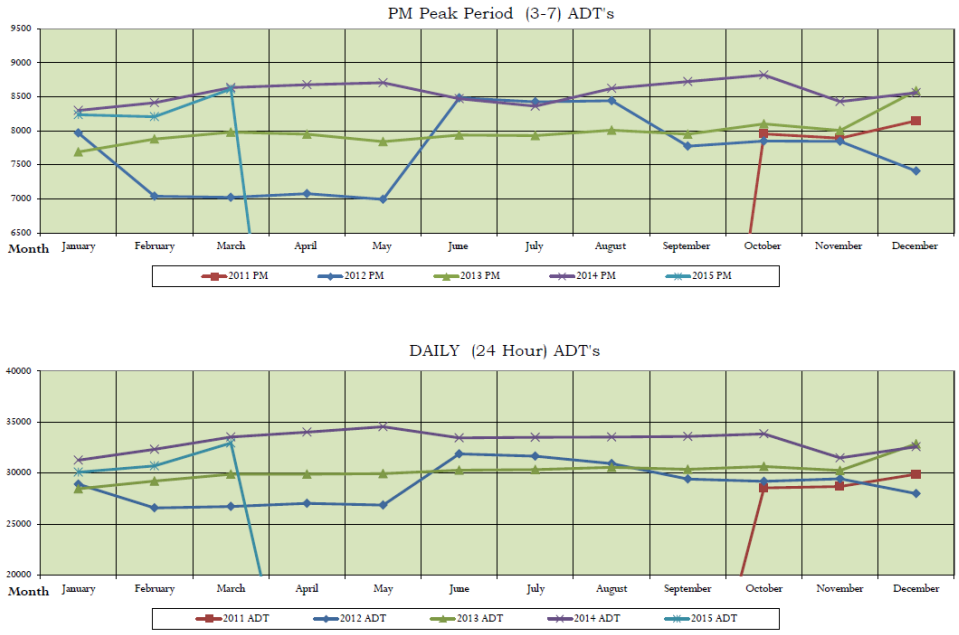

Figure 4: 2011-2015 PM peak and ADT traffic volumes for Ponce de Leon (Heath, 2015)

	Travel Time (min)	Speed (mph)
2012-2013 average	4.22	27.99
Spring 2014	3.69	31.88
Difference	***-0.53 min***	***+3.89 mph***

2012-2013 average	6.36	18.66
Spring 2014	7.75	16.26
Difference	***+1.39 min***	***-2.4 mph***

Figure 5: Before and after traffic speeds for Ponce de Leon (Heath, 2015)

East Boulevard – Charlotte, NC

East Boulevard is classified as a major collector roadway with an ADT of 18,800 in the Dilworth neighborhood, a relatively low-density historic residential neighborhood ("NCDOT Go!NC GIS Clearinghouse," n.d.). East Boulevard serves as a hub of mixed and higher-density land-uses for the neighborhood including offices, retail, grocery stores, restaurants, multi-family housing, a major hospital, and a park and greenway trail (Wagner & Searcy, n.d.). A city bus route is also located on the corridor. In 2010, the section of the roadway with a cross-section of four through

lanes with a TWTL and on-street, parallel parking was reconfigured to two lanes with a TWTL, bike lanes, and on-street parking as phase II of a three phase roadway reconstruction project.

A considerable amount of before and after traffic flow, speed, and crash data was collected for project. Since the data analyzes both roadway segments that the City converted from four to three lanes as well as those that the City converted from five to three lanes, this allows for some ability to control for speed limits, traffic volumes, land-use, safety, etc. when comparing the two segments. As indicated in **Figure 6**, traffic throughput was not significantly impacted as a result of the project for both the four to three lane section and the five to three lane section.

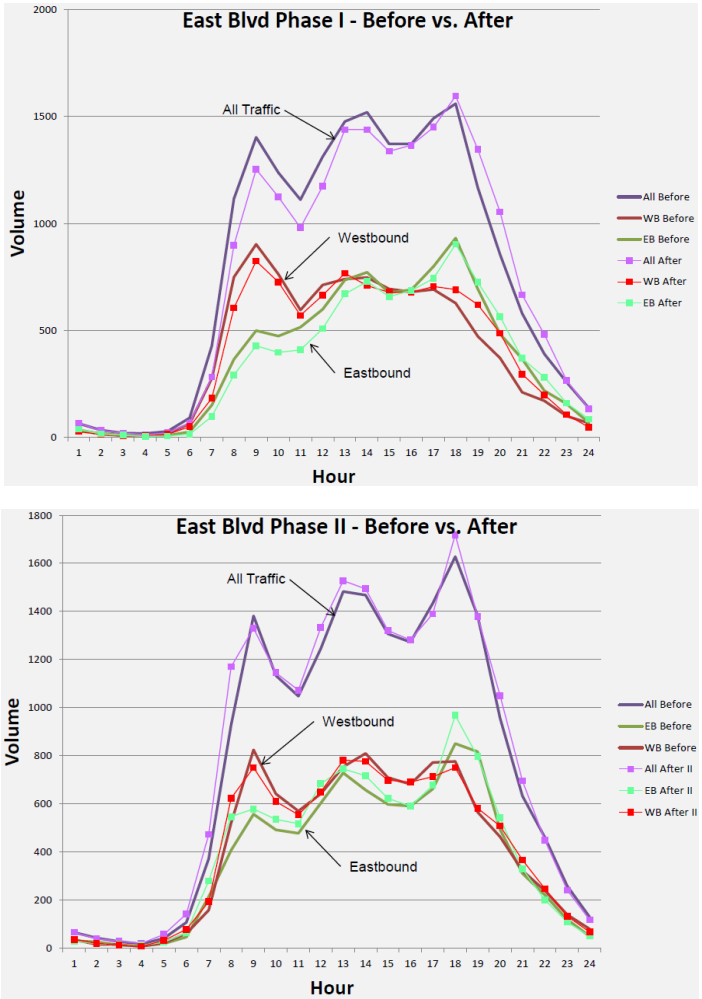

Figure 6: Traffic Volume Measurements on East Blvd before and after Phase I (4 to 3 lane road diet) and Phase II (5 to 3 lane conversion) (Saak, 2013).

Inconclusive Safety Impacts

Another common goal of road lane reallocation projects is to improve overall corridor safety. Four to three lane road diets have generally shown safety improvements, however the evidence gathered on five lane and greater lane reallocation projects has been inconclusive. Crash data is a commonly-used metric for evaluating changes in roadway safety. The analysis looked at crash data analyzed for Ponce de Leon Avenue, East Boulevard, Pennsylvania Avenue, Multnomah Street, and Colorado Boulevard generally showed similar numbers of reported crashes before and after project implementation. The East Boulevard and Pennsylvania Avenue projects showed increases in bicycle and pedestrian crashes, but this is likely a product of increased bicyclist and pedestrian use rather than a reduction in safety.

Speed reduction is a commonly cited objective in order improve safety and comfort for roadway users, especially bicyclists and pedestrians. The only case study that measured changes in before and after speeds was conducted on the East Boulevard project. The City conducted an analysis of 85th percentile speed before and after phase I and phase II of the roadway reallocation project. Both sections had a 35mph speed limit both before and after the conversion, and the five to three lane section experienced a larger drop in off-peak 85th percentile speed (4-7mph reduction) compared with the four to three lane section (3-4mph reduction) as seen in **Figure 7.**

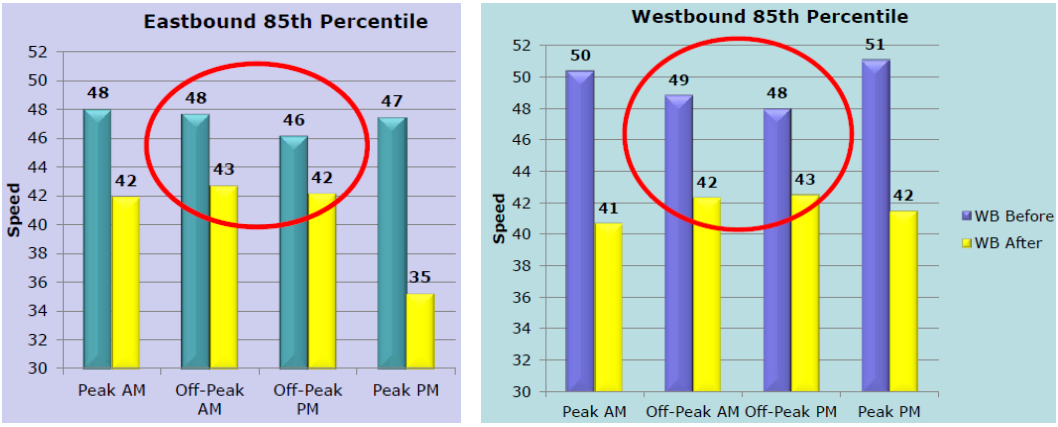

Figure 7: *85th percentile speeds on Phase II of East Boulevard roadway reconfiguration (Saak, 2013).*

Public Support for Projects

Road lane reallocation projects on five lane and larger roadways can be potentially controversial due to the relatively high use and visibility of the corridors. For example, various articles and reports on the Colorado Boulevard and East Boulevard projects noted sizeable controversy surrounding initial project planning and design. However, surveys on the satisfaction of corridor users and surrounding residents and tenants for the Pennsylvania Avenue and Multnomah Street projects reported general satisfaction in the project outcomes.

Among individuals surveyed regarding the Pennsylvania Avenue project, 90% of cyclists believe separated bike lanes are safer, 94% believe they are easier, 92% believe they are more convenient, and 86% would go out of their way to ride them. 75% of pedestrians notice fewer cyclists on the sidewalks, 84% of motorists like that bicycles are separated from the motor vehicle traffic, and 71% of residents think the separated bike lane is a valuable neighborhood asset (Goodno, 2013).

Residents surveyed about the Multnomah Street project indicated that they were more likely to shop along the corridor after the improvements and they felt the aesthetic character of the street had generally improved. Most residents surveyed also felt that the project had positive or no impacts on corridor operations, as seen in **Figure 8** (Monsere et al., 2014).

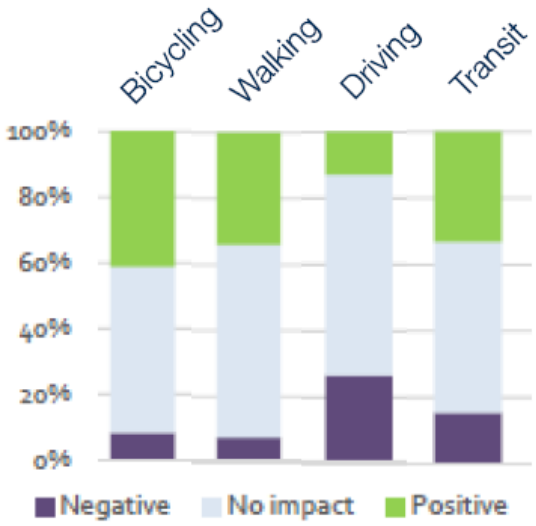

Figure 8: *Results from a resident survey asking perceptions of impacts to corridor operations on Multnomah Street (Monsere et al., 2014).*

Discussion of Findings

The findings of the study show that road lane reallocation projects on five lane and larger roadways can have many of the same benefits of those on four lane roadways. Some of the interesting highlights from the case studies analyses and literature review include:

- All projects which resulted in the addition or upgrade of bike lanes and that conducted before and after bicycle ridership counts noted significant increases in bike ridership.
- Crash data analysis is inconclusive on whether the projects positively or negatively affected corridor safety. However, one study suggests that road lane reallocation projects on roadways five lanes and greater can reduce unsafe corridor speeds.
- Vehicular LOS was generally only minimally impacted as a result of the projects.
- Two of the case studies suggest that vehicular traffic volumes decrease as a result of the road lane reallocation projects. However, it is unclear whether this is due to vehicular traffic shifting to other routes, mode-shift, or a reduction in overall trips.

In spite of the interesting observations, it is still unclear from the case studies and literature review what types and combinations of design treatments and corridor conditions are associated with specific safety and operational improvements. Furthermore, because the potential design solutions are more varied and potentially more complex among five lane or greater roadway reallocation projects than their four to three lane counterparts, it is more difficult to generalize rules, such as ADT thresholds, that determine the feasibility/minimize the risk of impacts of projects. For example, in the cases of East Boulevard in Charlotte and Ponce de Leon Avenue in Atlanta, the safety benefits and minimal impact on vehicular operations observed on these corridors could be attributed to creating more consistency in cross-section design along the corridor rather than the reduction of a travel lane in either direction. East

Boulevard also showed a higher safety improvement where a TWTL was added as part of the four to three road diet compared with where it already existed on the five to three lane reallocation section. This may indicate that much of the safety benefits associated with four to three lane reallocation projects are due to the addition of a TWTL.

In addition, one of the issues noted in the Colorado Boulevard and Ponce de Leon Avenue case studies was that Level of Service analysis predicted poorer results than were actually realized once the project was implemented. As a result, an evaluation of the applicability of Level of Service analysis for five lane or greater road lane reallocation projects should be investigated. Because such projects are often along corridors that are important for pedestrian, bicycle, transit, freight, and car traffic, a more appropriate metric for evaluating the need and feasibility of such projects may be one that weighs the benefits among all modes, such as Multimodal Level of Service.

Ultimately, further study with more data and examples is needed, as well as studies that control for specific before/after characteristics of the project. These could include 5 to 3 lane projects, 6 to 5 lane projects, 7 to 5 lane projects, projects adding center turn lanes or TWTL's, projects adding bike lanes, projects adding separated bike lanes, projects adding on-street parking, projects with differences in intersection spacing, and projects that include access management improvements, to name a few. Controlling for such characteristics may allow for the identification of general conditions that help determine project feasibility, such as ADT thresholds commonly cited with four to three lane roadway reallocation projects. Also, studies to evaluate the potential impact of specific countermeasures such as signal timing and phasing and right-hand turning pockets could be beneficial for addressing commonly cited issues with road lane reallocation projects such as intersection queuing and intersection LOS impacts.

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Appendix F. Design Guidelines



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Bicyclists have legal access to all county streets. While this Plan identifies a specific subset of streets to be designated as bikeways, many bicyclists will need to use other streets to reach their destinations. Therefore, it is important that all roadways be designed to accommodate bicyclists.

The County of Los Angeles works to implement on-and off-street projects to encourage walking and cycling, improve safety and accessibility, and enhance the quality of the walkway and bikeway networks so that these activities become integral parts of daily life. The County of Los Angeles features a mix of urban, suburban, and rural environments, and many future projects will involve retrofitting existing streets and intersections. The County has high demand for on-street parking in commercial corridors, an auto-oriented roadway system reliant on high-capacity arterials, and many other complex situations.

The Design Guidelines are intended to provide a range of design options for bicycle treatments. The Design Guidelines provide a toolbox of ideas that may be implemented by the County of Los Angeles, but is not inclusive of all treatments that may be used and does not identify treatments intended for any specific projects. The following key principles should guide the development of all future County bikeways and bicycle facilities:

- The bicycling environment should be safe. On-and off-road bikeways described in Chapter 3 (Table 3.1) should be designed and built to be free of hazards and to minimize conflicts with external factors such as noise, vehicular traffic and protruding architectural elements.
- The bicycle network should be accessible. Future bikeway design should ensure the mobility of all users by accommodating the needs of people regardless of age or ability. Bicyclists have a range of skill levels, and facilities should be designed for use by experienced cyclists at a minimum, with a goal of providing for inexperienced / recreational bicyclists (especially children and seniors) to the greatest extent possible. In areas where specific needs have been identified (e.g., near schools) the needs of appropriate types of bicyclists should be accommodated.
- The bicycle network should connect to places people want to visit. The bikeway network should provide continuous direct routes and convenient connections between destinations, including homes, schools, offices, commercial districts, shopping areas, recreational opportunities and transit.
- The bikeway network should be clearly designated and easy to use. On-and off-road bikeways should be designed so people can easily find a direct route to a destination and delays are minimized.
- Bicyclists should be able to enjoy a positive environment. Good design should enhance the feel of the bicycling environment. A complete network of on-street bicycling facilities should connect seamlessly to the existing and proposed off-street pathways to complete recreational and commuting routes around the County.
- All roadway projects and improvements *should* accommodate bicyclists.
- Bicycle improvements should be economical. Improvements should be designed to achieve the maximum benefit for their cost, including initial cost and maintenance cost as well as reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should stimulate, reinforce, and connect with adjacent private improvements.

Design guidelines are intended to be flexible and should be applied with professional judgment by designers. Specific national and state guidelines are identified in this document, as well as design treatments that may exceed these guidelines.

F.1 National, State, and Local Guidelines / Best Practices

The following is a list of references and sources utilized to develop design guidelines for the County of Los Angeles Bicycle Master Plan. Many of these documents are available online.

F.1.1 Federal Guidelines

- American Association of State Highway and Transportation Officials. (2004). *AASHTO Policy on Geometric Design of Streets and Highways*. Washington, DC. www.transportation.org
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F.1.2 State and Local Guidelines

- California Department of Transportation. (2006). *Highway Design Manual* (HDM), *Chapter 1000: Bikeway Planning and Design.* http://www.dot.ca.gov/hq/oppd/hdm/pdf/chp1000.pdf
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F.1.3 Best Practices Documents

- Alta Planning + Design and the Initiative for Bicycle & Pedestrian Innovation (IBPI). (2009). *Fundamentals of Bicycle Boulevard Planning & Design.* http://www.ibpi.usp.pdx.edu/media/BicycleBoulevardGuidebook.pdf
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- Rosales, Jennifer. (2006). *Road Diet Handbook: Setting Trends for Livable Streets.* Institute of Transportation Engineers.

F.2 Experimental Projects

Most of the design concepts in **Section F.5** are based on uniform standards outlined in the *California Highway Design Manual*, *Chapter 1000 – Bikeway Planning and Design*; *Manual of Uniform Traffic Control Devices* (CA MUTCD) 2010, Part 9 Traffic Controls for Bicycle Facilities and the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*. The toolbox also includes treatments that as yet have not been approved by the State of California Department of Transportation and/or the Federal Highway Administration. California State law requires the State to adopt uniform standards, and for local agencies to conform to these standards. California allows approved experimental projects on a case by case basis as approved by the California Traffic Control Devices Committee (CTCDC) and FHWA. These approved experimental projects are studied by the CTCDC and FHWA as a means to consider changes to these uniform standards.

These Design Guidelines contain several innovative treatments, such as cycle tracks, for which other jurisdictions both in California and in other states are experimenting. The State of California may at some future time approve these treatments, or other treatments not provided in these Design Guidelines, for use by all local agencies. As additional designs and standards are adopted by the State of California, the County will include those innovative treatments in the Plan's toolbox of treatments. The County promotes the use of these innovative treatments and will apply for and implement experimental projects utilizing them where cost effective and where such projects enhance the safety of bicycles, pedestrians, and motorists.

The process and requirements related to requests for approval for an experimental project from FHWA and CTCDC is outlined in the CA MUTCD. Examples of the processes to request and conduct experimental projects from the CTCDC and FHWA are shown in **Chart F-1** and **Chart F-2**, respectively. Per State guidelines, "experimental projects shall terminate at the end of the approved period unless an extension is granted, and all experimental devices and applications shall be removed unless specific permission is given for continued operation."

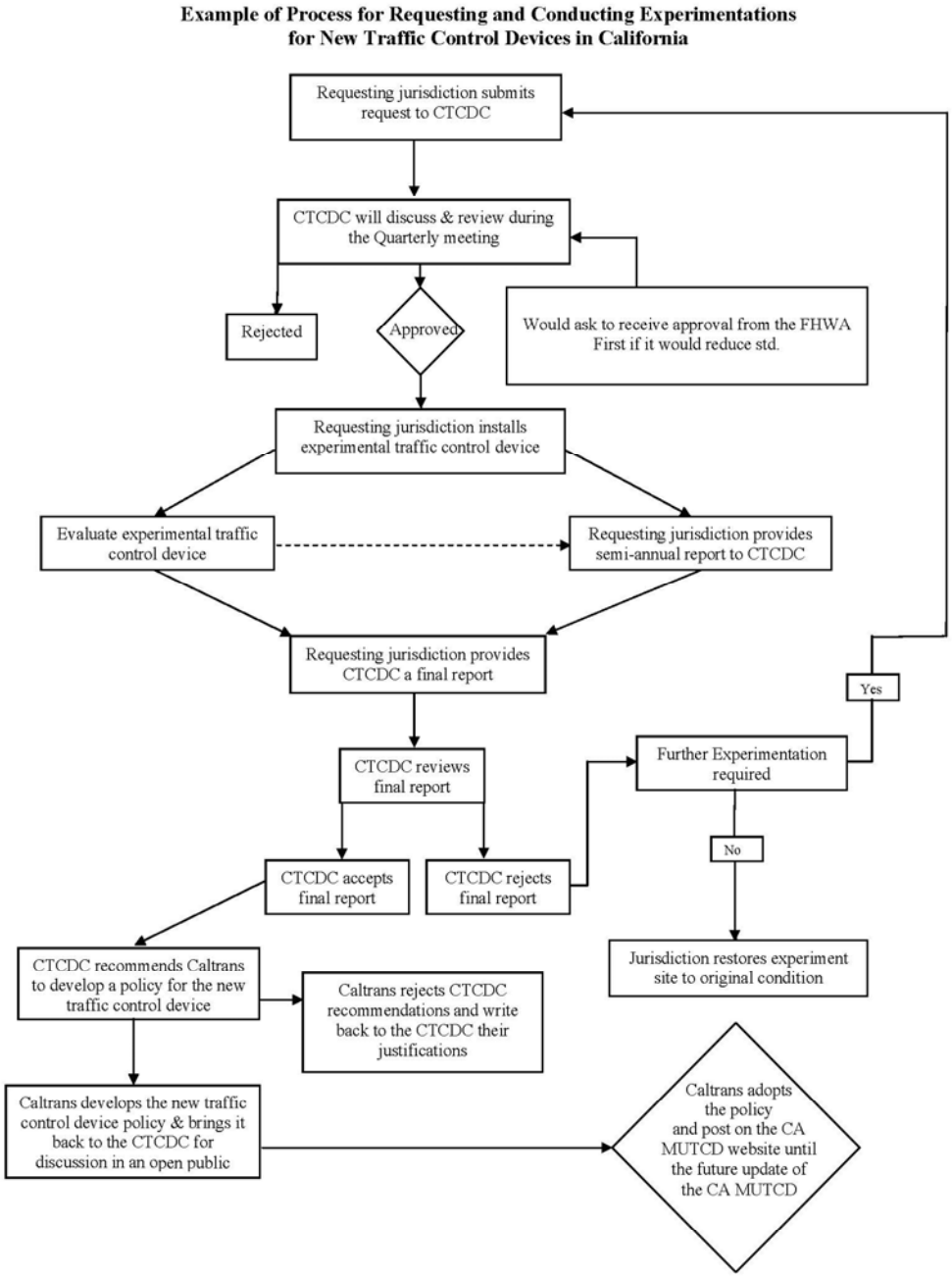


Chart F-1 – CTCDC Experimental Process

Reference: California Department of Transportation website

link: http://www.dot.ca.gov/hq/traffops/signtech/newtech/others/example-implementation.pdf

Example of Process for the Use of a Traffic Control Device in California Approved as on Interim Approval (IA) by the FHWA

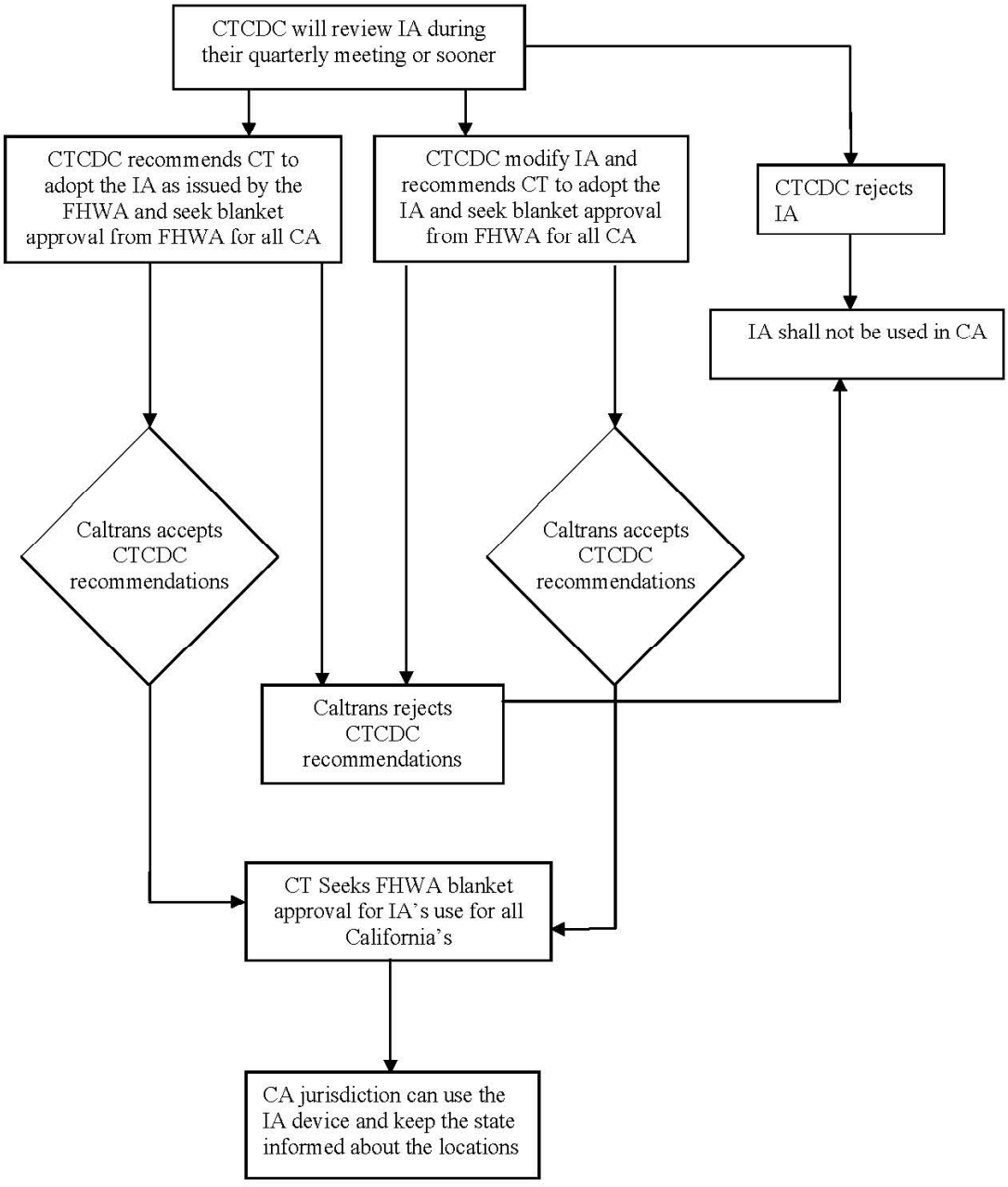


Chart F-2 – FHWA Experimental Process

Reference: California Department of Transportation website

link: http://www.dot.ca.gov/hq/traffops/signtech/newtech/others/example-experimentprocess.pdf

F.3 The Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles come in a variety of sizes and configurations. This variation can take the form of the variety in types of vehicle (such as a conventional bicycle, a recumbent bicycle, or a tricycle), or the behavioral characteristics and comfort level of the cyclist riding the vehicle. Any bicycle facility undergoing design should consider what types of design vehicles will be using the facility and design with that set of critical dimensions in mind.

F.3.1 Physical Dimensions

The operating space and physical dimensions of a typical adult bicyclist are shown in **Figure F-1**. Clear space is required for the bicyclist to be able to operate within a facility; this is why the minimum operating width is greater than the physical dimensions of the bicyclist. Although four feet is the minimum acceptable operating width, five feet or more is preferred.

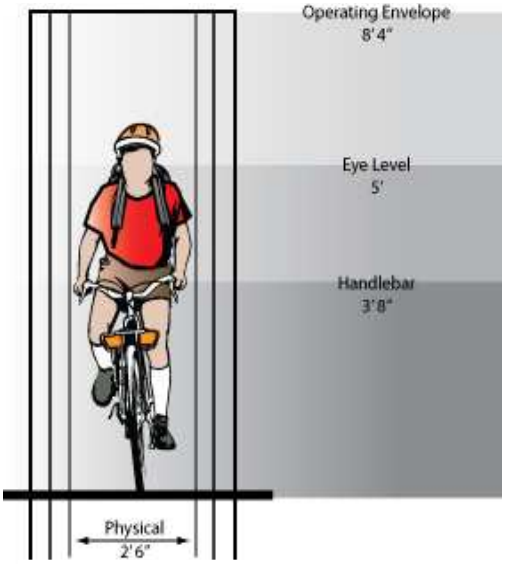


Figure F-1: Standard Bicycle Rider Dimensions

Outside of the design dimensions of a typical bicycle, there are many commonly used pedal driven cycles and accessories that should be considered when planning and designing bicycle facilities. The most common types of bicycles are depicted in **Figure F-2.**

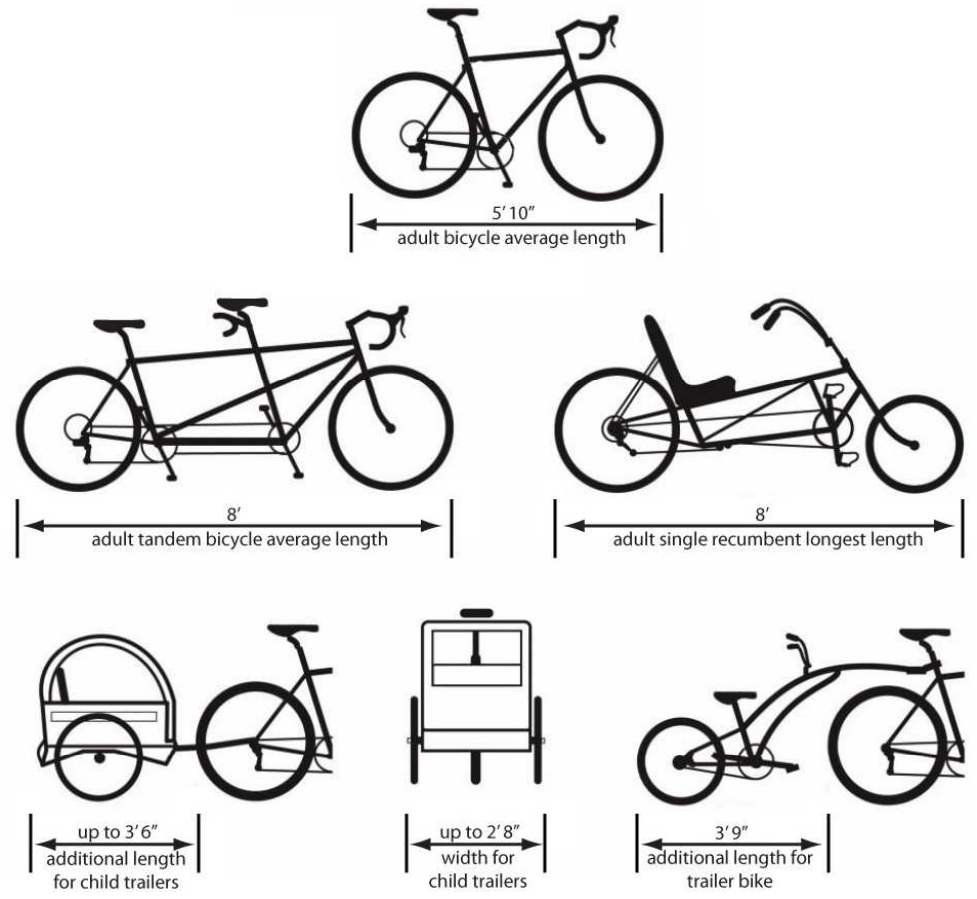


Figure F-2: Various Bicycle Dimensions

Table F-1 summarizes the typical dimensions for most commonly encountered bicycle design vehicles.

Table F-1: Bicycle as Design Vehicle – Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc.).	10 ft
	Approximate center of gravity	2 ft 9 in to 3 ft 4 in
Recumbent Bicyclist	Physical length	7 ft
	Eye height	3 ft 10 in
Tandem Bicyclist	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 6 in
Hand Bicyclist	Eye height	2 ft 10 in
Inline Skater	Operating width (sweep width)	5 ft

F.3.2 Design Speed

The speed that various types of bicyclists can be expected to maintain under various conditions can also have influence over the design of facilities such as shared use paths. **Table F-2** provides typical speeds of various types of bicyclists for a variety of conditions.

Table F-2: Bicycle as Design Vehicle – Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Level surface	15 mph
	Crossing Intersections	10 mph
	Downhill	30 mph
	Uphill	5-12 mph
Recumbent Bicyclist	Level surface	18 mph

F.3.3 Types of Cyclists

The skill level of the cyclist also provides a dramatic variance on expected speeds and expected behavior. There are several systems of classification currently in use within the bicycle planning and engineering professions. These classifications can be helpful in understanding the characteristics and infrastructure preferences of different cyclists. However, it should be noted that these classifications may change in type or proportion over time as infrastructure and culture evolve. Often times an instructional course can instantly change a less confident cyclist to one that can comfortably and safely share the roadway with vehicular traffic. Bicycle infrastructure should be planned and designed to accommodate as many user types as possible with separate or parallel facilities considered to provide a comfortable experience for the greatest number of cyclists.

A classification system that is currently in use in the Pacific Northwest and also under consideration for the Draft 2009 AASHTO *Guide for the Development of Bicycle Facilities* provides the following bicycle user types:

- **Strong and Fearless** (Very low percentage of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections, even if shared with vehicles, over separate bicycle facilities such as class I pathways.
- **Enthused & Confident** (5-10% of population) – This user group encompasses the 'intermediate' cyclists who are mostly comfortable riding on all types of bicycle facilities but will usually prefer low traffic streets or class I pathways when available. These cyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of cyclists including commuters, recreationalists, racers, and utilitarian cyclists.
- **Interested But Concerned** (approximately 60% of population) – This user type makes up the bulk of the cycling population and represents cyclists who typically only ride a bicycle on low traffic streets or class I pathways under favorable conditions and weather. These cyclists perceive significant barriers towards increased use of cycling with regards to traffic and safety. These cyclists may become "Enthused & Confident" with encouragement, education and experience.
- **No Way, No How** (approximately 30% of population) – Persons in this category are not cyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually give

cycling a second look and may progress to the user types above. A significant portion of these people will never ride a bicycle under any circumstances.

F.4 Routine Accommodation of Bicyclists (Complete Streets)

Bicyclists have legal access to all County streets. While this Plan identifies a specific subset of streets to be designated as bikeways, many bicyclists will need to use other streets to reach their destinations. Therefore, it is important that all roadways be designed to accommodate bicyclists. The California Complete Streets Act of 2008 (AB 1358) mandates that cities and counties plan for all users of roadways.

> *"Commencing January 1, 2011, upon any substantive revision of the circulation element, the legislative body shall modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan....*
>
> *For purposes of this paragraph, "users of streets, roads, and highways" means bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors."*

An engineering study, accounting for various site-specific factors including traffic speeds, parking turnover, bus and truck volumes, will determine whether it is safe to use "absolute minimum" travel and turn lane widths in order to accommodate bike lanes.

Figure F-3 through **Figure F-8** illustrate potential ways to configure roadways in order to enhance bicycle access. For roads without curb and gutter, the minimum bike lane width allowed in the Caltrans Highway Design Manual is four feet. The cross-sections shown below are not intended to be standards; they are merely illustrations how bikeways may be included on County roadways.

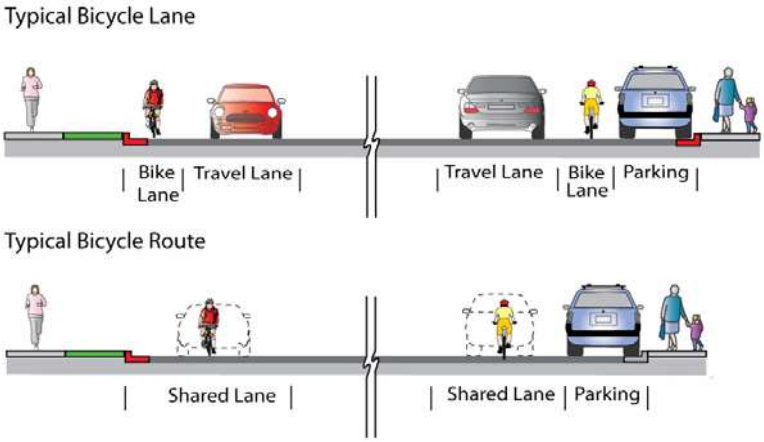
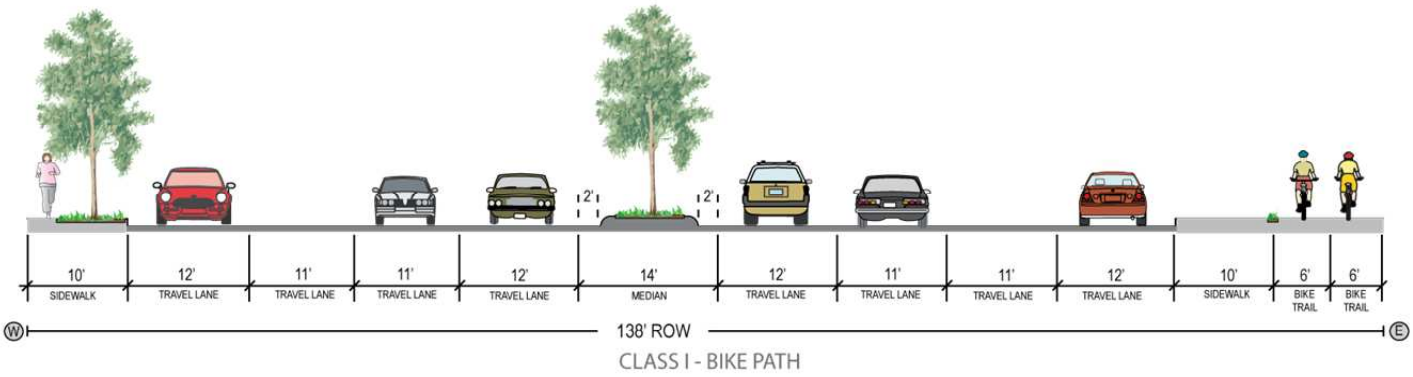


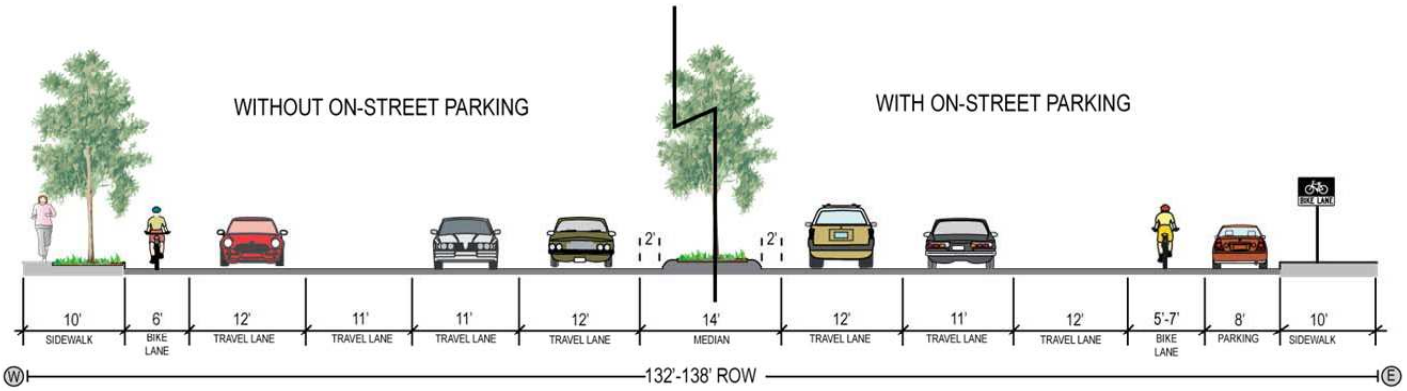
Figure F-3: Typical bicycle lane and bicycle route accommodation with and without on street parking

1 MAJOR HIGHWAY

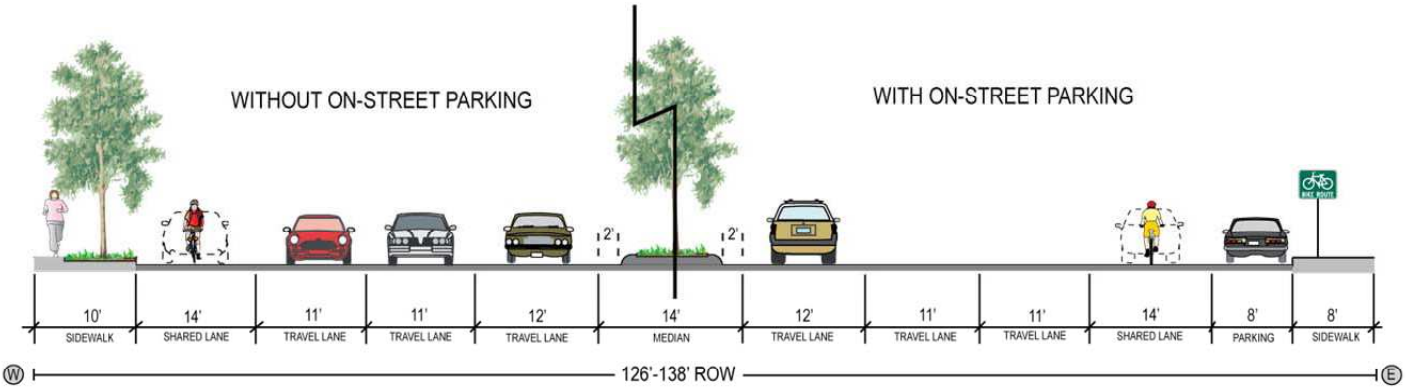
FOUR LANES IN EACH DIRECTION WITH RAISED LANDSCAPE MEDIAN



CLASS I - BIKE PATH



CLASS iI - BIKE LANE



CLASS III - BIKE ROUTE

Figure F-4: Major Highway with four traffic lanes, ROW ≥100'

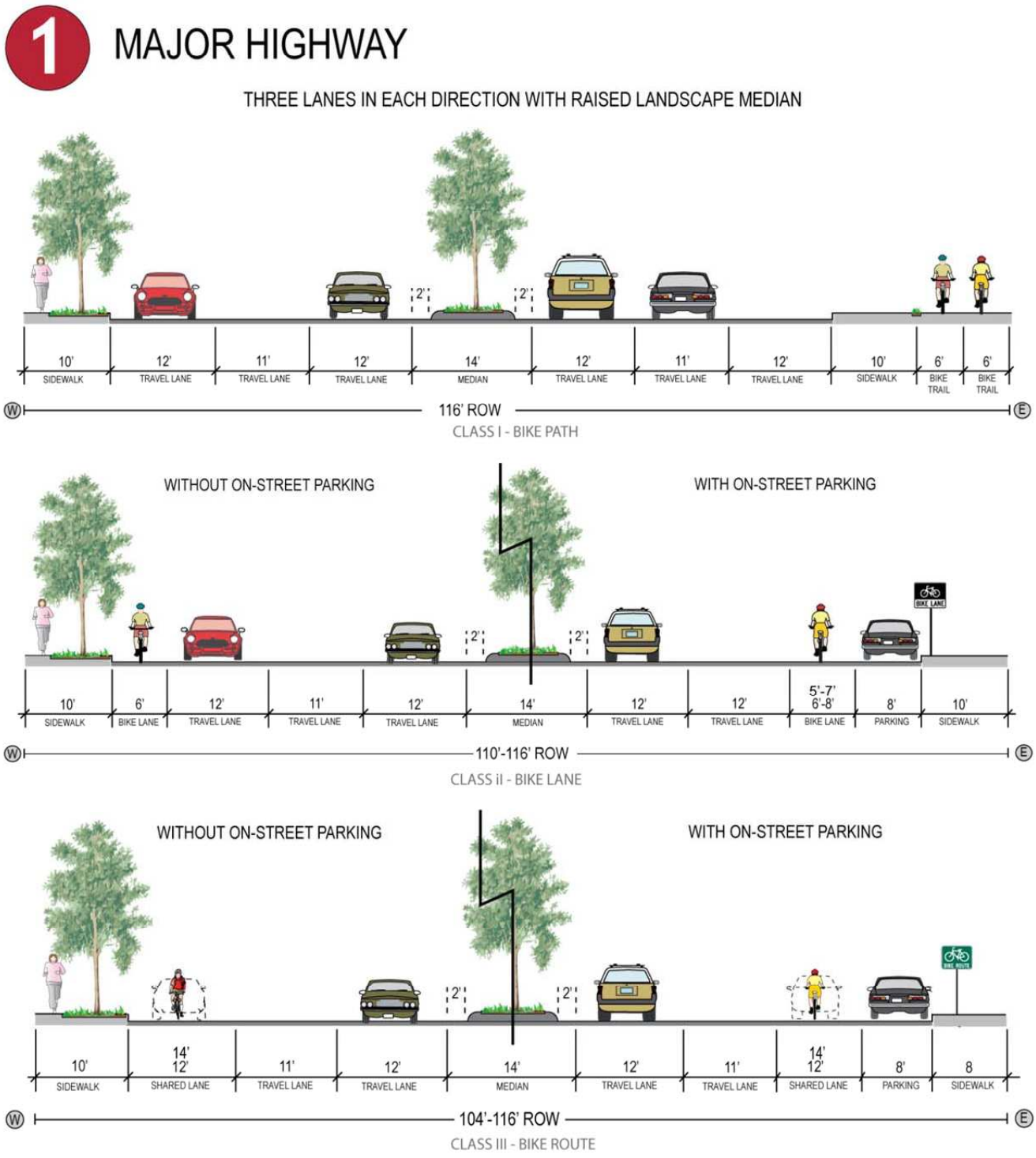


Figure F-5: Major Highway with three traffic lanes, ROW ≥100'

2 SECONDARY HIGHWAYS

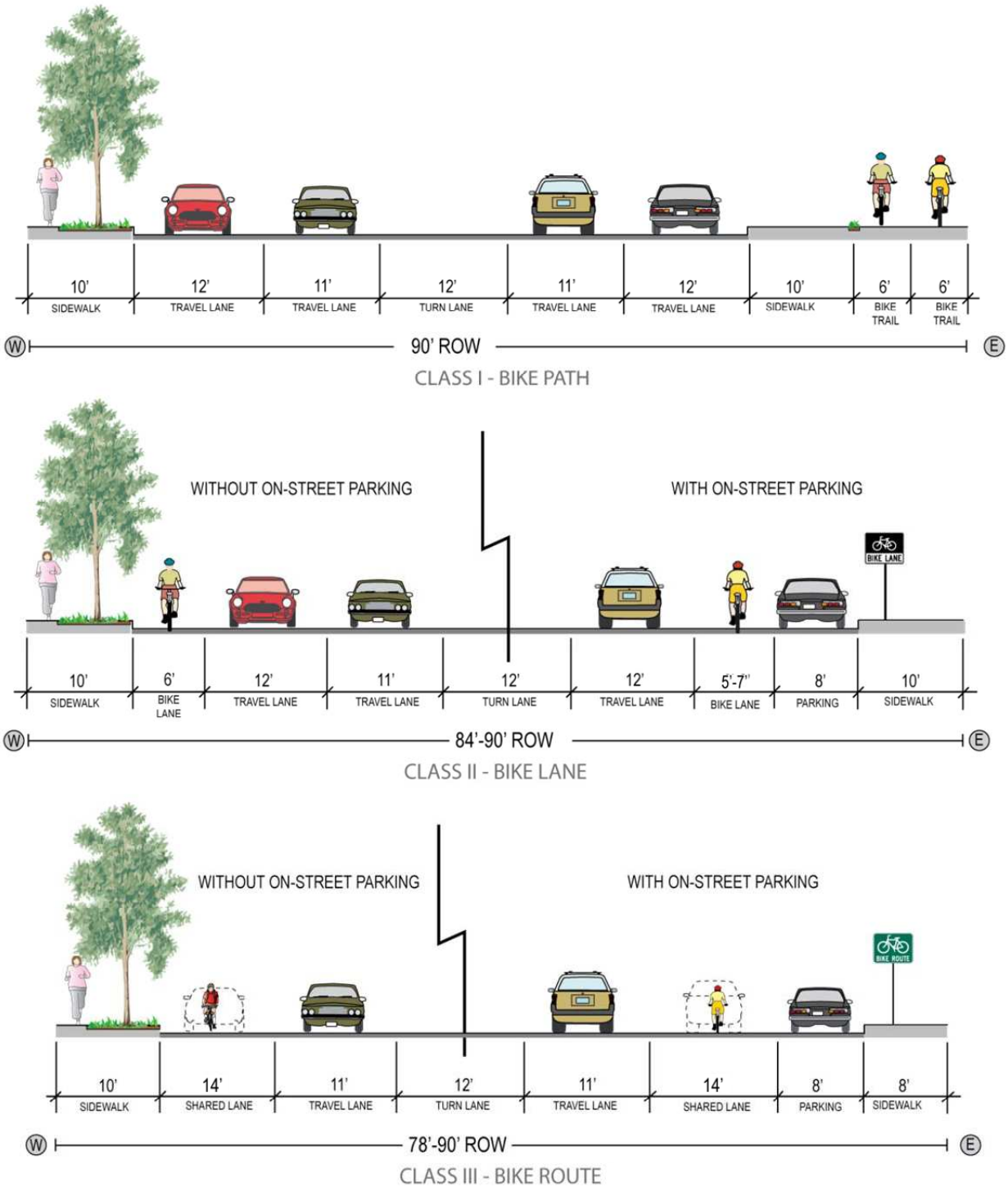


Figure F-6: Secondary Highway ROW 80'-90'

3 LIMITED SECONDARY HIGHWAY

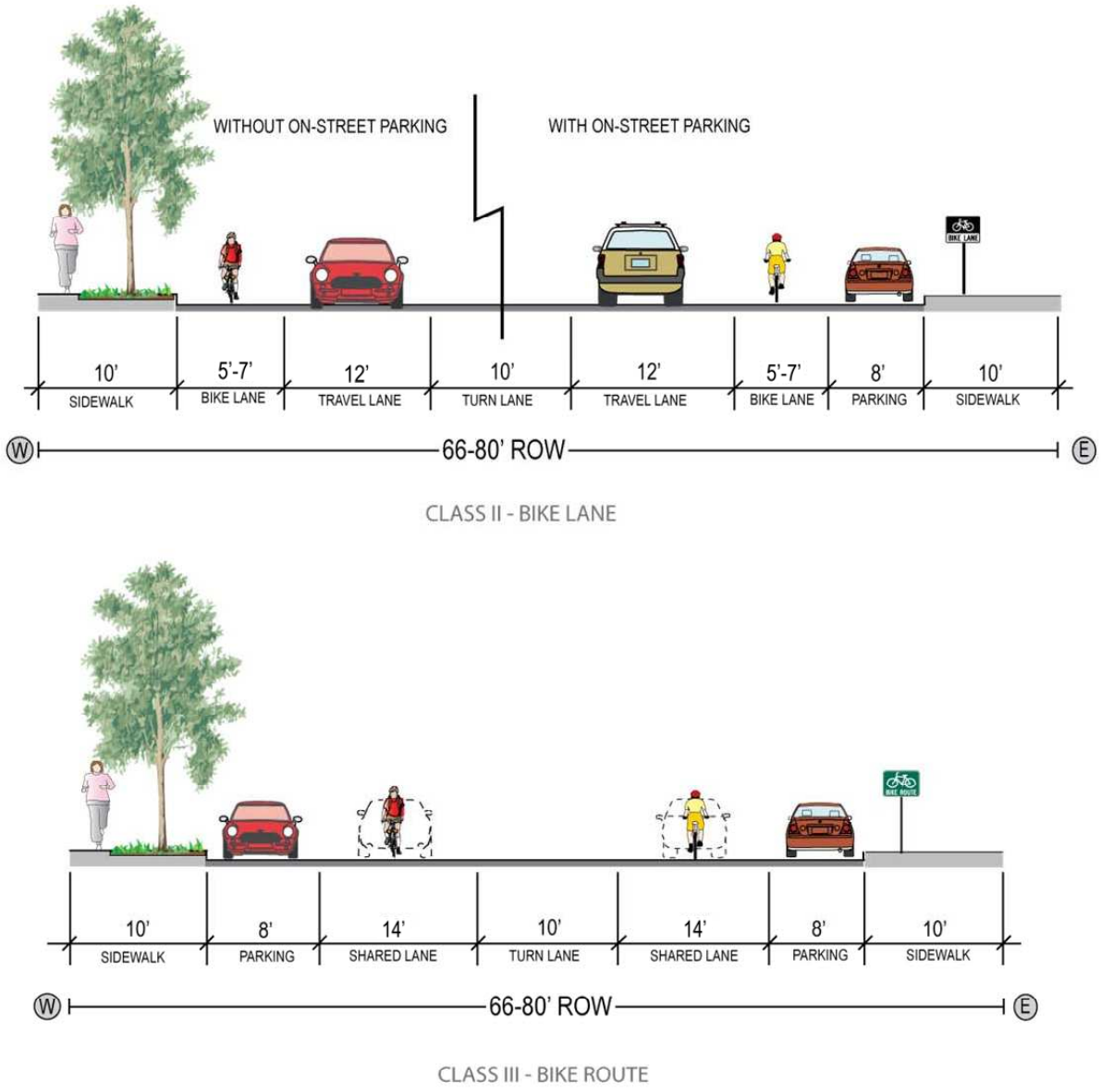


Figure F-7: Limited Secondary Highway ROW 66'-79'

4 LOCAL STREET

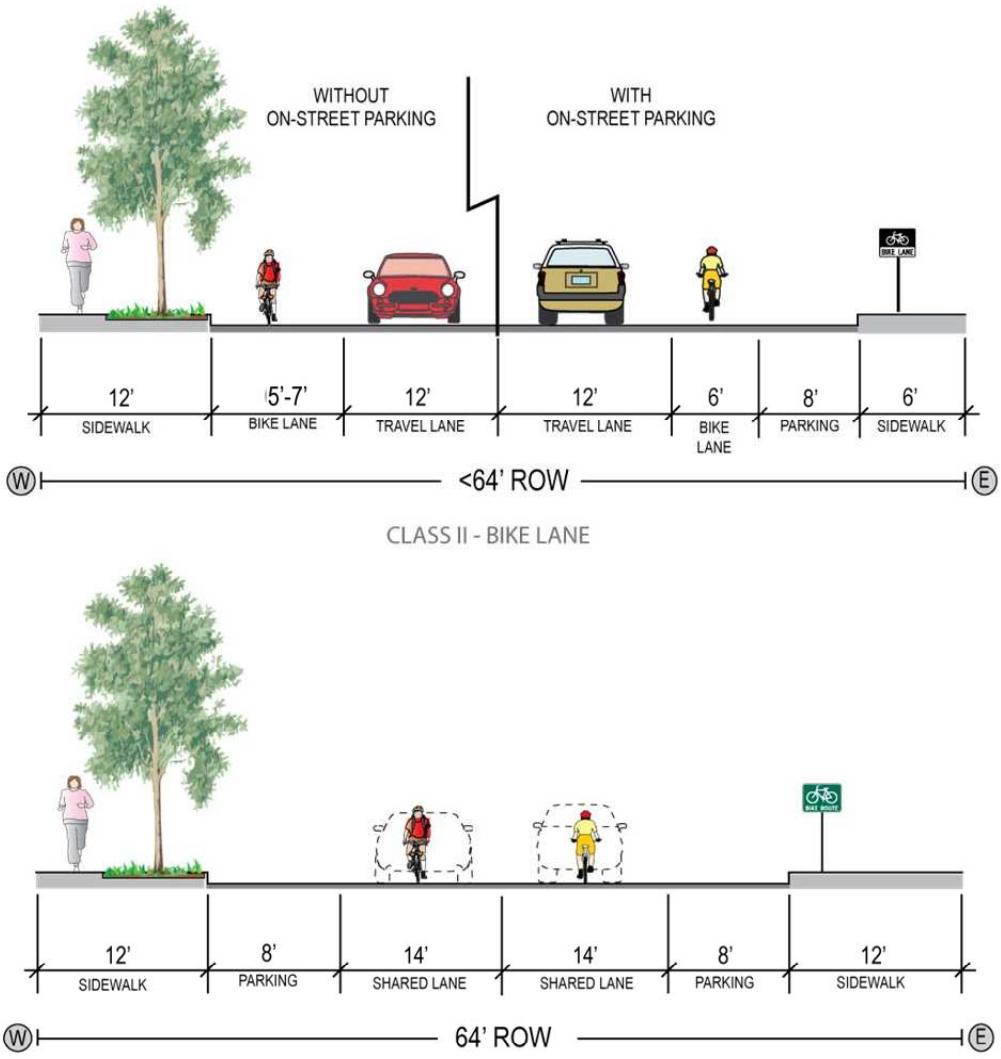


Figure F-8: Local street ROW <64'

F.5 Design Toolbox

F.5.1 Class I Bikeway

Bike Path (Class I Bikeway) Design Guidelines

A Class I facility allows for two-way, off-street bicycle and pedestrian traffic and also may be used by pedestrians, skaters, wheelchair users, and other non-motorized users. These facilities are frequently found in parks, along rivers, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Class I facilities can also include amenities such as lighting, signage, and fencing (where appropriate). In California, design of Class I facilities is dictated by Chapter 1000 of the Highway Design Manual. Class I facilities can provide a desirable facility particularly for novice riders, recreational trips, and cyclists of all skill levels preferring separation from traffic. Class I bikeways should generally provide new travel opportunities.

Class I facilities serve bicyclists and pedestrians and provide additional width over a standard sidewalk. Facilities may be constructed adjacent to roads, through parks, or along linear corridors such as active or abandoned railroad lines or waterways. Regardless of the type, paths constructed next to the road must have some type of vertical (e.g., curb or barrier) or horizontal (e.g., landscaped strip) buffer separating the path area from adjacent vehicle travel lanes.



Class I Bikeways (also referred to as "bike trails" or "paths") are often viewed as recreational facilities, but they are also important corridors for utilitarian trips.

Elements that enhance Class I bikeway design include:

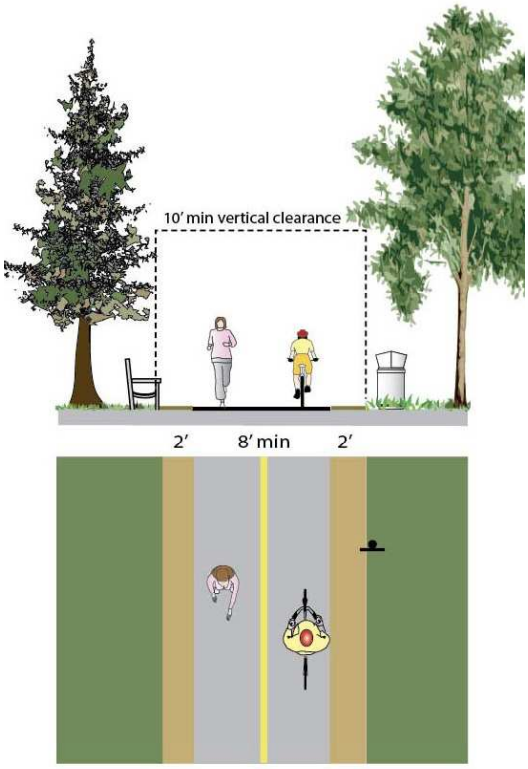
- Providing frequent access points from the local road network; if access points are spaced too far apart, users will have to travel out of direction to enter or exit the path, which will discourage use
- Placing directional signs to direct users to and from the path
- Building to a standard high enough to allow heavy maintenance equipment to use the path without damage
- Terminating the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street. If poorly designed, the point where the path joins the street system can put pedestrians and cyclists in a position where motor vehicle drivers do not expect them
- Identifying and addressing potential safety and security issues up front
- Whenever possible, and especially where heavy use can be expected, separate bicycle paths and pedestrian walkways should be provided to reduce conflicts
- Providing accessible parking space(s) at trailheads and access points
- Limiting the number of at-grade crossings with streets or driveways

Bike Path (Class I Bikeway) Design Guidelines (continued)

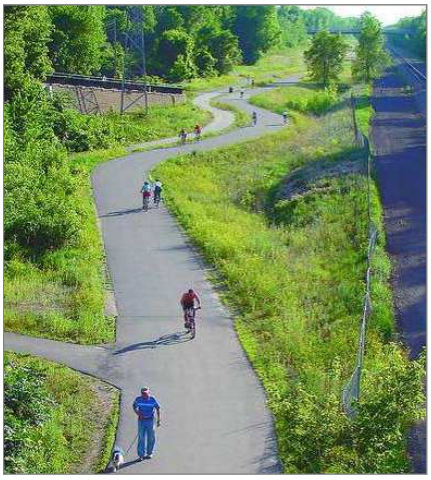
A hard surface should be used for Class I bikeways. Concrete, while more expensive than asphalt, is the hardest of all surfaces and lasts the longest. Dyes, such as reddish pigments, can be added to concrete to increase the aesthetic value of the facility itself. When concrete is used the Class I bikeway should be designed and installed using the narrowest possible expansion joints to minimize the amount of 'bumping' cyclists experience on the facility.
Where possible, Class I bikeways should be designed according to ADA standards. Topographic, environmental, or space constraints may make meeting ADA standards difficult and sometimes prohibitive. Prohibitive impacts include harm to significant cultural or natural resources, a significant change in the intended purpose of the trail, requirements of construction methods that are against federal, state or local regulations, or presence of terrain characteristics that prevent compliance.

Design Considerations

- Width standards:
  - 8′ is the minimum allowed for a two-way bikeway and is only recommended for low traffic situations
  - 10′ is recommended in most situations and will be adequate for moderate to heavy use
  - 12′ is recommended for heavy use situations with high concentrations of multiple users such as joggers, bicyclists, rollerbladers, and pedestrians
- Lateral Clearance: 2′ minimum or 3′ preferred shoulder on both sides (required by Caltrans' HDM, Chapter 1000)
- Overhead Clearance: 8′ minimum, 10′ recommended to accommodate first responders such as fire trucks or ambulance
- Minimum design speed: 25 mph. Speed bumps or other surface irregularities should never be used to slow bicycles
- Recommended maximum grade: 5%. Steeper grades can be tolerated for short distances (see guidelines following)
- Loading: AASHTO H-20. Heavy duty traffic load requirement



Recommended Class I Bikeway design.



The Cedar Lake Regional Trail in Minneapolis, MN has sufficient width to accommodate a variety of users.

Reference

California Highway Design Manual Chapter 1000
AASHTO Guide for the Development of Bicycle Facilities
U.S. Access Board, Public Rights-of-Way Accessibility Guidelines (PROWAG).
FHWA. Designing Sidewalks and Trails for Access.

Class I Bikeway: Along Utility Corridors/Waterway Corridors

Several utility and waterway corridors in Los Angeles offer excellent Class I bikeway and bikeway gap closure opportunities. Utility corridors typically include power line and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. Class I bikeway development along these corridors already exists in the Los Angeles area (e.g., along the Los Angeles and San Gabriel rivers). The LARMP Landscape Guidelines (2004) require service road access on both sides of the river and wash, which is compatible with bicycle path use.

Access Points

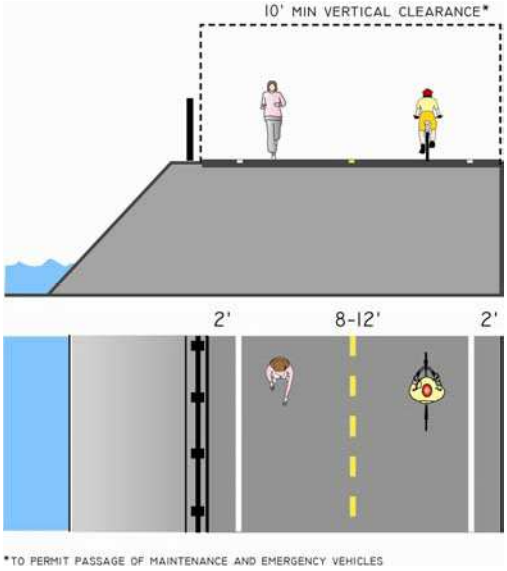
Any access point to the bikeway should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles. Removable bollards can prevent motorized access while preserving maintenance access to authorized vehicles (see bollards section for additional guidance). A gate that can prevent any access to the facility should also be present in case of path closure, to prevent public access to the bike path during maintenance activities or flooding. Advanced warning signs with detour information for path closures should be posted 14 days prior to planned closure. Signs should be posted at the closed access point and at the two adjacent access points in either direction.

Fencing

Public access to flood control channels or canals is undesirable for public safety. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris are all potential hazards. Fencing can help keep path users within the designated travel way. The County of Los Angeles requires a 5′ minimum height fences or railings to retain bicyclists. Fencing on the channel side should be constructed out of metal such as chain link or wrought iron, and allow a view down to the channel. Fencing on the non-channel side can take several forms. Bike path owners should consider constructing a masonry wall if the path is adjacent to high-security land-uses. Visually permeable fencing is acceptable for non-sensitive areas, with fence types including chain link or wrought iron in urban areas, to picket, split rail, or post and cable fencing in rural areas.

Landscaping

The Los Angeles and San Gabriel River Watershed Councils provide guidelines for sustainable re-vegetation of public right-of-way. Landscaping along bikeways within river corridors will conform to the Los Angeles River Master Plan Landscaping Guidelines and Plant Palettes and standards established by relevant Los Angeles County River Master Plans.



Recommended design for bikeways in flood control channels.



Flood control channels are a good opportunity to develop a continuous off-street pathway.



Gate at access point to San Gabriel River Bikeway.

Class I Bikeway: Along Utility Corridors/Waterway Corridors (continued)

Ownership and Liability

Owners of Bike Paths shall fund landscaping and landscaping maintenance at their cost. Bike paths and landscaping shall be non-invasive and compatible with existing and future flood control and maintenance uses. Operators of bike paths shall indemnify the Los Angeles County Flood Control District (LACFCD) for liability associated with bike paths within LACFCD right-of-way. Operators of bike paths shall assume all responsibility for opening and closing access points.

Design Considerations

- Meet or exceed Caltrans standards
- Use permeable surfacing where possible; where asphalt is required, grade towards infiltration strips
- Meet ADA standards to the maximum extent feasible
- 12' minimum vertical clearance to permit passage of maintenance and emergency vehicles
- Operators of bike paths shall indemnify the Los Angeles County Flood Control District (LACFCD) for liability associated with Bike Paths usage within LACFCD right-of-way
- Operators of bike paths are to fund landscaping and landscaping maintenance at their cost.
- Bike path landscaping is to be non-invasive. The plant palette in the LA River Master Plan is a good source for selecting low maintenance California Native Plants that are well suited to the environment
- Bike paths and landscaping along rivers and channels are to be compatible with existing and future flood control and maintenance uses
- Operators of Bike paths are to assume all responsibility for opening and closing access points

Reference

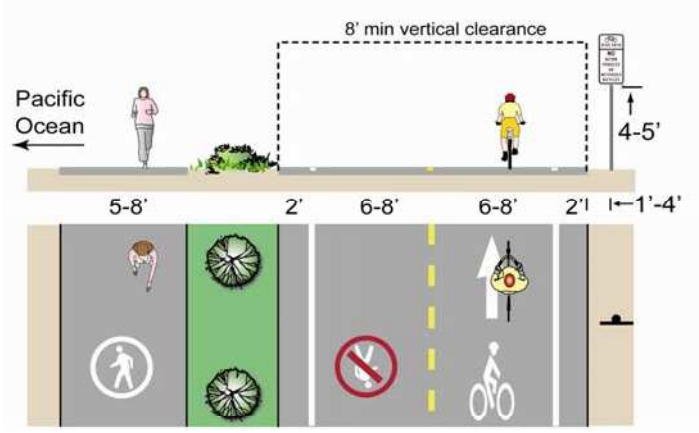
- AASHTO Guide for the Development of Bicycle Facilities
- California Highway Design Manual Chapter 1000
- LARMP Landscape Guidelines (2004)

Class I Bikeway: Coastal Paths

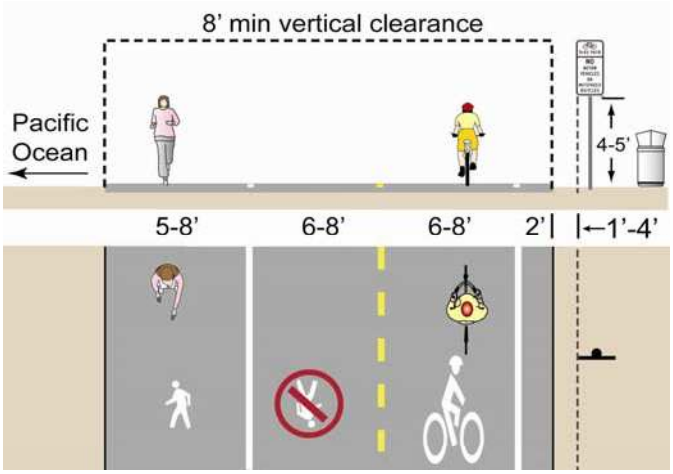
Coastal Paths attract many types of pathway users and conveyances. Bicyclists, pedestrians, rollerbladers, strollers, and pedal cabs typically compete for space. To provide an adequate and pleasant facility, adequate widths and separation are needed to maintain a good pathway environment.

Offsetting of the pedestrian path should be provided if possible. Otherwise, physical separation should be provided in the form of striping or landscaping.

The multi-use path should be located on whichever side of the path will result in the fewest number of anticipated pedestrian crossings. For example, the multi-use path should not be placed adjacent to large numbers of destinations. Site analysis of each project is required to determine expected pedestrian behavior.



Preferred design, with separation.



Preferred design, no separation.

Design Considerations

- Preferred Width: 17 feet
- Multi-use path: 12 feet minimum; 17 feet with parallel 5 foot pedestrian path, with 1 foot clearance for signage
- Pavement Markings: Facility should have graphic markings for non-English speakers
- Striping: Dashed centerline and shoulder striping should be used
- Surfacing: Paved surface adequate to support maintenance vehicles. Required thickness dependent upon paving material and subgrade

Reference

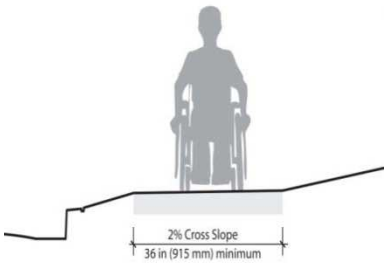
- California MUTCD
- Caltrans Highway Design Manual (Chapter 1000)
- AASHTO Guide for the Development of Bicycle Facilities

Class I Bikeway: Accessibility

Slopes typically should not exceed 5%. However certain conditions may require the use of steeper slope. For conditions exceeding a 5% slope, the recommendations are as follows:

- Up to an 8.33% slope for a 200-feet maximum run, with landings or resting intervals at minimum of 200 feet must be provided
- Up to a 10% slope for a 30-foot maximum run, with resting intervals spaced at a 30 feet minimum
- Up to 12.5 % slope for a 10-foot maximum run, with resting intervals spaced at a 10 feet minimum

The surface shall be firm and stable. The Forest Service Accessibility Guidelines defines a firm surface as one that is not noticeably distorted or compressed by the passage of a device that simulates a person who uses a wheelchair. Where rights-of-way are available, Class I bikeways can be made more accessible by creating side paths that meander away from a roadway that exceeds a 5% slope.



ADA clearance requirement.



Class I bikeways surfacing materials affects which types of users can benefit from the facility.

Design Considerations

3 foot minimum clear width where clear width of facility is less than 5 feet; passing space (5 foot section or wider) should be provided at least every 100 feet

Cross slope should not exceed 5%

Signs shall be provided indicating the length of the accessible trail segment

Ramps should be provided at roadway crossings. Tactile warning strips and auditory crossing signals are recommended.

FHWA recommends that when trails intersect roads, the design of trail curb ramps should, as a minimum, follow the recommendations provided in Chapter 7: Curb Ramps (FHWA *Designing Sidewalks and Trails for Access;*
www.fhwa.dot.gov/environment/sidewalk2/sidewalks207.htm

Reference

- American with Disabilities Act (ADA) for accessible trails
- See also FHWA. (2001).Designing Sidewalks and Trails for Access, Chapter 14: Shared Use Path Design, Section 14.5.1: Gradewww.fhwa.dot.gov/environment/sidewalk2/sidewalks212.htm#tra2

Class I Bikeway: Managing Multiple Users

On Class I bikeways that have high bicycle and pedestrian use, conflicts can arise between faster-moving bicyclists and slower bicyclists, as well as pedestrians and other users. As this is a common problem in more urban areas, a variety of treatments have been designed to alleviate congestion and minimize conflicts.

Centerline Striping

On trails of standards widths, striping the centerline identifies which side of the trail users should be on.

Trail Etiquette Signage

Informing trail users of acceptable trail etiquette is a common issue when multiple user types are anticipated. Yielding the right-of-way is a courtesy and yet a necessary part of a safe trail experience involving multiple trail users. Trail right-of-way information should be posted at trail access points and along the trail. The message must be clear and easy to understand. Where appropriate, trail etiquette systems should instruct trail users to the yielding of cyclists to pedestrians and equestrians and the yielding of pedestrians to equestrians.



Centerline striping and directional arrows encourage trail users to provide space for other users to pass.

Design Considerations

- Barrier separation – vegetated buffers or barriers, elevation changes, walls, fences, railings and bollards
- Distance separation – differing surfaces
- User behavior guidance signage

Reference

- The 2009 CA-MUTCD Section 9C.03 contains additional information about centerline striping on a trail

Class I Bikeway: Roadway Crossings

While at-grade crossings create a potentially high level of conflict between Class I bikeway users and motorists, well-designed crossings have not historically posed a safety problem for path users. This is evidenced by the thousands of successful paths around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to a reasonable degree of safety and can meet existing traffic and safety standards.
Evaluation of crossings involves analysis of vehicular and anticipated path user traffic patterns, including

- Vehicle speeds
- Street width
- Sight distance
- Traffic volumes (average daily traffic and peak hour traffic)
- Path user profile (age distribution, destinations served)

Consideration must be given for adequate warning distance based on vehicle speeds and line of sight. Visibility of any signing used to mark the crossing is absolutely critical. Catching the attention of motorists jaded to roadway signs may require additional alerting devices such as a flashing light, roadway striping or changes in pavement texture. Signing for Class I bikeway users must include a standard "STOP" sign and pavement marking, sometimes combined with other features such as a kink in the pathway to slow bicyclists.

Design Considerations

At-grade Class I bikeway/roadway crossings that provide assistance for cyclists and pedestrians crossing the roadway generally will fit into one of four basic categories:

- Type 1: Marked/Unsignalized - Uncontrolled crossings include trail crossings of residential, collector, and sometimes major arterial streets or railroad tracks.
- Type 1+: Marked/Enhanced – Unsignalized intersections can provide additional visibility with flashing beacons and other treatments.
- Type 2: Route Users to Existing Signalized Intersection - Trails that emerge near existing intersections may be routed to these locations, provided that sufficient protection is provided at the existing intersection.
- Type 3: Signalized/Controlled - Trail crossings that require signals or other control measures due to traffic volumes, speeds, and trail usage.
- Type 4: Grade-separated crossings - Bridges or under-crossings provide the maximum level of safety but also generally are the most expensive and have right-of-way, maintenance, and other public safety considerations.



An offset crossing forces pedestrians to turn and face the traffic they are about to cross.

Reference

- California Highway Design Manual Chapter 1000
- AASHTO Guide for the Development of Bicycle Facilities
- Federal Highway Administration (FHWA) Report, Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations

Class I Bikeway: Roadway Crossings (continued)

Summary of Path/Roadway At-Grade Crossing Recommendations[iv]

Roadway Type	Vehicle ADT ≤ 9,00			Vehicle ADT > 9,000 to 12,000			Vehicle ADT >12,000 to 15,000			Vehicle ADT > 15,000		
	Speed Limit (mph)**											
	30	35	40	30	35	40	30	35	40	30	35	40
2 Lanes	1	1	1/1+	1	1	1/1+		1	1+/3		1/1+	1+/3
3 Lanes		1	1/1+		1/1+	1/1	1/1+	1/1+	1+/3	1	1+	1+/3
Multi-Lane (4 +) w/ raised median***	1	1	1/1+	1	1/1+	1+/3	1/1+	1/1+	1+/3	1+/3	1+/3	1+/3
Multi-Lane (4 +) w/o raised median	1	1/1+	1+/3	1/1+	1/1+	1+/3	1+/3	1+/3	1+/3	1+/3	1+/3	1+/3

**General Notes: Crosswalks should not be installed at locations that could present an increased risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding which treatment to use.*

For each pathway-roadway crossing, an engineering study is needed to determine the proper location. For each engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, etc. may be needed at other sites.

*** Where the speed limit exceeds 40 mph marked crosswalks alone should not be used at unsignalized locations.*

**** The raised median or crossing island must be at least 4 ft (1.2 m) wide and 6 ft (1.8 m) long to adequately serve as a refuge area for pedestrians in accordance with MUTCD and AASHTO guidelines. A two-way center turn lane is not considered a median. Los Angeles County prefers a 14 ft wide raised median, although a 12 ft wide median without a median nose could be used.*

1= Type 1 Crossings. Ladder-style crosswalks with appropriate signage should be used.

1/1+ = With the higher volumes and speeds, enhanced treatments should be used, including marked ladder style crosswalks, median refuge, flashing beacons, and/or in-pavement flashers. Ensure there are sufficient gaps through signal timing, as well as sight distance.

1+/3 = Carefully analyze signal warrants using a combination of Warrant 2 or 5 (depending on school presence) and EAU factoring. Make sure to project pathway usage based on future potential demand. Consider Pelican, Puffin, or Hawk signals in lieu of full signals. For those intersections not meeting warrants or where engineering judgment or cost recommends against signalization, implement Type 1 enhanced crosswalk markings with marked ladder style crosswalks, median refuge, flashing beacons, and/or in-pavement flashers. Ensure there are sufficient gaps through signal timing, as well as sight distance.

[iv] *This table is based on information contained in the U.S. Department of Transportation Federal Highway Administration Study, "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations," February 2002.*

Class I Bikeway: Marked/Unsignalized Crossings

If well-designed, multi-lane crossings of higher-volume arterials of over 15,000 ADT may be unsignalized with features such as a combination of some or all of the following: excellent sight distance, sufficient crossing gaps (more than 60 per hour), median refuges, and/or active warning devices like flashing beacons or in-pavement flashers. These are referred to as "Type 1 Enhanced" (Type 1+). Such crossings would not be appropriate; however, if a significant number of schoolchildren used the path. Furthermore, both existing and potential future path usage volume should be taken into consideration.

On two-lane residential and collector roads below 15,000 ADT with average vehicle speeds of 35 MPH or less, crosswalks and warning signs ("Path Xing") should be provided to warn motorists, and stop signs and slowing techniques (bollards/geometry) should be used on the path approach. Curves in paths that orient the path user toward oncoming traffic are helpful in slowing path users and making them aware of oncoming vehicles. Care should be taken to keep vegetation and other obstacles out of the sight line for motorists and path users. Engineering judgment should be used to determine the appropriate level of traffic control and design.

On roadways with low to moderate traffic volumes (<12,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety. These crosswalks are raised 75 millimeters above the roadway pavement (similar to speed humps) to an elevation that matches the adjacent sidewalk. The top of the crosswalk is flat and typically made of asphalt, patterned concrete, or brick pavers. Brick or unit pavers should be discouraged because of potential problems related to pedestrians, bicycles, and ADA requirements for a continuous, smooth, vibration-free surface. Detectable warning strips are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street.

Design Considerations

A marked/unsignalized crossing (Type 1) consists of a crosswalk, signage, and often no other devices to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, path traffic, use patterns, vehicle speed, road type and width, and other safety issues such as proximity to schools.

Maximum traffic volumes:

- Up to 15,000 ADT on two-lane roads, preferably with a median
- Up to 12,000 ADT on four-lane roads with median

Maximum travel speed:

- 35 MPH

Minimum line of sight:

- 25 MPH zone: 155 feet
- 35 MPH zone: 250 feet
- 45 MPH zone: 360 feet



Type 1 crossings include signage and pavement markings.

Reference

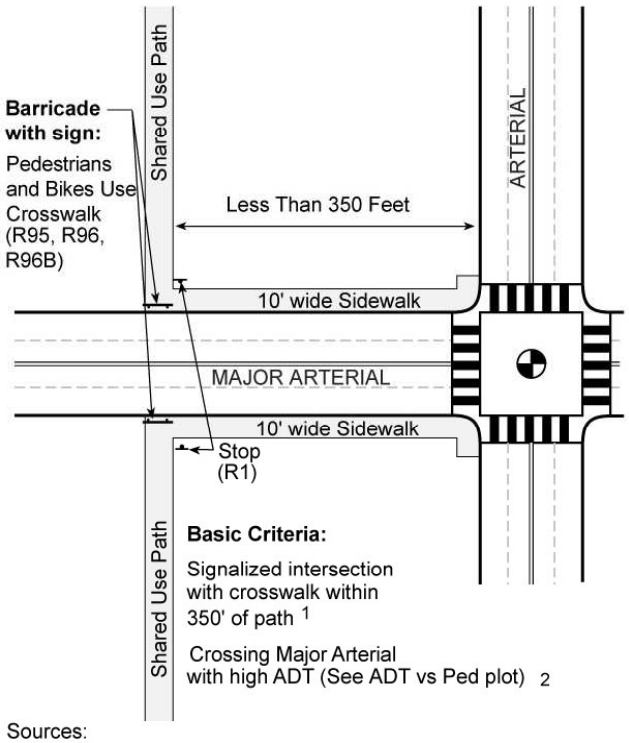
- California *Highway Design Manual* Chapter 1000
- AASHTO Guide for the Development of Bicycle Facilities
- Federal Highway Administration (FHWA) Report, Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations

Class I Bikeway: Route Users to Existing Signalized Intersection

Crossings within 350 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection for safety purposes. For this option to be effective, barriers and signing may be needed to direct shared-use path users to the signalized crossings. In most cases, signal modifications would be made to add pedestrian detection and to comply with ADA.

Design Considerations

- A Class I bikeway should cross at a signalized intersection if there is a signalized intersection within 350 feet of the path and the crossroad is crossing a major arterial with a high ADT.
- Intersection Warning (W2-1 through W2-5) signs may be used on a path in advance of the intersection to indicate the presence of the crossing and the possibility of turning or entering traffic. A trail-sized stop sign (R1-1) should be placed about 5 feet before the intersection.



Sources:
1. California MUTCD, 2006
2. Investigation of Exposure Based Accident Areas: Crosswalks, Local Street, and Arterials, Knoblauch, 1987

Recommended at-grade crossing of a major arterial at an intersection where trail is within 350′ of a roadway intersection

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- *California MUTCD*, Part 9
- AASHTO *Guide for the Development of Bicycle Facilities*
- AASHTO *Policy on the Geometric Design of Highways and Streets*
- FHWA-RD-87-038 *Investigation of Exposure-Based Pedestrian Accident Areas: Crosswalks, Sidewalks, Local Streets, and Major Arterials*

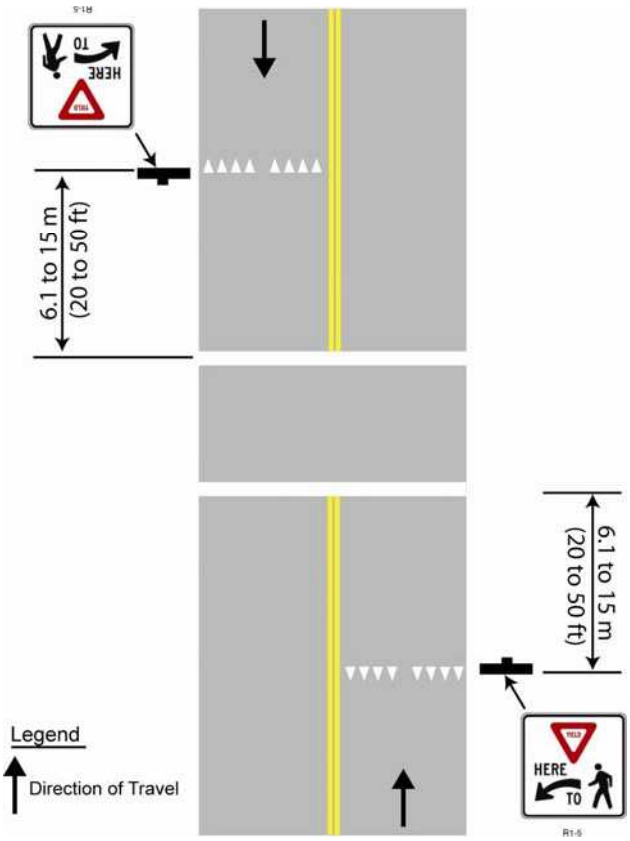
Class I Bikeway: Uncontrolled Mid-Block Crossing

The National MUTCD requires yield lines and "Yield Here to Pedestrians" signs at all uncontrolled crossings of a multi-lane roadway. Yield lines are not required by the CA MUTCD. The National MUTCD includes a trail crossing sign, shown to the right on the next page (W11-15 and W11-15P), which may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path.

Design Considerations

- Installed where there is a significant demand for crossing and no nearby existing crosswalks
- If yield lines are used for vehicles, they shall be placed 20–50 feet in advance of the nearest crosswalk line to indicate the point at which the yield is intended or required to be made and "Yield Here to Pedestrians" signs shall be placed adjacent to the yield line. Where traffic is not heavy, stop or yield signs for pedestrians and bicyclists may suffice.
- The Bicycle Warning (W11-1) sign alerts the road user to unexpected entries into the roadway by bicyclists, and other crossing activities that might cause conflicts

A ladder crosswalk should be used. Warning markings on the path and roadway should be installed.



Recommended design from CA-MUTCD, Figure 3B-15.

Reference

- California MUTCD, Part 9
- AASHTO Guide for the Development of Bicycle Facilities



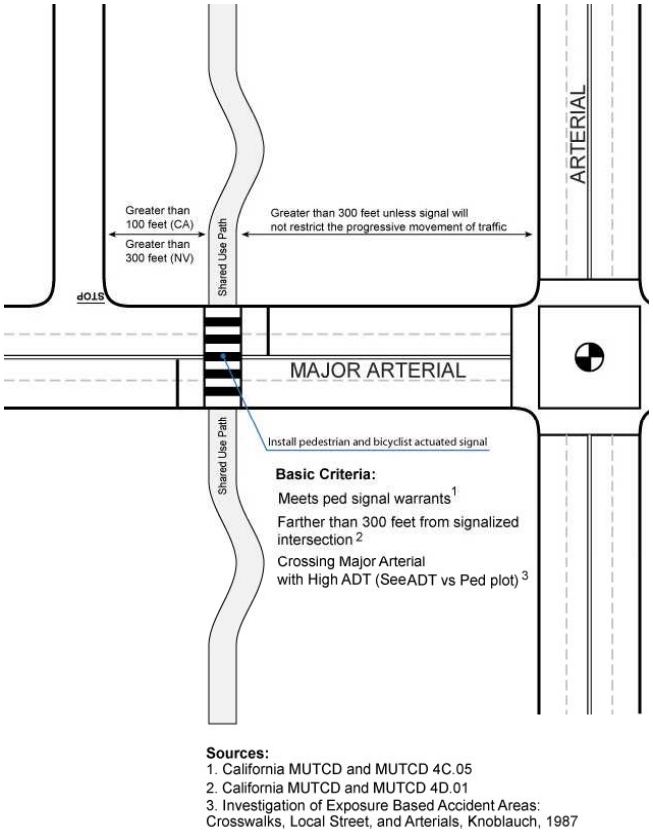
Recommended signage.

Class I Bikeway: Signalized Mid-Block Crossing

Warrants from the MUTCD combined with sound engineering judgment should be considered when determining the type of traffic control device to be installed at path-roadway intersections. Traffic signals for path-roadway intersections are appropriate under certain circumstances. The MUTCD lists 11 warrants for traffic signals, and although path crossings are not addressed, bicycle traffic on the path may be functionally classified as vehicular traffic and the warrants applied accordingly. Pedestrian volumes can also be used for warrants.

Design Considerations

- Section 4C.05 in the CAMUTCD describes pedestrian volume minimum requirements (referred to as warrants) for a mid-block pedestrian-actuated signal
- Stop lines at midblock signalized locations should be placed at least 40 feet in advance of the nearest signal indication



CA-MUTCD guidance for a signalized mid-block crossing.

Reference

- MUTCD, Sections 4C.05 and 4D
- California MUTCD, Chapters 3 and 9 and Section 4C.05 and 4D
- AASHTO Guide for the Development of Bicycle Facilities, Chapter 2

Class I Bikeway: Grade Separated Undercrossing

Undercrossings should be considered when high volumes of bicycles and pedestrians are expected along a corridor and:

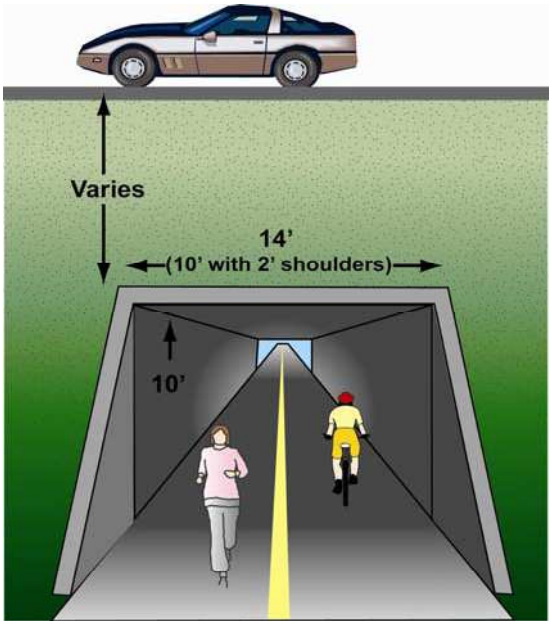
- Vehicle volumes/speeds are high
- The roadway is wide
- A signal is not feasible
- Crossing is needed under another grade-separated facility such as a freeway or rail line

Advantages of grade separated undercrossings include:

- Improves bicycle and pedestrian safety while reducing delay for all users
- Eliminates barriers to bicyclists and pedestrians
- Undercrossings require 10 feet of overhead clearance from the path surface. Undercrossings often require less ramping and elevation change for the user versus an overcrossing, particularly for railroad crossings.

Disadvantages or potential hazards include:

- If crossing is not convenient or does not serve a direct connection it may not be well utilized
- Potential issues with vandalism and maintenance
- Security may be an issue if sight lines through undercrossing and approaches are inadequate. Lighting or openings for sunlight may be desirable for longer crossings to enhance users' sense of security, especially at tunnels and underpasses under freeways and major highways. Lighting should follow Caltrans-accepted lighting design guidelines.
- High cost



Recommended undercrossing design.



Undercrossings provide key connections and allow path users to avoid a potentially dangerous at-grade crossing of a major street.

Design Considerations

- 14' minimum width to allow for access by maintenance vehicles if necessary
- 10' minimum overhead height (AASHTO)
- The undercrossing should have a centerline stripe even if the rest of the path does not have one

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- ASHTO *Guide for the Development of Bicycle Facilities*

Class I Bikeway: Grade Separated Overcrossing

Overcrossings require a minimum of 17' of vertical clearance to the roadway below versus a minimum elevation differential of around 12' for an undercrossing. This results in potentially greater elevation differences and much longer ramps for bicycles and pedestrians to negotiate.

Overcrossings should be considered when high volumes of bicycles and pedestrians are expected along a corridor and:

- Vehicle volumes/speeds are high
- The roadway is wide
- A signal is not feasible
- Crossing is needed over a grade-separated facility such as a freeway or rail line

Advantages of grade separated overcrossings include:

- Improves bicycle and pedestrian safety while reducing delay for all users
- Eliminates barriers to bicyclists and pedestrians

Disadvantages and potential hazards include:

- If crossing is not convenient or does not serve a direct connection it may not be well utilized
- Overcrossings require at least 17 feet of clearance to the roadway below involving up to 400 feet or greater of approach ramps at each end. Long ramps can sometimes be difficult for the disabled
- Potential issues with vandalism, maintenance
- High cost

Design Considerations

- 12 foot minimum width
- If overcrossing has any scenic vistas additional width should be provided to allow for stopped path users
- A separate 6 foot pedestrian area may be provided in locations with high bicycle and pedestrian use
- Minimum of 17 feet of vertical clearance to the roadway below
- 10 foot headroom on overcrossing
- Clearance below will vary depending on feature being crossed
- The overcrossing should have a centerline stripe even if the rest of the path does not have one.
- Ramp slopes should be ADA-accessible: 5% (1:20) grade with landings at 400-foot intervals, or 8.33% (1:12) with landings every 30 feet



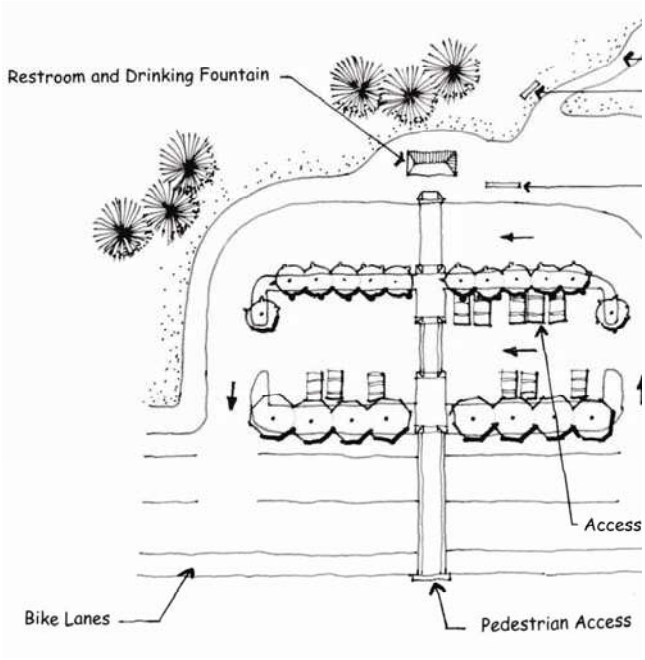
Overcrossings are frequently used over a major roadway.

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- AASHTO *Guide for the Development of Bicycle Facilities*

Class I Bike Paths: Trailheads

Good access to a path system is a key element for its success. Trailheads (formalized parking areas) serve the local and regional population arriving to the path system by car, transit, bicycle or other modes. Trailheads provide essential access to the shared-use path system and include amenities like parking for vehicles and bicycles, restrooms (at major trailheads), and posted maps. Trailheads with a small parking area should additionally include bicycle parking and accessible parking. Neighborhood access should be achieved from all local streets crossing the trail. In some situations "No Parking" signs on the adjacent streets are desirable to minimize impact on the neighborhood.



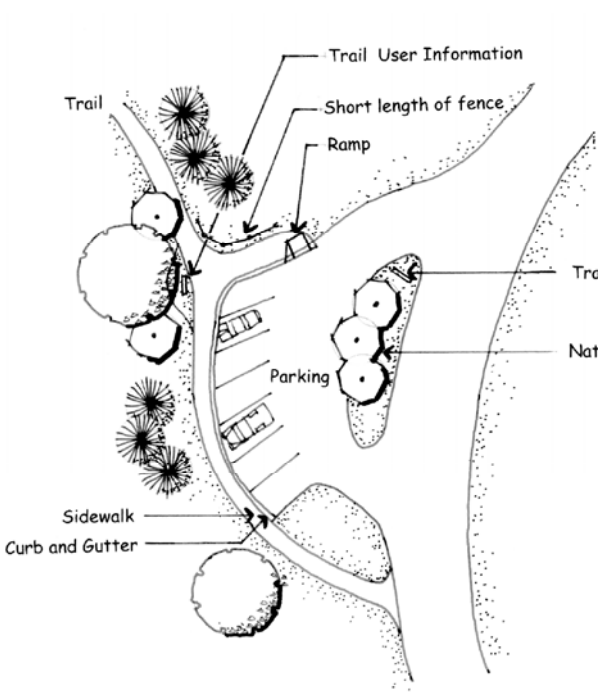
Example major trailhead.

Design Considerations

- Major trailheads should include automobile and bicycle parking, trail information (maps, user guidelines, wildlife information, etc.), garbage receptacles and restrooms
- Minor trailheads can provide a subset of these amenities
- Any trailhead improvements installed within Los Angeles County Flood Control District (LACFCD) right-of-way needs to be operated and maintained by the project sponsor

Reference

- AASHTO Guide for the Development of Bicycle Facilities



Example minor trailhead.

F.5.2 Class II Bikeway

On-Street Facility Design Guidelines

There are a range of different types of bicycle facilities that can be applied in various contexts, which provide varying levels of protection or separation from automobile traffic. This section summarizes best practice on-street bicycle facility design from North America and elsewhere.

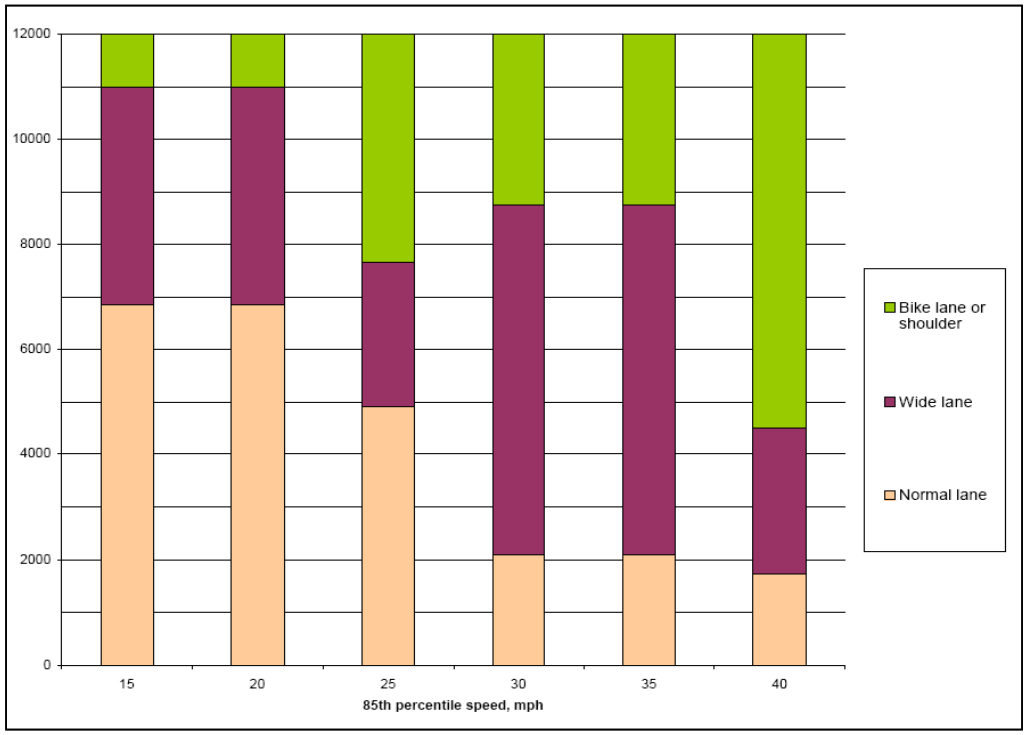
Facility Selection

There are a wide variety of techniques for selecting the type of facility for a given context. Roadway characteristics that are often used include:

- Motor vehicle speed and volume
- Presence of heavy vehicles/trucks
- Roadway width
- Demand for bicycle facilities
- User preference
- Land use/urban or rural context

There are no 'hard and fast' rules for determining the most appropriate type of facility for a particular location; engineering judgment and planning skills are critical elements of this decision.

A 2002 study combined bikeway dimension standards for ten different communities in North America. The goal of the study was to survey the varying requirements available and provide a best practices approach for providing bicycle facilities. The study included a comparison with European standards, and found that "North Americans rely much more on wide lanes for bicycle accommodation than their counterparts overseas." The table below shows the results of this analysis, which recommends use of bike lanes or shoulders, wide lanes, or normal lanes.



North American bicycle facility selection chart.

(King, Michael. (2002). Bicycle Facility Selection: A Comparison of Approaches. Pedestrian and Bicycle Information Center and Highway Safety Research Center, University of North Carolina – Chapel Hill.)

Class II Bikeway

Bike lanes or Class II bicycle facilities (Caltrans designation) are defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are generally found on major arterial and collector roadways and are 5-8 feet wide. Bike lanes can be found in a large variety of configurations, and can have special characteristics including coloring and placement if beneficial.
Bike lanes enable bicyclists to ride at their preferred speed without interference from prevailing traffic conditions and facilitate predictable behavior and movements between bicyclists and motorists. Bicyclists may leave the bike lane to pass other cyclists, make left turns, avoid obstacles or debris, and to avoid other conflicts with other roadway users.

Design Considerations

Width varies depending on roadway configuration, see following pages for design examples. 4-8 feet is standard, measured from edge of gutter pan, although a maximum of 7 feet is recommended to prevent parking or driving in the bike lane.

Striping

- Separating vehicle lane from bike lane (typically left sideline): 6 inches
- Delineate conflict area in intersections (optional): Length of conflict area
- Separating bike lane from parking lane (if applicable): 4 inches
- Dashed white stripe when:
  - Vehicle merging area (optional): Varies
  - Approach to intersections: 100-200 feet
  - Delineate conflict area in intersections (optional): Length of conflict area



Approved R-81 Sign.

Signing: use R81 Bike Lane Sign at:

- Beginning of bike lane
- Far side of all bike path (class I) crossings
- At approaches and at far side of all arterial crossings
- At major changes in direction
- At intervals not to exceed ½ mile

Pavement markings: the preferred pavement marking for bike lanes is the bike lane stencil with directional arrow to be used at:

- Beginning of bike lane
- Far side of all bike path (class I) crossings
- At approaches and at far side of all arterial crossings
- At major changes in direction
- At intervals not to exceed ½ mile
- At beginning and end of bike lane pockets at approach to intersection



Approved California bike lane stencils (either is optional, as is arrow).

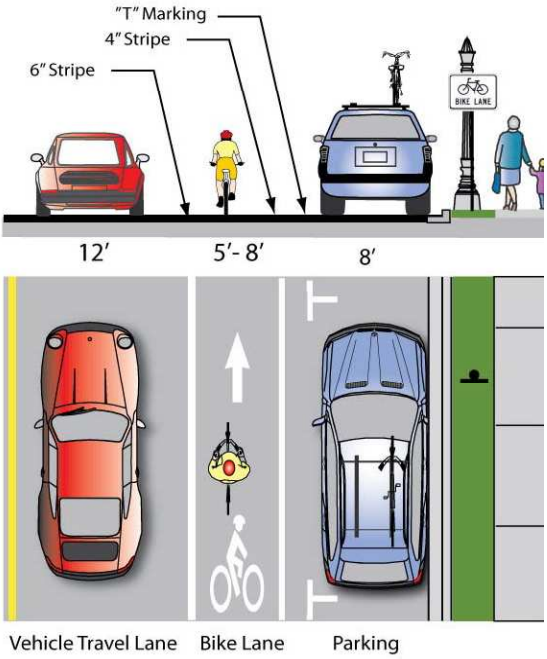
Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- *California MUTCD*
- AASHTO *Guide for the Development of Bicycle Facilities*
- Additional standards and treatments for bike lanes are provided in the following pages

Class II Bikeway: Bike Lane Adjacent to On-Street Parallel Parking

Bike lanes adjacent to on-street parallel parking are common in the U.S. and can be dangerous for bicyclists if they do not provide adequate separation from parked cars. Crashes caused by a suddenly-opened vehicle door are a common hazard for bicyclists using this type of facility. On the other hand, wide bike lanes may encourage the cyclist to ride farther to the right (door zone) to maximize distance from passing traffic. Wide bike lanes may also cause confusion with unloading vehicles in busy areas where parking is typically full. Treatments to encourage bicyclists to ride away from the 'door zone' include:

- Provide a buffer zone (preferred design). Bicyclists traveling in the center of the bike lane will be less likely to encounter open car doors. Motorists have space to stand outside the bike lane when loading and unloading.
- Installing parking "T's" and smaller bike lane stencils placed to the left.



Parking 'T' bike lane design.

Design Considerations

Bike Lane Width:

- 6 feet recommended when parking stalls are marked
- 5 feet minimum in constrained locations
- 8 feet maximum (greater widths may encourage vehicle loading in bike lane)

Shared bike and parking lane width:

- 13-14 feet for a shared bike/parking lane where parking is permitted but not marked on streets without curbs
- If the parking volume is substantial or turnover is high, an additional 1-2 feet of width is desirable

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- California *MUTCD*
- AASHTO *Guide for the Development of Bicycle Facilities*

Class II Bikeway: Bike Lanes on Streets Without Parking

Wider bike lanes are desirable in certain circumstances such as on higher speed arterials (45 mph+) where a wider bike lane can increase separation between passing vehicles and cyclists. Wide bike lanes are also appropriate in areas with high bicycle use. A bike lane width of 6-7 feet makes it possible for bicyclists to ride side-by-side or pass each other without leaving the bike lane, increasing the capacity of the lane. Appropriate signing and stenciling is important with wide bike lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane.

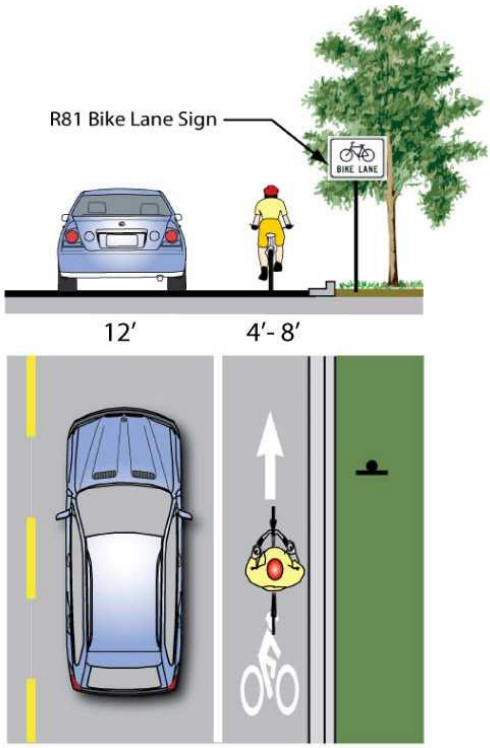
Design Considerations

Bike lane width:

- 4 foot minimum when no curb & gutter is present, 6 foot preferred (rural road sections). Parking may be allowed on the adjacent shoulder.
- 7 feet preferred when adjacent to curb and gutter (5′ more than the gutter pan width if the gutter pan is wider than 2′).
- 6 feet recommended where right-of-way allows.

Maximum width:

- 7 feet Adjacent to arterials with high travel speeds (45 mph+) and widen curb lanes by 2 feet.



Where on-street parking is not allowed adjacent to a bike lane, bicyclists do not require additional space to avoid opened car doors.

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- *California MUTCD*
- *AASHTO Guide for the Development of Bicycle Facilities*

Class II Bikeway: Retrofitting Existing Streets, Roadway Widening

Bike lanes could be accommodated on several streets with excess right-of-way through shoulder widening. Although street widening incurs higher expenses compared with re-striping projects, bike lanes could be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.



Roadway widening is preferred on roads lacking curbs, gutters and sidewalks

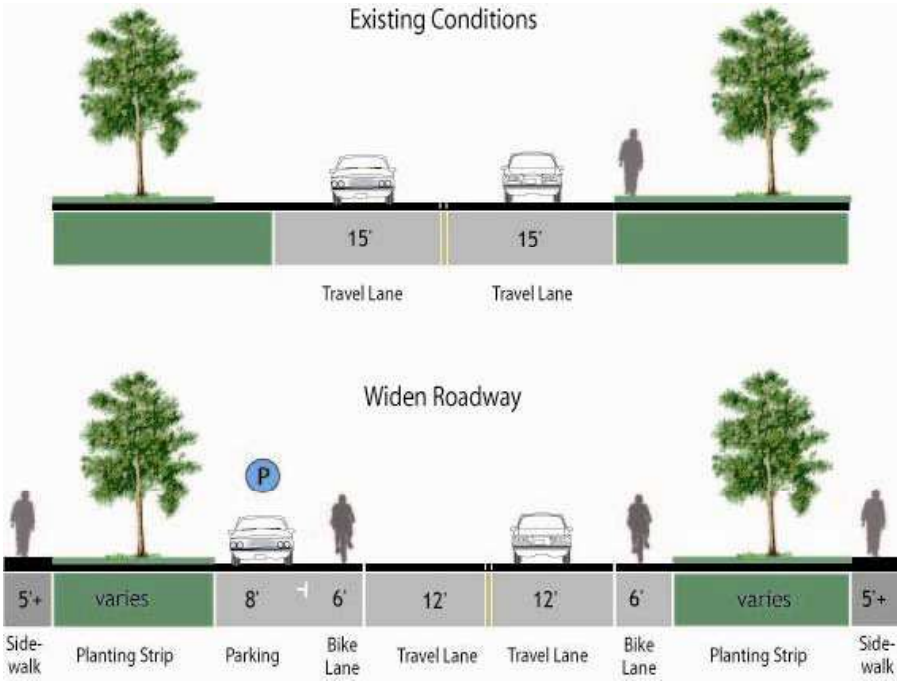
Design Considerations

Bike lane width:

- 6 feet preferred
- 4 feet minimum (see bike lane guidance)

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- AASHTO *Guide for the Development of Bicycle Facilities*
- Rosales, Jennifer. (2006). *Road Diet Handbook: Setting Trends for Livable Streets*



Example of roadway widening to accommodate bike lanes and sidewalks.

Class II Bikeway: Retrofitting Existing Streets, Lane Narrowing

Lane narrowing utilizes roadway space that exceeds minimum standards to create the needed space to provide bicycle lanes. Many roadways have lanes that are wider than currently established minimums contained in the AASHTO *Policy on the Geometric Design of Highways and Streets* and the Caltrans HCM. Most standards allow for the use of 11' and sometimes 10' travel lanes. Lane widths can be narrowed on a case by case basis to connect to bikeways in neighboring jurisdictions.

Special considerations should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bicycle lanes.



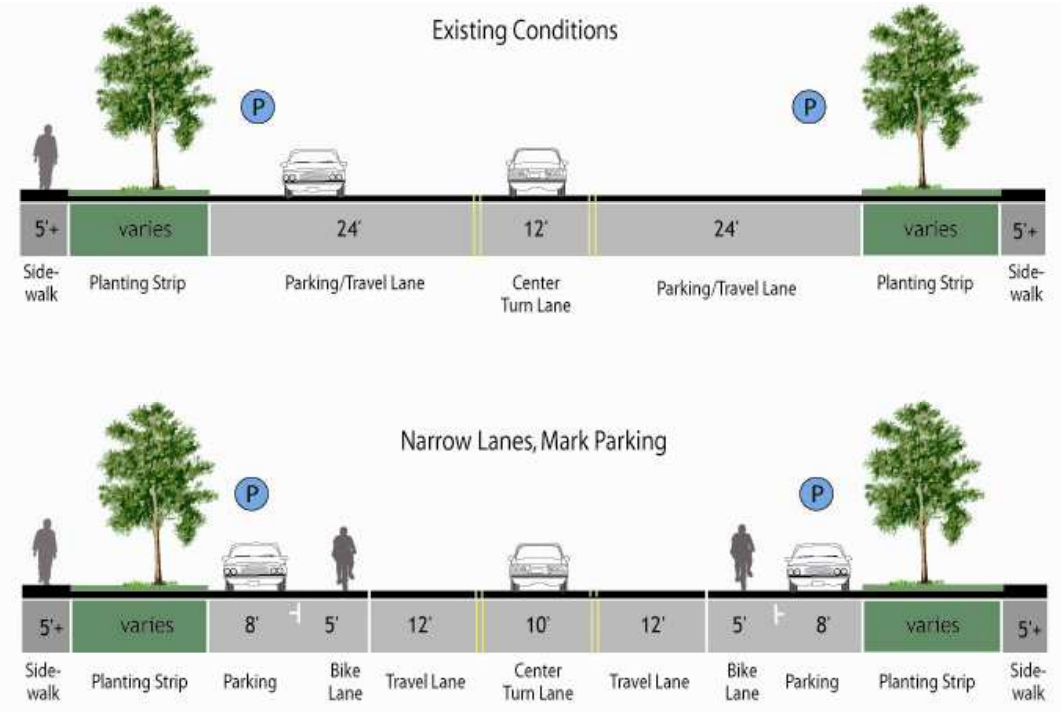
This street in Portland, Oregon previously had 13' lanes, which were narrowed to accommodate bike lanes without removing a lane.

Design Considerations

- Vehicle lane: before 12 feet to 15 feet; after: 10 feet to 11 feet
- Bike lane width: see bike lane design guidance

Reference

- Caltrans Highway Design Manual (Chapter 1000)
- AASHTO *Guide for the Development of Bicycle Facilities*
- Rosales, Jennifer. (2006). *Road Diet Handbook: Setting Trends for Livable Streets*



Example of vehicle travel lane narrowing to accommodate bike lanes.

Class II Bikeway: Retrofitting Existing Streets, Lane Reconfiguration

The removal of a single travel lane, also called a "Road Diet", will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects. Depending on a street's existing configuration, traffic operations, user needs, and safety concerns, various lane reduction configurations exist. For instance, a four-lane street (with two travel lanes in each direction) could be modified to include one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify impacts.



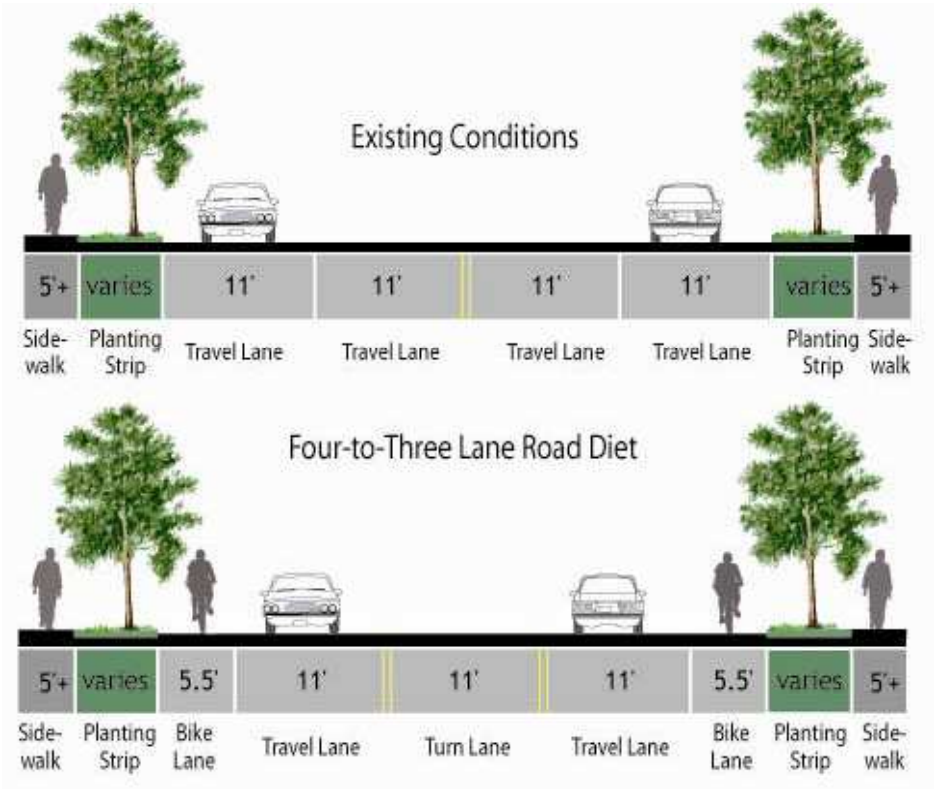
This road was re-striped to convert four vehicle travel lanes into three travel lanes with bike lanes.

Design Considerations

- Vehicle lane width depends on project. No narrowing may be needed if a lane is removed.
- Bike lane width: see bike lane design guidance

Reference

- Slated for inclusion in the update to the AASHTO *Guide for the Development of Bicycle Facilities*
- Rosales, Jennifer. (2006). *Road Diet Handbook: Setting Trends for Livable Streets*



Example of bikeway lane reconfiguration to accommodate bike lanes.

Class II Bikeway: Retrofitting Existing Streets, Parking Reduction

Bike lanes could replace one or more on-street parking lanes on streets where excess parking exists and/or the importance of bike lanes outweighs parking needs. For instance, parking may be needed on only one side of a street (as shown below and at right). Eliminating or reducing on-street parking also improves sight distance for cyclists in bike lanes and for motorists on approaching side streets and driveways. Prior to reallocating on-street parking for other uses, a parking study should be performed to gauge demand and to evaluate impacts to people with disabilities. On streets where parking is at a premium and the roadway width constrains bicycle lane implementation, a Class III Bike Route can be considered.



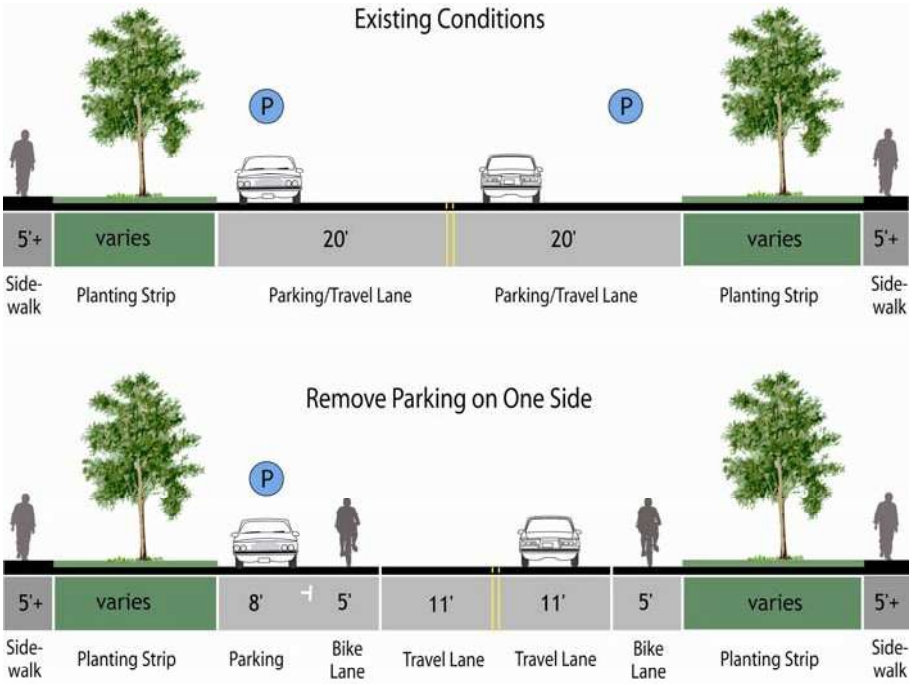
Some streets may not require parking on both sides.

Design Considerations

- Vehicle lane width depends on project. No narrowing may be needed depending on the width of the parking lane to be removed.
- Bike lane width: see bike lane design guidance

Reference

- Rosales, Jennifer. (2006). Road Diet Handbook: Setting Trends for Livable Streets



Example of parking removal to accommodate bike lanes.

Class II Bike Lane: Intersection Treatments, Bicycle Signal Actuation

Loop Detectors

Bicycle-activated loop detectors are installed within the roadway to allow a bicycle to trigger a change in the traffic signal. This allows the cyclist to stay within the lane of travel rather than maneuvering to the side of the road to trigger a push button.

All new loop detectors installed will be capable of detecting bicycles. Identify loops that detect bicycles with the "Bicycle Detector Symbol" shown in Figure 9C-7(CA) in the CA- MUTCD.

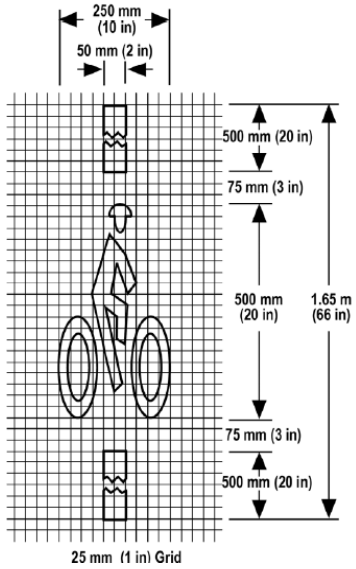
Detection Cameras

Video detection cameras can also be used to determine when a vehicle is waiting for a signal. These systems use digital image processing to detect a change in the image at the location. Cameras can detect bicycles, although cyclists should wait in the center of the lane, where an automobile would usually wait, in order to be detected. Video camera system costs range from $20,000 to $25,000 per intersection.

Detection cameras are currently used for cyclists in the City of San Luis Obispo, CA, where the system has proven to detect pedestrians as well.

Remote Traffic Microwave Sensor Detection (RTMS)

RTMS is a system developed in China, which uses frequency modulated continuous wave radio signals to detect objects in the roadway. This method is marked with a time code which gives information on how far away the object is. The RTMS system is unaffected by temperature and lighting, which can affect standard detection cameras.



Recommended loop detector marking (MUTCD-CA Supplement Figure 9C-7).



Example bicycle actuator marking.



Instructional Sign (MUTCD-CA Supplement Sign R62C).

Design Considerations

At signalized intersections, cyclists should be able to trigger signals when cars are not present. Requiring cyclists to dismount to press a pedestrian button is inconvenient and requires the cyclist to merge in into traffic at an intersection. It is particularly important to provide bicycle actuation in a left-turn only lane where cyclists regularly make left turn movements.

Reference

Additional technical information is available at:

- www.humantransport.org/bicycledriving/library/signals/detection.htm
- ITE Guidance for Bicycle—Sensitive Detection and Counters: http://www.ite.org/councils/Bike-Report-Ch4.pdf

Class II Bikeway: Intersection Treatments, Channelized Right Turn Pocket

The shared bicycle/right turn lane places a standard-width bike lane on the left side of a dedicated right-turn lane. A dashed strip delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

According to the CA MUTCD and Chapter 1000, the appropriate treatment for right-turn only lanes is to place a bike lane pocket between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to drop the bike lane entirely approaching the right-turn lane. Dropping the bike lane is not recommended, and should only be done when a bike lane pocket cannot be accommodated.

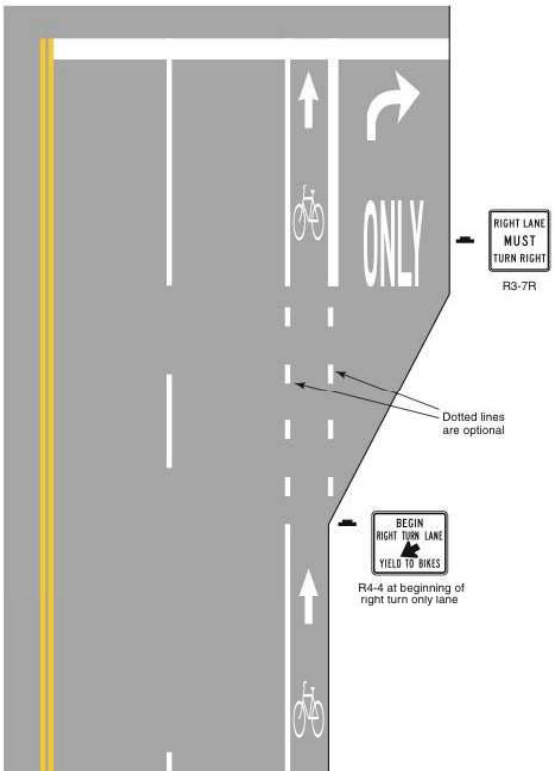
An optional through-right-turn lane next to a right-turn only lane should not be used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-right turn lane, the bicycle lane should be discontinued at the intersection approach.

Advantages:

- Aids in correct positioning of cyclists at intersections with a dedicated right-turn lane without adequate space for a dedicated bike lane
- Encourages motorists to yield to bicyclists when using the right-turn lane
- Reduces motor vehicle speed within the right-turn lane

Disadvantages/potential hazards:

- May not be appropriate for high-speed arterials or intersections with long right-turn lanes
- May not be appropriate for intersections with large percentages of right-turning heavy vehicles



Recommended bike/right turn lane design (MUTCD-CA Supplement Figure 9C-3).



Shared bike-right turn lanes require warning signage as well as pavement markings.

Design Considerations

- Right-turn lane width – minimum 12-foot width.
- Bike lane pocket width – minimum 4-5 feet preferred.
- Works best on streets with lower posted speeds (30 MPH or less) and with low traffic volumes (10,000 ADT or less)

Reference

- Caltrans Highway Design Manual (Chapter 1000)
- California MUTCD, Section 9C.04
- AASHTO Guide for the Development of Bicycle Facilities

Class II Bike Lane: Intersection Treatments, Interchanges

At highway interchanges, motor vehicles often make turns at higher speeds than on surface roads. Bike lanes through interchange areas should clearly warn motorists to expect bicyclists, and signage should alert bicyclists that they should not turn to enter the highway.

Figure 9C-104 (right) depicts the current guidance provided by the California MUTCD. On high traffic bicycle corridors, non-standard treatments may be desirable. Dashed bicycle lane lines with or without colored bike lanes may be applied to provide increased visibility for bicycles in the merging area. The use of double-turn lanes should be discouraged because of the difficulties they present for pedestrians and bicyclists (see previous treatment). Existing double-turn lanes should be studied and converted to single-turn lanes, unless found to be absolutely necessary for traffic operations.

Design Considerations

Bike lane width:

- 4-foot minimum when no curb & gutter is present (rural road sections).
- 5-foot minimum when adjacent to curb and gutter (5 feet more than the gutter pan width if the gutter pan is wider than 2 feet).
- 6 feet recommended where right-of-way allows

Maximum Width:

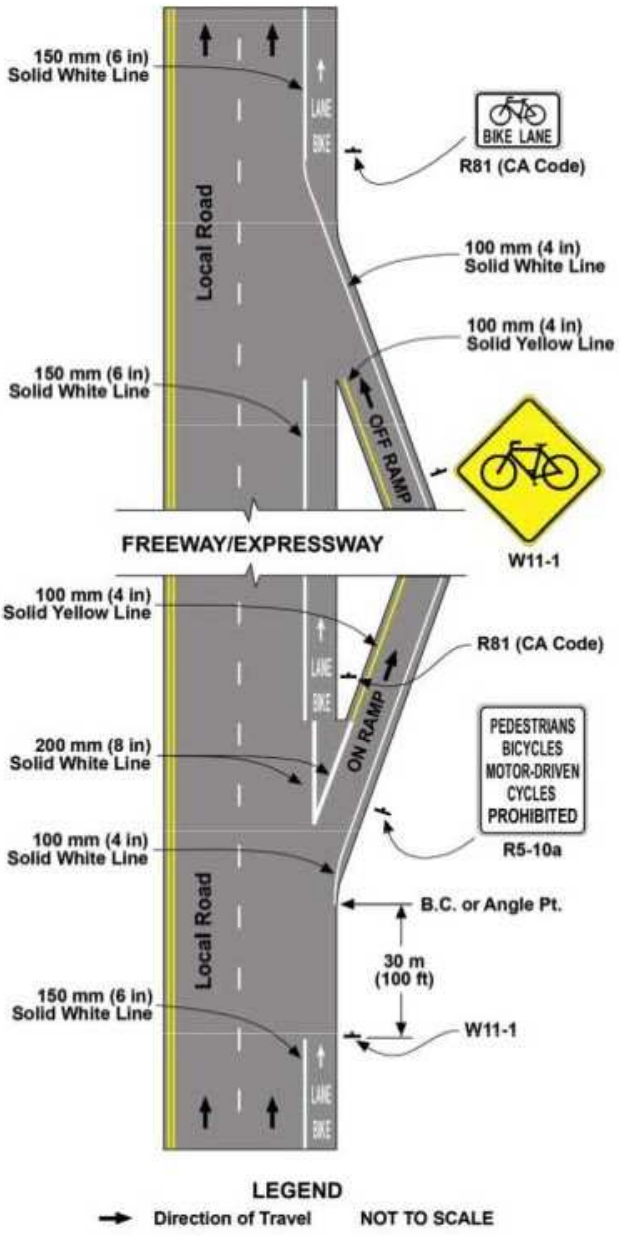
- 8 feet adjacent to arterials with high travel speeds (45 mph+)

Treatment for Interchange Ramp Ingress / Egress:

- Design intersections and ramps to limit the conflict areas or eliminate unnecessary uncontrolled ramp connections to urban roadways
- Follow AASHTO guidance (pp. 62 and 63) on methods for delineating or not delineating a bike lane through an interchange

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- *California MUTCD*
- AASHTO *Guide for the Development of Bicycle Facilities*



California MUTCD Figure 9C-104 provides guidance for continuing bike lanes through intersection areas.

F.5.3 Class III Bike Routes

Class III Bikeway: Bike Route

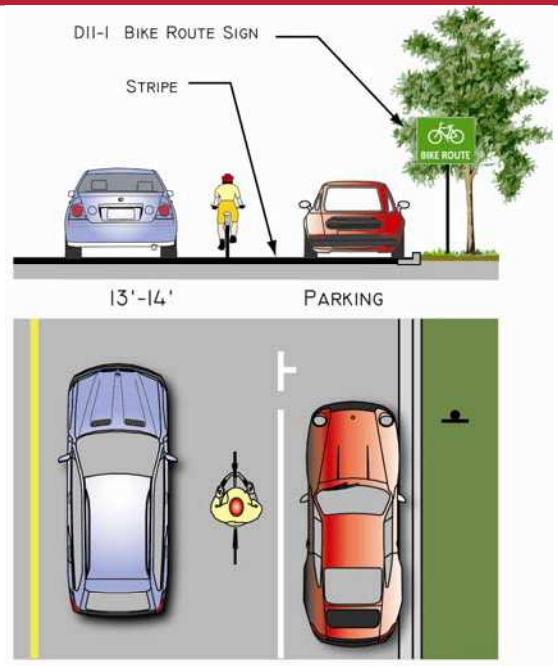
Class III bicycle facilities – (Caltrans designation) are defined as facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes; however, they can be used on higher volume roads with wide outside lanes or with shoulders. Roadways appropriate as shared roadways often have a centerline stripe only, and no designated shoulders.

Bike routes are indicated exclusively by signage, which provide key connections to destinations and trails where providing additional separation is not possible.

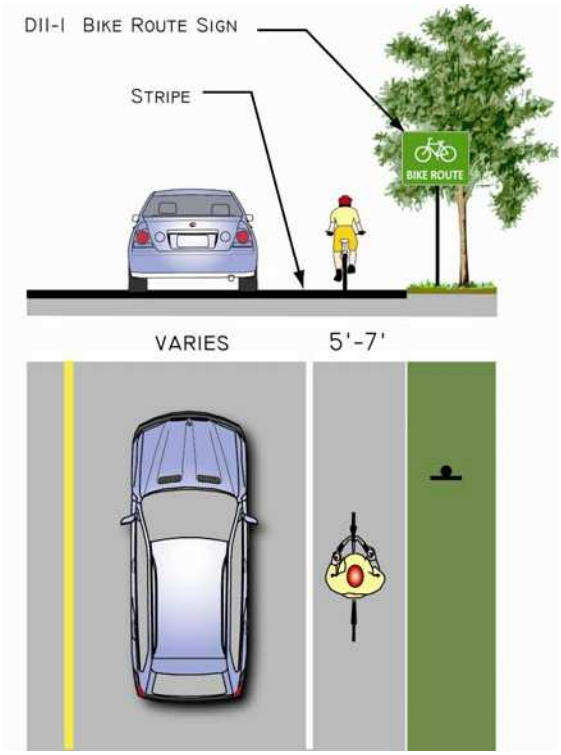
Rural roads with a large shoulder may already accommodate bicycle travel. Reclassifying these large shoulders as "shoulder bikeways" may encourage additional cyclist use. This type of facility can be developed on a rural roadway without curb and gutter. Bike routes along shoulders are appropriate and preferable to bike lanes in rural areas. The separation between the shoulder and the travel lane should be marked with an edge line, and the shoulder should be paved and maintained. A shoulder bikeway could also be used on an urban road where traffic speeds and volumes are low, although shared lane markings in addition to signage may be more appropriate in these locations.

When a roadway with a shoulder bikeway is reconstructed, widened, or overlaid, open drainage grates should be oriented with openings perpendicular to the direction of bicycle travel, so that bicycle wheels are not caught in the openings.

Rumble strips are placed along the sides of high-speed and rural roads, in order to alert drivers when their vehicles have left the roadway. Rumble strips can be dangerous for bicyclists, as a cyclist who runs over a strip could lose control of the bicycle. Conversely, rumble strips can help bicyclists feel more comfortable, knowing that drivers will be alerted if they are near the edge of the roadway. The bike-able area should have sufficient width (5-foot minimum) to accommodate bicycle travel. Rumble strips along shoulder bikeways should also include gaps to allow bicyclists to cross the rumble strip area.



Shared roadway recommended configuration.



Recommended shoulder bikeway configuration.

Class III Bikeway: Bike Route (continued)

Design Considerations

Shared Roadway Considerations:
Use D11-1 Bike Route sign at:

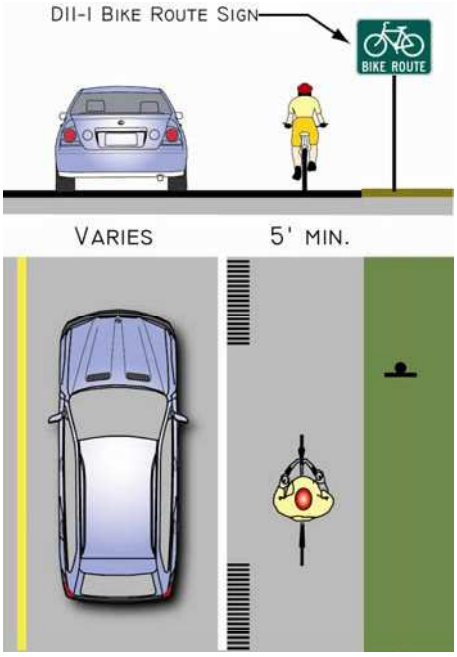
- Beginning or end of bike route (with applicable M4 series sign below)
- Entrance to bike path (class I) – optional
- At major changes in direction or at intersections with other bike routes (with applicable M7 series arrow sign)
- At intervals along bike routes not to exceed ½ mile

Shoulder Bikeway Considerations:
Widths (measured from painted edge line to edge of pavement or gutter pan):

- The shoulder should be a minimum of 4 feet and preferably, 6 feet wide
- On steep hills, additional width should be provided in the uphill direction, both for cyclists to pass each other and to allow cyclists to 'traverse' the hill by weaving slightly back and forth
- For shoulder bikeways along high-speed roadways, a buffer between the shoulder and vehicle lane using paint or bike-friendly rumble strips (see right) may be considered.

Additional considerations:

- Locate 5 feet from the face of the guardrail, curb, or other roadside barrier
- Use D11-1 "Bike Route" sign as specified for shared roadways



Shoulder bikeway with bike-friendly rumble strip



D11-1 "Bike Route" sign should be used along designated shared roadways.

Reference

- From Caltrans Highway Design Manual (HDM) Chapter 1000: "Class III bikeways (bike routes) are intended to provide continuity to the bikeway system. Bike routes are established along through routes not served by Class I or II bikeways, or to connect discontinuous segments of bikeway (normally bike lanes). Class III facilities are shared facilities, either with motor vehicles on the street, or with pedestrians on sidewalks, and in either case bicycle usage is secondary. Class III facilities are established by placing Bike Route signs along roadways."
- 2010 California MUTCD states," provide a right-of-way designated by signs or permanent markings and shared with pedestrians or motorists. Refer California Streets and Highways Code Section 890.4."
- 2010 California MUTCD Section 9C.04 states, "Class III Bikeways (Bike Route) are shared routes and do not require pavement markings. In some instances, a 100 mm (4 in) white edge stripe separating the traffic lanes from the shoulder can be helpful in providing for safer shared use. This practice is particularly applicable on rural highways and on major arterials in urban areas where there is no vehicle parking."
- AASHTO Guide for the Development of Bicycle Facilities
- Caltrans Standard Plan (2006 Edition).

Class III Bikeway: Shared Roadway Bicycle Marking (Sharrow)

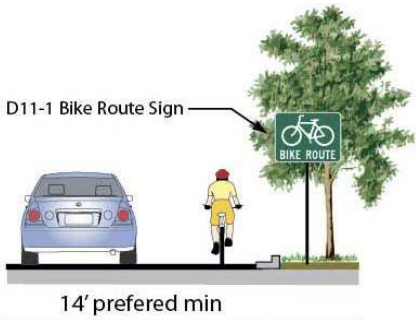
Shared lane marking stencils (also called "sharrows") have been introduced for use in California as an additional treatment for Class III facilities. The California MUTCD states that the shared roadway bicycle marking is intended to:

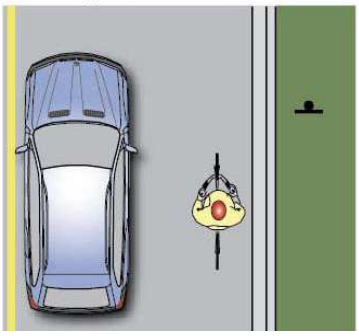
- Reduce the chance of collisions between open doors of parked vehicles and bicyclists on a roadway with on-street parallel parking
- Alert road users within a narrow traveled way of the lateral location where bicyclists ride
- Be used only on roadways without marked bicycle lanes or shoulders

The stencil can serve a number of purposes, such as making motorists aware of bicycles potentially in their lane, showing bicyclists the direction of travel, and, with proper placement, reminding bicyclists to bike further from parked cars to prevent "dooring" collisions.

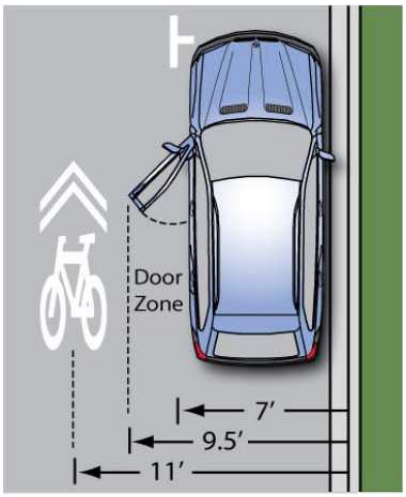
A wide outside lane can be used on roadways where bike lanes might otherwise be used, but the existing road width does not allow for restriping. The wide lane allows motor vehicles to pass bicycles while providing the recommended 3 feet of clearance.

When a roadway with a shoulder bikeway is reconstructed, widened, or overlaid, open drainage grates should be oriented with openings perpendicular to the direction of bicycle travel, so that bicycle wheels are not caught in the openings.





Wide curb lanes can include shared lane pavement markings to increase visibility.



Shared lane marking placement guidance for streets with on-street parking.

Design Considerations

- Use D11-1 "Bike Route" sign as specified for shared roadways
- Place in a linear pattern along a corridor at least 11' from face of curb (or shoulder edge) on streets with on-street parking. The longitudinal spacing of the markings may be increased or reduced as needed for roadway and traffic conditions.
- Shared lane markings should not be placed on roadways with a speed limit at or above 40 MPH (CA MUTCD)
- Marking should be placed immediately after an intersection and spaced at intervals no greater than 250 feet hereafter
- Use only on a roadway Class III Bikeway (bike route) or shared roadway (no bikeway designation) which has on-street parallel parking

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- Use of shared lane markings was adopted by Caltrans in 2005 as California MUTCD Section 9C.103 and Figure 9C-107
- AASHTO *Guide for the Development of Bicycle Facilities*

F.5.4 Bicycle Boulevards

Bicycle Routes/Bicycle Boulevards

Design Summary

- Roadway width varies depending on roadway configuration.
- Use D11-1 "Bike Route" sign as specified for shared roadways.
- Intersection treatments, traffic calming, and traffic diversions can be utilized to improve the cycling environment, as recommended in the following pages.

Discussion

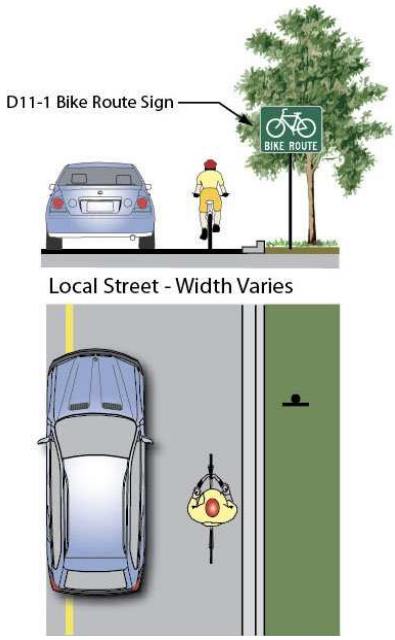
Bicycle boulevards are low-volume streets where motorists and bicyclists share the same space. Treatments for bicycle boulevards include five "application levels" based on their level of physical intensity, with Level 1 representing the least physically-intensive treatments that could be implemented at relatively low cost. Identifying appropriate application levels for individual bicycle Traffic calming and other treatments along the corridor reduce vehicle speeds so that motorists and bicyclists generally travel at the same speed, creating a more-comfortable environment for all users. Bicycle boulevards incorporate treatments to facilitate convenient crossings where the route crosses a major street. They work best in well-connected street grids where riders can follow reasonably direct and logical routes and when higher-order parallel streets exist to serve thru vehicle traffic.

Bicycle boulevards/bike routes can be treated with shared lane markings, directional signage, traffic diverters, chicanes, chokers, and /or other traffic calming devices to reduce vehicle speeds or volumes.

Bicycle boulevards can employ a variety of treatments from signage to traffic calming and pavement stencils. The level of treatment provided at a specific location depends on several factors, discussed following.

Guidance

- Bicycle boulevards have been implemented in Berkeley, Emeryville, Palo Alto, San Luis Obispo, and Pasadena, CA; Portland and Eugene, OR; Vancouver, BC; Tucson, AZ; Minneapolis, MN; Ocean City, MD; and Syracuse, NY.
- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook*. www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines*. http://www.ci.berkeley.ca.us/contentdisplay.aspx?id=6652
- AASHTO *Guide for the Development of Bicycle Facilities.*
- *MUTCD* – California Supplement.



Recommended design for bike routes/ bicycle boulevards.



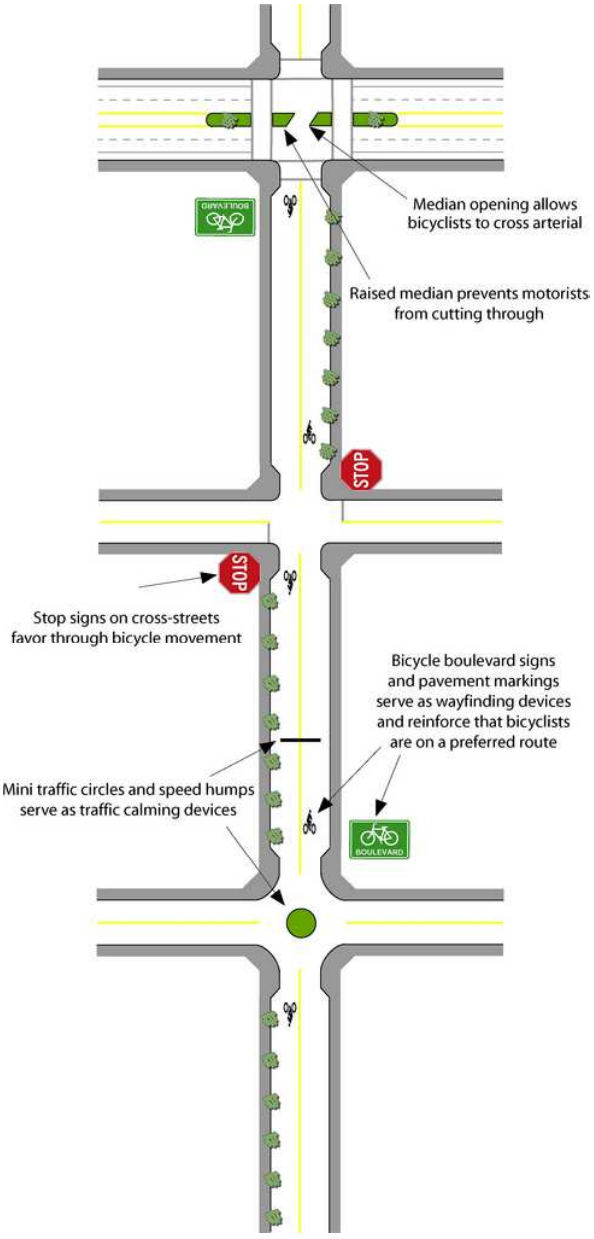
Bicycle boulevards are low-speed streets that provide a comfortable and pleasant experience for cyclists.

Bicycle Routes/Bicycle Boulevards

Discussion (continued)

Bicycle boulevards serve a variety of purposes:

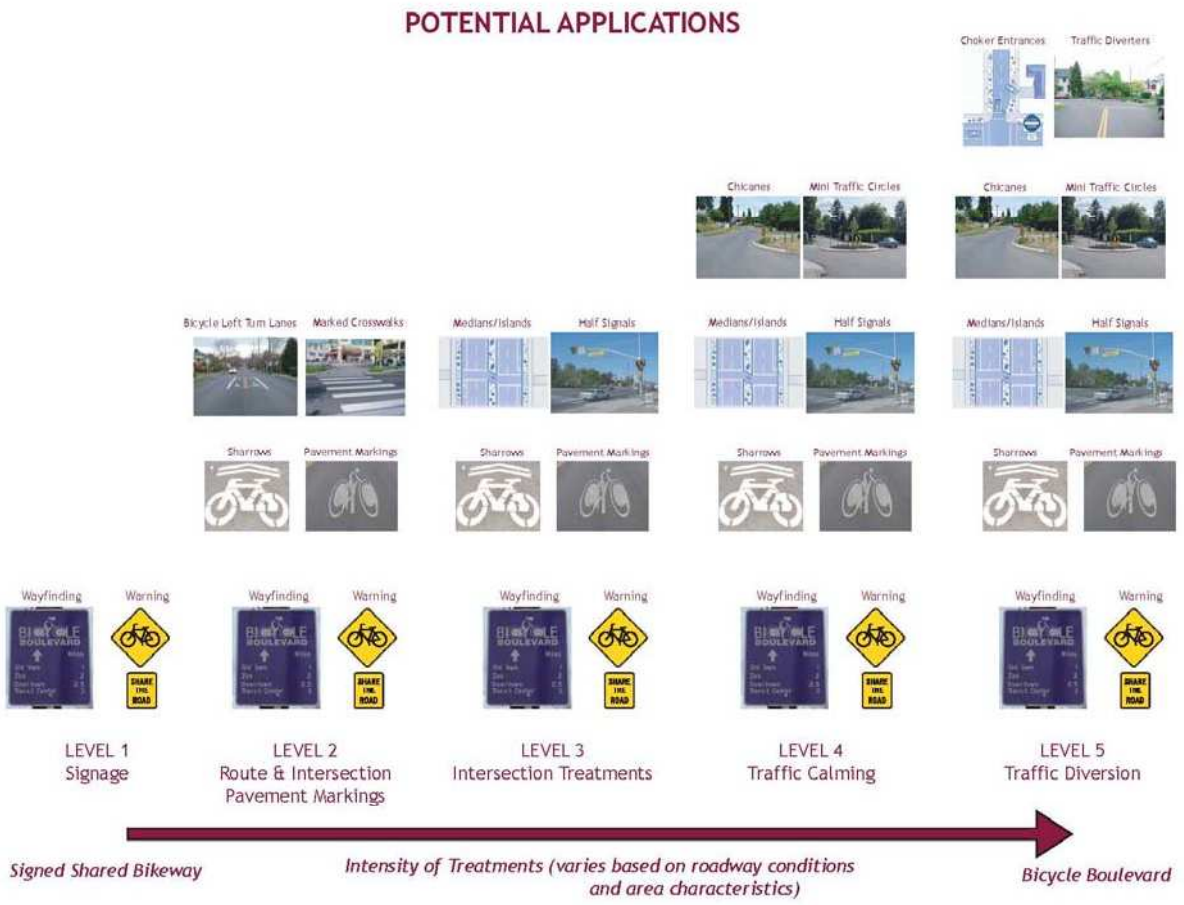
- Parallel major streets lacking dedicated bicycle facilities: Higher-order streets typically include major bicyclist destinations (e.g., commercial and employment areas). However, these corridors often lack bike lanes or other dedicated facilities creating an uncomfortable, unattractive and potentially unsafe riding environment. Bicycle boulevards serve as alternate parallel facilities that allow cyclists to avoid major streets for longer trips.
- Parallel major streets with bicycle facilities that are uncomfortable for some users: Some users may not feel comfortable using bike lanes on major streets due to high traffic volumes and vehicle speeds, conflicts with motorists entering and leaving driveways, and/or conflicts with buses loading and unloading passengers. Children and less-experienced riders might find these environments especially challenging. Utilizing lower-order streets, bicycle boulevards provide alternate route choices for these bicyclists. It should be noted that bike lanes on major streets provide important access to key land uses, and the major street network often provides the most direct routes between major destinations. For these reasons, bicycle boulevards should complement a bike lane network and not serve as a substitute.
- Ease of implementation on most local streets: bicycle boulevards incorporate cost-effective and less physically-intrusive treatments than bike lanes and cycle tracks. Most streets could be provided relatively inexpensive treatments like new signage, pavement markings, striping and signal improvements to facilitate bicyclists' mobility and safety. Other potential treatments include curb extensions, medians, and other features that can be implemented at reasonable cost and are compatible with emergency vehicle accessibility.
- Benefits beyond an improved bicycling environment: Residents living on bicycle boulevards benefit from reduced vehicle speeds and thru traffic, creating a safer and more-attractive environment. Pedestrians and other users can also benefit from boulevard treatments (e.g., by improving the crossing environment where boulevards meet major streets).



Sample bicycle boulevard treatments.

Bicycle Routes/Bicycle Boulevards

Bicycle Boulevard Application Levels



This section describes various treatments commonly used for developing Bicycle Boulevards. The treatments fall within five main "application levels" based on their level of physical intensity, with Level 1 representing the least physically-intensive treatments that could be implemented at relatively low cost. Identifying appropriate application levels for individual Bicycle Boulevard corridors provides a starting point for selecting appropriate site-specific improvements. The five Bicycle Boulevard application levels include the following:

Level 1: Signage	See Section 5.4.1
Level 2: Pavement markings	See Section 5.4.2
Level 3: Intersection treatments	See Sections 5.4.3-5.4.5
Level 4: Traffic calming	See Sections 5.4.6.
Level 5: Traffic diversion	See Sections 5.4.7.

It should be noted that corridors targeted for higher-level applications would also receive relevant lower-level treatments. For instance, a street targeted for Level 3 applications should also include Level 1 and 2 applications as necessary. It should also be noted that some applications may be appropriate on some streets while inappropriate on others. In other words, it may not be appropriate or necessary to implement all "Level 2" applications on a Level 2 street. Furthermore, several treatments could fall within multiple categories as they achieve multiple goals. To identify and develop specific treatments for each bicycle boulevard, Los Angeles County should involve the bicycling community and neighborhood groups. Further analysis and engineering work may also be necessary to determine the feasibility of some applications.

F.5.4.1 Bike Route/Boulevard Signing

Level 1: Bike Route/Boulevard Signing

Design Summary

- Signage is a cost-effective yet highly-visible treatment that can improve the riding environment on a bicycle boulevard.
- The County should adopt consistent signage and paint markings throughout the region.

Discussion

Wayfinding Signs

Wayfinding signs are typically placed at key locations leading to and along bicycle boulevards, including where multiple routes intersect and at key bicyclist "decision points." Wayfinding signs displaying destinations, distances and "riding time" can dispel common misperceptions about time and distance while increasing users' comfort and accessibility to the boulevard network.

Wayfinding signs also visually cue motorists that they are driving along a bicycle route and should correspondingly use caution. Note that too many signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists and pedestrians, rather than per vehicle signage standards.

Warning signs

Warning signs advising motorists to "share the road" and "watch for bicyclists" may also improve bicycling conditions on shared streets. These signs are especially useful near major bicycle trip generators such as schools, parks and other activity centers. Warning signs should also be placed on major streets approaching bicycle boulevards to alert motorists of bicyclist crossings.

Guidance

- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines*.
- AASHTO *Guide for the Development of Bicycle Facilities.*
- *MUTCD* – California Supplement.



F.5.4.2 Bike Route/Boulevard Pavement Markings

Level 2: Bike Route/Boulevard Pavement Markings

Design Summary

- The shared lane marking is the only approved wayfinding/ bicycle boulevard pavement marking by the California MUTCD.

Discussion

Directional Pavement Markings

Directional pavement markings (also known as "bicycle boulevard markings" or "breadcrumbs") lead cyclists along a boulevard and reinforce that they are on a designated route. Markings can take a variety of forms, such as small bicycle symbols placed every 600-800 feet along a linear corridor, as previously used on Portland, Oregon's boulevard network.

Recently, jurisdictions have been using larger, more visible pavement markings. Shared lane markings could be used as bicycle boulevard markings. See shared lane marking guidelines for additional information on this treatment.

In Berkeley, California, non-standard pavement markings include larger-scale lettering and stencils to clearly inform motorists and bicyclists of a street's function as a bicycle boulevard.

On-Street Parking Delineation

Delineating on-street parking spaces with paint or other materials clearly indicates where a vehicle should be parked, and can discourage motorists from parking their vehicles too far into the adjacent travel lane. This helps cyclists by maintaining a wide enough space to safely share a travel lane with moving vehicles while minimizing the need to swerve farther into the travel lane to maneuver around parked cars.

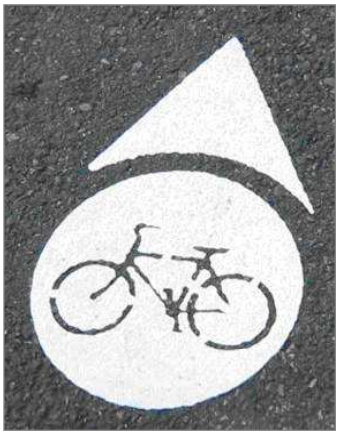
In addition to benefiting cyclists, delineated parking spaces also promote the efficient use of on-street parking by maximizing the number of spaces in high-demand areas.

Centerline Striping Removal

Automobiles have an easier time passing cyclists on roads without centerline stripes for the majority of the block length. If vehicles cannot easily pass each other using the full width of the street, it is likely that there is too much traffic for the subject street to be a successful bicycle boulevard. In addition, not striping the centerline reduces maintenance costs. Berkeley paints a double yellow centerline from 40-50' at uncontrolled or stop-controlled intersections, as well as pavement reflectors to identify the center of the street.

Guidance

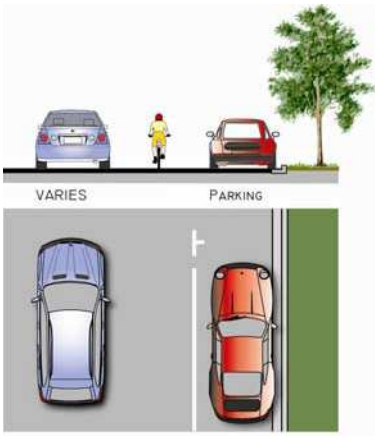
- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook*. www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines*.
- AASHTO *Guide for the Development of Bicycle Facilities.*
- *MUTCD* – California Supplement.



Bicycle boulevard directional marker.



Shared lane markings also provide directional support for bicyclists.



Example of on-street parking delineation.

F.5.4.3 Bike Routes/Boulevards at Minor Unsignalized Intersections

Level 3: Bike Routes/Boulevards at Minor Unsignalized Intersections

Design Summary

- To encourage use of the boulevard and improve cyclists' safety, reduce bicycle travel time by eliminating unnecessary stops and improving intersection crossings.

Discussion

Stop Sign on Cross-Street

Unmarked intersections can be dangerous for bicyclists, because cross-traffic may not be watching for cyclists. Stop signs on cross streets require crossing motorists to stop and proceed when safe. Stop signs are a relatively inexpensive treatment that is quite effective at minimizing bicycle and cross-vehicle conflicts. However, stop signs at intersections along bicycle boulevards may be unwarranted as a traffic control device.

Curb Extensions and High-Visibility Crosswalks

This treatment is appropriate near activity centers with large amounts of pedestrian activity, such as schools or commercial areas. Curb extensions should only extend across the parking lane and not obstruct bicyclists' path of travel or the travel lane. Curb extensions and high-visibility crosswalks both calm traffic and also increase the visibility of pedestrians waiting to cross the street, although they may impact on-street parking.

Bicycle Forward Stop Bar

A second stop bar for cyclists placed closer to the centerline of the cross street than the first stop bar increases the visibility of cyclists waiting to cross a street. This treatment is typically used with other crossing treatments (i.e. curb extension) to encourage cyclists to take full advantage of crossing design. They are appropriate at unsignalized crossings where fewer than 25 percent of motorists make a right turn movement.

Guidance

- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook*. www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines*.
- AASHTO *Guide for the Development of Bicycle Facilities.*
- *MUTCD* – California Supplement.



Stop signs effectively minimize conflicts along bicycle boulevards.



Curb extensions can be a good location for pedestrian amenities, including street trees.



Bicycle forward stop bars encourage cyclists to wait where they are more visible.

F.5.4.4 Bike Routes/Boulevards at Major Unsignalized Intersections

Level 3: Bike Routes/Boulevards at Major Unsignalized Intersections

Design Summary

- Increase crossing opportunities with medians and refuge islands.
- Instructional and regulatory signage should be included with installation of a bicycle signal. This signage is not standard and will have to be created for the application. Part 4 of the California MUTCD covers bicycle signals.

Discussion

Medians/Refuge Islands

At uncontrolled intersections at major streets, a crossing island can be provided to allow cyclists to cross one direction of traffic at a time when gaps in traffic allow. The bicycle crossing island should be at least 8' wide to be used as the bike refuge area. Narrower medians can accommodate bikes if the holding area is at an acute angle to the major roadway. Crossing islands can be placed in the middle of the intersection, prohibiting left and thru vehicle movements.

Half-Signals

Bicycle signals are an approved traffic control device in the state of California after the technology was studied and approved after years of service in the City of Davis. A bicycle signal provides an exclusive signal phase for bicyclists traveling through an intersection. This takes the form of a new signal head installed with red, amber, and green bicycle indications. Bicycle signals can be actuated with bicycle sensitive loop detectors, video detection, or push buttons.

Where cyclists have few crossable gaps and where vehicles on the major street do not stop for pedestrians and cyclists waiting to cross, "half signals" could be installed to improve the crossing environment. Half signals include pedestrian and bicycle activation buttons and may also include loop detectors on the bicycle boulevard approach. Many of these models have been used successfully for years overseas, and their use in the U.S. has increased dramatically over the last decade.



Medians on bicycle boulevards should provide space for a bicyclist to wait.



Half-signals for bicyclists should be clearly marked to minimize confusion.



Guidance

Note: While bicycle signals are approved for use in California, local municipal code should be checked or modified to clarify that at intersections with bicycle signals, bicycles should only obey the bicycle signal heads.

- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook*. www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines*.
- AASHTO *Guide for the Development of Bicycle Facilities.*
- *MUTCD* – California Supplement.

F.5.4.5 Bike Routes/Boulevards at Offset Intersections

Bike Routes/Boulevards at Offset Intersections

Design Summary

- Provide turning lanes or pockets at offset intersection , providing cyclists with a refuge to make a two-step turn.
- Bike turn pockets - 5' wide, with a total of 11' required for both turn pockets and center striping.



Example of a bicycle left-turn pocket.

Discussion

Offset intersection can be challenging for cyclists, who need to transition onto the busier cross-street in order to continue along the boulevard.

Bicycle Left-Turn Lane

Similar to medians/refuge islands, bicycle left-turn lanes allow the crossing to be completed in two phases. A bicyclist on the boulevard could execute a right-hand turn onto the cross-street, and then wait in a delineated left-turn lane (if necessary to wait for a gap in oncoming traffic). The bike turn pockets should be at least 5 feet wide, with a total of 11 feet for both turn pockets and center striping.

Bicycle Left Turn Pocket

A bike-only left-turn pocket permits bicyclists to make left turns while restricting vehicle left turns. If the intersection is signal-controlled, a left arrow signal may be appropriate, depending on bicycle and vehicle volumes. Signs should be provided prohibiting motorists from turning. Ideally, the left turn pocket should be protected by a raised curb, but the pocket may also be defined by striping if necessary. Because of the restriction on vehicle left-turning movements, this treatment also acts as traffic diversion.



This bike-only left-turn pocket guides cyclists along a popular bike route.

Guidance

- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* www.ibpi.usp.pdx.edu/guidebook.php
- AASHTO *Guide for the Development of Bicycle Facilities.*

F.5.4.6 Bicycle Boulevard Traffic Calming

Level 4: Bicycle Boulevard Traffic Calming

Design Summary

- Traffic calming treatments reduce vehicle speeds to the point where they generally match cyclists' operating speeds, enabling motorists and cyclists to safely co-exist on the same facility.

Discussion

Chicanes: Chicanes are a series of raised or delineated curb extensions on alternating sides of a street forming an S-shaped curb, which reduce vehicle speeds through narrowed travel lanes. Chicanes can also be achieved by establishing on-street parking on alternate sides of the street. These treatments are most effective on streets with narrower cross-sections.

Mini Traffic Circles: Mini traffic circles are raised or delineated islands placed at intersections, reducing vehicle speeds through tighter turning radii and narrowed vehicle travel lanes (see right). These devices can effectively slow vehicle traffic while facilitating all turning movements at an intersection. Mini traffic circles can also include a paved apron to accommodate the turning radii of larger vehicles like fire trucks or school buses.

Speed Humps: Shown right, speed humps are rounded raised areas of the pavement requiring approaching motor vehicles to reduce speed. These devices also discourage thru vehicle travel on a street when a parallel route exists.

Speed humps should never be constructed so steep that they may cause a bicyclist to lose control of the bicycle or be distracted from traffic. In some cases, a gap could be provided, whereby a bicyclist could continue on the level roadway surface, while vehicles would slow down to cross the barrier.

Other: The Count also has a Neighborhood Traffic Management Program toolbox, providing information on numerous traffic calming devices that be considered on any bicycle boulevard. The toolbox provides explanations of the pros and cons of these devices, as well as their level of effectiveness. Additional information is available at www.ladpw.org/TNL/NTMP.

Guidance

- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines*.
- AASHTO *Guide for the Development of Bicycle Facilities.*



Chicanes require all vehicles to slow down.



Traffic circles provide an opportunity for landscaping, but visibility should be maintained.



Speed humps are a common traffic calming treatment.

F.5.4.7 Bicycle Boulevard Traffic Diversion

Level 5: Bicycle Boulevard Traffic Diversion

Design Summary

- Traffic diversion treatments maintain thru-bicycle travel on a street while physically restricting thru vehicle traffic.
- Traffic diversion is most effective when higher-order streets can sufficiently accommodate the diverted traffic associated with these treatments.

Discussion

Choker Entrances

Choker entrances are intersection curb extensions or raised islands allowing full bicycle passage while restricting vehicle access to and from a bicycle boulevard. When they approach a choker entrance at a cross-street, motorists on the bicycle boulevard must turn onto the cross-street while cyclists may continue forward. These devices can be designed to permit some vehicle turning movements from a cross-street onto the bicycle boulevard while restricting other movements.



Choker entrances prevent vehicular traffic from turning from a main street onto a traffic-calmed bicycle boulevard.

Traffic Diverters

Similar to choker entrances, traffic diverters are raised features directing vehicle traffic off the bicycle boulevard while permitting thru travel.

Advantages:

- Provides safe refuge in the median of the major street so that bicyclists only have to cross one direction of traffic at a time; works well with signal-controlled traffic platoons coming from opposite directions.
- Provides traffic calming and safety benefits by preventing left turns and/or thru traffic from using the intersection.

Disadvantages:

- Potential motor vehicle impacts to major roadways, including lane narrowing, loss of some on-street parking and restricted turning movements.
- Crossing island may be difficult to maintain and may collect debris.



Traffic diverters prevent access to both directions of motor vehicle traffic.

Guidance

- Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* www.ibpi.usp.pdx.edu/guidebook.php
- City of Berkeley. (2000). *Bicycle Boulevard Design Tools and Guidelines.*
- AASHTO *Guide for the Development of Bicycle Facilities.*

F.5.4.8 Bike Signage and Wayfinding

Signing Standards and Guidelines

Bikeways have unique signage requirements and are included in a separate chapter in the Manual of Uniform Traffic Control Devices (MUTCD). In the MUTCD there are three types of signs:

- Regulatory signs indicate to cyclists the traffic regulations which apply at a specific time or place on a bikeway
- Warning signs indicate in advance conditions on or adjacent to a road or bikeway that will normally require caution and may require a reduction in vehicle speed
- Guide and information signs indicate information for route selection, for locating off-road facilities, or for identifying geographical features or points of interest

In addition to MUTCD signs, Los Angeles County uses regulatory signs to alert trail users to the rules and regulations in effect within river path corridors. Under the California Public Resources Code, rules must be posted in order to be enforced by patrolling police officers.



MUTCD Sign R5-1b and R9-3c are regulatory sign. The bicycle path exclusion sign (R44A) is specific to the CA MUTCD.



Warning signs are yellow, such as this combination of W11-15 and W11-15P from the MUTCD



Bicycle guide signs are green, and can include destination, direction and distance information. (MUTCD sign D1-3C).



Los Angeles County Department of Public Works regulatory signs post rules and provide contact information.

Design Considerations

- Bicycle signs shall be standard in shape, legend, and color
- All signs shall be retroreflective for use on bikeways, including shared-use paths and bicycle lane facilities
- Signs for the exclusive use of bicyclists should be located so that other road users are not confused by them
- Where signs serve bicyclists as well as other road users, vertical mounting height and lateral placement shall be as specified in Part 2 (Signs)

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- California MUTCD
- AASHTO *Guide for the Development of Bicycle Facilities*
- Los Angeles River Master Plan Sign Guidelines

Wayfinding Guidelines

The ability to navigate through a region is informed by landmarks, natural features, and other visual cues. Wayfinding is a cost-effective and highly visible treatment that can improve the bicycling environment through:

- Helping to familiarize users with the pedestrian and bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for infrequent cyclists or pedestrians (e.g., "interested but concerned" cyclists)

A bikeway wayfinding system is composed of three elements:

- Signs: Wayfinding signs throughout Los Angeles County can indicate to pedestrians and bicyclists their direction of travel, location of destinations, and travel time/distance to those destinations.
- Pavement Markings: Pavement markings indicate to cyclists the traffic regulations which apply at a specific time or place on a bikeway. Markings also reinforce to bicyclists that they are on a designated route and remind motorists to drive courteously.
- Maps and Kiosks: Provides users with valuable information regarding bicycle facilities and route options throughout Los Angeles County. Maps and kiosks provide bicyclists with key information such as the rules of the road, tips on safe cycling practices, and other bicycle safety information.

Design Considerations

Destinations for on-street signage can include: On-street bikeways, commercial centers, regional parks and trails, public transit sites, civic/community destinations, local parks and trails, hospitals, and schools.

Recommended uses for on-street signage include:

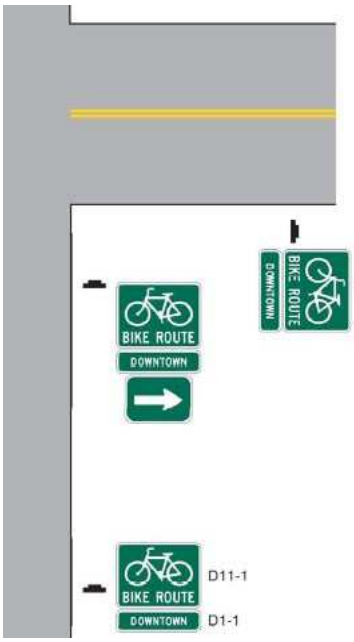
- Confirmation signs confirm that a cyclist is on a designated bikeway. Confirmation signs can include destinations and their associated distances, but not directional arrows.
- Turn signs indicate where a bikeway turns from one street onto another street. Turn signs are located on the near-side of intersections.



Custom bike route guide sign for the Los Angeles River Bikeway.



Pavement markings along the San Gabriel River Bikeway indicate mileage at quarter mile intervals.



Example of signing for an on-roadway bicycle route (MUTCD-CA Figure 9B-6).

Wayfinding Guidelines (continued)

- Decision signs mark the junction of two or more bikeways. Decision signs are located on the near-side of intersections. They can include destinations and their associated directional arrows, but not distances.

Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level that is most visible to bicyclists and pedestrians, rather than per vehicle signage standards. Additional recommended guidelines include:

- Place the closest destination to each sign in the top slot. Destinations that are further away can be placed in slots two and three. This allows the nearest destination to 'fall off' the sign and subsequent destinations to move up the sign as the bicyclist approaches.
- Use pavement markings to help reinforce routes and directional signage. Markings, such as bicycle boulevard symbols, may be used in addition to or in place of directional signs along bike routes. Pavement markings can help cyclists navigate difficult turns and provide route reinforcement.

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- California MUTCD 9B.19
- AASHTO *Guide for the Development of Bicycle Facilities*
- Los Angeles River Master Plan Sign Guidelines
- City of Oakland. (2009). *Design Guidelines for Bicycle Wayfinding Signage*
- City of Portland (2002). *Bicycle Network Signing Project*

F.5.5 Innovative Bicycle Treatments

Class II - Colored Bike Lanes

Design Summary

Bicycle Lane Width:
5' minimum and 7' maximum.



Colored bike lanes are a common treatment in many European Cities and are starting to garner acceptance in US cities.

Discuss ion

A contrasting color for the paving of bicycle lanes can also be applied to continuous sections of roadways. These situations help to better define road space dedicated to bicyclists and make the roadway appear narrower to drivers resulting in beneficial speed reductions.
Colored bicycle lanes require additional cost to install and maintain. Techniques include:

- Paint – less durable and can be slippery when wet
- Colored asphalt – colored medium in asphalt during construction – most durable.
- Colored and textured sheets of acrylic epoxy coating.
- Thermoplastic – Expensive, durable but slippery when worn.



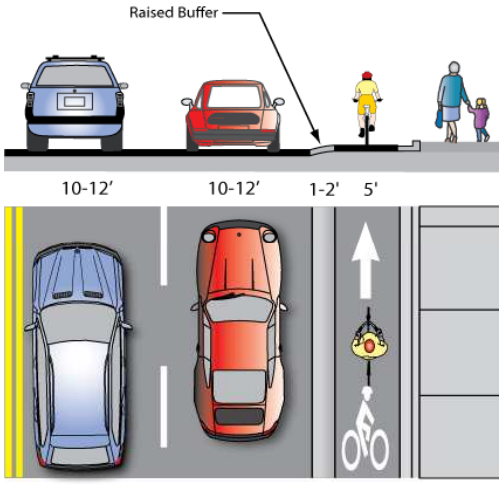
Guidance

Currently this treatment has been granted interim approval per FHWA.
National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide (2011).*

Class II - Raised Bicycle Lanes

Design Summary

Bicycle Lane Width:
5 feet minimum. Bicycle lane should drain to street. Drainage grates should be in travel lane.
Mountable Curb Design:
Mountable curb should have a 4:1 or flatter slope and have no lip that could catch bicycle tires.
Signage & Striping:
Same as traditional Class II bicycle lanes



Discussion

Raised bicycle lanes are bicycle lanes that have a mountable curb separating them from the adjacent travel lanes. Raised bicycle lanes provide an element of physical separation from faster moving vehicle traffic. For drivers, the mountable curb provides a visual and tactile reminder of where the bicycle lane is. For bicyclists the mountable curb makes it easy to leave the bicycle lane if necessary, when passing another bicyclist, or to merge to the left for turning movements. The raised bicycle lane should return to level grade at intersections.
Raised bicycle lanes cost more than traditional bicycle lanes and typically require a separate paving operation. Maintenance costs are lower as the bicycle lane receives no vehicle wear and resists debris accumulation.
Raised bicycle lanes work well adjacent to higher speed roadways with few driveways.

Guidance

Currently this treatment is not present in any State or Federal design standards
National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide (2011).*
Crow Design Manual for Bicycle Traffic - Chapter 5

Class II - Buffered Bicycle Lanes

Design Summary

Bicycle Lane Width:
Signage & Striping:
Same as traditional Class II bicycle lanes



Discussion

Provides cushion of space to mitigate friction with motor vehicles on streets with frequent or fast motor vehicle traffic. Buffered Bike lanes allow bicyclists to pass one another or avoid obstacles without encroaching into the travel lane.
These facilities increase motorist shy distance from bicyclist in the bike lane and reduce the risk of "dooring" compared to a conventional bike lane.
Buffered bike lanes require additional roadway space and maintenance.

Guidance

Currently this treatment is not present in any State or Federal design standards
National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide (2011)*.
Crow Design Manual for Bicycle Traffic - Chapter 5

Class II - Cycletrack

Design Summary

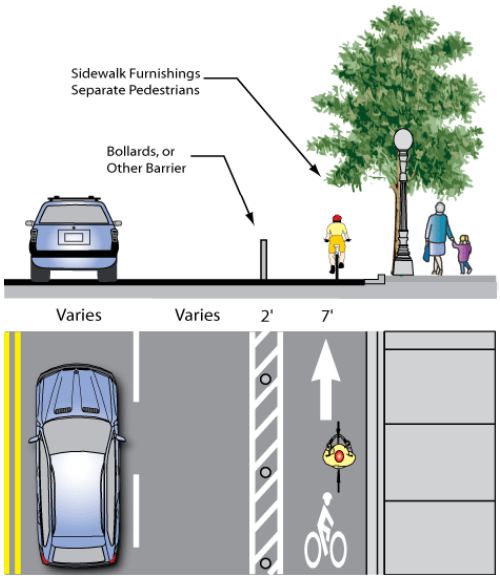
Cycle Track Width:
7 feet preferred to allow passing and obstacle avoidance
12 feet minimum for two-way facility

Discussion

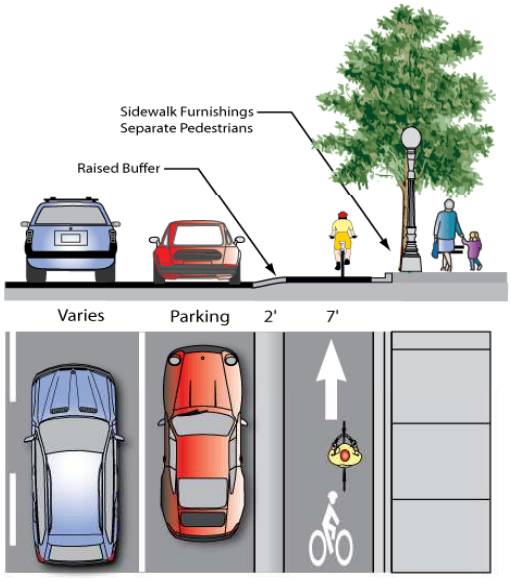
A cycle track is a hybrid type bicycle facility that combines the experience of a separated path with the on-street infrastructure of a conventional bicycle lane. Cycle tracks have different forms, but all share common elements. Cycle tracks provide space that is intended to be exclusively or primarily for bicycles, and is separated from vehicle travel lanes, parking lanes and sidewalks. Cycle tracks can be either one-way or two-way, on one or both sides of a street. They are separated from vehicles and pedestrians by either striping, colored pavement, bollards, curbs/medians or a combination of these elements.

Guidance

Currently this treatment is not present in any State or Federal design standards
National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide (2011)*
Crow Design Manual for Bicycle Traffic - Chapter 5



Recommended Design – No Parking

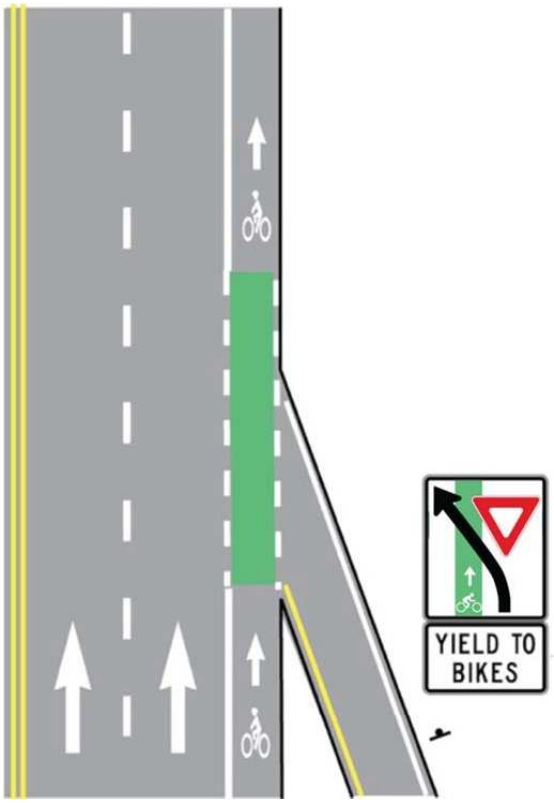


Recommended Design – On-Street Parking

Class II - Colored Bike Lanes at Interchanges

Design Summary

Bicycle Lane Width:
The bicycle lane width through the interchange should be the same width as the approaching bicycle lane (minimum five feet).



Discussion

On high traffic bicycle corridors non-standard treatments may be desirable over current practices outlined in the MUTCD. Dashed bicycle lane lines with or without colored bicycle lanes may be applied to provide increased visibility for bicycles in the merging area.

Guidance

Currently this treatment is not present in any State or Federal design standards
National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide (2011).*
City of Chicago - Green Pavement Markings for Bicycle Lanes (Ongoing) - FHWA Experiment No. 9-77(E)
Portland's Blue Bicycle Lanes
http://www.portlandonline.com/shared/cfm/image.cfm?id=58842



Class II - Bicycle Box
Single Lane – No Vehicle Right Turns On Red

Design Summary

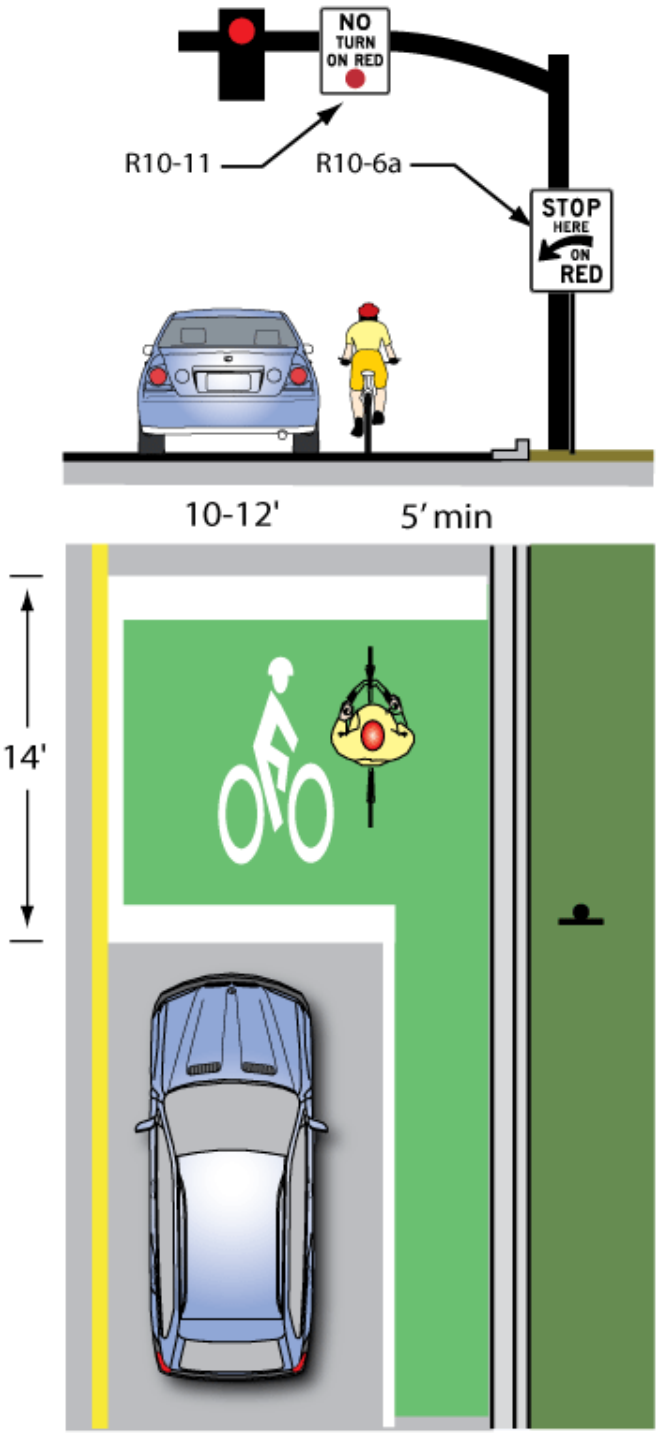
Bicycle Box Dimensions:
The Bicycle Box should be 14' deep to allow for bicycle positioning.
Signage:
Appropriate signage as recommended by the MUTCD applies. Signage should be present to prevent 'right turn on red' and to indicate where the motorist must stop.

Discussion

Bicycle boxes provide additional space for bicyclists to move to the front of the vehicular queue while waiting for a green light. On a two-lane roadway, the bicycle box can also facilitate left turning movements for bicyclists as well as through bicycle traffic. Motor vehicles must stop behind the white stop line at the rear of the bicycle box and may not turn right on red.

Guidance

Currently this treatment is not present in any U.S. State or Federal design manuals.
National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide (2011)*.
Examples of this treatment can be found in Cambridge, Portland and Vancouver



Class II - Bicycle Box
Multi Lane – No Vehicle Right Turns On Red

Design Summary

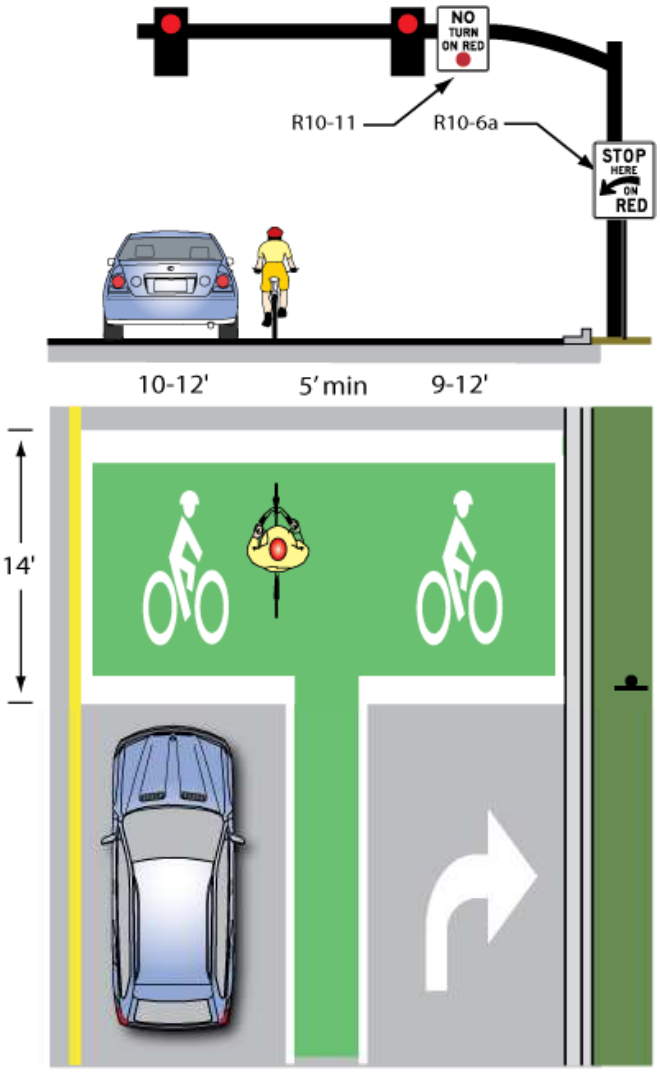
Bicycle Box Dimensions:
The Bicycle Box should be 14' deep to allow for bicycle positioning.
Signage:
Appropriate signage as recommended by the MUTCD applies. Signage should be present to prevent 'right turn on red' and to indicate where the motorist must stop.

Discussion

On wider roadways, the Bicycle Box can allow for movements in all directions for bicyclists providing for right turning, through, and left turning movements ahead of traffic. This treatment can be combined with a bicycle signal or an advanced signal phase to clear queuing bicyclists before vehicles are given a green phase.
At multi-lane bicycle boxes there can be a safety issue if a bicyclist is using the bicycle box to maneuver for a left turn just as the signal turns green. This would put the bicyclist possibly in the path of an approaching vehicle. It is recommended that installations wider than one lane across from the access point to the bicycle box be studied carefully before installation.

Guidance

Currently this treatment is not present in any State or Federal design standards



Class II - Bicycle Box
Multi Lane – Vehicle Right Turns On Red Allowed

Design Summary

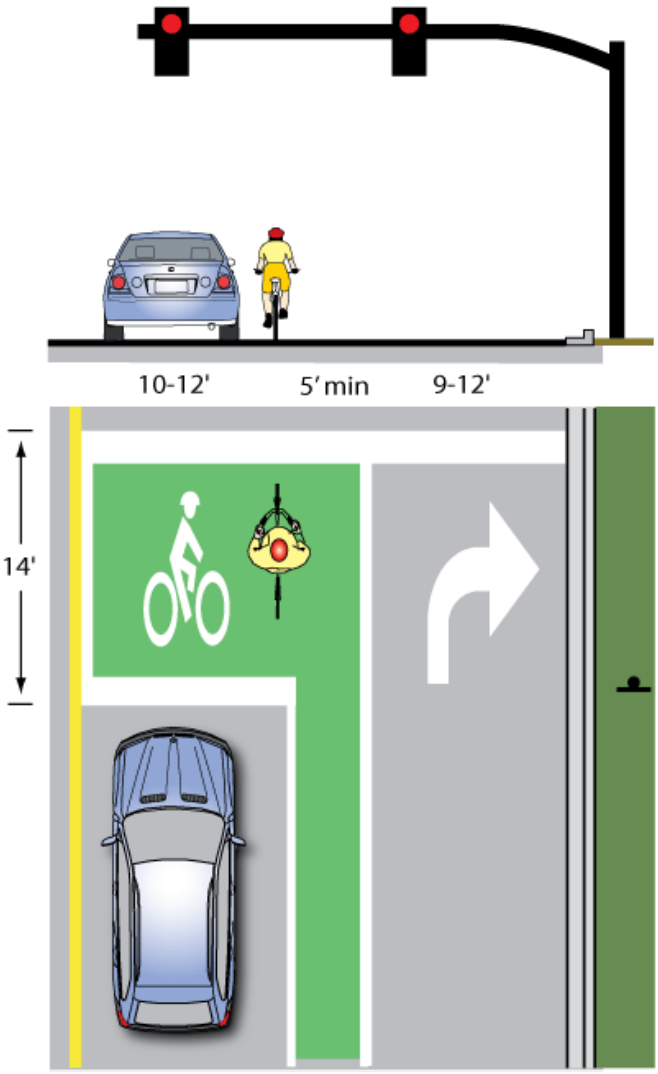
Bicycle Box Dimensions:
The Bicycle Box should be 14' deep to allow for bicycle positioning.
Signage:
Appropriate signage as recommended by the MUTCD applies.

Discussion

In some areas there may be a situation where a freeway ramp exists where bicycles are prohibited or areas where bicycles may not need to access such as parking garages. In these limited cases a vehicle right turn only lane may be provided to the outside of the bicycle box. Right turns on red are permitted in these instances.

Guidance

Currently this treatment is not present in any State or Federal design standards



F.5.6 Bicycle Parking

Bicycle Parking

- Short-term parking accommodates visitors, customers, messengers and others expected to depart within two hours; requires approved standard rack, appropriate location and placement, and weather protection.
- Long-term parking accommodates employees, students, residents, commuters, and others expected to park more than two hours. This parking is to be provided in a secure, weather-protected manner and location.

Design Considerations

Design Issue	Recommended Guidance
Minimum Rack Height	To increase visibility to pedestrians, racks should have a minimum height of 33 inches or be indicated or cordoned off by visible markers.
Signing	Where bicycle parking areas are not clearly visible to approaching cyclists, signs at least 12 inches square should direct them to the facility. The sign should include the name, phone number, and location of the person in charge of the facility, where applicable.
Lighting	A minimum of one foot-candle illumination at ground level should be provided in all high capacity bicycle parking areas.
Frequency of Racks on Streets	In popular retail areas, two or more racks should be installed on each side of each block. This does not eliminate the inclusion of requests from the public which do not fall in these areas. Areas officially designated or used as bicycle routes may warrant the consideration of more racks.
Location and Access	Access to facilities should be convenient; where access is by sidewalk or walkway, ADA-compliant curb ramps should be provided where appropriate. Parking facilities intended for employees should be located near the employee entrance, and those for customers or visitors near main public entrances. (Convenience should be balanced against the need for security if the employee entrance is not in a well traveled area). Bicycle parking should be clustered in lots not to exceed 16 spaces each. Large expanses of bicycle parking make it easier for thieves to be undetected.
Locations within Buildings	Provide bike racks within 50' of the entrance. Where a security guard is present, provide racks behind or within view of a security guard. The location should be outside the normal flow of pedestrian traffic.
Locations near Transit Stops	To prevent bicyclists from locking bikes to bus stop poles - which can create access problems for transit users, particularly those who are disabled - racks should be placed in close proximity to transit stops where there is a demand for short-term bike parking.

Bicycle Parking (continued)

Locations within a Campus-Type Setting	Racks are useful in a campus-type setting at locations where the user is likely to spend less than two hours, such as classroom buildings. Racks should be located near the entrance to each building. Where racks are clustered in a single location, they should be surrounded by a fence and watched by an attendant. The attendant can often share this duty with other duties to reduce or eliminate the cost of labor being applied to bike parking duties; a cheaper alternative to an attendant may be to site the fenced bicycle compound in a highly visible location on the campus. For long-term parking needs of employees and students, attendant parking and/or bike lockers are recommended.
Retrofit Program	In established locations, such as schools, employment centers, and shopping centers, the County should conduct bicycle audits to assess bicycle parking availability and access, and add additional bicycle racks where necessary.

The County could require bicycle parking as part of new developments. Quantities should be linked to land uses; the Association of Pedestrian and Bicycle Professionals (APBP) provides recommended quantities (see APBP reference).

Reference

- Caltrans Highway Design Manual (Chapter 1000)
- California MUTCD
- AASHTO Guide for the Development of Bicycle Facilities
- APBP Bicycle Parking Guidelines (2010.)www.apbp.org/?page=Publications

Short-Term Bicycle Parking

Short-term bicycle parking facilities include racks which permit the locking of the bicycle frame and at least one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame or components. Short-term bicycle parking is currently provided at no charge at various locations in The County of Los Angeles. Such facilities should continue to be free, as they provide minimal security, but encourage cycling and promote proper bicycle parking.

The majority of short-term bicycle parking is provided via a 'staple' on the sidewalk, located within the buffer zone.

Art racks can be an attractive way of providing bicycle parking facilities. Costs can be subsidized by businesses sponsoring racks that are appropriate to their business (e.g., a pair of glasses for an optician).

Bollard-type bicycle racks can also accommodate short-term bicycle parking.

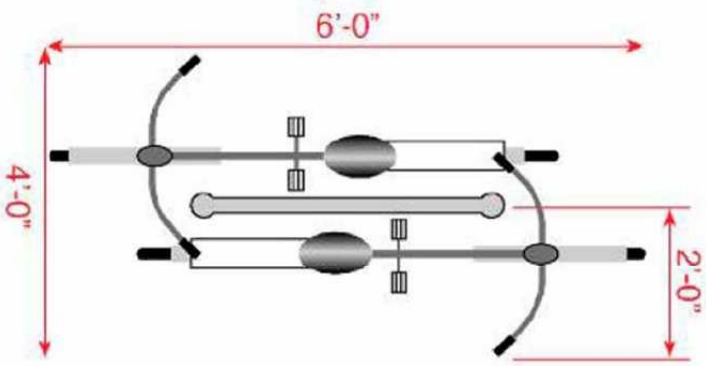
Bike corrals are high capacity bicycle racks installed in areas previously designated for automobile parking. The County shall evaluate requests for bike corrals if property owners and local stakeholders approve removing automobile parking spots.

Design Considerations

- See dimensions below

Reference

- Caltrans Highway Design Manual (Chapter 1000)
- California MUTCD
- AASHTO Guide for the Development of Bicycle Facilities



Staple rack parking configuration.



Standard bicycle 'staple' rack.



Art racks can be an attractive way of marketing the bicycle parking.



Bicycle parking can also be on a single post to minimize sidewalk obstructions.

Long-Term Bicycle Parking

Long-term bicycle parking facilities are intended to provide secure long-term bicycle storage. Long-term facilities protect the entire bicycle, its components and accessories against theft and against inclement weather, including snow and wind-driven rain. Examples include lockers, check-in facilities, monitored parking, restricted access parking, and personal storage. Check-in facilities are typically secured facilities that require an access code or key to access. Monitored parking facilities provide some form of supervision, e.g., an attendant.

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free. Potential locations for long-term bicycle parking include transit stations, large employers and institutions where people use their bikes for commuting, and not consistently throughout the day. Coordination between different agencies and property owners would be needed to install parking at many locations.



Bike lockers at a transit station.

Design Considerations

- Dimensions and configuration depends on type of parking

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- California MUTCD
- AASHTO *Guide for the Development of Bicycle Facilities*

F.5.7 Bikeway Maintenance

Bikeway Maintenance

Guidelines for regularly maintaining bicycle facilities are provided below.

Sweeping

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.

Action items involving sweeping activities include:

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Provide extra sweeping in the fall where leaves accumulate.

Roadway Surface

Bicycles are more sensitive to subtle changes in roadway surface than motor vehicles. Some paving materials are smoother than others, and compaction/uneven settling can affect the surface after trenches and construction holes are filled. Uneven settlement after trenching can affect the roadway surface nearest the curb where bicycles travel. Sometimes compaction is not achieved to a satisfactory level, and an uneven pavement surface can result due to settling over the course of days or weeks. When resurfacing streets, the county should use the smallest chip size and ensure that the surface is as smooth as possible to improve safety and comfort for bicyclists.

Recommended action items involving maintaining the roadway surface include:

- On all bikeways, use the smallest possible chip for chip sealing bike lanes and shoulders
- Use sealants with the same color as the pavement. This avoids sealing cracks in concrete segments with asphalt
- During chip seal maintenance projects, if the pavement condition of the bike lane is satisfactory, it may be appropriate to chip seal the travel lanes only
- Ensure that on new roadway construction, the finished surface on bikeways does not vary more than ¼ inch
- Maintain a smooth surface on all bikeways that is free of potholes
- Maintain pavement so ridge build-up does not occur at the gutter-to-pavement transition or adjacent to railway crossings
- Inspect the pavement two to four months after trenching construction activities are completed to ensure that excessive settlement has not occurred
- Remove existing markings before reapplying new markings
- When applying thermoplastic stencils for signalizing bikeways, ensure that maximum thickness is 90 millimeters.

Gutter-to-Pavement Transition

On streets with concrete curbs and gutters, 10-20 inches of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. It is at this location that water can erode the transition, creating potholes and a rough surface for travel.

The pavement on many streets is not flush with the gutter, creating a vertical transition between these segments. This area can buckle over time, creating a hazardous environment for bicyclists. Since it is the most likely place for bicyclists to ride, this issue is significant for bike travel.

Bikeway Maintenance (continued)

Action items related to maintaining a smooth gutter-to-pavement transition include:

- Ensure that gutter-to-pavement transitions have no more than a ¼ inch vertical transition
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets

Drainage Grates

Drainage grates are typically located in the gutter area near the curb of a roadway. Drainage grates typically have slots through which water drains into the municipal wastewater system. Many grates are designed with linear parallel bars spread wide enough for a tire to get caught so that if a bicycle were to ride over them, the front tire would get caught and fall through the slot. This would cause the cyclist to tumble over the handlebars and sustain potentially serious injuries. The County should consider the following:

- Continue to require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats
- Create a program to inventory all existing drainage grates and replace hazardous grates as necessary – temporary modifications such as installing rebar horizontally across the grate is no alternative to replacement

Pavement Overlays

Pavement overlays represent good opportunities to improve conditions for cyclists if it is done carefully. A ridge should not be left in the area where cyclists ride (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects offer opportunities to widen a roadway, or to re-stripe a roadway with bike lanes. Action items related to pavement overlays include:

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge
- If there is adequate shoulder or bike lane width, it may be appropriate to stop at the shoulder or bike lane stripe, provided no abrupt ridge remains
- Ensure that inlet grates, manhole, and valve covers are within ¼ inch of the pavement surface and are made or treated with slip resistant materials
- Pave gravel driveways to property line to prevent gravel from spilling onto shoulders or bike lanes

Signage

Signage is crucial for safe and comfortable use of the bicycle and pedestrian network. Such signage is vulnerable to vandalism or wear, and requires regular maintenance and replacement as needed. The County should consider:

- Check regulatory and wayfinding signage along bikeways for signs of vandalism, graffiti, or normal wear
- Replace signage along the bikeway network as-needed
- Perform a regularly-scheduled check on the status of signage with follow-up as necessary
- Create a Maintenance Management Plan (see below)

Landscaping

Bikeways can become inaccessible due to overgrown vegetation. All landscaping needs to be designed and maintained to ensure compatibility with the use of the bikeways. After a flood or major storm, bikeways should be checked along with other roads, and fallen trees or other debris should be removed promptly. Landscaping maintenance action items include:

- Ensure that shoulder plants do not hang into or impede passage along bikeways

After major damage incidents, remove fallen trees or other debris from bikeways as quickly as possible.

Reference

- Caltrans *Highway Design Manual* (Chapter 1000)
- California MUTCD





Appendix C: Design Guidelines

Introduction

The design guidelines featured here have been tailored to meet the specific facility development needs of Greensboro's greenway, bicycle, and pedestrian system. It is the intent of this Plan to comply with the Americans with Disabilities Act (ADA) and provide an accessible network. These guidelines provide a variety of facility ideas and serve as minimum standards for facility development. These guidelines are not a substitute for a more thorough examination and detailed landscape architectural and engineering evaluation of each project segment.

The guidelines adhere to national design standards as defined by the American Association of State Highway Transportation Officials (AASHTO), ADA, Designing Sidewalks and Trails for Access: Part 2 and the Manual on Uniform Traffic Control Devices (MUTCD). Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions.

For more in-depth information and design development standards, the publications listed below should be obtained and consulted by the City of Greensboro. It is advised that the publication Designing Sidewalks and Trails for Access: Part Two - Best Practices Design Guide be specifically consulted when making ADA accessibility design decisions.

Greenways: A Guide to Planning, Design and Development
Published by Island Press, 1993
Authors: Charles A. Flink and Robert Searns
www.greenways.com

Trails for the Twenty-First Century
Published by Island Press, 2001
Authors: Charles Flink, Robert Searns, Kristine Olka
www.greenways.com

Guide to the Development of Bicycle Facilities
Updated in 2000 by the American Association of State Highway and Transportation Officials (AASHTO).
Available from FHWA or AASHTO
www.aashto.org/bookstore/abs.html

North Carolina Bicycle Facilities Planning and Design Guidelines
Published by the North Carolina Department of Transportation, Raleigh, NC. 1994

Guide for the Planning, Design, and Operation of Pedestrian Facilities
Published by the American Association of State Highway and Transportation Officials (AASHTO), 2004

Manual on Uniform Traffic Control Devices (MUTCD)
Published by the U. S. Department of Transportation, Washington,DC, 2003

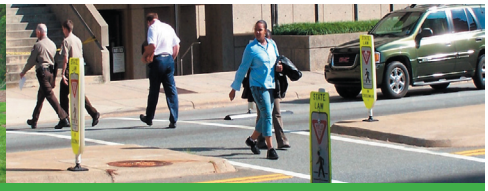
Universal Access to Outdoor Recreation: A Design Guide
Published by PLAE, Inc., Berkeley, CA, 1993

Designing Sidewalks and Trails for Access: Part Two - Best Practices Design Guide
Published by U.S. Department of Transportation, Washington, DC, 2001

Other useful web sites for information include:

- Rails-to-Trails Conservancy - www.railtrails.org
- National Park Service - www.nps.org
- U.S. Department of Transportation - www.walkinginfo.org and www.bicyclinginfo.org
- Trails and Greenways Clearinghouse - www.trailsandgreenways.org
- National Bicycle and Pedestrian Clearinghouse - www.bikefed.org/clear.htm



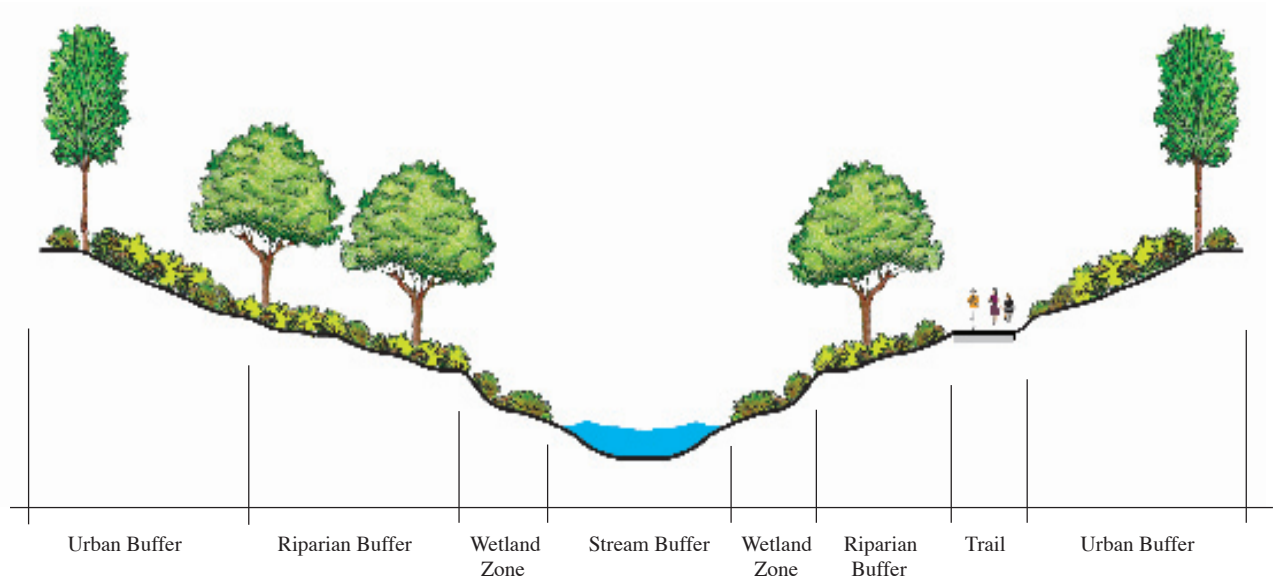


C1. Greenway Design Guidelines

The following pages focus on design guidelines for greenways. It includes information on riparian buffers, corridor plantings, different trail treads, different types of greenway facilities, trailheads, signage, and other ancillary facilities

Riparian Buffers (Type I facility)

Riparian buffers serve many functions. They filter stormwater pollutants, help moderate stream flow, stabilize streambanks, moderate stream temperature, and provide aquatic and terrestrial habitat. The minimum recommendations should require that new developments maintain a 50' vegetated buffer on both sides of all intermittent and perennial streams, lakes and ponds. For the purpose of these recommendations, a waterbody exists if the feature is present on either the most recent version of the soil map or 7.5 minute quadrangle topographic map prepared by the United States Geological Survey (USGS). The recommended required buffers consist of two zones: a 30' undisturbed zone adjacent to each side of the waterbody, and a vegetated zone that extends from the outer edge of the 30' zone for a distance of at least 20'. These recommendations are consistent with the State level Neuse and Tar-Pam Basinwide Rules.



Buffers are required in water supply watersheds throughout the state as part of the Water Supply Watershed Management Program. The Division of Water Quality manages the program through oversight of local ordinances and monitoring of land use activities. Local water supply watershed programs must be approved by the NC Environmental Management Commission (EMC). The program requires local governments to adopt land use controls that include buffer protection. For low-density development, 30' buffers are required along perennial streams, and 100' buffers are required for high-density development.





For the purpose of greenway facility development, a minimum 50' buffer (150' preferred) as measured from the top of streambank is required to mitigate the damaging effects of flooding from storms, filter pollutants from overland flow and develop appropriately sized greenway trail facilities.

Many local governments throughout the state have applied the 50' buffer. Some have placed additional buffers up to 100' on their streams, according to their stream order.

As an alternative to the conventional method of prescriptive buffers, stream buffer widths can be varied according to ecological features of the watershed. Each buffer width would be site specific, depending on the following characteristics of the stream, riparian buffer and watershed:

- Slope
- Soil
- Hydrology
- Vegetation
- Water Quality
- Impervious Surface

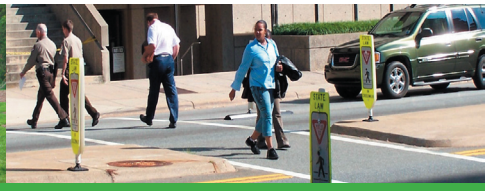
Many bird species and other wildlife require a much larger buffer width than that required to protect water quality. For corridors designed primarily as habitat protection, a 300' undisturbed buffer is desirable.

Corridor Planting

Some basic guides for planting in corridors is as follows:

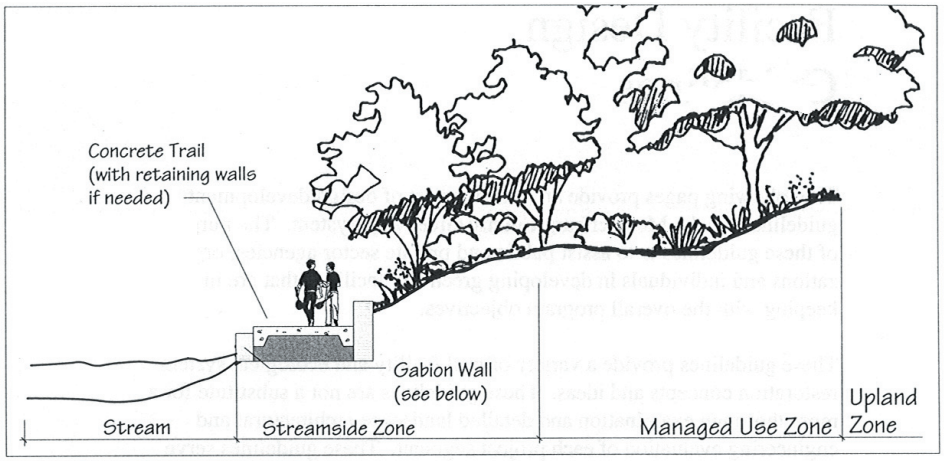
- Efforts should be made to eliminate non-native invasive species, such as privet (Ligustrum sinense) from corridors.
- Native overstory and understory trees/shrubs should be replanted where vegetation is removed or harmed due to construction of parks, trails, etc. in greenway corridors or open space.
- Fallen trees should not be removed unless they obstruct trails or present danger. Otherwise, they should be left to decay naturally. Evergreens, conifers, and deciduous trees should all be used proportionally.
- Mast producing trees and shrubs with berries should be utilized as food for wildlife whenever possible.
- Flowering trees and shrubs can be used to draw attention to important intersections and entrances.
- Evergreen shade trees are needed near seating areas and picnic tables.
- Evergreen shrubs, such as wax myrtle, can help separate public areas from private residences.





Creekside Trail Tread

Creekside trails are located only in urban areas, where right-of-way constraints and channelized streams restrict trail development to the floodway. Creekside trails are designed to accommodate walkers, bicyclists, rollerbladers, and joggers. These multi-use trails are typically positioned directly adjacent to the stream channel and are therefore subject to frequent flooding. These trails require hard-paved surfaces of concrete to withstand high-velocity stream flows. Retaining walls or other structural elements may also be required for stable construction and to protect the trail from erosion and flood damage.



Typical Multi-Use Creekside Trail Cross Section

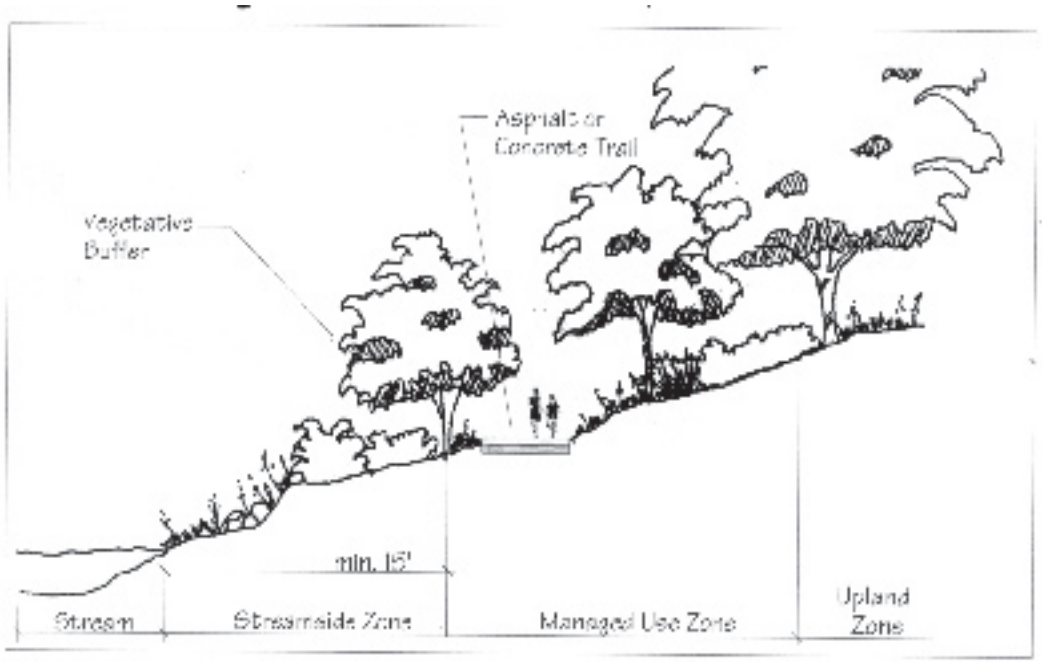
Creekside trails should be a minimum of 10' wide for multi-use trails. The installation of railings, benches, signage, and trash receptacles that could obstruct flow during storm events, should be carefully considered. Creekside trails must be designed and installed in a manner that minimizes their effect on flood waters and protects the amenities from flood damage. The use of retaining walls as seat walls is one way in which non-obtrusive amenities can be included on this type of trail facility. Special consideration should be paid to mitigating the impacts of trail construction on the natural environment.





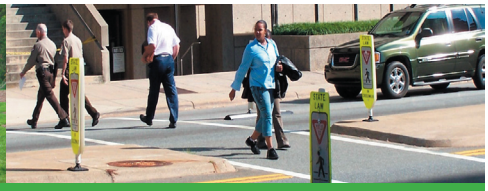
Floodway Trail Tread

These multi-use trails are typically positioned within the floodway but not directly adjacent to streams. They are designed to accommodate a variety of users including walkers, joggers, cyclists, and rollerbladers. Some vegetative buffer between the stream and trail should be left intact. Like the streamside trails, trails within the floodway are subject to periodic flooding, however, not as frequently. These trails require paved surfaces of either asphalt or concrete depending on frequency of flooding and expected velocity of flow. A proper trail foundation is important and will increase the longevity of the trail. No soft shoulder should be constructed due to flood considerations. Special consideration should be given to the mitigation of negative impacts from trail development on the natural stream environment. Multi-use trails within the floodway should be built with a minimum width of 10 feet. All elements of the trail including the trail tread, railings, benches, and trash receptacles will be periodically flooded. The design and materials for these trails should be carefully selected to accommodate this factor.



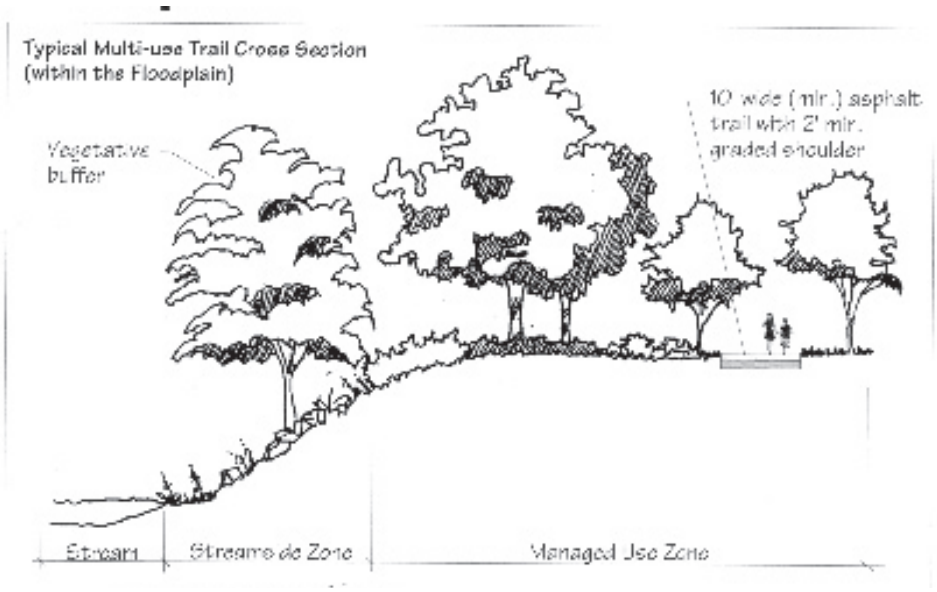
Typical Multi-Use Trail Cross Section
(Within the Floodway)





Floodplain Trail Tread

Like the floodway and creekside trails, multi-use trails within the floodplain are designed to accommodate uses such as walking, jogging, cycling, and rollerblading. These multi-use trails are positioned outside the floodway but within the floodplain. Significant vegetative buffers between the stream and trail should be left intact. These trails will be subject to occasional flooding during large storm events, and it is recommended that they be built with paved asphalt. However, an aggregate stone surface may be adequate in some locations. Multi-use trails within the floodplain should be built to a minimum width of 10' (12' to 14' is preferred). The graphics below illustrate two suitable pavement cross sections that can be used to build multi-use trails within the floodplain.



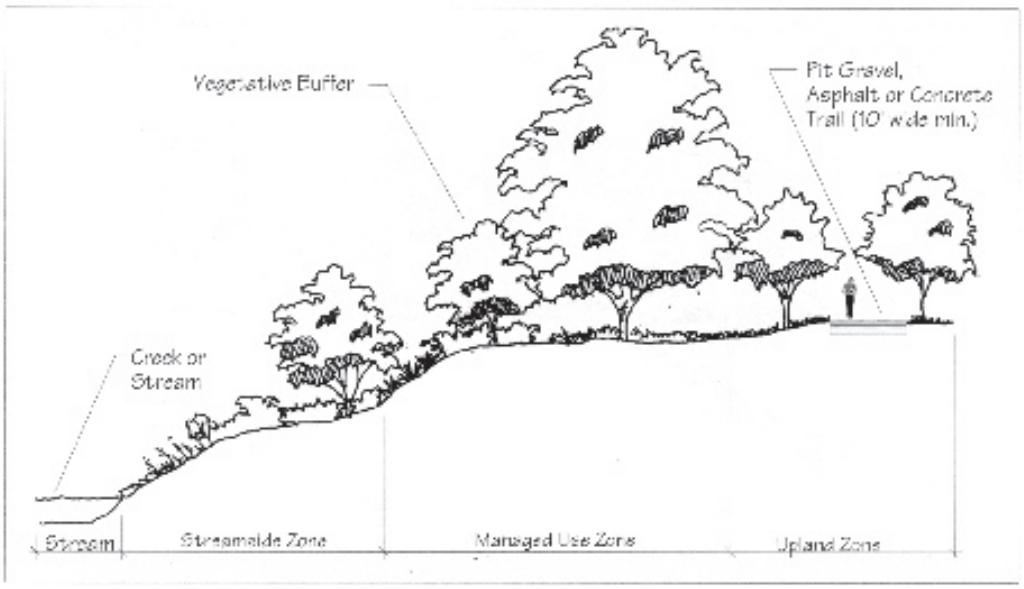
Typical Multi-Use Trail Cross Section
(Within the Floodplain)





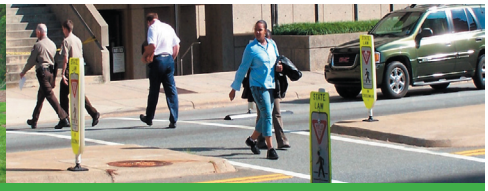
Upland Trail Tread

Upland multi-use trails are typically positioned completely outside designated floodplains. Significant vegetative buffer between any streams and the trail should be left in tact. It is recommended that these trails be built with paved asphalt or aggregate stone, depending on the preference of local user groups. Upland multi-use trails should be built to a minimum width of 10', though 12' is preferred.



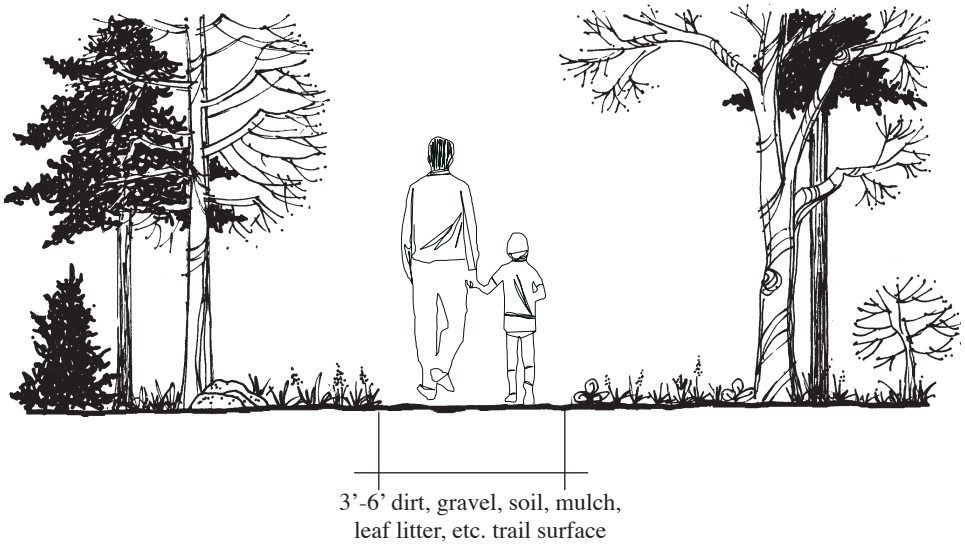
Upland Trail Cross Section





Footpath/Hiking Trail (Type II & III facilities)

Footpaths or hiking trails are designed to accommodate pedestrians and are not intended for cyclists or other wheeled users. These natural surface trails typically make use of dirt, rock, soil, forest litter, pine mulch and other native materials for the trail surface. Preparation varies from machine-worked surfaces to those worn only by usage. This is often the most appropriate surface for ecologically sensitive areas. The construction of these trails focuses on providing positive drainage for the trail tread and should not involve extensive removal of existing vegetation. Timbers may be used for steps along steep slopes. These trails vary in width from 3 feet to 6 feet and vertical clearance should be maintained at 9 feet. Footpath/Hiking trails are most commonly found within the streamside zone.

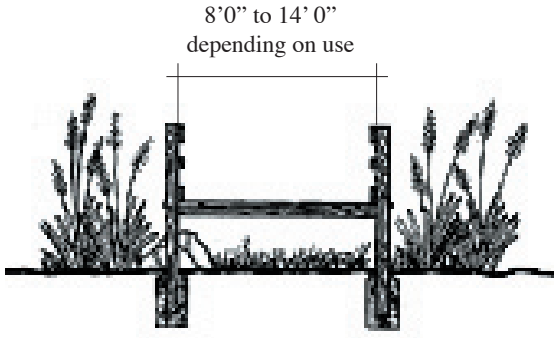






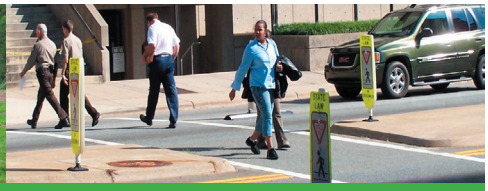
Boardwalk Trail Tread

Boardwalks, or wood surface trails, are typically required when crossing wetlands or poorly-drained areas. While boardwalks can be considered multi-use trails, the surface tends to be slippery when wet and may not be suitable for wheeled users. Boardwalks intended for multiple uses should be a minimum of 14 feet wide. However, boardwalk trails limited to pedestrian use only can be as narrow as 8 feet. If maintenance vehicles use the boardwalk for maintenance access, it should be a minimum of 14 feet.



Wood surfaced trails are usually composed of sawn wooden planks or lumber that forms the top layer of a bridge, boardwalk or deck. The most commonly used woods for trail surfacing are exposure- and decay- resistant species such as pine, redwood, fir, larch, cedar, hemlock and spruce. Wood is a preferred surface for special applications because of its strength and comparative weight, its aesthetic appeal and its versatility. Synthetic wood, manufactured from recycled plastics, is now available for use as a substitute in conventional outdoor wood construction. While these products are more expensive than wood, the recycled plastic lasts much longer, does not splinter or warp and will not discolor. They can, however, be more difficult to maintain if vandalism is a problem in the area.

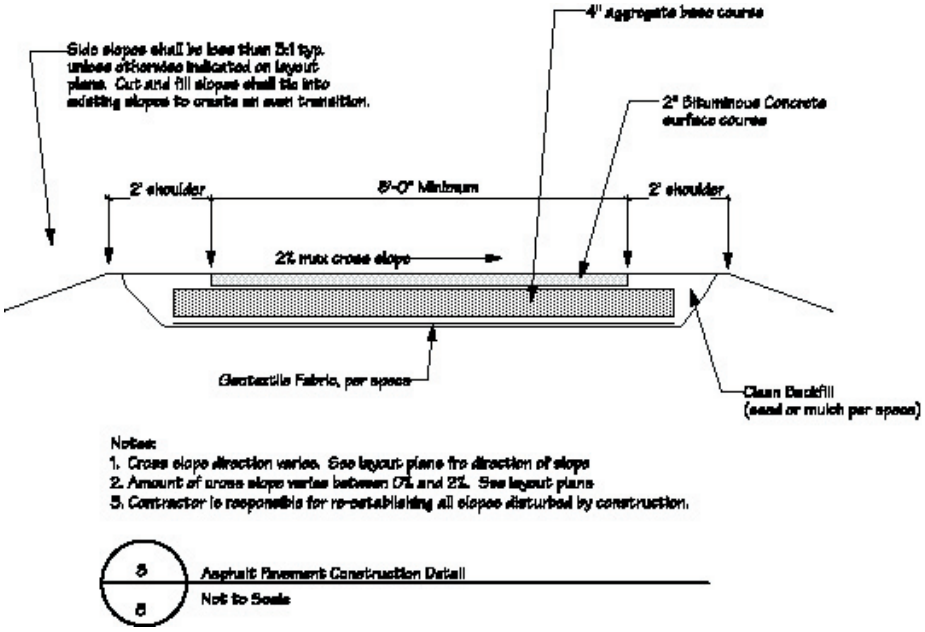




Paved Multi-Use Trail (Type IV facility)

Typical pavement design for a paved, off-road, multi-use trail should be based upon the specific loading and soil conditions for each project. These asphalt or concrete trails should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles. In areas prone to frequent flooding, it is recommended that concrete be used because of its excellent durability. For the Greenville Greenway system, it is anticipated that asphalt will be sufficient.

One important concern for asphalt trails is the deterioration of trail edges. Installation of a geotextile fabric beneath a layer of aggregate base course (ABC) can help to maintain the edge of a trail. It is important to provide a 2' wide graded shoulder to prevent trail edges from crumbling.



The minimum width for two-directional trails is 10', however 12'-14' widths are preferred where heavy traffic is expected. Centerline stripes should be considered for paths that generate substantial amounts of pedestrian traffic. Possible conflicts between user groups must be considered during the design phase, as cyclists often travel at a faster speed than other users. Radii minimums should also be considered depending on the different user groups.

Asphalt is a hard surface material that is popular for a urban trails. It is composed of asphalt cement and graded aggregate stone. It is a flexible pavement and can be installed on virtually any slope. Concrete surfaces are capable of withstanding the most powerful environmental forces. They hold up well against the erosive action of water, root intrusion and subgrade deficiencies such as soft soils. Most often, concrete is used for intensive urban applications. Of all surface types, it is the strongest and has the lowest maintenance requirement, if it is properly installed.

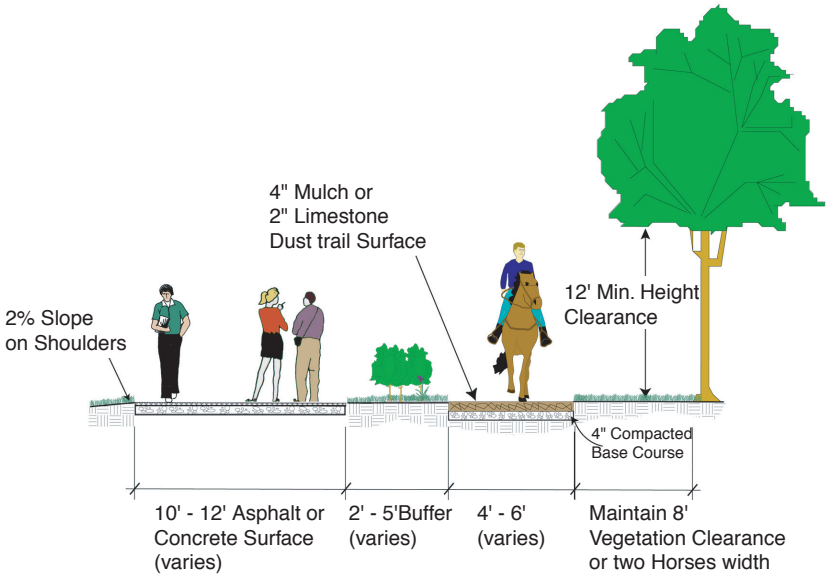




Dual Trail Tread

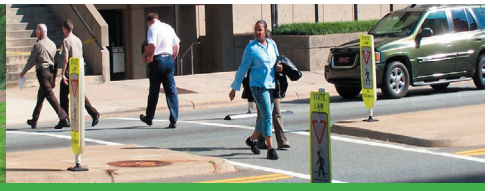
Dual tread trails are suggested on multi-use trail systems where the different uses may conflict, such as equestrians and bikers. If hard surfacing is being used on the multi-use trail, a softer, 5'-wide tread for horses should be considered. Mulch, dirt, stabilized dirt or limestone dust can be used. Hard surfaces, such as concrete and asphalt are undesirable for equestrians because they can injure horses' hooves. Granular stone may also present problems because it can get stuck in horse hooves.

Vertical clearance for equestrians should be at least 10', with a horizontal clearance of at least 5'. Low-hanging tree limbs should be cut flush with the trunk. Leaves, branches and other protrusions that could injure the horse, rider or gear should be removed. Within the tread, stumps, large rocks and other debris should be cleared. Sight distances for equestrians, who usually travel between 4 and 6 miles per hour, should be at lest 100'.



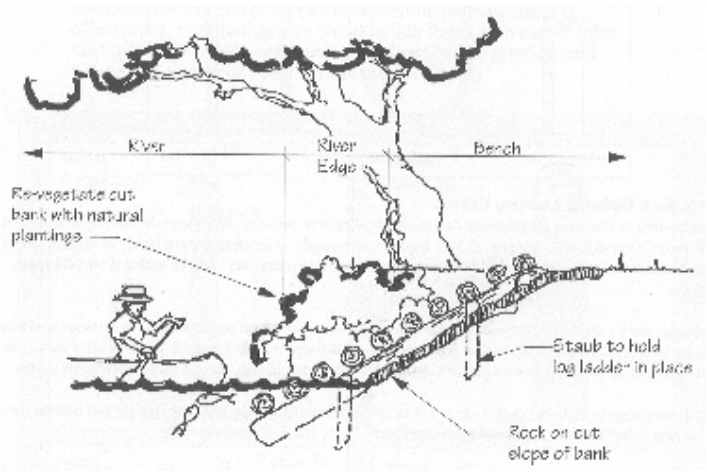
Typical Equestrian and Pedestrian Trail Cross Section





Water Based Trail (Type VI)

This designation applies to those rivers and streams that can successfully accommodate and/or which are designated to support canoeing, kayaking and boating. Water based trails can be designated with features and facilities that make this activity more enjoyable including signage systems, improved rapids, safety systems, and access points. Rental outfits could be established at put in/take out points. It is recommended that an official access point be located every 10 river miles along a paddle trail.



Small Boat Access



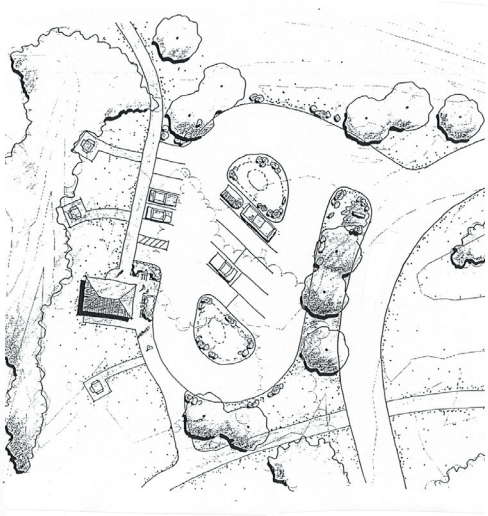


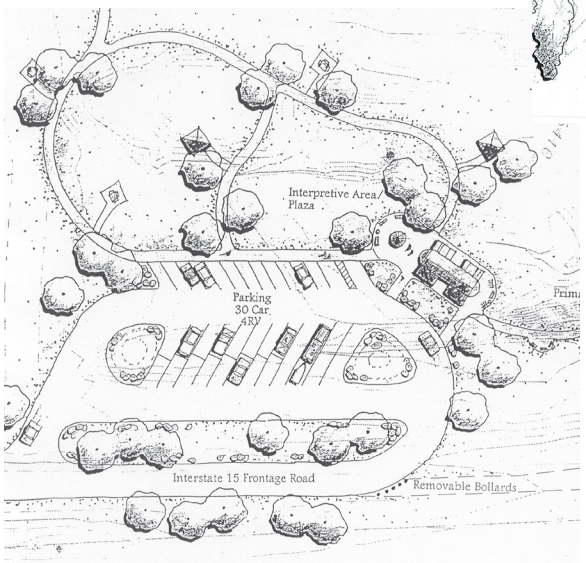


Major and Minor Trailheads

Trail heads should be installed throughout the greenway system to give the public access. These serve as points of formal public entry into the greenway system that may provide certain related public facilities such as parking, restrooms, drinking fountains, trail signage, etc. A mix of major and minor trail heads is suggested. Major trail heads should be located areas where there is expected to be significant use. An exhibition building or an interpretive exhibit may be incorporated, along with restrooms, water fountains, picnic tables, parking, signage, etc. Minor trail heads can be used to connect a smaller number of people to surrounding trails.

Typical Minor
Trailhead Plan View





Typical Major
Trailhead Plan View

Restrooms

Public amenities such as phones and restrooms should be located and concentrated at the confluence of vehicular and pedestrian traffic. ADA accessible restrooms should be placed at major trail access points in order to accommodate trail users. Where possible, other uses should be incorporated into the structure, such as storage for maintenance equipment. These structures should be located adjacent to thoroughfares for security, maintenance and access to utility hookups. They should also make use of natural light and ventilation as much as possible.





Typical Restrooms



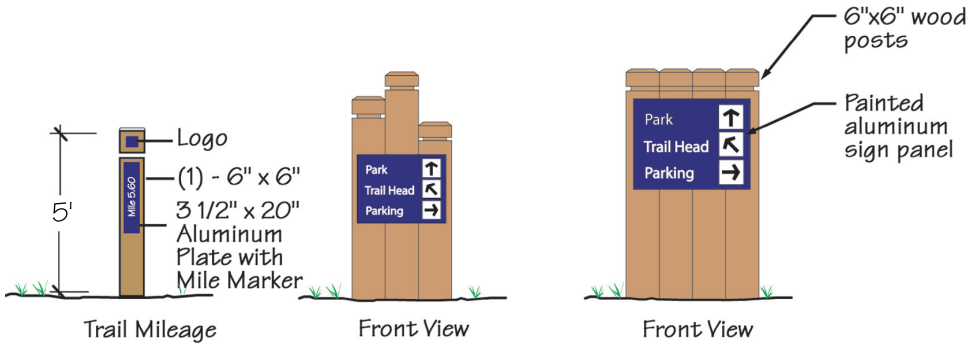
Waterless Restroom Option



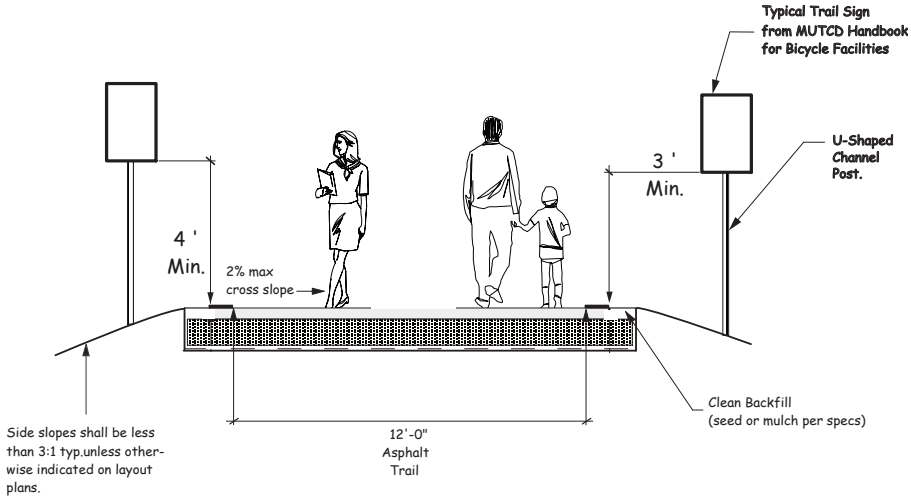


Directional Signage

Some examples can be seen below of typical directional signage. Whatever style the community chooses, there should be a similar appearance or theme throughout the system. Trail rules should also be posted at entry points to the system as should some sort of mileage notation.

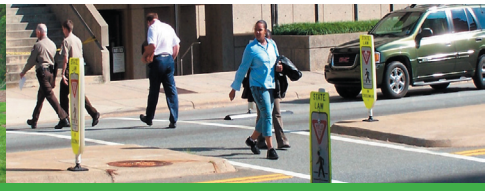


Where signs are located along the greenways is important so that their visibility is maximized. Maintaining a certain distance from the actual tread is important for safety reasons.



Typical Signage Location





Interpretive Signage

Greenways can benefit from signs that explain the natural, cultural, and historic value of a site. This sort of interpretive signage helps users understand the many values of the greenway system and can be valuable tools in using the greenway system as an educational tool.

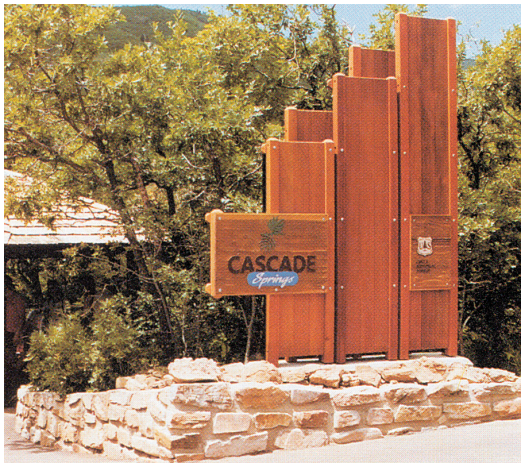


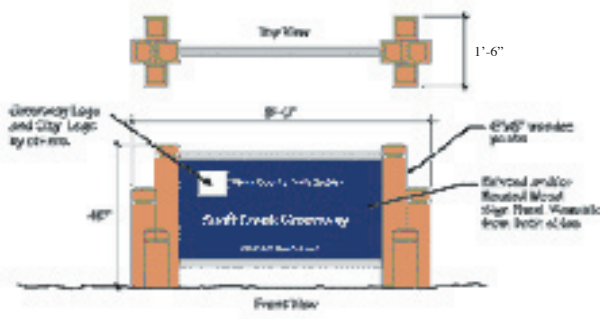




Entry Signage

Proper trail identification at trail terminal point and major intersections is important in the development of a comprehensive trail network. Greenway entry signage may also include mileage to provide users with a reference as to how far he or she has traveled, and the remaining distance to specific destinations.

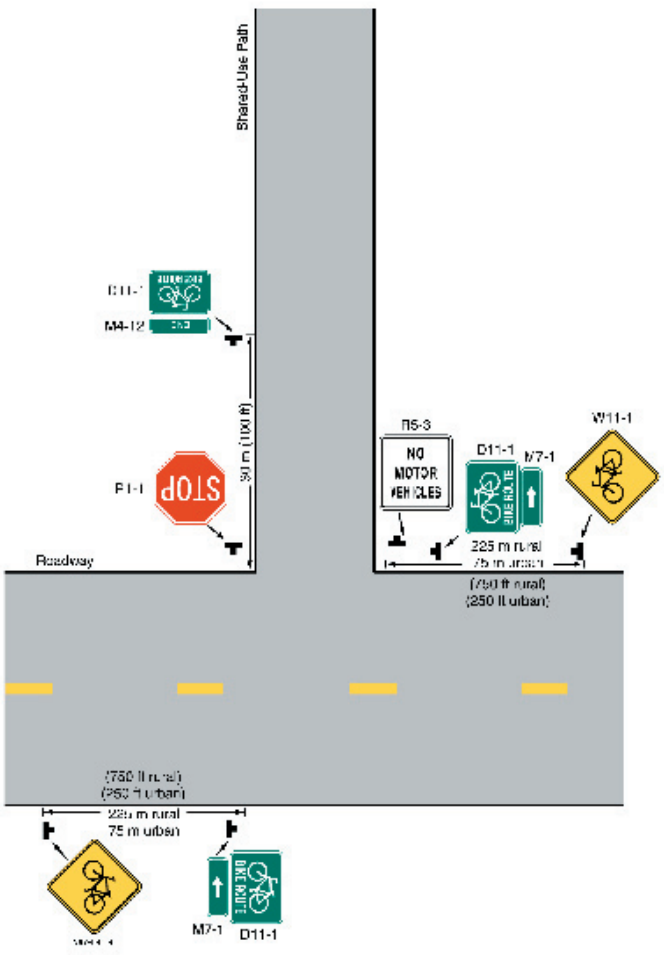




DOT Bike Signage

The US Department of Transportation's Manual on Uniform Traffic control Devices (MUTCD) specifies standard signage for all transportation configurations. Chapter 9 of that document is dedicated to Traffic controls for Bicycle Facilities. The entire document is available online at http://mutcd.fhwa.dot.gov/

It is recommended that this manual be consulted regularly regarding the proper placement of bicycle (and pedestrian) related traffic signage. Below is one example form the document about proper placement of bicycle related signs.



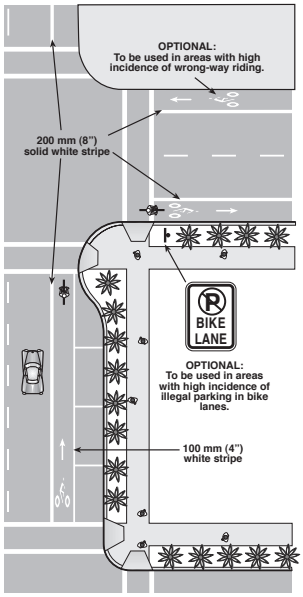
Signage Placement for Bicycle Facilities



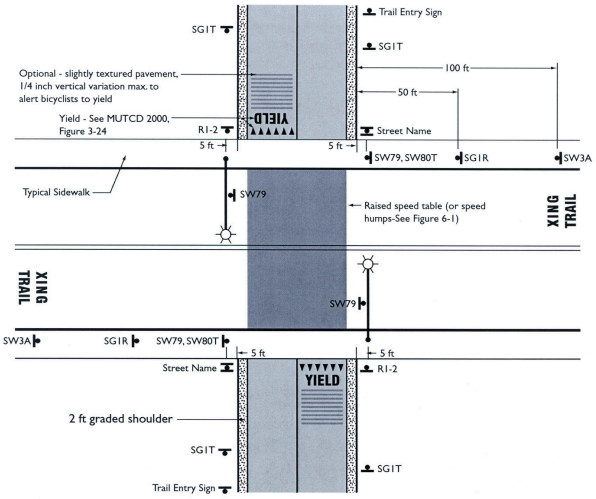


Trail Crossings

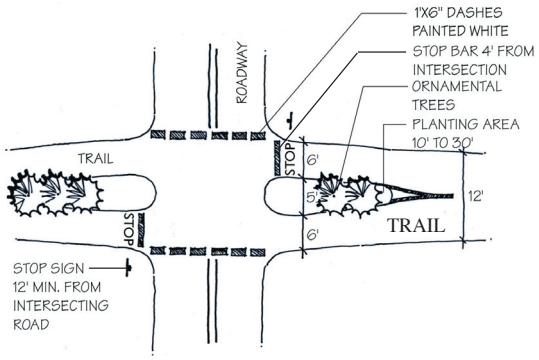
The images below present detailed specifications for the layout of intersections between trail corridors and roadways. Signage rules for these sorts of intersections are available in the MUTCD as well.



Typical Signage Layout for Intersection



Typical Trail Crossing at Local Street (from Contra Costa County Trail Design Guidelines)

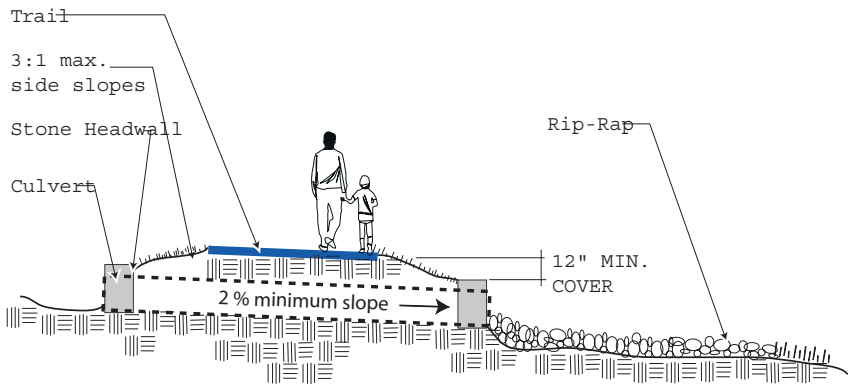


Typical Perpendicular Trail and Road Intersection

Trail Culvert

Proper installation of trail culverts is important to ensure proper stormwater runoff drainage, trail user safety, and longevity of the trail surface. Pipe length, diameter and material specifications will vary depending on specific site needs. Two materials typically used for trail culverts are reinforced concrete pipe (typically required when the trail is within NCDOT Right of Way), and High Density Polyethylene (HDPE) recycled plastic pipe.

Plastic pipes are typically less expensive on a per foot basis. Outlet protection varies per site needs and in some cases a flow spreader may be required at the outlet location. Rock check dams can be placed after the outlet to slow and filter drainage. The graphic below outlines proper installation parameters for greenway trail culverts.



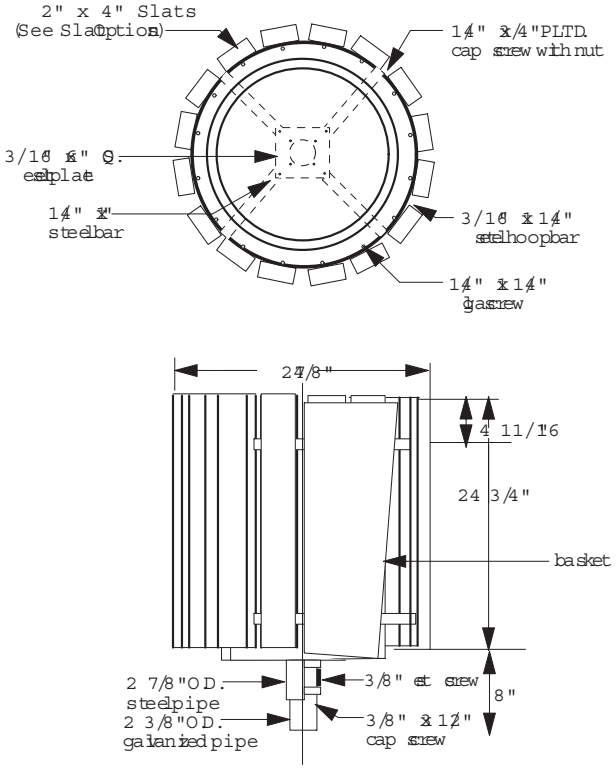
Culvert Placement Cross Section





Trash Receptacles

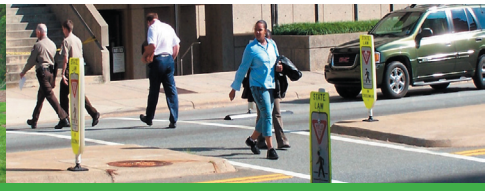
Trash containers can be attractive as well as functional and should be selected based on the amount of trash expected, the overall maintenance program of the trail, and the types of expected users. Trash cans need to be accessible to both trail users and maintenance personnel. At a minimum, 22-gallon or 32-gallon containers should be located at each entranceway and at each bench seating area. They should be set back 3' from the edge of the trail.





Typical Trash Receptacle Detail

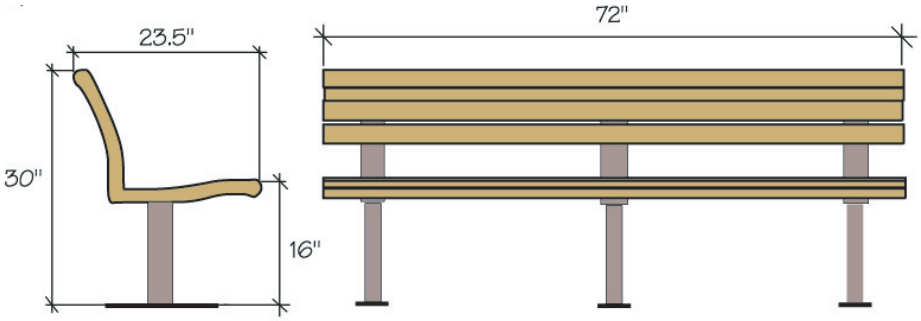




Benches

Benches along trails allow users to rest, congregate or contemplate. Trail benches should comfortably accommodate the average adult. They should be located at the primary and secondary entrances to the trail and at regular intervals, and should be set back 3' from the trail edge.

The graphics below illustrate a bench that can be manufactured using recycled plastic lumber or conventional treated wood lumber. The prefabricated plastic lumber units cost more initially but can save money over the long-term in maintenance and replacement costs.





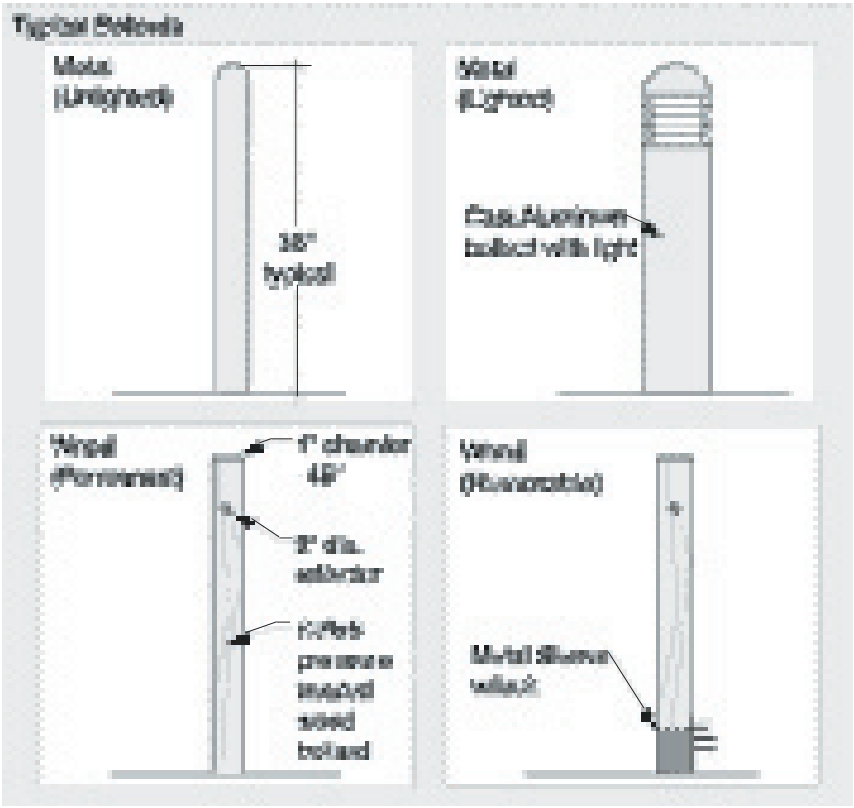






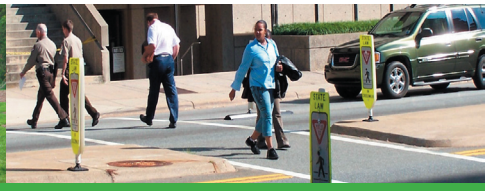
Bollards

Bollards are intended to provide separation between vehicles and trail users. They are available in a variety of shapes, sizes, and colors and come with a variety of features. Lighted bollards are intended to provide visitors with minimum levels of safety and security along trails which are open after dark. Bollards should be chosen according to the specific needs of the site and should be similar in style to the surrounding elements. Typical construction materials for bollards include painted steel or aluminum, with halogen or metal halide lights in weather tight casings. Removable bollards can be installed to provide trail access for emergency and maintenance vehicles.



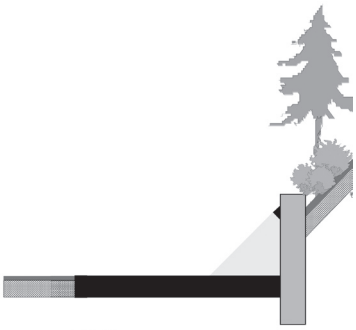
Typical Bollard Details





Trail Lighting

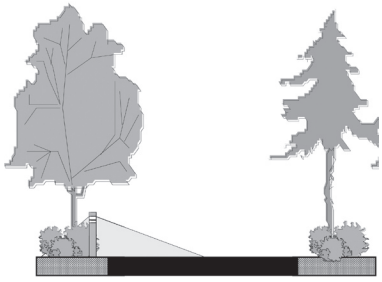
Particularly during winter months when trips to and from work are made in the dark, adequate lighting can make the difference in a person's choice to bicycle or walk. Lighting for multi-use trails should be considered on a case-by-case basis in areas where 24-hour activity is expected, with full consideration of the maintenance commitment lighting requires. Poorly maintained lights can lead to a number of serious safety issues. If lights are installed, they MUST be well maintained.



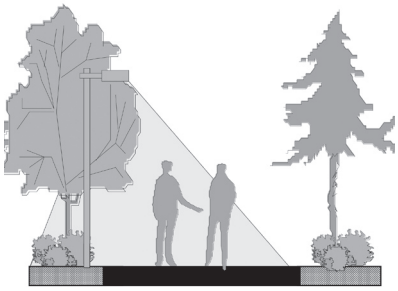
Wall



Up Lighting



Path



Spot Lighting

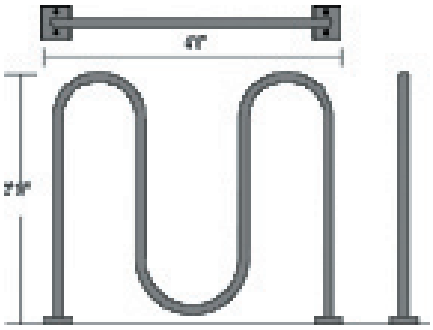




Bike Rack

It is important to choose a bicycle rack design that is simple for cyclists to operate. Bicycle racks should be designed to allow use of a variety of lock types. It may be difficult initially to determine the number of bicycle parking spaces needed. Therefore, bike racks should be situated on-site so that more can be added if bicycle usage increases.

The design shown below has proven popular and effective in numerous communities. It is inexpensive to fabricate locally, easy to install, vandal resistant and works well with popular high-security locks. In addition, it can be installed as a single unit, on a sidewalk, or in quantity, at major recreation nodes.

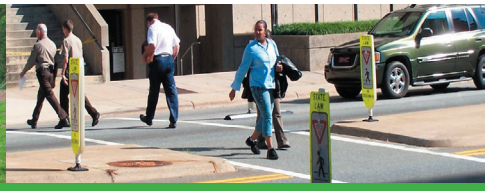




Location Criteria:

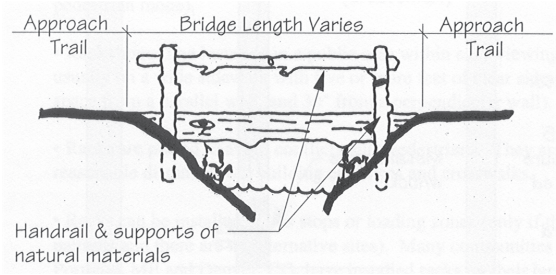
- Racks should be located within 50' of building entrances (where bicyclists would naturally transition into pedestrian mode).
- Racks should be installed in a public area within easy viewing distance from a main pedestrian walkway, usually on a wide sidewalk with five or more feet of clear sidewalk space remaining (a minimum of 24" clear space from a parallel wall and 30" from a perpendicular wall).
- Racks are placed to avoid conflicts with pedestrians. They are usually installed near the curb and at a reasonable distance from the building entrances and crosswalks.
- Racks can be installed at bus stops or at loading zones (only if they do not interfere with boarding or loading patterns and there are no alternatives). Bike racks on busses also facilitate bike-on-transit travel.



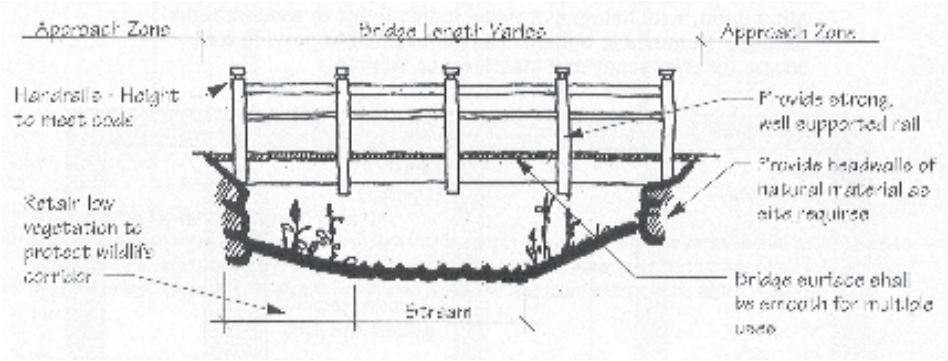


Bridges

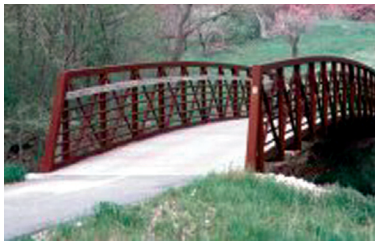
Bridges are an important element of almost any trail project. The type and size of bridges can vary widely depending on the trail type and specific site requirements. Some bridges often used for multi-use trails include suspension bridges, prefabricated span bridges and simple log bridges. When determining a bridge design for multi-use trails, it is important to consider emergency and maintenance vehicle access. Bridges intended for occasional vehicular use must be designed to handle up to 10,000 pound loads safely and be at least 14' wide to allow for vehicle passage.



Foot Bridge



Urban Trail Bridge



Span Bridge



This bridge crosses the Tar River in Rocky Mount, NC

Note: Prefabricated span bridges are ordered directly from the manufacturer. Approximate cost is $100/foot.



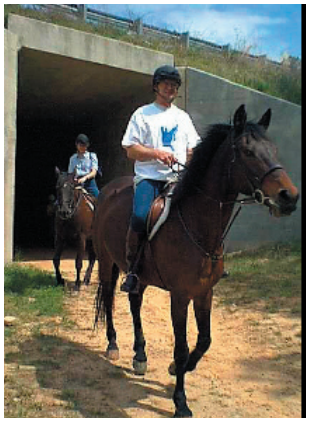


Underpass

Trail underpasses and overpasses can be used to avoid undesirable at-grade intersections of trails and freeways or high volume arterial highways. However, they should be used sparingly in suburban, fringe or rural areas. Underpasses typically utilize existing overhead roadway bridges adjacent to a stream or culverts under the roadway that are large enough to accommodate trail users. There are several key issues that must be addressed in the design of the roadway underpass:

1. The vertical clearance of the underpass must be at least 10 feet
2. The width of the underpass must be at least 12 feet
3. Proper drainage must be established to avoid pooling of stormwater inside the underpass
4. It is recommended that underpasses be lighted for safety

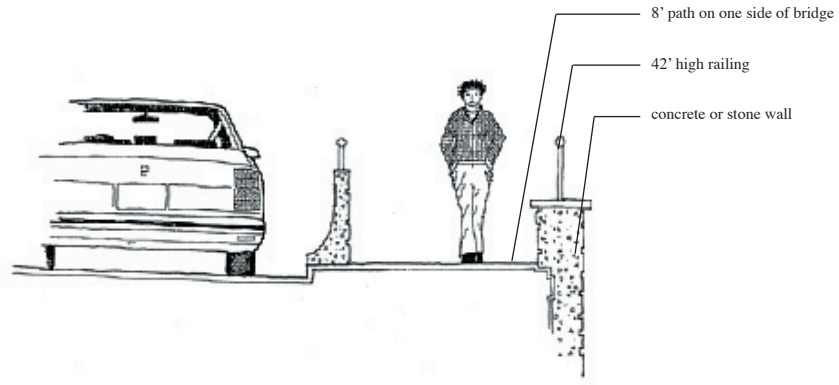


Overpass

Trail overpasses can be used in high traffic volume areas where underpasses are not possible. Overpass options include sidewalks on bridges, freestanding pedestrian/bike bridges or lanes attached to an existing bridge. The American Association of State Highway Transportation Officials (AASHTO) requires that bridges be a minimum of 36" wide, but prefers that they are at least as wide as the trail. Railing is required to be 42" high. A fenced cover, as shown below, provides a safer environment over highways and busy streets. The NCDOT should be referenced for height requirements, which vary depending on the type of road. Ramp specification should meet ADA requirements.

It is important to remember that pedestrians and cyclists will opt not to use an overpass or an underpass if it takes more than twice the time as crossing the street at-grade. For this reason, at-grade fencing might be a better alternative in some instances.



Typical Roadway Bridge with Sidewalk



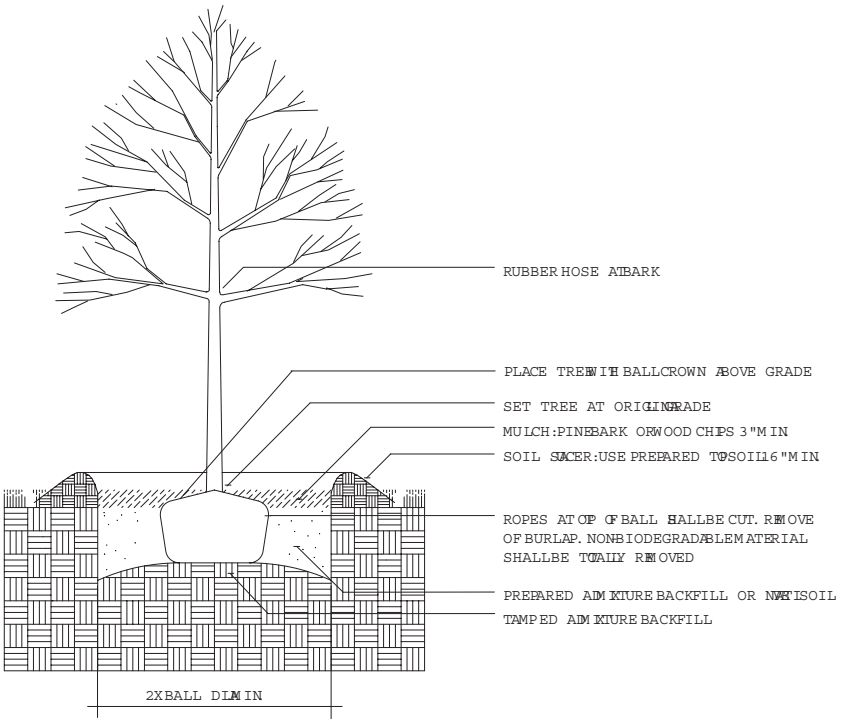




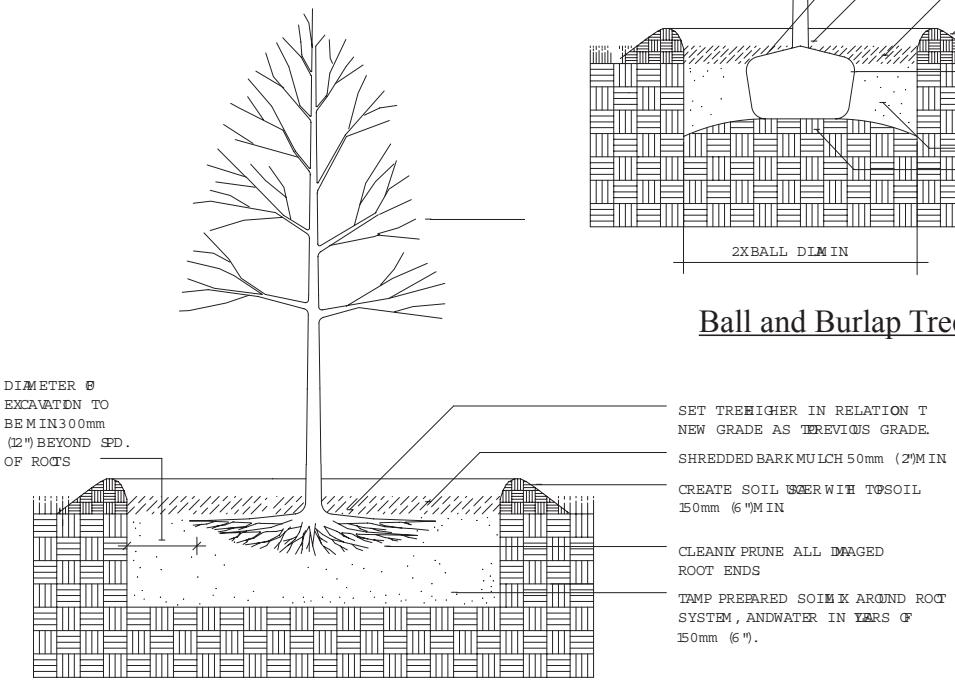


Tree Plantings

Trees are important to greenways and trails for both aesthetic and environmental reasons. Not only do they contribute to the appearance of a trail, their shade cools the environment for trail users and provides habitat for birds and wildlife. Trees also help keep streams healthy by providing shade (which regulates the temperature), filtering pollutants in storm runoff and adding leaf litter to feed small insects and fish. When choosing trees and shrubs for greenway corridors, it is recommended that indigenous and well-adapted species be used. This will reduce the need for chemical and water applications as a part of long term maintenance. The following graphics represent common installation practices used for several different types of plant material.



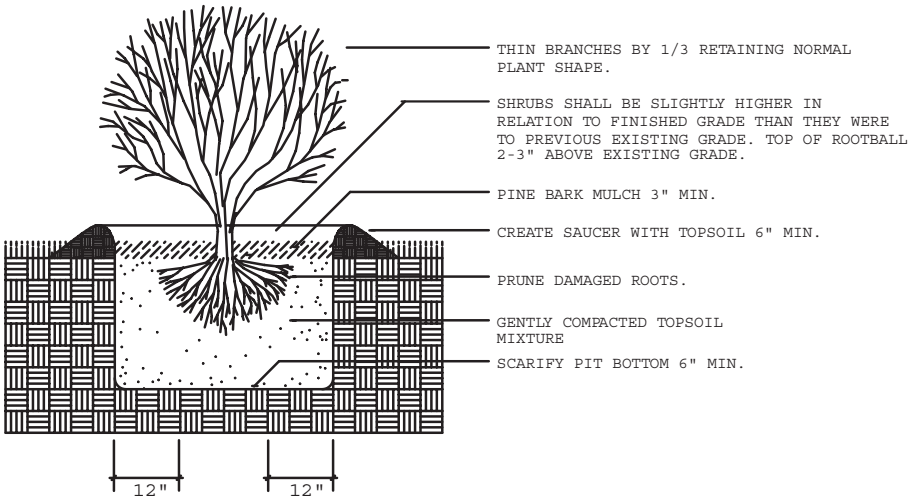
Ball and Burlap Tree Planting Detail



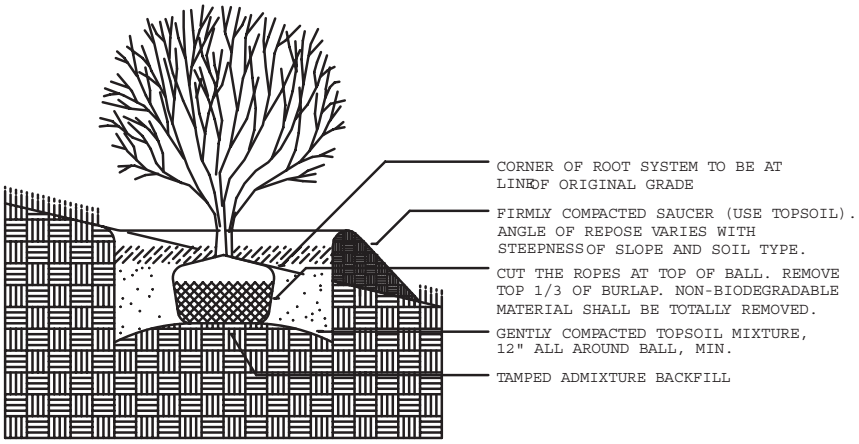
Bare Root Tree Planting Detail

Shrub Plantings

The amount of planting needed will vary depending on the project. While some projects will require little or no planting, others may require it for vegetative screening, habitat restoration, erosion control or aesthetics. The graphics below illustrate planting techniques for two types of shrub material (ball & burlap and bare root).



Bare Root Shrub Planting Detail



Ball and Burlap Shrub Planting Detail

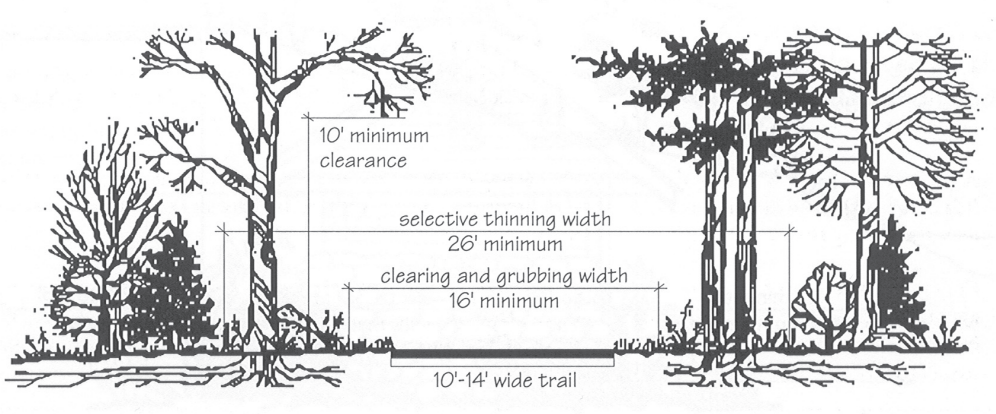




Vegetative Clearing

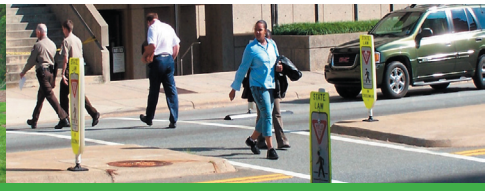
Vegetative clearing refers to the amount of vegetation removal that is required for various levels of trail development. The amount of vegetative clearing required for any one trail will depend on the type of trail being developed. While footpaths or hiking trails require little or no vegetation removal, paved pathways may require significantly more.

Single-tread, multi-use trails are the most common trail type in the nation. These trails vary in width, can accommodate a wide variety of users and are especially popular in urban areas. While the vegetative clearing needed for these trails varies with the width of the trail, the graphic below outlines typical requirements. The minimum width for clearing and grubbing a 14' wide trail is 16'. Selective thinning increases sight lines and distances and enhances the safety of the trail user. This practice includes removal of underbrush and limbs to create open pockets within a forest canopy, but does not include the removal of the forest canopy itself.



Typical Tree Trimming Distances





C2. Sidewalk Considerations

Sidewalks are a critical component of this Plan, especially related to the pedestrian portion. They not only encourage walking, but they also improve the safety of pedestrians. An individual's decision to walk is as much a factor of convenience as it is the perceived quality of the experience. Pedestrian facilities should be designed with the following factors in mind:

Sufficient width

Sidewalks should accommodate anticipated volumes based on adjacent land uses, and should at a minimum allow for two adults to walk abreast (min. 5', prefer 6').

Protection from traffic

High volume and/or high speed (greater than 35 mph) motor vehicle traffic creates dangerous and uncomfortable conditions for pedestrians. Physical (and perceptual) separation can be achieved through a combination of methods: a grassy planting strip with trees, a raised planter, bicycle lanes, on-street parallel parking, etc.

Street trees

Street trees are an essential element in a high quality pedestrian environment. Not only do they provide shade, they also give a sense of enclosure to the sidewalk environment which enhances the pedestrian's sense of a protected environment.

Pedestrian-scaled design

Large highway-scale signage reinforces the general notion that pedestrians are out of place. Signage should be designed to be seen by the pedestrian. Street lighting should likewise be scaled to the level of the pedestrian (14' tall), rather than providing light poles that are more appropriate on high-speed freeways.

Continuity

Pedestrian facilities are often discontinuous, particularly when private developers are not encouraged to link on-site pedestrian facilities to adjacent developments and nearby sidewalks or street corners. New development should be designed to encourage pedestrian access from nearby streets. Existing gaps in the system should be placed on a prioritized list for new sidewalk construction.

Clearances

Vertical clearance above sidewalks for landscaping, trees, signs and similar obstructions should be at least 10'. In commercial areas and the downtown, the vertical clearance for awnings should be 10'. The vertical clearance for building overhangs which cover the majority of the sidewalk should be 12'.

Conformance with national standards

Sidewalk design should be consistent with Americans with Disabilities Act requirements and/or ANSI requirements. Specific guidance is provided by the Architectural and Transportation Barriers Compliance Board's American's with Disabilities Act Accessibility Guidelines.





Sidewalk Obstacles

Street furniture and utility poles create obstacles to pedestrian travel when located directly on the sidewalk. At a minimum, there should be 36" of sidewalk width to allow wheelchairs to pass. Where possible, utilities should be relocated so as not to block the sidewalk. Benches should not be sited directly on the sidewalk, but set back at least 3'. The design of new intersections or re-design of existing intersections presents an opportunity to improve pedestrian circulation. Street furniture located near intersections can block sight lines. In general, the designer should consider the impact on sight distance for all features located in the vicinity of roadway intersections.

Sidewalk pavement design

Sidewalks and roadside pathways should be constructed of a solid, debris-free surface. Regardless of the type of surface chosen, it must be designed to withstand adequate load requirements. Pavement depth should reflect site specific soil conditions but never be less than 4.5." Brick and concrete pavers are popular materials for more decorative sidewalks. The use of stylized surfaces is encouraged, however they must be installed properly or they will deteriorate more rapidly.

Sidewalk width and setback guidelines

It is important to note that there are some areas that warrant wider sidewalks. For example, sidewalks in and around local universities and colleges must accommodate a much higher volume of pedestrians and, therefore, warrant additional width. The recommendations below are based upon standards used by other pedestrian-friendly communities in the U.S. Following the recommendations below ensures that basic needs of pedestrians are addressed in developing areas. In existing residential and commercial areas that lack sidewalks, new sidewalk construction (independent of new development) should occur first in locations that demonstrate the most need.

Sidewalks on local streets in residential areas

Five-foot wide sidewalks are recommended on at least one side of the street, with a 5 feet wide planting strip. The planting strip may need to be slightly wider to accommodate the roots of street trees, if they are included in the design. Sidewalks are not necessary on cul-de-sacs that are less than 500 feet in length.

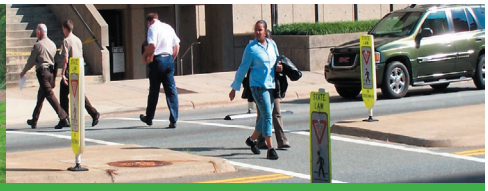
Sidewalks on collector streets in residential and commercial areas

Five-foot wide sidewalks are recommended on both sides of the street. However, one option may be to install a 6 feet wide sidewalk on the side of the street that generates the most activity. A 7 foot wide planting strip is recommended.

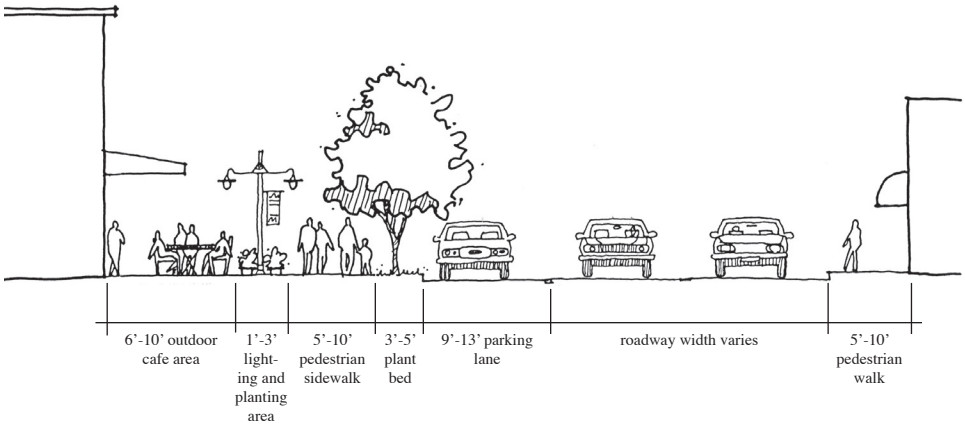
Sidewalks on arterial streets in residential and commercial areas

Six foot sidewalks are recommended on both sides of the street, with an 8’ wide planting strip.

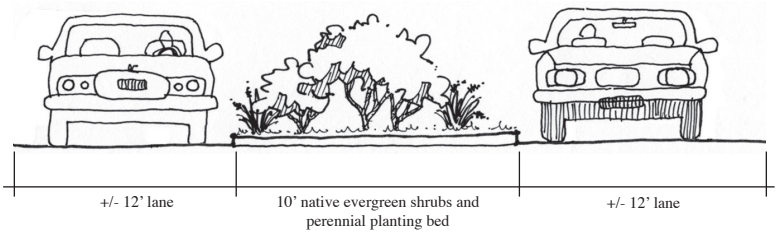




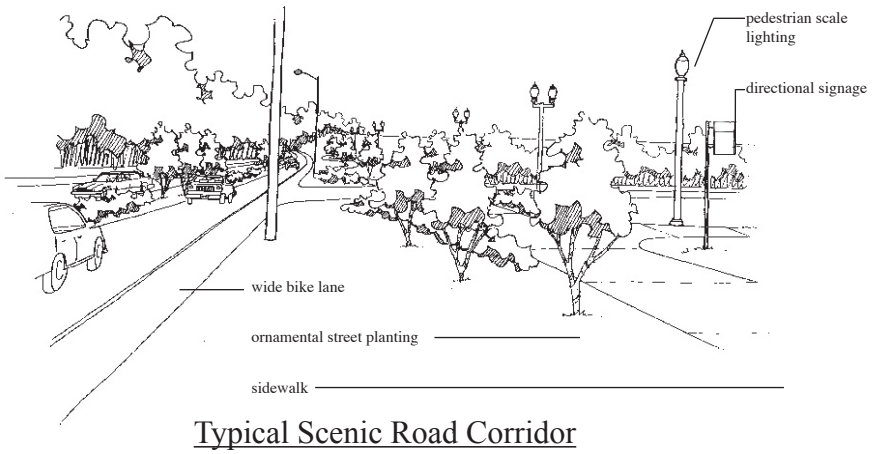
Roadside Treatments



Typical Street Section



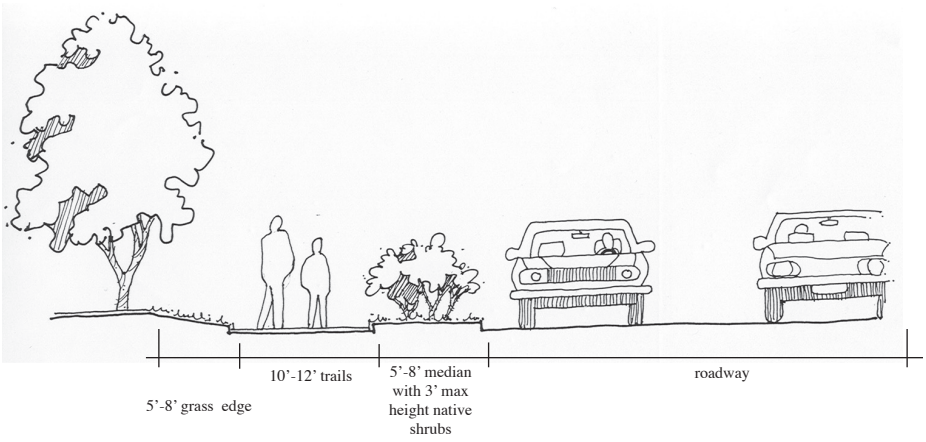
Typical Median Shrub Planting



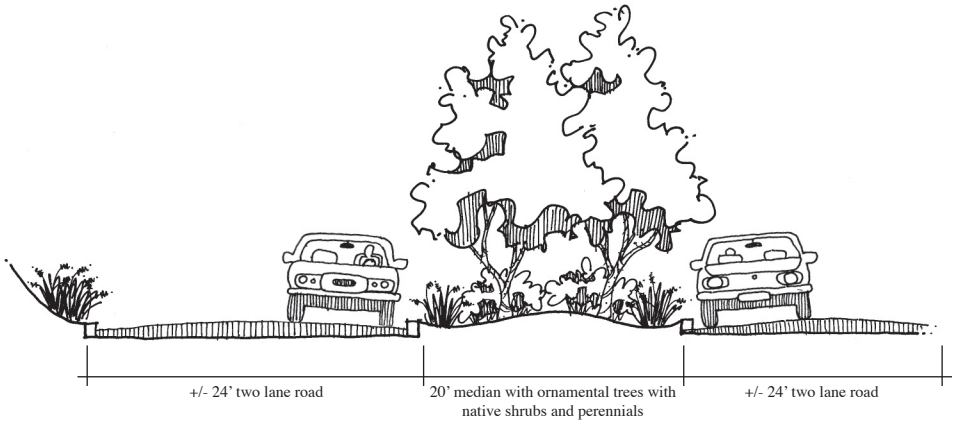
Typical Scenic Road Corridor





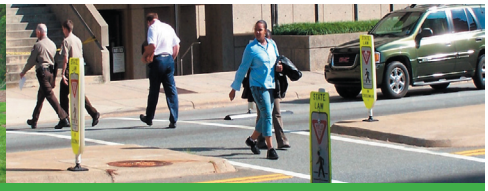


Typical Road with Adjacent Sidewalk



Typical Median Planting





C3. Pedestrian and Bicycle Facility Design Guidance

This section describes the reasoning behind several important pedestrian and bicycle facility design concepts in the Plan. While this part of the appendix does not represent a complete set of pedestrian and bicycle design guidelines, it can be referenced by planners, engineers, and designers looking to provide new and retrofit existing pedestrian and bicycle facilities in the Greensboro Urban Area.

Sidewalks on Both Sides of Roadways
Sidewalks should be provided on both sides of all collector, subcollector, and local streets (with the exception of short cul-de-sacs or dead-end streets, and roadways in areas with rural development (e.g., less than one dwelling unit per 6 acres).

Justification

All streets should have some type of walking space out of the vehicular travelway. When a sidewalk is provided on only one side of the street, pedestrians traveling on the opposite side may not cross to the sidewalk, and may instead elect to walk in the roadway. This creates an uncomfortable and potentially hazardous situation. If pedestrians do cross, they increase their exposure to vehicular traffic. Though it may be appropriate for some streets in developing areas to temporarily have a pedestrian walkway only on one side, sidewalks on both sides are necessary for pedestrian-compatible roadways. A research study of pedestrians' perceptions of walking along different types of roadway segments found that sidewalk presence has a significant positive effect on pedestrians' feelings of safety and security while walking along roadways (1). Further, an analysis of 47 pedestrian crash sites and 94 comparison sites found that the absence of sidewalks was associated with a significantly higher likelihood of pedestrian crashes (2).

Decisions on whether to provide a sidewalk should not be based on existing pedestrian volumes because they are not a reliable indication of pedestrian demand. Individuals tend to walk more in locations where continuous connections are provided. A lack of pedestrian activity in a location with discontinuous sidewalks is not necessarily an indication of a lack of pedestrian demand.

1. Landis, B.W., V.R. Vattikuti, R. M. Ottenberg, D.S. McLeod, M. Guttenplan. "Modeling the Roadside Walking Environment: Pedestrian Level of Service," *Transportation Research Record 1773*, Transportation Research Board, National Academy of Sciences, 2001.

2. McMahon, P.J., C.V. Zegeer, C. Duncan, R.L. Knoblauch, J.R. Stewart, and A.J. Khattak. *An Analysis of Factors Contributing to "Walking Along Roadway" Crashes: Research Study and Guidelines for Sidewalks and Walkways*, Federal Highway Administration, FHWA-RD-01-101, February 2002.

Minimum Sidewalk Width
Sidewalks should have a minimum width of five feet.

Justification





A five-foot sidewalk width is very important, as it enables two people to walk side by side, which is not possible on 4-foot wide sidewalks. Many other jurisdictions have increased their minimum sidewalk width to 5 feet. In addition, new rules that will be issued by the U.S. Access Board in the near future will require that 4-foot sidewalks provide a 5-foot passing area (a wider area where two wheelchairs can pass) every 200 feet. This makes constructing continuous 5-foot sidewalks much more practical than sidewalks of varying width. Additional sidewalk width is particularly important for locations with higher volumes of pedestrian activity, such as near schools, shopping centers, parks, and other pedestrian attractors. In these locations, it would be beneficial to require sidewalks that are 6-feet wide (or wider).

Sidewalk Buffers
The buffer space between the sidewalk and the curb and gutter (or edge of pavement) should be maximized within the available right-of-way.

Justification

Pedestrians feel more comfortable when there is a greater buffer between the sidewalk and the street, particularly when the roadway serves high volumes of traffic. A scientific study of the real-time perceptions of pedestrians walking along roadway segments identified buffer width as a significant factor in a pedestrian's comfort level. The study also showed that on-street parking and street trees also act as buffers between roadway traffic and the sidewalk and increase pedestrian comfort (1).

1. Landis, B.W., V.R. Vattikuti, R. M. Ottenberg, D.S. McLeod, M. Guttenplan. "Modeling the Roadside Walking Environment: Pedestrian Level of Service," *Transportation Research Record 1773*, Transportation Research Board, National Academy of Sciences, 2001.

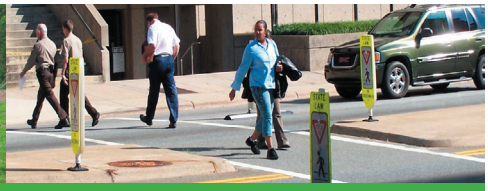
Raised Median Islands
Raised medians or pedestrian refuge islands should be provided, where practical, at crosswalks on streets with more than three lanes, especially on streets with high volumes of traffic. Median widths of 6 to 10 feet are recommended. Medians should be made accessible through the provision of level cut-throughs or curb ramps.

Justification

Raised medians have been shown to significantly reduce the incidence of pedestrian crashes, particularly at multi-lane sites. Medians make it easier for pedestrians to cross the street by reducing the width of roadway that pedestrians must cross at one time. Raised medians may provide a place for landscaping and change the character of the street, possibly reducing the speeds of vehicles. Medians and channelizing islands also reduce the rate of motor vehicle crashes and have particular benefits for older drivers.

Research suggests that raised medians are more effective than painted medians at reducing pedestrian crashes. Zegeer et al. found that raised medians and crossing islands correspond with a significantly lower crash rate on multi-lane roads with both marked and unmarked crosswalks, but that painted medians did not correspond with a reduction in pedestrian crash rates compared with multi-lane roads without medians (1).





Bowman and Vecellio also found that locations with raised medians correspond with lower pedestrian crash frequencies compared to locations on undivided arterial streets (2). Research in Australia described by Peter Cairney found that locations with raised medians had lower pedestrian crash frequencies than locations without, but that narrow medians have higher crash frequencies than wider ones (3).

1. Zegeer, C., Stewart J., Huang, H. and Lagerwey, P. "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations- Executive Summary and Recommended Guidelines." Report No. FWHA-RD-01-075, Federal Highway Administration, Washington, DC, March 2002.

2. Bowman, B.L., and R.L. Vecellio. "Effect of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety. " *Transportation Research Record* 1445 (1994): 169-179.

3. Cairney, Peter. "Pedestrian Safety in Australia." FHWA-RD-99-093. Federal Highway Administration, Washington DC, December 1999.

In-Street Pedestrian Crossing Signs

In-Street Pedestrian crossing signs (*MUTCD* sign R1-6) may be placed in the roadway at crosswalks to remind motorists of their responsibility to yield to pedestrians within the crosswalk. The *MUTCD* specifies that these signs may not be used at signalized locations.

Justification

In-street pedestrian crossing signs often increase the incidence of drivers yielding to pedestrians in the crosswalk by reminding motorists that it is their legal responsibility (1, 2, and 3).

1. City of Madison, Wisconsin Department of Transportation, Traffic Engineering Division, "Year 2 Field Evaluation of Experimental 'In-Street' Yield to Pedestrian Signs," Submitted to FHWA 1999.

2. H.F. Huang, C.V. Zegeer, R. Nassi, and B. Fairfax. "The Effects of Innovative Pedestrian Signs at Unsignalized Locations: A Tale of Three Treatments," FHWA, FHWA-RD-00-098, 2001, available online at: www.tfhrc.gov/safety/pedbike/pubs/00-098.pdf

3. Ercolano, J. "Pedestrian Crossing Devices," Case Study #28 in *PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System,* FHWA, FHWA-SA-04-003, September 2004.

Leading Pedestrian Interval (LPI)—Pedestrian Signal Timing

At signalized intersections with high pedestrian crossing volumes, the signals can be programmed to allow pedestrians to begin crossing 2 to 4 seconds before the vehicle traffic on the parallel street is given a green light.

Justification

This is a low-cost treatment. It gives pedestrians enough time to cross to the middle of the street so that turning





vehicles can see them, be aware of them, and yield to them before they receive a green light. Because the LPI is operated by the traffic signal controller, it is also possible to use the LPI only during certain times of the day, such as between 7 a.m. and 7 p.m., whenever the highest numbers of pedestrians are typically present. A study of a three-second leading pedestrian interval (LPI) found that the LPI decreased conflicts between turning motor vehicles and increased the percentage of motorists that yielded to pedestrians in the crosswalk (1).

Traffic signals with LPI have a longer all red phase, which may tempt drivers to take advantage of the extra time and run red lights. This type of behavior should be prevented through education and strict enforcement (2).

1. Van Houten, R., R. A. Retting, C. M. Farmer, J. Van Houten, and J. E. L. Malenfant. “Field Evaluation of a Leading Pedestrian Interval Signal Phase at Three Urban Intersections,” Transportation Research Record 1734, 2000.
2. Zegeer, C.V., Seiderman, C., Lagerwey, P., Cynecki, M., Ronkin, M. and Schneider, R. Pedestrian Facilities Users Guide: Providing Safety and Mobility, Federal Highway Administration, FHWA-RD-01-102, March 2002.

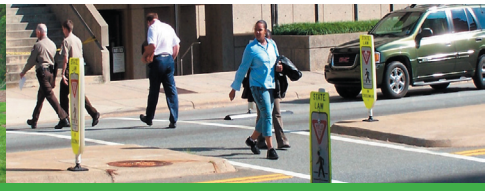
Traffic Calming
Traffic calming is the practice of slowing traffic speeds by reducing the design speed of roadways. This is done by making various physical changes to the roadway, including adding raised median islands, curb extensions, and raised crosswalks; adding chicanes; narrowing travel lanes; etc. Traffic calming is appropriate on neighborhood streets that should have low traffic speeds.

Justification

Numerous studies have shown that traffic calming has many benefits, including reductions in the number and severity of collisions, reductions in vehicular speeds, reductions in noise levels, and improvements in the comfort of pedestrians and bicycles (1, 2, 3, and 4). Since traffic speed is correlated with the severity of pedestrian crashes, the reduction of speeds help improve pedestrian safety. It is estimated that 85% of pedestrians who are struck at 40 mph are killed, 45% at 30 mph, and only 5% at 20 mph (5).

1. Institute of Transportation Engineers, Traffic Calming: State of the Practice, August 1999.
2. Zegeer, C.V., J.Stuart, and H. Huang, Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Crossing Locations, Federal Highway Administration, Washington, DC, 1999.
3. City of Cambridge, MA, Preliminary Results: Effects of Columbia Street Traffic Calming Project on Driver Behavior, April 2000.
4. Zein, S.R., Geddes, E., Memsing, S., Johnson, M., “Safety Benefits of Traffic Calming,” Transportation Research Record, Volume 1578 pp. 3-10, 1997.
5. Ashton, S.J. and Mackay, G.M., “Some characteristics of the population who suffer trauma as pedestrians when hit by cars.” Proceedings of the 4th International IRCOBI Conference on the Biomechanics of Truma, Goeteborg, Sweden, 5-7 September, 1979.





Travel Lane Widths
Roadway travel lane widths should not be excessively wide. Local and collector roadways should generally be striped with 10-foot travel lanes. Arterial roadways should have 10- or 11-foot lanes, depending on traffic volume and use by heavy trucks.

Justification

According to AASHTO's *Guide for Achieving Flexibility in Highway Design* (2004), the normal range of design lane width is between 9 and 12 feet (1). This guide states:

"In urban areas and along rural routes that pass through urban settings, narrower lane widths may be appropriate. For such locations, space is limited and lower speeds may be desired. Narrower lane widths for urban streets lessen pedestrian crossing distances, enable the provision for on-street parking and transit stops, and enable the development of left-turn lanes for safety."

Narrowing existing travel lanes can provide extra space for shoulders and bicycle lanes. In some situations this may also have a desired traffic calming effect, slowing typical motor vehicle traffic by several miles per hour.

According to the AASHTO *Policy On Geometric Design of Highways and Streets* (2004), minor thoroughfares (collector roadways) can be designed with 10-foot motor vehicle travel lanes. Ten-foot travel lanes are already used on several roadways in the Greensboro Metropolitan Area. Wider widths should be considered in rural areas if the roadway has high traffic volumes or speeds and considered in urban areas if the roadway carries a large amount of truck traffic (p. 425, 433).

Major thoroughfares (arterial roadways) are commonly designed with 11-foot travel lanes. However, in urban areas, some major thoroughfares can have narrower lanes. The AASHTO guide states, "Lane widths of 3.0 m [10 ft] may be used in highly restricted areas having little or no truck traffic" (p. 472) (2).

1. American Association of State Highway Transportation Officials. *A Guide for Achieving Flexibility in Highway Design*, 2004. Order from: https://bookstore.transportation.org/publications/bookstore.nsf/Categorized?OpenForm&cat=Design/Operations/Planning
2. American Association of State Highway Transportation Officials. *Policy On Geometric Design of Highways and Streets, Fifth Edition*, 2004. Order from: https://bookstore.transportation.org/publications/bookstore.nsf/Categorized?OpenForm&cat=Design/Operations/Planning

Bicycle Lanes
Bicycle lanes should be provided, where practical, on collector and arterial roadways in Greensboro.

Justification

National research has shown that bicyclists feel more comfortable and motor vehicles give bicyclists more lateral space when a shoulder or bike lane stripe is provided (Landis, et al. 1996; Harkey, et al. 1998; Hunter, et al. 1999; City of Cambridge, MA 2005) (1,2,3,4). Bike lanes help bicyclists navigate through complex





intersections with turn lanes and other features that might otherwise deter bicyclists. This research is supported by policies in the AASHTO Bicycle Guide (1999)(5), which states:

"Bike lanes are intended to delineate the right of way assigned to bicyclists and motorists and to provide for more predictable movements by each. Bike lanes also help to increase the total capacities of highways carrying mixed bicycle and motor vehicle traffic…[Bike lanes may be provided] by reducing the width of vehicular lanes or prohibiting parking…" (p. 8)

1. Landis, Bruce W.; Venkat R. Vattikuti; and Michael T. Brannick. "Real-Time Human Perceptions: Towards a Bicycle Level of Service," *Transportation Research Record 1578*, 1996. Available Online: http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/BLOS_TRBscanned.pdf
2. Harkey, D.L.; D.W. Reinfurt; M. Knuiman; and A. Sorton. *Development of the Bicycle Compatibility Index: A Level of Service Concept: Final Report*, Report No. FHWA-RD-98-072, Federal Highway Administration, Washington, DC, August 1998. Available Online: http://www.hsrc.unc.edu/research/pedbike/98095/.
3. Hunter, William W.; J. Richard Stewart; Jane C. Stutts; Herman H. Huang; and Wayne E. Pein. *A Comparitave Analysis of Bicycle Lanes Versus Wide Curb Lanes: Final Report*, Federal Highway Administration, FHWA-RD-99-034, December 1999. Available Online: http://www.walkinginfo.org/pdf/r&d/widelanes_final.pdf.
4. City of Cambridge, MA. "Safety Benefits of Bike Lanes." Available Online: http://www.cambridgema.gov/~CDD/et/bike/bike_safety.html.
5. American Association of State Highway and Transportation Officials. *Guide for the Development of Bicycle Facilities*, 1999.

Paved Shoulders on Rural Roads

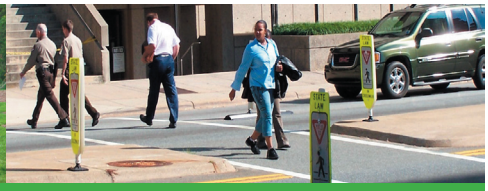
Paved shoulders should be provided on rural roadways with moderate to high traffic volumes in the Greensboro Metropolitan Area. There is no minimum width for paved shoulders, though a width of at least 4 feet is preferred. On many roadways, motor vehicle travel lanes can be narrowed to provide more shoulder space.

Justification

The benefits of paved shoulders to motor vehicle use are well-documented, including reduced numbers of certain crashes, higher capacity potentials, and reduced long-term maintenance costs. Paved shoulder space also improves the safety and comfort of bicyclists. A study of the real-time perceptions of bicyclists riding on a wide variety of roadway segments found that the width of the striped shoulder area had a significant influence on bicyclists' feeling of comfort and safety. Wider shoulders increase the comfort levels of bicyclists riding along roadway segments (1). A similar result was found in a Federal Highway Administration study that asked bicyclists to rate the suitability of different roadways for bicycling from video clips (2). Wider striped shoulders are preferred by bicyclists.

Further, according to the AASHTO Guide for the Development of Bicycle Facilities (1999), "where 4-foot widths cannot be achieved, any additional shoulder width is better than none at all" (3). AASHTO's Guide for Achieving Flexibility in Highway Design (2004) states, "Paving part or all of the shoulder…helps reduce





crash rates…and helps to facilitate use of the road by bicyclists. Shoulder paving also reduces maintenance requirements….Where a 'full width' shoulder cannot be achieved, the designer should strive to provide as wide a shoulder as possible that meets functional requirements" (p. 66) (4). Therefore, paved shoulders provide space for bicyclists and pedestrians, improve safety for motor vehicles, and prevent pavement damage to the travel lanes.

1. Landis, Bruce W. et.al. "Real-Time Human Perceptions: Toward a Bicycle Level of Service," *Transportation Research Record 1578*, Transportation Research Board, Washington, DC 1997.
2. Harkey, D.L., D.W. Reinfurt, M. Knuiman, J.R. Steward, and A. Sorton. *Development of the Bicycle Compatibility Index: A Level of Service Concept*, Federal Highway Administration, FHWA-RD-98-072, December 1998.
3. American Association of State Highway and Transportation Officials. *Guide for the Development of Bicycle Facilities*, 1999.
4. American Association of State Highway and Transportation Officials. *Guide for Achieving Flexibility in Highway Design*, 2004.

Pedestrian and Bicycle Accommodations on Roadway Bridges, Underpasses, and Interchanges
Pedestrians and bicycles should be accommodated on roadway bridges, underpasses, and interchanges in Greensboro. New bridges should be constructed with bicycle lanes and wide sidewalks. Bridge replacement projects on controlled access freeways where pedestrians and bicyclists are prohibited by law will generally *not* include facilities to accommodate bicyclists and pedestrians. In cases, however, where a bridge replacement project on a controlled access freeway impacts a non-controlled access roadway (i.e. a new overpass over an arterial roadway), the project should include the necessary access for pedestrians and bicycles on the non-limited access roadway, including such elements as: paved shoulders, sidewalks, and pedestrian/bicycle crossing improvements to associated ramps and intersections. The following text describes more specifically how bicycles and pedestrians should be accommodated on bridges under different circumstances.

Urban/Suburban Bridges (Closed Section)
On urban and suburban bridge projects, shoulder width should be based on anticipated (20 year) traffic volumes, as identified in Table C(a). In urban locations with higher volumes of pedestrians, the sidewalk width should be based on a level of service analysis, per the Highway Capacity Manual.

Table C(a).

Projected Traffic Volumes (20 Year)	Designated Shoulder width (min)	Sidewalk width (min)
<15,000 ADT	5.5'	5.5'
15,000> ADT	6.5'	7'





Urban/Suburban Bridge (Closed Section) <15,000 ADT

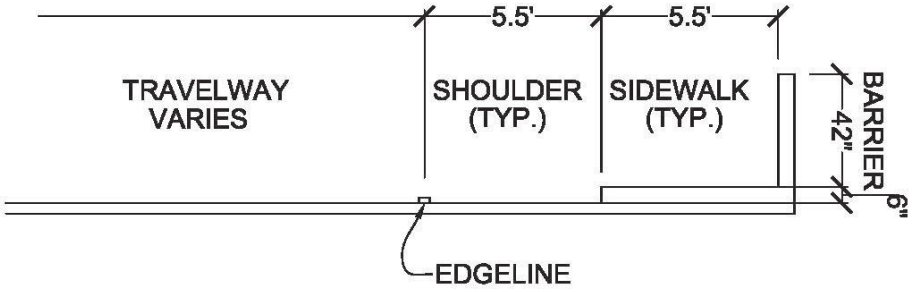


Figure C(a). Urban/Suburban Bridge <15,000 ADT

Urban/Suburban Bridge (Closed Section) >15,000 ADT

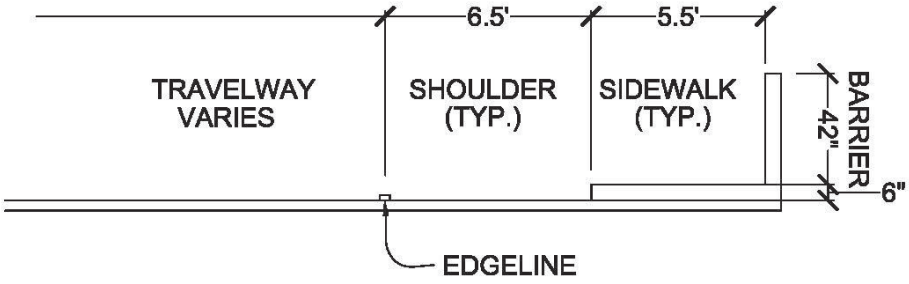


Figure C(a). Urban/Suburban Bridge >15,000 ADT

Locations with Shared Use Pathways

For bridges that have an existing or proposed shared use path approaching one side, the bridge should be constructed with a shared use path on that side, separated from traffic by a concrete barrier. Use of the concrete barrier requires a crash cushion, or should otherwise be designed so that it does not pose a hazard to errant vehicles. The pathway should be a minimum of 12' wide, and should not be less than 10' wide. The barrier between the pathway and the shoulder should be a uni-directional concrete barrier with a height of 42" from the surface of the pathway. The railing on the other side of the pathway is not required to be crashworthy. This railing should be constructed to a height of 48" from the surface of the pathway (See Figure C(c)). Transitions at the bridge approaches should enable access to the pathway on the bridge by bicyclists who may be riding on the paved shoulder rather than on the pathway.

Shared Use Path on Bridge

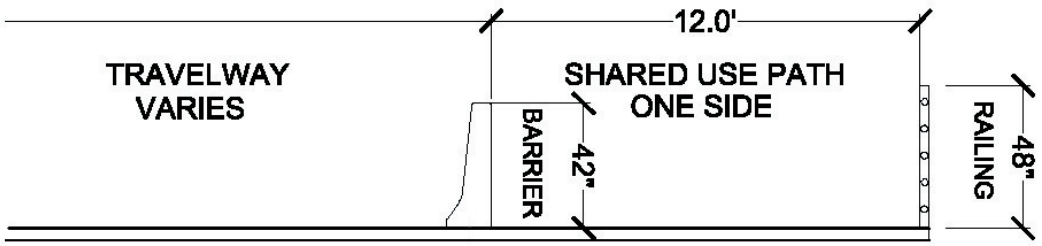


Figure C(c). Shared Use Path on Bridge

Long Bridges
Bridge replacement projects in urban or suburban areas that include one continuous bridge that is over 0.5 mile in length should include a multi-use pathway on one side of the bridge that is separated from traffic with a concrete barrier, designed according to Figure C(c). The provision of a pathway on one side requires that safe crossings (grade separated, if necessary) be provided on each end of the bridge so as to allow access to the other side of the road.

Bridges with a continuous length between.25 and .5 miles may either include a multi-use pathway on one side as defined above, or may follow the guidelines for urban/suburban bridges. The determination of the appropriate treatment should be based on the following factors:

- land uses and destinations: in an urban area with destinations in close proximity to the bridge on both sides of the road, pedestrians need access on both sides of the bridge
- cost: the cost of providing sidewalks on both sides of the bridge should be weighed against the cost of providing safe crossings (grade separated, if necessary) on either end of the bridge to enable pedestrians and bicyclists to access the other side of the road.

Rural Roads (Open Section)
The following guidelines apply to bridge replacement projects on rural roadways with open sections. These bridges should be constructed with 10' wide shoulders on both sides.

Roadway shoulder improvements associated with bridge replacement projects should include 4' wide (minimum) paved shoulders for bicycle use.

Pedestrians who occasionally use rural bridges will share the shoulder space with bicycles – sidewalks generally are not required on rural bridges. However, on bridge replacement projects that are near points of community development such as schools, shopping centers, local businesses, tourism attractions, or other land uses that result in pedestrian concentrations along the highway, a curb and sidewalk cross section should be used.





Rural Road (Shoulder Section)

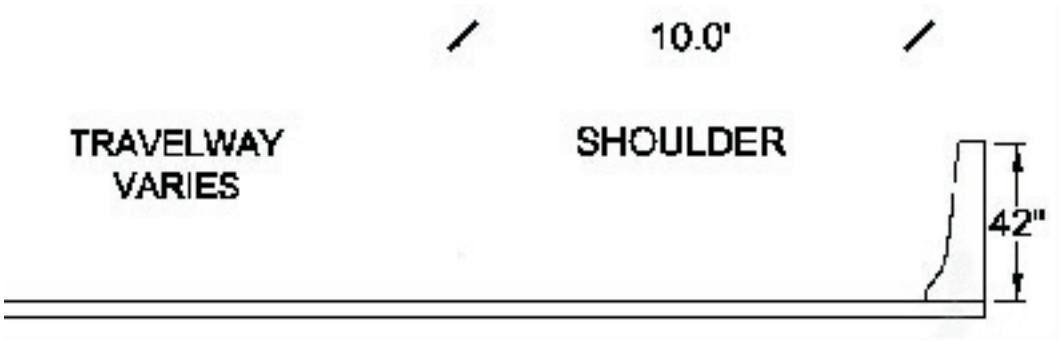


Figure C(d). Rural road (shoulder section).

Justification

The current Federal law for pedestrian and bicycle accommodation on bridges was established in the Transportation Equity Act for the 21st Century (TEA-21) and re-affirmed by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This law states:

"In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations." (23 U.S.C. Section 217)

In the case of controlled access freeway projects that impact non-controlled access roadways, it is important to include necessary access for pedestrians and bicycles on the non-limited access roadway. If this access is not provided, pedestrians and bicyclists might lose access to important destinations.

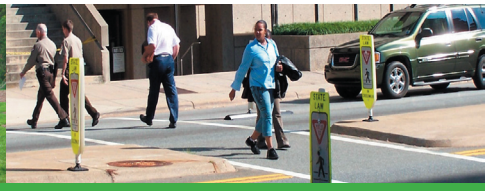
Shared Lane Pavement Markings

The Greensboro MPO should use shared roadway pavement markings as an experimental treatment in appropriate locations in Greensboro. Shared roadway pavement markings include the bicycle symbol and directional arrows on the pavement surface.

Justification

Shared lane pavement markings can be used on roadways where there is not enough space to provide standard, 5-foot-wide bike lanes. They can be used to mark bike routes, show the proper direction for cycling on the road and provide a visual cue that bikes are welcome on the road. These markings are particularly useful for connecting gaps between other bicycle facilities, such as bike lanes. Because they do not require as





much paint, these markings are also less expensive than bike lanes. These markings have already been used in cities such as Denver, CO, Gainesville, FL, Chicago, IL, and San Francisco, CA and are currently under consideration for inclusion in the *MUTCD*.

Road Diets

On multilane roadways with excess existing and future traffic capacity, underutilized roadway travel lanes should be removed. This right-of-way space should be used for bicycle and pedestrian facilities. The term "road diet" refers to re-allocating roadway space used as travel lanes to some other purpose, such as bicycle lanes, sidewalks, on-street parking, etc. One type of "road diet" refers to changing a four-lane, undivided roadway cross section into a cross section with one through-lane in each direction, a two-way left-turn lane, and bicycle lanes.

Justification

This type of treatment can improve (or at least maintain) traffic flow because it removes left-turning traffic from the inside travel lane. While the feasibility of the treatment depends on traffic volume, studies have shown that it does not reduce the capacity of roadways with ADT counts of up to 20,000 vehicles per day (1, 2). This type of conversion also has proven benefits in terms of pedestrian, bicycle, and motor vehicle safety (1, 2, and 3). Pedestrians who are crossing the street would have less motor vehicle lane distance to cross, and median refuge islands can be constructed in the center-turn lane area at appropriate crossing locations.

1. Huang, H.F., Stewart, J.R., and Zegeer, C.V. "Evaluation of lane reduction "road diet" measures on crashes and injuries", Transportation Research Record, No. 1784, TRB, National Research Council, Washington, D.C., pp. 80-90, 2002.
2. Huang, H.F., Stewart, J.R., and Zegeer, C.V. "Evaluation of Lane Reduction "Road Diet" Measures and Their Effects on Crashes and Injuries," Highway Safety Information System (HSIS) Summary, Publication HSIS FHWA-HRT-04-082, http://www.hsisinfo.org/pdf/04-082.htm, 2004. Accessed December 2005.
3. Pawlovich, M., W. Li, A. Carriquiry, and T. Welch. "Iowa's Experience with 'Road Diet' Measures: Impacts on Crash Frequencies and Crash Rates Assessed Following a Bayesian Approach", Submitted for review to Transportation Research Record, http://www.dot.state.ia.us/crashanalysis/pdfs/trb_roaddiet_papersubmission_08012005.pdf. Accessed December 2005.

Issues to Consider for Signed Bicycle Routes

A bicycle route is a bikeway or system of bikeways (roadways, bicycle lanes, shoulders or pathways) that is designated with appropriate directional and informational route markers. Bicycle routes can serve recreational, commuting and neighborhood trips. The reason for designating a bicycle route is to provide guidance, connection and continuity.

Justification

Signing of shared roadways indicates to cyclists that there are particular advantages to using these routes compared to alternate routes between the same places. This means that the responsible agencies have taken





action to ensure that these routes are suitable as shared routes and will be maintained as such.

There are several reasons for designating signed bicycle routes:

a) The route provides connectivity to other bicycle facilities such as bicycle lanes and shared use paths.

b) The route extends along a series of minor streets that
   -- would be difficult to follow without signs,
   -- provide a relatively direct through route between major destinations, or
   -- lead to an internal neighborhood destination such as a park, school, trail access point or commercial district, that would be hard to find otherwise.

c) The route is preferred among other potential routes between major destinations; it may include specific improvements made to enhance bicycle safety and convenience, or may have conditions more favorable to bicycling.

d) In rural areas, the route is preferred for bicycling due to low motor vehicle traffic volumes, high scenic and destination values and/or the presence of a paved shoulder.

Routes that meet any of these criteria should be evaluated to determine if the conditions along the route are adequate for bicycling. If the route is determined to be suitable, bicycle route signs can be installed along the route. Typically, a bicycle route should be a minimum of 1 mile in length unless it serves as a short neighborhood connecter.

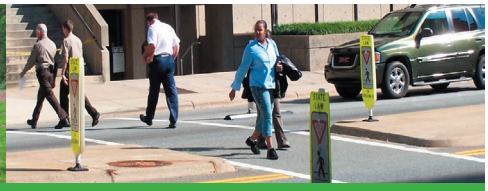
Issues to Consider for Pedestrian and Bicycle Overpasses and Underpasses

Overpasses and underpasses are sometimes necessary to facilitate pedestrian and bicycle crossings, although at-grade crossings are preferable in most situations.

Justification

Pedestrians and bicyclists can rarely be convinced to use a poorly-located crossing and as a result, convenience is essential in designing overpasses and underpasses. Grade-separated crossings should be provided within the normal path of pedestrians and bicyclists wherever possible. Topography should be a major consideration in determining whether an underpass or overpass is appropriate. If the crossing requires pedestrians to use switchback ramps and cover considerably more distance (at a significant up-grade or down-grade) than the at-grade crossing, it may be more advantageous to improve the at-grade crossing instead, depending upon traffic conditions. The best overpasses and underpasses are those that take advantage of the existing topography to make a direct and efficient crossing that eliminates conflicts between pedestrians and vehicular traffic. Grade separated facilities that take advantage of surrounding topography also tend to be less expensive to construct.





Draft Transportation-Air Quality Conformity Analysis for the Amended Plan Bay Area and the 2019 Transportation Improvement Program

Draft: June 6, 2018

June 2018

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I. Introduction

The Metropolitan Transportation Commission (MTC) prepares a transportation-air quality conformity analysis ("conformity analysis") when it amends or updates its Regional Transportation Plan (RTP), and/or updates its Transportation Improvement Program (TIP), or adds or deletes regionally significant, non-exempt projects into the TIP.

The purpose of this conformity analysis is to reconform the Amended RTP ("Plan Bay Area 2040") and to conform the 2019 TIP in accordance with the latest U.S. Environmental Protection Agency (EPA) transportation conformity regulations and the Bay Area Conformity State Implementation Plan (Conformity SIP), which is also known as the Bay Area Air Quality Conformity Protocol (MTC Resolution No. 3757). This conformity analysis addresses the 2008 national ambient air quality standard (NAAQS) for 8-hour ozone, the 8-hour national carbon monoxide standard, and the 2006 national 24-hour fine particulate matter ($PM_{2.5}$) standard.

This report explains the basis for the conformity analysis and provides the results used by MTC to make a positive conformity finding for the Amended Plan Bay Area 2040 and the 2019 TIP.

Purpose of Conformity Analysis

The Federal Clean Air Act, as amended in 1990 (CAAA) outlines requirements for ensuring that federal transportation plans, programs, and projects are consistent with ("conform to") the purpose of the SIP. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant national ambient air quality standards. A conformity finding demonstrates that the total emissions projected for a transportation plan ("RTP") or program ("TIP") are within the emissions limits ("budgets") established by the SIP, and that transportation control measures (TCMs) are implemented in a timely fashion.

Conformity requirements apply in all non-attainment and maintenance areas for transportation-related criteria pollutants and related precursor emissions. For the Bay Area, the criteria pollutants to be addressed are ground-level ozone, carbon monoxide, and PM2.5; and the precursor pollutants to be addressed include volatile organic compounds (VOC) and oxides of nitrogen (NOX) for ozone and for PM2.5. EPA's most recent revisions to its transportation conformity regulations to implement the 1990 Federal Clean Air Act section 176 were published in the Federal Register on March 14, 2012[1].

Metropolitan Planning Organizations (MPOs) such as MTC are required to follow these regulations, and any other procedures and criteria contained in the EPA-approved Conformity SIP (Transportation-Air Quality Conformity Protocol) for the Bay Area. In the Bay Area, procedures were first adopted in September 1994 to comply with the 1990 CAAA. Four subsequent amendments to the transportation conformity procedures in August 1995, November 1995, August 1997, and July 2006 have been adopted by the three co-lead agencies (MTC, Association of Bay Area Governments (ABAG), and Bay Area Air Quality Management District (BAAQMD)). MTC Resolution 3757 represents the latest San Francisco Bay Area Transportation-Air Quality Conformity Protocol adopted by the three agencies in July 2006. Acting on behalf of the three agencies, the BAAQMD submitted this latest Protocol to California Air Resources Board (CARB) as a revision to the Bay Area Conformity SIP. CARB approved this proposed revision to the

[1] The current version of the regulations is available on EPA's Transportation Conformity website at https://www.epa.gov/state-and-local-transportation/current-law-regulations-and-guidance-state-and-local-transportation

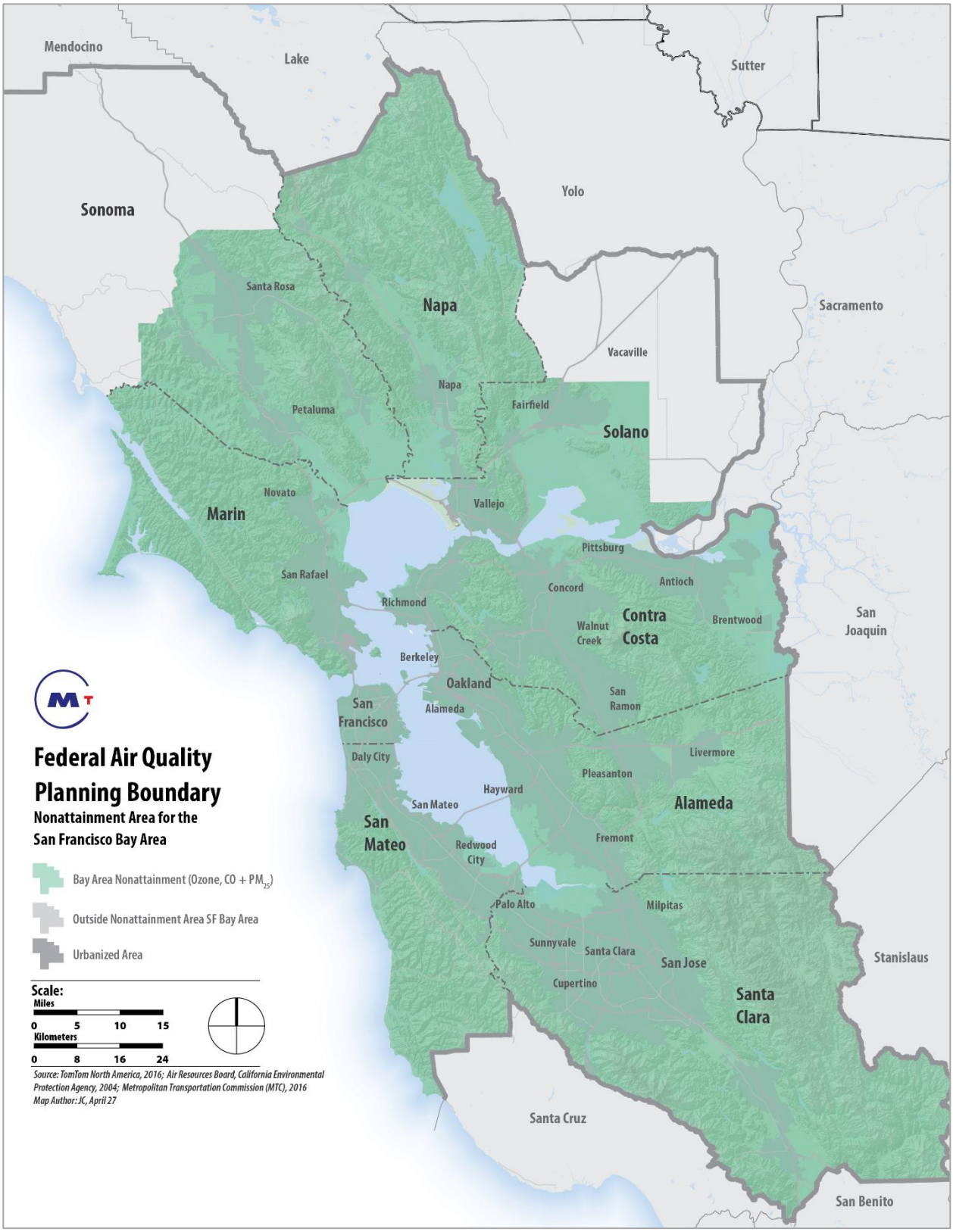

Figure 1: Map of the Non-Attainment Area for the San Francisco Bay Area

Bay Area's Conformity SIP in December 2006 and transmitted it to EPA for final action. EPA approved the Bay Area Conformity SIP in December 2007 (40 CFR Part 52).

These regulations and resolutions state in part that, MTC cannot approve any transportation plan, program, or project unless these activities conform to the purpose of the federal air quality plan. "Transportation plan" refers to the RTP. "Program" refers to the TIP, which is a financially realistic set of highway and transit projects to be funded over the next four years. A "transportation project" is any highway or transit improvement, which is included in the RTP and TIP and requires funding or approval from the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA). Conformity regulations also affect regionally significant non-federally funded projects which must be included in a conforming transportation plan ("RTP") and program ("TIP").

Status of Regional Transportation Plan

A regional transportation plan, or RTP, is a plan which includes both long-range and short-range strategies and actions that lead to the development of an integrated multimodal transportation system to facilitate the safe and efficient movement of people and goods in addressing current and future transportation demand. State law requires that RTP's include a Sustainable Communities Strategy (SCS) to identify a forecasted land use development pattern that when integrated with the future transportation system will meet the region's greenhouse gas reduction target set by CARB. As required by federal and state planning regulations, the RTP covers a minimum planning horizon of 20 years and is updated every four years in areas which do not meet federal air quality standards ("non-attainment"). The RTP is financially constrained to ensure project costs do not exceed regionally expected transportation revenues over the planning horizon. Once adopted, the RTP guides the development of the TIP for the region.

The San Francisco Bay Area's RTP/SCS is called Plan Bay Area 2040 ("the Plan"), was originally adopted in July 2017, and is an update to Plan Bay Area (2013). Plan Bay Area 2040 represents a strategic investment strategy to maintain existing transportation infrastructure, service, and system performance for Bay Area travelers through horizon year 2040. It includes a regional transportation investment strategy and subsequent list of highway, transit, local roadway, bicycle, and pedestrian projects identified through regional and local transportation planning processes. In addition, Plan Bay Area 2040 includes a focused growth land use pattern designed to reduce passenger vehicle travel in an effort to meet the region's greenhouse gas reduction target set by CARB.

Starting with the current state of the region, Plan Bay Area 2040 describes its goals, a proposed growth pattern and supporting transportation investment strategy, and key actions needed to address ongoing and long-term regional challenges. The Plan also includes supplemental reports for additional details. These documents and the adopted Plan can be found at http://2040.planbayarea.org/reports.

In March 2018, MTC and ABAG amended Plan Bay Area 2040 to modify the scope and project cost of the U.S. Highway 101 Managed Lanes Project in San Mateo County (RTPID 17-06-0007). The amendment updated the cost, clarified the project description, and modified lane configuration assumptions along the U.S. Highway 101 corridor to accommodate an Express Lane. In addition, the amendment increased the total project cost to $534 million. The Commission approved the Transportation-Air Quality Conformity Analysis for Amended Plan Bay Area 2040 and Amended 2017 Transportation Improvement Program on March 28, 2018 (MTC Resolution No. 4325). The FHWA and FTA approved MTC's conformity determination for the Amended Plan Bay Area 2040 and the Amended 2017 TIP on May 17, 2018.

This conformity analysis will serve to demonstrate that the Amended Plan Bay Area 2040 conforms to the SIP. Refer to Appendix B for a detailed list of projects included in the Amended Plan Bay Area 2040.

Status of Transportation Improvement Program

The federally required transportation improvement program, or TIP, is a comprehensive listing of surface transportation projects for the San Francisco Bay Area that receive federal funds, are subject to a federally required action, or are regionally significant. MTC, as the federally designated MPO, prepares and adopts the TIP at least once every four years. The TIP covers a four-year period and must be financially constrained by year, meaning that the amount of dollars committed to the projects (also referred as "programmed") must not exceed the amount of dollars estimated to be available. Adoption of the TIP must be accompanied by an air quality conformity analysis and finding, and all projects included in the TIP must be derived from and/or be consistent with the RTP.

The 2019 TIP contains approximately 800 projects totaling about $13.2 billion over the four-year period from fiscal year 2019-20 to 2021-22. This conformity analysis serves to conform the Draft 2019 TIP and Amended Plan Bay Area 2040.

Refer to Appendix A1 for a detailed listing of projects/programs in the Draft 2019 TIP. Note that specific funding sources are identified in the TIP itself. Appendix A2 list the projects in the Draft 2019 TIP with updated conformity analysis years.

II. Bay Area Air Pollutant Designations

National 1-Hour Ozone Standard

The Bay Area was initially designated as nonattainment for ozone on March 3, 1978. On November 6, 1991, the EPA designated the Bay Area as a moderate ozone non-attainment area. Based on "clean" air monitoring data from 1990 to 1992, the co-lead agencies—BAAQMD, MTC, and ABAG— determined that the Bay Area was attaining the 1-hour ozone standard and requested that CARB forward a re-designation request and an ozone maintenance plan to EPA.

On May 25, 1995, after evaluating 1990-1992 monitoring data and determining that the Bay Area had continued to attain the standard, the EPA re-designated the Bay Area as an ozone maintenance area. Shortly thereafter, the area began violating the standard again and on July 10, 1998, the EPA published a Notice of Final Rulemaking re-designating the Bay Area back to an ozone non-attainment area. This action became effective on August 10, 1998.

The re-designation to nonattainment triggered an obligation for the State to submit a SIP revision designed to provide for attainment of the 1-hour ozone NAAQS by November 15, 2000. This revision (the San Francisco Bay Area Ozone Attainment Plan for the 1-hour National Ozone Standard – June 1999 or "1999 Plan") was partially approved and partially disapproved by EPA on September 20, 2001 in conjunction with a determination that the area had failed to attain by the November 2000 deadline. The attainment demonstration and its associated motor vehicle emissions budgets were among the plan elements that were disapproved.

As a result of the EPA's finding of failure to attain and partial disapproval of the 1999 Plan, the State was required to submit a SIP revision for the Bay Area to EPA by September 20, 2002 that included an

updated volatile organic compounds (VOC) and nitrogen oxides (NOX) emissions inventory, new transportation conformity budgets, and provided for attainment of the 1-hour ozone standard no later than September 20, 2006. On November 1, 2001, CARB approved the San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard (2001 Plan) as a revision to the SIP. The BAAQMD and its co-lead agencies, (MTC and ABAG) adopted the 2001 Plan on October 26, 2001.

The 2001 Plan contains a control strategy with seven stationary source measures, five transportation control measures (TCMs), and eleven further-study measures. In the 2001 Plan, the District also committed to strengthening the then existing Smog Check program by requesting the State Bureau of Automotive Repair to implement two VOC-reducing program elements. The new measures and on-going programs will provide 271 tons per day of combined VOC and NOx emission reductions between 2000 and 2006. The 2001 Plan also included an attainment assessment based on Bay Area data.

On November 30, 2001, ARB submitted the 2001 Plan, which included VOC and NOx motor vehicle emissions budgets (164.0 tons per day (tpd) and 270.3 tpd, respectively) for the 2006 attainment year, to EPA for approval as a revision to the California SIP. To support the on-road motor vehicle emission inventory and transportation conformity budgets in the Plan, CARB also transmitted the San Francisco Bay Area-EMFAC2000 model to EPA for approval for the Bay Area ozone non-attainment area. On February 14, 2002, the EPA found the motor vehicle emissions budgets in the 2001 Plan adequate for transportation conformity purposes, based on its preliminary determination that the plan provided for timely attainment of the 1-hour ozone standard.

On April 22, 2004, based on air quality monitoring data from the 2001, 2002, and 2003 ozone season, EPA determined that Bay Area had attained the national 1-hour ozone standard. s. Because of this determination, requirements for some of the elements of the 2001 Ozone Attainment Plan, submitted to EPA to demonstrate attainment of the 1-hour standard, were suspended. The determination of attainment did not mean the Bay Area had been re-designated as an attainment area for the 1-hour standard. To be re-designated, the region would have had to submit a formal re-designation request to EPA, along with a maintenance plan showing how the region would continue to attain the standard for ten years. However, this re-designation request was no longer necessary upon the establishment of the new national 8-hour ozone standard.

National 8-Hour Ozone Standard

In July 1997, EPA revised the ozone standard, setting it to 80 parts per billion (ppb) in concentration-based specifically on the 3-year average of the annual 4th highest daily maximum 8-hour ozone concentrations. In April 2004, EPA issued final designations for attainment and non-attainment areas. In June 2004, EPA formally designated the Bay Area as a non-attainment area for national 8-hour ozone and classified the region as “marginal” based on five classes of non-attainment areas for ozone, ranging from marginal to extreme.

In March 2008, EPA lowered the national 8-hour ozone standard from 80 ppb to 75 ppb. On March 12, 2009, CARB submitted its recommendations for area designations for the revised national 8-hour ozone standard. These recommendations were based on ozone air quality data collected during 2006 through 2008. The CARB recommended that the Bay Area be designated as non-attainment for the national 8-hour ozone standard. EPA had one year to review the recommendations and were to notify states by November 12, 2009, if they planned to modify the state-recommended areas. EPA issued final designations by March 12, 2010, based on more up to date monitoring data.

On October 1, 2015, EPA strengthened the NAAQS for ground-level ozone to 70 ppb, based on extensive scientific evidence about ozone's effects on public health and welfare. The updated standards will improve public health protection, particularly for at-risk groups including children, older adults, people of all ages who have lung diseases such as asthma, and people who are active outdoors, especially outdoor workers. They also will improve the health of trees, plants and ecosystems.

Proposed implementation rule for the 2015 ozone standard was published November 17, 2016 (81 FR 81276) and proposed a framework for nonattainment area classifications and SIP requirements. In addition, the proposed rule follows the approach adopted for the previous Classifications Rule and SIP Requirements Rule (SRR) for the 2008 ozone NAAQS.

In September 2016, CARB recommended to EPA that the San Francisco Bay Area be in nonattainment for the 70 ppb 2015 ozone NAAQS. EPA concurred with CARB's recommendation and on April 30, 2018, EPA completed area designations for most of the United States (including the San Francisco Bay Area). These final designations will take effect 60 days after the notice is published in the *Federal Register*.

In addition, because marginal 8-hour ozone areas are not required to submit an attainment demonstration SIPs (containing on-road motor vehicle emission budgets required to demonstrate conformity), the conformity finding in this report is based on the approved 1-hour ozone on-road motor vehicle emission budgets contained in the Bay Area's 2001 Plan.

National $PM_{2.5}$ Standard

In 1987, The EPA established a standard for particle pollution equal to or smaller than 10 micrometers in diameter. A decade later, the 1997 revision to the standard set the stage for change, when a separate standard was set for fine particulate matter (particles that are 2.5 micrometers in diameter and smaller). Citing the link between serious health problems and premature death in people with heart or lung disease, the 1997 revision ultimately distinguished and set forth regulation on particle pollutants known as particulate matter 2.5 ($PM_{2.5}$) and particulate matter 10 (PM_{10}). Based on air quality monitoring data, the Bay Area was found to be attaining the 1997 $PM_{2.5}$ standards.

In 2006, the EPA revised the air quality standards for particle pollution. The 24-hour $PM_{2.5}$ standard was strengthened by lowering the level from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/ m^3$. The annual fine particle standard at 15 $\mu g/ m^3$ remained the same. Also, in 2006, the EPA published a final rule that established transportation conformity criteria and procedures to determine transportation projects that required analysis for local air quality impacts for $PM_{2.5}$ in non-attainment and maintenance areas. The newly established criteria and procedures require that those areas designated as nonattainment areas must undergo a regional conformity analysis for $PM_{2.5}$. Furthermore, the procedures also mandate that areas designated as non-attainment must complete an additional project-level $PM_{2.5}$ hot-spot analysis of localized impacts for transportation projects of air quality concern.

On December 14, 2009, EPA designated the Bay Area as non-attainment for the national 24-hour $PM_{2.5}$ standard based upon violations of the standard over the three-year period from 2007 through 2009. Pursuant to the Clean Air Act, the Bay Area and MTC were subject to the requirement (beginning on December 14, 2010) to demonstrate that the RTP and TIP conformed to the SIP. In addition, beginning on December 14, 2010, certain roadway and transit projects that involve significant levels of diesel vehicle traffic needed to prepare $PM_{2.5}$ hot-spot analyses.

National 8-Hour Carbon Monoxide Standard

In April 1998, the Bay Area was re-designated to a "maintenance area" for the national 8-hour carbon monoxide (CO) standard, having demonstrated attainment of the standards. As a maintenance area, the region must assure continued attainment of the CO standard.

Under 40 CFR 93.102(b)(4) of EPA's regulations, transportation conformity applies to maintenance areas through the 20-year maintenance planning period, unless the maintenance plan specifies that the transportation conformity requirements apply for a longer time period. Pursuant to the CAAA's section 176(c)(5) and as explained in the preamble of the 1993 final rule, conformity applies to areas that are designated nonattainment or are subject to a maintenance plan approved under the CAAA section 175A. The section 175A maintenance planning period is 20 years, unless the applicable implementation plan specifies a longer maintenance period[2]. The EPA further clarified this conformity provision in its January 24, 2008 final rule[3].

The approved maintenance plan for the San Francisco-Oakland-San Jose Carbon Monoxide nonattainment area did not extend the maintenance plan period beyond 20 years from re-designation. Consequently, transportation conformity requirements for CO will cease to apply after June 1, 2018 (i.e., 20 years after the effective date of the EPA's approval of the first 10-year maintenance plan and re-designation of the area to attainment for CO NAAQS). As a result, as of June 1, 2018 – transportation conformity requirements no longer apply for the CO NAAQS in the San Francisco-Oakland-San Jose CO nonattainment area for Federal Highway Administration/Federal Transit Association projects as defined in 40 CFR 93.101.

Approved Motor Vehicle Emissions Budgets and Conformity Tests

The Bay Area has conformity requirements for national ozone, CO, and $PM_{2.5}$ standards. Under the ozone and CO standard, the Bay Area has to meet an on-road motor vehicle emission "budget" test. Because the Bay Area does not have on-road motor vehicle emission budgets for $PM_{2.5}$ that have been determined to be adequate by EPA, it has to meet an emission interim test for the $PM_{2.5}$ standard. To make a positive conformity finding for ozone and CO, MTC must demonstrate that the calculated on-road motor vehicle emissions in the region are lower than the approved budgets. To make a positive "interim" conformity finding for $PM_{2.5}$, MTC must meet "build not greater than no build" or "build not greater than baseline year" tests based on $PM_{2.5}$ exhaust, tire wear, and brake wear, and NO_X as a $PM_{2.5}$ precursor, emissions.

On-road motor vehicle emissions budgets for VOC and NO_X, which are ozone precursors, were developed for the 2006 attainment year as part of the 2001 1-hour Ozone Attainment Plan. The VOC and NO_X budgets were found to be adequate by EPA on February 14, 2002 (67 FR 8017), and were subsequently approved by EPA on April 22, 2004 (69 FR 21717). Note that under EPA's conformity rule for the national 8-hour ozone standard, the existing 1-hour on-road motor vehicle emission budgets are to be used for conformity analyses until they are replaced.

The on-road motor vehicle emission budgets are listed below:

- VOC: 164 tons per day (2006 and beyond)
- NO_X: 270.3 tons per day (2006 and beyond)

[2] See 58 FR 62188, 62206 (November 24, 1993)
[3] See 73 FR 4420, at 4434-5 (January 24, 2008)

For $PM_{2.5}$, initially the Bay Area was required to prepare a SIP by December 2012 to show how the region would attain the standard by December 2014. In addition, although the Bay Area was designated as non-attainment for the national 24-hour $PM_{2.5}$ standard based on monitoring data for the 2006-2008 period, the region exceeded the standard by only a slight margin.

Monitoring data shows that the Bay Area currently meets the national standards for both annual and 24-hour $PM_{2.5}$ levels. However, because the health effects of PM are serious and far-reaching, and no safe threshold of exposure to PM has yet been identified, it is important that we continue efforts to further reduce PM emissions and concentrations.[4]

Under US EPA guidelines, a region with monitoring data showing that it currently attains an air quality standard can submit a "re-designation request" and a "maintenance plan" in lieu of a SIP attainment plan. However, the BAAQMD believes that it would be premature to submit a $PM_{2.5}$ re-designation request for the Bay Area at this time. Instead, the BAAQMD has pursued another option provided by US EPA guidelines for areas with monitoring data showing that they currently meet the $PM_{2.5}$ standard. In December 2011, CARB submitted a "clean data finding" request on behalf of the Bay Area. On January 9, 2013, EPA took final action and determined that the Bay Area attained the 2006 24-hour $PM_{2.5}$ standard. EPA's determination was based on complete, quality-assured, and certified ambient air monitoring data showing that the area monitored attainment based on the 2009-2011 monitoring period. Based on EPA's determination, the requirements for the Bay Area to submit an attainment demonstration, together with RACMs, an RFP plan, and contingency measures for failure to meet RFP and attainment deadlines are suspended for so long as the region continues to attain the 2006 24-hour $PM_{2.5}$ standard.

Since an approved on-road motor vehicle emissions budget for $PM_{2.5}$ is not available for use in this conformity analysis, MTC must complete one of the two interim emissions tests:

- the build-no-greater-than-no-build test ("build/no-build test") found at 40 CFR 93.119(e)(1), or
- the no-greater-than-baseline year emissions test ("baseline year test"), described at 40 CFR 93.119(e)(2).

Per the interagency consultation via the Air Quality Conformity Task Force meeting dated May 28, 2015, MTC elected to use the "baseline year test". In this test, conformity is demonstrated if in each analysis year, the RTP or TIP (the "build" scenarios) on-road motor vehicle emissions are less than or equal to emissions in the "baseline year" emission inventory. The "baseline year" for the 2006 24-hour $PM_{2.5}$ standard is the year 2008[5].

Under a determination of conformity, the following criteria are applied:

1. The latest planning assumptions and emission models are used.
   The transportation plan ("RTP") and program ("TIP") pass an emissions budget test using a budget that has been found adequate by EPA or an interim emissions test when budgets have not been
   established.
2. The transportation ("RTP") and program ("TIP") provide for the timely implementation of

[4] See BAAQMD's *2017 Clean Air Plan: Spare the Air, Cool the Climate* at: http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en

[5] Additional information is available here: https://www.epa.gov/state-and-local-transportation/baseline-year-baseline-year-test-40-cfr-93119

TCMs.

3. Interagency and public consultation is part of the process.

III. Conformity Analysis & Results

Approach to Conformity Analysis

The latest planning assumptions were used when preparing this conformity analysis. Regional estimates of future travel data were estimated using MTC's land use model (referred to as "*Bay Area UrbanSim*") and travel model (referred to as "*Travel Model One*"). This integrated model framework allows for analysis of how transportation projects affect the surrounding land use pattern, as well as how changes to residential and commercial activity affect transportation demand. *Travel Model One* (version 0.6) released in July 2016, is calibrated to year 2000 conditions and validated against year 2000, year 2005, and year 2010 conditions. The model generates spatially- and temporally- specific estimates of travel data—roadway usage and speed. This travel data is input into CARB's latest EMission FACtors (EMFAC2014) model to estimate on-road motor vehicle emissions.

In 2016, MTC updated the method by which Amended Plan Bay Area programmatic category projects are assessed and represented in Travel Model One in the analysis years between the year 2040 (the Horizon Year for the Amended Plan Bay Area) and the 2019 TIP. Please see Appendix C for the complete approach (for regional conformity modeling purposes) description.

The EMFAC2014 model shows how California on-road motor vehicle emissions have changed over time and are projected to change in the future. This information helps CARB evaluate prospective control programs and determine the most effective, science-based proposals for protecting the environment. EMFAC2014 includes the latest data on California's car and truck fleets and travel activity. The model also reflects the emissions benefits of CARB's recent rulemakings, including on-road diesel fleet rules, Advanced Clean Car Standards, and the Smartway/Phase I Heavy Duty Vehicle Greenhouse Gas Regulation. The model includes updates to truck emission factors based on the latest test data. More details about the updates in emissions calculation methodologies and data are available in the EMFAC2014 Technical Support Document.[6]

Bay Area UrbanSim[7] and *Travel Model One* are responsive to numerous inputs, including demographic, pricing, travel behavior, and highway and transit network assumptions. For this conformity analysis, the two models use demographic and highway and transit network assumptions consistent with the Amended Plan Bay Area 2040[8]. Highway and transit networks were updated for each analysis year to reflect investments in the Amended Plan Bay Area 2040 (see Appendix B) and the 2019 TIP (see Appendix A1 and A2). Pricing assumptions applied in *Travel Model One* include projected parking prices, gasoline and non-gasoline auto operating costs, fuel economy, bridge tolls, transit fares, and express lanes. Travel behavior assumptions include trip peaking factors, vehicle occupancy factors, and estimates of interregional commuters. Refer to Appendix D for detailed travel modeling assumptions used in this conformity analysis.[9]

[6] Additional information is available here: http://www.arb.ca.gov/msei/categories.htm
[7] Additional information is available here: http://2040.planbayarea.org/sites/default/files/2017-07/Land_Use_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf
[8] Additional information is available here: http://www.planbayarea.org/2040-plan/final-preferred-scenario
[9] Additional information is available here: http://2040.planbayarea.org/sites/default/files/2017-07/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017_0.pdf

Regional vehicle miles traveled (VMT) and engine starts (which are needed for emission calculations) are forecasted using a combination of output from *Travel Model One* and base year (2010) EMFAC2014 default VMT information provided by the CARB. For conformity purposes, MTC continues to employ the agreed to protocol for estimating VMT with updated 2010 base year data.

A separate process was used to develop demographic assumptions for the $PM_{2.5}$ "baseline year" of 2008. *Bay Area UrbanSim* generates Transportation Analysis Zone (TAZ)-level data set in 5-year increments. The calculation of data for the interim year 2008 requires a multi-stop process. First, regional control totals for each attribute are calculated using straight-line extrapolations between the two adjacent 5-year increments (2005 and 2010). Next, each TAZ's share of the regional total is calculated by extrapolation of the two adjacent 5-year increments. Finally, individual TAZ totals are calculated by multiplying the interim year TAZ share of the regional total by the regional control total.

Analysis Years

The analysis years for the budget and baseline year tests are to be a year within five years from the date the analysis is done, the horizon year of the RTP and intermediate years as necessary so that analysis years are not more than ten years apart. For this conformity analysis, the analysis years 2020, 2030 and 2040 for the 2008 ozone and 2006 $PM_{2.5}$ standards. For CO, the analysis years are 2018, 2020, 2030 and 2040. Travel data for year 2018 were interpolated between forecasted 2015 and 2020 travel data. MTC used *Travel Model One* to forecast travel data for the 2020, 2030 and 2040 analysis years. The forecasted travel data for each analysis year were then input into the EMFAC2014 model to calculate on-road motor vehicle emissions.

Consultation Process

MTC has consulted on the preparation of this conformity analysis and other conformity related issues with the Bay Area's Air Quality Conformity Task Force. The Conformity Task Force is composed of representatives of EPA, CARB, FHWA, FTA, Caltrans, MTC, BAAQMD, ABAG, the nine county Congestion Management Agencies, and Bay Area transit operators. The Conformity Task Force reviews the analysis assumptions, consults on TCM implementation issues, and reviews the results of the conformity analysis. The task force meetings are open to the public. Topics covered in past meetings of the Air Quality Conformity Task Force include the following:

April 2018

- $PM_{2.5}$ Project-Level Conformity Interagency Consultations
- Approach to Draft Conformity Analysis for the 2019 Transportation Improvement Program and Amended Plan Bay Area 2040
- MTC/SACOG Air Quality Planning/Conformity MOU Revision
- 2020 and 2022 Congestion Mitigation and Air Quality (CMAQ) Performance Targets

May 2018

- $PM_{2.5}$ Project-Level Conformity Interagency Consultations
- Update on the Conformity Analysis for the 2019 Transportation Improvement Program and the Amended Plan Bay Area

This document is part of the Final Amended Plan Bay Area 2040 scenario planning/development effort and the technical methods and assumptions used in this effort are consistent with what is applied in this conformity analysis.

Comparison of Motor Vehicle Emissions to Budgets

As explained earlier, on-road motor vehicle emissions budgets are established in the SIP for VOCs and NO_X. To make a positive conformity finding, the regional on-road motor vehicle emissions must be equal to or less than these budgets. The results of the vehicle activity forecasts and on-road motor vehicle emission calculations are described in the following section.

Ozone Motor Vehicle Emission Budgets

For VOC and NO_X, the on-road motor vehicle emission budget also reflects anticipated emission reductions from five Transportation Control Measures (TCMs) incorporated in the 2001 Ozone Attainment Plan (Table 1).

Table 1: VOC and NO_X Emissions Budgets from 2001 Ozone Attainment Plan (tons/day)

VOC	
2006 On Road Motor Vehicle Emissions	168.5
2006 Mobile Source Control Measure Benefits	(4.0)
2006 TCM Benefits	(0.5)
2006 Emissions Budget	164.0

NO_X	
2006 On Road Motor Vehicle Emissions	271.0
2006 TCM Benefits	(0.7)
2006 Emissions Budget	270.3

The vehicle activity forecasts by analysis year for the Amended Plan Bay Area 2040 and the 2019 TIP (the "build" scenarios) are shown in Table 2. Travel data (from MTC's *Travel Model One*) was input into CARB's EMFAC2014 emissions model, thereby generating regional vehicle activity and emissions estimates.

The analysis years for the budget and baseline year tests are to be a year within five years from the date the analysis is done, the horizon year of the RTP and intermediate years as necessary so that analysis years are not more than ten years apart. For this conformity analysis, the analysis years 2020, 2030 and 2040 for the 2008 ozone and 2006 $PM_{2.5}$ standards. Travel data for 2020, 2030 and 2040 were forecasted by *Travel Model One*. The forecasted travel data for each analysis year were then input into the EMFAC2014 model to calculate on-road motor vehicle emissions.

Table 2: Vehicle Activity Forecasts

	2020	*2030*	*2040*
Vehicles in use	4,699,352	5,503,145	6,227,537
Daily VMT (1000s)	167,420	182,510	195,533
Daily Engine Starts	29,309,833	34,101,662	38,493,145

Comparison of Estimated Regional On-Road Motor Vehicle Emissions to the Ozone Precursor Budgets

The vehicle activity forecasts for the Amended Plan Bay Area 2040 and the 2019 TIP, Table 2, are converted to emission estimates by MTC using EMFAC2014. Tables 3 compare the results of the various analyses with the applicable budgets. The analyses indicate that the on-road motor vehicle emissions

are substantially below the budget, due in large part to the effects of cleaner vehicles in the California fleet and the enhanced Smog Check program now in effect in the Bay Area and reflected in the EMFAC2014 model.

Table 3: Emissions Budget Comparisons for Ozone Precursors – Summertime Conditions (tons/day)

Year	*VOC Budget*[1]	*On-Road Motor Vehicles VOC*	*TCMs*[2]	*Net Emissions*
2020	164.0	36.00	(0.3)	35.70
2030	164.0	24.04	(0.3)	23.74
2040	164.0	18.51	(0.3)	18.21

Year	*NO_X Budget*	*On-Road Motor Vehicles NO_X*	*TCMs*[2]	*Net Emissions*
2020	270.3	65.14	(0.5)	64.64
2030	270.3	32.88	(0.5)	32.38
2040	270.3	28.94	(0.5)	28.44

[1] 2001 Ozone Attainment Plan

[2] The transit services for TCM A Regional Express Bus Program were modeled. The emission benefits from TCM A are therefore included in the On-Road Motor Vehicles VOC and NO_X emission inventories for 2006 and beyond.

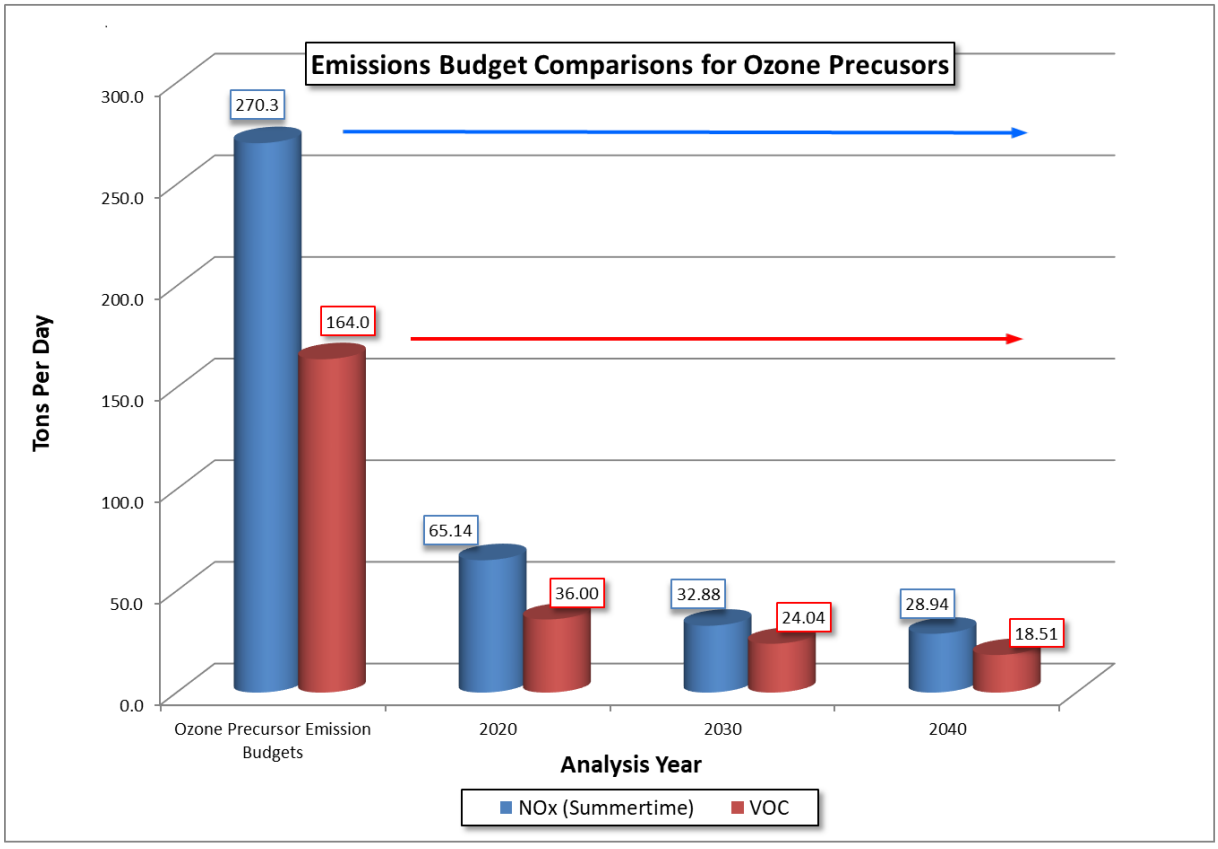

Figure 2: Emissions Budget Comparisons for Ozone Precursors

The estimated effectiveness of the various TCMs, given their current implementation status is shown in Table 4. TCMs A through E are fully implemented. They have achieved the required cumulative total emission reductions of 0.5 tons per day of VOC and 0.7 tons per day of NO_X by 2006.

Table 4: Emission Reductions for Transportation Control Measures A – E in State Implementation Plan (tons/day)

TCM	*VOC Emission Reductions through December 2006*	*NO_X Emission Reductions through December 2006*
TCM A: Regional Express Bus Program	0.20	0.20
TCM B: Bicycle/Pedestrian Program	0.04	0.03
TCM C: Transportation for Livable Communities	0.08	0.12
TCM D: Expansion of Freeway Service Patrol	0.10	0.25
TCM E: Transit Access to Airports	0.09	0.13
Total Reductions	**0.5**	**0.7**

Baseline Year Emissions Test for $PM_{2.5}$

For the baseline year test, emissions for both directly emitted $PM_{2.5}$ and NO_X (as the precursor to $PM_{2.5}$ emissions) were compared to the analysis years of 2020, 2030 and 2040. The analysis used inputs for the winter season, during which the Bay Area experiences its highest levels of $PM_{2.5}$ concentrations.

The vehicle activity forecasts by analysis year for the Amended Plan Bay Area 2040 and the 2019 TIP (the "build" scenarios) are shown in Table 5. Travel data (from MTC's *Travel Model One*) was input into CARB's EMFAC2014 emissions model, thereby generating regional vehicle activity and emissions estimates.

Table 6 presents the results of the Baseline Year test for the $PM_{2.5}$ emissions and the NO_X precursor for the 2006 24-hour $PM_{2.5}$ standard. Regional conformity analyses must be completed for directly emitted $PM_{2.5}$ (40 CFR 93.102(b)(1)). Directly emitted $PM_{2.5}$ includes exhaust, brake and tire wear emissions.

Table 5: Vehicle Activity Forecasts for the $PM_{2.5}$ Baseline Year Test

	2008 Baseline Year	*2020*	*2030*	*2040*
Vehicles in Use	4,631,001	4,699,352	5,503,145	6,227,537
Daily VMT (1000s)	154,100	167,420	182,510	195,533
Engine Starts	29,299,933	29,309,833	34,101,662	38,493,145

Table 6: Emissions Comparison for the $PM_{2.5}$ Baseline Year Test

	2008 Baseline Year	*2020*	*2030*	*2040*
$PM_{2.5}$	8.26	4.53	4.44	4.60
NO_X	194.58	60.09	27.12	23.06

[1] Emissions for wintertime only

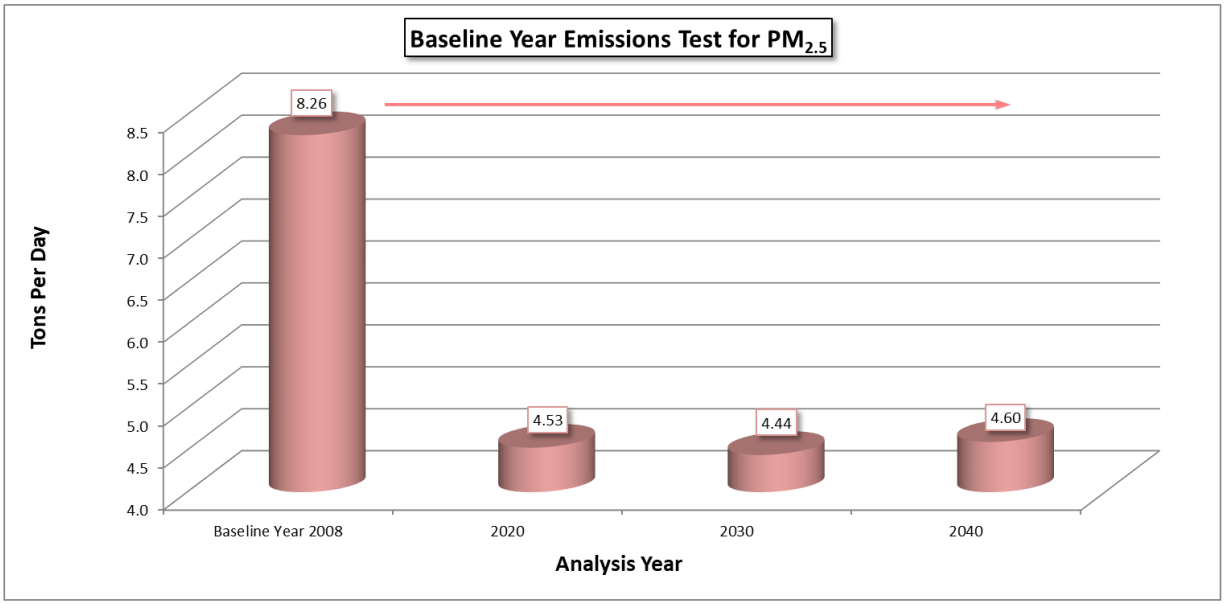

Figure 3: Baseline Year Emissions Test for $PM_{2.5}$

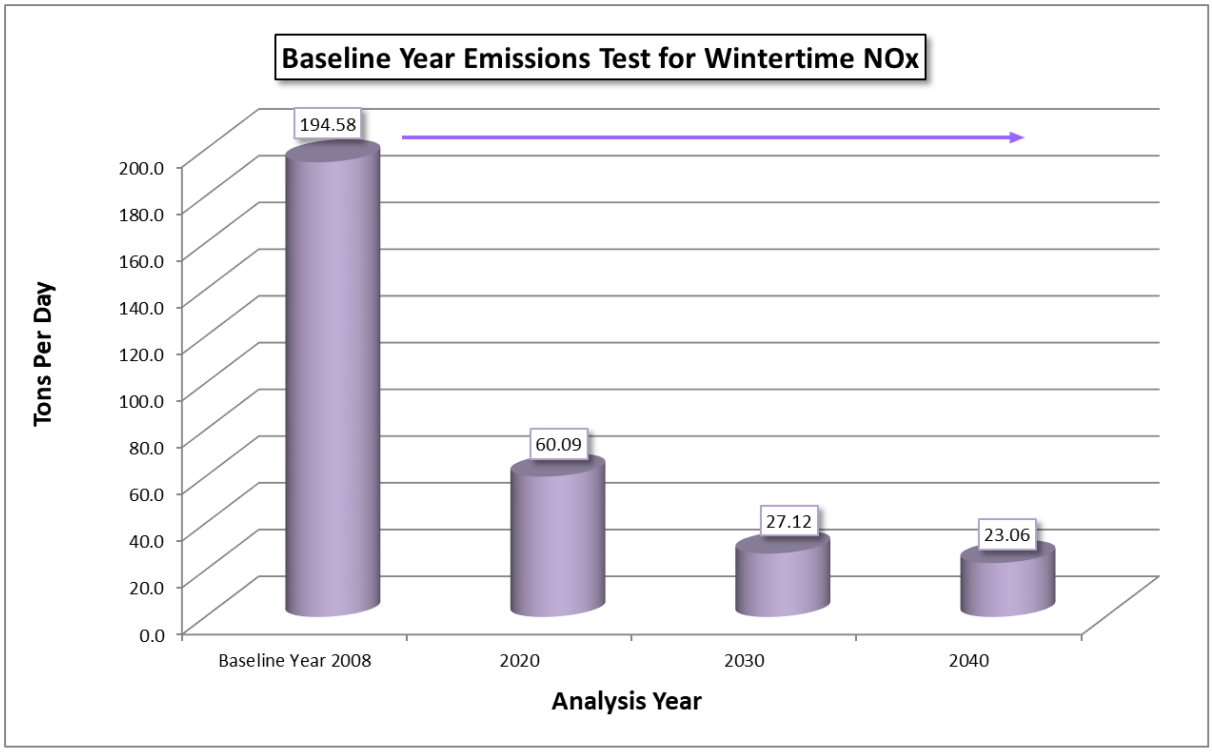

Figure 4: Baseline Year Emissions Test for Wintertime NO_X

IV. Transportation Control Measures

History of Transportation Control Measures

TCMs are strategies to reduce vehicle emissions. They include such strategies as improved transit service and transit coordination, ridesharing services and new carpool lanes, signal timing, freeway incident management, increased gas taxes and bridge tolls to encourage use of alternative modes, etc. The original set of TCMs plus the five most recent TCMs (A-E) have been fully implemented. The TCMs were added over successive revisions to the SIP (see Table 8). For more information on TCMs 1-28, which are completed, see the *Transportation-Air Quality Conformity Analysis for the 2001 Regional Transportation Plan and FY 2001 Transportation Improvement Program Amendment 01-32 (February 2002)*. This report can be found in the MTC/ABAG Library.

- Twelve (12) ozone measures were originally listed in the 1982 Bay Area Air Quality Plan.
- In response to a 1990 lawsuit in the federal District Court, sixteen (16) additional TCMs were subsequently adopted by MTC in February 1990 as contingency measures to bring the region back on the "Reasonable Further Progress" (RFP) line. The Federal District order issued on May 11, 1992, found that these contingency TCMs were sufficient to bring the region back on the RFP track anticipated in the SIP. These measures became part of the SIP when EPA approved the 1994 Ozone Maintenance Plan.
- Two (2) transportation control measures from the 1982 Bay Area Air Quality Plan apply to Carbon Monoxide control strategies, for which the region is in attainment with the federal standard, and primarily targeted downtown San Jose (which had the most significant CO problem at that time.) MTC also adopted a set of TCM enhancements in November 1991 to eliminate a shortfall in regional carbon monoxide emissions identified in the District Court's April 19, 1991, order. Carbon monoxide standards have been achieved primarily through the use of oxygenated/reformulated fuels in cars and with improvements in the Smog Check program.
- As part of EPA's partial approval/partial disapproval of the 1999 Ozone Attainment Plan, four (4) TCMs were deleted from the ozone plan (but two of these remain in the Carbon Monoxide Maintenance Plan).
- Five (5) new TCMs were adopted as part of the new 2001 1-Hour Ozone Attainment Plan and were fully funded in the 2001 TIP and 2001 Regional Transportation Plan.

With respect to TCM 2 from the 1982 SIP, there was a protracted debate, leading to a citizens lawsuit in federal court, about the obligations associated with this TCM. On April 6, 2004, MTC prevailed in the U.S. Court of Appeals for the Ninth Circuit which concluded that TCM 2 does not impose any additional enforceable obligation on MTC to increase ridership on public transit ridership by 15% over 1982-83 levels by November 2006 (Bayview Hunters Point Community Advocates v. Metropolitan Transportation Com'n, (2004 WL 728247, 4 Cal. Daily Op. Serv. 2919, 2004 Daily Journal D.A.R. 4209, 9th Cir.(Cal.), Apr 06, 2004)). Thus TCM 2 has been resolved, and there are no further implementation issues to address in this TCM.

Table 7: Transportation Control Measure in the State Implementation Plan

TCM	*Description*
Original TCMs from 1982 Bay Area Air Quality Plan	
TCM 1	Reaffirm Commitment to 28 percent Transit Ridership Increase Between 1978 and 1983
TCM 2	Support Post-1983 Improvements in the Operators' Five-Year Plans and, After Consultation with the Operators, Adopt Ridership Increase Target for the Period 1983 through 1987
TCM 3	Seek to Expand and Improve Public Transit Beyond Committed Levels
TCM 4	High Occupancy Vehicle (HOV) Lanes and Ramp Metering
TCM 5	Support RIDES Efforts
TCM 6[1]	Continue Efforts to Obtain Funding to Support Long Range Transit Improvements
TCM 7	Preferential Parking
TCM 8	Shared Use Park and Ride Lots
TCM 9	Expand Commute Alternatives Program
TCM 10	Information Program for Local Governments
TCM 11[2]	Gasoline Conservation Awareness Program (GasCAP)
TCM 12[2]	Santa Clara County Commuter Transportation Program
Contingency Plan TCMs Adopted by MTC in February 1990 (MTC Resolution 2131)	
TCM 13	Increase Bridge Tolls to $1.00 on All Bridges
TCM 14	Bay Bridge Surcharge of $1.00
TCM 15	Increase State Gas Tax by 9 Cents
TCM 16[1]	Implement MTC Resolution 1876, Revised — New Rail Starts
TCM 17	Continue Post-Earthquake Transit Services
TCM 18	Sacramento-Bay Area Amtrak Service
TCM 19	Upgrade Caltrain Service
TCM 20	Regional HOV System Plan
TCM 21	Regional Transit Coordination
TCM 22	Expand Regional Transit Connection Ticket Distribution
TCM 23	Employer Audits
TCM 24	Expand Signal Timing Program to New Cities
TCM 25	Maintain Existing Signal Timing Programs
TCM 26	Incident Management on Bay Area Freeways
TCM 27	Update MTC Guidance on Development of Local TSM Programs
TCM 28	Local Transportation Systems Management (TSM) Initiatives
New TCMs in 2001 Ozone Attainment Plan	
TCM A	Regional Express Bus Program
TCM B	Bicycle/Pedestrian Program
TCM C	Transportation for Livable Communities
TCM D	Expansion of Freeway Service Patrol
TCM E	Transit Access to Airports

[1] Deleted by EPA action from ozone plan

[2] Deleted by EPA action from ozone plan, but retained in Carbon Monoxide Maintenance Plan.

Source: Bay Area Air Quality Management District, Metropolitan Transportation Commission, 2001.

Status of Transportation Control Measures

TCMs A-E were approved into the SIP as part of EPA's Finding of Attainment for the San Francisco Bay Area (April 2004). The conformity analysis must demonstrate that TCMs are being implemented on schedule (40 CFR 93.113). TCMs A-E have specific implementation steps which are used to determine progress in advancing these TCMs (see Table 9). TCMs A-E are now fully implemented.

Table 8: Implementation Status of Federal Transportation Control Measures for Ozone (A – E)

#	TCM	Description	Ozone Attainment Plan Implementation Schedule	Implementation Status
A	Regional Express Bus Program	Program includes purchase of approximately 90 low emission buses to operate new or enhanced express bus services. Buses will meet all applicable CARB standards, and will include particulate traps or filters. MTC will approve $40 million in funding to various transit operators for bus acquisition. Program assumes transit operators can sustain service for a five-year period. Actual emission reductions will be determined based on routes selected by MTC.	FY 2003. Complete once $40 million in funding pursuant to Government Code Section 14556.40 is approved by the California Transportation Commission and obligated by bus operators	$40 million for this program was allocated by the CTC in August 2001. The participating transit operators have ordered and received a total of 94 buses. All buses are currently in operations. TCM A is fully implemented.
B	Bicycle / Pedestrian Program	Fund high priority projects in countywide plans consistent with TDA funding availability. MTC would fund only projects that are exempt from CEQA, have no significant environmental impacts, or adequately mitigate any adverse environmental impacts. Actual emission reductions will be determined based on the projects funded.	FY 2004 – 2006. Complete once $15 million in TDA Article 3 is allocated by MTC.	MTC allocated over $20 million in TDA Article 3 funds during FY2004, FY2005, and FY2006. TCM B is fully implemented.
C	Transportation for Livable Communities (TLC)	Program provides planning grants, technical assistance, and capital grants to help cities and nonprofit agencies link transportation projects with community plans. MTC would fund only projects that are exempt from CEQA, have no significant environmental impacts, or adequately mitigate any adverse environmental impacts. Actual emission	FY 2004 – 2006. Complete once $27 million in TLC grant funding is approved by MTC	In December 2003, the Commission reaffirmed its commitment of $27 million annually over 25 years for the TLC program as part of Phase 1 of the Transportation 2030 Plan. MTC and the county Congestion Management Agencies (CMAs) have approved over $27 million in TLC grant funding by FY 2006. In November 2004, MTC approved $500,000 for regional TLC

		reductions will be based on the projects funded.		Community Design Planning Program, and in December 2004, MTC approved $18.4 million in TLC funding for the regional TLC Capital program. As of December 2006, CMAs in Alameda, Marin and Sonoma counties approved an additional $12.4 million in their county-level TLC Capital programs for a regional total of $31.2 million. TCM C is fully implemented.
D	Additional Freeway Service Patrol	Operation of 55 lane miles of new roving tow truck patrols beyond routes which existed in 2000. TCM commitment would be satisfied by any combination for routes adding 55 miles. Tow trucks used in service are new vehicles meeting all applicable CARB standards.	FY 2001. Complete by maintaining increase in FSP mileage through December 2006	FSP continues to maintain the operation of the 55 lane miles of new roving tow truck coverage. This level of service was maintained through 2006. FSP continues to expand its service areas. TCM D is fully implemented. .
E	Transit Access to Airports	Take credit for emission reductions from air passengers who use BART to SFO, as these reductions are not included in the Baseline.	BART – SFO service to start in FY 2003. Complete by maintaining service through December 2006	Service began June 2003. Service adjustments have been made since start of revenue service. The BART to SFO service has been maintained through 2006 and is continued. TCM E is fully implemented.

V. Response to Public Comments

To be updated.

VI. Conformity Findings

Based on the analysis, the following conformity findings are made:

- This conformity assessment was conducted consistent with EPA's transportation conformity regulations and with the Bay Area Air Quality Conformity Protocol adopted by MTC as Resolution No. 4374.

- The Amended Plan Bay Area 2040 and the 2019 Transportation Improvement Program, as amended by Revisions Number 2018-XX, provide for implementation of TCMs pursuant to the following federal regulation:

  (1) An examination of the specific steps and funding source(s) needed to fully implement each TCM indicates that TCMs which are eligible for funding under title 23 U.S.C. or the Federal Transit Laws are on or ahead of the schedule established in the applicable implementation plan, or, if such TCMs are behind the schedule established in the applicable implementation plan, the MPO and DOT have determined that past obstacles to implementation of the TCMs have been identified and have been or are being overcome, and that all State and local agencies with influence over approvals or funding for TCMs are given maximum priority to approval or funding to TCMs over other projects within their control, including projects in locations outside the non-attainment or maintenance area.

  (2) If TCMs in the applicable implementation plan have previously been programmed for Federal funding but the funds have not been obligated and the TCMs are behind the schedule in the implementation plan, then the TIP cannot be found to conform if the funds intended for those TCMs are reallocated to projects in the TIP other than TCMs, or if there are no other TCMs in the TIP, if the funds are reallocated to projects in the TIP other than projects which are eligible for Federal funding intended for air quality improvements projects, e.g., the Congestion Mitigation and Air Quality Improvement Program.

  (3) Nothing in the TIP may interfere with the implementation of any TCM in the applicable implementation plan. (40 CFR Part 93.113(c)).

- For the two ground-level ozone precursors (VOC and NOx), motor vehicle emissions in the Amended Plan Bay Area 2040 and the 2018 Transportation Improvement Program, as amended by Revisions Number 2018-XX are lower than the applicable motor vehicle emission budgets for the 2008 national 8- hour ozone standard.

  For $PM_{2.5}$ and NOx, the Baseline Year test shows that the motor vehicle emissions are lower under the Build scenario for the various analysis years when compared to the baseline year emissions scenario.

Appendix A-1
List of Projects in the Draft 2019 TIP

List of Projects in the 2019 Transportation Improvement Program

Sorted by Air Quality Conformity Status, County and Sponsor

County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Alameda	AC Transit	ALA150004	AC Transit: East Bay Bus Rapid Transit	Alameda County: Along Broadway/ International/E 14th corridor from Oakland to San Leandro: Implement BRT including 34 stations, transit signal priority, level-boarding, shelters, off-board ticketing,	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0060	2020
Alameda	ACE	ALA170042	ACE Platform Extensions	ACE System: At Pleasanton, Livermore, Vasco, Tracy, and Manteca stations: Extend existing ACE platforms to accommodate longer train sets	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-01-0008	2040
Alameda	ACTC	ALA050014	SR 84 Expressway Widening	In Livermore: Widen Route 84 from Jack London Blvd. to Pigeon Pass.	2019 TIP Update. Keep in the 2019 TIP for informational purposes - project is not complete.	NON-EXEMPT	17-01-0032	2020
Alameda	ACTC	ALA050019	I-880 North Safety Improvements	Oakland: I-880 between 23rd Ave to 29th Ave: Reconfigure Interchange, including new ramps.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-01-0031	2020
Alameda	ACTC	ALA070009	Oakland/Alameda Freeway Access Project	Oakland and Alameda: Between Oak Street and Union Street: Reconfigure interchange and intersections to improve connections between I-880, the Posey and Webster tubes and the downtown Oakland	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0030	2030
Alameda	ACTC	ALA110002	I-880/Industrial Parkway West Interchange	In Hayward: At I-880/Industrial Parkway West: Reconstruct interchange, add on/off-ramp lanes, widen ramp lanes, provide HOV bypass lanes and routine accommodation for bicyclists and pedestrians.	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0023	2030
Alameda	ACTC	ALA130034	I-680 NB HOV/HOT Lane	Route I-680: from South of Auto Mall Parkway to State Route 84 in Alameda County: Construct NB HOV/HOT Lane.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0058	2020
Alameda	ACTC	ALA150001	Rte 84 Widening, south of Ruby Hill Dr to I-680	In Alameda County, on State Route 84 from south of Ruby Hill Drive to I-680, upgrade from 2-lane conventional highway to 4-lane expressway, make operational improvements to SR84/I-680 I/C and	2019 TIP Update	NON-EXEMPT	17-01-0029	2030
Alameda	ACTC	ALA150008	East Bay Greenway	Alameda County: Generally along the BART alignment from Lake Merritt BART station to South Hayward BART station: Install a trail facility consisting of Class I & Class IV bikeway facilities. Includes 2 road	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-01-0001	2040
Alameda	ACTC	ALA170001	State Route 262 (Mission Blvd) Improvements	In Fremont: Mission Blvd/I-680 IC: widen Mission Blvd to 3 lanes each direction through IC, rebuild the NB and SB I-680 on and off ramps	2019 TIP Update. Project completion scheduled for 2028. (FMS menus end at 2025).	NON-EXEMPT	17-01-0020	2030
Alameda	ACTC	ALA170004	I-880/West Winton Avenue Interchange	Hayward: At I-880/West Winton Avenue I/C: Reconstruct I/C including reconfiguration of eastbound to southbound on ramp and new connection to Southland Mall Drive	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0041	2030
Alameda	ACTC	ALA170005	I-880/Whipple Rd Industrial Pkwy SW I/C Imps	In Union City/Hayward: at I-880/Whipple Rd Interchange: Implement full interchange improvements including northbound off-ramp, surface street improvements and realignment, and bike/ped	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0021	2030
Alameda	ACTC	ALA170008	I-580/680 Interchange HOV/HOT Widening	Alameda County: On I-580 between Hacienda Dr. and San Ramon/Foothill Road and on I-680 between Stoneridge Dr. and Amado: Widen to add one HOV/HOT lane for WB 580 to SB 680 and NB 680 to EB	2019 TIP Update - Update the funding plan to add $5M in Sales Tax and $109M in RTP-LRP and reprogram funds between years and phases	NON-EXEMPT	17-01-0028	2030

* Projects with conformity analysis years of 2040 reference programmatic projects or projects with a completion date after 2030 in *Plan Bay Area 2040*

List of Projects in the 2019 Transportation Improvement Program

Sorted by Air Quality Conformity Status, County and Sponsor

County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Alameda	ACTC	ALA170009	Widen I-680 NB Imprv SB for EL: SR-84 to Alcosta	Alameda County: NB I-680 from SR-84 to Alcosta Blvd: Widen for express lanes; SB I-680 from SR-84 to Alcosta Blvd: express lane improvements. Project also references RTP ID 17-01-0014	2019 TIP Update - Update scope and funding	NON-EXEMPT	17-10-0058	2020
Alameda	ACTC	ALA170010	I-880 NB HOV/HOT: North of Hacienda to Hegenberger	Alameda County: I-880 in the northbound direction from north of Hacienda Ave to Hegenberger Road: Widen to provide one HOV/express lane	2019 TIP Update - Update the funding plan to reprogram funds between years and phases	NON-EXEMPT	17-10-0057	2030
Alameda	ACTC	ALA170086	7th Street Grade Separation West	Oakland: Within the Port: Implement road and rail improvements, realign and grade separate 7th St and Maritime intersection, reconstruct and widen multi-use path; Between Joint Intermodal Terminal and	2019 TIP Update	NON-EXEMPT	17-01-0015	2040
Alameda	ACTC	ALA978004	East-West Connector in Fremont & Union City	In Fremont & Union City: From I-880 to Route 238 (Mission Blvd); Construct new 4-lane roadway and widen existing roadways. Project is phased.	2019 TIP Update.	NON-EXEMPT	17-01-0047	2030
Alameda	Alameda	ALA170049	Central Avenue Safety Improvements	Alameda: On Central Ave from Main St to Sherman St: Implement multimodal street improvements including reduction from 4 to 3 lanes, a center turn lane, bike lanes, a 2-way separated bikeway, 2 traffic	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-01-0004	2040
Alameda	BAIFA	ALA170006	ALA-880 Express Lanes	In Alameda/Santa Clara Counties: On I-880 from Hegenberger to Dixon Landing (Southbound) and Dixon Landing to Lewelling (Northbound): Convert HOV lanes to express lanes. Project also references	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0052	2020
Alameda	BART	ALA110003	Hayward Shop and Yard Expansion	BART: Hayward Shop and Yard: Expansion facility to accommodate additional rail vehicles for storage, maintenance and repair.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0064	2040
Alameda	BART	ALA130032	BART Metro Priority Track Elements	BART: In Lafayette, Dublin and Millbrae: Provide three critical track extensions in order to provide the BART system with additional operational flexibility and additional capacity, all within existing right-of-	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0005	2030
Alameda	BART	ALA170044	Bay Fair Connection	BART: At and near Bay Fair Station: Modify station and approaches to add one or more additional tracks and one or more passenger platforms for improved train service and operational flexibility	2019 TIP Update	NON-EXEMPT	17-10-0005	2030
Alameda	Berkeley	ALA130026	Shattuck Complete Streets and De-couplet	Berkeley: Shattuck Ave, Shattuck Square and Berkeley Square from Allston Way to University Ave intersection: Reconfigure travel lanes and parking, repair pavement and make other improvements	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-01-0004	2040
Alameda	Dublin	ALA130005	Dougherty Road widening	Dublin: Dougherty Road from Sierra Lane to North City Limit: Widen from 4 lanes to 6 lanes	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-01-0053	2020
Alameda	Dublin	ALA130006	Dublin Boulevard widening	In Dublin: Dublin Blvd between Sierra Court and Dublin Court: Widenfrom 4 lanes to 6 lanes and install Class II bike lanes	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0057	2020
Alameda	Dublin	ALA150003	Dublin Blvd. - North Canyons Pkwy Extension	Alameda County, Dublin and Livermore: Dublin Blvd-North Canyons Parkway from Fallon Rd to Croak Rd: Construct six lane extension; Dublin Blvd-North Canyons Parkway from Croak Rd to Doolan Rd:	2019 TIP Update - Update scope and funding	NON-EXEMPT	17-01-0048	2030

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List of Projects in the 2019 Transportation Improvement Program

Sorted by Air Quality Conformity Status, County and Sponsor

County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Alameda	Dublin	ALA170045	I-580 Interchange Imps at Hacienda/Fallon Rd, Ph 2	Dublin: I580/Fallon Rd IC: Ph 2 - Reconstruct overcrossing to widen to 4 lanes in each direction, reconstruct and widen ramps, add bike/ped imps; I580 Hacienda Dr IC: Reconstruct overcrossing to add NB	2019 TIP Update	NON-EXEMPT	17-01-0038	2030
Alameda	Fremont	ALA130025	Fremont City Center Multi-Modal Improvements	Fremont: Capitol Ave from State St to Fremont Blvd: Construct roadway extension; Various locations around Fremont City Center and Fremont BART Station: Implement multi-modal improvements to	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-01-0004	2040
Alameda	Hayward	ALA090016	Rt 92/Clawiter/Whitesell Interchange Improvements	Hayward: Rt 92/Clawiter Rd: Upgrade existing Clawiter interchange. Add ramps and overcrossing for Whitesell St. extension. Signalize ramp intersections.	2019 TIP Update	NON-EXEMPT	17-01-0036	2030
Alameda	Hayward	ALA090020	I-880 Auxiliary lanes at Industrial Parkway	Hayward: I-880 NB between Industrial Pkwy and Alameda Creek; I-808 SB between Industrial Pkwy and Whipple Rd: Construct auxiliary lanes	2019 TIP Update	NON-EXEMPT	17-01-0007	2040
Alameda	Hayward	ALA170046	I-880/A Street Interchange Reconstruction	Hayward: I-880/A St. I/C: Reconstruct interchange to widen A St from 5 to 6 lanes, add bike lanes, and provide additional lane capacity for potential future freeway widening, modify signals and	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0024	2030
Alameda	MTC	ALA110104	Bay Bridge Park	Oakland: At the Oakland Touchdown of the new East Span of the Bay Bridge: Bay Bridge Park (Project previously titled "SFOBB Gateway Park")	2019 TIP Update	NON-EXEMPT	17-01-0001	2040
Alameda	MTC	ALA170011	Bay Bridge Forward - West Grand HOV/Bus Only Lane	In Oakland: Grand Avenue on-ramp: Convert shoulder to Bus/HOV only lane	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-10-0033	2040
Alameda	Oakland	ALA110046	Oakland Army Base Infrastructure Improvements	In Oakland: At former Oakland Army Base: Implementing Army Base Infrastructure Master Plan including TCIF funded OHIT improvements implemented by City of Oakland. For the related Port project, see	2019 TIP Update	NON-EXEMPT	17-01-0016	2040
Alameda	Oakland	ALA130014	7th Street West Oakland Transit Village, Phase II	In Oakland: On 7th Street between Wood Street and Peralta Street: Construct road diet, bicycle lanes, sidewalk enhancement, pedestrian amenities, traffic signal mods, street and pedestrian lights, storm	2019 TIP Update - Update funding plan and retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-01-0001	2040
Alameda	Oakland	ALA150042	Oakland: Telegraph Ave Bike/Ped Imps and Road Diet	HSIP7-04-014: In Oakland: Telegraph Ave from 29th to 45th St: Install crosswalk enhancements, painted bulb-outs, and painted median refuges; from 29th to 41st St: Implement road diet with buffered	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-01-0001	2040
Alameda	Oakland	ALA150043	Oakland: Shattuck and Claremont Bike/Ped Imps	HSIP7-04-016 Oakland: On Claremont from Telegraph to Clifton: Implement road diet with bike lanes; Shattuck at 49th, 51St, 59th St, Alactraz: Construct crosswalk enhancements, RRFBs, bulb-out,	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-01-0004	2040
Alameda	Oakland	ALA150047	Oakland: Telegraph Avenue Complete Streets	Oakland: on Telegraph Avenue between 20th St and 41st St: Implement complete street project inc. road diet, buffered bike lanes, ped crossing improvements, bulbouts, bus boarding islands, traffic signal	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-01-0004	2040
Alameda	Oakland	ALA170052	Oakland Fruitvale Ave Bike/Ped Imprvmnts H8-04-014	Oakland: Fruitvale Ave from E 10th St to E 23th St: H8-04-014 Install crosswalk enhancements, RRFBs, signal upgrades and modifications, signing, striping, markings. Implement road diet, parking lane	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-01-0004	2040

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List of Projects in the 2019 Transportation Improvement Program

Sorted by Air Quality Conformity Status, County and Sponsor

County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Alameda	Oakland	ALA991081	42nd Ave. & High St. I-880 Access Improv.	Oakland: In the vicinity of the I-880/42nd & High interchange: Widening and re-alignment of local streets Including modified traffic signals and intersection improvements.	2019 TIP Update - Update funding plan	NON-EXEMPT	17-01-0043	2020
Contra Costa	Antioch	CC-070008	Laurel Road Extension	Antioch: On Laurel Road between Kirk Lane and SR4 Bypass: Construct new 4 lane divided extension with bike lanes, sidewalks, and bus stops.	2019 TIP Update	NON-EXEMPT	17-02-0007	2040
Contra Costa	Antioch	CC-070009	Slatten Ranch Road Extension Phase I	Antioch: Slatten Ranch Road between Hillcrest Avenue to Wicklow Road: Phase I - Construct new 4 lane road.	2019 TIP Update	NON-EXEMPT	17-02-0007	2040
Contra Costa	BAIFA	CC-170002	CC-680 Northern Segment Express Lane - Southbound	Contra Costa County: On I-680 Southbound from Benicia-Martinez Toll Plaza to El Cerro: Convert HOV to express lanes and add/modify express lane elements. Project also references RTP ID 17-10-0054	2019 TIP Update	NON-EXEMPT	17-10-0049	2020
Contra Costa	BART	CC-050025	E-BART - East Contra Costa Rail Extension	Pittsburg/Antioch: East Contra Costa County: Extend Rail Service from the Pittsburg/Bay Point Station into eastern Contra Costa County	2019 TIP Update - Retain in the TIP for informational purposes	NON-EXEMPT	17-02-0047	2020
Contra Costa	BART	CC-130002	eBART Railroad Avenue Station	Pittsburg: on eBART corridor at Railroad Ave: Design and construction of station	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-02-0047	2020
Contra Costa	Brentwood	CC-070011	Brentwood Boulevard Widening - North (Phase I)	Brentwood: Brentwood Boulevard from Havenwood Avenue to Homecoming Way: Phase I-Widen from 2 to 4 lanes including a new parallel bridge over Marsh Creek, traffic signal modifications, and utilities	2019 TIP Update - Update funding plan	NON-EXEMPT	17-02-0030	2030
Contra Costa	Brentwood	CC-070078	John Muir Parkway Extension: Ph. II	Brentwood: John Muir Parkway northerly from Briones Valley Rd to a logical termini on Concord Avenue: Extend roadway(1 lane + 1 bike lane per direction).	2019 TIP Update	NON-EXEMPT	17-02-0007	2040
Contra Costa	Brentwood	CC-170015	Brentwood Boulevard Widening - North (Phase II)	Brentwood: Brentwood Blvd. between Homecoming Way and Lone Tree Way: Widen existing roadway from 2 to 4 lanes	2019 TIP Update	NON-EXEMPT	17-02-0030	2030
Contra Costa	CC County	CC-050030	Vasco Road Safety Improvements	Contra Costa County: Vasco Road from Walnut Blvd to the Alameda/Contra Costa County line: widen road and place concrete median barrier for 2.5 miles. Phase 1 completed a 1 mile widening segment.	2019 TIP Update	NON-EXEMPT	17-02-0004	2040
Contra Costa	CC County	CC-070075	Kirker Pass Road NB Truck Climbing Lanes	Unincorporated Contra Costa County: On Kirker Pass Road from Clearbrook Drive to approximately 1,000 feet beyond the crest of Kirker Pass Road; Construct northbound truck climbing lane and paved	2019 TIP Update	NON-EXEMPT	17-02-0014	2020
Contra Costa	CC County	CC-070081	Byron Highway - Vasco Road Connection	Contra Costa County: between Byron Highway and Vasco Road: Construct an east-west connection road	2019 TIP Update	NON-EXEMPT	17-02-0015	2040
Contra Costa	CC County	CC-170016	Camino Tassajara Realignment, S of Windemere Pkwy	Contra Costa County: Camino Tassajara between Windemere Parkway and the City of Dublin: Realign curves and widen road to four lanes	2019 TIP Update - Update scope and funding	NON-EXEMPT	17-02-0033	2030
Contra Costa	CCTA	CC-010023	I-680/SR 4 I/C Reconstruction - Phases1 & 2	Contra Costa Acounty: I-680/SR4 I/C: Reconstruct I/C, provide 2 lane direct connector from NB 680 to WB SR4 w/slip ramps at Pacheco Blvd, and 2 lane direct WB SR4 to SB I-680. Phases 1 and 2. Env Doc	2019 TIP Update - Update funding plan	NON-EXEMPT	17-02-0019	2030
Contra Costa	CCTA	CC-050028	I-680 SB HOV Lane Completion	Contra Costa County: I-680 from North Main Street to Livorna in the southbound direction: Construct a HOV lane	2019 TIP Update - Update funding plan	NON-EXEMPT	17-02-0022	2020

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List of Projects in the 2019 Transportation Improvement Program

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County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Contra Costa	CCTA	CC-070035	Reconstruct I-80/San Pablo Dam Rd Interchange	San Pablo: I-80/San Pablo Dam Rd I/C: Reconstruct I/C-relocating WB El Portal on-ramp to the full I/C northwards, providing access to McBryde through a new road from SPDR I/C, and replacing Riverside	2019 TIP Update - Update the funding plan	NON-EXEMPT	17-02-0021	2030
Contra Costa	CCTA	CC-130046	I-680 / SR 4 Interchange Reconstruction - Phase 3	In Pacheco: At the I 680/Route 4 interchange: Widen SR4 in the median to provide a third lane in each direction from Morello Avenue to Port Chicago (SR242). Work includes widening of bridges within	2019 TIP Update	NON-EXEMPT	17-02-0019	2030
Contra Costa	CCTA	CC-150009	CCTA - Carshare 4 All	Contra Costa County: Various locations: Expand carshare access at transit locations and conduct outreach	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-10-0015	2040
Contra Costa	CCTA	CC-150013	SR 4 Integrated Corridor Management	Contra Costa County: Along SR 4 between I-80 in Hercules to the SR 4/SR 160 Interchange in the City of Antioch: Implement Integrated Corridor Management along corridor.	2019 TIP Update	NON-EXEMPT	17-02-0010	2030
Contra Costa	CCTA	CC-170017	I-680 NB Exp Lane Conversion/HOV Ext & Op Imp	Contra Costa County: NB I680 from Livorna Rd to SR242: Extend HOV lane; NB I680 from Livorna to Benicia-Martinez Bridge: Convert HOV to EL; NB I680 from N Main St to Treat Blvd and from Livorna Rd to	2019 TIP Update	NON-EXEMPT	17-02-0012	2030
Contra Costa	CCTA	CC-170018	SR-4 Operational Improvements - Initial Phases	Contra Costa County: On SR-4 between I-680 and Bailey Road: Implement operational improvements including adding general purpose and auxiliary lanes at various locations	2019 TIP Update	NON-EXEMPT	17-02-0020	2030
Contra Costa	CCTA	CC-170061	I-680 Bus On Shoulder	In Contra Costa County: On I-680 between Ygnacio Valley Rd and Alcosta Blvd: Increase bus service efficiency by implementing bus operations on shoulder (BOS)	2019 TIP Update	NON-EXEMPT	17-02-0051	2030
Contra Costa	Concord	CC-070024	SR 242 / Clayton Road Interchange Improvements	Concord: At the SR242/Clayton Rd Interchange: Construct NB on-ramp and SB off-ramp	2019 TIP Update - Update funding plan	NON-EXEMPT	17-02-0016	2030
Contra Costa	Concord	CC-090026	Ygnacio Valley Road Widening	Concord: Ygnacio Valley Road from Michigan Boulevard to Cowell Road: widen from 4 lanes to 6 lanes	2019 TIP Update - Update the funding plan	NON-EXEMPT	17-02-0032	2030
Contra Costa	Concord	CC-130006	Concord BART Station Bike/Ped Access Improvements	Concord: Near the Downtown Concord BART Station: Implement bike/ped access improvements including road diets, buffered bike lanes (0.7 mi), Class 2 bike lanes (0.6 mi), and Class 3 bike routes (0.1	2019 TIP Update - Added $585,000 of Local Funds to project.	NON-EXEMPT - Not Regionally Significant Project	17-02-0003	2040
Contra Costa	Danville	CC-170001	San Ramon Valley Blvd Lane Addition and Overlay	In Danville: On San Ramon Blvd between Jewel Terrace and Podva Rd: Lane addition and rehabilitate roadway.	2019 TIP Update	NON-EXEMPT	17-02-0052	2020
Contra Costa	El Cerrito	CC-070046	El Cerrito del Norte Area TOD Complete Street Imps	El Cerrito: El Cerrito del Norte BART Station Area: Complete Streets improvements to access, circulation and safety for bicyclists, pedestrians, local and regional bus, rapid bus, and automobile connections	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-02-0005	2040
Contra Costa	Hercules	CC-030002	Hercules Intercity Rail Station	In Hercules: At future train station: Install multi-use trails, utility relocation, track improvements, construct rail station, and parking facility.	2019 TIP Update - Update funding plan and scope	NON-EXEMPT	17-02-0039	2030
Contra Costa	Martinez	CC-030004	Martinez Intermodal Station Parking Expansion	Martinez: At the Martinez Intermodal Station: Expand parking from 175 spaces to 600 spaces. Project includes adding a pedestrian and a vehicular bridge to access the parking lot.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-02-0009	2040

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Contra Costa	Oakley	CC-170019	Civic Center Railroad Platform Park & Ride Complex	Oakley: Main Street between 2nd Street and O'Hara Avenue: Build 2 parking lots for multi-modal park, ride, and transit activities. Lots will serve train riders for a future train platform which includes	2019 TIP Update	NON-EXEMPT	17-02-0046	2030
Contra Costa	Pittsburg	CC-130039	Pittsburg Multimodal Transit Station Access Imps.	In Pittsburg: At the Northeast corner of Railroad Ave and California Ave: Construct a Kiss-n-Ride lot, add a right-turn lane on California Ave and improve multi-modal access to eBART station.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-02-0005	2040
Contra Costa	Richmond	CC-050076	I-80/Central Avenue - Local Portion	Richmond: I-80/Central Ave Interchange: Connect Pierce St to San Mateo and relocate signal at Pierce/Central to San Mateo/Central intersection.	2019 TIP Update - Update scope and funding	NON-EXEMPT - Not Regionally Significant Project	17-02-0026	2030
Contra Costa	San Ramon	CC-090019	Bollinger Canyon Road Widening (Alcosta to SRVB)	San Ramon: Bollinger Canyon Road between Alcosta Blvd and San Ramon Valley Blvd: Widen from six to eight lanes. Project is phased.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-02-0007	2040
Contra Costa	San Ramon	CC-190001	Crow Canyon Road (Alcosta to Indian Rice) Widening	San Ramon: Crow Canyon Rd from Alcosta Blvd to Indian Rice Rd: Widen to three lanes in each direction	2019 TIP Update - new project	NON-EXEMPT	17-02-0007	2040
Contra Costa	WETA	CC-070062	Richmond Ferry Service	WETA: Between Richmond and San Francisco: Implement new ferry transit service	2019 TIP Update	NON-EXEMPT	17-02-0042	2020
Marin	GGBHTD	MRN130001	Larkspur Ferry Terminal Parking Garage	In Larkspur: At the Larkspur Ferry Terminal (LFT): Planning studies for a new three story parking structure	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-03-0014	2040
Marin	GGBHTD	MRN190001	Golden Gate Ferry: New Vessel	GGBHTD: 1 vechicle: Purchase a new, 450-passenger, high-speed ferry vessel to continue to provide expanded commute service from Larkspur and Tiburon to San Francisco.	2019 TIP Update - new project	NON-EXEMPT	17-10-0010	2030
Marin	Marin County	MRN110035	Mountain View Rd Bridge Replacement - 27C0154	Marin County: On Mountain View Rd. over San Geronimo Creek (Bridge No. 27C0154) near the intersection with Sir Francis Drake Blvd: Replace existing one-lane bridge with a new two-lane bridge	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-10-0024	2040
Marin	MTC	MRN150009	Richmond-San Rafael Bridge Access Improvements	In Contra Costa and Marin Counties: On I-580/Richmond-San Rafael Bridge: Convert existing shoulders to an automobile travel lane (EB) and a bike/ped path, construct bike/ped path in Contra Costa	2019 TIP Update - Update funding plan	NON-EXEMPT	17-10-0036	2020
Marin	Novato	MRN070006	Novato Boulevard Widening, Diablo to Grant	Novato: Novato Blvd between Diablo and Grant Ave.: Improvements to roadway including including widening existing two/three lanes to four lanes and adding turn lanes, bike lanes, curbs, and sidewalks.	2019 TIP Update	NON-EXEMPT	17-03-0011	2030
Marin	San Anselmo	MRN110032	San Anselmo - Center Blvd Bridge Replace (27C0079)	San Anselmo: Center Blvd Bridge over San Anselmo Creek, at Sycamore Ave: Replace existing 2 lane bridge with 3 lane bridge	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-10-0024	2040
Marin	TAM	MRN050034	US 101 HOV Lanes - Marin-Sonoma Narrows (Marin)	Marin and Sonoma Counties: From SR 37 in Novato to Old Redwood Highway in Petaluma; Convert expressway to freeway and widen to 6 lanes for HOV lanes.	2019 TIP Update	NON-EXEMPT	17-03-0006	2030
Multi-County	BAIFA	REG130004	Regional Express Lane Network	SF Bay Area: Regionwide: Program-level project costs to support the Regional Express Lane Network deployment including program (planning, coordination, & management), centralized toll system,	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0054	2040

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Multi-County	BAIFA	VAR170003	ALA/CC-80 and Bay Bridge Approach Express Lanes	In Alameda/Contra Costa counties: On I-80 from the Carquinez Bridge to Powell and the Bay Bridge Approaches: Convert HOV lanes to express lanes. Project also references RTP ID 17-10-0045.	2019 TIP Update	NON-EXEMPT	17-10-0053	2030
Multi-County	BART	REG090037	BART: Railcar Procurement Program	BART: Procure 790 Railcars (includes the replacement of 669 Railcars)	2019 TIP Update	NON-EXEMPT	17-10-0006	2040
Multi-County	BART	REG170017	BART Transbay Core Capacity Improvements	BART: Systemwide: Implement communication-based train control (CBTC) system, expand rail car fleet by 306 vehicles, add traction power substations (5); At Hayward Maintenance Complex; Expand	2019 TIP Update - Update funding plan	NON-EXEMPT	17-10-0006	2040
Multi-County	Caltrans	REG150001	Oakland to San Jose Double Track (Segment 2A)	Between Oakland and San Jose: On UPRR Niles subdivision from MP 6 to MP 35, and the Coast subdivision MP 13 to MP 35, and on the Caltrain Right of Way MP 44 to MP 48: Construct a second mainline	2019 TIP Update	NON-EXEMPT	17-01-0026	2040
Multi-County	MTC	REG170004	Bay Bridge Forward - Commuter Parking Initiative	Albany and Oakland: At I-80/Buchanan Ave, I-880/High St, I-880/Fruitvale: Establish commuter parking in East Bay including parking management technologies, to encourage carpool and express bus	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-10-0033	2040
Multi-County	MTC	REG170005	Bay Bridge Forward - Flexible On-Demand Transit	SF Bay Area: Region-Wide: Provide on-demand transit services between East Bay and San Francisco, including related supportive transportation demand management strategies.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-10-0033	2040
Multi-County	MTC	REG170011	Innovative Deployments to Enhance Arterials: Cat 2	SF Bay Area: Regionwide: Deploy advanced technologies along arterials to enhance mobility and safety across all modes, with a focus on Connected/Automated vehicles, including demonstration/pilot	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-10-0033	2040
Multi-County	MTC	REG170012	Shared Use Mobility	SF Bay Area: Regionwide: Implement innovative projects & initiatives that promote shared forms of technology-based transportation options, may include pilot microtransit programs of no more than five	2019 TIP Update	NON-EXEMPT	17-10-0033	2040
Multi-County	MTC	REG170015	Innovative Deployments to Enhance Arterials: Cat 1	SF Bay Area: Region-wide: Deploy advanced technologies along arterial to enhance mobility and safety across all modes, including demonstration/pilot queue jump lanes no longer than one quarter mile	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-10-0033	2040
Multi-County	MTC	VAR170013	Bay Bridge Forward - Casual Carpool	San Francisco and the East Bay: Along I-80 corridor: Establish and improve casual carpool pick-up locations at key locations in San Francisco and along I-80 and in East Bay.	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-10-0033	2040
Multi-County	MTC	VAR170021	Freeway Performance Program: I-880 Corridor	Alameda & Santa Clara Counties: I-880 from I-280 to I-80: Deliver operational strategies including adaptive ramp metering, advanced tech, arterial/transit priority signal upgrades & higher vehicle	2019 TIP Update	NON-EXEMPT	17-10-0033	2040
Multi-County	MTC	VAR170023	Freeway Performance Program: SR-84	Alameda & San Mateo Counties; SR-84 from I-880 to US-101; Deliver operational strategies including adaptive ramp metering, advanced technologies, arterial/transit priority signal upgrades, & higher	2019 TIP Update	NON-EXEMPT	17-10-0033	2040
Multi-County	SMART	SON090002	Sonoma Marin Area Rail Corridor	Between Sonoma and Marin Counties: On NWP rail line: Implement passenger rail service and non-motorized pathway. Project also references RTP ID 22001	2019 TIP Update - Update the funding plan	NON-EXEMPT	17-03-0015	2020

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Multi-County	WETA	MTC050027	Ferry Service - Berkeley	WETA: Berkeley: Provide ferry service from Berkeley to San Francisco.	2019 TIP Update	NON-EXEMPT	17-10-0042	2030
Multi-County	WETA	MTC050029	SF Ferry Terminal/Berthing Facilities	San Francisco: At the Ferry Terminal: Construct additional ferry docking/berthing facilities in the South Basin to improve ferry access and support WETA berthing/maintenance operational needs. Project is	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0018	2040
Napa	American Canyon	NAP110029	Eucalyptus Drive Realignment Complete Streets	American Canyon: Eucalyptus Dr. from Theresa Rd to Hwy 29: Extend roadway and reconfigure intersection of Eucalyptus Dr and Hwy 29 and Eucalyptus Drive and Theresa Road. Create complete street	2019 TIP Update - Update the funding plan	NON-EXEMPT - Not Regionally Significant Project	17-04-0004	2040
Napa	American Canyon	NAP130006	Devlin Road and Vine Trail Extension	American Canyon: Devlin Road from the southern terminus 2,500 feet south to Green Island Road: Construct roadway extension and Class I multipurpose path	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-04-0004	2040
Napa	NVTA	NAP050009	Park & Ride Lots in Napa County	Napa County: American Canyon, and Calistoga/St. Helena/Yountville: Construct Park and Ride Lots. Various existing Park and Ride Lots: Construct improvements	2019 TIP Update	NON-EXEMPT	17-04-0006	2040
Napa	NVTA	NAP170003	NVTA- Vine Transit Bus Maintenance Facility	Napa County: At an 8 acre site in south Napa County: Construct a new transit maintenance facility for Vine Transit operations	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-04-0006	2040
San Francisco	Port of SF	SF-130021	Pier 70 19th Street & Illinois Street Sidewalk	San Francisco: 19th St to 20th St (via Georgia St): Extend roadway and install bike/ped improvements.	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-05-0008	2040
San Francisco	Port of SF	SF-170001	Mission Bay Ferry Terminal	San Francisco: At the eastern terminus of 16th St: Construct new ferry landing to service San Francisco Mission Bay and Central Waterfront as a part of the Bay area ferry transit system	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0019	2030
San Francisco	SF County TA	SF-110049	Treasure Island Congestion Pricing Program	San Francisco: Treasure Island: Implement Congestion Pricing Program. project is phased	2019 TIP Update	NON-EXEMPT	17-05-0030	2030
San Francisco	SF County TA	SF-130004	Treasure Is/Yerba Buena Is Street Improvements	San Francisco: On Treasure Island: Implement Treasure Island/Yerba Buena Island street network Project includes a new street network, traffic calming, bike & pedestrian improvements, streetscape and	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0030	2030
San Francisco	SF County TA	SF-130005	Treasure Island Pricing Mobility Improvements	San Francisco: On Treasure Island: Pricing Program Mobility Improvements including Transit Capital and maintenance improvements. The project is phased	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-05-0030	2030
San Francisco	SF County TA	SF-130008	HOV/HOT Lanes on U.S.101 and I-280 in SF	San Francisco: On US 101 from SF/SM County line to I-280 interchange and on I-280 from US 101 interchange to 6th Street offramp: Convert an existing mixed traffic lane and/or shoulder/excess ROW in	2019 TIP Update	NON-EXEMPT	17-05-0020	2030
San Francisco	SF County TA	SF-130017	SF Downtown Congestion Pricing	San Francisco: In the downtown area: Implement a demonstration value pricing (tolls and incentives) program	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0029	2030
San Francisco	SF County TA	SF-150008	Quint-Jerrold Connector Road	San Francisco: From Oakdale Ave to Jerrold Ave: Provide an alternate access route between Oakdale and Jerrold Avenues and across the Caltrain tracks, to be coordinated with Caltrain's Quint Street Bridge	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-05-0008	2040
San Francisco	SF County TA	SF-991030	US 101 Doyle Drive Replacement	San Francisco: US 101 (Doyle Drive) from Lombard Street/Richardson Avenue to Route 1 Interchange; Replace/rehabilitate roadway.	2019 TIP Update - Update the funding plan	NON-EXEMPT	17-05-0022	2020

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San Francisco	SF DPW	SF-010038	Bayview Transportation Improvements	In San Francisco: From US 101 to the Hunters Point Shipyard along: 25th, I280-Illinois; Cesar Chavez, US101-Illinois; Illinois, 25th-Cargo; Cargo, Illinois-Jennings; Jennings, Cargo-Evans; Evans, Cesar	2019 TIP Update - Update the funding plan	NON-EXEMPT	17-05-0008	2040
San Francisco	SF DPW	SF-090004	Harney Way Roadway Widening	San Francisco: Harney Way from US 101 to Jamestown: Improvements including right-of-way engineering, land acquisition for future widening of roadway, design, landscaping and sidewalk improvements,	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0008	2040
San Francisco	SF DPW	SF-110006	Hunters Pt Shipyard and Candlestick Pt Local Roads	In San Francisco: Hunters Point Shipyard and Candlestick Point: Implement new local streets to support multi-modal mixed use development. The project is phased.	2019 TIP Update	NON-EXEMPT	17-05-0027	2040
San Francisco	SF DPW	SF-130001	SF- Better Market Street Transportation Elements	In San Francisco: Market St from Steuart St to Octavia Blvd: improve roadway, including resurfacing, sidewalk and transit boarding improvements, transit connections, traffic signals, transportation	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0016	2030
San Francisco	SF DPW	SF-130006	Southeast Waterfront Transportation Improvements	San Francisco: Between HP Shipyard and Candlestick Pt: improve roadways to facilitate 5-mile, multi-modal corridor, connecting project area with the Bayshore Intermodal Station. Project development and	2019 TIP Update	NON-EXEMPT	17-05-0031	2040
San Francisco	SF DPW	SF-130007	HOPE SF Street Network - Hunters View	San Francisco: Hunters View in Southeast: Realign streets and add new streets at public housing sites with new affordable housing units to improve transit, walking, and biking. Project is phased. Phase I	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-05-0008	2040
San Francisco	SF DPW	SF-130011	SF- Second Street Complete Streets and Road Diet	In San Francisco: On Second Street between Market and King; Design and construct a complete streets project including the removal of a vehicular travel lane from Market to Townsend	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-05-0004	2040
San Francisco	SF DPW	SF-170013	HOPE SF Street Network - Sunnydale and Potrero	San Francisco: Sunnydale and Potrero neighborhoods: Construct new and realigned street networks throughout the two remaining HOPE SF sites, including traffic calming pedestrian and bike network, and	2019 TIP Update - Update funding plan	NON-EXEMPT - Not Regionally Significant Project	17-05-0008	2040
San Francisco	SFMTA	SF-010037	SF Muni Third St LRT Phase 2 - New Central Subway	San Francisco: North-south alignment under 4th St. to Market, then under Geary to Stockton & under Stockton to Clay St; Extend the Light Rail line project includes procurement of four LRVs.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0038	2030
San Francisco	SFMTA	SF-070003	Historic Streetcar Extension to Fort Mason	San Francisco: From Fisherman"s Wharf through National Park Service lands in Aquatic Park to Fort Mason: Extend the E-line or the current F-line service.	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0042	2030
San Francisco	SFMTA	SF-070004	Geary Bus Rapid Transit	San Francisco: Along the Geary corridor between 34th Avenue and Market Street: Design and implement transit performance and safety improvements	2019 TIP Update - Update the funding plan and clarify scope and phasing	NON-EXEMPT	17-05-0021	2030
San Francisco	SFMTA	SF-090012	Additional Light Rail Vehicles to Expand Muni Rail	SFMTA: LRV Fleet: Procure approximately 109 expansion LRVs.	2019 TIP Update - Update scope and funding plan	NON-EXEMPT	17-05-0013	2040
San Francisco	SFMTA	SF-090016	Transit Center in Hunters Point	Muni:Transit Center in Hunters Point; Construct 10 bays, Low-level platform, Operator restroom, bus shelters,Electrical ductbank for MUNI power,etc	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0031	2040

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San Francisco	SFMTA	SF-090018	Oakdale-Palou Interim High-Capacity Bus Corridor	San Francisco: On the Palou Ave corridor: Implement Transit Preferential improvements, including bus bulbs, up to six traffic signals with transit signal priority, new bus shelters and pedestrian safety	2019 TIP Update	NON-EXEMPT	17-05-0010	2040
San Francisco	SFMTA	SF-090020	Geneva Harney BRT Infrastructure: Central Segment	SFMTA: From Executive Park/Harney Way under US 101 to SF/Daly City line on Geneva Avenue: Construct bus rapid transit facilities	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0032	2030
San Francisco	SFMTA	SF-090023	Geneva Harney BRT Infrastructure: Eastern Segment	SFMTA: Bayview and Hunters Point: from Executive Park/Harney Way to Hunters Point Transit Center via Candlestick/Hunters Pt. Shipyard development: Construct extension of Geneva Harney BRT	2019 TIP Update - Update funding plan	NON-EXEMPT	17-05-0032	2030
San Francisco	TBJPA	SF-010015	Transbay Term/Caltrain Downtown Ext - Ph.1	San Francisco: Transbay Transit Center; Replacement and expansion of the terminal at the present site.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing and update the funding plan to include actual total SF Sales Tax allocations	NON-EXEMPT	17-10-0039	2020
San Francisco	TBJPA	SF-050002	Transbay Terminal/Caltrain Downtown Ext: Ph. 2	San Francisco: From Fourth/Townsend to new Transit Center: Extend Caltrain commuter rail service	2019 TIP Update - update funding plan to include commitments of Other Local and SF Sales Tax funds	NON-EXEMPT	17-10-0038	2030
San Mateo	Brisbane	SM-090004	US 101/Candlestick Interchange	In San Mateo County: U.S. 101/Candlestick Point Interchange: Planning and environmental studies for interchange reconfiguration to allow for safer and better flow of traffic	2019 TIP Update - Update funding plan	NON-EXEMPT	17-06-0021	2040
San Mateo	Burlingame	SM-130021	Carolan Ave Complete Streets and Road Diet	Burlingame: Carolan Ave between Broadway and Oak Grove Ave: Implement road diet by converting a 4-lane roadway into a 2-lane roadway with a center turn lane, Class II bike lanes, and intersection	2019 TIP Update - Retain in TIP as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-06-0003	2040
San Mateo	Caltrain	SM-070008	Caltrain South Terminal Phase II and III	San Jose: Just north of Diridon Station: Phase II - Construct an additional mainline track and new signal controls; Just south of Diridon Station: Phase III - install an additional mainline track and signal	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-07-0065	2040
San Mateo	Caltrain	SM-190002	Peninsula Corridor Electrification Expansion	Caltrain: Electric Multiple Unit (EMU) fleet: Expand fleet through procurement of an additional 40 vehicles.	2019 TIP Update - Add new project	NON-EXEMPT	17-07-0065	2040
San Mateo	CCAG	SM-150017	US101 Managed Lanes: Santa Clara Co-S of Grand Ave	San Mateo County: On US101 from 2 miles south of the Santa Clara County Line to 0.3 miles south of Grand Ave I/C: Install Express Lanes. Use existing aux lanes where possible and add aux lanes where	2019 TIP Update - Update funding plan	NON-EXEMPT	17-07-0075	2030
San Mateo	Half Moon Bay	SM-090015	Route 1 improvements in Half Moon Bay	Half Moon Bay: On SR-1: Improve safety, including adding protected turn lanes, adding through lanes, and new ped/bike path; SR-1 from N. Main to Kehoe: Extend four lane configuration; Frontage Rd and	2019 TIP Update	NON-EXEMPT	17-06-0023	2030
San Mateo	Pacifica	SM-170004	Manor Drive Overcrossing and Milagra On Ramp	In Pacifica: Hwy 1 and Manor Drive I/C: Widen the existing overcrossing; Hwy 1 and Milagra: Construct a new on-ramp; Both intersections: install signals	2019 TIP Update - Update funding plan	NON-EXEMPT	17-06-0004	2040
San Mateo	Redwood City	SM-050027	US 101 / Woodside Interchange Improvement	Redwood City: US101/Woodside Rd Interchange: Reconstruct and reconfigure interchange including direct-connect flyover ramp to Veterans Blvd; Seaport Blvd and SR84 from US101/SR84 separation to	2019 TIP Update	NON-EXEMPT	17-06-0010	2030
San Mateo	Redwood City	SM-090007	Blomquist Street Extension	In Redwood City: On Blomquist Street from Seaport Blvd to Bair Island Road: Extend roadway. Project may be phased.	2019 TIP Update - Update funding plan	NON-EXEMPT	17-06-0040	2030

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San Mateo	Redwood City	SM-110002	Redwood City Ferry Service	SF Bay Area: Between Redwood City and San Francisco: Environmental clearance and design of ferry transit service	2019 TIP Update - Change project sponsor and update funding plan	NON-EXEMPT	17-06-0030	2040
San Mateo	SamTrans	SM-190003	SamTrans Express Bus Service	San Mateo, San Francisco and Santa Clara Counties: On the US-101 Corridor: Implement a network of four express bus routes	2019 TIP Update - add new non-exempt project	NON-EXEMPT	17-10-0033	2040
San Mateo	San Mateo	SM-090014	Improve US 101 operations near Rte 92	City of San Mateo: On US 101 near Route 92: Operational improvements	2019 TIP Update	NON-EXEMPT	17-06-0009	2040
San Mateo	San Mateo	SM-170011	US 101/Peninsula Avenue Interchange Improvements	San Mateo: US-101 at Peninsula Ave and East Poplar Ave: Convert a partial interchange to a full interchange by adding new southbound on- and off-ramps and closing the southbound on- and off-ramps	2019 TIP Update	NON-EXEMPT	17-06-0012	2030
San Mateo	SMCTA	SM-090009	US 101 Aux lanes from Sierra Point to SF Cnty Line	San Mateo County: On US 101 from Sierra Point to SF County Line; Construct auxiliary lanes or managed lanes. Project also references RTP ID 240060 for managed lanes	2019 TIP Update	NON-EXEMPT	17-06-0008	2030
San Mateo	SSF	SM-110003	US 101/Produce Avenue Interchange	South San Francisco: On US Highway 101 from Utah Avenue on the east side to the vicinity of Produce Avenue on the west side: Construct a local interchange	2019 TIP Update	NON-EXEMPT	17-06-0011	2030
Santa Clara	San Jose	SCL030006	US 101/Blossom Hill Interchange Improvements	San Jose: At US101/Blossom Hill I/C: Reconstruct I/C including the widening of Blossom Hill Rd, signal upgrades and other modifications to eliminate congestion caused by merge and weave problems and	2019 TIP Update	NON-EXEMPT	17-07-0038	2030
Santa Clara	San Jose	SCL070004	US 101 / Mabury New Interchange	San Jose: US 101/Mabury interchange at the location of the existing Talyor St overpass: Construct full interchange.	2019 TIP Update	NON-EXEMPT	17-07-0027	2030
Santa Clara	San Jose	SCL110006	San Jose - Autumn Street Extension	In San Jose: Autumn St between Julian Street and San Carlos Street: Widen, partially realign, and extend Autumn Street to adequately accommodate projected traffic demand.	2019 TIP Update	NON-EXEMPT	17-07-0005	2040
Santa Clara	San Jose	SCL190001	US 101/Old Oakland Road Interchange improvements	Oakland Rd - Commercial St to US 101: Widen to 8 lanes; Commercial St - Oakland Rd to Berryessa Rd: Add turn lanes; Commercial St - Berryessa Rd to Mabury Rd: Extend roadway: US 101 ramps: Widen	2019 TIP Update - new project	NON-EXEMPT	17-07-0039	2030
Santa Clara	Santa Clara Co	SCL090017	Montague Expwy Widening - Trade Zone-I-680	Santa Clara County: Montague Expressway between Trade Zone and I-680: Widen roadway to 8 lanes	2019 TIP Update - Update the funding plan	NON-EXEMPT	17-07-0005	2040
Santa Clara	Santa Clara Co	SCL110007	San Tomas Expressway Widening	Santa Clara County: San Tomas Expressway between El Camino Real and Homestead Road: Phase I widening; San Tomas Expressway between Homestead Road and Stevens Creek Blvd: Phase II widening	2019 TIP Update - Update the funding plan and clarify phasing	NON-EXEMPT	17-07-0078	2030
Santa Clara	VTA	BRT030001	BART - Berryessa to San Jose Extension	In San Jose: From Berryessa Station to San Jose and Santa Clara: Extend BART line	2019 TIP Update - Update funding plan	NON-EXEMPT	17-07-0012	2030
Santa Clara	VTA	SCL050009	Eastridge to BART Regional Connector	San Jose: At the Eastridge Transit Center: Ph I (completed) ¿ Improve and expand transit center; Capitol Expwy Light Rail from Alum Rock Transit Center to Eastridge Transit Center: Ph II - Extend light rail,	2019 TIP Update - Update scope to reflect phasing and update funding	NON-EXEMPT	17-07-0061	2030
Santa Clara	VTA	SCL090016	SR 152 New Alignment	Santa Clara/ San Benito counties: SR152 between US101 and SR156: Complete PA&ED for new alignment the highway.	2019 TIP Update - Update funding plan	NON-EXEMPT	17-07-0022	2040
Santa Clara	VTA	SCL090030	SR 85 Express Lanes	In Santa Clara County: Implement roadway pricing on SR 85 carpool lane from US 101 in San Jose to US 101 in Mountain View.	2019 TIP Update	NON-EXEMPT	17-07-0074	2030

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Santa Clara	VTA	SCL090040	LRT Extension to Vasona Junction and Double Track	Campbell and San Jose: From the existing Winchester Station to a new Vasona Junction Station, near Route 85: Extend the light-rail line and double-track single-track sections of the Vasona line	2019 TIP Update - Update scope and funding	NON-EXEMPT	17-07-0062	2030
Santa Clara	VTA	SCL110002	Santa Clara County - US 101 Express Lanes	In Santa Clara County: From Cochrane Rd. in Morgan Hill to San Mateo County line in Palo Alto: Implement roadway pricing on US 101 carpool lane	2019 TIP Update	NON-EXEMPT	17-07-0075	2030
Santa Clara	VTA	SCL110005	BART - Warm Springs to Berryessa Extension	Santa Clara County: From Warm Springs to the Berryessa Station in San Jose: Extend BART	2019 TIP Update	NON-EXEMPT	17-07-0077	2020
Santa Clara	VTA	SCL110008	SR 237 Express Lanes: North 1st St to Mathilda Ave	In Santa Clara County: On SR-237 from Mathilda Ave to North 1st St.: Implement roadway pricing carpool lane; On SR-237 from I-880 to Mathilda Avenue: Operational Improvements in terms of restriping	2019 TIP Update - Update funding plan	NON-EXEMPT	17-07-0070	2030
Santa Clara	VTA	SCL130001	SR 237/US 101/Mathilda Interchange Modifications	In Sunnyvale: US 101/Mathilda and SR 237/Mathilda interchanges: Modify interchanges to relieve congestion and improve traffic operations for all modes	2019 TIP Update	NON-EXEMPT	17-07-0033	2030
Santa Clara	VTA	SCL150018	Peery Park Rides	In Sunnyvale: Peery Park area: Implement flexible transit service as part of a trip reduction strategy.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-10-0015	2040
Santa Clara	VTA	SCL190002	I-280/Foothill Expressway Off Ramp Improvement	Santa Clara County: NB I-280/Foothill Expressway interchange: Widen off ramp to add one additional lane	2019 TIP Update	NON-EXEMPT	17-07-0079	2040
Santa Clara	VTA	SCL190004	I-280 HOV - San Mateo County line to Magdalena Ave	Santa Clara County: On I-280 in both directions from Magdalena Avenue in Los Altos Hills to the San Mateo County Line: Construct new HOV lane	2019 TIP Update	NON-EXEMPT	17-07-0028	2030
Santa Clara	VTA	SCL190005	SR 237 WB Auxiliary Lane fr McCarthy to North 1st	Santa Clara County: SR 237 between McCarthy Boulevard and North First Street: Add westbound auxiliary lane	2019 TIP Update - new project	NON-EXEMPT	17-07-0068	2030
Santa Clara	VTA	SCL190006	Double Lane Southbound US 101 off-ramp to SB SR 87	Santa Clara: Southbound US 101 to Southbound Route 87: Widen the existing connector ramp to add one additional traffic lane and construct and install Traffic Monitoring Station (TMC)	2019 TIP Update	NON-EXEMPT	17-07-0044	2020
Santa Clara	VTA	SCL190007	US 101/Zanker Road-Skyport Drive-N. Fourth St. Imp	San Jose: US101 at Zanker Rd/Skyport Dr./N. 4th St: Construct a new overcrossing over US 101 connecting Zanker Rd to Skyport Dr-N. Fourth St to create a new north-south corridor parallel to N. First St	2019 TIP Update	NON-EXEMPT	17-10-0023	2040
Santa Clara	VTA	SCL190008	US 101/De L Cruz Blvd - Trimble Road I/C Imp	Santa Clara: At the US101/De La Cruz Blvd/Trimble Rd IC: Modify interchange into a partial cloverleaf.	2019 TIP Update	NON-EXEMPT	17-07-0031	2030
Santa Clara	VTA	SCL190009	Calaveras Boulevard Widening	Milpitas: Calaveras Blvd. overpass at UPRR tracks from Abel St to Town Center Blvd: Widen from 4 to 6 lanes and modify signing, striping and signals	2019 TIP Update - new project	NON-EXEMPT	17-07-0051	2030
Santa Clara	VTA	SCL190010	US 101/Buena Vista Avenue Interchange Improvement	Gilroy: At Buena Vista Ave. overcrossing at US 101: Construct a complete interchange by widening the overcrossing structure and adding new northbound and southbound on and off ramps.	2019 TIP Update - new project	NON-EXEMPT	17-07-0035	2030
Santa Clara	VTA	SCL190011	I-280/Wolfe Road Interchange Improvement	Cupertino: I-280/Wolfe Road Interchange: Modify to relieve congestion and improve local circulation.	2019 TIP Update - new project	NON-EXEMPT	17-07-0026	2030

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Santa Clara	VTA	SCL190014	SR 17 Corridor Congestion Relief in Los Gatos	Los Gatos: On both directions of SR 17 from Lark Ave to south of SR 9 IC: Construct aux lanes including modifications to on-ramps and off-ramps to improve operations and relieve congestion; Along SR-	2019 TIP Update - new project	NON-EXEMPT	17-07-0067	2030
Solano	Dixon	SOL050009	Parkway Blvd/UPRR Grade Separation	In Dixon: Parkway Blvd from Valley Glen Dr. to Pitt School Rd: Construct new 4 lane roadway and overcrossing of UPRR & Porter Rd; Pitt School Rd from south of Hillview Drive to Porter Rd: widen shoulders	2019 TIP Update	NON-EXEMPT - Not Regionally Significant Project	17-08-0007	2040
Solano	Fairfield	SOL030002	Fairfield/Vacaville Intermodal Rail Station	In Fairfield: Capitol Corridor: Construct train station with passenger platforms, pedestrian undercrossing, highway overcrossing, park and ride lot,bike and other station facilities. Project is phased.	2019 TIP Update - Update funding plan	NON-EXEMPT	17-08-0015	2030
Solano	Fairfield	SOL110007	Fairfield Transportation Center - Phase 3	In Fairfield: Fairfield Transportation Center: Construct second parking structure with approximately 600 automobile parking spaces and access improvements.	2019 TIP Update	NON-EXEMPT	17-08-0015	2030
Solano	MTC	SOL110001	I-80 Express Lanes - Fairfield & Vacaville Ph I&II	I-80 in Solano County from Red Top Rd to I-505: Convert existing HOV to HOT & Construct new HOT lanes from Air Base Parkway to I-505. Project also references RTP ID 230660	2019 TIP Update	NON-EXEMPT	17-10-0044	2030
Solano	Solano County	SOL090015	Redwood-Fairgrounds Dr Interchange Imps	Solano County: I-80 Redwood St. I/C and SR-37/Fairgrounds Dr. I/C: Implement I/C and safety improvements; Fairgrounds Dr. from Redwood St. to SR-37: Remove left turn lane and widen to add one lane	2019 TIP Update - Update funding plan	NON-EXEMPT	17-08-0010	2030
Solano	STA	SOL070020	I-80/I-680/SR 12 Interchange Project	Fairfield: I-80/I-680/Route 12 IC: Ph-1 Improve IC, including connecting I-80 to SR 12 W, I-680 NB to SR 12W (Jameson Canyon), I-80 to I-680 (+ Express Lane Direct connectors), build local IC and build	2019 TIP Update	NON-EXEMPT	17-08-0009	2040
Solano	STA	SOL110004	Jepson: Walters Rd Ext - Peabody Rd Widening	Solano County: Jepson Parkway segment: Walters Road Extension, Peabody Widening.	2019 TIP Update	NON-EXEMPT	17-08-0012	2030
Solano	STA	SOL110005	Jepson: Leisure Town Road from Vanden to Commerce	Jepson Parkway segment: Leisure Town Road from Vanden Road to Commerce. Project is phased	2019 TIP Update	NON-EXEMPT	17-08-0012	2030
Solano	STA	SOL110006	Jepson: Leisure Town Road Phase 1B and 1C	Vacaville: (Phase 1B) Leisure Town Rd from Elmira Rd to Sequoia and (Phase 1C) from Sequoia Dr to Horse Creek: Widen to 4 lanes with multiuse sidewalk and safety improvements	2019 TIP Update - Update scope and funding	NON-EXEMPT	17-08-0012	2030
Sonoma	Santa Rosa	SON150006	US 101 Hearn Ave Interchange	Santa Rosa: US 101/Hearn Avenue over-crossing/interchange: Replace the US 101/Hearn Avenue over-crossing/interchange with a new over crossing/interchange including bike lanes, sidewalks, and re-	2019 TIP Update	NON-EXEMPT	17-09-0010	2030
Sonoma	Son Co TA	SON070004	US 101 Marin/Sonoma Narrows (Sonoma)	Marin and Sonoma Counties (Sonoma County Portion): From SR37 in Novato to Old Redwood Highway in Petaluma: convert expressway to freeway; Between Lakeville Highway and East Washigton Street:	2019 TIP Update	NON-EXEMPT	17-09-0006	2030
Sonoma	Son Co TA	SON150010	Santa Rosa Car Share	Santa Rosa: Various locations: Establish nine car share vehicles at four pods.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT - Not Regionally Significant Project	17-10-0015	2040

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Alameda	AC Transit	ALA010034	AC Transit: Facilities Upgrade	AC Transit: Systemwide: Agency's facilities & equipment upgrades.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Alameda	AC Transit	ALA150020	AC Transit: South County Corridors	AC Transit: South Alameda County Major Corridors: Travel time improvements including Adaptive Traffic Control Systems, corridor-wide Transit Signal Priority, signal coordination and relocation of key bus	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.128) - Traffic signal synchronization projects	17-01-0007	2040
Alameda	AC Transit	ALA150038	AC Transit: Purchase (10) Double-Deck Diesel Buses	AC Transit: (10) Double-Deck Diesel Buses: Purchase buses to replace buses in existing fleet	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA150039	AC Transit: Purchase (10) 40' Buses-Fuel Cell ZEB	AC Transit: 10 vehicles: Replace 10 40ft urban diesel buses with Zero-emission fuel cell buses	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA150045	AC Transit: PM - Exchange for 40ft Fuel Cell ZEB	AC Transit: Preventive maintenance program, including maintenance of buses and facilities. Project is in exchange for local funds to replace 10 (of 102 in sub-fleet) 40ft urban diesel buses with Zero-	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Alameda	AC Transit	ALA150052	AC Transit: SFOBB Forward	AC Transit: 14 replacement and 5 new buses: Rehab 14 buses and purchase 5 new double-decker buses to expand transbay service. Includes 1 year of operating funding.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0033	2040
Alameda	AC Transit	ALA170027	AC Transit: Purchase 10 Double-Decker Buses	AC Transit: 10 Double-Decker Buses: Purchase buses for transbay service	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170028	AC Transit: Purchase (35) 40ft Diesel Buses	AC Transit: 35 40-ft Diesel Buses: Purchase replacement buses to keep AC Transit's fleet in a state of good repair	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170029	AC Transit: Preventive Maintenance (Swap)	AC Transit: Systemwide: Preventive Maintenance (federal funding is provided for this project in exchange for AC Transit's commitment to Replace 5 40' Urban Buses - Battery using local funds)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Alameda	AC Transit	ALA170030	AC Transit: Preventive Maintenance (Deferred Comp)	AC Transit: Systemwide: Preventive Maintenance (funding is incentive for delaying bus purchases)	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Alameda	AC Transit	ALA170031	AC Transit: Replace (27) 40ft Urban Buses - Hybrid	AC Transit: (27) 40ft Urban Buses - Hybrid: Purchase replacement buses	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170032	AC Transit: Purchase 19 60-ft Artic Urban Buses	AC Transit: 19 vehicles: Purchase 19 60-ft Articulated Urban Buses	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170038	AC Transit: Replace (6) 24ft Cut-Away Vans	AC Transit: (6) 24ft Cut-Away Vans: Replace vans	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170041	AC Transit: 5 Battery Electric Bus purchase	AC Transit: 5 buses: Purchase 5 New Flyer battery electric buses with 5 depot charging stations and installation. Includes consulting PM support from CTE.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040

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Alameda	AC Transit	ALA170059	San Pablo and Telegraph Ave Rapid Bus Upgrades	AC Transit: Various locations on the San Pablo and Telegraph Ave Corridors: Implement rapid bus improvements including TSP upgrades, signal coordination, the relocation of key bus stops; On Telegraph	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0003	2030
Alameda	AC Transit	ALA170080	AC Transit: Purchase (10) 24ft Cut-aways	AC Transit:(10) 24ft Cut-away vans: Purchase vehicles to replace existing fleet at end-of-life.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170081	AC Transit: Purchase (24) 60ft Artic Hybrid Buses	AC Transit: 24 vehicles: Purchase (24) 60ft Artic Hybrid Buses. Replace existing bus fleet to keep fleet in state of good repair.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA170082	AC Transit: Purchase (59) 40ft Diesel Buses	AC Transit: Purchase (59) 40-ft Diesel Buses: Purchase buses to keep AC Transit's fleet in a state of good repair.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	AC Transit	ALA990052	AC Transit: Paratransit Van Replacement	AC Transit: Paratransit fleet: Amortized cost of replacing vans used for paratransit service. Vans are operated and replaced by paratransit contractor. FTA funds programmed annually in lieu of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040
Alameda	AC Transit	ALA990076	AC Transit: ADA Paratransit Assistance	AC Transit: Systemwide: ADA Paratransit Operating Subsidy.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-01-0002	2040
Alameda	ACE	ALA010056	ACE Track Improvements.	ACE: From Stockton to San Jose: Corridor improvements for signaling, grade crossing, track and other cost associated	2019 TIP Update. Project should be carried forward for informational purposes as additional federal funding is expected.	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-01-0008	2040
Alameda	ACE	ALA110099	ACE Preventative Maintenance	ACE Rail: Systemwide: Preventative maintenance activities for ACE service and associated equipment, functions, and facilities.	2019 TIP Update. Project should be carried forward for informational purposes as additional federal funding is expected.	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0026	2040
Alameda	ACE	ALA170048	ACE Fixed Guideway (Capital Lease)	ACE: Along ACE Corridor: Capital Lease payments required to operate along Union Pacific corridor	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Alameda	ACE	ALA170056	ACE - Locomotive Procurement	ACE: Systemwide: Purchase two locomotives to replace existing equipment	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	ACE	ALA170079	ACE: Railcar Midlife Overhaul	ACE: System-wide: Perform midlife overhaul of existing ACE railcars to extend useful life.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Alameda	ACTC	ALA050079	I-80 Gilman Interchange Reconfiguration	Berkeley: On Gilman Avenue at I-80: Reconfigure interchange providing dual roundabout at the entrance & exits from I-80 as well as the Eastshore Highway and West Frontage Rd and bike/ped	2019 TIP Update	EXEMPT (40 CFR 93.127) - Changes in vertical and horizontal alignment	17-01-0040	2040
Alameda	ACTC	ALA110033	Alameda County Safe Routes to School	Alameda County: Countywide: SR2S Program including education & outreach in various K-12 schools, ridesharing, & project development.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-01-0003	2040
Alameda	ACTC	ALA170002	I-80/Ashby Avenue Interchange Improvements	Alameda County: I-80/Ashby IC: Reconstruct the interchange including constructing new bridge, two roundabouts and bike/ped improvements	2019 TIP Update	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-01-0037	2040
Alameda	ACTC	ALA170085	7th Street Grade Separation East	Oakland: 7th St and rail tracks between I880 and Maritime St in the Port of Oakland: Reconstruct the existing 7th St underpass on an adjacent alignment, rail tracks, and other rail infrastructure. No through	2019 TIP Update	EXEMPT (40 CFR 93.127) - Changes in vertical and horizontal alignment	17-01-0015	2040

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Alameda	ACTC	ALA170087	Freight Intelligent Transportation System (FITS)	Oakland: In the Port of Oakland and surrounding areas: Implement ITS improvements, signal systems, and other technologies to cost-effectively manage truck arrivals and improve incident response	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-01-0026	2040
Alameda	Alameda	ALA150007	Cross Alameda Trail (includes SRTS component)	City of Alameda: Between Webster St and Sherman St: Construct a new trail with an on-street portion.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Alameda	ALA170073	Clement Avenue Complete Streets	Alameda: On Clement Avenue between Broadway and Grand St: Complete street improvements including Class II bike lanes, curb extensions, flashing beacons, bus shelters, sidewalk/curb ramp	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0004	2040
Alameda	Alameda	ALA170074	Alameda City-Wide Pavement Rehabilitation	Alameda: Buena Vista Ave from Willow St to Park St and Kofman Pkwy from Tralee Ln to Aughinbaugh Way: Resurface and rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0022	2040
Alameda	Alameda County	ALA010003	Crow Canyon Safety Improvements	Alameda County: On Crow Canyon Road from I-580 north to the Alameda/Contra Costa County line: Safety improvements, shoulder widening and curve realignment.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Shoulder improvements	17-01-0003	2040
Alameda	Alameda County	ALA030002	Alameda: Vasco Road Safety Improvements	Livermore: On Vasco Road from 1,000' South of Dalton Ave to CC County line; Realign roadway, provide standard shoulder widths, install median barriers and add truck-climbing lanes. (Total length of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Truck climbing lanes outside the urbanized area	17-01-0003	2040
Alameda	Alameda County	ALA050035	Cherryland/Ashland/CastroValley/Fairview BikePed	Cherryland, Ashland, Castro Valley, Fairview, San Lorenzo and other Unincorporated Areas of Alameda County: Various Locations: Sidewalk, bike lanes and other safety improvements in the vicinity of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Alameda County	ALA090022	Estuary Bridges Seismic Retrofit and Repairs	Oakland: 3 Oakland Estuary bridges: Seismic retrofit and repairs	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0024	2040
Alameda	Alameda County	ALA090023	Fruitvale Ave Roadway Bridge Lifeline	Alameda County: Fruitvale Roadway Bridge: Retrofit bridge to a lifeline facility	2019 TIP Update	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0024	2040
Alameda	Alameda County	ALA130018	Alameda Co-Various Streets and Roads Preservation	Unincorporated Alameda County: Various roadways: Rehabilitate pavement	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Alameda	Alameda County	ALA150002	Niles Canyon Rd (SR 84)/Pleas-Sunol Rd Inter. Imps	In Sunol Area: At Niles Canyon Rd(SR 84), Pleasanton Sunol Rd and Paloma Rd intersection: intersection improvements at the four corners includeing installation of a traffic signal, shoulder improvements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-01-0003	2040
Alameda	Alameda County	ALA170047	Active Oakland: A Comprehensive SR2S Program	Oakland: In Oakland Unified School District's most disadvantages schools: Promote walking and cycling	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-01-0002	2040
Alameda	Albany	ALA170088	San Pablo Ave & Buchanan St Pedestrian Imps.	Albany: Various Locations on Buchanan St and San Pablo Ave: Streetscape improvements including medians, bulb outs, signal modifications, striping of high visibility crosswalks. Project is phased.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0022	2040
Alameda	BART	ALA090065	BART: Fare Collection Equipment	BART: Systemwide: Acquire and install fare collection equipment.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040

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Alameda	BART	ALA090068	MacArthur BART Plaza Remodel	Oakland: MacArthur BART Station: Renovate the entry plaza	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-01-0004	2040
Alameda	BART	ALA110032	Downtown Berkeley BART Plaza/Transit Area Imps.	In Berkeley: Area around Downtown Berkeley BART Station: Streetscape improvements; design/construction of custom bus shelter, canopy design for 5 secondary BART entries and construction of one;	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-01-0004	2040
Alameda	BART	ALA170055	19th Street BART Station Modernization-GO Uptown	In Oakland: At the 19th Street BART Station and adjacent public realm: Implement station and streetscape improvements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0063	2040
Alameda	Berkeley	ALA130028	Hearst Avenue Complete Streets	In Berkeley: Hearst St from Shattuck Ave to Gayley/La Loma: Implement access and safety improvements to Downtown Berkeley PDA for all modes, includes a road diet from Shattuck Ave to Euclid Ave	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Berkeley	ALA130035	Bay Trail Shoreline Access Staging Area Project	Berkeley: Berkeley Marina: Construct segment 3 of Bay Trail Extension, construct new public restroom, and renovate existing public parking area and windsurf staging area.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Berkeley	ALA150048	9th St Bicycle Blvd Extension Pathway Ph II	In Berkeley: Between the 9th Street Bicycle Boulevard (south of Heinz Avenue) and Murray Street: Install a shared-use path	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Berkeley	ALA150049	goBerkeley Residential Shared Parking Pilot	In Berkeley: In residential areas adjacent to Southside/Telegraph and Elmwood goBerkeley program areas: Implement parking pricing pilot; In pilot areas: Implement TDM strategies and outreach focused on	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-01-0002	2040
Alameda	Berkeley	ALA170054	John Muir Safe Routes to School	Berkeley: Along Claremont south of Ashby near John Muir School: Install speed feedback signs; At the intersection of Claremont and Claremont Crescent: Implement crossing improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Berkeley	ALA170067	Southside Complete Streets & Transit Improvement	Berkeley: Various locations south of UC Berkeley: Construct two-way cycle tracks, signal mods, transit imps and TSP, loading zone imps, pedestrian safety imps, and repaving; On Telegraph from Channing	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Berkeley	ALA190002	Sacramento Street Complete Streets Improvements	Berkeley: On Sacramento Street at 4 intersections (Virginia, Delaware, University, & Addison): Construct bike/ped crossing improvements; On Acton between Virginia & Delaware and on Delaware between	Add new ATP project to the TIP.	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Caltrans	ALA170060	GL: Alameda County - TOS-Mobility	Alameda County: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and 40 CFR Part 93.127 Table 3 categories	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0033	2040
Alameda	Dublin	ALA170062	Dublin Blvd Rehabilitation	Dublin: Segments of Dublin Boulevard from Scarlet Drive to Hacienda Drive: Rehabilitate pavement	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	EB Reg Park Dis	ALA170077	Doolittle Drive Bay Trail	Oakland: Along Doolittle Dr. from the MLK Regional Shoreline Center near Langley Street 2,300 feet to the north end of the existing SF Bay Trail at the fishing dock, north of Swan Way: Construct SF Bay	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040

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Alameda	Emeryville	ALA170050	Emeryville Greenway Crossing Improvements	Emeryville: Greenway trail crossings at 65th, 66th, and 67th: Improve crossings with raised crosswalks, RRFBs, parking adjustments and signage and add bike share station	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Emeryville	ALA170072	Frontage Rd, 65th St and Powell St Pavement Maint	Emeryville: Various Locations on Frontage Road, 65th St, Powell St: Pavement maintenance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	Fremont	ALA130001	Widen Kato Rd from Warren Avenue to Milmont Drive	Fremont: Kato Road from Warren Avenue to Milmont Drive: Widen to provide left turn pockets, median island improvements, bike lanes on both sides of the roadway, and modify traffic signal at Kato	2019 TIP Update - Update scope and funding	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-01-0006	2040
Alameda	Fremont	ALA170069	City of Fremont Pavement Rehabilitation	Fremont: Various Locations: Rehabilitate pavement and implement bike/ped improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	Fremont	ALA170076	Complete Streets Upgrade of Relinquished SR84	Fremont: Thornton Ave (Blacow Rd to Fremont Blvd), Fremont Blvd (Alder Ave to Mattos Dr) and Peralta Blvd (Fremont Blvd to Sequoia Rd): Implement complete streets improvements; On Peralta Blvd	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Hayward	ALA170065	Hayward - Main Street Complete Street	Hayward: Main St from Mc Keever to D St: Reduce roadway from 4 to 2 lanes, construct bike lanes, widen sidewalks and add complete street elements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Hayward	ALA170066	Winton Ave Complete Street	Hayward: On Winton Ave from Hesperian Blvd to Santa Clara St: Rehabilitate pavement, upgrade curb ramps and streetlights; On Winton Ave just east of Santa Clara St: Landscape median	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0004	2040
Alameda	LAVTA	ALA030030	LAVTA: Preventive Maintenance	LAVTA: Systemwide: Preventive Maintenance Program for Agency Fleet.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Alameda	LAVTA	ALA150031	LAVTA: Replacement (11) 40' Hybrid Buses	LAVTA: 11 40' hybrid buses: Purchase buses to replace diesel buses that have exceeded their useful life	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	LAVTA	ALA150032	LAVTA: Replacement (9) 30' Hybrid Buses	LAVTA: 9 vehicles: Purchase nine (9) 30' hybrid buses to replace diesel buses that have exceeded their useful life	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	LAVTA	ALA150033	LAVTA: Service Vehicles (2) Trucks	LAVTA: 2 vehicles: Purchase two service trucks for use in maintenance yard and along the Wheels bus lines.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040
Alameda	LAVTA	ALA150035	LAVTA: Farebox Replacement	LAVTA: New Buses: Install farebox devices compliant with Clipper technology	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0028	2040
Alameda	LAVTA	ALA150036	LAVTA: Service Vehicles (3) Road Supervisor	LAVTA: 3 support vehicles: Purchase 3 vehicles for road supervisors' use when providing roadside assistance to the fixed-route fleet. Outfit with tools and equipment necessary to perform maintenance of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040
Alameda	LAVTA	ALA150037	LAVTA: Service Vehicles (4) shift trade	LAVTA: 4 vehicles: Purchase 4 vehicles outfitted with tools and equipment necessary to perform maintenance of signs and shelters along fixed-routes for road supervisors' use when providing roadside	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040

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Alameda	LAVTA	ALA170091	Livermore Transit Center Rehab and Improvement	LAVTA: Downtown Livermore Transit Center: Rehabilitate and improve the center by replacing or rehabilitating assets past their useful life including failed pavement, area security lighting, passenger	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-01-0008	2040
Alameda	LAVTA	ALA990077	LAVTA: ADA Paratransit Operating Subsidy	LAVTA: ADA Paratransit Operating Subsidy	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-01-0002	2040
Alameda	Livermore	ALA170068	Livermore Pavement Rehabilitation - MTS Routes	Livermore: Various Locations: Repair and/or rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	MTC	ALA130030	Improved Bike/Ped Access to East Span of SFOBB	In Oakland: In the vicinity of the East Span of the San Francisco-Oakland Bay Bridge: Construct improved bicycle and pedestrian access. Project is phased.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	MTC	ALA170007	Regional Planning Activities and PPM - Alameda	Alameda: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-10-0023	2040
Alameda	MTC	ALA170012	Bay Bridge Forward-Commuter Parking Access Imps.	Albany and Oakland: Adjacent to Park and Ride lots at I-80/Buchanan Ave, I-880/High St, I-880/Fruitvale: Bicycle/pedestrian/bus stop improvements to facilitate safer access to and from lots; toll credits	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0003	2040
Alameda	MTC	ALA170040	I-880 Integrated Corridor Management North Segment	Alameda County: I-880 corridor from I-880/I-980 IC to I-880/Davis St. IC: Install intelligent transportation system infrastructure to facilitate the active management of traffic that naturally diverts onto	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0013	2040
Alameda	MTC	ALA170057	I-880 Integrated Corridor Management - Central	Alameda County: I-880 Corridor from Davis St in San Leandro to Whipple Rd in Union City: Identify how existing and planned incident management strategies and operations can be better coordinated and	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0031	2040
Alameda	MTC	ALA170058	Bay Bridge Forward: West Grand TSP	In Oakland: Various locations on the West Grand Ave Corridor between Maritime and Northgate; Implement transit signal priority for AC Transit vehicles.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0033	2040
Alameda	Newark	ALA010052	Central Avenue Railroad Overpass at UPRR	Newark: On Central Avenue at the Union Pacific Railroad tracks: Construct grade separation. No new lanes. Project is phased.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Railroad/highway crossing	17-01-0003	2040
Alameda	Newark	ALA170061	Thornton Avenue Pavement Rehabilitation	Newark: On Thornton Ave between Spruce and Hickory St: Rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	Oakland	ALA070039	Oakland Waterfront Bay Trail	Oakland: From Emeryville border to San Leandro border; Construct new segments of the Bay Trail.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Oakland	ALA110072	Lake Merritt Improvement Project	In Oakland: Adjacent to Lake Merritt: Reconfigure roadways and construct paths, walls, structures, lighting, parking and landscaping; no added capacity	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0004	2040
Alameda	Oakland	ALA130003	Lake Merritt to Bay Trail Bike/Ped Bridge	Oakland: Over Embarcadero and UPRR tracks under I880 between the Estuary and Lake Merritt along the Channel: Construct ADA accessible bicycle pedestrian bridge to link Bay Trail to Lake Merritt.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040
Alameda	Oakland	ALA130024	Lakeside Complete Streets and Road Diet	Oakland: Along Harrison Street and Lakeside Drive between 19th Street and Grand Avenue: implement road diet and install bike and pedestrian facilities	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0001	2040

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Alameda	Oakland	ALA150010	International Boulevard Improvement Project	Oakland: International Boulevard (1st Ave to Durant) and East 12th Street (1st Ave to 14th Ave): Install pedestrian scale lighting along the corridor, repair sidewalk damage, and install curb ramps.	2019 TIP Update. Project is not complete.	EXEMPT (40 CFR 93.126) - Lighting improvements	17-01-0001	2040
Alameda	Oakland	ALA150012	Laurel Access to Mills, Maxwell Park and Seminary	Oakland: MacArthur Boulevard from High St to Simmons St: Implement bicycle and pedestrian improvements	2019 TIP Update - Update funding plan and retain in the TIP for informational purposes as the project is ongoing	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-01-0007	2040
Alameda	Oakland	ALA150044	19th St BART to Lake Merritt Urban Greenway	In Oakland: Between Broadway and Harrison Street: Improvements include sidewalk widening and bulbouts, ped crossing improvements, bikelanes, new traffic signals and signal mods, street/ped lighting,	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-01-0004	2040
Alameda	Oakland	ALA150050	Oakland Parking and Mobility Management Project	Oakland: Montclair and select areas of Downtown: Implement demand-responsive parking management and transportation demand management initiatives	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-01-0002	2040
Alameda	Oakland	ALA170043	Oakland - 14th Street Safe Routes in the City	In Oakland: On 14th St between Brush St and Oak St: Reduce travel lanes from 4 to 2, add paved Class IV protected bicycle lanes; transit boarding islands; improve ped facilities including refuges, crossings,	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Oakland	ALA170051	Fruitvale Alive Gap Closure Project	In Oakland: On Fruitvale Ave between Alameda Ave and E. 12th: Install class 4 cycle tracks and landscaped buffers, widen sidewalks, improve ped crossings, add ped scale lighting, reconfigure conflicting	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-01-0001	2040
Alameda	Oakland	ALA170053	Oakland 35th Ave Bike/Ped Improvements H8-04-015	Oakland: 35th Ave from San Leandro St to Sutter St: H8-04-015 Install crossing enhancements, HAWKs, RRFBs, signal upgrades/modifications, signing, striping, markings; 35th Ave from Int Blvd to E 12th	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Oakland	ALA170063	Lakeside Family Streets	In Oakland: On Harrison St between 20th St and 27th St, and along Grand Ave from west of Harrison to east of Bay Place: install cycle track, parking protected bikeways and protected intersection; On	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0004	2040
Alameda	Oakland	ALA170064	Oakland LSR Paving	In Oakland: Citywide: Implement paving Improvements including pavement resurfacing, bicycle transportation, curb, gutter, drainage, sidewalks, pedestrian safety, and ADA compliant curb ramps	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	Oakland	ALA170078	Oakland - Crossing to Safety	Oakland: At Park Blvd/Excelsior Ave-Grosvenor Place and Park Blvd/13th Ave-East 38th St: Provide sidewalks and shorter pedestrian crossings; At the Park Blvd intersection near Edna Brewer Middle School:	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0003	2040
Alameda	Piedmont	ALA170084	Piedmont - Oakland Avenue Improvements	Piedmont: Oakland Ave between Grand Ave and western city limits: Pavement rehabilitation and installation of bicycle and pedestrian safety improvements	2019 TIP Update.	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-01-0022	2040
Alameda	Pleasanton	ALA170070	Pavement Rehabilitation Hacienda Business Park	Pleasanton: Various locations near the Hacienda Business Park: Pavement rehabilitation and bike/ped improvements	2019 TIP Update.	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Alameda	San Leandro	ALA050002	SR 185- E. 14th St/ Hesperian Blvd/150th Ave	San Leandro: 150th/E. 14th/Hesperian: Construct NB left turn Ln from Hesperian to E.14th, EB left turn Ln from E.14th to 150th Av & SB Ln from Hesperian to 150th and other traffic circulation	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-01-0007	2040

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Alameda	San Leandro	ALA170075	San Leandro Washington Avenue Rehabilitation	San Leandro: Washington Ave from W. Juana Ave to Castro St: Reconstruct roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0022	2040
Alameda	Union C Transit	ALA150046	Union City Transit Rehab Two (2) Transit Buses	Union City Transit: Two (2) compressed natural gas (CNG) buses from 2008 that are now at their mid-life service expectancy: Rehabilitate vehicles: The vehicles have the potential to serve the transit agency	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Alameda	Union C Transit	ALA170013	Union City Transit Travel Time Improvements	Union City: South Alameda County Major Corridors: Travel time improvements including Adaptive Traffic Control Systems, corridor-wide Transit Signal Priority, signal coordination and relocation of key bus	2019 TIP Update	EXEMPT (40 CFR 93.128) - Traffic signal synchronization projects	17-01-0007	2040
Alameda	Union C Transit	ALA170014	Union City Paratransit Van Procurement	Union City Transit: Six (6) 2009 compressed natural gas (CNG) vans: Replace as they have reached the end of their useful life.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	Union C Transit	ALA170015	Union City Transit: Replace Paratransit Sedan	Union City Transit: 1 vehicle: Replace one (1) Union City Paratransit sedan with one (1) van	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	Union C Transit	ALA170039	Union City: ADA Paratransit Operating Subsidy	Union City Transit: Systemwide: ADA Paratransit Operating Assistance	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-01-0002	2040
Alameda	Union C Transit	ALA170092	Union City Replace Heavy-Duty Transit Vehicles	Union City Transit: 2 vehicles: Replace two (2) Heavy-Duty Compressed Natural Gas (CNG) Transit Vehicles and procure associated equipment	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Alameda	Union City	ALA170071	Union City-Dyer Street Pavement Rehabilitation	Union City: On Dyer St from Alvarado Blvd to Deborah Dr: Rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-01-0064	2040
Contra Costa	Antioch	CC-170035	Antioch - L Street Pathway to Transit	Antioch: On L Street from Hwy 4 to Antioch Marina: Widen street in various locations and restripe to provide continuous bike lanes and sidewalks, upgrade existing traffic signals, install new bus shelters	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	Antioch	CC-170036	Antioch Pavement Rehabilitation	In Antioch: On various roadways: Pavement Rehabilitation (Grind/overlay, plug pavement base failures, and/or cape seal) replace concrete curb ramps, curbs and sidewalks, replace traffic signal loops, place	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	BART	CC-110082	Walnut Creek BART TOD Access Improvements	Walnut Creek: In the vicinity of the Walnut Creek BART Station: construct public access improvements that are part of the proposed transit-oriented development	2019 TIP Update	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-02-0043	2040
Contra Costa	BART	CC-150019	Concord Yard Wheel Truing Facility	BART: Concord Yard: Construct a wheel truing facility which will house a dual-guage wheel truing machine to service both BART and eBART vehicle wheels.	2019 TIP Update - Retain in TIP as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0026	2040
Contra Costa	BART	CC-170024	El Cerrito del Norte BART Station Modernization	BART: El Cerrito del Norte BART Station: Modernize the station including expanding the station to relieve crowding, improve accessibility, reduce fare evasion, and enhance the customer experience.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0032	2040
Contra Costa	BART	CC-170060	Concord BART Station Modernization	Concord: In and around the Concord BART Station: Make capacity, access, placemaking, and state-of-good repair, improvements based on BART's 2016 Station Modernization Plan.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0032	2040

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Contra Costa	Brentwood	CC-070013	Lone Tree Way Undercrossing	Brentwood: On Lone Tree Way at the UPRR track: Construct 4-lane grade separation undercrossing.	2019 TIP Update - Update scope and funding	EXEMPT (40 CFR 93.126) - Railroad/highway crossing	17-02-0035	2030
Contra Costa	Brentwood	CC-170034	Brentwood Various Streets and Roads Preservation	In Brentwood: Various locations: Pavement preservation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	CC County	CC-130001	Bailey Road-State Route 4 Interchange	In Bay Point: At the Bailey Road-State Route 4 interchange; modify ramps and Bailey Road to improve bicycle and pedestrian circulation. Project is phased.	2019 TIP Update	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-02-0020	2030
Contra Costa	CC County	CC-130003	Bailey Road Bike and Pedestrian Improvements	Bay Point: Bailey Rd from Willow Pass Rd to SR 4: Improve bicycle and pedestrian accessibility. Improvements will expand sidewalks and construct uniform bike lanes to create a corridor conducive to all	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	CC County	CC-130027	Port Chicago Hwy/Willow Pass Rd Bike Ped Upgrades	Bay Point: Near the intersection of Port Chicago Hwy and Willow Pass Rd: Install bike lane, sidewalk, curb and gutter, bike/ped access improvements, and intersection channelization	2019 TIP Update. Archive project. (final closeout pending)	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-02-0005	2040
Contra Costa	CC County	CC-150010	CC County - Rio Vista Elementary Ped Connection	Contra Costa County: On Pacifica Avenue between Mariners Cove Drive and Wharf Drive: Install sidewalks, bike lanes, flashing beacons, speed feedback sign, retaining wall and drainage improvements and	2019 TIP Update.	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	CC County	CC-170020	Fred Jackson Way First Mile/Last Mile Connection	In Richmond: On Fred Jackson Way from Grove Avenue to Wildcat Creek Trail: Construct ADA accessible sidewalks with street trees; and from Wildcat Creek to Brookside Dr: Construct pedestrian path and	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	CC County	CC-170021	Pacheco Blvd Sidewalk Gap Closure Phase 3	In Martinez: Adjacent to Las Juntas Elementary School and across Vine Hill Creek on Pacheco Boulevard: Close a gap in sidewalk infrastructure and extend a 6' x 8' concrete culvert	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	CC County	CC-170027	Local Streets and Roads Preservation Project - CCC	Contra Costa County: Various local streets and roads: Pavement preservation	2019 TIP Update - Review of in-process application	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	CC County	CC-170028	Kirker Pass Road Open Grade Overlay	Contra Costa County: On Kirker Pass Rd from the Concord City Limits to approximately 140 feet east of the driveway to 6141 Kirker Pass Rd: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	CC County	CC-170029	West County Walk and Bike Leaders	Contra Costa County: At 7 high schools in West Contra Costa: Provide comprehensive bicycle and pedestrian education, encouragement, and engagement activities to foster a walk-and-bike-to-school	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-02-0003	2040
Contra Costa	CCCTA	CC-130045	CCCTA: Access Improvements Implementation	CCCTA: Various bus stops system-wide: Implement bicycle and pedestrian access improvements identified in County Connection's Access Improvement Study.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	CCCTA	CC-150006	CCCTA: Replace 18 30' Buses	CCCTA: 18 vehicles: Replace 18 30' Heavy Duty Diesel buses that have reached the end of their useful life, four (4) of the diesel buses will be replaced with four (4) electric buses.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	CCCTA	CC-150007	CCCTA: Replace 13 35' Buses	CCCTA: 13 vehicles: Replace 13 35' Heavy Duty Diesel Buses that have reached the end of their useful life.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040

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County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Contra Costa	CCCTA	CC-150012	REMIX Software Implementation Project	County Connection: Systemwide: Integrate REMIX mapping software into County Connection's planning process.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-02-0009	2040
Contra Costa	CCCTA	CC-170051	CCCTA Replace 42 Ford Cutaways - 22"	CCCTA: 42 Ford Cutaways - 22': Replace vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	CCCTA	CC-170053	CCCTA Replace 3 Gasoline 7-Year Paratransit Vans	CCCTA: Fleetwide: Replace paratransit vehicles that have reached the end of the their useful life.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	CCCTA	CC-99T001	CCCTA: ADA Paratransit Assistance	CCCTA: Systemwide: ADA Paratransit Assistance to transit agency.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Contra Costa	CCTA	CC-070067	Mokelumne Trail Bike/Ped Overcrossing	Brentwood: Near the Mokelumne Trail at State Route 4 in Brentwood: Construct a pedestrian and bicycle overcrossing.	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	CCTA	CC-110066	SR 239 - New State Highway Study	SR 239 between SR4 in Brentwood and I-205 in Tracy: Conduct environmental and design studies to create a new alignment for SR239 and develop corridor improvements from Brentwood to Tracy.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-02-0017	2040
Contra Costa	CCTA	CC-170062	I-680 Advanced Techologies	Contra Costa County: I-680 from the Solano County line to the Alameda County line: Deploy a suite of technology-based solutions to maximize the efficiency of I-680.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-02-0051	2030
Contra Costa	Clayton	CC-170047	Clayton Neighborhood Street Rehab	In Clayton: On various neighborhood streets: Pavement maintenance and rehabilitation including replacing pavement markings	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Concord	CC-170022	Commerce Ave Complete Streets	Concord: Along Commerce Ave: Upgrade street to Complete Streets standards including installing a Class III bike route, reconstruct asphalt pavement , ADA compliant sidewalk improvements, improved	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-02-0005	2040
Contra Costa	Concord	CC-170037	Concord Willow Pass Road Repaving and 6th St SRTS	In Concord: On Willow Pass Rd between Galindo St and San Vincente Dr: Rehabilitate pavement, repair sidewalk, and install ADA curb ramps; On 6th Street between Concord Blvd and nearly Willow Pass	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Concord	CC-170039	Monument Boulevard Class I Path	In Concord: Monument Blvd from Systron Dr to Cowell Rd and Cowell Rd from Monument Blvd to Mesa St: Install a Class I path and related improvements at signalized intersections	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	Concord	CC-170050	Downtown Corridors Bike/Pedestrian Improvements	Concord: Various locations:Implement bicycle and pedestrian safety improvements to three corridors connecting Downtown Concord to regional transit, senior housing, and low income communities.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-02-0003	2040
Contra Costa	Danville	CC-090001	Diablo Road Imps. - Green Valley to Avenida Neuva	Danville: Diablo Rd at Clydesdale Dr: add EB left turn pocket; Diablo Rd from Green Valley to Avenida: Drainage improvements, replace 1300 LF retaining wall, overlay roadway, replace guardrail	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-02-0008	2040
Contra Costa	Danville	CC-130023	Danville Various Streets and Roads Preservation	Danville: Sycamore Valley Road from Camino Ramon to San Ramon Valley Boulevard including the bus loop within the adjoining Park-and-Ride Lot, and El Cerro Boulevard from El Pintado Road to just east	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040

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Contra Costa	Danville	CC-130038	Vista Grande Street Pedestrian Improvements/SR2S	Danville: Vista Grande Street between Camino Tassajara and Diablo Road/Vista Grande Elmentary School: Construct separated asphalt concrete pathway and safety enhancements to provide direct ped/bike	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	Danville	CC-170058	Camino Ramon Improvements	In Danville: On Camino Ramon between Kelley Lane and Fostoria Way: Rehabilitate roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	EB Reg Park Dis	CC-070033	Conta Costa Parks Bike/Ped Trail Improvements	Contra Costa County: Various County Parks; Various bicycle and pedestrian trail improvements. Construction will be done in different phases.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	EB Reg Park Dis	CC-130050	SF Bay Trail, Pinole Shores to Bay Front Park	Pinole: Between Pinole Shores and Bayfront Park, approximately 0.5-mile: Construct a section of the San Francisco Bay Trail. Project is phased	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	ECCTA	CC-030035	Tri-Delta: ADA Operating Assistance	Tridelta: Systemwide: Operating assistance to fund ADA Set Aside requirement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-02-0001	2040
Contra Costa	ECCTA	CC-070092	ECCTA: Transit Bus Replacements	Tri-Delta Transit: Fleetwide: Replacement Revenue Vehicles and associated farebox equipment	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	ECCTA	CC-150020	ECCTA: Non-ADA Paratransit to FR Incentive Program	ECCTA: Systemwide: Use outreach, travel training and fare incentives to move non-ADA paratransit users to on demand, alternative transportation services.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-02-0001	2040
Contra Costa	ECCTA	CC-170052	TriDelta Clipper 2 Digital Communication Equipment	TriDelta: System-wide: Procure & install Clipper II compatible communication equipment for entire MB fleet	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0028	2040
Contra Costa	El Cerrito	CC-130024	Ohlone Greenway Station Area Bike/Ped Improvements	El Cerrito: On Ohlone Greenway at El Cerrito del Norte & Plaza BART Stations & at intersections of Hill, Cutting, Central & Fairmount, widen path & improve ped & bike facilities.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	El Cerrito	CC-170030	Carlson Blvd and Central Ave Pavement Rehab	In El Cerrito: On Central Ave from Santa Clara Ave to San Pablo Ave and Carlson Blvd from Central Ave to the northern city limits: Rehabilitate roadway including existing Class II bike lanes and pedestrian	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Hercules	CC-170043	Hercules - Sycamore/Willow Pavement Rehabilitation	In Hercules: Sycamore Ave from Civic Dr to Willow/Palm Ave and Willow Ave from Mariners Pointe to the SR4 overcrossing: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Lafayette	CC-170033	Pleasant Hill Rd Pavement Rehab & Maintenance	In Lafayette: On Pleasant Hill Rd between Mt Diablo Blvd and Taylor Blvd: Rehabilitate roadway, including adjacent ramp, curb, gutter, and sidewalk repairs.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Martinez	CC-130025	Martinez Various Streets and Roads Preservation	Martinez: Various Streets and Roads: Rehab and reconstruction of roadways, modify curb ramps to meet current ADA standards, including constructing bulb-outs where there is insufficient room and	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Martinez	CC-170059	Martinez Downtown Streets Rehabilitation	Martinez: Various streets in the Downtown Core Area (in or adjacent to the Downtown PDA): Pavement Rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0023	2040

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Contra Costa	Moraga	CC-170046	Moraga Way and Canyon/Camino Pablo Improvements	Moraga: Moraga Way from Moraga Rd to Ivy Dr: Resurface, close sidewalk gap, and improve bike facilities; Canyon Rd & Camino Pablo intersection: Install crosswalk improvements; Canyon Rd from	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0022	2040
Contra Costa	MTC	CC-170004	Regional Planning Activities and PPM - CC County	Contra Costa: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Contra Costa	Oakley	CC-170041	Oakley Street Repair and Resurfacing	Oakley: Vintage Parkway: Rehabilitate including new curb ramps and striping	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Orinda	CC-170032	Orinda Way Pavement Rehabilitation	Orinda: Orinda Way between cul de sac near Santa Maria Way and Camino Pablo through the Orinda Village downtown district: Perform pavement rehabilitation/maintenance including required upgrades for	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Pinole	CC-170048	Pinole - San Pablo Avenue Rehabilitation	In Pinole: On San Pablo Avenue from City Limits to Pinole Shores Dr: Rehabilitate roadway and make accessibility upgrades as warranted	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Pittsburg	CC-170040	Pittsburg BART Pedestrian and Bicycle Connectivity	In Pittsburg: On California Ave, Bliss Ave, and Railroad Ave in the vicinity of the Pittsburg Center eBART station: Construct Class I and IV bikeways and associated improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0005	2040
Contra Costa	Pittsburg	CC-170042	City of Pittsburg Pavement Improvements	In Pittsburg: On West Leland Rd from Woodhill Rd to Railroad Ave and on Loveridge Rd from Buchanan Rd to Pittsburg-Antioch Highway: Rehabilitate roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Pittsburg	CC-170049	Pittsburg Active Transp. and Safe Routes Plan	Pittsburg: Citywide: Identify and prioritize citywide bicycle and pedestrian improvements that would increase safety, accessibility, and connectivity between housing, schools, transit, parks, community	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-02-0003	2040
Contra Costa	Pleasant Hill	CC-170044	Pleasant Hill Road Improvements	In Pleasant Hill: Along Pleasant Hill Rd between Taylor Blvd and Gregory Ln: Pavement rehabilitation, install new bike lanes, repair sidewalk, modify signals, and landscape medians	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-02-0005	2040
Contra Costa	Richmond	CC-130047	37th Street Bicycle & Pedestrian Improvements	Richmond: On 37th St from Cerritto Ave to Center Ave: Install bike lanes and pedestrian countdown heads and upgrade traffic signals; On 37th from Barrett to Center: Implement road diet with one lane	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-02-0003	2040
Contra Costa	Richmond	CC-150016	The Yellow Brick Road in Richmond's Iron Triangle	Richmond: Various locations outlined in the the Yellow Brick Road Plan: Implement bike/ped improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	Richmond	CC-170056	Lincoln Elementary SRTS Pedestrian Enhancements	In Richmond: Along Chanslor, 5th St and 6th St near Lincoln School and at Chanslor Ave and 4th St: Pedestrian enhancements to improve the safety for school children by adding median refuges and curb	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-02-0003	2040
Contra Costa	Richmond	CC-170057	Richmond: Citywide Pavement Rehab ADA Improvement	Richmond: Various locations: Pavement rehabilitation, and ADA, bicycle facility, pedestrian safety, and vehicular efficiency improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	San Pablo	CC-130032	San Pablo Avenue Bicycle and Ped Improvements	San Pablo and Richmond: San Pablo Ave from Rumrill Blvd to La Puerta Rd: Reconfigure travel lanes, install sidewalks, bike lanes, lighting, medians, signals, modify existing medians and traffic signals, build	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-02-0003	2040

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Contra Costa	San Pablo	CC-150017	Rumrill Blvd Complete Streets Improvements	San Pablo: Along Rumrill Boulevard between San Pablo Avenue to the North and Costa Avenue to the South: Complete Streets Improvements and road diet	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-02-0005	2040
Contra Costa	San Pablo	CC-170031	San Pablo - Market Street Pavement Rehabilitation	San Pablo: On Market Street between Church Lane and 23rd Street: Rehabilitate roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	San Ramon	CC-170014	Iron Horse Trail Bike and Pedestrian Overcrossing	San Ramon: At the intersections of Bollinger Canyon Road and the Iron Horse Trail: Construct bicycle/pedestrian overcrossing	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-02-0003	2040
Contra Costa	San Ramon	CC-170026	San Ramon Valley Street Smarts	San Ramon Valley: At elementary, middle and high schools: Bicycle, Pedestrian and traffic safety education	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-02-0003	2040
Contra Costa	San Ramon	CC-170045	Alcosta Boulevard Pavement Rehab	In San Ramon: On Alcosta Blvd (southbound and northbound) from Montevideo Drive to Fircrest Lane: Rehabilitate roadway including stripping for class 3 bike path	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Walnut Creek	CC-150018	Walnut Creek-Parking Guidance System Pilot	Walnut Creek: Downtown core area: Implement Parking Guidance System connected to all public parking in downtown core area.	2019 TIP Update - Retain this project in the TIP as it is ongoing	EXEMPT (40 CFR 93.126) - Directional and informational signs	17-02-0008	2040
Contra Costa	Walnut Creek	CC-170025	Walnut Creek-N. Main St Rehab - I680 to California	Walnut Creek: North Main Street between the Interstate 680 Overpass and California Boulevard: Rehabilitate Roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	Walnut Creek	CC-170038	Ygancio Valley & Oak Grove Road Rehabilitation	Walnut Creek: Ygnacio Valley Rd from Civic Dr to San Carlos Dr, Oak Grove Rd from Ygnacio Valley Rd to Mitchell Rd: Rehab pavement, striping, adjust covers, ADA upgrades and install video detection at	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Contra Costa	WCCTA	CC-030025	WCCTA: Preventive Maintenance Program	WestCat: Systemwide: Operating assistance to aid agency with preventive maintenance activities of its fleet.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0026	2040
Contra Costa	WCCTA	CC-150015	WestCAT: Purchase (1) Fast Fare Electronic Farebox	WestCAT: 1 vehicle: Purchase and Install (1) FastFare Electronic Farebox for (1) 40 ft Revenue Vehicle	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-02-0009	2040
Contra Costa	WCCTA	CC-150021	WestCAT - AVL System with APC Element.	Western Contra Costa Transit Authority (WestCAT): Systemwide: Purchase and install a new AVL system including automatic passenger counting (APC)	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-02-0009	2040
Contra Costa	WCCTA	CC-170006	WestCAT: Replace (2) 2002 40ft Revenue Vehicles	WestCAT: 2 vehicles: Replace (2) 2002 40 ft Revenue Vehicles with similar vehicles	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	WCCTA	CC-170007	WestCAT: Purchase 2 Fast Fare Electronic Fareboxes	WestCAT: 2 vehicles: Purchase and Install (2) FastFare Electronic Fareboxes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-02-0009	2040
Contra Costa	WCCTA	CC-170008	WestCAT Replace (6) 2008 35ft Revenue Vehicles	WCCTA: (6) 2008 Revenue Vehicles: Purchase replacement vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	WCCTA	CC-170009	WestCAT: Purchase (6) Electronic Fareboxes	WestCAT: For (6) replacement 2008 35 ft revenue veicles: Purchase (6) Electronic Fare boxes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Contra Costa	WCCTA	CC-170010	WestCAT Replace 5 35ft and 4 40ft Vehicles	WestCAT: (5) 2007 35ft and (4) 2002 40 ft Revenue vehicles: Purchase replacement vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040

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Contra Costa	WCCTA	CC-170011	WestCAT: Purchase (9) Electronic Fareboxe	WestCAT: 9 vehicles: Purchase of (9) Electronic Fareboxes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Contra Costa	WCCTA	CC-170012	WestCAT - Replace (2) DAR MiniVans	WestCAT: 2 vehicles: Replace MiniVans (2007) with Cut Away DAR vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Contra Costa	WCCTA	CC-170013	WestCAT: Purchase of (2) Radio Systems	WestCat: Radio systems: Purchase of (2) Radio systems for (2) Cut Away Van's	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Contra Costa	WCCTA	CC-990045	WestCat: ADA Paratransit Operating Subsidy	WestCAT: Systemwide: ADA Paratransit Operating Subsidy	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-02-0001	2040
Marin	Caltrans	MRN170018	GL: Marin County - TOS-Mobility	Marin County: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and 40 CFR Part 93.127 Table 3 categories	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0033	2040
Marin	Corte Madera	MRN170019	Corte Madera-Paradise Drive Multiuse Path	Corte Madera: Along Paradise Dr. between San Clemente Dr. and Seawolf Passage: Extend multiuse pathway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	Corte Madera	MRN170023	Central Marin Regional Pathway Gap Closure	Corte Madera: On the west side of US 101 along Nellen Ave and Wornum Dr: separated pedestrian and bicycle facilities including protected bikeway, sidewalk and a pedestrian refuge island with walkway,	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	Fairfax	MRN130009	Parkade Circulation and Safety Improvements	Fairfax: Between Sir Francis Drake Boulevard, Pacheco Avenue, Claus Drive and Broadway: Improve bicycle, pedestrian, transit, and vehicular circulation and safety around and through the Parkade in	2019 TIP Update	EXEMPT (40 CFR 93.127) - Bus terminals and transfer points	17-03-0005	2040
Marin	GGBHTD	MRN030010	GGBHTD: Fixed Guideway Connectors	Golden Gate Ferry: Systemwide: Replace/rehab fixed guideway connectors such as floats, floating barges, ramps, and gangways	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Marin	GGBHTD	MRN050018	Golden Gate Bridge Seismic Retrofit, Phase 3B	SF/Marin County: Golden Gate Bridge; Seismic retrofit of the Golden Gate Bridge - construction of suspension span, south pier and fender.	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0009	2040
Marin	GGBHTD	MRN050019	Golden Gate Bridge-Suicide Deterrent SafetyBarrier	Golden Gate Bridge: Build suicide deterrent system. Including design & Environmental analysis, plus analysis of alternatives & wind tunnel tests to ensure the feasibility of designs and build deterrent	2019 TIP Update	EXEMPT (40 CFR 93.126) - Safer non-Federal-aid system roads	17-10-0009	2040
Marin	GGBHTD	MRN050025	GGBHTD: Facilities Rehabilitation	GGBHTD: Systemwide: Rehabilitate agency's maintenance and operating facilities and replace heavy duty operating and maintenance equipment.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Marin	GGBHTD	MRN110045	GGBHTD: Replace 7 - 40' Diesel Buses	GGBHTD: Seven (7) 40' Diesel Buses: Replace vehicles	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	GGBHTD	MRN130015	GGBHTD - Transit Systems Enhancements	GGBHTD: Systemwide: systems, technology and communication enhancements to transit fleet and facilites.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-03-0005	2040
Marin	GGBHTD	MRN150005	MS Sonoma Ferry Boat Refurbishment	GGBHTD: MS Sonoma: Refurbish 38-year old ferry vessel and lease replacement vessel to continue service while the vessel is in dry dock.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040

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County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Marin	GGBHTD	MRN150014	GGBHTD Ferry Major Components Rehab	GGBHTD: Systemwide: Ferry Rehab, replace major ferry components such as navigation systems, dry-dock, hull, interior, life saving equipment, propulsion and other ferry components.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Marin	GGBHTD	MRN150015	GGBHTD Ferry Propulsion Systems Replacement	GGBHTD: Systemwide: Ferry propulsion systems- replacement of power distribution systems, propellers, engines, generators, gear boxes, etc. for Golden Gate Ferry vessels.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Marin	GGBHTD	MRN170008	GGBHTD: Replace 67 Diesel Buses with Hybrid Buses	GGBHTD: Systemwide: Routine replacement of 67 standard diesel-powered revenue vehicles that have reached end of useful life with diesel-electric hybrid buses	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	GGBHTD	MRN170009	GGBHTD: Replace Paratransit Vehicles	GGBHTD: Fleetwide: Replace paratransit vehicles	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	GGBHTD	MRN170010	GGBHTD: Purchase 7 Hybrid Buses	GGBHTD: 6 diesel 45' buses: Replace with hybrid 40' buses; purchase 1 additional hybrid 40' bus.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	GGBHTD	MRN170013	San Rafael Transit Center Relocation	In San Rafael: San Rafael Transit Center: Relocate the existing San Rafael Transit Center (SRTC) to accommodate the extension of SMART service to Larkspur	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.127) - Bus terminals and transfer points	17-03-0013	2040
Marin	GGBHTD	MRN170024	Replace 14 - 22' Gas Body-on-Chassis Vehicles	GGBHTD: 14 paratransit vehicles: Routine replacement of paratransit vehicles that have reached end of useful life	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	GGBHTD	MRN970016	Golden Gate Bridge Seismic Retrofit, Ph: 1-3A	San Francisco /Marin Counties: Golden Gate Bridge; Seismic retrofit of the Golden Gate Bridge - construction on north and south approach viaducts, and Ft. Point Arch.	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0009	2040
Marin	GGBHTD	MRN990017	GGBHTD: Ferry Channel & Berth Dredging	Golden Gate Ferry: From San Francisco to Marin County: Dredge ferry channel and berth.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Marin	Marin County	MRN070019	Marin Parklands Visitor Access, Phase 2	Marin County: Pacific Way bridge at Big Lagoon: Reconstruct bridge and widen to add bike lanes. No added motor-vehicle capacity	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	Marin County	MRN170027	Hicks Valley/MarshallPetaluma/ Wilson Hill Rd Rehab	Marin County: Hicks Valley Rd from Point Reyes-Petaluma Rd to Marshall-Petaluma Rd, Wilson Hill Rd from Marshall-Petaluma Rd to Chileno Valley Rd, Marshall-Petaluma Rd from Hicks Valley Rd (milepost	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Marin	MCTD	MRN110040	MCTD Preventive Maintenance	Marin Transit: Systemwide: Bus Transit Preventative maintenance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Marin	MCTD	MRN110041	Marin Transit Low Income Youth Pass Program	Marin Transit: Systemwide: Provide low-income youth free bus passes. Other local funds are made available for this project by applying STP/CMAQ funding available through the TPI program to	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Continuation of ride-sharing and van-pooling promotion activities at	17-10-0027	2040
Marin	MCTD	MRN110047	MCTD: ADA Paratransit Assistance	MCTD: Systemwide: ADA Paratransit Assistance to transit agency.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Marin	MCTD	MRN150003	MCTD: On Board Vehicle Equipment	MCTD: Farebox: Install fareboxes on 62 paratransit vehicles and Dial-A-Ride vehicles. Replace fareboxes on 18 fixed route vehicles vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-03-0005	2040

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County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Marin	MCTD	MRN150010	MCTD - Relocate Transit Maintenance Facility	In North Eastern Marin County: Relocate contractor maintenance facilities in a centralized location, including bus parking and three maintenance bays.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Construction of new bus or rail storage/maintenance facilities categorically	17-10-0026	2040
Marin	MCTD	MRN150011	MCTD- Replace Shuttle Vehicles	MCTD: 12 shuttle buses: Purchase buses to replace ones that are beyond their useful life	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MCTD	MRN150012	MCTD - Replace 13 -40ft Buses	MCTD: 13 40ft vehicles: Replace vehicles that are beyond their useful life	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MCTD	MRN150013	MCTD - Emergency Radio System	MCTD: Fleetwide: Replace radio system on fixed route shuttles and rural service to meet emergency radio requirements.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Marin	MCTD	MRN170003	MCTD: Replace Paratransit Vehicles	MCTD: 19 Paratransit Vehicles: Replace vehicles	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MCTD	MRN170004	MCTD: Replace Paratransit Vehicles with Vans	MCTD: 3 vehicles: Replace two Paratransit Vehicles with Vans and purchase a third vehicle as a non-revenue support vehicle	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MCTD	MRN170005	MCTD: Replace Rural Cutaway Vehicles	MCTD: Four (4) Rural Cutaway Vehicles: Purchase replacement vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MCTD	MRN170006	MCTD: Replace Articulated Vehicles	MCTD: System-wide: Replace Articulated Vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MCTD	MRN170007	MCTD-Replace diesel vehicles	MCTD: 2- 2008 35ft diesel vehicles: Replace vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Marin	MTC	MRN170001	Regional Planning Activities and PPM - Marin	Marin: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Marin	Natl Park Svc	MRN170028	Fort Baker's Vista Point Trail	Golden Gate National Recreation Area: Between the Dana Bowers Vista Point Parking Area and both Fort Baker and Sausalito: Construct the Vista Point Trail, a new multi-use segment of the Bay Trail.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	Novato	MRN150016	Vineyard Road Improvements	Novato: Vineyard Road from Wilson Avenue to Sutro Avenue: Perform pavement rehabilitation, install bicycle lanes, and property owner-funded frontage improvements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Marin	Novato	MRN170017	Novato Downtown SMART Station Commuter Lot	Novato: At the future Downtown SMART Station: Construct parking lot improvements to the former railroad depot site	2019 TIP Update	EXEMPT (40 CFR 93.126) - Lighting improvements	17-03-0005	2040
Marin	Novato	MRN170022	Novato-Measure A Group 10 Pavement Rehabilitation	In the City of Novato: Nave Dr from Alameda Del Prado to Bel Marin Keys Blvd and Bel Marin Keys Blvd from Nave Dr to Galli Dr: Pavement Rehabilitation	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Marin	Novato	MRN170026	Hill Recreation Area Improvements	Novato: At the Hill Recreation Area: Add a network of bicycle and pedestrian walkways and multi-purpose pathways to preserve and enhance an existing park to increase recreational opportunities	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040

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Marin	Novato	MRN170029	Carmel Open Space Acquisition	Novato: Within the Carmel Open Space: Acquire a private parcel for use as a Priority Conservation Area	2019 TIP Update	EXEMPT (40 CFR 93.126) - Acquisition of scenic easements	17-03-0003	2040
Marin	San Anselmo	MRN130013	Sunny Hill Ridge and Red Hill Trails	In San Anselmo: Near Sunny Hill and Red Hill: Construct three miles of hiking trails	2019 TIP Update - Retain project in the TIP as it is in the process of being closed out	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	San Anselmo	MRN170020	San Anselmo Bike Spine	San Anselmo: In the vicinity of St. Anselm School, Wade Thomas ES, Sir Francis Drake HS, and Brookside ES: Install shared lane markings, roadway striping, school bike route signs, crossing enhancements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	San Anselmo	MRN170021	Sir Francis Drake Blvd Pavement Rehabilitation	In the Town of San Anselmo: On Sir Francis Drake Boulevard between Center Boulevard/Red Hill Avenue (The Hub) and Bolinas Avenue: Rehabilitate existing roadway pavements and install intersection	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Marin	San Rafael	MRN130005	San Rafael Transit Center Pedestrian Access Imps.	San Rafael: In the vicinity of the Bettini Transit Center and the future SMART station: Upgrade existing traffic signal equipment to be compliant with rail and improve pedestrian facilities	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-03-0016	2040
Marin	San Rafael	MRN150008	Grand Avenue Bicycle Pedestrian Improvements	San Rafael: Grand Ave accross the San Rafael Canal: Construct bridge and sidewalk improvements for bicyclists and pedestrians	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	San Rafael	MRN170012	Francisco Boulevard East Sidewalk Widening	In San Rafael: Francisco Blvd East and Grand Ave from Vivian St to Second St: Widen existing sidewalk and construct a pedestrian/bicyclist bridge over the Canal Waterway and a sidewalk on the west side of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	San Rafael	MRN170016	Francisco Blvd West Multi-Use Pathway	San Rafael: On Francisco Blvd West between Second St. and Anderson Dr.: Construct a multi-use path.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0018	2020
Marin	Sausalito	MRN110010	Sausalito - Bridgeway/US 101 Off Ramp Bicycle Imps	Sausalito: Highway 101 Off Ramp/Bridgeway/Gate 6 Intersection: Implement bicycle improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Marin	TAM	MRN170011	North-South Greenway Gap Closure	Marin County: Northern Segment: US101 off-ramp over Corte Madera Creek and along Old Redwood Highway to US101 overcrossing: widen to add bike/ped path. Southern Segment: From Northern	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-03-0001	2040
Multi-County	ACE	REG110044	ACE Positive Train Control	ACE: System-wide: Install an advanced train control system that allows for automated collision prevention, improved manual collision prevention, and improved headways.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Multi-County	BAAQMD	REG170019	Spare the Air	San Francisco Bay Area: Region-wide: Spare the Air Campaign - Inform/educate the public about ozone problems, notify when Spare the Air days are called and encourage use of transit, ridesharing, etc	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0015	2040
Multi-County	BAAQMD	REG170020	Electric Vehicle Programs and Outreach	San Francisco Bay Area: Inform/educate the public about electric vehicles, infrastructure and purchasing programs.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0015	2040
Multi-County	BAAQMD	REG170021	Electric Vehicle Infrastructure/Vehicle Buyback	SF Bay Area: Regionwide: Install EV charging stations along transportation corridors, at workplaces, MUDs and park and ride lots. Scrap operable 1994 and older vehicles and provide funding for EV	2019 TIP Update	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-10-0015	2040
Multi-County	BART	BRT030004	BART Train Control Renovation	BART: Systemwide: Replace obsolete elements and subsystems of the train control system.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0005	2030

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Multi-County	BART	BRT030005	BART: Traction Power System Renovation	BART: Systemwide: Replace obsolete elements and subsystems of the traction power system to maintain and improve reliability and safety	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0005	2030
Multi-County	BART	BRT97100B	BART: Rail, Way and Structures Program	BART: Systemwide: Replace worn out mainline rail and make other timely reinvestments in way.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
Multi-County	BART	BRT99T01B	BART:ADA Paratransit Capital Accessibility Improve	BART: At various stations: Capital Access Improvements Program including, station elevator improvements, installation of hands-free emergency telephones, and tactile stair tread replacement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0005	2030
Multi-County	BART	REG050020	BART Car Exchange (Preventive Maintenance)	BART: Systemwide: Preventive maintenance program, including maintenance of rail cars and other system components in exchange for local funds to the BART car replacement reserve.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Multi-County	BART	REG150005	Transit-Oriented Development Pilot Planning Progra	Oakland and San Francisco: Around BART Stations: Develop a comprehensive TOD strategy that fills the remaining gaps in transportation management and development implementation in the Transbay	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-10-0011	2040
Multi-County	BART	REG170008	BART Integrated Carpool to Transit Access Program	BART: Systemwide: Program to better integrate carpool access to public transit by matching carpools through an app. The app facilitates carpool matching, payment, and parking space reservation at the	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Continuation of ride-sharing and van-pooling promotion activities at	17-01-0002	2040
Multi-County	BART	REG170009	BART Train Seat Modification	BART: On up to 360 existing BART cars: Remove 7 seats to provide immediate relief for passengers in the peak period commute hours	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0005	2030
Multi-County	Caltrain	REG090051	Caltrain: Revenue Vehicle Rehab Program	Caltrain: Systemwide: Provide overhauls and repairs/replacements to key components of the Caltrain rolling stock to maintain it in a state of good repair.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Multi-County	Caltrain	REG110030	Caltrain Positive Train Control System	Caltrain: Systemwide: Implement PTC, an advanced train control system that allows for automated collision prevention, and improved manual collision prevention.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0008	2030
Multi-County	Caltrain	SM-050041	Caltrain: Signal/Communication Rehab. & Upgrades	Caltrain: Systemwide: Rehabilitate existing signal system and upgrade/replace communication equipment.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Multi-County	Caltrans	REG110041	GL: FTA Non-Urbanized Formula Program	GL: FTA Section 5311 Non-Urbanized Formula Program, Non-ITS portion. Projects include capital and operating assistance, capital and preventive maintenance. Projects consistent with 40 CFR Part 93.126,	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Multi-County	Caltrans	REG150002	GL: FTA 5311 Rural Area FY15	GL: FTA Section 5311 Rural Area Program, Non-ITS portion. Projects include capital and operating assistance. Projects consistent with 40 CFR Part 93.126 Exempt Table 2	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Multi-County	Caltrans	VAR170002	GL: Highway Safety Improvement Program	GL: Safety Imprv - Highway Safety Improvement Program: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories.	2019 TIP Update - Update the funding plan and back-up listing to reflect the latest information from Caltrans	EXEMPT (40 CFR 93.126) - Highway Safety Improvement Program implementation	17-10-0025	2040
Multi-County	Caltrans	VAR170004	GL: Pavement Resurfacing/Rehab SHS - Highway Maint	GL: Pavement Resurf/Rehab State Highway System - Highway Maintenance. Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories - Pavement resurfacing and/or	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0025	2040

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Multi-County	Caltrans	VAR170005	GL: Safety Improvements - SHOPP Mobility Program	SF Bay Area: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories	2019 TIP Update - Update the funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0013	2040
Multi-County	Caltrans	VAR170006	GL: Pavement Resurf./Rehab - SHOPP Roadway Presv.	Regionwide: Various Locations: Projects consistent with 40CFR93.126 Exempt Tables 2 categories - Pavement resurfacing and/or rehabilitation, Emergency relief (23 U.S.C. 125), Widening narrow	2019 TIP Update - Update the funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0025	2040
Multi-County	Caltrans	VAR170007	GL: Safety Imprv. - SHOPP Collision Reduction	Regionwide: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories	2019 TIP Update - Update the funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Guardrails, median barriers, crash cushions	17-10-0025	2040
Multi-County	Caltrans	VAR170008	GL: Emergency Repair - SHOPP Emergency Response	Regionwide: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 categories	2019 TIP Update - Update the funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Repair of damage caused by natural disasters, civil unrest, or terrorist acts,	17-10-0025	2040
Multi-County	Caltrans	VAR170009	GL: Safety Improvements - SHOPP Mandates	Regionwide: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories	2019 TIP Update - Update the funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-10-0025	2040
Multi-County	Caltrans	VAR170010	GL: Bridge Rehab and Reconstruction - SHOPP	Regionwide: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 categories - Widening narrow pavements or reconstructing bridges (no additional travel lanes).	2019 TIP Update - Update funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0024	2040
Multi-County	Caltrans	VAR170011	GL: Shoulder Imprv - SHOPP Roadside Preservation	Regionwide: Various Locations: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 categories - Fencing,Safety roadside rest areas	2019 TIP Update - Update funding plan and back-up listing	EXEMPT (40 CFR 93.126) - Plantings, landscaping, etc	17-10-0025	2040
Multi-County	Caltrans	VAR170012	GL: Bridge Rehab/Recon. - Local Hwy Bridge Program	GL: Local Bridge Rehab/Recon. - Local Highway Bridge Program(HBP) or Highway Bridge Replacement and Rehabilitation (HBRR). Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 categories.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0024	2040
Multi-County	Caltrans	VAR170017	GL: Railroad-Highway Crossing	GL: Railroad/Highway Crossings. Projects are consistent with 40 CFR 93.126 Exempt Tables 2 categories - Railroad/highway crossing	2019 TIP Update - Retain in TIP for informational purposes as projects are ongoing	EXEMPT (40 CFR 93.126) - Railroad/highway crossing	17-10-0025	2040
Multi-County	MTC	MTC050001	Bay Area Commuter Benefits Program	San Francisco Bay Area: Region wide: Implement the Bay Area Commuter Benefits Program. Toll credits applied in lieu of match	2019 TIP Update	EXEMPT (40 CFR 93.126) - Continuation of ride-sharing and van-pooling promotion activities at	17-10-0015	2040
Multi-County	MTC	REG090039	Regional Streets and Roads Program	SF Bay Area: Regionwide: Regional Streets and Roads Program including providing assistance to Bay Area agencies to implement & maintain computerized pavement management system (PMS),	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0022	2040
Multi-County	MTC	REG090042	511 Traveler Information	SF Bay Area: Regionwide: Provides multimodal, accurate, reliable, and accessible traveler information on multiple dissemination platforms, serves as the go-to source during major disruptions and	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Directional and informational signs	17-10-0029	2040
Multi-County	MTC	REG090045	Clipper Fare Collection System	San Francisco Bay Area: Regionwide: Design, build, operate and maintain the Clipper fare collection system. Note: Translink became Clipper on 6/16/10.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0028	2040
Multi-County	MTC	REG110039	GL: 5307 JARC Set-aside FY13-FY14 Large UA	GL: 5307 JARC Set-aside FY13 Large UA. Various 5307 (former JARC) projects in large urbanized areas. Project is consistent with 40 CFR Part 93.126, 127, 128, Exempt Tables 2 & 3.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0011	2040

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Multi-County	MTC	REG130001	Toll Bridge Maintenance	Region-wide: Seven state-owned toll bridges: routine maintenance of bridge facilities	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0024	2040
Multi-County	MTC	REG130002	Toll Bridge Rehabilitation Program	Bay Area: On 7 state-owned toll bridges: Rehabilitation program	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Widening narrow pavements or reconstructing bridges (no additional travel	17-10-0024	2040
Multi-County	MTC	REG130005	Bay Area Housing Initiatives	SF Bay Area: Regionwide: Establish land acquisition and land banking financing fund and Bay Area Preservation Pilot to maximize the production and preservation of affordable housing near transit stations;	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0011	2040
Multi-County	MTC	REG150004	GL: Lifeline Cycle 4 5307 JARC	GL: 5307 JARC Set-aside FY13 Small UA and FY14-FY16 Large and Small UA. Various 5307 (former JARC) projects in large and small urbanized areas. Project is consistent with 40 CFR Part 93.126 Exempt	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0011	2040
Multi-County	MTC	REG170001	Regional Planning Activities and PPM - MTC	Regional: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Multi-County	MTC	REG170002	Transportation Management Systems	SF Bay Area: Regionwide: Implement a collective approach to freeway operations and management, including field devices, response to incidents, and traffic management systems and software; Along the I-	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0013	2040
Multi-County	MTC	REG170003	511 Carpool and Vanpool Programs	SF Bay Area: Regionwide: Operate Carpool and Vanpool Programs. Toll credits applied in lieu of match; non-federal funds are non-participating	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Continuation of ride-sharing and van-pooling promotion activities at	17-10-0029	2040
Multi-County	MTC	REG170006	Spare the Air Youth	Regional: Education and Outreach: Program designed to reduce greenhouse gas emissions and vehicle miles traveled through education and encouragement programs for youth and families.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0015	2040
Multi-County	MTC	REG170007	Incident Management Program	SF Bay Area: Regionwide: Manage congestion by implementing strategies to enhance mobility and safety, and reduce the impacts of traffic incidents, including advanced transportation management	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0013	2040
Multi-County	MTC	REG170010	Reg. Prog. for Arterial System Synchronization	SF Bay Area: Regionwide: Develop plans to guide arterial system integration and operations investments, and provide project management and traffic engineering/tech assistance (including procuring traffic	2019 TIP Update	EXEMPT (40 CFR 93.128) - Traffic signal synchronization projects	17-10-0033	2040
Multi-County	MTC	REG170013	511 Next Gen	SF Bay Area: Regionwide: Provide free multi-modal traveler information via multiple platforms. Given the public's increasing reliance on private sector services, 511 will focus on being a data provider to	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Directional and informational signs	17-10-0029	2040
Multi-County	MTC	REG170014	Active Operations Management	SF Bay Area: Regionwide: Planning and design assessments of various multi-modal operational projects and policies.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0033	2040
Multi-County	MTC	REG170016	Regional Planning - PDA Implementation	SF Bay Area: Regionwide: Planning Assistance to support transportation investments and improve their performance in priority development areas.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0021	2040

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County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Multi-County	MTC	REG170018	Connected & Automated Vehicles	SF Bay Area: Regionwide: Deploy demonstration CV/AV technologies to prepare the region for future connected and automated vehicles and support strategies, including technical assistance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0033	2040
Multi-County	MTC	REG170022	Clipper® 2.0 Fare Payment System	SF Bay Area: Regionwide: Implement a wholesale replacement of the Clipper backend system and all customer facing fare devices, modernization of retail and customer service, and expansion of ways to	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0028	2040
Multi-County	MTC	REG170023	TCP Financing Repayment Obligations	SF Bay Area: Regionwide: Repayment of principal balance and interest costs associated with securitization of future FTA formula fund apportionments. Also references RTP IDs 17-10-0006 and 17-10-	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0016	2040
Multi-County	MTC	REG170024	Bay Bridge Forward-Commuter Parking Initiative O&M	Albany and Oakland: I-80/Buchanan Ave, I-880/High St, and I-880/Fruitvale: operations and maintenance of commuter parking facilities	2019 TIP Update	EXEMPT (40 CFR 93.126) - Continuation of ride-sharing and van-pooling promotion activities at	17-10-0033	2040
Multi-County	MTC	REG170025	Community Based Transportation Planning	SF Bay Area: Regionwide: Develop and/or update locally-led plans to address the mobility needs of low-income household's in the region's 35 Communities of Concern (CBTP)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-10-0011	2041
Multi-County	MTC	REG170027	Targeted Transportation Alternatives	SF Bay Area: Region-wide: Implement a digitally-based personalized travel assistance program that provides targeted audiences with travel information to shift from solo driving to sustainable forms of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0015	2040
Multi-County	MTC	REG170028	Regional Car Sharing	SF Bay Area: Region-wide: Implement strategies to grow carsharing in the Bay Area including developing policies and regulations, increasing the number of carshare vehicles, developing incentives and	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0015	2040
Multi-County	MTC	VAR150001	GL: FTA 5311 Rural Area FY16	GL: FTA Section 5311 Rural Area Program, Non-ITS portion. Projects include capital and operating assistance. Projects consistent with 40 CFR Part 93.126 Exempt Table 2	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Multi-County	MTC	VAR170014	Bay Bridge Forward - Integrated Bridge Corridor	Alameda County: Deploy ITS that integrate with SFOBB toll bridge metering lights system and Smart I-80 to improve traffic flow and information dissemination for users of the I-80, I-580, and I-880 bridge	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0033	2040
Multi-County	MTC	VAR170018	GL: FTA 5311 Rural Area FY17	GL: FTA Section 5311 Rural Area Program, Non-ITS portion. Projects include capital and operating assistance. Projects consistent with 40 CFR Part 93.126 Exempt Table 2	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0026	2040
Multi-County	MTC	VAR170019	GL: FTA 5311 Rural Area FY18	SF Bay Area: Regionwide: GL FTA Section 5311 Rural Area Program, Non-ITS portion. Projects include capital and operating assistance. Projects consistent with 40 CFR Part 93.126 Exempt Table 2	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0026	2040
Multi-County	MTC	VAR170020	GL: FTA Section 5310 Program FY15, FY16 and FY17	Region-Wide: Eld. & persons with Disabilities. Prog Lump Sum Listing; Project incl. Veh. replacements, minor expansion & office equip. Consist with 40 CFR Part 93.126	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Multi-County	MTC	VAR170024	Bike Share Capital Program	Fremont, Richmond, and Marin and Sonoma Counties, along the SMART Corridor: Various Locations: Implement bike / bicycle sharing	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-01-0001	2040

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Multi-County	WETA	REG090054	WETA: Ferry Channel & Berth Dredging	WETA: Various service areas: Dredge ferry channel, ferry basin and berth	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
Multi-County	WETA	REG090055	WETA: Ferry Propulsion System Replacement	WETA: Fleetwide: A mid-life overhaul is scheduled when a ferry reaches approximately 12.5 years of service life. Equipment service hours and specific vessel needs may affect the timing of the projects.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Multi-County	WETA	REG090057	WETA: Ferry Major Component Rehab/Replacement	WETA: Fleetwide: Rehabilitate and/or replacement major ferry components including shafts, propellers, navigation systems, onboard monitoring and alarm systems, interior components, boarding	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Multi-County	WETA	REG090067	WETA: Fixed Guideway Connectors	WETA: Various locations: This project will replace/rehab fixed guideway connectors such as floats, floating barges, ramps and gangways throughout the system.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Multi-County	WETA	REG110020	WETA: Facilities Rehabilitation	WETA: Various Locations: Rehabilitate ferry facilities in order to maintain existing transit services.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Napa	American Canyon	NAP170006	Green Island Road Class I	American Canyon: Green Island Road in the Green Island Industrial District (GRID): Construct new Class 1 multi-use trail.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-04-0001	2040
Napa	Calistoga	NAP150001	SR 128 and Petrified Forest Intersection Imp	In Calistoga: On SR 128 and Petrified Forest Road, convert 4-way stop controlled intersection to a traffic signal.	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-04-0002	2040
Napa	MTC	NAP170001	Regional Planning Activities and PPM - Napa	Napa: Countywide: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Napa	Napa	NAP110028	California Boulevard Roundabouts	City of Napa: At First Street/ California Blvd. and Second Street/ California Blvd: Construct roundabouts Caltrans: Construct roundabout at Northbound off-ramp of SR 29 and First Street	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-04-0005	2040
Napa	Napa	NAP130004	State Route 29 Bicycle & Pedestrian Undercrossing	Napa: On the North side of Napa Creek under Highway 29: Construct a Class 1 bicycle and pedestrian path	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-04-0001	2040
Napa	Napa	NAP170007	Vine Trail Gap Closure - Soscol Avenue Corridor	Napa: Between Third St and Vallejo St in Downtown Napa: Construct a Class I multi-use trail to close a gap in the Napa Valley Vine Trail	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-04-0001	2040
Napa	Napa	NAP170009	Silverado Trail Five-Way Intersection Improvements	In City of Napa: At the intersection of Silverado Trail, Third St, Coombsville Rd, and East Ave: Construct roundabout	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-04-0005	2040
Napa	Napa County	NAP110026	Hardin Rd Bridge Replacement - 21C0058	Napa County: On Harding Rd at Maxwell Creek, 1.6M SE of Pope Cyn Rd: Replace existing one lane bridge with new 2-lane bridge to meet standards	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Napa	Napa County	NAP110027	Loma Vista Dr Bridge Replacement - 21C0080	Napa County: Loma Vista Dr over Soda Creek, 1.4 miles north of Silverado Trail: replace existing one lane bridge with new two lane bridge to meet standards	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Napa	Napa County	NAP130003	Airport Boulevard Rehabilitation	In Napa County: On Airport Boulevard between SR 29 and Napa County Airport: Rehabilitate roadway and retrofit curb ramps at 3 intersections, retaining existing Class II bicycle lanes.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040

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Napa	Napa County	NAP170002	Napa County: 2014 Earthquake Pavement Repair	In Napa County: On various federal-aid system roads: Repair pavement damage caused by 2014 earthquake.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Repair of damage caused by natural disasters, civil unrest, or terrorist acts,	17-10-0022	2040
Napa	Napa County	NAP170008	Silverado Trail Phase L Rehab	Napa County: On Silverado Trail from Oak Knoll Ave to Hardman Ave: Rehabilitate existing asphalt concrete pavement, retain existing Class II bicycle lanes, replace existing rumble dots (audible pavement	2019 TIP Update and move STP (PCA) and STIP funding out a year to FY 20/21	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Napa	NVTA	NAP030004	NVTA: ADA Operating Assistance	Napa: Systemwide: ADA operating assistance for paratransit service	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Napa	NVTA	NAP090003	SR 12/29/221 Soscol Junction Interchange Imps.	In Napa County: At SR-221/SR-29 I/C: Construct new southbound Route 221 to southbound Route 29 flyover (including auxiliary lane to Route 12/Route 29)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-04-0009	2040
Napa	NVTA	NAP090005	NVTA: Replace Rolling Stock	NVTA: Fleetwide: Replace rolling stock for fixed-route, paratransit, and community shuttle fleet.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Napa	NVTA	NAP090008	NVTA Equipment Replacement and Upgrades	NVTA: Napa Vine service area: Replacement and upgrades to transit equipment	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0026	2040
Napa	NVTA	NAP110014	Napa Valley Vine Trail Design and Construction	Napa County: Various locations: Design and construction of individual segments of Vine Trail.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-04-0001	2040
Napa	NVTA	NAP150003	Napa Valley Vine Trail Calistoga-St. Helena Seg.	In Napa County: From Calistoga to St. Helena: Construct multi-use trail	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-04-0001	2040
Napa	NVTA	NAP170004	Napa County Safe Routes to Schools	Napa County: County-wide: Safe Routes to Schools Program, Non-Infrastructure	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-04-0001	2040
Napa	NVTA	NAP970010	Napa Vine Operating Assistance	Napa Vine: Systemwide: Operating assistance to support transit routes and services.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Napa	Saint Helena	NAP170005	Main Street St. Helena Pedestrian Improvements	Saint Helena: Along Main Street (SR29) from Mitchell Dr to Pine St: Replace and upgrade pedestrian facilities and install traffic calming devices	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-04-0003	2040
Napa	Yountville	NAP130008	Hopper Creek Pedestrian Bridge and Path Project	Yountville: Along Hopper Creek from Oak Circle Open Space to Mission St: Construct multi-use pathway and a pedestrian bridge across Hopper Creek	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-04-0001	2040
San Francisco	BART	SF-050014	BART/MUNI Direct Connection Platform	BART/MUNI: Powell Street Station: Provide a direct connection between BART & MUNI.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-05-0010	2040
San Francisco	BART	SF-170016	Embarcadero Stn: New North-Side Platform Elevator	San Francisco: Embarcadero BART: Procure and install a new elevator on the east end of the station, expand paid area to include the new elevator, dedicate existing elevator to Muni use 100%, project is	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0005	2030
San Francisco	GGBHTD	SF-170022	GGBHTD: Replace 2 Paratransit Vehicles	GGBHTD: 2 Paratransit Vehicles: Purchase replacement vehicles	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Francisco	MTC	SF-170002	Regional Planning Activities and PPM - SF County	San Francisco: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040

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San Francisco	MTC	SF-170003	Bay Bridge Forward-Sterling/Bryant St Managed Lane	Sterling/Bryant St. and Regionwide: Pilot Vehicle Occupancy Detection (VOD) technology and increased CHP enforcement at Sterling and other pilot sites, support planned HOV lanes to bridge; convert HOV	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0033	2040
San Francisco	Port of SF	SF-070009	Embarcadero Corridor Transportation Improvements	San Francisco: Embarcadero corridor (China Basin & Fisherman"s Wharf): Improvements to transit services including signage, parking management strategies, bike/ped improvements & other outreach	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Directional and informational signs	17-05-0002	2040
San Francisco	Port of SF	SF-170012	Cargo Way and Amador Street Improvements	In San Francisco: On Cargo Way from Jennings to 3rd Street and Amador Street from Illinois Street to 2,300 ft. east; design and construct a complete street project.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-05-0014	2030
San Francisco	SF County TA	SF-070027	Yerba Buena Island (YBI) Ramp Improvements	San Francisco: Existing on and off ramps at the Yerba Buena Island (YBI) interchange at US I-80: Reconst ramps; On the west side of the Island: Rehabilitate existing deficient bridges.	2019 TIP Update	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-05-0023	2020
San Francisco	SF County TA	SF-090011	Oakdale Caltrain Station	San Francisco: Oakdale near Palou: Planning, preliminary engineering, and environmental work for a new Caltrain station and transit service adjustments to serve station.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-05-0028	2040
San Francisco	SF County TA	SF-130010	Construct Treasure Island Bus Terminal Facility	San Francisco: Treasure Island: Construct Treasure Island Bus Terminal Facility	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.127) - Bus terminals and transfer points	17-05-0030	2030
San Francisco	SF County TA	SF-150013	SB I-280 Off-Ramp at Ocean Ave Realignment	San Francisco: I-280/Ocean Avenue Interchange: Realign the southbound I-280 off-ramp to Ocean Avenue into a T intersection with a new signal on Ocean Avenue	2019 TIP Update	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-05-0009	2040
San Francisco	SF DPW	SF-110005	Great Highway Restoration	San Francisco: Great Highway From Sloat to Skyline Hwy: Ph 1. Restore and stabilize roadway, stop bluff slides, and protect infrastructure. Phase 2. Implement road diet by closing remaining SB lane and	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Francisco	SF DPW	SF-150001	John Yehall Chin Safe Routes to School	In San Francisco: 5 intersections near 350 Broadway Street: Construct curb extensions.□	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-05-0003	2040
San Francisco	SFDPH	SF-150017	SF Safe Routes to School 2017-2019	San Francisco: Citywide: Implement a pilot proposal that includes innovative educational, encouragement, and evaluation activities and deliverables to increase safe walking and biking by schoolchildren	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-05-0003	2040
San Francisco	SFMTA	SF-030013	SFMTA: Wayside Fare Collection Equipment	SFMTA: Systemwide: Replacement of life-expired fare collection equipment.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
San Francisco	SFMTA	SF-050024	SFMTA:Train Control & Trolley Signal Rehab/Replace	SFMTA: Systemwide: Rehabilitate or replace elements of the ATCS Wayside/Central Train Control & Rail/Bus Signal Systems.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
San Francisco	SFMTA	SF-090035	SFMTA: Paratransit Vehicle Replacements	SFMTA: Paratransit service across San Francisco: preserve service and replace 84 paratransit vehicles	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Francisco	SFMTA	SF-150005	SFMTA - Replacement of 40' Motor Coaches	SFMTA: 40' Neoplan Buses: Replace 40' Neoplan Buses originally in service in 2002 with (85) 40'hybrid buses.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040

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San Francisco	SFMTA	SF-150006	SFMTA Replacement of 60' Motor Coaches	SFMTA: 60' Neoplan Buses: Replace 98 60' Neoplan Buses diesel buses originally in service in 2002 with 98 60' hybrid buses.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Francisco	SFMTA	SF-150007	SFMTA Farebox Replacement	SFMTA: Systemwide: Refurbish or purchase existing fareboxes and necessary support equipment to improve reliability, functionality, and the overall customer experience.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
San Francisco	SFMTA	SF-170004	SFMTA: Replacement of 40' Trolley Coaches	SFMTA: Systemwide: Purchase 40' replacement trolley coaches for the existing aging coaches.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Francisco	SFMTA	SF-170006	SFMTA: Station-area Ped and Bike Access Improvemnt	SFMTA: Citywide: Reconfigure station areas to provide pedestrians and bicyclists more space to improve access	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-05-0001	2040
San Francisco	SFMTA	SF-170008	SFMTA: Replace 35 Paratransit Cutaway Vans	SFMTA: 35 vehicles: Replace 35 paratransit cutaway vans	2019 TIP Update - Add new project	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Francisco	SFMTA	SF-170014	SF - Powell Street Safety Project	In SF: Powell Street from Ellis to Post: Improve pedestrian safety and reduce sidewalk crowding to encourage more people to walk, especially to jobs.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-05-0001	2040
San Francisco	SFMTA	SF-170017	Vision Zero SF: Safer Intersections	San Francisco Citywide: Education and outreach program targeting unsafe left turns in intersections.	2019 TIP Update: Funds have been allocated by CTC/Caltrans and will not be seeking additional federal funds. Archive.	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-05-0003	2040
San Francisco	SFMTA	SF-170018	SFMTA: 60' Motor Coach Mid-Life Overhaul	SFMTA: Existing 60' New Flyer motor coaches: Mid-life overhaul	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
San Francisco	SFMTA	SF-170019	SFMTA: 40' Motor Coach Mid-Life Overhaul	SFMTA: Existing New Flyer 40' motor coaches: Rehabilitate/conduct mid-life overhaul	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
San Francisco	SFMTA	SF-170020	SFMTA: Replacement of 30' Motor Coaches	SFMTA: Fleetwide: Replace the Orion 30' renewable diesel electric hybrid vehicles that were procured in year 2007.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Francisco	SFMTA	SF-170021	SFMTA: Rehab Historic Streetcars	SFMTA: Fleet of historic streetcars: Rehabilitate vehicles	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
San Francisco	SFMTA	SF-170023	SF Safe Routes to School Non-Infrastrure Project	San Francisco: Citywide: Coordinate school transportation services, including planning, operations, education, outreach and capital improvement activities. It will improve the safety of students who walk	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-05-0003	2040
San Francisco	SFMTA	SF-95037B	SF Muni Rail Replacement Program	SFMTA: Systemwide: Phased design and replacement of trackway, rail replacement, grinding, ultrasonic testing, track fastener, special trackwork, and related systems serving light rail and cable car lines.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
San Francisco	SFMTA	SF-970073	SFMTA: Cable Car Vehicle Renovation Program	SFMTA: Cable car fleet: Overhaul and reconstruct the cable car fleet to maintain system reliability and productivity. Project is phased.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
San Francisco	SFMTA	SF-970170	SFMTA: Overhead Line Recon. & Traction Power Prog	SFMTA: Systemwide: Improve Trolley Poles, Overhead Contact System, Rail Traction Power that provides power to Muni, based on evaluation of the Muni Track and Traction Power Condition Assessment,	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
San Francisco	SFMTA	SF-990022	SFMTA: ADA Paratransit operating support	Muni: ADA Paratransit Operating Subsidy.; provides funding for increased van/taxi services to people with disabilities who are prevented from using Muni's fixed route services.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-05-0002	2040

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San Francisco	SFMTA	SF-99T002	Cable Car Traction Power & Guideway Rehab	SFMTA: Cable Car System: Traction power and guideway rehab-repair various guideway, track curves, frogs, sheaves, replace Barn 12KV, switchgear, DC Motor, mechanical and infrastructure to improve the	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
San Francisco	TBJPA	SF-070029	Transbay Transit Center - TIFIA Loan Debt Service	San Francisco, Transbay Transit Center: TIFIA Loan debt service for Phase 1 & 2. Update annual debt service amounts based on TIFIA loan agreement.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-10-0017	2040
San Francisco	WETA	SF-110053	WETA: Replace Ferry Vessels	WETA: All existing ferry vessels for WETA: Replace vessels when they reach the end of their useful life of 25 years	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Mateo	Atherton	SM-170018	Atherton - Middlefield Road Class II Bike Lanes	Atherton: On Middlefield Rd between San Mateo County and City of Menlo Park: Widen pavement to include striping for class II bike path	2018 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-06-0001	2040
San Mateo	BART	SM-050005	BART: Preventive Maintenance	BART: Systemwide: Preventive Maintenance	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
San Mateo	BART	SM-130029	Daly City BART Station Intermodal Improvements	Daly City: At Daly City BART Station: Improve transit operations; pedestrian & bicycle access; and safety & patron experience	2019 TIP Update	EXEMPT (40 CFR 93.127) - Bus terminals and transfer points	17-06-0002	2040
San Mateo	Belmont	SM-170042	Ralston Avenue Corridor Segment 3	Belmont: Ralston Ave from South Rd to Alameda de las Pulgas: Implement bicycle and pedestrian improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Belmont	SM-170043	Belmont Pavement Preservation	Belmont: Various streets and roads: Pavement preservation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Brisbane	SM-170019	Brisbane - Tunnel Ave Rehabilitation	Brisbane: Tunnel Ave from northern city limits (N/O Beatty Ave) to 1500 ft. south: Rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Brisbane	SM-170041	Crocker Trail Commuter Connectivity Upgrades	Brisbane: On Crocker Trail bounded by Bayshore Blvd, S Hill Dr, W Hill Dr and Mission Blue Dr: Resurface trail	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Burlingame	SM-170015	Hoover School Area Sidewalk Impvts (Summit Dr.)	Burlingame: Summit Dr from Hillside Circle to Easton Dr and immediately adjacent to the new Hoover Elementary School: Construct sidewalk and bicycle improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0002	2040
San Mateo	Burlingame	SM-170020	Burlingame: Broadway PDA Lighting Improvements	Burlingame: Along the Broadway corridor within the business district: Replace aging pedestrian street lighting with new, safer, brighter lighting	2019 TIP Update	EXEMPT (40 CFR 93.126) - Lighting improvements	17-06-0003	2040
San Mateo	Burlingame	SM-170021	Burlingame Street Resurfacing	Burlingame: Various streets and roads: Roadway resurfacing	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Caltrain	SF-010028	Caltrain Electrification	Caltrain: From San Francisco to Gilroy: Electrification of the caltrain corridor from San Francisco to Tamien, including caternary poles, wires, power supply, track and signals, and Electric Multiple Units	2019 TIP Update	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0008	2030
San Mateo	Caltrain	SM-03006B	Caltrain: Systemwide Track Rehab & Related Struct.	Caltrain: Systemwide: Rehabilitate and replace existing track, track structures and related civil infrastructure	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
San Mateo	Caltrain	SM-050040	Caltrain: ADA Operating Set-aside	Caltrain: Systemwide: Set-aside for ADA needs	2019 TIP Update - Clarify scope	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040

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San Mateo	Caltrain	SM-130026	Caltrain Control Point Installation	Caltrain: On the mainline in San Carlos: Install a new control point (rail crossover)	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
San Mateo	Caltrain	SM-170005	South San Francisco Caltrain Station Improvements	South San Francisco: SSF Caltrain Station: Demolish and reconstruct the existing station with a new ADA compliant station that meets current Caltrain standards	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
San Mateo	Caltrain	SM-170010	Caltrain TVM Rehab and Clipper Functionality	Caltrain: Systemwide: 45 existing TVM machines: Refurbish and incorporate Clipper functionality.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0026	2040
San Mateo	Caltrans	SM-110047	SR92/El Camino Real (SR82) Ramp Modifications	San Mateo: At the SR92/El Camino Real (SR82) interchange: Modify existing on/off rampsto improve the ingress and egress of the interchange.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-06-0019	2020
San Mateo	CCAG	SM-070002	San Mateo Countywide ITS Improvements	San Mateo County: County-wide; ITS improvements at various locations in San Mateo County.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-06-0006	2040
San Mateo	CCAG	SM-110022	San Mateo County SR2S Program	San Mateo County: Countywide: Provide modularized safe routes to school programs and projects that focuses on education, encouragement, evaluation and enforcement components to all interested	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-06-0002	2040
San Mateo	CCAG	SM-170046	ITS Improvements in San Mateo County Northern Citi	San Mateo County: Along the US 101 corridor from Smart Corridors Ph 1 limits to the SF County line, and on I-280 from I-380 to the San Francisco County Line: Implement ITS Improvements in San Mateo	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-06-0006	2040
San Mateo	Colma	SM-170022	Colma - Mission Road Bike/Ped Improvements	Colma: Mission Rd between El Camino Real and Lawndale Blvd: Implement safety related improvements for pedestrians, bicyclists and vehicles	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Daly City	SM-150012	Daly City Central Corridor Bike/Ped Safety Imprmnt	In Daly City: On Junipero Serra Blvd and Eastmoor Ave/San Pedro Rd/E Market St/Guad Cyn Pkwy: Install bike and ped improvements; In Daly City/Uninc San Mateo County: On west side of Mission St/El	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Daly City	SM-170023	Daly City Street Resurfacing and Slurry Seal	Daly City: Various streets and roads: Pavement preservation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	East Palo Alto	SM-070004	Bay Rd Bicycle/Ped Improvements Phase II & III	E. Palo Alto: On Bay Rd btw Clarke/Illinois & Tara Rd (Ph II) & btw Tara Rd & Bay Trail (Ph. III);Improvements including resurface, streetscape, bike lanes, & other improvements.HPP #706 (remainder	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-06-0003	2040
San Mateo	East Palo Alto	SM-070006	US 101 University Ave Interchange Improvements	E. Palo Alto: On University Ave across US 101 btw Woodland Ave and Donahoe St: Construct Bike Lane, modify NB and SB off-ramps and intersections with overcrossing with no new lanes for off-ramps. HPP	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0005	2040
San Mateo	East Palo Alto	SM-130028	US-101 Pedestrian/Bicycle Overcrossing	East Palo Alto: Between Clarke Avenue and Newell Road: Install a Pedestrian/Bicycle Overcrossing of US-101 to connect the west-side with the east-side of East Palo Alto for safe pedestrian/bicycle access.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	East Palo Alto	SM-170024	East Palo Alto Citywide Street Resurfacing	East Palo Alto: Various streets and roads: Rehabilitate roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040

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San Mateo	Foster City	SM-170025	Foster City - Pavement Rehabilitation	Foster City: Various streets and roads: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Half Moon Bay	SM-170013	Half Moon Bay - Poplar Complete Streets	Half Moon Bay: On Poplar St from Main St to Railroad Ave: Implement complete street improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Hillsborough	SM-170026	Hillsborough Street Resurfacing	Hillsborough: Various roadways: Resurfacing and preventative maintenance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Menlo Park	SM-010047	US 101 / Willow Road Interchange Reconstruction	Menlo Park: US 101 at Willow Road Interchange: Reconstruct and reconfigure interchange (No additional travel lanes).	2019 TIP Update	EXEMPT (40 CFR 93.127) - Changes in vertical and horizontal alignment	17-06-0014	2020
San Mateo	Menlo Park	SM-170027	Menlo Park - Santa Cruz and Middle Avenues Rehab	Menlo Park: Santa Cruz Ave between Olive St and Orange Ave and Middle Ave between Olive St and San Mateo Dr: Pavement Rehabilitation and installation of rectangular rapid flashing beacon	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Millbrae	SM-050053	US 101 Millbrae Ave Bike/Ped Bridge	Millbrae: Across US 101 north of and adjacent to the existing Millbrae Avenue bridge; Construct a new 10-ft wide Class 1 mixed-use bike/ped overcrossing.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Millbrae	SM-170028	Millbrae Street Rehabilitation	Millbrea: Various streets and roads: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	MTC	SM-170002	Regional Planning Activities and PPM - San Mateo	San Mateo: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
San Mateo	Pacifica	SM-130016	Palmetto Avenue Streetscape	Pacifica: Palmetto Avenue from Bella Vista Avenue to Clarendon Road: Pavement rehabilitation and pedestrian sidewalk improvements.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0003	2040
San Mateo	Pacifica	SM-170029	Pacifica - Palmetto Sidewalk Extension	Pacifica: Along the coastal west side of Palmetto Ave from Westline Dr. to 1,400 feet south: Construct new concrete sidewalk.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Pacifica	SM-170030	Pacifica Citywide Curb Ramps	Pacifica: At various locations throughout the city: Install new curb ramps	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0022	2040
San Mateo	Pacifica	SM-170031	Pacifica Pavement Rehabilitation	Pacifica: Various streets and roads: Rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Portola Valley	SM-170044	Portola Valley Street Preservation	Portola Valley: Various streets and roads: Pavement preservation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Redwood City	SM-110065	Middlefield Rd and Woodside Rd Intersection Improv	In Redwood City: At the intersection of Middlefield Rd and Woodside Rd: modify intersection to provide pedestrian facilities.	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-06-0005	2040
San Mateo	Redwood City	SM-130022	Middlefield Road Bicycle / Ped Improvements	In Redwood City: on Middlefield Road between Main Street and Woodside Road: Modify roadway and utilities as needed to widen sidewalks and improve bike and pedestrian amenities. No vehicle travel	2019 TIP Update - Update scope	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0003	2040
San Mateo	Redwood City	SM-170032	Redwood City Pavement Preservation	Redwood City: Twin Dolphin Parkway from Marine Parkway to Redwood Shores Parkway: Pavement preservation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Redwood City	SM-170045	US 101/Woodside Road Class 1 Bikeway	Redwood City: East of Union Pacific Railroad between the intersections of Chestnut St/Veterans Blvd and Blomquist St/Seaport Blvd: Construct approximately 1,800 linear feet of new Class 1 path	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040

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San Mateo	SamTrans	SM-030023	SAMTRANS: Preventive Maintenance	SamTrans: Fleetwide: Preventative maintenance program	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
San Mateo	SamTrans	SM-070049	SAMTRANS Facility/Equipment Rehab/Replacement	SAMTRANS: Systemwide: Operating/maintenance facility/equip rehab/replacement, including the provision of facility improvements for admin, maintenance, and operations at the Central Administrative	2019 TIP Update - and update performance measures	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
San Mateo	SamTrans	SM-150010	SamTrans - Replacement of Cutaway Buses	SamTrans: Readi-Wheels Paratransit service: Purchase replacement cutaway buses	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Mateo	SamTrans	SM-150011	SamTrans - Purchase of Replacement Minivans	SamTrans: Purchase ten new replacement minivans used for ADA Paratransit service	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
San Mateo	SamTrans	SM-170008	El Camino Real Traffic Signal Priority Project	San Mateo County: On El Camino Real (State Route 82) from the Palo Alto Caltrain Station to the Daly City BART Station: Install Traffic Signal Priority system	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-06-0029	2040
San Mateo	SamTrans	SM-990026	SAMTRANS: ADA Paratransit Operating Subsidy	SamTrans: Systemwide: ADA Paratransit Operating Subsidy.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
San Mateo	San Bruno	SM-130019	San Bruno Ave Street Medians Improvements	San Bruno: San Bruno Ave from Elm Ave to I-280: Implement pedestrian improvement including curb ramps, speed radar display signs, demolish existing landscape and replace and replace existing spray	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	San Bruno	SM-170017	Huntington Transit Corridor Bike/Ped Improvements	San Bruno: On Huntington Ave from San Bruno Ave to the entrance of the Centennial Way Trail: Implement pavement preservation and bike/ped facilities including converting the rightmost lane on	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0003	2040
San Mateo	San Bruno	SM-170033	Huntington/San Antonio Street Rehabilitation	San Bruno: Huntington Ave between San Mateo Ave and San Felipe Ave, and San Antonio Ave between San Felipe Ave and Santa Inez Ave: pavement rehabilitation and preventive maintenance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	San Carlos	SM-170034	Ped Enhancements Arroyo/Cedar & Hemlock/Orange	San Carlos: At the intersections of Arroyo Ave and Cedar St and Hemlock St and Orange Ave and the Postman Walkway: Implement safety improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	San Carlos	SM-170035	Cedar and Brittan Ave Pavement Rehab	San Carlos: On Cedar Street, between San Carlos Avenue and the City of Belmont, and Brittan Avenue, between Elm Street and El Camino Real: Rehabilitate pavement and install ADA compliant facilities	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	San Carlos	SM-190001	Brittan Ave. Widening Project	San Carlos: At the intersection of Brittan and Industrial Road: Widen to accommodate three new left turn pockets	2019 TIP Update - new project	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-06-0004	2040
San Mateo	San Mateo	SM-130020	San Mateo Citywide Crosswalk Improvements	City of San Mateo: Various locations citywide: Install new high visibility crosswalks or upgrade existing crosswalks	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	San Mateo	SM-150002	City of San Mateo SR2S Program	City of San Mateo: Within a 0.1 to 0.5 mile radius around each of the 15 elementary and middle schools in the City: Develop and Implement a Safe Routes to School Program	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0002	2040

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San Mateo	San Mateo	SM-150016	San Mateo Downtown Parking Tech Implementation	In San Mateo: Various Locations Downtown: Replace existing parking meters, and pay stations and install parking availability signs at City facilities.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Directional and informational signs	17-10-0015	2040
San Mateo	San Mateo	SM-170006	East Hillsdale Boulevard Ped/Bike Overcrossing	City of San Mateo: Over US 101 at the US 101/Hillsdale Boulevard Interchange: Construct pedestrian and bicycle overcrossing	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	San Mateo	SM-170038	North San Mateo Drive Sustainable Streets	San Mateo: on San Mateo Dr from Peninsula Ave to Baldwin Ave: Install Class II bike lanes, curb extensions, enhanced striping & signage, upgraded traffic signals with ped countdown, ped scale lighting,	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-06-0001	2040
San Mateo	San Mateo	SM-170039	Laurie Meadows Ped/Bike Safety Improvements	San Mateo: Various locations in the Laurie Meadows neighborhood: Implement bike/ped safety improvements; On Laurie Meadows Dr from near Pacific Blvd to Woodbridge Circle: Implement road diet	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-06-0001	2040
San Mateo	San Mateo	SM-170040	San Mateo Street Rehabilitation	San Mateo: Various streets and roads: Resurface and/or rehabilitate the roadway, implement bicycle elements and upgrade ADA ramps	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	San Mateo Co	SM-130032	Midcoast Multi-Modal Trail	San Mateo County: On Highway 1 from Mirada Road in Miramar to Coronado Street in El Granada: Construct 4,537 feet of multi-use trail.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	San Mateo Co	SM-150013	RWC 2020 Sustainable Transportation Encouragement	San Mateo County: In and around Redwood City: Safe Routes to School walk and bike audits, encouragement and education programs and community-wide transportation mode share change evaluation.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-06-0002	2040
San Mateo	San Mateo Co	SM-170001	Hwy 1 Congestion & Safety improvement Project	In San Mateo County along 7 miles of Highway 1 between Pacifica in the north and Half Moon Bay in the south; Install raised medians, left turn lanes, acceleration lanes, and pedestrian crossings.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-06-0005	2040
San Mateo	San Mateo Co	SM-170012	Canada Road and Edgewood Road Resurfacing	San Mateo County: Edgewood Rd between 0.17 mi west of Crestview Dr to Cervantes Rd and Canada Rd between the NB and SB 280 off- and on-ramps: Resurface pavement including overlay, pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	San Mateo Co	SM-170014	San Mateo Countywide Pavement Maintenance	San Mateo County: Various streets and roads county-wide: Pavement maintenance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	San Mateo County	SM-150014	Safe Routes to School for Health and Wellness	San Mateo County: Countywide: Implement a non-infrastructure educational program to increase the number of children who bike and walk to school with a focus on long term sustainability. Other State	2019 TIP Update - Retain in TIP as project is ongoing	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-06-0002	2040
San Mateo	SF City/County	SM-130031	Southern Skyline Blvd. Ridge Trail Extension	San Mateo County: On the east side of SR-35 "Upper Skyline Blvd" between the intersection of Hwy 92 and Hwy 35 southward approximately 6 miles to the SFPUC Peninsula Watershed: Construct Southern	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	SSF	SM-130003	SSF Citywide Sidewalk Gap Closure Project	South San Francisco: Various Streets: closes gaps in the existing pedestrian infrastructure	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	SSF	SM-130013	SSF Grand Blvd Project: Chestnut to Arroyo	SSF: El Camino Real between Chestnut Ave/Westborough Blvd to Arroyo Ave: Design and construct improved pedestrian crossings with corner bulbouts, median refuges, expanded bus stop areas and new	2019 TIP Update - Retain in TIP as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0003	2040

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San Mateo	SSF	SM-130030	SSF Grand Blvd Project: Kaiser Way to McLellan	South San Francisco: Along El Camino Real between Kaiser Way and McLellan Drive: Implement bike and pedestrian enhancements, street trees, rain gardens and median landscaping as well as	2019 TIP Update. In coordination with TIP ID SM-130013	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-06-0003	2040
San Mateo	SSF	SM-150015	SSF Linden/Spruce Ave Traffic Calming Improvements	In South San Francisco: On Linden Avenue from California Ave to Miller Avenue and on Spruce Ave from Maple Ave to Lux Ave: install pedestrian/bicycling safety improvements including a class 3 bikeway.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	SSF	SM-170016	SSF Grand Boulevard (Phase III)	South San Francisco: El Camino Real from Arroyo Dr to Kaiser Way: Implement Grand Boulevard Complete Streets improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0003	2040
San Mateo	SSF	SM-170036	SSF Pavement Rehabilitation	South San Francisco: Various locations: Pavement Rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
San Mateo	Woodside	SM-170009	Woodside School Safety Pathway Phase 3	Woodside: Along SR-84 from Woodside Elementary to west of the intersection with Canada Rd: Create a pathway, paved shoulders for bikes and extend the current multi-use pathway improvements; near	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-06-0001	2040
San Mateo	Woodside	SM-170037	Woodside Road Rehabilitation	Woodside: Mountain Home Road from Woodside Road to Portola Road: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Campbell	SCL170035	Campbell - Winchester Blvd Overlay	Campbell: On Winchester Blvd from northern city limit near Rosemary Ln to southern city limit at Knowles Dr and Campbell Ave from Jeffers Way to Winchester Blvd: Install asphalt concrete overlay	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Campbell	SCL170036	Eden Avenue Sidewalk Improvements	Campbell: On Eden Avenue between Hamilton Avenue and north city limits: Install sidewalk, curb, gutter, curb ramps, flashing beacon system, storm drain inlet, pipes, striping, signs and other	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Cupertino	SCL170037	Cupertino Pavement Maintenance Phase 2	Cupertino: Various Locations: Rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Gilroy	SCL170058	Downtown Monterey Road Rehabilitation	Gilroy: Monterey Road between 1st Street and 8th Street: Pavement preservation including rehabilitation, resurfacing, roadway reconstruction, and/or spot reconstruction	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Los Altos	SCL170034	Los Altos: Miramonte Ave Bike and Ped Access Imps	In Los Altos: Miramonte Ave from City Limit (Covington) to Berry: Install new sidewalk and buffered Class II bike lanes, along with improving crosswalks and rechannelize traffic. Project is phased.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Los Altos	SCL170038	Los Altos: Fremont Ave Pavement Preservation	Los Altos: Fremont Ave between Grant Rd and Stevens Creek (City Limit): Rehabilitate roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Los Gatos	SCL170028	Los Gatos Creek Trail to Hwy 9 Trailhead Connector	In Los Gatos: The Los Gatos Creek Trail to the north and south sides of Highway 9 between the Highway 17 interchange and University Ave: Construct bike and pedestrian connector	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Milpitas	SCL170039	Milpitas Street Resurfacing	Milpitas: Various streets and roads: Rehabilitate roadway and upgrade ADA and bicycle facilities	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040

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Santa Clara	Morgan Hill	SCL170063	Dunne Avenue Pavement Rehabilitation	Morgan Hill: E Dunne Ave between lower Thomas Grade and Flaming Oaks Dr and between upper Thomas Grade and Holiday Dr, and Holiday Drive from E Dunne Ave to 2,500 linear feet east toward	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-07-0004	2040
Santa Clara	Mountain View	SCL170040	West Middlefield Road Improvements	Mountain View: W. Middlefield Rd between Rengstorff Ave and N. Shoreline Blvd: Resurface roadway and reconstruct the median island	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	MTC	SCL170001	Regional Planning Activities and PPM - Santa Clara	Santa Clara: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Santa Clara	Palo Alto	SCL130041	Adobe Creek/ Highway 101 Bicycle Pedestrian Bridge	Palo Alto: Where US 101 crosses Adobe Creek: Construct Bike/Ped Bridge. Project is phased.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Palo Alto	SCL170003	Palo Alto: Bay Area Fair Value CommutingMoDSandbox	In Palo Alto: Reduce Bay Area SOV commute share by using Fair Share Commuting (FVC), consisting of: Enterprise Commute Trip Reduction (ECTR) software; Mobility Aggregation (MobAg); parking feebate;	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0015	2040
Santa Clara	Palo Alto	SCL170021	North Ventura Coordinated Area Plan	Palo Alto: In proximity to the California Avenue Caltrain station, the California Avenue business district, El Camino Real and the Stanford Research Park: Develop a comprehensive planning document similar	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-10-0021	2040
Santa Clara	Palo Alto	SCL170041	Palo Alto Street Resurfacing	In Palo Alto: Various streets and roads: Resurface roadways	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Palo Alto	SCL170051	Palo Alto-El Camino Real Ped Safety & Streetscape	In Palo Alto: On El Camino Real between Stanford Ave and Grant Ave: Install complete streets improvements focused on pedestrian safety, enhanced bus operations, and new urban design amenities.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0001	2040
Santa Clara	Palo Alto	SCL170053	Waverley, E. Meadow & Fabian Enhanced Bikeways	Palo Alto: Waverley Multi-Use Path: Widen and upgrade path; E Meadow Dr from Alma to Fabian: Protected bike facility; Fabian Way from East Meadow Dr to E Charleston: Reconfigures roadway with a travel	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0001	2040
Santa Clara	San Jose	SCL050082	Bay Trail Reach 9 & 9B	In San Jose: Near Gold Street to the existing San Tomas Aquino Creek Trail; Design and construct 1.2 miles of commuter/transportation trail, pedestrian bridge, and underpasses with safety and	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	San Jose	SCL050083	Coyote Creek Trail (Hwy 237-Story Rd)	In San Jose: from Highway 237 to Story Road; Master plan entire system, design and construction of the trail.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	San Jose	SCL090004	Almaden Ave & Vine St Safety Improvements	In San Jose: Almaden Ave and Vine St: Construct pedestrian safety improvements.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	San Jose	SCL110029	San Jose: Los Gatos Creek Reach 5 Underpass	In San Jose: Los Gatos Creek Trail between Auzerais Ave and Montgomery/Bird Ave: Construct Los Gatos Creek Trail (Reach 5b/c).	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	San Jose	SCL110107	San Jose: Road Rehab and Ped. Facilities	In San Jose: On various streets: Rehabilitate roadway and construct pedestrian facilities.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	San Jose	SCL130004	San Jose - Better Bikeways	San Jose: Various locations in downtown: Implement a network of bikeways	2019 TIP Update - Update project scope and funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0003	2040

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Santa Clara	San Jose	SCL130016	East San Jose Bikeways	East San Jose: Various locations: make improvements to the bikeway network including the installation of new bikeways, traffic calming features, bike-friendly signal detection and pavement markings.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	San Jose	SCL170029	Tully Road Safety Improvements	In San Jose: Tully Road between Monterey Road and Capital Expressway: Implement safety elements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0064	2040
Santa Clara	San Jose	SCL170030	McKee Road Safety Improvements	San Jose: On McKee Road between Route 101 and Toyon Ave: Implement safety improvements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0064	2040
Santa Clara	San Jose	SCL170031	Mt Pleasant Ped & Bike Traffic Safety Improvements	San Jose: Various locations in the Mount Pleasant Area: Implement traffic safety improvements to serve student populations of seven schools	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0064	2040
Santa Clara	San Jose	SCL170044	San Jose Pavement Maintenance	San Jose: Various streets and roads: Pavement maintenance and rehabilitation and build pedestrian facilities	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	San Jose	SCL170060	DTSJ Mobility Streetscape and Public Life Plan	San Jose: Downtown PDA/Frame: Develop PDA implementation plan	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-07-0003	2040
Santa Clara	San Jose	SCL170061	W San Carlos Urban Village Streets Improvements	San Jose: West San Carlos St between I-880 and McEvoy St: Implement safety improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0001	2040
Santa Clara	San Jose	SCL170062	East Side Alum Rock (East of 680) Urban Village	San Jose: On Alum Rock between I-680 and King Road: Develop multi-modal transportation implementation plan	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-07-0003	2040
Santa Clara	Santa Clara	SCL170042	Santa Clara Streets and Roads Preservation	Santa Clara: Various streets and roads: Rehabilitate and reconstruct pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Santa Clara	Santa Clara	SCL170045	Saratoga Creek Trail Phase 1	Santa Clara: Saratoga Creek Trail between Homeridge Park and Central Park: Build a class I bicycle and pedestrian trail	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Santa Clara	SCL170052	San Tomas Aquino Creek Trail Underpass	In Santa Clara: San Tomas Aquino Creek Trail between Tasman Dr and 1/4 mile south of Tasman Dr: Construct bike/ped underpass.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Santa Clara	SCL170055	Hetch-Hetchy Trail Phase 1	Santa Clara: On the Hetch-Hetchy right-of-way from Stars and Stripes Dr to San Tomas Aquino Creek and along the east bank of San Tomas Aquino Creek from Hetch-Hetchy right-of-way to Agnew Rd:	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Santa Clara	SCL170056	Santa Clara School Access Improvements	Santa Clara: Various locations around Santa Clara Schools: Implement bicycle and pedestrian access improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Santa Clara Co	SCL110108	Isabel Bridge Replacement (37C0089)	In Santa Clara County: Isabel Bridge (Bridge No. 37C0089) on San Antonio Valley Road, 8.3 miles east of Kincaid Rd: Replace existing one lane bridge with a two-lane bridge	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Santa Clara	Santa Clara Co	SCL130037	Capitol Expressway ITS and Bike/Ped Improvements	In San Jose: Capitol Expressway: Upgrade traffic signals and ITS infrastructure and install pedestrian sensors and bike detection at all intersections to allow traffic responsive and adaptive signal timing and	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-07-0078	2030
Santa Clara	Santa Clara Co	SCL170019	Uvas Road Pavement Rehabilitation	Santa Clara County: On the County maintained portions of Uvas Rd: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-07-0004	2040

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Santa Clara	Santa Clara Co	SCL170032	McKean Rd Pavement Rehabilitation	Santa Clara County: On the County maintained portions of McKean Road: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-07-0004	2040
Santa Clara	Santa Clara Co	SCL170033	Capitol Expressway Pavement Rehabilitation	Santa Clara County: Capitol Expressway between Copperfeild Ave to McLaughlin Avenue: Pavement rehabilitation	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-07-0004	2040
Santa Clara	Saratoga	SCL130026	Prospect Rd Complete Streets	Saratoga: Prospect Road between Saratoga/Sunnyvale Rd and Lawrence Expressway and on Saratoga Ave between Highway 85 to the City Limits to the north (Lawrence Expressway): Reduce roads width to	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0003	2040
Santa Clara	Saratoga	SCL170054	Saratoga Village Crosswalks and Sidewalk Rehab	In Saratoga: Along Big Basin Way between 6th street and Hwy 9: Install curb bulbouts and crosswalk and rehabilitate sidewalk.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170017	Sunnyvale SNAIL Neighborhood Improvements	In Sunnyvale: Various locations: Implement bike/ped improvements, close slip lanes, add bulbouts, install detection systems, ADA compliant ped signals, enhance existing bike lanes to include green bike	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-07-0003	2040
Santa Clara	Sunnyvale	SCL170020	Bernardo Avenue Bicycle Underpass	Sunnyvale: Between North and South Bernardo Avenue under the Caltrain tracks: Construct bicycle underpass	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170022	Java Dr Road Diet and Bike Lanes	Sunnyvale: On Java Dr from Mathilda to Crossman: Construct approximately 5,000 linear feet of Class II bike lanes each side via a road diet	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170023	Peery Park "Sense of Place" Improvements	Sunnyvale: Various locations in the Peery Park Specific Area: Implement bike, pedestrian, and transit improvements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0003	2040
Santa Clara	Sunnyvale	SCL170024	East Sunnyvale Area "Sense of Place"	Sunnyvale: Various locations in the East Sunnyvale Sense of Place Plan Area: Implement bike, pedestrian and transit access improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0003	2040
Santa Clara	Sunnyvale	SCL170025	Fair Oaks Avenue Bikeway - Phase 2	Sunnyvale: Fair Oaks Ave from SR237 to Reed Ave: Reconfigure to install Bikeway/routes enhancements and close bikeway gaps	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170026	Lawerence Station Area Sidewalks & Bike Facilities	Sunnyvale: In the general area of the Lawrence Station Area Plan: Install bike and pedestrian improvements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170027	Sunnyvale Traffic Signal Upgrades/Replacements	Sunnyvale: Various intersections: Upgrade traffic signals and intersections to have pedestrian-friendly designs and improved bicycle detection for the traffic signals.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-10-0022	2040
Santa Clara	Sunnyvale	SCL170043	Homestead Rd at Homestead High School Improvements	Sunnyvale: Various locations on Homestead Rd near Homestead HS: Install safety improvements and upgrade signals; On Homestead Rd from McKenzie Dr to Mary Ave (south side) and from Mary Ave to	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170057	Sunnyvale Ped and Bike Infrastructure Improvements	Sunnyvale: At various locations city-wide: Add improvements to Bike/Ped infrastructure including enhancing and/or installing signs, striping, ADA compliant curb ramps and crossing safety treatments	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	Sunnyvale	SCL170059	Sunnyvale Safe Routes to School Improvements	Sunnyvale: In the vicinity of Bishop Elementary School: Install bike lanes, high visibility crosswalks, raised crosswalks, and curb extensions; Provide bicycle and pedestrian education and encouragement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0001	2040

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Santa Clara	VTA	SCL050001	VTA: Standard & Small Bus Replacement	VTA: Fleetwide: Standard and Small Bus Replacement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Santa Clara	VTA	SCL050002	VTA: Rail Replacement Program	VTA: Throughout the Light Rail system: Replace rails (no rail expansion).	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
Santa Clara	VTA	SCL050046	VTA: ADA Operating Set Aside	VTA: Systemwide: ADA operating assistance set aside.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Santa Clara	VTA	SCL050049	VTA: Rail Substation Rehab/Replacement	VTA: Guadalupe Light Rail Corridor: Rehabilitate electrical elements (such as disconnect switches, DC breakers, etc.) of traction power substations.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Santa Clara	VTA	SCL090044	VTA: TP OCS Rehab & Replacement	VTA: Systemwide: Rehabilitate and replace overhead catenary system (OCS) and associated components	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Santa Clara	VTA	SCL110099	VTA: Light Rail Bridge and Structure - SG Repair	VTA: Various Locations: Light rail bridge and structure defect investigation and repair. Stabilization measures to address Hamilton structure settlement.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
Santa Clara	VTA	SCL110104	VTA: Light Rail Track Crossovers and Switches	VTA: In the light rail system: Add light rail crossovers and switches to priority areas where crossovers are not currently available to enhance operational flexibility.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
Santa Clara	VTA	SCL110125	Local PDA Planning - Santa Clara	Santa Clara County: Various Agencies: Planning assistance pass through to local jurisdictions to support transportation investments and improve their performance in Priority Development Areas (PDAs).	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0021	2040
Santa Clara	VTA	SCL130040	Montague Expy Ped Bridge at Milpitas BART	Milpitas: At Milpitas BART Station over Montague Expressway: Construct a pedestrian bridge. Project is phased.	2019 TIP Update - update schedule.	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-07-0001	2040
Santa Clara	VTA	SCL130044	I-880 Stevens Creek Landscaping	San Jose: at the I-880/Stevens Creek interchange: Provide landscaping.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Plantings, landscaping, etc	17-10-0025	2040
Santa Clara	VTA	SCL150001	I-680 Soundwalls - Capitol Expwy to Mueller Ave	In San Jose: On I-680 between Capitol Expressway and Mueller Avenue: Construct soundwalls	2019 TIP Update	EXEMPT (40 CFR 93.126) - Noise attenuation	17-07-0064	2040
Santa Clara	VTA	SCL150005	VTA Train to Wayside Communication System Upgrade	VTA: Communications: Upgrade the existing DOS based train-to-wayside communications (TWC) system to a Windows based system while keeping the original system's operational functionality.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Santa Clara	VTA	SCL150006	VTA: Back-up Power for Elevated Stations	VTA: Various elevated stations: Replace the generators and automatic power bypass switch for elevated stations on the Guadalupe Light Rail line.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Santa Clara	VTA	SCL150008	VTA Track Intrusion Abatement	VTA: Various locations along trackway: Installation of fencing, barriers, signage, flashing signs, and pavement markings.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation or reconstruction of track structures, track, and trackbed in	17-10-0026	2040
Santa Clara	VTA	SCL150014	I-280/Winchester Blvd Interchange Improvement	San Jose: I-280/Winchester Interchange: Construct improvements at the Winchester Blvd. interchange and I-280/I-880/SR 17 freeway connectors including the addition of ramps and a fly-over and the	2019 TIP Update	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-07-0025	2030

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Santa Clara	VTA	SCL170002	VTA BART Phase II TOD and Station Access Planning	In Santa Clara County: In the vicinity of planned BART stations: Perform study of TOD and Station Access Planning.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Planning and technical studies	17-10-0032	2040
Santa Clara	VTA	SCL170005	VTA: Paratransit Vehicle Procurement	VTA: Paratransit Fleet: Procure vehicles and associated equipment for paratransit services.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Santa Clara	VTA	SCL170006	VTA: Replace Fault Monitoring System on LRVs	VTA: On Light Rail Vehicle Fleet: Upgrade Fault Monitoring System (FMS) Network that is no longer supported by the original equipment manufacturer (OEM)	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Santa Clara	VTA	SCL170007	VTA: Pedestrian Swing Gates Replacement	VTA: At various pedestrian crossing locations along the light rail system: Replace spring-hinge pedestrian swing gates	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0026	2040
Santa Clara	VTA	SCL170008	VTA: Vasona Pedestrian Back Gates	VTA: At several Vasona Light Rail Corridor crossings: Install pedestrian gates. Scope includes installation of automatic pedestrian gates, swing gates and railings, minor civil improvements and related signal	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-07-0064	2040
Santa Clara	VTA	SCL170009	VTA: Chaboya Yard Well Removal	VTA: At the Chaboya Bus Operating Division: Obtain case closure and demolish the ground water remediation system and wells	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Santa Clara	VTA	SCL170010	VTA: Guadalupe Train Wash Replacement	VTA: Guadalupe Light Rail Division: Replace train wash.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Santa Clara	VTA	SCL170011	VTA: Upgrade Rail Grade Crossing Control Equipment	VTA: Various Locations: Replace existing rail grade crossing equipment; such as controllers, relays, and surge panels; that have become obsolete.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Santa Clara	VTA	SCL170012	Santa Clara Pocket Track Light Rail Interlocking	Santa Clara: At pocket light rail track near Levi's Stadium: Implement interlocking improvements	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Santa Clara	VTA	SCL170046	VTA: Systemwide Security Improvements	VTA: Systemwide: Implement safety improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0026	2040
Santa Clara	VTA	SCL170047	VTA: Non-Revenue Vehicle Procurement	VTA: Systemwide: Acquire non-revenue vehicles to replace existing units that have reached the end of their useful life	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040
Santa Clara	VTA	SCL170048	VTA: Light Rail Roadway Protection System	VTA: On the VTA Light Rail System: Explore and implement Roadway Worker Protection System technologies to meet regulatory requirements	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0026	2040
Santa Clara	VTA	SCL170049	VTA: SCADA Middleware Replacement	VTA: Systemwide: Replace existing obsolete middleware software with updated software to ensure compatibility with other upgraded SCADA software and SCADA components	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0026	2040
Santa Clara	VTA	SCL170050	VTA: SCADA Control Center System Replacement	VTA: Systemwide: Provide upgrades to the Supervisory Control and Data Acquisition (SCADA) System hardware and software; At the Control and Data Center: Facility expansion	2019 TIP Update	EXEMPT (40 CFR 93.126) - Construction or renovation of power, signal, and communications systems	17-10-0026	2040
Santa Clara	VTA	SCL170064	I-280 Soundwalls - Bird Avenue to Los Gatos Creek	In San Jose: Along I-280 on both sides between Bird Avenue and Los Gatos Creek Bridge: Construct new soundwalls. Modifying the existing irrigation system, landscaping, and traffic control will be required	2019 TIP Update	EXEMPT (40 CFR 93.126) - Noise attenuation	17-07-0064	2040

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Santa Clara	VTA	SCL170065	IDEA Cat 2: Valley Transportation Authority	Palo Alto: At the Vetrans Administration Hospital: Implement an automated micro-transit feeder pilot project	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0033	2040
Santa Clara	VTA	SCL190003	Hwy. Transp Operations System/FPI Phase 1 & 2	Santa Clara County: At various locations: Implement Transportation Operations System/Freeway Performance Initiative projects	2019 TIP Update - new project	EXEMPT (40 CFR 93.126) - Traffic control devices and operating assistance other than signalization	17-07-0010	2040
Santa Clara	VTA	SCL190012	US 101/San Antonio Rd/Charleston/Rengstorff IC Imp	Mountain View and Palo Alto: US 101 interchanges at San Antonio and Charleston Road/Rengstorff Avenue: Construct interchange improvements include adding new auxiliary lane.	2019 TIP Update - new project	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-07-0034	2030
Santa Clara	VTA	SCL190013	US 101/SR 25 Interchange - Phase 1	Santa Clara County: US 101 and SR 25 Interchange: Phase 1 Reconfigure a portion of the overall interchange re-construction, focusing on improving the movement from southbound US 101 to southbound	2019 TIP Update - new project	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-07-0069	2030
Santa Clara	VTA	SCL190015	I-280/Saratoga Avenue Interchange Improvement	San Jose: I-280/ Saratoga Ave Interchange: Modify interchange to relieve congestion and improve local circulation	2019 TIP Update - new project	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-07-0029	2030
Santa Clara	VTA	SCL190016	I-280 NB Braided Ramps btw Foothill Expwy & SR 85	Santa Clara County: On northbound I-280 between Foothill Expressway and Route 85: Improve braided ramps	2019 TIP Update - new project	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-07-0030	2030
Santa Clara	VTA	SCL190017	I-680/ Alum Rock/ McKee Road Interchange Imp	San Jose: At the I-680/ Alum Rock and I-680/ McKee Road interchanges: Reconfigure interchanges, improve access for all modes of transportation, improve traffic operations and relieve congestion; In the	2019 TIP Update - new project	EXEMPT (40 CFR 93.127) - Interchange reconfiguration projects	17-07-0032	2030
Santa Clara	VTA	SCL990046	VTA: Preventive Maintenance	VTA: Preventive Maintenance of agency's fleet.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Solano	Benicia	SOL170011	Benicia - Park Road Improvements	Benicia: Park Road between I-780 and Bayshore Road: Resurface roadway and construct Class II/IV bicycle lane facilities and storm drain improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-08-0002	2040
Solano	Fairfield	SOL010006	City of Fairfield Operating Assistance	Fairfield: Systemwide: Transit operating assistance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Solano	Fairfield	SOL110041	Fairfield-Suisun Intercity/Local Bus Replacement	Fairfield: Systemwide: Replace local/intercity buses that have exceeded their expected useful life.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Solano	Fairfield	SOL170006	East Tabor Tolenas SR2S Sidewalk Gap Closure	In Fairfield: On East Tabor Avenue (north side); Construct sidewalk across the railroad tracks including slight roadway widening. On Tolenas Avenue (east side); widen the existing sidewalk.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0002	2040
Solano	Fairfield	SOL170010	Grange Middle School Safe Routes to School	In Fairfield: On East Tabor Avenue, at the intersections of Falcon Drive and blossom Avenue: enhance bicycle and pedestrian safety mobility.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-08-0004	2040
Solano	MTC	SOL170001	Regional Planning Activities and PPM - Solano	Solano County: County-wide: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Solano	Solano County	SOL070012	Cordelia Hills Sky Valley	Solano County: Cordelia Hill: Transportation enhancements including upgrade of pedestrian and bicycle corridors including open space acquisition along Cordelia Hill Sky Valley and McGary Road. Project is	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0005	2040

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Solano	Solano County	SOL130007	Suisun Vallley Bicycle and Pedestrian Imps	Solano County: At Mankas Corner: Construct staging area with bicycle and pedestrian improvements; At Various Locations in Solano County: Add a Class II bike lane to enhance bike access to areas	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0001	2040
Solano	Solano County	SOL170015	Solano County Roadway Preservation	Solano County: On Midway Road from I80 to HWY 113: Apply Asphalt Rubber Chip Seal and Micro Surface treatment	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Solano	Solano County	SOL170016	Solano County Farm to Market Phase 3	Solano County: Various locations in Suisun Valley: Construct a total of 4.6 miles of 6-foot class II bike lanes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0002	2040
Solano	SolTrans	SOL070032	SolTrans: Preventive Maintenance	SolTrans: Systemwide: Preventive maintenance of vehicles and equipment necessary for the maintenance of federally funded assets.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Solano	SolTrans	SOL090034	SolTrans: Bus Replacement (Alternative Fuel)	SolTrans: Eight 45' MCI commuter coaches: Replace vehicles as they reach their useful life.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Solano	SolTrans	SOL110025	SolTrans: ADA Paratransit Operating Subsidy	SolTrans: Systemwide: ADA Paratransit Operating Subsidy	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Solano	SolTrans	SOL110040	SolTrans: Operating Assistance	Solano County Transit: System-wide: Operating Assistance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Solano	SolTrans	SOL170002	SolTrans: Data Management Technology Enhancements	SolTrans: Systemwide: Procure data management systems and software	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of office, shop, and operating equipment for existing facilities	17-10-0026	2040
Solano	SolTrans	SOL170003	Soltrans: Facilities and Amenities Improvements	Soltrans: Systemwide: Facility and passenger amenities improvements	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Construction of small passenger shelters and information kiosks	17-10-0026	2040
Solano	STA	SOL110019	Solano Safe Routes to School Program	In Solano County: Countywide: Implement Countywide Solano Safe Routes to School Program, including Planning, Education, and Encouragement events and materials.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-08-0004	2040
Solano	STA	SOL150003	SR12/Church Rd Intersection Improvements	Rio Vista: At SR12/Church Rd. Intersection: Add Standard Shoulders, EB Left Turn Lane, WB Acceleration Lane (720 ft) and Deceleration Lane (300 ft), Remove Trees in Clear Recovery Zone	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-08-0005	2040
Solano	STA	SOL150004	STA SR2S Infrastructure & Non-infrastructure	Solano County: At 7 schools: Implement pedestrian infrastructure improvements; At 26 schools throughout the Cities of Benicia, Rio Vista & Vallejo: Providing education outreach	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0004	2040
Solano	STA	SOL170009	Solano Mobility Call Center	Solano County: County-wide: Operate call center featuring in-person assistance for customers related to transit, commuting, and mobility services, including ADA, Clipper, and ride matching, among others	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Solano	Suisun City	SOL170007	McCoy Creek Trail - Phase 2	In Suisun City: Along the west bank of the McCoy Creek canal and the north bank of the Laurel Creek canal between Pintail Dr and Worley Rd: Construct a Class I concrete pedestrian/bicycle trail with a	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0002	2040
Solano	Suisun City	SOL170014	New Railroad Avenue Pavement Rehabilitation	In Suisun City: On the eastbound lanes on New Railroad Avenue from Village Drive to Sunset Avenue: Rehabilitate roadway including striping for Class 2 bikeway.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040

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Solano	Vacaville	SOL010007	Vacaville Transit: Operating Assistance	Vacaville Transit: System-wide: Operating Assistance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Solano	Vacaville	SOL130017	Transit Marketing and Public Outreach	Vacaville: Citywide: Marketing and public outreach of City Coach transit benefits	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0027	2040
Solano	Vacaville	SOL170012	Vacaville - Pavement Preservation	Vacaville: Various streets and roads: edge grind, overlay, perform curb ramp replacements and striping	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Solano	Vacaville	SOL170013	Vaca Valley/I505 Multimodal Improvements	Vacaville: On Vaca Valley Parkway at E Monte Vista Ave and I-505 ramps: Install roundabouts and construct bicycle/pedestrian facilities over I-505 connecting to existing facilities and ADA improvements	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection channelization projects	17-08-0008	2040
Solano	Vallejo	SOL110035	Vallejo Downtown Streetscape	Vallejo: Various streets in the downtown area: Pedestrian enhancements including traffic calming, restriping, parking, signs, brick pavers, street furniture and art. Project is phased	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Transportation enhancement activities (except rehabilitation and operation	17-08-0002	2040
Solano	Vallejo	SOL110037	Sonoma Boulevard Improvements HSIP5-04-031	Vallejo: Sonoma Blvd. between York St. and Kentucky St: Implement road diet-reduce travel lanes from 4 to 2, add a two-way left turn lane or median, and add bike lanes.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-08-0004	2040
Solano	Vallejo	SOL170008	Vallejo Bay Trail / Vine Trail Gap Closure	In Vallejo: Between the existing Bay Trail to the south and the Bay Trail and Napa Vine Trail in American Canyon: Build multi-use path to close the gap between the existing trail segments	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-08-0002	2040
Sonoma	Cloverdale	SON130016	Cloverdale - Safe Routes to School Phase 2	Cloverdale: Various Locations: Construct sidewalks and add Class II bike lanes	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Cotati	SON170015	E. Cotati Avenue Street Rehabilitation Project	Cotati: E. Cotati Avenue from the railroad tracks east to the City limits: Repave street, landscape the median, update traffic signs, and repair and restore sidewalks to ADA compliance	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	Healdsburg	SON170024	Healdsburg Avenue Complete Streets Improvements	Healdsburg: On Healdsburg Ave from Powell Ave to Passalaqua Rd: Implement complete streets improvements for all modes of travel including reducing travel lanes from 5 to 3	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-09-0005	2040
Sonoma	MTC	SON170002	Regional Planning Activities and PPM - Sonoma	Sonoma County: Regional Planning Activities and Planning, Programming and Monitoring (PPM)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Planning activities conducted pursuant to titles 23 and 49 U.S.C	17-10-0023	2040
Sonoma	Petaluma	SON150007	Petaluma Transit: ADA Set-Aside	Petaluma Transit: Annual ADA Set-Aside	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Sonoma	Petaluma	SON170005	Petaluma: Transit Yard & Facilities Improvements	Petaluma: Transit Yard and Facility: Improvements to enhance security and maintain a state of good repair, including pavement repair and upgrades, video surveillance system, office security, yard lighting,	2019 TIP Update	EXEMPT (40 CFR 93.126) - Reconstruction or renovation of transit buildings and structures (e.g., rail	17-10-0026	2040
Sonoma	Petaluma	SON170011	Petaluma Blvd South Road Diet at E Street	Petaluma: Petaluma Blvd from E St to Crystal Ln: Rehabilitate pavement, reconfigure lanes for smoother traffic flow, and add class 2 bike lanes: Petaluma Blvd from E St to Mountain View Ave: Reduce lanes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-09-0001	2040

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Sonoma	Petaluma	SON170017	Petaluma AVL Equipment	Petaluma: Systemwide: Purchase AVL system equipment for fixed route vehicle.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts,	17-10-0026	2040
Sonoma	Petaluma	SON170018	Petaluma Purchase 1 Remanufactured Fixed Route Bus	Petaluma: 1 bus: Purchase replacement remanufactured 40' Fixed Route Bus	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	Petaluma	SON170019	Petaluma Purchase Service Vehicle	Petaluma: Systemwide: Purchase replacement support car for use by staff in the field	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040
Sonoma	Petaluma	SON170020	Petaluma: Replace 2 Paratransit Cutaways	Petaluma: Petaluma Paratransit: Replace two (2) paratransit vans	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	Rohnert Park	SON170016	Rohnert Park Various Streets Rehabilitation	Rohnert Park: On State Farm Drive from Rohnert Park Expressway to approximately 200 feet north of Professional Center Drive: Rehabilitate roadway	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	Santa Rosa	SON150003	Jennings Ave Bike & Ped RR Crossing Corridor	In Santa Rosa: At Jennings Ave and SMART railroad tracks: Construct a bicycle and pedestrian crossing and develop a Safe Routes to School service program focusing on education and awareness for the	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Santa Rosa	SON170012	Highway 101 Bicycle and Pedestrian Bridge	Santa Rosa: Over Highway 101 in the vicinity of the Santa Rosa Junior College and the Coddingtown Mall: Construct a Class I shared-use ADA accessible bicycle and pedestrian bridge	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Santa Rosa	SON170023	Santa Rosa Pavement Rehab of Various Streets	In Santa Rosa: Various locations: Pavement rehabilitation; Various locations: Restripe roadways to add Class II bike lanes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	SantaRosa Bus	SON030012	Santa Rosa City Bus: Transit Enhancements	Santa Rosa: Various Locations: Upgrade and improve transit facilities including amenities, accessibility, ADA compliance, pedestrian and bicycle access, and technology upgrades including transit system	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Construction of small passenger shelters and information kiosks	17-10-0026	2040
Sonoma	SantaRosa Bus	SON070020	Santa Rosa City Bus Replacement Bus Purchase	Santa Rosa CityBus: 9 vehicles: Purchase 5 Hybrid Electric Replacement Buses and 4 clean diesel buses to replace aging fixed route buses to replace fixed route buses	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Sonoma	SantaRosa Bus	SON090023	Santa Rosa CityBus: Operating Assistance	Santa Rosa CityBus: System-wide: Operating Assistance to Transit Agency	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Sonoma	SantaRosa Bus	SON090024	Santa Rosa CityBus: Preventative Maintenance	Santa Rosa CityBus: Preventative Maintenance program for agency fleet	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Sonoma	SantaRosa Bus	SON150008	SantaRosa Bus: Bus Replacement Purchase	SantaRosa Bus: 40' Fixed Route Vehicle: Replace three aging 40' fixed route diesel buses for operation purposes.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	SantaRosa Bus	SON150017	SRCityBus Non-Revenue Vehicle and Capital Equipmnt	Santa Rosa City Bus: At Transit Mall: Implement transit enhancements, purchase a replacement non-revenue vehicle, and rehab/renovate bus stops for ADA compliance	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Purchase of support vehicles	17-10-0026	2040
Sonoma	SantaRosa Bus	SON150019	Implementation of Reimagining CityBus	Santa Rosa CityBus: Systemwide: Operating Assistance for implementing Reimagining CityBus	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040

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Sonoma	SantaRosa Bus	SON170003	Santa Rosa CityBus-paratransit operations	Santa Rosa CityBus: Provide operating assistance to Santa Rosa Paratransit.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Operating assistance to transit agencies	17-10-0027	2040
Sonoma	SantaRosa Bus	SON170026	Santa Rosa CityBus: Electric Bus Replacement	Santa Rosa CityBus: Two 40-foot local transit buses: Replace with two 40-foot electric buses and purchase related charging equipment	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	Sebastopol	SON170021	Bodega Avenue Bike Lanes and Pavement Rehab	Sebastopol: Bodega Ave from Pleasant Hill Ave to High St: Rehabilitate pavement, fill in sidewalk gaps, widen pavement, add bike lanes, and implement pedestrian safety improvements	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-09-0001	2040
Sonoma	Son Co Reg Park	SON110050	Central Sonoma Valley Trail	In the unincorporated area of Sonoma County: Near City of Sonoma from Larson Park to Flowery Elementary School and along Verano Avenue from Sonoma Creek to Main Street: construct 0.42 miles of a	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Son Co Reg Park	SON170025	Joe Rodota Trail Bridge Replacement	Sonoma County: On the Joe Rodota Trail near the City of Sebastopol: Remove and replace two deteriorating bicycle and pedestrian bridges	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Son Co TA	SON150009	Highway 116/121 Intersection Improvement Project	Sonoma County: Southwest of the City of Sonoma at the intersection of State Routes 116, and 121, and Bonneau Road: Improve intersection	2019 TIP Update	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-09-0005	2040
Sonoma	Son Co TA	SON170009	Sonoma County - County-Wide SRTS Program	Sonoma County: Countywide: Safe Routes to Schools Education Program in schools, while encouraging schools to lead their own ongoing programs, with a goal of increasing active or shared modes of	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-09-0001	2040
Sonoma	Son Co Transit	SON030005	Sonoma Co Transit: Preventive Maintenance Program	Sonoma County Transit: Preventive maintenance program for agency fleet.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Rehabilitation of transit vehicles	17-10-0026	2040
Sonoma	Son Co Transit	SON150012	Sonoma County Transit: Replacement CNG Buses	Sonoma County Transit: two vehicles: Replace two 40-foot compressed natural gas (CNG)-fueled buses.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	Son Co Transit	SON150013	Sonoma County Transit: Replace 2006 CNG Buses	Sonoma County Transit: 5 vehicles: Replace five 40-foot CNG-fueled buses.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	Son Co Transit	SON170006	Sonoma County Transit: Replace 2009 CNG Buses	Sonoma County Transit: Three 40-foot CNG-Fueled Buses: Replace with similar buses	2019 TIP Update	EXEMPT (40 CFR 93.126) - Purchase of new buses and rail cars to replace existing vehicles or for	17-10-0026	2040
Sonoma	Sonoma City	SON170022	Fryer Creek Pedestrian and Bicycle Bridge	Sonoma: At Newcomb Street over Fryer Creek: Construct a new bicycle and pedestrian bridge and path as well as circulation and accessibility improvements to Newcomb Street and Fryer Creek Drive.	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Sonoma County	SON070026	Rehab King Ridge Bridge over Austin Crk 20C0433	In Sonoma County: On King Ridge Road, 2.3mi North of Fort Ross Road; rehabilitate one-lane bridge to 2 lanes and scour countermeasure	2019 TIP Update - Update the funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Sonoma	Sonoma County	SON090001	Replace Geysers Rd Bridge over Sulpher Crk 20C0005	In Sonoma County: On Geysers Road at Sulfur Creek: Replace single lane bridge with two lane bridge (Geysers Road Bridge 20C0005)	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040

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Sonoma	Sonoma County	SON090025	Replace Chalk Hill Bridge over Maacama Crk 20C0242	In Sonoma County: Bridge no. 20C0242, on Chalk Hill Rd, Over Maacama Creek, 1 Mi S of HWY: Replace existing spandrel arch bridge with approach spans with new bridge	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Sonoma	Sonoma County	SON090026	Replace Lambert Bridge over Dry Creek 20C0248	HBP: In Sonoma: Replace existing through truss bridge (Bridge No. 20C0248, Lambert Bridge Road, Over Dry Creek,0.4 Mi W of Dry Creek Rd.), that is in poor condition and has sesimic deficiencies with	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Sonoma	Sonoma County	SON090027	Replace W Dry Creek Rd Bridge over Pena Ck 20C0407	Sonoma County: On West Dry Creek Road, at Pena Creek: Replace existing one-lane bridge (Bridge No. 20C0407) with new two-lane bridge.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Sonoma	Sonoma County	SON110026	Replace Freestone Flat Bridge over Salmon 20C0440	In Sonoma: Bridge No.20C0440,Freestone Flat Road Bridge over Salmon Creek, 0.2 Mi E. Bohemian Way: Replace existing one-lane bridge with a new two-lane bridge	2019 TIP Update - Update funding plan	EXEMPT (40 CFR 93.126) - Projects that correct, improve, or eliminate a hazardous location or feature	17-10-0024	2040
Sonoma	Sonoma County	SON130010	Sonoma County Various Streets & Roads Preservation	Sonoma County: Various locations: Rehabilitate pavement	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	Sonoma County	SON130015	Bodega Highway Pavement Rehabilitation	Bodega Hwy: Beginning at the intersection of Sexton Lane and ending at the Sebastopol City Limits: The Project length is approximately 2 miles. The scope of work will includes pavement rehabilitation,	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	Sonoma County	SON150011	Sonoma SRTS High School Pilot	In Sonoma County: Countywide: Safe routes to school high school pilot program to shift mode away from single family vehicular trips to bicycle/pedestrian/carpooling/bussing.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Grants for training and research programs	17-10-0015	2040
Sonoma	Sonoma County	SON170010	Sonoma County - River Road Pavement Rehab	Sonoma County: River Rd from Trenton-Healdsburg Rd to just west of the SMART right-of-way (PM 19.77 to 24.60): Rehabilitation of pavement and striping for bike lanes	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	Sonoma County	SON170013	Rehabilitaiton of Various Roads in Sonoma County	Sonoma County: Various streets and roads: Preserve and rehabilitate pavement and improve pedestrian and bike access	2019 TIP Update	EXEMPT (40 CFR 93.126) - Pavement resurfacing and/or rehabilitation	17-10-0022	2040
Sonoma	Sonoma County	SON170014	Crocker Bridge Bike and Pedestrian Passage	Sonoma County: On existing north piers of Crocker Bridge: Construct a Class 1 bicycle and ped facility	2019 TIP Update	EXEMPT (40 CFR 93.126) - Bicycle and pedestrian facilities	17-09-0001	2040
Sonoma	Windsor	SON130012	Conde Ln/Johnson St Pedestrian Improvements	In Town of Windsor: At the intersection of Conde Lane and Johnson Street: Realign intersection to eliminate stop signs on Conde Lane. Johnson Street becomes right in and right out only. Add RRFB	2019 TIP Update - Retain in TIP as project is ongoing	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-09-0005	2040
Sonoma	Windsor	SON130013	Bell Rd/Market St/Windsor River Rd Ped Improvement	In Windsor: At the intersection of Bell Road-Market Street and Windsor River Road: Install a traffic signal and install pedestrian and bicycle signal equipment.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	EXEMPT (40 CFR 93.127) - Intersection signalization projects at individual intersections	17-09-0001	2040
Sonoma	Windsor	SON170001	Windsor River Road/Windsor Road Intersection Imps	Windsor: At the Windsor River Road/Windsor Road/SMART intersection: Construct rail crossing safety improvements, multi-use path, pedestrian and vehicle traffic improvements.	2019 TIP Update	EXEMPT (40 CFR 93.126) - Railroad/highway crossing	17-09-0003	2040

* Projects with conformity analysis years of 2040 reference programmatic projects or projects with a completion date after 2030 in *Plan Bay Area 2040*

Appendix A-2
List of Projects in the Draft 2019 TIP with Updated Conformity Analysis Years

List of Projects in the Draft 2019 Transportation Improvement Program with Updated Conformity Analysis Years

County	Sponsor	TIP ID	Project Title	Project Description	Description of Change	Air Quality Description	RTP-ID	Conformity Analysis Year*
Alameda	ACTC	ALA130034	I-680 NB HOV/HOT Lane	Route I-680: from South of Auto Mall Parkway to State Route 84 in Alameda County: Construct NB HOV/HOT Lane.	2019 TIP Update - Retain in TIP for informational purposes as project is ongoing	NON-EXEMPT	17-10-0058	2020
Alameda	ACTC	ALA170009	Widen I-680 NB Imprv SB for EL: SR-84 to Alcosta	Alameda County: NB I-680 from SR-84 to Alcosta Blvd: Widen for express lanes; SB I-680 from SR-84 to Alcosta Blvd: express lane improvements. Project also references RTP ID 17-01-0014	2019 TIP Update - Update scope and funding	NON-EXEMPT	17-10-0058	2020
Contra Costa	BAIFA	CC-170002	CC-680 Northern Segment Express Lane - Southbound	Contra Costa County: On I-680 Southbound from Benicia-Martinez Toll Plaza to El Cerro: Convert HOV to express lanes and add/modify express lane elements. Project also references RTP ID 17-10-0054	2019 TIP Update	NON-EXEMPT	17-10-0049	2020
Sonoma	Santa Rosa	SON150006	US 101 Hearn Ave Interchange	Santa Rosa: US 101/Hearn Avenue over-crossing/interchange: Replace the US 101/Hearn Avenue over-crossing/interchange with a new over crossing/interchange including bike lanes, sidewalks, and re-	2019 TIP Update	NON-EXEMPT	17-09-0010	2030

* Projects with conformity analysis years of 2040 reference programmatic projects or projects with a completion date after 2030 in *Plan Bay Area 2040*

Appendix B
List of Projects in Amended Plan Bay Area 2040

List of Projects in Amended Plan Bay Area 2040

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-01-0001	Alameda	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps, including but not limited to projects that would implement these components on the following facilities: Alameda Point Trail, Bay Trail Connections and Gap Closures, East Bay Greenway, Iron Horse Trail Crossing, Union City Boulevard, Pierce Street, Shattuck Avenue, 7th Street Transit Village, Lake Merritt BART, Lakeside Complete Streets, Peralta and MLK Boulevard					Yes
17-01-0002	Alameda	Climate Program: TDM and Emission Reduction Technology	Projects in this category implement strategies and programs that reduce emissions, encourage alternative transportation modes, and manage transportation demand including but not limited to projects such as TDM program implementation, parking management, local area shuttle and paratransit services					Yes
17-01-0003	Alameda	County Safety, Security and Other	Projects in this category address safety, security and other needs, including but not limited to projects such as Central Avenue Overpass, BART Security Program					Yes
17-01-0004	Alameda	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements, including but not limited to projects such as Grimmer Boulevard Greenway, Telegraph Avenue Complete Streets, West Grand Avenue Complete Streets, Hearst Avenue Compete Streets					Yes
17-01-0005	Alameda	PDA Planning	This category includes planning studies supporting the region's PDA framework and connecting transportation and land use					
17-01-0006	Alameda	Minor Roadway Expansions	This category includes roadway capacity increasing projects (new roadways or widening/extensions of existing roadways) on minor roads such as Clement Avenue, Mariner Square, Mitchell Street, Scarlett Drive, Stoneridge Drive, Kato Road					Yes
17-01-0007	Alameda	Roadway Operations	This category includes projects that improve roadway, intersection, or interchange operations, ITS, as well as other transportation system management					Yes
17-01-0008	Alameda	Minor Transit Improvements	This category includes minor projects that improve or complement existing transit operations including but not limited to projects such as rapid bus service in Alameda Point, the Bernal Park and Ride, Line 51 project completion and capital replacement, Newark Transit Station improvements, and Dumbarton Corridor Area Transportation Improvements					Yes
17-01-0009	Alameda	New Alameda Point Ferry Terminal	Provide for new ferry terminal at Seaplane Lagoon		Yes	Yes	Yes	
17-01-0014	Alameda	I-680 Southbound Express Lanes (SR-237 to SR-84) Upgrades	To upgrade the existing toll system for the I-680 southbound express lane project. Additionally, it would also result in upgrades to the existing pavement for a near continuous access express lanes facility.					
17-01-0015	Alameda	7th Street Grade Separation East	Project replaces the substandard 7th St. roadway & pedestrian underpass at the north end of Railport Oakland Intermodal Yard (RO-IY). The new, depressed roadway allows for new rail crossings to improve connections to the future OHIT IY and project completes a missing segment of the Bay Trail.					Yes
17-01-0016	Alameda	Oakland Army Base transportation infrastructure improvements	Constructs public improvements for trade, logistics and ancillary maritime services that promote cleaner modes of transportation, efficient goods movement, congestion relief on countywide freight corridors, new jobs, and fulfills a mandate to reduce truck trips through the West Oakland community.					Yes
17-01-0017	Alameda	Outer Harbor Intermodal Terminal (OHIT) Phases 2 and 3	OHIT consists of 3 phases. Phase 1, for the lead, support and manifest tracks, is under construction. Phase 2 has two intermodal tracks; Phase 3 has six intermodal tracks and electric cranes. The Project enables a shift of cargo from truck to rail to maximize the Port's operational potential.					
17-01-0018	Alameda	7th Street Grade Separation West	The Project creates a new elevated intersection at 7th & Maritime Streets, and provides new rail access between the Oakland Army Base and the Oakland International Gateway. The Project shifts cargo from truck to rail, reduces truck congestion and emissions, and improves public access.					
17-01-0019	Alameda	I-580 Integrated Corridor Mobility (ICM)	This project implements multiple traffic operation systems and strategies that will address the challenges of traffic congestion in the corridor. The project will install new and upgrade existing corridor management elements along Interstate 580. Full ICM depends on extending North Canyons Parkway to Dublin Boulevard (RTPID 17-01-0048)		Yes	Yes	Yes	
17-01-0020	Alameda	SR-262 Mission Boulevard Cross Connector Improvements	This project will increase mobility between I-680 and I-880 by widening Mission to 3 lanes in each direction throughout the I-680 interchange, rebuild the NB and SB 680 on and off ramps, and potentially grade separate Mission Blvd. from Mohave Dr. and Warm Springs Blvd.		Yes	Yes	Yes	Yes
17-01-0021	Alameda	I-880 Whipple Road Interchange Improvements	Full interchange improvements at Whipple Road/I-880, including northbound off-ramp, surface street improvements and realignment		Yes	Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-01-0022	Alameda	Outer Harbor Turning Basin	The project will upgrade the existing Outer Harbor Turning Basin (OHTB) at the Port of Oakland from 1,650' to 1,920' in diameter to handle ships up to 1.320' long.					Yes
17-01-0023	Alameda	I-880 Industrial Parkway Interchange Reconstruction	Reconstruct the I-880/Industrial Parkway interchange to provide a northbound off-ramp and a southbound HOV bypass lane on the southbound loop off-ramp. Reconstruct the bridge over I-880.		Yes	Yes	Yes	Yes
17-01-0024	Alameda	I-880 A Street Interchange Reconstruction	Reconstruct interchange to widen A Street from 5 lanes to 6 lanes and add bike lanes, and provide additional lane capacity for potential future freeway widening. Project also involves modifying signals and reconfiguring intersections to improve truck-turning maneuvers.		Yes	Yes	Yes	Yes
17-01-0025	Alameda	Oakland International Airport Perimeter Dike	This project will upgrade and improve the 4.5 mile long dike protecting OAK, terminal and other facilities, roadways, transit services & trails connecting Alameda and San Leandro. Includes seismic stabilization, FEMA compliance, and protection against climate change and sea level rise.					
17-01-0026	Alameda	Minor Freight Improvements Programmatic	This program includes projects that improve freight operations and reduce impacts of freight activity. This includes but is not limited to railroad quiet zones, multimodal safety projects at crossings, freight corridor upgrades, ITS improvements, terminal lighting, seismic monitoring, rail connections between Oakland and Niles Subdivisions, truck parking facilities, rail platforms, and other projects that would implement the Alameda CTC Goods Movement plan.					Yes
17-01-0027	Alameda	Middle Harbor Road Improvements	This project identifies & implements solutions to the traffic circulation issues on Middle Harbor Rd. Solutions may include dedicated queue or turn lanes, signalization, and relocation or reconfiguration of terminal gates and recommendations for Adeline St. Bridge reconfiguration as appropriate.					
17-01-0028	Alameda	I-580/I-680 Interchange: Project Development and Phase 1 Short-term Operational Improvements	Improve capacity, operations and safety at the interchange, primarily in the westbound direction approaching the interchange. This project includes the Phase 1 short-term operational improvements.		Yes	Yes	Yes	Yes
17-01-0029	Alameda	SR-84/I-680 Interchange Improvements and SR-84 Widening	Construct interchange improvements for the Route 84/I-680 Interchange, widen Route 84 from Pigeon Pass to I-680 and construct aux lanes on I-680 between Andrade and Route 84.		Yes	Yes	Yes	Yes
17-01-0030	Alameda	I-880 Broadway/Jackson Interchange Improvements	The project proposes to improve connectivity between I-880/I-980 and Alameda and Oakland. Improvements include reconfiguration of existing ramps, demolition of existing ones, and construction of new ramps.		Yes	Yes	Yes	Yes
17-01-0031	Alameda	I-880 at 23rd/29th Avenue Interchange Improvements	Provide improvements to NB I-880 at 23rd and 29th Avenue interchange by improving the freeway on- and off-ramp geometrics, replacing the overcrossings, and modifying local streets, landscape enhancement, and construction of a soundwall.	Yes	Yes	Yes	Yes	Yes
17-01-0032	Alameda	SR-84 Widening (Ruby Hill Drive to Concannon Boulevard)	The Route Expressway - South Segment involves widening a 2.4 mile section of SR 84 (Isabel Ave) from Ruby Hill Drive to Concannon Boulevard from two lanes to four lanes.	Yes	Yes	Yes	Yes	Yes
17-01-0033	Alameda	I-580 Vasco Road Interchange Improvements	Modify I-580/Vasco Rd interchange. Widen I-580 overcrossing and add new loop ramp in southwest quadrant. Includes widening Vasco Road to 8 lanes between Northfront Road and Las Positas Road and other local roadway improvements.		Yes	Yes	Yes	
17-01-0034	Alameda	I-580 Greenville Road Interchange Improvements	Construct a new interchange at I-580/Greenville Road to replace the existing interchange. Project will include widening the undercrossing to provide six lanes, and constructing ramps to achieve a modified partial cloverleaf interchange design.		Yes	Yes	Yes	
17-01-0035	Alameda	I-580 First Street Interchange Improvements	Reconstruct and modify the I-580/First Street interchange into partial cloverleaf design with 6-lanes on First Street over I-580.		Yes	Yes	Yes	
17-01-0036	Alameda	SR-92/Clawiter Road/Whitesell Street Interchange Improvements	The project would reconstruct the SR-92/Clawiter Rd interchange to create the SR-92/Whitesell St interchange, addressing truck traffic access needs by: reconfiguring Clawiter/SR 92 interchange, creating new access to SR 92 at Whitesell St, and consolidating access for these two local roads.		Yes	Yes	Yes	Yes
17-01-0037	Alameda	Ashby I-80 Interchange with Bicycle and Pedestrian Ramps	Reconstruct the Ashby Avenue interchange, including construction of a new bridge to replace existing bridges, a roundabout interchange, and bicycle/pedestrian access over the I-80 freeway at the Ashby-Shellmound interchange.					Yes
17-01-0038	Alameda	I-580 Interchange Improvement at Hacienda/Fallon Road - Phase 2	1-580/Fallon Rd I/C Improvements (Phase 2): Reconstruct overcrossing to add lanes I-580 Hacienda Dr I/C Improvements: Reconstruct overcrossing to add lanes		Yes	Yes	Yes	Yes
17-01-0039	Alameda	I-580 SR-84/Isabel Interchange Improvements Phase 2	Complete ultimate improvements at I-580/Isabel/State Route 84 Interchange to provide 6-lanes over I-580 at the Isabel/State Route 84 Interchange and 4-lanes over I-580 at the Portola Avenue flyover.		Yes	Yes	Yes	

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-01-0040	Alameda	I-80 Gilman Street Interchange Improvements	The proposed project is located in northwest Berkeley and will reconfigure the I-80/Gilman interchange. The limits for the freeway and ramp traffic operations would include I-80 from east of Buchanan Street to west of University Avenue.					Yes
17-01-0041	Alameda	I-880 Winton Avenue Interchange Improvements	This project proposes to modify the existing Winton Avenue/I-880 cloverleaf interchange to a partial cloverleaf interchange, implement Complete Street per Caltrans HDM and provide direct access to Southland Mall.		Yes	Yes	Yes	Yes
17-01-0042	Alameda	I-680 Overcrossing Widening and Improvements (at Stoneridge Drive)	Widen Stoneridge Drive overcrossing at I-680 constructing third westbound lane		Yes	Yes	Yes	
17-01-0043	Alameda	42nd Ave & High St Access Improvement at I-880 On/Off Ramp	Adjacent I-880/High St, project will widen and extend existing local roads; improve vehicles level of service, pedestrian & ADA accessibility, access to ramps/Alameda; expand the region's bike route; eliminate circuitous traffic and congestion near I-880, promote redevelopment in the Estuary Area.	Yes	Yes	Yes	Yes	Yes
17-01-0044	Alameda	I-680 Sunol Interchange Modification	Signalize Sunol @ I-680 Interchange ramps and widen Southbound on ramp	Yes	Yes	Yes	Yes	
17-01-0045	Alameda	Santa Rita Road I-580 Overcrossing Widening	Widen Southbound Santa Rita Road overcrossing at I-580 constructing third southbound through lane at Pimlico Drive and second on ramp lane to I-580 eastbound.		Yes	Yes	Yes	
17-01-0046	Alameda	Coliseum City Transit Hub	The project is a consolidated multi-modal transit hub at the existing Coliseum BART station and Amtrak Station for patrons of the future Coliseum City Transit-Oriented Development. Includes pedestrian concourse and replacement for 1000 BART parking spaces which may be shared with other uses.					
17-01-0047	Alameda	I-880 to Mission Boulevard East-West Connector	Improved east-west connection between I-880 and Route 238 (Mission Blvd.) comprised of a combination of new roadways along preserved ROW and improvements to existing roadways and intersections along Decoto Road, Fremont Boulevard, Paseo Padre Parkway, Alvarado-Niles Road and Mission Boulevard.		Yes	Yes	Yes	Yes
17-01-0048	Alameda	Dublin Boulevard - North Canyons Parkway Extension	This project will update the currently planned project by incorporating multimodal travel, and construct the street extension to connect Dublin Blvd. in Dublin with North Canyons Parkway in Livermore at Doolan Road. The existing RTP project lacks the current State, regional, and local priorities. This project was carried forward from RTPIDs 21473, 240392.		Yes	Yes	Yes	Yes
17-01-0049	Alameda	Fruitvale Avenue (Miller Sweeney) Lifeline Bridge Project	Replace the existing vehicular bridge with one structure that can provide the only Lifeline access from Alameda. Provide dedicated transit lanes, bike lanes, median and sidewalks.					
17-01-0050	Alameda	SR-84 Mowry Avenue Widening (Peralta Blvd to Mission Blvd)	Widen Mowry Ave from Peralta Blvd to Mission Blvd (State Route 84) from two to four lanes and install bike lanes and sidewalks on both sides of the street.		Yes	Yes	Yes	
17-01-0051	Alameda	Tassajara Road Widening from N. Dublin Ranch Drive to City Limit	This project will widen Tassajara Road from existing 2 lanes to 4 lanes between N/ Dublin Ranch Drive to City limit with C C County. It would add new bike lanes, construct/upgrade bus stops, and add missing sidewalks, ADA ramps, curb and gutter. Traffic signals will be upgraded.		Yes	Yes	Yes	
17-01-0052	Alameda	Auto Mall Parkway Widening and Improvements	Widen Auto Mall Parkway from four lanes to six lanes between I880 and I680 including intersection improvements and widening of the Auto Mall bridge over UPRR.		Yes	Yes	Yes	
17-01-0053	Alameda	Dougherty Road Widening	This project will complete 1.83 mile of widening of Dougherty Rd. from 4 lanes to 6 lanes from Dublin Blvd. to the county line. Some of the improvements include; class II bike lanes, landscaped median islands, street lighting, traffic signal modifications, and 1.4 miles of Bike/Ped. Class I trail.	Yes	Yes	Yes	Yes	Yes
17-01-0054	Alameda	Union City Boulevard Widening (Whipple to City Limit)	Widen Union City Boulevard to three travel lanes in each direction from Whipple Road to the City limits with Hayward.		Yes	Yes	Yes	
17-01-0055	Alameda	SR-84 Peralta Boulevard Widening (Fremont Blvd to Mowry Ave)	This project will widen Peralta Blvd (State Route 84) to four lanes with continuous bike lanes and sidewalks on both sides of the road from Fremont Blvd to Mowry Ave.		Yes	Yes	Yes	
17-01-0056	Alameda	Thornton Avenue Widening (Gateway Boulevard to Hickory Street)	The project will widen this undivided two-lane section of Thornton Avenue to a four-lane divided arterial street.		Yes	Yes	Yes	
17-01-0057	Alameda	Dublin Boulevard Widening - Sierra Court to Dublin Court	This project proposes to widen Dublin Boulevard from Sierra Court to Dublin Court in the westbound direction from two to three lanes in the City of Dublin. This project also includes the construction of Class II bike lanes.	Yes	Yes	Yes	Yes	Yes
17-01-0058	Alameda	Irvington BART Station	Construct a new BART station in Irvington PDA in Fremont on Osgood Road near Washington Boulevard as called for in the 2014 Alameda County Transportation Expenditure Plan		Yes	Yes	Yes	
17-01-0059	Alameda	Union City Intermodal Station Phase 4	Phase 4 is an at grade intermodal station to serve both AMTRAK, ACE and future Dumbarton Rail with elevated tracks and passengers platforms.					

				Complete and Operational By:				
RTPID	County/ Sponsor	Title	Description	2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-01-0060	Alameda	East Bay BRT	A 9.5 mile BRT line from downtown Oakland to the San Leandro BART station on International Blvd and East 14th St. with 80% dedicated lanes; 27 new hybrid buses; 34 level-boarding platform stations; real time arrival information; and transit signal priority. It also includes parking mitigations.	Yes	Yes	Yes	Yes	Yes
17-01-0061	Alameda	Ralph Appezzato Memorial Parkway BRT	To create BRT infrastructure between Webster Street and the Alameda Point PDA, connecting future residents and workers on the former base (as well as existing Alameda residents) to downtown Oakland and BART via Webster Street Tube. The BRT's Alameda term	Yes	Yes	Yes	Yes	
17-01-0062	Alameda	BART to Livermore/ACE Project Development and Construction Reserve	BART is preparing a project-level Environmental Impact Report evaluating five alternatives for the BART to Livermore Extension Project. BART extension to Isabel Avenue, DMU/EMU to Isabel Avenue, Express Bus/BRT, Enhanced Bus, and No-build.					
17-01-0063	Alameda	Broadway Shuttle Expansion	Planning and environmental analysis of the Broadway Shuttle Expansion project which seeks to extend the shuttle route and service hours, and upgrade the project to an Enhanced Bus or Electric Streetcar line to enhance transit circulation and mobility, and catalyze mixed-use TOD and economic develop					
17-01-0064	Alameda	Additional Local Road Preservation/Rehab	Additional funding for local streets and roads maintenance in Oakland from the City of Oakland Measure KK (Nov. 2016 ballot measure)					Yes
17-02-0001	Contra Costa	Access and Mobility Program	This category includes projects that improve access and mobility for people with disabilities, low-income residents, and seniors, such as West County Low-Income School Bus Program, paratransit through Contra Costa County, information and outreach projects, dial-a-ride, guaranteed ride home, non-operational transit capital enhancements (i.e. bus shelters), local shuttles, lighting and security projects, and discounted transit passes.					Yes
17-02-0002	Contra Costa	Innovative Transportation Technology	This category includes projects that would implement technological advances for transportation such as connected vehicle, autonomous vehicle, and other innovations.					
17-02-0003	Contra Costa	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps, such as Lamorinda Bicycle and Pedestrian Program, Wildcat Creek Trail, and Contra Costa County's Safe Routes to School Program					Yes
17-02-0004	Contra Costa	County Safety, Security and Other	Projects in this category address safety, security and other needs such as Lone Tree Way Undercrossing, Marsh Creek Road Curve Realignment, Cutting/Carlson grade crossing improvements, San Pablo Avenue overcrossing, Vasco Road safety improvement, and Viera Avenue Realignment					Yes
17-02-0005	Contra Costa	Multimodal Streetscape	Projects in this category implement complete streets improvements to roadways throughout Contra Costa County, such as on San Pablo Avenue, near the Del Norte and Concord BART stations, and in PDAs.					Yes
17-02-0007	Contra Costa	Minor Roadway Expansions	Funds future widening and extensions of non-regionally significant roadways such as John Muir Parkway, Slatten Ranch Road, James Donlon Blvd, Hillcrest Avenue, Sand Creek Road, San Jose Avenue and other roads throughout Contra Costa County					Yes
17-02-0008	Contra Costa	Roadway Operations	Projects in this category improve roadway operations through technology and management systems on roads throughout Contra Costa County such as Clayton Road, Treat Boulevard, Contra Costa Boulevard, St. Mary's Road, Alhambra Avenue, Mt. Diablo Boulevard, roads in downtown Lafayette and Gateway/Lamorinda Traffic Program					Yes
17-02-0009	Contra Costa	Minor Transit Improvements	Projects in this category improve or complement existing transit operations through rolling stock, park and ride lots, express bus service expansion, technology upgrades, bus transit preferential measures, eBART support service and school bus programs					Yes
17-02-0010	Contra Costa	SR4 Integrated Corridor Mobility	SR4 Integrated Corridor Mobility from I-80 to SR160, including adaptive ramp metering, advanced traveler information, arterial management system, freeway management system, connected vehicle applications		Yes	Yes	Yes	Yes
17-02-0011	Contra Costa	I-80 ICM Project Operations and Maintenance	I-80 Integrated Corridor Mobility (ICM) Project Operations and Management - Local Portion - Maintenance in Contra Costa; This project will implement Adaptive Ramp Metering (ARM) and Active Traffic Management (ATM) strategies will be employed to reduction congestion and provide incident management capabilities.	Yes	Yes	Yes	Yes	
17-02-0012	Contra Costa	I-680 Northbound Managed Lane Completion through 680/24 and Operational Improvements between N. Main and Treat Blvd	I-680 carpool lane completion thru 680/24 interchange and operational Improvements between N. Main and Treat Blvd		Yes	Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-02-0013	Contra Costa	I-680 Northbound HOV lane extension between N. Main and SR-242	Provides an HOV lane in the northbound direction between N. Main and SR242, which will shorten a gap in the HOV network which currently exists between Livorna and SR242.		Yes	Yes	Yes	
17-02-0014	Contra Costa	Kirker Pass Road Northbound Truck Climbing Lane, Clearbrook Drive to Crest of Kirker Pass Road	This project will add NB truck climbing lane from Clearbrook Drive in the City of Concord to a point 1,000 beyond the crest of Kirker Pass Road. The addition will include a 12-foot dedicated truck climbing lane and a Class II bike lane within an 8-foot paved shoulder.	Yes	Yes	Yes	Yes	Yes
17-02-0015	Contra Costa	Vasco Road Byron Highway Connector Road	New road between Vasco Road and Byron Highway that increases access to the Byron Airport. Road will be 1 lane per direction with at grade intersections at both end. Project is formerly named: SR-239: Airport Connector			Yes	Yes	Yes
17-02-0016	Contra Costa	Construct SR 242/Clayton Road on and off-ramps	Construct on and off-ramp for SR 242 at Clayton Road		Yes	Yes	Yes	Yes
17-02-0017	Contra Costa	SR-239 Feasibility Studies and Project Development	Environmental and design study to construct a new State Route connecting SR4 to Interstates 205/580 near Tracy. Route alignment is not yet defined.					Yes
17-02-0019	Contra Costa	I-680/SR4 Interchange Improvements - Phases 1-3	Improve I-680/SR4 interchange by implementing: direct connectors for NB I-680 to WB SR4 (Ph1) & WB SR4 to SB I-680 (Ph2), & widening SR4 btw SR242 & Morello from 2 to 3 lanes per direction (Ph3). The 2-lane direct connectors will replace a single lane loop ramp & a single lane diagonal ramp, respectively.		Yes	Yes	Yes	Yes
17-02-0020	Contra Costa	SR-4 Operational Improvements - Initial Phases	Various operational improvements on SR-4 between SR-242 and Bailey Road, including adding auxiliary lanes in strategic locations along this corridor		Yes	Yes	Yes	Yes
17-02-0021	Contra Costa	Reconstruct I-80/San Pablo Dam Road Interchange	Phase 1 includes relocating El Portal Dr. on-ramp to WB I-80 to the north, extending the auxiliary lane along WB I-80 between San Pablo Dam Rd off-ramp and El Portal Dr on-ramp, and reconstructing the Riverside Ave pedestrian overcrossing. Phase 2 includes modifications to McBryde and SPDR I/C & Includes provisions for bicyclists and pedestrians on San Pablo Dam Rd.		Yes	Yes	Yes	Yes
17-02-0022	Contra Costa	I-680 Southbound HOV Lane between N. Main and Livorna	Through the I-680/SR 24 Interchange, this project adds an HOV lane on I-680 SB, through minor widening and restriping to narrower lanes. Existing number of mixed flow lanes will be kept the same.	Yes	Yes	Yes	Yes	Yes
17-02-0023	Contra Costa	State Route 4 Widening and Balfour Road IC Construction	Construct SR4 Bypass interchange at Balfour Rd and Widen SR4 from 2 to 4 lanes.	Yes	Yes	Yes	Yes	
17-02-0024	Contra Costa	I-80/SR-4 Interchange Improvements - New Eastbound Willow Avenue Ramps	New SR4 eastbound offramp and onramp at Willow north of Palm Avenue and removal of Willow Hook Ramps		Yes	Yes	Yes	
17-02-0026	Contra Costa	I-80/Central Avenue Interchange Modification - Phases 1 & 2	Construct new signals and changeable message signs to redirect I-80 westbound on-ramp traffic during weekend peak periods to I-580, connect Pierce Street to San Mateo Street to relocate the traffic signal at Pierce Street/Central Avenue to the San Mateo Street/Central Avenue intersection, and construct other necessary improvements.		Yes	Yes	Yes	Yes
17-02-0027	Contra Costa	Construct Additional Auxiliary Lanes on I-680 - South of I-680/SR-24 Interchange	Additional I-680 NB and SB auxiliary lanes south of I-680/SR 24 Interchange, including the following locations: Alcosta Road to Bollinger Canyon Road; El Cerro Blvd to El Pintado Road; El Pintado Road to Stone Valley Road; Stone Valley Road to Livorna Road; and Livorna Road to Rudgear Road.	Yes	Yes	Yes	Yes	
17-02-0028	Contra Costa	I-80 Eastbound and Westbound Pinole Valley Road On-ramp Improvement	Improve conditions for merging onto the I-80 mainline from the eastbound and westbound Pinole Valley Road on-ramps to address vehicles accelerating uphill after stopping at ramp meter.		Yes	Yes	Yes	
17-02-0029	Contra Costa	Eastbound SR-24: Construct Auxiliary Lane, Wilder Road to Camino Pablo	Construct auxiliary lane along eastbound Highway 24 from on-ramp at Wilder Road to downtown Orinda off-ramp at Moraga Way/Camino Pablo/Brookwood Road		Yes	Yes	Yes	
17-02-0030	Contra Costa	Widen Brentwood Boulevard - Havenwood Way to north city limit; and Chestnut to Fir	Project would widen Lone Tree Way from 2 to 4 lanes for approximately 2400 linear feet. It also includes bike lanes, median islands, curb, gutter, sidewalk street lights and landscaping.		Yes	Yes	Yes	Yes
17-02-0031	Contra Costa	Widen Willow Pass Road, Lynwood Drive to SR 4	Widen Willow Pass Road from Lynwood Drive to State Route 4 from two lanes to four lanes and implement Complete Streets Improvements		Yes	Yes	Yes	
17-02-0032	Contra Costa	Widen Ygnacio Valley Road-Kirker Pass Road, Cowell to Michigan	Widen Ygnacio Valley Road from Michigan Blvd to Cowell Road from four lanes to six lanes and implement Complete Streets improvements		Yes	Yes	Yes	Yes
17-02-0033	Contra Costa	Widen Camino Tassajara Road, Windemere to County Line	Widen Camino Tassajara Road from 2-lanes to 4-lanes, including 8-foot paved shoulders and Class II bike lanes in both directions from Windemere Parkway to the Alameda/Contra Costa County Line.		Yes	Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-02-0034	Contra Costa	West Leland Road Extension	Construct new 4-lane arterial roadway with raised median, class 2 bike lanes, and sidewalks from San Marco Boulevard to Willow Pass Road, with a design speed of 55 mph.	Yes	Yes	Yes	Yes	
17-02-0035	Contra Costa	Lone Tree Way Widening	Widen Lone Tree Way to 4-lanes in order to match section west of O'Hara Avenue.		Yes	Yes	Yes	Yes
17-02-0036	Contra Costa	Pittsburg-Antioch Highway Widening	Widen existing 2-lane arterial roadway to 4-lane arterial with turning lanes at appropriate locations.	Yes	Yes	Yes	Yes	
17-02-0037	Contra Costa	Widen Main St, SR 160 to Big Break Rd	Widen Main Street from Highway 160 to Big Break Road from 4 lanes to 6 lanes.		Yes	Yes	Yes	
17-02-0038	Contra Costa	Main Street Bypass	Construct Main Street Downtown Bypass road between Vintage Parkway and 2nd Street.	Yes	Yes	Yes	Yes	
17-02-0039	Contra Costa	Hercules Train Station - All Phases	Implement all phases of the Hercules Train Station including extending John Muir Parkway with box culvert over North Channel and Bayfront Boulevard with bridge over Refugio Creek, eliminating gap in the Bay Trail West Segment by installing new trail connecting to new rail station, relocating fuel oil & fiber optic lines, constructing transit loop promenade and civic plaza, constructing parking structure, and conducting track/signal work		Yes	Yes	Yes	Yes
17-02-0040	Contra Costa	Martinez Intermodal Project: Phase 3	Constructs Martinez Intermodal Station (Phase 3), which includes an additional 425 spaces and auto/ped bridges (on top of planned 200 interim spaces).					
17-02-0041	Contra Costa	Privately Run Ferry Service including Small-Scale (non-WETA complying) Landside Improvements from Antioch, Martinez, and Hercules to San Francisco	Implement new ferry service from Antioch, Martinez, and Hercules to San Francisco. Project cost includes landside improvements and privately run ferry service, which would be provided at a lower cost than standard WETA service. Ferry service is only included in the Plan from 2020 to 2035.	Yes	Yes		Yes	
17-02-0042	Contra Costa	Richmond-San Francisco Ferry Service	Implements ferry service from Richmond to San Francisco as identified in the Water Transit Authority's Implementation and Operations Plan.	Yes	Yes	Yes	Yes	Yes
17-02-0043	Contra Costa	BART Capacity, Access and Parking Improvements	Includes projects that improve BART station capacity and implement access and parking improvement at Contra Costa BART station					Yes
17-02-0044	Contra Costa	Landside Improvements for Richmond Ferry Service	Construct landside improvements for Richmond ferry service, including expanded parking.					
17-02-0045	Contra Costa	El Cerrito del Norte BART Station Modernization, Phase 1	Project will provide improvements including, but not limited to: expansion of the paid area of the station, including a new station agent booth and new fare gates new elevators and stairwells within the paid area providing access to the platform new passenger restrooms, new public art installations					
17-02-0046	Contra Costa	Civic Center Railroad Platform Park & Ride Complex	The proposed project is the construction of an approximately 800-foot train platform along the San Joaquin Service line, which would be located north of Main Street in Oakley, between 2nd Street and O'Hara Avenue. Approximately 300 surface parking spaces, distributed in two parking lots to avoid one large surface lot off Main Street, will be included to support Park & Ride activities as well as future train riders.		Yes	Yes	Yes	Yes
17-02-0047	Contra Costa	East County Rail Extension (eBART), Phase 1	Construction of rail extension eastward from Pittsburg-Bay Point BART station with Phase 1 terminus at Hillcrest Avenue in Antioch.	Yes	Yes	Yes	Yes	Yes
17-02-0049	Contra Costa	West County High Capacity Transit Investment Study Implementation - Phase 1	Environmental, engineering and initial implementation work associated with the recommendations from the study.					
17-02-0050	Contra Costa	Brentwood Intermodal Transit Center	This project is a PNR facility in the City of Brentwood providing a transit connection to the current eBART terminus in Antioch. Tri-Delta transit would provide direct bus service from this facility which could serve as a future eBART station site in the future.		Yes	Yes	Yes	
17-02-0051	Contra Costa	I-680 Transit Improvements including Express Bus Service, ITS components, and Park & Ride Lots	I-680 Transit Improvements including Express Bus Service, ITS components, and Park & Ride Lots along the I-680 corridor from Dublin to Martinez		Yes	Yes	Yes	Yes
17-02-0052	Contra Costa	Widen San Ramon Valley Boulevard from 2 to 4 lanes - Jewel Terrace to Podva Road	Widen San Ramon Valley Boulevard from 2 to 4 lanes - Jewel Terrace to Podva Road	Yes	Yes	Yes	Yes	Yes
17-03-0001	Marin	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps throughout Marin County					Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-03-0002	Marin	Climate Program: TDM and Emission Reduction Technology	Projects in this category implement strategies and programs that reduce emissions, encourage alternative transportation modes, and manage transportation demand including but not limited to projects such as TDM program implementation, parking management, local area shuttle and paratransit services					
17-03-0003	Marin	County Safety, Security and Other	Projects in this category address safety and security needs including safe routes to school and coastal flood mitigation projects					Yes
17-03-0004	Marin	Roadway Operations	Projects in this category improve roadway operations through technology and management systems on roads throughout Marin County including Sir Francis Drake and other local corridor enhancements					
17-03-0005	Marin	Minor Transit Improvements	Projects in this category improve or complement existing transit operations through transit management systems, bus maintenance facility relocation, local bus and ferry service expansion, countywide bus stop improvements and access improvements to SMART stations, among other bus transit capital and facility projects					Yes
17-03-0006	Marin	Implement Marin Sonoma Narrows HOV Lane and corridor improvements Phase 2 (Marin County)	Extend US 101 HOV lane from Atherton Avenue to Marin/Sonoma County line in the northbound direction and from Rowland Boulevard to Marin/Sonoma County line in southbound direction. This project will complete the HOV lane system in Marin County from Richardson Bay Bridge to Marin/Sonoma County line.		Yes	Yes	Yes	Yes
17-03-0007	Marin	US 101/580 Interchange Direct Connector - PAED	Study, design and connection for a two lane direct connector northbound US 101 to eastbound HWY 580. The project would entail PSR, PAED and construction of a direct freeway to freeway interchange instead of local arterials. Study includes 580 westbound to south US 101.					
17-03-0008	Marin	Tiburon East Blithedale Interchange - PAED	Planning and environmental assessment of alternatives to improve the US 101/Tiburon Boulevard interchange					
17-03-0009	Marin	Access Improvements to Richmond San Rafael Bridge	Shift eastbound lane reduction 1,000 feet to the east on SFD and Improve shoulders from Larkspur Landing Circle to Anderson Drive. Improve bicycle access from Anderson Drive to Main Street. Add additional thru capacity at Bellam Boulevard off ramp from northbound 101 eastbound Interstate 580. Widen northbound Bellam off-ramp from US 101 to two lanes.	Yes	Yes	Yes	Yes	
17-03-0010	Marin	Highway Improvement Studies	Operational and capacity enhancement studies to address safety, sea level rise, and congestion on US 101, HWY 1 and HWY 37. primarily focused on Interchange and ramp modifications as well as mainline improvements. PSRs level studies are funded, PAED and advanced outreach flexibility.					
17-03-0011	Marin	Widen Novato Boulevard between Diablo Avenue and Grant Avenue	Widen Novato Blvd. between Diablo Ave. and Grant Ave. to accommodate future growth and enable roadway system to operate safely and efficiently, per City's General Plan.		Yes	Yes	Yes	Yes
17-03-0012	Marin	Sir Francis Drake Boulevard/Red Hill Avenue/Center Boulevard (known as "The Hub") - project development	Alternatives analysis, environmental and design of interchange improvements to this congested intersection. This study will include the study of a potential roundabout and improvements to this major arterial.					
17-03-0013	Marin	San Rafael Transit Center (SRTC) Relocation Project	This project involves the full or partial relocation of the Bettini Transit Center/San Rafael Transit Center (SRTC). Relocating the existing transit center is necessary because SMART rail bi-sects the transit center, which eliminates one existing bus platform and renders the remaining platforms of the transit service unusable in whole or in part.					Yes
17-03-0014	Marin	Larkspur Ferry Terminal Parking Garage - Planning Study	This project would provide environmental, design, engineering and construction of a parking garage to augment existing inadequate parking at the Larkspur Ferry Terminal (LFT) and improve parking, traffic and pedestrian circulation around and within LFT. The parking garage would increase parking capacity from by approximately 36%, from 1,800 to 2,450 parking spaces.					Yes
17-03-0015	Marin	SMART Downtown San Rafael to Larkspur Rail Extension	Extend rail from Downtown San Rafael 2.2 miles to Larkspur SMART Station.	Yes	Yes	Yes	Yes	Yes
17-03-0016	Marin	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements					Yes
17-04-0001	Napa	Bicycle and Pedestrian Program	Countywide bicycle network expansion, countywide bicycle network maintenance & rehabilitation, countywide pedestrian network enhancements, maintenance, rehabilitation and expansion. Also, includes countywide SRTS infrastructure and non-infrastructure projects/programs.					Yes
17-04-0002	Napa	County Safety, Security and Other	Railroad crossing safety upgrades, corridor and Safety Improvements					Yes
17-04-0003	Napa	Multimodal Streetscape	Complete streets implementation and street reconstruction.					Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-04-0004	Napa	Minor Roadway Expansions	Additional road capacity and extensions including bridge construction throughout Napa County and including along Devlin Road and Eucalyptus Drive					Yes
17-04-0005	Napa	Roadway Operations	Intersection improvements and modifications, roadway capacity enhancements, including SR 221 and Soscol Avenue, and other City of Napa intersection improvements					Yes
17-04-0006	Napa	Minor Transit Improvements	Enhanced and expanded transit services, improved commuter amenities, Vine transit maintenance and fueling station, transit fleet expansion, new transit and vehicle technology, improved signage and enhanced transit stops.					Yes
17-04-0007	Napa	Countywide Intelligent Transportation Systems Program	Technology and signalization integration, coordination and improvements.					
17-04-0008	Napa	State Route 29 Improvements	Construct SR29 to a 6-lane Parkway with improved conditions for all travel modes from Napa Junction Road to South Kelly Road and increase capacity in SR-29 from 4 lanes to 6 lanes in unincorporated Napa County, between South Kelly Road and SR 12 Jameson Canyon Road, as well as other operational and intersection improvements along the SR 29 corridor countywide.		Yes	Yes	Yes	
17-04-0009	Napa	Soscol Junction	Improvements at SR-29/SR-221/ Soscol Ferry Road.					Yes
17-04-0010	Napa	SR29 Gateway	Construct SR29 to 6-lanes for cars and improved conditions for other travel modes from American Canyon Road to Napa Junction Road		Yes	Yes	Yes	
17-05-0001	San Francisco	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps, including Second Street Complete Streets project					Yes
17-05-0002	San Francisco	Climate Program: TDM and Emission Reduction Technology	Projects in this category implement strategies and programs that reduce emissions, encourage alternative transportation modes, and manage transportation demand including but not limited to projects such as TDM program implementation, parking management, local area shuttle and paratransit services					Yes
17-05-0003	San Francisco	County Safety, Security and Other	Projects in this category address safety and security needs including Vision Zero improvements at ramps, local road safety and security, India Basin roadway transportation improvements, and transit safety and security					Yes
17-05-0004	San Francisco	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements in San Francisco					Yes
17-05-0005	San Francisco	PDA Planning	This category includes planning studies supporting the region's PDA framework and connecting transportation and land use					
17-05-0007	San Francisco	Transit Preservation/Rehabilitation	This project provides additional funding to transit capital preservation and rehabilitation beyond what is included in the regional transit capital project (RTPID 17-10-0026)					
17-05-0008	San Francisco	Minor Roadway Expansions	This project implements roadway capacity changes to minor roads throughout San Francisco including Transit Center District Plan, Transbay Redevelopment Plan Street Network, Balboa Reservoir Street Network, Central SoMa Plan Network Changes, Central Waterfront/Pier 70 Street Network, Harney Way, HOPE SF Street Networks, Mission Bay, Mission Rock, Parkmerced, Schlage Lock, Treasure Island, Bayview, Rincon Hill, and along the Great Highway					Yes
17-05-0009	San Francisco	Roadway Operations	This project includes local road intersection improvements					Yes
17-05-0010	San Francisco	Minor Transit Improvements	This project includes the transit performance initiative, transit management systems, minor transit improvements, Muni fare programs, maintenance facility projects, and transit preferential improvements					Yes
17-05-0011	San Francisco	San Francisco Late Night Transportation Improvements	New routes and increased frequency for all-night regional and local bus service, including Muni, AC Transit, Golden Gate Transit, and SamTrans routes. This is a pilot for 5 years.				Yes	
17-05-0012	San Francisco	SFgo Integrated Transportation Management System	SFgo™ is San Francisco's Citywide ITS program. It identifies signalized and non-signalized intersections located along arterials and the Muni transit system and prioritizes them for ITS upgrades, such as controllers, cabinets, transit signal priority, fiber optic or wireless communications, traffic cameras, and variable message signs. Also improves arterial safety and pedestrian safety.					

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-05-0013	San Francisco	Expand SFMTA Transit Fleet	This project entails future expansion of the SFMTA transit fleet and needed facilities to house and maintain transit vehicles. The purpose is to meet projected future transit demand, as indicated in the SFMTA Transit Fleet Plan. It will facilitate the future provision of additional service through the procurement of transit vehicles as well as the development of needed modern transit facilities. This also includes the expansion vehicles for Geary BRT (RTPID 17-05-0021) and does not include expansion vehicles for Central Subway, which are in RTPITD 17-05-0041.			Yes	Yes	Yes
17-05-0014	San Francisco	Muni Forward (Transit Effectiveness Project)	Includes transit priority improvements along Rapid and High Frequency transit corridors, service increases, transfer and terminal investments, overhead wire changes, and street improvements in support of Vision Zero.		Yes	Yes	Yes	Yes
17-05-0015	San Francisco	Rail Capacity Long Term Planning and Conceptual Design - All	Rail capacity long term planning and conceptual design for Muni, BART, and Caltrain. Planning and conceptual engineering phase for study of major corridor and infrastructure investments along existing and potential expansion rail corridors that either expand the system or provide significant increases in operating capacity to the existing rail system.					
17-05-0016	San Francisco	Better Market Street - Transportation Elements	Improve Market Street between Steuart Street and Octavia Boulevard. Includes resurfacing, sidewalk improvements, way-finding, lighting, landscaping, transit boarding islands, transit connections, traffic signals, transportation circulation changes, and utility relocation and upgrade.		Yes	Yes	Yes	Yes
17-05-0017	San Francisco	Core Capacity Implementation - Planning and Conceptual Engineering	Advance planning and evaluation of recommendations that emerge from the Core Capacity Transit Study. Examples of projects under consideration include HOV lanes on the Bay Bridge for buses and carpools; BART/Muni/Caltrain tunnel turnbacks, crossover tracks, grade separations, or other operational improvements; and a second transbay transit crossing.					
17-05-0018	San Francisco	Downtown San Francisco Ferry Terminal Expansion - Phase II	Expansion of berthing facilities along North Basin of Downtown San Francisco Ferry Terminal.					Yes
17-05-0019	San Francisco	Establish new ferry terminal at Mission Bay 16th Street	Establish New Ferry terminal to serve Mission Bay and Central Waterfront neighborhoods		Yes	Yes	Yes	Yes
17-05-0020	San Francisco	HOV/HOT Lanes on U.S. 101 and I-280 in San Francisco	Phase 1 (full implementation): Convert an existing mixed traffic lane and/or shoulder/excess ROW in each direction to HOV 3+ lanes on US 101 from SF/SM County line to I-280 interchange and on I-280 from US 101 interchange to 6th Street off ramp to enhance carpool and transit operations during peak periods. Phase 2 (planning and environmental review only): Convert Phase 1 HOV lanes to HOT/Express Lanes. Express transit to be funded with HOT lane revenues.		Yes	Yes	Yes	Yes
17-05-0021	San Francisco	Geary Boulevard Bus Rapid Transit	Implement Geary Bus Rapid Transit (BRT) to improve service between Market Street and Point Lobos Avenue. This proposal includes dedicated bus lanes, enhanced platforms, new bus passing zones, adjustments to local bus stops, turn lane restrictions, new signalization with Transit Signal Priority, real-time arrival information, low-floor buses, and safety improvements in support of Vision Zero. Expansion vehicles are included in RTPID 17-05-0013.		Yes	Yes	Yes	Yes
17-05-0022	San Francisco	Presidio Parkway	Reconstruct Doyle Drive with standard lane widths, shoulders, and a median barrier. Reconstruct interchange at State Route 1 and State Route 101 and add an auxiliary lanes between this interchange and Richardson Avenue. Transit access will be improved through the provision of extended bus bays near Gorgas Avenue to accommodate multiple transit providers, and well defined pedestrian routes. Post 2017 costs reflect annual SHOPP contributions for operations and maintenance.	Yes	Yes	Yes	Yes	Yes
17-05-0023	San Francisco	Yerba Buena Island (YBI) I-80 Interchange Improvement	Includes two major components: 1) On the east side of the island, the I-80/YBI Ramps project will construct new westbound on- and off- ramps to the new Eastern Span of the Bay Bridge; 2) On the west side of the island, the YBI West-Side Bridges Retrofit project will seismically retrofit the existing bridge structures.	Yes	Yes	Yes	Yes	Yes
17-05-0024	San Francisco	Balboa Park Station Area - Southbound I-280 Off-Ramp Realignment at Ocean Avenue	This project will realign the existing uncontrolled southbound I-280 off-ramp to Ocean Avenue into a T-intersection and construct a new traffic signal on Ocean Avenue to control the off-ramp.	Yes	Yes	Yes	Yes	

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-05-0025	San Francisco	Balboa Park Station Area - Closure of Northbound I-280 On-Ramp from Geneva Avenue	This project would study and implement closure of the northbound I-280 on-ramp from Geneva Avenue to improve safety. Closure of the ramp would initially be a pilot project, if possible, depending on the results of traffic studies. The linked on-ramp from Ocean Avenue would remain open.	Yes	Yes	Yes	Yes	
17-05-0026	San Francisco	Bayshore Station Multimodal Planning and Design	Planning, Preliminary Engineering, and Environmental Review to re-locate the Bayshore Caltrain station and potentially extend the T-Line to the station. The project would also include inter-modal facilities and additional supporting structures and utilities.					
17-05-0027	San Francisco	Hunters Point Shipyard and Candlestick Point Local Roads Phase 1	Build new local streets within the Hunters Point Shipyard and Candlestick Point area.			Yes	Yes	Yes
17-05-0028	San Francisco	Southeast San Francisco Caltrain Station - Environmental	Planning and environmental analysis of Caltrain infill station to replace Paul Ave Station in Southeast San Francisco (e.g. Oakdale).					Yes
17-05-0029	San Francisco	Downtown Value Pricing/Incentives - Pilot, Transit Service, Supportive Infrastructure	A set of street improvements to support transit operations and cycling and pedestrian safety and comfort to support the anticipated mode shift due to the implementation of congestion pricing.		Yes	Yes	Yes	Yes
17-05-0030	San Francisco	Treasure Island Mobility Management Program: Intermodal Terminal, Congestion Toll, Transit Service, Transit Capital	New ferry service between San Francisco and Treasure Island; AC Transit service between Treasure Island and Oakland; shuttle service on-Island; bike share on-Island; priced-managed parking on-Island; Travel Demand Management program.		Yes	Yes	Yes	Yes
17-05-0031	San Francisco	Southeast Waterfront Transportation Improvements - Phase 1	Create a 5 mile multi-modal corridor of streets, transit facilities, pedestrian paths, and dedicated bicycle lanes to link the Candlestick/Hunters Point Shipyard project area to BART, T-Third light rail, Caltrain, local bus lines and future ferry service. A BRT system (included in a RTPID 17-05-0032) would use exclusive transit right-of-way, station and shelter facilities, and transit signal priority infrastructure. This project also includes express bus and enhances transit service between the Southeast Waterfront and downtown San Francisco.			Yes	Yes	Yes
17-05-0032	San Francisco	Geneva-Harney Bus Rapid Transit	Provides exclusive bus lanes, transit signal priority, and high-quality stations along Geneva Avenue (from Santos St to Executive Park Blvd), Harney Way, and Crisp Avenue, and terminating at the Hunters Point Shipyard Center. The project includes pedestrian and bicycle improvements in support of Vision Zero and connects with Muni Forward transit priority improvements west of Santos Street. This is the near-term alternative that does not rely on the full extension of Harney Way across US 101.		Yes	Yes	Yes	Yes
17-05-0033	San Francisco	Van Ness Avenue Bus Rapid Transit	Implement Van Ness Avenue Bus Rapid Transit (Van Ness BRT) to improve approximately two miles of a major north-south urban arterial in San Francisco. Project would include a dedicated lane for BRT buses in each direction between Mission and Lombard Streets. There will be nine BRT stations, with platforms on both sides for right-side passenger boarding and drop-off.	Yes	Yes	Yes	Yes	
17-05-0034	San Francisco	Arena Transit Capacity Improvements	Identifies transit improvements needed to accommodate growth in Mission Bay. Improvements might include track crossovers to allow for trains to be staged; a 6-inch raised area along existing tracks; a platform extension to accommodate crowds; other trackway modifications; and a traction power study to ensure that the power grid can accommodate a large number of idling vehicles.					
17-05-0035	San Francisco	EN Trips: All Components	Implement streetscape improvements on Folsom Street between 5th and 11th Streets and on Howard Street between 4th and 11th Streets. On Folsom Street, a bi-directional cycle track, new transit bulbs and bus bulbs at intersections, and new signals would be	Yes	Yes	Yes	Yes	
17-05-0036	San Francisco	Regional/Local Express Bus to Support Express Lanes in SF	A 5-year regional/local express bus pilot to provide service to/from downtown San Francisco to/from San Francisco neighborhoods, Marin, Contra Costa, Alameda, San Mateo and Santa Clara counties to complement other freeway corridor management strategies. Some service to be funded with HOT lane revenues. See HOV/HOT Lanes on U.S. 101 and I-280 in San Francisco project. Includes vehicles.				Yes	
17-05-0037	San Francisco	Parkmerced Transportation Improvements	Implements transportation improvements for the Parkmerced development including enhanced transit service, pedestrian and bicycle facilities, intersection improvements, parking management, carshare and bikehare stations		Yes	Yes	Yes	

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-05-0039	San Francisco	Geneva Light Rail Phase I: Operational Improvements, Planning and Environmental	Planning and environmental analysis of extension of light rail track 2.7 miles along Geneva Avenue from the Green Railyard to Bayshore Boulevard and then to the existing T-Third terminus at Sunnydale Station. Project would increase operational flexibility, system resiliency, and provide a southern east west rail connection. Phase included in Plan Bay Area 2040 is for non-revenue service.					
17-05-0040	San Francisco	T-Third Mission Bay Loop	Connect the rail turnouts from the existing tracks on Third Street at 18th and 19th Streets with additional rail and overhead contact wire system on 18th, Illinois and 19th Streets. The loop would allow trains to turn around for special events and during peak periods to accommodate additional service between Mission Bay and the Market Street Muni Metro.	Yes	Yes	Yes	Yes	
17-05-0041	San Francisco	T-Third Phase II: Central Subway	Extends the Third Street Light Rail line north from King Street along Third Street, entering a new Central Subway near Bryant Street and running under Geary and Stockton Streets to Stockton & Clay Streets in Chinatown. New underground stations will be located at Moscone Center, Third & Market Streets, Union Square, and Clay Street in Chinatown. Includes procurement of four LRVs.	Yes	Yes	Yes	Yes	
17-05-0042	San Francisco	Historic Streetcar Extension - Fort Mason to 4th & King	The project would extend historic streetcar service by extending either the E-line or the F-line service from Fisherman's Wharf to Fort Mason, using the historic railway tunnel between Van Ness Ave. and the Fort Mason Center. The project will seek non-transit specific funds and will seek to improve the historic streetcar operation as an attractive service for tourists and visitors.		Yes	Yes	Yes	Yes
17-06-0001	San Mateo	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps, including but not limited to new multi-purpose pedestrian/bicycle bridges over US 101 and sidewalk gap closures					Yes
17-06-0002	San Mateo	County Safety, Security and Other	Projects in this category address safety and security needs of San Mateo County including county-wide implementation of Safe Routes to School Program					Yes
17-06-0003	San Mateo	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements, including but not limited to projects along facilities such as El Camino Real, Bay Road, Ralston Avenue, University Avenue, Middlefield Road, Palmetto Avenue, Mission Street, Geneva Avenue, and Carolan Avenue					Yes
17-06-0004	San Mateo	Minor Roadway Expansions	This category includes roadway capacity increasing projects (new roadways, widening or extensions of existing roadways) on minor roads such as Blomquist Street, California Drive, Railroad Avenue, Manor Drive, and Alameda de las Pulgas					Yes
17-06-0005	San Mateo	Roadway Operations	County-wide Implementation of non-capacity Increasing local road Intersection modifications and channelization countywide County-wide implementation of local circulation improvements and traffic management programs countywide					Yes
17-06-0006	San Mateo	County-wide Intelligent Transportation System (ITS) and Traffic Operation System Improvements	Installation of transportation system management improvements such as Intelligent Transportation System (ITS) elements and TOS equipment throughout San Mateo County.					Yes
17-06-0007	San Mateo	U.S. 101 Managed Lanes Project in San Mateo County	Modify US 101 to accommodate an Express Lane from approximately 2 miles south of the Santa Clara County Line to Grand Avenue interchange near the I-380 interchange. Work may include shoulder modification, ramp modifications, and interchange modifications to accommodate an extra lane. Work will be phased.		Yes	Yes	Yes	
17-06-0008	San Mateo	Add northbound and southbound modified auxiliary lanes and/ or implementation of managed lanes on U.S. 101 from I-380 to San Francisco County line	Add northbound and southbound modified auxiliary lanes and/or implementation of managed lanes on U.S. 101 from I-380 to San Francisco County line.		Yes	Yes	Yes	Yes
17-06-0009	San Mateo	Improve operations at U.S. 101 near Route 92 - Phased	US 101 operational improvements near Route 92. Project may have phased construction.					Yes
17-06-0010	San Mateo	Improve U.S. 101/Woodside Road interchange	Modifies the Woodside Road Interchange at US 101.		Yes	Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-06-0011	San Mateo	US 101 Produce Avenue Interchange	Construct a new interchange on US 101 at Produce Avenue, connecting Utah Avenue on the east side of US 101 to San Mateo Avenue on the west side of US 101. This will allow for reconfiguration of the existing southbound ramps at Produce Ave and Airport Blvd, as well incorporation of the northbound off- and on- ramps at S. Airport Blvd into the interchange design.		Yes	Yes	Yes	Yes
17-06-0012	San Mateo	U.S. 101 Interchange at Peninsula Avenue	Construct southbound on and off ramps to US 101 at Peninsula Ave to add on and off ramps from southbound 101.		Yes	Yes	Yes	Yes
17-06-0013	San Mateo	Reconstruct U.S. 101/Broadway interchange	Reconstructs the US 101/Broadway interchange.	Yes	Yes	Yes	Yes	
17-06-0014	San Mateo	Reconstruct U.S. 101/Willow Road interchange	The project proposes to reconstruct the existing US 101/Willow Road (Route 114) Interchange within the existing alignment to a partial cloverleaf interchange. Project includes class I bike paths and class II bike lanes.	Yes	Yes	Yes	Yes	Yes
17-06-0015	San Mateo	Construct auxiliary lanes (one in each direction) on U.S. 101 from Marsh Road to Embarcadero Road	Add northbound and southbound auxiliary lanes.	Yes	Yes	Yes	Yes	
17-06-0016	San Mateo	Improve access to and from the west side of Dumbarton Bridge on Route 84 connecting to U.S. 101 per Gateway 2020 Study - Phased	Improve access to /from the west side of Dumbarton Bridge (Route 84 connecting to U.S. 101) per Gateway 2020 Study (Phased implementation of short term projects. Environmental phase only for long term projects).			Yes	Yes	
17-06-0017	San Mateo	Route 101/Holly St Interchange Access Improvements	The proposed project would convert the existing full cloverleaf configuration to a partial cloverleaf design by eliminating two of the existing loop off-ramps of the interchange, and realign the diagonal on- and off-ramps into signalized T-intersections with local streets. A new pedestrian and bicycle over crossing will be constructed in the south side of Holly Street Interchange.	Yes	Yes	Yes	Yes	
17-06-0018	San Mateo	Improve local access at I-280/I-380 from Sneath Lane to San Bruno Avenue to I-380 - Environmental only	Environmental assessment of local access improvements at the existing I-280 / I-380 interchange located in the City of San Bruno. The project would provide access to I-380 from the two main east-west secondary roads of Sneath Lane and San Bruno Avenue.					
17-06-0019	San Mateo	State Route 92-82 (El Camino) Interchange Improvement	Widen the existing ramps and reconfigure the existing interchange from a full cloverleaf to a partial cloverleaf. Pedestrian and bicycle improvements would be included as part of the project.	Yes	Yes	Yes	Yes	Yes
17-06-0020	San Mateo	Hwy 1 operational & safety improvements in County Midcoast (acceleration/deceleration lanes; turn lanes; bike lanes; pedestrian crossings; and trails)	Operational and safety improvements for vehicles, bicycles, and pedestrians, along the Highway 1 corridor between Half Moon Bay and Pacifica. This could include acceleration lanes, deceleration lanes, turn lanes, bike lanes, enhanced crossings, and trail network improvements.	Yes	Yes	Yes	Yes	
17-06-0021	San Mateo	Environmental Studies for 101/Candlestick Interchange	Planning and environmental analysis of the reconstruction of 101/Candlestick Interchange to full all-directional interchange with a single point cross street connection. Project would provide all-direction ramp movements controlled by new signalized intersections at the cross street connections. Interchange would join an improved Harney Way to the east, and would join the Geneva Avenue Extension to the west. Accommodate E/W crossing of planned BRT facility.					Yes
17-06-0022	San Mateo	Westbound slow vehicle lane on Route 92 between Route 35 and I-280 - Environmental Phase	Planning and environmental analysis of a westbound slow vehicle lane on Route 92 between Route 35 and I-280					
17-06-0023	San Mateo	Route 1 Improvements in Half Moon Bay	In Half Moon Bay, On Route 1: Improve safety and reduce congestion by providing protected left and right turn lanes, warranted traffic signals, two through lanes only at signalized intersections, bike lanes, pathways, bus stops, traffic signal interconnects, safety lighting, median and channelization improvements.		Yes	Yes	Yes	Yes
17-06-0024	San Mateo	Reconstruct U.S. 101/Sierra Point Parkway interchange (includes extension of Lagoon Way to U.S. 101)	Reconstruct a partial interchange and provide improved access to Brisbane, Bayshore Blvd and proposed Brisbane Baylands project. Lagoon Way extension connects to the reconstructed interchange and provides improved access to Brisbane, Daly City, and the pending 600-acre Brisbane Baylands development.		Yes	Yes	Yes	
17-06-0025	San Mateo	US 101/University Ave. Interchange Improvements	On University Avenue across US-101, between Woodland Avenue and Donohoe Street; Add bike lanes and sidewalk and modify the NB and SB off-ramps to eliminate pedestrian/bicycle conflicts and improve traffic operations.					

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-06-0026	San Mateo	Implement incentive programs to support transit-oriented development	Implement an incentive programs to support transit-oriented developments in San Mateo County.					
17-06-0027	San Mateo	Implement supporting infrastructure and Automated Transit Signal Priority to support SamTrans express rapid bus service along El Camino Real	This project will institute necessary infrastructure and Automated Transit Signal Priority necessary to accommodate express rapid bus service along the length of El Camino Real from Palo Alto to Daly City.					
17-06-0028	San Mateo	Make incremental increase in SamTrans paratransit service - Phase	Expansion of curb-to-curb paratransit fleet and service for eligible users, compliant with ADA requirements, based on projected future demand.					
17-06-0029	San Mateo	Add new rolling stock and infrastructure to support SamTrans bus rapid transit along El Camino Real- Phase	This project will institute new rolling stock and infrastructure necessary to accommodate BRT along El Camino Real			Yes	Yes	Yes
17-06-0030	San Mateo	Environmental Clearance and Design of the Redwood City Ferry Terminal and Service	Planning and environmental analysis of the construction of a new ferry terminal, purchase of 3 new high-speed ferry vessels, and operation of new ferry service between Redwood City and San Francisco.					Yes
17-06-0031	San Mateo	Implement Redwood City Street Car - Planning Phase	Planning and environmental analysis of Redwood City Street Car Construction and Implementation					
17-06-0032	San Mateo	Route 1 San Pedro Creek Bridge Replacement and Creek Widening Project	Replace San Pedro Creek Bridge on CA 1 with a longer bridge and widen the creek channel for 100 year storm flow capacity. Provide for a class 1 multi-purpose trail on the eastern side.	Yes	Yes	Yes	Yes	
17-06-0033	San Mateo	Widen Route 92 between SR 1 and Pilarcitos Creek alignment, includes widening of travel lanes and shoulders	Widens shoulders and travel lanes to standard widths. Straighten curves at few locations.		Yes	Yes	Yes	
17-06-0034	San Mateo	Construct Route 1 (Calera Parkway) northbound and southbound lanes from Fassler Avenue to Westport Drive in Pacifica	The Calera Parkway project will widen Highway 1 from four lanes to six lanes, from approximately 1,500 feet south of Fassler Avenue to approximately 2,300 feet north of Reina Del Mar Avenue, a distance of 1.3 miles, and will add a 16€™ wide landscaped median between concrete barriers from San Marlo Way to Reina Del Mar Avenue			Yes	Yes	
17-06-0035	San Mateo	I-280 improvements near D Street exit	Improve the on and off-ramps and approaches for I-280 near the D Street exit in Daly City					
17-06-0036	San Mateo	Widen Skyline Boulevard (Route 35) to 4-lane roadway from I-280 to Sneath Lane - Phased	Widens Skyline Blvd. (SR 35) between I-280 and Sneath Lane. It is currently the last portion of what is otherwise a four lane roadway along Skyline Blvd. The project widens approximately 1.3 miles of the roadway into four lanes.			Yes	Yes	
17-06-0037	San Mateo	Widen Millbrae Avenue between Rollins Road and U.S. 101 soutbound on-ramp and resurface intersection of Millbrae Avenue and Rollins Road	Widen Millbrae Avenue between Rollins Road and US101 Southbound On Ramp and resurface the intersection of Millbrae Avenue and Rollins Road.		Yes	Yes	Yes	
17-06-0038	San Mateo	Construct a 6-lane arterial from Geneva Avenue/Bayshore Boulevard intersection to U.S. 101/Candlestick Point interchange - Environmental phase	Planning and environmental analysis of a 6-lane arterial from the Geneva Avenue at Bayshore Boulevard to 101/Candlestick Interchange. Grade separation at the Caltrain and Tunnel Ave, Class II bike lanes, on-street parking (travel lanes during peak periods), and sidewalks. Sections will be reserved for an exclusive lane BRT facility that connects to the Bayshore Multimodal Station and provides through service to BART Balboa Station.					
17-06-0039	San Mateo	Grade Separations	This project includes grade separations of the Caltrain right of way at approximately 2 to 3 high priority locations in San Mateo County, including 25th Avenue. This project is based on San Mateo County's Measure A grade separation category.					
17-06-0040	San Mateo	Extend Blomquist Street over Redwood Creek to East Bayshore and Bair Island Road	Redwood City Blomquist Street Extension and Blomquist Bridge over Redwood Creek		Yes	Yes	Yes	Yes
17-07-0001	Santa Clara	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps, including downtown San Jose Bike Lanes					Yes
17-07-0002	Santa Clara	Caltrain Grade Separations	This project includes grade separations of the Caltrain right of way at priority locations throughout Santa Clara County					

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17-07-0003	Santa Clara	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements throughout Santa Clara County including but not limited to Los Gatos Boulevard, Monterey Road, Shoreline Boulevard, Stevens Creek Road, Downtown Sunnyvale Complete Streets, Wedgewood Avenue, West San Carlos, and Winchester Boulevard. This category also includes intersection improvements for non-expressways in Santa Clara County.					Yes
17-07-0004	Santa Clara	Additional Local Road Preservation/Rehab	This project provides additional funding to local streets and roads preservation and rehabilitation beyond what is included in the regional local roads maintenance project (RTPID 17-10-0022)					Yes
17-07-0005	Santa Clara	Minor Roadway Expansions	This category includes roadway capacity increasing projects (new roadways or widening/extensions of existing roadways) on minor roads throughout Santa Clara County such as Buena Vista Avenue, bridges over US 101 in Gilroy, Blossom Hill Road, Lark Avenue, Pollard Road, Union Avenue, Butterfield Road, San Antonio Road, Charcot Avenue, King Road, Montague Expressway, San Carlos Street, Zanker Road, Coleman Avenue, Autumn Street, Winchester Boulevard, Center Avenue, DeWitt Avenue, Hill Road, Wastonville Road, Mary Avenue, and Wildwood Avenue					Yes
17-07-0007	Santa Clara	Affordable Fare Program	Program objective is to increase ridership by reducing the cost of transit services for low-income populations including seniors, persons with disabilities, youth and students.					
17-07-0008	Santa Clara	Implement System Operations and Management Program for Santa Clara County	This program includes projects that use technology to improve operation and management of the overall transportation system. These new technologies are collectively referred as Intelligent Transportation Systems.					
17-07-0009	Santa Clara	SR 87 Technology-based Corridor Improvements	Improvements in San Jose to address mainline congestion and system reliability through the implementation of technology-based operational improvements to the freeway.					
17-07-0010	Santa Clara	Hwy. Transportation Operations System/Freeway Performance Initiative Phase 1 & 2	Implement Freeway Performance Initiative projects for Santa Clara County, which includes freeway ITS infrastructure, arterial management, incident management, emergency preparedness, and operations and maintenance of ITS infrastructure.					Yes
17-07-0012	Santa Clara	BART Silicon Valley Extension - San Jose (Berryessa) to Santa Clara	The Berryessa Station to San Jose Extension Project would physically extend BART from the future BART Berryessa Station in San Jose to Downtown San Jose and then into Santa Clara. Project includes four new stations - Alum Rock, Downtown San Jose, Diridon, and Santa Clara. Project cost includes operating expenses - escalated capital cost is $5.175 billion.		Yes	Yes	Yes	Yes
17-07-0013	Santa Clara	Implement El Camino Rapid Transit Project	Implement Rapid line 522 improvements in the El Camino Real/The Alameda corridor including: dedicated guideways, signal prioritization, low-floor boarding, ticket vending machines, premium stations, real-time information, and specialized vehicles.		Yes	Yes	Yes	
17-07-0021	Santa Clara	Alviso Wetlands Doubletrack	Provide double track section on the UPRR Coast Subdivision from the Alameda County line to the vicinity of State Route 237. The improvements are expected to include double-tracking the segment running over the Alviso Wetlands.		Yes	Yes	Yes	
17-07-0022	Santa Clara	Environmental Studies for SR-152 New Alignment	Project includes further environmental and planning studies for the SR-152 corridor, including a new alignment and potential toll options.					Yes
17-07-0023	Santa Clara	US 101/Zanker Rd./Skyport Dr./Fourth St. Interchange Improvements	Construct a new interchange at U.S. 101/Zanker Road/Skyport Drive/Fourth Street		Yes	Yes	Yes	
17-07-0024	Santa Clara	Lawrence/Stevens Creek/I-280 Interchange	Lawrence/Stevens Creek/I-280 Interchange: Provide direct connections between Lawrence Expressway and I-280		Yes	Yes	Yes	
17-07-0025	Santa Clara	I-280/Winchester Blvd Interchange Improvements	Improve I-280/ Winchester Blvd Interchange to relieve congestion and improve operations and local circulation.		Yes	Yes	Yes	Yes
17-07-0026	Santa Clara	I-280/Wolfe Road Interchange Improvements	Modify I-280/Wolfe Road Interchange to relieve congestion and improve local circulation.		Yes	Yes	Yes	Yes
17-07-0027	Santa Clara	US 101/Mabury Rd./Taylor St. Interchange Improvements	Construct interchange at U.S. 101/Mabury Road/Taylor Street		Yes	Yes	Yes	Yes
17-07-0028	Santa Clara	I-280 New HOV Lane from San Mateo County line to Magdalena Avenue	New HOV lane added to I-280 from existing HOV lane at Magdalena Avenue to the San Mateo County Line. Requires constructing a new lane.		Yes	Yes	Yes	Yes
17-07-0029	Santa Clara	I-280/Saratoga Avenue Interchange Improvements	Modify I-280/ Saratoga Avenue Interchange to relieve congestion and improve local circulation		Yes	Yes	Yes	Yes
17-07-0030	Santa Clara	I-280 Northbound Braided Ramps between Foothill Expressway and SR 85	Improve braided ramps on northbound I-280 between Foothill Expressway and Route 85.		Yes	Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-07-0031	Santa Clara	US 101 Southbound/Trimble Rd./De La Cruz Blvd./Central Expressway Interchange Improvements	Improve interchange at U.S. 101 southbound Trimble Road/De la Cruz Boulevard/Central Expressway.		Yes	Yes	Yes	Yes
17-07-0032	Santa Clara	I-680/ Alum Rock/ McKee Road Interchange Improvements	Reconfigure interchange, improve access for all modes of transportation, improve traffic operations and relieve congestion at the I-680/ Alum Rock and I-680/ McKee Road interchanges. Construct an Express Bus Station in the Median of I-680 to connect buses using HOV or Express Lanes with Santa Clara Alum Rock BRT Station.		Yes	Yes	Yes	Yes
17-07-0033	Santa Clara	SR 237/Mathilda Ave. and US 101/Mathilda Ave. Interchange Improvement	The project proposes to improve local road operations on Mathilda Avenue in the City of Sunnyvale from Almanor Avenue to Innovation Way, including on- and off-ramp improvements at the State Route (SR) 237/Mathilda Avenue and US 101/Mathilda Avenue interchanges.		Yes	Yes	Yes	Yes
17-07-0034	Santa Clara	US 101 Interchanges Improvements: San Antonio Rd. to Charleston Rd./Rengstorff Ave.	Improve U.S. 101 interchanges at San Antonio Road to Charleston Road/Rengstorff Avenue including new auxiliary lane.		Yes	Yes	Yes	Yes
17-07-0035	Santa Clara	US 101/Buena Vista Ave. Interchange Improvements	Construct a full interchange at US 101 and Buena Vista Avenue in Gilroy. The interchange includes a flyover southbound on-ramp to braid with the existing truck exit at the CHP Inspection Station. Off-ramp diagonal ramps will be constructed.		Yes	Yes	Yes	Yes
17-07-0036	Santa Clara	SR 85 Northbound to Eastbound SR 237 Connector Ramp and Northbound SR 85 Auxiliary Lane	Widen off-ramp from Northbound SR 85 to SR 237 Eastbound to two lanes; construct auxiliary lane on Eastbound SR 237 between SR 85 on-ramp to Middlefield Rd.; construct braid off-ramp on Eastbound SR 237 between SR 85 and Dana St.		Yes	Yes	Yes	
17-07-0037	Santa Clara	SR 85/El Camino Real Interchange Improvements	Improve SR 85 auxiliary lanes between El Camino Real and SR 237, and SR 85/El Camino Real interchange.		Yes	Yes	Yes	
17-07-0038	Santa Clara	US 101/Blossom Hill Rd. Interchange Improvements	Widen interchange at U.S. 101/Blossom Hill Road.		Yes	Yes	Yes	Yes
17-07-0039	Santa Clara	US 101/Old Oakland Rd. Interchange Improvements	Improve interchange at U.S. 101/Old Oakland Road.		Yes	Yes	Yes	Yes
17-07-0040	Santa Clara	US 101/Shoreline Blvd. Interchange Improvements	Interchange improvements at Shoreline Boulevard.				Yes	
17-07-0042	Santa Clara	SR 237/Great America Parkway WB Off- Ramps Improvements	Modify WB off-ramps at the SR 237/Great America Parkway interchange to improve traffic operations and relieve congestion.		Yes	Yes	Yes	
17-07-0043	Santa Clara	SR 237/El Camino Real/Grant Rd. Intersection Improvements	Widen Westbound SR 237 within the existing median to extend both of the left-turn lanes; lengthen the Northbound El Camino Real right-turn lane onto SR 237 starting the lane at Yuba Drive; widen the Southbound El Camino Real left-turn lane within the existing median; and construct a right-turn lane on Southbound El Camino Real for traffic accessing Westbound Grant Rd.		Yes	Yes	Yes	
17-07-0044	Santa Clara	Double Lane Southbound US 101 off-ramp to Southbound SR 87	Widen Southbound US 101 freeway connector to Southbound SR 87 to add a second lane and install TOS.	Yes	Yes	Yes	Yes	Yes
17-07-0051	Santa Clara	Widen Calaveras Blvd. overpass from 4 to 6 lanes	Replaces the existing four lane bridge, which currently has a single sidewalk and no bicycle lane over the Union Pacific (UP) Railroad tracks, to a six lane bridge. Project will also add sidewalks and bicycle lanes in both directions.		Yes	Yes	Yes	Yes
17-07-0056	Santa Clara	Bus Stop Improvements	Enhance transit waiting environments by improving accessibility and amenities at VTA bus stops.					
17-07-0057	Santa Clara	Frequent Core Bus Network - 15 minutes	Provide 15-minute all day bus service on VTA's highest ridership routes	Yes	Yes	Yes	Yes	
17-07-0058	Santa Clara	SR 85 Corridor Improvements - reserve amount	This program will fund corridor transit studies that improve transit connectivity and reduce traffic congestion in this corridor. It also includes a reserve amount for future projects along SR 85 that would be funded with Measure B sales tax revenue.					
17-07-0059	Santa Clara	Implement Stevens Creek Rapid Transit Project	Implement Rapid Transit improvements in the Stevens Creek corridor including: dedicated guideways, signal prioritization, low-floor boarding, ticket vending machines, premium BRT stations, real-time information, and specialized vehicles.		Yes	Yes	Yes	
17-07-0060	Santa Clara	North First Street light rail speed Improvements	This project would improve light rail service and reliability along North First Street. Some of the problems in this area include signal timing issues, slow speeds (maximum speed currently restricted to 35mph), and unscheduled stops. Fencing along this corridor would allow maximum speeds to increase to 45 mph combined with improvements to signal timing.	Yes	Yes	Yes		

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17-07-0061	Santa Clara	Extend Capitol Expressway light rail to Eastridge Transit Center - Phase II	Extends the Capitol Avenue light rail line 2.6 miles from the existing Alum Rock Transit Center to a rebuilt Eastridge Transit Center. Includes the removal of HOV lanes on Capitol Expressway between Capitol Avenue and Tully Road in San Jose.		Yes	Yes	Yes	Yes
17-07-0062	Santa Clara	Extend light-rail transit from Winchester Station to Route 85 (Vasona Junction)	Extends light rail from Winchester Station to Route 85 (Vasona Junction).		Yes	Yes	Yes	Yes
17-07-0063	Santa Clara	Mineta San Jose International Airport APM connector - planning and environmental	Conduct planning and design work on a proposed project that would provide a transit link to San Jose International Airport using automated People Mover (APM) technology.					
17-07-0064	Santa Clara	County Safety, Security, Noise and Other	Noise abatement program countywide - This project will implement noise reduction projects throughout Santa Clara County.					Yes
17-07-0065	Santa Clara	Caltrain Station and Service Enhancements	Projects to improve Caltrain service, system performance and stations including full EMU conversion, longer vehicles, longer platforms, level boarding, parking improvements, bike facilities, transit connectivity, other station enhancements and track reconfigurations.					Yes
17-07-0066	Santa Clara	Future Transit Corridor Studies	This program includes future transit corridor studies throughout Santa Clara County.					
17-07-0067	Santa Clara	SR 17 Corridor Congestion Relief in Los Gatos	Operational improvements for the SR 17 Corridor, including upgrading Highway 17/Highway 9 interchange to improve pedestrian and bicycle safety, mobility, and roadway operations; deploying advanced transportation technology to reduce freeway cut thru traffic in Los Gatos, including traffic signal control system upgrades in Los Gatos, traveler information system, advanced ramp metering systems and multi-modal congestion relief solutions		Yes	Yes	Yes	Yes
17-07-0068	Santa Clara	237 WB Additional Lane from McCarthy to North First	Corridor Improvements in the cities of San Jose, Santa Clara and Milpitas to address mainline congestion and regional connectivity by the addition of SR 237 westbound auxiliary lane between McCarthy Boulevard and North First Street		Yes	Yes	Yes	Yes
17-07-0069	Santa Clara	US 101/SR 25 Interchange	The project consists of reconfiguring the interchange at US 101 and SR 25 just south of the City of Gilroy in Santa Clara County, connecting SR 25 and Santa Teresa Boulevard, and widening the existing freeway from 4 to 6 lanes from the Monterey Street interchange to the US 101/SR 25 interchange.		Yes	Yes	Yes	Yes
17-07-0070	Santa Clara	SR 237 Express Lanes: North First St. to Mathilda Ave.	Convert HOV to express lane in both directions		Yes	Yes	Yes	Yes
17-07-0074	Santa Clara	SR 85 Express Lanes: US 101 (South San Jose) to Mountain View	SR 85 typically has 1 HOV lane and 2 general purpose lanes in both directions with auxiliary lane in some segments. Project will convert existing HOV lane to express lane and add a second express lane between SR 87 and I-280 in both directions.		Yes	Yes	Yes	Yes
17-07-0075	Santa Clara	US 101 Express Lanes: Whipple Ave. in San Mateo County to Cochrane Road in Morgan Hill	Convert HOV Lanes to express lane and add a second express lane in some segments.		Yes	Yes	Yes	Yes
17-07-0076	Santa Clara	Santa Clara County Express Lanes Operations and Maintenance	This program includes operations and maintenance for the Santa Clara County (VTA) Express Lanes.					
17-07-0077	Santa Clara	BART – Warm Springs to Berryessa Extension (SVBX)	The project entails design, ROW, construction, equipment and Rolling Stock procurements necessary to extend BART to the future Berryessa Station in San Jose. Improvements will include track, bridges, traction electrification, stations, parking areas, fare vending equipment and other ancillary operating and/or maintenance equipment.	Yes	Yes	Yes	Yes	Yes
17-07-0078	Santa Clara	Envision Expressway (Tier 1 Expressway Plan) Major and Minor Projects	Various operational and capacity improvements to expressways in Santa Clara County comprising the Tier 1 investments from the Santa Clara County Expressway Plan. These projects include capacity improvements for Almaden Expressway, Capitol Expressway, Foothill Expressway, Lawrence Expressway, Montague Expressway, Oregon-Page Mill Expressway, San Tomas Expressway, Santa Teresa Boulevard. This project also includes the following ITS/Signal upgrades: Replace/upgrade/add fiber optic lines; upgrade equipment for new technologies; systemwide pedestrian sensors; enhance/replace bicycle and vehicle detection with new technologies on the County expressways	VARIES	Yes	Yes	Yes	Yes
17-07-0079	Santa Clara	Envision Highway Minor Projects	Includes: 1-280 NB Second exit lane to Foothill Expressway; SR 17 SB/Hamilton Ave Off-Ramp widening; San Tomas expressway at SR-17 Improvements; US101/SR 152 10th Street Ramp and Intersection Improvements; and Charcot Avenue Extension over I-880					Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-07-0080	Santa Clara	Alum Rock/Santa Clara Street Bus Rapid Transit	Implement Rapid Transit improvements in the Santa Clara/Alum Rock route, including: dedicated guideways, signal prioritization, ticket vending machines, premium stations, real-time information, and specialized vehicles.	Yes	Yes	Yes	Yes	
17-07-0081	Santa Clara	I-880 Express Lanes: SR-237 to US-101	Convert existing HOV lane to an express lane in both directions between SR 237 and US 101		Yes	Yes	Yes	
17-07-0082	Santa Clara	SR-87 Express Lanes: I-880 to SR-85	Convert existing HOV lane to an express lane in both directions between I-880 and SR-85		Yes	Yes	Yes	
17-07-0083	Santa Clara	I-680 Express Lanes: SR-237 to US-101	Convert existing general purpose lane to an express lane in both directions between SR-237 and US-101		Yes	Yes	Yes	
17-07-0084	Santa Clara	I-280 Express Lanes: US-101 to Magdalena Avenue	Convert existing HOV lane to an express lane in both directions between US 101 and Magdalena Avenue		Yes	Yes	Yes	
17-07-0085	Santa Clara	Santa Clara County Express Lanes - Environmental and Design Phase for Future Segments	This program includes environmental and design phases for future express lane segments in Santa Clara County, including along I-880, US 101 south of Morgan Hill, and for Highway 17					
17-07-0086	Santa Clara	Santa Clara County Express Lanes - Reserve	This program includes future revenue from express lanes in Santa Clara County					
17-07-0087	Santa Clara	Widen San Tomas Expressway to 8 Lanes from Stevens Creek Blvd to Campbell Ave	Widen San Tomas Expressway from 6 to 8 Lanes from Stevens Creek Blvd to Campbell Ave.		Yes	Yes	Yes	
17-07-0088	Santa Clara	Senter Road Widening from Umbarger to Lewis	Widening Senter Road between Umbarger Rd. and Lewis Rd. from 4 to 6 lanes with improved bicycle/ped facilities and install median landscaping.		Yes	Yes	Yes	
17-07-0089	Santa Clara	South Bascom Complete Streets	On South Bascom Ave. from Parkmoor Ave. to Southwest Expressway reduce the road to two lanes and make bicycle and pedestrian improvements in the corridor.		Yes	Yes	Yes	
17-07-0090	Santa Clara	Widen Brokaw Bridge over Coyote Creek	Widen north side of the bridge to add on additional through traffic lane on westbound Brokow Road.					
17-07-0091	Santa Clara	Widen Oakland Road from 4-lanes to 6-lanes between U.S. 101 and Montague Expressway	Widens Oakland Rd. from 4 to 6 lanes between US 101 and Montague Expwy. Also provides median island landscaping and operational improvements in roadway corridor.		Yes	Yes	Yes	
17-08-0001	Solano	Access and Mobility Program	This category includes projects that improve access and mobility for people with disabilities, low-income residents, and seniors, including providing Lifeline transit service countywide and providing transit service to seniors and individuals with disabilities separate from Lifeline					Yes
17-08-0002	Solano	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps					Yes
17-08-0003	Solano	Climate Program: TDM and Emission Reduction Technology	Projects in this category implement strategies and programs that reduce emissions, encourage alternative transportation modes, and manage transportation demand including but not limited to projects such as TDM program implementation, parking management, local area shuttle and paratransit services					
17-08-0004	Solano	County Safety, Security and Other	Projects in this category address safety, security and other needs. This project includes safety improvements to state highways throughout Solano County. This also includes countywide Safe Routes to School projects.					Yes
17-08-0005	Solano	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements					Yes
17-08-0006	Solano	PDA Planning	This category includes planning studies supporting the region's PDA framework and connecting transportation and land use					
17-08-0007	Solano	Minor Roadway Expansions	This category includes roadway capacity increasing projects (new roadways or widening/extensions of existing roadways) on minor roads throughout Solano County					Yes
17-08-0008	Solano	Roadway Operations	This category includes projects that improve roadway, intersection, or interchange operations, ITS, as well as other transportation system management. This project also includes a realigning SR 113 around downtown Dixon to I-80.					Yes
17-08-0009	Solano	I-80/I-680/SR12 Interchange (Packages 2-7)	Packages 2-7 provide direct connectivity from I-680 NB to SR12 WB, widens I-680 and I-80 near the interchange, and improves connections to Red Top road off-ramp. Express lane direct connectors are included in RTPID 17-10-0061.			Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-08-0010	Solano	Improve interchanges and widen roadways serving Solano County Fairgrounds, including Redwood Parkway	Improvements to interchanges and widening of roadways serving the Solano County Fairgrounds, including Redwood Parkway.		Yes	Yes	Yes	Yes
17-08-0011	Solano	Provide auxiliary lanes on I-80 in eastbound and westbound directions from I-680 to Airbase Parkway	Project provides Auxiliary Lanes on I-80 in the EB & WB directions from I-680 to Airbase Parkway; and removes the I-80/Auto Mall hook ramps and C-D road slip-ramp;		Yes	Yes	Yes	
17-08-0012	Solano	Construct 4-lane Jepson Parkway from Route 12 to Leisure Town Road at I-80	Constructs phase 2,3,4,6,7,8 and 10. Road costs only - bike and other special enhancements assumed from other programs (i.e. Regional Bicycle Program).		Yes	Yes	Yes	Yes
17-08-0013	Solano	Conduct planning and design studies along SR-12 corridor in Solano County	Conduct planning and design studies related to improvements from I-80 to the Rio Vista Bridge					
17-08-0014	Solano	Construct train station building and support facilities at the new Fairfield / Vacaville multimodal station	Construct train station building and expanded bicycle access for the new multimodal center serving the Capitol Corridor.	Yes	Yes	Yes	Yes	
17-08-0015	Solano	Solano MLIP Support Projects	Construct projects and operate programs to support implementation of the MLIP. Projects include expansion of transit centers, including in Vallejo and Fairfield, and new bus stops served by Solano Express; construction or expansion of Park and Ride facilities; and, replacement and maintenance of intercity buses.		Yes	Yes	Yes	Yes
17-08-0016	Solano	Vallejo Station Parking Structure Phase B	Vallejo: Baylink Ferry Terminal; Construct two phased parking structure to consolidate surface parking for ferry patrons; create a pedestrian link between bus transit facility and existing ferry terminal building adjacent to ferry parking structure.					
17-08-0017	Solano	I-80 WB Truck Scales	Project upgrades existing truck scales on WB I-80 in Solano County. Existing westbound truck scales are located on the most congested freeway segment of I-80 in Solano County. Scales are outdated and cannot process the current and future truck volumes on WB I-80. Trucks are slow to enter and leave the scales because of short ramps, adding to existing traffic congestion and safety issues on I-80.					
17-09-0001	Sonoma	Bicycle and Pedestrian Program	Projects in this category are new bicycle (on-street and off-street) and pedestrian facilities, and facilities that connect existing network gaps					Yes
17-09-0002	Sonoma	SMART Rail Freight Improvements	Improvements along publicly-owned SMART rail right-of-way to accommodate rail freight services and expansions. Programmatic category that could include freight spurs, Positive Train Control/systems and crossing upgrades, track and sidings expansions and bridge improvements.					
17-09-0003	Sonoma	Multimodal Streetscape	Projects in this category implement multimodal or complete streets elements.					Yes
17-09-0004	Sonoma	Minor Roadway Expansions	This category includes roadway capacity increasing projects (new roadways or widening/extensions of existing roadways) on minor roads such as Airport Boulevard, Caulfield Lane, Bodway Parkway, Brickway Blvd/Laughlin Rd, Corby Avenue, Dowdell Avenue, Fulton Road, Old Redwood Highway, River Road, Snyder Lane, and Jaguar Way					
17-09-0005	Sonoma	Roadway Operations	This category includes projects that improve roadway, intersection, or interchange operations, ITS, as well as other transportation system management. This project also includes landscaping along US 101 HOV lanes, intersection improvements at Route 116/Route 121, local circulation in Penn Grove, Sonoma Boulevard Improvements, among other operational improvements throughout Sonoma County.					Yes
17-09-0006	Sonoma	Implement Marin Sonoma Narrows Phase 2 (Sonoma County)	Adds 1 HOV lane in each direction to US 101 from Old Redwood Highway in Petaluma to the Marin/Sonoma County line making the freeway 6 lanes wide. It includes widening and replacing the Hwy 116 separation bridges.		Yes	Yes	Yes	Yes
17-09-0008	Sonoma	Arata Lane Interchange	Construction of the Northbound on-ramp to US 101 will complete the Arata Lane interchange with US 101. This project also includes the relocation of a portion of Los Amigos Road north of Arata Lane. Rights of way have been obtained in prior phases.		Yes	Yes	Yes	
17-09-0009	Sonoma	Cotati US 101/Railroad Avenue Improvements (incl. Penngrove)	This project is the creation of a new south bound off ramp and north bound on ramp at Railroad Avenue. There continues to be growth outside of Cotati and Penngrove that will exacerbate traffic in both Penngrove and in downtown Cotati, as these are the only options to access US 101. Improvements would include safety improvements on Railroad Avenue from Petaluma Hill to US 101.			Yes	Yes	

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-09-0010	Sonoma	Hearn Avenue Interchange	The project would replace the existing Hearn Avenue overcrossing bridge with a new bridge to accommodate four traffic lanes with bike lanes and sidewalks on both sides of the roadway. The project would also increase the bridge height clearance and improve ramp connections to US 101 and provide continuous bike lanes and sidewalks between Corby Avenue and Santa Rosa Avenue		Yes	Yes	Yes	Yes
17-09-0011	Sonoma	Shiloh Road Interchange Reconstruction	Reconstruct the Shiloh Road/US 101 interchange to provide two lanes in each direction. It is anticipated that the existing over crossing will be replaced and ramps reconfigured. It is expected that 60% of project costs will come from federal, state or regional funds.			Yes	Yes	
17-09-0012	Sonoma	Cotati Highway 116 Cotati Corridor Improvements	This project is a widening of Highway 116 between US 101 and Stony Point Road, including phased closure of driveway access to 116, the addition of signalized intersections, new bike lanes, and new sidewalk to improve the vehicle LOS, improve the safety of 116 for all modes of transportation, and create safe new corridors for pedestrian and bicyclists.	Yes	Yes	Yes	Yes	
17-09-0013	Sonoma	Petaluma Crosstown Connector and Rainier Interchange	Extend Rainier Avenue from current terminus at McDowell Boulevard westerly with a bridge crossing over the railroad tracks and the Petaluma River to a terminate at Petaluma Boulevard North. A second phase of work will construct a new interchange with the 101.		Yes	Yes	Yes	
17-09-0014	Sonoma	Farmers Lane extension between Bennett Valley Rd and Yolanda Avenue	Construct new road with travel lanes, bike lanes and sidewalks. Expand bike, pedestrian, transit, and vehicle improvements in Southeast Santa Rosa.		Yes	Yes	Yes	
17-09-0015	Sonoma	Road Diet Extension - Petaluma Boulevard South	Reduce Petaluma Boulevard from E-Street to Crystal Lane (Roundabout) from 4 through lanes to 2 through lanes and a two-way-left-turn-lane	Yes	Yes	Yes	Yes	
17-09-0016	Sonoma	SMART Petaluma Infill Station	Construct a second SMART station in the City of Petaluma including associated amenities.	Yes	Yes	Yes	Yes	
17-09-0017	Sonoma	Enhance bus service frequencies in Sonoma County	Enhance transit to achieve a 50% increase in bus service countywide - this includes Sonoma County Transit, Santa Rosa CityBus, Petaluma Transit. Project also includes BRT-like facilities in Santa Rosa.	Yes	Yes	Yes	Yes	
17-09-0018	Sonoma	SMART Rail Extension to Windsor + Environmental to Cloverdale + Bike Path	Project extends SMART from the Sonoma Airport to Windsor, implements the SMART bike path, and includes additional environmental/planning assessment of extending SMART to Healdsburg and Cloverdale.	Yes	Yes	Yes	Yes	Yes
17-10-0001	AC Transit	AC Transit Fleet Expansion and Major Corridors	Purchases rolling stock for enhanced transbay, local, or express services.		Yes	Yes	Yes	
17-10-0003	AC Transit	San Pablo Avenue BRT	Project implements BRT along San Pablo Avenue in Alameda and Contra Costa counties. This includes a bus-only lane from 20th Street to Ashby Avenue in Alameda County and from Richmond Parkway Center to Central Avenue in Contra Costa County. Project also includes enhanced real-time info, queue jump lanes where bus-only lane is not proposed, new buses and on-board equipment, and passenger amenities.		Yes	Yes	Yes	Yes
17-10-0004	AC Transit	Environmental Studies for Bay Bridge Contraflow Lane	This project includes further environmental and planning studies for the proposed Bay Bridge Contraflow lane, which would convert an EB lane on the bottom deck of the Bay Bridge into a peak-period WB lane in the AM period. This lane would likely be used by buses and carpool vehicles.					
17-10-0005	BART	BART Metro Program + Bay Fair Connector	Investments in support of the region's Sustainable Communities Strategy, including studies of a future Transbay Corridor rail crossing. Capital: Turnbacks/crossovers/tail track extensions (24th St, Lafayette, Glen Park, Millbrae, Dublin, Daly City, Richmond, South Hayward); Station capacity improvements (platform doors at 4 downtown SF stations, additional stairs/escalators/elevators Operating: 12-minute headways on all lines in the peak period (instead of current 15-minutes) Bay Fair Connector: Modify BART Bay Fair Station and approaches to add one or more additional tracks and one or more passenger platforms for efficient train service and operational flexibility. Includes station modernization, modifications to switches, tracks, crossovers, train control, signaling, traction power, etc.		Yes	Yes	Yes	Yes

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-10-0006	BART	BART Transbay Core Capacity Project	The Transbay Corridor Core Capacity Project is a multi-pronged effort to address capacity issues in the Transbay corridor and is in coordination with the BART Metro Program project. The project elements are: • Communication-based train control (CBTC) system to safely enable closer headways and allow BART to operate more frequent service (12 minute frequencies); • Expansion of the rail car fleet by 306 vehicles to add cars to existing trains and operate more frequent trains; • Added traction power substations to allow more frequent service; • Expansion of the Hayward Maintenance Complex (HMC) to provide storage and maintenance capability for the expanded fleet; • Other (Unallocated contingency) Financing cost is included in RTPID 17-10-0016.					Yes
17-10-0007	CAHSR	California HSR in the Bay Area	This project implements the segment of California High Speed Rail that is in the Bay Area.		Yes	Yes	Yes	
17-10-0008	Caltrain	Caltrain Electrification Phase 1 + CBOSS	The Peninsula Corridor Electrification Project (PCEP) includes the electrification of the Caltrain corridor between San Francisco and San Jose, the procurement of new, Electric Multiple Unit rolling stock, and an increase in the Caltrain service levels. This project also includes CBOSS, which is the Communications Based Overlay Signal System (CBOSS) Positive Train Control necessary to monitor and control train movements as well as increase safety.		Yes	Yes	Yes	Yes
17-10-0009	GGBHTD	Golden Gate Bridge Capital and Operations	This program includes operations and maintenance for the Golden Gate Bridge.					Yes
17-10-0010	GGBHTD	Bus and Ferry Service Expansion	This program includes planned bus and ferry expansion projects such as new express bus service between East Santa Rosa and San Francisco; between Richmond and San Rafael; and between Central Marin and West San Francisco. This program also includes off-site parking and an additional Larkspur Ferry crossing.		Yes	Yes	Yes	Yes
17-10-0011	Multi-County	Lifeline, Community Based Transportation Program, and Mobility Management	The Lifeline Transportation Program funds priority projects identified by residents in MTC's Communities of Concern through locally crafted Community-Based Transportation Plans. Projects can include community shuttles, transit services, streetscape improvements and bus stop amenities. Additionally, this program includes $90 million for a future mobility management program. Mobility management enables communities to monitor transportation needs and to link individuals to appropriate, cost-efficient travel options					Yes
17-10-0012	Multi-County	Means-Based Fare Study Implementation	This program would implement the recommendations from MTC's Means-Based Fare Study, which launched in 2015 to determine if a transit fare program based on household income would be feasible and effective. This study will identify possible fare structures and payment methods, eligible recipients, overall program costs, and potential technical challenges.					
17-10-0013	Multi-County	Transportation Management Systems	This program replaces and rehabilitates the physical ramp meters, induction loops and cameras used to manage traffic real-time and to collect traffic data for planning purposes. This program also maintains and replaces telecommunication networks connecting all field devices with potential to transition from copper lines to fiber optics. Related to the SHOPP program (RTPID 17-10-0025)					Yes
17-10-0014	Multi-County	Bay Trail - non toll bridge segments	This program would complete the Bay Trail along the shoreline. This program does not include the segments of the Bay Trail that would cross the Bay via toll bridges.					
17-10-0015	Multi-County	Climate Program: TDM and Emission Reduction Technology	MTC's Climate Initiatives Program includes transportation demand management (TDM) strategies, car sharing, vanpool incentives, alternative fuel/vehicle initiatives, targeted transportation alternatives, trip caps and commuter benefits ordinances.					Yes
17-10-0016	Multi-County	Cost Contingency and Financing	This program includes future financing costs for capital projects such as for BART's Transbay Core Capacity Project (RTPID 17-10-0006). It also would cover contingency for major capital projects, if needed.					Yes
17-10-0017	Multi-County	Capital Projects Debt Service	This program includes on-going payments to debt service resulting from past financing of revenue, especially for bridge toll and sales tax revenue sources.					Yes
17-10-0018	Multi-County	Goods Movement Clean Fuels and Impact Reduction Program	Program for implementing recommendations of the Freight Emission Reduction Action Plan and developing programs for impact reduction in neighborhoods with high levels of freight activity.					
17-10-0019	Multi-County	Goods Movement Technology Program	Program for deploying communications infrastructure to increase active traffic management along freight corridors and to/from the Port of Oakland					

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-10-0020	Multi-County	New/Small Starts Reserve	This is a reserve for future FTA funds (Section 5309) that are referred to as New Starts, Small Starts, or Core Capacity funding. This reserve is for future transit projects eligible for these funds and that serve the North or East Bay.					
17-10-0021	Multi-County	Priority Development Area (PDA) Planning Grants	This program includes Priority Development Area (PDA) Planning Grants and associated programs					Yes
17-10-0022	Multi-County	Local and Streets and Roads - Existing Conditions	This program includes local streets and roads maintenance throughout the region, including pavement and non-pavement assets					Yes
17-10-0023	Multi-County	Local Streets and Roads - Operations	This program includes on-going operations of the local streets and roads throughout the region					Yes
17-10-0024	Multi-County	Regional and Local Bridges - Exisiting Conditions	This program includes operations and maintenance of regional and local bridges. Golden Gate Bridge operations and maintenance is in a separate program (RTPID 17-10-0009)					Yes
17-10-0025	Multi-County	Regional State Highways - Existing Conditions	This program includes operations and maintenance of the state highways within the Bay Area. This program generally implements the SHOPP, which also includes minor mobility enhancements and management systems.					Yes
17-10-0026	Multi-County	Regional Transit Capital - Existing Conditions	This program includes capital maintenance and replacement funding for the region's transit operators. Types of projects in this category mostly include replacing vehicles and fixed-guideway assets like rail that have a direct impact on service. To a lesser extent, this program includes station upgrades and replacing other assets that do not directly affect revenue service.					Yes
17-10-0027	Multi-County	Regional Transit Operations	This program covers the costs to operate the Bay Area's existing transit service every year through the Plan horizon.					Yes
17-10-0028	Multi-County	Clipper	This program covers annual operating costs of Clipper as well as the upgrade of Clipper to Clipper 2.0.					Yes
17-10-0029	Multi-County	511 Traveler Information Program	This program covers the 511 program in the Bay Area. 511 includes a transit trip planner, real-time transit information, up-to-the minute traffic information, carpool and vanpool formation services and parking information.					Yes
17-10-0030	Multi-County	SAFE Freeway Patrol	This program covers MTC's Service Authority for Freeways and Expressways, or SAFE, program. MTC-SAFE manages the Bay Area's fleet of Freeway Service Patrol tow trucks and roadside call boxes.					
17-10-0031	Multi-County	Regional Transportation Emergency Management Program	This program enhances first responders' capabilities to clear traffic incidents and respond to major emergencies through integrated corridor management.					Yes
17-10-0032	Multi-County	Regional Rail Station Modernization and Access Improvements	This program includes station modernization and access improvements for rail station throughout the region.					Yes
17-10-0033	Multi-County	Bay Area Forward	This program includes a variety of operational and multimodal improvements, including: active traffic management - upgrades to all existing ramp meters to adaptive, implementing hard shoulder running lanes, contra-flow lanes, queue warning, and ramp modifications; arterial operations - implementation of traditional time-of-day signal timing coordination, adaptive traffic signal control systems, transit signal priority, real-time traffic monitoring devices, ped/bike detection, queue-jump lanes, etc; connected vehicles - pilot deployments of vehicle-to-infrastructure (V2I) strategies; Managed Lanes Implementation Plan - pilot express bus service for routes not currently served by operators; expands park-and-ride facilities throughout the region; and supports pilot deployment of shared-mobility solutions.	VARIES	VARIES	VARIES	Yes	Yes
17-10-0034	Multi-County	San Francisco-Oakland Bay Bridge West Span Bicycle, Pedestrian, and Maintenance Path - Environmental Only	This project continues environmental and design work on the proposed bicycle, pedestrian, and maintenance path on the west span of the Bay Bridge.					
17-10-0036	Multi-County	I-580 Access Improvements Project	Project converts the right shoulder of the Richmond-San Rafael Bridge to a third freeway lane from the Sir Francis Drake Blvd. on-ramp in Marin County to the Marine Street (Richmond Parkway/Point Richmond) exit in Contra Costa County. Project also constructs a path on the north side of I-580, including the upper deck of the Richmond-San Rafael Bridge, with concrete barriers to separate bicyclists and pedestrians from westbound freeway traffic.	Yes	Yes	Yes	Yes	Yes
17-10-0037	Multi-County	Highway 37 Improvements and Sea Level Rise Mitigation PSR	Prepare multi-county study, to PID standard, on improvements to SR 37 to accommodate future sea level rise and existing congestion					

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-10-0038	TJPA	Caltrain/HSR Downtown San Francisco Extension	The Downtown Rail Extension (DTX) will extend Caltrain commuter rail from its current terminus at Fourth and King streets and deliver the California High-Speed Rail Authority's future high-speed service to the new Transit Center. The 1.95-mile rail extension will be constructed principally below grade underneath Townsend and Second streets. The design includes an underground station at Fourth and Townsend streets, utility relocations, rail systems work, and structures for emergency exit, ventilation at six locations along the alignment, and an underground pedestrian bridge connecting the Transbay Terminal to the Embarcadero BART station. Cost includes operating expenses - capital cost is $3.999 billion		Yes	Yes	Yes	Yes
17-10-0039	TJPA	Implement Transbay Transit Center/Caltrain Downtown Extension (Phase 1 - Transbay Transit Center)	The project has 3 components: (1) new Transbay Transit Center built on the site of the former Transbay Terminal in downtown San Francisco serving 11 transportation systems; (2) extension of Caltrain commuter rail service from its current San Francisco terminus at 4th & King Streets to a new underground terminus; and (3) establishment of a Redevelopment Area Plan with related development projects.	Yes	Yes	Yes	Yes	Yes
17-10-0040	WETA	North Bay Ferry Service Enhancement	Purchase and operate 2 new ferry vessels for WETA North Bay ferry services. Project increases frequency for the Richmond-SF and Vallejo-SF ferry lines.		Yes	Yes	Yes	
17-10-0041	WETA	Central Bay Ferry Service Enhancement	Purchase and operate 2 new ferry vessels for WETA Central Bay ferry services. Project increases frequency for the Oakland-Alameda-SF ferry line and the Harbor Bay-SF ferry line.		Yes	Yes	Yes	
17-10-0042	WETA	Albany/Berkeley Ferry Terminal	Construct a new Berkeley/Albany ferry terminal, purchase 2 new ferry vessels, operate new ferry service between Berkeley/Albany and San Francisco.		Yes	Yes	Yes	Yes
17-10-0043	Multi-County	Regional Carpool Program	This program includes carpool outreach and promotion, supporting vanpools, positioning the program to rely on private sector ridematching apps, and other services. The Regional Carpool Program will support carpoolers during the launch of Bay Area Express Lanes, promote carpooling and vanpooling along high-priority congested travel corridors, and grow first/last mile carpool solutions to transit, consistent with its annual work plan. Includes MTC staff costs.					
17-10-0044	Multi-County	I-80 Express Lanes in both directions: Airbase Parkway to Red Top Road	Express Lanes on I-80 in Solano County from Red Top Road to Air Base Parkway - convert existing HOV lanes to express lanes		Yes	Yes	Yes	Yes
17-10-0045	Multi-County	I-80 Express Lanes: Westbound Bay Bridge Approaches	Express Lanes on the four westbound SFOBB bridge approaches: (1) I-80 direct connector from Powell Street to SFOBB metering lights (1.8 miles); (2) I-580 from I-80 junction to metering lights (1 mile); (3) I-880/880S direct connector from 14th Street to metering lights (1.5 miles); (4) West Grand Ave/I-880 direct connector to metering lights (0.7 miles) - convert existing HOV lanes to express lanes		Yes	Yes	Yes	
17-10-0047	Multi-County	I-680 Express Lanes: Northbound from Marina Vista to SR 242	Express Lanes on I-680 northbound from SR-242 to Marina Vista. Convert existing HOV lane to express lanes.		Yes	Yes	Yes	
17-10-0048	Multi-County	I-680 Express Lanes: Southbound from Marina Vista to Rudgear	Express Lanes on I-680 southbound from Marina Vista to Rudgear Rd. Convert existing and future SB HOV lane to express lane. Future SB HOV lane from North Main to Livorna/Rudgear is in RTPID 17-02-0022		Yes	Yes	Yes	
17-10-0049	Multi-County	I-680 Express Lanes in both directions: Livorna/Rudgear to Alcosta	Express lanes on I-680 in Contra Costa County from Alcosta Road to Livorna northbound and to Rudgear southbound - convert existing HOV lanes to express lanes	Yes	Yes	Yes	Yes	Yes
17-10-0050	Multi-County	SR-84 Express Lanes: Westbound from I-880 to Dumbarton Bridge Toll Plaza	Express Lanes on Route 84 westbound in Alameda County from I-880 through Dumbarton Bridge toll plaza - convert existing HOV lane to express lane	Yes	Yes	Yes	Yes	
17-10-0051	Multi-County	SR-92 Express Lanes: Westbound from Hesperian to San Mateo Bridge Toll Plaza	Express Lanes Route 92 WB in Alameda County from Hesperian Boulevard through San Mateo-Hayward Bridge toll plaza - convert existing HOV lane to express lane	Yes	Yes	Yes	Yes	
17-10-0052	Multi-County	I-880 Express Lanes in both directions: Hegenberger/Lewelling to SR-237	Express lane on I-880 in Alameda County from Lewelling Blvd to SR 237 Direct Connector in northbound direction, Hegenberger Rd to SR 237 Direct Connector in the southbound direction- convert existing HOV lanes to express lanes.	Yes	Yes	Yes	Yes	Yes
17-10-0053	Multi-County	I-80 Express Lanes in both directions: Carquinez Bridge to Bay Bridge	Express Lanes on westbound I-80 from Carquinez Bridge Toll Plaza to Powell St Direct Connector on eastbound I-80 from Powell St Direct Connector to Cummings Skyway. Add new express lane on eastbound I-80 from Cummings Skyway to Carquinez Bridge.		Yes	Yes	Yes	Yes
17-10-0054	Multi-County	MTC Express Lane Program Cost	Includes non-corridor activities such as centralized toll system activities, start-up program management, contingency and capitalized O&M.					Yes
17-10-0055	Multi-County	East and North Bay Express Lanes Operations and Maintenance	This program includes on-going operations and maintenance for the express lanes in the East and North Bay counties					

RTPID	County/ Sponsor	Title	Description	Complete and Operational By: 2020	2030	2040	Included in the Model?	Referenced in the 2019 TIP
17-10-0056	Multi-County	East and North Bay Express Lanes Reserve	This program includes future revenue from express lanes in the East and North Bay counties					
17-10-0057	Multi-County	I-880 Express Lanes: Northbound from Hegenberger to Lewelling and bridge improvements	I-880 Northbound express lane from Lewelling Blvd to Hegenberger Rd. and reconstruct bridges at Davis Street and Marina Boulevard - widen to add an express lane and reconstruct bridges		Yes	Yes	Yes	Yes
17-10-0058	Multi-County	I-680 Express Lanes: Northbound from SR-84 to SR-237	Express lanes on I-680 in the northbound direction from SR-84 to SR-237 which involves constructing a new lane.	Yes	Yes	Yes	Yes	Yes
17-10-0059	Multi-County	I-80 Express Lanes in both directions: Airbase Parkway to I-505	I-80 Solano Express Lanes from Air Base to I-505-widen to add an express lane in each direction	Yes	Yes	Yes	Yes	
17-10-0060	Multi-County	I-680 Express Lanes: Northbound from Rudgear to SR 242 and operational improvements	Widen I-680 for a new northbound express lane between N. Main Street and Route 242 and implement operational improvements on I-680 from Rudgear to N. Main. This project complements the NB HOV lane extension through the 680/24 interchange and from N. Main to SR 242 as well as operational improvements included in RTPIDs 17-02-0012 and 17-02-0013.		Yes	Yes	Yes	
17-10-0061	Multi-County	I-680 Express Lanes: I-80 westbound to I-680 southbound and I-680 northbound to I-80 eastbound direct connectors	Express lanes on I-680/I-80 interchange in Solano County - widen to add express lane direct connectors I-80 westbound to I-680 southbound and I-680 northbound to I-80 eastbound. This complements the larger interchange project of RTPID 17-08-0009.		Yes	Yes	Yes	
17-10-0062	Multi-County	East and North Bay Express Lanes - Environmental and Design Phases for Future Segments	This program includes environmental and design phases for future express lane segments in Alameda and Solano counties, including along I-80, I-680, and I-580					
17-10-0063	BART	BART Seismic Safety Augmentation	Alternatives analysis and design associated with the Berkeley Hills Tunnel plus design of the A-Line structural augmentation / improvement to operability standards.					Yes
17-10-0064	BART	Hayward Maintenance Complex Phase 1	This project increases maintenance capacity as part of its Fleet of the Future program as well as to support increased service for the Berryessa Extension. This Phase I project involves constructing an outdoor storage area for maintenance and engineering materials and equipment, building track access to new maintenance facilities from the existing mainline, and improving access for BART maintenance operations.					Yes

Appendix C:
Conformity Approach for MTC's Updated Long-Range Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) Memo

Approach to Transportation Conformity

Introduction

The Metropolitan Transportation Commission (MTC) prepares a transportation air quality conformity analysis when it amends or updates its long-range regional transportation plan and sustainable communities strategy (RTP/SCS). The purpose of this conformity analysis is to conform the RTP/SCS in accordance with the latest U.S. Environmental Protection Agency (EPA) transportation conformity regulations and the Bay Area Conformity State Implementation Plan (Conformity SIP), which is also known as the Bay Area Air Quality Conformity Protocol (MTC Resolution No. 3757).

In order to develop our RTP/SCS, we conduct a "call for projects" to identify candidate transportation projects/programs for consideration in the RTP/SCS. We then conduct a project performance assessment to evaluate uncommitted, regionally significant (total cost greater than $100 million), capacity increasing projects expected to open during the RTP/SCS planning horizon (2040, 24-years). This assessment discloses findings on the merits of individual projects, and is an importatnt step in identifying regional investment prorities and developing the fiscally constrained RTP/SCS.

This technical memorandum describes the approach we will take to define and model regionally significant, non-exempt projects in the RTP/SCS conformity analysis.

Technical Approach

Our general approach to the conformity analysis will be to begin with the adopted 2017 TIP, and to add the fiscally constrained, regionally significant, non-exempt RTP/SCS projects. The purpose of this approach is to:

- Streamline the conformity analysis;
- Ensure consistency with the adopted TIP;
- Assess the impacts of regionally significant, long-range projects; and,
- Provide flexibility for project delivery of non-regionally significant projects.

Regionally Significant Projects

We will assess and represent all regionally significant projects in the conformity analysis, and we will identify them as individual projects in the RTP/SCS. In terms of the RTP/SCS project preformance assessment, we have defined regionally significant as capacity increasing projects with a total cost greater than $100 million. For consistency, we will ensure that all projects subject to the project performance assessment are assessed and represented in the conformity analysis, to the extend these projects are included in the fiscally constrained adopted RTP/SCS. We have expanded the definition of regional significance for both street and highway projects and public transit projects for the conformity anlaysis.

For street and highway projects, regional significance will be based on the National Highway System (NHS) as designated by Caltrans[1]. We will designate all projects that expand or extend the NHS as regionally significant. The NHS classification consists of:

(A) The Interstate System;
(B) Principal Arterials;

[1] For more information on the NHS, visit http://dot.ca.gov/hq/tsip/hseb/nhs.html.

(C) Intermodal Connectors: Highways that provide motor vehicle access between the NHS and major intermodal transprotation facilities;
(D) STRAHNET (Strategic Highway Network): The network of highways important to U.S. strategic defense; and,
(E) STRAHNET Connectors: Connectors to major military installations.

As for public transit, we will designate all projects to expand or extend fixed guideway systems as regionally significant. We will define the term fixed guideway based on the Federal code, and we intend it to mean a public transportation facility:

(A) Using and occupying a separate right-of-way for the exclusive use of public transportation;
(B) Using rail;
(C) Using a fixed catenary system;
(D) For a passenger ferry system; or
(E) For a bus rapid transit system (BRT).

Non-Regionally Significant and Exempt Projects

We will not assess or represent exempt[2] or non-regionally significant projects in the conformtiy analysis, nor will we identify them by name in the RTP/SCS. Instead, we will use programmatic categories to represent a type or similar types of exempt projects, which will be listed in the RTP/SCS by county, transit operator or regionally.

[2] For a list of exempt project types, see Tables 1 & 2.

Table 1. Project Types Exempt from the Requirement to Determine Conformity

Project Type	RTP/SCS Programmatic Category
Safety	
Railroad/highway crossing.	Safety and Security
Projects that correct, improve, or eliminate a hazardous location or feature.	
Safer non-Federal-aid system roads.	
Shoulder improvements.	
Increasing sight distance.	
Highway Safety Improvement Program implementation.	
Traffic control devices and operating assistance other than signalization projects.	
Railroad/highway crossing warning devices.	
Guardrails, median barriers, crash cushions.	
Pavement resurfacing and/or rehabilitation.	Preservation/Rehabilitation
Pavement marking.	Safety and Security
Emergency relief (23 U.S.C. 125).	
Fencing.	Safety and Security
Skid treatments.	
Safety roadside rest areas.	
Adding medians.	
Truck climbing lanes outside the urbanized area.	
Lighting improvements.	
Widening narrow pavements or reconstructing bridges (no additional travel lanes).	
Emergency truck pullovers.	
Mass Transit	
Operating assistance to transit agencies.	Routine Operations and Maintenance
Purchase of support vehicles.	Preservation/Rehabilitation
Rehabilitation of transit vehicles.	
Purchase of office, shop, and operating equipment for existing facilities.	
Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts, etc.).	
Construction or renovation of power, signal, and communications systems.	Management Systems
Construction of small passenger shelters and information kiosks.	Minor Transit Improvements
Reconstruction or renovation of transit buildings and structures (e.g., rail or bus buildings, storage and maintenance facilities, stations, terminals, and ancillary structures).	Preservation/Rehabilitation
Rehabilitation or reconstruction of track structures, track, and trackbed in existing rights-of-way.	
Purchase of new buses and rail cars to replace existing vehicles or for minor expansions of the fleet1.	
Construction of new bus or rail storage/maintenance facilities categorically excluded in 23 CFR part 771.	
Air Quality	
Continuation of ride-sharing and van-pooling promotion activities at current levels.	Travel Demand Management
Bicycle and pedestrian facilities.	New Bicycle and Pedestrian Facilities or Multimodal Streetscape Improvements
Other	
Specific activities which do not involve or lead directly to construction, such as: • Planning and technical studies. • Grants for training and research programs. • Planning activities conducted pursuant to titles 23 and 49 U.S.C. • Federal-aid systems revisions.	Planning

Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action.	
Noise attenuation.	Minor Highway Improvements
Emergency or hardship advance land acquisitions (23 CFR 710.503).	Land Use
Acquisition of scenic easements.	Minor Highway Improvements
Plantings, landscaping, etc.	Multimodal Streetscape Improvements or Minor Highway Improvements or Minor Transit Improvements
Sign removal.	Minor Highway Improvements
Directional and informational signs.	
Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities).	
Repair of damage caused by natural disasters, civil unrest, or terrorist acts, except projects involving substantial functional, locational or capacity changes.	

Table 2. Project Types Exempt from Regional Emissions Analyses (§93.127)

Project Type	RTP/SCS Programmatic Category
Intersection channelization projects.	Intersection Improvements
Intersection signalization projects at individual intersections.	
Interchange reconfiguration projects.	Interchange Modification (no additional capacity)
Changes in vertical and horizontal alignment.	Safety and Security
Truck size and weight inspection stations.	Minor Freight Improvements
Bus terminals and transfer points.	Minor Transit Improvements

EXAMPLES:

Plan Bay Area Project Entry:

RTPID 22607 - Widen and extend major streets, and improve interchanges in east Contra Costa County

There are four projects being implemented through the Draft 2017 TIP (June 17, 2016) referencing RTPID 22607, see below.

Examples 1 & 2

Roadway Projects

Contra Costa County

Local Road Projects

TIP ID: **CC-070008** County: Contra Costa System: Local Road RTP ID: 22607 CTIPS ID: 20600003739
Sponsor: Antioch Implementing Agency: Antioch
Project Name: Laurel Road Extension
Description: Antioch: On Laurel Road between Hillcrest and SR4 Bypass; Construct new 4 lane divided extension.
Air Quality Exempt Code: NON-EXEMPT
Route: Post Mile From: Post Mile To: Toll Credits:

All funding in thousands of dollars

Phase	Fund Source	Prior Years	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	Future Years	Total Programmed
ENV	OTHER LOCAL	$ 300						$ 300
PSE	OTHER LOCAL	$ 600						$ 600
ROW	OTHER LOCAL		$ 50					$ 50
CON	RTP-LRP						$ 5,000	$ 5,000
Total Programmed Funding:		$ 900	$ 50				$ 5,000	$ 5,950

TIP ID: **CC-070009** County: Contra Costa System: Local Road RTP ID: 22607 CTIPS ID: 20600003740
Sponsor: Antioch Implementing Agency: Antioch
Project Name: Slatten Ranch Road Extension
Description: Antioch: On Slatten Ranch Road between Hillcrest Avenue to Wicklow Road; Construct new 4 lane road.
Air Quality Exempt Code: NON-EXEMPT
Route: 4 Post Mile From: Post Mile To: Toll Credits:

All funding in thousands of dollars

Phase	Fund Source	Prior Years	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	Future Years	Total Programmed
ENV	OTHER LOCAL	$ 50						$ 50
PSE	OTHER LOCAL	$ 300						$ 300
CON	OTHER LOCAL				$ 1,000			$ 1,000
Total Programmed Funding:		$ 350			$ 1,000			$ 1,350

Example 3

TIP ID: **CC-070078** County: Contra Costa System: Local Road RTP ID: 22607 CTIPS ID: 20600004007
Sponsor: Brentwood Implementing Agency: Brentwood
Project Name: John Muir Parkway Extension: Ph. II
Description: Contra Costa County: John Muir Parkway northerly from Briones Valley Rd to a logical termini on Concord Avenue: Extend roadway(1 lane + 1 bike lane per direction).
Air Quality Exempt Code: NON-EXEMPT
Route: Post Mile From: Post Mile To: Toll Credits:

All funding in thousands of dollars

Phase	Fund Source	Prior Years	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	Future Years	Total Programmed
ENV	OTHER LOCAL	$ 150						$ 150
PSE	OTHER LOCAL	$ 255						$ 255
CON	EARMARK	$ 735						$ 735
CON	OTHER LOCAL	$ 3,760						$ 3,760
Total Programmed Funding:		$ 4,900						$ 4,900

Example 4

TIP ID: **CC-070081** County: Contra Costa System: Local Road RTP ID: 22607 CTIPS ID: 20600004010
Sponsor: Contra Costa County Implementing Agency: Contra Costa County
Project Name: Byron Highway - Vasco Road Connection
Description: Contra Costa County: between Byron Highway and Vasco Road: Construct an east-west connection road
Air Quality Exempt Code: NON-EXEMPT
Route: Post Mile From: Post Mile To: Toll Credits:

All funding in thousands of dollars

Phase	Fund Source	Prior Years	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	Future Years	Total Programmed
PE	OTHER LOCAL		$ 500					$ 500
ROW	OTHER LOCAL			$ 450				$ 450
CON	RTP-LRP						$ 3,700	$ 3,700
Total Programmed Funding:			$ 500	$ 450			$ 3,700	$ 4,650

Appendix D
Travel Modeling Report (Plan Bay Area 2040: Final Supplemental Report)



TRAVEL MODELING REPORT



Plan BayArea 2040

FINAL SUPPLEMENTAL REPORT

Metropolitan Transportation Commission

Association of Bay Area Governments

JULY 2017



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Plan Bay Area 2040:
Final Travel Modeling Report

July 2017

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Executive Summary

This supplementary report presents selected technical results from the analysis of alternatives performed in support of the Metropolitan Transportation Commission's (MTC's) and the Association of Bay Area Governments' (ABAG's) Plan Bay Area 2040 environmental impact report (EIR). A brief overview of the technical methods used in the analysis, as well as a brief description of the key assumptions made for each alternative, precede the presentation of results.

Chapter 1: Analytical Tools

MTC uses an analytical tool known as a travel model (also known as a travel demand model or travel forecasting model) to first describe the reaction of travelers to transportation projects and policies and then to quantify the impact of cumulative individual decisions on the Bay Area's transportation networks and environment. MTC's travel model is briefly described below, along with two supporting tools: a population synthesizer and a vehicle emissions model.

Population Synthesizer

MTC's travel model is an agent-based simulation. The "agents" in our case are individual households, further described by the people who form each household. In this way, the travel model attempts to simulate the behavior of the individuals and the households who carry out their daily activities in a setting described by the input land development patterns and input transportation projects and policies. In order to use this type of simulation, each agent must be characterized in a fair amount of detail.

Software programs that create lists of households and persons for travel model simulations are known as population synthesizers. MTC's population synthesizer attempts to locate households described in the 2000 Decennial Census Public Micro-sample (PUMS) data (i.e., those who responded to the old "long forms" used by the Census Bureau to collect detailed household information) in such a way that when looking at the population along specific dimensions spatially (at a level of detail below which the PUMS data is reported), the aggregate sums more or less match those predicted by other Census summary tables (when synthesizing historical populations) or the land use projections made by our land use modeling tools/procedures (when forecasting populations). For example, if our land use tools project that 60 households containing 100 workers and 45 children will live in spatial unit X in the year 2035, the population synthesizer will locate 60 PUMS households in spatial unit X and will select households in such a way that, when summing across households, the number of workers is close to 100 and the number of children is close to 45.

MTC's population synthesizer "controls" (i.e., minimizes the discrepancy between the synthetic population results and the historical Census results or the land use forecasts) along the following dimensions:

1. Household "type", i.e. individual household unit or non-institutionalized group quarters (e.g., college dorm);
2. Household income category;
3. Age of the head of household;
4. Number of people in the household;
5. Number of children under age 17 in the household;
6. Number of employees in the household; and,
7. Number of units in the household's physical dwelling (one or more than one, as in an apartment building).

Travel Model

Travel models are frequently updated. As such, a bit of detail as to which version of a given travel model is used for a given analysis is useful. The current analysis uses MTC's *Travel Model One* (version 0.6),

released in July 2016, calibrated to year 2000 conditions and validated against year 2000, 2005, 2010 and 2015 conditions[1].

Travel Model One is of the so-called "activity-based" archetype. The model is a partial agent-based simulation in which the agents are the households and people who reside in the Bay Area. The simulation is partial because it does not include the simulation of individual behavior of passenger, commercial, and transit vehicles on roadways and transit facilities (though the model system does simulate the behavior of aggregations of vehicles and transit riders). In regional planning work, the travel model is used to simulate a typical weekday – when school is in session, the weather is pleasant, and no major accidents or incidents disrupt the transportation system.

The model system operates on a synthetic population that includes households and people representing each actual household and person in the nine-county Bay Area – in both historical and prospective years. Travelers move through a space segmented into "travel analysis zones"[2] and, in so doing, use the transportation system. The model system simulates a series of travel-related choices for each household and for each person within each household. These choices[3] are as follows (organized sequentially):

1. Usual workplace and school location – Each worker, student, and working student in the synthetic population selects a travel analysis zone in which to work or attend school (or, for working students, one zone to work and another in which to attend school).
2. Household automobile ownership – Each household, given its location and socio-demographics, as well as each member's work and/or school locations (i.e., given the preceding simulation results), decides how many vehicles to own.
3. Daily activity pattern – Each household chooses the daily activity pattern of each household member, the choices being (a) go to work or school, (b) leave the house, but not for work or school, or (c) stay at home.
4. Work/school tour[4] frequency and scheduling – Each worker, student, and working student decides how many round-trips they will make to work and/or school and then schedules a time to leave for, as well as return home from, work and/or school.
5. Joint non-mandatory[5] tour frequency, party size, participation, destination, and scheduling – Each household selects the number and type (e.g., to eat, to visit friends) of "joint" (defined as two or more members of the same household traveling together for the duration of the tour) non-mandatory (for purposes other than work or school) round trips in which to engage, then

[1] Additional information is available here: http://analytics.mtc.ca.gov/foswiki/Main/Development.
[2] An interactive map of these geographies is available here: http://analytics.mtc.ca.gov/foswiki/Main/TravelModelOneGeographies.
[3] These "choices", which often are not really choices at all (the term is part of travel model jargon), are simulated in a random utility framework – background information is available here: https://en.wikipedia.org/wiki/Choice_modelling.
[4] A "tour" is defined as a round trip from and back to either home or the workplace.
[5] Travel modeling practice use the term "mandatory" to describe work and school travel and "non-mandatory" to refer to other types of travel (e.g., to the grocery store); we use this jargon as well to communicate efficiently with others in our space. We neither assume nor believe that all non-work/school-related travel is non-mandatory or optional.

determines which members of the household will participate, where, and at what time the tour (i.e., the time leaving and the time returning home) will occur.

6. Non-mandatory tour frequency, destination, and scheduling – Each person determines the number and type of non-mandatory (e.g., to eat, to shop) round trips to engage in during the model day, where to engage in these tours, and at what time to leave and return home.
7. Tour travel mode – The tour-level travel mode choice (e.g., drive alone, walk, take transit) decision is simulated separately for each tour and represents the best mode of travel for the round trip.
8. Stop frequency and location – Each traveler or group of travelers (for joint travel) decide whether to make a stop on an outbound (from home) or inbound (to home) leg of a travel tour, and if a stop is to be made, where the stop is made, all given the round trip tour mode choice decision.
9. Trip travel model – A trip is a portion of a tour, either from the tour origin to the tour destination, the tour origin to a stop, a stop to another stop, or a stop to a tour destination. A separate mode choice decision is simulated for each trip; this decision is made with awareness of the prior tour mode choice decision.
10. Assignment – Vehicle trips for each synthetic traveler are aggregated into time-of-day-specific matrices (i.e., tables of trips segmented by origin and destination) that are assigned via the standard static user equilibrium procedures to the highway network. Transit trips are assigned to time-of-day-specific transit networks.

The *Travel Model One* system inherits without significant modification the representation of interregional and commercial vehicle travel from MTC's previous travel model system (commonly referred to as BAYCAST or BAYCAST-90). Specifically, commercial vehicle demand is represented using methods developed for Caltrans and Alameda County as part of the Interstate 880 Intermodal Corridor Study conducted in 1982 and the Quick Response Freight Manual developed by the United States Department of Transportation in 1996. When combined, these methods estimate four classes of commercial travel, specifically: "very small" trucks, which are two-axle/four-tire vehicles; "small" trucks, which are two-axle/six-tire vehicles; "medium" trucks, which are three-axle vehicles; and, "combination" trucks, which are truck/trailer combinations with four or more axles.

Reconciling travel demand with available transportation supply is particularly difficult near the boundaries of planning regions because little is assumed to be known (in deference to efficiency – the model must have boundaries) about the land development patterns – the primary driver of demand – or supply details beyond these boundaries. The typical approach to representing this interregional travel is to first estimate the demand at each location where a major transportation facility intersects the boundary and to then distribute this demand to locations either within the planning region (which results in so-called "internal/external" travel) or to other boundary locations ("external/external" travel). MTC uses this typical approach and informs the process with Census journey-to-work flows (from the 2000 Decennial Census, specifically), which are allocated via simple method to represent flows to and from MTC's travel analysis zones and 21 boundary locations, as well as the flows between boundary locations.

The travel of air passengers to and from the Bay Area's airports is represented with static (across alternatives), year-specific vehicle trip tables. These trip tables are based on air passenger survey data

collected in 2006 and planning information developed as part of MTC's Regional Airport Planning Study[6]. Similarly, the travel of high speed rail passengers to and from the Bay Area's expected high speed rail stations is represented with static (across alternatives), year-specific vehicle trip tables. The high speed rail demand estimates are derived from the California High Speed Rail Authority's 2016 Business Plan[7].

Vehicle Emissions Model

The MTC travel model generates spatially- and temporally-specific estimates of vehicle usage and speed for a typical weekday. This information is then input into an emissions model to estimate emitted criteria pollutants as well as emitted carbon dioxide (used as a proxy for all greenhouse gases). For the current analysis, MTC used the EMFAC 2014 version of the California Air Resources Board emissions factor software[8].

Chapter 2: Input Assumptions

In total, 12 scenarios were simulated. Selected results are presented and discussed in the remainder of the document. Four *categories* of scenarios are included, as follows: historical, no action, planned action, and alternative actions. Historical scenarios are labeled by their year and include Year 2005 and Year 2015. The no action alternative is referred to as "No Project"; No Project simulations were performed for a 2040 forecast year. The planned action is referred to as the "Proposed Plan" (often abbreviated as "Plan") alternative; Proposed Plan Simulations were performed for 2020, 2030, 2035, and 2040. Three separate alternative scenarios are included, and are labeled "Main Streets", "Big Cities", and "Environment, Equity, and Jobs" ("EEJ"). Year 2040 simulations were conducted for each of these alternatives. The various simulation years serve different purposes: historical years demonstrate the model's ability to adequately replicate reality[9] and provide the reader data for a familiar scenario; the California Air Resources Board established greenhouse gas targets for 2020 and 2035; the transportation plan, as guided by federal regulations, extends to 2040; and, air quality regulations require a 2030 simulation.

The above scenarios differ across four dimensions, namely: land use, roadway supply, transit supply, and prices. By land use, we mean the locations of households and jobs (of different types). Roadway supply is the physical network upon which automobiles, trucks, transit vehicles, bicycles, and pedestrians travel. Transit supply refers to the facilities upon which public transit vehicles travel (the roadway, along rail lines, ferry routes, and other dedicated infrastructure), as well as the stop locations, routes, and frequency of transit service. Prices include the monetary fees users are charged to board transit vehicles, cross bridges, operate and park private vehicles, and use express (also known as high occupancy toll) lanes.

In the remainder of this chapter, each of the six scenarios (the rows in Table 1) are discussed, organized by the above four dimensions; additional notes on "other assumptions" concludes the section. This organization should allow the reader to compare the input assumptions across scenarios.

---

[6] Additional information is available here: http://mtc.ca.gov/our-work/plans-projects/economic-vitality/regional-airport-plan.
[7] Additional information is available here: http://hsr.ca.gov/docs/about/business_plans/2016_BusinessPlan.pdf.
[8] Additional information is available here: http://www.arb.ca.gov/msei/msei.htm.
[9] Details of this "validation" process are available here: http://analytics.mtc.ca.gov/foswiki/Main/Development.

Table 1: Simulations by Year and Alternative

Alternative	*Simulation Year*					
	2005	*2015*	*2020*	*2030*	*2035*	*2040*
Historical	✓	✓				
No Project			✓		✓	✓
Proposed Plan			✓	✓	✓	✓
Main Streets			✓		✓	✓
Big Cities			✓		✓	✓
Environment, Equity, and Jobs			✓		✓	✓

Land Use

Additional information regarding the land development patterns is available in the companion supplementary report, *Summary of Predicted Land Use Responses*. Here, we provide a handful of details regarding the transformation of these land use inputs into the information needed by the travel model.

Prior to executing the travel model, the land development inputs provided by ABAG (control totals) and the UrbanSim model (distribution details) are run through the MTC population synthesizer as described above. The journey from control totals through UrbanSim and through the population synthesizer introduces very minor inconsistencies between the ABAG-estimated regional control totals, which are carried through UrbanSim, and the totals implied by the synthetic population. These inconsistencies are presented in Table 2.

Table 2: Demographic Statistics of Control and Simulated Populations

Alternative	*Year*	*Households*				*Population*		
		ABAG Results		*Synthetic Population*	*Percent Difference*[†]	*ABAG Results*	*Synthetic Population*	*Percent Difference*
		Households	*Group Quarters*					
Historical	2015	2,760,000	133,000	2,875,000	-0.6%	7,571,000	7,571,000	0.0%
No Project	2040	3,427,000	176,000	3,579,000	-0.7%	9,628,000	9,567,000	-0.6%
Proposed Plan	2040	3,427,000	176,000	3,579,000	-0.7%	9,628,000	9,561,000	-0.7%
Main Streets	2040	3,427,000	176,000	3,579,000	-0.7%	9,628,000	9,563,000	-0.7%
Big Cities	2040	3,427,000	176,000	3,579,000	-0.7%	9,628,000	9,554,000	-0.8%
EEJ	2040	3,427,000	176,000	3,579,000	-0.7%	9,628,000	9,559,000	-0.7%

† – Individuals living in group quarters are considered individual households in the synthetic population and, subsequently, the travel model.

A key function of the population synthesizer is to identify each member of the representative populous with one of eight "person type" labels. Each person in the synthetic population is identified as a full-time worker, part-time worker, college student, non-working adult, retired person, driving-age student, non-driving-age student, or child too young for school. The travel model relies on these person type classifications, along with myriad other variables, to predict behavior.

Figure 1 shows the distribution of person types for the historical scenarios and the Proposed Plan alternative, from years 2005 to 2040. Interesting aspects of these distributions, which are driven by assumptions embedded in ABAG's regional forecast, are as follows:

- The share of full-time workers peaks in 2015;
- The share of retired workers steadily increases from 2005 to 2040; and,
- The person type shares are effectively identical.

Figure 2 shows the distribution of person types across the five forecast year alternatives for year 2040.

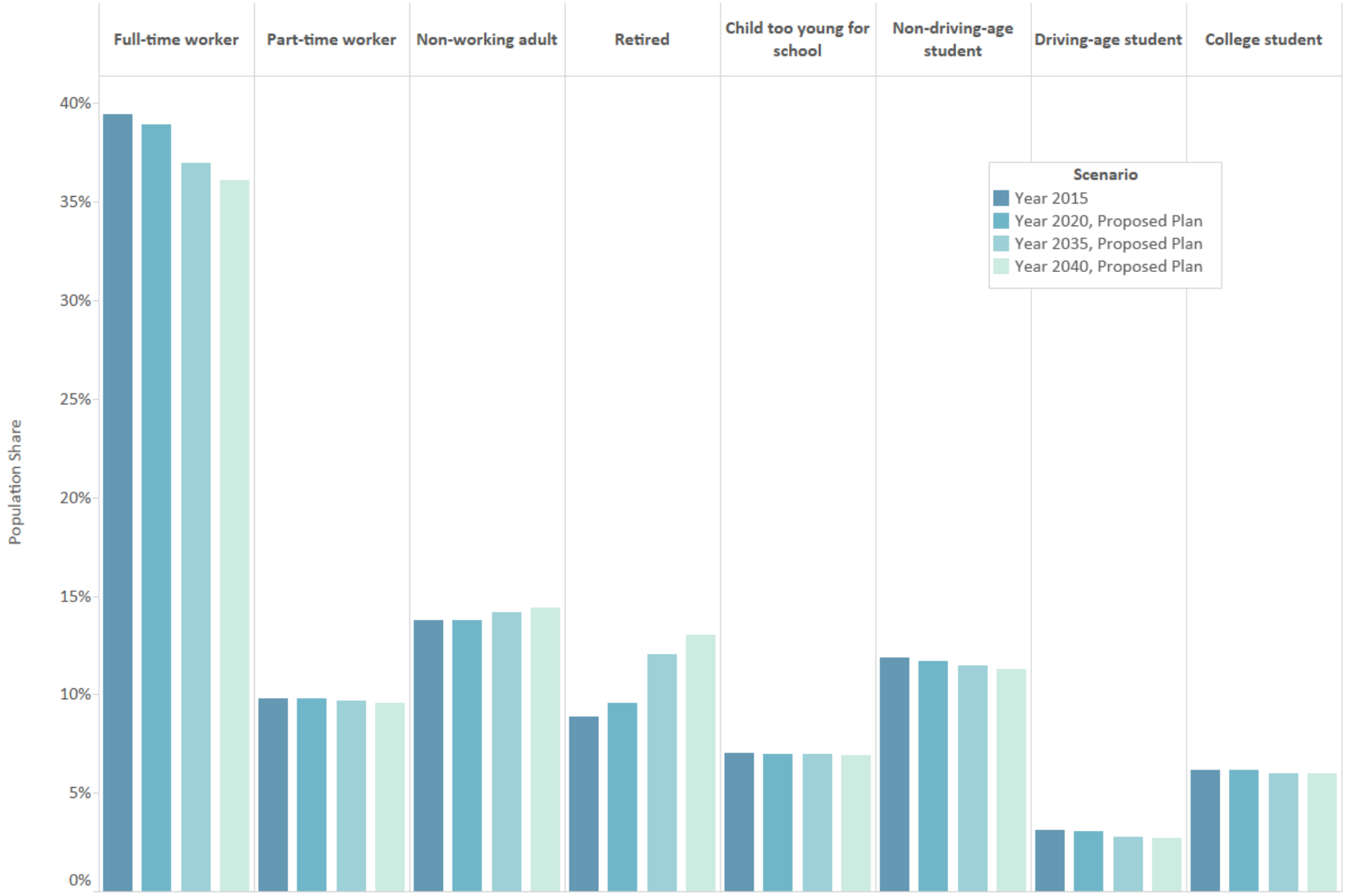

Figure 1: Historical and Forecasted Person Type Distributions for Proposed Plan Alternative

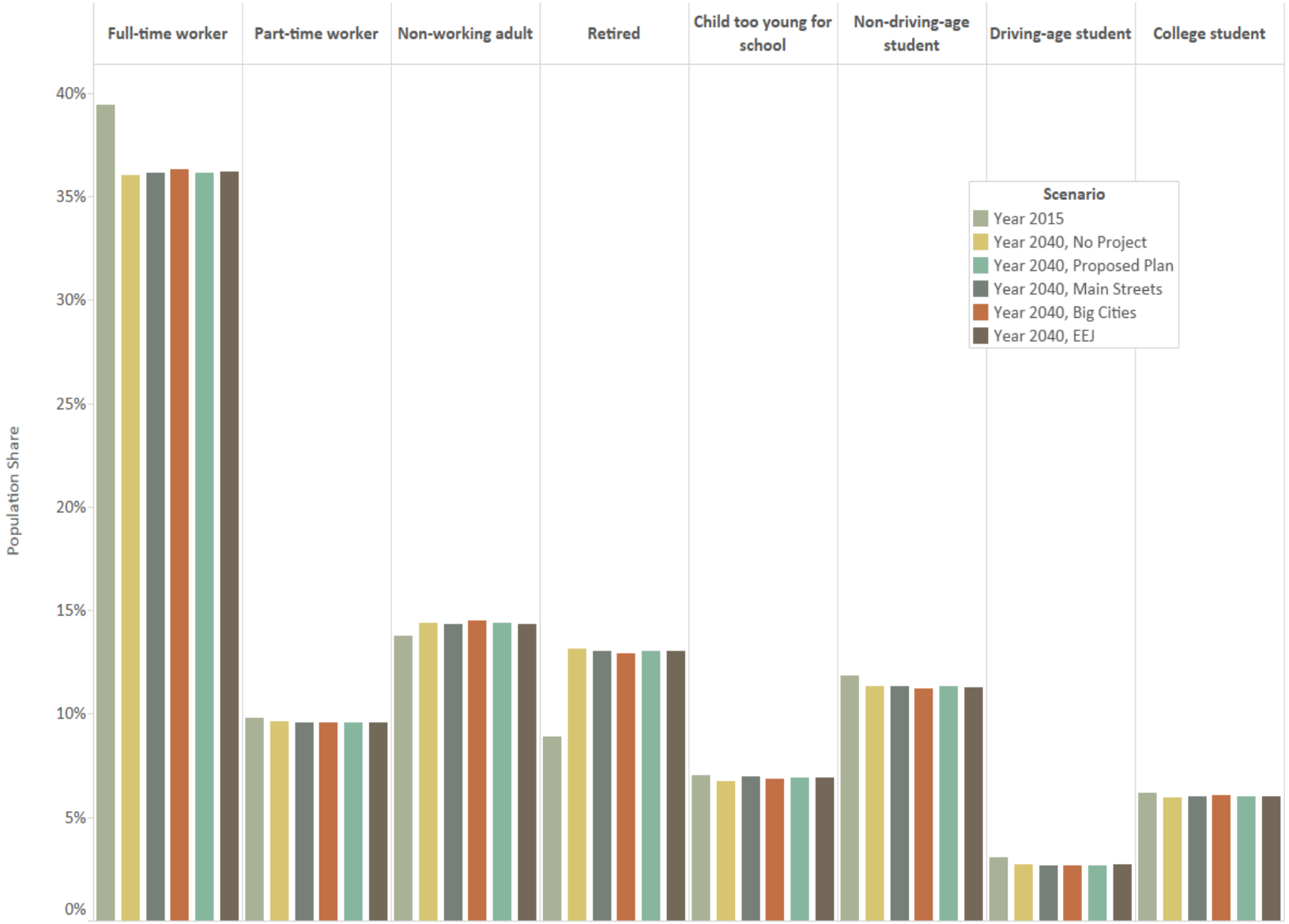

Figure 2: Year 2040 Person Type Distributions

Roadway Supply

The historical scenarios for 2005 and 2015 have a representation of roadways that reflect infrastructure that was in place in 2005 and 2015.

The No Project alternative includes projects that are either in place in 2016 or are "committed" per MTC policy. The Proposed Plan alternative includes the roadway projects included in the transportation investment strategy, which is discussed in detail elsewhere.

The Main Streets and Big Cities alternative roadway projects were detailed to MTC's Planning Committee in May 2016[10].

The Environment, Equity, and Jobs alternative starts with the No Project alternative roadway network and then adds the Proposed Plan alternative's bus rapid transit (BRT) infrastructure and the Columbus Day Initiative intelligent transportation systems scheme. No other uncommitted roadway projects are included in the EEJ alternative.

A graphical depiction of the changes in the roadway network is presented in Figure 3 below. The chart shows the change in lane-miles (e.g., a one-mile segment of a four-lane road is four lane-miles) available to automobiles in year 2040 relative to year 2015. San Francisco County shows a decrease in lane-miles, s some roadway segments are converted to dedicated bus ways. Figure 4 shows the change in lane-miles over time for the Proposed Plan alternative.

[10] For additional details, please see https://mtc.legistar.com/View.ashx?M=F&ID=4446887&GUID=31890CF7-8A5A-4A54-BA45-4466DEF7831B.

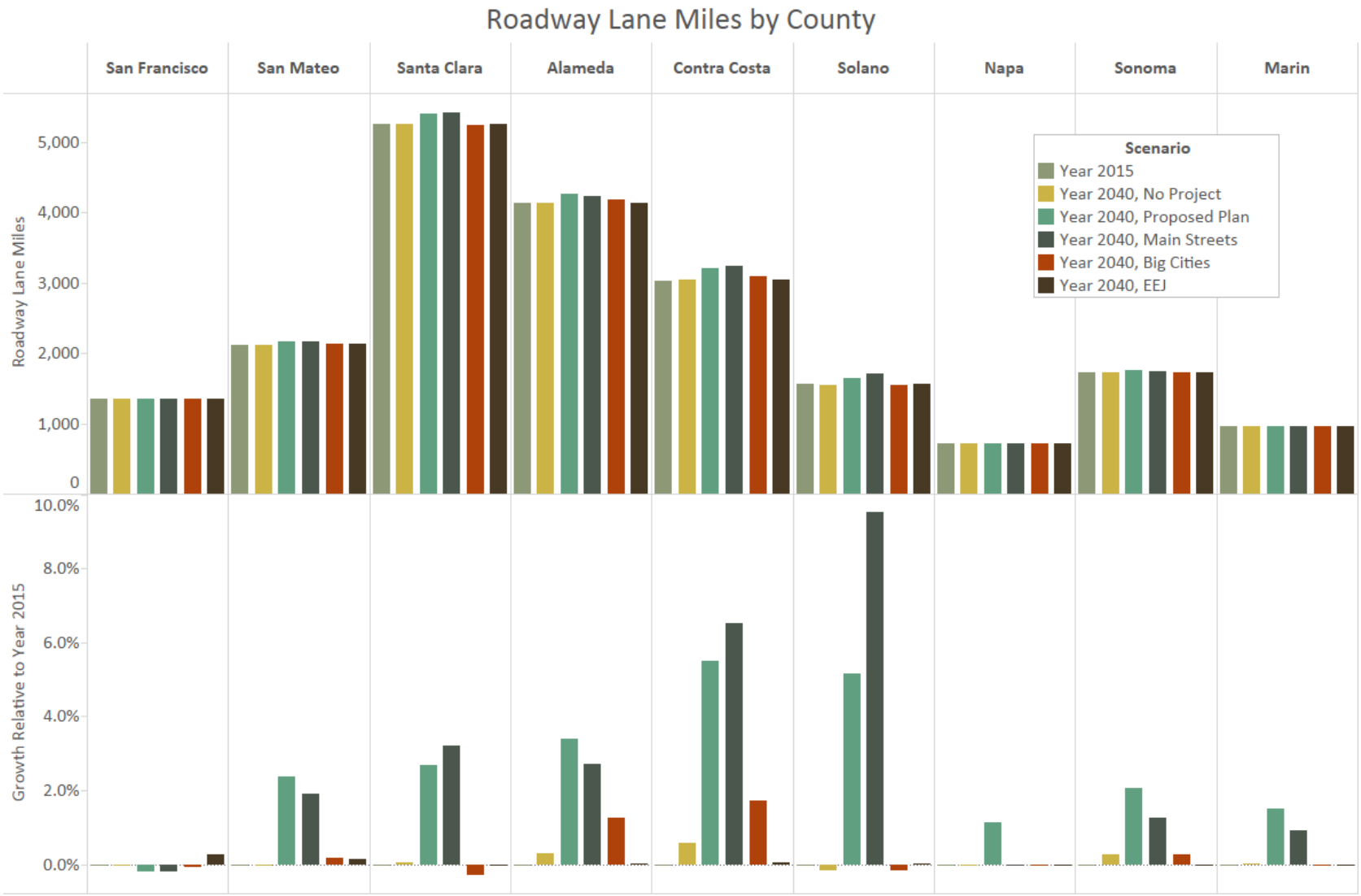

Figure 3: Year 2040 Growth in Roadway Lane Miles Available to Automobiles Relative to 2015

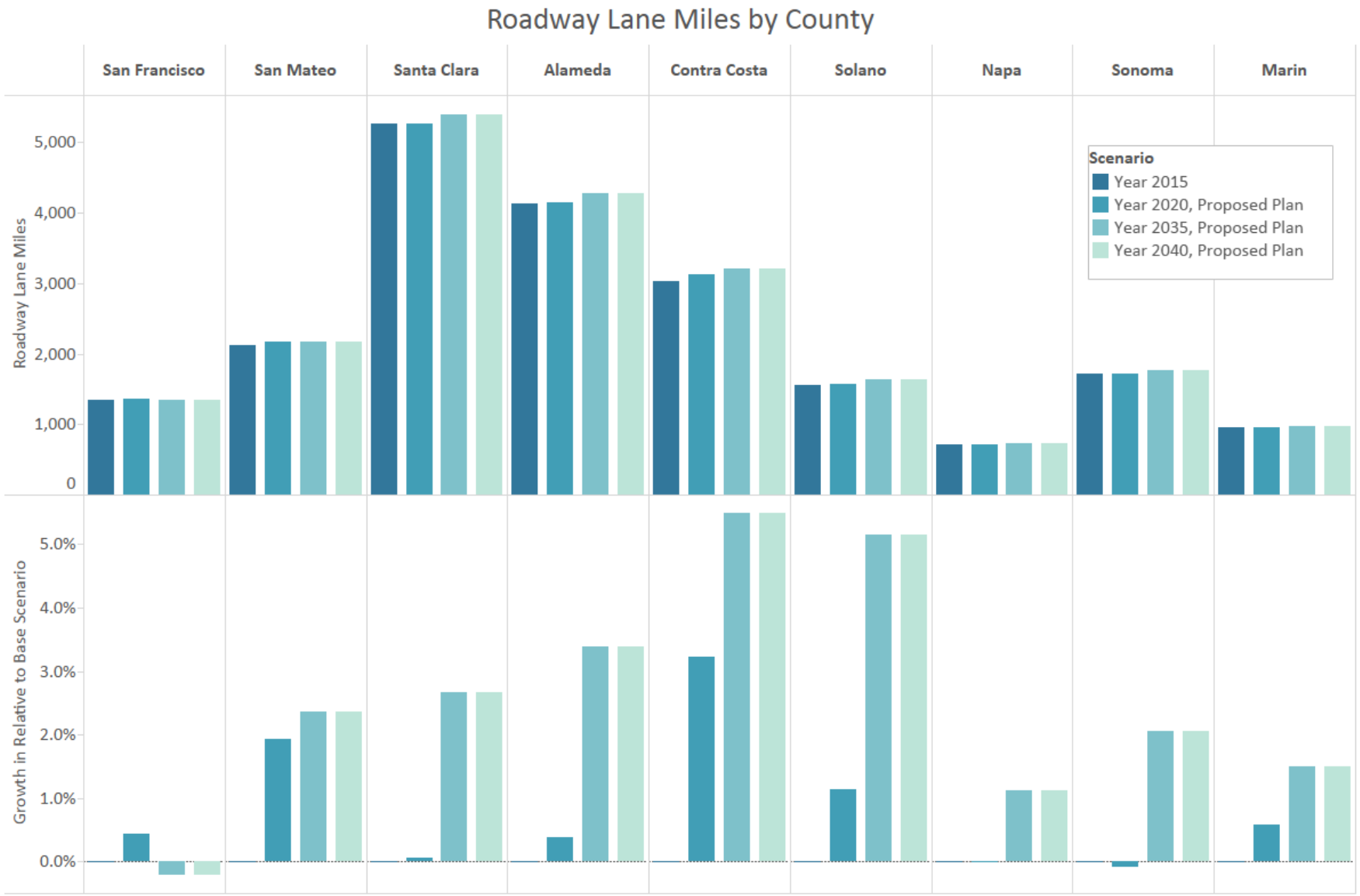

Figure 4: Growth in Roadway Lane Miles Available to Automobiles for Proposed Plan Alternative

Transit Supply

The historical scenarios for 2005 and 2015 reflect service in these years.

The No Project alternative begins with 2015 service levels and adds projects that are committed per MTC policy. The Proposed Plan alternative begins with 2015 service levels and adds both the committed projects as well as those included in the transportation investment strategy.

The Main Streets and Big Cities alternative transit projects were detailed to MTC's Planning Committee in May 2016[11].

The Environment, Equity and Jobs alternative begins with the Proposed Plan transit network and increases transit service frequency in some suburban areas.

A graphical depiction of these changes in transit service is presented in Figure 5 below. The chart shows the change in seat-miles (e.g., a one-mile segment of a bus with 40 seats is 40 seat-miles) in year 2040 compared to year 2015 across alternatives. Figure 6 shows the change in seat-miles over time for the Proposed Plan Alternative.

[11] Ibid.

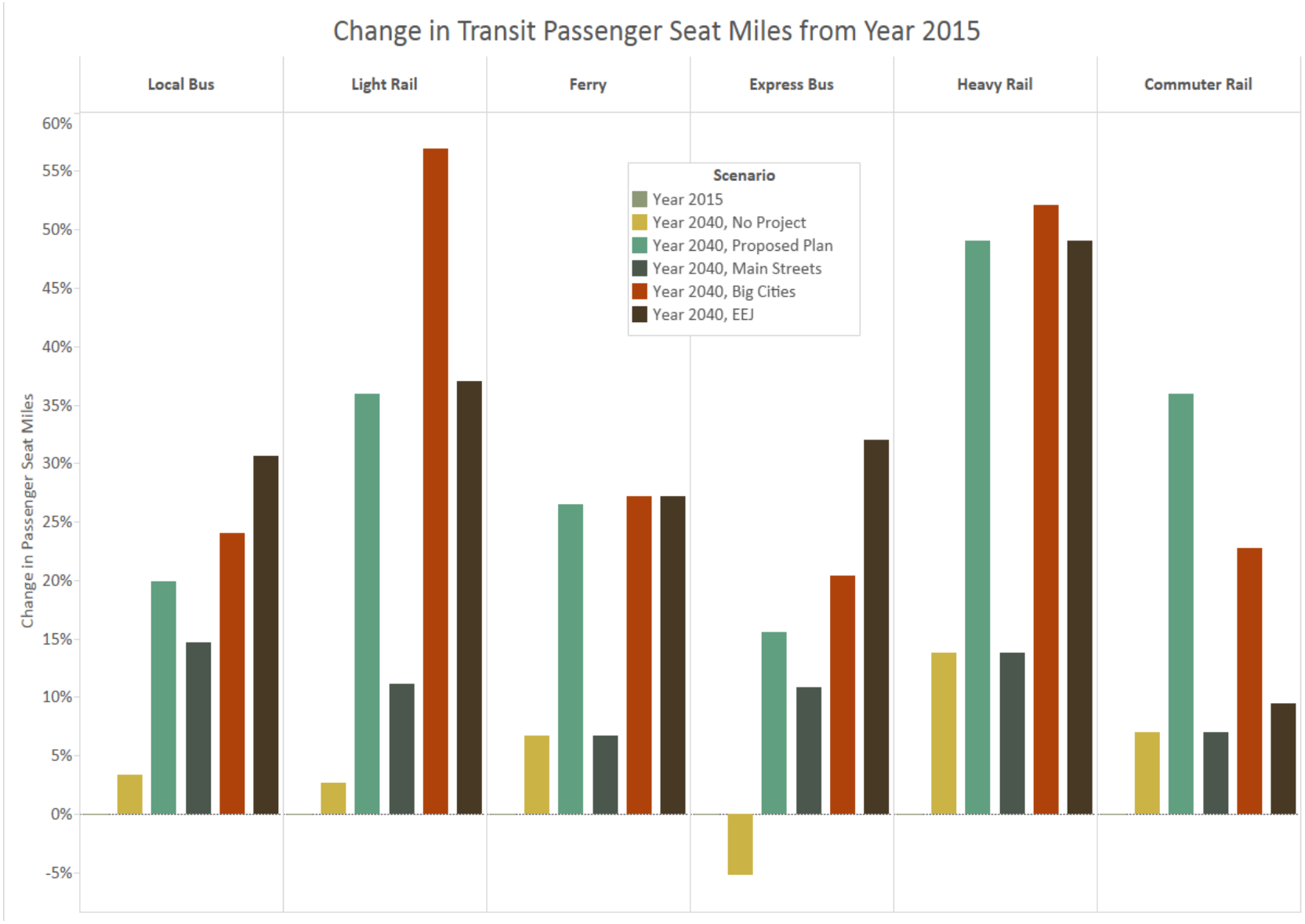

Figure 5: Year 2040 Growth in Transit Passenger Seat Miles from 2015

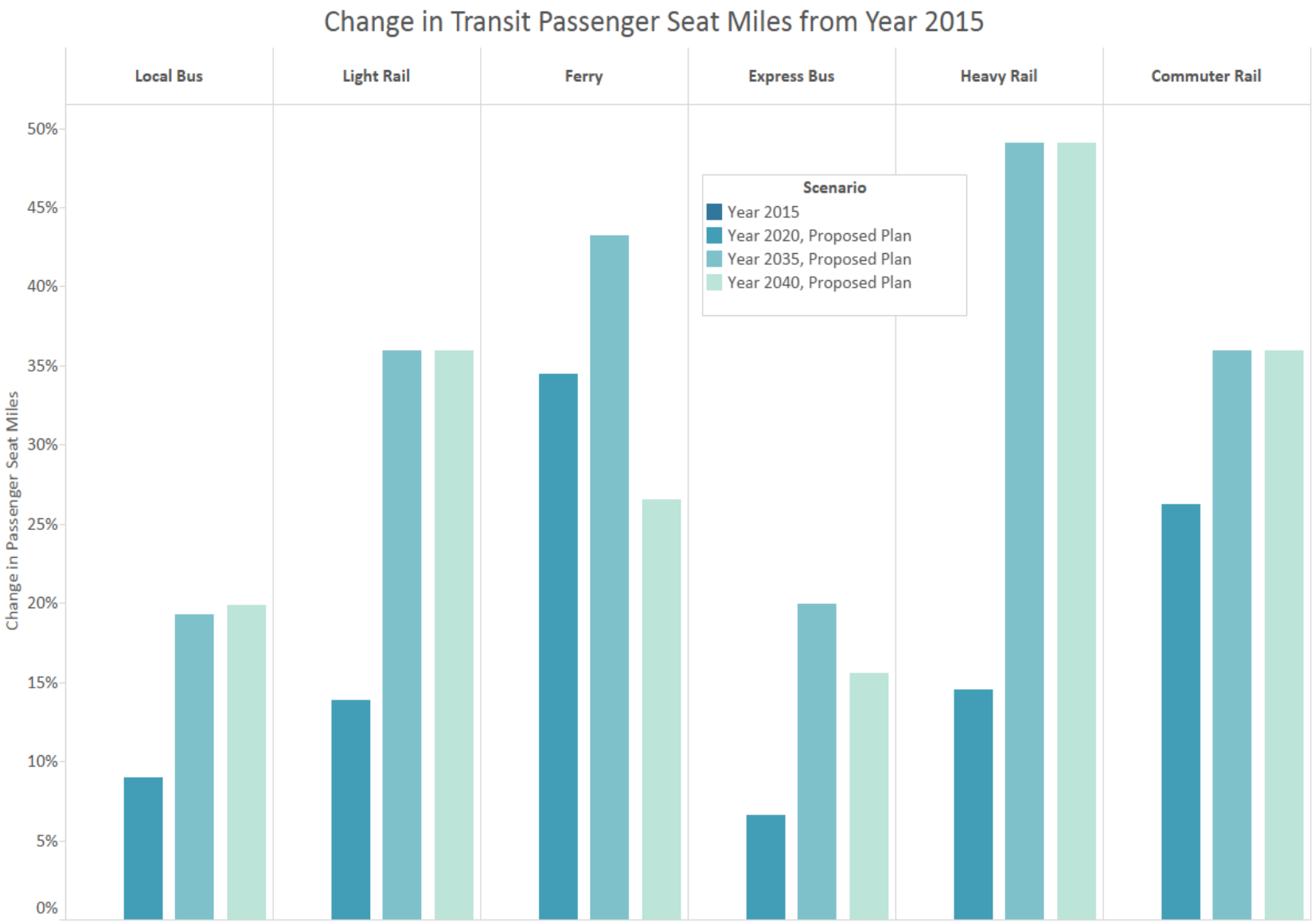

Figure 6: Year 2040 Growth in Transit Passenger Seat Miles from 2015 for Proposed Plan

Prices

The travel model system includes probabilistic models in which travelers select the best travel mode (e.g., automobile, transit, bicycle, etc.) for each of their daily tours (round trips) and trips. One consideration of this choice is the trade-off between saving time and saving money. For example, a traveler may have two realistic options for traveling to work: (i) driving, which would take 40 minutes (round trip) and cost $10 for parking; or, (ii) taking transit, which would take 90 minutes (round trip) and cost $4 in bus fare ($2 each way). The mode choice model structure, as estimated in the early 2000s, includes coefficients that dictate how different travelers in different contexts make decisions regarding saving time versus saving money. These model coefficients value time in units consistent with year 2000 dollars, i.e. the model itself – not an exogenous input to the model – values time relative to costs in year 2000 dollars. Because re-estimating model coefficients is "expensive" (in terms of staff time and/or consultant resources), it is done infrequently, which, in effect, "locks in" the dollar year in which prices are input to the travel model. To use the model's coefficients properly, all prices must be input in year 2000 dollars. In the remainder of this document, prices are presented both in (close to) current year dollars, to give the reader an intuitive sense as to the scale of the input prices, as well as year 2000 dollars, which are the units required by the model coefficients.

Six different types of prices are explicitly represented in the travel model: (i) bridge tolls; (ii) express lane tolls; (iii) transit fares; (iv) parking fees; (v) perceived automobile operating cost and gas taxes; and (vi) cordon tolls. A brief discussion on how the model determines each synthetic traveler's value of time is presented next, after which the input assumptions across each of these price categories are presented.

Value of Time

The model coefficients that link the value of time with the other components of decision utilities remain constant between the baseline and forecast years, with the one exception of the coefficients on travel cost. These coefficients are a function of each synthetic individual's value of time, a number drawn, in both the historical and forecast year simulations, from one of four log-normal distributions (see Figure 7). The means of these distributions are a function of each traveler's household income. The value of time for children in a household is equal to two-thirds that of an adult. The means and shapes of these distributions remain constant across forecast years and scenarios.

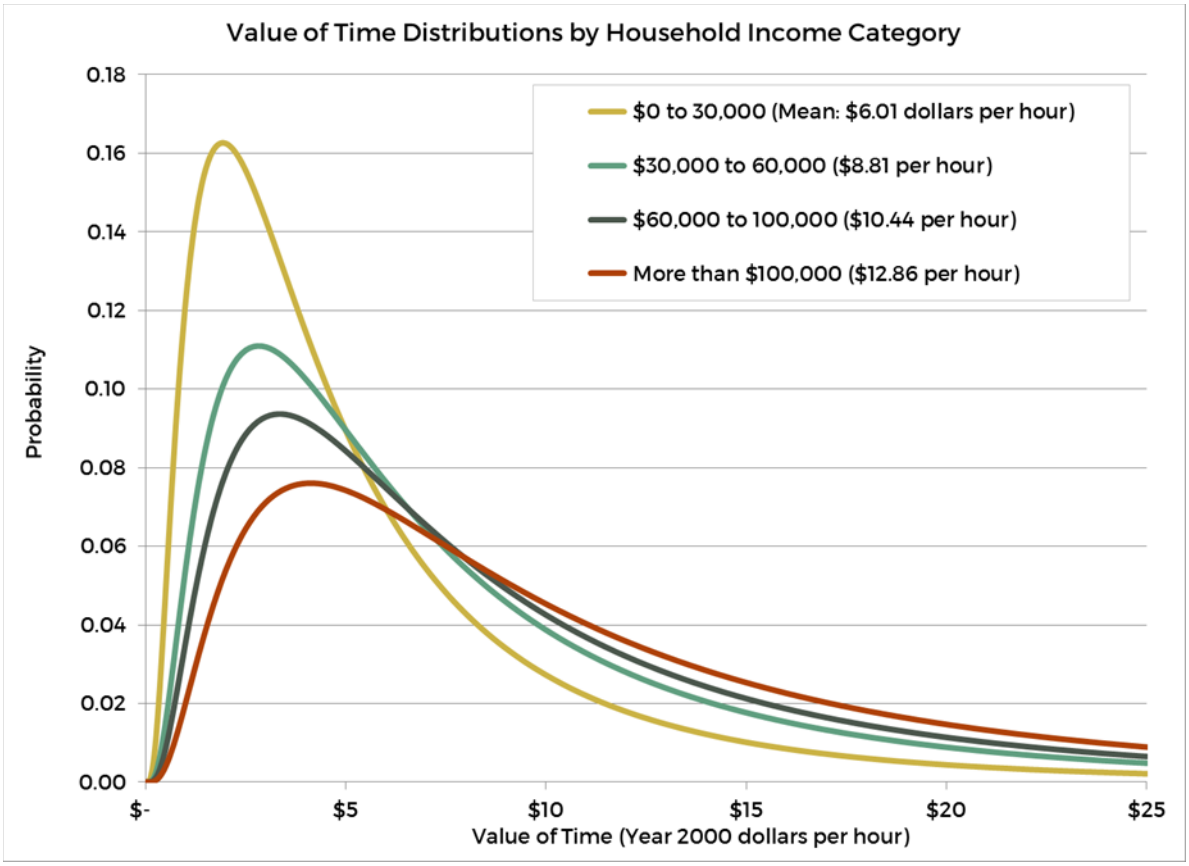

Figure 7: Value of Time Distribution by Household Income

Bridge Tolls

The bridge tolls assumed in the year 2015 baseline scenario are shown below in Table 3. Please note that Table 3 includes the price of tolls in year 2015 expressed in both year 2000 and year 2015 dollars.

The No Project alternative assumes the toll schedule in place as of July 1, 2012[12]. This schedule is consistent with the year 2015 tolls presented in Table 3.

The bridge tolls assumed in the Proposed Plan, Main Streets, Big Cities and Equity, Environment, and Jobs alternatives are summarized in Table 4. Again, the price of tolls in year 2040 are expressed in year 2000 and year 2015 dollars.

[12] Complete details are available here: http://bata.mtc.ca.gov/getting-around#/.

Table 3: Year 2015 Common Peak Period Bridge Tolls†

Bridge	*2-axle, single occupant toll*		*2-axle, carpool* toll*	
	$2000	*$2015*	*$2000*	*$2015*
San Francisco/Oakland Bay Bridge	$4.82	$6.00	$2.01	$2.50
Antioch Bridge	$4.02	$5.00	$2.01	$2.50
Benicia/Martinez Bridge	$4.02	$5.00	$2.01	$2.50
Carquinez Bridge	$4.02	$5.00	$2.01	$2.50
Dumbarton Bridge	$4.02	$5.00	$2.01	$2.50
Richmond/San Rafael Bridge	$4.02	$5.00	$2.01	$2.50
San Mateo Bridge	$4.02	$5.00	$2.01	$2.50
Golden Gate Bridge	$4.02	$5.00	$2.41	$3.00

† – The full toll schedule includes off-peak tolls and tolls for 3- or more axle vehicles.
* – Carpools are defined as either two-or-more- or three-or-more-occupant vehicles, depending on the bridge, and only receive a discount during the morning and evening commute periods (source: bata.mtc.ca.gov; goldengatebridge.org).

Table 4: Common Peak Period Bridge Tolls for Proposed Plan, Main Streets, Big Cities, and EEJ Alternatives†

Bridge	*2-axle, single occupant toll*		*2-axle, carpool* toll*	
	$2000	*$2015*	*$2000*	*$2015*
San Francisco/Oakland Bay Bridge	$5.72	$8.00	$2.86	$4.00
Antioch Bridge	$5.01	$7.00	$2.50	$3.50
Benicia/Martinez Bridge	$5.01	$7.00	$2.50	$3.50
Carquinez Bridge	$5.01	$7.00	$2.50	$3.50
Dumbarton Bridge	$5.01	$7.00	$2.50	$3.50
Richmond/San Rafael Bridge	$5.01	$7.00	$2.50	$3.50
San Mateo Bridge	$5.01	$7.00	$2.50	$3.50
Golden Gate Bridge	$4.47	$6.25	$3.04	$4.25

† – The full toll schedule includes off-peak tolls and tolls for 3- or more axle vehicles.
* – Carpools are defined as either two-or-more- or three-or-more-occupant vehicles, depending on the bridge, and only receive a discount during the morning and evening commute periods (source: bata.mtc.ca.gov; goldengatebridge.org).

Express Lane Tolls

MTC's travel model explicitly represents the choice of travelers to pay a toll to use an express lane (i.e., a high-occupancy toll lane) in exchange for the time savings offered by the facility relative to the parallel free lanes. To exploit this functionality, the analyst must assign a travel price by time of day and vehicle class on each express lane link in the network. To efficiently and transparently simulate the impacts of the express lanes on behavior, we segment the express lane network in the scenarios into logical segments, with each segment receiving a time-of-day-specific per mile fee. To illustrate the detail involved in this coding, Figure 8, Figure 9, Figure 10, and Figure 11 (abstractly) present the morning commute period price for the year 2040 simulations. Please note that the simulated prices are not perfectly optimal – meaning, MTC did not analyze each corridor iteratively to find the price that maximized a pre-defined operational goal. Rather, the prices are adjusted a handful of times in an attempt to keep congestion low and utilization high. Importantly, the prices are held constant over four-hour morning (6 to 10 am) and evening (4 to 7 pm) commute periods. MTC's travel model assumes that congestion is uniform over the entire four-hour commute periods. We know this is not true, but make this assumption as a simplification. The peak one-hour within the four-hour commute period would require a higher toll than those simulated in the model.

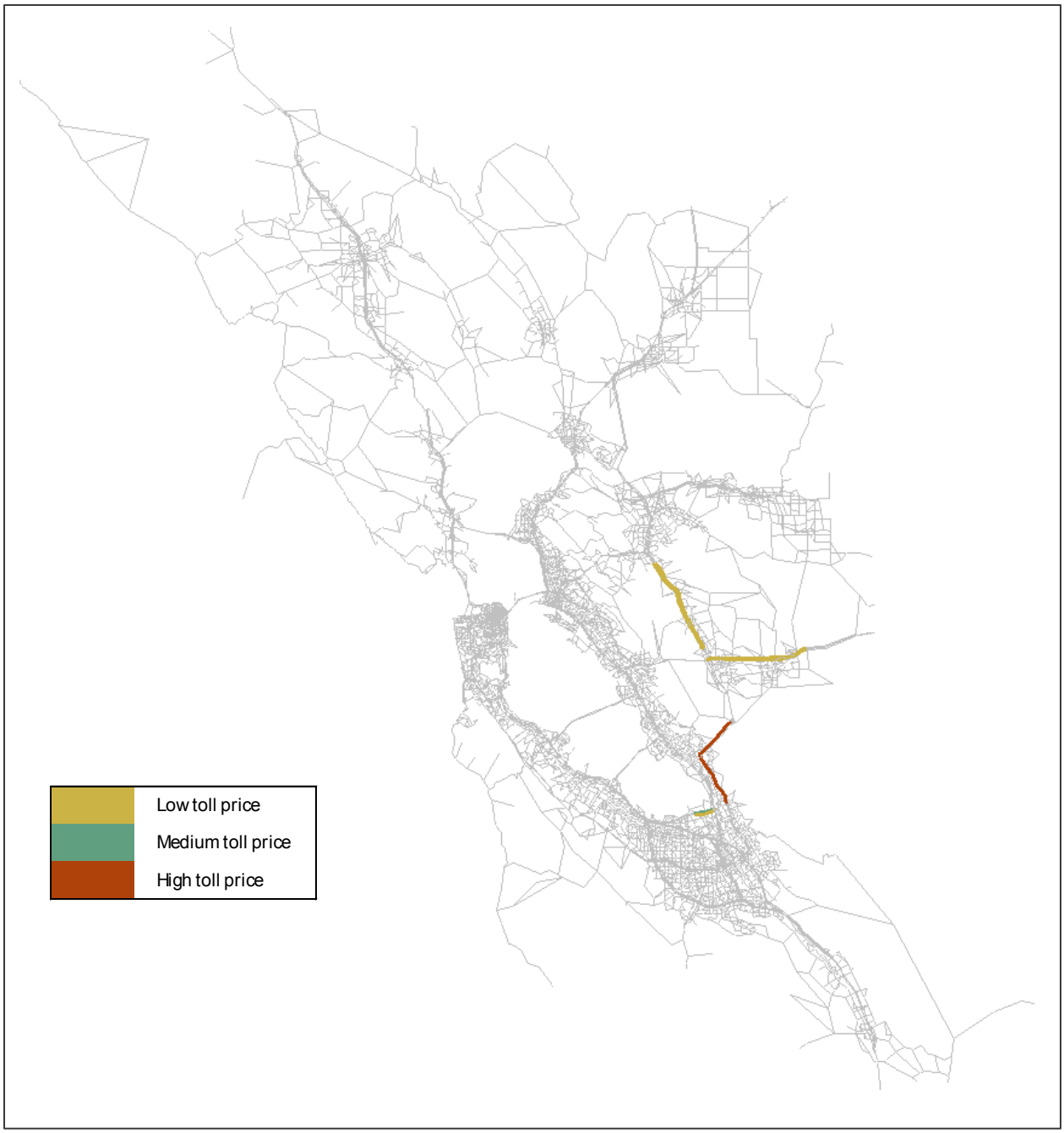

Figure 8: Morning Commute Express Lane Prices for No Project

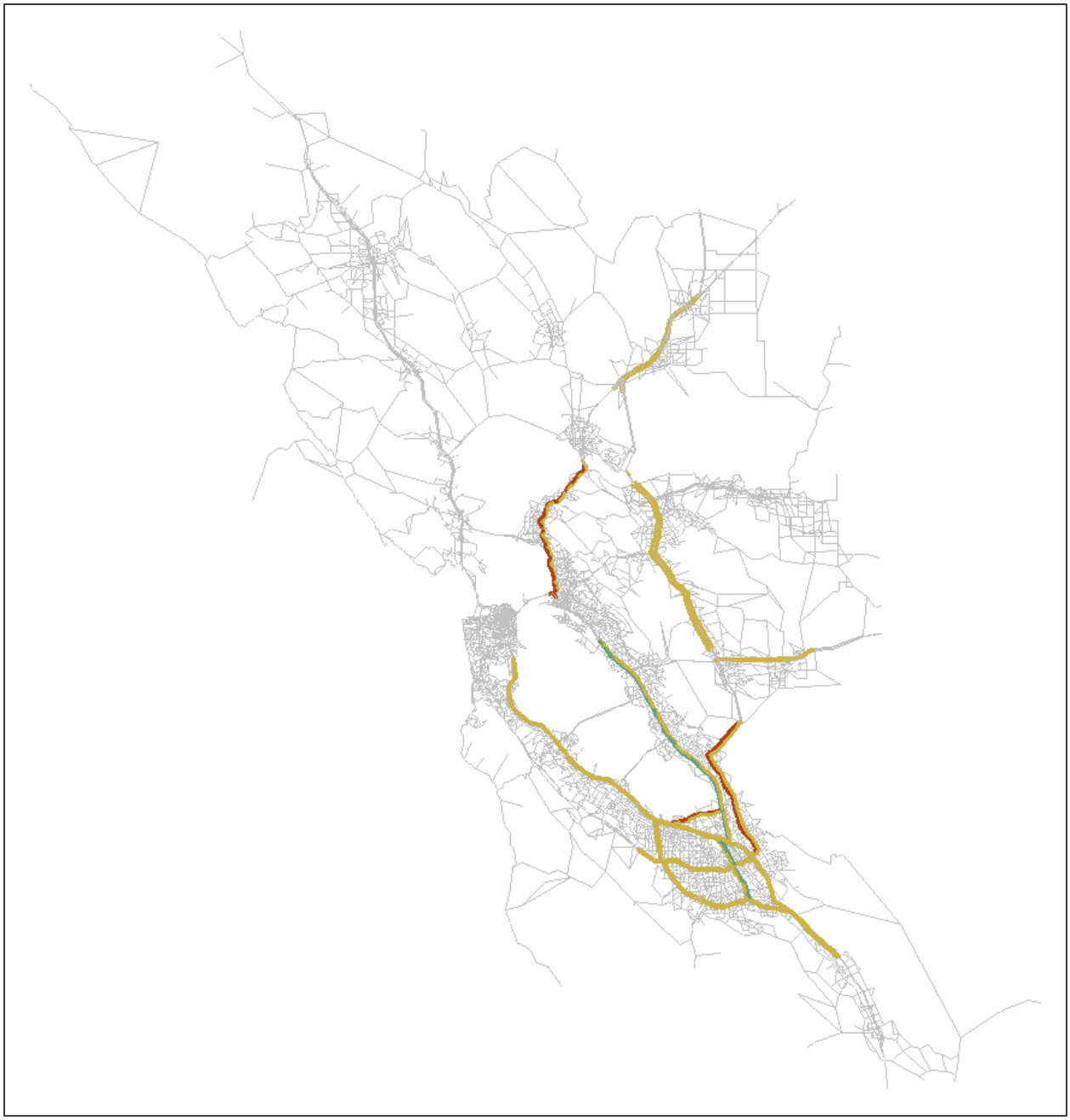

Figure 9: Morning Commute Express Lane Prices for Proposed Plan Alternative

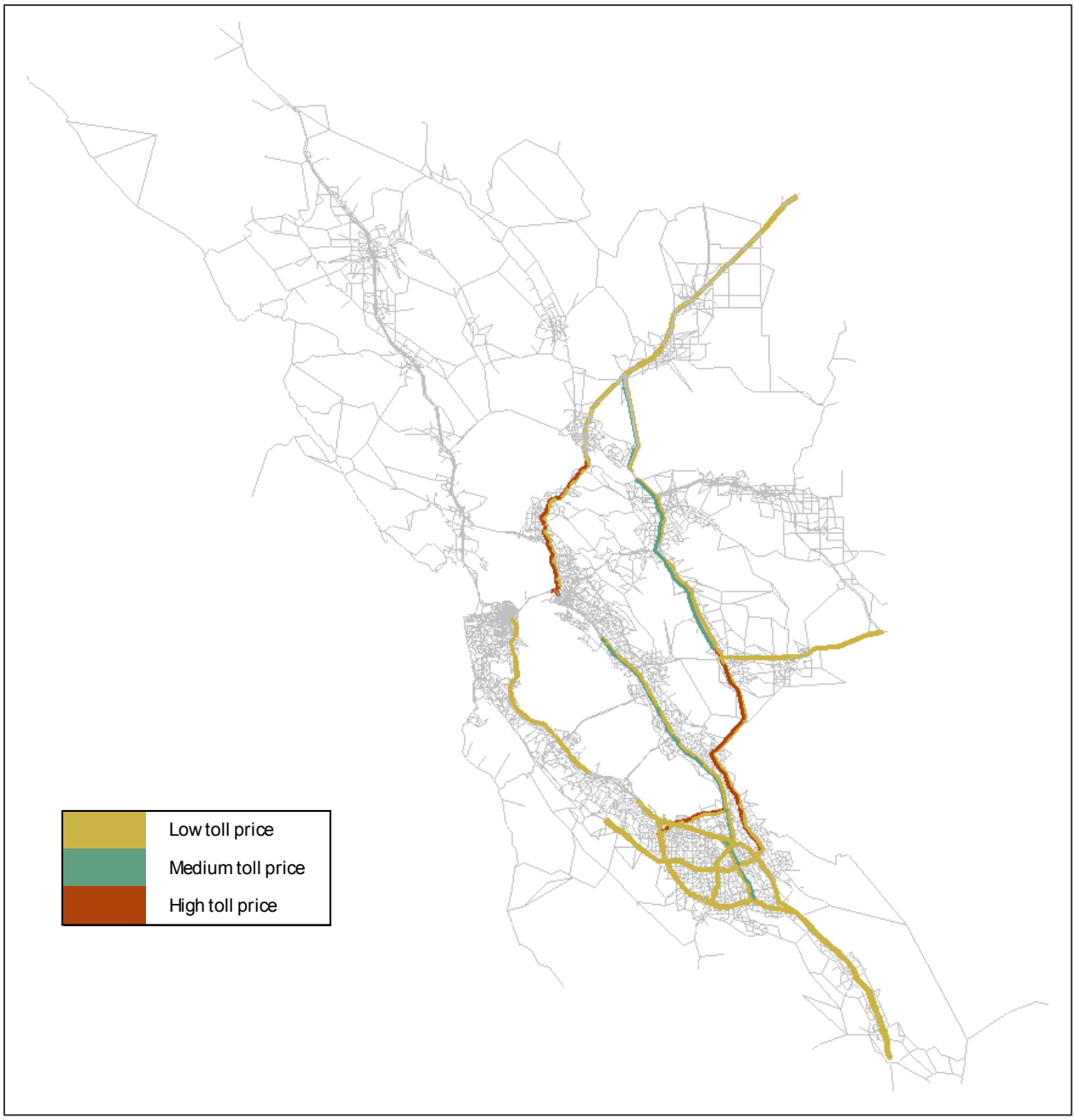

Figure 10: Morning Commute Express Lane Prices for Main Streets Alternative



Figure 11: Morning Commute Express Lane Prices for Big Cities and EEJ Alternatives

Transit Fares

The forecast year transit networks pivot off a year 2015 baseline network, i.e. the alternatives begin with 2015 conditions and add/remove service to represent the various alternatives. The transit fares in 2015 are assumed to remain constant (in real terms) in all of the forecast years. We are therefore explicitly assuming that transit fares will keep pace with inflation and that transit fares will be as expensive in the forecast year as they are today, relative to parking prices, bridge tolls, etc. As a simplification, we assume travelers pay the cash fare to ride each transit service. Table 5 includes fare prices in year 2015 expressed in both year 2000 and year 2015 dollars (i.e., the table does not include information about the cost of taking transit in the year 2000).

Table 5: Year 2015 Common Transit Fares

Operator	*Base fare*	
	$2000	*$2015*
San Francisco Municipal Transportation Agency (Muni)	$1.57	$2.25
Alameda/Contra Costa Transit (AC Transit) – Local buses	$1.47	$2.10
Santa Clara Valley Transportation Authority (VTA) – Local buses	$1.40	$2.00
Santa Clara Valley Transportation Authority (VTA) – Express buses	$2.80	$4.00
San Mateo County Transit (SamTrans) – Local buses	$1.40	$2.00
Golden Gate Transit – Marin County to San Francisco Service	$3.67	$5.25
County Connection (CCCTA)	$1.40	$2.00
Tri-Delta Transit	$1.40	$2.00
Livermore Amador Valley Transit Authority (Wheels, LAVTA)	$1.40	$2.00
Note: this is a sample, rather than an exhaustive list, of Bay Area transit providers and fares.		

Parking Prices

The travel model segments space into travel analysis zones (TAZs). Simulated travelers move between TAZs and, in so doing, burden the transportation network. Parking costs are applied at the TAZ-level: travelers going to zone X in an automobile must pay the parking cost assumed for zone X.

The travel model uses hourly parking rates for daily/long-term (those going to work or school) and hourly/short-term parkers. The long-term hourly rate for daily parkers represents the advertised monthly parking rate, averaged for all lots in a given TAZ, scaled by 22 days per month, then scaled by 8

hours per day; the short-term hourly rate is the advertised hourly rate – generally higher than the rate daily parkers pay – averaged for all lots in a given TAZ. Priced parking in the Bay Area generally occurs in greater downtown San Francisco, downtown Oakland, Berkeley, downtown San Jose, and Palo Alto.

When forecasting, we assume that parking prices change over time per a simple model: parking cost increases linearly with employment density. Across the scenarios, therefore, the parking charges vary with employment density.

Perceived Automobile Operating Cost and Gas Tax

When deciding between traveling in a private automobile or on a transit vehicle (or by walking, bicycling, etc.), MTC assumes travelers consider the cost of operating and maintaining, but not owning and insuring, their automobiles. The following three inputs are used to determine the perceived automobile operating cost: average fuel price, average fleet-wide fuel economy, and non-fuel related operating and maintenance costs.

In an effort to improve consistency among regional planning efforts across the state, the Regional Targets Advisory Committee (formed per Senate Bill 375) recommended that California's metropolitan planning organizations (MPOs) use consistent assumptions for fuel price and for the computation of automobile operating cost in long range planning. Using forecasts generated by the United States Department of Energy (DOE) in the summer of 2013 (and expressed in year 2010 dollars), the MPOs agreed[13] to procedures to consistently estimate forecast year fuel and non-fuel-related prices. The average fleet-wide fuel economy implied by the EMFAC 2014 software is used to represent the average fleet-wide fuel economy. A summary of our assumptions are presented below in Table 6. Note that the prices in Table 6 are presented in year 2015 (i.e., current year) dollars, year 2010 dollars (the units used in the above referenced documentation), and year 2000 dollars (units of the travel model).

In all of the year 2040 scenarios save the No Project, a regional gas tax of 10 cents per gallon ($2015 dollars) is assumed.

[13] Please see the memorandum titled "Automobile Operating Cost for the Second Round of Sustainable Communities Strategies" dated October 13, 2014.

Table 6: Perceived Automobile Operating Cost Calculations

Measure	*Analysis Year* 2010	2040
Average fuel price (Year 2000 dollars per gallon)	$2.51	$4.21
Average fuel price (Year 2010 dollars per gallon)	$3.17	$5.26
Average fuel price (Year 2015 dollars per gallon)	$3.61	$6.06
EMFAC-implied fuel economy (miles per gallon)	20.10	42.36
Non-fuel-related operating cost ($2000 per mile)	$0.04	$0.07
Non-fuel-related operating cost ($2010 per mile)	$0.05	$0.09
Non-fuel-related operating cost ($2015 per mile)	$0.06	$0.10
Perceived automobile operating cost ($2000 per mile) †	$0.17	$0.17
Perceived automobile operating cost ($2010 per mile) †	$0.21	$0.22
Perceived automobile operating cost ($2015 per mile) †	$0.24	$0.24

† – Sum of the fuel-related operating cost (fuel price divided by fuel economy) and non-fuel-related operating cost.

Cordon Tolls

The Proposed Plan, Big Cities and EEJ scenarios include a cordon toll in San Francisco. The scheme requires all vehicles to pay a $6 (in 2015 dollars) fee to enter or leave the greater downtown San Francisco area during the evening commute period. The cordoned area is bounded by Laguna Street to the west, 18th Street to the south, and the San Francisco Bay to the north and east.

Other Key Assumptions

Technology currently allows large numbers of Bay Area residents to work at home. In the forecast years, MTC assumes the trend of workers working at home revealed in Census data from 1980 through 2014 will continue through 2040. Figure 12 presents the historical data, the trend, and the MTC forecasts. These telecommuting assumptions are the same across all year 2040 scenarios, including the No Project.

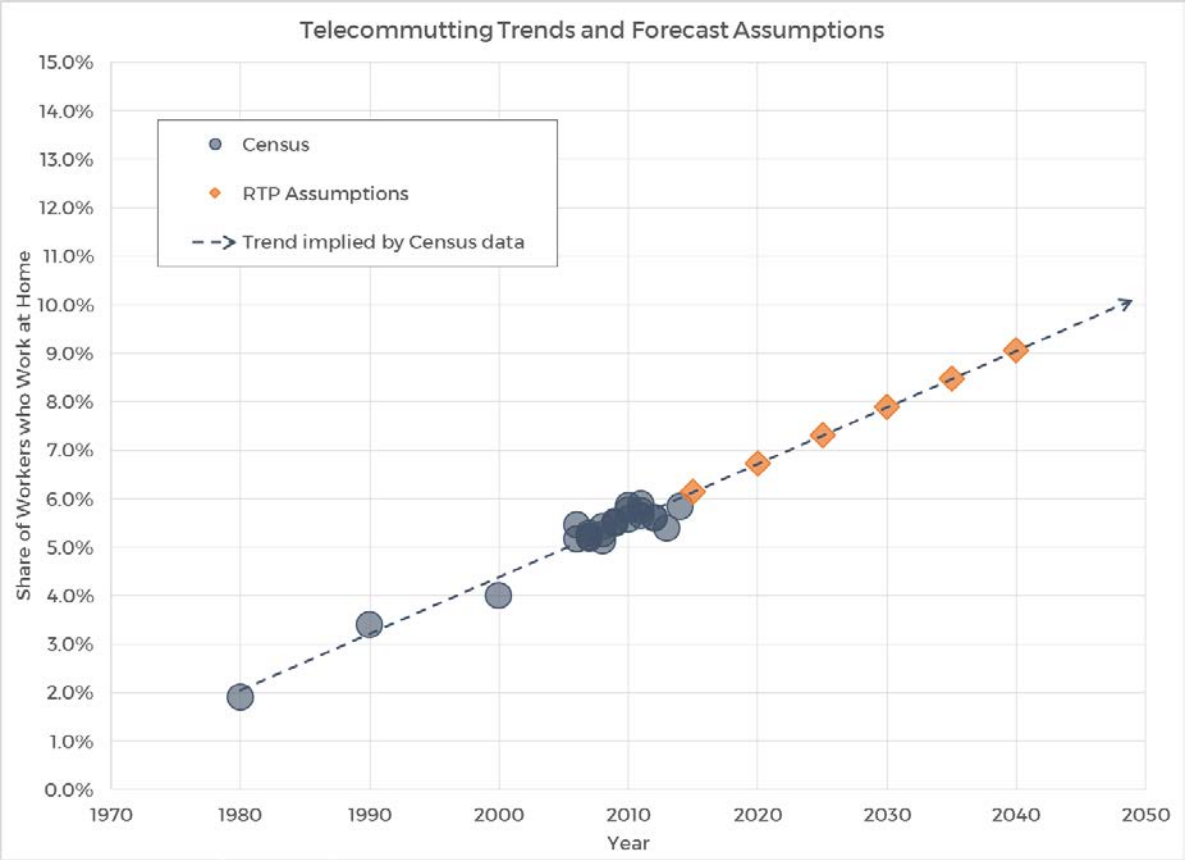

Figure 12: Work at Home Observations, Trends and Forecasts

Chapter 3: Key Results

Selected travel model results across a variety of dimensions are summarized and discussed here. The presented results are not exhaustive and are intended only to give the reader a general sense of the expected behavioral changes in response to differing input assumptions across scenarios.

Performance Targets and Equity Analysis

The purpose of this document is to describe the response of travelers to the projects and policies implemented in the scenarios described in the previous section. Information from the travel model is also used to help assess the performance of each of the scenarios per agency-adopted targets. This information is described in MTC's May 2016 Planning Committee memorandum[14].

Information from the travel model also is used to analyze how different populations are impacted by the investments and policies included in each alternative. This information is described in MTC's May 2016 Planning Committee memorandum[15].

[14] Available here: http://mtc.legistar.com/gateway.aspx?M=F&ID=a78d1547-7db3-4dd2-afdb-2d14fe3aec71.pdf
[15] Ibid.

Automobile Ownership

Figure 13 presents the automobile ownership rates across the four scenarios in the year 2040 simulations as well as year 2015. The differences across scenarios are not dramatic. A key finding is the general increase in zero automobile households in the Proposed Plan, Big Cities and EEJ scenarios.

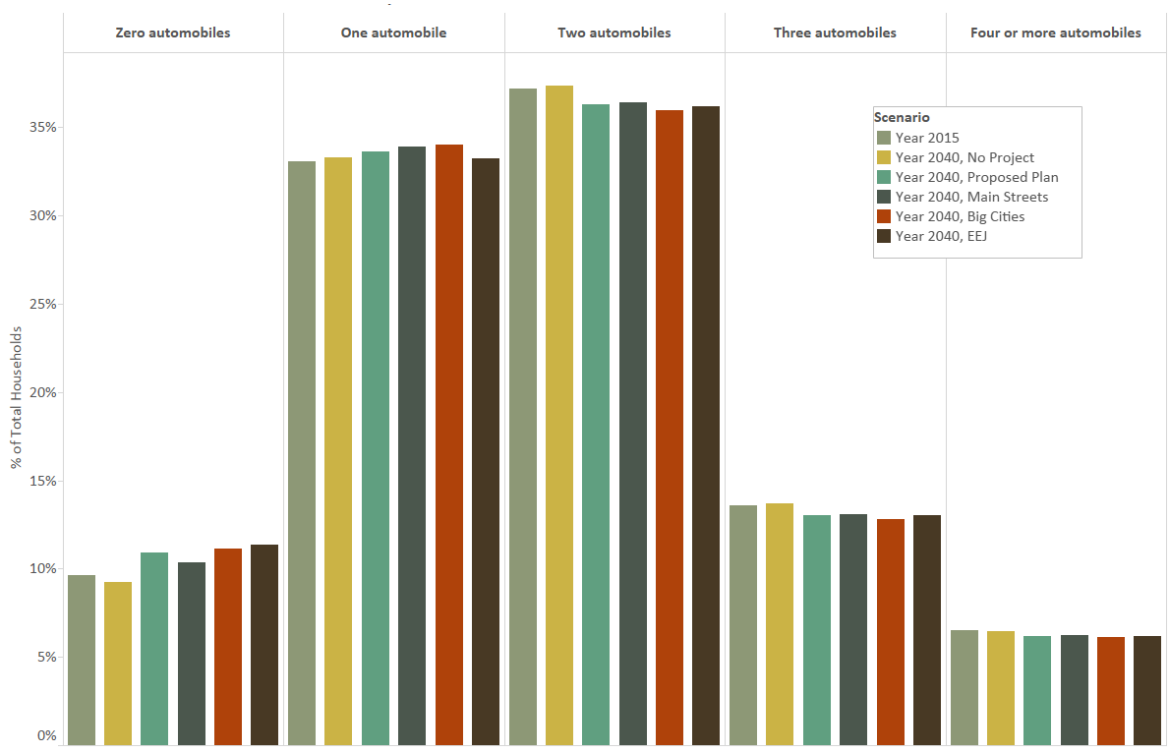

Figure 13: Year 2040 Automobile Ownership Results

Activity Location Decisions

Figure 14 and Figure 15 present the average trip distance by travel mode for all travel and for trips on work tours, respectively. The key finding here is that the Big Cities scenario brings activities slightly closer together, when compared to the 2015 baseline.

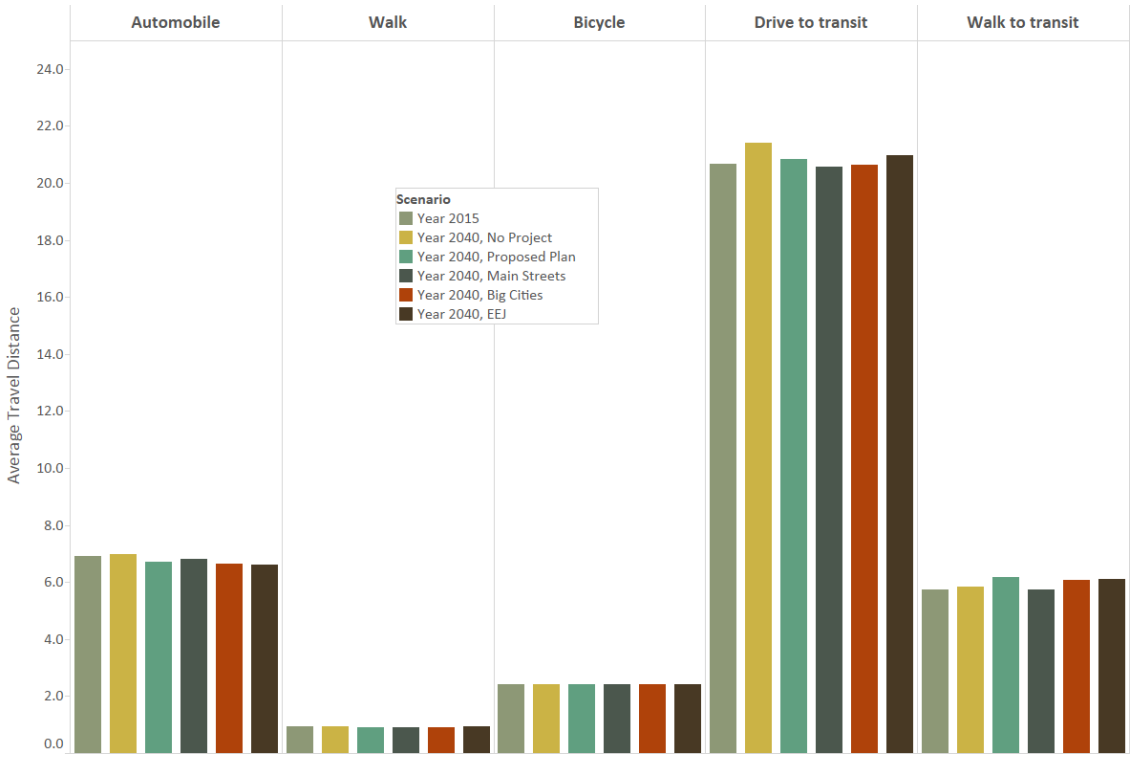

Figure 14: Year 2040 Average Trip Distance

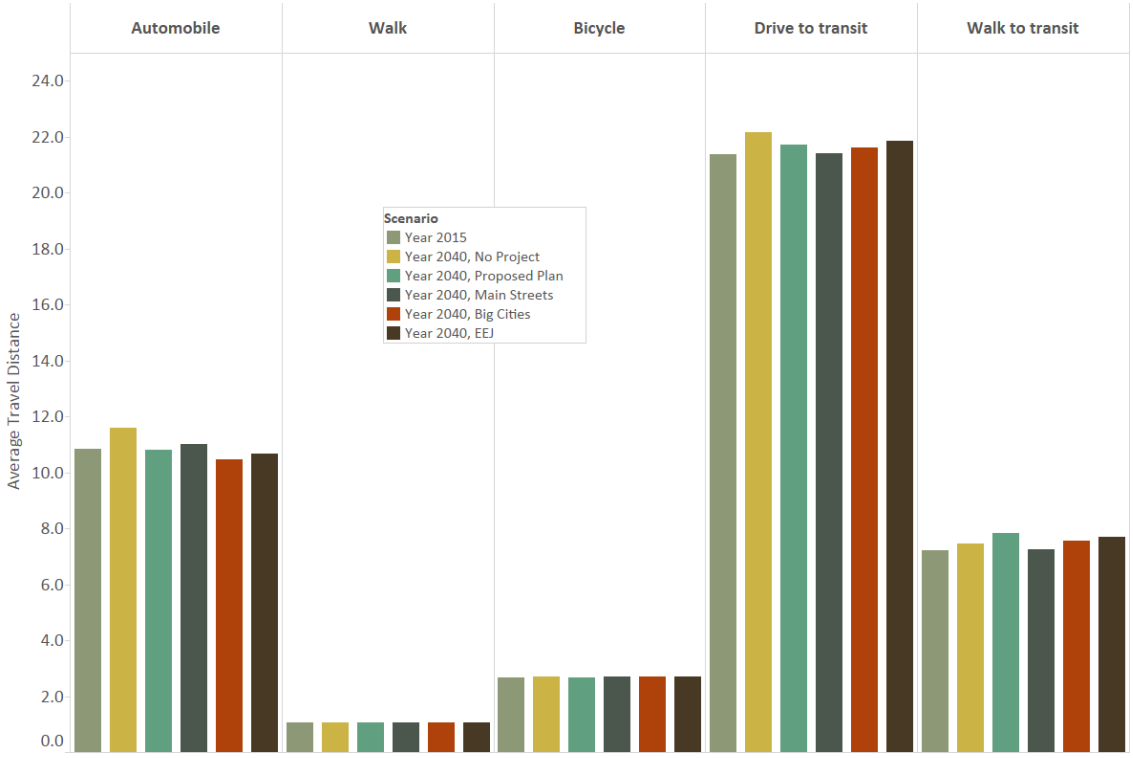

Figure 15: Year 2040 Average Trip Distance for Travel on Work Tours

Travel Mode Choice Decisions

The means by which a traveler gets from point A to point B is referred to as the travel mode. Within MTC's representation of travel behavior, five automobile-based modal options are considered, specifically:

- traveling alone in a private automobile and opting not to pay to use an express lane ("single occupant, no HOT"), an option only available to those in households who own at least one automobile;
- traveling alone in a private automobile and opting to pay to use an express lane ("single occupant, pay to use HOT"), an option only available to those who both own a car and whose journey would benefit from using the express lane facility (e.g., this option is not available to those driving through a residential neighborhood to drop a child at school);
- traveling with one passenger in a private automobile and opting not to pay to use an express lane ("two occupants, no HOT) (these travelers can use carpool lanes for which they are eligible), an option available to all households;
- traveling with one passenger in a private automobile and opting to pay to use an express lane ("two occupants, pay to use HOT"), an option available to all households provided they would benefit from using an express lane (if the express lane facility which benefits travelers allows two-occupant vehicles to travel for free, than these travelers are categorized as "two occupants, no HOT"); and,
- traveling with two or more passengers in a private automobile ("three-or-more occupants") – these travelers are allowed to travel for free on express lane facilities across all the scenarios (as well as carpool facilities).

The travel model explicitly considers numerous non-automobile options which are collapsed in these summaries into the following four options: transit, getting to and from by foot ("walk to transit"); transit, getting to or from in an automobile ("drive to transit"); walk; and, bicycle.

Figure 16 and Figure 17 present the share of trips made by various travel modes. Figure 16 shows shares of travel in automobiles by occupancy category as well as by willingness to pay to use an express lane. Overall, mode shares shift slightly towards transit in the four project scenarios compared with a slight shift towards auto travel in the No Project scenario. Figure 17 presents companion results for non-automobile travel modes, including public transit, walking, and bicycling. Here, we see a slight increase in walk-to-transit in the Big Cities and EEJ scenarios, which reflects the scenarios' increase in transit service and increasingly efficient land development patterns.

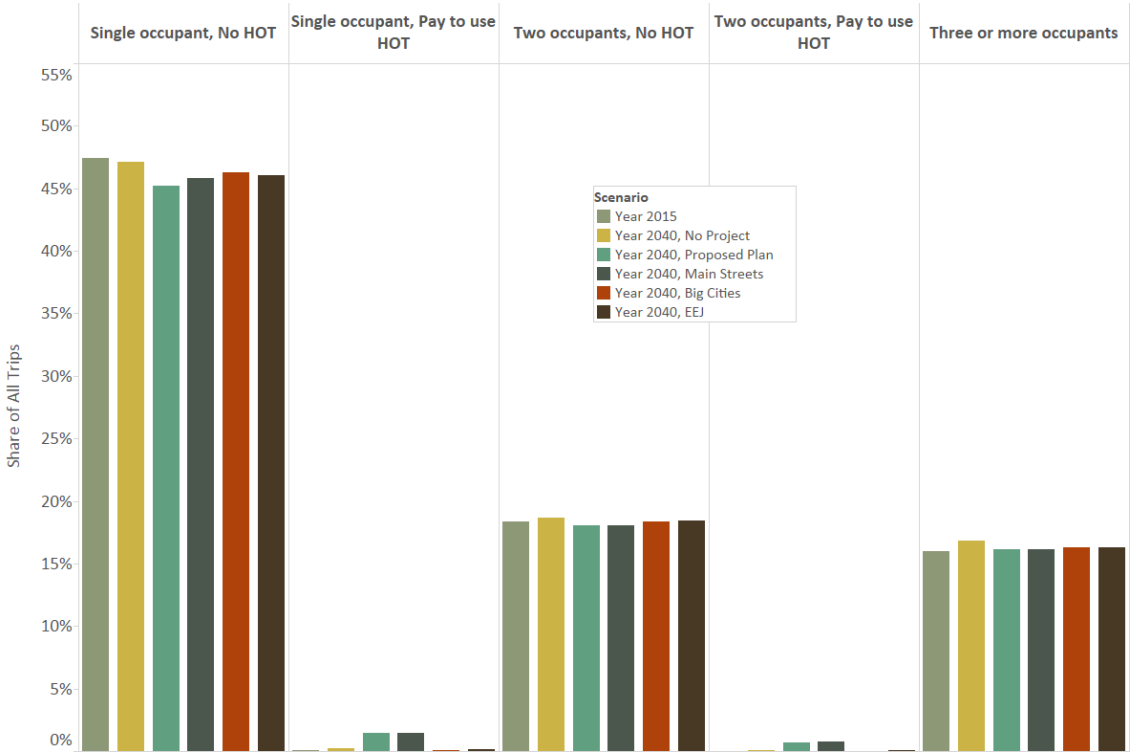

Figure 16: Year 2040 Automobile Mode Shares for All Travel

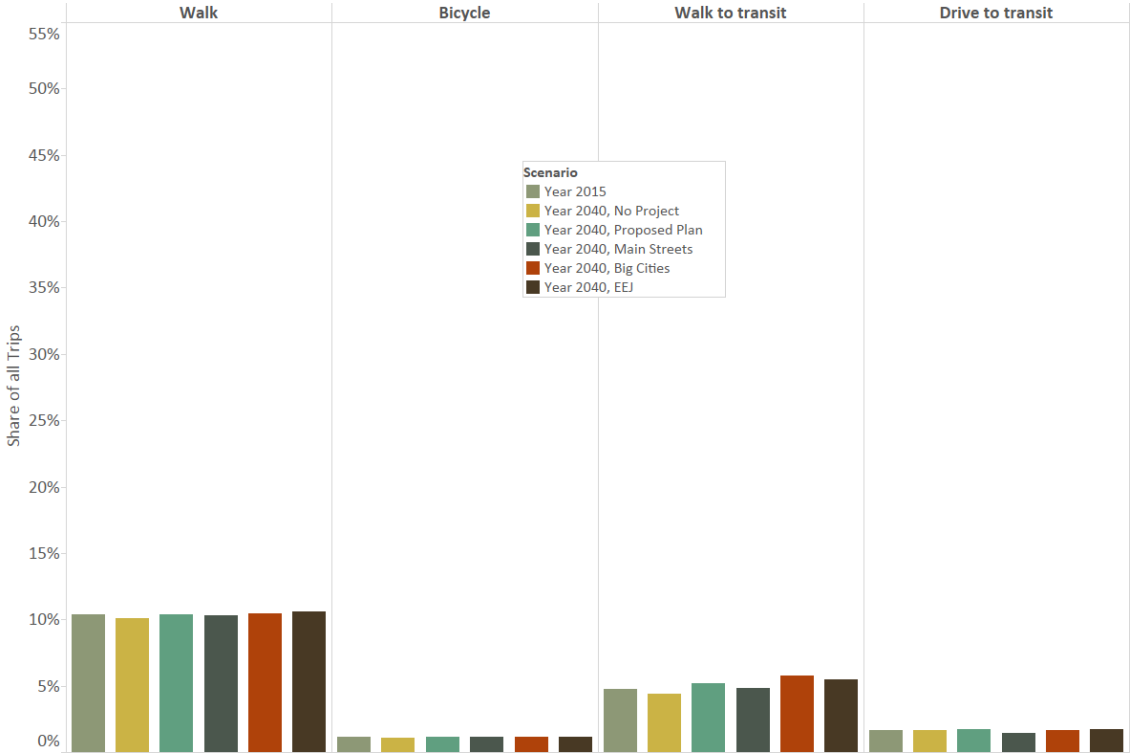

Figure 17: Year 2040 Non-Automobile Mode Shares for All Travel

Aggregate Transit Demand Estimates

Bay Area residents choosing to travel by transit are explicitly assigned to a specific transit route. As a means of organizing the modeling results, MTC groups transit lines into the following technology-specific categories:

- **Local bus**: standard, fixed-route bus service, of the kind a traveler may take to and from a neighborhood grocery store or to work, as well as so-called "bus rapid transit" service.
- **Express bus**: longer distance service typically provided in over-the-road coaches. Golden Gate Transit, for example, provides express bus service between Marin County and Downtown San Francisco.
- **Light rail**: represented in the Bay Area by San Francisco's Muni Metro and streetcar services (F-Market and E-Caltrain), as well as Santa Clara Valley Transportation Authority's light rail service.
- **Heavy rail**: another name for the Bay Area Rapid Transit (BART) service.
- **Commuter rail**: longer distance rail service typically operating in dedicated right-of-way, including Caltrain, Sonoma-Marin Area Rail Transit (SMART), Amtrak's Capitol Corridor, and Altamont Commuter Express.

Figure 18 presents the estimates of transit boardings by these categories on the typical weekday simulated by the travel model. Ridership increases from about 2.3 million daily boardings in 2015 to over 3 million daily boardings in all project scenarios, and over 3.4 million boardings in the 2040 Big Cities scenario.

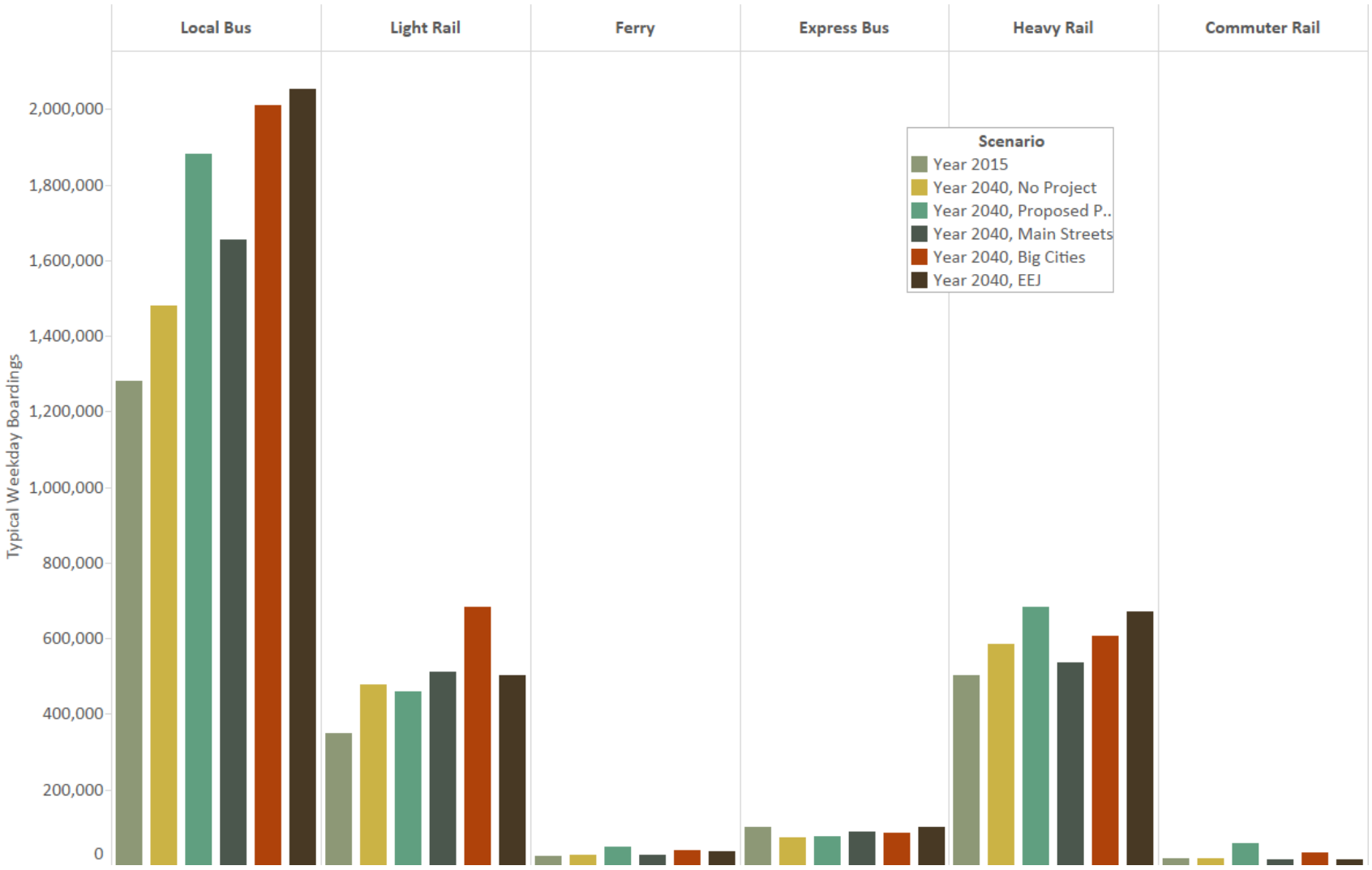

Figure 18: Year 2040 Typical Weekday Transit Boardings by Technology

Roadway Utilization and Congestion Estimates

Trips made by automobile are first aggregated into matrices identifying each trip's origin and destination, and then "assigned" to a representation of the Bay Area's roadway network. The assignment process iteratively determines the shortest path between each origin-destination pair, shifting some number of trips to each iteration's shortest path, until the network reaches a certain level of equilibrium – defined as a state in which travelers cannot change to a lower "cost" route (where cost includes monetary and non-monetary (time) expenditures). Several measures of interest are generated by the assignment process, including vehicle miles traveled, delay, and average travel speed.

Please note that MTC maintains three separate estimates of the quantity of vehicle miles traveled (VMT), as follows:

(1) the quantity assigned directly to the highway network;
(2) the quantity (1) plus so-called "intra-zonal" VMT (i.e., travel that occurs at a geographic scale finer than the travel model's network representation), which is computed off-line; and,
(3) the quantity (2) adjusted to match the VMT the California Air Resources Board (CARB) believes takes place in the Bay Area (a number slightly higher than MTC's estimate).

In this document, the VMT identified as (1) in the above list is presented.

Figure 19 first segments VMT into five time periods and then scales the VMT by the number of hours in each time period. The result is the intensity of VMT by time of day as well as the increase in VMT from 2015 to 2040. Overall, VMT varies only slightly across the year 2040 alternatives, with the Big Cities and EEJ scenarios having the lowest VMT.

Figure 20 presents the average freeway speed across scenarios. Looking at the speeds during the morning and evening commute periods, we see a reduction in speed (or, said another way, an increase in congestion) from the year 2015 scenario to the year 2040 No Project scenario. Each of the alternatives improves freeway speeds.

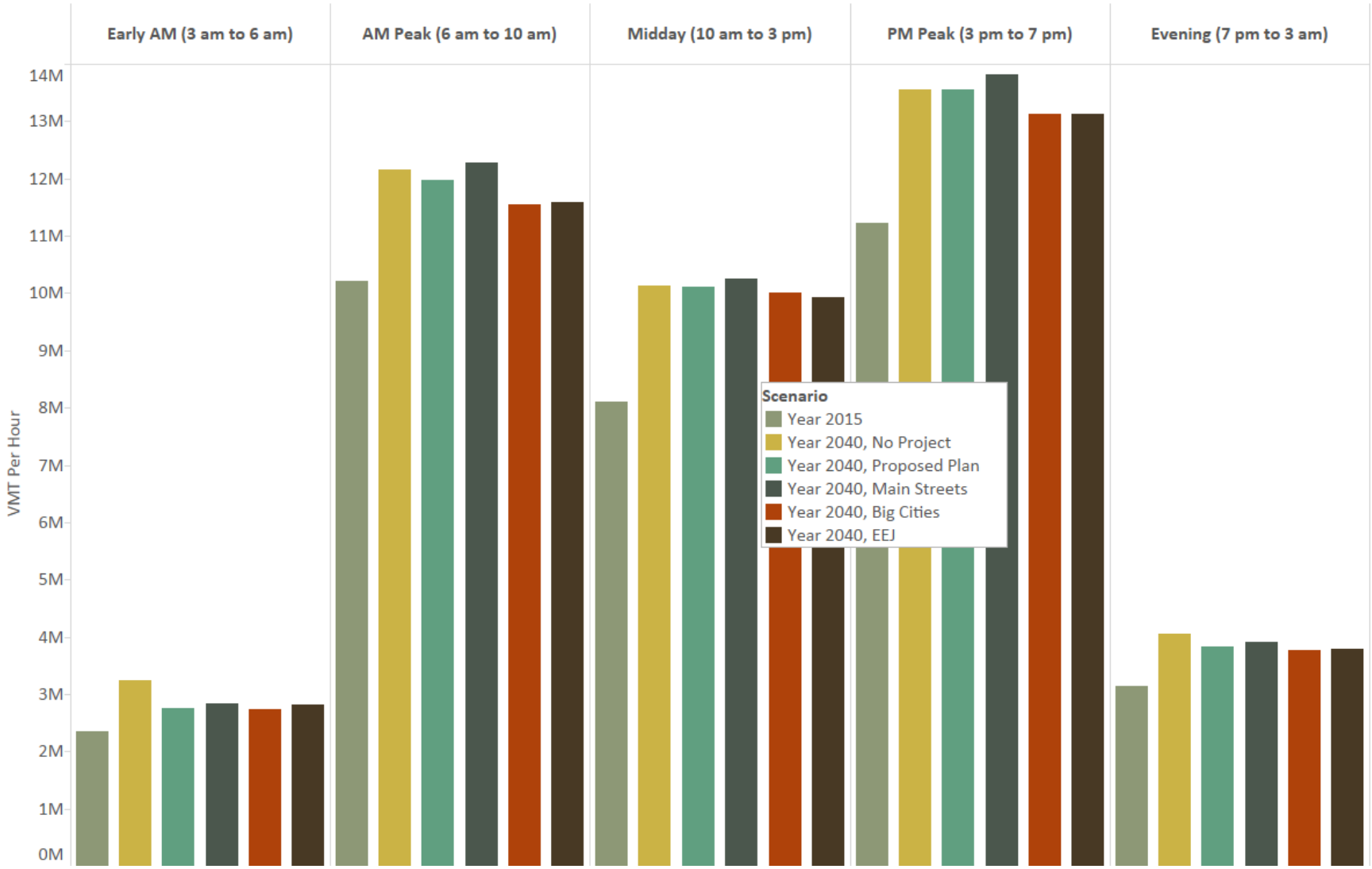

Figure 19: Year 2040 Vehicle Miles Traveled per Hour by Time Period

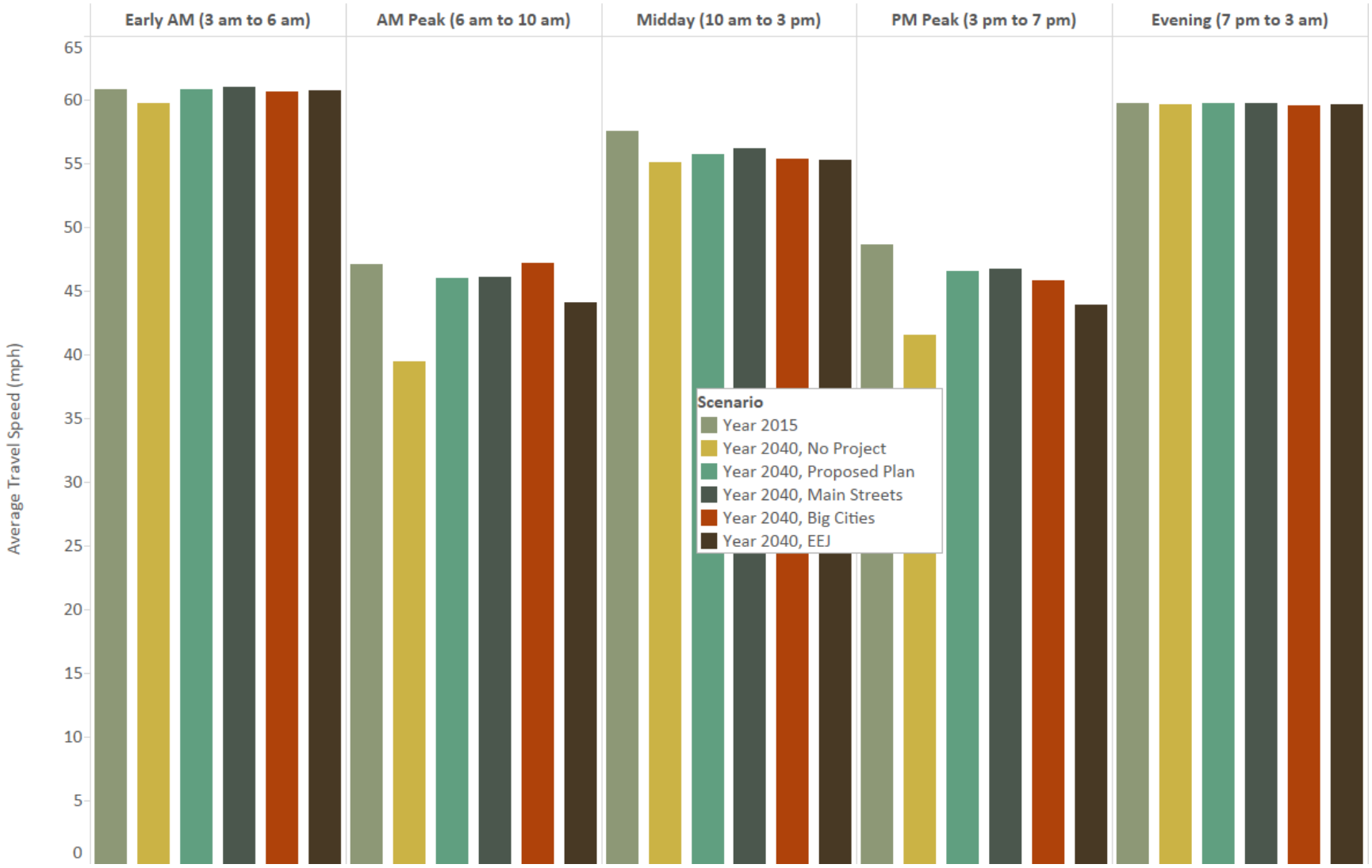

Figure 20: Year 2040 Average Vehicle Speeds on Freeways

Appendix A: Off-Model Emission Reduction Estimates

Off-Model Emission Reduction Estimates

MTC, with consultant assistance, prepared off-model analyses of various strategies, referred to as climate initiatives, anticipated to produce measurable per-capita greenhouse gas (GHG) emission reductions. Investments are made in programs that will accelerate the adoption of clean vehicle technologies and promote the use of sustainable travel modes.

The 2013 Plan Bay Area included an analysis of a variety of off-model strategies. In 2015, MTC reassessed the current strategies and explored new ones for inclusion in the update to Plan, Plan Bay Area 2040. This assessment took into account findings from the implemented strategies and review of new and emerging strategies not included in Plan Bay Area.

Based on the ICF assessment, MTC plans to include many of the climate strategies that were included in Plan Bay Area, namely:

- Commuter Benefits Ordinance;
- Car Sharing;
- Vanpools and Employer Shuttles;
- Regional Electric Vehicle Charger Network;
- Vehicle Buyback and PEV Incentive;
- Clean Vehicles Feebate Program; and
- Smart Driving.

Strategies not currently captured by MTC's travel model were added to the Plan update:

- Targeted Transportation Alternatives;
- Trip Caps;
- Bike Share; and
- Bicycle Infrastructure.

Each Climate Policy Initiative is summarized in the following pages, including a description of the project objective, contextual background, assumptions and methodology, analytic steps and results.

Emission Rates

To calculate the carbon dioxide (CO_2) emissions reductions from the Climate Policy Initiatives, the California Emissions Model (EMFAC) trip end emission rates and exhaust per mile emission rates for light and medium duty vehicles were used. The regional average rates for annual CO_2 emissions from light and medium duty vehicles are applied to the calculated trip reductions and VMT reductions, which are summarized in the individual policy descriptions below.

In order to compare results with SB 375's regional GHG emissions targets derived using EMFAC2007, EMFAC2014 GHG emissions outputs have been converted to EMFAC2007 equivalents by applying an adjustment methodology in accordance with ARB staff's guidance and consultation for the off-model analysis in order to derive the CO_2 emission factors used in the 2020 and 2035 CO_2 reduction estimates. Unadjusted EMFAC2014 outputs were used to create emission factors for 2040 CO_2 reduction

estimates. Table 1 summarizes the CO_2 emission factors used for passenger vehicles. Except where otherwise noted, we use these factors throughout our analysis.

Table 1: CO_2 emission factors

	2020 (based on EMFAC2007 equivalents)	**2035** (based on EMFAC2007 equivalents)	**2040** (based on EMFAC2014 outputs)
CO_2 Exhaust Emission Rate (grams per mile)	386.45	389.19	386.75
CO_2 Trip End Emission Rate (grams per trip)	80.75	79.09	85.80

Commuter Benefits Ordinance

In fall 2012, Senate Bill (SB) 1339 authorized the Bay Area Air Quality Management District (Air District) and MTC to adopt and implement a regional commuter benefits ordinance in the San Francisco Bay Area on a pilot basis through December 31, 2016. The goal of the pilot was to promote the use of transit and other sustainable commute modes in order to reduce single-occupant vehicle commute trips, traffic congestion, GHG and other pollutants. After completion of the pilot, MTC and the Air District achieved bi-partisan support in the State Legislature, and SB 1128 was signed by Governor Brown on September 22, 2016. SB 1128 extends the provisions of the Commuter Benefits Ordinance (CBO), establishing the pilot program permanently. MTC and the Air District continue to jointly administer the program and implement the law.

The CBO requires employers with 50 or more full-time employees in the Bay Area to offer their employees incentives to commute to work by modes other than driving alone. Employers can choose to offer one of the following options in order to make sustainable commute modes more attractive to their employees:

- Pre-Tax Benefit - allows employees to exclude their transit or vanpooling expenses from taxable income (IRS Code Section 132 (f));
- Employer-Provided Subsidy - provides a subsidy to reduce or cover employees' monthly transit or vanpool costs;
- Employer-Provided Transit - provides a free or low-cost transit service for employees, such as a bus, shuttle or vanpool service; or
- Alternative Commuter Benefit - provides an alternative commuter benefit that is as effective in reducing single-occupancy commute trips as Options 1, 2 or 3.

Off-model analysis is necessary to capture CO_2 reductions from the CBO because MTC's last household travel survey, which informs its model, was conducted in 2010, and does not capture the impacts of new strategies that change travel behavior such as this one. The CBO might be captured by a future model once it has been implemented to the extent that the options offered through the ordinance influence people's behavior in a way that can be captured by the travel surveys, and once the model framework has been altered to include inputs that are reflective of the CBO.

Assumptions and methodology

In Plan Bay Area, CO_2 reductions due to the CBO were projected based on research and evidence from similar efforts, particularly San Francisco's CBO, which has been in effect in since 2009. In 2015, MTC completed an evaluation of the CBO based on a random sample survey of over 1,400 Bay Area employees.[1] In the update to the Plan, Plan Bay Area 2040, the same methodology is applied to estimate CO_2 reductions as in the previous Plan, but the assumptions are based on MTC's evaluation.

CBOs encourage employees to shift from driving alone to taking transit, carpooling, bicycling or walking by offering incentives to cover the costs of using these modes or by providing shuttle/vanpool service. In order to quantify the benefits, the number of employees covered by the CBO and the corresponding VMT reduction are estimated.

Additionally, the number of employees at businesses that begin to offer benefits due to the CBO are estimated for each of the 34 superdistricts in MTC's travel model. The total number of employees in each superdistrict for each scenario-year was also collected and compared to the current Dun and Bradstreet size of business data to identify the percentage of employees in each superdistrict that work at businesses with 50 or more employees subject to the CBO. Region-wide, slightly over 50 percent of employees work at establishments with 50 or more employees, though the percentages range from 31% to 68 percent for individual superdistricts. Since some employers already offer the types of benefits described in the legislation, the methodology estimated the percentage of employees who do not already receive the benefits, which includes all new employees (i.e., employees added between 2015 and the scenario year) and a percentage of current (2015) employees. In 2009, the City and County of San Francisco enacted a CBO and found that 46 percent of employers already offered one of the required benefits prior to implementation of the city's ordinance.[2] Accordingly, 54 percent of current employees in the Bay Area are assumed to be receiving new benefits as a result of the CBO. This is a conservative estimate when applied to areas outside of San Francisco which is well-served by transit and other options to driving alone, and has many progressive employers who are more likely to offer their workers benefits to take advantage of these options independent of a CBO. The results were summed across all superdistricts within each of the nine Bay Area counties to estimate the total number of employees that receive benefits due to the CBO at the county level.

From MTC's evaluation of the CBO, which included a survey of employees, the county-level estimates of the percentage of employees who are aware that their employer offers a CBO program and the percentage of employees who reduce at least one SOV trip due to the CBO were determined. The methodology assumes that as time passes, all employers will comply with the CBO and all employees will be aware of the benefits available to them. These findings were applied to the average regional reduction in vehicle trips and VMT for employees who respond to the CBO to estimate VMT reductions. Table 2 summarizes the evaluation results used in the analysis.

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[1] Bay Area Air Quality Management District, Metropolitan Transportation Commission. Bay Area Commuter Benefits Program, Report to the California Legislature. February 2016. http://www.baaqmd.gov/~/media/files/planning-and-research/commuter-benefits-program/reports/commuter-benefits-report.pdf

[2] Data supplied by the San Francisco Department of Environment.

Table 2: Summary of CBO evaluation findings[3]

County	% of eligible employees who reduce SOV trips due to CBO	% of eligible employees who are aware of CBO benefits	% of eligible employees who reduce SOV trips due to CBO (adjusted)	Average yearly trip reductions for employees who reduce SOV trips	Average yearly VMT reductions for employees who reduce SOV trips
Alameda	4.5%	51.5%	8.7%	36.0	697.5
Contra Costa	7.6%	43.8%	17.4%	36.0	697.5
Marin	7.0%	32.0%	21.9%	36.0	697.5
Napa	8.8%	42.4%	20.8%	36.0	697.5
San Francisco	7.1%	75.0%	9.5%	36.0	697.5
San Mateo	8.8%	53.8%	16.4%	36.0	697.5
Santa Clara	6.4%	56.2%	11.4%	36.0	697.5
Solano	0.0%	28.0%	0.0%	36.0	697.5
Sonoma	0.0%	21.8%	0.0%	36.0	697.5

Analysis steps

To calculate CO_2 reductions due to the CBO, the methodology:

1. Identified the current and future number of employees for each MTC superdistrict.
2. Subtracted current from future employees to calculate the number of new employees for each MTC superdistrict.
3. Multiplied the number of current employees by the estimated percentage of employees who do not currently receive commuter benefits (54%) and added the result to the number of new employees to calculate the total number of employees who do not currently receive commuter benefits.
4. Multiplied the result by the percentage of employees in each superdistrict that are currently employed at businesses with over 50 employees to estimate the total number of employees who are newly eligible for CBO benefits in each superdistrict.
5. Summed results across all superdistricts within each county.
6. Multiplied the result by the adjusted percentage of eligible employees in each county who reduce drive-alone trips due to the CBO (see Table 2) and summed results across all counties to estimate the total number of employees who change behavior due to the CBO.
7. Multiplied the result by the average annual reduction in vehicle trips and VMT per affected employee (see Table 2) to estimate total annual reduction in vehicle trips and VMT.
8. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions.

Results

Table 3 and Table 4 summarize the CO_2 reductions due to the CBO.

Table 3: Daily CO_2 emissions reductions due to CBO (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	296	328	340

[3] MTC Climate Initiatives Program Evaluation: Commuter Benefits Ordinance, Prepared for MTC by True North Consulting, 2015. A summary of findings is available at http://mtccms01.prod.acquia-sites.com/sites/default/files/CIP%20Evaluation%20Summary%20Report_7-13-15_FINAL.pdf.

Main Streets	297	329	343
Big Cities	297	327	339
EEJ	297	327	340

Table 4: Per capita CO_2 emissions reductions from 2005 baseline due to CBO (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-0.36%	-0.35%	-0.34%
Main Streets	-0.36%	-0.35%	-0.35%
Big Cities	-0.36%	-0.35%	-0.34%
EEJ	-0.36%	-0.35%	-0.34%

Car Sharing

Car sharing allows individuals to rent vehicles by the minute or by the hour, thus giving them access to an automobile without the costs and responsibilities of individual ownership. Car sharing is growing rapidly in the Bay Area through traditional for-profit/non-profit services (City CarShare/Carma, Zipcar, UHaul Car Share, Enterprise CarShare), peer-to-peer car sharing (Getaround, RelayRides) and one-way car share services (Scoot, some preliminary offerings from Zipcar).

Traditional car sharing businesses operate on a membership basis. Users pay an annual fee in addition to hourly and sometimes per-mile rates. Gas, maintenance, parking, insurance and 24-hour access are included in the membership and usage rates. The pricing scheme is set up to encourage the use of the vehicles for errands, airport pickups and other short trips. For trips longer than one day, it is usually less expensive to rent a vehicle through a car rental agency. Traditional car sharing models are most effective for households in neighborhoods that are served by high-quality transit where vehicles are only infrequently needed. After joining a car sharing program, households in these neighborhoods can sometimes shed one or more vehicles due to the variety of modes accessible to them and the occasional use of a car sharing vehicle. In less dense neighborhoods, car sharing may allow a two- or three-car family to shed one car by making a vehicle accessible for the rare instances that multiple vehicles are needed at the same time. Car sharing can also help to enable and expand the trend of younger generations putting off obtaining licenses at age 16 and purchasing vehicles. In general, car sharing members are required to have a clean driving record and be over the age of 18 in order to join. Businesses can also sign up for business memberships to avoid maintaining or reduce the size of a company fleet of vehicles.

Peer-to-peer car sharing (also known as P2P) allows an individual to rent out his/her private vehicle when not in use. Participation in this car sharing model generates income for the owner and provides a wide range of vehicle types and prices to the renter. Peer-to-peer is similar to the traditional car sharing model insofar as vehicles need to be returned to the starting location, but differ in that they are more likely to succeed than traditional car sharing in less dense, suburban neighborhoods.[4] This is because the service is providing additional income to the vehicle owner, and the usage does not need to be high

[4] Hampshire, R. and C. Gaites, Peer-to-peer Carsharing: Market Analysis and Potential Growth, *Transportation Research Record* 2217, 2011.

enough to completely offset the vehicle ownership costs. One peer-to-peer company, Getaround, was launched in 2011 and has built a rapidly growing network of vehicles, including in the Bay Area cities of San Francisco, Berkeley and Oakland.

One-way car sharing allows a driver to pick up a vehicle in one location and drop it off at another—in some cases a dedicated pod; in others, wherever is convenient within a set geographic area. This model could allow an individual who takes transit to work to then pick up a vehicle and run errands on her way home. This model also allows vehicles to turn over more frequently since users can drive to an event, park the car, let someone else rent it and then pick up a different vehicle nearby for their return trip, which can lead to higher utilization of vehicles. Some of the more widespread one-way car sharing services include Car2Go, operated by Mercedes-Benz, and ZipCar's one-way service, both of which currently operate in seven cities. Scoot, a one-way scooter sharing system, currently operates in San Francisco.

Car sharing has positioned itself to cause a major shift in the market, but it is not captured in MTC's travel model, and accordingly is accounted for off-model. Car sharing reduces emissions in two primary ways: by lowering the average VMT of members and by allowing trips to be taken with more fuel-efficient vehicles than would have been used without car sharing. While shared transportation modes are becoming ever more popular and car sharing may continue to increase absent any intervention by MTC, MTC will be helping to accelerate expansion through this program. MTC could offer grants to fund a variety of efforts to encourage car sharing, potentially including opening new traditional car sharing offices or pods in underserved communities, developing parking codes that remove barriers to one-way car sharing and marketing and outreach programs.

Assumptions and methodology

CO_2 reductions due to car sharing are based on the number of Bay Area residents who are in the age groups likely to adopt car sharing and who live in communities that are compact enough to promote shared use. Research shows that adults between the ages of 20 and 64 are most likely to adopt car sharing, and estimates that between 10 percent[5] and 13 percent[6] of the eligible population in more compact areas when car sharing is available. With the introduction of one-way and peer-to-peer car sharing, as well as the implementation of regional strategies to support car sharing, adoption rates are assumed to reach 14 percent of the eligible population in dense urban areas (i.e., areas with at least ten people per residential acre) by 2035, while three percent of the eligible population could adopt car sharing by 2035 in suburban areas. Table 5 below summarizes the assumptions with respect to adoption rates.

[5] Zipcar. http://www.zipcar.com/is-it#greenbenefits. Accessed March 20, 2017.
[6] Zhou, B., Kockelman, K, and Gao, R. "Opportunities for and Impacts of Carsharing: A Survey of the Austin, Texas Market", TRB, 2009.

Table 5: Car sharing adoption rates

Scenario year	Adoption rates in urban areas (>10 people/res acre)	Adoption rates in suburban areas (<10 people/res acre)
2020	12%	0%
2035	14%	3%
2040	14%	3%

Research by Robert Cervero[7] indicates that on average traditional car share members drive seven fewer miles per day than non-members. This is mostly due to the members who shed a vehicle after joining car sharing. Their daily VMT drops substantially and outweighs the increase in VMT from car share members that previously did not have access to a vehicle. In addition to this reduction in VMT, when members drive in car share vehicles, their per-mile emissions are lower because car share vehicles are more fuel efficient than the average vehicle. Research by Martin and Shaheen[8] shows that the car share fleet uses 29 percent less fuel per mile than the passenger vehicle fleet in general, a difference assumed to persist through 2040. The same paper also shows that on average, members of traditional car sharing programs drive an average of 1,200 miles in car sharing vehicles per year. Also assumed is annual car share mileage will remain constant over time.

Although there are currently no one-way car sharing programs in the Bay Area, it is expected that this model will emerge over the coming years. Recent research suggest that while one-way car sharing still reduces CO_2 emissions, but not as much as traditional car sharing. For this analysis, it is assumed that one-way car sharing is not yet widespread in the Bay Area in 2020. However, by 2035, it is assumed that 20 percent of Bay Area car sharing members will be participating in a one-way car sharing program rather than a traditional program, and by 2040 this figure will increase to 25 percent. Table 6 summarizes these assumptions.

Table 6: One-way car sharing participation rates

	2020	2035	2040
Percent of car share members that participate in one-way car sharing (rather than traditional programs)	0%	20%	25%

New research by Martin and Shaheen[9] indicates that on average one-way car share members drive 1.07 fewer miles per day than non-members. Additionally, the one-way car sharing fleet uses 45 percent less fuel per mile, a difference assumed to persist through 2040. The same paper also shows that on average, members of traditional car sharing programs drive an average of 104 miles in car sharing vehicles per year. This mileage is also assumed to remain constant over time.

[7] Cervero, Golub, and Nee, "City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts", July 2006, TRB 2007 Annual Meeting paper.
[8] Martin, Elliot, and Susan Shaheen, “Greenhouse Gas Emission Impacts of Carshaing in North America,” 2010, Mineta Transportation Institute. MTI Report 09-11.
[9] Martin, Elliot, and Susan Shaheen, "Impacts of Car2Go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions", July 2016, Working Paper.

Analysis steps

To calculate the CO_2 emission reductions due to car sharing, the methodology:

1. Calculated the residential density of every TAZ (transportation analysis zone) during the scenario year by dividing the total population by the residential acres.
2. Summed the total car sharing eligible population (between the ages of 20 and 64) for urban areas (TAZs with a population density greater than 10 residents per residential acre) and for suburban areas (TAZs with a population density greater than 10 residents per residential acre).
3. Calculated total future car share membership population by multiplying the factors in Table 5 by the total car sharing eligible population in urban and suburban areas, respectively.
4. Applied the percentages in Table 6 above to determine the number of members in both traditional and one-way car sharing services.
5. Calculated the daily VMT reduction by multiplying the miles shed per day per member (7 miles in traditional car sharing programs, and 1.07 miles in one-way car sharing programs) to the number of members of each service type and summed the result across both service types.
6. Multiplied daily VMT reductions by exhaust emission rates to calculate CO_2 emission reductions due to car share members driving less.
7. Calculated the total annual miles driven in car share vehicles in the Bay Area by multiplying the car sharing member estimates for traditional and one-way car sharing by 1,200 annual miles, and 104 annual miles respectively. This was divided by the assumed number of travel days/year (250) to determine daily VMT for vehicles in each car share service type.
8. Multiplied daily VMT for vehicles in each car share service type by the vehicle efficiency gains for each service type (29% for traditional services and 45% for one-way services) and by exhaust emission rates to estimate CO_2 reductions due to car share members driving more efficient vehicles.
9. Summed CO_2 emission reductions due to car share members driving less (Step 6) and CO_2 reductions due to car share members driving more efficient vehicles (Step 8) to estimate total CO_2 reductions due to car sharing.

Results

Table 7 and Table 8 summarize the CO_2 reductions due to car sharing.

Table 7: Daily CO_2 emissions reductions due to car sharing (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-1,713	-1,935	-1,900
Main Streets	-1,709	-1,936	-1,900
Big Cities	-1,694	-1,925	-1,895
EEJ	-1,713	-1,936	-1,901

Table 8: Per capita CO_2 emissions reductions from 2005 baseline due to car sharing (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-2.09%	-2.06%	-1.92%
Main Streets	-2.09%	-2.06%	-1.92%
Big Cities	-2.07%	-2.05%	-1.91%
EEJ	-2.09%	-2.06%	-1.92%

Vanpools and Employer Shuttles

Vanpool

MTC has coordinated a vanpool program since 1981 to encourage alternative commutes and reduce congestion and emissions. To date, MTC's 511 vanpool program recruitment has consisted of online passenger and driver matching, employer outreach, up to $500 for startup fees, empty seat subsidies to encourage continued participation when a passenger is lost, free bridge tolls, and various other incentives. With these basic incentives there is an operational vanpool fleet in the Bay Area of over 515 vans. Since vanpools are not represented in MTC's travel model, the travel model cannot be used to assess the impacts of expanding the vanpool program, and therefore is captured off-model.

Employer shuttles

In addition to these traditional vanpools, there has been explosive growth in the number of employer-provided shuttles in the Bay Area. These shuttles are used as a recruiting tool and they allow for increased worker productivity due to the onboard wireless internet, thus turning commute time into productive time. Rough estimates indicate that the technology company shuttles that operate between San Francisco and Silicon Valley transport close to 17,500 people per workday.[10] The Google shuttle alone carried over 9,000 employees to work on peak days in 2015.[11] Google's shuttle system began as a vanpool in 2006 and rapidly grew into the current system. Prior to the SB 375 CO_2 emissions baseline year (2005) there were very few employer provided shuttles in the region. For purposes of this analysis there are assumed to have been no shuttles prior to 2005.

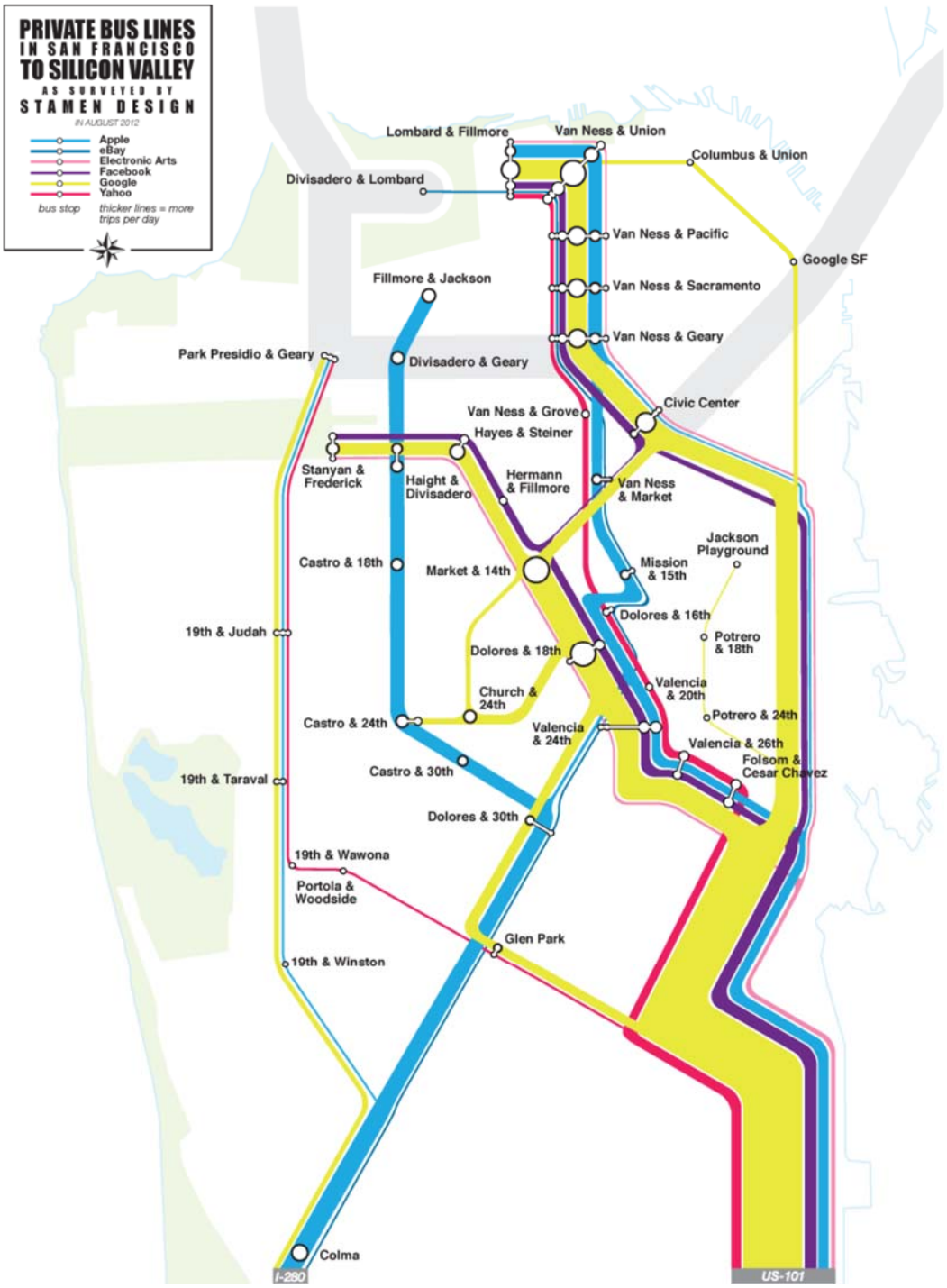
There are private shuttles running through all parts of the Bay Area including some that connect the East Bay and San Mateo County to Silicon Valley, some that operate just within San Francisco and San José, and others from BART and Caltrain stations to corporate campuses. These shuttles are not represented in MTC's travel model, and the 2010 travel survey that informs the model does not reflect the rapid growth in employer shuttles in recent years nor its impact on travel patterns, and therefore shuttles are accounted for off-model. To be conservative, the 17,500 daily employer operated shuttle riders from

[10] Based on Stamen's estimate that San Francisco shuttles carry approximately equal to 35% of Caltrain ridership levels (https://hi.stamen.com/the-city-from-the-valley-57e835ee3dc6#.4ic9o338l). Obtaining shuttle ridership levels is extremely difficult due to the confidential nature of the information since businesses use these shuttles as a recruiting tool. In the month prior to Stamen releasing their work, Caltrain reported ridership levels of 50,000 passengers per weekday.

[11] Google. 2016. Environmental Report, https://environment.google/projects/environmental-report-2016/. Accessed March 20, 2017

San Francisco to the Silicon Valley are assumed to account for all employer operated shuttle riders in the Bay Area.

Figure 1: Employer-operated shuttles running from San Francisco to Silicon Valley[12]



[12] *Source:* Stamen Design. The City from the Valley. 2012. https://hi.stamen.com/the-city-from-the-valley-57e835ee3dc6#.ifn458frg

Assumptions and Methodology

Vanpools

MTC plans to implement a vanpool program similar to programs already in operation in San Diego, Los Angeles, Denver, Arizona and elsewhere. San Diego's program began in 2001 and saw five to ten percent growth in the vanpool fleet every year through fiscal year 2013. LA Metro began its program in 2007 and the vanpool fleet has grown about 14 percent per year. MTC assumes the incentives these program provided will increase the Bay Area's vanpool fleet, increasing the number of vans in 2020 to 700 and doubling the 2013 fleet by 2035 (this equates to 1,030 vanpools), after which the number of vanpools would stabilize. The sustained fleet of 1,030 vans is slightly more than the 1996 peak of 900 vans. Accordingly, MTC plans to reevaluate the incentive package to reduce monthly operating costs.

Over time, the vanpool incentive is expected to become self-funding. This is accomplished by reporting the ridership mileage to the National Transit Database (NTD) which returns funding to the region for transit. Cities such as San Diego, Los Angeles, Denver and Arizona have found that NTD reporting of vanpool data returns more money to a jurisdiction than the amount spent to offset vanpool costs. For example, the Northern Virginia Transportation Commission found that failure to report vanpool data in the Washington, D.C. metropolitan area resulted in a $6-$8 million loss per year, and that each $1 invested would have returned more than $2 in transit funds.[13] Los Angeles spends $7 million annually to off-set vanpool costs and brings back $20 million in additional transit funding.[14] While the amount returned varies depending on the number of passenger miles travelled; vanpools that log more miles and carry more passengers have higher returns. MTC estimates that for every $1 spent on vanpools, it could expect a return of about $1.40 in transit funds.

Along with the increased subsidy, the methodology assumes that vanpools have an average of 10.8 passengers and roundtrip distance of 110 miles, both of which are expected to remain constant over time. In order to account for the emissions from the vanpool van itself, the calculations only account for 9.8 passengers in the van. Reducing the vanpool size is a simplified proxy for the emissions from the shared van.

The population that shifts to vanpools is expected to be consistent with the general population's commute mode share. Emissions reduced from a commuter switching from a single occupancy vehicle (SOV) are assumed to be 100 percent. Emissions reduced from a commuter switching from a two person carpool are assumed to be 50 percent. Emissions reduced from a commuter switching from a 3+ person carpool are assumed to be 33 percent. Shifts from other modes (walking, biking, or transit modes) are not assumed to reduce CO_2 emissions, because these modes emit fewer CO_2 emissions per mile than vanpools. In reality, it is unlikely that anyone would shift from walking or biking, which are typically short-distance modes, to a long-distance vanpool trip, and MTC focuses on providing vanpools for routes that are not currently well-served by transit. However, assuming consistency with the general commute mode share produces a conservative estimate of CO_2 reductions.

[13] Northern Virginia Transportation Commission; FTA Section 5307 Earnings Potential from Vanpools in DC Metropolitan Region; Revised: August 7, 2009.
[14] MTC October 2014 interview with LA Metro program manager, Jamie Carrington.

Since the baseline year for the SB 375 CO_2 emissions reduction target is 2005, the current vanpool fleet of 515 vans is not included in the analysis; only growth above and beyond 515 vans is included in the calculations.

Employer shuttles

Increases in the shuttle fleet from 2013 forward is assumed to be caused by companies meeting the requirements of the Commuter Benefit Ordinance (CBO). However, the benefits of existing shuttles are analyzed as the CBO program evaluation found that 46 percent of employers were already offering a benefit prior to the ordinance. The CBO therefore does not estimate the CO_2 reductions associated with these travelers. Some of these commuters take transit, which is captured in MTC's travel model. However, those who take shuttles are not captured in the model, and for this reason, the benefits of the existing shuttles are analyzed. To be conservative, the 17,500 daily employer operated shuttle riders from San Francisco to the Silicon Valley are assumed to account for all employer operated shuttle riders in the Bay Area.

The shuttles are assumed to carry an average of 30 passengers[15] and that the average round trip commute on a shuttle is 40 miles.[16] The assumption is if shuttle service was unavailable, the passenger commute mode split would mirror that of the general population. This is a conservative estimate given that some sources suggest shuttle riders would be likely to otherwise drive. For example, San Francisco County's survey of shuttle riders, which indicated that 63 percent of shuttle riders would have otherwise driven alone to work,[17] while the countywide drive-alone mode share is closer to 43 percent.[18]

Also accounted for are emissions from shuttle vehicles, assuming that they emit CO_2 at the same rate as urban buses. This likely overestimates emissions from shuttles since the shuttle fleet incorporates a range of vehicle sizes and the employers who have taken a proactive approach to sustainable transportation often strive to use the cleanest vehicles and fuels available. The exhaust emission rate extracted from EMFAC and used for 2020 shuttles is 2,265 grams/mile. The 2035 exhaust emission rate is 2,112 grams/mile, and the 2040 rate is 1,988 grams/mile.

Analysis steps

Vanpool

To calculate the CO_2 emission reductions due to vanpools, the methodology:

1. Multiplied the projected increase in vanpools by the number of passengers (minus the driver) to obtain number of vanpool participants.
2. Estimated the number of vehicle round trips reduced by vanpools, accounting for the previous mode selection of the vanpool participants by multiplying the number of vanpool participants by

[15] SFCTA Strategic Analysis Report (SAR) 08/09-2. The Role of Shuttle Services in San Francisco's Transportation System. http://www.sfcta.org/sites/default/files/content/Planning/Shuttles/Final_SAR_08-09_2_Shuttles_062811.pdf Most shuttles have a capacity of 25 passengers but the large employers operated shuttles that seat 50 to 70 passengers. An average capacity of 30 passengers per shuttle seems reasonable.
[16] Many shuttles operate from BART or Caltrain to employers offices. For this analysis the average round trip commute length includes a passenger's travel on transit since that is part of their low emission commute.
[17] SFCTA Strategic Analysis Report (SAR) 08/09-2. The Role of Shuttle Services in San Francisco's Transportation System. http://www.sfcta.org/sites/default/files/content/Planning/Shuttles/Final_SAR_08-09_2_Shuttles_062811.pdf
[18] See https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk.

each of the vehicle mode shares and an adjustment factor that accounts for the number of passengers and summed the results (i.e., vanpool participants * drive alone mode share * 1 + vanpool participants * 2 person carpool mode share * 0.5 + vanpool participants * 3 person carpool mode share * 0.33).
3. Multiplied the number of vehicle round trips reduced by 2 to estimate the daily one-way vehicle trips reduced.
4. Multiplied the number of vehicle round trips reduced by the round trip vanpool mileage to obtain daily VMT reduced.
5. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions.

Employer Shuttles

To calculate the CO_2 emission reductions due to employer shuttles, the methodology:

1. Estimated the number of vehicle round trips reduced by employee shuttles, accounting for the previous mode selection of the shuttle riders by multiplying the number of shuttle riders by each of the vehicle mode shares and an adjustment factor that accounts for the number of passengers and summed the results (i.e., shuttle riders * drive alone mode share * 1 + shuttle riders * 2 person carpool mode share * 0.5 + shuttle riders * 3 person carpool mode share * 0.33).
2. Multiplied the number of vehicle round trips reduced by 2 to estimate the daily one-way vehicle trips reduced.
3. Multiplied the number of vehicle round trips reduced by the average round trip shuttle mileage to obtain daily VMT reduced.
4. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions due to shuttle riders.
5. Calculated the minimum number of shuttle trips required to transport the shuttle riders by dividing the number of shuttle passengers by the average shuttle capacity.
6. Multiplied the number of shuttle trips by the round trip mileage of the shuttles to calculate the minimum shuttle VMT needed to serve the passengers.
7. Multiplied the shuttle VMT by the EMFAC emission rates for urban buses to obtain the shuttle vehicle emissions.
8. Subtracted the shuttle vehicle emissions (step 7) from the emissions reductions due to shuttle riders (step 4) to obtain the net emissions reduced.

Results

Table 9 and Table 10 summarize the combined CO_2 reductions due to vanpools and employer shuttles.

Table 9: Daily CO_2 emissions reductions due to vanpooling and employer shuttles (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-220	-328	-332
Main Streets	-221	-347	-354
Big Cities	-222	-321	-327
EEJ	-218	-322	-323

Table 10: Per capita CO_2 emissions reductions from 2005 baseline due to vanpooling and employer shuttles (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-0.27%	-0.35%	-0.33%
Main Streets	-0.27%	-0.37%	-0.36%
Big Cities	-0.27%	-0.34%	-0.33%
EEJ	-0.27%	-0.34%	-0.33%

Regional Electric Vehicle Charger Program

Plug-in electric vehicles (PEVs) have the potential to significantly reduce CO_2 emissions from motor vehicles. Today, the Bay Area is the leading market for PEV sales, including both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs). PHEVs have a hybridized powertrain which is fueled by chemical energy from a battery or by gasoline/diesel. BEVs are powered exclusively by the chemical energy from a battery. The focus of this strategy is on expanding the charging opportunities for PHEVs by establishing a regional public network of electric vehicle charging stations.

The costs of installing charging infrastructure can be high, and there are other barriers (e.g., on-site electrical capacity) that may also limit the potential for deploying charging infrastructure at workplaces. This program will be designed to help overcome some of those barriers by providing financial assistance to interested employers, retailers, parking management companies and others that qualify. PG&E received approval to install up to 7,500 charging stations in its service territory with a minimum of 15 percent in disadvantaged communities; this parallel process will support this program's goal of expanding charging opportunities for PHEV drivers. A regional network of charging infrastructure will provide drivers an opportunity to plug in while at work, which is where most vehicles spend most of their time parked when not at home. This will mean that PHEVs are able to travel more miles using electricity and fewer using gasoline, reducing CO_2 emissions.

MTC's travel model does not account for the mix of passenger vehicle and fuel types (e.g., conventional vehicles, PHEVs, BEVs, hybrids, etc.) in the Bay Area. Instead, the mix of vehicles, as well as the amount of miles that PHEVs travel using gasoline versus electricity, is accounted for in the emissions rates that MTC draws from EMFAC. This means that CO_2 reductions due to strategies that increase the miles that vehicles travel using electricity, like this one, must be captured off-model, by adjusting the assumptions contained within EMFAC. The assumptions from EMFAC, which fully accounts for the impact of state policies to reduce vehicle emissions, were used as a basis for analyzing this strategy.

Assumptions and methodology

The Plan Bay Area analysis was revised to account for improved fuel economy estimates, updated vehicle populations, and new vehicle sales in the Bay Area based on data included in EMFAC. PG&E's expected investment to deploy 7,500 chargers in the Bay Area was also incorporated along with the assumption that MTC would fund additional chargers after PG&E's initial investment. The analysis assumes a total of 76,000 chargers deployed, roughly one charger for every five PHEVs, which would enable all of these PHEVs to be able to plug in at work if multiple vehicles are able to plug into a single charger over the course of a day).

In the baseline, it was assumed that 40 percent of miles traveled by PHEVs would be in charge-depleting mode, i.e., electric miles instead of gasoline-powered miles. This comes from EMFAC, which indicates that:

> [CARB] staff modeled PHEVs as having a 25-mile all-electric range, which equates to a utility factor of 0.40. For the average commute, this would mean that 40 percent of the VMT could be from all-electric, and 60 percent would be from gasoline operations.[19]

This percentage is assumed to increase to 80 percent due to the Regional Charger Program. PHEVs have what is referred to as an all-electric range of between ten and fifty miles. For instance, the Ford C-MAX Energi has an all-electric range of 21 miles; the first-generation Chevrolet Volt has an all-electric range of 38 miles; and the second-generation Volt has a range of 53 miles. Data from The EV Project[20] and a paper from GM engineers[21] indicate that drivers of the Chevrolet Volt, a proxy for a PHEV with a 40-mile range (PHEV-40), are able to drive about 74 percent of their total miles in EV-mode without support from the internal combustion engine. Data from Ford Motor Company[22] indicate that vehicles in their Energi line, including the C-Max and Fusion, both of which are proxies for a PHEV with a 20-mile range (PHEV-20), travel about 33 percent of miles using electricity. ICF estimates that the current market is about 50/50 for PHEV-20/PHEV-40 today. Note that these values represent driver behavior during the early stages of charging infrastructure deployment, during which there has been no substantial dedicated effort to maximize eVMT. In other words, absent any concerted effort to deploy charging infrastructure to maximize electric miles, the average PHEV is likely traveling about 54 percent of its miles using electricity.

A network of regional charging infrastructure will further increase the percentage of miles that PHEVs travel in electric mode and the methodology assumes:

- Each charger deployed through the Regional Charger Network serves multiple vehicles each day over the course of a four-hour charging shift
- The chargers deployed are Level 2 chargers that deliver electricity with a rating of 5 kW; and
- The average electric vehicle consumes 0.35 kWh/mi.

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[19] California Air Resources Board, EMFAC2014 Volume III – Technical Documentation v1.0.7, May 2015. Available online at http://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf.

[20] EV Project, Quarterly Reports e.g., http://www.theevproject.com/cms-assets/documents/127233-901153.q2-2013-rpt.pdf.

[21] Duhon, A., Sevel, K., Tarnowsky, S., and Savagian, P., "Chevrolet Volt Electric Utilization," SAE Int. J. Alt. Power. 4(2):269-276, 2015.

[22] Proceedings EVS29, Montreal.

A ratio of approximately one charger for every five vehicles over the program years is assumed, consistent with charger-to-vehicle ratios estimated by Electric Power Research Institute (EPRI) for workplace and public charging opportunities and research conducted by ICF regarding charging optimization.[23]

These assumptions mean that these chargers would provide enough electricity to power 57 electric miles per day. Given that there are expected to be 420,000 PHEVs in the Bay Area in 2035 and 76,000 chargers funded through this program, this is equivalent to ten electric miles per PHEV per day. According to EMFAC, the average vehicle travels an average of 31 miles per day, so this additional electricity amounts to 32 percent of miles traveled. Given that the charger program is designed to fill gaps in charging opportunities, this is added to the baseline of 54 percent eVMT, which equals 86 percent. Even though there is the potential for improvements in the parameters that form the basis for the assumptions used to derive the additional eVMT potential of the regional charger network—battery sizing, vehicle efficiency, charger utilization, power delivered—over the next several decades, a conservative 80 percent eVMT assumption is used.

It is conceivable that the increased availability of chargers could increase the sales of BEVs in addition to increasing the percentage of electric miles for PHEVs, but this effect is not included in the calculations to be conservative.

Analysis steps

To determine the CO_2 emission reductions from charging infrastructure deployment throughout the region, the methodology:

1. Modified the percentage of miles traveled in charge depleting mode from the baseline 40% to 80%.
2. Determined the CO_2 emissions reduction.
    a. The CO_2 emissions attributable to PHEVs are based on how many miles each vehicle spends in each mode (charge depleting or gas/diesel).
    b. The CO_2 emission reductions are determined as the difference between the emissions attributable to the PHEV versus the emission that would have otherwise occurred using an average conventional gasoline vehicle.
3. Made no changes to the VMT.

Results

Table 11 and Table 12 summarize the CO_2 reductions due to the Regional Charger Program.

[23] D. Bowermaster, EPRI. *How Much Electric Vehicle Charging is Needed?* California Plug-in Electric Vehicle Collaborative Meeting, August 2012.

Table 11: Daily CO_2 emissions reductions due to the Regional Charger Program (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-252	-1,188	-1,287
Main Streets	-252	-1,188	-1,287
Big Cities	-252	-1,188	-1,287
EEJ	-252	-1,188	-1,287

Table 12: Per capita CO_2 emissions reductions from 2005 baseline due to the Regional Charger Program (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-0.35%	-1.42%	-1.46%
Main Streets	-0.35%	-1.42%	-1.46%
Big Cities	-0.35%	-1.42%	-1.46%
EEJ	-0.35%	-1.42%	-1.46%

Emission reductions are consistent across all EIR alternatives since the analysis does not rely on inputs from MTC's travel model.

Vehicle Buyback & PEV Incentive

Plug-in electric vehicles (PEVs) are being adopted at significant levels today in the Bay Area, and the Zero Emission Vehicle (ZEV) Program and the Low-Carbon Fuel Standard in California are regulatory drivers for advanced vehicle technologies and alternative fuels. However, despite the near-term success of PEVs in the Bay Area, PEV sales are still relatively small, representing just 3.5 percent of total new light-duty vehicle sales. There is also some uncertainty regarding the medium- to long-term availability of PEV purchase incentives; for example, California's Clean Vehicle Rebate Program changed in 2016 to adjust incentives based on household income, and the federal tax credit could change in future tax reform. Furthermore, one of the main drivers today for PEV sales, particularly for PHEVs, is HOV lane access: PHEVs are eligible for the green sticker and BEVs are eligible for the white sticker and qualify for HOV lane access through January 1, 2019. Although the California Air Resources Board (CARB) has continued to expand the number of HOV stickers for PEVs, it is likely that they will be limited and eventually discontinued, as they were for non-plug-in hybrid vehicles.

This program can provide a combination of an incentive of up to $2,500 to purchase a PEV along with the buyback of older, less efficient vehicles. This is intended to extend the market for PEVs into a broader range of income classes. Most analysts agree that the first adopters of PEVs are generally higher income individuals who own their homes, and in many cases, own or have owned a hybrid electric vehicle (e.g., a Toyota Prius). The higher purchase price of PEVs makes it difficult for middle and low income consumers to purchase them. Older and wealthier individuals tend to buy more new vehicles than other cross-sections of the population. This demographic also tends to buy newer cars more frequently. Furthermore, research from IHS Markit has shown that owners of both new and used vehicles are holding on to their vehicles longer, the scrappage rate has flattened, and the average age of vehicles has increased; the researchers forecast that the population of oldest vehicles (16 or more years)

will grow the fastest, increasing by 30% by 2021.[24] Additionally, CARB estimates that half of cars live to be 15 years old and one quarter live to be 20 years old. Interestingly, if a vehicle does survive to 20, there is a 40 percent chance it will be on the road for another ten years after that.[25] This will impact the turnover of the fleet significantly and may slow the purchase of new vehicles, including plug-in electric vehicles.

The vehicle buyback program seeks to accelerate fleet turnover while also incentivizing the purchase of advanced vehicle technology. The program will be designed to target older vehicles meeting a certain fuel economy threshold (as measured via miles per gallon, MPG) for scrapping, and will be coordinated with the Air District's Vehicle BuyBack Program. The consumer is only eligible for the program if the new vehicle being purchased is a PHEV or BEV. The incentive amount will vary with the fuel economy of the vehicle being traded in (measured in MPG) as well as the vehicle type being purchased (e.g., PHEV or BEV). Depending on the fuel economy threshold set by the program, the combination vehicle buyback and incentive program is intended to induce demand in middle and lower income brackets that might otherwise delay car purchasing, purchase a new conventional vehicle or purchase a used vehicle.

MTC's travel model does not account for the mix of passenger vehicle and fuel types (e.g., conventional vehicles, PHEVs, BEVs, hybrids, etc.) in the Bay Area. Instead, the mix of vehicles is accounted for in the emissions rates that MTC draws from EMFAC. This means that CO_2 reductions due to strategies that increase the proportion of clean vehicles in the passenger fleet, like this one, must be captured off-model, by adjusting the assumptions contained within EMFAC. The assumptions from EMFAC, which fully accounts for the impact of state policies to reduce vehicle emissions, were used as a basis for analyzing this strategy.

Assumptions and Methodology

The analysis was updated from Plan Bay Area to account for improved fuel economy estimates, updated vehicle populations, and new vehicle sales in the Bay Area based on data included in EMFAC.

We made the following assumptions in this methodology:

- Implementation of this program will begin in 2020.
- 94,000 additional PEVs will be on the road by 2035. This is a modest annual increase of about 1.5% in new vehicle sales attributable to the buyback incentive program.
- For the initial analysis, the deployed vehicles are evenly split between PHEVs and BEVs.
- The average incentive levels are $1,500 per PHEV and $2,500 per BEV. However, the actual incentive will vary based on the MPG of the vehicle being traded in as well as the technology of the vehicle being purchased.

Analysis steps

[24] "Vehicles Getting Older: Average Age of Light Cars and Trucks in U.S. Rises Again in 2016 to 11.6 Year, IHS Markit Says." Press release from IHS Markit, November 2016. Available online at: http://news.ihsmarkit.com/press-release/automotive/vehicles-getting-older-average-age-light-cars-and-trucks-us-rises-again-201

[25] Report to the California Legislature, Accelerated Light-Duty Vehicle Retirement Program. http://www.arb.ca.gov/research/apr/reports/l2070.pdf. Accessed March 20, 2013.

To calculate CO_2 reductions due to the introduction of PEVs, the methodology:

1. Determined the difference between the daily CO_2 emissions attributable to the PEV versus the emissions that would have otherwise occurred using an average conventional gasoline vehicle. For PHEVs this depends on the assumed proportion of time spent in charge depleting mode versus gas/diesel mode.
2. Multiplied the result by the number of new PEVs expected to be deployed due to the program.

Results

Table 11 and Table 12 summarize the CO_2 reductions due to the Vehicle Buyback and PEV Incentive Program.

Table 13: Daily CO_2 emissions reductions due to the Vehicle Buyback and PEV Incentive Program (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	0	-363	-234
Main Streets	0	-363	-234
Big Cities	0	-363	-234
EEJ	0	-363	-234

Table 14: Per capita CO_2 emissions reductions from 2005 baseline due to the Vehicle Buyback and PEV Incentive Program (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	0%	-0.44%	-0.27%
Main Streets	0%	-0.44%	-0.27%
Big Cities	0%	-0.44%	-0.27%
EEJ	0%	-0.44%	-0.27%

Emissions reductions will be realized after 2020, which is when program implementation is planned. Emissions reductions are consistent across all EIR alternatives because the analysis does not rely on inputs from the travel model.

Clean Vehicles Feebate Program

Originally coined in the 1990s, feebate programs are envisioned as a revenue-neutral approach to shift buying habits in the transportation and energy sectors. MTC is proposing to use a feebate program to incentivize consumers to scrap older vehicles and purchase higher performing, cleaner vehicles. A feebate program uses a combination of fees and rebates to change consumer behavior. Consumers purchasing a vehicle that emit more carbon dioxide on a gram per mile basis than a defined standard are assessed a fee at the point of purchase. These fees are used to provide rebates to consumers that purchase vehicles that emit less CO_2 on a gram per mile basis than the defined standard.

Feebates have been used with some success in other countries, including Denmark, France, the Netherlands and Norway. The structure of a feebate program for California was studied in considerable

detail for CARB.[26] In fact, California has come close to implementing a statewide feebate program on multiple occasions through legislative efforts – the first time in the early 1990s and more recently in 2008. Feebate programs have been proposed as a legislative initiative (e.g., AB 493 Ruskin in 2007), whereby implementation authority would be delegated to CARB and the State Board of Equalization, and a feebate program is not dissimilar from the fee that was approved by the Legislature via AB 434 (Sher, Chapter 807, Statutes of 1991) establishing the Transportation Fund for Clean Air (TFCA). Moving forward, MTC will engage with CARB and the Air District to determine how the program would be implemented and how to progress legislation prior to the start of the program. The feebate program would require legislation to provide regional agencies with the authority to implement it.

MTC's travel model does not account for the mix of passenger vehicle and fuel types (e.g., conventional vehicles, PHEVs, BEVs, hybrids, etc.) in the Bay Area. Instead, the mix of vehicles is accounted for in the emissions rates that MTC draws from EMFAC. This means that CO_2 reductions due to strategies that increase the proportion of clean vehicles in the passenger fleet, like this one, must be captured off-model, by adjusting the assumptions contained within EMFAC. The assumptions from EMFAC, which fully accounts for the impact of state policies to reduce vehicle emissions, were used as a basis for analyzing this strategy.

Assumptions and methodology

The analysis draws heavily from results reported by Bunche & Greene's feebate analysis for CARB. The lower-end estimate of impact of feebates on average fuel economy (1.6 percent) from their analysis is assumed. The major benefits of the feebate programs are attributable to the first several years of the program. In their report, the authors state, "In later years the level of CO_2 emissions reduction relative to the standard diminishes as the standard becomes more stringent."

It is assumed that the feebate program is introduced in 2020 and that there are not any increases in fuel economy standards at the state or national level after 2025. To maintain consistency with the Bunch & Greene study, this analysis assumes a $20 per g/mi feebate rate in a single benchmark system. Based on a sensitivity analysis performed by Bunch & Greene, an increase to $30 per g/mi feebate rate will yield a 50 percent increase in CO_2 reductions.

Since Plan Bay Area, the analysis was updated to account for improved fuel economy estimates, updated vehicle populations, and new vehicle sales in the Bay Area based on data included in EMFAC.

Analysis steps

To calculate the CO_2 emission reductions due to the Clean Vehicles Feebate Program, the methodology:

1. Estimated the improvement in fuel economy (back-calculated based on grams per mile estimates) of the new vehicle fleet due to the feebate program. Maximum improvement at the outset of the program is about 2.9%; by 2040, the improvement is reduced to 0.1%.
2. Based on vehicle turnover, estimated the modified fuel economy of entire fleet after the change to improved fuel economy of new vehicles as of 2020 due to the feebate program.

[26] Greene, David L. & Bunch, David S., "Potential design, implementation, and benefits of a feebate program for new passenger vehicles in California", Prepared for the California Air Resources Board, Contract UCD 08-312, February 2011.

3. Calculated the differential in well-to-wheels CO_2 emissions[27] of the modified fleet versus baseline fleet.

Results

Table 15 and Table 16 summarize the CO_2 reductions due to the Clean Vehicles Feebate Program.

Table 15: Daily CO_2 emissions reductions due to the Clean Vehicles Feebate Program (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	0	-682	-446
Main Streets	0	-682	-446
Big Cities	0	-682	-446
EEJ	0	-682	-446

Table 16: Per capita CO_2 emissions reductions from 2005 baseline due to the Clean Vehicles Feebate Program (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	0%	-0.82%	-0.51%
Main Streets	0%	-0.82%	-0.51%
Big Cities	0%	-0.82%	-0.51%
EEJ	0%	-0.82%	-0.51%
No Project	0%	-0.82%	-0.51%

Emission reductions will be realized after 2020, which is when program implementation is planned. Emission reductions are consistent across all EIR alternatives because the analysis does not rely on inputs from the travel model.

Smart Driving

When discussing transportation sector CO_2 reduction strategies, experts often refer to a three-legged stool consisting of vehicle technology, cleaner fuels and driver behavior. California's state agencies are leading the way on the first two legs, and SB 375 focuses on a key approach to changing driver behavior, reducing VMT by investing in alternatives to driving, locating housing closer to jobs and creating complete communities. In addition to changing how *much* someone drives, people can change *how* they drive through training in the techniques of smart driving. Smart driving behaviors are easy-to-implement actions (e.g., change in driving style, vehicle maintenance, etc.) that any driver can do. Research shows that it is possible to affect significant and swift reduction in emissions through behavior change.[28] MTC's

[27] Well-to-wheels (WTW) analysis refers to lifecycle analysis applied to transportation fuels and their use in vehicles. The analysis includes, for instance, resource extraction, fuel production, delivery of the fuel to vehicle, and end use of fuel in vehicle operations.

[28] See http://assets.511.org/pdf/drivesmart/Smart-Driving-Resource-Guide.pdf for a MTC's review of relevant research.

Smart Driving campaign reduces CO_2 emissions by promoting the driver behaviors that have been shown most effective in improving vehicle efficiency.

This strategy builds on series of previous actions by MTC. From 2013 to 2015, MTC conducted a pilot smart driving campaign that consisted of three core programs, which MTC evaluated to understand which approaches produce the most significant CO_2 reductions:[29]

- Fuel economy meters
- Smart driving lessons
- Smartphone app

In 2015, MTC expanded its smart driving investments into a region-wide program called Drive Smart Bay Area. The program development and implementation included:

- Selecting a smart driving in-vehicle device to distribute to drivers
- Developing a marketing strategy
- Developing a program website and video
- Establishing two device purchasing options
- Implementing the marketing strategy

As part of Plan Bay Area 2040, MTC is assessing the program's evaluation report prior to further implementation of the *Drive Smart Bay Area* program. Off-model analysis is necessary to capture CO_2 reductions due to this strategy because most of the behaviors promoted through *Drive Smart Bay Area* reduce vehicle emission rates, which come from EMFAC, not from MTC's travel model.

Assumptions and methodology

Implementation of the smart driving program is assumed to begin in 2020. Gas prices are currently relatively low, which would mean less consumer interest in the program and fewer CO_2 reductions if it were implemented today. It is assumed that gas prices will rise again by 2020 to the level that they were at when MTC completed its initial evaluations of the strategies discussed below, and remain at least that level thereafter. Therefore the changes to emission rates due to smart driving behaviors are assumed to be constant over time.

Smart driving educational campaign

In February 2011, MTC conducted a Baseline Climate Initiatives Survey that asked Bay Area residents about the ease of adopting various smart driving behaviors.[30] Of the respondents, 55 percent stated that it would be very easy or easy to practice "smooth acceleration and deceleration and staying at or below the speed limit." The U.S. Department of Energy reports that rapid acceleration and deceleration, and speeding can lead to fuel economy reductions from five percent on city streets to 33 percent on

[29] MTC Climate Initiatives Program Evaluation: Smart Driving, Prepared for MTC by ICF, 2015. A summary of findings is available at: http://mtccms01.prod.acquia-sites.com/sites/default/files/CIP%20Evaluation%20Summary%20Report_7-13-15_FINAL.pdf

[30] MTC conducted a Baseline Climate Initiatives Survey in February 2011. It was a 15 minute random digit dial and cell phone sample of Bay Area driving age residents. It was offered in English, Mandarin, and Spanish and had an overall margin of error of ±3.5%

freeways,[31] but current studies demonstrate a much lower average fuel economy savings of two to four percent[32] for smart driving behaviors.[33] This analysis assumes a conservative fuel efficiency reduction from smooth acceleration and deceleration of three percent.

60 percent of participants stated that it would be very easy or easy to practice "at least once per week, link several trips together, such as going shopping and to the post office, which you would normally make separately." For this analysis, this statement is interpreted to mean the driver will link three shopping trips per week due to the campaign (effectively reducing two trips).

The number of people to adopt smart driving behaviors is based on the survey results listed above and other cost effectiveness assumptions related to marketing investments. Preliminary cost estimates indicate that $1 million in advertising and education can purchase 8,000,000 TV views, 5,000,000 radio listeners and 15,000,000 online hits. Since the public needs to see or hear an advertisement multiple times before recognizing the message and being able to practice the requested behavior change; costs assume twelve views are needed for to internalize the message.[34] In order to reduce CO_2 emissions, potential adopters must also be capable of and motivated to make a change. For trip linking practices, ten percent of potential adopters are assumed to adopt the behavior. For smooth acceleration and deceleration, a more conservative assumption of five percent is used to avoid double counting the benefits of the fuel economy meter distribution program (see below for more details).

Fuel economy meters

Under this program, MTC would offer a rebate to consumers who purchase an on-board diagnostics (OBD)-connected after-market device similar to those made by Automatic and provided by MTC under Drive Smart Bay Area and the ones tested in the initial smart driving pilots. Recent studies have demonstrated an average fuel economy savings of two to four percent from smart driving education and devices. The MTC-funded smart driving pilot found that the installation of OBD-connected smart driving devices resulted in a 1.6 percent improvement in fuel economy; however the results are not statistically significant because they fall within the background fluctuation in fuel economy that was observed among the participating vehicles.[35] MTC also funded a study at UC Davis to test a smart driving app with different types of feedback. The most effective feedback mechanism (presenting the journey fuel

[31] US Department of Energy, Office of Energy Efficiency and Renewable Energy, US Environmental Protection Agency, Model Year 2005 Fuel Efficiency Guide, DOE/EE-0302

[32] While recent studies have found a range in the potential fuel efficiency improvements from smart driving techniques from zero to 18%, the substantial range in results is likely due to shortcomings in the studies including: insufficient sample sizes, short study periods, variations in the testing environment (simulations or tracks versus real-world driving conditions), and the lack of statistically significant findings. The 2-4% range is seen in studies that overcome these issues.

[33] Kurani, K., Stillwater, T., and Jones, M., 2013. Ecodrive I-80: A Large Sample Fuel Economy Feedback Field Test: Final Report. Institute of Transportation Studies Report: ITS-RR-13-15. Available at http://www.fueleconomy.gov/feg/pdfs/EcoDrive%20I-80.pdf

[34] The estimated number of views needed for the target audience to engage with the message varies dramatically by the medium and quality of the creative, but 12 views is seen as relatively standard conversion rate by marketing firms such as RHDG and Wit Media.

[35] ICF. 2015. *Climate Initiatives Program: Evaluation Summary Report*. Available at: http://mtccms01.prod.acquia-sites.com/sites/default/files/CIP%20Evaluation%20Summary%20Report_7-13-15_FINAL.pdf

economy in the center of the screen) had a statistically discernable effect of a 15.5 percent reduction in fuel consumption; however, the sample size was small with approximately 18 people viewing that version of feedback.[36] Given these varied findings, a three percent fuel economy savings from OBD-connected devices is used.

The analysis assumes that MTC will distribute 900,000 OBD-connected devices by 2035, covering roughly 30 percent of all Bay Area registered vehicles. This assumptions does not account for the fact that an increasing number of vehicles, particularly hybrids, come with displays that show information such as real-time fuel efficiency, five-minute-average fuel efficiency, overall trip fuel efficiency, or simple diagrams that indicate relative fuel efficiency.[37] This may help to further accelerate the spread of smart driving behaviors beyond the behavior change induced by the devices that MTC distributes.

Analysis steps

Smart driving educational campaign

Smooth acceleration and deceleration

In order to estimate CO_2 reductions due to smooth acceleration and deceleration, the methodology:

1. Estimated the total number of media impressions by multiplying the media ad-buy for smooth acceleration and deceleration by the estimated number of impressions per million dollars of media spend (28 million impressions/$1 million).
2. Estimated the number of residents who internalize the campaign messaging by dividing the total media impressions by the estimated number of views required for engagement (12).
3. Estimated the number of potential adopters by multiplying the total number of residents who internalized the campaign messaging by the percent of Bay Area residents who responded that adopting smooth acceleration and deceleration behaviors would be easy or very easy.
4. Estimated the number of residents who adopt the behavior by multiplying the number of potential adopters by the by the assumed adoption rate (5%).
5. Estimated the total daily VMT affected by the smart driving behavior by multiplying the number of behavior adopters by the regional average daily VMT per capita.
6. Estimated the equivalent quantity of VMT reduced due to smooth acceleration and deceleration by multiplying the total daily VMT affected by the assumed fuel efficiency savings of smooth acceleration and deceleration (3%).
7. Calculate the CO_2 emissions reduced by multiplying the equivalent VMT reduced by the EMFAC exhaust emissions CO_2 factor.

Trip linking

In order to estimate CO_2 reductions due to trip linking, the methodology:

1. Repeated Steps 1-4 of the smooth acceleration and deceleration calculations above, substituting using the appropriate assumptions for trip linking, to estimate the number of residents who adopt the behavior.

[36] Ibid.

[37] Barkenbus, Jack, 2010. *Eco-driving: An overlooked climate change initiative.* Journal of Energy Policy, 38 (2010) 762–769.

2. Estimated the annual vehicle trips reduced by the behavior adopters by multiplying the total number of behavior adopters by the assumed number of trips reduced per week (2) and the number of weeks per year (52).
3. Calculated the total annual VMT reduced by multiplying the annual vehicle trips reduced by the average length of a shopping trip in the region (approximately 4.6 miles; varies by year and scenario).
4. Divided the results of steps 2 and 3 by the assumed number of driving days per year (300) to calculate total daily trips and VMT reduced.
5. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions.

Fuel economy meters

In order to estimate CO_2 reductions due to trip linking, the methodology:

1. Estimated the total number of devices to be distributed by dividing the total investment by the assumed price per device (including program management fees).
2. Calculated the total daily VMT affected by the smart driving behavior by multiplying the number of behavior adopters by the regional average daily VMT per vehicle.
3. Estimated the equivalent quantity of VMT reduced due to fuel economy meters by multiplying the total daily VMT by the assumed fuel efficiency savings of the fuel economy meters (3%).
4. Calculated the CO_2 emissions reduced by multiplying the equivalent VMT reduced by the EMFAC exhaust CO_2 emissions factor.

Results

Table 17 and Table 18 summarize the CO_2 reductions due to MTC's efforts to promote smart driving.

Table 17: Daily emissions reductions due to smart driving (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	0	-677	-669
Main Streets	0	-681	-677
Big Cities	0	-672	-663
EEJ	0	-662	-655

Table 18: Per capita emissions reductions from 2005 baseline due to smart driving (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	0%	-0.72%	-0.67%
Main Streets	0%	-0.72%	-0.68%
Big Cities	0%	-0.71%	-0.67%
EEJ	0%	-0.70%	-0.66%

Targeted Transportation Alternatives

Targeted transportation alternatives programs employ a variety of strategies, including individual travel consultation, organized events, and distribution of outreach and informational materials to encourage people to shift from driving alone to carpooling, transit, biking, or walking for any of their trips. These programs are "targeted" because they tailor activities and materials to focus on the travel needs and transportation options that are available in specific job centers or residential neighborhoods. Several MPOs and large cities in the U.S. administer these programs, partnering with local governments, transit agencies, employers and transportation management associations to customize projects to different communities. Examples from other jurisdictions operating programs for ten years or more with positive results include Portland Metro's Regional Travel Options program, the City of Portland's SmartTrips program and the City of Seattle's InMotion program.

In addition, several public agencies in the Bay Area currently have marketing programs in place. Two of the Climate Initiative Innovative Grant pilot projects funded by MTC from 2011-13, GoBerkeley and Connect, Redwood City!, include targeted transportation alternatives components. The former involved working with property managers to market travel options and provide free bus passes to residents of multifamily transit-oriented developments, while the latter included focused outreach to employers with billboard and print advertising to promote alternatives to driving alone. These two projects were among the most effective Climate Initiative projects at reducing CO_2 emissions, and the targeted transportation alternatives components of these projects stood out for their cost effectiveness and results.

MTC's Targeted Transportation Alternatives Program is considering a similar implementation approach to Portland Metro's Regional Travel Options grant program, which issues grants to public agencies, transportation management associations, and non-profits to implement projects that make it easier for travelers to get around without driving alone.[38]

Off-model analysis is necessary to capture CO_2 reductions from targeted transportation alternatives programs. MTC's last travel survey which informs the travel model, was conducted in 2010, and does not capture the impacts of new strategies that change travel behavior such as this one. These strategies might be captured by a future model once they have been implemented to the extent that they influence people's behavior and can be captured by the travel surveys, and once the model framework has been altered to include inputs that represent the presence of behavior change strategies.

Assumptions and Methodology

Data from two community-based travel marketing programs from the Portland, OR metropolitan area was used to estimate CO_2 reductions for a regional targeted transportation alternatives program in the Bay Area. Since travel marketing programs are typically targeted toward employees or households; this strategy includes both workplace and residential components, and uses data from different programs to assess each component. Employee-focused programs can be more cost-effective at reaching workers

[38] http://www.oregonmetro.gov/tools-partners/grants-and-resources/travel-options-grants

who are concentrated at large employers, making outreach efficient. However, residential programs can produce greater CO_2 reductions per person reached because they affect all trips, not just commute trips.

Evaluation data from employer-focused projects in Portland Metro's Regional Travel Options program[39] was used to assess the impact of programs that target employers and data from the City of Portland's SmartTrips program,[40] which focuses on households, to assess the impacts of residential programs. These are longstanding programs, and each has conducted multiple rounds of evaluation, with each round covering multiple projects. Information was collected on the cost per year of marketing to an individual household/employee, the percentage of residents/employees receiving program information who change behavior (penetration rate), and the reduction in SOV mode share for those residents/employees from evaluations of these two programs. These were then applied to the daily number and distance of trips for all trips (for households) and for commute trips (for employees) to estimate VMT impacts. Evaluations of targeted transportation alternatives programs typically focus on impacts during the year after programs are implemented; long-term evaluations that provide information on how long behavior change persists due to marketing programs is not currently available. Therefore, the methodology uses a conservative assumption that behavior change lasts for five years before participants revert to their previous travel patterns. Table 19 summarizes these assumptions.

Table 19: Summary of Targeted Transportation Alternatives assumptions

	Households	Employees
Average cost per year of marketing to a household/employee	$3.11	$4.34
Average penetration rate	29%	33%
Average reduction in SOV mode share among participants	11%	9%
Average daily one-way driving trips affected	5.47	2
Average one-way trip length (miles)[41]	6.4	10.6
Number of years for which behavior change persists[42]	5	5

MTC's investment in this strategy is the primary input in the CO_2 estimates. Based on the budget available and the amount of CO_2 reductions that it needs to achieve, MTC anticipates investing $2.15 million in this strategy per year, with $2 million going to residential programs and $150,000 going to employee programs. Since this is a new strategy, MTC will be working with consultants to develop an approach to implementation.

[39] Metro, Regional Travel Options Program Evaluation Report, 2012, http://www.oregonmetro.gov/sites/default/files/appendix_d_rto_evaluation_2012.pdf.
[40] Portland Bureau of Transportation, Past SmartTrips 2004-2010, http://www.portlandoregon.gov/transportation/56703.
[41] This is an output from MTC's travel model, and the value varies for different scenarios and years. The values shown are for the Proposed Plan in 2035; values for other scenario/year combinations range from 6.2-6.5 (household) and 10.2-11.2 (employee)
[42] For 2020, we used a value of 3 since the strategy will take effect in 2017, and will only have been in place for 3 years.

Analysis steps

The amount of CO_2 reductions that MTC realizes through this strategy depends on the amount that it invests. To calculate CO_2 reductions based on the amount invested, the methodology:

1. Allocated the investment between household and employee programs.
2. Divided the respective household/employee investments by the average cost per year of marketing to a household/employee and multiplied by the penetration rate in order to calculate the total number of participants.
3. Multiplied the total number of participants by the average reduction in SOV mode share among participants and the average daily one-way driving trips affected to calculate the average daily number of vehicle trips reduced due to programs funded that year.
4. Multiplied the average daily number of vehicle trips reduced by the number of years for which behavior change persists to estimate the total average daily number of vehicle trips reduced in any given year. This accounts for the fact that programs funded in previous years produce ongoing vehicle trip reductions.
5. Multiplied daily vehicle trips reduced by the average one-way trip length to calculate the average daily VMT reductions.
6. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions.

Results

Table 20 and Table 21 summarize the CO_2 reductions due to Targeted Transportation Alternatives.

Table 20: Daily CO_2 emissions reductions due to Targeted Transportation Alternatives (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-954	-1,604	-1,578
Main Streets	-958	-1,598	-1,586
Big Cities	-952	-1,581	-1,553
EEJ	-948	-1,574	-1,552

Table 21: Per capita CO_2 emissions reductions from 2005 baseline due to Targeted Transportation Alternatives (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-1.17%	-1.71%	-1.59%
Main Streets	-1.17%	-1.70%	-1.60%
Big Cities	-1.16%	-1.68%	-1.57%
EEJ	-1.16%	-1.67%	-1.57%

Trip Caps

Trip caps set limits on the number of vehicle trips to and from workplaces, and enforce these limits via regular traffic counts and penalties for non-complying workplaces. By limiting the number of vehicle trips to a level below unrestricted access, trip caps can reduce CO_2 emissions. Local governments have the ability to set trip caps on new development projects through development agreements, but their

authority to enact caps on existing development is more limited. Trip caps therefore typically focus on minimizing the traffic impacts of new office or commercial development. Several South Bay cities, including Mountain View, Sunnyvale, Cupertino and Menlo Park, have enacted trip caps,[43] as has the City of Los Angeles. Stanford University and Santa Clara County have had a trip cap in effect for over ten years. Most of these caps focus on individual development projects, but Mountain View's trip cap covers an entire business district, providing a promising template for a program to encourage trip caps in employment centers throughout the Bay Area.[44] They are an increasingly popular strategy to reduce vehicle trips in the Bay Area's high-growth employment centers, and MTC can promote their use throughout the region, reducing CO2 emissions.

Trip caps complement, but do not duplicate, other commute transportation demand management strategies included in the off-model analysis, such as the Commuter Benefits Ordinance (CBO). These other strategies act as "carrots" that provide employees incentives to use sustainable commute modes; trip caps are a "stick" that require employers to reduce trips by employees or face fines. Trip caps also apply to different employers than other TDM strategies; for example the CBO applies to all employers with 50+ employees throughout the Bay Area whereas trip caps apply to all new businesses, regardless of size, in designated employment areas. In order to implement trip caps across the region, MTC is considering offering assistance to local governments through its existing planning grant programs.

Off-model analysis is necessary to capture CO_2 reductions from trip caps because MTC's last travel survey, which informs its model, was conducted in 2010, and does not capture the impacts of new strategies that change travel behavior such as this one. These strategies might be captured by a future model once they have been implemented to the extent that they influence people's behavior in a way that can be captured by the travel surveys, and once the model framework has been altered to include inputs that represent the presence of behavior change strategies.

Assumptions and Methodology

Estimating CO_2 reductions due to trip caps involves multiplying the number of employees affected by trip caps by the average reduction in vehicle trips for employees subject to caps, and then converting the result to CO_2 reductions.

In order to determine the number of employees affected, two assumptions were made where trip caps can apply:

1. Trip caps generally apply in employment centers where there is a high enough concentration of businesses to justify the effort in adopting a cap. All traffic analysis zones (TAZs) with more jobs than residents are assumed to represent employment centers.
2. Trip caps are feasible in areas where there is a high enough density of jobs and land uses to support transit, carpooling and other sustainable commute options which is assumed to be the case in all TAZs designated as either urban or suburban in MTC's travel model.

[43] For a summary of South Bay trip cap programs, see Cities21, Palo Alto Comp Plan Transport Element, Extended Comments, September 1, 2015, http://www.cities21.org/cms/PA_Transp_Elem_C21.pdf.
[44] City of Mountain View, North Bayshore Transportation Demand Management (TDM) Plan Guidelines, February 2015, http://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=15164.

Trip caps would apply to all new employees located in TAZs that met both of these criteria.

The next step was to determine the reduction in vehicle trips due to the trip cap. The baseline number of vehicle trips per employee in each TAZ where trip caps apply were estimated. To this, the average vehicle trip reduction from the City of Mountain View's North Bayshore Transportation Demand Management (TDM) Plan Guidelines was applied, which is based on a target of 45 percent drive-alone mode share and 10 percent carpool mode share.[45] According to MTC's travel model, the current regional average carpool occupancy is 2.58 people per carpool, and the cap is equivalent to 0.98 vehicle trips per employee per day. This represents a 40 percent decrease from the current level of 1.62 vehicle trips per employee per day, which was calculated based on the current mode share for home-based work trips to the superdistrict containing the North Bayshore area—76 percent drive alone and 14 percent carpool, according to MTC's travel model.

The 40 percent reduction in the North Bayshore trip cap represents an average estimate for the effectiveness of trip caps that should apply throughout the region, because it reflects both the opportunities and challenges that will be present in many Bay Area locations. On one hand, the area is experiencing high demand for commercial development and the City of Mountain View took a proactive approach to minimizing the traffic impacts of new development through the trip cap. On the other hand, the North Bayshore area is very challenging to serve with alternatives to driving given that it is cut off from the rest of Mountain View by the Bayshore Freeway and is home to the Shoreline Amphitheatre, the Google campus, and other land uses that are not conducive to walking, bicycling or transit.

Analysis steps

To calculate CO_2 reductions due to trip caps, the methodology:

1. Identified all TAZs where trip caps are likely to apply: urban and suburban TAZs with more jobs than households.
2. Identified the current drive-alone and carpool mode share for home-based work trips to each of the trip-capped TAZs.
3. Calculated the average number of daily vehicle trips per employee in each trip-capped TAZ by dividing carpool mode share by current average carpool occupancy, adding the result to the drive-alone mode share, and multiplying the sum by two to account for round trips to and from work.
4. Estimated the reduction in daily vehicle trips per employee by applying the trip cap reduction factor derived from the Mountain View North Bayshore TDM Plan (40%) to the result of Step 4.
5. Multiplied the result of step 4 by the number of new employees projected for the TAZ between 2015 and the scenario year to estimate the total reduction in daily vehicle trips for each trip-capped TAZ.
6. Multiplied the result of step 5 by the average trip distance for home-based work trips for each trip-capped TAZ to estimate the total reduction in daily VMT for each trip-capped TAZ.
7. Summed the total reduction in daily vehicle trips across all trip-capped TAZs.
8. Summed the total reduction in daily VMT across all trip-capped TAZs.
9. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions.

[45] City of Mountain View 2015, p. 4-3.

Results

Table 22 and Table 23 summarize the CO_2 reductions due to Trip Caps.

Table 22: Daily CO_2 emissions reductions due to trip caps (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-120	-688	-856
Main Streets	-150	-764	-1,111
Big Cities	-143	-646	-836
EEJ	-150	-622	-761

Table 23: Per capita CO_2 emissions reductions from 2005 baseline due to trip caps (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-0.15%	-0.73%	-0.86%
Main Streets	-0.18%	-0.81%	-1.12%
Big Cities	-0.18%	-0.69%	-0.84%
EEJ	-0.18%	-0.66%	-0.77%

Expanded Bike Share System

Bike share systems provide bicycles that members of the public can borrow and use for limited durations (typically under a day) in exchange for a fee. In most systems, bike share bicycles must be borrowed from and returned to designated docking stations, though some systems have payment technology and locks mounted on bicycles to allow users to leave them anywhere in the service area. In August 2013, in collaboration with MTC, the Air District implemented a bike share system in the Bay Area on a limited pilot basis called Bay Area Bike Share (BABS). BABS consists of approximately 700 bikes deployed across 70 stations; approximately half in San Francisco and the other half in South Bay cities. Stations are located at key destinations such as transit hubs and employment and commercial areas. In 2015, Motivate, a private company, took over management of BABS, and with corporate sponsorship, rebranded and will expand the system tenfold, including new service areas in the inner East Bay.[46] MTC will be promoting bike sharing through its existing or new outreach programs.

Bike share reduces CO_2 emissions by enabling users to take short-distance trips by bicycle instead of by car, and in some cases bike share can eliminate longer trips by enabling users to connect to transit. As the bike share system expands, further CO_2 reductions will be realized. Motivate's plans for the bike share system are still evolving, but CO_2 reductions are quantified based on information currently available to MTC about the planned system.

Assumptions and methodology

Based on information from Motivate, the criteria for service area expansion in Berkeley, Emeryville, Oakland, San Francisco and San Jose includes transit-rich, densely developed areas, in addition to some targeted neighborhoods for equitable access. Since the service areas are still being decided, the priority

[46] http://www.bayareabikeshare.com/expansion

development areas (PDAs) or areas in which most of the region's growth is anticipated to occur, were used to identify neighborhoods in each city that met these criteria. A contiguous bike share service area was then mapped that included these neighborhoods. Summarized below are the boundaries of the service area for each city:

- Berkeley: bike share covers the area east of College Ave., south of Cedar St., west of 6th St., and extends south to the city limits for contiguity with the Emeryville/Oakland bike share network.
- Emeryville: bike share covers the entire city east of Interstate 80.
- Oakland: North of Interstate 580, bike share covers the area west of College/Broadway. South of Interstate 580, the bike share service area is bounded in the southeast by 55th Ave. and in the southwest by 12th St. / San Leandro St., except for the area around Jack London square, where it extends down to the harbor.
- San Francisco: bike share covers most of the city, excluding hilly residential neighborhoods around Twin Peaks / Mt. Sutro, the Sunset, industrial lands along the Bayfront, and major parks. Though the Sunset meets the criteria for density and transit service, it was excluded as it is isolated from the rest of the service area.
- San Jose: bike share covers downtown and the residential neighborhoods surrounding it. The service area is bounded by Interstates 680 and 101 in the northeast, Tully Rd. in the southeast, Monterey Highway and Meridian Ave. in the west, and Berryessa Rd. and Hedding St. in the northwest.

With these geographic areas mapped, the number of residents and jobs in each using 2010 Census and Longitudinal Employer-Household Dynamics data were calculated. Information from Motivate on the approximate number of bikes in each city and the number of bikes per station was used to estimate the number of planned stations for each city.

The Institute for Transportation and Development Policy (ITDP) *Bike-Share Planning Guide* includes data on the effectiveness (in terms of the number of trips per 1,000 residents) of different bike share systems and compares effectiveness to different system characteristics.[47] ITDP finds that station density best explains bike share usage, and uses linear regression analysis to identify the relationship between station density and effectiveness. ITDP's data from U.S. systems was used to determine the equation best describing the relationship between station density and daily trips per 1,000 residents for U.S. systems:

*Daily trips per 1,000 residents = 1.74 * station density + 17.2*

This equation was then applied to the station density and number of residents in each bike share service area to estimate the total number of bike share trips per day. Table 24 summarizes the data and calculations for each service area.

[47] Institute for Transportation and Development Policy, *The Bike-Share Planning Guide*, Fig. 3, p. 45, https://www.itdp.org/the-bike-share-planning-guide-2/.

Table 24: Summary of bike share service areas by city

City	Number of bikes	Bikes per station	Total stations	Area (km2)	Stations per km2	Estimated daily bike share trips per 1000 residents	Current number of residents	Estimated current daily bike share trips (pop-based)
Berkeley	400	10	40	11.5	3.5	23.1	79,090	1,823
Emeryville	100	10	10	2.6	3.8	23.7	8,596	204
Oakland	850	10	85	34.8	2.4	21.3	207,116	4,401
San Francisco	4,500	15	300	67.0	4.5	24.8	659,773	16,356
San Jose	1,000	10	100	46.3	2.2	20.8	188,213	3,907
Total	**6,850**		**535**	**162**			**1,142,788**	**26,691**

The average regional population growth was applied to estimate the number of bike share trips in each scenario year. This results in a conservative estimate of bike share trips since bike share serves many of the Bay Area's highest-growth communities.

The bike share trips were then converted to VMT reductions based on results from MTC's evaluation of BABS, which found that each bike share trip reduced an average of 1.3 VMT.[48] Many bike share trips do not reduce any VMT because they do not displace vehicle trips, while others only reduce short trips, but the evaluation found that a significant share of bike share trips enables users to connect to transit, eliminating longer trips.

Analysis steps

To calculate CO_2 reductions due to bike sharing, the methodology:

1. Identified a service area for each city with planned bike share and collected data on the area, number of planned bike share stations, and population for each service area.
2. Divided the number of bike share stations by the area of each service area to calculate the number of stations per square kilometer.
3. Applied a regression formula derived from ITDP to estimate the number of daily trips per 1,000 residents in each service area.
4. Multiplied the results by the number of residents in each area to estimate the number of daily bike share trips in each service area, and summed results across all service areas.
5. Multiplied total daily bike share trips by average population growth for the scenario year to estimate future total daily bike share trips.
6. Multiplied the result by the average VMT reduced per bike share trip to estimate total VMT reductions due to bike share.
7. Multiplied exhaust emission rates by daily VMT reductions to calculate total CO_2 emission reductions.

[48] MTC Climate Initiatives Program Evaluation: Pilot Bike-sharing Program, Prepared for MTC by Eisen-Letunic, 2015.

Results

Table 25 and Table 26 summarize the CO_2 reductions due to the expanded bike share system. CO_2 reductions do vary slightly between the different EIR alternatives assessed, but the differences between alternatives are not visible at the level of precision shown in the tables.

Table 25: Daily CO_2 emissions reductions due to the expanded bike share system (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-18	-21	-22
Main Streets	-18	-21	-22
Big Cities	-18	-21	-22
EEJ	-18	-21	-22

Table 26: Per capita CO_2 emissions reductions from 2005 baseline due to the expanded bike share system (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-0.02%	-0.02%	-0.02%
Main Streets	-0.02%	-0.02%	-0.02%
Big Cities	-0.02%	-0.02%	-0.02%
EEJ	-0.02%	-0.02%	-0.02%

Expanded Bicycle Infrastructure

Bicycle infrastructure makes it safer, more convenient, and more pleasant for people to bike instead of driving. Research has found that many people are interested in bicycling more, but are concerned about being hit by motor vehicles.[49] Building new infrastructure allows trips by bicycle instead of driving. As of 2005, the Bay Area had over 6,500 miles of bike lanes and trails, and this number is projected to increase to over 11,300 miles by 2035, significantly increasing the number of bicyclists and reducing VMT and CO_2 emissions as a result. Off-model analysis is required to account for CO_2 reductions due to improving bicycle infrastructure. MTC's model estimates bicycle trips based on based on trip distance alone, and does not capture the quality of bicycle infrastructure nor how infrastructure affects travel.

MTC's Regional Bicycle Plan 2009 Update[50] estimated the cumulative cost of building out the regional bikeway network as $1.4 billion dollars. Local governments are assumed to fund projects not included in the regional bikeway network.

[49] Dill, J., and N. McNeil, Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential, Oregon Transportation Research and Education Consortium, August 10, 2012, http://web.pdx.edu/~jdill/Types_of_Cyclists_PSUWorkingPaper.pdf.

[50] Metropolitan Transportation Commission. Regional Bicycle Plan for the San Francisco Bay Area 2009 Update. March 2009. http://www.pedbikeinfo.org/pdf/PlanDesign_SamplePlans_Region_SFBayArea2009.pdf

Assumptions and methodology

In order to estimate CO_2 reductions due to expanded bicycle infrastructure, current and planned bicycle infrastructure in the region data was collected. Data on current infrastructure comes from MTC's Regional Bicycle Plan, which included an inventory of bicycle lanes and trails in the region. Data on planned infrastructure comes from an inventory of planned local and regional facilities conducted in 2013, and may underestimate future infrastructure because it does not capture facilities included in more recent plans. The impact on bicycle mode share was then estimated based on research conducted by Dill and Carr,[51] which estimates the absolute increase in bicycle mode share based on the number of bicycle lane-miles per square mile of land. Dill and Carr observed that if bike lane density increases by one lane-mile per square mile, bicycle mode share goes up by an absolute one percent, e.g., if the baseline mode share is two percent, it will increase to three percent. This increase in bicycle mode share was then converted to a reductions in vehicle trips, VMT and CO_2 emissions.

Analysis steps

To calculate CO_2 reductions due to expanded bicycle infrastructure, the methodology:

1. Divided miles of current bicycle lanes by the land area of the region to calculate the current bicycle facility density, in terms of the number of bicycle lanes and trails per square mile.
2. Repeated the step above for the scenario year.
3. Calculated the percent change in bicycle facility density between the current and scenario year.
4. Divided the percent change in bicycle facility density by 100 to estimate the change in bicycle mode share.
5. Multiplied the change in bicycle mode share by the baseline number of daily vehicle trips to estimate the number of daily vehicle trips reduced.
6. Multiplied the result by the average length of bicycle trips for the scenario year to estimate the average daily VMT reduced.
7. Summed the product of trip-end emission rates and daily vehicle trip reductions and the product of exhaust emission rates and daily VMT reductions to calculate total CO_2 emission reductions.

Results

Table 27 and Table 28 summarize the CO_2 reductions due to expanded bicycle infrastructure.

Table 27: Daily CO_2 emissions reductions due to expanded bicycle infrastructure (short tons)

EIR Alternative	2020	2035	2040
Proposed Plan	-24	-50	-52
Main Streets	-24	-51	-54
Big Cities	-22	-48	-51
EEJ	-24	-51	-53

[51] Dill, J., and T. Carr. 2003, Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them – Another Look, *Transportation Research Board* 1828, National Academy of Sciences, Washington, D.C.

Table 28: Per capita CO_2 emissions reductions from 2005 baseline due to expanded bicycle infrastructure (percent)

EIR Alternative	2020	2035	2040
Proposed Plan	-0.03%	-0.05%	-0.05%
Main Streets	-0.03%	-0.05%	-0.05%
Big Cities	-0.03%	-0.05%	-0.05%
EEJ	-0.03%	-0.05%	-0.05%

Appendix E
List of Transportation Control Measures (TCM) Projects

TCM A: Regional Express Bus

Regional Express Bus Program

Vehicle Deployment Throughout the Bay Area[1]

February 18, 2009

Transit Operator	Vehicle Type	Serial Registration[2]	Funds Obligated	Operating Agency	Route	Weekday Service Hours	Weekend Service Hours
AC Transit[3]	Over-The-Road	1M8PDMPA43P055640	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA63P055641	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA83P055642	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPAX3P055643	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA33P055645	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA53P055646	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA73P055647	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA93P055648	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA73P055650	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA93P055621	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA03P055652	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA23P055653	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA43P055654	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA63P055655	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPAX3P055657	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA13P055658	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA33P055659	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPAX3P055660	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA13P055661	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA73P055664	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA83P055656	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA03P055666	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA93P055665	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA53P055663	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA33P055662	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA23P055667	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA03P055649	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPAX3P055674	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA43P055668	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA63P055669	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA23P055670	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA43P055671	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA63P055672	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA83P055673	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA33P055676	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA53P055677	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	IM8PDMPA73P055678	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA93P055679	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Over-The-Road	1M8PDMPA13P055675	3/25/2001	AC Transit	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Suburban	15GCD201531111916	1/27/2003	AC Transit - Transferred from SamTrans[4]	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Suburban	15GCD201731111917	1/27/2003	AC Transit - Transferred from SamTrans[4]	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Suburban	15GCD201931111918	1/27/2003	AC Transit - Transferred from SamTrans[4]	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
	Suburban	15GCD201031111919	1/27/2003	AC Transit - Transferred from SamTrans[4]	Transbay - Bay, San Mateo, and Dumbarton Bridges	5:00 AM - 12:45 AM	5:30 AM - 12:50 AM
CCCTA	Suburban	15GDD271X21111662	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111663	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111664	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111665	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111666	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111667	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111668	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111669	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111670	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111671	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111672	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111673	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	
	Suburban	15GDD271X21111674	3/25/2002	CCCTA	960B & 960C Mitchell Drive Park & Ride/Bishop Ranch	**960B** 5:15 AM - 7:51 PM **960C** 6:15 AM - 7:50 PM	

TCM A: Regional Express Bus

Regional Express Bus Program

Vehicle Deployment Throughout the Bay Area[1]

February 18, 2009

Transit Operator	Vehicle Type	Serial Registration[2]	Funds Obligated	Operating Agency	Route	Weekday Service Hours	Weekend Service Hours
Fairfield-Suisun	Over-The-Road	1M8PDMPA13P055949	11/14/2002	Fairfield-Suisun	40 Vacaville/Fairfield to Pleasant Hill/Walnut Creek BART	5:00 AM - 9:57 AM & 3:01 PM - 8:31 PM	
	Over-The-Road	1M8PDMPA83P055950	11/14/2002	Fairfield-Suisun	40 Vacaville/Fairfield to Pleasant Hill/Walnut Creek BART	5:00 AM - 9:57 AM & 3:01 PM - 8:31 PM	
	Suburban	15GCD201731111920	1/27/2003	Fairfield-Suisun - Transferred from SamTrans[4]	30 Fairfield to Davis/Sacramento	6:08 AM - 7:05 PM	Sat Only 8:03 AM - 4:43 PM
	Suburban	15CGD201931111921	1/27/2003	Fairfield-Suisun - Transferred from SamTrans[4]	30 Fairfield to Davis/Sacramento	6:08 AM - 7:05 PM	Sat Only 8:03 AM - 4:43 PM
Golden Gate	Over-The-Road	1M8PDMPA53PO55680	11/8/2002	Golden Gate	71 Novato/San Rafael/Marin City/San Francisco	6:35 AM - 8:27 PM	Sat Only 6:59 AM - 7:28 PM
	Over-The-Road	1M8PDMPA73P055681	11/8/2002	Golden Gate	71 Novato/San Rafael/Marin City/San Francisco	6:35 AM - 8:27 PM	Sat Only 6:59 AM - 7:28 PM
	Over-The-Road	1M8PDMPA93PO55682	11/8/2002	Golden Gate	72 Santa Rosa/Rohnert Park/Cotati/San Francisco	3:54 AM - 8:59 AM & 2:12 PM - 8:05 PM	
	Over-The-Road	1M8PDMPAO3PO55683	11/8/2002	Golden Gate	72 Santa Rosa/Rohnert Park/Cotati/San Francisco	3:54 AM - 8:59 AM & 2:12 PM - 8:05 PM	
	Over-The-Road	1M8PDMPA23PO55684	11/8/2002	Golden Gate	75 Santa Rosa/Rohnert Park/Cotati · Petaluma /Marin Civic Center/San Rafael	5:02 AM - 8:35 AM & 2:59 PM - 7:18 PM	
	Over-The-Road	1M8PDMPA43PO55685	11/8/2002	Golden Gate	75 Santa Rosa/Rohnert Park/Cotati · Petaluma /Marin Civic Center/San Rafael	5:02 AM - 8:35 AM & 2:59 PM - 7:18 PM	
LAVTA	Suburban	15GDD271521110872	3/25/2002	LAVTA	70X Pleasanton - Walnut Creek Express	5:09 AM - 9:16 AM & 3:19 PM - 7:42 PM	
	Suburban	15GDD271721110873	3/25/2002	LAVTA	70X Pleasanton - Walnut Creek Express	5:09 AM - 9:16 AM & 3:19 PM - 7:42 PM	
	Suburban	15GDD271921110874	3/25/2002	LAVTA	70X Pleasanton - Walnut Creek Express	5:09 AM - 9:16 AM & 3:19 PM - 7:42 PM	
	Suburban	15GDD271021110875	3/25/2002	LAVTA	70X Pleasanton - Walnut Creek Express	5:09 AM - 9:16 AM & 3:19 PM - 7:42 PM	
NCTPA	Suburban	15GCD201631111911	1/27/2003	SamTrans Transfering to NCPTA on 2/28/09	June 2009 - Calistoga/Yountville/Napa/American Canyon/Baylink Ferry Terminal	5:00 AM-6:30 PM; Peak Only	
	Suburban	15GCD201831111912	1/27/2003	SamTrans Transfering to NCPTA on 2/28/09	June 2009 - Calistoga/Yountville/Napa/American Canyon/Baylink Ferry Terminal	5:00 AM-6:30 PM; Peak Only	
Tri-Delta	Over-The-Road	1M8PDMPA63P055686	11/8/2002	Tri-Delta	300 Express Commuter Service Brentwood/Pittsburg BART	4:15 AM - 9:07 PM	
	Over-The-Road	1M8PDMPA63P055687	11/8/2002	Tri-Delta	300 Express Commuter Service Brentwood/Pittsburg BART	4:15 AM - 9:07 PM	
	Over-The-Road	1M8PDMPA63P055688	11/8/2002	Tri-Delta	300 Express Commuter Service Brentwood/Pittsburg BART	4:15 AM - 9:07 PM	
	Over-The-Road	1M8PDMPA63P055689	11/8/2002	Tri-Delta	300 Express Commuter Service Brentwood/Pittsburg BART	4:15 AM - 9:07 PM	
Vallejo	Over-The-Road	1M8PDMPA13P055627	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
	Over-The-Road	1M8PDMPA33P055628	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
	Over-The-Road	1M8PDMPA53P055629	11/14/2002	Vallejo	78 Vallejo/Benicia/Pleasant Hill BART/Walnut Creek BART	5:00 AM - 8:38 PM	
	Over-The-Road	1M8PDMPA13P055630	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
	Over-The-Road	1M8PDMPA33P055631	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
	Over-The-Road	1M8PDMPA53P055632	11/14/2002	Vallejo	78 Vallejo/Benicia/Pleasant Hill BART/Walnut Creek BART	5:00 AM - 8:38 PM	
	Over-The-Road	1M8PDMPA73P055633	11/14/2002	Vallejo	78 Vallejo/Benicia/Pleasant Hill BART/Walnut Creek BART	5:00 AM - 8:38 PM	
	Over-The-Road	1M8PDMPA93P055634	11/14/2002	Vallejo	78 Vallejo/Benicia/Pleasant Hill BART/Walnut Creek BART	5:00 AM - 8:38 PM	
	Over-The-Road	1M8PDMPA03P055635	11/14/2002	Vallejo	78 Vallejo/Benicia/Pleasant Hill BART/Walnut Creek BART	5:00 AM - 8:38 PM	
	Over-The-Road	1M8PDMPA23P055636	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
	Over-The-Road	1M8PDMPA43P055637	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
	Over-The-Road	1M8PDMPA83P055639	11/14/2002	Leased to Fairfield-Suisun[5]	90 Fairfield/El Cerrito Del Norte BART	4:55 AM - 10:35 PM	
WestCat	Suburban	15GCD211121111974	3/7/2002	WestCat	30Z Hercules Transit Center/Martinez/BART	5:59 AM - 8:03 PM	
	Suburban	15GCD211521111975	3/7/2002	WestCat	30Z Hercules Transit Center/Martinez/BART	5:59 AM - 8:03 PM	
	Suburban	15GCD211121111976	3/7/2002	WestCat	30Z Hercules Transit Center/Martinez/BART	5:59 AM - 8:03 PM	
	Suburban	15GCD201X31111913	1/27/2003	WestCat - Transferred from SamTrans[4]	LYNX Rodeo/Hercules/San Francisco Transbay Terminal	5:00 AM - 9:45 AM & 3:30 PM - 8:33 PM	
	Suburban	15GCD201131111914	1/27/2003	WestCat - Transferred from SamTrans[4]	LYNX Rodeo/Hercules/San Francisco Transbay Terminal	5:00 AM - 9:45 AM & 3:30 PM - 8:33 PM	
	Suburban	15GCD201331111915	1/27/2003	SamTrans[4]	LYNX Rodeo/Hercules/San Francisco Transbay Terminal	5:00 AM - 9:45 AM & 3:30 PM - 8:33 PM	

1. Please note: MTC does not currently have information compiled on cumulative operating hours for all of the TCRP buses. For projects where the buses have been assigned to routes receiving operating funds that are tied to required performance measures, MTC has data compiled on the annual performance of those routes.
2. Each vehicle may be deployed on any of the approved routes listed for each operator.
3. Vehicles are deployed as needed for various routes on weekdays and weekends. All transbay service does not operate on weekends, but all vehicles may be deployed on weekend transbay service.
4. SamTrans REX service was discontinued in 2007 due to low ridership; all 11 TCRP vehicles purchased for the REX service were reallocated to AC Transit, Fairfield-Suisun Transit, WestCat, and NCTPA.
5. Route 90 service was transferred from Vallejo to Fairfield-Suisun Transit in 2006.

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2003-04	Alameda County	ADA Compliant Accessible Ramps	$ 105,767
FY 2003-04	Alameda County	Tesla Road Bicycle Lanes	$ 51,000
FY 2003-04	City of Albany	Manor Way Pedestrian Improvements	$ 22,706
FY 2003-04	City of Berkeley	Bicycle Safety Education	$ 30,000
FY 2003-04	City of Berkeley	Prepare plan for implementing future	$ 31,033
FY 2003-04	City of Fremont	Bike Detectors, Bike Logo on Pavement,	$ 128,989
FY 2003-04	City of Hayward	Installation of Wheelchair Ramps	$ 84,198
FY 2003-04	City of Livermore	Complete Portion of S. Livermore Valley	$ 97,301
FY 2003-04	City of Newark	Silliman Activity Center Pedestrian/	$ 59,158
FY 2003-04	City of Oakland	Bancroft Ave. Bike Lanes (96th - Durant)	$ 96,000
FY 2003-04	City of Oakland	Citywide Ped. Curb Ramp Program -	$ 295,266
FY 2003-04	City of Oakland	Lake Merritt 12th St. Dam Ped/Bike	$ 116,000
FY 2003-04	City of Oakland	Pedestrian Bulb Outs-Highland &	$ 100,000
FY 2003-04	City of Oakland	Walk/Bike Calif. Conf. - Alameda Co.	$ 30,000
FY 2003-04	City of Oakland	West City of Oakland Bay Trail	$ 289,000
FY 2003-04	City of Piedmont	Sidewalk Extension and Curb Cuts	$ 6,506
FY 2003-04	City of Pleasanton	ADA Compliant Wheelchair Accessible	$ 38,627
FY 2003-04	City of San Leandro	Install New Curb Cuts & Upgrade	$ 40,000
FY 2003-04	City of Brentwood	Installation of Wheelchair Ramps	$ 30,000
FY 2003-04	City of Concord	Iron Horse Trail Rte 242 Undercrossing	$ 36,000
FY 2003-04	City of Concord	Wren Avenue Ped. Improvements	$ 45,000
FY 2003-04	Contra Costa County	Bicycle/Pedestrian Safety Education	$ 21,500
FY 2003-04	Contra Costa County	Olympic Blvd. Ped. Path Phase II	$ 115,000
FY 2003-04	City of Lafayette	Hough Avenue Sidewalk	$ 37,000
FY 2003-04	City of Moraga	Rheem Blvd./Moraga Rd. Intersection	$ 66,100
FY 2003-04	City of Pittsburg	Polaris Drive Bike Facility	$ 77,500
FY 2003-04	City of San Ramon	Dougherty Road Sidewalk	$ 25,000
FY 2003-04	Marin County	Bicycle/Pedestrian Bridge	$ 140,000
FY 2003-04	Mill Valley	Signage Project	$ 7,200
FY 2003-04	City of Novato	Commuter Bikeway Connection	$ 402,286
FY 2003-04	City of Novato	Hill Road Path Connection	$ 60,000
FY 2003-04	City of San Anselmo	Purchase & Install Bicycle Racks	$ 15,000
FY 2003-04	Napa County	Yountville Cross Rd. Bike Lane	$ 150,000
FY 2003-04	Yountville	Yountville Cross Rd. Bike Lane	$ 47,000
FY 2003-04	City of Campbell	Westmont Ave. Improvement Project	$ 43,192
FY 2003-04	City of Los Altos	Fremont Ave. Sidewalk Phase III	$ 15,781
FY 2003-04	Los Altos Hills	Paseo Del Roble Pedestrian Bridge	$ 9,554
FY 2003-04	City of Milpitas	Calaveras Blvd. Sidewalk & Bike Path	$ 36,895
FY 2003-04	Mountain View	Access Ramp Installation	$ 24,905
FY 2003-04	Mountain View	Audible Ped. Signal Installations	$ 16,500
FY 2003-04	Mountain View	Bicycle Path Construction	$ 13,113
FY 2003-04	Palo Alto	Baffle Replacements: Calif. Ave.	$ 15,993
FY 2003-04	Palo Alto	Homer Ave. Ped. Bicycle Undercrossing	$ 293,000
FY 2003-04	Palo Alto	Ped. Walkway Lighted Warning System	$ 20,000
FY 2003-04	City of San Jose	ADA Wheel Chair Curb & Ramp Install.	$ 100,000
FY 2003-04	City of San Jose	Certified TDA Fiscal Audit	$ 9,000
FY 2003-04	City of San Jose	Murdock Park Bridge over San Tomas	$ 100,000
FY 2003-04	City of San Jose	Ped & Bike Facility Signing & Striping	$ 100,000
FY 2003-04	City of San Jose	Ped & Bike Safety Education	$ 50,000
FY 2003-04	City of San Jose	Pedro Street Sidewalk Improvement	$ 124,434
FY 2003-04	City of San Jose	Street Sidewalk Improvement	$ 147,435
FY 2003-04	City of Santa Clara	Certified TDA Fiscal Audit	$ 5,000
FY 2003-04	City of Santa Clara	Install Bike & Ped. Improvements	$ 61,815
FY 2003-04	City of Santa Clara	Update City's Existing Bike Plan &	$ 3,900
FY 2003-04	Santa Clara County	Bike Detector @ various Intersections	$ 58,118

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2003-04	Santa Clara County	Path along McKee Rd. bet Staples Ave.	$ 50,000
FY 2003-04	City of Saratoga	Saratoga Avenue Walkway Project	$ 17,254
FY 2003-04	City of Sunnyvale	Calabazas Creek Trail	$ 50,152
FY 2003-04	San Francisco City and County	Bicycle Projects	$ 404,000
FY 2003-04	San Francisco City and County	Pedestrian Projects	$ 300,000
FY 2003-04	City of Half Moon Bay	Construct Rt. 92 Bicycle Lanes and	$ 485,146
FY 2003-04	City of Pacifica	Milagra Drive Overcrossing at State	$ 240,000
FY 2003-04	City of San Bruno	Crystal Springs Rd. Traffic Signal	$ 20,000
FY 2003-04	City of San Mateo	Bikeway Detection Units	$ 30,000
FY 2003-04	City of San Mateo	Regional Bayfront Trail Upgrade	$ 150,000
FY 2003-04	South San Francisco	Construct San Francisco Bay Trail	$ 100,000
FY 2003-04	South San Francisco	Orange Avenue Intersection Improve.	$ 100,000
FY 2003-04	City of Benicia	Park Road Bike/Ped Improvements	$ 160,000
FY 2003-04	Solano County	Dixon to Davis Bike Route	$ 125,000
FY 2003-04	City of Suisun City	Central County Bikeway	$ 25,000
FY 2003-04	City of Healdsburg	Foss Creek Northwestern Pacific Multi-	$ 99,695
FY 2003-04	City of Petaluma	Washington Creek Multi-Use Path	$ 175,000
FY 2003-04	City of Santa Rosa	Sonoma Ave. Bike Lanes Phase II	$ 50,000
FY 2003-04	Sonoma County	Old Redwood Highway Class II Bike Lanes	$ 350,000
FY 2004-05	Alameda County	Conduct a planning study & develop	$ 38,000
FY 2004-05	Alameda County	Conduct bicycle plan study	$ 59,650
FY 2004-05	Alameda County	Sign & stripe 0.6 miles of 6-foot wide	$ 100,000
FY 2004-05	City of Berkeley	Contract with a qualified consultant	$ 34,281
FY 2004-05	City of Berkeley	Educate children about bicycle safety	$ 30,000
FY 2004-05	City of Fremont	Stripe bike lanes, modify bike lane	$ 121,168
FY 2004-05	City of Hayward	Design & construct ADA wheel chair	$ 88,925
FY 2004-05	City of Newark	Design & construct ADA wheel chair	$ 27,009
FY 2004-05	City of Piedmont	Design & construct ADA wheel chair	$ 6,852
FY 2004-05	City of Pleasanton	Preserve Golf Course	$ 75,000
FY 2004-05	City of San Leandro	Install curb ramps, accessible ped.	$ 41,438
FY 2004-05	City of San Leandro	Install curb ramps, accessible ped.	$ 50,024
FY 2004-05	City of San Leandro	Install curb ramps, accessible ped.	$ 8,000
FY 2004-05	City of Antioch	Improve curbs, ramps, crosswalk, signs	$ 80,000
FY 2004-05	City of Brentwood	Install lighted crosswalk and flashing lights	$ 31,500
FY 2004-05	City of Concord	Construct 500 ft of 4-to 6-foot wide bike/ped path	$ 45,000
FY 2004-05	City of El Cerrito	Conduct a planning study for bicycle/ped needs	$ 26,500
FY 2004-05	City of Lafayette	Construct 125 feet of 5-foot wide	$ 10,000
FY 2004-05	City of Martinez	Replace the two existing unsafe bridges	$ 90,000
FY 2004-05	City of Orinda	Develop a Lamorinda Trail Map & install	$ 28,500
FY 2004-05	City of Pittsburg	Construct Class II and Class III	$ 51,000
FY 2004-05	City of Pittsburg	Sign & stripe 3600 feet of 13-foot wide	$ 52,000
FY 2004-05	City of San Pablo	Install bike/ped friendly lighting	$ 45,100
FY 2004-05	City of Walnut Creek	Construct 2040 feet of asphalt walkway	$ 95,000
FY 2004-05	Contra Costa County	Construct 344 feet of 4.5-foot wide bike/ped path	$ 201,000
FY 2004-05	Contra Costa County	Construct 402 feet of 5-foot wide bike/ped path	$ 158,928
FY 2004-05	Contra Costa County	Provide bicycle & pedestrian safety	$ 20,000
FY 2004-05	City of San Rafael	Construct 6' wide sidewalk & stripe	$ 207,710
FY 2004-05	City of Sausalito	Construct 6' wide sidewalk & stripe	$ 186,290
FY 2004-05	City of Calistoga	Construct 1.0 miles of Class I bike-ped path	$ 270,881
FY 2004-05	City of Napa	Construct 2.0 miles of Class I bikeway	$ 149,727
FY 2004-05	City of Campbell	Construct Class II bike lockers at J.D.	$ 24,308
FY 2004-05	City of Campbell	Widen & regrade bicycle/Pedestrian	$ 515,600
FY 2004-05	City of Cupertino	Construct 1030' bike path	$ 107,622
FY 2004-05	City of Gilroy	Complete 881' of Uvas Creek Class I	$ 50,000
FY 2004-05	City of Gilroy	Refurbish & replace bikeway signs, etc	$ 10,611

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2004-05	City of Gilroy	Rehabilitate, resurface & stripe 2.5 mile path	$ 60,666
FY 2004-05	City of Los Altos	Construct approx. 300' of concrete bike path	$ 27,354
FY 2004-05	City of Los Altos	Replace approx. 2,800 lineal feet of bike path	$ 17,580
FY 2004-05	City of Los Gatos	Design & construct solution to restore path	$ 35,000
FY 2004-05	City of Morgan Hill	Install bicycle sensitive detector	$ 36,000
FY 2004-05	City of Mountain View	Install countdown pedestrian signals	$ 30,000
FY 2004-05	City of Mountain View	Install curb access ramps at Showers	$ 2,381
FY 2004-05	City of Mountain View	Install curb access ramps at various	$ 15,696
FY 2004-05	City of Mountain View	Purchase & install 14 bicycle lockers	$ 14,506
FY 2004-05	City of Palo Alto	Construct raised pavement pedestrian path	$ 50,000
FY 2004-05	City of San Jose	Construct 0.66 miles of Class I paved path	$ 712,131
FY 2004-05	City of San Jose	Design & construct ADA wheel chair improvement	$ 176,068
FY 2004-05	City of San Jose	Design & construct sidewalk for school	$ 36,000
FY 2004-05	City of San Jose	Design & install 12' wide asphalt path	$ 136,821
FY 2004-05	City of San Jose	Install median island ped. Refuge	$ 185,000
FY 2004-05	City of San Jose	Install sidewalk, ADA curb ramps	$ 90,000
FY 2004-05	City of San Jose	Provide bicycle & pedestrian safety	$ 50,000
FY 2004-05	City of San Jose	Stripe crosswalks, paint pavements	$ 100,000
FY 2004-05	City of Santa Clara	Perform an annual transportation	$ 5,000
FY 2004-05	City of Santa Clara	Stripe crosswalks & paint pavements	$ 62,148
FY 2004-05	City of Saratoga	Install continuous curb & gutter	$ 19,357
FY 2004-05	City of Sunnyvale	Provide gates, signs, fencing and ramps	$ 27,550
FY 2004-05	Santa Clara County	Construct a 3,300' by 5' walkway	$ 63,403
FY 2004-05	Santa Clara County	Sign & restripe 8" stripe on shoulders	$ 121,105
FY 2004-05	SF City/County	Bicycle safety brochures, maps, public education	$ 31,500
FY 2004-05	SF City/County	Prelim. engineering (plan & design) of bike path	$ 200,000
FY 2004-05	SF City/County	Purchase & install bicycle racks	$ 95,000
FY 2004-05	SF City/County	Repair public sidewalks at various locations	$ 115,000
FY 2004-05	SF City/County	Stripe & sign Class II bike lanes	$ 188,500
FY 2004-05	City of Benicia	Final design plans, specs & estimate	$ 124,573
FY 2004-05	City of Suisun City	Constr. 10' wide concrete bike path	$ 86,000
FY 2004-05	City of Vacaville, Transit	Construct 3400 feet of Class I bike/Ped path	$ 148,738
FY 2004-05	Solano Transportation Authority (STA)	Build bridge adjacent to existing path	$ 76,000
FY 2004-05	City of Petaluma	Construction of pedestrian & bicycle path	$ 54,876
FY 2004-05	City of Rohnert Park	Install 80' long bicycle & pedestrian path	$ 160,000
FY 2004-05	City of Santa Rosa	Install directional signage & ADA signs	$ 18,900
FY 2004-05	County of Sonoma	Construct 1.5 miles of Class I Bikeway	$ 160,000
FY 2004-05	County of Sonoma	Conduct bicycle safety education workshop	$ 10,000
FY 2004-05	County of Sonoma	Install 27 "Share Road" bicycle sign	$ 15,000
FY 2004-05	County of Sonoma	Purchase 37 front loading bicycle	$ 5,000
FY 2005-06	San Carlos	Class II bike lanes on Alameda de Las Pulgas and on Brittan Avenue; Class III bike lanes on Old County Road	$ 20,000
FY 2005-06	San Mateo	Design of a pedestrian and bicycle bridge in the vicinity of the Hillsdale interchange of highway U.S. 101	$ 100,000
FY 2005-06	South San Francisco	Bicycle and pedestrian crosswalk and signals at intersection of Spruce Ave. and South San Francisco Linear Park	$ 150,000
FY 2005-06	Half Moon Bay	Construct 6600 foot Class I trail in the right of way of Highway 1 between Highway 92 and Higgins Purisima Rd.	$ 220,000
FY 2005-06	Brisbane	Install 45 feet by 8 feet asphalt cement path adjacent to Shoreline Court; sign and restripe existing Class II bikeway	$ 25,739

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2005-06	South San Francisco	Construct 363 feet by 12 feet asphalt bicycle and pedestrian trail near the Oyster Point Marina	$ 36,000
FY 2005-06	San Bruno	Construct a Class II bike lane in both directions of Sneath Lane from El Camino Real to Skyline Boulevard	$ 60,000
FY 2005-06	Daly City	Install bike lanes on Callan Blvd from King Dr to Serramonte Blvd and along Serramonte Boulevard	$ 82,000
FY 2005-06	Burlingame	Install bike lane directional signs at 52 locations along north-south bicycle routes throughout the city	$ 17,400
FY 2005-06	Burlingame	Install an in-pavement lighted crosswalk system across Carolan Avenue at Morrell Avenue, including new push buttons	$ 30,000
FY 2005-06	Menlo Park	Install video detection for bikes at 3 intersections: Willow at Middlefield, Marsh at Bohannon, Marsh at Bay	$ 44,000
FY 2005-06	San Mateo	Install bridge railing fencing on the north side of the Nineteenth Avenue Bridge over highway U.S. 101	$ 50,000
FY 2005-06	Menlo Park	Create bicycle lanes on Bay Road between Berkeley Avenue and Willow Road, plus signage	$ 13,600
FY 2005-06	San Mateo	Install bike detection loops at: 3rd + Claremont, 3rd + Delaware, 4th + Claremont, 4th + Delaware	$ 40,000
FY 2005-06	Daly City	Install in-pavement lights and warning signs: Park Plaza Dr. north of Belmar, and Mission St. at Evergreen Ave.	$ 120,000
FY 2005-06	San Mateo	Install pedestrian countdown signal heads at 27 existing signalized intersections throughout the city	$ 50,000
FY 2005-06	Daly City	Install pedestrian countdown signal heads at 15 signalized intersections; and audible warnings at 11 of them	$ 20,000
FY 2005-06	Burlingame	Install pedestrian countdown signal heads with audible pedestrian warnings at 8 signalized intersections	$ 30,900
FY 2005-06	Menlo Park	Create bicycle lanes on Middlefield Road between Willow Road and San Francisquito Creek	$ 2,400
FY 2005-06	San Mateo	Install in-pavement lighted crosswalks: 5th Ave. at Central Park; Bovet Rd. betw. Borel Ave. and El Camino Real	$ 110,000
FY 2005-06	South San Francisco	Install pedestrian countdown signal heads at 12 existing signalized intersections throughout the city	$ 22,000
FY 2005-06	County of San Mateo	Bike detection loops, countdown signal heads with audible warnings, upgrade pedestrian signal actuators	$ 80,509
FY 2005-06	Sebastopol	Construct .5 mile Class I trail between Joe Rodota trail and Sebastopol Avenue and Morris Street intersection	$ 51,356
FY 2005-06	Santa Rosa	Construct connector ramp between Joe Rodota trail and Pierson Reach of Prince Memorial Greenway trail	$ 350,000
FY 2005-06	Windsor	Construct a 950 foot Class I trail within Keiser Park, including brdige crossing a tributary of Starr Creek	$ 112,000

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2005-06	Contra Costa County, Health Services	Provide bicycle and pedestrian safety education to low-income county residents, particularly children	$ 20,000
FY 2005-06	Concord	Constr't 500 foot Class I trail adjacent to Galindo Crk. + Ygnacio Valley Rd betw. Alberta Way + Pebble Glen Dr	$ 60,000
FY 2005-06	Lafayette	1030 feet x 5 feet sidewalk Sweet Dr. betw Walnut + Woodview; Woodview Dr. betw. St Mary's + Sweet Drive	$ 110,000
FY 2005-06	Antioch	Construct curb ramps and sidewalks at Hillcrest Avenue, Somersville Road, "G" Street, and Dallas Ranch Road	$ 110,000
FY 2005-06	Brentwood	Install pedestrian countdown signal heads + large diameter pedestrian push buttons at 12 signalized intersections	$ 66,000
FY 2005-06	Contra Costa County, Public Works	Construct 240 feet x 5 feet sidewalk and curb ramps on Camino Tassajara and on Hansen Lane	$ 20,000
FY 2005-06	Orinda	Replace 12 existing non-compliant curb ramps in downtown Orinda with ADA compliant ramps	$ 45,000
FY 2005-06	San Pablo	Install in-pavement lighted crosswalks: Market Avenue at 21st St.; 23rd St. at Wilcox Ave.; 23rd St. at Stanford Ave.	$ 180,000
FY 2005-06	Brentwood	Restripe Minnesota Ave. bike lane; install lighted crosswalk; construct 1300 feet of sidewalk, curb and gutter	$ 31,000
FY 2005-06	San Francisco	Public sidewalk repair and reconstruction	$ 180,000
FY 2005-06	San Francisco	Preliminary engineering of curb ramps	$ 270,000
FY 2005-06	San Francisco	Safety brochures, maps, public outreach concerning bicycle pavement arrows, hotline, and bicycle safety advertising	$ 45,000
FY 2005-06	San Francisco	Purchase and install bicycle racks at various locations in San Francisco as requested by the public	$ 100,000
FY 2005-06	San Francisco	Stripe and sign bike lanes: Conservatory Drive East, San Jose Avenue ramps, Townsend Street, and elsewhere	$ 305,000
FY 2005-06	Berkeley	Bicycle & Pedestrian Injury Prevention Program	$ 30,000
FY 2005-06	Berkeley	Ninth Street Bicycle Boulevard extension (Project from FY01/02)	$ 135,000
FY 2005-06	Oakland	ADA Compliant Wheelchair Accessible Ramps (Project Completed FY01/02)	$ 294,548
FY 2005-06	Oakland	Laurel Pedestrian Project, Phase I (Project Completed FY01/02)	$ 200,000
FY 2005-06	Oakland	MacArthur Blvd. Bicycle Lane Design (Project Completed FY01/02)	$ 55,000
FY 2005-06	Oakland	Grand Avenue Transit and Pedestrian Improvements (Project from FY 04/05)	$ 245,847
FY 2005-06	Oakland	ADA Compliant Wheelchair Accessible Ramps Program	$ 121,144
FY 2005-06	Oakland	Market Street Bikeway	$ 165,000
FY 2005-06	Oakland	Bancroft Bikeway Gap Closures	$ 25,000
FY 2005-06	Piedmont	ADA Wheelchair Accessible Ramps and Pedestrian enhancements at Rose/Arroyo & Grand Ave	$ 8,353
FY 2005-06	Hayward	ADA Wheelchair Accessible Ramps	$ 109,309

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2005-06	San Leandro	Pedestrian Accessibility Improvements & Sidewalk Gap Closures	$ 74,177
FY 2005-06	Fremont	Citywide ADA Compliant Wheelchair Accessible Ramps	$ 158,067
FY 2005-06	Newark	History Center Complex Sidewalks and ADA Wheelchair Accessible Ramps	$ 33,072
FY 2005-06	Union City	San Francisco Bay Trail Specific Plan (Project Completed FY01/02)	$ 63,585
FY 2005-06	Dublin	Bicycle Master Plan	$ 45,144
FY 2005-06	Livermore	Chestnut and N. P Street Bicycle Lanes	$ 113,044
FY 2005-06	Alameda Co. Congestion Management Agency	Alameda Countywide Bicycle Master Plan	$ 20,000
FY 2005-06	County of Alameda	Pedestrian Safety Improvements in the vicinity of Schools	$ 75,775
FY 2005-06	County of Alameda	Pedestrian Safety Improvement Projects - Sidewalk Improvements	$ 75,600
FY 2005-06	County of Alameda	Restriping Bicycle Lanes Along Various Roadways	$ 30,000
FY 2005-06	Benicia	Stripe and sign bike lanes: Military East between East 5th Street and Park Road	$ 25,000
FY 2005-06	Fairfield	Design McGary Road segment of Solano Bikeway Extension and complete extension feasibility study	$ 100,000
FY 2005-06	Suisun City	Construct curb ramps and sidewalks at Whispering Bay Lane and Francisco Dr.	$ 5,400
FY 2005-06	Suisun City	Replace existing non-compliant curb ramps in downtown Suisun City with ADA compliant ramps	$ 11,856
FY 2005-06	Solano County	Reconstruct deck and railings, seismic retrofit, lighting and pathways to railroad trestle bridge over Putah Creek	$ 180,000
FY 2005-06	Campbell	Implement bike lanes on Harriet Ave and Union Ave, Replace Los Gatos creek bridge, and widen Campbell Ave bridge	$ 27,859
FY 2005-06	Campbell	Design and construct sidewalk and bike lanes and edge striping, curb and gutter along Westmont Avenue	$ 39,992
FY 2005-06	Campbell	Widen Campbell Ave. bridge over Los Gatos Creek for bike lane and sidewalk; and reconstruct sidewalk under SR 17	$ 240,000
FY 2005-06	Cupertino	Construct pedestrian and bicycle bridge across Interstate 280 along Mary Avenue between Homestead Rd and Meteor Dr	$ 38,361
FY 2005-06	Los Altos Hills	Replace pedestrian bridge adjacent to the Foothill College entrance road connecting to El Monte Road	$ 11,310
FY 2005-06	Los Gatos	Replace existing College Avenue sidewalk and fencing; and repair Los Gatos Creek Trail footbridge decking	$ 20,000
FY 2005-06	Milpitas	Install ADA pedestrian ramps with truncated dome landings along suggested routes to schools	$ 47,112
FY 2005-06	Morgan Hill	Identify where additional bicycle and pedestrian trails can be established adjacent to creeks and streams	$ 32,000
FY 2005-06	Mountain View	Bicycle boulevard from Mayfield Mall area to Stevens Creek Trail, including signs, markings and signal modifications	$ 25,000

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2005-06	Mountain View	ADA Compliant Wheelchair Accessible Ramps Program	$ 17,000
FY 2005-06	Mountain View	Produce bicycle and pedestrian education and awareness materials, and a new bike map and multilingual flyers	$ 5,000
FY 2005-06	Mountain View	Install "bikes wrong way" signs on existing poles along California Street and adjacent streets	$ 5,217
FY 2005-06	Palo Alto	Bicycle boulevard along Maybell Ave and Donald Dr.: signs, markings, speed tables, & median refuge islands	$ 75,000
FY 2005-06	San Jose	Install sidewalk, curb and gutter to improve access to Lynhaven Elementary School	$ 90,000
FY 2005-06	San Jose	Install sidewalk, curb and gutter to fill gap on Borina Ave. at Saratoga Ave.	$ 70,000
FY 2005-06	San Jose	Install sidewalk, curb and gutter to improve access on both sides of Yerba Buena Road at Thompson Creek	$ 47,000
FY 2005-06	San Jose	Install sidewalk, curb, gutter and ADA ramps on Carola Avenue at Clarita Avenue	$ 110,000
FY 2005-06	San Jose	Install sidewalk, curb, gutter, pedestrian crossing and median island to provide access to Penitencia Creek County Park	$ 62,000
FY 2005-06	San Jose	Install sidewalk, curb and gutter on Senter Road at Burke Street	$ 58,000
FY 2005-06	San Jose	Install sidewalk, curb and gutter to improve access to Toyon Elementary School	$ 45,000
FY 2005-06	San Jose	Citywide ADA Compliant Wheelchair Accessible Ramps	$ 100,000
FY 2005-06	San Jose	Sign and stripe bicycle and pedestrian facilities, including bike lanes, bike routes, crosswalks, and bike paths	$ 58,397
FY 2005-06	San Jose	Provide bicycle and pedestrian safety education to elementary school children and adults, purchase educational material	$ 35,000
FY 2005-06	Santa Clara	Install and maintain bicycle and pedestrian facilities, including bike lanes, bike routes, crosswalks, and bike paths	$ 78,180
FY 2005-06	Saratoga	Acquire right-of-way to upgrade UPRR railroad crossing in a bulb configuration to allow bicycles to cross at 90 degrees	$ 95,000
FY 2005-06	Sunnyvale	Improve Calabazas Creek Trail with additional gates, signs, fences, ramp modifications, and a bridge across creek	$ 182,048
FY 2005-06	County of Santa Clara	Restripe four co. expressways' shoulders with 8 inch stripes and sign to allow functioning as bicycle shoulder	$ 50,000
FY 2005-06	Brentwood	Crosswalk and sidewalk improvements on Minnesota Avenue between Deer Creek and Sand Creek	$ 31,000
FY 2005-06	Union City	Construct 1750 feet by 15 feet textured decorative concrete sidewalks plus 5 foot bike lanes on both sides of 11th Street	$ 53,142
FY 2005-06	TAM	Update and complete bicycle and pedestrian master plans countywide and for cities and towns in Marin County	$ 160,000

TCM B: Bicycle/Pedestrian Program
TDA ARTICLE 3 [Transportation Development Act Funds for Bicycle and Pedestrian Projects]

	SPONSOR	PROJECT NAME	AMOUNT
FY 2005-06	Campbell	Construct bike lanes on Harriet Avenue north of Westmont Avenue and on Union Avenue south of Campbell Avenue	$ 24,308
FY 2005-06	Larkspur	Design + construct 13 ft wide Class I bike/pedestrian path and modify signals on Magnolia Ave. + Doherty Dr	$ 136,668
FY 2005-06	County of San Mateo	Develop bike route data for GIS, integrate into countywide GIS files, and maintain bike route GIS data	$ 40,000
FY 2005-06	City of Napa	Class I path along Napa Valley Wine Train right of way between Redwood Rd/SR 29 and Vallejo St/Soscol Av	$ 85,271
FY 2005-06	American Canyon	Construct bike lanes and Class I trail adjacent to Commerce Boulevard	$ 34,729
		Total	**$ 21,785,915**

TCM C: Transportation for Livable Communities

FY 2004-05 MTC TLC Planning Program

Project Sponsor	Project Title	TLC Grant
Alameda County		
City of Oakland	Revitalizing Foothill / Seminary: A Model for Oakland's Regional Transit Streets	$ 75,000
City of Berkeley	Downtown Berkeley BART Plaza and Transit Area	$ 75,000
Contra Costa County		
City of Lafayette	BART-Downtown Lafayette Pedestrian Linkages Project	$ 20,000
San Francisco County		
San Jose/Guerrero Coalition to Save Our Streets	The San Jose/Guerrero Neighborhood Plan	$ 75,000
San Mateo County		
Redwood City	Transit Station Sub-area Precise Plan	$ 71,760
SamTrans	Transforming the El Camino Real to Link Caltrain Stations with Vibrant Downtowns in Redwood City, San Carlos and Belmont	$ 63,840
Santa Clara County		
City of Sunnyvale	Murphy Avenue Streetscape Revitalization	$ 75,000
Sonoma County		
City of Santa Rosa	Downtown Pedestrian Linkages Study	$ 44,400
	Total	**$ 500,000**

FY 2004-05 MTC TLC Capital Program

Project Sponsor	Project Title	TLC Grant
City of Oakland, CEDA	Revive Chinatown – Phase 1	$ 2,200,000
City of Union City Public Works Dept.	Union City Intermodal Station –Pedestrian connections and New East Plaza	$ 1,124,000
Richmond Redevelopment Agency	Richmond Transit Village: Intermodal Transit Station	$ 1,581,000
County of Marin	Cal-Park Hill Tunnel Rehab and Class I Bikeway	$ 1,500,000
City of Gilroy	Monterey Streetscape Improvements – Fourth Street to Sixth Street	$ 2,500,000
City of Morgan Hill	Morgan Hill – Depot Street Capital Improvements	$ 2,627,000
Bay Area Rapid Transit District	Daly City BART- St. Charles Pedestrian & Bike Project	$ 501,000
City & Co. of San Francisco Dept. of Public Works	Broadway Streetscape Improvements Project – Phase II	$ 2,000,000
City of South San Francisco	BART Linear Park-Huntington Avenue to Orange Avenue	$ 1,933,000
City of Vallejo	Vallejo Station Pedestrian Links	$ 2,071,000
City of Petaluma/Eden Housing Inc.	Downtown River Apts Riverwalk and Streetscape Improvements	$ 358,000
	Total	***$ 18,394,000***

Contingency Projects

City of Union City Public Works Dept.	Union City Intermodal Station – West Plaza Enhancements	$ 1,713,500
City of Oakland, CEDA	MacArthur Transit Hub Streetscape Improvement Project	$ 1,918,000
Town of Los Gatos Parks & Public Works Dept.	Streetscape & Gateway	$ 2,400,000
City of San Leandro Community Dev. Dept.	East 14th Street South Area Revitalization Project – La Palma District	$ 1,600,000
County of Contra Costa Redevelopment Agency	North Richmond Third Street Upgrades	$ 1,966,000

TCM C: Transportation for Livable Communities

FY 2005-06 Marin County TLC Capital Program

Project Sponsor	Project Title	TLC Grant
Town of Fairfax	Center Boulevard Streetscape Redesign Project	$ 500,000
County of Marin	Fireside Pedestrian and Traffic Safety Project	$ 198,906
Town of Corte Madera	Bayside Trail Improvement Project	$ 371,826
	Total	**$ 1,070,732**

FY 2005-06 Alameda County TLC Capital Program

Project Sponsor	Project Title	TLC Grant
City of Oakland	Coliseum BART Streetscape	$ 500,000
City of Oakland	Oakland Coliseum Pedestrian Walkway	$ 885,000
City of Oakland	W. Oakland Transit Village Streetscape Project	$ 1,300,000
City of Oakland	MacArthur Entry Plaza & 40th Streetscape Project	$ 1,147,000
City of Berkeley	Ashby/Ed Roberts Bicycle/Pedestrian Improvements	$ 1,200,000
City of Union City	Pedestrian/Bicycle Improvements	$ 2,000,000
	Total	**$ 7,032,000**

FY 2005-06 Sonoma County TLC Capital Program

Project Sponsor	Project Title	TLC Grant
City of Petaluma	Petaluma Blvd. Pedestrian Enhancements	$ 485,000
City of Rohnert Park	Rohnert Park City Center Drive Improvements	$ 1,150,000
Town of Windsor	Windsor Pedestrian Enhancements & Traffic Calming	$ 235,000
Sonoma County Reg'l Parks	Sonoma County Santa Rosa Creek Trail	$ 550,000
Town of Windsor	Windsor Old Redwood Hwy Pedestrian Linkages	$ 338,000
Sonoma County Reg'l Parks	Sonoma County Bodega Bay Bicycle & Pedestrian Trail	$ 535,000
City of Santa Rosa	Santa Rosa Courthouse Square Off-Site Improvements & Gateway Street	$ 1,000,000
	Total	**$ 4,293,000**

	Grand Total	**$ 31,289,732**

TCM D: Additional Freeway Service Patrol

The Bay Area FSP is a joint project of the Metropolitan Transportation Commission Service Authority for Freeways and Expressways (MTC SAFE), the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). The service is provided by private tow truck companies, selected through a competitive bid process, under contract to MTC SAFE. During the hours of operation, the vehicles and drivers are exclusively dedicated to patrolling their freeway beat. The program is intended to augment the MTC SAFE network of motorist-aid call boxes in the nine Bay Area counties.

Current Profile (as of February 2009)
A fleet of 83 trucks patrols some 550 miles of the Bay Area's freeways. Patrol routes are selected based on several factors, including a high rate of traffic and congestion, frequent accidents or stalls, and lack of shoulder space for disabled vehicles.

The FSP tow trucks operate primarily during morning and afternoon commute hours, generally from 6 a.m. to 9 a.m. or 10 a.m. and from 3 p.m. to 6 p.m. or 7 p.m., Monday through Friday. Weekend service is provided in Napa, as well as seasonally along Highway 17, and in some other locations on Sunday.

FSP tow trucks are equipped for nearly any contingency. In addition to the standard auto repair and towing equipment, they carry 5 gallons of diesel fuel, 5 gallons of unleaded gasoline, and 5 gallons of water, as well as an external speaker and public address system.

Funding
The tow trucks are financed with federal, state and local moneys. Local funds come from the MTC SAFE, which is financed by a $1 annual vehicle registration fee in participating counties. The service costs approximately $7 million a year to operate. Another $2 million is invested in sophisticated communications equipment, including an automatic vehicle location system that enables CHP and Caltrans to monitor the location of the trucks and improve dispatching efficiency.

Implementation Plan
See the attached Implementation Plan, which is also available at:
http://www.fsp-bayarea.org/implementation_plan/lplan.pdf

BAY AREA FREEWAY SERVICE PATROL PROGRAM
IMPLEMENTATION PLAN

Revised 06/01/07

BEAT ID	CONTRACTOR	LOCATION COUNTY	LOCATION ROUTE	BEAT LIMITS	CALTRANS ONE WAY LENGTH (IN MILES)	START DATE	ENDING DATE	WEEKDAYS AM SHIFT	WEEKDAYS MIDDAY SHIFT	WEEKDAYS PM SHIFT	SUNDAY PM SHIFT	# OF TOW TRUCKS	# OF PICKUP TRUCKS	# OF FLATBED TRUCKS	# OF BACKUP TRUCK	NOTES	TOTAL CONTRACT HOURS	BEAT ID
1	Redhill Towing	ALA	980	Interstate 580 to Interstate 880	2.03	07/01/07	07/26/09	6:00-10:00		15:00-18:30	13:00-19:00	2	1			b	12,395	1
		ALA	880	7th Street to Jackson Street	2.04													
		ALA	24	Interstate 580 to Contra Costa County Line	4.39													
		CC	24	Contra Costa County Line to Oak Hill Road	6.25													
		CC/ALA	*13*	*State Route 24 to Redwood Avenue*	(4.23)											e		
2	A-One Towing Service	ALA	80	Powell Street to Contra Costa County Line	4.25	07/01/07	07/26/09	6:00-10:00	10:00-15:00	15:00-19:00	13:00 - 19:00	2	1		1	a, b, c	15,755	2
		CC	80	Alameda County Line to San Pablo Dam Road	4.34													
		ALA/CC	580	Interstate 80 to Western Drive/Pt. Molate	6.01													
3	Palace Garage	ALA	880	Alvarado-Niles Road to State Route 238	7.66	06/25/07	06/26/11	06:00-10:00		15:00-19:00	13:00-19:00	2				b,c	17,132	3
		ALA	92	Interstate 880 to Clawiter Road	1.91													
4	Palace Garage	ALA	880	Broadway to State Route 238	10.55	07/01/07	07/26/09	6:00-10:00		15:00-19:00	13:00-19:00	2	1			b	13,170	4
		ALA	238	Interstate 880 to Interstate 580	2.11													
5	K&S Tow	CC	680	Stone Valley Road to Marina Vista Road	13.89	07/02/07	07/04/11	06:00-09:00		14:00-18:30		2	1		1	b	22,523	5
		CC	24	Oak Hill Road U/C to Interstate 680	2.87													
6	B&A Body Works & Towing	SM	101	State Route 92 to SF City Limit/101 to Foster City Boulevard	14.23	07/01/07	07/05/09	6:00-10:00	10:00-15:00	15:00-19:00		2	2		1	a, b	18,754	6
		SM	92	Interstate 101 to Foster City Boulevard	1.47													
7	Redhill Towing	MRN	101	Alexander to 3rd Street/Irwin Street (Central San Rafael Exit)	10.28	07/03/05	07/06/08	6:00-10:00		15:00-19:00	13:00 - 19:00	2			1	b, c	13,090	7
		MRN	580	Highway 101 to Interstate 580 San Quetin	1.60													
8	Campbell's Towing	SCL	101	Blossom Hill Road to Ellis Street	18.40	07/01/07	07/05/09	6:00-10:00		15:00-19:00	13:00 - 19:00	2	2		1	b, c	16,808	8
		SCL	237	Highway 101 to Lawrence Expressway	2.12													
9	Campbell's Towing	SCL	280	Interstate 680/Highway 101 to Foothill Exp.	11.45	06/11/07	06/10/11	6:00-10:00		15:00-19:00		3	1		1	b	32,032	9
		SCL	85	Junction Route 280 to El Camino Real	3.3													
		SCL	87	State Route 85 to Hwy. 101	9.22													
10	Sunrise Enterprise 87	SCL-SM	101	Ellis Street to State Route 92	17.44	06/11/07	06/10/11	6:00-10:00		15:00-19:00		2	1			a, b	24,024	10
		SCL	92	Junction Route 101 to El Camino Real	0.93													
11	B&A Body Works & Towing	SF	101	Cesar Chavez to San Mateo Co. Line	2.92	06/11/07	06/12/11	6:00-10:00	10:00-15:00	15:00-19:00	10:00-16:00	2				a, b,c	22,473	11
		SF	280	San Mateo Co. Line to Highway 101	4.34													
		SM	101	Harney Way to San Francisco Co. Line	0.41													
		SM	280	Geneva/Ocean Avenue to San Francisco Co. Line	1.77													
	(Bridge Tow Coverage)	*SF*	*280*	*Highway 101/Interstate 280 Interchange to Sixth Street*	(3.2)											e		
	(Bridge Tow Coverage)	*SF*	*80*	*Cesar Chavez to Interstate 80/Fourth Street*	(1.5)											e		
12	Ken Betts Towing	CC	80	San Pablo Dam Road to Cummings Skyway	8.39	07/09/07	07/10/11	6:00-10:00	10:00-15:00	15:00-19:00	13:00-19:00	2				a, b, c	22,473	12
13	Bill's Towing	MRN	101	Interstate 580 to Junction Route 37	9.13	06/25/07	06/26/11	6:00-10:00		14:30-18:30	13:30-18:30	2				b, c	17,282	13
14	All Ways Tow & Transport	ALA	880	Mowry Avenue to Alvarado Niles Road	5.84	07/01/07	07/24/09	6:00-10:00		15:00-19:00		2				b	8,272	14
		ALA	84	Thornton Avenue to Interstate 880	2.26													
15	Yarbrough Bros. Towing	SON	101	Wilfred Avenue to River Road	10.8	07/02/07	07/01/11	6:30-9:30		15:30-18:30		1					6,006	15
16	Lima Tow	SCL	17	Junction Route 9 to Summit Road	7.07	07/09/07	07/10/11	6:30-9:30		15:30-18:30	See separate beat 16/SC schedule	1				b, c, f	7,974	16
17	Sierra Hart	SOL	12	Interstate 80 to Napa Co. Line	2.95	07/23/07	07/24/11	6:00-10:00		15:00 -19:00	8:00-16:30 Sat. & Sun.	1 wkdy, 2 wknd			1 wkdy		15,573	17
		NAP	12	Napa Co. Line to Sonoma Co. Line	11.60													
		NAP	29	State Route 37 to Oakville Cross Road	24.0													
		SON	12	Sonoma Co. Line to Junction 116	4.90													
		NAP	*29*	*Oakville Cross Road to State Route 128*	(1.8)											e		
18	All Ways Tow & Transport	SCL	880	Junction Route 237 to Alameda County Line	2.08	07/01/07	07/10/09	6:00-10:00		15:00-19:00		2				b	8,112	18
		ALA	880	SCL County Line to Mowry Avenue	7.18													
19	Lima Tow	SCL	880	Junction Route 237 to Junction Route 17	8.42	07/01/07	07/10/09	6:00-9:00		15:00-19:00		2	1			b	10,647	19
		SCL	17	Junction Interstate 880 to Junction Route 9	6.88													
		SCL	237	Junction Interstate 880 to Lawrence Expressway	4.70													
20	Nelson's Tow	SM	280	*Geneva/Ocean Avenue* to Interstate 380	8.18	07/01/07	07/10/09	6:30-9:30		15:00-18:00		2				b	6,084	20
		SM	380	Interstate 280 to Highway 101	1.67													
21	Matos Towing & Transport	ALA	680	Scott Creek to Alcosta Boulevard	21.35	07/01/07	07/10/09	5:30-9:30		15:00-19:00		1	1	1	1	b	12,168	21
22	Palace Garage	ALA	580	Vasco Road to Santa Rita	8.25	07/23/07	07/24/11	5:30-9:30		15:30-19:00	13:00-19:00	2	1			b, c, d	25,685	22
		ALA	580	Grant Line Road to Vasco Road	8.23													
23	Campbell's Towing	SCL/ALA	680	Highway 101 to Scott Creek Road	10.17	07/01/07	07/10/09	5:30-9:30		15:00-19:00		2				b	8,112	23
24	Roadrunner Tow	SOL	680	Interstate 80 to Junction 780	14.30	07/23/07	07/22/11	6:00-9:00		15:30-18:30		1				g	6,036	24
		SOL	780	Junction 680 to Junction 80	6.42													
25	B&D Towing	CC	4	Hillcrest Avenue to Pacheco Blvd.	20.39	07/01/07	07/17/09	5:30-9:30		15:30-19:00		2	1			b	11,520	25
		CC	242	State Route 4 to Interstate 680	3.4													
26	A-One Tow Service	ALA	580	Harrison Street/Oakland Avenue to Junction Route 238	13.47	07/01/07	07/17/09	6:30-9:30		15:30-18:30		1		1		b	6,144	26
		ALA	*13*	*Redwood Avenue to Interstate 580*	(0.0)											e		
27	Palace Garage	ALA	580	Santa Rita Road to Junction 238	12.86	06/25/07	06/26/11	6:00-9:30		15:30-18:30	13:00-19:00	2	1			b,c	21,020	27
28	Bill's Towing	MRN/SON	101	State Route 37 to East Washington Boulevard	13.1	07/01/07	07/17/09	5:30-9:30		15:30-18:30		1				b	3,584	28
29	Roadrunner Tow	SOL	80	Magazine Street to Abernathy Road	14.04	07/09/07	07/10/11	6:00-9:00		15:30-18:30	13:00-19:00	2				b, c, h	15,020	29
					0													
30	Nelson's Tow	SM	92	State Route 1 to Highway 280	8.03	07/23/07	07/22/11	6:00-9:30		15:30-18:30		2				b	13,013	30
		SM	280	Interstate 380 to State Route 92	10.20													
		SM	92	Interstate 280 to Highway 101	4.83													
31	Campbell's Towing	SCL	101	Blossom Hill Road to East Dunne Avenue	12.6	07/01/07	07/19/09	6:00-9:00		16:00-19:00	13:00 - 19:00	2				b, c	6,900	31
32	Dick's Automotive Transport	SCL	85	Interstate 280 to Cottle Road	16.48	07/01/07	07/17/09	6:00-9:00		16:00-19:00		2				b	6,144	32
33	Yarbrough Bros. Towing	SON	101	East Washington Boulevard to Wilfred Avenue	10.26	07/24/05	07/20/08	6:00-9:00		15:30-18:30		1				b	4,482	33
34	Vacaville Tow	SOL	80	Abernathy Road to I-505 Vaca Valley Road	12.54	07/09/07	07/10/11	6:00-9:00		15:30-18:30	13:00-19:00	2				b, c, h	15,020	34
35	Palace Garage	CC	680	Alcosta Boulevard to Stone Valley Road	10.36	07/09/07	07/08/11	6:00-9:00		15:00-18:30		1				b	6,507	35
36	Ken Betts Towing	CC	4	Interstate 80 to Pacheco Blvd.	11.8	07/23/07	07/22/11	6:00-9:30		15:30-19:00		1					7,007	36
37	Vacaville Tow	SOL	80	Junction I-505 to Richards Blvd.	16.4	07/23/07	07/24/11	6:00-9:00		15:30-18:30	13:00-19:00	2				b, c, h	15,032	37
					539.67							**65 wkdy, 66 wknd**	**15**	**2**	**8 wkdy, 7 wknd**		**493,973**	

TCM E: Transit Access to Airports

BART to San Francisco International Airport:
S. San Francisco: From Colma BART station to the new SFO station; Extend BART system to the San Francisco International Airport.

BART Fares and Schedules
The latest BART fares and schedules (as of January 2008) can be found at: http://www.bart.gov/guide/brochures.aspx

Service Adjustments
See attached document for service adjustments overtime since June 2003 through December 2006.

SFO Service Changes Over Time

Below is a list and description of service changes that have been implemented since the San Francisco Extension opening on June 22, 2003 through December 31, 2006. Some of these changes are major system changes. Other changes are more minor involving train sizing.

June 22, 2003 - SFO Initial Service

Bay Point trains provide service to Millbrae during all hours of operation, all week. Dublin trains provide service to the San Francisco Airport (SFO) during all hours of operation, all week. These routes operate on 15 minute headways during the weekday, and on 20 minute headways during evenings and on weekends. A shuttle train provides service between Millbrae and SFO on 20 minute headways during all hours of operation, all week. In addition to the base 15 minute service, three AM peak period rush trains provide service from Bay Point to Daly City, then operate express from Daly City to SFO. These three trains return during the evening peak period and operate express from SFO to Daly City, then on to Bay Point.

1. Direct service to/from Millbrae and direct service to/from SFO
2. Peak rush trains provide Bay Point line passengers direct service to/from SFO during the peak periods
3. 20 minute shuttle does not synch with the 15 minute base service during the day

February 9, 2004

Bay Point trains provide direct service to SFO, then continue to Millbrae. On the return trip these trains follow the same route back to Bay Point. This service route has been called the "Reverse L" service because the shape of the service on the SFO extension resembles a backward or reverse "L" shape. During the 3-1/2 hour AM and PM peak period on weekdays, Richmond trains provide direct service to Millbrae, then continue to SFO. On the return trip these trains follow the same route back to Richmond. This service route is referred to as the "L" service. The Richmond trains do not operate on the weekend. When the Richmond trains are operating on the extension during the week the Bay Point trains terminate at SFO and do not continue to Millbrae. At all other times (off-peak, evenings and weekends) the Bay Point trains complete the "Reverse L" service pattern. There are no other direct peak period rush trains. Service during the day (and during the peak rush) is 15 minutes, while evenings and weekends operate at 20 minute headways.

1. Provides for direct service on all extension routes to Millbrae and SFO, no need to transfer
2. 20 minute shuttle (during normal 15 minute service) replaced by 15 minute direct trains
3. During off-peak, evenings and weekends, direct service to Millbrae is through the SFO station

March 8, 2004

Train sizing adjustments: Train 361 increased from 4 to 5-car train off-peak. Train 441 changed to 10-car peak size for all PM trips instead of breaking to 5-car train on last trip. Other minor adjustments were made to the 200s and 500s.

September 13, 2004

Bay Point trains provide direct service to SFO, then continue to Millbrae. This service provides "Reverse L" service and operates during all hours of operation, all week. During the 3 hour AM and PM peak period on weekdays, Richmond trains provide direct service to SFO, then continue to Millbrae in a "Reverse L" service configuration. During the 3 hour AM and PM peak period (weekdays only) the Richmond and Bay Point trains both provide service directly to and from Millbrae/SFO. The Richmond trains do not operate on the weekend. Service during the day on each route (and during the peak rush) is 15 minutes, while evenings and weekends operate at 20-minute headways.

1. Provides for direct service on all extension routes to Millbrae and SFO, no need to transfer

2. During all hours, direct service to Millbrae is through the SFO station (but is effectively every 7.5 minutes during the 3 hour AM and PM peak periods)

December 13, 2004
Train sizing adjustments were made to better match capacity with demand, generally to shorter trains.

April 23, 2005
Train sizing adjustments: The 300 series trains on Saturday were increased from 8 to 9-car trains.

June 13, 2005
Train lengths were generally shortened to an 8-car plan in two phases, in June and August, 2005, with peak size trains running all day on the Bay Point line.

August 15, 2005
Second phase of implementing the "8-car" plan.

September 12, 2005
Dublin trains provide direct service to SFO, then continue to Millbrae in a "Reverse L" service configuration. Only the Dublin trains will provide service to the extension on weekdays and weekends. Richmond and Bay Point trains will truncate at Daly City. Service during the day (and during the peak rush) is 15 minutes, while evenings and weekends operate at 20-minute headways. Although direct service from Bay Point has been replaced with this new service, the transfer time from a Bay Point base train to SFO train (from Dublin) is only 3-4 minutes in each direction.

September 22, 2005
Extend service from Richmond and lengthen trains. Up to six consists will be lengthened from 4 to 8-car trains. Richmond trains to Daly City will be extended to Colma for two hours in the morning and two hours in the evening.

October 10, 2005
The following adjustments were made:

Weekday
100s - three trains lengthened
200s - one train lengthened, Make/Break timing changed
300s - several trains lengthened with a few trains reduced in size
400s - one train lengthened
500s - No change since September 22, 2005 (Make/Break timing)

Saturday
300s - some trains lengthened

Sunday
300s - some trains lengthened

December 5, 2005
The following adjustments were made:

Weekday
100s – 115 becomes the last AM Break train
300s – Train 323 and 363 increased from 8-car to 9-car trains

Saturday
200s – All trains are now 6-car trains during the day

January 30/31, 2006e
The following adjustments were made:

Weekday
100 Series Trains (net +1)
Train 101 +1 (9 to 10 cars) peak increase
Train 115 off peak increase 4 to 5 cars

200 Series Trains (net 0)
No change

300 Series Trains (net –2)
Train 365 off peak decrease only on dispatches of 20:58, 22:19, and 23:38
Train 367 +1 (9 to 10 cars) off peak decrease only on dispatches of 21:18, 22:39, and 24:00
Train 371 –1 (10 to 9 cars)
Train 377 –1 (10 to 9 cars)
Train 381 –1 (10 to 9 cars)
Train 331 -2 (10 to 8 cars)
Train 335 +2 (8 to 10 cars)

400 Series Trains (net +2)
Train 443 –1 (9 to 8 cars) for AM peak period only
Train 445 +1 (8 to 9 cars)
Train 453 –1 (9 to 8 cars) for PM peak period only
Train 455 +2 (8 to 10 cars) and off peak increase 4 to 5 cars

500 Series Trains (net +10)
Train 501 +1 (8 to 9 cars) peak increase and off peak increase 4 to 5 cars
Train 503 +1 (8 to 9 cars) peak increase and off peak increase 4 to 5 cars
Train 505 +1 (8 to 9 cars) peak increase
Train 507 +1 (8 to 9 cars) peak increase
Train 509 +1 (8 to 9 cars) peak increase
Train 511 +1 (8 to 9 cars) peak increase
Train 513 +1 (8 to 9 cars) peak increase and off peak decrease 8 to 5 cars
Train 519 +1 (8 to 9 cars) peak increase
Train 521 +1 (8 to 9 cars) peak increase and off peak increase 4 to 5 cars
Train 523 +1 (8 to 9 cars) peak increase

Saturday
100s – no change
200s – no change
300s – All 8-car trains are now 9-car trains
400s – no change
500s – Four trains increased from 4 to 5-cars (501, 505, 511, and 515)

Sunday
200s – no change
300s – no change
500s – All trains 9-car midday and some offpeak increased from 4 to 5-cars (503, 505, and 515)

Appendix F
Methodology for Bay Area Conformity Determinations

Winston H. Hickox
Agency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

November 30, 2001

Mr. Wayne Nastri
Regional Administrator
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Dear Mr. Nastri:

The Air Resources Board (ARB/Board) hereby transmits the Bay Area emission factor model (SF Bay Area-EMFAC 2000) to the U.S. Environmental Protection Agency (U.S. EPA) for approval and use in the 2001 San Francisco Bay Area State Implementation Plan (Bay Area SIP) and subsequent Bay Area conformity determinations.

SF Bay Area-EMFAC 2000 is tailored specifically to the San Francisco Bay Area. The emission factors contained in SF Bay Area-EMFAC 2000, along with updated activity data from the Metropolitan Transportation Commission (MTC), provide the basis for the mobile source emissions budgets in the 2001 Bay Area SIP. SF Bay Area-EMFAC 2000 will be used for subsequent Bay Area conformity determinations. At a public meeting on November 1, 2001 the ARB Board approved SF Bay Area-EMFAC 2000 for these purposes following a 30-day public notice. At the time the Bay Area SIP was being developed, this model was the most current emission factor model available. SF Bay Area-EMFAC 2000 was based on EMFAC2000. The documentation for EMFAC2000 was publicly available beginning in May 2000 and made available for use by the Bay Area Air Quality Management District when it began developing the 2001 Bay Area SIP in November 2000.

The three Bay Area co-lead agencies responsible for developing the Bay Area SIP have committed to do a mid-course review of the Bay Area SIP by December 31, 2003 and revise the 2001 SIP by March 2004. ARB has committed to submit the revised Bay Area SIP to U.S. EPA by April 15, 2004. The mid-course review will use the most current emission factor model available at that time to develop the mobile source emissions budgets. This model will be EMFAC2001 or its successor.

This transmittal provides documentation of the emission factors and activity data used in SF Bay Area-EMFAC 2000 to develop the 2001 Bay Area SIP. In addition, it includes the methodology ARB will be using to conduct Bay Area conformity determinations.

SF Bay Area-EMFAC 2000 Emission Factor Model Documentation

Comparison between MVEI7F/7G and SF Bay Area-EMFAC 2000

The emission factors used in the SF Bay Area-EMFAC 2000 emission factor model represent a major improvement over emission factors used in older models such as MVEI7F and MVEI7G. SF Bay Area-EMFAC 2000 exhaust hydrocarbon emission rates are significantly higher than the emission rates included in the older models. The increase in exhaust hydrocarbon rates is mainly a result of the following changes:

- More accurately reflecting real-world driving by using the Unified Cycle (UC) driving cycle rather than the Federal Test Procedure (FTP);
- Using new speed adjustment factors to better reflect how emissions change as average driving speeds change;
- Representing 45 model years, rather than only 35; and
- Incorporating new vehicle test data.

Evaporative hydrocarbon emission rates in SF Bay Area-EMFAC 2000 are also significantly higher than the older models' emission rates. The most important changes causing the increase in evaporative hydrocarbon emission rates include:

- Higher hot soak emission rates, especially for older catalyst-equipped vehicles;
- Higher running loss emission rates, based on new data; and
- Including emissions for vehicles with liquid fuel leaks.

Emission rates for oxides of nitrogen (NOx) are also significantly higher in SF Bay Area-EMFAC 2000 than in the older models. The increased estimates of NOx emission rates are primarily due to the following changes:

- Inclusion of "off-cycle NOx" (i.e., NOx emissions that were not represented in the certification driving cycle); and
- Incorporation of new vehicle test data for catalyst equipped passenger cars and light trucks.

Incorporation of Latest Standards

SF Bay Area-EMFAC 2000 also includes the effects of recently adopted standards on the emissions of the on-road fleet. The future year emission rates in SF Bay Area-EMFAC 2000 reflect the adopted standards described below.

<u>Supplemental Federal Test Procedure</u>
Two supplemental test procedures to the FTP were adopted by the Board in July of 1997. These new standards are applicable to passenger cars, light-duty trucks, and medium-duty vehicles weighing 8,500 pounds or less. These standards require the

control of excess emission of hydrocarbon and oxides of nitrogen during “off-cycle” operations (high speed and hard acceleration), and excess emissions associated with the use of air conditioning. The new standards are to be phased-in between 2001 and 2005.

Low Emission Vehicles (LEVII)

The second phase of Low Emission Vehicle Standards (LEVII) was adopted by the Board in November of 1998. This action imposed more stringent hydrocarbon, carbon monoxide, NOx and exhaust particulate matter emissions standards for passenger cars, light-duty trucks and medium-duty vehicles up to 14,000 pounds sold in California beginning in 2003.

Near Zero Evaporative Standards

Also in November 1998, the Board adopted new standards for the emissions of evaporative hydrocarbons (diurnal, hot soak and resting loss). The standards were reduced from 2 grams per test (hot soak plus diurnal) for passenger cars, to 0.5 grams per test.

New On-Road Motorcycle Standards

In December of 1998, the Board adopted lower exhaust emission standards for on-road motorcycles. These standards, which may require future motorcycles to utilize catalytic converters, are applicable to new motorcycles sold in California beginning in 2004.

Off-Cycle NOx Mitigation

In a settlement reached between the federal government, the Air Resources Board and heavy-duty engine manufacturers, several mitigation measures were agreed to regarding off-cycle NOx emissions. In addition to ending the practice of defaulting to an advanced timing condition during extended cruise operation, several manufacturers have agreed to perform “low emission” rebuilds for in-use engines. These rebuilds will lower the emissions of the in-use fleet.

New Exhaust Emissions Standards for Urban Transit Buses

In February of 2000, the Board adopted a regulation that allows transit agencies the choice between either a diesel or alternative fuel “path” to lower emissions. Beginning in 2002, over the course of 10 years, this regulation requires increased introduction of

cleaner engine buses in transit agencies' fleets, use of cleaner diesel fuel, retrofits to reduce exhaust particulate matter (PM) emissions from older diesel buses, and use of zero-emission buses (ZEBs).

Public Review

The emission factors used in SF Bay Area-EMFAC 2000 were developed in a 3-year process and were subject to public review and comment during three workshops held in 1998, 1999, and 2000. Throughout the comment period, ARB received a number of written and verbal comments, which were addressed in the development of the emission factor model.

Further detail regarding the development of the SF Bay Area-EMFAC 2000 emission factor model may be found in the attached Technical Support Documentation. The Technical Support Documentation refers to broader work on the statewide EMFAC2000 emission factor model, but also applies to the region specific SF Bay Area-EMFAC2000.

Activity Data Documentation

The Bay Area vehicle miles traveled (VMT), VMT growth rates, and VMT-speed distributions incorporated into SF Bay Area-EMFAC 2000 represent the best current activity data estimates available. The derivation of these estimates are explained below.

Vehicle Miles of Travel

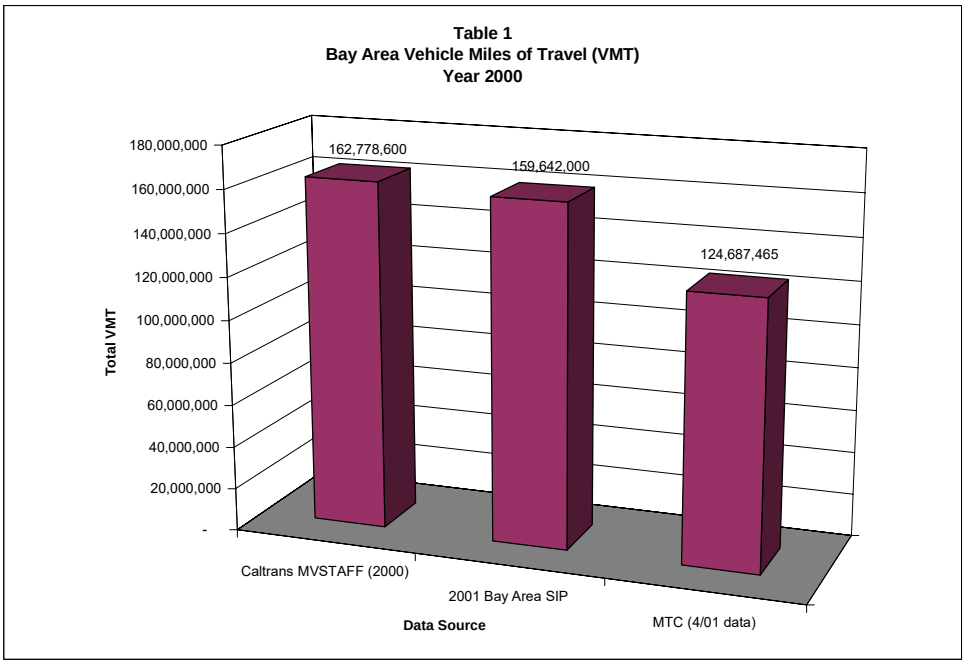
Bay Area VMT estimates for calendar year 2000 are based on the ARB VMT estimation methodology using mileage accrual rates derived from Smog Check odometer data and Department of Motor Vehicle vehicle populations (see Section 7 of the attached Technical Support Documentation for further detail on the ARB VMT estimation methodology).

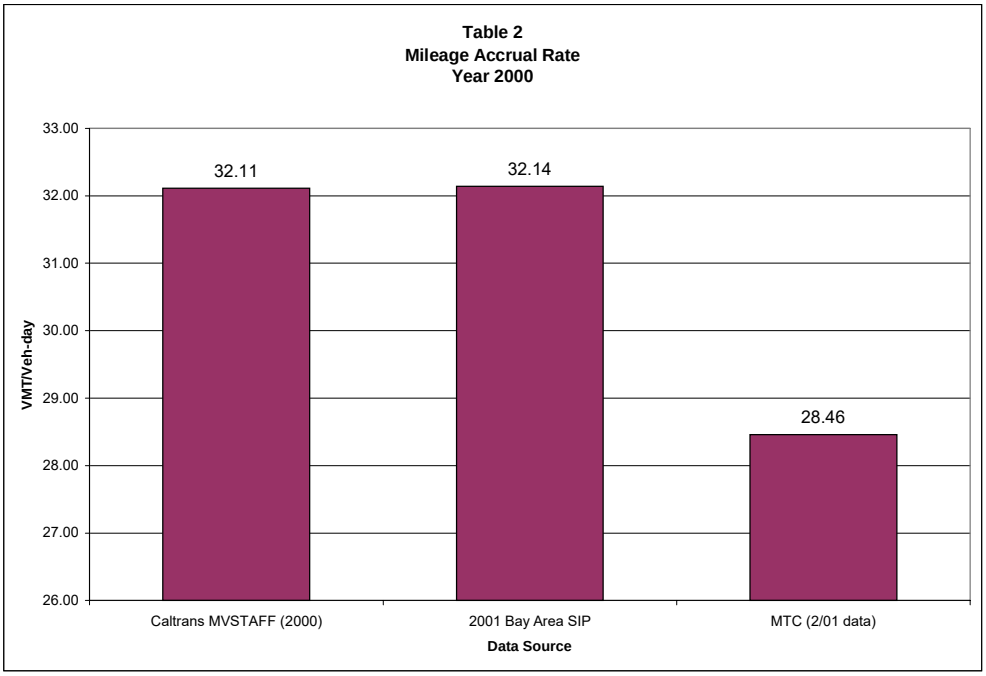
The decision to use ARB's VMT estimate instead of the VMT estimate from MTC's BAYCAST-90 travel demand model for calendar year 2000 was made in an agreement between MTC and ARB. As Table 1 illustrates, MTC's 2000 VMT estimate for the region is about 22 percent lower than both ARB and Caltrans' estimates. The ARB and Caltrans[1] methods for estimating VMT were developed independently of each other, yet fall within 1 percent of each other.
Additional justification for using the ARB VMT estimation methodology is found in the estimate of the number of miles driven by each vehicle per day (i.e., the mileage accrual

[1] Caltrans' VMT estimate was taken from the annual "Motor Vehicle Stock, Travel, and Fuel Forecast" (MVSTAFF) report. The MVSTAFF report forecasts statewide VMT based on statewide vehicle population data from the DMV, fuel consumption estimates from the Board of Equalization, and fuel economy estimates derived from the national fuel economy standards. Statewide VMT estimates are then disaggregated to the county level using county auto registration and road system mileage ratios.

rate). Table 2 compares mileage accrual rates from various data sources. MTC's estimates appear too low to be consistent with odometer readings collected in the Smog Check program. MTC's mileage accrual estimates are 11 percent lower than both Caltrans' ARB's estimates for the Bay Area.

For the purposes of the 2001 Bay Area SIP, MTC agreed to use ARB's 2000 VMT estimate. It was also agreed that the difference in VMT between ARB's and MTC's calendar year 2000 VMT estimates would be used as a "correction" for all future analysis years.





VMT Growth Rates

In the agreement between ARB and MTC, ARB agreed to use MTC's VMT growth rate as implied by the VMT estimates produced by BAYCAST-90. The rationale for this is that while ARB questions the level of travel in calendar year (CY) 2000 as estimated by MTC's travel demand model, ARB is not questioning future year growth projections included in the travel demand model.

VMT-Speed Distributions

The final pieces of activity data provided by MTC and incorporated into SF Bay Area-EMFAC 2000 are the VMT-speed distributions for two calendar years (2000 and 2005). Based on consultation between MTC and ARB staff, ARB incorporated the VMT-speed distributions into SF Bay Area-EMFAC 2000 by applying CY2000 speed distributions to CYs 2000-2003, and CY2005 speed distributions to CYs 2004+.

Methodology for Bay Area Conformity Determinations

For all Bay Area conformity determinations based on the mobile source emissions budgets set in the Bay Area SIP (using SF Bay Area-EMFAC 2000), the following step-wise methodology will be followed:

1. MTC will submit to ARB updated VMT-speed distributions and updated VMT estimates by county for all relevant analysis years. ARB will follow the procedures below for analysis years for which MTC does not submit new activity data (i.e. for which activity data does not change from MTC's original SIP submittal):
    - ARB will use the speed distributions submitted by MTC for the most recent calendar year prior to the analysis year of interest. For example, if MTC submits new VMT-speed distributions for 2005 and 2010, but not for the 2006 analysis year, the 2006 analysis year will use the speed distributions submitted for 2005. VMT-speed distributions will not be interpolated.
    - The VMT estimate for each county will be interpolated using county-specific compounded growth rates.[2] The interpolated VMT will then be used for the following steps.

2. ARB will calculate VMT for the portions of Sonoma and Solano Counties that fall in the San Francisco (S.F.) Air Basin. This is necessary since the SIP budgets are based on the S.F. Air Basin (which covers only the southern portions of Solano and Sonoma Counties), while the MTC VMT estimates include the full nine Bay Area counties. The county portions will be calculated by multiplying the full county VMT submitted by MTC by the VMT ratio (partial county/county) derived from SF Bay Area-EMFAC 2000.[3] In year 2000, about 71 percent of Solano County, and 77 percent of Sonoma County VMT occurred in the S.F. Basin.

3. ARB will calculate the year 2000 difference in VMT between the VMT estimate included in the SF Bay Area-EMFAC 2000 runs[4] and the VMT estimate submitted by MTC for conformity.[5] The resulting differences by county represent the VMT "correction" between ARB and MTC's VMT estimates.

4. The VMT correction will be added by county to the submitted VMT for all analysis years, resulting in the "target" VMT estimate that will be used for the conformity modeling runs.[6]

---

[2] For example, 2006 VMT is interpolated from 2005 and 2010 VMT estimates submitted by MTC by the following equation: $VMT_{2006} = (VMT_{2010} / VMT_{2005})^{0.2} * VMT_{2005}$

[3] For the S.F. Basin portions of Solano and Sonoma County VMT:
S.F. Basin County Portion VMT_{MTC} = [S.F. Basin County Portion $VMT_{SFBayArea\text{-}EMFAC2000}$ / Total County VMT $_{SFBayArea\text{-}EMFAC2000}$] * Total County VMT_{MTC}

[4] SF Bay Area-EMFAC 2000 calculates VMT based on Smog Check odometer readings and DMV vehicle registration data for light duty vehicle classes, and instrumented truck data for the truck classes.

[5] VMT $correction_{county\ a}$ = SIP VMT_{CY2000} – MTC VMT_{CY2000}

[6] Target $VMT_{county\ a}$ = MTC $VMT_{county\ a}$ + VMT $correction_{county\ a}$

5. The county-specific target VMT in the conformity modeling runs will be achieved in SF Bay Area-EMFAC 2000 by modifying the county-specific vehicle populations in SF Bay Area-EMFAC 2000 using the What-if-Scenario (WIS) option. Since vehicle population and VMT are linearly related in SF Bay Area-EMFAC 2000, to obtain the "target" vehicle population, ARB staff will take the ratio between the SIP VMT estimates and the target VMT for each analysis year and apply them to the SIP vehicle population estimates for each respective analysis year.[7]

6. Once the target vehicle populations have been calculated, ARB staff will run SF Bay Area-EMFAC 2000 using the WIS option to adjust vehicle populations by county, and incorporate any updated speed distributions.

7. ARB staff will then apply control factors to the model output to adjust for emission reduction measures not included in the SF Bay Area-EMFAC 2000 emission factor model or changed since the model was developed.

8. Finally, ARB staff will compare the results to the SIP budgets for the conformity demonstration.

If you have questions regarding this submittal, you may contact me at (916) 445-4383, or have your staff contact Ms. Cynthia Marvin, Chief of the Air Quality and Transportation Planning Branch, at (916) 322-7236.

Sincerely,

/s/

Michael P. Kenny
Executive Officer

Enclosures

cc: See next page.

[7] Target Veh Pop = [((Target VMT – SIP VMT) / SIP VMT) * SIP Veh Pop] + SIP Veh Pop

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January 2003

Recommended Methods for Use of EMFAC2002 To Develop Motor Vehicle Emissions Budgets and Assess Conformity

As the agency charged with estimating motor vehicle emissions for air quality plans, the Air Resources Board (ARB) has improved the EMFAC modeling tool for use in combination with estimates of vehicle population and activity to develop motor vehicle emissions budgets and assess transportation conformity. The most recent version of this tool, EMFAC2002, has been transmitted to the U.S. Environmental Protection Agency (U.S. EPA) for approval for use in State Implementation Plans (SIPs) and conformity assessments. This paper describes the recommended practices for ARB, air districts, metropolitan planning agencies (MPOs) and regional transportation planning agencies (RTPAs) to use vehicle activity in conjunction with EMFAC2002 emission rates to calculate emissions budgets and conduct conformity assessments.

The vehicle activity indicators commonly used to develop emissions inventories are vehicle trips and vehicle miles of travel (VMT) by speed, vehicle class and time of day. Though not a direct measure of travel activity, vehicle population may also be a variable for these purposes, as described below.

Vehicle trips. In California, MPOs and RTPAs use demographic forecasts and travel demand models to develop estimates of current and future daily VMT, daily vehicle trips and average travel speeds for links in the transportation network. ARB separately estimates daily vehicle trips, but defines trips as the number of times a vehicle is started, rather than a number of specific daily destinations. This distinction is important; ARB and U.S. EPA studies find that vehicles are started five to six times per day, while trips associated with destinations as reported through travel surveys and predicted in travel demand models occur three to four times per day. Because start emissions and the duration of time between starts are crucial to emissions estimation, ARB equates vehicle trips with vehicle starts. Though EMFAC2002 permits model users to alter estimates of vehicle trips used to estimate emissions, ARB recommends that the model's default estimates of vehicle trips (starts), developed from instrumented vehicle studies, be used for air quality planning and conformity purposes.[1] Alternatively, for vehicle classes where appropriate local data are made available for review through the interagency consultation process, use of trip factoring or other methods to fully account for vehicle starts may be employed. Such alternative approaches should be discussed in the interagency consulation process.

[1] An exception would occur when a user chooses to factor these start-based trips to account for trip reduction programs. EMFAC2002 start-based trips rather than destination-based trips should serve as the baseline for this adjustment. The adjustment would be made through the What-If Scenario (WIS) function of EMFAC2002 as follows, where TRS denotes the trip reduction scenario:

*WIS Input TRS Trips = EMFAC Default Trips * (RTPA TRS Trips / RTPA Baseline Trips)*

Vehicle speeds. Most travel demand models provide output of estimated average speed by time period and link that may be summarized for use in EMFAC2002. For each major vehicle class and up to 24 hourly time periods, total VMT is divided into 13 different speed "bins" (5 mph through 65 mph) and used as input to EMFAC2002. ARB recommends continuation of this current practice to develop emissions budgets and assess conformity. Travel from intrazonal trips should be assigned to the appropriate speed bin based on the speed assigned to that travel in the travel demand model. VMT for each speed bin and time period can be used as input through the WIS function of EMFAC2002. It is also possible to input this data specific to vehicle class if adequate and defensible local data are available.

Vehicle population. Vehicle trips (starts) in EMFAC2002 are estimated as a function of the number of vehicles, or vehicle population, by county. The population of each class of motor vehicle is estimated and forecast from Department of Motor Vehicles (DMV) registration data. EMFAC2002 assumes there is a relationship between vehicle population and VMT, carried through mileage accrual rates.[2] In the default case, the model assumes *vehicle population * mileage accrual = VMT.* ARB-preferred practice is to maintain this internal consistency, for reasons explained below.

Vehicle miles of travel. Daily VMT is both an emissions model input usually provided by MPOs/RTPAs and a model output used to estimate exhaust emissions. ARB staff reviews MPO/RTPA estimates of VMT and vehicle speeds, and supports these estimates for use in air quality plans whenever we agree they are reasonable and defensible. Use of the latest estimates of MPO/RTPA VMT and speeds in plan development facilitates the subsequent federal transportation conformity process. This is particularly important for any year for which the plan creates emissions budgets, as conformity rules allow no emissions budget exceedance, regardless of how small. As there may be some variance between default EMFAC2002 VMT and more recent MPO/RTPA estimates to be used for SIP development, we are recommending a procedure to more exactly incorporate into emissions budgets revised VMT estimates for emissions budget analysis years.

Although it is possible to directly input VMT into EMFAC2002 through the model's WIS function, it is generally not recommended to do this independent of vehicle population because of the desire to properly estimate start and evaporative emissions tied to the size of the vehicle fleet. A change in total forecasted miles of travel implies a change either in the number of vehicles traveling those miles or in mileage accrual rates. For future years, we generally recommend making vehicle population the variable, rather than mileage accrual. Thus, VMT adjustment would usually occur through vehicle population adjustment in the model's WIS function, according to this formula:

*WIS Input Population = EMFAC Default Population * (RTPA VMT / EMFAC Default VMT)*

[2] Accrual rates are miles traveled per year as a function of vehicle age, derived from the Bureau of Automotive Repair Smog Check database as described in Section 7.1 of the EMFAC2000 Technical Support Document, found via http://www.arb.ca.gov/msei/on-road/latest_revisions.htm#pcaccrual.

The result of this modification is that emissions estimates more precisely incorporate the daily VMT provided by each MPO/RTPA to calculate exhaust emissions, and vehicle population is adjusted for consistency with this assumption of higher or lower VMT, providing similarly modified start and evaporative emissions.[3] Though the emissions impact of using this approach will often be small, we believe the approach is appropriate given the desire to fully reflect the impacts of changes in travel activity on all emissions processes. Use of consistent methods in air quality plans and conformity assessments will both reduce potential conformity problems and preserve the integrity of the SIP and conformity processes.

Alternatively, local data may indicate that changes in VMT are tied more closely to changes in household or business rates of travel than to changes in vehicle ownership. Or, improved travel demand modeling may project auto ownership rates with a high degree of confidence. In such cases it may be appropriate to adjust total mileage accrual rather than vehicle population. It is also possible to derive a modified VMT forecast from adjustments to both variables in EMFAC2002. Planning agencies are encouraged to present alternative approaches for consideration in the interagency consultation process.

Recommendations

1. ARB recommends that the EMFAC2002 default estimates of vehicle trips, based on starts per day, be used for SIP development and conformity purposes. Model defaults for trips may be factored to account for trip reduction scenarios, but should not be replaced with estimates that do not account for all vehicle starts. Alternative approaches, such as the factoring of travel demand model trip outputs for appropriate classes to account for additional starts, may be considered through interagency consultation.

2. We recommend continuation of current practices for input of latest speed distributions for SIPs and conformity assessments. Travel from intrazonal trips should be assigned to the appropriate speed bin based on the speed assigned to that travel in the travel demand model.

3. To fully reflect the impacts of modified VMT forecasts on all emissions processes, in the calculation of SIP emissions budgets, and in the assessment of conformity with those budgets, vehicle population should be adjusted in EMFAC2002 proportional to the estimated VMT change. Local circumstances may alternatively support adjustment of mileage accrual rates, subject to interagency consultation.

[3] After adjusting VMT through use of the population variable in the WIS function of EMFAC, a user who desires to match VMT even more exactly (to the mile instead of the tens of miles) can then adjust VMT in the WIS without disturbing the population adjustment. This is unlikely to have a discernible impact on emissions, however.

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Coordinating, Developing, and Delivering Highway Transportation Innovations

Publication Number: FHWA-HRT-15-005 Date: July/August 2015

Publication Number: FHWA-HRT-15-005
Issue No: Vol. 79 No. 1
Date: July/August 2015

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Access for All

by Patrick Gomez, Candace Groudine, Elizabeth Hilton, and Brooke Struve

On the 25th anniversary of the Americans with Disabilities Act, FHWA celebrates milestones in an epic journey to remove barriers and empower travelers of all levels of ability.



A quarter-century after the passage of the ADA, accessibility for persons with disabilities has vastly improved in communities across the country.

Transportation fundamentally serves accessibility and mobility. It provides the foundation for how individuals live and connect with others, and how the economy grows at the local, State regional, and national levels. Social equity demands that transportation--its planning, development, and implementation--support mobility for people of varying levels of ability and income, and serve broader community goals such as economic development and community vitality.

According to the U.S. Census Bureau, approximately 56.7million people living in the United States had some kind of disability in 2010. These individuals offer unique sets of skills to the workforce, and they make up a significant market of consumers, representing more than $200 billion in discretionary spending in 2010, as reported by the U.S. Department of Labor.

The Americans with Disabilities Act (ADA) of 1990 aims to open doors to full participation by providing opportunities for people with disabilities. It fosters social equity and ensures nondiscrimination in all areas of life, including transportation.

Prior to implementation of the various disability rights laws, individuals with disabilities faced an uphill battle to attain a level playing field in pedestrian environments, the workplace, schools, places of entertainment, housing, shopping centers, and transportation. A common rationalization for not implementing such comprehensive protective laws for individuals with disabilities was the notion that there were not enough individuals with disabilities to warrant the expense of curb ramps, detectable warnings, and other public accommodations. As a result, most individuals with disabilities were not able to go about their daily lives independently outside their homes.

The ADA fostered a significant shift in the way the transportation industry approaches building and maintaining roadways, sidewalks, and other infrastructure. In many cases, the act literally paved a path for people with disabilities. This year marks the 25th anniversary of the ADA, and with that comes an opportunity to look back and celebrate its achievements--and look ahead at what remains to be done.

Landmark Legislation

The groundbreaking Civil Rights Act of 1964 guaranteed profound protections for many--prohibiting discrimination on the basis of race, color, and national origin--but it did not include protections for individuals with disabilities. In 1973, Congress recognized that society had historically discriminated against people with disabilities and condemned the “invisibility of the handicapped in America.” To rectify this discrimination in programs conducted by Federal agencies or programs receiving Federal financial assistance, Congress passed the Rehabilitation Act of 1973. This act is widely recognized as the first civil rights statute for persons with disabilities (29 U.S. Code Section 701) and paved the way for passage of the ADA.

Enacted July 26, 1990, the ADA promotes a society in which persons of all abilities have the right to participate as valuable individuals in the areas of employment, public services, public accommodations, telecommunications, and transportation. The ADA broke down barriers that prevent persons with disabilities from receiving the benefits of society and making their own important contributions.

However, Congress did not fully anticipate the extent to which the ADA would be challenged in the courts. Subsequent case law narrowly construed

the intent of the ADA and failed to provide the broad protections Congress intended for individuals with disabilities.

To clarify the original intent of the ADA, Congress enacted the ADA Amendments Act of 2008. These amendments clarified the ADA's objectives to provide "a clear and comprehensive national mandate for the elimination of discrimination" and "clear, strong, consistent, enforceable standards addressing discrimination" by reinstating a broad scope of protection to be available under the ADA (42 U.S. Code Section 12101).

Congressional findings written into the ADA best demonstrate the broad reach and necessity of the legislation. The statute refers to the 43 million people in the United States in 1990 who, at that time, had one or more physical or mental disabilities, and recognizes that this number would continue to grow, as it has done. The statute also acknowledges that individuals with disabilities are often excluded from services, programs, and activities, and points to the continuing discriminatory effects of architectural, transportation, and communication barriers. Congress' intent was clear: to enable persons with disabilities to "compete on an equal basis and to pursue those opportunities" available to persons without disabilities. Congress also recognized that "dependency" and "nonproductivity" come at an inevitable, unnecessary, and tremendous cost to society when such discrimination exists.

A case reflecting the broad reach of the ADA with regard to public rights-of-way is that of *Barden v. City of Sacramento*, 292 F.3d 1073 (9th Cir. 2002), which determined that local governments must maintain accessible sidewalks because doing so is simply a "normal function of a city." The court further found that the U.S. Department of Justice's ADA regulations require the provision of curb ramps to ensure the accessibility of sidewalks. The U.S. Department of Transportation, through the Federal Highway Administration, and the U.S. Department of Justice recently issued joint guidance on the requirements of Title II of the ADA to install curb ramps when roadways are altered. For more information, visit www.fhwa.dot.gov/civilrights/programs/ada.cfm.

Proposed Guidelines for Accessible Public Rights-of-Way

The U.S. Access Board is developing guidelines for the accessible design of pedestrian facilities in the public right-of-way. The Access Board has not yet finalized these guidelines, but key elements of the current draft of the guidelines include the following:

- The minimum continuous width of sidewalks should be 4 feet (1.2 meters), exclusive of curb.
- The longitudinal grade of sidewalks may match, but not exceed, the grade of the adjacent roadway.
- Wherever pedestrian-activated signals are installed, the pushbuttons must be properly located and have locator tones and audible and vibrotactile indications.
- The cross slope of crosswalks at intersections may not exceed 2 percent if crossing traffic always slows or stops, as at a YIELD or STOP sign.
- The cross slope of crosswalks at intersections may not exceed 5 percent if crossing traffic may at times proceed through the intersection without slowing, as during the green phase of a signal.
- All crosswalks, whether marked or unmarked, must be accessible to the sidewalks via a curb ramp or blended transition.
- Curb ramps and blended transitions must have detectable warning surfaces to alert pedestrians with vision disabilities of the boundary between the sidewalk and street.
- Some parking spaces with accessible features must be provided wherever there is onstreet parking.

For more information, visit www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way.

"The ADA reflects a holistic approach to accessibility," says David M. Capozzi, executive director of the U.S. Access Board, a Federal agency that establishes accessibility guidelines for the built environment, transit systems, and information and communication technologies under the ADA and other laws."Those who drafted the ADA recognized that equal access to public accommodations, goods and services, and employment were of limited benefit if barriers remained along the means of getting to them; so they included specific requirements for transportation systems in the statute."

The ADA requires the establishment of mandatory accessibility standards for the built environment and transportation systems based on guidelines established by the Access Board.Currently, the Access Board is finalizing new guidelines for accessible public rights-of-way."These guidelines are the first of their kind in comprehensively addressing access to public streets and sidewalks," Capozzi says."They will provide an essential tool in ensuring that the level of accessibility called for by the ADA is indeed met when streets and sidewalks are built or altered."





(Before) In Peoria, IL, this sidewalk at the intersection of Elm Street and Adams Street was inaccessible. (After) The city reconstructed and widened the sidewalk to provide an ADA-compliant curb ramp for each crosswalk. Street lamps were also installed as part of the project.

Compliance Oversight

The Department of Justice has primary authority for ensuring compliance with the ADA, but FHWA also has responsibilities for the enforcement of ADA compliance. Multiple disciplines at FHWA work to advance accessibility while closely coordinating with the agency's Office of Civil Rights to ensure that recipients of USDOT funding comply with Section 504 of the Rehabilitation Act and that State and local public agencies comply with the ADA. FHWA's key stewardship and oversight responsibilities related to the ADA include ensuring that its funding recipients and subrecipients are informed of their responsibilities to provide accessibility in their programs, activities, and facilities, and making sure that recipients and subrecipients are applying appropriate accessibility standards to all transportation facilities. FHWA also ensures that all complaints filed under Section 504 or the ADA are processed in accordance with established procedures.

In recent years, the majority of the complaints FHWA has addressed involved sidewalks and curb ramps. However, FHWA has handled a number of other types of complaints, such as those involving roundabouts, shared-use paths, signals, crosswalks, signage, and transition plans.

FHWA recommends resolving issues of discrimination voluntarily and informally whenever possible. Frequent consultation with ADA specialists in various FHWA Offices facilitates the informal resolution process and enables parties to deal with concerns before they become formal complaints. Such consultation also expedites the agency's ability to respond to complainants in a timely manner. These consultations include professionals with diverse backgrounds from the FHWA Offices of Civil Rights; Infrastructure; Chief Counsel; Planning, Environment, and Realty; and Technical Services.

FHWA officials anticipate that changing demographics (that is, a population with increasing numbers of older adults, veterans, and others with one or more disabilities) may result in an increase in the number of ADA complaints. "We're confident that our steadfast oversight of recipients and fine-tuned compliance process will enhance our ability to meet these challenges," says Nichole McWhorter, director of the compliance and coordination unit in FHWA's Office of Civil Rights.

Self-Evaluations and Transition Plans

The Department of Justice's ADA regulations require all public entities to conduct self-evaluations. At a minimum, public entities must "evaluate [their] current services, policies, and practices, and the effects thereof, that do not or may not meet the requirements of Title II of the ADA and, to the extent modification of any such services, policies, and practices is required, the public entity shall proceed to make the necessary modifications," according to 28 CFR 35.105(a).

In other words, all public entities, regardless of the number of employees, must assess everything that they are responsible for that may have an effect on persons with disabilities, including their public rights-of-way. After identifying all deficiencies, public entities must proceed to make necessary modifications to ensure accessibility. Public entities that employ 50 or more persons have additional responsibilities and must develop transition plans identifying the steps necessary to complete required changes. A transition plan is a prioritized planning document that outlines upcoming projects. In both the self-evaluation and transition plan processes, public entities must seek input from the public, especially from people with disabilities and organizations that represent people with disabilities.

If public entities fail to carry out their self-evaluation and transition plan obligations, they could face administrative enforcement actions, including potential suspension or loss of Federal funding in the absence of voluntary compliance, private litigation, or actions by the Department of Justice. Thus, it is imperative that all States and local public entities keep their transition plans current to ensure that the public is apprised of work that will be forthcoming and to ensure accessibility for everyone on public property.

"The Area Plan Commission of Tippecanoe County, the [metropolitan planning organization] for the Lafayette, IN, [metropolitan statistical area], prepared its current long-range plan to emphasize ADA and [support] multimodal projects on existing streets and roads," says Sallie Dell Fahey, executive director of the Area Plan Commission of Tippecanoe County. "Over time, programming projects that improve our existing assets will add significantly to the quality of place enjoyed by our communities. Real, measurable progress is being made in Greater Lafayette and in communities all over Indiana--progress directly attributable to the FHWA planning emphasis on creating and implementing ADA transition plans."

Complete Streets and Context Sensitive Solutions

Complete streets is a term used to define a street that functions holistically for its users and surrounding community, supporting not only all modes of transportation but also appropriate adjacent land uses and activities. Its guiding principle is to create roadways and related infrastructure that provide safe travel for users of all abilities.

Context sensitive solutions involve collaborative, interdisciplinary approaches that invite all stakeholders to play a role in designing a transportation facility that fits its setting. The approach leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources while improving or maintaining safety, mobility, and infrastructure conditions.

A National Cooperative Highway Research Program Project 20-7(232), titled *ADA Transition Plans: A Guide to Best Management Practices*, provides information for agencies working to develop or update their transition plans. The report is available at http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-07(232)_FR.pdf.

Advancing Livability and Sustainability Goals

In recent years, a surge of public interest has propelled the implementation of more pedestrian-friendly designs across the transportation system. This is in contrast to the automobile's former domination in U.S. transportation policy. Complete streets and context sensitive solutions are concepts that are an integral part of today's transportation dialogue, which includes a close examination of the fundamental social issues that transportation projects are trying to accomplish.

Highway engineers work to incorporate accessibility guidance into their manuals, and many also receive training in accessible pedestrian design. They are supported in this shift in perspective by advocates for livable and sustainable communities, including architects, environmentalists, public health officials, and urban planners.

The breadth of FHWA disciplines and ongoing collaboration among professionals across the agency involved in advancing accessibility reflect this conceptual change. For example, FHWA's Office of Planning, Environment, and Realty has developed tools to assess the degree to which a particular community is accessible for persons of all abilities and to evaluate programs and projects based on sustainability criteria, including accessibility.

PlaceFit is a Web-based tool that enables users to assess various features of a community--including accessibility--and compare them to other communities throughout the country. FHWA developed PlaceFit to emphasize the connection between transportation, livability, and communities by providing a central location for information from a variety of existing Web sites. This investigative tool can help users identify communities with characteristics that appeal to them and their lifestyle. Given the growing population of older adults, as well as persons with disabilities, accessibility in the public rights-of-way is increasingly becoming a more important factor for individuals trying to identify the "place" that "fits" best for them. The PlaceFit tool is available at www.fhwa.dot.gov/livability/tools/placefit.

FHWA's Infrastructure Voluntary Evaluation Sustainability Tool, known as INVEST, is a Web-based collection of best practices designed to help State departments of transportation, metropolitan planning organizations, local transportation agencies, and others assess and improve the sustainability of transportation projects and programs. FHWA's commitment to sustainability not only ensures that those parts of the transportation system over which it has responsibility are efficient, safe, convenient, healthy, and renewable, but also that the system operates fairly and is accessible to persons of all abilities.

"Both physical and equitable accessibility for persons of all abilities are among the criteria that can be assessed with this tool," says Clarence Dickerson,III, project development program manager with the District Department of Transportation's Infrastructure Project Management Administration, "thereby transforming the transportation investment process in a way that incorporates the principle of social equity."



(Before) To access the elevated sidewalk and entrances to these businesses near the intersection of SH–11 and Taylor Street in Linden, TX, visitors had to climb this flight of stairs. (After) The Texas Department of Transportation (TxDOT) installed a split sidewalk providing both ramp and stair access to the sidewalk and businesses.

The tool enhances the capability of public agencies to consider persons of all abilities during the planning and development stages of a project. INVEST is available at www.sustainablehighways.org.

Showcasing Improved Accessibility

Infrastructure improvements that remove barriers to pedestrian access in public rights-of-way reap significant benefits to pedestrians with disabilities and society as a whole. Accessible facilities generally work better for everyone--those using wheelchairs or white canes to travel, parents with strollers, and those delivering goods. What follows are several examples highlighting how projects to improve the accessibility of infrastructure can make a real difference in communities.

Linden, TX

In 2012, the Texas Department of Transportation (TxDOT) completed pedestrian improvements along two State routes in Linden, TX, and along roads surrounding the Cass County Courthouse, the oldest continuously used courthouse in the State. The town of Linden was established in 1848. Like many towns of that era, sidewalks are elevated 2–5 feet (0.6–1.5meters) above the roadway with steps along the sidewalk to access business entrances at varying elevations.

The $810,000 project was funded largely through the American Reinvestment and Recovery Act, (ARRA) along with other Federal, State, local, and private funds. The project included numerous features to improve pedestrian accessibility, such as eliminating sidewalk stairs and adding curb ramps and accessible onstreet parking. The project also upgraded storm drains, street lighting, and aesthetics.

Gardiner, NY

In 2004, the town of Gardiner, NY, identified needed pedestrian and bicycle facilities as part of its master plan for the community and to connect to the recently opened Wallkill Valley Rail Trail. The town applied for and received Federal funding for a combination of projects from the Transportation Enhancement Program and ARRA.

The projects included pedestrian facilities on Main Street (State Route 44/55) in the central business district and access to the regional system of trails, including the Wallkill Valley Rail Trail. The town constructed new sidewalks and crosswalks on Route 44/55 and made drainage improvements. The sidewalks are accessible to persons with disabilities and greatly improved overall pedestrian accessibility. The project was completed in October 2013.

“The installation of the sidewalks has helped revitalize the Gardiner Hamlet,” says Carl Zatz, the town’s supervisor. “Businesses are opening with a renewed confidence that pedestrian traffic will increase and business will grow. Lampposts illuminate the walkways, new landscaping lines Route 44/55, and disabled and senior access is more available, as is access to the George Majestic Memorial Park, the rail trail, and the town hall. Gardiner never imagined such a vibrant hamlet. Now the possibilities are endless.”

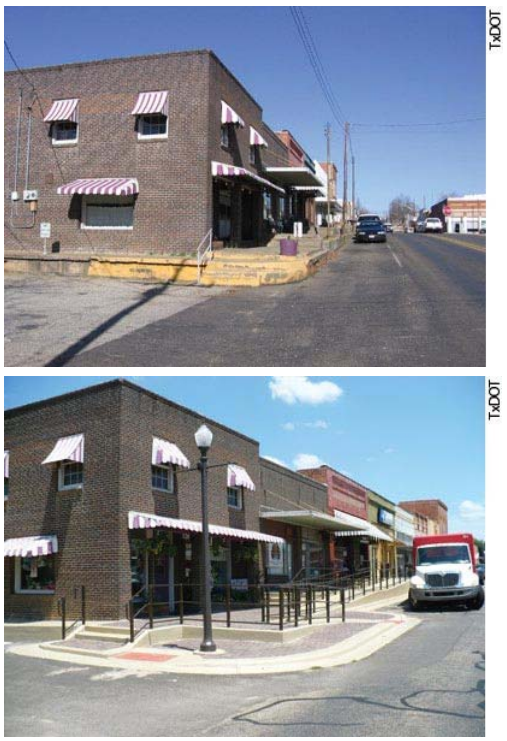
Peoria, IL

The city of Peoria, IL, recently completed a $13.8 million project to make complete streets improvements in its Warehouse District. Funded through the Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant program, the improvements will make the street network safer, more attractive, and accessible for motorists, pedestrians, cyclists, and other users.

The scope of the project includes lane reductions, onstreet parking accommodations, widened sidewalks, improved lighting, and streetscape elements. Accessibility was a top priority in the design of all project elements. In addition, project designers incorporated sustainable design elements, such as stormwater bioinfiltration and LED traffic lights, into the infrastructure improvements.

The Value of Planning Ahead

Each of these highlighted projects demonstrates that consideration of accessible design elements during project scoping and throughout planning and design is essential to accomplish usable, functional, and aesthetically pleasing facilities. Detailed engineering work is often necessary, especially in complex environments, rather than an overreliance on standard detail drawings. Designing for proper drainage is also important early in planning to integrate accessible design elements with existing features and to avoid pools of water at the bottom of curb ramps.



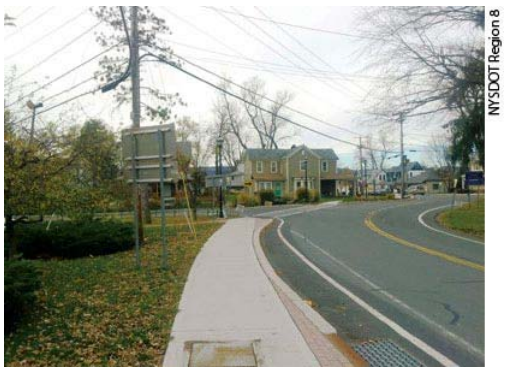
(Before) At the intersection of FM–125 at Rush Street in Linden, pedestrians had to climb several sets of steps to access this elevated sidewalk. (After) TxDOT supplemented the stairs at the intersection by adding a curb extension that connects to the curb ramp. This improvement provides better access to the area around the Cass County Courthouse.

Agencies that wait until the construction phase and then try to “fit in” the accessibility components find it difficult to achieve good design or ADA compliance. The location of curb ramps and sidewalks in relation to crosswalks, signal heads, pushbuttons, and other pedestrian features is critical throughout project design. Contractors must also understand these critical elements so field adjustments do not negatively impact the accessibility and usability of the final constructed design.

Innovation and Emerging Technologies

In 2013, USDOT launched the Accessible Transportation Technologies Research Initiative (ATTRI), which leads research, development, and implementation of transformative solutions, applications, and systems for people of all abilities. The initiative seeks to enhance mobility choice and quality for travelers with disabilities by enabling them to reliably, safely, and independently plan and execute their travel. ATTRI identifies, coordinates, develops, and implements integrated technological solutions to advance these capabilities.





(Before) Previously, the entrance to Gardiner, NY, along Route 44/55 Main Street had a broad shoulder but no pedestrian accommodation. (After) The New York State Department of Transportation (NYSDOT) narrowed the shoulder to install a curb and sidewalk to improve pedestrian access.

This 5-year USDOT joint research and development initiative is being co-led by FHWA and the Federal Transit Administration with support from USDOT's Intelligent Transportation Systems Joint Program Office and other Federal agencies. ATTRI leverages recent advances in vehicle- and infrastructure-based technologies and wireless communication and information technologies that connect users, mobile devices, vehicles, and infrastructure. These technologies can provide access to a wealth of real-time situational data sources, including transportation data, municipality data, points of interest data, crowdsourced data, and disability data.

"ATTRI seeks to find synergy not only among the new and emerging technology solutions, but also among the research conducted by Federal agencies and other public and private organizations," says Mohammed Yousuf, research transportation specialist in FHWA's Office of Operations Research and Development at the Turner-Fairbank Highway Research Center and program manager of ATTRI. "The goal really is to understand the travel needs of the people with disabilities, veterans with disabilities, and older adults, and design technology solutions that enhance independent mobility."

Research in accessible transportation has gained momentum in recent years as a result of several Federal initiatives (such as the Partnership for Sustainable Communities and USDOT Livability Initiative). The future of accessible transportation depends on finding synergies among these initiatives and combining their advances to address the needs of travelers with disabilities. USDOT and industry research in the program areas of vehicle-to-vehicle, vehicle-to-infrastructure, and vehicle-to-pedestrian communications; automation; Veterans Transportation and Community Living Initiative; and Mobility Services for All Americans could help produce seamless transportation capability for all citizens, particularly travelers with disabilities. In addition, emerging research and other technological innovations, such as assistive robots and crowdsourcing, increase the opportunities for enhancing accessibility.

By working with Federal partners, USDOT seeks to achieve an accessible transportation network that is far more economical, expansive, and welcoming--something that is of increasing importance to all travelers.

The Role of Collaboration

To create environments that provide access to people of all abilities requires meaningful and continuous community outreach and public involvement. This means that potentially affected stakeholders and residents have an opportunity to participate in decisions that affect transportation-related accessibility. Effective public involvement programs, in turn, enable transportation professionals to develop systems, services, and solutions that meet the needs of everyone in society.

FHWA has played a central role in providing extensive training and technical assistance in Section 504 of the Rehabilitation Act and ADA compliance, not only to civil rights specialists at State transportation agencies, but also for the many other practitioners who make accessibility-related decisions. The agency's development of policy and guidance on Section504 and ADA-related matters will continue to be a collaborative effort that crosses many disciplines.





(Before) Vehicles used to park on the sidewalk in front of this business in Peoria. (After) The city improved the sidewalk by adding a curb to definitively separate the parked vehicles from the pedestrian route and also added lighting.

As Warren Whitlock, associate administrator for the Office of Civil Rights at FHWA says, “Civil rights practitioners, community planners, environmental specialists, safety experts, and design and construction engineers must continue to work together to ensure that the social equity goals that are part of the ADA’s ultimate objectives are met in the transportation planning and project development process.”

Patrick Gomez serves as a civil rights specialist for the FHWA Resource Center where he performs work in various civil rights areas, but with a primary focus on disability law. Gomez has a B.A. from the University of Nevada, Las Vegas, and a J.D. degree from the Cleveland-Marshall College of Law at Cleveland State University.

Candace Groudine is senior policy and regulatory specialist for FHWA’s Office of Civil Rights, where she focuses on disability law, environmental justice, and limited English proficiency. Groudine received a J.D. degree from Georgetown University Law Center, a Ph.D. in educational administration and policy studies from the University at Albany, an M.A. in philosophy from Columbia University, and a B.A. in philosophy and psychology from Brooklyn College.

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Page Owner: Office of Research, Development, and Technology, Office of Corporate Research, Technology, and Innovation Management

Topics: Public Roads, Research,Safety, Infrastructure, Operations, Environment, Policy, Materials, Pavements, Asphalt, Concrete, Bridges
Keywords: Public Roads, Research,Safety, Infrastructure, Operations, Environment, Policy, Materials, Pavements, Asphalt, Concrete, Bridges
TRT Terms: Public Roads, Research,Safety, Infrastructure, Operations, Environment, Policy, Materials, Pavements, Asphalt, Concrete, Bridges
Scheduled Update: Archive - No Update needed

This page last modified on 01/31/2017

Available online at www.sciencedirect.com
ScienceDirect
Environmental Pollution 151 (2008) 362–367
ENVIRONMENTAL POLLUTION
www.elsevier.com/locate/envpol

Human health effects of air pollution

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Received 4 June 2007; accepted 10 June 2007

The effect of air pollutants on human health and underlying mechanisms of cellular action are discussed.

Abstract

Hazardous chemicals escape to the environment by a number of natural and/or anthropogenic activities and may cause adverse effects on human health and the environment. Increased combustion of fossil fuels in the last century is responsible for the progressive change in the atmospheric composition. Air pollutants, such as carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NOx), volatile organic compounds (VOCs), ozone (O_3), heavy metals, and respirable particulate matter (PM2.5 and PM10), differ in their chemical composition, reaction properties, emission, time of disintegration and ability to diffuse in long or short distances. Air pollution has both acute and chronic effects on human health, affecting a number of different systems and organs. It ranges from minor upper respiratory irritation to chronic respiratory and heart disease, lung cancer, acute respiratory infections in children and chronic bronchitis in adults, aggravating pre-existing heart and lung disease, or asthmatic attacks. In addition, short- and long-term exposures have also been linked with premature mortality and reduced life expectancy. These effects of air pollutants on human health and their mechanism of action are briefly discussed.
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Keywords: Air pollutant; Human health; Cellular actions; Detoxification

1. Introduction

Although a number of physical activities (volcanoes, fire, etc.) may release different pollutants in the environment, anthropogenic activities are the major cause of environmental air pollution. Hazardous chemicals can escape to the environment by accident, but a number of air pollutants are released from industrial facilities and other activities and may cause adverse effects on human health and the environment. By definition, an *air pollutant* is any substance which may harm humans, animals, vegetation or material. As far as humans are concerned an air pollutant may cause or contribute to an increase in mortality or serious illness or may pose a present or potential hazard to human health. The determination of whether or not a substance poses a health risk to humans is based on clinical, epidemiological, and/or animal studies which demonstrate that exposure to a substance is associated with health effects. In the context of human health, ''risk'' is the probability that a noxious health effects may occur.

2. Pollutant categories

The main change in the atmospheric composition is primarily due to the combustion of fossil fuels, used for the generation of energy and transportation. Variant air pollutants have been reported, differing in their chemical composition, reaction properties, emission, persistence in the environment, ability to be transported in long or short distances and their eventual impacts on human and/or animal health. However, they share some similarities and they can be grouped to four categories:

1. Gaseous pollutants (e.g. SO_2, NOx, CO, ozone, Volatile Organic Compounds).

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doi:10.1016/j.envpol.2007.06.012

2. Persistent organic pollutants (e.g. dioxins).
3. Heavy metals (e.g. lead, mercury).
4. Particulate Matter.

Gaseous pollutants contribute to a great extent in composition variations of the atmosphere and are mainly due to combustion of fossil fuels (Katsouyanni, 2003). Nitrogen oxides are emitted as NO which rapidly reacts with ozone or radicals in the atmosphere forming NO_2. The main anthropogenic sources are mobile and stationary combustion sources. Moreover, ozone in the lower atmospheric layers is formed by a series of reactions involving NO_2 and volatile organic compounds, a process initiated by sun light. CO, on the other hand, is a product of incomplete combustion. Its major source is road transport too. While the anthropogenic SO_2 results from the combustion of sulphur-containing fossil fuels (principally coal and heavy oils) and the smelting of sulphur containing ores, volcanoes and oceans are its major natural sources. The latter contribute only ~2% of the total emissions. Finally a major class of compounds that fuel combustion and especially combustion processes for energy production and road transport are the major source of emission are the so called volatile organic compounds (VOCs). This is a class of compounds, which includes chemical species of organic nature such as benzene. Even though the majority of gaseous pollutants are inhaled and mainly affect the respiratory system they can also induce haematological problems (CO, benzene) and cancer.

Persistent organic pollutants form a toxic group of chemicals. They persist in the environment for long periods of time, and their effects are magnified as they move up through the food chain (bio-magnification). They include pesticides, as well as dioxins, furans and PCBs. Generally, the generic term ''dioxins'' is used to cover polychlorinated dibenzo-dioxins (PCDDs) and polychlorinated dibenzo-furans (PCDFs) while polychlorinated biphenyls (PCB) are called ''dioxin like compounds'' and can act similarly in terms of dioxin-type toxicity (Schecter et al., 2006). Dioxins are formed during incomplete combustion and whenever materials containing chlorine (e.g. plastics) are burned. Emitted in the atmosphere, dioxins tend to deposit on soil and water but, being water-insoluble, they do not contaminate ground water sources. Most dioxins in plants come from air and dust or pesticides and enter the food chain where they bio-accumulate due to their ability to be stably bound to lipids.

Heavy metals include basic metal elements such as lead, mercury, cadmium silver nickel, vanadium, chromium and manganese. They are natural components of the earth's crust; they cannot be degraded or destroyed, and can be transported by air, and enter water and human food supply. In addition, they enter the environment through a wide variety of sources, including combustion, waste water discharges and manufacturing facilities. To a small extent they enter human bodies where, as trace elements, they are essential to maintain the normal metabolic reactions. However, at higher (although relatively low) concentrations they can become toxic (Jarup, 2003). Most heavy metals are dangerous because they tend to bio-accumulate in the human body. *Bioaccumulation* means an increase in the concentration of a chemical in a biological organism over time, compared to the chemical's concentration in the environment. Compounds accumulate in organisms any time they are taken in and stored faster than they are broken down (metabolized) or excreted.

Particulate matter (PM) is the generic term used for a type of air pollutants, consisting of complex and varying mixtures of particles suspended in the breathing air, which vary in size and composition, and are produced by a wide variety of natural and anthropogenic activities (Poschl, 2005). Major sources of particulate pollution are factories, power plants, refuse incinerators, motor vehicles, construction activity, fires, and natural windblown dust. The size of the particles varies ($PM_{2.5}$ and PM_{10} for aerodynamic diameter smaller than 2.5 μm and 10 μm respectively) and different categories have been defined: *Ultrafine* particles, smaller than 0.1 μm in aerodynamic diameter, *Fine* particles, smaller than 1 μm, and *Coarse* particles, larger than 1 μm. The size of the particles determines the site in the respiratory tract that they will deposit: PM_{10} particles deposit mainly in the upper respiratory tract while fine and ultra fine particles are able to reach lung alveoli. So far, no single component has been identified that could explain most of the PM effects. Among the parameters that play an important role for eliciting health effects are the *size and surface* of particles, their number and their composition. The composition of PM varies, as they can absorb and transfer a multitude of pollutants. However, their major components are metals, organic compounds, material of biologic origin, ions, reactive gases, and the particle carbon core. There is strong evidence to support that ultra fine and fine particles are more hazardous than larger ones (coarse particles), in terms of mortality and cardiovascular and respiratory effects. In addition, the metal content, the presence of PAHs and other organic components such as endotoxins, mainly contribute to PM toxicity.

3. Routes of exposure

Humans enter in contact with different air pollutants primarily via inhalation and ingestion, while dermal contact represents a minor route of exposure. Air pollution contributes, to a great extent, to the contamination of food and water, which makes ingestion in several cases the major route of pollutant intake (Thron, 1996). Via the gastrointestinal and respiratory tract, absorption of pollutants may occur, while a number of toxic substances can be found in the general circulation and deposit to different tissues. Elimination occurs to a certain degree by excretion (Madden and Fowler, 2000).

4. Health effects

Sporadic air pollution events, like the historic London fog in 1952 and a number of short and long term epidemiological studies investigated the effects of air quality changes on human health. A constant finding is that air pollutants contribute to increased mortality and hospital admissions (Brunekreef

and Holgate, 2002). The different composition of air pollutants, the dose and time of exposure and the fact that humans are usually exposed to pollutant mixtures than to single substances, can lead to diverse impacts on human health. Human health effects can range from nausea and difficulty in breathing or skin irritation, to cancer. They also include birth defects, serious developmental delays in children, and reduced activity of the immune system, leading to a number of diseases. Moreover, there exist several susceptibility factors such as age, nutritional status and predisposing conditions. Health effects can be distinguished to acute, chronic not including cancer and cancerous. Epidemiological and animal model data indicate that primarily affected systems are the cardiovascular and the respiratory system. However, the function of several other organs can be also influenced (Cohen et al., 2005; Huang and Ghio, 2006; Kunzli and Tager, 2005; Sharma and Agrawal, 2005).

4.1. Effects of air pollutants on different organs and systems

4.1.1. Respiratory system

Numerous studies describe that all types of air pollution, at high concentration, can affect the airways. Nevertheless, similar effects are also observed with long-term exposure to lower pollutant concentrations. Symptoms such as nose and throat irritation, followed by bronchoconstriction and dyspnoea, especially in asthmatic individuals, are usually experienced after exposure to increased levels of sulphur dioxide (Balmes et al., 1987), nitrogen oxides (Kagawa, 1985), and certain heavy metals such as arsenic, nickel or vanadium. In addition particulate matter that penetrates the alveolar epithelium (Ghio and Huang, 2004) and ozone initiate lung inflammation (Uysal and Schapira, 2003). In patients with lung lesions or lung diseases, pollutant-initiated inflammation will worsen their condition. Moreover air pollutants such as nitrogen oxides increase the susceptibility to respiratory infections (Chauhan et al., 1998). Finally chronic exposure to ozone and certain heavy metals reduces lung function (Rastogi et al., 1991; Tager et al., 2005), while the later are also responsible for asthma, emphysema, and even lung cancer (Kuo et al., 2006; Nawrot et al., 2006). Emphysema-like lesions have also been observed in mice exposed to nitrogen dioxide (Wegmann et al., 2005).

4.1.2. Cardiovascular system

Carbon monoxide binds to haemoglobin modifying its conformation and reduces its capacity to transfer oxygen (Badman and Jaffe, 1996). This reduced oxygen availability can affect the function of different organs (and especially high oxygen-consuming organs such as the brain and the heart), resulting in impaired concentration, slow reflexes, and confusion. Apart from lung inflammation, systemic inflammatory changes are induced by particulate matter, affecting equally blood coagulation (Riediker et al., 2004). Air pollution that induces lung irritation and changes in blood clotting can obstruct (cardiac) blood vessels, leading to angina or even to myocardial infraction (Vermylen et al., 2005). Symptoms such as tachycardia, increased blood pressure and anaemia due to an inhibitory effect on haematopoiesis have been observed as a consequence of heavy metal pollution (specifically mercury, nickel and arsenic) (Huang and Ghio, 2006). Finally, epidemiologic studies have linked dioxin exposure to increased mortality caused by ischemic heart disease, while in mice, it was shown that heavy metals can also increase triglyceride levels (Dalton et al., 2001).

4.1.3. Nervous system

The nervous system is mainly affected by heavy metals (lead, mercury and arsenic) and dioxins. Neurotoxicity leading to neuropathies, with symptoms such as memory disturbances, sleep disorders, anger, fatigue, hand tremors, blurred vision, and slurred speech, have been observed after arsenic, lead and mercury exposure (Ewan and Pamphlett, 1996; Ratnaike, 2003). Especially, lead exposure causes injury to the dopamine system, glutamate system, and *N*-methyl-D-Aspartate (NMDA) receptor complex, which play an important role in memory functions (Lasley and Gilbert, 2000; Lasley et al., 2001). Mercury is also responsible for certain cases of neurological cancer. Dioxins decrease nerve conduction velocity and impaired mental development of children (Thomke et al., 1999; Walkowiak et al., 2001).

4.1.4. Urinary system

Heavy metals can induce kidney damage such as an initial tubular dysfunction evidenced by an increased excretion of low molecular weight proteins, which progresses to decreased glomerular filtration rate (GFR). In addition they increase the risk of stone formation or nephrocalcinosis (Damek-Poprawa and Sawicka-Kapusta, 2003; Jarup, 2003; Loghman-Adham, 1997) and renal cancer (Boffetta et al., 1993; Vamvakas et al., 1993).

4.1.5. Digestive system

Dioxins induce liver cell damage (Kimbrough et al., 1977), as indicated by an increase in levels of certain enzymes in the blood (see following discussion on the underlying cellular mechanisms of action), as well as gastrointestinal and liver cancer (Mandal, 2005).

4.2. Exposure during pregnancy

It is rather important to mention that air pollutants can also affect the developing foetus (Schell et al., 2006). Maternal exposure to heavy metals and especially to lead, increases the risks of spontaneous abortion and reduced fetal growth (preterm delivery, low birth weight). There are also evidences suggesting that parental lead exposure is also responsible for congenital malformations (Bellinger, 2005), and lesions of the developing nervous system, causing important impairment in newborn's motor and cognitive abilities (Garza et al., 2006). Similarly, dioxins were found to be transferred from the mother to the fetus via the placenta. They act as endocrine disruptors and affect growth and development of the central nervous

system of the foetus (Wang et al., 2004). In this respect, TCDD is considered as a developmental toxin in all species examined.

5. Cellular mechanisms involved in air pollutants actions

Common cellular mechanism by which most air pollutants exert their adverse effects is their ability to act directly as pro-oxidants of lipids and proteins or as free radicals generators, promoting oxidative stress and the induction of inflammatory responses (Menzel, 1994; Rahman and MacNee, 2000). Free radicals (reactive oxygen and nitrogen species) are harmful to cellular lipids, proteins, and nuclear- or mitochondrial-DNA, inhibiting their normal function (Valko et al., 2006). In addition, they can interfere with signaling pathways within cells (Valko et al., 2006). In eukaryotic aerobic organisms including humans, free radicals are continuously generated during normal metabolism and in response to exogenous environmental exposures (e.g. irradiation, cigarette smoke, metals and ozone). When free radical concentration increases, due to an overwhelming of organism's defense, a state of oxidative stress occurs. This oxidative state has been implicated in a wide variety of degenerative diseases such as atherosclerosis, heart attacks, stoke, chronic inflammatory diseases (rheumatoid arthritis), cataract, central nervous system disorders (Parkinson's, and Alzheimer's disease), age related disorders and finally cancer.

Furthermore, the toxic effects of heavy metals, apart from inducing oxidative stress, can be also attributed to their ability to substitute diverse polyvalent cations (calcium, zinc, and magnesium) that function as charge carriers, intermediaries in catalyzed reactions, or as structural elements in the maintenance of protein conformation. Indeed, metals accumulate in cellular organelles and interfere with their function. For example it has been observed that lead accumulation in mitochondria induces several changes such as inhibition of Ca^{2+} uptake, reduction of the transmembrane potential, oxidation of pyridine nucleotides, and a fast release of accumulated Ca^{2+} (Chavez et al., 1987). Moreover, metals bind to proteins (Goering, 1993) and inhibit a large number of enzymes, including the mitochondrial ones (Rossi et al., 1993). Nucleic acid binding proteins are also involved, while it has been shown that metals can also bind to DNA, affecting the expression of genes. For example nickel enters the nucleus, interacts with chromatin and silences the expression of genes such as tumor suppressor genes, inducing carcinogenesis (Costa et al., 2003). Finally, some metals interfere with various voltage- and ligand-gated ionic channels exerting neurotoxic effects. For instance lead affects the *N*-methyl-D-aspartic acid (NMDA) receptor, subtypes of voltage- and calcium-gated potassium channels, cholinergic receptors and voltage-gated calcium channels (Garza et al., 2006; Toscano and Guilarte, 2005).

Dioxin causes a broad range of adverse effects (Birnbaum, 1994): they alter metabolism by inducing a number of metabolic enzymes (e.g. CYPs, glutathione-transferase, tyrosine kinase etc.), homeostasis, through hormone modulation (e.g. estrogens, androgens glucocorticoids, insulin, thyroid hormones) and their receptors, and growth and differentiation by interfering with growth factors (e.g. EGF, TGFα, TNFα) and their receptors. At the cellular level, dioxins interact with the aryl hydrocarbon receptor (AhR) (Schwarz et al., 2000) which has a basic helix-loop-helix domain, acting as a transcription factor after nuclear translocation, allowing interaction of dioxins with DNA. The receptor-ligand complex binds to specific sites on DNA, altering the expression of a number of genes.

As far as cancer is concerned from the data presented above it becomes clear that most pollutants play an important role in the initiation, promotion and progression of cancer cells (Fig. 1).

6. Natural protection

In our day-to-day life we are exposed in different kinds of pollutants. Health impacts, as already described above, depend on the pollutant type, its concentration, length of exposure, other coexisting pollutants and individual susceptibility.

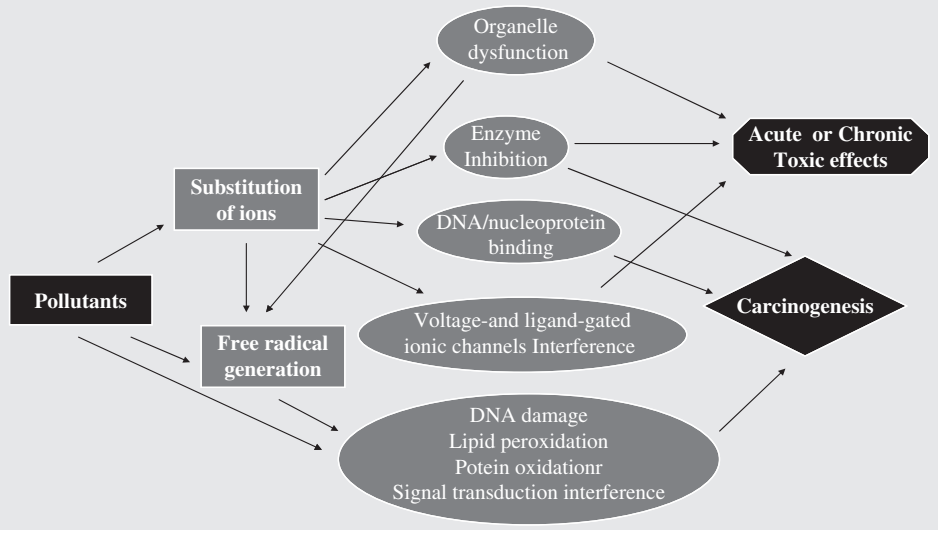

Fig. 1. Basic mechanisms of carcinogenesis.

People living in cities are exposed to a greater extent, as a consequence of increased industrialization and demands for energy and motor vehicles. Occupational exposure is also an important factor that should be taken into consideration. During the last decade, health effects of air pollution are studied more in developed countries, while more and better environmental monitoring data are required in order to setup threshold levels. In addition efforts should be intensified by taking the appropriate measures, in order to reduce the possibility of human pollutant exposure.

The human body, in order to protect itself against the potential harmful insults from the environment, is equipped with drug or xenobiotic metabolising enzymes (DMEs or XMEs) that play a central role in the biotransformation, metabolism and/or detoxification of xenobiotics or foreign compounds, including different kinds of pollutants. XMEs include a variety of enzymes such as cytochrome P450 (P450 or CYP), epoxide hydrolase, glutathione transferase, UDP-glucuronosyltransferase, sulfotransferase, NAD(P)H quinone oxidoreductase 1, and aldo-keto reductase. These enzymes mainly participate in the conversion of xenobiotics to more polar and water-soluble metabolites, which are readily excreted from the body. Finally, it should be noted that, in many cases, the chemically reactive metabolites produced during metabolism, are equally harmful and therefore undergo additional metabolism to inactive products. Hence, the final outcome of a compound modulating the detoxification enzyme systems is the result the effects on the different metabolic pathways.

A number of substances of dietary nature are beneficial, protective, and supportive of good health and the body's own natural chelation mechanisms. They include nutrients with natural chelating properties, which may help to detoxify the body, such as antioxidants, herbs, minerals, essential amino acids, other detoxifying or protective agents, and fiber (Kelly, 2004). Among them dietary antioxidants contribute to the organism's antioxidant defence system, that includes a series of antioxidant enzymatic (e.g. peroxidase) and non-enzymatic compounds (such as glutathione, or food-derived like vitamin E, or polyphenols), as well as damage removal/repair enzymes.

Several natural compounds, such as vitamins C, E, and A and polyphenols, found in the majority of plant foods, interfere with or scavenge ROS concentration within cells and subsequently protect the organism from the adverse effects of oxidative stress. Indeed, as it has been shown by our group that the antioxidant activity of plasma in humans following a diet rich in vegetables, fruits and olive oil was increased in comparison to a normal diet (Kampa et al., 2002). This increase can be mainly attributed to polyphenols which exhibit a wide range of biological activities, including anti-tumorigenic, anti-mutagenic, anti-inflammatory, and antiviral actions (Bravo, 1998; Hertog and Hollman, 1996) mainly due to their antioxidant properties and their ability to exert inhibitory effects by affecting basic cellular functions. Indeed the beneficial role of polyphenols in preventing cancer can be in part attributed to their ability to modify enzymes that activate or detoxify environmental carcinogens.

7. Conclusion

This brief review presents the adverse effects of a number of (air) pollutants in human health. As shown, major impairments of different organs can be observed. The main conclusion drawn is that, in view of increased exposure of humans in a diversity of pollutants, dietary interventions, rich in plant-derived foods, may protect or decrease their effects on different organs. This conclusion is supported by a number of epidemiological studies on the beneficial effect of a Mediterranean-type diet on human health.

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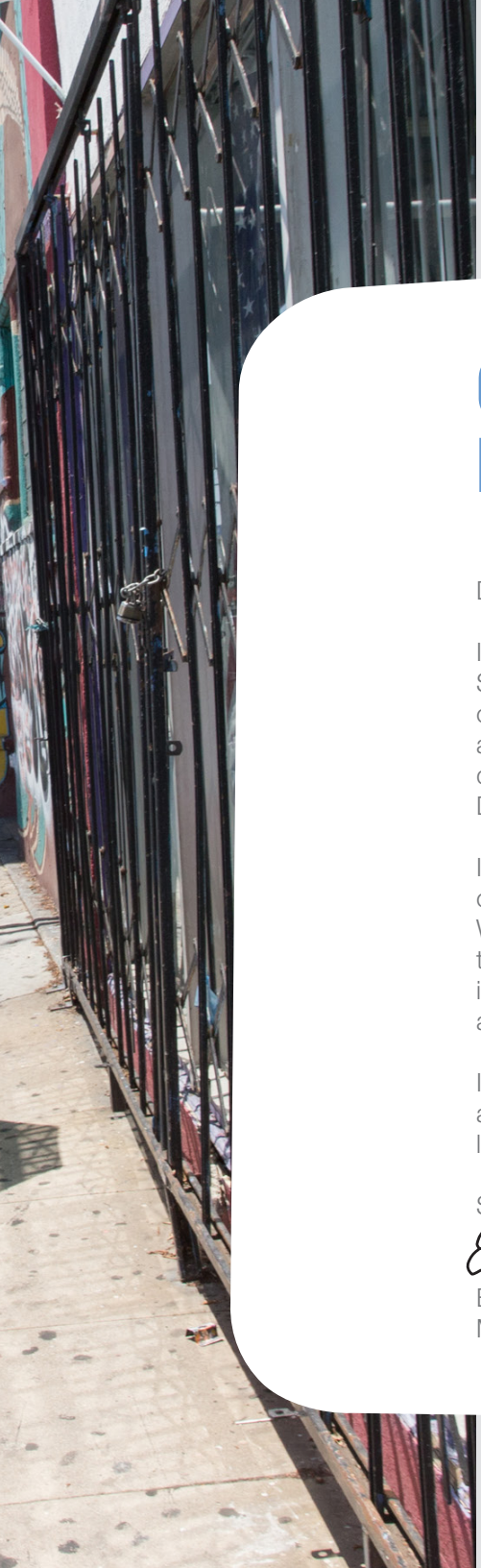
BENCHMARKING GREAT STREETS

VENICE BOULEVARD

PART 11 IN A PRE-PROJECT EVALUATION OF OUR FIRST 15 GREAT STREETS
FALL, 2016

1 2 3 4 5 6 7 8 9 10 **11** 12 13 14 15


Fickett St
300 N
NOTARY



GREAT STREETS FOR LOS ANGELES



Dear Fellow Angelenos,

I am pleased to present this snapshot of the City's first 15 Great Streets corridors as they looked before we began partnering with communities to activate public spaces and support local culture and economies. This report provides an unprecedented level of detail about neighborhood streets by tapping into the City's Open Data Portal and interviewing Angelenos and business owners.

I launched the Great Streets Initiative as a partnership with local communities to strengthen neighborhoods one main street at a time. With this benchmark in hand, we can develop an understanding of the needs and opportunities on Great Streets. As we begin to deliver improvements on these corridors, we can track the economic, social, and environmental quality of our city—one Great Street at a time.

I invite you to read these data-driven stories, and learn about how you can partner with the City to transform your local Great Street by visiting www.lagreatstreets.org.

Sincerely,

Eric M. Garcetti
Mayor

Eric Garcetti
#lamayor

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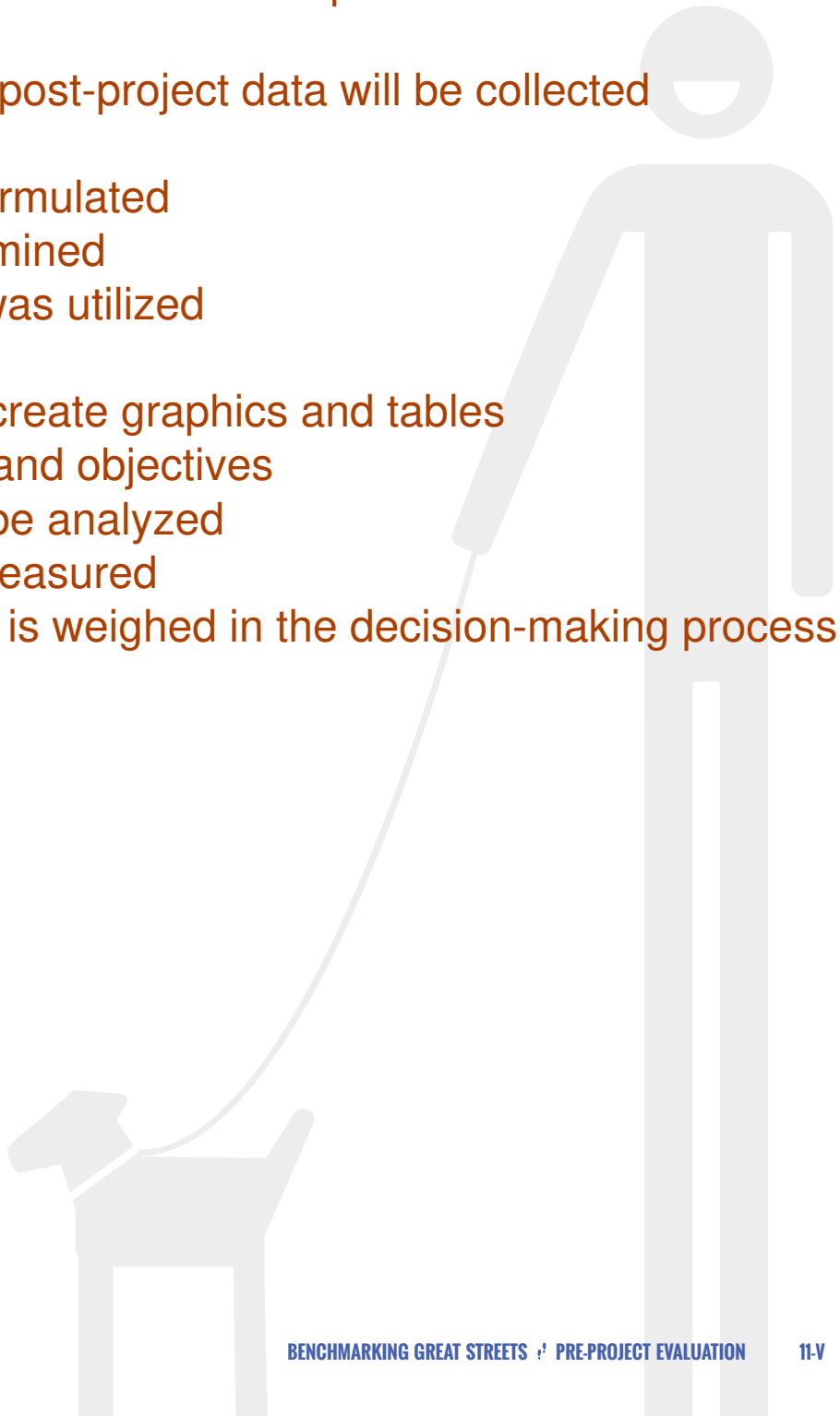
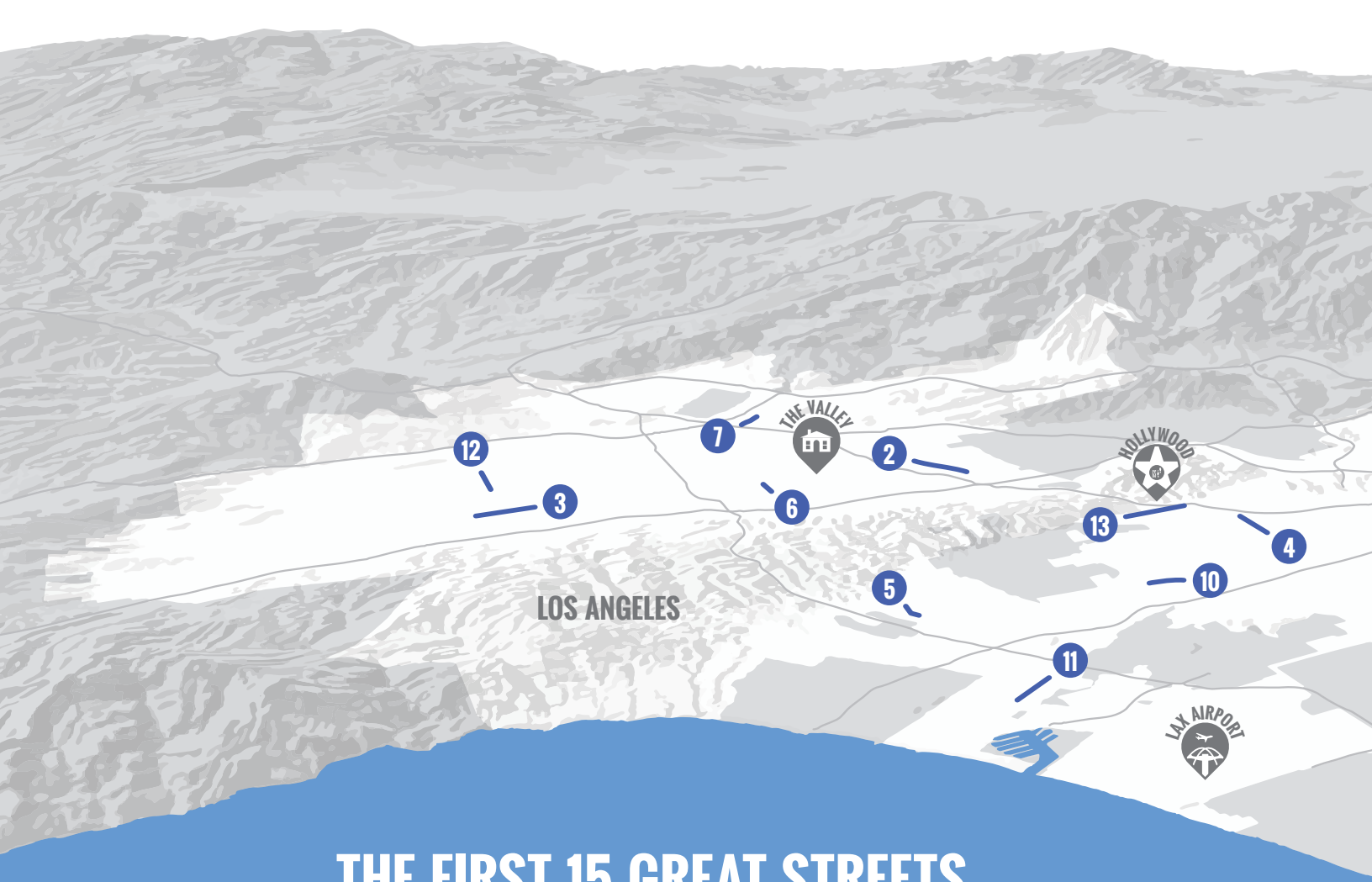
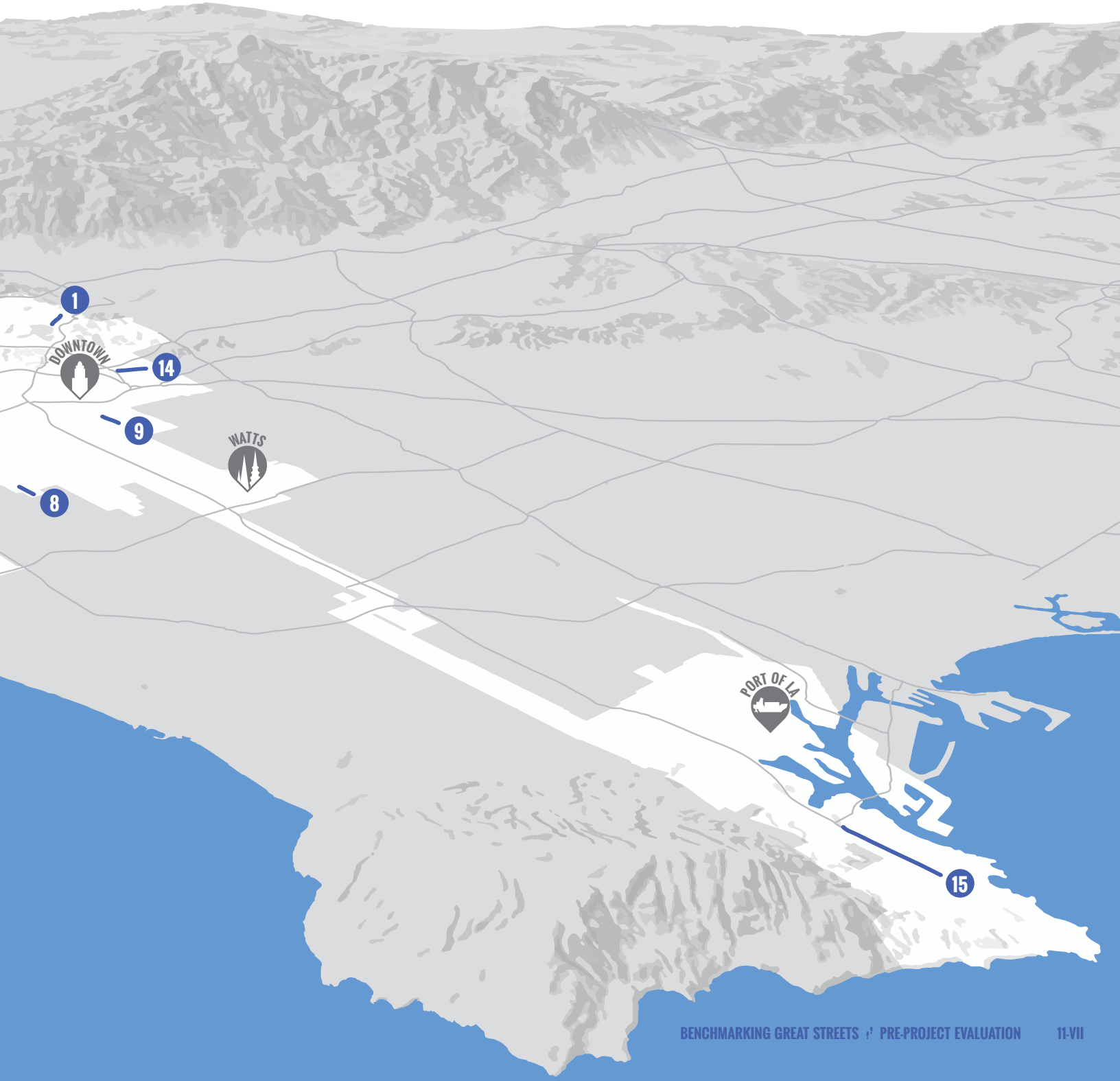
This document is a summary. It is not a final report.
It does not include:
a description of how pre- and post-project data will be collected
the survey instruments used
how survey questions were formulated
how sample sizes were determined
what sampling methodology was utilized
tables of the data collected
copies of the reports used to create graphics and tables
a list of specific project goals and objectives
a discussion of how data will be analyzed
how project success will be measured
how each outcome measured is weighed in the decision-making process





THE FIRST 15 GREAT STREETS

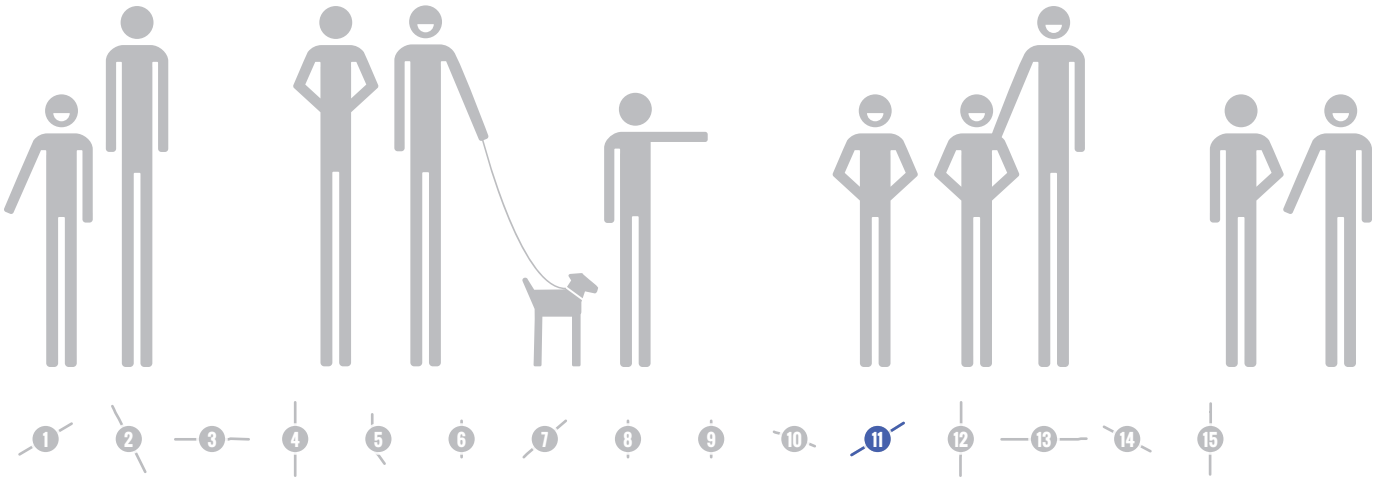
1. **NORTH FIGUEROA ST** — Highland Park
2. **LANKERSHIM BLVD** — North Hollywood
3. **SHERMAN WAY** — Reseda
4. **WESTERN AVE** — Koreatown/Larchmont
5. **WESTWOOD BLVD** — Westwood Village
6. **VAN NUYS BLVD** — Van Nuys
7. **VAN NUYS BLVD** — Pacoima
8. **CRENSHAW BLVD** — Hyde Park
9. **CENTRAL AVE** — Historic South Central
10. **PICO BLVD** — Mid-City
11. **VENICE BLVD** — Mar Vista
12. **RESEDA BLVD** — Northridge
13. **HOLLYWOOD BLVD** — Hollywood
14. **CÉSAR CHÁVEZ AVE** — Boyle Heights
15. **GAFFEY ST** — San Pedro


1
DOWNTOWN
14
9
WATTS
8
PORT OF LA
15

WHAT IS THE GREAT STREETS INITIATIVE?

MAYOR ERIC GARCETTI launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. Our streets are the backbone of our neighborhoods—the places where we live, work, learn, and recreate on a daily basis. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people. And that's why we chose one Great Street from each of Los Angeles' 15 City Council districts as our first 15 corridors.

In partnership with the Mayor's Office and City Council, a team of diverse stakeholders identified these first-phase project areas to develop community partnerships. The Great Streets will also receive targeted city services to activate the streets as public spaces. Our partnership of neighbors, business owners, local organizations, City staff, and elected officials is also working to transform the Great Streets. Based on input we hear from you, we will enhance these corridors as public spaces. Have an idea? Let us know at http://lagreatstreets.org.



WHY ARE WE BENCHMARKING THE GREAT STREETS?

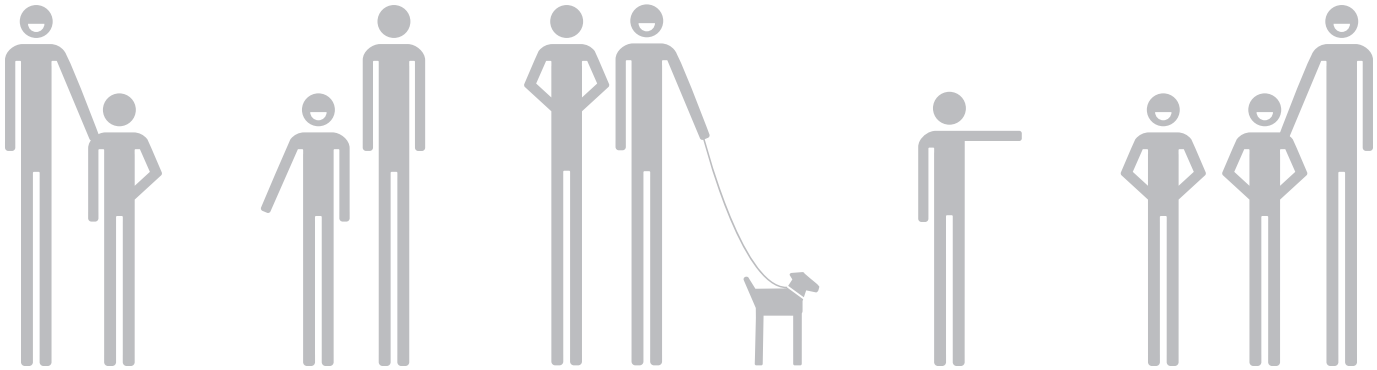
THE GOAL of this benchmarking report is to measure and document neighborhood conditions as they exist before any Great Streets projects are built. We're striving for a holistic snapshot of conditions along the Great Streets, so we're looking at a broad spectrum of data ranging from economics; to safety; to opinions of merchants, residents, and visitors. We may have even spoken with you! This report represents the City's first effort to comprehensively evaluate how streets and neighborhoods change when the City invests in improvements.

Generally, we're looking at data from 2013-2014—a two-year window leading up to the start of Great Streets project construction—although this time period varies for some data sets. We will repeat this analysis again two years after Great Streets projects are built so we have an even, "apples to apples" comparison of how conditions have changed over time. This comparison will help us to better understand how our city is growing and better serve all Angelenos based on what we learn.

As you'll see on the next pages, we've established a set of goals to help us track our performance over time.

SOMETHING TO CONSIDER

While the goal of the Great Streets Initiative is to strengthen our communities and enhance quality of life for Angelenos, the Great Streets projects themselves may not necessarily be the driving force behind all the neighborhood changes that happen along the Great Streets. Broader economic factors, inter- and intra-city migration, and the context of each Great Street all influence neighborhood dynamics. We recommend keeping these factors in mind as you read through this report.



GREAT STREETS GOALS: MOVING THE NEEDLE

What goals and objectives are you using to measure this?
What does success or failure look like?
What is the threshold for determining if the pilot stays or goes?

ENHANCED NEIGHBORHOOD CHARACTER

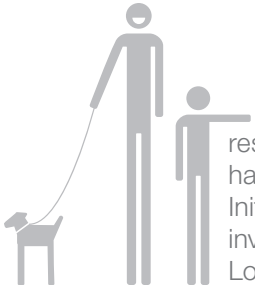
Are we contributing to the unique identities that define our neighborhoods and make them great places to live and work?

IMPROVED ACCESS & MOBILITY

Are we able to access the destinations that matter most to us in a safe and convenient manner?

INCREASED ECONOMIC ACTIVITY

Are we growing our local economies in beneficial ways that allow all Angelenos to prosper?



LOS ANGELES must carefully consider how to leverage and invest our limited resources, and we must strategically coordinate our investments in a way that has the most meaningful benefit for Angelenos. A hallmark of the Great Streets Initiative is a dedication to tracking our progress. Great Streets is a platform for investing in our communities that cuts across the many aspects that define life in Los Angeles. We're tracking our progress towards achieving the goals below.



GREATER COMMUNITY ENGAGEMENT

Do all Angelenos feel that they have a say in how our city grows and are they able to participate in decision-making?



IMPROVED ENVIRONMENTAL RESILIENCE

Are we fostering a healthy environment for all, one with the ability to sustain itself and the capacity to adapt to changes?

SAFER & MORE SECURE COMMUNITIES

Do we have communities where people from all backgrounds feel comfortable participating in civic life?

DATA SOURCES BY CORRIDOR & GOAL

So where can we see this pre- and post-pilot project data?

WHAT YOU SEE IN THIS TABLE

These are the data sources that form the backbone of this report. We've collected data from City departments, published archival sources, observations of travel patterns, and firsthand accounts from survey respondents

		NORTH FIGUEROA	LANKERSHIM	SHERMAN	WESTERN	WESTWOOD	VAN NUYS (VAN NUYS)	VAN NUYS (PACOIMA)	CRENSHAW	CENTRAL	PICO	VENICE	RESEDA	HOLLYWOOD	CÉSAR CHÁVEZ	GAFFEY
INCREASED ECONOMIC ACTIVITY	*Building permits*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Business operator & customer perceptions							✓		✓		✓	✓	✓	✓	
	Business revenue	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Commercial real estate data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Median household income	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Number & type of businesses	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Parking meter revenue	✓		✓		✓	✓				✓	✓		✓	✓	
IMPROVED ACCESS & MOBILITY	*Driving, walking, & biking traffic volumes*	✓			✓			✓	✓	✓		✓	✓	✓	✓	✓
	Pavement condition index	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Speeding vehicles							✓		✓		✓	✓	✓	✓	
	Transit ridership	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Travel mode to Great Street							✓		✓		✓	✓	✓	✓	
	Travel mode split							✓		✓		✓	✓	✓	✓	
	Pedestrian and bike rider observations							✓		✓		✓	✓	✓	✓	
	Vehicle travel speed							✓		✓		✓	✓	✓	✓	
ENHANCED NEIGHBORHOOD CHARACTER	*Neighborhood perceptions*							✓		✓		✓	✓	✓	✓	
	Streetscape elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

		NORTH FIGUEROA	LANKERSHIM	SHERMAN	WESTERN	WESTWOOD	VAN NUYS (VAN NUYS)	VAN NUYS (PACOIMA)	CRENSHAW	CENTRAL	PICO	VENICE	RESEDA	HOLLYWOOD	CÉSAR CHÁVEZ	GAFFEY
GREATER COMMUNITY ENGAGEMENT	*MyLA 311 service requests*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IMPROVED ENVIRONMENTAL RESILIENCE	*CalEnviroScreen 2.0 data*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Environmental quality of life	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Obesity rates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Physical activity rates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAFER & MORE SECURE COMMUNITIES	*Collisions*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Crime statistics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Female, youth, & elderly presence							✓		✓		✓	✓	✓	✓	
	Safety perceptions							✓		✓		✓	✓	✓	✓	
	Streetlight availability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

HOW GREAT STREETS CAN IMPROVE PUBLIC HEALTH

AN UNDERLYING PHILOSOPHY of the Great Streets Initiative is that our streets can do more than just get us from point A to point B. By making neighborhoods safer, more prosperous, and more inviting, Great Streets have the potential to improve health, too. Health—good or poor—is the result of many factors, from individual behavior like diet and exercise, to the physical environment of our communities, as well as access to quality health care. Together, all these factors contribute to how long and how well we live.[i] As the graphic on the facing page shows, the conditions in our local neighborhoods influence individual behaviors and opportunities to be healthy.

Preventing chronic diseases is at the forefront of public health. Chronic diseases, such as coronary heart disease, stroke, diabetes, and obesity, are responsible for 70% of all deaths; and in Los Angeles County, 1 in 3 adults have at least one chronic disease.[ii] Engaging in physical activity is one of the most important ways to prevent and treat chronic diseases;[iii] however, in Los Angeles, only 62% of residents get enough physical activity each week.[iv] One way that Great Streets can help improve health is by creating places for Angelenos to be physically active.

Walking is a simple and affordable way to get the recommended amount of physical activity.[v] Studies have shown that residents of walkable neighborhoods report twice as many walking trips per week than residents of less walkable neighborhoods.[vi] By promoting safe, beautiful, and vibrant streets, Great Streets have the potential to positively impact levels of walking in neighborhoods across Los Angeles.[vii]

The vision of the Los Angeles County Department of Public Health is “healthy people in healthy communities.” Changing health outcomes is a complex undertaking that goes beyond what any one individual, community-based organization, government agency, or private sector partner can do. Collaboration and coordination to create strategies that meet multiple goals—including health—can make the difference. Great Streets present an opportunity to create healthier communities, one neighborhood at a time. In this benchmarking report, we have included indicators for obesity and walking for the zip code of each Great Street. We hope that these indicators will improve over time as Great Streets and other complementary initiatives are implemented.

Where is the data that establishes the pre-pilot project baseline for these goals in line 1? How are you measuring the outcomes cited in line 2?

IF WE CAN FACILITATE...

SAFER STREETS & NEIGHBORHOODS

Improved roads, sidewalks, and lighting

COMMUNITY RESOURCES

Thriving businesses, attractive housing & neighborhoods, and mixed land uses

HEALTHY PHYSICAL ENVIRONMENTS

Cleaner air & less noise

WE WOULD EXPECT TO SEE...

HEALTHIER BEHAVIORS

Increased physical activity & healthier eating

IMPROVED SAFETY

Increased law abidance & safer behaviors

SOCIAL COHESION

Increased interactions among neighbors, friends, and others in the community

ACCESS TO ECONOMIC OPPORTUNITIES

Better exposure to economic opportunities

WHICH ALL SUPPORT IMPROVED HEALTH

DECREASED CHRONIC DISEASE

Obesity, hypertension, diabetes, and asthma

DECREASED INJURY & CRIME

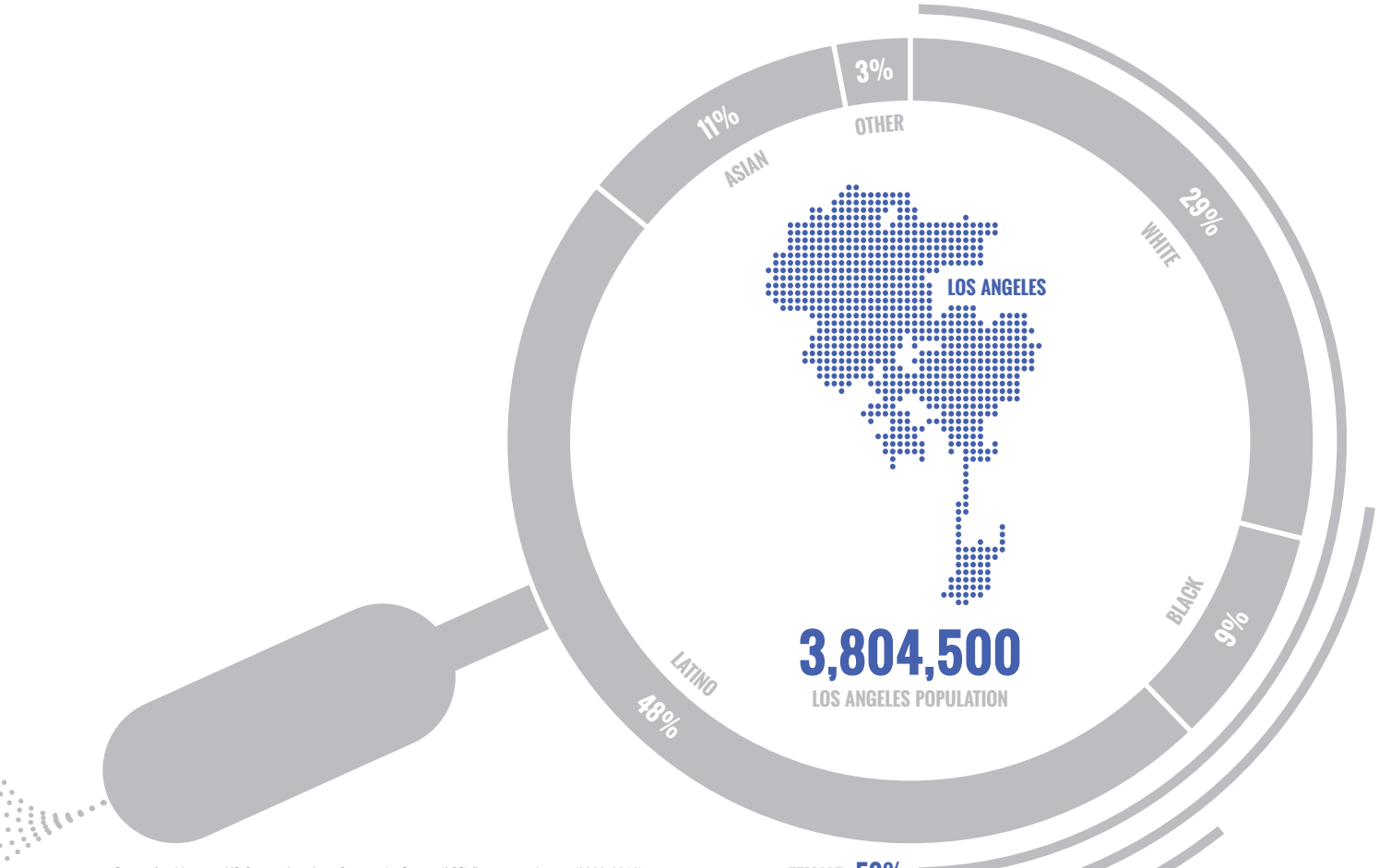
IMPROVED MENTAL HEALTH

i. Senterfitt JW, Long A, Shih M, Teutsch SM. How Social and Economic Factors Affect Health. Social Determinants of Health, Issue no. 1. Los Angeles: Los Angeles County Department of Public Health. January 2013.
ii. Lui CL, Wallace SP. Chronic Conditions of Californians: 2007 California Health Interview Survey. California Health Care Foundation: 2010
iii. Chakravarthy, MV. "An obligation for primary care physicians to prescribe physical activity to sedentary patients to reduce the risk of chronic health conditions." Mayo Clinic Proceedings. Vol. 77. No. 2. Elsevier, 2002.
iv. Los Angeles County Department of Public Health, Office of Health Assessment and Epidemiology. Mortality in Los Angeles County 2011: Leading causes of death and premature death with trends for 2002-2011. August 2014.
v. Audrey, Suzanne, Sunita Procter, and Ashley R. Cooper. "The contribution of walking to work to adult physical activity levels: a cross sectional study." Int J Behav Nutr Phys Act 11 (2014): 37
vi. Khan LK, et al. Recommended community strategies and measurements to prevent obesity in the United States. Vol. 58. US Department of Health & Human Services, Centers for Disease Control and Prevention, 2009.
vii. Brownson, Ross C., et al. "Environmental and policy determinants of physical activity in the United States." American Journal of Public Health 91.12 (2001): 1995-2003.

CITYWIDE CONTEXT

THE DATA YOU SEE ON THESE PAGES offer a citywide perspective for each of the six Great Streets goals and for demographic trends across the city. The numbers here are totals for the entire City of Los Angeles. We've included them to provide additional context for the data that follow in this benchmarking report.

INCREASED ECONOMIC ACTIVITY	**$49,745** MEDIAN HOUSEHOLD INCOME (2008-2012)	**395,900** TAXED BUSINESSES (2014)	**259,300** BUILDING PERMITS ISSUED (2013-2014)	
IMPROVED ACCESS & MOBILITY	**77%** DRIVE TO WORK (2008-2012)	**11%** TAKE PUBLIC TRANSIT TO WORK (2008-2012)	**5%** WALK OR BIKE TO WORK (2008-2012)	
ENHANCED NEIGHBORHOOD CHARACTER	**96** NEIGHBORHOOD COUNCILS (2016)	**41** BUSINESS IMPROVEMENT DISTRICTS (2016)	**257** CULTURAL GRANT AWARDS (2014)	
GREATER COMMUNITY ENGAGEMENT	**1,820,500** REGISTERED VOTERS (2015)	**1,256,500** MYLA 311 SERVICE REQUESTS (2013-2014)	**99,700** MAYOR'S OFFICE TWITTER FOLLOWERS (2016)	
IMPROVED ENVIRONMENTAL RESILIENCE	**24%** ADULTS WHO ARE OBESE (2011-2012)	**37%** ADULTS WHO WALK AT LEAST 150 MINUTES PER WEEK (2011-2012)		
SAFER & MORE SECURE COMMUNITIES	**236,000** CRIMES (2014)	**25,024** TRAFFIC COLLISIONS (2013)		



FEMALE **50%**
UNDER 18 **23%**
OVER 65 **11%**

Source for this page: US Census American Community Survey (ACS) five-year estimates (2008-2012)
Sources for previous page (left to right, top to bottom): ACS five-year estimates, Los Angeles Office of Finance, Los Angeles Department of Building & Safety, ACS five-year estimates, ACS five-year estimates, ACS five-year estimates, Los Angeles Department of Neighborhood Empowerment, Los Angeles City Clerk, Los Angeles Department of Cultural Affairs, Los Angeles City Clerk, Los Angeles Information Technology Agency, Twitter, California Health Interview Survey, California Health Interview Survey, Los Angeles Police Department, California Statewide Integrated Traffic Records System


12224
OPEN
{ Soaptopia }
VENICE
GRIND
follow us on!



COUNCIL DISTRICT 11

VENICE BOULEVARD



Venice Bl

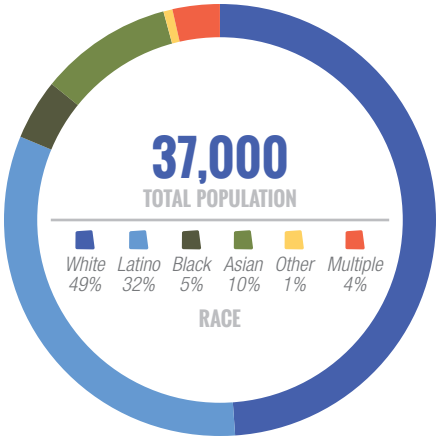
Mar Vista

OVERVIEW

The heart of Mar Vista, Venice Boulevard offers a special blend of local retail and community-serving uses, including unique coffee shops and restaurants, art and architecture studios, and other creative and vital businesses. Every Sunday, the Mar Vista Farmers Market brings hundreds of Angelenos to this sunny stretch of Venice Boulevard.

According to the US Census American Community Survey (ACS) five-year estimates (2008-2012), there are about 37,000 people living in the Census block groups within one-half mile of the Great Streets corridor. The charts below provide more demographic information using the same source.

DEMOGRAPHICS AROUND THE GREAT STREET



18%
UNDER 18

11%
OVER 65

50%
FEMALE

AT A GLANCE

BEETHOVEN - INGLEWOOD
Area of analysis

0.8 MI
Corridor Length

MIKE BONIN
City Councilmember, District 11

MAR VISTA
Neighborhood Council

PALMS - MAR VISTA - DEL REY
Community Plan Area

AREA OF ANALYSIS



VENICE BOULEVARD

IN PICTURES










Venice Bl


COFFEE




CICLAVIA
PEDESTRIAN
ZONE
Please dismount and walk
ciclavia.org

INCREASED ECONOMIC ACTIVITY

INCREASED ECONOMIC ACTIVITY

measures the degree to which we are providing more opportunities for local residents and businesses to prosper as a result of inclusive community investment.

In terms of businesses, we're tracking this goal through the types of businesses that choose to locate on the Great Street, business revenues, merchant and customer surveys, and other commercial real estate trends. We see that the proportions of business types on the Great Street are generally similar to citywide proportions.

Reported business revenues have remained relatively stable over the last 10 years while the number of taxed businesses on the Great Street has grown. While commercial rents have risen and fallen, they have seen an overall upward trend. Vacant commercial buildings make up a very small amount of available commercial real estate.

We surveyed a sample of merchants and people along the Great Street to learn more about the perceptions of those who live, shop, work, and play in the area. Through the surveys, we saw that weekday midday/evenings and weekend midday/afternoons tend to be the busiest times for surveyed merchants. We also saw that people who walk and drive to the Great Street tend to visit most frequently.

Parking meter revenues are another way of approximating how many people visit the Great Street. The amount of parking meter revenue increased between 2013 and 2014 while the number of meters decreased, which could suggest that the number of people visiting the Great Street is growing.

Finally, we're keeping an eye on median household income. We see that the median income in the area is generally above the citywide average.

Where is the list of the businesses on Venice Blvd pre-pilot project? The project was installed in 2017, yet this data is from 2014.

TYPES OF BUSINESSES

LEGEND

Categories are listed clockwise from top

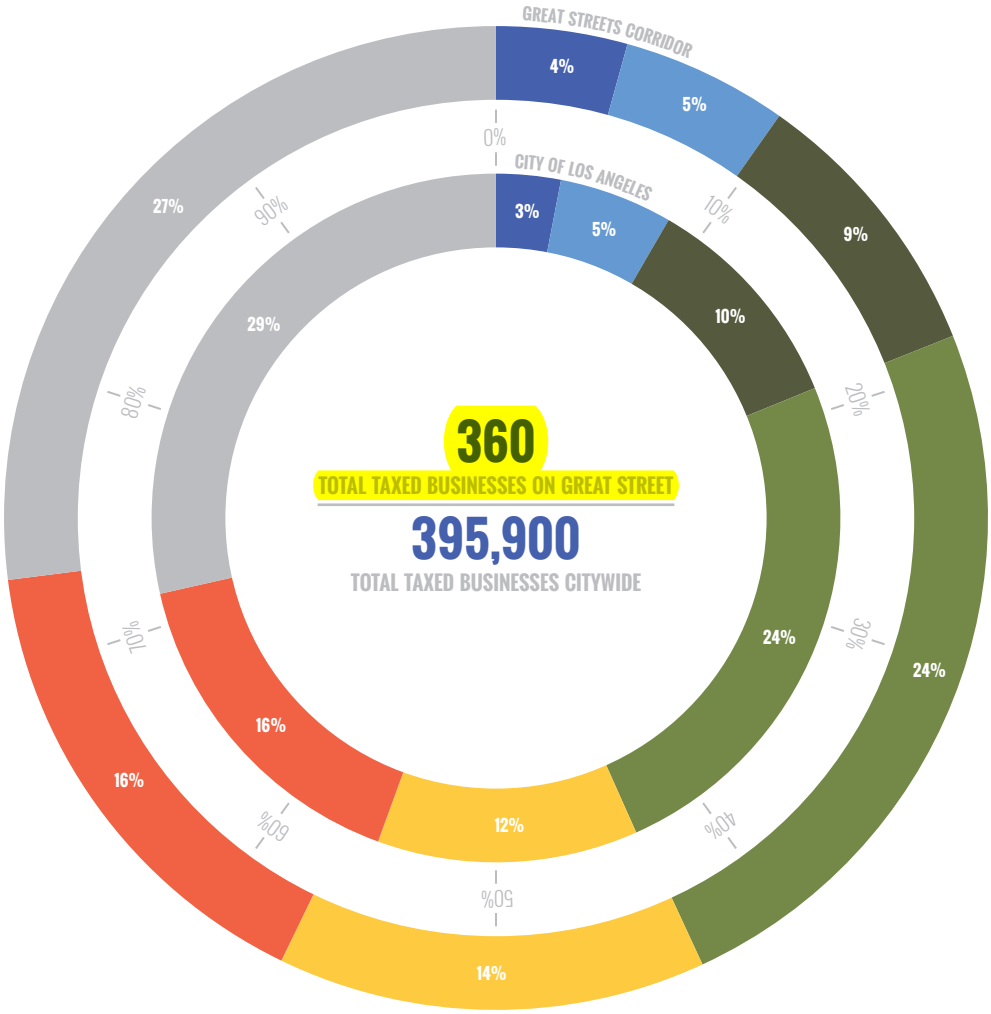
- *Accommodation, Food Services*
- *Healthcare*
- *Industrial (Agriculture, Construction, Manufacturing, Natural Resources, Transportation, Utilities, Warehousing)*
- *Professional Services (Administrative Support, Education, Finance, Information Technology, Insurance)*
- *Real Estate Rental & Leasing*
- *Retail & Wholesale Trade*
- *Other or Not Stated*

WHAT YOU SEE BELOW

Distribution of taxed businesses along the Great Streets corridor (outside ring) and City of Los Angeles as a whole (inside ring). While not all businesses are included, this measure helps give a sense of the number of active businesses located along the Great Street

SOURCE & DATES

Los Angeles Office of Finance, 2014



Where is the data used to create these graphs?

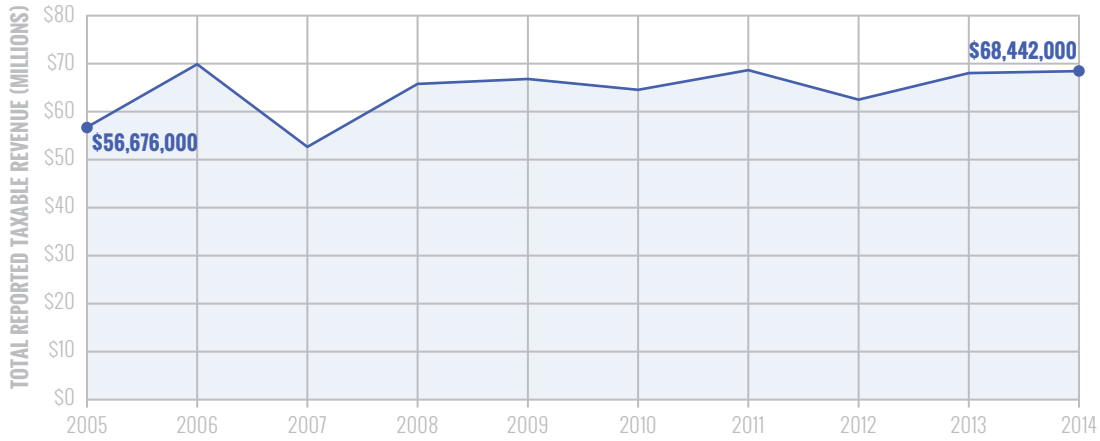
BUSINESS REVENUE & NUMBER OF BUSINESSES

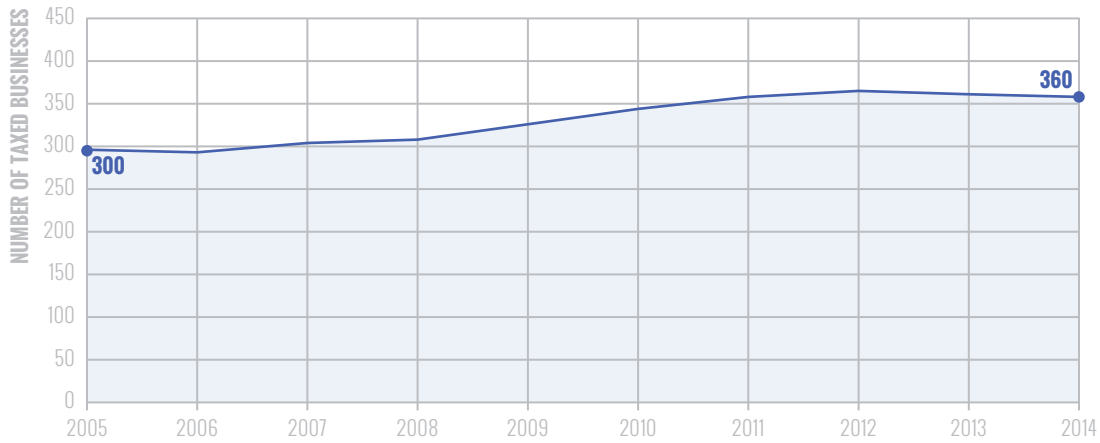
SOURCE & DATES

Los Angeles Office of Finance, 2005 - 2014

WHAT YOU SEE BELOW

Top: Total reported taxable revenue over the last 10 years (in 2014 inflation-adjusted dollars) for all eligible businesses on the Great Street. Taxable revenue typically includes retail/wholesale sales or payments for services received, and not all types of businesses are taxed
Bottom: Number of taxed businesses on the Great Streets corridor. While not all businesses are included, this measure helps give a sense of the number of active businesses located along the Great Street





Where is the data used to create these graphics?

COMMERCIAL REAL ESTATE

WHAT YOU SEE BELOW

Summary of key real estate development indicators for properties directly fronting the Great Street (all except building permit data) and half-mile area around the Great Street (building permit data)

SOURCE

CoStar/City of Los Angeles (all except building permit data); Los Angeles Department of Building & Safety (LADBS) (building permit data)

DATES

2013-2014, unless otherwise noted

244,861
TOTAL RETAIL SQUARE FOOTAGE

1% VACANT



AVERAGE ANNUAL COMMERCIAL RENT PER SQUARE FOOT

LEASING DEALS
8

COMMERCIAL PROPERTY SALES
4

MEDIAN COMMERCIAL PROPERTY SALE PRICE
$1,024,000

BUILDING PERMITS ISSUED
1,221

49
COMMERCIAL BUILDINGS

What businesses were surveyed? Was this a random sample? Where is the survey instrument and the responses?

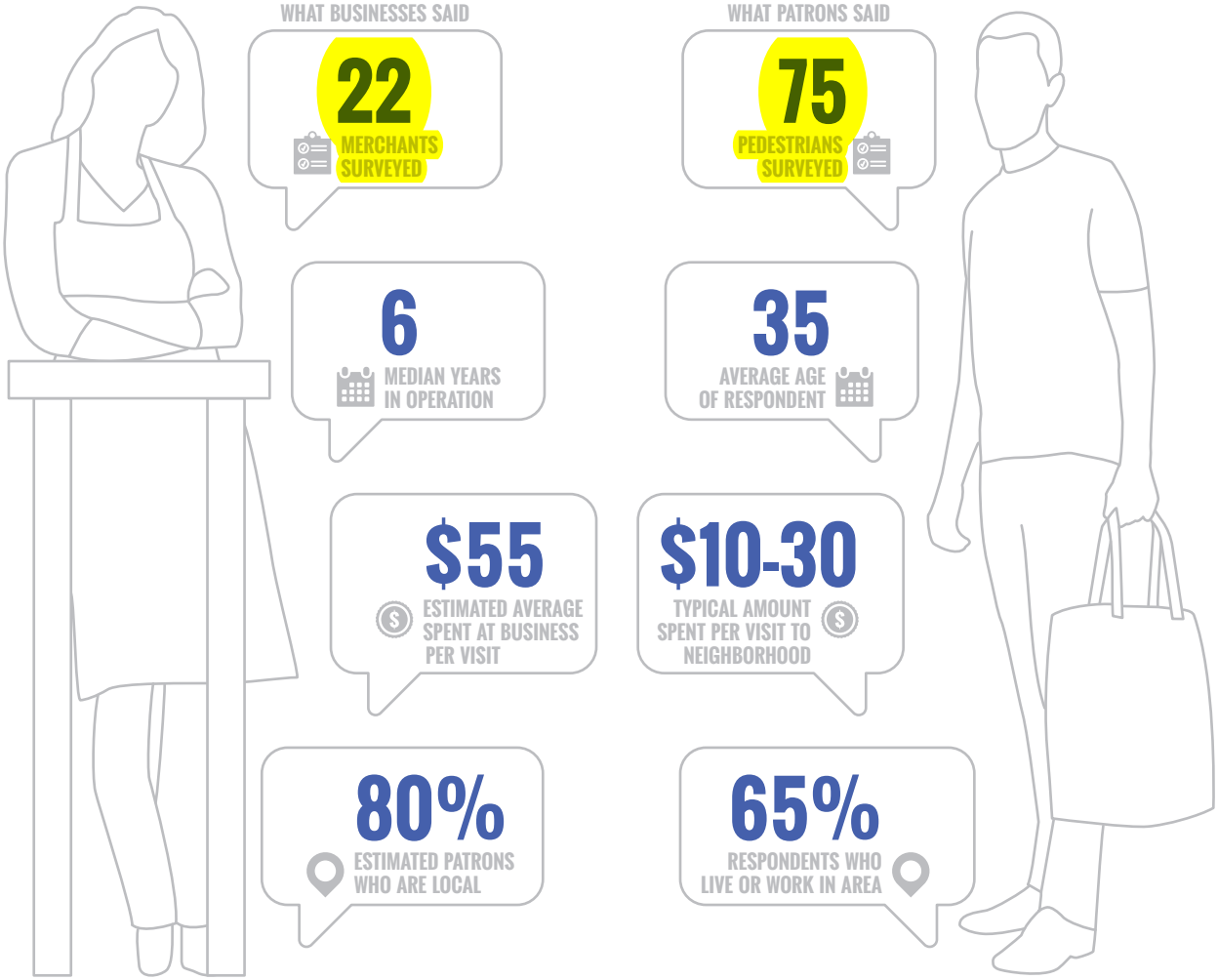
BUSINESS PERCEPTIONS

WHAT YOU SEE BELOW

Summary of the most common responses we heard from surveyed businesses and patrons of the area

SOURCE & DATES

Survey of 22 merchants and 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015



Where is the raw survey data? Where is the survey instrument used?

BUSINESS PERCEPTIONS (CONTINUED)

WHAT YOU SEE BELOW

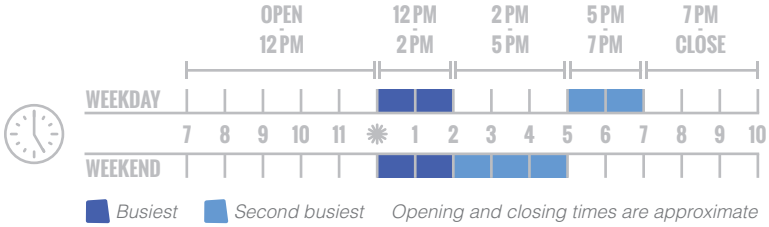
Summary of the most common responses we heard from surveyed businesses and patrons of the area

SOURCE & DATES

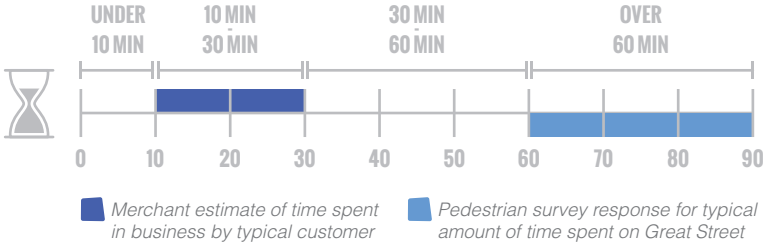
Survey of 22 merchants and 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015

BUSIEST TIMES OF DAY

Based on merchant survey responses



MOST COMMON LENGTH OF VISIT



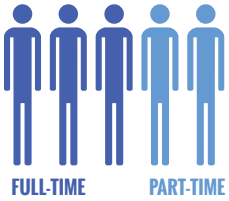
ANTICIPATED TRENDS

Shown in number of survey responses



AVERAGE NUMBER OF EMPLOYEES

Not including business owner



BUSINESS PERCEPTIONS (CONTINUED)

WHAT YOU SEE BELOW

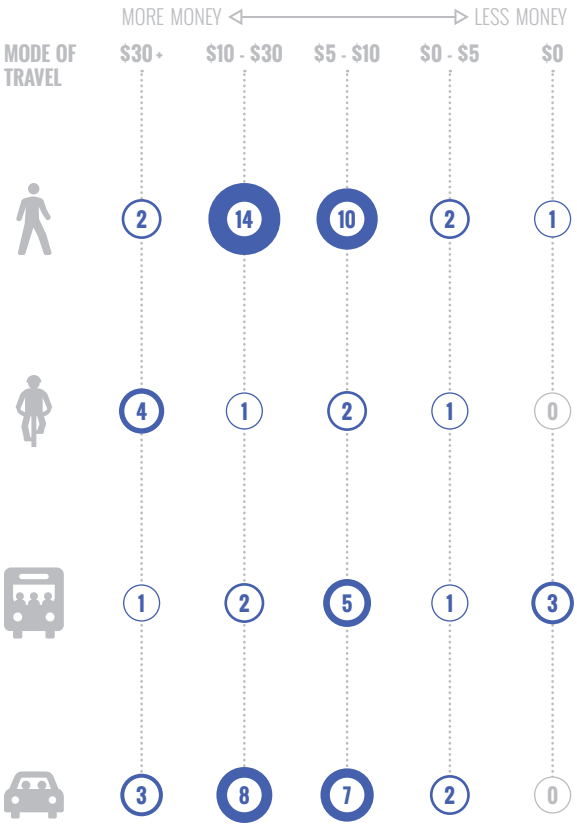
Summary of the most common responses we heard from surveyed patrons of the area

SOURCE & DATES

Survey of 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015

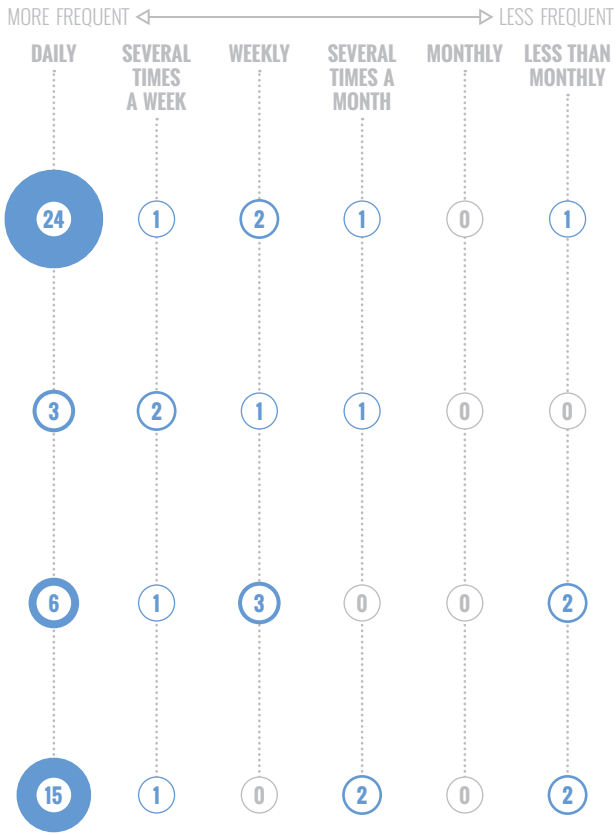
AVERAGE AMOUNT SPENT PER VISIT

As stated by pedestrian survey respondents; shown in number of survey responses



FREQUENCY OF VISITS TO GREAT STREET

As stated by pedestrian survey respondents; shown in number of survey responses




MEDIAN HOUSEHOLD INCOME
WHAT YOU SEE ON THIS MAP
Median household income for all census block groups within one-half mile of the Great Streets corridor
SOURCE
US Census American Community Survey (ACS) five-year estimates
DATES
2008-2012
MAR VISTA
CULVER CITY
LEGEND
$0 - $25,000
$25,000 - $50,000
$50,000 - $75,000
$75,000 - $100,000
$100,000 - $125,000
The citywide median household income is $49,745
NORTH
PALMS BLVD
WOODGREEN ST
STEWART AVE
WESTMINSTER AVE
COLONIAL AVE
CHARNOCK RD
VICTORIA AVE
BARRINGTON AVE
MC CUNE AVE
INGLEWOOD BLVD
MOUNTAIN VIEW AVE
MARCASEL AVE
MAY ST
MARCO PL
GRAND VIEW BLVD
OCEAN VIEW AVE
CENTINELA AVE
KEESHEN DR
PACIFIC AVE
WASATCH AVE
BOISE AVE
STEWART AVE
WADE ST
MAY ST
MEIER ST
MOORE ST
BEETHOVEN ST
FRANCES AVE
MATTESON AVE
BARBARA AVE
MITCHELL AVE
187
LYCEUM AVE
MANOR LN
CASWELL AVE
ZANJA ST
HERBERT ST
WASHINGTON BLVD

Where is the most recent data? This project was implemented in 2017 and the baseline data is from 2013-2014?

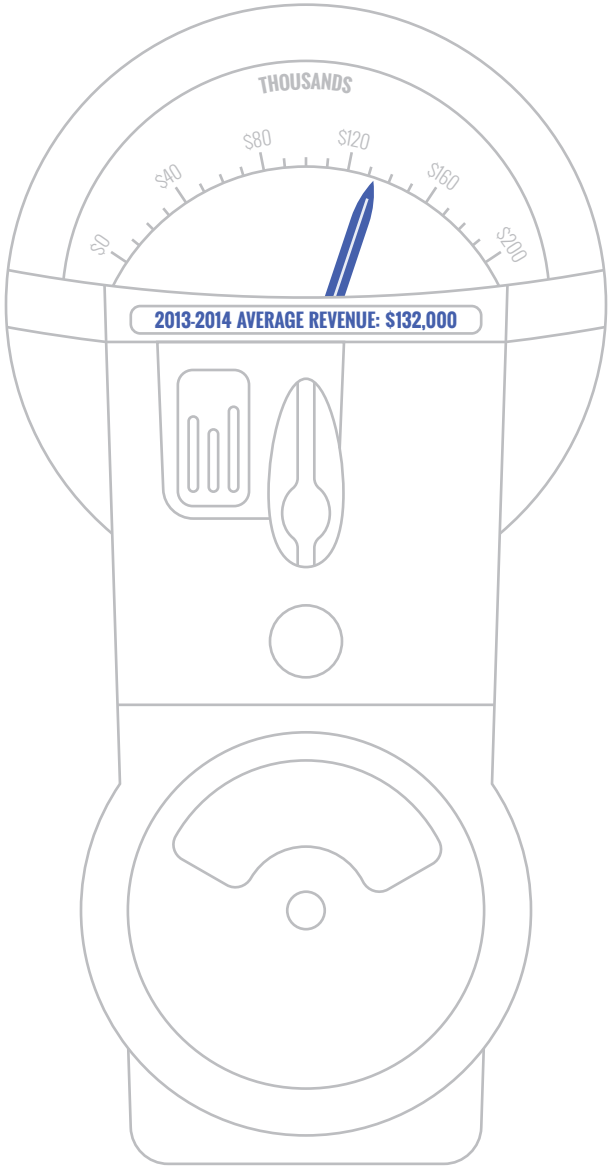
PARKING METER REVENUE

WHAT YOU SEE HERE

Meter revenue collected by the City of Los Angeles for all parking meters along this Great Streets corridor. Meter revenues help maintain and improve the City's parking infrastructure and fund other City services

SOURCE & DATES

Los Angeles Department of Transportation (LADOT), 2013-2014



	2013	2014
METERS ON GREAT STREET	94	89
METER REVENUE	$127,000	$136,000
REVENUE PER METER	$1,350	$1,530

IMPROVED ACCESS & MOBILITY

Where is the raw traffic count data? What methodology was used? How many traffic, pedestrian and bike counts were conducted?

IMPROVED ACCESS & MOBILITY assesses how well we can reach the destinations that matter most to us in a safe and convenient manner.

To gauge our performance toward this goal, we collected data on the number of people driving, walking, and biking along the Great Street as well as general characteristics of people walking and biking. We see that about 18,000 to 19,000 vehicles drive in each direction along the Great Street on a typical weekday. No drivers were observed speeding.

We saw approximately 85 people walking and 80 people biking per hour. We consider this a very high level of biking activity. While we saw more men walking than women, we observed comparatively high levels of women riding bikes and comparatively low levels of bike riding on the sidewalk.

We also surveyed merchants and pedestrians about the different ways that people travel to the neighborhood. While surveyed merchants estimated most of their customers arrive in car, we saw that a large percent of surveyed people also traveled to the area on foot.

Additionally, we examined transit ridership and the condition of pavement on city streets in the area. Transit ridership for routes traveling on the Great Street is measured in terms of people getting on and off transit vehicles along the Great Street. We see that boardings and alightings are mostly concentrated at Centinela Avenue.

This section of Venice Boulevard is currently designated as a state highway. Since Caltrans maintains state highways rather than the City of Los Angeles, pavement condition information is not available for the Great Street.

Where is the raw transit ridership data? How many transit counts (boarding and alightings) were conducted?

Where is the raw data? Why was only ONE count conducted? Why wasn't CalTrans data reviewed or used? Why is there such a discrepancy between CalTrans and NDS data?

VEHICLE VOLUMES

WHAT YOU SEE BELOW

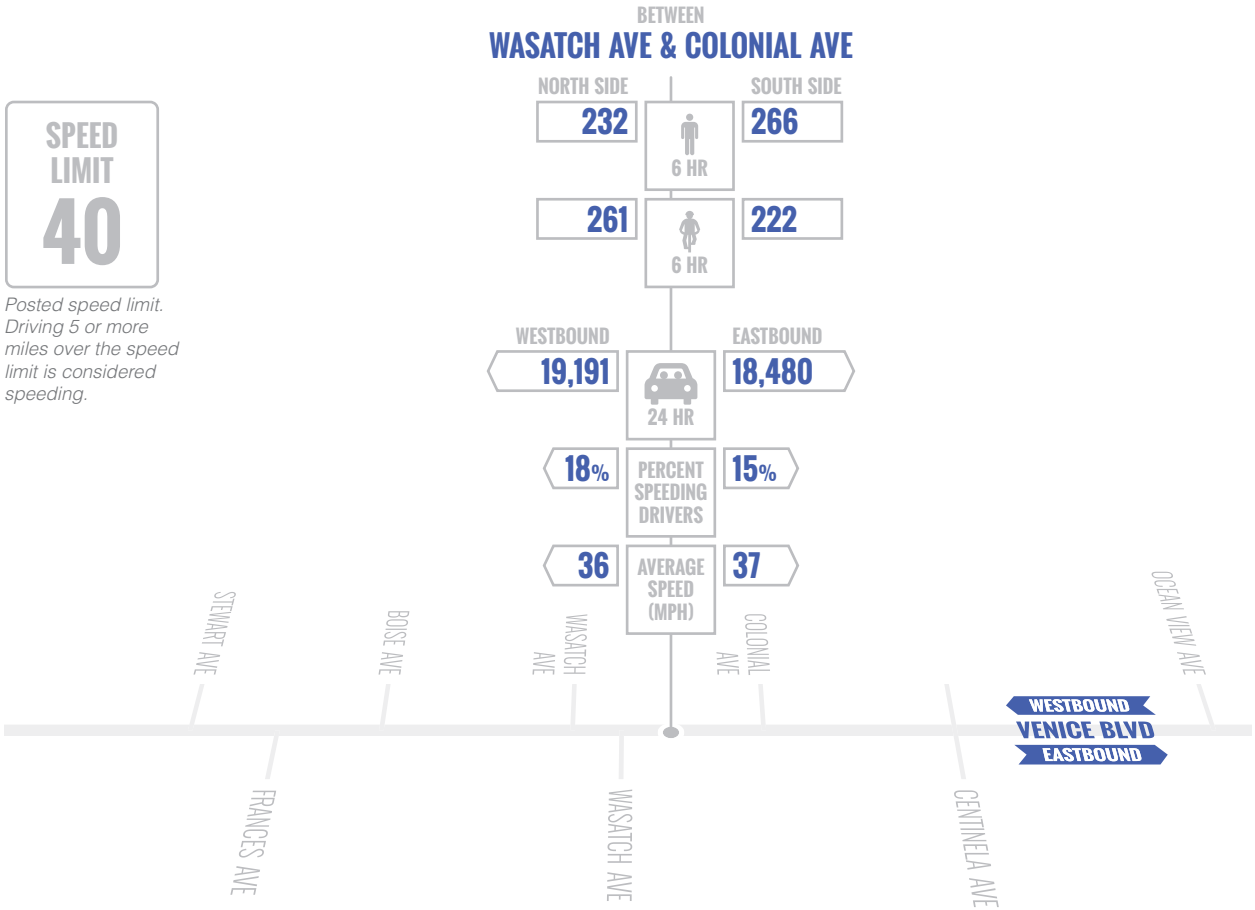
Weekday 24-hour auto counts & 6-hour walking and biking counts (7am-10am, 3pm-6pm)

SOURCE & DATES

Collected by National Data and Surveying Services (NDS) on Tuesday, September 22, 2015

LEGEND

Weekday



Nice graphics, but where is the raw data with the actual numbers?

TRAVEL MODE SPLIT AND PEDESTRIAN & BIKE RIDER OBSERVATIONS

WHAT YOU SEE BELOW

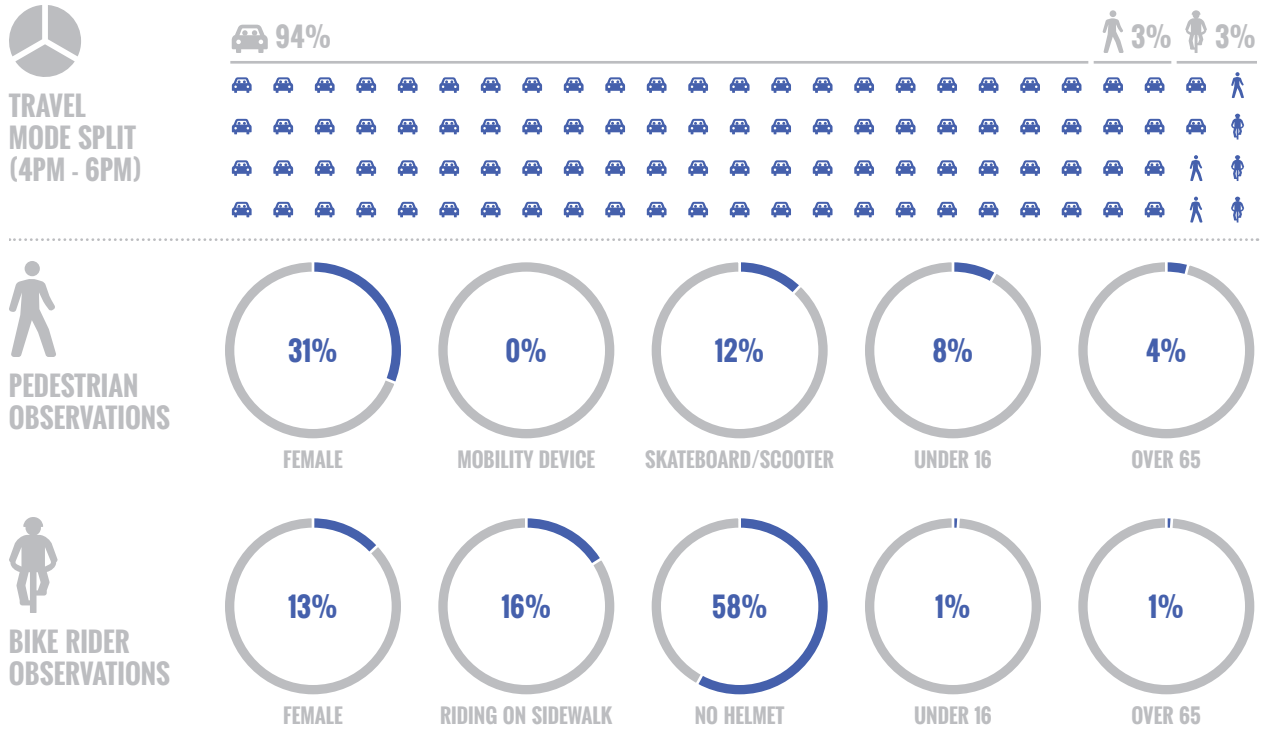
Top: Percentages of people observed traveling along the Great Street in vehicle (including bus), on foot, and by bike. The data below do not isolate transit ridership
Bottom: Characteristics of people observed walking and biking along the Great Street

SOURCE & DATES

Collected by NDS on Tuesday, September 22, 2015

LEGEND

Weekday



What is the demographic breakdown of pedestrian survey respondents? i.e. age, race, gender, home zip code, income, etc.

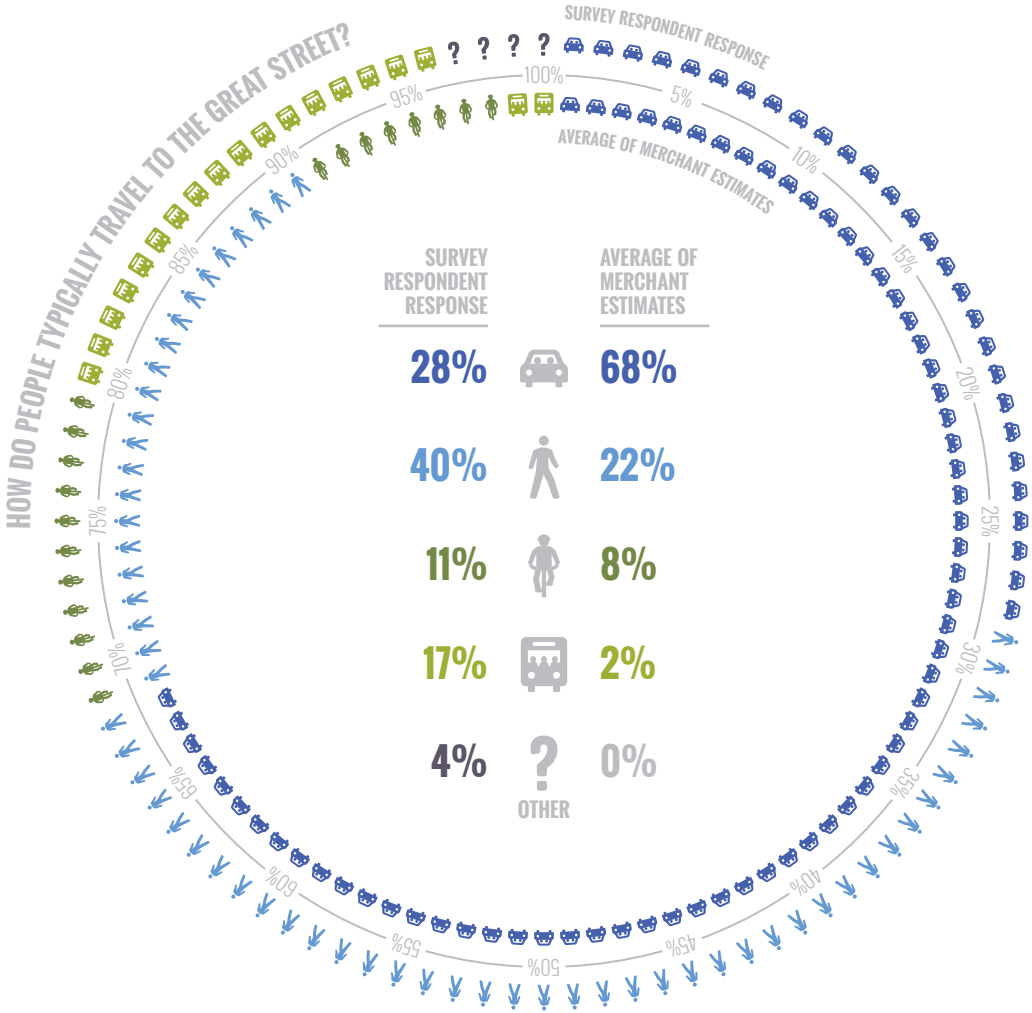
TRAVEL MODE TO GREAT STREET

WHAT YOU SEE BELOW

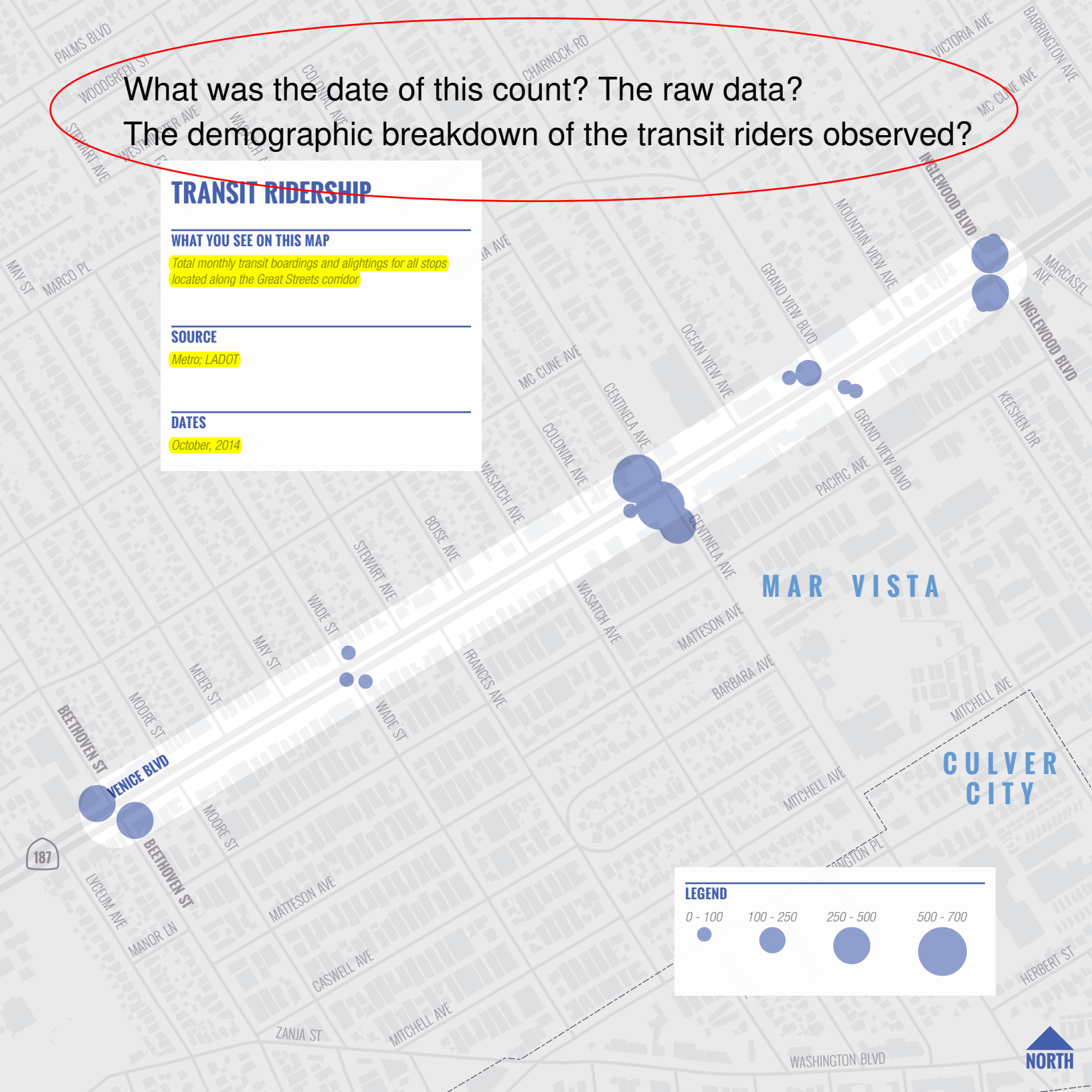
Comparison of pedestrian survey respondents' stated mode of travel to the Great Street and surveyed merchants' estimates of how their customers travel to the Great Street

SOURCE & DATES

Survey of 22 merchants and 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015



What was the date of this count? The raw data?
The demographic breakdown of the transit riders observed?



Where is the report prepared by LABSS for this map?



VENICE BOULEVARD

ENHANCED NEIGHBORHOOD CHARACTER

ENHANCED NEIGHBORHOOD CHARACTER charts our progress in contributing to the unique identities that define our neighborhoods and make them great places to live and work.

We surveyed pedestrians about their feelings of the neighborhood and the things they come to do on the Great Street. Most survey respondents agreed the neighborhood is clean, safe, attractive, and active. More than half of all survey respondents also felt the neighborhood has a strong identity.

When asked their reason for visiting the Great Street, survey participants most commonly responded that they live or work in the area.

While it's not possible to quantify every feature that contributes to a Great Street, we've created a list of key amenities that help express neighborhood character and make our streets quality places to live, work, and socialize. We see that some of these features—like street trees, civic art, and regular special events—are already present along the Great Street, but opportunities exist to expand the offering of these and other amenities.

Where is the survey instrument and the responses?

Nice graphic, but I want to see the survey instrument and a table with the reponses.

NEIGHBORHOOD PERCEPTIONS

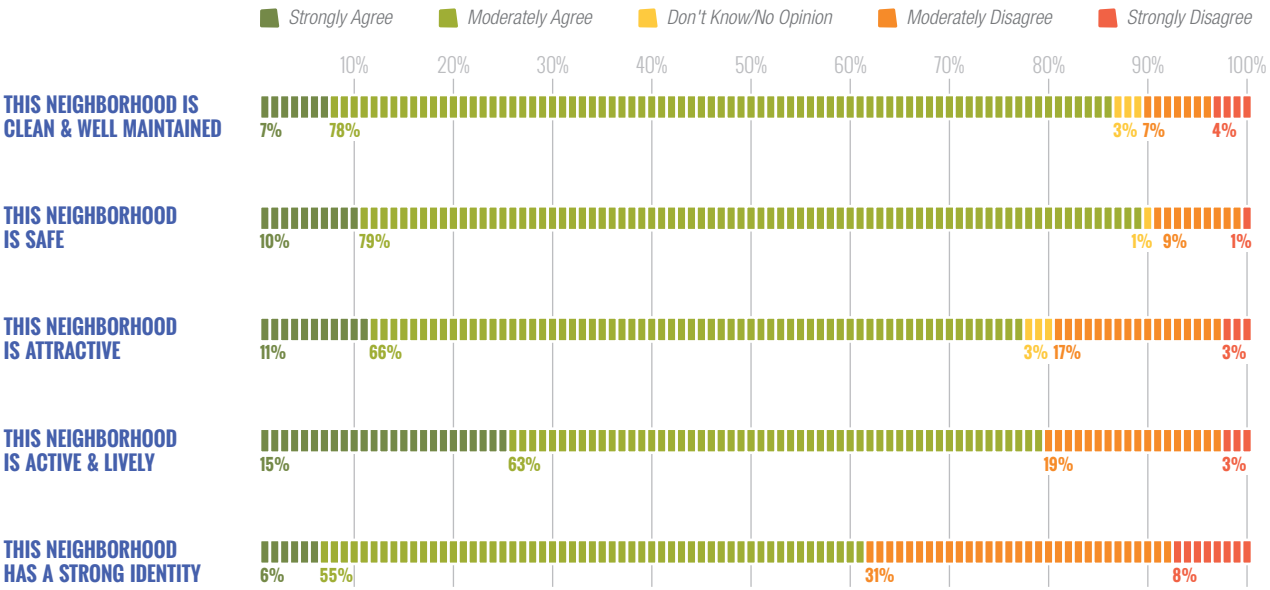
WHAT YOU SEE BELOW

Top: Perceptions of the Great Street and surrounding neighborhood
Bottom: Reasons stated for visiting this neighborhood

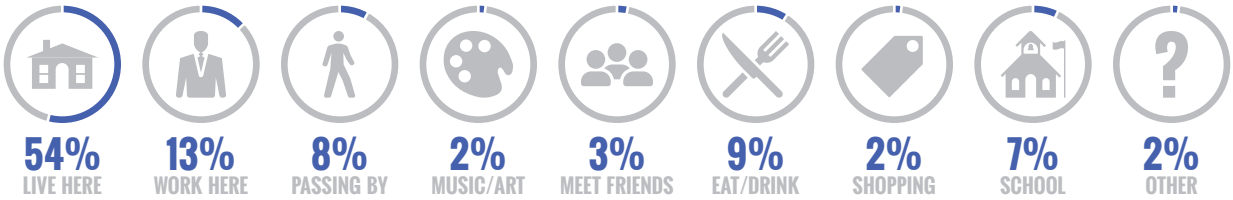
SOURCE & DATES

Survey of 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015

PERCEPTIONS



REASON FOR VISIT



Where is the written inventory document?

GREAT STREETS STREETSCAPE ELEMENTS

LEGEND

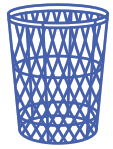
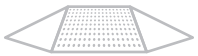
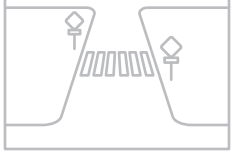
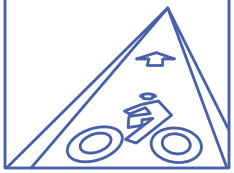
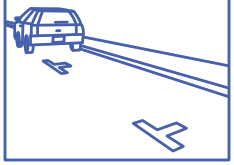
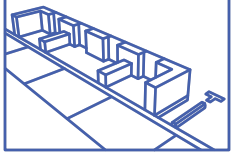
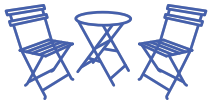
PRESENT | ABSENT

WHAT YOU SEE BELOW

Great Streets include a host of amenities that help express their character and make them quality places to live, work, and socialize. While it's not possible to quantify every feature that contributes to a Great Street, the matrix below shows whether certain key attributes can be found along this corridor

SOURCE & DATES

Physical inventory of corridor, collected by Fehr & Peers, 2015

IMPROVED ENVIRONMENTAL RESILIENCE	**STREET TREES** 	DROUGHT-TOLERANT LANDSCAPING 	**TRASH CANS** 	**ACCESS TO HEALTHY FOOD** 
SAFER & MORE SECURE COMMUNITIES	HIGH-VISIBILITY CROSSWALKS 	ACCESSIBLE CURB RAMPS 	PEDESTRIAN-SCALE LIGHTING 	MID-BLOCK CROSSINGS 
IMPROVED ACCESS & MOBILITY	SMOOTH & ACCESSIBLE SIDEWALKS 	TRANSIT STOP SEATING & SHELTER 	**DEDICATED BIKEWAYS** 	**AVAILABLE PARKING** 
ENHANCED NEIGHBORHOOD CHARACTER	**PUBLIC GATHERING SPACES** 	**OUTDOOR SEATING AT BUSINESSES** 	**REGULAR SPECIAL EVENTS** 	**CIVIC ART** 

GREATER COMMUNITY ENGAGEMENT

GREATER COMMUNITY ENGAGEMENT

measures the degree to which all Angelenos feel they have a say in how our city grows and are able to participate in decision-making.

Each year, the City receives over a million requests for services through MyLA 311, a one-stop portal for citizens to request many of the most sought-after City services. The City keeps data on these requests, which provides a snapshot of the services Angelenos need and the ways they choose to involve themselves in their communities.

We see that sanitation and cleanliness, as well as planning, zoning, and building rank among the top requested services. When comparing the types of service requests around the Great Street to citywide averages, we see there were proportionally more requests for planning, zoning, and building and fewer requests for sanitation and cleanliness around the Great Street than there were citywide.

This pilot project was installed in 2017 and the pre-project data is from 2013-2014? Where is the updated data?

MYLA 311 SERVICE REQUESTS

WHAT YOU SEE BELOW

MyLA 311 requests for the half-mile area surrounding the Great Streets corridor categorized by type. MyLA 311 is a one-stop portal for citizens to request many of the most sought-after City services. From 2013-2014, there were 1,256,500 MyLA 311 requests citywide

SOURCE

Los Angeles Information Technology Agency (ITA)

DATES

2013-2014



ANIMAL SERVICES
359



ARTS & ENTERTAINMENT
1



COMPLAINTS
117



CONSERVATION EFFORTS
11



ECONOMIC & WORKFORCE DEVELOPMENT
243



ENFORCEMENT & VIOLATION REPORTING
2,748



EVENTS
10



GANG DIVISION
0



GRAFFITI REMOVAL
2,260



HEALTH, FAMILY, & SOCIAL SERVICES
57



HOUSING ASSISTANCE
349



OTHER
3,417



PLANNING, ZONING, & BUILDING
16,584



PUBLIC SAFETY & EMERGENCY SERVICES
353



PUBLIC SERVICES, POTHOLE REPAIR, & TREE TRIMMING
2,469



PUBLIC WORKS & UTILITIES
1,084



RECREATION
64



SANITATION & CLEANLINESS
5,589



TRANSPORTATION & PARKING
1,814



VOLUNTEER & CHARITY
41

MYLA 311 SERVICE REQUESTS (CONTINUED)

LEGEND

Categories are listed clockwise from top

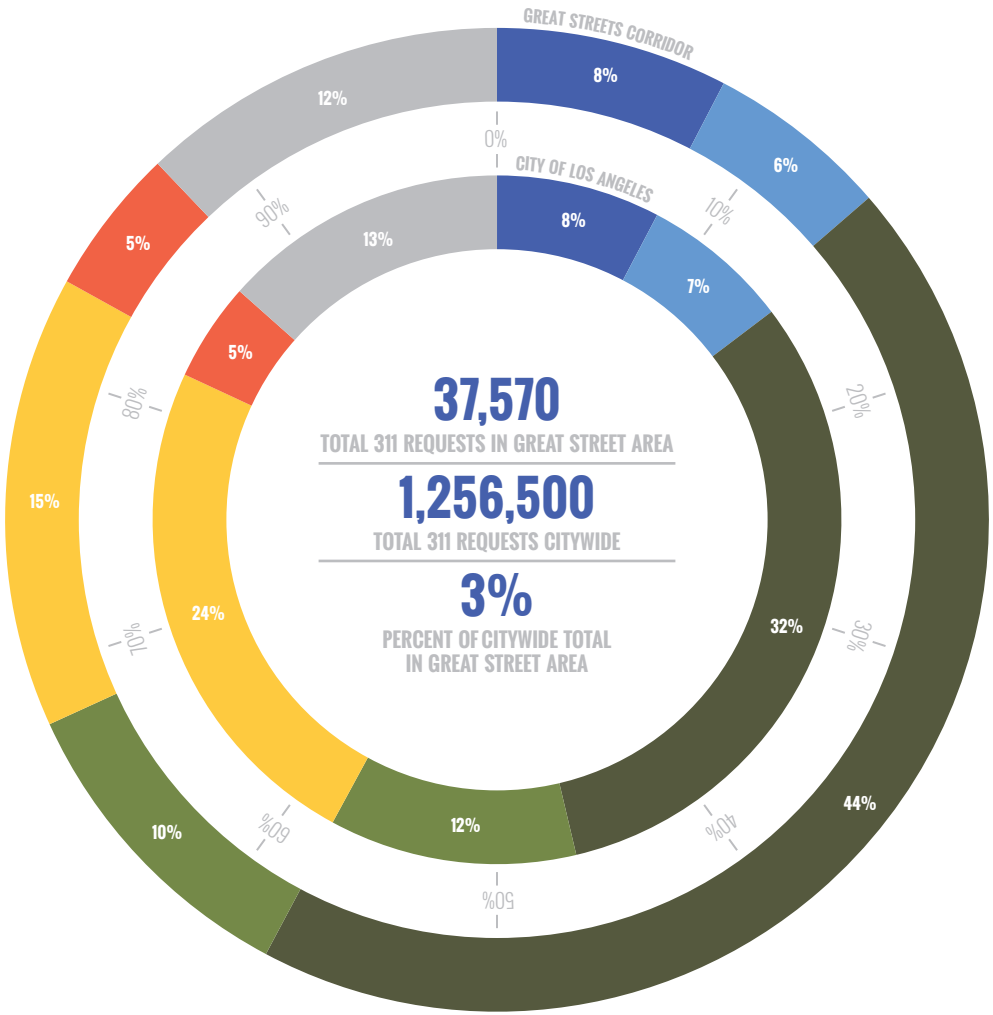
- *Enforcement, Violation Reporting, Complaints*
- *Graffiti Removal*
- *Planning, Zoning, Building*
- *Public Services, Public Works, Public Safety*
- *Sanitation, Cleanliness*
- *Transportation, Parking*
- *Other*

WHAT YOU SEE BELOW

Distribution of MyLA 311 requests for the half-mile area surrounding the Great Streets corridor (outside ring) and City of Los Angeles as a whole (inside ring)

SOURCE & DATES

ITA, 2013-2014



IMPROVED ENVIRONMENTAL RESILIENCE

IMPROVED ENVIRONMENTAL RESILIENCE measures our progress toward fostering a healthy environment for all—one with the ability to sustain itself and the capacity to adapt to changes. We're tracking this goal through a variety of sources.

From a public health perspective, we see that obesity rates around the Great Street are lower than citywide levels while physical activity rates are comparable to the citywide average.

Environmental quality of life is the notion that our neighborhoods should be clean and healthy places, free of trash, and with appropriate resources to maintain these conditions.

As measured through MyLA 311 service requests, we see that requests to remove bulky items, collect trash, and maintain landscaping were highest.

CalEnviroScreen 2.0 is a composite score showing the level to which communities are economically disadvantaged and burdened by pollution. It uses a 100-point scale, where lower scores indicate better economic stature and less exposure to pollution. Scores for the majority of the Great Street fall toward the lower range of the 100-point continuum, indicating a low exposure to pollution.

Where is the CalEnviroScreen 2.0 report?

PUBLIC HEALTH INDICATORS

WHAT YOU SEE BELOW

Left: Percent of adults (18 and older) who are obese in the zip code(s) encompassing the Great Streets corridor and the City of Los Angeles as a whole. Obesity is defined as having a body mass index (BMI) of 30.0 or above, and BMI was calculated using survey respondents' self-reported weight and height
Right: Percent of adults (18 and older) who walked for at least 150 minutes in the past week (at time survey was administered) in the zip code(s) encompassing the Great Streets corridor and the City of Los Angeles as a whole

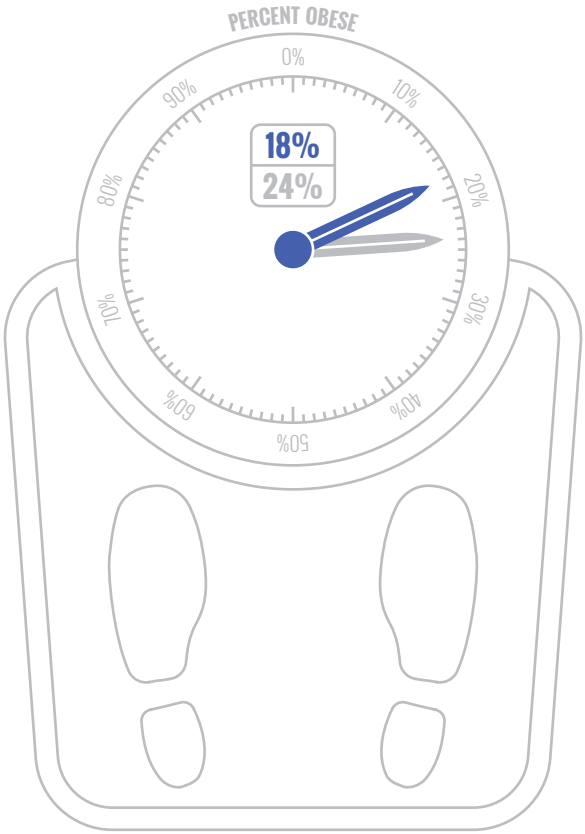
LEGEND

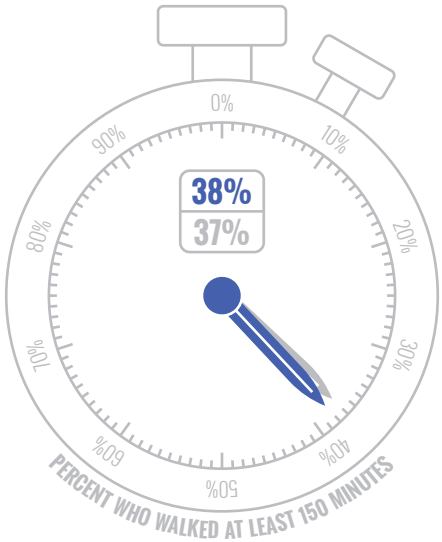
Great Street zip code(s)

City of Los Angeles

SOURCE & DATES

California Health Interview Survey, Neighborhood Edition, 2011 - 2012





ENVIRONMENTAL QUALITY OF LIFE

WHAT YOU SEE BELOW

Requests for various environmental quality of life services via MyLA 311 for the half-mile area surrounding the Great Streets corridor

SOURCE

Los Angeles Information Technology Agency (ITA)

DATES

2013-2014



BULKY ITEM PICKUP

4,207



ENERGY & WATER CONSERVATION

10



E-WASTE

17



HANGING SHOE REMOVAL

12



HAZARDOUS MATERIAL PICKUP

39



ILLEGAL DUMPING

57



NEIGHBORHOOD CLEANUP

7



RECYCLING

15



TRASH COLLECTION & REMOVAL

719



TREES & LANDSCAPING

591

Where is the report that this map is based on? Did it measure air quality and noise pollution?



SAFER & MORE SECURE COMMUNITIES

Where is the survey instrument? Where are the results of the survey (raw data)? Where is the data on traffic collisions?

SAFER & MORE SECURE COMMUNITIES

tracks our progress toward communities where people from all backgrounds feel comfortable participating in civic life.

We are measuring these trends through public perceptions of safety as measured by surveys we conducted along the Great Street and by the observed presence of youth, the elderly, and women. Research on public space use suggests these groups may be less likely to frequent an area if they perceive it to be unsafe. We are also examining data on crime, traffic collisions, and the availability of streetlights.

We see that women represent less than half of the observed population in the traffic counts we conducted and the people we spoke with in our surveys. As measured by the US Census American Community Survey (ACS), half the people living in the area are women. Proportions of elderly and youth in our surveys and traffic counts were also lower than proportions in the ACS. Most of the people we surveyed perceived the neighborhood around the Great Street as being relatively safe.

We looked at crime data for the Los Angeles Police Department division in which the Great Street is located and the City of Los Angeles as a whole. We see that financial crimes like robbery and theft make up the largest volume of reported crimes in the area surrounding the Great Street. Around the Great Street, the proportion of special crimes is lower and the proportion of financial crimes is higher than the citywide distributions of these crime types.

In reviewing traffic collisions along the Great Street, we see higher concentrations of collisions of all types at and to the east of Centinela Avenue.

Streetlights are essential to safety after dark. In reviewing streetlight locations and approximate lighting coverage, we see there is a consistent provision of streetlights along the Great Street. Yet, the streetlights are mostly located in the median of Venice Boulevard, so they provide less coverage of sidewalks.

SAFETY PERCEPTIONS

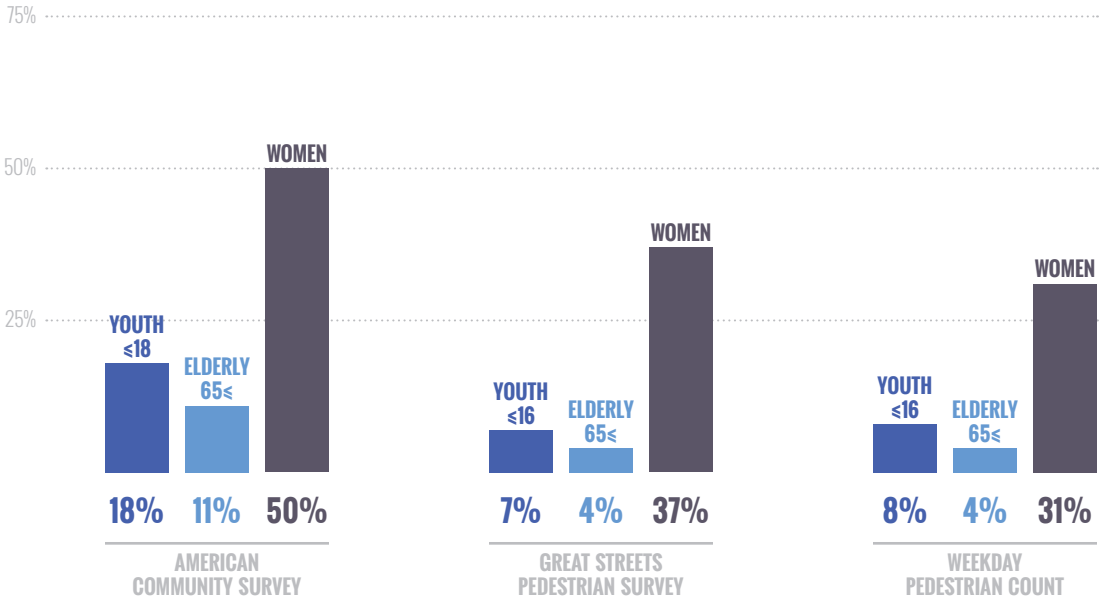
WHAT YOU SEE BELOW

Top: Observed percentages of youth, elderly, and women along the Great Street. Research on public space use suggests these groups may be less likely to frequent an area if they perceive it to be unsafe
Bottom: Perceptions of neighborhood safety as stated in pedestrian surveys

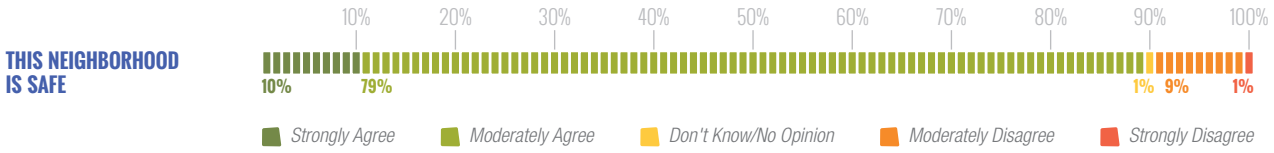
SOURCE & DATES

American Community Survey: US Census, 2008-2012
Pedestrian surveys & safety perceptions: Fehr & Peers, 2015
Pedestrian counts: NDS, 2015

PRESENCE OF YOUTH, ELDERLY, OR WOMEN



PERCEPTION OF SAFETY



CRIME STATISTICS

WHAT YOU SEE BELOW

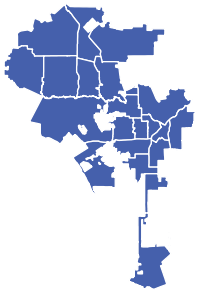
Left number: Los Angeles Police Department (LAPD) crime data, categorized by type, for the entire City of Los Angeles
Center number: LAPD crime data by type for the LAPD division within which the Great Streets corridor is located
Right number: Percent of citywide crime occurring in the LAPD division containing the Great Street

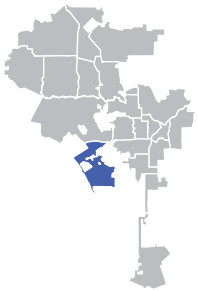
SOURCE

Los Angeles Police Department (LAPD)

DATES

2013-2014





	CITYWIDE TOTAL	LAPD PACIFIC DIVISION	PERCENT OF CITYWIDE TOTAL
VIOLENT CRIMES (ASSAULT, HOMICIDE, OTHER BODILY HARM)	54,400	2,300	4%
FINANCIAL CRIMES (EXTORTION, EMBEZZLEMENT, FRAUD, ROBBERY, THEFT)	215,400	13,600	6%
QUALITY OF LIFE CRIMES (ARSON, VANDALISM, DISTURBING THE PEACE, WEAPONS/DRUGS, POSSESSION/INTOXICATION)	56,900	2,800	5%
SPECIAL CRIMES (MINORS, SEXUAL, GENDER-BASED)	38,500	1,000	3%
OTHER CRIMES	104,700	5,800	6%

CRIME STATISTICS (CONTINUED)

LEGEND

Categories are listed clockwise from top

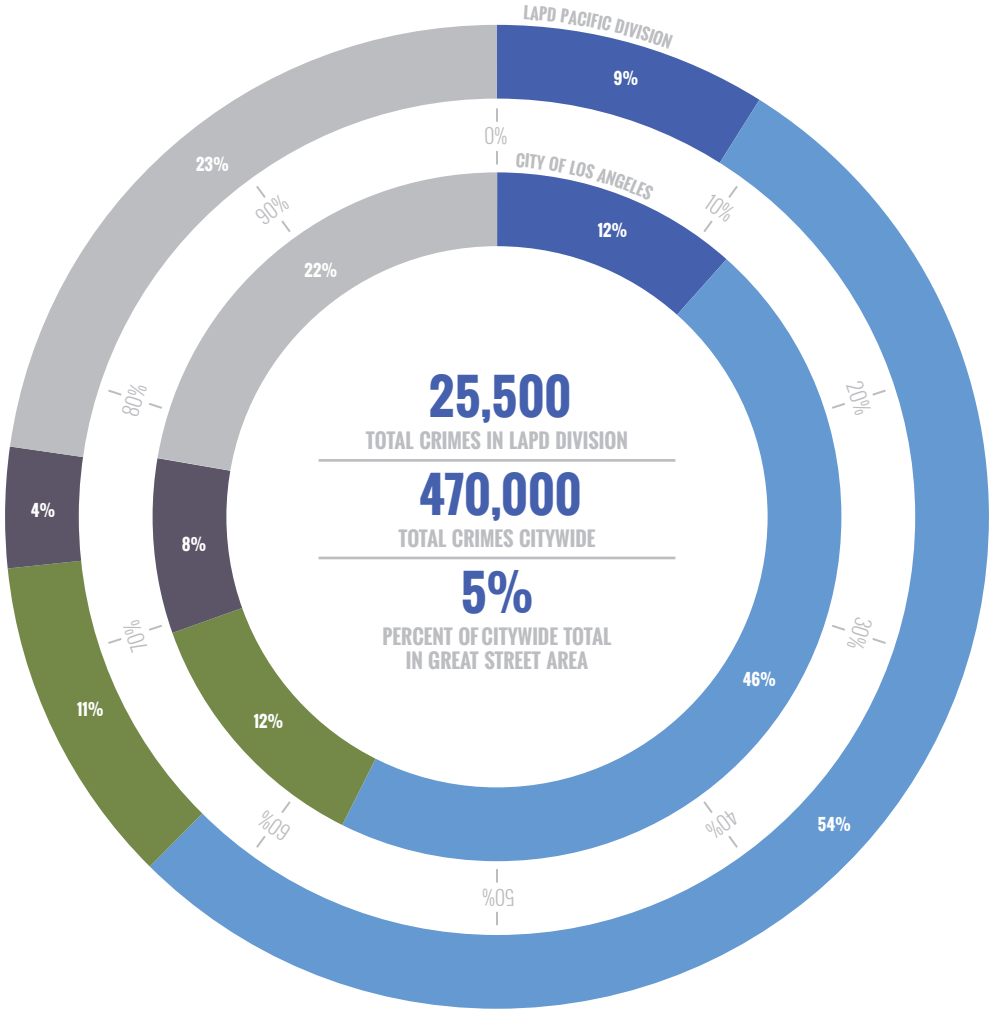
- *Violent Crimes (Assault, Homicide, Other Bodily Harm)*
- *Financial Crimes (Extortion, Embezzlement, Fraud, Robbery, Theft)*
- *Quality of Life Crimes (Arson, Vandalism, Disturbing the Peace, Weapons/Drugs Possession/Intoxication)*
- *Special Crimes (Minors, Sexual, Gender-Based)*
- *Other Crimes*

WHAT YOU SEE BELOW

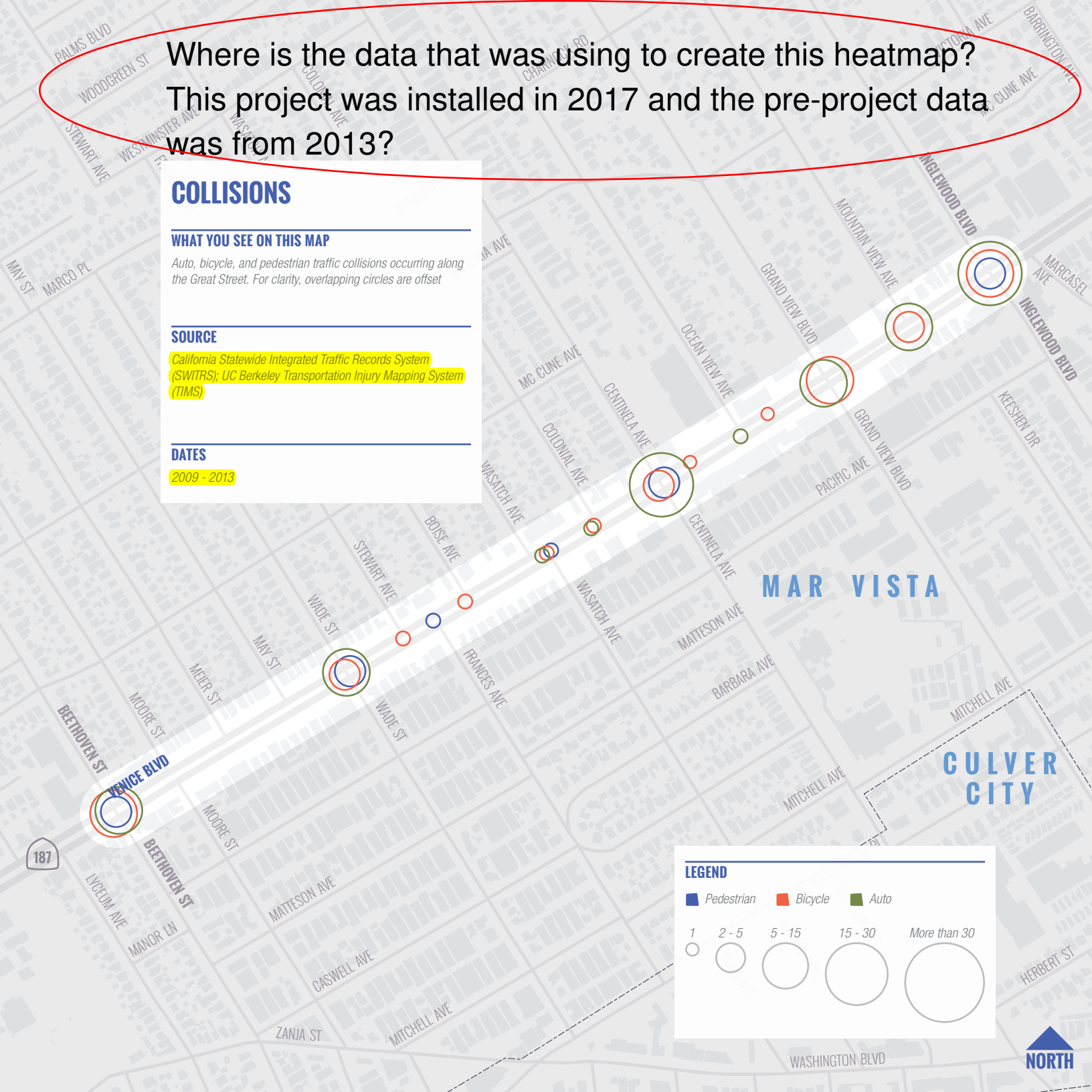
Distribution of LAPD crime data for the LAPD division within which the Great Streets corridor is located (outside ring) and City of Los Angeles as a whole (inside ring)

SOURCE & DATES

LAPD, 2013-2014



Where is the data that was using to create this heatmap? This project was installed in 2017 and the pre-project data was from 2013?



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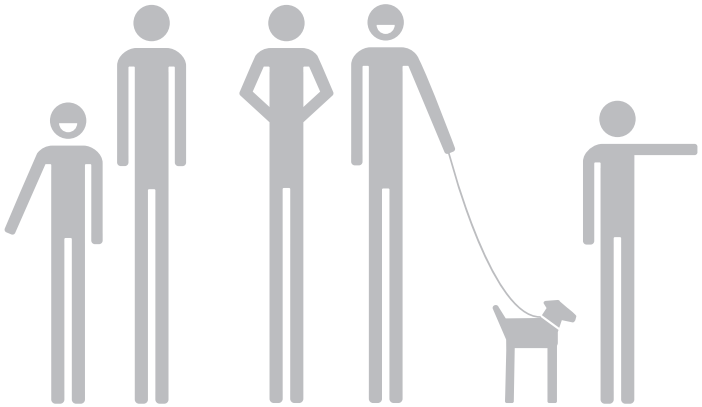

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ACKNOWLEDGMENTS

GREAT STREETS STUDIO

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Data Collection & Analysis

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PARKLET STUDIES

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This project is in part supported by funding from the Centers for Disease Control and Prevention, Cooperative Agreement No. 1U58DP005509-01, through the Los Angeles County Department of Public Health.

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TERRESTRIAL SNAILS AS QUANTITATIVE INDICATORS OF ENVIRONMENTAL METAL POLLUTION

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(Received: October 1991)

Abstract. Concentrations of cadmium, lead, copper and zinc were measured in individuals of *Arianta arbustorum* from different urban sampling sites. In comparison to snails from a reference site, the animals collected in the city showed higher concentrations of cadmium, lead, and copper, indicating elevated levels of metal pollution. The most pronounced difference in tissue concentrations between control animals and contaminated snails was observed for lead. Within the city, metal levels in snails differed significantly, even between adjacent populations.

Arianta arbustorum is a suitable species for biomonitoring, because it is widespread, resident and easy to collect; it has a high capacity for metal accumulation and shows different concentrations depending on metal contamination of the sampling area. An interspecific comparison of metal concentrations in terrestrial gastropods was conducted to define background levels and classes of burden. Three pollution levels are distinguished on the basis of the snails' metal burden: no pollution (class 1: reference sites), moderate (class 2: traffic and other human activities in urban areas), and high pollution (class 3: mining and heavy industry).

1. Introduction

Because some species of molluscs accumulate high amounts of metals (Martin and Flegal, 1975; Howard and Simkiss, 1981; Russel *et al.*, 1981; Viarengo *et al.*, 1981; Ward, 1982; Dallinger and Wieser, 1984; Kurihara and Suzuki, 1987; Knutti *et al.*, 1988) and reflect the levels of bioavailable metals in their environment (Coughtrey and Martin, 1977; Bryan *et al.*, 1984; Talbot, 1985; Balogh, 1988; Czarnezki, 1987; Lyngby, 1987; Cossa, 1988) these animals are often used as quantitative indicators of metal pollution. Bivalve molluscs, in particular, combine several advantageous features for use in biomonitoring surveys (Goldberg, 1975; Philips, 1976; Talbot, 1986; Cossa, 1989) and they have been more frequently employed as biomonitors of metals in aquatic environments than have species of any other group of organisms (Philips, 1990). Marine mussels such as *Mytilus spp.* (Talbot, 1985; Lyngby, 1989; Cossa, 1988) and freshwater species such as *Lampsilis ventricosa* (Czarnezki, 1987), *Unio pictorum* (Balogh and Salanki, 1987; Balogh, 1988) and *Corbicula spp.* (Doherty, 1990) have been successfully used as monitor organisms. Gastropods have been less extensively studied as potential biomonitors than bivalve molluscs. Only few data, however, are available for terrestrial pulmonates. Several factors are known to influence metal concentrations in snails, for example body weight (Coughtrey and Martin, 1982), temperature (Meincke and Schaller, 1974), season (Williamson, 1979; Williamson, 1980), diet and microhabitat (Greville and Morgan, 1989), so that an accurate analysis of these factors is required.

Environmental Monitoring and Assessment **25:** 65–84, 1993.
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For individuals of a certain species to be useful as indicator organisms this species must meet a number of prerequisites (Butler *et al.*, 1971; Philips, 1980; Wren, 1986; Arndt *et al.*, 1987). In the present study the value of the terrestrial snail *Arianta arbustorum* as a quantitative indicator of metal pollution in an urban area was evaluated by means of a list of criteria, which can be summarized under the following headings:

- *Practical prerequisits*: distribution; abundance; ease of sampling, identification and handling; etc.
- *Metal accumulation and influencing factors*: dependence of rates of metal uptake and excretion on body size, age, season, weather, etc.; synergistic or antagonistic effects.
- *Incorporation of the results in a reference system*: definition of background concentrations and of different levels of burden to allow an assessment of the environmental situation of the study area.

2. Material and Methods

2.1. Study Area and Sampling of the Snails

Innsbruck (Tyrol, Austria), a city of approximately 120000 inhabitants, is situated in an alpine basin at a height of 560 m above sea level. Although there is no heavy industry, such as smelting and metal works, the city is an important traffic junction. Thus the main sources of metal pollution in Innsbruck are traffic exhausts, followed by emissions from heating systems and a few industrial plants (Dallinger *et al.*, 1989).

To ascertain whether the metal concentrations of *Arianta arbustorum* differ according to their habitat, the sampling sites were distributed over a large area and were selected to provide as wide a variety as possible. A wood eight kilometers to the east of the city and more than one kilometer from the next public road was defined as reference area (sampling site I). Sampling site II was a private garden in an old residential district now directly situated along a road of average traffic density. Another garden in the vicinity, separated from the road by a building, was designated as sampling site II*. Sampling site III was a hedge in the industrial zone in the west of Innsbruck and enclosing a printing office and a garage. The verge of an arterial road with dense traffic was chosen as sampling site IV. Sampling site V was a meadow with solitary bushes along a highway in the south of Innsbruck. At each of the sampling sites in the city of Innsbruck twelve snails with a body weight of about 0.3 g (dry weight without shell) were collected for determination of their metal concentrations (Table I). The following factors were examined:

- differences between the metal concentrations of *Arianta arbustorum* from sites listed in Table I, A;

TABLE I

Description of sampling sites, numbers (n) and body dry weights (means±standard deviations) of the snails.

site	description	distance from nearest road	body weight mean±SD [g]	n
(A) Inter-site differences				
I	wood (reference)	> 1 km	0.27±0.04	12
II	urban garden	2–5 m	0.29±0.06	12
III	industrial area	2–5 m	0.26±0.04	11
IV	main road	1–3 m	0.28±0.06	12
V	highway	10–20 m	0.30±0.08	12
(B) Differences between neighbouring habitats				
II	urban garden	2–5 m	0.24±0.06	12
II*	urban garden	20–30 m	0.26±0.06	12
(C) Seasonal pattern				
	season			
II	spring (05.05.87)		0.29±0.06	12
II	summer (31.07.87)		0.24±0.05	12
II	autumn (27.10.87)		0.29±0.06	12
III	spring (05.05.87)		0.26±0.04	11
III	summer (31.07.87)		0.22±0.04	12
III	autumn (27.10.87)		0.24±0.04	12

- metal burden in snails from two adjacent populations at sites II/II* (Table I, B);
- seasonal patterns of metal concentrations within one period of activity on sites II and III (Table I, C).

2.2. Preparation of samples and metal analyses

After removal of the shells, the tissues of the snails were put into screw-capped polypropylene tubes (Greiner, Austria), dried at 60°C for several days and weighed. The samples were digested with a mixture (1 : 1) of 1–2 ml of nitric acid (Suprapure, Merck) and distilled water in a heated aluminium block at 70°C. The concentrations of cadmium, lead, copper and zinc were measured by means of flame atomic absorption spectrophotometry (Perkin Elmer, model 2380) using an air-acetylene fuel mixture. Calibration was carried out using metal standard solutions (Titrisol, Merck) diluted with distilled water and nitric acid at the same ratio as the samples. The accuracy of the external calibration method was confirmed by the

use of certified reference material (Lobster hepatopancreas, TORT 1, NRC). Metal concentrations were found to be within the accepted means for reproducibility.

3. Results

3.1. Metal Concentrations of *Arianta arbustorum* from different sampling sites

3.1.1. Cadmium

A concentration of 6.5 μg/g (dry wt.) was found in snails from sampling site I (controls), this concentration being significantly lower than that of snails collected in the urban region, with the exception of those from sampling site V (Figure 1a). As indicated in Figure 1a, statistically significant differences also exist within the cadmium concentrations of snails from the urban sites. On an average, snails living in an urban environment show a concentration of cadmium twice as high as that of the reference animals. The highest average concentration (14.46 μg/g) was found in snails from sampling site IV, which is situated directly beside a main road.

3.1.2. Lead

Compared to the other metals, concentrations of lead show the most pronounced intersite differences ranging from 4.8 μg/g at sampling site I to 22.8 μg/g at sampling site IV. The level of lead in animals from sampling site I is significantly lower by a factor of 3.5, 3, 5, and 3 for sites II, III, IV, and V respectively (Figure 1b). The mean level of lead in snails inhabiting urban areas is 3.5 times higher than the background values. Snails living near a main road (sampling site IV) have significantly higher concentrations of lead than snails from any of the other sampling sites (Figure 1b), thus indicating traffic exhausts as the main source of lead contamination in the vicinity of roads.

3.1.3. Copper

The copper concentration in control animals (sampling site I) is significantly lower than that found in snails from the other sampling sites (Figure 1c). The level of copper is elevated by a factor of between 2 and 4 in snails from the urban sites, reaching a maximum of 400 μg/g on sampling site II. The concentrations in snails from this site are significantly higher than from any other site.

3.1.4. Zinc

The lowest average concentration of zinc is 130 μg/g, and is found in control animals, the highest is 301 μg/g, measured in snails from V (Figure 1d). This means a difference of a factor of 2.5. But on an average, the zinc levels of urban snails (sampling sites II–V) are 1.5 times above the control level, which is lower than the factors found for cadmium, lead and copper.

In conclusion, the following picture can be drawn: individuals of *Arianta arbus-*

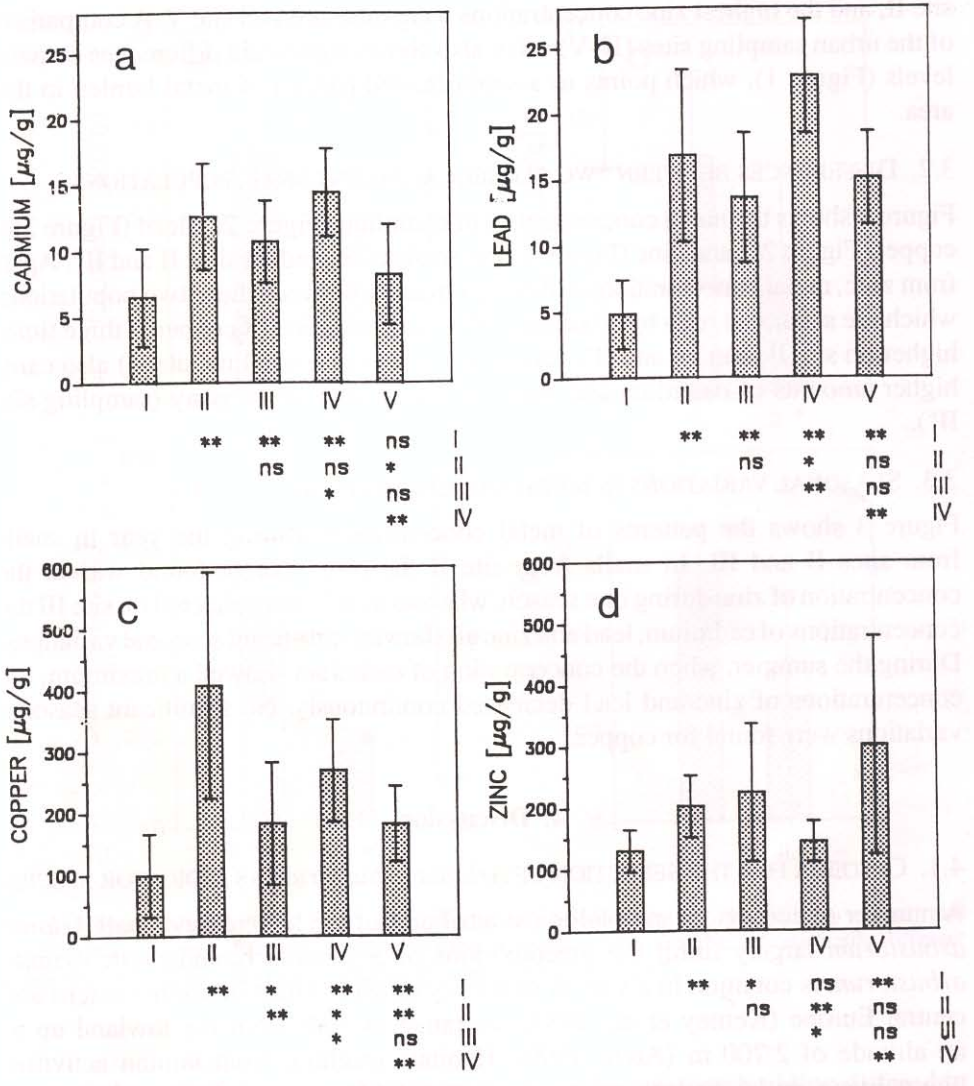

Fig. 1. Mean concentrations (± standard deviations) of (a) cadmium, (b) lead, (c) copper, and (d) zinc in specimens of *Arianta arbustorum* from sampling sites I–V in Innsbruck. Metal concentrations of different sites were compared by Student's *t*-test. The results of this test are shown below each diagram, levels of significance are indicated by symbols, as follows: ns...not significant ($p \geq 0.05$); *...$p \leq 0.05$; **...$p \leq 0.01$.

torum from the control area (sampling site I) show the lowest concentrations for all metals measured. Snails from urban sites invariably show significantly higher metal levels. This is most pronounced for lead, followed by copper, cadmium and zinc. Sampling site IV, close to a main road, is the most contaminated site with respect to lead and cadmium. The highest concentrations of copper were found on

site II, and the highest zinc concentrations were measured on site V. A comparison of the urban sampling sites (II–V) often also shows significant differences in metal levels (Figure 1), which points to a sophisticated pattern of metal burden in this area.

3.2. Differences between two closely adjacent snail populations

Figure 2 shows the mean concentrations of cadmium (Figure 2a), lead (Figure 2b), copper (Figure 2c) and zinc (Figure 3d) in snails collected on sites II and II*. Apart from zinc, metal concentrations differ significantly between these two populations, which are separated only by a building. The concentration of copper is three times higher on site II than on site II*. Snails near the road (sampling site II) also carry higher amounts of cadmium and lead than those only 20 m away (sampling site II*).

3.3. Seasonal variations in metal concentrations

Figure 3 shows the patterns of metal concentrations during the year in snails from sites II and III. In snails from site II the only change found was in the concentration of zinc during one season, whereas in animals collected on site III the concentrations of cadmium, lead and zinc all showed significant seasonal variations. During the summer, when the concentration of cadmium showed a maximum, the concentrations of zinc and lead decreased continuously. No significant seasonal variations were found for copper.

4. Discussion

4.1. Criteria for the selection of *Arianta arbustorum* as indicator species

A number of ecological and biological attributes of the helicid land snail *Arianta arbustorum* largely fulfill the preconditions of a suitable bioindicator: *Arianta arbustorum* is common in a variety of mostly moist habitats in north-western and central Europe (Kerney *et al.*, 1983), its range extends from the lowland up to an altitude of 2,700 m (Arter, 1990). Habitats resulting from human activities like gardens, parks, hedges, road verges, traffic islands and so on, are regularly inhabited by *Arianta arbustorum*, where up to 43 individuals/m^2 can be found (Baur and Baur, 1990). At the sampling sites in the city of Innsbruck numerous individuals of *Arianta arbustorum* were collected within a period of time. Because of its ubiquitous and wide distribution, *Arianta arbustorum* could be used for biomonitoring in many regions of Europe, especially in industrial and urban areas.

In order to be regarded as representative of the study area, an indicator organism should be sedentary or its activity range should be restricted (Butler *et al.*, 1971). Baur and Baur (1990) found that the average displacements of individuals of *Arianta arbustorum* ranged from 1.5 to 4.9 m within one season and that roads are barriers to the snails' dispersal. These results suggest that snail populations in towns dissected by paved roads may be isolated from each other. In this study

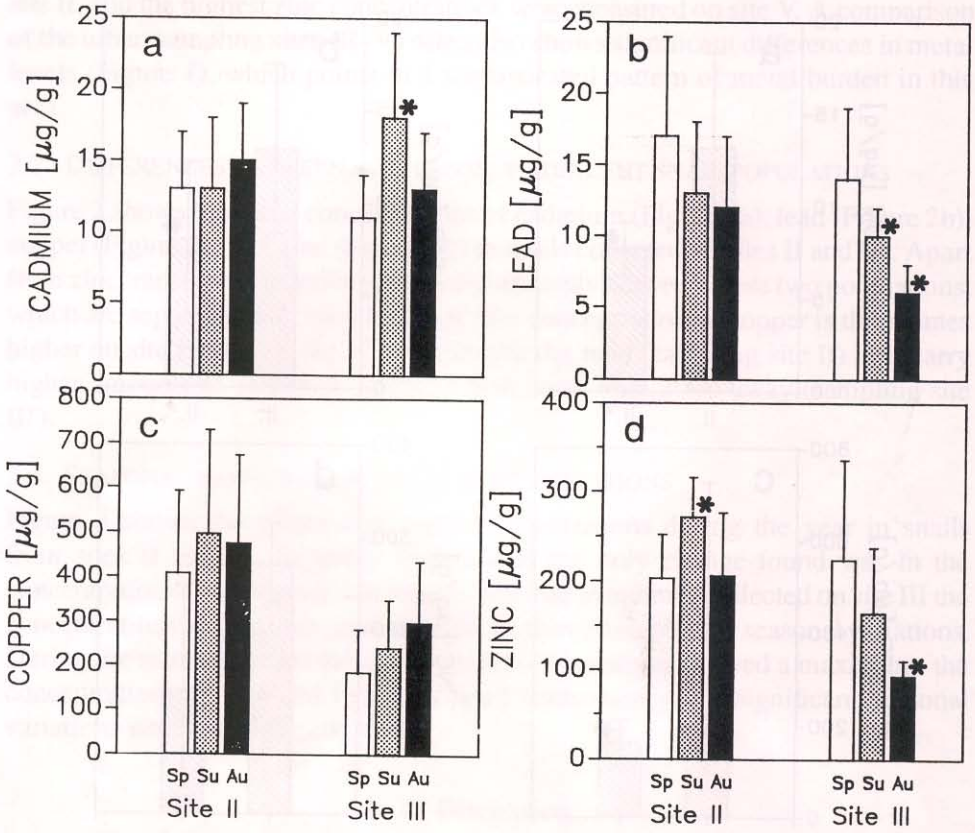

Fig. 3. Seasonal variation in (a) cadmium, (b) lead, (c) copper, and (d) zinc concentrations of *Arianta arbustorum* from sampling sites II and III. An asterisk indicates a significant change in metal concentration since the previous season (Student's t-test; $p \leq 0.01$). Abbreviations: Sp...spring; Su...summer; Au...autumn.

with brown shells in forests at lower altitudes, to smaller yellow individuals, found mainly in grasslands at higher altitudes (Arter, 1990). It is not known whether these subspecies differ with regard to metal accumulation.

The metal contents of *Arianta arbustorum* depend on the animals' size. The smaller animals have higher concentrations of cadmium, lead and zinc than larger individuals, but those heavier than 0.2 g (dry weight without shell) do not show this correlation (Berger and Dallinger, 1989; Berger, 1990). In order to avoid size-dependent interference, adult animals belonging to the weight class of 0.3 g were used in this study (Table I). This method also helps to avoid age-dependent effects, if the sampling sites are within an ecologically homogeneous area. Along an altitudinal gradient, size does not correlate with age (Baur and Raboud, 1988). In such a case an estimation of the age would be necessary.

Arianta arbustorum spend an average of 3–4 years as adults, but lifespans

of up to 14 years have been recorded (Raboud, 1986; Baur and Raboud, 1988). Therefore, the bioaccumulation levels out short-term variations in the exposure and availability of a pollutant and represents the mean burden of the habitat.

Because of its convenient size, collection and handling of individuals of *Arianta arbustorum* are easily and quickly achieved. The animals can be kept under laboratory conditions and fed on artificial or homogeneous diet for long periods of time (Frömming, 1954), which allows experimental studies of the kinetics of metal accumulation and detoxification mechanisms of *Arianta arbustorum* and other pulmonate snails to be carried out. By using food enriched with cadmium, copper, lead or zinc, the routes and rates of metal accumulation have been quantified in *Helix aspersa* (Beeby, 1985), *Helix pomatia* (Berger *et al.*, 1991) and *Arianta arbustorum* (Berger and Dallinger, 1989). The metal concentrations achieved in these feeding experiments within a period of 10–30 days are similar to the highest values reported for snails under field conditions (Hopkin, 1989). Metal accumulation in terrestrial gastropods is efficient and occurs at fast rates, whereas elimination seems to be a slow process (Dallinger and Wieser, 1984; Berger and Dallinger, 1989). Their high capacity for the accumulation and storage of metals is attributed to the induction of metal-binding proteins belonging to the metallothioneins (Dallinger *et al.*, 1989). These proteins are probably responsible for the long half-life of cadmium in snails (Williamson, 1980). The low rate of elimination means that the metal concentrations present in the tissues are the sum of a long-term process of accumulation and are therefore indicative of the environmental level of this contaminant over a long period. Additionally, some short-term effects such as changes in feeding activity due to temperature, humidity and other meteorological variables could affect the amount of metals assimilated. Factors of this kind may account for the apparently irregular variations in metal concentrations in *Arianta arbustorum* collected from the same site within one activity period (Figure 3). For this reason the period of sampling should be as short as possible.

4.2. Ranges of metal concentrations in terrestrial snails: A reference system to define levels of burden

To assess metal contaminations by means of biomonitoring it is important to know the whole range of concentrations possible for a monitor organism exposed to different levels of pollution. Since the information available about metal burdens of a given species of gastropods is insufficient for the establishment of such a scale, we have compared the cadmium, lead, copper and zinc concentrations of different terrestrial gastropod species from polluted and unpolluted regions to allow interpretation of the metal concentrations found in *Arianta arbustorum*. Data for 16 species (7 species of snails and 9 species of slugs) are summarized. A complete list of the species, metal concentrations, descriptions of the sampling sites and references are given in the Appendix.

The areas from which the gastropods of this inter-specific comparison were collected can be divided into three classes, according to the source of metal pollution:

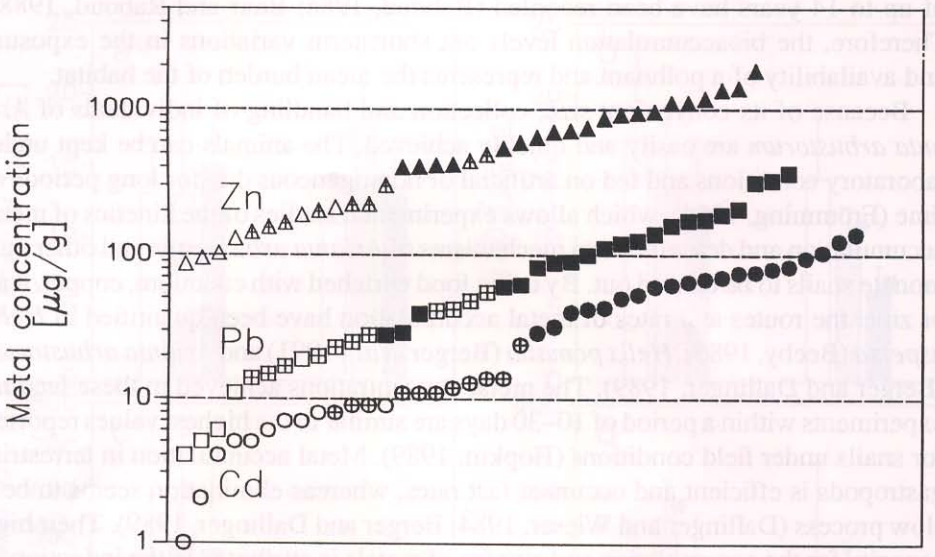

Fig. 4. Cadmium (circles), lead (squares) and zinc (triangles) concentrations reported from different species of terrestrial gastropods. The data are arranged in ascending order of concentration as listed in the Appendices A, B, and D. Three classes of sampling sites are distinguished (see text):
Class 1: reference areas;
Class 2: sampling sites near roads or within cities;
Class 3: mining areas or regions of metal-working industry.
Metal concentrations of animals from class 1 sites are indicated by open symbols, those of class 2 sites by crossed symbols and those of class 3 sites by closed symbols.

Class 1: reference areas;
Class 2: sampling sites near roads or within cities;
Class 3: mining areas and regions of metal-working industry.

If the metal concentrations of terrestrial gastropods give any information about the source and intensity of pollution of their habitats, this classification, derived only from a description of the sampling site, should correspond to the metal levels found in the animals. In Figure 4 the concentrations of cadmium, lead and zinc in terrestrial gastropods are shown in ascending order. The three categories of sampling sites, indicated by different symbols, are clearly distinguishable on the basis of the metal concentrations of the gastropods. Table II summarizes the ranges and mean concentrations of cadmium, lead, copper and zinc measured in gastropods from habitats belonging to classes 1, 2 or 3. The increase in metal burden for a specific class is shown by the ratio (f) of its mean metal concentration to the average background level (class 1).

The concentration of cadmium varies between 1 and 139 μg/g (Figure 4, Ap-

pendix A). The three classes of sampling sites are distinctly separated. Animals from class 1 habitats (controls) have a mean cadmium concentration of 5.4 μg/g, those from urban areas have an average of 12.7 μg/g. The wide range of concentrations in class 2 (8–24 μg/g) could be a result of the variable levels of exposure in cities, depending on traffic density and industrial activities. The highest and most variable concentrations are found in gastropods near mining areas and smelters. The mean concentration of 70 μg/g is 13 times above background, showing that this kind of human activity pollutes the environment much more than traffic and cities. The cadmium concentrations of gastropods indicate both highly polluted sites (class 3) as well as moderately polluted areas (class 2). This underlines the variety of possible uses of a bioindicator.

The cadmium concentration of *Arianta arbustorum* (see Appendix A) from sampling site I (7 μg/g) corresponds to the level of class 1 (Table II). The concentrations found on sampling sites II, III, and IV are as high as those measured in *Helix aspersa* and *Cepaea hortensis* from similar types of habitats (Williamson, 1980; Martin and Coughtrey, 1982). Although sampling site V is situated near a highway, cadmium concentrations in the snails are below the average of class 2 (Appendix A; Table II).

The range of lead concentration in terrestrial gastropods is 4–365 μg/g and can be divided into levels of burden corresponding to the three classes of sampling sites (Figure 4, Appendix B). The mean concentration of animals from class 1 sites is only a fifth and a sixteenth of those from class 2- and class 3-sites, respectively (Table II). In contrast to cadmium, the lead concentrations of class 2 and class 3 overlap to a much greater extent. This is because of the high variability of lead concentrations in gastropods from urban areas. Lead concentrations of snails collected near roads exceeded those of individuals living 3.2 km from a smelter (see Appendix B; Coughtrey and Martin, 1976; Williamson, 1980; Beeby and Richmond, 1987). This shows the importance of the contribution of traffic exhausts to total lead pollution. The variability of lead levels in urban gastropods can be attributed to the high dependence of environmental lead concentrations on distance from the road (Leonzio and Pisani, 1987; Yassoglou *et al.*, 1987; Kasperowski and Frank, 1989), on traffic density (Burguera *et al.*, 1989; Ho and Tai, 1988; Stary *et al.*, 1989; Dallinger *et al.*, 1991) and on exposure of the habitat (Dallinger *et al.*, 1989). This leads to a complex mosaic of different levels of pollution within a city, which can only be described by a narrow mesh of sampling points (Dallinger *et al.*, 1991).

On the basis of this interspecific comparison the concentrations of lead in *Arianta arbustorum* collected in Innsbruck are relatively low. The lead concentration in snails from sampling site I (5 μg/g) is below the average of class 1 (9 μg/g). The highest concentration of lead, measured in animals from site IV, was 23 μg/g, which is considerably less than the concentrations in most snails from class 2 sites. The distance of 10–20 m of sampling site V from the highway may be the reason for the low lead burden of its snails. Increasing distance from a road leads to expo-

TABLE II
Classification of metal concentrations in terrestrial gastropods according to the specific source of the pollutant.

		Class 1 controls	Class 2 traffic & cities	Class 3 smelters & mines
Cadmium				
Range	[μg/g]	1–9	8–24	29–139
Average	[μg/g]	5	13	70
	n	(10)	(10)	(20)
	f	1	2	14
Lead				
Range	[μg/g]	4–19	14–160	28–365
Average	[μg/g]	9	41	141
	n	(5)	(12)	(20)
	f	1	4.5	16
Copper				
Range	[μg/g]	46–104	30–408	45–228
Average	[μg/g]	84	188	84
	n	(4)	(7)	(9)
	f	1	2	1
Zinc				
Range	[μg/g]	86–212	144–748	400–1868
Average	[μg/g]	136	310	873
	n	(6)	(10)	(19)
	f	1	2	6.5

f = ratio of the mean metal concentration of a class to the mean concentration of class 1.

nentially decreasing metal concentrations in the soil, reaching background levels at approximately 50 m (Yassoglou *et al.*, 1987). Kasperowski and Frank (1989) found no elevation of lead 10 m away from a motorway. The lead concentration of the terrestrial snail *Cernuella virgata* decreases exponentially within a distance of 200 m from a road and is halved after the first 20 m (Leonzio and Pisani, 1987).

Copper concentrations of terrestrial gastropods range between 30 and 408 μg/g (Table II, Appendix C), but in this case the classification of sampling sites into different categories does not correspond with different levels of concentration (Table II). The following points should be considered in this context: (1) less information is available concerning copper in snails than for cadmium, lead or zinc.

Appendix A: Cadmium concentrations

Species	Cd [μg/g]	Sampling site	Class	Ref.
Arion subfuscus	1	wood	1	7
Arion ater	2	wood	1	7
Helix pomatia	4	wood	1	7
Helix aspersa	5 ± 1	reference area	1	9
Helix aspersa	5 ± 1	reference area	1	5
Helix aspersa	6 ± 1	garden	1	1
Perforatella incanata	7	wood	1	7
Arianta arbustorum	7 ± 4	wood; I	1	10
Oxychilus sp.	8	wood	1	4
Arianta arbustorum	8 ± 4	highway; 10–20 m; V	2	10
Cepaea nemoralis	9	suburb	2	6
Helix aspersa	9 ± 1	car park	2	5
Helix aspersa	9	wood	1	4
Arianta arbustorum	11 ± 3	industrial area; III	2	10
Helix aspersa	11 ± 6	wood	2	4
Helix aspersa	11 ± 1	urban garden	2	4
Cepaea hortensis	12	roadside	2	4
Arianta arbustorum	13 ± 4	urban garden; II	2	10
Cepaea hortensis	14	roadside	2	3
Arianta arbustorum	14 ± 3	main road; IV	2	10
Helix aspersa	24 ± 4	wood	2	1
Arion fasciatus	29	smelter	3	4
Cepaea nemoralis	32 ± 7	zinc smelter	3	4
Arion hortensis	34 ± 4	Pb/Zn mine	3	8
Arion hortensis	42	smelter	3	4
Agriolimax reticulatus	43	smelter	3	4
Helix aspersa	50 ± 11	smelter; 1 km	3	9
Helix aspersa	53 ± 19	smelter; 3.2 km	3	4
Agriolimax reticulatus	60	smelter	3	4
Helix aspersa	62	smelter; 3.2 km	3	4
Deroceras reticulatum	64 ± 10	Pb/Zn mine	3	8
Helix aspersa	65 ± 8	smelter; 3.2 km	3	1
Cepaea nemoralis	68	smelter; 2 km	3	4
Milax budapestensis	70 ± 10	Pb/Zn mine	3	8
Clausilis bidentata	76	smelter; 2.8 km	3	4
Arion ater	76 ± 8	Pb/Zn mine	3	8
Agriolimax reticulatus	83	smelter	3	4
Arion subfuscus	93 ± 16	Pb/Zn mine	3	8
Agriolimax reticulatus	104	smelter	3	4
Deroceras caruanae	119 ± 16	Pb/Zn mine	3	8
Arion hortensis	139	smelter	3	4

Appendix B: Lead concentrations

Species	Pb [μg/g]	Sampling site	Class	Ref.
Helix aspersa	4 ± 1	reference area	1	5
Arianta arbustorum	5 ± 3	wood	1	10
Helix aspersa	6 ± 1	reference area	1	9
Helix aspersa	11	wood	1	4
Arianta arbustorum	14 ± 5	industrial area; III	2	10
Arianta arbustorum	15 ± 4	highway; 10–20 m; V	2	10
Arianta arbustorum	17 ± 7	urban garden; II	2	10
Helix aspersa	19 ± 8	garden	1	1
Arion ater	20 ± 2	highway; 40–80 m	2	2
Arianta arbustorum	23 ± 4	main road; IV	2	10
Helix aspersa	25 ± 14	wood	2	4
Helix aspersa	28 ± 4	wood	2	1
Helix aspersa	28	smelter; 3.2 km	3	4
Helix aspersa	29 ± 3	smelter; 3.2 km	3	1
Helix aspersa	39 ± 21	smelter; 3.2 km	3	4
Cepaea hortensis	41	road side	2	3
Helix aspersa	42 ± 6	urban garden	2	4
Helix aspersa	48 ± 5	car park	2	5
Cepaea hortensis	55	roadside	2	4
Arion hortensis	60	smelter	3	4
Agriolimax reticulatus	62	smelter	3	4
Arion hortensis	80 ± 9	Pb/Zn mine	3	8
Cepaea nemoralis	82	smelter; 2 km	3	4
Agriolimax reticulatus	88	smelter	3	4
Deroceras caruanae	98 ± 7	Pb/Zn mine	3	8
Arion fasciatus	112	smelter	3	4
Helix aspersa	121 ± 124	smelter; 1 km	3	9
Agriolimax reticulatus	126	smelter	3	4
Deroceras reticulatum	130 ± 15	Pb/Zn mine	3	8
Milax budapestensis	149 ± 18	Pb/Zn mine	3	8
Arion ater	160 ± 30	highway; 0–40 m	2	2
Agriolimax reticulatus	173	smelter	3	4
Arion ater	185 ± 25	Pb/Zn mine	3	8
Clausilis bidentata	208	smelter; 2.8 km	3	4
Arion subfuscus	307 ± 25	Pb/Zn mine	3	8
Arion hortensis	315	smelter	3	4
Cepaea nemoralis	365 ± 65	Zn smelter	3	4

Appendix C: Copper concentrations

Species	Cu [μg/g]	Sampling site	Class	Ref.
Helix aspersa	30 ± 15	moderately polluted	2	4
Helix aspersa	33 ± 8	moderately polluted	2	1
Helix aspersa	46 ± 4	garden	1	1
Milax budapestensis	68 ± 12	Pb/Zn mine	3	8
Arion ater	68 ± 3	Pb/Zn mine	3	8
Helix aspersa	68 ± 10	smelter; 3.2 km	3	1
Deroceras reticulatum	69 ± 16	Pb/Zn mine	3	8
Arion subfuscus	85 ± 7	Pb/Zn mine	3	8
Arion hortensis	85 ± 6	Pb/Zn mine	3	8
Helix aspersa	86 ± 15	control area	1	5
Helix aspersa	87 ± 25	smelter; 3.2 km	3	4
Arianta arbustorum	99 ± 67	wood; I	1	10
Helix aspersa	104 ± 28	control area	1	9
Deroceras caruanae	123 ± 14	Pb/Zn mine	3	8
Arianta arbustorum	182 ± 61	highway; 10–20 m; V	2	10
Arianta arbustorum	183 ± 99	industrial area; III	2	10
Helix aspersa	213 ± 23	car park	2	5
Helix aspersa	228 ± 43	smelter	3	9
Arianta arbustorum	269 ± 83	main road; IV	2	10
Arianta arbustorum	408 ± 184	urban garden; II	2	10

Appendix D: Zinc concentrations

Species	Zn [μg/g]	Sampling site	Class	Ref.
Helix aspersa	86	wood	1	4
Helix aspersa	95 ± 8	garden	1	1
Helix aspersa	103 ± 14	control area	1	9
Arianta arbustorum	130 ± 34	wood	1	10
Arianta arbustorum	144 ± 33	highway; 10–20 m; V	2	10
Helix aspersa	156 ± 55	wood	2	4
Helix aspersa	167 ± 9	wood	2	1
Oxychiclus sp.	189	wood	1	4
Arianta arbustorum	202 ± 50	urban garden; II	2	10
Helix aspersa	212 ± 22	control area	1	5
Helix aspersa	224 ± 32	urban garden	2	4
Arianta arbustorum	224 ± 112	industrial area; III	2	10
Arianta arbustorum	301 ± 178	main road; IV	2	10
Helix aspersa	400	smelter; 3.2 km	3	4
Helix aspersa	404 ± 151	smelter; 3.2 km	3	4
Helix aspersa	413 ± 46	smelter; 3.2 km	3	1
Helix aspersa	418 ± 71	smelter; 1 km	3	9
Cepaea hortensis	444	roadside	2	3
Cepaea hortensis	490	roadside	2	4
Arion hortensis	587 ± 69	Pb/Zn mine	3	8
Clausilis bidentata	592	smelter; 2.8 km	3	4
Cepaea nemoralis	644	smelter; 2 km	3	4
Agriolimax reticulatus	700	smelter	3	4
Cepaea nemoralis	714 ± 90	Zn mine	3	4
Helix aspersa	748 ± 146	carpark	2	5
Deroceras reticulatum	875 ± 122	Pb/Zn mine	3	8
Arion ater	923 ± 128	Pb/Zn mine	3	8
Agriolimax reticulatus	948	smelter	3	4
Deroceras caruanae	975 ± 72	Pb/Zn mine	3	8
Arion fasciatus	1111	smelter	3	4
Agriolimax reticulatus	1115	smelter	3	4
Arion subfuscus	1182 ± 103	Pb/Zn mine	3	8
Agriolimax reticulatus	1364	smelter	3	4
Arion hortensis	1413	smelter	3	4
Arion hortensis	1868	smelter	3	4

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BEST PRACTICES

EMERGENCY ACCESS IN HEALTHY STREETS

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FOR Los Angeles County Department of Public Health
March 23, 2013







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transportation planning for livable communities
County of Los Angeles Public Health

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This project was made possible by a RENEW grant from the Los Angeles County Department of Public Health.

STATEMENT OF THE ISSUE

OVERVIEW

In recent decades, planners, engineers, and other stakeholders have been rethinking the way we design our streets and communities. For much of the latter half of the 20th century, concern for automobility dominated street design, land use controls, and infrastructure priorities. This produced wide, fast streets and sprawling suburban development. Recently, this paradigm has shifted, and many seek to design streets with broader goals in mind: to serve bicyclists, pedestrians, and transit, to function as public space, to facilitate economic activity, to encourage and enable physical activity, and to ensure the safety of all road users. The street designs that meet these ends often involve traffic calming, road diets, and other treatments which slow cars and narrow the traveled way.

Simultaneously, our emergency response providers, primarily fire departments, are seeking ways to reduce the time it takes to arrive to the scene of an emergency call. Every minute of a medical call, fire or other emergency, is critical to preserve lives and property. Cities and counties often use emergency response time as an evaluation measure. Further, responders require physical space in order to deploy their equipment at the scene, space which may be constrained by street design. Thus, emergency responders often oppose narrower, slower streets, as they perceive that these street designs will increase response times or impede their ability to respond at the scene.

International Fire Code (IFC)

Emergency responders have powerful means to influence street design because of the International Fire Code (IFC). The IFC is developed by the International Code Council, a private non-profit organization formed in 1994 to develop comprehensive construction codes. The leverage of the IFC results from states and/or local jurisdictions adopting it. Most states, including California, have adopted it and require local jurisdictions to comply. The most relevant codes to this paper include (International Code Council, 2012):

- A requirement for a minimum of 20 feet of unobstructed street width
- A requirement that traffic calming measures be approved by local fire code officials

The local fire department has the legal authority to stop construction of new streets and modifications to existing streets if they deem designs fall out of compliance.

We now have two public interests moving in opposite directions that both value safety and health. Public health professionals, planners, engineers, residents, and other stakeholders seek ways to reduce speeding and motor vehicle crashes. Emergency responders seek to reduce emergency response time. Both have legitimate aims, and fortunately, with coordination and cooperation, achieving these goals does not need to be an either-or proposition. With careful design of streets and thoughtful purchase of emergency equipment, street designers can coordinate with fire departments to reach mutually beneficial public policy.

The purpose of this paper is to collect previous research on this topic and to highlight best practices. This paper is funded by the Los Angeles County Department of Public Health through a Renewing Environments for Nutrition, Exercise and Wellness (RENEW) grant. RENEW is funded by the U.S. Health and Human Services (HHS) and the Centers for Disease Control and Prevention's (CDC) Communities Putting Prevention to Work initiative. We hope this paper will serve as a resource to foster changes in design, policy and practice that allow Los Angeles County's cities as well as communities across the US to have both safe, healthy streets and rapid emergency access.

EMERGENCY RESPONDERS' NEEDS

Need for Rapid Emergency Response

Emergency calls must receive a rapid response in order to save lives and reduce property damage. For example, cardiac arrest requires nearly instant response. According to

the Red Cross, brain damage can occur within four to six minutes after cardiac arrest (2013). Brain damage is likely between six and ten minutes and certain after 10 minutes (Lambert and Meyer, 2006). After a cardiac arrest, survival chances decrease by 10% for each minute defibrillation is delayed (American Red Cross, 2013).



Flashover fire. Credit: Ryan Snyder.

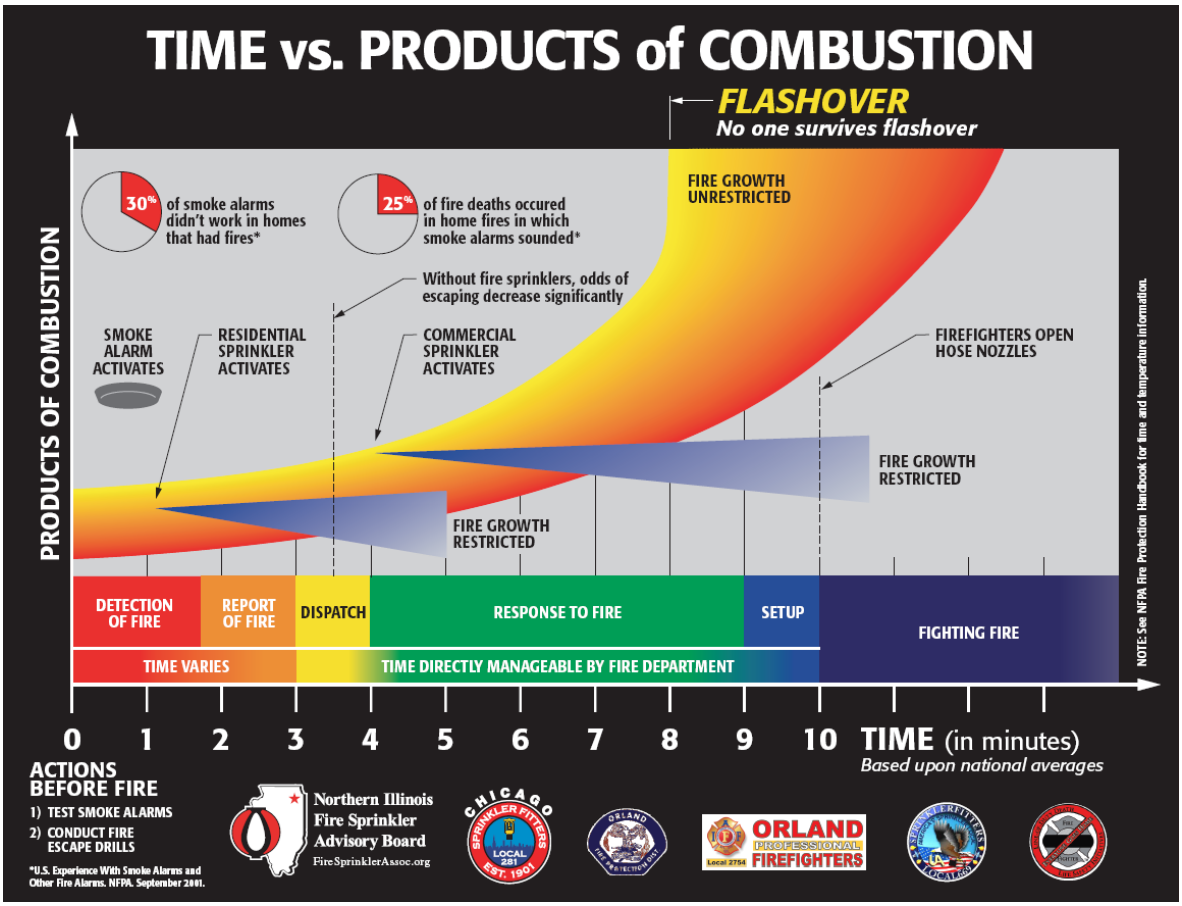
A similar urgency holds for fire emergencies. Fires reach a critical point called flashover. Flashover occurs when flammable vapors escape room contents, igniting an entire room. Temperatures can exceed 1,000 degrees Fahrenheit. Prior to flashover, fires are more easily extinguished with less effort and water. Once flashover occurs, smoke and heat reduce the chances of safe evacuation, and property damage becomes much greater. The chance of firefighters becoming injured or dying in fires also greatly increases. Because flashover typically happens within six to nine minutes after the start of a fire, arriving within this timeframe is crucial to saving lives and property, as well as reducing costs (Olympia, WA Fire Department, 2004). Moreover, as Figure 1 shows, the time it takes for a fire truck to travel from the station to the site of the fire is only one of several steps that must take place after a fire is detected. Fire departments must perform the "dispatch" and "response to fire" steps in Figure 1 as quickly as possible because they do not have control over how much time elapses during detection and reporting of the fire.

The need for rapid response to fires and other emergencies is reflected in the National Fire Protection Association's (NFPA) NFPA 1710, Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments. It recommends that fire departments strive to meet the response time goals shown in Table 1, where response time is defined as the time from when the fire station receives the alarm to when the initial responding company arrives on the scene of the incident and initiates mitigation efforts (National Fire Protection Association, 2010). This document recommends the following emergency response time goals (Cummings, 2012):

TABLE 1. *Response time goals.*

NFPA 1710 RESPONSE TIME GOAL	TIME IN SECONDS (MINUTES) FOR 90% OF INCIDENTS
First Engine Company at a Fire Suppression Incident	320 seconds (5 minutes 20 seconds)
First responder with an Automatic External Defibrillator (AED) at an Emergency Medical Services (EMS) incident	300 seconds (5 minutes)
First Advanced Life Support (ALS) responder on scene of an EMS incident	540 seconds (9 minutes)

FIGURE 1. *Time vs. products of combustion.*



Street Design Factors That Affect Response Times

Once the emergency vehicle has been dispatched, the time required for emergency responders to reach an emergency can be determined using the following formula:

Response time = average speed x distance to emergency.

Streets that allow firefighters to travel to an emergency at higher speeds, or that allow firefighters to travel a shorter distance from their home base to an emergency, reduce response times. Street design factors that allow firefighters to travel to an emergency with shorter average response times include:

- Short blocks
- Connected street networks
- Alleys
- Wide streets that allow unobstructed clear width, enough room to pass other vehicles (moving and parked)
- Wide lanes
- Multiple lanes
- Parking prohibitions
- Large curb radii
- Lack of constraints along the route (traffic signals, stop signs, traffic circles, curb extensions, speed humps, chicanes, other traffic calming measures)
- Lack of features that limit the ability of firefighters to cross the centerline of the street (medians, pedestrian islands, etc.)

Street Design Factors that Affect Responders' Ability to Work at the Scene

Firefighters need room to deploy equipment and personnel. They also want to keep firefighters and equipment out of the collapse zone of buildings.

When working at the scene of an incident, fire departments usually need to accomplish some or all of the following tasks:

- Open cab doors so that firefighters can exit the vehicle
- Retrieve equipment from compartments on the side of vehicles
- Retrieve ground ladders from the vehicle

- Connect fire hoses to pumps on the fire engine
- Move equipment and vehicles around or beside the first fire vehicle to arrive at the scene
- Keep firefighters and equipment at a safe distance from a building's collapse zone, if possible
- When using an aerial ladder, deploy stabilizers (a.k.a. outriggers) to prevent the ladder truck from tipping over when the ladder is extended to the side of the vehicle

The space that emergency responders need to be able to accomplish these tasks can vary considerably, depending on (1) the kind of fire apparatus and other emergency response equipment chosen by a department, (2) the type of incident, and (3) the design of the neighborhood's streets, building design and street network. For example, where zoning allows for tall buildings (over 35 feet), the streets will need to accommodate aerial ladder trucks. Aerial ladder trucks are not needed in neighborhoods where no tall buildings exist or will be built, so the streets need not be designed to allow an aerial ladder truck to deploy its stabilizers. In suburban and rural communities that have no tall buildings, the fire department fleet frequently will not include an aerial ladder truck.

STREET DESIGN

This section reviews the research on what makes streets safe, healthy, environmentally responsible, economically successful, and livable. This research explains why street designers want the flexibility to design streets with less than 20 feet of unobstructed street width, apply traffic calming measures, and engage in other design practices that narrow streets, reduce lanes, and slow cars.

Measures that allow for large fire vehicles to travel at high speeds generally allow and encourage high-speed driving by all vehicles, and the result can be a significant decrease in safety for all users of the streets. Similarly, designs which make it easy for fire vehicles to cross the centerline of streets, such as eliminating raised medians, make it possi-

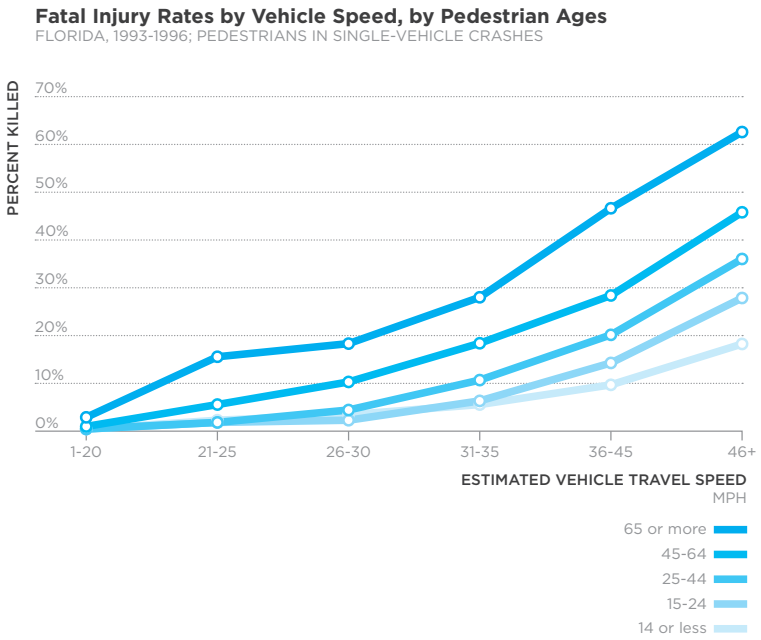
ble for all vehicles to cross the centerline easily, which can result in increases in head-on collisions and other types of collisions. In short, street designs that enable high-speed driving and maneuvering can improve emergency response times, but frequently worsen traffic safety. Further, as this section will explain, these designs compromise our ability to design streets that serve a number of other important community goals.

Safety

The preponderance of evidence indicates that high vehicle speeds cause traffic deaths, particularly pedestrian deaths. Leaf and Preusser, in their 1999 review of the literature conducted for the National Highway Traffic Safety Administration, find that higher vehicle speeds are strongly associated with both greater likelihood of crash occurrence and greater severity of pedestrian injury. Leaf and Preusser analyze a database of over 23,000 pedestrian-involved crashes where the police report contained an officer's estimate of the pre-crash vehicle speed (1999). Figure 2 shows the stark correlation between vehicle speed and the likelihood that a pedestrian will be killed. In 122 U.S. counties, Lambert and Meyer found that speed limits significantly correlate with rates of fatal pedestrian crashes (2006).

Several studies find a correlation between residential street width and traffic fatalities. Swift et. al. conducted regression analyses on 20,000 crash records from Longmont, Colorado (Swift, Painter, and Goldstein, 1997). After eliminating crashes where some significant factor aside from street design probably caused the crash (i.e. snow or icy conditions, drunk driving), they examine physical street design features at each crash location. They find that the number of crashes per mile of street per year rises exponentially with the width of the street. Moreover, street width explains 73% of the variation in crash rates. The study concluded that 36-foot wide streets have 485% more injury collisions than 24-foot wide streets. However, in their analysis of pedestrian fatality and serious injury crashes in Florida, Leaf and Preusser (1999) found that roadway width is unrelated

FIGURE 2. *Fatal injury rates by vehicle speed by pedestrian ages.*



to the speed of striking vehicles. The relationship between width and increased crashes may be uniquely strong for residential streets. It may also be mediated through variables other than speed.

Health

Due to the safety problems with wide and fast streets, both real and perceived, these streets are less conducive to walking, bicycling, using a wheelchair, skateboarding and other modes of active transportation. A body of public health research links rapidly rising rates of obesity to a built environment that discourages active transportation. Numerous surveys conducted by pollsters (Gallup, 2008; Harris, 1991), cities, and consultants routinely find that the primary factors that prevent people from bicycling and walking more are the lack of safe streets, sidewalks, and street crossings. In order to entice more people to walk, bicycle or wheel, we have to make our streets safer. Much of making our streets safer relates to slowing vehicle speeds.

Energy and Environment

Transportation consumes 28% of the energy used in the United States, with most of this consumption being due to

motor vehicle use (US Energy Information Administration, 2012). Making walking, bicycling and transit more attractive could significantly curtail transportation-related energy use.

According to the National Household Travel Survey (Federal Highway Administration, 2009) 39% of personal trips in US metropolitan areas are less than 3 miles long, and 17% are less than 1 mile. Yet 47% of all trips less than 1 mile and 69% of trips less than 3 miles are taken by car. A great opportunity exists to enable people to choose to walk and bike for these short trips. Research indicates that improvements in street design to make walking and bicycling safer and more convenient result in more people walking and biking (Pucher and Buehler, 2012). Furthermore, most transit trips begin with a walking or bicycling trip. Making the trip to the bus stop or transit station safer and more attractive by walking or bicycling would encourage transit use.

Motor vehicles produce large amounts of air pollution as well as greenhouse gases (GHG). Of GHG emissions in the US, 28% come from the transportation sector (US Department of Transportation, 2006). Making walking, bicycling and transit more attractive could significantly reduce transportation-related GHG emissions.

Economy

Street design impacts our economy in several ways. First, wide streets are more expensive to construct and maintain than narrower streets since they have more surface to pave and maintain. Second, wide streets and multi-lane streets create higher speeds and reduce the likelihood that motorists will stop (Rosales, 2006), which impedes pedestrian access to businesses along these streets. Retail streets that are easy for pedestrians to cross effectively bring all of the stores and restaurants closer to shoppers, making it more likely they will patronize them. Third, enabling more people to walk, cycle and take transit can save households the money they spend on daily transportation. The average household in the Los Angeles-Long Beach-Santa Ana Met-

ropolitan Statistical Area spent $12,154 per year on transportation between 2005 and 2009 (Center for Neighborhood Technology, 2012).

Social Interaction and Livability



Walking to school. Credit: Ryan Snyder.

Streets with less traffic and slower traffic enable people to interact more. Research conducted by (Appleyard, 1981) showed a distinct correlation between traffic volumes and the number of acquaintances people have. The research showed that people had more friends and more contact with their neighbors on streets with less traffic than those with more.

Narrower and slower streets create more livable communities than wide, high-speed streets (Rosales, 2006). In neighborhoods where children can safely walk to school, to the park or to visit friends, children grow up more independently and place fewer burdens on their parents to transport them. Many older adults don't drive and walk slowly. When they can cross streets and walk to the store, dry cleaners, doctor's office, friends' homes, parks or places of worship, they experience healthier and more independent lives.

Building streets for speed compromises our humanity. Where streets are built at a human scale, people have higher quality of life than along streets built for vehicle movement.

BEST PRACTICES

The need for rapid emergency response need not clash with street designers' other goals. This section describes some practices that create healthy and livable streets that do not conflict with rapid response, falling into three broad categories. First, we discuss the fact that prevention of crashes is a goal that both emergency responders and street designers share.

Next, we enumerate street and community design practices that can improve response times. At minimum, the practices listed do not worsen response times, and some of them can actually improve response times. Finally, we de-

TABLE 2. *Comparison of fire-related and traffic related injuries and fatalities.*

FIRE-RELATED FATALITIES	TRAFFIC-RELATED FATALITIES	FIRE-RELATED INJURIES	TRAFFIC-RELATED INJURIES
2,640	32,885	13,350	2,239,000

Sources: Fire-related statistics are from the US Center for Disease Control, Fire Deaths and Injuries, 2010. Traffic-related statistics are from the US National Highway Traffic Safety Administration, 2010.

scribe best practices that facilitate successful emergency response and do not conflict with healthy street design.

PREVENTING CRASHES

Public health officials and advocates call attention to the preventive aspect of thoughtful street design. By preventing traffic crashes we can reduce injuries and fatalities, and thus the need for emergency response. Since many emergency response calls attend to traffic crashes, reducing the number and severity of these can significantly reduce these calls. Table 2 compares fire-related fatalities and injuries to traffic-related fatalities and injuries. It shows that traffic fatalities and injuries far outnumber those that are fire related. There are five traffic fatalities for every one fire-related fatality. There are 167 traffic injuries for every fire-related injury.

Designing for healthy streets can also save lives, lengthen lives, and improve the quality of life by offering the opportunity for active transportation. Inactive life styles are leading to rapidly growing rates of obesity, diabetes and related heart problems.

STREET AND COMMUNITY DESIGN BEST PRACTICES

Compact Neighborhoods

Average response times are shorter in compact neighborhoods. When all other factors are equal, compact neighborhoods have shorter response distances, because the

average distance from the fire station to neighborhood homes is shorter. When communities sprawl outwards, with homes built further and further from firehouses, it becomes increasingly costly and difficult for emergency responders to maintain ideal response times.

In their 2006 study of traffic crashes in 122 U.S. counties in the U.S. National Highway Traffic Safety Administration's (NHTSA) Fatal Accident Reporting System, Lambert and Meyer found that average emergency response times in ex-urban areas were greater than average response times in urban areas (10.7 minutes and 7.6 minutes respectively) (Lambert and Meyer, 2006). Moreover, in their regression model of emergency response times to 244 crashes, they find that greater population density is associated with lower response times.

In Los Angeles, response times also vary by density. In denser, central neighborhoods the Los Angeles Fire Department (LAFD) usually beats the 6-minute standard to reach rescues. But in the hillside neighborhoods stretching from Griffith Park to Pacific Palisades, the LAFD doesn't meet the standard nearly 85% of the time (Linthicum, Welsh, and Lopez, 2012).

Those promoting healthy, active, walkable communities favor compact neighborhoods because they bring many origins and destinations close and within walking and bicycling distance. These neighborhoods are also more transit conducive, because more people live within the access shed of any given transit line.

Street Connectivity

Street connectivity particularly stands out as an area of agreement between fire departments and advocates for healthier streets.

Highly connected street networks with short blocks offer emergency responders several advantages. First, they allow emergency responders more routing options to reach

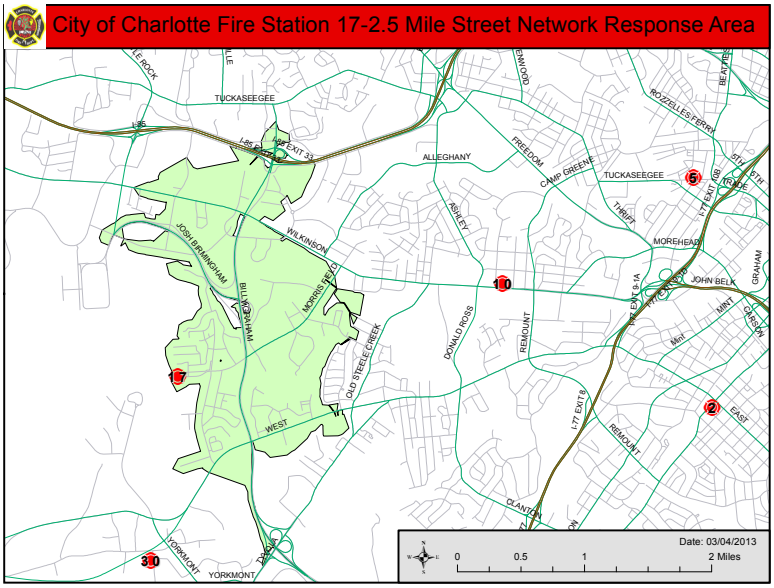


Figure 3. Fire department access shed on a well connected street network. Source: Charlotte Fire Department.

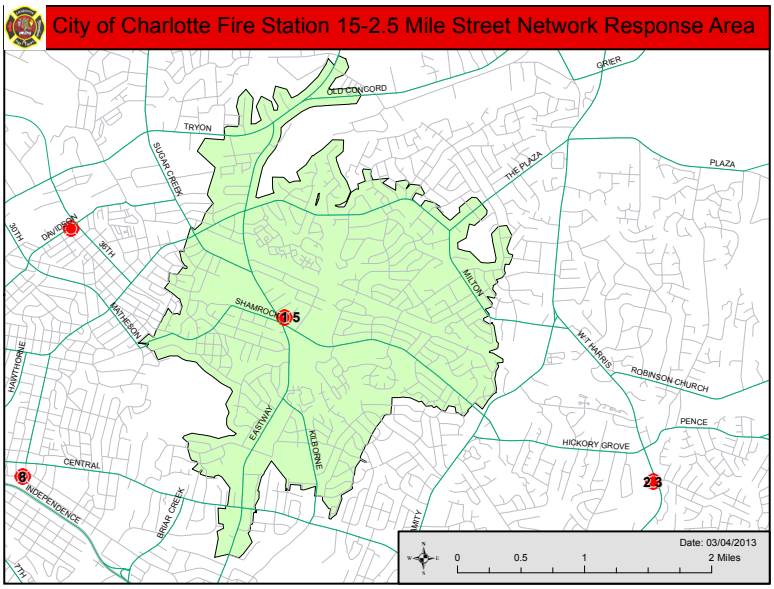


Figure 4. Fire department access shed on a poorly connected street network. Source: Charlotte Fire Department.

their emergency. Second, routes are in general more direct, and responders can access emergencies faster. Third, responders can approach burning buildings from more than one side, which also allows greater access to the fire. This is especially true with alleys. Finally, fire departments can cover much more territory with the same personnel and equipment in highly connected street networks.

Charlotte, North Carolina periodically examines emergency response coverage areas in three neighborhood types, with varying levels of street connectivity. They found that a fire station in the most interconnected neighborhood could provide service to more than three times as many commercial and residential units as could a station in the least connected neighborhood (Charlotte, NC Fire Department, 2013). Figures 3 and 4 illustrate their research. Both show the access shed within 2.5 linear centerline miles from the station. On the disconnected streets in Area 17, this access shed is only 2.8 square miles in size, while on the connected streets of Area 15 the access shed is 5.5 square miles in size.

Advocates for healthier streets favor connected streets because they spread traffic and reduce the necessity for multi-lane streets. Two-lane streets operate slower, are more comfortable to ride a bicycle on, and are easier and safer for pedestrians to cross. They also provide much more direct access and shorten distances from origins to destinations than less connected street networks. This makes walking and bicycling more convenient, and it shortens walking distance to transit stops.

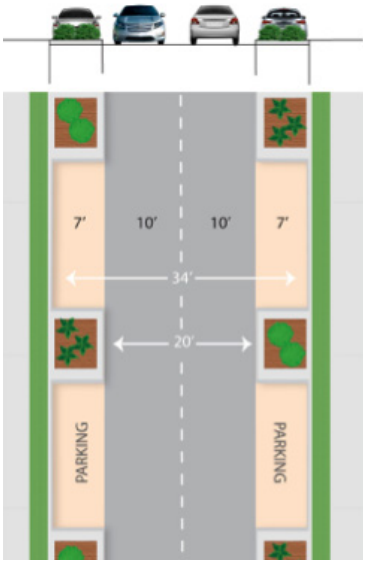
Street Design

Five street design techniques accommodate emergency access while slowing traffic:

- Parking placement strategies
- Mountable curbs
- Use of surface materials and paint
- Roundabouts
- Appropriate use of traffic calming measures

Parking Placement Strategies

Some parking placement strategies maintain the 20-foot clearance required by the IFC, and also can slow traffic. They include the following:



Inset parking. Credit: Michele Weisbart.

Inset parking. Extending curbs out midblock and at intersections insets parking and can make the street feel narrow. With the curb extended the width of the parking lane, the street width can be as narrow as 20 feet where these curbs exist.

Valley gutters. Valley gutters lay between the parking and travel lanes, causing the street and parking to slope towards one another. This narrows the feel of the street.

Fire hydrants and parking. Prohibiting parking and extending the curb at fire hydrants can create extra space to maneuver and access the hydrants.

Parking on one side of the street. Permitting parking on only one side of the street allows the streets to be constructed to as narrow as 27 feet while preserving 20 feet of clearance. Where parking utilization rates are low, parking can be permitted on both sides of streets narrower than 36 feet while still maintaining emergency access.

Mountable Curbs

Mountable curbs rise up from the street a few inches. They discourage most motorists from driving on them, but allow trucks and buses to drive over them if need be. Mountable curbs can be placed on any street feature that constrains the navigable width for emergency vehicles: curb extensions, roundabouts, traffic circles, medians, or islands.

Use of Surface Materials and Paint

Use of surface materials. Varying surface materials and colors visually narrow the feel of a street, yet allow for emergency vehicles to drive on them. These can be used on the sides of streets, for parking lanes and as curbless medians. In Seattle's High Point neighborhood alleys have 20 feet of clearance with 16 feet of pavement.



Valley gutters (red area). Credit: Ryan Snyder.



Mountable curb. Credit: Ryan Snyder.



Calming with street materials. Credit: Ryan Snyder.

Bike lanes. On-street bike lanes not only accommodate bicyclists, they provide separation between motor vehicles and pedestrians. Coloring bike lanes between the white stripes narrows the feel of the street. Bike lanes also provide extra space for emergency vehicles to operate and create larger turning radii at intersections.

Roundabouts

Roundabouts reduce intersection delays while simultaneously slowing motor vehicles. Where roundabouts replace traffic signals average travel time can be reduced. Although they slow vehicles at the intersection, they also reduce delay and make travel speeds steadier.

Appropriate Use of Traffic Calming Measures

Walkable Communities and the Local Government Commission produced a detailed book called Emergency Response: Traffic Calming and Traditional Neighborhood Streets (Burden and Zykofsky, 2001). The book provides guidance on where to use which type of traffic calming measures and the pros and cons related to emergency access. Recommendations of the book include:

- Cities with the most effective traffic calming rely on active partnerships between residents, engineers, policymakers and emergency response personnel.
- Traffic calming can increase response time, but need not do so if carefully planned. If combined with removal of some stop signs, traffic calming can reduce response time.

- Speed humps shouldn't be used on primary emergency response routes. They can damage ladders, cabinets and other equipment and accessories. Some firefighters have been injured while fire trucks drove over speed humps.
- Speed tables, sometimes called raised sidewalks, are preferred over speed humps since they impede emergency equipment and access less than speed humps while providing significant calming benefits.
- Roundabouts and mini traffic circles generally speed emergency access while calming traffic. They eliminate the queues often experienced at stop and signal-controlled intersections.
- Well-designed curb extensions at intersections prohibit motor vehicle parking and do not hinder access or turning. They generally aid emergency access. Where delay occurs, it is usually minor.
- Chicanes, humps and tables should not be placed along major emergency access routes. Visual and linear traffic control measures, on the other hand, such as gateways, medians, landscaping, colored bike lanes and similar measures, have no negative impact on emergency responders.
- Traffic calming has significant safety benefit. Seattle neighborhoods have seen a 93% reduction in crashes along streets with traffic calming.
- Street closures can greatly impact emergency access and response time. Any closures should retain access by emergency vehicles, pedestrians and bicyclists.
- Stop signs are not traffic calming. They increase response time and are often overused. Replacing stop signs with mini traffic circles, roundabouts, raised intersections or curb extensions can improve response time while slowing traffic.
- Speed pillows can effectively slow traffic, yet do not impede emergency access. They provide a good substitute for speed humps.
- Medians and landscaping can calm traffic without impacting response time.

Land Use Controls

There are several land use controls that can improve emergency access without relying upon wide, fast, clear streets. Controlling building height and requiring setbacks can improve access for fire vehicles and reduce or eliminate the need for aerial ladder trucks. Land use measures can also address issues of tree spacing, height, etc. Limiting development in high-hazard areas reduces the need for emergency services. Coastal and wetlands preservation laws limit development in areas that are prone to hurricanes and floods. Urban growth boundaries, urban limit lines, open space preserves and clear boundaries between communities create defensible fire lines and allow for greater use of controlled burns. The Mid-Peninsula Regional Open Space District in Northern California practices controlled burns in open space preserves. Oregon, Tennessee, and Sonoma and Ventura counties in California have all enacted urban growth boundaries or urban limit lines.

Sprinkler Requirements

Sprinklers in buildings can significantly reduce the intensity of fires as well as allow firefighters more time to arrive before fires grow out of control. Further, it takes water flows of 1,687 gallons per minute to extinguish fires in buildings that have sprinklers, while buildings without sprinklers need a spray of 6,750 gallons per minute, nearly a fourfold increase (Congress for the New Urbanism, 2009).

EMERGENCY ACCESS BEST PRACTICES

Emergency responders want the streets on which they will drive fire apparatus to have certain minimum dimensions for two major reasons: (1) firefighters and other emergency responders need to be able to reach the emergency quickly, and (2) when at the scene of the incident, they require enough room to deploy equipment and fight fires. The amount of room they need to respond to any given in-

cident depends on what kind of equipment the responders will be deploying.

Background

Types of Incidents

In the United States, fire departments and other emergency responders often handle a wide range of fire and rescue missions. Depending on the department, these may include:

- Medical emergencies, such as heart attacks and strokes
- Road crashes, which may require the use of extrication equipment such as the "Jaws of Life"
- Fires in low-rise structures that require only ground ladders for the response
- Fires in mid-rise and high-rise structures, which firefighters will fight with a combination of both aerial ladder trucks and other tactics
- Wildfires and rescue operations ranging from swift water rescue to mountain rescue to avalanche rescue

Nearly 2/3 (65%) of fire department calls across the United States are for medical aid. Only 5% are for fires. The remainder are for mutual aid (4%), hazardous materials (2%) and other hazardous responses (1%). About 8% are false alarms, and 14% are classified as "other" (Karter, 2010). These statistics vary from community to community. The Los Angeles County Fire Department reports that 72% of their calls are for emergency medical services and less than 3% are for fires. (Los Angeles County Fire Department, 2011)

Mutual Aid Obligations

Most fire departments have mutual aid obligations that require them to respond to fires in other communities. This means that most fire departments have to respond to fires that may take place in communities with different types of streets and terrain, sometimes in hillside and woodland communities with narrow streets, even if such streets do not exist in their own community. So they need vehicles



Charlotte, NC Fire Heavy Rescue firefighter opens roll-up cabinet doors. Credit: Patrick Siegman.



Charlotte, NC Fire Heavy Rescue truck with roll-up cabinet doors. Credit: Patrick Siegman.

that can respond to various situations. This may necessitate those departments purchasing fire engines and trucks that can access narrow streets and traffic calmed streets.

Equipment Best Practices

Being mindful of street limitations when equipment is purchased can enable firefighters to perform their necessary functions on slower and narrower streets. The following lists equipment strategies that work more adeptly on narrower and slower streets.

Retrieving Equipment from Side Compartments

Many departments which respond to incidents in neighborhoods with smaller streets choose roll-up doors for the equipment compartments on their vehicles. The adjacent photo shows a heavy rescue truck used by the Charlotte, NC Fire Department with roll up doors. Other fire engines and trucks, however, are equipped with swing-out doors, which require more room for the firefighters working around the vehicle.

Ground Ladder Retrieval

Some departments, such as the San Francisco Fire Department, keep ground ladders attached to the sides of fire engines, and retrieve them manually. Other departments use motorized ladder racks. These racks typically





San Francisco fire engines with ground ladders and side-mount pumps. Credit: Patrick Siegman.

keep the ground ladders stored on top of the vehicle, and swing down the sides of the vehicle to bring them within the reach of firefighters. Motorized ladder racks typically require more clearance room at the side of the fire engine.

Deploying Stabilizers for Aerial Ladder Trucks

Some American fire departments use aerial ladder trucks that require 19' of width to fully deploy the truck's stabilizers. Other departments, particularly those in older communities with many narrow streets, use ladder trucks with stabilizers that fully deploy in less than 15 feet of width, and which can be short jacked (i.e., deployed at less than full width, or fully extended on just one side of the fire truck) within a width of less than 9 feet. For example, Nantucket, Massachusetts, has purchased a Rosenbauer Raptor ladder truck with stabilizers that have a maximum spread of 14 feet 9 inches when fully deployed, and which occupy 8 feet 3 inches of width when short jacked.

Connecting Fire Hoses to Pumps on Side-Mount Versus Rear-Mount Pumpers

Many American fire departments use fire engines (also known as pumpers) with side-mount pumps. Firefighters using a fire engine with side-mount pumps must have room to work beside the engine to connect hoses, and fire hoses charged with water must then have room to run from the pump to wherever the hose is being deployed. However, as



Side-mount pumper, Daytona, FL. Credit: Oshkosh Corporation.

described in recent articles in Fire Chief (Cavette, 2008) and Fire Apparatus Magazine (Petrillo, 2011), rear-mount pumpers are growing in popularity among American fire departments. On rear-mount pumpers, fire hoses are attached at the rear of the vehicle, making it substantially easier for firefighters to connect hoses when working in close quarters.

Purchasing an Appropriate Fleet of Vehicles

As mentioned above, a majority of emergency calls serve medical purposes. A relatively small portion of calls responds to actual fires. Fire departments can purchase more ambulances. Ambulances are smaller and can more easily navigate through skinny streets and traffic calmed streets. Ashland, Oregon has adopted this practice. Their normal dispatch practice sends ambulances to medical emergencies not involving vehicle crashes. They send both ambulances and fire engines to motor vehicle crashes in case of fire or need to evacuate.

Fire Trucks

Most fire departments custom order new trucks. In newer American cities, fire apparatus is sometimes chosen on the assumption that all streets will be wide, and that many streets will be cul-de-sacs. By contrast, in older cities and towns, whether in Europe or the United States, fire apparatus and emergency response tactics are often adapted to handle the many existing narrow streets in these communities. Many older cities, such as Boston, San Francisco, Seattle, and many others, have hundreds of blocks of narrow streets. In these cities it is common to find local streets that have just 10 feet to 14 feet of clear width between parked vehicles, since these were typical dimensions for local streets in the United States before World War II. Fire departments in these communities typically purchase vehicles and adopt tactics that allow them to function effectively on these existing streets. Milwaukee, Wisconsin purchased fire engines specifically for older neighborhoods that have excellent turning radii. Piedmont, California ordered highly maneuverable fire engines for use in responding to fires on

existing narrow streets in hillside neighborhoods. Departments that respond to fires and emergencies in rural and wilderness areas—especially in rugged mountain and forest terrain—often purchase vehicles that are designed to handle narrow, windy roads and tracks.

By contrast, fire departments in new communities may have few or no streets with less than 20 feet of clear width, and may have chosen all of their fire apparatus on the assumption that they would be responding to emergencies only on these wide streets. When communities are planning their street designs and their fire equipment purchases, it is essential that they consider the interaction between the two.

If a community already has many blocks of neighborhood streets with less than 20 feet of clear width, then it is likely that the fire department already has the fire apparatus, staff, training and equipment needed to handle these streets. In this situation, using similar street dimensions in a new neighborhood in that community usually poses no new challenges for the fire department. On the other hand, if a new neighborhood with narrow streets is planned for a community where the department has little or no experience with firefighting on similar streets, then greater care is required. In this situation, either (1) the streets need to be adapted to the fire department's current equipment, or (2)new equipment will need to be purchased. Given the expense involved in purchasing new equipment, and the relatively long equipment replacement cycles in many communities, communities may need to adopt both short-term and long-term strategies. In the short term, use only street designs and traffic calming measures which accommodate the needs of current equipment, and in the long-term, purchase new equipment that is more maneuverable and adaptable. The most maneuverable equipment in the existing fleet can be prioritized for use in neighborhoods that have designs for slower streets.

COLLAB-ORATION

Greater collaboration between fire departments and transportation, planning and health departments offers significant potential to maintain expedient emergency access while designing healthier, safer, more livable streets. Too often these departments operate in silos and proceed without considering multiple objectives. The International Fire Code has taken important aspects of street design out of the hands of the people that know street design for the purpose of maintaining rapid response times. While few would argue against the value of rapid emergency response, street design affects other important community goals that are compromised when we focus only on emergency response. By working together, communities can design streets that meet a variety of community goals.

EXAMPLES OF SUCCESSFUL COLLABORATIVE PROCESSES

Collaborative exercises are underway in different communities throughout the US. The Congress for the New Urbanism (CNU) Emergency Response and Street Design Initiative has been the most notable. In 2007 CNU partnered with the US Environmental Protection Agency and fire marshals from across the country to reconcile the growing desire for appropriately sized streets with the needs of emergency responders. To inaugurate the process, urban planners, transportation engineers and fire marshals convened in a workshop in Austin, Texas. Neil Lipski, former Deputy Fire Chief of Milwaukee, Wisconsin teamed with transportation engineer Peter Swift to draft a new section of the Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities street manual. The project team also drafted proposed recommendations to the International Fire Code to empower local jurisdictions with flexibility on the requirement for 20 feet of clear space on streets. The proposal went to the International Code Council and was rejected. However, the effort set the stage for greater collaboration.

The Local Government Commission organized and facilitated many workshops around the country. They typically covered topics including:

- Street networks
- Culs-de-sac
- Conflicts between fire codes and street manuals
- Fire fighting in existing neighborhoods with narrow streets
- Street width and traffic safety
- Building design
- Performance standards

The workshops also convene work groups that mix emergency responders with planners and advocates for safe streets to identify common ground, as well as areas of disagreement.

Workshops were conducted at several New Partners for Smart Growth conferences. Special daylong workshops with fire marshals and planners were held with the Los Angeles County Fire Department, the Orange County Fire Agency and the Petaluma Fire Department.

The Local Government Commission wrote up case studies in Seattle, Memphis and Hercules, California (Tracy, 2007).

- The High Point development project in Seattle, Washington was a national model in sustainable drainage design as well as healthy street design. Some residential streets in High Point are 25 feet wide. The fire marshal signed off on the street designs partially due to the well-connected street network.
- Hercules, California adopted a form-based code for its Waterfront District. The code includes 26-foot wide streets with parking on one side and edge drives that are only 19 feet wide. This agreement was reached between the fire department and Redevelopment Agency after the plan required sprinklers in the single-family housing units.
- The Harbor Town development project in Memphis, Tennessee presents an excellent example of collab-

oration between developers, fire officials and city planners. The developers wanted to replicate the old neighborhoods in Memphis that have small homes and narrow streets. They included the Memphis Fire Department in early discussions of the project. The City Traffic Engineer couldn't agree to the narrow streets as public, so they became private with a gate and are serviced by the fire department. The fire department posseses a device to open a wide exit gate that allows them entry. This project includes streets with 28 feet of width and parking on both sides. Some streets with landscaped medians and parking on one side were designed with 18 to 20 feet between the curbs. They also negotiated and agreed upon street trees and location of utilities that allow convenient fire access.

OPPORTUNITIES FOR COLLABORATION

Ongoing collaboration involving planners, transportation engineers, emergency responders and public health officials can help bring about more consensus on street design issues. Schools, neighborhood associations and other community groups should be brought in on comprehensive planning efforts, as well as on individual projects that affect them. The specific stakeholders depend on the jurisdiction. Any planners or engineers involved with determining street design, street cross sections, intersection design and traffic calming should be included. Within the fire departments the people making policy on these same issues need to be at the table. This should include both officials from planning as well as operations. Sometimes operations emergency responders are more familiar with the practical abilities they have to maneuver their vehicles and equipment, and are able to approve street widths and designs that the fire department planners assume are unworkable.

Adopting New Street Standards

The process of adopting new street standards, whether at the state or local level, provides an excellent opportunity for emergency responders, street designers, and many other stakeholders to collaborate, because community values are encoded in street standards in so many ways. New street standards provide the opportunity to enact many of the best practices listed in this paper. In particular, states and other jurisdictions can choose to reconsider their adoption of the IFC in order to enable a more collaborative process for establishing street standards. States may also enable local jurisdictions to make local amendments to the IFC, as is the case in Nevada.

There are two notable examples where states have chosen not to adopt the IFC. Neither Oregon nor Washington requires local jurisdictions to adhere to the IFC. They permit cities to design streets with clearances of less than 20 feet. Oregon uses Neighborhood Street Design Guidelines. The Oregon Office of the State Fire Marshal, the Oregon Fire Chiefs' Association and the Oregon Fire Marshals' Association endorse these guidelines. They include street cross sections of 20 feet without on-street parking, 24 feet with parking on one side, and 28 feet with parking on both sides. The guidelines also provide for periodic breaks in parking with driveways and no parking areas, so that 20 feet is available at intermittent locations along the streets.

Comprehensive plans, such as General Plans and Mobility Plans often include street cross section designs as well as identification of primary fire access routes. Some local jurisdictions prepare separate street design standards and guidelines outside of their General Plans and Mobility Plans. Setting traffic calming policies and procedures is also at the intersection of healthy streets and emergency access. These efforts all call for collaboration.

On a project basis, new large developments that alter street cross sections, sidewalk widths and intersections create a need to work together. The project developers need to be

involved in these planning efforts along with the previously mentioned stakeholders.

Comparative Costs

When designing streets and neighborhoods, setting code requirements for buildings, establishing fire stations, purchasing firefighting equipment and vehicles, and setting staffing levels, communities must necessarily consider costs. Ideally, communities should work to consider the impact of different choices on both public sector budgets (e.g., the public works department's cost to maintain and reconstruct streets, and the fire department's costs for fire stations, equipment and staff), and the costs to citizens (e.g., the effects of code requirements and street design requirements on housing costs). Some questions to consider include the following.

Regarding fire equipment choices:

What effect will different vehicle and equipment choices have on the fire department's costs for equipment and staffing? As a rule, fire departments' costs for staffing are substantially larger than the department's costs for purchasing and maintaining equipment. As a result, one of the most significant issues for a fire department is whether a different equipment choice will increase or decrease staffing costs.

Regarding neighborhood and street designs:

- *What effect will different street network designs (e.g., disconnected networks with many cul-de-sacs versus highly connected street networks) have on the number of fire stations, fire vehicles and firefighters needed to maintain acceptable emergency response times?*
- *What effect will different neighborhood densities have on the number of fire stations, fire vehicles and firefighters needed to maintain acceptable emergency response times?*

- *What effect will different street width requirements have on the cost of housing?* Generally, the initial cost of building streets in a neighborhood is borne by homebuilders, who pass along the cost to homebuyers as part of the purchase price of the home.
- *What effect will different street widths have on the public works departments' costs to maintain streets?*

CONCLUSION

As a society we value quick response when emergencies arise. We also value health, safety from traffic crashes, livable neighborhoods, and places where people of all ages can feel comfortable walking and bicycling. Collectively, we need to reduce the use of motor vehicles to curtail energy consumption and release of GHG emissions. In order to accomplish these latter goals, we need to design streets built for human scale and activity rather than motor vehicle speed. Each community has different challenges, so collaboration between local fire departments, urban planners, transportation engineers and public health officials will be invaluable to meeting these goals.

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William & Mary Environmental Law and Policy Review

Volume 42 | Issue 2 Article 6

Bike Lanes, Not Cars: Mobility and the Legal Fight for Future Los Angeles

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Repository Citation

Ernesto Hernandez-Lopez, *Bike Lanes, Not Cars: Mobility and the Legal Fight for Future Los Angeles*, 42 Wm. & Mary Envtl. L. & Pol'y Rev. 553 (2018), https://scholarship.law.wm.edu/wmelpr/vol42/iss2/6

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BIKE LANES, NOT CARS: MOBILITY AND THE LEGAL FIGHT FOR FUTURE LOS ANGELES

ERNESTO HERNANDEZ-LOPEZ*

ABSTRACT

In 2015, the City of Los Angeles adopted the controversial Mobility Plan 2035. The Plan restructures city transportation planning by emphasizing alternatives to cars for the next twenty years. Predictably, bike lanes became its most polemic aspect. The Plan envisions dramatic increases in bike lanes throughout car-obsessed Los Angeles. This bike lane increase was challenged in court, with objectors claiming that eliminating car lanes would increase congestion and compromise air quality. These arguments are ironic, since environmental justifications typically motivate bike projects.

The Mobility Plan illustrates how law supports and challenges bike lane projects. This Article argues that although this bike lane fight regards inches and miles of road space, the fight is primarily centered on how Angelinos will live in the future. As bike advocates attain popular and policy successes, they must confront legal contests driven by car-centric interests. Los Angeles shows how city planning achievements open a path for bike lane opposition armed with city governance, environmental, transportation, and land use doctrines.

INTRODUCTION

In August of 2015, the City of Los Angeles approved the controversial new Mobility Plan 2035 ("Mobility Plan" or "Plan").[1] The City Council

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[1] Ian Lovett, *A Los Angeles Plan to Reshape the Streetscape Sets Off Fears of Gridlock*, N.Y. TIMES (Sept. 7, 2015), https://www.nytimes.com/2015/09/08/us/a-los-angeles-plan-to

enacted this wide-ranging effort to restructure how Los Angeles makes transportation and land use decisions, and it places an emphasis on alternatives to automobiles.[2] Revising the transportation elements of the city's General Plan from 1999, the Mobility Plan envisions city support for walking; transit in the form of buses, trams, and rail; bike paths and other bicycle infrastructure; and intermodal connections between these transport methods.[3] The Plan will guide Los Angeles's future decisions with an eye toward having a citywide vision implemented by 2035, in two decades. For this, the Mobility Plan anticipates increases in walking by 38%, public transit use by 56%, and bicycling by 170%.[4]

The Plan caught national attention, given Los Angeles's long-term preference for automobiles.[5] In dramatic terms, it signaled how a local government de-emphasizes a city planning default for cars. This was not necessarily unique for cities, but it was a big change in Los Angeles.[6] Unlike many cities its size in the United States and globally, Angelinos live amidst the idealized single-user car and fast-moving highway visions and the realities of gridlocked streets, traffic jammed freeways, and limited automobile parking.[7] Los Angeles is described as having a love affair with cars, a product of the city's spatial expansion in the mid-twentieth century.[8] This metropolitan development relied on government support for

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[2] L.A. DEP'T OF CITY PLANNING, MOBILITY PLAN 2035: AN ELEMENT OF THE GENERAL PLAN at 14, 31 (2015) [hereinafter MOBILITY PLAN 2035], https://planning.lacity.org/eir/CrossroadHwd/deir/files/references/A08.pdf [https://perma.cc/8RNN-T6YN].

[3] *Id.* at 13–17, 31–32.

[4] David Zahniser, *L.A. maps out sweeping transportation overhaul*, L.A. TIMES (Aug. 9, 2015), http://www.latimes.com/local/california/la-me-mobility-debate-20150809-story.html [https://perma.cc/HY2C-2B2V].

[5] Irvin Dawid, *Los Angeles' Mobility Plan 2035 Slapped with Lawsuit*, PLANETIZEN (Sept. 14, 2015), https://www.planetizen.com/node/80969/los-angeles-mobility-plan-2035-slapped-lawsuit [https://perma.cc/VKC2-97EA]; Anai Ibarra, *Latest Update on LA Mobility Plan 2035*, AARP CAL. (Feb. 29, 2016), http://states.aarp.org/read-about-the-latest-update-on-l-a-mobility-plan-2035/ [https://perma.cc/AY6F-VR5H]; Lovett, *supra* note 1; Alexander Nazaryan, *A Young Mayor's Fight to Save Los Angeles from its Gridlocked Self*, NEWSWEEK (Jan. 13, 2016), http://www.newsweek.com/2016/01/22/los-angeles-mayor-eric-garcetti-traffic-cars-gridlock-sidewalks-414912.html [https://perma.cc/Y8V6-XAT3].

[6] Lovett, *supra* note 1; Nazaryan, *supra* note 5.

[7] *See* Lovett, *supra* note 1.

[8] The Mobility Plan states that "Los Angeles' reputation as a car culture is not unfounded" this "often ignore[s] the earlier and continued presence of pedestrians, bicyclists, trains,

single-family and suburban residences, highways to move commuting residents, cheap fuel, limited clean air regulations, and booms in road construction and auto manufacturing.

One commenter speculated that through the Mobility Plan, "the world's first great automobile-oriented city could become the first city to de-orient itself from the automobile."[9] The Mobility Plan points to a dramatic shift away from city government support for automobiles through its emphasis on car alternatives and its institutional prioritization of walking, public transit, and bicycles.[10] Fully implemented, the Plan will decrease car lanes on some streets;[11] however, only ten percent of the city's major streets are targeted for these reductions.[12] As a blueprint for future planning decisions, the Plan does not directly impact freeways.

The Plan's lofty goals were challenged in courts. The non-profit organization Fix The City quickly filed a lawsuit against the city, essentially arguing that the Mobility Plan will increase traffic and decrease the quality of life for Angelinos.[13] Central to Fix The City's argument is the view that the Plan will impact the environment by slowing automobile movement.[14] Fix The City's position prioritizes automobiles and attempts to protect their access to public space, in terms of roadways and parking.[15] At the time this Article was written, this dispute has not reached trial, any decision, or settlement, but is eagerly followed by bike and transportation advocates, city planners and politicians, real estate developers, and car

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streetcars, and delivery trucks." *See* MOBILITY PLAN 2035, *supra* note 2, at 31; *see also* Christopher Hawthorne, *Mobility Plan 2035 May Be the Cornerstone of a New L.A.*, L.A. TIMES (Sept. 18, 2015), http://www.latimes.com/entertainment/arts/la-ca-cm-hawthorne-notebook-20150920-column.html [https://perma.cc/5HRV-UAX2].

[9] Josh Stephens, *Mobility plan nudges Los Angeles towards new transportation modes*, CAL. PLAN. & DEV. REP., 2015 WLNR 33577080, Oct. 2015, at 11.

[10] *See* MOBILITY PLAN 2035, *supra* note 2, at 13–17, 31–32.

[11] The Times Editorial Board, Editorial, *An L.A. Transit Plan with Vision*, L.A. TIMES (Aug. 11, 2015), http://www.latimes.com/opinion/editorials/la-ed-mobility-plan-los-angeles-20150811-story.html [https://perma.cc/5J2H-B6HT].

[12] *Id.*

[13] *See* Verified Petition for Writ of Mandate and Complaint for Injunctive Relief at ¶¶ 2, 28, Fix the City, Inc. v. City of Los Angeles, No. BS157831 (Cal. Super. Ct. L.A. Cty. Sept. 9, 2015) [hereinafter Complaint Sept. 9]; Verified Petition for Writ of Mandate and Complaint for Injunctive Relief at ¶¶ 4, 39–40, Fix the City, Inc. v. City of Los Angeles, No. BS159574 (Cal. Super. Ct. L.A. Cty. Dec. 15, 2015) [hereinafter Complaint Dec. 15].

[14] *See* David Zahniser, *Lawsuit says new L.A. streets plan creates more air pollution, not less*, L.A. TIMES (Sept. 9, 2015), http://www.latimes.com/local/lanow/la-me-ln-mobility-plan-20150908-story.html [https://perma.cc/WGU7-HMHV].

[15] *See Project: Mobility Plan 2035*, FIX THE CITY—LOS ANGELES, http://fixthecity.org/?page_id=434 [https://perma.cc/384E-SFBS] (last visited Jan. 21, 2018).

advocates. For years, transportation and land use issues have influenced Los Angeles elections, suggesting that street use politics is understood in local terms by voters and consequently by policymakers.[16] The Mobility Plan continues this.

This Article examines the Mobility Plan and the *Fix The City v. City of Los Angeles* lawsuit ("*Fix The City*") as a case study of how local government law facilitates and challenges public efforts to implement bike lanes. The Article refers to this as the "bike lane fight."[17] This inquiry is important for two reasons. First, it illustrates the significance of law in transportation and urban planning. Law determines public obligations and how physical space will be used.[18] Importantly, bike lanes and street planning encompass government choices about how to use public land.[19] Bike and public transportation advocates argue that a series of legal mechanisms make automobiles the default in urban planning priorities.[20] Land

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[16] *See* Nazaryan, *supra* note 5 (discussing survey that indicates traffic is the number one concern among Angelenos).

[17] This Article poses a general inquiry about how law informs bike lane policies, specifically proposed in the city's Mobility Plan. It does not focus on larger issues involving bike storage; bike sharing; bikes on public transport; and laws about bikes and right of way, rider signals, or helmet requirements. The article does not focus on the other mobility aspects of the Mobility Plan such as walking or public transit, other than how they support policies on bike lanes and the Plan's general approach. Similarly, this Article does not offer a normative position on how California Environmental Quality Act ("CEQA") norms or Environmental Impact Review ("EIR") procedures should resolve bike lane fights. Likewise, it does not side with Fix The City or Los Angeles in their dispute over the Mobility Plan. Instead, this Article relates biking scholarship and bike lane proposals to abstract larger lessons on local government law, local planning and bike lanes. Much of this analysis is positive and aims to benefit policy makers, advocates, and local stakeholders. For the sake of simplicity, this does not examine similar proposals by regional transit authorities, Los Angeles county, and other cities in the county.

[18] Kenneth Stahl has argued that land use doctrine motivates suburban expansion while also limiting the zoning influence of neighborhoods. *See generally* Kenneth A. Stahl, *The Suburb as a Legal Concept: The Problem of Organization and the Fate of Municipalities in American Law*, 29 CARDOZO L. REV. 1193 (2008); Kenneth A. Stahl, *Neighborhood Empowerment and the Future of the City*, 161 U. PA. L. REV. 939 (2013). Sarah Schindler finds law as incapable of regulating how physical structures promote exclusion and segregation. *See generally* Sarah Schindler, *Architectural Exclusion: Discrimination and Segregation Through Physical Design of the Built Environment*, 124 YALE L.J. 1934 (2015).

[19] *See* Ryan Seher, Comment, *I Want to Ride My Bicycle: Why and How Cities Plan for Bicycle Infrastructure*, 59 BUFF. L. REV. 585, 586–88 (2011).

[20] James Longhurst explains that the law protects bicyclists' rights but automobile drivers are protected by car culture, physics, and road design and that government policies created an American preference for cars. JAMES LONGHURST, BIKE BATTLES A HISTORY OF SHARING THE AMERICAN ROAD at 3–6, 8, 11–12, 21 (2015). Zack Furness argues that American car culture was built by laws supporting road creation, industry lobbying, real estate zoning,

use doctrine, fossil fuel and automobile industry lobbying, and housing and transportation programs guard the local terrain automobiles enjoy.[21] Law protects this privilege. This privilege appears in the form of car lanes, parking lots and regulations, residential housing, and urban development plans. However, these developments come at the expense of walkways, dedicated bus lanes, trams and subways, bike paths, bike share and bike parking infrastructure, and land devoted to high-density housing or public use. The side of the debate encompassed in the Mobility Plan idealizes bikes, public transportation, parks, and multi-unit housing. The other side of the debate, as argued by Fix The City, favors individual car use, streets and highways to freely move cars, dedicated space for parking lots, and single-unit homes.

Second, city policies reflect a new attention to addressing quality of life and public health issues.[22] With efforts like the Mobility Plan, cities justify their objectives by pointing to environmental issues.[23] This is a particularly significant policy space given challenges at the federal and global stage to tackle these harms. Moreover, cities seek to attract or keep residents by addressing problems like air quality, traffic, health, and resident mobility. In this light, the Mobility Plan does not just reflect a Los Angeles effort to look like Copenhagen, Paris, Portland, or New York, but it illustrates local government law's constitutive role in these debates.[24] As described below, in Los Angeles this specific law regards environmental and city governance doctrines.

This Article argues three points about law's role in this and future bike lane fights. First, the *Fix The City* lawsuit focuses on environmental and city governance law with these norms fueling the bike lane fight. Second, the fight transpires essentially over designations of inches and feet of space over miles of roads, but it implicates how Los Angeles will live and move in the future. Accordingly, the lawsuit challenges the city's land use determinations. Third, as biking advocacy attracts more policy attention, its accomplishments will depend on how it confronts issues such as sustainability, traffic impacts, safety, fitness, lobbying, and electoral politics. Opponents of urban bike projects will look to the legal doctrines

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automobile manufacturing, and underfunded public transportation. ZACK FURNESS, ONE LESS CA: BICYCLING AND THE POLITICS OF AUTOMOBILITY 5 (2010).

[21] *See* FURNESS, *supra* note 20.

[22] *See generally* Kenneth A. Stahl, *Local Home Rule in the Time of Globalization*, 2016 BYU L. REV. 177 (2016).

[23] *See* MOBILITY PLAN 2035, *supra* note 2, at 141–48.

[24] *See generally* CITY CYCLING (John Pucher & Ralph Buehler eds., MIT Press 2012) [hereinafter Pucher & Buehler] (discussing efforts by some of the most bike friendly cities including Copenhagen, Paris, Portland, and New York).

corresponding with these issues when challenging bike lanes. In Los Angeles, state environmental law fuels opposition to city land use designations, implicit in bike lane and Mobility Plan projects. For future bike plans to succeed, bike advocates will have to address norms sourced in governance, environmental, transportation, and land use doctrines, at private, local, state, special district, and federal levels. Los Angeles biking experiments show how when projects move beyond traditional legal bike issues, like "right to bike" and "right of way," they run into opposition fueled by city governance and the California Environmental Quality Act ("CEQA") doctrines.[25] Meanwhile many non-biking issues, such as delays by California in issuing CEQA regulations and the Mobility Plan's comprehensive scope, implicitly help bike lane opposition.

These three points illustrate the challenges cities face when they try to implement more bike lanes. The challenge is that on the one hand, lanes are easier to achieve politically with more comprehensive transit projects like LA's Mobility Plan; however, on the other hand, this political success creates a legal risk with ensuing lawsuits. Since the Mobility Plan was approved, bike lane opposition armed with legal action has begun to destabilize political support in Los Angeles for bike lanes. Los Angeles's opposition has focused on "road diets" and traffic, but in other cities or in the future, opposition could focus on other bike infrastructures like signage, bike sharing, or bike storage. Many local governments have had to face legal obstacles and popular opposition to bike lane projects.[26]

LA's bike lane fight is over public space, attempting to shift away from government support for cars, the usual default position.[27] To describe this, the Article looks to recent scholarship on biking policies. This

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[25] *See* Liam Dillon, *Want a bike lane in your neighborhood? It's not so simple in California*, L.A. TIMES (Apr. 7, 2016), http://www.latimes.com/politics/la-pol-sac-enviro-bike-lanes-20160407-story.html [https://perma.cc/Z86J-J59Q].

[26] *See* Luke Broadwater & Yvonne Wenger, *Bikemore drops lawsuit after city pledges not to demolish Canton bike lane*, BALT. SUN (June 28, 2017), http://www.baltimoresun.com/news/maryland/baltimore-city/politics/bs-md-ci-bike-lane-settlement-20170628-story.html [https://perma.cc/F74P-U3JF]; Selina Cheah, *Prospect Park West bike lane antagonists finally drop lawsuit,* CURBED N.Y. (Sept. 28, 2016), https://ny.curbed.com/2016/9/28/13098378/ prospect-park-west-bike-lane-lawsuit-dropped [https://perma.cc/9DLE-9JVA]; Lolly Bowean, *Homeless advocacy group seeks to stop eviction of Uptown tent city*, CHIG. TRIBUNE (Aug. 29, 2017), http://www.chicagotribune.com/news/local/breaking/ct-viaduct-homeless-met-0829-20170828-story.html [https://perma.cc/3DWU-CMY5]; Bill Chappel, *Family Trust Wins Supreme Court Fight Against Bike Trail*, NPR (Mar. 10, 2014), https://www.npr.org/sections/thetwo-way/2014/03/10/288584936/family-trust-wins-supreme-court-fight-against-bike-trail [https://perma.cc/ZL3P-DDE5].

[27] *See* LONGHURST, *supra* note 20.

scholarship offers a history of bike rights in the United States,[28] cultural analysis of biking as a political act,[29] comparative examination of efforts to increase urban biking,[30] and history of recent transportation developments in New York City.[31] These perspectives help contextualize how law shapes the Mobility Plan's bike lane fight, which is part of a larger contest about the future of Los Angeles. These perspectives represent just a small part of the growing law,[32] scholarly,[33] policy perspective,[34] planning,[35] and news literature[36] on biking. This Article uses a law and policy lens to make

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[28] *Id.*

[29] FURNESS, *supra* note 20, at 1–2, 5.

[30] *See* Pucher & Buehler, *supra* note 24.

[31] JANETTE SADIK-KHAN & SETH SOLOMONOW, STREETFIGHT: HANDBOOK FOR AN URBAN REVOLUTION (2016).

[32] For examples of recent legal scholarship on biking issues see Jason J. Czarnezki, *New York City Rules! Regulatory Models for Environmental and Public Health,* 66 HASTINGS L.J. 1621 (2015); Daniel B. Rodriguez & Nadav Shoked, *Comparative Local Government Law in Motion: How Different Local Government Law Regimes Affect Global Cities' Bike Share Plans*, 42 FORDHAM URB. L.J. 123 (2014); Franklyn P. Salimbene, *Seeking Peaceful Coexistence: Streetcars and Bicycles in the New Urban Environment*, 7 WAKE FOREST J.L. & POL'Y 365 (2017); Ken McLeod, *Bicycle Laws in the United States—Past, Present, and Future*, 42 FORDHAM URB. L.J. 869 (2015); Colleen Maker, *Strict Liability in Cycling Laws to Ready the Roads for Environmentally Friendly Commuting*, 42 B.C. ENVTL. AFF. L. REV. 473 (2015); Seher, *supra* note 19; Bruce Epperson, *The Great Schism: Federal Bicycle Safety Regulation and the Unraveling of American Bicycle Planning*, 37 TRANSP. L.J. 73 (2010); César Garcia Hernández, *Ready or Not, the Velorution Has Arrived: Critical Mass—An Experiment in Democracy*, 8 LOY. J. PUB. INT. LAW 133 (2007); Alexandra Flynn, *Regulating Critical Mass: Performativity and City Streets*, 37 W.R.L.S.I. 98 (2016).

[33] *See* LUIS A. VIVANCO, RECONSIDERING THE BICYCLE (2013) (providing an anthropological view, historic and comparative, of how bicycles change notions of mobility in cities); STEVEN FLEMING, CYCLE SPACE (2012) (describing how cyclists based on riding experience view different cities throughout the globe); BRUCE D. EPPERSON, BICYCLES IN AMERICAN HIGHWAY PLANNING (2014) (offering a history of how cyclists preferred riding on highways and how this influenced resistance to bike lanes on roads).

[34] JEFF MAPES, PEDALING REVOLUTION (2009) (offering a local politics journalist's perspective on how health, fitness, and social benefits are pushing riders and cities to change urban living).

[35] *See*, *e.g.*, Ann Forsyth & Kevin Krizek, *Urban Design: Is There a Distinctive View from the Bicycle?*, 16 J. URB. DESIGN 531 (2011); Hilda Blanco et al., *Hot, Congested, Crowded and Diverse: Emerging Research Agendas in Planning*, 71 PROGRESS PLAN. 153 (2009).

[36] *See* Matthew Shaer, *Not Quite Copenhagen: Is New York too New York for bike lanes?*, N.Y. MAG. (Mar. 20, 2011), http://nymag.com/news/features/bike-wars-2011-3/ [https://perma.cc/3BEP-TWBZ]; Niall McCarthy, *Which U.S. Cities Have the Most Bike Lanes?*, FORBES (Sept. 26, 2014), https://www.forbes.com/sites/niallmccarthy/2014/09/26/which-u-s-cities-have-the-most-bike-lanes-infographic/#7b04850c7d7a [https://perma.cc/NPC6-GFR6]; Maria Konnikova, *Cars vs. Bikes vs. Pedestrians*, NEW YORKER (Nov. 5, 2015), https://www.newyorker.com/science/maria-konnikova/cars-vs-bikes-vs-pedestrians [https://perma.cc/67GW-TUHH].

sense of law's role in a city government effort to shift its planning support from automobiles to bikes.

To identify this role, this Article focuses on bike lanes in the Mobility Plan, while not examining its walking, public transportation, and bike share objectives. This Article refers to bike paths and bike lanes as the same choice made by a government to protect the public space or to highlight the use of a road by bicycles.[37] Technically, city planners use different designations including bike paths, bike lanes, and various other separations.[38] These classifications demarcate what public space is exclusive, protected, reserved, or accessible for bikes or shared by bicycles, vehicles, and buses.[39] At times these infrastructure demarcations focus on paths in parks or lanes in urban streets. But for the sake of simplicity to make the larger point about legal support for bicycles on Los Angeles streets and future life in the city, this Article uses bike paths and bike lanes as synonymous, even if this is technically inaccurate. For this Article, bike lanes and bike paths refer to space devoted on a road or separate from the road for use by a bicycle, where automobiles are not allowed exclusive use. A similar case study could focus on different transportation means of the Mobility Plan, but for the sake of simplicity, this Article focuses on bike lanes, policy decisions, and law's role in how these two meet.

This Article's focus on bike lanes in Los Angeles takes inspiration from two strains of scholarly thought regarding Los Angeles. These include contests about public land use regarding car parking and sidewalks and how the city's geographic sprawl reflects larger socio-economic, cultural, and political challenges. In *The High Cost of Free Parking*, Donald Shoup argues that when cities provide free streetside car parking, they indirectly subsidizes car use, pushing people away from public transit and increasing the costs for goods and services that rely on automobiles.[40] This viewpoint has been applied to examine recent housing challenges in Los Angeles.[41] In *Sidewalks: Conflict and Negotiation over Public Space*, Anastasia Loukaitou-Sideris and Renia Ehrenfeucht illustrate how local

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[37] L.A. DEPT. OF CITY PLANNING, CITY OF LOS ANGELES COMPLETE STREETS DESIGN GUIDE 120–32 (2015), https://planning.lacity.org/documents/policy/CompleteStreetDesignGuide.pdf [https://perma.cc/WV9S-VBMB] [hereinafter COMPLETE STREETS DESIGN GUIDE]; MOBILITY PLAN 2035, *supra* note 2, at 83.

[38] *Id.*

[39] *Id.*

[40] DONALD C. SHOUP, THE HIGH COST OF FREE PARKING (2005).

[41] Michael Manville, Alex Beata, & Donald Shoup, *Turning Housing into Driving: Parking Requirements and Density in Los Angeles and New York*, 42 HOUSING POLICY DEBATE 350 (2013).

regulation of sidewalks, usually assumed as minimal terrain, illustrates what localities prioritize, whether it is pedestrian mobility, abutting property owners interests, or other factors.[42] This Article applies a similar approach to the bike lanes. Like with sidewalks and parking spaces, the struggle to implement bike lanes in Los Angeles demonstrates how a local planning default for cars has traffic and environmental impacts. Fix The City's legal position is made from an ideological dashboard that assumes that automobiles should be protected from any limits on their road use.

Similarly, bike lanes have the potential to recreate urban geography in Los Angeles. Scholars of Los Angeles have emphasized how its layout, often criticized as unplanned and endless sprawling, is structured to meet socio-economic and cultural objectives, such as mid-century suburban housing, discrimination, and industrial needs.[43] The "LA School" argues that urban geography is not neutral and often suits private industry, racist, classist, and social control goals.[44] LA School authors see actual locations as important actors in socio-economic change. Locations and physical settings are intentionally utilized to benefit public and private interests. This Article argues that bike lanes and the Mobility Plan reflect a bold political attempt to modify the city's geography and that opposition emphasizes the privilege cars enjoy for roads and city mindsets. The heated and repeated fights over feet of road space, for bikes or cars, reflect what Edward Soja calls a "spatial-justice" dispute.[45]

Part I of the Article focuses on the Mobility Plan describing its basics and how it seeks to reallocate road use to increase bike paths. Part II presents the legal arguments in the *Fix The City* dispute. Fix The City argues that deprioritizing car lanes on roads has a negative impact on the environment, and that as such, the Mobility Plan should not have been approved.[46] In doctrinal terms, the dispute regards environmental law and city governance claims. Part III applies analysis from bicycling scholarship

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[42] RENIA EHRENFEUCHT & ANASTASIA LOUKAITOU-SIDERIS, SIDEWALKS: CONFLICT AND NEGOTIATION OVER PUBLIC SPACE (MIT Press, 2009).

[43] For examples of these studies, *see* REYNER BANHAM, LOS ANGELES: THE ARCHITECTURE OF FOUR ECOLOGIES (2nd ed., 2009); GREGORY HISE, MAGNETIC LOS ANGELES: PLANNING THE TWENTIETH-CENTURY METROPOLIS (1999); WILLIAM B. FULTON, THE RELUCTANT METROPOLIS: THE POLITICS OF URBAN GROWTH IN LOS ANGELES (1997).

[44] For descriptions of the LA School, *see* Michael Dear, *Los Angeles and the Chicago School: Invitation to Debate*, 1 CITY AND COMMUNITY 1 (March, 2002); Walter J. Nicholls, *The Los Angeles School: Difference, Politics, City*, 35 INT'L JOURNAL OF URBAN AND REGIONAL RESH. 189 (January, 2011); Michael Dear & Nicholas Dahmann, *Urban Politics and the Los Angeles School of Urbanism*, 44 URBAN AFFAIRS REV. 266–79 (2008).

[45] EDWARD SOJA, SEEKING SPATIAL JUSTICE (Univ. Minnesota Press, 2010).

[46] Zahniser, *supra* note 4.

to make sense of LA's bike lane fight. Part IV abstracts law and policy lessons from Los Angeles to apply in other cities, referring to approaches to bikes as vehicles and the policy privilege automobiles enjoy. The Article's methodology examines city planning reports, court papers in the *Fix The City* lawsuit, and cycling scholarship from history, cultural studies, urban planning, and transportation disciplines. This qualitative analysis identifies law's role in Los Angeles's ongoing bike lane fight. Ideally, it will guide future bike lane fights in other metropolitan governments.

I. THE MOBILITY PLAN DRIVES CARS AWAY FROM A TRANSPORTATION DEFAULT

Distributed as a two-hundred-page document for public reading, the Mobility Plan is a comprehensive revision of the 1999 City of Los Angeles Transportation Element of the General Plan.[47] Sixteen years earlier, the city's main mobility focus was to prioritize cars moving as quickly as possible, often by widening streets at the expense of walking and other transportation means.[48] Since then, public transit and bike ridership have increased in Los Angeles.[49] The Mobility Plan offers a policy foundation guiding transport decisions through 2035. It aims to achieve a transportation system that takes into account the needs of all road users.[50] Specifically, this is done with new goals, objectives, and policies. The Mobility Plan lays out a strategy for city authorities to determine how streets will be used.[51] The city's Planning Department is charged with implementing this vision.[52] This vision includes 117 miles of bus-only lanes, 120 miles of bus-only lanes during rush hour, 300 miles of protected bicycle lanes, and traffic calming measures.[53] Moreover, this plan is formulated to work with nine other local transportation plans from the county, transportation agencies, and the region.[54] The city's prior 2010 Bicycle Plan was incorporated into the Mobility Plan in order to seek multimodal goals with future walking, public transit, and biking plans interconnected.[55]

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[47] California law requires a city's General Plan to provide concrete direction on at least seven elements which are internally consistent, including transportation, housing, conservation, open space, noise, and safety. MOBILITY PLAN 2035, *supra* note 2, at 16.
[48] *Id.* at 31.
[49] *Id.* at 44.
[50] *Id.* at 13.
[51] *Id.* at 17.
[52] *Id.*
[53] Zahniser, *supra* note 4.
[54] Stephens, *supra* note 9.
[55] MOBILITY PLAN 2035, *supra* note 2, at 15.

As a blueprint for future city planning choices, the Mobility Plan articulates its forward-looking vision with five goals: 1) Safety First; 2) World-Class Infrastructure; 3) Access for all Angelinos; 4) Collaboration, Communication, and Informed Choices; and 5) Clean Environments and Healthy Communities.[56] These five goals structure the Plan's chapters. The Plan is supplemented with an Introduction, Action Plan with multiple network maps and 160 relevant city programs, and appendices.[57] Each of the Mobility Plan's goals contains objectives, used as targets, to measure implementation progress. Each goal describes specific policies to strategize how the objectives are enacted and goals eventually reached. In sum, goals refer to a future condition the plan envisions.[58] Objectives serve as aspirational measurements to reach goals. Policies provide a clear course of action for decision makers. Describing a series of maps and programs, the Action Plan presents methods to prioritize implementation taking into account costs, resources, feasibility, and the discretionary nature of most policies.[59]

The Mobility Plan's purpose is to guide future development of the city's transportation system by maximizing efficient use of infrastructure, employing advanced technology, reducing vehicle trips, and focusing on proximity to public transit.[60] It provides a blueprint for later projects to be proposed and then implemented, and it is designed to meet changing mobility, air quality, and health challenges in Los Angeles. An important aspect of the Plan is having different modes of transportation linked with "first-mile and last-mile solutions," which facilitate getting people out of their cars with easy ways to use transit close to their homes and work, a distance that is usually only a mile.[61] With this comprehensive approach, the Mobility Plan correlates what is usually seen as transportation questions, regarding bus routes or road size, with larger issues about health and safety, access to city services and public space, environmental and air quality concerns, and support for the local economy. As proposed and adopted, the Mobility Plan is aspirational and suggests road changes and various other programs in the future. Each later project has to be implemented and often this requires public outreach, education and feedback, and studying the impacts of potential projects by neighborhood planning and public safety officials.[62]

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[56] *Id.* at 13.
[57] *Id.* at 7.
[58] *Id.* at 15.
[59] *Id.* at 15–16.
[60] *Id.* at 13–14, 17.
[61] MOBILITY PLAN 2035, *supra* note 2, at 92, 106.
[62] The Times Editorial Board, *supra* note 11; Zahniser, *supra* note 4.

The Mobility Plan refers to two general perspectives that spur most of its controversy: "complete streets"[63] and reducing car trips.[64] The complete streets approach seeks to accommodate multiple users of streets versus streets used just by cars, trucks, and buses. Examples of complete streets use a combination of widened sidewalks and cross walks, different kinds of bike paths, bus lanes, street level shopping, and benches and greenery. With complete streets, roads have utility in addition to automobiles. In 2008, California passed the Complete Streets Act which requires that cities consider the needs of all transportation users.[65] This act requires localities to plan for multimodal transportation for the needs of "all users of streets, roads, and highways" including "motorists, pedestrians, bicyclists, children, persons with disabilities, seniors, movers of commercial goods, and users of public transportation."[66]

The Mobility Plan has been described as applying complete streets approaches to the entire city's street grid. This starts with the premise that built-out cities should not widen streets anymore.[67]

Complete street approaches emphasize use of streets by various transportation methods (not just cars) and connections between different modes of travel.[68] The focus is to not only make streets more inviting and used, but also to have a policy vision shared by agencies that work with roads and specific steps to implement these policies.[69] One organization that is advocating for complete streets is the National Complete Streets Campaign.[70] Improvements in health, recreation, sustainability, and increasing street-level eating and shopping motivate many cities to develop these projects. Implementing complete streets for many cities implies challenges in terms of legal authority and lawsuits, city agency politics, stakeholder buy-in, and local legislating.[71]

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[63] COMPLETE STREETS DESIGN GUIDE, *supra* note 37, at 3.
[64] MOBILITY PLAN 2035, *supra* note 2, at 145.
[65] California Complete Streets Act of 2008, Assemb. B. 1358, 2008 Leg., 2007–2008 Sess. (Cal. 2008), 2008 Cal. Stat. 4515 (codified as amended at CAL. GOV'T CODE §§ 65040.2, 65302).
[66] MOBILITY PLAN 2035, *supra* note 2, at 13.
[67] Stephens, *supra* note 9 (quoting Seleta Reynolds, Director of L.A. Dep't of Transp.).
[68] *National Complete Streets Coalition*, *Elements of an Ideal Complete Streets Policy*, SMART GROWTH AM., https://www.smartgrowthamerica.org/app/legacy/documents/cs/policy/cs-policyelements.pdf [https://perma.cc/T69M-KTGJ](last visited Jan. 21, 2018).
[69] *Id.*
[70] *National Complete Streets Coalition*, SMART GROWTH AM., https://smartgrowthamerica.org/program/national-complete-streets-coalition/ [https://perma.cc/A4J9-XY89] (last visited Jan. 21, 2018).
[71] For a description of the diverse challenges *see* Sebastian Przbyla, Finding the Right of

The next controversial measure is that the Mobility Plan attempts to decrease congestion by reducing car trips and by facilitating other modes of transportation such as public transit, walking, or biking. The Plan states that its primary emphasis is "maximizing the efficiency of existing and proposed transportation infrastructure through advanced transportation technology, through reduction of vehicle trips, and through focusing growth in proximity to public transit."[72] The Plan's common objective is to take people out of their cars.[73] For this reason, the Mobility Plan seeks to increase sidewalks widths, add bike lanes, and dedicate transit only road lanes. This contrasts a common perspective that widening streets will lessen congestion. The Plan's approach is that transportation resources are limited and that more efficient uses would support walking, biking, and public transportation.[74] It responds to the commonly held but mistaken assumption that adding car lanes to streets, widening streets, or lessening sidewalks decreases traffic.[75] Similarly, the Plan slows down car traffic in some locations by eliminating car lanes. Slower car movement achieves added safety and can often accommodate more cars in an area.

Many of these aspects are described as implementing "road diets." These project are referred to as "road diets" because they shrink the road space reserved for moving or parked cars.[76] Road diets are criticized for contracting the space devoted for cars and this is argued to increase congestion. The Federal Highway Administration explains that the four-lane road became the norm in the United States without much engineering guidance and that many such roads had less volume than four lanes requires.[77] Supporters of road diets point to the traffic calming effect of making streets safer, the ease with which such projects can be implemented with normal road maintenance, and that public costs are limited to just painting the road.[78] The Federal Highway Administration describes

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Way: Implementing Complete Streets Programs, 33 No. 10 Zoning and Planning Law report 1, Nov. 2010.

[72] MOBILITY PLAN 2035, *supra* note 2, at 17.

[73] *Id.*

[74] *Id.* at 126.

[75] *Id.* at 94, 145.

[76] The Federal Highway Administration refers to this definition of "road diet" as removal of "travel lanes from a roadway and utilizing the space for other uses or travel modes." FED. HIGHWAY ADMIN., *Road Diet Informational Guide* at 1.1 (2014), https://safety.fhwa.dot.gov/road_diets/guidance/info_guide/ch1.cfm [https://perma.cc/6MBU-VHGY] (citing JENNIFER ROSALES, ROAD DIET HANDBOOK (2006)).

[77] *Id.* at 1.2.

[78] Eric Jaffe, *So What Exactly is a 'Road Diet'?*, CITYLAB (Sep. 12, 2014), https://www.citylab.com/design/2014/09/so-what-exactly-is-a-road-diet/379975/ [https://perma.cc/G9AB-MG9R].

road diets as "one of the transportation safety field's greatest success stories," noting experiences in small and large cities.[79] In Los Angeles, road diets have been a point of legal and popular contention, both before and after the Mobility Plan.[80] This contention is such that bike advocacy generates debate beyond biking rights, and into areas such as city governance, traffic analysis, and environmental impacts.

One way the Mobility Plan seeks to implement its street vision is by reclassifying arterial streets to permit for a variety of widths. The new classification has five arterial street categories: Boulevard I, Boulevard II, Avenue I, Avenue II, and Avenue III.[81] The previous breakdown only contained three category of roads, i.e., Major Highway Class I, Major Highway Class II, and Secondary Highway.[82] The new scheme allows for greater variations and reflects how roads are currently being used. The aim is for roads to be designed for target operating speed of automobile movement. For instance, the prior-used Secondary Highway now includes Avenue I and Avenue II. Avenue I streets are designed to be 70 feet wide and with

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[79] LIBBY THOMAS, FED. HIGHWAY ADMIN., ROAD DIET CONVERSIONS (2013), http://www.pedbikeinfo.org/cms/downloads/WhitePaper_RoadDiets_PBIC.pdf [https://perma.cc/6PPV-KV35].

[80] Catherine Liberty Feliciano, *LA City Council votes to move proposed Westwood Boulevard bike lane,* DAILY BRUIN (May 16, 2016), http://dailybruin.com/2016/05/16/la-city-council-votes-to-move-proposed-westwood-boulevard-bike-lane/ [https://perma.cc/R8FE-MAKU]; Dave Goodsmith & Ben Van Dyke, Opinion, *Despite the controversy, Silver Lake's 'Road Diet' worked*, L.A. TIMES (Sept. 29, 2016), http://www.latimes.com/opinion/livable-city/la-ol-rowena-silver-lake-road-diet-20160929-snap-story.html [https://perma.cc/4ZX7-CGS4]; Alice Walton, *Silver Lake's leads to road rage, captured on video*, L.A. TIMES (Sept. 30, 2015), http://www.latimes.com/local/lanow/la-me-ln-silver-lake-road-rage-htmlstory.html [https://perma.cc/26F4-L2B6]; Bianca Barragan, *Data Scientists Say Controversial Rowena 'Road Diet' actually worked,* CURBED (Sept. 29, 2016), https://la.curbed.com/2016/9/29/13113142/rowena-road-diet-success-data [https://perma.cc/KNQ9-HF8V]; *Is Silver Lake's Rowena Road Diet a Disaster?*, EASTSIDER (May 21, 2015), http://www.theeastsiderla.com/2015/05/is-silver-lakes-rowena-road-diet-a-disaster/ [https://perma.cc/6ASA-VEHK]; Laura J. Nelson, *L.A. Has Been Sued Again Over Traffic Lane Reductions in Playa del Rey*, L.A. TIMES (Aug. 11, 2017), http://www.latimes.com/local/lanow/la-me-ln-playa-del-rey-lawsuit-20170810-story.html [https://perma.cc/Y24C-8NFG]; Elija Chiland, *Drivers Aren't Happy About Pedestrian-Friendly Changes in Playa del Rey*, CURBED (June 7, 2017), https://la.curbed.com/2017/6/7/15758036/playa-del-rey-safe-streets-bonin-vista-del-mar-traffic [https://perma.cc/G8QV-39QU]; Matt Tinoco, *Bike Haters Can't Stop Bike Lanes Coming to Westwood and South L.A.*, LAIST (Feb. 11, 2016), http://laist.com/2016/02/11/despite_opposition_city_chooses_to.php [https://perma.cc/P7MX-SJHK]; Hoa Quach, *South LA Protestors Bach Councilman Price's Bike Proposal*, MYNEWSLA (Feb. 9, 2016), https://mynewsla.com/government/2016/02/09/south-la-protesters-bash-councilman-prices-bike-proposal/ [https://perma.cc/A2KZ-TFPQ].

[81] MOBILITY PLAN 2035, *supra* note 2, at 18–19.

[82] *Id.*

a right-of-way width of 100 feet, 1–2 lanes in each direction, sidewalks 15 feet wide, and a targeted operating speed of 35 miles per hour. While Avenue II streets are geared to less movement with a roadway width of 56 feet, right-of-way width of 86 feet, and targeted operating speed of 30 miles per hour, their number of lanes and sidewalk widths are similar to those of Avenue I streets. The street standards reflect the approach of the National Association of City Transportation Officials ("NACTO") Urban Bikeway Design Guide.[83]

Each of the Mobility Plan's five goals refers to objectives and policies specific to biking. The goal of Safety First describes many of these. These include Vision Zero, a city effort to eliminate transportation fatalities to zero by 2025; enacting speed control measures in reference to the Complete Street Design Guide; applying speed controls to school zones; and increasing female bicycle ridership.[84] Here, the Mobility Plan notes that roadway users such as walkers, children, the elderly, the mobility-impaired, and bikers can be highly vulnerable.[85] The Plan seeks to implement complete street concepts using layered network approaches, with different modes of travel operating at one location. These modes include transit, bicycle, and vehicle networks.[86] This approach also attempts to increase connectivity between transit modes. At certain locations or at specified times, these plans may prioritize a particular mode.

The policy of designing safe speeds aims to avoid traffic fatalities. Key to this policy is that streets are designed with Targeted Operating Speeds, as defined in the Complete Streets Design Guide.[87] Faster car speeds dramatically increase the likelihood of a fatality in a collision. There is an eighty percent chance of death when a vehicle travels forty miles per hour or higher, but a collision at twenty miles per hour or slower only has a five percent chance of fatality.[88] As such, layered approaches to biking and walking along with vehicles can increase safety, depending on what mode of travel the street is designed to prioritize.[89]

The Plan guides the city's mobility planning decisions in conjunction with the city's separate street safety initiative called Vision Zero. Announced by the Mayor in August of 2015, Vision Zero seeks to eliminate traffic fatalities by coordinating various local efforts such as street design,

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[83] *Id.*
[84] *Id.* at 61.
[85] *Id.* at 62.
[86] *Id.* at 63.
[87] MOBILITY PLAN 2035, *supra* note 2, at 65.
[88] *Id.*
[89] *Id.*

traffic lights, law enforcement data gathering, and others.[90] Many of the Mobility Plan's benefits, such as increasing street calming and city biking, look to Vision Zero efforts for support. Vision Zero aims to address specific Los Angeles challenges such as the second highest rate of pedestrian deaths by motor vehicles and a pedestrian fatality rate nearly four times the national average, representing more than half of all traffic collision fatalities.[91]

Vision Zero is premised on the ideas that deaths due to traffic collisions are unacceptable and that street design can contribute to unsafe streets and be utilized to reduce fatalities.[92] Vision Zero design includes traffic light coordination, vehicle speed, enforcing right of way and speed rules, and street calming such as bike lanes, greenery, and resident activity on sidewalks. Vision Zero's Action Plan was released in January of 2017, with maps and listings of which corridors and intersections carry the highest risk of collision.[93] Central to the Action Plan are statistics, also referred to the Mobility Plan, that show that there is a five percent likelihood of a death for a pedestrian hit by a car traveling twenty miles per hour, but this increases to forty five percent for cars traveling thirty miles per hour.[94] When this initiative was announced, six percent of the city's street mileage accounted for sixty five percent of pedestrian and cyclist deaths and severe injuries.[95] The initiative's goals are to reduce traffic fatalities by twenty percent by 2017 and eliminate them by 2025.[96] Its effort began in earnest in 2017 when the City allocated $27 million to fund Vision Zero projects including an essential $8.3 million for infrastructure improvements.[97] This funding was originally slated to be far less, only $3 million, before city voters approved a sales tax measure in November of

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[90] Eric Garcetti, Mayor of the City of L.A., Executive Directive No. 10 at 1–2 (2015), https://www.lamayor.org/sites/g/files/wph446/f/page/file/Mayor_Garcetti_File_Executive_Directive_10_Vision_Zero.pdf?1440454405 [https://perma.cc/YW7X-TVRB].
[91] *Id.* at 1.
[92] *See generally* Alissa Walker, *Why Do City Leaders Want to Keep LA's Streets Dangerous?*, CURBED (May 17, 2017), https://la.curbed.com/2017/5/17/15644618/vision-zero-traffic-deaths-budget-bonin-ryu [https://perma.cc/3U3W-B8BS] (describing the need for Vision Zero in Los Angeles and its funding challenges).
[93] CITY OF L.A., VISION ZERO ACTION PLAN at 18–19, 21 (2017), http://visionzero.lacity.org/wp-content/uploads/2017/04/VisionZeroActionPlan-2017.pdf [https://perma.cc/T6PM-ND9Y].
[94] Garcetti, *supra* note 90, at 2.
[95] *Id.*
[96] *Id.*
[97] Alissa Walker, *City Council votes to dedicate $27M to Vision Zero, its plan to end traffic deaths*, CURBED (May 18, 2017), https://la.curbed.com/2017/5/18/15660082/vision-zero-walking-biking-budget-bonin [https://perma.cc/7UXN-XRA6].

2016 for infrastructure.[98] Los Angeles's Vision Zero initiative is similar to efforts by cities worldwide, which have succeeded in reducing deaths for walkers and bike riders but never fully eliminated them.[99] Los Angeles Vision Zero projects like road diets and traffic calming attract much of the same public opposition as do bike lanes and other projects envisioned by the Mobility Plan.[100]

Advocates for Complete Street approaches, road diets, and bike lanes sight numerous empirical studies that essentially conclude that bike infrastructure, including bike lanes and other means like street demarcations and signage, along with slowing automobiles, lessen biking injuries, collisions, and fatalities.[101] In Los Angeles, critics of bike lanes essentially argue that they take away road use that should be devoted to cars and that planned road diets will make things worse.[102] In 2017,

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[98] *Id.*

[99] Susan Carpenter, *Inside the Audacious Plan to Eliminate Traffic Deaths in L.A.*, L.A. MAG. (Aug. 21, 2017), http://www.lamag.com/mag-features/vision-zero/ [https://perma.cc/5GKD-LKNV].

[100] *Id.*

[101] There are many examples of these studies. John Pucher and Ralph Buehler, conclude that in ten American and Canadian cities with improved biking infrastructure, for the 2000–2015 and 2005–2015 periods, there has been a reduction in cyclist crashes and serious injuries, *see* John Pucher & Ralph Buehler, *Safer Cycling Through Improved Infrastructure*, 106 AM. J. PUB. HEALTH 2171 (2016). Felipe E. Pedroso et al find that after bike infrastructure improvements in Boston during 2009–2012 the total percentage of bike accidents with injuries "diminished significantly," *see* F. E. Pedroso et al., *Bicycling Use and Cyclist Safety Following Boston's Bicycle Infrastructure Expansion, 2009–2012*, 106 AM. J. PUB. HEALTH 2171 (2016). Dave Goldsmith argues that bike collisions in Los Angeles can be predicted and their root causes identified, since the city is a world leader in open data. This proposes solutions to Vision Zero perspectives that roads designed for cars cause bike accidents. *See* Dave Goodsmith, *How we can use data to prevent cycling deaths in Los Angeles*, L.A. TIMES (Dec. 18, 2015), http://www.latimes.com/opinion/livable-city/la-ol-livable-data-prevent-cycling-deaths-20151217-htmlstory.html [https://perma.cc/8FYD-U6QP]. Harris et al. finds that bike lanes and traffic diversion makes bike riding safer by separating cyclists from cars and reducing car speeds, *see* M. Anne Harris et al., *Comparing the effects of infrastructure on bicycling injury at intersections and non-intersections using a case-crossover design*, 19 INJ. PREV. 303 (2013). Li Chen et al. finds that in New York City increases in bike lanes and the number of cyclists did not increase the number of crashes and that reduced vehicle speeds and separating cars from bikes explains this, *see* Li Chen et al., *Evaluating the Safety Effects of Bicycle Lanes in New York*, 102 AM. J. PUB. HEALTH 1120 (2012). In 2009 after reviewing a series of studies, Conor CO Reynolds et al. concluded that biking infrastructure likely reduces bike crashes and injuries and that transport engineers should develop cycling safety guidelines, *see* Conor C. Reynolds et al., *The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature*, 8 ENVTL. HEALTH 47 (2009).

[102] *See* Alexis Garcia, *L.A. Is Creating Traffic Jams to Push Commuters to Ride Bikes and*

some council members sought measures to limit bike lanes. This came after local opposition to individual bike lanes, which began in 2015, lead to lawsuits and political challenges for council members.[103] The city has on several occasions installed bike lanes after lawsuits from cyclists injuries or death, accounting for $22 million in six cases since 2014.[104]

The Mobility Plan's next objectives of a World-Class Infrastructure goal focus mostly on non-bike networks, but also include public outreach for completing bike lanes and neighborhood enhanced networks.[105] This infrastructure goal lists four kinds of policies that would include bike lanes.[106] Most obvious is policy 2.6 Bicycle Network. It describes biking as important to both long and short distances and encompasses both protected bike lanes and bike paths.[107] Bike lanes are dedicated roadways only for bicycle use, often found in parks or in open spaces. Bike paths refer to space reserved for bicycle use, whether exclusive or not, on a road that is used by other transportation modes, such as vehicles or buses. The Complete Streets Design Guide explains the various bike treatments and when they work best.[108] Importantly, it notes that many cities have increased bike ridership and lessened traffic delays by employing street calming measures such as bike lanes.[109] Biking policies support health, safety, and equity factors of mobility planning. For policy makers, these factors can be prioritized using data-driven choices, as described in policy 4.6 from Plan's chapter 4.[110] Two other infrastructure polices encompass bike lanes; the Complete Streets Design Guide and Neighborhood Enhancement Network. The Complete Streets Design Guide acts as a toolkit to design streets, aiming for safety, increased vitality, and access.[111] Bike lanes are incorporated as a mode of transportation prioritized on a street to decrease vehicle speed and to increase public access to roads. The

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Rail, REASON (Nov. 20, 2017), http://reason.com/reasontv/2017/11/20/los-angeles-war-on-commuters-road-diet [https://perma.cc/J25H-MK8T].

[103] *See* Joe Linton, *How Councilmembers Englander and Krekorian Could Respond To Collision Lawsuits*, LA STREETSBLOG (Oct. 26, 2017), https://la.streetsblog.org/2017/10/26/how-councilmembers-englander-and-krekorian-could-respond-to-collision-lawsuits/ [https://perma.cc/U62Y-E9RJ].

[104] *Id.*

[105] MOBILITY PLAN 2035, *supra* note 2, at 76.

[106] *Id.* at 77.

[107] *Id.* at 83.

[108] *Id.* at 79.

[109] *Id.* at 83.

[110] *Id.*

[111] COMPLETE STREETS DESIGN GUIDE, *supra* note 37, at 4, 210.

Neighborhood Enhancement Network seeks to do the same in locally serving streets. In both settings bike paths add to street life, calm car speeds, and reduce the need for car trips.[112]

In the Access for all Angelenos goal, the Mobility Plan describes two biking objectives. First, the Plan prioritizes proximity to biking infrastructure.[113] It states that ninety percent of households should be within one-half mile of bike lanes, bike paths, or neighborhood enhanced streets. Next, the Plan aims for half of all households to have access to bike sharing within one quarter miles. An important policy for these are "first-mile and last-mile solutions," which ensures that users have a way to get to public transit, be it a transit station or a bus stop.[114] Bike lanes and bike sharing are useful for filling this gap. This is an example of multimodal transportation planning.

The Mobility Plan's Collaboration, Communication, and Informed Choices goal seeks to inform the public, employ electronic technologies, and rely on data-based policy choices.[115] It includes the simple biking objective to implement wayfinding on all parts of the Bicycle Enhancement Network.[116] Wayfinding is the system of street signs and easy to decipher signals indicating where paths continue, connect, and turn. Most policies for this goal utilize outreach, private-public cooperation, and digital means to provide information and track mobility choices.

The Mobility Plan's Policy 4.6 Data-Driven Prioritization of Projects contains what is the most legally debated aspect of the Mobility Plan.[117] This policy explains that a "data-driven process" identifies the most impact a project can have.[118] This is important since financial resources are limited and leaders should seek to strategically prioritize improvements.[119] Projects may achieve multiple objectives and benefits, while having a wider appeal to funding sources. This policy guidance can be interpreted as framing how non-automobile modes are more attractive than automobile modes. Policy 4.6 explains that this requires "considering a wider array of data beyond vehicular throughput," which has "traditionally been the primary factor guiding transportation investments."[120]

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[112] MOBILITY PLAN 2035, *supra* note 2, at 81.
[113] *Id.* at 100.
[114] *Id.* at 106.
[115] *Id.* at 119.
[116] *Id.* at 126.
[117] *See infra* Part III notes.
[118] MOBILITY PLAN 2035, *supra* note 2, at 126.
[119] *Id.*
[120] *Id.*

By doing this, the Mobility Plan aims to change the transportation policy focus away from being a default or priority for cars. It suggests asking how a policy eliminates car trips, lessens vehicle speeds, invites public use, helps air quality or public health, and supports bikes, walking, or transit modes.[121] This is a different policy lens than asking simply how much faster or slower cars travel when a city transportation decision is made. This prioritization contained in Policy 4.6 points to the legal debate between Los Angeles and Fix The City over a host of issues, starting with how many feet cars are excluded from, but also encompassing air quality, CEQA regulations, and the benefit of lessening auto trips versus the burden of traffic calming.

This changed approach to assessing the impact of transportation programs also appears in the Clean Environments and Healthy Communities goal. Here, a central objective is to decrease Vehicle Miles Traveled ("VMT") per capita by five percent every five years to twenty percent.[122] This means that there is an aim to reduce car trips by twenty percent. Policies to enact this and other environmental objectives include sustainable transportation, VMT, and alternative metrics. Bike lanes are just one source of many sustainable transportation methods, but biking in general can only be publicly supported with data-based justifications. For this reason, the policies on VMT and metrics are so significant.

In sum, the Mobility Plan includes adding new bike lanes to Los Angeles as part of a larger project to prioritize safety and travel options for city residents, targeting about ten percent of the city's streets with lane reductions. This is part of the Plan's larger effort to balance the needs of all transportation means. As a blueprint for future transportation and urban planning city goals, the Plan guides choices on what type of projects will be implemented in the future. Its environmental benefits, produced by decreased car use, should be reflected in future environmental metrics for traffic analysis.

II. THE BIKE LANE FIGHT OVER ENVIRONMENTAL IMPACTS AND CITY GOVERNANCE

Environmental law and city governance norms frame the bike lane fight over the Mobility Plan and how Angelenos will live and move

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[121] *Id.* at 127.
[122] *Id.* at 143.

in the future. Soon after the City Council approved the Mobility Plan in 2015, Fix The City filed a lawsuit arguing that the city failed to properly take into account how the Mobility Plan would increase car congestion, causing air pollution and compromising public safety, and moreover, that the Mayor and City Planning Commission had not reviewed Plan amendments. The suit alleges that the Plan will produce increased car traffic on streets, since bikes and buses will occupy lanes previously used by cars.[123] This increase will result in more emissions and less air quality.[124] Moreover, the purported increased gridlock will interfere with emergency responders' ability to rescue city residents. Fix The City avers that these facts necessitate additional environmental review and more public comment.[125] It characterizes the Plan as forcing riders out of their cars and into massive auto congestion because of the city's shift to support public transit, walking, and biking.

This litigation strategy focusing on CEQA review and procedural infractions in related EIR and city legislative and executive approvals characterize bike lane fights, past, present, and for the future.[126] The Mobility Plan has been embroiled in a lawsuit since then and similar legal action has developed against new bike lanes recently installed.[127] Los Angeles's bike lane fight is part of a larger effort to restructure mobility and living in the city, but in litigation and implementation terms it follows the contested course San Francisco battled with for its Bike Plan a decade before.[128]

This Article refers to the Mobility Plan adopted by the City Council on January 20, 2016 and approved by the City Planning Commission on December 17, 2015.[129] This is the Plan that the City will implement, to guide how mobility projects including bike lanes are enacted. But a prior version of the Plan had been approved by the city just a few months before.[130] It gave rise to the *Fix The City* lawsuit.

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[123] First Am. Verified Pet. for Writ of Mandate and Compl. for Injunctive and Declaratory Relief at ¶ 44, Fix the City, Inc. v. City of Los Angeles (Cal. Super. Ct. L.A. County Feb. 19, 2016) (No. BS159574) [hereinafter Amended Complaint].
[124] *Id.* ¶44.
[125] *Id.* ¶ 53.
[126] *Id.* ¶¶ 51–62, 82–90.
[127] Nelson, *supra* note 80.
[128] *See* Rachel Gordon, *Judge puts city's bicycle plan on hold/injunction imposed until project's review process examined*, SF GATE (June 24, 2006), http://www.sfgate.com/bayarea/article/SAN-FRANCISCO-Judge-puts-city-s-bicycle-plan-on-2494121.php [https://perma.cc/8YA8-NK4C].
[129] MOBILITY PLAN 2035, *supra* note 2.
[130] Complaint Sept. 9, *supra* note 13, at ¶ 2.

A brief description of these steps offers a look into how the Mobility Plan became the subject of litigation.[131] On August 11, 2015 the City Council adopted the first version of Mobility Plan and certified its corresponding EIR, which the City Planning Commission had been working on since 2013.[132] Fix The City filed its first complaint, alleging CEQA and city governance claims, on September 9.[133] Purportedly in response to this, the City Council initiated a motion to rescind the Mobility Plan on October 30.[134] On November 25, the City Council rescinded the first version of the Mobility Plan adopted on August 11.[135] On December 17, the City Planning Commission held a public hearing on amendments to the Mobility Plan, as approved in August by the City Council. Fix The City filed a new complaint on December 15.[136] The City Council adopted the second version of the Mobility Plan on January 20, 2016.[137]

Fix The City's complaint presented its CEQA and city governance claims.[138] The lawsuit was not a surprise the organization had provided public and written testimony against the Mobility Plan during several phases of the EIR and in city agency and council hearings. Over the years, it attracted much public attention in Los Angeles for lawsuits filed against high-density housing, public infrastructure, and mixed-use development projects. For the Mobility Plan dispute, its later complaints refer to procedural infractions created by rescinding the first version of the Plan and not conducting a new EIR.[139]

Fix The City describes itself as a nonprofit public benefit corporation with a mission focused on quality of life and public safety.[140] Its objectives include neighborhood improvements and protection, local infrastructure, local government efficiency, and environmental advocacy in Los Angeles.[141] Its webpage refers to its effort not as "anti-development" but as "pro-public

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[131] This history is described in Complaint Sept. 9, *supra* note 13, at ¶¶ 2,4, 11–24; Complaint Dec. 15, *supra* note 13, at ¶¶ 2–5, 12–34; Amended Complaint, *supra* note 123, at ¶¶ 2–5, 12–36.
[132] Complaint Sept. 9, *supra* note 13, at ¶ 2.
[133] *Id.*
[134] Complaint Dec. 15, *supra* note 13, at ¶ 27.
[135] *Id.* ¶ 35.
[136] *See generally* Complaint Dec. 15, *supra* note 13.
[137] MOBILITY PLAN 2035, *supra* note 2.
[138] *See* Complaint Dec. 15, *supra* note 13, at ¶¶ 48–90.
[139] *Id.*
[140] FIX THE CITY—LOS ANGELES, http://fixthecity.org/?page_id=283 [https://perma.cc/JU3N-LLTL] (last visited Jan. 21, 2018).
[141] *Id.*

safety, pro-livability, and pro–'rules matter.'"[142] This mission is painted as monitoring government policies so the "type, amount and location of development" correlates with "adequate supporting infrastructure and services."[143] In addition to the Mobility Plan, active projects include seeking high-density development in West Los Angeles and Hollywood are consistent with community plans.[144] Traditionally the group garners public attention for trying to stop or modify development in Los Angeles, while recently criticism focus on how Fix The City settles with developers to attain money and pursue its other projects.[145]

In its first cause of action, Fix The City claims that the Mobility Plan violates the CEQA, since the Environmental Impact Report ("EIR") used to support the Plan was outdated and omitted important relevant information.[146] Enacted in 1970, CEQA created a comprehensive scheme seeking to ensure California agencies: examine the environmental effects of state projects, inform themselves and the public of these potential harms, and make efforts to avoid or reduce these harms.[147] CEQA requires agencies to review if there will be a significant adverse effect to the environment caused by the project, then an EIR must be prepared, certified, and reviewed by the agency before any approval of the project.[148] "Significant effect" is defined as substantial or potentially substantial adverse change to the environment, referring to "physical conditions . . . affected by a proposed project, including land, air, water, minerals, flora, fauna, noise, [and] objects of historic and aesthetic significance."[149] An EIR has the objective of serving as a way for agencies and the public to receive information about a project and the environment and methods to avoid or lessen these impacts.[150] The EIR should be prepared to support decisions that intelligently take into account environmental consequences of a project. This includes identifying the effects of a project and how they can be avoided, litigated,

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[142] *Id.*
[143] *Id.*
[144] *Project: Hollywood Community Plan Update*, FIX THE CITY—LOS ANGELES, http://fixthecity.org/?page_id=13 [https://perma.cc/C8J3-JXA6] (last visited Jan. 21, 2018).
[145] David Zahniser, *When Developers Strike Deals with Homeowner Groups: 'Hush Money,' or a Way to Defend L.A. Neighborhoods?*, L.A. TIMES (Apr. 4, 2017), http://www.latimes.com/local/lanow/la-me-ln-homeowner-developer-pacts-20170330-story.html [https://perma.cc/37Q2-7MR2].
[146] Complaint Dec. 15, *supra* note 13, at ¶ 50.
[147] California Environmental Quality Act, CAL. PUB. RES. CODE §§ 2100–21189.57 (West 2016 & Supp. 2017); CAL. CODE REGS., tit. 14, § 15002 (2017).
[148] *Id.* at § 21002.1.
[149] *Id.* at § 21068.
[150] *Id.* at § 21002.1.

substantially lessened or minimized, and if alternatives to project, included not proceeding with the project, exist.[151] This process of identifying effects and how to lessen or avoid them allows for the state agency to make an intelligent decision about the project.[152] The "core of the EIR" is in the mitigation and alternatives sections.[153]

In April 2013, Los Angeles issued a notice to prepare an EIR.[154] The Department of City Planning released its Draft Environmental Impact Report ("DEIR") on February 13, 2014 and a Revised Draft Environmental Impact Report ("RDEIR") six days later.[155] The Final Environmental Impact Report ("FEIR") was published in May of 2015.[156] The FEIR totals over 300 pages and includes sections for Findings of Fact, Mitigation Monitoring Plan, and a Statement of Overriding Consideration.[157] Importantly, it includes general and itemized responses to public inquiries and comments from the DEIR, which is over 900 pages.

In its lawsuit, Fix The City's CEQA arguments focus on the EIR, in its three phases, and how Los Angeles City Council, Mayor, Planning Department, and council committees referred to the EIR in approving the Mobility Plan.[158] This argumentation regards purported environmental harms caused by the Mobility Plan and then procedural deficiencies with the City Council and the Mayor decision not to add to the EIR or begin a new EIR.[159] Fix The City argues in its complaint, and has contended since the DEIR was issued, that the Mobility Plan: increases congestion by taking car lanes away for transit, bikes, and walking; makes claims about reducing Green House Gases ("GHG") that are unproven; relies on outdated traffic data; uses the wrong methodology to examine traffic congestion by relying on VMT versus vehicle hours; ignores significant impact to response times for emergency services caused by eliminating car lanes; and ignores alternatives.[160]

Fix The City's more particular CEQA claims focus on the FEIR and the procedure used to approve the Mobility Plan. The City did not prepare a new EIR after the September 2015 certification and referred

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[151] PUB. RES. § 21002; CAL. CODE. REG, tit. 14, §§ 15126, 15143 (2017).
[152] PUB. RES. §§ 21002.1(a), 21061.
[153] *In re* Bay-Delta Programmatic Envtl. Impact Report Coordinated Proceedings, 184 P.3d 709, 722 (Cal. 2008).
[154] Complaint Dec. 15, *supra* note 13, at ¶ 13.
[155] *Id.* ¶ 16.
[156] *Id.* ¶ 20.
[157] *Id.* ¶ 21.
[158] *Id.* ¶¶ 50–54, 57–60.
[159] *Id.*
[160] Complaint Dec. 15, *supra* note 13, at ¶ 39.

to CEQA Guidelines section 15162.[161] This Guideline only requires a subsequent EIR when the lead agency determines "substantial changes" due to "new significant environmental effects," "increase in the severity," changed "circumstances," or "new information of substantial importance, which was not known or could have been known."[162] This determination needs to be based on "substantial evidence in light of the whole record."[163] Fix The City argues that a finding of fact was needed to rely on this determination. It contends that new evidence arose between the RDEIR and later the FEIR regarding first response times of emergency services and that this should have been reviewed.[164] Moreover, it argues that a new EIR should have looked into the City Council adding the implementation criteria of equity and public safety and designating itself as lead agency to implement the Mobility Plan.

The second kind of argument made by Fix The City focuses on the City Council's process in approving the Plan.[165] Specifically, it refers to sections 555, 556, and 558 of the Los Angeles City Charter ("LACC"), Section 11.5.6 of the Los Angeles Municipal Code ("LAMC"), and Government Code 65400.5.[166] Section 555 of LACC requires that the City Council attain approval from the City Planning Commission and the Mayor for amendments to the city's General Plan, which the Mobility Plan is.[167] While sections 556 and 558 of the Charter refer to consistency with the city's General Plan and to consistencies for city ordinances, orders, and resolutions, respectively.[168]

Specific to the Section 555 claim, Fix The City refers to how the City Council repealed the Mobility Plan without obtaining review from City Planning Commission and the Mayor, argued to be required by Section 555(c).[169] This likely refers to the November 25, 2015 council action rescinding the original Mobility Plan from September of that year. Next, Fix The City refers to further procedural infractions of Los Angeles Municipal

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[161] CAL. CODE. REGS., tit. 14, § 15162 (2017).
[162] *Id.*
[163] *Id.*
[164] Amended Complaint, *supra* note 123, at ¶ 56.
[165] *Id.* ¶¶ 66–73.
[166] *Id.* ¶¶ 69–71.
[167] L.A., CAL., CITY CHARTER, art. V, § 555 (2015), http://library.amlegal.com/nxt/gateway.dll/California/laac/administrativecode?f=templates$fn=default.htm$3.0$vid=amlegal:losangeles_ca_mc [https://web.archive.org/web/*/http://library.amlegal.com/nxt/gateway.dll/California/laac/administrativecode?f=templates$fn=default.htm$3.0$vid=amlegal:losangeles_ca_mc] (last visited Jan. 21, 2018).
[168] *Id.* §§ 556, 558.
[169] Amended Complaint, *supra* note 123, at ¶ 69.

Code section 11.5.6.[170] It argues that the Council could only take action within a seventy-five-day window after recommendation from the City Planning Commission and the Mayor.[171] Here it is argued that the Council could not approve the version of the Mobility Plan from November since the window had expired.[172] Lastly, Fix The City argues that the Mobility Plan is inconsistent with Los Angeles's thirty five community plans, which require a reduction in automobile congestion, and with the city's requirements to provide police and fire services.[173] This allegedly violates the City Charter sections 556 and 588 and Government Code 65300.5.[174]

Fix the City's CEQA legal arguments hit at the most significant stumbling block for urban bike planning projects in California. Many cities, including Los Angeles, Oakland, San Diego, San Francisco, and Berkeley, have found that CEQA is a roadblock to developing bike plans, creating bike lanes, or installing bike infrastructure.[175] CEQA offers a four decade-old regime mandating analysis of environmental effects, mitigation and alternatives; public disclosure and discussion of this; and certification by a lead agency.[176] For many urban planners and bike advocates, this environmental law creates the greatest challenge for bike plans.[177] The irony is that urban biking projects are sought because of their environmental benefits, but CEQA's strict procedural mandates, guaranteed public participation, and private standing secure a legal avenue for opposition. By examining how projects delay automobile travel and thus impact the environment, CEQA is often in tension with state requirements to decrease greenhouse gas emissions.[178] CEQA's transportation analysis often encourages car trips and these vehicle miles traveled pose a historic challenge for meeting California's greenhouse gas

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[170] L.A., CAL., MUN. CODE § 11.5.6 (current through June 30, 2017).
[171] Amended Complaint, *supra* note 123, at ¶ 70.
[172] *Id.*
[173] *Id.* ¶¶ 79, 81.
[174] L.A., CAL., CITY CHARTER, art. V, §§ 556, 558 (2015); CAL. GOV'T CODE § 65300.5 (West 2016).
[175] Liam Dillon, *Want a Bike Lane in Your Neighborhood? It's Not So Simple in California*, L.A. TIMES (Apr. 7, 2016), http://www.latimes.com/politics/la-pol-sac-enviro-bike-lanes-20160407-story.html [https://perma.cc/G87Q-S2QJ].
[176] *See generally* California Environmental Quality Act, CAL. PUB. RES. CODE §§ 2100–21189.57 (West 2016 & Supp. 2017).
[177] Justin Ewers, *There's a Better Way than CEQA: Urban Planner's Perspective*, CAL. ECON. SUMMIT (Jan. 31, 2013), http://www.caeconomy.org/reporting/entry/theres-a-better-way-than-ceqa-urban-planners-perspective [https://perma.cc/43J9-MYEY].
[178] Martha Bridegam, *LOS to VMT: The Arguments Have Begun*, CAL. DEV. & PLAN. REP. (Aug. 27, 2014), http://www.cp-dr.com/articles/node-3560 [https://perma.cc/UJ38-AE8Q].

emission reduction targets.[179] Moreover, Fix the City's claims regarding city governance complement the CEQA arguments, with both doctrines mandating procedural steps and information disclosure. The Mobility Plan is a long-term guide for land use determination, but the litigation challenging it capitalizes on environmental law and informational disclosures.

Fix the City's litigation strategy focused on the EIR and CEQA is very similar to the lawsuit that challenged San Francisco's Bike Plan from 2005 to 2013.[180] In 2005, city leaders in San Francisco approved a comprehensive plan increasing the number of bike lanes in the city and permitting bikes on public transport. Groups called the Coalition for Adequate Review and Ninety-Nine Percent and an individual Rob Anderson filed a lawsuit in 2005, challenging the bike plan and seeking an EIR as mandated by CEQA.[181] A court enjoined the Bike Plan in November of 2006 because it lacked an EIR.[182] The city had argued that a prior EIR from 1997 was sufficient. It contended that the 2005 Bike Plan merely amended the prior bike plan.[183] In addition to bike lanes, this 2005 amendment tried to: eliminate city use of Level of Service ("LOS") measures for car congestion, make bikes a priority in city planning and land use decisions, and require consistency in land use and mobility decisions with the bike plan.[184] In 2009 a new EIR was certified by city leaders, with an over 2,000 page report, 36,000 pages of administrative record, and 60 projects ready to be completed.[185] The next year in 2010 the trial court sided with the city, but Rob Anderson appealed this trial court order and won.[186] In January of 2013, the appeals court found that despite the EIR the city had not made the proper findings about the Bike Plan's infeasibility.[187]

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[179] Joanna D. Malaczynski & Timothy P. Duane, *Reducing Greenhouse Gas Emissions from Vehicle Miles Traveled: Integrating the California Environmental Quality Act with California Global Warming Solutions Act*, 36 ECOLOGY L.Q. 71 (2009).

[180] For a description of the Bike Plan content and the various steps in approval, litigation, EIR, and appeals, *see Environmental Impact Report for Upgrade of San Francisco Bicycle Plan Satisfied California Environmental Quality Act, Although Board Must Make Required Findings,* 65 PLAN. & ENVTL. L. 121 (2013). For details on what motivated the lead plaintiff Rob Anderson *see* Phred Dvorak, *One man's crusade puts brakes on SF's bicycle plans*, PRESS DEMOCRAT (Aug. 23, 2008), http://www.pressdemocrat.com/news/2203132-181/one-mans-crusade-puts-brakes [https://perma.cc/U2ZD-4F2Q].

[181] Dvorak, *supra* note 180.

[182] *Id.*

[183] *See* Rob Anderson v. City and Cnty. of San Francisco, No. A129910, 2013 WL 144915, at *1 (Cal. Ct. App. Jan 14, 2013).

[184] *Id.* at *2.

[185] *Id.* at *1.

[186] *Id.*

[187] *Id.*

Eventually, much of the bike plan was implemented, which has been argued by some as litigation delays and by others as CEQA-mandated analysis of environmental impacts. Had San Francisco initially conducted an EIR in 2005, it could have avoided the costly litigation and delays. San Francisco's experience, with city planning efforts supporting bikes at cars expense and a resultant CEQA-focused dispute, illuminates the challenges Los Angeles faces.

Since then California has made two significant changes to CEQA involving bike projects in particular and how transportation projects are measured to have environmental impacts.[188] First, the state amended CEQA to greater facilitate city efforts to install bike lanes and develop urban bike plans. The San Francisco experience with the 2005 Bike Plan motivated new exemptions to CEQA for cities and bikes.[189] Effective in 2014, CEQA exempted EIR requirements for bicycle transportation plans in urbanized areas and for bike lane projects in urbanized areas consistent with a local bicycle transportation plan.[190] The first exemption focused on transportation plans mentions restriping roads for bike lanes, bike parking, signal timing, and other signage.[191] The second exemption focused just on the projects of restriping roads for bike lanes.[192] While an EIR is not required for these plans and lanes, agencies must still hold public hearings, seek resident input, and prepare a report about traffic and safety impacts along with mitigation measures.[193] If the project or plan is approved, then the agency must file a notice with state and county clerks, providing an analysis of traffic and safety impacts. These two exemptions were renewed in July of 2017, with their effectiveness extended until January 1, 2021.[194]

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[188] Sara Dudley, *Use It or Lose It? CEQA's Bicycle Transportation Exemptions and Legislative Efforts to Preserve Them*, REMY MOOSE MANLEY (May 30, 2017), http://www.rmmenvirolaw.com/2017/05/use-it-or-lose-it-ceqas-bicycle-transportation-exemptions-and-legislative-efforts-to-preserve-them/ [https://perma.cc/WCL9-AET5].

[189] CAL. S. COMM. ENVTL. QUALITY, BILL ANALYSIS ASSEMB. B1218, 2017–2018, at 1–2 (June 21, 2017); Dudley, *supra* note 188.

[190] PUB. RES. CODE §§ 21080.1 (exempting bike transportation plans), 21080.25 (exempting bike lanes). In 2013, AB 417 originally amended the Public Resources Code to create these exemptions. *See* Assemb. B. 417, 2013 Leg., 2013–2014 Reg. Sess. (Cal. 2013), 2013 Cal. Stat. 4896. They were set to expire January 1, 2018, but were extended until January 1, 2021 by AB 1218 without any changes to each section. *See* Assemb. B. 1218, 2017 Leg., 2017–2018 Reg. Sess. (Cal. 2017), 2017 Cal. Legis. Serv. Ch. 149 (West).

[191] PUB. RES. § 21080.20.

[192] *Id.* § 21080.20.5.

[193] *Id.* §§ 21080.20, 21080.20.5.

[194] *Id.*; Assemb. B. 1218; Liam Dillon, *Gov. Brown Signs Bill Making It Easier to Create Bike Lanes—But Not That Much Easier*, L.A. TIMES (July 31, 2017), http://www.latimes

Larger reforms lie ahead for CEQA and bike lanes, specific to determining how transportation choices impact urban expansion and the use of automobiles. These changes by no means focus on bicycles, but they stand to greatly impact how EIRs will measure the benefits and drawbacks of bike lanes. On September 12, 2013 the legislature passed SB 743 which for transit project analysis replaced LOS measurements with VMT measurements.[195] The basic argument is that LOS focuses too much on a delay in car travel and encourages urban sprawl with wider roads and requiring road construction for cars.[196] LOS examines the number of vehicles that travel through an intersection at a given time.[197] By contrast, VMT analysis prioritizes projects which decrease the number of trips taken by automobiles. VMT evaluates vehicle usage rather than congestion.[198] Even though SB 743 is over four years old, regulations specifically regarding VMT have not been formally been issued by California. The Governor's Office of Planning and Research ("OPR") released proposals in January 2014 and January 2016, but final regulations have not been issued by the state's Natural Resources Agency.[199] Final VMT regulations has been complicated by delays, commentary, and formalizing what metrics within VMT will be required. As this Article is written, new proposals for VMT regulations are pending and anticipated to be implemented in 2018.[200]

These changes in California's environmental law point to an optimistic policy path for bike lanes, even though CEQA poses the most significant legal challenge for Los Angeles's Mobility Plan currently. This points to the ambivalent progress of urban bike advocacy. For decades, biking groups have sought or have been urged by health and environmental

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.com/politics/essential/la-pol-ca-essential-politics-updates-governor-signs-bill-making-it-easier-to-1501536252-htmlstory.html [https://perma.cc/9UQH-Z3FW].

[195] PUB. RES. § 21099.

[196] Mitchell M. Tsai, *Concerns About a CEQA Reform That Favors Multimodal Transportation*, L.A. LAW. MAG. 36, 36 (Jan. 2015); Bridegam, *supra* note 178.

[197] Donald E. Sobelman & Kathryn L. Oehlschlager, *The End (of LOS) is Nigh: OPR's Revised Proposal on Analysis of Transportation Impacts*, CEQA CHRONICLES (Apr. 5, 2016), http://www.ceqachronicles.com/2016/04/the-end-of-los-is-nigh-oprs-revised-proposal-on-analysis-of-transportation-impacts/ [https://perma.cc/YU2A-F9ET]; *SB 743 Implementation*, CAL. DEP'T. OF TRANSP., http://www.dot.ca.gov/hq/tpp/sb743.html [https://perma.cc/GZ8E-PC5P] (last visited Jan. 21, 2018).

[198] Sobelman & Oehlschlager, *supra* note 197.

[199] *Id.*; *SB 743 Implementation*, *supra* note 197.

[200] *See* Liam Dillon, *California regulators hope new rules will spur more bike lanes, housing near transit*, L.A. TIMES (Nov. 27, 2017), http://www.latimes.com/politics/essential/la-pol-ca-essential-politics-updates-california-regulators-hope-new-rules-1511810701-htmlstory.html.

interests not to focus only on biking issues but instead seek coalition support for broader change. The Mobility Plan exemplifies such an end result. The Mobility Plan coordinates bike lanes with pedestrian plans and multimodal transportation means. It emphasizes bike lanes as part of a bike network sharing the city with vehicle and public transit networks, justified by sustainability and health benefits. This change in approach makes it easier for such projects to attain approval from community, policy maker, and local government levels.

For this Mobility Plan though, non-biking issues pose the largest legal challenges. The Mobility Plan's policy successes and its shift beyond bike lanes also set the course for legal disputes. The *Fix The City* lawsuit shows this in two ways. The Mobility Plan cannot fully rely on EIR exemptions for bike lanes or from the advantages of VMT metrics in traffic analysis. Both of these changes to CEQA promise to make bike lane implementation easier, but are not fully applicable to the Mobility Plan's legal defense.

Since the Mobility Plan is far more encompassing than bike lanes or a city bike plan, it cannot benefit from the EIR exemptions created by AB 417 in 2012. These exemptions allow bike lane projects to evade the more rigorous parts of CEQA and substitute a full EIR process with just public hearings and a negative declaration. Fix The City's CEQA claims brought up against the city focus on alleged deficiencies in the EIR for the Mobility Plan. For this, the Mobility Plan reforms much more than just bikes lanes in Los Angeles, this may have a larger impact on the city and make bike projects more feasible in local politics. But this expanded scope precludes the bike lane and bike plan exemptions California enacted specific to EIRs.

With a similar effect, CEQA changes to the determination of the environmental effect of traffic patterns cannot yet benefit the Mobility Plan. VMT is expected to make EIR scrutiny less daunting for replacing car lanes with bike lanes. Bike lanes lessen the number of cars on the road and this should result in less vehicle miles traveled, thus fairing well under VMT metrics.[201] The Mobility Plan EIR explains that it must use LOS, which essentially focuses on how a project impacts car delays, since VMT regulations had not yet been issued.[202] It explains that future

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[201] Zahniser, *supra* note 4.

[202] CITY OF L.A., DEP'T OF CITY PLANNING, FINAL ENVIRONMENTAL IMPACT REPORT: CITY OF LOS ANGELES MOBILITY PLAN 2035, No. ENV-2013-0911-EIR, at 1–3 (May 2015), http://planning.lacity.org/eir/mobilityplan/FEIR/feirmay12.pdf [https://perma.cc/P8DE-Q2FM].

projects that the Mobility Plan guides should fare better with VMT.[203] Bike plans in cities are just one of many types of projects that must undergo an EIR in California. This reaches far beyond transportation projects. Accordingly, VMT promises to impact far more than just bike lanes and transportation plans.[204] For this reason, the opposition to VMT has been so substantial and it explains why VMT guidelines have been delayed by nearly five years. In this light, issues outside biking, such as housing and real estate development, defer VMT's implementation.

The *Fix The City* lawsuit and the changes to CEQA point to a shift in how law supports and challenges bike planning. As Fix the City sued Los Angeles in 2015, the city devised its plan and conducted its EIR. Well before most Mobility Plan projects were enacted, California was reinventing how to measure the negative impact of cars, bikes, and infrastructure use. Meanwhile other California cities have moved to use VMT to support the reorganization of transportation planning.[205] In sum, the LA's bike lane fight looks to the future with Mobility Plan–inspired projects and VMT regulations for CEQA, but prior approaches to analyzing the environmental impact of traffic still fuel current litigation.

Meanwhile at the street and neighborhood level, the bike lane fight continues as a debate about road diets. Local opposition argues that bike lanes eliminate spaces for cars resulting in an increase in traffic.[206] Bike advocates and city leaders point to the safety benefits of bike lanes and traffic calming.[207] They also explain that many bike lanes are implemented after significant study and are responses to bike or pedestrian fatalities and consequential lawsuits.[208] This resistance has had a political impact with many city council members doubting the need to support Vision Zero and bike lanes.[209] This pattern of a bike lane fight

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[203] *Id.*
[204] *Id.* at 1–2.
[205] Josh Stephens, *Pasadena Ushers in Era of VMT Metrics*, CAL. PLAN. & DEV. REP. (2015), http://www.cp-dr.com/articles/node-3713 [https://perma.cc/H4CY-HLKM].
[206] *See* Laura J. Nelson, *L.A. reverses course on lane reductions that 'most people outright hated,'* L.A. TIMES (July 27, 2017), http://www.latimes.com/local/lanow/la-me-ln-vista-del-mar-lanes-20170726-story.html [http://perma.cc/YB6X-DN75].
[207] *See id.*; Linton, *supra* note 103.
[208] *See* Nelson, *supra* note 206; Linton, *supra* note 103.
[209] *See* Hillel Aron, *Is L.A.'s Ambitious Plan to End Traffic Fatalities Already Dead?*, LA WEEKLY, Nov. 3, 2017, *available at* http://www.laweekly.com/news/vision-zero-las-plan-to-eliminate-all-traffic-fatalities-by-2025-is-having-a-hard-time-8812716 [http://perma.cc/Z5S5-FVAW]. One bike lake fight even lead to a recall effort of one city council members, *see* Laura J. Nelson, *Critics frustrated by 'road diets' launch effort to recall L.A. Councilman*

and resulting erosion of political support for bike lanes has repeated itself in various locations in Los Angeles in the last years.[210]

III. LAW'S FORCE IN SECURING ROAD SPACE FOR BIKES

To help identify how law specifically facilitates and challenges city efforts to enact bike lanes, this Article looks to recent scholarship on bike policies from the history, cultural studies, urban planning, and transportation planning disciplines. Specifically, these books are *Bike Battles: a History of Sharing the American Road* by environmental historian James Longhurst;[211] *One Less Car: Bicycling and the Politics of Automobility* by cultural studies Professor Zack Furness;[212] *City Cycling* edited by urban planners John Pucher and Ralph Buehler;[213] and *Streetfight: Handbook for an Urban Revolution* by Janette Sadik-Khan and Seth Solomonow[214] who both worked in the New York City Department of Transportation as Commissioner and Chief Media Strategist, respectively. These four studies provide different lenses into developing bike policies. They do this specific to their focus on biking rights, resistance by cyclists, city planning decisions, and transportation policies. These viewpoints help contextualize what develops in legal terms as Los Angeles defends and proceeds to implement the Mobility Plan.

In *Bike Battles,* James Longhurst, an environmental historian, provides a long-term history of biking rights, charting legal cases since the late nineteenth century before cars existed to interest in fitness biking in the 1970s.[215] During this long journey, cyclists have had to defend their legal rights to use roads, as cars have acquired and then defended their protected road privilege.[216] This history develops broadly as a series of "battles." The first battle was to have bikes legally classified as vehicles and therefore able to be used on public roads in 1895. Second, bicycles became reflective of white and upper class notions of independence during the turn of the century. Third, bikes faced increased exclusions by vehicle codes and rising popularity of cars and freeways before World War II.

Mike Bonin, L.A. TIMES (Sept. 15 2017), http://www.latimes.com/local/lanow/la-me-ln-bonin-recall-20170915-story.html [http://perma.cc/KPF2-D8JG].

[210] For descriptions of this pattern *see* Aron, *supra* note 209; Linton, *supra* note 103.

[211] LONGHURST, *supra* note 20.

[212] FURNESS, *supra* note 20.

[213] Pucher & Buehler, *supra* note 24.

[214] SADIK-KHAN & SOLOMONOW, *supra* note 31.

[215] *See generally* LONGHURST, *supra* note 20.

[216] *Id.* at 4.

These trends only increased with suburban expansion, federal highway spending, and booms in cheap fuel and car manufacturing in the 1950s and 1960s. Finally, there were renewed biking interests with calls for fuel efficiency and fitness in the 1970s.[217] Since the 1930s, bike riding has been challenged by societal stereotyping of bikes as for children and automobiles as preferred for adults. For example, model vehicle codes protect road access for cars, and road construction tied to gasoline tax effectively subsidizes cars on roadways.[218]

Bike Battles argues that in the United States roadways privilege cars over bicycles, but that bikes have to fight and refight for their legal right to access public roads. These contests are framed by land use decisions creating path dependency, wherein current policy debates are framed by past policy determinations.[219] Bike access to public roads as vehicles has been challenged in an evolving context since the early twentieth century. Longhurst explains that currently three factors frame path dependency: gasoline taxes from car use fund road construction; various model codes for city planning deprioritize, if not exclude, bicycles from local policy determinations; and building bike lanes is seen as expensive.[220]

Applying these *Bike Battles* insights to Los Angeles, the Mobility Plan represents a local government's effort to shift path dependency from a default planning privilege for automobiles to a diverse transport support for biking, walking, public transit, and intermodal connections between these options.[221] Importantly, this city planning project is aspirational and forward-looking, with a vision for 2035, while it is also political with the city council, the planning department, and stakeholders working on the Plan.[222] Key to the Plan is the city explicitly balancing the interests of many modes of transportation and not just prioritizing the needs of automobiles.[223]

Looking to the lessons described in *Bike Battles,* the *Fix The City* lawsuit emphasizes that the legal debate is about city authority to enact mobility plans and not about the legal right cyclists or bicycles have to use roads. In this light, the city's political project and long-term aspects of the Mobility Plan stand out as attempts to break the path dependency

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[217] *Id.* at x.
[218] *Id.* at 237.
[219] *Id.* at 20.
[220] *Id.* at 238.
[221] MOBILITY PLAN 2035, *supra* note 2, at 14.
[222] *Id.* at 53.
[223] *Id.* at 13.

and privilege for cars. The Mobility Plan justifications of health, environment, and access add to the traditional needs advocated by cyclists. In sum, *Bike Battles* helps frame the legal fight for bike paths, envisioned by the Mobility Plan, as something more comprehensive, long-term, and politically focused on how to live in Los Angeles. The debated future of Los Angeles is not limited to cyclist rights, bike access to roads, or only protecting road space for automobiles.

In *One Less Car: Bicycling and the Politics of Automobility*, Zack Furness analyzes how biking is intrinsically a political act with riders forced to contest the dominant cultural narrative and political protection afforded to cars.[224] Examining a history of bike advocacy, Furness describes how since bicycles were first manufactured, riders have had to fight for access to public space, with roads and municipal facilities denied.[225] Central to his cultural studies approach, Furness illustrates that technology, in this case bicycles and automobiles, is not politically neutral.[226] Vehicles in the form of bikes or cars benefit from political and economic support, such as access to public space in road, infrastructure subsidies, and land use priorities made by local authorities.[227]

One Less Car describes two aspects of this bike advocacy relevant to the Mobility Plan dispute. First, in the 1960–70s bike activism articulated a "right to the city" position.[228] Starting in Amsterdam, Netherlands, but later in other large European and North American cities, riders protested to raise urban awareness and to push local leaders to make cities safer to bike within.[229] Furness refers to Henri Lefebvre's call for a "right to the city" as the right to "participate in urbanity, the right to appropriate the city not merely as an economic unit, but as a home and an expression of lived experience."[230] This fight was not just to have bike lanes or have biking rights legally recognized in urban and metropolitan settings. These movements were reactions to how urban space, especially in city centers, had been reconceived to support cars, with automobile movement and parking prioritized. After mass manufacturing of cars began in the 1920s, city planners prioritized space and infrastructure to accommodate cars. Automobiles could rely on a host of industries and lobbying to help

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[224] FURNESS, *supra* note 20, at 5.
[225] *Id.* at 10.
[226] *Id.*
[227] *Id.* at 5, 52.
[228] *Id.* at 47–48.
[229] FURNESS, *supra* note 20, at 5.
[230] ANDY MERRIFIELD, DIALECTICAL URBANISM: SOCIAL STRUGGLES IN THE CAPITALIST CITY 156 (2002).

craft land use policies, vehicle codes, infrastructure development, and housing and city planning to benefit cars. In reaction, bike advocacy movements importantly articulated their vision, not just for access to roadways, but as a right to the city.[231]

Also importantly, Furness presents the cultural biases challenging bike advocacy.[232] The media presents bikes as abnormal, different, or riders as weird, when compared to the idealized automobile. Movies and social stereotypes prioritize individuals owning and using cars. These two factors, city planning and cultural stigma, explain why biking is an act of resistance. This transpires in urban areas and influences how cities are planned, building on a cultural trope that productive and desired residents use cars for transportation, own cars, and cities facilitate this.

Looking at the Mobility Plan, the insights from *One Less Car* point to the city presenting benefits of biking in a different light, as less directly in conflict with cars and more as alleviating congestion, environmental, and public health harms. Central to this is how it is a "Mobility" Plan and not just a transportation project or bike plan.[233] A "transportation" plan would emphasize bus, rail, tram, and subway modes. But "mobility" is more inclusive, including biking and walking. Moreover, "mobility" suggests residents can move and chose what method to achieve this, with the person having options and being active in their selection while the "transport" label is more focused on the means and services. These policy and presentation foci, regarding how the Mobility Plan was developed, illustrate how bike path advocacy can be less directly in conflict with city planners and automobile interests. Employing these approaches the long-term resistance cyclists face, as Furness describes, is mitigated. Resistance and stereotyping lessen when bike paths are part of a more comprehensive approach (including health, environment, and congestion concerns).

The Mobility Plan's "complete streets" approach demonstrates another way to deflect the cultural stigma attached to biking, described by Furness.[234] By pointing to streets as inviting leisure, walking, commercial, and social activities, complete streets reframe the conflict between bikes and vehicles. Previously, the two modes were seen as a contest literally over feet and inches on streets. Complete streets diffuses this tension by adding public life to street planning, beyond just automobile

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[231] FURNESS, *supra* note 20, at 76.
[232] *Id.* at 109.
[233] MOBILITY PLAN 2035, *supra* note 2, at 13.
[234] *Id.* at 13–14.

movement. This recasts how streets are used, but in reference to Furness's lens it paints streets as open to many urban life uses, with one being bike lanes. This shifts a debate about bikes in cultural and political resistance to an optimistic view of how streets can be used for many activities.

The *Fix The City* lawsuit's focus on environmental law and council governance claims illustrates that a doctrinal contest is really about city authority and not just cars. The Mobility Plan articulates this authority with a lens to balance mobility needs of different users. *Fix The City* seeks to stop these determinations by local government, arguing they cause congestion, lessen air quality, and were improperly made. Seen in a *One Less Car*'s lens, this legal contest aims to decouple the city's street planning vision from the benefits of mobility and complete streets approach.

In *City Cycling,* editors John Pucher and Ralph Buehler offer a comparative analysis of how cities worldwide develop policies to support utilitarian biking.[235] This form of bicycle riding is not merely for fitness or recreation, but also for the rider to commute, run errands, and to use in daily travel.[236] Urban planning professors Pucher and Buehler provide a variety of chapters analyzing utility biking as well as global trends, health benefits, technical innovation in equipment, safety, utility biking's connection to public transportation, bikesharing programs, and results in different-sized cities worldwide.[237] The book's schematic organization examines what kind of bike lanes, safety regulation, cycle storage, and public transportation connections work.[238] A central theme of the edited volume is how the Netherlands, Denmark, and other European countries achieve between fifteen and twenty-six percent of resident travel on bikes, while the highest percentages in North America never reach these levels.[239] Similarly, *City Cycling* shows that successful biking policies are local but that national level influence regarding biking goals and infrastructure funding greatly helps facilitate city biking achievements.[240]

Pucher and Buehler find that success in increasing utility biking depends on a package of mutually supportive bike infrastructure, bike programs, and bike policies. Infrastructure includes bike lanes and signage, connections to public transportation, and bike storage.[241] Bike programs

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[235] Pucher & Buehler, *supra* note 24, at 2.
[236] *Id.*
[237] *Id.*
[238] *Id.*
[239] *Id.* at 9.
[240] *Id.* at 19, 20.
[241] Pucher & Buehler, *supra* note 24, at 349.

aim to have the city or region specifically address biking needs, seek input from cyclists, and encourage residents to ride.[242] Policies are essential to enforce safety requirements; encourage car awareness of bike riders; guide car, transit, and walker movement; calm traffic; invite the use of public space for transportation modes other than cars; and safety education.[243] This comprehensive approach increases utility biking by discouraging car use and making biking an easier, more sustainable, cheaper, and safer travel method. This approach encourages residents to ride, facilitates riding, and increasing the costs of traveling inside a city by a car.[244] For advocates and policy makers pushing for more bike use, Pucher and Buehler argue that a successful approach goes beyond bike rights.[245] Utility biking increases when the policy narrative seeks coalitions with other stakeholders (such as environmental and health advocates), to minimize traffic congestion, and to employ data (about safety, use, and traffic) to support policy positions.

The Los Angeles Mobility Plan clearly illustrates Pucher and Buehler's point that local politics is where utility cycling is most contested. The Los Angeles City Council acted. The city's Planning Department sought community support and input. The lawsuit is fought with local and state doctrines, on environmental and procedural norms. Similarly, the Mobility Plan points to Pucher and Buehler's advocacy suggestions of working with other groups and issues, such as a complete streets approach, providing alternatives to cars, making bike use easier and cheaper, calming streets, and finding common causes with environmental, public health, and fitness interests.

In *Streetfight: Handbook for an Urban Revolution*, Janette Sadik-Khan and Seth Solomonow describe the experiences and lessons from the New York City Transportation Commission.[246] Starting in 2007, the Commission implemented a series of measures making the city's streets more accessible to urban life, deprioritizing cars, and reflecting many of the changes envisioned in the Los Angeles Mobility Plan 2035.[247] This includes bike lanes, a bike share program, converting street intersections into plazas and parks, and making sidewalks pedestrian friendly. City Transportation Commissioner Sadik-Khan lead these efforts.[248]

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[242] *Id.* at 350.
[243] *Id.*
[244] *Id.*
[245] *Id.* at 360.
[246] SADIK-KHAN & SOLOMONOW, *supra* note 31, at xvi, 4.
[247] *Id.* at 1–5.
[248] *Id.* at xi.

She describes her approach as combining Robert Moses' vision and Jane Jacobs' action, referencing the highly followed urban planning debate of the 1960s.[249] As parks commissioner, Moses led New York's projects to make the city more car friendly with highways and bridges, to aid suburban commutes while controversially destroying historic city neighborhoods. Jacobs, a sociologist, described pedestrian life and city neighborhoods as how cities actually move. Jacobs led a popular protest stopping Moses' plan to build a highway crossing through Manhattan which would have destroyed much of Soho and Greenwich Village. *Streetfight* explains that Moses' vision to build for future projects can be executed by capitalizing on the way city residents actually use streets, versus attempting to help automobiles move with larger roads.

Incorporating urban theory and policy experience, Sadik-Khan emphasizes that prior urban design focused on moving automobiles by creating wide roads and highways.[250] Continued street widening, at the expense of supporting public transport, bikes, or sidewalks, does not decrease traffic.[251] It is wrong to assume that eliminating car lanes increases traffic. These lanes will always be filled by cars if they exist. What decreases traffic is getting people not to take the car trip and to instead choose walking, public transit, or biking.[252] Making the street more inviting to life and non-car modes of transportation takes people out of cars. This last point explains how landscaping, plaza seating, street dividers, leisure space, and street level commerce fit into city transportation choices.

Streetfight explains an easy way to carve out space for bike lanes in common street layouts. Streets as currently used offer space to reallocate car movement, parking, and bike lanes. Car parking can be used to calm the street and protect bike lanes. Bike lanes are significantly narrower than car lanes. Most city streets are too wide, with 12 feet allocated for each car lane, but most cars are only 6 feet wide and most trucks are only 8.5 feet wide. This creates 20 feet of excess street width, which is not needed for most city streets. For arterial streets, cars and trucks need this width, but for other streets there is room to include bike lanes with a separation from cars. *Streetfight* explains how these measures are done in tandem with cross walk extensions and street calming measures, like greenery and benches, all of which invite walking and decrease red light times.[253]

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[249] *Id.* at 8–9.
[250] *Id.* at 4.
[251] *Id.* at xvi, 47, 62.
[252] SADIK-KHAN & SOLOMONOW, *supra* note 31, at 58, 62, 64.
[253] *Id.* at 49–54.

But when bike paths are added, the reallocation of the street space is viewed as a "war on cars" and "New York City's Public Enemy No. 1."[254] New York City's experience illustrates how for decades streets have not been designed for cyclists. The tensions, traffic, and injuries are products of how streets have been designed for a century.[255] At one point, tensions boil when the assumed and taken for granted space for car is reallocated. *Streetfight* describes highly public contests over bike lanes on Broadway in Manhattan and Bedford Avenue and Prospect Park West in Brooklyn, fueled by ideas that lanes take away parking spaces, slow down traffic, or make streets more dangerous by inviting bike ridership.[256] These street fights grab governmental, news, and stakeholder attention. Bike lane tensions reach a tipping-point, gaining the most attention and momentum, when they symbolize a package of changes in city planning. Bike lanes gain the most criticism after a series of transformations.

Streetfight describes the significance in data-driven bike planning on New York streets, an approach shared with the Los Angeles Mobility Plan. This significance of this data is encapsulated in the saying, "In God we trust. Everyone else, bring data."[257] Urban planning is intrinsically local and affects people's daily lives. Opinions about city projects are usually only viewed through the lens of personal needs. This feeds the emotional reaction many city residents and businesses have to bike lanes and reorganizing street layouts.[258] Data about the impacts of street changes provides a way for city officials and leaders to see the larger picture with less localized or personal lenses. *Streetfight* describes how data about injuries, traffic flow, and economic impacts on real estate and commercial sales were vital to changing local impressions about bike lanes and bike sharing. Bike injuries decrease when riders, walkers, and vehicles have a designated terrain on streets, wherein each means of transportation creates predictable behaviors on the road. With riders and walkers spending more time on streets, instead of in automobiles, they spend more time in shops, restaurants, and services.[259]

Applying these *Streetfight* lessons to Los Angeles, four points stand out. First, the Mobility Plan attempts a big project for the future. In this regard, it resembles Sadik-Khan's inspiration from Moses, but

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[254] *Id.* at 144.
[255] *Id.* at 150.
[256] *Id.* at 148.
[257] *Id.* at 251.
[258] SADIK-KHAN & SOLOMONOW, *supra* note 31, at 252.
[259] *Id.* at 257.

like with the New York experience it seeks to maximize how street space is used to reduce traffic. Key to this point is taking persons out of their cars and facilitating their selection of other mobility modes. This is envisioned for 2035 and changes how residents live in Los Angeles. Second, similar to *Streetfight*'s recent inspiration from Jacobs, the Mobility Plan closely looks at how streets are used. For this, the Plan seeks "complete streets" solutions and to prioritize the mobility needs of all street users. For this reason, it includes bike enhanced, neighborhood, and vehicle networks laid out over the city. Streets have varied uses, depending on their location and typography. This variation can help focus street planning and most efficiently allocate mobility options. Third, the Mobility Plan's Policy 4.6 emphasizes the data-based approaches mentioned in *Streetfight*. Numeric analysis helps to make sense of how streets are used, who uses them, timing delays, speeds, and accidents. This becomes powerful when comparing program costs. Sadik-Khan explains that this approach was vital to formulating and then defending policies.

Lastly, *Streetfight* presents a picture of how heated the fight over bike lanes can become. In Los Angeles, it is expected that *Fix The City* will persist with the lawsuit and seek public support for its position by presenting cars as in conflict with bike lanes. Already, major public relations and political contests have altered how bike lanes can be used in various parts of West Los Angeles, where population density is lower and car traffic is an issue on many residents' minds. *Streetfight* describes how a boiling point and inevitable public opinion coalesce on one proposal. The fight is not just about the proposed lane or shifts in parking or car lanes, but it is about larger transport and planning issues. In Los Angeles, the strict procedural and evidentiary requirements of CEQA shape this debate. In New York, environmental law did not place as many limits, thus the street fight was articulated differently.

IV. BIKES BETWEEN VEHICLE PHILOSOPHY AND AUTOMOBILITY

Bike lane fights are not limited to Los Angeles. Los Angeles has learned from progress in American cities and various examples worldwide. Bike lanes will surely become agenda items for more municipalities. Cities will try to employ bike lanes and other bike infrastructure resulting in social, political, and legal challenges. These jurisdictions will benefit from noting how urban biking can move away from vehicular cycling and automobility with comprehensive efforts like the Mobility Plan or with specific projects to install bike sharing, bike storage, or bike

lanes. Vehicular cycling is a riding philosophy, arguing that bikes should not receive special space on roads and that cyclists should become better educated when riding to avoid accidents with cars.[260] Automobility is the socio-economic term used to identify how cars benefit from a system of default protective status in society.[261]

These two concepts help to identify what progress bike advocacy achieves, looking at how cyclists use city streets and how privilege for automobiles may change. Vehicular cycling looks at the options for bikes, while automobility examines the systemic challenges bikes must face. The notion of vehicular cycling helps identify what urban riding options exist without efforts like the Mobility Plan. Vehicular cycling is a concept created by cyclists that emphasizes that riders should use streets as if they were cars and without seeking any specific protections in the forms of bikes lane or right of way guarantees.[262] Vehicular cycling emphasizes that riders are responsible for their movements and should not seek protections from urban planners.

Tom Babin describes vehicular cycling as a dying philosophy pitting cars against cyclists.[263] The Mobility Plan dramatically shifts biking options away from vehicular cycling. It views roads not only for automobile movement but also for different mobility modes. When fully implemented, the city will have overlapping bike, transit, and vehicles networks.[264] Bike lanes are one of many mechanisms the Mobility Plan uses to deprioritize street planning for cars. Vision Zero highlights the fatal risks of not extending protections to bikes and of ignoring foreseeable harms caused by cars on city roads.[265] In sum, efforts like the Mobility Plan are

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[260] Vehicular cycling is mostly associated with John Forester's 1976 book, EFFECTIVE CYCLING, published in its seventh edition in 2012.

[261] Mimi Sheller and John Urry use "automobility" to identify how important cars are to urban planning in response to the incorrect assumptions that cars represent neutral technology, recreate inevitable living patterns, and primarily eliminate prior urban patterns, *The City and the Car*, 24 INT'L J. URB & REG. RES. 737, 738 (2000).

[262] For recent descriptions of the applicability of vehicular cycling, *see* Brooks, *Forester's Effective Cycling*, THE RETROGROUCH (Jan. 22, 2014), http://bikeretrogrouch.blogspot.com/2014/01/foresters-effective-cycling.html [https://perma.cc/66XN-CHZJ]; John Forester, *Review of the Great Schism: Federal Bicycle Regulations and Unraveling of American Bicycling Planning*, 39 TRANSP. L. J. 21 (2011); John Forester, *The Bicycle Transportation Controversy*, 55 TRANSP. QUART. 7 (2001).

[263] Tom Babin, *The philosophy that has pitted cars against cyclists for the last 40 years if finally dying*, L.A. TIMES (July 12, 2016), http://www.latimes.com/opinion/livable-city/la-oe-babin-protected-bike-lane-20160712-snap-story.html [https://perma.cc/T6PM-QBJ4].

[264] MOBILITY PLAN 2035, *supra* note 2, at 65.

[265] *Id.* at 59–60.

a major shift from the laissez-faire approach to vehicular cycling and a lack of bike infrastructure, developing from increased regulation of roads securing road space for non-car users.

Automobility is a term that combines the notions of autonomy and mobility, to emphasize how cars as social and technical objects can chart their own futures.[266] John Urry refers to the notion of automobility to analyze the complex set of private economic, governmental, and cultural assumptions that make cars a default.[267] Cars have attained a privileged status in American society not just because of their popularity as a means of transportation, their governmental support, or their technical capacities for movement.[268] Instead, a set of socio-economic forces make cars the policy preference. Six factors permit cars to rise to this privileged role. These are: the automobile manufacturing process involves several industries; cars provide their owners social status; various industries, like fossil fuels and home construction, depend heavily on automobile use; the use of cars subordinates other mobility means like walking and biking; cars culturally symbolize freedom, the good life, and citizenship; and cars are the most significant cause of environmental resource use.[269]

Urban bike plans can be assessed by examining how many of these interrelated forces they impact. Automobility is not a locked-in system with a path dependent future .[270] Instead, progress away from its systemic primacy becomes possible as the links between automobility factors are broken.[271] For instance, the LA Mobility Plan explicitly deprioritizes automobiles by balancing the needs of various means of transportation, emphasizing multimodal transit systems, and dividing up urban roads into different networks.[272] It seeks to address the cultural and social aspects of automobility with Vision Zero, highlighting the harms caused by cars and reconfiguring public use of streets through the "complete streets" approach.[273] Likewise, the Mobility Plan counters the environmental

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[266] *See generally* Mike Featherstone, *Automobiles: an Introduction*, 21 THEORY, CULTURE & SOC'Y 1 (2004).
[267] *See* John Urry, *The "System" of Automobility*, 21 THEORY, CULTURE & SOC'Y 25, 26 (2004).
[268] For descriptions of this privileged role for cars and their influence on city planning, *see* JOSEPH F.C. DIMENTO & CLIFF ELLIS, CHANGING LANES: VISIONS AND HISTORIES OF URBAN FREEWAYS (2013); COTTEN SEILER, REPUBLIC OF DRIVERS: A CULTURAL HISTORY OF AUTOMOBILITY IN AMERICA (2008); CLAY MCSHANE, DOWN THE ASPHALT PATH (1994).
[269] These six interlocking components are paraphrased from SEILER, *supra* note 268.
[270] *See generally* Katherine J. Goodwin, *Reconstructing Automobility: The Making and Breaking of Modern Transportation*, 10 GLOB. ENVTL. POL. 60 (2010).
[271] *See id.*
[272] MOBILITY PLAN 2035, *supra* note 2, at 13.
[273] *Id.* at 59–60.

expense of automobiles with justifications that public transit and bikes reduce greenhouse gas emissions and its overarching goals of reducing car trips.[274] In sum, these two concepts, which focus on bikers and the system that benefits cars, serve as a way to evaluate the progress of urban biking plans.

CONCLUSION

This Article has made three arguments about law's role in bike lane fights. First, in the *Fix The City* lawsuit, norms in environmental and city governance law laid the foundation for Los Angeles's bike lane battle. At initial glance the *Fix The City* case mostly involves governmental procedures, environmental assessments, and information disclosures.[275] But far more is riding on this case. Second, as litigants argue over the demarcations of inches and feet over miles of urban roads what is at stake is how the Angelinos will live in the future. The bike lane fight reflects a larger contest between car-centric and alternative visions of city life which prioritize bikes, walking, and public transit. LA's bike lane fight represents more than street space for bikes.

Third, when biking advocacy succeeds politically, as it has through the Mobility Plan, it will confront new forms of opposition. Opponents will look to lobbying, electoral politics, and legal options in governance, environmental, transportation, and land use doctrines, at private, local, state, special district, and federal levels. In Los Angeles, this has focused on state-level CEQA and city-level and community-level procedures.[276] Encompassing concerns beyond bike issues made the Mobility Plan a policy success in city agencies, committees, and the council. But this achievement and an expansive mobility scope challenge bike lanes. Non-biking issues implicitly bolster its legal opposition. The Mobility Plan could not benefit from CEQA exemptions for bike lanes and bike plans in SB 417, since the bill encompasses far more than bike lanes.[277] Similarly, favorable environmental impact analysis of traffic patterns, with VMT metrics, have not yet been able to support the Mobility Plan. VMT guidelines have been delayed by a variety of issues beyond bikes.[278] In sum, policy achievements for bike lanes open the road for opposition armed with non-biking legal claims.

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[274] *Id.* at 143.
[275] *See supra* notes 147–61 and accompanying text.
[276] *See id.*
[277] *See supra* notes 189–94 and accompanying text.
[278] *See supra* notes 195–203 and accompanying text.

These three aspects stand out when the Mobility Plan and the *Fix The City* lawsuit are examined with scholarly lessons on bikes. Environmental history, cultural studies, urban planning, and transportation disciplines emphasize that city bike battles are not limited to issues like right of way or status as vehicles. Instead the effort to secure bike lanes implies social and cultural changes for city life, shaped by the land use and transportation decisions of municipal authorities. Longhurst presents the historic arc of how bikes challenge implicit exclusions in land use policies on public roads.[279] Furness explains that bike advocacy must combat not only political privilege for cars but also the social assumptions that urban life excludes bikes.[280] Pucher and Buehler emphasize that bike projects succeed when coalitions are built with other interest groups, focused on sustainability, fitness, and public health.[281] Sadik-Khan and Seth Salomonow describe how bike lane issues become the pathway to express resident opposition to reinvigorating public life on streets.[282]

Bike lanes in Los Angeles reflect on these scholarly suggestions. The *Fix The City* lawsuit continues the bike battles Longhurst describes, with legal argumentation focused on city procedures and environmental assessments.[283] The Mobility Plan counters automobile privilege with the central priority of balancing various mobility modes .[284] Similarly, the Mobility Plan exemplifies policy success, with support from the Mayor, various committees, and the city council, because it speaks to various urban interests not just bike lanes.[285] The *Fix The City* dispute functions as a vehicle to express rejection especially in less dense West Los Angeles.[286]

In conclusion, the Mobility Plan 2035 illustrates what is at stake when cities attempt to implement bike lanes on their streets. In Los Angeles, city leaders, bike advocates, environmentalists, real estate developers, and residents fight over public designations of inches and feet regarding street widths. This is a debate that includes the metrics of traffic analysis, required environmental disclosures, and competing sources of public authority—all extremely technical. Moreover, localized sentiment from residents, transit users, homeowners, and drivers fuel these

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[279] *See supra* notes 215–23 and accompanying text.
[280] *See supra* notes 224, 229–34 and accompanying text.
[281] *See supra* notes 235–45 and accompanying text.
[282] *See supra* notes 246–58 and accompanying text.
[283] *See supra* notes 147–61 and accompanying text.
[284] *See* MOBILITY PLAN 2035, *supra* note 2, at 13.
[285] *See id.*
[286] *See supra* notes 80 and 123 and accompanying text.

tensions. This is influential because it is emotional and easily understood by so many Angelinos, who relate to gridlock and mounting commute times.

The bike lane fight is not just over who has guaranteed access to streets, it is about how city governments influence future urban living. Recent scholarship points to the intrinsic political nature of bike riding. In Los Angeles, the Mobility Plan reflects how this is about city identity. As Mobility Plan projects are implemented and its future is fought out in courts, local government law has the capacity to provide cyclists an option other than free-for-all vehicular mindsets and the status quo of car-centric privileges.

Deaths Expected from Delayed Emergency Response
Due to Neighborhood Traffic Mitigation

Submitted to the City Council of Boulder, Colorado

3 April 1997

Background

During the 11 June 1996 City Council Study Session for Boulder's neighborhood traffic mitigation program (NTMP), several members requested additional quantitative information so that they could better understand the issues. In particular, Councilman Mock asked for data that would allow a comparison of the impacts of delayed emergency response time versus the putative increases in neighborhood safety. His question can be answered well enough by considering cardiac arrest emergencies, for which reasonably good data exists, and then making a crude estimate to allow for the other critical emergencies. Data on the following are required: traffic accident deaths, cardiac arrest emergencies and survivals, emergency response times, and delays from traffic mitigation devices. Fairly accurate numbers exist for all of these items. They are certainly accurate enough for reasonable "risk assessment", which often involves far worse vagaries and rough estimates than in the present case.

Traffic Deaths in Boulder

Transportation staff member Bill Cowern supplied data showing that deaths from traffic accidents for the entire City averaged about 2.8 per year for 1991 through 1996. However, only one death, about 0.17 deaths per year, occurred on streets slated for treatment under the NTMP. So, assuming that this mitigation actually would save lives

from reduced vehicle speeds, the improvement could not possibly be dramatic. Because the mitigation devices themselves present some direct hazards, they could possibly cause *more* deaths by accidents rather then *fewer*. For discussion purposes, I assume that mitigation city wide would reduce the present traffic death rate on mitigated streets by about 0.1 person per year on average. This is believed to be a generous assumption.

Obviously, the 0.1 death per year estimate could be considerably in error. Perhaps the one neighborhood death in the past six years was from some cause that could not be cured by planned mitigation devices; or it could be argued that a death at 13th and College should be included because there may be some traffic mitigation applied there under another program. When lives are at stake, it is best not to make optimistic assumptions, so I do not think it is wise to use an estimate higher than about 0.1 for the assumed lives saved by the NTMP. In any case, doubling or even tripling this number would not change the important conclusions drawn in the last section.

Deaths Caused by Delayed Emergency Response from The NTMP

From the NTMP planning documents, I estimate that emergency response runs will suffer roughly 14 % delay in a sizable area, or over the whole city, if the program is fully applied to the streets in that area. This amounts to about 30 seconds typically and about one minute or more on long runs. Though the NTMP presently includes a condition that the delays must not exceed 30 seconds for any run, it is obvious from measured delays from individual traffic circles and speed humps that only sparse application of these devices would be possible under this criterion. So, the BFD is being pressured to allow a relaxation of original emergency response delay condition. The analysis presented here shows this move to be ill-advised. Even the original allowance of a maximum of 30 seconds involves an intolerable trade-off - lives will be lost due to a large risk/benefit ratio.

Sudden cardiac arrest (SCA, or simply CA) is the most common critical emergency needing prompt intervention. It strikes more than 350,000 people a year in the U. S. ("Sudden Cardiac Arrest", a Communicore publication). Scaled to Boulder, this indicates roughly 140 SCAs per year. About 90% of those treated within two minutes survive; while only about 10% survive if treated after 6 minutes. Survivors have a good long term outlook - about 80% are alive at one year and about 57% are alive at five years. This is impressive because the average age of victims is 65. (However, many victims are much younger, in their 30s and 40s).

Some statistics for Boulder roughly confirm the above scaled value of 140 CAs per year. Brad Baker of AMR, Boulder's ambulance service, informed me that they had "worked and delivered", to the hospital, 30 cardiac arrest victims in Boulder in 1996. Regardless of whether AMR or the BFD reached the victim first, both have roughly the same response times. So, the calculated present average survival probability of 30% for Boulder (see Appendix), if naively applied, indicates that the 30 "successful" resuscitations correspond to roughly 100 CAs. However, the calculations assume that defibrillation equipment is always available with the responding vehicle, which is not true at present; so the present success rate may be well below 30%. This consideration, taken by itself, indicates that substantially more than 100 CAs occur in Boulder each year. Also, not all CAs are reported as emergencies because the persons are found obviously dead or are reported too late for successful initial intervention, which further indicates there are considerably more than 100 CA's per year for Boulder. On the other hand, not all of the 30 victims delivered to the hospital survive long enough to be considered true survivors, which, by itself, would indicate fewer than 100 CAs per year for Boulder.

What is needed here is **the number of CA emergencies that were either reported promptly or that were given CPR along with reasonably quick reporting.** These "fortunate" victims would approximately follow the CA survival curve used in the calculations

in the Appendix. From the discussion in the previous paragraph, 60 to 80 is a reasonable, perhaps conservative, estimate of the number of good prospects for successful resuscitation. In the Appendix, I have used 60. The final conclusions will not be changed even if these estimates are much in error.

The relevant CA survivability curves and the BFD response time curves are fairly well known. This allows a calculation of the number of survivals out of the "fortunate" victims for both the current response times as well as degraded or improved response times, as detailed in the Appendix. The Appendix also has a written confirmation of the calculation procedure from Dr. Irving Weiss, who is a retired math professor and who specializes in statistical analysis.

From my estimate of 60 "fortunate" CA victims per year, the calculations in the Appendix indicate that roughly 5.3 additional deaths per year in Boulder can be expected if full neighborhood traffic mitigation is implemented. This assumes that the one minute response time improvement target of the BFD is not accomplished. If their goal is met, only to be negated by the NTMP, then roughly 6.5 additional CA deaths can be expected from the NTMP. I believe the BFD improvement goals are realistic and will be achieved. Therefore, I offer the 6.5 additional CA deaths as the best guess as determined by the present analysis.

But what about other time-critical, life-threatening emergencies? I have not been able to find sufficient data on these to make a satisfactory estimate. However, the worst possible assumption would be that there are *no* additional deaths from response delays for burn victims, heavy traumas, choking children, drowning victims, ruptured appendices, child birth emergencies, shock victims (electric, toxic, etc.), severe asthma attacks, and other critical emergencies. It is lamentable that better data is not kept with respect to these emergencies. As a gross guess, I estimate that at least two additional non-CA deaths per year would result from a one minute degradation in response times, for a total of roughly 8.5 lives per year.

Discussion

To put the predicted consequences from a fully implemented NTMP in perspective, I note that 8.5 lives per year is three times larger than the usual 2.8 traffic deaths per year for the entire city. Further, these predicted additional deaths are very large compared to the 0.1 life per year assumed to be saved by this program. The present analysis indicates a risk/benefit ratio of 85 to 1, in terms of human lives (property loss risks are ignored here but are probably quite sizable). Over time, 85 additional deaths are predicted from delayed emergency response for each life saved, if any, by the NTMP.

Of course, the above comparisons are very rough due to the lack of precise data and the assumptions involved. Assuming a wildly optimistic posture, if the estimate for lives saved by the NTMP is low by a factor of three, giving 0.3 lives saved per year; and if the estimate for the lives lost due to delayed emergency response is high by a factor of three, then only about three additional lives lost per year are foreseen. Even with these rather absurd allowances, nearly 10 lives are predicted to be lost, over time, for each one saved by full implementation of the NTMP.

The risk/benefit ratio will be the same in mitigated *portions* of the city as for the *whole city,* as long as the mitigation is extensive enough to cause, on average, the same proportional delays in the emergency response curve. However, different models and analyses are needed for projects of limited extent - for example, a few obstructions on a cul-de-sac. Given the large risk/benefit ratios for extensive mitigation, it is likely that such local mitigation also involves significantly increased risk. *For the few special situations where obstructive mitigation appears possibly beneficial, the city should conduct the proper engineering studies rather than blindly allowing mitigation projects that might endanger the affected residents.*

Deaths Expected from Delayed Emergency Response Due to Neighborhood Traffic Mitigation

Appendix

Cardiac-Arrest Emergencies in Boulder, CO Lives Saved or Lost Versus Emergency Response Times

The Basic Data
(Page 1)

The Boulder Fire Department (BFD) Master Plan contains data on the survival probability for cardiac arrest (CA) emergencies in terms of the time delay before treatment occurs (from textbook data). Histograms of responses of Boulder's fire trucks to emergency calls are also given (the fire department provides the early medical treatment). Along with data for the yearly number of CA emergencies, reasonable estimates can be made for expected survivals not only for the present situation but also for several relevant scenarios, such as delayed responses due to traffic mitigation or quicker responses due to anticipated improvements in equipment and protocol.

Pages A3 and A4 are copies from the BFD Master Plan that show the three key curves in Figures 7 and 10 from that plan: (1) the smoothed BFD response histogram (Figure 7); (2) the cumulative arrival time curve (Fig 10), which is simply an integration of the smoothed response histogram; and (3) the survival probability for CA emergencies as a function of time. The survival curve relates to victims who are given defibrillation treatment. This curve does apply to the BFD as they are now purchasing defibrillators.

Page A5 shows a spreadsheet and some graphs of the pertinent data. The data in the leftmost 6 columns was scaled from Fig. 10 on Page

A4. There are three additional hypothetical response time data sets, each proportional to the present response data:
"0.14 quicker" than present, which amounts to a one minute improvement in the present 90% response time of 7 minutes and is BFD's goal for the near future
"0.14 slower" than present, which is an estimate for response delays within and beyond any area effected by full mitigation according to the original Boulder NTMP (eventually, the area effected could be most of the city)
"90% within 4 minutes", which is the response-time goal of Boulder's peer cities

The hypothetical curves were formed by applying proportional changes to the time axis of the "present" curve. For the mitigation-delayed response curve, a proportional change assumes that the mitigation obstructions are, on average, spread uniformly along the routes. The proportional degradation or improvement is also applied to the roughly one minute time interval between notice of the emergency and leaving the station. While it is appropriate to assume that the "roll out" times will be shorter for the improved response scenario, the mitigation devices will not degrade the roll out times. So, there is a small error in proportionally increasing roll-out times for the degraded scenario.

Integrating the Probabilities to Determine the Survivors (Page 2)

While there is no arrival time histogram for CA emergencies alone, it is reasonable to assume that the arrival time histogram for CA emergencies is the same as that in Figure 7, which is for all fire and medical emergency calls.

To have symbols for the ordinates of the curves in Figures 7 and 10, let F represent the smoothed arrival time histogram of Figure 7, let S represent the survivability curve of Figure 10, let A represent the cumulative arrival time curve of Figure 10.

To perform an approximate integration using these curves, we will need some approximate formulas that are well within the accuracy of the data base for the curves. Let X be the number of "fortunate" (Page 2, main text) CA emergencies per year. Since F is the fraction of total arrivals per minute interval at a given arrival time, the number of CA emergencies per year reached within a time interval DT ("delta" T) centered at a given arrival time is DT*F*X. Then, the number of lives saved for the given arrival time period is DT*F*X*S. To carry out the approximate integration over all arrival times, it is convenient to make some substitutions in this formula.

Now refer to the graph on Page A5, where a DT of one-half minute is shown. Because the cumulative arrival time curve, A, is simply the integral of F, it follows that DT*F for a given time interval is equal to (AE-AB) for the corresponding time interval. ("E" refers to the end of a time period and "B" refers to the beginning). Further, S expressed in terms of the beginning and ending values is (SE+SB)/2, the average value for the interval. So, the number of lives saved for any given time interval is 0.5*(SE+SB)*X*(AE-AB). For a given number of cases per year, the sum of these formulas for all half-minute intervals from 1 to 10 minutes gives the predicted total number of lives saved per year.

The formulas in the rightmost four columns of the spreadsheet are 0.5*(SE+SB)*(AE-AB). The X has been factored out and applied later, as shown in the area just below the column sums. Each column sum is the average survival probability for randomly reported CA emergencies in Boulder for the corresponding arrival time curve.

From the discussion in the main text, X=60 is an estimate of the "fortunate" emergencies. This estimate is for the "most probable" case rather than either end of a range of reasonably likely possibilities. The approximate integrations performed here show that roughly 10% of these "fortunate" CA victims are saved or lost by one minute changes in the present 90% response time.

Dr. Irving Weiss has supplied a formal derivation along with a confirmation of the integration procedure (See Page A6). The integration procedure has also been verified by using some simple postulated probability distributions that have obvious results.

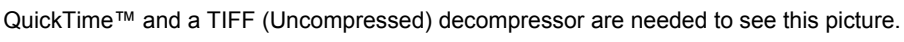
Deaths Expected from Delayed Emergency Response
Due to Neighborhood Traffic Mitigation

Response Time Distribution

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

Deaths Expected from Delayed Emergency Response
Due to Neighborhood Traffic Mitigation

Probabilities of Survival and an Engine Arriving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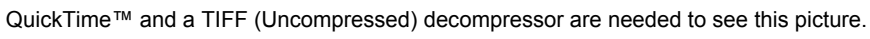
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QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

Confirmation of the Calculation Procedure - Appendix, Page 6

Boulder, Colorado
March 19,1997

Dear Ray:

I have checked your method for estimating the probability of surviving a heart attack when treated by the emergency services of the Boulder Fire Department and have found it to be correct. Your use of numerical integration is formalized below.
I am using a discrete model rather than a continuous one to avoid curve fitting and to simplify calculations.

This equation corresponds to the righthand four columns in your table: "Consequences of Emergency Response on Cardiac Arrest Survival".

To obtain the average or expected number of survivors, E(S), multiply the number of cases, n, by P(S). E(S) = nP(S). Let Q(S) be the probability that one does not survive emergency treatment; ie is a fatality. Then the expected number of fatalities, E(F) is

Sincerely yours,
Irving Weiss, PhD

Pedestrian Design for Accessibility Within the Public Right-of-Way

Introduction

The pedestrian facilities at intersections must be usable by pedestrians of all ages and capabilities. Intersections in particular must be designed to safely accommodate pedestrians of all ages and physical and mental abilities. Often, however, intersection designs fail to accommodate people with visual and mobility disabilities.



Figure 1: Intersections should accommodate all pedestrians

Intersection pedestrian features have traditionally been designed for people who are mentally and physically agile, with good stamina, vision, and hearing. However, according to the Census Bureau, approximately 15 percent of people age 5 or older have some disability.[1] This represents more than 41 million individuals.

The Americans with Disabilities Act (ADA) provides minimum design standards that are to be applied to all public environments, including the public right-of-way. These standards, the Americans with Disabilities Act Accessibility Guidelines (ADAAG), are the foundation for designing all pedestrian environments. Additional, specific requirements for public rights-of-way are currently in draft form.

Pedestrian accessibility enhancements not only benefit people with disabilities; they benefit all pedestrians as well. Examples include curb ramp improvements that assist people pushing carts or strollers and placing the WALK push buttons in a place that is accessible and easily understandable for all intersection users.

Rather than a standard for dimensions, the ADAAG should be considered minimum criteria. Entities are encouraged to design and set codes beyond the minimum standards to facilitate access for a wider spectrum of people. If designers are faced with designing a facility not specifically addressed within the guidelines, they are still responsible for making the features/facility accessible. The nondiscrimination requirements for usability by people with disabilities in ADA are the overarching regulations that must be applied.[2] It is critical for transportation providers to understand the details and principles for accessible design in order to apply good engineering judgment in difficult design situations. Pedestrian facilities with physical barriers, unusable sign and signal information, gaps in the system, and poorly designed features have critical safety implications for people with disabilities and may leave them stranded and unable to get to their destinations.

1. US Census Bureau, 2006 American Community Survey http://factfinder.census.gov/home/saff/main.html.
2. It is not the intent, however, that agencies be required to purchase right-of-way for the sole purpose of meeting ADA criteria. http://www.access-board.gov/prowac/draft.htm#ta.

U.S.Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
Investment in roadway safety saves lives

FHWA-SA-10-005

Challenges for Engineers and Designer

For pedestrians with disabilities, intersections can prove to be a challenge. Some of those challenges and design recommendations to better accommodate pedestrians with disabilities include the following:

- The assumption of pedestrian walking speeds of 4 feet per second (fps) is often inadequate.
- The pedestrian clearance time should be sufficient to allow a pedestrian crossing in the crosswalk who left the curb at the end of the WALK signal indication to travel at a walking speed of 3.5 fps to the far side of the traveled way or to a median of sufficient width for pedestrians to wait.[3] [4]
- A walking speed of up to 4 fps may be used to evaluate the sufficiency of the pedestrian clearance time at locations where equipment such as an extended push button press or passive pedestrian detection has been installed to provide slower pedestrians an opportunity to request and receive a longer pedestrian clearance time.[5]
- Where pedestrians who travel slower than 3.5 fps routinely use the crosswalk, a slower walking speed should be used in determining the clearance interval.
- The total of the walking interval and pedestrian clearance time should be sufficient to allow a pedestrian crossing in the crosswalk who left the pedestrian detector (or, if no pedestrian detector is present, a location 6 feet back from the face of the curb or from the edge of the pavement) at the beginning of the WALKING PERSON signal indication to travel at a walking speed of fps to the far side of the traveled way being crossed.

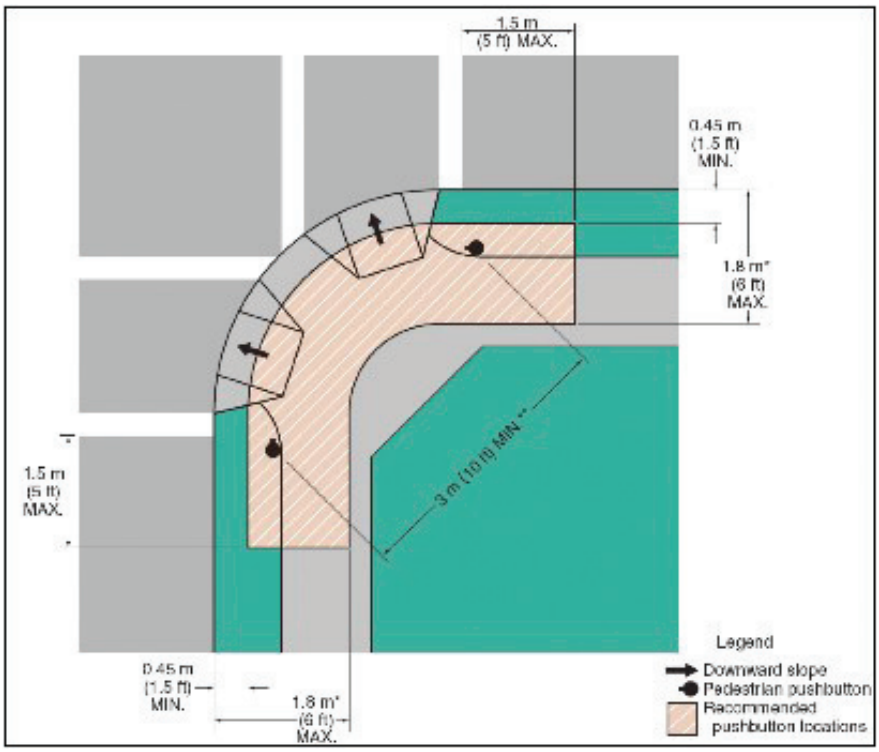

Figure 2: MUTCD, figure 4E-2 http://mutcd.fhwa.fhwa.dot.gov

Curb ramps are required at all crossings to provide access for pedestrians who use wheelchairs or who cannot step off a curb. Ideally, a separate curb ramp should be provided for each crosswalk (See Figure 3, which shows a curb ramp on only one side of the street). The ramp should have no more than 8.33% running slope and no more than 2% cross slope. A level landing/turning space is required at the top of a perpendicular ramp. Truncated dome detectable warnings are required at the transition to the street where there is no curb, to alert pedestrians who are blind to the edge of the street. Where possible, the curb ramp should be aligned with the direction of travel on the crosswalk so individuals with disabilities are properly aligned to cross and don't have to turn after entering the street. Design guidance for curb ramps in new construction and in alterations situations can be found in *Designing Sidewalks and Trails for Access, Part 2*, published by FHWA in 2001, and in *Special Report: Accessible Public Rights-of-Way, Planning and Designing for Alterations*, published in 2007 by the Institute of Transportation Engineers and the Access Board.

Curb ramps at intersections need to be designed so that they do not create an inaccessible condition for the pedestrians using the sidewalk and not crossing the street. The primary problem encountered in maintaining an accessible route is ensuring a 3-foot wide path with a cross slope of 2% or less is provided through the intersection (Figure 4 shows a cross slope that is too steep. This makes it difficult for a wheelchair user to negotiate a pedestrian accessible route).

At intersections, turning vehicles and the speed at which they travel pose the greatest threat to pedestrians, and often the motorist's attention is focused on other motorists.

- Intersections should be designed to reduce the speeds at which vehicle/pedestrian conflict occur.
- Conflicts points should be clearly defined for all users.

3. MUTCD 2008 NPA, Section 4E.10, FHWA, Washington, DC, 2008.
4. The ADA Draft Public ROW Accessibility Guidelines state, "Each crosswalk with pedestrian signal indication shall have an accessible pedestrian signal which includes audible and vibrotactile indications of the WALK interval." http://www.access-board.gov/prowac/.
5. Ibid.



Figure 3: View of a new perpendicular ramp with returned curbs on one side of the street, but vertical curb prevents passage on opposite side of the street



Figure 4: Example of a too steep cross slope

Skewed intersections can be especially problematic for pedestrians with mobility impairments. While the shortest crossing distance of a roadway occurs at aright angle, this is not usually the best approach for striping crosswalks at skewed intersections. Crosswalks at skewed intersections should be striped parallel to the adjacent roadway. The alternative, a crossing perpendicular to the roadway, places pedestrians out of the intersection area where motorists expect and are looking for conflicts. Accessible pedestrian signals (APS) should be used to provide positive guidance to pedestrians with vision impairments.

Right-turn-on-red, roundabouts and channelized right-turn lanes and other features designed to move traffic more quickly can be hazardous for people with visual disabilities. Pedestrians who are blind or who have low vision typically rely on the sounds of traffic stopping and starting as cues to signal phases, or to gaps in traffic as cues to cross at unsignalized locations.

In roundabouts and channelized turn lanes, sound created from constantly moving traffic from other lanes may mask the sound of a vehicle in the immediate lane being crossed. While a pedestrian who is sighted can cross in a gap just after a vehicle has crossed the crosswalk, a pedestrian who is blind may have to wait until the sound of that vehicle has faded before being able to tell if there is a gap in traffic.

- For roundabouts and single-lane channelized right-turn lanes, approaches should be designed to minimize vehicular speeds.

- For multi-lane roundabouts and multi-lane channelized right-turn lanes, a pedestrian activated signal complying with APS should be provided for each segment of each crosswalk, including the splitter island.

- In addition, the location of the crosswalk is usually not in the line of travel on approach so additional cues are needed in order for pedestrians who are blind or who have low vision to find the crosswalk. For example, low landscaping or barriers along the curb edge can prevent pedestrians from crossing at the wrong location and provide guidance to the crosswalk location.

At many intersections, pedestrian push buttons are located two per pole or are located such that the crossing they serve is unclear. Place pedestrian push buttons on the far side of the curb ramp (away from the parallel roadway) and perpendicular to the crossing.

Accessible Pedestrian Signals

The Manual on Uniform Traffic Control Devices (MUTCD) provides guidance and standards for accessible pedestrian signals in 4E.06 and 4E.09 (ref. 2003 MUTCD) and the MUTCD Notice of Proposed Amendment provides more specific criteria, based on new types of APS. New types of APS are integrated into the pedestrian push button and include speakers and vibrating surfaces incorporated in the pedestrian push button housing. These provide crossing indications to the waiting pedestrian at the departure curb rather than from overhead, as in older technology, and permit speaker volume to be set at a significantly lower and less obtrusive level. Tactile arrows and other features—push button locator tones, additional audible or Braille information, crosswalk maps, actuation indicators—enhance the effectiveness of these new devices.

Figures 5 and 6 show several of the push button-integrated APS devices available in the United States. All include a push button that is at least 2 inches in diameter, both audible and vibrotactile WALK indications, a push button locator tone, a tactile arrow and automatic volume adjustment. Configuration, functioning and adjustment methods vary somewhat by manufacturer.



Figure 5: APS example

Most push button-integrated APS can provide additional features. These may include Braille labels for street names, actuation indicators (a light or beep), tactile crosswalk maps, and options activated by an extended button push: audible beaconing (useful for directional guidance at irregular or long crossings), extended pedestrian timing and recorded information of street names or additional information about the intersection.

For further information, see NCHRP Web-only Document 117A, *Accessible Pedestrian Signals: A Guide to Best Practice*.

APS should be considered when:
- A request has been submitted for accessible pedestrian signals;
- There are traffic volumes during times when pedestrians might be present, including periods of low traffic volumes or high right turn-on-red volumes;
- There is complexity of traffic signal phasing (such as split phases, protected turn phases, leading pedestrian intervals, and exclusive pedestrian phases); and
- The intersection geometry is complex.

Questions to Ask During Project Development

Designing for accessibility is largely a matter of common sense on the part of the designer or engineer, once there is awareness and understanding. It means understanding the capabilities of users (children, elderly, people with cognitive, visual, and mobility disabilities) and knowing how a facility should perform for all pedestrians.

Some questions to ask:

- Are the sidewalks passable by people using wheelchairs, walkers, and strollers?
- Are crosswalks accessible?
- Are there curb ramps (two per corner where practical)?
- Do the ramps comply with ADA specifications (critical design aspects are the presence of a level platform at the top of the ramp, cross-slope of the ramp and wheelchair traps at the base of the ramp)?
- Is the ramp located in the path pedestrian travel (i.e., do people wanting to use the ramp need to divert from the most direct path)?
- Is the push button of an actuated pedestrian traffic signal accessible?
- Does it have a locator tone for people who are blind?
- Is the button proximate to the crosswalk?



Figure 6: Examples of APS

- Is it clear which crosswalk the button actuates?
- Is the button located within reach of a wheelchair user or child?
- Are there nonvisual cues that alert pedestrians to when they are leaving the sidewalk and entering the street (examples are curb, lip of an ADA ramp, or other tactile surface)?
- Is there an alternate route for pedestrians at construction sites?
- Are there cues at the site giving a person using a white cane the information that is needed to know there is a sidewalk closure or open pit?
- Does the information give cues on how to navigate safely around the site and not into the construction?
- Is there a wheelchair ramp at the site for users to navigate to the alternate route?
- Can pedestrians (especially those with low vision) see the pedestrian signal across the street?
- Is the pedestrian signal located on the same pole as the vehicle indication for conflicting movements (normally left and right turns) so that pedestrians understand vehicle conflicts and vice versa?
- Is the pedestrian signal located on the inside edge of the crosswalk so that a truck stopped at the intersection will not obstruct it?
- Are pedestrian signs easy to understand and interpret?
- Are there design features that create special challenges for visually impaired pedestrians (examples: right-turns-on-red, right-slip lanes, or roundabouts without controlled crossings)?

Resources

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11 ISSUE BRIEFS

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The Built Environment and Traffic Safety: A Review of Empirical Evidence

Reid Ewing and Eric Dumbaugh

Journal of Planning Literature 2009; 23; 347
DOI: 10.1177/0885412209335553

The online version of this article can be found at:
http://jpl.sagepub.com/cgi/content/abstract/23/4/347

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Journal of Planning Literature
Volume 23 Number 4
May 2009 347-367
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10.1177/0885412209335553
http://jpl.sagepub.com
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The Built Environment and Traffic Safety

A Review of Empirical Evidence

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The article reaches two conclusions counter to accepted transportation engineering theory. First, the traffic environments of dense urban areas appear to be safer than the lower-volume environments of the suburbs. The reason is that many fewer miles are driven on a per capita basis, and the driving that is done is at lower speeds that are less likely to produce fatal crashes. Second, at least in dense urban areas, less-"forgiving" design treatments—such as narrow lanes, traffic-calming measures, and street trees close to the roadway—appear to enhance a roadway's safety performance when compared to more conventional roadway designs. The reason for this apparent anomaly may be that less-forgiving designs provide drivers with clear information on safe and appropriate operating speeds.

Keywords: *traffic safety; built environment; urban sprawl; street design*

Introduction

In 2007, a front-page story in *USA Today* proclaimed: "16 states see road deaths slashed" (January 30, 2007). State officials attributed the drop to traffic enforcement, education, and unspecified improvements in highway design. However, the article ended on a less congratulatory note. One expert called it "unfair" to give too much credit to these factors, without looking at "*vehicle miles traveled,* the cost of gas, whether people were driving as much" (emphasis added). And the final paragraph noted: "In states where fatalities rose substantially, agencies cited increases in *pedestrian deaths,* aggressive driving, drunken driving, and *speeding* as factors" (emphasis added). Readers who turned to page three learned that ten states saw very significant increases in traffic fatalities.

Before we declare victory in the war against highway deaths and injuries, we should take a closer look at the factors highlighted in the previous paragraph. This article summarizes the literature on the relationship between the built environment and traffic safety, paying attention to how the activities of planners can either help or hurt. We begin by examining broad impacts on traffic safety at the macro levels of the region and community, and then examine impacts at the micro levels of the street and site.

Traffic Safety as a Public Health Priority

Concerns about public health and safety have always been central to the planning field. Recent research has focused on active living, specifically how the built environment affects physical activity and hence overall health (Transportation Research Board 2005). Far less attention has been paid to another important health outcome of the built environment, traffic-related deaths and injuries.

Yet, worldwide, roughly 1.2 million transportation-related fatalities and fifty million traffic-related injuries occur each year. More than half of these injuries and fatalities involve pedestrians, and the majority occur in developing countries. Because of the rapid increase in personal automobile use in developing countries, these numbers are projected to increase by 65 percent by 2020, thus raising traffic fatalities to the

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sixth leading preventable cause of death worldwide (World Health Organization 2004).

In the United States, traffic fatalities are already the sixth leading preventable cause of death (Mokdad et al. 2004). We suffer roughly forty thousand fatal crashes and an additional eight hundred thousand injuries each year (Fatality Analysis Reporting System & the General Estimate System). While the United States once had the second-safest transportation system in the developed world, its traffic safety record has since fallen behind every other developed country, including England, Australia, and the entirety of the continental Europe. This is true whether safety is measured in terms of traffic fatalities per capita, or traffic fatalities per vehicle mile traveled (World Health Organization 2004). Pedestrians make up 11 percent of traffic fatalities in the United States, far out of proportion to the amount of walking, and pedestrian injuries outnumber pedestrian fatalities by a ratio of almost fifteen to one (Surface Transportation Policy Project 2004).

Conceptual Framework

A conceptual framework for this literature review is presented in figure 1. The published literature is generally supportive of this framework. In this framework, the built environment affects crash frequency and severity through the mediators of traffic volume and traffic speed. Development patterns impact safety primarily through the traffic volumes they generate, and secondarily through the speeds they encourage. Roadway designs impact safety primarily through the traffic speeds they allow, and secondarily through the traffic volumes they generate. Traffic volumes in turn are the primary determinants of crash frequency, while traffic speeds are the primary determinants of crash severity.

Figure 1
Conceptual Framework Linking the Built Environment to Traffic Safety

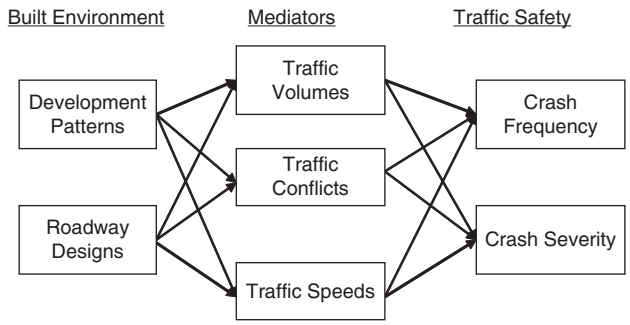
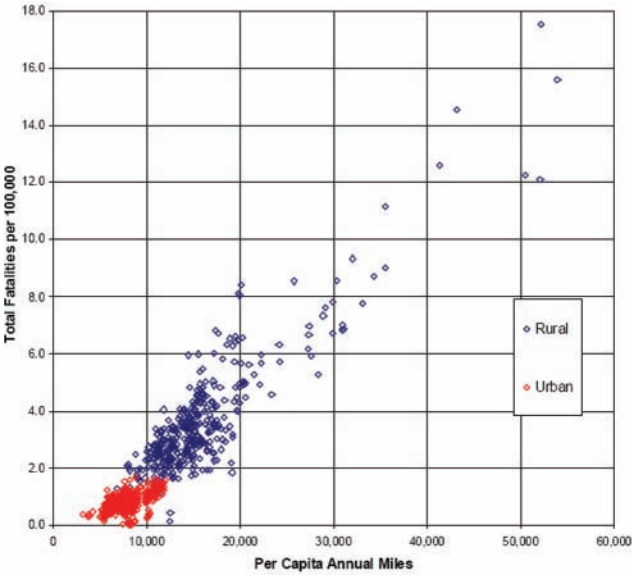


Figure 2
Traffic Fatalities and VMT for Urban and Rural Areas (Litman and Fitzroy 2005)



Mediating Factors

Traffic Volume

A key tenet in traffic safety is that humans are prone to error. Failure to notice a potential hazard, delayed response to a perceived hazard, or unexpected behaviors by other road users can all produce traffic crashes. Thus, each and every trip—whether as a motorist, pedestrian, or bicyclist—involves an element of risk.

Ceteris paribus, the more vehicular travel, the more risk of crashes. Litman and Fitzroy (2005) examined the relationship between per capita traffic fatalities and vehicle miles traveled (VMT) for urban and rural areas in the United States. As shown in figure 2, the relationship is roughly linear: as VMT increases, so do traffic fatalities. For urban areas, each 1 percent increase in travel is associated with a 1 percent increase in traffic fatalities. For rural areas, each 1 percent increase in VMT is associated with a 1.5 percent increase in traffic fatalities (Litman and Fitzroy 2005).

Balkin and Ord (2001) found that fatalities along individual highway facilities vary seasonally, with crashes increasing during periods that experience

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seasonal increases in VMT. Conversely, reductions in annual mileage during economic recessions often reduce per capita crash rates. A study of young drivers found that "the consistently significant factor influencing risk of motor vehicle crash involvement was *quantity* of kilometres driven" (Bath 1993, 5). Similarly, the lower crash rate observed for female drivers is approximately equal to their lower average driving mileage (Butler 1996).

Other studies finding significant relationships between average daily traffic or VMT and crash frequency include Levine, Kim, and Nitz (1995a, 1995b); Roberts et al. (1995); Hadayeghi, Shalaby, and Persaud (2003); Lovegrove and Sayed (2006); and Hess et al. (2004).

Traffic Speed

The other main mediating factor is traffic speed. Simple physics tells us that higher operating speeds give drivers less time to react to unforeseen hazards and result in increased force of impact when crashes occur. At a running speed of forty miles per hour, a typical driver needs more than 280 feet to stop on wet pavement; at thirty miles per hour, emergency stopping distance drops to just over 130 feet; and at twenty miles per hour, it is about 60 feet (see figure 3).

Beyond the generalized safety benefits associated with lower vehicle operating speeds, lower speeds have a profound effect on pedestrian safety. Struck by a vehicle traveling forty miles per hour, a pedestrian has an 85 percent chance of being killed. The fatality rate drops to 45 percent at thirty miles per hour and to 5 percent at twenty miles per hour or less (UK Department for Transport 1997; Zegeer et al. 2002a). This relationship is nonlinear as well, with crash severity increasing exponentially with vehicle speed (see figure 4).

Yet perhaps more importantly, the very likelihood that a pedestrian-related crash will occur appears to increase with vehicle operating speeds. In general, low speed, "main street" type designs experience the lowest rates of vehicle-pedestrian crashes, while downtown areas with wide travel lanes and higher operating speeds experience the highest rates (Garder 2004).

It is for these reasons that European roadway engineers design for lower vehicle operating speeds, at least in developed areas (Federal Highway Administration 2001; Lamm, Psarianos, and Mailender 1999; Organisation for Economic Co-Operation and Development [OECD] 1998; UK Department for Transport 2007).

Figure 3
Typical Emergency Stopping Distance on Wet Pavement for Various Running Speeds (Transportation Research Institute 1997)

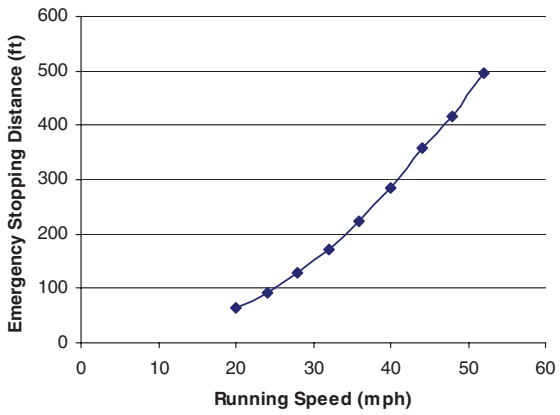
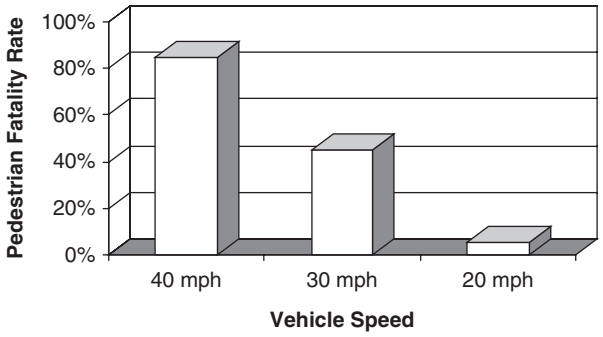


Figure 4
Pedestrian Fatality Rates for Collisions at Different Speeds (Zegeer et al. 2002a, 13)



Traffic Conflicts

It is not traffic speed alone that causes crashes. Rather it is speed differentials among vehicles in the traffic stream. Likewise, it is not traffic volume alone that causes crashes, but rather conflicting movements when traffic volumes are high. The independent role of conflicts comes up in discussions of on-street parking, access management, traffic calming, intersection control, and pedestrian countermeasures. To make this point explicit, an extra box, representing the mediating effect of traffic conflicts, has been added to figure 1.

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Development Patterns and Traffic Safety

Accepted Theory

The literature is replete with studies showing that areas with more residents, more employment, and more arterial lane miles experience more crashes (Levine, Kim, and Nitz 1995a, 1995b; Hadayeghi, Shalaby, and Persaud 2003; Kmet, Brasher, and Macarthur 2003; Ladrón de Guevara, Washington, and Oh 2004; Hadayeghi et al. 2006; and Lovegrove and Sayed 2006). Such studies may be useful for crash prediction. However, they do not explain the relative risk of crashes or the rate of crashes per capita, only overall crash frequency. Where there are more people and jobs, there tends to be more of everything, from traffic to crime to coffee shops. Most of these crash-prediction studies do not control for the confounding influence of VMT.

Some small-area studies have reported more crashes at higher population densities. Any attempt to infer a causal relationship is fraught with difficulty (Hadayeghi, Shalaby, and Persaud 2003). Areas with high population densities tend to be located in or near employment centers, thus experiencing not only local traffic but also regional traffic entering from other areas. Also, high-density areas are more likely to be traversed by multilane arterials, roadways with high crash rates. These too are confounding influences.

Alternative Theory

Given the direct relationship between VMT and crash exposure, development patterns with lower VMT should also have lower traffic crash rates.

Starting in about 1990, researchers began to rigorously study the relationships between the built environment and travel, with the term "4Ds" being coined to describe the factors most likely to influence travel behavior—density, diversity, design, and destination accessibility. Density is usually measured in terms of persons, jobs, or housing units per unit area. Diversity refers to land-use mix. It is often related to the number of different land uses in an area and the degree to which they are complementary. Design includes street network characteristics within a neighborhood. Street networks vary from dense urban grids of highly interconnected, straight streets, to sparse suburban networks of curving streets forming "loops and lollipops." Design also includes sidewalk coverage, building setbacks, pedestrian crossings, presence of street trees, and a host of other physical variables. Destination accessibility refers to relative ease of accessing jobs, housing, and other attractions within the region, which tends to be highest at central locations and lowest at peripheral locations.

A 2001 review of this literature identified some fifty studies that were methodologically rigorous, in the sense that they used disaggregate travel data for individuals or households, controlled for demographic and socioeconomic factors that influence travel behavior, and tested a wider variety of local land-use, transportation, and site design variables than had earlier studies (Ewing and Cervero 2001).

The 4Ds are consistently found to have a significant effect on the distance people travel and the mode they choose. Trip lengths are generally shorter at locations that are more accessible, have higher densities, or feature mixed uses. This holds true for both the home end (i.e., residential neighborhoods) and nonhome end (i.e., activity centers) of trips. Walk and transit modes claim a larger share to all trips at higher densities and in mixed-use areas, meaning that the number of vehicle trips (VT) drops as well.

Table 1, below, presents elasticities of VT and VMT with respect to the 4Ds. An elasticity is a percentage change in one variable with respect to a 1 percent change in another variable. Hence, from table 1, we would expect a doubling of neighborhood density to result in a 5 percent reduction in VMT, and thus a 5 percent reduction in traffic crashes per capita in urban areas, *ceteris paribus.* These effects are independent and additive. Note that the elasticity of VMT with respect to destination accessibility is as large as the others combined, suggesting that areas of high accessibility—such as center cities—may experience substantially lower rates of traffic fatalities and injuries than dense mixed-use developments in the suburbs.

EPA is funding a full-blown meta-analysis of this ever-expanding literature. The number of rigorous studies now exceeds 150, including studies that examine multiple D variables simultaneously, studies that compare travel behavior across nations, and studies that account for residential preferences that may confound results.

Urban Sprawl

If the relationship between VMT and traffic fatalities is near-linear, then "sprawling" environments, which are known to generate higher per capita VMT, should also report higher rates of traffic crashes and fatalities (Ewing, Pendall, and Chen 2002). The *Mean Streets* series, put out by the Surface Transportation

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Table 1
Typical Elasticities of Travel with Respect to the 4Ds

	Vehicle Trips (VT)	Vehicle Miles Traveled (VMT)
Local Density	–.05	–.05
Local Diversity (Mix)	–.03	–.05
Local Design	–.05	–.03
Regional Accessibility	—	–.20

Source: (Ewing and Cervero 2001).

Table 2
Most Dangerous Metropolitan Areas for Pedestrians

Metro Area	Pedestrian Danger Index
1. Orlando, FL	243.6
2. Tampa-St. Petersburg-Clearwater, FL	215.3
3. West Palm Beach-Boca Raton, FL	209.9
4. Miami-Fort Lauderdale, FL	166.3
5. Memphis, TN-AR-MS	159.1
6. Atlanta, GA	144.4
7. Greensboro—Winston-Salem—High Point, NC	122.5
8. Houston-Galveston-Brazoria, TX	121.9
9. Jacksonville, FL	120.7
10. Phoenix-Mesa, AZ	117.2

Note: The Pedestrian Danger Index is calculated by dividing the average annual fatality rate per one hundred thousand population for a metropolitan area by the percentage of commuters walking to work in that metropolitan area, using "journey to work" data from the decennial Census.
Source: (Surface Transportation Policy Project 2004).

Policy Project (STPP), shows pedestrian fatality rates, adjusted for exposure, to be higher in metropolitan areas generally viewed as more sprawling (Surface Transportation Policy Project 2000, 2002, 2004). STPP created a pedestrian danger index by adjusting annual pedestrian fatality rates for a measure of exposure, the share of commuters walking to work from the U.S. Census. The ten most dangerous places in terms of this index are all sprawling sunbelt metros (see table 2).

Limiting the value of these studies is the fact that they (1) do not measure sprawl explicitly, (2) do not control for potentially confounding variables such as income and age distribution, (3) use an imprecise measure of pedestrian exposure, and (4) fail to test for statistical significance. As with all studies at this level of geographic aggregation, the possibility of aggregation bias may preclude extension of results to smaller areas.

Table 3
Traffic Safety Measures for Thirteen Study Regions

	Fatalities per Million Population per Year	Fatalities per Billion Vehicle Miles Traveled (VMT) per Year
Philadelphia	66	9.6
Atlanta	119	9.8
Houston	137	14.2
Pittsburgh	99	10.9
Tampa/St. Petersburg	179	20.2
St. Louis	89	8.1
New Orleans	112	19.2
Charlotte	145	11.8
Nashville	175	15.5
Omaha	81	10.1
Little Rock	190	16.3
Erie	135	22.9
Binghamton	107	8.9

Source: (EPA 2004).

A study for the U.S. Environmental Protection Agency (EPA) matched metropolitan areas in terms of size and density, but consciously chose metros with contrasting transportation systems (EPA 2004). Differences were evident in block size, street-network density, intersection density, percent of four-way intersections, and transit-service density. Metros with smaller blocks, dense streets and intersections, more four-way intersections, and more transit service were said to epitomize "smart growth." The others were more representative of sprawl. The matched comparison showed that metros with smart growth transportation systems (the first one in each set in table 3) sometimes had lower annual traffic fatality rates per million population. This was the case for Philadelphia, New Orleans, and Omaha. Other times the reverse was true. Results were also mixed for annual fatalities per billion VMT traveled.

Applicability of these results is, once more, limited by the geographic scale of the places compared, by lack of control variables, and lack of statistical testing. Compared to the results of studies using more complete measures of the built environment, they suggest that transportation system characteristics by themselves (absent more compact land use patterns) do not guarantee a safer traffic environment.

In an attempt to overcome such limitations, Ewing, Pendall, and Chen (2002, 2003) developed metropolitan sprawl indices and related them to various transportation outcomes. Sprawl was defined by: (1) a

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population widely dispersed in low-density residential development; (2) a rigid separation of homes, shops, and workplaces; (3) a lack of distinct, thriving activity centers, such as strong downtowns or suburban town centers; and (4) a network of roads marked by very large block size and poor access from one place to another. Principal component analysis was used to reduce twenty-two land-use and street-network variables to four factors representing these four dimensions of sprawl, each factor being a linear combination of the underlying operational variables. The four were combined into an overall metropolitan sprawl index. All indices were standardized on a scale with a mean value of 100, and a standard deviation of 25. The way the indices were constructed, the higher the value of the index, the more compact the metropolitan area; the lower the value, the more sprawling the metropolitan area.

Controlling for sociodemographic differences across metropolitan areas, three of the factors—density, mix, and centering—were significantly related to annual traffic fatalities per one hundred thousand residents (see table 4). The higher the density, the finer the mix, and the more centered the development pattern, the fewer highway fatalities occur on a per capita basis. This is in part because of the mediating influence of VMT per capita, which is lower in compact metropolitan areas. But it may also be the result of another mediating influence, lower average speeds. The traffic fatality rate actually declines at a faster rate than VMT as density, mix, and centering increase.

Ewing, Schieber, and Zegeer (2003) also developed a simpler county sprawl index to measure the built environment at a finer geographic scale, the individual county. It is a linear combination of six variables from the larger set, these six being available for counties, whereas many of the larger set are available only for metropolitan areas. Four of the variables relate to residential density and two relate to street accessibility from one place to another. Principal component analysis was used to extract the single factor that best represents the degree of sprawl. The factor was then transformed into a scale with a mean of 100 and standard deviation of 25.

County-level sprawl proved significantly related to each of three accident-related variables, the overall county-level traffic fatality rate per one hundred thousand residents and two county-level traffic fatality rates specific to pedestrians. Controlling for socioeconomic differences across counties, the more sprawling the area, the higher the all-mode traffic fatality rate and the higher the rate of pedestrian fatalities, adjusted for exposure (see figure 5). The relationship between county-level sprawl and miles driven has recently been confirmed for teenage drivers as well (Trowbridge and McDonald 2008).

Table 4
Best-Fit Regression Equation for Annual Traffic Fatalities per One Hundred Thousand Residents (*t*-Statistics in Parentheses)

Constant	20.16
Metropolitan density factor	–0.105 (–2.5)*
Metropolitan mix factor	–0.041 (–2.5)*
Metropolitan centeredness factor	–0.037 (–2.3)*
Metropolitan streets factor	0.0149 (0.8)
Metropolitan population	–9.4E-08 (–0.3)
Average household size	0.667 (0.3)
Percentage working-age population	0.226 (1.1)
Per capita income	–0.00032 (–2.6)*
Adjusted R^2	0.44

* .05 probability level
** .01 probability level
*** .001 probability level
Source: (Ewing 2002).

Finally, a novel study by Lucy and Rabalais (2002) and Lucy (2003) compared the relative risk of living in cities and suburbs, taking into account both traffic fatalities and homicides. Leaving home proved more dangerous for residents of outer suburban areas than for many central city residents and for nearly all inner suburban residents. They reached this conclusion by analyzing the locations and rates of traffic fatalities and homicides by strangers. The metropolitan areas examined were Baltimore, Chicago, Dallas, Houston, Milwaukee, Minneapolis-St. Paul, Philadelphia, and Pittsburgh for the years 1997 through 2000. Homicides committed by family and friends, usually in the home, were excluded as irrelevant to the study of safety and the built environment. The overall fatality rate by county for one metropolitan area is plotted in figure 6. Note the greater danger associated with outlying areas.

Street Network Design

The traditional urban grid has short blocks, straight streets, and a crosshatched pattern. The typical

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Figure 5
All-Mode Traffic Fatality Rate for Most Sprawling and Most Compact Counties (Ewing, Schieber, and Zegeer 2003)

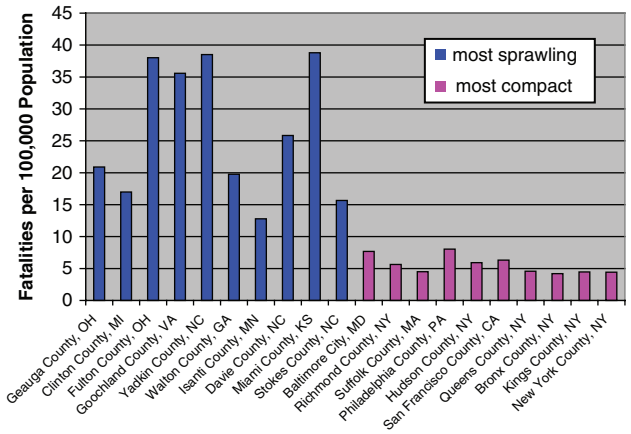
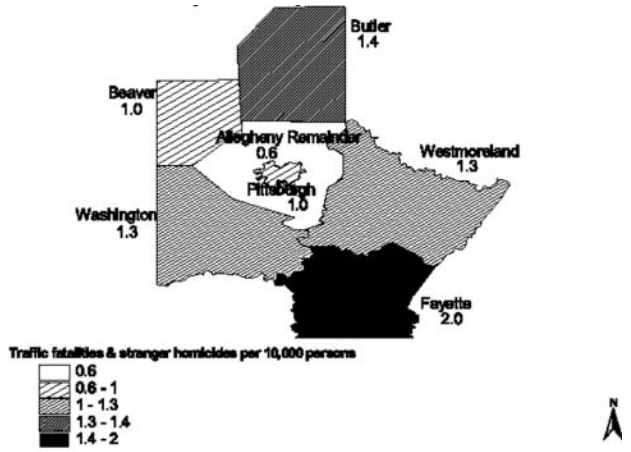


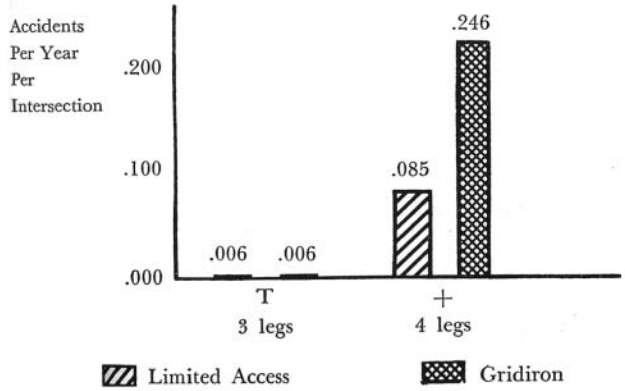
Figure 6
Average Rate of Traffic Fatalities and Stranger Homicides for the Pittsburgh Metropolitan Area (Lucy and Rabalais 2002)



contemporary suburban street network has large blocks, curving streets, and a branching pattern. The two prototypical networks differ in three respects: (1) block size, (2) degree of curvature, and (3) degree of interconnectivity.

One early study compared crash rates in subdivisions with the two types of networks, referred to as gridiron and limited-access (Marks 1957). These roughly correspond to the traditional and contemporary networks described above. The distribution of

Figure 7
Crash History of Three-Way and Four-Way Intersections (Marks 1957)



crashes was fairly uniform across the gridirons; crashes were concentrated wherever two continuous streets met at a four-way intersection. Where there were interruptions in the grid, creating three-way intersections, crashes were infrequent. The limited-access networks also had crashes concentrated at four-way intersections, but there were relatively few of these intersections in the network. The large number of T-intersections in the limited-access network had practically no crash history. Overall, the crash frequency for the five-year period studied was 77.7 crashes per year for the gridiron subdivisions and 10.2 crashes per year for the limited access subdivisions. The difference was in the proportion of four-way vs. three-way intersections for the two types of networks. Crash frequencies were dramatically higher for four-way than three-way intersections, regardless of the network type (see figure 7). As discussed in the traffic-calming section below, roundabouts and other techniques can mitigate dangers at four-way intersections, thus addressing the safety concerns of a gridiron network.

The Marks study has been criticized for failing to consider the severity of crashes in the two networks, and the rate of crashes for the networks as a whole (not just the portion within subdivisions). Still, the main conclusions are supported by more recent studies.

Lovegrove and Sayed (2006) found that areas with more four-way intersections had higher crash rates than those with three-way intersections. They also found that areas with more lane miles of arterials had significantly higher crash rates relative to those with more local street mileage. Ladrón de Guevara,

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Washington, and Oh (2004) similarly found a positive relationship between percentage of roadways classified as arterials or collectors and rates of total and injurious crashes, if not fatal ones. Higher intersection densities were associated with fewer total, injurious, and fatal crashes, a result attributed to lower speeds.

Generalizing, it appears that the shorter the uninterrupted length of roadway, the slower the traffic will travel and the less severe any crashes will be. Short stretches ending in T-intersections are particularly effective in reducing speed, crash frequency, and crash severity.

Roadway Design and Traffic Safety

Accepted Theory

The conventional theory of roadway design is that wider, straighter, flatter, and more open is better from the standpoint of traffic safety. High-speed designs are presumed to be more forgiving of driver error, and thus to lead to reduced incidence of crashes and injuries. As stated in the American Association of Highway and Transportation Officials (AASHTO) Green Book (2004a, 67): "every effort should be made to use as high a design speed as practical to attain a desired degree of safety."

Two facts and two concurrent trends support this view. One fact is that high-speed design features such as wide shoulders and gentle curves improve highway safety in rural areas, particularly on two-lane rural roads (Zegeer and Council 1995). The other fact is that the Interstate highway system, which is designed for high speeds, generally experiences lower crash rates than other roadway classes.

The concurrent trends are (1) the sharp decline in crash rates over the past forty years at the same time (2) lanes and shoulders have been widened, curves straightened, and design speeds generally raised. Concurrent timing has led to the assumption of causality, specifically, that the use of higher design speeds enhances roadway safety (Dumbaugh 2005a).

The conventional engineering wisdom fails to account for an array of confounding factors that influence the safety performance of highways. Land-use context and vehicle-operating conditions are entirely different in urban than rural areas. The much greater degree of conflict among road users in urban areas renders findings from rural safety studies of limited value in urban areas. The lower crash rates on the Interstate highway system are at least in part attributable to controlled access, which eliminates the turning maneuvers and speed differentials that produce the majority of urban crashes (Dumbaugh 2005a; 2006b). In addition, pedestrians and bicyclists, vulnerable road users, are banned from the Interstate highway system.

As for the concurrent trends, after accounting for changes in the demographic mix of the driver population, increased seat belt use, and improvements in emergency services, one national study of crash performance found that:

> Changes in highway infrastructure that have occurred between 1984 and 1997 have not reduced traffic fatalities and injuries, and have even had the effect of increasing total fatalities and injuries . . . other factors, primarily changes in the demographic age mix of the population, increased seat belt usage, and improvements in medical technology are responsible for the downward trend in fatal accidents. (Noland 2001)

This study was replicated using more focused data for the state of Illinois, and again it was found that "changes in infrastructure have actually led to increased accidents and fatalities" (Noland and Oh 2004, 532).

Alternative Theory

Beginning with Jane Jacobs' *The Life and Death of Great American Cities* (Jacobs 1961) and extending to the New Urbanism (Duany and Talen 2002), walkable communities (Bicycle Federation of America 1998), and smart growth (Smart Growth Network n.d.) movements, urban planners have argued for narrower, shorter, more enclosed, and more interconnected streets. The viewpoint of planners is almost 180 degrees counter to conventional engineering practice.

Planner/engineer Peter Swift studied approximately twenty thousand police accident reports in Longmont, Colorado to determine which of thirteen physical characteristics at each accident location (e.g., width, curvature, sidewalk type, etc.) accounts for the crash. The results are not entirely surprising: the highest correlation was between collisions and the width of the street. A typical thirty-six-foot wide residential street has 1.21 collisions/mile/year as opposed to 0.32 for a twenty-four-foot wide street. The safest streets were narrow, slow, twenty-four-foot wide streets (Swift et al. 2008).

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Table 5
Collision Rates by Cross Section, Development Type, and Development Density

	Collisions per One Hundred Million Vehicle Miles			
Development Density:	Medium		High	
Development Type:	Residential	Commercial	Residential	Commercial
Cross Section				
Two-lane	110	270	230	[a]
Three-lane	180	210	190	230[b]
Undivided four-lane	230	260	370	1500[b]

a. No data.
b. Very small sample sizes.
Source: (Hummer and Lewis 2000).

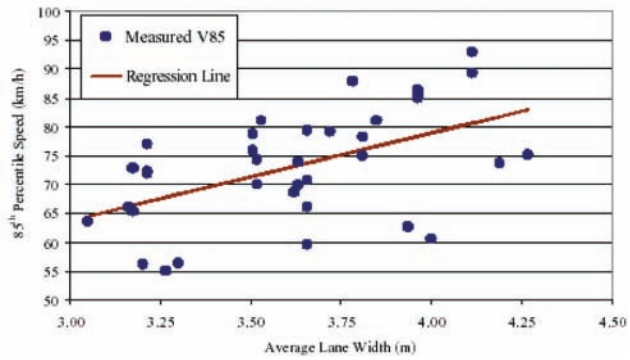
Who is right? How to reconcile these different points of view? Based on a review of urban safety studies, this section concludes that what is good for rural roads and urban freeways is not necessarily best for urban roadways generally. Because of their different operating conditions and different contexts, urban roadways appear to follow a different set of safety rules more in line with the views of the urbanists. Still, when it comes to on-street parking, access management, and pedestrian countermeasures, the engineers may have gotten it right.

Road Width

There is constant pressure to add lanes and widen roads to relieve congestion. Whatever the operational benefits, research has shown the road widenings occur at the expense of safety, even after controlling for traffic volumes (Dumbaugh 2005b; Harwood 1986; Milton and Mannering 1998; Noland and Oh 2004; Sawalha and Sayed 2001; Vitaliano and Held 1991; Hummer and Lewis 2000—see table 5). Conversely, eliminating lanes appears to improve traffic safety. Studies of "road diet" projects, which are projects that convert four-lane roadways into roadways with two-through lanes and a center turn lane, find that traffic crashes decrease as lanes are eliminated (Huang, Stewart, and Zegeer 2002; Knaap and Giese 2001).

Wide lanes may also adversely affect traffic safety, at least in urban areas. Noland and Oh (2004) found that wider lanes were associated with statistically significant increases in total and fatal crashes in the state of Illinois. Lee and Mannering (1999) discovered that while wide lanes reduced the probability of run-off-roadway crashes in rural settings, they were associated with *increases* in the same crash types in urban areas. Hauer (1999) reexamined the historical literature on lane widths and traffic safety, and found that research from 1940 forward has consistently shown crashes increasing as lanes exceed eleven feet in width.

Figure 8
Average Lane Width vs. 85th Percentile Speed (Fitzpatrick et al. 2001)



The root cause may be speed. Vehicle operating speeds decline somewhat as individual lanes and street sections are narrowed (Harwood 1990; Farouki and Nixon, 1976; Heimbach, Cribbins, and Chang 1983; Clark 1985; Gattis and Watts 1999; Gattis 2000; Fitzpatrick et al. 2001—see figure 8). Drivers seem to behave less aggressively on narrow streets, running fewer traffic signals, for example (Untermann 1990). Also, drivers may feel less safe and drive more cautiously on narrow streets (Mahalel and Szternfeld 1986). On two-lane roads, prudent drivers set the pace and others must follow. On multilane roads, where passing is possible, high-speed drivers set the prevailing speed (Burden and Lagerwey 1999).

Yet, one should be careful not to give too much credit to narrow cross sections alone. Dumbaugh

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(2005b) concluded that it is not narrow lanes by themselves that reduce speeds, but narrow lanes combined with other design elements, such as roadside streetscape elements, that reinforce the message to slow down.

On-Street Parking

Good shopping streets nearly always have on-street parking. So do most residential streets. Parked cars act as a buffer between traffic and pedestrians. They are a convenience to shoppers and residents.

However, these benefits may be realized at the expense of traffic safety. The limited literature on the subject suggests that on-street parking accounts for a significant proportion of urban crashes (Seburn 1967; Humphreys 1978; Texas Transportation Institute 1982; McCoy et al. 1990; McCoy et al. 1991; Box 2000, 2002, 2004; ITE 2001). This is especially true for children, as a large number of child injuries and fatalities from motor vehicle crashes occur when children dart out from between parked cars. If parking is permitted, conflicts with parked cars produce about 40 percent of total crashes on two-way major streets, 70 percent on local streets, and a higher percentage on one-way streets (Box 2000). The number of crashes increases with the parking turnover rate, meaning that land uses that generate high turnover will also generate more traffic crashes (Humphreys 1978). Crash rates are particularly high with angle parking, as compared to parallel parking (McCoy et al. 2001; ITE 2001; Box 2002).

Interestingly, we could find no study of crash rates on comparable roadway sections with and without curbside parking, the ultimate test of on-street parking's safety impact. One study that did measure residential street typology and the rate of crashes with pedestrians found that the existence of parking had no affect on crash rates (Swift et al. 2008). It is possible that where parking is provided, parked cars account for a large proportion of crashes, and yet overall crash rates are about the same as on sections without parking.

Another consideration with on-street parking is its effect on bicycle safety. One of the main causes of vehicle–bicycle incidents is "dooring"—a vehicle occupant suddenly opening a door into the path of a cyclist. Designers go to great lengths to create facilities that place cyclists out of the door zone. Norwegian research suggests that prohibiting on-street parking leads to a 20 to 25 percent reduction in vehicle–bicycle collisions. So while parking acts as a buffer for pedestrians and provides "friction" that slows vehicles, it presents challenges for cyclists and can "hide" children from drivers.

Traffic-Calming Measures

Speed humps, traffic circles, and other traffic-calming measures are perceived by some traffic engineers, residents, and members of the media as obstacles in the roadway. Were they truly obstacles, such measures might increase crash rates. They do just the opposite by slowing traffic.

The Insurance Corporation of British Columbia summarized forty-three international traffic-calming case studies (Geddes 1996). Collision frequencies declined by anywhere from 8 to 100 percent with traffic calming. Ewing (2001) compared collision frequencies before and after traffic-calming measures were installed. For the sample as a whole, collisions declined to a very significant degree after traffic calming (the difference being statistically significant at the .001 probability level). Adjusting for changes in traffic volumes, and dropping cases for which volume data were not available, collisions still declined significantly at the conventional 0.05 probability level. As for individual traffic-calming measures, all reduced the average number of collisions on treated streets, and twenty-two-foot tables and traffic circles produced differences that were statistically significant (see table 6).

The mitigating role of traffic conflicts is implicit in these statistics. Speed tables are believed to have a better safety record than speed humps because their higher design speeds require less deceleration on the approach, and less acceleration on the exit (Ewing 1999). This reduces the likelihood of rear-end collisions. Seattle traffic circles particularly improve safety by reducing the number of conflicting movements at uncontrolled four-way intersections. Seattle circles thus overcome the primary disadvantage of the traditional urban grid (see figure 9 and "Street Network Design").

It is curious that safety impacts of traffic calming in the United States, while favorable, would be less pronounced than outside the United States. One possible explanation is that European and British traffic-calming treatments are more intensive and more integrated with their surroundings than U.S. treatments. Reported speeds drop on average by almost eleven miles per hour or 30 percent in a British sample (County Surveyors Society 1994) compared to under seven miles per hour or 20 percent for U.S. treatments (Ewing 2001).

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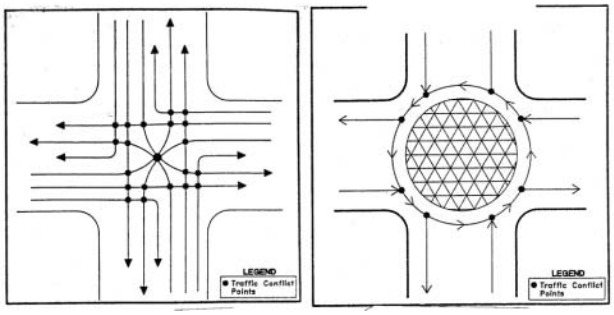
Table 6
Safety Impacts of Traffic-Calming Measures

	Number of Observations	Average Number of Collisions Before/After Treatment	% Change in Collisions Before-> After Treatment	*t*-Statistic (Significance Level—Two-Tailed Test)
Humps	54	2.8/2.4	–14	–1.2 (.22)
22' tables	51	1.5/0.8	–47	–3.0 (.005)
Circles				
Without Seattle	17	5.9/4.2	–29	–2.2 (.05)
With Seattle	130	2.2/0.6	–73	–10.8 (.001)
All measures				
Without adjustments	235	2.2/1.1	–50	–8.6 (.001)
With adjustments	47	1.8/1.2	–33	–2.5 (.05)

Source: (Ewing 2001)

Figure 9
Conflict Points for Uncontrolled Intersection without and with a Traffic Circle



All of the traffic-calming literature referenced thus far relates to traffic collisions generally. One recent study showed that the presence of speed humps on a street was associated with lower odds of child pedestrians being injured within their neighborhoods or being struck in front of their homes (Tester et al. 2004).

Access Management

Speed is not the only culprit in urban traffic crashes. The presence of driveways and side streets along arterials create conflicts between through-moving vehicles and those attempting to turn into and out of adjacent driveways. Rear-end crashes are common as drivers decelerate to negotiate turns or enter the traffic stream from driveways or side streets at lower-than-prevailing speeds. Angle crashes are commonplace as drivers attempt to turn left into driveways or side streets, but have insufficient time to clear opposing traffic lanes.

Two strategies exist for moderating access-related crashes. The first is to reduce the speeds of through-moving vehicles, thereby minimizing speed differentials with turning vehicles (Dumbaugh 2006a). The second is to control turning movements, while maintaining higher speeds for through-moving vehicles, through access management. Access management is the control of the location, spacing, and operation of driveways, median openings, and street connections to a main roadway.

The traffic safety benefits associated with access management techniques are summarized by S&K Transportation Consultants (2000). They range from a 20 percent reduction in crashes associated with the addition of right-turn bays, to a 67 percent reduction associated with the addition of left-turn dividers. Crash rates appear to vary with the square root of access density, up to about forty access points per mile (Committee on Access Management 2003). Crash rates are higher on roads with unlimited left turns (Gluck, Levinson, and Stover 1999). The dual effects of two variables—access point density and nontraversable medians—are reflected in table 7.

Raised medians, embraced by highway agencies for operational reasons, are favored by pedestrian advocates as well. They provide refuge areas for pedestrians, who can cross in stages. A study of pedestrian–vehicle crash experience on arterial roadways in Atlanta, Phoenix, and Los Angeles found that crash rates were about half as high on arterials with raised medians compared to undivided

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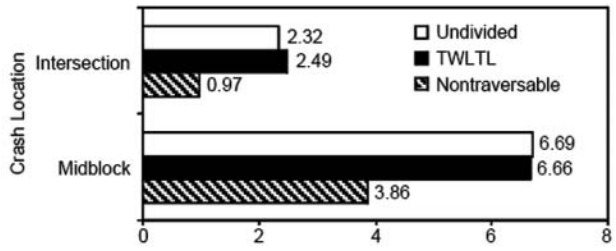
Table 7
Crash Rates on Urban and Suburban Roads with Different Levels of Access Control (per Million Vehicle Miles)

Access Points per Mile	Median Type: Undivided	Two-Way Left-Turn Lane	Nontraversable Median
<20	3.8	3.4	2.9
20-40	7.3	5.9	5.1
40-60	9.4	7.9	6.8
>60	10.6	9.2	8.2

Source: (Committee on Access Management 2003).

Figure 10
Pedestrian Crash Rates for Suburban Arterials with Different Access Control (Bowman and Vecellio 1994)



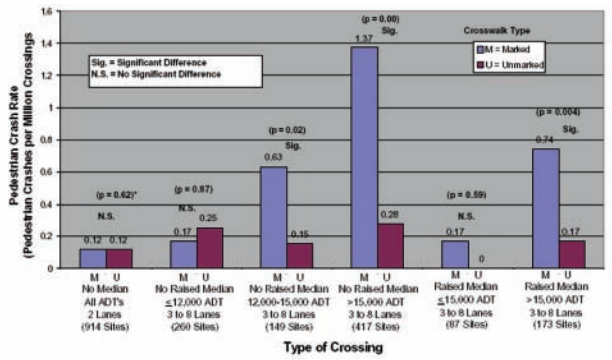
roadways or roadways with center two-way left-turn lanes (see figure 10).

Safety benefits of medians appear to vary by type and width. In one study, pedestrian collisions fell by 23 percent when a six-foot painted median was replaced with a wide raised median (Claessen and Jones 1994). In another study, the narrowest medians (four feet) had four times the pedestrian crash rate of the widest medians (ten feet) (Scriven 1986). Very narrow medians may reduce vehicle-to-vehicle crashes but have no effect on pedestrian crashes (Johnston 1962; Leong 1970). Raised medians and raised crossing islands may reduce vehicle–pedestrian crashes on multilane roads, while painted medians and two-way left turn lanes do not (see figure 11).

Access management can also benefit cyclists for the same reason it affects overall traffic flow. Without the distraction of constant driveways and cross-traffic, cycling is safer and more comfortable.

Before one declares access management a win-win for motorists and pedestrians, two caveats should be

Figure 11
Pedestrian Crash Rates by Type of Crossing (Zegeer et al. 2002b, 8)



noted. First, while medians may enhance pedestrian safety, it is not clear that access management strategies, considered as a whole, also do so. Central to the concept of access management is wide spacing of signalized intersections, preferably with distances of one-quarter mile or greater (Florida Department of Transportation 2006; Minnesota Department of Transportation 2002; Nevada Department of Transportation 1999). Such spacing limits the number of opportunities for pedestrians to cross with signals, thus encouraging hazardous midblock crossings. Also, access management may involve the provision of service roads adjacent to the main line or parallel reliever roads for local traffic. A portion of the reported safety benefits currently attributed to access management may be lost when access-related crashes are transferred from a main arterial to parallel roads.

Intersection Control

Crashes are concentrated at intersections because vehicle–vehicle and vehicle–pedestrian conflicts are concentrated there. Some forms of intersection control are more effective at reducing conflicts than others.

All-way stops have never been a favorite with U.S. traffic engineers. Yet, all-way stops produce lower vehicle speeds near intersections than do traffic signals or two-way stops. From a safety standpoint, they appear to outperform signals at moderate traffic volumes, say, up to ten thousand vehicles per day on the major street (Bissell and Neudorff 1980; Ebbecke and Schuster 1977; and Syrek 1955). One study found that pedestrian collisions declined by 25 percent when traffic signals at low-volume urban intersections were converted to all-way stops (Persaud et al. 1997).

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Table 8
British Crash Rates for Pedestrians at Roundabouts and Signalized Intersections

Intersection Type	Pedestrian Crashes per Million Trips
Mini-roundabout	0.31
Conventional roundabout	0.45
Flared roundabout	0.33
Signals	0.67

Source: (Robinson 2000).

Historically, U.S. traffic engineers have not favored roundabouts either, as modern roundabouts were mistaken for old-fashioned traffic circles. With modern roundabouts, yield to circulating vehicles, deflection at entry, and the curvature of the travel path through the intersection, all reduce travel speeds. Counterclockwise circulation around the center island reduces the number of conflict points, largely eliminating certain types of collisions such as right angle and left turn head-on crashes.

Several studies have shown that roundabouts outperform other intersection control devices with respect to safety (Persaud et al. 2002; Jacquemart 1998; Maycock and Hall 1984; Robinson 2000; Schoon and Minnen 1993, 1994). Even where crash frequencies are comparable to other intersections, crash severity is lessened (Brown 1995). Persaud et al. (2002) evaluated the change in crash rates following the conversion of twenty-four intersections to modern roundabouts in the United States. There was a significant overall reduction of 39 percent in crash rates. For crashes involving injuries, the reduction was 76 percent. Crashes involving deaths or incapacitating injuries fell by about 90 percent.

Small and medium capacity roundabouts are safer than large or multilane roundabouts (Maycock and Hall 1984; Alphand, Noelle, and Guichet 1991). Single-lane roundabouts, in particular, have been reported to produce substantially lower pedestrian crash rates than comparable intersections with traffic signals (Brude and Larsson 2000). Crash reductions are most pronounced for motor vehicles, less pronounced for pedestrians, and uncertain for bicyclists, depending on the study and bicycle design treatments (Robinson 2000; Schoon and Minnen 1993, 1994; Brown 1995). Comparative crash statistics from one study are presented in table 8.

While the European experience with roundabouts suggests that they are relatively safe for pedestrians and bicyclists, there remains in the United States a preference for traffic signals at locations with heavy pedestrian and bicycle traffic. Signals provide a periodic gap in traffic for crossing pedestrians, while the continuous flow of roundabouts does not. Signals require no deflection of motor vehicles crossing an intersection, while roundabouts may cause motorists to cross paths with bicyclists. There are particularly serious issues of access for pedestrians with disabilities. Some of this may be attributed to low levels of cycling and walking in the United States as compared to Europe, which creates a more hostile relationship between drivers and other roadway users.

Roadside Design

The roadside is the location for most pedestrian amenities, including sidewalks, street trees, and street lighting. Conventional engineering design practice encourages placement of such features as far away from the roadway as possible, to create a wide "clear zone" in case motorists lose control and leave the roadway. ". . . the wider the clear zone, the safer it will be" (Transportation Research Board 2003, V-43).

This recommendation is based on the physical locations of roadside crashes. Hall et al. (1976) observed that most utility pole crashes occur along curves and within 11.5 feet of the travelway, Zeigler (1986) that 85 percent of tree-related crashes occurred within thirty feet of the travelway, and Turner and Mansfield (1990) that 60 percent of trees involved in crashes were located along horizontal curves, and that 80 percent were within twenty feet of the travelway.

Such descriptive statistics only tell us where roadside crashes occur, not whether roadside crashes are more likely or more severe when fixed objects are near the roadway. Also, any conclusions related to clear zones on high-speed rural roads will not necessarily apply to low-speed urban streets. Lee and Mannering (1999) found that urban roadways with trees located in the nominal "clear zone" actually have fewer roadside crashes than locations where trees were not present. Naderi (2003) examined the safety effects of urban streetscape improvements along five arterial roadways in downtown Toronto, and concluded that the addition of roadside features such as trees and concrete planters reduced crashes by 5 to 20 percent. Plotting the frequency of injurious roadside crashes against the actual percentage of road segments that had clear zones of each offset width, Dumbaugh (2005b) found that the probability of a roadside-object-related crash was largely independent of the roadway's fixed-object offset (see figure 12).

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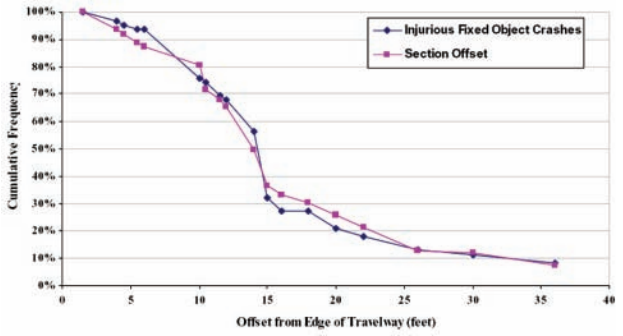
Figure 12
Injurious Roadside Crashes and Roadside Offset (Dumbaugh 2005b)



Pedestrian Countermeasures

Pedestrian countermeasures are engineering actions taken to improve the safety of roadways for pedestrians. One study classified countermeasures into three broad categories: separation of pedestrians from vehicles by time and space; measures that increase the visibility and conspicuity of pedestrians; and reductions in vehicle speed (the last of these already covered under the heading of traffic calming) (Retting, Ferguson, and McCartt 2003). The *Pedestrian Facilities Users Guide* lists forty-seven such measures (Zegeer et al. 2002a).

Most of the studies of pedestrian countermeasures have used proxies for traffic safety to document impacts. Travel speeds have been measured in some cases, conflict counts and yielding behavior in others. Actual crash rates are seldom measured in such studies. This may not constitute as big a shortcoming as would at first appear, however, since conflict counts have been shown to provide an accurate estimate of multiyear crash rates (Hauer and Garder 1986).

Sidewalks are an absolute necessity along all through-streets serving developed areas. Vehicle–pedestrian collisions are more likely on street sections without sidewalks than those with them, two and one-half times more likely according to one study (Knoblauch et al. 1988). Sidewalk clearances, vertical curbs, street trees between street and sidewalk, and parked cars all add to the sense of security.

At signal- and stopped-controlled intersections, traffic is forced to stop for pedestrians with or without marked crosswalks. The issue is whether to mark crosswalks at uncontrolled intersections and midblock locations. In one study of uncontrolled locations, drivers were found to approach pedestrians in a crosswalk somewhat slower, and crosswalk usage was found to increase, after markings were installed (Knoblauch, Nitzburg, and Seifert 2001). However, this study found no changes in driver yielding behavior or pedestrian assertiveness. Overall, the study concluded that marking pedestrian crosswalks at relatively low-speed, low-volume, unsignalized intersections is a desirable practice.

Another study evaluated driver speeds before and after installation of crosswalk markings at uncontrolled intersections (Knoblauch and Raymond 2000). Speed data were collected under three conditions: no pedestrian present, pedestrian looking, and pedestrian not looking. Overall, there was a significant reduction in speed under both the no-pedestrian and the pedestrian-not-looking conditions. It appeared that crosswalk markings made drivers on relatively low-speed arterials more cautious and more aware of pedestrians.

The most ambitious study of crosswalks at uncontrolled locations involved a comparison of five years of pedestrian crashes at one thousand marked crosswalks and one thousand matched unmarked comparison sites. All sites in this study lacked traffic signals or stop signs on the approaches (Zegeer et al. 2002b). The study results revealed that on two-lane roads, the presence of a marked crosswalk alone at an uncontrolled location was associated with no difference in pedestrian crash rate, compared to an unmarked crossing. Furthermore, on multilane roads with traffic volumes above about twelve thousand vehicles per day, having a marked crosswalk alone (without other substantial improvements) was associated with higher pedestrian crash rates (after controlling for other site factors). Hazards were mitigated by raised medians.

A comparative evaluation of different engineering treatments found that the particular crossing treatment employed has a dramatic effect on motorists' propensity to yield to crossing pedestrians (see figure 13). Treatments that show a red signal indication to motorists have a statistically significant advantage over devices that do not show a red indication. Specifically, midblock signals, half signals, and high-intensity activated crosswalk (HAWK) signal beacons have compliance rates greater than 95 percent even on busy, high-speed arterial streets. Pedestrian crossing flags and in-street crossing signs also were effective in prompting motorist yielding, achieving 65 and 87 percent compliance, respectively. However, most of these crossing treatments were installed on lower-speed and lower-volume, two-lane roadways. High

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Figure 13
Average and Range of Percentage Motorists Yielding to Pedestrians by Crossing Treatment (Fitzpatrick et al. 2006, 49)

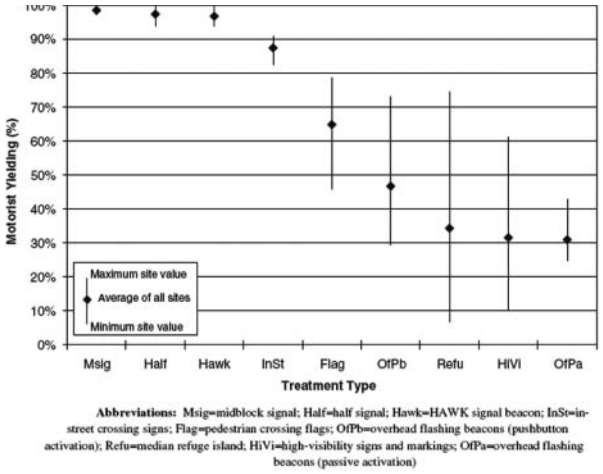
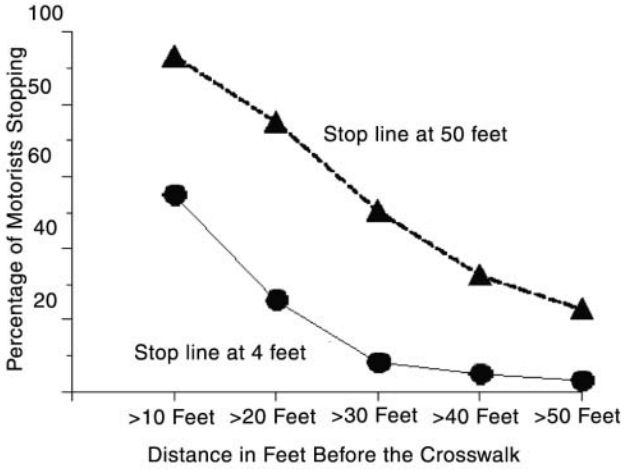


Figure 14
Percentage of Vehicles Stopping More than Ten Feet, Twenty Feet, Thirty Feet, Forty Feet, and Fifty Feet from the Crosswalk for Each Placement of the Stop Line (Van Houten and Malenfant 1992)



visibility signs and markings, and overhead flashing beacons, had much lower compliance rates. On this basis, the study recommended changes in the *Manual on Uniform Traffic Control Devices* (MUTCD) pedestrian traffic signal warrant.

Studies from other countries speak to the safety benefits of pedestrian-activated signals at uncontrolled crossing points. Installing so-called Pelican signals was highly effective in reducing crashes in Australia, the quarterly crash rate falling by 90 percent (Geoplan 1994). The Pelican signal is similar to a standard mid-block pedestrian signal, except that during the pedestrian clearance phase, the display facing motorists changes to a flashing yellow, indicating that vehicles may proceed cautiously through the crossing but are required to yield to pedestrians. In this way these signals produce less delay for motorists than standard pedestrian-activated signals. Installing standard pedestrian-activated signals at midblock locations also gave rise to statistically significant reductions in crashes. In this case the adjusted reduction was 49 percent.

Canadian research in the area of pedestrian safety has focused on six countermeasures:

- Interventions to prompt pedestrians to look for turning vehicles when crossing at signalized crosswalks, including modification of the pedestrian signal head.
- Modification of pedestrian signals to increase the clarity of the indication for the clearance interval.
- The use of pedestrian-activated flashing beacons at mid-block crosswalks and at crosswalks on major roads at intersections not controlled by traffic signals.
- The use of advance stop lines to get motorists to stop upstream of crosswalks.
- Interventions to increase the conspicuity of crosswalks.
- The use of multifaceted programs that focus on engineering, enforcement, and education (the three Es) to increase yielding to pedestrians in crosswalks.

Studies of these countermeasures have demonstrated changes in behavior of motorists and/or pedestrians (Van Houten and Malenfant 1999). For example, advance stop lines, placed fifty feet upstream of a crosswalk rather than the standard four feet, cause a higher percentage of drivers to stop well in advance of the crosswalk rather than encroaching on it (figure 14). At signalized intersections, exclusive pedestrian intervals—which stop all vehicle traffic for all or part of the pedestrian crossing signal—have been shown to significantly reduce conflicts between pedestrians and motor vehicles (Van Houten et al. 2000). Two studies of in-pavement flashing warning lights automatically activated by the presence of pedestrians have shown reductions in both vehicle speeds and conflicts at uncontrolled crossings (Hakkert et al. 2002; Prevedourous 2001).

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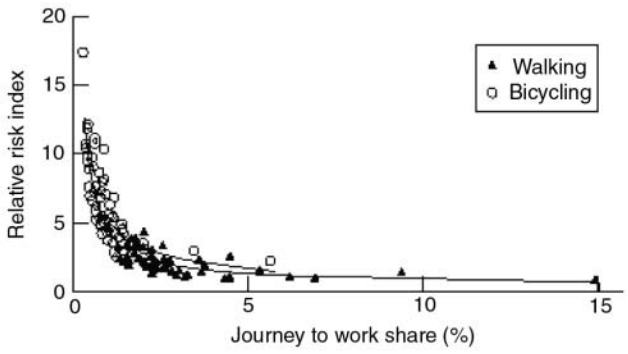
Figure 15
Relative Risk of Pedestrian and Bicyclist Crashes as a Function of Journey to Work Mode Shares in Sixty-Eight California Cities (Jacobsen 2003)



Finally, the most compelling countermeasure for pedestrian and bicyclist safety is simply more people out walking and bicycling, which can be viewed as another positive effect of compact development patterns. There appears to be safety in numbers. Jacobsen (2003) demonstrated a direct relationship between number of cyclists and pedestrians and their safety (see figure 15). For a 100 percent increase in walking, the attendant increase in injuries is only 32 percent. So while there might be more injuries, there are fewer per capita. Australian research has confirmed these findings. "If cycling doubles, the risk per kilometre falls by about 34 percent; conversely, if cycling halves, the risk per kilometre will be about 52 percent higher" (Robinson 2005).

Context-Sensitive Design

In urban areas, the literature generally shows enhanced safety with lower-speed, less-"forgiving" design treatments—such as narrow lanes, traffic-calming measures, and street trees close to the roadway. The reason for this apparent anomaly may be that less-forgiving designs provide drivers with clear information on safe and appropriate operating speeds, thereby preparing drivers to respond to the many vehicle and pedestrian "conflicts" present in highly urbanized areas. As detailed by Dumbaugh (2005b), the basis is both biological and psychological. There is a well-documented communicative process that exists between the road environment and the roadway user. Where a roadway consistently informs the driver that caution is warranted, the result is that drivers are more vigilant in their search for oncoming hazards, as well as better prepared to respond to these hazards when they occur.

European designers have long recognized that the use of high design speeds leads to higher operating speeds, and have sought to remedy this problem by designing roadways for their intended operating speeds (Study Tour Team 2001). Unlike in the United States, where roadways are classified mainly in terms of their access and mobility functions, European design practice begins by examining the developmental context of a roadway, identifying the hazards that are expected to exist in these environments, and then specifying a target design speed to ensure that the driver travels at speeds that are appropriate given these hazards (Lamm, Psarianos, and Mailender 1999). The result is that a roadway's operating speed is consistent with its target speed, contributing to per capita traffic fatalities that are 50 to 75 percent lower than those in the United States (World Health Organization 2004).

Many individual engineers have recognized the need for lower-speed designs in urban contexts, a recognition that has led to the emergence of "context-sensitive design" as a new paradigm. The context-sensitive redesign of Bridgeport Way, the main street of University Place, Washington, led to a 69 percent crash reduction (see figure 16). Several local, state, and national organizations now encourage engineers to practice context-sensitive design on a project-by-project basis, and many exemplary projects have been built in recent years (Committee on Geometric Design 2004; Congress for the New Urbanism 2002; AASHTO 2004b). Yet, national and state highway design manuals continue to point engineers in the wrong direction, toward less safe designs, in urban settings (Ewing 2002). This may be changing, thanks to efforts such as the Institute of Transportation Engineers' proposed recommended practice for major urban thoroughfares, prepared through an unprecedented collaboration with the Congress for the New Urbanism (Daisa 2006).

Discussion

Contemporary transportation engineering practice is oriented toward mobility, with safety identified as a complementary goal. This is readily evidenced in the goal statements of metropolitan planning organizations and state departments of transportation, where the provision of a "safe and efficient" transportation

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Figure 16
Context-Sensitive Redesign of Bridgeport Way in University Place, WA

a



b



system is listed as a single agency goal. Because safety and efficiency are treated as mutually supportive goals, most conventional transportation-planning applications begin by identifying levels of congestion for a given horizon year, and then proposing mobility-oriented solutions, such a road widenings. Once a mobility need is identified, safety is addressed by designing these improvements for higher design speeds under the presumption that higher design speeds equate to enhanced safety performance. To the extent that the built environment is considered at all, it is solely for forecasting future levels of traffic demand to identify needed mobility improvements.

Yet, the empirical evidence on traffic safety strongly suggests that safety and mobility may be conflicting goals, at least in urban areas. Contrary to accepted theory, the stop-and-go, high-volume traffic environments of dense urban areas appear to be safer than the lower-volume environments of the suburbs. The reason is that many fewer miles are driven on a per capita basis, and the driving that is done is at lower speeds that are less likely to produce fatal crashes. Also contrary to accepted theory, at least in dense urban areas, less-"forgiving" design treatments—such as narrow lanes, traffic-calming measures, and street trees close to the roadway—appear to enhance a roadway's safety performance when compared to more conventional roadway designs. The reason for this apparent anomaly may be that less-forgiving designs provide drivers with clear information on safe and appropriate operating speeds.

Considered broadly, the fundamental shortcoming of conventional traffic safety theory is that it fails to account for the moderating role of human behavior on crash incidence. Decisions to reduce development densities and segregate land uses, or to widen specific roadways to make them more forgiving, are based on the assumption that in so doing, human behavior will remain unchanged. And it is precisely this assumption—that human behavior can be treated as a constant, regardless of design—that accounts for the failure of conventional safety practice (Dumbaugh, 2005b; 2006a). If safety is to be meaningfully addressed, we must begin to develop our understanding of how the built environment influences the both the incidence traffic-related crashes, injuries, and deaths, as well as the specific behaviors that cause them.

The results of our review suggest that future research on the built environment and traffic safety should address three geographic levels. First: we need to better develop our understanding of how regional development patterns influence total travel and trip making, and how the resulting travel patterns in turn influence population-level crash exposure. The literature reviewed in this article indicates that more compact regional forms have the ability to reduce VMT to levels that also reduce population-level crash incidence. Yet the magnitude of these benefits, as well as how to best achieve them, remains unclear.

Second, we need to reexamine how the design and configuration of individual communities may influence crash incidence. The prevailing theory of community design aims to increase safety via disconnected residential subdivisions that eliminate neighborhood cut-through traffic. Yet, the result of such designs is that all trips not destined for residential trip ends are forced onto higher-speed arterial thoroughfares. The

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result is that lower-speed users, including bicyclists, pedestrians, and access-related traffic are forced to share the right-of-way with higher-speed, through-moving traffic, a user mix that is likely to increase crash incidence. It is likely that the safety gains achieved through the elimination of neighborhood traffic are offset by crash increases on arterial thoroughfares.

Finally, we must begin to develop our understanding of how design influences the behavior of specific roadway users, and how these behaviors in turn influence crash incidence. Modifications in the built environment can profoundly influence vehicle speeds and traffic conflicts, which in turn have a profound effect on crash incidence. Yet there has been little research aimed at relating specific pre-crash behaviors to the environments in which they occur, and almost no attempt to understand how the characteristics of the built environment may encourage, or discourage, these behaviors from occurring in the first place. Rather than superimposing rural design solutions on urban environments, as is often done, we must begin to develop a real understanding of the moderating role of behavior on the relationship between design and crash incidence.

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Eric Dumbaugh (edumbaugh@tamu.edu) is an assistant professor at Texas A&M University and the program coordinator for Texas A&M's graduate certificate program in transportation planning. He is the author of more than 20 scholarly and professional publications, including "Safe streets, livable streets" (2005a), and "The design of safe urban roadsides," (2006b) which received the Transportation Research Board's award for outstanding paper in geometric design.

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STATE	FEDERAL PROJECT NO.	DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
CALIF		07	LA	187	3.5/8.9	1	3

DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

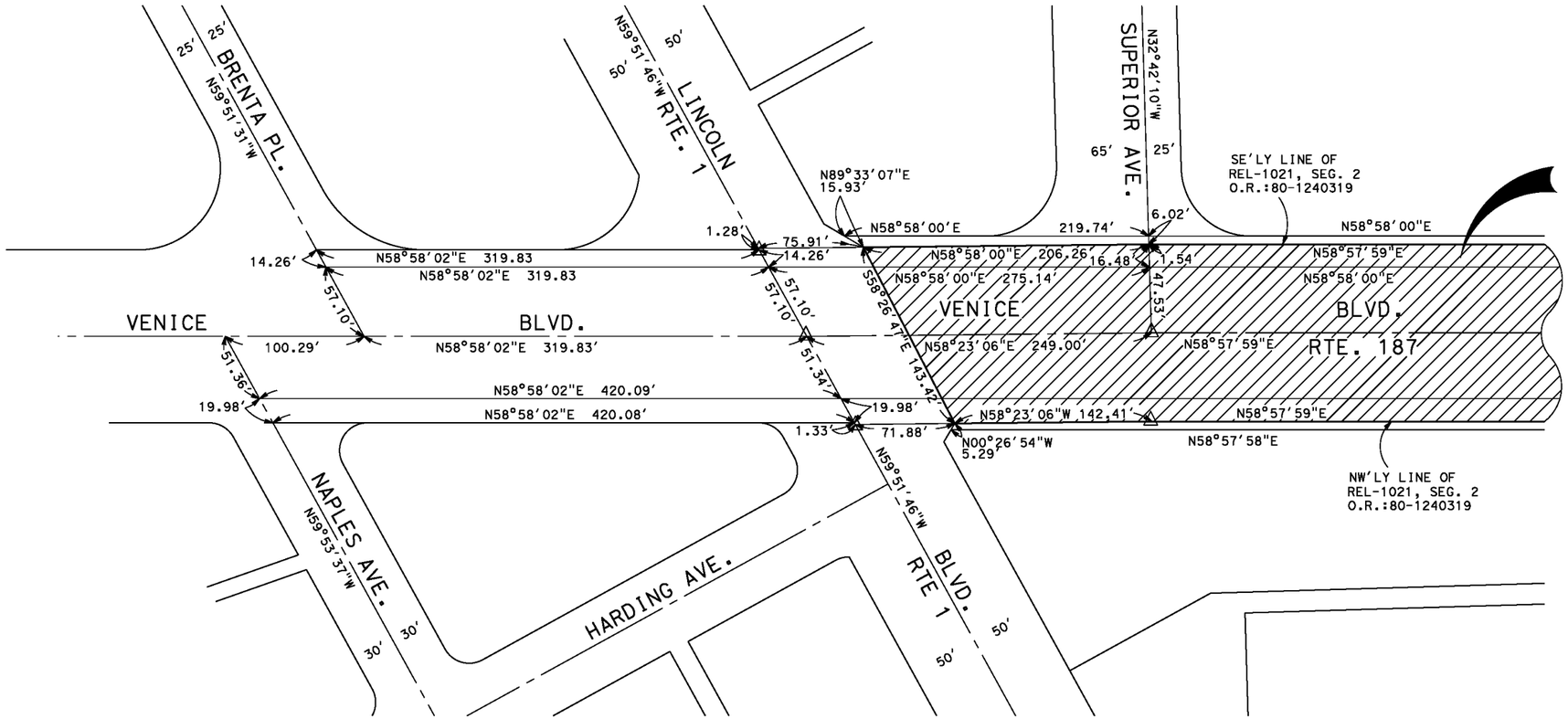
APPROVAL DATE

PROFESSIONAL LAND SURVEYOR
D. DIANE WELLS
No. 7651
Exp. 12-31-16
STATE OF CALIFORNIA

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

IN THE CITY OF LOS ANGELES, ROUTE 187 (VENICE BOULEVARD)
REOM LINCOLN BOULEVARD TO CADILLAC AVENUE



NOTE:
1. COORDINATES AND BEARINGS ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE 7, NORTH AMERICAN DATUM (NAD) OF 1927.
2. ALL DISTANCES ARE GRID. TO OBTAIN GROUND DISTANCE DIVIDE GRID DISTANCE BY COMBINATION FACTOR 0.99999I.

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STATE HIGHWAY MAP BOOK NO. _____

DATE: _____ AT PAGE _____

RECORDERS INDEX NO. _____

RECORDS OF _____ COUNTY

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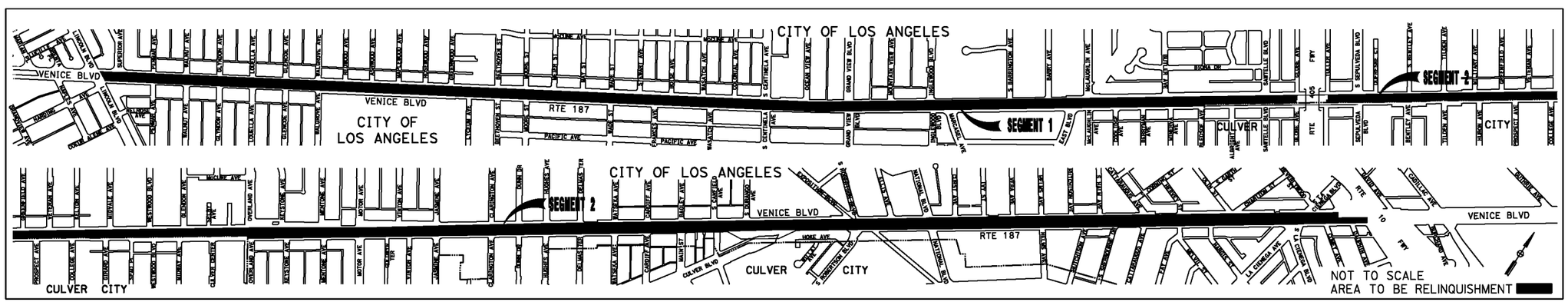

CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY		REL-1260	
REVISED			

STATE	FEDERAL PROJECT NO.
CALIF	

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
07	LA	187	3.5	2	3

DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

APPROVAL DATE

PROFESSIONAL LAND SURVEYOR
D. DIANE WELLS
No. 7651
Exp. 12-31-16
STATE OF CALIFORNIA

NOTE:
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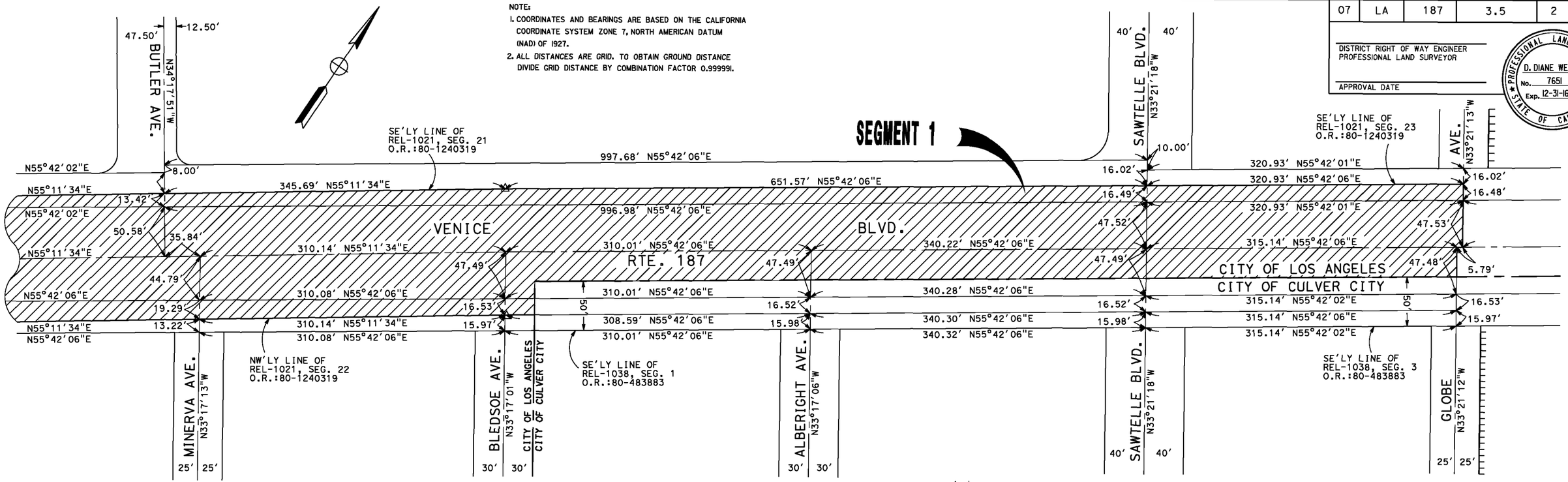

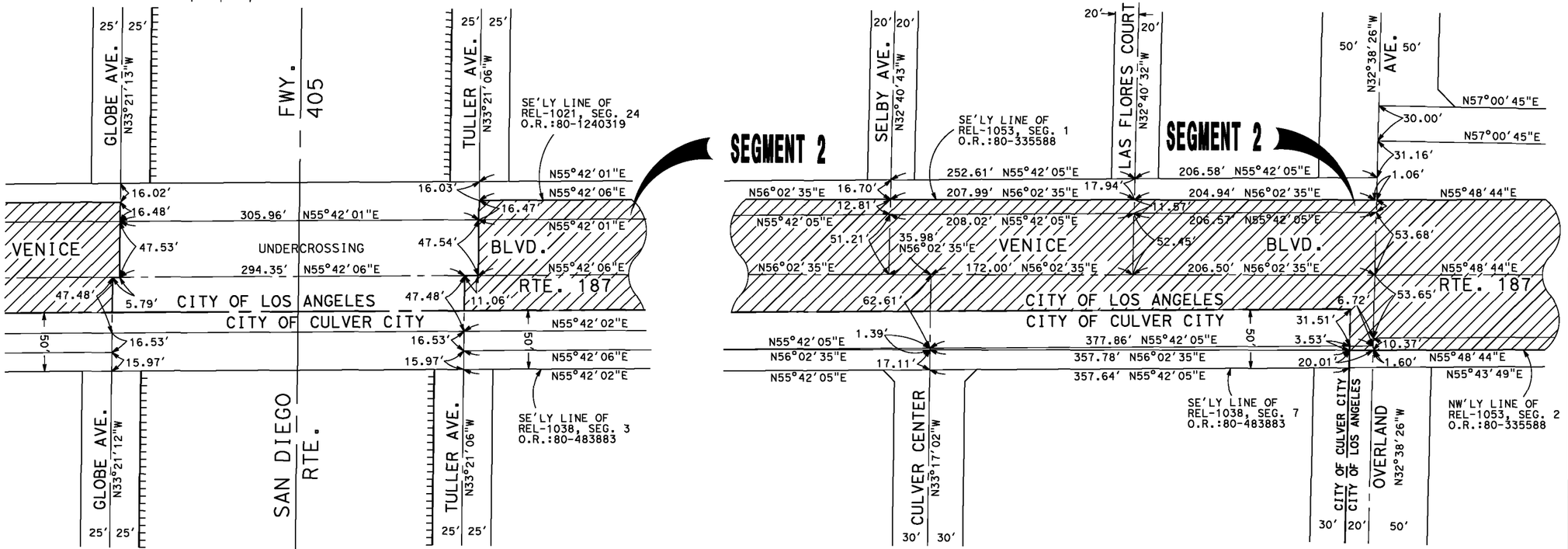

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CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY		**REL-1260**	
REVISED			

STATE	FEDERAL PROJECT NO.	DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
CALIF		07	LA	187	3.5	3	3

DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

APPROVAL DATE

PROFESSIONAL LAND SURVEYOR
D. DIANE WELLS
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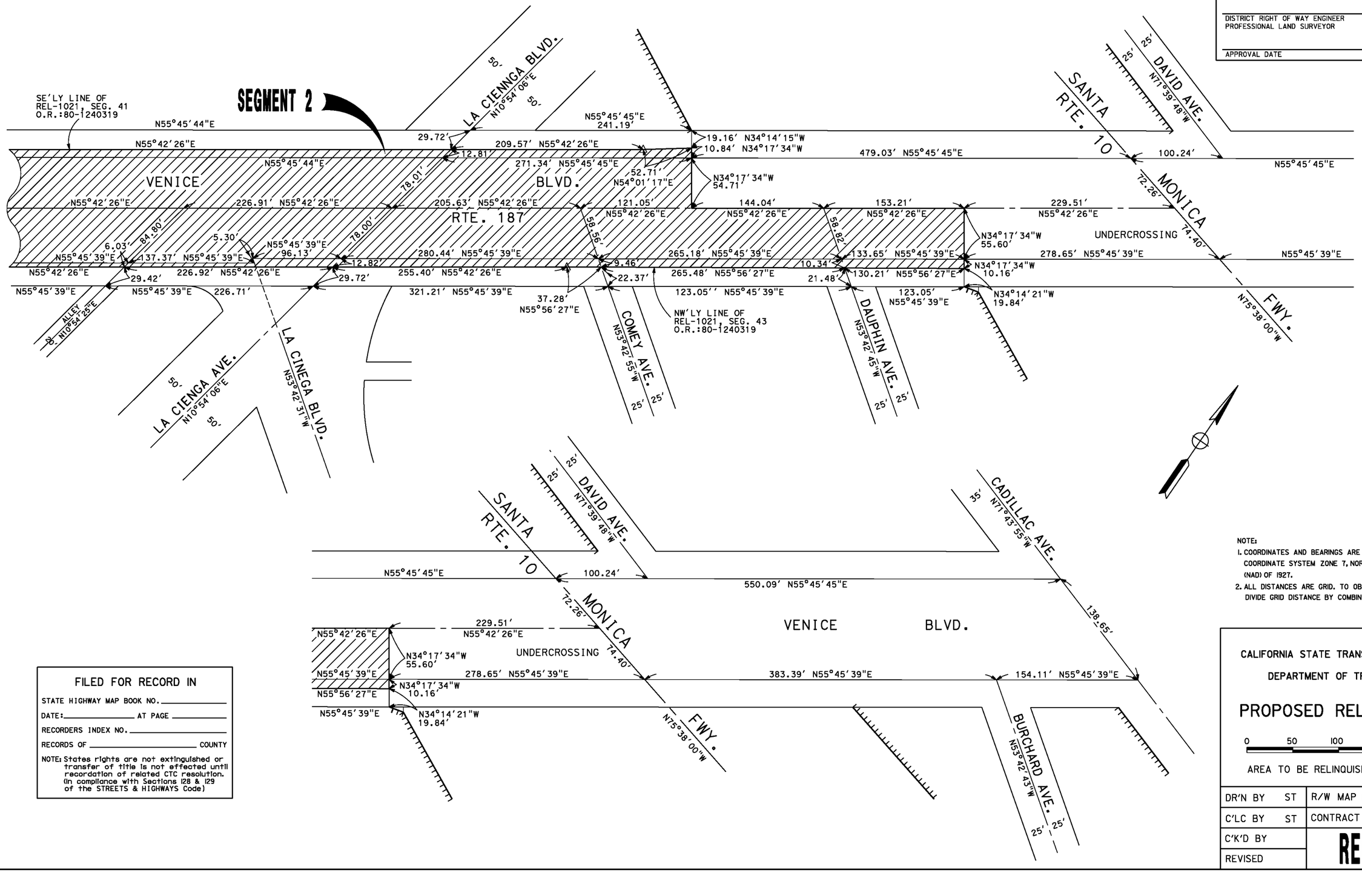
STATE OF CALIFORNIA

CITY OF LOS ANGELES



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CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

DR'N BY ST	R/W MAP NO. F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY ST	CONTRACT NO.
C'K'D BY	REL-1260
REVISED	

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Chapter 11 - Air Quality

- What Does this Topic Include?
- Laws, Regulations, and Guidance
  - NEPA Assignment
  - Federal Air Quality Laws and Regulations
  - State Air Quality Laws and Regulations
  - Policy Memos
  - Key Web Sites
  - Air Quality Guidance and Information
  - Contact Lists and Related Information
- Background
  - Regulatory Framework
  - Various Pollutants
- Interagency Coordination
  - Early Coordination Meeting
  - Interagency Consultation for Conformity
- Reporting
  - Determining the Need For a Technical Report
  - Report Content
  - Preparer Qualifications
  - Processing and Approval
  - Recommended Methodologies
- Direct Impacts
  - Mobile Source Air Toxics (MSAT) in the NEPA Process for Highways
- Indirect and Cumulative Impacts
- Conformity
  - 23 USC § 327
  - 23 USC § 326
  - Project Level Conformity
  - Conformity Flow Chart
  - Components of a Project-Level Conformity Analysis
    - Conformity Exemption
    - Regional Conformity
    - Hot-Spot Analysis
    - SIP Control Measures
    - Suggested Language for Conformity Documentation
- Information for the Environmental Document
  - Regulatory Setting

- Affected Environment
- Environmental Consequences
  - Direct Impacts
  - Temporary, Construction-Related Impacts
  - Indirect and Cumulative impacts
- Avoidance, Minimization, and/or Mitigation Measures
- Information Needed for Project Delivery
- Regional Transportation Plan
- Project Initiation Document
- Draft Project Report
- Project Report
- Environmental Reevaluation
- Permits/Approvals Required

WHAT DOES THIS TOPIC INCLUDE?

This topic covers the regulatory framework and recommended procedures for performing an air quality analysis for both Caltrans and local agency transportation projects. Preparation of the air quality section of the environmental document and supporting technical report are discussed in detail. There is also discussion of air quality requirements throughout the project delivery process, from transportation conformity determinations at the regional planning stage to project requirements during construction.

LAWS, REGULATIONS, AND GUIDANCE

See also SER, Chapter 1, "Federal Requirements" and Chapter 2, "State Requirements" for laws and regulations that apply to all environmental analysis activities.

The primary laws related to air quality issues are the federal and California Clean Air Acts, federal Planning regulations and enabling legislation, U.S. EPA conformity regulations, and local and air district ordinances and regulations related to specific activities. Air quality is a required subject for the environmental analysis pursuant to the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

NEPA ASSIGNMENT

California participated in the "Surface Transportation Project Delivery Pilot Program" (Pilot Program) pursuant to 23 USC § 327, for more than five years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (P.L. 112-141), signed by President Obama on July 6th, 2012, amended 23 USC § 327 to establish a revised and permanent Surface Transportation Project Delivery Program. As a result, the Department entered into a memorandum of understanding pursuant to 23 USC § 327 (NEPA Assignment MOU) with FHWA. With NEPA Assignment, FHWA assigned and the Department assumed all of the United States Department of Transportation (USDOT) Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System (SHS) and Local Assistance Projects off the SHS within the state of California, except for categorical exclusions that FHWA assigned to the Department under the 23 USC § 326 CE Assignment MOU, projects excluded by definition, and specific project exclusions. Under the 23 USC § 327 MOU, FHWA's air quality conformity responsibilities may not be assigned to the Department. However, if a project under 23 USC § 327 is clearly exempt from the conformity requirements under 40 CFR 93.126 or 128 a conformity determination from FHWA is not needed. Additionally, a project-level conformity determination from FHWA is not needed for any project exempt from regional conformity (40 CFR 93.127) if the project is located in an area NOT subject to CO, PM2.5, and/or PM10 hot-spot requirements (i.e. ozone-only areas). This is documented in the Air Quality Conformity Findings Checklist. For projects under 23 USC § 327 requiring interagency consultation, FHWA participates in the interagency consultation because FHWA continues to make the project-level conformity determination for those projects.

Air quality conformity determinations for CEs assigned to the Department under 23 USC § 326 MOU have been assigned to the Department. FHWA does not participate in the interagency consultation process for projects assigned under 23 USC § 326; the Department carries out that function.

See the SER, Vol. 1, Chapter 38, "NEPA Assignment" for more information

FEDERAL AIR QUALITY LAWS AND REGULATIONS

- Federal Clean Air Act Amendments of 1990 (42 USC § 7401 et seq.)
- Federal Clean Air Act Conformity Requirement (42 USC § 7506)
- Transportation Conformity Regulations
- 40 CFR 51- Requirements for Preparation, Adoption, and Submittal of Implementation Plans; (Subpart W - PDF, (101 KB) starting at Section 51.850, deals with Conformity and Conformity SIP requirements). Scroll down to Section 850.
- U.S. EPA "NESHAP" Air Toxic Regulations - Asbestos via Government Printing Office (40 CFR 61, Subpart M)
- 40 CFR 81.305 (California Area Designations for National Ambient Air Quality Standards)
- U.S. EPA Office of Air and Radiation (all air quality programs) Exit CT

STATE AIR QUALITY LAWS AND REGULATIONS

- California Clean Air Act of 1988; Chapter 1568, Statutes of 1988; AB2595
- California Air Pollution Control Laws and Regulations (general reference site)
- Air Pollution Control District Rules Database (California Air Resources Board)

POLICY MEMOS

- Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA

KEY WEB SITES

- Caltrans Division of Environmental Analysis - Air Quality
- Caltrans Transportation Planning
- Caltrans Transportation Programming
- Caltrans SER, Vol. 1, Chapter 38, "NEPA Assignment"
- California Air Resources Board Exit CT
- California Air Resources Board Transportation Strategies web site Exit CT
- Federal Highway Administration - Conformity Exit CT
- Federal Highway Administration - Environment/ Exit CT
- Federal Highway Administration - Mobile Source Air Toxics Exit CT
- U.S. EPA Transportation/Air Quality - Conformity Exit CT
- U.S. EPA Region IX home page Exit CT

AIR QUALITY GUIDANCE AND INFORMATION

- National Ambient Air Quality Standards (NAAQS) and State Ambient Air Quality Standards Chart - PDF (30KB)
- UCD/Caltrans Carbon Monoxide Hot-Spot Analysis Protocol
- CALINE4 Model
- CALINE4 Manual (1989 research report)
- U.S. EPA Project-Level Conformity & Hot-Spot Analyses Exit CT
- U.S. EPA - Regulatory Models and Modeling Guidance Exit CT
- California Air Resources Board: Models Exit CT
- California Air Resources Board: Air Quality Standards Exit CT
- California Air Resources Board: Naturally Occurring Asbestos Exit CT
- OPR Website - Naturally Occurring Asbestos Guidance Memo - PDF (350KB)
- U.S. EPA Region IX air quality maps Exit CT
- U.S. EPA "Green Book" (nonattainment and maintenance area designations) Exit CT
- Interim Guidance on Conformity Requirements for the 1997 Ozone NAAQS

CONTACT LISTS AND RELATED INFORMATION

- California Air Resources Board - California Air Districts Resource Directory Exit CT
- California Metropolitan Planning Organizations and Regional Transportation Planning Agencies - PDF (1.2MB) Exit CT
- MPO & RTPA List at CalCOG Exit CT
- Caltrans HQ Air Quality Contacts

BACKGROUND

REGULATORY FRAMEWORK

Nearly all transportation projects have some effect on air quality. On-road motor vehicles are the major source of air pollutant emissions contributing to violations of most air quality standards. Projects that affect the capacity or location of major roads or other elements of the transportation system can cause both adverse and beneficial air quality impacts. The impact is often positive, a capacity or alignment change may improve traffic flow enough, at least for a period of time, to reduce pollutant emissions compared to existing conditions or no-build alternative. In the long term, overall emissions from motor vehicles will drop due to improved vehicle emission controls, but future traffic growth will, to some degree, counteract these reductions. For some pollutants, vehicle-related emission controls may not have a major effect; for example, re-entrained road dust emissions are roughly proportional to vehicle miles traveled. Also, short-term emissions from construction processes and equipment may be an issue if not adequately accounted for in existing regional air quality plans and regulations.

Most of California's transportation air quality requirements come from the federal Clean Air Act (FCAA) and the California Clean Air Act (CCAA). The FCAA, as amended in 1990, sets nationwide air quality standards, called National Ambient Air Quality Standards (NAAQS). The U.S. Environmental Protection Agency (U.S. EPA) administers the FCAA, sets the specific air quality and emissions standards, and delegates certain responsibilities to other federal agencies and to the states. U.S. EPA sets and updates both primary (health) and secondary (welfare) standards for the six "criteria pollutants" - carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matters (PM10 and PM2.5).

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), U.S. EPA and the California Air Resources Board (ARB) also regulate Toxic Air Contaminants (TACs, or air toxics). Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (such as airplanes), areas sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSAT) make up a subset of the 188 (187 as of May 2014) air toxics defined by the FCAA. MSAT are compounds emitted from highway vehicles and non-road equipment. FHWA released updated Interim Guidance on Air Toxic Analysis for NEPA documents on December 6, 2012.

While the FHWA Interim Guidance and U.S. EPA's emission control programs provide for the national level, California's vehicle emission control and fuel standards are more stringent than federal standards. The state's standards are also effective sooner, so the effect on air toxics of combined state and federal regulations is expected to result in greater emission reductions, more quickly, than the FHWA analysis on which the Interim Guidance is based shows. The FHWA analysis, with modification related to use of the California-specific EMFAC model rather than the MOBILE or MOVES model, would therefore be conservative.

The California Clean Air Act sets up a structure managed by ARB similar to the federal one for air toxics. All federal air toxics are incorporated into the California lists by reference. In addition, California regulates a large number other substances not currently on the federal list. Key California-only air toxics for consideration in transportation projects include diesel exhaust particulate matter and naturally occurring asbestos.

The ARB's air toxics program web page is at: http://www.arb.ca.gov/toxics/toxics.htm Exit CT. Note that not all of the ARB toxics programs apply to transportation projects; consult with technical or Legal staff before getting into a lot of detail.

Under the FCAA, U.S. EPA has designated planning areas throughout the country. Areas are classified as being in "attainment" for a given pollutant if they meet the prescribed standards. If an area does not meet the standard, it is designated as a "nonattainment" area for that pollutant. Areas that were previously designated as non-attainment areas but have now met the standard (with U.S. EPA approval of a suitable air quality plan) are called "maintenance" areas.

The FCAA requires that states produce improvements in air quality over time. This means reducing air pollution to healthful levels in nonattainment areas and developing controls to ensure the air remains healthful in subsequent years. The State Implementation Plan (SIP) process is the means by which states develop a collection of regulations and plans to demonstrate this effort to the federal government. In order to meet their transportation planning goals, Metropolitan Planning Organizations (MPO) and Regional Transportation Agencies (RTPA) create long-range plans and programs, such as Regional Transportation Plans (RTP) and Regional Transportation Improvement Programs (RTIP), which include proposed transportation projects. The projects included in these plans and programs must be consistent with (or conform to) the approved SIP, and hence the requirements of the FCAA. This process is called "Transportation Conformity." If a project would contribute to the violation of a standard, it cannot be included in the conforming plan and cannot be built. For more about how air quality is addressed at the planning stage, see the SER, Vol. 1, Chapter 4, "Environmental Considerations During Transportation Planning."

In nonattainment or maintenance areas, transportation conformity applies if projects will be funded by the FHWA, Federal Transit Administration (FTA), or any agency that has been delegated project approval by these agencies. It also applies if projects are determined to be regionally significant as defined at 40 CFR 93.101 and are approved by a regular recipient of federal highway or transit funds, such as Caltrans and most local transportation agencies.

A further demonstration of transportation conformity–at the project level–is required if a project is located in a nonattainment or maintenance area. The basic demonstration of conformity consists of showing that the project is listed in and consistent with a conforming RTP and TIP. In addition, a microscale or "hot-spot" analysis for conformity is required if a project is located in a nonattainment area for CO, and/or PM2.5 and PM10. Emission reduction measures may be required to ensure that the project will not cause or contribute to new violations of a standard. Caltrans cannot approve a project that would cause or contribute to violation of a federal air quality standard. FHWA and U.S. EPA released a national guidance memo on March 29, 2006, for doing qualitative PM2.5 and PM10 hot-spot analysis. See the attachment at the bottom of this memo.

The California Clean Air Act (CCAA) must be addressed in CEQA documents for transportation projects. Although state air standards for some pollutants are more stringent than federal standards, there is no conformity process under the state law. Over time, as air quality improves under the federal conformity process, it is expected that there will be progress in meeting state standards as well. The California Air Resources Board (ARB) is responsible for establishing state air quality standards and enacting regulations for statewide air pollution control programs, and for submitting the SIP to the U.S. EPA. Local air pollution control districts and air quality management districts directly regulate stationary and some area sources of emissions, but not mobile sources, under the structure set up by the CCAA. The air districts perform most of the air quality planning in California, including the development of SIP submittals under the FCAA.

VARIOUS POLLUTANTS

Environmental documents for FHWA Federal-aid projects (on and off the SHS) must analyze a variety of air pollutants in order to assess a project's potential to impact the environment. The following is a brief breakdown of the most common pollutants.

- Ozone impacts are regional in nature and cannot be ascribed to any single project. Ozone is formed by reactions, in the presence of sunlight and heat, primarily between organic compounds and nitrogen oxides. These precursor compounds are emitted by all combustion sources, and in many regions mobile sources including motor vehicles are the major source. Ozone violations most often occur in summer (April-October), since strong sunlight and heat are necessary for its formation. Projects that are included in the RTP and TIP have been included in a regional conformity analysis and require no further conformity analysis for ozone at the Project initiation Document (PID) or subsequent project phases. Additional ozone analysis may be needed for CEQA, however.

- Particulate Matter (PM10 and PM2.5) refers to airborne particles that are less than 10 microns in diameter (PM10) and less than 2.5 microns in diameter (PM2.5), respectively. Particulate matter is both a regional and project-level issue. Particulate matter is both directly emitted and, especially for PM2.5, a result of secondary formation based on nitrogen oxides (NOx), volatile organic compounds (VOC), sulfates (SOx), and ammonia (NH3). As with ozone, secondary pollution forms some distance away from the precursor emission sources, and up to several hours later. Regional PM is primarily a winter nighttime product, since cool, damp, stable weather is needed to support the chemical reactions that produce it. Directly-emitted PM2.5 and PM10 has been determined to be a conformity issue in California. Project-level PM analysis should follow the EPA Quantitative Analysis Guidance in areas that are subject to conformity requirements for PM10 or PM2.5, or EPA's Quantitative (2013) or Qualitative (2006) Analysis Guidance in areas that are attainment-unclassified for federal PM standards. PM from diesel engine exhaust (mostly in the PM2.5 size range) is also a toxic air contaminant under California regulations and one of the Mobile Source Air Toxics (MSAT) listed by U.S. EPA.

- Carbon monoxide is emitted directly from vehicles and is a major issue at the project level. Transportation projects in nonattainment or maintenance areas for CO are evaluated using approved emissions models such as the Caltrans/UCD CO Protocol and Exit CT the CALINE4 model.

- Asbestos is an air quality, as well as a hazardous materials, issue. If structural demolition is needed, such as removal of an existing bridge, the release of friable asbestos may be an abatement issue. In areas where naturally occurring asbestos is an issue, geologic studies, mandatory air district notices, special construction provisions, and other activities may be needed. Structural asbestos (demolition) is regulated by federal and related state/air district regulations (NESHAP) Exit CT. Naturally occurring asbestos is regulated under ARB regulationsExit CT and worker-safety programs.

- Construction stage impacts are an issue in some areas of the state. This is especially true if sensitive land uses (such as schools, health- and child-care facilities) are nearby. Dust emissions are an important consideration, but are largely mitigated by standard dust control techniques required by Caltrans' Standard Specifications (14-9.03, 2010 version). In a growing number of areas, more stringent regulations requiring specific work practices and plans for dust control are contained in air district or local rules; these regulations apply to all work using Caltrans specifications and special provisions based on Section 14-9.02 of the Caltrans Standard Specifications, 2010 version. Federal conformity regulations require analysis of construction impacts for projects when construction activities will last for more than five years; analysis for shorter construction periods may be needed for both NEPA and CEQA if sensitive land uses are nearby or construction emissions are likely to be large.

- The Clean Air Act identifies 188 (187 as of February 2015) air toxics, also known as hazardous air pollutants. The U.S. EPA has identified 21 of these toxics as MSAT. They have also identified a subset of MSAT that are known as Priority MSAT. These are: benzene, formaldehyde, acetaldehyde, acrolein, 1,3-butadiene, napathalene, a subset of polycyclic organic matter compounds, and diesel particulate matter/diesel exhaust organic gases. Diesel Exhaust Particulate Matter is a growing area of interest, although no single analysis method, or criterion for determining when detailed analysis is needed, has yet been defined by the air quality regulatory community. Quantitative health risk analysis is generally not done for transportation projects, but there is a growing emphasis on identifying and avoiding impacts to sensitive receptors, such as schools. FHWA has updated their Interim Guidance on Air Toxic Analysis for NEPA documents several times.

INTERAGENCY COORDINATION

EARLY COORDINATION MEETING

Air quality is one of the more complex of the resource areas treated in environmental documents. For many projects there is a substantial amount of interagency work done at the transportation planning stage. When a project moves into the PID stage, environmental planners and air quality specialists should attend any early coordination meetings held for air quality.

For major projects, the local air district should be involved in at least one early meeting during project initiation. Also, the local air district should be invited to any public or agency scoping meeting held at the Project Approval and Environmental Document (PA&ED) phase.

Here are some good questions to consider at this stage:

- Is the project in an area where federal Clean Air Act conformity requirements apply? If so, does the project come from a conforming Regional Transportation Plan?
- Are any project-level conformity issues present? Will a hot-spot analysis be needed for conformity?
- Is adequate traffic information available to determine the Level of Service (LOS), vehicle fleet mix, and traffic volumes both on the project (for Baseline, the no-build alternative, and viable build alternatives) and for nearby major intersections?
- If an air quality analysis has already been prepared, does it adequately document project effects on localized emissions of CO and/or PM 2.5 and PM10?
- Could asbestos be an issue? Asbestos may be naturally occurring, or can be from structural modification. Is any demolition or structural modification necessary?
- What standard minimization and avoidance measures, such as dust control during construction, could be part of the project?
- Are there schools, health facilities, or other sensitive receptors in the project area?

INTERAGENCY CONSULTATION FOR CONFORMITY

Conformity requirements apply in areas that are designated nonattainment or maintenance for federal air quality standards. For projects that affect highway capacity, or other projects where questions arise regarding conformity issues, a regional interagency consultation process is available to discuss and gain consensus on conformity issues. Areas in California that are subject to conformity requirements are shown at the Division of Environmental Analysis Air Quality web page. A map and a table of affected areas (with links to relevant transportation planning and air quality agencies) are available.

Interagency consultation requirements are defined in the U.S. EPA Conformity Rule at 40 CFR 93.105. Most metropolitan areas have adopted consultation procedures involving local, state, and federal transportation planning, transit, and air quality agencies. Interagency consultation for conformity and air quality planning is managed by the MPO in most areas.

FHWA retains air quality conformity determinations under the 23 USC § 327 NEPA Assignment MOU. Caltrans has prepared an Air Quality Conformity Findings Checklist, conformity language in annotated outlines for the various types of NEPA documents, and an annotated outline for an Air Quality Conformity Analysis report that supports requests to FHWA for project-level conformity determinations. These items are available at the SER Forms and Templates web site. Additional information can be found at the FHWA Conformity web site. Exit CT

REPORTING

There may be several distinct air quality analyses or studies performed in support of the project development process, both at the PID and the PA&ED phases. For many projects, a technical report is completed to summarize studies, outline conformity information, and provide other needed information for the environmental document.

DETERMINING THE NEED FOR A TECHNICAL REPORT

This should be determined at the scoping stage of the project and documented in the PID. The project will probably NOT need a technical report if:

- it is exempt from all conformity analysis requirements (see the "Table 2" exemption list in 40 CFR 93.126 **AND**
- it has no potential air quality impacts subject to NEPA analysis according to the initial screening procedure of the CO Protocol, and qualifies for a NEPA Categorical Exclusion pursuant to 23 USC 326 (except for 771.117[c][22] or 771.117[c][23]), AND
- it qualifies for a Categorical Exemption under CEQA.

For projects in areas subject to conformity, the conformity documentation and the Air Quality Conformity Findings Checklist must be prepared and filed with the NEPA CE even if no other air quality analysis is determined to be necessary. The documentation should also cover consultation with FHWA/FTA, the MPO, and air agencies, where needed.

For most other projects, an air quality technical report should be prepared, although the report can be fairly short for projects where air quality issues are minimal and can be avoided or minimized with standard measures. Here are some examples where a comprehensive report is recommended:

- The environmental document will be a higher level document with many complex issues, including air quality.
- Early scoping, air analyses, or the PID indicate that air quality mitigation beyond standard impact minimization and avoidance measures may be needed.
- The project is regionally significant for conformity analysis purposes, regardless of the type of environmental documentation to be prepared. All capacity-increasing State Highway System (SHS) projects, including auxiliary lanes, passing lanes, and many truck climbing lanes, are considered regionally significant by definition under federal conformity regulations.

The Air Quality Conformity Findings Checklist summarizes and documents the conformity analysis and determination for projects. The checklist must be completed for all projects on and off the SHS for which a NEPA environmental document or determination will be prepared. The checklist is completed and signed by the District/Region air quality specialist, indicating that the analysis is complete and documented in the project file. If the project is exempt from conformity analysis (Steps 1 and 2 only), then the Environmental Planner/Generalist may sign the checklist.

For projects processed pursuant to 23 USC 326 CE Assignment (except for 771.117(c)(22), (c)(23), (c)(26), (c)(27), or (c)(28)[1]) for which an Air Quality Conformity Analysis is required), the Senior Environmental Planner's signature on the Categorical Exclusion (CE) formally documents the conformity determination for the project. If hot-spot or other analysis is done to back up checklist entries, such as use of the CO Protocol to determine whether modeling is needed, that analysis must be retained in the project file.

For projects processed pursuant to 23 USC 327 NEPA Assignment, the Department will document the air quality conformity analysis and submit it to FHWA who will make the formal conformity determination. The air quality conformity analysis and request for air quality conformity determination must be submitted by the Department to FHWA. The Air Quality Conformity Analysis annotated outline is available on the SER Forms and Templates page. The FHWA conformity determination must be received before NEPA can be completed. FHWA's June 21, 2007 letter and “Transportation Conformity and NEPA Assumption Questions and Answers” describe FHWA's expectations for the 23 USC 327 project-level air quality conformity determination process. The FHWA determination shall be included in the environmental document.

REPORT CONTENT

An air quality study report should include:

- A basic project description documenting project design assumptions-such as future (design-year) traffic and an interim year such as open-to-traffic that are relevant to the air quality analysis. The project description should include a brief description of the alternatives under consideration. Make sure it is consistent with the environmental document.
- Regional meteorology and climate discussion. Include a description of the area's topography as well, if pertinent to the discussion.
- Regulatory Framework. Provide a description of the applicable regulations as well as the agencies, such as air districts and MPOs that are involved with air quality in the area or region. Also outline regulations on the federal, state, local levels. Include a table outlining air quality standards on both the federal and state levels.
- Project area and affected environment: Include monitor locations and data, area conformity designations and classifications, location of sensitive receptors.
- Results of air quality analyses. Include a description of methodologies and assumptions used.
- Potential impacts of the project on air quality: direct, indirect, temporary, and permanent.
- Potential avoidance, minimization and/or mitigation measures.
- Project-level conformity documentation, if the project is in an area subject to conformity requirements under the FCAA.
- An appendix with the results of any emissions modeling done for the analysis.

PREPARER QUALIFICATIONS

Air quality reports should be prepared by an air quality specialist.

If asbestos is an issue, that portion of the report should be coordinated with a hazardous materials specialist. Certain asbestos studies must be done, by law or regulation, by or under the direction of a Registered Geologist, a Certified Industrial Hygienist (CIH), or a Certified Asbestos Consultant (CAC).

PROCESSING AND APPROVAL

The air quality study report should be reviewed, at a minimum, by the District air quality specialist (for consultant-prepared documents), the District hazardous waste technical specialist, and the Environmental Planner/Generalist responsible for the environmental document. The air quality study report is approved by the air quality specialist's supervisor (District Branch Chief). Approval should be completed before circulation of the draft environmental document.

Local Assistance Projects - Air quality study reports prepared in support of local agency Federal-aid transportation projects "off" the SHS have the same review and approval requirements but are processed through the District Local Assistance Engineer (DLAE). The report shall be reviewed by the District air quality specialist, the District hazardous waste technical specialist and the District Local Assistance Environmental Planner/Generalist, and approved by the air quality specialist's supervisor (District Branch Chief).

RECOMMENDED METHODOLOGIES

The methods for analyzing air quality impacts can be quite complex. This section is meant to guide the environmental planner in scoping and/or reviewing the technical report, and then writing the environmental document. The analyses are typically done by an air quality specialist. Note that avoidance, minimization, and/or mitigation measures are discussed in the environmental document section of this chapter.

DIRECT IMPACTS

See "Information for the Environmental Document " for a discussion of permanent and temporary direct impacts.

INDIRECT AND CUMULATIVE IMPACTS

See "Information for the Environmental Document" for a discussion of indirect and cumulative impacts.

CONFORMITY

Conformity is both a project-level and a regional planning issue. Extensive modeling is required at the planning stage to do a regional conformity analysis for RTPs and TIPs, both of which must describe the specific projects that are included. See the overview section for more on this topic.

Note: Compliance with conformity requirements may be adequate to cover federal criteria pollutant cumulative impact issues but does not address state criteria pollutant or non-criteria-pollutant issues (MSAT, asbestos, etc.) as might be covered under CEQA. Additional analysis may be needed for state-level issues.

23 USC § 327

Air quality conformity determinations are excluded from NEPA Assignment [(see 23 USC § 327(a)(2)(b)]. Conformity determinations, both regional conformity and project-level conformity, will remain the responsibility of FHWA California Division for all projects under 23 USC § 327. For Environmental Assessments (EAs) and Environmental Impact Statements (EISs) under 23 USC § 327, FHWA will make the conformity determinations after the preferred alternative is identified and prior to completion of the final environmental document (FED). For CEs under 23 USC § 327, FHWA will make the conformity determinations prior to the approval of the CE. Both the regional and project-level conformity determinations must be documented in the air quality section of the final environmental document. A copy of the FHWA conformity determination letter must also be included in the final EA or EIS. The Department may not issue a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) without the conformity determination(s) from FHWA.

For conformity determinations under NEPA Assignment, the Department will send FHWA, separate from the environmental review process, a request for conformity determinations. In this regard, FHWA will be treated much like other federal resource agencies. FHWA's preference is that the air quality conformity documentation submitted to FHWA be a stand-alone report. The air quality conformity documentation must include adequate summary information such that conformity determinations can be made on the preferred alternative without having to refer to the environmental document. An Air Quality Conformity Analysis Annotated Outline can be found on the SER Forms and Templates page. The conformity documentation should not include air quality issues that are not required for transportation conformity purposes (e.g., air toxics, asbestos, etc.)

23 USC § 326

For projects covered by the 23 USC § 326 CE Assignment MOU, both regional and project-level air quality conformity determinations for individual projects have been assigned to the Department and those determinations are made by the district/region. For additional information, see the SER, Vol. 1, Chapter 38, "NEPA Assignment."

PROJECT-LEVEL CONFORMITY

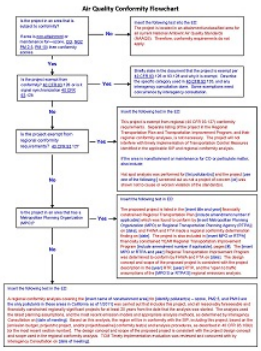
At the project level, existence of a valid regional conformity analysis must be documented, and in some cases more specific "hot-spot" analysis and other findings may be needed. Here are some good resources on transportation conformity.

- FHWA Transportation Conformity website Exit CT

- Transportation Conformity Rule 40 CFR 93 Subpart A

Conformity Flow Chart

Click on image below to view larger or printable version.



Components of a Project-Level Conformity Analysis

The project-level conformity documentation is done by the air quality specialist and documented in the technical report. The environmental document preparer will summarize the results in the environmental document. Ensuring conformity and documenting it is a step-by-step process. Here are the basic steps:

- Determine if the project area is subject to conformity requirements (within a nonattainment or maintenance area for a federal criteria air pollutant).
- If so, determine if the project exempt from conformity, or at least from regional conformity analysis, requirements

If not exempt, confirm:

- Status of Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) conformity, or if an Isolated Rural area the date and status of the most recent regional conformity analysis.
- That the project listed in the conforming RTP and TIP, or in a previous regional emission analysis if in an Isolated Rural area.
- If not, include the results of a regional emission analysis done for the project (usually only in Isolated Rural areas).
- If in a carbon monoxide (CO) and/or particulate matter (PM2.5, PM10) area, include results of "hot-spot" analysis with respect to conformity requirements.
- Determine whether the project implements a Transportation Control Measure (TCM) identified in the applicable air quality plan (SIP) and RTP; if not a TCM, confirm that the project does not interfere with implementation of any TCMs.

More details on some of the key concerns in this documentation outline are provided below. See the air quality specialist if there are questions on conformity.

Conformity Exemption

Certain types of projects are exempt from conformity requirements. These project types are found by U.S. EPA to be neutral from an air quality or emissions standpoint, and are listed in the Conformity Regulations at 40 CFR 93.126, 40 CFR 93.127, and 40 CFR 93.128. If a project fits one of the listed types, it may need little or no conformity analysis, and does not need to be individually listed and considered in regional conformity modeling.

Regional Conformity

If a project is not exempt from conformity requirements, and is regionally significant (see definition at 40 CFR 93.101), it must come from a conforming RTP and TIP. Documentation of the nonattainment or maintenance status of the area, including SIP submittal/approval dates, is needed. Also, documentation of the RTP and TIP conformity status (most recent amendment dates, date of last full and updated conformity determinations) is needed. The design concept and scope of the project must match the design concept and scope used in the RTP and FTIP project listing. "Design concept" means the type of facility that is proposed, such as a freeway as opposed to an expressway or arterial highway. "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project. The "open-to-traffic" delivery date of the project must be within the same conformity analysis time period that the project is listed in for the RTP and FTIP conformity analysis. For Draft NEPA documents, at least one viable alternative must match the RTP and TIP project listing; for the Final NEPA document, the selected alternative design scope and design concept must match the RTP and TIP project listing.

If the project is in an “isolated rural” nonattainment area—where there is no MPO in the nonattainment area—there will be no RTP and TIP conformity to which to refer. In this case for regionally significant projects, regional analysis must be done and documented for the project itself using procedures (including interagency consultation and public involvement) and criteria similar to those used by an MPO. See 40 CFR 93.109(g) for more information.

Hot-Spot Analysis

If a project is located in a CO and/or PM 2.5 and PM10 non-attainment or maintenance area, a hot-spot analysis is required for conformity purposes. The analysis must confirm that the project will not cause or worsen a localized violation of the standard. Ordinarily, the hot-spot analysis done for the environmental document will be adequate to allow for conformity hot-spot findings. In CO areas, a project is analyzed using the Caltrans/UCD CO Protocol and modeled if necessary using the CALINE4 model. CO hot -spot analysis tools and guidance can be found at http://www.dot.ca.gov/hq/env/air/pages/coprot.htm. See the Division of Environmental Analysis Air Quality web page for details on current acceptable methodologies. Also refer to the U.S. EPA PM Hot-Spot Analysis Guidance. Exit CT

In any area (attainment or nonattainment), a project must not cause an exceedance of the federal NAAQS for CO, PM10, or PM2.5. In CO, PM2.5, and PM10 non-attainment areas, a project must not cause an exceedance, OR contribute to increasing an existing exceedance (make it worse). For the project to conform, the build design-value must be less than or equal to the no-build design-value at each receptor in the build scenario that exceeded the NAAQS. If one or more of these tests fails, the project cannot proceed. In such a situation the project must be modified to produce changes in traffic operation that allow the hot-spot tests to be met, which in

some cases may require additional work at intersections in the vicinity that otherwise might not be part of the project. Areas where the conformity hot-spot tests are needed can be found in the list of areas subject to conformity at the Division of Environmental Analysis Air Quality web page. The conformity hot-spot test is required only if the project area is determined to be a project of air quality concern and it is in an area of non-attainment or maintenance for the federal CO and/or particulate matter standards. CO and PM hot-spot consideration is needed in all areas, not just nonattainment/maintenance areas, to ensure for NEPA and CEQA purposes that the project would not create a violation that could put the area into nonattainment.

SIP Control Measures

All projects in areas subject to conformity must demonstrate that they do not interfere with implementation of Transportation Control Measures (TCMs) listed in the State Implementation Plan for the area. (TCMs are regional measures used to reduce emissions. They are a broad array of strategies and can range from specific traffic control measures to the incorporation of carpool programs. If a project comes from a conforming RTP and TIP the RTP and FTIP conformity analyses would have documented system-level timely implementation and non-interference with TCMs.)

Suggested Language for Conformity Documentation

CE Documentation: Attach a sheet to the standard CE/CE form with conformity documentation. Backup materials such as a localized (CO, PM 2.5, PM10) impact analysis or screening, as needed, should be included in the project file. Projects that are processed with CEs under CEQA and NEPA will usually, but not always, be exempt from regional conformity requirements as well. Include a copy of the Air Quality Conformity Findings Checklist in the project file.

EA or EIS: Use the flowchart included in the environmental document annotated outlines (AOs) in the SER. Where additional documentation is needed, consult with the air quality specialist for content for the environmental document. Include a copy of the Air Quality Conformity Findings Checklist in the project file.

INFORMATION FOR ENVIRONMENTAL DOCUMENT

Caltrans uses a standard format for impact discussions in its environmental documents. See the SER forms and Templates page for the following annotated outlines:

- IS/EA outline with annotated guidance, including an air quality section
- EIR/EA outline with annotated guidance, including an air quality section
- EIR/EIS outline with annotated guidance, including an air quality section
- EIS outline with annotated guidance, including an air quality section
- EA outline with annotated guidance, including an air quality section

The use of the joint NEPA/CEQA AOs or the NEPA-only AOs is *required* for any project receiving FHWA Federal-aid funds. In addition, the AOs are required for projects on the SHS. The use of the joint NEPA/CEQA AOs is highly recommended for all other projects. This section is meant to complement and, where needed, expand on the information and guidance provided in the outlines.

The air quality section of the environmental document should discuss the following items, as appropriate:

- Regulatory Setting
- Affected Environment
- Environmental Consequences (including permanent, temporary, direct and indirect)
- Avoidance, Minimization and/or Mitigation Measures
- Cumulative Impacts

Construction impacts can be included or treated as a separate section in the environmental document.

Summarize the information in the technical report, as needed, to draft the environmental document. Remember to write the document for the general reader. Technical detail should be kept to a minimum. If needed, refer the reader to the technical report.

REGULATORY SETTING

Use the standard (boilerplate) language in the approved AO if applicable. If not using one of the AOs, include a brief discussion of the regulatory framework for the analysis, including local, state, and federal laws. Provide a summary of regional transportation planning.

AFFECTED ENVIRONMENT

- Briefly describe climate and meteorology, focusing on what will most affect air quality.
- Describe current air quality status of the area for both state and federal criteria pollutants. Include a chart of air quality standards for reference. Here is a chart that may be useful: ARB air quality standards chart - PDF. Exit CT (30KB)
- List air quality monitoring stations and recent data (generally the last 3 years) in the project area, and any other localized air quality-related information pertinent to the air quality analysis.
- Document if naturally occurring asbestos is found in the project area.

ENVIRONMENTAL CONSEQUENCES

Note: Be sure to address impacts of the no-build and ALL alternatives in the environmental document.

Conformity: In areas where conformity applies, include a brief discussion and documentation of project-level conformity. Refer the conformity discussion in the Reporting Section for details.

Direct Permanent Impacts

The following are permanent impacts directly and locally attributable to implementation and operation of the project. The analyses for CO, PM2.5, and PM10 are also used to document project-level conformity, where required.

- CO (carbon monoxide) hot-spot analysis: the air quality specialist should use the CO Protocol. All projects affecting traffic flow should be evaluated for potential CO impacts. Modeling may be needed. If there are questions on CO models, see the Caltrans Headquarters Air Quality Page.

- PM2.5 and PM10 (particulate matter/dust) analysis for conformity: If the project is determined, usually through interagency consultation, to be a project of air quality concern, quantitative (with dispersion modeling) analysis is required. For more information, consult the U.S. EPA PM Hot-Spot Analysis Guidance. Exit CT

- Mobile Source Air Toxics (MSAT): For guidance on how to address mobile source air toxics in an environmental document, please refer to the FHWA Interim Guidance on Addressing MSAT Exit CT.

  Mobile Source Air Toxics (MSAT) in the NEPA Process for Highways

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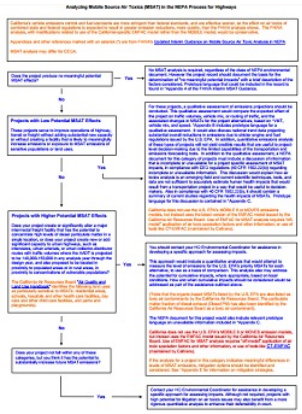

- Diesel exhaust: This a particular issue on facilities with large volumes of truck traffic. It is known that exposure to diesel exhaust over time can have effects on health. Criteria and quantitative methods for assessing diesel impacts are not yet developed at the regulatory level. However it is important to document any sensitive land uses in the vicinity of the project.

  - *Sensitive Land Uses* are schools, medical centers and similar health care facilities, child care facilities, and parks and playgrounds.

  - *Vicinity of the project* is 500 feet or 150 meters from the edge of the nearest traveled lane.

Temporary, Construction-Related Direct Impacts

These are temporary impacts related to construction activities.

- Dust Control. Visible emissions of all types including dust must be controlled. See Standard specifications 14-9.03 and Section 18. Local and air district regulations may also apply. Standard Specification14-9.02 requires compliance with all applicable air quality laws and regulations including local and air district ordinances and rules. Construction impact analysis should document the PM 2.5 and PM10 (dust) impacts expected.

- Structural Asbestos: Document the need for (or results of) asbestos inspection for structures that will be demolished or substantially renovated. Formal air district or ARB/U.S. EPA notification (depending on delegation status of the area) not less than 10 working days before starting demolition work is required by federal NESHAP and some air district regulations.

- Naturally Occurring Asbestos: Document the need for (or results of) site surveys regarding naturally occurring asbestos. This impact is largely construction-related, but may occur through ongoing maintenance activities as well. Notification of the air district before starting work is required by ARB and some air district regulations. Cross reference with the hazardous materials chapter as appropriate.

- Provide results of studies aimed at any location-specific issues that may occur. In San Joaquin Valley, South Coast, and Coachella Valley areas (as of 3/2005), summarize how project design and operational/construction practices will comply with PM2.5 and PM10 regulations.

- If construction will last more than 3 years, or will substantially affect traffic due to detours, closures, and temporary terminations, then the CO and PM10 hot-spot impacts of the disturbed traffic flow should be analyzed. In areas subject to transportation conformity requirements, a construction impact analysis is required if construction will last more than 5 years.

Indirect and Cumulative Impacts

Air pollutant emissions from a project may have an indirect or cumulative effect at a **regional** scale, since they combine with all other emissions in a region to produce certain pollutant concentrations. If a project is included in a RTP and TIP that contributes to attainment or maintenance of applicable air quality standards–as documented in a program level environmental document or a conformity analysis–it would not typically have a cumulative adverse impact on regional air quality.

There may be cases where a separate methodology is needed for assessing indirect and/or cumulative impacts.

See the SER for guidance on cumulative impact analysis and growth-related indirect impact analysis.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

For direct, operational impacts, summarize any avoidance, minimization and/or mitigation measures. Include, for example, project design features such as paved shoulders, which will reduce PM2.5 and PM10 emissions from re-entrained road dust. Include also any design changes that were included to avoid CO exceedances. Include design changes made to avoid or minimize exposure of sensitive receptors.

For construction-related, temporary impacts:

- Summarize avoidance, minimization and/or mitigation measures for issues such as naturally occurring or structural asbestos.
- Describe any standard or special provisions that will be included in the project to minimize dust exposure during construction.

Finally:

- Note that compliance with any applicable local, air district, state, and federal air quality laws and regulations applicable to construction activity is required by Standard Specifications Section 14-9.02.
- List/summarize any air quality permits or notifications expected to be needed for construction.

INFORMATION NEEDED FOR PROJECT DELIVERY

REGIONAL TRANSPORTATION PLAN

This information should be documented in the environmental document prepared by the MPO or RTPA for the RTP and serve as a building block in subsequent decision making.

- The RTP should establish a purpose and need for regionally significant projects.
- The RTP should include a listing of all regionally significant projects assumed to be constructed and open to travel in each of the analysis periods used for the air quality analysis. Individual project listings should include a brief description of the design concept and scope of the project.

PROJECT INITIATION DOCUMENT

The following information should be included in the Preliminary Environmental Analysis Report (PEAR) prepared as part of the PID.

- Verify air quality information from RTP stage. If the project was specifically listed in the RTP conformity analysis, verify design concept and scope information and make sure any new alternatives are included. If design concept and scope have changed substantially from that used in the RTP Conformity analysis, a RTP amendment may be needed to complete the programming process. Determine whether conformity applies, whether the project is exempt from conformity, whether the project is listed in the conforming RTP if not exempt, whether regional significance questions are relevant, etc.
- Determine whether conformity applies, and if so whether a conformity exemption applies.
- Plan any needed early coordination meetings.
- Plan the cost, scope, and schedule for any air studies to be completed at the environmental document stage.
- If needed, perform localized impact (hot-spot) and/or regional analysis; however, detailed analysis is usually best left for the actual environmental document phase because analysis at the PID stage is intended mainly to estimate scope and cost of environmental studies.

DRAFT PROJECT REPORT

This is the stage where the bulk of air quality analysis is done. Detailed analyses for all viable alternatives and the no-build alternative are completed. If field air quality monitoring is done (exceptional cases only), it would be completed at this stage, but might need to start during the PID phase due to timing requirements (CO monitoring must be done for the entire period between October and April; PM monitoring, if done, must occur for several months during the period when known exceedances of the PM standards occur). The following information should be included in the Draft Environmental Document (DED) or used as supporting documentation for a CE, as appropriate.

- Make sure the design concept and scope (40 CFR 93.101) of at least one alternative matches the conforming RTP and TIP project descriptions.
- Make sure the purpose and need and project descriptions of the DED and draft project report match.
- The potential impacts of each alternative must be analyzed and discussed in the environmental document, along with appropriate avoidance, minimization, and/or mitigation measures.
- Confirm the project-level conformity status of the project.
- The technical report and all supporting studies must be completed before the draft project report and DED can circulate.

PROJECT REPORT

This information should be presented in the Final Environmental Document (FED).

- Prepare updated air quality report/analysis responding to comments made during DED circulation.
- Determine whether analysis requires updating to address selected alternative; update if needed.
- Determine and document whether the selected alternative is contained, with substantially the same design concept and scope, in the current conforming RTP and TIP. If RTP and TIP amendments are needed to deal with design concept and/or scope changes during the environmental process, they must be completed and a revised regional conformity determination made by FHWA and FTA before the FED can be signed and a ROD or FONSI issued. Include the final project-level conformity determination, determination of impacts, and specify and incorporate into the project required avoidance, minimization, and/or mitigation measures for the selected alternative.
- A copy of the FHWA conformity determination letter must also be included in the FED.
- Provide cost estimates for mitigation measures, as defined, for the Mitigation Cost Tracking System.

ENVIRONMENTAL REEVALUATION (DURING DESIGN AND RIGHT OF WAY PHASES OF A PROJECT)

Air issues should be re-examined and updated as necessary whenever an Environmental Reevaluation is done. If regional conformity lapses during later phases, such

as Design, work on the project may not be able to proceed to the next phase. A regional conformity "freeze" can prevent changes that affect the design concept and scope of the project. In areas where conformity requirements are newly applied after the environmental process is complete, it may be necessary to perform the first conformity analysis, and obtain a conformity determination from FHWA and FTA, at the time the Plans, Specifications, and Estimates (PS&E) is submitted. In order to retain the conformity determination made for the FED, no more than 3 years may elapse between each of the following milestones: Final NEPA approval; start of Design work; acquisition of "a substantial portion" of the needed right of way; and completion of PS&E.

PERMITS/APPROVALS REQUIRED

Local permits and approvals are often required at the construction stage. They are usually the responsibility of the Contractor. Where applicable, they should be listed in the PS&E for the project. The Resident Engineer is responsible for ensuring that all air quality permits are complied with during construction.

Here are some typical local permits:

- In some air districts, an Indirect Source permit or fee may be required for major construction projects.
- In some air districts, a dust control plan, with plan and inspection fees, may have to be filed for construction activities.
- Asbestos Notification (for demolition and renovation activities, including removal of asbestos discovered during construction) to the local air district and U.S.EPA.
- Asbestos notification (for naturally occurring asbestos) to the local air district is required where work is in an area that may have it. Local (typically air district) permit or notification for removal of lead-based paint or other sandblasting operations.
- Local air district permits or formal notification for Portable Equipment to be used during construction. A statewide equipment registration program administered by the California Air Resources Board is available, and is commonly used by contractors and equipment suppliers.
- If construction includes work subject to Permit to Construct or Permit to Operate requirements under air district rules (such as a stationary engine/generator set, or long-term operation of Portable Equipment like a batch plant), those permits must be obtained prior to starting construction.

[1]Please note that certain activities covered by these categorical exclusions may require that Caltrans prepare an Air Quality Conformity Analysis rather than documenting the conformity determination with the Senior Environmental Planner's signature on the Categorical Exclusion form.

(Last content update: 06/29/16 JH)

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Road Diet Guide

Overview

In the mid-20th century many urban streets were designed to maximize automobile capacity, with wide lanes and few barriers from traffic. Much of that traffic was motorized-short or disrupted due to suburbanization and other factors. Many of these streets are underutilized today, and streets which are over-sized can also result in a high transportation option for automobiles. These under-utilized streets can be converted to other uses, such as pedestrian opportunities for purpose and traffic for more sustainable uses.

Research and numerous case studies have shown that road diets (removing one or more automobile traffic lanes) are an effective way to reduce automobile crashes and improve conditions for users with all types of road for pedestrian, cycling or transit facilities. Some road diets have also increased capacity for motor traffic, due to the driving projects at minimal cost. Preliminary analysis considering a road diet should begin with reviewing daily traffic volumes, and then considering a number of other factors and referencing capacity charts of similar roads listed below.

The importance of road diets increased in the 1980s. Then after multiple benefits, including traffic calming, a reduction in crashes, and more space for other uses, road diets have been implemented with ease by sustainable modes and human-scaled public spaces.



Road diet on Fremont Road in Los Angeles, California, which used to be a four-lane undivided street. [SOURCE]

Identifying the Problem

Roads with multiple lanes in each direction increase the crash risk for pedestrians and automobiles. Congested automobile crashes on roads with 4 lanes or more pose a greater risk than those on roads with fewer lanes. Pedestrians are struck by motor vehicles at any an wide, undivided approaches from the same direction. In this diagram, car A is struck by the pedestrian while car B is not struck through.



Likewise, multiple lanes in each direction increases the number of possible collisions between cars. For the cars, roads, the lower lane offers car A as the turn lane's opportunity to turn left, while car B is not. Multiple lanes in each direction also have a cross-section effect of traffic, reducing the chances for a collision. Lane changing maneuvers then add another layer of risk for drivers.



Multi-lane intersections have more possible conflict points than 2 or 3 lane roads. In a 4 lane intersection, the lanes are set in a stacked pattern and may at intersections by pedestrians, cyclists, and drivers. Road diets can help remove potentially traffic movements.



Wider streets with more automotive traffic lanes tend to be more dangerous for pedestrians. Streets with 4 or more lanes with between 20-5 and 30-0 mph have a correlation between crash rates across all modes and the number of lanes. Streets with 4 or more lanes with speeds of 30 mph or more combine for road rates that are over high volume, high crash rates and diverse load rate which are conducive to pedestrian traffic. [Federal Highway Administration Publication]



Every day observations also lead to the conclusion that wider streets encourage faster traffic speeds. Driver behavior differences on 2 one-lane versus 2 two-neighborhood streets. [SOURCE] Wider streets encourage faster speeds and are associated with greater distances traffic speeds. In terms of improving traffic safety, slowing down traffic is one of the most effective ways to reduce fatalities and serious injuries on roadways.

Capacity

Capacity is a major concern for planners and engineers when considering road diets. Many roads have excess traffic capacity—roadways, traffic are existing at all times. Traffic capacities for various roadway types are [Roadway Capacity Considerations and Methodologies for Alternatives in the Highway Capacity Manual]

- 3-lane (a-all-lane): 1,000 vehicles per day (passed on 3-safety)
- 3-lane (w/ left turn lanes): 16,000 vehicles per day
- 4-lane (w/ left turn lanes): 19,000 vehicles per day
- 5-lane (w/ left turn lanes): 19,000 vehicles per day
- 4-lane Freeway: 72,000 vehicles per day
- 6-lane Freeway: 108,000 vehicles per day
- 8-lane Freeway: 144,000 vehicles per day

The primary factor city planners and traffic engineers use in determining the feasibility of a road diet is capacity for traffic. Municipalities and MPOs use varying traffic capacities for roadways, but the ranges listed above are often use they are considered conservative. If the road is 3 lanes or other areas, some 4 lane roads even operate at 2 lane road capacity, and 5 lane roads can be 3 lane roads. Capacity is the most limit of these two lane roads.

FHWA provides the following traffic volume guide for road diets on 4 lane roads:



Source: [FHWA Road Diet Traffic Volume Guide]

Cities can survive traffic volume thresholds based on the number of intersections and the number of traffic-influencing adjacent land uses and other factors.



Maximum Volumes for 4 Yr 4 lane road

In terms of number of peak-hour vehicles on 4 lane lanes, dedicated to private motor vehicles are the least efficient use of space. Bicycle lanes can accommodate more than 4 times as many people as dedicated automobile traffic. Bike lanes have the highest capacity of a roadway while making it safer for all users.



Source: Bicycling Society of Texas [SOURCE]

Automobiles are also the least efficient way to move people around based on physical space required for infrastructure.



Space Efficiency by Travel Mode [SOURCE]

Development and Future Traffic Volumes

Future traffic volumes should be considered for high growth areas and areas expected to grow. The Florida Department of Transportation has the FTI Trip Generation Report which are included below. Keep in mind these are just estimates and for example, on a multi-based on the number of dwelling units [SOURCE]

- Single-Family Home (per unit): 10 trips per day, 1 per peak hour
- Apartment (Garden/Townhouse) (per unit): .6 trips per day, .1 per peak hour
- Office (per 1000 sq ft): 11 trips per day, 1.5 peak hour
- Retail (per 1000 sq ft): 110 trips per day, 5.7 per peak hour
- Industrial (per 1000 sq ft): 7 trips per day, 1 per peak hour

This general rate studies have recently been completed for [street car development] in cities where the [development] growth itself was political and encourage mixed-use development. Some cities have also created [overlay districts] to encourage mixed-use development and other land uses. Mixed-use development and [infill] could fill the physical gaps of automobile capacity in other streets.

Many road diet projects saw a reduction in average daily traffic after construction, reduced demand, whereby commuters changed their travel behavior to avoid the area, or to leave. Reducing roadway capacity by private vehicles has been shown to motivate drivers to take other routes or use alternate modes.



Source: Bicycling Society, University of Oregon

Types of Road Diets

Simple 4 to 3 (one road diet)

Consolidating two eastbound vehicle lanes, adding a middle turn lane and maintaining an street parking.



Bike Lanes

4 to 3 conversion with 5' wide traditional bike lanes



Sidewalk Widening

Where full reconstruction is possible, pedestrian environment lanes can be re-purposed as pedestrian lanes.



Bus Rapid Transit Lanes

Dedicated bus lanes can be a good use of under-utilized auto lanes.



Left Switch Road Diet Video Examples

Left Switch Road Diet Video Examples: Cooper Street, Arlington, Texas [SOURCE]

Pedestrian Refuge Islands

An overlooked benefit of road diets is pedestrian refuge islands. Pedestrian refuge islands are medians or islands in the middle of the road that provide landscaping and storm water management opportunities. Refuge islands also provide opportunities to high pedestrian volumes and desire locations.



Lane Diets

While not technically a road diet, reducing the width of a traffic lanes slows down traffic and allows spare right-of-way to be used for other purposes. Lane diets are usually done in urban areas considering that traffic lanes on arterial streets usually require 11' lanes. It is not uncommon for urban arterial streets to have 12' lanes. Lane diets can be safely designed with 11', or 10' lanes. Lane diets provide opportunity for low-cost re-striping improvements and possible sidewalk or bicycle lane widening.

Road Diet Results (source: Bethlehem Township, University of Oregon)

- 4TH Ave., East Hartford — Broad St to Governor Rd
  - ADT went from 17,000 before construction to 11,500 after construction
  - Rear-end/angle increased by 33% along the corridor (70% fixture that was redesigned)
- Stone Ward, Rs, Seattle, WA — 4 to 3 lane road diet with bike lanes
  - ADT went from 13,000 before construction to 12,000 after construction
  - Total collisions has declined 16%
  - Pedestrian collisions at crossings were reduced 80%
- Nebraska Ave., Tampa FL — Simple 4 to 3 lane road diet
  - ADT went from 15,000 before construction to 13,000 after construction
  - 57% crashes per year on average before construction, 16 crashes after
- Cross Blvd, Myrtle Beach — 5 to 4 lane road diet
  - Reduced the number of crashes between 2009 after the redesign
  - Pedestrian crashes dramatically reduced
  - Average speeds reduced 5 mph after Cross Blvd

Road Diets and Autonomous Vehicles

Autonomous Vehicles have the potential to alter the propulsion of traffic modeling and eventually reduce future roadway capacity requirements. Although the full effects of autonomous vehicles may be able to disrupt congestion to groups with gaps between vehicles of only a few inches. Road diets can be considered a transitional step to help cities provide vehicle capacity. While traffic flow facilities will provide vehicle capacity. While traffic flow facilities will be necessary for the foreseeable future, road diets can help and have traffic flow now and provide the possibility to add streets due to the technology even as America's driving habits change. Autonomous vehicles are not the most important in the future.

While Amazon analytics analyzes how users search for benefits are there to focus on who browses when the Best site in our top 3 Amazon analytics and performance is a proportion of intermediate leads between the Amazon analytics and Amazon Prime. And, and 2017. At the At that rate it is dollar to estimate traffic, the search on 2 2016, Beyond that, when regulations, and Amazon Prime, and Amazon Prime and create more aggressive car following algorithms, which allows them to [Source: Where all Real Cars Went in Amazon Capacity]

Resources

[FHWA Road Diet Manual]

[MN TH Urban Road Design Guide]

[TX Roadway Handbook]

[Transportation Research Board Guidelines for Road Diet Conversions]

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Carter Road Traffic Study

Prepared for the City of Roanoke, VA









2007

Roanoke Valley Area Metropolitan Planning Organization

Roanoke Valley Area Metropolitan Planning Organization

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Introduction

This study was conducted to quantify the amount of traffic that drives through Carter Road and Avenel Avenue without stopping in the adjoining residential neighborhood. This type of traffic is commonly referred to as "cut-through" traffic. The City has long heard complaints from residents along these streets that there is considerable cut-through traffic in their neighborhood.

Study Area

Carter Road and Avenel Avenue are located in the southwest portion of the Greater Raleigh Court neighborhood in the City of Roanoke, Virginia (Figure 1). They are local streets that connect the residential area to two arterials, Brandon Avenue and Grandin Road, which provide primary access into the City from points in Roanoke County and the City of Salem. Adjacent to the study area, along Grandin Road, is the adjoining campuses of Patrick Henry High School, the Roanoke Valley Governor's School, and Raleigh Court Elementary School. The main entrance onto the campus is at the intersection of Grandin Road and Avenel Avenue.

Data Collection

License Plate Survey

In order to determine the extent of the cut-through traffic, staff conducted a vehicle license tag survey for traffic entering and exiting Carter Road and Avenel Avenue. A license plate survey involves recording the license plate number of a vehicle passing a particular point at a specific time. License plates recorded at both the entry and exit point within a certain time frame are considered to represent traffic passing through the neighborhood with neither an origin nor destination within it.

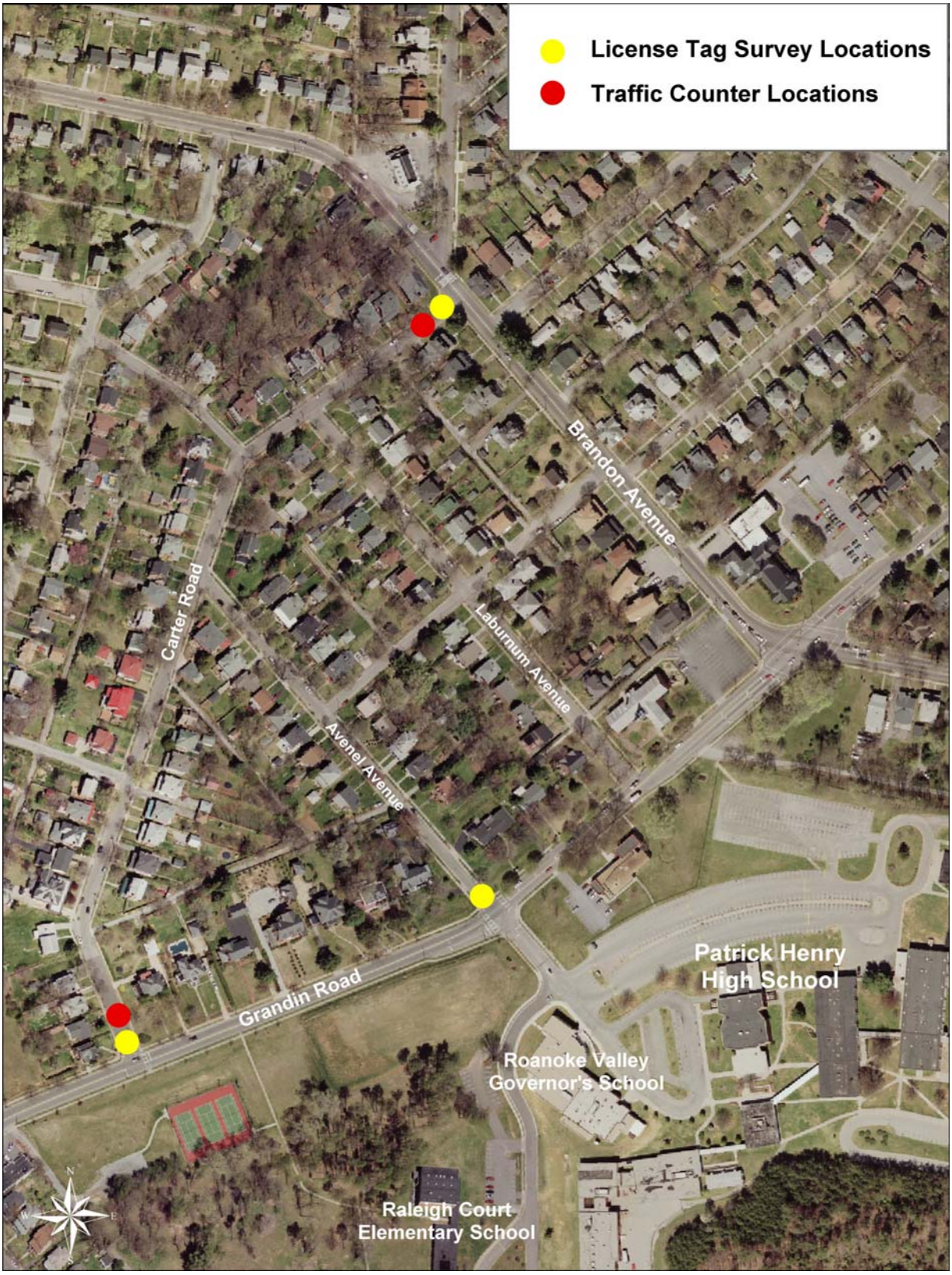
License plate numbers were manually collected on March 8, 2007 for the AM (7:00 to 9:00AM) and PM (4:00 to 6:00PM) peak periods, at the following intersections: Carter Road/Brandon Avenue, Carter Road/Grandin Road, and Avenel Avenue/Grandin Road (Figure 1). Vehicles that were recorded both entering and leaving the neighborhood within a 3-minute time frame were considered to be cut-through traffic.

During the 4-hour survey period, the license tag information was recorded for 753 vehicles. The breakdown of these records for the AM and PM peak 2-hour periods, including vehicles entering and exiting the neighborhood, is shown in Table 1. Sixty-two percent of the surveyed vehicles were recorded during the AM peak (467), compared with 38% (286) in the PM peak.

Table 1: Total License Plate Observations by Location

Survey Location	AM Period (7:00 to 9:00 AM)		PM Period (4:00 to 6:00 PM)	
	Southbound	Northbound	Southbound	Northbound
Carter/Brandon	144	81	83	46
Carter/Grandin	70	65	57	48
Avenel/Grandin	97	10	33	19
Total	**311**	**156**	**173**	**113**

Figure 1: Vicinity Map with Survey and Counter Locations



Traffic Counts

Additional traffic count information was also collected on March 8, 2007 by the City of Roanoke Transportation Division using Nu-Metrics Hi-STAR traffic analyzers. The data was collected in order to verify that the combined license plate records closely match the actual traffic during the survey periods. A significant mismatch between the license plate record totals and the traffic counts can be indicative of problems with the license plate survey. A later section shows the comparison of the total number of observed license plates (entering and exiting) and the traffic count results.

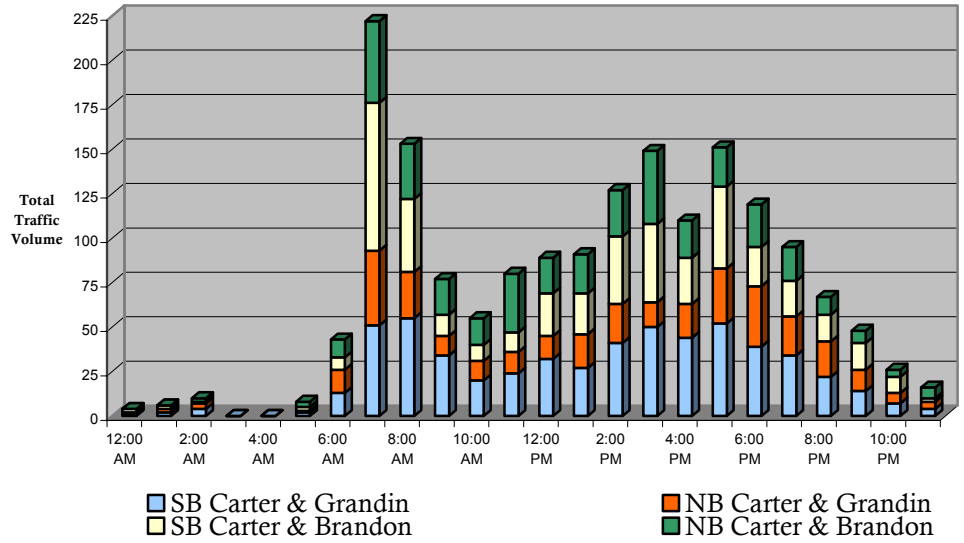
Table 2: Traffic Counts by Location

Survey Location	Daily	AM Period (7:00 to 9:00 AM)		PM Period (4:00 to 6:00 PM)	
		Southbound	Northbound	Southbound	Northbound
Carter/Brandon	840	124	77	72	43
Carter/Grandin	918	106	68	96	50
Total		**230**	**145**	**168**	**93**

A total of 4 traffic counters were located on Carter Road at its intersection with Brandon Avenue and Grandin Road. One counter was located in each lane in order to separately measure the entering and exiting traffic. The counters began collecting data at 10AM on March 7, 2007 and concluded on March 9, 2007 at 10AM, lasting a total of 48 hours. Data was recorded in 15 minute time periods. The traffic counts by location and direction of traffic are shown in Figure 2 for the 12-hour count period on March 8, the day of the license plate survey. This chart shows three distinct traffic peaks, a morning peak between 7AM to 9AM, and two afternoon peaks, from 2PM to 4PM and from 5PM to 6PM. The dual PM peaks are likely due to school ending from 2PM-3PM and the expected PM peak from 4PM-6PM.

Ninety-seven percent of the vehicles recorded by the traffic counters on Carter Road were passenger vehicles, with small trucks and school buses making up the remaining 3%. The average speed of all vehicles was 18 miles per hour, with 6.65% exceeding the 25mph speed limit near the Grandin Road intersection and 8% near the Brandon Avenue intersection.

Figure 2
Total Volume of Carter Street
(3/08/07)



Travel Time

Travel times within the study area were collected on two different days for both the AM and PM peak periods. The travel times are used to compare the time required to travel on arterials versus a combination of arterials and local streets, which can provide insight into the possible motivations of cut-through drivers. Average travel times, based on multiple runs, are provided in Table 3.

Table 3: Comparison of Travel Times by Route

Route	AM Period Travel Time (Minutes & Seconds)		PM Period Travel Time (Minutes & Seconds)	
	Southbound	Northbound	Southbound	Northbound
Brandon/Grandin (b/t Carter & Avenel)	3:00	6:11	3:05	5:16
Brandon/Grandin (b/t Carter & Carter)	3:30	6:40	3:27	5:45
Carter	1:05	1:06	1:05	1:12
Carter/Avenel	1:13	0:59	1:17	1:00

The travel times for the routes traveling on the local streets of Carter Road or Avenel Avenue are significantly less than those using the arterials of Grandin Road and Brandon Avenue, particularly during the AM peak period. The largest time savings were realized by vehicles using Avenel and/or Carter to travel northbound from Grandin Road to Brandon Avenue. During the AM peak, the trip from Grandin to Brandon, without using a neighborhood cut-through, is slowed by manual traffic control at the intersection of Grandin Road and Avenel Avenue, as well as the traffic signal timing for the left turn from Grandin onto Brandon. The manual traffic control is used to manage traffic entering and exiting the Patrick Henry High School campus from 7:45 to 8:00AM. Considerable time savings was also gained by vehicles using Carter and/or Avenel to travel southbound from Brandon Avenue to Grandin Road. Many of these vehicles had business at the school campus, especially during the AM time period.

Analysis

License Plate Versus Traffic Counts

Traffic count data is used as a means to verify the collective number of license plate records against traffic counts. Significant discrepancies between the number of license plates survey records and the number of vehicles counted by the traffic counter could be indicative of problems with the survey. In the license tag survey of Carter Road, the number of vehicles recorded was within 4%-11% of the traffic counts for both the AM and PM peak periods (Table 4). The discrepancies in counts are likely due to minor machine over or undercounting caused by vehicle queuing or vehicle route deviations due to on-street parking.

Table 4: Comparison of License Plate Survey vs. Traffic Counts

Survey Location	AM License Plate Survey	AM Traffic Counts	PM License Plate Survey	PM Traffic Counts
Carter/Brandon	225	201	129	115
Carter/Grandin	135	174	105	146
Total	**360**	**375**	**234**	**261**

License Plate Matches

Following the collection of license plate numbers, the data was analyzed in order to determine the level of traffic passing through the neighborhood without stopping. A valid match was confirmed if the license plate recorded at an entry point matched a plate recorded at an exit, and occurred within a consecutive 3-minute period. If a match occurred above the 3-minute threshold, the vehicle was considered to have had business in the neighborhood and did not contribute to the overall through-traffic total.

Table 5: Match Rate at Each Survey Location

Survey Location	AM Matches	Total Valid AM Records	Match Percent	PM Matches	Total Valid PM Records	Match Percent
Carter	68	362	18.7%	52	236	22%
Carter/Avenel	51	105	48.6%	10	50	20%
Total	**119**	**467**		**62**	**286**	

During the AM peak period 48.6% of Avenel Avenue's traffic was determined to be through-traffic, which was more than any other survey location or time period. This high percentage during the AM period can be almost entirely contributed to vehicles seeking a cut-through route to gain quicker access to the school campus. The main entrance to the campus is located at the southern terminus of Avenel Avenue, just after crossing Grandin Road.

Conclusions

This study has shown that there is a significant amount of traffic passing through Carter Road and Avenel Avenue without stopping in the neighborhood. This issue seems particularly prevalent during the AM and PM peak traffic periods. It also corresponds very closely with the schedule of the three schools contained on the Patrick Henry High School campus. Based on field observations of the traffic, it appears that a majority of the through traffic's origin or destination is the school campus, particularly for vehicles traveling on Avenel Avenue.

The travel time analysis shows that there is significant time savings for vehicles using Carter Road and/or Avenel Avenue to shorten their trip from or to Grandin Road and Brandon Avenue. For example, a vehicle traveling east on Grandin Road, with a destination west on Brandon Avenue, could save over 5 minutes of time by using Carter Road to gain access to Brandon Avenue. These time differences, and others noted previously, are largely due to the signal timing at the intersection of Grandin Road and Brandon Avenue. The short length of the right turn lane and the right on red restriction from Brandon onto Grandin also creates long travel times for vehicles traveling along that route. Additional delay is also created during the AM peak by the manual traffic control at the intersection of Grandin Road and Avenel Avenue.

Many communities consider 20% through-traffic in residential areas as a threshold for additional traffic study or consideration of traffic calming measures. Based on the traffic count information speeding is not a major issue on the two subject streets, however the volume of traffic and congestion created from through-traffic can be problematic for adjacent residents. The City of Roanoke should consider meeting with neighborhood residents to discuss acceptable traffic calming strategies that would effectively mitigate the impact of the through traffic.



FROM POLICY TO PAVEMENT

IMPLEMENTING COMPLETE STREETS IN THE SAN DIEGO REGION

PREPARED THROUGH COLLABORATION OF
THE COMPLETE STREETS TASK FORCE

JUNE 2012

APA CA
American Planning Association
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Making Great Communities Happen

WALK SanDiego
Promoting walkable communities

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» The Complete Streets Task Force wishes to thank the San Diego County Air Pollution Control District and The Planning Center|DC&E for assistance with document preparation.

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EXECUTIVE SUMMARY

There is tremendous pent up demand for safe, comfortable facilities to walk and bicycle, and for better transit service. Complete Streets help provide these opportunities. This report is a collaborative effort by local planners and traffic engineers who want to encourage the region's local governments to go beyond the minimum level of implementation of Complete Streets, required by State law (AB 1358).

The document is structured around five key assumptions:

1. A city's streets are its largest landholding and one of its greatest assets. Complete Streets maximize the value of that asset.
2. The way streets look and function should represent a community's vision of itself, not simply an opportunity to move vehicles. Cities need to regularly update their understanding of what the community values.
3. When a street is being designed or retrofitted, representative user groups and partners in other departments or agencies should be thoroughly consulted. The Complete Streets approach is as much about the design process as the outcome.
4. Good street design must be combined with compatible land uses to take best advantage of a Complete Street treatment.
5. Complete Streets help induce compatible land uses, but land use changes, by themselves, rarely induce Complete Streets.

One Solution, Many Benefits

The benefits of Complete Street investments are numerous:

- Designing streets primarily to reduce traffic delay has had numerous unintended consequences. Complete Streets treatments offer a way to keep traffic moving while providing for other modes and meeting other community values.
- For the municipality, Complete Streets investments can increase tax collections and jobs, reduce road building and maintenance costs, reduce emergency response costs, and improve air and water quality.
- "Green street" techniques such as bioswales and porous pavements can reduce the costs of constructing roads, managing stormwater, irrigating landscaped areas, and heating and cooling.
- For the individual, Complete Streets provide cost effective health and mental health benefits, reduce transportation costs, provide safe travel for non-drivers, reduce all types of crashes, reduce noise-related stress, and create more opportunities for local shopping and entertainment.
- The health and safety benefits of Complete Streets are especially noteworthy. Every $1 spent on walking and bicycling facilities can yield between $5-$100 in benefits, depending on which benefits are counted.
- New York City is among the most ambitious US municipalities implementing walking, bicycling, and traffic safety improvements. In just over a decade, the city's crashes have dropped over 40%, to the lowest level in 100 years.

Complete Streets Policy

Adopting a Complete Streets policy is an important step.

- Various local standards, zoning requirements, and funding mechanisms discourage or even prohibit implementation of Complete Streets. To address these barriers, it is necessary to adopt policies establishing Complete Streets as a priority.
- Policies at the federal, state, and regional level encourage or require Complete Street investments. All of the professional transportation organizations, such as AASHTO and ITE have endorsed Complete Streets and context-sensitive design, in which the local context and the needs of affected stakeholders take precedence over road classification.
- Complete Street policies can be established in a variety of ways, but the most effective mechanism is through the Circulation Element of the General Plan. Where a General Plan update has been recently completed, a stand-alone Complete Street Policy or other mechanism can be used.
- An effective Complete Street policy sets a vision for the community's streets, includes all modes, applies broadly, emphasizes connectivity, manages exceptions, recognizes neighborhood context, establishes performance standards, and includes implementation steps.
- Two ways the General Plan can work against Complete Streets is by specifying roadway dimensions and Level of Service standards in the plan itself. It is recommended that broad goals for modal performance be specified, and that the plan identify which areas or corridors will emphasize which modes.

Level of Service and Complete Streets

Traffic delay concerns, especially Level of Service (LOS) standards, are often seen as a barrier to Complete Streets, but need not be:

- In the past, preserving LOS has lead to streets that are less safe or impractical for walking, bicycling, and transit use.
- Some cities (e.g., National City and San Jose) have designated districts, corridors, or intersections where walking, bicycling, and transit are prioritized, and further road expansion is prohibited. LOS F is considered acceptable in these locations.
- Vehicle LOS can be supplemented by use of Multi-Modal LOS (MMLOS) methodologies, one of which is included in the 2010 Highway Capacity Manual. MMLOS is not yet widely used, but is designed to compare the trade-offs in the service quality for each mode when considering alternative designs, and requires additional data collection.
- San Francisco is preparing to replace the LOS metric with "Auto Trips Generated," in order to incentivize developers to minimize new vehicle trips and to fund improvements for walking, bicycling, and transit. Other cities will likely follow suit if this system proves successful.
- The traditional planning paradigm assumes traffic will grow steadily with time, but traffic volumes in the U.S. have leveled off in the last 10 years, and both young adults and retiring Baby Boomers exhibit a strong preference for walkable, transit-accessible neighborhoods.

- Traffic planning also assumes traffic volumes are predictable based on land uses. However, evidence shows a large portion of trips are flexible, and traffic tends to equilibrate with available capacity. Therefore, it may make more sense to build streets serving all modes rather than trying to predict and meet vehicle traffic demand.
- Transportation Demand Management (TDM) methods are often overlooked, but can be far more cost-effective than capacity improvements. Comprehensive TDM strategies reliably provide 15% reductions in trips and parking demand, which can solve most peak hour congestion problems. Complete Streets complement TDM investments.

Complete Streets under CEQA

Meeting the requirements of the California Environmental Quality Act (CEQA) is another potential barrier to Complete Streets, but there are strategies to overcome this barrier:

- Complete Street projects which maintain the current right-of-way and modes served can qualify for a CEQA exemption. Examples can be found in San Marcos and La Mesa.
- CEQA delays for more extensive Complete Street retrofit projects can be minimized or avoided by adopting appropriate General Plan policies or a freestanding Complete Streets program which has itself undergone CEQA review.
- For development review, CEQA provides flexibility to local governments to establish their own significance thresholds, and to require project mitigation that improves walking, bicycling, or transit facilities rather than expanding roadway capacity for vehicles.
- The 2010 revisions to the State's CEQA Guidelines emphasizes consideration of project impacts on all transportation modes, rather than prioritizing vehicle flow over all other modes. The Project Checklist allows the use of transportation measures other than Level of Service, if a jurisdiction so chooses.

The Implementation Toolbox

Many new guidance documents and other tools are available to ease implementation of Complete Streets:

- Newly emerging planning tools include more effective multi-departmental planning processes, "living street" design guidelines, and a Complete Streets project checklist.
- Although new planning processes are proving invaluable to implement Complete Streets, the standard planning toolbox, from general plans to zoning and design guidelines, should also be employed.
- Newer street design manuals are becoming increasingly available to redesign streets to meet the needs of all users while meeting AASHTO and other conventional guidelines. "It's not in the manual" can now be replaced with "We really need to update our manual."
- Cities leading the way to Complete Streets have found that Five-Year Transportation Action Plans are an essential tool to maintain progress implementing a long-term transportation vision.
- Public involvement which includes all stakeholders in street design decisions is a cornerstone of the Context Sensitive Solutions approach championed by FHWA, AASHTO, and Caltrans, and helps ensure design decisions consider the needs of diverse community members.

Performance Measures

The use of performance measures is important in tracking progress implementing Complete Streets and other long-term transportation goals.

» The chosen measures should reflect the general plan or other important policy documents, including in the following areas:

- Economic Development
- Mode Shares
- Crashes
- Public Perception
- Pedestrian Facilities
- Bike Facilities
- Safety
- Environment

» Performance measures are meaningful only to the extent they are compiled in an annual report and distributed to city departments, to elected officials, and to the public. Annual progress reports are an excellent tool utilized by cities leading the way on Complete Streets implementation.

» Performance measures should be established at the community level, and for particular projects. Community stakeholders should be involved in establishing performance measures, particularly at the project level.

» Project-level performance measures may be a small subset of the community-level measures, but should meaningfully reflect project objectives, chosen with the input from the community.

Complete Street Treatments – Where? and What?

Prioritizing street segments for Complete Streets and choosing appropriate treatments are subjects that are beyond the scope of this report, but some useful approaches include as follows:

» Pedestrian Composite GIS Model used in many Pedestrian Master Plans

» SANDAG's Healthy Communities Atlas

» SANDAG's Smart Growth Opportunities Areas, submitted by each jurisdiction

» Regional Bike Plan routes

» The Complete Streets Task Force estimates that, across the San Diego region, there are 1092 miles of street segments that may be good candidates for treatments. Of that total, 292 miles are in existing or planned Smart Growth Opportunity Areas.

» Potential treatments exist for high-speed arterials, lower classification arterials, neighborhood collectors, and residential streets.

» Some promising approaches are Multi-way Boulevards, road diets, traffic calming devices, various intersection treatments, buffered bike lanes, enhanced crosswalks, conversion of a small number of parking spaces to seating or bike corrals, new bicycle or pedestrian facilities, and "shared streets."

Overcoming Barriers to Complete Streets

State-wide and regional surveys of local transportation agency staff identified several barriers to Complete Street implementation. The full report provides potential solutions for each of the following barriers.

- Inadequate funding
- Inconsistent city council direction
- Uncoordinated transportation implementation
- Initial public opposition
- Lagging acceptance of changing professional standards
- Lack of training in Complete Streets concepts
- Out-of-sync environmental priorities
- Suboptimal Complete Street implementation
- Under-appreciation of the multiple benefits of Complete Streets

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ABOUT THIS REPORT

Background and Purpose

The San Diego Complete Streets Task Force (Task Force) was initiated jointly by the San Diego Section of the American Planning Association and WalkSanDiego in 2011. The principal goal of the Task Force is to transform city and neighborhood streets throughout the region into an interconnected multi-modal network that (1) places safe and convenient walking, bicycling, and public transit access on a more equitable footing with motor vehicles, and (2) uses street design to foster community places worthy of admiration.

The mission of the Complete Streets Task Force is to promote the implementation of Complete Streets by sharing best practices, encouraging dialogue, and recognizing innovative projects in the San Diego region.

To that end this report has been prepared to equip local governments with the road map to successfully transform their communities with Complete Streets.

Process and Assumptions

This report is a collaborative effort by local planners and traffic engineers who see the enormous potential in the Complete Streets concept and want to encourage the region's local governments to go beyond the minimum level of implementation effort required by State law. At the same time we acknowledge the need to help fit new concepts and methodologies into the existing planning, funding, and regulatory framework. The document is structured around five key assumptions:

- A city's streets are its largest landholding and one of its greatest assets. Complete Streets maximize the value of that asset.
- The way streets look and function should represent a community's vision of itself, not simply an opportunity to move vehicles. Cities need to regularly update their understanding of what the community values.
- When a street is being designed or retrofitted, representative user groups and partners in other departments or agencies should be thoroughly consulted. The Complete Streets approach is as much about the design process as the outcome.
- Good street design must be combined with compatible land uses to take best advantage of a Complete Street treatment.
- Complete Streets help induce compatible land uses, but land use changes, by themselves, rarely induce Complete Streets.

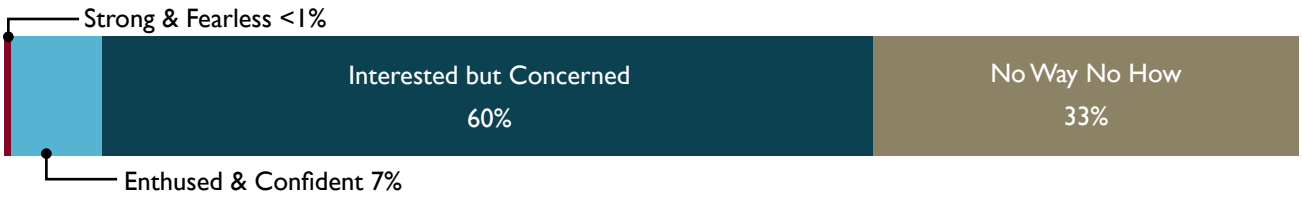
Public Demand for Complete Streets

Local and national surveys and studies reveal a strong public preference for walkable neighborhoods and safe bicycling opportunities:[1]

- A 2010 survey of San Diegans found 79% of respondents support making neighborhoods more walkable as a greenhouse gas reduction strategy.[2]
- A study of mid-city San Diego neighborhoods commissioned by WalkSanDiego and The California Endowment found that during the 2007-2009 recession, home values in less walkable areas declined 17% whereas nearby homes in walkable locations declined 12%.[3]
- Nationally, homes in walkable neighborhoods command up to a 15% higher selling price than similar homes in less walkable neighborhoods, and a majority of Americans – particularly "Generation Y" and retiring Baby Boomers (the "Silver Tsunami") – would prefer to live in a walkable neighborhood.[4]
- The Portland, Oregon, Department of Transportation estimates that, counting current bicyclists, around 70% of residents would bicycle regularly for transportation if safe facilities were provided (see graphic). This number has been vetted nationally and most likely reflects the latent U.S. demand for better bicycling facilities.[5] Portland's 2030 Bike Plan is designed to serve the 60% of residents considered "interested but concerned" for their safety.
- In a national survey conducted in May 2012, 80 percent of Republican respondents and 88 percent of Democratic respondents think Congress should maintain or increase federal funds for biking and walking.[6]
- The Alliance for Biking & Walking, a national support organization for local advocacy groups, reports[7] that since 1996, its membership has grown from 12 groups employing a combined 10 FTE staff, to 214 groups with 375 FTE staff. This represents a 1700% increase in groups and 5200% increase in combined staff.

Taken together, these data make a persuasive case that elected officials and agency staff who make Complete Streets a priority will receive strong support from residents and other stakeholders.

Figure 1. Four Types of Transportation Cyclists in Portland (by Proportion of Population)



Questions Addressed by this Report

This report was organized to answer the "why" and "how" questions that usually arise when discussing the implementation of Complete Streets:

- Changing our jurisdiction's approach to streets will divert resources from other priorities. Is it really worth the trouble? (Chapter 2. One Solution, Many Benefits)
- Do we really need a Complete Streets policy? What are the options? (Chapter 3. Setting the Policy Direction)
- How can Complete Streets be implemented given the existing framework of Level of Service (LOS) standards? How can the city require developers to fund transportation improvements if we don't use LOS to document inadequacies? (Chapter 4. Level of Service Standards and Complete Streets)
- How can the costs, delays, and legal risks associated with CEQA (California Environmental Quality Act) be overcome? (Chapter 5. Complete Streets Under CEQA).
- Does a jurisdiction need a new set of policy documents, regulatory tools, and design guidelines? (Chapter 6. The Implementation Toolbox)
- How will we know when we've succeeded? How do we hold ourselves accountable? (Chapter 7. Measuring Progress)
- Which streets are good candidates for Complete Street treatments? (Chapter 8. Where to Begin)
- Even if we could afford another new program, how do we overcome the legal issues, uncertain Council and resident support, established engineering practice, and declining staffing levels? (Chapter 9. Overcoming Implementation Barriers). Hint: Complete Streets is not a "program," but rather a new way of meeting all transportation needs.

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ONE SOLUTION, MANY BENEFITS

Given today's fiscal realities, a new mantra for local governance might be:

"Every project should solve multiple issues and avoid creating new ones."

Transforming single-purpose roadways to Complete Streets fits well with this idea. Indeed, the Complete Streets concept emerged from the realization that roadway design meant to reduce traffic delays has had numerous unintended consequences with explicit or hidden costs. As the organization Project for Public Spaces[8] puts it:

- Congestion is rampant.
- Americans die on our roads at the rate of almost 3,000 a month.
- Parents are afraid to let their children walk down the streets.
- New communities have no soul.
- Obesity and its related diseases are rampant.
- Dependence on imported oil makes us vulnerable to the economics of oil price and climate change is not being sufficiently addressed.
- Furthermore, streets are no longer viewed as places, which is a huge loss given that streets can take up as much as one-third of a community's land.

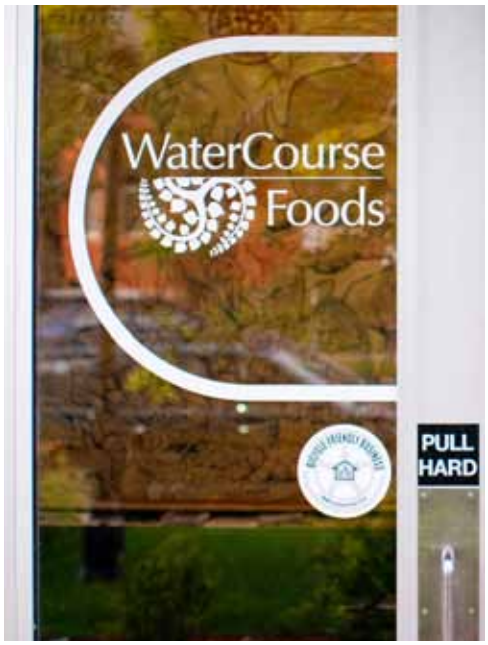
With these concerns in mind, designing streets to serve all users, in a sustainable manner, can have wide-ranging, comprehensive benefits. example[9]

Economic Development

Complete Streets represent a tangible public investment and commitment to stronger commercial centers and urban neighborhoods. Their contribution to place-making is essential and profound (see "Complete Street Conversion Pays Off Big in Lancaster" on page 13 for example[9]). When combined with supportive zoning and increased land use efficiencies, Complete Streets create optimal conditions for infill development. Investment in Complete Streets is especially important for under-performing suburban corridors to redefine traditional auto dominance and catalyze economic growth.

Revitalizing commercial streets or raising residential property values through Complete Streets investments is a thoroughly proven strategy. Case studies can be found on the National Complete Streets Coalition website.[10] San Diego's most successful recent project, the transformation of La Jolla Boulevard in the Bird Rock area of La Jolla, is highlighted at the end of this chapter.

Commercial streets revitalized by Complete Street treatments can be promoted through community events, walking maps, Bike Friendly Business District[11] campaigns (see photo), and other promotions.



A Bicycle Friendly Business in Denver, CO
Photo: Kate At Yr Own Risk via Flickr

Fiscal Savings

Complete Streets cost less to build and maintain, and create more value in the long run because they serve non-drivers as well as drivers. Some examples are as follows: (Note that savings in avoided fuel use, crashes, healthcare costs, and other externalities are not included.)

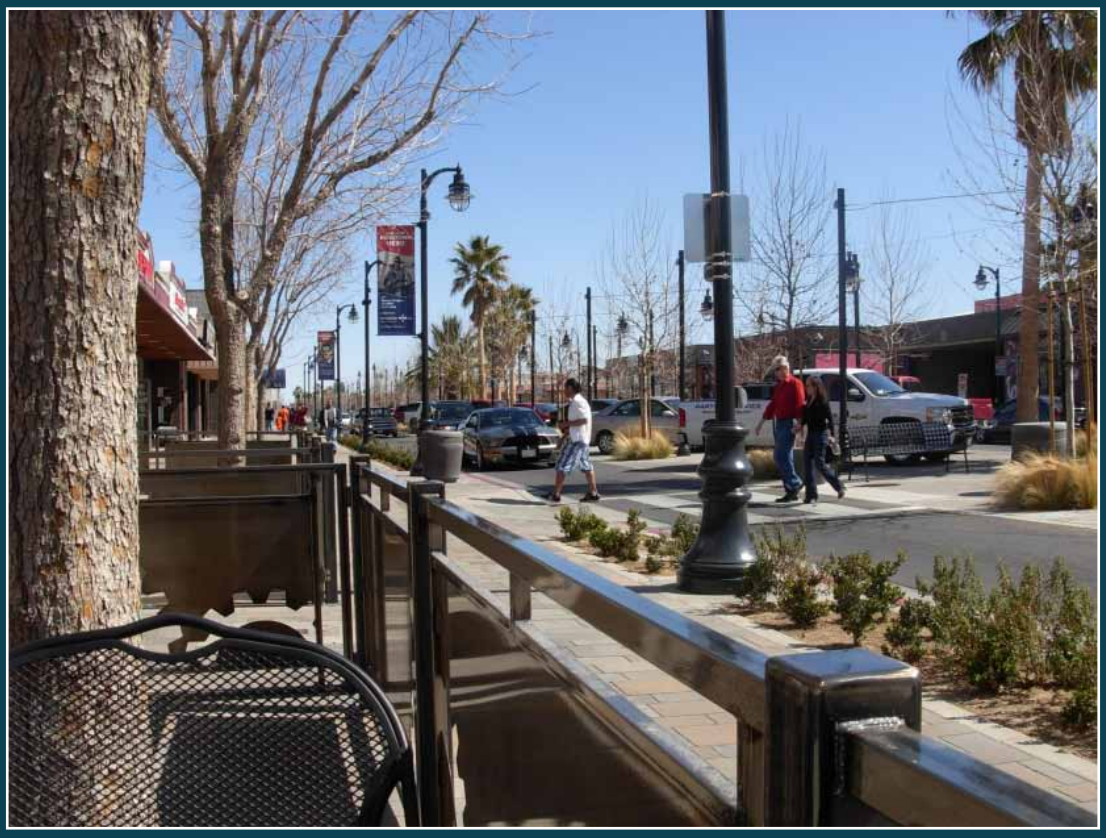
- In De Pere, Wisconsin, the county highway department saved $347,515 (16.5%) on construction of a major street by reducing the number of lanes from four to two, replacing two planned signals with roundabouts, and adding bicycle facilities.[12]
- In Lee County Florida, County staff looking for Complete Street candidates, saved $58.5 million by reprogramming five road widening projects approved in the 2035 Long Range Transportation Plan. Each was slated for four lanes, but was scaled back to two lanes with median and turn lanes, and cycling and walking facilities.[13]
- A study prepared by the City of Orlando found that re-striping Edgewater Drive from 4 lanes to 2 lanes, a center turn lane, and bicycle lanes reduced the frequency of crashes involving injuries from every nine days to once every 30 days while the number of people walking and bicycling rose 23% and 30%, respectively.
- In Vancouver, Washington, Fourth Plain Boulevard was converted from four lanes with poor provisions for people walking, biking or in wheelchairs into a street with two through lanes, a center turn lane, two bicycle lanes, curb ramps and improved sidewalks. After this inexpensive treatment, vehicle collisions dropped 52%, and the number of pedestrian crashes dropped from two per year to zero.
- In 2012, the City of Carlsbad re-evaluated plans for a water line replacement and sidewalk construction project on Valley Street and Magnolia Avenue. To reduce vehicle speeds and avoid triggering expensive storm water treatment, staff found that narrowing the roadway from 40 to 34 feet would save the city over $78,000-$300,000 in road paving costs and increase safety for everyone.[14] Future repaving costs would also be lower.

Health

By supporting active transportation, the Complete Streets approach is a key strategy to reduce chronic disease. According to the San Diego County Department of Health and Human Services, sedentary behavior is a primary or contributing cause of the top four chronic diseases in San Diego County: cancer, heart disease and stroke, type 2 diabetes, and pulmonary disease such as asthma. Considered together, these diseases cost $4 billion in direct treatment expenditures in San Diego County in 2007,[15] and a far greater total in indirect costs such as missed work days.

Complete Street Conversion Pays Off Big in Lancaster

The return on investment of a Complete Street treatment is dramatically illustrated by the nine-block redesign of 5-lane Lancaster Boulevard in Lancaster, CA. Prior to the project, the Boulevard was a blighted and crime-ridden business district. Within two years of the project's groundbreaking, the street and surrounding area were transformed into a vibrant regional destination for shopping, dining, entertainment and the arts. The economic development benefits during that period include: 1,100 construction jobs, 802 permanent commercial and retail jobs, 40 new businesses, and 807 new housing units constructed or rehabilitated. Project investments include $41 million by the Lancaster Redevelopment Agency ($11.1 million for the street improvements) and $107 million in private investment. Total economic output to date is estimated at $274 million with $13.3 million in state and local revenues.



The California Department of Public Health[16] estimated in 2011 that, for San Francisco, a shift in active transportation from a median of 4.4 to 22 minutes a day (2% to 15% mode share) would save $1.4 to $22 billion in annual health costs and add 9.5 months of life expectancy by reducing:

- Heart disease, stroke and diabetes by 14%
- Dementia and depression by 6-7%
- Breast and colon cancer by 5%

Health Savings

Research examining the health benefits of bicycling and walking point to the same conclusion: investments in active transportation pay enormous dividends. The literature suggests the largest share of benefits comes from the well-being and health outcomes associated with being physically active.[17]

- Lincoln, Nebraska: Every $1 spent on bicycle and pedestrian trails (including construction, maintenance, equipment, and travel) yields $2.94 in direct medical benefits.[18]
- Portland, Oregon: Every $1 invested in bicycling yields $3.40 in health care cost savings. When the statistical value of lives is considered, as is done for the evaluation of highway safety improvement projects, every $1 invested yields nearly $100 in benefits.[19]
- Kansas City: Every dollar invested in bicycle and pedestrian projects yields $11.80 in benefits, the greatest portion of which is the perceived health and recreation value of those biking and walking.[20]
- A summary of several studies in the U.S. and Europe found that every dollar invested in bicycle networks yields at least $4 to $5 in benefits, mostly related to health and safety.[21]

Safe Transportation for All

In the San Diego region, up to one-third of residents in low-income neighborhoods lack access to a car. This includes children, elderly and disabled residents, and those who cannot afford or choose not to own a car. Wide, high-volume streets are also more prevalent in low-income neighborhoods.[22] Not surprisingly, these residents suffer far higher rates of vehicle, bicycling, and walking injuries and fatalities. Thus, Complete Street treatments can often provide the greatest benefits in low-income neighborhoods.



Photo: Dan Burden via PedBike Image Library

Greater Accessibility

"Mobility" measures the ease of physical movement, whereas "accessibility" measures the ease of reaching goods, services, or activities. Too often, transportation planning focuses on increasing mobility – reducing vehicle congestion – when accessibility is what creates lasting economic value, quality of life, health, and equal opportunity. Complete Streets, combined with compact mixed uses, maximize accessibility for all members of society – and tax returns to the municipality – while reducing environmental impacts.



"Green" Trolley corridor, Photo: Jim Stone



E Street, Chula Vista – Before/After photo simulation by Urban Advantage courtesy of SANDAG[23]

Green Street Opportunities

Rebuilding a street for all users offers an opportunity to incorporate porous pavements, bioswales,[24] street trees, and other techniques that reduce heat load and pollution, and capture and treat stormwater on-site, rather than relying on the expensive and sometimes inadequate conveyance system. Some built examples include as follows:[25]

- Seattle's Natural Drainage Projects saved an average of $329 per square foot.
- Chicago's Green Alleys Program was found to be 3 to 6 times more cost-effective handling storm water than conventional infrastructure.[26]
- Portland's Green Streets Program found that 80-85% of peak storm water flows could be managed on-site by two "green streets" it had installed, and at far lower cost than a conventional system.[27]

San Diego County's Low Impact Development Handbook is an excellent general resource for incorporating green street features. The Handbook notes:

> *Traffic circles, chicanes, chokers, and center islands, offer the opportunity for stormwater management through the use of bio-retention areas or infiltration within these areas while providing pedestrian safety. (p. 53)*

Traffic Capacity

An emerging literature of the past 20 years makes a compelling case that adding traffic capacity increases congestion (See Chapter 4) by attracting additional vehicle trips[28] and forcing more people to use their cars as roads become less safe and less pleasant for walking and bicycling. In short, widening roads may mean spinning our wheels and is not sustainable indefinitely. Conversely, street transformations such as Complete Street projects, road diets, and the conversion of signalized intersections to roundabouts have been found to allow the same traffic through-put, but at lower, safer, speeds, while providing new opportunities for walking, biking, and transit use (See box: Prospect Park West).



Photos: Ryan Snyder

Safety

The research of Dr. Eric Dumbaugh[29] and others,[30] shows that many of the engineering safety practices embodied in such authoritative sources as AASHTO's 2002 Roadside Design Guide are based on years of tradition, not necessarily strong evidence, and result in more, not fewer crashes than Complete Street designs. Urban standards that call for wide straight roads, wide lanes, infrequent intersections, and the removal of roadside objects, encourage speeding and result in a higher number of crashes.

A few transportation agencies are rethinking road standards in favor of Complete Street designs more in line with current safety evidence. New York City is leading the nation in innovative safety improvements for all street users. One result: bicycling trips increased 100% between 2007 and 2011. The city's focus on improved safety for bicyclists and pedestrians has especially benefited drivers. In 2011, the city recorded its lowest traffic fatality rate in 101 years of data collection, a 40% decrease since 2001.[31]

Noise

Studies show the human stress hormone cortisol rises with ambient noise.[32] Noise from traffic travelling at 50 mph can be ten times greater than at 25 mph. Indeed, traffic noise is one of the greatest impacts of high-volume roads on adjacent land uses. The remarkable Complete Street conversion of La Jolla Boulevard in the San Diego neighborhood of Bird Rock, discussed below, reduced traffic noise from about 60-70 dB(A) to 40 dB(A)[33]. Since noise is measured on a logarithmic scale, this represents at least a 100-fold decrease in noise level. This is one reason sidewalk cafes and strolling conversations are now a common sight in the area.

Prospect Park West: A Safer Street Serving More Trips

New York is leading the nation in innovative safety improvements for all street users. An example project is the Prospect Park West Traffic Calming/Bike Lane Project, which had the following benefits: (Photo: New York City Department of Transportation)

- Speeding decreased from 74% of drivers to 20%.
- Bicyclists riding on the sidewalk decreased from 46% to 3%.
- Weekday bicycle trips increased from 349 (June 2009) to 1,131 (August 2010).
- Children routinely accompany their parents on the bike lanes.
- Vehicle traffic peak volume was unchanged.
- Even with one traffic lane converted, counting cyclists, overall peak traffic increased.
- PM peak travel time through the corridor decreased by 4 seconds.
- Crashes were reduced 16%; injury crashes were reduced 62.5%.
- The pedestrian crossing distance, and thus traffic exposure, was reduced by half.



Case Study: La Jolla Boulevard– Bird Rock, San Diego

Each of the above benefits is reflected in the remaking of La Jolla Boulevard in the San Diego community of Bird Rock. For decades, this important street suffered from blight due to high speeds (38-42 mph), lack of safe pedestrian crossings, a shortage of parking, struggling businesses, and inadequate public space. After years of debate, several focus group sessions and various community workshops, the community settled on a plan to radically alter the boulevard using Complete Street concepts.

Changes included the development of five roundabouts, landscaped median islands 8–10 feet wide, pedestrian crossings and plazas, and diagonal parking on either side. Because of their efficiency at handling traffic, the roundabouts allowed the city to reduce the number of travel lanes from four to two. This reduces the pedestrian crossing distance substantially, resulting in less exposure to moving traffic.

The roundabouts reduced speeds to about 15-20 mph, substantially reducing both the number and severity of crashes. The reduction in lanes made space available for pedestrian seating and plazas, landscaped medians and other beautification treatments.

The accompanying reduction in traffic noise has been marked as one of the project's greatest benefits. Thriving businesses, sidewalk cafes, outdoor sales, and chance encounters with neighbors have made La Jolla Boulevard a community gathering place.

Landscaped roundabouts and medians combined with diagonal parking spaces create a village atmosphere that promotes more walking and better accommodates outdoor activities. The project triggered substantial revitalization of the adjacent businesses, and spurred a number of new developments, including a 139-unit condominium development, several new mixed use developments, and a major drugstore. Tax receipts from businesses spiked immediately after the reopening of the road.





Photos: San Diego Association of Governments (SANDAG)

Environment

The concept of sustainable communities is nearly meaningless without the provision of transportation choices beyond the personal automobile. Cities investing strategically in Complete Streets, such as Santa Monica, Vancouver, and Portland, find they can lower VMT and reduce criteria pollutants and greenhouse gas emissions from automobiles while providing a higher quality of life. Studies find that congestion, and emissions per vehicle trip and per capita, are lower in mixed use neighborhoods with many travel options.[34]

These beneficial effects align with SANDAG's Sustainable Community Strategy (SCS) which projects that most new housing units built in the region through 2050 will be multi-family, from luxury townhomes to affordable apartments. Greater reliance on alternative transportation, especially for short trips, supports and reinforces compact multi-family development patterns that lower total energy use for both space heating and transportation. Since many new housing units will be in designated Smart Growth Areas, it is imperative that cities plan now for Complete Streets in these areas, lest residents find walking and biking conditions too unwelcoming to adopt the transit-friendly lifestyle they will be offered. As discussed above, Complete Streets can also be built as green streets, with attendant on-site and downstream environmental benefits.

Conclusions

1. Designing streets primarily to reduce traffic delay has had numerous unintended consequences. Complete Streets treatments offer a way to keep traffic moving while providing for other modes and meeting other community values.
2. For the municipality, Complete Streets investments can increase tax collections and jobs, reduce road building and maintenance costs, reduce emergency response costs, and improve air and water quality.
3. "Green street" techniques such as bioswales and porous pavements can reduce the costs of constructing roads, managing stormwater, irrigating landscaped areas, and heating and cooling.
4. For the individual, Complete Streets provide cost effective health and mental health benefits, reduce transportation costs, provide safe travel for non-drivers, reduce all types of crashes, reduce noise-related stress, and create more opportunities for local shopping and entertainment.
5. The health and safety benefits of Complete Streets are especially noteworthy. Every $1 spent on walking and bicycling facilities can yield between $5-$100 in benefits, depending on which benefits are counted.
6. New York City is among the most ambitious US municipalities implementing walking, bicycling, and traffic safety improvements. In just over a decade, the city's crashes have dropped over 40%, to the lowest level in 100 years.

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3

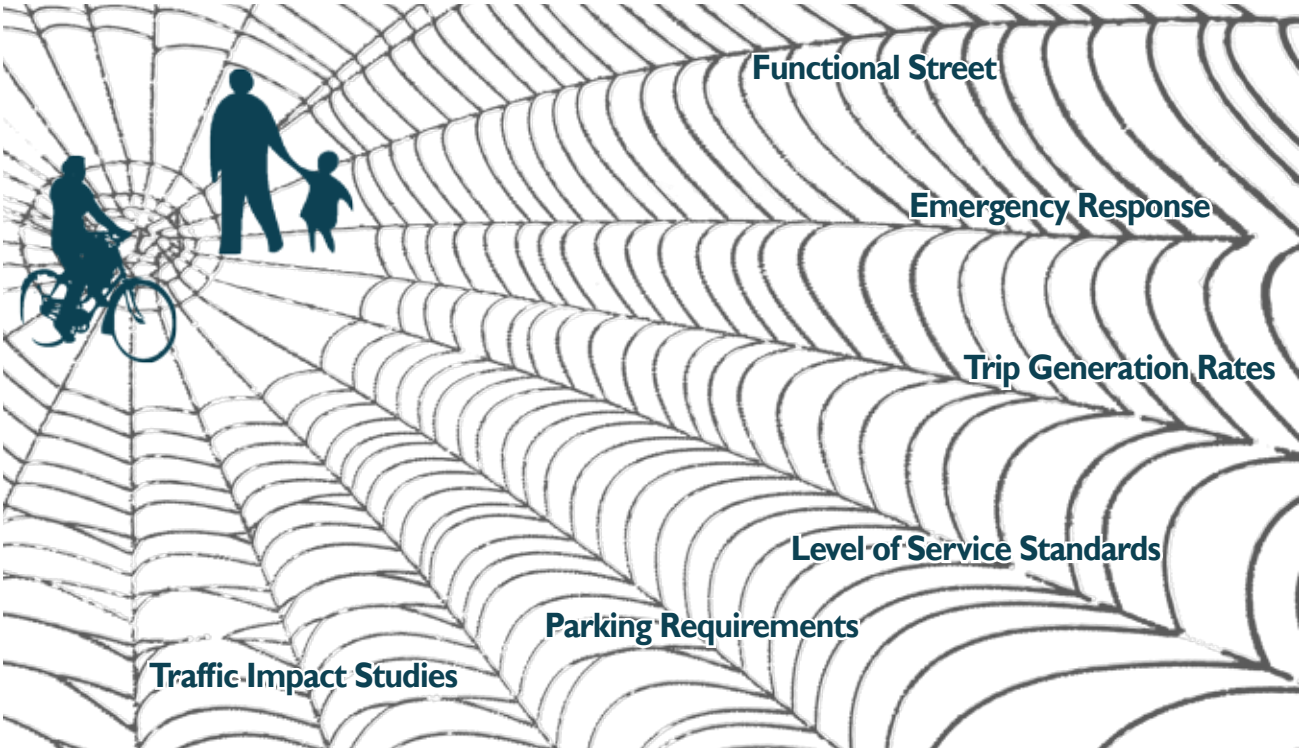
SETTING A POLICY DIRECTION

Why Adopt Complete Streets Policies?

At all levels of government, our current systems for planning, funding, implementing, operating, and maintaining transportation facilities are grounded in long-established policies, funding formulas, parking requirements, warrants, and guidelines (Figure 3-1). This entrenched policy web favors vehicle movement, with other street users considered only secondarily, and not with the research-based rigor we might hope for.

Any local government wishing to implement Complete Streets must therefore provide definitive policy direction, and reinforce it with staff training and changes in procedures, design guidelines, performance goals, and reporting mechanisms. As discussed in Chapter 4, clear policy direction also allows jurisdictions to avoid the "Level of Service straightjacket" imposed during CEQA review of new facilities and private developments.

Figure 3-1. Web of Auto-Oriented Planning Policies and Standards



Supportive State Policies

Adopting local Complete Street policies is more easily justified when corresponding State policies are in place. In California, state-level policy leadership promoting Complete Streets has been especially strong, in the form of new laws, guidance documents, and Caltrans policies, as follows (quoting actual language in each case):

The Complete Streets Act (AB1358)

The Complete Streets Act (2008) requires that,

> *Commencing January 1, 2011, upon any substantive revision of the circulation element, the legislative body shall modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan.*

Accordingly, every city in the region undergoing a General Plan update is now incorporating, to a greater or lesser degree, policies to provide safe accommodations for all users of the street. Per another AB 1358 provision, the Governor's Office of Planning and Research issued *General Plan Guidelines: Complete Streets and the Circulation Element* (2010) to inform this process. Jurisdictions, and their consultants, who fully understand the Complete Streets concept acknowledge within the General Plan that providing for all users is a new way of doing business, not simply an add-on program that competes with other departmental demands.

SB 97 CEQA and Greenhouse Gas Emissions

SB 97 (2007) directed the California Office of Planning and Research to revise the CEQA Guidelines to clarify how GHG emissions and their impacts should be addressed in the CEQA process. The eventual revisions, issued in March 2010, sought to redress the long-standing criticism that transportation impact analysis and mitigation has actually increased environmental impacts by focusing on the mitigation of traffic delay, which is not itself an environmental impact. The revisions emphasize the impact of a project on the circulation system as a whole, and on alternative modes in particular. The revised CEQA Guidelines are discussed further in Chapters 4 and 5.

Caltrans Deputy Directive, Complete Streets – Integrating the Transportation System, DD-64-R1[35]

This policy includes extensive discussion of the obligation and intention to provide a network of Complete Streets, including the necessity to break down departmental silos, revise manuals, and provide staff training:

> *Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets" beginning early in system planning and continuing through project delivery and maintenance and operations. Developing a network of "complete streets" requires collaboration among all Department functional units and stakeholders to establish effective partnerships. (p. 1)*
>
> *[T]he Department and local agencies have the duty to provide for the safety and mobility needs of all who have legal access to the transportation system…To ensure successful implementation of "complete streets," manuals, guidance, and*

training will be updated and developed. (p. 2)

Caltrans Director's Policy on Context Sensitive Solutions, DD#22

The intent of this policy is to move away from "one size fits all" road designs that ignore the context of a road segment, including demand for safe and convenient walking, biking, and transit. This is accomplished by (1) incorporating the viewpoints and needs of local stakeholders in all project phases, and (2) utilizing the flexibility in design afforded by primary guidance documents:

> *The Department's Highway Design Manual, Federal Highway Administration (FHWA) regulations, FHWA's Flexibility in Highway Design publication, and the American Association of State Highway Transportation Officials' A Policy on Geometric Design of Highways and Streets all share a philosophy that explicitly allows flexibility in applying design standards and approving exceptions to design standards where validated by applying sound engineering judgment. This design philosophy seeks transportation solutions that improve mobility and safety while complementing and enhancing community values and objectives. (p. 2)*

Regional Transportation Plan Guidelines (2010 Amendments)

The California Transportation Commission (CTC) approves regional transportation plans and projects. The Commission's guidelines for the preparation of Regional Transportation Plans were amended in 2010 to read, in part:

> *"MPOs and RTPAs should integrate Complete Streets policies into their Regional Transportation Plans, identify the financial resources necessary to accommodate such policies, and should consider accelerating programming for projects that retrofit existing roads to provide safe and convenient travel by all users.*
>
> *MPOs and RTPAs should encourage all jurisdictions and agencies within the region to ensure that their circulation elements and street and road standards, including planning, design, construction, operations, and maintenance procedures, address all users of the transportation system, to the extent practicable." (p. 24)*

Regional Policy Initiatives

SANDAG

In October 2011, the San Diego Association of Governments (SANDAG) adopted its first Sustainable Community Strategy (SCS) in conjunction with the 2050 Regional Transportation Plan (RTP). The SCS was required by SB375, a 2008 law that requires every California region to meet 2020 and 2035 targets for reductions in GHG emissions from cars and light trucks. The vision established by the SCS/RTP is "more sustainable, compact, well-designed communities interconnected by a transportation system that expands travel choices and reduces greenhouse gas emissions." Compared to previous RTPs, the 2050 RTP encompasses significantly more transit services and a 6-fold increase in funding for walking, bicycling, and traffic calming ("Active Transportation"). To support local efforts, SANDAG provides excellent, research-based resources[36] on planning for livable communities, including:

- Pedestrian design guidelines

- Smart growth design guidelines
- Parking strategies for smart growth areas
- Trip generation rates in smart growth areas
- A smart growth photo library
- Photo simulations of redeveloped/completed street scenes from around the region
- Transportation Demand Management implementation guidance
- The data-driven "Health Atlas" and other GIS tools

County Health Department

For the last several years, the San Diego County Department of Health and Human Services (HHSA) has brought significant attention to the role of infrastructure, neighborhood form, and other environmental issues in determining individual health outcomes. Among other efforts, HHSA teamed with SANDAG on the federally funded "Healthy Works" project, which in part brought a new health focus to the RTP/SCS, provided local health-related planning grants, and is establishing a network of high-tech pedestrian and bicycle counters to help measure progress.

Another and potentially powerful tool resulting from the Healthy Works collaboration is the creation of a large and unique set of GIS data layers that can reveal how environmental and social determinants of health are correlated with health outcomes (see Chapter 8). Still another aspect of this work is the piloting by SANDAG of Health Impact Assessments (HIA) on two infrastructure projects in the planning stage. The HIA is emerging as a potentially "game-changing" evaluation tool being pursued by planning departments nationwide, and by many California state agencies.

Air Pollution Control District

Pursuant to the California Clean Air Act, the APCD's Indirect Source Program has long provided technical assistance and comments to support smart growth and alternatives to automobile travel, which is the region's largest source of emissions. APCD published two advisory documents, Tools for Reducing Vehicle Trips Through Land Use Design and Slow Down! Taming Neighborhood Traffic, available upon request. Staff provides assistance to jurisdictions, developers, neighborhood organizations, business districts, and others regarding Complete Street policies and best practices in traffic calming, pedestrian and compact land use design.

The 10 Elements of an Ideal Complete Streets Policy

A Complete Streets policy can take many forms (Table 3-1). However, an effective policy must include several key components. In a 2010 report examining hundreds of Complete Streets policies, the National Complete Streets Coalition identified the best example policies of various types.[37] The report recommends the following elements be included in a Complete Streets policy:

1. Sets a vision.
2. Includes all modes.

3. Applies to both new and retrofit projects.
4. Emphasizes connectivity.
5. Applies to all phases of all applicable projects.
6. Specifies and limits exceptions, with management approval required.
7. Uses latest design guidelines, is flexible.
8. Is context-sensitive.
9. Sets performance standards.
10. Includes implementation steps.

Types of Complete Street Policies

Table 3-1 Pros and Cons of Various Policy Options

Policy Type	Pros	Cons
City Council Resolution	• Quick and easy, sets the vision	• Not comprehensive, may lack specificity and leave priorities, standards, procedures, and performance measures unchanged.
City Council Policy	• Can include most of the elements of an ideal policy.	• Possibly involves more steps, requiring longer preparation. • Not integrated with other policies with which it may conflict.
Ordinance	• Implements the vision and provides specific standards and procedures; has the force of law.	• More steps, requiring longer preparation. • May not have adequate policy support.
Tax Ordinance	• Provides the vision, relevant policies, and a funding source.	• May lack policy support. • Requires more public process since a public vote is required. • May be difficult to achieve (as part of a tax referendum) in a down economy.

Policy Type	Pros	Cons
Internal Policy	• Quicker implementation. • Required buy-in from affected agencies provides education opportunity across departments and disciplines.	• Not necessarily anchored in official policy. • May lack accountability mechanism such as performance measures and regular reports.
General Plan Policy	• Ideal policy vehicle for creating a Complete Street policy and exceptions to Level of Service. • The GP is the jurisdiction's "constitution". All other policies, zoning, and regulations must be consistent with the GP.	• General Plan amendments can require a lengthy process. • Must be followed up with specific implementation steps.
Street Design Manual	• Provides specific design guidelines allowing flexible options for complete street features.	• May lack necessary policy underpinning, including priorities, design flexibility, maintenance and operation details, performance measures, and a reporting requirement.
Pedestrian/Bike Plans	• Provide specific improvements and/or a framework for additional improvements.	• Tend not to provide guidance for balancing pedestrian or bicycle accommodations with those for other modes.
Focused Plans (Specific Plans, Corridor Plans, etc.)	• Tailored to a particular geographic area and population. • Provides a pilot to test ideas. • Successful strategies can be adapted to other projects, but may require a design- exception approval process.	• Limits applicability to a small area. • May lack some key elements that apply to a citywide policy, such as flexibility and accountability.

Once the Complete Street policy (or policies) is in place, it is important to ensure that related policies echo the Complete Street priorities. These may include street design requirements, traffic impact study guidelines, trip generation rates, parking requirements, and facility requirements for new development. Since this is a long-term effort, it is important to lay out how policy conflicts will be dealt with in the interim.

What *Not* to Include in a Complete Streets Policy

There are some policies that should not be included in a policy document governing community priorities, including road

design and operation, for example:

- The Circulation Element of the General Plan should not specify roadway dimensions or the number of lanes for particular roads, since this may require a General Plan amendment should the community decide to reduce the number of lanes, revert to a lower classification, reduce speeds, narrow lanes, or otherwise provide for greater safety of all users.
- Most General Plans specify LOS C or D as a citywide standard while claiming a vision of expanded travel options for all. These two policies are difficult to reconcile, and may set the stage for later legal challenges. A specified LOS as the primary measure of transportation performance elevates traffic flow above all other community goals described in the General Plan, including traffic safety. A better approach is to map which areas or corridors will emphasize which modes. (These issues are explored further in the next chapter.)

With the emergence of Complete Streets as a significant planning imperative all over the country, alternative transportation metrics are evolving rapidly. Jurisdictions would be prudent to avoid stating explicit performance standards in the General Plan and other high-level planning documents, and instead establish multi-modal goals while retaining flexibility regarding how these will be attained, and how success is to be measured.

Conclusions

1. Various local standards, zoning requirements, and funding mechanisms discourage or even prohibit implementation of Complete Streets. To address these barriers, it is necessary to adopt policies establishing Complete Streets as a priority.
2. Policies at the federal, state, and regional level encourage or require Complete Street investments. All of the professional transportation organizations, such as AASHTO and ITE have endorsed Complete Streets and context-sensitive design, in which the local context and the needs of affected stakeholders take precedence over road classification.
3. Complete Street policies can be established in a variety of ways, but the most effective mechanism is through the Circulation Element of the General Plan. Where a General Plan update has been recently completed, a stand-alone Complete Street Policy or other mechanism can be used.
4. An effective Complete Street policy sets a vision for the community's streets, includes all modes, applies broadly, emphasizes connectivity, manages exceptions, recognizes neighborhood context, establishes performance standards, and includes implementation steps.
5. Two ways the General Plan can work against Complete Streets is by specifying roadway dimensions and Level of Service standards in the plan itself. It is recommended that broad goals for modal performance be specified, and that the plan identify which areas or corridors will emphasize which modes.

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4

L.O.S. STANDARDS AND COMPLETE STREETS

Level of Service Standards – A Barrier to Complete Streets?

Traffic flow has historically been analyzed using the vehicle Level of Service (LOS) metric, from A (free-flow) to F (stop and go). All jurisdictions in the San Diego region have established an LOS standard of C or D (E in downtowns), which routinely triggers roadway and intersection widening to reduce current or projected peak hour vehicle trips. LOS has been an important barrier to accommodating non-motorized modes and transit (since most transit riders are also walkers). Traffic engineer Gary Toth, a 34-year veteran of the New Jersey Department of Transportation, has written,

> *[I]n search of high LOS rankings, transportation professionals have widened streets, added lanes, removed on-street parking, limited crosswalks, and deployed other inappropriate strategies. In ridding our communities of the weeds of congestion, we have also pulled out the very plants that made our "gardens" worthwhile in the first place.*[38]

Follow the Money

The LOS rating mechanism provides legal leverage for a jurisdiction to demand traffic mitigation funds from developers during project entitlement. Even cities interested in Complete Streets are understandably reluctant to give up the LOS-based funding mechanism, grounded as it is in decades of technical validation, legal precedents, and simple logic. Yet, some cities in California and elsewhere have begun rethinking the application of LOS standards, and requiring developer funding of pedestrian, bicycle, and transit improvements instead of more travel lanes.

Alternatives to LOS

Strategic Relaxation of LOS

Some cities have designated in the General Plan or other governing document certain intersections, corridors, or districts where LOS standards will be lower or will not apply at all (Table 4-1). These are typically areas where expanding traffic capacity would unduly harm neighborhood character, undermine pedestrian comfort in a highly walkable zone, or compromise other community values.

Table 4-1 L.O.S. Relaxation Examples

City	Target Area	Alternative Method
San Jose, CA	• Downtown • Transit corridors • Neighborhood business districts	• "Protected Intersections" cannot be expanded • Projects impacting them must fund walk/bike/transit improvements
National City, CA[39]	• City-wide	• Designated "Community Corridors" (Complete Street avenues) cannot be widened
San Diego, CA	• Downtown	• LOS lowered from D to E, but improvements to LOS F streets may not endanger pedestrians
Lancaster, CA	• Lancaster Blvd.	• LOS lowered from D to E
Sacramento, CA[40]	• Downtown Core Area Multi-Modal Districts	• LOS lowered from D to F; impacts require enhancements to non-auto travel modes
Portland, OR	• Central Portland, including Downtown	• LOS F acceptable at peak hours
Vancouver, BC	• Downtown and West End	• No LOS applied. Capacity expansions prohibited.

Multi-Modal Metrics

At this writing, there were a number of road performance metrics available as an enhancement, supplement, or replacement of LOS (Table 4-2). While the array of tools may seem daunting, they are all based on similar approaches and research results. Cities are encouraged to experiment with these tools in their next road planning effort, and consider adapting one or more for future projects.

Example: MMLOS from the 2010 HCM

As an illustration of a multi-modal metric, the 2010 update of the ubiquitous Highway Capacity Manual includes a MMLOS methodology for quantifying trade-offs between service quality for vehicles, transit vehicles, bicycling, and walking when considering alternative designs. As with most of the other new metrics, the walk/bike computations are based on research that identified key factors (Table 4-3) affecting the decision to walk or bicycle on a particular street. The disadvantages of this method are that it is not yet widely tested, it requires additional data collection, not all important factors may be quantifiable (and are thus excluded), and it retains some of the flaws inherent in reliance on vehicle LOS.

Table 4-2 Matrix of Roadway Performance Metrics

Method	Method Type	Modes			
		AUTO	TRANSIT	BICYCLE	PEDESTRIAN
Pedestrian Environmental Quality Index	Checklist, Computational				●
Bicycle Environment Quality Index	Checklist, Computational			●	
Charlotte MMLOS	Other			●	●
Florida DOT MMLOS	Computational	●	●	●	●
HCM 2010 MMLOS	Computational	●	●	●	●
Fort Collins MMLOS	Checklist, Computational	●	●	●	●
Person Delay	Computational	●	●	●	●
Layered Networks	Other	●	●	●	●
Auto Trips Generated	Other	●	●	●	●

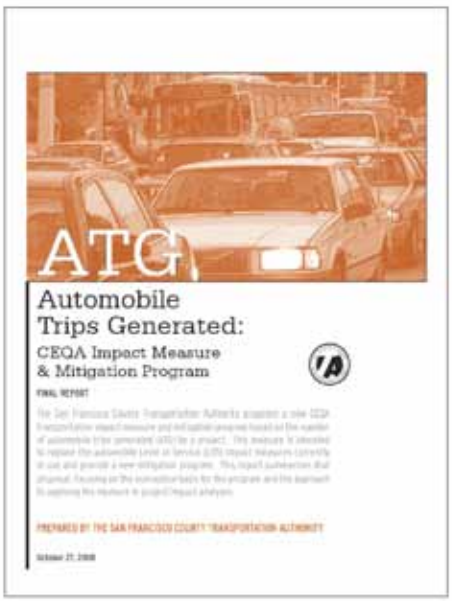
Adapted from Ronald T. Milam, Fehr and Peers, 2012. See online resource, MMLOS Toolkit.[41]

Table 4-3. MM LOS Factors for Calculating Pedestrian and Bicycle Level of Service (2010 HCM)

Pedestrian Level of Service Factors	Bicycle Level of Service Factors
Link Factor • Outside travel lane width (+) • Bicycle lane/shoulder width (+) • Buffer presence (e.g., on-street parking, street trees) (+) • Sidewalk presence and width (+) • Volume and speed of motor vehicle traffic in outside lane (-)	Link Factor • Volume and speed of traffic in outside travel lane (-) • Heavy vehicle percentage (-) • Pavement condition (+) • Bicycle lane presence (+) • Bicycle lane, shoulder, and outside lane widths (+) • On-street parking presence and utilization (+/-)
Intersection Factor • Permitted left turn and right-turn-on-red volumes (-) • Cross-street motor vehicle volumes and speeds (-) • Crossing length (-) • Average pedestrian delay (-) • Right-turn channelizing island presence (+)	Intersection Factor - Signalized • Width of outside through lane and bicycle lane (+) • Cross-street width (-) • Motor vehicle traffic volume in the outside lane (-)
Roadway Crossing Difficulty Factor (if mid-block crossing is allowed)	Driveways and Unsignalized Intersections per Mile

Auto Trips Generated

In 2003, the San Francisco Municipal Transit Agency (SFMTA) determined that the use of LOS to measure and mitigate transportation impacts from new development was resulting in infrastructure changes that were contrary to its long-standing Transit First Policy.[42] The city analyzed alternative options and settled on the simple metric, Auto Trips Generated (ATG). Development projects must demonstrate compatibility with the Transit First Policy and pay a mitigation fee for each new vehicle trip generated, thus creating a strong incentive to minimize trips. The collected fees will be applied to transportation performance improvements, either site-specific or city-wide, with all modes eligible. At this writing, the city is conducting a Nexus Study to establish the fee amount.[43]



LOS and CEQA – A Failed Marriage?

The ATG metric represents a significant departure from the customary assumption that traffic delay represents a "physical impact to the environment" – a fundamental requirement of CEQA. The SFMTA's study of alternative traffic metrics determined that LOS (traffic delay) is a measure of motorist convenience – a social impact – rather than an environmental impact. Indeed, agencies are within their rights to remove the LOS analysis from the CEQA umbrella. Traffic studies may still be needed to determine traffic-related physical impacts, namely conventional pollutants and GHGs, but LOS alone is a poor predictor of emissions. Mitigation of ATG via multimodal improvements addresses the direct air quality impacts, not the social benefit of reducing congestion, and is thus more in line with CEQA's purpose.

Evidence presented in this report suggests improvements to non-vehicular travel promise to alleviate traffic congestion more effectively than traditional LOS mitigations but in an environmentally responsible way. Nevertheless, SFMTA staff report they fully expect to be sued following replacement of LOS with ATG, but welcome the opportunity to set a legal precedent. California jurisdictions wishing to reduce the influence of LOS should follow the progress of the SFMTA's ATG adoption process.

Is Traffic Congestion Inevitable?

The conventional traffic planning paradigm assumes that traffic volumes grow steadily, based on traffic generation rates for each land use, and that failure to plan for them will lead to gridlock. However, studies of both road widening and road removal suggest that traffic demand is largely flexible, and equilibrates with the supply provided, rather than being a fixed number based on population or land uses.[44]

Induced Travel and Disappearing Traffic

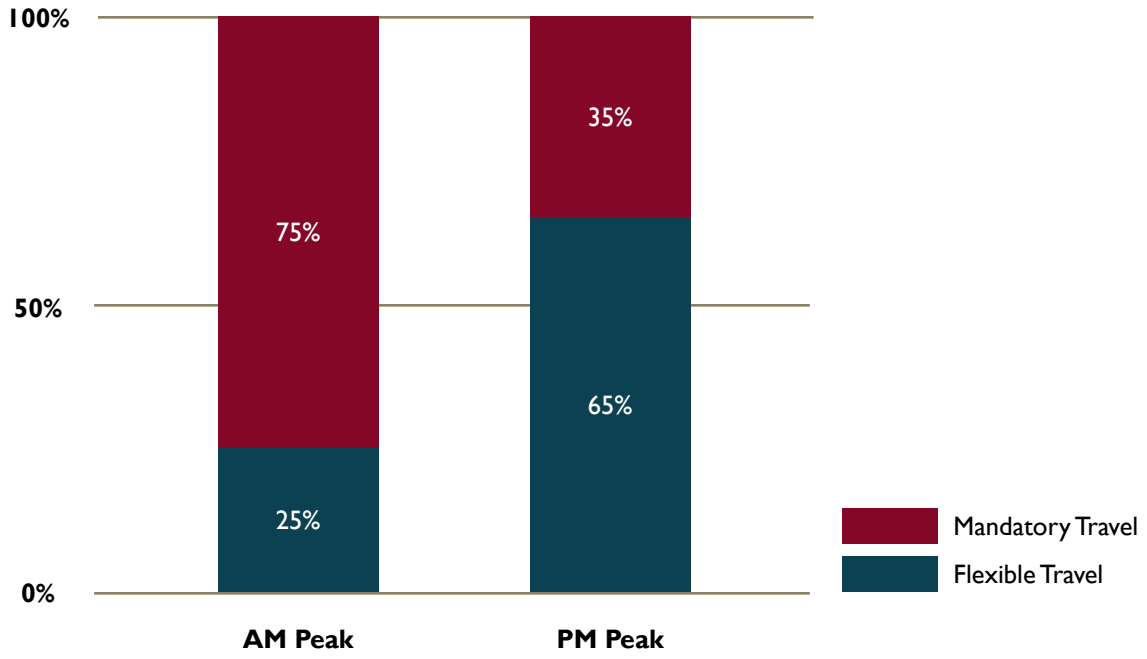
Two traffic demand phenomena have been studied: (1) the "induced travel" effect, in which far more drivers than predicted by a traffic model head for a new or expanded roadway, and (2) "disappearing traffic," wherein modeled gridlock or diversion of traffic to other roads following the removal of a key roadway fails to occur as predicted. A study of induced traffic in California showed that 60-90% of new roadway capacity is filled by new traffic within five years,[45] primarily from existing travelers switching modes or routes to the new or expanded facilities.

Similarly, a study of 60 roadway removal cases worldwide showed that around 16-25% of traffic simply disappears.[46] Surveys of the "disappeared" drivers show they switched to a different mode, changed travel times or destinations, or decided not to take the trip at all. These cases suggest that drivers exercise a larger degree of flexibility regarding when, how, and whether to travel than current traffic models assume.

Mandatory vs. Flexible Travel

Vehicle trips can be categorized as either mandatory (work or school related) or flexible (shopping, dining, visiting friends, etc.). Data from the National Highway Travel Survey show that on weekdays, morning peak trips are comprised of 75% mandatory and 25% flexible trips (Figure 4-1). By contrast, 65% of afternoon peak trips are flexible.[47] Adding road capacity attracts more flexible trips. Thus, maintaining peak LOS in every location may not be necessary in order to accommodate travel needs, and in fact may be a poor use of public resources.

Figure 4-1. Weekday Vehicle Travel



Driving Declines

The New York Times recently reported,[48]

> *In 2008, 46.3 percent of potential drivers 19 years old and younger had drivers' licenses, compared with 64.4 percent in 1998, according to the Federal Highway Administration, and drivers ages 21 to 30 drove 12 percent fewer miles in 2009 than they did in 1995.*

Both young adults[49] and retirees show a majority preference for dense, lively neighborhoods built for walking, bicycling, and transit. Retirees are trading large-lot suburban homes for close-in walkable neighborhoods, partly for the opportunities, and partly in anticipation of outliving their ability to drive. The result of these choices, coupled with rising gas prices, will sooner or later show up in reduced or stabilizing traffic volumes in the San Diego region as it has in other regions.[50]

TDM – Efficient, Affordable and Largely Untapped

Over the four decades of their use, Transportation Demand Management (TDM) strategies have often proven to be far more cost-effective than expanding road capacity, while avoiding the undesirable impacts. TDM consists of measures to make the existing transportation system more efficient, partly by reducing drive-alone trips and shifting trips to off-peak hours.

A new volume addressing the subject, Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy, and Resilient Communities,[51] states that a comprehensive set of TDM measures can realistically cut traffic and parking demand by more than 15%. Some recommended strategies are as follows:

- Employer-Based Transit Pass Subsidies reduced auto commuting by 24% in Bellevue, Washington, and by 16% in Santa Clara, California. Mountain View has required some new developments to provide free passes to all employees.
- Employee Parking Cash-Out Programs (providing cash in lieu of a parking space) have decreased parking demand an average of 27%, including 26% in transit-poor areas. (California law requires parking cash-out for certain employers of 50+ employees, and cities and counties may enforce the law, as of January 1, 2010.)
- Requiring Unbundling Parking Costs from Rent, which consists of charging for parking separately from residential or commercial rents, reduces parking demand 10-20% (and reduces trips). It also spares non-drivers from subsidizing others' parking spaces, and makes the parking cost more visible. Unbundling parking costs can be required in development standards.
- Development Requirements for Providing Bicycle Facilities such as showers, lockers, and secure bike parking. The American Planning Association's Bicycle Facility Planning guidance[52] recommends providing bike parking equivalent to 5-10% of auto parking spaces, depending on the use.
- Promoting Market Mechanisms to make the cost of driving more visible. These include car-sharing, pay-as-you-drive (PAYD) insurance, paid parking, and others. PAYD insurance is now available from at least three insurance companies operating in California.

Complete Streets complement TDM programs. For example, the recently concluded federal Non-motorized Transportation Pilot Program, which provided funding for four communities to improve walking and biking infrastructure and to conduct encouragement activities, found PM peak bicycling increased 49% and walking increased 22% over four years.[53] Most of these trips were made for meeting daily needs, displacing vehicle trips.

In 2012, SANDAG published a TDM manual highlighting best practices and successful strategies: Integrating Transportation Demand Management Into the Planning and Development Process: A Reference for Cities. The report will be available on SANDAG's website.

Traffic Congestion as a Planning Tool

The authors of Sustainable Transportation Planning argue that some degree of traffic congestion is inevitable, and that most successful cities locate their congestion bottlenecks strategically. Two examples worth noting are:

- In its 1997 Transportation Plan, Vancouver allowed traffic to reach saturation in areas where the city prioritized urban design and the convenience and safety of other modes (i.e., Complete Streets) above traffic flow. Despite dramatic growth in population and employment, the number of vehicle trips into and within Downtown Vancouver and adjacent neighborhoods has decreased over time.
- Santa Monica's 2010 Land Use and Circulation Element[54] update concluded that it could best manage its traffic by allowing congested intersections at the edges of the community to remain congested, effectively "metering" traffic entering the heart of the community.

Jurisdictions are of course free to maintain roadway capacity such that every vehicle trip is accommodated everywhere, at all times. However, as discussed in previous chapters, it is important to consider what is lost in the way of safety, noise, aesthetics, public health outcomes, small businesses, and other quality of life factors. The current planning paradigm does not ensure these trade-offs are considered when LOS standards are adopted or renewed. Factoring in trade-offs occurs only when a jurisdiction takes it upon itself to embark in a new policy direction.

Conclusions

1. Vehicle Level of Service (LOS) is often a barrier to implementing Complete Streets, and leads to streets that are less safe or impractical for walking, bicycling, and transit use.
2. Some cities (e.g., National City and San Jose) have designated districts, corridors, or intersections where walking, bicycling, and transit are prioritized, and further road expansion is prohibited. LOS F is considered acceptable in these locations.
3. Vehicle LOS can be supplemented by use of Multi-Modal LOS (MMLOS) methodologies, one of which is included in the 2010 Highway Capacity Manual. MMLOS is not yet widely used, but is designed to compare the trade-offs in the service quality for each mode when considering alternative designs, and requires additional data collection.
4. San Francisco is preparing to replace the LOS metric with "Auto Trips Generated," in order to incentivize developers to minimize new vehicle trips and to fund improvements for walking, bicycling, and transit. Other cities will likely follow suit if this system proves successful.
5. The "predict and provide" traffic paradigm assumes traffic will grow steadily with time, but traffic volumes in the U.S. have leveled off in the last 10 years, and both young adults and retiring Baby Boomers exhibit a strong preference for walkable, transit-accessible neighborhoods.
6. Traffic planning also assumes traffic volumes are predictable based on land uses. However, evidence shows a large portion of trips are flexible, and traffic tends to equilibrate with available capacity. Therefore, it may make more sense to build streets serving all modes rather than trying to predict and meet vehicle traffic demand.
7. Transportation Demand Management (TDM) methods are often overlooked, but can be far more cost-effective than capacity improvements. Comprehensive TDM strategies reliably provide 15% reductions in trips and parking demand, which can solve most peak hour congestion problems. Complete Streets complement TDM investments.

COMPLETE STREETS UNDER CEQA

The California Environment Quality Act (CEQA) requires state, local, and other agencies to evaluate and disclose the environmental impacts of their actions, and to mitigate these impacts to the extent possible. Environmental review is often expensive, lengthy, and provides a convenient target for litigation. By including traffic congestion as an environmental impact – something the CEQA statute does not require – it also traps traffic planners/engineers in a vicious cycle of widening roads to accommodate vehicle trips, which in turn induces more people to use cars. In this way, CEQA can be a roadblock, or a lengthy detour, to implementing Complete Streets. There are strategies available to overcome the CEQA barrier.

CEQA Guideline Revisions

In response to Senate Bill 97 (2007), the California Natural Resources Agency amended the CEQA Guidelines in March 2010 to include analysis and mitigation of greenhouse gas emissions (motor vehicles being the largest source), as well as potential negative impacts of traffic mitigation on bicyclists, pedestrians, and the environment. As the Agency stated,

> *"[E]vidence…indicates mitigation of traffic congestion may lead to even greater environmental impacts than might result from congestion itself.*[55]

Revisions to the CEQA Environmental Checklist Form[56] included the following changes to the Transportation/Traffic section.

Table 5-1 Revisions to the CEQA Environmental Checklist Form

Previous Language	Replaced With
Would the project: (a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	Would the project: (a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Previous Language	Replaced With
Would the project: b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	Would the project: b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?
Would the project: f) Result in inadequate parking capacity?	(Parking provision deleted.)
Would the project: g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	Would the project: f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Significantly, the CEQA Checklist revisions allow the use of transportation performance measures other than LOS (Chapter 4), instead emphasizing performance of the system as a whole. Additionally, consideration of a project's impacts on all modes is emphasized, while consideration of parking supply is eliminated entirely. (See Chapter 4.)

Reducing Unnecessary CEQA Costs and Delays

Complete Street projects can greatly improve the urban environment (Chapter 2), including pedestrian and motorist safety, land use, aesthetics, air quality, greenhouse gas emissions, and noise, and are initiated by cities for this purpose. Yet, CEQA Checklist threshold criteria can trigger environmental review, including mitigated negative declarations and full environmental impact reports, particularly for larger projects. Because of the threat of lawsuits, many cities spend considerable sums on environmental documentation, sometimes in excess of the project's actual cost.

How can locally-initiated Complete Street projects be implemented without unnecessary costs and delays due to CEQA review? Several options are available:

A Good Plan

Roadway and other infrastructure projects must conform to the General Plan and any other guiding documents. Many CEQA issues arise because the governing planning document was not internally consistent or not specific enough. If a document states that pedestrian and bicycle access take precedence over LOS considerations in a certain area of town, the CEQA document can cite and rely on this directive.

Clear Project Goals

Prior to the start of a major street project, the jurisdiction should invite stakeholders to help establish a clear set of project priorities and goals, which the City Council may then be asked to bless. If this step is taken, the CEQA process can cite project priorities established by the jurisdiction. In this way, declaring "overriding considerations" of any environmental impacts are easily explained and justified.

Categorical Exemption

Many Complete Street projects meet CEQA exemption criteria,[57] particularly if the total right-of-way width and facility uses will remain the same (per Section 15301(1)(c)). Local examples include Rock Springs Road in San Marcos and Allison Avenue in La Mesa (see photos). Re-striping projects (per Section 15282(j)) are also exempt. Whenever relying on an exemption, especially a common sense exemption, it is good practice to draft a memo for the file documenting how the conclusion that the project was exempt was reached. In addition, project sponsors should file a notice of exemption after approval of the project in order to trigger the applicable statute of limitations.



Rock Springs Road, San Marcos
Photo: City of San Marcos



Allison Avenue, La Mesa
Photo: City of La Mesa

Amend Local CEQA Thresholds

Local jurisdictions may raise the threshold criteria for determining when Mitigated Negative Declarations and Environmental Impact Reports are required for street improvements. This can best be done through the process of adopting a comprehensive Complete Streets Policy (Chapter 3).

Ministerial versus Discretionary Permits

Cities are given wide latitude to establish what project types are ministerial (allowed by right) and which require discretionary permits. Within highly urbanized areas, the potential environmental impacts of the two are often not much different. Thus, cities that want to encourage infill development can avoid unnecessary CEQA review by establishing under which circumstances permits will be ministerial, reducing the number of discretionary categories. More specifically, cities can eliminate requirements for conditional use permits for mixed-use developments and reduce the number of planned or special district permits. The use of form-based codes can also provide certainty to the city or residents while avoiding discretionary reviews.

17th Street Pedestrian Plaza, San Francisco

Inspired by New York City's conversions of excess pavement into plazas, residents of San Francisco's Castro district sought a similar treatment at the 17th & Castro transit stop. Partly to reassure skeptics, the project started as a completely reversible, low-budget pilot project. Sidewalk extensions and sitting areas were painted onto the pavement, and inexpensive concrete planters served as protective bollards. Once in place, the reclaimed pedestrian areas were immediately embraced by the neighborhood, demonstrating pent up demand. Residents partnered with the city to install more substantial planters, street furniture, and landscaping. The result was rapid implementation and a genuine sense of community investment and ownership.







Photos: Steven Kyle Weller via stevenkyleweller.com

Tiering from a Programmatic EIR

Complete Street programs can be described and undergo CEQA review as a stand-alone "project," or as part of a General Plan update. In this way, Complete Street conversions can avoid project by project CEQA review by referring to a programmatic EIR, so long as each project is consistent with the described program elements. This means the General Plan or Community Plan update process is an excellent opportunity to establish Complete Street goals and objectives which may then justify implementation without requiring the delay and cost of project-level CEQA review. For example, National City[58] adopted a general plan update and related documents which incorporated Complete Street plans, all of which underwent CEQA review.

Exempt Pilot Projects

In a two-year period, New York City was able, without environmental reviews, to complete dozens of Complete Street projects, including dedicating half the width of some streets to cycle tracks and converting other streets entirely to pedestrian plazas. This was done by treating these projects as pilot projects. The CEQA statute does not explicitly recognize pilot projects, but this avenue should be explored in individual cases. By definition, a pilot project is a temporary installation that is reversible if evaluation shows the goals of the project are not met. In no case has New York found it necessary to remove fairly dramatic Complete Street conversions, since motorists quickly adjusted to the changes, and residents embraced the new facilities created.

Statutory Exemption

In the long term, it may be appropriate for the California legislature to amend CEQA to statutorily exempt Complete Street projects if certain conditions are met, in the same way that safety projects included in the Regional Transportation Improvement Program are exempt from federal air quality conformity analysis. The State has shown periodic interest in CEQA streamlining for compact developments requiring less driving.

Form-Based Code

Form-Based Codes (FBC) are development requirements or options focusing on form rather than uses. FBCs, discussed more fully in Chapter 6, replace or overlay conventional zoning, in a particular district, corridor or citywide. FBCs can specify or suggest street dimensions and features as well. Examples include the Lancaster (Blvd) Specific Plan,[59] the Beach and Edinger Corridor Specific Plan in Huntington Beach,[60] and two corridor plans in the City of Ventura, the Midtown Corridor[61] and the Victoria Avenue Corridor.[62]



La Boheme, a mixed-use, infill project, 30th Street, San Diego
Photo: Greg Konar

Streamlining for Transit-Oriented Development (TOD)

SB 375, which is designed to promote compact infill development offers CEQA permit streamlining for transit priority projects located within half-mile of transit. While the premise behind transit priority projects is sound, it is generally acknowledged by local planning experts that the qualifying criteria are too limiting and the incentives too weak to interest developers. At this writing, the State's Office of Planning and Research is conducting rulemaking to implement CEQA streamlining provisions for infill development as mandated by SB 226 (2011).[63] Complete Street projects may be included as an element of a TOD.

Conclusions

1. Local governments interested in Complete Streets frequently struggle with CEQA, or the perceived barrier CEQA represents, when retrofitting a street to serve all users, or when reviewing private developments that will impact traffic.
2. Complete Street projects which maintain the current right-of-way and modes served can qualify for a CEQA exemption. Examples can be found in San Marcos and La Mesa.
3. CEQA delays for more extensive Complete Street retrofit projects can be minimized or avoided by adopting appropriate General Plan policies or a freestanding Complete Streets program which has itself undergone CEQA review.

4. For development review, CEQA provides flexibility to local governments to establish their own significance thresholds, and to require project mitigation that improves walking, bicycling, or transit facilities rather than expanding roadway capacity for vehicles.
5. The 2010 revisions to the State's CEQA Guidelines emphasizes consideration of project impacts on all transportation modes, rather than prioritizing vehicle flow over all other modes. The Project Checklist allows the use of transportation measures other than Level of Service, if a jurisdiction so chooses.

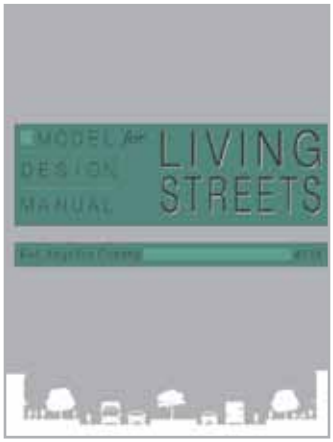
THE IMPLEMENTATION TOOLBOX

Design Guidance for Complete Streets

Although local governments may legally develop and test their own design standards, very few have the resources to do so. Therefore, a frequent question concerning Complete Streets is whether the concept is compatible with state, federal or professional traffic design guidelines. The following are recommended design resources, with deviations from current design guidelines as noted:

Model Design Manual for Living Streets

Ryan Snyder Associates & UCLA School of Public Affairs, Luskin Center for Innovation, 2011.[64]



This manual is a significant resource all cities should examine whether or not they are interested in providing Complete Streets. The Living Streets manual is a comprehensive treatment on Complete Street design techniques that specifically fit within the parameters of existing traffic engineering "bibles" (AASHTO,[65] MUTCD, HDM, etc.). The manual includes legal standing of street manuals, performance measures, street networks and classifications, traveled way design, intersection design, universal pedestrian access, pedestrian crossings, bikeway design, transit accommodations, traffic calming, the streetscape ecosystem, place-making for streets, designing land use around streets, retrofitting suburban streets, and community engagement.

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach

Institute of Transportation Engineers & Congress for New Urbanism, 2010[66]

This path breaking guide is a collaborative report by ITE and the Congress for the New Urbanism which provides guidance on how Context Sensitive Solutions principles can be employed in the process of planning and developing walkable urban thoroughfares. ITE's involvement in the document lends legitimacy to the CSS approach, describing it as compatible with the flexibility that is inherent in the AASHTO "Green Book" (Policy on Geometric Design of Highways and Streets).

NACTO Urban Bikeway Design Guide

National Association of City Transportation Officials (updated continuously)[67]

The NACTO Urban Design Bikeway Guide is an online resource designed to provide cities with state-of-the-practice bicycling facilities. While each design has been tested in an American city, some designs have not been approved for inclusion in the requisite engineering bibles. Indeed, this resource was created specifically to support more rapid approval of proven, innovative designs. U.S. Secretary of Transportation Ray LaHood has endorsed the NACTO guide and many U.S. cities are actively using it.

Main Streets: Flexibility in Design and Operations

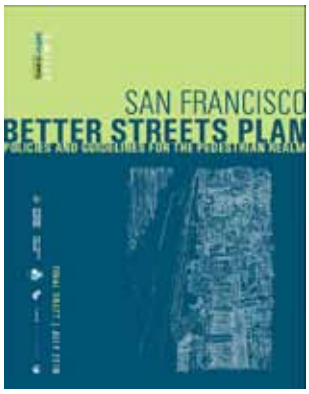
Caltrans 2005[68]

This is a concise booklet emphasizing Caltrans's commitment to make state highways that also happen to be local main streets more livable. The booklet identifies context sensitive solutions and livable community concepts that can assist communities and Caltrans in balancing community values with concerns for safe and efficient operations for travelers, pedestrians, bicyclists, transit users, and highway workers.

Leading Complete Street Guidelines, Plans and Programs

The following are leading examples of guidelines, plans, or program documents that reflect Complete Street principles.

City of San Francisco Better Streets Plan (2010)[69]



The Better Streets Plan provides a unified set of standards, guidelines, and implementation strategies for building and maintaining San Francisco's pedestrian environment. It carries out the intent of San Francisco's Better Streets Policy which requires best management practices in environmental planning and pedestrian oriented, multi-modal street design, and incorporation of sustainable water management techniques. The Better Streets Plan strongly emphasizes collaboration between City agencies to comprehensively plan for streets.

NYC Sustainable Streets Strategic Plan (2008) and Progress Report (2009)[70]

These two resources comprise a detailed transportation plan with clear goals and implementing actions that set a new direction in transportation policy for the City of New York. The plan contains benchmarks and performance standards that were used to evaluate progress in the 2009 Progress Report. The strategic plan underpins the impressive transformation of New York's streets during the past several years.

NYC Street Design Manual (2009)[71]

An outgrowth of the Sustainable Streets Strategic Plan, the NYC Street Design Manual is a leading example of a context sensitive street design manual for a large city.

Ada County Highway District Livable Street Design Guide (2009)[72]

One of the first comprehensive street design manuals to embrace the concept of livability and the potential for street design to change the character of existing areas, the Ada County manual also employs context sensitive street classifications.

Downtown Lancaster Specific Plan (2008)[73]

The Downtown Lancaster Specific Plan is a good example of how a specific plan can be used to coordinate Complete Street improvements with form based code zoning. The highly successful Lancaster "BLVD" project fulfills the plan's vision for the Boulevard District, one of seven in the downtown area. The plan also illustrates how potential conflicts with LOS standards can be resolved at the plan level.

City of Charlotte Urban Street Design Guidelines (2007)[74]

The USDG is an excellent example of street design guidelines intended to create Complete Streets on a city-wide basis. The guidelines are keyed to new context sensitive street types that overlay traditional functional classifications.

Sacramento Council of Governments Complete Street Resource Toolkit[75]

The toolkit is an online collection of useful resources related to Complete Streets, and part of the Sacramento Area's Council of Government's (SACOG) Complete Streets technical assistance program. The Caltrans-funded toolkit is funded through a Caltrans grant, and is continually maintained and updated through user input.

Moving Beyond Prevailing Street Design Standards: Assessing Legal and Liability Barriers to More Efficient Street Design and Function[76]

This paper clarifies the legal standing of prevailing road design guidelines, and discusses how cities can avoid legal liability when using road design techniques inconsistent with prevailing guidelines.

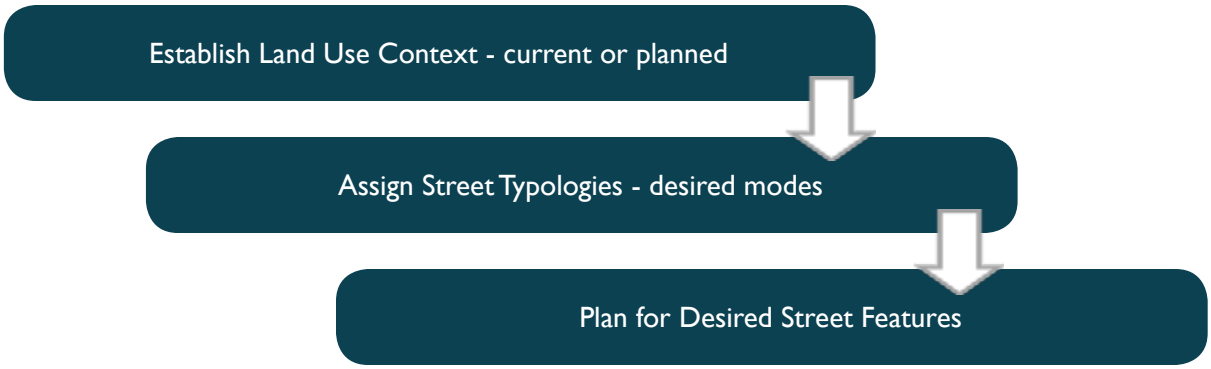
National Complete Streets Coalition Website[77]

A one-stop online source for Complete Street information including facts, fundamentals, resources, policy and advocacy support.

Context-Sensitive Implementation and Assessment Tool

This section describes a context sensitive implementation approach that can help cities move beyond current regulatory barriers to more rapid deployment of Complete Streets programs. As shown in Figure 6-1, the process involves acknowledging the current or future land use context in each area and then planning for streets that will support the desired context. This process aims to avoid the mismatch between street design decisions and desired land uses – for example building a wide boulevard to accommodate traffic through a neighborhood Main Street area, thereby degrading the qualities that draw traffic there.

Figure 6-1. Context-Sensitive Planning Process for Complete Streets



Context is the Key

Context Sensitive Solutions (CSS) is a Federal Highway Administration initiative[78] embraced by both AASHTO and Caltrans.[79] CSS is "a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting." In short, CSS aims to avoid the "one size fits all" street design approach that necessitated the Complete Streets concept in the first place.

Street Typology versus Functional Classification

For decades, a street's functional classification has been assigned based on whether it serves local or more regional traffic, and its traffic volume. Finer distinctions about the local land use character on a given segment of the street have been given less consideration. In addition, federal incentives have long favored choosing the highest possible classification.[80] These circumstances have led to dangerous situations, for example, transit passengers accessing a bus stop on a regional arterial must interact with high-speed, high-volume traffic, with tragic results.[81] On such streets, bicycling and walking have been neglected as legitimate modes of travel on a neighborhood-serving street.

The implementation of context sensitive Complete Street programs is still evolving and cities have taken a variety of approaches. The methods documented in Designing Walkable Urban Thoroughfares: A Context Sensitive Approach and further articulated in the Model Design Manual for Living Streets (both discussed above) can be customized to meet local needs and are compatible with the most advanced corridor and land use planning tools. Both documents recommend reclassifying all streets using customized, context-sensitive typology, rather than the traditional functional classifications (Table 6-1 provides an example). This approach is especially important in addressing the needs of specialized streets such as main streets, drives, transit malls, bike boulevards, festival streets, and shared space streets.

Street Typology Examples

The City of Charlotte, North Carolina, uses six context-sensitive street typologies: Main Streets, Avenues, Boulevards, Parkways, and Local Streets.[82] Similarly, the City of San Marcos introduced street typologies in its updated General Plan, mixing new typologies with more traditional classifications: Multi-Way Boulevard, Arterial, Arterial with Enhanced Bike/Pedestrian Facilities, Freeway, Collectors, Bicycle/Pedestrian Trails, Neighborhood Streets, Industrial Collectors, and Main

Table 6-1. Common Context-Sensitive Street Typologies for Urbanized Areas (ITE/CNU)

Street Type	Role	Characteristics
"Boulevard" (conventionally arterials)	Traverses and connects districts and cities; primarily a longer distance route for all vehicles including transit.	Designed for high vehicle capacity and moderate speed, traversing an urbanized area. Boulevards serve as primary transit routes and should include bike lanes and safe pedestrian access to transit stops. They may be equipped with dedicated bus lanes or side access lanes buffering sidewalks and buildings. Many boulevards also have landscaped medians.
"Avenue" (conventionally collectors)	Traverses and connects districts, links street with boulevards. For all vehicles including transit.	Designed for moderate to high vehicular capacity and low to moderate speed acting as a short distance connector between urban centers and may be equipped with a landscaped median.
"Street" (conventionally local street)	Serves neighborhoods, connects to adjoining neighborhoods; serves local function for vehicles and transit.	A local, multi-modal facility suitable for all urbanized zones, frontages, and land uses. A street is urban in character, with raised curbs (except where curbless treatments are designed), drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an alley. Character may vary in response to the commercial or residential uses lining the street.
Alley/Lane	Link between streets; allows access to garages.	A narrow street, often without sidewalks. Alleys and lanes connect streets and can provide access to the backs of buildings and garages.

Street. The City of New York, whose context is more heavily weighted toward its dense urban setting, employs five context-sensitive street typologies: General Street, Boulevard, Slow Street, Transit Street, and Pedestrian-Only Street. Once a street or portion of a street is classified as a certain street type, the street design should reflect that classification and future land use decisions along the street should also reflect that classification.

Reclassifying streets around typologies shifts the focus from capacity and traffic flow to context and the full functioning of the street. In this approach, project planning, project review, and environmental documentation must account for how a private development or infrastructure improvement project supports or detracts from the broader functionality of the street. It also shifts the focus from Level of Service, whether vehicular or multi-model LOS, to qualitative standards that consider how the street contributes to the community. That is the objective.

The functional street classifications will remain to the extent required by State law. But the goal is to move entirely toward a context-sensitive street classification system. Once the streets are reclassified, the next step is to identify the potential and need for context sensitive/Complete Street retrofit. This is discussed further in Chapter 8.

More Effective Planning Tools

In addition to using context-sensitive street typologies, leading cities implementing comprehensive Complete Street Programs have adopted two additional tools: five-year Transportation Action Plans and more inclusive public participation.

Five-Year Action Plans

As a bridge between the long-term vision (general plan) and annual budget (Capital Improvement Program), a mid-term plan seems necessary to make steady progress implementing transformational change. WalkSanDiego's study[83] of successful Complete Street programs around the nation found that most utilize five-year Transportation Action Plans, usually supplemented by an annual update or "report card" (discussed in the next chapter). Example plans include:

- Charlotte's Five-Year Transportation Action Plan[84]
- New York City's (Five-Year) Pedestrian Safety Action Plan[85]
- Seattle's (Five-Year) Strategic Transportation Plan[86]
- Redmond, Washington's Transportation Master Plan and Five Year Transportation Status Report[87]
- Boulder's Transportation Master Plan (updated every five years)

Five-year action plans allow elected officials, city staff, and participating stakeholders to avoid the temptation to focus only on immediate issues, and instead to think strategically about what specific data-gathering and investments will be needed to implement the community's transportation vision.

Project Checklist

With the realization that street design affects so much more than traffic flow, leading Complete Streets programs have been successful in part because they endeavored to break down silos between city departments. In addition to regular meetings between departments, some cities have instituted a Project Checklist that is circulated for a sign-off from each interested department when street designs are in process. The best known example comes from the City of Seattle.[88] Metropolitan Planning Organizations also use project checklists to ensure funding for street improvements adhere to Complete Street goals. Examples include the Bay Area's Metropolitan Transportation Commission,[89] and the Mid-Ohio Regional Planning Commission.[90]

Inclusive Public Participation

As emphasized in the Key Assumptions of this report (Chapter 1), building Complete Streets is as much about the design process as the outcome. Cities such as Charlotte and Portland have placed great emphasis on involving all types of users in the design of streets. For example, Charlotte's six-step design process[91] is based on three underlying assumptions:

1. The process will involve a variety of stakeholders. The number of stakeholders and discussions will vary, depending on the magnitude and consequences of the street(s) to be designed.

2. The resulting street will be as "complete" a street as possible, in order to meet the multimodal objectives defined in the Transportation Action Plan.

3. The steps in the decision-making process will be well-documented. The documentation will clearly describe the major trade-offs made among competing design elements, how those were discussed and weighed against each other, and the preliminary and final outcomes. Thorough documentation will ensure that all stakeholders' perspectives are adequately considered in the final design.

The National Complete Streets Coalition is documenting the economic and financial advantages of Complete Streets, including the cost savings involved in designing for all users.[92] Involving stakeholders – especially traditionally absent voices – early and often in the design process can improve the final design, avoid costly delays, and prevent expensive retrofits later.

The Sacramento-based Local Government Commission (www.lgc.org) is updating its best practices report for public consultation aimed at working with stakeholders to implement better-functioning communities, including Complete Streets. Look for this manual in 2013.

The Standard Land Use Planning Toolbox

For long-term success implementing Complete Streets, the planning processes and documents familiar to local government staff and elected officials should be utilized.

General Plan

General Plans are State-required planning policy documents[93] that typically include both a vision for the community and plans for particular improvements. By law, General Plans must undergo CEQA review, thus smoothing the way for their implementation. A General Plan update is therefore the ideal opportunity for making a long-term commitment to Complete Streets (see Chapter 3). Some of the ways various cities have done so are as follows:

- The Complete Streets Act AB1358 (2008) requires updated General Plan Circulation Elements to "plan for a balanced, multimodal transportation network." Some cities have taken this to heart, reworking both the process and priorities for designing or retrofitting streets.
- Recognizing that land use and street design act in concert to create a safe and inviting environment for all modes, some cities (e.g., Chula Vista, Sierra Madre) have **combined the Land Use and Circulation Elements** into a single element. The intent is to restructure these elements around the enormous contribution that Complete Streets and other design issues can play in revitalizing neighborhoods and communities.
- General Plans can call for **Corridor Plans** and **Specific Plans** focusing on targeted transformation areas (e.g., National City). Such plans may include tailored design and development guidelines and overlaid zoning. In these situations, street design should be the main policy focus and the land use coordinated to support it.

» In the City of San Diego and the County, comprehensive updates of officially adopted **Community Plans** are an opportunity to work with local stakeholders on establishing targets and design approaches for future Complete Street treatments, per policy language and goals established in the General Plan.

Bicycle and Pedestrian Master Plans

These plans are an extension of General Plan policy and a bridge to Complete Streets implementation, but are usually project-focused rather than policy and context-centered. Since most bicycle and pedestrian master plans in the San Diego region continue the conventional approach of minimizing impacts on vehicle traffic, they may augment, but are not a substitute for a comprehensive Complete Street policy or plan.

Zoning Code

Conventional zoning codes emphasize land use and density, height, setbacks, parking and related regulations but often neglect the street interface. Mixed-use and Transit Oriented Development (TOD) overlay zones, and other specialized zoning have been used to enhance the development/street interface and are very compatible with Complete Street concept plans. Design guidelines may also be used in conjunction with conventional zoning codes.

Form-Based Codes

Form-Based Codes (FBC) are a specialized type of zoning that emphasizes building types and their relationship to the street rather than land use and density. Permitted uses are specified, but densities typically are not. Mixed-use is encouraged. The greater control over the appearance of buildings and the ability to establish a consistent street wall makes FBCs an ideal choice for main street applications and to compliment Complete Street corridor transformations. The Cities of Miami[94] and El Paso[95] have recently adopted comprehensive FBCs to ensure more effective planning decisions and better design, including Complete Streets. (Southern California examples are cited on page 41.)

FBCs may also be used in conjunction with Specific Plans. Because the regulations are highly prescriptive and implemented through ministerial permits, FBCs are not typically used with design guidelines. They also require more effort to develop which can limit their application to relatively few areas within a city. **Hybrid Form Based Codes** are essentially zoning codes which have areas of both form based zoning and conventional zoning. This is the most likely application scenario for form-based codes in cities with limited resources or a low tolerance for political risk.

Other Implementing Ordinances

Ordinances such as the subdivision ordinance or public works codes are also used by jurisdictions to govern the uses and development standards of the built environment within a City/County that affect the design of streets. The Street Design Guidelines are generally included within this regulatory category.

Design Manuals

Design Manuals may be developed for certain areas, i.e., a particular corridor, or may apply city-wide. Complete Streets principles can be incorporated in design manuals pertaining to street design, streetscape/frontage/landscape requirements, or bicycle or pedestrian facilities.

Case Study: National City

National City is one of the San Diego region's often over-looked and under-estimated cities located immediately south of Downtown San Diego along San Diego Bay. It has long been a low-income, ethnically diverse, and heavily industrialized pocket within the region. In January 2012, the City completed a comprehensive planning process,[96] from setting an ambitious vision, to creating policy and developing zoning regulations, to the programming components including a General Plan update, Climate Action Plan, specific plans, and Capital Improvement Program implementation. Through this effort the City focused on becoming a model for sustainability, smart growth and equity – and to complete its streets in the process. Key aspects of the program are:

- Integration of sustainability, health and environmental justice considerations throughout the planning process.
- Plans for construction of over 6,000 units of high-density housing in close proximity to two light rail transit stations.
- Designation of Complete Street community corridors throughout the City.
- Conversion of 10 unneeded street blocks into pocket parks dispersed throughout the city.
- Restoration of three miles of Paradise Creek, and construction of a creekside trail.
- Development of neighborhood gardens and local farmers' markets to emphasize healthy food in all of the city's neighborhoods.
- Amortization of industrial uses within residential neighborhoods, and new standards for industrial hygiene to enhance resident health.
- Coordination of these efforts with SANDAG's regional planning efforts under SB 375 to expedite processing future transit-priority projects.

Conclusions

1. Complete Streets implementation can be made easier by adopting newly emerging planning tools: more effective multi-departmental planning processes, "living street" design guidelines, and a Complete Streets project checklist.
2. Although new planning processes are proving invaluable to implement Complete Streets, the standard planning toolbox, from general plans to zoning and design guidelines, should also be employed.
3. Newer street design manuals are becoming increasingly available to redesign streets to meet the needs of all users while meeting AASHTO and other conventional guidelines. "It's not in the manual" can now be replaced with "We really need to update our manual."
4. Cities leading the way to Complete Streets have found that Five-Year Transportation Action Plans are an essential tool to maintain progress implementing a long-term transportation vision.
5. Public involvement which includes all stakeholders in street design decisions is a cornerstone of the Context Sensitive Solutions approach championed by FHWA, AASHTO, and Caltrans, and helps ensure design decisions consider the needs of diverse community members.

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MEASURING PROGRESS

Purpose of Performance Measures

While the General Plan and other long-range plans may include transportation goals, these documents are easily forgotten when it comes to executing a particular project, responding to a constituent issue, or creating the annual capital improvement budget. Performance measures are an important tool for pairing good planning intentions with the everyday work of providing transportation facilities and services.

Annual Performance Reports

Performance measures should reflect the jurisdiction's long-term goals for Complete Streets and other transportation priorities. However, they are useful only to the extent they are carefully tracked and distributed among departments, to the public, and to elected officials to ensure progress. Noteworthy examples include:

- New York City's Sustainable Streets Progress Report[97] and the Citywide Performance Reporting System[98]
- Redmond, Washington's Annual Mobility Report Card[99]
- Charlotte's Transportation Action Plan Annual Report[100]

Recommended Performance Measures

Performance measures discussed in this section are recommended for tracking progress toward meeting Complete Streets goals, for both a single project and at the community or network level. The metrics chosen should be meaningful to professionals, citizens, and elected officials so that all can be conversant in assessing how well community objectives are being met. Elected leaders also find annual progress reports to be useful in communicating with constituents, creating the annual city budget, establishing departmental priorities, and holding staff accountable.

Goals and performance measures are suggested below in the following areas:

- Economic Development
- Mode Shares
- Crashes
- Public Perception
- Pedestrian Facilities
- Bike Facilities
- Safety
- Environment

Project Measures – Before and After Construction

At the project-level, performance measures help focus the design of a project to meet transportation policy goals and ensure the needs of all users are met, or are at least balanced to the extent possible. Since project designers cannot possibly anticipate the needs of all users of a street, community stakeholders should be involved in establishing project-level performance measures for all significant projects. The following measures are recommended for Complete Street projects in both the before and after conditions:

- Average vehicle speed and volume
- Number of crashes and injuries involving pedestrians, bicyclists, and vehicles
- Pedestrian counts at representative locations
- Bicycle counts at representative locations
- Percentage of people surveyed who feel safe using non-motorized modes
- Noise level at the sidewalk edge
- Total sales tax collections for affected street segments
- On-street parking use

Community or Network Measures

Performance measures at the community or network level should reflect policy goals from the General Plan, Circulation Element, Pedestrian or Bicycle Plan, or other publicly-vetted policy document. It is important to recognize that goals are value-based. For example, vehicle Level of Service standards favor vehicle through-put over all other considerations. The community may or may not share this value. In fact, surveys consistently suggest most do not. For this reason, the public and any especially affected stakeholders should be involved in establishing transportation goals, and then in crafting performance measures that will quantify progress toward meeting them.

The following should be considered for performance measures for the community or circulation network as a whole:

Economic Development

- Total sales tax collections
- Sales tax collections for key businesses or market segments such as "locally-owned"
- Mode share of Home-to-shop and Work-to-shop trips
- Percent of businesses easily accessible on foot or by bike

Travel Mode

- Pedestrian trips (representative sample taken at the same locations over a number of years)
- Bicycle trips

- Transit trips
- Vehicle trips

Crashes

- Pedestrian injuries per pedestrian trip
- Pedestrian fatalities per pedestrian trip
- Bicyclist injuries per bicycle trip
- Bicyclist fatalities per bicycle trip
- Motor vehicle occupant injuries
- Motor vehicle occupant fatalities
- Property damage
- Number of hotspot locations (crash clusters)
- Percent reduction in crashes (pedestrian, bike, and/or vehicle) at top-15 crash locations

Public Perception

- Percent of people surveyed who feel safe using non-motorized modes on arterial streets
- Percent of parents who feel comfortable allowing their children to walk or bike to school or to use city streets on the weekend, unaccompanied by an adult

Pedestrian Facilities

- Percent of sidewalk mileage in good condition
- Percent of signalized intersections with marked crosswalks
- Percent of signalized intersections with one or more of the following: countdown signals, leading pedestrian intervals, bulb-outs, or pedestrian refuge islands
- Percent of uncontrolled crosswalks that are marked consistent with federal guidelines
- Percent of unsignalized 4-way (multilane) intersections along urban arterials with marked crosswalks and one or more of the following: High Intensity Activated Walk (HAWK) signal, yield to pedestrian signage, user-activated overhead warning lights, pavement flashers, rapid flash beacons, or equally effective treatment
- Percent of required curb ramps installed

Bike Facilities

- Percent of urban arterial mileage with dedicated bike lane/trail
- Percent of intersections with one or more of the following bicycle improvements: bike box, painted bicycle lane through the intersection, bicycle signal, functioning bicycle loop detectors, bicycle left turn lane

Safety

- Percent of urban arterials on which the 85th percentile driving speed is no greater than 25 mph
- Miles of lane reductions (road diets)
- Number of driveway cuts per mile on urban arterials

Environment

- Percent of urban arterial mileage designed to reduce environmental impacts through "green street" principles.

Conclusions

1. The use of performance measures is important in tracking progress implementing Complete Streets and other long-term transportation goals. The chosen measures should reflect the general plan or other important policy documents.
2. Performance measures are meaningful only to the extent they are compiled in an annual report and distributed to city departments, to elected officials, and to the public. Annual progress reports are an excellent tool utilized by cities leading the way on Complete Streets implementation.
3. Performance measures should be established at the community level, and for particular projects. Community stakeholders should be involved in establishing performance measures, particularly at the project level.
4. Project-level performance measures may be a small subset of the community-level measures, but should meaningfully reflect project objectives, chosen with the input from the community.

8

COMPLETE STREET TREATMENTS

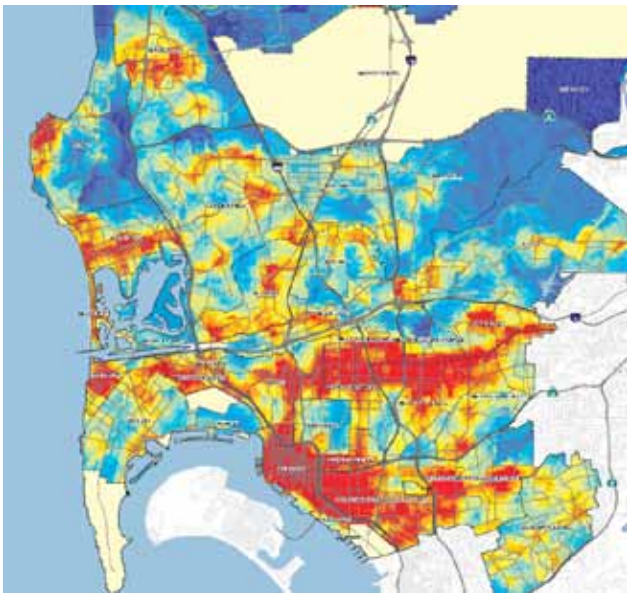
Once a jurisdiction embarks on the Complete Street approach, it must answer the questions of "Where?" and "What?" Although these questions are beyond the scope of this report, this chapter provides some hints on where to start.

Selecting Streets for Complete Street Treatments

Complete Street treatments are available for every imaginable street and situation. Once staff or interested stakeholders begin looking around, candidate streets pop up almost immediately. Some are high cost and require substantial planning; others, such as retiming a signal's pedestrian phase to accommodate slower walkers, can be implemented this afternoon. But where is the largest bang for the buck? There are a few ways to make these decisions.

Pedestrian Demand Models

Pedestrians are considered the "indicator species" of a livable community, which makes walkability investments a good place to start when considering Complete Street priorities. In recent years, pedestrian master plans prepared for many of the region's cities have included a GIS-based model which identifies the most promising areas for investment in traffic calming and pedestrian facilities. The model considers generators such as residences, attractors such as schools and shopping, and detractors such as injury crashes or posted speeds over 30 mph. A "composite model" combines these factors into a single pedestrian demand map. This methodology has the benefit of providing objective logic to the process of choosing areas for treatments, and helps steer the selection process away from the political process. To put it bluntly, it becomes harder to argue that places where fatalities are occurring should not receive the highest priority.



Composite Pedestrian Demand Model
City of San Diego Pedestrian Master Plan[101]

SANDAG's Healthy Communities Atlas

An important product of the Healthy Works work program undertaken by SANDAG and the County Health Department (Chapter 3) is a complete inventory of the region's sidewalks, and layering of GIS health data with neighborhood variables. Using these data, SANDAG has issued a "Healthy Communities Atlas" that maps many environmental and social determinants of health (proximity to parks, violent crime, income, traffic density, etc.). The GIS data behind those maps are available to help local agencies identify and address neighborhoods where improvements would be most likely to improve health and livability. No other US region has this mapping capability. Interested jurisdictions should contact SANDAG about using this tool.

Smart Growth Opportunity Areas

Another resource for identifying best Complete Street opportunities is SANDAG's Smart Growth Opportunity Areas (SGOA) map.[102] The map includes both existing and planned areas of denser, mixed use, walkable areas designated by each jurisdiction that is, will be, or could be served by public transit. Both major and minor streets in smart growth areas need to be carefully designed to serve all modes if the transit, walking, and biking in those areas is to be viable. The advantage of choosing streets from the SGOA map is that each jurisdiction has already spent considerable resources identifying these areas, hopefully in conjunction with residents and other stakeholders.

Regional Bike Plan Routes

Another excellent resource for considering Complete Street treatments is the 2012 Regional Bicycle Plan,[103] especially where planned bike facilities overlap with Smart Growth Opportunity Areas, transit stations, schools, beach access areas, and similar priority areas.

How Big Is the Regional Opportunity?

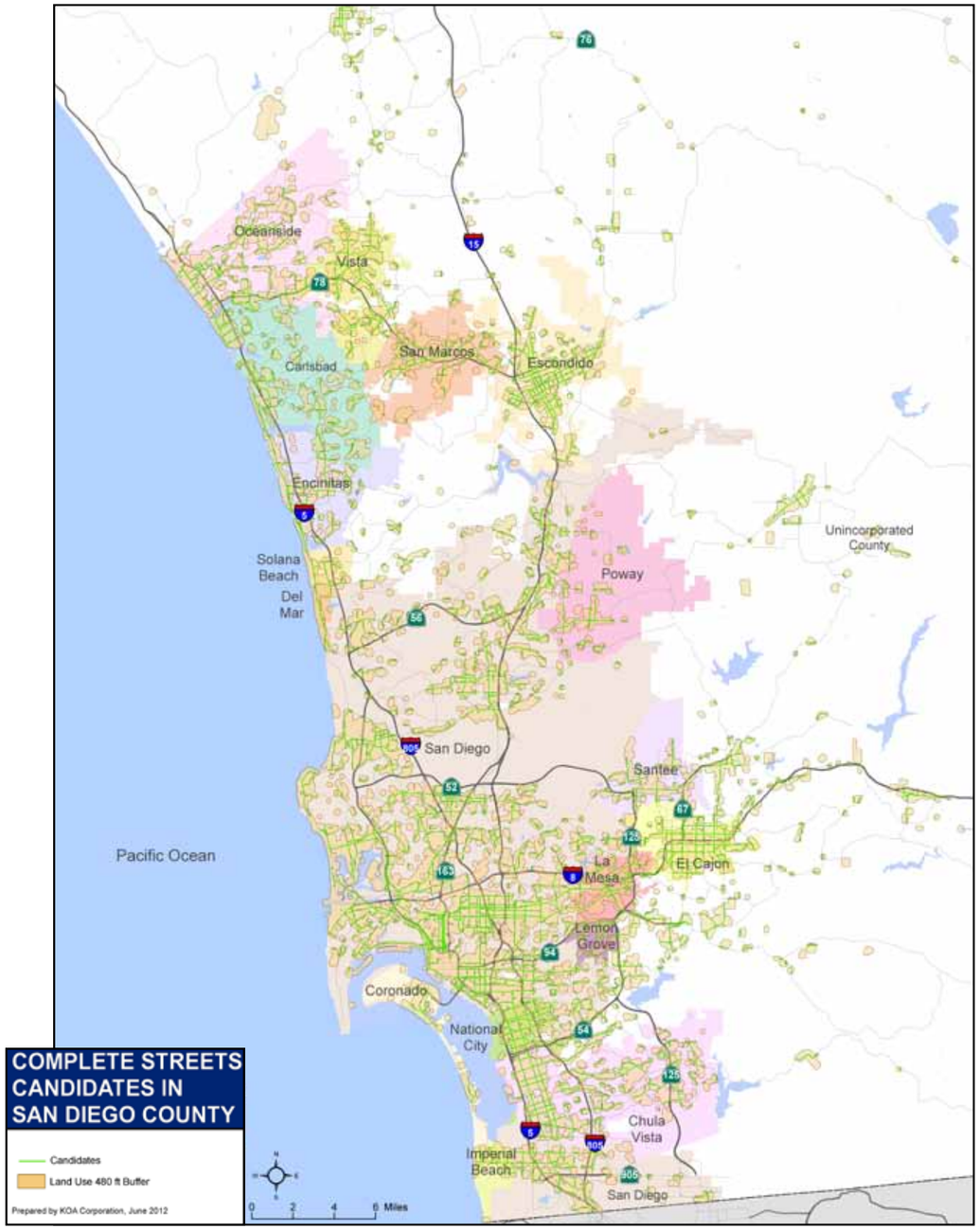
Using the SanGIS regional database, the Complete Streets Task Force sought to identify segments of existing non-residential roads throughout the region that may be good candidates for Complete Streets treatment. The database was queried for segments with relatively dense land use clusters within walking proximity of transit stops and nearby destinations such as shopping, parks, and schools. This gross-level query identified 1,029 miles of non-residential street segments worthy of consideration as high-priority candidates. Of this total, 292 miles fall within Smart Growth Opportunity Areas; around half of this total (158 miles) fall within the City of San Diego (Table 8-1). This query represents only one way to cut the data, but it provides a sense of the opportunity for applying Complete Street treatments throughout the region.

Potential Treatments

This descriptive section and the photo gallery in the next section hint at ways to apply Complete Street improvements to various types of roadways.

Table 8-1. Complete Street Opportunities within SANDAG Smart Growth Areas

Jurisdiction	Light Collector	Rural Collector	Major Road	Rural Light Collector	Prime Arterial	Collector	Two Lane Major	Local Street	Six Lane Major	Total Miles	Percentage of Total
San Diego	12.0	-	82.7	0.1	1.0	47.3	6.2	3.8	5.4	**158.4**	**54%**
San Diego County	1.9	0.4	4.8	1.6	7.1	2.5	2.9	0.0	-	**21.2**	**7%**
Escondido	3.2	-	0.4	-	7.7	6.0	0.3	-	-	**17.5**	**6%**
National City	1.4	-	10.6	-	-	2.3	0.1	-	0.1	**14.5**	**5%**
La Mesa	1.0	-	8.4	-	2.1	2.1	0.4	0.1	0.2	**14.3**	**5%**
Chula Vista	-	-	4.7	-	1.4	3.0	-	0.8	0.4	**10.3**	**4%**
Oceanside	2.2	-	2.5	-	2.4	1.4	0.2	0.0	0.6	**9.4**	**3%**
Vista	0.4	-	2.4	-	4.7	1.5	0.1	-	0.1	**9.2**	**3%**
San Marcos	0.1	-	0.7	-	5.3	1.1	-	-	0.2	**7.4**	**3%**
El Cajon	0.9	-	2.9	-	0.4	1.7	0.2	-	0.1	**6.4**	**2%**
Imperial Beach	1.5	-	1.1	-	0.3	1.5	0.1	-	-	**4.6**	**2%**
Santee	-	-	1.0	-	1.0	1.9	-	-	-	**3.9**	**1%**
Encinitas	0.4	-	-	-	2.2	0.7	-	-	0.1	**3.5**	**1%**
Coronado	0.4	-	1.8	-	0.6	0.3	-	-	-	**3.0**	**1%**
Carlsbad	0.5	-	0.8	-	1.1	0.6	0.1	-	-	**3.0**	**1%**
Lemon Grove	0.2	-	2.0	-	-	0.7	-	-	0.1	**3.0**	**1%**
Poway	-	-	0.3	-	0.7	0.3	-	-	-	**1.4**	**0%**
Solana Beach	-	-	-	-	0.9	-	-	-	-	**0.9**	**0%**
Del Mar	0.0	-	-	-	0.5	-	-	-	-	**0.6**	**0%**
Total	**26.1**	**0.4**	**127.0**	**1.7**	**39.5**	**75.0**	**10.5**	**4.7**	**7.2**	**292.1**	**100%**
Percentage of Total	**9%**	**0%**	**43%**	**1%**	**14%**	**26%**	**4%**	**2%**	**2%**	**100%**	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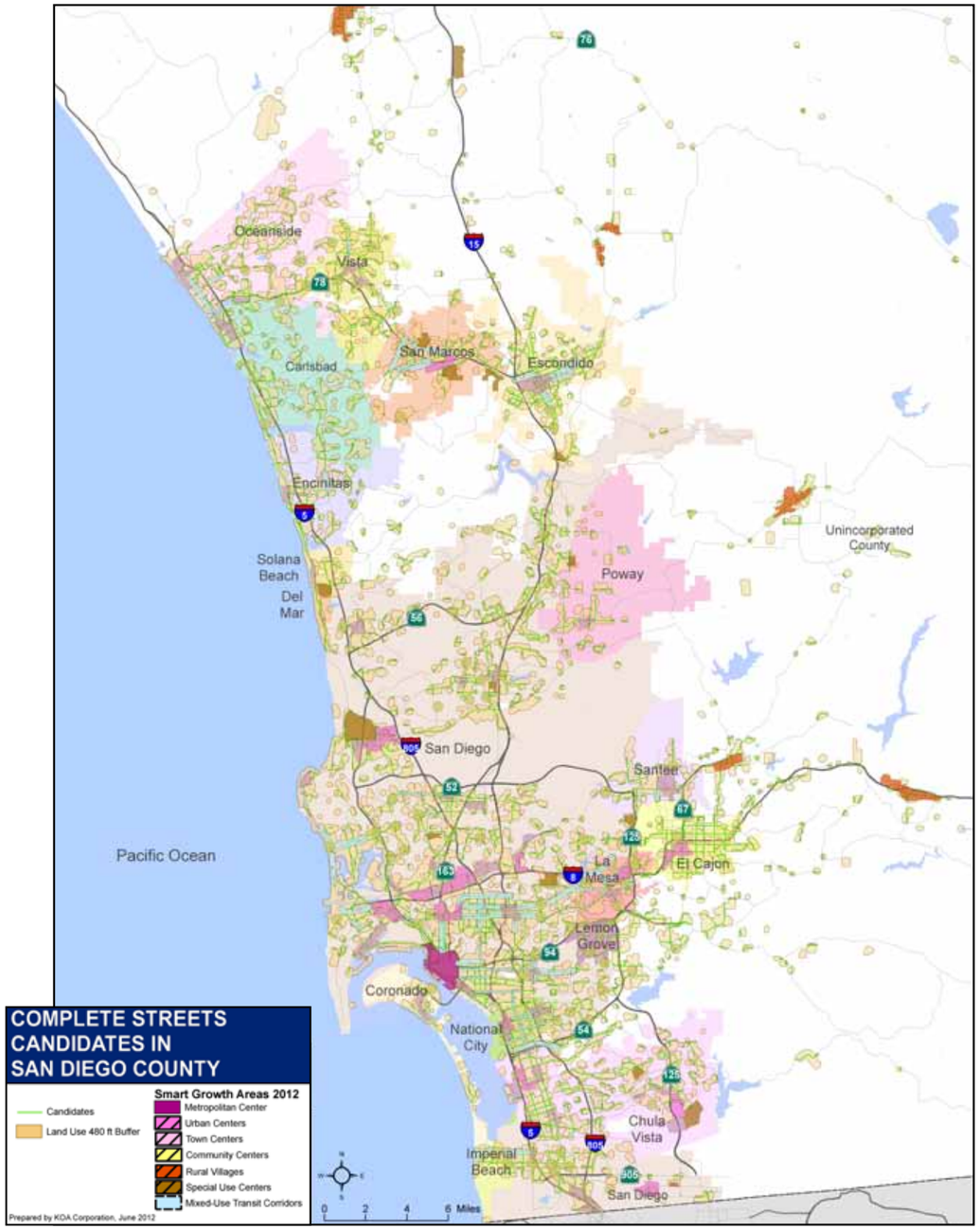
Poway
Unincorporated County
San Diego
Santee
El Cajon
La Mesa
Lemon Grove
Coronado
National City
Chula Vista
Imperial Beach
Pacific Ocean
COMPLETE STREETS CANDIDATES IN SAN DIEGO COUNTY
Candidates
Land Use 480 ft Buffer
Prepared by KOA Corporation, June 2012
0 2 4 6 Miles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National City
Chula Vista
Imperial Beach
Pacific Ocean
COMPLETE STREETS CANDIDATES IN SAN DIEGO COUNTY
Candidates
Land Use 480 ft Buffer
Smart Growth Areas 2012
Metropolitan Center
Urban Centers
Town Centers
Community Centers
Rural Villages
Special Use Centers
Mixed-Use Transit Corridors
Prepared by KOA Corporation, June 2012
0 2 4 6 Miles

Arterials (45 mph+)

Most of the region's major arterials are part of the Regional Arterial Network System. Although they serve high volumes of traffic and serve important transit routes, most lack basic amenities to not just accommodate but attract pedestrians, bicyclists (other than "strong and fearless" cyclists), and transit riders. Examples include Palm Avenue (Imperial Beach), H Street (Chula Vista), El Cajon Boulevard and Clairemont Mesa Boulevard (San Diego), and El Camino Real (North County).

Because of prevailing speeds and volumes, major arterial roads have high crash rates, high ambient noise levels, and act as community barriers. Initially, Complete Street treatments on these facilities make the most sense where transit routes, regional bike facilities, and dense adjacent land uses coincide.

Lower Classification Arterials (25-45mph)

These community-serving roads suffer from some of the same constraints and challenges for non-drivers as major arterials, but also present some of the most promising Complete Street opportunities. Examples include University Avenue and Clairemont Drive (San Diego), Grand Avenue (Escondido), and much of the Coast Highway in North County.

Neighborhood Collectors

These roads are often lined with homes but serve an entire neighborhood or a particular group of residential streets. Examples include Texas Street (San Diego), Moss Street (Chula Vista), and Borden Road (San Marcos). Traffic calming, and bicycle and pedestrian facilities can attract more bicyclists and pedestrians to these streets. Since daily traffic volumes usually do not exceed 10,000, 4-lane collectors can successfully be restriped to two or three lane configurations while adding bike lanes.

Residential Streets

Residential street opportunities are very case-specific, based on prevailing speeds and neighborhood character. Even without sidewalks, many residential areas are considered walkable and bike-friendly by local residents because their narrow or curving design discourages fast vehicle speeds. A good test of whether a residential street is "complete" is whether parents allow their children to travel the street or to play in it during traffic lulls. If not, parking arrangements, traffic calming treatments, sidepaths, or other treatments can help.

Gallery of Complete Street Treatments

Multi-way Boulevard Design

This treatment applies to prime arterials of six or more lanes. It uses three medians to reduce pedestrian crossing distances, reduce speeds and crashes, and create a local access lane for busses, parking, bicyclists, and right-turning vehicles.



Octavia Boulevard., San Francisco
Photo: Steve Boland, Nelson/Nygaard Consulting Associates



Planned multi-way boulevard conversion, Palm Avenue, Imperial Beach
Courtesy of SANDAG)

Supportive Land Uses

Adopt new or overlay zoning, form based code, and/or design guidelines to bring development to the sidewalk, create façade transparency (not blank walls), add landscaping, pedestrian amenities, bike parking, bus shelters, etc.



La Mesa Mixed-Use Strategic Plan
Courtesy of City of La Mesa

Street Conversion ("Road Diet")



North Coast Highway 101 Streetscape Project
Courtesy of City of Encinitas



University Avenue Mobility Plan
Courtesy of City of San Diego and KTU+A

Convert one or more travel lanes to provide room for buffered/colored bike lanes, wider sidewalks, bioswale gardens, street trees, etc.

Intersection Treatments

Pork chop islands, median refuge islands, pedestrian signal enhancements, cyclist call buttons, bicycle conflict area markings,



Pork chop island, Olympia Washington
Photo: Dan Burden via PedBikeImages.org



Multiple intersection treatments, Branford, CT
Photo: Tom Harned via PedBikeImages

etc. The publication, *Intersection Treatments That Benefit Pedestrians*[104] (America Walks/Fehr and Peers) recommends many possible treatments.

Buffered Bike Lanes



Buffered bike lane, Seattle
Photo: Seattle DOT



9th Avenue cycle track, parking lane, and crosswalk, New York City
Photo: Jacob-uptown via Flickr

To be "complete," arterial bicycle facilities must be sufficiently protected to attract the 60% of riders falling in the category



Crosswalk and Pedestrian Refuge, San Diego
Photo: Andy Hamilton



High Intensity Activated Crosswalk Signal, Tucson, AZ
Photo: Mike Cynecki

of "Interested but Concerned" Riders (Chapter 1).



Portland Bike Corral
Photo: Heather Bowden via PedBikeImages



San Francisco Parklet
Photo: Jeremy A. Shaw via Flickr

Enhanced Crosswalks

Parking Space Conversions



Chicane, Fousatt Road, Oceanside
Photo: Andy Hamilton



Traffic circle, Louisiana Street, San Diego
Photo: Andy Hamilton



Raised crosswalk, Cedros Avenue, Solana Beach
Photo: Dan Gallagher



Curb extension and asphalt sidewalk, Del Mar
Photo: Andy Hamilton

Traffic Calming Treatments



Portland "intersection repair"
Photo: Donkeycart via Flickr



Portland "Intersection Repair"
Photo: City Repair via Flickr

These apply primarily to two-lane roads.



Texas Street Multi-Use Path under construction
Photo: Andy Hamilton



Cherokee Street, San Diego
Photo: Greg Konar

Public Art Traffic Calming



Wall Street, Asheville, NC
Photo: Dan Burden via PedBikeImages

New Pedestrian and Bicycle Facilities

Shared Streets or Pedestrian-Only Streets

Conclusions

1. Tools for selecting street segments for Complete Street treatments include the following:
   - » Pedestrian Composite GIS Model
   - » SANDAG's Healthy Communities Atlas
   - » SANDAG's Smart Growth Opportunities Areas, submitted by each jurisdiction
   - » Regional Bike Plan routes
2. The Complete Streets Task Force estimates that, across the region, there are 1092 miles of street segments that may be good candidates for treatments. Of that total, 292 miles are in existing or planned Smart Growth Opportunity Areas.
3. Potential treatments exist for high-speed arterials, lower classification arterials, and neighborhood collectors, as well as residential streets.
4. Some promising approaches are Multi-way Boulevards, road diets, traffic calming devices, various intersection treatments, buffered bike lanes, enhanced crosswalks, conversion of a small number of parking spaces to seating or bike corrals, new bicycle or pedestrian facilities, and "shared streets."

OVERCOMING BARRIERS TO IMPLEMENTATION

While Complete Streets goals and policies are finding their way into the plans and ordinances of many cities, strategies for systematic and widespread implementation are still evolving. An important first step in developing such strategies is identifying the barriers that are impeding progress.

State-Wide Survey

A 2011 survey of California cities conducted by the UC Davis Department of Civil and Environmental Engineering[105] found that although many cities are exploring strategies that better integrate all modes into traditionally designed streets, more than half (57%) had not adopted a Complete Streets or context sensitive design approach. Further, the implementation of individual features typically associated with Complete Streets (such as enhanced landscaping, narrow lane widths, mid-block crossings, traffic circles, road diets etc.) varies widely.

Most cities have employed at least some Complete Street techniques ranging from planting trees (61% of reporting cities) to improving bicycle facilities (36%) to the use of road diets (15%). Yet the use of these techniques unguided by adopted policy or context does not necessarily achieve "Complete Streets."

In the same study, when cities were asked to identify key constraints to implementing Complete Streets and context sensitive design, the two most common responses were: 1) lack of financial resources (40%) and 2) unable to dedicate staff time to implement (32%).

Region-Wide Interviews

In conjunction with WalkSanDiego's report, *Safe for All: 2011 Street Design Benchmark Study for the San Diego Region,*[106] interviews were conducted with key staff from each city in the region to identify best street design practices and common barriers to context-sensitive Complete Street implementation, as follows:

Inadequate Funding for Roadway Retrofit Projects

Every city reported that the list of street retrofit projects, including bike and pedestrian projects identified in bicycle and pedestrian master plans, far exceeds available funding. All jurisdictions rely heavily on Transnet funding and actively seek other available sources. Nevertheless, local street maintenance sources do exist. Routine maintenance projects are an opportunity to restripe a street to accommodate more modes. Without sufficient funding the pace of more comprehensive Complete Street solutions is slow, projects are limited in scope, and political considerations often override plan priorities.

Several jurisdictions have planned or implemented Complete Street pilot projects and have produced some exemplary general plan circulation elements and bicycle and pedestrian master plans strongly supporting Complete Streets. However, staffing levels are dependent upon dwindling funding, and jurisdictions are unable to dedicate sufficient staff time towards rapid Complete Street implementation. Still, there appears to be untapped potential to harness ongoing street construction and maintenance projects as Complete Street projects. The goal should be to systematically implement an interconnected system of context sensitive Complete Streets in the San Diego region.

As noted previously, in the 2050 RTP, SANDAG increased the regional Active Transportation Program allocation from less than half of 1% in the previous RTP to 3% of the total transportation budget. This amounts to $3.8 billion dollars, and includes an Early Action Program (before 2013). It also includes a commitment to adopt a regional Complete Streets policy for the region.

Inconsistent City Council Direction

City councils within the San Diego region are showing increased interest in Complete Streets. This interest has mainly focused on traditional "main street" corridor projects identified in recently adopted general plans and revitalization/traffic calming projects initiated by business improvement districts or neighborhood groups. The cities of San Diego, Chula Vista, La Mesa, and Encinitas, in particular, have made significant progress. However, according to city staff, inconsistent city council direction is still a major barrier to widespread Complete Street implementation. It should be noted that, as one respondent stated, there has not yet been a concerted effort to "sell" the Complete Streets concept to city councils, and reinforce it with regular updates.

Because Complete Streets require a significant departure from the traditional approach to street design, staff may be hesitant to recommend new methods. Merely studying innovative techniques may be politically safe, but proposed projects can easily be shot down unless staff has assurances that the city council fully embraces a Complete Streets approach.

Context sensitive designs require more leadership from elected officials and more collaboration between traffic engineers, land planners, and specialized staff than ever before. Such collaboration demands a reorganization of current decision processes, the institution of new performance measures, and in some cases a rebalancing of Level of Service analysis, among other changes. Only the mayor or city council can provide the direction needed to overcome institutional barriers between city departments.

As discussed below, some neighborhood opposition to Complete Streets projects is inevitable, at least initially. Such opposition can easily compromise or derail good projects unless council members have a strong vision of what they wish to accomplish.

The good news for local leaders is that public acceptance of multi-modal streets is likely to be very strong once any initial skepticism is overcome. Cities that have taken the plunge toward a more balanced street system have discovered a pent up demand for walking and bicycling opportunities. The response of residents and businesses has been overwhelmingly positive and demand appears to be growing.



Photo: Steven Kyle via stevenkyleweller.com

An attractive characteristic of Complete Street programs is that the community benefits are immediate and tangible. Politicians who campaign on a Complete Streets platform and deliver on their promises are likely to benefit at the polls. It is worth noting that Complete Streets concepts have the potential to be implemented rapidly--within a four-year election cycle. This potential has been amply demonstrated in cities outside the San Diego region, including Long Beach, New York City, Charlotte, Seattle, and many others.

Uncoordinated Transportation Implementation

Most local cities rely on the general plan circulation element for transportation policy guidance, and bicycle and pedestrian plans for more detailed policies and objectives related to active transportation. Bicycle and pedestrian plans do an excellent job of identifying projects and establishing implementation priorities. But while logical and thorough, the implementing components are not well coordinated across other transportation plans, maintenance practices, or repaving schedules.

While recent plan updates encourage the implementation of Complete Streets, including the concept at the core of a multi-modal transportation system is largely missed. For the most part, existing plans lack measurable goals, commitments to action, schedules for implementation, or a publicly accessible report on progress.

Cities outside the San Diego region that have committed to Complete Street implementation often have overarching multi-modal transportation plans or street design guidelines that elevate the role of Complete Streets in the larger transportation picture.

Examples of plans organized around Complete Street concepts include the *Charlotte Urban Street Design Guidelines* (2007),[107] the *City of New York Sustainable Streets Strategic Plan* (2008),[108] the *Seattle Transportation Strategic Plan* (2005),[109] and the *City of Redmond, Transportation Master Plan* (2005).[110] In Seattle, one dedicated planner interviewed department heads from various disciplines and wrote a series of white papers on the anticipated barriers to implementing the city's Complete Streets plan. The white papers were the basis for inter-disciplinary meetings among various departments regarding necessary revisions to codes and policies.

Initial Public Opposition

San Diegans live in an automobile oriented culture and the concept of actually designing streets for slower traffic speeds may alarm city residents who depend on the automobile for most trips. Such concerns when expressed at public hearings also influence local politics. Traffic engineers and planners interviewed during the study often described how Complete Street projects were scaled back or innovative features were trimmed in response to resident concerns over potential impacts to vehicular traffic or parking.

In general, support for Complete Streets appears to be stronger in urban areas with higher densities and transit opportunities and weaker in suburban areas that are more dependent on the automobile. But concern over the possibility of increased congestion and traffic delay can be found everywhere.

To be effective, Complete Streets must deliver on the promise that while speeds may be lowered, travel times will not be substantially reduced, congestion will not increase, and overall street capacity will be enhanced considering all modes. (From Lancaster to New York, this has proven to be quite feasible, in part because most trips are flexible by nature – see Chapter 4.)

Complete Streets must benefit all users. A comprehensive street design program will allow Complete Streets to vary by context. A suburban parkway for example will have a different configuration and modal emphasis than a downtown main street.

As Complete Streets are implemented and the benefits realized, public acceptance is likely to follow. This appears to be the overwhelming experience, even in cities with auto-oriented land use patterns.[111]

Lagging Acceptance of Changing Professional Standards

Many traffic engineers interviewed, while understanding the potential for Complete Streets, expressed caution in utilizing techniques that are not required by city ordinances or sanctioned by official traffic engineering manuals such as those provided by ITE, AASHTO, Caltrans and the Federal Highway Administration.

In the UC Davis survey described previously, the Caltrans Highway Design Manual was frequently cited as an impediment to Complete Streets, even though the standards were intended for highways and not local streets. This finding was confirmed to some extent locally but more often traffic engineers cited concerns about deviating from locally adopted standards and policies, which were often derived from the HDM.

In 2012, Caltrans substantially revised the HDM to support Complete Streets. Nevertheless, caution persists even as the laws and professional street design standards change. Fortunately many California policy initiatives in the last few years support greater inclusion of Complete Streets approaches to urban planning, transportation facilities, and environmental review (Chapter 3). Additionally, Complete Street techniques have been publicly endorsed by all of the professional transportation engineering organizations and the state and federal transportation agencies. Concerning liability, risks are often overemphasized. Clearly documenting the decision process when exceptions to previous standards are made allows adequate legal protection.[112]

These changes in policy and professional standards have allowed for the implementation of Complete Street projects, at least on a pilot basis. Interestingly, while no one interpreted the existing standards as authorization to begin converting streets into Complete Streets, neither did they report that existing city standards prevented Complete Streets from being implemented.

Lack of Training in Complete Streets Concepts

Knowledge and enthusiasm for Complete Street concepts varies widely among local transportation engineering and planning staff. Many transportation engineers would welcome the opportunity to implement more Complete Street projects and are making an effort to educate themselves on the latest techniques. Others feel that the existing functional based system and emphasis on vehicular LOS is perfectly adequate. (We respectfully disagree.)

On the whole, interest is growing, but the other barriers need to be addressed before the transportation engineers and planners will be in a position to take ownership of the change process. Often, the response to a new concept, like multi-modal LOS, will be to adopt a "wait and see" position. It is easier to let other jurisdictions test the new CEQA guidelines, for example, than to risk a legal challenge over the adequacy of a traffic analysis.

Out-of-Sync Environmental Priorities

Several high profile corridor improvement projects such as the University Avenue Mobility Project and the Mid-City Rapid Bus Project will have been in planning, design and environmental review at least a decade before breaking ground. Much of the delay can be attributed to the extensive design and review to which these projects have been subjected.

By contrast, during a two year period, the City of New York completed over a dozen Complete Street projects, including several innovative cycle tracks, two operational BRT lines, and the conversion of Times Square into a pedestrian plaza. In 2008 alone the City added 90 miles of new bicycle lanes contributing to an unprecedented 35% single-year increase in bicycle commuting. All of this occurred in an exceedingly dense, highly constrained and fully "built-out" area.

Chapter 4 discusses various ways to minimize delays due to CEQA. In general, the best approach is to establish clear goals and policies in primary policy documents, and conduct environmental review of these documents.

Suboptimal Complete Street Implementation

While not an actual barrier, it is worth noting that some projects described as Complete Street projects fall short of their potential. This can happen, for example, if the multi-model system is not truly integrated, if corridors are missing key components, if bicycle lanes are not designed to meet the safety concerns of ordinary riders, if the available funding is used primarily to reduce vehicle congestion, or if design integrity is seriously compromised. A corner shaved here or there can render a carefully-designed element completely ineffective.

Without comprehensive transportation plans, funding for active transportation could easily be absorbed into the current process without producing the transformative result needed to increase pedestrian safety, enhance community livability, and improve access to public transit. Unless these goals are realized local public support for Complete Streets may not materialize and funding could eventually be curtailed.

Under-appreciation of the Multiple Benefits of Complete Streets

Another factor that did not show up in surveys, but which contributes to the lag in Complete Street implementation, is the lack of a mechanism for forecasting the potential economic, health, and quality of life benefits of Complete Street projects. This can be addressed in part by instituting Health Impact Assessments for individual projects, plans, or policies. This approach is being taken by some leading California cities including Richmond and Encinitas, and is being tested by SANDAG.

Conclusions

Surveys of municipal traffic engineering and planning staffs throughout California and in the San Diego reveal a consistent set of barriers to Complete Streets implementation. The barriers and their potential solutions are summarized in Table 9-1.

Table 9-1. Summary of Complete Street Barriers and Potential Solutions

Barriers to Complete Streets	Potential Solutions
Funding	• Local maintenance funds • TransNet local streets and roads allocation • SANDAG Active Transportation Grants • SANDAG Smart Growth Incentive Program • Mitigation for private developments
Inconsistent Council Direction	• Establish comprehensive Complete Streets program through General Plan policies or stand-alone policy (Chapter 3). • Provide regular education and updates to City Council • Institute an annual transportation "report card" for City Council
Initial Citizen Skepticism	• Demonstrate pent-up demand for more walking, biking, and transit through advisory committees, surveys, workshops, etc. • Emphasize safety and health benefits, and (if applicable) travel time benefits • Implement improvements incrementally • Lead with Safe Routes to School, main street revitalization, or other popular project
Acceptance by Engineering Department	• Keep abreast of state and federal policies and guidelines; seek buy-in from elected officials.
Need for Technical Training	• Attend trainings offered by SANDAG, ITE, WalkSanDiego, APA, Caltrans, and others. Include staff training line item in departmental budgets.
Environmental Review	• Chapter 5 lists several ways to minimize delays and costs related to CEQA review.
Suboptimal Implementation	• Create comprehensive plans and accountability processes for measuring progress • Evaluate key streets for opportunities to apply low-cost solutions, e.g. crosswalks, road diets, bicycle lanes.
Undervaluing Benefits of Complete Streets	• Utilize new analysis tools such as Health Impact Assessments

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SAN DIEGO SECTION OF THE AMERICAN PLANNING ASSOCIATION
and
WALKSANDIEGO

- COMPLETE STREETS TASK FORCE -

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WALK
SanDiego
Promoting walkable communities


AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

FAQs: Great Streets Adjustments - June 2017 - Present

Below, please find a series of Great Streets adjustments based on expressed concerns among community members. Additionally, please find space at the bottom of the sheet to address additional concerns you may have over the Great Streets pilot.

1. **Concern -** Lack of visibility for driver when turning across bike lane
    a. **Adjustment-** Re-designed the right turn lanes to allow drivers to see the people on bikes more clearly
2. **Concern -** Overflow from left turn lane causing backup on Venice Blvd
    a. **Adjustment -** Added a new double left turn lane on Centinela and Venice to allow more space for major movement and eliminating the turn queue from protruding into the first lane.
3. **Concern -** Extended wait times at light
    a. **Adjustment -** Adjusted signal timing on Venice Boulevard to improve and expedite traffic flow
4. **Concern -** Difficulty spotting the bike lanes on the road
    a. **Adjustment -** Highlighted potential conflict zones where cars cross the bike lane with reflective green paint visible during the day and at night
5. **Concern -** Lack of priority for emergency vehicles on Venice Boulevard
    a. **Adjustment -** Implementation of transponders at Fire Station #62 (#63 in process) in order to establish a priority signal at traffic lights for emergency vehicles to expedite their travel time.

Please use the space below to address additional concerns you may have:

_____

_____

_____

_____

_____

_____

Scan and email your response to: hannah.levien@lacity.org
Fax your response to: (310) 575-8305
Mail your response to: Hannah Levien, Mar Vista Field Deputy,
Council District 11 WLA Field Office, 1645 Corinth Ave., #201, Los Angeles, CA 90025

THE NATIONAL ACADEMIES PRESS OPENBOOK

Methodology to Predict the Safety Performance of Urban and Suburban Arterials (2008)

Chapter: Chapter 2. Safety Performance of Urban and Suburban Arterials

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Los Angeles cityscape
Source: Christian Arballo

LADOT

Transportation Impact Study Guidelines

December 2016

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For comments or questions regarding the transportation study review policies and practice of the City of Los Angeles, please contact:

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SECTION 1:

Overview of Process & Procedures

1.1 BACKGROUND

The City of Los Angeles Department of Transportation (LADOT) may require Applicants to analyze and evaluate Project-specific transportation impacts to comply with the California Environmental Quality Act (CEQA) and/or City regulations. This edition of the City of Los Angeles Transportation Impact Study (TIS) Guidelines replaces the Traffic Study Policies and Procedures, last updated in August 2014, to identify the criteria, guidelines, objectives, and standards to be used in the preparation of a TIS in the City of Los Angeles.

In 2013, when Governor Edmund G. Brown Jr. signed Senate Bill 743 into law, the Governor's Office of Planning and Research (OPR) was charged with developing new guidelines for evaluating transportation impacts under CEQA using methods that no longer focus on measuring automobile delay and level of service (LOS). Senate Bill 743 directs agencies to develop new guidelines that develop a transportation performance metric that can help promote: the reduction of greenhouse gas emissions, the development of multimodal networks, and a diversity of land uses. Thus, the City's TIS Guidelines are subject to revisions and updates upon the certification and adoption of OPR's recommended guidelines and criteria for determining transportation impacts by the Secretary of the California Natural Resources Agency. The City is in the process of updating its travel demand model and transportation impact thresholds based on vehicle miles traveled (VMT), so revision of these guidelines is imminent.

1.2 PURPOSE

At a time when safety, sustainability, smart growth, and the reduction of greenhouse gas emissions - in addition to traditional mobility considerations - are prime concerns for the City of Los Angeles, these TIS Guidelines support the City's goal of developing a safe, accessible, well-maintained, and well-connected multimodal transportation network for all Angelenos. The TIS Guidelines have been developed to identify Projects that may have transportation impacts, to provide step-by-step guidance for assessing transportation impacts and preparing Transportation Studies, and to ensure consistency in site access design, on-site circulation planning, and off-site improvements for proposed land use Development Projects.

Project Applicants and consultants shall follow the procedures and standards set forth in this document when preparing and submitting a TIS to ensure a timely review by LADOT. However, note that TIS requirements may differ in certain areas of the City where specific plans or similar ordinances establish distinct guidelines. LADOT strongly recommends that the Project applicant and/or consultants communicate with LADOT staff early in the design of the Project to ensure that traffic access, circulation and safety issues are addressed, and to establish the scope and basic assumptions of the TIS. Applicable fees for the various submittals and reviews described in these TIS Guidelines are listed in the Los Angeles Municipal Code (LAMC) Section 19.15 (Planning and Zoning Code) (see **Attachment A**).

1.3 INITIAL STEPS

Upon receipt of an application for discretionary action, LADOT will prepare an initial assessment of the Development Project to determine if a Technical Memorandum or a TIS is required. A Development Project is defined as any proposed land use project that changes the use within an existing structure, creates an addition to an existing structure, or new construction, which includes any occupied floor area. For transportation infrastructure Projects for which a transportation analysis is required (e.g. lane reconfiguration, roadway improvement, transit project, etc.), refer to ***Section 2.1B*** of these guidelines for recommended transportation analysis methods.

The general parameters for determining the appropriate transportation impact review process for a Development Project are as follows:

- A **Technical Memorandum** is required when the Development Project is likely to add 25 to 42 a.m. or p.m. peak hour vehicle trips, and the adjacent intersection(s) are presently estimated to be operating at LOS E or F. The scope of work of a Technical Memorandum, which is a significantly scaled-down version of a TIS, must be reviewed and approved by LADOT. If LADOT determines the preparation of a Technical Memorandum is required, the Project applicant or consultant should evaluate the potential impacts of the Development Project to intersections adjacent to the Project site at a minimum. The Technical Memorandum shall be prepared under the direction of, and signed by, a Professional Engineer, registered in the State of California to practice either Traffic or Civil Engineering.

- A **Transportation Impact Study (TIS)**, previously referred to as a Traffic Study, is required when the Development Project is likely to add 43 or more a.m. or p.m. peak hour vehicle trips. Transportation Studies aim to predict and analyze the circulation and congestion impacts generated by Development Projects and identify feasible mitigation measures to offset any impacts. The criteria, guidelines, objectives, and standards described herein shall be used by the public, private consultants, and City staff in the preparation and review of a TIS in Los Angeles. The preparation of a TIS must follow the guidelines, as described herein, and shall be prepared under the direction of, and signed by, a Professional Engineer, registered in the State of California to practice either Traffic or Civil Engineering. Further, the Consultant hired by a Project Applicant to complete the TIS must have a valid Los Angeles City Business Tax Registration Certificate.

1.4 PROCESS

Any Project Applicant or their designated representative (e.g. transportation consultant) required to prepare a Transportation Impact Study (TIS) for a Development Project, shall follow the steps summarized in Figure 1 and described here. Steps applicable to Project Applicants preparing a Technical Memorandum are identified below.

Step 1 Contact LADOT with a request to prepare a new Technical Memorandum or TIS. During this initial communication, the following information shall be provided:

I. Project Description – Provide a general description of the proposed Project size (defined by square footage per use and/or number of dwelling units), uses, and heights of proposed new buildings and other structures to be remodeled and/or removed. Include information on any sequence of phased construction and any unusual conditions. Specify a building address, legal description and project title.

For Projects that require the preparation of an EIR, the transportation analysis should include Project alternatives. For such Projects, the LADOT assessment letter will be limited to summarizing the findings and requirements for the preferred Project alternative or the alternative that generates the most peak period trips. Should the Project applicant request separate assessments for each alternative, then additional review fees may be required.

II. Proposed Study Assumptions and Content – The assumptions and content of the Technical Memorandum or TIS shall be presented in accordance with:

a. California Environmental Quality Act (CEQA) guidelines,

b. the Los Angeles County Congestion Management Program (CMP) (see ***Section 2.5*** for guidance),

c. any applicable Transportation Specific Plan (TSP) and

d. other applicable plans, laws, or ordinances (see ***Section 2*** for guidance).

III. Project Site Plan – Submit the proposed Project's site plan with driveway location(s), loading/unloading area, and parking scheme to help estimate the distribution of Project trips according to any necessary turn prohibitions at the proposed driveways. Projects should integrate existing alleys into the design of site access and circulation plans. Projects should avoid creating new driveways and consider reducing driveways on roadways within the High Injury Network or where protected bicycle lanes are planned. While existing alleys should be used primarily for vehicular access, loading, and service access, they can also serve as mid-block paseos for pedestrians and bicyclists.

Project site access, circulation, and parking plans should be compliant with the transportation and public accommodation provisions of the Americans with Disabilities Act (ADA). Development proposals that are not able to meet their parking-code requirements and cannot provide accessible parking on-site may be required to install accessible on-street parking space(s) with the complimentary ADA access ramp(s). Additionally, the design of driveways requires approval by LADOT and the Bureau of Engineering. Please refer to the LADOT "Driveway Design" Guidelines for additional information.

Generally, final LADOT recommendation of driveway location(s) and parking scheme will be conducted at LADOT's Citywide One-Stop Counter, the Valley Development Review Office, or West Los Angeles Development Review Office (see ***Section 5*** for contact information) as a clearance on the Project's building permit. Traffic flow considerations must be designed and incorporated early into the building and parking layout plans. In order to minimize and prevent last minute building design changes, Project applicants should contact LADOT for driveway width and internal circulation requirements before building or parking layout design.

Step 2 Consult with other affected agencies or adjacent jurisdictions (i.e., Caltrans, L.A. County Public Works, other cities, transit agencies, etc.) to ensure that all transportation-related concerns and issues that may result from the Project and may affect that agency are properly addressed in the TIS. If a TIS includes the evaluation of an intersection or intersections in a neighboring local jurisdiction, then the TIS standards and methodology and impact thresholds of that local jurisdiction should be used to assess a Project's impact on that intersection or intersections.

Step 3 Consult with the Bureau of Engineering and LADOT to determine any highway dedication and street improvement requirements, as well as requirements under the Americans with Disabilities Act (ADA) (see **Attachment C**). For streets that front the proposed Project, the Technical Memorandum or TIS should reference the Mobility Plan 2035 for street classifications, and for roadway and right-of-way standard dimensions.

Step 4 If the Project is expected to generate a significant number of regional trips, LADOT may require the TIS to use travel demand simulation modeling and predict potential regional Project impacts. The decision to require travel demand modeling shall be made by the Bureau Chief supervising the development review functions of LADOT. These studies will be subject to LADOT's model calibration and validation standards.

Step 5 Submit payment of necessary fees per LAMC Section 19.15 (see **Attachment A**). For a TIS, a scoping Memorandum of Understanding (MOU) must be executed (see **Attachment D**). The MOU describes the assumptions that shall be included in the TIS including study intersections, residential street segments and freeway

segments; freeway analysis screening filter; related projects; trip generation rates; ambient growth rate; trip distribution pattern and trip assignments; trip credits for existing active or previous land use; projected buildout year and study methodology.

Step 6 Collect traffic counts in accordance with standards and methods established in ***Section 3.3C*** and at LADOT's discretion.

Step 7 Inform LADOT on the progress made in completing the TIS. LADOT approval is required for any deviations from the assumptions described in the executed MOU or any other changes made in the analysis, before the final report is prepared.

Step 8 Submit the complete Technical Memorandum or TIS comprised of all components described in ***Section 3*** of these guidelines and payment for required fees to initiate LADOT's review. The consultant shall also submit proof of possessing a valid Los Angeles City Business Tax Certificate.

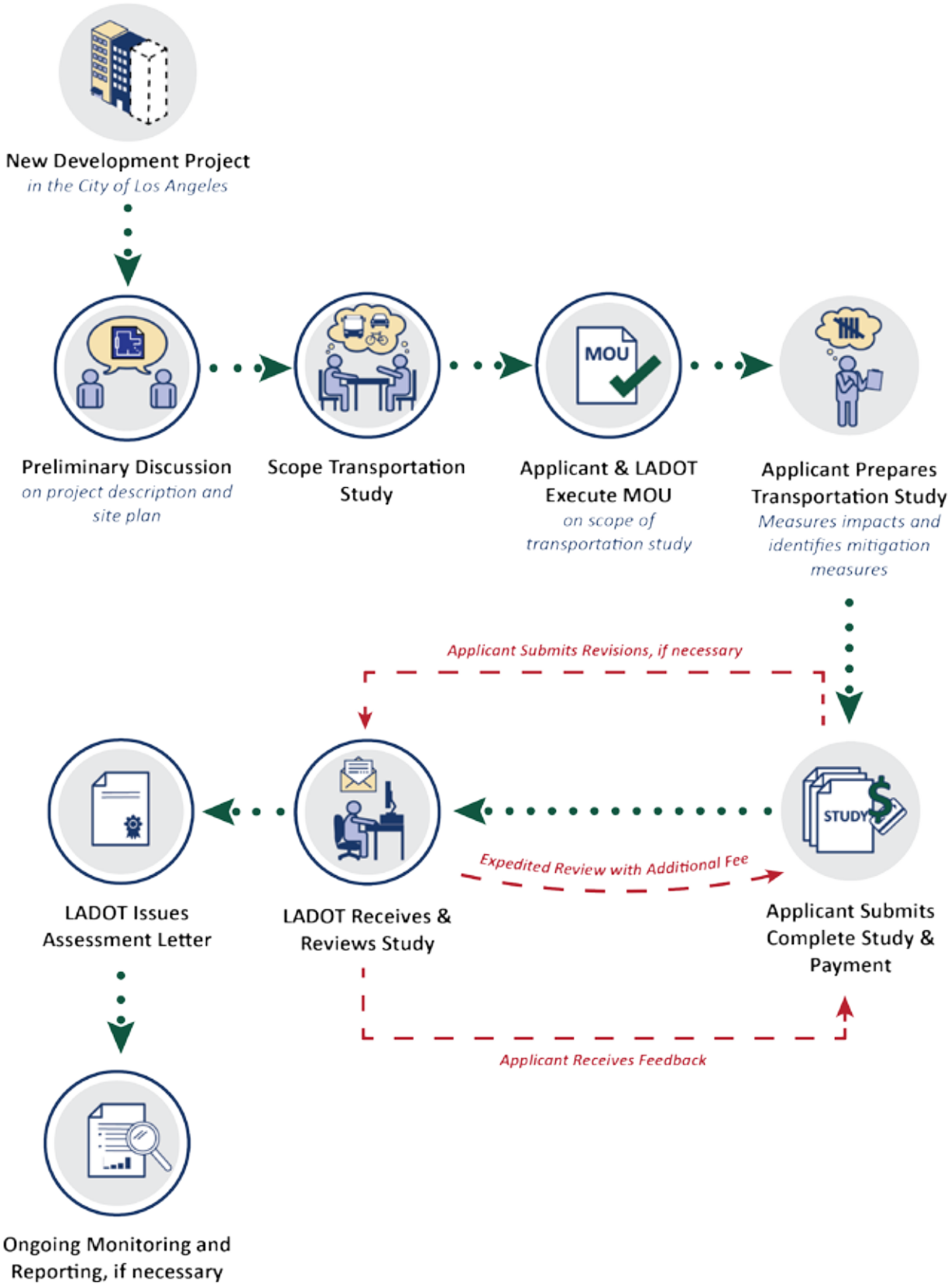
Step 9 After reviewing the submittal, LADOT will release a Project impact assessment report. LADOT will not release their Project impact assessment report until all necessary review fees are received and the complete and final electronic version of the Technical Memorandum or TIS in portable document format (PDF) has been submitted.

1.5 STUDY HIATUS AND INTERRUPTIONS

Occasionally, LADOT will review a TIS for a Project that is later modified. If LADOT determines that the description or scope of the Project has changed such that extensive and major revisions to the TIS are required, then LADOT shall consider the revised Project a new Project, which will require a new TIS and payment of the applicable review fees. If LADOT determines that revisions to the TIS can be accomplished without the preparation of a new TIS, then LADOT may require the preparation of a Technical Memorandum or supplemental analyses and payment of any necessary review fees.

Similarly, if, after LADOT has commented on a TIS, LADOT staff receives no further written communication from the Project Applicant or the Consultant on the status of the Project for one year or more, then LADOT will assume that the Project is no longer being pursued. To reinstate the Project after this time, a new TIS and traffic review fee will be required and the environmental processing "clock" shall start again.

Figure 1: Overall Review Process for Transportation Impact Study



SECTION 2:

Identifying Transportation Impacts

The City of Los Angeles's current policies and procedures for determining a Project's transportation impacts begins with an application for a discretionary action including, but not limited to, a master development plan, planned development, conditional use permit, variance, hillside development permit, design review, and/or a request to alter the assessor's map. This section describes different transportation analyses the City may require as part of a TIS to ensure the proposed Project is consistent with State environmental requirements and local policies.

2.1 LEVEL OF SERVICE (LOS) ANALYSIS

Currently, LADOT describes the performance of the City's transportation system using Level of Service (LOS). LOS is a performance measure that considers multiple roadway characteristics such as travel speed, travel time and flow interruptions and describes the quality of vehicular traffic flow. LOS ranges from "A" to "F" with LOS "A" representing excellent, free flow conditions and LOS "F" representing jammed, forced flow conditions. Table 1 provides a description of the different LOS measures and associated Volume/Capacity (V/C) ratios, which are measured on a scale of 0.000 to 1.000.

2.1A DEVELOPMENT PROJECTS

To assess the transportation impacts of proposed Development Projects, the Transportation Research Board, Circular 212 Critical Movement Analysis (CMA) Planning Method shall be used to analyze traffic operating conditions at study intersection(s). CMA is a method that determines the volume to capacity (V/C) ratio on a critical lane basis and the LOS associated with each V/C ratio at a signalized intersection. When determining which intersections should be included in the impact analysis for Development Projects, only signalized intersections should be selected.

Unsignalized intersections should be evaluated solely to determine the need for the installation of a traffic signal or other traffic control device(s), but will not be included in the impact analysis. When choosing which unsignalized intersections will be reviewed, intersections that are adjacent to the Project or that are expected to be integral to the Project's site access and circulation plan should be identified. For these intersections, the overall intersection delay should be measured pursuant to procedures accepted by LADOT during the scoping process. Based on the estimated delay, if the resultant LOS is E or F in the "Future with Project" scenario, then the intersection should be evaluated for the potential installation of a new traffic signal. The study shall include a traffic signal warrant analysis prepared pursuant to Section 353 of LADOT's Manual of Policies and Procedures and submitted to LADOT for review and approval.

2.1B INFRASTRUCTURE PROJECTS

To assess the transportation impacts of proposed transportation infrastructure Projects, including transit, rail, bicycle, and other roadway improvements, Transportation Studies should use the Highway Capacity Manual's (HCM) delay-based methodology for signalized intersections. In such cases, micro-simulation may also be necessary to fully understand the effects of the Project in terms of queue lengths, traffic signal timing parameters, transit travel times, etc. **Table 1** provides a description of the different LOS performance measures and associated delays in terms of "delay per vehicle."

Table 1: Level of Service Definitions for Signalized Intersections[1]

LEVEL OF SERVICE	VOLUME/ CAPACITY RATIO	DELAY PER VEHICLE (Sec/Vehicle)	DEFINITION
A	0.000 - 0.600	≤ 10	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	> 10 - 20	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 - 0.800	> 20 - 35	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 - 0.900	> 35 – 55	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 - 1.000	> 55 – 80	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than 1.000	> 80	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

2.2 SIGNIFICANT IMPACT THRESHOLDS

The thresholds contained herein determine a Development Project's expected level of impact on the transportation system and determine the need for mitigation. The "Final V/C Ratio" shall define the future V/C ratio at a study intersection considering impacts with Development Project, and ambient and related Project growth without proposed transportation impact mitigation. "Project-Related Increase in V/C" shall be calculated as the change in V/C between the future V/C ratio with Project, ambient and related project growth without proposed traffic mitigation, and the future V/C ratio with ambient and related project growth without Project and proposed traffic mitigation. A transportation impact at a signalized intersection shall be deemed "significant" in accordance with **Table 2**, except as otherwise specified in a TSP, ICO, or CMP.

Table 2: Significant Transportation Impact Thresholds for Development Projects

LEVEL OF SERVICE	FINAL V/C RATIO	PROJECT-RELATED INCREASE IN V/C
C	> 0.701 - 0.800	equal to or greater than 0.040
D	> 0.801 - 0.900	equal to or greater than 0.020
E	> 0.901-1.000	equal to or greater than 0.010
F	Greater than 1.000	equal to or greater than 0.010

1 Sources: Transportation Research Board, Interim Materials on Highway Capacity, Transportation Research Circular No. 212, January 1980; and Transportation Research Board, Highway Capacity Manual 2010.

For transportation impact analysis purposes, the "Final Delay" shall mean the future delay per vehicle at an intersection considering impacts with Project, ambient and related Project growth but without proposed traffic mitigation. "Project-Related Increase in Delay" shall mean the change in delay between the future delay with Project, ambient and related project growth without proposed traffic mitigation, and the future delay with ambient and related project growth without Project and proposed traffic mitigation. When using the HCM method for signalized intersections to assess transportation infrastructure Projects, a transportation impact shall be deemed "significant" in accordance with **Table 3**.

Table 3: Significant Transportation Impact Thresholds for Transportation Infrastructure Projects

LEVEL OF SERVICE	*FINAL V/C RATIO*	*PROJECT-RELATED INCREASE IN V/C*
C	> 20 - 35	equal to or greater than 6.0 seconds
D	> 35 – 55	equal to or greater than 4.0 seconds
E	> 55 – 80	equal to or greater than 2.5 seconds
F	> 80	equal to or greater than 2.5 seconds

2.3 RESIDENTIAL STREET IMPACT ANALYSIS

Commercial Development Projects may be required to conduct Residential Street Impact Analysis. The objective of the Residential Street Impact Analysis is to determine potential increases in average daily traffic associated with cut-through traffic that can result from a Project and impact residential streets. Cut-through trips are measured as vehicles that bypass a congested arterial street or intersection to instead travel along a residential street. To address these potential impacts, non-restrictive traffic calming measures should be considered and, if deemed warranted, implemented to off-set any anticipated impacts. Restrictive traffic calming measures should not be considered. See ***Section 4*** of these guidelines for a description of restrictive and non-restrictive traffic calming measures.

When selecting residential street segments for analysis during the traffic study scoping process, all of the following conditions must be present:

- the proposed project is a non-residential development and not a school,
- the arterial is sufficiently congested, such that motorists traveling on the arterial may opt to divert to a parallel route through a residential street; the congestion level of the arterial can be determined based on the estimated LOS under project conditions of the study intersection(s); LOS E and F are considered to represent congested conditions,
- the Project is projected to add a significant amount of traffic to the congested arterial that can potentially shift to an alternative route; Project traffic would need to exceed the daily minimum significance thresholds listed below under "Project-Related Increase in ADT," and
- the local residential street(s) provides motorists with a viable alternative route.

A local residential street shall be deemed significantly impacted based on an increase in the projected average daily traffic (ADT) volumes as shown in **Table 4**.

Table 4: Significant Residential Street Impact Thresholds

PROJECTED ADT WITH PROJECT (FINAL ADT)	*PROJECT-RELATED INCREASE IN ADT*
0 to 999	120 or more
1,000 to 1,999	12 percent or more of final ADT
2,000 or 2,999	10 percent or more of final ADT
3,000 or more	8 percent or more of final ADT

2.4 FUTURE PERFORMANCE MEASURES

The LOS measure calculated by the CMA and HCM methods, respectively, focuses on the performance of transportation facilities for vehicular travel. To help achieve the City's vision of developing a robust multimodal transportation network and encouraging sustainable modes of travel, LADOT is currently evaluating other performance measures that can better analyze Project impacts on non-vehicular modes of travel. Updating the measures LADOT uses to identify Project impacts can provide useful information regarding the ability of a Project or a mitigation measure to reduce vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions and to promote sustainable modes of travel.

The LOS performance measure cannot quantify the measurable reduction in VMT or GHG emissions of some mitigation measures, thus limiting the number of transportation impact mitigation measures that may be considered. In the case that mitigation measures with potential VMT or GHG reduction benefits are proposed, the TIS should include a description of the proposed improvements and the anticipated benefits to air quality. Additionally, traffic volume counts collected at the study intersections should include the volumes of pedestrians and bicycles that enter the intersection. These are helpful parameters and provide the necessary context when evaluating the overall operation of each intersection.

2.5 CONGESTION MANAGEMENT PROGRAM (CMP) TRANSPORTATION IMPACT ANALYSIS

The 2010 Congestion Management Program (CMP) for Los Angeles County includes the "Guidelines for CMP Transportation Impact Analysis" (Appendix "D" of the 2010 CMP) intended to assist local agencies in evaluating impacts of Development Projects on the CMP system through the preparation of a regional transportation impact analysis (TIA). A CMP TIA is necessary for all Projects required to prepare an Environmental Assessment based on local determination. The geographic area examined in the TIA must include, at a minimum, the following:

- All CMP arterial monitoring intersections, including freeway on and off-ramp intersections, where a proposed project is expected to add 50 or more trips during either the weekday a.m. or p.m. peak hours (of adjacent street traffic).

- Mainline freeway monitoring locations where a project is expected to add 150 or more trips, in either direction, during either the weekday a.m. or p.m. peak hours.

Based on these criteria, if the TIA does not identify any impacted regional facilities, then further CMP traffic analysis is not required. However, Projects must still consider transit impacts (also per the 2010 CMP). For further information on the CMP TIA process, visit the Metro CMP website (https://www.metro.net/projects/congestion_mgmt_pgm/) or contact Stacy Alameida at (213) 922-7414 or alameidas@metro.net.

2.6 FREEWAY IMPACT ANALYSIS SCREENING CRITERIA

Pursuant to the Freeway Agreement between LADOT and the California Department of Transportation (Caltrans) District 7, executed in October 2013 and updated in December 2015, Project applicants may be required to conduct a focused freeway impact analysis in addition to the CMP TIA described in ***Section 2.5***. Since the Freeway Agreement is about to expire, to better align with the State's multimodal transportation and environmental action goals, Caltrans is pursuing vehicle miles traveled (VMT) as the metric of Project impacts.

Until further revision of these guidelines; however, all Projects for which a TIS is required shall conduct a freeway impact screening analysis. The screening analysis should be submitted to LADOT along with the Study MOU and should include the Project's trip generation and distribution estimates. Based on these estimates, the screening analysis shall also include a morning and afternoon peak hour Project trip assignment to determine the amount of Project traffic expected to be assigned to the freeway system. The freeway impact screening analysis shall investigate whether the Project meets any of the following screening criteria:

- The Project's peak hour trips would result in a 1% or more increase to the freeway mainline capacity of a freeway segment operating at LOS E or F (based on an assumed capacity of 2,000 vehicles per hour per lane); or
- The project's peak hour trips would result in a 2% or more increase to the freeway mainline capacity of a freeway segment operating at LOS D (based on an assumed capacity of 2,000 vehicles per hour per lane); or
- The project's peak hour trips would result in a 1% or more increase to the capacity of a freeway off-ramp operating at LOS E or F (based on an assumed ramp capacity of 850 vehicles per hour per lane); or
- The project's peak hour trips would result in a 2% or more increase to the capacity of a freeway off-ramp operating at LOS D (based on an assumed ramp capacity of 850 vehicles per hour per lane).

If the proposed Project meets any of the screening criteria, the Applicant will be directed to Caltrans Intergovernmental Review (IGR) for a determination on the need for analysis beyond the CMP TIA and, if necessary, the methodology to be utilized for a freeway impact analysis. To assist in the evaluation of impacts on State facilities, the Project's transportation consultant should refer to Caltrans' "Guide for the Preparation of Traffic Impact Studies" found at the following web link: http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

SECTION 3:

Study Preparation

Each Transportation Impact Study (TIS) should follow a consistent format and organization and include all of the figures, maps, and information presented in this section. The appropriate level of detail required for each Project's transportation impact analysis with respect to specific issues should be determined during the scoping process and identified in the MOU. When this version of the TIS Guidelines is referenced in a TIS report, LADOT suggests using "2016 LADOT Transportation Impact Study Guidelines" to properly identify this reference.

3.1 PROJECT DESCRIPTION

All TIS reports shall include a detailed project description at the beginning of the document. The project description should include the following information:

- Project case number, as assigned by the Department of City Planning (if applicable)
- Location of the Project site, address, Assessor's Block and Lot number(s), cross streets, and City Council District
- Existing and proposed total square footage for each type of land use and the number of units for residential, hotel/motel, and live/work projects including the net changes for each type of use
- Existing and proposed type and number of parking spaces
- This section shall also include the following maps and figures:
    - » Project site plan showing driveway locations, loading/unloading area, and any proposed highway dedication
    - » Site map showing study intersections and distance of the Project driveway(s) from the adjacent intersections. Include location and identification of all major buildings, driveways, parking areas and loading docks of the Project

3.2 PROJECT CONTEXT

The information on the locale and surroundings of the Project shall be discussed following the Project description as a different section of the TIS report. This section will provide a brief but comprehensive description of the existing transportation infrastructure and conditions in the vicinity of the Project. Normally, the Project vicinity is defined as a ¼-mile radius around the Project site; however, a larger area may be required during the scoping process. The specific boundaries of the TIS area, for both the locale and Project impact analysis, should be confirmed during the initial discussion and scoping process with LADOT. The boundaries of the TIS area are subject to LADOT revision after initial impact analysis.

The Project context section should include the following information, with the level of detail to be directed by LADOT during the scoping process:

- Street designations, classifications, and modal priorities as identified in the Mobility Plan 2035, the Transportation Element of the Los Angeles General Plan. This street information can be found on the following maps in the

Transportation Element of the General Plan: Citywide General Plan Circulation System; Transit Enhanced Network; Neighborhood Enhanced Network; Bicycle Enhanced Network; Bicycle Lane Network; Vehicle Enhanced Network; Pedestrian Analysis; and Goods Movement.

- Description of the TIS area streets, including the number and width of lanes, direction of flow, and the presence of peak period tow-away lanes affecting roadway travel capacity, the presence of bicycle lanes, and any other significant street information.

- Location of, distance from, and routings to and from on-ramps and off-ramps of regional highways and freeways.

- Description of public transit routes operating on the streets within the TIS area, including hours of service, peak period headways, type of vehicle (diesel coach, trolleybus, light rail vehicle, etc.), and service provider.

This section of a Technical Memorandum and TIS will also include the following maps and figures:

- Area map showing location of proposed Project and related projects

- Street maps of the study area indicating street names, classifications, modal priorities

- Table indicating location, size, name, description, and trip generation of each related project

3.3 ANALYSIS AND DISCUSSION

Following the descriptions of the Project and its surroundings, the TIS report shall contain a section that details the analyses conducted, summarizes the results, and identifies any impacts and mitigation measures.

3.3A TRIP GENERATION ANALYSIS

The latest edition of the Institute of Transportation Engineer's (ITE) Trip Generation Handbook for trip generation rates and formulas should be used to estimate the Project's trip generation. However, if the Project is in a Transportation Specific Plan (TSP) area, then the procedures and trip rates identified in the TSP should be applied. If other rates are proposed, then these rates must first be submitted with the appropriate background survey data for approval by LADOT. A table presenting the estimated number of daily trips and a.m. and p.m. peak-hour trips generated by the proposed Project entering and exiting the site must be included.

3.3B ADJUSTMENTS TO TRIP GENERATION RATES

Any trip generation rate adjustments must be approved by LADOT during the scoping process and those trips must be included in existing base year traffic counts. The following adjustments may apply to some Projects:

- Unique Developments

  Unique types of development may require trip generation studies of similar facilities in order to establish a trip rate for use in the impact analysis. These developments may include land uses for which trip generation rates are not available in the ITE Trip Generation Handbook, or land uses for which the rates in the ITE Trip Generation Handbook are based on a small sample of surveyed sites. The procedures and the results of the trip generation studies must be approved by LADOT.

- Existing Use

  When estimating the Project's net new trips, any claim for trip credits for an "existing" active land use requires that the "existing" use is/was in place at the time of the base year traffic counts. Generally, for CEQA purposes this means the "existing" use must have been active for at least 6 months during the past 2 years. To fully ensure that "existing use" trip credit claims are validated by LADOT, supporting documentation (leasing agreements, utility bills, etc.) must be submitted. Documentation of any previous environmental review of the circulation impacts of the "existing" use should be included in this submittal. Note that some TSP ordinances allow different time frames for the determination of existing use trip credits and of any applicable trip fees.

- Terminated Land-Use

  Any claim for trip credits for a previously terminated land use must be supported with appropriate documentation of the previous active use, such as copies of any building permit, certificate of occupancy, business license, lease agreement, affidavits, or photographs as well as documentation as to when the previous land use was terminated. Documentation of any previous environmental review of the circulation impacts of the terminated land use should also be submitted in support of such claims. The absence of documentation of previous environmental review may result in denial of the claim for trip credits.

- Pass-by Trips

  Any claim for "pass-by" trip generation adjustments must use the trip rates summarized in **Attachment F** titled "Pass-By Trip Rates," which are based on rates published by ITE. However, these rates may be superseded by additional guidelines provided in specific plans or interim control ordinances. Pass-by trip generation adjustments shall not be used in determining the need for a Transportation Impact Study.

- Transit-friendly Projects

  LADOT encourages Project applicants to design and construct transit-friendly Projects that create safe and walkable site design and facilities that connect Project patrons to and from transit stations and stops. Consistent with City policy goals to promote the use of transit and walking, LADOT, at its discretion, may allow up to a 25% transit/walk trip generation reduction, subject to the following guidelines, on a case by case basis:

  - Developments above or adjacent to a Metro Rail, Metrolink, or Orange Line station, or to a similar dedicated transit line station with convenient pedestrian access to the station may qualify for a maximum 25% trip generation adjustment. The actual adjustment provided should be determined by an analysis of the transit service frequency and density at the specified transit station.

  - Developments within a 1/4-mile walking distance of a transit station, or of a RapidBus stop, may qualify for up to a 15% trip generation adjustment. The actual adjustment provided will be determined by an analysis of the transit service frequency and density at the specified transit station or RapidBus stop.

  - To obtain the maximum trip generation adjustment, Development Projects should include the following improvements listed in priority order:

    » Provide a wider than standard sidewalk along the streets fronting the Project through additional sidewalk easement or by dedicating additional right-of-way beyond street standards.

    » Improve the condition and/or aesthetics of existing sidewalks leading to transit station(s) with adequate lighting and safety improvements to provide for a safer pedestrian environment.

  - » Provide continuous paved sidewalks / walkways with adequate lighting from all buildings in the Project to nearby transit services and stops. This may include mid-block paseos.
  - » Implement transit shelter enhancements.
- If the Development Project is not within ¼-mile walking distance of a transit station or a RapidBus stop, the Project may still qualify for up to 10% trip generation adjustment. To be eligible for this adjustment, the Project should include design features that promote alternative travel modes and provide certain amenities to tenants and employees. Features and amenities that may qualify a Project for this adjustment include the following:
  - » An on-site transit information kiosk and/or on-site transit pass sales;
  - » On-site facilities such as ATM machines, cafeteria, convenience shopping, showers, and changing rooms;
  - » Pricing for single-occupancy auto parking;
  - » Publicly accessible car share or bike share station, contingent on LADOT approval;
  - » Bicycle racks or amenities for people traveling by bicycle;
  - » Provision of on-site concierge service to facilitate use of transit, taxis, or private shuttles by employees/ residents;
  - » Provision of shuttle service for employees and/or customers.

  Transit trip adjustment will not be automatically granted to Development Projects located in an area with infrequent transit service. However, all reasonable efforts by the developer to promote the use of public transit or walking will be considered for transit adjustments on a case-by-case basis.

  NOTE: Refer to ***Section 4.2*** of these TIS Guidelines for transit-related impact mitigation measures.

- Affordable Housing Projects

  Residential or mixed-use developments that include Affordable Housing Units [as defined in LAMC 12.22-A.25 (b)] are eligible to use the trip generation rates presented in **Table 5**, which are based on the total number and type of dwelling units reserved as affordable. These trip generation rates are based on vehicle trip count data collected at affordable housing sites in the City of Los Angeles in 2016. These trip generation rates for Affordable Housing units are not subject to any of the aforementioned adjustments in this Section.

Table 5: Trip Generation Rates for Affordable Housing Projects

Affordable Housing Type	***Daily Rate*** *(Trips per DU)*	***Average AM Peak Hr Rate*** *(Trips per DU)*	***% AM Trips In***	***% AM Trips Out***	***Average PM Peak Hr Rate*** *(Trips per DU)*	***% PM Trips In***	***% PM Trips Out***
Family	4.08	0.50	40%	60%	0.34	55%	45%
Seniors	1.72	0.12	38%	62%	0.15	52%	48%
Permanent Supportive Housing / Special Needs	1.27	0.12	44%	56%	0.12	59%	41%

Family affordable housing offers affordable dwelling units designed for households with children. Senior affordable

housing provides affordable dwelling units designed for mature residents. Permanent supportive housing provides long-term housing with supportive services designed to enable homeless persons and individuals/families at risk of homelessness to ensure that they remain housed and live as independently as possible.

3.3C TRAFFIC COUNTS

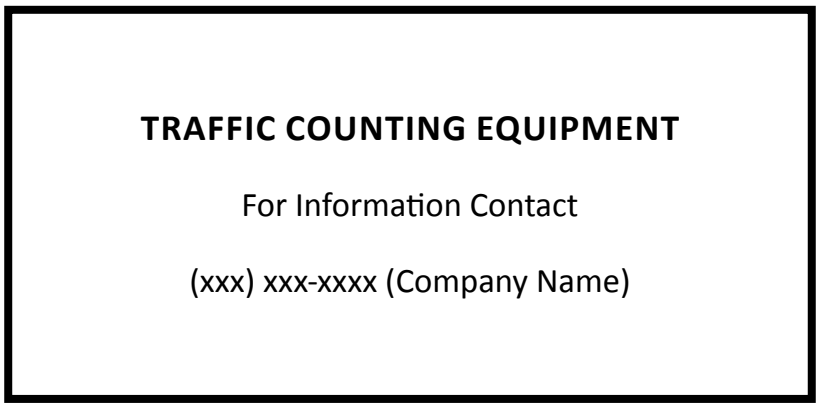
The LADOT traffic count database should be searched for any recent traffic counts at the Study intersections. The TIS should not use any traffic counts that are more than two years old. If recent LADOT traffic counts are not available, then new traffic counts shall be collected by a qualified data collection firm. Turning movement data at the study intersections should be collected in 15-minute intervals during the hours of 7:00 a.m. to 10:00 a.m. and 3:00 p.m. to 6:00 p.m., unless LADOT specifies other hours (e.g., for a signal warrant determination or weekend analysis). Unless otherwise required, all traffic counts should generally be conducted when local schools or colleges are in session, on days of good weather, on Tuesdays through Thursdays during non-Summer months, and should avoid being taken on weeks with a holiday. Relative to the proposed Project description, the TIS may be required to collect traffic data on and evaluate special circumstances, such as:

- Summer weekend activity in recreational areas
- Holidays or special events
- Alternative Project scenarios if required by another City Department or adjacent jurisdiction

Traffic counts should include vehicle classifications, pedestrian volume counts, and bicycle counts. If traffic count data is collected utilizing video technology equipment that is left unattended in the public right-of-way, the video equipment should be clearly labeled as traffic counting equipment and should include the name and contact information of the company conducting the count, as shown in **Figure 2**. All traffic data collected should be summarized and presented in the standard LADOT format depicting turning movement volumes for all required modes as shown in **Attachments G and H**, and submitted in digital and hard copy formats.

The TIS should include map(s) showing the "existing" (specify base year) traffic volumes for both the a.m. and p.m. peak hours at the study intersections and the average daily traffic (ADT) on any analyzed street segments. Additionally, the TIS should include map(s) showing future traffic volumes with ambient growth without Project at the Study intersections and street segments. This map should specify the future year used in the impact analysis and should be based on the expected date of project buildout. The future year identified in this step shall remain consistent for all other analyses and maps used to illustrate future traffic projections.

Figure 2: Sample Label for Traffic Counting Equipment



3.3D TRIP DISTRIBUTION

The TIS must include map(s) showing Project trip distribution percentages (inbound and outbound) at the study intersections, freeway locations and project driveway(s). This map must be pre-approved by LADOT and included in the scoping MOU.

3.3E RELATED PROJECTS LIST

The TIS must consider proposed Projects and associated trip generation within the vicinity of the Project site. The Study must include map(s) showing traffic generated by the related projects only. Use a separate map for similar land uses (e.g. retail, office, residential, industrial/manufacturing) with similar trip distribution patterns (as they affect the study intersections and freeway locations). Consultation with the Department of City Planning and LADOT may be required to compile the related projects list.

3.3F SELECTED HORIZON YEAR AND AMBIENT GROWTH RATE

The TIS must estimate ambient traffic at the Development Project site for the horizon year selected during the scoping phase and recorded in the executed MOU. The Study must clearly identify the horizon year and annual ambient growth rate used for the Study. The horizon year should align with the Development Project's expected completion year. For Development Projects constructed over several years, the TIS should analyze intermediary milestones before the buildout and completion of the Project. The annual ambient growth rate shall be determined by LADOT staff during the scoping process and will be based on an adopted TSP, Metro CMP guidance, or most recent SCAG regional transportation model, as applicable.

3.3G TRANSPORTATION ANALYSIS

The TIS should include calculations, data, and descriptions of any transportation analyses conducted to determine Project impacts on the transportation system. During the scoping process, LADOT staff will determine which of the transportation analyses listed in Section 2 of these TIS Guidelines or other methods of assessment are required.

To assist the evaluation of Development Projects, LADOT has developed a CMA spreadsheet in MS-Excel format to estimate the LOS for study intersections. All Transportation Studies that require the use of CMA to estimate impacts should be prepared using this spreadsheet. Completed LOS calculations must be submitted to LADOT in digital format and included with the submittal of the TIS. A typical sample of a LOS calculation worksheet is shown in **Attachment I**. A digital copy of the spreadsheet will be provided to firms preparing Transportation Studies in the City of Los Angeles. Contact any of the LADOT offices identified in Section L for a copy of the LOS spreadsheet. For some intersections (such as a 5-legged intersection, diamond interchange, etc.), the V/C ratio may need to be calculated manually or may need to be adjusted accordingly. The methodology utilized for these special cases should be discussed with the appropriate LADOT staff during the MOU scoping process.

The intersection capacity at intersections along a congested corridor may need to be adjusted to account for reduced capacity due to gridlock, heavy pedestrian volumes, or other prevailing factors. The LOS spreadsheet developed by LADOT allows users to override the standard CMA capacities to account for these factors. However, any such revisions to the standard capacities or to any formula or function used in the LOS spreadsheet require LADOT approval.

3.3H RESULTS & IMPACTS

The TIS should describe the results of all Project scenarios and identify impacts for all Projects. When a LOS analysis

is conducted, V/C ratios at Study intersections should be calculated to three decimals, rounded and summarized in a table showing weekday a.m. and p.m. peak hour LOS at study intersections for existing conditions, existing with Project, future without Project, future with Project and future with Project plus mitigation. In a separate appendix, the TIS shall include the detailed LOS worksheets for each study intersection. The results of the impact analysis shall be summarized and presented as shown in **Table 6**, in which the "cumulative base" scenario represents existing traffic conditions plus increases in traffic related to ambient growth and related projects and the "project" scenario is equal to the cumulative base scenario plus the Project trips.

Table 6: Project Impact Summary Table Format

(Year) ***Existing Traffic Conditions***	***Existing Plus Project***	***Project Impact***	*(Buildout Year)* ***Cumulative Base***	*(Buildout Year)* ***Project***	***Project Impact***	*(Buildout Year)* ***Project with Traffic Mitigation***	***Net Project Impact***
V/C LOS	V/C LOS		V/C LOS	V/C LOS		V/C LOS	

The TIS should also include a map or table that illustrates the lane configurations and lane volumes for each study intersection. Also, any programmed and funded transportation improvements that are expected to be implemented on or before the project buildout year should be identified in the study. Should these programmed improvements include a modification to the existing lane configuration to any of the study intersections, then the study should identify these changes and include the revised lane configuration in the V/C calculations for all future scenarios.

In determining the lane assignments for an intersection with an unmarked curb lane, the V/C calculations may assume the capacity of a functional right-turn only lane, provided that the lane width is a minimum of 18 feet wide, there are no bus stops at the approach, on-street parking would not impede vehicles turning right, the pedestrian volumes are low during the peak hour, and this de-facto right-turn operation has been verified in the field. Should the TIS include an analysis of freeway segments, then consultation with Caltrans is needed on the capacity analysis methodology used to evaluate state facilities.

3.4 ALIGNMENT WITH VISION ZERO

Directed by Mayor Eric Garcetti's Vision Zero Los Angeles initiative, the City is committed to creating safer streets for our most vulnerable road users, including children, older adults, and people walking and bicycling. All proposed Projects in the City must be designed to prioritize the safety of people walking, bicycling, rolling, taking transit to improve their connectivity. The City aims to eliminate all traffic-related deaths by the year 2025. To focus the implementation of safety countermeasures, LADOT conducted a citywide traffic collision analysis and identified a network of streets known as the High Injury Network (HIN), which consists of streets where high incidences of collisions involving vulnerable road users have resulted in severe injuries and deaths. Projects proposed on a roadway within the HIN should be designed to enhance safety.

During the preparation of the TIS, the Applicant or designated representative must consult with LADOT to identify treatments that may enhance safety at the Project site. Treatments that have proven to enhance the safety of vulnerable road users and/or lower vehicle speeds include, but are not be limited to, curb extensions, leading

pedestrian intervals, controlled mid-block crosswalks, pedestrian refuge islands, protected bicycle lanes, bike boxes, exclusive bicycle signal phases, protected left-turn lanes, etc. Additionally, site access plans for proposed Projects on roadways identified within the HIN should avoid or minimize the number of proposed driveways on that street. To determine whether a Project is on the HIN, visit the interactive map on www.navigatela.lacity.org and/or download the street dataset available on the City's Vision Zero website (www.visionzero.lacity.org).

3.5 TRANSPORTATION MITIGATION MEASURES

When a Project is expected to result in significant traffic impacts, as defined in **Sections 2.2 and 2.3**, the Project's consultant should meet with LADOT to discuss potential transportation mitigation options before submitting a TIS. Different transportation mitigation solutions should be explored when attempting to mitigate a Project's significant transportation impact to a level of insignificance.

In addition to traditional traffic flow considerations, mitigation programs must primarily aim to minimize the demand for trips by single-occupancy vehicles through transportation demand management (TDM) strategies. A preliminary draft performance-based TDM Program, prepared as outlined in Section 4 of these TIS Guidelines, must be included in the TIS for any Project seeking trip generation amendments supported by TDM. If the TDM Program is acceptable to LADOT, the applicant will be allowed to reduce the total Project trips by an amount determined to be commensurate with the measures proposed in the TDM Program. For additional information on TDM and other mitigation measures, refer to ***Section 4*** of these guidelines.

The adequacy and feasibility of each mitigation measure must be determined to the satisfaction of LADOT. The final required mitigation measures for the Project will be determined by the appropriate decision maker (e.g., the City Planning Commission, the City Council). All proposed mitigation measures shall comply with the following requirements:

3.5A PLAN PREPARATION FOR PHYSICAL MITIGATION

a. Existing Conditions

- Prepare preliminary geometric design drawing to a scale 1" = 40' for each of the significantly impacted intersections for existing conditions, where lane reconfigurations are a proposed mitigation measure. Conduct field investigations and illustrate all important roadway details, including adjacent land use(s), parking restrictions, sidewalks, driveways, lane dimensions, roadway striping, curb and right-of-way lines, and "footprints" of building line on the plan.

- Use existing LADOT drawings where available and field check for accuracy to reflect current conditions.

- Provide copy of current City Bureau of Engineering District Map illustrating public rights-of-way on impacted streets.

b. Future Conditions with Mitigation

- Prepare preliminary geometric design drawing to a scale of 1" = 40' showing recommended changes in striping including additional roadway and right-of-way necessary to mitigate the significant impact(s) of the project for each location where street reconfiguration is a proposed mitigation measure.

- Plans showing striping modifications should include adequate segments of the roadway (approximately 300-

400 feet on each leg of the intersection) to indicate the appropriate transitions from the existing striping.

- Plans should indicate parking restrictions (existing and proposed), bus stops (existing and relocated), driveways, signals, street lights, signs, trees, utility poles and catchment basins.

c. Traffic Volume Diagram

- Attach the a.m. and p.m. peak hour lane volume diagram with the geometric design plan for each intersection.

d. Finalize Plans as necessary

- Revise mitigation plans as required and resubmit the final mitigation plans to LADOT for approval.

3.5B GUARANTEES OF MITIGATION MEASURES

All physical transportation mitigations and associated traffic signal work within the City must be guaranteed through the B-Permit process of the Bureau of Engineering, prior to the issuance of any building permit and completed prior to the issuance of any certificate of occupancy. Temporary certificates of occupancy may be granted in the event of any delay through no fault of the applicant, provided that, in each case, the applicant has demonstrated reasonable efforts and due diligence to the satisfaction of LADOT. All improvements along state highways and freeway ramps require approval from Caltrans. An encroachment permit must be obtained from Caltrans for these improvements before the issuance of any building permits.

In the event the originally proposed mitigation measure becomes infeasible, a substitute mitigation measure may be provided subject to approval by LADOT or other governing agency with jurisdiction over the location, upon demonstration that the substitute measure is equivalent or superior to the original measure in mitigating the project's significant impact.

3.5C MITIGATION MONITORING AND REPORTING PROGRAM IN DRAFT EIRS

Each mitigation measure part of a Project's mitigation monitoring program should be described separately for inclusion in the Draft EIR. The following details are required for each measure:

- Identification of the responsible agency for monitoring the measure and the designated coordination for all participants

- Qualifications, if any, of the necessary monitor(s)

- Monitoring schedule (i.e., the phase of the project during which the measure should be monitored, frequency, and completion/termination) - this should be stated for physical mitigation measures required during construction as well as those that are for the operation/life of the project (e.g., TDM program)

- Funding required and sources of funding for monitoring activities by both project and City personnel (especially for long-term monitoring activities)

SECTION 4:

Mitigating Transportation Impacts

This section of the guidelines presents mitigation categories in order of priority to the City. If a Transportation Impact Study (TIS) identifies Project-related impacts, these mitigation measures should be considered when evaluating and proposing transportation mitigations.

4.1 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a general term for strategies and actions that improve overall transportation system efficiency by encouraging and supporting a shift from single-occupancy vehicle trips to other modes of travel, or moving vehicle trips out of peak periods. When successful, TDM influences how people choose to travel in order to make the most of existing transportation facilities and creates livable communities. Development Projects proposing the construction of new, nonresidential development in excess of 25,000 square feet gross floor area are required by LAMC 12.26-J to provide and maintain minimal TDM measures, by way of a covenant and agreement associated with the land, prior to issuance of a building permit, that the owner or applicant agree. LAMC 12.26-J is summarized in **Attachment J**.

LAMC 12.26-J notwithstanding, a consultant may be required to prepare a more comprehensive, integrated program of TDM measures. LADOT strongly encourages the development of a comprehensive TDM program to eliminate as many new Project single-occupancy vehicle trips from the transportation system as possible. TDM strategies should aim to reduce demand for single-occupancy vehicle trips by encouraging, promoting, and supporting the use of other sustainable modes of travel like public transit, walking, and bicycling.

If TDM strategies are claimed as a mitigation of Project-related traffic impacts, or if required under any applicable TSP or other City ordinances, then the TDM program shall include the following elements:

A. Statement of measurable goals to be achieved
B. Estimate of trips to be reduced
C. Key elements of the program
D. Schedule and responsibilities for funding and implementation
E. Method of monitoring program performance
F. Contingency plan and/or penalties for failure to achieve goals

If the Project is a mixed use project that includes housing, LADOT will consider adjusting the Project's trip generation to account for the internal trip characteristics of the Project. This adjustment shall be limited to the trips that would be affected by the special features of the Project relative to ITE or TSP trip generation rates. If the Project site is under one ownership or control; is uniquely located so as to permit accurate monitoring of all site trips; and extraordinary trip reduction goals are proposed, LADOT may recommend a trip cap agreement. Such an agreement typically places a cap on the total vehicle trips entering and leaving the site during peak hours and includes a monitoring and contingency plan.

To achieve additional vehicle trip reductions as traffic mitigation, TDM programs may include, but not be limited to, the following elements:

- Implementation of vehicle trip reduction incentives and services for Project employees and/or tenants; provide on-site education on alternative transportation modes.
- Implementation of flexible / alternative work schedules and telecommuting programs.
- Provide a bicycle and pedestrian-friendly environment; provide bicycle amenities such as secure bicycle racks, lockers and showers for employees.
- Provide bicycle parking beyond the requirements of the Bicycle Parking Ordinance No. 182,386.
- Enhance the environment for bicycling such as consolidating driveways and improving pavement conditions;
- Financial contribution to the City's Bicycle Plan Trust Fund.
- Implement a Neighborhood Friendly Street improvement as identified in the Mobility Plan 2035, which may include curb extensions, wayfinding signage, diverters, bicycle loop detection, shared lane markings, etc.
- Conduct educational workshops for Project employees and/or tenants related to the usage of bicycles on streets including how to integrate bicycles use with transit use and how to ride next to vehicles.
- Provide bicycle repair stations for use by Project employees and/or tenants.
- Provide fully or significantly subsidized transit passes to Project residents and/or employees.
- Implementation of first and last mile solutions that can increase the use of transit by bridging the gap between transit stops/stations and a commuter's origin or final destination.
- Implementation of a parking cash-out program.
- Pursuant to Internal Revenue Code Section 132(f), arrange pre-tax dollar transit commute expense accounts to provide transportation fringe benefits to eligible employees.
- Vehicle trip reduction incentives and services affecting visitors to the project, such as shoppers, clients, patrons, etc.
- Financial support for the capital and/or operating costs of enhanced transit or vanpool service to the project.
- Provision of a variety (mixed use) of land uses in close proximity, facilitating trip making by walking, bicycling or local shuttles.
- Provision of onsite facilities that encourage the use of alternate forms of transportation such as bicycle lanes and amenities, enhanced pedestrian connections, telecommuting facilities, etc.
- Include site trip cap and/or parking cap in trip monitoring agreements.
- Join an existing Transportation Management Organization serving the area where the Project is located.

4.2 TRANSIT CAPACITY AND ACCESS IMPROVEMENTS

Vehicle trips generated by a Project may be reduced by operating or contributing to the operation of public transit systems. If a Transit Program is claimed as a mitigation of Project-related impacts, or if required under any applicable TSP or other City ordinances, the Transit Program shall contain elements similar to those in the TDM Program described above. Additionally, a description of the Transit Program and a letter of support from the related transit service provider is required.

The exact mitigation effectiveness shall be determined on the basis of the Project's size, type of use(s), and the frequency/density of transit service in the vicinity of the Project. The following elements should be considered when developing a Transit Program:

- Contribution of funds or equipment to increase the capacity of existing public transit systems (must be coordinated with transit providers)
- Transit shuttles provided by applicant (e.g., bus, taxicab, van, etc.)
- Contributions toward construction or enhancement of public transit stations or centers
- Construbutions toward construction of bike share station and/or operation/maintenance costs
- Provision of facilities or equipment which expedite transit flow (e.g., transit priority signal systems, exclusive transit lanes, HOV lanes, etc.)
- Contributions toward operation/maintenance costs and/or fleet vehicle replacement costs of existing public transit service (must be coordinated with providers)

4.3 PARKING MANAGEMENT MEASURES

Parking management strategies use existing parking facilities efficiently to reduce parking demand and shift travel away from single-occupancy vehicle trips. If Project-related transportation impacts are mitigated through a Parking Management Program, or if required under any applicable TSP or other City ordinances, the Program shall contain elements similar to those in the TDM program described above. Additionally, the following parking management strategies should be considered:

- Contribution of equipment or funds to LADOT ExpressPark Program to implement intelligent parking systems, which can include the use of new parking meter technology, vehicle sensors, dynamic signage, a central management system, and a real time parking guidance system. Such upgrades should be implemented along appropriate City block faces with existing parking meter zones in the vicinity of the Project, or at all approaches and departures of an impacted intersection.
- "Unbundling" of parking spaces in multiple unit residential development, e.g., parking shall be bought or rented separately when the dwelling units are initially bought or rented, enabling discounts for not using parking spaces and/or complementing Flex Car or other car sharing programs.
- "Unbundling" of parking spaces in non-residential development, e.g., employee parking is not to be provided free-of-charge and/or parking costs are listed as a separate line item in lease agreements. This would be a necessary component of a Parking Cash-Out program.

- Shared parking agreements, e.g., parking is provided by existing parking facilities and shared by multiple land uses through an agreement among private lot and property owners.

4.4 JOBS / HOUSING BALANCE MEASURES

A travel demand mitigation value of up to 10% may be approved for a Development Project that incorporates Work Force housing (dwelling units affordable to, and reserved for, sale to Low and Moderate Income persons/families as defined in CA Health and Safety Code Section 50093 who are employed at the development) or that constructs such housing within a one-half mile of the Project. LADOT will determine the exact mitigation value based on an analysis of the development size and type of land use, employment type/density, and the number of Work Force housing units to be provided. The affordability of the Work Force housing units must be guaranteed for a minimum period of thirty (30) years.

4.5 TRAFFIC SIGNAL OPERATIONAL IMPROVEMENTS

Traffic signal enhancements that include, but are not limited to, traffic signal phasing modifications, communication hub upgrades, new signal installations, CCTV camera installations, additional vehicle detector loops, etc., may be considered and provided as transportation impact mitigation or as supplemental measures to proposed intersection mitigations. Signal improvements that are considered Project-serving or that provide access to the project are not considered impact mitigations.

4.6 STREET RESTRIPING

Generally, street re-striping is not an acceptable mitigation measure because it often requires parking prohibitions which may cause secondary impacts in certain commercial and residential areas. Street restriping may be an acceptable complimentary element to another acceptable mitigation measure, such as installation of left-turn phasing, implementation of traffic signal upgrades, expanding transit service, etc.

4.7 PHYSICAL STREET IMPROVEMENTS

Street improvements recommended as impact mitigation must be physically feasible and meet minimum City standards. Physical mitigation measures proposed on a street identified in one of the six Network Concept Maps of the City's Mobility Plan 2035 should be designed to effectuate the modal priorities identified for that street. See **Attachment K** for a sample intersection mitigation drawing. Proposed physical mitigation measures shall not result in inadequate sidewalk widths, should accommodate pedestrian activities, and should meet ADA requirements.

4.7A PARKING INVENTORY AND DEMAND ANALYSIS

Any mitigation proposal that would require the loss of on-street parking should include an on-street parking utilization study at the intersections and/or along the roadway where the potential improvements were identified. The study results should be presented in a parking inventory and demand analysis that summarizes that area's parking demand and supply, and informs LADOT on the secondary impacts that may result from the loss of parking. This analysis should include proposed measures to mitigate any such impacts to the extent feasible. The scope of the parking utilization study, including study area and survey hours, shall be approved by the appropriate LADOT staff prior to commencing the survey.

4.7B PARKING METER REVENUE LOSS

When a mitigation proposal for a Development Project requires the permanent removal of any metered parking spaces, payment to LADOT for lost parking meter revenue is required. The lost revenue fee will be determined during the site plan or B-permit plan review process and will be based on the revenue collected over the last twelve continuous months for each removed parking meter, as determined by LADOT's Parking Meter Division. The removal of each on-street metered parking space will require payment to LADOT in the amount of the annual revenue projected over a ten year period. The Project applicant will also be subject to any costs incurred by LADOT during the removal of each parking meter, including but not limited to meter post removal, parking sensors (if any), sign and post removal/ relocation, stall marking, pavement messages, and curb painting.

4.8 FAIR SHARE CONTRIBUTIONS

If a TIS demonstrates that the Project applicant is responsible for only a portion of a large and costly transportation enhancement, such as a bridge or roadway improvement, a fair share contribution toward the cost of the improvement may be an acceptable mitigation. Fair share contributions are applicable in those cases where there are other proposed Development Projects in the vicinity that may also contribute toward the cost or when the City has other funding sources for the improvement.

4.9 TRANSPORTATION MITIGATION TRUST FUND

If Project is located in a TSP area, an applicant may be required to pay "mobility or trip fees" into a mitigation trust fund for implementation of regional transportation improvements specified in the TSP.

4.10 INFEASIBLE MITIGATION MEASURES

The TIS should also include a discussion of mitigation measures deemed to be infeasible, as appropriate, to record the reason(s) for rejecting these measures.

4.11 SUBSTITUTE MITIGATIONS

If a proposed transportation impact mitigation measure does not receive the required approval during plan review, a substitute mitigation measure may be provided subject to the approval of LADOT or other governing agency with jurisdiction over the mitigation location, upon demonstration that the substitute measure is environmentally equivalent or superior to the original measure in mitigating the Project's significant transportation impact. To the extent that a mitigation measure proves to be infeasible and no substitute mitigation is available, then a significant transportation impact would remain.

4.12 UNMITIGATED IMPACTS

Projects with unmitigated transportation impacts that seek a Statement of Overriding Considerations should evaluate and consider other suitable enhancements that improve quality of life in the public realm, such as non-restrictive traffic calming measures, traffic safety enhancements, signal timing upgrades, and community streetscape features (e.g., lighting, landscaping, shade, sidewalk repairs, etc.) Such community benefit improvements, whether voluntary or required, can serve to offset the significant impacts of a Project. If the Project results in unmitigated impacts after no other mitigation measures are feasible, the developer should consider revising and reducing the scope of the Project.

4.13 RESIDENTIAL NEIGHBORHOOD TRAFFIC MANAGEMENT PROGRAM

If the TIS indicates that the Project may result in residential street impacts, the applicant may be required to develop a plan to reduce Project-related trips from traveling through nearby residential areas as part of the mitigation program for the project. If Neighborhood Traffic Management (NTM) measures are required to offset potential residential street impacts, then, prior to Project occupancy, the applicant shall conduct public outreach and develop a NTM Plan. The Project applicant must consult with LADOT, the affected City Council District office, and neighborhood stakeholders to collaboratively prepare the NTM Plan. Coordination with the appropriate City Council District office may be necessary to designate the stakeholders that should facilitate the public outreach.

The Project applicant shall also be responsible for conducting the engineering evaluation of the potential measures to determine the feasibility in regards to drainage, constructability, street design, etc. The applicant shall also be responsible in implementing any NTM measures approved by LADOT and supported by stakeholders. Prior to the outreach, a cost estimate on the potential NTM Plan shall be determined in consultation with LADOT. The cost should be commensurate with the size of the Project and with the level of residential street impacts that are expected. The development of the NTM Plan shall include the analysis of any relevant traffic data, roadway characteristics, and conditions of the impacted residential street segments identified in the TIS.

The NTM Plan should focus solely on implementing non-restrictive traffic calming, which may include, but are not limited to, traffic circles, speed humps, roadway narrowing effects (raised medians, traffic chokers, etc.), landscaping features, roadway striping changes, and stop sign pattern. Restrictive measures such as turn restrictions, physical barriers, signal metering, etc., should not be considered since these measures can potentially lead to the diversion of traffic from one street to another, or one neighborhood to another. The NTM Plan should also consider and evaluate neighborhood improvements that can offset the effects of added traffic, including street trees, sidewalks, landscaping, neighborhood identification features, and pedestrian amenities. Such measures can support trip reduction efforts by encouraging walking, bicycling, and the use of public transit.

As with other mitigation measures, any required NTM measures on City streets must be implemented prior to the issuance of any certificates of occupancy. A temporary certificate of occupancy may be granted in the event of any delay through no fault of the Project applicant, provided that the applicant has demonstrated reasonable efforts and due diligence to the satisfaction of LADOT. The NTM Plan shall be prepared in conformance with the guidelines established by LADOT and should contain, at a minimum, the following elements:

- Description of existing facilities and neighborhood traffic conditions,
- Description of proposed neighborhood traffic controls, including sketches of specific street modifications,
- Analysis of any change in existing or future traffic patterns as a result of implementation of the plan, and
- Implementation and monitoring program.

SECTION 5:

Bureau Contact Information

Thank you for your cooperation. If you have any questions, please contact the appropriate LADOT Bureau of Planning and Development Review office based on your geographic area (see **Attachment L**) or stage in development.

METRO DEVELOPMENT REVIEW

Projects proposed within all areas south of Mulholland Drive, east of Robertson Boulevard and north of the San Pedro Community Plan area

Mail 100 S. Main Street, 9th Floor
Los Angeles, CA 90012
Telephone (213) 972-8482 or (213) 972-8481

WEST LOS ANGELES DEVELOPMENT REVIEW

Projects proposed within San Pedro and all areas south of Mulholland Drive and west of Robertson Boulevard

Mail 7166 W. Manchester Avenue
Los Angeles, CA 90045
Telephone (213) 485-1062
Fax (213) 485-1285

VALLEY DEVELOPMENT REVIEW

Projects proposed within the entire San Fernando Valley north of Mulholland Drive

Mail 6262 Van Nuys Boulevard, 3rd Floor
Van Nuys, CA 91401
Telephone (818) 374-4699
Fax (818) 374-4696

LADOT CITYWIDE ONE-STOP COUNTER

Projects proposed within the City that require early consultation on review processes and design standards, permit sign-off, condition clearance, driveway plan review, etc.

Mail 201 N. Figueroa Street, 5th Floor
Los Angeles, CA 90012
Telephone (213) 482-7024
Fax (213) 482-7011

ORDINANCE NO. 183270

An ordinance amending Section 19.15 of Article 9 of Chapter 1 of the Los Angeles Municipal Code in its entirety to revise and update the fees paid to the Department of Transportation for the review and assessment of traffic study reports, condition clearance and permit issuance activities related to obtaining any environmental clearance for private development projects within the City of Los Angeles.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Section 19.15 of Article 9 of Chapter 1 of the Los Angeles Municipal Code is amended in its entirety to read as follows:

SEC. 19.15. DEPARTMENT OF TRANSPORTATION TRAFFIC STUDY REVIEW, CONDITION CLEARANCE AND PERMIT ISSUANCE FEES.

(a) **Fees.** The following specific fees shall be paid to the Department of Transportation (Department) for the preparation and processing of traffic reports, clearance of conditions and permit sign-offs in connection with obtaining any environmental clearance and/or permit issuance related tasks.

(1)	Building Permit Sign Offs (Note 1)	$365
(2)	Dedication & Widening Waivers	$445
(3)	Department Referral Form (Note 2)	$430
(4)	Driveway Permit Sign Offs (Note 3)	$535
(5)	Haul Route Review	$420
(6)	Master Plan / Complex Circulation Review (Note 4)	$1,595
(7)	Project Condition Clearance (Note 5)	$270
(8)	Revocable Permit	$205
(9)	Street Vacation Requests	$965
(10)	Subdivision Report	$205
(11)	TDM Compliance / Trip Monitoring Report Review	$770
(12)	Technical Study (Note 6)	$1,340

(13) Traffic Study MOU.....$1,175

(14) Traffic Study Review (Note 7).....$7,480

(15) Traffic Study Review / Plan Review – Expedited.....See Subsection (c)

(16) Worksite Traffic Control Plan Review (non B-permit).....$1,645

Note 1: For a project with multiple addresses and permits (i.e., multi-family units), $365 should be charged per distinct site plan and not per unit. For example: if, for a 100 unit small lot subdivision condominium project, each unit falls into one of three different site plan options, then the Department review fee should be $1,110 ($370 X 3) even if there are 100 separate building permits to approve.

Note 2: The Department Referral Form may also be submitted to the Department in the form of an Initial Site Assessment Form or a Site Plan Review Form. If this is the case, the Department Referral Form fee still would apply.

Note 3: When reviewing a Building Permit application that also includes a Driveway Permit Sign Off, the applicant should not be charged two fees (Building Permit and Driveway Permit). Instead, the applicant should be charged only the Building Permit fee if the driveway plan does not include a new curb cut. If the driveway plan does include a new curb cut, then the applicant only should be charged the Driveway Permit Sign-Off fee.

Note 4: This fee applies to Master Plan type developments or large scale projects with complicated circulation plans that require considerable staff time to help applicant arrive at an acceptable access and circulation plan.

Note 5: $270 for the first three condition clearances plus $200 for each additional condition clearance.

Note 6: A "technical study" can include technical memorandums (defined in LADOT's Traffic Study Guidelines), trip generation assessments, traffic study supplements, shared parking analyses, etc. The fee includes the cost to process a study MOU, if required.

Note 7: $7,480 for the first ten study intersections plus $400 per each additional study intersection, not to exceed a total of $25,000.

Special Note: If a project is approved by LADOT through the subdivision clearance or building permit process and the applicable fees have been paid, future approvals will not require additional fees as long as there have been no substantial changes to the approved portion of the project.

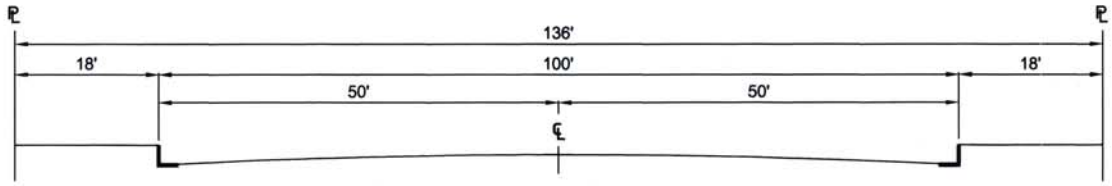
(b) **Transportation Review Fee Fund.** Each fee collected pursuant to this section shall include a five percent surcharge to be deposited into the Transportation Review Fee Fund No. 50Y. This fund shall be used exclusively by the Department to provide funding for the continual enhancement of development review related information technology systems and for procurement costs associated with equipment, software, materials, staff training and, if needed, consultant services. With the exception of the five percent surcharge deposited into the Transportation Fee Fund No. 50Y, the remaining 95 percent fees collected shall be credited to the General Fund.

(c) **Expedited Services.** The Department shall offer expedited services in the review of traffic studies or the review of B-permit design plans. Project applicants can choose to pay a higher review fee to allow Department staff to work overtime hours to expedite their review. The actual review fee to process a traffic study, which will be greater than the standard traffic study review fee, will be determined by the Department during the preparation of the Traffic Study Memorandum of Understanding executed between the Department and the applicant's representative. The fee established shall be based on the applicant's desired completion date, the availability of staff to work overtime and the affected division's case workload. During times of peak workloads, the expedited review fee may be utilized by the Department to procure an outside firm from the Department's pré-screened list of consultants to conduct the review of the study. Similarly, the actual fee to process B-permit design plans shall be established by the Department at the pre-design meeting with the applicant's representative.

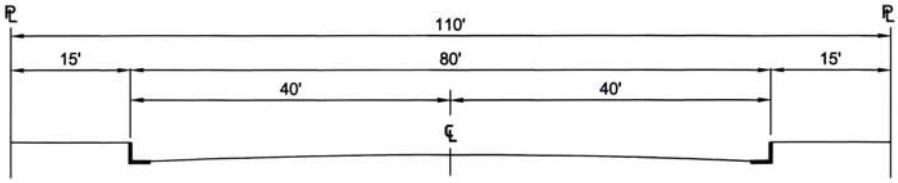
(d) **Fee Revisions.** The Department shall provide an annual review of the fees established pursuant to this section, and shall submit recommendations for changes in these fees for special services to the Council. The fees shall be revised by the Department to account for any staff salary cost of living adjustments. Notice of a revision in fees shall be in accordance with California Government Code Sections 66018 and 6062a, which require that prior to adoption of a new or increased fee a public hearing be held and notice of that hearing be published in a newspaper with two publications at least five days apart over a ten-day period. The notice period begins the first day of publication, and there must be at least five days intervening between the first and second publications, not counting the dates of publication.

Attachment B: Standard Street Dimensions

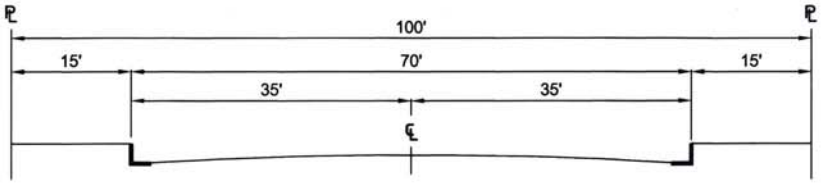
ARTERIAL STREETS



BOULEVARD I (MAJOR HIGHWAY CLASS I)



BOULEVARD II (MAJOR HIGHWAY CLASS II)



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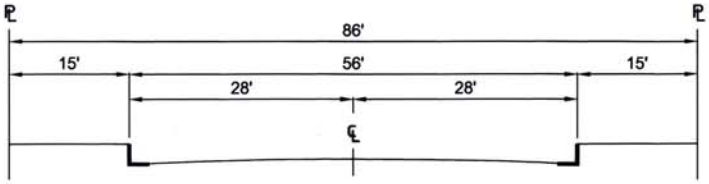

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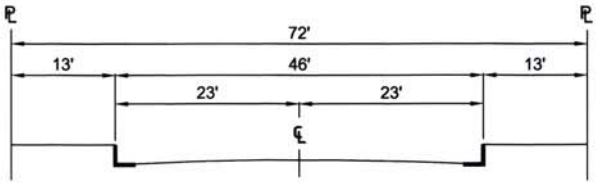


AVENUE III (SECONDARY HIGHWAY)

BUREAU OF ENGINEERING — DEPARTMENT OF PUBLIC WORKS — CITY OF LOS ANGELES

STANDARD STREET DIMENSIONS

STANDARD PLAN
S-470-1

PREPARED	SUBMITTED	APPROVED
KITTY SIU, P.E. BUREAU OF ENGINEERING	10/13/15 SAMARA ALI-AHMAD, P.E. DATE ENGINEER OF DESIGN BUREAU OF ENGINEERING	Gary Lee Moore 10-20-15 GARY LEE MOORE, P.E., ENV. SP. DATE CITY ENGINEER
CHECKED RAFFI MASSABKI, P.E. BUREAU OF ENGINEERING	10/13/15 KENNETH REDD, P.E. DATE DEPUTY CITY ENGINEER	10-21-15 DEPARTMENT OF TRANSPORTATION DATE GENERAL MANAGER 10-21-15 DIRECTOR OF PLANNING DATE

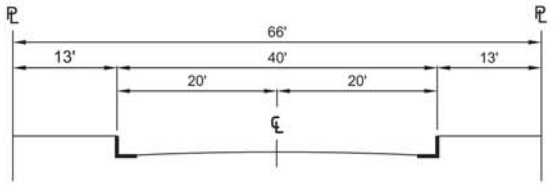
REGISTERED PROFESSIONAL ENGINEER — GARY LEE MOORE — No. C-49446 — Exp. — CIVIL — STATE OF CALIFORNIA

SUPERSEDES	REFERENCES
D-22549 S-470-0	

VAULT INDEX NUMBER: B-4738

SHEET 1 OF 4 SHEETS

NON-ARTERIAL STREETS



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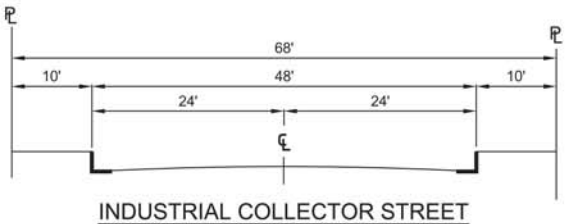

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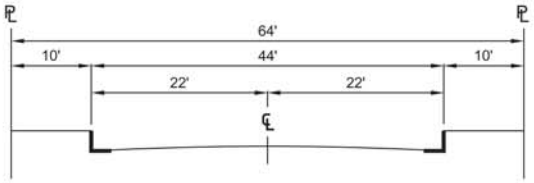

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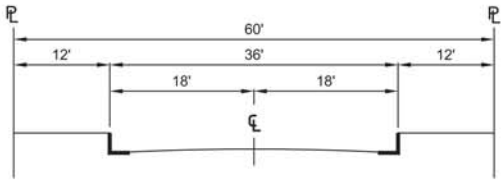

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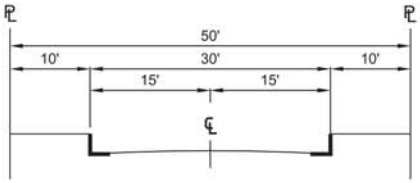
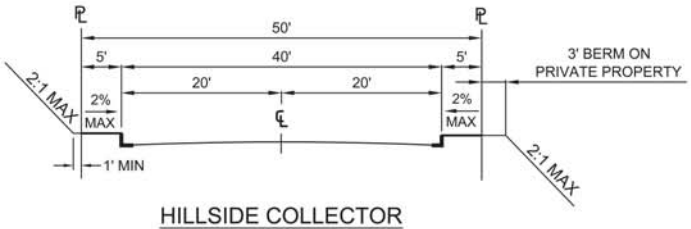
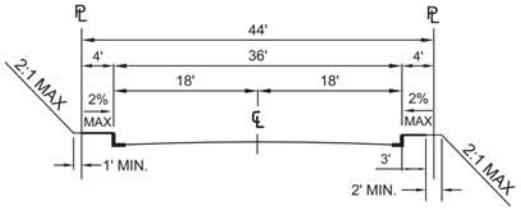


LOCAL STREET - LIMITED

HILLSIDE STREETS



HILLSIDE COLLECTOR



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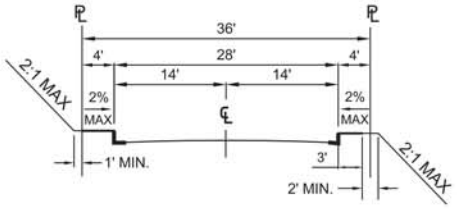
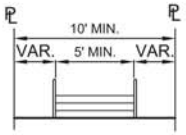


HILLSIDE LIMITED STANDARD

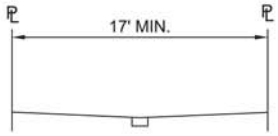


PUBLIC STAIRWAY

CONSTRUCTED IN ACCORDANCE WITH
BUREAU OF ENGINEERING STANDARD PLANS

BUREAU OF ENGINEERING
CITY OF LOS ANGELES
OFFICIAL RECORD

OTHER PUBLIC RIGHTS-OF-WAY



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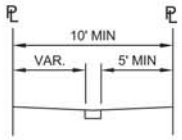

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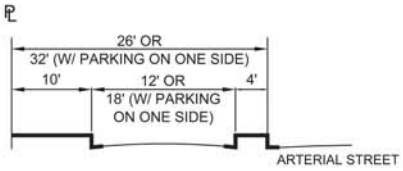
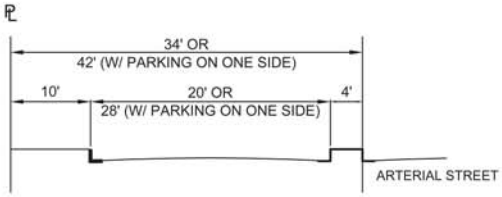
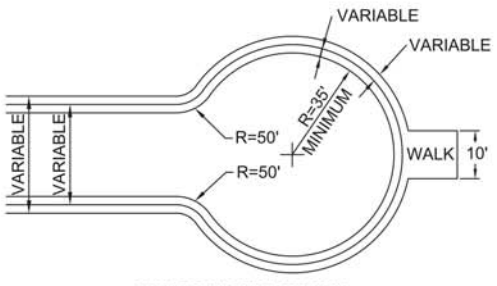


ONE-WAY SERVICE ROAD



BI-DIRECTIONAL SERVICE ROAD

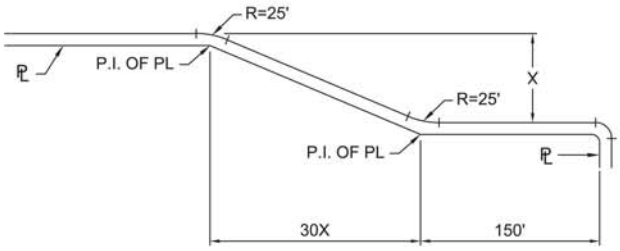
CUL-DE-SAC



MAY BE UNSYMMETRICAL
(PLAN VIEW)

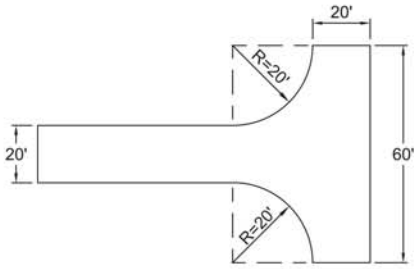
NOTE: FOR FIRE TRUCK CLEARANCE, NO OBSTRUCTION TALLER THAN 6" SHALL BE PERMITTED WITHIN 3FT. OF THE CURB. ON-STREET PARKING SHALL BE PROHIBITED.

TRANSITIONAL EXTENSIONS

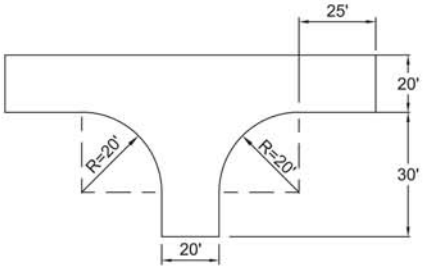


STANDARD FLARE SECTION
(PLAN VIEW)

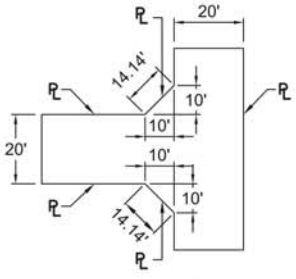
ALLEYS



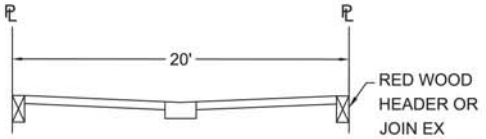
STANDARD TURNING AREA
(PLAN VIEW)



MINIMUM TURNING AREA
(PLAN VIEW)



STANDARD CUT CORNERS
FOR 90° INTERSECTION
(PLAN VIEW)



STANDARD CROSS-SECTION
(PLAN VIEW)

BUREAU OF ENGINEERING
CITY OF LOS ANGELES
FOUNDED 1781
OFFICIAL RECORD

STANDARD PLAN NO. S-470-1	VAULT INDEX NUMBER B-4738	SHEET 3 OF 4 SHEETS

NOTES

1. CITY COUNCIL MAY, BY ORDINANCE, ADOPT SPECIFIC STANDARDS FOR INDIVIDUAL STREETS THAT DIFFER FROM THESE OFFICIAL STANDARD STREET DIMENSIONS. COMMUNITY PLANS AND SPECIFIC PLANS SHOULD BE REVIEWED FOR FOOTNOTES, INSTRUCTIONS AND/OR MODIFIED STREET DIMENSIONS THAT WOULD REQUIRE STANDARDS DIFFERENT THAN THOSE INDICATED ON THIS STANDARD PLAN.

2. FOR ADDITIONAL GUIDANCE AS TO THE USE OF THE ROADWAY AND SIDEWALK AREA, PLEASE REFER TO THE COMPLETE STREET DESIGN GUIDE AND MANUALS.

3. FOR DISCRETIONARY PROJECTS REQUIRING ACTION FROM THE DEPARTMENT OF CITY PLANNING (PLANNING), PLANNING MAY INCLUDE SPECIFIC INFORMATION AS TO THE DESIGN AND UTILIZATION OF THE SIDEWALK AREA.

4. WHERE A DESIGNATED ARTERIAL CROSSES ANOTHER DESIGNATED ARTERIAL STREET AND THEN CHANGES IN DESIGNATION TO A STREET OF LESSER STANDARD WIDTH, THE ARTERIAL SHALL BE TAPERED IN A STANDARD FLARE SECTION ON BOTH SIDES, AS ON SHEET 3, TO MEET THE WIDTH OF LESSER DESIGNATION AND PROVIDE AN ORDERLY TRANSITION.

5. PRIVATE STREET DEVELOPMENT SHOULD CONFORM TO THE STANDARD PUBLIC STREET DIMENSIONS SHOWN ON THE SHEET, WHERE APPROPRIATE. VARIATIONS MAY BE APPROVED ON A CASE-BY-CASE BASIS BY THE CITY.

6. FIFTY-FOOT CURB RADII (INSTEAD OF THE STANDARD 35' CURB RADII) SHALL BE PROVIDED FOR CUL-DE-SACS IN INDUSTRIAL AREAS. SEE CUL-DE-SAC ILLUSTRATION FOR FURTHER DESIGN STANDARDS.

7. ALLEYS SHALL BE A MINIMUM OF 20' IN WIDTH AND INTERSECTIONS AND/OR DEAD-END TERMINUSES SHALL BE DESIGNED TO CONFORM TO THE ALLEY ILLUSTRATIONS INCLUDED HEREIN.

8. FOR INTERSECTIONS OF STREETS, THE FOLLOWING DEDICATIONS SHALL APPLY;
   A. INTERSECTIONS OF ARTERIAL STREETS WITH ANY OTHER STREET: 15' X 15' CUT CORNER OR 20' CURVED CORNER RADIUS.
   B. INTERSECTIONS ON NON-ARTERIAL AND/OR HILLSIDE STREETS: 10' X 10' CUT CORNER OR 15' CURVED CORNER RADIUS.

9. STREETS THAT ARE ACCOMPANIED BY A PARALLEL FRONTAGE AND/OR SERVICE ROAD ARE DEEMED TO MEET THE STREET STANDARDS SET FORTH HEREIN AND THE DEDICATION REQUIREMENT SHALL BE NO MORE THAN IS NECESSARY TO BRING THE ABUTTING SIDEWALK DIMENSION INTO COMPLIANCE WITH THE STREET STANDARD.

10. DUE TO THEIR UNIQUE CHARACTER AND DIMENSIONS ALL STREETS DESIGNATED AS DIVIDED ARE CONSIDERED TO HAVE MET THEIR STREET STANDARD AND THE DEDICATION SHALL BE NO MORE THAN IS NECESSARY TO BRING THE ABUTTING SIDEWALK DIMENSION COMPLIANT WITH THE STREET STANDARD.

11. THE DIMENSION OF ANY MEDIAN, DIVIDED STRIP AND/OR TRANSIT WAY SHALL BE INCLUDED WHEN DETERMINING THE RIGHT-OF-WAY DIMENSION.

12. THE LOCATION OF THE DRAINAGE GUTTER IS NOT RESTRICTED TO THE CENTER OF THE SHARED STREET AND CAN BE PLACED WHERE NECESSARY AS APPROVED BY THE CITY.

13. A SHARED STREET SHALL PROVIDE A DEDICATED PEDESTRIAN ACCESS ROUTE.

BUREAU OF ENGINEERING
CITY OF LOS ANGELES
CALIFORNIA
FOUNDED 1781
OFFICIAL RECORD

LADOT

Transportation Impact Study Memorandum of Understanding (MOU)

This MOU acknowledges that the Transportation Impact Study for the following Project will be prepared in accordance with the latest version of LADOT's Transportation Impact Study Guidelines:

I. PROJECT INFORMATION

Project Name: _____

Project Address: _____

Project Description: _____

_____

LADOT Project Case Number: _____ Project Site Plan attached? *(Required)* ☐ Yes ☐ No

II. TRIP GENERATION

Geographic Distribution: N _____ % S _____ % E _____ % W _____ %

Illustration of Project trip distribution percentages at Study intersections attached? *(Required)* ☐ Yes ☐ No

Trip Generation Adjustments *(Exact amount of credit subject to approval by LADOT)*

	Yes	No
Transit Usage	☐	☐
Transportation Demand Management	☐	☐
Existing Active Land Use	☐	☐
Previous Land Use	☐	☐
Internal Trip	☐	☐
Pass-By Trip	☐	☐

Source of Trip Generation Rate(s)? ☐ ITE 9th Edition ☐ Other: _____

Trip generation table including a description of the proposed land uses, ITE rates, estimated morning and afternoon peak hour volumes (ins/outs/totals), proposed trip credits, etc. attached? *(Required)* ☐ Yes ☐ No

	IN	OUT	TOTAL
AM Trips			
PM Trips			

III. STUDY AREA AND ASSUMPTIONS

Project Buildout Year: _____ Ambient or CMP Growth Rate: _____ % Per Yr.

Related Projects List, researched by the consultant and approved by LADOT, attached? *(Required)* ☐ Yes ☐ No

Subject to Freeway Impact Analysis, in addition to CMP Analysis? *(Freeway analysis screening filter must be included in this MOU; selecting "yes" implies that at least one criteria was satisfied)* ☐ Yes ☐ No

Map of Study Intersections attached? *(May be subject to LADOT revision after initial impact analysis)* ☐ Yes ☐ No

Is this Project located on a street within the High Injury Network? ☐ Yes ☐ No

IV. CONTACT INFORMATION

	CONSULTANT	DEVELOPER
Name:		
Address:		
Phone Number:		
E-Mail:		

Approved by: x _____ _____ x _____ _____

Consultant's Representative | Date | LADOT Representative | Date

PASS-BY TRIP RATES

PASS-BY TRIP DISCOUNT RATE	LAND USE CATEGORY
10%	Shopping Center 600,000 sf or more, Quality Restaurant, Specialty Retail, Furniture Store, Medical Office, Day Care, Theater/Cinema, Auto Sales/Repair
15%	Discount Club, Discount Store
20%	Shopping Center 300,000 to less than 600,000 sf, Bank/Savings & Loan, High Turnover Restaurant, Car Wash, Hardware/Lumber Store, Garden Center, Recreation/Health Club
30%	Shopping Center 100,000 to less than 300,000 sf, Auto Parts, Music/Video Store
40%	Shopping Center 50,000 to less than 100,000 sf, Supermarket, Drugstore, Bookstore
50%	Shopping Center less than 50,000 sf, Fast Food Restaurant, Gasoline/Service Station, Convenience Market, Flower/Bakery/Yogurt Shop, Dry Cleaner, Liquor Store

Note: These rates are derived from surveys published in the "Trip Generation Handbook: An ITE Recommended Practice," 2003.

Attachment E: Manual Traffic Count Summary

City Of Los Angeles
Department Of Transportation

MANUAL TRAFFIC COUNT SUMMARY

STREET:
North/South BROADWAY

East/West 75TH ST

Day: MONDAY Date: JULY 16, 2007 Weather: SUNNY

Hours: 7-10AM 2-5PM

School Day: YES District: CENTRAL I/S CODE 1451

	N/B	S/B	E/B	W/B
DUAL-WHEELED	101	139	3	6
BIKES	0	11	0	0
BUSES	0	98	0	0

	N/B	TIME	S/B	TIME	E/B	TIME	W/B	TIME
AM PK 15 MIN	329	7.15	168	7.45	5	8.00	28	7.15
PM PK 15 MIN	174	2.15	273	4.45	12	2.15	56	2.30
AM PK HOUR	1230	7.15	625	7.15	14	7.15	106	7.15
PM PK HOUR	609	2.00	1002	4.00	33	2.00	111	2.15

NORTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	7	1056	94	1157
8-9	4	806	63	873
9-10	2	529	10	541
2-3	9	518	82	609
3-4	5	448	19	472
4-5	8	514	21	543
TOTAL	35	3871	289	4195

SOUTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	47	550	11	608
8-9	32	459	5	496
9-10	10	374	4	388
2-3	33	679	12	724
3-4	30	816	16	862
4-5	20	973	9	1002
TOTAL	172	3851	57	4080

TOTAL	**XING S/L**		**XING N/L**	
N-S	Ped	Sch	Ped	Sch
1765	63	25	0	0
1369	30	8	2	0
929	4	0	1	0
1333	89	40	0	0
1334	12	4	4	0
1545	16	0	5	0
8275	214	77	12	0

EASTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	1	2	10	13
8-9	2	2	4	8
9-10	6	0	7	13
2-3	6	5	22	33
3-4	6	6	10	22
4-5	9	4	9	22
TOTAL	30	19	62	111

WESTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	43	4	54	101
8-9	32	2	34	68
9-10	18	1	19	38
2-3	42	5	60	107
3-4	34	2	27	63
4-5	32	5	27	64
TOTAL	201	19	221	441

TOTAL	**XING W/L**		**XING E/L**	
E-W	Ped	Sch	Ped	Sch
114	70	39	45	2
76	46	11	35	1
51	30	3	12	0
140	103	100	74	25
85	63	18	38	7
86	48	11	32	0
552	360	182	236	35

(Rev Oct 06)

SAMPLE

City of Los Angeles

Department of Transportation

Level Three

BICYCLE COUNT SUMMARY

Draft 6/09/15

STREET:

North/South :	**"A" Street**				
East/West :	**"B" Street**				
Day:	Monday	**Date:**	0	**Weather:**	Sunny
School Day:	Yes	**District:**	0	I/S CODE:	0
Hours:	7-10 AM & 3-6 PM	**Staff:**	0		

NORTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	0	0	0	0
8-9	0	0	0	0
9-10	0	0	0	0
3-4	0	0	0	0
4-5	0	0	0	0
5-6	0	0	0	0
TOTAL	0	0	0	0

SOUTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	0	0	0	0
8-9	0	0	0	0
9-10	0	0	0	0
3-4	0	0	0	0
4-5	0	0	0	0
5-6	0	0	0	0
TOTAL	0	0	0	0

TOTAL

N-S
0
0
0
0
0
0
0

EASTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	0	0	0	0
8-9	0	0	0	0
9-10	0	0	0	0
3-4	0	0	0	0
4-5	0	0	0	0
5-6	0	0	0	0
TOTAL	0	0	0	0

WESTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	0	0	0	0
8-9	0	0	0	0
9-10	0	0	0	0
3-4	0	0	0	0
4-5	0	0	0	0
5-6	0	0	0	0
TOTAL	0	0	0	0

TOTAL

E-W
0
0
0
0
0
0
0

REMARKS (6 hour total):

	NB	SB	EB	WB	TOTAL
- Female riders	1	1	1	1	4
- No helmet riders	1	4	1	1	7
- Sidewalk riding	1	4	4	1	10
- Wrong way riding	1	1	1	1	4

NB: Northbound, **SB**: Southbound, **EB**: Eastbound, **WB**: Westbound, **I/S**: Intersection

Source: (company name)

City of Los Angeles
Department of Transportation

Level Three

PEDESTRIAN COUNT SUMMARY

Draft 6/11/15

STREET:

North/South : **"A" Street**

East/West : **"B" Street**

Day:	Monday	**Date:**		**Weather:**	Sunny
School Day:	Yes	**District:**	Central	I/S CODE:	0
Hours:	7-10 AM & 3-6 PM	**Staff:**	0		

AM PEAK PERIOD

15 Min. interval	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
7:00 - 7:15	0	0	0	0	**0**
7:15 - 7:30	0	0	0	0	**0**
7:30 - 7:45	0	0	0	0	**0**
7:45 - 8:00	0	0	0	0	**0**
8:00 - 8:15	0	0	0	0	**0**
8:15 - 8:30	0	0	0	0	**0**
8:30 - 8:45	0	0	0	0	**0**
8:45 - 9:00	0	0	0	0	**0**
9:00 - 9:15	0	0	0	0	**0**
9:15 - 9:30	0	0	0	0	**0**
9:30 - 9:45	0	0	0	0	**0**
9:45 -10:00	0	0	0	0	**0**

Hours	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
7 - 8	0	0	0	0	**0**
8 - 9	0	0	0	0	**0**
9 - 10	0	0	0	0	**0**
TOTAL	**0**	**0**	**0**	**0**	**0**

PM PEAK PERIOD

15 Min. interval	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
3:00 - 3:15	0	0	0	0	**0**
3:15 - 3:30	0	0	0	0	**0**
3:30 - 3:45	0	0	0	0	**0**
3:45 - 4:00	0	0	0	0	**0**
4:00 - 4:15	0	0	0	0	**0**
4:15 - 4:30	0	0	0	0	**0**
4:30 - 4:45	0	0	0	0	**0**
4:45 - 5:00	0	0	0	0	**0**
5:00 - 5:15	0	0	0	0	**0**
5:15 - 5:30	0	0	0	0	**0**
5:30 - 5:45	0	0	0	0	**0**
5:45 - 6:00	0	0	0	0	**0**

Hours	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
3 - 4	0	0	0	0	**0**
4 - 5	0	0	0	0	**0**
5 - 6	0	0	0	0	**0**
TOTAL	**0**	**0**	**0**	**0**	**0**

REMARKS (6 hour total):

	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
- Wheelchair/special needs assistance	0	0	0	0	0
- Skateboard/scooter	0	0	0	0	0

N: North, **S**: South, **E**: East, **W**: West, **I/S**: Intersection

Source: (company name)

Level of Service Worksheet
(Circular 212 Method)

I/S #:	North-South Street:	Highland Avenue	Year of Count:	2016	Ambient Growth: (%):	1.0	Conducted by:	NDS	Date:	9/27/2016
CMA01	East-West Street:	Franklin Avenue	Projection Year:	2018	Peak Hour:	AM	Reviewed by:	KB	Project:	5-16-0264-1 Project

	EXISTING CONDITION			EXISTING PLUS PROJECT			FUTURE CONDITION W/O PROJECT				FUTURE CONDITION W/ PROJECT				FUTURE W/ PROJECT W/ MITIGATION			
MOVEMENT	Volume	No. of Lanes	Lane Volume	Project Traffic	Total Volume	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume
NORTHBOUND																		
Left	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Left-Through		0							0				0				0	
Through	2624	3	**875**	0	2624	**875**	0	2677	3	**892**	0	2677	3	**892**	0	2677	3	**892**
Through-Right		0							0				0				0	
Right	128	1	0	2	130	0	0	131	1	0	2	133	1	0	0	133	1	0
Left-Through-Right		0							0				0				0	
Left-Right		0							0				0				0	
SOUTHBOUND																		
Left	103	1	**103**	1	104	**104**	0	105	1	**105**	1	106	1	**106**	0	106	1	**106**
Left-Through		0							0				0				0	
Through	2181	3	727	0	2181	727	0	2225	3	742	0	2225	3	742	0	2225	3	742
Through-Right		0							0				0				0	
Right	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0
Left-Through-Right		0							0				0				0	
Left-Right		0							0				0				0	
EASTBOUND																		
Left	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Left-Through		0							0				0				0	
Through	1	0	**0**	0	1	**0**	0	1	0	**0**	0	1	0	**0**	0	1	0	**0**
Through-Right		0							0				0				0	
Right	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Left-Through-Right		0							0				0				0	
Left-Right		0							0				0				0	
WESTBOUND																		
Left	614	2	**338**	2	616	**339**	0	626	2	**344**	2	628	2	**345**	0	628	2	**345**
Left-Through		0							0				0				0	
Through	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Through-Right		0							0				0				0	
Right	73	1	0	1	74	0	0	74	1	0	1	75	1	0	0	75	1	0
Left-Through-Right		0							0				0				0	
Left-Right		0							0				0				0	
CRITICAL VOLUMES	*North-South:*		978	*North-South:*		979	*North-South:*			997	*North-South:*			998	*North-South:*			998
	East-West:		338	*East-West:*		339	*East-West:*			344	*East-West:*			345	*East-West:*			345
	SUM:		1316	*SUM:*		1318	*SUM:*			1341	*SUM:*			1343	*SUM:*			1343
VOLUME/CAPACITY *(V/C)* RATIO:			0.924			0.925				0.941				0.942				0.942
V/C LESS ATSAC/ATCS ADJUSTMENT:			**0.824**			**0.825**				**0.841**				**0.842**				**0.842**
LEVEL OF SERVICE (LOS):			**D**			**D**				**D**				**D**				**D**

	NB--	SB--	EB--	WB--
Right Turns: FREE-1, NRTOR-2 or OLA-3?	3	0	0	3
ATSAC-1 or ATSAC+ATCS-2?				2
Override Capacity				0

REMARKS:

Version: 1i Beta; 8/4/2011

PROJECT IMPACT

Change in *v/c* due to project:	0.001	Δ*v/c* after mitigation:	0.001
Significant impacted?	NO	Fully mitigated?	N/A

TRANSPORTATION DEMAND MANAGEMENT AND TRIP REDUCTION MEASURES

(LAMC Section 12.26-J - amended by Ordinance 168,700)

1. DEFINITIONS

For the purpose of this section, certain words and terms are defined as follows:

Carpool. A vehicle carrying two to five persons to and from work on a regular schedule.

Development. The construction of new non-residential floor area.

Gross Floor Area. That area in square feet confined within the outside surface of the exterior walls of a building, as calculated by adding the total square footage of each of the floors in the building, except for that square footage devoted to vehicle parking and necessary interior driveways and ramps.

Preferential Parking. Parking spaces, designated or assigned through use of a sign or painted space markings for Carpools or Vanpools, that are provided in a location more convenient to the entrance for the place of employment than parking spaces provided for single-occupant vehicles. **Transportation Demand Management (TDM)**. The alteration of travel behavior through programs of incentives, services, and policies, including encouraging the use of alternatives to single-occupant vehicles such as public transit, cycling, walking, carpooling/vanpooling and changes in work schedule that move trips out of the peak period or eliminate them altogether (as in the case in telecommuting or compressed work weeks).

Trip Reduction. Reduction in the number of work-related trips made by single-occupant vehicles.

Vanpool. A vehicle carrying six or more persons to and from work on a regular schedule, and on a prepaid basis.

Vehicle. Any motorized form of transportation, including but not limited to automobiles, vans, buses and motorcycles.

2. APPLICABILITY

This subdivision applies only to the construction of new non-residential gross floor area. Prior to the issuance of a building permit, the owner/applicant shall agree, by way of a covenant that runs with the land, to provide and maintain in a state of good repair the following applicable transportation demand management and trip reduction measures.

3. REQUIREMENTS

(a) **Development in excess of 25,000 square feet of gross floor area**. The owner shall provide a bulletin board, display case, or kiosk (displaying transportation information) where the greatest number of employees are likely to see it. The transportation information displayed should include, but is not limited to, the following:

(1) Current routes and schedules for public transit serving the site;

(2) Telephone numbers for referrals on transportation information including numbers for the regional ridesharing agency and local transit operations;

(3) Ridesharing promotion material supplied by commuter-oriented organizations;

(4) Regional/local bicycle route and facility information;

(5) A listing of on-site services or facilities which are available for carpoolers, vanpoolers, bicyclists, and transit riders.

(b) **Development in excess of 50,000 square feet of gross floor area**. The owner shall comply with Paragraph (a) above and in addition shall provide:

(1) A designated parking area for employee carpools and vanpools as close as practical to the main pedestrian entrance(s) of the building(s). This area shall include at least ten percent of the parking spaces required for the site. The spaces shall be signed and striped sufficient to meet the employee demand for such spaces. The carpool/ vanpool parking area shall be identified on the driveway and circulation plan upon application for a building permit;

(2) One permanent, clearly identified (signed and striped) carpool/vanpool parking space for the first 50,000 to 100,000 square feet of gross floor area and one additional permanent, clearly identified (signed and striped) carpool/vanpool parking space for any development over 100,000 square feet of gross floor area;

(3) Parking spaces clearly identified (signed and striped) shall be provided in the designated carpool/vanpool parking area at any time during the building's occupancy sufficient to meet employee demand for such spaces. Absent such demand, parking spaces within the designated carpool/vanpool parking area may be used by other vehicles;

(4) No signed and striped parking spaces for carpool/vanpool parking shall displace any handicapped parking;

(5) A statement that preferential carpool/vanpool spaces are available on-site and a description of the method for obtaining permission to use such spaces shall be included on the required transportation information board;

(6) A minimum vertical clearance of 7 feet 2 inches shall be provided for all parking spaces and access ways used by vanpool vehicles when located within a parking structure;

(7) Bicycle parking shall be provided in conformance with Section 12.21A16 of this Code.

(c) **Development in excess of 100,000 square feet of gross floor area**. The owner shall comply with Paragraphs (a) and (b) above and shall provide:

(1) A safe and convenient area in which carpool/vanpool vehicles may load and unload passengers other than in their assigned parking area;

(2) Sidewalks or other designated pathways following direct and safe routes from the external pedestrian circulation system to each building in the development;

(3) If determined necessary by the City to mitigate the project impact, bus stop improvements shall be provided. The City will consult with the local bus service providers in determining appropriate improvements. When locating bus stops and/ or planning building entrances, entrances shall be designed to provide safe and efficient access to nearby transit stations/stops;

(4) Safe and convenient access from the external circulation system to bicycle parking facilities on-site.

4. EXCEPTIONS

The provisions of this subsection shall not apply to developments for which an application has been deemed complete by the City pursuant to Government Code Section 65943, or for which a Notice of Preparation for a Draft Environmental Impact Report has been
circulated or for which plans sufficient for a complete plan check were accepted by the Department of Building and Safety, on or before the effective date of this ordinance **(03/31/1993)**.

5. MONITORING

The Department of Transportation shall be responsible for monitoring the owner/applicant's continual implementation and maintenance of the project trip reduction features required by this ordinance.

6. ENFORCEMENT

Applicants shall execute and record a Covenant and Agreement that the trip reduction features required by this ordinance will be maintained, that required material specified in Subdivision 3 (a) (1)-(5) will be continually posted, and that additional carpool/vanpool spaces within the designated preferential area will be signed and striped for the use of ridesharing employees based on demand for such spaces. The Covenant and Agreement shall be acceptable to the Department of Transportation.

7. HARDSHIP EXEMPTION

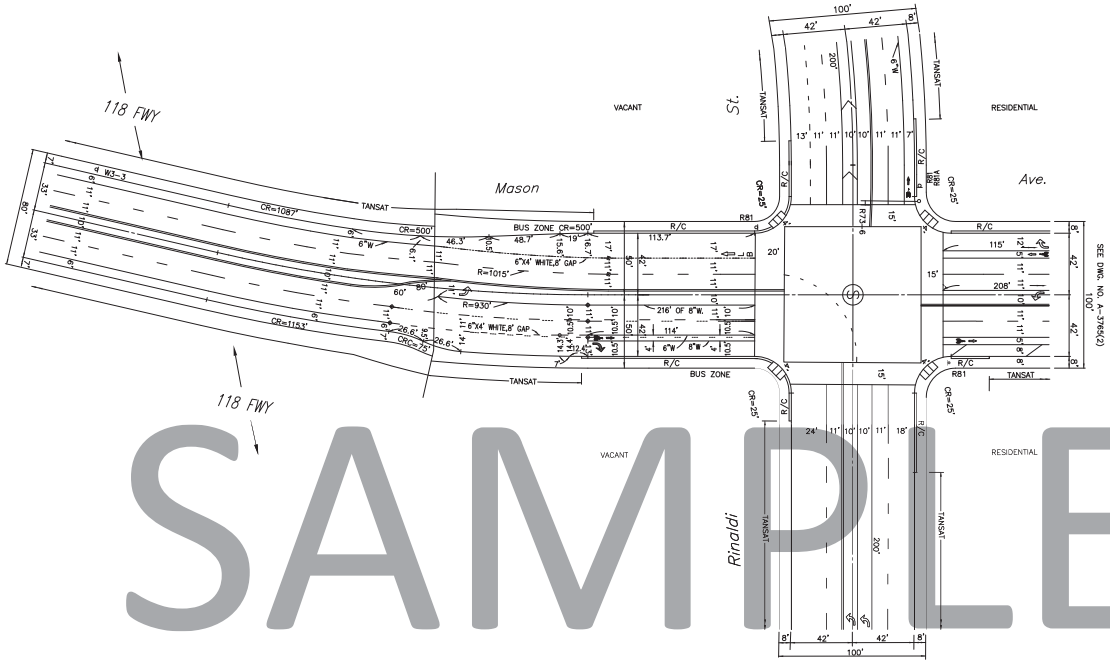
In cases of extreme hardship, duly established to its satisfaction, the City Council, acting in its legislative capacity, and by resolution, may grant an exemption from any/or all the provisions of this ordinance. In granting such an exemption, the City Council shall make the following findings:

(a) Specific features of the development make it infeasible to satisfy all of the provisions of this subsection; and

(b) The applicant has committed to provide equivalent alternative measures to reduce vehicle trips.

Attachment I: Sample Physical Mitigation Drawing

Sample Physical Mitigation Drawing



SAMPLE

LEGEND

1. EXISTING STRIPING & MARKINGS TO REMAIN
   EXISTING STRIPING & MARKINGS TO BE REMOVED
   PROPOSED STRIPING & MARKINGS
2. EXISTING SIGNS ▷ PROPOSED SIGNS
3. SIGNALIZED INTERSECTION
4. EXISTING RED CURB
   PROPOSED RED CURB

NOTES

1. LENGTH OF DESIGN : 400' ±
2. PAINT REMOVAL REQUIRED.
3. TRAFFIC SIGNAL PLAN REQUIRED.

SCALE: 1"=40'

XXXX

SUBMITTED ____ 20 ____ Transportation Engineer
RECOMMENDED ____ 20 ____ Senior Transportation Engineer
APPROVED ____ 20 ____ Principal Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN:
MARKOUT COMPLETED:
STRIPING COMPLETED:
References:

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
RITA L. ROBINSON, GENERAL MANAGER

MASON AVENUE
AT RINALDI ST.

Thomas Guide	District	PROJECT NO.	DRAWING NO.	
500; C1	W.V.	90306	A-5457	1/1

1"=20' ORIGINAL MAP SCALE 1"=40' 20 10 0 20 40 60 80 100 FEET 40 20 0 40 80 120 160 200 FEET

SCALES HORIZ. 1"= VERT. 1"=

SHEET

INDEX NUMBER

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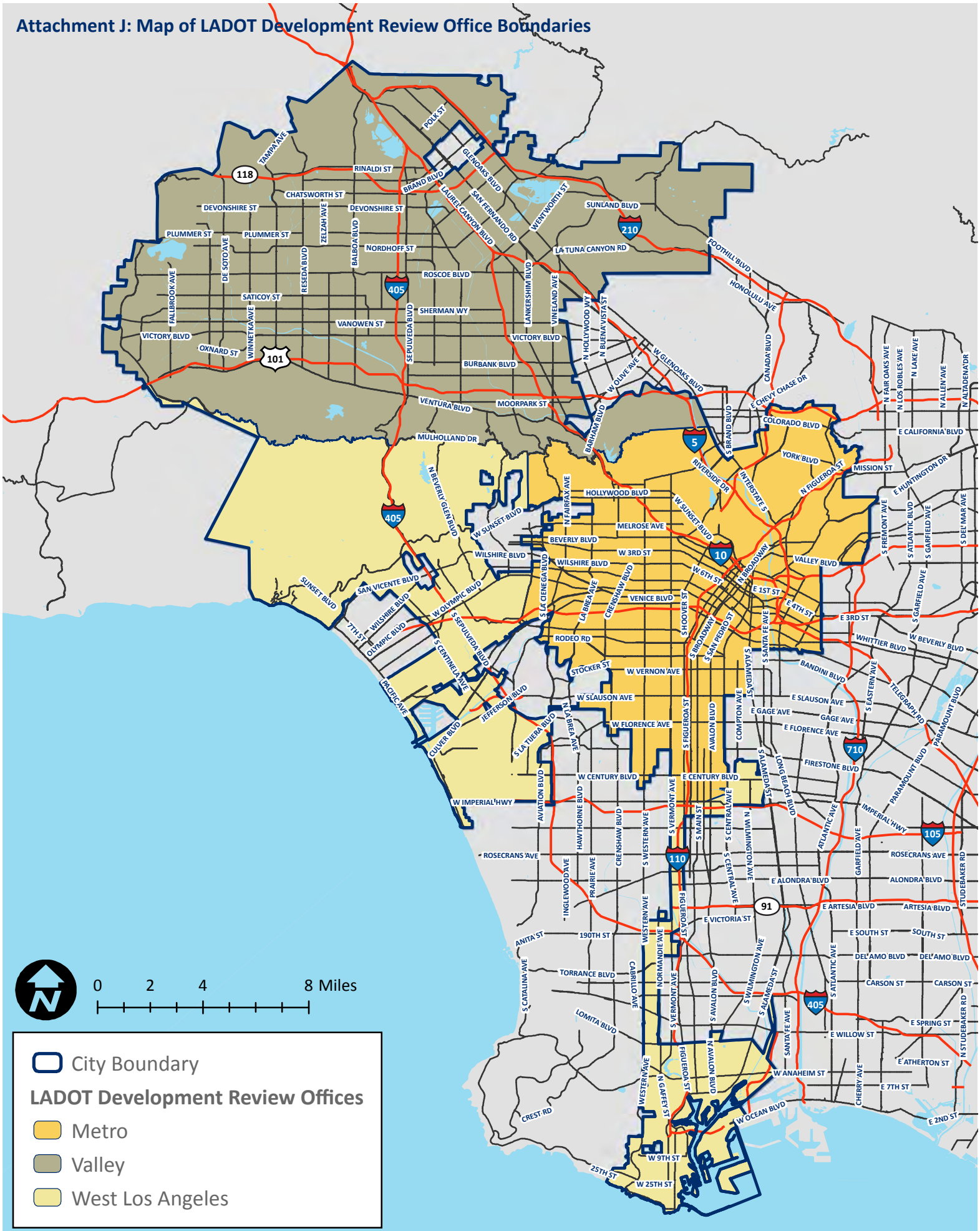
NO.	REVISION DESCRIPTION	DATE	BY
	PRINCIPAL T.E.		
	T.E./SR. T.E.	10-28-09	K.T.
	SUPERVISOR	10-22-09	T.C.
	DISTRICT SIGNALS		
	S.S.		
	DESIGN		
	CHECK		
	BASE		

Attachment J: Map of LADOT Development Review Office Boundaries



Data Sources: LADOT, Los Angeles County GIS Portal

VISION ZERO NETWORK

Communications Strategies for Vision Zero

Lessons from New York City

July 2016

Prepared by
Vision Zero Network

Communications strategies for Vision Zero: Lessons from New York City

Summary

New York City launched its Vision Zero effort in 2014, the first of the pioneering cities in the U.S. to adapt the Swedish-inspired, human-centered approach to traffic safety. New York's efforts have drawn significant attention, particularly as other U.S. cities look for lessons learned, inspiration, best practices, and shared experiences that can help with their own Vision Zero ambitions. By virtue of being one of the earliest adopters, as well as having a robust, relatively well-funded, multi-disciplinary Vision Zero program with a strong emphasis on data collection and analysis, New York's experiences offer valuable insights to other cities working to eliminate traffic deaths and serious injuries. New York may not have all the answers, but it does have the most experience with Vision Zero of any American city.

This white paper is intended to help the San Francisco Municipal Transportation Agency (SFMTA) advance its communication efforts around Vision Zero by highlighting some of the core communications practices of a peer agency in a comparable city. But the strategies discussed below are not only relevant to San Francisco. Any city pursuing Vision Zero efforts will find the lessons of New York City helpful to their communications planning, though some of the concepts will need to be scaled and adapted to local budgets and cultures. Cities are also advised to consult the Vision Zero Network case study "Communications Strategies to Advance Vision Zero" for more details, examples and best practices from San Francisco and New York (see Resources section at end of report).

This report is organized into three sections, each one highlighting a key lesson, practice, or particular Vision Zero communications example from New York City:

1. **INTERNAL OUTREACH** – Building a Vision Zero culture within the city family
2. **EXTERNAL OUTREACH** – Using data to craft effective messages
3. **CAMPAIGN CASE STUDY** – 'Your Choices Matter'

Internal communications: Building a Vision Zero culture within the city family

Communications have always been a part of street safety efforts in New York City, and are a key part of NYC's modern Vision Zero work. Traditionally, Vision Zero dialogues around street design, speed management, and law enforcement tend to be led by professionals in transportation or public policy. However, communicating clearly with the public about these subjects, as well as leading education and behavior change campaigns, is a task best assigned to strategic communications professionals. More than many city-led initiatives, Vision Zero demands a high degree of coordination and collaboration across departments and with community members and stakeholders. In New York City, the Department of Transportation (NYC DOT) is the lead agency behind Vision Zero efforts and the hub for communications, but good communications require coordination with other agencies and departments that share Vision Zero implementation roles. In NYC's example, communications functions are tightly coordinated among partners in the Mayor's Office, Police Department, Department of Public Health, and other departments.

Creating a formal task force was essential to internal Vision Zero coordination. "The task force was everything. The marketing working group was established early to bring different agencies together," said Michelle Kaucic, Director of Strategic Communications at NYC DOT. The formal presence of the task force, combined with high-level political support, allowed internal champions to unite behind a unified Vision Zero message. In other words, there were already a lot of people within New York City's vast bureaucracy who cared about and were working on traffic safety, but giving it a name and a brand — Vision Zero — was a powerful rallying cry that helped overcome departmental differences.

One of the fundamental lessons from New York City regarding communications is being savvy and strategic about internal (City agencies and partners) and external (the public) audiences. While cities may be well-practiced at communicating with constituents, marketing to other arms of city government isn't always as intuitive. Staff may feel less confident in their ability to approach this audience. Yet it's critical to the long-term success of traffic safety goals to build a shared ownership and leadership of Vision Zero across city departments. Vision Zero can not be successful due to the efforts of one agency or individual leader alone; broad and meaningful buy-in from all relevant arms of city government is essential to success.

The Brand Book

To ensure consistent communication across departments, NYC DOT's communications staff created an internal "brand book." The document provides statistics, talking points, graphics, and guidance about terminology, messaging and language related to Vision Zero. "We want everyone to feel they're contributing to the (Vision Zero) initiative in a positive way, and internal communications within the agency are really important," said NYC DOT's Kaucic. The creation of the book involved a task force of communications specialists from multiple agencies. While

there may be different styles and goals among the communications staff from different agencies, it is critical that the public-facing communications about Vision Zero come from a consistent 'City' voice.

It isn't enough to just create the internal brand book. It needs to be promoted and understood by its audiences. The NYC DOT team invests real resources into continuous internal promotion through the city intranet, email blasts, and in-person trainings with key staff in targeted departments. Furthermore, the internal brand book undergoes regular revisions as the narrative around Vision Zero evolves. Finding and nurturing internal champions within different agencies, along with support and resources from a high-level leadership, enabled the Vision Zero marketing group to achieve a broad adoption of the messaging strategies defined in the brand book.

Of course, the communications efforts to transform internal culture are only supporting measures. Nothing can replace strong political leadership, a talented and empowered staff with adequate resources, and effective community partners. Building on all of that, a well-coordinated internal outreach plan is still a must-do to sustain momentum for Vision Zero interventions beyond the initial ribbon cutting.

External outreach: Using data to communicate effectively

A core theme of New York City's work is the collection, analysis, and application of data to guide Vision Zero communications work. This scientific precision comes from an understanding that resources are limited, and that communications should be focused where they can deliver the highest return on investment. Public-facing messaging should be inclusive, but that doesn't mean that audiences shouldn't be segmented and targeted, campaigns evaluated, and crash data analyzed to understand patterns and behaviors that can save lives.

Using market research data to deploy communications

New York City stresses the importance of utilizing professional marketing services in its external communications efforts. Sophisticated audience research and segmentation is standard in corporate marketing campaigns - yet is often de-prioritized by public agencies when tough decisions about budgets must be made. But without this information, it's very difficult to ensure that external communications are heard where they most need to be. For example, New York chose to focus much of its marketing efforts on men between ages 30-45, as well as senior citizens, because their data analysis showed that behavior change in these groups would have the greatest impact on traffic safety.

Visualizing crash data

Most thoughtful Vision Zero efforts begin with a study of injury collisions to better understand where they happen, why they happen, and who is involved. While the quality of data varies from city to city, in most places clear patterns show that a significant portion of crashes resulting in death or serious injury happen in relatively few places under somewhat predictable circumstances. Communicating this analysis in a clear and transparent way is essential for helping constituents understand why design and behavior change efforts are prioritized in particular locations.
Visualizing this data in an interactive way is one of the strategies employed by NYC DOT early in its Vision Zero campaign to help build public trust around changes to streets, as well as to support the narrative that severe traffic crashes are not random, unpredictable events. Visualizations of crash data are only as good as the data itself; electronic crash data reporting is a promising technological tool that can help automate this process. A link to New York's 'Vision Zero View' crash data visualization is included in the Resources section of this report.

Self-evaluation and reporting

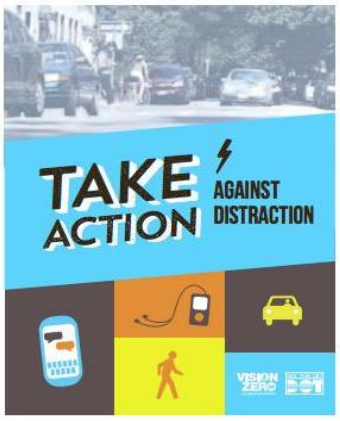
One challenge to building public support for Vision Zero is framing the goals effectively and convincingly. Like many public health crises, traffic violence is not particularly visible in daily public life, and it is easy to underestimate its impact. Once again, data is a powerful communications tool for providing a map between defining the problem and prioritizing and building public and political support for a response.

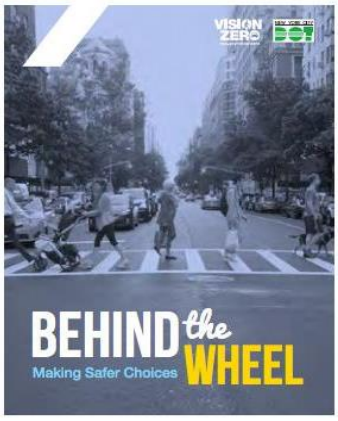
NYC DOT, along with its city and community partners, including the non-profits Families for Safe Streets and Transportation Alternatives, has been especially rigorous in self-evaluating and reporting progress. Their frequent Vision Zero reports are thoroughly researched and visually attractive — detailed enough for professionals but also approachable for anyone with an interest in the subject. While it does take an investment of time and money to produce the reports, their quality communicates a commitment to transparency and accountability, and builds a shared definition of the problems Vision Zero aims to address. Furthermore, the commitment to frequent reporting helps build internal urgency, with staff and political leaders knowing that progress is being watched closely and needs to be visible. See the Resources section for examples of New York's Vision Zero progress reports.

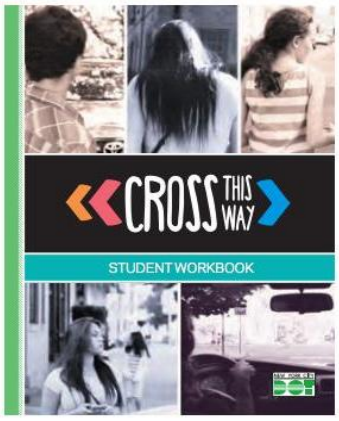
Safety education

A commitment to education around Vision Zero in public schools is one of the ways that safety education is advanced. Schools were already committed to traffic safety education before Vision Zero, but aligning the brand with existing educational resources — and developing new ones — are helpful to building the brand among students, parents and educators.

Similarly, the City has increased Vision Zero branding within its professional driver training programs. The Department of Citywide Administrative Services (DCAS), along with the Taxi and Limousine Commission (TLC) and Metropolitan Transport Authority (MTA) are the agencies with the largest numbers of professional drivers on New York streets. In partnership with Families for Safe Streets and Transportation Alternatives, a 15-minute film, “Drive Like Your Family Lives Here,” was produced and is now a part of the required training for all taxi and city fleet drivers. The film uses interviews with traffic victim’s families to build an emotional case for safe driving behavior and needed infrastructure improvements. (See link to video in Resources section)







Owned media

Like all communications work, New York’ City’s Vision Zero efforts span multiple types of media as part of the strategy to build a public narrative around traffic safety. Besides traditional earned media (journalism, blogs, and coverage produced by traditional news sources), paid media (advertising) and social media (Facebook, Twitter, etc.), NYC DOT has been particularly effective at using a fourth type — owned media — to advance its Vision Zero brand.

This often-overlooked channel of media may be one of the practices that is most easily replicated in any city.

Owned media describes the communication channels that the City government directly controls. Consider all the different ways that a City communicates with its residents — mailings, websites, telephone interactions, signage and public space — and how a Vision Zero message could be integrated into them at little or no cost. In New York City, many of the municipal fleet vehicles that work in the public realm have Vision Zero branding and messages, providing rolling billboards in highly visible places. City work crews wear hazard vests with the Vision Zero logo boldly portrayed. And when safety improvements are made to fleet vehicles, such as truck side rails that help

mitigate crash severity, Vision Zero messaging is prominent. This often-overlooked channel of media may be one of the practices that is most easily replicated in any city.



Source: New York City Vision Zero Year Two Report

Case study: 'Your Choices Matter' campaign

New York City was one of the first to undertake an ambitious, large-scale, multi-year advertising campaign aimed at individual behavior changes as part of Vision Zero. The 'Your Choices Matter' messaging resulted from extensive market research of New Yorkers. To do this, NYC DOT employed the services of a full-service ad agency, something it highly recommends to other cities, if possible. Focus groups, interviews, and other qualitative research methods revealed that New Yorkers responded best to empowering messages that were not didactic, but rather offered them agency to make better decisions as street users. The campaign also needed to be direct and attention-grabbing — in the media-saturated landscape of New York, the campaign needed to be bold in order to be noticed. The resulting campaign is graphic and somewhat shocking. This potential controversy of this approach was considered, but the thorough research behind the campaign's effectiveness bolstered decision makers' confidence in going forward with its implementation.



The timeline of the campaign was designed to progress through a series of phases, moving from initial building of awareness to calling for action and behavior change. The campaign's creators looked to other public health campaigns for inspiration. Campaigns to curb smoking and reduce drunk driving, in particular, were effective in large part because of well-coordinated communications efforts. But they took many years to permeate society. Building an effective behavior change campaign requires tactical focus, resources, and perhaps most of all patient persistence.



New York City DOT stresses the importance of metrics. From the beginning, evaluating the results of the campaign was a top priority. The intent was not only to measure the effectiveness of the messaging as part of public outreach efforts, but also to help build an internal narrative around the value of sustained marketing. To do this, NYC DOT found it helpful to track a simplified set of metrics that are valuable for conveying the effectiveness of campaigns to non-marketing professionals in decision-making positions. These "at-a-glance" stats about how well the marketing effort is working were especially useful for high-level political discussions and as part of the budgeting process. This isn't a replacement for the deep analysis and detailed metrics necessary for effective marketing, but an important tool for making the case with key, internal audiences.

***Simplified metrics**: Providing an "at-a-glance" view of a campaign*

Awareness: How many people in our city have heard of Vision Zero? How many have seen the campaign? How many know about recent changes in policy (such as a city-wide speed limit reduction)?

Behavior: Is yielding behavior improving at target intersections? How many people expect more enforcement of traffic laws? Do people report that the ads caused them to pay more attention to safety in traffic?

Objective numbers: How many actual crashes are happening? How many deaths? Serious injuries? How many moving violation citations?

Results

Two-plus years in, the City is observing the effects of the campaign. Initial results are promising. These results are all based on surveys of New York residents. NYC DOT admits that it is difficult to assign real behavior change to the campaign, since the results are self-reported and that actual behavior change is a result of many factors. With available funding, it would be preferable to add in-depth qualitative analysis methods to the evaluation, such as ethnographies, focus groups, and interviews.

Some of the initial results that NYC DOT has shared from the Your Choices Matter campaign include the following:

- 72% of drivers recall having seen an advertisement
- 91% of drivers understand it's their responsibility to yield to people in the crosswalk
- 79% of drivers identify driver behavior as a cause in fatal crashes
- 87% of drivers reported that the ads persuaded them to avoid texting or making calls while driving
- 86% of drivers reported that the ads reminded them to pay more attention to people walking and biking
- 75% of drivers said they expect more traffic law enforcement after seeing the ads
- 75% of non-drivers said the ads made them a more careful pedestrian

Conclusions

New York City's solutions cannot be copied and pasted. Strategies must be tailored to the budgets and cultures of each city. But the methods NYC credits for its early successes — including enlisting professional marketing services, emphasizing data and metrics to craft and evaluate messages, and creating and implementing internal marketing protocols to achieve a high level of cross-departmental coordination — are replicable elsewhere. While the resulting messages, campaigns and outreach strategies may look different from place to place, building a solid base for strong internal and public communications is universally critical.

Drawing inspiration from other places is key to the spread of any innovation. Vision Zero is a new idea in the U.S. context, and the pace of evolution in the field is very fast. While early adopters like New York City may not offer the exact campaign models for every emerging Vision Zero city, its experiences can motivate better results in other places than would otherwise be achieved by working in a vacuum. By providing a springboard for action, New York's example can inspire other cities to protect and improve the lives of its citizens through a coordinated, cohesive effort.

Resources:

Communications Strategies to Advance Vision Zero:
http://visionzeronetwork.org/communications-strategies-to-advance-vision-zero/http://visionzeronetwork.org/communications-strategies-to-advance-vision-zero/

NYC's Vision Zero Home Page:
www.nyc.gov/visionzerohttp://www.nyc.gov/visionzero

Vision Zero Plans & Reports:
http://www.nyc.gov/html/visionzero/pages/the-plan/library.shtmlhttp://www.nyc.gov/html/visionzero/pages/the-plan/library.shtml

Vision Zero View (visualization of crash data):
http://www.nycvzv.info/http://www.nycvzv.info/

"Your Choices Matter" Campaign Landing Page:
http://yourchoicesmatter.nyc/http://yourchoicesmatter.nyc/

NYC DOT Home Page:
www.nyc.gov/dot

Drive Like Your Family Lives Here video
https://www.youtube.com/watch?v=OAnSw3nzj0Uhttp://www.nyc.gov/dot

Select Vision Zero Press Releases:
• Mayor de Blasio Launches Interagency Working Group to Implement 'Vision Zero,' Prevent Pedestrian Fatalitieshttp://www1.nyc.gov/office-of-the-mayor/news/023-14/mayor-de-blasio-launches-interagency-working-group-implement-vision-zero-prevent-pedestrian - /0

• NYC DOT and NYPD Announce the Launch of the First Arterial Slow Zone, Designed to Reduce Speeding on Atlantic Avenue as the Agencies' Vision Zero Efforts Continuehttp://www.nyc.gov/html/dot/html/pr2014/pr14-038.shtml

• NYC DOT Invests $2.5 Million For Vision Zero Multi-Cultural Media Campaign Funded By the City Councilhttp://www.nyc.gov/html/dot/html/pr2016/pr16-017.shtml

• NYC DOT and NYPD Launch Third Year of Vision Zero Street Teams Citywidehttp://www.nyc.gov/html/dot/html/pr2016/pr16-036.shtml

• During Grandparents Week, Transportation Department, Police Department and Department for the Aging Announce Education and Enforcement Efforts to Keep Seniors Safe On City Streetshttp://www.nyc.gov/html/dot/html/pr2016/pr16-041.shtml

NYC DOT Social Media Links:
www.youtube.com/nycdothttp://www.youtube.com/nycdot
www.flickr.com/nycstreetshttp://www.flickr.com/nycstreets
www.facebook.com/nycdothttp://www.flickr.com/nycstreets
www.twitter.com/nyc_dothttp://www.flickr.com/nycstreets
www.instagram.com/nyc_dot





Great Streets for Los Angeles

CITY OF LOS ANGELES

COMPLETE STREETS

DESIGN GUIDE

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Complete Streets Design Guide
ACTIVITY LOG

Street Standards Commitee Amendments

Date	Amendment

Date	Amendment

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COMPLETE STREETS DESIGN GUIDE

1 INTRODUCTION





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1. INTRODUCTION

Goals of the Guide

Great Streets for Los Angeles: Complete Streets Design Guide lays out a vision for designing safe, accessible and vibrant streets in Los Angeles. As outlined in California's Complete Streets Act of 2008 (AB 1358), the goal of Complete Streets is to ensure that the safety, accessibility, and convenience of all transportation users – pedestrians, bicyclists, transit riders, and motorists – is accommodated.

Streets not only influence our mobility choices, but they also affect the safety and quality of life in our neighborhoods. When streets are designed with only vehicular throughput in mind, they create an environment that invites unsafe speeds. As a result, bicycling becomes more daunting and pedestrian walkways become less enjoyable. An overabundance of single-occupancy vehicles on the road slows down buses and other motorists, making public transit less convenient and driving more frustrating. When streets are continually widened to accommodate more vehicular volume, they create an induced demand for car travel that only encourages future traffic congestion.

Los Angeles' streets serve a much larger purpose than just moving cars. They can provide lively gathering places that foster community building and neighborhood identity. Complete Streets encourage healthy recreational activities such as walking, running, and bicycling, and they can boost the economic activity and visibility of storefront businesses. When cars travel at slower, safer speeds, the number of collisions between motorists and active transportation users decreases. Moreover, fewer cars on the road means lower levels of air pollution. Overall, a city that is designed for Complete Streets prioritizes people over cars, and safety over speed.

The Complete Streets Design Guide provides a compilation of design concepts and best practices that promote the major tenets of Complete Streets—safety and accessibility. The Guide is meant to supplement existing engineering practices and requirements in order to meet the goals of Complete Streets. Due to specific site and operational characteristics associated with any given street, any proposed street improvement project must still undergo a detailed technical analysis by the appropriate city departments. Specific design guidance that is in a demonstration phase and has yet to be incorporated into the California Manual on Uniform Traffic Control Devices (CA MUTCD)

will require provisional approval from the appropriate City departments. Overall, the Complete Streets Design Guide seeks to establish the concept of Complete Streets into Los Angeles' present and future street design so that all stakeholders are able to plan for, implement, and maintain safe and accessible streets for all users.

The Complete Streets Design Guide accompanies Mobility Plan 2035, an important update to the Mobility Element (formerly Transportation Element) of the City of Los Angeles' General Plan. Mobility Plan 2035's five goals – Safety First, World Class Infrastructure, Access for all Angelenos, Informed Choices, and Clean Environments for a Healthy Community – set the policy foundation making Complete Streets a priority in Los Angeles. The Plan's emphasis on safety, traffic calming and access are key principles that mirror the goals of the Complete Streets Design Guide.

The Complete Streets Design Guide is a living document, meaning that it will be amended as best practices and innovations in street design continue to evolve. The Guide falls under the authority of the City of Los Angeles' Streets Standards Committee, which is composed of the Director of City Planning (Chairman), General Manager of the Department of Transportation, and the City Engineer (LAMC 17.05).

Complete Streets Design

Designing is not a one-size-fits-all approach. It requires an analysis of various site conditions to determine what sort of treatments and solutions are applicable for a given street. Factors that should be considered include the physical characteristics of the street, urban vs. suburban context, surrounding land uses, collision history, and expected pedestrian and roadway demand. Treatments can vary from installing physical infrastructure, to altering signalization, or to simply reinforcing safety efforts with signage. Funding is also a major determinant of what types of treatments are feasible for certain projects.

Applicability

The Complete Streets Design Guide is intended to serve a variety of users. For City departments that oversee the implementation of street improvement projects, the Guide serves as a guiding document that ensures all projects are designed with Complete Street principles in mind. Private developers can also use the Guide to tailor their projects to support Complete Street principles. Elected officials can consult the Guide when proposing public improvements in their jurisdictions, while communities and local groups can refer to the Guide when advocating for safety treatments in their neighborhoods.

Design Immunity

Because the design of Complete Streets may involve deviations from traditional engineering standards, it is important to embrace an environment where the many benefits of Complete Streets outweigh the complexities of conventional street design. Design immunity is a powerful defense available to local agencies to defend against tort lawsuits that allege dangerous conditions of public property (e.g., streets and highways). It involves specific statutory requirements set out in section 830.6 of the Government Code. While there is no guarantee in all cases that a judge will determine that a local agency is protected against liability by design immunity, local agencies will be well-positioned if their engineers properly document engineering judgments made in approving the design of projects prior to construction.

Guide Organization

Chapter 1. Introduction

Chapter 2. Street Classifications
This chapter summarizes the various enhanced networks and illustrates the new street classifications.

Chapter 3. Complete Street Diagrams
This chapter provides a variety of sample diagrams that illustrate how Complete Street principles can be applied into the street classifications and how a network assignment can influence the division of a street into different use areas for public transit, motor vehicles, truck traffic, bicyclists, and pedestrians.

Chapter 4. Sidewalk Area
This chapter provides a "toolkit" of structural, natural, and functional components that contribute to a safe, accessible, and enjoyable pedestrian environment.

Chapter 5. Roadways
This chapter presents several infrastructure enhancements and roadway treatments that contribute to multi-modal safety, accessibility, and convenience.

Chapter 6. Intersections & Crossings
This chapter presents enhancements to infrastructure and signalization at roadway intersections and mid-block pedestrian crossings.

Chapter 7. Off-Street Non-Vehicular Treatments
This chapter presents design guidance for several features that are located outside of a street right-of-way.

Glossary

Acronyms and Abbreviations

AASHTO. American Association of State Highway and Transportation Officials

BOE. Bureau of Engineering in the City of Los Angeles Department of Public Works

BOS. Bureau of Sanitation in the City of Los Angeles Department of Public Works

BSL. Bureau of Street Lighting in the City of Los Angeles Department of Public Works

BSS. Bureau of Street Services in the City of Los Angeles Department of Public Works

Caltrans. California Department of Transportation

DCA. City of Los Angeles Department of Cultural Affairs

DCP. City of Los Angeles Department of City Planning

DPW. City of Los Angeles Department of Public Works

FHWA. Federal Highway Administration

LAPD. Los Angeles Police Department

LADOT. Los Angeles Department of Transportation

LAMC. Los Angeles Municipal Code

MUTCD. Manual on Uniform Traffic Control Devices

NACTO. National Association of City Transportation Officials

UFD. Urban Forestry Division of the City of Los Angeles Bureau of Street Services

Definitions

City departments and bureaus often have different definitions of elements within the street right-of-way. The following are definitions used in the Co Complete Streets Design Guide. If applicable, where they differ from the definition used by the Bureau of Engineering in its 1970 Street Design Manual, the difference is noted. Terminology in this document generally conforms to that found in U.S. Department of Transportation Federal Highway Administration publications in an attempt to standardize City of Los Angeles terminology and synchronize it with that of other municipalities in the United States.

Above Ground Infrastructure (AGI). Any utility structure or other appurtenance that is installed above the surrounding grade in the public right-of-way

Average Daily Traffic (ADT). The average 24-hour volume measured by the total traffic volume during a stated period divided by the number of days in that period. Unless otherwise stated, the period is 1 year.

Amenity Zone. The portion of the Sidewalk Area (Border) between the face of the curb and the Pedestrian Zone. Primary uses include street trees, landscaping, street utilities, signage, and street furniture. Where long landcaping strips exist (as in many residential areas), the Amenity Zone is commonly referred to as the “parkway”.

Border. The term used by BOE for the part of the right-of-way between the curb face and property line. In this guide, this part of the public right-of-way is referred to as “Sidewalk Area”.

Business Improvement District (BID). A group of commercial property owners or tenants that agrees to fund improvement projects, services, or programs within their designated commercial area.

Convenience Strip. A walkable strip adjacent to the curb, providing access to parking where there is a non-walkable planted parkway or tree well.

Curb extension. A curb extension extends the curb line and Sidewalk Area out into the roadway, reducing the effective roadway width while increasing the Sidewalk Area for pedestrians. Curb extensions can be in the form of a corner bulbout, neckdown, chicane, or bus bulb.

Curb radius. A geometrical measurement of the sharpness of the curb angle at intersections. Also referred to by LADOT and BOE as curb return.

Flex Zone. The part of the right-of-way – usually the width of a parking lane – adjacent to an existing curb face that can be utilized for roadway uses or for extensions of the Sidewalk Area (curb extensions).

Frontage Zone. The portion of the Sidewalk Area adjacent to the property line. There is no frontage zone in many residential districts because the pedestrian zone directly adjoins the property line.

Functional Classification. Distinct "functional" categories based on the amount of travel a street is intended to accommodate.

Green Streets. Streets that incorporate sustainable elements including stormwater management practices, street trees, and landscaping.

Highway. Per BOE, "a general term denoting a public way for purposes of vehicular travel, including the entire area within the right of way." Since few, if any, streets in Los Angeles are solely for the purpose of vehicular travel, the term "highway" is not used in this guide, except to reference the current functional classifications of arterial streets.

LADOT Manual of Policies and Procedures (MPP). The Department of Transportation's document containing design standard and guidelines for striping, channelization, special signing, and traffic signal timing and operation.

Low Impact Development (LID). A design and engineering approach for stormwater management that reduces urban runoff into the traditional stormdrain system, accomplished by treating, detaining, and/or infiltrating stormwater on-site.

Level of Service (LOS). A metric for measuring vehicle delay and traffic flow. The use of this metric has been discontinued, replaced by newer metrics such as Average Daily Traffic (ADT).

Median. The portion of divided roadway separating the traveled ways for traffic in opposite directions. It may be striped as a two-way-left-turn lane or include raised landscaped medians with left-turn lanes.

Median Opening. Per BOE, a gap in a median provided for crossing and turning traffic.

Parking Lane. A curbside lane on the roadway utilized primarily for the parking of vehicles.

Parkway. The commonly-used term for a landscaped portion of the Sidewalk Area (Border) between the face of curb and the pedestrian walkway.

Pedestrian Zone. Also known as the Pedestrian Access Route (PAR), the Pedestrian Zone is a continuous and unobstructed path of travel provided along the Sidewalk Area. The pedestrian zone is intended to be a seamless pathway for wheelchair and white cane users, composed of a firm, stable, and slip-resistant surface (typically concrete). It should be at least 5 feet wide to provide adequate space for two pedestrians to comfortably pass or walk side by side. BOE refers to the paved pedestrian path as the "sidewalk".

Raised Landscaped Median. A raised longitudinal space separating the two main directions of traffic, generally with 6-inch curbs and an unpaved, planted surface.

Right-of-Way (ROW). The entire area between property lines as shown on Navigate LA. Not as defined by BOE ("A general term denoting land, property or interest therein, usually in a strip acquired for or devoted to Public Works projects")

Roadway. The portion of the right-of-way for vehicular use, including travel lanes, parking lanes, and shoulders.

Shoulder. The curbside area that is adjacent to roadway travel lanes and is on the same level as the roadway. For roadways with curb and gutter, this area is typically delineated by solid white striping and is usually narrower than vehicular parking lanes.

Sidewalk. As defined by BOE, "the portion of the roadway primarily for the use of pedestrians." In this guide, this is referred to as the "Pedestrian Zone."

Sidewalk Area. The portion of the public right-of-way between the face of curb and property line. The term for this currently used by BOE is "Border."

Street Standards Committee. A committee consisting of representatives from the Department of City Planning, Department of Transportation and Bureau of Engineering, tasked with the responsibility of establishing street standards and applying them to streets within the City. The committee oversees amendments to the Complete Streets Design Guide.

Travel Way. Per BOE, the portion of the roadway for the movement of vehicles, exclusive of shoulders. The term is not used in this guide.

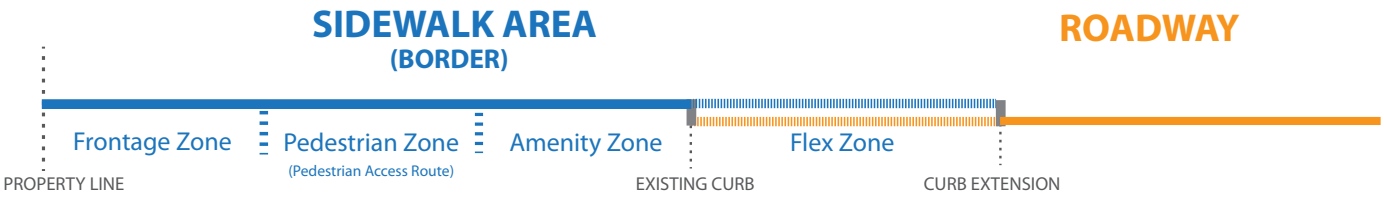
Two-Way Left-Turn Lane. ("Median Transversable Lane" per BOE). A speed change lane within the median to accommodate left turning vehicles from either direction.

Vehicle Miles Traveled (VMT). A measurement of miles traveled by vehicles in a specified region for a specified time period.

Walkway. In this guide, this is referred to as the "Pedestrian Zone" or "Pedestrian Access Route".

Right-of-Way Zones and Sample Uses

The public right-of-way is composed of two primary areas: the Roadway, which is used mainly by motor vehicles, public transit, and bicycles; and the Sidewalk Area, which represents the pedestrian realm. The Sidewalk Area is typically partitioned into three zones: Frontage Zone, Pedestrian Zone, and Amenity Zone. In addition, the Flex Zone represents a part of the right-of-way that can include Complete Streets enhancements for either roadway or pedestrian uses; vehicle uses take place at the roadway level, while pedestrian uses typically take place at sidewalk-level curb extensions. Each zone has its own distinct function in a Complete Street. Their boundaries are not always fixed, and many features can be located in more than one zone. Not all zones may be present; most low-density residential districts do not have a frontage zone because the property line abuts the walkway (Pedestrian Zone). The diagram below illustrates sample uses within each zone.



Frontage Zone

- ◘ Concrete Paving
- ◘ Building Entries
- ◘ Store signage and merchandising
- ◘ Public seating
- ◘ Outdoor dining
- ◘ Landscaping/trees
- ○ Asphalt paving
- ○ Bike racks/other
- ○ Some utilities (e.g. pedestrian light fixtures)
- ○ Ped-oriented signs
- ○ Public Art
- ○ Waste and recycling receptacles
- ○ Stormwater treatment

Pedestrian Zone

- ◘ Concrete paving
- ○ Asphalt paving
- ○ Nonstandard surfacing (e.g. stone, tile, brick)

Amenity Zone

- ◘ Concrete paving
- ◘ Utilities
- ◘ Landscaping
- ◘ Trees
- ◘ Parkway strip
- ◘ Public seating
- ◘ Bike racks
- ◘ Transit stop amenities
- ◘ Pedestrian-oriented signage
- ◘ Waste and recycling receptacles
- ◘ Newsracks
- ○ Asphalt paving
- ○ Stormwater treatment &management facilities
- ○ Public art
- ○ Outdoor dining
- ○ Bikeshare station
- ◘ Parking meters and pay stations
- ◘ Roadway signage

Flex Zone

- ○ Parklet
- ○ Public seating
- ○ Dining
- ○ Bikeshare station
- ○ Bicycle corral
- ○ Stormwater treatment & management facilities
- ○ Corner Bulbout
- ○ Neckdown
- ○ Chicane
- ◘ Vehicular parking
- ◘ Vehicular travel lane
- ◘ Bus pad
- ◘ Commercial loading area
- ○ Protected bicycle lane
- ○ Two-stage turn queue
- ○ Reverse-angle parking
- ○ Bus-only lane
- ○ Shared bike-bus lane
- ○ On-street carshare parking

Roadway

- ◘ Asphalt travel lane(s)
- ◘ Standard (usually offset) bike lanes
- ◘ Offset bus lanes
- ◘ Landscaped median
- ○ Concrete travel lane(s)
- ○ Median busway/BRT
- ○ Intersection and crossing enhancements (merge/ conflict zones)
- ○ Crossing refuge island
- ○ Traffic mini-circle
- ○ Mini-roundabout
- ○ Pedestrian plaza

KEY

Pedestrian and Bicycle Oriented

Vehicular Oriented

◘ **More Common**

○ **Less Common**



Frontage Zone

Pedestrian Zone

Amenity Zone

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COMPLETE STREETS DESIGN GUIDE

2 STREET CLASSIFICATIONS





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2. STREET CLASSIFICATIONS

Introduction

In order to be eligible for federal funding for street improvement projects, the Federal Highway Administration (FHWA) requires local governments to assign each of their streets a functional classification. In other words, cities must classify all their streets according to how they intend each street to function with respect to its roadway width and intended travel volume. Streets are broadly classified as either an arterial, collector, or local. Arterial streets can be thought of as the City's trunk lines that provide access to major commercial destinations, while local streets are typically streets in residential areas with low volumes of travel. Collector streets provide linkages between local streets and arterials.

Every street in the City of Los Angeles is given a specific street classification according to the Bureau of Engineering's Standard Plan for standard street dimensions (S-470). The S-470 Standard Plan outlines the different types of classifications and the corresponding dimensions for arterial, collector, and local streets in Los Angeles. In an effort to modernize the S-470, the City of Los Angeles has expanded its arterial street classifications to include larger right-of-way widths and to incorporate wider, more pedestrian-friendly sidewalks.

The updated street standard dimensions also attempt to address the many nuances of Los Angeles' streets by providing new nomenclature for arterial classes. For example, in the past, arterial streets in Los Angeles were classified into one of three categories: Major Class I Highway, Major Class II Highway, and Secondary Highway. According to these new standard dimensions, arterial streets are now classified as one of five types: Boulevard I, Boulevard II, Avenue I, Avenue II, or Avenue III. The wider range of arterial categories allows streets to be classified more accurately according to their existing physical character and operational function. The previous arterial classifications, due to their prevalent usage throughout the City's municipal code and in various manuals, will be parenthetically retained for reference and funding purposes. Overall, the City's updated Standard Plan for street standard dimensions includes five updated arterial classes and three new non-arterial classes.

This chapter discusses how the impacts of land uses and transportation characteristics inform the classification of streets. In addition, the chapter describes the concept of enhanced networks (as introduced in Mobility Plan 2035) and how they help achieve the goal of Complete Streets by prioritizing different modes of travel on certain streets. Lastly, general descriptions of each street classification help distinguish how streets differ according to their right-of-way widths, sidewalk widths, and target operating speed. For each classification, a typical number of travel lanes is provided, although there is no requirement as to the minimum or maximum number of lanes a street must include.

Network Overlays

Mobility Plan 2035's enhanced networks concept takes a layered approach to designing Complete Streets in Los Angeles. Under this concept, a subset of the City's streets is selected to prioritize travel for a specific transportation mode. In all, there are four enhanced networks: the Bicycle Enhanced Network, Transit Enhanced Network, Vehicle Enhanced Network, and Neighborhood Enhanced Network. In addition to these networks, many areas that could benefit from additional pedestrian features are identified as Pedestrian Enhanced Districts.

Bicycle Enhanced Network

The Bicycle Enhanced Network (BEN) is comprised of streets that prioritize bicycle travel by providing specific bicycle facilities and improvements. Improvements along the BEN primarily consist of right-of-way infrastructure improvements, signal timing infrastructure improvements, and end-of-trip facilities. Enhancements include protected bicycle lanes (or cycle tracks) that offer an increased degree of separation between bicyclists and the adjacent travel lanes (e.g., an on-street parking buffer between the vehicular travel lanes and the cycle track). In addition, the installation of protected bicycle lanes would likely include signalization enhancements for bicycles along with turning-movement restrictions for motor vehicles.

Transit Enhanced Network

The Transit Enhanced Network (TEN) is comprised of streets that prioritize travel for transit riders. Moderate enhancements typically include bus stop enhancements and increased service, with transit vehicles continuing to operate in mixed traffic. An upgraded enhancement would include an exclusive bus lane during the peak travel period only, while comprehensive enhancements typically include transit vehicles operating in an all-day exclusive bus lane.

Vehicle Enhanced Network

The Vehicle Enhanced Network (VEN) includes a select number of arterials that enhance long-distance travel on corridors. Moderate enhancements typically include technology upgrades and peak-hour restrictions for parking and turning movements. Comprehensive enhancements can include improvements to access management, all-day lane conversions of parking, and all-day turning movement restrictions or permanent access control.

Neighborhood Enhanced Network

The Neighborhood Enhanced Network (NEN) is comprised of local streets that benefit from pedestrian and bicycle-related safety enhancements while preserving the connectivity of local streets to other enhanced networks. There are many appropriate treatments for streets on the NEN including curb bulbouts, mini traffic circles, neckdowns, raised crosswalks, and diagonal diverters. These enhancements encourage lower vehicle speeds, providing added safety for pedestrians and bicyclists. They can also reduce vehicular traffic volumes by making the street less desirable for through traffic.

Pedestrian Enhanced Districts

Pedestrian-Enhanced Districts (PEDs) include streets where pedestrian improvements are prioritized to provide safe and enjoyable walking connections to and from major destinations within communities. PEDs are selected based on safety, public health, equity, access, social, and/or economic benefits. Examples of pedestrian enhancements include wayfinding signage, street trees, pedestrian-scale street lighting, enhanced crosswalks, automatic pedestrian signals, reduced crossing length (e.g., corner bulbouts and crossing refuge islands), sidewalk widening, and public seating areas.

Additional Overlays

The design of Complete Streets considers additional overlays that are not formally designated networks in Mobility Plan 2035. For example, the design and dimensioning of truck routes (and other roadways designated for goods movement) might include features such as wider travel lanes and larger turning radii in order to accommodate large trucks.

Roadways that are designated as Scenic Highways also present distinct factors to consider, such as preserving landscaping treatments, ensuring views, and incorporating appropriately-designed street amenities.

Arterial Streets

Arterial streets represent around 40% of the City's streets (approximately 3,000 of the total 7,500 miles) and carry a large volume of regional through traffic not handled by the freeway system. Arterial streets are typically characterized by commercial uses, but single-family and multi-family residential uses are also located along existing arterial streets.

Historically, the City has maintained three arterial street classifications: Major Highway Class I, Major Highway Class II, and Secondary Highway. These classifications will now be referenced under a "Boulevard" and "Avenue" category. Not all streets classified as a type of "Boulevard" or "Avenue" may contain a "Blvd" or "Ave" in their street name. For example, Sunset Blvd has been classified as an "Avenue I."

Boulevards represent the City's widest streets that typically provide regional access to major destinations. They include two categories:

- Boulevard I
- Boulevard II

Avenues may vary in their land use context, with some streets passing through both residential and commercial areas. This classification has been divided into three categories:

- Avenue I
- Avenue II
- Avenue III

An operating speed limit of 25mph is established for arterials located in areas with high pedestrian volume and areas located within the regional centers, community centers and/or mixed-use boulevards identified in the City's General Plan. A universal target operating speed of 15 mph is established for all turning movements at intersections.

Boulevard I (Major Highway Class I)

Roadway Width: 100 ft.

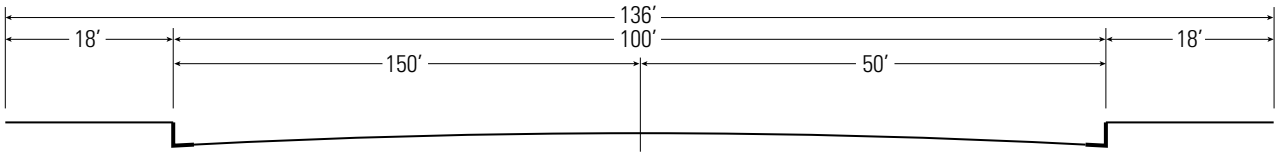
Right-of-Way Width: 136 ft.

Typical Number of Lanes: 3-4 lanes in each direction

Typical Sidewalk/Border Width: 18 ft.

Target Operating Speed: 35 mph





Boulevard II (Major Highway Class II)

Roadway Width: 80 ft.

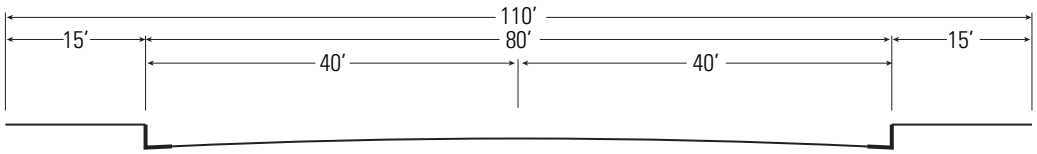
Right-of-Way Width: 110 ft.

Typical Number of Lanes: 2-3 lanes in each direction

Typical Sidewalk/Border Width: 15 ft.

Target Operating Speed: 35 mph





Avenue I (Secondary Highway)

Roadway Width: 70 ft.

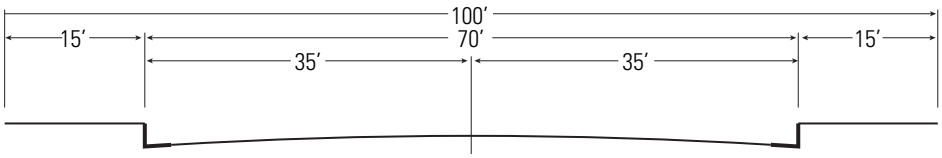
Right-of-Way Width: 100 ft.

Typical Number of Lanes: 1-2 lanes in each direction

Typical Sidewalk/Border Width: 15 ft.

Target Operating Speed: 35 mph





Avenue II (Secondary Highway)

Roadway Width: 56 ft.

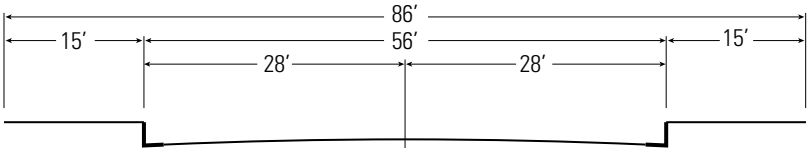
Right-of-Way Width: 86 ft.

Typical Number of Lanes: 1-2 lanes in each direction

Typical Sidewalk/Border Width: 15 ft.

Target Operating Speed: 30 mph





Avenue III (Secondary Highway)

Roadway Width: 46 ft.

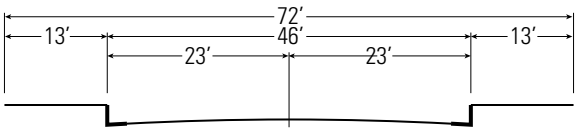
Right-of-Way Width: 72 ft.

Typical Number of Lanes: 1-2

Typical Sidewalk/Border Width: 15 ft.

Target Operating Speed: 25 mph





Non-Arterial Streets

Non-arterials represent 60% (over 4,500 miles) of the overall street system (not including alleys). Non-arterial streets connect travelers to local residential neighborhoods or industrial areas through a more fine-grain street network than the arterial street system.

Collector

Collector streets are generally located in residential neighborhoods. They provide access to and from arterial streets for lo**c**al traffic and are not intended for cut-through traffic.



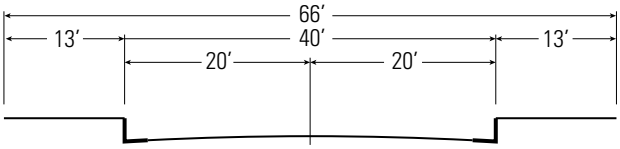
Roadway Width: 40 ft.

Right-of- Way Width: 66 ft.

Typical Number of Lanes: 1 lane each direction

Typical Sidewalk/Border Width: 13 ft.

Target Operating Speed: 25 mph



Industrial Collector

To accommodate larger vehicles, a typical Industrial Collector has larger curb radii to allow for the wider lane widths and turning radii required of trucks.

Roadway Width: 48 ft.

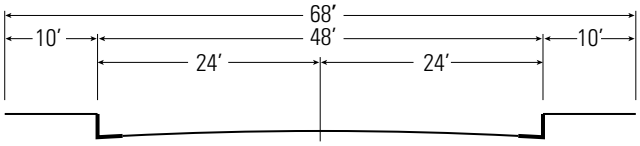
Right-of-Way Width: 68 ft.

Typical Number of Lanes: 1 lane in each direction

Typical Sidewalk/Border Width: 10 ft.

Target Operating Speed: 25 mph





Industrial Local

Industrial Local streets provide the first- and last-mile connections for goods movement. Compared to a typical local street, an Industrial Local street provides a wider roadway to better accommodate truck traffic while still providing parking on both sides.

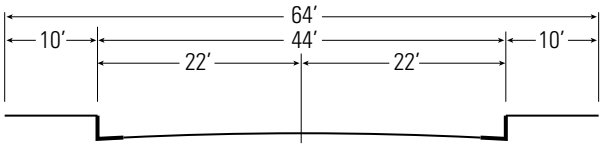
Roadway Width: 44 ft.

Right-of-Way Width: 64 ft.

Typical Number of Lanes: 1 lane in each direction

Typical Sidewalk/Border Width: 10 ft.

Target Operating Speed: 20 mph



Local Street Standard

Local streets are intended to accommodate lower volumes of vehicle traffic. Local streets have one lane in each direction and have parking on both sides of the street.



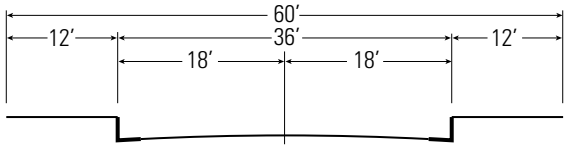
Roadway Width: 36 ft.

Right-of-Way Width: 60 ft.

Typical Number of Lanes: 1 lane in each direction

Typical Sidewalk/Border Width: 12 ft.

Target Operating Speed: 20 mph



Local Street Limited

These are local streets that lead to a dead-end rather than providing through traffic.

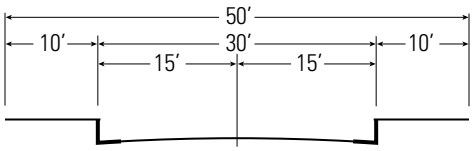
Roadway Width: 30 ft.

Right-of-Way Width: 50 ft.

Typical Number of Lanes: 1 lane in each direction

Typical Sidewalk/Border Width: 10 ft.

Target Operating Speed: 15 mph



Hillside Streets

Hillside streets are often narrow, winding roadways in residential areas. They provide access to hillside communities, such as parts of the Silver Lake and Echo Park neighborhoods of Los Angeles.

Hillside streets are designed as either Collector, Local, Standard, or Limited. Hillside Collectors are the primary streets leading into a hillside area. Hillside Local and Hillside Standard streets are narrower streets that branch off Hillside Collectors. Hillside Limited streets branch off Hillside Locals and typically provide access to a limited number of homes.

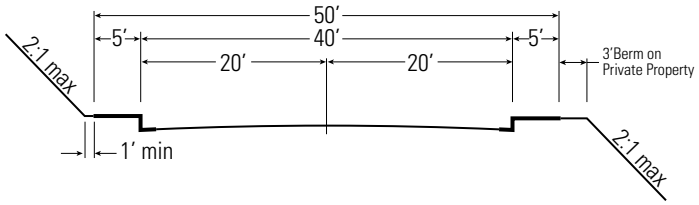
Hillside Collector

Roadway Width: 40 ft.

Right-of-Way Width: 50 ft.

On-Street Parking: both sides of street

Target Operating Speed: 15 mph



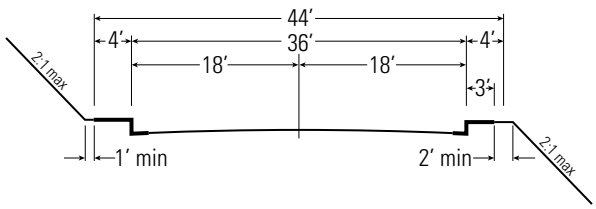
Hillside Local

Roadway Width: 36 ft. min

Right-of-Way Width: 44 ft.

On-Street Parking: both sides of street

Target Operating Speed: 15 mph



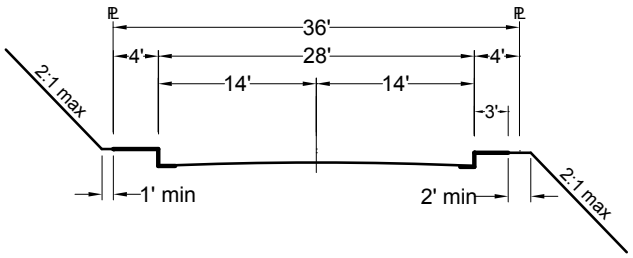
Hillside Standard

Roadway Width: 20 ft. min

Right-of- Way Width: 26 ft.

On-Street Parking: one side of street

Target Operating Speed: 10 mph



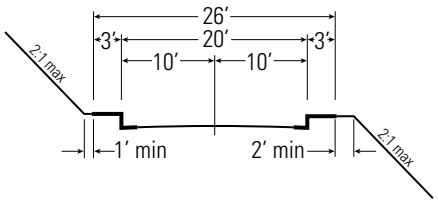
Hillside Limited

Roadway Width: 20 ft. min

Right-of- Way Width: 26 ft.

On-Street Parking: one side of street

Target Operating Speed: 10 mph



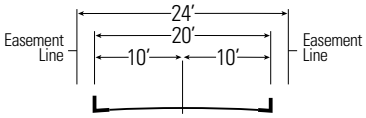
Service Road

Usually parallel to a divided highway, Service Roads (also known as frontage roads) provide local access and additional parking for nearby uses.

Access Roadway

Right-of-way width: 24’

Roadway width: 20’



Limited to private streets only that access no more than four dwelling units and are a maximum of 300’ in length

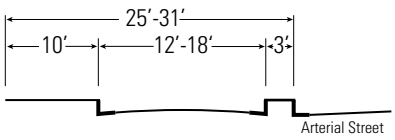
One-Way Service Road

Right-of-way width: 25-31’

Roadway width: 12-18’

Curb separation from arterial street: 3’





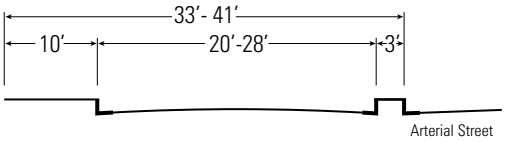
Bi-Directional Service Road

Right-of-way width: 33-41’

Roadway width: 20-28’

Curb separation from arterial street: 3’





Other Public Rights-of-Way

The streets and other public rights-of-way in this category offer opportunities to meet unique access conditions. Shared Street is a new classification presented in this guide.

- Shared Street
- Pedestrian Walkway
- Service Road
- Alley

Shared Street

In neighborhoods where the context is appropriate, a shared street provides a slow-speed environment where cars, bikes, pedestrians, and scooters are able to all comfortably utilize the same space. The addition of landscaping and other traffic calming elements enhances the aesthetics and reinforces the safety aspects of a shared street.

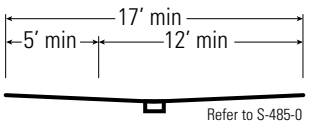
Roadway Width: 20 ft. min

Right-of- Way Width: 30 ft.

Typical Buffer Zone Width: 5 ft.

Target Operating Speed: 5 mph

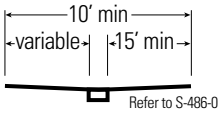




Pedestrian Walkway

A pedestrian walkway is designed for pedestrian use but may also be appropriate for slow-moving bicyclists.

Walkway Width: 10-25 ft.



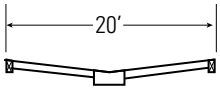
Alley

Alleys provide additional access outside of the main street network. They also offer opportunities for implementing green features such as permeable paving, stormwater management, lush plantings, and other sustainable practices.

Alley width: 20'

Target Operating Speed: 5 mph





Standard Cross Section
for 90° Intersection
(Plan View)

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COMPLETE STREETS DESIGN GUIDE

3 COMPLETE STREET DIAGRAMS





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3. COMPLETE STREET DIAGRAMS

Introduction

The following cross-sections and plan-view illustrations provide examples of how Complete Streets principles may be implemented within different street designations and along different networks. The illustrations do not represent a finite list but merely represent a series of examples that could be applied depending upon the street classification and the network assignment.

Complete Street Cross Sections

Street Classification and Network Assignments

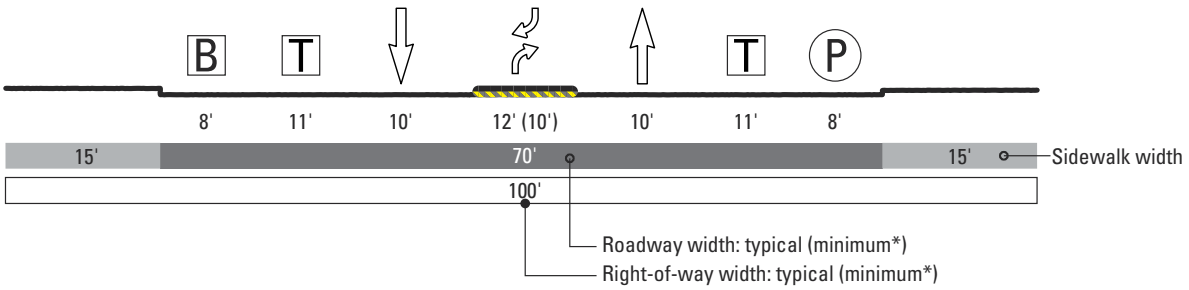
The cross section diagrams are numbered according to Street Classification (lettered "A" to "H") and Network Assignment (numbered 1-4)

		Typical Row Width	Typical Roadway Width
A	Boulevard I (Major Highway Class I)	136'	100'
B	Boulevard II (Major Highway Class II)	110'	80'
C	Avenue I (Secondary Highway)	100'	70'
D	Avenue II (Secondary Highway)	86'	56'
E	Avenue III (Secondary)	72'	46'
F	Collector Street	66'	40'
G	Industrial Collector Street	68'	48'
H	Local Street	60'	36'

Network Assignments	
1	**Neighborhood Enhanced (NEN)**
2	**Bicycle Enhanced (BEN)**
3	**Transit Enhanced (TEN)**
4	**Vehicle Enhanced (VEN)**

Legend for Complete Street Cross Sections

LEGEND FOR ALL EXAMPLE CROSS SECTIONS



Symbols:

- B — Cycle track/Bicycle lane
- T — Full-time or peak period transit lane
- BRT — Bus rapid transit
- 11'(10') — Typical (minimum) dimension
- Travel lane
- P — Curbside parking lane

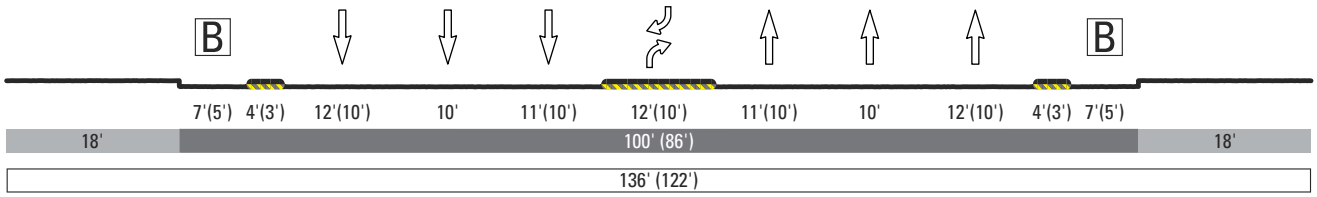
Center Lanes & Raised Medians or Platforms:

- Striped roadway-level left-turn lane
- Raised median or roadway-level turn lane (variable depending on location along the street segment)
- Raised median or Platform
- Painted Buffer or Raised median
- Painted Buffer

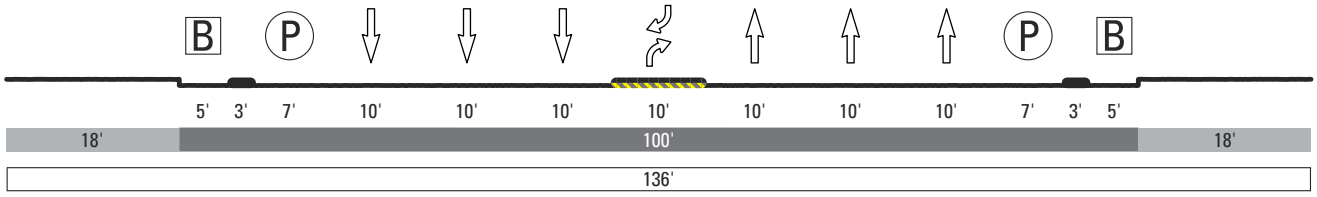
* Minimums illustrate the minimum width in which the illustrated cross section could be accommodated.

Sample Cross Sections

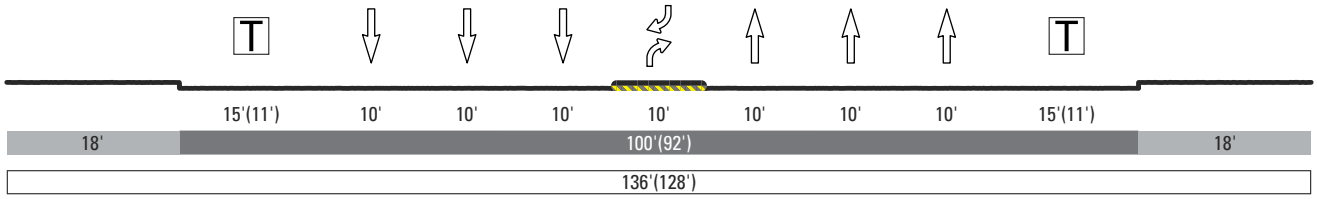
A.	Boulevard I (Major Highway Class I)
2	**Bicycle Enhanced (BEN)**
2.1	Cycle Track-without curbside parking



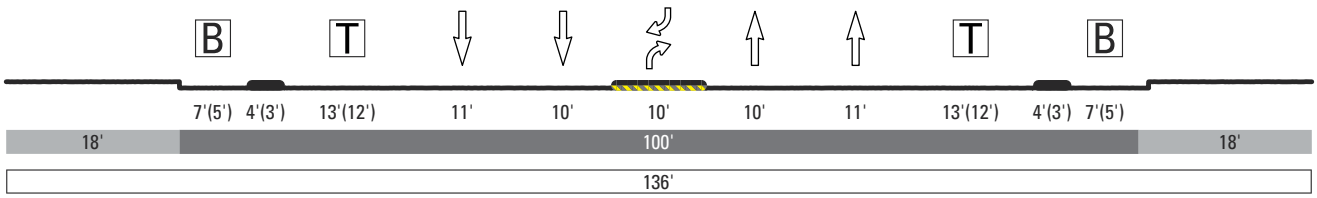
2.2	Cycle Track-with curbside parking



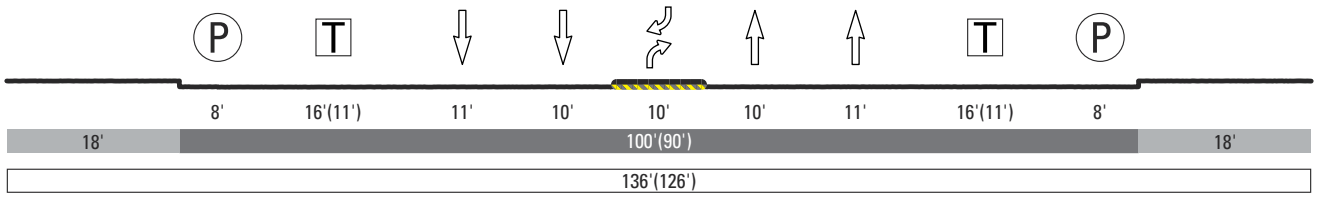
3	**Transit Enhanced (TEN)**
3.1	Full-time or peak period transit lane



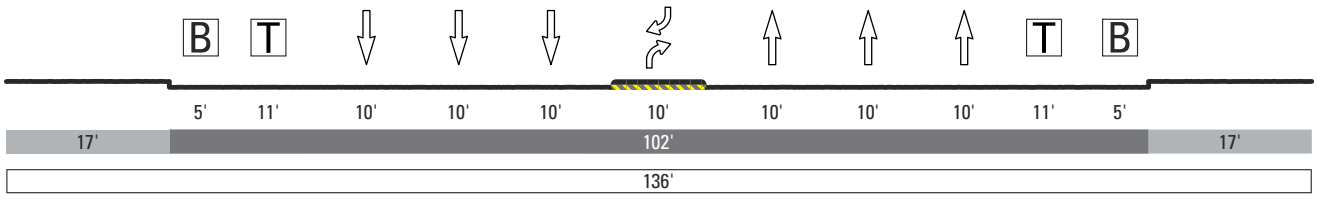
3.1	Full-time or peak period transit lane +
3.1	.1 Cycle Track



A.	**Boulevard I (Major Highway Class I)--136’ ROW, 100’ Roadway (Typical)**
3.1	Full-time or peak period transit lane
3.1	.2 Curbside Parking

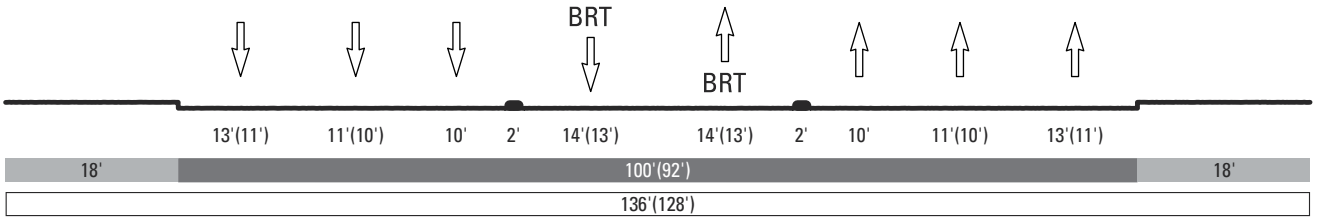


3.1	Full-Time or peak-period transit lane +
3.1	.3 Bicycle lane

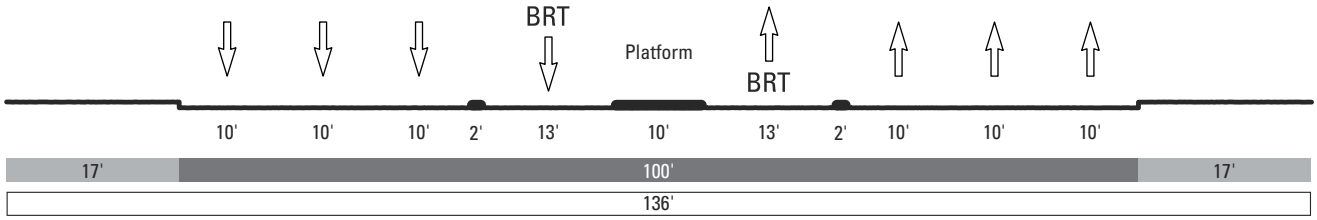


3.2	Bus Rapid Transit (BRT) (center running)

Midblock



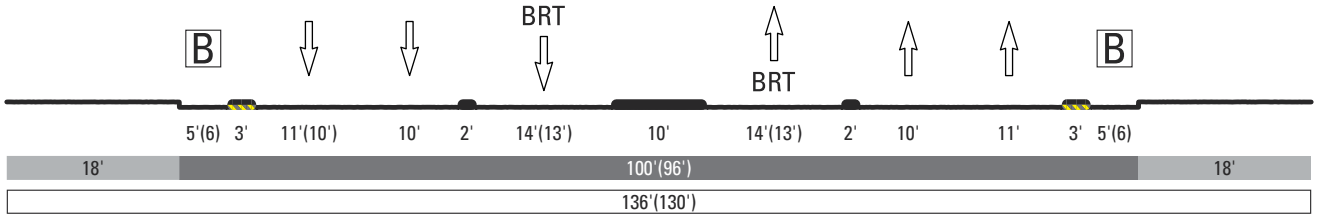
At/approaching platform - 1’ additional roadway each side (shown) or 1’ wide BRT shoulder



A. Boulevard I (Major Highway Class I)--136' ROW, 100' Roadway (Typical)

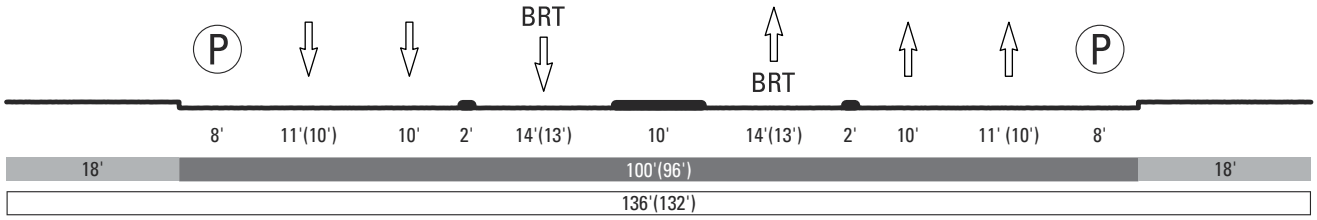
3.2 Bus Rapid Transit (BRT) (At Platform) +

3.1 .1 Cycle Track



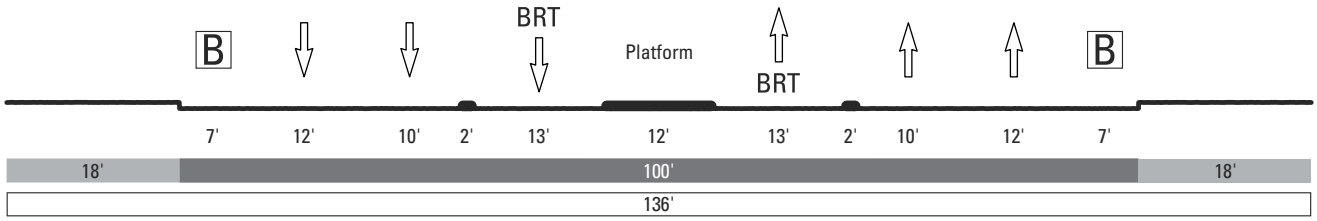
3.2 Bus Rapid Transit (BRT) (at platform) +

3.2 .2 Curbside parking



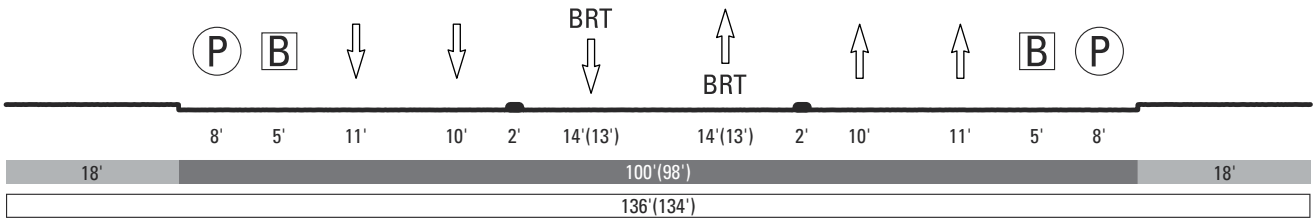
3.2 Bus Rapid Transit (BRT) (At Platform)+

3.2 .3 Bicycle lane



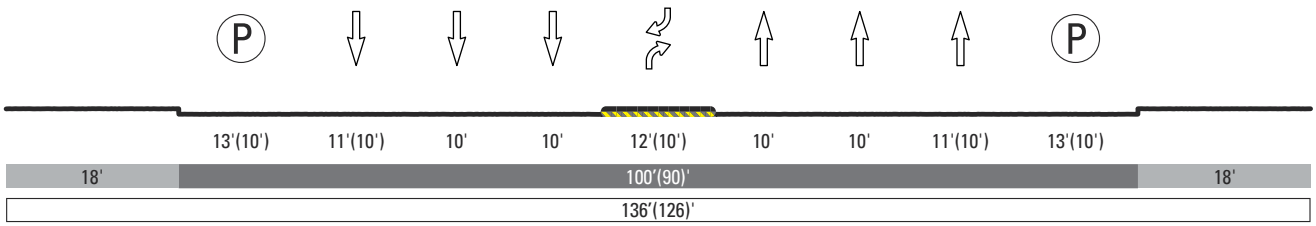
3.2 Bus Rapid Transit (BRT) (mid-block) +

3.2 .4 Bicycle lane and curbside parking

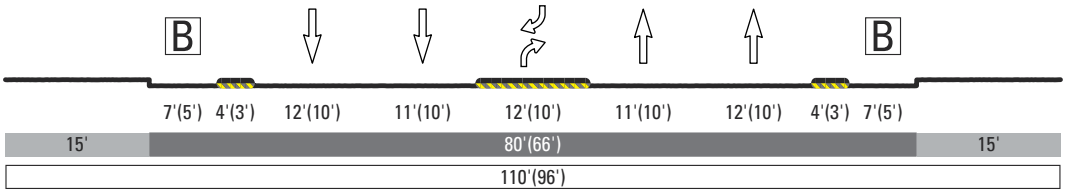


4 Vehicle Enhanced (VEN)

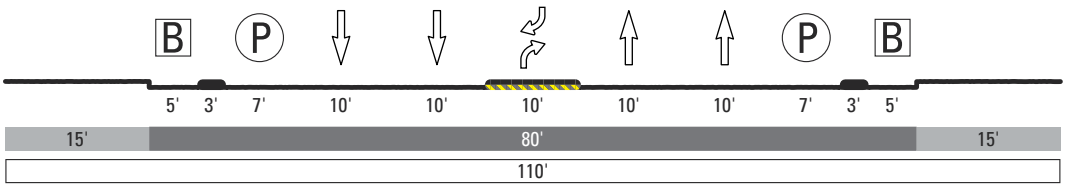
4.1 With full-time or off-peak curbside parking



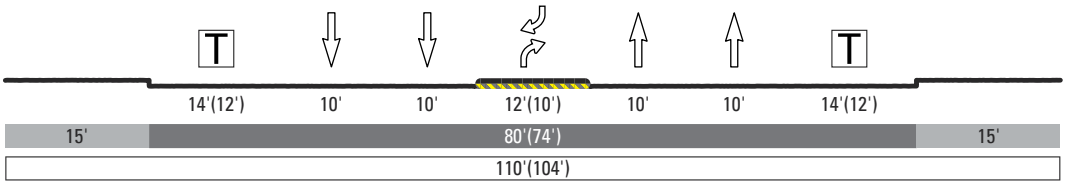
B.	**Boulevard II (Major Highway Class II)--110’ ROW, 80’ Roadway (Typical)**
2	Bicycle Enhanced (BEN)
2.1	Bicycle lane without parking



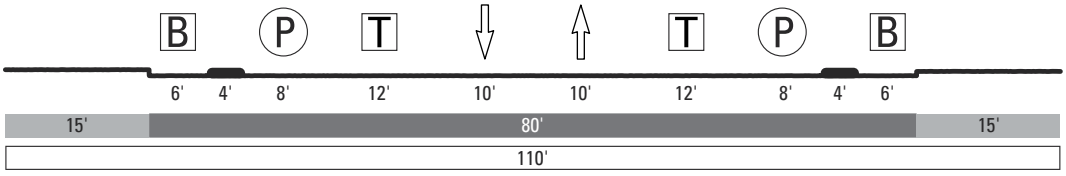
2.2	Cycle Track - with curbside parking



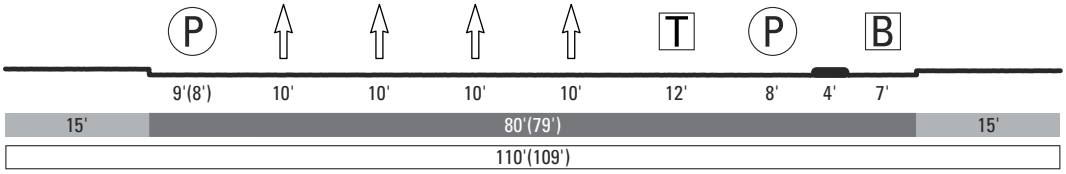
3	Transit Enhanced (TEN)
3.1	Full-time or peak period transit lane (curbside)



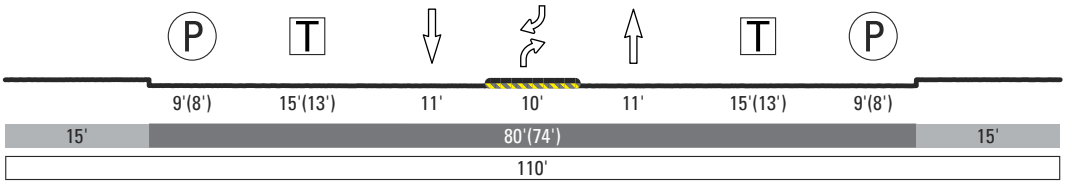
3.1	Full-time or peak period transit lane+
3.1	.1 a. Cycle track with curbside parking



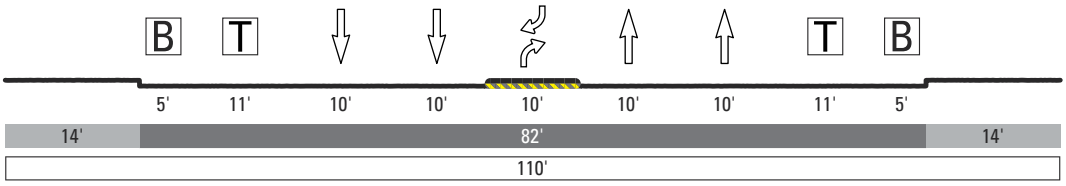
B.	Boulevard II (Major Highway Class II)--110’ ROW, 80’ Roadway (Typical)
3.1	.1 b. Cycle Track with curbside parking (one-way example)



3.1	Full time or peak period transit lane +
3.1	.2 Curbside parking

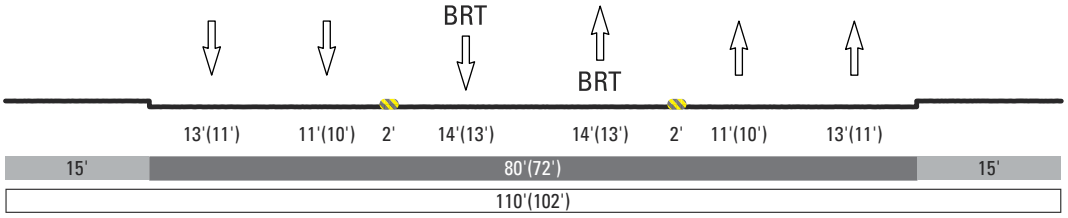


3.1	Full-time or peak period transit lane+
3.1	.3 Bicycle lane



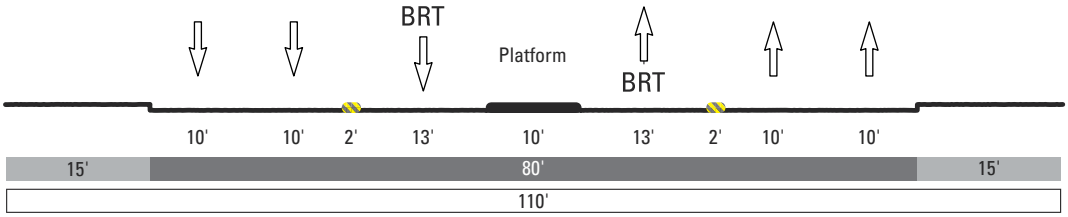
3.2	Bus Rapid Rransit (BRT) (center-running)

Midblock

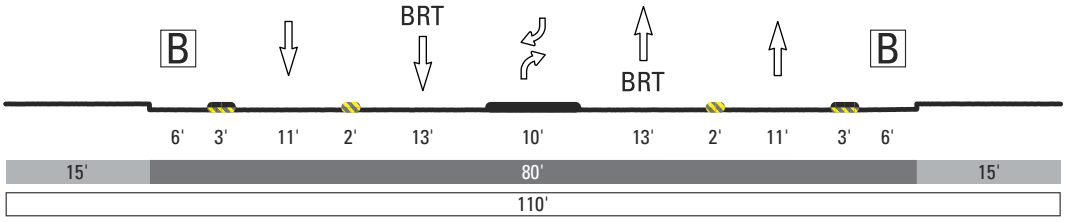


B.	**Boulevard II (Major Highway Class II)--110’ ROW, 80’ Roadway (Typical)**
3.2	Bus Rapid Transit (Center-running)

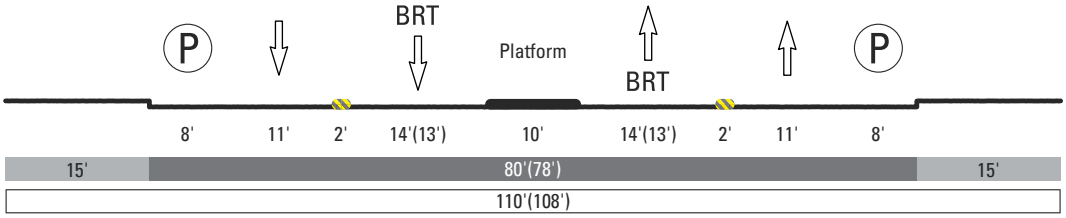
At approaching platform



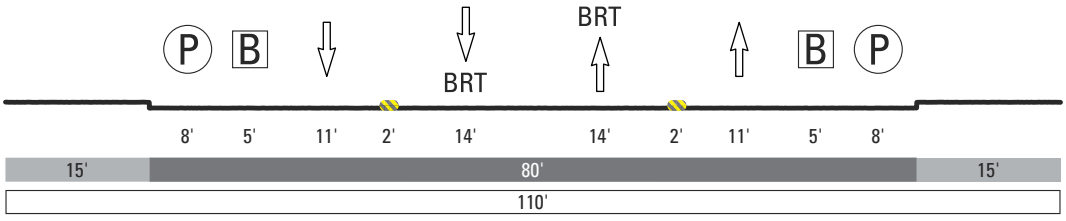
3.2	Bus Rapid Transit (at platform)+
3.2	.1 Cycle Track



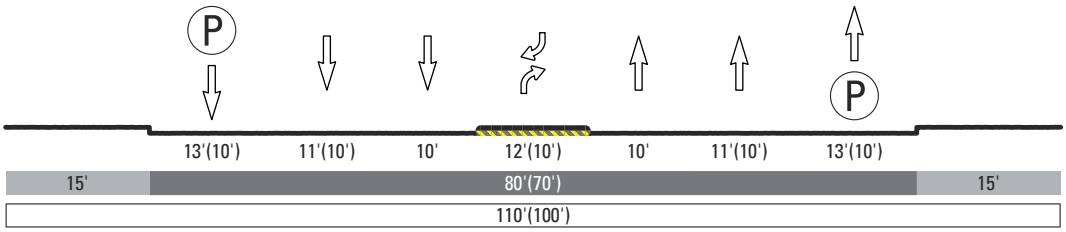
3.2	Bus Rapid Transit (BRT)(center-running)+
3.2	.2 Curbside parking



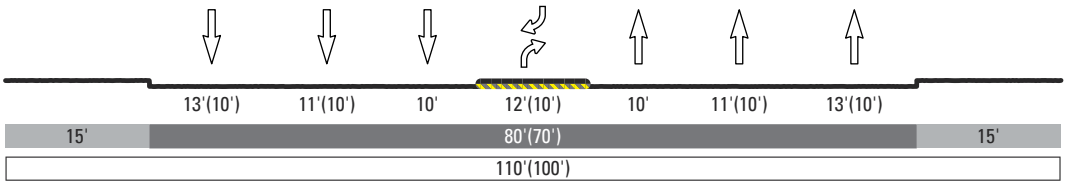
3.2	Bus Rapid Transit (BRT) (Midblock)+
3.2	.3 Bicycle lane and curbside parking



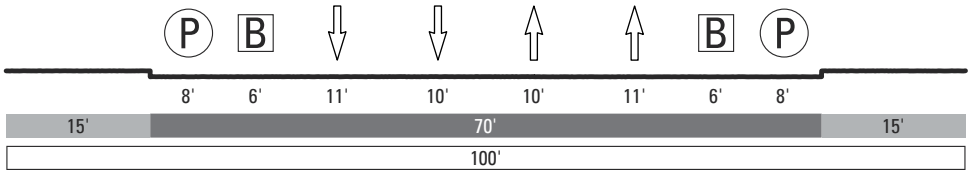
B.	**Boulevard II (Major Highway Class II)--110’ ROW, 80’ Roadway (Typical)**
4	Vehicle Enhanced (VEN)
4.1	b. With full-time or off-peak curbside



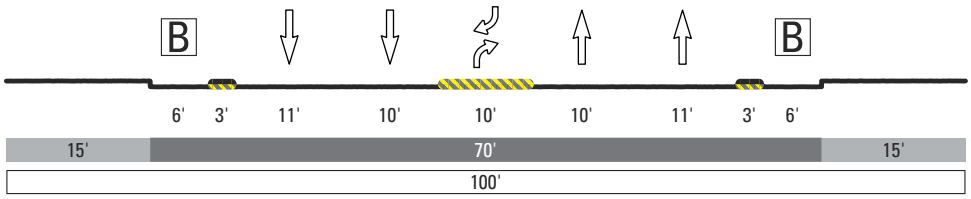
4.2	Without curbside parking



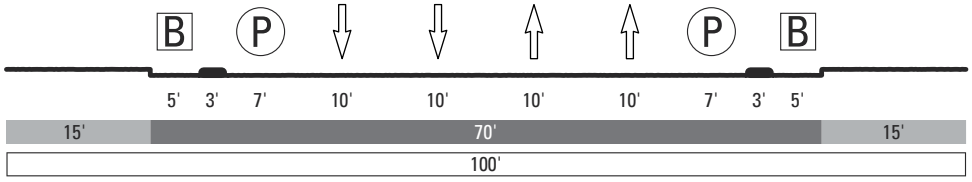
C.	**Avenue I (Secondary Highway)--100’ ROW, 70’ Roadway (Typical)**
1	Neighborhood Enhanced Network (NEN)
1.1	Bicycle lane and curbside parking



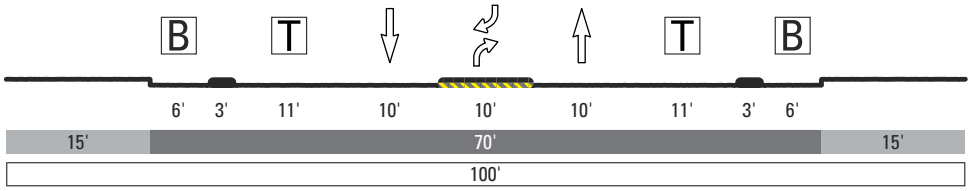
2	Bicycle Enhanced Network (BEN)
2.1	Cycle track - without curbside parking



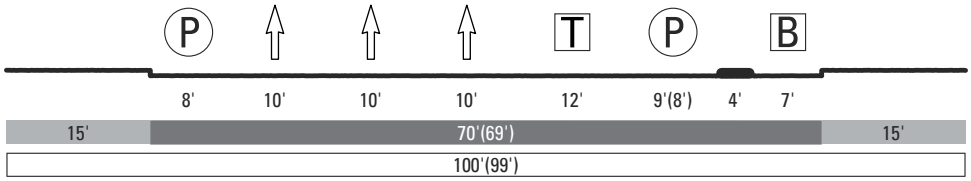
2.2	Cycle track with curbside parking



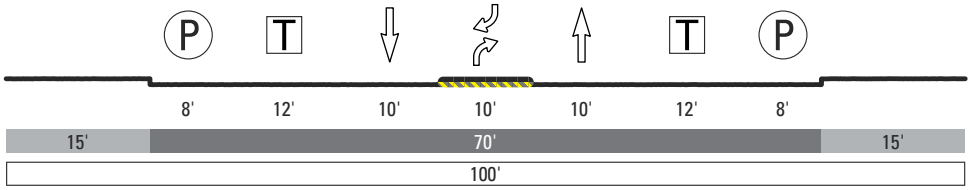
3.	**Transit Enhanced (TEN)**
3.1	Full-time or peak period transit lane+
3.1	.1 a. Cycle track (two way)



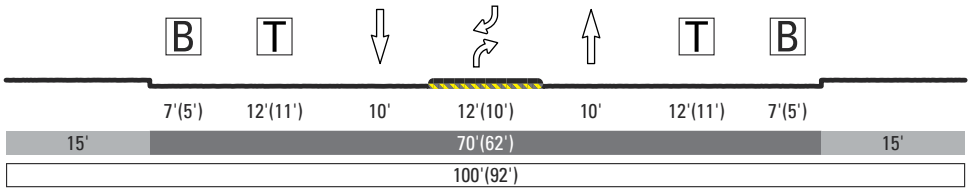
3	**Transit Enhanced (TEN)**
3.1	.1 b. Cycle Track (one-way)



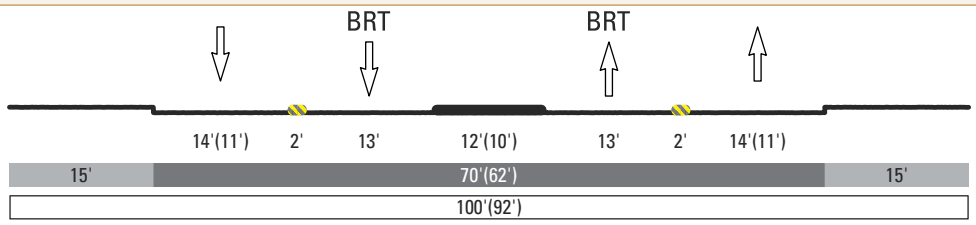
3.1	Full-time or peak period transit lane
3.1	.2 Curbside Parking



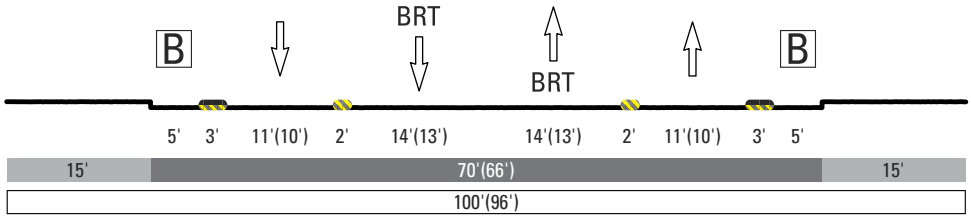
3.1	Full-time or peak period transit lane+
3.1	.3 Bicycle lane



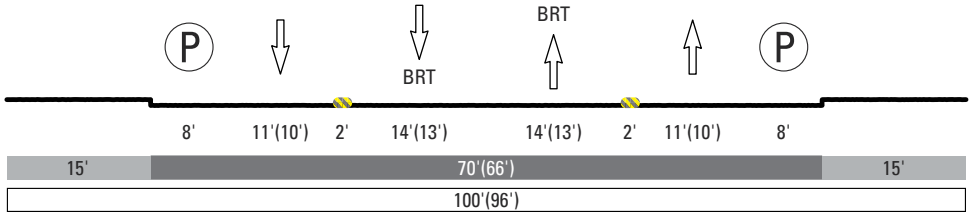
c.	**Avenue I (Secondary Highway) -- 100’ ROW, 70’ Roadway (Typical)**
3.2	Bus Rapid Transit (BRT) (at platform)
	at platform



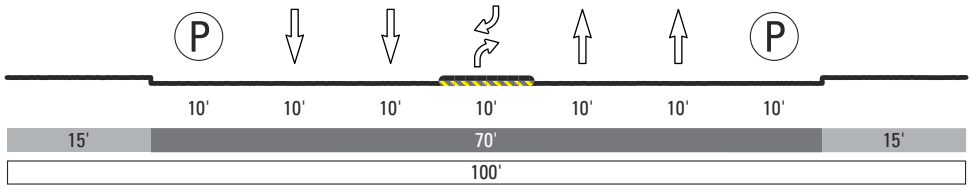
3.2	Bus Rapid Transit (BRT) (Midblock)+
3.2	.1 Cycle Track



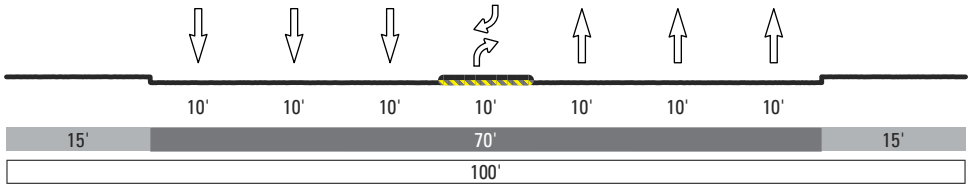
3.2	Bus Rapid Transit (BRT) (Midblock)
3.2	.2 Curbside parking



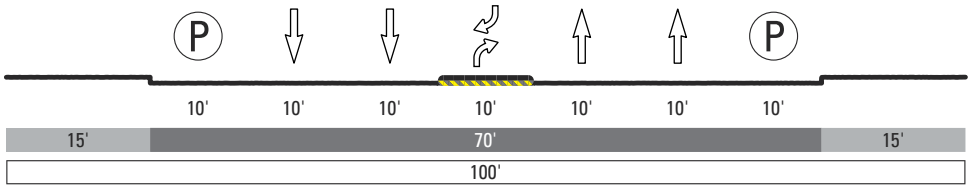
4	**Vehicle Enhanced (VEN)**
4.1	With full-time or off peak curbside parking



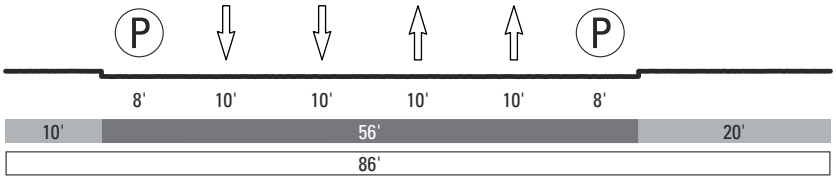
4.2	Without curbside parking



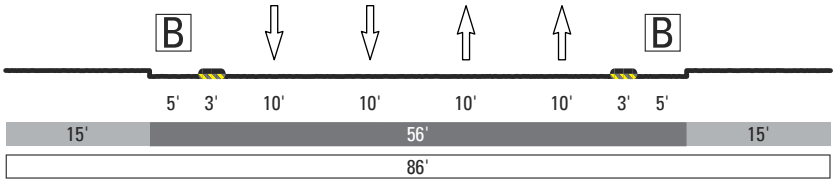
D.	**Avenue II (Secondary Highway) -- 86’ ROW, 56’ Roadway (Typical)**
1	Neighborhood Enhanced (NEN)
1.1	Bicycle lane and curbside parking



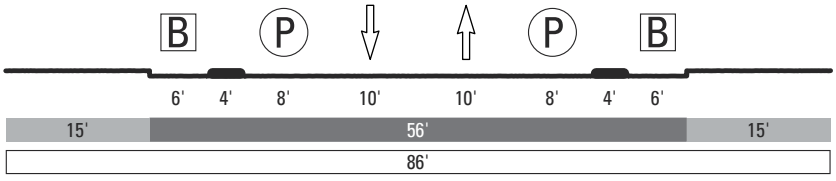
1.2	Equestrian Trail (one-side)



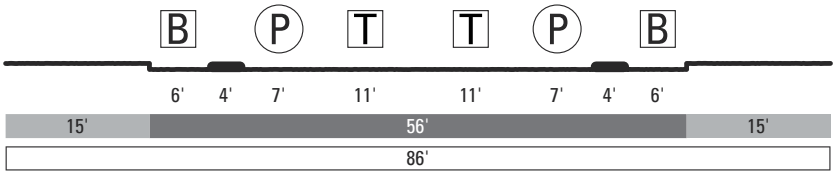
2	Bicycle Enhanced (BEN)
2.1	.1 Cycle Track without curbside parking



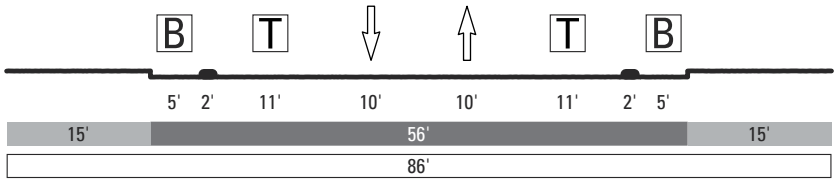
2.2	Cycle Track - with curbside parking



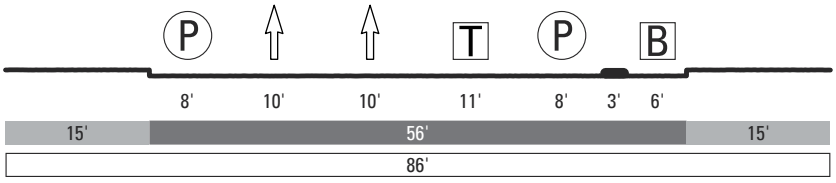
3	**Transit Enhanced (TEN)**
3.1	Full-time on peak period transit lane+
3.1	a. Cycle Track with parking



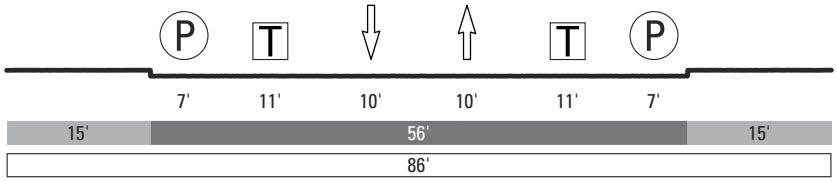
D.	Avenue II (Secondary Highway) -- 86’ ROW, 56’ Roadway (Typical)
3.1	.1 b. Cycle Track without parking



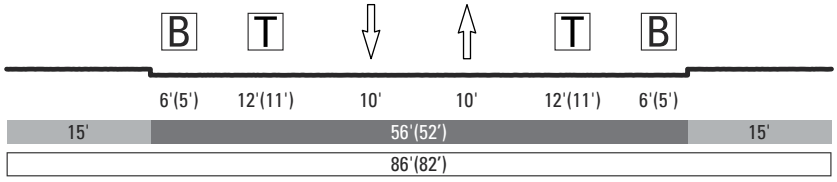
3.1	.1 c. Cycle Track (one-way)



3.1	Full-time or peak period transit lane+
3.1	.2 Curbside parking

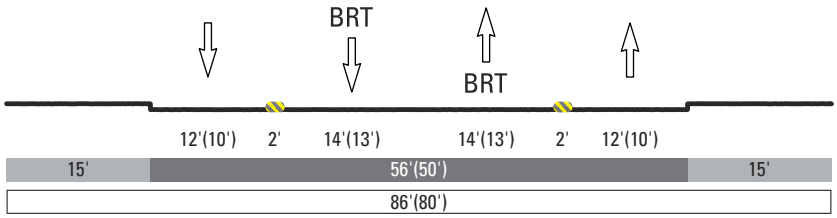


3.1	Full-time or peak period transit lane+
3.1	.3 Bicycle lane

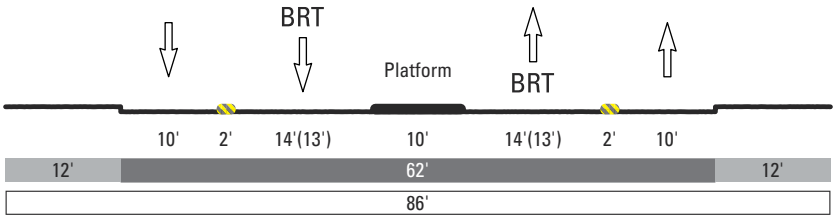


3.2	a. Bus Rapid Transit (BRT) (Center-running)

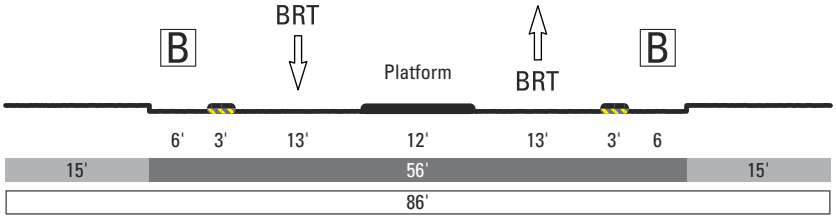
Midblock



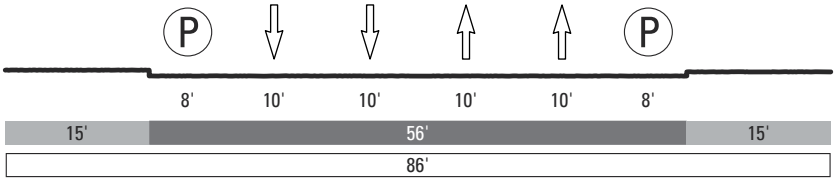
D.	**Avenue II (Secondary Highway) -- 86’ ROW, 56’ Roadway (Typical)**
at / approaching platform	



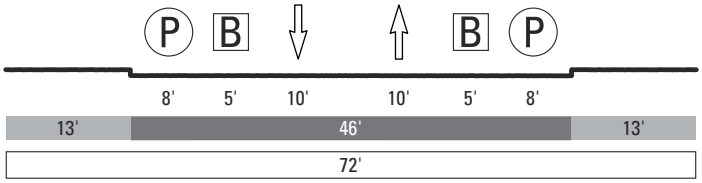
3.2	Bus Rapid Transit (BRT) (at platform)
3.2 .1	Cycle Track



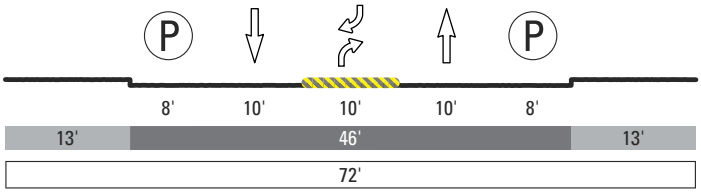
4	**Vehicle Enhanced Network (VEN)**
4.1	With curbside parking



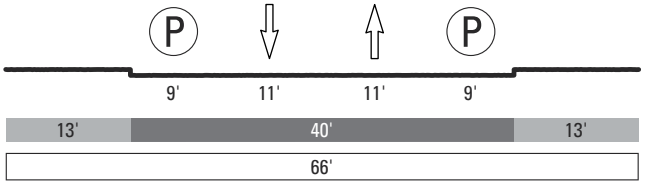
E.	**Avenue III (Secondary Highway) -- 72’ ROW, 46’ Roadway (Typical)**
1	**Neighborhood Enhanced (NEN)**
1.1	Bicycle lane and curbside parking



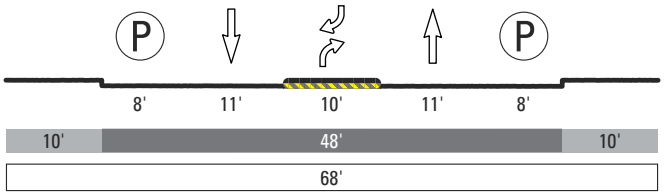
1.2	Shared lane markings and curbside parking



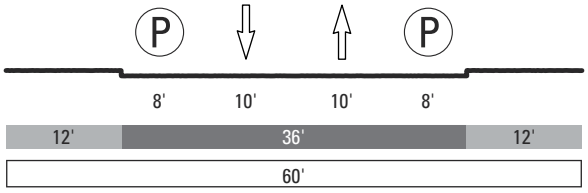
F.	Collector Street -- 66’ ROW, 40’ Roadway (Typical)
1	**Neighborhood Enhanced (NEN)**
1.1	Shared lane markings and curbside parking



G.	Industrial Collector Street - 68’ ROW, 48’ Roadway (Typical)
1	**Neighborhood Enhanced (NEN)**
1.1	Shared lane markings and curbside parking

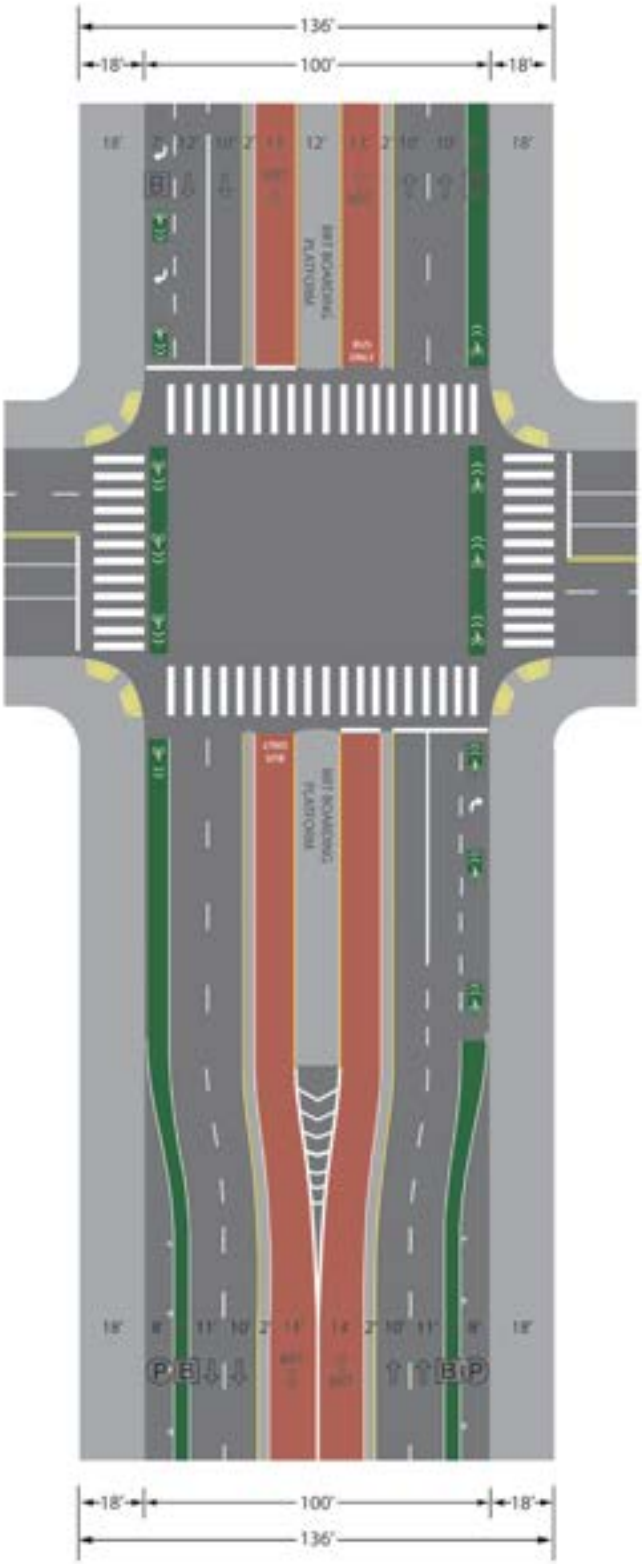


H.	Local Street (Standard) -- 60’ ROW, 36’ Roadway (Typical)
1	**Neighborhood Enhanced (NEN)**
1.1	Shared lane markings and curbside parking

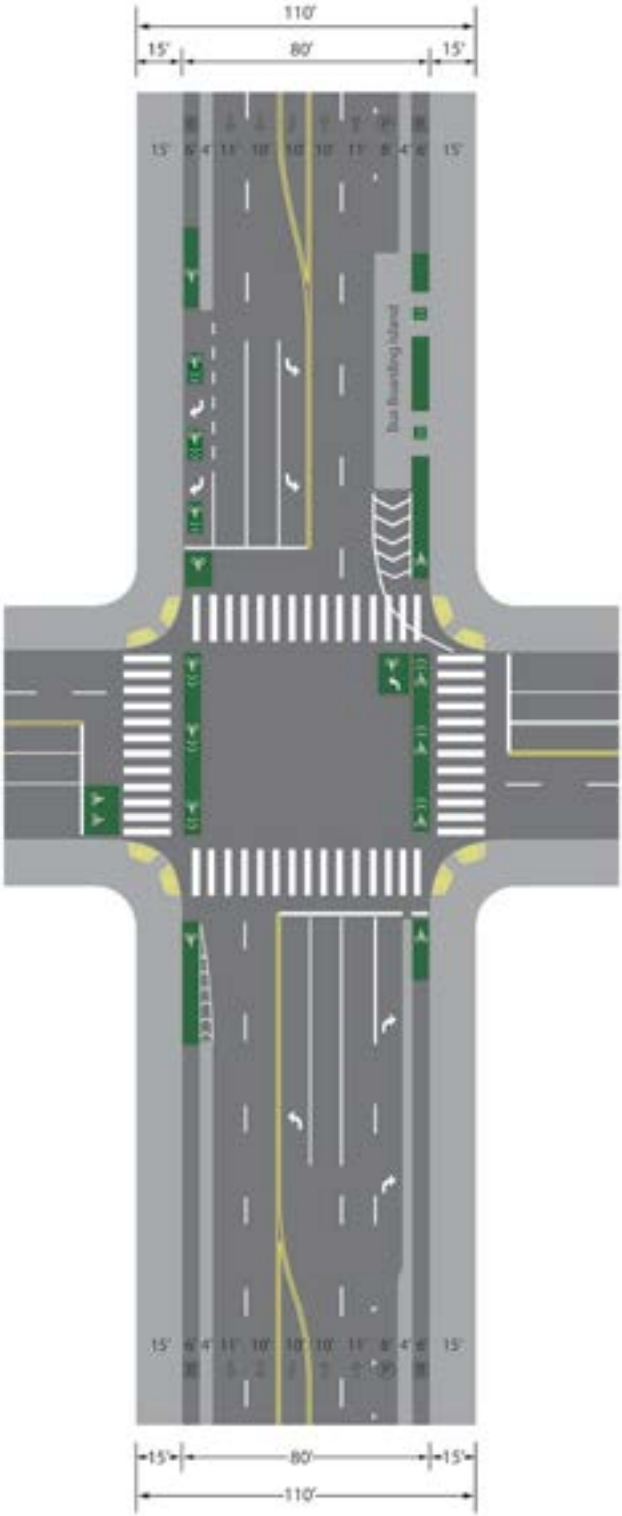


Complete Street Sample Plan Views

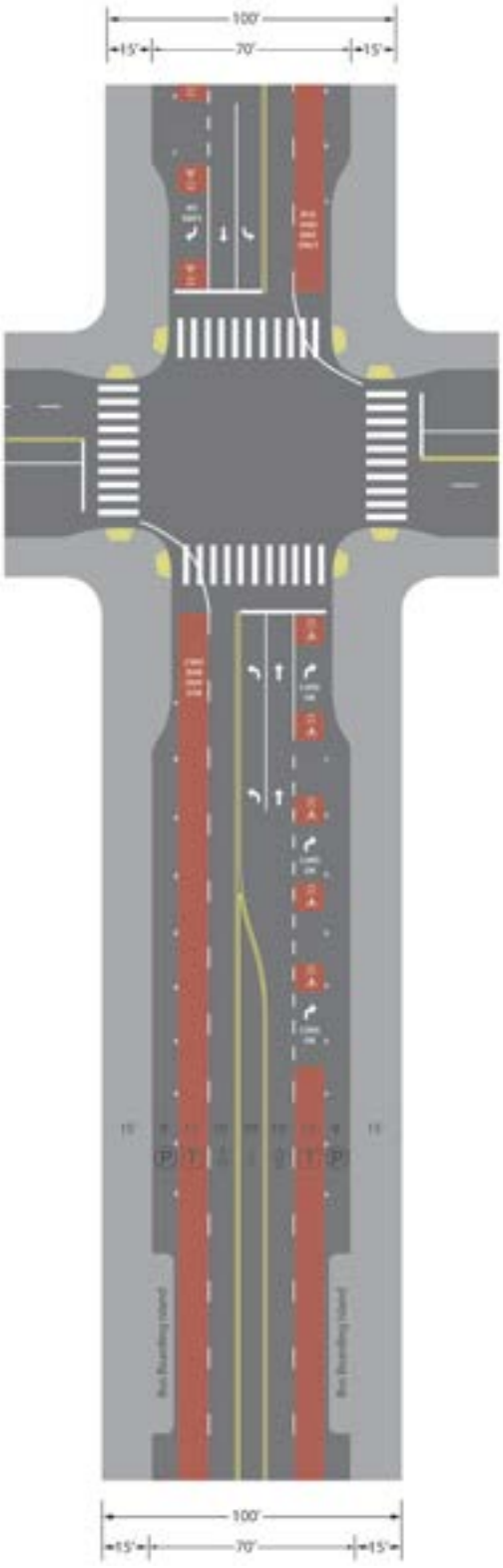
Boulevard I (Major HIghway Class I) - Transit Enhanced Network with Bus Rapid Transit (BRT)



Boulevard II (Major HIghway Class II) - Bicycle Enhanced Network with Protected Bike Lanes



Avenue I (Secondary Highway) - Transit Enhanced Network with Bus-Bike Only Lanes



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COMPLETE STREETS DESIGN GUIDE

SIDEWALK AREA

4





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4. SIDEWALK AREA

Introduction

The Sidewalk Area represents the pedestrian realm located between the curb and the property line. While its primary function is to provide a safe and accessible means of travel for pedestrians travelling along the street, the sidewalk area can also be a vibrant place where people can enjoy the urban environment. This chapter introduces a variety of structural, natural and functional components that may be applied based on contextual factors including adjacent land uses, pedestrian volumes, and sidewalk area dimensions. Used individually or in coordination with other interventions in this guide, these components enhance safety, security, accessibility, and the overall urban experience for all users.

The Sidewalk Area can be partitioned into four zones: Frontage Zone, Pedestrian Zone, Amenity Zone, and Flex Zone. Each zone (defined and illustrated in chapter 1) has its own distinct function in a Complete Street. Their boundaries are not always fixed, and many features can be located in more than one zone.

4.1 Building Entries

Building entries can be enhanced by revsourceful and imaginative utilization of the frontage zone. Treatments include lighting, awnings, pavement decoration, and landscape planters.

Benefits

- Enlivens the pedestrian environment by adding visual and spatial interest to the sidewalk area
- Highlights building entry points as an important feature of the urban environment
- Provides retail businesses with additional opportunities to attract passersby

Applications

- The usage of the frontage zone for entrance enhancements occurs most commonly in pedestrian-oriented districts where building frontages adjoin the sidewalk, especially in commercial and mixed-use districts with high pedestrian activity.
- In districts with lower densities where buildings are generally set back from the public right-of-way, sidewalk-adjacent property entry points (e.g. entry paths, gates, portals, or columns) can also be enhanced in similar fashions.

Design Guidance

- Elements including landscaping planters and lighting must not encroach upon the minimum pedestrian access route (PAR). Additionally, entry treatments should ensure a fully-accessible access route from the walkway zone to the point of entry.
- The aesthetic qualities of entrance treatments should complement and visually reinforce the design of both the building and the streetscape.
- Planters must be durable and highly-visible so they do not become hazards to visually-impaired pedestrians. If necessary, awnings may extend over the walkway zone. Canopies with structural supports can be allowed when the supports are located outside of the walkway zone within the frontage or amenity zone.
- Light fixtures should be oriented and directed to provide light only within the entrance area, so that skyward and horizontal light pollution is kept to a minimum.
- Pavement textures and/or materials should meet ADA standards for accessible surfaces.



Landscape planters and awnings can distinguish a building entry.



Marquees and entrance canopies mark important entries and can contribute to a vibrant, enjoyable street environment.

- In many older sidewalk-oriented commercial districts in Los Angeles, building owners gave prominence to their entranceways by utilizing decorative paving, marquees, and/or metal awnings. These provide visual and spatial interest in the pedestrian realm, and they should be preserved when possible

Resources

BOE/BSS R-Permit procedure BOE Entrance Canopy Permit procedure

Other Discussion

In Los Angeles, a business owner is granted conditional use of the public right-of-way by a Revocable Permit (R-Permit) issued by the Department of Public Work's Bureau of Engineering (BOE), with approval from the Bureau of Street Services (BSS). The R-Permit review process ensures that encroachments are checked for compliance with the City's specifications for design and use. BOE also issues Entrance Canopy Permits for canopies with structural supports away from the building (not awnings), assuring that they meet standards for design, size, material, and placement.

Metal roll-up doors, used as a security feature, conceal urban storefronts during non-business hours and present road users with a blank, opaque streetwall lacking in visual interest. At a minimum, semi-transparent metal gate/screen roll-up doors or side fold-away doors with windows should be encouraged as an alternative to fully-opaque metal roll-up doors. Business and property owners should be encouraged to remove these doors entirely to ensure a more transparent and interesting streetwall even during non-business hours.



Metal roll-up security doors should generally not be used, because they detract from the street experience and conceal storefronts and entries.



Compared to solid metal roll-up doors, grated security gates provide a more interesting street environment and a more pleasant pedestrian experience, while still ensuring security.

4.2 Portable Signage and Sidewalk Merchandising

In pedestrian-oriented commercial areas, many retail businesses utilize the frontage zone for pedestrian-scale signage and merchandise displays. Typically, sidewalk signage consists of sandwich boards placed in front of businesses. Merchandise displays can range in scale – from a single rack placed beside a store entrance to a collection of tables/racks that extend a storefront into the public realm.

Benefits

- Adds visual and spatial interest to the public realm
- Enlivens the street environment by promoting activity and public interaction
- Provides retail establishments with a valuable opportunity to attract customers and to be more visible to passersby

Applications

- Sidewalk signage and merchandising are primarily located in pedestrian-oriented shopping districts, although they are used by retail- and service-providing businesses in a variety of land use contexts.

Design Guidance

- The utilization of the sidewalk area for signage and/or merchandising is possible only when the sidewalk area has sufficient width to ensure the required accessible pedestrian access route (PAR). When determining placement of signage and merchandise displays, owners and permitting agencies must take into account the active space around the fixtures likely to be used by shoppers.





- The size of portable sidewalk signage (sandwich boards) should conform to BSS standards. Businesses should generally be limited to one portable sign to avoid clutter.
- Signage and merchandise displays should be freestanding so they are removable at the end of business hours.
- Businesses sometimes place portable signage that is oriented toward automotive traffic instead of the sidewalk environment. Examples include signs at curbside valet zones parking lot entrances. These signs, where permitted, should be designed to be in scale with the pedestrian environment. Display fixtures shall be fabricated of durable materials that are compatible with the surrounding visual character and that are resistant to sun and water damage. Fixtures must be stable and have sufficient weight to avoid being tipped over by wind.
- In addition to being located outside of the walkway zone, design considerations should be made to ensure maximum visibility and safety for visually-impaired pedestrians. For example, display racks may incorporate bright colors, and highly-visible diverters can be placed at either end of the merchandising area.

Other Discussion

In Los Angeles, a business owner is granted conditional use of the public right-of-way by obtaining a Revocable Permit (R-Permit) issued by the Department of Public Work's Bureau of Engineering (BOE) with approval from the Bureau of Street Services (BSS). The R-Permit review process ensures that encroachments are checked for compliance with the City's specifications for design and use.

Other sidewalk merchandising includes newsracks and newsstands, although both are becoming less utilized in today's urban environment. BOE grants newsrack permits after BSS has approved their placement per guidelines in the municipal code. Newsstand permits are granted in a similar manner. Both newsracks and newsstands should be located near areas of high pedestrian activity. Newsracks should be consolidated in groups of two or more; a multi-unit newsrack is preferred to individual racks placed side-to-side. As trends continue to shift toward non-print media, there is a decline in the utilization of newsracks and newsstands. Unused and/or unmaintained newsracks can be a visual blight; the removal of under-utilized newsracks should be encouraged.

Resources

BOE R-Permit procedure
BOE Newsrack Permit procedure



The placement of portable signage should not encroach on the pedestrian zone. Sandwich boards should be located fully within either the frontage or amenity zones.


Multiple newspaper racks consolidated into a single location can be artfully screened from the street, making an attractive contribution to the sidewalk environment.

4.3 Streetscape Signage and Wayfinding

Signage in the public right-of-way is a ubiquitous feature of the urban streetscape. At a minimum, signs convey essential information to motorists, cyclists and pedestrians. Within the pedestrian realm, signage can also highlight gateways to neighborhoods or districts, provide directional and wayfinding information, and offer educational opportunities. The placement of signs is as important as the information they convey. Poor placement and/or excessive signage can reduce effectiveness and create a cluttered street environment.

Benefits

- Facilitates safe streets through the effective design and placement of essential traffic signs such as speed limit and warning signs
- Enhances pedestrian mobility by providing directional information to nearby destinations, transit stops/ stations, other districts, etc.
- As placemaking tools, provides a coherent image of a neighborhood or district, marks entry points, and gives information about places of interest and/or local history.



Informational displays are an important placemaking tool to highlight a district's history, culture, and uniqueness.

Applications

- Generally, roadway-oriented signage is sited according to existing standards (e.g., distances from intersections/crossings, distances between signs, etc.). The placement of pedestrian-oriented signs, however, is largely dependent on specific contexts. As for all other physical features in the sidewalk area, these signs should comply with required clearances from other street elements and comply with ADA accessibility requirements.
- Pedestrian-oriented signage is most appropriate in areas with high pedestrian volumes including commercial districts, tourist-oriented locations, historic districts, and cultural districts. Wayfinding programs can be used to provide signage to enhance pedestrian mobility throughout the city; they can deliver directional information to guide pedestrians to special destinations such as parks, historic buildings, cultural amenities, bus stops and Metro stations. Signs can be used to convey spatial information through the use of maps and written directions.

Considerations

- A major challenge is to avoid adding to the visual clutter that often exists along the roadways and sidewalks in Los Angeles. Too many signs clustered together can make them indecipherable and ineffective.

Guidance

- Sign installation should be coordinated between departments and agencies in order to provide a less-cluttered streetscape and to encourage clear and effective communication. Currently, at transit stops serving multiple transit agencies, it is common practice for each agency to post flag signs on its own individual sign pole. This results in visual clutter, obscuration of one flag sign by another, and reduced space for boarding and alighting. Transit-providing agencies (e.g. LA Metro, LADOT, Santa Monica Municipal Bus Lines, and Culver CityBus) should coordinate the placement of flag signs to minimize the number of poles at shared bus stops.



At many transit stops, multiple sign poles create obstructions for transit riders boarding and exiting the bus, and they produce visual clutter. Transit signs can be consolidated in order to limit the number of sign poles.

Roadway-oriented signage

- The number of sign poles should be minimized by placing traffic and parking signs onto single poles and by placing new signs on existing poles wherever possible. On the other hand, too many signs attached to one pole can result in a jumble that renders the signs ineffective. Sign placement should comply with MUTCD guidelines.

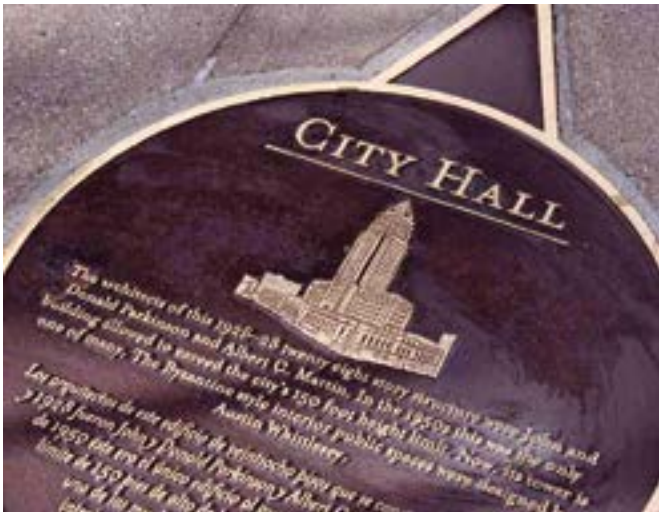
- Traffic and parking signs should be placed so that they are unobstructed by other streetscape elements.

- Signs should be placed away from locations ideal for landscaping, lighting, and site furnishings wherever possible.

- Signs should not be placed in locations where they obstruct the minimum clearance width for, or protrude into, the pedestrian walkway.

- Roadway-oriented signs with two posts where one or both posts are located in the pedestrian zone should not be utilized. These interior posts often intrude upon the pedestrian clear path and are hazards for visually-impaired pedestrians.

- Parking sign designs that utilize graphics and numbers (in lieu of an abundance of text) should be considered for use in the City. These designs communicate parking hours and restrictions in a clear manner for all road users including non-English speakers.



Pavement plaques can be an enjoyable alternative to above-ground wayfinding signage.

Pedestrian-oriented signage

- Wayfinding signage should have a distinct and coordinated design that reflects the culture and character of the surrounding neighborhood or district. Well-designed signage supports a neighborhood or district's distinct identity.
- Kiosks in public areas provide valuable information such as maps, bulletin boards, and community announcements. Kiosks can often be combined with gateway signs and are an attractive and useful street feature. They may be located in any of the following areas:
- Wayfinding signage and/or kiosks should be provided at all major transit stops. They should be visible to transit users without negatively affecting accessibility.
- Signage should utilize clear, concise and consistent language and provide easily-understood graphic information.
- Placemaking signage that provides destination descriptions and local history should be supplemented with tactile information to be accessible to people with visual impairments.



Bicycle-oriented signage

Bicycle lanes have unique signage requirements that are included in chapter nine of the California Manual of Uniform Traffic Control Devices (MUTCD). The MUTCD should be consulted during the design of any facility.

Directional and wayfinding signage should be visually distinguishable from vehicle-oriented roadway signage.



References

Traffic and directional signage: CA MUTCD
Los Angeles Municipal Code Sign Regulations-

4.4 Public Seating

Public seating contributes to an active pedestrian environment by enhancing the role of the sidewalk as an enjoyable public space. Seating serves short-term needs to rest or wait, and it also fosters socialization and enjoyment of the urban environment. Examples of public seating include fixed benches, sitting rounds, seats built into other amenities like landscape planters, and even movable chairs and tables.

Benefits

- Activates and enlivens the sidewalk environment
- Forms active social spaces, especially when grouped in areas of higher pedestrian activity
- Provides valuable places for pedestrians to rest along the path of travel
- Contributes to economic vitality by creating a pedestrian-oriented environment that is attractive for shopping

Applications

- Seating is a valuable public amenity on all streets in Los Angeles regardless of surrounding land uses.
- Providing well-distributed seating furniture is especially important in areas with high concentrations of pedestrian activity and on streets with pedestrian-oriented destinations.
- Seating may be located anywhere within the sidewalk area as long as the minimum walkway clear width is maintained.
- Benches and other seating areas are most commonly located in the amenity zone. Seating is also a primary component of many curb extensions in the flex zone. In addition, seating can be located in the frontage zone, where users benefit from an added buffer from the roadway.
- Business and building owners, Business Improvement Districts, and neighborhood groups are encouraged to install and maintain public seating fixtures as a public benefit.
- Benches to accommodate transit users should be provided at all transit stops.
- Seating in outdoor dining areas is discussed in “Outdoor Dining”, section 4.5 below.



Curb extensions can provide additional space for sidewalk seating.



Public seating can be oriented perpendicular to the curb. Ideally, seats should face each other to encourage social interaction. instead of being placed back-to-back as shown above.

Considerations and Guidance

- Seating should not impede ADA clear widths (Pedestrian Access Route) in the pedestrian zone. This determination must account for the seated persons' utilization of space beyond the boundaries of the seating element.
- Seating must not conflict with access to building entries, loading zones, parked vehicles, driveways, and fire hydrants.
- Poorly-located seating is often under-utilized seating. City agencies must ensure proper locational placement so that seating fixtures situated in areas where people would like to-or need to-be seated. Seating is especially valuable in shaded areas, preferably under trees.
- Public-private partnerships between City agencies (mainly the Bureau of Street Services) and business or neighborhood groups are a powerful tool for installing and maintaining abundant and varied seating opportunities throughout the City's diverse districts and neighborhoods. Other creative financing opportunities include bench sponsorship programs and incentives to business owners for the installation and maintenance of public amenities outside their businesses. These methods can support broader streetscape improvements incorporating other streetscape elements such as trees, landscaping, wayfinding signage, and lighting.
- The placement of seating fixtures must be balanced with other sidewalk elements and functions. Seating should be integrated with the placement of other street furniture (e.g., pedestrian lighting and trash receptacles).
- The aesthetic qualities of seating fixtures should complement and visually reinforce the design of the streetscape. Seating should be designed to complement other street furniture in material and scale, and it can harmonize with architectural qualities of surrounding buildings.
- Public seating on the sidewalk should be permanently affixed unless an adjacent business agrees formally to be responsible for its maintenance and security.
- Where there is sufficient space (for example, on curb extensions and in wide amenity zones), seating can be clustered to form social spaces.
- Where seating in the amenity zone is oriented parallel to the curb, it should face toward buildings and away from the street (except at transit stops). In frontage zones, seating that is oriented parallel to the building wall should generally face away from buildings. Where sidewalk width permits, seating in either zone can be perpendicular to the curb or building wall, placed either individually or in pairs facing one another; this orientation can create spaces that encourage socialization.



Wide sidewalks provide abundant space for public seating that encourages social interaction. Trees placed adjacent to seating provide shade and contribute to a comfortable, attractive pedestrian environment



There are many innovative alternatives to traditional bench seating, including seating at the edge of landscape planters.



This fanciful seating is part of a streetscape project completed through the City's Great Streets Initiative.

- Curbside seating should be avoided where there is a curbside vehicular travel lane, although it is acceptable at transit stops (see further discussion in "Transit Stops", below). The lack of an adequate buffer between seating and traffic results in lower safety and comfort.
- Informal seating opportunities may be used as an alternative to free-standing benches. These include low walls, sitting rounds, seating built into planter walls, or leaning bars.
- On streets with ground-floor commercial uses and medium to high pedestrian volumes, seating for 3 (e.g. one 6-foot-long bench) should be provided at least every 200 feet.
- In locations where production filming is common, the placement of street furniture should take into consideration the movement of large production equipment between the roadway and the sidewalk area. This can be accomplished by allowing sufficient clear space along the curb between street amenities and/or by placing street amenities further away from the curb. (In both cases, four feet of clear space is generally desired).

Other Discussion

In Los Angeles, a property owner is granted conditional use of the public right-of-way by a Revocable Permit (R-Permit) issued by the Department of Public Work's Bureau of Engineering (BOE), with approval from the Bureau of Street Services (BSS). The R-Permit review process ensures that encroachments are checked for compliance with the City's specifications for design and use.

4.5 Outdoor Dining

Sidewalk dining facilities encourage social use of the public realm, helping to foster a vibrant urban environment. Common features include tables, chairs, sheltering elements (e.g., awnings and umbrellas), and enclosing elements (e.g., planters and fencing). Dining uses in the public right-of-way exist in a variety of forms and intensities; for example, sidewalk dining can be as simple as a pair of small tables placed in front of a local cafe, or it can be as substantial as a semi-enclosed dining patio.

Benefits

- Provides opportunities for patrons to enjoy the surrounding urban environment and the outdoors
- Activates and enlivens the sidewalk environment
- Provides visual interest to the streetfront
- Increases business revenue by attracting patrons and providing additional seating space



Applications

- Sidewalk dining areas are encouraged in commercial districts with active pedestrian-oriented environments. They are most commonly located in the frontage zone directly adjacent to the restaurant establishment. Dining facilities may also be permitted in the amenity and flex zones as long as some additional considerations are addressed (see discussion below). Curb extensions and parklets (further discussed in Section 4.15 below) can provide valuable space for outdoor dining while maintaining full pedestrian functionality on narrow sidewalks.
- The minimum width (perpendicular to the building frontage and curbline) necessary to accommodate dining facilities is generally considered to be 6 feet.



Considerations

- Care must be given to the design and layout of sidewalk dining facilities to ensure that sidewalk functionality is maintained. The minimum (or desired) Pedestrian Access Route (PAR) should remain clear, and ADA requirements must be met. When considering the effects of non-enclosed dining facilities on pedestrian mobility, business owners and city staff should account for space used for wait staff and for additional items like strollers and shopping bags.

- Tables and chairs in the amenity and flex zones should maintain access to parked vehicles, and they should not be located on sidewalks adjacent to handicap-accessible parking, commercial loading, and passenger loading lanes. Placement of tables and chairs on the sidewalk must not interfere with curb ramps, access to building entries, intersection/driveway/alley visibility, fire escapes, and access to above-ground infrastructure. Minimum clear widths between dining furniture and the above street elements are identical to those for seating and other physical sidewalk elements.

- The design and layout of dining facilities placed in the amenity and flex zones require additional considerations, including accounting for restaurant-related cross-traffic across the walkway zone and maintaining curbside access for parking, utilities, emergency access, etc.

- As a private use of public space, it is necessary to hold the restaurant establishment accountable for maintenance and upkeep.



Design Guidance

- Diverters at either end of a dining area (perpendicular to or angled away from the facade) are required to guide the visually impaired toward the clear path of travel. These can be in the form of fencing, low walls, or planters – preferably in highly-visible colors. Enclosures along the long edge (parallel to the facade) are required only where alcohol is served, but they may be provided elsewhere to help delineate space and to create a sense of security for patrons.

- Since the public purpose sidewalk dining is to stimulate activity on the street, the City should prohibit restaurants from fully enclosing the dining area, which effectively privatizes public space. The use of low movable planters to define a sidewalk dining area is encouraged. To maintain permeability between the dining area and the public realm, enclosures (including plant heights) shall not exceed 42 inches in height.

- Dining furniture – including tables, umbrellas, chairs, and enclosing elements – can be either freestanding or fixed. In most settings, furniture should be freestanding so it is removable at the end of business hours, yet care must be taken in its placement to ensure a clear walkway. Dining furniture should be fabricated of durable materials that are compatible with the surrounding visual character and that are resistant to sun and water damage. Furniture must be stable and have sufficient weight to avoid being tipped over by wind.

- For dining areas in the amenity and flex zones, sufficient buffering elements (e.g., parked vehicles or landscape planters) must be present to protect patrons from passing vehicles. Generally, dining areas should not be located in the amenity or flex zones on streets with design speeds over 30mph.

Other Discussion

Currently, a business owner is granted conditional use of the public right-of-way by a Revocable Permit (R-Permit) issued by the Bureau of Engineering (BOE), along with an approval by the Bureau of Street Services (BSS). The R-Permit review process ensures that encroachments are checked for compliance with the City's specifications for design, use, material, and inspection. The City is encouraged to further refine this process city-wide to simplify and expedite the permitting process for businesses.



Resources

BOE R-Permit procedure



4.6 Public Art

Public art takes many forms with a wide array of functions and benefits. For example, art can reward passersby with a moment of visual delight, provide interactive/participatory opportunities for learning and play, act as a focal point, and/or provide a functional use (e.g., wayfinding, seating or bicycle parking). On a larger scale, public art can be a placemaking element that reinforces a community's identity and culture.

Benefits

- Activates and enlivens the sidewalk environment, providing passersby and users of public space with opportunities for visual stimulation, interaction, and delight
- Reinforces a community's or district's identity when themed to reflect its culture and/or character
- Can provide a focal point for a shared public space such as a park, plaza or seating area

Applications

Public art can be situated in a variety of areas and locations, especially on streets and public spaces with high concentrations of pedestrians. Art can be located anywhere in the sidewalk area (except the pedestrian zone) and on exterior building walls that are adjacent to or nearby the sidewalk area. In addition, art for public benefit is encouraged on private property through various city programs.



Considerations and Guidance

- Public art should be considered during the planning and design phase of development in order to be more closely integrated with other streetscape elements.
- Public art can be incorporated into utilitarian street elements (e.g., landscaping, light standards, benches, trash receptacles, bicycle parking facilities, and utility boxes). This is especially beneficial to areas with high pedestrian volumes such as commercial, civic and cultural districts.
- Public art can also be interactive, encouraging play and recreation. The best art provides these benefits for people of all ages.



Utility boxes provide abundant opportunities to enliven the street environment.

- Art murals on private property are an integral part of LA's urban environment. Non-commercial murals should especially be encouraged for blank exterior walls that are visible from the roadway and sidewalk.
- Public art should be accessible to persons with disabilities, and its placement must not compromise the clear pedestrian zone.
- The siting of public art should maintain all clearances and applicable Americans with Disabilities Act (ADA) requirements.
- Maintenance should be coordinated with sponsoring agencies or groups.
- Large-scale public art (e.g., murals or "supergraphics") can be oriented toward roadway users as long as it does not pose a distraction hazard.

Other Discussion

Public art affords a rich opportunity for public-private partnerships to improve the built environment through collaboration and coordination. A successful public arts program involves a robust public-private partnership including City agencies, business owners, cultural organizations and neighborhood groups.



In Los Angeles, the Department of Cultural Affairs' Public Art Division currently coordinates four arts programs: the Public Works Improvements Arts Program (PWIAP, more commonly known as Percent-for-Public-Art; the Private Arts Development Fee Program (ADF); the Murals Program; and the City's Art Collection.

Ordinance number 182706 (2013) amended the Los Angeles Municipal Code (Sections 14.4.2, 14.4.3 and 14.4.20) to allow for the creation of new non-commercial art murals and the preservation of existing art murals on private property including residential single-family residences. The purposes of the new regulations are to "encourage artistic expression, foster a sense of pride, prevent vandalism at mural sites through the installation of murals that vandals are reluctant to disturb and preserve existing murals that are a valued part of the history of the City of Los Angeles.

Section 91.107.4.6 of the Los Angeles Municipal Code (amended in entirety in 1997) developed an "Arts Development Fee". This fee applies to any private developer of a commercial or industrial project with a construction permit value of at least $500,000. If the developer pays the fee when pulling their permit at the Department of Building and Safety, then the Department of Cultural Affairs is responsible for providing cultural and artistic amenities that will be available to the community.

References

Municipal Code Section 14.4.20
Municipal Code Section Section 91.107.4.6



Bicycle racks can be works of public art.

4.7 Street Trees and Landscaping

Street trees and landscaping are essential for an attractive, enjoyable and sustainable urban environment. They provide numerous aesthetic, environmental, health, and even psychological benefits.

Benefits

- Enriches the visual qualities of a street and enhances the experience for all road users
- Reduces stormwater runoff by increasing permeable surface area
- Improves air quality by cooling the air, producing oxygen, filtering airborne pollutants, and absorbing greenhouse gases
- Street trees provide valuable shade and shelter for pedestrians, and they ameliorate the heat-island effect
- Provides habitat, food, and nesting sites for indigenous wildlife
- Increases property values and sales revenues for residences and businesses along the street
- Contributes to traffic calming by reducing the perceived width of the street, which encourages drivers to slow down and to pay more attention to their surroundings



Street trees provide shade and shelter for pedestrians and make the street more visually attractive

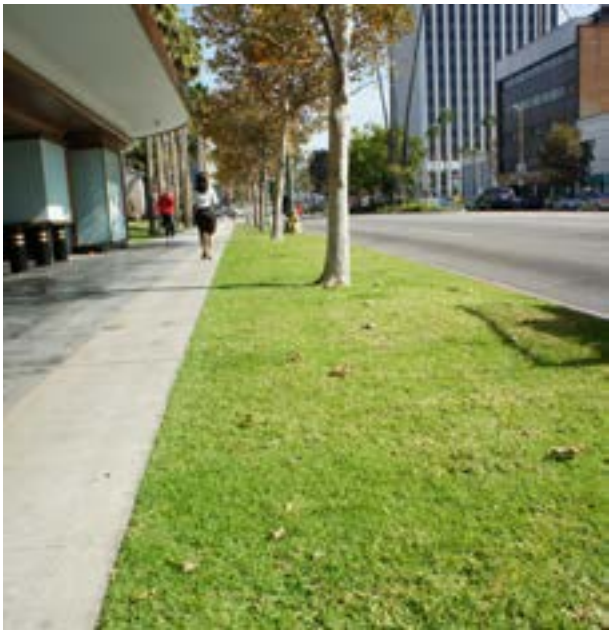
Applications

- Landscaping and trees in the public right-of-way are like any other street element in that their selection, placement, and style are products of surrounding land use contexts, street uses and practical considerations such as utility placement and underground infrastructure.
- The planting of landscaping and trees in the public right-of-way occurs mainly in the sidewalk amenity zone. On most non-residential streets in Los Angeles, landscaping and trees are often located in tree wells and/or sidewalk-level planters, interspersed with paved areas that provide curbside access. In residential areas, planting in the amenity zone generally takes the form of a parkway strip divided only by driveway entrances; although this land is public property, private property owners are responsible to plant and maintain the parkway area in front of their property.



Nontraditional landscaping in the parkway might provide accessibility issues to parked cars, and should be approved by the Bureau of Street Services' Urban Forestry Department.

- Generally, adjacent property owners and/or community/business groups are responsible to care for plantings in the amenity zone. Landscaping and trees are also planted in center medians within the roadway; generally, the city is responsible for planting and maintaining a landscape median.



Long, wide parkway strips provide a substantial permeable area that is a good place for street trees to flourish.

- Landscaping and trees can also be planted in the frontage zone where there is sufficient width; trees should only be placed in the frontage zone when they are spaced appropriately far enough away from buildings. (In residential settings, there is typically no frontage zone between the pedestrian walkway and the property line; the property line abuts the sidewalk.) In addition, trees and landscaping should be an integral part of sidewalk curb extensions in the flex zone.

Considerations

- In order for street trees and landscaping to provide these benefits, they must be provided with conditions that allow them to thrive, including adequate uncompacted soil, water, and air.

- Urban soils have become highly compacted through construction activities and the passage of vehicle and even foot traffic. Compaction reduces the soil's capacity to hold and absorb water. In these conditions, the tree roots of many tree types will expand directly beneath the sidewalk surface to take advantage of water that does not infiltrate compacted soils. In addition to tree selection, this is a primary factor in the damage of urban sidewalks.



Appropriate plantings (such as climbing vines) can turn an unsightly fence into a "green wall" that separates pedestrians from unsightly land uses and adds comfort to the pedestrian environment.

Plant Selection and Placement

- Selecting plants and trees that are adapted to a site's climate and local rain cycles can create a more-sustainable urban forest. Landscaping and trees in Los Angeles need to survive with minimal irrigation upon establishment. Selected plants should tolerate urban environmental elements, such as radiant heat from the sidewalk or street surface.
- Planting in the amenity zone (in parkway strips or planter beds) should use species that:
    - ♦ Are drought tolerant
    - ♦ Do not exceed a height of 2 feet within 5 feet of a driveway/curb cut and within 20 feet of a crosswalk, and, excluding trees, 3 feet elsewhere. Drought-tolerant perennials, shrubs, and/or groundcover that do not exceed 36 inches in height
    - ♦ Do not have thorns or sharp edges adjacent to any walkway or curb
    - ♦ Raised planter beds can be incorporated into larger sidewalk elements such as public seating areas. Planter bed edges can be used as seating walls when designed with adequate width. Planter beds must meet all required clearances to ensure an unobstructed pedestrian access route and access to other street elements such as utilities.
- Above-ground planters should generally be considered interim solutions, or they can be used where in-ground landscaping is not possible (for example, on sidewalks above basements).
- Soil analyses should address the concentration of elements that may affect plant growth, as well as pH, salinity, infiltration rate, and other factors. Remove and replace or amend soil as needed. Good preparation saves money in the long run because it reduces the need to replace plants, lowers water consumption, and reduces fertilizer applications.
- Where there is no water irrigation, plants and trees that are as mature as possible should be selected because they can better survive dry periods.
- An 18" walkable convenience strip should be provided when planting areas (such as a residential parkway strip) extend more than 10' along a curb.

Trees

Tree Selection

- Refer to the Urban Forestry Division (UFD) Street Tree Selection Guide for suitable tree species for Los Angeles' urban environment.
- Avoid planting trees with aggressive root systems known to damage the surrounding pavement, sidewalks, and substructures.
- In choosing a street tree, consider what canopy, form, and height will maximize benefits over the course of its life.



Long planter strips provide beneficial conditions for tree growth and health. They also provide a large permeable area to infiltrate rainwater runoff from the sidewalk. In a commercial setting, curbside access should be accompanied by a walkable "convenience strip" along the length of the curb; in addition, planter strips must be spaced apart regularly in order to provide walkable strips connecting the convenience strip to the primary pedestrian walkway.



Tree Location and Placement

- Permeable surfaces and planting areas complement and support street trees, in particular by providing uncompacted, permeable areas that accommodate roots and provide air, water and nutrients. Generally, a planted parkway should be as wide as possible where there are trees: when feasible, at least 6 to 8 feet wide. However, many existing parkways and medians are narrower. Narrower parkways can support understory plants and some tree species. The preferred size for a tree pit is at least 4' x 10' x 3' deep or 120 cubic feet.

- Subsurface/utility investigations should be completed before selecting locations for (and types of) street trees. In addition, tree location at corners should comply with the City's site distance requirements designated by BOE.

- Closer spacing of large canopy trees is encouraged to create a lacing of canopy, as trees in groups or groves can create a more favorable microclimate for tree growth than is experienced by isolated trees exposed to heat and desiccation from all sides. Where constraints prevent an even spacing of trees, it is preferable to place a tree slightly off the desired rhythm than to leave a gap in the pattern.

- Typically, trees on commercial streets will not achieve the same scale as they will on residential streets where greater effective root zone volumes may be achieved. On commercial streets with existing multi-story buildings and narrow sidewalks, select trees with a narrower canopy than can be accommodated on the limited sidewalk width.

- In commercial areas where the visibility of façade-mounted signs is a concern, choose species whose mature canopy allows for visibility.

- While consistent use of a single species helps reinforce the character of a street or district, a diversity of species may help the urban canopy resist disease and insect infestations.

- General Clearances (mostly as specified by UFD):

    - Mature height under power lines: 5 feet lower than electrical power line (excludes phone, cable, other non-electrical lines, which need not clear the tree canopy).



Ample space should be allotted between street trees and commercial signs so that the trees do not impede the visibility of the signs

- Mature height: no limits/maximums, but should be appropriate and complement roadway scale/ use and land uses.
- Spacing from other elements: Trees with mature canopy diameter of 30 feet or less may be 20 feet from street lights. Trees may be 10 feet from pedestrian lights if their canopies are pruned up 2 feet above the lights. Trees may be 10 feet from utility poles if canopies are pruned to allow access on the poles. In certain locations, smaller clearances may provide greater flexibility in tree spacing and allow for a more complete tree canopy; these clearances may be used with UFD approval. Tree size at planting: Arterials: 36-inch box recommended (not currently standard); Non-arterials: 24-inch boxTrunk diameter: Arterials – 2-2.5 inches; Non Arterials – 1-1.5 inches
- Height: recommended Arterials – 14'; Non Arterials– 10'
- Adequate clear space should be provided between trees and awnings, canopies, balconies, and signs so they will not come into conflict through normal growth or require excessive pruning to remediate such conflicts.

References

Urban Forestry Department (UFD) Residential Parkway Landscaping Guidelines

UFD Street Tree Selection Guide

BOE Standard Plan S-456-1: Tree well, root barrier and planting

BOE Standard Plan S-450

Current permitting through Bureau of Street Services: Tree Root Prune Permits, Tree Prune Permits, Tree Removal Permits, Tree Planting Permits





4.8 Stormwater Treatment and Management

While conventional stormwater controls in the public right-of-way aim to move water off-site and into storm drains as quickly as possible, sustainable methods for stormwater treatment and management provide on-site retention, filtration, and infiltration to reduce urban runoff and naturally reduce contaminants. These methods and their associated physical systems are commonly known as Best Management Practices (BMPs). In the public right-of-way, the primary goal of BMPs is to capture, filter and treat stormwater runoff from the roadway, driveways, and sidewalk area.

Benefits

- Reduces total stormwater volume entering the conventional storm drain system
- Lowers peak flow intensities and helps to make flow rates more consistent during large rain events
- Removes pollutants (including metals, oils, and bacteria) from urban runoff, improving the water quality of runoff that flows into natural bodies of water
- Contributes to and treats groundwater recharge through infiltration
- Reduces the use of potable water for irrigation
- Provides an attractive and valuable public space amenity
- Supports the urban ecosystem and wildlife habitat



(Above and below) On Hope Street in downtown Los Angeles, several infiltration planters capture stormwater runoff through curb cuts. Stormwater enters the facility, is temporarily detained, and is treated as it slowly infiltrates natural soils.



Applications

- The choice of Best Management Practice (BMP) is a result of several factors including soil characteristics, geotechnical hazards, and the location of existing utilities and street infrastructure. Infiltration rates in existing soils will determine if the facility can be designed to achieve infiltration, partial infiltration, or no infiltration; in the latter, stormwater is treated as it flows through the facility before the flow-through is discharged (typically to the storm drain system).
    - ♦ *Infiltration* BMPs include bioswales, infiltration trenches, and some structural methods such as infiltration planters and permeable paving systems (see descriptions below). Infiltration facilities treat stormwater runoff as it percolates through surrounding subsoils; pollutant levels are reduced by the natural filtration, absorption,

and biological decomposition properties of soils, plant roots, and micro organisms. Because it is often impractical to infiltrate runoff at the same rate that it is generated, most infiltration facilities have a functional component that allows for temporary storage. In addition, infiltration BMPs recharge groundwater reserves and improve the quality of groundwater. Infiltration BMPs are most practical in areas where there is sufficient open space and where soil, hydrological, and geotechnical characteristics are favorable for infiltration.

- BMPs which allow for ***partial infiltration*** include many of the same facilities used for infiltration. Unlike infiltration BMPs, partial infiltration BMPs have a structural drainage component which conveys overflow to the conventional stormwater system or to a natural detention facility such as a detention basin. These facilities reduce runoff and recharge groundwater at rates that are lower than facilities that allow for full infiltration. Partial infiltration BMPs are typically located in areas with limited infiltration capacity due to soil and/or site characteristics.

- ***Flow-through facilities*** are structural methods that do not allow for infiltration into surrounding subsoils; infiltration is limited to the soil capacity within the facility itself. Stormwater flows through the facility and is treated before being conveyed to a discharge point. Like most BMPs, these structural facilities typically allow for temporary storage, so they also help to regularize runoff flow rates. Flow-through BMPs include self-contained planters that are impermeable to surrounding soils and utilize drain pipes to discharge treated water back into the storm drain system. Flow-through facilities are most commonly employed in areas where site conditions do not support infiltration, or in dense urban areas where soil saturation could undermine building foundations and/or street infrastructure.

- Stormwater management facilities can be located in a variety of land use contexts and densities. Generally, where land use densities are high and open space is limited, it is more appropriate to utilize structural BMPs such as planters that allow for less (or no) infiltration. Non-structural BMPs such as bioswales and drainage basins are appropriate in areas with available open space.

- Stormwater management facilities in the public right-of-way are typically placed in the amenity zone to supplement or replace existing parkway landscaping. (Existing parkway landscaping already plays a valuable role in stormwater treatment and management by creating permeable surfaces. These traditional plantings receive and infiltrate surface rainfall as well as sidewalk runoff, but they do not have the added benefit of receiving and treating roadway runoff. Additionally, groundwater quality is often worsened by the use of pesticides.)

- Opportunities for the installation of BMPs are greatest when they can be integrated into development projects, street infrastructure projects, and/or streetscape projects. When part of a multifaceted project, planning and installation costs for BMPs are reduced.

- Because LA's existing sidewalks are often too narrow to accommodate BMPs, curb extensions are an invaluable tool for integrating stormwater treatment and management into the streetscape. Stormwater facilities should be considered in the design of all curb extensions – including mid-block neckdowns, corner bulbouts, and other sidewalk extensions used to expand the pedestrian realm. (Also see discussion of curb extensions in Chapter 6 "Intersections and Crossings".) Curb extensions can also be developed solely for the purpose of stormwater treatment and management (see Vegetated Stormwater Curb Extension section below).

Considerations

- Conditions that can limit the use of infiltration include soil properties, proximity to building foundations and street infrastructure, geotechnical hazards (e.g., liquefaction and landslide potential), and potential adverse impacts on groundwater quality such as industrial pollutants and contaminated soils. To ensure that infiltration would be feasible and beneficial, a screening of site feasibility criteria must be completed prior to the use of infiltration BMPs.

- Impermeable clay soil is not conducive to infiltration facilities. Unfortunately, this soil type is prevalent in Los Angeles except for much of the San Fernando Valley. Clay limits the type of feasible stormwater treatment and management facilities to retention and flow-through rather than infiltration.

- The success of an installed BMP depends largely on the intensity of a given storm and the characteristics of the site: depth to groundwater, soil water-holding capacity, infiltration rates, and how much moisture the soil already contains.

- One of the largest obstacles to sustainable stormwater management and treatment in Los Angeles is the Southern California climate, which makes it difficult to maintain adequate vegetated cover all-year without irrigation. Because a dense vegetated cover is a requirement of stormwater facilities, it is often necessary to provide irrigation during the dry season.

- Maintenance is crucial for proper and continuous operation, effectiveness, and efficiency of a management/treatment facility. This includes maintenance of the vegetation to ensure that it is healthy and dense enough to provide a filtering function and to protect underlying soils from erosion.

- In order to ensure proper maintenance, BMPs should have active partners (e.g., neighborhood councils, BIDs, homeowners associations, etc.) that provide and finance both general upkeep and periodic maintenance.

- If the stormwater facility is not engineered correctly, high rainfall rates can cause damaging flows that cause channeling, erosion, and loss of vegetation. Because vegetation is necessary for most BMPs to be functional and beneficial, vegetation loss is a major concern. Well-engineered facilities have mechanisms for inflow attenuation and overflow conveyance.

- There is a potential for upstream flow to inundate a facility, so extra care must be taken to ensure that flows entering a facility are not greater than its handling capacity. The most-upstream facility in a series is most prone to inundation and damage by high flow rates.

Guidance

- The selection of the best method for a given site is made by considering a combination of factors, indicated in Table 4.5 “Biofiltration BMP Design Criteria” in the Low Impact Development Guide (see reference below).

- If infiltration or partial infiltration is desired, soil feasibility studies must be conducted to ensure adequate percolation rates and low liquefaction potentials. There should maintain a minimum 10-foot depth separation between the bottom of the infiltration pit and the top of the groundwater table.

- Urban conditions are generally not conducive to “end-of-line” treatments, but rather more installations that treat smaller drainage areas closer to the source of pollutants. Stormwater facilities are most effective when they are installed as a group or in a series (e.g., a series of planters along a street in a commercial district, or a set of several bioswales closely dispersed over a few residential blocks). This way stormwater runoff is distributed more evenly and the potential for upstream flow to inundate a standalone facility is lessened.

- The siting of BMPs must be coordinated with existing siting of utilities including water mains, power, fire hydrants, etc.

- All BMPs should conform to the standards of the American With Disabilities Act (ADA), the standard specifications for the public works construction (SSPWC) as amended by Los Angeles City Brown Book, and any other applicable regulations.

- Where street parking exists, design solutions should ensure pedestrian access between the sidewalk area and the parking lane. There should be a minimum 18”-wide convenience strip that is adjacent and parallel to the back of curb, allow ingress and egress for occupants of parked vehicles. The convenience strip



Riverdale Avenue before (above) and after “Green Street” improvements (below)





can be either paved, planted with low growing drought tolerant turf substitutes, or drought tolerant turf. In all cases, the convenience strip shall form a commonly accepted walking surface, and its finished surface and/or grade shall be flush with the top of curb.

- Plants are integral to the success of a BMP, so the selection of plant type(s) is exceptionally important.. Plants should be chosen based on their effectiveness in existing related BMPs and from the City-approved plant materials list provided by the Bureau of Street Services (BSS) and the Bureau of Engineering (BOE).

- Streetwater management practices can be integrated into the myriad design elements in the public right-of-way. For example, traffic calming and road diets can double as streetwater harvesting strategies.

- The functions described in this section should be made visible for street users to see, understand, appreciate, and replicate. Public right-of-way stormwater installations can inspire private property installations and serve as model installations for neighborhoods.

Common Treatments in the Public Right-of-Way

Infiltration and Flow-Through Planters

Planters are structural landscaped reservoirs that capture, manage, and treat roadway runoff. Typically, stormwater is collected and temporarily stored to allow for even rates of filtration and infiltration through the facility. Pollutants are filtered out as water percolates through the vegetation, soil media, and gravel layer. Planters can allow for infiltration into surrounding subsoils, or they can simply allow water to flow through the facility to be discharged elsewhere (typically the storm drain system).

Planters provide opportunities for stormwater treatment/management in many urban conditions because the can take up relatively little width (a minimum of 4 feet) and can be incorporated into streetscape projects. They are typically located adjacent to the curb either in the amenity zone or in a curb extension. Typically, roadway runoff enters a facility directly from the street through curb cuts. Where there is curbside parking, a paved convenience strip of at least 24” must allow access to parked vehicles.

Treating street runoff requires multiple installations in a row; this ensures their effectiveness at managing the sometimes heavy amounts of runoff by dispersing it over many facilities.

A. Infiltration Planter

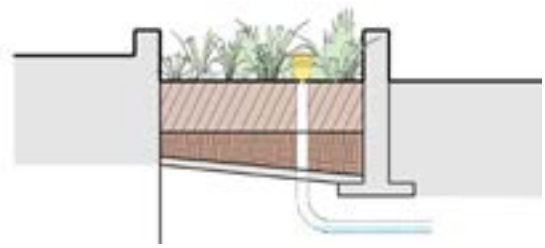
- Infiltration planters are placed where site conditions are appropriate for allowing water to infiltrate surrounding native soils. Infiltration planters have impermeable sides to keep water from saturating nearby top soil, while the bottom is open to allow for water to percolate the surrounding subsoil.
- Infiltration planters may have negative effects on existing and new utility installation. Utility boxes may require waterproofing or watertight installation. Many utility boxes have opened undersides (no bottom slab) and water can get in from below.
- Infiltration planters should generally not be constructed closer than 10 feet to building footprints.
- As in all infiltration BMPs, the feasibility of infiltration planters requires geotechnical investigation and soil feasibility studies. Infiltration planters are not suitable where the seasonal high groundwater table is within 10 feet of the bottom of the facility.
- Because they have vertical walls, the vegetation used should grow taller than the planter's walls for aesthetic purposes.
- BOE Standard Plans S-481-0, S 482-0, and S-483-0 contain detailed design guidelines for planters (referred to as "parkway swales").



Infiltration planters have impermeable sides to keep water from saturating nearby topsoil, while the bottom is open to allow for water to percolate the surrounding subsoil. When the subsoil is saturated, excess water collects in a perforated pipe and then drains to a discharge point.

B. Flow-Through Planter

- ***Flow-through*** planters are completely contained in an impermeable structure and do not allow for infiltration into surrounding natural soils. Flow through planters capture runoff and provide stormwater treatment through filtration and absorption within the facility. After percolating through the facility, excess stormwater then collects in a perforated pipe at the bottom of the flow-through planter and drains to a discharge point; in an urban setting this outflow is usually discharged to the storm drain system, while in less-developed areas outflow can be directed to a natural drainage facility such as a drainage basin.



Flow-Through Planters provide stormwater treatment through filtration and absorption within a completely contained structure.



An example of an infiltration planter within a curb extension

- Flow-through planters are most appropriate in locations where infiltration is not feasible due to soil qualities, contamination, or where the groundwater table is within 10 feet of the surface. In addition, flow-through planters are often the best option for urban settings where saturated soils could cause damage to urban infrastructure and/or building foundations.

C. Vegetated Stormwater Curb Extension

- A Vegetated Stormwater Curb Extension (VSCE) is similar in function to infiltration or flow-through planters in that it captures stormwater runoff from nearby streets, sidewalks, and driveways. Guidelines for VSCEs are similar to those of planters. VSCEs can be installed as an alternative to planters in the sidewalk area, especially when sidewalk widths are inadequate, or they can be applied as supplements to planters.

- BOE Standard Plan S-484-0 contains detailed design guidelines for VSCEs.

Permeable paving

Permeable (or pervious) paving comes in two primary forms: 1) modular paving system such as concrete or brick pavers, and 2) poured-in-place pavement surface such as porous concrete or permeable asphalt. Permeable paving reduces stormwater runoff volumes by reducing the amount of impervious surfaces; typically, stormwater is conveyed to an underlying aggregate base, where it is temporarily stored for either infiltration into subsoils or gradual release to the storm drain system.

Permeable paving improves water quality by trapping contaminants (such as oils and metals) within the underlying rock materials. An additional benefit of permeable paving is that it can reduce puddling and slip hazards common to impervious surfaces with inadequate drainage slopes.

The Bureau of Street Services (BSS) also regularly uses other permeable materials such as decomposed granite or natural paths that achieve similar effect to permeable paving.



An example of permeable paving. Rainwater drains through gaps between the pavement stones.

- Permeable paving systems are appropriate for:
    - ♦ Sidewalks, plazas, cafés, and areas with very low traffic rates including parts of driveways or alleys
    - ♦ Sites where there is limited space in the right-of-way for other more-intensive BMPs
    - ♦ Sidewalk areas in the frontage, amenity or flex zones. In particular, permeable paving around tree wells provides additional permeable area to promote tree health
    - ♦ Locations that have soil characteristics and land use contexts that are conducive to infiltration into subsoils, unless the facility has a drainage component



An example of permeable paving

- The installation of permeable pavement (as for all BMPs) requires a site/soil survey as well as a determination of feasibility based on storm water calculations for flow volume and duration. When infiltration into surrounding natural subsoils is not feasible, subdrainage infrastructure must convey water to offsite storage facilities or to the storm drain system.
- In denser urban environments, buildings are often too close to sidewalks to allow for porous pavement in the frontage zone or in the pedestrian zone because of the risk of destabilizing building foundations. Permeable paving should not be used within 20 feet of sub-sidewalk basements and 10 feet of building foundations
- Permeable paving systems should generally be avoided on all road surfaces because they cannot support the weight of vehicles. However, they may be considered on low-traffic driveways and alleys.
- *Modular pavers* should not be used at active pedestrian uses such as transit stops or crossings, because they are not in compliance with ADA requirements for “firm, stable, and slip-resistent” surfaces. However, *poured-in-place porous paving* is usually ADA compliant and can sometimes be used in active pedestrian areas.



When the bioswale has reached full retention capacity, excess water can leave the facility through small curb openings.



A bioswale on Elmer Avenue in Low Angeles during a dry period.



The same bioswale during a rain event.

- High moisture content beneath sidewalk can attract tree roots and cause deformation, cracking and lifting of the sidewalk. “Structural soils” can be used to improve soil permeability and control tree root growth while maintaining tree health. (See Section 4.7 “Landscaping and Trees” for further discussion.)

- Type and pattern of permeable pavers must be approved by the Bureau of Engineering. Approved pavers are listed on the “Approved products for use in the public right-of-way pavers list”.

Other BMPs Located in the Public Right-of-Way

Vegetated Swale

A vegetated swale is a broad, shallow channel with dense, low-lying vegetation and a very gradual downstream slope. It collects stormwater runoff, allowing pollutants to settle and filter out as the water infiltrates into the ground and slowly flows through the facility to a downstream discharge location. The vegetation reduces flow velocities and the risks of both erosion and channelization. A swale may be engineered with “check dams” (typically composed of rock or earthen berms) that allow water to pool; these dams reduce peak flows by allowing some storage during high flow periods, and they also encourage gradual infiltration into the ground.

Swales are most appropriate in areas with lower-density development such as residential neighborhoods. In neighborhoods that front urban waterways (such as the Los Angeles River), swales provide a rich opportunity to treat and reduce urban runoff before it flows into rivers and bodies of water.

A vegetated swale is feasible on streets with gradual slopes. They are impractical in steep topography where high flows would result in channelization and loss of vegetation.

Filter Strip

A filter strip is a gently-sloped vegetated area designed to slow and pretreat runoff from adjacent impervious surfaces (such as walkways and driveways). Streetwater enters the linear facility through curb-cuts, spreads evenly across the slope, and then flows to a nearby

or adjacent BMP. Filter strips also provide some water absorption, and they reduce the sediment load entering a BMP; this reduces long-term maintenance needs by providing settling of large particles before runoff reaches the BMP.

Infiltration Trench

An infiltration trench is a long, narrow, rock-filled channel bordered on each side by a grass or vegetated filter strip. As discussed above, the filter strips slow and pretreat run off to limit the amount of coarse sediments entering the trench which can cause clogging. Runoff is stored in the trench and infiltrates through the bottom into the soil matrix.

Because of their long, narrow configuration, infiltration trenches are most appropriate for urban applications along street medians or along the sidewalk

Other Discussion

Bureau of Street Services (BSS) standard practice already includes sidewalks constructed with a mild slope that helps direct runoff and irrigate adjacent street trees and plants along parkways.

The City's Low Impact Development (LID) Ordinance (2011), ensures that many development and redevelopment projects mitigate runoff in a manner that captures rainwater at its source, while utilizing natural resources. The LID Ordinance requires the first ¾-inch of rain from a storm event to be captured, infiltrated and/or used onsite at most developments and redevelopments where more than 500 square feet of impervious surface is added. Adopted in November 2011, the LID Ordinance requires stormwater mitigation for a much larger number of development and redevelopment projects than was previously required under the Standard Urban Stormwater Mitigation Plan (SUSMP).

Most single family residences can comply by planting landscaped areas and installing simple BMPs such as rain barrels, permeable pavement and rainwater storage tanks. Larger developments can utilize a wide variety of methods; depending on site conditions, the LID requirements could encourage an aggressive use of BMPs. Although LID-complying facilities are generally located within the parcel and not in the public right-of-way, it is possible that installations by developers of BMPs in the public right-of-way could be a component of LID compliance.

The City of Los Angeles must comply with the Los Angeles Regional Water Quality Control Board's Municipal Separate Storm Sewer System (MS4) Permit, which requires all jurisdictions in Los Angeles County to reduce contaminants in runoff to improve water quality in waterways. These requirements stem from National Pollutant Discharge Elimination System (NPDES) requirements of the Clean Water Act, as promulgated by the U.S. Environmental Protection Agency and delegated to the Los Angeles Regional Water Quality Control Board.

References

The City of Los Angeles Stormwater Program: www.lastormwater.org.

"Development Best Management Practices Handbook: Low Impact Development Guide", Los Angeles Bureau of Sanitation (2011)

"Stormwater Best Management Practice Design and Maintenance Manual for Publicly Maintained Storm Drain Systems", County of Los Angeles Department of Public Works (1999)

Existing Standard Plans: S-480-0 through S-486-0

S-480-0: General Requirements for Green Street

S-481-0: Parkway Swale in Major/Secondary Highways

S-482-0: Parkway Swale in Local/Collector Streets

S-483-0: Parkway Swale with no street parking

S-484-0: Vegetated Stormwater Curb Extension (VSCE)

S-485-0: Interlocking pavers for vehicular alleys

S-486-0: Interlocking pavers for pedestrian alleys

S-485-0 and S-486-0

"Approved products for use in the public right-of-way pavers list." (boe.lacity.org/apm/)

City-approved plant materials list, BSS and BOE

4.9 Bicycle Parking

Secure bicycle parking is an integral part of the bikeway network. Most commonly, the City of Los Angeles Department of Transportation (LADOT) installs curbside inverted-U bicycle racks, usually placed individually or in pairs. As bicycling continues to become an attractive travel option for Angelenos, there are increased opportunities to provide enhanced parking facilities such as bicycle lockers, sheltered bicycle parking, bike corrals, and bike hubs with shower and changing facilities.



The "inverted-U" rack is the City's accepted standard for on-street bicycle parking.



Bicycle racks can be fanciful pieces of public art, while still meeting required specifications.

Benefits

- Encourages bicycling as a viable travel option by adding convenience and security for short-term parking
- Benefits businesses by providing easily-accessible bicycle parking facilities for use by patrons
- Promotes an attractive and fully-accessible sidewalk environment by reducing the need to lock bicycles haphazardly to fences, entry gates, and street poles

Applications

- Bicycle parking facilities should be located frequently and regularly in active commercial districts. In Los Angeles, bicycle parking in the public realm is most commonly placed in the amenity zone utilizing inverted-U Racks placed parallel to the curb.
- Multiple racks should be provided near major destinations including parks, libraries, major transit stops, retail destinations, and college neighborhoods. High-capacity bike parking is encouraged when available space can accommodate clustered racks, parking shelters, and/or bicycle corrals.
- To promote "first-mile last-mile" connections, bicycle parking should be provided near transit stops where applicable. Bike racks should be placed near the back of the transit stop or be placed outside of but adjacent to the transit stop, ensuring unobstructed boarding/alighting at all bus doors.
- On-street bicycle parking (bike corrals) should be considered where there are space constraints on the sidewalk, especially where parking demand is high. (See section 5.5" Bicycle Corral" below).

- Sheltered bicycle parking can accommodate a large number of bicycles while providing the convenience and comfort of sun and rain protection. Shelters are especially encouraged at locations with longer-term parking needs like transit centers and rail stations. They should be placed where sidewalk-area dimensions provide adequate space to ensure ADA compliance.

- Bike lockers are especially useful for bicyclists who prefer to park their bicycles in a highly-secured manner that also protects their bicycle from natural elements. Lockers are encouraged at larger destinations with long-term parking needs, such as bus stops and rail stations. User fees decrease maintenance costs and compensate for the larger initial capital cost.

- Individual and clustered racks can be located in the frontage zone if sufficient sidewalk-area width exists. Long-term bicycle parking for residents, employees, and students should be provided within buildings when possible.

Considerations and Guidance

- Bike rack locations are approved by the Department of Transportation and the City Engineer after they are deemed in compliance with material, clearance, and accessibility requirements presented in the above guidelines and in Standard Plan S-671

- For all clearance and accessibility requirements for bicycle rack placement, refer to BOE Standard Plan S-671-0. ADA accessibility requirements must be met. In order to ensure accessibility and ADA compliance, the placement and spacing of bicycle racks should consider dimensions when occupied by bicycles. The placement of bicycle racks should also consider usage space, so that bicyclists do not impede the pedestrian walkway while maneuvering their bicycles.

- Because racks are typically placed 24”-30” from the curb, cyclists utilizing the streetside side sometimes have little space between the rack and roadway to maneuver their bicycles. When space allows, racks should be placed further away from the curbline.

- Making bicycle parking visible to foot traffic reduces the incidents of theft and vandalism. Bicycle parking should be located in well-lit, secure locations close to the main entrance of a building. Avoid placement in a secluded place or behind screening or tall plantings.

- Install parking devices that support the frame of the bicycle at two points, Racks should support the bicycle well and make it easy to lock a U-shaped lock to the frame of the bike and the rack.

- Poorly-designed bicycle racks made of substandard materials result in higher rates of theft, and design flaws may cause damage to bicycles. Racks with any one of the following characteristics must not be employed:

    - Support the bicycle at one point of contact
    - Support the bicycle by one wheel
    - Have sharp edges that can be hazardous to users and pedestrians



Bicycle lockers provide high security and protection from natural elements.



- Have mounting hardware that can be unscrewed with common tools
- Requires the bicyclist to lift their bicycle onto the rack

- While the inverted-U design is the accepted standard in Los Angeles for bicycle parking in the public right-of-way, other rack designs may be accepted for use at the discretion of LADOT and approval of the Department of Public Works. The installation of creatively-designed racks can provide a public art amenity; these should be encouraged, especially in pedestrian-oriented districts.

- In addition, property owners are encouraged to install bicycle racks in the frontage zone near building entrances (after receiving the required conditional permit from BOE) or on private property near building entrances.

- New development projects must provide a minimum number of bicycle parking spaces per the Los Angeles Bicycle Parking Ordinance, section 12.21.AA16 of the Municipal Code.

Location and Placement of Bicycle Racks

Amenity Zone:

Bicycle racks that are parallel to the curb should be a minimum 24 inches from the curbline to allow for access to parked vehicles and provide adequate space for cyclists to maneuver. To provide added safety for bicyclists, when fronting a curbside vehicular travel lane racks should be set back further, preferably at least 36 inches from the curbline.

- The rack should allow a minimum of 5 feet of clearance when placed parallel to the roadway (along a single line), measured from center of base plate to center of base plate. In areas with curbside vehicular parking, a rack oriented parallel to the curbline must be a minimum of 90 inches from another curbside rack to ensure pedestrians with clear access to and from the curb parking between two parked parallel bicycles (BOE S-671 Standard Plan).

- The rack should maintain 5 feet of clearance from other street furniture. Other street furniture includes but is not limited to: parking meters, trees, tree wells, newspaper racks, light poles, sign poles, telephone poles, utility meters, benches, mailboxes, fire hydrants, and trash cans.



Wide sidewalk areas afford opportunities to consolidate multiple racks in groups.

- A bicycle rack should not be installed in a bus stop zone, taxi zone or loading zone. A rack should not be installed near a fire hydrant or near handicap-accessible parking.

Frontage Zone:

- In the frontage zone, bicycle racks can be placed perpendicular, angled, or parallel to a building or property frontage. Perpendicular or angled parking should be provided if space permits; these orientations allow for better-accessible clustered parking.

- Racks located parallel to the property line should be placed at least 30" from the structure. When racks are placed side by side, each rack should be spaced at least 60" from one another in order to accommodate both rider and bicycle in the aisle.

Flex Zone – Curb Extensions

Bicycle racks located on mid-block curb extensions should comply with all guidelines stated above for racks located in the amenity zone. Bicycle racks should generally not be located on corner bulbouts near intersections because they hinder visibility for pedestrians, bicyclists, and motorists.

Other Discussion

Los Angeles code does not currently allow decommissioned parking meters to be retrofitted to accommodate bicycle parking, although LADOT has completed pilot retrofit projects. This is common tpractice in many other localities and should be considered in Los Angeles.

Bike repair stations are a valuable convenience for cyclists. These should be located in strategic locations with high bicycle traffic, ideally placed adjacent to clustered parking facilities. To ensure security and safety, they should be placed in a secure part of the street that is highly-visible and well-lit.

The current placement of bicycle racks should be checked for compliance with standards. Racks that are not in compliance should be relocated, as designated by LADOT under guidance by the above guidelines as well as those in Standard Plan S-671.

References

APBP Bicycle Parking Guidelines

NACTO Urban Bikeway Design Guide

BOE Standard Plan S-671

2013 Bicycle Parking Ordinance (LAMC Ord. No. 182386)



Bike repair stations are a valuable public convenience for bicycle riders.

4.10 Bikeshare Stations

A bikeshare program provides bicycles for use on a short-term basis. Patrons typically include annual members as well as occasional users. The success of a bikeshare program is largely dependent upon the strategic location of stations, ensuring that patrons are provided with the most convenient locations for checking out and returning bicycles.

Benefits

- Provides a convenient transportation option that can be used for short trips and "first-mile last-mile" connections
- Provides health benefits by encouraging physical activity
- Increases visibility of bicycling as a viable transportation option
- Reduces congestion and increases capacity of transit
- Provides a convenient alternative to owning, maintaining, and storing/parking a personal bicycle

Applications

- A bikeshare program is best utilized in higher-density districts (e.g., downtown or other areas with business, cultural, and tourist destinations) where bicycling is a convenient and safe mode of travel. Because a bikeshare program is designed to attract all users, it is best suited in areas with bicycle lanes and traffic-calming measures.
- Bikeshare stations are especially valuable near major transit stops to provide valuable "first-mile last-mile" connections, near places of interest, and in locations where short trips are commonplace (e.g., high-density mixed use districts and around college campuses).
- Stations are located either in the sidewalk area (typically in the amenity zone) or in the roadway parking lane (flex zone).



Considerations

- By limiting the number of places where bicycles can be accessed or returned, bikeshare service is sometimes less convenient than a privately-owned bicycle capable of point-to-point transport.
- The placement and design of bikeshare stations requires a coordinated effort amongst many city agencies, business/community groups, and the bikeshare operator.

Guidance

- For safety reasons, stations should be well-lit by pedestrian-scaled lighting and located in locations that are highly visible to other users of the street.
- To ensure visibility at intersections, stations that are located in the parking lane should be at least 30 feet from intersection departure and 50 feet from intersection approach, per LADOT bicycle corral standard design.
- Stations can be located in a red curb zone as long as standard clearances are met. There should be at least a 25 foot clearance from a fire hydrant.
- There should be adequate, ADA-compliant clearances from bus stop, utilities, driveways, tree wells, and other street furniture.
- When placed in the roadway, stations should be buffered using wheel stops on both ends and object marker signage, per LADOT bicycle corral standard design.

Other Discussion

- The Los Angeles City bikeshare program is a component of the regional bikeshare program, which is a partnership between the City, LA Metro, and other cities.



4.11 Parking Meters and Pay Stations

Modern-day "smart" parking meters and pay stations give motorists convenient payment options. They also provide the City with an opportunity to expand variable pricing programs. Multi-space pay stations that typically serve 8-10 vehicles can be a beneficial alternative to single-space meters.



Benefits

- Offers motorists the convenience of multiple payment options and the opportunity to add time remotely by cell phone or internet
- When using multi-space pay stations, reduces visual clutter in the urban landscape by allowing for the removal of single-space parking meters. Multi-space pay stations are also less expensive for the City to operate and service than numerous single-space meters.
- Variable pricing programs de-incentivize car usage and increase parking revenue

Considerations

- The conversion of single-space meters to multi-space units reduces visual clutter from the urban landscape. However, conversion decisions should be made based on practical parking management considerations. (For example, shorter curbside zones may not have the length and/or number of spaces to justify a multi-space meter.)
- Parking meters shall be accessible per ADA, so in a landscaping strip a concrete pad connected to the walkway should be provided at the meter's base.

Design Guidance

- Single-space parking meters should be placed in the amenity zone, 18-24" from the curbline. They should be placed at the front end of each parking stall.

- Parking pay stations may be located in the amenity zone, at least 18" from the curbline. They may also be located in the flex zone in a curb extension; this helps to maintain a clear pedestrian walkway in areas with narrow sidewalk widths. Multi-space stations should be placed every 8 to 10 parking spaces and spaced approximately 150 to 200 feet apart. Signs should clearly direct patrons to the pay station and be spaced no more than 100 feet apart.

- Areas with multi-space pay stations often consist of delineated, numbered spacing stalls. When parking stalls are delineated by pavement striping, they also must be clearly numbered at the curb.

- Alternatively, multi-space pay stations could allow for the removal of rigid delineations of parking spaces, potentially allowing a given area to accommodate a higher number of vehicles. Rather than recording a parking stall number, users simply use their license plate number.

- When possible, the design of single- and multi-space meters should reflect the design of other streetscape elements. They should comply with the clearance requirements for all other street features and appurtenances, including tree wells, street lighting, bicycle racks, and news racks.

Other Discussion

In locations where filming is common, conversion of individual meter poles to multi-space pay stations can be especially beneficial because this reduces the number of obstacles in front of parked production trucks.

Decommissioned parking meter poles can be repurposed into bicycle racks. Pole repurposing should only be considered where there is a sufficient clear distance between the rack and the curbline. Los Angeles code does not currently allow decommissioned parking meters to be retrofitted to accommodate bicycle parking, although LADOT has completed pilot retrofit projects. Relatedly, bicyclists often use functioning meter poles as impromptu bicycle racks, blocking curbside access as well as access to the meter itself. To avoid this problem, locations with parking meter poles should contain enough dedicated bicycle racks to meet demand (see section 4.9 "Bicycle Parking").



When an area with single-space parking meters is converted to multi-space pay stations, the decommissioned parking meter poles can be repurposed into bicycle racks.

4.12 Utilities and other infrastructure

Effective management of utility placement on, above, and below the sidewalk area ensures a safer and more enjoyable street environment. The placement of other sidewalk amenities can potentially reduce maintenance access to utilities, highlighting the need for interdepartmental coordination. Utilities that affect sidewalk functionality include surface-mounted facilities (SMFs) such as utility vault and signal boxes; above-ground infrastructure (AGI) such as power and telecommunications wiring; and underground infrastructure serving electricity, storm drainage, sewer and water, gas, telecommunications, street lighting, and traffic signalization. (Note: street lighting is discussed separately in Section 4.13 below.)

Benefits

Well-placed utilities and other infrastructure:

- Reduce clutter on the sidewalk
- Improve pedestrian safety
- Reduce maintenance conflicts with other street amenities
- Allow for more landscaping and trees

Considerations and Guidance

- When practicable, the placement or relocation of new utilities should avoid areas conducive to future placement of street amenities such as seating areas, landscaping, stormwater management treatments, and transit stops. New development should submit utility plans with initial development proposals so that utilities can be placed away from suitable locations for streetscape amenities wherever practicable. Conversely, the placement of street amenities (e.g., street furniture and landscaping) must ensure easy access to utilities for maintenance and emergencies.
- Existing vaults located in a curb ramp should be moved or modified to meet accessibility requirements.
- Tree removal should be avoided and minimized during the routing of large-scale utility undergrounding projects.
- Many projects involving sidewalk widening or curb extensions require the demolition or excavation of an existing walkway, and existing underground utilities may be impacted. Utility companies should be contacted and provided with plans outlining the proposed improvements.





Overhead power lines detract aesthetically from the urban environment, and utility poles take valuable sidewalk space. By relocating utilities underground, valuable above-ground space is made available for other public amenities such as landscaping, street trees, lighting, and street furniture. Without the need to be pruned around power lines, larger shade-providing trees can be planted.

- When adding curb extensions or widening the sidewalk, utilities such as water mains, meters, and sewer vents should remain in place whenever possible, as they can be cost prohibitive to move. Utility vaults and valves should be minimized in curb extensions where planting or street furnishings are planned.

- Utility installation and repair should be coordinated with roadway and streetscape improvement projects to avoid duplication of efforts or making new cuts in new pavement. Roadway and streetscape improvement projects provide the opportunity to incorporate utility retrofits and new utility installations.

- In densely-developed districts, utility vaults and valves may be placed in the frontage zone. To facilitate access, however, the placement of utility structures in the frontage zone is preferred only when it has been determined that incorporating utility vaults into the amenity zone is not feasible.

- Above-grade and surface-mounted utilities should be placed to minimize disruption to pedestrian travel, and to maintain required widths for pedestrian access routes.

- Small utility vaults, such as water and gas meters and street lighting access, should be located to minimize conflicts with existing or potential tree locations and landscaped areas. Vaults should be aligned or clustered wherever possible.

- Catch basins and surface flow lines associated with storm drainage systems should be located away from the crosswalk or between curb ramps. Catch basins should be located upstream of curb ramps to prevent ponding at the bottom of the ramp.

- Utility boxes may be painted as part of a public art program. (See Section 4.6 “Public Art”.)

- Trenchless technologies, such as moling and tunneling, should be used wherever possible to avoid excavation and disruption of streetscape elements.

- In pedestrian-oriented residential and commercial areas, surface-mounted utilities (SMUs) should be screened with landscaping and/or decorative screens whenever practicable.

Other Discussion

On most public rights-of-way in Los Angeles, the only utilities located under the sidewalk are street lighting conduit and lateral lines that extend from utility mains beneath the roadway. However, in some older neighborhood gas and other utility lines are also located under the sidewalk.

Some of the most extensive visual and physical intrusions into the built environment are utility poles and overhead lines for power and communications. In addition to their negative aesthetic effects, they interfere with the placement of amenities such as street trees/ landscaping, seating, street lighting, and stormwater management. The relocation of overhead utility lines can provide an enormous aesthetic benefit and allow for better sidewalk accessibility and increased opportunities for sidewalk enhancements and amenities. One of the most effective contributions to Complete Streets is to remove overhead utility lines by undergrounding them or relocating them to alleys or rear yards.

Above-ground electrical lines are typically not insulated and therefore necessitate the regular pruning of street trees to a sub-standard height and prevent the planting of new trees that are appropriately scaled for the street. As a result, the myriad benefits of street trees – aesthetic, cooling effect, air quality, etc. – are often compromised. An alternative, where the lines cannot be undergrounded or relocated, may be to replace the existing electrical lines with insulated, braided lines used in back yard conditions. Tree branches can grow around these electrical lines without concern that a fire will started if the lines break. Trees will still need to be pruned when limbs put pressure on power lines.

4.13 Street Lighting

Street lighting serves a necessary public function by illuminating the roadway and sidewalk area to ensure safety, security, and accessibility for all road users. Through their type, scale, and design, street lighting elements affect the aesthetic qualities and character of a street, especially at night when they play a pivotal role in shaping the nighttime environment. In particular, pedestrian-scale lighting of the sidewalk area creates a safer and more enjoyable pedestrian realm.



A pedestrian-oriented light fixture can share a single pole with a roadway light fixture. In some instances, new pedestrian-oriented lighting fixtures can be affixed to existing roadway light poles.

Benefits

Well-designed, properly-located, and appropriately-scaled street lighting:

- Improves nighttime safety and security by illuminating the roadway and sidewalk area to benefit all users of the public right-of-way including motorists, bicyclists, transit users, and pedestrians
- Improves pedestrian accessibility and mobility by illuminating sidewalks, crosswalks, curb ramps, and signs as well as barriers and potential hazards
- Incorporates pedestrian-scale lighting to create a more comfortable illumination *quality* by using softer light than typical roadway lighting
- Contributes to the identity of a district or neighborhood, and serves as a strong unifying element in the streetscape
- Reduces energy consumption and costs by utilizing energy-efficient bulbs and incorporating sustainable technologies
- Reduces light pollution and light trespass (unwanted light)

Applications

- Most arterial streets in Los Angeles contain street light poles that are 30 feet tall and illuminate both the roadway and the sidewalk. Non-arterial streets typically contain poles 20-30 feet tall. Generally, taller pole heights afford a larger illuminated area, so spacing between lighting fixtures can be wider and the number of fixtures lower. While this is more economical for construction and maintenance, overly-high light fixtures may be out of scale to the street and land use contexts.

- Pedestrian-scale lighting fixtures are typically 12 to 15 feet high. They should be encouraged to provide supplemental light for the sidewalk area, especially in areas with high nighttime pedestrian volumes such as commercial districts and other areas with higher-density land uses. Pedestrian-scale lighting should be installed in all locations where a wide sidewalk is not well-illuminated by the roadway lights. Pedestrian lighting should be installed in all pedestrian pathways under all freeway underpasses.

- Critical locations such as ramps, crosswalks, transit stops and seating areas that are used at night should be highly visible and well lit.



Considerations and Guidance

Location and placement

- The placement of both roadway and pedestrian lighting should consider street dimensions and function as well as land use contexts. Wide arterial streets have different lighting requirements than narrow streets.

- Pedestrian lighting should be installed primarily in the sidewalk amenity zone. In sidewalk areas 24 feet or wider, pedestrian light fixtures may be located within the pedestrian zone as long as a required clear path is maintained. Where a building is set back from the sidewalk area, pedestrian light fixtures may be installed in the frontage zone on poles directly adjacent to the property line. Where a building fronts the sidewalk area, pedestrian light fixtures may be attached directly to the building façade.

- The placement of light poles should be coordinated with the placement of landscaping, street furniture, transit stops and other utilities. Their placement should comply with clearance requirements in relation to other facilities, curbs, intersections, and crossings.

- Roadway lighting fixtures should be placed between trees to facilitate maximum lighting and to ensure that the tree canopy is maintained and that excessive tree pruning is avoided. When the illumination of the sidewalk is provided solely by roadway lighting, trees often create shadowed areas that may not be safely lit (especially when the placement of trees and light fixtures is not well-coordinated). Because they can





be located below the tree canopy, pedestrian-scale lighting offers increased safety and more-uniform illumination along a pathway. In this way the tree canopy can be retained without sacrificing accessibility and safety.

- Retrofits of existing street lights and new installations should include pedestrian-scale lighting, especially in areas with high pedestrian activity. As a cost-saving measure, pedestrian lighting could be added to existing street light poles; in these situations it is often beneficial to provide additional sidewalk area lighting by installing pedestrian light fixtures between roadway light poles.

- The potential for unwanted light trespass onto private property should be investigated before installing roadway and pedestrian light fixtures.

Type and Design

- Fixture design should complement and be coordinated with the design of other streetscape elements. Fixture design should relate to the character of the neighborhood or district. New lighting fixtures should be coordinated with the design of street furniture (e.g., seating, transit shelters, trash receptacles, and kiosks) to provide a more unified streetscape.

- Lighting fixtures of lower height and illumination levels which are spaced at closer intervals along the street are preferred over tall light fixtures with bright illumination levels spaced further apart.

- The use of LEDs, and in some cases, induction technology for roadway light fixtures, is now standard practice in the City of Los Angeles.

- Pedestrian light sources should provide a warm (yellow, not blue) light if using metal halide or high-pressure sodium bulbs; LED pedestrian lights should produce a similar quality of light.

- As appropriate, dark sky-compliant lighting should be selected to minimize light pollution cast into the sky while maximizing light cast onto the ground. A minimum of 95% of emitted light should be directed toward the ground.

- In addition to lower energy and maintenance costs, LEDs can enhance visibility with better color rendering (i.e. colors appear more natural) and a more consistent spread of light. LEDs are also designed to minimize light pollution and light trespass.

- Solar light fixtures should be utilized where possible for new installations or for retrofit projects. Where solar light fixtures are not appropriate or possible, LED or a future more energy-efficient technology should be used.

- Some local streets in older residential neighborhoods contain electrolier lampposts that illuminate the roadway and sidewalk; these are well-scaled to the neighborhood environment. New streetlights in these residential neighborhoods should be chosen to match their design and scale. A balance should be found so that roadways are illuminated sufficiently to meet illumination requirements while also complementing the neighborhood scale and providing a more-comfortable sidewalk environment.

- Historically-significant street light poles and fixtures should be maintained and upgraded to incorporate newer illumination technologies where appropriate.

Other Discussion

Los Angeles has over 200,000 streetlights in more than 400 different styles. According to the Bureau of Street Lighting, "street lights provide illumination of both the roadways and sidewalks to the levels required by the Bureau of Street Lighting (BSL) for safety and security." Additionally, "lighting systems are designed and constructed to conform to nationally accepted standards which are sponsored by the Illuminating Engineering Society and approved by the American National standards Institute."

Street poles can be outfitted with clamp-on brackets for banners, adding to the visual quality of the streetscape. These banners generally consist of placemaking themes pertinent to a particular district (adding to the character and cultural heritage of a place), and informational uses to promote cultural and civic events and amenities including festivals, museum exhibitions, and special events. (Also see Section 4.3 "Streetscape Signage and Wayfinding" and Section 4.6 "Public Art".)

For property owners that request street lighting, currently only lighting for minimal traffic safety (usually at "traffic conflict areas") is provided at no cost for installation or maintenance. For all other lighting installations, property owners share the costs of installation and annual operation/maintenance through a special assessment. Some projects obtain outside funding for the installation cost. In order to provide safe lighting equitably throughout the City, government-funded street lighting and streetscape projects should be a priority in residential areas with higher pedestrian volumes and larger safety concerns.

References

BSL's "DESIGN STANDARDS AND GUIDELINES": illumination standards (roadways and sidewalks,

BSL's "Special Specifications for the Construction of Street Lighting Systems. Which supplement the latest edition of the "Standard Specifications for Public Works Construction (Green Book)" Specs include special provisions, standard drawings, approved equipment, etc.

City of Los Angeles LED Streetlight Replacement Program

Municipal Solid-State Street Lighting Consortium (sponsored by U.S. Dept of Energy)



4.14 Waste and Recycling Receptacles

Well-designed and strategically-located receptacles are an essential component of a clean, enjoyable sidewalk environment. Their effectiveness in keeping litter off the streets is largely dependent on their placement, functional design, and volume capacities.

Benefits

- Contribute to an enjoyable and attractive street environment by reducing litter, especially when placed frequently and in convenient locations
- Provides a more-unified streetscape when coordinated with the design of other street furniture
- In particular, solar compactors increase capacity, decreasing the number of receptacles needed while also decreasing maintenance costs by reducing the required frequency of trash removal

Applications

- Waste receptacles should be located near high activity generators such as major civic and commercial destinations, at transit stops, and near street corners.
- At least one waste/recycling receptacle should be located at all transit stops. At stops with higher usage, multiple receptacles may be necessary to ensure that trash is accommodated; these can be either adjoining or separated, depending on stop layout and function.
- Along streets in retail commercial districts, there should be a maximum of one trash receptacle every 200 feet. Additional trash receptacles should be provided only if a private sponsor provides continued maintenance.



Solar-powered waste receptacles allow for "just-in-time" collection by wirelessly communicating fullness levels to service operators. Some also incorporate compactors to effectively increase receptacle capacity and reduce the frequency of servicing.



Waste receptacles can be street design elements that complement the design of surrounding street furniture.

- Receptacles should generally be located in the amenity zone between the curb and the pedestrian walkway. Receptacles may also be located in the frontage zone as long as they do not impede the pedestrian zone, this can work well for businesses who agree to provide continued trash removal.

- Waste and recycling receptacles should be located near street corners but should not inhibit corner visibility.

Design Guidance

- Receptacles should be immovable and bolted to the pavement to ensure that their proper placement is maintained. Receptacles should not merely be chained to light poles, which is common practice today.

- Receptacles should be opaque not mesh or wire baskets and have a top. Attention must be paid to the receptacle's functional design so that there is a large opening to ensure usability while also effectively screening the trash. Trash receptacles should open from the side to allow easy access for removal/ replacement of garbage bags.

- Durable, graffiti-resistant materials such as galvanized or stainless steel should be used.

- Solar receptacles (compactors) should be considered for use in high-volume locations. This means that fewer receptacles are necessary in high volume locations, lessening their negative aesthetic effects on the street environment.

- In some locations, trash receptacles are serviced by waste removal companies that do not practice mixed-waste processing (a process in which recyclables are sorted out). In these locations, waste receptacles should be paired with recycling receptacles, and they should be easily distinguishable from one another. Ideally, a single fixture that incorporates two receptacles – one for trash and one for recycling – should be used.

- Waste receptacles, like all street furniture, should be considered a street design element. Their design should complement the design of surrounding street furnishings (including benches, street lights, bike racks, etc.)



A typical waste receptacle used in Los Angeles.



Wire basket waste receptacles are unattractive and its contents are open to the effects of wind.



Waste recptacles can be a street design element.

Other Discussion

The benefits of waste receptacles are only attained with regular installation, maintenance, and servicing. However, there is no coordinated program in Los Angeles for the installation, maintenance, and servicing of waste and recycling receptacles. Instead, these services are provided by a variety of public agencies, community organizations, and private companies:

- The Bureau of Sanitation services approximately 3,000 receptacles. Other city departments such as the Department of Recreation and Parks provide and service receptacles adjacent to their facilities.
- In their “Adopt-A-Basket” program, BSS provides receptacles to sponsors (e.g., community/business groups or individual property owners) who agree to maintain and service them.
- Many private organizations (e.g. Business Improvement Districts and Homeowners Associations) install and service their own receptacles; these require R-Permits to be placed in the public right-of-way.
- Trash receptacles that are installed during streetscape and/or development projects are supposed to be serviced through sub-agreements with developers, community-based BIDS, HOAs, non-profit organizations, and/or individual property owners.
- The Bureau of Street Services (BSS) oversees two contractors that provide receptacles adjacent to transit furniture. Martin Outdoor Media, LLC installs and services around 2,000 receptacles placed adjacent to bus benches that they also maintain. As part of the City’s Coordinated Street Furniture Program, CBS Decaux, LLC services around 1700 trash receptacles that are placed adjacent to their transit shelters.

4.15 Parklets

Parklets transform one or two curbside parking spaces into an active, vibrant, and accessible public space. They typically incorporate benches, tables, landscaping, and/or bicycle parking on a platform that is flush with the sidewalk. Parklets are sponsored, installed, and maintained by a community partner such as a neighborhood or business group.

Benefits

- Activates the public realm and creates a distinctive setting for sitting, dining, socializing, and relaxing
- Promotes and supports local businesses by providing unique public spaces that attract customers
- Adds visual and spatial interest to the streetscape
- Expands the usable width of the sidewalk in constrained conditions



Huntington Drive, El Sereno

Applications

Parklets are especially valuable at locations with high pedestrian activity, especially at locations where narrow or congested sidewalks prevent the full utilization of public space.

Considerations

- Because parklets are located in a parking lane adjacent to vehicular and/or bicycle lanes, safety must be strongly considered. The siting and design of parklets must incorporate substantial buffering elements to protect users from vehicular traffic. (See design guidance.)
- Because they are in the public right-of-way separate from the property line, parklets must be open to the public even when their primary use is affiliated with an adjacent business.
- In areas where production filming is common, the location of parklets should take into consideration the movement of large production equipment between the roadway and the sidewalk area, the length of continuous curb space required to park large production vehicles (typically at least 120'), as well as the ability of production crews to "dress" a location for a time- or place-specific scene.



Spring Street, Downtown Los Angeles



York Boulevard, Highland Park



Spring Street, Downtown Los Angeles

Guidance

Location and Placement

- Parklets should generally be located only along streets with a speed limit of 25 MPH or less.
- Parklets should be at least one parking space away from the street corner. They must provide adequate clearance for automobiles to turn in and out of driveways.
- Parklets should be located between vehicular parking spaces (flanked on either end by an on-street parking space). Parked cars by themselves provide an important protective buffer from vehicular traffic.
- The parking lane of a parklet site should be at least eight feet wide from the curb face to the adjacent travel lane. In order to ensure pedestrian safety, platform areas should generally have a width of two feet less than the width of the parking lane in order to provide a buffer from moving traffic.
- LADOT guidelines must be adhered to for other clearances and access requirements.

Design

- At the time of the completion of this Guide, the Los Angeles Department of Transportation offers pre-approved parklet models to simplify and expedite approval and implementation. Community partners can choose from several models that utilize combinations of standardized components to suit the desired function(s) of the parklet. Common design elements include built-in or standalone seating, bike racks, and greenery.
- Parklets may be further designed in a variety of ways to meet the needs of the local residents. Some additional creative uses include recreational amenities such as exercise equipment, chessboard tables, or interactive play elements.

- Parklets should be buffered using wheel stops on both ends that are 4 feet from the platform. Safety planters should be placed on the traffic-facing end of the parklet to help absorb the impact of vehicular intrusion. Safety planters should typically be made of fiberglass and weigh a minimum of 700 pounds when full with a soil and sand mixture. Planters should be outfitted with reflective tape for added nighttime visibility.

- Parklets must have vertical elements that make them clearly visible to traffic, such as flexible posts.

- Roadbed graphics are an additional visual element that can mark the area between the wheel stops and the side parklet edges as well as the area adjacent to the roadway edge. Striping should consist of broad (approximately one-foot wide) painted stripes using bright colors, at a 45 degree angle from the curbline. This serves to further alert motorists and demarcate the area as a public amenity.

- To enhance accessibility, the entry of the parklet should be flush with the curb and sidewalk.

- Parklets must not inhibit adequate stormwater drainage and should include metal grates at the roadway level to keep debris from accumulating underneath the platform while allowing water to flow freely.

- Signage facing the sidewalk area should clearly communicate to pedestrians that the parklet is available for anyone to use, not just for patrons of a sponsoring business.

- LADOT guidelines must be adhered to for other design requirements and treatments including those for planters, furniture, signage, and bicycle racks. These guidelines also provide guidance for clearances and access.

References

City of Los Angeles Department of Transportation's "People St" program (peoplest.lacity.org)

4.16 Bus Stop Location

Bus stops that are optimally located provide riders with convenient access to jobs, destinations and residences. Bus stops can be placed on the near side or far side of the intersection, or at the midblock.

Benefits

- All bus stop locations offer specific benefits, whether they are located on the far side, near side, or at the midblock.

Far Side

- Reduces delay because buses do not have to wait for a green light after passengers have boarded and alighted
- Helps create gaps in traffic for buses to reenter the travel lane
- Minimizes conflicts between buses and right turning vehicles traveling in the same direction
- Provides additional right-turn capacity by allowing other traffic to use the right lane at intersection approaches
- Improves pedestrian safety when riders have to utilize the crosswalk located behind the bus; Increases visibility of crossing pedestrians for bus drivers waiting at a red light.
- Provides the optimal location for traffic signal priority corridors
- Improves bus drivers' sight distance and maneuverability when approaching intersections
- Gives buses deceleration space in the intersection

Near Side

- Provides convenience for riders when undesirable traffic occurs on the far side of the intersection
- Allows passengers to board and alight if the bus is stopped at a red light
- May minimize the number of red lights that buses encounter when transit signal priority is absent
- Allows riders to utilize the crosswalk closest to the bus' front door



Locating Bus Stops midblock can allow riders to more easily access streetside shops and restaurants..

Midblock

- Less risk of sidewalk congestion or conflict between pedestrian crossings and riders waiting at the stop
- Provides convenience for riders when a major destination is located at the midpoint of a long block
- Allows buses to avoid vehicle queuing that may occur at intersection approaches

Applications

- The ideal bus stop location for riders depends on the physical or operational context of the roadway and transit route/system.
- The following site conditions should inform bus stop location: available curbside space, sidewalk width and pavement quality, travel lane width and quantity, intersection geometry, sight distances, and the presence of major destinations, on-street parking, bicycle facilities, and/or crosswalks.
- The following criteria should also inform bus stop location: ridership demand, bus routing, transfer locations, and traffic volume and turning movement data.
- Far side bus stops are the most common location and are generally preferred, but near side and midblock stop locations should always be considered when evaluating the criteria.

Considerations

Far Side

- Queuing vehicles may block the intersection during peak periods
- Buses may obstruct sight distances for motorists approaching intersections
- Buses may have to stop twice -- once at an intersection approach, and then again at the far side stop

Near Side

- Increases potential for conflict with right-turning vehicles
- Decreases roadway capacity during peak periods due to buses queuing in travel lanes near bus stops
- Causes delays when a bus boarding occurs during the green light phase and finishes boarding during the red light phase
- Poses a pedestrian safety risk when eager passengers dash across a crosswalk in front of the bus

Midblock

- Requires more curbside space
- Decreases on-street parking supply (unless a bus stop bulb exists)
- Requires a midblock crosswalk to conveniently access the bus stop; may encourage jaywalking in location lacking a midblock crosswalk
- Increases walking distance to a transfer location or destination if they are not located at the midblock

Design Guidance

- Bus stops should not obstruct driveways or other pedestrian paths wherever possible.
- Bus stop spacing should balance ridership demand while providing adequate coverage. The spacing between bus stops running local service should be no more than a ¼ mile, while the spacing for rapid stops should be between ½ and 1 mile.
- Where feasible, bus stop bulbs can be installed at bus stop locations to help improve on-time performance while also improving the waiting area for passengers.

4.17 Bus Bulb

A bus bulb is a curb extension that increases transit performance by allowing buses to stop in the travel lane at bus stops. It also adds valuable space that can be dedicated to transit amenities (e.g., shelters, benches, and kiosks) without encroaching on the pedestrian walkway.

Benefits

- Improves transit performance by eliminating the need for buses to maneuver into a curb space to board passengers, then back into the travel lane to continue along its route
- Provides space to install a bus shelter, additional seating, and/or off-board payment collection equipment without conflicting with pedestrian movements in the pedestrian zone
- Reduces the likelihood that other vehicles will be parked at the curbside space designated for bus boardings and alightings
- Facilitates accessibility by allowing for additional space for boarding and alighting.
- Requires removing only two on-street parking spaces while the equivalent of four spaces are required for buses to pull over at a curbside bus stop.

Applications

- Bus bulbs are typically applied on multi-lane arterial corridors (with on-street parking) so that cars are able to pass stopped buses.
- They can be applied at locations where the on-time performance of major high-frequency bus routes (such as Metro Rapid lines) are hindered by having to merge back into the travel lane
- They can also be applied where the existing sidewalk width is too narrow to accommodate a bus shelter.



Considerations

- Vehicle traffic in the travel lane is blocked while buses are stopped at a bus bulb. This may prompt unsafe vehicle maneuvers to pass stopped buses.
- Bus bulbs at near-side stops affect streets that experience heavy right turn vehicle movements.
- Cost estimates, drainage concerns, utility relocation, and street sweeping operations should be analyzed before implementation.

Design Guidance

- Bus stop bulbs should extend a length of at least 60' (excluding the tapers of the curb extension). They should extend a length of 120' (or 140' for articulated buses) to accommodate locations where the frequency of service results in multiple buses arriving at the stop at the same time.
- Longer bus bulbs should accommodate at least a 5' clearance between multiple buses.
- A 10' clearance behind the back of the bus should be provided to prevent the back end of buses from protruding into the intersection
- Bus stop bulbs should preferably be 8' to 10' wide (or minimum 6') to comfortably accommodate a bus shelter.
- Bus bulb tapers should have a return angle of 45 degrees.
- When applied at near-side stops, bus bulbs may require right-turn-on-red restrictions.

4.18 Sidewalk Equestrian Trails

Equestrian trails allow individuals to enjoy a unique form of recreation and travel within the City of Los Angeles. An integrated network of trails promotes horseback riding and provides a safe means for recreational riders to experience scenic parts of the City.



Benefits

- Provides access to scenic open spaces across parts of the City
- Ensures the safety and viability of horseback riding in the City with proper design and facilities
- Provides a means to incorporate more landscaping and native vegetation throughout the city

Applications

Sidewalk equestrian trails are located primarily in the San Fernando Valley and Santa Monica Mountains, where urban trails connect to mountain trail systems.

Design Guidance

- Design trails adjacent to streets to be between 10 and 12 feet in width to accommodate a double-track. Trail widths may be reduced in cases where topography or space is prohibitive. No trail width should be less than 6 feet.
- Maintain a vertical clearance of 10 feet from the ground and any physical barrier such as bridges, underpasses, and maintain vegetation free of protruding branches.
- A minimum height of 4 feet is recommended for all fences and barriers along trails. A greater height may be permitted for trails adjacent to high speed roads where traffic may startle horses. Height should be tapered down as trail approaches intersections or end, to maximize horse/rider view.
- Low walls or fences with railings added for more height are acceptable. Bollards or barrier posts can help separate equestrian from other uses. Barrier posts should be an odd number to prevent confusion, and placed 5 feet apart to allow equestrians to pass through.

- Preferred fence materials include “woodcrete” or other sturdy material that gives the appearance of wood-like finish.
- A second signal actuator push button (equine crossing signal) should be installed 5 to 6 feet above the ground. The post should be placed 6.5 feet from the road edge so that the animal’s head does not encroach into the roadway.
- Use of native plants for landscaping is encouraged. Low walls or fences can include vegetation facing the trail to improve appearance, especially along trails with pipe railing. Vegetation should be trimmed to less than 4 feet high for crime prevention purposes, and trimmed to avoid injury to equines.
- Plants toxic to equines must be removed or identified with signage.
- Urban trails should be designed in accordance with traffic engineering standards. The Metropolitan Transportation Authority Congestion Management Plan (CMP) and the Transportation element of the County of Los Angeles General Plan should be consulted to determine the traffic impacts of a trail.

References

County of Los Angeles Trails Plan (2011)

Major Equestrian and Hiking Trails Plan (1968)

Guide to Existing and Potential Equestrian Trails, Los Angeles Department of City Planning (revised 1991)

Rim of the Valley Trail Corridor Plan, Santa Monica Mountains Conservancy (1990)



4.19 Esplanade

An esplanade integrates an offstreet bicycle path (typically two-way), a pedestrian walkway, trees, and landscaping into a travel corridor alongside a vehicular roadway. An esplanade creates an inviting pathway that is safe and enjoyable for a wide range of users.

Benefits

- Encourages bicycling and walking as an alternative to motorized travel
- Increases comfort and safety by separating pedestrians and bicyclists from the roadway
- May provide additional safety and comfort by providing a parkway strip separating the pedestrian walkway from the bicycle path
- Provides key pedestrian and bicycle linkages

Applications

- An esplanade is an intensive project that is appropriate for large-scale streetscape and roadway projects. It is best located on streets with fewer cross streets so that crossings are kept to a minimum.
- An esplanade is highly beneficial when it provides linkages between popular destinations and/or districts.

Considerations

- An esplanade generally requires greater width than that of a typical sidewalk area, so its development will likely necessitate the relocation of the curb to increase sidewalk width. This will likely require the relocation of utility infrastructure (e.g., drainage infrastructure, streetlights, utility poles, underground wiring, and utility boxes).
- An esplanade should have dedicated signalization at intersections with vehicular roadways. This is desired for a few reasons: 1) pedestrians and bicyclists are less visible to turning traffic because the pathways are set back further from the street, 2) at roadway crossings with two-way bicycle paths, motorists may not expect oncoming bicycle traffic, and 3) dedicated signalization adds convenience and comfort to users.

Design Guidance

- An esplanade is typically 25-35’ wide, accommodating a minimum 7’-wide pedestrian walkway, minimum 12’ two-way bicycle path, and a parkway with landscaping, trees, and/or streetlights. Ideally there should be two parkway strips – one between the roadway and bicycle path, and another between the bicycle path and pedestrian walkway. Trees with broad canopies should be chosen to help create an attractive environment and protect users from the sun.
- Methods for stormwater treatment and management should be integrated into the landscaping plan. Permeable pavement should be considered for pathway surfaces.
- For further design guidance regarding the bicycle path, see Section 5.3 “Protected Bicycle Lane”.
- For design guidance regarding intersections and mid-block crossings with a roadway, as well as instances where pedestrian walkways cross a bicycle path, see Section 5.3 “Protected Bicycle Lane” and Section 6.11 “Bicycle Lanes at Intersections”.

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COMPLETE STREETS DESIGN GUIDE

ROADWAYS

5





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5. ROADWAYS

Introduction

This chapter presents several treatments and techniques that provide complete street enhancements in the roadway, which is defined as the area between the curbs. The following interventions represent “tools” in the complete streets design “toolkit”. Their application varies based on many factors including land use context, street configuration, pedestrian and traffic volumes, and vehicle speeds. Used individually or in coordination with other interventions in this guide, they provide safer vehicular speeds, improved goods movement, transit prioritization, and even pedestrian use of the roadway zone.

Pedestrian Enhancements

5.1 Pedestrian Plaza

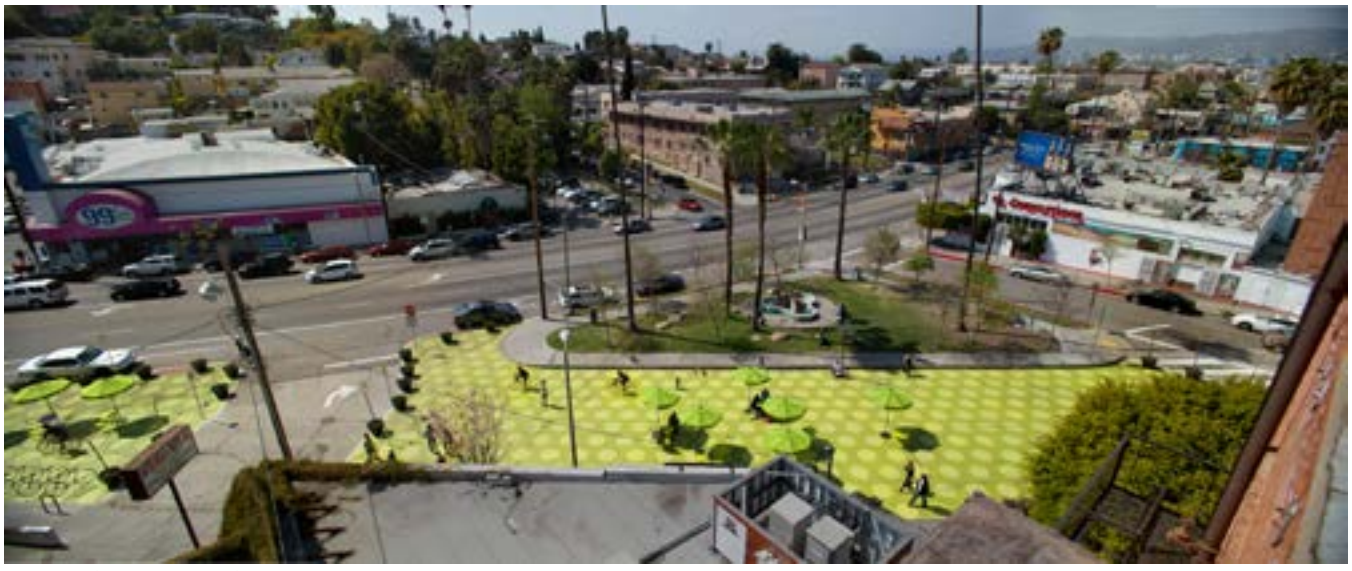
A pedestrian plaza is an outdoor public space with public amenities that contributes to fostering a greater sense of community. Formed by repurposing a portion of existing roadway, these spaces can be used to host community events and draw patrons to local neighborhood businesses.

Benefits

- Provides an opportunity to turn low-volume streets into pedestrian-oriented public spaces
- Creates a sense of place and identity for neighborhoods
- Provides opportunities for community programming, public art displays, and increased neighborhood economic activity
- Slows down street traffic on surrounding streets

Applications

- Pedestrian plazas should be considered on a street segment with low vehicle traffic or on roadways that pose safety or operational issues because of unorthodox geometry.
- They should be applied in locations where a community partner agrees to maintain the plaza's cleanliness and furniture.
- Land uses such as restaurants, cafes, and retail shops, should complement the site of the plaza.



Sunset Triangle Plaza, Silver Lake



Sunset Triangle Plaza, Silver Lake



NoHo Plaza, North Hollywood

Considerations

- While bicycle parking should be installed within the plaza, vehicle parking should be prohibited unless for loading purposes at specific hours when the plaza is not occupied.
- Access for emergency vehicles must be accommodated

Design Guidance

- Pedestrian plazas should be clearly delineated from adjacent roadways using design elements such as a colorful or textured surface treatment, bollards, striping, delineators, and perimeter planters. Additional street lighting should be considered to increase the plaza's visibility and safety.
- The plaza may contain tables, seating, bicycle parking, bicycle repair stations, aesthetic landscaping, stormwater vegetation, public art, recreational amenities, and exercise equipment.

Other Discussion

- LADOT's People St. Program works with local stakeholders to establish plazas in their neighborhoods. After the success of Los Angeles' first pedestrian plaza, Sunset Triangle, in Silver Lake in 2012, LADOT's People St. Program continues to partner with local groups to bring more plazas across the city. The overall goal of the People St program is to catalyze permanent roadway-to-plaza conversions as described above.

References

NACTO Urban Street Design Guide

LADOT People St. Program - http://peoplest.lacity.org/

5.2 Bicycle Lane

Bicycle lanes provide safe, dedicated travel lanes for bicyclists. Classified as Class II facilities by the state, bike lanes serve the mobility needs of riders by providing them with useful connections to destinations.

Benefits

- Provides bicyclists with a safe, dedicated space on the roadway
- Facilitates predictable behavior and movements between motorists and bicyclists
- Allows bicyclists to travel at speeds appropriate to bicyclists rather than moving traffic

Applications

- Bike lanes are valuable on streets where demand is high and/or where connections are needed.
- Bike lanes are typically applied on arterial streets with travelways in both directions.
- Road diet projects present opportunities to install bike lanes and reduce off-peak vehicular speeds.
- Apply on streets designed for one-way travel on one way streets or for two-way travel on both sides of the street.
- Apply on streets/corridors which allow the placement of bike lanes adjacent to the existing curb.
- Apply on streets/corridors where there are parking lanes provided and which allow the provision of bike lanes through the reallocation of existing street space, i.e. the narrowing of travel lanes, the reconfiguration of parking lanes, and/or the removal of travel lanes.

Considerations

- On streets with heavy bicycle traffic, wider bicycle lanes should be considered in order to allow faster-moving bicyclists to pass slow moving bicyclists.
- Left-side bike lanes should be considered on one-way arterial streets if significant transit service is present on the right-most travel lane. Contraflow bike lanes can be considered on the left side of one-way streets.
- Uphill conditions may pose a challenge for some riders. Wider bike lanes should be considered in these instances, along with downhill Shared Lane Markings to allow bicyclists to take the vehicular travel lane on the downhill.
- Streets with frequent parking turnover may increase the risk of conflict and “dooring” collisions with bicyclists. This safety factor can be addressed by increasing parking lane and/or bike lane widths, or by painting a striped buffer between the bike lane and parking lane.
- Parked or moving vehicles should be prohibited in the bike lane. Bike lanes should only be traversed by vehicles when entering or exiting an on-street parking space or driveway; or when entering a right turn lane at the designated merging area near the intersection approach.



In this image, a dashed line seeks to demarcate the so-called “door zone”, which is the space in which a cyclist is in danger of being hit by an open car door. There is currently no standard treatment for providing a door-zone buffer between parked vehicles and bicyclists.



Painted striping provides a spatial buffer from passing vehicles, providing protection from fast-moving vehicles. Note that, in this case, there is insufficient space to also incorporate a buffer in the "door zone" next to parked vehicles.

Design Guidance

- The City of Los Angeles Department of Transportation lists the following widths for bike lanes:
- Interior Bike lane:
  - 7' (desirable)
  - 5' (minimum)
  - 4' (absolute minimum and only for short distances)
- Bike Lane w/o Parking:
  - 7' (desirable)
  - 5' (minimum w/ gutter)
  - 4' (minimum w/ no gutter)
- Bike Lane w/ Parking:
  - 15' (desirable)
  - 13' (minimum)
  - 12' (absolute minimum)
- Striping:
  - White line separating vehicle lane from bicycle lane must be 6"
  - White line separating bicycle lane from parking lane must be 4"
  - A buffered space can be added to bike lanes according to the amount of available roadway space.

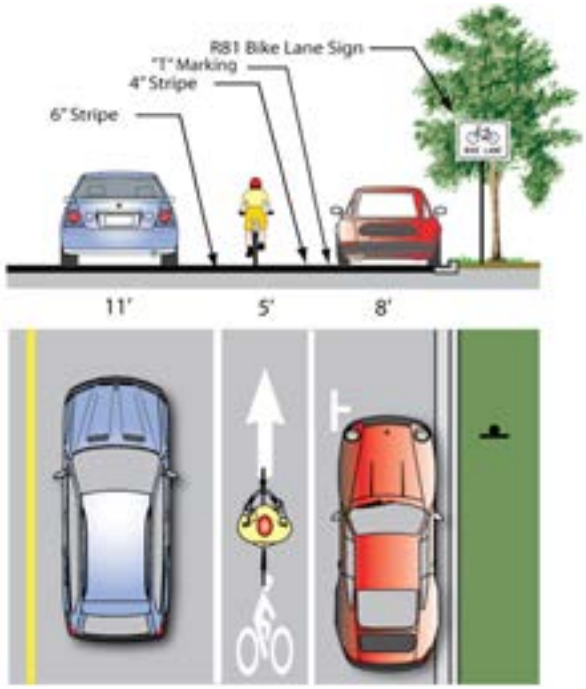
Bicycle Enhancements

- Signage for bicycles lanes (R81-CA MUTCD) must be provided at:
    - Beginning of bike lane
    - Approaches and at far side of all arterial crossings
    - Major changes in direction
    - Intervals not to exceed ½ mile
- Pavement Markings for bicycle lanes shall be the "BIKE LANE" stencil or graphic representation of a bicyclist with directional arrow (preferred) to be used:
    - At the beginning of a bicycle lane:
    - Far side of all bicycle path (Class I) crossings
    - Aproaches and at far side of all arterial crossings
    - Major changes in direction
    - Intervals not to exceed ½ mile
    - Beginning and end of bicycle lane pockets at approach to intersection

Other Design Guidance

Bicycle Lane Next to On-Street Parallel Parking

- Lane Width: 5' minimum, 7' maximum
- Discussion: Bicycle lanes adjacent to on-street parallel parking are the most common type used in the United States. Crashes caused by a suddenly opened vehicle door are a hazard for bicyclists using this type of facility. Providing wider bicycle lanes is one way to mitigate against potential bicyclist collisions with car doors. However, if the outer edge of the bicycle lane abuts the parking stall, bicyclists may still ride too close to parked cars. Bicycle lanes that are too wide may also encourage vehicles to use the bicycle lane as a loading zone in busy areas where on-street parking is typically full or motorists may try to drive in them. Design treatments to encourage bicyclists to ride farther away from parked vehicles will increase the safety of the facility. If sufficient space is available, the preferred design provides a buffer zone between parked cars and the bicycle lane.
- Caltrans Highway Design Manual: The figure below depicts bicycle lanes on an urban type curbed street where parking stalls (or continuous parking stripes) are marked. Bicycle lanes are located between the parking area and the traffic lanes.



Standard dimensions for a bicycle lane next to on-street parallel parking

Bicycle Enhancements

As indicated, 5 feet shall be the minimum width of bicycle lane where parking stalls are marked. If parking volume is substantial or turnover high, an additional one to two feet of width is desirable. Bicycle lanes shall not be placed between the parking area and the curb. Such facilities increase the conflict between bicyclists and opening car doors and reduce visibility at intersections. Also, they prevent bicyclists from leaving the bicycle lane to turn left and cannot be effectively maintained. Bicycle lanes are established in conjunction with the parking areas. As indicated, 11 or 12 feet (depending on the type of curb) shall be the minimum width of the bicycle lane where parking is permitted. This type of lane is satisfactory where parking is not extensive and where turnover of parked cars is infrequent. However, if parking is substantial, turnover of parked cars is high, truck traffic is substantial, or if vehicle speeds exceed 55 km/h, additional width is recommended



Standard dimensions for a curbside bicycle lane (no on-street parking).

- AASHTO Guide for the Development of Bicycle Facilities (1999): If parking is permitted, the bicycle lane should be placed between the parking area and the travel lane and have a minimum width of 5 feet. Where parking is permitted but a parking stripe or stalls are not utilized, the shared area should be a minimum of 11 feet without a curb face and 12 feet adjacent to a curb face as shown in figure below. If the parking volume is substantial or turnover is high, an additional 1 to 2 feet of width is desirable

Bicycle Lane with No On-Street Parking

- Lane Width: 5' minimum measured from face of curb when adjacent to curb.
- Preferred Width: 6-7' where right-of-way allows.
- Maximum Width: 7' adjacent to arterials with high travel speeds.
- Discussion: Wider bicycle lanes are desirable in certain circumstances such as on higher speed arterials (45 mph+) where a wider bicycle lane can increase separation between passing vehicles, parked vehicles and bicyclists. Wide bicycle lanes are also appropriate in areas with high bicycle use. A bicycle lane width of 6' or 7' makes it possible for bicyclists to pass each other without leaving the lane, increasing the capacity of the bicycle lane. Frequent signing and pavement markings are important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane.

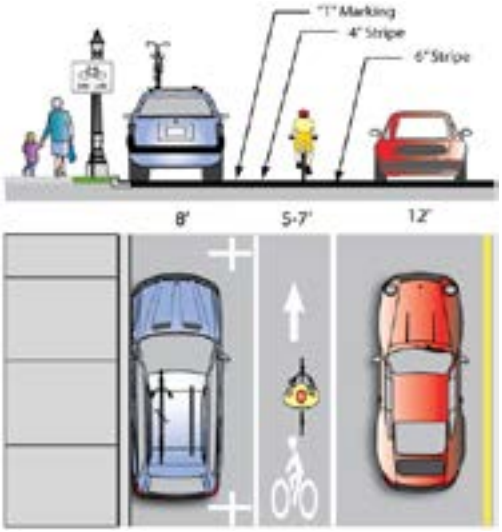


A typical curbside bicycle lane in Los Angeles

Bicycle Enhancements

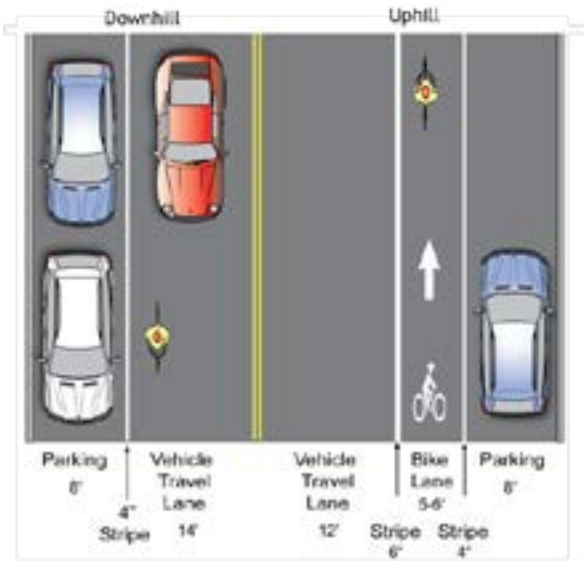
Bicycle Lane on Left Side of One-Way Street

- Lane Width: 5' minimum when adjacent to curb and gutter, 7' maximum.
- Discussion: Bicycle Lanes on the left side of a one-way street are generally discouraged, but they can be useful in certain limited circumstances. Left-side bicycle lanes on one-way streets should only be considered on roadways with either: 1) heavy transit use on the right side of the street, 2) high volumes of right turn movements by vehicles, 3) bicyclists need to make left turns on the one way street.
- Benefits:
  - ♦ With the bicycle lane on the left, bicyclists are seen in the motorist's driver's side mirror, which has a smaller blind spot than the passenger side mirror.
  - ♦ Most bus stops and loading zones are on the right side of the street.
  - ♦ Left-side bicycle lanes reduce the number of conflicts caused by buses or trucks blocking or merging through a bicycle lane.
  - ♦ Considerations:
  - ♦ There may also be potential for increased conflicts between bicyclists and motorists making left turns. A left turn pocket with the bicycle lane oriented to the right may address these conflicts if space permits.
  - ♦ Drivers are not accustomed to looking for bicycles on the left hand side of their vehicles.
  - ♦ Car passengers opening doors are less likely to be aware of the presence of bicyclists to their right.
  - ♦ Bicycle lanes on the left side of the street may experience higher levels of 'wrong way riding' by bicyclists.
  - ♦ Bicyclists may not be accustomed to looking over their right shoulders to monitor traffic, the facilities render helmet and handlebar mounted mirrors useless.
  - ♦ Where adjacent to parallel parking, left side bicycle lanes may result in poorer visibility to motorists leaving parking spaces.



Standard dimensions for a bicycle lane on the left side of a one-way street.

Bicycle Enhancements



Uphill climbing bicycle lane with a downhill "sharrowed" multi-modal travel lane

Uphill Climbing Bicycle Lanes

- Lane Width: 5 or 6 feet wide (6' is preferred for extra maneuvering room on steep grades).
- Striping: On the uphill side, use a 6" stripe between the vehicle travel lane and bike lane, and a 4" stripe between the bicycle lane and the parking lane or shoulder. On the downhill side, use a 4" shoulder stripe or edgeline between vehicle travel lane and the parking lane shoulder and/or add sharrows to the travel lane.
- Discussion: Separating vehicle and bicycle traffic, uphill bicycle lanes (also known as "climbing lanes") enable motorists to safely pass slower-speed bicyclists, thereby improving conditions for both travel modes. The right-of-way or curb-to-curb width on some streets may only provide enough space to stripe a bicycle lane on one side. Under these conditions, bicycle lane striping could be added to the uphill side of the street only. This measure often includes delineating on-street parking (if provided), slightly narrowing travel lanes, and/or shifting the centerline if necessary.

Wide Outside Bicycle Lane as a Connection Gap Closure

- Lane Width: The outside lane should be 14' wide minimum.
- Signage: Appropriate signage as recommended by the CA MUTCD applies. The gap area should have "Bicycle Route" (D11-1) signs placed at maximum 400' intervals. Additionally, "Bicycles May Use Full Lane" signage (MUTCD R4-11) may be used on roadways with higher traffic volumes.
- Discussion: For connection gaps with no on-street parking and without adequate right of way for widening or lane width reductions to provide continuous bicycle lanes, a wide outside lane may be used with the appropriate signage. If parking is under-utilized, its removal should be considered to provide for dedicated bicycle facilities.

Bicycle Enhancements

Contra-Flow Bicycle Lane on One-Way Street

- Lane Width: The contra-flow lane should be 5' minimum when adjacent to curb and gutter
- Discussion: Contra-flow bicycle lanes enable bicyclists to ride in the opposite direction of vehicle traffic on one-way streets for local access. The facility is placed on the opposite side of vehicle travel lanes (to the motorists' left), and separated from traffic with a double yellow line or extruded curb. This informs motorists that bicyclists are riding legally in a dedicated lane.

Measures should be taken to signalize all stop-controlled intersections on streets with contra flow bicycle lanes. All left-turn-on-red movements from intersecting one-way streets onto the street with the contra-flow bicycle lane should be prohibited (R-13B).

If driveways exist, exiting left turns should be prohibited if possible by relocating exit movements to other streets. If left turn out of driveways onto the street with the contra-flow bicycle lane must be permitted, special signage should be developed warning motorists to look left for approaching bicyclists before turning left.

Wide Bicycle Lane with Additional Pavement Markings Next to On-Street Parallel Parking (Non Standard)

- Lane Width: 7' maximum
- Discussion: Wide bicycle lanes may encourage less-experienced bicyclists to ride farther to the right (door zone) to maximize distance from passing traffic. Diagonal stripes may be added to encourage bicyclists to ride to the left of the bicycle lane. This treatment is not standard and should be studied before use. Providing a buffer between parking stalls and the outside bicycle lane stripe are preferred (see Preferred Design for Bicycle Lane Next to On-Street Parallel Parking). However, the treatment at right may be used in areas where parking stalls are undesirable or otherwise cannot be used.

Floating Bicycle Lane or Bicycle Accommodatio with Part-Time Parking (Non Standard)

- Lane Width: Standard bicycle lane design as recommended by the CA MUTCD, a minimum of 5' and a maximum of 7' or double row of Shared Lane Markings.
- Design Summary: Standard parking T's where appropriate. Add required signage and tapered pavement markings or striping to lead into the facility.
- Discussion: When parking is allowed, bicyclists use the floating bicycle lane where cars were previously parked between a 4" wide white stripe and the curb. When parking is not allowed, bicyclists move to the right and share a wide travel lane or Shared Lane Marking pavement treatment. On roadways where there is a part time parking prohibition, yet there is a demonstrated need for bicycle travel through the corridor, it may be feasible to install a floating bicycle lane or double row of Shared Lane Markings to provide bicycle accommodation.

References

NACTO Urban Bikeway Design Guide

LADOT Manual of Policies and Procedures – Section 531, Page 8-9

CA MUTCD

Caltrans Highway Design Manual

AASHTO Guide for the Development of Bicycle Facilities

5.3 Protected Bicycle Lane

A protected bicycle lane, or "cycle track," is a type of bicycle facility that provides a physical separation for bicyclists traveling on the roadway.

Benefits

- Decreases injuries and fatalities while providing a safer, more comfortable bicycling experience
- Encourages bicyclists to travel in a protected bicycle lane on the roadway, as opposed to on the sidewalk
- Mitigates conflicts between bicyclists and motorists by providing greater clarity about roadway behavior
- Increases bicycle ridership

Applications

- Protected bicycle lanes are typically applied:
  - ♦ one-way on each side of two-way streets
  - ♦ one-way on one side of a one-way street, two-way on one side of a one-way street, and are separated from vehicles and pedestrians by pavement markings or coloring, bollards, curbs/medians and on-street parking, or a combination of these elements.
- Protected bicycle lanes should be applied along corridors with adequate right- of-way. Sidewalks or other pedestrian facilities should not be narrowed to accommodate the Cycle Track, as pedestrians will likely walk on the Protected Bicycle Lane if sidewalk capacity is reduced.
- Apply in relation to school routes, dense commercial districts, and arterials heavily traveled by bicyclists.
- Apply along streets with long blocks and few or no driveway or midblock access points for vehicles. Protected Bicycle Lanes located on one-way streets will have fewer potential conflicts than those on two-way streets.



A Complete Street rendering incorporating protected bicycle lanes with on-street parking and bus boarding islands (image courtesy of NACTO)

- Apply along routes where there are more destinations on one side of a street or if the Protected Bicycle Lane will be connecting to a shared use path or other bicycle facility on one side of the street.

Design Guidance

Separation

- Protected Bicycle Lanes can be separated by a device or barrier (pavement markings or coloring, bollards, curbs/medians and on-street parking or a combination of these elements. from the travel lane or by on-street parking with additional striping provided between the lane and the Cycle Track. Protected Bicycle Lanes using barrier separation are typically at-grade. Openings in the barrier or curb are needed at driveways or other access points. The barrier should be dropped at intersections to allow vehicle crossing. When on-street parking is present, it should separate the Protected Bicycle Lane from the roadway, the Protected Bicycle Lane should be placed with a 3-foot (min.) buffer between parking and the Protected Bicycle Lane to minimize the hazard of opening car doors into passing bicyclists.



Painted buffers and soft-hit posts (as seen here in Chicago, Illinois) are inexpensive interim treatments to establish protected bicycle lanes before more-costly permanent facilities can be constructed.



Protected bike lane with a landscaped buffer

Bicycle Enhancements

Protected Bicycle Lane Only

- *Raised buffer without adjacent parking* -- If there is no parking adjacent to the buffer it may be as narrow as 2 feet, although a width of 4 feet is preferable.



The Figueroa Street streetscape plan envisions protected bicycle lanes intermixing with bus boarding islands. (image courtesy of Melendrez)

Protected Bicycle Lane adjacent to Parking Lane

- *Raised buffer with adjacent parking* -- This should be at least 3' wide to ensure an adequate buffer for open vehicle doors. The preferred width is at least 4' to better accommodate pedestrian egress and ingress from parked vehicles.

- *Striped buffer with adjacent parking.* -- A standard for this condition would be a preferred width of 4 feet and a minimum width of 3 feet.

Protected Bicycle Lane adjacent to Parking Lane / Peak Hour Bus Lane

- Protected Bicycle Lanes, when designed adjacent to Parking Lanes / Peak-Time Bus Lanes should be placed between the lane and the sidewalk. This treatment prevents the conflict of bicyclists riding between two travel lanes. At intersections where Protected Bicycle Lanes meet bus stops, a bus stop island, 4' – 5' wide, should be provided, between the Protected Bicycle Lane and the Peak-Time Bus Lane, which allows pedestrians to board the bus. Additionally, the Protected Bicycle Lane should have yield signs at such conflict zones, and it should be raised to be at-grade with the sidewalk and bus stop island, before descending to be at-grade with the travel lanes.



This conceptual rendering for 7th Street incorporates a wide buffered area that can accommodate non-car uses such as transit boarding islands, bikeshare stations, and bicycle parking corrals. (Image courtesy of Melendrez)

Considerations

- May create design challenges at intersections for right-turning vehicles.
- May require creating entry and exit points for driveways and parking lots along the Cycle Track route.
- May require bicyclist-only signal phasing to allow for left turns along the route by installing two-stage left-turn boxes.
- May be difficult for existing street maintenance equipment to maintain Protected Bicycle Lane due to maintenance vehicle design widths.
- Raised buffers require additional design consideration, in particular, drainage, street cleaning and treatment at intersection.
- Access to fire hydrants must be accommodated; fire trucks can typically mount a low physical barrier.
- In locations where production filming is common, cycle track design should take into consideration the movement of large production equipment between the roadway and the sidewalk area. At-grade painted buffers and/or movable barriers can be utilized in lieu of a raised buffer.



A conceptual rendering of a protected bicycle lane (cycle track) on Huntington Drive in El Sereno.

Interim Design Strategies

- By re-allocating roadway space (including removing or reallocating parking lanes and/or travel lanes), interim cycle tracks can be physically protected from parking or travel lanes by painted buffers at least 3' in width with flexible delineators.



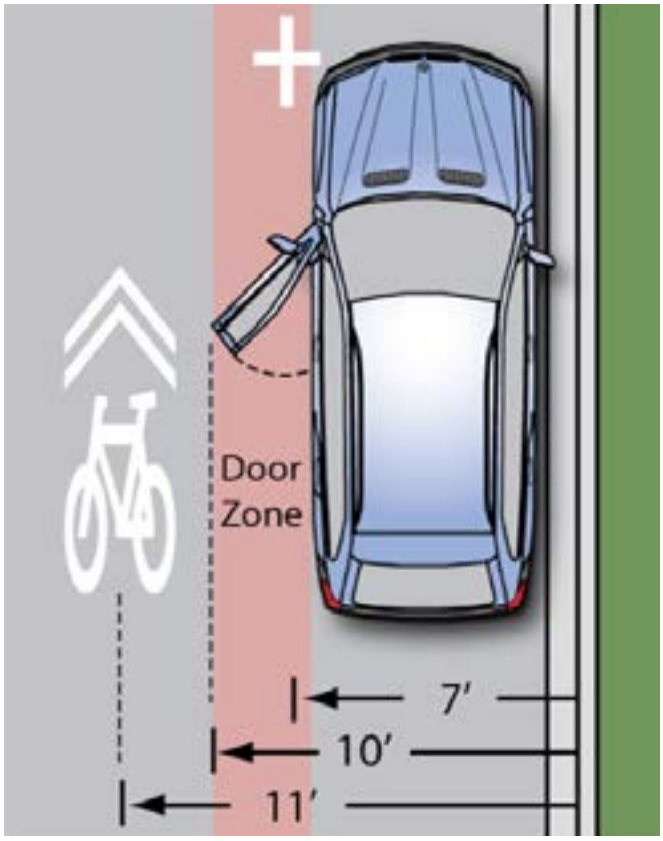
A buffered bicycle lane on 2nd Street in downtown Los Angeles provides separation and protection from vehicular traffic.

References

NACTO Urban Bikeway Design Guide

5.4 Shared Lane Marking (Sharrow)

Shared Lane Markings serve as a visual cue for motorists to be aware of bicyclists traveling on the street. The presence of Shared Lane Markings indicate that that particular street serves as a vital connection for bicyclists, however, physical roadway constraints make it infeasible to implement a bicycle lane.



Shared Lane markings should be placed so as to encourage bicyclists to ride at least 3 feet away from parked cars in order to prevent "dooring" collisions..

Benefits

- Alerts motorists to the lateral location of bicyclists likely to occupy the travel lane
- Reinforces the right of bicyclists to use the entire travel lane
- Guides bicyclists in the correct direction of travel
- Reminds bicyclists to ride 3' away from parked cars to prevent "dooring" collisions

Applications

- Shared Lane Markings should be applied on streets that serve bicycle traffic but that do not have sufficient roadway space to accommodate a bike lane.
- They are recommended on streets that are designated as bike routes (Class III bicycle facilities) and on streets that have travel speeds of 35 mph or less.
- Shared Lane Markings should be provided only after fully considering the feasibility of a bike lane.

Bicycle Enhancements

Design Guidance

- Where on-street parking is present, Shared Lane Markings (sharrows) should be placed (centered) a minimum of **11'** from the face of the curb or from the edge of the pavement where a curb is absent
    - ♦ It may be placed **more than 11'** from the face of the curb if adequate roadway width exists.
    - ♦ If on-street parking spaces are wider than **7'** the shared lane marking should be moved further out accordingly.
- Where on-street parking is absent and the travel lane is less than 14' wide, the center of the shared lane marking should be at least 4' from the face of the curb or from the edge of the pavement.
- Shared Lane Markings should be placed immediately after an intersection and spaced at intervals not greater than 250' thereafter.
- "Bicycles May Use Full Lane" signage (MUTCD R4-11) should be used to supplement the effect of the shared lane marking.

References

CA MUTCD 9C.07 – Shared Lane Marking





Shared lane markings could be highlighted using a green painted backgroud

5.5 Bicycle Corral

A bicycle corral supplies additional bike parking by replacing a single on-street parking space with a row of bicycle racks or a cycle stall.

Benefits

- Benefits local businesses by increasing the overall supply of on-street parking
- Makes bicycling more convenient (especially for local trips) when users know that bicycle parking is present
- Reduces the likelihood of parked bicycles affixed to railings, private property, or other street furniture

Applications

- A bicycle corral is especially valuable in environments that have a high demand for bicycle parking, such as commercial districts and corridors.
- Bicycle Corrals work well where sidewalks are too narrow to accommodate bicycle racks on the sidewalk, or when demand for bicycle parking (especially short-term) is not met by sidewalk racks alone.

Design Guidance

- Bicycle racks within a corral can be installed in a parallel or diagonal configuration, depending on the orientation of the surrounding on-street parking spaces.
- A typical corral replaces one parking space with up to 14 parked bicycles.
- Spacing between racks should be at least 48" to allow for adequate room to maneuver bicycles into and out of the stalls
- Reflective flexible delineators, wheel stops or planters should serve as buffers for the corral at both ends. Object marker signage can further increase the visibility of bicycle corrals.
- There should be adequate clearances from bus stops, fire hydrants, utilities (including manhole covers), driveways, tree wells, and other street furniture.



Standardized rack for Los Angeles bicycle corrals

Bicycle Enhancements

- Corrals can be located in a red curb zone as long as standard clearances are met. There should be at least a 25 foot clearance from a fire hydrant.
- Bicycle corrals should be located at least 30 feet from intersection departure and 50 feet from intersection approach.

Other Discussion

- LADOT should consider developing a standard plan for the placement and design features of bicycle corrals, including striping, signage, dimensioning and other elements.
- Bicycle corrals are part of LADOT's Bicycle Friendly Business Program, a public-private partnership that serves local stakeholders, business owners, or community partners that are interested in increasing bicycle friendliness in their community by hosting a bicycle corral outside of their establishment. LADOT pays for the corral, site design, and installation in the public right-of-way, while the requesting party agrees to become a maintenance partner that ensures the corral's cleanliness and upkeep.

References

LADOT Bike Blog: ladotbikeblog.wordpress.com/bike-corrals/

LADOT Bicycle Friendly Business Program http://ladotbikeblog.wordpress.com/bicycle-friendly-business-program/

Standard Plan: S-671 Bicycle Rack



York Boulevard, Highland Park

5.6 Shared Bicycle-Bus Lane

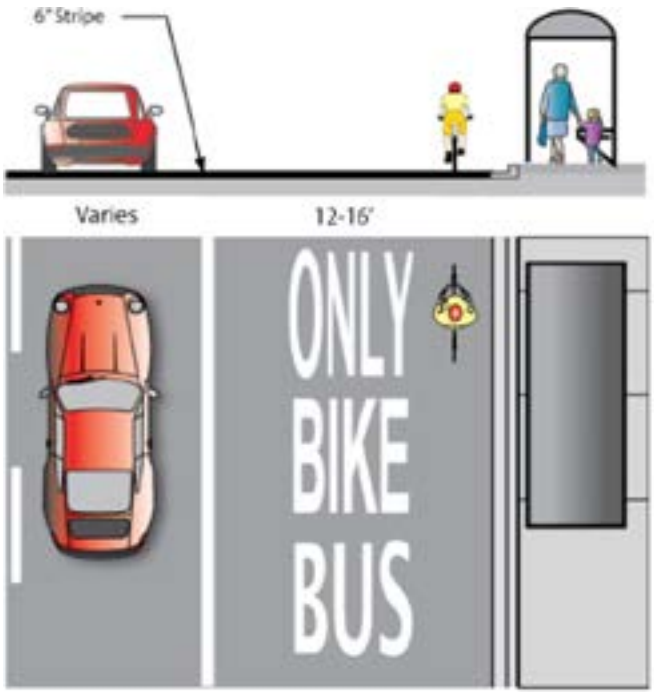
A shared bicycle-bus lane provides bicyclists and buses with an exclusive travel lane on the roadway, especially where constrained roadways cannot accommodate separate facilities for both modes.

Benefits

- Provides a more pleasant bicycle ride or transit trip by minimizing interaction with cars
- Improves travel times for buses
- Reduces risk of collision between cars and bicyclists
- Fosters a safer travel environment when bus drivers and bicyclists are well trained and educated on how to co-exist and interact in the same space.

Applications

- Shared bicycle-bus lanes are applicable where inadequate roadway space exists to accommodate a separate bike lane and bus lane.



- Generally, such shared uses are operationally acceptable unless very high volumes of bus and bicycle traffic exist. By law, California bicyclists must ride as far to the right as practicable. This allows bicyclists lawful use of a right-hand bus lane.

Considerations

- Right turning vehicles can reduce the benefits of the shared lane by creating congestion at intersection approaches.
- Enforcement should ensure that private vehicles do not encroach onto the shared lane.
- Some bicyclists may be uncomfortable with buses passing them within the same travel space.
- Bicyclists traveling along their route may not be comfortable with continually having to "leap frog" buses that are temporarily stopped to board and alight passengers.

Design Guidance

- The minimum width of the shared lane should be **16'** from the curb, which allows space for buses to pass bicyclists.
- A **14'** shared lane may be allowed on roadways with low traffic volumes and/or lower bus frequency, while a **12'** shared lane should only be considered in very constrained areas.
- To minimize delays to transit vehicles and bicyclists, vehicular right turns should be limited or prohibited at locations.
- There is no current standard CA MUTCD signage for a shared bicycle-bus lane. Many cities have developed their own signage.

5.7 Peak-hour Bus Lane

A peak-hour bus lane increases the efficiency of transit during peak hours (7am-9am, 4pm-7pm) by providing a dedicated lane for bus travel. Placed on an arterial street with heavy transit ridership, peak-hour bus lanes typically occupy the curbside travel lane and prohibit on-street parking during peak hours.

Benefits

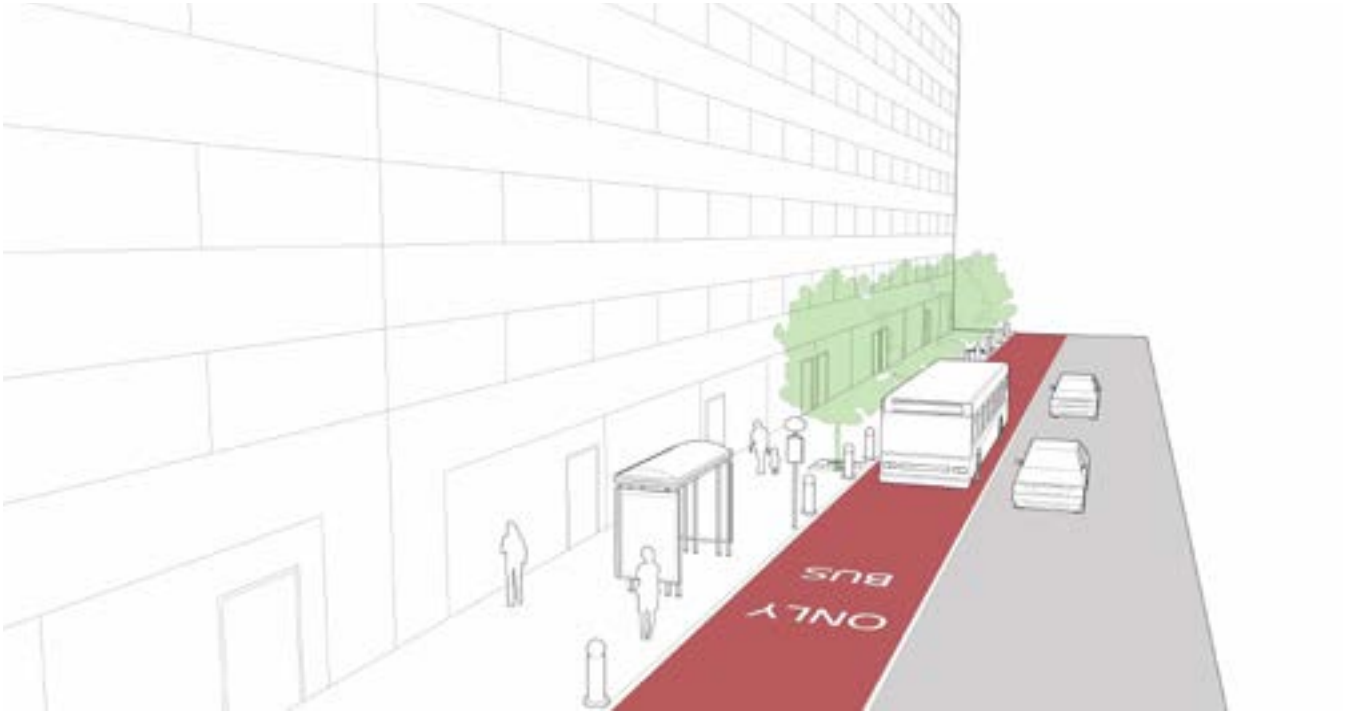
- Increases reliability and on-time performance of transit during peak travel times
- Prioritizes and promotes transit as an attractive mode of travel

Applications

- Peak-hour bus lanes should be considered on multi-lane arterial corridors where major transit service suffers from poor on-time performance, as a result of peak hour congestion.

Considerations

- Businesses along the street should be notified in advance that implementation of a curbside peak-hour bus lane will result in the restriction of on-street parking during peak hours.
- The appropriate width for a bicycle lane may not be feasible alongside a peak-hour bus lane, in which case the lane can then be designed as a shared bike-bus lane.
- Personnel or video/photo technology should be considered as enforcement tools to ensure the lane is only used by buses during peak hours.



Peak-hour Bus Lanes allow buses to stay on schedule at hours when vehicle lanes tend to get congested..

Design Guidance

- Peak-hour bus lanes should be installed with the appropriate parking signage and pavement markings (See City of Los Angeles' Department of Transportation standard plan S-487 for Exclusive Bus Lane Markings for further detail).
- At intersections, right turning movements by other motorists and bicyclists can be facilitated by marking dashed lines at the intersection approach. If buses traveling in the lane experience significant delays, right turns at select intersections may need to be prohibited.
- Transit signal prioritization should be given to buses operating in these lanes.
- Bus pads should be installed at stops to prevent street warping.
- Alternatively, a peak-hour bus lane can be offset, meaning the bus only lane is located one lane away from the curb (See Section 5.8 "Offset Bus Lane").
- Peak-hour bus lanes may also be designed as shared bike-bus lanes (See Section 5.6 "Shared Bike/ Bus Lane").
- Red paint should be considered as a supplemental treatment used to delineate and reinforce the lane for bus use only.

Additional Discussion

- Starting in 2013, the Los Angeles County Metropolitan Transportation Authority (Metro), in partnership with the City of Los Angeles, implemented curbside peak-hour bus lanes on a 7.7- mile segment of Wilshire Blvd as part of their Wilshire Bus Rapid Transit (BRT) Project. Overall, the project aims to improve bus passenger travel times, service reliability, and ridership along the corridor. The bus lanes are operational on weekdays from 7 am to 9 am and 4 pm to 7 pm. In addition, bicyclists are also allowed on these lanes during the peak period.

References

FTA Bus Lanes http://www.fta.dot.gov/12351_4358.html

Effective Bus-Only Lanes http://nacto.org/docs/usdg/effective_bus_only_lanes_kiesling.pdf

The City of Los Angeles' Department of Transportation currently has a standard plan (S-487) for Exclusive Bus Lane Markings.



Red paint on the curb emphasizes the lane's exclusive dedication to bus use..

5.8 Offset Bus Lane

Unlike a peak-hour bus lane, an offset bus lane is located away from the curbside, and are separated from the curb by a parking lane. Offset bus lanes provide the greatest benefits when bus bulbs are integrated.

Benefits

- Increases reliability and on-time performance of transit during peak travel times
- Prioritizes and promotes transit as an attractive mode of travel
- Allows existing on-street parking to remain operational
- Provides a lane for emergency vehicles to use in congested conditions
- Allows for the implementation of bus bulbs, which eliminates the need for drivers to pull into and out of bus stop locations

Applications

- Offset bus lanes should be considered on multi-lane arterial corridors where major transit service suffers from poor on-time performance, as a result of peak hour congestion.



Design Guidance

- The minimum width of a dedicated bus lane in an offset position is **10'**.
- Bus bulbs should be implemented in conjunction with offset lanes (See Section 4.17 "Bus Bulb")
- Offset bus lanes should be installed with the appropriate pavement markings (See City of Los Angeles' Department of Transportation standard plan S-487 for Exclusive Bus Lane Markings for further detail)
- At intersections, right turning movements by other motorists and bicyclists can be facilitated by marking dashed lines at the intersection approach. If buses traveling in the lane experience significant delays, right turns at select intersections may need to be prohibited.
- Transit signal prioritization should be given to buses operating in these lanes.
- Bus pads should be installed at stops to prevent street warping.
- Peak-hour bus lanes may also be designed as shared bike-bus lanes (See Section 5.6 "Shared Bicycle-Bus Lane").
- Red pavement paint should be considered as a supplemental treatment used to delineate and reinforce the lane for bus use only.

Considerations

- Personnel or video/photo technology should be considered as enforcement tools to ensure the lane is used appropriately by only buses.

References

The City of Los Angeles' Department of Transportation currently has a standard plan (S-487) for Exclusive Bus Lane Markings.
NACTO Urban Street Design Guide

5.9 Median Bus Lane / Busway

A median bus lanes enhances transit service by providing a dedicated right-of-way for buses to run down the center of corridors. A median busway functions similarly to a median bus lane except that it provides a physical separation from vehicle traffic. For both of these facilities, passengers board and alight at station stops that are located on median boarding islands.

Benefits

- Minimizes conflicts with on-street curbside parking and vehicle turning movements
- Improves speed and reliability of transit by eliminating the need for buses to pull into bus stops and merge back into traffic
- Provides a lane for emergency vehicles to use in congested conditions

Applications

- Median bus lanes should be considered on multi-lane arterial corridors where major transit service suffers from poor on-time performance, as a result of peak hour congestion.

Design Guidance

- The minimum width of a median bus lane should be 11'.
- Median bus lanes should be installed with the appropriate pavement markings (See City of Los Angeles' Department of Transportation standard plan S-487 for Exclusive Bus Lane Markings for further detail)
- Contiguous lanes that run in opposite directions should be separated by a solid single or double white stripe(s).
- Median boarding islands should be placed in close proximity to safe, signalized crosswalks.
- A median busway can be separated from other travel lanes using a curb strip or rumble strips.



Image courtesy of NACTO

Transit Enhancements

- Transit signal prioritization should be given to buses operating in these lanes.
- Bus pads should be installed at stops to prevent street warping.
- Red paint should be considered as a supplemental treatment used to delineate and reinforce the lane for bus use only.

Considerations

- Personnel or video/photo technology should be considered as enforcement tools to ensure the lane is used appropriately by only buses.
- Intersections that require left turning provisions for vehicles should be provided with a protected turn signal.
- Compared to peak-hour bus lanes and offset bus lanes, the additional costs of constructing of median boarding islands should be factored in the project feasibility.

References

NACTO Urban Street Design Guide

5.10 Bus Pad

A concrete bus pad is placed at a bus stop to help mitigate the impacts that frequent bus service and heavy vehicles have on the roadway surface.



A concrete bus pad under construction



Where no bus pad exists, the weight of heavy vehicles causes rippling and cracking of the asphalt surface.s

Benefits

- Helps prevent long-term damage (e.g., gaps, cracks, and ripples) to the roadway surface
- Maintains smooth road surface for bicyclists and vehicles

Applications

- Apply concrete bus pads at bus stops where frequent bus service exists with headways of 15 minutes or less.

Design Guidance

- Bus pads should be designed with a minimum width of 12’ per pad and a minimum length of 90’. See City of Los Angeles Bureau of Engineering standard plan S-433 for further detail.
- Bus pads may warrant a longer length to accommodate multiple bus lines and/or articulated buses.

References

- City of Los Angeles Bureau of Engineering standard plan S-433 - Bus Pad.

Transit Enhancements

5.11 Median Bus Boarding Island

A median boarding island provides a boarding platform for passengers waiting for transit vehicles travelling away from the roadway curbline center-running Bus Rapid Transit, and locations with protected bicycle lanes (Cycle Tracks).

Benefits

- Provides space to accommodate bus shelters and other transit-related amenities that would not be possible on constrained sidewalks
- Supports reliable transit operations that run on an exclusive right-of-way
- Provides some landscaping opportunities as long they do not obstruct boarding and alighting portions of the island
- May function as a refuge island for pedestrian crossings

Applications

- Transit boarding islands are applied where transit runs in center lanes.
- They may also be utilized adjacent to protected bicycle lanes (cycle tracks). See Section 5.3 “Protected Bicycle Lane”.

Design Guidance

- Pedestrian crossings from the sidewalk to the median boarding island should be designed and supplemented with the appropriate signage to reduce the risk of collision.



Image Courtesy of Omnitrans

Transit Enhancements

- Transit boarding islands should be at least as long as the distance between the front of the vehicle and its back door, with an additional **5'** clearance at the rear end.
- If applicable, the boarding island should be long enough to accommodate multiple buses with a **5'** buffer space between each pair of stopped buses.
- Transit boarding islands should facilitate accessible boardings by providing a raised platform with a ramp and a minimum **5' wide by 8' long** loading pad.
- Boarding islands should include an enclosure or barrier separating waiting passengers and moving traffic, unless engineering judgment deems them unnecessary because of low volumes of slow-moving traffic.
- Boarding islands should warrant high visibility crossings connecting the platform to the sidewalk, complete with detectable warning plates, ADA ramps, and Braille signage.
- Platform amenities such as seating and fare machines should not obstruct waiting areas or nudge waiting passengers toward the center lane.



A median boarding island ensures access while allowing a protected cycle track to continue along an existing curbline. In this instance, the boarding island is accessed via a curb ramp (somewhat visible in the foreground) that adjoins the crosswalk.

5.12 Lane Reconfiguration / Road Diet

In a "road diet" project, a street's roadway space is reconfigured to prioritize safer vehicle speeds, fewer collisions, and a pedestrian- and bicycle-friendly environment. A typical road diet project involves restriping the roadway to provide a center turn lane and bicycle lanes by reducing a travel lane in each direction.

Benefits

- Encourages safer vehicle travel speeds
- Increases driver awareness of bicyclists and pedestrians
- Reallocates space for bicycle facilities and potential sidewalk widenings
- Provides a center turn lane for emergency vehicles use lane to bypass congested traffic
- Center turn lane eliminates queuing of vehicles that wish to continue through the intersection



A "traditional 4:3" Road Diet

Applications

- Road diet projects are applied to multi-lane streets that exhibit unsafe vehicle speeds and have a documented history of pedestrian and bicycle safety concerns or that are designated as streets with a Class II bicycle facility.
- Prior to implementation, road diet projects should have a traffic analysis conducted to determine their feasibility.
- According to the FHWA, a four-lane roadway with average traffic daily volumes up to 20,000 vehicles represents a good candidates for a potential road diet project.

Design Guidance

- The nature of the road diet depends on a street's existing configuration, traffic operations, user needs, and safety concerns. For instance, a four-lane street (two travel lanes in each direction) could be modified to include one travel lane in each direction, a center turn lane, and bicycle lanes.

References

FHWA "Road Diet" - http://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_013.pdf



Before road diet



After road diet: *Images courtesy of NACTO*

Transit Enhancements

5.13 Lane Narrowing

Roadway space can be optimized by narrowing the width of travel lanes in order to make room for other beneficial roadway features (such as bicycle lanes) and provide traffic calming benefits.

Benefits

- Encourages slower speeds and reduces the risk of collisions
- Provides space for bicycle lanes and/or wider sidewalks

Applications

- Lane narrowing should be considered on roadways with wider lanes (12 feet or wider), excess traffic capacity, and safety/speeding concerns.
- Lane narrowing can be done in conjunction with a road diet project.

Design Guidance

- See LADOT Manual for Policies and Procedures for detailed information about standard lane widths:
  - Travel lane with speeds **less than or equal to 35 mph** should be a minimum of **10'**, with a **9'** wide lane being the absolute minimum width in scenarios where the safety impacts of operational options have been carefully considered.
  - Travel lane with speeds **greater than or equal to 40 mph** should be a minimum of **11'**, with a **10'** wide lane being the absolute minimum width in scenarios where the safety impacts of operational options have been carefully considered.
  - The minimum lane width for a travel lane that is directly **adjacent to a bike lane** (i.e., without a painted buffer) is **11'** (minimum) or **10.5'** (absolute minimum).
  - On streets that are designated for truck or transit traffic , one travel lane of 11' may be used in each direction.

References

LADOT Manual of Policies and Procedures – Section 531, Page 8-9.

NACTO Urban Street Design Guide – Lane Width http://nacto.org/usdg/lane-width/



5.14 Neckdown

A neckdown, also known as a “choker” or “pinchpoint,” consists of curb extensions on both sides of a street at the midblock. The narrower roadway helps calm vehicle speeds, while also decreasing the distance of pedestrian crossings.

Benefits

- When paired with a midblock crosswalk, a neckdown reduces the crossing distance for pedestrians and makes pedestrians more visible for motorists
- Encourages drivers to slow down by providing a physical and visual constraint
- Provides additional sidewalk space for street furniture and green landscaping features
- Delineates direct crosswalk paths and allows more space for smoother grade transitions on the curb ramp
- Produces opportunities for landscaping and stormwater management features

Applications

- A neckdown with or without an associated pedestrian crossing can be applied on any local or non-arterial street that exhibits vehicles traveling at unsafe speeds, especially where pedestrians are present.
- They should be considered around high activity areas, such as schools, commercial destinations, key transit stops, and dense office environments.

Considerations

- Operations for larger vehicles such as buses, delivery/garbage/construction trucks, street sweepers, and emergency vehicles should be addressed before implementation.
- They may require the relocation of existing storm drainage inlets and above ground utilities (e.g., fire hydrants).

Design Guidance

- A neckdown should be narrow enough to discourage drivers from traveling at unsafe speeds.
- At crossings where pedestrian volumes are high, crosswalk markings should be wider than the typical width of 10’.

Interim Design Strategies

- Neckdowns, like other curb extensions, can be installed using low-cost, interim materials such as plastic bollards, planters, or striping. These temporary treatments provide safety benefits until funding becomes available to construct an actual concrete neckdown.





Other Traffic Calming Treatments

5.15 Chicane

Chicanes are alternating curb extensions on the roadway that encourage motorists to drive at slower, safer speeds. Chicanes form an S-shaped curve, forcing cars to slow down.

Benefits

- Discourages speeding on local streets, reducing the risk of collisions caused by motorists
- Fosters a friendlier bicycling and pedestrian environment
- Provides opportunities for landscaping and stormwater management features

Applications

- Chicanes are typically applied on streets in residential contexts where unsafe vehicle speeds pose a threat to pedestrians and bicyclists.
- They are applied at the midblock on narrower streets where there is a travel lane in each direction, or on one-way roads.



Design Guidance

- Chicanes typically consist of a set of **2 or 3** curb extensions set in an alternating pattern.
- The desired design speed of the street should help inform the degree of horizontal deflection (i.e., the lateral movement of vehicles around the chicane). Some European manuals recommend that chicanes should have a displacement of at least **one lane** and the angle of deflection should be at least **45 degrees**.
- Curb extensions may be designed as edge islands with a **1' to 2'** gap from the curb, as a way to address drainage concerns.
- The installation of a center island can help prevent cars from speeding straight through chicanes.
- Signage and striping should be used to help alert and guide motorists along the curves on the roadway.
- Landscaping and vegetated planted in chicanes should be low growing to maintain clear sight distances.



Interim Design Strategies

- Achieving the traffic calming benefits of chicanes can be achieved by using striping and plastic bollards to demarcate the areas where the curb extensions would be.
- Configuring on-street parking to create a chicane effect another inexpensive design solution.

References

NACTO Urban Street Design Guide

Institute of Transportation Engineers – Traffic Calming Measures: Chicane http://www.ite.org/traffic/chicane.asp

5.16 Landscaped Median

A landscaped median can range from being a tree-lined promenade to an intensively landscaped boulevard median.

Benefits

- Supports trees and other plants where conditions are relatively conducive to their growth and allows for installation of drought-tolerant and native plants
- Contributes to community identity with unique landscaping and other elements
- Channelizes vehicular traffic and limits midblock left-turns where appropriate
- Provides, at times, a pedestrian refuge on a wide street at pedestrian crossings
- Provides an opportunity to provide traffic calming
- Collects and treats or infiltrates stormwater
- Provides a visual separation that makes the roadway appear narrower and thus reduces speeds

Applications

- Apply on two-way streets that have more than two travel lanes in each direction.
- Apply on streets being considered to be pedestrian-friendly areas.
- Apply contextually on streets that are being considered for lane narrowing and/or lane reduction.

Considerations

- Continuous medians may not be the most appropriate treatment in every situation. In some cases, they can increase traffic speeds by decreasing the perceived friction through separating traffic flow directions. They may also take up space that can be better used for wider sidewalks, bicycle lanes, landscaping buffer strips, or on-street parking.



- Design must account for impact of raised median on emergency vehicle movement and access. Landscaping or stormwater source controls require a partner for ongoing maintenance.
- Continuous raised median may prevent left turns into driveways on opposite side of street. On streets that have a limited right of way, other treatments should be considered first before application of this treatment.

Design Guidance

- Minimum width: At least 7 feet wide, including curbs, except the median strip adjacent to left-turn lane may be a minimum of 3 feet wide
- Minimum width to include trees: In order to accommodate trees, both in terms of soil volume and separating from travel lanes, medians should be at least 7 feet wide, including curbs.
- Tree spacing from intersection: In order to provide visibility, trees should be 50 feet from a crosswalk or from the limit line at an intersection where there is no crosswalk.
- Where possible, vegetated gutters and bioswales should be included in the median to expand stormwater drainage efforts along the roadway.
- Stormwater treatment: Minimize runoff from stormwater onto the roadway and, where feasible, infiltrate runoff.
- Planting: Appropriate plant materials will vary depending on local conditions and maintenance. Typically, low growing, low maintenance, low water use plants are appropriate. Refer to BSS for specific requirements.
- Irrigation: Overspray and runoff onto the roadway pavement from irrigation is prohibited. Refer to BSS for specific requirements.
- Other elements: Gateway signs or elements, art, pathways on wide medians, and other elements can also be provided on medians. If a median is particularly wide, seating and recreational elements may be provided.



5.17 Speed Feedback Sign

A speed feedback sign displays an approaching vehicle's speed and prompts drivers to slow down when traveling at unsafe speeds.

Benefits

- Encourages safer vehicle speeds
- Improves safety and reduces the risk of collisions with pedestrians and bicyclists
- Alerts drivers they are traveling on a street where vulnerable users may be present (e.g., school children, senior residents)



Applications

- Speed feedback signs are applied near schools, campuses, local neighborhood streets, and construction sites.
- They can also be applied where high vehicle speeds continually exceed the stated speed limit, or where a history of collisions on a street has been caused by unsafe vehicle speeds.

Considerations

- Speed feedback signs should be considered if more inexpensive options, such as traditional signage, are not as effective.
- Alternatively, physical treatments such as chicanes, neckdowns, or speed tables can be considered instead of speed feedback signs.

Design Guidance

- See MUTCD Chapter 2L Changeable Message Signs for comprehensive design guidance
- Speed feedback signs shall not include advertising, animation, rapid flashing, dissolving, exploding, scrolling, or other dynamic elements.
- They shall automatically adjust their brightness under varying light conditions to maintain legibility.
- They should be located sufficiently upstream of high collision locations to enable road users to slow down.

References

MUTCD Chapter 2L. Changeable Message Signs

5.18 On-Street Carshare Parking

Carsharing is designed to give individuals short-term access to cars when they need it. Typically, a user checks out a vehicle from a designated off-street lot or garage. Access to shared vehicles can be easy or inconvenient depending on where one lives. By assigning a select number of on-street parking spaces for carshare use, shared vehicles will be available in more locations to serve more users.

Benefits

- Provides carshare users with greater access to shared vehicles, especially in residential areas where off-street carshare locations are not close by
- Increases visibility of car sharing as a viable transportation option
- Promotes more walking and bicycling amongst carshare users when they are not driving
- Carsharing in general helps alleviates the financial burden of having to own a personal vehicle because users are only charged for the times they choose to drive
- Carsharing also reduces parking demand, vehicle miles traveled, and auto emissions

Applications

- On-street parking for car share usage should be applied in select locations where the demand for carshare access is high and where off-street carshare parking is not available, such as in residential neighborhoods with low vehicle ownership rates; or in commercial districts that attract high volumes of patrons.

Design Guidance

- Designate no more than two on-street spaces per block for the exclusive use of carshare.
- On-street parking spaces for carshare should not be designated in peak period tow-away zones or on spaces reserved for disabled persons, loading purposes (yellow-painted curb), or short-term parking (green curb).

Other Discussion

- The San Francisco Municipal Transportation Agency (SFMTA) is currently in the middle of their On-Street Car Share Pilot Project where they have converted 150 on-street spaces for carsharing use for a two-year period from 2013 to 2015. The pilot program will help inform where the demand for carshare services is highest and help further establish definitive locations where carshare will continue to thrive and serve communities in the future.
- CA Vehicle Code Section 22507.1. outlines local regulations for parking privileges for car share or ridesharing programs. It states in part 'a' that "A local authority may, by ordinance or resolution, designate certain streets or portions of streets for the exclusive parking privilege of motor vehicles participating in a car share vehicle program or ridesharing program. The ordinance or resolution shall establish the criteria for a public or private company or organization to participate in the program, and may limit the types of motor vehicles that may be included in the program. Under the car share vehicle program a car share vehicle or ridesharing vehicle shall be assigned a permit by the local authority that allows that vehicle to park in the exclusive designated parking areas."



5.19 Back-In Angle Parking

Back-in angle parking requires cars to back into on-street parking spaces, oriented diagonally. When exiting, motorists can more safely maneuver back into the travel lane because they will have a clearer view of oncoming vehicles, bicyclists, and pedestrians.

Benefits

- Expands and increases motorists' field of vision when exiting, reducing the risk of colliding with pedestrians and bicyclists
- May prove easier for some motorists to back-in at an angle as opposed to backing in and parking parallel.
- Makes loading and unloading activities more convenient by orienting the vehicle's trunk toward the sidewalk
- Eliminates the risk of motorists "dooring" bicyclists traveling in the bicycle lane, as evidenced on streets with a parallel parking configuration
- Increases the overall supply of on-street parking spaces when compared to parallel parking
- Encourages safer vehicles speeds when back-in angled parking is part of a road diet project



Applications

- Back-in angle parking should first be considered on non-arterial roadways that can adequately accommodate the necessary design width, especially in areas where parking is scarce, vehicle speeds are unsafe, and bicycle traffic is frequent.
- The back-in configuration should also be considered near schools, in commercial districts, and in conjunction with proposed road diets projects

Considerations

- Motorists must be aware of cyclists as they attempt to back into an angled space.
- Exhaust pipe emissions from parked cars are directed toward pedestrians on the sidewalk.

Design Guidance

- Although not drawn to specifically reflect the design for back-in angled parking, the City of Los Angeles Department of Transportation does currently have a Standard Plan (S-440) for On-Street Angle Parking Stalls.
- Angle parking requires that the curbside parking lane be wider than what is needed to accommodate parallel parking, typically at least 16.9' depending on the angle of the parking stall (refer to Standard Plan S-440 On-Street Angle Parking Stalls).
- Parking stall width should be 8' wide and 16' feet long. A maximum 2' overhang space over the space is provided for longer vehicles that exceed the 16' length.
- On parking spaces angled 45 degrees or more, a 4' minimum buffer space should be provided between moving traffic and the outer edge of the stall marking.
- Bike lanes next to back-in angled stalls should ideally by 6' wide. Striping should delineate the travel lane from the bicycle lane, but a second stripe is not necessary delineating the bike lane and the parking stall.

References

- Pedestrian and Bicycle Information Center – Back-in Angle Parking http://www.pedbikeinfo.org/data/faq_details.cfm?id=3974
- Charlotte Bicycle Master Plan http://charmeck.org/city/charlotte/Transportation/PedBike/Documents/ChapterSeven070708.pdf

5.20 Commercial Loading

Roadway space that is specifically designated for commercial loading activities allows deliveries and goods movement operations to function smoothly and efficiently.

Benefits

- Provides convenient access to storefronts for loading and unloading purposes
- Reduces the likelihood of double parking by delivery vehicles, causing an obstruction for other roadway users

Applications

- Commercial loading zones should be applied in select locations along commercial corridors where an on-street parking is scarce or where high volumes of deliveries currently occur.
- Where feasible, loading zones should be consolidated at midblock locations to minimize conflicts with bicyclists and motorists near intersections. In addition, the location of loading zones at the midblock (rather than near intersections) helps to ensure that large vehicles do not obstruct corner visibility.

Design Guidance

- Designated loading and unloading zones should be delineated by the use of yellow-colored curbs, roadway striping and signage.

Additional Discussion

- LADOT has existing regulations for the placement of commercial loading zones, described as 'yellow curb zones'. The regulations are listed below:
  - Vehicles with a commercial license plate are allowed to park in yellow zones, only if they are actively loading or unloading freight, for a maximum of 30 minutes.
  - Yellow curb zone restrictions are in effect Monday through Saturday from 7:00am to 6:00pm unless otherwise posted on signs; all other parking regulations are in effect outside hours noted.
  - Vehicles without a commercial license plate may load and unload passengers or baggage in these zones, but only for a maximum of 5 minutes.

References

LADOT - Colored Curb Zones http://www.ladot.lacity.org/WhatWeDo/Parking/CanIParkThere/ColoredCurbZones/index.htm



Loading and unloading zones should be designated by both signs and yellow-colored curbs..

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COMPLETE STREETS DESIGN GUIDE

INTERSECTIONS AND CROSSINGS

6





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6. INTERSECTIONS AND CROSSINGS

Introduction

Intersections and crossings are where all travel modes converge and intermix, so their design is especially important to the creation of Complete Streets. Pedestrians and bicyclists are most at risk for injury in the event of a crash with a motor vehicle, so the design of intersections and crossings should prioritize their needs. This chapter presents design components that improve safety and efficiency using a variety of methods, including structural enhancements, surface treatments, signal timing, and signal prioritization.

Physical Enhancements - Pedestrian

6.1 Crosswalk Markings

Crosswalk markings delineate a safe path for pedestrians to crossing while also signaling to motorists to prepare to yield or stop.

Benefits

- Provides a direct, visible, and accessible path for pedestrians to cross the street
- Improves and reinforces the pedestrian environment
- Provides safe access to destinations
- Alerts motorists to stop or yield for pedestrian crossings





An advanced stop line is always paired with the installation of a continental crosswalk. This line keeps waiting vehicles away from the actual crosswalk area.

Applications

- Marked crosswalks should be provided on all intersection legs controlled by traffic signals, unless a pedestrian crossing is specifically prohibited because of an intersection's unique geometry.
- At controlled intersections. Midblock crossings or uncontrolled crossings (crossings where motorists do not have signals or stop signs) areas with high pedestrian traffic volumes, including schools, campuses, commercial districts, parks, public spaces, transit stations, bus stops, hospitals, large offices
- At sites that complement surrounding land uses and/or address a history of collisions
- The following factors should be considered in determining whether a marked crosswalk should be used: vehicular approach speeds from both directions, vehicular volume and density, vehicular turning movements, pedestrian volumes, roadway width, day and night visibility by both pedestrians and motorists, desirable clarity of pedestrian routes for sighted or sight-impaired pedestrians, discouragement of undesirable pedestrian routes, consistency with marking at adjacent intersections or within the same intersection.
- Intersections without traffic signals or STOP signs are considered uncontrolled intersections. The decision to mark a crosswalk at an uncontrolled location should be guided by an engineering study. Factors considered in the study include vehicular volumes and speeds, roadway width and configuration, stopping sight distance, distance to the next controlled crossing, night time visibility, grade, and pedestrian volumes.

Considerations

- Crossings should be provided on all legs of the intersection unless an intersection's unique geometry (with LADOT's engineering judgment) warrants restricting access for safety and visibility reasons.



Continental crosswalks can be an important component of safe mid-block crossings.

Design Guidance

- Continental striping is now a common crosswalk treatment in Los Angeles (see LADOT standard plan 481.1). Continental striping provides high visibility for both motorists and pedestrians. They consist of **24"** wide bars (placed perpendicular to the path of travel), with bars generally painted in line with lane and centerline striping; in this arrangement vehicle tire paths go between the bars to reduce wear, reducing the frequency of repainting.

- The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors.

- Crosswalk markings should be considered in conjunction with other measures (e.g., curb extensions, crossing refuge island, and unidirectional curb ramps) to make crossings safer and more comfortable for pedestrians while increasing motorists' awareness of pedestrians.

- For candidate crosswalk locations on either a multi-lane street (three or more lanes), or on two-lane streets with daily traffic volumes (ADT) greater than 12,000 or with posted speed limit exceeding 30 mph, enhanced treatments beyond striping and signing may be needed. Enhanced treatments may include–but are not limited to–intersection signalization, Overhead Flashing Beacons, Rectangular Rapid Flash Beacon (RRFB) or High-Intensity Activated Crosswalk (HAWK) signals.

- Crosswalks should be at least as wide as the sidewalk, but may be wider in locations with high pedestrian demand or narrow sidewalks. Crosswalks should be no less than **15'** in width but may vary according to site conditions.

- Crosswalks must be outfitted with curb ramps and tactile warning strips per federal accessibility guidelines.

- Crosswalk markings near schools shall be yellow per CVC 21368.

Physical Enhancements - Pedestrian

Other Discussion

- The City of Los Angeles' Department of Transportation currently has standard plans for crosswalks (S-481.0 "Traffic Controls for Marked Crosswalks on Uncontrolled Approaches" and S-481.1 "Continental Crosswalks on Controlled Approaches").
- The City of Los Angeles' Department of Transportation also has an applicable standard plan (S-490.0 – "Crosswalk Alignment") which specifies where crosswalks align with curb ramps.
- Long blocks, high vehicle speeds/volumes, and long signal cycles make the pedestrian experience more arduous. Proper crosswalk spacing optimizes pedestrians' desired walking routes and helps build a pedestrian network that provides more direct access to destinations, minimizes travel times, and encourages safe crossing behavior.
- The Federal Highway Administration (FHWA) concluded that high visibility pedestrian crosswalks increase driver yielding compliance, better delineate pedestrian space, and increase driver awareness of pedestrians.



References

CA MUTCD (3B.18)*

NACTO Urban Street Design Guide**

CA Vehicle Code (21368)***

6.2 Decorative Pavement Materials

Decorative pavement materials can utilize different colors, textures, and patterns to distinguish crosswalk markings and/or intersections in certain environments. However, use is discouraged with priority given to LADOT's standard plans for high-visibility continental crosswalls.

Benefits

- Adds a supplemental placemaking component to neighborhoods and destinations
- Signifies to the pedestrian that they are in a specific neighborhood or district

Applications

- Decorative pavement materials can be applied on crosswalks and intersections in distinct locations such as cultural and civic destinations. They can enhance district identity or physically/visually connect public spaces.

Considerations

- Decorative colors, patterns, and textures should not be seen as a safety measure and should therefore be considered secondarily to high-visibility continental crosswalks (LADOT Standard Plans S-481.0 and S-481.1).
- They must be maintained periodically to prevent colored visibility from deteriorating or uneven textured pavement from forming.

Design Guidance

- Decorative crosswalks should use stable, durable, and slip-resistant materials that create a smooth surface and provide a high color contrast with the surrounding asphalt.
- Pavement materials should not pose tripping hazards or cause excessive vibration for wheelchair users

Other Discussion

- The City of Los Angeles' Bureau of Engineering currently has a standard plan (S-601-3) for Brick, Concrete, or Other Decorative Pavers

References

ADA and Title 24 standards for more information.



Decorative crosswalks can be a placemaking tool, but they should generally be limited to smaller crossings. Continental crosswalks are the preferred treatment for most pedestrian crossings.

Physical Enhancements - Pedestrian

6.3 Advance Yield Markings

Advance yield markings consist of a row of white triangles placed across each approach to alert motorists to yield for pedestrians at unsignalized or uncontrolled crosswalks.

Benefits

- Notifies motorists that pedestrians may be crossing and indicates where drivers should stop as a pedestrian crosses
- Discourages motor vehicles from speeding through unsignalized or uncontrolled crosswalks
- Helps prevent multiple threat collisions (i.e., when a yielding vehicle in one lane obscures the vision of motorist in an adjacent lane, resulting in the latter continuing through an unsignalized or uncontrolled crosswalk and potentially colliding with crossing pedestrians).



Applications

- Advance yield markings are applied in conjunction with unsignalized or uncontrolled crosswalks, which are typically located at midblock locations.
- They should not be used at locations where drivers are required to stop in compliance with a STOP sign or a signal on multi-lane roadways.

Design Guidance

- Advance yield markings should be placed **20'** to **50'** in advance of crosswalks
- Typically, the preferred setback for effectiveness in advance of crosswalks is **30'**. This setback provides a driver sufficient sight lines to see a crossing pedestrian when vehicles are present or stopped in adjacent lanes.
- Engineering judgment should determine the exact placement of advance yield markings by considering context-specific variables such as vehicle speeds, traffic controls, roadway width, on-street parking, nearby land uses with vulnerable populations, the demand for vehicle-queuing space, and the potential for visual confusion.

References

Section 3B.16 of the MUTCD

LA County Model Design Manual for Living Streets

FHWA PedSafe -- http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=13

6.4 Raised Crosswalk

A raised crosswalk is a pedestrian walkway that is at the same level of the sidewalk. In addition, a raised crosswalk also serves as a speed table that slows approaching traffic.

Benefits

- Provides accessible and convenient crossings for pedestrians, especially those with mobile and visual impairments, because they do not require vertically transitioning up and down a curb ramp.
- Improves motorists' visibility of pedestrians, especially at midblock crosswalks
- Discourages motorists from speeding through crossings and intersections and signals the presence of pedestrians
- Eliminates water ponding and debris collection at the base of typical curb ramps

Applications

- Raised crosswalks can be applied on local or narrower collector streets at midblock locations.
- They are useful in situations where unsafe vehicle speeds pose a threat to pedestrians, particularly around schools, parks, retail districts, and other pedestrian-heavy destinations.
- They should also be considered at crossings where there are issues of poor pedestrian visibility and motorist yielding, or where there is a pattern of collisions indicating points of conflicts between pedestrians and motorists.



Image courtesy of NACTO

Physical Enhancements - Pedestrian

Considerations

- Raised crosswalks should be avoided on wide multi-lane arterial roadways and on streets with steep grade changes and sharp curves.
- The impact of raised crosswalks on the operational needs of transit buses and emergency vehicles should be considered.
- The impact to drainage patterns should be examined to ensure that raised crossings properly accommodate the flow of water.
- In order to maximize their benefits, raised crosswalks can be implemented in conjunction with curb extensions (on streets with curbside parking) in order to decrease crossing distances and make pedestrians more visible to motorists.
- Detectable warning strips should be installed at both ends of the crosswalk for pedestrians with visual impairments.
- The ramp slopes should be designed to help achieve target operating speeds for the given street.
- Aesthetic enhancements, such as decorative colors and/or textured materials, can be applied. Textured or special pavements can also be placed on the beveled slopes of the raised crosswalk so that they will be made visible to approaching motorists.

Design Guidance

- Raised crosswalks (or speed tables) should be **15'** to **20'** wide, paved with smooth materials, and be flush with the sidewalk in height.
- They should be wide enough (**10'** minimum) that both the front and rear wheels of a passenger vehicle can sit atop the speed table at the same time when traveling over it.

References

ITE/FHWA document Traffic Calming: State of the Practice



Image courtesy of NACTO

6.5 Corner Bulbout

A corner bulbout is a curb extension at intersection corners, making vehicular turning movements safer and pedestrian crossings shorter.



Image courtesy of Cityworks Design



Image courtesy of Cityworks Design

Benefits

- Reduces the distance pedestrians have to cross and increases their queuing space
- Encourages drivers to slow down when turning at intersections (because of tighter curb radii)
- Provides additional sidewalk space for street furniture, landscaping, or stormwater management features
- Allows pedestrians and motorists to see each other more clearly
- Delineates direct crosswalk paths and allows more space for smoother grade transitions on the curb ramp

Applications

- Bulbouts can be applied at corners where on-street parking exists, but not where a curbside peak period travel lane exists.
- They should be applied where high volumes of pedestrians are present, especially around schools, parks, senior housing, and retail destinations.
- Bulbouts should be considered on streets at locations where collisions occur between turning vehicles and pedestrian crossings.

Considerations

- Bulbouts should be sufficiently wide enough to maximize their benefit given their costs.
- They may have an impact on the turning movements of larger vehicles such as buses, delivery/garbage/construction trucks, street sweepers, and emergency vehicles.
- They may require the relocation of existing storm drainage inlets and above ground utilities (e.g., fire hydrants, light poles, signal poles, etc).

Physical Enhancements - Pedestrian

Design Guidance

- Bulbouts should usually extend the full width of a parking lane, typically **8'** from the curb. If a bike lane is present, however, the bulbout should be designed to accommodate drainage flows without affecting bicycle travel.
- When bulbouts conflict with the turning movements of trucks and transit vehicles, the width and/or length should be reduced rather than eliminating the bulbout.
- Street furniture, landscaping elements, and other sidewalk amenities located on curb bulbouts must not impede pedestrian flows, emergency access, or affect the sightlines of roadway users.
- Stormwater drainage should be accommodated to prevent ponding at the base of curb ramps, which may include designing catch basins or utilizing trench drains to channel water.

Other Discussion

A curb bulbout is one of many types of curb extensions. In addition, this guide discusses other types of curb extensions such as chokers (or pinchpoints), neckdowns, chicanes, and bus bulbs.

Interim Design Strategies

Curb bulbouts at intersections can be installed using low-cost, interim materials such as delineators, planters, surface treatments or striping. Temporary bulbout treatments provide safety benefits until funding becomes available to construct a more permanent bulbout.

References

AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities



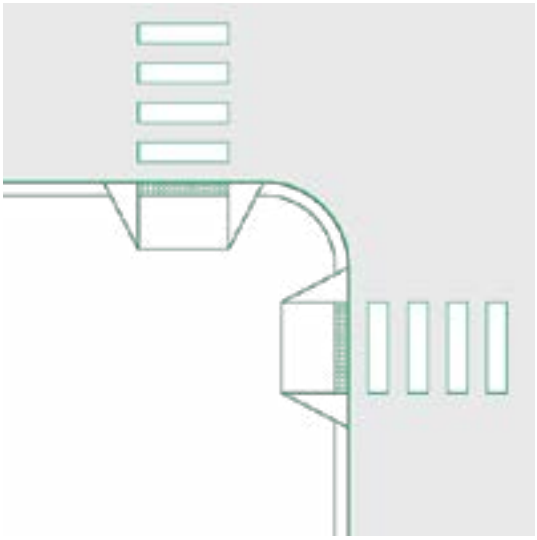
6.6 Curb Radius

The curb radius determines the shape of the curb at street corners. A corner curb with a large radius has a broad arc, while a curb with a smaller radius has a sharper curve. Smaller radii generally encourage slower, safer vehicular turning movements. The curb radius is a primary factor in determining the *effective* turning radius, which is the actual radius available for a vehicle to make a turn at an intersection.

Benefits

A smaller curb radius:

- Reduces the risk of pedestrian-vehicle collisions by encouraging slower turning movements
- Shortens the crossing distance for pedestrians
- Increases pedestrian visibility, especially when corner bulbouts are installed



A smaller curb radius also makes it possible for unidirectional curb ramps to lead directly to crosswalks.

Applications

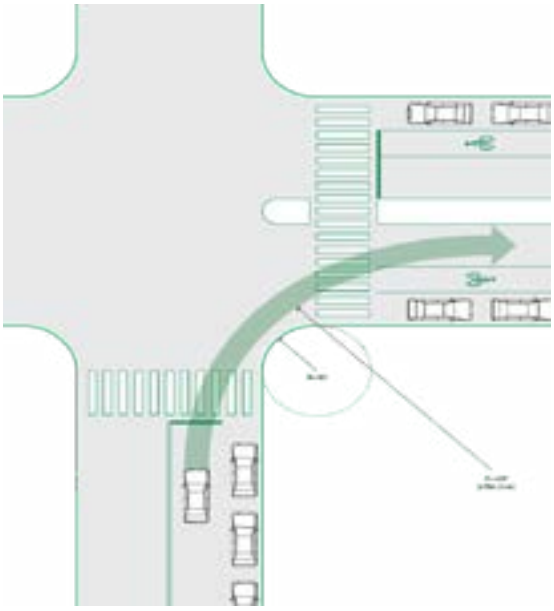
A smaller curb radius can be considered on any street. Smaller curb radii are especially beneficial in areas with high pedestrian volumes such as commercial districts, school zones, and intersections with high pedestrian-vehicle collision rates.

Considerations

Large vehicles (e.g., buses, delivery/garbage/construction trucks, street sweepers, and emergency vehicles) typically make wider turns and may have trouble negotiating a corner with a smaller curb radius.

At corners with smaller curb radii, drivers that underestimate their turning speed may inadvertently mount the curb, endangering pedestrians waiting on the sidewalk.

In addition to corner curb radius, the *effective turning* radius is influenced by other factors including the presence of on-street parking and bike lanes, as well as the width of travel lanes. Typically, these two factors create larger effective turning radii and, therefore, allow for faster turning movements.

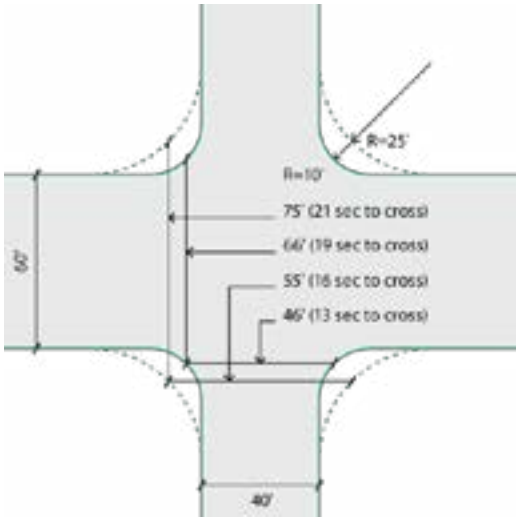


The effective turning radius is a property of both the actual curb radius and the placement of turning lanes.

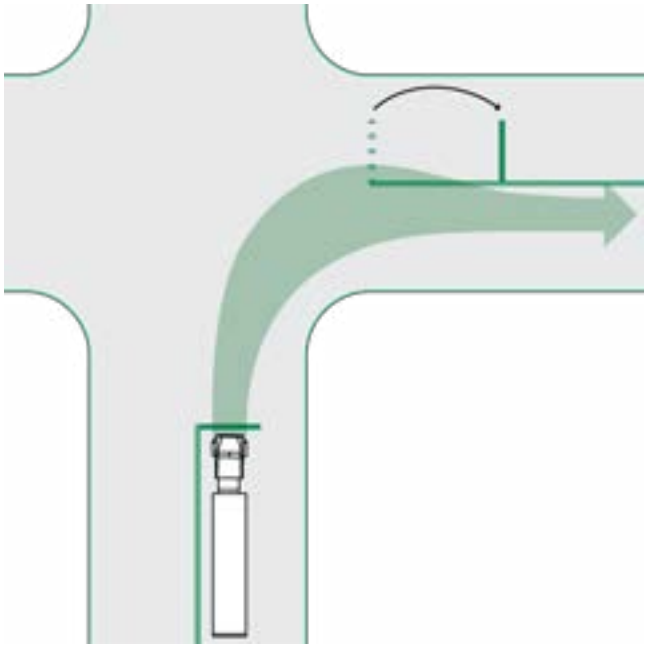
Physical Enhancements - Pedestrian

Design Guidance

- Curb radii should be minimized as much as possible. A larger curb radius may be necessary for some roadways with high truck volumes (such as truck routes).
- A curb designed with a smaller curb radius should incorporate unidirectional curb ramps, where applicable: unidirectional ramps direct pedestrians – especially the visually impaired – in line with the crosswalk. Unidirectional curb ramps have a distinct advantage over bidirectional curb ramps; in the latter, pedestrians waiting at the base of the corner ramp may be vulnerable to injury by motorists that inadvertently mount the curb. (For further discussion, see Section 6.7 “Curb Ramp”.)
- A corner bulbout is a valuable design tool to decrease the curb radius (and effective turning radius). It also can shorten pedestrian crossing distances. (Also see section 6.5 “Corner Bulbout”.)
- Several types of vehicular uses should be considered when determining smaller curb radii that enhance pedestrian safety while also accommodating larger vehicles. These include:
    - Emergency vehicles: Emergency vehicles are generally able to use the full right-of-way (including opposing travel lanes) when motorists pull over to the curbside. However, the ability to swing widely into opposing lanes may be hindered by queued traffic unable to pull over to the curbside. In some locations, this can be mitigated by setting back the limit line of the opposing interior lane.
    - Commercial and package delivery trucks: These include trucks with up to a 40-foot (WB-40) wheelbase.
    - Trailer trucks: Freight Routes should be designed for trailer trucks with a wheelbase of 50 feet or greater.
    - Maintenance vehicles: Ideally, trash sweepers should be able to negotiate a turn while being able to sweep around the curb. However, at locations where a small radius may make this unfeasible, other methods for street cleaning at the intersection could be utilized; for example, sidewalk sweeper machines used by some business improvement districts are able to maneuver tight corners.
    - Transit buses: At intersections along transit routes, curb and/or effective radii should be designed for a bus with a wheelbase of 40 feet (BU-40) or greater.



Examples of different curb radii



Turning movements for long vehicles can be accomodated by setting the stop line further back from the intersection

General guidelines for curb radii:

- 15’ for new construction
- 15’ for intersections without corner bulbouts or curbside parking
- 20’ for intersections without corner bulbouts or curbside parking, when the roadway which the truck is turning into is less than 28 feet wide
- 20’ for intersections with bulbouts
- 25’ on arterial streets with high volumes of turning buses and/or trucks
- 20’-25’ on streets designated as part of the Transit Enhanced or Vehicle Enhanced Networks
- 40’ on narrow streets in industrial areas with high truck volumes

Interim Design Strategies

Interim treatments such as striping, alternative pavement surfaces, and/or plastic delineators can be used to demarcate a smaller curb radius and/or a temporary corner bulbout.

Physical Enhancements - Pedestrian

6.7 Curb Ramp

A curb ramp facilitates access between the sidewalk and the roadway for pedestrians. Unidirectional ramps are two curb ramps placed at a corner, while a bidirectional ramp places a single ramp diagonally at the corner of an intersection.

Benefits

- Provides access across intersections at midblock locations for all individuals.
- Provides a smooth slope for pedestrians pushing bicycles, strollers, and other wheeled devices
- Detectable warning surfaces placed at the base of the curb ramp make crosswalk destinations visible while also providing a tactile vibration for sight-impaired pedestrians.



Applications

- Curb ramps must be installed at all intersections and midblock crossings.
- Unidirectional ramp installation (two ramps per corner) should be prioritized at intersections around schools, senior housing communities, major transit hubs, and other pedestrian-heavy destinations.
- Curb ramp design should analyze sidewalk widths, crossing distances, curb height, street slope, proximity to traffic, drainage concerns; distance to signal poles, street lights, trees or other obstructions.



A bidirectional curb ramp (in yellow at the base of the image) orients users to the center of the intersection, requiring users to re-orient themselves toward the actual desired direction of travel.

Considerations

- A single, bidirectional ramp (one ramp diagonally placed at the corner) forces users to undertake a longer, more circuitous path of travel to the other side of the crossing. Bidirectional ramps orient users to the center of the intersection where they risk greater exposure to turning vehicles.
- Feasibility and cost considerations may favor not installing unidirectional ramps because of existing utilities and physical site-specific conditions.
- The accumulation of water or debris at the base of curb ramps should be avoided.

Physical Enhancements - Pedestrian



A unidirectional ramp leads directly to the crosswalk in the desired direction of travel.

Design Guidance

- A level landing pad, no greater than 2% slope in any direction and a minimum of 4' wide perpendicular to the curb, must be provided on the sidewalk.
- Curb ramps should be accompanied by detectable warning strips that meet ADA standards.
- Unidirectional ramps can be installed in conjunction with a corner bulbout at intersections.
- Utility poles or other street furniture should not obstruct the path of pedestrians on the curb ramp. Existing street amenities should be relocated when feasible.
- Reducing the curb radius makes ramp placement easier to design.
- Curb ramps must comply with the Americans with Disabilities Act (ADA) and any other current local, state, and federal regulations.

Other Discussion

- The City of Los Angeles' Bureau of Engineering currently has a standard plan (S-442-3) for Curb Ramps and (S-601-3; Sheet 35) for Detectable Warning Surface.

References

- ADA Best Practices Tool Kit for State and Local Governments: Chapter 6 - Curb Ramps and Pedestrian Crossings Under Title II of the ADA.

Physical Enhancements - Pedestrian

6.8 Crossing Refuge Island

A crossing refuge island provides a waiting area on the street median to help pedestrians complete long crossings.

Benefits

- Allows pedestrians to cross wide streets in two stages, which benefits slower-walking pedestrians, seniors, children, or those with disabilities.
- Allows pedestrians to focus on oncoming traffic in one direction at a time when crossing.
- Allows pedestrians to find gaps in traffic in order to cross at unsignalized crossings.
- Slows vehicle speeds when drivers are conscious of pedestrians waiting on the refuge island.
- Reduces risk of left turn collisions (at intersections) and vehicle head-on collisions (at the midblock).
- Provides landscaping opportunities on the median next to the refuge island.



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Applications

- A crossing refuge island can be applied at signalized or unsignalized crossings at the intersection or at the midblock.
- They can be installed at the midblock when blocks are longer and vehicle speeds are high.
- They can be applied on wider multi-lane roadways (at least four total lanes) at the midblock or intersection, when crossing distances cannot be conveniently traversed with one stage.
- They should be located in places where pedestrians commonly cross, such as schools, large offices, retail destinations, senior housing, transit stations, and major midblock bus stops.

Physical Enhancements - Pedestrian

Considerations

- Pedestrian safety islands may be enhanced using plantings or street trees. Plantings may require additional maintenance responsibilities and need to be maintained to ensure visibility.
- May impact underground utilities.
- Design must account for impact of raised median on emergency vehicle movement and access.

Design Guidance

- In addition, a neckdown should be added in conjunction with median refuge islands, where feasible, to provide more space on the sidewalk at the crossing.
- Crossing islands perform best with both tall trees and low ground cover. This greatly increases their visibility, reduces surprise, and lowers the need for a plethora of signs. When curves or hill crests complicate crossing locations, median islands are often extended over a crest or around a curve to where motorists have a clear (six second or longer) sight line of the downstream change in condition.
- Crossing refuge islands should be considered where crossing distances are greater than **50'**.
- They should have proper lighting, signage, reflectors, and drainage accommodations.
- On narrower medians, the refuge island should be as wide as the crosswalk (at least **6'** wide but preferably **8'-10'**) and be level with the roadway.
- On wider medians, the refuge island should be raised to provide more visibility for waiting pedestrians. Raised refuge islands should include curb ramp access, detectable warning strips on the curb ramps, and at least a **5'** wide level waiting area.
- At intersection crossings, median "noses" should be provided perpendicular to the crosswalk, at the tip of the median, pointed toward the intersection.
- Drainage concerns should be addressed in the design of crossing refuge islands.
- At midblock locations, crossing refuge islands can incorporate a slanted design that orients pedestrians to look for oncoming traffic before they continue on to the second stage of the crossing.



Crossing Refuge Islands should be marked by signs.

Physical Enhancements - Pedestrian

6.9 Driveways

While driveways provide vehicular access to off-street destinations, they also pose a potential conflict for pedestrians and bicyclists when drivers cross the sidewalk or enter the roadway. Too many driveways can disrupt pedestrian flows and degrade the pedestrian environment.

Benefits

- Fewer driveways reduce the risk of collision between vehicles and other modes
- Fewer driveways result in additional space for street furniture and landscaping opportunities.
- Ideal driveway design (that incorporates signage, mirrors, and surface treatments) encourages vehicles to yield to pedestrians on the sidewalk, while also helping pedestrians anticipate cars that are exiting and entering.

Applications

- In urban settings, driveway installation should be selective and minimal, so as to limit potential conflicts with heavy pedestrian and bicycle movements.

Considerations

- On-street parking can make it difficult for drivers to see bicyclists when they are exiting a driveway.

Design Guidance

- Where a driveway crosses the sidewalk, it should maintain a level walkway. Driveway aprons that encroach onto the pedestrian zone can render a sidewalk impassable to users of wheelchairs, walkers, and crutches.
- Whenever possible, driveways should be equipped with the proper signage, blind spot mirrors, and tactile surface treatments to alert drivers that pedestrians may be crossing the sidewalk.



Physical Enhancements - Pedestrian



- Commercial, industrial, and large residential properties should consolidate driveways. Where possible, parking should be shared amongst multiple uses, including loading areas for trucks.
- Where applicable, site access should be designed from the alley.
- Corner lots should locate driveways on the minor street to avoid conflicts on the major arterial.
- Driveways should be avoided at points close to the intersection.
- Driveways with entry gates should ensure that the gate is appropriately placed (at least 20' from property line) so that vehicles do not obstruct the path of travel for pedestrians on the sidewalk.

Other Discussion

- The City of Los Angeles' Bureau of Engineering currently has a standard plan (S-440-4) for Driveways.
- The City of Los Angeles' Department of Transportation discusses driveway design in their Manual for Policies and Procedures (Section 321).
- The Los Angeles Municipal Code discusses driveway location in Sections 62.105.1, 62.105.2, 62.105.3 and 62.105.4

Physical Enhancements - Pedestrian

6.10 Bicycle Pavement Markings approaching an Intersection

Bicycle pavement markings alert bicyclists and motorists of each other's presence as they approach intersections.

Benefits

- Maintains continuity of the bicycle facility
- Guides bicyclist movements when approaching intersections
- Alerts motorists to expect and yield to merging bicycle traffic
- Signifies an appropriate location for motorists to safely merge across the bike lane into the right-turn lane
- Reduces potential for conflicts between bicyclists and automobiles



Applications

- Markings in the conflict area are applied on streets with right-side bike lanes and right-turn-only lanes at intersection.
- When approaching intersections, the appropriate treatment for right-turn only lanes is to place a bike lane pocket between the right-turn lane and the right-most through lane.
- They can be applied on streets with left-side bike lanes and left-turn only lanes at intersections.
- They can also be applied on streets with bike lanes and a parking lane that transition into a turn lane at intersection.



Considerations

- If a full bike lane pocket cannot be accommodated, a shared bicycle/right turn lane can be installed that places a standard-width bike lane on the left side of a dedicated right-turn lane. This treatment may include signs advising motorists and bicyclists of proper positioning within the lane.

Physical Enhancements - Bicycle



- In cases where there is insufficient roadway space to accommodate a bike lane pocket, the bicycle lane may have to be dropped altogether. However, sharrows provide an alternative option for marking a bikeway through an intersection where a bike lane pocket cannot be accommodated.

Design Guidance

- Consider the use of green paint or thermoplastic treatments to increase the visibility of conflict areas (e.g., intersection approaches, driveways, and transitional zones).
- Apply dashed white lines (**4"** wide, **2'** long) in the merging area at least 50' before the intersection or **100'** if along a high speed/volume roadway.
- Bicycle lane pocket and through lane (next to a vehicular right turn pocket) should be **4'** minimum but **6'** preferred.
- Include signage (MUTCD R4-4) signifying merging of bike lane and vehicle.
- Include signage (MUTCD R3.7R) to force vehicle in right-turn lane to turn right.





Physical Enhancements - Bicycle

Other Discussion

Bicycle Lanes at Double Right Turn Intersections

- Lane Width: Bicycle Lane pocket should have a minimum width of 4' with 5' preferred.

- Discussion: Merging across two lanes exceeds the comfort zone of most bicyclists. Double right turn lanes or an inside through/right combination lane should be avoided on routes with heavy bicycle use. To prevent vehicles in the outside right turn lane from turning into a bicyclist it is important to encourage proper lane positioning for the bicyclist. This can be accomplished by providing either a bicycle lane to the left of the outside turn lane with a bicycle lane (Option A). This design positions bicyclists using a bicycle lane to the outside of a double right-turn lane. This treatment should only be considered at locations where the right most turn lane is a pocket at the intersection. In this instance, the bicyclist would only have to merge across one lane of traffic to reach the bicycle lane. While non-standard colored bicycle lanes may also help distinguish the bicycle lane in the merging area. Bicyclists should not be expected to merge across two lanes of traffic to continue straight though an intersection.

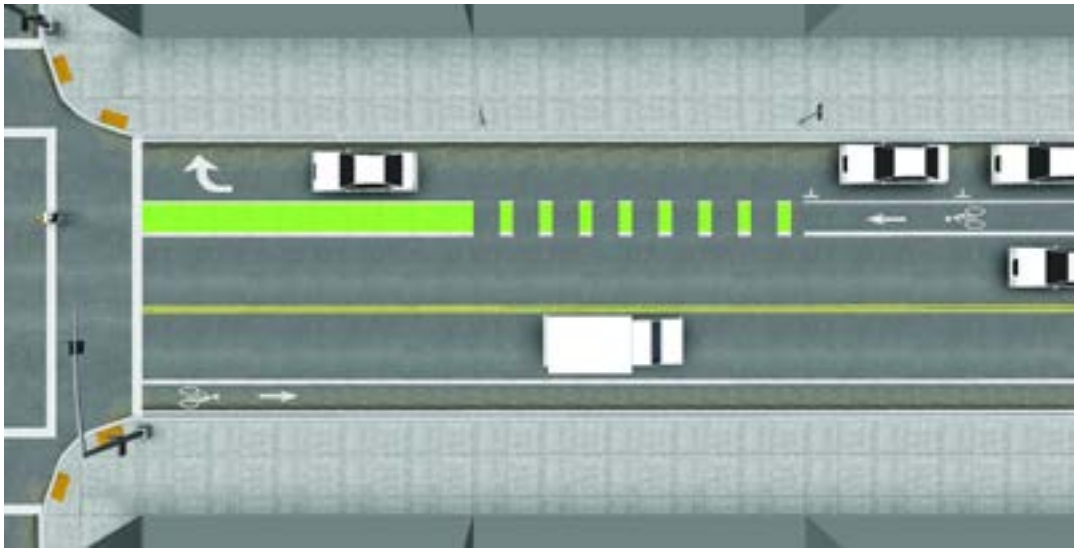
References

CA MUTCD

Caltrans Highway Design Manual

AASHTO Guide for the Development of Bicycle Facilities

NACTO Urban Bikeway Design Guide



6.11 Bicycle Pavement Markings through an Intersection

Bicycle pavement markings provide a clear boundary to help guide bicyclists safely through intersections.

Benefits

- Raises awareness for both bicyclists and motorists to potential conflict areas within the intersection.
- Guides bicyclists through an intersection in a straight and direct path.
- Alerts motorists to not veer into the path of bicyclists also passing through the intersection.
- Relieves bicyclist stress by delineating clear travel paths.
- Reduces conflicts between bicyclists and motorists.

Applications

- Markings through an intersection are applied across signalized intersections, especially in large or complex intersections where the path of travel for bicyclists is unclear.
- Apply across yield-controlled cross streets.

Considerations

- Striping may not be required for every signalized intersection, and should be evaluated and implemented on a case-by-case basis.



Bicycle Pavement Markings guide bicyclists through an intersection on a straight and direct path.

Physical Enhancements - Bicycle

Design Guidance

- Dashed lines shall bind the path of travel (MUTCD 3B.08)
- Striping width should be a minimum of **6”** adjacent to motor vehicle travel lanes and / or should otherwise match the striping dimensions and lateral positioning of the leading bike lane.
- Instead of dashed white lines, alternative striping can be applied, such as shared lane markings in between dashed white lines, green colored paint between dashed white lines, or white **14’** to **20’** squares (“elephant tracks”).

References

MUTCD 3B.08 – Extensions Through Intersections or Interchanges

AASHTO Guide for the Development of Bicycle Facilities.

NACTO Urban Bikeway Design Guide.



6.12 Bicycle Box

A bicycle box is generally a right angle extension to a bicycle lane at the head of a signalized intersection. Bicycle boxes give bicyclists a clear, designated space in front of queued vehicles while waiting for a green light at intersections. Motorists must stop behind the white limit line at the back-end of the bicycle box and are restricted from making a right turn on a red light at the intersection. Bicycle boxes allow bicyclists to safely position themselves before shifting into their desired travel lane.



Bicycle Boxes enable bicyclists to position themselves to safely make left turns at an intersection.

Benefits

- Improves visibility of bicyclists
- Allows bicyclists to safely position themselves at the front of the queue and establish position in the intersection when the light turns green
- Reduces signal delay for bicyclists
- Allows bicyclists to avoid breathing in exhaust fumes from queued vehicles
- Facilitates ideal positioning for bicyclist left turns on a two-lane roadway with traffic in each direction, or at offset/jogged intersections
- Reduces conflicts between bicyclists and motorists, especially where collisions occur when vehicles turn right



Applications

- Bicycle boxes should be applied at signalized intersections with high volumes of left-turning movements.
- They should be applied where right or left-turning conflicts exist between bicyclists and motorists.
- They should be applied where a bicyclist's left turn is required to follow a designated bike facility.
- They should be applied when the majority of motor vehicle traffic on the street turns right but bicycle traffic continues through the intersection.

Physical Enhancements - Bicycle

Design Guidance

- The bicycle box should be **14'** deep to allow for bicycle positioning with a pronounced stop line (MUTCD 3B.16) at the back edge as a buffer from vehicles.
- Signage should be present to prevent 'right turn on red' and to indicate where the motorist must stop (MUTCD R10-6A).
- A "Wait Here" marking can also be used to supplement the intent of the stop line.
- In the United States, bicycle boxes have been installed with white striping or with white accompanied with a colored treatment (e.g. green paint) to increase visibility.
- Where right-turn-only lanes for motor vehicles exist, bicycle lanes should be designed to the left of the turn lane. If a right-turn-on-red is desired, consider ending the bicycle box at the edge of the bicycle lane to allow motor vehicles to make this turning movement.

Other Discussion

This treatment is not currently present in any U.S. State or Federal design manuals but is currently being recommended as of June 2014 by the National Committee for Uniform Traffic Control Devices (NCUTCD) to the FHWA for inclusion into a new edition of the MUTCD.

References

NACTO Urban Bikeway Guide



Coloring a Bicycle Box increases the box's visibility.

6.13 Two-Stage Turn Queue Box

A two-stage turn queue box, or a "Copenhagen left turn," helps facilitate bicyclist left turns at multi-lane signalized intersections. When bicyclists enter the intersection from a right-side bicycle lane, they can wait in a queue box that allows them to reposition their bike and complete their original left turn at the next green light.



Benefits

- Improves bicyclist ability to safely and comfortably make left turns
- Provides a formal queuing space for bicyclists making a two-stage turn
- Reduces turning conflicts between bicyclists and motor vehicles
- Prevents conflicts arising from bicyclists queuing in a bike lane or crosswalk
- Separates turning bicyclists from through bicyclists



A Two-Stage Turn Queue Box separates turning bicyclists from through bicyclists.

Physical Enhancements - Bicycle

Applications

- Two-stage turn queue boxes are applied along right-side bicycle lanes at signalized intersections.
- They should be considered on multi-lane roadways with high traffic speeds and/or traffic volumes that make left turns for bicyclists difficult.
- They should be considered at intersections where a significant number of bicyclists turn left from a right side bicycle lane.
- They may also be used at unsignalized intersections to simplify turns from a bicycle lane onto a neighborhood street.
- They may also be used at midblock crossings so that bicyclists can properly orient themselves for safe crossings.

Design Guidance

- A queue box shall be designated to hold queuing bicyclists and formalize two-stage turn maneuvers.
- Pavement markings shall include a bicycle stencil and a turn arrow to clearly indicate proper bicycle direction and positioning.
- The queue box shall be placed in a safe, designated area that does not conflict with the path of motor vehicle travel. Typically this is between the bicycle lane and the pedestrian crosswalk within the intersection. Colored paving inside of the queuing area should be used to further define the bicycle space.
- Markings across intersections should be used to define through bicyclist positioning.
- In cities that permit right turns on red signal indications, a "No Turn on Red" sign shall be installed overhead to prevent vehicles from entering the queuing area (MUTCD Section 2b.54).
- In cases where a constrained roadway geometry or right of way prevents the creation of a dedicated two stage turn queue box in a protected location:
    - ♦ The pedestrian crosswalk may be adjusted or realigned to enable space for a queue box.
    - ♦ A bike box may be provided behind the pedestrian crossing to serve the same purpose. This configuration should only be considered if pedestrian volumes are low, as bicyclists must yield to pedestrians in the crosswalk before entering the queue.

References

NACTO Urban Bikeway Design Guide



The pedestrian crosswalk can be realigned to create space for a Queue Box.

6.14 Bicycle-Only Left Turn Pocket

A bicycle-only left turn pocket grants exclusive left turn access to bicyclists from the center turn lane. At locations with jogged and T-intersections, bicyclists can enter a left turn pocket in the center turn lane and wait for a gap in traffic before continuing left onto the intersecting local street.

Benefits

- Provides route continuity for bicycle travel along local streets that have jogged or offset intersections

Applications

- Bicycle-only left turn pockets are ideal where bicycle travel on local streets becomes disrupted by the presence of jogged and T intersections.
- This treatment typically should be applied on lower volume arterials and collectors that intersect with local streets that are prioritized for bicycle travel.
- If the intersection is controlled, the left-turn pocket may have a left arrow signal, depending on bicycle and vehicle volumes.

Considerations

- If traffic volumes are moderate to high, restricting vehicular left turns (at offset intersections where bicycle left turn pockets are present) may reduce conflicts between bicyclists and vehicles.

Design Guidance

- The bicycle left turn pocket should be **4'** minimum in width, with **5'** preferred.
- Signs and raised median design restrictions should be provided that prohibit motorists from turning, while allowing access to bicyclists.
- Bicycle only signal heads may also be used at busy or complex intersections (although not possible under current guidelines).
- Ideally, the left turn pocket should be protected by a raised curb, but the pocket may also be defined by striping if necessary (not possible under current guidelines).

References

There is no currently adopted Federal or State guidance for this treatment.



A bicycle-only Left Turn Pocket grants bicyclists exclusive left-turn access from the center turn lane.



Bicycle-Only Left Turn Pockets can be defined by striping if necessary.

Physical Enhancements - Bicycle

6.15 Diverter

A diverter redirects vehicular traffic by restricting specific turn movements, while at the same time, providing cut-through openings for bicycle traffic.

Benefits

- Provides traffic calming in residential neighborhoods
- Increases the comfort and accessibility of local streets for pedestrians and bicyclists
- Increases safety by reducing the potential for collisions between cars and other modes of travel
- Helps to reduce cut through traffic in neighborhoods

Applications

- Diverters are appropriate for select local streets where through high volume vehicle traffic is not desirable.
- They are applicable to local streets that experience high volumes of spillover traffic from nearby streets or freeways.



Diverters increase accessibility of local streets for bicyclists.

Physical Enhancements - Bicycle



Considerations

- Diverters may affect access for emergency vehicles; Designs that allow emergency vehicle access are required and should be coordinated with emergency responders.
- Street maintenance operations should be coordinated with diverter installation.
- If applicable, maintenance needs for landscaping should be determined and provided for before installation.
- They should only be considered when other measures, such as signage, are not as effective; and as part of an overall traffic calming strategy in conjunction with other treatments.



Design Guidance

- Diverters should be designed flexibly with mountable curbs to allow emergency vehicles to traverse them.
- Cut-through access for bicycles should be accommodated for in the design.
- Accompanying signage should be provided to guide motorists' turning movements and indicate restricted cut-through access.
- Any landscaping on diverters should maintain clear sight lines and capitalize on potential stormwater management practices.



Interim Design Strategies

- Temporary diverters can be installed and piloted to test how a permanent diverter might affect neighborhood traffic.

References

There is no currently adopted Federal or State guidance for this treatment.

6.16 Traffic Mini-Circle

A traffic mini-circle is a small circular, raised island placed in the center of a residential intersection to mitigate unsafe vehicle speeds. Unlike roundabouts, traffic mini-circles focus more on controlling vehicle speeds and are not designed to handle higher traffic volumes.

Benefits

- Improves the pedestrian and bicycling environment
- Facilitates safer bicycle movements through residential intersections
- Reduces vehicular speeds and potential for crashes
- Eliminates possibility of vehicles head-on collisions
- Provides opportunities for aesthetic landscaping and stormwater infiltration



Applications

- Traffic mini-circles are applied on local or collector streets (with or without four-way stop signs) that experience unsafe vehicle speeds and/or a history of collisions.
- On two-lane collector streets, traffic mini-circles are typically applied when average daily traffic (ADT) is **less than 5,000** and bus/heavy vehicle volumes are **less than 2% of total ADT**.
- They can be implemented along a stretch of blocks, prioritizing bicycle travel along local streets.
- Traffic mini-circles can also serve as an alternative for signalization or stop signs in a low volume, neighborhood context.

Considerations

- Traffic mini-circles should not be installed on transit routes that make bus turning movements difficult and burdensome.
- Larger vehicles may have difficulty navigating around the mini-circle, while drivers of emergency vehicles may be concerned with the treatment's impact on response times.

Physical Enhancements - Other Traffic Calming Treatments



- Traffic mini-circles should have “Keep Right” signage to safely guide drivers.

- Proper design should ensure that traffic mini-circles do not create confusion or an inconvenience for pedestrians with visual impairments.
- Landscaping and vegetation on the mini-circle should be maintained so that it does not obstruct a driver or pedestrian’s visibility.
- High volume streets and intersections should consider mini roundabouts as a more appropriate treatment
- Underground utility access should be factored into the design.
- Neighborhoods should be educated and notified about traffic-mini circles before implementation.

Design Guidance

- Traffic mini-circles should have “Keep Right” signage in the center island to safely guide drivers around the circle.
- Reflective paint on the circle’s curb should be used to improve the visibility of the center island.
- A mountable curb should be provided so that large trucks or emergency vehicles can negotiate constrained spaces.
- The design speed around the circle should be **10 to 15 mph**.
- Curb radii at intersection corners should be small to encourage slower right turns.
- The size of the circle should be determined based on the width of the intersecting streets, and should be at least large enough so that they properly encourage vehicles to slow down.
- A **4’** buffer should be provided between the maximum vehicle displacement around the circle and pedestrian crossing zone (i.e., the offset distance). Typically, this results in a width of **15’** from the circle to the corner, safely ensuring that vehicles do not encroach onto the crosswalk.
- Landscaping and stormwater elements can be planted in the center island, so long as an agreement is in place that a party will maintain them.

Physical Enhancements - Other Traffic Calming Treatments

Other Discussion

- Examples of other places in Southern California where traffic mini-circles have been installed include Long Beach, Pasadena, Santa Barbara, West Hollywood, and Santa Monica
- Traffic Mini-Circle Design Dimensions in Seattle, WA
    - The distance between a traffic circle and the curb (off-set distance) should be a maximum of 5.5'.
    - The width between a traffic circle and a curb return (opening width) should be a minimum of 16' and a maximum of 20'.
    - As the off-set distance decreases from the maximum 5' feet, the opening width should increase from the minimum of 16'.
    - The outside 2 feet of the traffic circle should be constructed with a mountable monolithic cement concrete curb and pavement surface doweled to the existing pavement.

References

FHWA Pedestrian Safety Guide

6.17 Mini-Roundabout

A mini-roundabout is a larger, raised island placed in an intersection to control higher traffic speeds and reduce delay. Unlike mini traffic-circles, they come equipped with splitter islands on all approaches and utilize yielding signage and markings to facilitate traffic flow.



Benefits

- Reduces vehicle speeds at intersections while facilitating simultaneous vehicle movements from all intersection approaches
- Eliminates possibility of head-on collisions from vehicle left turns or through traffic
- Reduces need to widen streets approaching intersection to store vehicles under signalized operation
- Provides opportunities for landscaping and stormwater capture
- Facilitates continuous bicycle movements by not forcing them to stop and then rebuild momentum.
- Allows pedestrians to cross frequently when vehicular volumes are low



Roundabouts ease movement at intersections for bicyclists.

Applications

- Mini-roundabouts can be used at existing intersections to replace two-way stop control, all-way stop control, or a traffic signal.
- They should be considered at locations with heavy vehicle-turning movements, low pedestrian crossing compliance, poor safety records, or where signalization has led or may lead to operational issues for pedestrians or bicyclists
- They are most effective in lower speed environments in which all approaching roadways have a posted speed of 30 mph or less and an 85th-percentile speed of less than 35 mph near the proposed yield and/or entrance line

Physical Enhancements - Other Traffic Calming Treatments

Considerations

- Mini-roundabouts require a larger spatial footprint for the intersection.
- They may require modification to street drainage infrastructure and underground utilities.
- Landscaping maintenance must be arranged prior to installation.
- Pedestrians, especially those with visual and mobility impairments, must be aware of free flowing traffic when crossing.



Signs at a Roundabout entrance instruct incoming traffic to yield.

Design Guidance

- A mini-roundabout inscribed circle diameter generally should not exceed **90'**.
- The central island should be domed using **5 to 6%** cross slope, with a maximum height of **5"**.
- The advanced entrance line into the circulatory roadway should be placed at least **2'** outside of the vehicle paths
- Splitter islands at least **6'** in width should be provided as deflection and as refuge island for pedestrian crossings.
- Reflective signage should be placed within the center island and reflective paint should be used on the curb
- Sidewalks should be set back from the edge of the circulatory roadway by at least **5'** so that pedestrians with visual impairments can clearly follow designated crossing paths.
- Signage and detectable warning plates should be provided to delineate pedestrian crossing paths and signal drivers to yield.

Signalization Enhancements - Pedestrian

- Clear sight lines between crosswalks and approaching traffic should be provided.
- At single lane roundabouts, the pedestrian crossing should be at least one vehicle length (25 feet) from the yield line at the intersection with the roundabout to allow one car to queue beyond the crossing.
- Landscaping within the center island should be less than 3' tall within 4' of the edge of the curb

References

FHWA Roundabout Design Guidance

http://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa10007/#s4



Caption goes here

Signalization Enhancements - Pedestrian

6.18 Exclusive Pedestrian Phase

An exclusive pedestrian phase, or pedestrian scramble, allows intersection crossings in all directions (including diagonally) while vehicles are stopped.

Benefits

- Allows pedestrians to cross in any direction, negating the need to cross twice to reach destinations diagonally across the intersection (when diagonal crossings are employed).
- Reduces conflicts between motorists and pedestrians by isolating movements for each to occur in separate signal cycles.

Applications

- Exclusive pedestrian phases are applicable at intersections where a high frequency of turning vehicles with high pedestrian volumes (e.g., **1,200** pedestrian crossings per day)
- They are ideally suited to intersections that have shorter crossings, and where sight distances and unique roadway geometries are problematic.
- They are applicable in high-volume pedestrian areas such as schools, senior housing communities, parks, hospitals, and major transit stops.



Signalization Enhancements - Pedestrian

Considerations

- Although an exclusive pedestrian phase enables crossings in all directions, pedestrians must wait a little longer for their next walk signal while vehicles traveling through the intersection complete their signal phase.
- The tradeoff to safer, multi-directional crossings afforded by an exclusive pedestrian phase is increased wait times for all intersection users.
- This treatment may potentially confuse visually impaired pedestrians who rely on traffic sounds to decide when and where to cross
- This treatment may affect the ability to synchronize timing at adjacent
traffic signals.

Design Guidance

- Pedestrian and vehicular traffic volume data should be used to analyze whether the amount of cars and pedestrians traveling through an intersection warrant an exclusive pedestrian phase.
- "No Turn on Red" signs should be installed at intersections with exclusive pedestrian phases.

Reference

LADOT Signal Treatment Toolbox adapted from ***Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*** and ***FHWA's Proven Countermeasures*** list.



An intersection utilizing an exclusive pedestrian phase, located near the UCLA campus in Westwood. s

Signalization Enhancements - Pedestrian

6.19 Pedestrian Beacon

A pedestrian beacon is used to help pedestrians safely cross by flashing a blinking light to approaching motorists, warning them that a pedestrian is crossing. The beacons are actuated by a pedestrian call button and come in multiple forms including, Rectangular Rapid-Flashing Beacons (RRFB) and High-Intensity Activated Crosswalks (HAWK).

Benefits

- Makes pedestrian crossings more visible to drivers, especially outside of daylight hours.
- Provides safety benefits and achieves high rates of compliance by motorists.

Applications

- A pedestrian beacon should be applied at unsignalized crossings, and not at intersections with signals or stop signs.
- They should be applied at locations that experience significant pedestrian volumes, do not meet traffic signal criteria, or have a high incidence of collisions.
- They can offer an upgraded safety treatment when normal signage or other milder design treatments are ineffective or insufficient.
- They should not be installed in locations with critical sight distance constraints that limit a motorist's ability to recognize pedestrians waiting to cross.

Design Guidance

- A flashing beacon, such as a RFFBs, are placed curbside below the pedestrian crossing sign and above the arrow indication pointing at the crossing. They should always be accompanied by the appropriate pedestrian crossing signage. The installation should include an audible message confirming that the device is activated and instructing pedestrians to wait until cars have stopped before crossing. Another LED panel should be placed facing the pedestrian to indicate that the beacon has been activated (See MUTCD Chapter 4K, "Flashing Beacons").



A flashing light accompanies the pedestrian crossing sign.

Signalization Enhancements - Pedestrian



Lincoln Blvd., Los Angeles



- A pedestrian hybrid beacon, such as HAWKs, should only be installed at a marked crosswalk, in conjunction with signage and advanced yield markings (See MUTCD Chapter 4F, “Pedestrian Hybrid Beacons”)
- The pushbutton and other components of the crosswalk must abide by all other accessibility requirements.
- Pedestrian beacons can also be fitted with solar panels to able to generate and sustain their own energy needs.

References

- The City of Los Angeles’ Department of Transportation currently has a standard plan (S-55) entitled Typical Layout for Activated Pedestrian Warning Device
- Chapter 4K of the CA MUTCD provides guidance for the use of flashing beacons.
- Chapter 4F of the CA MUTCD provides guidance for the use of pedestrian hybrid beacons.
- FHWA study, the “Effects of Yellow Rectangular Rapid flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks.”

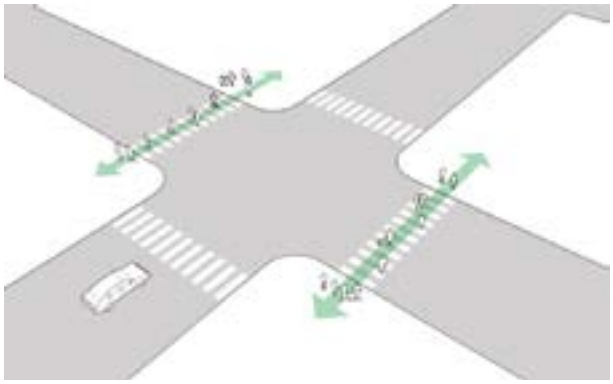
Signalization Enhancements - Pedestrian

6.20 Leading Pedestrian Interval

A Leading Pedestrian Interval (LPI) gives pedestrians a head start when entering the crosswalk, affording extra time to cross before vehicles can begin their turn through an intersection.

Benefits

- Prioritizes pedestrian movements at intersections
- Reduces risk of collision by making pedestrians more visible to turning vehicles
- Reinforces the pedestrian's right-of-way over turning vehicles
- Helps reduces conflicts at sites with a history of collisions and jaywalking



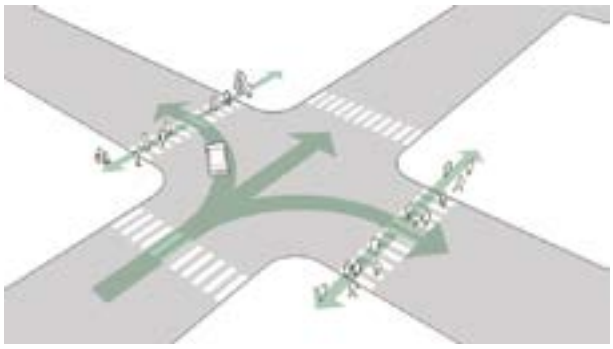
Stage 1: Pedestrian only

Applications

- Leading pedestrian intervals are applied at signalized intersections with a high volumes of pedestrian crossings and turning vehicles.
- They are applicable in dominant vehicle and pedestrian environments, such as a downtown or other major destinations.

Design Guidance

- Leading pedestrian intervals grant pedestrians a walk signal 3 to 7 seconds before a green light is given to vehicles traveling in the same direction, or turning left at the intersection.
- In addition to an LPI, a lagging protected left green arrow should be provided for vehicles
- To increase the effectiveness of an LPI and improve the visibility of pedestrians, a curb extension should be installed at the intersection corners.
- "NO TURN ON RED" signs should be considered with LPIs.



Stage 2: Pedestrian and vehicular

Signalization Enhancements - Pedestrian

Other Discussion

- At intersections where bicycle through movements conflicts with turning traffic, a leading bicycle interval can be implemented along with a leading pedestrian interval. A leading bicycle interval facilitates bicycle through-travel more quickly through the intersection and can help prevent right hook collisions by vehicles.

References

NACTO Urban Street Design Guid

Signalization Enhancements - Pedestrian

6.21 Accessible Pedestrian Signal

An accessible pedestrian signal (APS) provides audible or vibrotactile information (such as audible tones, speech messages, and/or vibrating surfaces) to facilitate safer pedestrian crossings.

Benefits

- Enhances recognition and understanding of the information by all pedestrians, particularly individuals with vision or cognitive impairments and young children.

Applications

- Accessible pedestrian signals can be applied where a particular signalized location presents difficulties for pedestrians who have visual disabilities to cross the roadway.
- They can be applied at new signalized intersections and planned upgrades to signalized intersections that are equipped with pedestrian crosswalks.

Design Guidance

- See LADOT Standard Plan S-73.2 for Accessible Pedestrian Signals.
- Accessible pedestrian signal detectors may be pushbuttons or passive detection devices.
- The accessible pedestrian signal is typically integrated into the pedestrian detector (push button), so that the audible tones and/or messages come directly from the pushbutton housing.
- They should have a pushbutton locator tone and tactile arrow, and can include audible beaconing and other special features.
- The tone of the walk signal should distinct from the push button locator tone.
- When accessible pedestrian signals are located as close as possible to where pedestrians are waiting to cross the street, they provide the clearest and least ambiguous indication of which pedestrian crossing is served by a device.

References

The City of Los Angeles' Department of Transportation currently has a standard plan (S-73.2) for Accessible Pedestrian Signals

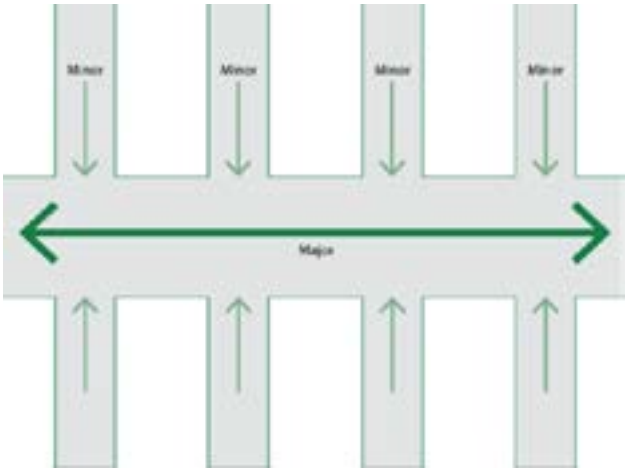
CA MUTCD's Sections 4E.09, 4E.10, 4E.11, 4E.12, and 4E.13 for Accessible Pedestrian Signals and Detectors

FHWA: Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide



6.22 Shorter Signal Cycle Length

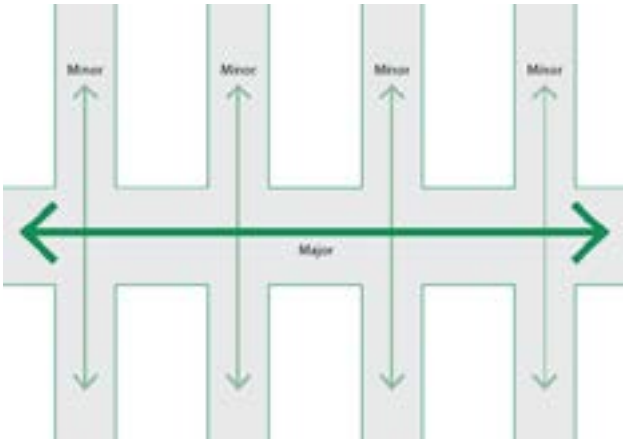
A shorter signal cycle length at intersections prioritizes pedestrian convenience by decreasing wait times to cross the street.



Corridor-based signal timing with longer cycles



Corridor-based cycle lengths (sec)



Balanced signal timing with shorter cycles



Balanced cycle lengths (sec)

Benefits

- Prioritizes pedestrian activity over high vehicle speeds on arterial streets
- Encourages safer pedestrian behavior by providing shorter wait times to cross
- Provides more consistent crossing opportunities
- Facilitates a more fluid network of flows for all travel modes
- Minimizes delays for all users

Applications

- The overall goal of signal design is to minimize cycle lengths to reduce delay for all users. Long cycle lengths make walking less convenient and may encourage unsafe behavior such as pedestrians jay walking and bicyclists running red lights. Signal coordination should be optimized to balance the needs of all users and to minimize the delay for pedestrians, bicyclist, and transit vehicles.
- Shorter signal lengths should be used in conjunction with other treatments and strategies to prevent vehicles from speeding in between signals.
- Cycle lengths should account for the time of day to account for fluctuating vehicle or pedestrian volumes. Cycle length adjustments should be minimal and consider both pedestrian and vehicle volumes at peak and off-peak times.

Signalization Enhancements - Pedestrian

Considerations

- Shorter signal lengths may come at the expense of the time that a pedestrian has to cross the street, potentially necessitating a crossing refuge island or curb bulbouts on wider multi-lane arterial streets.
- They may also make it more burdensome for bicyclists, forcing them to brake and accelerate more often.

Design Guidance

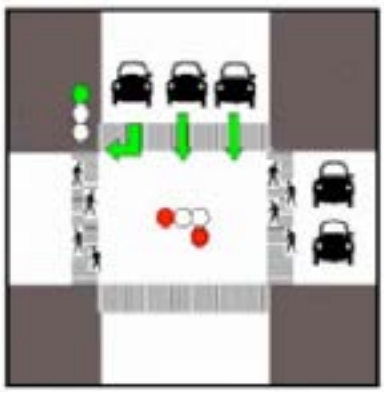
- Shorter cycle lengths of **60 to 90 seconds** should be used for high-pedestrian urban environments.
- Other pedestrian-oriented treatments should complement shorter signal timing lengths (e.g., corner bulbouts, neckdowns, crossing refuge islands, and road diets).
- Shorter cycle lengths should always consider the pedestrian crossing distance (and the correlated minimum crossing time needed) before implementation.
- Signal lengths should be set so that bicyclists do not experience more delay than vehicles.

References

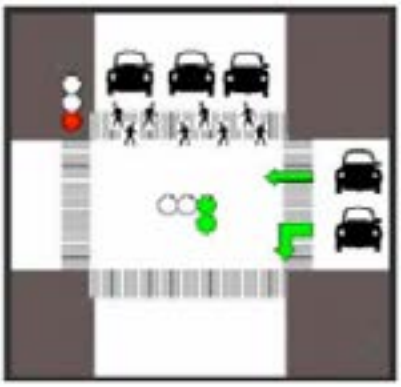
NACTO Urban Street Design Guide

6.23 Split Phasing

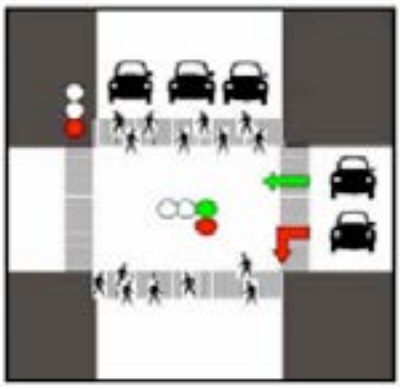
Split phasing provides turns at intersections to mitigate potential conflicts between pedestrian crossings, bicycle crossings, and turning vehicular traffic.



Phase 1



Phase 2



Phase 3

Benefits

- Reduces the risk of conflict between pedestrians and vehicles
- Decreases the potential for head-on vehicle collisions.
- Reduces delay for vehicles that, when a left turn arrow is absent at the intersection, have to wait for left-turning traffic to yield to opposing through traffic.

Applications

- Split phasing is applied at intersections that have a history of collisions between left-turning vehicles and pedestrian crossings.
- It can be applied when unique intersection geometry impedes a driver's visibility and makes turning movements difficult and dangerous to conduct alongside pedestrian crossings.
- It can be applied at locations where high volume/high speed intersections or unconventional intersection geometry makes pedestrian crossings feel unsafe.
- It can be applied when left-turn lane volumes on two opposing approaches are roughly equal to the volume of through traffic.
- It can be applied for right-turn vehicular movements when the turn lane is adjacent to a cycle track. In this case, split phasing separates right-turn movements from bicyclists continuing through the intersection. A dedicated bicycle signals could be utilized in addition to the vehicular signal.

Considerations

- Split phasing can be limited to specific times in the day when the likelihood of collision is at its highest
- Split phasing increases the overall signal cycle length, which results in longer wait times for pedestrians

Signalization Enhancements - Bicycle

Design Guidance

- Split phasing can separate movements using the following phase intervals as an example:
    - Phase 1: For **5 to 10** seconds, pedestrians and through traffic are given a green signal while turning vehicles are restricted at the intersection. This affords pedestrians a leading interval.
    - Phase 2: For **20 to 40 seconds**, right-turning traffic is given a green light but must yield to pedestrians already in the crosswalk.
    - Phase 3: For **5 to 10 seconds**, left turning vehicles are granted a protected left arrow while pedestrian crossings and through traffic are restricted to prevent potential collisions.

Other Discussion

- See CA MUTCD Sections 4D.107 (Selection of Left-Turn Phasing), 4D.108 (Dual Left-Turn Phasing), and 4D.109 (Lead-Lag Left-Turn Phasing)

References

NACTO Urban Street Design Guide

FHWA-**HRT-04-091** Signalized Intersections: Informational Guide

6.24 Bicycle-Only Signal

A bicycle signal head is a traffic control device at intersections that facilitates bicycle movements separately from cars.



Benefits

- Separates bicycle movements from conflicting motor vehicle, streetcar, light rail, or pedestrian movements
- Provides priority and protection to bicycle movements at intersections with a leading or lagging bicycle interval
- Helps address real and perceived bicycle safety issues at intersections
- Simplifies bicycle movements through complex intersections
- Potentially improves operations and reduces conflicts for all modes

Applications

- Bicycle signal heads are applied at complex intersections that are difficult for bicyclists to navigate.
- They should be applied at intersections that experience heavy bicycle traffic, high volumes of bicycle turning movements, and/or have a noticeable collision history.
- They should be applied where predominant bicycle movements conflict with predominant motor vehicle movements during the same green light phase.

Signalization Enhancements - Bicycle

Design Guidance

- See FHWA's "Interim Approval for Optional Use of a Bicycle Signal Face (IA-16)" for comprehensive design recommendations.
- Bicycle signal heads typically use standard three-lens signal heads in green, yellow, and red with a stencil of a bicycle.
- A Bicycle Signal (R10-10b) sign shall be installed immediately adjacent to every bicycle signal face that is intended to control only bicyclists, including signal faces that are comprised of all bicycle symbol signal indications, all arrow signal indications, and every combination thereof.
- The purpose of the sign is to inform any motor vehicle drivers who can also see the signal face that these signal indications are intended only for bicyclists.

References

See CA MUTCD Sections 4C.102 (Bicycle Signal Warrant) and 4D.104 (Bicycle Signals)

6.25 Bicycle Loop Detector

A bicycle loop detector notifies traffic signals to change when bicyclists are waiting at a red light. When a bike is positioned squarely on top of the designated pavement marking (where the loop detector lies underneath), it will be picked up and trigger a green light at the next available signal phase for the bicyclist.



Benefits

- Improves efficiency and flow of bicycle traffic
- Reduces delay for bicyclists
- Increases convenience and safety of bicycling
- Affords bicyclists the same technology given to motorized vehicles
- Provides more time for bicyclists to clear the intersection by prolonging the green light phase
- Discourages red light running by bicyclists, which reduces the risk of collisions with motorized vehicles

Applications

- Bicycle loop detectors are applied underneath the roadway at intersection approaches that are actuated, typically where bicycle lanes, bicycle boxes, left-turn queue boxes, or bicycle signal heads exist.



Considerations

- Loop detector sensitivity settings need to be monitored and adjusted over time.
- Higher car speeds and longer intersections may warrant specific signal timing consideration for bicyclists

Design Guidance

- One loop detector should be installed within the bicycle lane, about **100'** from the intersection approach, while a second loop is placed right behind the intersection's limit line.

Signalization Enhancements - Bicycle

- A bicyclist must be detected in a **6' x 6'** area (i.e., the "limit line detection zone") immediately behind the limit line, centered either in a normal width lane; or, if the lane is more than **12'** wide, centered **6'** from the left lane line.
- For a lane of **20'** or greater, two minimum **6' x 6' areas** shall constitute the limit line detection zone.
- If more than 50% of the limit line detectors need to be replaced at a signalized intersection, then the entire intersection should be upgraded so that every lane has a limit line detection zone.



Other Discussion

- The City of Los Angeles' Department of Transportation currently has a standard plan (S-70) entitled Limit Line Inductive Loop Detector Placement.

References

NACTO Urban Bikeway Design Guide

CA Vehicle Code Section 21450.5 – Traffic Actuated Signals: Detection of Motorcycles and Bicycles

CA MUTCD Section 4D.105(CA) - Bicycle/Motorcycle Detection

MUTCD Figure 9C-7. Bicycle Detector Pavement Marking http://mutcd.fhwa.dot.gov/htm/2009/part9/fig9c_07_longdesc.htm

Caltrans Standard Plans (1999) ES-5B

6.26 Bicycle Green Wave

A green wave is when traffic signals are deliberately timed to coordinate successive green lights along a corridor. Therefore, bicyclists that travel along a green wave street at moderate speeds benefit from not having to intermittently stop at intersections.



Bicycle Green Waves facilitate movement for bicycles while encouraging cars to travel at slower speeds..

Benefits

- Reduce the amount of stops along a corridor
- Provides for a continuous flow of bicycle traffic at the target speed
- Lessens the physical demands of bicycling, especially for younger, older, and/or newer riders
- May encourage drivers decrease their speeds in order to reap the benefits of the green wave
- Slower car speeds improves safety conditions for both pedestrians and bicyclists

Applications

- Bicycle green waves are applicable along corridors that currently carry or show potential for high volumes of daily bicycle riders.
- They can be applied on corridors that warrant traffic calming measures to mitigate high vehicle speeds.
- They are typically applied on corridors with closely spaced intersections (**1/4 mile or less**)

Considerations

- Before making traffic signal timing modifications, the presence of major transit routes and their ability to meet on-time performance goals should be evaluated on potential green wave streets.

Design Guidance

- The appropriate signage should be posted to let bicyclists know they are traveling on a street with a green wave.

Signalization Enhancements - Bicycle

Other Discussion

The San Francisco Municipal Transportation Authority (SFMTA) has implemented green wave along select streets in the city of San Francisco. Currently, the city of San Francisco has green waves on specific segments of Valencia St, 11th St, and 14th St. Internationally, European cities such as Copenhagen have fitted many of their arterial streets with a green wave treatment.

References

NACTO Urban Street Design Guide

6.27 Transit Signal Prioritization

Transit signal prioritization allows transit vehicles to shorten red lights or extend green lights at signalized intersections without disrupting the overall signal timing system.

Benefits

- Reduces delay for transit vehicles
- Improves transit reliability and travel times

Applications

- Transit signal prioritization is applied along corridors with frequent bus service and high ridership demand.
- It can be applied on bus routes and at-grade rail routes that are consistently bogged down by congestion and cross-traffic.
- It can also be used with or without the presence of a dedicated bus only lane.

Considerations

- Signal coordination should not increase delay for all modes (including transit itself), and should take into consideration the acceleration rates and speeds of bicyclists.

Design Guidance

- Transit signal prioritization requires the installation of specialized equipment at an intersection's traffic signal controller and on the transit vehicle.
- Transit signal priority projects are more effective when bus stops are placed at the far side of a signalized intersections.
- A corridor's traffic signals can also be programmed to achieve a green wave for transit vehicles by timing the signals to match a bus's average operating speed instead of an automobile's average speed.

Other Discussion

- Signal priority differs from signal preemption in that the former merely modifies normal signal operations (e.g., transit vehicles) by shortening or lengthening the current phase, while the latter abruptly interrupts the current phase to trigger a green light (e.g., police/ emergency vehicles).
- A queue jump lane is another traffic signal concept that prioritizes transit operations. At an intersection, an early green signal is granted to buses waiting at the front of a designated queue jump lane. Meanwhile, other vehicles traveling in the same direction must wait at a red light while the bus gets a jumpstart. Queue jump lanes can be can be used at intersections that either have or do not have a bus stop.

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COMPLETE STREETS DESIGN GUIDE

7 OFF-STREET NON-VEHICULAR TREATMENTS AND STRATEGIES





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7. OFF-STREET NON-VEHICULAR TREATMENTS AND STRATEGIES

Introduction

This chapter presents design guidance for several features often located outside of the public right-of-way. In addition to physical elements such as bicycle ramps and paths, this chapter also presents programmatic interventions that provide vitality to Complete Streets, such as farmers markets and “Pop-Up Retail” events.

7.1 Bicycle Channel Ramps for Stairways

Bicycle Channels provide a ramped surface which cyclists can use to guide bicycles up and down a stairway. Existing stairways can typically be retrofitted with metal rails, and new stairways can integrate a metal rail or concrete channel into their design.

Benefits

- Provides users a safe and convenient alternative to carrying a bicycle up and down a stairway
- Encourages bicycle use by removing a major physical obstacle



Bicycle Channel Ramps can allow bicyclists to travel more easily up and down stairways.

Applications

- Bicycle channels should be included in the design of all new public stairways.
- Existing stairways should be retrofitted to accommodate bicycle tracks, especially in areas with higher bicycle traffic such as transit stations, underpasses, and overpasses.

Considerations

- Accessibility guidelines that limit the distance from stair tread to handrail usually require side bicycle rails or channels to be placed very close to the handrail. As a result, users must angle their bicycle significantly to keep handlebars and bike pedals from catching on the handrail.
- One alternative used in other countries is to incorporate center-running concrete ramps or channels into stairway design. Unfortunately, this treatment is problematic because it creates a hazard especially for the visually-impaired.
- Bicycle channels are easier to use on stairways with slopes which are smaller than standard. Bicycle channels on steep stairways are often underutilized because it is easier for most cyclists to lift their bicycles. A steep slope makes it more difficult to gain sufficient leverage to push a bicycle up the stairway, and it also makes it less convenient for guiding a bicycle down the stairway.

Design Guidance

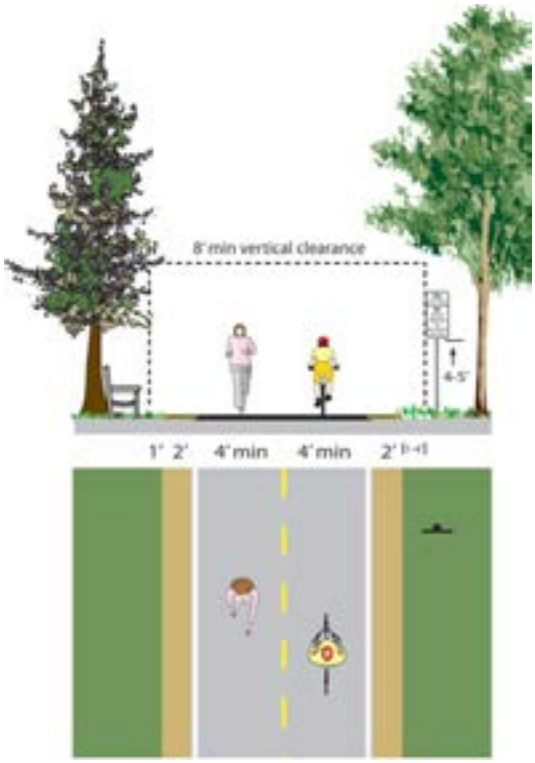
- A metal channel is fabricated of “U” or “L” shaped stock steel and has one or two sides to guide the bicycle’s wheels and keep them from straying.
- For “L”-shaped channels, the upright of the “L” goes next to the outside (handrail-side) and the bike leans against the bicyclist for stability.
- The channel surface should be textured with grit or grip tape to provide a less-slippery surface.
- All channel designs should be able to accommodate a wide variety of common bicycle wheel widths.
- In new and redesigned stairways, bicycle channels can be integrated into the overall design. Metal channels are the simplest and least costly method, while concrete channels or ramps can also be integrated into the stairway design.
- Stair handrails can be placed in the center of the stairway to allow for easier use of the side bicycle channels, as long as all ADA requirements are met.
- New stairways can be designed with slopes that are slightly more gradual than standard; this ensures full usability of the bicycle channels.

7.2 Multi-Purpose Paths (Class I)

A bicycle path (Caltrans designation Class I) allows for two-way, off-street bicycle use. Class I facilities can also include amenities such as lighting, signage, and fencing. If a parallel pedestrian path is not provided, other non-motorized users are legally allowed to use a bicycle path in California. In California, design of Class I facilities is dictated by the Caltrans Highway Design Manual (HDM).

Benefits

- Bicycle paths can provide a desirable facility, particularly for novice riders and children, recreational trips, and long distance commuter bicyclists of all skill levels who prefer separation from traffic.



Applications

- These facilities are frequently found in parks, along rivers beaches, in rail rights-of-way , and in utility corridors with sufficient right-of-way width.
- Bicycle paths may be considered along roadways under the following conditions:
    - ♦ The path will generally be separated from all motor vehicle traffic with few intersections with motor vehicles.
    - ♦ Bicycle use is anticipated to be high or a need for facilities for novice-bicyclists is demonstrated.
    - ♦ In order to provide continuity with an existing path through a roadway corridor.
    - ♦ The path can be terminated at each end onto streets with good bicycle facilities, or onto another well-designed path.
    - ♦ There is adequate access to local cross-streets and other facilities along the route.
    - ♦ Grade separated structures do not add substantial out-of-direction travel.



Separating pedestrians from bicycle traffic on bicycle paths avoids pedestrian-bicycle conflicts.


A bicycle path next to a roadway should include physical barriers to prevent bicyclists from encroaching on highway traffic.

Considerations

- Both the Caltrans Highway Design Manual (HDM) and the AASHTO Guide for the Development of Bicycle Facilities generally recommend against the development of bicycle paths directly adjacent to roadways. Also known as "sidepaths", these facilities may create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path. This can also result in unsafe situations where motorists entering or crossing the roadway at intersections and driveways do not notice bicyclists coming from their right, as they are not expecting traffic from that direction. In addition, stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may frequently block paths or pull out unexpectedly. Bicyclists traveling from an unexpected direction may go unnoticed by motorists, especially when sight distances are poor.

Design Guidance

Some of the elements that enhance off-street path design include:

- Frequent access points from the local road network. If access points are spaced too far apart, users will have to travel out of the way to enter or exit the path, which can discourage use.
- Grade-separated crossings (bridges or underpasses) at intersections.
- Placing wayfinding signs to direct users to and from the path at major roadway crossings.
- Building to a construction standard high enough to allow heavy maintenance and emergency equipment to access the path without causing deterioration.
- Proper design of intersections with on-street roadways, to alert motorists to the presence of bicyclists and to alert bicyclists to the presence of motor vehicles for all crossing movements.

- Identifying and addressing potential security problems.
- Provision of separate pedestrian ways to reduce conflicts.
- Landscape designs that encourage bicyclist use and safety, but discourage loitering.
- The following design standards are derived from the Caltrans Highway Design Manual, the California MUTCD, and existing City of Los Angeles design practice.



- **Width:** The minimum paved width for a two-way bicycle path shall be 12 feet. 4' for two-way bicycle travel lane with 2' shoulders. 17' is preferred with 2' shoulders, 4' each way for two-way bicycle travel lane and 5' for pedestrians. A minimum 2-foot wide graded area shall be provided adjacent to the pavement on each side. Additional clearance of 1 foot must be added for signage.
- **Clearance to Obstructions:** A 2-foot minimum shoulder on both sides of the path is required by Caltrans' HDM. The City of Los Angeles paves the 2-foot shoulder. An additional foot of lateral clearance (total of 3 feet) is required by the CA MUTCD for the installation of signage or other furnishings. Grading is not required beyond the 2-foot shoulder.
- The clear width between structures and railings should be not less than 12 feet.
- The vertical clearance to obstructions across the clear width of the path shall be a minimum of 12 feet.
- **Striping:** The City of Los Angeles requires a 4-inch dashed yellow centerline stripe with 4-inch solid white edge lines to delineate bi-directional bicycle travel, and the shoulder needs a 2' white stripped shoulder for pedestrian use.
- **Separation from Roadway:** Bicycle paths closer than 5 feet from the edge of the shoulder shall include a physical barrier to prevent bicyclists from encroaching onto the highway. Bicycle paths within the clear recovery zone of freeways shall include a physical



barrier separation. Suitable barriers may include chain link fences.

- **Noise and dust:** Bicycle path corridors adjacent to busy roadways, freeways or rail lines may be subject to noise, dust, vibration or vandalism, which may discourage use of the path. Methods of reducing this impact include the addition of vegetation or baffles to fencing barriers. This can increase the initial cost and ongoing maintenance cost.

- **Surfacing:** The use of asphalt surfacing is the most common surface used for new bicycle paths in Los Angeles and has proven to be the most suitable for long-term use. However, the material composition and construction methods used can have a significant determination on the longevity of the pathway. Thicker asphalt sections (min. 4") and a well-prepared subgrade will reduce deformation over time and reduce long-term maintenance costs. If asphalt is to be used for surface material, redwood headers must be used to form the pathway. Using modern construction practices, asphalt provides a smooth ride with low maintenance costs and provides for easy repair of surface anomalies.

- Concrete is also a common surface for bicycle paths. The surface must be cross-broomed and the crack-control joints should be saw-cut, not troweled. Concrete paths cost more to build than asphalt paths, and can be highly durable, but concrete is subject to frequent cracking, and repairs to concrete path are more costly and time consuming than repairs to asphalt paths.

- Off-street paths should be designed with sufficient surfacing structural depth for the subgrade soil type to support maintenance and emergency vehicles. Where the path must be constructed over a very poor subgrade (wet and/or poor material), treatment of the subgrade with lime, cement or geotextile fabric should be used.

- Design Speed: The minimum design speed for bicycle paths is 25 miles per hour except on long downgrades as described in the table below, where a 30 mph design speed should be used. Installation of "speed bumps" or other similar surface obstructions, intended to cause bicyclists to slow down in advance of intersections or other geometric constraints, should generally not be used.

- **Horizontal Alignment and Superelevation:** The minimum radius of curvature negotiable by a bicycle is a function of the superelevation rate of the bicycle path surface, the coefficient of friction between the bicycle tires and the bicycle path surface, and the speed of the bicycle.

- For most bicycle path applications the superelevation rate will vary from a minimum of 2 percent (the minimum necessary to encourage adequate drainage) to a maximum of approximately 5 percent (beyond which maneuvering difficulties by slow bicyclists and adult tricyclists might be expected). A straight 2 percent cross slope is recommended on tangent sections. The minimum superelevation rate of 2 percent will be adequate for most conditions and will simplify construction. Superelevation rates steeper than 5 percent should be avoided on bicycle paths expected to have adult tricycle traffic.

Design Speed of Bicycle Paths

Type of Facility	Design Speed
Bicycle Paths with Mopeds Prohibited	25 mph
Bicycle Paths on Long Downgrades (steeper than 4%, longer than 50 feet)	30 mph

- The minimum radius of curvature can be selected from the table below. When smaller curve radii (i.e., smaller than the minimum radii shown below) must be used on bicycle paths because of right of way and/or topographical considerations, then standard curve warning signs and supplemental pavement markings should be installed. The negative effects of nonstandard curves can also be partially offset by widening the pavement through the curves.



- **Stopping Sight Distance:** To provide bicyclists with an opportunity to see and react to the unexpected, a bicycle path should be designed with adequate stopping sight distances. The distance required to bring a bicycle to a full controlled stop is a function of the bicyclist's perception and brake reaction time, the initial speed of the bicycle, the coefficient of friction between the tires and the pavement, and the braking ability of the bicycle.

- The table below indicates the minimum stopping sight distances for the common design speeds and grades on two-way paths. For two-way bicycle paths, the descending direction, that is, where grade is negative, will control the design. The higher design speed should be used on segments with five percent grade and higher.

Grades: Bicycle paths typically attract less-skilled bicyclists, so it is important to avoid steep grades in their design. Bicyclists not physically conditioned will be unable to negotiate long, steep uphill grades. Since novice bicyclists often ride poorly maintained bicycles, long downgrades may also cause problems. For these reasons, bicycle paths with long, steep grades will

Curve Radii and Superelevation

Minimum Radius (feet)

Design Speed (mph)	2% Superelevation	3% Superelevation	4% Superelevation	5% Superelavation
25	154	147	141	137
30	282	269	259	249

Stopping Distance

Stopping Distance (feet)

Design Speed (mph)	0% Grade	5% Grade	10% Grade	15% Grade	20% Grade
25	176	197	232	300	507
30	246	279	332	440	763

generally receive very little use. The maximum grade rate recommended for bicycle paths is 5 percent. It is desirable that sustained grades be limited to 2 percent if a wide range of riders is to be accommodated. Steeper grades can be tolerated for short segments (e.g., up to about 500 feet). Where steeper grades are necessitated, the design speed should be increased and additional width provided.

Lighting: Fixed-source lighting reduces conflicts along paths and at intersections. In addition, lighting allows the bicyclist to see the bicycle path direction, surface conditions, and obstacles. Lighting for bicycle paths is important and should be considered where riding at night is expected, such as bicycle paths serving college students or commuters, and at highway intersections. Lighting should be installed through underpasses or tunnels, and where nighttime security may be a problem.

Depending on the location, average maintained horizontal illumination levels of 5 lux to 22 lux should be considered. Where special security problems exist, higher illumination levels may be considered. Light standards (poles) should meet the recommended horizontal and vertical clearances. Luminaries and standards should be at a scale appropriate for a bicycle path. In the City of Los Angeles, the Department of Public Works Bureau of Street Lighting works with the Department of Transportation to establish lighting standards for equipment and lighting levels.

References

Caltrans Highway Design Manual

California MUTCD

7.3 Multi-Purpose Paths in River and Utility Corridors

Multi-Purpose Paths in river and utility corridors provide unique bicycling and pedestrian opportunities. Utility corridors typically include powerline and sewer corridors, while waterway corridors include flood control channels, drainage ditches, rivers, and beaches.





Benefits

Provide excellent transportation and recreation opportunities for bicyclists of all ages and skills.

Applications

Path development along these corridors already exist in Los Angeles (e.g., along the Los Angeles River and Ballona Creek).

Design Guidance

Path Width

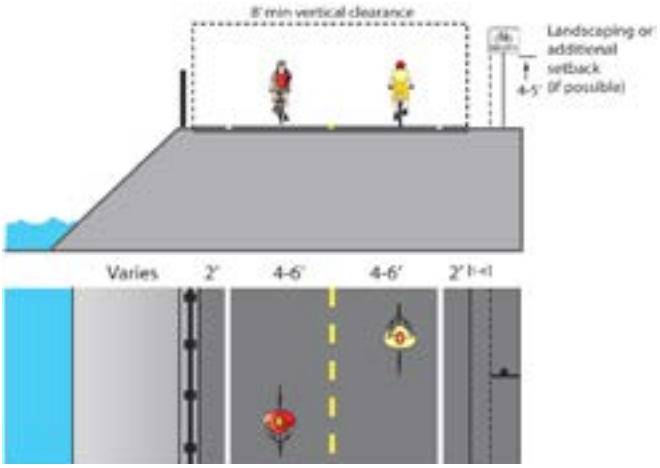
- 12' minimum (8' paved area + 2' shoulders on each side) + 1' clearance for signage
- 17' when 5' parallel pedestrian path is included
- Paths in utility corridors should meet or exceed Caltrans Highway Design Manual standards. If additional width allows wider paths and landscaping are desirable

Access Points: Any access point to the path should be well-defined with lighting and appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles. Path access should be facilitated by gates.

Path Closure: Public access to a path in a flood control channel is prohibited during:

- Flood control channel utility maintenance or other activities
- Inclement weather or the prediction of storm conditions

Fencing: Public access to flood control channels or canals is undesirable during storm events when hazardous materials, deep waters, swift currents, debris, and steep, slippery slopes may pose a public safety threat. Appropriate fencing may be required to keep path users within the designated travel way and away from hazards. The City of Los Angeles requires 5' as a minimum height for fences or railings along the bicycle paths. Such fences or railings should be present on the channel side of the path. Typical fencing on the channel side may be constructed out of metal such as galvanized pipe to allow for views down into the channel.



Fencing along the edge of a path can protext bicyclists from hazards.

References

Flood control channels are not discussed specifically, but general bicycle path guidance is available in the following documents:

California MUTCD

Caltrans Highway Design Manual

AASHTO Guide for the Development of Bicycle Facilities

7.4 Multi-Purpose Paths in Existing Active Rail Corridor

Existing active rail corridors can provide bicycling and pedestrian facilities ("rail-with-trail") if the necessary right-of-way can be accommodated.



Benefits

These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.

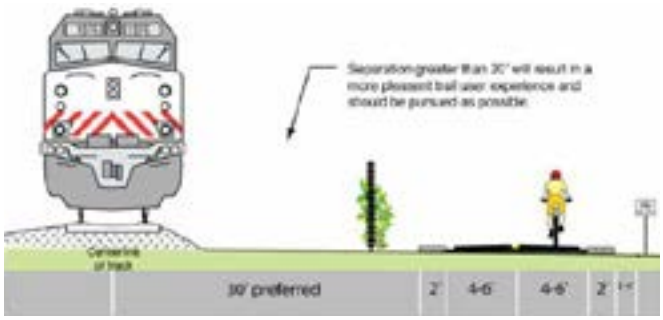
Applications

These facilities have been proposed and developed within active rail corridors throughout the City of Los Angeles (e.g., the San Fernando Road Bicycle Path and the Expo Light Rail Bicycle Path).

Considerations

It should be noted that some constraints may impact the feasibility of rail-with-trail projects. In some cases, space may need to be preserved for future planned freight, transit or commuter rail service. In other cases, limited right-of-way width, inadequate setbacks, concerns about safety/trespassing, and numerous mid-block crossings may affect a project's feasibility.

Design Guidance



Bicycle Path Width:

- 12' minimum (8' paved area + 2' shoulders on each side) + 1' clearance for signage.
- 17' when 5' parallel pedestrian path is included.

Setback:

- The setback is the distance from the centerline of the railroad to the edge of the bicycle path facility. Each railroad generally has its own policies on bicycle paths adjacent to active rail lines. For example, the BNSF's policy on "Trails with Rails" states, "Where train speeds are greater than 90 mph, trails are not acceptable. No trail will be constructed within 100 ft. of any mainline track

where train speeds are between 70 mph and 90 mph. Trails may be constructed between 50 ft. and 100 ft. where mainline train speed is 50 mph to 70 mph. Trails may be constructed 50 ft. from centerline of track where train speeds are 25 mph to 50 mph, and 30 ft. from any branchline track with speeds of 25 mph or less. No trails less than 30 ft. from centerline of track for any reason."

- The Southern California Regional Rail Authority (SCRRA) has published guidelines for rail-with-trail projects and identifies its minimum recommended setback requirements:
    - 45 feet for main line track where train speeds exceed 90mph
    - 40 feet for main line track where train speeds is between 90 and 78 mph
    - 35 feet where main line speed is between 78 and 60 mph
    - 30 feet where main line speeds is between 59 and 40 mph;
    - 25 feet where main line speed is below 40 mph.
- Additionally, the SCRRA acknowledges that it may not be possible to provide recommended minimum setbacks at certain points. "Additional barriers, vertical separation or other methods will be employed.
- **Separation:** Separation is any physical barrier that keeps bicycle path users from accessing railroad operations. Separation can take the form of fencing, walls, vegetation, vertical grade, and ditches or swales. Fencing is the most common form of separation and can vary from chain link to wire, wrought iron, vinyl, steel picket, galvanized pipe, and wooden rail. Fencing should be a minimum of 5 feet in height with higher fencing usually next to sensitive areas such as switching yards.
- **Fencing:** Railroads typically require fencing with all rail-with-trail projects. Concerns with trespassing and safety can vary with the amount and type of train traffic on the adjacent rail line and the setting of the bicycle path, i.e. whether the section of track is in an urban or rural setting. The SCRRA typically requires tubular steel or welded wire mesh fencing. Exceptions may be granted that include 'best practices to ensure safe trail use and rail operations'. In rural or environmentally sensitive areas, fencing options may include a three rail split-rail fence in combination with landscaping. Fence height should be four to five (4-5) feet within 150 feet of at-grade crossings and six (6) feet in other areas.

Other Discussion

Existing Guidance:

From Rails-with-Trails: Lessons Learned, FHWA, 2002: "No national standards or guidelines dictate rail-with-trail facility design. Guidance must be pieced together from standards related to bicycle paths, pedestrian facilities, railroad facilities, and/or roadway crossings of railroad rights-of-way. Bicycle path designers should work closely with railroad operations and maintenance staff to achieve a suitable RWT design. Whenever possible, path development should reflect standards set by adjacent railroads for crossings and other design elements. Ultimately, RWTs must be designed to meet both the operational needs of railroads and the safety of bicycle path users. The challenge is to find ways of accommodating both types of uses without compromising safety or function."

References

Caltrans Highway Design Manual

CA MUTCD

AASHTO

"Rails-with-Trails": Lessons Learned, FHWA, 2002

SCRRA Rail-with-Trail Design Guidelines

7.5 Multi-Purpose Path Constructed within New Transit Corridor

New transit corridors can provide bicycling and pedestrian facilities if the necessary right-of-way can be accommodated.

Benefits

- Offers excellent transportation and recreation opportunities for bicyclists of all ages and skills
- Provides "first-mile last-mile" linkages to/from transit stations
- Provides a safe, protected bicycle route with a reduced number of street crossings



Considerations

High profile bikeways such as the Orange Line Bikeway require special design treatments to meet high use by pedestrians and bicyclists allowing for separation and other amenities.

Design Guidance

- **Path width:** 12' minimum; 17' with parallel 5' pedestrian path; 1' for signage clearance.
- **Pavement markings:** Standard pavement markings should be used per the CA MUTCD. In order to reinforce the need for separation of bicyclists and pedestrians, graphic markings may be used.
- **Striping:** 4" dashed yellow centerline, 4" solid white shoulder stripe, hash marks to separate bicyclists from pedestrians, where pedestrian facilities are provided.
- **Surfacing:** Paved surface thickness adequate to support maintenance vehicles (4" min). Redwood headers if asphalt surface.



The Orange Line Bikeway has separate lanes for bicycles and pedestrians.

References

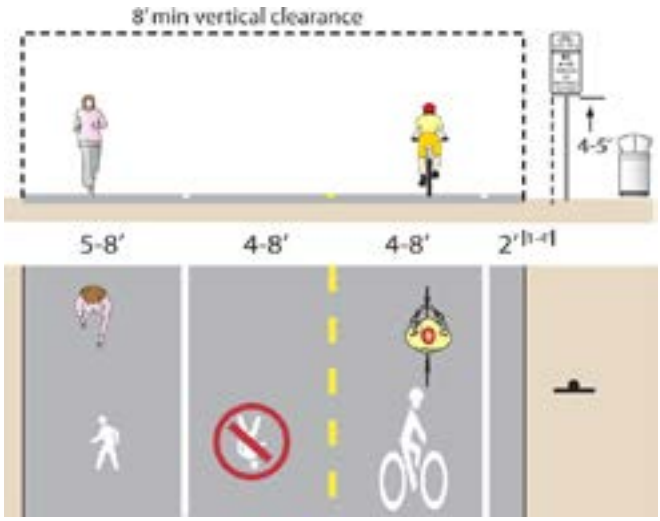
California MUTCD

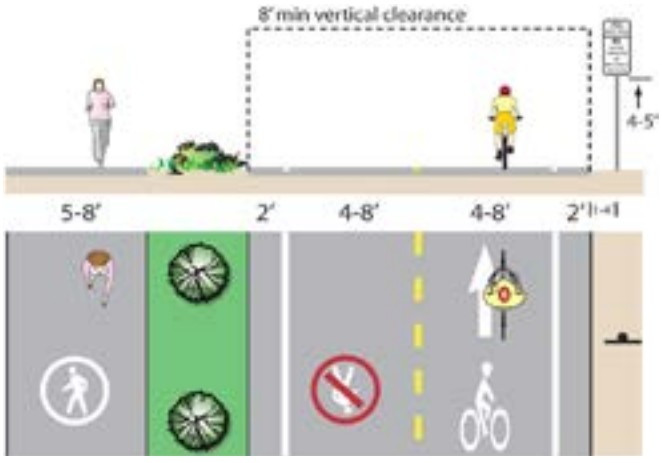
Caltrans Highway Design Manual

AASHTO Guide for the Development of Bicycle Facilities.

7.6 Coastal Paths

Coastal paths attract many types of pathway users and conveyances, including bicyclists, pedestrians, rollerbladers, and pedicabs.





Landscaping can be used to physically separate pedestrian and bicyclist right-of-ways.

Benefits

- Provides a pleasant recreational facility for many types of users to enjoy
- Provides a safe way to enjoy scenic rides and walks

Applications

- Coastal paths are applied along stretches of recreational beach sites.

Considerations

- The bicycle path should not be placed adjacent to large numbers of destinations.

Design Guidance

- **Path Width:**
  - Bicycle Path: 12' minimum;
  - 17' with parallel 5' pedestrian path
  - 1' clearance for signage.
- **Pavement Markings:** Standard pavement markings should be used per the CA MUTCD. In order to reinforce the need for separation of bicyclists and pedestrians, graphic markings may be used.
- **Surfacing:** Paved surface thickness 4", adequate to support maintenance vehicles. Redwood headers if asphalt surface.

- To provide an adequate and pleasant facility, adequate widths and separation are needed to maintain an enjoyable pathway environment.

- Offsetting of the pedestrian path should be provided if possible. Otherwise, separation should be provided in the form of striping or landscaping.

- The bicycle path should be located on whichever side of the path will result in the fewest number of anticipated pedestrian crossings. Site analysis of each project is required to determine expected pedestrian behavior.

References

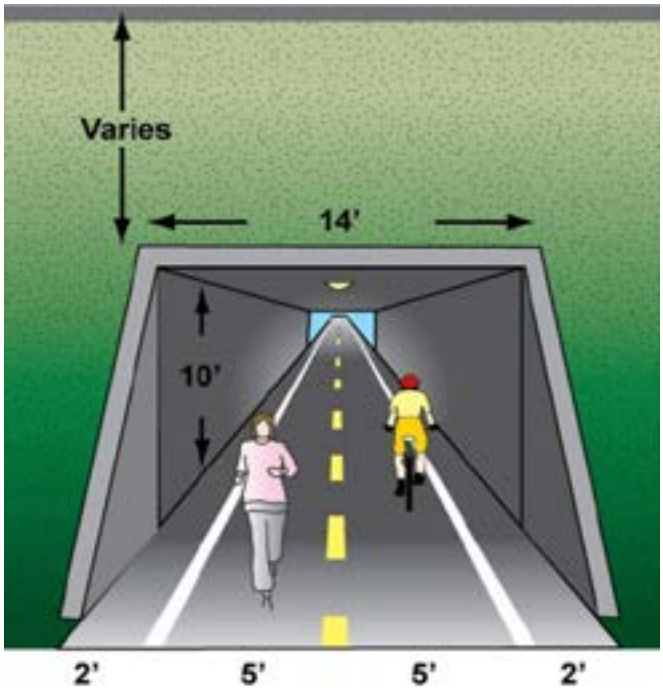
California MUTCD

Caltrans Highway Design Manual

AASHTO Guide for the Development of Bicycle Facilities

7.7 Grade-Separated Undercrossings and Overcrossings

Bicycle/pedestrian undercrossings and overcrossings provide critical bicycle path links by separating the path from conflicts with motor vehicles. These structures are designed to provide safe crossings for bicyclists where they previously did not exist.





Benefits

- Improves bicycle safety while reducing delay for all users.
- Eliminates barriers to bicyclists.
- Require less ramping and elevation change for the user versus an overcrossing, particularly for railroad crossings

Applications

- Undercrossings should be considered when high volumes of bicyclists and pedestrians are expected along a corridor and:
  - ♦ Vehicle volumes/speeds are high.
  - ♦ The roadway is wide.
  - ♦ An at-grade crossing is not feasible.
  - ♦ Crossing is needed under another grade-separated facility such as a freeway or rail line.
- Overcrossings should be considered when:
  - ♦ Vehicle volumes/speeds are high.
  - ♦ The roadway to be crossed consists of multiple travel lanes.
  - ♦ An at-grade crossing is not feasible.
  - ♦ Crossing is needed over a grade-separated facility such as a freeway or rail line

- An undercrossing or overcrossing may be appropriate where bicycle demand exists to cross a freeway in a specific location, or where a flood control channel (e.g., the Los Angeles River) separates a neighborhood from a nearby bicyclist destination.
- These facilities may also overcome barriers posed by railroads, and are appropriate in areas where frequent or high-speed trains would create at-grade crossing safety issues, and in areas where trains frequently stop and block a desired bicycle crossing point.
- They may also be required by the California Public Utilities Commission (PUC) which often prohibits new at-grade railroad crossings for bicyclists, or to replace existing at-grade crossings for efficiency, safety, and liability reasons.
- Hazardous bicycle crossing conditions (e.g., few or no gaps in the traffic stream, conflicts between motorists and bicyclists at intersections, etc.) could also create the need for an overcrossing or undercrossing.

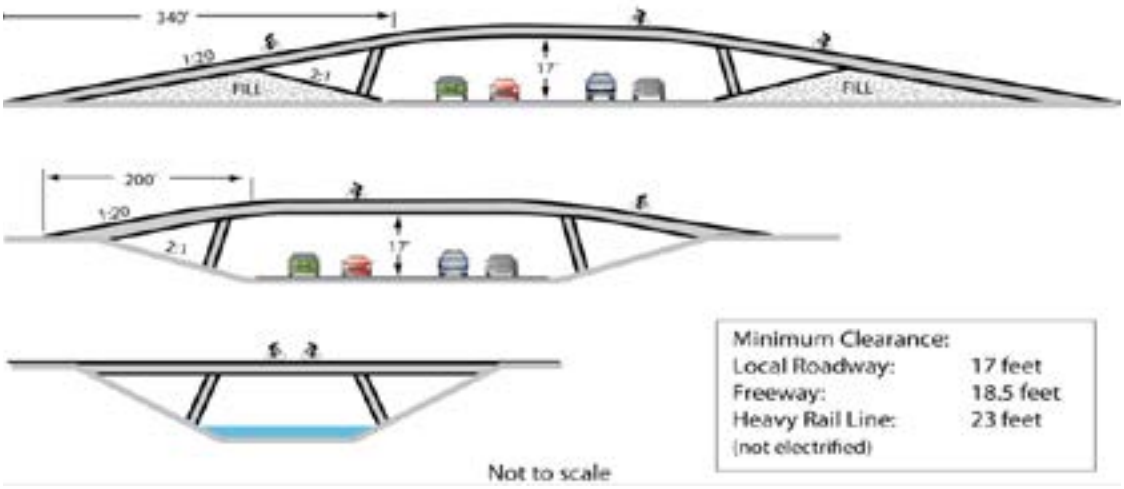
Considerations

- If the crossing is not convenient or does not serve a direct connection, it may not be well utilized.
- Potential issues with vandalism and maintenance.
- Security may be an issue if sight lines through undercrossing and approaches are inadequate. Undercrossing width greater than 14 feet, vandal resistant lighting and/or skylights are desirable for longer crossings to enhance users' sense of security.
- Overcrossings require at least 17 feet of clearance to the roadway below involving up to 400 feet or greater of approach ramps at each end. Long ramps must meet ADA requirements.

Design Guidance

Undercrossings

- Width: 14' minimum to allow for access by maintenance vehicles if necessary.
- Height: 10' minimum overhead clearance from the path surface.
- Pavement Markings: Standard pavement markings should be used per the CA MUTCD. In order to reinforce the need for separation of bicyclists and pedestrians, graphic markings may be used.
- Lighting: Vandal-resistant lighting should be installed with all undercrossings in culverts or tunnels.
- Grade Requirements: As with other path sections, grade should not exceed 5%.





When a bicycle path follows a low-lying flood control channel, an undercrossing is often necessary.

- **Overcrossings**

- Width: 12’ minimum width. 14’ preferred. If overcrossing has any scenic vistas additional width or belvederes should be provided to allow for stopped path users. A separate 5’ pedestrian area be provided for facilities anticipated to have high bicycle and pedestrian use.

- Height: 10’ vertical clearance.

- Signage & Striping: 4” dashed yellow centerline, 4” solid white shoulder stripe, hash marks to separate bicyclists from pedestrians, where pedestrian facilities are provided.

- Grade: Ramps should not exceed 5% grade.

- Overcrossings require a minimum of 17’ of vertical clearance to the roadway below versus a minimum elevation differential of around 12’ for an undercrossing. This results in potentially greater elevation differences and longer ramps.

- Ramp Considerations: Overcrossings for bicycles typically fall under the Americans with Disabilities Act (ADA), and guidance is included in the Caltrans HDM which strictly limits ramp slopes to 5% (1:20) with landings at 400 foot intervals, or 8.33% (1:12) with landings every 30 feet.

References

CA MUTCD

Caltrans Highway Design Manual

Caltrans Bridge Design Specifications

AASHTO Guide for the Development of Bicycle Facilities

AASHTO Guide Specifications for Design of Pedestrian Bridges

7.8 Fencing for Bike Paths

Fencing can serve multiple purposes along path facilities, including access control, visual screening, channeling of path users, and safety.

Benefits

- Provides safety for bicyclists and pedestrians
- Channels users accordingly along a path



Applications

- Fencing should be provided where exposure to hazards or safety risks are present along a path

Considerations

- **Cost:** Fencing and other barriers, depending on the type of materials used and the length, can be costly, so options should be considered carefully.
- **Fencing height:** The height and design of a fence influences whether lateral movement will be inhibited. Few fences are successful at preventing people from continuing to cross at historic illegal crossing locations. Fencing that cannot be climbed will typically be cut or otherwise vandalized. Heavy-duty fencing such as wrought iron or steel mesh security fencing that are difficult to climb or cut are often much more expensive.
- **Noise and dust:** Bicycle path corridors adjacent to busy roadways, freeways or rail lines may be subject to noise, dust, vibration or vandalism, which may discourage use of the path. Methods of reducing this impact include the addition of vegetation or baffles to fencing barriers. This can increase the initial cost and ongoing maintenance cost.

Design Guidance

- **Height:** 5' minimum

- **Security:** Fencing between the path and adjacent land uses can protect the privacy and security of the property owners. While crime or vandalism has not been proven to be a common problem along most bicycle paths, fencing is still considered a prudent feature. The type, height, and responsibility of the fencing is often dependent on local conditions.

- **Fence types:** Below are examples of common types of fencing typically used with bicycle paths.

    - *Type-I Steel Pipe Fence:* The City of Los Angeles standard steel pipe fence is a sturdy low maintenance option for bicycle path fencing.

    - *Type-III Chain-Link:* Chain-link fences are popular due to their effectiveness in keeping path users within the public right-of-way, relative low cost, and ease of maintenance but are often discouraged as "handle bar catchers." Most chain-link fences are visually unappealing and tend to project an image of an urban industrial environment. Chain-link is very easy to cut and vandalize and may not be useful in areas with a high history of trespassing. For these reasons, designers should be sensitive to the land-use context when considering the use of chain link fencing. Privacy slats, plastic woven fabric or wood battens can be installed within the chain link material to provide a solid-type barrier to help catch debris, prevent handle bar grabbing and provide wind and visual buffering.

    - *Type-V Wrought-Iron Picket Fence:* Often used as vandal-resistant fencing, and is used in locations that have a history of trespassing. It is difficult to cut and difficult to scale. Because of its cost and visual impact, it is typically used at specific locations rather than along an entire corridor.

    - *Type-II Post and Cable:* Post and cable fencing is an expensive option which serves primarily to demarcate right-of-way boundary but can be cut by vandals. The fence does not provide any screening or anti-trespassing features.

    - *Type-IV Vinyl-Coated Chain-Link:* Vinyl-coated chain-link offers the same level of security, low cost and maintenance with a more passive and polished appearance than galvanized chain link. Privacy slats, plastic woven fabric or wood battens can be installed within the chain link material to provide a solid-type of barrier to help catch debris, prevent handle bar grabbing and provide wind and visual buffering.

    - *Type-VI Steel Mesh Security Fence:* Sometimes referred to as Israeli-style fencing for its use in Israel to protect kibbutzs, this product is more expensive than chain-link, difficult to vandalize, difficult to scale and relatively easy to repair if cut. The fine grade of the mesh helps to prevent grabbing of handle bars. It would be inappropriate for areas requiring aesthetic treatment, and provides limited screening or buffering benefits.

    - *Type-VII Sound Wall:* Sound walls have high costs and visual impacts. Solid concrete block walls are virtually indestructible and offer complete buffering and screening. Walls are most commonly used in areas where a grade separation requires a retaining wall adjacent to the path. These structures can become targets for graffiti artists and can create visually isolated stretches of bicycle path.

References

Caltrans Highway Design Manual

AASHTO Guide for the Development of Bicycle Facilities

7.9 Programming and Temporary Treatments

Pop-Up Retail

Also known as a pop-up shop or flash retailing, pop-up retail (pop-up) is a temporary transformation of a vacant commercial space by a local entrepreneur or small-business owner. Pop-up businesses typically sell clothing, food, seasonal items, art, and other merchandise. Pop-ups activate streets and can help reduce commercial vacancies by demonstrating the business potential for these spaces.



A Farmers Market

Pop-Up Library

A pop-up library is a temporary installation offering free books to read, borrow, and donate. In addition to encouraging reading and learning, pop-up libraries can help to activate public spaces. There are examples of transforming underutilized street infrastructure, such as payphones and phone booths, into pop-up libraries.

Farmers Market

Farmers Markets are retail markets featuring food sold directly by farmers to consumers. Vendors sell products such as fruits, vegetables, meats, and other prepared dishes typically from booths or stands. Beyond offering the local community a source to fresh foods, farmers markets help to activate often large, underutilized spaces.

Pop-Up Plazas

Pop-Up Plazas are underutilized spaces, sometimes roadways, which are transformed into temporary pedestrian spaces. Delineated using temporary materials, such as paint or planters, these public spaces can have community and economic benefits by allowing for such things as outdoor seating, live music, or public art.
Like pop-up retail, pop-up plazas can demonstrate the potential for a permanent pedestrian plaza.

Pallet Furniture



Wooden pallets are a low cost material to build street furniture. Pallet furniture is often placed in strategic locations to enliven spaces such as alleys and street corners. Furniture is often designed to be moveable and for public use. The furniture can be painted, stained, or treated with a water seal to enhance its appeal and longevity.

Community Clean Up

Encouraging volunteers to help in a community cleanup is an affordable way to beautify a neighborhood while giving local residents and businesses a stronger sense of ownership to the community.

Mural Pavement Treatments

Pavement murals enhance pedestrian safety by encouraging drivers to slow down as they enter an intersection. These murals are an effective and low-cost alternative to traffic calming while enhancing the street.

Other Interventions

Public EV Charging Stations



Electric Vehicles (EVs) are a sustainable mobility alternative and are increasing in consumer demand. According to a study by the UCLA Luskin Center for Innovation, the adoption of EVs has the potential to help reduce carbon emissions and traffic noise. The study's market analysis found that Los Angeles has a strong market potential for EVs. Similar to meter parking, The City of Los Angeles can price EV charging stations to fund for its maintenance and other improvement projects. Installing EV charging stations in strategized locations can help to prepare and accommodate for future EV demand.

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RON GALPERIN
CONTROLLER

January 23, 2017

Honorable Eric Garcetti, Mayor
Honorable Michael Feuer, City Attorney
Honorable Members of the Los Angeles City Council
All Angelenos

Re: Audit of Income-Restricted Affordable Housing Units in Los Angeles: *A Review of the City's Density Bonus Program and Overall Oversight*

How do we create more affordable housing[1] in Los Angeles? That is one of the most fundamental questions our City faces as it seeks to achieve a lofty goal of having 100,000 new units built by 2021, of which 15,000 would, hopefully, be deemed affordable.

The City has a number of policies and programs that aim to help the City achieve its goal -- among them our density bonus program[2], which is a tool used to incentivize developers to include very low, low, and moderate income housing units in their new developments. The program offers density bonuses and other incentives, such as reduced parking requirements, in exchange for a certain percentage of on-site affordable housing. Landlords utilizing the program enter into covenants recorded against title to the property that restrict the rent on the units for 55 years.[3]

But, just how effective has the density bonus program overseen by the City's Housing and Community Investment Dept. (HCID) been in achieving the construction of new income-restricted affordable units -- particularly in buildings with primarily market rate housing? How many income-restricted units were created through the program in affordable housing projects? And, how effective has the City been in monitoring and overseeing income-restricted units generally across the City?

To answer these questions, my office is today releasing an audit entitled: Income-Restricted Affordable Housing Units in Los Angeles: *A Review of the City's Density Bonus Program and Overall Oversight.*

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[1] *For purpose of the report, and this letter, affordable housing refers to income restricted units monitored only by HCID, and excludes HACLA-overseen projects and units.*

[2] *State Law has permitted density bonuses since 1979, and since the passage of Senate Bill 1818 in 2004, CA has mandated cities offer them. Los Angeles adopted a density bonus ordinance in 2008.*

[3] *The time period for rent restriction of density bonus units was changed from 30 years to 55 years pursuant to AB 2222, signed by Governor Brown on September 2014.*

Density Bonus Law Has Not Lived Up to Its Potential

We found that 21 percent of new multi-family projects, of five units or more, built between 2008 and 2014 (169 of 790 projects) utilized some aspect of the density bonus program -- resulting in 4,463 units designated as affordable. However, just 329 of these units were created in market-rate projects throughout the City -- an arguably minimal impact when considering our overall affordable housing needs. While the Dept. of City Planning and HCID have reported higher numbers, we sought to zero in on actually completed projects and on actual units that can be attributed to the density bonus program. The data highlights the modest impact the density bonus program had on creating affordable housing in market rate projects. The results suggests that incentives may not be of enough value for market rate developers and that the cumbersome process serves as a further disincentive.

The City's Monitoring Program

Our audit also examined oversight and monitoring[4] of City's overall stock of 28,482 income-restricted units overseen by HCID. This includes density bonus units, Section 8 units, Community Redevelopment Agency project units, and other income-restricted units. The Controller's Office has mapped the locations of all such units, and can be found at www.lacontroller.org/geopanel_la. While we found reasonably adequate monitoring and a 93 percent compliance rate, better oversight tools are needed to deal with conditions we found of some owners collecting more rent than allowed and some tenants exceeding income guidelines.

Based on a thorough analysis of information available for 2014, we found the following:

- For 1,482 units (5.2%) -- landlords charged higher rents to tenants than allowable under covenants to which landlords agreed. When such circumstances are identified, HCID's contractor is charged with sending letters to owners demanding remediation.
- For 464 units (1.6%) -- tenant earnings exceeded program guidelines. In more than two-thirds of such instances, tenants reported incomes that exceeded limits by at least $5,000 per year and, in one case, by $149,000.
- For 1,056 units (3.7%) -- no one verified tenant incomes when tenants moved in.
- For 1,181 tenants, no income was reported at all.

Recommendations

To achieve better results, our auditors recommend that the City should:

- Set a target for how many affordable density bonus units it seeks to achieve in the coming years;
- Consider revising the density bonus ordinance to review the percentage set-asides and the "on-menu" and "off-menu" incentives;
- HCID should work with its contractor to better report on compliance status for each unit monitored, and better institutionalize and document policies and procedures.
- Request a legal opinion for options the City has in developing policies to transition over-income tenants out of income-restricted units.

[4] *HCID contracts with Urban Futures Inc. to conduct monitoring.*

Furthermore, I encourage the Dept. of City Planning and policy makers to explore:

- Create additional incentives that could be offered through the density bonus program. This might include additional density or permitting micro units;
- Streamline processes to enhance the experience and attractiveness of the density bonus program. This might include modifications to the current process of site plan review and expedited processing of Environmental Impact Reports;
- Conduct a legal analysis of what opportunities might exist, within the density bonus program, to allow market-rate developers to create income-restricted units off-site -- or to pay equivalent values into a fund which would build income-restricted units throughout Los Angeles.
- Review how Area Median Income (AMI) levels are defined for the purpose of the density bonus program.[5] Holding income levels to a more stringent standard than prescribed in State law is arguably preventing the City from optimizing the number of affordable units built in new developments. If the optional higher rent levels were permitted, we may be able to incentivize more developers to provide the nearly double amount of low-income units; and
- Expedite updates to the City's density bonus program pursuant to changes to California law that took effect Jan. 1, 2017. On September 28, 2016, Governor Brown signed AB 2501, AB 2556, AB 2442, and AB 1934 which amended the State Density Bonus Law. The Dept. of City Planning reports it is currently updating the City Ordinance to reflect the changes in the law. In addition, ordinance amendments will need to acknowledge AB 2280 (2008).

In Summary

The City's Density Program is not living up to its potential -- but with modifications thereto, along with enhanced oversight by the City of income-restricted affordable housing units, we can -- and must -- improve the availability of housing for all Angelenos.

Respectfully submitted,



Ron Galperin
CITY CONTROLLER

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[5] *The State's Health & Safety Code allows to cities to designate a unit as income when it is to be restricted to tenants with incomes of 30% to 60% of AMI - or "at a level not to exceed 30% of gross income of the household", which permits a higher allowable rent level when incomes are between 60% and 80% AMI. The City of Los Angeles, however, currently takes allows a unit to count as income-restricted only if the unit is set aside for tenants with incomes of 30% to 60% of AMI. The net result of this policy is that almost every market rate density bonus developer chooses to provide very-low income units, which only require approximately HALF the amount of restricted affordable housing units to be provided.*

RON GALPERIN
CONTROLLER

January 23, 2017

Rushmore D. Cervantes, General Manager
Los Angeles Housing and Community Investment Department
1200 W. 7th Street, 9th Floor
Los Angeles, CA 90017

Dear Mr. Cervantes:

Enclosed is the final report entitled, "Income-Restricted Affordable Housing Units in Los Angeles: *A Review of the City's Density Bonus Program and Overall Oversight*." A draft of this report was provided to your Department on June 21, 2016, and we considered your staff's comments in revising the report. A subsequent draft was provided on September 22, 2016 to request your Department's formal response and action plan for the thirteen recommendations addressed to your Department. These are included in Appendix X of the report.

If you have any questions or comments, please contact me at alfred.rodas@lacity.org or (213) 978-7392.

Sincerely,

Alfred Rodas, CPA, CIA, CIG, CIGI
Director of Auditing

Enclosure

cc: Ana Guerrero, Chief of Staff, Office of the Mayor
Brenda Shockley, Deputy Mayor
Richard H. Llewellyn, Interim City Administrative Officer
Sharon Tso, Chief Legislative Analyst
Holly L. Wolcott, City Clerk
Independent City Auditors

RON GALPERIN
CONTROLLER

January 23, 2017

Vince Bertoni, Director of Planning
Department of City Planning
200 North Spring Street, 5th Floor
Los Angeles, CA 90012

Dear Mr. Bertoni:

Enclosed is the final report entitled, "Income-Restricted Affordable Housing Units in Los Angeles: *A Review of the City's Density Bonus Program and Overall Oversight*." A draft of this report was provided to your Department on June 21, 2016 and we considered your staff's comments in revising the report. A subsequent draft was provided on September 22, 2016 to request your Department's formal response and action plan for the three recommendations addressed to your Department. These are included in Appendix X of the report.

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Sincerely,

Alfred Rodas, CPA, CIA, CIG, CIGI
Director of Auditing

Enclosure

cc: Ana Guerrero, Chief of Staff, Office of the Mayor
Raymond Chan, Deputy Mayor
Richard H. Llewellyn, Interim City Administrative Officer
Sharon Tso, Chief Legislative Analyst
Holly L. Wolcott, City Clerk
Independent City Auditors

RON GALPERIN
CONTROLLER

January 23, 2017

Frank Bush, General Manager
Department of Building and Safety
201 N. Figueroa Street, Suite 1000
Los Angeles, CA 90012

Dear Mr. Bush:

Enclosed is the final report entitled, "Income-Restricted Affordable Housing Units in Los Angeles: *A Review of the City's Density Bonus Program and Overall Oversight."* A draft of this report was provided to your Department on June 21, 2016 and we considered your staff's comments in revising the report. A subsequent draft was provided on September 22, 2016 to request your Department's formal response and action plan for the four recommendations addressed to your Department. These are included in Appendix X of the report.

If you have any questions or comments, please contact me at alfred.rodas@lacity.org or (213) 978-7392.

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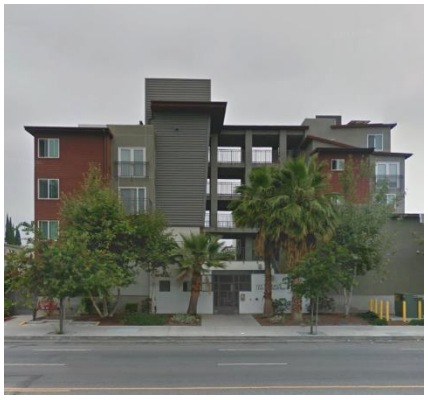

City of Los Angeles

Audit of Income-Restricted Affordable Housing Units in Los Angeles: *A Review of the City's Density Bonus Program and Overall Oversight*

January 23, 2017

RON | GALPERIN
Los Angeles City Controller
LAController.org

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SUMMARY

THE ROLE OF DENSITY BONUSES IN CREATING AFFORDABLE HOUSING

Los Angeles needs more housing – both in the form of market rate units, and affordable units available exclusively to individuals and families with low incomes. Without additional units, housing costs will continue to soar, hurting other sectors of the economy and exacerbating problems such as homelessness.

One tool intended to create more housing is the City's Density Bonus program, whereby

(a) private developers can add up to 35% more units to their projects than zoning would ordinarily allow, and/or be granted relief from other zoning restrictions. In exchange, the developers agree to set-aside 5% to 30% of the total units as affordable for various levels of low and moderate income tenants;[1]

(b) affordable housing developers can also participate.[2]

State law has permitted Density Bonuses since 1979, and since the passage of Senate Bill 1818 in 2004, California has mandated that cities offer them. Los Angeles adopted a Density Bonus ordinance in 2008.

This audit focused on two main questions:

- How much additional affordable housing has the Density Bonus program actually created since 2008?

- Did the City adequately ensure that the affordable housing created through Density Bonuses and other subsidized programs stayed affordable?

Based on a review of land use covenants, from 2008 to 2014, we found that the Density Bonus program resulted in only 329 *additional* affordable housing units built in market rate developments within the City. While affordable housing developments took advantage of the Density Bonus program incentives, the land use covenants were not explicit as to how many additional

[1] The audit report refers to these as "market-rate developments/projects" built by private developers without government assistance.
[2] The audit report refers to these as "affordable housing developments/projects" that received government subsidies or financing assistance.

units were built. As a result, we were able to identify only 97 *additional* units, and while more may have been built, the data could not corroborate this.

We also found that City efforts are inadequate to ensure that affordable housing is occupied only by eligible low-income persons and that those persons are not overcharged.

The Density Bonus program should help add housing for low-income individuals and families as well as help add more market rate units. But how successful is this program?

THE MEASURABLE IMPACT ON AFFORDABLE HOUSING

In 2015, the City's Housing and Community Investment Department (HCID) HCID reported to the City Council that 4,668 affordable housing units were built in 201 projects that had participated in the Density Bonus program since 2008. However, this number included several duplicate projects, and one project that was terminated. Eliminating the duplicate and terminated projects results in 169 projects and 4,463 units. This number represented the units set aside as affordable in market rate developments as well as ALL of the income-restricted units in affordable housing projects that took advantage of any aspect of the Density Bonus program, including reduced requirements for parking spaces. It should be noted that HCID was not required to calculate and report the number of incremental[3] affordable units that were created because of the Density Bonus program.

Accordingly, we sought to determine how many additional affordable units were built only due to the Density Bonus program. This required us to review the land use covenants that HCID prepared for each of the projects. While approximately 21% of all eligible multi-family projects that were completed and available for occupancy from 2008 through 2014 took advantage of some aspect of the Density Bonus program, we determined that the program led to the creation of 329 additional affordable units within market rate projects and at least 97 additional units within affordable housing projects. We noted that private market rate developers took advantage of the program more often than affordable housing developers, building 54% (91 of the 169) of the projects.

[3] Incremental unit refers to the *additional* unit(s), i.e., above the number specified by the zoning code for a particular multi-family housing project, that were created as a result of the City's density bonus incentive.

In launching the City's Density Bonus program, policymakers did not set goals for how to measure success. To set such goals, policymakers would have to weigh the relative benefits of easing some restrictions imposed on developers, the benefit of providing additional income-restricted affordable units, and the quality of life and community concerns related to greater density.

If the City determines that the Density Bonus program should be a more significant component to addressing its affordable housing needs, options to encourage more developers will need to be explored. It is difficult to assess what incentives might need to be offered or changed to entice more developers to take advantage of the program. For example, we surveyed developers who previously participated in the Density Bonus program. While 16 of the 19 developers who responded indicated they would participate in the Density Bonus program again, one stated that the total number of bonus units was not sufficient; four said the process added too much time to their project timeline.

According to the Regional Housing Needs Assessment, the City will need 82,002 units of all sorts to meet housing demands by 2021, and 46,590 of those should be deemed affordable.

IMPROVEMENTS NEEDED IN MONITORING AND ENFORCEMENT

Land use covenants are intended to ensure that the affordable units remain affordable. They are recorded along with the property's title for a set period of time (typically 30 years per SB 1818, or 55 years per that law's 2014 revision).

In an attempt to ensure that the units stay affordable, HCID contracts with a monitor to check on tenant income and the rent charged after the units are occupied. HCID contracts for monitoring of all units within the City's affordable housing inventory.

In examining whether or not the affordable units built through the Density Bonus program in fact remained affordable, we assessed whether the City adequately monitored ALL of its affordable housing stock, so that these units remain occupied by eligible low and moderate income tenants.

The City's income-restricted affordable housing stock includes approximately 28,000 units including:

- Units within projects that received government funds through the City, such as long-term loans from the City's Affordable Housing Trust Fund and/or Federal and State housing funds;
- Units within projects that received funds from the former Community Redevelopment Agency; and
- Units created through City Land Use Concessions such as the Density Bonus, when there was no exchange of funds but the developer was relieved of some land use or zoning requirements.

The City monitors all of these affordable units through a private company under contract, and those efforts are more extensive than any other city we benchmarked. All tenants are required to report their income to their landlords, who then report that income to the City's contractor, along with the amount of rent they charged each tenant.

While it would be tedious and costly to gather this information through other means, the 2014 monitoring data raises several concerns regarding:

- **Landlords Who Charged Too Much** – In 1,482 units – or 5.2% of the affordable housing stock monitored by the City, landlords charged tenants more rent than allowed under affordable housing program rules.

- **Tenants Who Earned Too Much** -- In 464 units, which represents 1.6% of the City's affordable housing stock, tenants exceeded the income requirements for affordable housing. In some cases, the excess was small, but in more than two-thirds of the cases, tenants reported exceeding the income limits by more than $5,000. In one case, a household earned $149,000 more than the income limit.

- **Tenants Without Reported Earnings** -- For approximately 1,200 tenants, no income amount was reported. We question if all of these tenants actually earned nothing from work wages, personal businesses, unemployment/disability benefits, social security, retirement accounts, dividends or other investments.

We also found that HCID failed to verify tenant income in 1,056 units – or 3.7% of all affordable units – before the tenants moved in. While these tenants may have still qualified, HCID is supposed to ensure that landlords only rent affordable units to tenants who meet the income requirements.

Also, in 18% (5,221) of the restricted units, landlords accepted Housing Choice Vouchers (Tenant-Based Section 8 Rental Assistance) though they received other government subsidies for their housing project. While it is legal

to layer these programs, the housing vouchers are designed to help tenants occupy market rate units. When tenants with vouchers occupy restricted units, it reduces the number of affordable units that could be available to other families who do not have vouchers but still need assistance.

Cumulatively these numbers negatively impact the number of affordable housing units available to the City's low-income residents. Furthermore, while the City can compel landlords to return rent they overcharged, the City has no way to transition tenants out of affordable housing if they exceed income requirements. Given how pressing the need for housing is, more can be done to ensure that the City's restricted affordable housing stays truly affordable, and units are available to those in need.

RECOMMENDATIONS

If Policymakers determine that Density Bonus units should be a significant component of the City's affordable housing strategy, to improve the program, with an eye toward increasing the number of additional units built, we recommend:

- Exploring how to get more developers to build affordable units through the Density Bonus program, such as by possibly increasing incentives.

To improve transparency of the Density Bonus program results, we recommend:

- Better tracking of the number of market rate and affordable units that developers build.
- Simplifying/standardizing covenants and making them available online for easy public access.

To improve enforcement for all affordable housing and to make sure units go to those in need, we recommend:

- Developing policies to gradually transition over-income tenants out of affordable housing.
- Ensuring that all tenant income is properly verified.

- That Council consider restricting the use of Housing Choice Vouchers to privately-owned units.

REVIEW OF THE REPORT

On June 21, 2016 we provided a draft of this report to HCID, Department of Building and Safety (DBS) and Department of City Planning (DCP) management. We met with HCID representatives at an exit conference held on July 6, 2016 and received written comments from DBS and DCP management. We considered the comments and clarifying information provided as we finalized the report.

DEPARTMENTS' RESPONSE AND ACTION PLAN

The Housing and Community Investment Department, Department of City Planning and the Department of Building and Safety all provided a formal response and Action Plan (See Appendix X). Below is our assessment and comments pertaining to each Department.

Housing and Community Investment Department

The Department agreed with ten of the thirteen recommendations directed to the Housing and Community Investment Department, and we now consider three Recommendations (2.2, 2.3 and 6.1) as Implemented, and seven Recommendations (1.3, 1.5, 1.6, 2.1, 3.1, 3.4, and 3.6) as Partially Implemented.

HCID disagreed with three recommendations (3.2, 3.3, and 3.5) related to income thresholds and Housing Choice Vouchers.

Income Thresholds and Transitional Policies

To ensure the City's affordable housing stock is occupied by those who are in most need, Recommendations 3.2 and 3.3 urged HCID to develop a removal policy for tenants who surpass an over-income threshold, as well as a timeline for tenants to transition out of the restricted unit when they exceed the income limit. HCID expressed concern that such removal policies would create displacement in the City's tight housing market. The Department also indicated that could result in tenants' under-reporting income or disincentivizing tenants to increase their incomes in the future. The Department proposed as an alternative to work with the City Attorney to draft a policy to increase the rent paid by tenants that exceed income limits.

The intention of the original recommendation was to ensure that existing restricted units remain occupied by genuinely low-income, eligible tenants. By allowing tenants whose incomes exceed original program guidelines to remain in restricted units indefinitely and without a transition plan, those restricted units will not be available for those in greater need.

Housing Choice Vouchers

HCID also disagreed with Recommendation 3.5, to consider restricting the use of Housing Choice Vouchers (HCVs) to privately owned units. The Department indicated that it considers HCVs a source of income for tenants, and it does not want to limit access to a restricted unit based on their source of income. The Department also indicated that prohibiting the use of HCVs in City financed units would increase the existing hardship for voucher holders to find landlords who accept HCVs, due to the high rents and low vacancy rates in the City. The Department noted that the exclusion of Section 8 tenants contradicts guidelines of the HOME Investment Partnerships Program, which is leveraged with the City's Affordable Housing Trust Fund.

While we acknowledge these issues, the audit demonstrates the impact of the current policy, which results in fewer affordable housing options for eligible Los Angeles residents. If an individual with HVC rental assistance occupied an apartment outside of HCID's inventory (e.g. a privately-owned unit), two low-income households could be served. The intention of implementing the recommendation was to increase the number of units in the City available to eligible low-income residents. We urge the Department to reconsider this policy should the City's housing market become less tight in the future.

Department of Building and Safety

Management agreed with the four recommendations addressed to the Department of Building and Safety. Based on their response, we now consider all four (1.3, 1.4, 1.6 and 3.4) as Partially Implemented. The Department indicated that it is collaborating with HCID and DCP to develop or improve their information systems, which will increase the efficiency of tracking and subsequent reporting of milestones related to units created through the Density Bonus program. The Department also indicated that it plans to work with HCID to develop an automated process to ensure HCID's Occupancy Monitoring unit is immediately notified when a Certificate of Occupancy is issued for a housing project with restricted units. This will help ensure HCID's Occupancy Monitoring Unit can certify tenants' income *before* they move into the unit.

Department of City Planning

Management agreed with the three recommendations addressed to the Department of City Planning. Based on their response, we now consider all three (1.3, 1.6, and 4.1) as Partially Implemented. DCP also indicated a commitment to collaborate with HCID and DBS to improve the tracking and reporting of units created through the Density Bonus program.

Background

Studies suggest that individual families and the community-at-large benefit from affordable housing. The stability of an affordable mortgage or rent can improve childhood development, school performance and health outcomes. Further, affordable housing increases spending and employment in the surrounding economy; this spending acts as an important source of revenue for local governments, and reduces the likelihood of foreclosure and its associated costs.

The City's blueprint for meeting housing and growth is the 2013-2021 Housing Element of the General Plan. It states that from 2000 to 2010, rents increased 31% in real terms, while incomes only increased 1.2%. In 2014 the average rent for a two-bedroom/two-bathroom apartment ranged from $2,400 to $2,600.[4]

According to the Regional Housing Needs Assessment[5] (RHNA) the City will need an additional 82,002 new units through 2021 to meet demand, and 46,590 of these units (57%) should be affordable. In April 2015, the Mayor released the "Sustainability City pLAn," which directs City Departments to minimize the loss of existing affordable housing units and includes a specific goal to build 100,000 *total* housing units by 2021. In October 2015, Mayor Garcetti announced a goal to build and preserve 15,000 *affordable* units by 2021.

To be part of the City's affordable housing inventory, a unit must be restricted by both income and rent guidelines. California's Department of Housing and Community Development (HCD) establish these guidelines each year. Income guidelines consider household income and size, while the rent guidelines consider household income and number of bedrooms. To occupy a restricted unit, residents must prove they do not exceed the applicable income level limits. Likewise, the owner cannot charge more rent than the unit's associated income level.

For Density Bonus projects, three[6] categories based on the Area Median Income (AMI) dictate the income and rent limits:

- Very Low (50% of AMI)
- Low (80% of AMI)
- Moderate (120% of AMI)

[4] Realfacts Database.
[5] The Regional Housing Needs Assessment (RHNA) is mandated by State Housing Law as part of the periodic process of updating local housing elements of the General Plan. It is completed by the Southern California Association of Governments (SCAG).
[6] Some programs consider a fourth income category, Extremely Low, which is 30% of AMI.

DENSITY BONUSES

One of the tools the City uses to increase affordable housing units is the Density Bonus program. Density Bonuses are a type of ***Land Use concession***, in which there is no exchange of funds, but rather developers are relieved of some land use requirements.

The Density Bonus program allows a developer to build more residential market-rate units (bonus units) than the Zoning Code allows, ***if*** the developer commits to set aside a certain number of restricted affordable units within the project. The percent of bonus units granted depends on the corresponding income-level[7] of the affordable housing units (very low-income, low-income, or moderate-income). Conversely, the number of restricted affordable units required depends on how many bonus market rate units the developer requests to build, or the number of incentives they wish to use.

For example, if the original project includes 10 base units, and the developer requests the 10% low-income Density Bonus option, they would be required to set aside one low-income unit, (10 x 10% = 1) and they would be allowed to build two bonus market-rate units (10 x 20% = 2). The additional units that are created because of the Density Bonus can be described as "incremental units."

Incremental Unit – refers to the *additional* unit(s), i.e., above the number specified by the zoning code for a particular multi-family housing project, that were created as a result of the City's density bonus incentive.

Exhibit 1: Density Bonus Calculation Example

Project begins with **10** base units:

Low Income		
Set-Aside Affordable Units	Bonus Market Rate Units	Total Units After DB
10 x 10% = 1	10 x 20% =2	12

The terms of each Density Bonus agreement are formalized through a covenant agreement. When a covenant is officially recorded with the County, the restricted units become part of the City's affordable housing inventory.

[7] See Appendix V for a table of the bonus unit and income level and bonus unit for the required set-aside percentages.

THE CITY'S DENSITY BONUS PROGRAM

State law and City ordinances dictate how the City can offer Density Bonuses to developers. In 2004, the California State Legislature passed Senate Bill Number 1818 (SB 1818), which stipulated that all local governments must grant developers the option of a Density Bonus. SB 1818 also dictated:

- The terms of affordability for restricted units must be at least 30[8] years, but can be longer if required by the financing/rental subsidy programs.
- The Density Bonus option must be offered to developers of projects with 5 or more units.
- The number of bonus units can vary depending on the number of restricted units included for very low income, low income or moderate income levels. However, the percentage of bonus units cannot exceed 35% of the total units originally proposed.
- Municipalities must offer developers at least one to three incentives. While a municipality has some discretion, they must include options related to parking reductions, yard setbacks, and open space.

City Council approved the City's Density Bonus program[9] on April 15, 2008.

EXHIBIT 2: DENSITY BONUS ILLUSTRATION

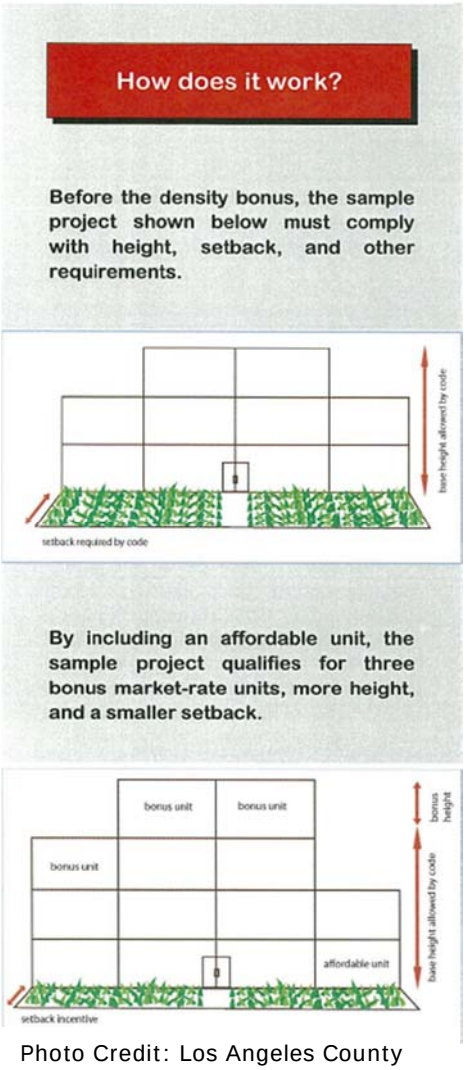


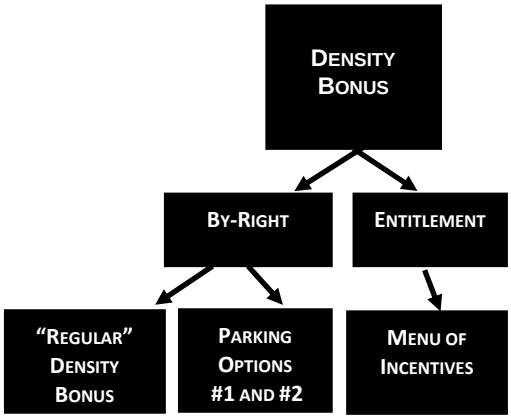
Photo Credit: Los Angeles County Department of Regional Planning

In the City, Density Bonuses usually fall under two categories, By-Right or Entitlement. These categories have different sub-programs and specific application and approval processes.

[8] AB 2222 revised the terms from 30 to 55 years, effective January 1, 2015.
[9] Ordinance No. 179681. Los Angeles Municipal Code Section 12.22

A. Density Bonus By-Right

Exhibit 3: Density Bonus Components



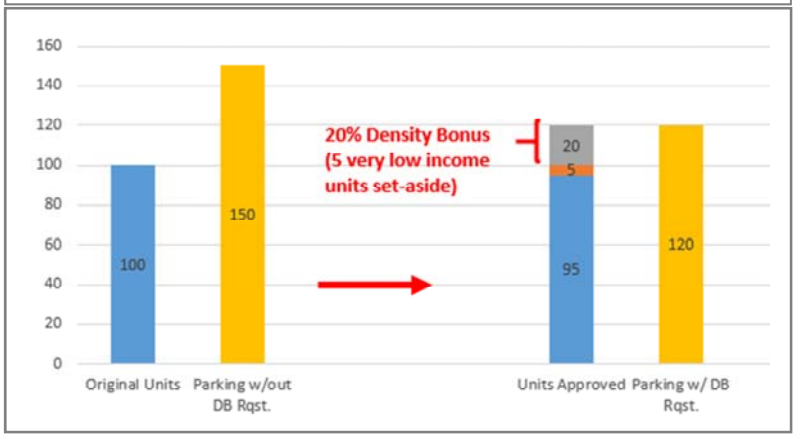
The By-Right Density Bonuses are also referred to as "ministerial", because they meet the Zoning Code and are *automatically* granted if the development is approved. Since the By-Right Density Bonuses do not require a request for relief from the Zoning Code, the developer does not submit an application to the Planning Department; rather, the developer is only required to submit the request to DBS during the building permit review process. Further, the City does not collect a fee for the By-Right Density Bonuses.

"Regular" By-Right Options

The City's Ordinance stipulates that a Density Bonus must be provided if developers agree to one of the following:

- Include requisite number of Low or Very Low Income Restricted Affordable Units
- Include Senior Citizen Housing
- Include Common Interest Development[10] with Low or Moderate Income Units, or with Low or Very Low Income units for rent
- Donate Land
- Include Child Care Facility
- Convert Multi-Unit Buildings to Condominiums

EXHIBIT 4: EXAMPLE OF DB WITH PARKING REDUCTION



By–Right Parking Reductions

A second component of the Density Bonus By-Right is the parking reduction option, in which the developer may reduce the number of parking spaces required by

[10] Common-interest developments or CIDs, include condominiums, retirement communities, vacation timeshares, and other housing developments comprised of individually owned units, in addition to shared facilities and common areas.

the Zoning Code. Since the parking reduction option is by-right, the bonus units and reduced parking are automatically approved, if they agree to set-aside affordable units.

Exhibit 4 illustrates how a Density Bonus with parking reduction works. In this example, if the developer agrees to set aside five units restricted for very low income residents, the development could include an additional 20 market rate units, ***and*** decrease the number of required parking spots by 30.

B. Entitlement Density Bonus (with Incentives)

In accordance with SB 1818, in addition to the By-Right Density Bonus options, the City offers a menu of additional Density Bonus incentives available to developers. Below is a summary[11] of the "menu" of the incentives, detailed in Ordinance No. 179681:

- up to 20% decrease from **yard/setback** requirements,
- up to 20% increase from **lot coverage** requirements;
- up to 20% decrease from **lot width** requirements;
- up to 35% increase from **floor area** ratio requirements;
- an increase in the **height** requirement equal to the percentage of the Density Bonus; and
- up to 20% decrease from **open space** requirements.

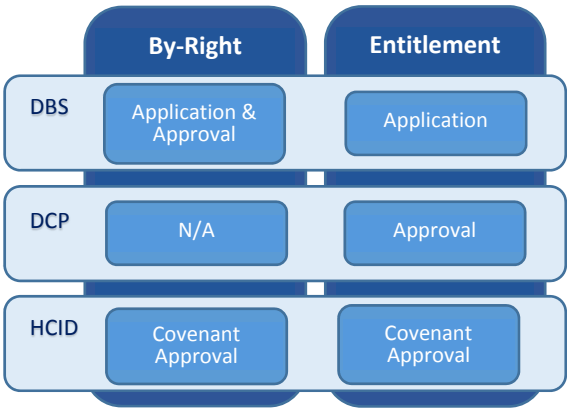
Developers may request one or more of the above incentives. Developers can also request additional incentives that are not on the list, which are considered "off-menu."

Unlike by-right Density Bonuses, developers must pay a fee to apply for these incentives. The fee depends on the type and number of incentives, and is based on the administrative costs incurred by Department of City Planning staff to review and process the application.

[11] See Appendix VI for a detailed listing of the incentives.

DENSITY BONUS APPLICATION AND APPROVAL

Several City Departments administer and oversee the Density Bonus program application and approval phases. The specific process is determined by whether a Density Bonus project is By-Right or Entitlement.



The Department of Building and Safety

A developer begins the application process with the Department of Building and Safety (DBS) by requesting a building permit.

- **By-Right**
  DBS will process requests for a by-right/parking reduction Density Bonus. For these projects, DBS staff will calculate and verify the number of units in a project; review all building plans; and approve the project. DBS staff also issue building permits so construction can begin and Certificates of Occupancy once construction is complete, prior to tenant move-in. The Certificate of Occupancy allows an owner to begin leasing/selling the units.

- **Entitlement**
  If a developer requests an entitlement Density Bonus, DBS staff refer the developer to the Department of City Planning (DCP) for all aspects of project review.

Department of City Planning
(Entitlement Density Bonus Reviews Only)

The Department of City Planning (DCP) only reviews Density Bonus applications when a developer requests entitlements in the form of incentives. During the entitlement review, DCP determines the number of restricted and bonus market rate units. The Density Bonus ordinance[12] directs staff to round-up to the next whole number of units.

According to DCP staff, most entitlement projects are large and complex. The review process of entitlement projects requires additional steps such as public

[12] LAMC Section 12.25 (c), (7) *Fractional Units*. In calculating Density Bonus and Restricted Affordable units, any number resulting in a fraction shall be rounded up to the next whole number.

hearings. These tend to lengthen the duration of the City's review and delay approval needed to initiate construction. DCP staff must also verify that the project plans comply with the City's General and Specific Plans, as well as conditions set in State law.

An assigned City Planner reviews a development case file to ensure it is accurate and complete. For entitlement Density Bonus projects the review typically includes:

- ✓ Ensuring the project complies with the Zoning Code;
- ✓ Calculating the number of bonus and restricted units;
- ✓ Conducting environmental review to comply with the California Environmental Quality Act (CEQA);
- ✓ Conducting public hearings (if required);
- ✓ Presenting recommendations to the Planning Commission; and
- ✓ Writing the final Letter of Determination, which details the outcome of the entitlement review.

According to the Department, staff does not conduct detailed pro forma analyses of off-menu incentives. DCP staff also indicated that the typical entitlement review process takes 1-2 months. While we did not audit the timeframe for the entitlement review, we did survey developers who participated in the Density Bonus program to understand their experience. We asked them if they had plans to participate in the Density Bonus program again in the future. While most of the developers who responded indicated that they would, 21% indicated that the process added too much time to their project timeline.

After DCP staff issues a Letter of Determination on entitlement projects, Public Counter staff conducts a detailed review of project plans to ensure conditions of approval and environmental mitigations have been incorporated into the project plans prior to DBS issuing a building permit.

The Director of City Planning or the City Planning Commission (CPC) authorizes the Entitlement Density Bonus projects.

- ➢ A project with one to three on-menu incentives is approved by the Director of the Department of City Planning.

- ➢ A project with more than three incentives, or incentives that are off-menu is reviewed by the CPC.

Housing and Community Investment Department

Staff at the Housing and Community Investment Department (HCID) are responsible for preparing the land use covenants which dictate the terms of the Density Bonus projects.

After HCID drafts the Covenant, the City Attorney reviews and approves it. The approved draft is sent to the owner for signature. HCID completes the approval, then sends the executed covenant to the LA County Recorder. The covenant and all its stipulations will remain on the property's title despite any change in ownership or foreclosure proceeding.

Upon project completion and covenant execution, DBS issues the Certificate of Occupancy, which initiates HCID's monitoring responsibilities.

DENSITY BONUS MONITORING

HCID monitors restricted units to ensure that tenants meet income requirements and owners comply with rent guidelines.

Urban Futures Bond Administrators (UFBA) – Occupancy Monitoring

HCID's Occupancy Monitoring Unit contracts with an outside provider, Urban Futures Bond Administrators (UFBA) to monitor all of the City's designated restricted units. The most recent contract for calendar year 2014, totaling $680,000, was awarded through a Request for Proposal (RFP) in 2013. The contract was amended in December 2014, to extend through calendar year 2015, and increased the amount by $710,000, for a total of $1,390,000. Funding for the contract is derived from the Municipal Housing Finance Fund (MHFF) and the Federal HOME Investment Partnerships Program (HOME) Fund.

Reported Density Bonus Units

In May 2014, a council motion (Council File 14-0692-S1) instructed HCID to prepare a report responding to questions related to the affordable units that were produced since the City implemented the Density Bonus ordinance. In April 2015, HCID reported that 201 Density Bonus properties with 4,668 affordable housing units had been constructed since 2008 pursuant to the City's Density Bonus Ordinance.

HCID also reported that 73% (3,400 of 4,668 units) were within affordable housing developments; while 27% (1,268 of 4,668 units) were within market rate developments, and the vast majority of the units were occupied by low-income families (e.g., in 2014 a family of four with income of $68,300, or less.)

Exhibit 5: HCID's Reported Restricted Units Created 2008 - 2014							
Number of SB 1818 Properties	Very Low Income		Low Income		Moderate Income		Total
201	899	19%	3,693	79%	76	2%	4,668

The report also indicated that most of the restricted affordable units were located in Council Districts 1, 9 and 13.

However, as described in Finding 1, HCID's reported number of projects and restricted units did not show the impact of the Density Bonus program on the City's affordable housing stock, in terms of *additional* units created.

Specifically, we found that HCID reported the total restricted affordable units within the developments that took advantage of the program, without distinguishing the number of added bonus units that were restricted as affordable. Our review of the covenants identified 169 SB 1818 properties that were constructed from 2008 thru 2014, which generated 329 additional affordable units within market rate projects and at least 97 additional units within affordable housing projects.

While the Density Bonus program requires the developer to set aside units for very low, low or moderate income tenants, generally, only the market rate developments incrementally added to the City's affordable housing stock. In contrast, with few exceptions, affordable housing developments seemingly continued with the same number of planned affordable units, but requested other incentives available through the program, such as parking reductions. In those cases, we could not determine if there was an *incremental* increase to the City's affordable housing stock resulting from the Density Bonus.

We also reviewed every covenant in detail to determine the number of projects built by private developers (i.e., without government assistance) compared to subsidized affordable housing projects that participated in the City's Density Bonus program.

- 54% (91 of 169) of the Density Bonus projects were built by private developers; while,
- 46% (78 of 169) of the Density Bonus projects were affordable housing projects that received other financial subsidies through the City or other government agencies.

Density Bonuses Have Evolved

Prior to the City's formal Density Bonus program, restricted units were approved through Land Use Entitlements, such as Conditional Use Permits or the Mello Act.

- ✓ The Department of City Planning issues **Conditional Use Permits** which allows the City to consider land use options that are otherwise not allowed within a Zone.

- ✓ The **Mello Act** dictates that if existing restricted housing units in California's Coastal Zone are converted or demolished, the low and moderate income designated units must be replaced. Further, if a new housing development is built, it must include restricted units.

Most recently, in September 2014, the California State Assembly approved Assembly Bill 2222 (AB 2222), which modified SB 1818, and requires developers applying for Density Bonus projects to adhere to the following:

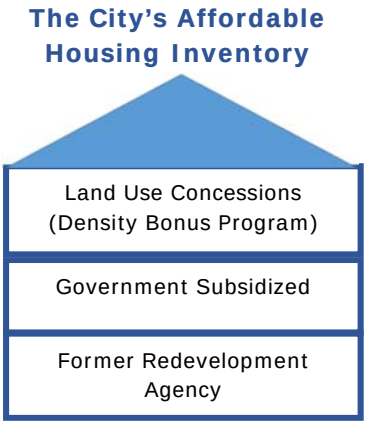
- The term of affordability must be 55 years or longer for all very low and low-income units (an increase from 30 years required by SB 1818); and

- For new or redevelopment of buildings with existing rent restricted units, owners must replace those units with the same number to be made available for, and occupied by, persons and families in the same or lower income category.

AB 2222 Implementation Concerns

The Department of City Planning and the Housing and Community Investment Department are considering a revised Density Bonus ordinance to incorporate AB 2222. However, there is controversy regarding the implementation of AB 2222 because of its requirement to replace existing, as well as any demolished, affordable housing units associated with the City's Rent

Stabilization Ordinance (RSO).[13] The RSO was designed to protect tenants from excessive rent increases while allowing landlords a reasonable return on their investments. Although subject to rent limits, RSO units are not income restricted and can be occupied by any household. Consequently, they differ from the City subsidized or Land Use Units that require an affordable housing covenant and are subject to monitoring activities.



Currently, developers may invoke the California Ellis Act provision to remove RSO regulations from a rental unit by demolishing it altogether, permanently removing it from the housing market, or keeping it vacant for 5 consecutive years. By demolishing and then rebuilding a new rental unit, a developer can circumvent the RSO. As such, there is concern that if the City implements an AB 2222 ordinance that requires developers to replace all existing/demolished RSO units, this would discourage developers from utilizing Density Bonuses. There are also questions about whether all RSO units should be maintained as affordable, since some RSO units are not below market rate. For example, if an RSO unit is vacated and re-rented every year when a rent increase is permitted, the Owner can maintain market-rate rent, thereby the unit is not part of the broad population of "affordable" housing.

THE CITY'S AFFORDABLE HOUSING INVENTORY

The Density Bonus program, and other Land Use Concessions are part of the City's larger effort to provide affordable housing. The City also offers affordable housing through Government Subsidized programs (which directly finance affordable housing units) and through units inherited from the former Community Redevelopment Agency (which used to help finance units in economically blighted zones.)

➢ GOVERNMENT SUBSIDIZED

The Housing and Community Investment Department of Los Angeles (HCID) helps to administer various types of funding including Community Development Block Grants (CDBG) and HOME Investment

[13] The Rent Stabilization Ordinance became effective May 1, 1979. Generally, landlords are allowed to increase the rent 3%-8% every 12 months in accordance with the annual rent increase percentage, which is based on the Consumer Price Index (CPI).

Partnerships Program[14] to preserve or build affordable housing for low-income residents. HCID uses the City's Affordable Housing Trust Fund Program (AHTF), to administer the majority of this funding, which provides long-term loans through a competitive process to developers, typically non-profit organizations that focus on affordable housing. The Department also acts as "pass-through" funder for State-issued bonds, which provide financing for affordable housing projects.

Developers generally leverage the City funds with other sources of funding to build rental units for low and very low-income households. HCID's projects and programs are categorized as follows:

i. **Major Projects** - New construction or major rehabilitation projects, funded through the AHTF.

ii. **Housing Opportunities for People with AIDS (HOPWA)** – HOPWA funds are leveraged to develop new permanent supportive affordable housing for persons living with HIV/AIDS and their families.

iii. **Bond Projects** - Newly constructed units developed using funds made available through the sale of multi-family housing revenue bonds.

iv. **Neighborhood Preservation Program (NPP)** - The NPP includes rehabilitation/preservation of smaller properties.

v. **Homeownership Programs** – though not for rental units, these homeownership loans are primarily financed through several programs, including:

- The HOME Program;
- The Neighborhood Stabilization Program (NSP); and
- The 2014 Low Income Purchase Assistance Program (LIPA)

➢ **FORMER COMMUNITY REDEVELOPMENT AGENCY (CRA) PROJECTS**

The Community Redevelopment Agency (CRA) was created in 1948 for the purpose of addressing blight within the City of Los Angeles, by

[14] The U.S. Department of Housing and Urban Development administers the CDBG and HOME funding.

building affordable housing, creating living-wage jobs, developing commercial and industrial sites and making public improvements. However, in 2011 California dissolved[15] Redevelopment Agencies to help mitigate the State's deficit. Subsequently, in June 2012, HCID became the successor entity for the CRA and is now responsible for enforcing the income compliance for all of the pre-existing CRA affordable housing units. The City's Earthquake Emergency Loan Program units also fall under the former CRA portfolio.

- **Earthquake Projects** –The projects are primarily rehabilitation projects financed with other HUD funds.

"Layered" Units

HCID cannot readily determine the number of individual affordable housing units because many units are layered. "Layered" units are located in housing projects with/subsidized by multiple financing programs. Layered units are routinely monitored and "counted" more than once since HCID monitors affordable housing according to the program that created or financed the unit. For example, a CRA project might also have received a Density Bonus. In this case, it may be monitored in accordance to the Density Bonus guidelines and the CRA guidelines. For example, as of Spring 2016, HCID's portfolio consisted of an estimated 40,218 units. In contrast, our audit determined that there were 28,482 unduplicated units based on 2014 monitoring data. HCID's inventory does not include all of the affordable units administered by the Housing Authority of the City of Los Angeles (HACLA).[16]

Audit Objectives

The overall objective of this audit was to evaluate the effectiveness of the City's application and monitoring processes for Density Bonuses as related to affordable housing. The audit focused on the Density Bonus application and approval process through the Department of City Planning, the Department of Building and Safety, and the Housing and Community Investment Department.

[15] The State of California dissolved all Redevelopment Agencies throughout the State with the passage of Assembly Bill 1X26, which took effect February 1, 2012.

[16] HACLA's portfolio includes 79,379 units, which consist of Public Housing Units, Housing Choice Vouchers, Project Based Section 8 properties and other housing assistance program units. Source: HACLA's 2016 Final Agency Plan.

Background

While the scope of this audit focused on the Density Bonus program, we also reviewed the monitoring and enforcement processes for all of the City's affordable housing programs, as managed by HCID.

The audit also included benchmarking and an assessment of related practices of other jurisdictions and agencies.

A survey was sent to developers regarding their experience and opinions regarding the City's Density Bonus program, and a direct mailing was sent to tenants who reported $0 income in 2014, in an effort to collect their earned income amount.

Findings and Recommendations

Section I: Density Bonuses - Unclear Benefits for Affordable Housing

Given the City's housing shortage, proponents of the Density Bonus program view it as an important tool to increase the number of housing units throughout the City. Some may also consider the Density Bonus program an optimal and cost-effective way to increase affordable housing, since the City does not directly contribute public dollars to construct these units. However, there are other issues and indirect costs involved. Critics indicate that the Program accelerates growth and strains the City's infrastructure, including public safety services, roads, schools, and the sewer and water delivery systems. Opponents also voice concern that additional development changes community character. These views have led to public debate regarding density in general.

The City is required by State law to implement a Density Bonus program; therefore, the question is not whether the City should administer a program; rather, what are the quantitative goals of the program, and what is the City's strategy to achieve those goals?

Our audit sought to evaluate the success of the Density Bonus program, but this was difficult because policymakers have not set unit goals or criteria by which to measure its success. While it may have been assumed that the program would create additional housing in the City, including restricted affordable units, it is unclear to what extent the City intended to rely on the Density Bonus program to generate additional income-restricted units to increase the City's supply of affordable housing.

In approving the City's land use regulations, and more specifically, the provisions of the Density Bonus ordinance for by-right development as well as for each entitlement application submitted through City Planning, policymakers must weigh the relative benefits of easing some restrictions imposed on developers, with the benefit of providing additional income-restricted affordable units, while also considering quality of life and community concerns relative to density. Public policy, as effected through ordinances and related program goals, should clarify what the City is willing to provide to help meet the housing needs of residents through increased density.

We identified shortcomings that have prevented departments from providing the data needed by policymakers to inform a strategy and specific goals for the Density Bonus program. Without this information, policymakers do not

have a baseline that would inform a strategy or specific goals for the City's Density Bonus program or allow for adequate program evaluation in the future.

Finding No. 1: None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.

As a result, the City cannot measure the impact of the Density Bonus program. Specifically, it cannot determine the number of bonus units (as either restricted affordable or at market rate) the program has generated. Nor can it assess how the various concessions provided to developers are actually increasing the City's affordable housing stock.

The City Cannot Identify the Number of Density Bonus Units Created

In May 2014, a council motion (Council File 14-0692-S1) instructed HCID to prepare a report responding to questions related to the affordable units that were produced since the City implemented the Density Bonus ordinance. Approximately one year later HCID reported that 4,668 affordable housing units had been constructed since 2008 pursuant to the City's Density Bonus Ordinance, and most of the affordable housing units were located in Council Districts 1, 9 and 13.

However, based on our review, we found a compilation error with HCID's number of SB 1818 projects reported to City Council, and the categorization of some projects as affordable housing vs. market-rate.

Project Count

During our review of HCID's analysis of SB 1818 projects, we found that the Department's project count included duplicate projects and a terminated covenant.

Once these were removed, we identified 169 SB 1818 properties constructed from 2008 thru 2014, as opposed to the 201 reported.

Exhibit 6: April 2015 HCID Report to Council Regarding SB1818 Properties and Units Constructed during 2008 - 2014	
Total Number of Properties	Total Number of Affordable Units
201	4,668

- *Duplicate Projects*
  HCID manually entered project data in separate excel worksheets and tabulated totals incorrectly. We identified this error by consolidating all of the worksheets and running a duplicate check based on the covenant number and address.

- *Terminated Covenant*
  The Department also included a project that was not a part of the City's Density Bonus program. Staff explained that prior to construction, the developer pulled the building permits for the project and terminated the Density Bonus covenant. However, HCID had not removed the covenant from the list of active Density Bonus projects.

Exhibit 7: Auditor Review of SB1818 Properties and Units Constructed during 2008 - 2014	
Total Number of Properties	Total Number of *Incremental* Affordable Units
169	329 Market Rate projects At least 97 Affordable projects

Project Categorization

During our review of the 169 covenants we also noted the funding sources used to finance the projects to determine the number of ***projects*** built by private developers without government assistance (considered market rate developments), compared to subsidized affordable housing projects that participated in the City's Density Bonus program. We found that some of the projects had to be re-categorized and found:

- 54% (91 of 169) of the Density Bonus projects were built by private (market rate) developers; while,

- 46% (78 of 169) of the Density Bonus projects were subsidized affordable housing projects.

This provides some perspective regarding the participation in the Density Bonus program. Our review found that private developers participated in the program at a slightly higher rate than affordable housing developers.

Incremental Restricted Units

While Council did not specifically request the incremental (new, our "bonus") units generated through the program, we reviewed each of the covenants in an effort to show the effect of the Density Bonus program on the City's affordable housing stock. Since the incremental restricted units are not specifically tracked, we had to review the descriptive language included in the covenants, and calculate the units when the information was available. We identified 329 additional affordable units within market rate projects and at least 97 additional units within affordable housing projects, were generated through the City's Density Bonus program from 2008 thru 2014.

Incremental Restricted Units within Affordable Housing Developments

HCID reported 4,668 affordable units were generated through the Density Bonus program and were restricted under a land use covenant. The Department reported in their count generally *all* of the restricted units within the affordable projects that participated in the Density Bonus program, because those were the total number of restricted units cited in the land use covenants.

For example, if a subsidized affordable housing project also received a Density Bonus allowing it to build 12 units rather than 10 as originally planned, all are restricted as affordable, and HCID tracked and reported all 12 as restricted for land use purposes.

However, for this example, we reported the two additional (i.e. incremental) units as a means to measure the true impact of the Density Bonus program on the City's affordable housing inventory.

Alternatively, if a project is for market-rate units, only 1 of the units within the 10 originally planned (base) number of units would be set aside as affordable, while 2 additional bonus units would be rented at market rate.

Exhibit 8: Example of How the Incremental Units are Considered for Market Rate Housing Projects

Base Units	Required set-aside affordable units	Bonus/Incremental Units			Total Units After DB
10	10% x 10 = 1 Unit	10 x	20% =	2	12
This 1 affordable unit is within the 10 base units		***Ideally, HCID would be able to report these 2 units***			

Our review noted that most of the subsidized affordable housing developments that took advantage of the Density Bonus program did so to realize parking reductions, rather than to build bonus units. In some cases, according to City staff, a subsidized project may not have been viable without a Density Bonus concession; however, the covenants do not clearly identify when this is the case. While more incremental units may have been created as a result of the Density Bonus program, an exact number could not be determined as part of this audit. None of the City departments involved (i.e. HCID, DBS or DCP) distinguish the base number of units the project had prior to obtaining the Density Bonus in any of the application documents, the incremental units are not separately tracked.

Lack of Tracking Prior to 2008

HCID and DCP staff indicated that prior to the formal Density Bonus ordinance in 2008, Density Bonus units may have been granted to Owners through Conditional Use Permits and the Mello Act. This was attributed to the fact that the City did not adopt an ordinance to implement the Density Bonus program until 2008, even though the State passed the Density Bonus statute in 2005. Thus, between 2005 and 2008, no policies were in place to administer the Density Bonus program. DCP management explained that Planners reviewed Density Bonus cases using the Conditional Use Permits criteria (LAMC Sec. 12.24) and/or Public Benefit Projects (which require a covenanted agreement, per LAMC Sec.14.00).

HCID also expressed concern regarding the complete inventory of Density Bonus units. Staff indicated that there have been instances when Owners have called to ask questions about a covenant (restricting the income eligibility or rent) tied to their property, but HCID did not have a record of the covenant in its databases or files. If HCID does not have a record of the covenant, they cannot track or monitor the associated units. In 2010, HCID hired a new Manager for the Land Use unit who established a process to track covenant information in order to report on the total number of units created within each income level and affordable housing program. The ability to track Density Bonus units has since improved; however, there are still information system limitations.

Evaluating the Success of the Density Bonus Program Requires Consistent Data Collection and Adequate Systems

Standard Covenant Language

Identifying the incremental units required a detailed review of each of the 169 covenants because the covenants have different language and describe the incentives in different ways. For example, some of the covenants include a Density Bonus percentage and others do not. While recent covenants appear more standardized, the information still varies; a standardized template would allow HCID to more easily collect consistent data. As such, HCID should work with the City Attorney to standardize the Density Bonus covenant templates. Further, in order to facilitate transparency and ensure the terms of the covenants are known to the owners and the general public, HCID should post executed covenants on the departmental website.

Multi-Department Effort – Disjointed Systems

Multiple databases and systems also hinder the administering department's efforts to effectively track and report on the Density Bonus program. Since these databases and systems do not interface, departments cannot easily identify the total number of bonus market rate units the City has approved, nor the number of restricted affordable units gained over time. Significant manual effort is required to determine the number of restricted and bonus units developed as a result of the Density Bonus program. Further, although City staff indicated that the vast majority of the Density Bonus requests are granted, no department analyzes the approval rate for the Density Bonus requests – whether *By-Right* or *Entitlement.*

Each of the three departments that administer Density Bonuses (DBS, DCP and HCID) has its own information systems/databases to track its role in the review, approval, and monitoring process. However, none of the systems can compile summary metrics that would help evaluate the Density Bonus program overall.

- *Department of Building and Safety*

  - *Plan Check Inspection System (PCIS)*

    DBS uses the Plan Check and Inspection System (PCIS) to track the Plan Check process, clearances, Building Permits, and Certificates of Occupancy for all types of development.

Within PCIS the Density Bonus project applications are identified by the clearance description field: "Housing Density Bonus". However, PCIS is limited in its capability to *identify* restricted units, bonus units, and incentives, and to distinguish whether a project is By-Right or Entitlement. Although this information can be found in narrative fields, it cannot be extracted for summary reporting.

- *Department of City Planning*

  - *Planning Case Tracking System (PCTS)*

    The Planning Case Tracking System is used by DCP staff to track development projects with entitlement Density Bonus requests. In addition to capturing necessary planning information such as lot size and zone information, PCTS tracks fee-related information, and review process milestones.

    In response to the Mayor's 2014 housing initiative, DCP is implementing changes in PCTS to distinguish the number of affordable units from market rate units approved. PCTS will also be able to track the number and type of units at three stages of development: application, approval, and construction. While this will help provide data regarding the Density Bonus program, it will only report on projects developed since July 2013. As a result, it will not allow DCP to evaluate the effectiveness of the Density Bonus program since its inception in 2008.

- *Housing and Community Investment Department*

  - *Housing Information Management System (HIMS)*

    The Housing and Information Management System (HIMS) is a web-based system developed internally by HCID in 2008 to maintain information for the entire affordable housing stock that is funded and monitored by HCID.

    While HIMS has a module to track its monitoring of government subsidized units, it lacks a separate module to track project details such as the number of market rate versus restricted units within a Density Bonus project. HIMS cannot report the number of units

in a Density Bonus project, or the significant details of the overall program. Consequently, the Land Use unit uses a separate Access database and Excel spreadsheets to record Density Bonus project details. These disparate databases make it difficult to efficiently aggregate Density Bonus data.

- *Land Use and Environmental Services Unit Access Database*

  HCID's Land Use Unit uses the Land Use Access Database to track land use covenants. It includes information on the housing program, project name and address, project description, and unit description (floating/fixed, set-aside units, income requirements, number of bedrooms, etc.). However, based on our review of a sample of projects, the database is incomplete.

- *Land Use and Environmental Services Unit Excel Spreadsheets*

  HCID's Land Use Unit Manager uses Excel spreadsheets to track the total number of Land Use covenants and related restricted affordable units by income level. The spreadsheets also distinguish between the market rate and City subsidized Density Bonus units, but it does not distinguish the By-Right and Entitlement projects.

Since there are multiple databases that track Density Bonus applications and approvals, a universal tracking number, which would standardize project identification numbers throughout all databases, could facilitate the application and approval rates. However, a unique identifier does not solve the problem of free-form, narrative fields that cannot be queried to yield quantitative reports. Similarly, incentives granted through the Density Bonus program are also tracked in free-form text fields, so they cannot be easily aggregated or reported either.

Further, while DCP and DBS track Density Bonus applications in their respective systems, neither department reports on the number of Density Bonus applications or approvals in a consistent or meaningful way; nor does either department use the numbers to report on the Density Bonus program overall.

HCID tracks the number of approved Density Bonus applications as they execute the covenants, but it does not have efficient processes to track and report on the Density Bonus projects and units. Due to the lack of

comprehensive data collection (prior to 2008), system integration and consistent, robust data collection, none of the departments can ensure that the various concessions provided to developers are actually increasing the affordable housing stock, or market rate housing stock.

Review the Percentage Set-Asides and Menu of Incentives

Since the City has not set unit goals for the Density Bonus program, and the administering departments are considering how to implement AB 2222, (pg. 10) it is an ideal time to review the percentage set-asides and the on-menu incentives developers have requested to identify which have resulted in producing incremental affordable units. One of the developers who responded to our survey stated that the number of bonus units was not sufficient. Reviewing the incentives and units generated by them would allow policymakers to determine whether or not the Density Bonus ordinance should be revised to maximize the number of additional units it generates. For example, since we found that most affordable housing developers participated in the program to realize parking reductions, should the City mandate that affordable housing developers build additional incremental affordable units when they utilize a parking reduction? In addition to the type of incentives, City stakeholders could also consider revising the current affordable and bonus percentages in the ordinance in an effort to attract more developers. More developers may participate if the percentages of Density Bonus units allowed increased.

In order to determine the impact of the Density Bonus program on the City's housing stock, both as affordable restricted and at market rate, policymakers must first identify the goals of the program, and what a successful program will accomplish. Once these have been decided, DBS and DCP should work with HCID to track the number of units a developer proposed **prior** to the Density Bonus calculation and the number of approved incremental bonus units, and separately identify those additional Density Bonus units as restricted affordable units, or market rate units to determine the impact of the program.

Exhibit 9: The City's Current Density Bonus Percentage for Low Income Units

% Low Income Units	% Density Bonus
10	20
11	21.5
12	23
13	24.5
14	26
15	27.5
16	29
17	30.5
18	32
19	33.5
20	35

Recommendations

If policymakers determine that Density Bonus units should be considered a significant component of the City's affordable housing strategy, Mayor and Council should:

1.1 Set a target goal for the number of incremental restricted units the Density Bonus program is expected to generate. This will allow for periodic evaluations to review the success of the City's Density Bonus program, and its impact on the City's affordable housing inventory.

1.2 Request an analysis from DCP/DBS/HCID identifying the percentage set-asides and the on-menu incentives requested by developers in prior Density Bonus projects to determine which have been most effective in encouraging Developers to participate in the Density Bonus program, and consider revising the ordinance to increase outcomes.

To accurately determine the impact of the Density Bonus program on the City's affordable housing inventory, DCP, HCID and DBS should:

1.3 Work together to track the number of units a developer proposed prior to the Density Bonus calculation (base units) and, the number of approved incremental bonus units. In addition, separately identify bonus units as either market rate or restricted as affordable, and determine the incremental affordable units that are created through the program.

To enable reporting on the types of Density Bonus units that were requested, approved and constructed, DBS Management should:

1.4 Consider updating the Plan Check and Inspection System similar to the updates the Department of City Planning is incorporating in the Planning Case Tracking System.

HCID Management should:

1.5 Develop a standardized template for the Density Bonus covenants. Also consider making each recorded covenant publicly accessible and mapping each project location on the Department's internet site.

To overcome report shortcomings and evaluate the effectiveness of the Density Bonus program, DBS, DCP and HCID should:

1.6 Consider developing and using a unique identifier for all projects that can be used by all departments involved in administering development projects. This would enable stakeholders to track the projects' progression and report on the status of various milestones.

Finding No. 2: HCID does not report the occupancy compliance rate (income and rent) of the restricted units under the Density Bonus program or the City's entire affordable housing inventory to stakeholders.

Therefore, the City lacks assurance that its entire Affordable Housing inventory actually remains affordable, and in line with the goals of the program.

Data collection and accurate reporting is critical for the transparency of public policies and programs. In addition to providing information regarding the City's progress towards the development of affordable housing, as discussed in the previous finding, Density Bonus program data can help assess compliance with income and rent guidelines. This information would help stakeholders determine if the program is helping meet the need for affordable housing in the City, and assess whether or not resources are maximized.

The City has made a substantial effort to monitor and enforce affordable housing guidelines, but the information collected is not being used in the most constructive manner because HCID is limited in its ability to trend the compliance of any one program type or project, and the department does not summarize results to analyze the occupancy monitoring compliance rate. Further, HCID does not formally report the compliance rates of the units in the City's affordable housing inventory to stakeholders, because the current systems used by the Department and its contracted Monitor, Urban Futures Bond Administrators (UFBA) do not have the ability to aggregate the total number of restricted units that exceed income and/or rent limits.

UFBA's Case Management System (CMS)

UFBA developed their proprietary Case Management System (CMS) in 2012, and primarily uses it as a repository for documents related to tenant income and rent. On an annual basis, owners are required to report tenants' annual income and provide rent rolls to UFBA.

While the process differs for each affordable housing program, once CMS is updated with the required documents, UFBA reviews as follows:

- Annual Occupancy Summary **-** Owners complete an "Occupancy Summary," which documents the annual income for residents in restricted units and the rent paid by the tenant. Any subsidies[17] that contributed to the total rent are also noted. The Occupancy Summary is also intended to note changes in household composition and/or new tenants. Once completed, the Occupancy Summary is uploaded to CMS.

- Based on the Occupancy Summaries, UFBA determines whether the unit complies with rent and income guidelines. UFBA's assessment is reflected in a Project Overview report, which lists each unit, the associated income and rent amount, as well as the compliance status.

Each month, UFBA bills HCID for each unit monitored by submitting an invoice and the Project Overview reports to support the work completed.

CMS is a critical tool because it can track compliance/non-compliance at the project and unit level. Although each unit is reviewed in detail by UFBA at least once a year, and the compliance information is in CMS, HCID does not request or review the data in an aggregated manner.

Although UFBA logs monitoring details for each restricted unit, CMS is not currently programmed to run compliance/status reports. For example, to obtain information for our data analysis, UFBA had to ask their CMS developer to compile a database with the monitoring information for each unit monitored during 2014.

EXHIBIT 10: URBAN FUTURES BOND ADMINISTRATION FEE SCHEDULE

Program	Fee
Bond Only	$17
Major Projects (MP)	$27
Neighborhood Preservation Project (NPP)	$22
Earthquake (EO)	$20
Land Use (LU)	$14
Community Redevelopment Agency (CRA)	$17
Housing Opportunities for Persons with AIDS (HOPWA)	$17
Single Family Homeownership Residency Monitoring	$15

Further, for all properties constructed with federal funds, HUD requires the City to monitor tenant household incomes and rents for compliance with HOME and other program requirements. UFBA bills HCID different monitoring fees per unit, dependent on the program type since there are different levels of review. For example, UFBA reviews income source documentation and supporting documents for each Major Project unit, but only reviews a

[17] Examples of subsidies include utility assistance or Section 8 vouchers.

project summary that includes limited self-reported information for the Land Use units.

The City's contract with UFBA totaled $1.4 million for Fiscal Years 2014 and 2015, to monitor all of the City's restricted affordable units included in HCID's inventory, based on the fee schedule.

Based on our benchmarking, HCID and UFBA's monitoring activities go beyond the efforts of other cities. For instance, Sacramento and Santa Ana do not monitor their entire affordable housing inventory; instead, they sample a percentage of those units annually. Our benchmarking found that the City of Los Angeles monitors a larger volume of affordable housing units than other cities, and was the only agency to utilize an outside contractor to conduct its monitoring.

Inconsistent Data Entry

Based on our data analysis, we noted HCID does not utilize consistent or standard address fields in its databases. For example, the same project may be entered in the system under two different naming conventions; 123 S. Main St., may also be in the system as 123 South Main Street. This issue makes it difficult to efficiently and accurately report on the entire inventory of affordable housing units.

Since HCID/UFBA do not have efficient reporting systems, the City cannot analyze compliance trends over the years or across program types. In addition, since HCID and UFBA lack a robust system that can track monitoring of a unit according to multiple program restrictions, it cannot report aggregated results. As a result, the City lacks assurance that its Affordable Housing Units are occupied solely by residents who meet income eligibility criteria; or that an Owner is collecting rent within the allowable limit. (See Finding No. 3)

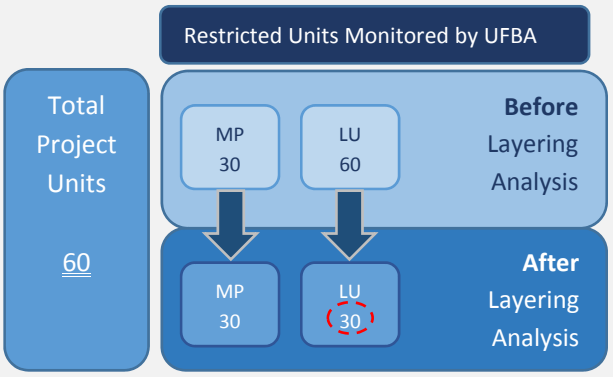
Double Monitoring

Our analysis identified 1,490 units that were monitored more than once in 2014. While the vast majority were required to be monitored more than once because of specific program guidelines, we noted that 379 Land Use restricted units were still "double monitored" in 2014.

When tenants begin occupying a new affordable housing project, HCID forwards the project information to UFBA, and the units are added to the

annual monitoring schedule. Although some projects are restricted by multiple program guidelines, Land Use restricted units should only be monitored once according to the most restrictive program. For example, a 60 unit project restricted by Land Use (all 60) and Major Project (30) guidelines may have been monitored 90 times. In this case, 30 of the units should be monitored according to Major Project guidelines, which are the most restrictive, and the remaining 30 units should be monitored in accordance with the Land Use guidelines.

EXHIBIT 11: EXAMPLE OF DOUBLE MONITORING ANALYSIS



MP = Major Projects Program LU= Land Use

Since UFBA double monitored 379 units, HCID paid UFBA an additional $5,306. Since these Land Use units were layered with a more restrictive program type, they could have only been monitored once.

The OM unit completed an analysis to determine how many of the Land Use units were unnecessarily "double monitored" and directed UFBA to discontinue monitoring the Land Use units that are layered with more restrictive programs. The OM Unit should ensure that all Land Use units layered with any other program type are removed from the monitoring list and are not double monitored in future cycles.

Recommendations

To assess whether the City's affordable housing supply (including Density Bonus units) remains affordable, HCID management should:

2.1 Work with UFBA to generate a monthly / quarterly report on the compliance status for each unit monitored. This should be used to assess the compliance rate for the City's affordable housing inventory.

2.2 Develop a standard format for entering project / address information in HIMS and CMS to enable HCID to efficiently

identify projects and determine the number of restricted units to ensure unduplicated unit counts.

2.3 Continue to ensure that Land Use units subject to multiple program restrictions are only monitored once against the most restrictive requirements.

Section II: The City Cannot Enforce Compliance for All Affordable Housing Programs

Given the limited supply of affordable housing units in the City, it is imperative that the restricted affordable units are occupied only by income eligible individuals. Further, since developers already receive benefits for building affordable housing (such as direct financing or Density Bonuses), they should not gain the additional benefit of collecting more rent than is allowed. The City should make every effort to ensure all affordable units remain affordable in exchange for any benefit provided to owners.

Although the primary focus of the audit was Density Bonuses, we reviewed the available 2014 monitoring data for all of the restricted units in the City's affordable housing inventory. This included Land Use Concession units, Government Subsidized units and former CRA units. We found that not every affordable housing unit is going to those in need, reducing the options for those residents most in need.

Finding No. 3: The City's actual affordable housing inventory is less than the number of restricted units listed on paper, because some tenants exceed income guidelines and some owners collect more rent than allowed. Our analysis found that 6.8% (1,946) of the units exceeded affordability restrictions, such as restrictions on household income (1.6%) or rent (5.2%).

- **HCID failed to conduct the initial income verification for 3.7% (1,056) of the tenants upon move-in, and there is a risk that these tenants may also exceed income limits.**

While the City can require owners to reimburse tenants for rent that was over-collected, the City does not have a process to remove tenants who surpass the income guidelines. If these rates hold steady the City's true affordable housing inventory will continue to decline, and will always be lower than the number of restricted units on paper.

We also noted that in 18% (5,221) of the restricted units, landlords accepted Housing Choice Vouchers (Tenant-Based Section 8 Rental Assistance), in addition to receiving financing for their housing project. While legal, tenants with vouchers who occupy restricted units reduce the number of units that would otherwise be available to families in need.

The Occupancy Monitoring (OM) Unit at HCID is responsible for monitoring all of the City's designated affordable units to ensure that residents meet the income guidelines and that owners collect the correct rent amounts. HCID's OM staff conducts an initial income verification before a prospective tenant can move into an affordable unit restricted by a Land Use concession. Thereafter, HCID relies on Urban Futures, Inc. to conduct annual monitoring to ensure units and tenants meet affordability requirements. HCID and the City Attorney's Office are responsible for enforcing the City's housing regulations.

OVER- INCOME TENANTS

We reviewed the data for every restricted affordable unit that was monitored in 2014[18], and found tenants in 464 units that exceeded income requirements considering their household and unit size. Overall, 69.4% of the 464 households exceeded income limits by $5,000 or more.

Exhibit 12: Over-Income Ranges		
$0-$100	5	1.1%
$101-$1,000	50	10.8%
$1,001-$5,000	87	18.8%
$5,001-$10,000	77	16.6%
$10,001-$20,000	124	26.7%
$20,001-$50,000	100	21.6%
> $50,001	21	4.5%

Some tenants were nominally over the limit; for example, five instances were within $100 of the income limit. However, there were some egregious cases, with one household earning more than $149,000 over the income limit. In effect, these households are depriving genuinely low-income households of affordable places to live.

Exhibit 13: Over Income Data Statistics	
Total	464 Units
Lowest	$10
Highest	$149,018
Average	$15,709
Median	$10,539

In addition, 1,181 units in the 2014 monitoring data noted no tenant income. As this appeared questionable, Auditors sent letters to those tenants requesting their income to determine if there were additional units where tenants exceeded income restrictions. While we received only 251 responses to the survey, we noted an additional 8 tenants exceeded the income limits. Based on these responses, an additional 3% of residents in affordable housing could exceed income limits. As these were self-reported amounts, it is possible that the income amounts were also under-stated.

However, using a conservative approach that considers only the affirmative responses to the direct mailing and the monitoring data, we found that overall 1.6% of the tenants exceeded income limits in 2014.

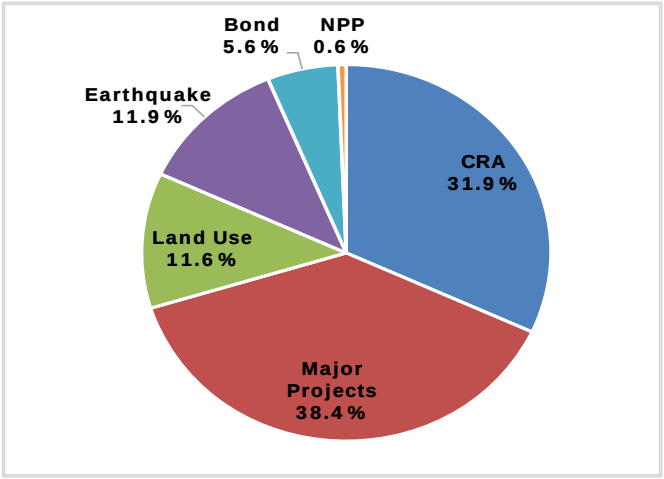
[18] Since the data was requested in 2015, the only complete year of data available was for 2014.

Exhibit 14: Over-Income Households in 2014							
	Bond	**CRA**	**Earth-quake**	**Land Use**	**Major Projects**	**NPP**	**Total**
# of Over-Income Units	**26**	**148**	**55**	**54**	**178**	**3**	**464**
# of Total* Units	2,208	10,822	1,244	4,333	9,680	195	**28,482**
% of Over-Income Units by Program Type	1.18%	1.37%	4.42%	1.25%	1.84%	1.54%	**1.63%**

*Includes the tenants from the direct mailing responses and the 2014 UFBA monitoring data.

Most of the over-income units fall under the (former) CRA and Major Projects programs, though proportionally, units under the Earthquake program had the most over-income tenants. It is possible a tenant may have been *initially* income qualified when they moved in; however, over time, their income may have increased above the eligible threshold.

Exhibit 15: Over-Income Units by Program Type



Missing Initial Income Verifications

Though required for Density Bonus projects, we found that HCID did not conduct income verification for all prospective tenants; thus, there is a risk that tenants exceeding income limits moved into a restricted unit. We found that HCID did not conduct the initial income verification for 3.7% of the tenants that occupied City administered restricted affordable units.

Exhibit 16: Units without Initial Income Verification							
	Bond	**CRA**	**Earthquake**	**Land Use**	**Major Projects**	**NPP**	**Total**
# of Units Missing Initial Income Verification	115	218	112	611	0	0	**1,056**
# of Total Units	2,208	10,822	1,244	4,333	9,680	195	**28,482**
% of Total Units	5.2%	2.0%	9.0%	14.1%	0.0%	0.0%	**3.7%**

HCID's Occupancy Monitoring unit must verify that a Certificate of Occupancy (CofO) is issued before an owner can lease any/all newly-built restricted unit(s). To prevent an owner from leasing a restricted unit without the initial income verification, the Occupancy Monitoring unit should immediately contact owners that have obtained a Certificate of Occupancy.

The Occupancy Monitoring unit is responsible for completing the initial income verification, a multi-step process. Once HCID finds that the CofO has been issued, the Occupancy Monitoring staff emails the ***owner***[19] the Tenant Income and Rent Certification (TIRC) documents. Owners must complete and remit the TIRC package to the Occupancy Monitoring unit for every new tenant that the owner wants to move into a restricted unit. Within 10 days, staff reviews and responds to requests. The OM unit maintains an Income Certification Log to track the time-frames throughout the initial TIRC process, with a date the package was submitted, forwarded, reviewed, and completed. If the TIRC document package is not complete, Occupancy Monitoring sends a request for missing information, and the owner must respond within 5 days. OM staff will close the file after 5 days and the owner will be required to start the process over again, by resubmitting documents. If documents are complete, Occupancy Monitoring reviews the relevant income documents which can include bank statements or W-2s. If unemployed, the tenant must provide social security statements, disability insurance, etc. HCID OM staff references the annual income and rent schedules to verify eligibility. (See Appendix VI for rent and income schedules.)

<u>Lack of Electronic Communication between HCID and DBS</u>

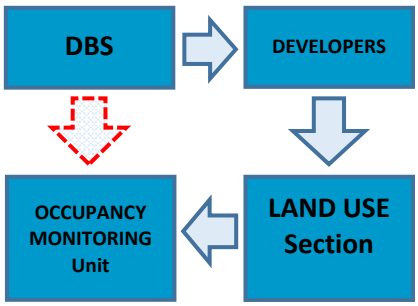
Missed initial income verifications will likely be avoided if the Department of Building and Safety proactively involves HCID's Occupancy Monitoring unit prior to issuing the Certificate of Occupancy. Doing so would mitigate the risk

[19] The City does not contact the tenants directly. All communication regarding tenant(s) income and rent collected is sent directly to the building owner/property manager.

of inadequate verification of tenant income eligibility and related impact to the City's affordable housing stock.

By default, the clearance process ensures that developers will notify HCID of an application when they begin the covenant preparation process. However, DBS does not have an automated reporting capability to: a) remit approved Density Bonus applications, or b) notify HCID when a Certificate of Occupancy for the projects is issued. This lack of communication between DBS and the Occupancy Monitoring unit poses a risk that owners may lease restricted units before the City can verify that a prospective tenant is qualified to occupy a restricted unit.

HCID's Land Use section staff must manually look up each individual covenant in DBS' Plan Check and Inspection System (PCIS) and notify the Occupancy Monitoring unit. Currently, only the Land Use section can verify issuance of the CofO because staff has direct access to PCIS to complete the covenant sign-off.



Student Verification/Eligibility in Restricted Units

If an adult tenant of a restricted affordable unit is a student, they must submit proof of school enrollment. Our direct mailing to tenants in restricted units that did not report any income in 2014 provided an anecdotal example of why it is important to monitor student eligibility. A tenant called regarding the letter and indicated that he was not aware he was occupying a restricted affordable unit. He explained that he was a recent law school graduate and could not recall his income for the prior year. The tenant did not provide his current income to the audit team, however, it is possible that his current income exceeds the limit, as he has since graduated, and is now gainfully employed.

In response to questions from the City Council's Housing Committee, HCID proposed conducting additional verification of income for students who apply to occupy restricted units, by requiring them to disclose whether they are being claimed as a dependent by someone else, and to provide that person's tax returns. The Housing Committee's interest illustrates the importance of the Initial Income Certification process to the City's affordable housing inventory.

Inability to Remove Over-Income Tenants from Restricted Units

Over-income tenants are problematic because the City lacks adequate enforcement mechanisms to remove tenants who exceed income requirements. Specifically, the City has no policies or legal processes in place to evict tenants that exceed income limits and continue to occupy restricted units. HCID management indicated that the Department does not want to "be in the business of removing residents from their homes," as it contradicts their mission. According to HCID, the City should not penalize individuals who work hard and increase their income over time, since the intention of providing affordable housing is to help residents improve their circumstances.

However, other governments have approached the tenant over-income issue through transition programs which gradually remove over-income tenants, and free up affordable units for those in greater need.

- HUD

  The U.S. Department of Housing and Urban Development (HUD) issued a public housing final rule in December 2004 which gave public housing authorities[20] discretion to establish and implement policies that would require families with incomes above the eligibility income limits to find housing in the unassisted market.

Exhibit 17: Over-Income Threshold Example

Tenant Initially Earns	= $45,000
AMI Threshold example	= $63,000
200% AMI	= $126,000
Once tenant reaches 200% AMI or more	→ Transition Out

- San Francisco

  San Francisco has a high demand for affordable housing, and does not allow tenants to remain in restricted units if their income exceeds a specified level. If the tenant's income exceeds the Area Median Income (AMI) by 200%, the City transitions them out of a restricted unit no sooner than the end of the (current) lease term of the tenant Household.

[20] This rule is specifically addressed to public housing authorities (PHAs), which manage public housing buildings that are constructed with public funds and managed directly by a local government entity. The Housing Authority of the City of Los Angeles oversees these buildings for the City. These buildings do **not** include restricted affordable units constructed by non-profit or private developers that require covenants, and are considered separate from the City's affordable housing inventory.

- TCAC Funded Projects

  Projects that receive a tax credit from the State Tax Credit Allocation Committee (TCAC) must also adhere to stringent income regulations. If a tenant's income exceeds 140% of the AMI, the unit is no longer considered affordable by the TCAC, and the owner is at risk of losing the tax credit.

Establishing over-income threshold limits and a transition policy would support tenants improving their financial situation over time, while also keeping restricted units available for those most in need, thus helping more households over the long-term.

Fixed and Floating Units

Given that the City lacks policies to evict ineligible tenants, including "floating" units in all covenants may be a desirable interim option, as they provide a relatively quick remedy to ensure the project remains compliant with the intent and restrictions of the affordable housing covenant.

Covenants requiring restricted affordable units will stipulate either "fixed" or "floating" units. While a fixed unit is always designated as affordable (e.g. Unit #1A), a project with floating units allows any comparable unit in the development to serve as a restricted unit. For example, if a tenant exceeds income limits in a restricted unit, the owner must lease the next available, comparable unit to an eligible household at the income level stipulated in the covenant. This is in contrast to when an over-income tenant is living in a "fixed" unit, and the owner must wait until the tenant moves out in order for the new tenant to meet income guidelines.

Floating units should be considered an interim solution because monitoring them is complicated, as the restricted unit may change during each monitoring cycle.

OWNERS COLLECTED MORE RENT THAN ALLOWED

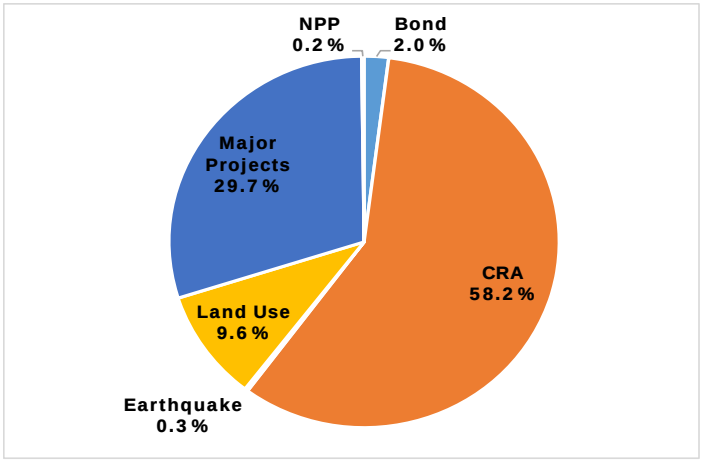
Based on the 2014 monitoring data, UFBA reported that 5.2% of the owners collected more rent than allowed by the associated program guidelines.

Exhibit 18: Units for which Owners Collected More Rent Than Allowed							
	Bond	**CRA**	**Earthquake**	**Land Use**	**Major Projects**	**NPP**	**Total**
# of Over Rent Units	**30**	**862**	**4**	**143**	**440**	**3**	**1482**
Total # of Units	2,208	10,822	1,244	4,333	9,680	195	**28,482**
% of Total Units	1.4%	8.0%	0.3%	3.3%	4.5%	1.5%	**5.2%**

Most of the over-rent units fall under the (former) CRA and Major Projects programs.

City policy requires that in instances of over-rent collection, UFBA notifies the owner, and gives the owner two weeks to reimburse the tenant.

Exhibit 19: Over-Rent Units by Program Type

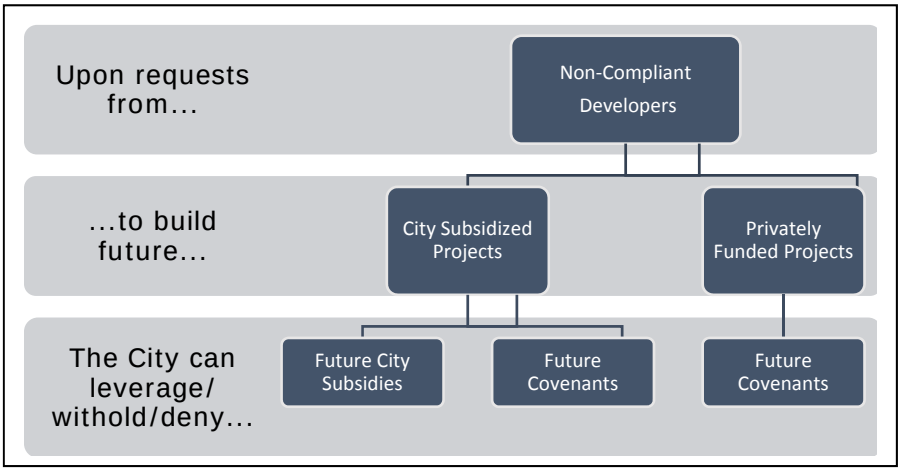


Penalties for Developers

Government-Subsidized Projects

HCID has stringent policies to enforce compliance for government-subsidized projects. For example, if owners do not respond to letters from the City Attorney to correct any non-compliant issues, HCID's Asset Management Division can withhold future Affordable Housing Trust Fund (AHTF) financing if the developer re-apply for public funding.

Exhibit 20: HCID Compliance Enforcement Methods



Land Use Projects

For Land Use projects that did not receive government funding, HCID has little recourse for non-compliance. Developers of these projects have already received a land use concession through the Density Bonus program; therefore, the City cannot

leverage much beyond denying a covenant on a future project. HCID's current policy directs staff to conduct a compliance check for developers applying for a new covenant. Developers with non-compliant projects will *not* be issued any new covenants, unless non-compliance issues are remedied. However, developers do not face any monetary threats such as penalties or withheld funding.

SECTION 8 VOUCHERS USED WITHIN RESTRICTED AFFORDABLE HOUSING PROJECTS

Often times, multiple programs are layered within a restricted affordable housing project. For example, a developer may receive HUD funding and a Low-Income Housing Tax Credit to build affordable units, AND a tenant may utilize voucher assistance (commonly known as Section 8 Project-Based or Housing Choice Vouchers) to help cover the rent. We noted 10,408 of the units within the City's affordable housing stock that were monitored by HCID in 2014 accepted Section 8 Vouchers.

Financing and Renting Affordable Housing

The more common financing and rental assistance programs, which are frequently layered, are described below:

Financing Affordable Housing

Affordable housing developers use many tools to finance restricted affordable housing projects, including direct federal funds from HUD, or the Low-Income Housing Tax Credit.

- *HOME Investment Partnerships Program (HOME)*

  The "HOME Investment Partnerships Program" (HOME), allocates formula funds to participating jurisdictions to increase the number of families served with decent, safe, sanitary, and affordable housing and to expand the long-term supply of affordable housing. HCID is the City's administrator of HOME funds and awards funds to developers based on competitive applications.

- *Low Income Housing Tax Credits*

  Created by the Tax Reform Act of 1986, the LIHTC program gives California's Tax Credit Allocation Committee (TCAC) the authority to issue tax credits to incentivize developers to build affordable housing.

Renting an Affordable Unit

Low-income families, as well as the elderly, and the disabled may benefit from Section 8 Vouchers to help cover the cost of their rent. Federal funds are allocated by HUD to local public housing agencies (PHAs), who administer the Vouchers. The Housing Authority of the City of Los Angeles (HACLA), is the City's PHA. A housing subsidy is paid to the landlord directly by the PHA on behalf of the participating family. The family then pays the difference between the actual rent charged by the landlord and the amount subsidized by the program, but cannot exceed 30% of the family's monthly income.

There are two types of Section 8 Vouchers, Project-Based Vouchers and Housing Choice Vouchers:

- *Project-Based Voucher (PBV)*

  Project-Based Vouchers are attached to a particular unit in a building. The owner agrees to reserve some or all of the units in a building for low-income tenants, and in return HUD guarantees to make up the difference between the tenant's rent contribution and the rent amount in the owner's contract with the government. In 2014, 5,187 PBVs were included in City restricted units.

- *Housing Choice Voucher (HCV)*

  In the Housing Choice Voucher program, also referred to as Tenant-Based Vouchers, the participant is free to choose housing that meets the requirements of the program, including privately-owned single-family homes, townhouses and apartments. In 2014, 5,221 HCV's were applied towards rent in City-restricted units.

Project-Based Voucher (PBV)	Housing Choice / Tenant-Based Voucher (HCV)
Stays with the Unit • Non Transferrable	Stays with the Tenant • Can be applied towards rent in any unit (including privately owned) that meets program guidelines.

Since HCVs are tenant-based assistance, the subsidy is tied to the low-income tenant, not the unit. When the tenant moves, the HCV can move with the tenant. Whereas the PBV subsidy is attached to a specific unit, and is not transferrable. If the tenant moves out, the subsidy stays with the unit and benefits the next low-income tenant that moves in.

Consider Restricting the Use of Housing Choice Vouchers to Non-HOME Financed Units

While legal, tenants with HCVs who occupy restricted units reduce the number of units that would otherwise be available to families who are also in need, but do not have a HCV. Although federal law prohibits owners who have received HOME financing from refusing to rent to tenants with HCV, the impact of this policy results in fewer affordable housing options. If the tenant with rental assistance rented an apartment outside of HCID's inventory (e.g. privately-owned unit), two low-income households could be served. In other words, rent for the unit that would otherwise be restricted as affordable will not be available to those without a voucher. We are not questioning the legality of these practices, but rather how they are not necessarily in-line with the spirit of the City's housing goals and needs. Therefore, in order to ensure the City's restricted affordable units are maximized, it may be ideal to restrict the use of Housing Choice Vouchers to non-HOME financed, privately-owned units.

If the City considers prohibiting owners that accept government funding to build units from also accepting HCVs from tenants, this may eventually increase the number of affordable units. This is, of course dependent upon the availability of HCVs and private owner participation.

OBSERVATION REGARDING OWNERS WHO MAY COLLECT HIGHER RENT WHEN TENANTS HAVE RENTAL ASSISTANCE

Exhibit 21: Over Rent Data Statistics (For Units with Rental Assistance)	
Total	4,621
Minimum	$1
Maximum	$1,423
Average	$266
Median	$213

We also noted that rent collected by owners of restricted affordable units exceeded the rent limits for 16% (4,621) of the units that accepted Section 8 vouchers, either Project Based or Tenant Based. Our analysis found that 76% of these owners collected $100-$500 per month more rent from tenants that received additional rental assistance.

Exhibit 22: Monthly Over Rent Range (For Units with Rental Assistance)		
$0-$100	694	15.0%
$100-$500	3,515	76.1%
$500-$800	251	5.4%
$800-$1,500	161	3.5%

Affordable housing financing programs set rent and income levels, and tenants are expected to pay the rent amount. When a tenant has qualified for a voucher, the tenant is responsible for paying a portion of the rent (based on 30% of their monthly income), while the voucher

covers the difference with funds from HUD through the Housing Authority of the City of Los Angeles (HACLA). To maximize their rental income, an owner will actually prefer a tenant with rental assistance over one without.

Federal law allows owners to collect a fair market rent amount as determined by the Department of Housing and Urban Development, which may be more than the rent limits, though less than market rate.

Exhibit 23 shows how a unit occupied by a tenant with a voucher subsidy could appear to exceed rent limits.

Exhibit 23: Example of Voucher Subsidy Increasing Monthly Rent Amount	
Fair Market Rent as Determined by HUD	$800 (Market Rent $1200)
Tenant Contribution	$100 (based on 30% monthly income)
Voucher	$600 (based on family size and fair market rent comparable)
Rent Collected	$700
Rent Limit	$650 (based on program restrictions)
Over Rent	$50

In these cases, the owner may collect higher rent than what appears specified by the regulations. This is the explanation for the 16% of apparent "over-rent" units we noted.

VACANCY RATES

Given the dire need for affordable housing, the Department should make all efforts to make the vacancy rate in its portfolio zero. While the monitoring data is based on one point in time, we noted a vacancy rate of 3%.[21]

HCID management indicated that this is lower than the citywide vacancy rate (approximately 5%) and explained that OM staff review the individual monthly project compliance reports and call owners to ask about the status of a unit when 10%, or 2 or more units are vacant. According to staff, property managers usually state that units are not vacant for very long, and the vacancy is attributed to a unit being cleaned after a tenant moved out.

Currently, marketing a restricted unit and finding an eligible tenant is the responsibility of the owner. However, to help owners market restricted affordable units and minimize vacancies, the City recently signed a contract with socialserve.com and the County of Los Angeles. Socialserve.com operates a database that is linked to the County's housing resource center website, which will eventually list all of the restricted units in the City. Per staff, the Major Projects units are currently on the site, and over the next two years, it will be updated to include the City's entire inventory of restricted

[21] Since HCID does not track or report vacancy rates in an aggregated manner, we could not trend this to determine if 3% is representative of the monthly average.

affordable units. To ensure full participation, property managers will have to register their affordable units on the site to remain compliant with program requirements.

Occupancy Monitoring Policies and Procedures

Throughout the audit, we noted that the Occupancy Monitoring unit does not have Policies & Procedures that detail the monitoring and enforcement processes for the City's restricted units. In addition to formal institutional knowledge, policies and procedures are important because they ensure all stakeholders clearly understand their role and they provide transparency to a unit's function.

Recommendations:

To ensure the City's affordable housing stock is occupied only by those who are most in need, HCID should develop and propose the following to policymakers:

3.1 An over-income threshold for tenants who occupy restricted units.

3.2 Removal or transitional policies for tenants that surpass the over-income threshold.

3.3 A timeline/deadline transitional tenants will have to meet, when required to vacate a restricted unit.

To ensure initial income certifications are completed in a timely manner, HCID and DBS management should:

3.4 Consider implementing an automated process to ensure HCID's Occupancy Monitoring Unit is immediately notified when a Certificate of Occupancy is issued for a Housing project with restricted units.

In an effort to maximize the number of affordable housing options in the City, HCID should urge policymakers to:

3.5 Consider restricting the use of Housing Choice Vouchers to non-HOME financed, privately-owned units.

To provide additional transparency and maintain institutional knowledge, HCID should:

3.6 Ensure all of the processes, procedures and polices relevant to monitoring the City's affordable housing inventory are clearly documented.

Section III: The City is Missing Opportunities to Collect Density Bonus Related Fees from Developers

While there are flaws related to the reporting and enforcement for the Density Bonus program and the City's affordable housing in general, developers continue to build units. Since the Program is intended to increase the number of affordable units in the City, efforts should be made to improve administrative processes as well, specifically those related to Density Bonus fees.

Per City financial guidelines, departments can charge fees for services if permissible by state and federal law, and if a group who benefits from the services is identifiable. These fees should support the full cost of operations, including all direct and indirect and capital costs. In the case of residential development, developers directly benefit from the various City services involved in reviewing and approving a project for construction and completion, and subsequent monitoring efforts to ensure compliance with requirements.

Finding No. 4: Density Bonus related fees collected by the Department of City Planning have not been updated since 2011. There is a risk that fees do not cover the administrative costs to review the Density Bonus entitlement applications.

If a developer intends to request incentives through the entitlement process they must pay a fee. The Density Bonus ordinance dictates the fees for the entitlements/incentives as outlined in the table.

EXHIBIT 24: DENSITY BONUS ENTITLEMENT APPLICATION FILING FEES

Type of Application	Fee
Density Bonus including a request for one or more Incentives included in the Menu of Incentives	$7,115
Density Bonus including a request for an Incentive not included in the Menu of Incentives	$23,287
Density increase in excess of that permitted	$20,718

We found that the Department of City Planning has not reviewed or updated the Density Bonus Entitlement Application Filing fee amounts since 2011. Given increases in salaries and other associated costs for completing the application reviews, there is a risk that DCP has not been

recovering the administrative costs related to entitlement reviews of Density Bonus applications.

Developers that apply for one or more of the ***on-menu*** incentives are charged the lowest flat-fee. Developers pay higher fees when requesting incentives that are not on the menu (off-menu), or request density increases in excess of that permitted. The fees are remitted into the Planning Case Processing Special Fund, which helps to offset the staff costs involved in processing planning and land use applications.

Per the City's Revenue Policies, departments shall monitor "all user charges and fees for the City" *on an annual basis*, "to determine that rates are adequate and each source is maximized."

DCP management indicated that a fee study is currently underway to determine if fees are adequately recovering costs, given the last fee increase was phased-in as of 2011. DCP selected an outside contractor to complete the study, which is expected to be completed during 2016.

Recommendation:

The Department of City Planning should:

4.1 Ensure that the entitlement fee study is completed as soon as possible and implement the appropriate fees in a timely manner.

Finding No. 5: The City is missing opportunities to collect fees that would help offset costs associated with the Density Bonus program, and the development of affordable housing.

The City does not currently collect a fee from developers to cover the administrative costs associated with preparing the covenants for Density Bonus Projects. If the City adopts a covenant fee, HCID could potentially collect $366,000 per year.

Despite the various administrative processes involved in executing the covenants, the City does not collect a fee from developers to cover the costs involved to draft the covenants for Density Bonus projects, or any of the affordable housing developments subject to a covenant. HCID staff indicated that developers have requested the ability to pay an expediting fee to the covenant process. Collecting a preparation fee would allow HCID to hire more staff to complete the process in a more expeditious manner.

Once a development is approved for a Density Bonus, the developer must work with HCID's Land Use and Environmental Services Section (Land Use Unit) to execute an Affordable Housing Land Use Covenant.

To start the covenant execution process, the developer must submit documents to HCID's Land Use Unit, including a covenant application, the building permit application, and the grant deed.

Once the covenant is drafted, HCID sends a copy to the City Attorney for review and approval. If approved, the covenant is sent to the owner, who has 30 days to review it, sign it, make 4 notarized copies, and send one notarized copy back to HCID. Upon receipt, it must be signed by HCID's General Manager. This signature allows Land Use staff to sign off on the clearance sheet, allowing the developer to move forward with the building permit approval process.

Exhibit 25: Developer Response Results Regarding Fee Payment

Would your Firm be willing to pay a fee to expedite the covenant preparation process?	#	%
Yes	17	89%
No	2	11%
Totals	19	100%

The developer must then file a notarized copy of the covenant with all signatures with the County Recorder's Office to ensure the covenant, and all its stipulations, remain on the property's title through any future change in ownership or foreclosure proceeding.

Currently, HCID funds Land Use unit staff salaries with funds from the Municipal Housing Finance Fund (MHFF), Community Development Block Grants (CDBG), and HOME Investment Partnerships Program (HOME) grants. However, the grant sources have administrative service caps, so the amount of funding that can be used to pay HCID staff salaries is limited. Consequently, the number of staff that HCID can hire to help execute covenants is also limited.

In contrast, City Planning, which is also involved in processing and reviewing Density Bonus related applications, collects administrative-related fees to offset its staff costs.

Proposed Affordable Housing Covenant Preparation Fee

In 2013, HCID completed a fee study that considered the various activities performed by Land Use staff and proposed five categories of fees related to the preparation ***and*** enforcement of affordable housing covenants. If the "Affordable Housing Covenant Preparation Fee" is adopted, developers would pay $5,999 to HCID when they submit a Land Use application. Based on a projected annual number of projects, HCID estimated that the new fees, if adopted, would generate $365,932[22] per year in additional revenues to the City.

Based on our review of HCID's methodology to determine the covenant fee, it appears that staff included the appropriate activities and cost components. The methodology considered direct costs, which include the salaries and benefits for HCID Clerical and Analyst[23] staff, as well as City Attorney staff involved in the covenant preparation process. HCID also used Cost Allocation Plan (CAP) 34 to calculate the indirect costs such as fringe benefits and building leases.

In 2014, the City Administrative Officer reviewed the methodology used by HCID, and approved the fee for consideration by City Council. However, as our audit fieldwork, the Housing Committee has considered the fee, but not yet adopted it.

[22] Based on the historical average of 61 covenants per year through 2014.
[23] Management Analyst and Senior Management Analyst

We surveyed developers and 89% of those that responded, indicated they would be willing to pay a fee to expedite the covenant preparation process.

Recommendation

City Council and the Mayor should:

5.1. Approve a covenant fee that would cover the current administrative costs related to executing the covenants for all affordable housing projects, including Density Bonus projects. Once adopted, periodically review and adjust the fee to reflect the administrative costs involved in preparing covenants.

Finding No. 6: HCID has not consistently collected an annual monitoring fee from owners to help cover the costs of monitoring the restricted units to ensure compliance with income and rent guidelines.

While HCID has actively monitored restricted units for the last 10 years, HCID only began consistently collecting a monitoring fee of $135 for each restricted unit in 2013. This amount is stated in covenants prepared since 2013. Older covenants stipulated varying monitoring fees; for example, $50/restricted unit, $75/restricted unit, or 5% of the gross rent collected. It is unclear how fees included in older covenants were determined, and there was no formal effort to collect a monitoring fee from owners of projects associated with these older covenants. According to HCID management, the City Attorney's Office has advised them not to collect fees retroactively. For example, for covenants executed in 2010 that include a $75/restricted unit monitoring fee, HCID only collected the fee for monitoring completed in 2013 and 2014. The department did not bill the owner for monitoring the unit in 2010, 2011 or 2012.

HCID conducted a fee study in 2013 which determined that the monitoring fee amount should be $135. Starting in January 2014, HCID began billing project owners for monitoring activities on an annual basis. HCID bills project owners on one invoice for all monitored covenants. All fees collected are remitted to the Municipal Housing Finance Fund (MHFF). According to the current process, the monitoring fee billed each year pertains to the monitoring conducted during the previous calendar year. For example, monitoring fees collected in 2014 corresponded to monitoring performed during calendar year 2013.

Through 2015, HCID sent collection letters seeking $881,635 in monitoring fees, and has received $734,960 from owners.

Exhibit 26: Affordable Housing Monitoring Fees Billed and Collected for 2013 & 2014

Monitoring Year	# of Units	Total Amount Billed	Total Amount Collected	% Collected
2013	4,750	$334,260	$274,810	82%
2014	6,193	$547,375*	$460,150	84%
		$881,635	$734,960	83%

*****_This includes the prior year uncollected amount of $66.615._

HCID should have been applying a consistent fee methodology to determine the monitoring fee amounts, and more importantly, it should have been collecting fees as soon as the restricted units were occupied.

Since HCID did not collect a monitoring fee, other funding sources, (including limited CDBG grant monies) were used to pay the contracted monitor, UFBA.

Recommendation

HCID should:

6.1 Review the current monitoring fee amount of $135 per restricted unit, to ensure it is appropriate and continue to collect it for each affordable unit monitored on an annual basis.

Respectfully submitted,

Diana Galaviz
Internal Auditor II

Sydia Reese
Internal Auditor IV

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Chief Internal Auditor

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GLOSSARY OF KEY TERMS

AMI- Average Median Income

By-Right Density Bonus - Also referred to as "ministerial." Land uses which do not require a variance from the Zoning Code, and are automatically granted if the development is approved.

Covenant - A regulatory agreement or contract which dictates the terms of conditions for the use of the land, which is tied to the deed.

DBS – Department of Building and Safety

DCP – Department of City Planning

Developer- Individual or firm that funds and/or builds new real estate projects, including the new construction and renovation of existing building(s).

Entitlement Density Bonus–Land uses which require a variance from the Zoning code. They must be requested as a "conditional use" and approved by the Director of City Planning or the City Planning Commission.

HUD – Federal Department of Housing and Urban Development

HCID – Housing and Community Investment Department

HIMS- Housing and Information Management System used by HCID staff to track restricted affordable housing project details.

Incremental Unit(s) – The *additional* unit(s), i.e., above the number specified by the zoning code for a particular multi-family housing project, that were created as a result of the City's Density Bonus incentive.

Layered Units – A restricted affordable housing unit that is subject to multiple programs, guidelines, and related restrictions generally defined by the type of financial assistance provided.

OM Unit- Occupancy Monitoring Unit at HCID, responsible for monitoring the income and rent compliance for the City's restricted affordable units.

PCIS – The Plan Check and Inspection System used by Department of Building and Safety staff to track building plans' processes and fees.

GLOSSARY OF KEY TERMS (cont.)

PCTS – The Planning Case Tracking System used by Department of City Planning staff to track the planning review processes.

UFBA – Urban Futures and Bond Administration

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
Section I: Density Bonuses: Unclear Benefits for Affordable Housing						
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.	16	If policymakers determine that Density Bonus units should be considered a significant component of the City's affordable housing strategy, Mayor and Council should: 1.1 Set a target goal for the number of incremental restricted units the Density Bonus program is expected to generate. This will allow for periodic evaluations to review the success of the City's Density Bonus program, and its impact on the City's affordable housing inventory.	24	Mayor City Council	A
			1.2 Request an analysis from DCP/DBS/HCID identifying the percentage set-asides and the on-menu incentives requested by developers in prior Density Bonus projects to determine which have been most effective in encouraging Developers to participate in the Density Bonus program, and consider revising the ordinance to increase outcomes.	24	Mayor City Council	A

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.	16	To accurately determine the impact of the Density Bonus program on the City's affordable housing inventory, DCP, HCID and DBS should: 1.3 Work together to track the number of units a developer proposed prior to the Density Bonus calculation (base units), and the number of approved incremental bonus units. In addition, separately identify bonus units as either market rate or restricted as affordable, and determine the incremental affordable units that are created through the program.	24	DCP HCID DBS	A
			To enable reporting on the types of Density Bonus units that were requested, approved and constructed, DBS Management should: 1.4 Consider updating the Plan Check and Inspection System similar to the updates the Department of City Planning is incorporating in the Planning Case Tracking System.	24	DBS	A

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.	16	HCID Management should: 1.5 Develop a standardized template for the Density Bonus covenants. Consider making each recorded covenant publicly accessible and mapping each project location on the Department's internet site.	24	HCID	A
			To overcome report shortcomings and evaluate the effectiveness of the Density Bonus program DBS, DCP and HCID should: 1.6 Consider developing and using a unique identifier for all projects that can be used by all departments involved in administering development projects. This would enable stakeholders to track the projects' progression and report on the status of various milestones.	25	DBS DCP HCID	A

APPENDIX I: ACTION PLAN

	Finding	Pg.	Recommendation	Pg.	Entity Responsible for Implementation	Priority
2	HCID does not report the occupancy compliance rate (income and rent) of the restricted units under the Density Bonus program or the City's entire affordable housing inventory to stakeholders.	26	To assess whether the City's affordable housing supply (including Density Bonus units) remains affordable, HCID management should: 2.1 Work with UFBA to generate a monthly/quarterly report on the compliance status for each unit monitored. This should be used to assess the compliance rate for the City's affordable housing inventory.	29	HCID	B
			2.2. Develop a standard format for entering project/address information in HIMS and CMS to enable HCID to efficiently identify projects and determine the number of restricted units to ensure unduplicated unit counts.	29	HCID	A
			2.3 Continue to ensure that Land Use units subject to multiple program restrictions are only monitored once against the most restrictive requirements.	30	HCID	A

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
Section II: The City Cannot Enforce Compliance for All Affordable Housing Programs						
3	The City's actual affordable housing inventory is less than the number of restricted units listed on paper, because some tenants exceed income guidelines and some owners collect more rent than allowed. Our analysis found that 6.8% (1,946) of the units exceeded affordability restrictions, such as restrictions on household income (1.6%) or rent (5.2%).	31	To ensure the City's affordable housing stock is occupied only by those who are most in need, HCID should develop and propose the following to policymakers: 3.1 An over-income threshold for tenants who occupy restricted units.	43	HCID	A
			3.2 Removal or transitional policies for tenants that surpass the over-income threshold.	43	HCID	A
			3.3 A timeline/deadline transitional tenants will have to meet, when required to vacate a restricted unit.	43	HCID	A

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
3	The City's actual affordable housing inventory is less than the number of restricted units listed on paper, because some tenants exceed income guidelines and some owners collect more rent than allowed. Our analysis found that 6.8% (1,946) of the units exceeded affordability restrictions, such as restrictions on household income (1.6%) or rent (5.2%).	31	To ensure initial income certifications are completed in a timely manner, HCID and DBS management should: 3.4 Consider implementing an automated process to ensure HCID's Occupancy Monitoring Unit is immediately notified when a Certificate of Occupancy is issued for a Housing project with restricted units.	43	HCID and DBS	A
			In an effort to maximize the number of affordable housing options in the City, HCID should urge policymakers to: 3.5 Consider restricting the use of Housing Choice Vouchers to non-HOME financed, privately owned-units.	43	HCID	A
			To provide additional transparency and maintain institutional knowledge, HCID should: 3.6 Ensure all of the processes, procedures and polices relevant to monitoring the City's affordable housing inventory are clearly documented.	44	HCID	B

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
	Section III: The City is Missing Opportunities to Collect Density Bonus Related Fees from Developers					
4	Density Bonus related fees collected by the Department of City Planning have not been updated since 2011. There is a risk that fees do not cover the administrative costs to review the Density Bonus entitlement applications.	45	4.1 Ensure that the entitlement fee study is completed as soon as possible and implement the appropriate fees in a timely manner.	46	DCP	A
5	The City is missing opportunities to collect fees that would help offset costs associated with the Density Bonus program, and the development of affordable housing.	47	5.1 Approve a covenant fee that would cover the current administrative costs related to executing the covenants for all affordable housing projects, including Density Bonus projects. Once adopted, periodically review and adjust the fee to reflect the administrative costs involved in preparing covenants.	49	City Council and the Mayor	A

APPENDIX I: ACTION PLAN

	Finding	Page	Recommendation	Page	Entity Responsible for Implementation	Priority
6	HCID has not consistently collected an annual monitoring fee from owners to help cover the costs of monitoring the restricted units to ensure compliance with income and rent guidelines.	50	6.1 Review the current monitoring fee amount of $135 per restricted unit, to ensure it is appropriate and continue to collect it for each affordable unit monitored on an annual basis.	51	HCID	B

A –High Priority *- The recommendation pertains to a serious or materially significant audit finding or control weakness. Due to the seriousness or significance of the matter, immediate management attention and appropriate corrective action is warranted.*

B –Medium Priority *- The recommendation pertains to a moderately significant or potentially serious audit finding or control weakness. Reasonably prompt corrective action should be taken by management to address the matter. Recommendation should be implemented no later than six months.*

C –Low Priority *- The recommendation pertains to an audit finding or control weakness of relatively minor significance or concern. The timing of any corrective action is left to management's discretion.*

APPENDIX II: FINANCIAL SCORECARD

Finding/Recommendation	Page	Category	Financial Impacts
Finding No. 5: The City is missing opportunities to collect fees that would help offset costs associated with the Density Bonus program, and the development of affordable housing.	47		
The City does not currently collect a fee from developers to cover the administrative costs associated with preparing the covenants for Density Bonus Projects. If the City adopts a covenant fee, HCID could potentially collect $366,000 per year.		Increased Revenue	Adopting a covenant preparation fee could generate approximately $366,000 each year for HCID.
Recommendation 5.1: Approve a covenant fee that would cover the current administrative costs related to executing the covenants for all affordable housing projects, including Density Bonus projects. Once adopted, periodically review and adjust the fee to reflect the administrative costs involved in preparing covenants.	49		

Cost Recovery: Monies that may be recoverable.

Cost Savings and Efficiencies: Cost savings opportunity and process enhancements.

Cost Avoidance: Monies that are lost but are avoidable in the future.

Increased Revenue: Revenue opportunities.

Wasted Funds: Monies that are lost and not recoverable due to reckless act or mismanagement of funds.

We strive to identify and recommend actions that will result in real financial impact, whereby the City can achieve significantly more through cost savings and/or increased revenue than the cost of the audit function. The above dollar estimates are dependent upon various factors, such as full implementation of audit recommendations and should not be used as guaranteed amounts

APPENDIX III – AUDIT SCOPE AND METHODOLOGY

We reviewed the effectiveness of the City's application and monitoring processes for Density Bonuses since 2008 through 2014, as related to restricted affordable units. The audit focused on the Density Bonus application and approval process through the Department of City Planning, the Department of Building and Safety, and the Housing and Community Investment Department (HCID). We also reviewed the monitoring and enforcement processes related to the City's affordable housing inventory, as managed by HCID. Audit fieldwork was primarily conducted from October 2015 through February 2016 and generally covered activities FY 2008-2009 through FY 2013-FY 2014. This audit was performed in accordance with Generally Accepted Government Auditing Standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. In accordance with these standards and best practices, we performed the following key tasks:

Interviews and Observations

We interviewed Department of Building Safety, Department of City Planning and the Housing and Community Investment Department staff involved in the administration and oversight of the City's Density Bonus program. These interviews included staff from HCID's occupancy monitoring contractor, UFBA. We also reviewed project case files, and relevant information systems and databases.

Data Analyzed

We analyzed 2014 monitoring result data of the City's restricted affordable inventory provided by UFBA. We used the data analysis software, IDEA and Excel to remove duplicated units, identify tenants who exceeded income limits, and owners who collected more rent than the limits.

Benchmarking

We surveyed other agencies throughout the country regarding the administration and oversight of their Density Bonus programs. We received responses from the cities of Glendale, Sacramento, Santa Ana and San Francisco. See Appendix IV for the benchmarking results.

APPENDIX III – AUDIT SCOPE AND METHODOLOGY

We sent a survey to developers who previously built projects in the City, to understand their experience and solicit their opinion regarding the City's Density Bonus program. See Appendix IX for their results.

We sent a direct mailing to tenants who did not report any income in 2014, in an effort to collect their earned income amount. See Appendix VIII for the results of the responses.

APPENDIX IV Benchmarking

These are the results of benchmarking with other cities, regarding their Density Bonus programs.

	Santa Ana	Sacramento	San Francisco	Glendale
1) When did your City start administering Density Bonuses?	2011	Likely when the state law took effect.		2006
2) How many Density Bonus projects have been built in your City since you started administering Density Bonuses?	4	1 or 2		
2a) How many restricted (affordable) units are in those projects?	24	I don't know.		127 As reported in 2014-2012 Housing Element
3) Does your City have a Density Bonus goal?	No	No		Yes, One Density Bonus Project per Year
3a) If yes, please describe your City's Density Bonus goal and if it is referring to the restricted, market rate, or overall units.				
4) What is the threshold for developers to be eligible for Density Bonuses? (e.g. in LA, the development has to be >5 units)	5 or more units	>5 units		
5) What departments are involved in administering Density Bonuses?	Planning and Building Agency, Community Development Agency (Housing Division)	Community Development Department and the Sacramento Housing and Redevelopment Agency (SHRA)		Department of City Planning

APPENDIX IV Benchmarking

	Santa Ana	Sacramento	San Francisco	Glendale
6) What type of incentives are most popular, and why?	Density, Parking, Setbacks	Concessions are not very attractive because we updated our zoning code in 2013 to better facilitate urban infill development that has streamlined entitlements, and context sensitive, flexible development standards.		
7) What fees do developers incur in the application process for Density Bonus projects, and how much are they?	Not applicable	No fee.		
8) Does your City collect a monitoring fee?	No	Yes	Yes	Does not currently collect a monitoring fee, but in process of conducting study.
8a) If yes, how often is the monitoring fee collected?		Semi annually	Annually	NA
8b) If yes, how much is the monitoring fee?		.15% of original loan amount. If there is a bond, than it is .15% of bond.		
9) Instead of providing restricted units on-site, can developers opt to pay in-lieu fees towards city-owned affordable housing development?	If subject to the Housing Opportunity Ordinance (Inclusionary Housing), then yes	No		
9a) If yes, how much are the in-lieu fees?	Various, however currently revising Housing Opportunity Ordinance. Under the new Ordinance, proposed at $15 per habitable s.f.			

APPENDIX IV Benchmarking

	Santa Ana	Sacramento	San Francisco	Glendale
10) How does your City monitor affordable housing units to ensure they are occupied by eligible tenants? For example, do you collect and review income verification documents from tenants or from owners?	City staff will inspect housing units 1-3 years to ensure Health and Safety for the tenants, as well as conduct on-site review of tenant files and income verification documents. Both are completed in a sampling of the units. In addition, the City request annual reports for the affordable units which includes a rent roll. Finally, City staff has started to monitor evictions of units while completing annual on-site visits.	No. SHRA reviews a minimum 20% sample annually. The owner/manager collect and verify to insure income qualification.	The Mayor's Office of Housing monitors the income and rent of the affordable and restricted units.	
11) Does your City have a contractor to monitor your affordable housing projects to ensure owners are complying with income verification requirements?	No	No	No	No
12) How often does your City monitor its contractor to ensure the contractor is correctly and efficiently monitoring affordable units?				
13) If your City has a contractor, how often does the contractor verify tenant incomes?				
14) Does your City distinguish between fixed and floating units?	No	Yes	SF does not allow floating units.	

APPENDIX IV Benchmarking

	Santa Ana	Sacramento	San Francisco	Glendale
15) Are the same monitoring standards used for monitoring market rate projects as for monitoring government subsidized projects? If so, please describe.	Currently, yes the same monitoring standards are utilized for both market rate projects and monitoring government subsidized projects. The City uses the HUD standards for inspections (DSS) and will put the unit on an inspection cycle between 1-3 years. The City also utilizes the same forms for the inspection of units and the file inspections.	With the exception of our Rental Housing Inspection Program, we do not monitor market-rate projects.		
16) What is your City's definition of occupancy noncompliance?	Lack of income verification document, restricted units not occupied by eligible tenants, tenants were not income qualified at entry, occupancy standards at unit entry (lease up)	Over income, overcharging of rent, not being in compliance with affirmative marketing requirements, not maintaining property standards, and any other violations of the loan agreement.		
17) What percentage of your City's Density Bonus restricted units are in compliance, i.e. occupied by only eligible households?	100%	I don't know.		Don't Know

APPENDIX IV Benchmarking

	Santa Ana	Sacramento	San Francisco	Glendale
18) How does your City enforce compliance?	Through recorded agreements with the developer and annual inspections.	SHRA has compliance violation fees, recommend change of property management, technical training to get management back on track. Otherwise owner goes into default on loan.	To enforce compliance with income requirements	
18a) Do you impose a penalty on owners if they are not complying?	No	Yes		No
18b) If you charge a noncompliance fee, how much is it?	No	Multiple fees		
19) Does your City have a process to remove ineligible tenants who no longer meet the income requirements?	Standard legal procedure	Yes	Yes. Once they exceed 55% of the Area Median Income, they have 6 months to transition out.	No

Appendix V
Detailed Menu of Density Bonus Incentives Per LAMC Section 12.22 A25 (f)

Tables in the City's Density Bonus Ordinance
LAMC Section 12.22 A25 (c)1 and (c)4

The tables dictate the percentage of (how many) Bonus Market Rate units a developer can include in a project if they agree to include the corresponding percentage of restricted affordable units.

% Very Low Income Units	% Density Bonus
5	20
6	22.5
7	25
8	27.5
9	30
10	32.5
11	35

% Low Income Units	% Density Bonus
10	20
11	21.5
12	23
13	24.5
14	26
15	27.5
16	29
17	30.5
18	32
19	33.5
20	35

% Moderate Income Units	% Density Bonus
10	15
11	16
12	17
13	18
14	19
15	20
16	21
17	22
18	23
19	24
20	25
21	26
22	27
23	28
24	29
25	30
26	31
27	32
28	33
29	34
30	35

Appendix VI
Detailed Menu of Density Bonus Incentives Per LAMC Section 12.22 A25 (f)

Menu of Incentives. Housing Development Projects that meet the qualifications of Paragraph (e) of this subdivision may request one or more of the following Incentives, as applicable:

1. **Yard/Setback.** Up to 20% decrease in the required width or depth of any individual yard or setback except along any property line that abuts an R1 or more restrictively zoned property provided that the landscaping for the Housing Development Project is sufficient to qualify for the number of landscape points equivalent to 10% more than otherwise required by Section 12.40 of this Code and Landscape Ordinance Guidelines "O."

2. **Lot Coverage.** Up to 20% increase in lot coverage limits, provided that the landscaping for the Housing Development Project is sufficient to qualify for the number of landscape points equivalent to 10% more than otherwise required by Section 12.40 of this Code and Landscape Ordinance Guidelines “O”.

3. **Lot Width.** Up to 20% decrease from a lot width requirement, provided that the landscaping for the Housing Development Project is sufficient to qualify for the number of landscape points equivalent to 10% more than otherwise required by Section 12.40 of this Code and Landscape Ordinance Guidelines “O”.

4. **Floor Area Ratio.**

   i. A percentage increase in the allowable Floor Area Ratio equal to the percentage of Density Bonus for which the Housing Development Project is eligible, not to exceed 35%; or

   ii. In lieu of the otherwise applicable Floor Area Ratio, a Floor Area Ratio not to exceed 3:1, provided the parcel is in a commercial zone in Height District 1 (including 1VL, 1L and 1XL), and fronts on a Major Highway as identified in the City’s General Plan, and

      a. the Housing Development Project includes the number of Restricted Affordable Units sufficient to qualify for a 35% Density Bonus, and

b. 50% or more of the commercially zoned parcel is located in or within 1,500 feet of a Transit Stop/Major Employment Center.

A Housing Development Project in which at least 80% of the units in a rental project are Restricted Affordable Units or in which 45% of the units in a for-sale project are Restricted Affordable Units shall be exempt from the requirement to front on a Major Highway.

5. **Height.** A percentage increase in the height requirement in feet equal to the percentage of Density Bonus for which the Housing Development Project is eligible. This percentage increase in height shall be applicable over the entire parcel regardless of the number of underlying height limits. For purposes of this subparagraph, Section 12.21.1 A.10 of this Code shall not apply.

   i. In any zone in which the height or number of stories is limited, this height increase shall permit a maximum of eleven additional feet or one additional story, whichever is lower, to provide the Restricted Affordable Units.

      a. No additional height shall be permitted for that portion of a building in a Housing Development Project that is located within fifteen feet of a lot classified in the R2 Zone.

      b. For each foot of additional height the building shall be set back one horizontal foot.

   ii. No additional height shall be permitted for that portion of a building in a Housing Development Project that is located within 50 feet of a lot classified in an R1 or more restrictive residential zone.

   iii. No additional height shall be permitted for any portion of a building in a Housing Development Project located on a lot sharing a common lot line with or across an alley from a lot classified in an R1 or more restrictive zone. This prohibition shall not apply if the lot on which the Housing Development Project is located is within 1,500 feet of a Transit Stop but no additional height shall

be permitted for that portion of a building in the Housing Development Project that is located within 50 feet of a lot classified in an R1 or more restrictive residential zone.

6. **Open Space.** Up to 20% decrease from an open space requirement, provided that the landscaping for the Housing Development Project is sufficient to qualify for the number of landscape points equivalent to 10% more than otherwise required by Section 12.40 of this Code and Landscape Ordinance Guidelines "O".

7. **Density Calculation.** The area of any land required to be dedicated for street or alley purposes may be included as lot area for purposes of calculating the maximum density permitted by the underlying zone in which the project is located.

8. **Averaging of Floor Area Ratio, Density, Parking or Open Space, and permitting Vehicular Access.** A Housing Development Project that is located on two or more contiguous parcels may average the floor area, density, open space and parking over the project site, and permit vehicular access from a less restrictive zone to a more restrictive zone, provided that:

   i. the Housing Development Project includes 11% or more of the units as Restricted Affordable Units for Very Low Income households, or 20% of the units for Low Income households, or 30% of the units for Moderate Income households; and

   ii. the proposed use is permitted by the underlying zone(s) of each parcel; and

   iii. no further lot line adjustment or any other action that may cause the Housing Development Project site to be subdivided subsequent to this grant shall be permitted.

Appendix VII
Income and Rent Limit Tables

Land Use/Density Bonus Schedule VI

This schedule was used by HCID to determine the income and rent limits for the restricted affordable units under the Density Bonus program.

Los Angeles HOUSING+COMMUNITY Investment Department

Eric Garcetti, Mayor
Rushmore D. Cervantes, General Manager

LOS ANGELES HOUSING & COMMUNITY INVESTMENT DEPARTMENT

2014 Income and Rent Limits - Land Use Schedule VI

Effective Date: July 1, 2014

Density Bonus

2013 MFI $64,800 MFI change
2014 MFI $64,800 from 2014= 0.00%

Table I: Qualifying Maximum Income Levels Based on Family Size from State Income Limits for 2014

	Family Size							
Income Level	**One**	**Two**	**Three**	**Four**	**Five**	**Six**	**Seven**	**Eight**
Extremely Low (30%)	$17,950	$20,500	$23,050	$25,600	$27,650	$29,700	$31,750	$33,800
Very Low (50%)	$29,900	$34,200	$38,450	$42,700	$46,150	$49,550	$52,950	$56,400
Low (60% / 80%)	$47,850	$54,650	$61,500	$68,300	$73,800	$79,250	$84,700	$90,200
Moderate (120% / 110%)	$54,450	$62,200	$70,000	$77,750	$83,950	$90,200	$96,400	$102,650

Table II: Maximum Allowable Rent Levels

	Number of Bedrooms				
Rent Level	**Single**	**One**	**Two**	**Three**	**Four**
Extremely Low (30%)	$326	$373	$419	$466	$503
Very Low (50%)	$543	$621	$699	$776	$838
Low (60% / 80%)	$652	$745	$838	$932	$1,006
Moderate (120% / 110%)	$1,195	$1,366	$1,537	$1,708	$1,844

The annual allowable automatic rent adjustment rate for rental units subject to the Rent Stabilization Ordinance (RSO) is currently 3%.

Appendix VII
Income and Rent Limit Tables

Land Use Schedule II

This schedule was used by HCID to determine the income and rent limits for the restricted affordable units under HCID's other affordable housing programs.

Los Angeles HOUSING+COMMUNITY Investment Department

Eric Garcetti, Mayor
Rushmore D. Cervantes, General Manager

LOS ANGELES HOUSING & COMMUNITY INVESTMENT DEPARTMENT

2014 Income and Rent Limits - Mello Schedule II / LU Schedule VII (HCD Gross Rents)

Effective Date: July 1, 2014

2013 MFI	$64,800	MFI change	
2014 MFI	$64,800	from 2014=	0.00%

Table I: Qualifying Maximum Income Levels Based on Family Size

	Family Size							
Income Level	**One**	**Two**	**Three**	**Four**	**Five**	**Six**	**Seven**	**Eight**
Very Low	$29,900	$34,200	$38,450	$42,700	$46,150	$49,550	$52,950	$56,400
Low/Lower	$47,850	$54,650	$61,500	$68,300	$73,800	$79,250	$84,700	$90,200
Moderate	$54,450	$62,200	$70,000	$77,750	$83,950	$90,200	$96,400	$102,650

Table II: Maximum Allowable Rent Levels

	Number of Bedrooms				
Rent Level	**Single**	**One**	**Two**	**Three**	**Four**
Very Low	$567	$648	$729	$810	$875
Lower	$680	$778	$875	$972	$1,050
Low	$907	$1,037	$1,166	$1,296	$1,400
Moderate	$1,247	$1,426	$1,604	$1,782	$1,925

Note: This Schedule is HCD Gross Rent Schedule for Projects with AHTF funding and Mello program Covenant.

The annual allowable automatic rent adjustment rate for rental units subject to the Rent Stabilization Ordinance (RSO) is currently 3%.

Appendix VIII
Results of Direct Mailings to Tenants Who Did Not Report Any Income in 2014

Summary of Responses to Units that Reported $0 Income in 2014	
Total Letters Sent Initially	1,181
Total Responses Received	248
Total Letters Returned to Sender	152
	1,029
Response Rate (Not including returned letters)	24%
Reported Income Exceeds the Income threshold in UFBA 2014 report	8 3%

Responses by Program Type						
BOND	CRA	Earthquake	Land Use	Major Project	NPP	Total
11	116	51	39	28	3	248
4%	47%	21%	16%	11%	1%	

Q1. Does the Owner ask for income documentation once a year?			
Blank	No	Yes	Total
8	32	208	248
3%	13%	84%	

Q2. How many people lived in the Unit in 2014?							
1-one person	2-two people	3-three people	4-four people	5-five people	6-six people or more	Blank	Total
146	39	24	16	11	5	7	248
59%	16%	10%	6%	4%	2%	3%	

Q3. How many years have you lived in this unit?								
0-1 year	1-2 years	2-3 years	3-4 years	4-5 years	5-6 years	6 years or more	Blank	Total
36	31	23	31	13	12	100	2	248
15%	13%	9%	13%	5%	5%	40%	1%	

Appendix IX
Results of Developer Survey

Total Responses - 19							
1. How did you/your Firm become aware of the City's Density Bonus program?	**# / %**	**2. Does your Firm have plans to participate in the City's Density Bonus program again in the future?**	**# / %**	**3. If your Firm does not plan to participate in the City's Density Bonus program again, why not?**	**# / %**	**4. Would your Firm be willing to pay a fee to expedite the covenant preparation process?**	**# / %**
Department of Building and Safety Staff*	0/0%	Yes	16/84%	The process added too much time to project timeline.	4/21%	Yes	17/89%
Department of City Planning Staff	4/21%	No	3/16%	The number of bonus market rate units offered by City is not appealing enough.	1/5%	No	2/11%
Other City of Los Angeles Department Staff	1/5%	Other	0%	The number of affordable/restricted units required by the City to qualify for the bonus units is too burdensome		Other	
Other Development Firm	3/16%	Blank	0%	The additional profit from the bonus units does not exceed the cost incurred by providing affordable/restricted units.		Blank	
More than one option selected	4/21%			Other	0		
Other	6/32%			Blank	0		
Blank	1/5%						
Totals	19/100%		19/100%		5/26%		19/100%

*DBS staff is included in "More than one option selected"

APPENDIX X
Departments' Response and Action Plan

As part of our audit protocol, we requested a formal response and action plan from each Department involved in the audit.

A formal response, including comments and planned actions, was received from the Housing and Community Investment Department; the Department of Building and Safety; and the Department of City Planning, which are included in this section. It should be noted that all three departments have already begun to implement the audit's recommendations.

Los Angeles
HOUSING+COMMUNITY
Investment Department

Eric Garcetti, Mayor
Rushmore D. Cervantes, General Manager

INTER-DEPARTMENTAL MEMORANDUM

TO:	**SIRI A. KHALSA, CPA** **OFFICE OF THE CONTROLLER**
FROM:	**RUSHMORE CERVANTES, GENERAL MANAGER** **HOUSING + COMMUNITY INVESTMENT DEPARTMENT**
DATE:	**OCTOBER 20, 2016**
REGARDING:	**FORMAL RESPONSE TO AUDIT REPORT ENTITLED, "IMPACT OF THE CITY'S DENSITY BONUS PROGRAM ON AFFORDABLE HOUSING"**

In response to your request dated September 22, 2016, please find attached the matrix with the Office of the Controller's findings and recommendations. HCID has provided comments and planned actions on this matrix. Please consider this HCID's formal response to the audit report entitled, "Impact of the City's Density Bonus Program on Affordable Housing."

If you have additional questions regarding the responses or status of the recommendations, please contact Helmi Hisserich at (213) 808-8662 or Helmi.Hisserich@lacity.org.

Attachment.

Report Title: Impact of the Density Bonus Incentive Program on Affordable Housing
Department Responsible for Implementation: **Housing (HCID)**
Reported Status Date: October 20, 2016

				Department Reported Information			
Finding #	**Summary Description of Finding**	**Reco No**	**Recommendation**	**Current Status**	**Basis for Status**	**If I/P, % Complete**	**Target Date for Implementation**
Section I	**Density Bonuses: Unclear Benefits for Affordable Housing**						
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.		To accurately determine the impact of the Density Bonus program on the City's affordable housing inventory, DCP, HCID and DBS should:		Currently working with DCP and DBS to improve the City's affordable housing inventory tracking.	0%	2017
		1.3	Work together to track the number of units a developer proposed prior to the Density Bonus calculation (base units), and the number of approved incremental bonus units. In addition, separately identify bonus units as either market rate or restricted as affordable, and determine the incremental affordable units that are created through the program.	PI			
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.		To enable reporting on the types of Density Bonus units that were requested, approved and constructed, HCID Management should:		Currently have a standardized template in place and continue to work with the City Attorney to improve the template on an on-going basis. HCID will work with the Systems Unit to create a link on the HCID website to access City Clerk's website for a copy of the covenant.	50%	n/a
		1.5	Develop a standardized template for the Density Bonus covenants. Consider making each recorded covenant publicly accessible and mapping each project location on the department's internet site.	PI			
			To overcome report shortcomings and evaluate the effectiveness of the Density Bonus programs DBS, DCP and HCID should:		Currently working with DCP and DBS to develop a unique identifier for all projects in all departments.	0%	2017
		1.6	Consider developing and using a unique identifier for all projects that can be used by all departments involved in administering development projects. This would enable stakeholders to track the projects' progression and report on the status of various milestones.	PI			
2	HCID does not report the occupancy compliance rate (income and rent) of the restricted units under the Density Bonus program or the City's entire affordable housing inventory to stakeholders.		To assess whether the City's affordable housing supply (including Density Bonus units) remains affordable, HCID management should:		UFBA currently provides monthly compliance report. HCID will work with UFBA to generate an enhanced report to assess the compliance rate.	50%	2017
		2.1	Work with UFBA to generate a monthly/quarterly report on the compliance status for each unit monitored. This should be used to assess the compliance rate for the City's affordable housing inventory.	PI			
		2.2	Develop a standard format for entering project/address information in HIMS and CMS to enable HCID to efficiently identify projects and determine the number of restricted units to ensure unduplicated unit counts.	I	HCID has developed a standard format for entering project/address information in HIMS and CMS. New projects that are sent to UFBA use this standard format.	100%	n/a
		2.3	Continue to ensure that Land Use units subject to multiple program restrictions are only monitored once against the most restrictive requirements.	I	HCID will continue to ensure that Land Use units subject to multiple program restrictions are only monitored once against the most restrictive requirements.	100%	n/a

I - Implemented
PI - Partially Implemented
NI - Not Implemented
D - Disagree

Report Title: Impact of the Density Bonus Incentive Program on Affordable Housing
Department Responsible for Implementation: **Housing (HCID)**
Reported Status Date: October 20, 2016

				Department Reported Information			
Finding #	**Summary Description of Finding**	**Reco No**	**Recommendation**	**Current Status**	**Basis for Status**	**If I/P, % Complete**	**Target Date for Implementation**
Section II	**The City Cannot Enforce Compliance for All Affordable Housing Programs**						
3	The City's actual affordable housing inventory is less than the number of restricted units listed on paper, because some tenants exceed income guidelines and some owners collect more rent than allowed. Our analysis found that 6.8% (1,946) of the units exceeded affordability restrictions, such as restrictions on household income (1.6%) or rent (5.2%).		To ensure the City's affordable housing stock is occupied only by those who are most in need, HCID should develop and propose the following to Policy Makers:				
		3.1	An over-income threshold for tenants who occupy restricted units.	PI	HCIDLA has determined that it will establish an over-income threshold, which is consistent with other affordable housing funding restrictions. If a household is deemed to be over-income, HCIDLA will implement a rent increase (i.e. rent to be charged at 30% of income) without eviction, for over-income tenants residing in restricted units. This policy will apply only to units that are only restricted by a Land Use covenant, so that there is no programmatic conflict with other funding sources/programs, which allow tenants to go over-income without raising their rent. Within the next 90 days, HCID will draft language for the City Attorney's consideration to amend the covenant to include this over-income remedy.	10%	2017
		3.2	Removal or transitional policies for tenants that surpass the over-income threshold.	D	Implementing removal policies for over-income tenants would create displacement of tenants in a housing market with high rents and low vacancy rates. It may also cause the unintended consequences of encouraging people to under-report income or to dis-incentivize increasing tenant's household income. Instead, HCIDLA, in consultation with City Attorney, will review the implement a rent increase (i.e. rent to be charged at 30% of income) for over-income tenants residing in restricted units, without eviction.	n/a	n/a
		3.3	A timeline/deadline transitional tenants will have to meet, when required to vacate a restricted unit.	D		n/a	n/a

I - Implemented
PI - Partially Implemented
NI - Not Implemented
D - Disagree

Report Title: Impact of the Density Bonus Incentive Program on Affordable Housing
Department Responsible for Implementation: **Housing (HCID)**
Reported Status Date: October 20, 2016

				Department Reported Information			
Finding #	**Summary Description of Finding**	**Reco No**	**Recommendation**	**Current Status**	**Basis for Status**	**If I/P, % Complete**	**Target Date for Implementation**
3	The City's actual affordable housing inventory is less than the number of restricted units listed on paper, because some tenants exceed income guidelines and some owners collect more rent than allowed. Our analysis found that 6.8% (1,946) of the units exceeded affordability restrictions, such as restrictions on household income (1.6%) or rent (5.2%).	To ensure initial income certifications are completed in a timely manner, HCID and DBS management should:					
		3.4	Consider implementing an automated process to ensure HCID's Occupancy Monitoring Unit is immediately notified when a Certificate of Occupancy is issued for a Housing project with restricted units.	PI	Working with HCIDLA Systems and DBS to implement.	0%	2017
		In an effort to maximize the number of affordable housing options in the City, HCID should urge policy makers to:					
		3.5	Consider restricting the use of Housing Choice Vouchers (HCV) to non-HOME financed, privately owned-units.	D	HCIDLA disagrees that tenants with HCV should be prohibited from living in a restricted unit due to their source of income, a HCV. The impact of implementing a prohibition of Section 8 in restricted units would increase the existing hardship that voucher holders experience in finding landlords to accept Section 8 due to the extremely high rents and low vacancy rates in Los Angeles. This exclusion of Section 8 tenants also runs counter to a mandate of the major funding source of the Affordable Housing Trust Fund; HOME prohibits turning down tenants with Section 8.	n/a	n/a
		To provide additional transparency and maintain institutional knowledge, HCID should:					
		3.6	Ensure all of the processes, procedures and polices relevant to monitoring the City's affordable housing inventory are clearly documented.	PI	In process.	10%	2017
6	HCID has not consistently collected an annual monitoring fee from owners to help cover the costs of monitoring the restricted units to ensure compliance with income and rent guidelines.	**6.1**	Review the current monitoring fee amount of $135 per restricted unit, to ensure it is appropriate and continue to collect it for each affordable unit monitored on an annual basis.	I	Completed review; Land Use Fees Transmittal approved by the Mayor pending final ordinance by the City Attorney.	100%	2016

I - Implemented
PI - Partially Implemented
NI - Not Implemented
D - Disagree

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DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK M. BUSH
GENERAL MANAGER

OSAMA YOUNAN, P.E.
EXECUTIVE OFFICER

October 11, 2016

Ms. Siri A. Khalsa, CPA
Interim Director of Auditing
Office of the Controller
200 N. Main St., 4th Floor
Los Angeles, CA 90012

Dear Ms. Khalsa,

In response to your letter dated September 22, 2016 regarding the final draft audit report entitled, "Impact of the City's Density Bonus Program on Affordable Housing," we have reviewed the report and provided our Department's planned actions and responses in the attached DBS recommendations matrix. In summary, we will be working closely with HCIDLA and Planning to implement the recommendations.

If you have any questions or comments you would like to discuss, please contact me at Frank.Bush@lacity.org or (213) 482-6800.

Sincerely,

for Frank Bush

Frank Bush
General Manager

Enclosure

cc: Sydia Reese, Internal Auditor

AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER

Report Title: Impact of the Density Bonus Incentive Program on Affordable Housing

Department Responsible for Implementation: **Building & Safety (DBS)**

Reported Status Date: 10/11/2016

				Department Reported Information			
Finding #	Summmary Description of Finding	Reco No	Recommendation	Current Status	Basis for Status	If I/P, % Complete	Target Date for Implementation
Section I	**Density Bonuses: Unclear Benefits for Affordable Housing**						
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.	To accurately determine the impact of the Density Bonus program on the City's affordable housing inventory, DCP, HCID and DBS should:					
		1.3	Work together to track the number of units a developer proposed prior to the Density Bonus calculation (base units), and the number of approved incrementa bonus units. In addition, separately identify bonus units as either market rate or restricted as affordable, and determine the incremental affordable units that are created through the program.	NI	Work together with HCID and Planning	0%	Dec-16
		To enable reporting on the types of Density Bonus units that were requested, approved and constructed, DBS Management should:					
		1.4	Consider updating the Plan Check and Inspection System similar to the updates the Department of City Planning is incorporating in the Planning Case Tracking System.	NI	Work together with HCID and Planning	0%	Dec-16
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.	To overcome report shortcomings and evaluate the effectiveness of the Density Bonus programs DBS, DCP and HCID should:			Currently working on Build LA which provides the mechanism to assign a unique identifer for all projects that can be used by all departments. This is dependent on a contract being signed this December 2016 for completion and delivery by January 2018.	10%	Jan-18
		1.6	Consider developing and using a unique identifier for all projects that can be used by all departments involved in administering development projects. This would enable stakeholders to track the projects' progression and report on the status of various milestones.	PI			

Report Title: Impact of the Density Bonus Incentive Program on Affordable Housing

Department Responsible for Implementation: **Building & Safety (DBS)**

Reported Status Date: 10/11/2016

				Department Reported Information			
Finding #	**Summmary Description of Finding**	**Reco No**	**Recommendation**	**Current Status**	**Basis for Status**	**If I/P, % Complete**	**Target Date for Implementation**
Section II	**The City Cannot Enforce Compliance for All Affordable Housing Programs**						
3	The City's actual affordable housing inventory is less than the number of restricted units listed on paper, because some tenants exceed income guidelines and some owners collect more rent than allowed. Our analysis found that 6.8% (1,946) of the units exceeded affordability restrictions, such as restrictions on household income (1.6%) or rent (5.2%).	To ensure initial income certifications are completed in a timely manner, HCID and DBS management should:					
		3.4	Consider implementing an automated process to ensure HCID's Occupancy Monitoring Unit is immediately notified when a Certificate of Occupancy is issued for a Housing project with restricted units.	NI	Working with with HCIDLA Systems to implement	0%	2017

I - Implemented
PI - Partially Implemented
NI - Not Implemented
D - Disagree

FORM GEN. 160 (Rev. 6-80)

CITY OF LOS ANGEL.ES
INTER-DEPARTMENTAL CORRESPONDENCE

October 13, 2016

TO: Siri A. Khalsa, CPA
Interim Director of Auditing
Office of the Controller

FROM: Vincent P. Bertoni, AICP
Director of Planning
Department of City Planning

SUBJECT: **RESPONSE TO FINAL DRAFT AUDIT REPORT "IMPACT OF THE DENSITY BONUS PROGRAM ON AFFORDABLE HOUSING"**

Thank you for the opportunity to review the Controller's Office final draft audit of the Density Bonus program. Upon my appointment as Director of Planning this year, the Department of City Planning (DCP) has prioritized affordable housing in a number of work programs across Department divisions—through policy, entitlement review and clearances, and operational improvements. I am fully committed to improving our planning processes and procedures in all aspects of the DCP's operations to achieve positive outcomes in the production of affordable housing, and working collaboratively with your office to identify future areas of change.

The DCP is charged with implementing housing policies through individual project entitlement review, and through developing ordinances and Municipal Code updates for City Planning Commission, City Council, and Mayoral consideration. The Department's emphasis on quality affordable housing production is evidenced by the recently accelerated initiation of affordable housing and density bonus policy work, a new dedicated BuildLA unit, and a new Priority Housing Project Program that operates with expedited functions across the Department. Additional details on these work programs are provided in subsequent pages in specific responses.

I support the full evaluation of the Density Bonus process, policy, and practice, with the goal of creating additional housing that is affordable to low income households. To this end, I will also work closely with the Housing and Community Investment Department (HCID) and the Department of Building and Safety (DBS) to integrate recommended procedures and improve the intersecting responsibilities outlined in this report.

The following pages include responses to your recommendations. For additional assistance or follow up on the comments below, please contact Lisa Webber, Deputy Director (213-978-1274 / lisa.webber@lacity.org), or Shana Bonstin, Principal City Planner (213-978-1217 / shana.bonstin@lacity.org).

DEPARTMENT OF CITY PLANNING COMMENTS ON DENSITY BONUS AUDIT

Recommendation No. 1.2: (Mayor and Council should...) Request an analysis from DCP/DBS/HCID identifying the percentage set-asides and the on-menu incentives requested by developers in prior Density Bonus projects to determine which have been most effective in encouraging Developers to participate in the Density Bonus program, and consider revising the ordinance to increase outcomes.

The Department recently prioritized affordable housing in our long range policy work program, and this year created a Housing Policy Unit designed to focus on these efforts. An update to the Density Bonus Ordinance and Affordable Housing Incentive Guidelines (AHIG) began work in July 2016. Background work has been done to identify areas that require revision. The team is compiling data on existing cases and cataloging which incentives were used most frequently. A component of the policy program will be to work with developers to receive practical input and feedback from the completion of projects in previous cases.

As a part of the Density Bonus Ordinance amendment, the Department will be reevaluating the processes with an aim to streamline procedures such that compliance review could be accomplished by a ministerial sign-off process or a Director-level determination, in lieu of a lengthier approval and determination at the City Planning Commission level. This would also serve to address the concern noted in the summary section of the audit (bottom of page ii), stating that some developers said the existing "process added too much time to their project timeline" to continue to utilize it.

Recommendation No. 1.3: (DCP, HCID, and DBS should...) Work together to track the number of units a developer proposed prior to the Density Bonus Calculation (base units) and, the number of approved incremental bonus units. In addition, separately identify bonus units as either market rate or restricted as affordable, and determine the incremental affordable units that are created through the program.

The DCP is committed to coordinating with HCID and DBS to track the units as recommended by your report. Currently, the Department captures housing unit data for projects when application forms with detailed calculations are submitted and reviewed as part of the DCP entitlement process. Potential future upgrades to the Department's Planning Case Tracking System (PCTS) and the Dwelling Unit Data Tracking function include the creation of new fields to electronically capture this data—incremental bonus units and whether they are market rate or restricted affordable. Furthermore, in working with HCID and DBS, this effort can be coordinated to complement the DBS permitting and HCID covenant recordation processes and also capture data for ministerial projects.

Recommendation 1.6: (DBS, DCP, and HCID should...) Consider developing and using a unique identifier for all projects that can be used by all departments involved in administering development projects. This would enable stakeholders to track the projects' progression and report on the status of various milestones.

The DCP is actively collaborating with DBS on the BuildLA program, which will permit a single application tracking system for use by all departments within the City. A function of this program will be a unique project identifier, equivalent to a "universal" identification number. This year, DCP filled the initial staffing positions for the dedicated BuildLA efforts, in anticipation of commencing work with the consultant, Accela, by the end of the year.

As well, the Department created the Priority Housing Project Program (PHP) this year, in response to the Mayor's Executive Directive 13. The program offers streamlined processing services for qualifying (20%+) affordable housing projects. Prioritization occurs with dedicated staff in each geographically-organized Project Planning Division and Affordable Housing Liaisons at our Development Services Center and the Citywide Policy Division. A housing scorecard has been developed to track the Department's progress. Since January 2016, 20 new projects with a total of 1,883 units have been filed and are being monitored through this program.

Recommendation No. 4.1: (DCP should...) Ensure that the entitlement fee study is completed as soon as possible and implement the appropriate fees in a timely manner.

The DCP received funding to conduct a comprehensive fee study in Fiscal Year 2014/15 and initiated the study in January 2015. The contractor has been working with staff to conduct the fee study and analysis, which includes a review of Density Bonus related fees. A draft report from the contractor is expected this month, October 2016, and the Department is preparing a report on fee revisions to achieve full cost recovery to the City Council. This will address a portion of the concern that existing fees do not cover administrative costs associated with Density Bonus review.

Attachment

VPB:LW:cf

Report Title: Impact of the Density Bonus Incentive Program on Affordable Housing
Department Responsible for Implementation: City Planning (DCP)
Reported Status Date: October 13, 2016

				Department Reported Information			
Finding #	Summmary Description of Finding	Reco No	Recommendation	Current Status	Basis for Status	If I/P, % Complete	Target Date for Implementation
Section I	Density Bonuses: Unclear Benefits for Affordable Housing						
1	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.		To accurately determine the impact of the Density Bonus program on the City's affordable housing inventory, DCP, HCID and DBS should:	PI	Currently, the Department captures housing unit data for projects when application forms with detailed calculations are submitted and reviewed as part of the DCP entitlement process. Potential future upgrades to the Department's PCTS and the Dwelling Unit Data Tracking function include new fields to electronically capture this data—incremental bonus units and whether they are market rate or restricted affordable. Furthermore, in working with HCID and DBS, this effort can be coordinated to complement the DBS permitting and HCID covenant recordation processes and also capture data for ministerial projects	50%	Dec-16
		1.3	Work together to track the number of units a developer proposed prior to the Density Bonus calculation (base units), and the number of approved incremental bonus units. In addition, separately identify bonus units as either market rate or restricted as affordable, and determine the incremental affordable units that are created through the program.				
	None of the administering Departments separately track or report the number of additional units, including the incremental affordable housing units, generated by the Program. Further, the City does not effectively track applications and approvals for Density Bonuses and only began tracking the Land Use restricted affordable units in 2008.		To overcome report shortcomings and evaluate the effectiveness of the Density Bonus programs DBS, DCP and HCID should:			80%	Dec-16
		1.6	Consider developing and using a unique identifier for all projects that can be used by all departments involved in administering development projects. This would enable stakeholders to track the projects' progression and report on the status of various milestones.	PI	DCP is actively collaborating with DBS on the BuildLA program, which will permit a single application tracking system for use by all departments. A function of this program will be a unique project identifier, equivalent to a "universal" identification number. This year, DCP filled the initial staffing positions for the dedicated BuildLA efforts, in anticipation of commencing work with the consultant, Accela, by the end of the year.		
Section III	The City is Missing Opportunities to Collect Density Bonus Related Fees from Developers						
4	Density Bonus related fees collected by the Department of City Planning have not been updated since 2011. There is a risk that fees do not cover the administrative costs to review the Density Bonus entitlement applications.	4.1	Ensure that the entitlement fee study is completed as soon as possible and implement the appropriate fees in a timely manner.	PI	DCP received funding to conduct a fee study and initiated the study in January 2015. The fee study and analysis includes a review of Density Bonus related fees. A draft report is expected this month, October 2016, and the Department is preparing a report on fee revisions to achieve full cost recovery to the City Council.	95%	Dec-16

I - Implemented
PI - Partially Implemented

Case Studies on Transport Policy xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Case Studies on Transport Policy

journal homepage: www.elsevier.com/locate/cstp

Costs and benefits of a road diet conversion

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ARTICLE INFO

Article history:
Received 30 July 2014
Accepted 14 September 2015
Available online xxx

Keywords:
Road diet
Cost-benefit analysis
Safety

ABSTRACT

The analysis presented here is of a cost benefit evaluation of a road diet conversion, reducing an urban arterial street from two-lanes in each direction to one-lane in each direction with a middle turning lane. Livingston Avenue is located in New Brunswick, New Jersey, and is an oversized arterial corridor accessing the center of the city. The costs include increases in travel time from the capacity reduction. These are modeled with a VISSIM micro-simulation of the street. Safety benefits of road diets are one of the main reasons that these are pursued. Evidence on the safety effect suggests that road diet conversions of arterial streets in urban areas will achieve about a 19% reduction in crashes. The benefits of crash reductions and the costs of increased delay are evaluated based on the value of statistical lives saved versus the cost of travel time. This is done for various different scenarios and includes robustness checks. Results overwhelmingly find benefits exceed costs over a 20 year period.
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1. Introduction

Complete Streets policies are aimed at balancing the needs of all roadway users, encouraging and allowing safe travel by bicyclists, pedestrians, transit users, and freight, in addition to existing car traffic. This is made possible through the transformation of the built environment and may include the installation of bicycle lanes, crosswalks, sidewalks, pedestrian signals, and transit stops. It may also include the addition of median islands, curb extensions, or the occasional road diet. The latter is the focus of this analysis for Livingston Avenue in New Brunswick, New Jersey, a major arterial road that cuts through a residential area and feeds the center of the city. There is substantial pedestrian traffic that crosses the street at both signalized and unsignalized crosswalks. This study was a collaboration funded by a Rutgers University Community–University partnership grant. The focus was on determining the costs and benefits of implementing a road diet along Livingston Avenue.

The City of New Brunswick adopted a Complete Streets policy in May 2009. The policy reinforced the city's commitment to "creating a comprehensive, integrated, connected street network that safely accommodates all road users of all abilities and for all trips." (City of New Brunswick, 2013a) The city has since made plans to increase investment in bicycle and pedestrian infrastructure(Barna, 2013; Bradshaw, 2013a,b) and has also passed legislation and increased traffic enforcement in an attempt to eradicate preventable vehicular-pedestrian crashes. (Bradshaw, 2013a,b) This study, thus, is an instrumental part of this plan. However, at initial stages of this work, it was clear that the City was concerned about public opposition to any reductions in road capacity that might slow traffic entering the City.[1]

This analysis is intended to evaluate the feasibility of a road diet on Livingston Avenue to understand how this may affect traffic flow and also to evaluate the benefits and costs of the conversion. There is evidence that road diets are effective at reducing crashes and reducing speeds (Gates et al., 2007; Pawlovich et al., 2006; Thomas, 2013) and some evidence that there is no effect (Huang et al., 2002). A synthesis of the literature concluded that road diets are effective at reducing crashes (Thomas, 2013). Specifically, the costs are primarily associated with any traffic delay that might occur, while the benefits are based on potential reductions in traffic crashes, including those with pedestrians.

The approach taken here is to investigate the feasibility of a road diet by analyzing the results of a micro-simulation of the traffic network using VISSIM software. VISSIM is a microscopic, time step and behavior-based simulation model developed to model urban traffic and public transport operations (Planung Transport Verkehr

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[1] This was expressed in an early meeting with city staff. There was a desire to complete the work prior to the start of a mayoral election campaign, since the plan was seen as controversial and would likely be opposed by voters.

http://dx.doi.org/10.1016/j.cstp.2015.09.002
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Please cite this article in press as: R.B. Noland, et al., Costs and benefits of a road diet conversion, Case Stud. Transp. Policy (2015), http://dx.doi.org/10.1016/j.cstp.2015.09.002

(PTV), 2012). VISSIM is particularly useful for examining different scenarios with altered lane configurations and signal timings. The key output provided by the model is the total travel time within the network as well as the time each vehicle is delayed. This provides a means of assessing how the relative level of service of Livingston Avenue and the key intersections are affected by various road diet configurations. Estimates of crash and injury reduction are based on recent research suggesting that road diets can reduce crashes by 19% (Thomas, 2013), and additional scenario analysis is conducted to investigate the robustness of the cost/benefit analysis.

2. Background

New Brunswick is located in central New Jersey and sits along the Raritan River. It is the county seat of Middlesex County. The population is about 50% Hispanic, 16% African–American and totals about 55,000 residents. Over one-third of the population is foreign born. About 25% of the population is below the poverty line and median household income is $40,280 based on the American Community Survey 5-year estimate, and average household income is $53,854. New Brunswick is home to the main campus of Rutgers University with an enrollment of over 40,000 students. The city is relatively densely populated at about 10,500 residents per square mile (4075 per sq km) (City of New Brunswick, 2013b). Employment in the city has grown to about 27,000 jobs from 20,000 in 1990. Rutgers University and Johnson & Johnson (which is headquartered in New Brunswick) are the two major employers in the city.

The northeast corridor offers direct train service to New York City, which has led to major redevelopment of the city as a transit-oriented development. About 10% of the population commutes to work by public transportation and slightly over 3% walk to work. Much of the city is very walkable, with adequate sidewalks along almost all major and minor streets.

Livingston Avenue (also known as county route 691), the subject of this study, is a major local street corridor that connects downtown New Brunswick with US route 1 in the south. It stretches about 3.5 miles (5.6 km) and provides access to the many neighborhoods within the city. Livingston Avenue has two lanes in each direction with a 25 mph speed limit for almost its entire length in New Brunswick. The roadway has an AM peak traffic volume of about 14,000 vehicles and a PM peak volume of about 17,500–18,000 vehicles, over three hours for each peak. Most vehicles exceed the speed limit of 25 mph (40 km/h). Land uses along the street are a mix of residential, retail, and small offices. A number of uses fronting on Livingston Avenue attract vulnerable road users, including three elementary schools, a rehabilitation center for the blind, the public library, a 50-unit senior citizen apartment building, multiple churches and a Rutgers University academic building. Total pedestrian activity tabulated during this study amounted to over 9000 street crossings for both the morning and evening peak periods (over three hours in each peak), for counts at nine intersections along Livingston Avenue.

The street enters North Brunswick to the south where it reduces to three lanes, one of which is a central turn lane and has an increased speed limit of 35 mph (56 km/h). Along this final stretch in North Brunswick the environment becomes more suburban in character and the sidewalks disappear.

Livingston Avenue has been identified as having on over-representation of pedestrian crashes among county roads in Middlesex county (Kaplan et al., 2012). Classified as an urban minor arterial, it is meant to interconnect with and augment the principal highway system. According to a road safety audit conducted in 2011 there were a total of 113 vehicle crashes between 2007 and 2009. Of these, 17% involved a pedestrian and 6% involved a bicyclist (Kaplan et al., 2012). Over two-thirds of the pedestrian crashes occurred at night and most were at major intersections along Livingston Avenue. According to the safety audit, 49 of the 113 crashes (43%) resulted in an injury, with 54 people having injuries; there were no fatal crashes during this time period. One issue noted in the audit is that the police department reported that many pedestrian crashes occur when vehicles that

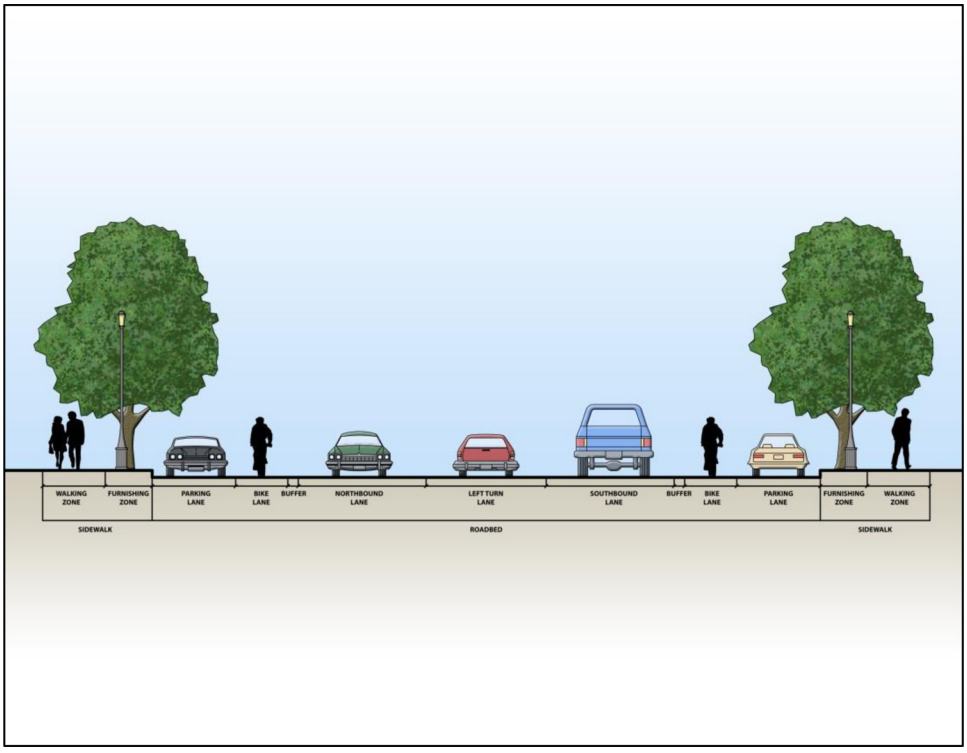

Fig. 1. Road diet cross-section showing a typical configuration.

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are stopped for the pedestrian block the view of other vehicles that are passing. The road safety audit recommended consideration of a road diet as one way to mitigate these occurrences.

A road diet generally consists of converting a four lane road to a three lane road where the middle lane is a two-way turning lane; Fig. 1 displays a typical cross-section. Bicycle lanes (or wider shoulders) are also often part of the redesign of the road as there is now adequate space for them. Figs. 2 and 3 show before and after photos of a road diet on Livingston Avenue (the latter being a visualization of what it would look like). The study area for this project includes only the 1.5 mile segment of Livingston Avenue (shown in Fig. 4) that lies fully within the City of New Brunswick. There are a number of key pedestrian attractors shown in Fig. 4, in addition to bus stops that line the street.

Recent research has demonstrated that road diets can significantly reduce crashes (Thomas, 2013). A review commissioned by the FHWA synthesized the available research that has evaluated crash rates before and after implementation of a road diet. While not many projects have been evaluated, the results of this synthesis suggest that in large urban areas crashes can be reduced by about 19%. For rural highways that pass through smaller urban areas this can be as much as a 47% reduction in crashes. No studies have evaluated the impact on traffic fatalities and more severe injuries, but one would expect these to also be reduced.

3. Data

3.1. Traffic counts

To estimate travel times, a VISSIM model was calibrated for Livingston Avenue. In order to calibrate the VISSIM model to actual traffic conditions, traffic counts were collected at various sites along the corridor. Physical turning movement counts at each of the five major signalized intersections were also collected, and one representative unsignalized intersection location. These data were collected on weekdays in November and December, 2012 for 3 h duration for both AM peak hour (7AM–10AM) and PM peak hour (3PM–6PM). Two additional counts were performed during the AM and PM peak period to confirm the proportion of truck and bus traffic on Livingston Avenue.

In setting up the traffic assignment in VISSIM, we used the average counts for each signalized intersection. The traffic flow at each unsignalized intersection was scaled proportionally based on the counts from one unsignalized intersection. Thus, the turning movements for each unsignalized intersection were proportionally equivalent, but scaled up or down based on the Livingston Avenue traffic flow passing each unsignalized intersection. Pedestrian counts were also obtained at these intersections, plus three additional locations with large pedestrian attractors. The total number of pedestrians who crossed Livingston Avenue for the six hours in which counts were made is 3393 pedestrians (the balance of almost 6000 crossings were along side streets), indicating a high degree of exposure and potential risk. Our simulation did not include vehicle-pedestrian interactions.

3.2. Road geometry

The road geometry data are derived from the 2012 New Jersey High Resolution Orthophotography, downloaded from the New Jersey Geographic Information Network (New Jersey Geographic Information Network, 2013). The images were combined together in ArcGIS from which an image was exported to serve as the base map for the simulation. The map provides basic road geometry data, such as the edges of the roads, the centerline of the roads and other geometry. The basic road network was then plotted in VISSIM using this image as background.

3.3. Signal timings

The existing traffic signals are timed with actuated signals at the intersections of Livingston Avenue with New Street, Suydam Street, Handy Street, Sandford Street, and Nassau. There are separate timing plans for the morning and evening. The signals



Fig. 2. Livingston Avenue as it is currently configured.

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Fig. 3. A visualization of Livingston Avenue with a road diet.

operate on simple two- or three-phase plans allowing for extended green time when the pedestrian request is called in order to allow sufficient time for pedestrians to safely cross Livingston Avenue. The cycle length is fixed at 90 s for New Street and Nassau Street. Variable cycle lengths are allowed at Suydam Street (52–80 s), Handy Street (56–80 s), and Sandford Street (54–80 s).

For the study of the Livingston Avenue corridor, we did not collect sufficiently detailed data to record how often the signal is actuated for pedestrians or how often the vehicle extension was actuated. The analysis was conducted treating the signal timings as fixed as though there were high traffic and pedestrian demand in every cycle. The fixed timing plans used as the existing case for the study are summarized in Table 1. This is consistent with operation of the corridor at its capacity when all of the actuated phases would be at their maximum length. In the interest of studying the performance of the corridor during the height of the AM and PM

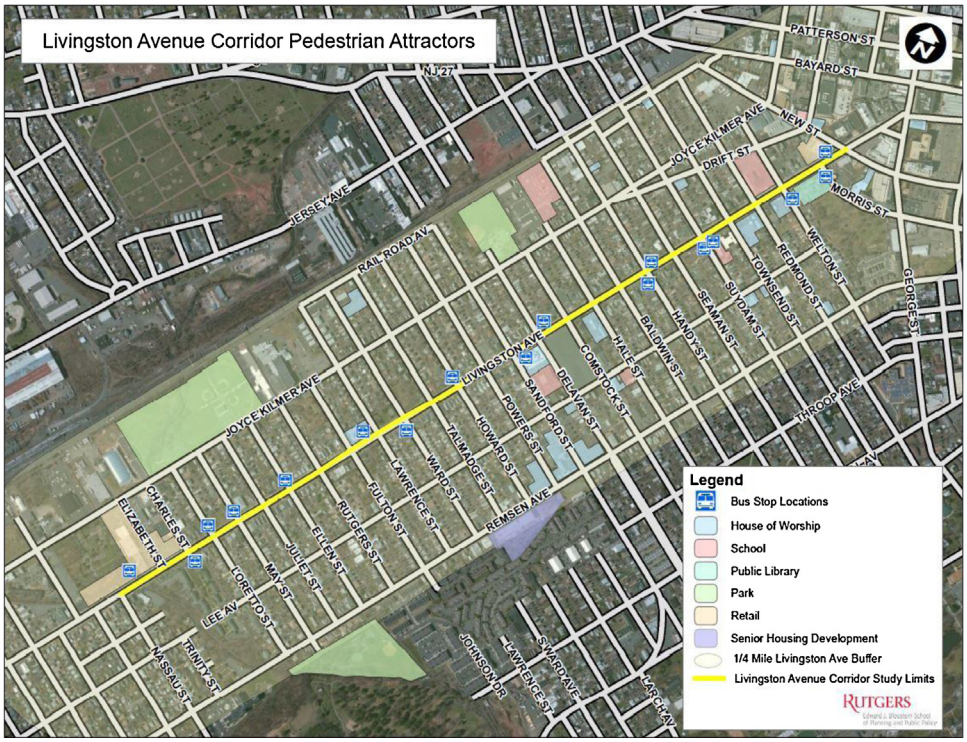

Fig. 4. Livingston Avenue Study Area, with key pedestrian attractors.

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peaks, we are able to provide an estimate of the worst-case level of service for car traffic during the busiest time of the day. Therefore predictions of future performance are conservative and robust if pedestrian traffic in the corridor were to increase substantially in the future.

The simulation model was calibrated to recreate existing traffic conditions with the current signal timings and traffic flows. The road diet on Livingston Avenue was then simulated with these existing signal timings to estimate the effect on intersection level of service from changing the street geometry without adjusting the traffic signals. The simulations resulted in excess congestion during the evening peak period. A set of re-optimized signal timings were developed specifically for the evening peak period to better reflect the changed traffic conditions.

Synchro 8 was used to re-optimize the cycle length, phase lengths, and offsets in order to provide coordination for an efficient green wave for the peak travel direction (i.e., outbound from downtown New Bunswick), and minimize the effects of queue spillbacks blocking other intersections. Since the proposed road diet reduces the capacity at intersections, a longer cycle length is needed in order to reduce the effect of the lost time between phases on the intersection's capacity. The optimized signal timing plan for the evening peak, accounting for the changed geometry of the road diet, is summarized in Table 2.

The cycle length is set to 100 s at all intersections so that the signal phases are coordinated in every signal cycle. All phases are greater in length than the minimum time required for pedestrians to cross the intersection as estimated from existing pedestrian signal phases along Livingston Avenue.

4. Simulation assumptions

Various assumptions and settings must be made in VISSIM prior to running a simulation. These include speed distribution assumptions, vehicle composition, and driver and pedestrian behavior.

For the speed distribution we use an “S” curve based on a speed limit of 30 mph, despite the posted limit being 25 mph. Observation of the street suggested that only a small fraction of vehicles observed the posted speed limit. Resource limitations prevented us from collecting actual speed data for Livingston Avenue. Average speed along Livingston Ave. within the simulation was 15.35 mph (24.7 km/h) during the AM peak period and 14.71 mph (23.7 km/h) during the PM peak period. This takes into account any vehicle stops at signalized intersections and other vehicles in the roadway.

Data on vehicle mix was collected. Buses and trucks are a very small proportion of the traffic flow during peak periods. We set both as Heavy Goods Vehicles (HGV) in VISSIM. During the AM peak the percent HGV was 5%, while during the PM peak the percent HGV was 3%.

The settings for driver behavior were assumed to be the urban (motorized) environment default parameters as specified by VISSIM. These are based on Wiedeman's car following model (Planung Transport Verkehr (PTV), 2012; Wiedemann, 1974). The driving behavior parameters as specified in VISSIM are as follows: look ahead distance, minimum: 0 ft, maximum: 820.21 ft (250 m); look back distance minimum: 0 ft, maximum: 492.13 ft. (150 m); average standstill distance: 6.56 ft (2 m), additive part of safety distance: 2.00 ft (0.61 m), and multiplicative part of safety distance: 3.00 ft (0.91 m).

The road diet was configured in VISSIM by realigning the lanes for vehicular traffic to fit within a narrower right of way that would allow for installation of bicycle lanes on both sides of Livingston Avenue. Since VISSIM does not have a straightforward way to model a shared left turn lane, the lane alignment at each intersection has been carefully constructed so that left turning vehicles from Livingston Avenue and from side streets interact in a realistic way. The simulated network with the road diet has been configured to recreate the vehicular interactions that would result from a shared left turn lane and, most importantly, to exhibit the expected capacity for vehicular traffic in the corridor.

For turning behavior we assume that if a vehicle is turning right from a side street to Livingston Ave, it will enter the right side lane of Livingston Ave. Left turning vehicles will enter the left side lane of Livingston Ave. Our road diet scenarios (discussed below) include a center lane that left turning vehicles will turn into from side streets, prior to merging with the flow of traffic.

5. Road diet scenarios

Our base case scenarios included both peak hours, AM and PM, based on our traffic counts and the signal cycles discussed

Table 1
Existing timing plan (s).

Intersection	Green	Yellow	All red	Phase total
New St. (6AM–9AM)				
Livingston Ave (all movements)	38	3	3	44
New St. (WB lead)	10	3		13
New St. (all movements)	26	3	4	33
New St. (all other times)				
Livingston Ave (all movements)	28	3	3	34
New St. (WB lead)	10	3		13
New St. (all movements)	36	3	4	43
Suydam St.				
Livingston Ave (all movements)	34	4	2	40
Suydam St. (all movements)	34	4	2	40
Handy St.				
Livingston Ave (all movements)	39	3	2	44
Handy St. (all movements)	30	4	2	36
Sandford St.				
Livingston Ave (all movements)	36	4	2	42
Sandford St. (all movements)	32	4	2	38
Nassau St.				
Livingston Ave (all movements)	36	4	2	42
Nassau St. (all movements)	32	4	2	38

Table 2
Re-optimized timing plan for PM peak (s).

Intersection	Green	Yellow	All red	Phase total
New St. (offset = 0)				
Livingston Ave all movements)	32	3	3	38
New St. (WB lead)	10	3		13
New St. (all movements)	42	3	4	49
Suydam St. (offset = 61)				
Livingston Ave (all movements)	48	4	2	54
Suydam St. (all movements)	40	4	2	46
Handy St. (offset = 52)				
Livingston Ave (NB lead)	6	3		9
Livingston Ave (all movements)	49	3	2	54
Handy St. (all movements)	31	4	2	37
Sandford St. (offset = 98)				
Livingston Ave (all movements)	51	4	2	57
Sandford St. (all movements)	37	4	2	43
Nassau St. (offset = 0)				
Livingston Ave (all movements)	51	4	2	62
Nassau St. (all movements)	32	4	2	38

Note: All offsets are for the beginning of the first listed phase relative to the intersection at New St.

previously. The model was calibrated and adjusted as needed to match these counts and achieve a smooth flow without any major backups at intersections. Of particular note is the intersection with New Street at the northern end of Livingston Avenue. This is just prior to the core area of downtown New Brunswick. Most of the inbound traffic turns right, flowing towards NJ state route 18, a controlled access road that parallels the Raritan River, both bypassing downtown New Brunswick to the north and headed towards US route 1 and the New Jersey Turnpike towards the south.

Our first road diet scenario included a center turning lane for the entire length of Livingston Avenue, from New Street to Nassau Street. The traffic lanes were reduced to one lane in each direction from two lanes in each direction in the base case. Bicycle lanes were also included, although we did not simulate bicycle traffic.

In our initial road diet simulations, the PM peak hour model resulted in significant congestion and spillback at the northern end of Livingston Avenue. This resulted in blocking side street turns into Livingston Avenue. We re-optimized the signal timing in an attempt to fix this problem. Unfortunately, these changes were insufficient to alleviate the spillback problem.

Given the problem with this simulation we tested what would happen by incrementally reducing the total traffic volume from 2% up to 10%, in steps of 2%. The simulation performed adequately with the traffic volume reduced by 10% with the original signal timings. With modified signal timings (discussed previously) the simulation was adequate with an 8% reduction in traffic.

We feel that an 8–10% reduction in volume may be a realistic outcome when the road diet is implemented. First, if the road were to congest to the extent that our simulation suggested with a major spillback, then some drivers would opt to find different routes. In theory, the increase in congestion should lead to some suppression of demand. The opposite effect, induced demand, is a documented response to increased road capacity (Noland and Lem, 2002). As we are reducing road capacity by up to 50% for the 1.5 mile stretch of Livingston Avenue, applying a lower bound lane-mile elasticity of 0.2 would result in a 20% reduction in vehicle-miles of travel along the road (Noland and Lem, 2002). Thus, we feel an 8–10% reduction is at the low range of probable responses.

An alternative scenario was also tested that would not require any assumptions on reducing total traffic. Since most of the spillback problem is between New Street and Handy Street we tested alternative modifications to the road network between these streets.

One scenario involved not implementing the road diet between these two intersections. Thus, this part of Livingston Avenue would continue to be a four-lane road. This is not an optimal design from a walkability perspective as it is precisely this end of Livingston Avenue that is closest to downtown New Brunswick and has the most pedestrian traffic. This scenario worked well with the original signal timings.

Our other scenario to alleviate this problem was to keep two lanes for the southbound travel direction from New Street to Handy Street while the northbound flow would remain one lane. There were no spillback issues with the northbound flow, so this solution was aimed at allowing better flow for those vehicles turning into Livingston Avenue from New Street. This scenario worked well with the re-optimized signal timing.

6. Simulation results

In total seven simulations were run. These included our base case AM and PM calibrations that provide a baseline for existing traffic conditions. Road diet scenarios included one AM scenario with the full road diet. For the PM road diet scenarios several simulations were run, given the spillback problems that occurred. PM road diet scenarios included 8% and 10% traffic reduction, the former with the re-optimized signal plan, one with no road diet from New St. to Handy St., and one with one northbound and two southbound lanes between New St. and Handy St. Each simulation was run for three hours of traffic, omitting the first and last five minutes of the simulation in calculating results. Details of each scenario are listed in Table 3.

As VISSIM is a stochastic model, each simulation was run ten times and each measure of effectiveness was evaluated based on its mean and standard deviation. The standard deviation in all our simulations is small, thus random variation in results is not an issue. The vehicles in the simulations were calibrated to actual traffic count data but vary slightly due to stochasticity. For the AM peak the simulation count is generally slightly less than 14,000 vehicles and for the PM peak about 18,500–19,000 vehicles (except for those scenarios where the vehicles are intentionally reduced). These results are shown in Table 4.

We measured the total travel time per vehicle along the corridor, the delay time per vehicle, and the delay time per vehicle for each of the signalized intersections, allowing the Level of Service (LOS) to be evaluated. Results for total travel along the corridor and corresponding delay times per vehicle are shown in Table 4. These are evaluated relative to the AM and PM base case scenarios.

The base case scenarios (1 and 2) both have an average delay of slightly over 30 s. For our road diet simulations this increases to about 47 s for the AM period. Of the various PM road diet scenarios tested, the lowest delay occurs in scenario 6, when no road diet is implemented for the northern blocks of Livingston Avenue, avoiding the spillbacks in the simulation. If we assume a 10% reduction in traffic (scenario 5), the average delay is similar. When only two southbound lanes are maintained (scenario 7) the increase in delay is larger than implementing the entire road diet (with a reduction in traffic). The last column shows the increase in total delay relative to the base case (AM and PM, respectively). Using the road diet results with the lowest level of delay for both AM and PM periods we have a total increase calculated for all vehicles of 61.89 and 56.15 h of delay per workday, respectively, or 118.04 h. This does not account for any alternative routes that the 10% reduction in PM traffic may have taken to avoid the more congested road.

An alternative measure is to examine the change in travel times for those vehicles traversing the length of Livingston Avenue. These would likely be vehicles making non-local trips and commute trips. Table 4 also displays the result for both northbound and

Table 3
Scenarios simulated with VISSIM.

Scenario number	Scenario	Scenario description
1	Base case	AM
2		PM
3	Road diet	AM
4		PM–8% traffic reduction, re-optimized signal timings
5		PM–10% traffic reduction, original signal timings
6		PM–4 lanes maintained from New St. to Handy St.
7		PM–2 southbound lanes maintained from New St. to Handy St., and 1 northbound lane

Please cite this article in press as: R.B. Noland, et al., Costs and benefits of a road diet conversion, Case Stud. Transp. Policy (2015), http://dx.doi.org/10.1016/j.cstp.2015.09.002

Table 4
Performance measures for simulated results.

Scenario Number	Scenario	Average delay per vehicle (s)	Average speed (mph)	Average Number of vehicles	Total increase in delay (hrs)	Average travel time—New St. to Nassau (south-bound) (s)	Average travel time—Nassau St. to New St. (north-bound) (s)	Average delay time—New St. to Nassau (south-bound) (s)	Average delay time—Nassau St. to New St. (north-bound) (s)	Increase in average delay (south-bound) (s)	Increase in average delay (north-bound) (s)	Total increase in average delay, both directions (s)
1	Base	31.10	15.35	13964	–	297.33	319.78	66.86	89.83	–	–	–
2	case	32.44	14.71	18963	–	316.98	304.56	85.21	74.48	–	–	–
3	Road	47.03	13.32	13984	61.89	333.29	406.58	101.94	176.03	35.08	86.20	121.27
4	diet	49.31	12.57	17798	83.36	385.64	368.59	153.75	138.72	68.53	64.24	132.77
5		44.00	13.11	17499	56.15	381.52	360.96	150.27	129.61	65.06	55.13	120.19
6		43.47	13.25	18975	58.14	375.45	348.08	143.41	119.30	58.20	44.82	103.02
7		52.66	12.30	18982	106.61	390.08	391.21	157.50	159.69	72.29	85.21	157.50

southbound average travel times and average delay as well as the increase in average delay time (relative to the base case AM and PM scenarios). VISSIM does not provide data on the number of vehicles traversing the length of Livingston Avenue, thus we cannot calculate a total aggregate delay.

Base case average travel times are about 300 s, for both the AM and PM peaks in both directions. The road diet increases these average travel times to no more than about 400 s, with most scenarios less than 400 s.

The final column summarizes the average increase in delay time for each scenario. This is the sum of the northbound and southbound increase in average delay. The road diet scenarios add about 120 s of additional delay; the lowest increase in average delay is when no road diet is implemented between Handy St. and New St. (scenario 6).

Delay at each signalized intersection is also analyzed. Results are shown in Table 5 for the five signalized intersections along Livingston Avenue that were simulated. Both average delay time for all vehicles entering each intersection as well as the Level of Service (LOS) are reported. For New Street and Nassau Street the LOS does not change for any of the scenarios, remaining at C for New Street and B for Nassau Street. The other three intersections are all at LOS B in the base case analysis; some deteriorate to LOS C, but this is still considered an adequate LOS. Those intersections that deteriorate from LOS B to LOS C show minor changes in total average delay.

7. Benefit-cost analysis of road diet implementation

Implementation of a road diet results in benefits to a community from the reduction of traffic crashes that would otherwise occur. The trade-off is that this also involves an increase in travel time for those using the road, as one objective of a road diet is to slow traffic down. The benefits and costs of implementation can be compared by conducting a benefit-cost analysis of the impacts of the road diet. This is based on analyzing the estimated dollar value of crash reduction and the dollar value of increases in travel time. The US Department of Transportation provides guidance on how to conduct these analyses (Trottenberg and Rivkin, 2013; Trottenberg and Belenky, 2011).

To analyze the benefits of crash reduction, US DOT guidance provides estimates of the value of a statistical life. This is defined as "the additional cost that individuals would be willing to bear for improvements in safety . . . that, in the aggregate, reduce the expected number of fatalities by one." (Trottenberg and Rivkin, 2013). The value estimated for the year 2011 is $9.1 million with the recommendation that low and high values of $5.2 million to $12.9 million be evaluated. This value is indexed by 1.07% per year, under the assumption that increases in median real wages over time will result in higher valuations of statistical life. Therefore, for 2014 the value is $9,295,782 with the corresponding low and high values being $5,311,875 and $13,177,537, respectively.

While these values apply to fatal crashes, most crashes do not result in a fatality. Thus, guidance is also provided on crashes that result in a range of different levels of severity. These are valued as a fraction of the value of a statistical life as shown in Table 6.

As previously mentioned, the road audit of Livingston Avenue reported 113 crashes over 3 years, so this is slightly less than 38 crashes per year, on average.[2] Some 17% involved pedestrians and 6% involved bicyclists, and 43% involved an injury, or 49 crashes with 54 injuries in total (Kaplan et al., 2012). Assuming an estimated reduction in crashes of 19%, this would be 7.16 fewer crashes per year, on average (Thomas, 2013) and assuming an equivalent reduction in injuries, this would be 3.42 fewer injuries per year. Slightly more than half the crashes were property-damage only crashes; these have additional costs that are not considered in this analysis.

The road safety audit of Livingston Avenue does not provide full information on the severity of crashes. About 6–7% of all pedestrian casualties are fatal in the state of New Jersey, but we do not expect this high a fraction on roads in urban areas, so we assume 1% is not survivable. For vehicle only crashes we assume 0.01% are not survivable. Based on this information we assume the distribution of severity as displayed in Table 7.

The assumptions in Table 7 can be combined to develop a weighted value of statistical life based on this distribution of crashes and the split of vehicle versus non-motorized crashes on Livingston Ave. This is shown for low, mean, and high estimates of the value of a statistical life in Table 8 for annual crashes on Livingston Avenue.

Assuming the road diet results in a 19% reduction in crashes, and that the distribution of severity levels stay the same, the cost savings from the road diet in 2014 would be as shown in Table 9.

The cost of the increase in travel time associated with the road diet can be estimated based on the value of travel time (Trottenberg and Belenky, 2011). Guidance from the US DOT recommends that for personal travel this is 50% of the nationwide median household income, with plausible ranges varying from 35 to 60%. For business travel, the value of travel time is 100% of the nationwide median household income. Both are inflated by 1.6% per year, reflecting estimates of increases in the valuation of time. The nationwide median household income was $53,046 in 2012. New Jersey has a higher median household income of $71,637, while Middlesex County's median household income is even higher at $79,442. New Brunswick however has a median household income of only $40,280. This suggests a range of values

[2] The road safety audit only measured crashes between Suydam and Nassau St., about a one-mile stretch of the full 1.5 mile road. Thus, this is a low estimate.

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Table 5
Average delay and level of service (LOS) at each signalized intersection.

Scenario number	Scenario	New St.		Suydam street		Handy street		Sanford street		Nassau street	
		Average delay time (s)	LOS	Average delay time (s)	LOS	Average delay time (s)	LOS	Average delay time (s)	LOS	Average delay time (s)	LOS
1	Base	22.32	C	17.81	B	16.60	B	16.22	B	15.77	B
2	case	23.11	C	19.59	B	17.95	B	17.61	B	16.23	B
3	Road	21.84	C	18.68	B	19.58	B	18.15	B	16.41	B
4	diet	26.11	C	25.57	C	25.14	C	21.64	C	17.85	B
5		22.08	C	23.54	C	19.22	B	18.08	B	16.63	B
6		23.15	C	19.76	B	18.31	B	21.02	C	17.28	B
7		25.27	C	23.58	C	26.39	C	22.49	C	18.78	B

Table 6
Relative disutility factors by injury severity level (AIS).

AIS level	Severity	Fraction of VSL
AIS 1	Minor	0.003
AIS 2	Moderate	0.047
AIS 3	Serious	0.105
AIS 4	Severe	0.266
AIS 5	Critical	0.593
AIS 6	Unsurvivable	1.000

Source: (Trottenberg and Rivkin, 2013).
Note: AIS is abbreviated injury scale.

Table 7
Assumptions on severity of crashes on Livingston Avenue.

AIS Level	Severity	Distribution of crashes vehicle crashes	Distribution of non-motorized crashes
AIS 1	Minor	80.00%	20.00%
AIS 2	Moderate	10.00%	40.00%
AIS 3	Serious	6.99%	20.00%
AIS 4	Severe	2.00%	12.00%
AIS 5	Critical	1.00%	7.00%
AIS 6	Unsurvivable	0.01%	1.00%

Table 8
Cost of all annual crashes on livingston avenue based on statistical value of life and weighted severity assumptions.

AIS Level	Severity	Low valuation	Mean valuation	High valuation
AIS 1	Minor	$144,720	$253,259	$359,016
AIS 2	Moderate	$1,094,486	$1,915,351	$2,715,167
AIS 3	Serious	$1,324,522	$2,317,913	$3,285,833
AIS 4	Severe	$1,728,502	$3,024,879	$4,288,015
AIS 5	Critical	$2,199,585	$3,849,274	$5,456,663
AIS 6	Unsurvivable	$465,065	$813,864	$1,153,719
Total		$6,956,880	$12,174,540	$17,258,413

Table 9
Cost savings based on value of a statistical life and severity weighting assumptions, for year 2014.

AIS Level	Severity	Low valuation	Mean valuation	High valuation
AIS 1	Minor	$27,497	$48,119	$68,213
AIS 2	Moderate	$207,952	$363,917	$515,882
AIS 3	Serious	$251,659	$440,403	$624,308
AIS 4	Severe	$328,415	$574,727	$814,723
AIS 5	Critical	$417,921	$731,362	$1,036,766
AIS 6	Unsurvivable	$88,362	$154,634	$219,207
Total		$1,321,807	$2,313,163	$3,279,099

to use for estimating travel time costs for this analysis; we analyze results assuming New Brunswick household income (low), Middlesex County household income (high), as well as US household income. Hourly value of time assumptions are shown in Table 10. These are applied for 260 work days per year based on US DOT guidance (Trottenberg and Belenky, 2011).

Travel for business must also be taken into account. While our traffic counts could not discern all business travel, we did count heavy-goods vehicles and buses. These were 5% of the count during the PM peak and 3% during the AM peak.

We also assume that average occupancy of each vehicle is 1.2 people. We did not count occupancy rates, but this is a reasonable assumption as most vehicles are single-occupant.

Based on these assumptions, we can estimate how each road diet scenario will increase the cost of travel time in 2014, including both AM and PM peak periods when delay occurs. Results for each scenario are presented, summing both the AM and PM analysis of delay. These are shown in Table 11.

The construction costs of converting the road must also be taken into account. While we don't have any specific values, road diet conversions can be relatively cheap and mainly involve restriping of the road. Removal of existing stripes would also be necessary. Based on contractor estimates from New Jersey bid sheet data, we assume that the cost for both striping and restriping is about $2000 per mile. This would be done for a 1.5 mile length; four existing stripes would be removed while an additional eight new stripes would be painted. A bicycle lane would also be required for each side of the road; we assume the bicycle lanes cost as much as putting down eight stripes. This gives a cost estimate of $60,000.

The total cost and benefits of the annual travel time costs and safety benefits are evaluated over a 20 year project lifetime. Construction costs occur in the first year and the stream of costs and benefits are discounted to the present. We assume a 4% discount rate. This provides a net present value for the project.

Results are presented for all combinations of estimates for each road diet scenario. In Table 12 we present the results using US DOT recommended valuations of travel time (based on median US household income), for low, middle, and high valuations of statistical lives saved. In Table 13 we include the highest value of time estimates, based on Middlesex County median incomes. All scenarios show a large positive net present value over 20 years.

These results assume a 19% reduction in crashes and that the cost of restriping is $60,000. Both these assumptions could be off. To evaluate this, the break-even crash reduction needed to have a benefit is calculated by varying these assumptions for the scenario with the highest travel time cost and the lowest VSL. Assuming a $60,000 construction cost, a crash reduction of only 16.46% is needed to break even. If the cost were $6,000,000, then the crash reduction needed would be 22.19%. Both of these are within the margin of error one would expect and given that this is the most conservative scenario, it is clear that overall there would be net benefits from a road diet conversion.

Our analysis did not account for growth in traffic over time. While there is evidence of a saturation in growth of travel (otherwise

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Table 10
Value of travel time assumptions.

	Value of time per hour	
	Personal travel (50%)	Business travel (100%)
New Brunswick	$9.68	$19.37
Nationwide	$12.75	$25.50
New Jersey	$17.22	$34.44
Middlesex County	$19.10	$38.19

Table 11
Estimated cost of delay for one year for different value of travel time assumptions (2012 valuations).

Scenario, combining AM and PM delay	Total cost of delay (New Brunswick household income)	Total cost of delay (US household income)	Total cost of delay (Middlesex County household income)
4	$396,001	$593,849	$883,474
5	$320,650	$481,987	$717,276
6	$326,161	$490,168	$729,431
7	$460,386	$689,431	$1,025,485

Table 12
Net present value of road diet, assuming US median household income for estimates of travel time costs.

Scenario, combining AM and PM delay	Low VSL	Middle VSL	High VSL
4	$9,789,504	$21,315,067	$38,946,998
5	$11,643,283	$23,168,846	$40,800,777
6	$11,507,707	$23,033,270	$40,665,201
7	$8,205,515	$19,731,077	$37,363,009

VSL: valuation of statistical life.

Table 13
Net present value of road diet, assuming Middlesex County median household income for estimates of travel time costs.

Scenario, combining AM and PM delay	Low VSL	Middle VSL	High VSL
4	$4,989,838	$16,515,401	$34,147,332
5	$7,744,071	$19,269,634	$36,901,565
6	$7,542,641	$19,068,204	$36,700,135
7	$2,636,441	$14,162,004	$31,793,935

VSL: valuation of statistical life.

known as “peak car”) (Goodwin and Van Dender, 2013), we might still expect some growth in traffic associated with further development in New Brunswick. While we did not run a simulation model with additional traffic, we adjusted the travel cost for each scenario to assume a 3% annual growth in traffic over 20 years. This is probably unrealistic, but the bottom line is that it results in only two negative net present value estimates over a 20 year lifetime (scenarios 4 and 7 with a low valuation of statistical life). Thus, the results are very robust with respect to growth in traffic.

Many other factors not accounted for in this analysis may affect both the benefits and costs of the road diet conversion. On the benefits side, we have not accounted for the benefits that pedestrians receive from less time crossing Livingston Avenue and how their travel time may be reduced. We have also not accounted for the benefits that bicyclists receive, such as health benefits, or the savings associated with using a lower cost mode of travel. Reducing property damage only crashes also is a benefit, and this has not been included in the valuations. On the cost side, we have not accounted for the costs associated with diverting some traffic or suppressing demand, as well as how travel time and crashes may change on parallel routes. Given the large magnitude of the benefits, we would not expect these to change the finding that the road diet provides a positive net present value.

8. Conclusions

Our results have shown that implementation of a road diet, consistent with a complete streets policy along Livingston Avenue will result in some extra delay to traffic both along and within the corridor. However, the costs of the delay to traffic are less than the large benefits associated with the reduction in traffic crashes, based on a cost/benefit analysis. Furthermore, the implementation of a road diet with modifications to the signal timing to improve traffic flow will result in no or little change in the Level of Service (LOS) along Livingston Avenue. Where the LOS is degraded, the new LOS is still within acceptable service levels. Additionally, as a large majority of vehicles on the roadway have been identified as traveling in excess of the speed limit, the minor increases in travel time on the road should result in lower overall speeds. Lower vehicle speeds correlate with reduced traffic crashes. Research suggests that road diets may decrease crashes by about 19% on urban arterials such as Livingston Avenue.

The AM peak period is not affected as much as the PM peak period. Various adjustments to signal timings and reducing the flow of traffic provide some mitigation to the increase in delay; additional exploration of other mitigation options might be worth exploring, however one of the objectives of a road diet is to reduce speed, thus one would expect to see delay times increase.

The use of micro-simulation software is one approach to assessing changes in road configurations. This analysis is limited by any inherent assumptions embedded within the model, although our analysis was robust to multiple simulations for each scenario. The standard deviations in travel time and delay were minor for each scenario. Probably the main limitation is how travelers react to a new configuration. Some may divert to alternative routes, some may opt to bicycle along the corridor if it is safer; while we estimated results with up to a 10% reduction in traffic during the PM period, shifts in traffic behavior may be greater.

The decision to move forward with a road diet plan for Livingston Avenue depends on a balancing of the costs and benefits by the City of New Brunswick and Middlesex County. Our benefit/cost analysis balances the costs of travel time delay with the benefit of reducing crashes, and shows overwhelmingly positive benefits outweighing the travel time costs associated with the road diet conversion. The net present value over 20 years is estimated to range from $2.6 million to over $37 million for the road diet conversion. This assumes a 19% crash reduction. Robustness checks that vary the crash reduction rate and the construction costs also result in benefits for almost every scenario analyzed.

9. Epilogue

This report was completed in February 2014. In March 2014, the City of New Brunswick announced that it intended to make changes to Livingston Avenue to improve safety for pedestrians and bicyclists.

New Brunswick Mayor James Cahill stated that “Initiatives such as a road diet for Livingston Avenue are part of the City’s effort to make New Brunswick as ‘walkabl’ and healthy a city as possible” (Amaral, 2014). In May 2014, three children were injured while crossing Livingston Avenue as they were walking home from school (Attrino, 2014). One of the children sustained major injuries, while the other two had more minor injuries. In response, there was widespread demand in the community that something be done about Livingston Avenue (Cangiano et al., 2014).

Within days of the protests, the City worked with Middlesex County to have two sections of the street restriped. This can be

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Fig. 5. Restriping of Livingston Avenue in May 2014.

seen in Fig. 5. As of September 2015, no additional restriping has been done, however, the city has developed alternative designs to complete the work. Anecdotally, there does not seem to be any disruption to traffic on the road from the two sections that have been changed.[3]

From a policy perspective, one of the interesting conclusions is the reaction of the public. The protests demanded that something be done about unsafe traffic on Livingston Avenue. At the early phases of this project, the City appeared concerned about the political consequences of implementing a road diet. Yet the protests suggested the public was very much in favor of changes. Public officials should be less timid in their approach to implementing positive changes that improve safety and walkability, even at the expense of potential delays to traffic.

Acknowledgements

Funding for this project was provided by Rutgers University as a Community-University Research Partnership Grant for New Brunswick. These are intended to recognize Rutgers University as a strong partner serving the City of New Brunswick. We also thank Glenn Patterson of the City of New Brunswick for comments on an earlier draft and James Van Schoick, formerly of the Voorhees Transportation Center who coordinated student researchers to conduct traffic counts; we also thank all the students who worked on this project.

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Traffic Calming

Traffic-calming incorporates a variety of design and management strategies in local streetscapes to control volume and speed of traffic for the safety of both motorists and non-motorists.

Last updated: August 2011

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Preliminary Sections

Summary

Traffic-calming incorporates a variety of design and management strategies into local streetscapes to control motor vehicle speeds and traffic volume for the safety of both motorists and non-motorists. For example, speed tables or speed bumps compel drivers to slow down to speeds at which they are better able to react to unexpected situations such as a child darting across the street. Even if a crash does occur, lower speed crashes are less likely to kill or seriously injure.

Typical End Users

- Local government

Track Record

Over decades of use, traffic-calming solutions have proven to reduce both the number and severity of pedestrian and vehicular crashes.

In Pennsylvania, scores of communities have implemented traffic-calming strategies to improve the safety of specific intersections or neighborhoods and improve safety conditions for pedestrians, motorists and bikers.

Introduction

History

Traffic-calming is founded on the idea that streets are a means of connecting people to their communities, offering critical functionalities that help to create and preserve a sense of place. They provide a service to the community as a whole and should adequately and safely serve multiple users such as walkers, shoppers, tourists, cyclists, runners, children and families, as well as motorized vehicle passengers and mass transit riders.

Traffic-calming uses techniques designed to lessen the impact of motor vehicle traffic by slowing it down, or literally "calming" it. This helps build human-scale, walkable, bikable and livable communities where motor vehicles are intended to be one form of transportation but not the sole form of transportation.

Traffic-calming began in the Netherlands in the 1960s with the design of "woonerven", or "living yards". The Woonerven in The Netherlands is a street or road where pedestrians and cyclists have legal priority over motorists. Using a variety of traffic-calming techniques, woonervens were intended to improve pedestrian, bicycle and motor vehicle safety.

In the late 1970s, Germany began working in this area using the term "Verkehrsberuhigung" which would eventually be translated as "traffic calming". A number of communities in the United States began applying the principles of traffic-calming in the late 1970s, at the same time that it was spreading to other European countries, Canada, and Australia. However, it has taken many years for traffic-calming to gain popularity in America. As a result, many of the initial studies on the effects of traffic-calming have taken place abroad, where its application has reportedly lowered crash and injury rates anywhere from 20 to 80 percent.

Purpose

The basic principle behind traffic-calming is that reducing the speed of motorized vehicles will decrease the likelihood that pedestrians or cyclists will be hit; and even if a collision does occur, the impact is reduced and the injuries are not as severe. Statistically, collisions that occur at lower speeds are less likely to kill or seriously injure.

Communities may wish to control vehicular speeds and traffic volumes to achieve a variety of objectives. Those objectives might include: reducing accidents, collisions, noise, vibration, pollution, and crime. Some communities are also exploring how providing safe conduits for pedestrians and bikers can provide for healthier lifestyles.

According to the U.S. Department of Transportation, general objectives of traffic-calming include:

- To encourage citizen involvement in the traffic-calming process by incorporating the preferences and requirements of the citizens
- To reduce vehicular speeds
- To promote safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents
- To improve the environment and livability of neighborhood streets
- To improve real and perceived safety for non-motorized users of the streets
- To discourage use of residential streets for cut-through vehicular traffic

Effectiveness

Enhanced safety is one of the most fundamental benefits of traffic-calming and one of the primary reasons that programs are created. By reducing speed and decreasing traffic volume, the number and severity of vehicle crashes are significantly reduced.

According to a report by the Insurance Corporation of British Columbia, which examined 43 international studies, collision frequencies in areas with traffic-calming measures declined between 8-100%. The report also revealed that there were no increases in collision frequencies where traffic-calming measures had been employed.[i]

A more recent study conducted found that children living near traffic-calming devices were 50% less likely to be hit and injured by an automobile in their neighborhood.[ii]

Reducing vehicle speed creates a more walkable environment and significantly reduces the likelihood of serious injury or fatality of pedestrians. In fact, speed of the vehicle is by far the most significant factor contributing to pedestrian fatalities. According to data from the National Accident Sampling System, the rate of severe injury for people involved in crashes at impact speeds of 21-30 mph is 11.1; this rate increases to 27.9 at impact speeds of 31-40 mph and to 54.3 at speeds of 50 mph or more. Any collision with a pedestrian taking place at more than 50 mph is almost certain to result in a fatality.

Traffic-calming strategies typically include a combination of education, enforcement and engineering, each of which are covered more comprehensive below. Each of these, dependent on the municipality's overall goal or objectives, varies in effectiveness when used independently of one another; often effectiveness is improved when one or more of these strategies is utilized:

- Educational/outreach programs can be fairly cost-effective, but are most effective when used in combination with enforcement and engineered alterations.

- Highly visible, long-term law enforcement can be very effective though such techniques can be disruptive on high volume streets and provide only short-term results. Enforcement strategies may be more effective in conjunction with an educational campaign that makes residents more aware of the potential consequences of their driving practices.

- Engineered traffic-calming measures are most often implemented to reduce traffic volume and speed and include a variety of options. Engineered traffic-calming measures have proven far more effective in preventing child pedestrian injuries than basic road safety education, which has been unsuccessful in changing the behavior of children. The table below provides a quick overview on the effectiveness of each engineered traffic-calming strategy based on its overall goal.

	Volume Reduction	Speed Reduction	Conflict Reduction	Emergency Response
Horizontal Deflection				
Bulb-out / curb extension	☐	◪	◪	☐
Chicane	◪	◪	☐	◪
Gateway	☐	☐	☐	☐
On-street parking	☐	◪	☐	◪
Raised median island / pedestrian refuge	☐	◪	◪	☐
Traffic circle	◪	◪	■	■
Vertical Deflection				
Textured crosswalk	☐	☐	☐	☐
Speed hump	◪	■	◪	■
Raised crosswalk	◪	■	◪	■
Raised intersection	☐	◪	◪	■
Physical Obstruction				
Semi-diverter	■	◪	◪	◪
Diagonal diverter	■	◪	◪	◪
Right-in / right-out island	◪	☐	◪	◪
Raised median through intersection	■	☐	◪	■
Street closure	■	◪	■	■
Signing and Pavement Markings				
Speed limit signing	☐	◪	☐	☐
Multi-way stop control	☐	◪	◪	◪
Turn prohibitions	◪	☐	◪	☐
One-way streets	■	☐	◪	◪
Commercial vehicle prohibitions	◪	◪	☐	☐
Roadway narrowing with edge lines	☐	◪	☐	☐
Transverse markings	☐	◪	☐	☐

☐ Minimal or no effect
◪ Moderate effect
■ Significant effect

Source: Pennsylvania's Traffic-calming Handbook (PennDOT, 2001)

Traffic-Calming Planning & Approval Process

Preliminary Issues

Funding

Expenses related to implementing and maintaining traffic-calming related programs are often much less in comparison to other transportation related costs. Local governments nationwide most frequently fund their traffic-calming programs from municipal capital improvement funds, general funds, or state gas tax subsidies. Neighborhood residents may choose to help cover costs of the installation and/or maintenance of specific traffic calming measures; this is particularly beneficial if the project is low on the municipality's priority list.

Act 209 of 1990 amended the Pennsylvania Municipalities Planning Code (LINK) to enable municipalities to impose an impact fee on new development to generate revenue for funding eligible transportation improvement projects needed as a result of the development. Impact fees can be used for capacity improvements to accommodate traffic

generated by new development, but not to address existing or anticipated deficiencies unrelated to the development. Before establishing an impact fee ordinance, municipalities must first complete a series of transportation studies as defined by Act 209. The process is daunting, deterring most municipalities from using the impact fee tool. Learn more by reading Transportation Impact Fees: A Handbook for Pennsylvania's Municipalities (LINK TO LIBRARY ITEM).

No money has been designated at the state or federal level specifically for implementation of traffic-calming projects. Municipalities may apply for competitive grants, including:

Transportation Enhancement Program - Provides federal funds to local municipalities to help expand transportation choices and enhance the transportation experience through 12 eligible TE activities related to surface transportation, including pedestrian and bicycle infrastructure and safety programs, scenic and historic highway programs, landscaping and scenic beautification, historic preservation, and environmental mitigation. For more information, visit the Pennsylvania Transportation Enhancements Program Website (LINK)

Safe Routes to School Program – Federal grant program established enable and encourage primary and secondary school children to walk and bicycle to school. For more information: Pennsylvania Federal Safe Routes to School Program (LINK) and National Center for Safe Routes to School (LINK).

Pennsylvania Community Transportation Initiative (PCTI)* - PCTI is a competitive funding process to help municipalities fund local transportation projects that best exemplify the goals of PennDOT's Smart Transportation initiative. The Smart Transportation goals include the linking of transportation planning and land use as well as the design of sustainable roadways that meet the needs of all users and modes of transportation including pedestrians, bicyclists, transit, and motor vehicles. For more information, visit Smart-Transportation.com (LINK). Municipalities may also contact their local PennDOT Engineering District to obtain information on the Pennsylvania Community Transportation Initiative (LINK: http://www.smart-transportation.com/pcti.html). [*Editor's Note: PennDOT has allocated all available PCTI funds for projects to be completed through 2012. As of July 2011, the future of the funding is uncertain.]

Liquid Fuels Funds

In Pennsylvania, Liquid Fuels funds may be used for traffic-calming measures provided that a well defined "Traffic-calming Study and Approval Process" has been followed.

For any project that involves state or federal money, or Liquid Fuels funds, the processes outlined in Pennsylvania Department of Transportation's (PennDOT) Design Manual Part 1 and 1A (LINK TO LIBRARY ITEM) must be followed. Whenever Liquid Fuels funds are considered for a traffic-calming project, the local municipality should contact PennDOT's Municipal Services representative in the local Engineering District Office.

Calming of State Highways

Before traffic-calming measures are installed on State highways, a written agreement between the local municipality and PennDOT's local Engineering District must be established to outline funding responsibilities for installation, maintenance, pavement markings, and any other associated traffic control devices such as warning signs. This agreement will indicate that the funding for each of these areas will be the responsibility of the local municipality, unless otherwise agreed upon by PennDOT.

Legal Issues

Safety/Liability

Since governments may be held liable for any foreseeable condition, a traffic-calming measure should be designed so that a driver acting reasonably and exercising ordinary care would perceive the intent of the measure and safely negotiate it. To do this, geometric design, signing, pavement markings, and lighting should conform to standard engineering principles as much as possible and comply with state transportation department standards and approved procedures. Installation of traffic-calming measures should be done only after careful study by a qualified engineer. (PennDOT Traffic-calming Guide)

Eminent Domain

Eminent domain may be required in the implementation of traffic-calming measures. The two types of eminent domain include 1) *consequential damages*, where injuries to property occurring are a natural result of an act lawfully done, but not amounting to a taking of the property; and *de facto taking* occurs when exceptional circumstances amount to the substantial deprivation of the use and enjoyment of the property. Both types have a causation requirement. If the damage to the property is not the direct, immediate, necessary, and unavoidable consequence of the government's actions or activities, there can be no recovery in eminent domain. (PennDOT Traffic-calming Guide)

American Disabilities Act

The American Disabilities Act must also be considered when implementing traffic-calming measures. Traffic-calming measures must be designed, installed, and maintained so as not to impede the mobility of individuals with disabilities. In addition, any alteration to the facility that affects its usability, such as installation of a physical device in the street, or a change to the curbing or sidewalk, triggers the obligation to construct curb ramps or other appropriate accommodations to the entire facility. (PennDOT Traffic-calming Guide)

Large Trucks

Communities may see traffic-calming measures that narrow road width as a solution to heavy volumes of large trucks. However, local ordinances that establish measures designed solely to unreasonably restrict access to 102-inch-wide truck combinations are subject to legal challenge under the Pennsylvania Surface Transportation Assistance Act (STAA) of 1982.

Preliminary Study

A preliminary study can result from a request by citizens or simply because the municipality recognizes a problem in a particular location of the municipality. Municipal officials must have a good understanding of the issues before fully implementing any traffic-calming measures.

The Pennsylvania Department of Transportation (PennDOT) "Pennsylvania's Traffic-calming Handbook" provides specific guidance on the "Traffic-calming Study and Approval Process", which PennDot strongly recommends in the establishment of a well-organized traffic-calming program. This process has been designed as a supplement to existing policies and procedures and is not intended to replace or supersede any current requirements. Not all traffic-calming projects will require the use of the "Traffic-calming Study and Approval Process" since many traffic-calming measures are used routinely without any resistance from the community. For any project that involves state or federal money, or Liquid Fuels funds, the process outlined in PennDOT's Design Manual Part 1 and 1A [LIBRARY ITEM] must be followed.

Prior to installing traffic-calming measures on local streets, traffic conditions on adjacent arterial streets should be investigated to determine if operational deficiencies are contributing to the identified traffic concerns. If the adjacent arterial streets are the responsibility of the local government, these deficiencies should be addressed before traffic-calming is considered. In addition, when the use of traffic-calming measures may divert large volumes of traffic from local streets, the effects on adjacent roadways should be addressed.

Project Prioritization

Because a municipality may not have the funding to complete every traffic-calming project that is proposed, it may be helpful to establish a ranking system to prioritize specific projects in an effort to best address the needs of the community. During the prioritization process, community leaders may review a variety of criteria including speed, traffic volume, number of crashes, pedestrian safety, pedestrian or cyclist volume, designated school zone, etc., assigning a certain number of points to each element and a statement explaining the point assignment.

Local Traffic Advisory Committee (LTAC)

The Pennsylvania Department of Transportation recommends the establishment of a Local Traffic Advisory Committee (LTAC) when a community is considering implementing traffic-calming measures. The LTAC is a standing committee, appointed by the elected officials, typically comprised of a municipal/county engineer, a municipal/county planner, a representative from the governing body, a representative from emergency services, one or more local citizens, and a representative from public works. The LTAC coordinates all requests for traffic-calming measures made within a local jurisdiction.

Supporting Data Collection

The study process involves gathering of preliminary information, including:

- **Identification of Project Areas** – identify specific locations where the municipality would like to traffic-calming strategies may make local intersections or roadways safer
- **Classification of Street Functions and Land Use** – identify general functions of the neighborhoods where traffic-calming measures are proposed (e.g., residential, industrial, school zone, business district)
- **Identify Speeding & Cut-Through Problems** – specifically identify areas where speeding and volume are issues
- **Neighborhood Traffic-calming Survey -** the local government, the LTAC, or the interested neighborhood group should compile a list of all residents and businesses in the project area and conduct either a mail or door-to-door inquiry to document interest in the traffic-calming project.

Plan Development

A good traffic-calming plan is developed with robust input from the community, guidance from a qualified engineer or consultant, and approved by the necessary elected and appointed officials. The plan will make specific recommendations on how to adjust traffic patterns and increase safety on targeted roadways.

The components of a traffic-calming plan will most likely incorporate various approaches, including engineering strategies, educational and outreach efforts as well as increased enforcement. (see Three E's of Traffic Calming)

The development of the plan should include public meetings, providing residents and stakeholders with the opportunity to ask questions of the municipal officials and the consultant hired to facilitate the project.

A Neighborhood Traffic-calming Committee (NTCC) should be established from interested residents attending the public meeting. The municipal engineer, with assistance from the LTAC and the NTCC, should gather more extensive data that can be used to further define the traffic problem affecting the neighborhood. In addition, the data may help identify appropriate solutions or define which traffic-calming measures are appropriate for the particular application.

Although LTAC and NTCC representatives can assist in this endeavor, traffic data collection and analysis must be performed by appropriate traffic engineering or technical professional.

The planning process should include:

- Examining arterial streets for operational deficiencies which might contribute to traffic safety and flow issues;
- Examining neighborhood streets to ensure that traffic-calming strategies implemented on arterial streets would not shift traffic problems to other areas in the community;
- Review and select all potential traffic-calming strategies that could resolve the issues that have been identified;

- Develop alternative traffic-calming plans to be considered, reviewing the pros and cons of each strategy;
- Provide ample opportunities for the public and impacted stakeholders to understand the alternative traffic-calming strategies and provide input and comments; (See Approval Process)
- An implementation strategy, once the final draft of the plan has been approved, which should include cost estimates, project priorities and a realistic time line.

Approval Process

Public Meeting
Once consensus has been reached by the LTAC and local government officials, the preliminary and final traffic-calming plans should be presented at an open house or public meeting.

Finalize Plan
Following public review, any necessary modifications are made to the traffic-calming plan. Additional public meetings can be held if the changes are very substantial. Otherwise, the plan is ready for community approval. The final plan should include implementation strategies.

Neighborhood Survey
Once the traffic-calming plan is completed, a second neighborhood survey should be conducted. PennDOT recommends that a 70% approval threshold be used to indicate overall community support for the traffic-calming project. If less than 70% is obtained, additional modifications to the plan may be needed.

Local Government Approval
After 70% community approval is obtained, the traffic-calming plan must be officially approved by the local government. At this point, the funding source should be clearly identified and money set aside for implementation and maintenance.

PennDOT Approval (if required)
If the project involves a State road, or if State, Federal, or Liquid Fuels funds are requested, PennDOT approval is also required. This approval will include the issuance of a highway occupancy permit. When a State road is involved, a legal agreement between PennDOT and the local municipality identifying the installation and maintenance responsibilities must be established.

Plan Implementation
After the traffic-calming plan has been reviewed and approved by residents, impacted stakeholders and by elected local government officials, the plan can be implemented. Implementation of the plan should include:
- Determining design strategies based on the best available current practices;
- Determining prioritization for implementation of strategies;
- Determining timeline for implementing various strategies;

- Monitoring impacts of implemented strategies to determine how effective the chosen traffic-calming solutions are and how they meet pre-determined goals and objectives;

Traffic-calming Strategies

Traffic-calming can be addressed in a number of ways and usually includes a combination of three strategies: education, enforcement and engineering. Using this three-tiered approach can provide municipalities with greater flexibility and help identify specific traffic-calming measures to be implemented while prioritizing projects accordingly.

Different traffic-calming methods have varied levels of effectiveness based on the overall goal or objective. For example, some methods are more effective in reducing the speed of motorized vehicles while others are intended to decrease congestion or overall amount of traffic. Although education and enforcement may offer more cost-effective solutions to traffic calming, municipalities do often find that engineering strategies are required especially when a municipality or community is trying to reduce "cut through" traffic, traffic that utilizes local streets rather than the arterial roadway network that circumvents the community.

Education & Outreach

Municipalities can help calm traffic and reduce high speeds on local streets through an outreach campaign that addresses the consequences of speeding and reckless driving.

Public education can be an effective tool in changing the attitude and behavior of drivers. Educational efforts focus on the consequences of unsafe driving practices as well as educating inattentive, aggressive drivers that modifications of their own driving behavior may help solve the problem of unsafe roadways.

Outreach campaigns may use brochures or neighborhood newsletters to spread this message. Newsletters may also contain information on speeding fines (particularly in school zones), pedestrian and bicycle safety tips, and information on average speeds in the neighborhood.

Methods

- **Neighborhood Meeting** – Organize a meeting with the affected neighborhood to discuss the specific traffic issues for that neighborhood and recommend ways for residents to personally reduce speeds and increase safety in their neighborhood.
- **Traffic Safety Newsletter** - Preparation of a newsletter designed for a specific neighborhood describing the traffic concerns and recommendations. The newsletter may provide information on volumes and speeds in the area, as well as reminders of traffic laws and traffic safety tips.
- **Speed Trailer** – Use of a portable trailer equipped with a radar unit, which detects the speed of passing vehicles and displays it on a reader board. The trailer shows drivers their actual speed versus the posted speed limit and encourages

compliance. The device also helps by-standers to gauge how fast the posted speed limit looks as drivers pass by.

- **Neighborhood Pledge or "Pace" Cars** – A pledge form may be distributed through the neighborhood to encourage neighbors to commit to driving the speed limit. The municipality may also provide a bumper sticker or decal for residents committed to driving the speed limit. The drivers of these "pace" cars will lead by example through their neighborhood and others.
- **Signing** – The posting of appropriate regulatory or warning signs to remind drivers of the traffic laws. Examples of signing that could be used to educate drivers of traffic laws include: speed limit, no outlet, pedestrian crossing or school warning signs.
- **Turn restrictions** – Full or part-time turn restrictions may be used where a specific movement is creating a safety problem or where cut-through in a neighborhood is an issue. This could also apply to "No Right on Red" designations. However, installing this type of sign requires continued police enforcement.

Enforcement Strategies

Enforcement strategies can be very useful in addressing traffic-calming issues in a community. Increasing enforcement in targeted areas where speeding is an issue may encourage motorists to drive at the posted speeds or risk some form of punishment by local law enforcement. However, enforcement strategies may require a consistent and continual presence of law enforcement to be most effective. Many communities may find that this is cost prohibitive since rarely do the fines collected cover the full cost of the enforcement. Enforcement strategies are often coupled with education measures that can help address specific safety issues in a community and educate the public on why increased enforcement is needed.

Methods

- **Neighborhood Speed Watch Program** - A speed-monitoring program in which residents of a neighborhood measure vehicle speeds with a radar unit and record license plate numbers of those exceeding the speed limit. The registered owners are sent letters explaining the safety concerns in the neighborhood and asking them to reduce their speeds.
- **Targeted Police Enforcement** - Increased police enforcement of traffic regulations within a designated area.

Engineered Traffic-Calming Measures

Engineered measures include structural modifications as well as signs and pavement markings. Different traffic-calming methods have varied levels of effectiveness based on the overall goal or objective. Traffic-calming measures can be separated into two groups based on the intended impact of the measure:

1) **Speed control measures** are primarily used to address speeding problems by changing vertical alignment, changing horizontal alignment, or narrowing the roadway.
2) **Volume control measures** are primarily used to address cut-through traffic problems by blocking certain movements, thereby diverting traffic to streets better able to handle it.

[INSERT PHOTOS OF VARIOUS MEASURES]

Speed Control Measures

Horizontal Deflection

There are two types of horizontal deflection devices used in traffic calming. Although horizontal deflection measures are mainly used to address speed concerns, applications that narrow the travel lane can improve pedestrian safety by reducing the width of the crossing. Horizontal deflection measures may also have the secondary effect of reducing volumes; however, the effects will typically be minor.

The first type hinders the driver's ability to drive in a straight line by creating a horizontal shift in the roadway. This shift forces drivers to slow their vehicles in order to safely navigate the measure.

The second type of horizontal deflection measure is designed to narrow the width of the travel lane. Doing so reduces the usable surface of the roadway causing drivers to slow their vehicles to maintain an acceptable level of comfort.

Examples of horizontal deflection measures, include:

- **Curb extension / bulb-out / Neckdown**- areas of expanded curbing that extend across a parking lane and may narrow a travel lane.
- **Chicane** - series of 3 bulb-outs, staggered at mid-block locations on alternating sides of the street.
- **Gateway** - entrance treatment, typically using physical and textural changes, that provides identity to an area.
- **On-street parking** – provision of on-street parking that reduces roadway width.
- **Raised median island / pedestrian refuge** - narrow islands, at mid-block or intersections, between travel lanes with breaks in landscaping and curbing for pedestrians.
- **Traffic circle** - raised island in the center of an intersection that requires vehicles to travel counterclockwise around the circle.

Vertical Deflection

These are traffic-calming measures that create a change in the height of the roadway. When designed properly, vehicles must slow down over these measures in order to avoid unpleasant bumping sensations. As with horizontal deflection measures, vertical deflection measures are mainly used to reduce vehicle speeds, with only minor effects on

traffic volumes. Vertical deflection measures can also be used to improve the safety of pedestrian crossings.

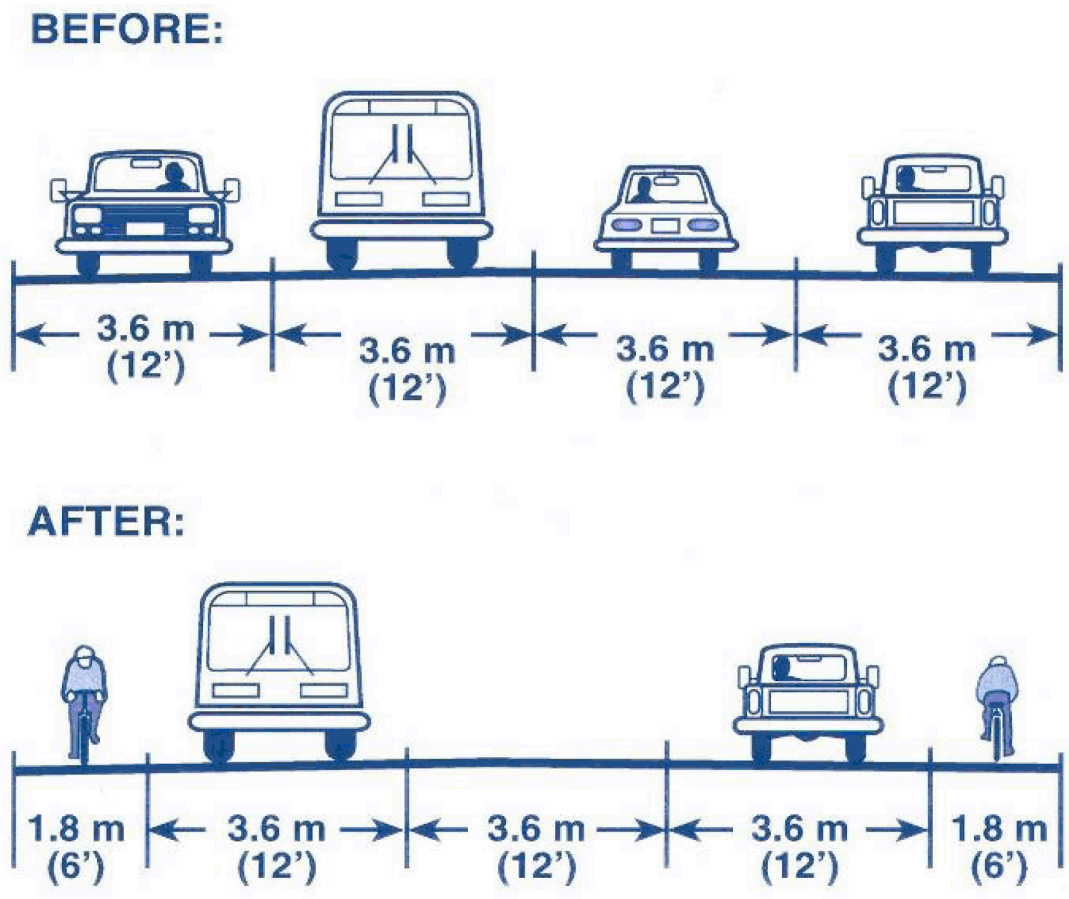
- **Textured crosswalk** - use of pavers or other materials to demarcate crosswalks and alert motorists that they are entering a pedestrian-friendly area.
- **Speed hump** - raised humps in the roadway, typically 3 inches high with a 12 or 22-foot travel length.
- **Raised or textured crosswalk** - marked pedestrian crossings elevated 3 to 6 inches above street grade at intersections or mid-block.
- **Raised intersection** - intersections, including crosswalks, raised 3 to 6 inches above street grade.

Horizontal Narrowing or Road Diet

A Road Diet is the removal of travel lanes from a roadway and converting that space for other uses such as bike lanes, parking, and landscaping. Narrowing traffic lanes differs from other road treatments by making slower speeds seem more natural to drivers and less of an artificial imposition, as opposed to most other treatments used that physically force lower speeds or restrict route choice. Some examples include:

- **Neckdown** - curb extensions at intersections that reduce the roadway width from curb to curb.
- **Center Island Narrowings** - a raised island located along the centerline of a street that narrow the travel lanes at that location.
- **Chokers** - curb extensions at midblock locations that narrow a street by widening the sidewalk or planting strip

A common Road Diet measure is the conversion of a four lane arterial to three lanes. The new three lane configuration would feature one through lane per direction with left turn lanes at all signalized intersections.



The Road Diet concept is supported by PennDOT's Smart Transportation Guidebook (Link to Library Item), which states that "the desire to go 'through' a place must be balanced with the desire to go 'to' a place." The Road Diet concept is based on the premise that roadways are meant for all users and modes of transportation including vehicles, pedestrians, bicyclists, and mass transit. As such, if a roadway can effectively slow or calm vehicular traffic, it is more likely to be used safety and comfortably by pedestrians and bicyclists.

The U.S. Department of Transportation (USDOT) completed a study of selected Road Diet measures implemented across the country. After reviewing the data, the report concluded, a 6 percent decrease in the proportion of crashes at road diet sites in the after period than at the comparison sites in the after period. See U.S. Department of Transportation/Federal Highway Administration's report entitled "Evaluation of Lane Reduction 'Road Diet' Measures and Their Effects on Crashes and Injuries". (LINK TO LIBRARY ITEM)

Signs and Pavement Markings

Signs and markings can be used as traffic-calming measures that regulate traffic movements in lieu of physical changes to the roadway. In certain applications, these measures may produce the same effect as the physical traffic-calming measures. However, police enforcement is often required to ensure motorist compliance.

Volume Control Measures

Physical Obstruction

Physical Obstruction refers to measures that prevent particular vehicle movements, thereby discouraging or eliminating cut-through traffic. The overall traffic volume reduction depends upon the nature of the traffic-calming measure and the number of movements obstructed. Including:

- **Semi-diverter** - directional closure created by physically blocking half the street.
- **Diagonal diverter** - physical barrier placed diagonally across a four-way intersection to create two unconnected intersections.
- **Right-in / right-out island** - the use of raised islands to prevent left turns and through movements, to and from side streets, at intersections with major streets.
- **Raised median through intersection** - median barrier through an intersection that discourages through traffic in a residential area by restricting movements.
- **Street closure** - the use of a cul-de-sac to close a roadway by extending a physical barrier across the entire width, obstructing all traffic movements.

Learn more about the benefits and application of each of these measures at Pennsylvania's Neighborhood Traffic-calming Resource (http://www.students.bucknell.edu/projects/trafficcalming/Measures.html). Also see Traffic-calming Measures at http://www.trafficcalming.org/measures2.html.

Case Studies

Lemoyne Borough (Cumberland County, PA)

Lemoyne Borough made the decision to apply streetscape design and traffic-calming strategies to a stretch of road that runs through the center of the community's commercial district. Through an open public process, the borough actively worked to improve safety conditions for motor and non-motorized users, improve the aesthetics of the downtown business district and expand the borough's ecological stewardship practices.

The borough recognized that heavy traffic volumes needed to be better managed along the Market Street Corridor and wanted to approach the issue proactively before the situation worsened. Borough Counsel was interested in creating a safer environment for both pedestrians, including school children crossing, and motorists with the added objective of creating safer, improved access to downtown businesses.

Borough officials reached out to their Downtown Revitalization Committee and the Kairos Design Group, LLC to evaluate potential solutions and to help build public consensus. The business operators, residents, property owners and the Lemoyne Business Association were engaged in a series of public meetings to discuss analysis results, conceptual alternatives, selected preliminary designs and final designs.

The project included the analysis of hardscapes and landscapes, historical context, transportation, utilities, the existing business environment, real estate considerations, lighting, etc. The design consultants worked closely with the Downtown Revitalization Committee in a highly interactive process to ensure that the needs of the community were properly reflected in the final Master Plan.

[BEFORE/AFTER PHOTOS]

The traffic-calming strategies chosen included:

- paved and textured crosswalks to alert motorists that they are entering a pedestrian-friendly area; (PHOTO)



- bump outs, or curb-extensions that extend into the parking lanes but do not impact the travel lanes thus providing vertical protection for parked cars, improving pedestrian visibility and minimizing exposed crossing distances for pedestrians; and (PHOTO)



- crosswalk lighting for proper nighttime illumination of the crosswalks. (PHOTO)

Streetscape safety in the Market Street corridor is planned to be achieved in Phase 1 and subsequent phases by separating modes of different speeds and vulnerabilities to the

extent possible by both space and time (bicyclists from pedestrians and pedestrians from vehicles), informing ALL users of the presence and mix of travel modes (walk, bike, drive) and establishing provisions for adequate sight distance.

The borough has made a commitment to "green" their streets and improve the quality of life for its residents through a holistic, cost-savings strategy that combines traffic-calming streetscape and stormwater management elements. These improvements include infiltration pavers in the sidewalks, rain gardens, bump-outs, pedestrian scale lighting, native plantings and branded "L" bike racks.

Through the public input process, residents also developed a variety of community-based projects that included organized borough clean-ups, planters at the 3rd Street intersection, and the creation of gateway signage. Residents were also very supportive of the engineered measures (e.g., bump-outs, paved crosswalks) installed, recognizing the added safety benefits they provide for pedestrians, bicyclists and motorists.

The Borough funded the project through borough capital funds and through assistance from the Cumberland County Redevelopment Authority, Senator Pat Vance's office, Representative Glenn Grell's office, the Lemoyne Business Association, Pennsylvania Department of Community & Economic & Development grant funding, as well as private and business donations and volunteer support.

Though the borough has not completed before and after traffic studies, it is easily observed that traffic has been calmed through this section of Market Street, creating a safer environment for residents and visitors as well as a more pedestrian-friendly environment for consumers to explore the downtown's shops and eateries. The rain gardens have been successful in filtering petroleum products and salt from reaching the river.

Craig Bachik, Kairos Design Group, LLC recommends a holistic approach that "involves all potential stakeholders (especially maintenance personnel who will inherit the project once it is complete)" and adds that in Lemoyne Borough the maintenance staff "has been outstanding in their commitment to the effort".

"Start with understanding your community's history, strengths and weaknesses and never give up on creating a vision for future generations," Bachik explains. "It takes a lot of entities to make these projects happen in a successful way. That is why broad-based support is critical."

Carlisle Borough (Cumberland County, PA)

Carlisle's downtown is currently troubled by excessive vehicle speeds and long crosswalks. The two four-lane highways that intersect at the Square in the center of town create an auto-dominance that makes it difficult for bicyclists and pedestrians to navigate through town. Carlisle's proximity to Interstate 81 and the Pennsylvania Turnpike along with the large number of warehouses in and around the borough generates truck traffic

that degrades the downtown experience with unwanted noise, air pollution, and traffic congestion.

The proposed traffic-calming project will be an excellent opportunity for Carlisle to recreate the thriving, walkable downtown that it once had. Currently, transportation engineers are planning and designing sustainable roadways that meet the needs of all users and modes of transportation including pedestrians, bicyclists, and motor vehicles.

In 2007, a group of concerned stakeholders formed which included members of the Clean Air Board, the Downtown Carlisle Association, Dickinson College, the Letort Regional Authority, and the Redevelopment Authority of Cumberland County, among others. The stakeholders approached the Carlisle Borough Council and requested that something be done to calm traffic and improve the quality of life in Downtown Carlisle. In response, the Borough Council, with a commitment of $20,000, and Dickinson College, with a pledge of $50,000, teamed together to fund the Comprehensive Traffic Study of Downtown Carlisle. This study produced the recommendations, which became the Downtown Carlisle Improvements Project, which is currently under construction.

A series of four stakeholder meetings were held to develop traffic-calming strategies that met the following objectives:

- Devise a traffic flow that calms traffic and enhances an intimate, small-town feeling.
- Promote walking by making it easier for pedestrians to cross roadways.
- Promote bicycling by providing bicycle facilities through the downtown, linking employment and recreation areas.
- Reduce vehicle accidents.
- Reduce pollution and noise from vehicles.
- Maximize downtown business success.
- Improve access and safety of on-street and off-street parking.

In addition to the stakeholder meetings, two public meetings and several Borough Council meetings were utilized to present the traffic-calming recommendations and obtain feedback from the public. Input received was used to shape the final traffic-calming recommendations which were submitted to PennDOT District 8-0 for approval.

The primary traffic pattern change is a traffic-calming "Road Diet" for High and Hanover Streets. Road Diets have been proven to reduce vehicle speeds by up to five mph and to significantly reduce the number of accidents at intersections. The Road Diet will convert the existing four lanes to three lanes with the addition of a five feet wide bike lane in each direction.

"The idea of a Road Diet may seem counter-intuitive and counter-productive to improve traffic flow", explains Chad Decker, Senior Traffic Engineer for Dewberry and manager of this project, "but [this approach] has been proven to be successful in many locations, including Pottstown, Indiana, Butler, Lewistown, and Philadelphia."

A dedicated left turn lane will be provided for High and Hanover Streets at each intersection in the Downtown to improve traffic flow. A traversable brick pattern median will be created in select locations to calm traffic and improve the appearance of the downtown. Significant upgrades to the existing traffic signals include a state of the art traffic adaptive signal system, emergency vehicle preemption, and audible countdown signals to better serve pedestrians.

A Truck Mitigation Signing Plan is also included to direct trucks away from Carlisle's downtown. Curb extensions at intersections are planned to shorten the crossing distance for pedestrians to reduce their exposure to vehicles. The existing parallel parking spaces will remain as they currently are. The proposed bike lanes will also serve as a buffer to make parallel parking easier and make entering and exiting your vehicle safer.

The first phase of improvements were completed in the summer of 2011. Post-construction travel time and delay studies will be conducted a few months after completion after people have settled in to the new traffic patterns. The following rendering depicts what the post construction downtown will look like.



Carlisle Borough received a $2,826,000 grant in 2009 through The Pennsylvania Community Transportation Initiative (PCTI).

In January 2011, Carlisle Borough received a $539,643 PCTI grant, which will be used to continue its traffic calming initiatives. The funds will enable the borough to develop a comprehensive network of on-street bike lanes and off-road trails, linking all components of the Borough's existing trail system. The concept for the network came from the LeTort Regional Authority's 2008 Master Trail/Urban Greenway Plan. In addition to linking

parks, schools, and other points of interest within the borough, the trail network will also provide links to Carlisle's surrounding townships.

Decker advises that achieving community acceptance of the concept is vital to the project's success. "Allowing residents and business owners to participate in the planning process can help them obtain a sense of ownership in the project and will lead to greater acceptance."

Besides building strong public support, Decker recommends municipalities focus their energy on obtaining the necessary funding for construction and implementation of the traffic calming strategies.

Doylestown Borough (Bucks County, Pennsylvania)

Doylestown Borough first began to review the need for traffic-calming strategies during the commercial redevelopment of the borough's train station area, where traffic speeds were determined unsafe for a high-pedestrian area. Concerned members of the community initiated the process and developed a neighborhood committee to share their concerns and findings with the elected officials regarding the renovation project.

This case study describes two projects that relate to Doylestown Borough's traffic-calming program.

Green Street Traffic Study/ Traffic-calming Improvements

This project was brought about by the need to alleviate a documented speeding problem in an area with a high volume of pedestrian traffic. Additionally, a number of cars parked along this street had been damaged due to the high volume of fast moving vehicles. The project incorporated a number of standard traffic-calming elements including lane shifts, traffic tables and curb bump-outs. The curb bump-outs also serve to protect on-street parking spaces, as well as add a street beautification element by incorporating landscape treatments. Highly visible pedestrian crossings, utilizing a combination of textured and painted crosswalks to improve pedestrian safety in the area.

AFTER PHOTOS PROVIDED

West Court Street Traffic-calming and Beautification

The West Court Street traffic-calming project incorporated a number of standard traffic-calming elements to slow traffic in front of Central Bucks West High School:

- Landscaped curb bump-outs provide protected parking spaces and add a beautification element to the area.
- A twenty-six foot wide raised brick walkway was added to aid pedestrian traffic at the school entrance and also serves to slow traffic.
- Brick accents were added at various locations in the existing sidewalk.
- A lane shift was incorporated with curb bump-outs as a traffic-calming method.

- At the intersection of West Court and Memorial Streets a 'gateway into the Borough' was constructed which includes a low stone wall, brick and cobblestone pavers, historic street lighting, welcome signage and landscaping.

AFTER PHOTOS PROVIDED

Neighborhood residents in areas where traffic-calming has been implemented seem to be satisfied with the results. Speed data was collected where center islands were installed, revealing the 85th percentile speed was reduced by 4 mph.

Funding for traffic-calming in Doylestown has been provided through various means including the Borough's general fund, grants and revenues as a result of construction by developers.

According to Karyn Hyland, Project Engineer for Gilmore & Associates, the borough's engineering consultant, "Community involvement was the key element throughout this project." In addition, she adds, "traffic-calming efforts work best as a combination of multiple strategies. For example, coupling streetscape elements, curb bump-outs, lane narrowing and gateway treatments is more effective and provide greater benefits than just the installation of one traffic-calming element.

Related Guides

Library

Related Library Categories at ConservationTools.org

Featured Library Items at ConservationTools.org

Title: Pennsylvania's Traffic-calming Handbook
Author:
Organization/Source: Pennsylvania Department of Transportation/Bureau of Highway Safety & Engineering
Year: 2001
Description: This Handbook contains information on various traffic-calming issues such as legal authority, liability, funding, impacts on emergency services, as well as many others. Chapter 4 includes a "Traffic-calming Study and Approval Process" which is critical for the development of a well organized traffic-calming program.
url:
http://www.dot.state.pa.us/Internet/pdHwyIntHS.nsf/frmTrafficCalming?OpenFrameset
Fee: no

Type: Guide/Handbook

Title: Taming Traffic: Context-Sensitive Solutions in the DVRPC Region
Author:
Organization/Source: Delaware Valley Regional Planning Commission
Year: 2000
Description: This document details the findings and recommendations of a study focused on a problem location that will benefit from the implementation of CSS techniques.
url: http://www.dvrpc.org/reports/09067.pdf
Fee: no
Type: Guide/Handbook

Title: Integrating Transportation and Land Use in Comprehensive Plans
Author:
Organization/Source: Pennsylvania Department of Transportation
Year: 2009
Description: This handbook is intended as a resource for Pennsylvania's county and municipal leaders who seek practical guidance in better integrating land use and transportation in their comprehensive plan efforts.
url:
Fee: no
Type: Guide/Handbook

Title: Pennsylvania Neighborhood Traffic-calming Resource
Author:
Organization/Source: Bucknell University
Year: n/a
Description: This site is designed to introduce communities and individuals to traffic calming. Here, you will find the necessary tools and information to make informed decisions about implementing traffic-calming in your area.
url: http://www.students.bucknell.edu/projects/trafficcalming/index.html
Fee: no
Type: website

Title: TrafficCalming.org
Author:
Organization/Source: Fehr & Peers Transportation Consultants
Year: n/a
Description: This site serves as a practical guide to traffic-calming and neighborhood traffic management.
url: http://trafficcalming.org
Fee: no
Type: website

Title: U.S. Traffic-calming Manual
Author: Reid Ewing, Steven Brown

Organization/Source: APA Planners Press and American Society of Civil Engineers
Year: 2009
Description: A comprehensive how-to manual for traffic-calming in the United States. Planners and engineers can look to this manual for guidance on the appropriate use, design, and signing and marking of traffic-calming measures. For local officials, developers, and community associations, it is an introduction to the goals and tactics of traffic calming.
url: http://www.planning.org/apastore/Search/Default.aspx?p=3945
Fee: yes
Type: Book (hardcover)

Title: Traffic Calming: State of the Practice
Author:
Organization/Source: Institute of Transportation Engineers/U.S. Department of Transportation
Year: 1999
Description: The information in this document has been obtained from the research and experiences of transportation engineering and planning professionals.
url: http://www.ite.org/traffic/tcstate.asp#tcsop
Fee: no
Type: Guide/Handbook

Title: Lancaster County Smart Growth Toolbox
Author:
Organization/Source: Lancaster County
Year: n/a
Description: The Toolbox includes a wide variety of strategies, ordinances, programs, and best management practices that can be applied by communities to implement the goals and objectives of the County Comprehensive Plan as well as regional and local comprehensive plans.
url: http://www.co.lancaster.pa.us/toolbox/site/default.asp?toolboxNav=|
Fee: no
Type: website

Title: Evaluation of Lane Reduction "Road Diet" Measures and Their Effects on Crashes and Injuries
Author:
Organization/Source: U.S. DOT
Year: n/a
Description: This study evaluated road diets at several locations in California and Washington.
url: http://www.fhwa.dot.gov/publications/research/safety/humanfac/04082/index.cfm
Type: guide

Title: Smart Transportation Guidebook: Planning and Designing Highways and Streets that Support Sustainable and Livable Communities

Organization: PennDOT/NJDOT
Year: 2008
Description: The goal of the Guidebook is to integrate the planning and design of streets and highways in a manner that fosters development of sustainable and livable communities. The Guidebook has equal applicability to rural, suburban and urban areas.
Fee: No
Type: Guide

Title: Road Diet Handbook: Setting Trends for Livable Streets
Author: Jennifer Rosales
Organization/Source: n/a
Year: 2009
Description: This book takes a practitioner through planning, analysis, design, and implementation of road diet projects. It includes guidelines for identifying and evaluating potential road diet sites, design concepts such as typical cross-sections, and lessons learned from experiences.
Fee: no
url: http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=LP-670
Type: textbook

Title: Local Government Commission
Author: n/a
Organization/Source: Local Government Commission
Year: n/a
Description: The Local Government Commission (LGC) is a nonprofit, nonpartisan, membership organization that provides inspiration, technical assistance, and networking to local elected officials and other dedicated community leaders who are working to create healthy, walkable, and resource-efficient communities.
Fee: no
url: http://www.lgc.org/
Type: website

Title: AmericaWalks.org
Author: Mark Fenton
Organization/Source: America Walks
Year: n/a
Description: The mission of America Walks is to foster the development of community-based pedestrian advocacy groups, to educate the public about the benefits of walking, and, when appropriate, to act as a collective voice for walking advocates.
url: http://www.americawalks.org
Fee: no
Type: website

Title: Promoting Safe Walking and Cycling to Improve Public Health: Lessons From The Netherlands and Germany

Author: John Pucher, PhD, and Lewis Dijkstra, PhD
Organization/Source: America Walks
Year: 2003
Organization/Source: American Journal of Public Health
Description: This study examines a wide range of measures are available to improve the safety of walking and cycling in American cities, both to reduce fatalities and injuries and to encourage walking and cycling.
url: http://policy.rutgers.edu/faculty/pucher/AJPHfromJacobsen.pdf
Fee: no
Type: Journal article

Title: Safety Benefits of Traffic Calming
Author: SR Zein, E. Geddes, S. Hemsing, M. Johnson
Organization/Source: Pedestrian and Bicycle Research
Year: 1997
Organization/Source: American Journal of Public Health
Description: This study was conducted to determine whether there are quantifiable collision-reduction benefits that result from traffic calming.
Type: Journal article

Experts

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Craig Bachik, Kairos Design Group, LLC, has served as Lead Project Designer and Senior Landscape Architect for the master planning of urban revitalization and streetscape enhancement projects.

Bio:
Mr. Bachik is one the two founding principals of KAIROS DESIGN GROUP, LLC and has served as Lead Project Designer and Senior Landscape Architect for the master planning of urban revitalization strategies, streetscape enhancement projects, health care campuses and educational facilities.

Mr. Bachik's work experience includes urban site redevelopment programs, community parks and recreation facilities, single and multi family residential developments and corporate business/industrial parks. Having worked with public and private sector clients on multiple Feasibility Studies, Land Use Plans, Streetscape and Economic Development

Master Plans Mr. Bachik is the Principal that leads the KAIROS team through the analysis and visioning stages of every project, as well as guiding the research and documentation, schematic design, final design, implementation, and financial feasibility phases. He oversees client coordination and is intimately involved with project development and design, preparation of perspectives, project presentations and direct communication with the client and any outside agencies that would be needed in support of this project.

Mr. Bachik has lectured at a variety of conferences related to urban revitalization and redevelopment strategies including the National Historic Preservation Conference related to lighting design and historic streetscapes.

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Guide Blurb:
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Bio:
Chad Decker is a Senior Traffic Engineer and Project Manager with 14 years of experience with Dewberry. He is responsible for the day to day management of the Traffic Engineering Group in Dewberry's Carlisle, PA office. His duties also include project management, traffic signal design, traffic control plans, signing and pavement marking plans, and traffic studies.

Chad received his Bachelor's and Master's degrees from Penn State University. He is a registered Professional Engineer in Pennsylvania and New Jersey and is also a certified Professional Traffic Operations Engineer (PTOE).

Local Technical Assistance Program (PennDOT)
Phone:1-800-FOR-LTAP
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Harrisburg, PA 17120

https://www.dot7.state.pa.us/LTAP/

PennDOT LTAP provides technical information and proven technologies dealing with roadway maintenance and safety methods to meet the growing demands on municipal governments.

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Acknowledgements

Some of the material was excerpted and/or adapted from PennDOT's Pennsylvania's Traffic-calming Handbook. Additional material was researched and edited by Nicole Faraguna.

The Pennsylvania Land Trust Association prepared this guidance with support from the William Penn Foundation and the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation, Community Conservation Partnerships Program.





Submit Comments and Suggestions

The Pennsylvania Land Trust Association would like to know your thoughts about this guide: Did we miss issues? Do any subjects need clarification or expansion? Other concerns? Please contact Andy Loza at 717-230-8560 or *aloza@conserveland.org* with your thoughts. Thank you.

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[i] Sany R. Zein, Geddes, E., Hemsing, S. & Johnson, M. (1997). Safety Benefits of Traffic Calming. *Transportation Research Record 1578*, 3-10.

[ii] Pucher, PhD, John & Dijkstra, L, (2003). Promoting Safe Walking and Cycling to Improve Public Health: Lessons Learned from The Netherlands and Germany, *American Journal of Public Health 93*, 1509-16.


Northern Bypass 2
Note that Palms serves a regional east-west route beyond the bypass, as an alternative to Venice. Palms is showing a ~16% increase in traffic or +1.5K ADT.
Northern Bypass 2.1
Note that Palms serves a regional east-west route beyond the bypass, as an alternative to Venice.
Northern Bypass 1.1
Charnock is showing a ~50% increase in traffic or +1.3K ADT.
Palms Blvd
Charnock Rd
Grand View Blvd
Inglewood Blvd
McLaughlin Ave
Beethoven St
Victoria Ave
S Centinela Ave
Pacific Ave
Venice Blvd
Washington Pl
Northern Bypass 1
Victoria is showing a ~4% increase in traffic.
Venice Blvd. GS
ADT reduced from 37K to 31K.
Southern Bypass 1
Pacific is showing a ~50% increase in traffic or +1K ADT.
Southern Bypass 2.1
No counts were taken for Washington Pl. and there are no recent historical counts available. Washington Pl. W/O Centinela is in Culver City. We will need to rely on INRIX data.

Facts about Venice Blvd. Cut Through Traffic

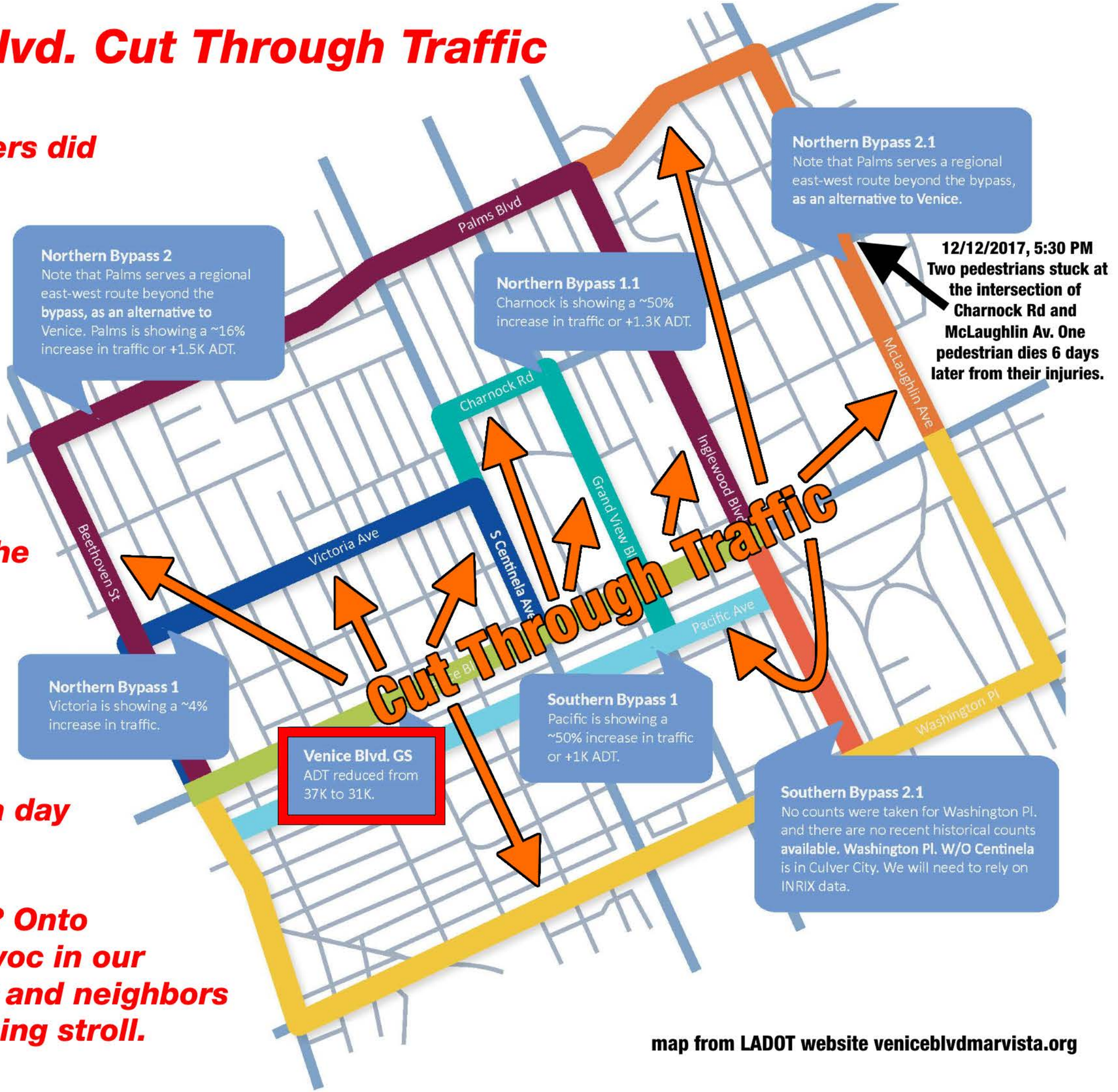
LADOT contractor Fehr and Peers did their one day traffic study on 9/22/2015, the day before Yom Kippur. They said the average daily trafffic (ADT) that day was 37,000 cars.

CalTrans published their 2016 annual ADT numbers for Venice Blvd. and said between 46,500 and 52,000 cars a day travel on Venice Blvd through the intersection at Centinela Ave.

In 2017, LADOT said they reduced the number of cars on Venice Blvd. to 31,000 a day.

That means up to 21,000 cars a day are diverting off Venice Blvd.

Where are all those cars going? Onto residential streets, creating havoc in our neighborhoods where kids play and neighbors walk their dogs or take an evening stroll.



map from LADOT website veniceblvdmarvista.org

TRANSPORTATION CONFORMITY ANALYSIS

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

2016 2040 RTPSCS

APPENDIX

DRAFT DECEMBER 2015

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PLAN PERFORMANCE | TRANSPORTATION CONFORMITY ANALYSIS

DRAFT DECEMBER 2015

TRANSPORTATION CONFORMITY ANALYSIS

INTRODUCTION

The federally required conformity analyses and findings for the 2016 RTP/SCS are set forth in the following sections. The conformity sections cover all federally required analyses for the conformity determination of the 2016 RTP/SCS. These analyses also update the 2015 Federal Transportation Improvement Program (FTIP). All transportation and air quality conformity analyses in this document are in compliance with applicable federal and state law, including conformity and transportation planning regulations. This Appendix contains three sections that specifically address the conformity analyses required for federal approval:

- Section I summarizes the conformity requirements and findings.
- Section II provides modeling methodologies, assumptions and results of the regional emissions analyses for the 2016 RTP/SCS.
- Section III highlights the conformity findings of the Timely Implementation of Transportation Control Measures (TCMs) analysis, and describes the implementation status of all applicable TCMs in the SCAG region.

SECTION I: CONFORMITY REQUIREMENTS AND FINDINGS

FEDERAL REQUIREMENTS

SCAG, the MPO for the six-county Southern California region, is mandated to comply with federal and state transportation and air quality regulations. Federal transportation law authorizes federal funding for highway, highway safety, transit and other surface transportation programs. The federal Clean Air Act (CAA) (42 USCA §§7401 to 7671q) establishes National Ambient Air Quality Standards (NAAQS) and planning requirements for various criteria air pollutants.

REGIONAL TRANSPORTATION PLAN (RTP) AND FEDERAL TRANSPORTATION IMPROVEMENT PROGRAM (FTIP)

Federal transportation law requires that SCAG develop an RTP for a 20-year minimum period. SCAG must also develop an FTIP that allocates monies over a four-year period to implement the RTP. The FTIP must be consistent with the RTP (e.g., projects, scope, implementation schedules, etc.). In addition, in the federal nonattainment or maintenance areas, the RTP and FTIP must comply with the transportation conformity requirements of the U.S. Environmental Protection Agency's (EPA) Transportation Conformity Regulations.

DESIGNATION OF FEDERAL NONATTAINMENT AND MAINTENANCE AREAS

The U.S. EPA may make a federal "nonattainment area" designation to any area that has not met CAA health standards for one or more criteria pollutants. A nonattainment area designation may require additional air-quality controls for transportation plans, programs and projects. The California Air Resource Board (ARB) recommends the federal nonattainment area boundaries to EPA for final designations. Subsequently, the EPA finalizes and defines the boundaries of the federally designated nonattainment areas for each criteria pollutant.

A maintenance area is any geographic region of the United States previously designated nonattainment pursuant to the CAA Amendments of 1990, and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under section 175A of the CAA, as amended.

STATE IMPLEMENTATION PLANS (SIPs)

To comply with the CAA in achieving the National Ambient Air Quality Standards (NAAQS), SIPs are required to be developed for federal nonattainment and maintenance areas. In California, SIP development is a joint effort of the local air agencies and the ARB working with federal, state and local agencies (including the MPOs). Local air quality management plans (AQMPs) are prepared in response to federal and state requirements.

In California, all SIPs have to go through three steps: air district action, ARB action and finally EPA action. Each air district submits its respective AQMPs to the ARB for inclusion in the SIPs. The ARB is the official state agency that submits the SIPs to EPA for all federal nonattainment and maintenance areas in California.

The SIP may include two important components relative to transportation conformity requirements – emissions budgets (for all criteria pollutant SIPs) and Transportation Conformity Measures (TCMs) (for ozone and CO SIPs only). Emissions budgets set an upper limit which transportation activities (for SIP purposes motor vehicles are also known as "on-road mobile sources") are permitted to emit. TCMs, required for serious and above ozone nonattainment areas and serious CO nonattainment areas, are strategies to reduce emissions from on-road mobile sources. The 2016 RTP/SCS must conform to the applicable SIPs [i.e., emissions budgets and TCMs] in the SCAG region.

FEDERAL TRANSPORTATION CONFORMITY RULE

Transportation conformity is required under CAA section 176(c) to ensure that federally supported highway and transit project activities "conform to" the purpose of the SIP. Conformity currently applies to areas that are designated nonattainment, and those re-designated to attainment after 1990, maintenance areas, with plans developed for the

specific transportation-related criteria pollutants. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The transportation conformity regulation is found in 40 CFR part 93, and provisions related to conformity SIPs are found in 40 CFR 51.390.

CLEAN AIR ACT DESIGNATIONS IN THE SCAG REGION

APPLICABLE CRITERIA POLLUTANTS IN THE SCAG REGION

Four criteria pollutants are subject to air quality conformity for the RTP and FTIP:

Carbon Monoxide (CO) – a product of automobile exhaust. CO reduces the flow of oxygen in the bloodstream and is particularly dangerous to persons with heart disease.

Nitrogen Dioxide (NO_2) – created under the high pressure and temperature conditions in internal combustion engines. It impacts the respiratory system and degrades visibility due to its brownish color.

Ozone (O_3)– formed by the reaction between volatile organic compounds (VOC) and oxides of nitrogen (NO_X) in the presence of sunlight. Ozone negatively impacts the respiratory system.

Particulate Matter (PM_{10} and $PM_{2.5}$) – extremely small particles and liquid droplets associated with dust, soot and combustion products. Particulate pollution has been linked to significant health problems, including aggravated asthma, increases in adverse respiratory problems, chronic bronchitis, decreased lung function and premature death.

AIR BASINS AND AIR DISTRICTS IN THE SCAG REGION

There are four air basins and five air districts within the six-county SCAG region (see **EXHIBITS 1** and **2** at the end of the report):

The South Coast Air Basin (SCAB) covers the urbanized portions of Los Angeles, Riverside and San Bernardino counties and all of the County of Orange. With the exception of the Morongo and Pechanga Areas of Indian Country for the 2008 8-hour ozone NAAQS, the SCAB is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). For the 2008 ozone standard, the Morongo and Pechanga Areas of Indian Country within the SCAB are administered by their respective Indian Tribal Governments.

The South Central Coast Air Basin (SCCAB), Ventura County portion, is within the jurisdiction of the Ventura County Air Pollution Control District (VCAPCD).

The Mojave Desert Air Basin (MDAB) covers the desert portions of Los Angeles, Riverside and San Bernardino counties. A small portion of this air basin is in Kern County and outside of the SCAG region. The SCAG portion of this air basin is under the jurisdiction of three air districts:

- The Mojave Desert Air Quality Management District (MDAQMD) administers portions of the MDAB situated in San Bernardino County and eastern Riverside County. The Riverside County portion is known as the Palo Verde Valley Area.
- The SCAQMD administers the portion of MDAB in Riverside County situated between the Salton Sea Air Basin and the Palo Verde Valley Area.
- The Antelope Valley Air Quality Management District (AVAQMD) administers the Los Angeles County portion of the MDAB.

The Salton Sea Air Basin (SSAB) covers all of Imperial County and the eastern portion of Riverside County (excluding the MDAB portion). This air basin is under jurisdiction of two air districts:

- The Imperial County Air Pollution Control District (ICAPCD) administers the Imperial County portion of the SSAB.
- The SCAQMD administers the Riverside County portion of the SSAB, Coachella Valley, situated between the SCAB and the MDAB.

NONATTAINMENT AND MAINTENANCE AREAS IN THE SCAG REGION

There are 19 federal nonattainment and maintenance areas in the SCAG region as follows:

- Imperial County Portion of SSAB – nonattainment for 8-hour ozone; $PM_{2.5}$ (2006 24-hour and 2012 Annual Standards); and $PM1_{10}$
- Morongo Indian Reservation Portion of SCAB – nonattainment area for 8-hour ozone
- Pechanga Indian Reservation Portion of SCAB – nonattainment area for 8-hour ozone
- Riverside County Portion of SSAB (Coachella Valley) – nonattainment area for: 8-hour ozone and PM_{10}
- San Bernardino County portion of MDAB:
  - Searles Valley – nonattainment for PM_{10}
  - San Bernardino County (excluding the Searles Valley area) – nonattainment area for PM_{10}
- SCAB – nonattainment for $PM_{2.5}$ (1997 & 2006 24-hour and 2012 Annual standards) and 8-hour ozone; maintenance area for CO; NO_2 and PM_{10}.

- Ventura County Portion of SCCAB – nonattainment area for 8-hour ozone
- Western MDAB (Antelope Valley portion of Los Angeles County and San Bernardino County portion of MDAB excluding Searles Valley) – nonattainment area for 8-hour ozone

The boundaries of the nonattainment and maintenance areas are illustrated in **EXHIBITS 3 – 7** at the end of the report.

APPLICABLE EMISSIONS BUDGETS IN THE SCAG REGION

For the 2016 RTP/SCS conformity determination, the applicable emissions budgets are established in the SIPs, as described below:

Ventura County Portion of SCCAB

- 2008 8-Hour Ozone Early Progress Plan SCAB (budgets effective May 20, 2008)
- 2007 Ozone SIP (budgets effective April 30, 2012)
- 2007 $PM_{2.5}$ SIP (budgets effective January 9, 2012)
- 2007 CO SIP (Maintenance Plan) (budgets effective June 11, 2007)
- 2007 NO_2 SIP (Maintenance Plan) (budgets effective January 4, 2010)
- 2010 PM_{10} SIP (Maintenance Plan) (budgets effective July 26, 2013)

Riverside County Portion of SSAB (Coachella Valley)

- 2008 8-Hour Ozone Early Progress Plan (budgets effective May 22, 2008)
- 2003 PM_{10} SIP (budgets effective April 9, 2008)

Western MDAB (Antelope Valley and portion of Los Angeles County and San Bernardino County portion of MDAB excluding Searles Valley)

- 2008 8-Hour Ozone Early Progress Plan (budgets effective May 20, 2008)

Imperial County Portion of SSAB (Ozone)

- 2008 8-Hour Ozone Early Progress Plan (budgets effective May 20, 2008)

SIP STATUS IN OTHER AREAS OF THE SCAG REGION

In absence of applicable emissions budgets for conformity, SCAG has to conduct interim emissions tests for regional emissions analysis of the 2016 RTP/SCS. At the present time, there is no federally approved SIP for the following areas:

- San Bernardino County Portion of MDAB (PM_{10})
- Searles Valley Portion of MDAB (PM_{10})
- Imperial County Portion of SSAB ($PM_{2.5}$ and PM_{10})

APPLICABLE TCMS

In the SCAG region, ozone SIPs developed in the South Coast Air Basin and the Ventura County portion of the South Central Coast Air Basin contain TCM strategies and are subject to EPA's Transportation Conformity Rule analyses. The two SIPs with TCM strategies are:

2012 South Coast AQMP/SIP (SCAB)

Effective October 3, 2014, the U.S. EPA approved the portions of the SCAQMD's Final 2012 Air Quality Management Plan that updated the approved control strategy for the 1997 8-hour ozone standard and that provided a demonstration of attainment of the 1-hour ozone standard by December 31, 2022. As a result, the 2012 South Coast Ozone AQMP/SIP is the applicable Ozone SIP for the SCAB. It is important to note that the TCM categories in the 2012 Ozone AQMP/SIP are consistent with the TCM categories in the 1994/1997/2003/2007 Ozone AQMPs/SIPs.

2007 Ozone SIP (Ventura County Portion of SCCAB)

The TCM strategies incorporated in the 1994 (as amended in 1995) Ozone AQMP/SIP function as the applicable TCMs for conformity finding. The EPA approved the 1994 Ozone SIP revisions on January 8, 1997. The 2007 Ozone AQMP/SIP revision (which EPA has not taken an action on) makes no changes to previously approved TCMs contained in the 1994 SIP (as amended in 1995). Effective July 27, 2009, EPA took a final action to find that the Ventura County attained the revoked 1-hour ozone standard by its attainment date. Effective January 2, 2013, EPA took another final action to find that the Ventura County attained the 1997 8-hour ozone standard by its attainment date.

It is noted that the Ventura County SIP does not claim emission reduction credits from TCM projects. They have been included to assist transportation and air quality agencies to identify projects that have the potential of reducing vehicle emissions, vehicle trips and vehicle miles traveled.

It should also be noted that while the 1-hour Ozone standard has been revoked and replaced with an 8-hour Ozone standard, the TCMs in the 1-hour Ozone SIPs remain applicable.

There are no applicable TCMs in any other federal non-attainment or maintenance areas in the SCAG region. For more information on TCMs and timely implementation of the TCMs, see Section III of this document.

CONFORMITY STATUS OF CURRENT RTP/SCS AND FTIP

The FHWA and FTA approved the conformity determination for the 2012 RTP/SCS through Amendment No. 2 and the 2015 FTIP on December 15, 2014 for all nonattainment and maintenance areas in the SCAG region. The conformity determination is valid through June 4, 2016.

CONFORMITY ANALYSIS AND FINDINGS FOR THE 2016 RTP/SCS

Per the US DOT Metropolitan Planning Regulations and EPA's Transportation Conformity Rule requirements, SCAG's 2016 RTP/SCS needs to pass four tests:

Regional Emissions Analysis (40 CFR, Sections 93.109, 93.110, 93.118, and 93.119)

Timely Implementation of Transportation Control Measures Analysis (40 CFR, Section 93.113)

Financial Constraint Analysis (40 CFR, Section 93.108 and 23 CFR, Section 450.322)

Interagency Consultation and Public Involvement Analysis (40 CFR, Sections 93.105 and 93.112 and 23 CFR, Section 450.324)

SCAG has made the following conformity findings for the 2016 RTP/SCS under the required federal tests.

REGIONAL EMISSIONS TESTS

These findings are based on the regional emissions test analyses shown in **TABLES 13 – 40**.

Finding: The regional emissions analyses for the 2016 RTP/SCS update the regional emissions analyses for the 2015 FTIP as previously amended.

Finding: The 2016 RTP/SCS regional emissions analysis for $PM_{2.5}$ and its precursors (1997, 2006 and 2012 NAAQS) meet all applicable emission budget tests for all milestone, attainment and planning horizon years in the SCAB.

Finding: The 2016 RTP/SCS regional emissions for the Ozone precursors meet all applicable emission budget tests for all milestone, attainment and planning horizon years for the SCAB, excluding Morongo and Pechanga, Morongo, Pechanga, SCCAB (Ventura County portion), Western MDAB (Los Angeles County Antelope Valley portion and San Bernardino County western portion of MDAB), and SSAB (Riverside County Coachella Valley and Imperial County portions).

Finding: The 2016 RTP/SCS regional emissions for NO_2 meet all applicable emission budget tests for all milestone, attainment and planning horizon years in the SCAB.

Finding: The 2016 RTP/SCS regional emissions for CO meet all applicable emission budget tests for all milestone, attainment and planning horizon years in SCAB.

Finding: The 2016 RTP/SCS regional emissions for PM_{10} and its precursors meet all applicable emission budget tests for all milestone, attainment and planning horizon years in SCAB and the SSAB (Riverside County Coachella Valley portion).

Finding: The 2016 RTP/SCS regional emissions for PM_{10} meet the interim emission test (build/no-build test) for all milestone and planning horizon years for the MDAB (San Bernardino County portion excluding Searles Valley portion and Searles Valley portion of San Bernardino County) and for the SSAB (Imperial County portion).

Finding: The 2016 RTP/SCS regional emissions analysis for $PM_{2.5}$ and its precursors (1997 and 2006 NAAQS) meet the interim emission test (build/no-build test) for all milestone, attainment and planning horizon years for the SSAB (urbanized area of Imperial County portion).

TIMELY IMPLEMENTATION OF TCM TEST

Finding: The TCM project categories listed in the 1994/1997/2003/2007/2012 Ozone SIPs for the SCAB area were given funding priority, are expected to be implemented on schedule, and, in the case of any delays, any obstacles to implementation have been or are being overcome.

Finding: The TCM strategies listed in the 1994 (as amended in 1995) Ozone SIP for the SCCAB (Ventura County) were given funding priority, are expected to be implemented on schedule, and, in the case of any delays, any obstacles to implementation have been or are being overcome.

FINANCIAL CONSTRAINT TEST

Finding: The 2016 RTP/SCS is fiscally constrained. SCAG's 2016 RTP/SCS demonstrates financial constraint in the financial plan by identifying all transportation revenues including local, state and federal sources available to meet the region's programming totals. [1]

INTER-AGENCY CONSULTATION AND PUBLIC INVOLVEMENT TEST

Finding: The 2016 RTP/SCS complies with all federal and state requirements for interagency consultation and public involvement. SCAG's Transportation Conformity Working Group has served as a forum for interagency consultation and, additionally, there were many ad-hoc meetings held between the stakeholder agencies for this purpose. SCAG's RTP/SCS public

outreach effort is documented in a separate Public Participation and Consultation Appendix. Continued interagency consultation and public involvement will occur throughout the public review process. All conformity specific comments received during the public review will be documented and responded to.

SECTION II: REGIONAL EMISSIONS ANALYSIS

BACKGROUND

SCAG's Regional Travel Demand Model is an advanced four-step model that meets and in many cases exceeds the state of the practice. The Model meets all the requirements of the Transportation Conformity Rule, specifically 40 CFR 93.122(b) (see Table 10). The results from the Regional Travel Demand Model are input to the ARB's EMFAC model for calculating regional emissions.

REGIONAL TRAVEL DEMAND MODEL OVERVIEW

SCAG is the primary agency responsible for the development and maintenance of travel demand forecasting models for the SCAG region. SCAG has been developing and improving these travel demand forecasting models since 1967. SCAG's Modeling Task Force, consisting of modeling technical peers from the various county and state agencies and private firms, meets every other month at SCAG to discuss regionally significant modeling projects and modeling issues, including the development, maintenance and application of SCAG's Regional Travel Demand Model as well as the travel demand models used by other stakeholders agencies.

SCAG's regional transportation modeling area covers the entire SCAG region, including Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. This modeling area is divided into 11,267 Transportation Analysis Zones (TAZs) with an additional 40 external cordon stations, 12 airport nodes, and 31 port nodes for the Ports of Los Angeles and Long Beach. The SCAG model was peer reviewed and updated based on the 2012 California Household Travel Survey. A comprehensive model validation was also performed to ensure the model properly replicates base-year (2012) travel conditions, which is the base year for the 2016 RTP/SCS (see Draft Year 2012 Model Validation Report).

MODEL INPUTS AND ASSUMPTIONS

SCAG's modeling methodologies, parameters and inputs are regularly updated to reflect current travel conditions and demographic changes.

Socioeconomic Data by Census Block Group – Socioeconomic data (SED), which describes population, households and employment at Block Group level, are used as major input to SCAG's Regional Travel Demand Model. The concept is that travel is a derived demand, which is directly related to the demographics and economic characteristics of households. The model uses both aggregate and disaggregate SED. The aggregate data are counts of population, households and employment for each TAZ. The disaggregate data are Public Use Microdata Sample (PUMS) records from the Census, which contain detailed information about person and household characteristics in the region.

Highway Networks – The highway networks were originally developed from the Thomas Brothers GIS database and then updated with street inventory survey data (the latest SCAG region street inventory survey was conducted in year 2008) in the TransCAD environment. The networks include detailed coding of the region's freeway system (mixed-flow lane, auxiliary lane, HOV lane, HOT lane, toll lane, truck lane, etc.) as well as arterials, major collectors and some minor collectors. Separate highway networks for each time period were developed to simulate time of day differences in roadway capacity and vehicle travel restrictions, such as arterial parking restrictions during peak hours, HOV lane minimum vehicle occupancy requirement, and heavy-duty vehicle restrictions on certain roadways.

Land Use Accessibility for Auto Ownership Model – Accessibility refers to the ease of reaching goods, services, activities and destinations. Many factors affect accessibility, including the quality and affordability of transport options, transport system connectivity and land use patterns. The auto and non-auto accessibilities of a zone directly influence household auto ownership. Land use patterns, in particular high density, mixed-use developments also directly influence household auto ownership.

Land Use, Parking, Pricing, TDM, Walk and Bike for Mode Choice Model – Land use, zonal parking, roadway pricing and Travel Demand Management (TDM) are inputs to mode choice, in addition to the modal level of service obtained from the highway, transit and non-motorized networks. Parking fees/restrictions, road pricing cost/policies, and land use densities have direct influence on travelers' mode choice. For example, increasing parking fees encourages travelers to shift from auto to transit. Also, high employment and residential densities encourage the use of transit and non-motorized modes.

Transit Networks – The transit networks include more than 3,000 existing and future transit routes/patterns, representing about 70 transit operators with fixed route service over the entire SCAG region. The transit routes are completely compatible with the highway geography. Separate transit networks are developed for five time periods based on the transit service information contained in the up-to-date Los Angeles County Metropolitan Transportation Authority (LACMTA) Transit Trip Master database and data collected from transit agencies not included in the TripMaster database. Transit services are grouped into 8 transit modes (Local Bus, Rapid Bus, Express Bus, Bus Rapid Transit (BRT), Transit

Way, Urban Rail, Commuter Rail and High Speed Rail (HSR)), according to their service characteristics and fare structures. The transit networks include detailed representation of all rail stations, transfer opportunities among the different modes and between transit routes and park-and-ride locations. A TeleAtlas street network along with Census Block level data is used to calculate walk accessibilities and to develop walk access to transit.

External Trips – External trips (i.e., inter-regional trips) are trips with one or both ends located outside the SCAG modeling area. SCAG's model includes 40 cordon locations consisting of freeways and arterials leading into and out of the SCAG modeling area. A cordon traffic origin-destination survey was conducted in year 2003 and the results were used to develop inter-regional Light and Medium (LM) duty vehicle trip matrices, including External-to-External (E-E), External-to-Internal (E-I), and Internal-to-External (I-E) trips. The origin-destination survey is updated for the 2016 RTP/SCS .

Airport Trips – Airports trips include passenger trips and cargo trips, and are represented by about 100 zones in the SCAG modeling area. The daily airport passenger trips are disaggregated into regional model TAZ and further split into five time periods by five vehicle modes of travel: drive alone, 2-person carpool, 3-person carpool, 4-or-more person carpool and transit. The airport vehicle trips are merged with the other auto vehicle trips prior to the network assignment step. Air cargo truck trips are disaggregated into the regional model TAZs. The daily air cargo trips are split into five time periods by three heavy-duty truck (HDT) types (light HDT, medium HDT, and heavy HDT) and merged with the HDT truck trips prior to network assignment.

Employment, Commodity Flow, Ports and Warehouse Activities – These inputs to the transportation model are data related to the freight activities, including employment by industrial classification, commodity flows, seaports, warehousing, trucking and wholesale trade, etc.

MODEL MODULES AND PROCEDURES

Household Classification and Population Synthesizer – This module classifies zonal households into several household segments. Prior to the application of Auto Ownership module, households are classified across the following four attributes:

- Household Size (4 categories): the number of one-person households, two-person households, three-person households and four or more person households.
- Number of Workers (4 categories): the number of households with no worker, one worker, two workers and three workers or more.
- Household Income (4 categories): the number of households with annual household income (in 2011 dollars) less than $35,000 (Low), $35,000–$74,999 (Medium), $75,000–$149,999 (High) and $150,000 or more (Very High).
- Type of Dwelling Unit (2 categories): number of households living in single-family detached housing, and living in other housing.

For Home-Based-Work (HBW) trip generation, trips are estimated for five household markets which are carried out through trip distribution and mode choice:

- Zero car households
- Car insufficient households
- Car sufficient household, Low Income (less than $35,000)
- Car sufficient household, Medium income ($35,000-$74,999)
- Car sufficient household, High income ($75,000 or greater)

The Population Synthesizer is a module that generates a synthetic population by expanding existing disaggregate sample data (from 2010 Census PUMS data) to mirror known aggregate distributions of household and person attributes (from SCAG zonal data). A set of population and household variables of interest are used as control variables in the population synthesizer. A synthetic population is generated for the entire SCAG region using this procedure.

Auto Ownership Model – The auto ownership model provides an estimate of households by auto ownership level (0, 1, 2, 3, 4 or more) for each zone. This information is used in trip generation models to estimate zonal person trips. The basic structure of the auto ownership model is a multinomial logit formulation, using input socioeconomic variables (household size, household income, number of workers and type of dwelling unit) and land use and accessibility variables (mixed residential and employment, density, transit and non-motorized accessibilities).

Trip Generation Model – Trip generation is the process of estimating daily person trips generated by (i.e., trip production) and attracted to (i.e., trip attraction) in each TAZ on an average weekday. The trip generation model contains 9 trip purposes, each subdivided into different household markets. The total trips produced by TAZ were estimated for each of the following purposes:

1. Home-based work (HBW). There are two types of HBW trips. "Direct" homework trips go directly between home and work. "Strategic" home-work trips include one or more intermediate stops between home and work.
2. Home-based school (HBSC)
3. Home-based college/university (HBCU)
4. Home-based shopping (HBS)
5. Home-based social-recreational (HBSR)

6. Home-based serving-passenger (HBSP)
7. Home-based other (HBO)
8. Work-based other (WBO)
9. Other-based other (OBO)

Trip Distribution Models – The trip distribution model estimates the number of trips from each TAZ to each other TAZ. The SCAG model uses two types of trip distribution models. Destination choice models are developed for HBW, HBS, HBSR, HBSP, HBO, WBO and OBO trip purposes while a gravity model approach is used to distribute trips for HBSC and HBCU trip purposes.

Mode Choice Models – Mode choice is the process of taking the zone-to-zone person trips by trip purpose from the trip distribution model, and determining how many of these trips are made by various travel modes. The SCAG mode choice model is a nested logit model. The top branch of the nesting structure includes Auto, Transit and Non-Motorized. The branch under Auto includes Drive Alone and Shared Ride, which is further split into 2-person carpool, 3-person carpool, and 4-or-more person carpool. The branch under Transit includes Local Bus, Rapid Bus, Express Bus, Bus Rapid Transit (BRT), Transit Way, Urban Rail, Commuter Rail and High Speed Rail (HSR). The branch under Non-Motorized includes Walk and Bicycle. Separate mode choice models are estimated for each trip purpose and time period. Mode choice is a function of level of service attributes (in-vehicle travel time, out-of-vehicle travel time, fares, parking fees, roadway tolls, auto operating costs), household attributes such as income, and zonal attributes such as residential and employment densities. Currently the region includes more than 11,000 miles of limited access roadways, 900+ lane miles of HOV (2 and 3 and more persons) roadways, two dynamically priced HOT facilities and several toll roads.

Heavy Duty Truck (HDT) Model – HDT trucks are defined by ARB as a truck with a gross vehicle weight of 8,500 pounds or more. The SCAG HDT Model includes internal truck and external truck trip models. The internal truck trips are generated using a cross classification method by applying truck trip rates for a two-digit NAICS code by the number of employees in that category and the number of households within each zone. The daily truck trip ends are distributed using a gravity model to create daily truck trips for each of the three truck types: 1) light HDT, 2) medium HDT, and 3) heavy HDT. The external truck trips are developed using an econometric model to estimate inbound and outbound commodity flows by counties. The county to county commodity data are allocated to the zonal level based on NAICS employee distribution and then converted to trucks trips using observed data collected during model development. Seaport and airport related truck trips were included as special generator truck trips. The daily truck trips by truck types are allocated to five time periods and merged with the auto trips in trip assignment.

Network Assignment Model – Network assignment is the process of loading vehicle trips on the appropriate networks. For highway assignment, the Regional Model consists of a series of multi-class simultaneous equilibrium assignments for eight classes of vehicles (drive alone, 2-person carpool using HOV, 2-person carpool using general purpose lanes, 3 or more person carpool using HOV, 3 or more person carpool using general purpose lanes, light HDT, medium HDT and heavy HDT) and for each of the five time periods. During this assignment process, trucks are converted to Passenger Car Equivalent (PCE) for each link and each truck type based on 1) percentage of trucks, 2) percentage of grade, 3) length of the link, and 4) level of congestion (v/c ratios). Transit vehicles are also included in the highway assignment. For transit trip assignment, the final transit trips from the last loop mode choice models are aggregated by access mode and time period, and then assigned to transit networks for each time period. The vehicle trip tables obtained from mode choice, airport and heavy duty models are aggregated to the 4,109 Tier 1 zone systems prior to network assignment.

Model Convergence – In order to maintain consistency between the speeds predicted by the highway assignment and the travel times input to the entire travel demand model chain, the predicted speeds are used to re-compute highway and transit travel times, and the entire model sequence are repeated until input and output speeds are consistent with each other.

Highway Performance Monitoring System (HPMS) VMT-based Post-Process – In this step, the outputs from the Network Assignment Model, which including traffic volumes, speeds, Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT) and Vehicle Hours of Delay (VHD) are adjusted so that the base-year model VMT by air-basin by county is consistent with HPMS VMT as appropriate.

MODEL OUTPUTS

Population Synthesizer Outputs – The socio-economic data for year 2012 consists of various marginal and joint distributions of population and households for each TAZ. A total of 65 socio-economic variables and eight joint distribution of two or more variables are developed as model inputs. Those variables include population, households, school enrollments, household income, workers and employment, etc. These variables are available at TAZ level.

Auto Ownership Model Outputs – The auto ownership model generates households by auto ownership, in other words, the number of households with 0 car, 1 car, 2 cars, 3 cars and 4 or more cars for each zone, which are the inputs to the Trip Generation Model. The key findings are: Auto availability increases with household size, household income and the number of workers in the household, and decreases for households living in multifamily housing. Auto availability decreases with increasing transit and walk accessibility to employment, and also decreases with increasing mixed density.

Trip Generation Model Outputs – The output from the trip generation model includes daily person trips for an average weekday by households within each TAZ. The model contains a series of models to estimate trip production and attractions by trip purpose. Ten trip purposes, each subdivided into different household markets. A market stratification is defined by household income and car sufficiency. The car sufficiency is defined relative to household workers for HBW trips and relative to household size for HBO trips.

Trip Distribution Model Outputs – Eight destination choice models were estimated. The HBWD, HBWS, HBSH, HBSR, HBSP and HBO models are stratified by the car sufficency/ income market segments. The WBO and OBO models are not stratified as is customary for non-home-based models. Several different measures of the fit of the model to the observed data were examined, including average trip length by trip purpose, time period and trip market level, average trip length by trip purpose market and density level, trip length distribution and coincidence ratio, ACS 5-year county-level worker flow patterns.

Mode Choice Model Outputs – Mode choice models are similarly stratified as Trip Distribution models, in order to better reflect the effect of transit-dependent users on mode and destination choice. The various travel modes estimated by the model.

The outputs from the Time of Day Model include passenger vehicle trip matrices in OD format by time period and occupancy level. These matrices are then combined with external trips, airport trips and HDT trips to produce final vehicle OD matrices (-3 passenger vehicle classes and 3 HDT classes in 5 time periods) for the Network Assignment step. The five passenger vehicle classes are drive alone, 2-person carpool, using HOV lane, and 3-person+ carpool using HOV lane, 2-person carpool using GP (general purpose) lane, and 3-person+ carpool using GP lane. The 3 HDT classes are light HDT, medium HDT and heavy HDT. Transit person trips matrices for each of five time periods are also produced in this step for transit assignment.

Network Assignment Model Outputs – Major outputs of the Network Assignment Model are highway and transit level of service attributes, including traffic flows and the associated speeds, VMT, VHT and VHD on the highway networks as well as transit boarding and passenger loads on each transit line for each time period.

2016 RTP/SCS MODELING ASSUMPTIONS

Socio-Economic Data – **TABLES 1** and **2** show population and employment summaries by county and air basin which reflect current trends. This forecast has been in development

TABLE 1 Summary of Population Data (000s)

County	Air Basin	2017	2019	2020	2021	2023	2026	2030	2031	2035	2040
Imperial	SSAB	203	223	234	235	240	247	257	260	272	282
Los Angeles	SCAB	9,814	9,873	9,900	9,948	10,048	10,195	10,389	10,438	10,627	10,937
	MDAB	411	418	422	428	440	459	483	489	513	572
Orange	SCAB	3,200	3,247	3,271	3,287	3,319	3,360	3,397	3,404	3,431	3,461
Riverside	SCAB	1,887	1,934	1,954	1,982	2,033	2,111	2,218	2,245	2,355	2,430
	MDAB	27	28	29	31	35	40	47	49	57	64
	SSAB	472	489	497	507	524	550	586	595	632	673
San Bernardino	SCAB	1,604	1,628	1,641	1,658	1,693	1,747	1,821	1,840	1,923	1,978
	MDAB	541	552	557	566	586	617	658	669	715	753
Ventura	SCCAB	868	881	886	891	899	911	926	930	945	965
SCAG Region	SSAB	674	712	732	742	764	798	843	855	904	955
	SCAB	16,505	16,682	16,765	16,875	17,093	17,414	17,825	17,927	18,335	18,806
	MDAB	980	998	1,007	1,025	1,061	1,116	1,189	1,207	1,285	1,389
	SCCAB	868	881	886	891	899	911	926	930	945	965
Total		19,028	19,273	19,390	19,533	19,818	20,238	20,783	20,919	21,470	22,116

Rounded to nearest thousand.

since 2012 under SCAG's Community, Economic and Human Development (CEHD) Committee's guidance, and in collaboration with SCAG's subregions and local jurisdictions. The process involved several major steps outlined as follows:

- Evaluate and assess regional socioeconomic estimates and growth trends based on data sources ranging from the U.S. Departments of Commerce, Health and Human Services, Bureau of Labor Statistics, the California Department of Finance, and Employment Development Department.
- Analyze key assumptions (fertility rate, mortality rate, net immigration, labor force rates, headship rates, etc.) and forecast methodologies.
- Conduct panel of expert reviews.
- Collaborate with peer agencies and local jurisdictions including one on one meetings.

The comprehensive discussion of the socio-economic data is included in the 2016 RTP/SCS Demographics and Growth Forecast Appendix

TABLE 2 Summary of Employment Data (000s)

County	Air Basin	2017	2019	2020	2021	2023	2026	2030	2031	2035	2040
Imperial	SSAB	86	96	102	103	106	109	114	116	121	125
Los Angeles	SCAB	4,413	4,515	4,565	4,589	4,638	4,713	4,811	4,835	4,933	5,084
	MDAB	90	93	94	96	100	106	114	116	125	137
Orange	SCAB	1,666	1,709	1,730	1,743	1,767	1,801	1,836	1,843	1,870	1,899
Riverside	SCAB	570	612	633	646	671	710	761	774	825	870
	MDAB	6	7	7	7	8	8	9	9	10	11
	SSAB	186	201	208	213	222	236	254	259	277	293
San Bernardino	SCAB	618	643	655	666	687	719	761	771	814	837
	MDAB	123	131	134	138	144	154	168	171	184	191
Ventura	SCCAB	359	369	375	377	381	389	398	400	409	420
SCAG Region	SSAB	272	297	310	316	328	345	368	374	397	418
	SCAB	7,267	7,478	7,583	7,643	7,764	7,942	8,169	8,223	8,442	8,690
	MDAB	219	230	235	241	252	269	291	297	319	340
	SCCAB	359	369	375	377	381	389	398	400	409	420
Total		**8,116**	**8,375**	**8,503**	**8,577**	**8,725**	**8,944**	**9,226**	**9,294**	**9,568**	**9,868**

Rounded to nearest thousand.

Networks – A summary of the transportation system attributes for the highway and transit networks for Years 2008 to 2040 are shown in **TABLES 3**, **4** and **5**. Lane mile data includes freeway to freeway connectors. Other freeway ramps, freeway Type 3 lanes, and centroid connectors are not included. Note that values in the tables in this report may not add exactly due to rounding. A detailed list of modeled projects is in the Project List Appendix.

TABLE 3 Summary of Highway Network Lane Miles

	Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
SCAB	2017 Build	8,311	1,058	28,406	11,100	48,875
	2019 Build	8,342	1,116	28,642	11,198	49,298
	2020 Build	8,551	1,192	29,110	11,333	50,186
	2021 Build	8,606	1,194	29,166	11,356	50,322
	2021 No Build	8,401	1,047	28,199	11,079	48,726
	2023 Build	8,686	1,279	29,344	11,463	50,772
	2026 Build	8,781	1,390	29,657	11,620	51,448
	2030 Build	8,836	1,495	29,837	11,790	51,958
	2031 Build	8,836	1,495	29,837	11,790	51,958
	2031 No Build	8,479	1,049	28,202	11,071	48,801
	2035 Build	8,978	1,535	30,316	11,949	52,778
	2040 Build	8,988	1,606	30,310	11,949	52,853
	2040 No Build	8,479	1,049	28,202	11,071	48,801
SCCAB	2017 Build	531	9	1,797	1,008	3,345
	2019 Build	531	9	1,802	1,008	3,350
	2020 Build	533	9	1,814	1,010	3,366
	2021 Build	533	9	1,815	1,010	3,367
	2021 No Build	528	9	1,795	1,009	3,341
	2023 Build	533	9	1,829	1,010	3,381
	2026 Build	551	9	1,832	1,010	3,402
	2030 Build	556	52	1,849	1,016	3,473
	2031 Build	556	52	1,849	1,016	3,473
	2031 No Build	528	9	1,795	1,009	3,341
	2035 Build	556	52	1,849	1,016	3,473
	2040 Build	556	52	1,849	1,016	3,473
	2040 No Build	528	9	1,795	1,009	3,341

TABLE 3 Summary of Highway Network Lane Miles: Continued

	Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
MDAB	2017 Build	1,892	23	4,149	6,759	12,823
	2019 Build	1,893	23	4,253	6,768	12,937
	2020 Build	2,349	23	4,639	6,783	13,794
	2021 Build	2,349	23	4,644	6,783	13,799
	2021 No Build	1,892	23	4,049	6,738	12,702
	2023 Build	2,349	23	4,668	6,799	13,839
	2026 Build	2,349	23	4,720	6,837	13,929
	2030 Build	2,349	73	4,829	6,884	14,135
	2031 Build	2,349	73	4,829	6,884	14,135
	2031 No Build	1,892	23	4,049	6,738	12,702
	2035 Build	2,349	101	5,041	6,927	14,418
	2040 Build	2,349	101	5,200	7,123	14,773
	2040 No Build	1,892	23	4,050	6,738	12,703
SSAB (Coachella)	2017 Build	389	0	1,284	1,205	2,878
	2019 Build	393	0	1,297	1,222	2,912
	2020 Build	393	0	1,335	1,248	2,976
	2021 Build	396	0	1,351	1,262	3,009
	2021 No Build	390	0	1,263	1,198	2,851
	2023 Build	397	0	1,411	1,302	3,110
	2026 Build	397	0	1,468	1,366	3,231
	2030 Build	397	0	1,486	1,409	3,292
	2031 Build	397	0	1,500	1,415	3,312
	2031 No Build	390	0	1,263	1,198	2,851
	2035 Build	397	0	1,524	1,446	3,367
	2040 Build	397	0	1,524	1,446	3,367
	2040 No Build	390	0	1,263	1,198	2,851

TABLE 3 Summary of Highway Network Lane Miles: Continued

	Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
SSAB (Imperial)	2017 build	380	0	1,157	2,464	4,001
	2019 Build	380	0	1,157	2,464	4,001
	2020 Build	380	0	1,172	2,464	4,016
	2021 Build	380	0	1,172	2,464	4,016
	2021 No Build	380	0	1,157	2,465	4,002
	2023 Build	380	0	1,173	2,464	4,017
	2026 Build	380	0	1,212	2,464	4,056
	2030 Build	417	0	1,200	2,463	4,080
	2031 Build	417	0	1,200	2,463	4,080
	2031 No Build	380	0	1,157	2,465	4,002
	2035 Build	417	0	1,200	2,463	4,080
	2040 Build	417	0	1,200	2,463	4,080
	2040 No Build	380	0	1,157	2,465	4,002
Total SCAG Region	2017 Build	11,503	1,090	36,793	22,536	71,922
	2019 Build	11,539	1,148	37,151	22,660	72,498
	2020 Build	12,206	1,224	38,070	22,838	74,338
	2021 Build	12,264	1,226	38,148	22,875	74,513
	2021 No Build	11,591	1,079	36,463	22,489	71,622
	2023 Build	12,345	1,311	38,425	23,038	75,119
	2026 Build	12,458	1,422	38,889	23,297	76,066
	2030 Build	12,555	1,620	39,201	23,562	76,938
	2031 Build	12,555	1,620	39,215	23,568	76,958
	2031 No Build	11,669	1,081	36,466	22,481	71,697
	2035 Build	12,697	1,688	39,930	23,801	78,116
	2040 Build	12,707	1,759	40,083	23,997	78,546
	2040 No Build	11,669	1,081	36,467	22,481	71,698

Notes:
1) Arterials = Expressway + Principle Arterial + Minor Arterial
2) Collectors = Major Collector + Minor Collector
3) Total does not include ramps and truck

TABLE 4 Summary of Transit Route Miles

Network	Local Bus	Express Bus	Rail	HSRT	Total
2017 Build	10,200	1,772	994	0	12,966
2019 Build	10,204	1,802	1,001	0	13,007
2020 Build	10,208	1,816	1,010	50	13,084
2021 Build	10,208	1,816	1,020	50	13,094
2021 No Build	10,194	1,672	992	0	12,858
2023 Build	10,208	1,816	1,024	50	13,098
2026 Build	10,208	1,816	1,029	50	13,103
2030 Build	10,208	1,816	1,070	50	13,144
2031 Build	10,208	1,816	1,070	50	13,144
2031 No Build	10,194	1,672	992	0	12,858
2035 Build	10,210	1,816	1,100	113	13,239
2040 Build	10,221	2,185	1,116	113	13,635
2040 No Build	10,194	1,672	992	0	12,858

TABLE 5 Summary of Transit Service Miles

Network	Local Bus	Express Bus	Rail	HSRT	Total
2017 Build	453,059	43,989	48,317	0	545,365
2019 Build	453,351	45,262	50,070	0	548,683
2020 Build	453,606	46,445	50,458	5,600	556,109
2021 Build	453,606	46,445	58,801	5,600	564,452
2021 No Build	451,847	37,897	44,545	0	534,289
2023 Build	453,607	46,445	60,968	5,600	566,620
2026 Build	453,954	46,445	64,566	5,600	570,565
2030 Build	453,956	46,445	72,193	5,600	578,194
2031 Build	453,956	46,445	72,193	5,600	578,194
2031 No Build	451,847	37,897	44,545	0	534,289
2035 Build	457,375	46,445	81,113	7,742	592,675
2040 Build	465,999	63,120	91,408	7,742	628,269
2040 No Build	451,847	37,897	44,545	0	534,289

Work-at-Home and Telecommuting – Home-Based-Work trips were reduced for Work-at-Home, Telecommuting, Flexible work schedules and Parking subsidies. In year 2017, Work-at-Home trips were 5.56 percent, Telecommute trips were 3.49 percent and Flexible work schedule were 0.35% for a total Home-Based-Work trip reduction of 9.40 percent. **TABLE 6** below shows the total reductions to the home-based-work person trips over the 2012 base as applied in the trip generation model.

TABLE 6 Total Home-Based-Work Person Trip Reductions

Category	2017	2019	2020	2021	2023	2026	2030	2031	2035	2040
Work-at-Home	5.56%	5.79%	5.91%	6.01%	6.21%	6.53%	6.97%	7.09%	7.57%	8.13%
Telecommute	3.66%	5.01%	5.70%	5.87%	6.21%	6.77%	7.58%	7.80%	8.75%	10.00%
Flexible work schedules	0.59%	1.76%	2.34%	2.41%	2.54%	2.76%	3.08%	3.16%	3.53%	3.49%
Parking subsidies	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.61%	3.07%	2.97%
Total Trip Reductions	9.81%	12.56%	13.95%	14.28%	14.96%	16.05%	17.63%	18.67%	22.92%	24.59%
Increase over 2012 Base	2.42%	5.17%	6.56%	6.89%	7.57%	8.66%	10.24%	11.28%	15.53%	17.20%

Auto Operating Cost – There are two components used in calculating auto operating cost: the cost of gasoline and "other" costs. The "other" costs category includes costs for repairs, light maintenance, lubrication, tires and accessories. The assumption used in the modeling work is that if an auto is available at the household then the depreciation of the car and the insurance costs are already being paid for whether the car is left at home or used for commuting to work. **TABLE 7** lists the auto operating costs used for 2016 RTP/SCS. All costs are in 2011 constant dollars. Note: costs are expressed in 2011-dollar values for input into the mode choice models. Auto Operating costs are calculated using the following formula: Auto Operating Cost = Fuel Cost / Fuel Economy + Other Costs.

TABLE 7 Auto Operating Costs (Cents per Mile)

Category	2017	2019	2020	2021	2023	2026	2030	2031	2035	2040
Auto Operating Cost *	25.31	25.76	26.04	26.02	25.95	28.21	29.12	29.48	30.83	33.00

** Cents/mile; year 2011 constant $. 2040 includes 2.80 cents VMT fee.*

Transit Fares – The transit network includes three types of transit fares: base boarding fares, zone fares and transfer fares; and two types of fare factors: base fare factor and transfer fare factor. Fare values were collected through the Transit Level of Service Data Collection program. Considering the complex fare structure for most carriers, only published full cash fares for initial boarding and transfers are used to represent the base fare and transfer fare. To account for the revenue composition of different fare types, such as one-way walkup fares, daily/weekly/monthly passes, Senior/Student/Disabled fares and other special fares, base fare factors and transfer fare factors are estimated from the boarding and revenue data provided by transit operators. By applying fare factors to the published full cash fare, the resulting fares represent actual fares paid by an average passenger. Finally, all boarding fares (base fare and transfer fare) are converted into 2011 dollars using a CPI adjustment factor derived from the CPI factor published by the U.S. Department of Labor for the Los Angeles-Riverside-Orange County metropolitan area.

The fare structure varies significantly by operator and by service for the same operator. For example, LACMTA has both local and express bus service. For local bus, the general fare is a flat rate of $1.50. For express bus, there is a surcharge of $0.70 for each zone in addition to the $1.50 fare. However, OCTA, another major operator in the region, charges a general fare of $1.50 for local bus. For express bus, the fare is a flat rate of $4.00 or $6.00 depending on the route. To accommodate variations in the fares for different routes, the transit network codes general flat fares (i.e., base fares, transfer fares) at the route level, while the fare factors are calculated at the carrier level.

Two other major operators, Metrolink and Amtrak, follow a zone-based fare structure. For example, Metrolink fares are calculated with a distance-based formula using the shortest driving distance between stations, with an 80-mile maximum charge. To capture the published cash fare between two station pairs, a fare matrix was developed for Metrolink and Amtrak. Similarly, the LACMTA Express bus and Los Angeles Department of Transportation (LADOT) Commuter Express bus that have zone-based fare are also included as a zone-to-zone fare matrix. Similar to the development of fare factors for flat-rate routes, a fare factor matrix was developed based on Metrolink sales and boarding data to represent the weighted average fare for each station pair. In addition, regression analysis was conducted to generate the relationship between the distance and fares for Metrolink to predict future fares for new stations.

No real cost increase in transit fares was assumed from 2012 to 2040.

Capacity and Free Flow Speed – Highway capacities (including for heavy duty truck) used in the Model for each of the facility types vary, depending on area location (i.e., CBD, urban, suburban, rural or mountain) (see **TABLE 8** below). Free flow speeds are based on posted speeds.

TABLE 8 Highway Capacities and Free Flow Speeds Used in the Model

Facility Type	Vehicles / Lane / Hour	Free Flow Speed (MPH)
Freeway (MF)	1,900 – 2,100	60 – 75
Principal Arterial	475 – 975	21 – 56
Other Arterial	475 – 975	19 – 55
Collector	375 – 975	17 – 52

Toll Roads – There were approximately 325 lane miles of toll roads in 2012, increasing to about 1,855 toll/HOT lanes in 2040. This includes a regional Express Lane network (**TABLE 9**) that would build upon the success of the 91 Express Lanes and Transportation Corridor Agencies (TCA) Toll Roads in Orange County and two demonstration projects in Los Angeles County.

TABLE 9 Express/HOT Lane Network

County	Route	From	To
LOS ANGELES	I-5	SR-14	PARKER ROAD
LOS ANGELES	I-405	I-5 (NORTH SF VALLEY)	LA/OC COUNTY LINE
LOS ANGELES	I-110	ADAMS BLVD (S/O I-10)	I-405
LOS ANGELES	I-10	ALAMEDA ST	I-710
LOS ANGELES	I-10	I-710	I-605
LOS ANGELES	I-10	I-605	LA/SB COUNTY LINE
LOS ANGELES	I-105	I-405	I-605
LOS ANGELES	I-605	LA/OC LINE	I-10
ORANGE	I-605	I-405	LA/OC COUNTY LINE
ORANGE	I-405	LA/OC COUNTY LINE	SR-55
ORANGE	SR-55	I-405	SR-91
ORANGE	SR-73	I-405	MACARTHUR
RIVERSIDE	I-15	RIV/SB COUNTY LINE	SR-74
RIVERSIDE	SR-91	OC/RV COUNTY LINE	I-15
SAN BERNARDINO	I-10	LA/SB COUNTY LINE	I-15
SAN BERNARDINO	I-10	I-15	FORD ST
SAN BERNARDINO	I-15	HDC	SR-395
SAN BERNARDINO	I-15	SR-395	I-215
SAN BERNARDINO	I-15	I-215	RIV/SB COUNTY LINE

The effect of the toll charges on the toll roads was incorporated into the highway assignment procedure. The toll charge was added to each toll facility by inserting the cost to the appropriate link and identifying the link with a unique Toll Class Number. Toll costs (in 2011 dollars) were converted to a time value (in minutes) in the network assignment step.

ITS – The speeds and capacities on Smart Streets were increased by 5 percent to reflect the improved traffic flow due to the Advanced Transportation Technologies/Intelligent Vehicle Highway System (ATT/IVHS).

Conformity requirements – **TABLE 10** below is a summary of the conformity requirements related to travel demand model and how SCAG's regional travel demand model satisfies these requirements.

TABLE 10 Conformity Requirements Related to Travel Demand Model

CFR	Requirement	How Requirement is Satisfied
93.122(b)(1)(i)	Network-based travel models must be validated against observed counts (peak and off-peak, if possible) for a base year that is not more than 10 years prior to the date of the conformity determination. Model forecasts must be analyzed for reasonableness and compared to historical trends and other factors, and the results must be documented.	The SCAG travel demand models were estimated and calibrated using data from SCAG's Year 2000 Post-Census Regional Travel Survey, 2003 External Travel Survey, the 2010 US Census and various Transit on-board Surveys. The model was validated against 2012 ground counts and 2012 HPMS data.
93.122(b)(1)(ii)	Land use, population, employment, and other network-based travel model assumptions must be documented and based on the best available information.	All land use, population, households, employment, and network-based model assumptions were updated for 2016-2040 RTP/SCS and documented in Demographics and Growth Forecast Appendix and this Conformity Report.
93.122(b)(1)(iii)	Scenarios of land development and use must be consistent with the future transportation system alternatives for which emissions are being estimated. The distribution of employment and residences for different transportation options must be reasonable.	Land development and use are consistent with future transportation systems. The distribution of employment, population, and household is reasonable with respect to the transport systems.
93.122(b)(1)(iv)	A capacity-sensitive assignment methodology must be used, and emissions estimates must be based on a methodology which differentiates between peak and off-peak link volumes and speeds and uses speeds based on final assigned volumes.	The SCAG travel demand model includes separate multi-modal user equilibrium assignments for peak and off-peak time periods. The network assignments are capacity-sensitive. Link speeds are calculated based on final assigned volumes.
93.122(b)(1)(v)	Zone-to-zone travel impedances used to distribute trips between origin and destination pairs must be in reasonable agreement with the travel times that are estimated from final assigned traffic volumes. Where use of transit currently is anticipated to be a significant factor in satisfying transportation demand, these times should also be used for modeling mode splits.	The SCAG travel demand model includes full feedback of travel time among trip generation, trip distribution, mode choice, and trip assignment steps. Both highway and transit times are included in the mode choice model.
93.122(b)(1)(vi)	Network-based travel models must be reasonably sensitive to changes in the time(s), cost(s), and other factors affecting travel choices.	The SCAG travel demand model was developed with rigorous model calibration and validation effort that includes extensive model sensitivity tests to ensure the model is reasonably sensitive to changes in the time(s), cost(s), and other factors affecting travel choices. Travel time(s) such as in-vehicle and out-of-vehicles times, cost(s) such as auto costs and transit fares, and other factors such as transportation infrastructure capacity and control measures are directly modeled in various model components such as auto ownership, trip generation, destination choice, mode choice, and route choice models.

SUMMARY OF REGIONAL VEHICLE MILES TRAVELED

TABLE 11 below is a summary of VMT in 1,000-mile increments by air basin. VMT data were produced from the SCAG Regional Travel Model and does not include VMT from school buses, urban buses, and motor homes (non-modeled). These non-modeled VMT were provided by the ARB and are included in the emissions analysis.

TABLE 11 VMT Summary (000s)

Air Basen	L&MD	HD	Total
	2017 BUILD		
SCCAB	19,854	1,034	20,889
SCAB	373,588	24,375	397,963
MDAB	31,790	5,753	37,543
SSAB	16,049	2,913	18,963
Total	441,282	34,075	475,357
	2019 BUILD		
SCCAB	19,953	1,069	21,022
SCAB	372,795	25,363	398,158
MDAB	32,572	6,056	38,628
SSAB	16,755	3,083	19,837
Total	442,075	35,571	477,646
	2020 BUILD		
SCCAB	19,856	1,088	20,944
SCAB	370,125	25,801	395,927
MDAB	33,075	6,401	39,475
SSAB	16,987	3,169	20,156
Total	440,043	36,459	476,502
	2021 BUILD		
SCCAB	19,955	1,107	21,063
SCAB	372,322	26,254	398,576
MDAB	33,683	6,617	40,300
SSAB	17,291	3,262	20,552
Total	443,250	37,241	480,491

TABLE 11 VMT Summary (000s): Continued

Air Basen	L&MD	HD	Total
	2021 NO-BUILD		
SCCAB	20,696	1,109	21,805
SCAB	385,940	26,179	412,119
MDAB	34,013	6,400	40,414
SSAB	17,748	3,272	21,020
Total	458,398	36,960	495,357
	2023 BUILD		
SCCAB	20,134	1,149	21,283
SCAB	377,553	27,241	404,794
MDAB	34,756	7,073	41,829
SSAB	17,874	3,456	21,330
Total	450,318	38,918	489,236
	2026 BUILD		
SCCAB	19,841	1,216	21,057
SCAB	372,880	28,833	401,713
MDAB	35,941	7,866	43,807
SSAB	18,306	3,786	22,092
Total	446,968	41,702	488,669
	2030 BUILD		
SCCAB	19,994	1,316	21,310
SCAB	375,713	31,027	406,740
MDAB	38,066	9,143	47,209
SSAB	19,207	4,283	23,491
Total	452,980	45,770	498,750

TABLE 11 VMT Summary (000s): Continued

Air Basen	L&MD	HD	Total
	2031 BUILD		
SCCAB	19,924	1,342	21,267
SCAB	374,624	31,620	406,245
MDAB	38,483	9,529	48,012
SSAB	19,365	4,418	23,783
Total	452,396	46,910	499,307
	2031 NO-BUILD		
SCCAB	21,169	1,345	22,514
SCAB	397,568	31,485	429,054
MDAB	39,219	9,214	48,433
SSAB	20,350	4,425	24,775
Total	478,306	46,470	524,776
	2035 BUILD		
SCCAB	19,600	1,458	21,058
SCAB	371,240	34,335	405,575
MDAB	40,541	11,479	52,021
SSAB	20,471	5,024	25,495
Total	451,852	52,297	504,150
	2040 BUILD		
SCCAB	19,481	1,618	21,099
SCAB	362,136	37,458	399,594
MDAB	43,155	13,508	56,663
SSAB	20,739	5,707	26,445
Total	445,511	58,291	503,802
	2040 NO-BUILD		
SCCAB	21,032	1,620	22,652
SCAB	391,436	37,262	428,699
MDAB	43,467	13,080	56,547
SSAB	22,352	5,728	28,080
Total	478,287	57,691	535,978

2016 RTP/SCS REGIONAL EMISSIONS ANALYSIS

EPA's Transportation Conformity Rule requires that the 2016 RTP/SCS regional emissions be consistent with (i.e., not exceed) the motor vehicle emissions budgets in the applicable SIPs. Consistency with emissions budgets must be demonstrated for each year that the applicable emissions budgets are established, for the transportation planning horizon year, and for any milestone years as necessary so that the years for which consistency is demonstrated are no more than ten years apart. Where there are no EPA-approved SIP budgets, an interim emission test is used for conformity. For the interim emissions tests, the build scenario's emissions must be less than or equal to the no-build scenario's emissions and/or the build scenario's emissions must be less than or equal to the base year. Listed below is a description of the various network scenarios:

2016 RTP/SCS Conformity Baseline Year – The conformity baseline year is 2011 for 2008 8-hour ozone; 2014 for 2012 $PM_{2.5}$; 2008 for 2006 $PM_{2.5}$; 2002 for 1997 $PM_{2.5}$; 1990 for PM_{10}.

2016 RTP/SCS No Build – The "No Build" scenario includes all existing regionally significant highway and transit projects, all ongoing TDM or Transportation System Management (TSM) activities, and all projects which are undergoing right-of-way acquisition, are currently under construction, have completed the NEPA process, or are in the first year of the previously conforming FTIP (Fiscal Year 2015).

2016 RTP/SCS Build – The "Build" scenario is generally defined as all RTP/SCS projects, including the 2016 RTP/SCS No Build, and the future transportation system that will result from full implementation of the 2015 FTIP and the 2016 RTP/SCS.

For more specific individual project information as part of the RTP/SCS modeling and regional emissions analysis, refer to the 2016 RTP/SCS Project List Appendix.

Section 93.122 (e)(2) and Section 93.122(f)(2) of the EPA Transportation Conformity Rule requires that in PM nonattainment and maintenance areas for which the SIPs identify construction-related fugitive dust as a contributor to the area problem, the regional emissions analysis should include construction-related fugitive PM. Of the SCAG PM nonattainment areas, only the SCAB and the Coachella Valley portion of SSAB have PM SIPs. The relevant emissions budgets for these two areas include construction emissions, and the 2016 RTP/SCS PM regional emissions analyses include construction emissions as appropriate.

The on-road motor emissions estimates for the 2016 RTP/SCS were analyzed using the EMFAC2014 emission model developed by ARB. For paved road dust, SCAG uses the approved EPA's AP-42 method and VMT by facility type for all applicable years.

REQUIRED REGIONAL EMISSIONS TESTS FOR 2016 RTP/SCS

The required regional emissions tests for the 2016 RTP/SCS are presented in **TABLES 12 –20**. Since transportation conformity findings are needed out to the RTP's horizon year 2040, the latest budget years deemed adequate by U.S. EPA serve as the budgets for future years in each emissions test.

TABLE 12 South Central Coast Air Basin – Ventura County Portion

Modeling Year	2020	2030	2040
NAAQS	Ozone [a]	Ozone	Ozone

TABLE 13 South Coast Air Basin

Modeling Year	2017	2019	2020	2021	2023	2030	2031	2040
NAAQS	Ozone [b]		Ozone [b]		Ozone [b] (interpolation)		Ozone [a]	Ozone
		$PM_{2.5}$ [a] (2006 NAAQS)		$PM_{2.5}$ [a] (2012 NAAQS)		$PM_{2.5}$		$PM_{2.5}$
			PM_{10} [b]			PM_{10} [b]		PM_{10}
			CO			CO		CO
			NO_2			NO_2		NO_2

Note: 2030 is allowed to be done by interpolation per Conformity Regulations..

TABLE 14 Morongo Ozone Non-attainment Area

Modeling Year	2017	2020	2023	2031	2040
NAAQS	Ozone [b]	Ozone [a, b]	Ozone [b] (interpolation)	Ozone	Ozone

TABLE 15 Pechanga Ozone Non-attainment Area

Modeling Year	2017	2020	2023	2031	2040
NAAQS	Ozone [a, b]	Ozone [b]	Ozone [b] (interpolation)	Ozone	Ozone

TABLE 16 Western Mojave Desert Air Basin *

Modeling Year	2020	2026	2031	2040
NAAQS	Ozone	Ozone [a]	Ozone	Ozone

** Antelope Valley Portion of Los Angeles County and San Bernardino County Portion of MDAB excluding Searles Valley.*

TABLE 17 Mojave Desert Air Basin –San Bernardino County Portion Excluding Searles Valley

Modeling Year	2021	2031	2040
NAAQS	PM_{10}	PM_{10}	PM_{10}

TABLE 18 Mojave Desert Air Basin – Searles Valley Portion

Modeling Year	2021	2031	2040
NAAQS	PM_{10}	PM_{10}	PM_{10}

TABLE 19 Salton Sea Air Basin – Coachella Valley Portion

Modeling Year	2021	2026	2031	2040
NAAQS	Ozone	Ozone [a]	Ozone	Ozone
	PM_{10}		PM_{10}	PM_{10}

TABLE 20 Salton Sea Air Basen – Imperial County Portion

Modeling Year	2017	2021	2031	2040
NAAQS	Ozone [a]	Ozone	Ozone	Ozone
		$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$
		PM_{10}	PM_{10}	PM_{10}

[a] *Attainment year.*
[b] *Budget year.*

SUMMARY OF REGIONAL EMISSIONS ANALYSIS BASED ON EMFAC2014

The following tables summarize the required regional emission analyses for each of the non-attainment and maintenance areas within SCAG's jurisdiction based on EMFAC2014 which is the latest emission model pending approval by U.S. EPA. If EMFAC2014 is approved by U.S. EPA before the 2016 – 2040 RTP/SCS is adopted by the Regional Council, the regional emission analysis based on EMFAC2014 will serve as the final regional emission analysis for the RTP/SCS, superceding the regional emissions analysis based on EMFAC2011. For those areas which require budget tests, the RTP/SCS emissions values in the summary tables below utilize the rounding convention used by ARB to set the budgets (i.e., any fraction rounded up to the nearest ton), and are the basis of the conformity findings for these areas.

South Central Coast Air Basin – Ventura County Portion

TABLE 21 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
ROG *	Budget	13	13	13
	RTP	5	3	2
Budget – RTP		8	10	11
NO_x	Budget	19	19	19
	RTP	6	3	3
Budget – RTP		13	16	16

** Reactive Organic Gases*

South Coast Air Basin

TABLE 22 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		Nonattainment Area	2017	2020	2023	2031	2040
ROG	Budget	SCAB	119	108	99	99	99
	RTP	Morongo	0.5	0.4	0.3	0.2	0.2
		Pechanga	0.1	0.1	0.1	0.0	0.0
		SCAB excluding Morongo and Pechanga	102.1	79.3	67.3	49.2	36.5
		Sum	102.7	79.8	67.7	49.4	36.7
		SCAB	103	80	68	50	37
	Budget – RTP		16	28	31	49	62
NO_x	Budget	SCAB	224	185	140	140	140
	RTP	Morongo	2.3	1.8	1.1	0.7	0.6
		Pechanga	0.9	0.7	0.5	0.3	0.2
		SCAB excluding Morongo and Pechanga	180.9	137.6	86.3	63.9	59.2
		Sum	184.1	140.1	87.9	64.9	60.0
		SCAB	185	141	88	65	60
	Budget – RTP		39	44	51	75	80

TABLE 23 1997, 2006, and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2019	2021	2030	2040
ROG	Budget	132	132	132	132
	RTP	76	72	48	35
Budget – RTP		56	60	84	97
NO_x	Budget	290	290	290	290
	RTP	165	135	71	64
Budget – RTP		125	155	219	226
$PM_{2.5}$	Budget	35	35	35	35
	RTP	10	8	4	2
Budget – RTP		25	27	31	33

South Coast Air Basin: Continued

TABLE 24 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
ROG	Budget	110	81	81
	RTP	73	47	32
Budget – RTP		37	34	49
NO_x	Budget	180	116	116
	RTP	149	71	64
Budget – RTP		31	45	52
PM_{10}	Budget	164	175	175
	RTP	85	90	89
Budget – RTP		79	85	86

TABLE 25 CO (Winter Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
CO	Budget	2,137	2,137	2,137
	RTP	572	318	233
Budget – RTP		1,565	1,819	1,904

TABLE 26 NO_2 (Winter Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
NO_2	Budget	680	680	680
	RTP	148	70	62
Budget – RTP		532	610	618

Western Mojave Desert Air Basin – Antelope Valley Portion of Los Angeles County and San Bernardino County Portion of MDAB

TABLE 27 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2026	2031	2040
ROG	Budget	22	22	22	22
	RTP	8	6	6	5
Budget – RTP		14	16	16	17
NO_x	Budget	77	77	77	77
	RTP	18	10	9	11
Budget – RTP		59	67	68	66

Mojave Desert Air Basin – San Bernardino County Portion Excluding Searles Valley

TABLE 28 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

		2021	2031	2040
PM_{10}	No Build	9.9	12.3	14.3
	Build	8.9	10.9	12.7
No Build – Build		1.0	1.4	1.6

Mojave Desert Air Basin – Searles Valley Portion

TABLE 29 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

		2021	2031	2040
PM_{10}	No Build	0.0	0.0	0.0
	Build	0.0	0.0	0.0
No Build – Build		0.0	0.0	0.0

Salton Sea Air Basin – Coachella Valley Portion

TABLE 30 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2026	2031	2040
ROG	Budget	7	7	7	7
	RTP	4	3	3	3
Budget – RTP		3	4	4	4
NO_x	Budget	26	26	26	26
	RTP	8	5	4	5
Budget – RTP		18	21	22	21

TABLE 31 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

		2021	2031	2040
PM_{10}	Budget	10.9	10.9	10.9
	RTP	5.1	5.6	5.8
Budget – RTP		5.8	5.3	5.1

Note: Budget set to one decimal place by 2003 Coachella SIP.

Salton Sea Air Basin – Imperial County Portion

TABLE 32 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2017	2021	2031	2040
ROG	Budget	7	7	7	7
	RTP	4	3	3	2
Budget – RTP		3	4	4	5
NO_x	Budget	17	17	17	17
	RTP	7	5	4	4
Budget – RTP		10	12	13	13

TABLE 33 2006 and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
NO_x	No Build	2.4	1.6	1.6
	Build	2.4	1.5	1.6
No Build – Build		0.0	0.1	0.0
$PM_{2.5}$	No Build	0.3	0.3	0.3
	Build	0.2	0.2	0.2
No Build – Build		0.1	0.1	0.1

TABLE 34 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
PM_{10}	No Build	1.4	1.6	1.8
	Build	1.0	1.2	1.4
No Build – Build		0.4	0.4	0.4

DETAILED EMISSIONS ANALYSES BASED ON EMFAC2014

The following tables present further detail of the emissions analyses for all non-attainment and maintenance areas within SCAG's jurisdiction. For those areas which require budget tests, the RTP/SSCS emissions values in the tables below utilize the rounding convention used by ARB to set the budgets (i.e., any fraction rounded up to the nearest ton), and are the basis of the conformity findings for these areas.

South Central Coast Air Basin – Ventura County Portion

TABLE 35 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
ROG	RTP	4.2	2.5	1.7
Total Emissions		5	3	2
Emission Budget		13	13	13
Budget		8	10	11
NO_x	RTP	6.0	2.7	2.2
Total Emissions		6	3	3
Emission Budget		19	19	19
Budget		13	16	16

South Coast Air Basin

TABLE 36 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		Nonattainment Area	2017	2020	2023	2031	2040
ROG	Budget	SCAB	119	108	99	99	99
	RTP	Morongo	0.5	0.4	0.3	0.2	0.2
		Pechanga	0.1	0.1	0.1	0.0	0.0
		SCAB excluding Morongo and Pechanga	102.1	79.3	67.3	49.2	36.5
		Sum	102.7	79.8	67.7	49.4	36.7
		SCAB	103	80	68	50	37
	Budget – RTP		16	28	31	49	62
NO_x	Budget	SCAB	224	185	140	140	140
	RTP	Morongo	2.3	1.8	1.1	0.7	0.6
		Pechanga	0.9	0.7	0.5	0.3	0.2
		SCAB excluding Morongo and Pechanga	180.9	137.6	86.3	63.9	59.2
		Sum	184.1	140.1	87.9	64.9	60.0
		SCAB	185	141	88	65	60
	Budget – RTP		39	44	52	75	80

South Coast Air Basin: Continued

TABLE 37 1997, 2006 and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2019	2021	2030	2040
ROG	RTP	82.5	71.7	49.1	34.8
Baseline Adjustments *		-7.16	N/A	-1.79	-0.48
Total Emissions		76	72	48	35
Emission Budget		132	132	132	132
Budget – Emissions		56	60	84	97
NO_x	RTP	166.6	134.9	70.6	63.1
Baseline Adjustments *		-1.88	N/A	-0.03	0.00
Total Emissions		165	135	71	64
Emission Budget		290	290	290	290
Budget – Emissions		125	155	219	226
$PM_{2.5}$	RTP	10.8	10.2	10.0	9.7
Re-entrained Road Dust Paved		7.6	7.7	8.2	8.3
Re-entrained Road Dust Unpaved *		0.6	0.6	0.6	0.6
Road Construction Dust *		0.3	0.5	0.8	0.5
ROG to $PM_{2.5}$ Trading		-1.2	-1.3	-1.8	-2.0
NO_x to $PM_{2.5}$ Trading		-8.4	-10.4	-14.7	-15.1
Sum		9.7	7.3	3.1	2.0
Total Emissions **		10	8	4	2
Emission Budget		35	35	35	35
Budget – Emissions		25	27	31	33

** The detailed $PM_{2.5}$ emission budgets were provided by ARB on March 8, 2012 (Table 29A).*
*** The Plan $PM_{2.5}$ emissions for years after 2014 are calculated with the NOX to $PM_{2.5}$ (10 to 1) trading mechanism as approved by EPA on November 9, 2011.*

TABLE 38 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
ROG	RTP	76.3	49.1	34.8
Smog Check Reductions *		-3.8	-2.8	-2.8
Sum		72.5	46.3	32.0
Total Emissions		73	47	32
Emission Budget		110	81	81
Budget – Emissions		37	34	49
NO_x	RTP	150.1	70.6	63.1
Smog Check Reductions *		-1.7	0.0	0.0
Sum		148.4	70.6	63.1
Total Emissions		149	71	64
Emission Budget		180	116	116
Budget – Emissions		31	45	52
PM_{10}	RTP	24.0	23.9	23.7
Re-entrained Road Dust Paved		50.8	54.7	55.6
Re-entrained Road Dust Unpaved **		5.8	5.8	5.8
Road Construction Dust		3.7	5.4	3.4
Sum		84.3	89.8	88.5
Total Emissions		85	90	89
Emission Budget		164	175	175
Budget – Emissions		79	85	86

** Provided by ARB. * Provided by SCAQMD.*

South Coast Air Basin: Continued

TABLE 39 CO (Winter Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
CO	RTP	571.7	317.1	232.8
Total Emissions		572	318	233
Emission Budgets		2,137	2,137	2,137
Budget – Emissions		1,565	1,819	1,904

TABLE 40 NO_2 (Winter Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2030	2040
NO_2	RTP	147.3	69.4	62.0
Total Emissions		148	70	62
Emission Budgets		680	680	680
Budget – Emissions		532	610	618

Western Mojave Desert Air Basin – Antelope Valley Portion of Los Angeles County and San Bernardino County Portion of MDAB

TABLE 41 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2020	2026	2031	2040
ROG	RTP	7.9	6.0	5.2	4.3
Total Emissions		8	6	6	5
Emission Budget		22	22	22	22
Budget – Emissions		14	16	16	17
NO_x	RTP	17.5	9.8	9.0	10.1
Total Emissions		18	10	9	11
Emission Budget		77	77	77	77
Budget – Emissions		59	67	68	66

Mojave Desert Air Basin – San Bernardino County Portion Excluding Searles Valley

TABLE 42 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
PM_{10} No-Build	Re-entrained Road Dust	8.1	10.1	11.7
	Motor Vehicle	1.8	2.2	2.6
	Total Emissions	9.9	12.3	14.3
PM_{10} Build	Re-entrained Road Dust	7.7	9.2	10.4
	Paving Unpaved Roads	-0.6	-0.4	-0.3
	Motor Vehicle	1.8	2.1	2.6
	Total Emissions	8.9	10.9	12.7
No Build – Build		1.0	1.4	1.6

Mojave Desert Air Basin – Searles Valley Portion

TABLE 43 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
PM_{10}	No Build	0.0	0.0	0.0
	Build	0.0	0.0	0.0
No Build – Build		0.0	0.0	0.0

Salton Sea Air Basin – Coachella Valley Portion

TABLE 44 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2026	2031	2040
ROG	RTP	3.5	2.9	2.6	2.2
Total Emissions		4	3	3	3
Emission Budget		7	7	7	7
Budget – Emissions		3	4	4	4
NO_x	RTP	7.4	4.1	3.8	4.0
Total Emissions		8	5	4	5
Emission Budget		26	26	26	26
Budget – Emissions		18	21	22	21

Salton Sea Air Basin – Coachella Valley Portion

TABLE 45 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
PM_{10}	RTP	0.91	1.04	1.16
Re-entrained Road Dust Paved		2.08	2.43	2.67
Re-entrained Road Dust Unpaved *		1.71	1.70	1.70
Road Construction Dust *		0.32	0.37	0.26
Sum		5.02	5.54	5.79
Total Emissions		5.1	5.6	5.8
Emission Budget		10.9	10.9	10.9
Budget – Emissions		5.8	5.3	5.1

** Provided by SCAQMD.*

Salton Sea Air Basin – Imperial County Portion

TABLE 46 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2017	2021	2031	2040
ROG	RTP	3.0	2.6	2.0	1.8
Total Emissions		4	3	3	2
Emission Budget		7	7	7	7
Budget – Emissions		3	4	4	5
NO_x	RTP	6.4	4.9	3.1	3.4
Total Emissions		7	5	4	4
Emission Budget		17	17	17	17
Budget – Emissions		10	12	13	13

Salton Sea Air Basin – Imperial County Portion

TABLE 47 2006 and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
NO_x	No-Build	2.4	1.6	1.6
	Build	2.4	1.5	1.6
No Build – Build		0.0	0.1	0.0
$PM_{2.5}$ No-Build	Re-entrained Road Dust	0.11	0.12	0.14
	Motor Vehicle	0.10	0.11	0.13
	Sum	0.21	0.23	0.27
	Total Emissions	0.3	0.3	0.3
$PM_{2.5}$ Build	Re-entrained Road Dust	0.06	0.07	0.08
	Motor Vehicle	0.10	0.11	0.12
	Sum	0.16	0.18	0.20
	Total Emissions	0.2	0.2	0.2
No Build – Build		0.1	0.1	0.1

TABLE 48 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2014)

Pollutant		2021	2031	2040
PM_{10} No-Build	Re-entrained Road Dust	0.92	1.07	1.18
	Motor Vehicle	0.42	0.50	0.59
	Sum	1.34	1.57	1.77
	Total Emissions	1.4	1.6	1.8
PM_{10} Build	Re-entrained Road Dust	0.58	0.71	0.81
	Motor Vehicle	0.42	0.49	0.57
	Sum	1.00	1.20	1.38
	Total Emissions	1.0	1.2	1.4
No Build – Build		0.4	0.4	0.4

SUMMARY OF REGIONAL EMISSIONS ANALYSIS BASED ON EMFAC2011

The following tables summarize the required regional emission analyses for each of the non-attainment and maintenance areas within SCAG's jurisdiction based on EMFAC2011 in case EMFAC2014 is not approved by EPA before adoption of the Final 2016 RTP/SCS by the Regional Council. If EMFAC2014 is not be approved prior to the adoption by SCAG Regional Council of the Final 2016 RTP/SCS, the regional emission analysis based on EMFAC2011 will supersede the regional emission analysis based on EMFAC2014. Again, for those areas

which require budget tests, the RTP/SCS emissions values in the summary tables below utilize the rounding convention used by ARB to set the budgets (i.e., any fraction rounded up to the nearest ton), and are the basis of the conformity findings for these areas.

South Central Coast Air Basin – Ventura County Portion

TABLE 49 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
ROG	Budget	13	13	13
	RTP	5	4	4
Budget – RTP		8	9	9
NO_x	Budget	19	19	19
	RTP	9	6	6
Budget – RTP		10	13	13

South Coast Air Basin

TABLE 50 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		Nonattainment Area	2017	2020	2023	2031	2040
ROG	Budget	SCAB	119	108	99	99	99
	RTP	Morongo	0.5 *	0.4	0.4	0.3	0.3
		Pechanga	0.0 *	0.0	0.0	0.0	0.0
		SCAB excluding Morongo and Pechanga	104.4 *	87.2	79.2	65.1	59.5
		Sum	104.9	87.6	79.6	65.4	59.8
		SCAB	105	88	80	66	60
	Budget – RTP		14	20	19	33	39
NO_x	Budget	SCAB	224	185	140	140	140
	RTP	Morongo	1.6 *	2.0	0.9	0.8	0.9
		Pechanga	0.0 *	0.0	0.0	0.0	0.0
		SCAB excluding Morongo and Pechanga	203.0 *	162.5	126.1	108.4	110.2
		Sum	204.6	164.5	127.0	109.2	111.1
		SCAB	205	165	127	110	112
	Budget – RTP		19	20	13	30	28

[a] *2017 interpolated between 2014 and 2018*

South Coast Air Basin: Continued

TABLE 51 1997, 2006, and 2012 $PM_{2.5}$ (Standards Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2019	2021	2030	2040
ROG	Budget	132	132	132	132
	RTP	90	83	65	59
Budget – RTP		42	49	67	73
NO_x	Budget	290	290	290	290
	RTP	193	163	119	119
Budget – RTP		97	127	171	171
$PM_{2.5}$	Budget	35	35	35	35
	RTP	21	13	12	12
Budget – RTP		14	22	23	23

TABLE 52 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
ROG	Budget	110	81	81
	RTP	80	52	45
Budget – RTP		30	29	36
NO_x	Budget	180	116	116
	RTP	173	103	104
Budget – RTP		7	13	12
PM_{10}	Budget	164	175	175
	RTP	86	93	92
Budget – RTP		78	82	83

TABLE 53 CO (Winter Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
CO	Budget	2,137	2,137	2,137
	RTP	698	488	443
Budget – RTP		1,439	1,649	1,694

TABLE 54 NO_2 (Winter Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
NO_2	Budget	680	680	680
	RTP	174	116	117
Budget – RTP		506	564	563

Western Mojave Desert Air Basin – Antelope Valley Portion of Los Angeles County and San Bernardino County Portion of MDAB

TABLE 55 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2026	2031	2040
ROG	Budget	22	22	22	22
	RTP	6	5	5	6
Budget – RTP		16	17	17	16
NO_x	Budget	77	77	77	77
	RTP	19	16	16	19
Budget – RTP		58	61	61	58

Mojave Desert Air Basin – San Bernardino County Portion Excluding Searles Valley

TABLE 56 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

		2021	2031	2040
PM_{10}	No Build	10.0	12.5	14.7
	Build	9.0	11.2	13.1
No Build – Build		1.0	1.3	1.6

Mojave Desert Air Basin – Searles Valley Portion

TABLE 57 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

		2021	2031	2040
PM_{10}	No Build	0.0	0.0	0.0
	Build	0.0	0.0	0.0
No Build – Build		0.0	0.0	0.0

Salton Sea Air Basin – Coachella Valley Portion

TABLE 58 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2026	2031	2040
ROG	Budget	7	7	7	7
	RTP	3	3	3	3
Budget – RTP		4	4	4	4
NO_x	Budget	26	26	26	26
	RTP	8	7	8	9
Budget – RTP		18	19	18	17

Salton Sea Air Basin – Coachella Valley Portion: Continued

TABLE 59 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

		2021	2031	2040
PM_{10}	Budget	10.9	10.9	10.9
	RTP	5.1	5.8	6.1
Budget – RTP		5.8	5.1	4.8

Note: budget set to one decimal place by 2003 Coachella SIP.

Salton Sea Air Basin – Imperial County Portion

TABLE 60 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2017	2021	2031	2040
ROG	Budget	7	7	7	7
	RTP	3	2	3	3
Budget – RTP		4	5	4	4
NO_x	Budget	17	17	17	17
	RTP	7	6	6	7
Budget – RTP		10	11	11	10

TABLE 61 2006 and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2031	2040
NO_x	No Build	2.6	2.5	2.9
	Build	2.6	2.5	2.8
No Build – Build		0.0	0.0	0.1
$PM_{2.5}$	No Build	0.3	0.3	0.4
	Build	0.2	0.3	0.3
No Build – Build		0.1	0.0	0.1

TABLE 62 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2031	2040
PM_{10}	No Build	1.5	1.7	2.0
	Build	1.1	1.4	1.6
No Build – Build		0.4	0.3	0.4

DETAILED EMISSIONS ANALYSES BASED ON EMFAC2011

The following tables present further detail of the emissions analyses for all non-attainment and maintenance areas within SCAG's jurisdiction. For those areas which require budget tests, the FTIP emissions values in the tables below utilize the rounding convention used by ARB to set the budgets (i.e., any fraction rounded up to the nearest ton), and are the basis of the conformity findings for these areas.

South Central Coast Air Basin – Ventura County Portion

TABLE 63 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
ROG	RTP	5.0	3.7	3.2
Total Emissions		5	4	4
Emission Budget		13	13	13
Budget – Emissions		8	9	9
NO_x	RTP	8.7	5.6	5.4
Total Emissions		9	6	6
Emission Budget		19	19	19
Budget – Emissions		10	13	13

South Coast Air Basin

TABLE 64 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		Nonattainment Area	2017	2020	2023	2031	2040
ROG	Budget	SCAB	119	108	99	99	99
	RTP	Morongo	0.5 *	0.4	0.4	0.3	0.3
		Pechanga	0.0 *	0.0	0.0	0.0	0.0
		SCAB excluding Morongo and Pechanga	104.4 *	87.2	79.2	65.1	59.5
		Sum	104.9	87.6	79.6	65.4	59.8
		SCAB	105	88	80	66	60
	Budget – RTP		14	20	19	33	39
NO_x	Budget	SCAB	224	185	140	140	140
	RTP	Morongo	1.6 *	2.0	0.9	0.8	0.9
		Pechanga	0.0 *	0.0	0.0	0.0	0.0
		SCAB excluding Morongo and Pechanga	203.0 *	162.5	126.1	108.4	110.2
		Sum	204.6	164.5	127.0	109.2	111.1
		SCAB	205	165	127	110	112
	Budget – RTP		19	20	13	30	28

[a] *2017 interpolated between 2014 and 2018*

South Coast Air Basin: Continued

TABLE 65 1997, 2006 and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2019	2021	2030	2040
ROG	RTP	89.8	82.4	64.8	58.1
Total Emissions		90	83	65	59
Emission Budget		132	132	132	132
Budget – Emissions		42	49	67	73
NO_X	RTP	192.8	162.8	118.1	118.6
Total Emissions		193	163	119	119
Emission Budget		290	290	290	290
Budget – Emissions		97	127	171	171
$PM_{2.5}$	RTP	11.6	11.5	12.1	12.5
Re-entrained Road Dust Paved		7.6	7.7	8.2	8.3
Re-entrained Road Dust Unpaved *		0.6	0.6	0.6	0.6
Road Construction Dust *		0.3	0.5	0.8	0.5
NO_X to PM2.5 Trading		N/A	-7.7	-10.4	-10.4
Sum		20.1	12.6	11.3	11.5
Total Emissions **		21	13	12	12
Emission Budget		35	35	35	35
Budget – Emissions		14	22	23	23

** The detailed $PM_{2.5}$ emission budgets were provided by ARB on March*
*** The Plan $PM_{2.5}$ emissions for years after 2014 are calculated with the NO_X to $PM_{2.5}$ (10 to 1) trading mechanism as approved by EPA on November 9, 2011*

TABLE 66 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

		2020	2030	2040
ROG	RTP	85.2	64.8	58.1
Advanced Clean Cars Reductions *		-1.4	-10.7	-10.7
Smog Check Reductions *		-3.8	-2.8	-2.8
Sum		80.0	51.3	44.6
Total Emissions		80	52	45
Emission Budget		110	81	81
Budget – Emissions		30	29	36
NO_X	RTP	177.1	118.1	118.6
Advanced Clean Cars Reductions *		-2.7	-15.2	-15.2
Smog Check Reductions *		-1.7	0.0	0.0
Sum		172.7	102.9	103.4
Total Emissions		173	103	104
Emission Budget		180	116	116
Budget – Emissions		7	13	12
PM_{10}	RTP	25.0	26.2	26.6
Re-entrained Road Dust Paved		50.8	54.7	55.6
Re-entrained Road Dust Unpaved **		5.8	5.8	5.8
Road Construction Dust		3.7	5.4	3.4
Sum		85.3	92.1	91.4
Total Emissions		86	93	92
Emission Budget		164	175	175
Budget – Emissions		78	82	83

** Provided by ARB. ** Provided by SCAQMD.*

South Coast Air Basin: Continued

TABLE 67 CO (Winter Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
CO	RTP	697.4	487.6	442.5
Total Emissions		698	488	443
Emission Budgets		2,137	2,137	2,137
Budget – Emissions		1,439	1,649	1,694

TABLE 68 NO_2 (Winter Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2030	2040
NO_2	RTP	173.8	115.8	116.2
Total Emissions		174	116	117
Emission Budgets		680	680	680
Budget – Emissions		506	564	563

Western Mojave Desert Air Basin – Antelope Valley Portion of Los Angeles County and San Bernardino County Portion of MDAB

TABLE 69 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2020	2026	2031	2040
ROG	RTP	5.7	5.0	5.0	5.5
Total Emissions		6	5	5	6
Emission Budget		22	22	22	22
Budget – Emissions		16	17	17	16
NO_x	RTP	18.1	15.0	15.2	18.1
Total Emissions		19	16	16	19
Emission Budget		77	77	77	77
Budget – Emissions		58	61	61	58

Mojave Desert Air Basin – San Bernardino County Portion Excluding Searles Valley

TABLE 70 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2031	2040
PM_{10} No-Build	Re-entrained Road Dust	8.1	10.1	11.7
	Motor Vehicle	1.9	2.4	3.0
	Total Emissions	10.0	12.5	14.7
PM_{10} Build	Re-entrained Road Dust	7.7	9.2	10.4
	Paving Unpaved Roads	-0.6	-0.4	-0.3
	Motor Vehicle	1.9	2.4	3.0
	Total Emissions	9.0	11.2	13.1
No Build – Build		1.0	1.3	1.6

Mojave Desert Air Basin – Searles Valley Portion

TABLE 71 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2031	2040
PM_{10}	No Build	0.0	0.0	0.0
	Build	0.0	0.0	0.0
No Build – Build		0.0	0.0	0.0

Salton Sea Air Basin – Coachella Valley Portion

TABLE 72 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2026	2031	2040
ROG	RTP	2.7	2.4	2.4	2.5
Total Emissions		3	3	3	3
Emission Budget		7	7	7	7
Budget – Emissions		4	4	4	4
NO_x	RTP	8.0	6.9	7.1	8.3
Total Emissions		8	7	8	9
Emission Budget		26	26	26	26
Budget – Emissions		18	19	18	17

** Provided by ARB*

Salton Sea Air Basin – Coachella Valley Portion

TABLE 73 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant	2021	2031	2040
PM_{10}	1.04	1.24	1.41
Re-entrained Road Dust Paved	2.08	2.43	2.67
Re-entrained Road Dust Unpaved *	1.71	1.70	1.70
Road Construction Dust *	0.32	0.37	0.26
Sum	5.10	5.74	6.04
Total Emissions	5.1	5.8	6.1
Emission Budget	10.9	10.9	10.9
Budget – Emissions	5.8	5.1	4.8

** Provided by SCAQMD.*

Salton Sea Air Basin – Imperial County Portion

TABLE 74 2008 8-Hour Ozone (Summer Planning Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2017	2021	2031	2040
ROG	RTP	2.1	1.9	2.1	2.4
Total Emissions		3	2	3	3
Emission Budget		7	7	7	7
Budget – Emissions		4	5	4	4
NO_X	RTP	6.8	5.3	5.3	6.4
Total Emissions		7	6	6	7
Emission Budget		17	17	17	17
Budget – Emissions		10	11	11	10

Salton Sea Air Basin – Imperial County Portion: Continued

TABLE 75 2006 and 2012 $PM_{2.5}$ Standards (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2031	2040
NO_X	No-Build	2.6	2.5	2.9
	RTP Build	2.6	2.5	2.8
No Build – Build		0.0	0.0	0.1
$PM_{2.5}$ No-Build	Re-entrained Road Dust	0.11	0.12	0.14
	Motor Vehicle	0.13	0.16	0.18
	Sum	0.24	0.28	0.32
	Total Emissions	0.3	0.3	0.4
$PM_{2.5}$ Build	Re-entrained Road Dust	0.06	0.07	0.08
	Motor Vehicle	0.12	0.15	0.17
	Sum	0.18	0.22	0.25
	Total Emissions	0.2	0.3	0.3
No Build – Build		0.1	0.0	0.1

TABLE 76 PM_{10} (Annual Emissions [Tons/Day]) (EMFAC 2011)

Pollutant		2021	2031	2040
PM_{10} No-Build	Re-entrained Road Dust	0.92	1.07	1.18
	Motor Vehicle	0.50	0.62	0.75
	Sum	1.42	1.09	1.93
	Total Emissions	1.5	1.7	2.0
PM_{10} Build	Re-entrained Road Dust	0.58	0.71	0.81
	Motor Vehicle	0.49	0.61	0.74
	Sum	1.07	1.31	1.55
	Total Emissions	1.1	1.4	1.6
No Build – Build		0.4	0.3	0.4

SECTION III: TIMELY IMPLEMENTATION OF TRANSPORTATION CONTROL MEASURES

INTRODUCTION

This section itemizes and reports the findings of timely implementation of Transportation Control Measure (TCM) projects specified in the fiscally constrained portion, or the first two years (i.e., FY 2014/15-2015/16) of the 2015 FTIP. The findings are required only for the applicable TCM projects contained in the approved SIPs for the relevant air basins.

TRANSPORTATION CONFORMITY RULE

TRANSPORTATION CONTROL MEASURES (TCMs)

The criteria for identifying TCM projects and the requirements for timely implementation of these projects are defined in the U.S. EPA's Transportation Conformity Rule, 40 CFR Parts 51 and 93:

> *Transportation control measure (TCM) is any measure that is specifically identified and committed to in the applicable implementation plan, including a substitute or additional TCM that is incorporated into the applicable SIP through the process established in CAA section 176(c)(8), that is either one of the types listed in CAA section 108, or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Notwithstanding the first sentence of this definition, vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs for the purposes of this subpart. 2*

Section 108(f)(1)(A) of the federal Clean Air Act (CAA) lists the following 16 measures as illustrative of TCMs. However, this list should not be considered exhaustive.

- Programs for improved use of public transit;
- Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;
- Employer-based transportation management plans, including incentives;
- Trip-reduction ordinances;
- Traffic flow improvement programs that achieve emission reductions;
- Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;
- Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use;
- Programs for the provision of all forms of high-occupancy, shared-ride services;
- Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
- Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
- Programs to control extended idling of vehicles;
- Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;
- Employer-sponsored programs to permit flexible work schedules;
- Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
- Programs for new construction and major reconstruction of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest; and
- Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.[3]

In addition to the types of measures listed above, other measures may be considered as TCM projects if they reduce emissions or concentrations of air pollutants from transportation sources by modifying vehicle use, changing traffic flow, or mitigating traffic congestion conditions. TCM projects may be voluntary programs, incentive-based programs, regulatory programs, as well as market- or pricing-based programs. However, all TCM categories must be listed in the applicable (EPA-approved) SIP to be considered TCMs.

It should be noted, however, that measures and projects that use technology to reduce emissions – such as innovations in fuel formulation technologies, or the promotion of zero-emission vehicles, or of alternative fueled engines – cannot be considered TCM projects. Roadway capacity enhancement projects are also not typically considered TCMs.

CRITERIA AND PROCEDURES FOR THE TIMELY IMPLEMENTATION OF TCMS

The transportation conformity process is designed to ensure timely implementation of TCM strategies, thus reinforcing the link between AQMP/SIPs and the transportation planning process. If a TCM cannot be implemented or is only partially implemented, the shortfall must be made up by either substituting it with a new TCM strategy or by enhancing other control measures through the substitution.

The Transportation Conformity Rule (40 CFR 93.113) states:

- The transportation plan, TIP, or any FHWA/FTA project which is not from a conforming plan and TIP must provide for the timely implementation of TCMs from the applicable implementation plan.
- For transportation plans, this criterion is satisfied if the following two conditions are met:
  - The transportation plan, in describing the envisioned future transportation system, provides for the timely completion or implementation of all TCMs in the applicable implementation plan which are eligible for funding under title 23 U.S.C. or the Federal Transit Laws, consistent with schedules included in the applicable implementation plan.
  - Nothing in the transportation plan interferes with the implementation of any TCM in the applicable implementation plan.
- For TIPs, this criterion is satisfied if the following conditions are met:
  - An examination of the specific steps and funding source(s) needed to fully implement each TCM indicates that TCMs which are eligible for funding under title 23 U.S.C. or the Federal Transit Laws are on or ahead of the schedule established in the applicable implementation plan, or, if such TCMs are behind the schedule established in the applicable implementation plan, the MPO and DOT have determined that past obstacles to implementation of the TCMs have been identified and have been or are being overcome, and that all State and local agencies with influence over approvals or funding for TCMs are giving maximum priority to approval or funding of TCMs over other projects within their control, including projects in locations outside the nonattainment or maintenance area.
  - If TCMs in the applicable implementation plan have previously been programmed for Federal funding but the funds have not been obligated and the TCMs are behind the schedule in the implementation plan, then the TIP cannot be found to conform if the funds intended for those TCMs are reallocated to projects in the TIP other than TCMs, or if there are no other TCMs in the TIP, if the funds are reallocated to projects in the TIP other than projects which are eligible for Federal funding intended for air quality improvement projects, e.g., the Congestion Mitigation and Air Quality Improvement Program.
  - Nothing in the TIP may interfere with the implementation of any TCM in the applicable implementation plan.
- For FHWA/FTA projects which are not from a conforming transportation plan and TIP, this criterion is satisfied if the project does not interfere with the implementation of any TCM in the applicable implementation plan. [4]

APPLICABLE SIPS IN THE SCAG REGION

In the SCAG region, ozone SIPs developed in the South Coast Air Basin and the Ventura County portion of the South Central Coast Air Basin contain TCM strategies and are subject to EPA's Transportation Conformity Rule analyses. The two SIPs with TCM strategies are:

2012 South Coast AQMP/SIP (SCAB)

Effective October 3, 2014, the U.S. EPA approved the portions of the SCAQMD's Final 2012 Air Quality Management Plan that updated the approved control strategy for the 1997 8-hour ozone standard and that provided a demonstration of attainment of the 1-hour ozone standard by December 31, 2022. As a result, the 2012 South Coast Ozone AQMP/SIP is the applicable Ozone SIP for the SCAB. It is important to note that the TCM categories in the 2012 Ozone AQMP/SIP are consistent with the TCM categories in the 1994/1997/2003/2007 Ozone AQMPs/SIPs.

2007 Ozone SIP (Ventura County Portion of SCCAB)

The TCM strategies incorporated in the 1994 (as amended in 1995) Ozone AQMP/SIP function as the applicable TCMs for conformity finding. The EPA approved the 1994 Ozone SIP revisions on January 8, 1997. The 2007 Ozone AQMP/SIP revision (which EPA has not taken an action on) makes no changes to previously approved TCMs contained in the 1994 SIP (as amended in 1995). Effective July 27, 2009, EPA took a final action to find that the Ventura County attained the revoked 1-hour ozone standard by its attainment date. Effective January 2, 2013, EPA took another final action to find that the Ventura County attained the 1997 8-hour ozone standard by its attainment date.

It is noted that the Ventura County SIP does not claim emission reduction credits from TCM projects. They have been included to assist transportation and air quality agencies to identify projects that have the potential of reducing vehicle emissions, vehicle trips and vehicle miles traveled.

It should also be noted that while the 1-hour Ozone standard has been revoked and replaced with an 8-hour Ozone standard, the TCMs in the 1-hour Ozone SIPs remain applicable.

There are no applicable TCMs in any other federal non-attainment or maintenance areas in the SCAG region. For more information on TCMs and timely implementation of the TCMs, see Section III of this document.

TCM REPORTING PROCESS IN THE SCAG REGION

Only those TCM-category projects that have been committed for implementation are considered for purposes of timely implementation reporting. As such, only those projects designated as TCMs in the first two years (the fiscally constrained portion) of the prevailing FTIP are considered for reporting.

In the SCAG region, new TCMs are identified by the FTIP process. Projects that meet the TCM criteria become committed TCMs and part of the applicable SIP after: 1) funds are committed for right-of-way or construction in the first two years (the fiscally constrained portion) of the FTIP; 2) the FTIP is approved by the Regional Council; and 3) state and federal approval of the FTIP.

The projects reported on in this report are those TCM-category projects that have committed to right-of-way acquisition, construction or implementation in the first two years of the prevailing FTIP (the 2012RTP/SCS and 2015 FTIP, as amended). In addition, those TCM projects designated for reporting in previous FTIPs, and which are still under construction or implementation, will continue to be reported. TCM projects completed during this FTIP cycle are also reported.

Although project implementation remains an enforceable commitment by project sponsor agencies, SCAG is responsible for assuring the timely implementation of TCMs. Per a request from the federal agencies, beginning with the 2003 AQMP/SIP, SCAG began to develop a protocol for tracking currently anticipated project completion dates against previously reported completion dates, as provided by the county transportation commissions (CTCs). It is SCAG's intention that project completion dates reported when a TCM is first listed in an approved FTIP will be reported in all subsequent Timely Implementation Reports alongside the most current completion dates, until such a time as the project is completed. In this case, ongoing projects include the original date listed beginning with the 2004 RTIP, or a later FTIP when first listed as a committed TCM.

SCAG relies on the established project status update process used for the RTP and the FTIP to gather data from CTCs for preparing the TCM Timely Implementation Report. It is an iterative and collaborative process. The final data gathered on TCM project implementation status, currently anticipated completion dates, and, when delay occurs, reasons for the delay and efforts to overcome the implementation obstacles, is used to establish the final Timely Implementation Report. SCAG's process integrates an assessment of the specific steps and funding sources needed to fully implement each TCM, and confirms that the projects are on or ahead of schedule. Or, in the case that some particular project is delayed, the analysis establishes that the obstacles to implementation have been or are being overcome, and that the project is henceforth expected to be expeditiously implemented.

TIMELY IMPLEMENTATION OF TCM PROJECTS IN THE SCAG REGION

The federal Transportation Conformity Rule states that timely implementation is to be measured against the TCM projects in the applicable SIP. SCAG evaluates the TCM-category projects to determine the anticipated level and current status of implementation. The enforceable commitment is to report on the funding and implementation of TCM projects in the first two years of the six-year FTIP. In each FTIP, TCM category projects roll forward and the enforceable commitment is automatically revised to encompass the first two-year schedule of TCM-category projects without the need for a SIP revision. The implementation status of each of these TCM projects then continues to be reported on in subsequent FTIPs, until the TCM project is reported as having been completed, or the suitably replaced or substituted project has been completed.

South Coast Air Basin

The 2012 AQMP/SIP (SCAB) includes the following three TCM project categories:

- High Occupancy Vehicle (HOV) Measures,
- Transit and Systems Management Measures, and
- Information-based Transportation Strategies.

It should be noted that the TCM project categories in Appendix IV-C, Regional Transportation Strategy and Control Measures, of the 2012 Ozone AQMP/SIP, are consistent with those of TCM01 specified in the 1994 and subsequent Ozone SIPs, and are updated by the list provided in the Timely Implementation Report section of this document.

Ventura County Portion of SCCAB

The applicable TCM projects in Ventura County include the following strategies:

- Ridesharing
- Non-Motorized Strategies
- Traffic Flow Improvement Strategy
- Land Use Strategy Transit Strategies

Listing of TCMs Subject to Timely Implementation and completed/corrected projects

The information in the following tables demonstrates timely implementation of TCMs (by County).

TABLE 77 LOS ANGELES COUNTY

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
AZUSA	LAF5309	CITY OF AZUSA TRAFFIC MANAGEMENT SYSTEM. THIS PROJECT WILL UPGRADE TRAFFIC SIGNALS AT 43 INTERSECTIONS IN THE CITY OF AZUSA. THE PROJECT WILL FUND THE DESIGN AND CONSTRUCTION/IMPLEMENTATION OF CONTROLLERS, WIRING, DETECTION, CONDUIT, FIBER OPTIC, COUNTDOWN PEDESTRIAN HEADS, SIGNALS, VIDEO DETECTION, CCTV CAMERAS AND TRAFFIC CONTROL AND MONITORING UPGRADES AT THE 43 INTERSECTIONS.	12/1/2017	12/1/2017	12/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
BALDWIN PARK	LA0G1140	COMPLETE STREET IMPROVEMENTS ALONG MAINE AVE. FROM LOS ANGELES ST. TO ARROW HWY. IMPROVEMENTS INVOLVE THE RECONFIGURATION OF THE CORRIDOR BY MEANS OF ROAD DIET. PROJECT COMPONENTS INCLUDE (1) CLASS II BIKE WAYS (2) ROAD DIET FROM 4 TRAVEL LANES TO 2 LANES (3) SHARE LEFT TURN LANES (4) CURB EXTENSION AT 13 INTERSECTIONS (5) SIDEWALK EXTENSION (6) HIGH VISIBILITY CROSSWALKS (7) REPLACING PED SIGNALS AT 5 INTERSECTIONS (8) PED LIGHTING AND (9) ADA IMPROVEMENTS	10/1/2018	10/1/2018	10/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
BALDWIN PARK	LA0G1178	EXPANSION OF THE CITY'S CIRCULATOR SHUTTLE TO CONNECT TO BUSINESS AND MEDICAL COMMUTERS FROM THE BALDWIN PARK TRANSIT CENTER AND METROLINK STATION TO THE CITY'S MAIN BUSINESS CENTERS. PURCHASE OF 2 CNG BUSES.	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
BALDWIN PARK	LAF3507	SOUTH BALDWIN PARK COMMUTER BIKEWAY PROJECT. CONSTRUCT 3-MILE COMMUTER CLASS I BIKE PATH ALONG SAN GABRIEL RIVER AND WALNUT CREEK CONNECTING TO MAJOR EMPLOYMENT CENTERS ON BALDWIN PARK BLVD.	9/30/2015	9/30/2015	6/30/2018	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO UNANTICIPATED EIR REQUIREMENT AND ADA COMPLIANCE ALONG THE RIVER BANK. ADDITIONAL TIME NEEDED TO RE-PROCURE ENGINEERING FIRMS AND TO DEVELOP ADDITIONAL ALTERNATIVES. WORKING WITH LA METRO AND OTHER PARTNERS TO ADDRESS THE DEIGN ISSUES. PROCUREMENT FOR DESIGN SERVICES AND SEEKING ADDITIONAL PARTNERS.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
BURBANK	LA0G1211	THIS PROJECT WOULD PROVIDE TRAFFIC SIGNAL UPGRADES, SIGNAL CONTROLLER UPGRADES, TIMING PLANS, AND TRAFFIC SIGNAL SYSTEM MONITORING TO INTERSECTIONS ON ARTERIAL STREETS WITHIN 1 MILE OF THE INTERSTATE 5 CORRIDOR. SCOPE INCLUDES AUGMENTING BURBANK TMC STAFF FOR MONITORING SIGNAL COORDINATION AND POLICE TRAFFIC CONTROL DURING THE LIFE OF THE CONSTRUCTION PROJECT.	7/30/2019	7/30/2019	7/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THIS PROJECT IS ONGOING AND WILL PROCEED AS THE I-5 RECONSTRUCTION PROJECT THROUGH BURBANK PROGRESSES
BURBANK	LA0G914	MEASURE R ARROYO VERDUGO HIGHWAY OPERATIONAL IMPROVEMENTS ALONG (WITHIN 1 MILE) THE I-5 CORRIDOR IN BURBANK. INCLUDES 50 NON-CONTIGUOUS INTERSECTIONS SIGNAL IMPROVEMENTS, INSTALLATION OF FIBER COMMUNICATIONS, DETECTION AND CAMERAS.	6/1/2015	6/1/2015	12/31/2015	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE FACT THAT A NUMBER OF DISCRETE CONSTRUCTION PROJECTS WERE UNDERTAKEN. THE LAST OF THE PROJECTS IS CURRENTLY UNDER CONSTRUCTION AND WILL BE COMPLETE BY 12/31/2015. THE PROJECT IS ALMOST COMPLETE.
BURBANK	LA0G916	MEASURE R ARROYO VERDUGO HIGHWAY OPERATIONAL IMPROVEMENTS ALONG SR-134 CORRIDOR. INCLUDES APPROXIMATELY 20+ INTERSECTIONS (NON-CONSECUTIVE) AND INCLUDES CCTV, SIGNAL/TURN-SIGNAL IMPROVEMENTS, FIBER COMMUNICATIONS AND VIDEO DETECTION.	12/1/2015	12/1/2015	12/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. A NUMBER OF DISCRETE CONSTRUCTION PROJECTS WERE UNDERTAKEN. THE LAST OF THE PROJECTS IS CURRENTLY UNDER CONSTRUCTION.
BURBANK	LAF1502	SAN FERNANDO BIKEWAY. IMPLEMENT A CLASS I BIKEWAY ALONG SAN FERNANDO BLVD, VICTORY PLACE AND BURBANK WESTERN CHANNEL TO COMPLETE THE BURBANK LEG OF A 12 MILE BIKEWAY.	2014	10/30/2017	10/30/2019	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO I-5 PROJECT, WHICH IS IMPACTING 2/3 OF THE PROJECT AREA. I-5 PROJECT IS SCHEDULED TO BE COMPLETED BY 2017. THE CITY IS WORKING WITH LA METRO TO RENEW FUNDING AGREEMENT, AMEND TIP TO READY FOR PROJECT DELIVERY ONCE THE I-5 PROJECT IS COMPLETED. CURRENTLY UNDER ENG PHASE, COMPLETING 30% DESIGN.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
BURBANK	LAF3313	BURBANK-GLENDALE TRAFFIC SYSTEM COORDINATION. REPLACE TYPE 170 TRAFFIC SIGNAL CONTROLLERS WITH TYPE 2070 & ASSOCIATED COMMUNICATIONS EQUIPMENT IN BURBANK & GLENDALE & INSTALL SYSTEM DETECTION ON GLENOAKS BL & SAN FERNANDO BL. CITY OF BURBANK AND CITY OF GLENDALE ALONG GLENOAKS BOULEVARD BETWEEN BUENA VISTA STREET IN BURBANK AND GENEVA STREET IN GLENDALE, AND ALONG SAN FERNANDOM BOULEVARD BETWEEN OLIVE AVENUE IN BURBANK AND GLENDALE AVENUE IN GLENDALE (SIG SYN - APROX. 65 SIGNALS).	12/1/2017	12/1/2017	12/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. APPROXIMATELY 10 PERCENT OF THE FUNDS HAVE BEEN SPENT. BURBANK AND GLENDALE ARE PREPARING TO PURCHASE 2070 CONTROLLERS AND INSTALL NEW SOFTWARE.
BURBANK GLENDALE PASADENA AIRPORT	LA000789A	BURBANK-GLENDALE-PASADENA AIRPORT INTERMODAL GROUND ACCESS LINK: CONSTRUCTION OF A LINK BETWEEN THE AIRPORT AND OTHER TRANSPORTATION SERVICES, INCLUDING CONSTRUCTION OF A NEW METROLINK STATION AT HOLLYWOOD WAY/SAN FERNANDO ROAD ON THE ANTELOPE VALLEY LINE AND A LINK BETWEEN THE AIRPORT AND OTHER TRANSPORTATION SERVICES. (CONSTRUCTION OF LA000789)	3/31/2017	3/31/2017	3/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ENG AND CON FUNDS HAVE BEEN OBLIGATED.
CALABASAS	LA0G606	THIS PROJECT WOULD REDESIGN THE INTERSECTION AT THE PARKWAY CALABASAS ON/OFF RAMP FOR THE US101. PRESENTLY, TRAFFIC QUEUES OBSTRUCT THROUGH TRAFFIC ALONG CALABASAS ROAD, AND THERE ARE NO PEDESTRIAN IMPROVEMENTS. THIS PROJECT WOULD WIDEN CALABASAS ROAD FROM MUREAU ROAD TO THE PARKWAY CALABASAS OFFRAMP AND PROVIDE BIKE LANES AND SIDEWALKS.	7/1/2015	7/1/2015	7/1/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO A PROPOSED NEW COMMERCIAL DEVELOPMENT AT THE SAME INTERSECTION. THE CITY IS WORKING WITH THE DEVELOPER TO COORDINATE THE INTERSECTION CONFIGURATION. CURRENTLY IN ENG PHASE.
CALTRANS	LA000357	ROUTE 005: --- FROM ROUTE 170 TO ROUTE 118 ONE HOV LANE IN EACH DIRECTION (10 TO 12 LANES) INCLUDING THE RECONSTRUCTION OF THE I-5/SR-170 MIXED FLOW CONNECTOR AND THE CONSTRUCTION OF THE I-5/SR-170 HOV TO HOV CONNECTOR (CFP 345) (2001 CFP 8339; CFP2197). (EA# 121901, PPNO 0158K) (TCRP#41.2)	2008/2010	6/30/2015	6/30/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT IS OPENED TO TRAFFIC AND IS CURRENTLY IN PLANT ESTABLISHMENT PHASE
CALTRANS	LA000358	ROUTE 005: --- FROM ROUTE 134 TO ROUTE 170 HOV LANES (8 TO 10 LANES) (CFP 346)(2001 CFP 8355). (EA# 12180, 12181,12182+12183=1218W,12184, 13350 PPNO 0142F,151E,3985,3986,3987) SAFETEA LU # 570. CONSTRUCT MODIFIED IC @ I-5 EMPIRE AVE, AUX LNS NB & SB BETWEEN BURBANK BLVD & EMPIRE AVE; AND MODIFY EXISTING STRUCTURES. ADD AUXILIARY LANE BETWEEN ALAMEDA AND OLIVE FROM PM 28.43 TO PM 29.78	2012/2010	12/31/2016	6/30/2019	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO UTILITIES RELOCATION COMPLICATIONS.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
CALTRANS	LA000548	ROUTE 10: FROM PUENTE TO CITRUS HOV LANES FROM 8 TO 10 LANES & SOUNDWALLS (C-ISTEA 77720, 95 STIP-IIP) (EA# 117080,11172, 1170U, PPNO# 0309N, 0309S)-(USE TOLL CREDITS AS LOCAL MATCH).	2030/2015	10/31/2018	10/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT IS CURRENTLY IN CONSTRUCTION
CALTRANS	LA01342	ROUTE 10: RT 10 FROM RT 605 TO PUENTE AVE HOV LANES (8+0 TO 8+2) (EA# 117070, PPNO 0306H) PPNO 3333 3382 AB 3090 REP (TCRP #40)	2008/2010	10/28/2014	10/28/2014	COMPLETE. PROJECT IS OPENED TO TRAFFIC AND IS CURRENTLY IN PLANT ESTABLISHMENT PHASE
CALTRANS	LA0B875	ROUTE 10: HOV LANES AND PAVEMENT REBHAB FROM CITRUS TO ROUTE 57 - (EA# 11934+31120 = 1193U, PPNO# 0310B+4812=0310B).USE TOLL CREDIT AS LOCAL MATCH	2015	1/4/2018	1/4/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT IS READY FOR ADVERTISEMENT AND SHOULD BE GOING TO CONSTRUCTION IN WINTER 2015.
CALTRANS	LA0D73	ROUTE 5: LA MIRADA, NORWALK & SANTA FE SPRINGS-ORANGE CO LINE TO RTE 605 JUNCTION. WIDEN FOR HOV & MIXED FLOW LNS, RECONSTRUCT VALLEY VIEW (EA 2159A0 = 21591, 21592, 21593, 21594, 21595, 31320 PPNO 2808 = 4153, 2808, 4154, 4155, 4156, 4841). TCRP#42.2&42.1 (USE TOLL CREDITS AS LOCAL MATCH)	2014	12/1/2017	9/12/2019	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO ADDITIONAL SCOPE OF WORK INVOLVING TWO NEW BRIDGE RAMPS. LAST SEGMENT OF THIS CORRIDOR [2159U] IS READY FOR ADVERTISEMENT AND SHOULD BE GOING TO CONSTRUCTION IN MAY 2016.
CALTRANS	LA0G440	ROUTE 005: PHASE 2,FROM SR-14 TO PARKER ROAD, CONSTRUCT HOV/HOT, TRUCK & AUX LANES (EA 2332C, PPNO 3189A & EA 2332E PPNO 3189B), SAFTETEA-LU#465. PE & RW $ ARE PROGRAMMED FOR EA 2332E ONLY.	6/11/2018	6/11/2018	6/11/2020	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO COMPLICATED/ EXTENSIVE PROCUREMENT PROCESS PER PUBLIC PRIVATE PARTNERSHIP RELATIKON. PROJECT IS CURRENTLY IN CONSTRUCTION

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
CARSON, CITY OF	LA0G1130	ACTIVE TRANSPORTATION PROGRAM - CITY-WIDE BIKE AND PEDESTRIAN IMPROVEMENTS - THE INFRASTRUCTURE COMPONENT INCLUDES A CLASS II BIKE LANE (1.07 MILE) ON SANTA FE AVE, HIGH VISIBILITY CROSSWALKS, COUNTDOWN PEDESTRIAN SIGNALS, CURB RAMPS, ETC. THE NON-INFRASTRUCTURE COMPONENT INCLUDES, EDUCATION, ENCOURAGEMENT, AND ENFORCEMENT PROGRAMMING THAT WILL OCCUR OVER A THREE YEAR PERIOD.	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. SUBMITTED PES AND FIELD REVIEW FORM TO CALTRANS. SUBMITTED A REQUEST FOR FUNDING ALLOCATION TO CALTRANS TO BEGIN PREPARATION OF PS&E. CARSON WAITING FOR AUTHORIZATION TO PROCEED.
CARSON, CITY OF	LA0G1179	TRANSFORM MAINTENANCE ROAD TO A NEW 1.3 MILE CLASS I BIKE PED PATH ON DOMINGUEZ CHANNEL. IMPROVEMENTS INCLUDE IMPROVING HORIZONTAL AND VERTICAL GEOMETRY FOR IMPROVED SIGHT DISTANCE, ADDING A GUARDRAIL TO EXISTING BRIDGE, AND IMPROVING THE AVALON BLVD. INTERSECTION SIGNAL.	12/30/2018	12/30/2018	12/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. SUBMITTED FUNDING AGREEMENT FOR THE METRO EXPRESSLANES NET TOLL REVENUE REINVESTMENT FUNDS. CARSON WAITING FOR AUTHORIZATION TO PROCEED.
COMPTON	LA0G1131	WILMINGTON AVE SAFE STREETS PED/BICYCLE IMPROVEMENTS IS A PED/BIKE SAFETY IMPROVEMENT PROJECT FOR THE COMMUNITIES ADJACENT TO THE WILMINGTON AVENUE TRANSPORTATION CORRIDOR BY DEVELOPING SAFER PED CROSSINGS AND INTERSECTIONS AS WELL AS INSTALLING BIKE PATHS TO IMPROVE PED/BIKE SAFETY. TOTAL LENGTH OF CLASS II BIKE WAY IS 1.09 MILE ALONG WILMINGTON AVE BETWEEN EL SEGUNDO BLVD AND ROSECRANS AVE (0.9 MILE) AND ALONG ROSECRANS AVE BETWEEN WILMINGTON AVE AND COMPTON CREEK (0.19 MILE).	6/30/2018	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
COVINA	LAF5501	CITY OF COVINA BICYCLE NETWORK-CONSTRUCT CLASS II BIKE LANES ON CITRUS AV (1.8 MI), FRONT ST (0.13 MI), SECOND AV (0.87 MI), BADILLO ST (3.61 MI) AND AZUSA AV (1.53 MILES). THIS PROJECT PROVIDES DIRECT CONNECTIVITY TO A REGIONALLY SIGNIFICANT BIKE-TRANSIT HUB (COVINA METROLINK STATION) IDENTIFIED IN METRO'S 2006 BICYCLE TRANSPORTATION STRATEGIC PLAN. THE PROJECT WILL ALSO PROVIDE SECURE BIKE PARKING AT A LOCATION DETERMINED TO HAVE SIGNIFICANT NEED FOR BICYCLISTS.	4/30/2019	4/30/2019	4/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. FUNDS ARE ALLOCATED FOR FY15/16. CITY IS WAITING FOR THE FUNDS.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
CULVER CITY	LAF3318	TRAFFIC MONITORING AND SURVEILLANCE SYSTEM GAP CLOSURE. DESIGN AND IMPLEMENTATION OF 14 CCTV CAMERA TRAFFIC MONITORING AND SURVEILLANCE SYSTEM, HUB SWITCHING EQUIPMENT AND APPROX. 4 MI OF FIBER OPTIC COMMUNICATION CABLES, AND EOC VIDEO.	12/30/2016	12/30/2016	12/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
CULVER CITY	LAF5302	PROJECT WILL UPGRADE THE CURRENT TRAFFIC CONTROL SYSTEM TO AN ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). PROJECT WILL REPLACE 90 TYPE 170 CONTROLLERS WITH TYPE 2070, ADD ADDITIONAL VEHICLE DETECTORS AT 102 LOCATIONS, AND UPGRADE COMMUNICATIONS EQUIPMENT AND CONNECTION TO FIBER-OPTIC BACKBONE. THE ATCS WILL CONTROL 102 INTERSECTIONS THROUGHOUT CULVER CITY.	3/1/2019	3/1/2019	3/1/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
CULVER CITY MUNI BUS LINES	LAF3317	BUS SIGNAL PRIORITY IN CULVER CITY. DESIGN, DEVELOP & INSTALL WIRELESS BUS SIGNAL PRIORITY SYSTEM ON CULVER CITY BUS FLEET AND AT INTERSECTIONS TO INCREASE OPERATION EFFICIENCY & TRAVEL TIME SAVINGS. THE PROJECT INCLUDES INTERSECTIONS WITH TRANSIT SERVICE WITHIN THE BOUNDARY OF THE CITY OF CULVER CITY.	6/30/2017	6/30/2017	6/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
DIAMOND BAR	LAF7300	DIAMOND BAR ADAPTIVE TRAFFIC CONTROL SYSTEM PROJECT : INSTALLS ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS) AT SIGNALIZED INTERSECTIONS ON DIAMOND BAR BL, GOLDEN SPRINGS DR, AND GRAND AV. (2) PROVIDES FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM BASED ON TRAFFIC DEMANDS.	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. BUDGETED TO BEGIN THE RFP PROCESS THIS FISCAL YEAR 2015-2016.
DOWNEY	LAF5114	TELEGRAPH ROAD TRAFFIC THROUGHPUT AND SAFETY ENHANCEMENT BETWEEN THE RIO HONDO RIVER CHANNEL TO THE SAN GABRIEL RIVER CHANNEL, A DISTANCE OF 2.2 MILES. PROJECT INVOLVES THE CONSTRUCTION OF RAISED MEDIAN ISLANDS, MINOR WIDENING AT INTERSECTIONS, TRANSIT PRIORITY SYSTEM AND BIKE (2.2 MILES IN LENGTH) AND PEDESTRIAN CIRCULATION IMPROVEMENTS.	6/30/2018	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
DUARTE	LAF5627	DUARTE GOLD LINE STATION PEDESTRIAN IMPROVEMENTS. THIS PROJECT IS LOCATED IN DUARTE ON DUARTE RD BETWEEN HIGHLAND AV AND BUENA VISTA ST. IT WILL FUND PEDESTRIAN IMPROVEMENTS AROUND THE DUARTE GOLD LINE STATION, CONNECTING THE STATION WITH SURROUNDING LAND USES AND OTHER TRANSIT LINES BY CONSTRUCTING SIDEWALK ON THE NORTH SIDE OF DUARTE RD AND INSTALLING PEDESTRIAN LIGHTING, LANDSCAPING, BENCHES, TRASH RECEPTACLES, CURB RAMPS, PEDESTRIAN CROSSINGS, AND WAYFINDING SIGNS.	6/1/2017	6/1/2017	6/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE CITY OF DUARTE INTENDS TO COMPLETE THE PROJECT PRIOR TO 6/1/2017 AND IS IN THE PROCESS OF SELECTING CONSULTANTS FOR THE WAY-FINDING SIGNAGE AND PS&E FOR THE PROPOSED IMPROVEMENTS.
EL MONTE	LA0G1180	A 0.5 MILE CLASS III BIKE ROUTE WITH SHARROWS, A 0.7 MILE CLASS II GREEN-PAINTED BIKE LANE, AND A 2 MILE A CLASS II BIKE LANE WITH BUFFER PAVEMENT STENCILING. IMPROVEMENTS INCLUDES ROADWAY RESURFACING, HIGHLIGHTING, CROSSWALK IMPROVEMENTS, CAMERA INSTALLATION AT INTERSECTIONS, AND WAYFINDING SIGNAGE. THE PROJECT RUNS 3.2 MILES ALONG SANTA ANITA FROM ELLIOT AVENUE (SOUTH) TO WEST HONDO PARKWAY (NORTH).	12/30/2018	12/30/2018	12/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. FUNDS ARE ALLOCATED FOR FY15/16. CITY IS WAITING FOR THE FUNDS.
EL MONTE	LAF5705	SHARED PARKING PROGRAM/SMART PARKING DETECTION SYS IN DOWNTOWN AREA; I-10 FWY, EL MONTE BUSWAY, EL MONTE TRANSIT CTR, TRANSIT VILLAGE, AND EL MONTE METROLINK STATION. COMPREHENSIVE PARKING STRATEGY PLAN. INCLUDES SMART PARKING DETECTION SYSTEM AND SHARED PARKING PROGRAM. UTILIZE MOBILE COMMUNICATION DEVICES TO ASSESS THE PARKING AVAILABILITY AT MULTIPLE PARKING LOTS. PROVIDE REAL-TIME INVENTORY OF PARKING SPACES.	6/30/2017	6/30/2017	6/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ENG PHASE.
GARDENA	LA0G1164	LINE 1X-EXPAND TRANSIT BUS SERVICE ON I-110 FREEWAY: EXPANSION OF LINE 1X TRANSIT SERVICE TO PROVIDE MID-DAY SERVICE. THIS PROJECT IS FUNDED BY THE METRO'S EXPRESSLANES TOLL REVENUE REINVESTMENT PROGRAM.	6/30/2018	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
GARDENA	LA0G1175	COMPUTER AUTOMATED DISPATCHING/AUTOMATED VEHICLE LOCATION (CAD/AVL)SOLUTION WITH REAL TIME PASSENGER INFORMATION NETWORK. TOLL CREDIT (TDC) OF $400 WILL BE UTILIZED IN FY15/16 TO MATCH FTA 5307 FUNDS.	12/30/2016	12/30/2016	12/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

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GARDENA	LAF3306	GARDENA MUNICIPAL BUS LINES LINE #1X TSP (TRANSIT SIGNAL SYNCHRONIZATION PROJECT 21-SIGNALS). PROJECT WILL IMPLEMENT TRANSIT SIGNAL PRIORITY ALONG ITS LINE #1X TO REDUCE TRANSIT TRAVEL TIMES AND ENHANCE ON-TIME PERFORMANCE. CITY OF GARDENA: MARINE AVENUE: FROM YUKON AVENUE TO WESTERN AVENUE WESTERN AVENUE: FROM MARINE AVENUE TO 166TH STREET NORMANDIE AVENUE: FROM 166TH STREET TO GARDENA BOULEVARD VERMONT AVENUE: FROM GARDENA BOULEVARD TO 153RD STREET; UP TO 21 LOCATIONS.	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
GLENDALE	LA0G1148	SIGNAL INSTALLATION AT VARIOUS LOCATIONS-PACIFIC AVE. TRAFFIC SIGNAL MODIFICATIONS. SIGNAL SYNCH FOR SIX (6) NON-CONSECUTIVE INTERSECTIONS ALONG PACIFIC AVENUE.	6/1/2016	6/1/2016	6/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
GLENDALE	LA0G809	CONSTRUCTION OF CITYWIDE BIKEWAY FACILITY THIS PROJECT INCLUDES CONSTRUCTION OF CLASS II, AND SHARROWS RECOMMENDED IN THE GLENDALE BICYCLE MASTER PLAN AND INSTALLATION OF CITYWIDE BIKE RACKS, AND OTHER AMENITIES RELATED TO BICYCLE. THE PROJECT LENGTH MAY INCLUDE OVER 12 MILES OF BIKE LANES.	12/1/2018	12/1/2018	12/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CURRENTLY IN ENG PHASE. PROJECT WILL BE COMPLETED BY 12/1/2018
HUNTINGTON PARK	LA0G1141	STATE ST. COMPLETE STREET PROJECT BETWEEN RANDOLPH ST AND SANTA ANA ST (1.5 MILE) PROPOSES IMPROVEMENTS THAT WILL HELP IMPROVE STATE STREET'S OVERALL OPERATION AND EFFICIENCY WHILE PROMOTING BICYCLING AND WALKING WITHIN HUNTINGTON PARK.	5/1/2017	5/1/2017	5/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
INGLEWOOD	LA0G843	MEASURE R ITS PHASE IV - PART A OF A TWO PART ITS IMPROVEMENT PROJECT. DESIGN AND CONSTRUCTION OF APPROXIMATELY 2.7 MILES OF COMMUNICATION INFRASTRUCTURE ALONG LA BREA, FLORENCE, CRENSHAW, MANCHESTER AND CENTINELA. SIGNAL SYNCHRONIZATION (APPROX. 20 LOCATIONS); DESIGN AND CONSTRUCTION OF SYSTEM DETECTION (APPROX. 40 INTERSECTIONS); CHANGEABLE MESSAGE SIGNS (2 LOCATIONS); CCTV CAMERAS (APPROX. 6 LOCATIONS) AND TRAFFIC MANAGEMENT CENTER EQUIPMENT AND COMMUNICATION NETWORK INTEGRATION.	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

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LAWNDALE	LA0G954	THIS PROJECT WILL IMPROVE OUTDATED AND NON-ACTUATED TRAFFIC SIGNAL SYSTEMS WITHIN LAWNDALE AND WILL INCLUDE: FULL ACTUATION, INADEQUATE BICYCLE & PEDESTRIAN ACCOMMODATION, LIMITED TIMING PLANS, NEW CONTROLLERS/CABINETS WHERE NEEDED, AND NEW WIRING/LOOPS WHERE NEEDED AT ALL INTERSECTIONS.	12/1/2015	12/1/2015	12/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LAWNDALE	LAF7500	HAWTHORNE BOULEVARD CLASS II BICYCLE LANES: (1) INSTALLS 1.0 MILE OF CLASS 2 BIKE LANES ON HAWTHORNE BLVD FOR BOTH DIRECTIONS. (2) PROVIDES BICYCLE PARKING.	10/31/2019	10/31/2019	10/31/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. WILL COMMENCE PS&E PHASE ON RECEIPT OF MEASURE R FUNDING.
LONG BEACH	LAE0332	LONG BEACH PARK AND RIDE FACILITY AT 3RD STREET AND PACIFIC AVE SOUTH OF THE MTA BLUE LINE PACIFIC STATION. 300 TO 500 SPACE AND INCLUDE RESIDENTIAL AND COMMERCIAL DEVELOPMENT	10/1/2011	10/1/2011	UNDERGOING TCM SUBSTITUTION	PROJECT WILL BE CANCELLED. TCM SUBSTITUTION IS UNDER EPA REVIEW.
LONG BEACH	LAE1296	LONG BEACH INTELLIGENT TRANSPORTATION SYSTEM	2011	9/30/2015	12/31/2016	OBSTACLES ARE BEING OVERCOME. IN ENG PHASE.
LONG BEACH	LAF1530	BICYCLE SYSTEM GAP CLOSURES & IMPROVED LA RIVER BIKE PATH. PROJECT WILL CONSTRUCT PRIORITY CLASS I & III BICYCLE SYSTEM GAP CLOSURES IN LONG BEACH AND IMPROVE CONNECTION TO LA RIVER. CLASS II BIKE LANES 4.8 MILES, CLASS III 3 MILES.	2014	6/30/2015	6/30/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE DELAY OF ENG PHASE. CITY IS WORKING HARD TO SPEED UP THE RFA PROCESS TO START CONSTRUCTION. ENG PHASE COMPLETED AND CURRENTLY PREPARING RFA FOR CON PHASE.
LONG BEACH	LAF5503	CITY OF LONG BEACH PHASE II BIKE SHARE PROGRAM. THIS PROJECT IS LOCATED IN THE CITY OF LONG BEACH AND WILL IMPLEMENT A PHASE II BIKE-SHARE PROGRAM. FUNDS ARE REQUESTED FOR THE PURCHASE AND INSTALLATION OF 500 BIKES, 50 DOCKING STATIONS AND KIOSKS, AND WAYFINDING/SIGNAGE. THE PROJECT WILL SUPPORT LOCAL AND METRO TRANSIT STATIONS, EMPLOYMENT AREAS, BUSINESS DISTRICTS, AND MAJOR ACTIVITY NODES.	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LONG BEACH	LA0G830	I-710 IMPROVEMENTS/SHOEMAKER BRIDGE - DOWNTOWN EXITS. THE PROJECT MAKES BICYCLE, PEDESTRIAN, AND STREETSCAPE IMPROVEMENTS ON MAJOR THOROUGHFARES.	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

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LONG BEACH	LAF5609	DOWNTOWN LONG BEACH PINE AVENUE STREETSCAPE IMPROVEMENT. THIS PROJECT IS LOCATED ON PINE AVE BETWEEN SEASIDE WY AND ANAHEIM ST. IT WILL IMPLEMENT STREET IMPROVEMENTS, SUSTAINABLE DESIGN FEATURES, AND PEDESTRIAN ENHANCEMENTS ALONG A MAJOR TRANSIT NODE INCLUDING: PEDESTRIAN LIGHTING, CROSSWALK ENHANCEMENTS, DIAGONAL CROSSWALKS, STREET FURNITURE, BIKE RACKS, STREET TREES, LANDSCAPING, BOLLARDS TO FACILITATE STREET CLOSURE FOR COMMUNITY EVENTS AND REMOVAL OF OBSTRUCTIONS FROM THE WALKWAY.	7/1/2016	7/1/2016	7/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LONG BEACH	LAF7316	ARTESIA CORRIDOR ATCS ENHANCEMENT PROJECT : (1) UPGRADES TRAFFIC SIGNALS ALONG ARTESIA BL BETWEEN LONG BEACH BL AND DOWNEY AV TO CONNECT WITH ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). (2) INSTALLS CCTV AND CMS ON ARTESIA BL. (3) INSTALLS FIBER OPTIC CABLE AND DEVICES TO CONNECT SIGNALS TO EACH OTHER AND TRAFFIC MANAGEMENT CENTER (TMC). (4) TWO NEW TRAFFIC SIGNALS IN COMPTON (5) INSTALLS CLASS II BIKE LANE IN BOTH DIRECTIONS FROM ATLANTIC AV TO SUSANA RD. (6) PEDESTRIAN IMPROVEMENTS.	1/1/2019	1/1/2019	1/1/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY	LA0C8120	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTI JURISDICTIONAL, SIGNAL SYSTEM IMPROVEMENTS ON REGIONAL ARTERIALS & ADVANCED ITS TECHNOLOGY. (APROX. 770 INTERSECTIONS)	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. TSSP PROJECTS COMPLETED. OPERATIONAL IMPROVEMENTS AT INTERSECTIONS UNDER CONSTRUCTION. ITS WORK UNDER DESIGN AND CONSTRUCTION.
LOS ANGELES COUNTY	LA0D465	COLIMA ROAD-CITY OF WHITTIER LIMITS TO FULLERTON ROAD, FOR A TOTAL DISTANCE OF 4.9 MILES. THE PROJECT WILL WIDEN COLIMA RD BY UP TO SIX FEET AT SPOT LOCATIONS AND RESTRIPE TO ACCOMMODATE THREE THROUGH LANES IN EACH DIRECTION.. A CLASS II BIKEWAY FROM THE CITY OF WHITTIER WILL BE EXTENDED TO ALLENTON AV, A DISTANCE OF 1.2 MILES, AND BUS PADS WILL BE REPLACED. INCLUDES MEDIAN LANDSCAPING. TOLL CREDITS USED TO MATCH FY 14/15 AND FY 15/16 CMAQ.	12/15/2020	12/15/2020	12/15/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. UNDER DESIGN 60 PERCENT

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES COUNTY	LAF1511	EASTSIDE LIGHT RAIL BIKE INTERFACE PROJECT. PROJECT INCLUDES DESIGN AND CONSTRUCTION OF BIKE ROUTES WITH APPROPRIATE SIGNAGE AND STRIPING TO ACCESS METRO GOLD LINE STATIONS. TOLL CREDITS - LOCAL AND STATE HWYOF $20 WILL BE USED TO MATCH FY16 FEDERAL FUNDS FOR THE CON PHASE	10/21/2014	10/30/2015	10/30/2016	OBSTACLES ARE BEING OVERCOME. UNDER DESIGN- PREVIOUSLY FUNDED BY METRO CFP BUT NOW PROJECT HAS RECEIVED FUNDING FROM ATP CYCLE 1.
LOS ANGELES COUNTY	LAF1514	EMERALD NECKLACE BIKE TRAIL PROJECT. DESIGN AND CONSTRUCT 1.1 MILES OF CLASS I BIKE PATH TO CONNECT DUARTE ROAD TO THE SAN GABRIEL RIVER BICYCLE TRAIL.	2011	6/1/2015	12/31/2015	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO RFA PROCESS. FUNDS ARE OBLIGATED. ADVERTISE FOR CONSTRUCTION.
LOS ANGELES COUNTY	LAF3308	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN AND CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCH, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSPORTATION SYSTEM COMPONENTS ON REGIONAL ARTERIALS. APROX. 183 SIGNALS TOTAL.	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. MOU EXECUTED FOR DESIGN WORK ONLY. COMPLETED THE INTERSECTION OF MYRTLE AVENUE/ PECK ROAD AT LIVE OAK AVENUE LEFT-TURN PHASING WITH A LETTER OF NO PREJUDICE.
LOS ANGELES COUNTY	LAF3310	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN AND CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, OPERATIONAL IMPROVEMENTS & ITS COMPONENTS ON ARTERIALS IN THE SOUTH BAY AREA OF LA COUNTY. (APROX 40+ SIGNALS)	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. MOU EXECUTED FOR DESIGN WORK ONLY.
LOS ANGELES COUNTY	LAF5515	FLORENCE METRO BLUE LINE STATION BIKEWAY ACCESS IMPROVEMENTS.DESIGN AND CONSTRUCT 11.19 MILES OF CLASS III BIKE ROUTES WITH SHARROWS AND ENHANCED TREATMENTS (BICYCLE BOULEVARD). SHORT-TERM BICYCLE PARKING WILL BE PROVIDED AND LIMIT LINE LOOP DETECTORS WILL BE UPGRADED TO DETECT BICYCLES AT ALL REQUIRED SIGNALIZED INTERSECTIONS. CLASS III BIKE ROUTES WITH SHARROWS WILL BE INSTALLED AT VARIOUS LOCATIONS.. TOLL CREDITS - LOCAL AND STATE HWYOF $18 WILL BE USED TO MATCH FY16 FEDERAL FUNDS FOR THE CON PHASE	10/30/2020	10/30/2020	10/30/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. UNDER DESIGN- PREVIOUSLY FUNDED BY METRO CFP BUT NOW PROJECT HAS RECEIVED FUNDING FROM ATP CYCLE 1
LOS ANGELES COUNTY	LA0D461	RECONSTRUCT- THE OLD ROAD FROM HILLCREST PARKWAY TO LAKE HUGHES RD & WIDEN FROM 40' TO 68', 2 VEH. LANES AND A 5' CLASS II BIKELANE IN EA DIR & STRIPPED MEDIAN (FROM 2 TO 4 LNS 2 EA DIR) FOR 2.1 MILES.	6/30/2021	6/30/2021	6/30/2021	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT PRELIMINARY DESIGN

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES COUNTY	LAF1311	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSP. SYSTEM COMPONENTS ON REGIONAL ARTERIALS. SYNCHRONIZES 50 CONSECUTIVE INTERSECTIONS.	10/1/2015	10/1/2015	10/1/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO DESIGN DELAY. CURRENTLY DESIGN PHASE IS COMPLETED AND PREPARING FOR ADVERTISEMENT. COMPLETED DESIGN OF TWO TSSP PROJECTS. PREPARING PROJECTS TO ADVERTISE FOR CONSTRUCTION IN WINTER 2015.
LOS ANGELES COUNTY	LAF1321	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSPORTATION SYSTEM COMPONENTS. SYNCHRONIZES 83 CONSECUTIVE INTERSECTIONS.	10/1/2015	10/1/2015	10/1/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO DESIGN DELAY. CURRENTLY DESIGN PHASE IS COMPLETED AND PREPARING FOR ADVERTISEMENT. COMPLETED DESIGN OF FOUR TSSP PROJECTS. PREPARING PROJECTS TO ADVERTISE FOR CONSTRUCTION IN WINTER 2015.
LOS ANGELES COUNTY	LAF3309	GATEWAY CITIES FORUM TRAFFIC SIGNAL CORRIDORS PROJ, PHASE VI. DESIGN AND CONSTRUCT MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS & ITS COMPONENTS ON REGIONAL ARTERIALS IN GATEWAY CITES AREA. (APROX. 126 SIGNALS)	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. MOU EXECUTED FOR DESIGN WORK ONLY.
LOS ANGELES COUNTY	LAF5310	RAMONA BOULEVARD/BADILLO STREET/COVINA BOULEVARD TSSP/BSP. IMPLEMENTION OF A TRAFFIC SIGNAL SYNCHRONIZATION PROJECT (TSSP) ON RAMONA BL/BADILLO ST/COVINA BL FROM SANTA ANITA AV TO THE 57 FREEWAY. A BUS SIGNAL PRIORITY (BSP) PROJECT WILL BE IMPLEMENTED ON RAMONA BL/BADILLO ST FROM TYLER AV TO GRAND AV TO GIVE TRANSIT PRIORITY FOR FOOTHILL TRANSIT OPERATIONS (APROX. 48 SIGNAL LOCATIONS)	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY	LAF5314	GATEWAY CITIES FORUM TRAFFIC SIGNAL CORRIDORS PROJECT - IMPROVE TRAFFIC SIGNAL OPERATIONS BY UPGRADING EACH TRAFFIC SIGNAL TO FEDERAL AND STATE STANDARDS, PROVIDING ADDITIONAL VEHICLE DETECTION TO ENABLE OPERATION AS A FULLY TRAFFIC-ACTUATED SIGNAL, INSTALLING THE APPROPRIATE COMPONENTS TO ENABLE EACH SIGNAL TO BE CAPABLE OF TIME-BASED COORDINATION AND RETIMING SIGNALS TO IMPROVE THE OVERALL PROGRESSION OF TRAFFIC. (APROXIMATLY 17 SIGNALS INCLUDED)	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES COUNTY	LAF5315	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. THIS PROJECT INCLUDES 6 INTERSECTIONS AT MYRTLE AV/PECK RD BETWEEN HUNTINGTON DR AND CLARK ST AND PROVIDES FOR SYSTEM WIDE COORDINATION, TIMING AND OPERATIONAL IMPROVEMENTS AND TRAFFIC SIGNAL SYNCHRONIZATION, EQUIPMENT UPGRADES AND INTERSECTION OPERATIONAL IMPROVEMENTS. (APROX. 20+ SIGNALS)	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY	LAF5316	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT - SYSTEMWIDE COORDINATION, TIMING AND OPERATIONAL IMPROVEMENTS AND TRAFFIC SIGNAL SYNCHRONIZATION, EQUIPMENT UPGRADES AND INTERSECTION OPERATIONAL IMPROVEMENTS IN SOUTH BAY REGION. 25 SIGNALS SYSTEM WIDE. ADDITIONALLY, THIS PROJECT WILL INSTALL ANY WARRANTED AND FEASIBLE ROADWAY IMPROVEMENTS ALONG THE ROUTES TO IMPROVE OVERALL PROGRESSION.	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY	LAF5514	VERMONT AVE BIKE LANE - MANCHESTER BLVD TO EL SEGUNDO BLVD. FUNDS ARE REQUESTED TO DESIGN AND CONSTRUCT CLASS II BIKE LANES ON VERMONT AV (3.0 MILES). SHORT TERM BICYCLE RACKS (14) ARE ALSO PROPOSED AT KEY DESTINATIONS.. TOLL CREDITS OF $10 WILL BE USED TO MATCH FY16 FEDERAL FUNDS FOR THE CON PHASE	2/26/2019	2/26/2019	2/26/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. UNDER DESIGN- PREVIOUSLY FUNDED BY METRO CFP BUT NOW PROJECT HAS RECEIVED FUNDING FROM ATP CYCLE 1
LOS ANGELES COUNTY	LAF7703	EXPERIENCELA 3.0-MOBILITY IN THE CLOUD : DEVELOPS AND IMPLEMENTS CLOUD COMPUTING BASED SOFTWARE TECHNOLOGY TO PROVIDE TRANSIT USERS LOCATION SPECIFIC INFORMATION VIA PERSONAL MOBILE DEVICES AND INTERACTIVE KIOSKS AT KEY TRANSPORTATION FACILITIES.	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT TO BE DELIVERED BY COUNTY ARTS COMMISSION-CONSULTANT SERVICES ARE PROCURED.
LOS ANGELES COUNTY MTA	LA0C8164	EXPOSITION BLVD RIGHT-OF-WAY BIKE PATH-WESTSIDE EXTENSION. DESIGN AND CONSTRUCTION OF 2.5 MILES OF CLASS 1 BIKEWAY, LIGHTING, LANDSCAPING & INTERSECTION IMPROVEMENTS. (PPNO# 3184)	2009	7/31/2018	7/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE BIKE PATH IS AN ONGOING DESIGN AND BUILD PROJECT. THE CONSTRUCTION IS BEING PERFORMED IN CONJUNCTION WITH THE EXPOSITION LIGHT RAIL TRANSIT - PHASE 2 PROJECT.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES COUNTY MTA	LA0C8114	LA CNTY RIDESHARE SERVICES; PROVIDE COMMUTE INFO, EMPLOYER ASSISTANCE AND INCENTIVE PROGRAMS THROUGH CORE & EMPLOYER RIDESHARE SERVICES & MTA INCENTIVE PROGRAMS. PPNO 9003	2009	12/30/2016	12/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE REGIONAL RIDESHARE PROJECT IS BEING IMPLEMENTED IN A TIMELY MANNER AND IS ON SCHEDULE. ALL FUNDS ARE BEING SPENT IN ACCORDANCE WITH PROP C 25% GUIDELINES.
LOS ANGELES COUNTY MTA	LA0D198	CRENSHAW/LAX TRANSIT CORRIDOR - THE CRENSHAW/LAX TRANSIT CORRIDOR PROJECT IS AN 8.5-MILE LIGHT RAIL TRANSIT (LRT) LINE EXTENDING FROM THE INTERSECTION OF CRENSHAW AND EXPOSITION BOULEVARDS ALLOWING FOR TRANSFER TO THE EXPOSITION LIGHT RAIL TRANSIT LINE TO A CONNECTION WITH THE METRO GREEN LINE AT THE AVIATION/LAX STATION	12/31/2018	4/30/2021	4/30/2021	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. RIGHT OF WAY IS 81% COMPLETE. CONSTRUCTION IS UNDERWAY WITH FIVE MAJOR CONTRACTS AWARDED: C0988 DESIGN BUILD, C0990 ADVANCED UTILITY RELOCATION, C0991 SOUTHWESTERN YARD & STORAGE FACILITY, C0992 CONCRETE TIES AND ASSEMBLY ITEMS
LOS ANGELES COUNTY MTA	LA0F021	EXPOSITION LIGHT RAIL TRANSIT SYSTEM PHASE II - FROM CULVER CITY TO SANTA MONICA	12/31/2017	12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE DESIGN PHASE IS APPROXIMATELY 99.9% COMPLETE. THE CONSTRUCTION PHASE IS APPROXIMATELY 82.3% COMPLETE.
LOS ANGELES COUNTY MTA	LA0F075	LIGHT RAIL TRANSIT FLEET-UP TO 133 NEW CARS SYSTEMWIDE. THESE EXPANSION RAIL CARS WILL BE ASSIGNED TO EXPO II, GOLD LINE FOOTHILL AND VEHICLE REPLACEMENTS.	3/30/2018	3/30/2019	3/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY MTA	LA0G010	REGIONAL CONNECTOR - LIGHT RAIL IN TUNNEL ALLOWING THROUGH MOVEMENTS OF TRAINS, BLUE, GOLD, EXPO LINES. FROM ALAMEDA / 1ST STREET TO 7TH STREET/METRO CENTER	12/31/2019	5/31/2021	5/31/2021	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE OVERALL FINAL DESIGN IS 72% COMPLETE AS OF THE END OF JUNE 2015. SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT(SEIS) WAS ISSUED FOR PUBLIC COMMENTS ON JUNE 12, 2015.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES COUNTY MTA	LA0G1052	METRO PURPLE LINE WESTSIDE SUBWAY EXTENSION SECTION 2 - WILSHIRE/LA CIENEGA TO CENTURY CITY	6/30/2026	6/30/2026	6/30/2026	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ESCROW CLOSED ON JUNE 18, 2015, FOR METRO'S PURCHASE OF THE ACE GALLERY BUILDING PROPERTY.
LOS ANGELES COUNTY MTA	LA0G1149	IMPROVEMENTS AT FOUR SITES ALONG CESAR CHAVEZ AVENUE, THE PERIMETER OF THE LOS ANGELES UNION STATION, AT ALAMEDA AND VIGNES STREETS. LAND WILL BE ACQUIRED FOR A BUS PAVILION, BIKE FACILITIES, AND ENHANCED LANDSCAPING AT ONE SITE. STREET FURNITURE WILL BE REPLACED AND UPDATED AT THE THREE OTHER SITES. A CONTINENTAL CROSSWALK WILL BE INSTALLED ON ALL FOUR SEGMENTS OF THE INTERSECTION AT CESAR CHAVEZ AVENUE AND VIGNES STREET	5/31/2017	5/31/2017	5/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. COMPLETING PLANNING STAGES, PROJECT SCOPING COMPLETED, REAL ESTATE APPRAISAL IS UNDERWAY. COORDINATION INITIATED WITH SEVERAL CITY OF LOS ANGELES DEPARTMENTS. INTERNAL COORDINATION TO DETERMINATION BETWEEN ACQUIRING A SITE OR USING AND EXITING ONE OWNED BY LACMTA.
LOS ANGELES COUNTY MTA	LA0G1167	DESIGN AND CONSTRUCTION OF STREETSCAPE, PEDESTRIAN AND BICYCLE ACCESS IMPROVEMENTS IN THE LITTLE TOKYO AND ARTS DISTRICT NEIGHBORHOOD OF DOWNTOWN LOS ANGELES WITHIN A ONE-MILE RADIUS OF THE 1ST/CENTRAL STATION OF THE REGIONAL CONNECTOR LIGHT RAIL LINE.	8/31/2020	8/31/2020	8/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT IS STILL UNDER DESIGN STAGE WITH CONSTRUCTION EXPECTED TO START IN SEPTEMBER 2016.
LOS ANGELES COUNTY MTA	LA0G1182	EXPRESS LANES - 84 BIKE STATION AND 840 BIKES FOR DEPLOYMENT OF THE BIKESHARE WITHIN 1 MILE RADIUS OF RAIL STATIONS.	12/30/2018	12/30/2018	12/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY MTA	LA0G1184	DESIGN AND CONSTRUCT A HIGH-CAPACITY BIKE PARKING FACILITY TO ACCOMDATE AT LEAST 300 PARKED BICYCLES IN A SECURE ENVIRONMENT.	12/30/2018	12/30/2018	12/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY MTA	LA0G447	METRO PURPLE LINE WESTSIDE SUBWAY EXTENSION SECTION 1 - WILSHIRE/WESTERN TO LA CIENEGA	12/31/2019	12/31/2023	12/31/2023	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. OVERALL SECTION 1 ADVANCED UTILITY RELOCATIONS WORK IS 48% COMPLETE.

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LOS ANGELES COUNTY MTA	LA29202W	WILSHIRE BLVD BRTPHASE I: 12.5-MI. CORRIDOR WITH 7.7-MI. PEAK PERIOD BUS LANE ON WILSHIRE WITHIN THE CITY AND COUNTY OF LA FROM VALENCIA ST. TO CITY OF SANTA MONICA. INCLUDES STREET WIDENING, CURB LANE REPAVING/ RECONSTRUCTING, IMPROVED TRAFFIC SIGNAL TIMING & BUS SIGNAL PRIORITY. PHASE II: INCLUDES ENHANCED SHELTERS & LANDSCAPING; STREET REPAIR/RECONSTRUCTION; CONCRETE BUS PADS AND P&R FACILITIES.	2009/2010	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY MTA	LA0B408	ROUTE 405: ADD A 10-MILE HOV LANE ON THE NORTHBOUND 405 BETWEEN I-10 AND U.S. 101 IN LA FROM RTE 10 TO RTE 101 WIDEN FOR HOV LANE & MODIFY RAMPS, & HOV INGRESS/EGRESS AT SANTA MONICA BLV(EA 12030, PPNO 0851G, SAFETLU SECTION 1302 #18, 1934 #20)	5/24/2016	5/24/2016	5/24/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT IS WORKING WITH KIEWIT TO SETTLE MERITED CLAIMS, REQUEST FOR CHANGES (RFCS), AND PROVISIONAL SUM ITEMS PRIOR TO GOING TO ARBITRATION.
LOS ANGELES COUNTY MTA	LA0G1048	ACTON SIDING AND SECOND PLATFORM. LENGTHEN AN EXISTING SIDING WEST OF CP QUARTZ BY APPROX. 4,000 FEET INCLUDING A CROSSOVER, AND ADD A SECOND STATION PLATFORM AT VINCENT GRADE/ ACTON STATION. THE PROJECT WILL PROVIDE BENEFITS TO FREIGHT AND COMMUTER RAIL WITH IMPROVED OVERALL CAPACITY, TRACK OPERATIONS, AND SAFETY ALONG A VITAL SEGMENT OF THE ANTELOPE VALLEY LINE.	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY MTA	LA0G1051	EXTEND SEVERAL OF THE STUB-END TRACKS IN UNION STATION TO CONNECT WITH EXISTING MAINLINE TRACKS. THE PROJECT WILL SERVE THE EXISTING METROLINK, AMTRAK, AND NEW HIGH SPEED TRAIN PROJECT IN THIS CORRIDOR. IT WILL INCLUDE THE PREPARTION OF AN UPDATED ENVIRONMENTAL REPORT AND CLEARANCE, PREPARATION OF THE P/E DOCUMENTATION, PREPARATION OF FINAL PLANS, SPECIFICATIONS AND ESTIMATES, AND THE CONSTRUCTION OF THE PROJECT.	2/28/2019	2/28/2019	2/28/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES COUNTY MTA	LA0G635	DESIGN AND CONSTRUCTION OF PEDESTRIAN AND TRANSIT ENHANCEMENTS ALONG THE PUBLIC RIGHT-OF-WAY OF THE METRO GOLD LINE EASTSIDE EXTENSION TO SURROUNDING NEIGHBORHOOD. TRANSIT ENHANCEMENTS ARE WITHIN 3 MILES OF EASTSIDE GOLDLINE EXTENSION STATION.	6/30/2020	6/30/2020	6/30/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT SEGMENTS ARE EITHER UNDER FINAL DESIGN OR IN CONSTRUCTION.

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LOS ANGELES COUNTY MTA	LA0G640	PACIFIC SURFLINER CORRIDOR - RAYMER/BERNSON DOUBLE TRACK IMPROVEMENTS - UPGRADE THE RAIL CORRIDOR FROM A SINGLE TRACK TO A DOUBLE TRACK, INSTALL CONCRETE TIES ON BOTH TRACKS, INSTALL FOUR NEW SPECIAL TRACKWORK TURNOUTS, NINE AT-GRADE CROSSINGS AND TWO BRIDGES, A NEW SECOND PLATFORM & NEW FENCING AT NORTHRIDGE AND A NEW PEDESTRIAN UNDERPASS. OTHER ENHANCEMENTS INCLUDE SIGNAL RELOCATION, UTILITY RELOCATION AND DRAINAGE IMPROVEMENTS.	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES, CITY OF	LA0B7330	SAN FERNANDO RD ROW BIKE PATH PHSE II-CONSTRUCT 2.75 MILES CLAS I FRM FIRST ST TO BRANFORD ST,ON MTA-OWND ROW PARLEL TO SAN FERNANDO RD. LINK CYCLSTS TO NUMROUS BUS LNE. PPNO 2868.	2005	12/31/2014	12/31/2015	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE DELAY IN PROCUREMENT PROCESS. 95% COMPLETE
LOS ANGELES, CITY OF	LA0G1128	EXPO LINE BUNDY STATION FIRST]LAST MILE IMPROVEMENTS. THIS PROJECT WILL ESTABLISH PEDESTRIAN/BIKE-FRIENDLY ROUTES TO THE EXPO/BUNDY STATION THROUGH TRAFFIC CALMING, SAFETY IMPROVEMENTS, WAYFINDING, AND PLACE MAKING. PROJECT ELEMENTS INCLUDE SHADE TREES, ACCESS RAMPS, NEW SIDEWALKS, MEDIAN REFUGE, BICYCLE PARKLET, CURB EXTENSIONS, PEDESTRIAN LIGHTING, BIKE RACKS, AND STREET FURNITURE.	6/30/2017	6/30/2017	6/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN DESIGN. WE WILL BE ALLOCATING CONSTRUCTION FUNDS AT THE JUNE 2016 CTC MEETING.
LOS ANGELES, CITY OF	LA0G1165	COMMUTER EXPRESS SERVICE EXPANSION TO ALLEVIATE CONGESTION ON HARBOR FREEWAY: PURCHASE ONE NEW COMMUTER EXPRESS BUS AND EXTENSION OF SEVERAL AM & PM TRIPS ON EXPRESS ROUTE 438.	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES, CITY OF	LA0G182	THE CENTRAL CITY EAST PROJECT WILL PROVIDE A FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM TO APPROXIMATELY 150 INTERSECTIONS CURRENTLY OPERATIONAL WITH ATSAC CAPABILITY.	5/1/2014	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CONSTRUCTION 70% COMPLETED.
LOS ANGELES, CITY OF	LA0G901	HISTORIC LOS ANGELES STREETCAR	6/30/2017	6/30/2017	6/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. WORKING ON ENVIRONMENTAL DOCUMENT

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES, CITY OF	LAF1524	SAN FERNANDO RD. BIKE PATH PH. IIIA/IIIB - CONSTRUCTION. RECOMMEND PHASE IIIA-CONSTRUCTION OF A CLASS I BIKE PATH WITHIN METRO OWNED RAIL RIGHT-OF-WAY ALONG SAN FERNANDO RD. BETWEEN BRANFORD ST. AND TUXFORD ST INCL BRIDGE. 2 MILE BIKEPATH.	10/1/2015	6/30/2017	6/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. 80% DESIGN
LOS ANGELES, CITY OF	LAF1708	HOLLYWOOD INTEGRATED MODAL INFORMATION SYSTEM. INSTALLATION OF ELECTRONIC, DIRECTION AND PARKING AVAILABILITY SIGNS WITH INTERNET CONNECTIVITY TO PROVIDE ADVANCE AND REAL-TIME INFORMATION INTENDED TO INCREASE TRANSIT RIDERSHIP	2015	9/21/2015	9/21/2017	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE RE-PROGRAMMING PROCESS BECAUSE FUNDS WERE PREVIOUSLY OBLIGATED BY THE CRA AND WERE SUBSEQUENTLY DE-OBLIGATED DUE TO INACTIVITY. WORKING WITH METRO TO RE-ALLOCATE THE LAPSED FUNDS TO THE CITY OF LA AND TO FINALIZE LOA. WORKING ON LOA WITH METRO AS THE PROJECT FUNDS WERE LAPSED BY METRO WHILE THE PROJECT WAS TRANSFERRED FROM CRA/LA TO THE CITY OF LOS ANGELES.
LOS ANGELES, CITY OF	LAF3171	DE SOTO AVE WIDENING: RONALD REAGAN FWY TO DEVONSHIRE ST.. WIDEN DE SOTO AVE FR SR-118 TO DEVONSHIRE ST TO PROVIDE 3 LANES IN EACH DIRECTION & UNIFORM ROADWAY WIDTH. EXISTING ASPHALT BERMS TO BE REPLACED WITH CURB, GUTTER, & 10' SIDEWALK. SIDEWALK IS 1.42 MILES, 90% OF THE SIDEWALKS ALONG THE PROJECT LIMITS WILL BE NEW.	12/1/2015	12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES, CITY OF	LAF3314	INTELLIGENT TRANSPORTATION SYSTEM (ITS) COMMUNICATION SYSTEM. UPGRADE AND REPLACE UNDER CAPACITY COMMUNICATION SYSTEM HARDWARE IN ORDER TO PROVIDE A VIABLE AND COST EFFECTIVE COMMUNICATION LINK BETWEEN TRAFFIC CORRIDORS AND THE LA COUNTY IEN.	12/31/2015	12/31/2015	12/31/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO STAFF TURNOVER. NEW PROJECT MANAGER. DESIGN 90% COMPLETE. PREPARING E76 FOR CONSTRUCTION.
LOS ANGELES, CITY OF	LAF3513	DESIGN AND CONSTRUCT 3.85 MILE BIKEWAY ALONG FUTURE EXPOSITION LIGHT RAIL CORRIDOR BETWEEN VENICE/ROBERTSON BLVDS. AND SANTA MONICA CITY LIMITS AT CENTINELA. CLASS I AND CLASS II BIKEWAYS.	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CONSTRUCTION IN PROGRESS, STAGE OF CONSTRUCTION IS AT 20%.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES, CITY OF	LAF3731	DOWNTOWN LA INTER-MODAL TRANSIT INFORMATION AND WAYFINDING. INSTALL TRANSIT INFORMATION MONITORS, VARIABLE MESSAGE SIGNS, INTERACTIVE KIOSKS & PARKING AVAILABILITY SIGNAGE ALONG BROADWAY CORRIDOR TO OLYMPIC.	12/31/2014	12/31/2014	12/31/2017	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE FACT THAT FUNDS WERE ORIGINALLY AWAREDED TO THE CRA. THE CITY OF LOS ANGELES DEPARTMENT OF TRANSPORATION WILL ASSUME THE LEAD (PER COUNCIL DIRECTIVE). THE CITY OF LA HAS BEEN WORKING WITH METRO TO TAKE OVER THE PROJECT. CURRENTLY IN ENG PHASE.
LOS ANGELES, CITY OF	LAF5518	THIS PROJECT IS LOCATED IN THE CITY OF LOS ANGELES IN THE WEST SAN FERNANDO VALLEY. CONSTRUCTION OF A BICYCLE/PEDESTRIAN PATH FROM OWENSMOUTH AV TO MASON AV (1.25 MILES) ALONG THE SOUTH BANK OF THE LA RIVER. INCLUDES UNDERPASSES AT DE SOTO AV AND CANOGA AV/BUSWAY BRIDGES. THE PROJECT WILL INCLUDE LIGHTING, RAILING, STRIPING AND SIGNAGE AND A CONNECTION STRUCTURE TO THE METRO ORANGE LINE BIKEWAY.	6/30/2018	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. 60% DESIGN, FILED ENVIRONMENTAL CEQA, COMMENCING PERMIT PROCESS WITH LA COUNTY FLOOD CONTROL DISTRICT & ARMY CORP, COMMENCING NEPA DOCUMENT. CITY SEEKING ADDITIONAL FUNDS TO COVER HIGHER CONSTRUCTION ESTIMATE.
LOS ANGELES, CITY OF	LAF5620	EXPO LINE - TRANSIT/PEDESTRIAN LINKAGES - WEST. IT WILL FUND PEDESTRIAN IMPROVEMENTS BY INSTALLING DECORATIVE SIDEWALKS, STREET TREES, NEW AND UPGRADED ACCESS RAMPS, TRASH RECEPTACLES, BENCHES, BICYCLE RACKS, PEDESTRIAN LIGHTING, AND DECORATIVE CROSSWALKS. FUNDS ARE REQUESTED FOR DESIGN AND CONSTRUCTION COSTS. PEDESTRIAN LINKAGES 2.5 MILES.	7/1/2018	7/1/2018	7/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN DESIGN.
LOS ANGELES, CITY OF	LAF1612	CENTURY CITY URBAN DESIGN AND PEDESTRIAN CONNECTION PLAN. PROJECT WILL IMPLEMENT SIDEWALK IMPROVEMENTS, DECORATIVE CROSSWALKS, MEDIAN ISLAND, CURB RAMPS, PEDESTRIAN LIGHTING, SHELTERS, BENCHES, TRASH RECEPTACLES & STREET TREES. THE PHYSICAL IMPROVEMENTS WILL CONSIST OF A MEANDERING PEDESTRIAN WALKWAY, SOLAR-POWERED PEDESTRIAN SCALE LIGHTING, STREET LIGHTING, TRASH RECEPTACLES, BUS BENCHES, (10) BICYCLE RACKS.	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES, CITY OF	LAF3315	CITY/COUNTY TRAFFIC MANAGEMENT INTEGRATION PHASE 2 PROJECT. INTEGRATE THE IEN TRAFFIC SIGNAL TIMING DATA AS SECOND LEVEL INPUTS INTO ATCS AND MAKE REVISIONS FROM 2007 CALL APPLICATION TO THIS PROJECT.	6/30/2015	6/30/2015	12/31/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE FACT THAT LADOT LOST EXERIENCED STAFF ON DATA COMMUNICATIONS AND DATABAS. NEW STAFF ON BOARD. 20% COMPLETE.
LOS ANGELES, CITY OF	LAF3515	SAN FERNANDO RD. BIKE PATH PH. IIIB CONSTRUCTION. CONSTRUCT 2.75 MILE CLASS I BIKE PATH WITHIN METRO RIGHT-OF-WAY ALONG SAN FERNANDO RD. BETWEEN TUXFORD ST. AND COHASSET ST. TO COMPLETE 12-MILE BIKEWAY.. THE PROJECT IS LOCATED WITHIN THE CITY OF LOS ANGELES, IN THE COMMUNITY OF SUN VALLEY. THE PROJECT CONSISTS OF A CLASS I FACILITY 12 FEET IN WIDTH AND 2.75 MILES IN LENGTH BETWEEN TUXFORD ST. AND COHASSET ST. (BURBANK CITY LIMIT).	1/1/2016	1/1/2016	1/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LOS ANGELES, CITY OF	LAF3646	ARTS DISTRICT/LITTLE TOKYO GOLD LINE STATION LINKAGES. PEDESTRIAN ENHANCEMENTS INCLUDING SIDEWALK/PATH PAVING; PED LIGHTS; STREET TREES/PLANTING; DISTRICT SIGNAGE; ENTRY ELEMENTS; STREET FURNITURE; CROSSWALK PAVING; AND BIKE PARKING. (10 BIKE RACKS)	12/31/2016	12/31/2016	12/30/2017	OBSTACLES ARE BEING OVERCOME. DELAY BECAUSE CITY WAS REQUIRED TO SEEK ATP FUNDS ATP FUNDS HAVE BEEN SECURED AND DESIGN BACK ON SCHEDULE. 50% DESIGN.
LOS ANGELES, CITY OF	LAF5519	THIS PROJECT IS LOCATED IN THE CITY OF LOS ANGELES. CONSTRUCTION OF BICYCLE FRIENDLY STREET TREATMENTS: AT LEAST 100 DIRECTIONAL SIGNS, AT LEAST 500 SHARED LANE MARKINGS, AND BICYCLE DETECTORS AND MARKINGS PROVIDED TO AT LEAST 15 SIGNALIZED INTERSECTIONS. OTHER TREATMENTS WILL INCLUDE TRAFFIC CALMING DEVICES AND DIVERSION, WHICH INCLUDE AT LEAST ONE DIVERTER AND ROUNDABOUT.	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. LOA SIGNED.
LOS ANGELES, CITY OF	LAF5525	TO DESIGN AND CONSTRUCT CURB-SIDE BICYCLE PARKING (BICYCLE CORRAL) THAT WILL SERVE EACH COUNCIL DISTRICT. THE PROJECT REQUIRES SURFACE MODIFICATIONS TO CURBSIDE PARKING AREAS FOR INSTALLING AT LEAST 150 BIKE RACKS.	1/1/2018	1/1/2018	1/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PREPARING LOA.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
LOS ANGELES, CITY OF	LAF5710	EXPERIENCE LA HISTORIC CULTURAL NEIGHBORHOOD CONNECTIONS. INSTALLATION OF 22 KIOSKS AT TRANSIT HUBS IN ACTIVITY CENTERS THROUGHOUT THE CITY OF LOS ANGELES. BY UTILIZING SMART TECHNOLOGY TRANSIT USERS WILL BE ABLE TO USE CELL PHONES OR THE KIOSK TO FIND INFORMATION THAT WILL MAKE THE TRANSFER MORE SEAMLESS TO THEIR FINAL DESTINATION.	6/1/2019	6/1/2019		INFORMNATIONAL KIOSKS ARE NOT TCM.
LOS ANGELES, CITY OF	LAF7628	WATTS STREETSCAPE IMPROVEMENTS PHASE 2: INSTALLS ADA RAMPS, LANDSCAPING STREET TREES, STREET FURNITURE, PED LIGHTING, CROSSWALK ENHANCEMENTS, CURB EXTENSIONS, SHARROWS, AND PED & BIKE WAYFINDING SIGNAGE.	12/31/2019	12/31/2019	12/31/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. 1ST YEAR OF PROGRAMMING IS 15/16. WE WILL BE EXECUTING A MOU THIS FY TO INITIATE DESIGN.
LOS ANGELES, CITY OF	LAF7707	LAST MILE FOLDING BIKE INCENTIVE PROGRAM : PROVIDES FINANCIAL INCENTIVES TO TRANSIT RIDERS TOWARDS THE PURCHASE OF 1,800 COLLAPSIBLE OR ELECTRIC BIKES TO USE IN CONJUNCTION WITH BUS AND RAIL SYSTEMS.	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PREPARING LOA.
MALIBU	LA0G910	PACIFIC COAST HIGHWAY REGIONAL TRAFFIC MESSAGE SYSTEMS. THE PROJECT WILL ENABLE THE CITY OF MALIBU AND OTHER AGENCIES TO NOTIFY TRAVELERS OF CRITICAL REGIONAL TRAFFIC AND SAFETY INFORMATION AND FACILITATE TRAFFIC FLOW THROUGHOUT THE REGION. 6 PERMANENT AND 2 MOBILE CHANGEABLE MESSAGE SIGNS WILL BE INSTALLED AT STRATEGIC LOCATIONS ALONG PCH/SR-1 CORRIDOR IN THE CITY OF MALIBU.	1/31/2017	1/31/2017	12/1/2017	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE DELAY OF SCOPING AND PERMITTING PROCESS. THE SCOPING AND DESIGN PROCESS HAS BEEN COMPLETED. GIVEN THE TIME ASSOCIATED WITH EXECUTING METRO MOUS AND CALTRANS PERMITTING THE PROJECT COMPLETION DATE NEEDS TO BE EXTENDED TO DECEMBER 2017.
METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AU	LA0G558	GOLD LINE FOOTHILL LRT EXTENSION - PASADENA TO AZUSA	12/31/2017	12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. WILL BE SUBSTANTIALLY COMPLETE IN SEPT 2015 AND REVENUE OPERATIONS IS SCHEDULED FOR MARCH 2016.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
MONROVIA	LAE0039	TRANSIT VILLAGE - PROVIDE A TRANS. FACILITY FOR SATELLITE PARKING FOR SIERRA MADRE VILLA GOLD LINE STA, P-N-R FOR COMMUTERS, A FOOTHILL TRANSIT STORE INCLUDING THREE (3) BUS BAYS, AT LEAST FOUR (4) SHELTERS WITH BENCHES, LIGHTING FOR SAFETY AND SECURITY, TRASH RECEPTACLES, DRINKING FOUNTAINS, AND INFORMATION KIOSKS. ADDITIONAL TRAFFIC SIGNALS AND SOME STREET WIDENING WILL TAKE PLACE TO IMPROVE BUS TRAFFIC FLOW.	2010	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
MONTEBELLO	LAES757	CUSTOMER INFORMATION SYSTEM PROJECT: INCLUDING AUTOMATIC VEHICLE LOCATION AND REAL-TIME PASSENGER INFORMATION SYSTEMS.	7/1/2016	7/1/2016	7/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THIS IS AN ON-GOING PROJECT INSTALLING AUTOMATIC VEHICLE LOCATION AND REAL-TIME PASSENGER INFORMATION SYSTEMS.
MONTEBELLO	LA0G862	PURCHASE OF SEVEN (7) ALTERNATIVE FUEL EXPANSION TRANSIT BUSES	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CURRENTLY MONTEBELLO TRANSIT IS DISCUSSING WITH LA METRO TO DETERMINE THE EXTENT OF THE EXPANSION SERVICE.
MONTEREY PARK	LA0G1181	2.86 MILES CLASS III BIKE PATH. 1.96 MILES CLASS II BIKE PATH CONVERTED FROM ON-STREET PARKING AND MEDIAN. CLASS III BIKE PATH: MONTEREY PASS RD/GARVEY AVE (2.86 MILE). CLASS II BIKE PATH: CESAR CHAVEZ/RIGGIN (1.96 MILE)	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE GRANT MOU WAS EXECUTED ON JUNE 6, 2015. CONSTRUCTION IS SCHEDULED TO START IN JAN. 2016 AND COMPLETED BY DEC. 2016.
NORWALK	LAF3443	IMPROVEMENTS TO THE PEDESTRIAN PLAZA AT THE NORWALK/SANTA FE SPRINGS METRLINK STATION. IMPROVEMENTS INCLUDE DEVELOPMENT OF A CONTINUOUS NEW PEDESTRIAN WALKWAY AND BICYCLE PATH UTILIZING THE ROADBED ALONG THE NORTHERN EDGE OF THE PROPERTY. ADDITIONAL IMPROVEMENTS INCLUDE PASSENGER CAR PICK-UP/DROP-OFF AREA, PROPER SIGNAGE AND STRIPING, BUS SHELTER/SEATING AREA, SECURITY LIGHTING, AND LANDSCAPING AND INSTALLATION OF CLOSED CIRCUIT TELEVISION (CCTV) SURVEILLANCE SECURITY SYSTEM.	7/1/2017	7/1/2017	6/1/2016	AHEAD OF SCHEDULE. CITYN HAS AWARDED THE FOLLOWING CONTRACTS FOR THIS PROJECT: CONSTRUCTION MANAGEMENT TO PSOMAS ON 11/18/14. PROJECT MANAGEMENT TO MARRS, INC. ON 4/21/15. CONSTRUCTION CONTRACT TO KEMCORP ON 5/5/15. CONSTRUCTION STARTED ON 6/15/15 AND WE ARE CURRENTLY IN THE DEMOLITION STAGE OF THE PROJECT.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
PASADENA	LAE3790	THE PASADENA ITS INTEGRATES 2 COMPONENTS; TRAFFIC SIGNAL COMMUNICATION AND CONTRL, AND PUBLIC PARKING AVAILABILITY INFO. SAFETEA-LU PRJ #3790	2010	6/30/2015	4/30/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO RE-ADVERTISEMENT. THE CITY IS ADVERTISING THIS PROJECT ON JULY 23, 2015. PLANS, SPECS AND ESTIMATE PACKAGE IS COMPLETE AND ROUTING THROUGH THE CITY FOR ADVERTISEMENT APPROVAL.
PASADENA	LAF3501	DETECTION OF BICYCLES AT SIGNAL CONTROLLED INTERSECTIONS. BICYCLE DETECTION SYSTEMS AT INTERSECTIONS CONTROLLED BY TRAFFIC SIGNALS ALONG BIKE CORRIDORS. PROJECT CORRIDOR LENGTH IS 15.5 MILES.	5/1/2016	5/1/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PLANS, SPECS AND ESTIMATE PACKAGE IS ALMOST COMPLETE.
PASADENA	LAF3301	METRO GOLD LINE AT-GRADE CROSSING MOBILITY ENHANCEMENTS. DEPLOYMENT OF ITS AT SIGNALIZED INTERSECTIONS ADJACENT TO METRO GOLD LINE AT-GRADE CROSSINGS TO PROVIDE ADAPTIVE TRAFFIC SIGNAL CONTROL TO IMPROVE MOBILITY & ENHANCE SAFETY. PROJECT INCLUDES 14 INTERSECTIONS.	5/1/2016	5/1/2016	5/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. STILL ON DESIGN COMPLETION. PRESENTLY 68% DESIGN COMPLETED.
PASADENA	LAF3302	INTELLIGENT TRANSPORTATION SYSTEM (ITS) PHASE III (SIGNAL SYNCHRONIZATION PROJECT 3+ SIGNALS). COMPLETE THE MAIN COMMUNICATION INFRASTRUCTURE SYSTEM OF THE ITS COMMUNICATION MASTER PLAN BY CLOSING ALL GAPS IN THE EXISTING FIBER COMMUNICATION NETWORK. AS STATED IN THE PROJECT DESCRIPTION, THIS PROJECT TARGETS CRITICAL EXISTING GAPS WITHIN THE CITY'S ITS FIBER MASTER PLAN.	5/1/2016	5/1/2016	12/30/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE FACT THAT THE CITY IS SHORT STAFFED AS EFFORTS ON DESIGN ARE SHIFTED TO DIFFERENT PROJECTS. DESIGN STAFF IS BEING MOVED TO HELP COMPLETE THIS PROJECTS DESIGN. THE CITY ANTICIPATED ADVERTISEMENT IS ON MAY 15, 2016.
PASADENA	LAF3710	PASADENA'S WAYFINDING SYSTEM. IMPLEMENT WAYFINDING SYSTEM INCLUDING TRANSIT INFORMATION AND CONNECTIVITY TO ADJACENT DESTINATIONS AT TRANSIT STOPS AND PARKING LOTS.	5/1/2016	5/1/2016	5/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PROJECT IS IN ENG STATUS.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
POMONA	LA0G1135	DESIGN AND CONSTRUCT 14.5 MILE OF NEW BIKEWAYS AND IMPROVE PEDESTRIAN SAFETY THROUGH CROSSING IMPROVEMENTS AT EIGHT MAJOR INTERSECTIONS. BIKE IMPROVEMENTS INCLUDE 3.8 MILES OF CLASS II BUFFERED BIKE LANES, 2.9 MILES OF CLASS II BIKE LANES, AND 7.8 MILES OF CLASS III BIKE ROUTES.	9/30/2019	9/30/2019	9/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ALL OF THE GRANT FUNDING ON THIS PROJECT IS IN CON FOR US.THE CITY HAS SUBSTANTIAL LOCAL FUNDING OBLIGATED FOR DESIGN, ETC. DESIGN IS OVER 30% COMPLETE CONSTRUCTION AND REIMBURSEMENT IS EXPECTED TO BE COMPLETE BY FALL 2019.
PORT OF LOS ANGELES	LAF3170	PORT TRUCK TRAFFIC REDUCTION PROGRAM: WEST BASIN RAILYARD. INTERMODAL RAILYARD CONNECTING PORT OF LA WITH ALAMEDA CORRIDOR TO ACCOMMODATE INCREASED LOADING OF TRAINS AT THE PORT, THEREBY REDUCING TRUCK TRIPS TO OFF-DOCK RAILYARDS.(LAF5204)	12/1/2014	12/1/2014	4/30/2017	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO UNFORESEEN UTILITY CONFLICTS, DELAYS IN OBTAINING 3RD PARTY AGENCY PERMITS AND APPROVALS AND UNREASONABLY HIGH CONTRACTOR QUOTES RESULTING IN A PARTIAL RE-BID OF THE WORK SCOPE. THE PROJECTS WAS SEPARATED INTO THREE PHASES TO MOVE FOREWARD WHILE RESOLVING UTILITY CONFLICTS. 90% OF PROJECT HAS BEEN COMPLETED
RANCHO PALOS VERDES	LAF1605	PEDESTRIAN SAFE BUS STOP LINKAGE. LINKING 11 BUS STOPS CURRENTLY INACCESSIBLE BECAUSE OF LACK OF SIDEWALKS ON BOTH THE EAST AND WEST SIDE OF HAWTHORNE BLVD. FROM CREST RD. TO PALOS VERDES DR. SOUTH (ABOUT 13,000')	2013	12/9/2015	3/30/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE FACT THAT THE CITY OBTAINED AN E-76 FOR CONSTRUCTION ON 07/23/2014 AND WAS WAITING FOR THE COOLER WINTER WEATHER TO CONSTRUCT THE PROJECT SINCE LANDSCAPING WAS INCLUDED. THE PLANS AND SPECS ARE CURRENTLY BEING REVISED. CONSTRUCTION WILL BEGIN IN OCTOBER 2015.

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Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
REDONDO BEACH	LA0D29	HEART OF THE CITY BUS TRANSFER STATION AMENITIES. RELOCATE THE EXISTING INTERMODAL TRANSIT TERMINAL AND CONSTRUCT A NEW TRANSIT CENTER WITH 12 BUS BAYS, PASSENGER WAITING AREA AND INFORMATION CENTER, AND A DRIVER OPERATOR LOUNGE. THE PROPERTY WILL ALSO PROVIDE 339 PUBLIC PARKING SPACES (PLUS 2 FOR STAFF: MAINTENANCE & SECURITY) AND BICYCLE FACILITIES. LOCATION - 1521 KINGSDALE AVENUE, REDONDO BEACH, CA 90278	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
REDONDO BEACH	LAF3502	REDONDO BEACH BICYCLE TRANSPORTATION PLAN IMPLEMENTATION. IMPLEMENT CLASS II AND III BIKE FACILITIES IDENTIFIED IN THE CITY OF REDONDO BEACH'S ADOPTED BICYCLE TRANSPORTATION PLAN. APPROXIMATELY 2.1 CENTERLINE MILES OF BIKE LANES AND 15.8 CENTERLINE MILES OF BIKE ROUTES THROUGHOUT THE CITY OF REDONDO BEACH.	12/31/2015	12/31/2015	6/30/2017	OBSTACLES ARE BEING OVERCOME. CURRENTLY THE PROJECT IS IN DESIGN AND SPECIFICATION FOR VIDEO DETECTION. RESLOVE THE ISSUE WITH LA METRO CFP PROJECT MANAGERS TO FASTEN THE LOA/ MOU PREPARATION PROCESS. ALSO HIRING A NEW STAFF TO ENSURE TIMELY COMPLETION OF THE PROJECT.
SAN GABRIEL VALLEY COG	LA990359	GRADE SEP XINGS SAFETY IMPR; 35- MI FREIGHT RAIL CORR. THRGH SAN.GAB. VALLEY - EAST. L.A. TO POMONA ALONG UPRR ALHAMBRA &L.A. SUBDIV - ITS 2318 SAFETEA #2178;1436 #1934 PPNO 2318. NOGALES(LA) PROJECT INCLUDES WIDENING FROM 2 TRAVEL LANES TO 4 TRAVEL LANES OF E.WALNUT DRIVE NO. EAST OF NOGALES FOR 2600 LINEAR FEET AND WIDENING FROM 2 TRAVEL LANES TO 4 TRAVEL LANES OF GALE AVE. WEST OF NOGALES FOR 1900 LINEAR FEET.	2003/2009	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
SANTA CLARITA	LAF3535	CITYWIDE WAYFINDING PROGRAM FOR PEDESTRIANS AND BICYCLISTS. DIRECT USERS TO METROLINK STATIONS AND OTHER REGIONAL TRIP GENERATORS, DESIGN AND INSTALL WAYFINDING SIGNS ALONG THE CITY'S EXISTING NETWORK OF MULTI-USE PATHS, ON-STREET BIKEWAYS, PASEOS IN THE VALENCIA AND SAUGUS NEIGHBORHOODS, AND SIDEWALKS ALONG MOST MAJOR ROADWAYS.	12/31/2017	12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. DESIGN OF THE PROJECT IS COMPLETE. ENVIRONMENTAL CLEARANCE WAS OBTAINED IN MAY 2015. PLANS AND SPECIFICATIONS ARE CURRENTLY BEING PREPARED TO SUBMIT FOR RIGHT-OF-WAY CERTIFICATION. CONSTRUCTION IS EXPECTED TO OCCUR IN 2016.

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SANTA CLARITA	LAF3300	ITS PHASE IV INTERCONNECT GAP CLOSURE AND SIGNAL SYNCH. THIS PROJECT INVOLVES RE-SYNCHRONIZING TRAFFIC SIGNALS ON ARTERIALS, DEPLOYING AN ADAPTIVE SIGNAL SYSTEM, AND A REDUNDANT FIBER-OPTIC INTERCONNECT SYSTEM. (APROX. 40+ SIGNALS)	12/31/2017	12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
SANTA MONICA	LAF3703	A 'NO NET NEW TRIPS' RIDESHARE TOOLKIT. DEVELOP A TDM TOOLKIT WITH ONLINE MULTI-MODAL MOBILITY INFORMATION, BIKE ACCOMMODATIONS, 300 WALKING-ROLLING CARTS, 75 BIKE LOCKERS & INCENTIVE PROGRAMS FOR EMPLOYERS, SCHOOLS & NEIGHBORHOODS. WITHIN THE CITY OF SANTA MONICA IN DEMAND MANAGEMENT AREAS AS DEFINED IN THE LAND USE AND CIRCULATION ELEMENT (LUCE) ADOPTED JULY 2010.	6/30/2014	6/30/2015	6/30/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO RETIREMENT OF THE LAST TWO PROJECT MANAGERS AND THE LOSS OF PART-TIME SUPPORT STAFF. CURRENTLY THE PROEJCT IS 60% COMPLETE AND THE PROJECT IS ON SCHEDULE LAUNCH THE WEBISTE AND HOST THE REMAINING EVENTS THIS YEAR. THE PROJECT MANAGER POSITION HAS BEEN FILLED, ADDITIONAL STAFF SUPPORT HAS BEEN PROVIDED, AND THE PROJECT IS NOW HEADED TOWARDS COMPLETION.
SANTA MONICA	LAF3505	BIKE NETWORK LINKAGES TO EXPOSITION LIGHT RAIL PROJECT. BIKE NETWORK ENHANCEMENTS TO SUPPORT EXPOSITION LINE. INCREASED SAFETY AND CONVENIENCE WITH SIGNAL DETECTION, HIGHLY VISIBLE LANE MARKINGS AND NEW BIKE RACKS. THE PROJECT AREA IS LOCATED THROUGHOUT THE CITY OF SANTA MONICA AND NO MORE THAN TWO MILES FROM THE PROPOSED EXPOSITION LIGHT RAIL LINE STATIONS.	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CURRENTLY PREPARING RFA PACKAGE TO OBLIGATE CMAQ FUNDS.
SANTA MONICA	LAF5524	IMPLEMENTATION OF A SANTA MONICA BIKE-SHARE PROGRAM, INCLUDING THE PURCHASE AND INSTALLATION OF 250 BIKES AND 25 DOCKING STATIONS TO BE LOCATED AT ACTIVITY NODES AND TRANSIT STATIONS (INCLUDING EXPO LRT STATIONS). TWO VEHICLES WILL BE ACQUIRED AND OUTFITTED TO TRANSPORT AND REDISTRIBUTE BICYCLES BETWEEN STATIONS AS NEEDED. THE BIKE-SHARE DOCKING STATIONS WILL BE SOLAR POWERED WHERE APPROPRIATE AND INCLUDE A TECHNOLOGY PLATFORM FOR SYSTEM OPERATION THROUGH THE WEB AND SMART PHONE APPLICATIONS.	6/30/2019	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

Table 77.1 Los Angeles County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
TORRANCE	LA0G358	SOUTH BAY REGIONAL INTERMODAL TRANSIT CENTER PROJECT AT 465 N. CRENSHAW BLVD., TORRANCE, CA 90503.	12/31/2015	12/31/2015	12/31/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO ENVIRONMENTAL ISSUES. CONSTRUCTION PHASE BEGINS. THE ENVIRONMENTAL ISSUES HAVE BEEN MITIGATED AND ADDRESSED AND THE PROJECT IS NOW MOVING FORWARD.
TORRANCE	LA0G1166	TORRANCE TRANSIT EXPANSION OF LINE #1 AND LINE #4 HOTLANE SERVICE * : TRANSIT EXPANSION OF LINE #1 AND #4 TO INCLUDE MID-DAY AND WEEKEND SERVICE. THE ACQUISITION OF 5 40'FOOT CNG BUSES.	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CURRENTLY THE PROJECT IS IN CONSTRUCTION PHASE.
WHITTIER	LA0G257	WHITTIER GREENERY TRAILHEAD PARK. EXTENSION OF WHITTIER GREENERY TRAIL FROM MILLS AVENUE TO 300 FEET EAST OF MILLS AVENUE IN CONJUNCTION WITH CONSTRUCTION OF NEW TRAILHEAD PARK AND 20 SPACE PARK & RIDE PARKING LOT.	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE.
VARIOUS AGENCIES	LA0G772	VALLEY VILLAGE - PURCHASE OF 7 SERVICE EXPANSION SMALL BUS 8 AP, 2 WC...	12/1/2015	12/1/2015	12/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT

Table 77.2 Los Angeles County Completed/Corrected TCMS

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Project Status
GLENDALE	LAF3714	ARROYO VERDUGO COMMUTE MANAGER SYSTEM. DEVELOPMENT OF A CUSTOMIZED TDM-SPECIFIC GEOGRAPHICALLY BASED WEBSITE.	12/30/2017	12/30/2017	WEBSITE IS NOT TCM
GLENDALE	LA0G202	TRAFFIC LIGHT SYNCHRONIZATION ALONG THREE MAJOR ARTERIAL , GLENDALE AVE, BRAND BLVD.,SAN FERNANDO RD., AND COLORADO ST.	12/1/2014	12/1/2014	COMPLETE
GLENDALE	LA0G406	FAIRMONT AVE. PARK-N-RIDE FACILITY (83 PARKING SPACES) TO SERVE COMMUTERS USING SR-134, I-5. THE LOCATION OF THE PARK-N-RIDE IS FAIRMONT AVENUE AND SAN FERNANDO RD, ON THE SOUTH SIDE OF FAIRMONT AVENUE BETWEEN SAN FERNANDO ROAD AND SR-134 WESTBOUND FREEWAY RAMPS. THE WORK INCLUDES EARTHWORK, DRAINAGE, AND PLACEMENT OF AC, LIGHTING, LANDSCAPING, FENCING, AND SIGNAGE WORK. THE WORK ALSO INCLUDES INSTALLING A SIDEWALK FOR PEDESTRIAN ACCESS FROM SAN FERNANDO ROAD.	12/30/2012	12/30/2014	COMPLETE
HAWTHORNE	LAF3109	HAWTHORNE BOULEVARD MOBILITY IMPROVEMENT PROJECT. IMPROVE CIRCULATION, INCREASING EFFICIENCY FOR VEHICULAR, PEDESTRIAN, PUBLIC TRANSIT AND BICYCLE MOVEMENT ON HAWTHORNE BLVD.. THE PROJECT LIMIT IS FROM EL SEGUNDO BOULEVARD TO THE NORTH AND TO THE SOUTHERN CITY LIMIT AT ROSECRANS AVENUE. FROM I-105/120 STREET TO EL SEGUNDO BOULEVARD.	1/15/2015	1/15/2015	COMPLETE
LONG BEACH	LAF1341	OCEAN BL. SIGNAL SYNCHRONIZATION AND ENHANCEMENT PROJECT. INSTALLATION OF NEW SIGNALS, INTERCONNECT, PEDESTRIAN SAFETY ENHANCEMENTS, ADA ACCESS RAMPS, TRANSIT INFORMATION SYSTEMS, AND TRAFFIC SIGNAL UPGRADES AND RECONSTRUCTION. OCEAN BL,ALAMITOS TO LIVINGSTON	10/1/2013	12/31/2014	COMPLETE
LOS ANGELES, CITY OF	LAF1704	DOWNTOWN L.A. ALTERNATIVE GREEN TRANSIT MODES TRIAL PROGRAM. OFFER SHARED RIDE-BICYCLE AND NEIGHBORHOOD ELECTRIC VEHICLE TRANSIT SERVICES TO LA CITY HALL AS AN ALTERNATIVE TO OVERCROWDED DASH SERVICE	6/27/2016	6/27/2016	DEMONSTRATION PROJECT IS NOT TCM
LOS ANGELES, CITY OF	LAF1725	WIFI ON THE GOLD LINE. WIFI INTERNET INSTALLED ON GOLD LINE TRAINS, POLES & STATIONS, EASTSIDE EXTENSION, CHINATOWN & LITTLE TOKYO/ARTS DISTRICTS.	12/31/2014	12/31/2014	WIFI INTERNET IS NOT TCM
RANCHO PALOS VERDES	LAF1506	BIKE COMPATIBLE RDWY SAFETY AND LINKAGE ON PALOS VERDES DR. THE PROJECT WILL HAVE A CLASS II BIKE LANE ON BOTH SIDES OF PALOS VERDES DRIVE SOUTH, WITH AN UNPAVED SHOULDER FOR EMERGENCY USE. (DISTANCE 1.3 MILES)	2014	10/9/2014	THIS PROJECT HAS BEEN REPLACED WITH LA0G257 VIA 2015 FTIP AMENDMENT #15-09
SANTA CLARITA	LAF5502	DESIGN AND CONSTRUCT CLASS II BIKE LANES ON TOURNEY ROAD FROM VALENCIA TO MAGIC MOUNTAIN PKWY (1.1 MILES), AND CLASS III BIKE ROUTES ON ORCHARD VILLAGE RD FROM MCBEAN PKWY TO LYONS (1.35 MILES). THE PROJECT WILL INCLUDE BIKE DETECTION AT ALL INTERSECTIONS AND BICYCLE WAYFINDING AND SIGNAGE.	12/1/2017	12/1/2017	COMPLETE
SANTA MONICA	LAF1728	CITY OF SANTA MONICA ITS IMPROVEMENTS. SANTA MONICA REAL TIME BEACH PARKING SIGNS. THIS PROJECT WILL MAKE INFORMATION REGARDING BEACH PARKING AVAILABLE TO MOTORISTS DESTINED FOR SANTA MONICA BEACH PARKING LOTS.	6/30/2013	6/30/2014	PROJECT FOR RECREATIONAL PURPOSES IS NOT TCM
TORRANCE	LAF3312	CITY OF TORRANCE ITS & TRAFFIC IMPROVEMENTS. IMPLEMENT ITS COMPONENTS AT LOCATIONS NOT COVERED BY '95 METRO CFP SOUTH BAY SIGNAL SYNCH PROJECT, TO PROVIDE EFFECTIVE CITYWIDE AND MULTI-JURISDICTIONAL TRAFFIC MANAGEMENT. *CRENSHAW BLVD BETWEEN PCH AND THE MOST SOUTH CITY CONTROLLED SIGNALIZED INTERSECTION.(APROX. 3 SIGNALS)	12/31/2016	12/31/2016	COMPLETE

TABLE 78 ORANGE COUNTY

Table 78.1 Orange County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
ANAHEIM	ORA112622	BROOKHURST ST (600' NORTH OF I-5 TO SR-91). ADD ONE LANE EACH DIRECTION. FROM 4 TO 6 LANE FACILITY WITH RAISED MEDIAN. THE PROJECT WILL INCLUDE SIX-FOOT-WIDE CLASS II BIKEWAYS, TEN-FOOT WIDE PARKWAYS/SIDEWALKS AND CONCRETE SOUNDWALLS ALONG THE EAST AND/OR WEST SIDES OF BROOKHURST ST. CONSISTENT WITH THE 2012 RTP	6/30/2017	6/30/2017	6/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CURRENTLY IN ROW.
BREA	ORA150103	THE TRACKS AT BREA SEGMENTS 2 & 3. CONSTRUCTION CLASS I BICYCLE/PEDESTRIAN TRAIL ALONG 1.15 MILE LONG SECTION ON THE TRACKS AT BREA. SEGMENT 2 FROM BREA FLOOD CONTROL CHANNEL TO NORTH BREA BOULEVARD. SEGMENT 3 FROM NORTH BREA BOULEVARD TO STATE COLLEGE BOULEVARD.	7/30/2017	7/30/2017	7/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
CYPRESS	ORA131706	CERRITOS AVENUE BIKE CORRIDOR IMPROVEMENTS (FROM DENNI STREET TO WALKER STREET) - CONSTRUCT AN OFF-ROAD BIKE PATH TO REPLACE AN EXISTING ON-STREET BIKE ROUTE TO IMPROVE SAFETY AND CONNECTIVITY. CLASS 1 FOR 1 MILE. TOLL CREDITS: FY 15/16 CMAQ CON FOR $9,405, FY 15/16 ATP-MPO CON FOR $72,490.	7/1/2017	7/1/2017	7/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
LA HABRA	ORA113011	LA HABRA UNION PACIFIC RAILROAD BIKEWAY. ENG FOR UNION PACIFIC RAILROAD RIGHT-OF-WAY BETWEEN LA HABRA WEST CITY LIMITS AND LA HABRA EAST CITY LIMITS. ROW FOR LA HABRA WEST CITY LIMITS TO BEACH BOULEVARD. TOLL CREDIT MATCH: FY15/16 CMAQ CON FOR $10,552, FY15/16 ATP-MPO CON FOR $81,235.	7/1/2025	7/1/2025	7/1/2025	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA085004	ANAHEIM CANYON STATION PROJECT WILL ADD DOUBLE TRACK AND ANOTHER PLATFORM AS WELL AS EXTEND THE EXISTING PLATFORM TO BE IN CONFORMANCE WITH THE METROLINK STANDARDS FOR PASSENGER PLATFORM LENGTH. (PROJECT UTILIZES $1,812,260 IN TOLL CREDIT IN FY15/16 FOR CON, & $400,200 IN STATEWIDE TOLL CREDIT FOR FTA 5337 FY14/15 FOR CON)	6/1/2014	6/1/2018	7/23/2020	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO THE SPECIFIC LANGUAGE REQUIRED IN THE PROJECT DEFINITION REPORT BY THE CITY OF ANAHEIM. OCTA STAFF WORKED WITH THE CITY TO ADD REQUIRED LANGUAGE. PA/ED CONSULTANT PROCUREMENT. FINAL SCOPE OF WORK WAS JUST APPROVED AND THE 2020 DATE IS BASED ON THAT.

Table 78.1 Orange County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111001	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF PACIFIC COAST HIGHWAY TO SAN JUAN CREEK ROAD. PPNO:2531F	11/1/2016	11/1/2016	12/13/16	OBSTACLES ARE BEING OVERCOME. CONSTRUCTION STARTED 2/13/14 AND IS 50% COMPLETE
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111002	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF AVENIDA VISTA HERMOSA TO SOUTH OF PACIFIC COAST HIGHWAY. PPNO 2531E	10/1/2016	10/1/2016	10/26/16	OBSTACLES ARE BEING OVERCOME. CONSTRUCTION STARTED 8/27/14 AND IS 17% COMPLETE
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA65002	RIDESHARE SERVICES RIDEGUIDE, DATABASE, CUSTOMER INFO, AND MARKETING (ORANGE COUNTY PORTION).	2010	12/30/2020	12/30/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA990929	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF AVENIDA PICO TO SOUTH OF AVENIDA VISTA HERMOSA AND RECONFIGURE AVENIDA PICO INTERCHANGE. PPNO:2531D (UTILIZE TOLL CREDIT MATCH FOR IMD AND STIP)	7/1/2017	7/1/2017	11/1/17	OBSTACLES ARE BEING OVERCOME. CONSTRUCTION STARTED 2/17/15 AND IS 7% COMPLETE
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111209	LAGUNA NIGUEL TO SAN JUAN CAPISTRANO PASSING SIDING - ADD 1.8 MILES OF NEW RAILROAD TRACK ADJACENT TO THE EXISTING MAIN TRACK. MP 193.9 - MP 195.7 (PROJECT WILL UTILIZE TRANSIT DEVELOPMENT CREDITS MATCH - CMAQ FY13/14 FOR $438 AND FY14/15 FOR $1,832)	8/31/2018	8/31/2018	1/21/2020	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO PROCUREMENT PROCESS TOOK LONGER THAN PLANNED. THE ENGINEERING PHASE IS ANTICIPATED TO BE COMPLETED IN MAY 2016. ADVERTISING FOR CONSTRUCTION IS ANTICIPATED FOR AUGUST 2016.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111801	I-5 (ALICIA PARKWAY TO EL TORO ROAD) SEGMENT 3 - THE PROJECT WILL ADD ONE GENERAL PURPOSE LANE ON THE I-5 IN EACH DIRECTION BETWEEN ALICIA PARKWAY AND EL TORO ROAD (APPROXIMATELY 1.7 MILES), EXTEND THE 2ND HOV LANE IN BOTH DIRECTIONS AND ADD AUXILIARY LANES WHERE NEEDED.	6/30/2023	6/30/2023	6/30/2023	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. BEGIN DESIGN 4/1/15

Table 78.1 Orange County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA030612	PLACENTIA TRANSIT STATION - E OF SR-57 AND MELROSE ST AND N OF CROWTHER AVE. CONSTRUCT NEW METROLINK STATION AND RAIL SIDEING PPNO 9514	4/30/2016	4/30/2016	6/30/2018	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO PENDING BNSF AGREEMENT FOR CONSTRUCTION. OCTA HAS CONTINUED TO WORK WITH ALL PARTICIPATING MEMBER AGENCIES TO PUT THE AGREEMENT IN PLACE.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA110304	GOLDENWEST TRANSPORTATION CENTER. CONSTRUCT A SURFACE PARKING LOT (300 SPACES)	4/30/2016	4/30/2016	4/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. COMPLETING PAVING THE PARKING LOT AND PENDING ELECTRICAL SERVICE.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111210	I-5 FROM SR 55 TO SR 57 - ADD 1 HOV LANE EACH DIRECTION	12/1/2018	12/1/2018	12/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. FINAL PR/ED 4/1/15
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA112702	RIDESHARE VANPOOL PROGRAM - CAPITAL LEASE COST FY12/13 - FY16/17. (USE TOLL CREDITS FOR $1.338 IN FY12/13)	1/31/2017	1/31/2017	1/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
SANTA ANA	ORA131709	NEWHOPE-CIVIC CENTER-GRAND CLASS II BIKE LANES PROJECT - CLASS II 0.45 MILE ON NEWHOPE STREET FROM FIRST STREET TO MCFADDEN AVENUE. CLASS II 0.87 MILE SEGMENT ON CIVIC CENTER DRIVE FROM BRISTOL TO BROADWAY. CLASS II 1.25 MILE SEGMENT ON GRAND AVENUE FROM 21ST STREET TO FAIRHAVEN AVENUE. TOLL CREDITS FY 14/15 CON FOR $31,349.	7/1/2017	7/1/2017	7/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. UNDER CONSTRUCTION.
SANTA ANA	ORA150106	DEVELOP, DESIGN, AND CONSTRUCT BISHOP-PACIFIC-SHELTON BIKE BOULEVARDS. CONSTRUCT CLASS III FACILITIES ALONG BISHOP STREET, PACIFIC AVENUE, AND SHELTON STREET. DEVELOPMENT, DESIGN, AND CONSTRUCTION. INCLUDES BULB OUTS, TRAFFIC CIRCLES, AND TRAFFIC TURNING RESTRICTIONS AND/OR SPEED BUMPS. IMPROVEMENTS ALONG 2.268 MILES OF BIKEWAYS. TOLL CREDITS FOR FY 14/15 PA&ED/PS&E FOR $8,029, FY 15/16 CON FOR $100,936.	12/31/2017	12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. CTC ALLOCATED PA/ED & PS&E.

Table 78.1 Orange County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
TCA	10254	SAN JOAQUIN HILLS TRANSPORTATION CORRIDOR (SJHTC – SR 73). 15 MI TOLL RD BETWEEN 1-5 IN SAN JUAN CAPISTRANO & RTE 73 IN IRVINE, CONSISTENT WITH SCAG/ TCA MOU 4/5/01. EXISTING 3 M/F EA DIR. 1 ADDITIONAL M/F EA DIR, PLUS CLIMBING & AUX LANES BY 2020.	2015/2008	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
TCA	ORA050	EASTERN TRANSPORTATION CORRIDOR (ETC- SR 241/261/133) 26.4 MI TOLL ROAD CONNECTS SR 91 TO I-5 VIA SR 261 AND SR 133, CONSISTENT WITH SCAG/TCA MOU 4/05/01. EXISTING 2 M/F EA DIR. 2 ADDITIONAL M/F IN EA DIR, PLUS CLIMBING AND AUX LANES BY 2020.	2015/2010	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
TCA	ORA051	FOOTHILL TRANSPORTATION CORRIDOR-NORTH (FTC-N - SR 241). 12.7 MI TOLL ROAD BETWEEN OSO PKWY AND ETC, CONSISTENT WITH SCAG/TCA MOU 4/05/01. EXISTING 2 M/F IN EA DIR. 2 ADDITIONAL M/F, PLS CLIMBING & AUX LANES BY 2020.	2015/2010	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
TCA	ORA052	FOOTHILL TRANSPORTATION CORRIDOR-SOUTH (FTC-S - SR 241). 10.3 MI TOLL ROAD BETWEEN SAN DIEGO COUNTY LINE AND OSO PKWY, CONSISTENT WITH SCAG/TCA MOU 4/05/01. 2 M/F EA DIR FROM OSO PKWY TO COW CAMP RD BY 2017. 2 M/F EA DIR FROM COW CAMP RD TO SAN DIEGO CO LINE BY 2021. 1 ADDITIONAL M/F EA DIR PLS CLIMBING & AUX LANES BY 2030.	2015/2010	2021/2030 SAME AS THE ORIGINAL DATE	2021/2030	UNDER SUBSTITUTION PROCESS
VARIOUS AGENCIES	ORA150602	ABRAZAR - 2 MEDIUM EXPANSION BUSES, 7 EXPANSION MINIVANS, AND 6 SMALL EXPANSION BUSES. (TRANSIT DEVELOPMENT CREDITS MATCH – FTA 5310 FY14/15 FOR $163)	4/30/2017	4/30/2017	4/30/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

Table 78.2 Orange County Completed/Corrected TCMS

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Project Status
ANAHEIM	ORA120318	ANAHEIM REGIONAL TRANS INTERMODAL CENTER (ARTIC) PHASE I - INCLUDE EXPAND OF EXIST AMTRAK/METROLINK STATION AT ANA STAD TO PROVIDE ACCESS W/ TRANS SVC. TOLL CREDITS FTA 5337 FY 12/13 FOR $1,600. TOLL CREDITS FOR FTA 5309C FY12/13 FOR $1,500. TOLL CREDITS FOR CMAQ FY 13/14 FOR $2,747.	6/30/2018	6/30/2018	COMPLETE
CALTRANS	ORA000193	HOV CONNECTORS FROM SR-22 TO I-405, BETWEEN SEAL BEACH BLVD. (I-405 PM 022.558) AND VALLEY VIEW ST. (SR-22 PM R000.917), WITH A SECOND HOV LANE IN EACH DIRECTION ON I-405 BETWEEN THE TWO DIRECT CONNECTORS. TOLL CREDIT MATCH FOR CMAQ.	2010	10/1/2014	COMPLETE
CALTRANS	ORA000194	HOV CONNECTORS FROM I-405 TO I-605, BETWEEN KATELLA AVE. (I-605 PM R001.104) AND SEAL BEACH BLVD. (I-405 PM 022.643), WITH A SECOND HOV LANE IN EACH DIRECTION ON I-405 BETWEEN THE TWO DIRECT CONNECTORS. TOLL CREDITS FOR CMAQ.	2010	12/31/2014	COMPLETE
NEWPORT BEACH	ORA113013	EASTBLUFF DRIVE/FORD ROAD CLASS II BIKE LANE IMPROVEMENT WILL ADD A 1.09 MILE STRIPED BIKE LANE ALONG THE SELECTED PORTION OF EASTBLUFF DRIVE AND CONTINUE IT PAST JAMBOREE ROAD ONTO FORD ROAD.	12/1/2016	12/1/2016	COMPLETE
ORANGE COUNTY	ORA113006	COYOTE CREEK CLASS I BIKEWAY. MALVERN AVENUE/LA MIRADA BOULEVARD TO HILLSBOROUGH DRIVE FOR A TOTAL LENGTH OF APPROXIMATELY 1.95 MILES.	9/25/2016	9/25/2016	COMPLETE
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA112005	IMPLEMENT BIKE STATIONS AND BIKE SHARING PROGRAM IN ORANGE COUNTY	10/30/2015	10/30/2015	COMPLETE
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA030605	I-405 FROM SR-73 TO I-605 ADD 1 MF LANE IN EACH DIRECTION, AND ADDITIONAL CAPITAL IMPROVEMENTS. COMBINED WITH ORA045, ORA151, ORA100507 AND ORA120310	9/30/2022	9/30/2022	HIGHWAY COMPACITY ENHANCEMENT PROJECT IS NOT TCM.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA081619	STATION REHABILITATION AND REPAIR IMPROVMENTS FOR ORANGE COUNTY METROLINK STATIONS	5/11/2015	5/11/2015	STATION REHABILITATION AND REPAIR IMPROVMENTS PROGRAM IS NOT TCM.
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA020820	METROLINK SERVICE TRACK EXPANSION AND GRADE CROSSING IMPROVEMENTS. PART OF A PLAN TO IMPLEMENT 30 MINUTE HEADWAYS COULD INCLUDE TURNBACK FACILITIES, LAYOVER FACILITIES, AND OR RELIABILITY IMPROVEMENTS FOR HIGH FREQUENCY METROLINK SERVICE OPERATIONS BETWEEN FULLERTON AND LAGUNA NIGUEL/MISSION VIEJO	1/1/2015	1/1/2015	COMPLETE
VARIOUS AGENCIES	ORA990906	GROUPED PROJECTS FOR BICYCLE AND PEDESTRIAN FACILITIES FUNDED WITH TE - SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 AND TABLE 3 CATEGORIES - BICYCLE AND PEDESTRIAN FACILITIES (BOTH MOTORIZED AND NON-MOTORIZED)	12/30/2014	12/30/2014	COMPLETE

TABLE 79 RIVERSIDE COUNTY

Table 79.1 Riverside County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
CITY OF EASTVALE	RIV151201	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF EASTVALE - TRAFFIC SYCHRONIZATION OF SIX TRAFFIC SIGNALIZED INTERSECTIONS ALONG HAMNER AVENUE FROM SCHLEISMAN ROAD TO EASTVALE GATEWAY	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. RFA FOR CONSTRUCTION SUBMITTED TO CALTRANS ON 6/15/2015.
MORENO VALLEY	RIV071240	IN THE CITY OF MORENO VALLEY - EAST BOUND CACTUS AVE WIDENING BETWEEN VETERANS WAY & HEACOCK: WIDENING OF EAST BOUND CACTUS AVE FROM 2 TO 3 LANES, INCLUDING TRAFFIC SIGNAL MODIFICATIONS WITHIN THE PROJECT REACH, CHANNELIZATION, AND SIGNAL INTERCONNECT SYSTEM (6 SIGNALS).	6/1/2013	2/28/2015	11/30/2015	OBSTACLES ARE BEING OVERCOME. PROJECT UNDER CONSTRUCTION.
MORENO VALLEY	RIV151202	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF MORENO VALLEY - DESIGN AND CONSTRUCTION OF ITS, INCLUDING AN ETHERNET FIBER-OPTIC BACKBONE SYSTEM, CCTV CAMERAS AT 26 KEY INTERSECTIONS, AND NEW TRAFFIC SIGNAL CONTROLLERS AT EXISTING 43 SIGNALIZED INTERSECTIONS (CMAQ PM 2.5 BENEFITS .21 KG/DAY)	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN ENVIRONMENTAL.
PERRIS	RIV140850	IN WESTERN RIVERSIDE CO. IN THE CITY OF PERRIS – MURRIETA RD PED IMPROVEMENTS: INSTALL 1.0 MILE OF SIDEWALK GAPS, CURB & GUTTER ON W-SIDE OF MURRIETA RD W/ CLASS II BIKE LANES IN BOTH DIRECTIONS B/W SAN JACINTO AVE & 1000' NORTH OF NUEVO RD; 10' WIDE BRIDGE OVER METZ FLOOD CONTROL CHANNEL; TRAFFIC SIGNAL AT MURRIETA & NUEVO RDS; NEW SIDEWALK ON DALE ST B/W WILSON & MURRIETA RD. TC TO MATCH ATP	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS IN ENVIRONMENTAL /DESIGN.
RIVERSIDE COUNTY	RIV140838	IN WESTERN RIVERSIDE CO. FOR THE COUNTY OF RIVERSIDE IN MEAD VALLEY-CLARK ST S/W & INTERSECTION SAFETY IMPROVEMENTS: ON EASTSIDE OF CLARK ST B/W RIDER ST AND CAJALCO RD, CONSTRUCT APPROX. 2,000 L.F. OF CONCRETE SIDEWALK, CURB & GUTTER, PAVEMENT IMPROVEMENTS, NEW CURB RAMPS MEETING LATEST ADA REQS, DRIVEWAY APPROACHES, SIGNS, MARKINGS, & OTHER INCIDENTAL ITEMS TO IMPROVE PEDESTRIAN SAFETY.	12/31/2021	12/31/2021	12/31/2021	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN ENVIRONMENTAL WITH ATP FUNDS FOR PA&ED ALLOCATED AT THE 3/26/2015 CTC MEETING.

Table 79.1 Riverside County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
RIVERSIDE COUNTY	RIV151210	IN WESTERN RIVERSIDE COUNTY FOR THE COUNTY OF RIVERSIDE - CONSTRUCTION OF A 7.2 MILE MULTI-MODAL URBAN TRAIL ALONG THE SALT CREEK FLOOD CONTROL CHANNEL BETWEEN THE COMMUNITIES OF HEMET, MENIFEE AND CANYON LAKE. THE MULTI-MODAL TRAIL WILL INCLUDE A 16 FT WIDE CLASS I BIKEWAY AND 12 FT WIDE DECOMPOSED GRANITE PEDESTRIAL TRAIL	12/31/2018	12/31/2018	12/31/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV071250	ON SR-91/I-15: SR91 - CONST 1 MF LN (SR71-I15)/1 AUX LN VAR LOCS(SR241-PIERCE) (OC PM 14.43-18.91), CD SYSTEM (2/3/4 LNS MAIN-I15), 1 TOLL EXPR LN (TEL) & CONVERT HOV TO TEL EA DIR (OC-I15); I15- CONST TEL MED DIR CONNCT NB15 TO WB91 AND EB91 TO SB15, 1 TEL EA DIR SR91 DIR CONNCT-ONTARIO IC (I15 PM 37.56-42.94).	7/31/2017	9/4/2017	9/4/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. AS OF JUNE 2015, THE DESIGN BUILD CONTRACT HAS ACHIEVED 29% PROJECT COMPLETION.
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV111207	IN WESTERN RIVERSIDE COUNTY - CONTINUE THE IMPLEMENTATION OF PARK-N-RIDE FACILITIES THROUGH PROPERTY LEASES (VARIOUS LOCATIONS THROUGHOUT THE WESTERN COUNTY).	12/30/2018	12/30/2018	12/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ON-GOING RCTC PROGRAM AS PART OF THE COMMISSION'S COMMUTER ASSISTANCE ACTIVITIES FOR WESTERN RIVERSIDE COUNTY.
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV520109	RECONSTRUCT & UPGRADE SAN JACINTO BRANCH LINE FOR RAIL PASSENGER SERVICE (RIVERSIDE TO PERRIS) (PERRIS VALLEY LINE) (FY 07 5307) (UZA: RIV-SAN).	2012	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN CONSTRUCTION
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV520111	REGIONAL RIDESHARE - CONTINUING PROGRAM ($115.73 IN FY12/13 AND $193.96 IN FY 13/14 IN TOLL CREDITS UTILIZED TO MATCH CMAQ IN CONS).	2009	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ON-GOING RCTC PROGRAM AS PART OF THE COMMISSION'S COMMUTER ASSISTANCE ACTIVITIES FOR WESTERN RIVERSIDE COUNTY.

Table 79.1 Riverside County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV071267	I-15 IN RIVERSIDE COUNTY: CONSTRUCT 4 TOLL EXPR LNS (TEL) (2 TE EA DIR) FROM SR60 (PM 51.4) TO HIDDEN VALLEY PKWY (PM 42.9) AND CONS 2 TE LNS (1 TE EA DIR) FROM HIDDEN VALLEY PKWY (PM 42.9) TO CAJALCO RD (PM 36.8). ADVANCE SIGNAGE WILL BE INSTALLED A THE SOUTH END BETWEEN PM 34.7 TO PM 36.8 (CAJALCO RD) AND AT THE NORTH END BETWEEN PM 51.4 (SR60) TO PM 1.3 IN SAN BERNARDINO COUNTY.	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. NEPA CLEARANCE (MND/FONSI) ANTICIPATED APPROVAL IN EARLY SPRING 2016. SUBSEQUENT TO NEPA APPROVAL, RCTC WILL PROCEED WITH DESIGN BUILD PROCUREMENT; START OF CONSTRUCTION IN SPRING 2017 AND COMPLETION IN FALL 2020.
RIVERSIDE TRANSIT AGENCY	RIV041030	IN WESTERN RIVERSIDE COUNTY FOR RTA IN THE CITY OF HEMET: CONSTRUCT NEW HEMET TRANSIT FACILITY ON KIRBY ST BETWEEN DEVONSHIRE AVE AND W. LATHAM AVE. THE IMPROVEMENTS WILL ACCOMODATE NINE BUS ROUTES AND WILL INCLUDE PASSENGER SHELTERS AND ITS ELEMENTS. (5309C FY04 + 05 EARMARKS)	6/30/2010	12/31/2015		UNDERGOING TCM SUBSTITUTION.
RIVERSIDE TRANSIT AGENCY	RIV050553	IN TEMECULA – CONSTRUCT NEW TEMECULA TRANSIT CENTER AT 27199 JEFFERSON AVE. (SW OF JEFFERSON AVE & SE OF CHERRY ST) (04, 05, 06, 07, E-2006-091, E- 2007-0131, & 2008-BUSP-0131, SAFETEA-LU).	12/30/2010	12/31/2015		UNDERGOING TCM SUBSTITUTION.
RIVERSIDE TRANSIT AGENCY	RIV151211	IN WESTERN RIVERSIDE COUNTY FOR RTA: RAPIDLINK SERVICE ALONG THE RTE 1 SERVICE AREA DURING WEEKDAY PEAK COMMUTE PERIODS ALONG UNIVERSITY AND MAGNOLIA AVES (RIVERSIDE/CORONA CORRIDOR) BETWEEN UCR AND CORONA. THIS INCLUDES PURCHASE OF 14 NEW BUSES (40 FT) AND OPERATING ASSISTANCE FOR THE FIRST THREE TO FIVE YEARS OF SERVICE. (CMAQ - $9,212K) (BENEFITS FOR PM 2.5 = .239 KG/DAY; PM 10 = .258 KG/DAY)	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. RTA WILL BEGIN PROCURING REVENUE SERVICE VEHICLES FOR THE IMPLEMENTATION OF RAPID LINK 1 - SERVICE SCHEDULED TO START IN JULY 1, 2016.
RIVERSIDE, CITY OF	RIV140841	IN WESTERN RIVERSIDE COUNTY FOR CITY OF RIVERSIDE-IOWA AVE & MLK BLVD BIKE IMPROVEMENTS: CONSTRUCT 0.8 MI 10 FT WIDE TWO DIR MULTI-USE PATH ON N.SIDE OF MLK BLVD B/W CANYON CREST DR & CHICAGO AVE & WIDENING IOWA AVE B/W MLK BLVD & EVERTON PL INCLUDES GRADING, ASPHALT PAVING, SIGNS, & RESTRIPING & INSTALL 6 FT CLASS II BIKE LNS FOR 0.8 MI WITH 2 FT BUFFERS	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.

Table 79.1 Riverside County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
RIVERSIDE, CITY OF	RIV140843	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE-WELLS/ARLANZA SIDEWALK IMPROVEMENTS: INSTALL ADA RAMPS, DRIVEWAY APPROACHES & 32,730 SQ FT OF SIDEWALK ON ONE SIDE OF FIVE STREETS (CHALLEN AVE, IVANHOE AVE, KENT AVE, RUTLAND AVE, BABB AVE) SURROUNDING WELLS MIDDLE SCHOOL AND ARLANZA ELEMENTARY SCHOOL. TC USED TO MATCH ATP FUNDS	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.
RIVERSIDE, CITY OF	RIV140844	IN WESTERN RIVERSIDE CO. IN THE CITY OF RIVERSIDE - NORTE VISTA SIDEWALK IMPROVEMENTS: INSTALL ADA RAMPS, DRIVEWAY APPROACHES & 94,200 SQ.FT. OF SIDEWALK ON ONE SIDE OF FOUR STREETS (GAYLORD ST, JONES AVE, CHADBOURNE AVE, BUSHNELL AVE) NEAR NORTE VISTA HIGH SCHOOL, ROSEMARY KENNEDY ELEMENTARY SCHOOL, AND TWINHILL ELEMENTARY SCHOOL. TC USED TO MATCH ATP	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.
RIVERSIDE, CITY OF	RIV140852	IN WESTERN RIVERSIDE CO. IN THE CITY OF RIVERSIDE – DOWNTOWN & ADJOINING AREAS BICYCLE AND PED IMPROVEMENTS: 17 MILES OF BIKE LANES, 2,500 FT. OF CONNECTING SIDEWALKS, BIKE STATION AT METROLINK, CONNECTIVITY MAP KIOSKS, TWO NEW HAWK SIGNALS, BIKE STAGING AREA, BIKE SHARE TERMINAL, BIKE CORRALS, BIKE BLVD, PEDESTRIAN SIGNALS, WALKING PATH, ALL-WAY STOP CROSSWALK & NEW SIDEWALK.	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.
RIVERSIDE, CITY OF	RIV151205	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - INSTALL FIBER-OPTIC SIGNAL INTERCONNECT IMPROVEMENTS ON MARKET ST/ MAGNOLIA AVE FROM FIRST ST TO BUCHANAN ST AND INSTALL MISSING CONDUITS ON MAGNOLIA AVE FROM LA SIERRA AVE TO PIERCE ST UPDATING 49 SIGNALIZED INTERSECTIONS	12/31/2016	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.
RIVERSIDE, CITY OF	RIV151209	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - INSTALL UP TO FOUR BICYCLE STATIONS AND PROVIDE FORTY BICYCLES, TEN AT EACH STATION, TO IMPLEMENT A BIKE SHARE PROGRAM IN THE VICINITY OF DOWNTOWN RIVERSIDE, RIVERSIDE METROLINK STATION AND UNIVERSITY OF CALIFORNIA IN RIVERSIDE.	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN PA&ED.

Table 79.1 Riverside County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
RIVERSIDE, CITY OF	RIV151215	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - CONSTRUCTION OF SIDEWALK ON ONE SIDE OF BRUCE STREET FROM ADAIR AVE TO LAKE AVE. IMPROVEMENTS INCLUDE A TOTAL OF 2,100 LF OF NEW SIDEWALK	12/31/2015	12/31/2015	10/31/2016	OBSTACLES ARE BEING OVERCOME. MINOR PROJECT DELAYS ASSOCIATED WITH BIOLOGICAL AND CULTURAL STUDIES REQUIRED BY CALTRANS ENVIRONMENTAL.
SAN JACINTO	RIV140856	IN WESTERN RIVERSIDE CO. IN THE CITY OF SAN JACINTO – SAFE & ACTIVE SAN JACINTO SRTS: INFRASTRUCTURE INCLUDES 33,275 SQ. FT. OF NEW SIDEWALK, 5,215 SQ. FT. OF EXISTING SIDEWALK UPGRADES, 52,800 SQ. FT. OF BIKE TRAILS WITHIN WALKING DISTANCE TO SCHOOLS; NON-INFRASTRUCTURE INCLUDES PED/BIKE SAFETY EDUCAITON, SRTS WORKSHOPS, DEVELOPMENT OF SRTS PLANS FOR EACH SCHOOL, AND OUTREACH.	12/31/2020	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. THE PROJECT IS CURRENTLY IN DESIGN.
TEMECULA	RIV62029	IN SOUTHWEST RIVERSIDE COUNTY IN TEMECULA ON TEMECULA PKWY (FORMERLY SR79) AT LA PAZ ST: ACQUIRE LAND, DESIGN AND CONSTRUCT PARK-AND-RIDE LOT - 157 SPACES. OTHER IMPROVEMENTS INCLUDE THE CONSTRUCTION OF 10 BICYCLE LOCKERS, PASSENGER LOAD/UNLOAD ZONE AND ADA ACCESSIBLE PARKING.	2004/2007	12/31/2015	9/1/2016	OBSTACLES ARE BEING OVERCOME. CEQA APPROVAL PREVIOUSLY SECURED. CMAQ FUNDS APPROVED BY RCTC TRIGGERED NEPA APPROVAL (IN PROCESS). DESIGN COMPLETE. RIGHT-OF-WAY CERTIFICATION SUBMITTED. CONSTRUCTION PENDING NEPA APPROVAL AND OBLIGATION OF FUNDS.
WILDOMAR	RIV151213	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF WILDOMAR - WIDENING OF GRAND AVE (CLINTON KEITH RD TO DAVID BROWN MIDDLE SCHOOL) TO INCLUDE A CLASS II BIKE LANE AND MINIMAL WORK TO INCORPORATE CLASS II/III BIKE LANES ON CLINTON KEITH RD FROM GRAND AVE TO GEORGE AVE. IMPROVEMENTS INCLUDE A TOTAL OF 7,300 LF OF NEW BIKE LANES	12/31/2015	12/31/2015	8/31/2016	OBSTACLES ARE BEING OVERCOME. MINOR DELAY IS DUE TO THE COMBINATION OF THE TWO PROJECTS. PROJECT SPONSOR IS EXPLORING THE POSSIBILITY OF COMBINING RIV151213 AND RIV151214 INTO ONE PROJECT.

Table 79.1 Riverside County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
WILDOMAR	RIV151214	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF WILDOMAR - WIDENING OF GRAND AVE (CORYDON RD TO DAVID BROWN MIDDLE SCHOOL) TO INCLUDE A CLASS II BIKE LANES. IMPROVEMENTS INCLUDE A TOTAL OF 12,000 LF OF NEW BIKE LANES	12/31/2016	12/31/2016	8/31/2016	OBSTACLES ARE BEING OVERCOME. MINOR DELAY IS DUE TO THE COMBINATION OF THE TWO PROJECTS. PROJECT SPONSOR IS EXPLORING THE POSSIBILITY OF COMBINING RIV151213 AND RIV151214 INTO ONE PROJECT.

Table 79.2 Riverside County Completed/Corrected TCMS

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2106 RTP/SCS Project
RIVERSIDE TRANSIT AGENCY	RIV090609	IN WESTERN RIVERSIDE COUNTY FOR RTA: INSTALL ADVANCE TRAVELER INFORMATION SYSTEMS (ATIS) ON VARIOUS FIXED ROUTE VEHICLES AND INSTALLATION OF ELECTRONIC MESSAGE SIGNS AT APPROX. 60 BUS STOPS (FY 'S 05, 07, 08, 09, AND 10 – 5309).	2011	12/30/2015	COMPLETE

TABLE 80 SAN BERNARDINO COUNTY

Table 80.1 San Bernardino County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2015 RTP/SCS Completion Date	2016 RTP/SCS Project Status
OMNITRANS	20150109	PEDESTRIAN & BICYCLE ACCESS IMPROVEMENTS WITHIN 1/2 MILE OF RAPID TRANSIT STATIONS, INCLUDING SIDEWALK AND CURB RAMP REPLACEMENT & BIKE PARKING AT STATIONS (TERMINI AT POMONA DOWNTOWN METROLINK STATION & KAISER MEDICAL CENTER FONTANA, FOLLOWING HOLT AVE/BLVD, ARCHIBALD AVE, MILLIKEN AVE, FOOTHILL BLVD, & SIERRA AVE).	3/31/2018	3/31/2018	3/31/2018	NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
RIALTO	200450	RIALTO METROLINK STATION - INCREASE PARKING SPACES FROM 225-775	2006	12/1/2015	6/30/2016	OBSTACLES ARE BEING OVERCOME. A TCM SUBSTITUTION REQUEST IS AWAITING FEDERAL APPROVAL TO REDUCE THE TOTAL EXPANSION FROM 550 TO 121 SPACES. THE CONSTRUCTION CONTRACT WAS REBID BECAUSE LOW BID DID NOT MEET DBE GOAL. A CONSTRUCTION CONTRACT FOR 121 ADDITIONAL SPACES WAS AWARDED ON 4/28/2015. SCRRA PERMIT APPROVAL AND REBIDDING OF THE CONSTRUCTION CONTRACT HAS CAUSED THE 6 MONTHS DELAY IN SCHEDULED COMPLETION.
SANBAG	20061012	DOWNTOWN S.B. PASSENGER RAIL – FROM SAN BERNARDINO METROLINK STATION TO APPROX. 1 MILE EAST TO A NEW TRANSIT STATION AT RIALTO AVE AND E ST. IN DOWNTOWN SAN BERNARDINO	10/10/2014	6/30/2015	8/30/2016	OBSTACLES ARE BEING OVERCOME. AWARD OF THE CONTRACT WAS DELAYED DUE TO ISSUES WITH ACQUIRING RIGHT OF WAY AND COORDINATION WITH BNSF. THE PROJECT IS UNDER CONSTRUCTION.
SANBAG	2011150	SOUTH COAST AIR BASIN RIDESHARE PROGRAM (TOLL CREDITS ARE BEING USED AS MATCH FOR CMAQ IN FY14/15 FOR $233)	12/1/2015	12/1/2015	12/1/2019	NO DELAY. ON-GOING PROGRAM.
SANBAG	SBD031505	GROUPED PROJECTS FOR LTF ARTICLE 3 PROJECTS LTF, ARTICLE 3 BICYCLE/ PEDESTRIAN PROJECTS AT VARIOUS LOCATIONS (PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126, 127,128, EXEMPT TABLES 2 & 3)	12/1/2015	12/1/2015	12/1/2019	NO DELAY. ON-GOING PROGRAM.
UPLAND	20040825	UPLAND METROLINK STATION - ADDITIONAL PARKING FROM 200 TO 500 SPACES	12/1/2013	12/1/2013		UNDER TCM SUBSTITUTION. THE PROJECT WILL BE REMOVED FROM THE FTIP WHEN THE SUBSTITUTION IS APPROVED.

Table 80.1 San Bernardino County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2015 RTP/SCS Completion Date	2016 RTP/SCS Project Status
SANBAG	20150108	BICYLE AND PEDESTRIAN ACCESSIBILITY IMPROVEMENTS ALONG SIX METROLINK TRANSIT STATIONS (MONTCLAIR, UPLAND, RANCHO CUCAMONGA,FONTANA, RIALTO, AND SAN BERNARDINO) PHASE I. (TOLL CREDIT TO MATCH ATP IN ALL PHASES)	12/31/2021	12/31/2021	12/31/2021	NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
OMNITRANS	20150109	PEDESTRIAN & BICYCLE ACCESS IMPROVEMENTS WITHIN 1/2 MILE OF RAPID TRANSIT STATIONS, INCLUDING SIDEWALK AND CURB RAMP REPLACEMENT & BIKE PARKING AT STATIONS (TERMINI AT POMONA DOWNTOWN METROLINK STATION & KAISER MEDICAL CENTER FONTANA, FOLLOWING HOLT AVE/BLVD, ARCHIBALD AVE, MILLIKEN AVE, FOOTHILL BLVD, & SIERRA AVE).	3/31/2018	3/31/2018	7/3/12019	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO ENVIRONMENTAL APPROVAL. IT IS TIED TO THE ENVIRONMENTAL DOCUMENT OF A LARGER PROJECT THAT IS DELAYED. OMNITRANS IS EXPLORING THEIR ABILITY TO SEPARATE THIS PROJECT FROM THE LARGER PROJECT TO EXPEDITE DELIVERY.

Table 80.2 San Bernardino County Completed/Corrected TCMS

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Project Status
HIGHLAND	20061015	GREENSPOT ROAD BRIDGE AT SANTA ANA RIVER - GREENSPOT RD.CONSTRUCT NEW 4 LANE BRIDGE (STRIPING FOR 2 LANES) AT SAR W/ CHANNEL IMPROVMENTS-REALIGN APPROX 2400 FT OF 2 LANE RD.(54C0368) - EXISTING BRIDGE WILL BE PRESERVED AND REHABILITATED FOR PEDESTRIAN, BICYCLE, AND EQUESTRIAN USES. (TOLL CREDITS: HBRR-L IN R/W & CON/ TEA IN CON)	12/30/2014	3/31/2015	COMPLETE
HIGHLAND	201186	AT SR-210/BASE LINE IC: RECONSTRUCT/WIDEN BASE LINE BETWEEN CHURCH AVE AND BOULDER AVE FROM 4 TO 6 THROUGH LANES AND EXTEND LEFT TURN LANES, WIDEN RAMPS – WB EXIT 1 TO 3 LANES, WB AND EB ENTRANCES 1 TO 3 LANES INCLUDING HOV PREFERENTIAL LANES (EA 1C970)	10/1/2017	10/1/2017	CORRECTED AS NON-REPORTABLE.
SANBAG	200614	I-215 BI-COUNTY HOV LANE GAP CLOSURE PROJECT- ADD 1 HOV LANE IN EACH DIRECTION FROM SPRUCE ST. ON RIV 91 TO ORANGE SHOW RD;(ALSO INCLUDES RTP 4M0803 (STIP 2010 $24881 RCTC AND $45089 SANBAG)(M003)	12/21/2015	12/21/2015	COMPLETE
SANBAG	200074	LUMP SUM – TRANSPORTATION ENHANCEMENT ACTIVITIES PROJECTS FOR SAN BERNARDINO COUNTY-BIKE/PED PROJECTS (PROJECTS CONSISTENT W/40CFR PART 93.126,127,128, EXEMPT TABLE 2 & 3).	2004	12/1/2015	COMPLETE

TABLE 81 VENTURA COUNTY

Table 81.1 Ventura County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
CAMARILLO	VEN040502	SANTA ROSA ROAD FROM UPLAND ROAD TO WOODCREEK ROAD WIDEN FROM TWO TO FOUR LANES AND ADD BIKE LANES	9/30/2008	7/1/2015	12/31/2016	OBSTACLES ARE BEING OVERCOME. DESIGN WAS DELAYED DUE TO RIGHT-OF-WAY ACQUISITION ISSUES WHICH WERE ADDRESSED THROUGH A REDESIGN. READY TO ADVERTISE.
SAN BUENAVENTURA	VEN140804	IN SAN BUENAVENTURA, CONSTRUCT SIDEWALK AND CLASS II AND III BIKE LANES ON CEDAR ST BETWEEN PROSPECT AND POL ST (0.3 MI). VARIOUS SIDEWALK, CURB IMPROVEMENTS ON VENTURA AVE BETWEEN KELLOGG ST AND SHOSHONE ST (0.9 MI). FLASHING BEACONS TO BE INSTALLED ON VENTURA AVE. EXISTING BEACONS TO BE UPDATED.	3/1/2017	3/1/2017	3/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ENVIRONMENTAL CLEARANCE UNDERWAY.
SANTA PAULA	VEN140806	IN SANTA PAULA ON 10TH ST (SR 150) CONSTRUCT NEW CLASS II BIKE LANE BETWEEN SR 126 AND SANTA PAULA ST (1.2 MI). REPAIR SIDEWALKS, ENHANCE CROSSWALKS, ADD BIKE AMENITIES, BENCHES AND LANDSCAPING.	12/1/2016	12/1/2016	12/1/2017	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO UNANTICIPATED CALTRANS DESIGN REQUIREMENTS INCLUDING SIGNAL PLAN. THE REQUIRED ADDITIONAL DESIGN IS CURRENTLY UNDERWAY.
THOUSAND OAKS	VEN110308	ERBES ROAD FROM FALMOUTH TO THOUSAND OAKS BLVD (3900') CONSTRUCT CLASS II BIKE LANES, SIDEWALK/DRAINAGE IMPROVEMENTS, EXTEND TURN LANES AT INTERSECTION OF ERBES/HILLCREST (CMAQ IN FY 14/15 INCLUDES $30 TOLL CREDITS).	7/1/2015	7/1/2015	10/1/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO UTILITY ISSUES WHICH WERE RESOLVED. CONSTRUCTION IS ONGOING
VENTURA COUNTY TRANS COMMISSION (VCTC)	VEN93017	REGIONAL RIDESHARE PROGRAM FOR 14/15, 15/16, 16/17, 17/18.	2010	6/30/2019	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. ONGOING ACTIVITY
OXNARD	VEN130101	IN THE NORTHEAST COMMUNITY OF THE CITY OF OXNARD, NORTHEAST OF OXNARD TRANSPORTATION CENTER. INSTALL 1.9 MI CLASS II BIKE LANES, 6.3 MI CLASS III BIKE LANES AND IMPROVEMENTS TO 3.69 MI OF EXISTING BIKE LANES.	5/31/2015	8/31/2016	8/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PE UNDERWAY
OXNARD	VEN130102	ON C STREET FROM VINEYARD AVE TO CHANNEL ISLANDS BLVD, CONSTRUCT 4.9 MI OF CLASS II BIKE LANES. CONSTRUCT CLASS III BIKE LANES ON GUAVA ST/HEMLOCK AVE AND ALONG HILL ST.	3/1/2015	8/31/2016	8/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. PE UNDERWAY

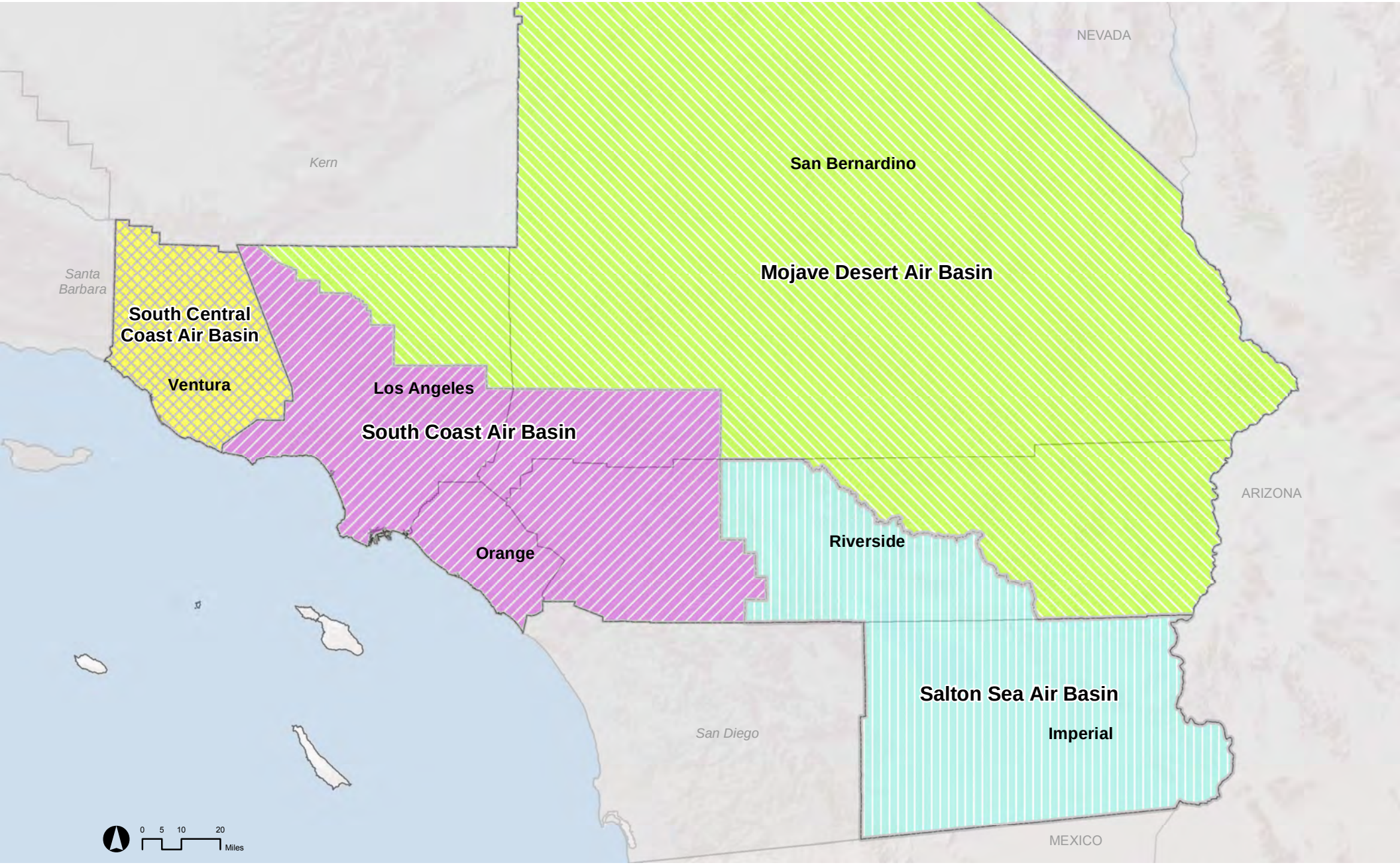
Table 81.1 Ventura County TCMS Subject To Timely Implementation

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Completion Date	2016 RTP/SCS Project Status
SANTA PAULA	VEN111102	SANTA PAULA BIKE TRAIL IMPROVEMENTS INCLUDING BIKE/PEDESTRIAN IMPROVEMENTS AT 16 ADJACENT INTERSECTIONS AND CONSTRUCTION OF ONE REST AREA SHADE STRUCTURE	6/1/2015	12/31/2016	12/31/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. FINAL DESIGN.
SIMI VALLEY	VEN120417	WEST LOS ANGELES AVE IN SIMI VALLEY, WIDEN 10 FT TO ADD BIKE LANES AND SIDEWALK FROM THE PUBLIC SERVICES CENTER TO WEST CITY LIMIT (1 MILE). (CMAQ IN FY 14/15 INCLUDES $5 FOR RW, AND $287 FOR CON).	12/31/2014	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT. BID/ADVERTISE
VENTURA COUNTY TRANS COMMISSION (VCTC)	VEN040405	NEXT BUS UPGRADE FOR REAL-TIME BUS STOP SIGNAGE (TRANSIT ENHANCEMENTS)	7/1/2018	7/1/2018	7/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.
VENTURA COUNTY TRANS COMMISSION (VCTC)	VEN121002	FARE COLLECTION AND RIDERSHIP MONITORING EQUIPMENT AND MAINTENANCE	7/1/2018	7/1/2018	7/1/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2015 FTIP TCM REPORT.

Table 81.2 Ventura County Completed/Corrected TCMS

Lead Agency	Project ID	Project Description	Original Completion Date	2015 FTIP Completion Date	2016 RTP/SCS Project Status
CALTRANS	VEN070201	NEAR MUSSEL SHOALS ADD 1 HOV LANE EACH DIR FROM MOBILE PIER ROAD UC TO S/O CASITAS PASS RD IN SANTA BARBARA CO. (PM R 39.8 TO 2.2). HOV LANES ARE PROPOSED TO BE PART-TIME (AM & PM PEAK PERIODS) ONLY. EXTEND ON/OFF-LANES AT MUSSEL SHOALS & LA CONCHITA FOR BETTER ACCEL AND DECEL; KEEP AS SINGLE LANES. CLOSE EXISTING 3 MEDIAN OPENNINGS LOCATED NEAR LA CONCHITA AND MUSSEL SHOALDS AND TANK FARM.	8/22/2016	8/22/2016	COMPLETE
CAMARILLO	VEN110106	CALLEGUAS CREEK BIKE PATH PHASE 4 - SOUTH SIDE OF ROUTE 101 FROM PETIT STREET TO CALLEGUAS CREEK / VILLAGE AT THE PARK DRIVE – CONSTRUCT APPROXIMATELY 3500 FOOT CLASS I BIKE PATH	1/31/2013	1/31/2015	COMPLETE
OJAI	VEN010203	OJAI VALLEY BIKE TRAIL EXTENSION/FULTON ST EXTENSION (STP INCLUDES TOLL CREDITS OF $54 FOR FY 2010/11 CON AND $11 FOR FY 13/14 CON.)	2002/2004	12/31/2014	COMPLETE
OXNARD	VEN110112	VICTORIA AVENUE FROM GUM TREE ST TO GONZALES RD SIDEWALK AND DRAINAGE IMPROVEMENTS, RESTRIPING TO PROVIDE THREE NB THROUGH LANES AND BIKE LANE	8/31/2014	8/31/2014	COMPLETE
VENTURA COUNTY	VEN130103	ON LAS POSAS RD FROM PLEASANT VALLEY RD TO LAGUNA RD, CONSTRUCT 2.05 MI CLASS III BIKE LANE. (CMAQ IN FY 14/15 INCLUDES $28 IN TOLL CREDITS.)	11/1/2015	11/1/2015	COMPLETE

EXHIBIT 1 Air Basins in the SCAG Region

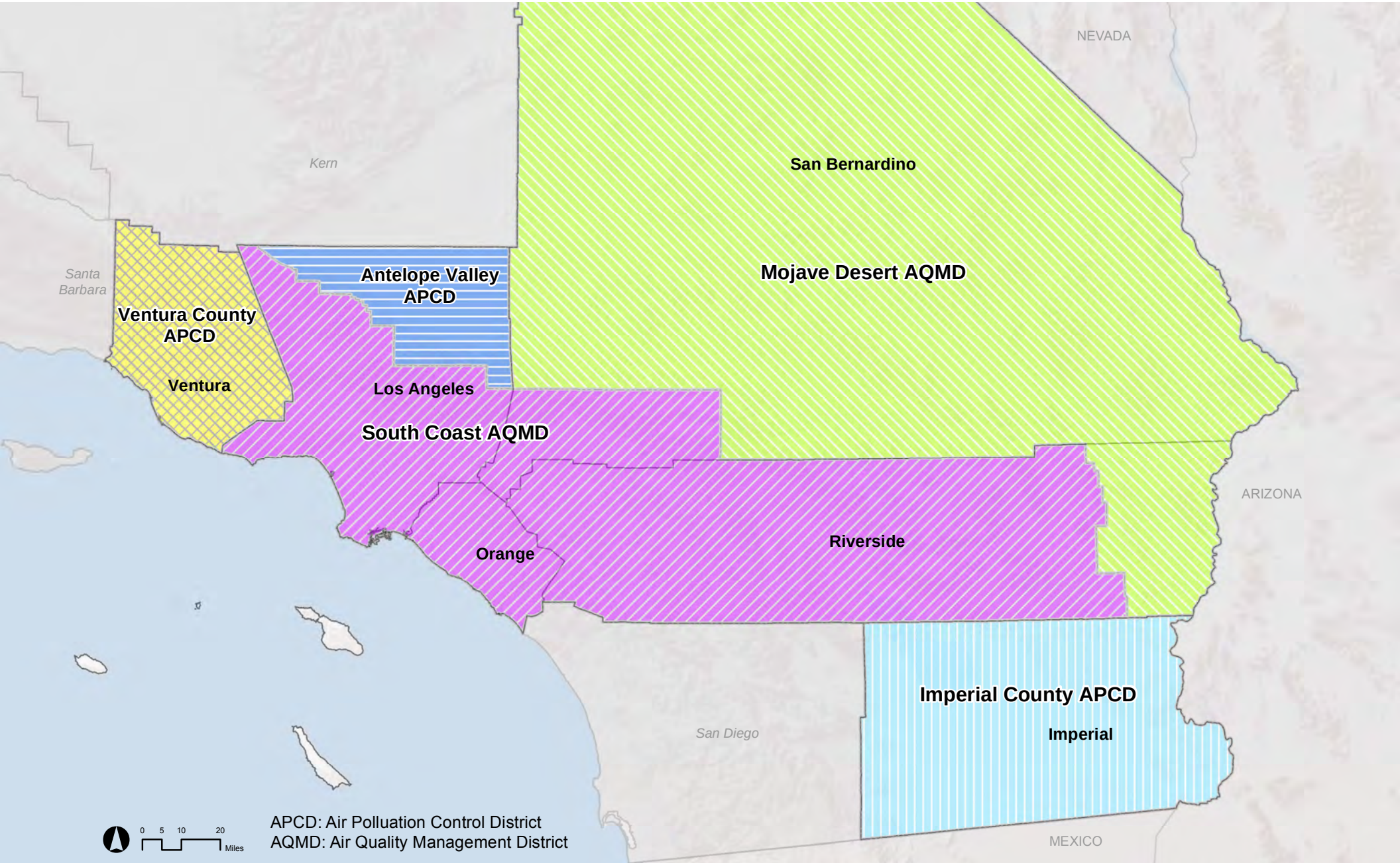


Air Basins in the SCAG Region

Mojave Desert Air Basin | Salton Sea Air Basin | South Coast Air Basin | South Central Coast Air Basin | County Boundaries

Source: SCAG, 2015

EXHIBIT 2 Air Districts in the SCAG Region

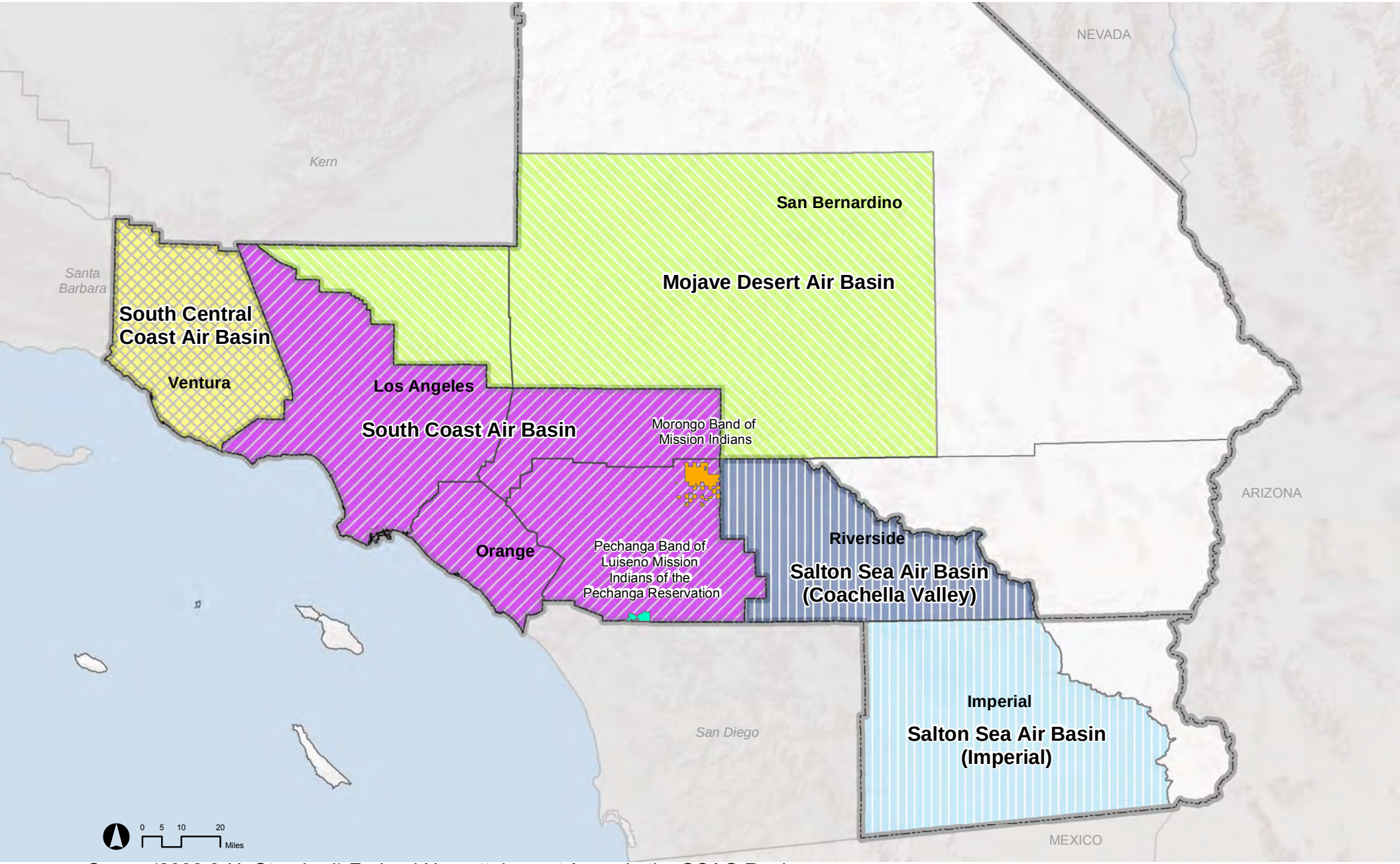


Air Districts in the SCAG Region

AVAPCD ICAPCD MDAQMD SCAQMD VCAPCD County Boundaries

Source: SCAG, 2015

EXHIBIT 3 Federal Nonattainment Areas in the SCAG Region – 2008 8-hout Ozone

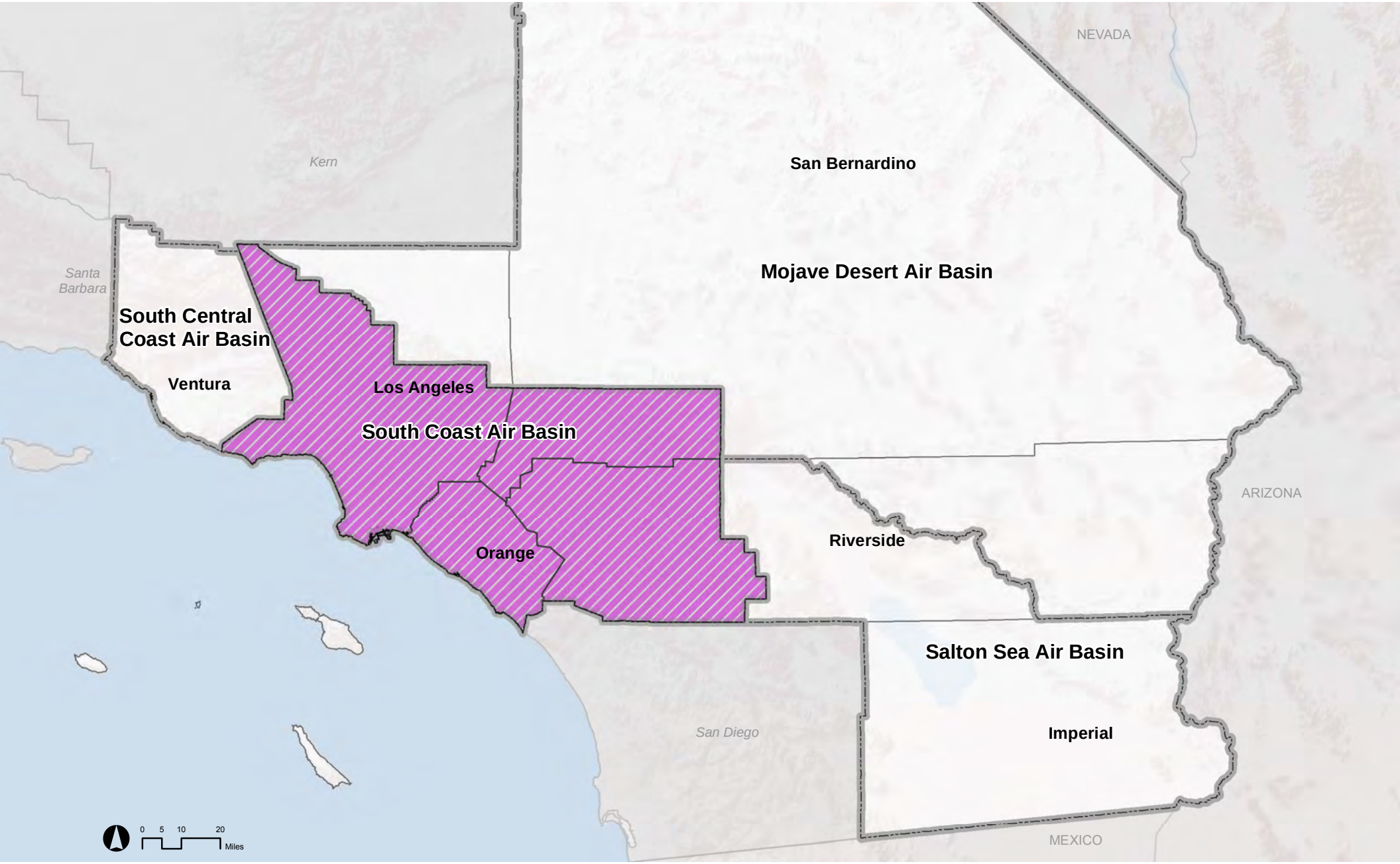


Ozone (2008 8-Hr Standard) Federal Non-attainment Areas in the SCAG Region

- Air Basins
- County Boundaries
- South Central Coast AB
- South Coast AB excluding Morongo and Pechanga
- Western Portion of Mojave Desert AB (San Bernardino County & Antelope Valley)
- Salton Sea AB (Coachella Valley)
- Salton Sea AB (Imperial)
- Morongo Band of Mission Indians
- Pechanga Band of Luiseno Mission Indians of the Pechanga Reservation

Source: SCAG, 2015

EXHIBIT 4 Federal Nonattainment Area in the SCAG Region – 1997 24-hour $PM_{2.5}$

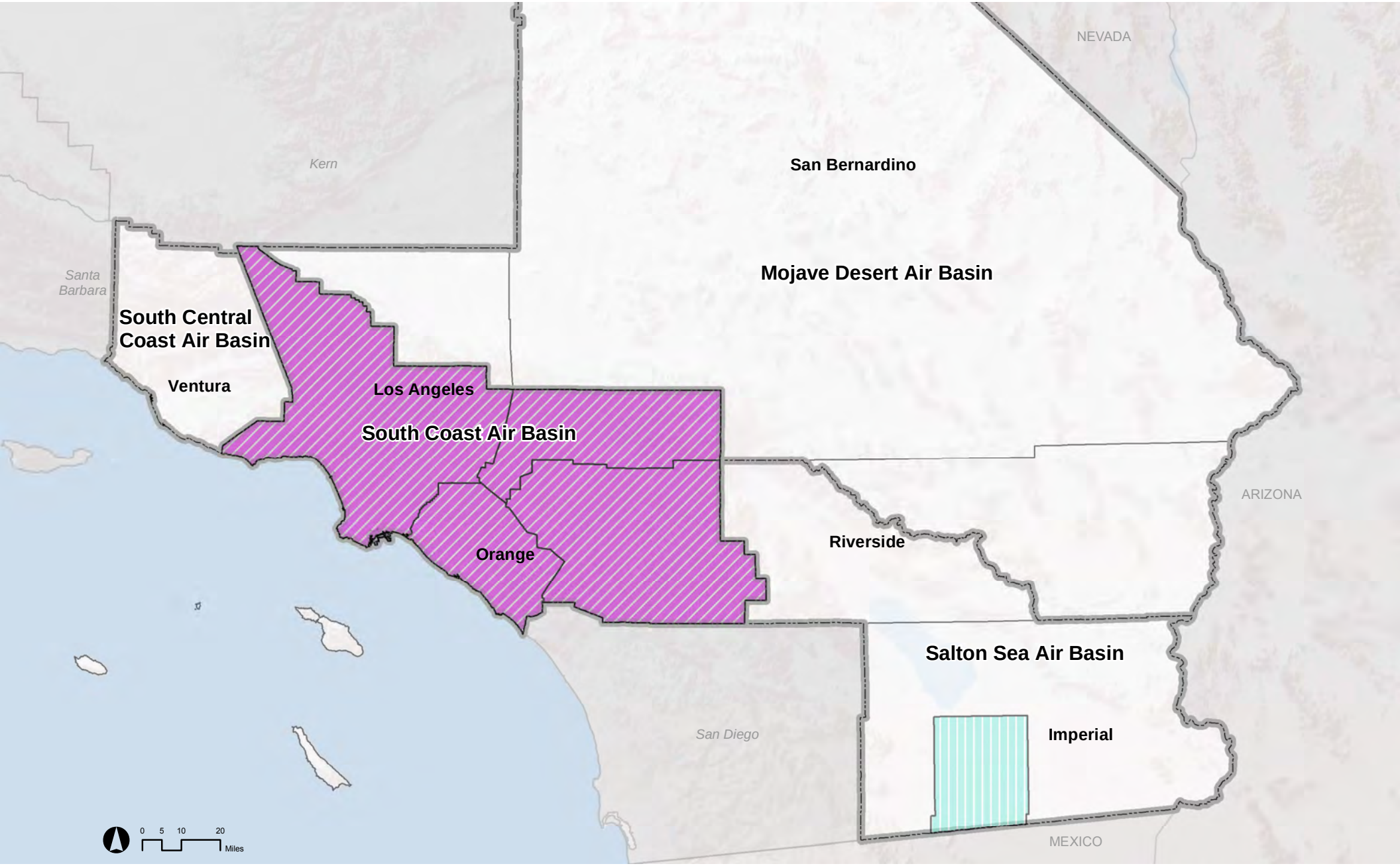


1997 Particulate Matter (PM 2.5) Federal Non-attainment Area in the SCAG Region

Air Basins | South Coast AB | County Boundaries

Source: SCAG, 2015

EXHIBIT 5 Federal Non-attainemnt Areas in the SCAG region - 2006 $PM_{2.5}$

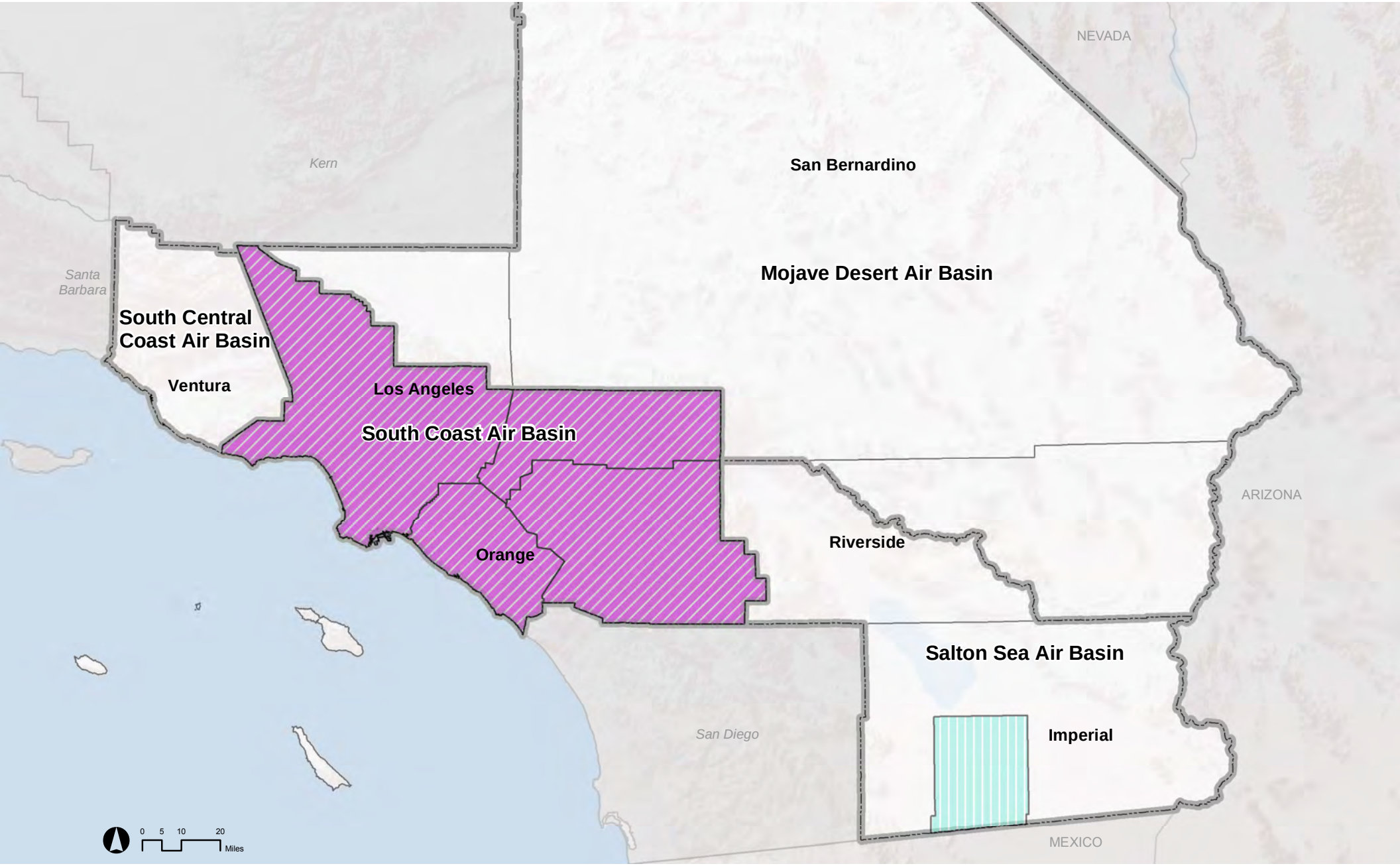


2006 Particulate Matter (PM 2.5) Federal Non-attainment Area in the SCAG Region

Air Basins | South Coast AB | Salton Sea AB (Urbanized Portion of Imperial) | County Boundaries

Source: SCAG, 2015

EXHIBIT 6 Federal Non-attainemnt Areas in the SCAG region - 2012 $PM_{2.5}$

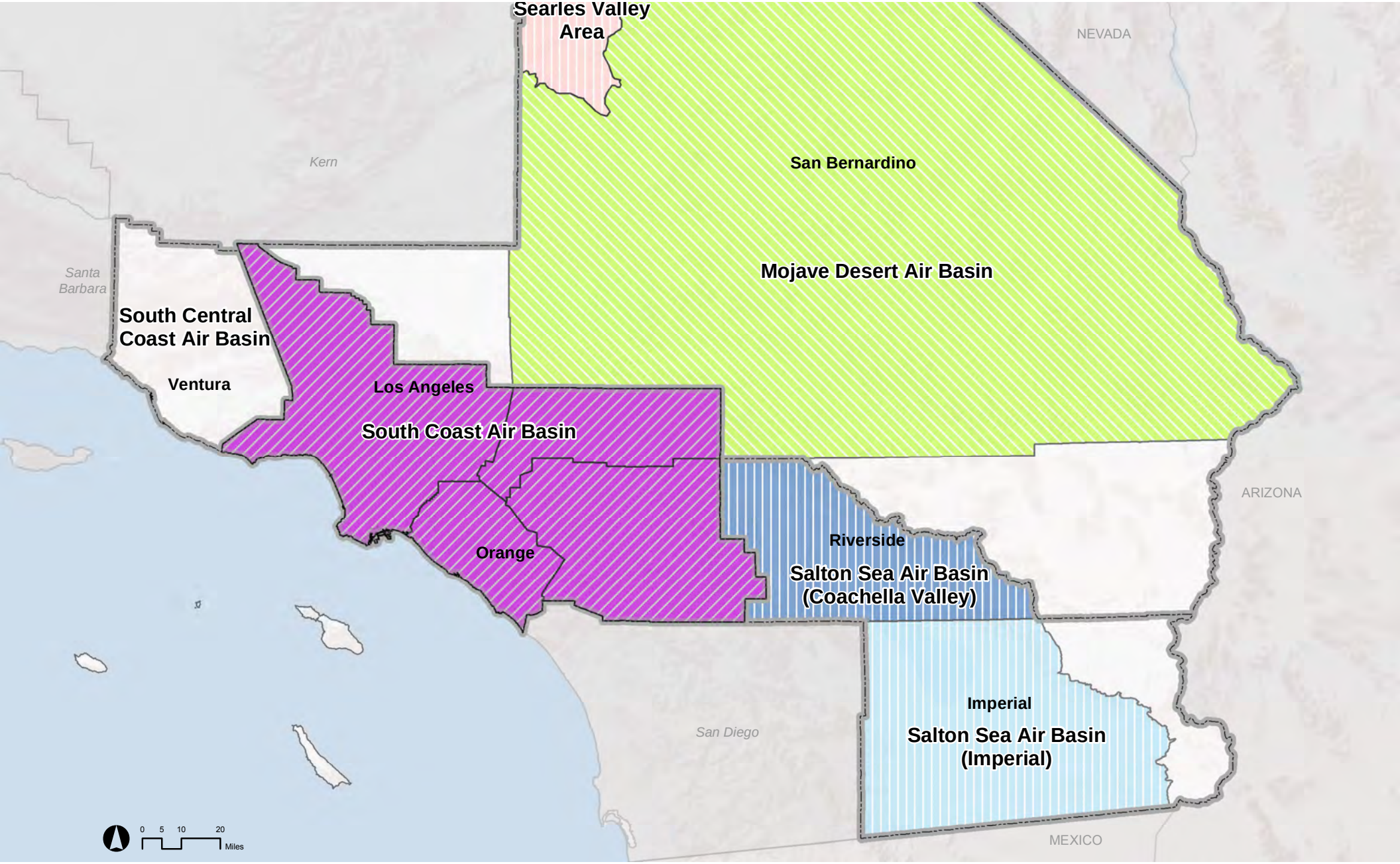


2012 Particulate Matter (PM 2.5) Federal Non-attainment Area in the SCAG Region

Air Basins | South Coast AB | Salton Sea AB (Urbanized Portion of Imperial) | County Boundaries

Source: SCAG, 2015

EXHIBIT 7 Federal Nonattainment and Maintenance Areas in the SCAG Region - PM_{10}

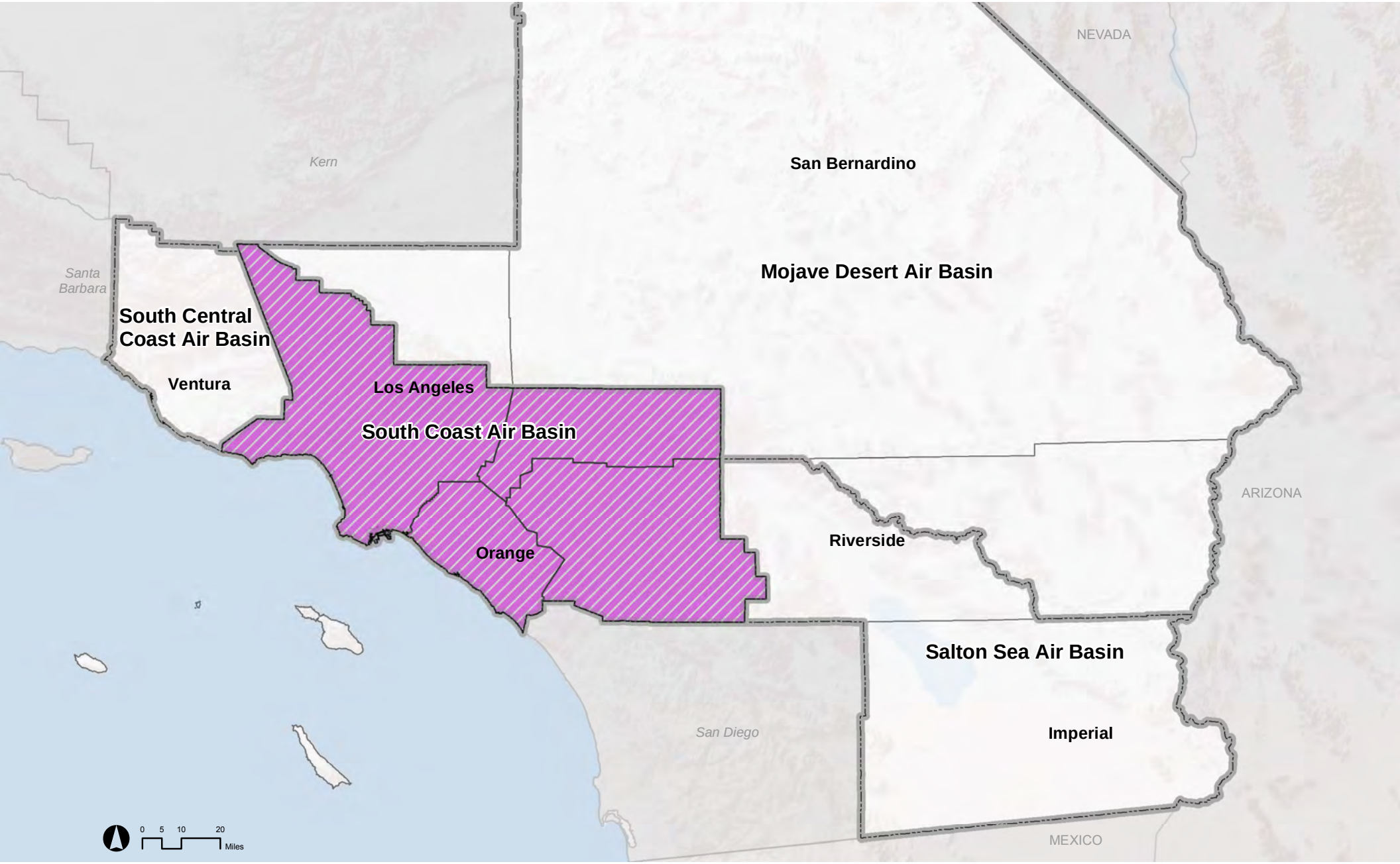


Particulate Matter (PM 10) Federal Non-attainment and Maintenance Areas in the SCAG Region

- Air Basins
- County Boundaries
- South Coast AB (Maintenance Area)
- Salton Sea AB (Coachella Valley)
- Salton Sea AB (Imperial)
- Mojave Desert AB (San Bernardino County excluding Searles Valley)
- Mojave Desert AB (Searles Valley) (Maintenance Area)

Source: SCAG, 2015

EXHIBIT 8 Federal Maintenance Area in the SCAG Region - CO

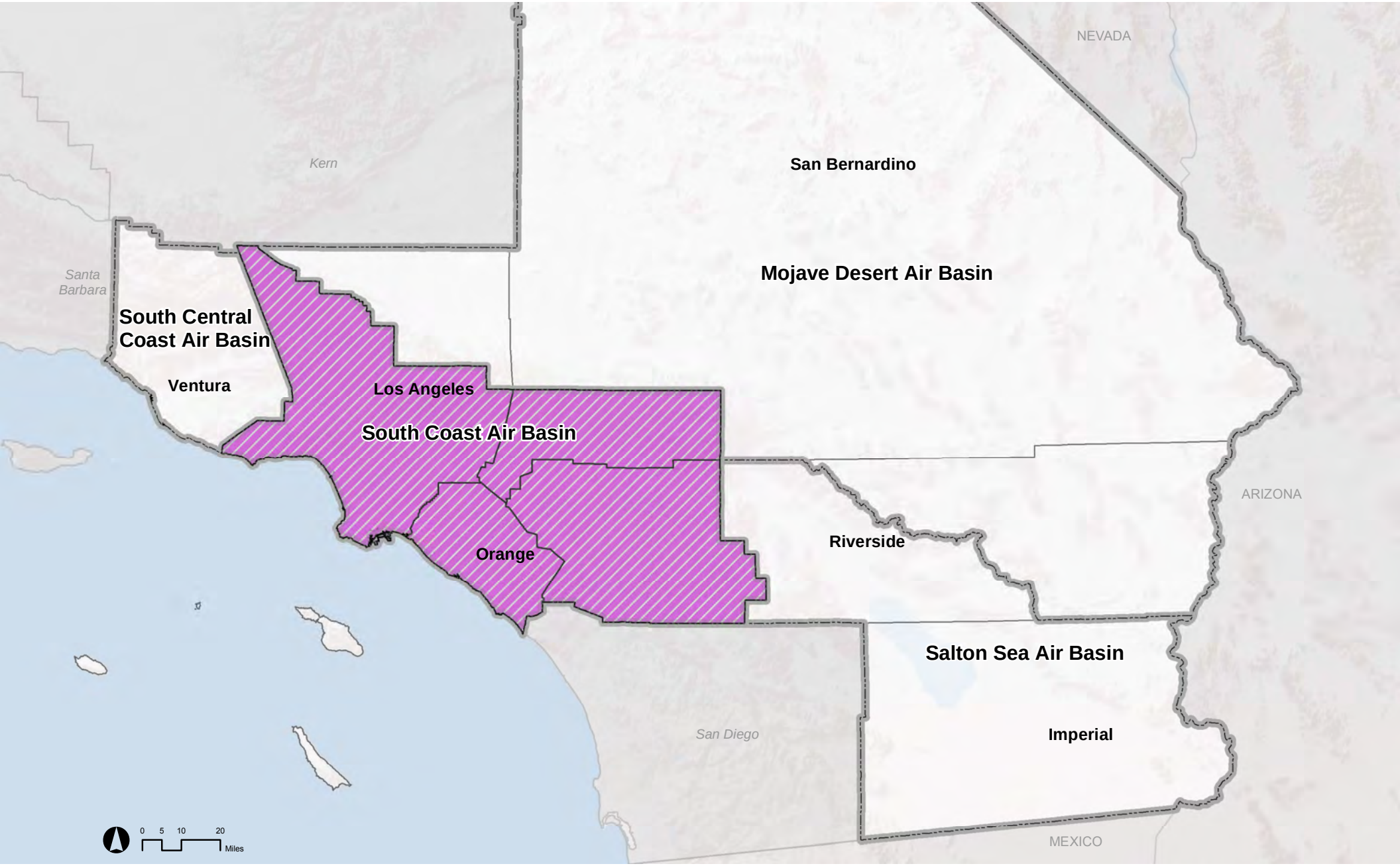


Carbon Monoxide (CO) Federal Maintenance Area in the SCAG Region

Air Basins | South Coast AB | County Boundaries

Source: SCAG, 2015

EXHIBIT 9 Federal Maintenance Area in the SCAG Region - NO_2



Nitrogen Dioxide (NO2) Federal Maintenance Area in the SCAG Region

Air Basins | South Coast AB | County Boundaries

Source: SCAG, 2015

NOTES

1 See the 2016 RTP/SCS Financial Plan.

2 U.S. EPA, Transportation Conformity Regulations Updated April 2012, page 8.

3 Clean Air Act, pages 29-30.

4 U.S. EPA, Transportation Conformity Regulations Updated April 2012, page 22.



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2016 2040 RTPSCS

APPENDIX

PLAN PERFORMANCE | TRANSPORTATION CONFORMITY ANALYSIS

DRAFT DECEMBER 2015

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DEPARTMENT OF CITY PLANNING

RECOMMENDATION REPORT

Department of Transportation

Date:	May 24, 2013
Public Hearing:	Public Hearing held February 13, 2013

Reference Council File Nos.:	10-2385-S1, 10-2385-S2
CEQA No.:	ENV-2013-1233-SE
Council No.:	1-Reyes, 14-Huizar
Plan Area:	Northeast Los Angeles

PROJECT LOCATION

The project area is located in portions of the Northeast Community Plan. The project is located in the public right-of-way along N. Figueroa Street bounded by San Fernando Road to the southwest and Colorado Boulevard to the northeast and along Colorado Boulevard from the Los Angeles / Glendale City limits to the west and Avenue 64 to the east.

PROPOSED PROJECT

The Proposed Project is part of 40.4 miles of new bicycle lanes proposed as part of the First-Year of the First Five Year Implementation Strategy of the 2010 Bicycle Plan.[1] The Proposed Project implements several programs of the 2010 Bicycle Plan, which includes completion of a backbone bicycle network. The Proposed Project consists of 8.1 miles of new bicycle lanes (including 5.1 miles of a combination of standard and buffered bicycle lanes along N. Figueroa Street, from San Fernando Road to Colorado Boulevard, and 3 miles of a combination of standard and buffered bicycle lanes along Colorado Boulevard, from Glendale City limit (200' east of Lincoln Avenue) to Avenue 64 that would be striped within the existing right-of-way (**Table 1**). Buffered bicycle lanes are proposed along the southern portion of N. Figueroa Street, from Avenue 28 to York Boulevard, and along Colorado Boulevard, from Sierra Villa Drive and the SR-134 on/off ramps. **Figure 1** shows the location of the proposed new bicycle lanes in relation to the existing bicycle lanes.

The Proposed Project would include restriping only. No excavation or construction is contemplated in connection with the proposed bicycle lanes. Implementation of the proposed bicycle lanes would not change access to existing facilities and properties.

---

[1] *A Draft EIR was prepared and made available on January 17th, 2013 that evaluated the traffic and safety impacts of 39.5 miles proposed bicycle lanes not including the Proposed Project. The Proposed Project was introduced later after the release of the Draft EIR and was evaluated in a separate Traffic and Safety Assessment pursuant to the procedures of Section 21080.20.5 of the Public Resource Code (PRC).*

TABLE 1: PROPOSED BICYCLE LANES - STREET SEGMENTS			
Street / Facility Type	**Limits**	**Length (miles)**	**Area/Connection**
N. Figueroa St. / standard bicycle lanes	San Fernando Rd. to Colorado Blvd.	5.1	Northeast/ Glendale – Eagle Rock - Pasadena
Colorado Blvd. / standard and buffered bicycle lanes	Glendale City limit (200' e/o Lincoln Ave.) to Ave 64	3.0	Northeast/Cypress Park - Mt. Washington – Highland Park - Eagle Rock
TOTAL		8.1	Northeast
SOURCE: City of Los Angeles, LADOT, 2012.			

The Proposed Project would reduce traffic lanes in several segments along N. Figueroa Street. On N. Figueroa Street, between San Fernando Road and the I-110 on/off ramps, one northbound lane would be eliminated. On N. Figueroa Street, between the I-110 on/off ramps and York Boulevard, one southbound lane would be eliminated leaving two northbound travel lanes and one southbound travel lane. On N. Figueroa Street, between York Boulevard and Colorado Boulevard, a full travel lane would be eliminated in each direction, leaving one northbound travel lane and one southbound travel lane. The proposed project would also eliminate one travel lane along Colorado Boulevard, in each direction, from Sierra Villa Drive and Avenue 64.

The implementation of the Proposed Project would result in greater bicycle network benefits in Northeast Los Angeles by connecting to the existing standard bicycle lanes (along York Boulevard, Avenue 50, Cypress Avenue and Eagle Rock Boulevard), thereby facilitating inviting and safe bicycle travel from the northeast neighborhoods of Mount Washington, Cypress Park, Highland Park, and Eagle Rock into the Cities of Glendale and Pasadena as well as the Central City area.

REQUESTED ACTIONS

1. That the Department of Transportation (LADOT) install 8.1 miles of new bicycle lanes (including 5.1 miles of a combination of standard and buffered bicycle lanes along N. Figueroa Street from San Fernando Road to Colorado Boulevard and 3 miles of a combination of standard and buffered bicycle lanes along Colorado Boulevard from Glendale City limit (200' east of Lincoln Avenue) to Avenue 64) in accordance with the 2010 Bicycle Plan.

2. That the Department of Transportation (LADOT) determine that the 5.1 miles of new bicycle lanes along N. Figueroa Street from San Fernando Road to Colorado Boulevard and 3 miles of bicycle lanes along Colorado Boulevard from Glendale City limit (200' east of Lincoln Avenue) to Ave 64 are exempt from CEQA pursuant to Public Resource Code (PRC) Section 21080.20.5.

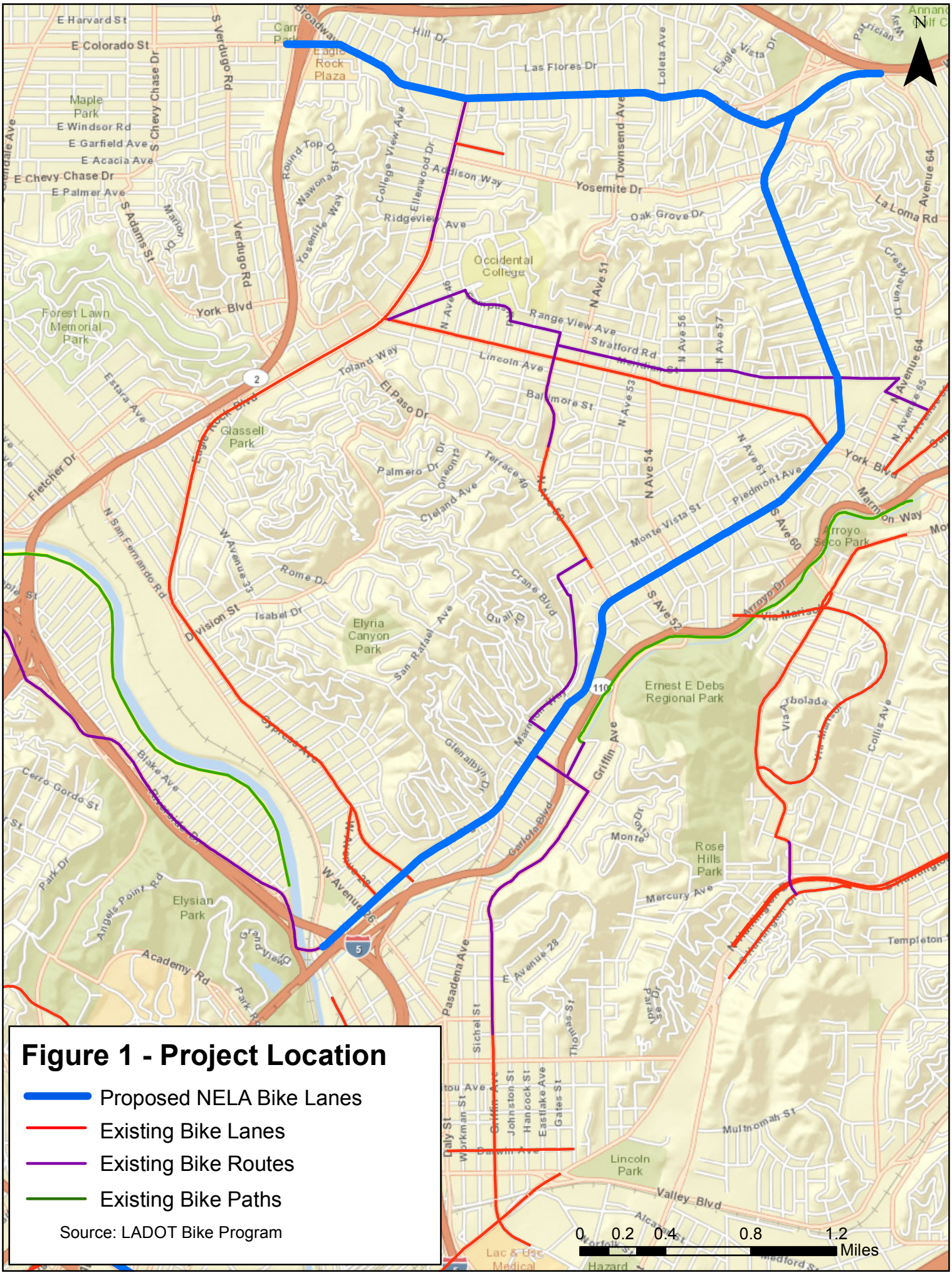
Figure 1 - Project Location
Proposed NELA Bike Lanes
Existing Bike Lanes
Existing Bike Routes
Existing Bike Paths
Source: LADOT Bike Program
0 0.2 0.4 0.8 1.2
Miles
N
E Harvard St
E Colorado St
S Verdugo Rd
S Chevy Chase Dr
Maple Park
E Windsor Rd
E Garfield Ave
E Acacia Ave
E Chevy Chase Dr
E Palmer Ave
S Adams St
Marion Dr
Verdugo Rd
York Blvd
Forest Lawn Memorial Park
Broadway
Eagle Rock Plaza
Hill Dr
Las Flores Dr
Loleta Ave
Eagle Vista Dr
Townsend Ave
Round Top Dr
Wawona St
College View Ave
Ellenwood Dr
Addison Way
Yosemite Way
Ridgeview Ave
Yosemite Dr
Oak Grove Dr
La Loma Rd
Occidental College
N Ave 51
N Ave 56
N Ave 57
Range View Ave
Stratford Rd
Lincoln Ave
Toland Way
El Paso Dr
Baltimore St
N Ave 53
N Ave 54
N Ave 61
Piedmont Ave
Monte Vista St
S Ave 60
S Ave 53
Arroyo Seco Park
Arroyo Dr
Via Marisol
Via Arbolada
Collis Ave
Marmion Way
Eagle Rock Blvd
Estara Ave
Fletcher Dr
Glassell Park
Palmero Dr
Oneonta
Terrace 49
Cleland Ave
N San Fernando Rd
W Avenue 33
Rome Dr
Division St
Isabel Dr
Elyria Canyon Park
San Rafael Ave
Crane Blvd
Quail Dr
Ernest E Debs Regional Park
Griffin Ave
Glenalbyn Dr
Garlota Blvd
Monte Dr
Rose Hills Park
Mercury Ave
Templeton
Cypress Ave
Blake Ave
Riverside Dr
Cerro Gordo St
Park Dr
Angels Point Rd
Elysian Park
Academy Rd
Grand View Dr
W Avenue 26
E Avenue 28
Pasadena Ave
Sichel St
Thomas St
Pasa Dr
Workman St
Daly St
Griffin Ave
Johnston St
Hancock St
Eastlake Ave
Gates St
Baldwin Ave
Multnomah St
Lincoln Park
Valley Blvd
Alcazar St
Lac & Usc Medical
Hazard
Medford St
110
5
2

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BACKGROUND

2010 Bicycle Plan Implementation

The City of Los Angeles adopted the 2010 Bicycle Plan (Bicycle Plan) on March 1, 2011. The Bicycle Plan identifies a 1,684-mile bikeway system and includes a comprehensive collection of programs and policies.

The Bicycle Plan establishes the Five-Year Implementation Strategy as a logical process to design, analyze and build 1,227 miles, on the Backbone and Neighborhood Networks, in five-year increments, within the next 35 years. Program 1.1.2 C of the 2010 Bicycle Plan calls for funding and construction of at least 200 miles of on-street bicycle facilities on the Backbone and Neighborhood Networks every five years, until the networks are complete.

At the time of adoption, the bicycle lanes that were included in the 2010 Bicycle Plan were in various stages of planning. Some were well defined, but others required additional study to determine exact routes and/or roadway design. To the extent that impacts of the Bicycle Plan could be analyzed they were addressed in a Mitigated Negative Declaration. However, as some bicycle lanes are further defined it has become apparent that some require additional analysis because the implementation could potentially impact travel delay. In general, bicycle lanes typically have the potential to significantly impact traffic (as well as related environmental issues such as air quality) if the result is a loss of a travel lane in a high-traffic area, or the loss of a parking lane, adjacent to land uses, without off-street parking available. The implementation of the Proposed Project would require the removal/reallocation of mixed-flow travel lanes and as such would potentially result in travel delay requiring further traffic and safety analysis.

Statutory Exemption Requirements

On September 2012, Governor Brown signed Assembly Bill (AB) 2245 (adding Section 21080.20.5 to the Public Resources Code (PRC)), which allows (through January 1, 2018) a Statutory Exemption from the California Environmental Quality Act (CEQA) for the striping of new bicycle lanes, on existing urban streets, that are lanes included in an adopted bicycle transportation plan.

Projects eligible for the statutory exemption must still assess project-related traffic and safety impacts, identify traffic and safety mitigation measures, hold noticed public hearings in areas affected by the project, and respond to public comments.

DISCUSSION

It was determined that the Proposed Project qualified for the Statutory Exemption and therefore the City initiated a traffic and safety assessment, identified mitigation measures, and held a public hearing.

Traffic and Safety Assessment

The City initiated a Draft Environmental Impact Report (EIR), for the First Year of the First Five-Year Bicycle Plan Implementation Strategy and Figueroa Streetscape Project prior to the passage of AB 2245. Since the Draft EIR included the traffic and safety impacts of the Proposed Project, it serves as the traffic and safety assessment of the Proposed Project as required by 21080.20.5 (b)(1) of the PRC. As shown in Table 2, the traffic analysis concluded that the implementation of the proposed bicycle lanes would result in a significant and unavoidable impact due to travel delay at three intersections in both the AM and PM peak periods along N. Figueroa Street and three intersections in both the AM and PM peak periods along Colorado Boulevard. The Proposed Project would result in a total of five impacted intersections. Traffic impacts on parallel facilities, resulting from trip redistribution, is not expected since parallel arterial streets along these portions of N. Figueroa Street and Colorado Boulevard are not available to serve the same purposes to attract cut-through traffic.

TABLE 2: INTERSECTION LEVEL OF SERVICE: PROPOSED PROJECT

Street	Study Intersection[1]	AM Peak Hour					PM Peak Hour				
		Post Project Delay (sec)	Change in Delay (sec)	LOS Pre	LOS Post	Sig Impact	Post Project Delay (sec)	Change in Delay (sec)	LOS Pre	LOS Post	Sig Impact
N. Figueroa St.	Colorado Blvd	56.2	30.5	C	E	YES	40.1	19.5	C	D	YES
	York Blvd	66.4	41.5	C	E	YES	46.1	17.3	C	D	YES
	Pasadena Ave	25.3	5.6	B	C	NO	13.4	0.2	B	B	NO
	Ave 26	149.5	95.4	D	F	YES	45.7	6.8	D	D	YES
	San Fernando Rd	14.3	-0.7	B	B	NO	21.6	5.6	B	C	NO
Colorado Blvd.	SR-2 NB Ramps	17.3	0.1	B	B	NO	16.7	0	B	B	NO
	Broadway	12.8	-0.4	B	B	NO	17	-0.1	B	B	NO
	Sierra Villa Dr[2]	50.7	27.2	C	D	YES	350.9	203.6	F	F	YES
	Eagle Rock Blvd[2]	55.7	22.4	C	E	YES	115.5	64.3	D	F	YES
	SR-134 Ramps	19.4	-3.9	C	B	NO	19	4.3	B	B	NO
	N. Figueroa St	56.2	30.5	C	E	YES	40.1	19.5	C	D	YES

Source: LADOT, 2012

(1) Figueroa Street/Colorado Boulevard is a duplicate study intersection where a study street meets another study street.

(2) Due to error in traffic counts, the results were revised from the impacts reported in the Draft EIR. See Attachment 2, Corrections and Additions.

The Proposed Project would result in a significant travel delay at three intersections during both the AM and PM peak periods along N. Figueroa Street. All five study intersections currently operate at LOS D, or better, in the AM and PM peak hours. The Proposed Project would cause three intersections to operate at LOS E or F in the AM peak hour. These intersections would continue to operate at LOS D, or better, conditions in the PM peak hour. It is noted that during the AM peak hour, the intersection of N. Figueroa Street and San Fernando Road would experience a minor decrease in delay. This intersection's most congested movement is the southbound left turn from Figueroa Street to San Fernando Road. The project would change the

northbound shared lane into a right turn lane. This change would make it easier for the left turning vehicles, from Figueroa Street, to perceive the oncoming traffic and make their turn, reducing the intersection delay.

The Proposed Project would result in a significant travel delay at three intersections during both the AM and PM peak periods along Colorado Boulevard. All six study intersections currently operate at LOS C or better in the AM peak hour, and there is one intersection operating at LOS E or F in the PM peak hour. With the Proposed Project, the number of intersections operating at LOS E or F conditions would increase, to two, in the AM and PM peak hours.[2]

The traffic analysis, in the Draft EIR, found that the Proposed Project would increase bus travel times along both N. Figueroa Street and Colorado Boulevard and would further result in a substantial increase in bus travel delay along Colorado Boulevard.[3] It also found that the Proposed Project would result in either less than significant impacts or no impacts to General Plan consistency and emergency access. There would be no loss of on-street parking as the result of the Proposed Project and thus it would have no impact on parking.

With the implementation of the proposed bicycle lanes, it is anticipated that bicyclists would benefit from improved safety due to the designation of a clear right-of-way for their use. The safety benefits would even be greater where additional buffer separation is provided, between the bicycle lane and the adjacent travel lane, such as proposed along Colorado Boulevard and the segment of N. Figueroa Street between York Boulevard and San Fernando Road.

The Traffic and Safety Assessment found that the Proposed Project would improve bicycle accessibility, connectivity and safety, and would encourage bicycle use (potentially resulting in improved health of the population), would not decrease the safety of bicyclists, pedestrians and transit riders. Rather, the proposed bicycle lanes would significantly improve bicycle safety, as well as safety for all road users, by installing bicycle lanes along N. Figueroa Street and Colorado Boulevard.

Mitigation Measures

The Draft EIR recommended the following mitigation measures relevant to the Proposed Project to reduce impacts to traffic circulation:

MM T1: LADOT will adjust traffic signal timing after the implementation of the proposed bicycle lanes (both along project routes and parallel roadways if traffic diversions have occurred as a result of the proposed bicycle lanes). Signal timing adjustment could reduce traffic impacts at impacted intersections. (LADOT routinely makes traffic signal timing changes and signal optimization on an as-needed basis to accommodate the changes in traffic volumes to reduce congestion and delay in the City.)

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[2] *The traffic LOS was revised since publication of the Draft EIR. See Attachment 2, Corrections and Additions.*

[3] *Study areas with aggregated delays of five minutes or longer were considered to have a substantial increase transit travel time for the bus routes operating in mixed traffic.*

MM T2: The City shall implement appropriate Transportation Demand Management (TDM) measures in the City of Los Angeles including potential trip-reducing measures such as bike share strategies, bike parking, expansion of car share programs near high density areas, bus stop improvements (e.g. shelters and "next bus" technologies), crosswalk improvements, pedestrian wayfinding signage, etc. (Such improvements shall also be required of private projects in the project area as part of the review and approval process.)

The Traffic and Safety Assessment recommended the following mitigation measure to reduce impacts from the construction phase:

MM T5: Construction activities will be managed through the implementation of a traffic control plan to mitigate the impact of traffic disruption and to ensure the safety of all users of the affected roadway. The plan will extend for the duration of construction and could include such measures as a temporary traffic signal or the use of flagmen as appropriate.

Public Hearing

The Department of City Planning (DCP) held a total of four public hearings for the proposed bicycle lanes included in the First Year of the First Five-Year Implementation Strategy. The hearings were located in areas affected by the proposed bicycle lanes as required by PRC Section 21080.20.5 (b)(2). For the purposes of the public hearing, the Proposed Project was included with the other proposed bicycle lanes in the First Year of the First Five-Year Implementation Strategy that were proposed in the northeast area of the City. The DCP held this public hearing on February 13, 2013 at the Los Angeles River Center at 570 W. Avenue 26, attended by 56 members of the public. At the hearing, LADOT and DCP staff were available to present the Proposed Project, and summarized the results of the assessment of traffic and safety impacts as described above. Additionally, one webinar-style public hearing was held on February 20th where interested public could provide feedback on all of the proposed bicycle lanes in the First Year of the First Five-Year Implementation Strategy.

A Notice of Availability (NOA) of the Draft EIR and Public Hearing was included in the January 17th, 2013 edition of the Los Angeles Times in compliance with Section 21080.20.5 (b)(2) of the PRC. Additionally, notices were sent to multiple public agencies and organizations including Metro, the City Council offices and neighborhood councils with jurisdiction in the area. Notices were also distributed electronically to over 1,400 individuals who were either participants involved in the adoption of the 2010 Bicycle Plan or have been involved in the implementation process. Hard copies of the Draft EIR were made available at the Arroyo Seco Regional Library, 6145 N. Figueroa Street, as well as the City Clerk Vault, and the Department of City Planning offices in City Hall. An electronic copy of the Traffic and Safety Assessment was made available on the Department of City Planning website, and information about the electronic copy was included on the notices described above.

Summary of Public Hearing Testimony

Of the 56 people attending the public hearing, 31 gave verbal testimony during the hearing and three submitted written comments at the hearing. Of the 31 who gave verbal testimony, 27 spoke in support of implementing the bicycle lanes in the First Year of the First Five-Year Implementation Strategy in the Northeast Area (the Proposed Project), while four were opposed. In addition to those present at the public hearing, two comments were submitted after the public hearing during the comment period that addressed the Proposed Project. Of the letters received, five were in favor of the Proposed Project.

The comments favorable about the Proposed Project stated that the proposed bicycle lanes would create safer riding conditions by allocating space for the bicyclist whereas currently, bicyclists must contend with mixed-flow traffic. The comments also indicate that the Proposed Project would provide a much needed connections in Northeast Los Angeles, improve access to destinations including local businesses, and result in traffic calming attributed to the revised roadway allocation. The comments stated that these benefits would outweigh the cost of increases in travel delay that would result from the Proposed Project.

The comments opposed to the Proposed Project were concerned about increases in travel delay, and how the travel lane reduction would impair access to local businesses. Others mentioned concern over potential impacts to emergency services, and the travel delay that could exacerbate the use of N. Figueroa by truck traffic.

LADOT and DCP have participated in subsequent meetings and outreach related to the Proposed Project in coordination with the two City Council Offices, Council District (CD) 1 and Council District (CD) 14. The responses at the meetings were similar to what was received at the public hearing. Any new discussion items that were not received during the comment period are included below.

Summary of Key Issues from Comments Received

The Draft EIR was made available on January 17th, 2013 for a 45-day comment period that ended on March 4th, 2013. Comments on the analysis were received at the public hearing as described above, and submitted electronically and by mail. The following discussion highlights key issues that were raised, during the public comment period, by members of the public, as they relate to the Proposed Project. Since the Draft EIR evaluated over 40 miles of proposed bicycle lanes included in the First Year of the First Five Year Implementation Strategy, not all comments had direct relevance to the analysis of the Proposed Project. However, responses to comments that addressed the analysis in general have been included. A complete set of responses, to the comments received on the Draft EIR analysis in general and as they relate to the Proposed Project, are included as Attachment 1 of this Report. Responses that address impacts to other bicycler lanes, not including the Proposed Project, proposed as part of the First

Year of the First Five Year Implementation Strategy either were,[4] or will be, addressed in subsequent staff reports.

Safety Concerns and Benefits

Many comments were submitted stating the safety benefits that would result from installing bicycle lanes along N. Figueroa Street and Colorado Boulevard. These comments generally articulated that reducing a travel lane would provide the added benefit of reducing overall travel speeds, which would in turn benefit bicyclists, pedestrians and other motorists. Comments observed that traffic fatalities are higher where Colorado Boulevard traverses Los Angeles than through Glendale or Pasadena. With three travel lanes in each direction, Colorado Boulevard has excess capacity during non-peak travel times that is seen to encourage speeding. One organization, Take Back the Boulevard, referred to a survey they conducted of select residents that identifies traffic speeds and road width as a substantial barrier for pedestrians crossing Colorado Boulevard. The segment of N. Figueroa Street between York Boulevard and Yosemite Drive was mentioned as being difficult for bicyclists to share within a travel lane. Another comment urged DCP to evaluate the number of collisions before, and after, implementation of the bicycle lanes to determine the positive or negative impacts on safety.

These same comments stated the potential for the travel lane reduction to reduce the crossing distance, thereby contributing to a safer pedestrian environment and providing an important benefit around the areas' schools. Other comments mentioned that the Proposed Project would help to improve the pedestrian environment by attracting more bicyclists to ride in the street thereby reducing pedestrian/bicycle conflicts on sidewalks. The bicycle lanes are also seen to increase safety, especially in locations of greater topography where there is a need to separate slow-climbing bicyclists from faster moving vehicular traffic. These comments also generally supported implementing buffered bicycle lanes as they would provide added protection for bicyclists between faster moving traffic and the door zone of parked cars. They would help to create a low-stress bicycle network that would be attractive to those that currently do not travel by bicycle.

Opponents to adding bicycle lanes also cited safety concerns in stating the perception that bicyclists endanger other road users because they generally do not observe traffic rules. Others raised concerns that the installation of bicycle lanes would only encourage more people to engage in a perceived unsafe activity where they will have to compete with fast moving vehicles and merging bus traffic.

The Draft EIR assessed the safety of the Proposed Project (see page 3-5 and 3-6 as well as 4.5-33 of the Draft EIR) and found that the effective reduction in travel lanes would help to reduce travel speeds, and thereby the installation of bicycle lanes would

[4] *Sunset Boulevard (From Figueroa St to Douglas St) Staff Recommendation Report was made available on April 1st, 2013. Available here:*

http://cityplanning.lacity.org/cwd/gnlpln/transelt/NewBikePlan/Txt/First%20Year(Sunset%20Blvd)%20Staff%20Report_04.01.13.pdf

result in a direct safety benefit. The addition of bicycle lanes on arterial streets is shown to reduce the risk of serious injuries by about 30 percent.[5] According to studies in other Californian cities, per capita injury rates to pedestrians and bicyclists are shown to fall as the level of bicycling increases.[6] Increases in bicycling rates through the country are seen as a direct response to investment in bicycle supporting infrastructure.[7] While some percentage of bicyclists may observe poor judgment in disregarding traffic rules, reasons for this may stem from current road conditions that attract a higher amount of risk prone bicyclists. Adding low stress facilities such as buffered bicycle lanes have a greater potential to encourage the more risk adverse bicycle riding population that would likely have greater observance of traffic rules.

Traffic Delay

Some commenters expressed comfort with increased travel delay, while others expressed opposition to the installation of bicycle lanes if it required the removal of travel lanes. Comments that were comfortable with an increase in travel delay indicated that the safety and network benefits outweighed the costs of additional travel delay.

Those opposed to the removal of travel lanes expressed concern that their quality of life would decline as a result of the increased congestion. They are concerned that infrequent traffic back-ups, experienced during past lane closures, would become the norm. They also expressed a viewpoint that the bicycle lanes would benefit only a small minority as they believe many are not able to bicycle for transportation due to lifestyle constraints. Some stated that the neighborhoods that comprise Northeast Los Angeles are attractive to residents because they have not experienced the extent of congestion felt in other areas of the City.

As discussed above, the traffic analysis found that the Proposed Project would result in significant travel delay at three intersections along N. Figueroa Street and three intersections along Colorado Boulevard. However, the analysis conservatively assumes that there would be no shift in existing travel choice as the result of the new bicycle lanes. Bicycle riding as a travel mode is anticipated to increase as greater connectivity is achieved. A recent examination of 70 case studies, of other roadways where capacity was reallocated to accommodate more bicyclists and pedestrians, reveals that the true traffic impacts are rarely as bad as predicted and that in 73 percent of the cases, traffic was actually less than before the changes were was implemented. The unexpected (from a modeling perspective) reduction in traffic is largely due to the fact that traditional Level of Service (LOS) analysis for roadway changes does not account for changes in travel behavior.[8]

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[5] Kay Teschke et al. 2012. Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study. American Journal of Public Health.

[6] Jacobsen, P.L. 2003. Safety in Numbers: More Walkers and Bicyclists, Safety Walking and Bicycling. Injury Prevention 9~3!:205–209.

[7] Dill, Jennifer and Theresa Carr. 2003. Bicycle Commuting and Facilities in Major Cities: If You Build Them, Commuters Will Use Them. Transportation Research Record 1828:116-123

[8] Cairns *S*, Atkins *S*, Goodwin P (2002) *Disappearing traffic*? *The story so far*. Municipal Engineer, vol. 151, pp 13–22

Neither the 2010 Bicycle Plan, nor the traffic and safety analysis in the Draft EIR, assumes that all segments of the population will use the bicycle lanes. The growth in bicycle ridership in general, as a result of new bikeways, is not expected from those who either lack interest or whose lifestyle prohibits them from bicycling on a regular basis. Rather, growth in bicycle ridership, due to the build-out of bike facilities, is mostly expected from people who already ride occasionally for convenience or recreation, or show an interest in doing so.

Some comments also mentioned how N. Figueroa Street functions as a truck route creating a higher traffic demand on the roadway to carry regional truck traffic.

Trucks would experience the same impacts as motor vehicle traffic and would not be disproportionately impacted. Trucks above 6,000 pounds are restricted from the State Route (SR)-110 between U.S. Route 101 and the SR-110 terminus in Pasadena, though truck movements through this area would continue to be facilitated by the I-5, SR-2 and SR-134. Some truck operations may use the N. Figueroa Street to access local businesses, though N. Figueroa Street is not an officially designated truck route. However, these commercial delivery operators have greater flexibility in altering the delivery schedules to off-peak periods to avoid impacts to travel times.

Network Benefits

Some comments, including bicycle advocacy organizations such as the Los Angele County Bicycle Coalition (LACBC) identified North Figueroa and Colorado Boulevard as high priority corridors to implement, due to their benefits in completing the bicycle network in Northeast Los Angeles that currently includes York Boulevard, Cypress Avenue, parts of Eagle Rock Boulevard, and Avenue 50. Many of the commenters expressed support for the bicycle lanes due to the resulting bikeway network that would provide better access to the high number of destinations in the area, including transit and housing. These comments expressed a preference to implement buffered bike lanes along most of the corridors in order to maximize safety benefits. Preference for buffered bicycle lanes was seen to encourage higher ridership from less confident bicycle riders, such as female bicycle riders. The Proposed Project was also seen to benefit children as the buffered bicycle lanes would provide them a safe, on non-auto travel to get to school.

The Proposed Project includes additional buffer separation between the bicycle lane and the adjacent travel lane for most of the segment along Colorado Boulevard and the segment of N. Figueroa Street between York Boulevard and San Fernando Road.

Other comments submitted from residents in the area identified bicycling as their main travel choice for commuting from Northeast Los Angeles to other parts of the City. Opponents of the Proposed Project indicated that, from their perspective, there is currently sufficient room for bicycling in the existing road configuration. They also perceive that the existing bicycle lanes on York Boulevard and Eagle Rock Boulevard are poorly utilized. Some comments also indicated that the hilly terrain along Colorado Boulevard would be a barrier for bicyclists.

The LACBC conducted bicycle counts in 2009 and 2011 that included intersections at York Boulevard and Avenue 50 as well as N. Figueroa Street and Pasadena Avenue. Bicycle Counts were also conducted at Colorado Boulevard and Eagle Rock Boulevard in 2011. According to the 2011 bicycle count data, bicycle counts for York Boulevard and Avenue 50, N. Figueroa Street and Pasadena Avenue, and Colorado Boulevard and Eagle Rock Boulevard intersections during the peak P.M. peak period (between 4 P.M. and 6 P.M.) were 70, 136 and 51 respectively. Bicycle ridership at the York Boulevard and Avenue 50 intersection increased by 140 percent in the two years between 2009 and 2011, the second highest increase in the City shown during this time period. [9] Bicycle lanes were installed on York Boulevard in 2010, which may have been a contributing factor to the increase in ridership.[10] Both national studies and feedback from the local bicycle community state that the lack of bicycle facilities deters people from bicycling.

Economic Costs and Benefits

Some of the comments in support of the Proposed Project predicted that the bicycle lanes would enhance the economic vibrancy of Colorado Boulevard businesses by slowing traffic during non-peak periods, and providing increased access for pedestrians and bicyclists that would likely support local businesses. One organization, Take Back the Boulevard, referred to a survey they conducted that indicated that 22 percent of respondents access local business by bicycle. The same survey indicated that bicycle for non-work travel will increase if bicycle lanes are installed.

Some of the comments in opposition, expressed concerns that travel delay would negatively impact local businesses along N. Figueroa Street. The comment further asserted that bicycle lane utilization is low along York Boulevard (where LADOT has removed a travel lane), and that the resulting subsequent travel delay has harmed local business there. Another commenter suggested that DCP conduct a cost/benefit analysis of the lane being allocated to bicycles versus cars. The bases of the concern appear from the perception that benefits appear to be disproportionately serving few bicyclists over the majority of drivers as expressed above.

A Bikes Belong grant supported study conducted by the Los Angeles County Bicycle Coalition evaluated the economic impacts of the bicycle lanes along York Boulevard, which required a removal of a travel lane (road-diet).[11] The study compiled data on business taxes, business closures and openings and property sales records and found no significant difference to economic activity along York Boulevard after the road diet was implemented. The study included a survey that found that most merchants did not feel that bicycle lanes would hurt their business, but a large percentage of merchant and customers were hesitant to support bicycle lanes that would remove a travel lane. However, the study also demonstrated that merchants, on average, underestimate the percentage of their costumers that arrive by some means other than the car.

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[9] *LACBC. (2011) L.A. Bike Count: Results from the 2011 City of Los Angeles Bicycle and Pedestrian Count. Pp.27*

[10] *Ibid. Pp.28*

[11] *McCormick, Cullin. (2012) York Boulevard., Economic of a Road Diet. UCLA Luskin School of Public Affairs*

While socioeconomic issues are not required by CEQA, unless they lead to physical environmental impacts, the Draft EIR references cost benefits as part of the safety impact discussion as a footnote for informational purposes. The safety benefit/cost analysis methodology used was established for allocating funding under CalTrans' implementation of the federal Highway Safety Improvement Program (HSIP). Since the programmatic goals of the HSIP are to increase safety of the roadways, economic costs of travel delay are not considered as part of the evaluation. In order for bicycle lanes to be eligible for the AB 2245 exemption, a safety impact discussion is required, but the calculation of economic costs due to travel delay is not.

Another comment urged DCP to evaluate factors, such as retail sales and property values before, and after, implementation of the bicycle lanes, to determine positive or negative impacts on livability. While the Bikes Belong study was not part of a formal City program, Policy 3.2.6 of the 2010 Bicycle Plan seeks to establish a means to measure the economic impact of bikeway improvements on commercial corridors. A part of such program could include collecting data on business taxes and property sales records for a given period to monitor patterns in response to bikeway improvements.

Bicycle Lanes on Alternative Streets

Some of the comments in opposition to bicycle lanes suggested directing bicyclists to use alternative streets than those included in the Proposed Project. One suggested an alternative to bicycle lanes along N. Figueroa Street that included Marmion Way, Avenue 50, Monet Vista, Avenue 59 and Piedmont Avenue. Another suggested that a bikeway be included on Avenue 64 instead of N. Figueroa Street, north of York Boulevard. Commenters suggested both Yosemite Drive and Los Flores Drive as alternatives to bicycle lanes along Colorado Boulevard.

Some of the streets that were offered as alternatives fail to provide a complete network connection, while other proposed alternatives do not connect bicycle riders to their preferred destinations. Some of the alternative streets also lack the width necessary to install bicycle lanes while maintaining one travel lane in each direction along with on-street parking.

Other comments suggested that instead of installing bicycle lanes, the City could focus on providing bicycle and motorist education, improved lane marking and signage, and installing more bicycle parking. Many of these programs are currently included in the 2010 Bicycle Plan, however, none independently has been shown to increase bicycle ridership as much as bicycle lanes.

Design Features

There were several requests by bicycle lane supporters to install a buffered bicycle lane along the entire length of Colorado Boulevard, and to continue the bicycle lane on N. Figueroa Street southwest of Avenue 26 to San Fernando Road. There was also support for completing bicycle lanes on Eagle Rock Boulevard, from its current terminus, north to Colorado Boulevard to complete the network connection.

The Draft EIR evaluated the installation of a buffered bicycle lane on most of Colorado Boulevard and as well as bicycle lanes along N. Figueroa Street including the intersection at Avenue 26. LADOT is currently reviewing the completion of bicycle lane striping on Eagle Rock Boulevard.

Some commentors concerned about the potential travel delay prefer that (for just the portion of N. Figueroa Street in proximity to the Gold Line train crossing) 'sharrows' be installed instead of bicycle lanes. Other comments suggested the intersection design treatments emphasize the bicyclists' path of travel and protect turn movements (bike boxes). These design options shall be forwarded to LADOT for consideration.

Some of the comments requested that signal timing should be calibrated to encourage traffic to move at the lower prevailing peak travel speeds, as opposed to the posted speed limit in order to encourage slower traffic flow.

LADOT shall make adjustments to signal timing once the bicycle lanes are installed as part of Mitigation Measure T1 to facilitate safe and efficient traffic movement for all roadway users.

Environmental Benefits

Some commenters suggested that traffic congestion induced by the bicycle lanes, would likely lead to increased air quality problems, while others thought that the bicycle lanes would help to improve air quality in the long run. Pages 4.1-15 to 4.1-16 of the Draft EIR found that the Proposed Project's impacts on air quality would be less than significant. In addition, potential improvements in air quality are discussed on pages 3-6 to 3-7 of the Draft EIR as a project benefit, resulting from the encouragement of a non-polluting source of transportation.

Emergency Vehicle Access

Opponents to the bicycle lanes raised concern that the Proposed Project would create potential safety impacts (and associated liability to the City) due to increased congestion and reduced road capacity hindering emergency vehicle access and prompt response times.

Emergency vehicles are able to use sirens to move traffic out of the path of travel. Buffered bicycle lanes could also provide sufficient space for cars to pull over into, in order to yield right-of-way to emergency response vehicles. In general emergency vehicles will be able to use center left turn lanes. In addition, bicycle lanes would provide either space for vehicles to move out of the way or in some cases emergency vehicles would be able to use the bike lane and buffer as an emergency vehicle lane. Substantial impacts to emergency services are not anticipated.

Traffic Study Error

Some comments stated concerns with suspiciously high traffic delay numbers reported in the Draft EIR for the intersections of Sierra Villa Drive and Eagle Rock Boulevard

along Colorado Boulevard, and requested that the traffic counts be investigated and revised if needed.

LADOT staff looked into this and found irregularities with the traffic count data. New counts were conducted and showed that the potential impact at the two intersection of Sierra Villa Dr. and Eagle Rock Boulevard were overestimated in the Draft EIR. The revised analysis found that the Proposed Project would result in the following two intersections on Colorado Boulevard:

- 50.7 instead of a 94.7 second delay during the AM Peak Hour at Sierra Villa Drive
- 350.9 instead of a 471.5 second delay during the PM Peak Hour at Sierra Villa Drive
- 55.7 instead of a 111.4 second delay during the AM Peak Hour at Eagle Rock Boulevard
- 115.5 instead of a 453 second delay during the PM Peak Hour at Eagle Rock Boulevard

Revisions to both Table 4.5-2 on Page 4.5-9 and Table 4.5-5 on Page 4.5-19 of the Draft EIR is included in the attached Corrections.

Demonstration Trial Lane Closure

LADOT, DCP and CD 14 received a several requests during the extended public outreach to assess the feasibility of temporarily closing one lane on Colorado Boulevard for one week in order to simulate the traffic impacts of the Proposed Project.

Trial lane closures are not part of the Proposed Project. Granting or denying the request is at the discretion of LADOT in exercising their judgment of encouraging orderly and safe operation of the roadway. In addition, LADOT will need to assess the task relative to resource and staffing constraints.

Additional Outreach, Surveys and Petitions

LADOT and DCP attended Neighborhood Council meetings as well as community meetings sponsored by the CD 14 Council Office in order to further engage the public, and receive feedback, on the Proposed Project. Comments raised at the meetings largely repeated feedback received at the hearing and written comments received during the comment period and addressed throughout this staff report.

City staff have received subsequent email comments during this extended outreach that included 85 comments, in support of various elements of the proposed Project, and 32 letters in opposition to the removal of travel lanes. Organizations that submitted support letters for bicycle lanes along Colorado Boulevard include the Eagle Rock Neighborhood Council, the LACBC, Take Back the Boulevard, and over 40 local business owners in Eagle Rock. Organizations that submitted opposition letters include several local business owners along Colorado Boulevard. Some of the support and opposition from these groups seem to also overlap with the respective support for, or concern with, bicycle lanes along N. Figueroa Street.

In addition, a number of surveys and petitions have been submitted to council offices, as well as DCP and LADOT staff, that both support and oppose the Proposed Project. Estimating the total amount of support or opposition is difficult to gauge by the petitions

submitted, due to repeating names on multiple petitions, as well as individuals signing both support and opposing petitions. This latter ambiguity could stem from the nature of the petition question since the responses could be influenced depending on how the question is framed. In addition, some reasons that were raised for opposing the Proposed Project included the loss of parking, though the Proposed Project does not include the loss of parking spaces. This could indicate a lack of understanding of the Proposed Project as a basis for the opposition.

SUMMARY AND RECOMMENDATION

Based on the completion of the publication of the traffic and safety assessment in the Draft EIR, the inclusion of mitigation measures and the holding of a public hearing, the DCP recommends that LADOT find that the City is in compliance with Section 21080.20.5 of the PRC, and therefore determine that the Proposed Project is not subject to Division 13 of the PRC, also known as CEQA. Based on the conclusions of the traffic and safety assessment in the Draft EIR, the safety improvement benefits of building out the bicycle network, and the role the Proposed Project plays in implementing the goals and policies of the 2010 Bicycle Plan, the DCP recommends that LADOT act to move forward with the implementation of the 8.1 miles of new bicycle lanes in the Northeast Los Angeles area.

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ATTACHMENT 1. SUMMARY OF COMMENTS AND RESPONSES

The following master comments, and their corresponding master responses, are derived from the comments (verbal comments from the public hearings as well as written comments) received in response to the circulation of the Draft EIR, which included the transportation and safety analysis. Since the Draft EIR evaluated over 40 miles of proposed bicycle lanes included in the First Year of the First Five Year Implementation Strategy, not all of the comments were directly related to the Proposed Project. However, general comments have been included here in addition to comments that address the Proposed Project in Northeast Los Angeles. Comments that specifically address the other bicycle lanes in the First Year of the First Five Year Implementation Strategy will be addressed in subsequent Department of City Planning (DCP) Staff Recommendation Reports or the Final EIR for the Figueroa Streetscape Project.

The following Master Comments (in bold) have been distilled from a number of similar comments. A list of some of the specific comments related to each master comment is included in Appendix 1.

Master Comment 1a: Expressions of support to bicycle lanes in general and/or specific projects.

Master Response 1a: A number of letters were received that supported bicycle lanes in general or supported specific segments.

A number of comments addressed the unsafe conditions along existing streets and the need for safe bicycle lanes to ensure that bicycles have access to paths of travel (north-south and east-west as well as connections to existing bicycle routes and future transit stations) in the City. Some people indicated a preference for protected bicycle lanes in order to maximize safety and therefore increase bicycle use of the routes. Many supporters cited improvements in bicycle safety as a major reason to implement the lanes. Also people noted that increasing bicycle connectivity and increasing accessibility to area uses is anticipated to increase bicycle ridership.

Several people noted that decreasing vehicular capacity could, over time, lead to different travel behavior (working from home, living closer to work) thus reducing congestion.

Some supporters drew parallels to other cities to indicate what was possible. Supporters predicted that an improved bicycle network, coupled with slower traffic, will increase access to and patronage of local businesses. Supporters of bike lanes pointed to reduced traffic speed as a side benefit.

Master Comment 1b: Expressions of opposition to bicycle lanes in general and/or specific projects.

Master Response 1b: A number of letters were received that opposed bicycle lanes in general or opposed specific segments.

The Draft EIR/traffic and safety analysis indicated significant impacts along a number of streets as a result of the project. A number of comments agreed with the conclusions of the Draft EIR, with respect to the significance of the travel impacts, and further indicated that such impacts were unacceptable. Opponents expressed that comparing Los Angeles to other more bicycle friendly cities was flawed in not highlighting the differences that set Los Angeles apart. They also predicted that travel lane reduction will harm access to local businesses.

Master Comment 2: Outreach efforts were inadequate to reach all interested parties.

Master Response 2: The City complied with notification requirements of Section 21080.20.5 (b)(2) of the Public Resource Code (PRC) through publishing a notice in a newspaper of general circulation. The Notice of Availability and Public Hearing was published in the Los Angeles Times on January 17, 2013. In addition to the legal requirements of the PRC, notification and outreach process for the Proposed Project also included a variety of lists used to distribute notices of the Hearings and Draft EIR availability. The distribution included neighborhood councils in affected areas, a list of public agencies, email contacts of interested

parties whom have submitted inquiry by email on the 2010 Bicycle Plan and implementation process, and organizations that have submitted letters in the scoping process.

A Notice of Public Hearing was distributed on December 13, 2012. The notice was distributed two months in advance of the public hearing in order to give neighborhoods councils sufficient time to agendize the item for an upcoming meeting and to perform any outreach and input they deemed sufficient in advance of the Hearing. The Notice of Availability of the Traffic and Safety Assessment was released on January 17, 2013, in advance of the Public Hearing on the Proposed Project, and included both a physical and email address where comments could be sent to. The Notice of Availability was distributed to the same parties that were sent a hearing notice.

City staff believes this process of notification to be comprehensive and that all interested parties had an opportunity to be notified through these channels. This is in addition to the information provided by LADOT staff at various neighborhood council and community forums, as well as noticing on the LADOT Bike Blog and the Department of City Planning website. All comments expressing opinion about the Proposed Project have been forwarded to the respective Council offices.

Master Comment 3: The use of a CEQA Exemption is not the appropriate environmental documentation. The City failed to comply with the eligibility requirements of PRC Section 21080.20.5. The 2010 Bicycle Plan fails to comply with Section 891.2 of the California Streets and Highways Code.

Master Response 3: AB 2245 (PRC Section 21080.20.5) allows for a Statutory Exemption from CEQA. The exemption provides that CEQA does not apply to restriping of streets in urban areas. Restriping in urban areas, consistent with a bicycle plan, is statutorily exempt from CEQA. A Statutory Exemption from CEQA contrasts with a Categorical Exemption. (For example, CEQA Section 15304 Minor Alterations to Land, subsection (h) allows bicycle lanes in existing rights of way.) A Categorical Exemption is for a class of projects that is generally found to have less than significant impacts. However, a Categorical Exemption is not allowed in circumstances where a significant impact could occur. Therefore, AB 2245 was proposed to streamline the processing of bicycle lanes that had the potential to result in significant adverse impacts.

The comment alleges that the implementation of bicycle lanes identified in the 2010 Bicycle Plan are not eligible for the Exemption under AB 2245 because: implementation of the 2010 Bicycle Plan requires a General Plan Amendment that includes a major revision to the Circulation Element, the eligibility requirements of PRC Section 2180.20.5 were not appropriately satisfied and the 2010 Bicycle Plan itself does not comply with Section 891.2 of the Streets and Highways Code.

As stated in the DCP Staff Recommendation Report, the City complied with the provisions of PRC Section 21080.20.5 by assessing the traffic and safety assessments of the Proposed Project and including the analysis in a Draft EIR. The Draft EIR was made available on January 17, 2013, nearly one month in advance of the Public Hearing of the Proposed Project held on February 13, 2013. See Master Response 2 for notification of availability of Draft EIR and the Public Hearing.

The commenter implies that the 2010 Bicycle Plan is not in compliance with several provisions of Section 891.2 of the Streets and Highways Code. The provisions include existing number of bicycle commuters and the estimated increase of bicycle commuters from plan implementation; a map of land uses, existing and proposed land uses; a map of existing and proposed transport and parking facilities; a map of clothing storage facilities; a description of bicycle safety and education programs; a description of citizen and community involvement; a description of plan coordination with local and regional plans, a description of projects proposed in the plan; and a description of past expenditures for bicycle facilities future financial needs for bicycle safety improvements.

The commenter seems to confuse the proposed action under review, which is an administrative action (implementation of the 2010 Bicycle Plan), with a legislative action (amendment to the 2010 Bicycle Plan). The Proposed Project implements the 2010 Bicycle Plan. The Proposed Project is included in the 2010

Bicycle Plan as part of the Backbone Bikeways Network. Implementation of the 2010 Bicycle Plan is an administrative decision by LADOT, and a General Plan Amendment (a legislative action) is not required to implement the 2010 Bicycle Plan. The proposed action does not require the re-adoption of the 2010 Bicycle Plan, as the 2010 Bicycle Plan was adopted by resolution by the City Council on March 1st, 2011. Compliance with Section 891.2 of the Streets and Highway Code is not related to the action to implement the 2010 Bicycle Plan, but was required when the 2010 Bicycle Plan was adopted. Furthermore, Los Angeles County Metropolitan Transportation Authority (Metro) issued a memo to the Department of City Planning on March 16, 2012 that found that the 2010 Bicycle Plan was in compliance with Section 891.2 of the Streets and Highway Code. The compliance pursuant to Section 891.2 of the Streets and Highway Code can be found in 2010 Bicycle Plan Appendix C: Bicycle Transportation Account (BTA) Checklist.

The commentor states the need to complete a Final EIR but fails to demonstrate why the completion of a Final EIR is necessary.

Master Comment 4: The Draft EIR addresses bicycle lanes in a piecemeal manner, which is not permitted by CEQA.

Master Response 4: The comment asserts that the Draft EIR conducted a piecemeal analysis and that the analysis should encompass the entire 2010 Bicycle Plan.

The 2010 Bicycle Plan was reviewed in one environmental document (Mitigated Negative Declaration (MND), ENV-2009-2650-MND, published on October 8, 2010). At the time the MND was prepared, the basic design configurations for many bikeways were undetermined. The bikeways established in the 2010 Bicycle Plan, that did not require either the removal of a mixed flow travel lane, or the removal of a mixed-flow travel lane that did not result in a significant travel delay impact were cleared through the MND. On Page 114 of the 2010 Bicycle Plan it was determined that, once a design was identified, bicycle lanes that required the removal of a travel lane(s), that could potentially result in a travel delay impact, would require further analysis. The process established by AB 2245, exempts the implementation of bicycle lanes from CEQA. In order to qualify for the exemption, AB 2245requires that a traffic and safety analysis be conducted, that mitigation measures be incorporated, and a public hearing be held.

The analysis of all potential bikeways in the 2010 Bicycle Plan is not possible at this time because the specific facility type and the implementation phase of many of the bikeways in the 2010 Bicycle Plan is remote and speculative. Once a bikeway is prioritized for implementation, and a facility type is known, the City determines if subsequent review is required based on the potential for traffic and safety impacts. The City shall comply with all requirements of Section 21080.20.5 of the PRC (AB 2245) once it is determined that subsequent analysis is necessary.

Master Comment 5: The proposed bicycle lanes are inconsistent with the Framework Element of the General Plan that includes a requirement that all streets designated as bicycle routes have a curb lane wide enough to accommodate bicycle traffic.

Master Response 5: As described on page 4.3-16 of the Draft EIR, the 2010 Bicycle Plan was approved and adopted by the City as part of the Transportation Element of the City's General Plan, which is the overall guiding plan element that establishes the City's transportation policy. The 2010 Bicycle Plan (Bicycle Plan) identifies a 1,684 mile bikeway system that includes City streets and establishes policies and programs intended to make bike riding safe on City streets, consistent with General Plan Framework Policy 5.3.4. The Proposed Project is identified in the Bicycle Plan as part of the City's Backbone Network, and therefore, would be consistent with the goals and objectives of the Bicycle Plan, the Transportation Element, and the General Plan Framework.

The Proposed Project includes installing bicycle lanes that could result in the loss of at least one travel lane. The loss of travel lane is necessary to provide a curb lane wide enough to accommodate bicycle traffic along designated bikeways, and for consistency with the policies of the Bicycle Plan and the City's General Plan Framework. The buffered bicycle lanes are included to provide additional safety for bicyclists and conform

to standards in the Technical Design Handbook, as well as the California Manual of Uniform Traffic Control Devices (MUTCD).

The comment alleges that the Draft EIR picks and chooses from many objectives and policies of the Framework Element and misses important ones critical to an objective EIR but fails to provide evidence to support how the Proposed Project would conflict with the Framework Element, or how such conflict would contribute to a significant impact. The Comment identified a number of General Plan Framework policies and programs; however, many of these programs do not relate to the Proposed Project or to bicycle lanes in general. For this reason, they are not referenced in the Draft EIR. For example, program P4 calls for the development of Transportation Improvement and Mitigation Plans (TIMPs) for the purpose of expediting the approval of new development applications and streamline traffic mitigation procedures. The Bicycle Plan is not the appropriate mechanism to set policy for development review applications, as TIMPs are developed as the Community Plans are updated. However, one of the elements of the TIMP to be considered is a bicycle access plan for targeted growth areas. Rather than conflicting with the program as implicated by the comment, the Proposed Project substantially improves bicycle access in a high-targeted growth area of the Central City, South and Southeast Community Plan areas.

The absence of these General Plan Framework policies in the Draft EIR that are unrelated to implementation of the Proposed Project does not influence the objectiveness of the Draft EIR. However, some of the Framework Element programs mentioned in the comment letter are considered as mitigation measures when implementing bicycle lanes on City streets, such as neighborhood traffic management strategies.

Master Comment 6: The Proposed Project is not consistent with applicable Community Plans.

Master Response 6: The Draft EIR analyzes the impacts of implementation of just 39.5 miles of the 1,684 miles of bicycle lanes identified in the 2010 Bicycle Plan. The City's updated community plans, which are in various stages of planning and approval, are just one of several opportunities available to evaluate the implementation of proposed bicycle lanes identified in the 2010 Bicycle Plan. However, the completion of a Community Plan update is not necessary to implement bicycle lanes in the Community Plan area. Proposed bikeways that potentially result in significant impacts are subject to the exemption process established by AB 2245, and can be cleared through subsequent traffic and safety assessments provided they meet the requirements of AB 2245.

As described on pages 4.3-16 and 4.3-17 of the Draft EIR, the Proposed Project are generally consistent with applicable plans and policies, and are consistent with applicable Community Plan objectives and policies related to the promotion of pedestrian and bicycle use. However, due to the loss of traffic lanes, the Proposed Project is inconsistent with objectives and policies related to traffic volumes and flow, though the loss of traffic capacity would not create unsafe conditions or substantially affect the aesthetic character of the community. The Draft EIR concluded on page 4.3-16, that because the Proposed Project would be consistent with applicable plans and policies encouraging alternative transportation, sustainability, and in general responds to State and regional sustainability requirements, impacts related to land use plan and policy consistency would be less than significant. Policies referenced in the comments primarily relate to physical development and do not apply to the Proposed Project. Applicable objectives and policies of the community plans are identified in Table 4.3-2 of the Draft EIR. The intended positive effect of the Proposed Project on communities is also discussed in Section 3.2, Project Objectives, and Section 3.3 Project Benefits, of the Draft EIR.

Master Comment 7: The proposed bicycle lanes represent a major revision to the Circulation Element. The Proposed Project does not address how the 2010 Bicycle Plan also plans for bicycling as a recreation use, as well as a transportation use. A full EIR is required.

Master Response 7: The commenter seems to confuse the proposed action under review, which is an administrative action (implementation of the 2010 Bicycle Plan), and not a legislative action (amendment to the 2010 Bicycle Plan). The Proposed Project implements the 2010 Bicycle Plan. The Proposed Project is included in the 2010 Bicycle Plan as part of the Backbone Bikeways Network. The 2010 Bicycle Plan was

adopted by the City Council March 1st, 2011 by resolution. Implementation of the 2010 Bicycle Plan is an administrative decision by LADOT, and a revision of the Circulation Element (a legislative action) is not required to implement the 2010 Bicycle Plan. See Master Response 4 for the environmental clearance process of the 2010 Bicycle Plan.

In response to the comment that the Bicycle Plan does not link the Circulation Element to the Land Use Element, the 2010 Bicycle Plan considered land use as a factor in designating the City's bikeways. The implementation of bikeways in the 2010 Bicycle Plan is influenced by a number of factors including increased bicycle access to destinations along commercial corridors.

The comment does not substantiate how the Proposed Project would benefit people choosing to bicycle for recreation purposes over mobility purposes or how increasing recreational riding would contribute to an environmental impact.

See also Master Responses 10 (regarding alternate streets), 30 (regarding use of bicycle lanes) and 32 (regarding mode shifts).

Master Comment 8: The Proposed project is not consistent with the Complete Streets Act.

Master Response 8: AB 1358 requires that upon any substantive revision of the circulation element of a general plan, the circulation element should be modified to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roadways, and highways. The adopted 2010 Bicycle Plan is a component of the City's Transportation Element (which itself is in the process of being revised). The 2010 Bicycle Plan plans for the provision of a bicycle network that is safe and convenient. The implementation of the 2010 Bicycle Plan does not preclude the creation of a balanced multimodal transportation network; rather it is just one component of such a network and supports the use of other forms of transportation, consistent with the intent of AB 1358. Contrary to one commenter's statement, the 2010 Bicycle Plan does not make changes to any community plans. However, as the community plans are updated they will incorporate the bikeway system identified in the 2010 Bicycle Plan.

The Proposed Project implements a small portion of the bicycle network identified in the 2010 Bicycle Plan. An objective of the Proposed Project is to encourage multi-modal travel by creating a better environment for bicyclists, pedestrians, and transit users while accommodating vehicles. Page 3-2 of the Draft EIR lists the objectives of the Proposed Project, all of which are consistent with the intent of AB 1358. Implementation of the Proposed Project would not preclude the use of vehicles for those who do not wish to walk or bicycle.

The commentor states the need to complete a Final EIR and show how this plan complies with AB 1358, but fails to indicate either the lack of compliance with AB 1358, or the significant impact would occur as a result. See Master Response 3.

Master Comment 9: The Bicycle Plan discriminates against people with disabilities.

Master Response 9: Consistent with a number of planning strategies in the State, Region and City, the Bicycle Plan addresses plans to improve one mode of transportation, but not to the exclusion of other travel modes. The City will continue to plan for travel modes that are accessible to the disabled. The 2010 Bicycle Plan does not discriminate against people with disabilities.

Master Comment 10: Commenters identified a number of alternative streets other than those analyzed in the Draft EIR and other programs to promote bicycling in the City, in lieu of installing bicycle lanes.

Master Response 10: Some of the streets that were offered as alternatives lack feasibility because they do not provide a complete connection along a corridor as compared to the Proposed Project, while other proposed alternatives do not connect bicycle riders to their preferred destinations. Some of the proposed alternative streets also lack the necessary width to install bicycle lanes while also maintaining one travel lane in each direction and on-street parking.

Some of the comments suggested programs that promote car pooling, transit, and greater reliance on sidewalks for bicycling, as a means to full fill some of the project objectives, instead of installing bicycle lanes. Car pooling and changes to transit are separate projects that are simultaneously being pursued in the City; they are not alternatives to the bicycle lanes proposed. Use of sidewalks by bicycles - though legal in the City of Los Angeles – is not encouraged; studies show that bicycle riding on sidewalks presents more risks to all users, as compared to riding a bicycle in the street. The City is also encouraging increased pedestrian activity and therefor separating bicycles from pedestrians is beneficial.

Some of the comments sought greater investment in bicycle facilities such as cycle ways and cycle tracks beyond standard and buffered bicycle lanes. Elevated cycleways and protected bicycle lanes throughout the system are currently infeasible, in the short-term, due to insufficient funding and road allocation needs. An elevated bicycle facility would likely lack the added safety benefits achieved by reducing the number of travel lanes and effectively lowering the design speed. The Department of City Planning is currently undergoing an update to the Mobility Element that currently includes the identification of a low-stress bicycle network throughout the City. This will likely include the proposal for more protected bicycle lanes also known as cycle tracks. However, this is a long-term goal and implementation of standard or buffered bicycle lanes is more feasible option in the short-term. A buffered bicycle lane is proposed for most of the length along Colorado Boulevard and the segment of N. Figueroa Street between York Boulevard and San Fernando Road.

Master Comment 11: The Draft EIR does not provide accurate information regarding the monetary value of injuries and fatalities.

Master Response 11: The monetary value of various injuries, by type of collisions, were included as a footnote 28 on Page 4.5-33 of the Draft EIR, The information was included to demonstrate the safety benefits, in monetary terms, in reducing the amount of bicycle and pedestrian related collisions if bicycle lanes were installed. A response to inquiry with the Transportation Injury Mapping System (TIMS) staff verified that the original monetary values were underreported.[1] The follow text corrects what was provided in the Draft EIR.

~~Injury types and their respective monetary values used are Fatality ($140,301), Severe Injury ($7,560), Other Visible Injury ($2,765), and Complaint of Pain ($1,572).~~ The values used for the safety benefits and methodology used in the benefit-cost calculator are on page 82 of the CalTrans Local Roadway Safety Manual (April 2012). Bicycle lanes in general reduce bicycle/pedestrian collisions by 35%..

Crash Severity **	**Crash Cost ***
Fatality (K)	$4,008,900
Severe/Disabling Injury (A)	$216,000
Evident Injury – Other Visible (B)	$79,000
Possible Injury – Complaint of Pain (C)	$44,900
Property Damage Only (O)	$7,400
* The letters in parenthesis (K, A, B, C and O) refer to the KABCO scale; it is commonly used by law enforcement agencies in their crash reporting efforts and is further documented in the HSM. ** Highway Safety Manual (HSM), First Edition, 2010.	

Master Comment 12: The heat map showing bicycle safety is too general.

Master Response 12: The heat map (Figure 4.5-1) is intended to show citywide trends regarding bicycle collisions. Project level bicycle collision data is available; see Master Responses 10 and 17.

[1] *Email correspondence with the Transportation Injury Mapping System (TIMS) staff on January 22, 2013.*

Master Comment 13: The Draft EIR analyses traffic impacts and does not address LOS of transit or other modes of transportation.

Master Response 13: LADOT is studying alternative methodologies to identify impacts to street throughput including all modes of transportation. Until an alternative methodology is adopted, and the types of data needed to undergo any new methodology are identified and collected, the existing thresholds and LADOT methodology for traffic studies are the only available methodologies at this time. However, the Draft EIR verifies that the bicycle-transit-only lane would reduce the transit travel time, within this segment, during the peak hours of travel demand.

Master Comment 14: The EIR should address impacts to Native American Resources.

Master Response 14: The Proposed Project is the installation of bicycle lanes, and does not involve the disturbance of previously undisturbed ground. The project is limited to paint associated with bicycle lanes. Therefore no disturbance of Native American resources is anticipated.

Master Comment 15: The Draft EIR should identify standards for bike lanes (e.g., width and distance from curb or parked cars).

Master Response 15: The standard dimensions for standard Class II Bicycle lanes include a 5-foot minimum bike lane width next to a curb or parking lane. The minimum distance of a parking lane is 7-foot when a 5-foot bike lane is adjacent to it. A minimum 10.5-foot traffic lane is required next to a bicycle lane. The Proposed Project includes buffered bicycle lanes that exceed the 5-foot minimum bicycle lane dimensions.

Master Comment 16: The City should collect more traffic and bicycle count data as well as economic data in order to be able to evaluate project success and any unintended consequences (impacts to businesses, adjacent streets). Additionally data regarding collisions and delay should be made available.

Master Response 16: LADOT maintains an inventory of traffic counts, at specific locations, around the City. Complete counts, across even small areas of the City, including neighborhoods, would require effort beyond the staffing capacity commensurate with the installation of bicycle lanes. The City continues to reach out to third party organizations to conduct bicycle counts and has applied for funding to install bicycle counters in strategic locations. However, these efforts are either contingent on funding or timing constraints that may be infeasible to occur during specific project implementation.

LADOT and DCP currently monitors bicycle crash data from the Statewide Integrated Traffic Records System (SWITRS) as implementation of Program 3.2.4 A of the 2010 Bicycle Plan. The SWITRS data is collected by California Highway Patrol and is available through the Transportation Injury Mapping System (TMS) established by Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley. The monitoring of bicycle and pedestrian collision data is currently reviewed by staff prior to bicycle lane installation and will be reviewed over the long term to determine the safety benefits of bicycle facilities.

The comment refers to a Bikes Belong grant supported study conducted by the Los Angeles County Bicycle Coalition (LACBC) that evaluated the economic impacts of a similar installation of bicycle lanes along York Boulevard that required a removal of a travel lane (road-diet).[2] While this type of evaluation was not part of a formal City program, Policy 3.2.6 of the 2010 Bicycle Plan seeks to establish a means to measure the economic impact on commercial corridors resulting in bikeway improvements. However, implementation of this program is contingent on program funding. A part of such program could include collecting data on business taxes and property sales records for the given period to monitor patterns in response to bikeway improvements.

[2] McCormick, Cullin. (2012) York Boulevard., Economic of a Road Diet. UCLA Luskin School of Public Affairs

See Master Response 28 related to neighborhood intrusion impacts.

Master Comment 17: The cost benefit analysis does not address the impacts/costs of added travel delay.

Master Response 17: Socioeconomic issues are not required by CEQA unless they lead to physical environmental impacts. The cited benefit/cost results were included as a footnote for informational purposes as part of the safety impact discussion. The benefit/cost analysis methodology used was established for allocating funding under CalTrans' implementation of the federal Highway Safety Improvement Program (HSIP). Since the programmatic goals of the HSIP are to increase safety of the roadways, economic costs of travel delay are not considered as part of the evaluation. In order for bicycle lanes to be eligible for the AB 2245 exemption, a safety impact discussion is required, but the calculation of economic costs due to travel delay is not.

Master Comment 18: The Draft EIR should cite safety, injury and fatality studies.

Master Response 18: The following Table A shows bicycle/ pedestrian collision injuries and fatalities data for 10 years for the Proposed Project street segment.

TABLE A: BICYCLE PEDESTRIAN COLLISION INJURIES AND FATALITIES ON PROJECT ROUTES

Street	Bike/Ped Collision Injuries Total 10 Years (2001-2010)	Bike/Ped Collision Fatalities 10 Years (2001-2010)	Route Miles	Collision Injury/Fatality rate per mile per year
N. Figueroa St.	169	9	5.1	3.49
Colorado Blvd.	50	2	3	1.73

Source: Data compiled using the Transportation Injury Mapping System developed by the University of California, Berkeley. http://www.tims.berkeley.edu/

Master Comment 19: The Bicycle Plan should be coordinated with other Citywide plans and projects.

Master Response 19: Implementation of the 2010 Bicycle Plan is a citywide planning effort that is being undertaken jointly by DCP and LADOT. Their efforts are coordinated with other planning efforts being undertaken at the same time including the Mobility Element Update, the Westside Mobility Study, new, community plans, specific plans, etc. However, as noted below, detailed analysis of bicycle lanes can only be undertaken when the bicycle lanes /street cross sections have been designed. Therefore, it is not possible to fully coordinate all planning efforts at the same time as individual bicycle lanes may be designed after completion of some of the planning efforts mentioned.

Master Comment 20: What is the source of funding for the projects?

Master Response 20: The Proposed Project is funded by Measure R local return.

Master Comment 21: The EIR does not provide sufficient mitigation to reduce project impacts.

Master Response 21: Some comment letters allege the inadequacy of mitigation measures, but failed to provide measures that would be as effective at reducing impacts while achieving the project objectives. Mitigation Measure T1, the adjustment to signal timing and Mitigation Measure T2 implementation of citywide Transportation Demand Management (TDM) measures are feasible means to both move traffic within the system capacity as efficiently as possible, while providing programmatic support to reduce the overall demand of driving. Other potential mitigation, such as road widening are either too costly in terms of additional right-of-way acquisition or compromise the travel demand and safety benefits achieved by the Proposed Project.

Mitigation Measure T3 was incorporated in the Draft EIR to address potential neighborhood intrusion

impacts due to the roadway reconfigurations proposed as part of the First Year of the Five Year Implementation Strategy. Neither Colorado Boulevard nor N. Figueroa Street were identified in the Draft EIR as areas where implementation of bike lanes could potentially result in diversion of traffic to adjacent residential streets. Therefore, Mitigation Measure T3 is not required for the Proposed Project.

See also Master Response 28 related to traffic diversion.

Page 4.5-32 of the EIR acknowledges, that the Proposed Project would result in a potentially significant impact related to transit operations along N. Figueroa Street and Colorado Boulevard due to increases in transit travel time and transit delay. Mitigation Measure T1, the adjustment to signal timing would help to reduce transit delay in addition to general traffic delay. There were no other mitigation measures identified by the comments that would further reduce impacts to transit delay. As the comment fails to include measures that would deem as adequate, no further response is necessary.

Master Comment 22: The cumulative analysis is inadequate.

Master Response 22: CEQA Guidelines [Section 15130(d)] allow for two methods for reviewing cumulative development:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or
- A summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or greenhouse gas reduction plan. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

If approved, the various bicycle projects, included in the First Year of the Five Year Implementation Strategy are anticipated to be in place within one year. Many of the known cumulative projects are anticipated to be completed over a number of years. In addition projects not yet known will occur throughout the City. For that reason the City chose to use a plan based analysis of cumulative conditions. The SCAG projections take in to account City growth projections, large known projects are typically included in the SCAG modeling data.

It is City policy to not include mitigation measures from related projects in the traffic analysis of proposed projects due to uncertainty in the related project approval and implementation phase.

Bike lanes as proposed on these streets would not adversely impact emergency responders. See Master Response 26 below.

Master Comment 23: The Draft EIR uses count data for each intersection based on only one day. Use of a single day to assess traffic impacts could underestimate traffic impacts.

Master Response 23: Performing a one-day count conforms to the LADOT Traffic Study Policies and Procedures and is representative of a typical day. The LADOT Traffic Study Policies and Procedures establish that all traffic counts should generally be taken on Tuesdays through Thursdays during non-Summer months, when local schools are in session, on days of good weather, and should avoid being taken on weeks with a holiday.[3] Minor fluctuations occur from day to day and over seasons. One day counts are adequate for the analysis.

[3] LADOT, Traffic Study Policies and Procedures. May 2013. Page 6

Master Comment 24: The Draft EIR analyzes the peak hours of 3 pm to 6 pm, which may not be enough to capture all peak hours. The peak hours in the City of Los Angeles last well past 6 pm.

Master Response 24: Peak hour in the City of Los Angeles occurs during the peak period between 3 PM and 6 PM. That is not to say that increased traffic does not extend beyond these hours just that the peak traffic occurs during these periods. In many areas of the City as noted by a number of commenters commuter traffic extends to 7:30 PM and beyond, but the peak activity occurs between 3 PM and 6 PM. For the purposes of the analysis, the peak period is used to demonstrate the worst-case scenario of traffic impacts. The LOS impacts would not change if the peak period were to be extended, since LOS of non-peak period is not evaluated.

Master Comment 25: The Draft EIR does not account for special events or seasonal traffic.

Master Response 25: Background traffic during special events, etc. is typically much lower than the background traffic during the peak period, and past traffic counts at these locations have confirmed this. Even with event traffic, overall maximum intersection delay occurs during the peak period (3-6 PM). Traffic in the immediate vicinity of special events may be worse outside peak hours, but is not easily captured because of inherent variability in types of events.

Master Comment 26: The removal of travel lanes would impact emergency vehicle and response times.

Master Response 26: Emergency vehicles are able to use sirens to move traffic out of the path of travel. Buffered bicycle lanes could also provide sufficient space for cars to pull over into in order to yield right of way to emergency response vehicles. In general, emergency vehicles are also able to use center left turn lanes. In addition, the bicycle lanes would provide space for vehicles to pull over to allow passage of emergency vehicles, or in some cases, emergency vehicles could use the bicycle lane and buffer as an emergency vehicle lane. Substantial impacts to emergency services are not anticipated.

Master Comment 27: The Draft EIR averages delay and impacts and does not take into account further delay that could occur between intersections, or at left turns.

Master Response 27: The Draft EIR Traffic analysis evaluates impacts based on the peak hour. So to the extent that peak hour impacts are analyzed (as opposed to peak 15 minutes), impacts are averaged. Significant impacts are not expected at intersections with minor streets because, even with the loss of lanes, the amount of delay at such intersections is not anticipated to exceed the LADOT significance thresholds. Some negligible delay at minor intersections could be experienced, in addition to the delay at major intersections.

The Proposed Project is not expected to increase left turn movement above current conditions. As the Proposed Project is in final design stage, LADOT are exploring ways to improve left turns by adding them to locations where they do not currently exist, extending the refuge areas and adding additional markings. Left turns are not expected to be further delayed by the Proposed Project.

Master Comment 28: The bicycle lanes could result in reasonably foreseeable diversion of traffic to adjacent streets resulting in additional impacts.

Master Response 28: The methodology used to evaluate traffic impacts is conservative in that no diversion of traffic or changes to travel behavior was assumed in order to estimate maximum delay. The Draft EIR found potential for some movement of traffic to parallel streets to occur along some streets included in the First Year of the Five Year Implementation Strategy, and Mitigation Measure T3 was incorporated to address potential neighborhood intrusion impacts. However, neither Colorado Boulevard nor N. Figueroa Street were identified in the Draft EIR as areas where implementation of bike lanes could potentially result in diversion of traffic due to the general absence of parallel adjacent residential streets. Therefore, Mitigation Measure T3 is not required for the Proposed Project.

Master Comment 29: Striping of streets is identified in AB 2245 but installation of permanent curbs to provide "Protected" bike lanes is not just "striping".

Master Response 29: This comment was related to the S. Figueroa Corridor Streetscape Project. As the Proposed Project does not include this type of facility, no response is necessary. Nonetheless, in part to address the lack of clarity in the regulation, a Final EIR is being prepared for the Figueroa Streetscape Project.

Master Comment 30: The demand for new bicycle lanes is questioned. New bicycle lanes are perceived to be underutilized.

Master Response 30: The use of bicycle lanes is anticipated to increase as greater connectivity is achieved. The utility of any one bicycle segment is directly related to how it connects to a greater system, how it facilitates trip to desired destinations, and the level of comfort experienced along the entire trip length. As the bicycle network is expanded, to connect people to desired destinations, and increases overall perceptions of safety and comfort of bicycling, it is anticipated that bicycle use will grow substantially. According to SCAG estimates, bicycling could amount to as high as 16 percent of all trips throughout the region by 2035 based on current increases in projected ridership trends.[4] However, SCAG anticipates conservatively that even if bicycle ridership is not sustained at the current levels of growth, bicycle trips could still represent at least 8 percent of all trips throughout the region in 2035.[5] The percentage could exceed 8 percent contingent on the comprehensiveness of the bicycle network, services and facilities and the opportunity cost to other travel modes such as gas prices.

Master Comment 31: Increased delay will lead to increased idling of cars which will lead to increased vehicle emissions. In addition cars loss of parking will lead to cars circling and looking for parking, which will increase emissions. These emissions were not studied.

Master Response 31: For purposes of identifying a conservative estimate of vehicle travel delay, the Draft EIR assumes that vehicle traffic volumes on the various affected roadway segments will remain unchanged even where there would be a reduction in travel lanes and roadway to accommodate bicycle lanes. The pollutant most affected by traffic delay is carbon monoxide (CO). Typically, CO emissions increases as vehicle speed decreases between the range of 10 miles per hour (mph) and 25 mph, and increase further as vehicles speed decreases to 2.5 mph idling speed, while CO emissions decrease as vehicle speed decreases above 25 miles per hour.[6] Where capacity is reduced there could be an incremental reduction in vehicle speeds along the affected street segments and there could be a localized incremental increase in CO emissions. In some cases, where capacity is reduced, the number of vehicles passing through an intersection during the peak hour could decrease, which could lead to the peak period being extended, as well as modest increases in CO emissions. Localized concentrations of CO could occur where large amounts of traffic operate under heavily congested conditions and if vehicles are left idling for a substantial period of time. Many roadway segments affected by the proposed projects are already congested and operate at or near capacity during peak hour periods and any incremental change in traffic volumes or vehicle idling emissions would not be significant.

Other factors taken in to account in the analysis are as follows: 1) the proposed project would affect capacity of approximately 0.5 percent of the roadway miles in the City of Los Angeles (32.5 miles out of 6,500) and 2) the existing ambient CO levels are extremely low within the Los Angeles Air Basin. The one-hour concentration is typically 3 ppm and the 8-hour concentration is typically 2 ppm according to monitoring data for the SCAQMD monitoring station located in downtown Los Angeles. The Air Basin, is designated a maintenance area for CO which means that that both State and federal air quality standards are satisfied. There are no air quality CO hot spots within the basin as a whole or the City of Los Angeles in particular.

[4] SCAG 2012-2035 Regional Transportation Plan (RTP), page 42
[5] Based on correspondence with SCAG modeling staff, Naresh Amatya on March 18, 2013
[6] Federal Highway Administration (FHWA) website, http://www.fhwa.dot.gov/resourcecenter/teams/airquality/tinja.cfm, accessed on May 15, 2013

To trigger an impact, CO emissions along any roadway segment affected by the project, would be have to increase by almost 7 times in the peak hour or by four times in over an 8-hour period. Because of the low ambient CO condition, even where average street segment speeds could be reduced to almost zero the resulting CO emissions would only increase by two times. Under the most extreme circumstance, the change in emission levels would not be high enough to cause an exceedance of the CO air quality standard, and therefore would not result in a significant impact.

The Proposed Project would not result in in the removal of parking spaces. Parking losses were identified as being associated with some of the other proposed bicycle lanes included in the First Year of the First Five year Implementation Strategy, and the impact discussion is elaborated in the DCP Staff Recommendation Reports for those projects.

Master Comment 32: The Draft EIR does not take into account the decrease in vehicle trips anticipated to occur as more people use transit and bicycles and other modes.

Master Response 32: The impacts of converting vehicle trips to bicycle trips is not fully taken in to account in the traffic modeling. The SCAG modeling projections use conservative (i.e. low) assumptions regarding the number of trips anticipated to occur via bicycle (an average of 8% region-wide in 2035[7], with an upper limit of 2/3 of all trips under 3 miles and ½ of all trips under 5 miles occurring by bicycle).[8] Similarly, changes in behavior that are anticipated to occur over time (e.g. increased telecommuting, people living closer to their jobs, changing routes due to congestion) are not fully taken in to account in the SCAG future year modeling. Because changes in mode share and behaviors are uncertain, LADOT takes a conservative approach to modeling. The analysis is considered conservative (worst case) because it does not assume that changes that have occurred in other cities will happen in Los Angeles. The City is currently evaluating different methods for measuring impacts to all modes of travel as a part of the Mobility Element Update.

Master Comment 33: The Draft EIR does not adequately assess impacts to residents and businesses in the area of the Proposed Project.

Master Response 33: The Draft EIR identifies the potential physical environmental impacts of the proposed bicycle lanes. CEQA does not address socio-economic concerns unless they lead to physical environmental impacts. As described on page 4.5-33 of the Draft EIR, LADOT conducted a cost-benefit analysis to calculate the potential safety benefits expected from the proposed bicycle lanes. This cost-benefit analysis did not contemplate the cost of added delays. However, traffic circulation impacts described in Section 4.5 of the Draft EIR were evaluated based on the additional average vehicle delay that the Proposed Project would cause under Existing Plus Project conditions and Future Cumulative (2035) conditions. This is considered a conservative analysis because the Existing Plus Project conditions do not take into account decreases in traffic caused by the shift to alternative transportation modes and the SCAG Regional Travel Demand Model used to forecast future year traffic conditions assumes a relatively modest (8%) share of all trips to be bicycle trips (Draft EIR page 4.5-17).

While the Draft EIR evaluated the impact of delays in the context of traffic, the Draft EIR did not analyze the impact of delays on retail sales and property values. As described on page 4.5-27 of the Draft EIR, parking deficits are considered to be social effects unless they lead to blight and physical impacts. In accordance with CEQA Guidelines Section 15131, economic effects of a project need not be included in an EIR, and the economic effects of a project should not be treated as a significant effect on the environment. For this reason, an analysis of the economic effects of the proposed project was not included in the Draft EIR. The Proposed Project would not result in in the removal of parking spaces. Parking losses were identified as being associated with some of the other proposed bicycle lanes included in the First Year of the First Five year Implementation Strategy, and the impact discussion is elaborated in the DCP Staff Recommendation Reports for those projects.

7 Based on correspondence with SCAG modeling staff, Naresh Amatya on March 18, 2013
8 SCAG 2012-2035 Regional Transportation Plan (RTP), page 42

As indicated in Table 2-1 in the Summary, the Draft EIR determined that the proposed project would result in significant and unavoidable impacts related to intersection level of service and transit. All other impacts were determined to be less-than-significant after mitigation.

The proposed projects are intended to facilitate increased bicycle trips as a percentage of total trips and encourage multi-modal travel. With implementation of the Proposed Project, bicycle trips are anticipated to increase as a percentage of total trips resulting in a reduction in vehicle trips, a stated objective of the proposed project.

The Draft EIR found potential for some movement of traffic to parallel streets to occur along some streets included in the First Year of the Five Year Implementation Strategy, and Mitigation Measure T3 was incorporated to address potential neighborhood intrusion impacts. However, neither Colorado Boulevard nor N. Figueroa Street were identified in the Draft EIR as areas where implementation of bike lanes could potentially result in diversion of traffic due to the general absence of parallel adjacent residential streets. Therefore, Mitigation Measure T3 in the Draft EIR is not required for the Proposed Project.
The Proposed Project is not anticipated to permanently prevent or disrupt access to surrounding land uses, such as businesses located along bicycle routes, identified by the commenter. A Bikes Belong grant supported study, conducted by the Los Angeles County Bicycle Coalition (LACBC), evaluated the economic impacts of a similar installation of bicycle lanes along York Boulevard that required a removal of a travel lane (road-diet).[9] The study compiled data on business taxes, business closures and openings and property sales records and found no significant difference to economic activity along York Boulevard after the 'road diet was implemented. The study also conducted survey data that found that most merchants did not feel that bicycle lanes hurt their business, while a large percentage of merchant and customers were hesitant to support bicycle lanes that remove a travel lane. However, it also demonstrated the merchants on average, underestimated the percentage of their costumers that arrive at the business by means other than car. See Master Response 15 related to collection of economic data.

Master Comment 34: Congestion could discourage transit use and impose costs on transit operators.

Master Response 34: On a few of the streets in the First Year of the Five Year Implementation Strategy that include bicycle lanes with heavy bus volumes, LADOT is evaluating or proceeding with bus-bike lanes, which should improve bus performance. Page 4.5-32 of the EIR acknowledges, that the Proposed Project would result in a potentially significant impact related to transit operations along N. Figueroa Street and Colorado Boulevard due to increases in transit travel time and transit delay. Mitigation Measure T1, the adjustment to signal timing would help to reduce transit delay in addition to general traffic delay. There were no other mitigation measures identified by the comments that would further reduce impacts to transit delay. Transit would continue to be impacted on streets where there would be no transit lane, and therefore impacts to transit would be significant and unavoidable.

LADOT is working with Metro on routes where bus performance may be potentially impacted. In general, bus-bike lanes would enhance bus performance. In order to foster coordination to respond to potential short and long-term impacts to transit service, Metro Bus Operations Control Special Events Coordinator and Metro Service Planning & Scheduling shall be contacted in advance of installation of bicycle lanes.

Socio-economic issues such as impacts to the costs of bus operations are not addressed by PRC Section 21080.20.5, or CEQA unless they lead to physical environmental impacts. See also Master Response 33. See Corrections and Additions for page 4.5-10. Page 4.5-10 the description of Metro services is revised as follows:

> **Los Angeles County Metropolitan Transportation Authority (Metro)**. The Metro provides bus, light rail and subway services within the Los Angeles County. There are ~~six~~ four Metro light rail lines (i.e., Blue, ~~Red,~~ Green, Gold, ~~Purple,~~ and Expo), two subway lines (i.e., Red and Purple), and two ~~subway~~ bus lines (i.e., Orange and Silver) operating in exclusive right-of-ways.

[9] McCormick, Cullin. (2012) York Boulevard., Economic of a Road Diet. UCLA Luskin School of Public Affairs

Master Comment 35: The Draft EIR does not adequately address safety.

Master Response 35: The Draft EIR generally discusses bicycle safety in the City of Los Angeles. As with any mode of travel there are inherent risks, riding a bicycles is no exception. The purpose of the safety analysis is to evaluate any unusual hazards within a given project. LADOT designs bicycle lanes to maximize safety to the extent feasible.. In general, studies indicate that the addition of bicycle lanes make roadways safer for all road users.

The Draft EIR addresses the safety benefits of bicycle lanes in two locations. A general discussion of bicycle lane safety benefits is included on pages 3-5 and 3-6 as well as 4.5-33 of the Draft EIR. Figure 4.5-1 is included that demonstrates the location of proposed bicycle lanes relative to the density of bicycle collisions. The discussion is included as follows.

The perception of safety is one of the most important factors in choosing bicycle as a travel mode. In 2001, bicyclists in the United States had 12 times more fatalities than drivers per mile traveled.[10] The addition of bicycle lanes on arterial streets is shown to reduce the risk of serious injuries by about 30 percent, while the upgrade to fully protected bicycle lanes or cycle tracks reduce the risk of injury by 90 percent.[11] Of 68 cities across California with the highest per capita pedestrian and bicycle collisions, per capita injury rates to pedestrians and bicyclists are shown to fall precipitously revealing a non-linear relationship of bicycle safety as the level of bicycling increases.[12] This study showed as much as an eightfold variation of collisions (expressed as a percentage of those that bike or walk to work) in comparing low and high bicycling cities. [13]

The underlying reason for this pattern is that motorists drive slower when bicyclists and pedestrians are visible either in number or frequency, and drive faster when few pedestrians and bicyclists are present, resulting in higher overall travel speeds. This effect of modified driving behavior is consistent with other research, focused on 24 California cities, that shows that higher bicycling rates among the population generally lowers the risk of fatal crashes for all road users.[14] Comparing these low versus high bicycling communities, there was a ten-fold reduction in fatality rate for motorists, an eleven-fold reduction in fatality rates for pedestrians, and an almost fifty-fold reduction in fatality rateso for bicyclists.[15]

Injury risks to bicyclists in New York City dropped by 72 percent between 2000 and 2010 and declined by nearly 30 percent two consecutive years in a row (2008, and 2009) when the City was the most active in building bicycle lanes.[16] A 2000 safety study of 682 bicycle-motor vehicle crashes in Phoenix found that 95 percent of crashes occurred on streets with no bicycle facilities and merely 2 percent occurred in bicycle lanes.[17]

See Corrections and Additions for page 4.5-37, revised Footnote 28.

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[10] Pucher, J., and L. Dijkstra. 2003. Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany. American Journal of Public Health, Vol. 93, No. 9, 2003, pp. 1509–1516.

[11] Kay Teschke et al. 2012. Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study. American Journal of Public Health.

[12] Jacobsen, P.L. 2003. Safety in Numbers: More Walkers and Bicyclists, Safety Walking and Bicycling. Injury Prevention 9~3!:205–209.

[13] Jacobsen, P.L. 2003. Safety in Numbers: More Walkers and Bicyclists, Safety Walking and Bicycling. Injury Prevention 9~3!:205–209.

[14] Marshall, Wesley E., N. W. Garrick. 2011. Evidence on Why Bike-Friendly Cities Are Safer For All Road Users. Environmental Practice 13 (1) March 2011

[15] Ibid.

[16] Adam Arvidson, 2012. *Power to the Pedalers.* Planning May/June 2012, pp. 12 through pp.17.

[17] Ibid.

Metro Comment 36: Shared bus bicycle lanes can have a negative impact on transit.

Master Response 36: This comment was related to the Bicycle-Transit–Only Lanes included as part of the First Year of the First Five Year Implementation Strategy. As the Proposed Project does not include this type of facility, no response is necessary.

Master Comment 37: How can slowing traffic be beneficial?

Master Response 37: The comment seems to indicate that the goals to alleviate congestion conflicts with goals to improve roadway safety. LADOT is responsible for working toward both goals. LAMC Section 89.01 states that the General Manager of LADOT shall consider public safety, convenience, and expediting the movement of traffic as determining factors when installing lane markings in addition to other design parameters of City streets.

Congestion is mostly experienced at peak travel times where roadway capacity reaches its limits to move traffic in a free-flowing manner. However, substantial safety risks are posed, especially during the off-peak period where driving above the speed limit is more common. Driving behavior is largely influenced by roadway design, and poses disproportionate risks to more vulnerable road users such as pedestrians and bicyclists. The City lacks the ability to lower speed-limits in commercial arterials, which are determined by Section 2B.13 of the California Manual of Uniform Traffic Control Devices (MUTCD) based on the 85th-percentile speed that statistically represents one standard deviation above the average speed. Therefore, traffic calming measures such as narrowing lane widths, reducing travel lanes and introducing elements such as speed bumps and landscape medians often used to reduce vehicle travel speed.

As stated in the Draft EIR, pedestrian collision with a vehicle traveling at 20 miles per hour results in a 5 percent pedestrian fatality, and pedestrian fatalities increase to 40, 80 and 100 percent when the vehicle speed increases to 30, 40 and 50 miles per hour respectively.[18] Bicycle lanes, when accompanied by travel lane reduction, can help reduce over-all vehicle speed.[19] This would be most beneficial in the off-peak periods where the risks of pedestrian fatalities are higher due to higher travel speeds.

Master Comment 38: The project could lead to increased traffic and therefore increased noise in residential areas.

Master Response 38: A doubling of traffic volumes would be required to increase noise levels by an audible 3 dBA. The Draft EIR presents a conservative analysis (in terms of identifying total delay) that assumes all cars will stay on the street with the bike lane. The Draft EIR found potential for some movement of traffic to parallel streets to occur along some streets included in the First Year of the Five Year Implementation Strategy. However, neither Colorado Boulevard nor N. Figueroa Street were identified in the Draft EIR as areas where implementation of bike lanes could potentially result in diversion of traffic due to the general absence of parallel adjacent residential streets. Even if there was a potential for traffic diversion, it would not be anticipated to result in a doubling of traffic volumes on adjacent parallel streets. On streets where existing volumes are very low, should traffic volumes double, the resulting noise level would still be within the acceptable range for residential uses. For these reasons, the Draft EIR concludes that the proposed project would result in a less-than-significant impact related to mobile noise due to traffic diversion.

[18] U. S. Department of Transportation National Highway Traffic Safety Administration. 1999. Literature Review on Vehicle Travel Speeds and Pedestrian Injuries. DOT HS 809 021

[19] Federal Highway Administration (FHWA) website. http://www.fhwa.dot.gov/publications/research/safety/10053/index.cfm, accessed on November 19, 2012

Master Comment 39: Bicycle trips should count against the Congestion Management Program (CMP) traffic count thresholds.

Master Response 39: The CMP Guidelines were established a number of years ago. Bicycle trips are not included in the criteria for determining when to analyze an intersection. Bicycle trips have different characteristics as compared to vehicle trips and are not at the present time accounted for in the CMP guidance.

Master Comment 40: Increased bicycle trips should be quantified.

Master Response 40: The Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP) assumes an 8% bicycle mode share of all trips, i.e. that 8% of all trips will be by bicycle in 2035[20] (with an upper limit of 2/3 of all trips under 3 miles and ½ of all trips under 5 miles occurring by bicycle). However, this a conservative (low) assumption for purposes of capturing traffic and air quality impacts as part of the RTP process. The RTP Active Transportation Appendix (page 42 of the Active Transportation Appendix of the 2012—2035 RTP) indicates the following:

> … active transportation has grown dramatically in recent years. This trend is expected to continue into the foreseeable future aided by several factors. First, dramatic increase in the bicycle network, … will result in improved access to bicycle network for the Region's residents by more than 50 percent. Second, more compact mixed use urban forms in the future will be much more conducive to biking and walking. Third, better coordination with other modes, primarily transit, will become an incentive for some to switch to biking or walking. Most importantly, a significant change in the culture that values a healthy lifestyle, bikeability and walkability will become a greater impetus in promoting active transportation as a viable means of accessing opportunities. Given this context and survey data that supports dramatic increase in bicycling and walking mode shares in recent years, it is reasonable to assume this trend will continue into the future. For example, according to the National Household Travel Survey (NHTS) data, bicycle mode share increased for all trips from 0.8 percent in 2000 to over 1.7 percent in 2009. This is an increase of almost 9 percent on an annualized basis. The share of walk trips for all trip purposes increased by approximately 6 percent on an annualized basis during the same period.
>
> So, if we assumed annualized increase of 9 percent in mode share of bicycle trips for all trips, the potential bicycle mode share could be as high as 4.4 percent in 2020 and as high as 16 percent in 2035. However, it is somewhat unrealistic to assume that 9 percent growth rate could be sustained over such a long period of time. On the other hand, given the significant investments proposed for active transportation and the current trends, it is reasonable to assume that at least 2/3 of all trips shorter than 3 miles or half of all trips that are 5 miles or less could be converted to active transportation[21] by 2035.
>
> … based on NHTS-CA Survey for all trips, bicycling and walking mode share for all trips are approximately 1.7 percent and 19.24 percent respectively for2009. This represents a little over 50 percent of all trips less than 3 miles. Assuming 2/3 of all trips under 3 miles or half of all trips under 5 miles as the upper limit of Active Transportation mode share in 2035, relative increase (from the base year of 2008) in bicycling and walking mode shares can be estimated as 1.7 percent and 3.1 percent in 2020, and 3.9 percent and 6.3 percent in 2035. Relative reduction in VMT resulting from these mode shifts are estimated at approximately 7.8 million miles and 20.4 million miles for 2020 and 2035 respectively.[22]

Skate boarders do not count as bicycle lane users.

Master Comment 41: The proposed bicycle lanes would adversely impact Environmental Justice.

Master Response 41: CEQA does not address environmental justice issues. See Master 34 above related to potential impacts to transit.

[20] Based on correspondence with SCAG modeling staff, Naresh Amatya on March 18, 2013
[21] Active Transportation includes bicycle and pedestrian trips.
[22] SCAG 2012-2035 Regional Transportation Plan (RTP), page 42

Master Comment 42: The Proposed Project would result in severe traffic impacts.

Master Response 42: As indicated in the traffic and safety analysis in the Draft EIR, implementation of the proposed bicycle lanes is anticipated to result in a number of significant adverse traffic impacts throughout the area. The Proposed Project would result in a significant travel delay impact at three intersections during both the AM and PM peak periods, along N. Figueroa Street and three intersections, during both the AM and PM peak periods along Colorado Boulevard.

This specific additional in delay (and total delay) in seconds of the following intersections for the respective peak period along N. Figueroa St. are:

Colorado Boulevard: 30.5 (56.2) AM peak period and 19.5 (40.1) PM peak period*
York Boulevard: 41.5 (66.4) AM peak period and 17.3 (46.1) PM peak period
Avenue 26: 95.4 (149.5) AM peak period and 6.8 (45.7) PM peak period

This specific additional in delay (and total delay) in seconds of the following intersections for the respective peak period along Colorado Boulevard are:

Sierra Villa Drive: 27.2 (50.7) AM peak period and 203.6 (350.9) PM peak period
Eagle Rock Boulevard: 22.4 (55.7) AM peak period and 64.3 (115.5) PM peak period
N. Figueroa St. 30.5 (56.2) AM peak period and 19.5 (40.1) PM peak period*

* The N. Figueroa Street and Colorado Boulevard intersection overlap between the two corridors.

The Draft EIR does not account for shifts in travel behavior overtime to bicycling. However, studies show that bicycle ridership increases in response to the availability of facilities, especially if they add to the comfort of the experience and connect people to their destinations. Such benefits are long term in nature and are considered as a number of transportation solutions to provide greater level of access to City residents while reducing impacts on the environment.

Additional Specific Comments and Responses

1. **There should be no "exceptions" on Figueroa. If all but the Avenue 26 intersection is striped, it would create a dangerous conflict point that countless cyclists will have to travel through.**

   The comment that there should be full implementation of bicycle lanes on N. Figueroa Street is noted. See Master Response 35 for discussion on the safety benefits of installing bicycle lanes. The comment will be forward to the decision maker, in this case the General Manager of LADOT, whose final decision will depend on a number of factors that include improvements to safety of both bicycle and vehicular travel.

2. **Favor signal-timing on N. Figueroa St. to get the speeds of cars down to make safer for everyone.**

   LADOT shall make adjustments to signal timing once the bicycle lanes are installed as part of Mitigation Measure T1 to facilitate safe and efficient traffic movement for all roadway users.

3. **Signal timing on N. Figueroa should coincide with peak am (southbound) and pm (northbound) to get cars moving.**

   As indicated in Mitigation Measure T1 (see page 2-5 and 4.5-42 of the Draft EIR), signal timing will be optimized for efficient traffic flow.

4. **The City should finish striping the bike lane on Eagle Rock Blvd. from Westdale to Colorado.**

   LADOT is currently reviewing the completion of striping of Eagle Rock Boulevard.

5. **When there is an accident or closure on the 134, cars divert onto Colorado -- gridlock can extend two miles. Much worse with one fewer lane for the cars.**

   The comment is noted and will be taken into consideration by the decision maker, in this case the General Manager of LADOT. The analysis in the Draft EIR found that the Proposed Project would result in significant impacts to travel delay at three of the six intersections evaluated along Colorado Boulevard during both the AM and PM peak periods. This would also likely include times when there are accidents and closures along the SR-134. However, travel delay along Colorado Boulevard aggravated by accidents and closures along the SR-134 would be infrequent and short-term in duration.

6. **N. Figueroa is the only truck route up Arroyo Seco through Northeast LA, narrowing to one lane would impact trucks.**

   Trucks would experience the same impacts as motor vehicle traffic though would not be disproportionately impacted. Trucks above 6,000 pounds are restricted from the State Route (SR)-110 between U.S. Route 101 and the SR-110 terminus in Pasadena. Truck movements through this area would be continued to be facilitated by the I-5, SR-2 and SR-134. Although N. Figueroa Street is not an officially designated truck route, some truck operations may use the N. Figueroa Street to access local businesses. However, these commercial delivery operators have greater flexibility in altering the delivery schedules to off-peak periods to avoid impacts to travel times.

7. **Was the hilly nature of Northeast LA taken in to account?**

   The Proposed Project has been demonstrated to have strong support amongst bicycle riders that currently use Colorado Boulevard and N. Figueroa Street, which was a factor in selecting these roads for priority implementation. The bicycle lanes provide an added benefit in hilly terrain by separating slow-climbing bicyclists from faster moving vehicular traffic.

8. **Figueroa between San Fernando Road and Colorado Blvd., is already impacted by Gold Line crossings that back up traffic on Figueroa up to Avenue 59 or for six blocks to Roselawn during rush hours when a train passes – at least every 7 mins. With one lane, traffic will back up to Avenue 57 which is where people enter and exit the freeway. What will be done to help traffic flow?**

   Comment noted. The comment refers to northbound traffic back up where the Gold Line crosses N. Figueroa Street just northeast of the Avenue 61 intersection. LADOT determined to maintain two northbound lanes while eliminating one southbound lane at this location based on the traffic counts that demonstrated that northbound movement carries higher traffic volumes during the PM peak period. Given that two northbound lanes will be maintained at this location, the condition of traffic back up cited by the comment will not be aggravated by the Proposed Project.

9. **Commenter opposes the alternative to maintain three travel lanes on Colorado Boulevard between Sierra Villa and eagle Rock Blvd. 1) Traffic calming is needed. Traffic speed and the difficulty for pedestrians crossing the street are seen as serious problems. 2) The project would not create a bikeway comfortable for all bicyclists. Colorado Blvd. is curving and sloped in this location. Bicyclists may go too fast. A minimum width bicycle lane squeezed between narrow parking lane and narrow travel lane would not be comfortable for less confident bicyclists.**

   The Draft EIR assessed the safety of the Proposed Project (see page 3-5 and 3-6 as well as 4.5-33 of the Draft EIR) and found that the effective reduction in travel lanes would help to reduce travel speeds, and thereby installing bicycle lanes would result in a direct safety benefit. The addition of bicycle lanes on arterial streets is shown to reduce the risk of serious injuries by about 30 percent.[23] According to

[23] Kay Teschke et al. 2012. Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study. American Journal of Public Health.

studies in other Californian cities, per capita injury rates to pedestrians and bicyclists are shown to fall as the level of bicycling increases,[24] and increase in bicycling rates through the country is seen as a direct response to investment in bicycle supporting infrastructure.[25] While some percentage of bicyclists may observe poor judgment in disregarding traffic rules, reasons for this may stem from current road conditions that attract a higher amount of risk prone bicyclists. Adding low stress facilities such as buffered bicycle lanes have a greater potential to increase a more risk adverse bicycle riding population that would likely have greater observance of traffic rules. The commenter's opinion will be forwarded to the decision maker for consideration in the final project design.

10. **Erroneous data in the EIR for two intersections on Colorado (Sierra Villa and Eagle Rock).**

    LADOT staff looked into this and found irregularities with the traffic count data. New counts were conducted, which showed that the potential impact at the two intersections of Sierra Villa Dr. and Eagle Rock Boulevard were overestimated in the Draft EIR. See Corrections and Additions Section for pages 4.5-10 and 4.5-21 with respect o changes to date for these intersections.

Webinar General Comments and Responses

1. **The graphs are from 2007: do you have anything more recent?**

   The graphs the comment is referring to were illustrative and not data related to the current project.

2. **What is the percentage of City, County and DOT employees that use public transportation or bike to work? Is there a plan to make it mandatory?**

   The percentage of mode shift of bicycle commuting of City employees is recorded as part of the Annual Transportation Survey. However, since responses only allow one commute mode response, bicycle commuting is assumed to be underreported since other travel modes such as transit are often involved. In any event, reporting on this survey is not relevant to the analysis of the Draft EIR since it captures only a small portion of the City's workforce. The City does not have the ability to make a given transportation mode mandatory. However, bicycle commuting is encouraged through campaigns such as Bike to Work week.

3. **Where do you get 20% of trips are bike/ped? What is the criteria for a "trip." This figure seems very high?**

   Bicycle/pedestrian trips are 21% of all trips in the SCAG region according to the 2009 National Household Travel Survey.

4. **If you are correct about increased bike ridership, will bikes be licensed as all other forms of road transportation vehicles are?**

   Bicycle licensing is not a City of Los Angeles policy and is not related to the environmental analysis.

5. **On the issue of enforcement: What percent of collisions are hit and run? What has LAPD been doing to enforce hit and run collisions, especially those that hit more vulnerable pedestrians and cyclists?**

   Data regarding hit and run accidents is not immediately available and is not relevant to the analysis in the EIR.

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[24] Jacobsen, P.L. 2003. Safety in Numbers: More Walkers and Bicyclists, Safety Walking and Bicycling. Injury Prevention 9~3!:205–209.

[25] Dill, Jennifer and Theresa Carr. 2003. Bicycle Commuting and Facilities in Major Cities: If You Build Them, Commuters Will Use Them. Transportation Research Record 1828:116-123

6. Travel time impacts to bicyclists ignored. Topography matters to bicyclists.

The2010 Bicycle Plan attempts to provide connectivity to all areas of the City even those with hills. But the 2010 Bicycle Plan also seeks to provide connections that allow bicyclists to optimize their routes, using terrain as one of many factors. The bicycle lanes provide an added benefit in hilly terrain by separating slow-climbing bicyclists from faster moving vehicular traffic.

Appendix 1: Comments that are summarized by Master Comments

Comments Summarized by Master Comment 2:

- Homeowners/landowners don't seem to know about project, bike supporters do but not others. Who received notice of webinar?
- Have not solicited enough community input.
- Legal requirement to adequately involve the public.
- Notice did not provide e-mail or physical address to send comments.
- Notice to a complete set of stakeholders in the impacted area.
- Should have had posting in areas where disruption of traffic or parking could occur.
- Circulation period poorly publicized. Comment period should be extended.
- Forward comments to Mayor and Council.
- Several times during the City staff presentation, reference was made to input that had been received from the "Bicycle Coalition". However, there was no reference to or evidence of input that had been received from the several homeowners associations in the area or from the many business owners/operators. A greater effort to incorporate information from those sources should be made as the consideration of the feasibility of the proposed bicycle lanes progresses.

Comments Summarized by Master Comment 3:

- The Bike Plan does not meet the requirements of AB 2245. The City of Los Angeles incorrectly claimed that AB 2245 allows it to circumvent CEQA and not prepare or certify a Final EIR. While AB 2245 does exempt Class 2 bicycle lanes from the EIR process in certain circumstances (compliance with section 891.2 of the California Streets and Highways code) the 2010 Bicycle Plan falls short of compliance on several points.
- Paragraph PRC 21080.20.5(b)(1) requires a partial environmental impact report (EIR) prepared per CEQA procedures (because this mandate is part of CEQA), including public comment periods.
- Only after magnitude of impacts assessed in partial Draft EIR in paragraph (b)(1) can City do the public hearings in Section (b)(2) in light of findings in (b)(1). The steps were not fulfilled to bring to second step.
- Further AB 2245 requires compliance with California Streets and Highways Code Section 891.2 and that Section is located in Article 3, California Bicycle Transportation Act (890-894.2). Article 3 states that "it is the intent of the Legislature, in enacting this article, to establish a bicycle transportation system. It is the further intent of the Legislature that this transportation system shall be designed and developed to achieve the functional commuting needs of the employee, student, business person, and shopper as the foremost consideration in route selection, to have the physical safety of the bicyclist and bicyclist's property as a major planning component, and to have the capacity to accommodate bicyclists of all ages and skills."
- From the Streets and Highway Code 891.2. A city or county may prepare a bicycle transportation plan, which shall include, but not be limited to, the following elements:

  (a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.
  (b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.

  There were no maps as described. Not showing residential communities or commercial districts does not show the full impact of Bike lanes on the surrounding communities. 20 of the 35 Community plans are impacted by the Bike Plan. Maps that show existing and proposed Land user and settlement patterns can be found in Bicycle plans of other California Cities and are necessary to

evaluate impacts that the loss of parking and motorized travel lanes would have on businesses and adjacent Residential communities. This is a serious issue.

(c) A map and description of existing and proposed bikeways.

(d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.

(e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.

(f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.

(g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.

Safety. The Bike plan mentions Safety but this is the only reference in the DEIR. “Support local advocacy groups and bicycle-related businesses to provide bicycle-safety curricula to the general public”. This is not a clear Commitment to allocate specific funds for Safety. Without funds for safety to protect the public and the bicycle community there will be unmitigated serious impacts.

Education. The Bike plan mentions education but funds are sketchy. It says Metro will allocate 2% of bike plan funds to bike safety and Education programs. This does not rise to the level of a clear Commitment to allocate specific funds for education. Without funds to educate the public and the bicycle community there will be unmitigated serious impacts.

Law Enforcement. Specific amounts of funding and agencies involved must be made prior to approving this Plan or DEIR. The general public has no confidence that there will be enforcement of the vehicle code for bicyclists.

DEIR too vague where it says “Education and encouragement programs would further mitigate congestion by increasing bicycle mode share”. Mitigating congestion without proper funds attached will not produce useful results.

(h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.

(i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.

(j) A description of the projects proposed in the plan and a listing of their priorities for implementation.

(k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.

There is no description of Past Expenditures in the 2010 Bicycle Plan. DEIR lists the requirement but still there is no list of past expenditures. Future PLAN lists costs in future $235-427 Million, though couldn’t find any in Draft EIR.

Comments Summarized by Master Comment 5:

- The Framework Element was last updated in 2002 filed a statement of overriding considerations for the Bicycle plan which this DEIR and the Bicycle Plan do not address.
- In addition to the Framework Element, other mitigation measures recommended by the Final EIR include:
  - Ensure that all City Streets have a curb lane wide enough to accommodate bicycle traffic; and

- Require that all new developments install in all garages electric plugs that can recharge electric vehicles. Pursuant to Section 21081 of the Public Resources Code. the City finds the first mitigation measure to be physically and economically infeasible without extensive condemnation of private property or purchase of right-of-way. A “built out” city cannot ensure that all the streets will be rebuilt with the required width for bicycle routes. Also, there are streets where any kind of bicycling would be unsafe. Therefore, the City will not adopt this mitigation measure and will adopt a substitute measure as follows: "Ensure that all City streets designated in the Bicycle Plan as bicycle routes have a curb lane wide enough to accommodate bicycle traffic .

- Curb lane wide enough. Wide curb lane - A 14 foot (or greater) wide outside lane adjacent to the curb of a roadway, that provides space for bicyclists to ride next to (to the right of) motor vehicles. Also referred to as a “wide outside lane”. If adjacent to parking, 22 feet in width may also be considered a wide curb lane.
- DEIR picks and chooses from many objectives and policies of the Framework Element and misses important ones critical to an objective EIR. The comment refers to Policy 5.3.4 – Streets. Identify commuter and recreational bicycle routes that link major destinations within the City, and establish and implement standards to maintain their safety and security. The comment also includes Program 3 and Program 4. Program 3 directs the City to formulate and periodically update a citywide Transportation Element that address multiple measures that include VMT reduction measures, access to employment centers and non-motorized transportation systems, and a host of other transportation related measures in the context of the regional transportation system. Program 4 directs the City to develop Transportation Improvement and Mitigation Plans (TIMPs) that will expedite approvals of new development applications and streamline traffic mitigation procedures. The program mentions vehicle, transit and bicycle access plans, and neighborhood traffic management as an example of a number of measures to be included in TIMPs.

Comments Summarized by Master Comment 6:

- Out of the 20 Community plans the 2010 Bike Plan will impact, only two (Hollywood and Boyle Heights) have a policy listed. The rest make do with Objectives which are much easier to manipulate rather than Policies which Implement the Community Plans. Community plans do a whole lot more than provide the necessary focus on bicyclists at the Community level. Pick any Community plan (below we quote from the West LA Community plan) and look at what it says about the Purpose of the Community plan.
- Role of the Community Plan. The Community Plans are intended to promote an arrangement of land uses, streets and services which will encourage and contribute to the economic, social and physical health, safety, welfare and convenience of the people who live and work in the community.
- The 2010 Bicycle Plan lays out the process for implementing the Bike Plan by updating the Community Plans when it states the following: The City is currently in the process of updating all 35 Community Plans that together comprise the Land Use Element of the General Plan. As each Community Plan is updated future bicycle lanes in that planning area will be analyzed with regard to potential environmental impacts. Currently future bicycle lanes are being analyzed for the Sylmar, Granada Hills, Southeast, South, San Pedro, and West Adams/Leimert Park Community Plans.
- That is not being done and as a result: This Bicycle plan is inconsistent with the Community Plans.

Comments Summarized by Master Comment 7:

- Shall be designed and developed to achieve the Functional commuting needs. The Bike Plan relies heavily on other types of bike riding. Sport, recreation not commuting.

  In enacting the 2010 Bicycle Plan the City of Los Angeles states in Chapter 1, this Chapter articulates the Purpose of the 2010 Plan to increase, improve and enhance bicycling in the City as a safe, healthy, and enjoyable means of transportation and recreation.

  As a matter of fact much of the 2010 Plan deals with Recreational use, fitness, and sport use. The Plan states that in 2000, 0.61% of commuters used a bicycle to commute to work each day and by 2008 that number had risen to 0.90%. That still means that less than 1% of Angelinos use a bicycle to commute to

work on a daily basis. While that number may be laudable it shows that the vast majority of those who will use the Class 2 routes in the plan will not be using it as intended for "the functional commuting needs of the employee, student, business person, and shopper" and as such different criteria must be used as the foremost consideration in route selection. That can only be achieved through a full EIR which takes into consideration the full impact of this plan. A Final EIR would give the community the ability to challenge the assertions in the DEIR and 2010 Plan. It would also give the City time to provide evidence that such programs exist and will have sufficient funding.

- Land Use Element. The Bike Plan does not link the Circulation Element to the Land Use Element (Community Plans).

Comments Summarized by Master Comment 8:

- The standard practice should be to construct complete streets while prioritizing project selection and project funding so that jurisdictions accelerate development of a balanced, multimodal transportation network.
- In Los Angeles the Transportation Element is the Circulation Element. The 1996 Framework Element stated that the Transportation Element supersedes the Circulation Element. That means that the 2010 Bicycle Plan which proposes to make changes to 20 of the 35 Community plans must conform to the Complete Streets Act instead of just planning for Bike Lanes.
- It should be clear that the City of Los Angeles is merely giving lip service to Complete Streets in this update to the Bicycle Plan. At the minimum they must complete a FEIR and show how this plan complies with AB 1358.

Comment Summarized by Master Comment 9:

- The 2010 Bike Plan which is a major update of the Circulation Element discriminates against persons with Disabilities. Recent litigation (CALIF v. City of Los Angeles) against the City of Los Angeles showed that there are over 800,000 persons with Disabilities living within the City of Los Angeles. The 2010 Bike Plan does not address their needs and discriminates against them in favor of persons who can ride Bicycles.

- The 2010 plan makes 2 passing references to persons with disabilities. One was about children (K8) and the other with ADA compliance but there were no programs to help either in this Bicycle Plan. That's unfortunate but the DEIR for the Plan is even worse stating the plan would encourage children, including those with disabilities, to walk and bicycle to school. I suppose those children as well as adults who cannot ride a bicycle or walk have no place in this plan.

Comments Summarized by Master Comment 10:

- Commenters opposed to bicycle lanes along N. Figueroa suggested alternative should be considered that comprise the following streets: Pasadena Avenue to Marmion Way to Avenue 50 to Monet Vista to Avenue 59 to Piedmont Avenue.
- Alternate route leaving N. Figueroa at Marmion Way through Highland Park to Avenue 64, and Avenue 64 as an Alternative route to N. Figueroa
- Review Figueroa Routes to/from Downtown LA from the North via Arroyo Seco via the LA River Path.
- Buffered bike lane on Colorado (as well as Figueroa) for safety.
- Why not have bicycle lanes next to the curb rather than next to the parked cars?
- Look to the past. Elevated California Cycleway was proposed in 1900 from Pasadena to Los Angeles, over a mile was built including night illumination. Attractive alternative to driving. Propose this method for encouraging and promoting bike use not taking auto lanes or parking spaces.
- Car pooling and ride share should be rewarded.
- More buses per stop should be planned.
- Using sidewalks for bicyclists could be an option.

- See the City of Davis, California for a way to create bike lanes which do not impact the flow of traffic or negotiation of businesses and still keep bicyclists safe.

Comments Summarized by Master Comment 16:

- All lanes (or at least one or two key projects) should have pre- and post- (say 5 to 10 years out) studies (like the one on York Blvd. by Cullen McCormick) to measure impact on safety, retail sales, property values, livability, etc.
- Data to be used in future planning to capture actual traffic counts (before and after) on the streets involved and on nearby streets that may experience the resulting cut-through traffic?
- Quantitative data should be provided about current daily volumes of cyclists using the Figueroa Corridor and modeled projections indicating the expected increase in use.

Comments Summarized by Master Comment 21:

- T1 though T-6 are inadequate. Existing measures are inadequate, need a program to identify "before" condition on residential streets.
- The DEIR does not even attempt to identify which impacts, if any, will be mitigated and concludes that the traffic impacts will remain significant and unmitigated.
- Since the City's Neighborhood Traffic Management unit no longer exists and there is no mechanism for the provision of neighborhood mitigations, it is unclear to us as to what a process might be should, for example a bicycle friendly street be identified in our area (or any other area). What LADOT staff will be available to monitor the many local neighborhood streets that will be potentially impacted not only on the Westside, but throughout the program area? If long-range monitoring personnel availability cannot be guaranteed, the credit for the mitigation measure should not be allowed.
- The EIR identifies no mitigation for transit impacts.

Comments Summarized by Master Comment 26:

Increased traffic on Figueroa between San Fernando Road and Colorado Blvd. would lead to lack of accessibility for emergency vehicles, "lawsuit waiting to happen."

Comments Summarized by Master Comment 27:

How would the removal of traffic lanes impact traffic when drivers are making left hand turns on such intersections as Highland View Ave., Vincent Ave., Hermosa Ave., La Roda, Glen Iris, and Floristan?

Comments Summarized by Master Comment 30:

- York Blvd. in Highland Park was recently reduced to a single lane to allow for bicycle lanes. Bike lane is empty. Has LADOT followed up with bike lane utilization and cost/benefit analysis?

Comments Summarized by Master Comment 31:

- In addition, if you take the increases in delay that you have projected, what kinds of impact does that delay have on added air pollution and air quality? Have efforts been made to quantify these impacts?
- EIR acknowledges "idling cars create pollutants which are likely to flow over to neighborhoods." O3, CO, PM10, PM2.5, NO2, SO2 and others have the potential to contribute to increases in asthma, heart disease, cancer and more. Health concern to residents, businesses and bicyclists.
- Even with the increased bike lanes throughout LA, the City estimates that in 2030 bike commuters will only increase from 2,612 to 12,021, as such air quality improvements would be negligible and could actually be made worse with congestion.

Comments Summarized by Master Comment 33:

- The loss of on street parking in many built out communities would deprive those businesses of the only parking they have in close proximity to their businesses and could lead to conditions of BLIGHT on

certain boulevards. Residential communities will suffer the intrusion of motorists looking for a parking space close to their parking destination and increase GREEN HOUSE gasses as motorists circle endlessly looking for a coveted parking spot. This situation is much worse than it should have been due to the flagrant "escheatment" of City special parking funds to fill the coffers of the City general fund.

- Commenter opposes reduction of automobile lanes on Figueroa between San Fernando Road and Colorado Blvd., because traffic impact would negatively impact local businesses.

- Impacts to businesses on Colorado Blvd. Business on York Blvd. has seen a 20% decrease in sales since the bike lane went in, which translates to $11,000 less in sales tax over a four month period. Multiply that by all the businesses.

Comments Summarized by Master Comment 34:

- MTA has operational concerns regarding the removal of any travel lane where bus service operates. The prior removal of a travel lane on Main Street south of Pico Boulevard to install a bike lane has caused PM rush hour backups from Pico Boulevard to 17th Street. This in turn has resulted in bus delays and has increased Metro's operating cost.
- Removal of travel lanes and turning movements will significantly slow bus travel. Quantitative Analysis was not conducted. Cost of bus: $130 per bus per hour to operate. Slowing buses will increase costs. Metro has no additional money for operations. Bus service could be reduced.
- New bicycle lane has caused significant bus queuing on Main Street between 12th and 16th Streets increasing costs and making it harder for Metro to maintain on-time service. Impacts will be worse where travel lanes are reduced to one per direction.
- Several transit corridors with Metro bus service could be impacted by construction of the proposed project. Municipal bus service operators including LADOT, Foothill Transit, and City of Santa Clarita Transit may also be impacted and therefore should be included in construction outreach efforts.
- Description of Metro services contained in Section 4.5, Page 10 of the Draft EIR should include the following corrections:
  1. Metro light rail lines include the Blue, Exposition, Green and Gold Lines. Subway lines consist of the Red and Purple Lines (heavy rail, not light rail). The Orange and Silver Lines operate as Bus Rapid Transit (BRT).

Comments Summarized by Master Comment 35:

- Safety analysis should quantify risks including traffic accidents in or near streets impacted by displaced driving and parking.
- Safety analysis has no substance. Does not quantify the increased number of bicycle trips that would be induced or what would happen when those trips pass through the ill-defined areas of risk. Those trips would not be entirely within bike lanes, a fact not noted or accounted for.
- What about traffic diverted to residential streets where children play.
- What about increased risk of crime from strangers parking and walking in neighborhoods? Increased risk to vulnerable people who have to walk further from parked car to residence. Also, risk of increased auto theft and burglary as people park in more remote areas.
- The City has failed to provide the resources to construct truly safe and separated lanes for those who wish to bike, which is especially important in areas of heavy traffic. It is not reasonable to implement the philosophy of "the slower the safer for bikes and the slower the more likely we will frustrate drivers out of their cars and onto bikes or transit."
- Bicyclists ignore traffic rules (ride through stop lights and signs).

Comments Summarized by Master Comment 36:

MTA has reviewed current research on shared bicycle/bus facilities. A Summary of Design, Policies and Operational Characteristics for Shared Bicycle/Bus Lanes (State of Florida Department of Transportation, July 2012) includes a literature review and case study summary of shared bicycle/bus lanes in the United States as well as internationally. The bus frequency found on this particular segment of Cesar E. Chavez Avenue, is dramatically higher than any of the facilities documented in the study. The highest bus frequency cited in the study was the Stewart Street shared bicycle/bus lane in Seattle, WA, with 77 buses per hour. Every other facility detailed in the study has bus frequencies of 30 per hour or less. The study cites design guidance from Ottawa, Canada that indicates that bicycle and bus facilities should be separated in locations with more than 20 buses per hour. Given that there are more than 120 buses per hour under existing conditions, and this is expected to grow in the near future with the completion of the Division 13 project, Metro has serious concerns over the frequency of bus-bicycle conflicts that would be inherent in bicycles sharing a facility with buses on Cesar E. Chavez Avenue.

Comment Summarized by Master Comment 38:

In some residential areas traffic might double because there is so little traffic there now. Background measurements near affected side streets are missing from the document.

Comment Included as Master Comment 40:

Do skaters and skate boarders count as bike lane users?

Comments Summarized by Master Comment 41:

- Do bicyclists count more than someone delivering goods or driving to work.
- Potential FTA Title VI and Environmental Justice issue due to transit impacts.
- Due to potentially adverse impacts to transit bus service, the EIR should analyze the proposed project's compliance with Title VI and associated Environmental Justice regulations as stipulated by the Federal Transit Administration (FTA).

Comment Summarized by Master Comment 42:

Streets are currently over extended, removal of auto lanes will considerably slow traffic and bike lanes will do little to mitigate impacts.

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ATTACHMENT 2. CORRECTIONS AND ADDITIONS

The following presents Corrections and Additions to the Draft EIR that relate to the Proposed Project. Correction to the Draft EIR that are directly related to other portions of the First Year of the First Five Year Implementation Strategy will be addressed in other DCP Staff Recommendation Reports or the Final EIR for the Figueroa Streetscape Project. In general new text is underlined and deleted text is in strike-through font.

- Project Description, Labeling of Figures. The following two figures have been revised to clarify the labeling of project alteratives. In the Draft EIR, they show lane configurations as "Alternative 1" and "Alternative 2". In the following what is labeled as Alternative 1 is EIR Alternative 2A, and what is labeled as Alternative 2 is Alternative 2B:

  3-11 North Figueroa Street*
  3-18 Colorado Boulevard*

  See revised figures.

- Page 4.1-14 (Table 4.1-5), daily construction emission significance impact revised as follows:

TABLE 4.1-5: DAILY CONSTRUCTION EMISSIONS – YEAR 2013

Construction Activity	Pounds Per Day					
	VOC	**NO_X**	**CO**	**SO_X**	**$PM_{2.5}$**	**PM_{10}**
On-Site	1	6	3	0	<1	<1
Off-Site	<1	<1	1	0	<1	<1
Maximum Regional Total	1	6	4	0	<1	<1
Regional Significance Threshold	**75**	**100**	**550**	**150**	**55**	**150**
Exceed Threshold?	No	No	No	No	No	No
Maximum On-Site Total	1	6	3	0	<1	<1
Localized Significance Threshold /a/	**--/b/**	**74**	**680**	**-- /b/**	**3**	**5**
Exceed Threshold?	--	No	No	--	~~Yes~~ No	~~Yes~~ No

/a/ The analysis assumed aone-acre project site and a 25-meter (82-foot) receptor distance.
/b/ SCAQMD has not developed localized significance methodology for VOC or SO_X.
SOURCE: TAHA, 2010.

- The second to last paragraph on page 4.1-14 (Localized Construction Emissions) is revised as follows:

  As shown in **Table ~~4.1-6~~4.1-5**, daily construction emissions would not exceed the SCAQMD localized significance thresholds. Therefore, the proposed projects would result in a less-than-significant impact related to localized construction emissions.

- The last paragraph on page 4.1-15 (Localized Operational Emissions) is revised as follows:

  Localized. ~~Reconfiguration of roadway striping would potentially remove one or more vehicular travel lanes. Alternatively, existing parking lanes could be removed instead of vehicular travel lanes to incorporate the proposed bicycle lanes. Reducing the number of travel lanes would result in local traffic congestion, resulting in a signalized intersection worsening Level of Service (LOS) E or F. Localized high concentrations of CO concentration could occur where large amounts of traffic operate under heavily congested conditions and if vehicles would be idling for a substantial period of time. Many roadway segments affected by the proposed projects already operate at or near capacity during peak hour periods and any incremental change in traffic volumes or vehicle idling emissions would not be significant. In addition, despite the fact the components of the proposed projects in traffic may decrease vehicle speeds and increase idle times at certain intersections, CO~~

~~concentrations in the Basin have not exceeded State standards since 1992 due to stringent State and federal mandates for lowering vehicle emissions. This is accurate even when considering the most congested City intersections with the highest traffic volumes and largest percentage of vehicle idle time. It is not anticipated that any intersection affected by the proposed projects contains the requisite vehicle volumes and delays to generate a CO hotspot. Therefore, the proposed projects would result in a less than significant impact related to localized CO concentrations.~~ Reconfiguration of roadway striping would potentially remove one or more vehicular travel lanes. For purposes of identifying a conservative estimate of delay, the EIR assumes that vehicle traffic volumes on the various affected roadway segments will remain unchanged even where there would be a reduction in travel lanes and roadway to accommodate bicycle lanes. The pollutant most affected by traffic delay is carbon monoxide. Typically, carbon monoxide emissions increases as vehicle speed decreases between the range of 10 miles per hour (mph) and 25 mph, and increase further as vehicles speed decreases to 2.5 mph idling speed, while carbon monoxide emissions decrease as vehicle speed decreases above 25 miles per hour. Where capacity is reduced there could be an incremental reduction in vehicle speeds along the affected street segments and there could be a localized incremental increase in carbon monoxide emissions. In some cases, where capacity is reduced, the number of vehicles passing through an intersection during the peak hour could decrease, which could lead to the peak period being extended, as well as modest increases in carbon monoxide emissions. Localized carbon monoxide concentrations could occur where large amounts of traffic operate under heavily congested conditions and if vehicles would be idling for a substantial period of time. Many roadway segments affected by the proposed projects are already congested and operate at, or near, capacity during peak hour periods and any incremental change in traffic volumes or vehicle idling emissions would not be significant.

Other factors taken in to account are: 1) the proposed project would affect capacity of approximately 0.5 percent of the roadway miles in the City of Los Angeles (32.5 miles out of 6,500) and 2) the existing ambient carbon monoxide levels are extremely low within the Los Angeles Air Basin. The one-hour concentration is typically 3 ppm and the 8-hour concentration is typically 2 ppm according to monitoring data for the SCAQMD monitoring station located in downtown Los Angeles. The Air Basin, is designated a maintenance area for carbon monoxide which means that that both State and federal air quality standards are satisfied. There are no air quality carbon monoxide hot spots within the basin as a whole or the City of Los Angeles in particular.

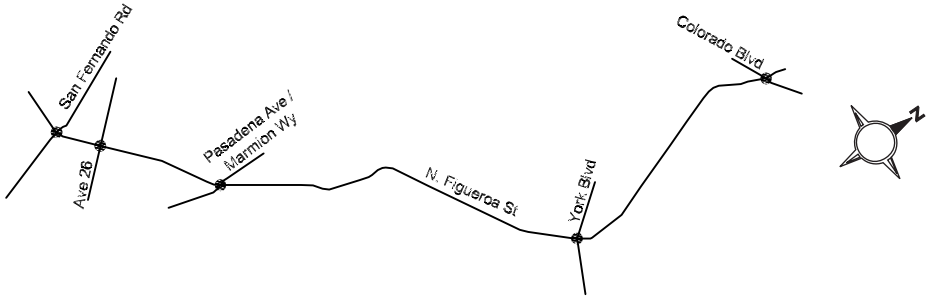
To trigger an impact, carbon monoxide emissions along any roadway segment affected by the project, would have to increase by almost 7 times in the peak hour or by four times over an 8-hour period. Because of the low ambient carbon monoxide condition, even where average street segment speeds could be reduced to almost zero the resulting carbon monoxide emissions would only increase by two times. Under the most extreme circumstance, the change in emission levels would not be high enough to cause an exceedance of the carbon monoxide air quality standard, and therefore would not result in a significant impact.

- Page 4.5-9 (Table 4.5-2), the delay and LOS for the intersections of Colorado Blvd and Eagle Rock and Colorado Blvd. and Sierra Villa are revised as follows:

No.	Street	Study Intersection	AM Peak Hour		PM Peak Hour	
			LOS	Delay (seconds)	LOS	Delay (seconds)
86	Colorado Blvd.	Sierra Villa Dr.	C	~~29.4~~ 23.5	F	~~246.6~~ 147.3
87		Eagle Rock Blvd.	~~D~~ C	~~37.0~~ 33.3	~~F~~ D	~~264.4~~ 51.2

- Page 4.5-10 the description of Metro services is revised as follows:

	EXISTING	PROJECT	ALTERNATIVE 2A	ALTERNATIVE 2B
N/S: N. Figueroa St E/W: Colorado Blvd	LOS: C / C Delay: 23.5 / 21.3	LOS: D / D Delay: 54.4 / 40.4	LOS: C / D Delay: 26.3 / 40.4	LOS: C / C Delay: 23.5 / 21.3
N/S: N. Figueroa St E/W: York Blvd	LOS: C / C Delay: 24.9 / 28.8	LOS: E / D Delay: 66.4 / 46.2	LOS: D / D Delay: 42.8 / 36.9	LOS: C / C Delay: 24.9 / 28.8
N/S: N. Figueroa St E/W: Pasadena Ave	LOS: B / B Delay: 19.7 / 13.2	LOS: C / B Delay: 25.1 / 13.4	LOS: C / B Delay: 25.1 / 13.4	LOS: B / B Delay: 19.7 / 13.2
N/S: N. Figueroa St E/W: Ave 26	LOS: D / D Delay: 54.1 / 38.9	LOS: F / D Delay: 149.5 / 45.7	LOS: D / D Delay: 53.1 / 39.1	LOS: D / D Delay: 54.0 / 38.9
N/S: N. Figueroa St E/W: San Fernando Rd	LOS: B / B Delay: 15.0 / 16.0	LOS: B / C Delay: 14.3 / 21.6	LOS: B / C Delay: 14.9 / 21.6	LOS: B / C Delay: 14.6 / 21.6



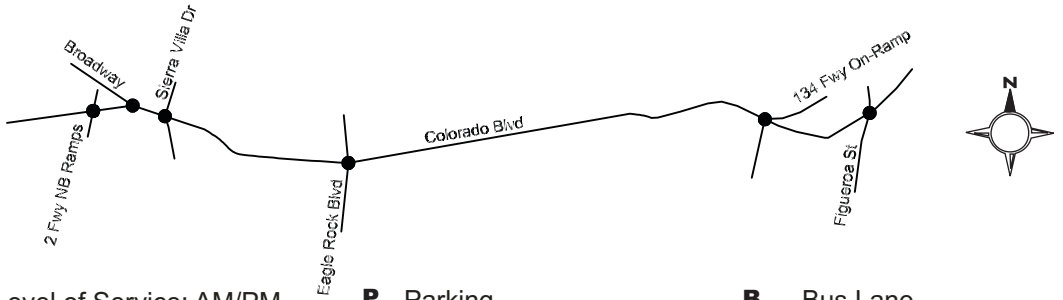
LEGEND:

- ● Study Intersection
- Intersection Lane Geometry
- **LOS** Level of Service: AM/PM
- **Delay** Delay: AM/PM (Second)
- **P** Parking
- **OP** Off-Peak Street Parking
- **B** Bus Lane
- **=#** Estimated Parking Loss

SOURCE: LADOT, 2012.

FIGURE 3-11
NORTH FIGUEROA STREET - EXISTING AND PROPOSED LANE INTERSECTION CONFIGURATIONS

	N/S: 2 Fwy NB Ramp E/W: Colorado Blvd	N/S: Broadway E/W: Colorado Blvd	N/S: Sierra Villa Dr E/W: Colorado Blvd	N/S: Eagle Rock Blvd E/W: Colorado Blvd	N/S: 134 Fwy Ramp E/W: Colorado Blvd	N/S: N. Figueroa St E/W: Colorado Blvd
EXISTING	LOS: B / B Delay: 17.2 / 16.7	LOS: B / B Delay: 13.2 / 17.1	LOS: C / F Delay: 29.4 / 246.6	LOS: D / F Delay: 37.0 / 264.4	LOS: C / B Delay: 23.4 / 14.8	LOS: C / C Delay: 29.4 / 20.7
PROJECT	LOS: B / B Delay: 17.3 / 16.7	LOS: B / B Delay: 12.8 / 17.0	LOS: F / F Delay: 94.7 / 471.5	LOS: F / F Delay: 111.4 / 453.0	LOS: B / B Delay: 19.4 / 19.0	LOS: E / D Delay: 57.9 / 41.7
ALTERNATIVE 2A	LOS: B / B Delay: 17.2 / 16.7	LOS: B / B Delay: 13.1 / 17.1	LOS: C / F Delay: 30.0 / 262.6	LOS: F / F Delay: 121.1 / 476.3	LOS: B / B Delay: 19.4 / 19.0	LOS: C / D Delay: 31.5 / 40.3
ALTERNATIVE 2B	LOS: B / B Delay: 17.2 / 16.7	LOS: B / B Delay: 13.2 / 17.1	LOS: C / F Delay: 29.4 / 246.6	LOS: D / F Delay: 37.0 / 264.4	LOS: B / B Delay: 19.4 / 19.0	LOS: E / D Delay: 57.9 / 41.7



LEGEND:

- Study Intersection
- Intersection Lane Geometry
- **LOS** Level of Service: AM/PM
- **Delay** Delay: AM/PM (Second)
- **P** Parking
- **OP** Off-Peak Street Parking
- **B** Bus Lane
- **=#** Estimated Parking Loss

SOURCE: LADOT, 2012

FIGURE 3-18
COLORADO BOULEVARD - EXISTING AND PROPOSED LANE INTERSECTION CONFIGURATIONS

Los Angeles County Metropolitan Transportation Authority (Metro). The Metro provides bus, light rail and subway services within the Los Angeles County. There are ~~six~~ four Metro light rail lines (i.e., Blue, ~~Red,~~ Green, Gold, ~~Purple,~~ and Expo), two subway lines (i.e., Red and Purple), and two ~~subway~~ bus lines (i.e., Orange and Silver) operating in exclusive right-of-ways.

- Page 4.5-19 (Table 4.5-5), delay and LOS for intersections of Colorado Blvd and Eagle Rock and Colorado Blvd. and Sierra Villa are revised as follows:

No.	Street	Study Intersection	AM Peak Hour				PM Peak Hour			
			LOS	Delay (sec)	Change in Delay	Sig Impact	LOS	Delay (sec)	Change in Delay	Sig Impact
86	Colorado Blvd.	Sierra Villa Dr.	~~F~~ D	~~94.7~~ 50.7	~~65.3~~ 27.2	YES	F	~~471.5~~ 350.9	~~224.9~~ 203.6	YES
87		Eagle Rock Blvd.	~~F~~ E	~~111.4~~ 55.7	~~74.4~~ 22.4	YES	F	~~453~~ 115.5	~~188.6~~ 64.3	YES

- Page 4.5-37, Footnote 28 is replaced with the following:

~~Injury types and their respective monetary values used are Fatality ($140,301), Severe Injury ($7,560), Other Visible Injury ($2,765), and Complaint of Pain ($1,572).~~ The values used for the safety benefits and methodology used in the benefit-cost calculator are on page 82 of the CalTrans Local Roadway Safety Manual (April 2012). Bicycle lanes in general reduce bicycle/pedestrian collisions by 35%..

Crash Severity **	Crash Cost *
Fatality (K)	$4,008,900
Severe/Disabling Injury (A)	$216,000
Evident Injury – Other Visible (B)	$79,000
Possible Injury – Complaint of Pain (C)	$44,900
Property Damage Only (O)	$7,400
* The letters in parenthesis (K, A, B, C and O) refer to the KABCO scale; it is commonly used by law enforcement agencies in their crash reporting efforts and is further documented in the HSM. ** Highway Safety Manual (HSM), First Edition, 2010.	

- In Chapter 5.0 Alternatives, the level of Service and Parking Tables are added for Alternatives 2A and 2B (Alternative 1 is existing conditions and shown in Section 4.5 and Alternative 3 is described qualitatively):

ALTERNATIVE 2A: INCREASED PARKING REMOVAL/ALTERNATE TRAVEL LANE IMPACTS

TABLE A: INTERSECTION LEVEL OF SERVICE -- ALTERNATIVE 2A

No.	Street	Study Intersection (1)	AM Peak Hour				PM Peak Hour			
			LOS	Delay (sec)	Change in Delay (sec)	Sig Impact	LOS	Delay (sec)	Change in Delay (sec)	Sig Impact
44	N. Figueroa St.	Colorado Blvd	C	28.1	2.4	NO	D	40.1	19.5	YES
45		York Blvd	D	42.8	17.9	YES	D	36.9	8.1	YES
46		Pasadena Ave	C	25.1	5.4	NO	B	13.4	0.2	NO
47		Ave 26	D	53.1	-1	NO	D	39.1	0.2	NO
48		San Fernando Rd	B	14.9	-0.1	NO	C	21.6	5.6	NO
84	Colorado Blvd.	SR-2 NB Ramps	B	17.2	0	NO	B	16.7	0	NO
85		Broadway	B	13.1	-0.1	NO	B	17.1	0	NO
86		Sierra Villa Dr	C	22.9	-0.6	NO	F	163.8	16.5	YES
87		Eagle Rock Blvd	E	56.4	23.1	YES	F	121.1	69.9	YES
88		SR-134 Ramps	B	19.3	-4	NO	B	19	4.3	NO
89		N. Figueroa St	C	28.1	2.4	NO	D	40.1	19.5	YES

/a/ Includes a duplicate study intersection of Figueroa Street/Colorado Boulevard.
SOURCE: LADOT, 2012.

TABLE B: LOSS OF PARKING SPACES -- ALTERNATIVE 2A

Bike Lane Corridors and Segments	No. of Parking Spaces Lost	Adjacent Land Uses	Parking Hours	
			N/W Side	S/E Side
N. Figueroa St.	N/A (Traffic and Transit Impacts Only)			
Colorado Blvd.	N/A (Traffic and Transit Impacts Only)			

Note: AM peak period typically lasts from 7:00 a.m. to 9:00 a.m., and PM peak period lasts from 4:00 p.m. to 6:00 p.m.
SOURCE: LADOT, 2012.

ALTERNATIVE 2B: INCREASED PARKING REMOVAL/ALTERNATE TRAVEL LANE IMPACTS VARIANT

TABLE C: INTERSECTION LEVEL OF SERVICE -- ALTERNATIVE 2B

No.	Study Corridor	Study Intersection	AM Peak Hour				PM Peak Hour			
			LOS	Delay (sec)	Change in Delay (sec)	Sig Impact	LOS	Delay (sec)	Change in Delay (sec)	Sig Impact
44	N. Figueroa St.	Colorado Blvd.	C	25.3	-0.4	NO	C	20.9	0.3	NO
45		York Blvd.	C	24.9	0	NO	C	28.7	-0.1	NO
46		Pasadena Ave.	B	19.7	0	NO	B	13.2	0	NO
47		Ave 26	D	54	-0.1	NO	D	38.9	0	NO
48		San Fernando Rd.	B	14.6	-0.4	NO	C	21.6	5.6	NO
84	Colorado Blvd.	SR-2 NB Ramps	B	17.2	0	NO	B	16.7	0	NO
85		Broadway	B	13.1	-0.1	NO	B	17.1	0	NO
86		Sierra Villa Dr	C	23.5	0	NO	F	147.3	0	NO
87		Eagle Rock Blvd	C	33.3	0	NO	D	51.2	0	NO
88		SR-134 Ramps	C	23.8	0.5	NO	B	18	3.3	NO
89		N. Figueroa St	C	25.3	-0.4	NO	C	20.9	0.3	NO

SOURCE: LADOT, 2012

TABLE D: LOSS OF PARKING SPACES -- ALTERNATIVE 2B

Bike Lane Corridors and Segments		No. of Parking Spaces Lost	Adjacent Land Uses	Parking Hours	
				N/W Side	S/E Side
N. Figueroa St.	San Fernando Rd to Ave 26	-19	Commercial	Ave 22 to Ave 26: All Day	All Day
	Ave 26 to Pasadena Ave.	-125	Residential & Commercial	Ave 26 to Ave 28: All Day except for AM Peak; Ave 28 to Pasadena Ave: All Day	All Day
	Pasadena Ave. to York Blvd.	-329	Residential & Commercial	All Day	All Day
	York Blvd. to Colorado Blvd.	-224	Residential	York Blvd to Meridian St: All Day; Myosotis St to Springvale Dr: All Day; Farrington St to Colorado Blvd: All Day	York Blvd to Ruby Place: All Day; St. Albans St to Annan Way: All Day; Yosemite Dr to Neola St: All Day
	AGG. LOSS	-697			
Colorado Blvd.	Eagle Rock Blvd to SR-134 Ramps	-233	Residential & Commercial	Eagle Rock Blvd to Marywood Ave: All Day; Shearin Ave to SR-134 Ramps: All Day	Eagle Rock Blvd to Mt. Helena Ave: All Day
	AGG. LOSS	-233			
TOTAL		**-2,177**			

NOTE: AM peak period typically lasts from 7:00 a.m. to 9:00 a.m., and PM peak period lasts from 4:00 p.m. to 6:00 p.m.
SOURCE: LADOT

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Designing Road Diet Evaluations: Lessons Learned from San Jose's Lincoln Avenue Road Diet

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Designing Road Diet Evaluations: Lessons Learned from San Jose's Lincoln Avenue Road Diet







MTI Report WP 12-14





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LEAD UNIVERSITY OF MNTRC

The Mineta Transportation Institute (MTI) was established by Congress in 1991 as part of the Intermodal Surface Transportation Equity Act (ISTEA) and was reauthorized under the Transportation Equity Act for the 21st century (TEA-21). MTI then successfully competed to be named a Tier 1 Center in 2002 and 2006 in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Most recently, MTI successfully competed in the Surface Transportation Extension Act of 2011 to be named a Tier 1 Transit-Focused University Transportation Center. The Institute is funded by Congress through the United States Department of Transportation's Office of the Assistant Secretary for Research and Technology (OST-R), University Transportation Centers Program, the California Department of Transportation (Caltrans), and by private grants and donations.

The Institute receives oversight from an internationally respected Board of Trustees whose members represent all major surface transportation modes. MTI's focus on policy and management resulted from a Board assessment of the industry's unmet needs and led directly to the choice of the San José State University College of Business as the Institute's home. The Board provides policy direction, assists with needs assessment, and connects the Institute and its programs with the international transportation community.

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MTI works to provide policy-oriented research for all levels of government and the private sector to foster the development of optimum surface transportation systems. Research areas include: transportation security; planning and policy development; interrelationships among transportation, land use, and the environment; transportation finance; and collaborative labor-management relations. Certified Research Associates conduct the research. Certification requires an advanced degree, generally a Ph.D., a record of academic publications, and professional references. Research projects culminate in a peer-reviewed publication, available both in hardcopy and on TransWeb, the MTI website (http://transweb.sjsu.edu).

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REPORT WP 12-14

DESIGNING ROAD DIET EVALUATIONS: LESSONS LEARNED FROM SAN JOSE'S LINCOLN AVENUE ROAD DIET

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July 2017

A publication of
Mineta Transportation Institute
Created by Congress in 1991

College of Business
San José State University
San José, CA 95192-0219

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. CA-MTI-17-1629	**2. Government Accession No.**	**3. Recipient's Catalog No.**
4. Title and Subtitle Designing Road Diet Evaluations: Lessons Learned from San Jose's Lincoln Avenue Road Diet		**5. Report Date** July 2017 **6. Performing Organization Code**
7. Authors Hilary Nixon, Ph.D., Asha Weinstein Agrawal, Ph.D., and Cameron Simons		**8. Performing Organization Report** MTI Report WP 12-14
9. Performing Organization Name and Address Mineta Transportation Institute College of Business San José State University San José, CA 95192-0219		**10. Work Unit No.** **11. Contract or Grant No.** DTRT12-G-UTC21
12. Sponsoring Agency Name and Address U.S. Department of Transportation Office of the Assistant Secretary for Research and Technology University Transportation Centers Program 1200 New Jersey Avenue, SE Washington, DC 20590		**13. Type of Report and Period Covered** Final Report **14. Sponsoring Agency Code**
15. Supplemental Notes		

16. Abstract

This report analyzes traffic impacts from the 2015 implementation of a pilot "road diet" on Lincoln Avenue, in the City of San Jose, California, comparing data on traffic volumes and speeds from before and after the road diet was implemented. The analysis looks at impacts on both the road diet location itself and on surrounding streets likely to have been impacted by traffic diverted off the road diet segment. The results within the road diet zone were as expected, with falling volumes and numbers of speeders. The all-day data aggregated by street type (e.g., neighborhood streets, major streets) showed limited overall negative impacts outside the road diet segment. These summary results do not tell the entire story, however. Individual locations, particularly among the neighborhood streets, saw more noticeable negative impacts. The report ends with recommendations for best practices in designing and conducting road diet evaluation studies.

17. Key Words Evaluation; speeding; traffic safety; traffic volume; arterial streets	**18. Distribution Statement** No restrictions. This document is available to the public through The National Technical Information Service, Springfield, VA 22161		
19. Security Classif. (of this report) Unclassified	**20. Security Classif. (of this page)** Unclassified	**21. No. of Pages** 110	**22. Price** $15.00

Form DOT F 1700.7 (8-72)

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072017

ACKNOWLEDGMENTS

The authors thank the many people who helped us with this project. We would not have been able to do this project at all without help getting the road diet data, provided by James A. Bittner, P.E., Senior Civil Engineer, and Warren J Navarro, Transportation Options Graduate Intern, both with the Department of Transportation, City of San Jose. In addition, Ivana Jovičić and Xiaohong Liu, graduate students in the SJSU Department of Mathematics, provided advice on the feasibility of statistical testing. SJSU Master of Urban Planning (MUP) student Nicholas Danty prepared the maps, and MUP alum Bahar Vaezi prepared cross-sections of Lincoln Avenue.

The authors thank MTI staff, including Executive Director Karen Philbrick, Ph.D.; Publication Support Coordinator Joseph Mercado; Executive Administrative Assistant Jill Carter; Editor Kimberly Hammond; and Webmaster Frances Cherman.

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I. INTRODUCTION

This report analyzes traffic impacts from the 2015 implementation of a pilot "road diet" on Lincoln Avenue, in the City of San Jose, California. Road diets are street reconfiguration projects that reduce the number of travel lanes in a street, most often converting a four-lane, undivided roadway to a three-lane roadway with two through-travel lanes and a two-way center left-turn lane. For the study, we compared data on traffic volumes and speeds from before and after the road diet was implemented, looking not only at the impacts on the road diet segment itself, but also on surrounding streets that might have been impacted by traffic diverted off the road diet segment. Our analysis also compares impacts over different time periods: all day, during the am and pm peak periods, and by hour of the day.

When road diets work well, they are a relatively low-cost measure that improves safety, multi-modal accessibility, and quality of life in the neighborhood. Specific goals for many road diet projects include fewer crashes, improved facilities for pedestrians (who have to cross fewer lanes of traffic), and improved facilities for bicyclists (if new bicycle lanes are installed in the space freed up from the eliminated traffic lane).

Road diets are not without concerns, however. Travel times may increase along the slimmed road. Also, depending on the configuration of side streets, some traffic may switch to nearby side roads, thus increasing traffic volumes and speeds on roads potentially less suited to handle such traffic.

Despite growing interest in road diets among transportation planners and community members, there is limited empirical evidence on the effects of these roadway conversions. While some local governments and researchers have conducted evaluations on road diets, these vary widely in the metrics they evaluate and the quality of data collected.[1] For example, a number of studies evaluate only safety outcomes. Also, many studies look only at the impact on the road diet segment, omitting impacts on neighborhood streets. (For helpful summaries of the factors analyzed in many of the older studies, see Huang, et al, 2003 and Lyles, et al, 2012.[2]) Further, many road diet evaluations are not formally published and archived in a permanent, accessible location, making them difficult to access. In short, transportation planners have limited high-quality resources to review when they want to understand how road diets perform in practice.

This report contributes to the small but growing body of published road diet literature by analyzing the traffic effects of a road diet in San José, California, focusing on neighborhood-wide traffic volume and speed impacts. In the spring of 2015, the City of San José implemented a road diet pilot program along a one-mile stretch of Lincoln Avenue in the Willow Glen neighborhood of central San José. Lincoln runs through a predominantly residential neighborhood with a small neighborhood business district. The street, a four-lane, undivided roadway, has become a popular route for commuters avoiding the more congested nearby freeways and expressways. Close to 20,000 vehicles per day travel along this route, often above posted speed limits, posing a risk to pedestrians and bicyclists.

This study analyzes before-and-after traffic volume and speed data that was collected at 45 different locations on Lincoln Avenue, intersecting streets, and nearby parallel streets. The City of San Jose collected the data in February 2015, several weeks prior to the beginning of the road diet pilot, and later in February 2016, one year after the project began.

The traffic data was used to answer the following research questions specific to the Lincoln Avenue road diet:

1. How did the road diet impact all-day counts of traffic volumes and speeders for each street type? The street types analyzed were Lincoln Avenue road diet locations, Lincoln Avenue locations outside the road diet, major streets, and neighborhood streets.

2. How did the road diet impacts vary by street type when looking at all-day counts versus data for peak hours and data by hour of the day?

3. Did individual locations see speeding and volume increases noticeably greater than the street-type averages, such that additional traffic calming measures might be warranted?

An additional objective of the research project was to recommend best practices in designing road diet evaluations that look at speeding and traffic volume impacts.

As part of the City of San Jose's analysis of the Lincoln Avenue road diet, a detailed report was prepared (City of San Jose, 2016). The current MTI report provides an independent third-party review of the traffic volume and speed data collected, as well as more detailed analysis of the hourly traffic patterns.

The remainder of the report is organized as follows: Chapter 2 describes the history of the Lincoln Avenue road diet effort, Chapter 3 explains the study methods, and Chapter 4 presents detailed study findings. In conclusion, Chapter 5 summarizes the findings and offers recommendations for designing future road diet evaluations. Appendices present detailed data about each of the 45 data collection locations.

II. HISTORY OF THE LINCOLN AVENUE ROAD DIET PROJECT

Lincoln Avenue is a major north-south street that runs through the Willow Glen neighborhood in San José, California. Figure 1 shows the road diet location within the City of San Jose.

Willow Glen is a relatively affluent neighborhood with approximately 27,000 residents.[3] The city's only Community Benefit Improvement District is located in Willow Glen, focused on the vibrant neighborhood business district located along Lincoln Avenue between Minnesota Avenue in the south to approximately Lester Avenue in the north.

During the fall of 2014, the Willow Glen Business Association (WGBA), the Willow Glen Neighborhood Association (WGNA), and the City of San José discussed the possibility of implementing a four-lane to three-lane conversion of Lincoln Avenue in the stretch running through the Willow Glen Business District. Many residents were interested in such a road diet as a way to slow traffic and improve safety.

The street, a four-lane, undivided roadway, had become a popular route for commuters avoiding the more congested nearby freeways and expressways. Close to 20,000 vehicles per day traveled along this route, often above posted speed limits, posing a risk to pedestrians and bicyclists.

In anticipation of planned pavement work on Lincoln Avenue in 2015, city staff proposed and city council approved a pilot study to evaluate the potential impacts of a road diet along an approximately one-mile stretch of Lincoln Avenue from Minnesota Avenue to Coe Avenue. The intent of the pilot was to install temporary road markings and evaluate the effectiveness of the road diet prior to the major repavement effort, at which point the road diet could be made permanent if the pilot performed well.

The original pilot study was scheduled for a three-month period from February to April 2015, and later extended to a full year, until February 2016. Because the project faced considerable controversy and the outcome of pilot evaluation was of great community interest, the city designed a very extensive evaluation project. Indeed, the data collection for the Lincoln Avenue road diet ended up being the most extensive such data collection effort ever undertaken by San José's Department of Transportation.

City staff designed the road diet to reduce through traffic lanes from four to three. Prior to the road diet, Lincoln had two travel lanes in each direction; after the road diet, Lincoln had one through travel lane in each direction, plus a two-way center turn lane. The city used the space freed up from the fourth travel lane to create marked bicycle lanes on each side of the road (Figure 2).

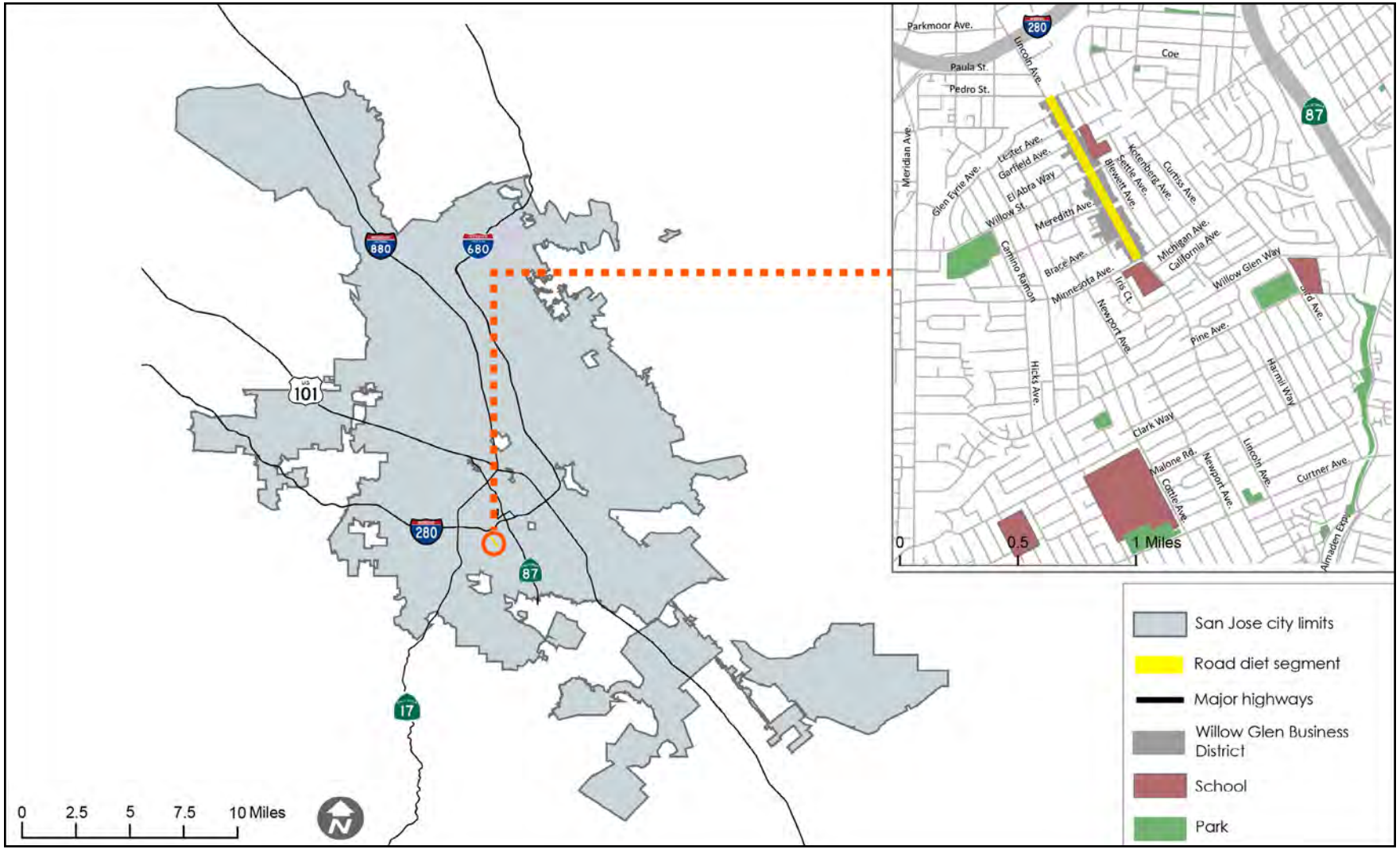


Figure 1. Location of the Lincoln Avenue Road Diet in the City of San Jose

Source: Map created by Nicholas Danty using shapefiles from the City of San Jose Community Development Department and Santa Clara County Department of Planning and Development.

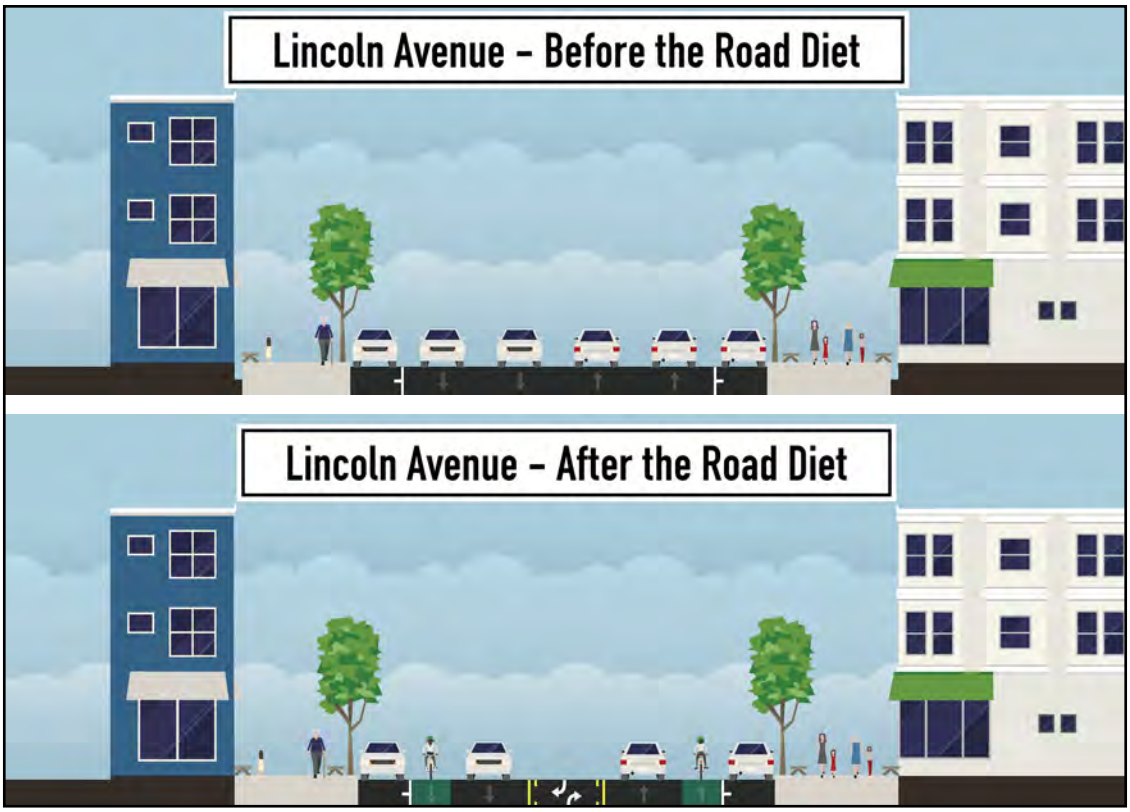


Figure 2. Illustration of a 4-Lane to 3-Lane Road Diet

Source: Created by Bahar Vaezi using Streetmix.net

The pilot began in late February 2015 and garnered considerable attention, both in terms of support and opposition for the new configuration. Two competing change.org petitions were established. The "Remove the Road Diet from Lincoln Ave." petition eventually garnered a total of 816 supporters,[4] while the "Make the Lincoln Avenue Road Diet Permanent in Willow Glen" petition received 1,448 supporters.[5] The two sides also took to social media, engaging in spirited discussion on several community Facebook sites. The WGBA surveyed local businesses, while the WGNA surveyed surrounding residents.

In April 2015, the city collected traffic data and reported back the results.[6] After reviewing the report and community feedback, the WGNA came out officially in support of the road diet,[7] while the WGBA officially declared its opposition.[8] The lack of a clear consensus, plus additional controversy within the community, led councilmember Pierluigi Oliverio to request that the road diet pilot be extended to a full year, until February 2016. The city council approved this extension and also directed the Department of Transportation to make additional changes to the configuration, to help alleviate some of the traffic concerns expressed by community members during the original three-month trial.[9]

The Department of Transportation collected additional traffic data in February 2016 and issued an extensive evaluation a few months later.[10] After reviewing that evaluation, in June of 2016 the San José City Council voted unanimously to make the road diet permanent. According to Major Sam Liccardo, Lincoln Avenue "has been the most studied city road in our history."[11]

III. STUDY METHODS

This study compares traffic volume and speed data collected in February 2015, before the road diet implementation, and one year later, in February 2016. This chapter describes the city's traffic data collection process and the analytic methods used in this report.

DATA COLLECTION

We obtained the data for this research from the City of San José's Department of Transportation. The city contracted with a consultant, Traffic Data Service, to conduct the data collection. The consultant recorded traffic volumes and speeds using portable, pneumatic road tubes placed at 45 locations in the Willow Glen neighborhood (see Figure 3). The locations were distributed throughout the neighborhood as follows:

- **Lincoln Avenue road diet segment**: 2 locations within the road diet implementation zone

- **Lincoln Avenue non-road diet segment**: 4 locations along Lincoln Avenue outside the road diet area

- **Major streets**: 16 locations along all major roads within the Willow Glen area. Major roads were those identified as main arterials running north-south or east-west through the community. Most experience average daily traffic (ADT) of 10,000 or more vehicles, although there were some exceptions, including Parkmoor (~7,000 ADT), Coe (~6,000 ADT), Pine (~4,600-7,800 ADT), and Almaden (~6,500 ADT).

- **Neighborhood streets**: 23 locations along neighborhood streets thought most likely to be impacted by the road diet because they were close to Lincoln Avenue or likely to serve as an alternate route. All streets have 25 mph or lower speed limits and ADT of less than 5,500. In many cases, ADT is less than 1,000.

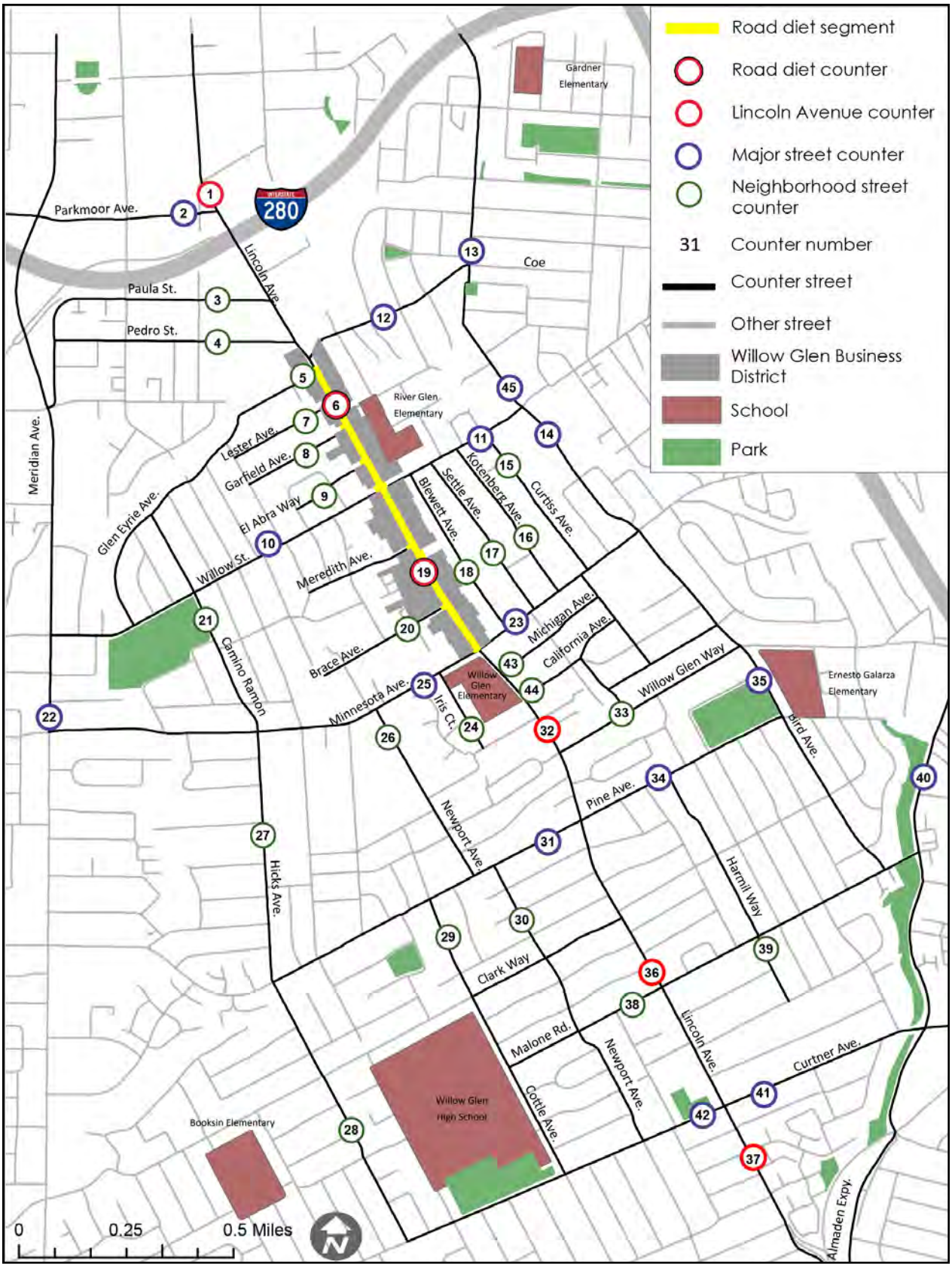


Figure 3. Location of the Data Collection Counters

Source: Map created by Nicholas Danty using shapefiles from the City of San Jose Community Development Department and Santa Clara County Department of Planning and Development.

Data was collected before the implementation of the road diet on February 4 and 5, 2015.[12] One year later, data was collected at the same 45 locations on February 10 and 11, 2016.[13] The dates selected were chosen to represent "typical" mid-week traffic conditions. The weather was similar in both the before and after data collection periods.[14]

The city provided summary reports for each location. For each day of data collection, we analyzed the following data for every data collection point:

- Vehicle counts, by hour and by speed "bins" (the speed bins used were 0-10 mph, 10-15 mph, 15-20 mph, 20-25 mph, 25-30 mph, 30-35 mph, 35-40 mph, 40-45 mph, 45-50 mph, 50-55 mph, 55-60 mph, and 60-100 mph)

- Total number of vehicles per day

- 85th percentile speed[15] for the entire data collection "before" period (two days) and "after" period (three days)

DATA ANALYSIS

The analytical approach taken here focuses on descriptive changes in traffic volumes and speeds across the four types of street location (i.e., Lincoln Avenue road diet segment, Lincoln Avenue non-road diet segment, major streets, and neighborhood streets), as well as at each of the 45 individual locations.

Our study approach differs from that in the City of San Jose Department of Transportation's 2016 report on the road diet project by covering fewer topics—only speeds and volumes—but doing so in greater depth for those issues. The city's report focused only on all-day speed and volume data, while this report also considers peak period and hour-by-hour data. In addition, the city's report looked only at results for individual data collection locations, while this report also examines traffic impacts summarized across each street type. Finally, although the city's analysis of traffic volumes and speeds was narrower than that presented here, the city's report looked at many factors we did not analyze—the economic impacts to the Lincoln Avenue Business District, intersection level-of-service changes along Lincoln Avenue, pedestrian and bicycle counts, and vehicle travel times along Lincoln Avenue.

We initially planned to test whether the speed and volume impacts were statistically significant, but ultimately decided not to because of data limitations. The key challenge with statistical testing of the road diet pilot data was the small sample size, particularly for the road diet segment along Lincoln Ave. There were only two data collection locations within the road diet and only two days of data before-and-after that could be used for some type of matched pairs analysis, significantly limiting the ability to conduct hypothesis testing.

With a small sample size, there is low statistical power[16] and a greater likelihood of causing a Type II error. A Type II error occurs when a hypothesis test does not detect a statistically significant effect that is actually present. While some researchers suggest that testing can be performed on extremely small sample sizes, the effect size (e.g. the change in traffic

volume or number of speeders) needs to be quite large for any significant impact to be detected, and the pilot project data presented few large effect sizes.[17]

To assess effect size for this project, we conducted a power analysis. This technique enables the researcher to identify the minimum change needed in order to detect a significant effect based on sample size and other key data parameters (e.g. mean and standard deviation). In most cases, the effect size needed to be able to detect a significant impact of the road diet, given the small sample size, was larger than the actual change that occurred, limiting the potential usefulness of hypothesis testing.

IV. FINDINGS

This chapter looks first at how the road diet impacted traffic volumes and at the impact on the number of speeders. In each section, we start with a look at the most aggregated data (all-day data averaged for all streets of each street type), then move to a more nuanced look at the impacts by time of day for each street type, and conclude by looking at specific locations that saw noticeable changes.

It is important to note a key limitation with this research, the lack of control locations. Ideally, data for the same time periods would have been collected for a similar set of streets located outside of the Willow Glen neighborhood, to serve as a control or counterfactual. Because of the lack of a counterfactual, it is impossible to determine with real confidence whether changes that occurred after the implementation of the Lincoln Avenue road diet were due to the road diet itself or due to some other, unknown reason. Was traffic behavior changing similarly on similar roads in other parts of the region during this time period? Or were the changes in Willow Glen unique and likely attributable to the road diet? These issues remain unanswered.

TRAFFIC VOLUME IMPACTS

We analyzed volume impacts in several ways. First, we looked at mean values for each street type, considering both at all-day volumes and also impacts by time of day (peak-hour volumes and volumes for each hour of the day). To conclude, we also looked at impacts at each of the 45 locations individually. This analysis was done to determine whether looking across street types, as an approach, obscures important findings about specific locations where traffic volumes diverge in meaningful ways from the broader pattern for a street type.

All-Day Impacts

Data in the first row of Table 1, which shows all-day traffic volumes before and after the road diet, suggests that the road diet did not divert traffic to other streets in the neighborhood. Although volumes fell noticeably at the Lincoln road diet collection points, traffic volumes for the other street types also fell or, in a few cases, remained essentially flat. This pattern held for both all-day vehicle counts and hourly traffic volumes for the two peak periods. Overall, total traffic volume in the Willow Glen area declined by 2% after the road diet, suggesting that some vehicles may have diverted completely out of the area to other surrounding neighborhoods or major highways.

Looking at the all-day volume counts, the decline was most significant at the Lincoln Avenue road diet locations (-6%) and neighborhood street locations (-5%). The other two street types, the Lincoln Avenue collection points outside the road diet and major street locations, saw much smaller changes: a 2% drop and essentially no change, respectively.

Table 1. Traffic Volumes, Pre-and Post-Road Diet, by Street Type and Time Period

	Lincoln Avenue – road diet				Lincoln Avenue – no road diet				Major streets				Neighborhood streets			
Time period	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**
Vehicles per day	15,722	14,761	-961	**-6%**	13,695	13,420	**-275**	**-2%**	12,107	12,058	**-48**	0%	1,939	1,850	**-89**	-5%
Vehicles per AM peak hour [a]	1,392	1,072	-320	**-23%**	1,312	1,147	**-164**	**-14%**	944	950	6	1%	187	187	0	0%
Vehicles per PM peak hour [a]	1,246	1,111	-134	**-12%**	1,171	1,053	**-118**	**-10%**	1,005	984	**-21**	-2%	156	147	**-9**	-6%

Note: Green font indicates a drop in volume.

[a] AM peak = 7 AM – 9 AM; PM peak = 4 PM – 7 PM

Impacts by Time of Day

Looking at hourly volumes during the peak hours, traffic fell noticeably more during the peak hours than it did for all-day counts on both types of Lincoln Avenue locations, though not for the major streets and neighborhood streets. (See the second and third rows of Table 1.) For example, traffic volumes during the morning peak hours dropped 23% at the Lincoln Avenue road diet locations, compared to an all-day drop of 6%. By contrast, the major streets saw tiny peak-hour volume changes (1% and 2% declines) that were similar to the all-day measure for those locations. Finally, the neighborhood streets saw no change in morning peak-hour volumes but 6% fewer vehicles in the afternoon peak-hour.

Figure 4 and Figure 5 allow one to look at variation over time in even more detail, showing the change in traffic volume by hour, pre- and post- the road diet, for all four road types. The line graphs in the left hand column show the magnitude of hourly volumes pre- and post-road diet, while the bar graphs in the middle and left-hand column show the *change* in volumes.

For the Lincoln Avenue road diet locations, Figure 4 reinforces the finding that volumes dropped more during the peak hours then at other times. However, one can see that volumes were actually higher post-diet during the evening hours, as well as at a few other hours scattered across the day.

The graphs for the neighborhood streets (Figure 5) show that traffic volumes fell consistently from the morning peak, through the mid-day, and into the evening peak, but actually rose late at night and early in the morning.

The variation for neighborhood streets between the mid-day drop and late-night/early-morning increase, a detail masked in the all-day and peak-hour data (Table 1), illustrates a key finding for this report: when evaluating a road diet, it is important to look at the data by time-of-day as well as aggregated across the whole data.

Similar to the overall ADT volume for the entire Willow Glen area, peak-period hourly traffic declined by 5% for both the AM and PM time periods.

Localized Impacts

Although evaluating the broad impacts of the road diet in traffic volumes across different street types is important for understanding global impacts, this approach can obscure important effects at individual locations. In this section we point out several locations where traffic volumes diverge from the broader pattern for a particular street type or otherwise indicate that the road diet may have produced an unanticipated impact. The discussion focuses on negative impacts such as noticeable increases in traffic volume, particularly on neighborhood streets.

The report presents the data by collection location in a variety of formats because each method of displaying the information highlights different aspects of the findings. Figure 6 and Figure 7 show the change in AM peak-hour and PM peak-hour volumes in map format.

Appendix A presents data in table format, with pre- and post-road diet all-day and peak-hour traffic volumes (and speeds). Finally, Appendix B presents a graphic representation of volume and speed data by hour.

Three neighborhood street locations (3, 16, and 44) experienced more than a 10% increase in ADT after the road diet. Nine neighborhood locations (3, 5, 9, 16, 18, 21, 27, 43, and 44) also experienced a double-digit percentage increase in hourly traffic during the AM peak period. As was pointed out earlier, though, large percentage changes do not always indicate major impact. In some of these neighborhood street locations, the actual increase in the number of vehicles was fairly small. For example, location 9 (El Abra) saw a 19% increase in AM peak hourly traffic, but that amounted to an increase of only 9 vehicles per hour.

Location 3, on Paula Avenue west of Lincoln, saw one of the largest percentage increases in ADT (12%) as well as one of the largest increases in traffic volume (+166 cars per day). This street provides a fairly direct connection between Lincoln and Meridian Avenues, so some drivers likely diverted off Lincoln onto Paula. While traffic volumes increased at a similar rate along Paula Ave. during the AM peak period, the PM peak period saw a small decline in traffic, suggesting that this street served as an alternative route for the morning commute but not in the afternoon.

A possible consequence of a road diet is that drivers seek out alternative routes that provide similar access. California Avenue east of Lincoln (location 44), a low-volume neighborhood street, seems to have been affected this way. For vehicles heading north on Lincoln in the morning, California provides an alternative route to Highway 87 that bypasses the Lincoln Avenue road diet segment. (Drivers take California to Minnesota, which connects to Highway 87.) California experienced a double-digit increase in ADT (up 17%, or 93 cars), as well as during peak periods. During the AM peak period, hourly traffic nearly doubled, from 45 to 80 cars per hour. Afternoon commute traffic along California was much lower compared to the morning, but there was still a 25% increase in PM peak hourly traffic (+9 cars per hour).

Traffic appears to have diverted onto arterials parallel to Lincoln, as well. Bird Avenue and Meridian Avenue are obvious alternatives to Lincoln, as they provide a parallel route and are major streets with higher speed limits than most neighborhood streets. Both streets can accommodate some additional traffic comfortably, so moderate traffic diversion to them would likely not create problems. Interestingly, Meridian Avenue (location 22) saw volume declines during both peak periods, as well as all day, while impacts along Bird Avenue (locations 13, 14, 35, and 45) were mixed.

Another parallel route which is a less desirable alternative from a traffic planning perspective as it is a single-lane, residential street with a 25 mph speed limit is Camino Ramon/Hicks Avenue (locations 21, 27, & 28). While all-day traffic volume increased only slightly along Camino Ramon (2%) and actually declined along Hicks Avenue, morning peak period hourly traffic increased 11% for Camino Ramon and 13% for location 27 along Hicks Avenue. Afternoon peak periods did not experience a similar negative impact.

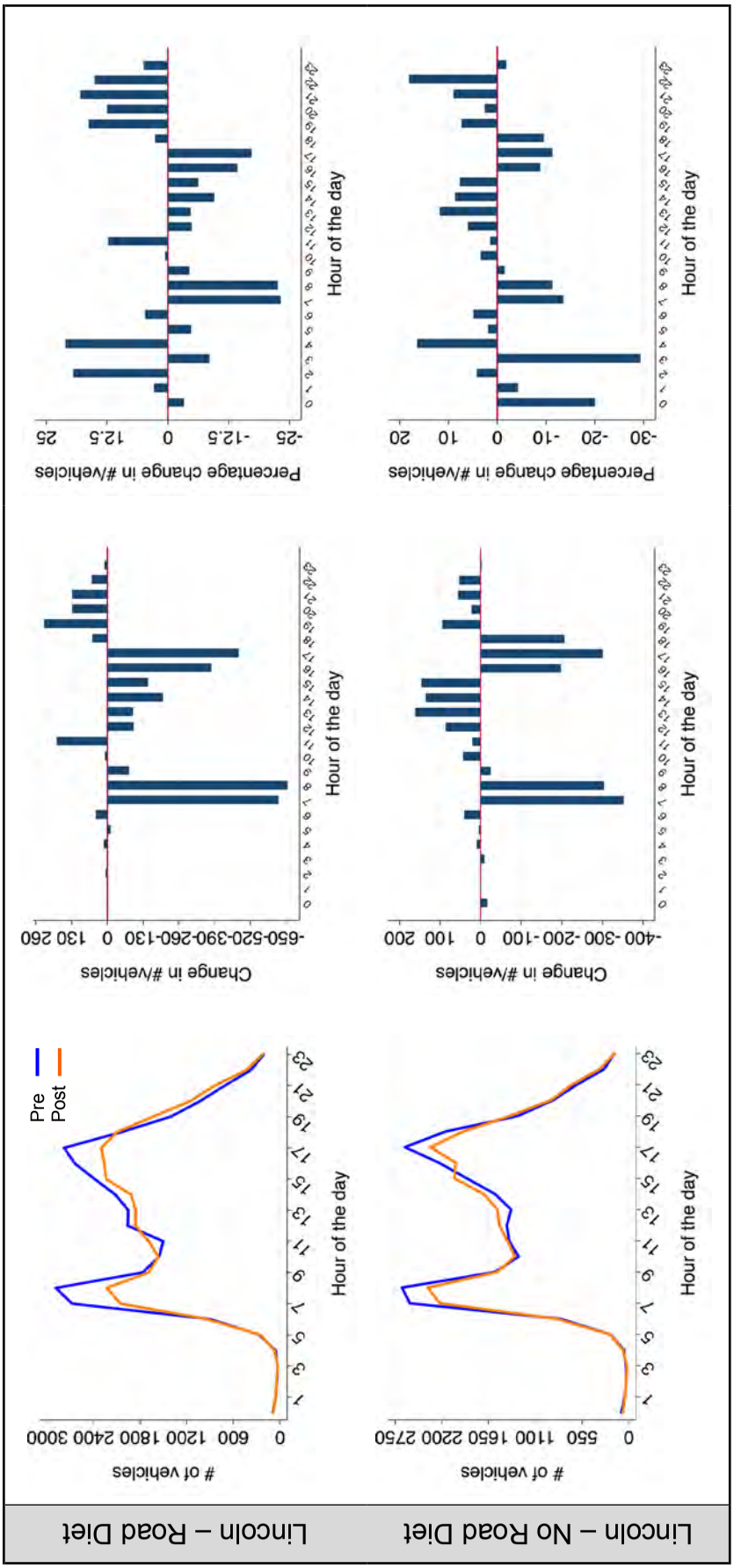


Figure 4. Number of Vehicles, Pre-and Post-Road Diet, by Hour of the Day, for Lincoln Avenue Locations

Note: Y-axis scales differ for each graph.

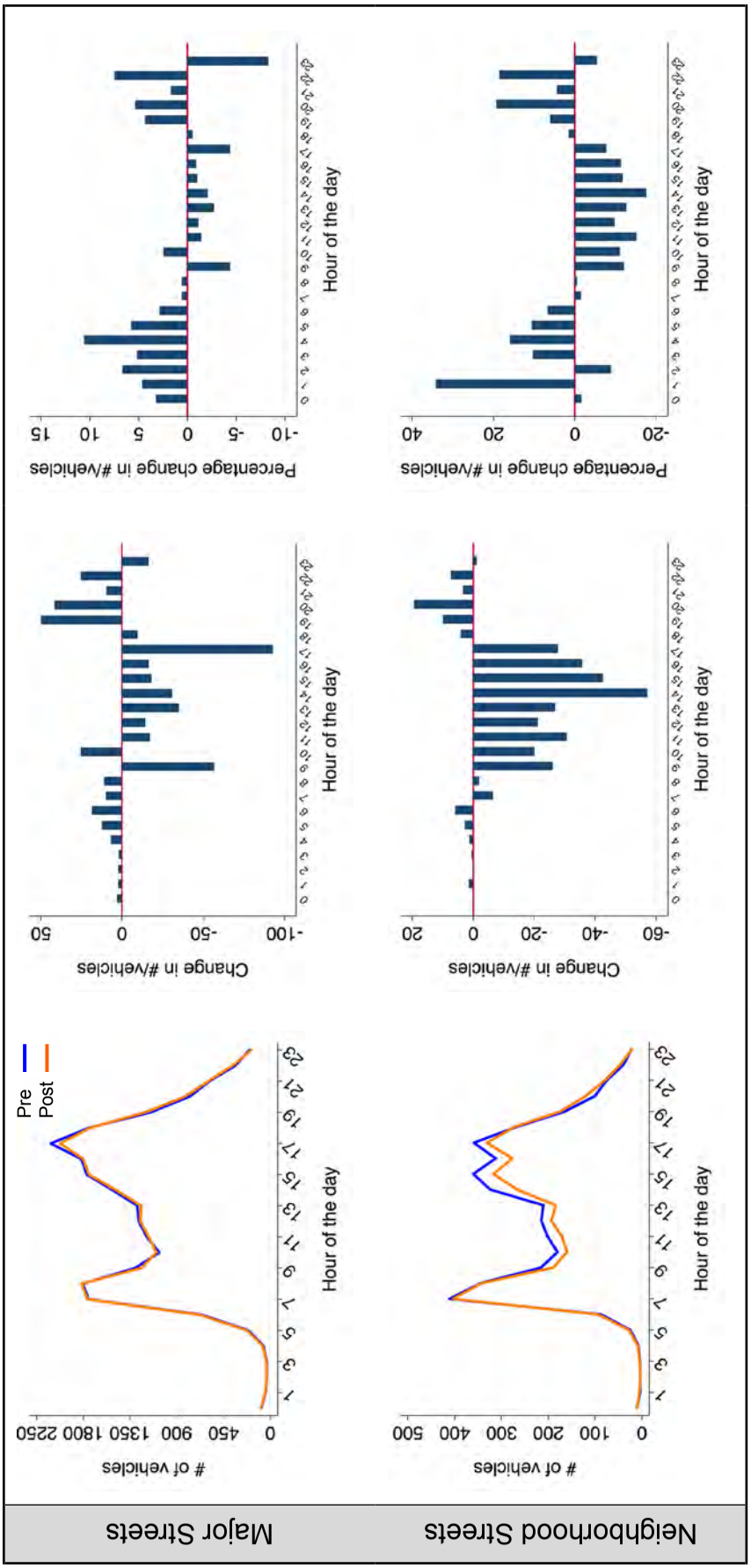


Figure 5. Number of Vehicles, Pre-and Post-Road Diet, by Hour of the Day, for Major and Neighborhood Street Locations

Note: Y-axis scales differ for each graph.

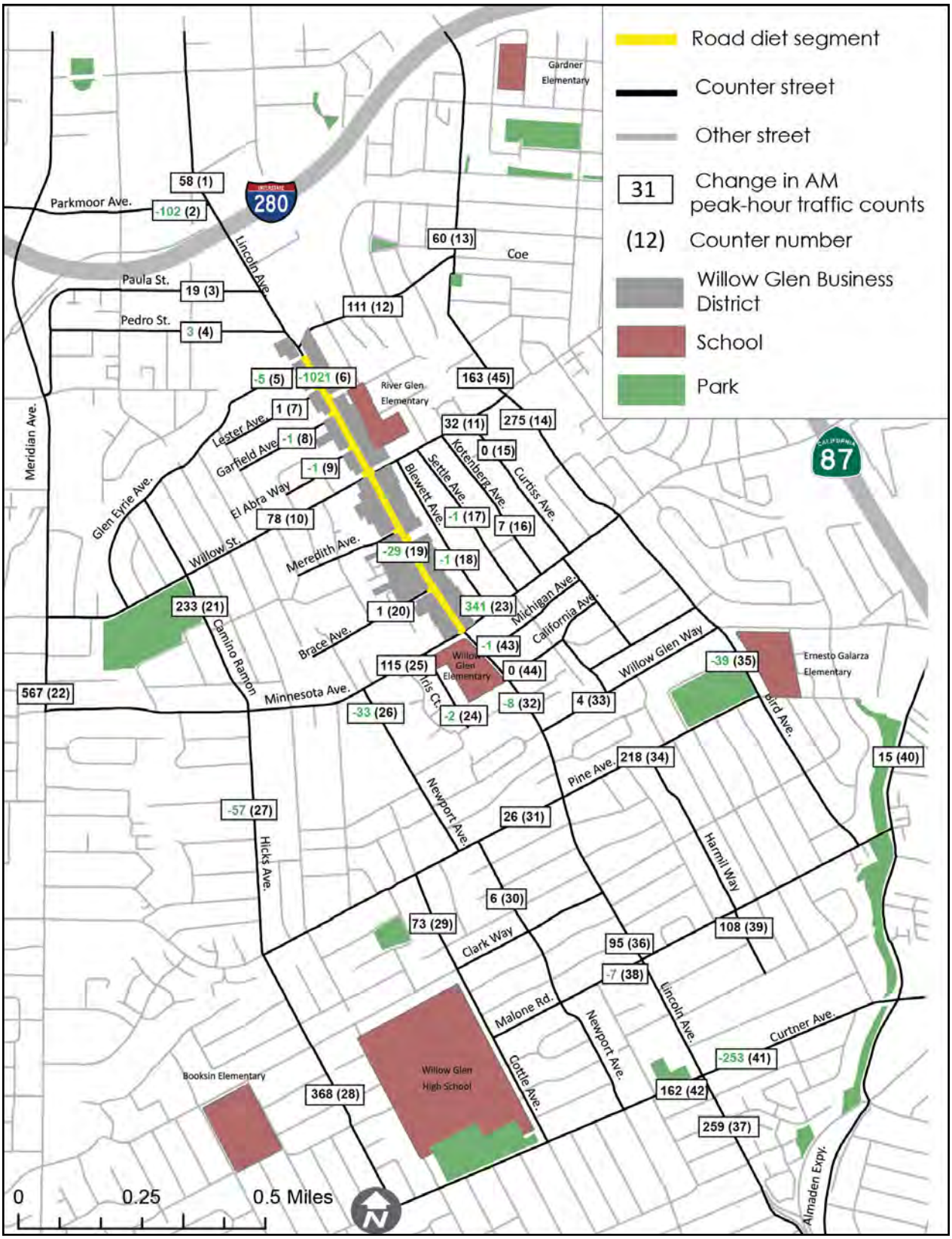


Figure 6. Change in AM Peak-Hour Traffic Counts, Pre- and Post-Road Diet, by Counter Location

Source: Map created by Nicholas Danty using shapefiles from the City of San Jose Community Development Department and Santa Clara County Department of Planning and Development.

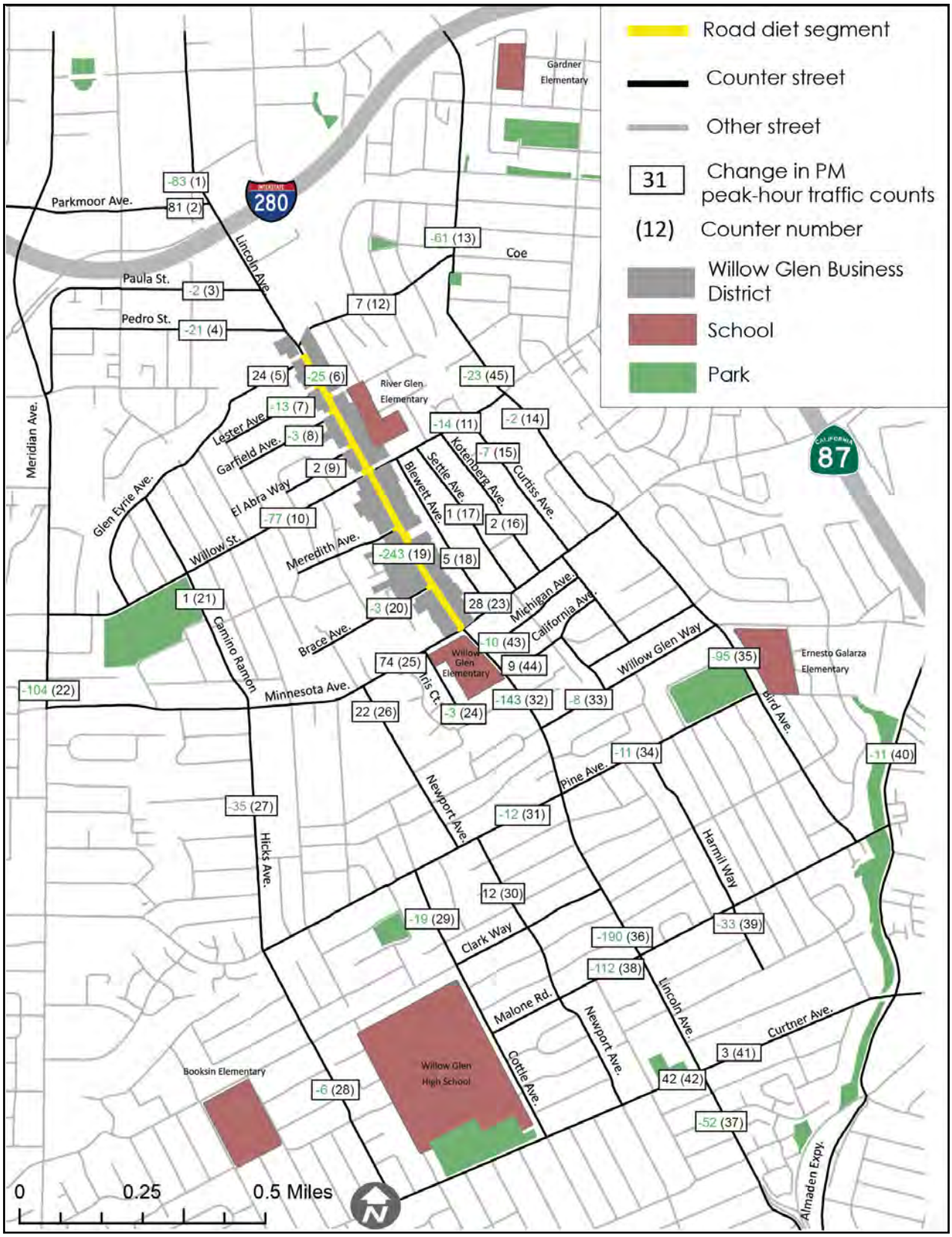


Figure 7. Change in PM Peak-Hour Traffic Counts, Pre- and Post-Road Diet, by Counter Location

Source: Map created by Nicholas Danty using shapefiles from the City of San Jose Community Development Department and Santa Clara County Department of Planning and Development.

TRAFFIC SPEED IMPACTS

We investigated the road diet's impact on speeding by looking at two measures of "speeders," the number of vehicles traveling 5 mph or more over the speed limit and the number of vehicles traveling 10 mph or more over the speed limit. These metrics were chosen as a clear way to look at the number of problem drivers per se – the people traveling too fast for safety.

All-Day Impacts

Looking at all-day effects (Table 2), the road diet successfully reduced the number of speeders along the road diet segment, especially the number of 10+ mph speeders. The number of 5 mph+ over speeders dropped by 1,625 vehicles per day, or 44%, and the number of 10 mph+ speeders by 525, a 60% drop.

In contrast to the road diet locations, the three other street types all saw the number of speeders increase, with the increases being fairly large—double digits—in percentage terms. The change was most pronounced on the major streets. The number of 5 mph+ over speeders went up 24%, an increase of 375 vehicles over the day. For the 10+ mph speeders, the percentage increase was even greater (43%), though the number of additional speeding vehicles was lower (111 vehicles).

Impacts by Time of Day

For almost every street type, the percentage change in the number of speeders was greater during the peak hours than for the all-day counts, and the change was usually more extreme in the AM peak than the PM peak (Table 2 and Figure 8 through Figure 11). The only exception to this pattern was for the neighborhood streets, where the percent increase in PM-peak-hour speeders was lower than the all-day increase.

Table 2. Speeders Traveling 5 or 10 MPH above the Speed Limit, Pre-and Post-Road Diet, by Street Type and Time Period

	Lincoln Avenue – road diet				Lincoln Avenue – no road diet				Major streets				Neighborhood streets			
Time period	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**	**Pre (#)**	**Post (#)**	**Change (#)**	**Change (%)**
Vehicles 5+ mph over																
All day	3,683	2,058	-1,625	-44%	1,532	1,897	365	24%	1,571	1,946	375	24%	461	536	75	16%
AM peak hour[a]																
# of vehicles	421	190	-231	-55%	119	143	25	21%	117	157	40	34%	45	60	15	34%
% of vehicles/hour[b]	30%	18%	--[c]	--[c]	9%	12%	--[c]	--[c]	12%	17%	--[c]	--[c]	24%	32%	--[c]	--[c]
PM peak hour[a]																
# of vehicles	266	98	-168	-63%	144	182	37	26%	131	171	40	31%	54	60	6	12%
% of all vehicles	21%	9%	--[c]	--[c]	12%	17%	--[c]	--[c]	13%	17%	--[c]	--[c]	35%	41%	--[c]	--[c]
Vehicles 10+ mph over																
All day	877	352	-525	-60%	270	371	101	38%	257	367	111	43%	86	117	31	36%
AM peak hour[a]																
# of vehicles	97	29	-68	-70%	16	27	10	63%	17	27	10	59%	8	12	4	53%
% of vehicles/hour[b]	7%	3%	--[c]	--[c]	1%	2%	--[c]	--[c]	2%	3%	--[c]	--[c]	4%	6%	--[c]	--[c]
PM peak hour[a]																
# of vehicles	51	10	-42	-82%	24	34	10	42%	17	26	9	53%	9	11	2	28%
% of all vehicles	4%	1%	--[c]	--[c]	2%	3%	--[c]	--[c]	2%	3%	--[c]	--[c]	6%	8%	--[c]	--[c]

Note: Green font indicates a drop in volume.

[a] AM peak = 7 AM – 9 AM; PM peak = 4 PM – 7 PM.

[b] This measure is calculated as the percent of all vehicles travelling during the peak hour that are going 5 mph+ over. Table 1 shows the number of vehicles per peak hour, used in the calculation here.

[c] Not applicable.

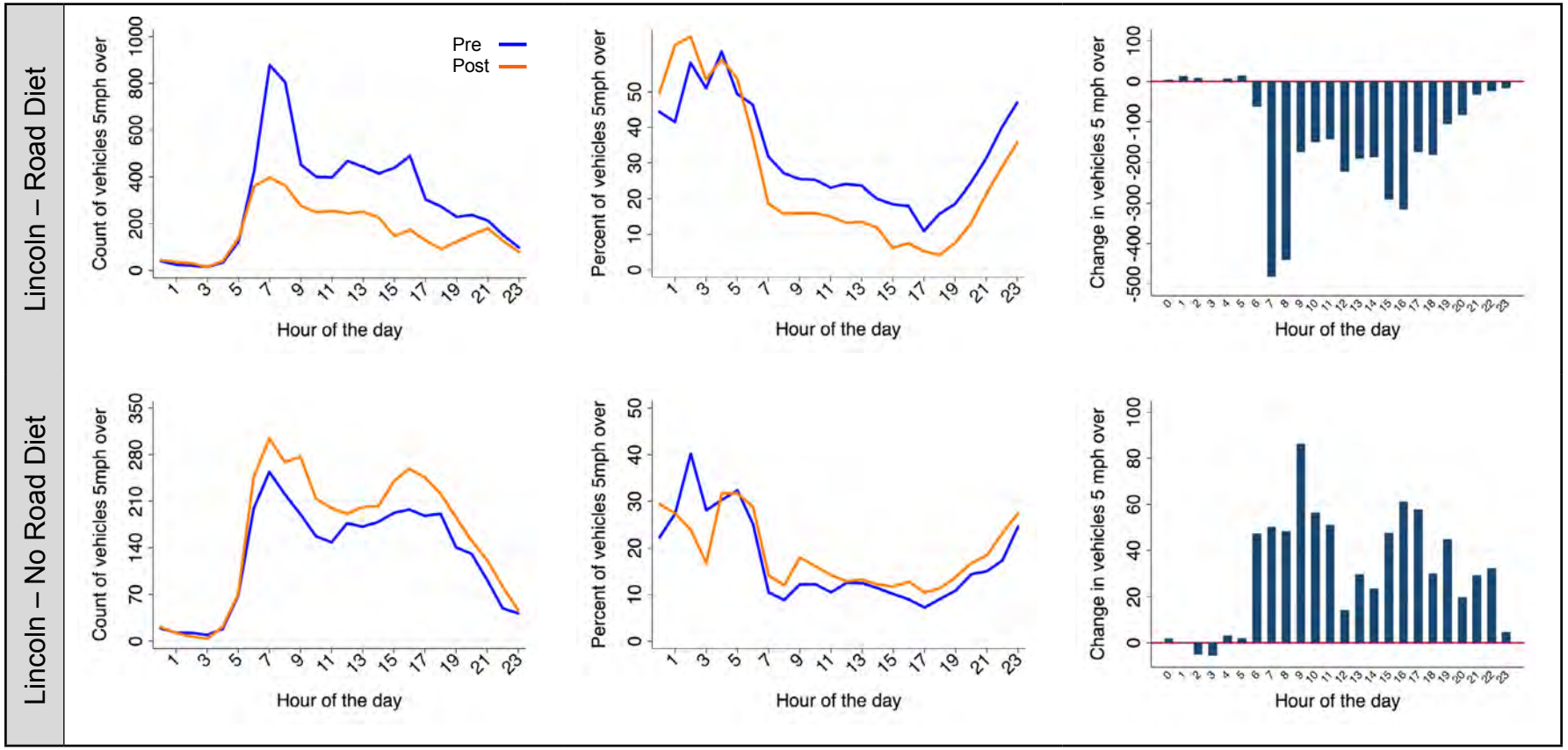


Figure 8. Vehicles Traveling 5+ MPH above the Speed Limit, Pre- and Post-Road Diet, by Hour of the Day, Lincoln Avenue Locations

Note: Y-axis scales differ for each graph.

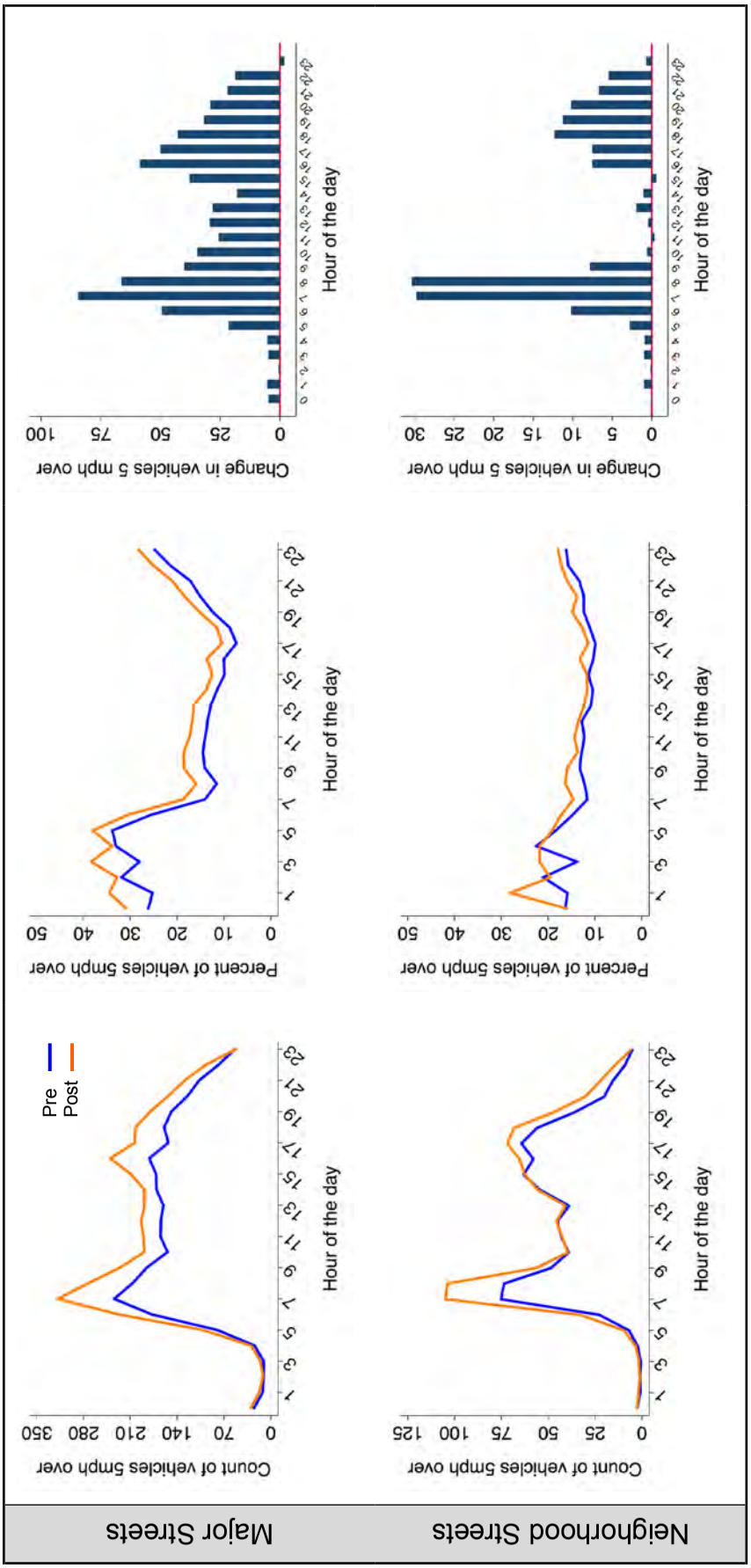


Figure 9. Vehicles Traveling 5+ MPH above the Speed Limit, Pre- and Post-Road Diet, by Hour of the Day, Major and Neighborhood Street Locations

Note: Y-axis scales differ for each graph.

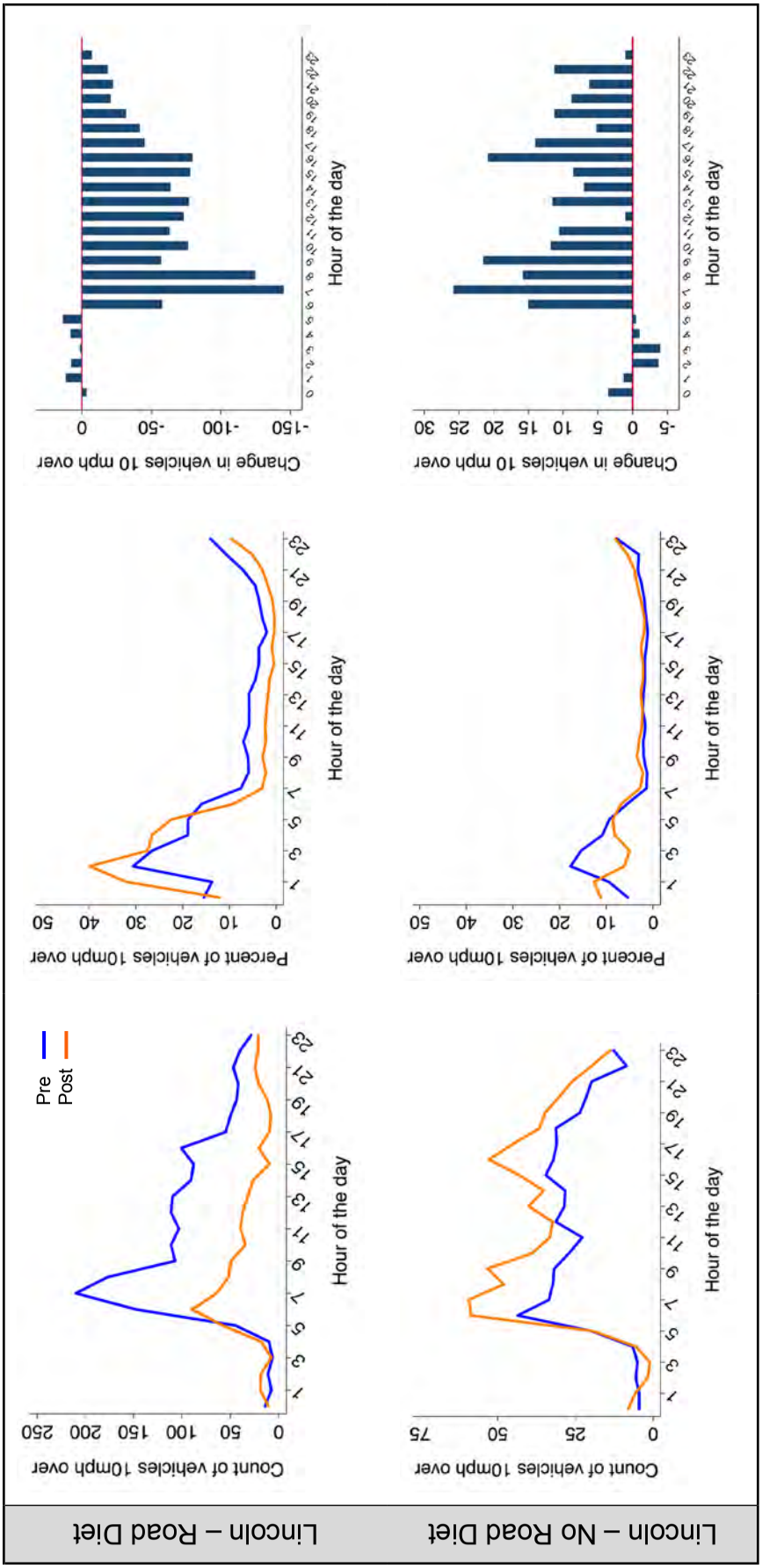


Figure 10. Vehicles Traveling 10+ MPH above the Speed Limit, Pre- and Post-Road Diet, by Hour of the Day, Lincoln Avenue Locations

Note: Y-axis scales differ for each graph.

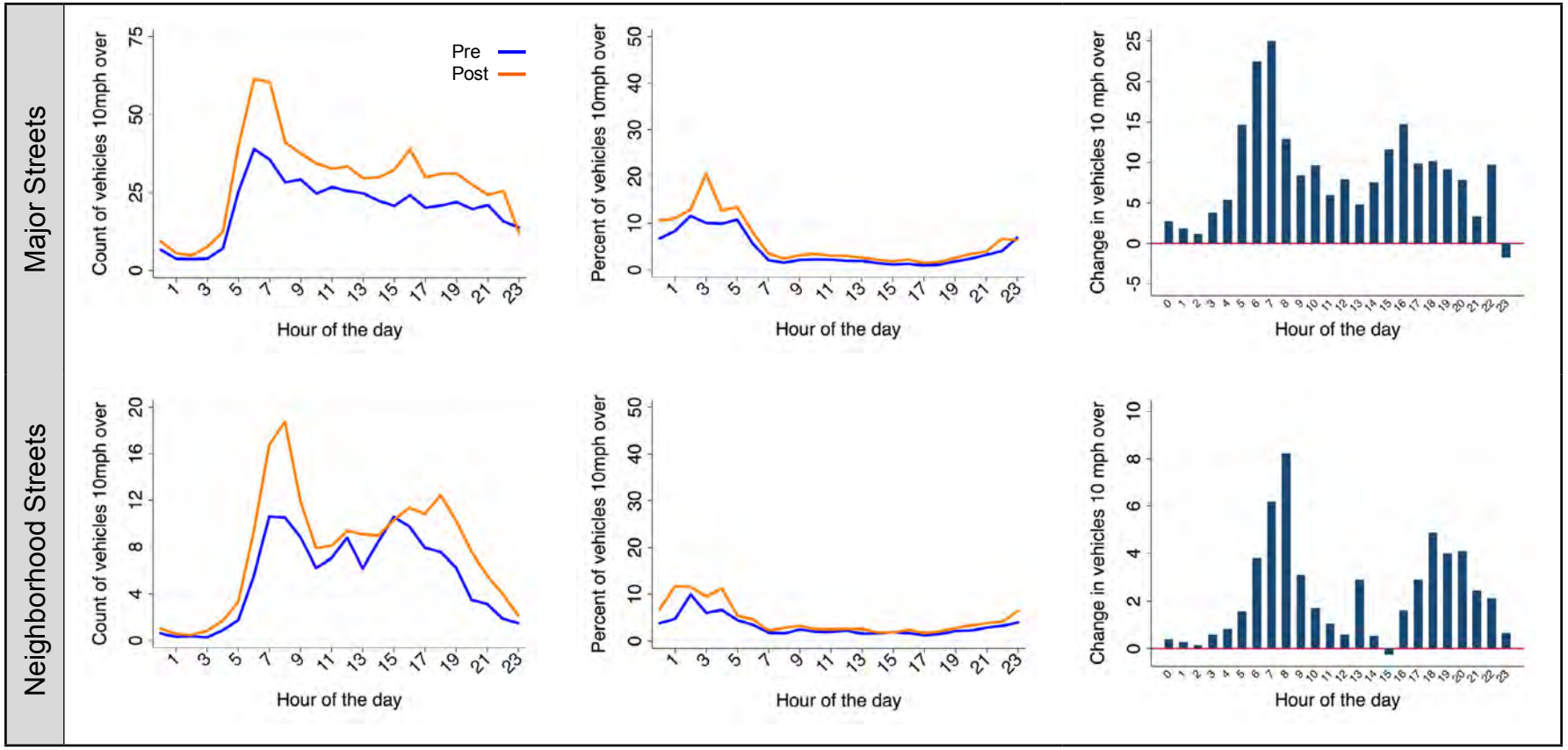


Figure 11. Vehicles Traveling 10+ MPH above the Speed Limit, Pre- and Post-Road Diet, by Hour of the Day, Major and Neighborhood Street Locations

Note: Y-axis scales differ for each graph.

Localized Impacts

One striking impact of the road diet, noticeable only from looking at the data in each of the 45 locations, is that the two Lincoln Avenue road diet data collection points saw very different changes in the number of speeders. (See Table 3 in Appendix A and the figures in Appendix B for detailed information about the road diet data collection points, which are locations 6 and 19.) Location 6 had a major drop in the number of speeders going both 5 mph+ and 10 mph+ over the limit, while location 19 saw only very modest decreases. This difference appears to be explained by the fact that location 6 had many more speeders than location 19, prior to the road diet. The stark difference between the impacts at locations 6 and 19 underscores the importance of collecting data at multiple points along a road diet, since the impacts may not be consistent throughout. Another implication of this observation is that aggregating speed and volume data across multiple locations (two, in this case) can obscure the major positive impact the road diet has in a particular place, in this case location 6.

Moving from the road diet segment itself to the other street types, it is important to assess whether there was increased speeding at specific locations that might warrant additional traffic calming. As noted above, speeds increased across all non-road-diet street types, although in many cases the actual increase in the number of speeders was small, particularly along neighborhood streets.

In general, major streets saw the highest increase in number of speeders. However, two neighborhood streets stood apart from this pattern, as they experienced some of the highest overall increases in number of vehicles speeding: Camino Ramon (location 21) and Hicks Avenue (location 28). In fact, Hicks Avenue saw the second highest overall increase in number of speeders all day going 10 mph+ over the speed limit (113% increase, +693 cars). These locations saw among the highest increase in speeders during the AM and PM peak hours as well. Both streets serve as a north-south route parallel to Lincoln, so some drivers may have shifted here in order to avoid the road diet segment. The large increase in speeders on a residential street suggests that additional traffic calming might be needed for those locations.

Another area of particular concern related to speeding are the locations on Minnesota Avenue very close to Willow Glen Elementary School, locations 25 and 23. Location 23, which is east of the school on the other side of Lincoln Avenue, saw a 215% increase in speeders going 5 mph+ over the limit (+1,558 vehicles) and nearly a 400% increase among those going 10 mph+ over (+342 vehicles). Location 23 also had the single largest increase in 85th percentile speed, an increase of 3.3 mph. (Speeds rose from 32.7 to 36 mph.) Similarly, Location 25, which sits just west of the school, also experienced one of the highest increases in number of speeders among all 45 locations after the road diet. During the AM peak period, a time when many students are arriving at school, there was a 29% increase in speeders going 5 mph+ over the limit and a 32% increase in those going 10 mph+ over the limit. Fortunately, the neighborhood street on the east side of the school (Iris Court, location 24) did not experience this same pattern and actually saw a slight decline in speeding.

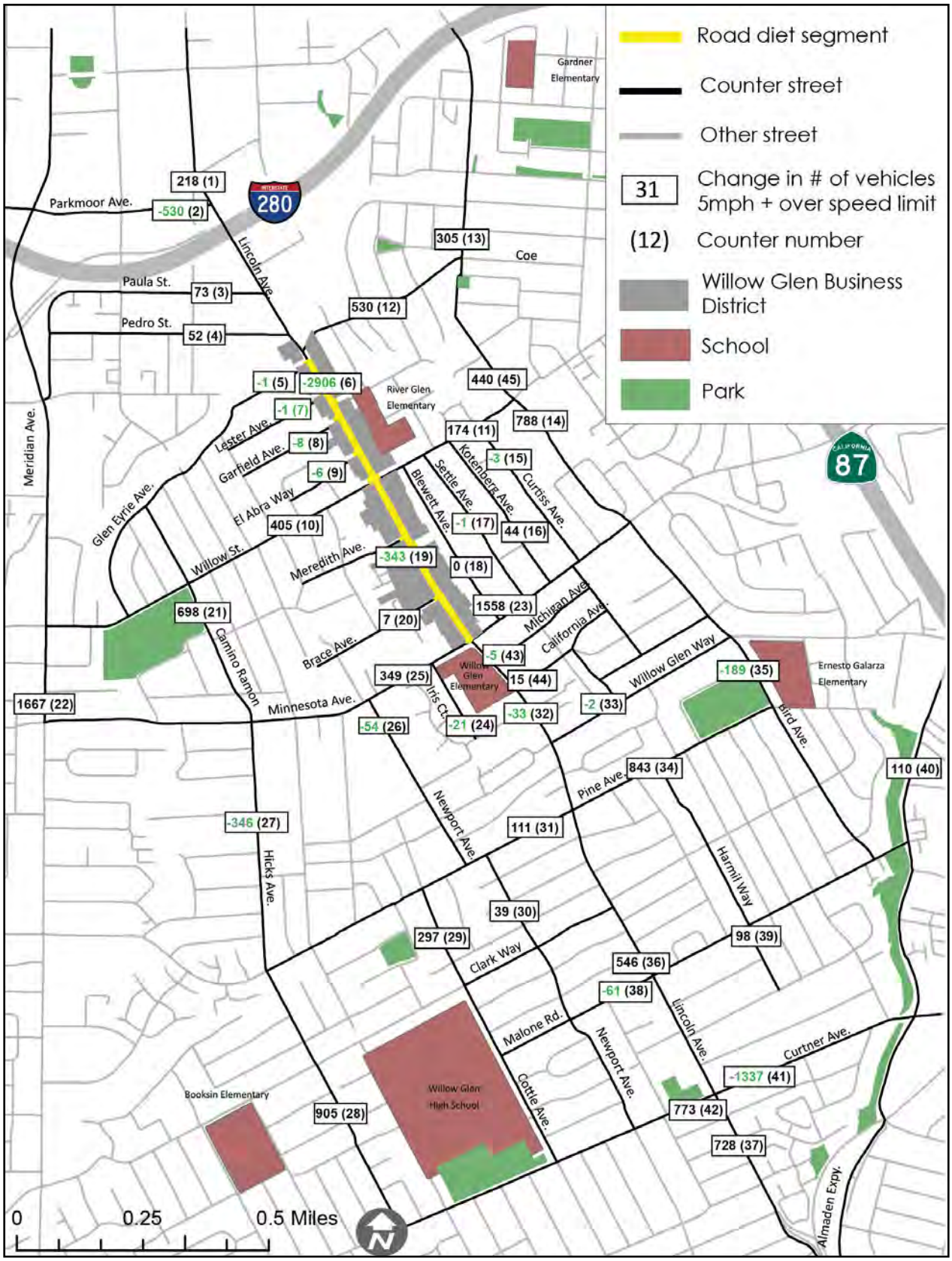


Figure 12. Change in Number of Vehicles 5+ MPH over the Speed Limt, Pre- and Post-Road Diet, by Counter Location

Source: Map created by Nicholas Danty using shapefiles from the City of San Jose Community Development Department and Santa Clara County Department of Planning and Development.

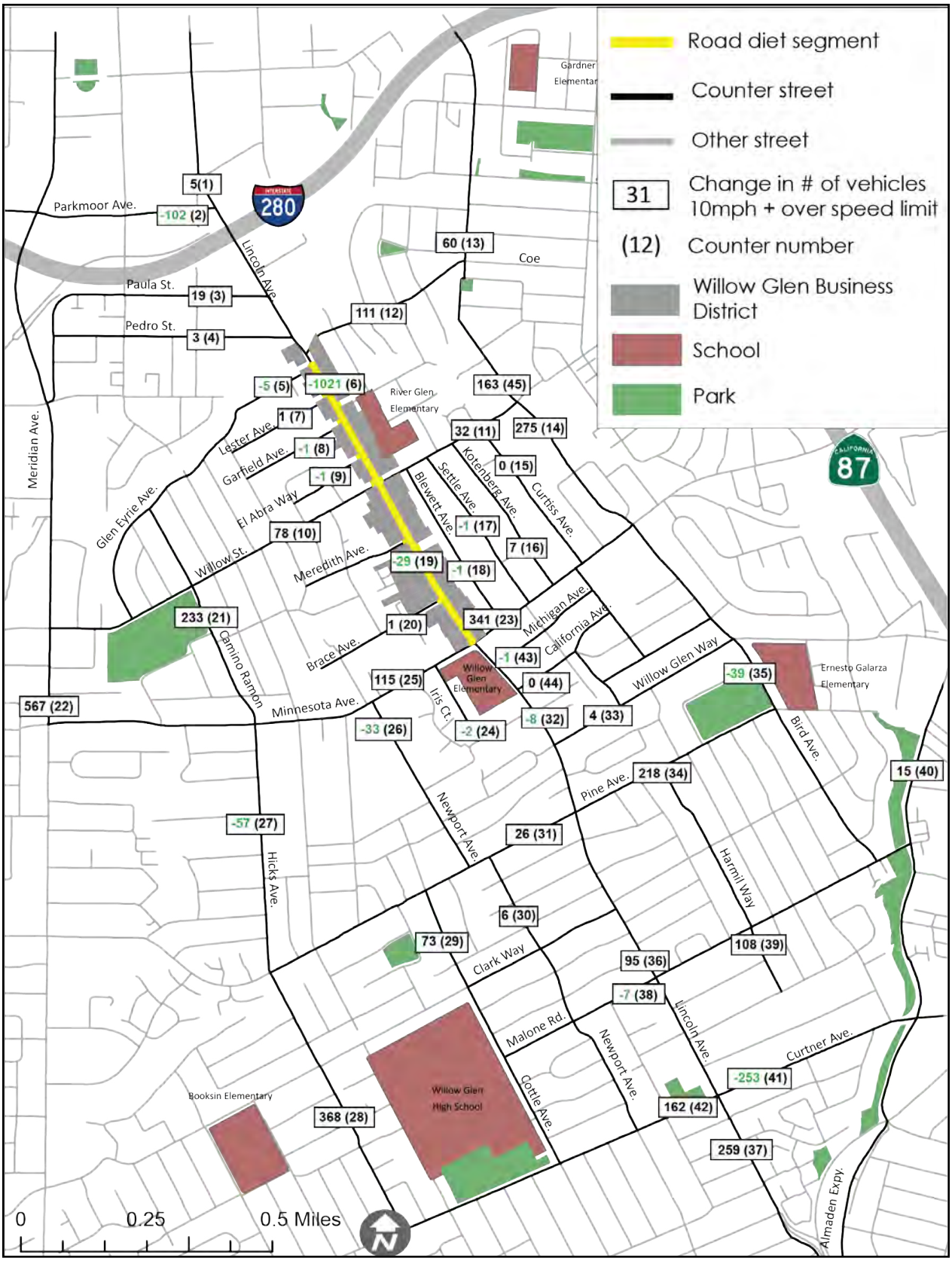


Figure 13. Change in Number of Vehicles 10+ MPH over the Speed Limt, Pre- and Post-Road Diet, by Counter Location

Source: Map created by Nicholas Danty using shapefiles from the City of San Jose Community Development Department and Santa Clara County Department of Planning and Development.

V. RECOMMENDATIONS FOR EVALUATING SPEED AND VOLUME IMPACTS FROM ROAD DIETS

This chapter concludes the report with recommendations for how city staff and researchers can design road diet evaluations to effectively assess speed and volume impacts. These recommendations flow from our analysis of the City of San José data, as well as from our review of other road diet evaluations. The chapter begins with suggested approaches to designing the data collection plan and then offers suggestions for the data analysis approach.

DESIGNING THE DATA COLLECTION PLAN

A careful plan for a road diet data collection effort, with an eye to the way the information will later by analyzed, permits high-quality evaluations. By contrast, without careful planning it is possible to spend a great deal of time and money collecting data that ultimately does not allow evaluators to assess the project impacts with any certainly or nuance. In short, if a city plans to invest the money to evaluate speed and volume impacts at all, it is worth making sure that this investment is carefully designed to get the maximum benefit possible.

For the Lincoln Avenue road diet, the City of San Jose collected an impressively large set of data that allowed for deep analysis of many facets of the road diet impacts. Particularly noteworthy was the choice to look at many locations outside the road diet segment itself. However, our analysis of the data revealed that some changes to the data collection process would have provided data that could have been considerably more useful for analysis. Our experience with the strengths and limitations of the Lincoln Avenue data supports the following recommendations for road diet evaluation plans:

- *Collect data on enough days to smooth day-to-day variations.* It is important to do this for various reasons. More days of data collection ensures that results aren't distorted by unusual events such as atypical weather, construction, or accidents. Additional days of collection also enables more accurate statistical analysis and a greater likelihood of detecting statistically significant impacts. The cost to add in additional days is unlikely to significantly add to evaluation costs, so is likely to be well worth the small extra investment.

- *Determine the minimum amount of data needed by conducting a power analysis*. Specifically, this process can identify the minimum sample size needed (i.e. days of data collection and/or number of locations for data collection) in order to increase the likelihood of detecting a statistically significant effect.

- *Select days for evaluation with "regular" traffic patterns*. It is important to collect data on days when there are no school holidays or other major events. For an area with a business district such as Lincoln Avenue, it may also be advisable to collect data on Friday evenings and/or weekends as well as the more traditional data collection on mid-week days. Business districts often see considerable traffic on weekends, but with different mixes of modes and types of drivers as compared to weekday traffic.

- *Collect and share the raw data for every vehicle instead of packaging data into categories*. Analysts have much greater flexibility with the types of analysis they can do if they can work with the raw data. For example, giving the data on the speed of each vehicle, rather than presenting the data by speed "buckets" as was done with the Lincoln Avenue data, would have allowed us to better estimate speeding patterns or recalculate 85th percentile speeds for different time periods. One potential limitation with this approach, however, is that analysts will need the technical skill to manipulate very large quantities of data.

- *Develop a method to compare changes in traffic volumes and speeds in the road diet area with changes in volumes and speeds outside the road-diet neighborhood itself*. This could be done with a cross-sectional research design – comparing the road diet neighborhood with a comparable neighborhood elsewhere in the city – or by using city-wide data as the comparison. For an example of a study that used the former approach, see the study by Huang, et al, that looks at a variety of road diets in the states of California and Washington.[18] The *Road Diet Handbook* by Knaap, et al, also provides advice on designing cross-sectional studies.[19]

DATA ANALYSIS APPROACHES

To prepare this report, we explored numerous options for different speed and volume impact metrics, for statistical testing of the road diet impacts, and for displaying the results graphically. Based on this experience, we recommend the following approaches to conducting the data analysis and communicating the findings:

- *Analyze and present the impacts at each data collection location as well as impacts by street types*. The Lincoln Avenue study results showed that averaging changes in speed and volume across multiple locations can mask significant variations at individual locations. Thus, it is important to look at each location as well as mean values across multiple data-collection locations.

- *Analyze impacts by time of day as well as by all-day metrics*. The study findings show that all-day metrics can mask considerable variation by time of day, with impacts at the peak hours often being much larger than the all-day impacts.

- *Present findings about changes as both actual counts and percentages.* It is important to look at changes both as numbers and percentages in order to understand the true impact and relevance of the study findings. For example, most traffic analysts would not consider an extra few hundred vehicles a day to be a meaningful increase for a street carrying ten thousand of vehicles a day, whereas that same number of extra vehicles might be concerning on a neighborhood street. Conversely, on a street that previously had only a handful of speeders, a few extra could create a very large *percentage* increase that is nevertheless an impact of only a few vehicles per day and therefore not likely to be a serious concern (even if undesirable).

- *Look at the numbers of "speeders," rather than mean speeds, to identify safety outcomes*. While mean speed values may help to assess whether a road diet is unreasonably slowing traffic flow, mean speeds are not an effective way to identify whether the road diet has achieved one of its key goals, which is to reduce the number of vehicles traveling at *dangerous* speeds. Analysts should define one or more speed thresholds of concern, and then assess the number of vehicles traveling above those thresholds.

- *Design graphics that emphasize the changes between the pre and post periods*. Using graphics that show the *change* before and after the road diet, as opposed to simply showing the before and after values, makes it easier for readers to quickly grasp which impacts are important and which are not.

APPENDIX A: SUMMARY DATA FOR EACH DATA COLLECTION POINT

Table 3 presents summary information about each data collection location.

Table 3. Volume and Speed Data for Each Location, Pre- and Post-Road Diet

Location name (and site #)	Speed limit	Average daily traffic		#/vehicles per AM peak hour		#/vehicles per PM peak hour		#/vehicles 5+ MPH over limit, per day		#/vehicles 10+ MPH over limit, per day		85th percentile speed (MPH)	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Lincoln road diet													
Lincoln s/o Glen Eyrie (6)	25	15,555	15,347	1,457	1,180	1,189	1,164	6,210	3,304	1,608	587	34	31
Lincoln s/o Meredith (19)	25	15,889	14,174	1,326	962	1,303	1,059	1155	812	147	118	28	27
Lincoln non-road diet													
Lincoln n/o Parkmoor (1)	35	10,382	9,879	1,019	850	886	803	972	1,191	161	220	39	39
Lincoln s/o Nevada (32)	35	14,818	14,674	1,402	1,172	1,268	1,124	1,121	1,087	174	166	38	38
Lincoln s/o Clark (36)	35	16,319	15,783	1,520	1,330	1,409	1,219	1,398	1,945	223	318	38	39
Lincoln s/o Curtner (37)	35	13,261	13,344	1,306	1,238	1,120	1,067	2,638	3,366	521	780	41	42
Major streets													
Parkmoor w/o Lincoln (2)	30	7,855	6,947	579	475	578	496	924	394	150	48	34	32
Willow w/o Lincoln (10)	30	8,778	8,200	570	521	739	662	1,001	1,406	123	201	34	35
Willow e/o Lincoln (11)	30	12,103	11,298	695	656	964	950	674	848	93	126	32	33
Coe e/o Riverside (12)	30	5,782	5,977	426	455	517	525	515	1,045	58	170	33	35
Bird n/o Coe (13)	35	16,022	16,318	1,313	1,374	1,423	1,361	1,301	1,606	222	282	38	39
Bird s/o Willow (14)	25	10,307	9,533	923	793	953	951	3,744	4,533	635	910	33	34
Meridian n/o Minnesota (22)	35	33,421	33,221	2,584	2,479	2,577	2,473	2,723	4,390	446	1,013	38	40
Minnesota e/o Lincoln (23)	30	10,772	11,251	785	843	915	944	725	2,283	89	431	33	36
Minnesota w/o Lincoln (25)	30	11,156	11,863	839	967	924	998	2,720	3,069	529	644	37	37
Pine w/o Lincoln (31)	30	7,763	7,815	594	609	684	672	388	499	40	67	32	33
Pine e/o Lincoln (34)	25	4,620	4,655	378	437	413	402	849	1,693	106	325	30	33
Bird s/o Willow Glen Way (35)	35	11,995	11,274	1,048	1,085	1,049	954	714	525	100	60	37	37
Almaden RD n/o Malone (40)	35	6,344	6,523	565	588	471	460	692	802	110	125	39	39
Curtner e/o Lincoln (41)	35	16,846	17,006	1,278	1,265	1,334	1,337	3,602	2,264	767	514	41	39
Curtner w/o Lincoln (42)	35	17,794	18,219	1,470	1,469	1,428	1,471	1,745	2,518	286	448	39	40
Bird n/o Willow (45)	25	12,154	12,837	1,060	1,180	1,110	1,086	2,830	3,270	357	520	31	32

Table 3, continued

Location name (and site #)	Speed limit	Average daily traffic		#/vehicles per AM peak hour		#/vehicles per PM peak hour		#/vehicles 5+ MPH over limit, per day		#/vehicles 10+ MPH over limit, per day		85th percentile speed (MPH)	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Neighborhood streets													
Paula w/o Lincoln (3)	25	1,402	1,567	79	89	127	125	216	289	33	52	30	30
Pedro w/o Lincoln (4)	25	3,227	2,984	251	213	279	258	590	642	96	99	30	31
Glen Eyrie w/o Lincoln (5)	25	1,784	1,932	118	138	166	190	89	87	13	8	27	27
Lester w/o Lincoln (7)	25	640	531	47	40	58	45	10	9	2	3	24	24
Garfield w/o Lincoln (8)	25	561	575	41	42	57	54	26	18	4	2	27	25
El Abra w/o Lincoln (9)	25	402	414	40	49	32	34	7	1	2	0	26	22
Curtiss s/o Willow (15)	25	659	592	45	46	50	43	6	3	1	1	23	23
Kotenburg s/o Willow (16)	25	618	724	57	75	57	58	50	94	5	13	28	29
Settle s/o Willow (17)	25	523	469	38	40	34	37	16	14	3	2	26	26
Blewett s/o Willow (18)	25	1,144	1,154	57	71	100	105	22	21	4	3	25	25
Brace e/o Coolidge (20)	25	1,812	1,449	89	87	126	122	41	48	3	4	25	26
Camino Ramon s/o Willow (21)	25	3,461	3,532	382	424	279	280	956	1,654	140	373	32	34
Iris s/o Minnesota (24)	20	736	580	69	62	38	35	62	41	7	5	23	22
Newport s/o Minnesota (26)	25	3,145	3,040	349	372	203	225	839	785	156	123	32	32
Hicks s/o Cherry Valley (27)	25	4,932	4,929	423	476	448	413	2,024	1,678	398	340	33	33
Hicks s/o Callecita (28)	25	5,429	5,378	585	578	424	418	2,132	3,037	325	693	33	34
Cottle s/o Pine (29)	25	3,831	3,720	431	434	321	302	1,020	1,317	171	245	32	33
Newport s/o Fairview (30)	25	1,622	1,766	206	222	111	123	73	112	8	14	27	28
Willow Glen w/o Hill (33)	25	968	850	100	89	75	67	74	71	9	13	28	28
Malone w/o Lincoln (38)	25	2,557	1,197	360	168	189	77	111	50	14	7	26	26
Malone e/o Harmil (39)	30	4,295	4,231	472	463	348	315	2,233	2,331	590	698	35	35
Michigan e/o Lincoln (43)	25	309	301	18	37	28	18	6	1	1	0	24	22
California e/o Lincoln (44)	25	551	643	45	80	28	37	9	24	2	3	26	26

APPENDIX B: GRAPHIC REPRESENTATION OF VOLUME AND SPEED DATA AT EACH DATA COLLECTION POINT

This appendix shows three types of data for each data collection point:

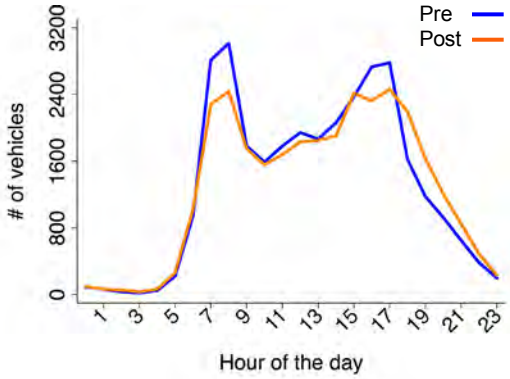
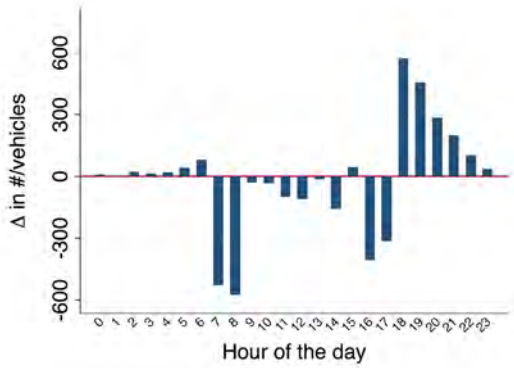
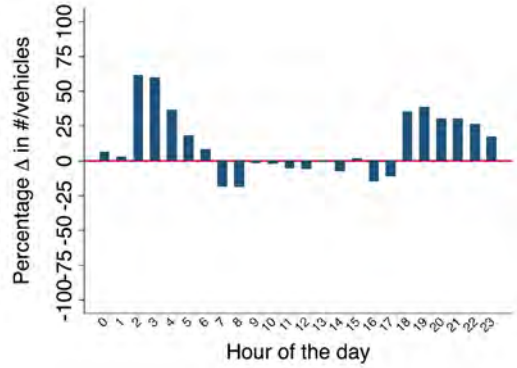
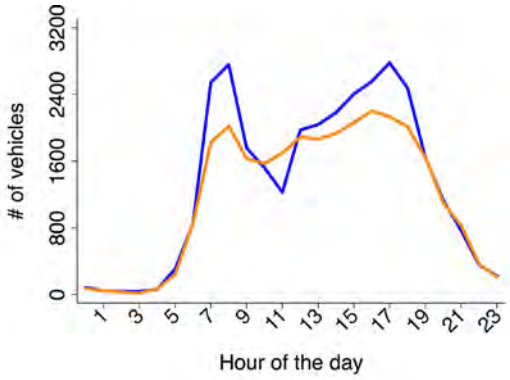
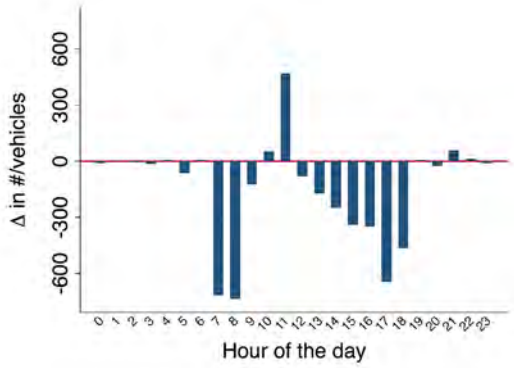
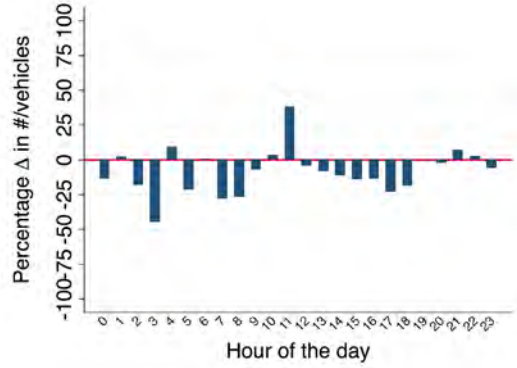
- All-day volumes
- 5+ MPH over speeders (“all speeders”)
- 10+ mph over speeders (“extreme speeders”)

The appendix is organized by data type. Within each data type section, the locations are organized by road type: first the road diet locations, then the Lincoln Avenue-no diet locations, then major streets, and finally the neighborhood streets.

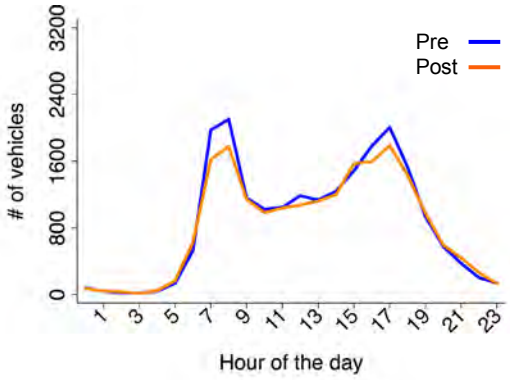
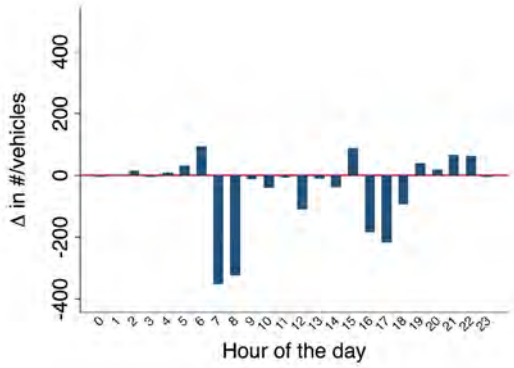
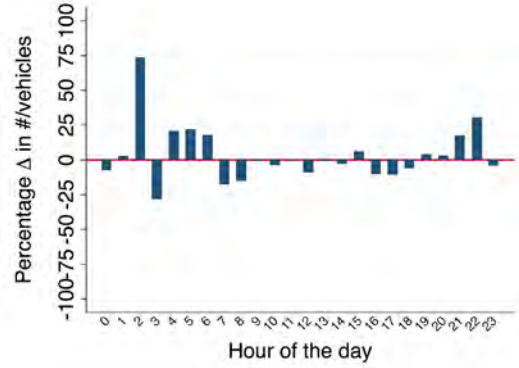
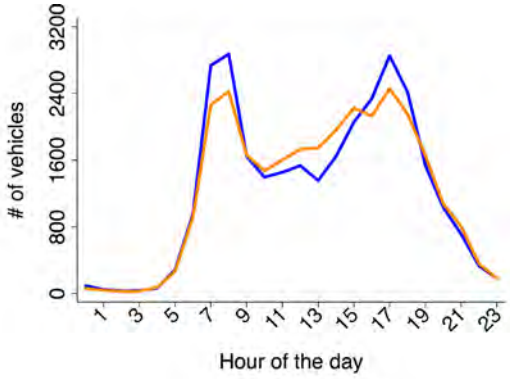
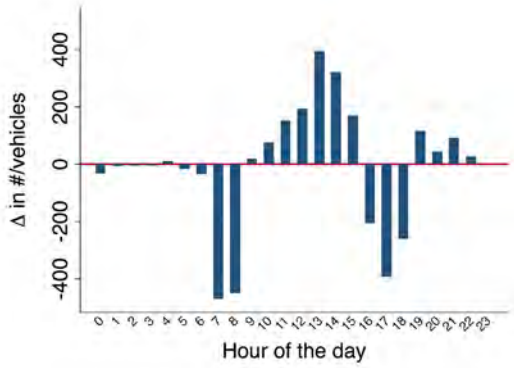
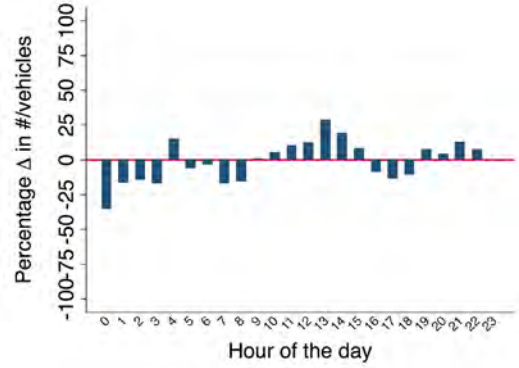
Note that the y-axis scale is not consistent across all graphs.

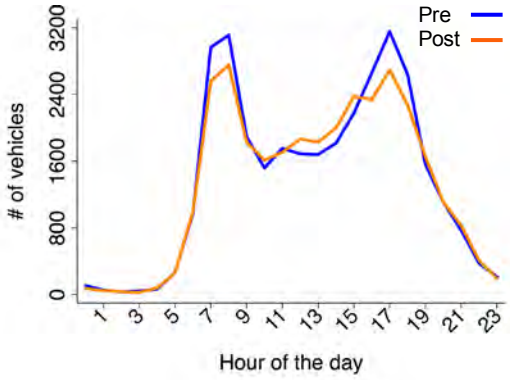
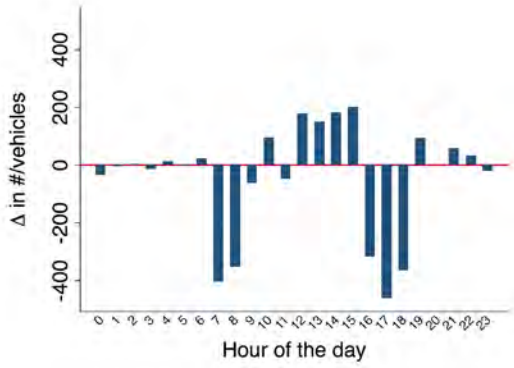
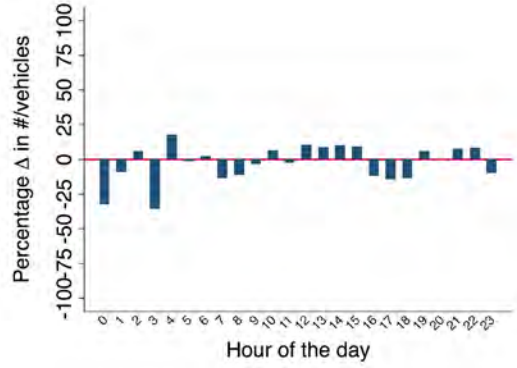
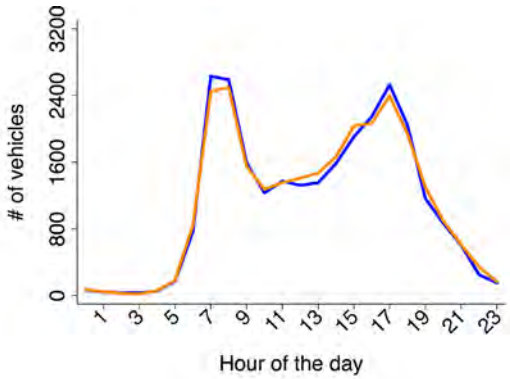
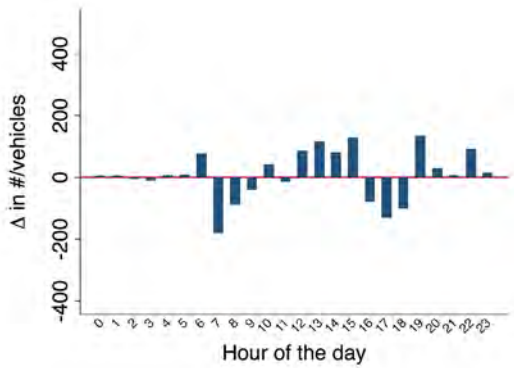
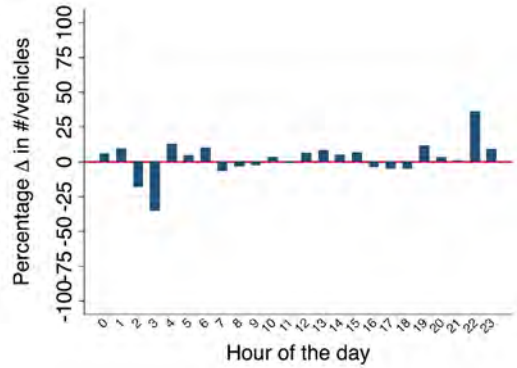
ALL-DAY TRAFFIC VOLUME GRAPHS

Lincoln Avenue Road Diet Location Graphs: Before-and-after the road diet – total number of vehicles before-and-after, change in number of vehicles after the road diet, and percentage change in number of vehicles after the road diet.

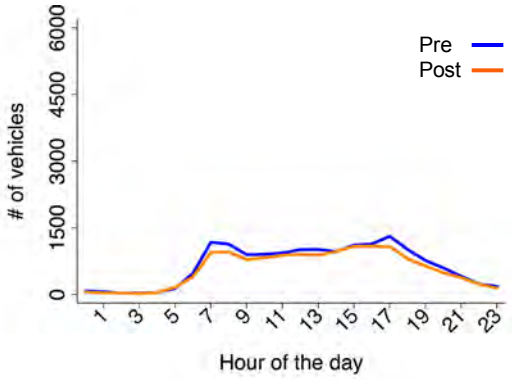
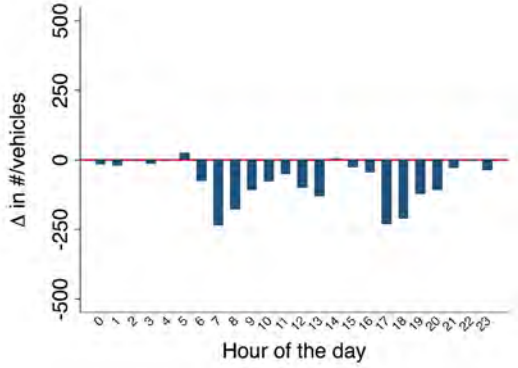
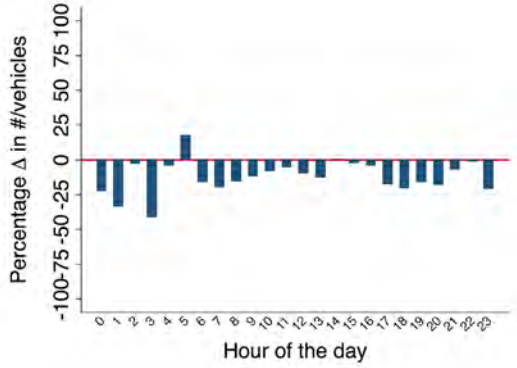
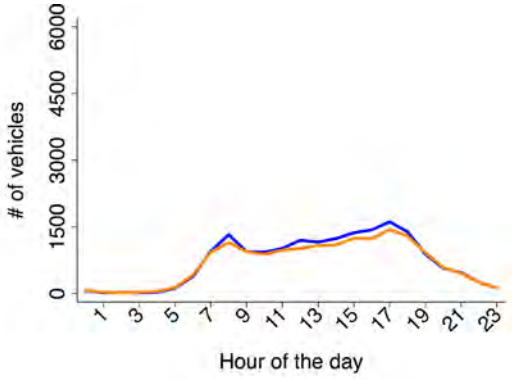
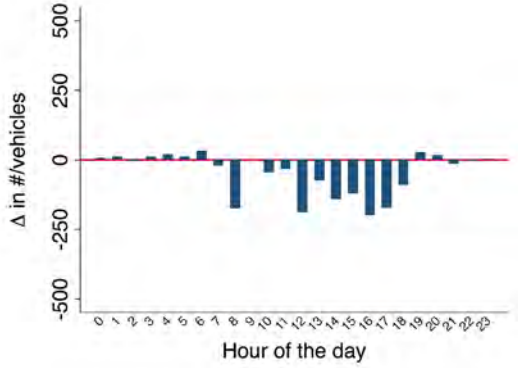
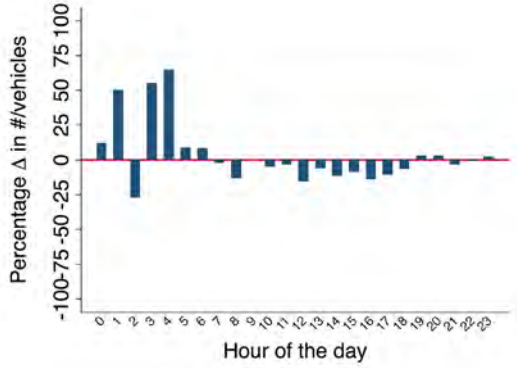
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 6: Lincoln, south of Glen Eyrie		
		
Location 19: Lincoln, south of Meredith		
		

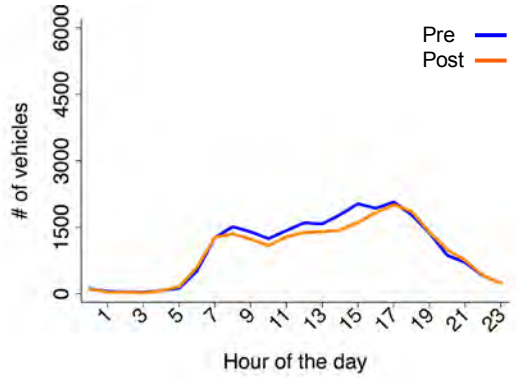
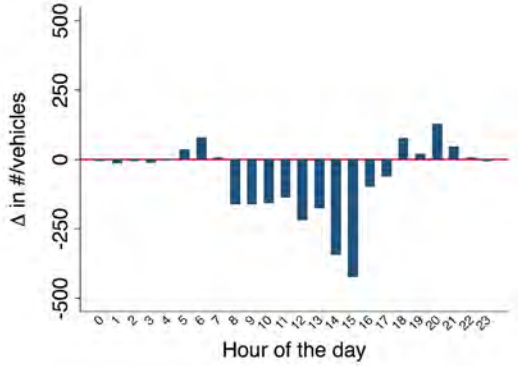
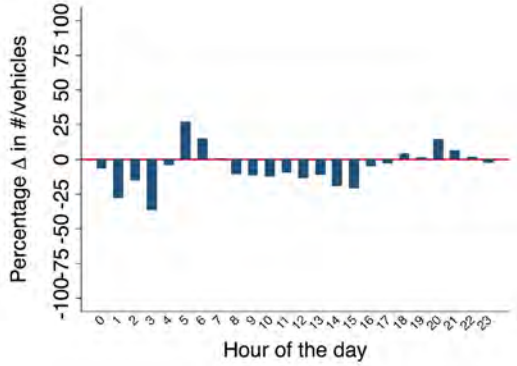
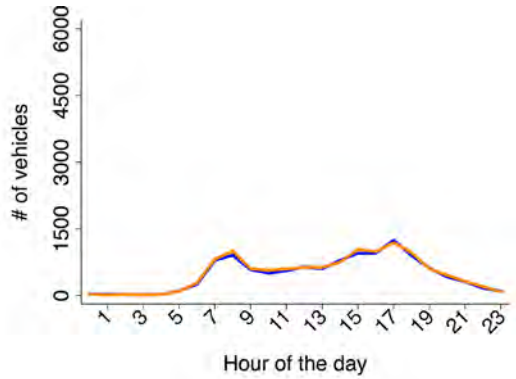
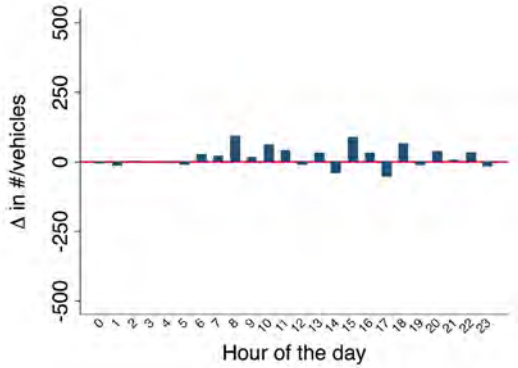
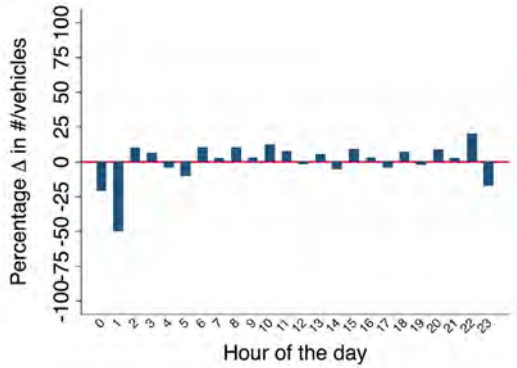
Lincoln Avenue Non-Road Diet Location Graphs: Before-and-after the road diet – total number of vehicles before-and-after, change in number of vehicles after the road diet, and percentage change in number of vehicles after the road diet.

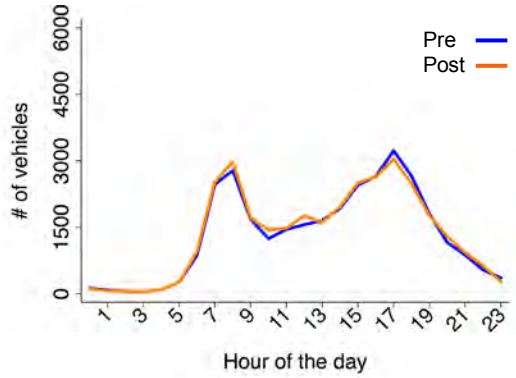
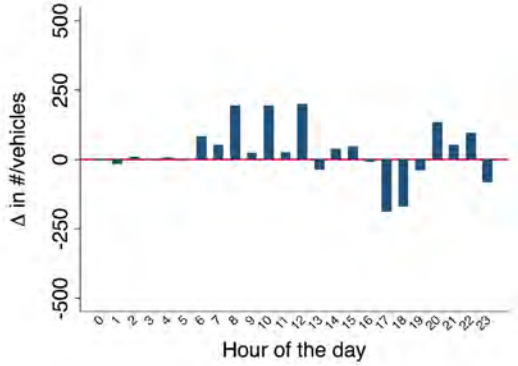
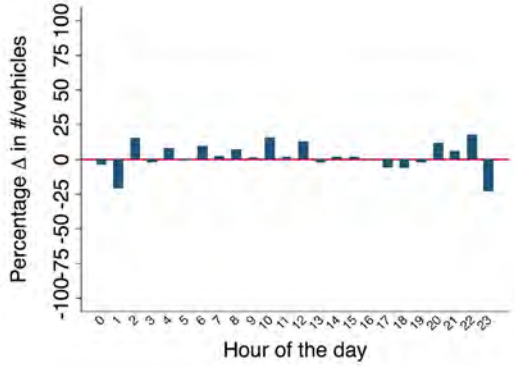
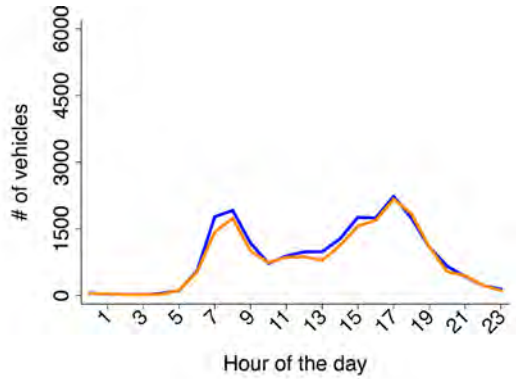
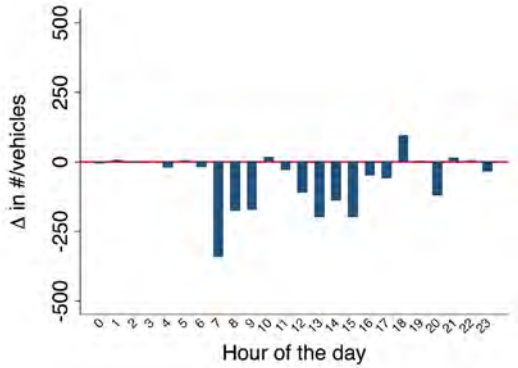
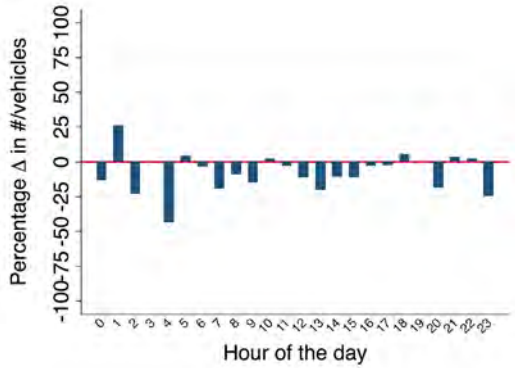
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 1: Lincoln, north of Parkmoor		
		
Location 32: Lincoln, south of Nevada		
		

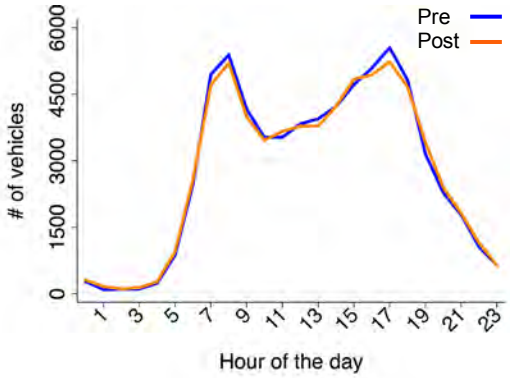
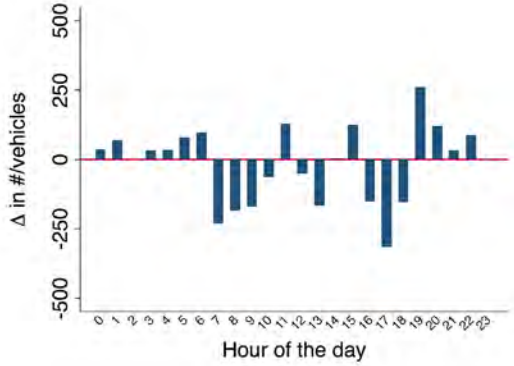
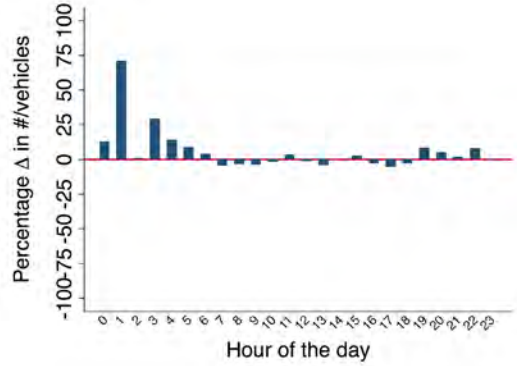
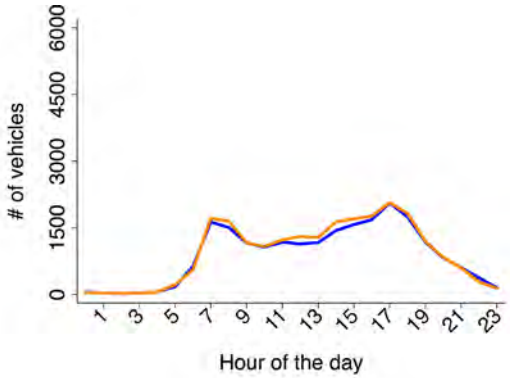
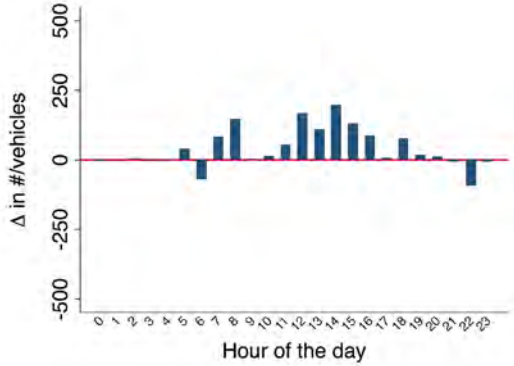
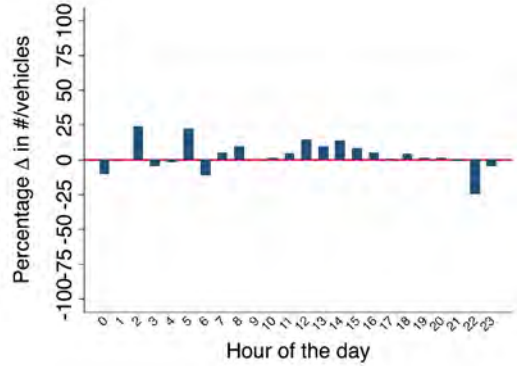
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 36: Lincoln, south of Clark		
		
Location 37: Lincoln, south of Curtner		
		

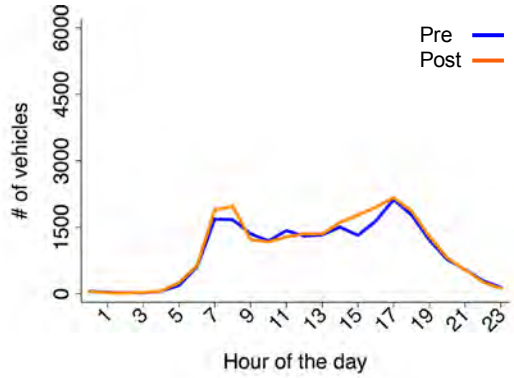
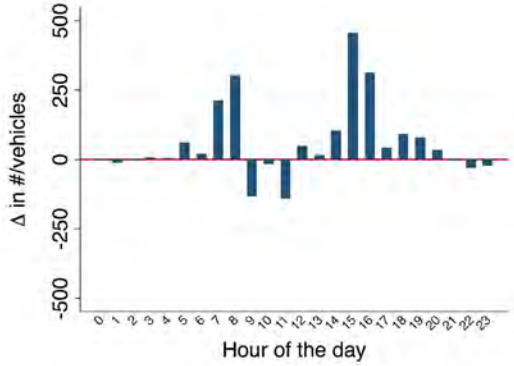
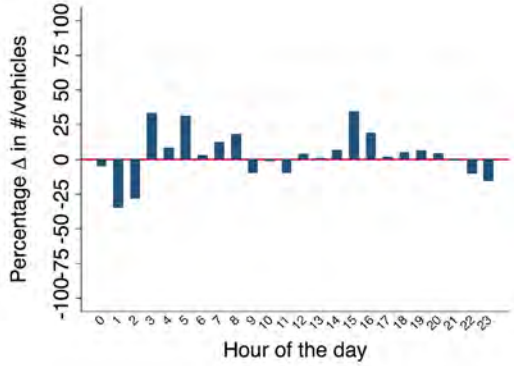
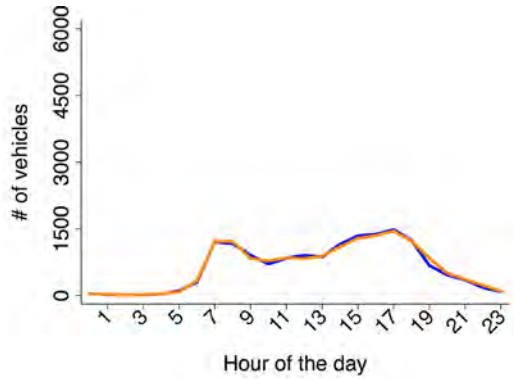
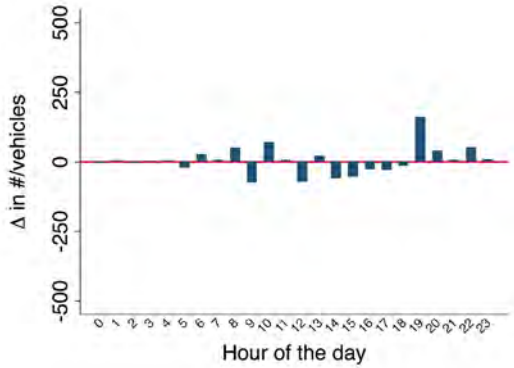
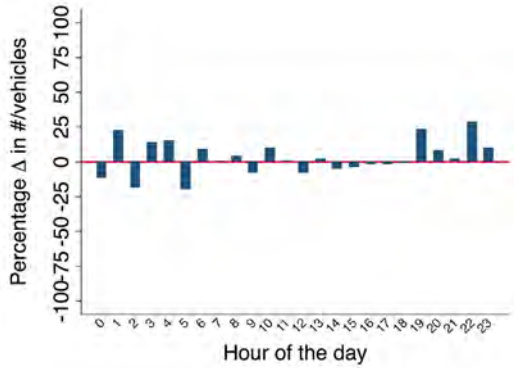
Major Streets Location Graphs: Before-and-after the road diet – total number of vehicles before-and-after, change in number of vehicles after the road diet, and percentage change in number of vehicles after the road diet.

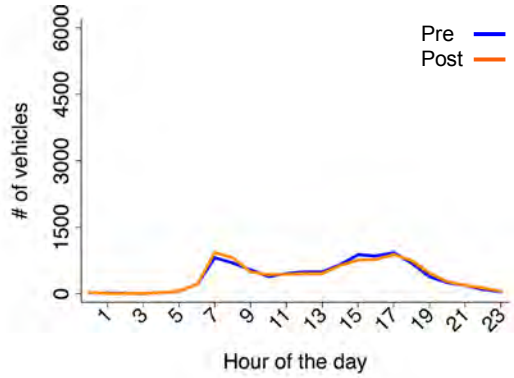
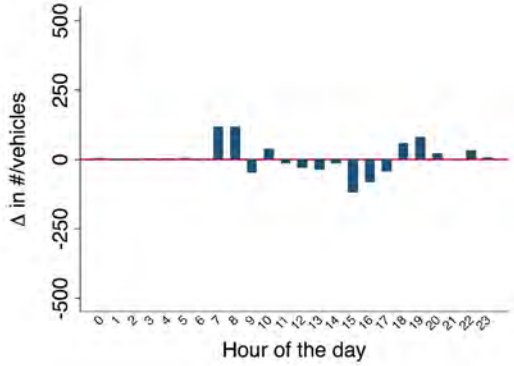
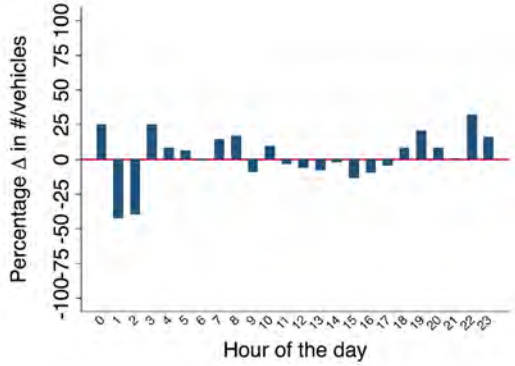
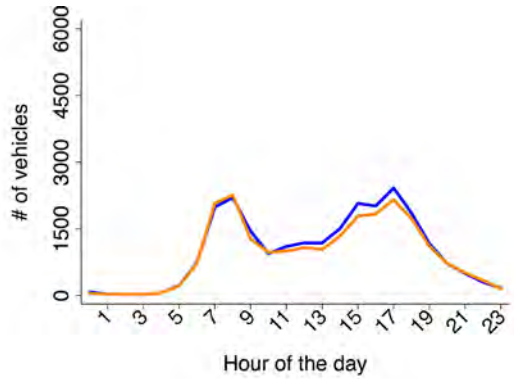
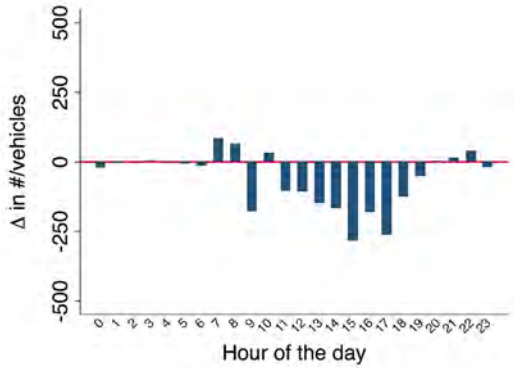
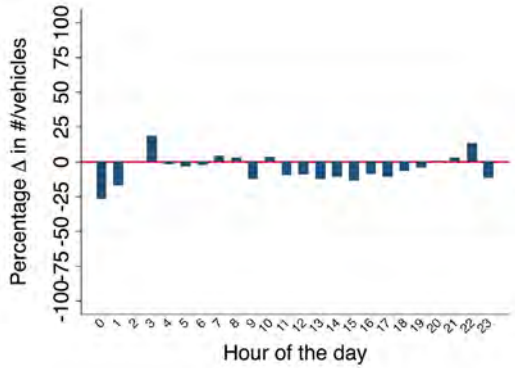
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 2: Lincoln, south of Glen Eyrie		
		
Location 10: Willow, west of Lincoln		
		

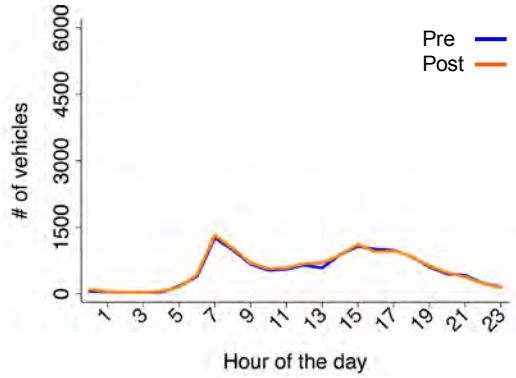
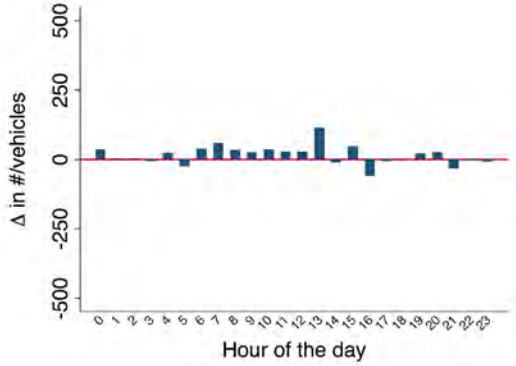
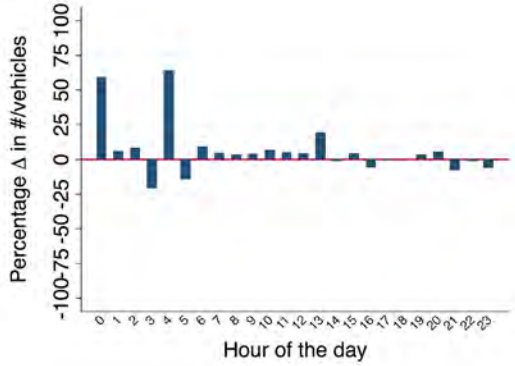
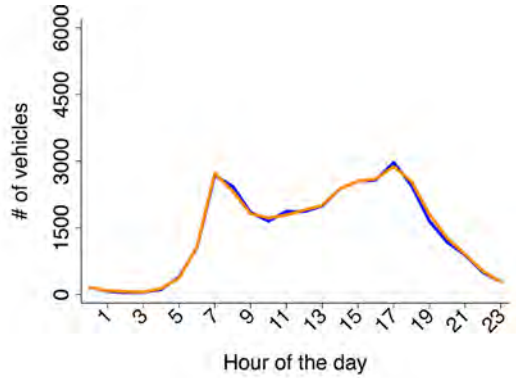
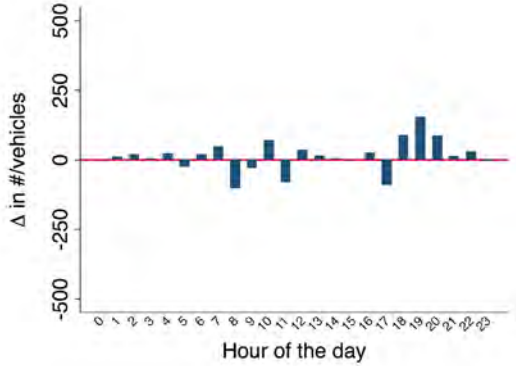
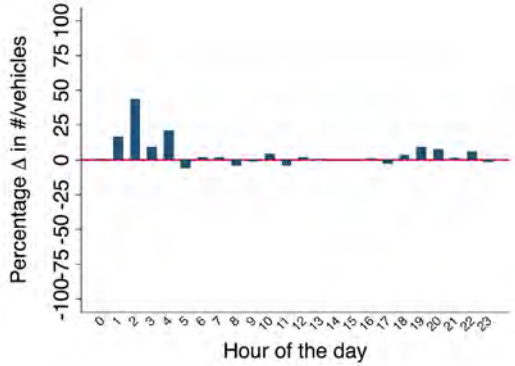
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 11: Willow, east of Lincoln		
		
Location 12: Coe, east of Riverside		
		

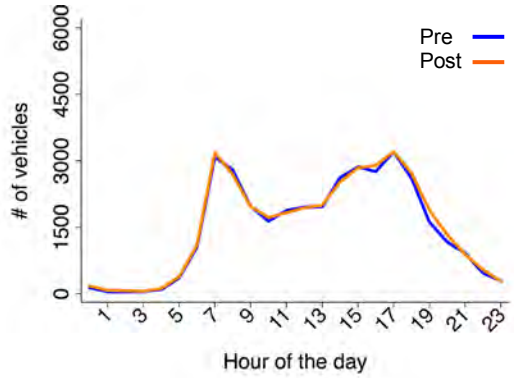
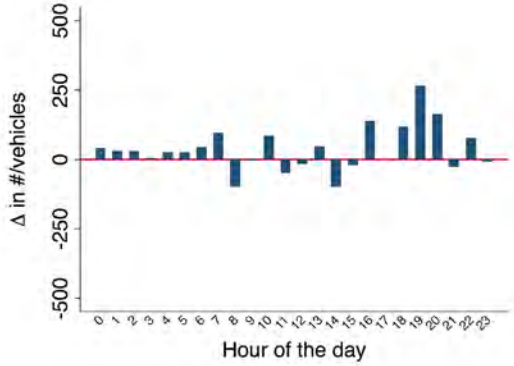
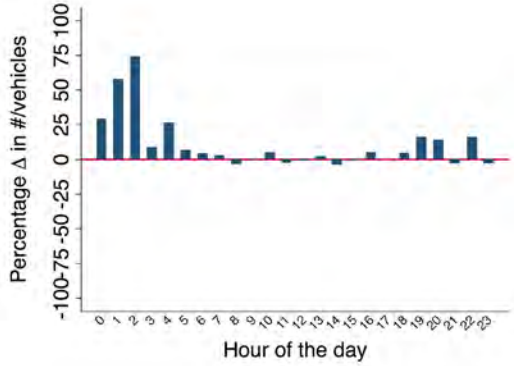
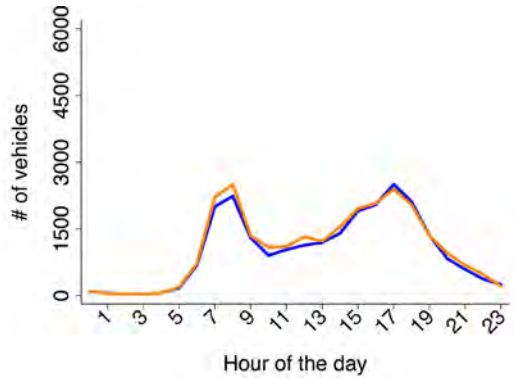
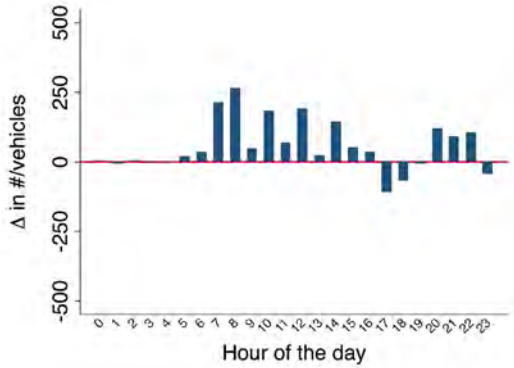
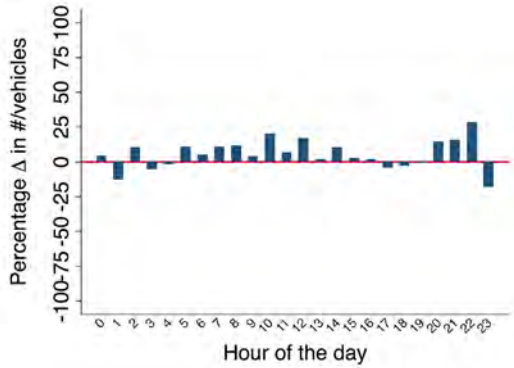
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 13: Bird, north of Coe		
		
Location 14: Bird, south of Willow		
		

Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 22: Meridian, north of Minnesota		
		
Location 23: Minnesota, east of Lincoln		
		

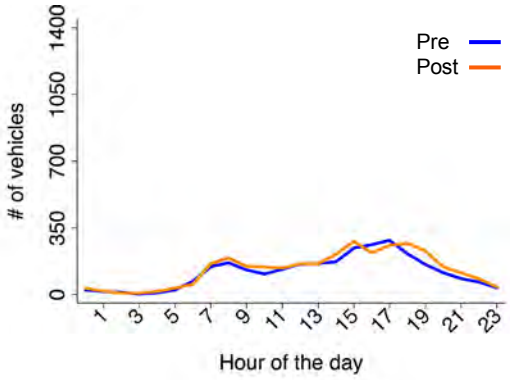
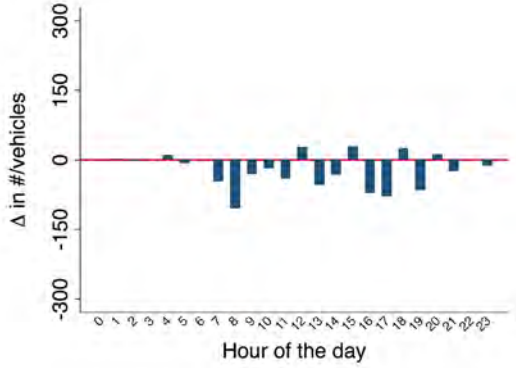
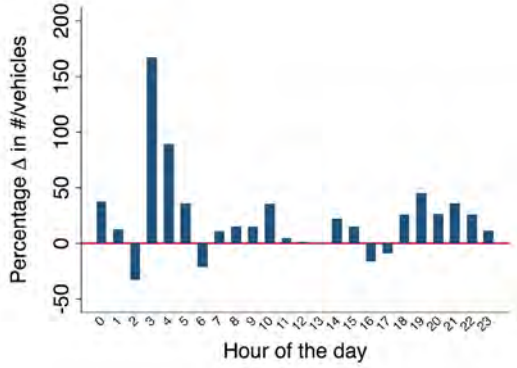
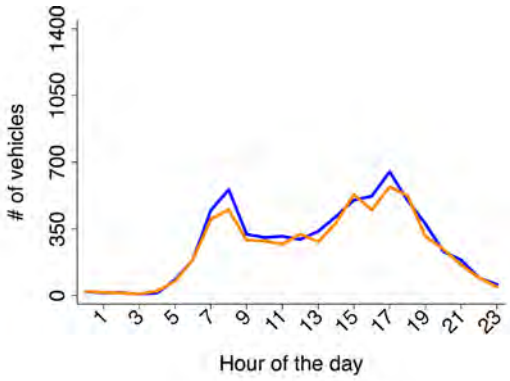
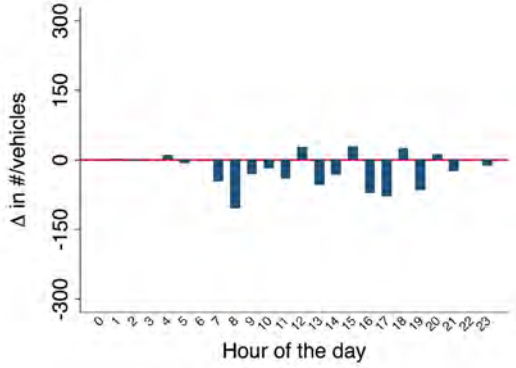
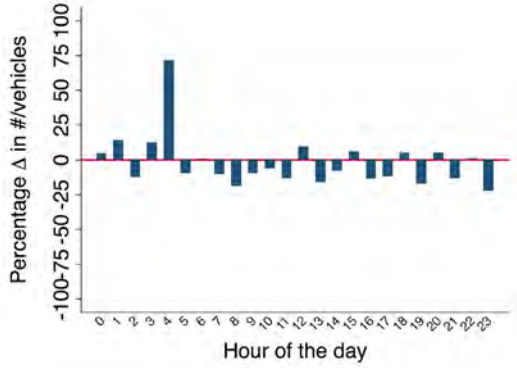
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 25: Minnesota, west of Lincoln		
		
Location 31: Pine, west of Lincoln		
		

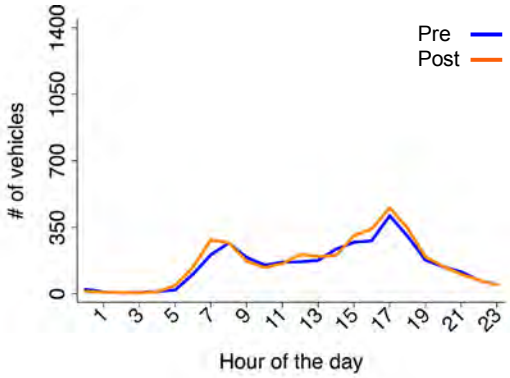
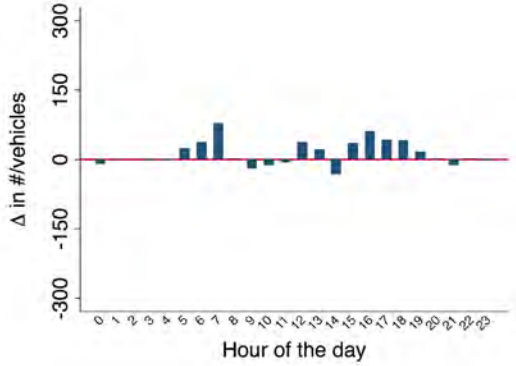
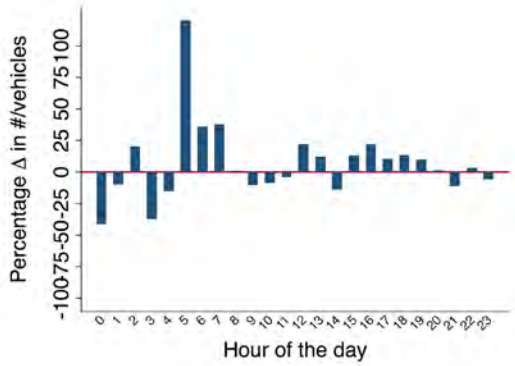
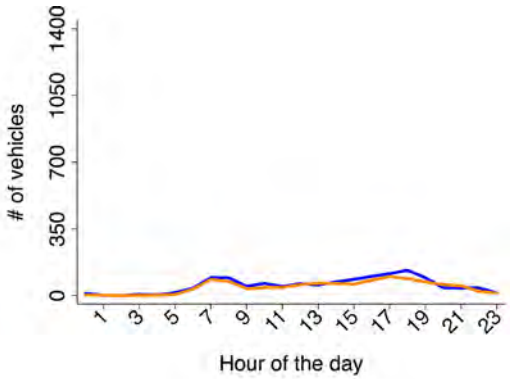
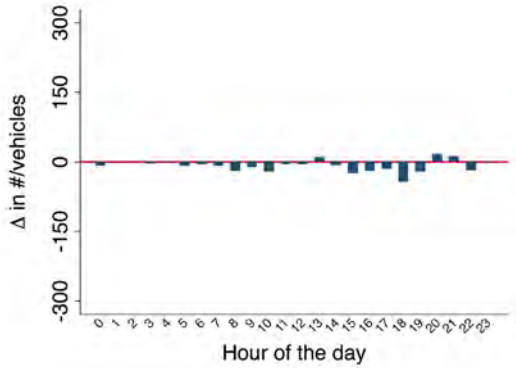
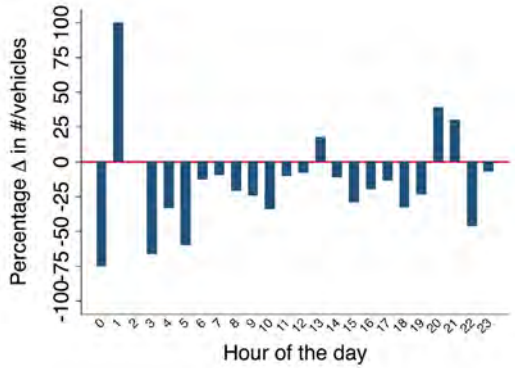
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 34: Pine, east of Lincoln		
		
Location 35: Bird, south of Willow Glen Way		
		

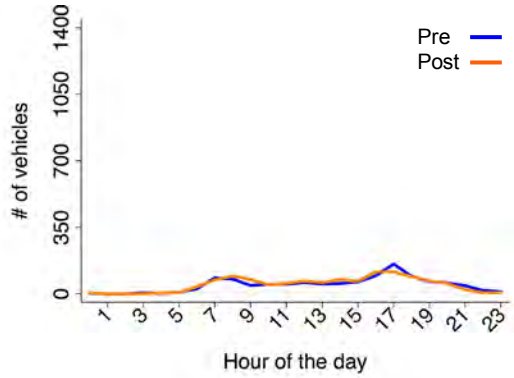
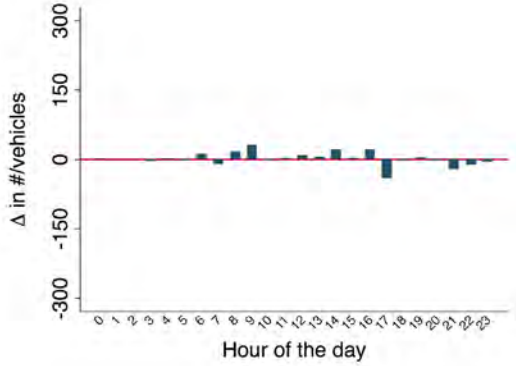
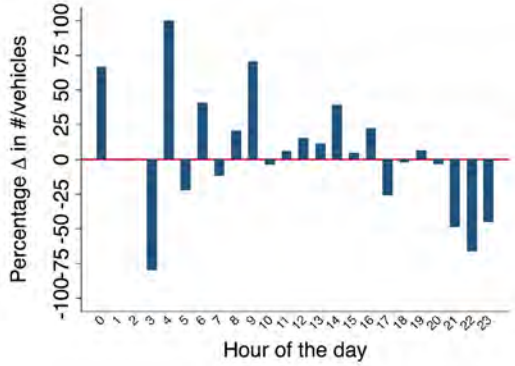
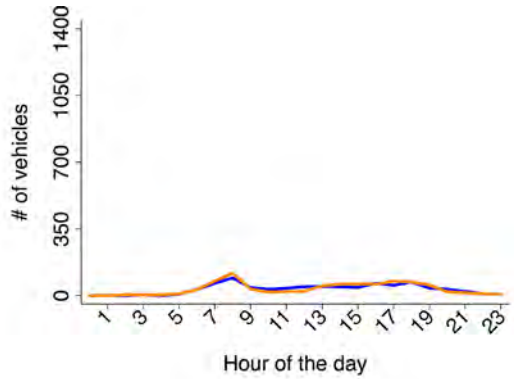
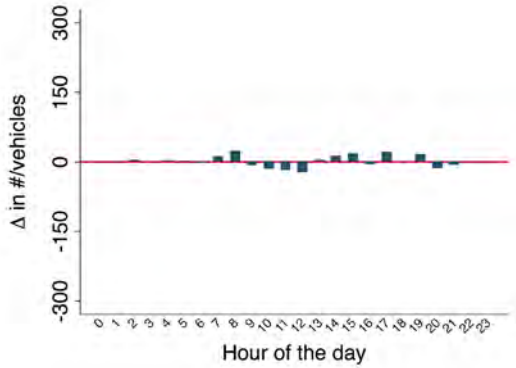
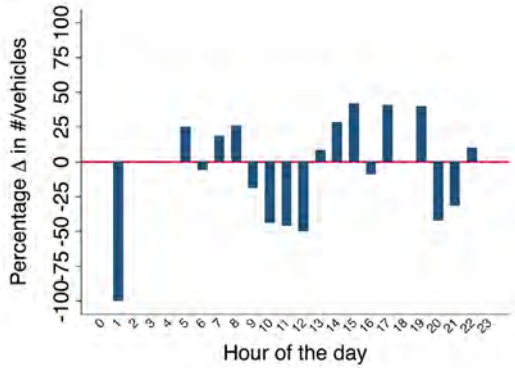
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 40: Almaden, north of Malone		
		
Location 41: Curtner, east of Lincoln		
		

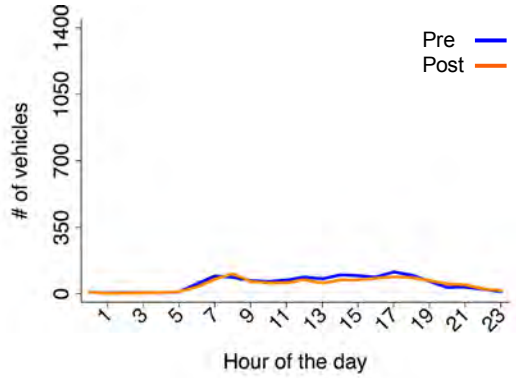
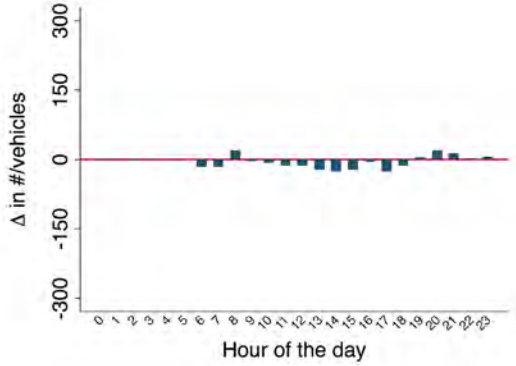
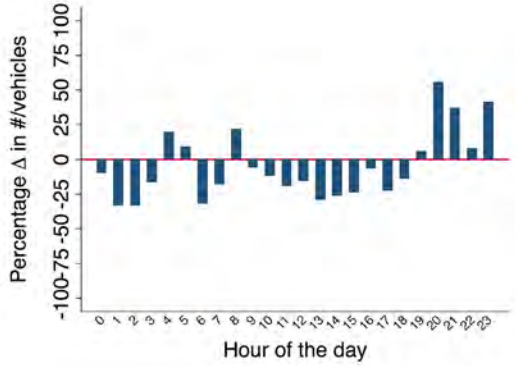
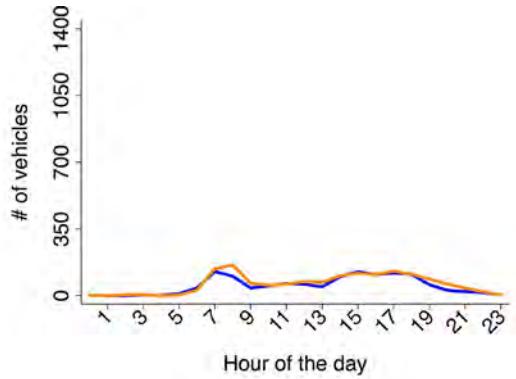
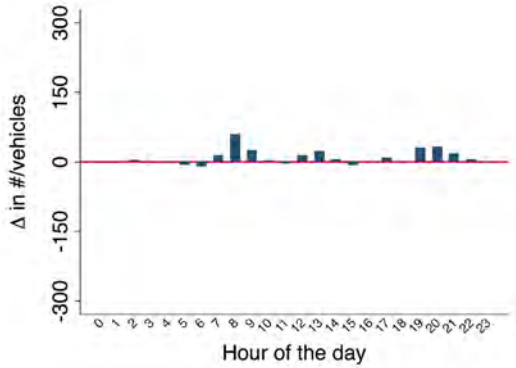
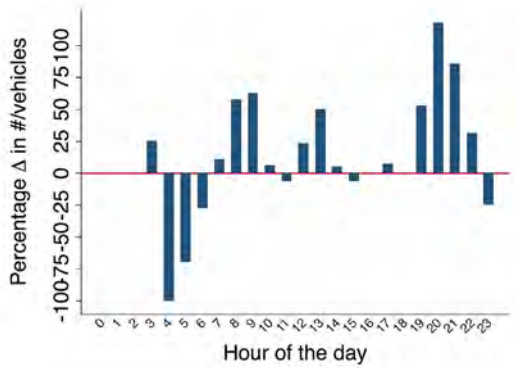
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 42: Curtner, west of Lincoln		
		
Location 45: Bird, north of Willow		
		

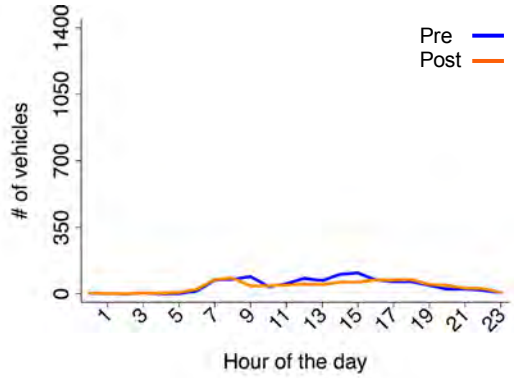
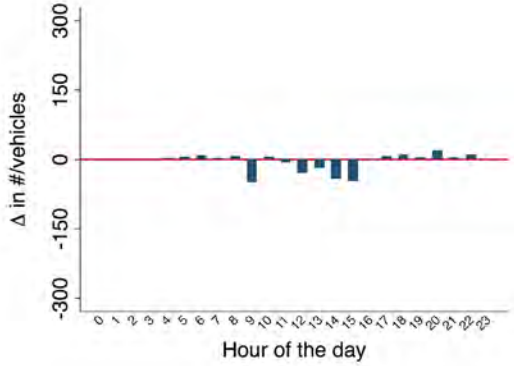
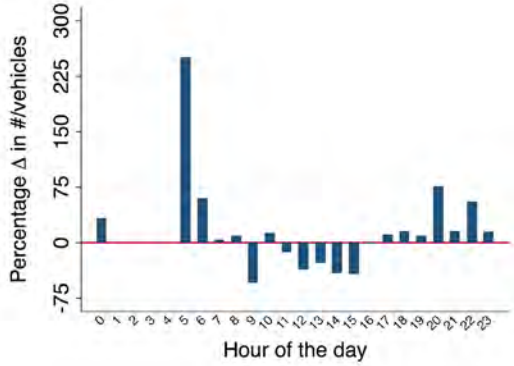
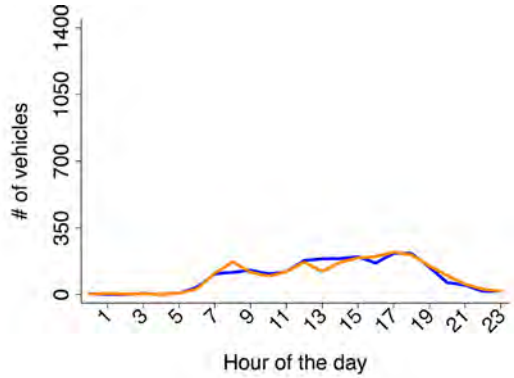
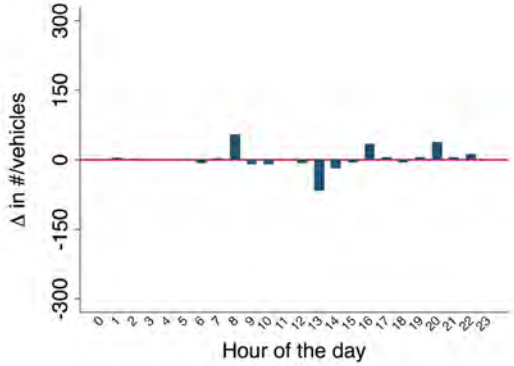
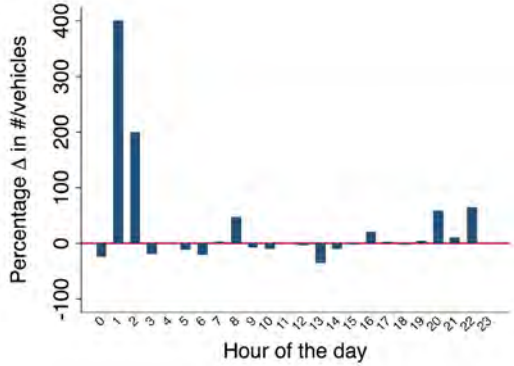
Neighborhood Streets Location Graphs: Before-and-after the road diet – total number of vehicles before-and-after, change in number of vehicles after the road diet, and percentage change in number of vehicles after the road diet.

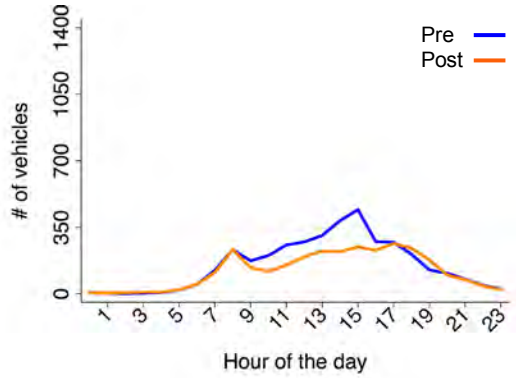
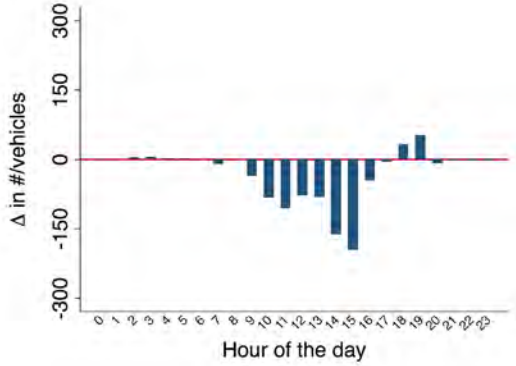
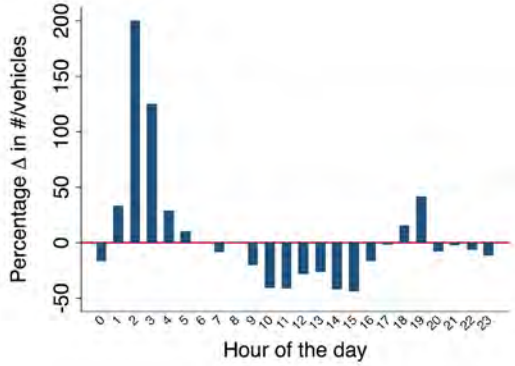
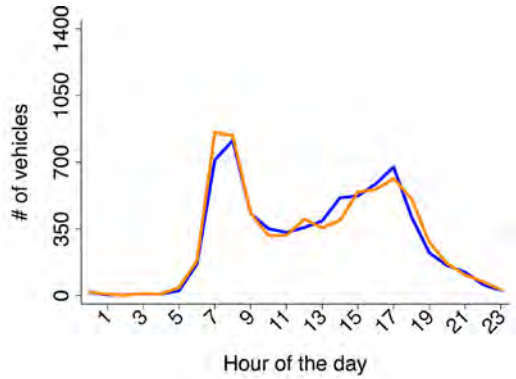
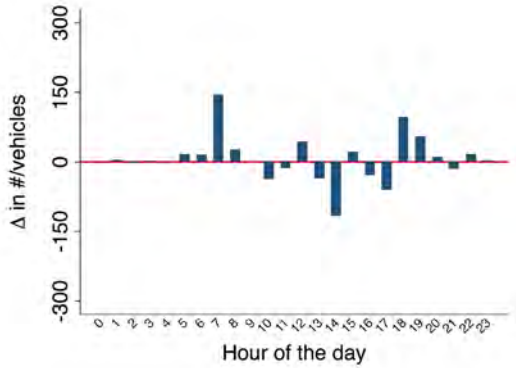
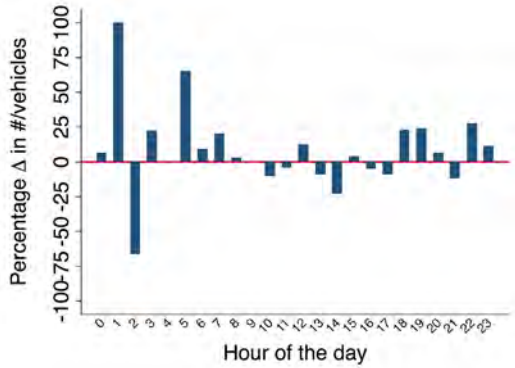
Total number of vehicles	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 3: Paula, west of Lincoln		
		
Location 4: Pedro, west of Lincoln		
		

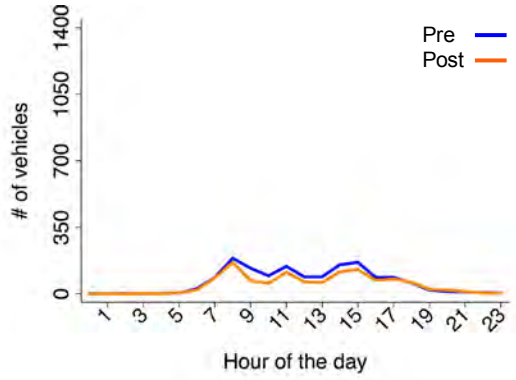
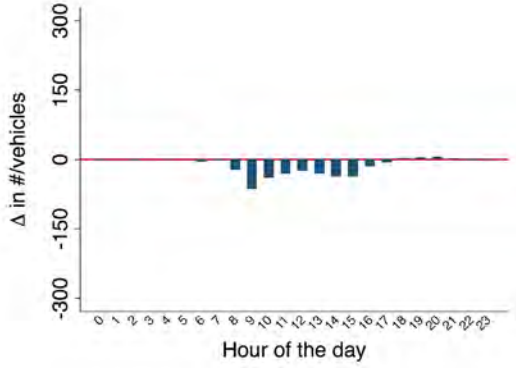
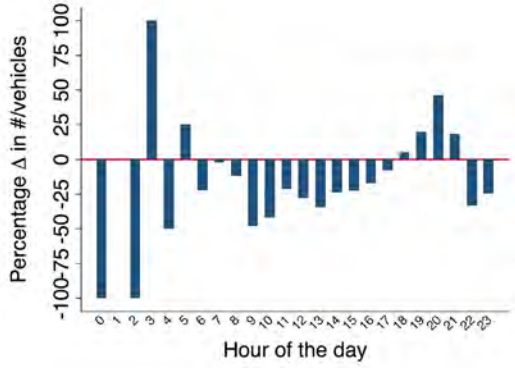
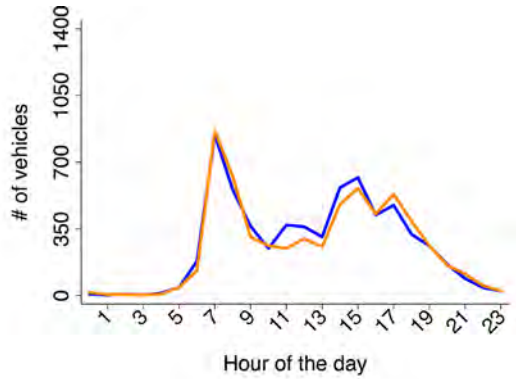
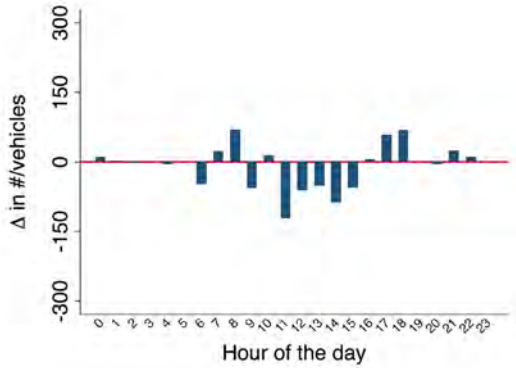
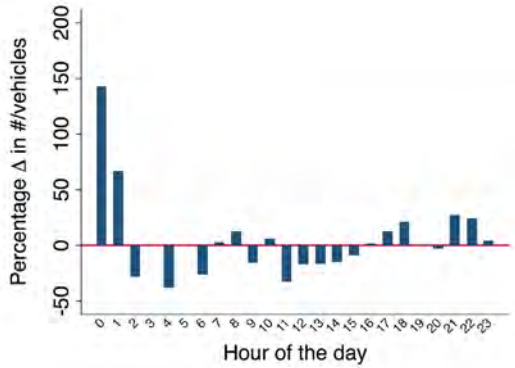
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 5: Glen Eyrie, west of Lincoln		
		
Location 7: Lester, west of Lincoln		
		

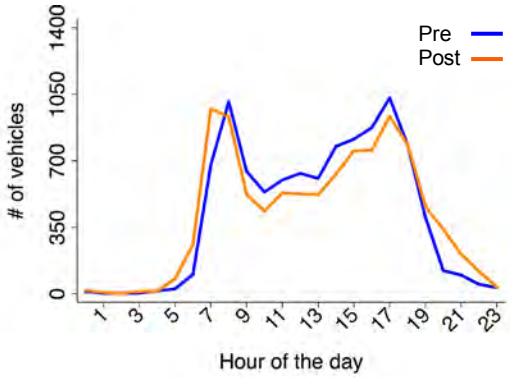
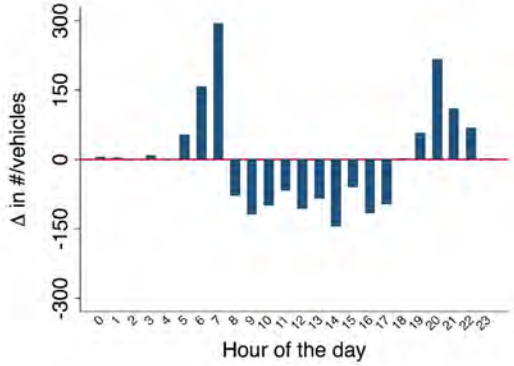
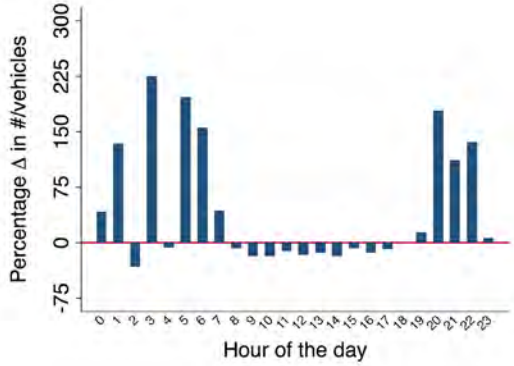
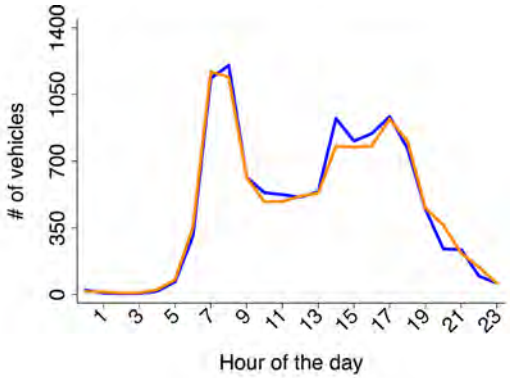
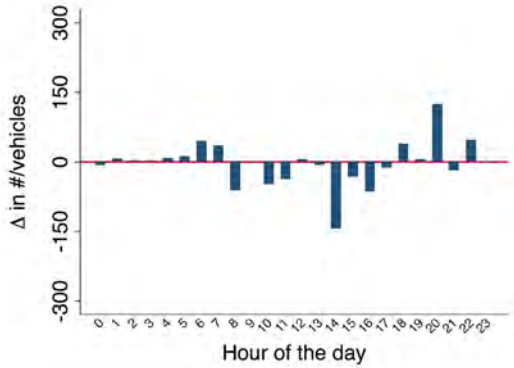
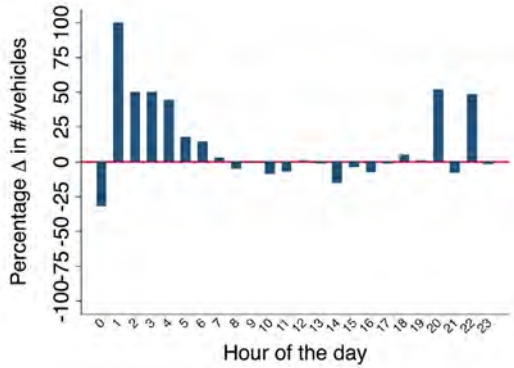
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 8: Garfield, west of Lincoln		
		
Location 9: El Abra, West of Lincoln		
		

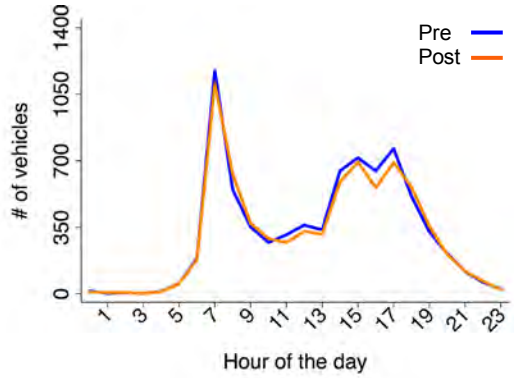
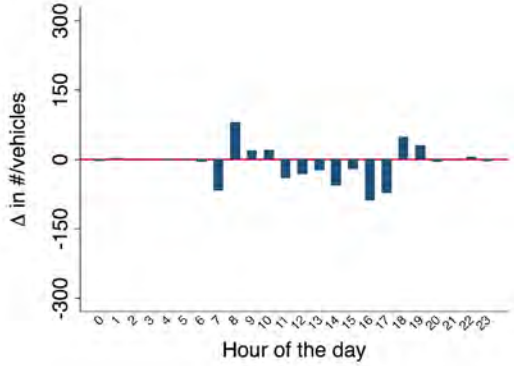
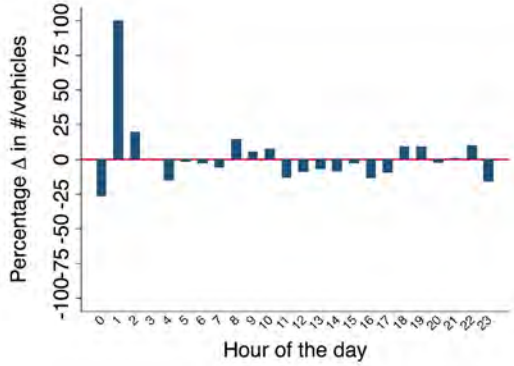
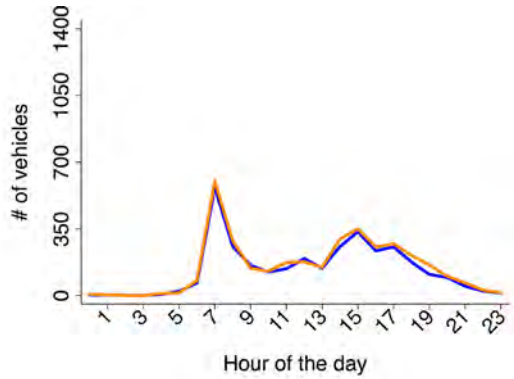
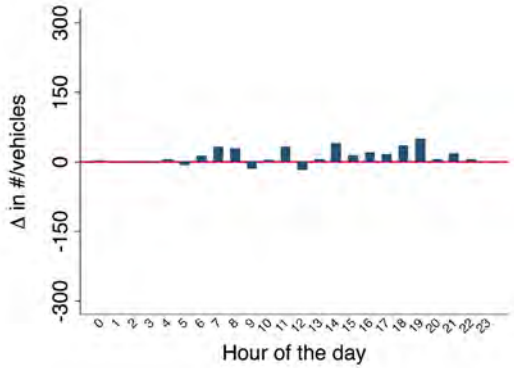
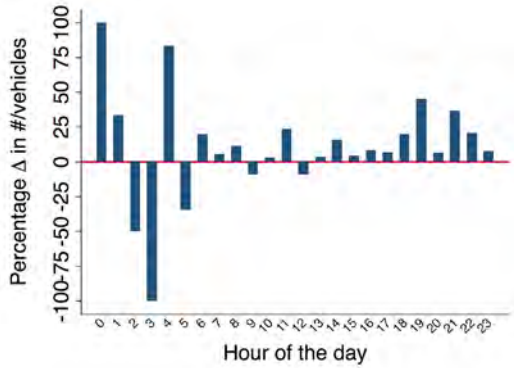
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 15: Curtiss, south of Willow		
		
Location 16: Kotenburg, south of Willow		
		

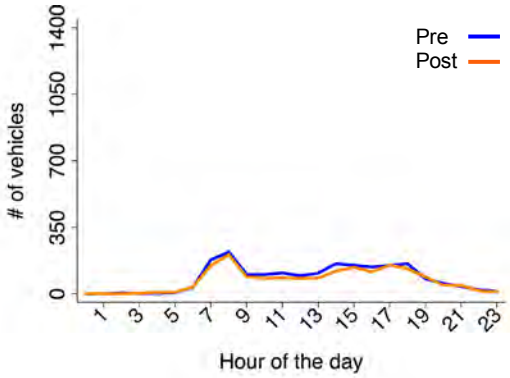
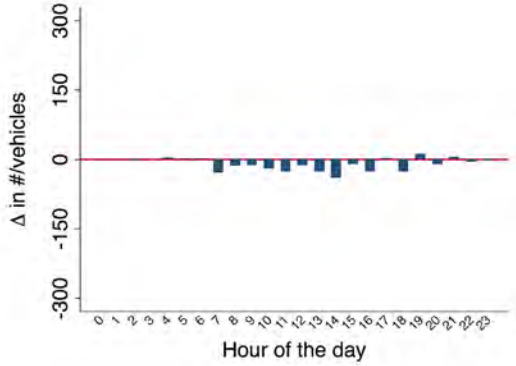
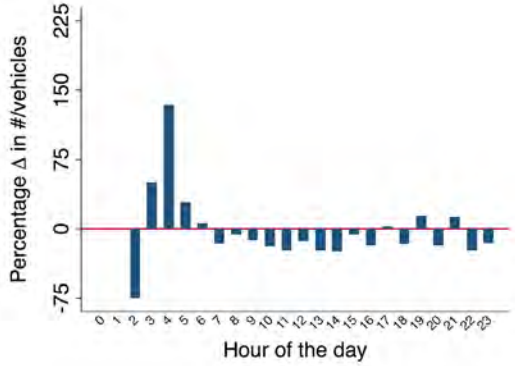
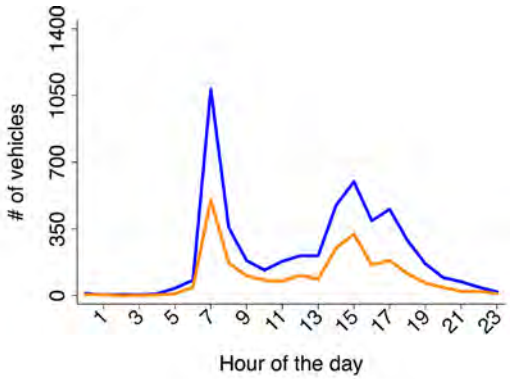
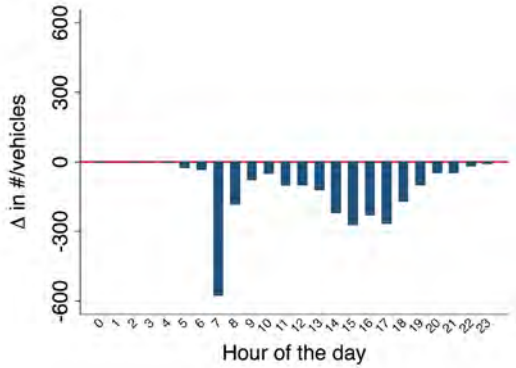
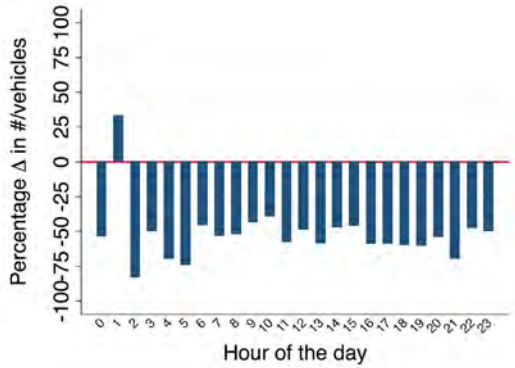
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 17: Settle, south of Willow		
		
Location 18: Blewett, south of Willow		
		

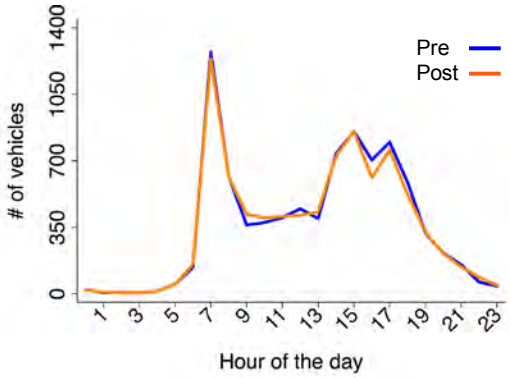
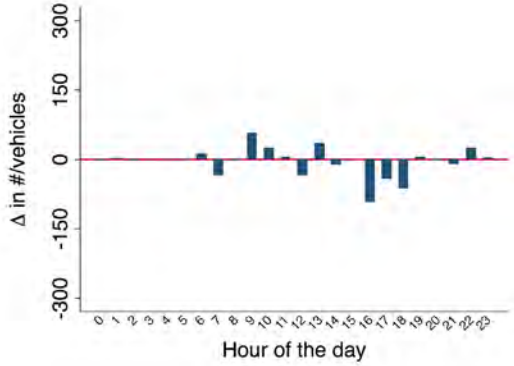
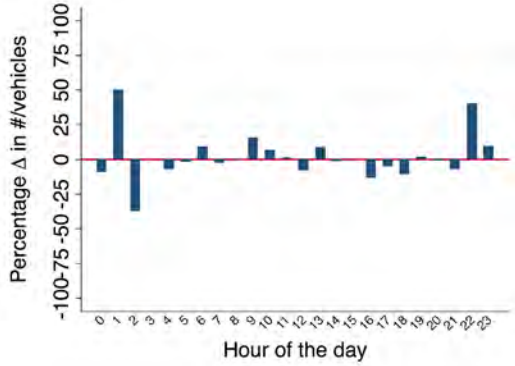
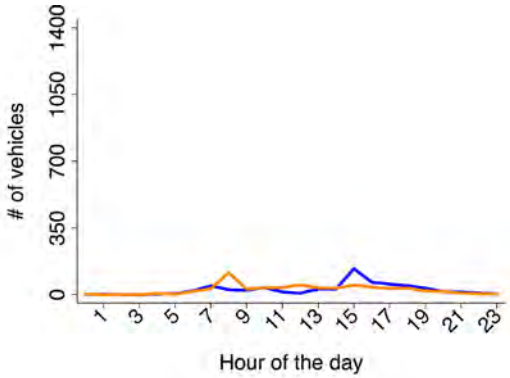
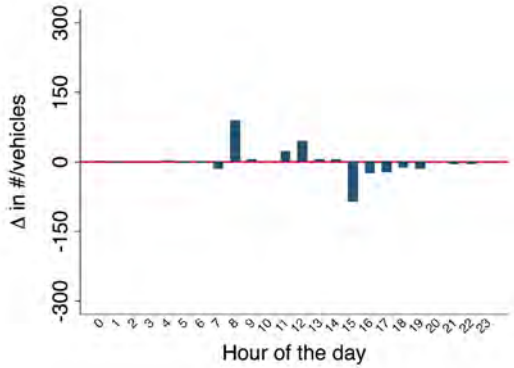
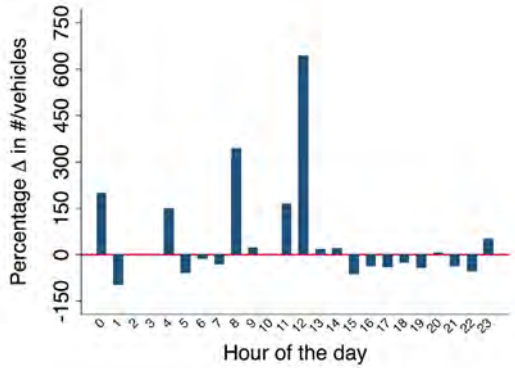
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 20: Brace, east of Coolidge		
		
Location 21: Camino Ramon, south of Willow		
		

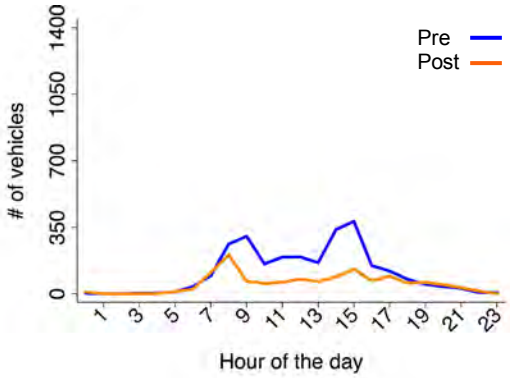
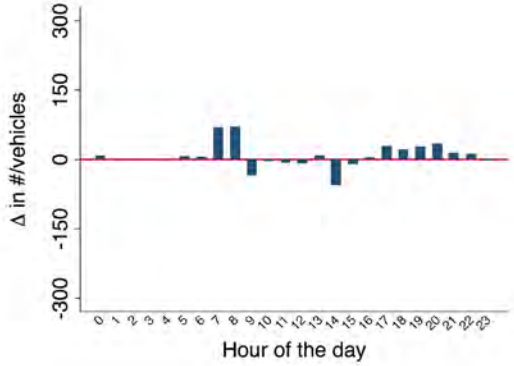
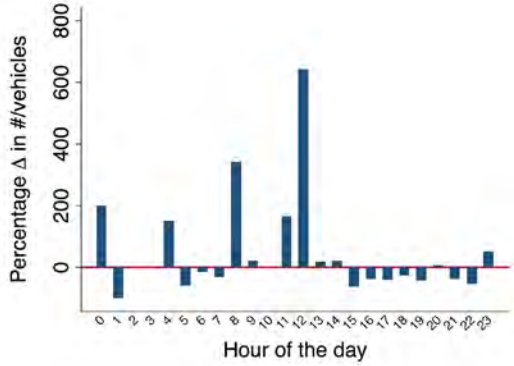
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 24: Iris, south of Minnesota		
		
Location 26: Newport, south of Minnesota		
		

Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 27: Hicks, south of Cherry Valley		
		
Location 28: Hicks, south of Callecita		
		

Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 29: Cottle, south of Pine		
		
Location 30: Newport, south of Fairview		
		

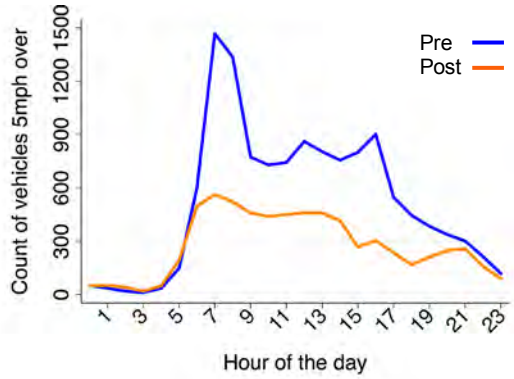
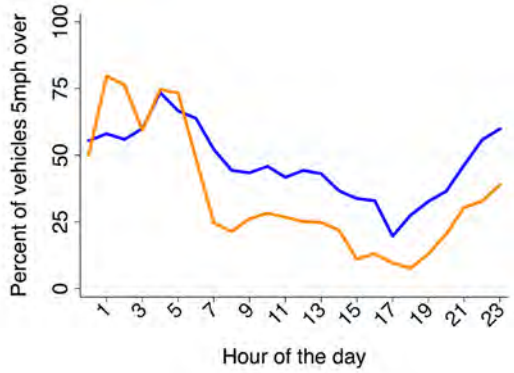
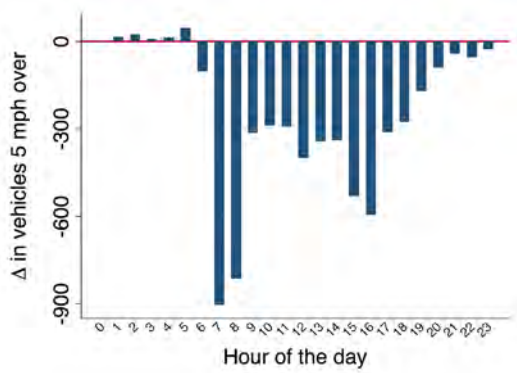
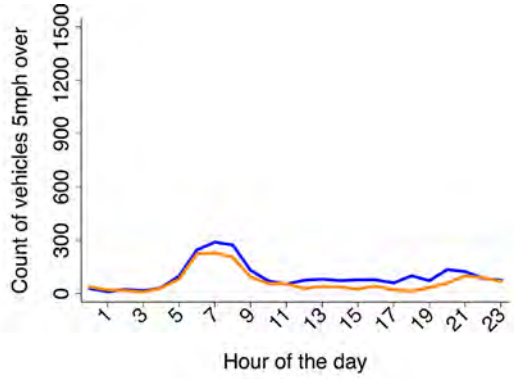
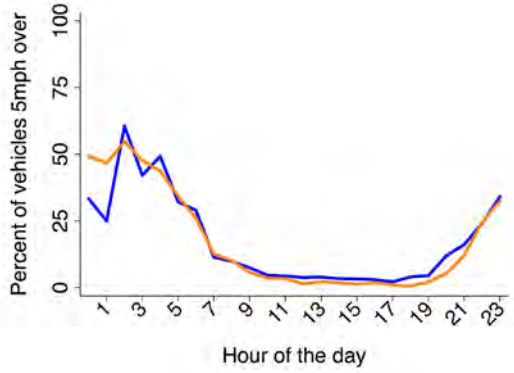
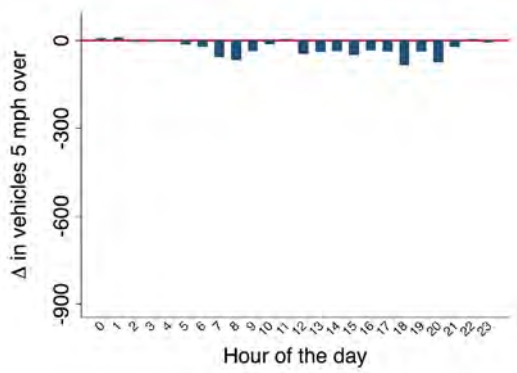
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 33: Willow Glen, west of Hill		
		
Location 38: Malone, west of Lincoln		
		

Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 39: Malone, east of Harmil		
		
Location 43: Michigan, east of Lincoln		
		

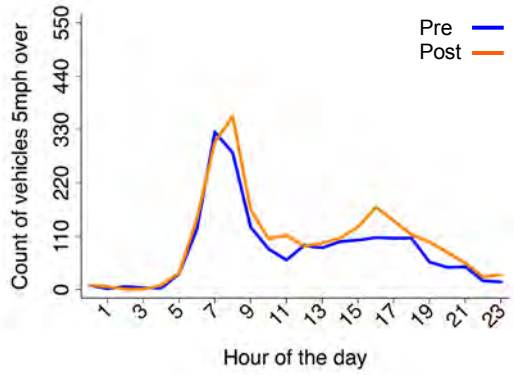
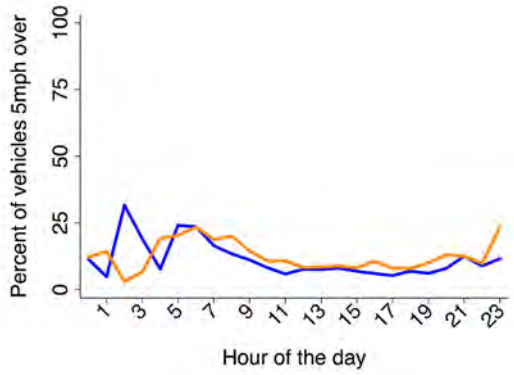
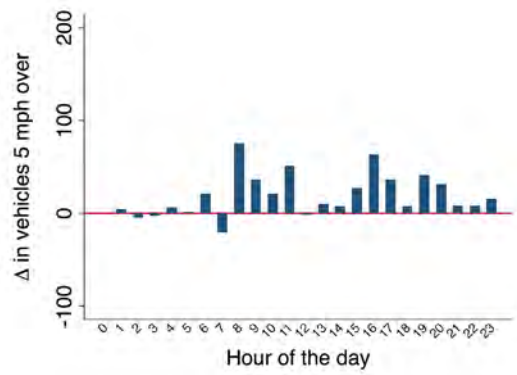
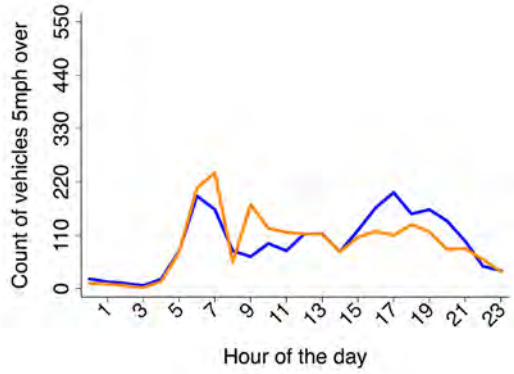
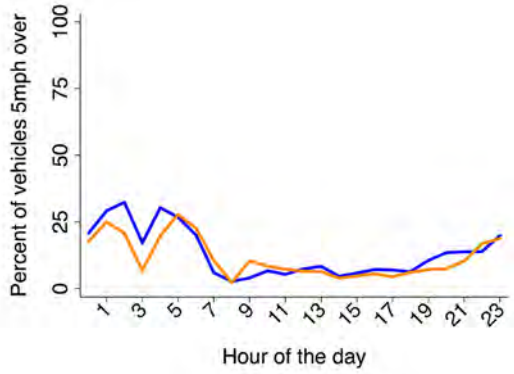
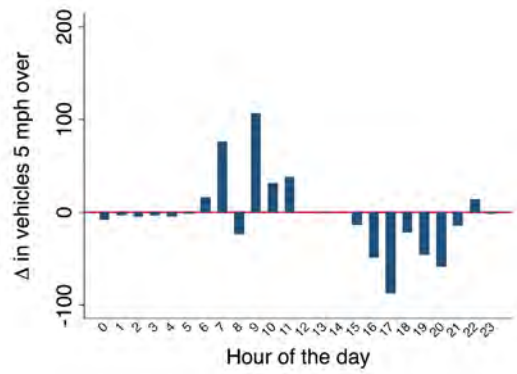
Total number of vehicles, by hour	Change in number of vehicles after the road diet, by hour	Percentage change in number of vehicles after the road diet, by hour
Location 44: California, east of Lincoln		
		

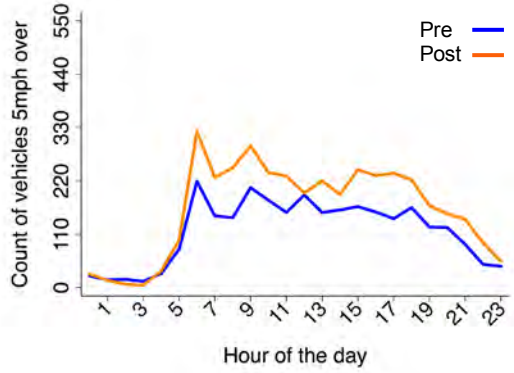
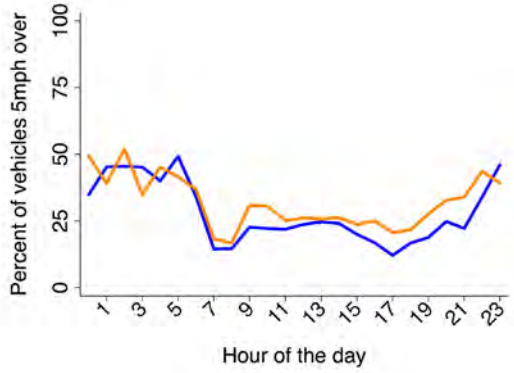
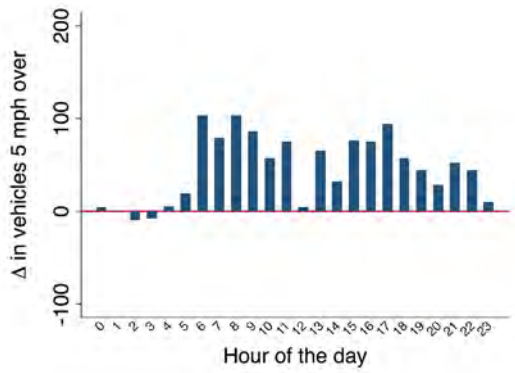
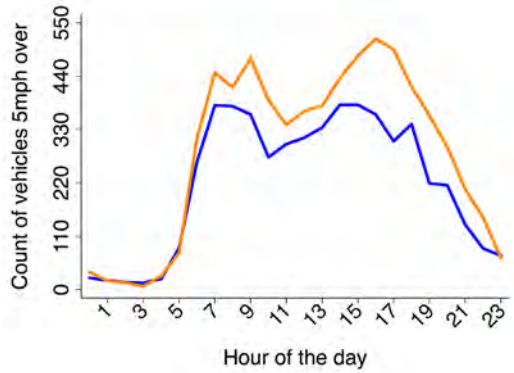
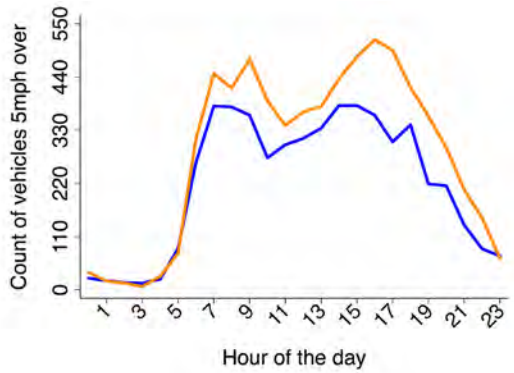
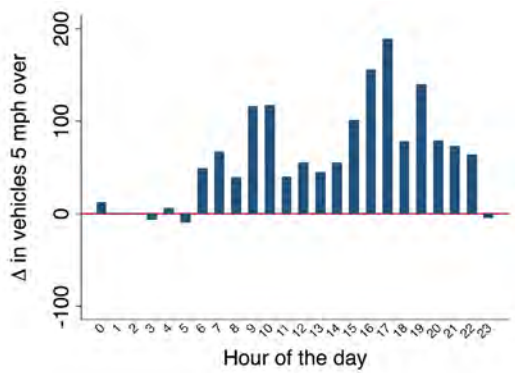
5 MPH+ OVER THE SPEED LIMIT GRAPHS

Lincoln Avenue Road Diet Location Graphs: Before-and-after the road diet – total number of vehicles traveling 5mph+ over posted speed limit, percent of vehicles traveling 5mph+ over posted speed limit, and change in number of vehicles travelling 5mph+ over posted speed limit.

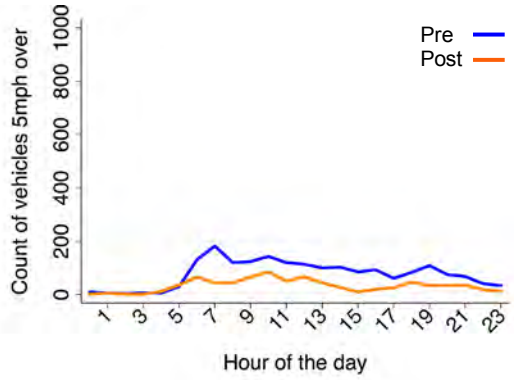
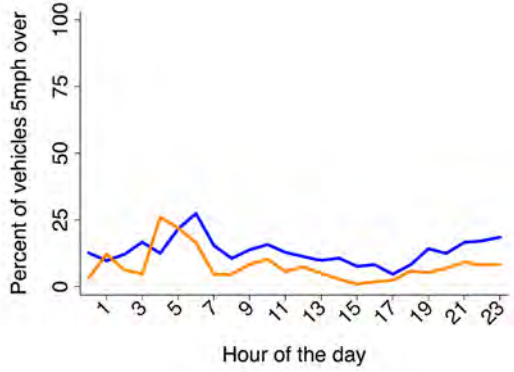
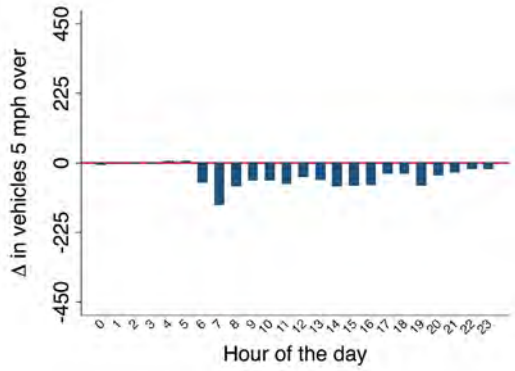
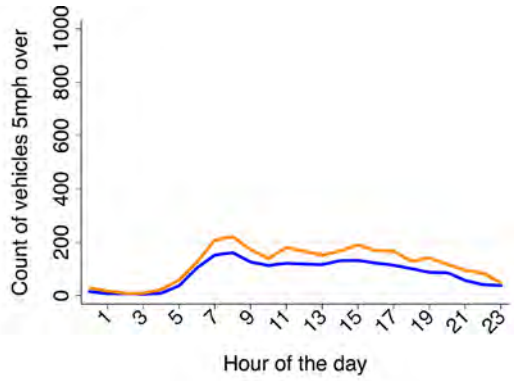
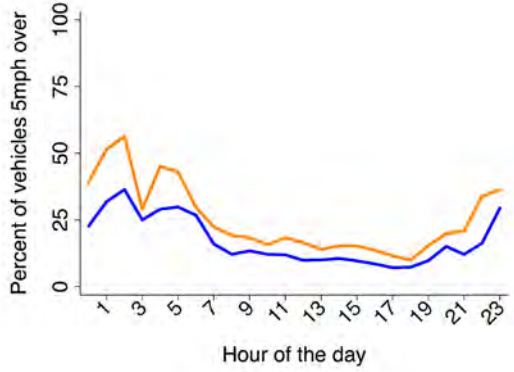
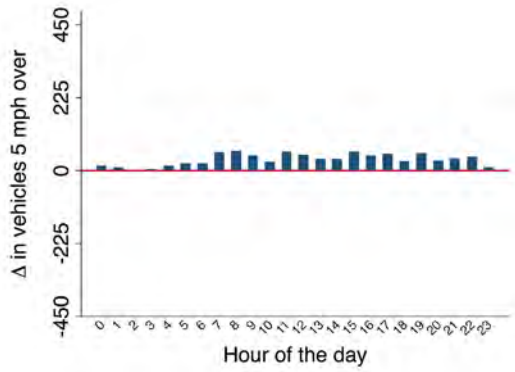
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 6: Lincoln, south of Glen Eyrie		
		
Location 19: Lincoln, south of Meredith		
		

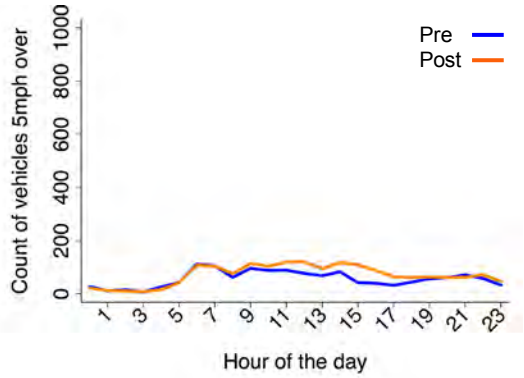
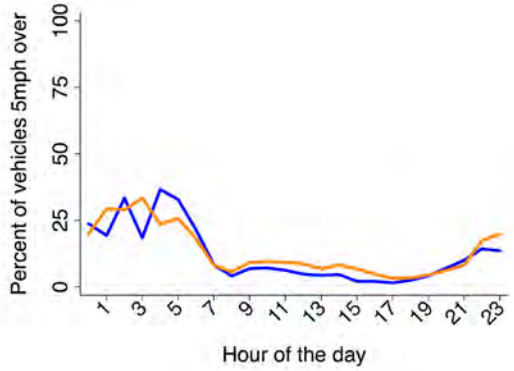
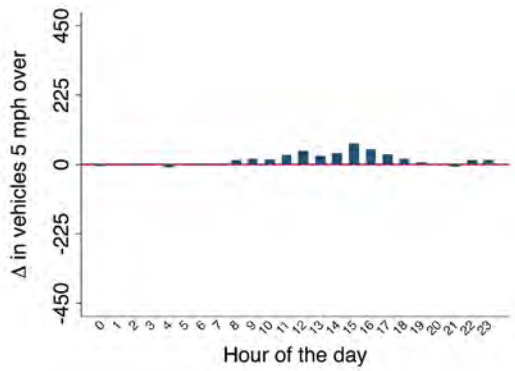
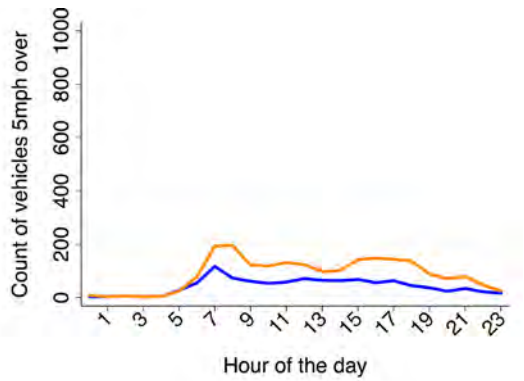
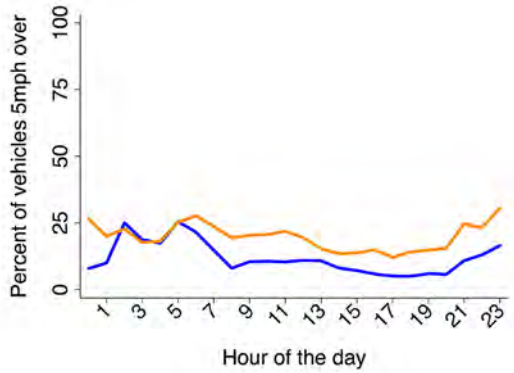
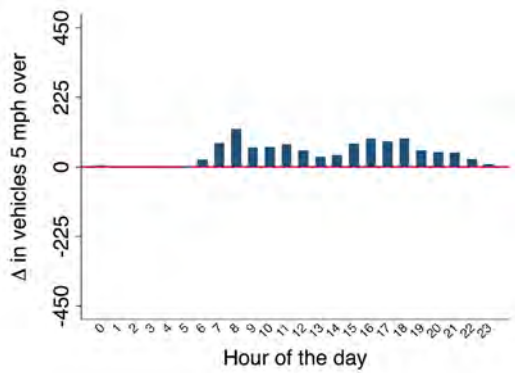
Lincoln Avenue Non-Road Diet Location Graphs: Before-and-after the road diet – total number of vehicles traveling 5mph+ over posted speed limit, percent of vehicles traveling 5mph+ over posted speed limit, and change in number of vehicles travelling 5mph+ over posted speed limit.

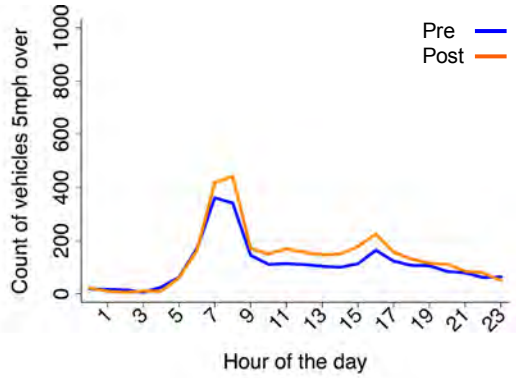
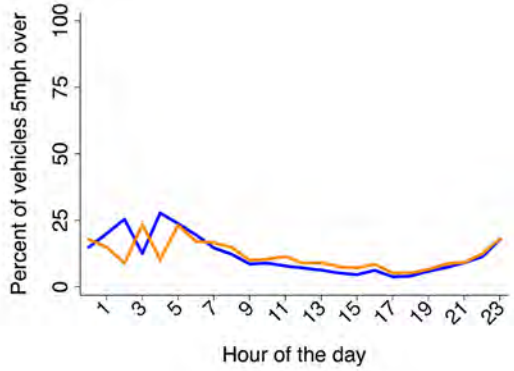
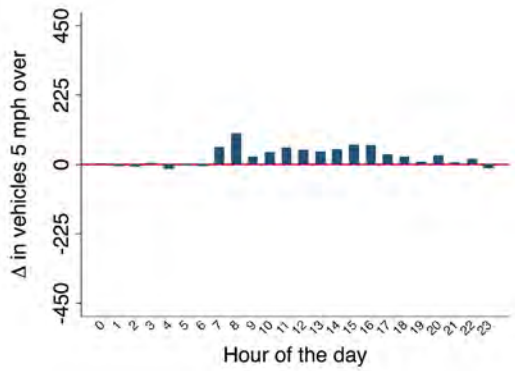
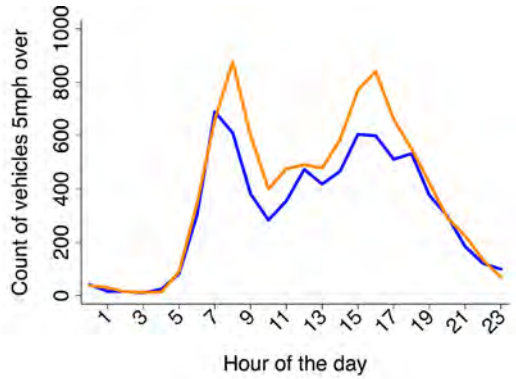
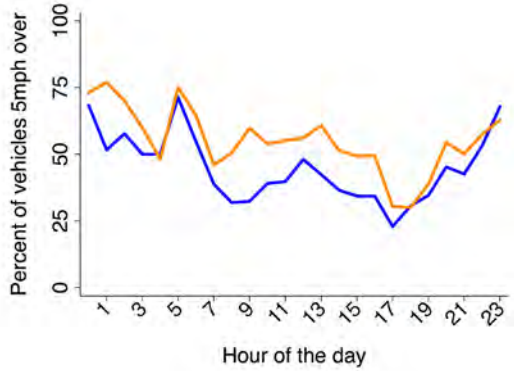
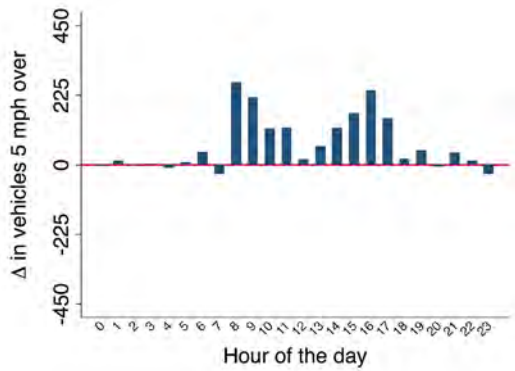
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 1: Lincoln, north of Parkmoor		
		
Location 32: Lincoln, south of Nevada		
		

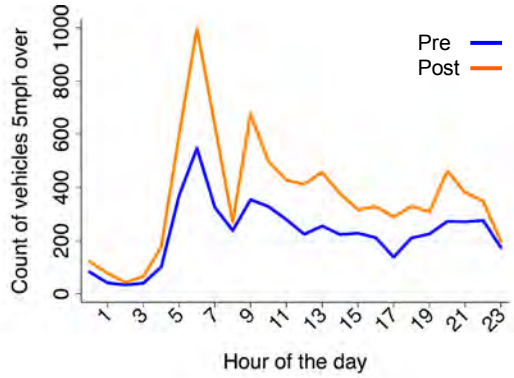
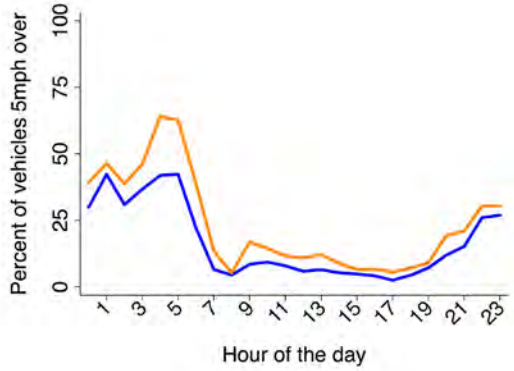
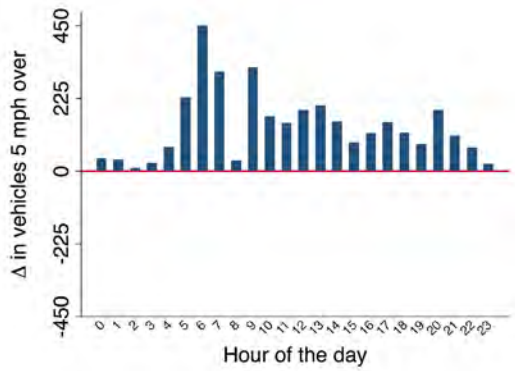
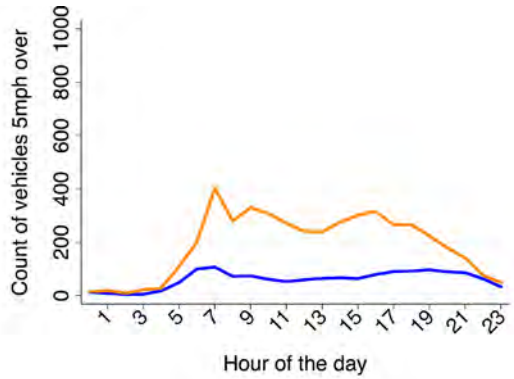
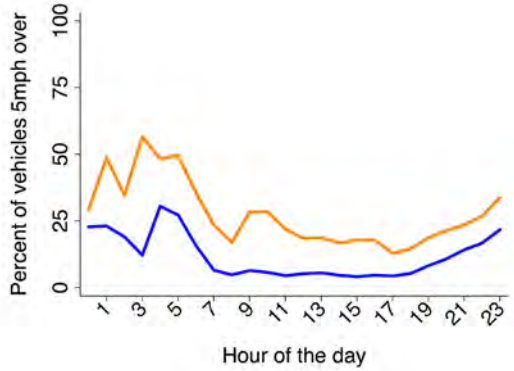
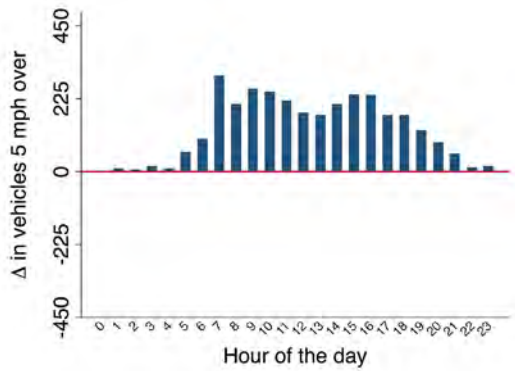
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 36: Lincoln, south of Clark		
		
Location 37: Lincoln, south of Curtner		
		

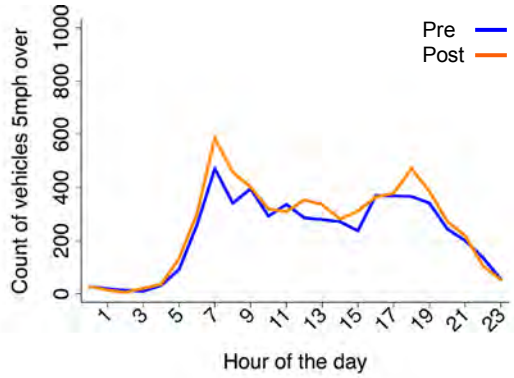
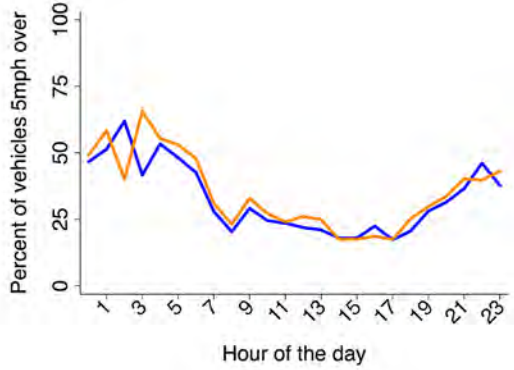
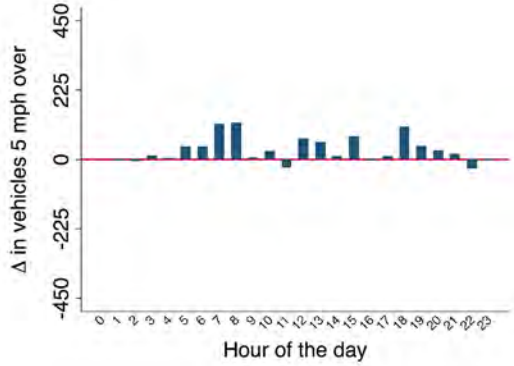
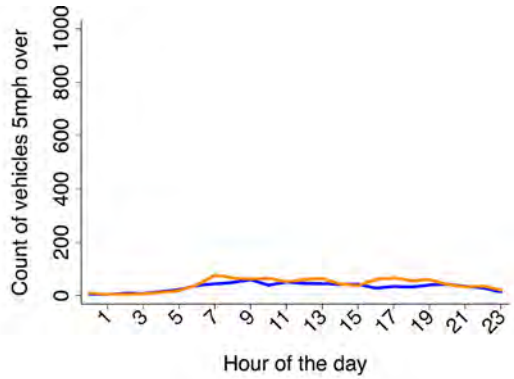
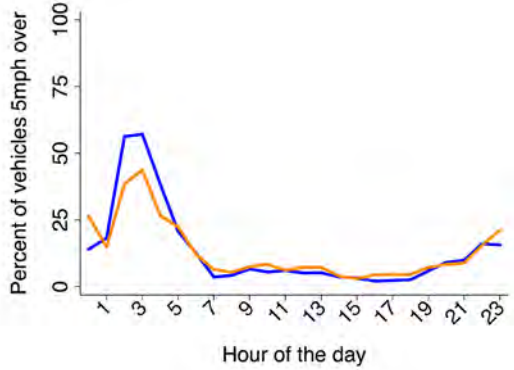
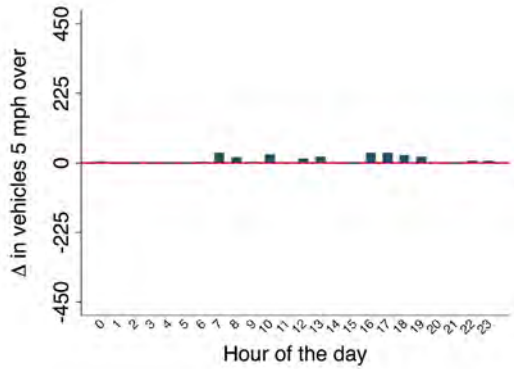
Major Streets Location Graphs: Before-and-after the road diet – total number of vehicles traveling 5mph+ over posted speed limit, percent of vehicles traveling 5mph+ over posted speed limit, and change in number of vehicles travelling 5mph+ over posted speed limit.

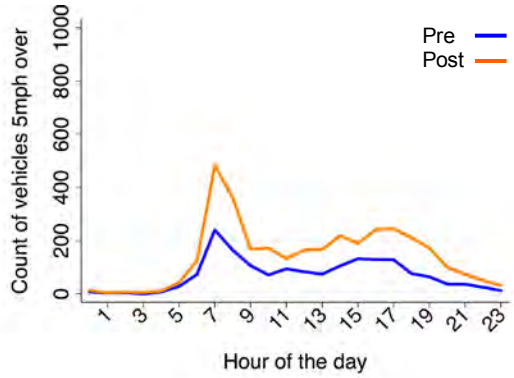
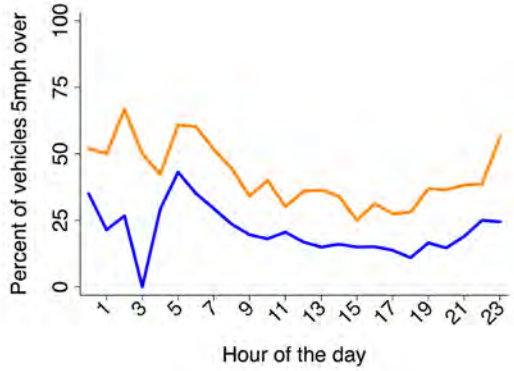
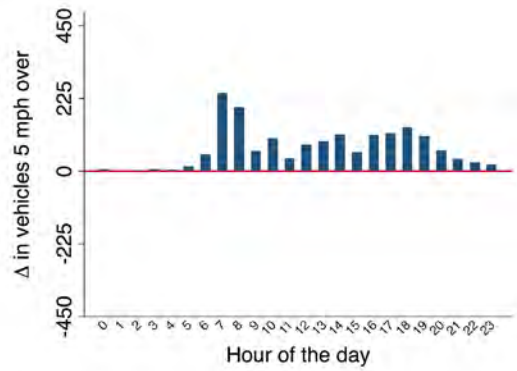
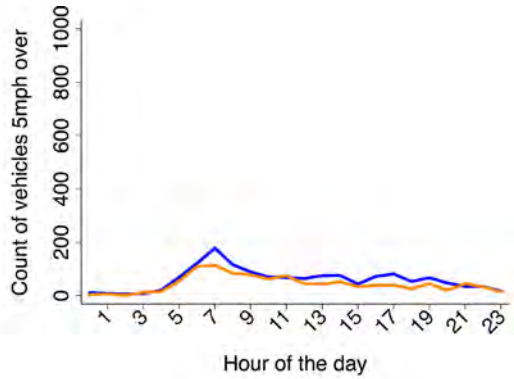
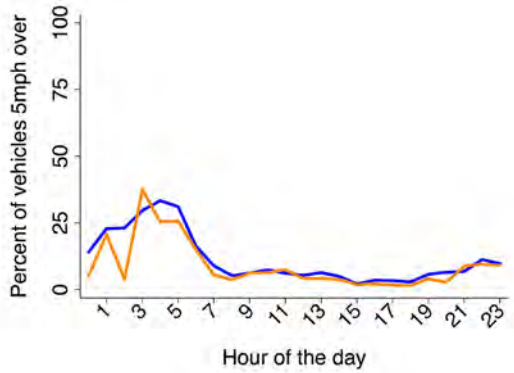
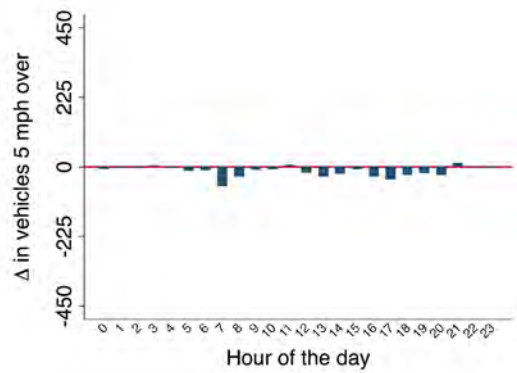
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 2: Lincoln, south of Glen Eyrie		
		
Location 10: Willow, west of Lincoln		
		

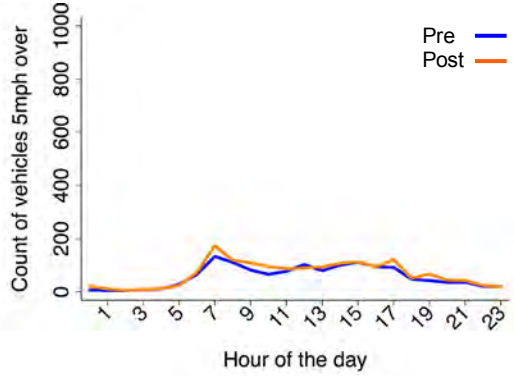
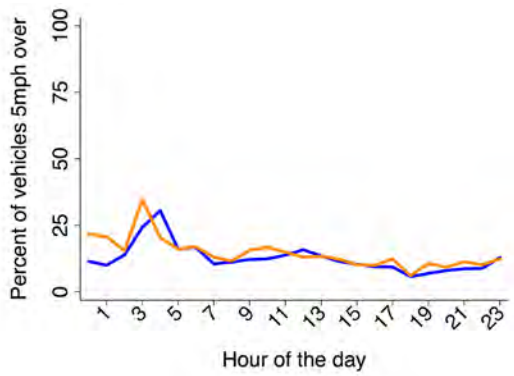
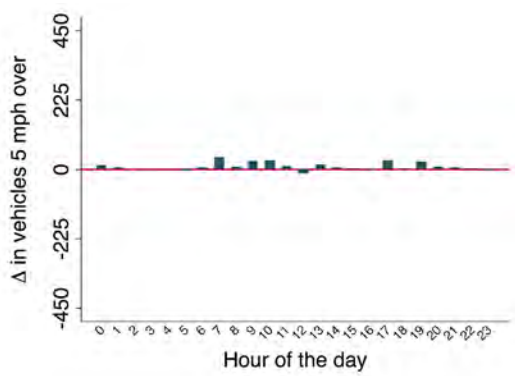
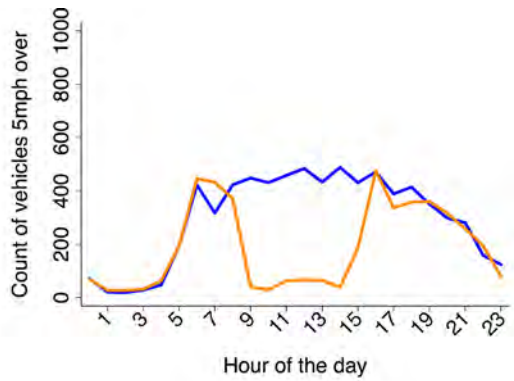
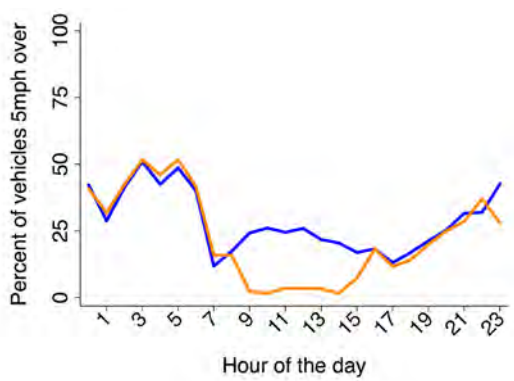
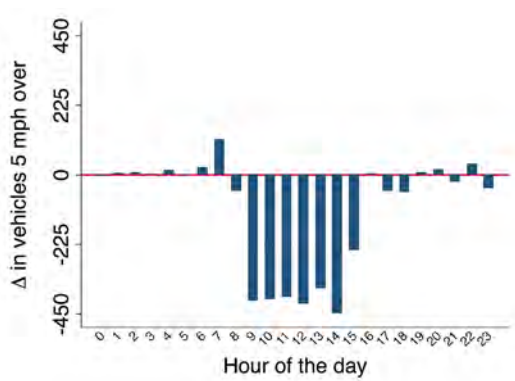
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 11: Willow, east of Lincoln		
		
Location 12: Coe, east of Riverside		
		

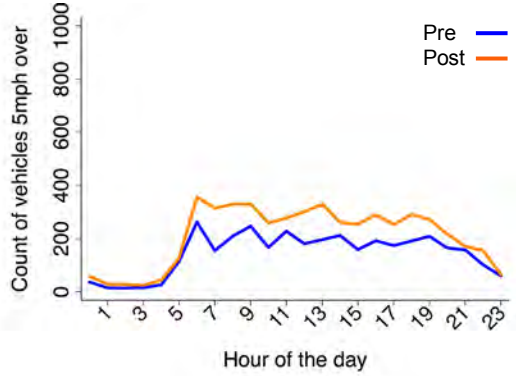
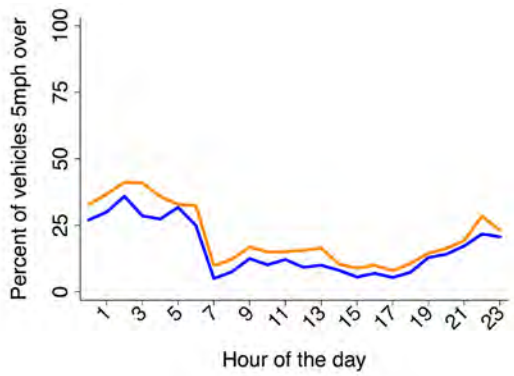
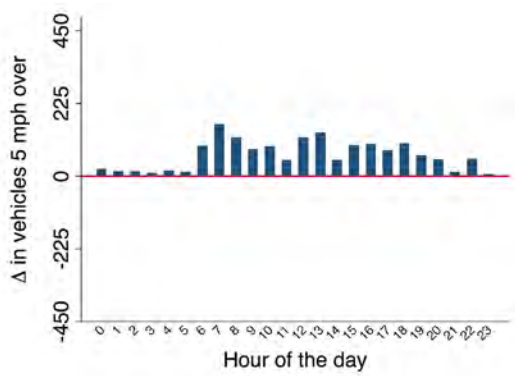
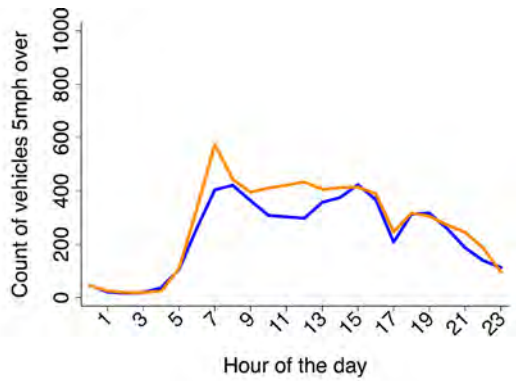
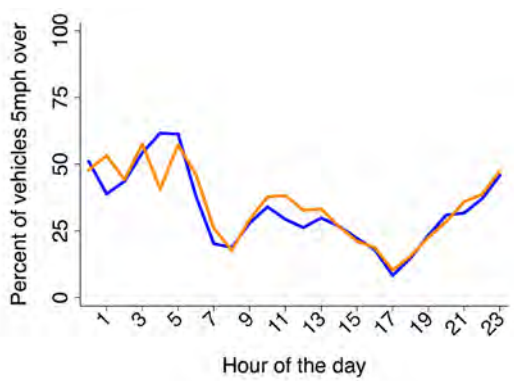
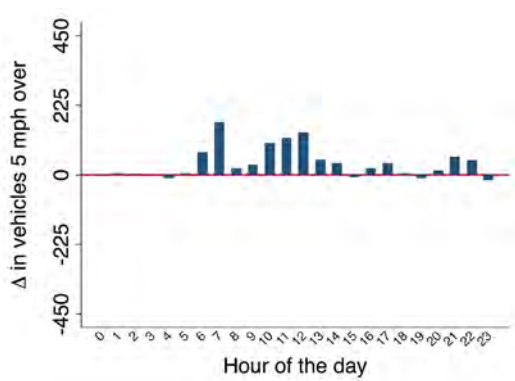
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 13: Bird, north of Coe		
		
Location 14: Bird, south of Willow		
		

Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 22: Meridian, north of Minnesota		
		
Location 23: Minnesota, east of Lincoln		
		

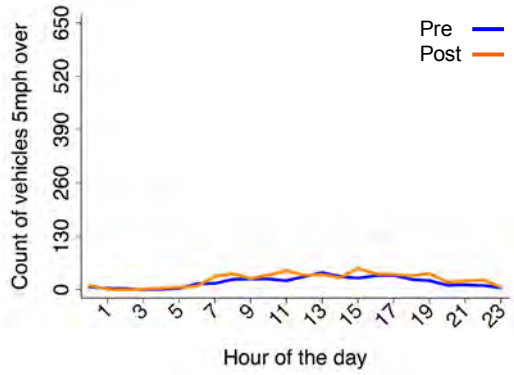
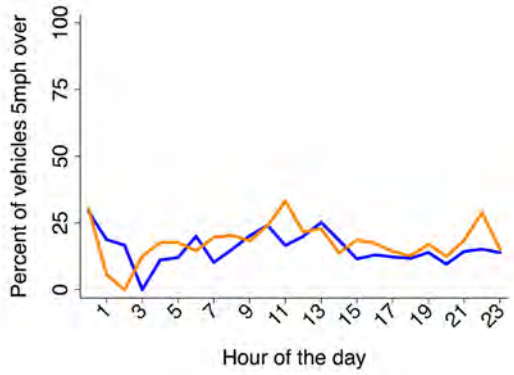
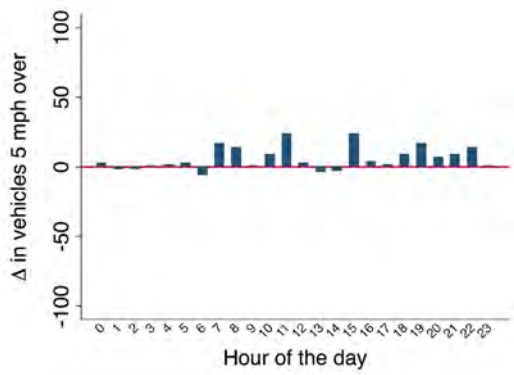
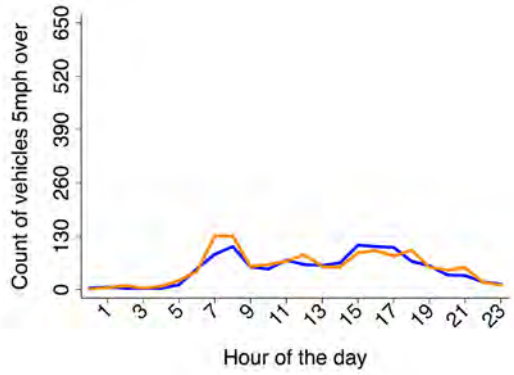
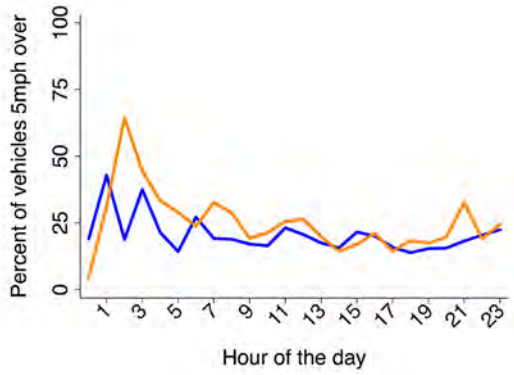
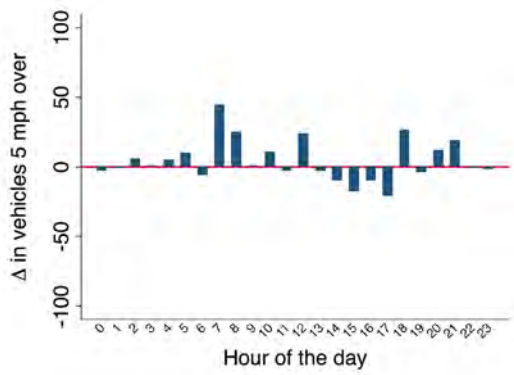
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 25: Minnesota, west of Lincoln		
		
Location 31: Pine, west of Lincoln		
		

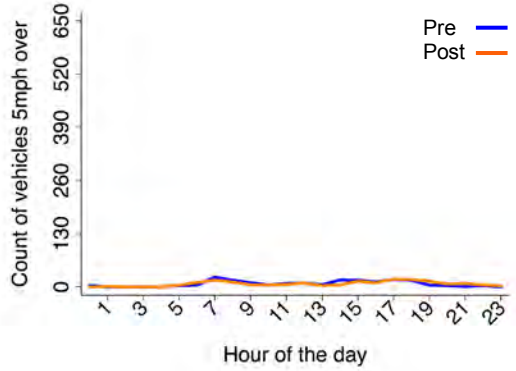
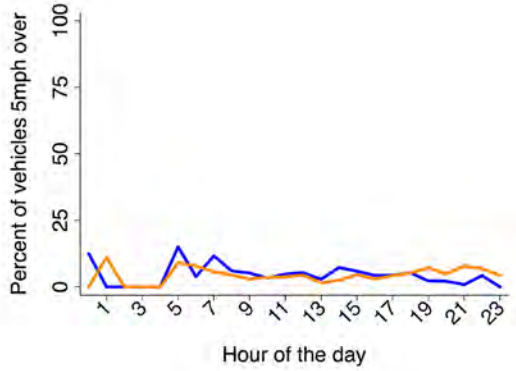
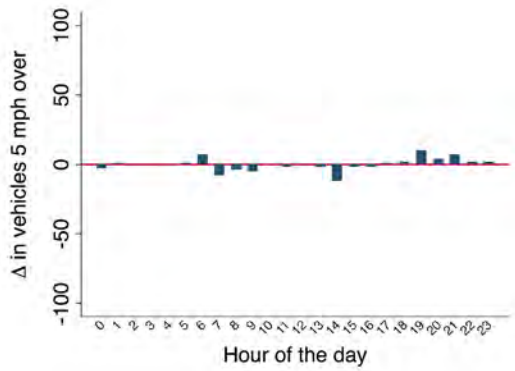
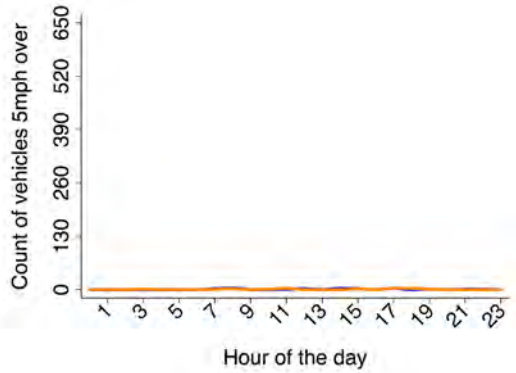
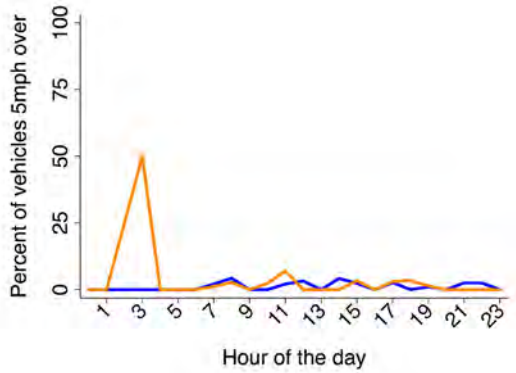
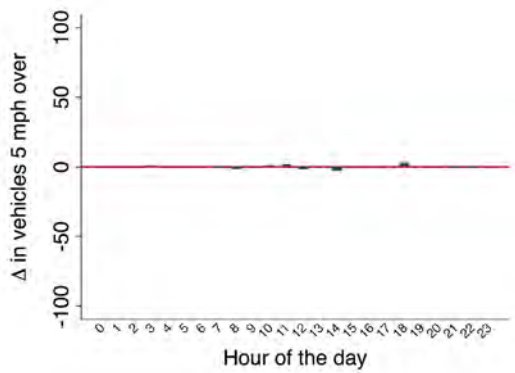
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 34: Pine, east of Lincoln		
		
Location 35: Bird, south of Willow Glen Way		
		

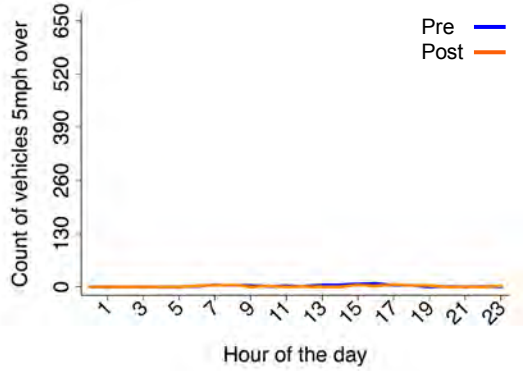
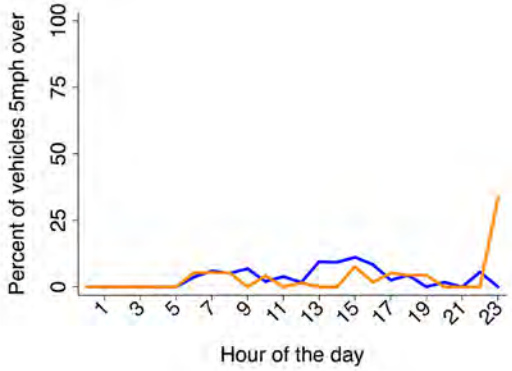
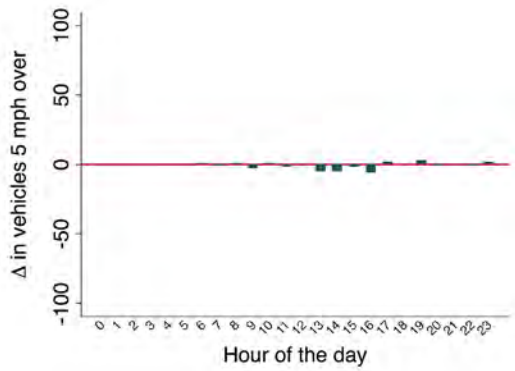
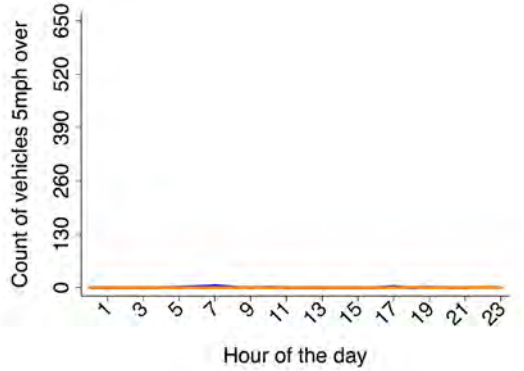
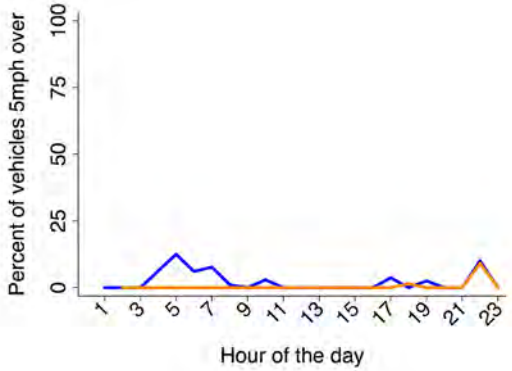
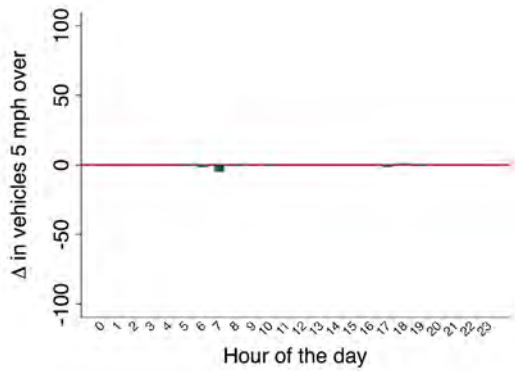
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 40: Almaden, north of Malone		
		
Location 41: Curtner, east of Lincoln		
		

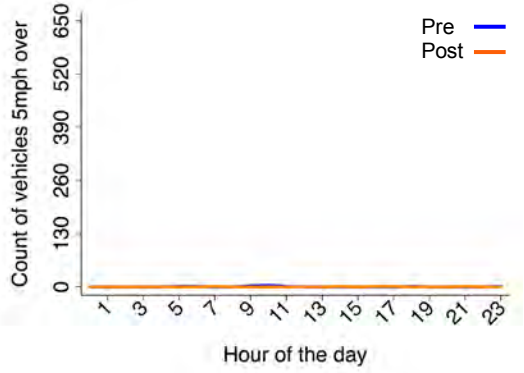
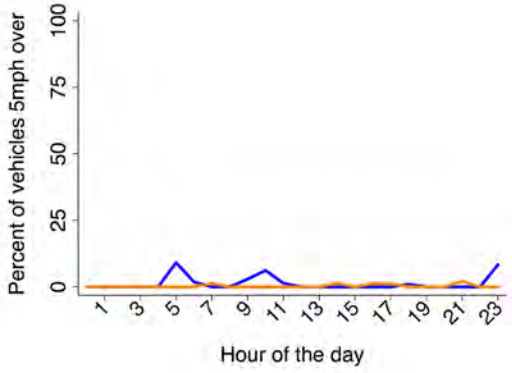
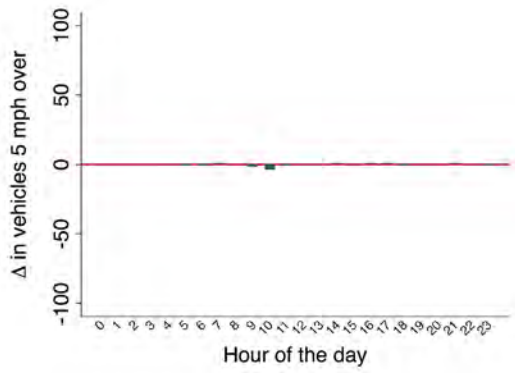
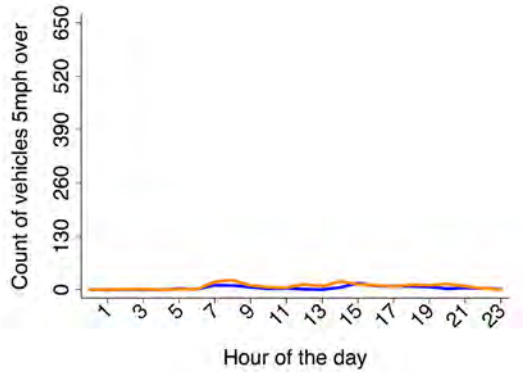
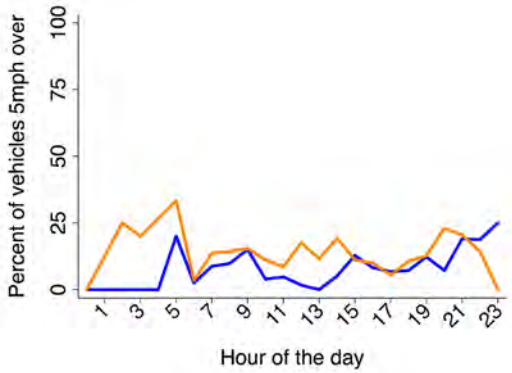
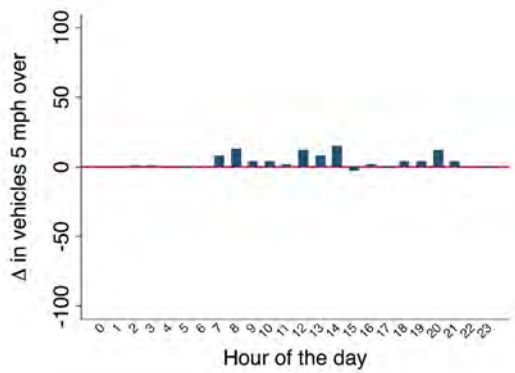
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 42: Curtner, west of Lincoln		
		
Location 45: Bird, north of Willow		
		

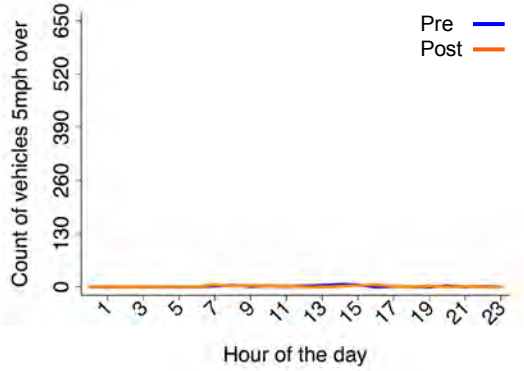
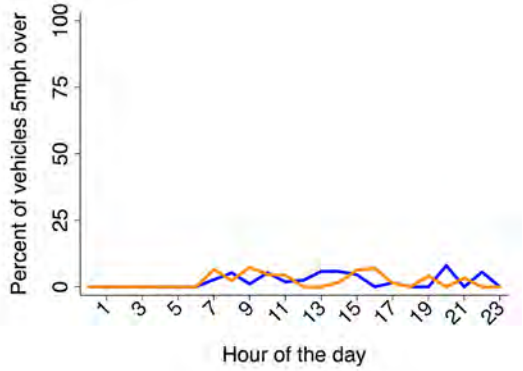
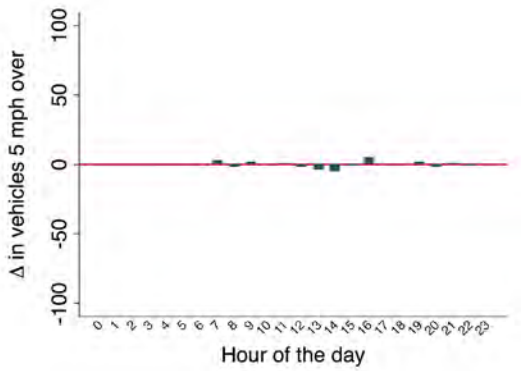
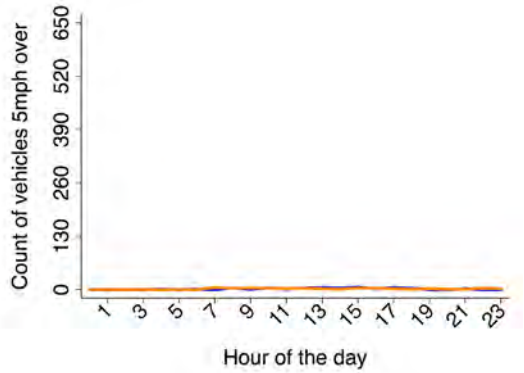
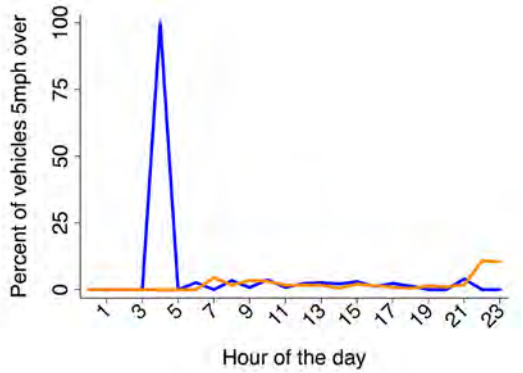
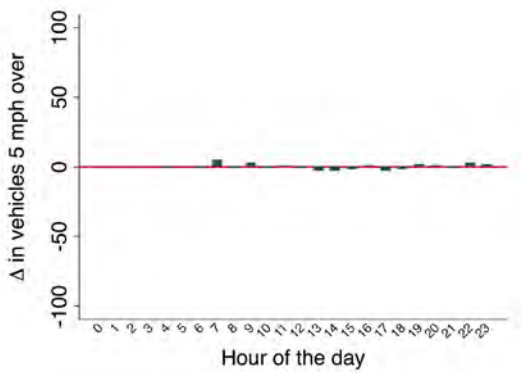
Neighborhood Streets Location Graphs: Before-and-after the road diet – total number of vehicles traveling 5mph+ over posted speed limit, percent of vehicles traveling 5mph+ over posted speed limit, and change in number of vehicles travelling 5mph+ over posted speed limit.

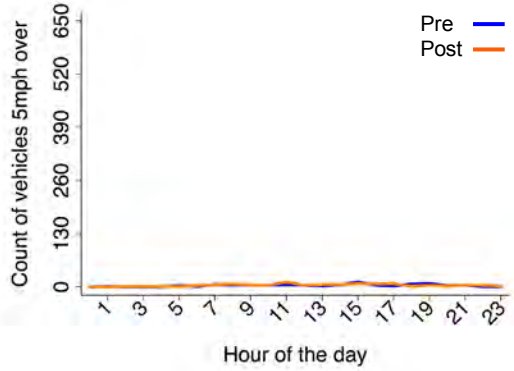
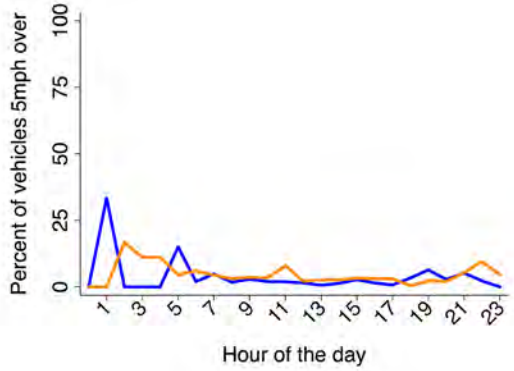
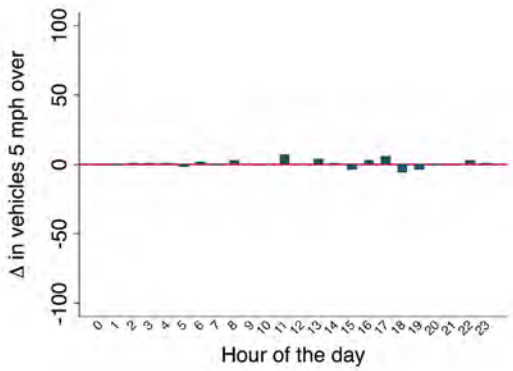
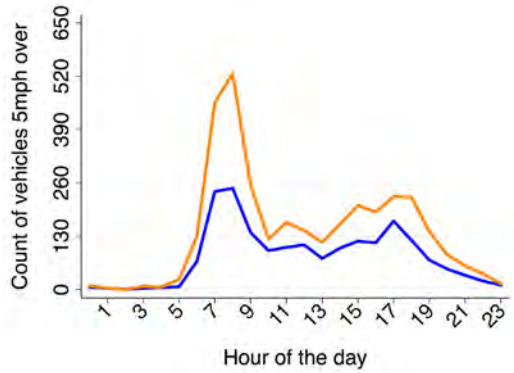
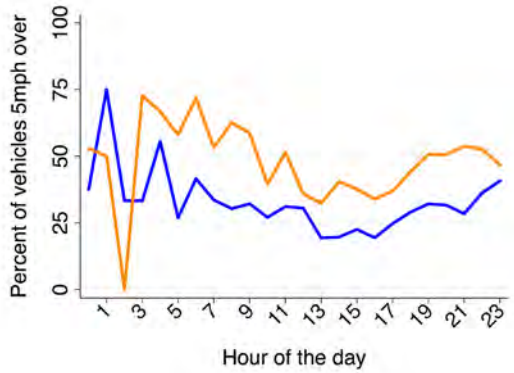
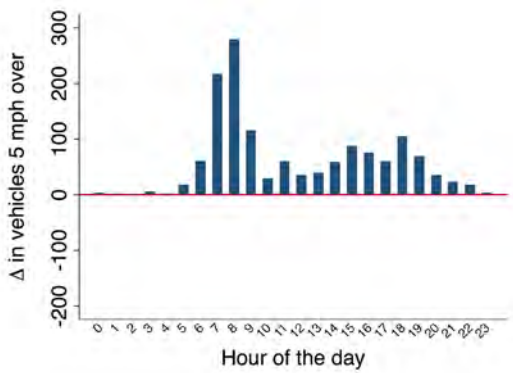
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 3: Paula, west of Lincoln		
		
Location 4: Pedro, west of Lincoln		
		

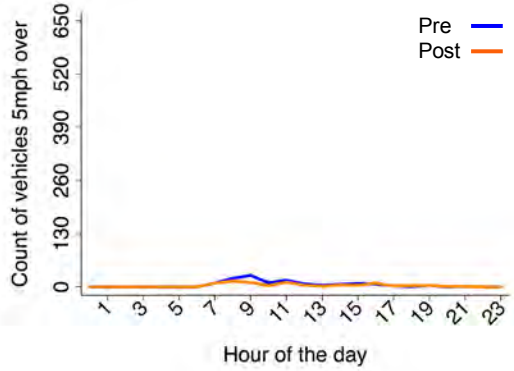
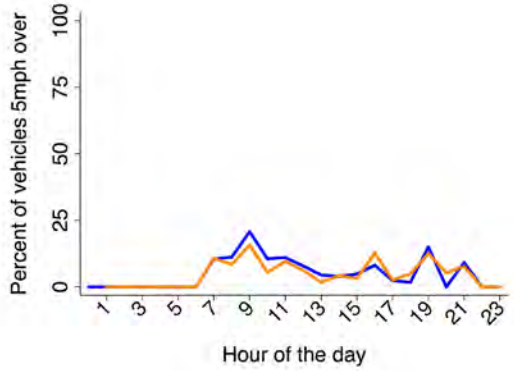
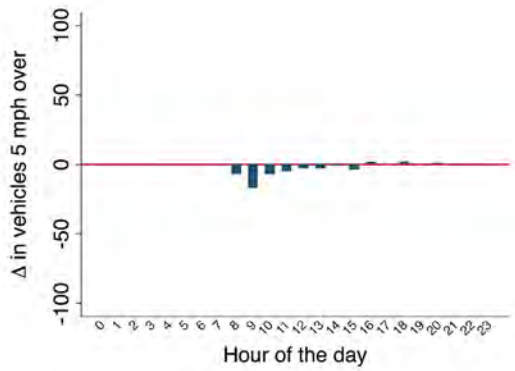
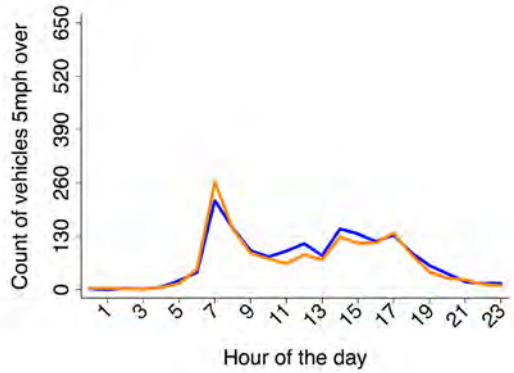
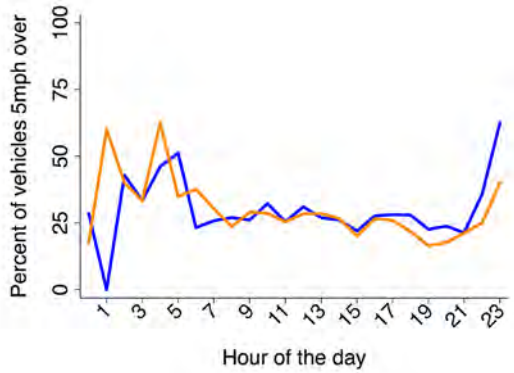
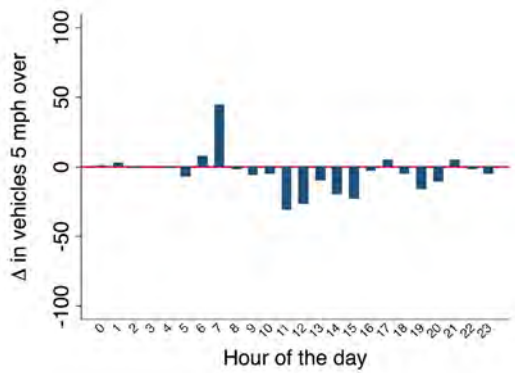
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 5: Glen Eyrie, west of Lincoln		
		
Location 7: Lester, west of Lincoln		
		

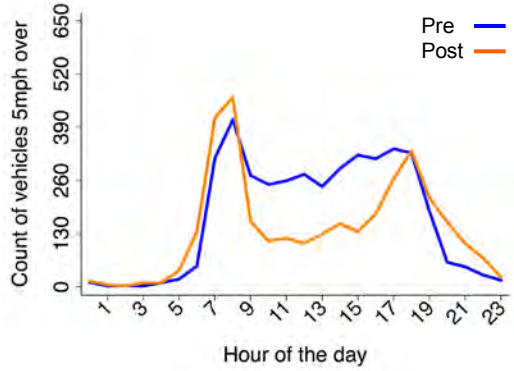
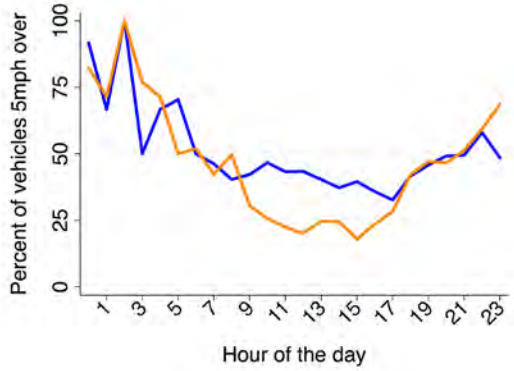
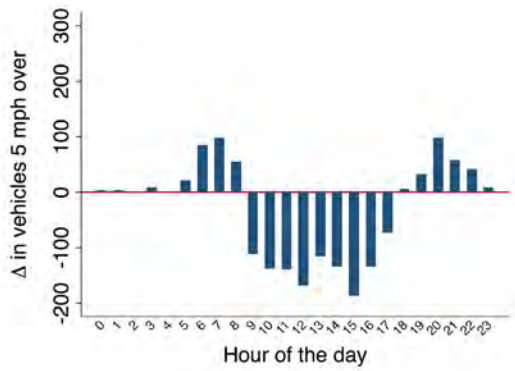
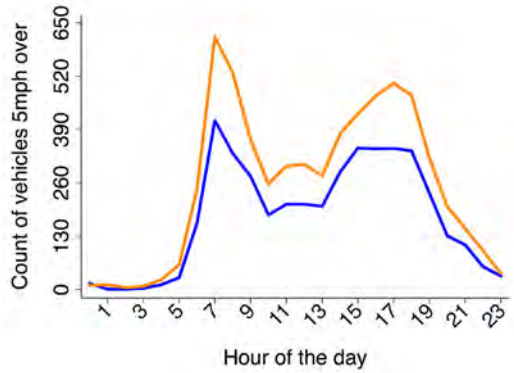
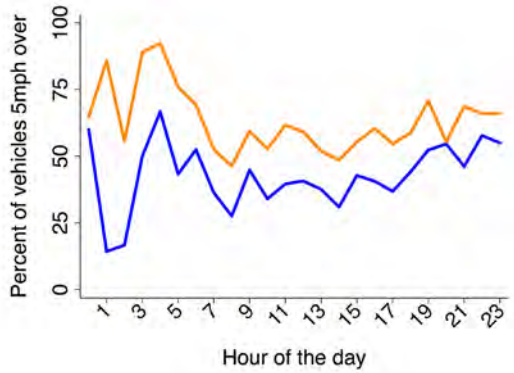
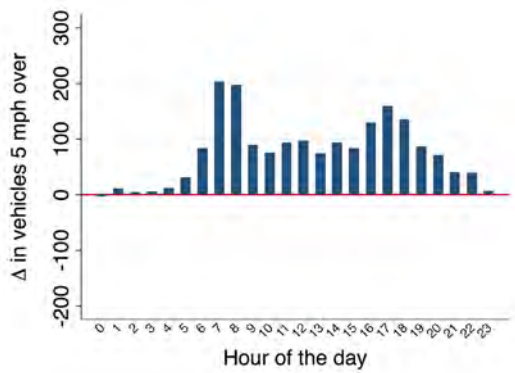
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 8: Garfield, west of Lincoln		
		
Location 9: El Abra, West of Lincoln		
		

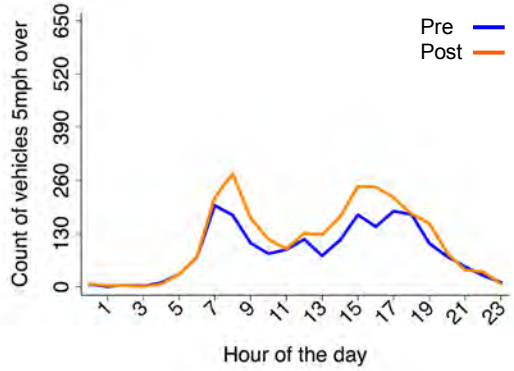
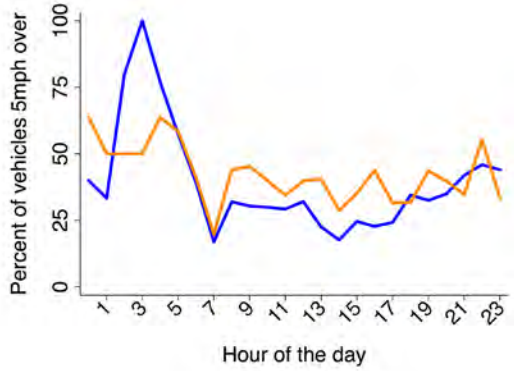
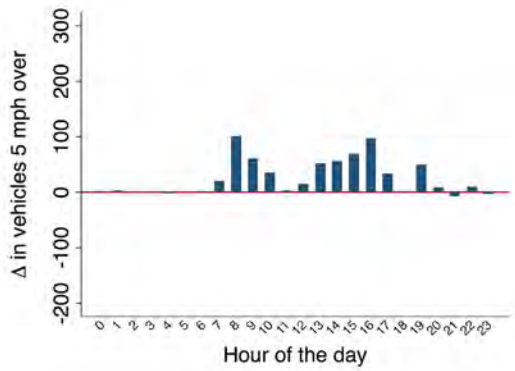
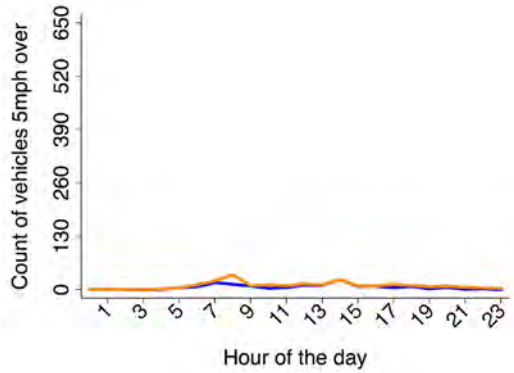
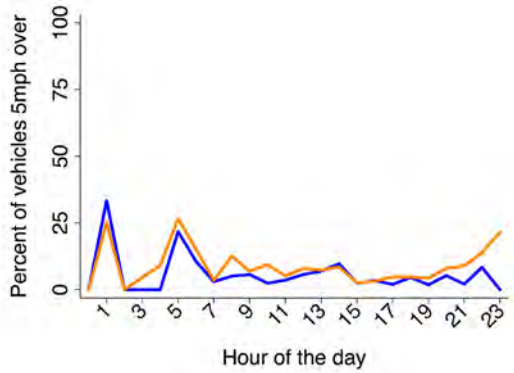
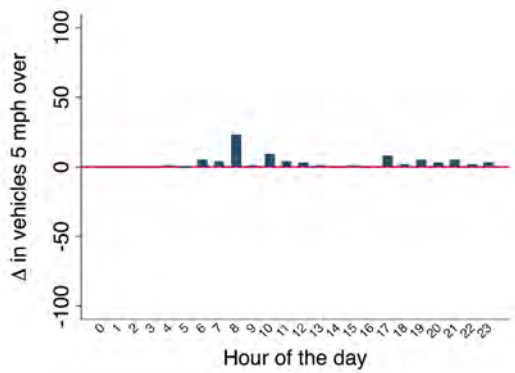
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 15: Curtiss, south of Willow		
		
Location 16: Kotenburg, south of Willow		
		

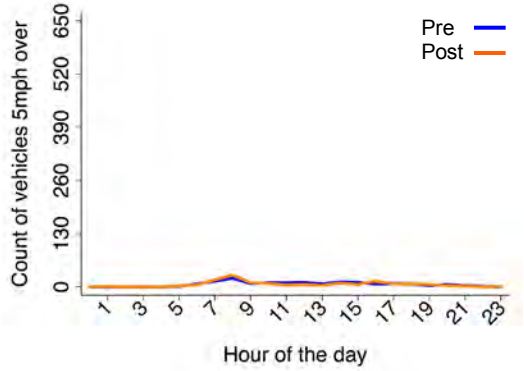
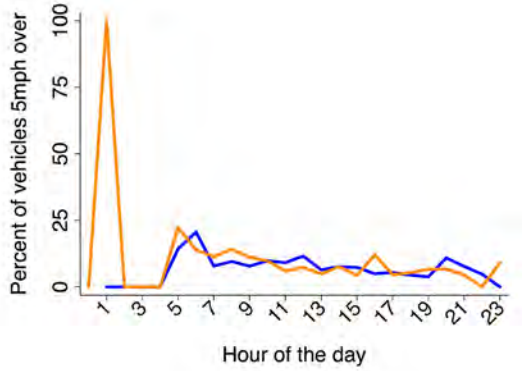
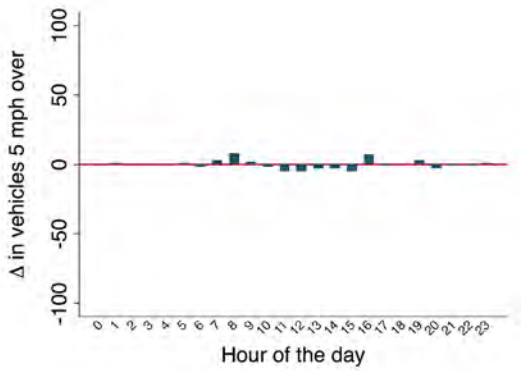
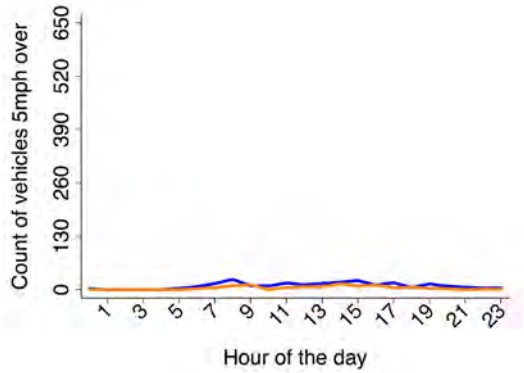
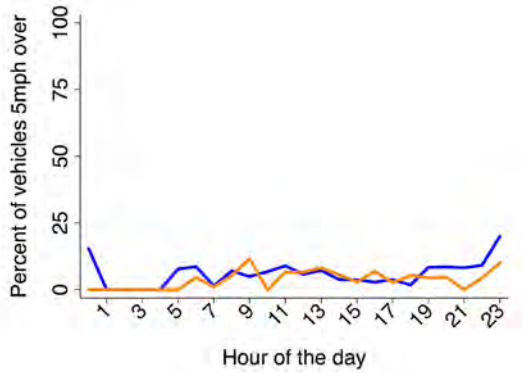
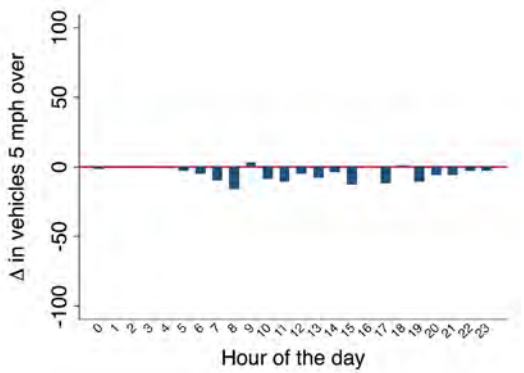
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 17: Settle, south of Willow		
		
Location 18: Blewett, south of Willow		
		

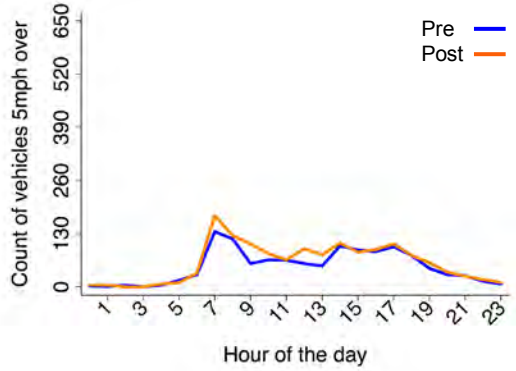
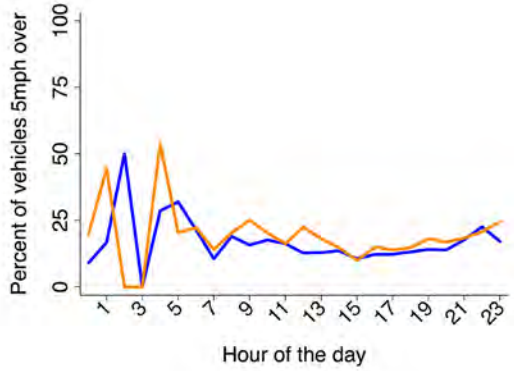
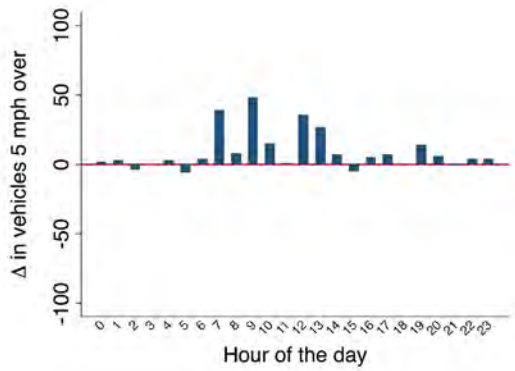
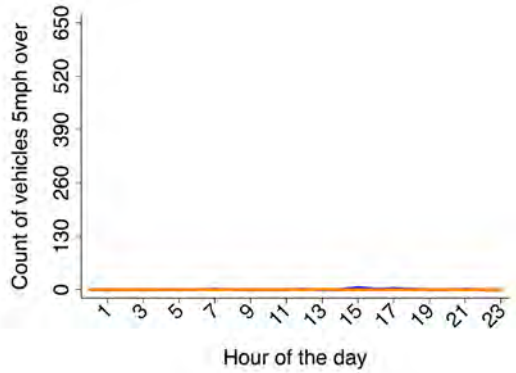
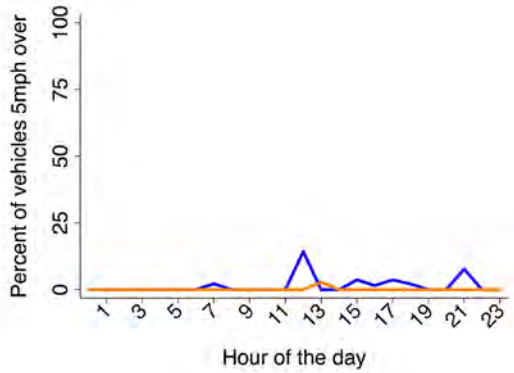
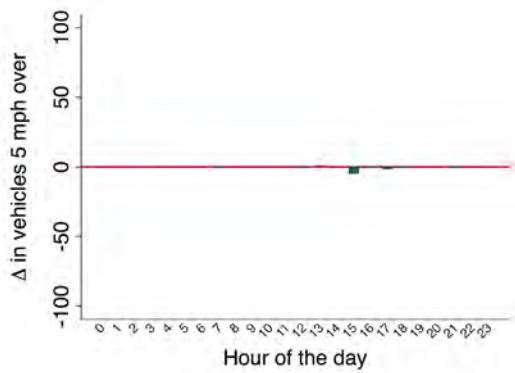
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 20: Brace, east of Coolidge		
		
Location 21: Camino Ramon, south of Willow		
		

Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 24: Iris, south of Minnesota		
		
Location 26: Newport, south of Minnesota		
		

Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 27: Hicks, south of Cherry Valley		
		
Location 28: Hicks, south of Callecita		
		

Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 29: Cottle, south of Pine		
		
Location 30: Newport, south of Fairview		
		

Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 33: Willow Glen, west of Hill		
		
Location 38: Malone, west of Lincoln		
		

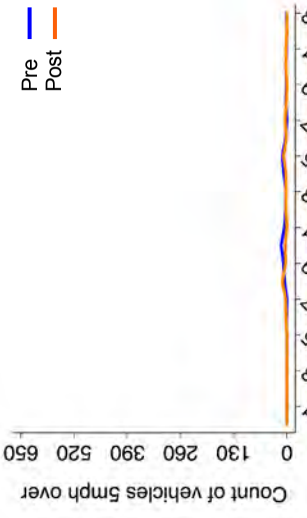
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 5mph+ over posted speed limit, by hour
Location 39: Malone, east of Harmil		
		
Location 43: Michigan, east of Lincoln		
		

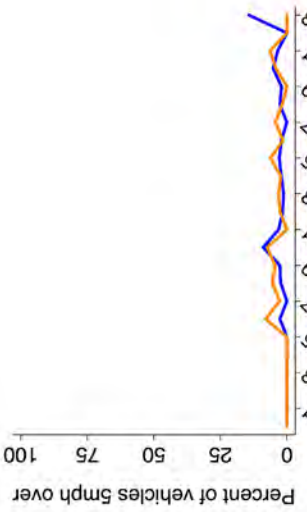
Total number of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour

Percent of vehicles traveling 5mph+ over posted speed limit, before-and-after the road diet, by hour

Change in number of vehicles travelling 5mph+ over posted speed limit, by hour

Location 44: California, east of Lincoln

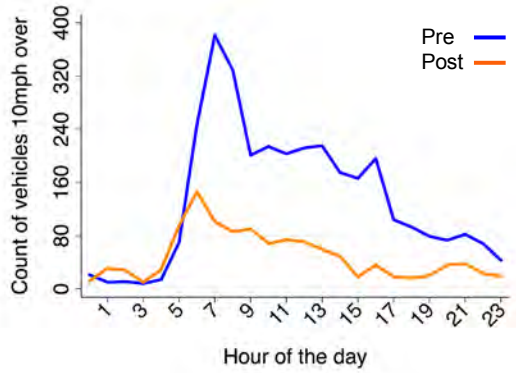
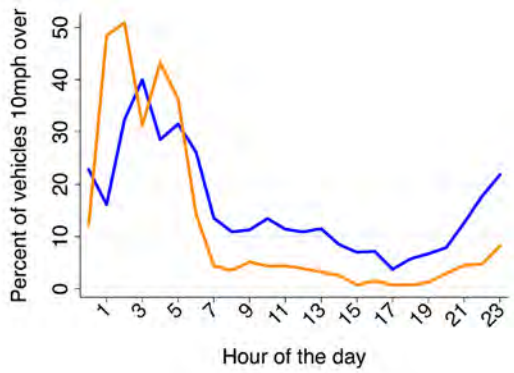
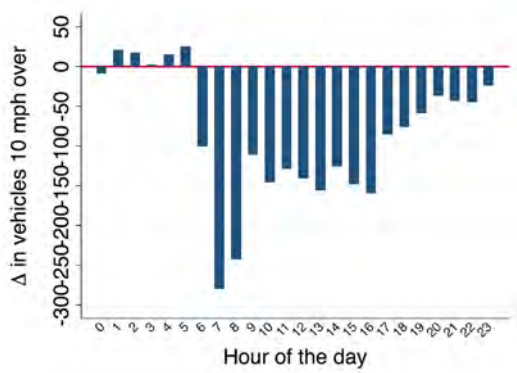
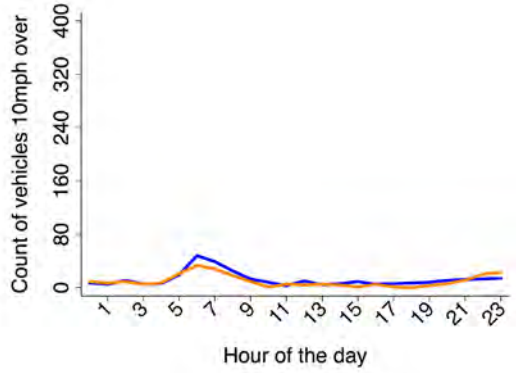
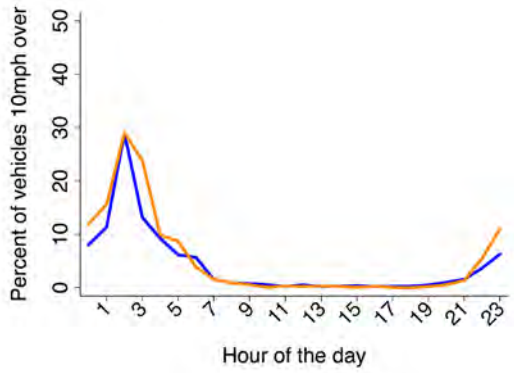
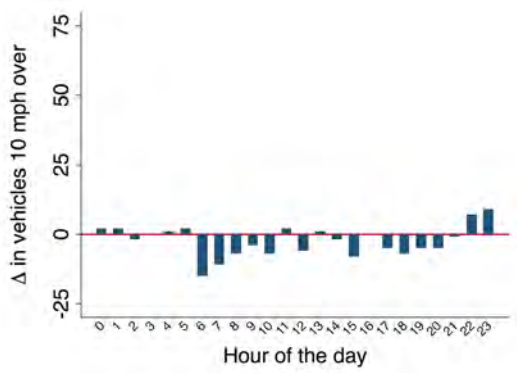




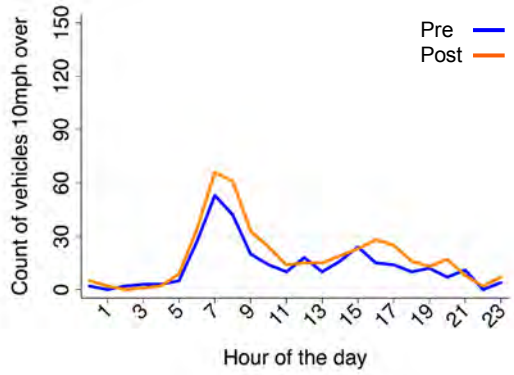
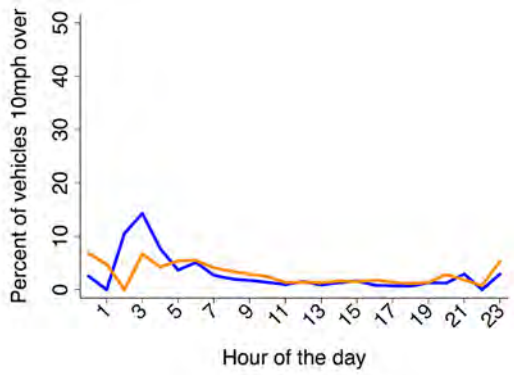
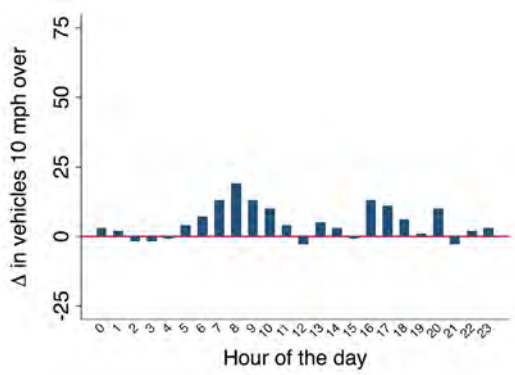
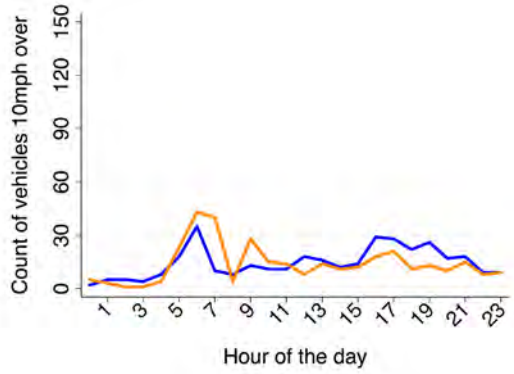
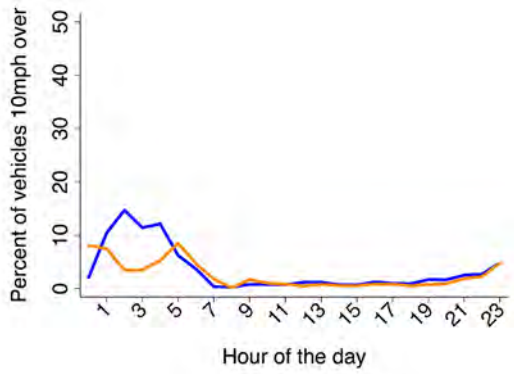
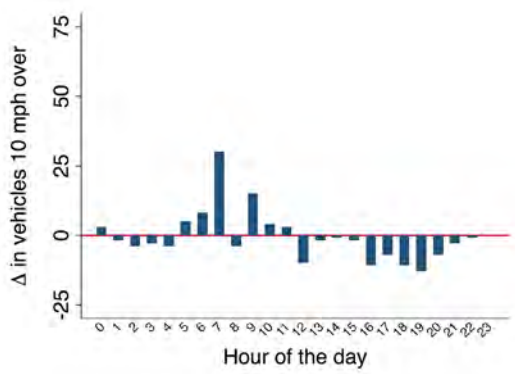


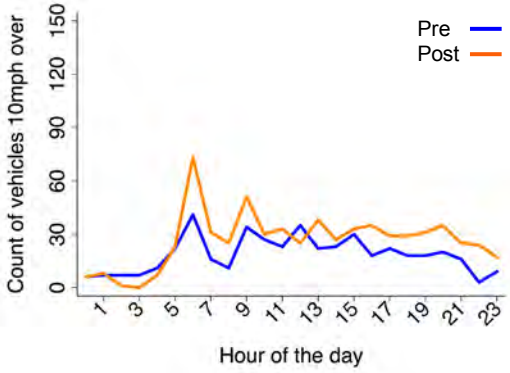
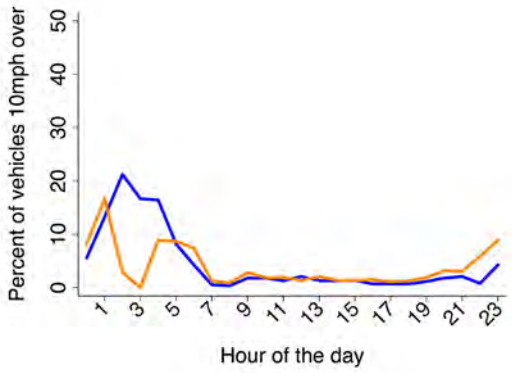
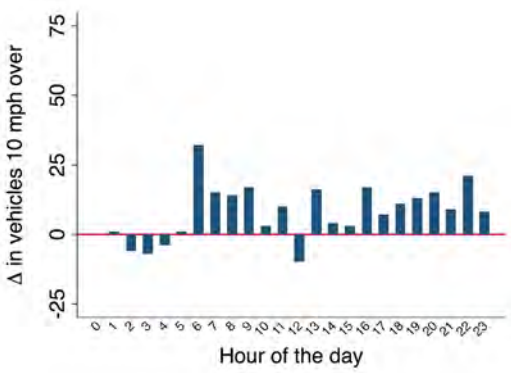
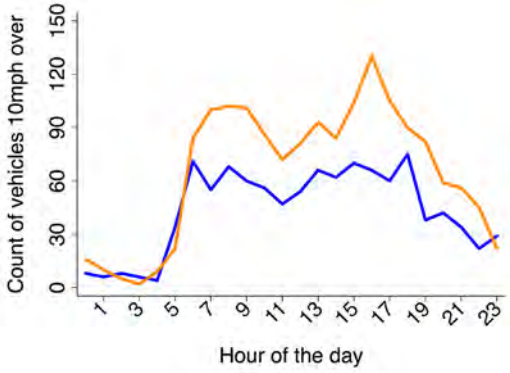
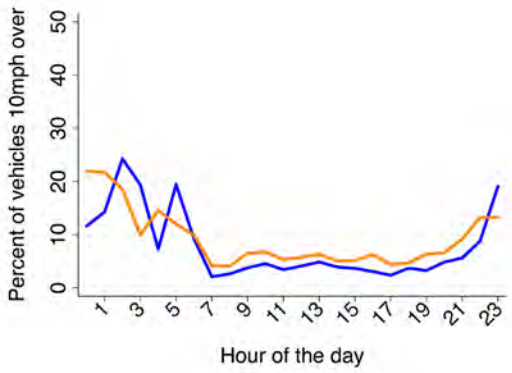
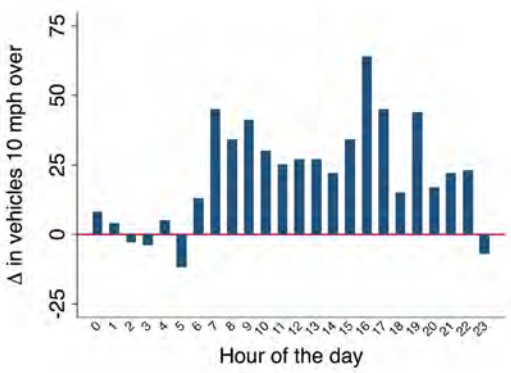
10 MPH+ OVER THE SPEED LIMIT GRAPHS

Lincoln Avenue Road Diet Location Graphs: Before-and-after the road diet – total number of vehicles traveling 10mph+ over posted speed limit, percent of vehicles traveling 10mph+ over posted speed limit, and change in number of vehicles travelling 10mph+ over posted speed limit.

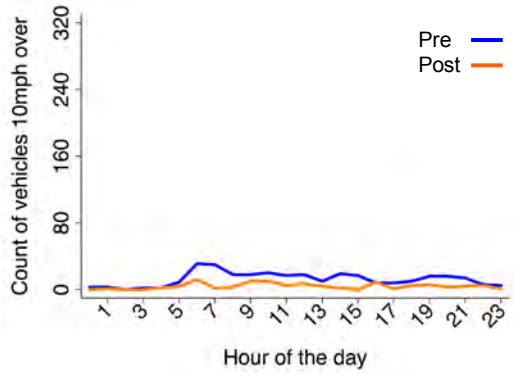
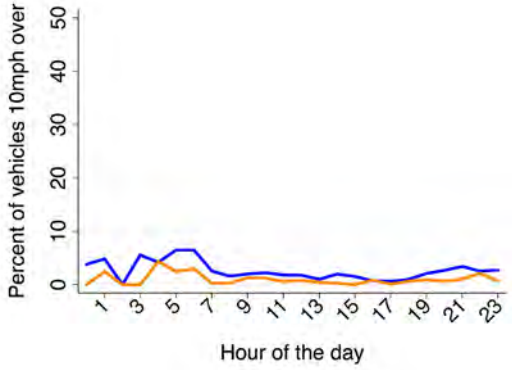
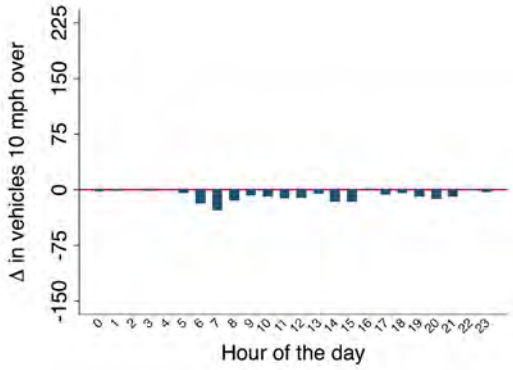
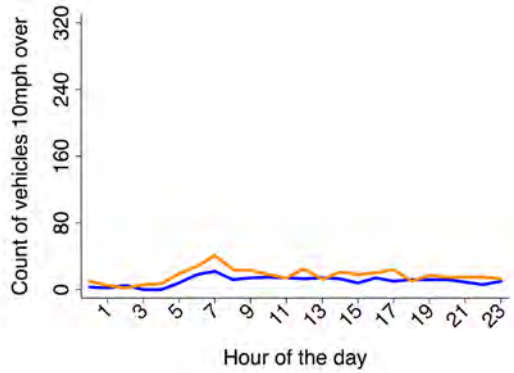
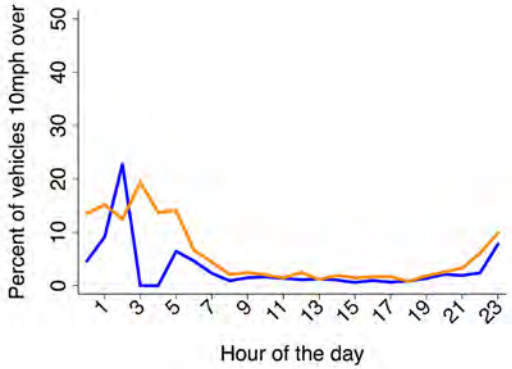
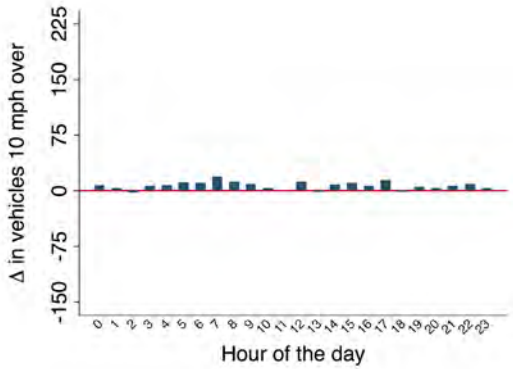
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 6: Lincoln, south of Glen Eyrie		
		
Location 19: Lincoln, south of Meredith		
		

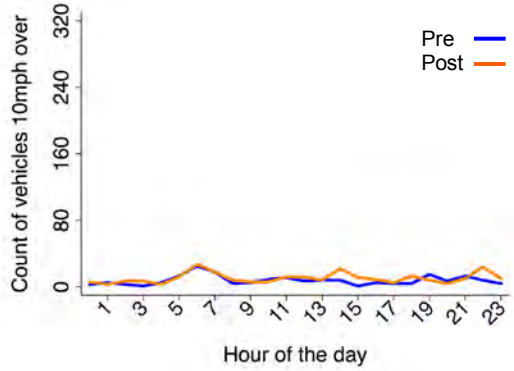
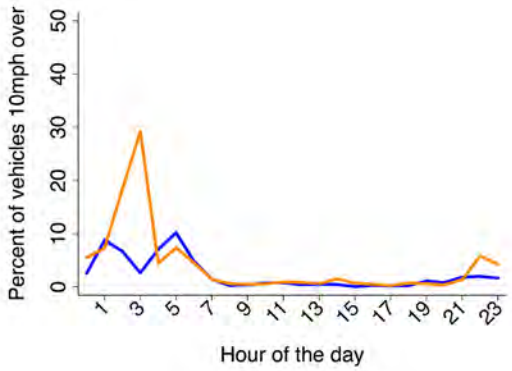
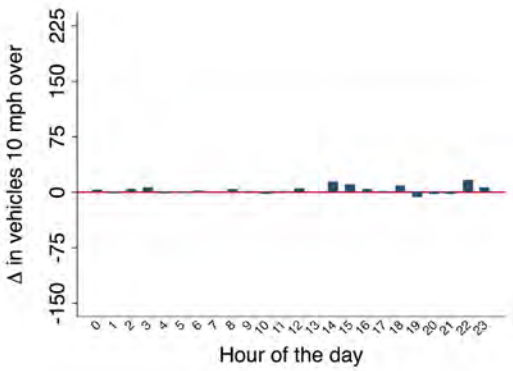
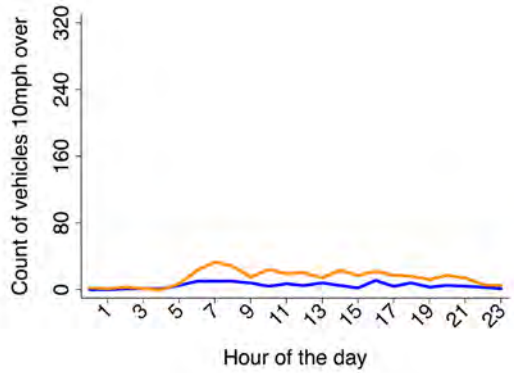
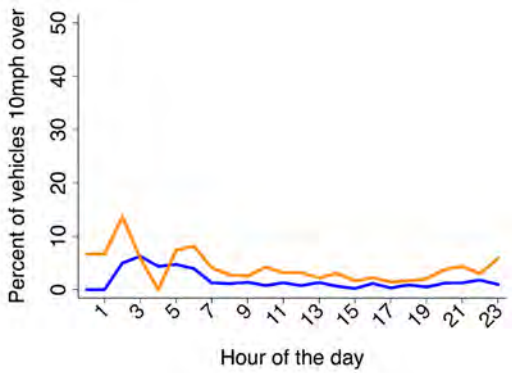
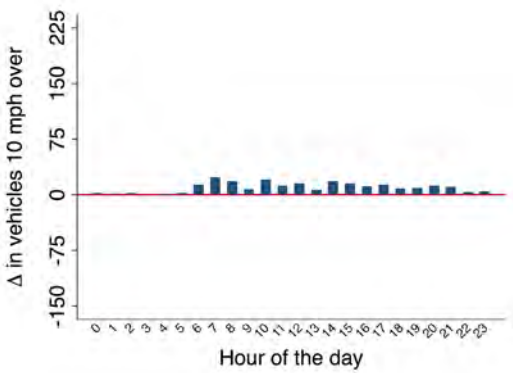
Lincoln Avenue Non-Road Diet Location Graphs: Before-and-after the road diet – total number of vehicles traveling 10mph+ over posted speed limit, percent of vehicles traveling 10mph+ over posted speed limit, and change in number of vehicles travelling 10mph+ over posted speed limit.

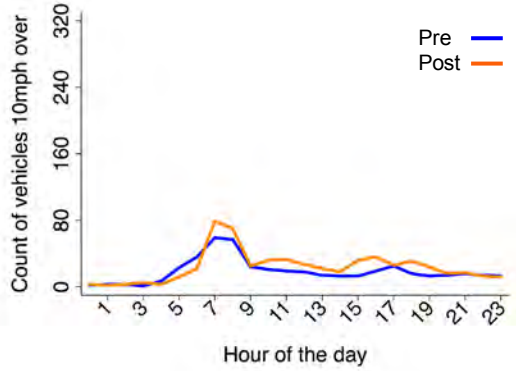
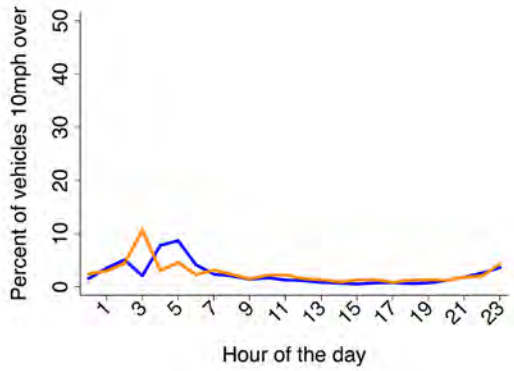
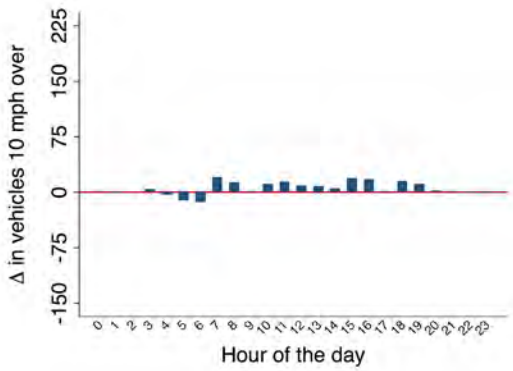
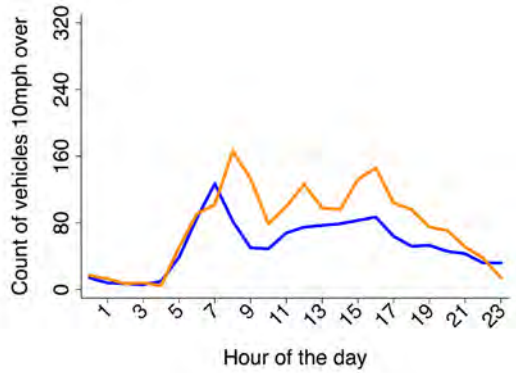
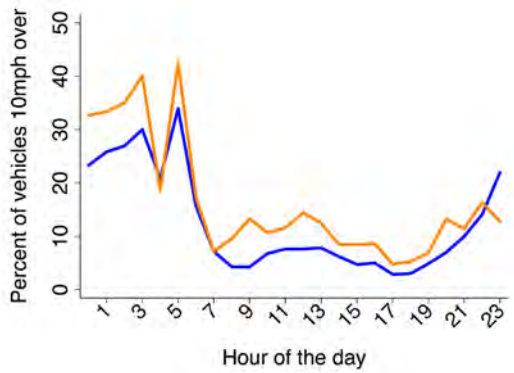
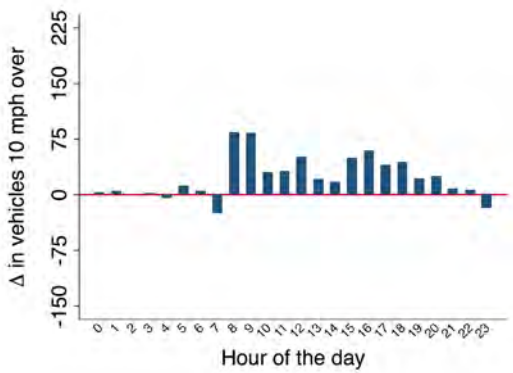
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 1: Lincoln, north of Parkmoor		
		
Location 32: Lincoln, south of Nevada		
		

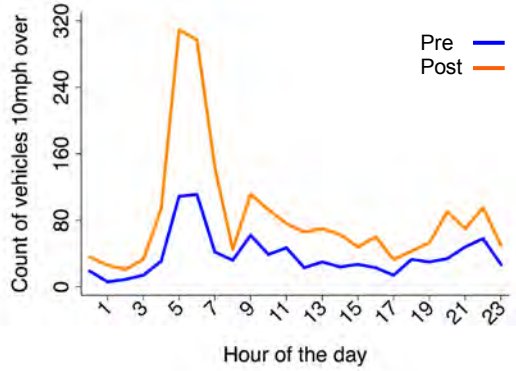
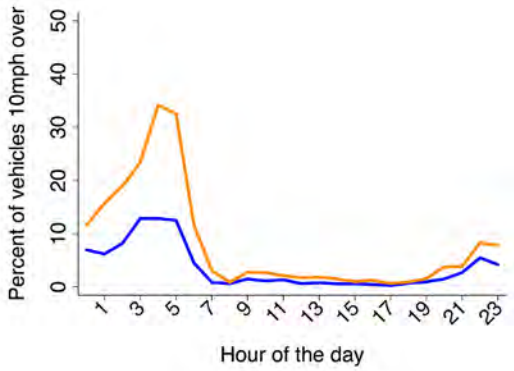
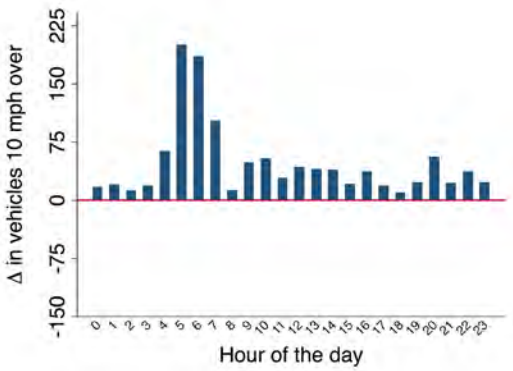
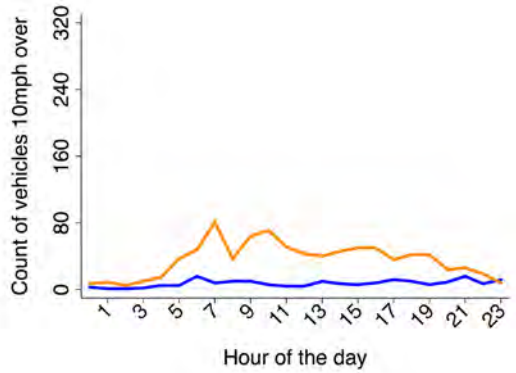
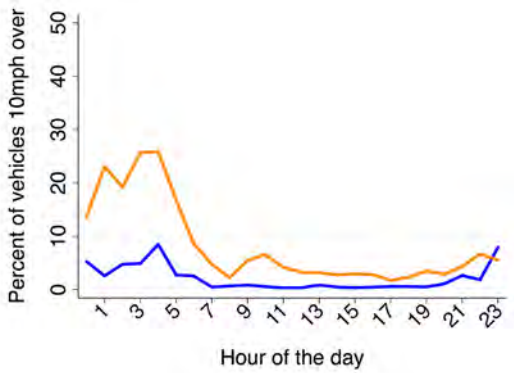
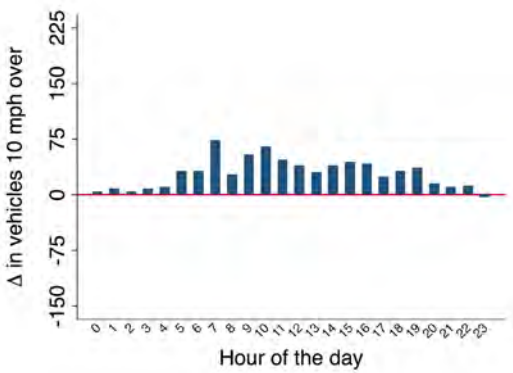
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 36: Lincoln, south of Clark		
		
Location 37: Lincoln, south of Curtner		
		

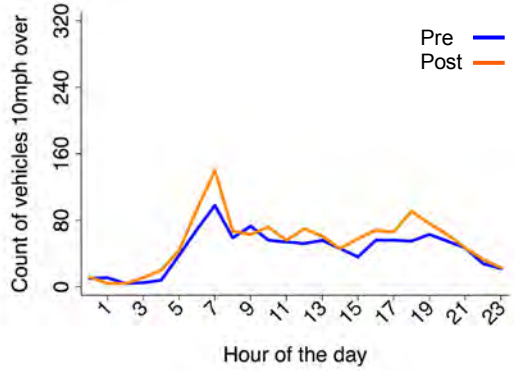
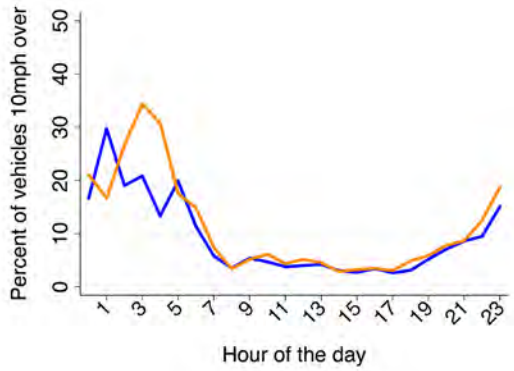
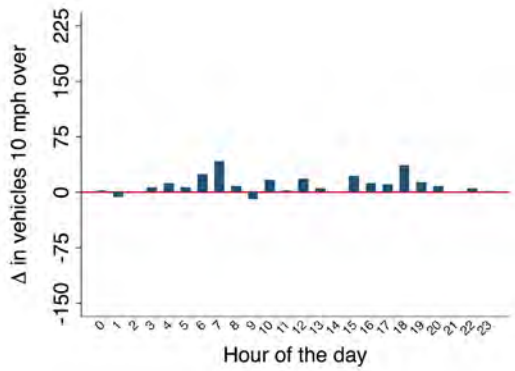
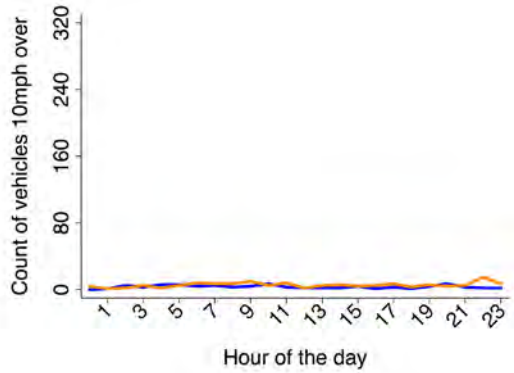
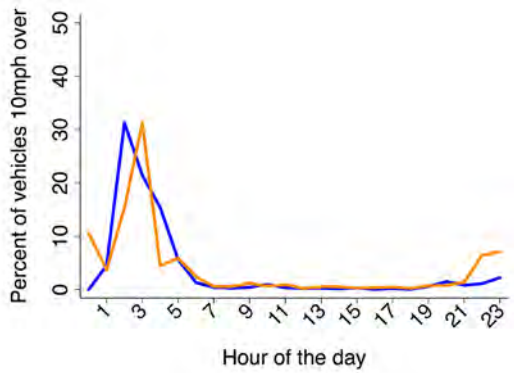
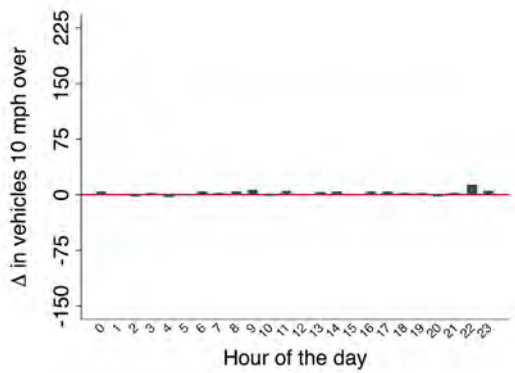
Major Streets Location Graphs: Before-and-after the road diet – total number of vehicles traveling 10mph+ over posted speed limit, percent of vehicles traveling 10mph+ over posted speed limit, and change in number of vehicles travelling 10mph+ over posted speed limit.

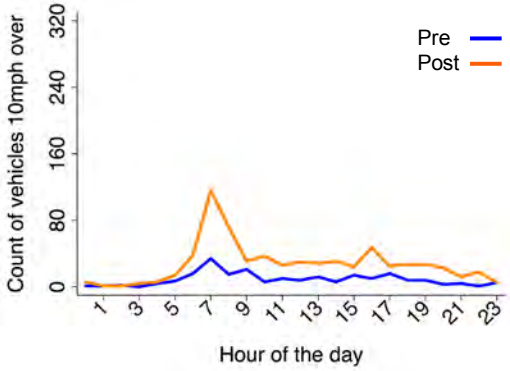
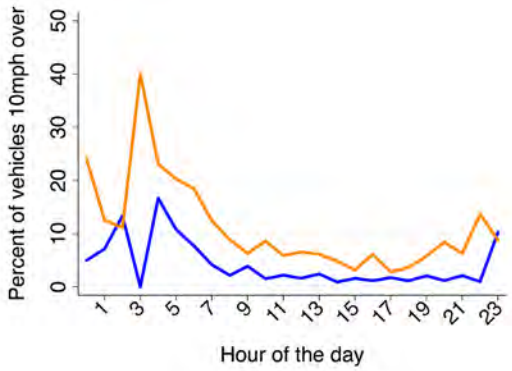
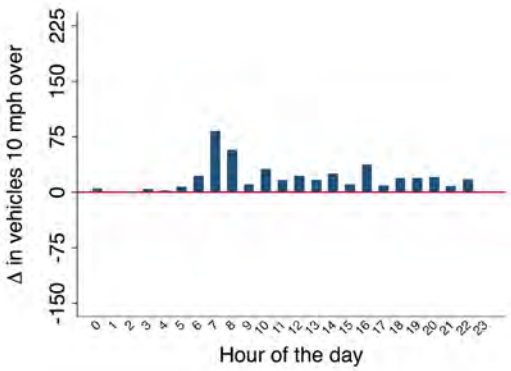
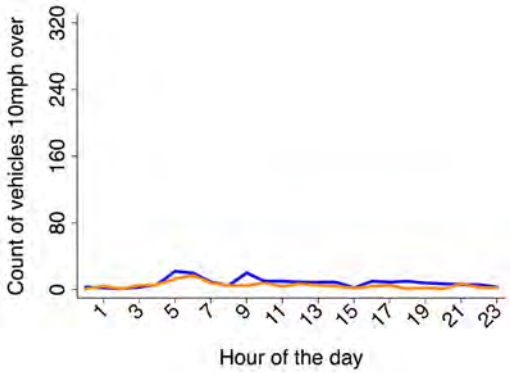
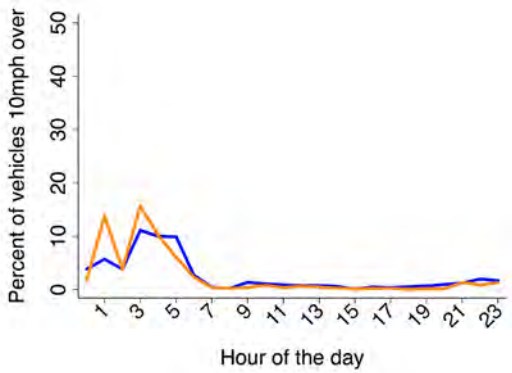
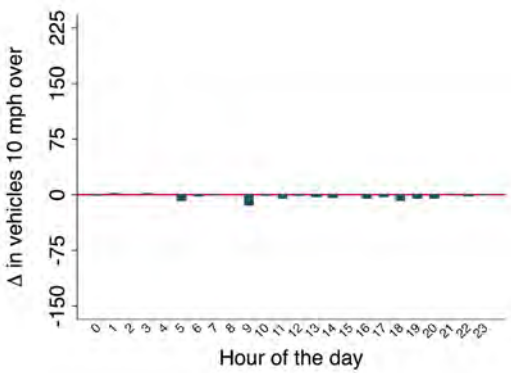
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 2: Lincoln, south of Glen Eyrie		
		
Location 10: Willow, west of Lincoln		
		

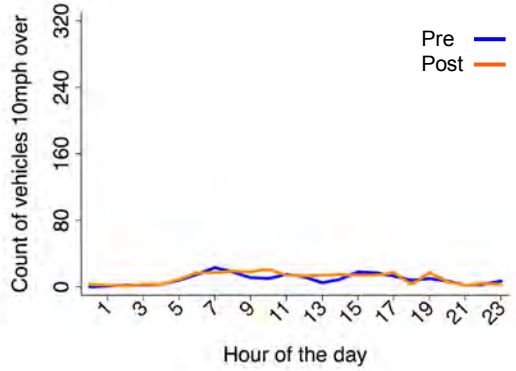
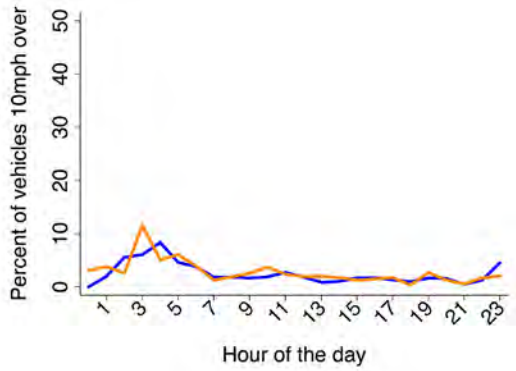
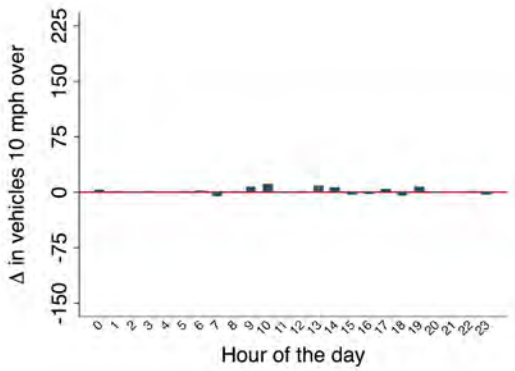
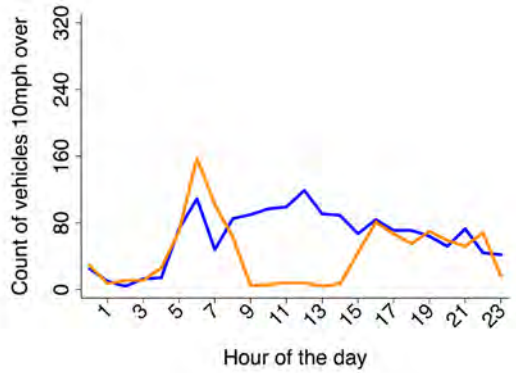
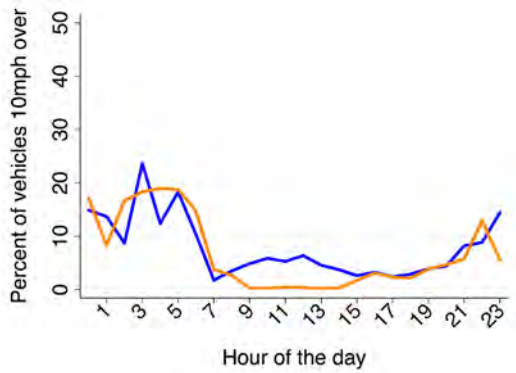
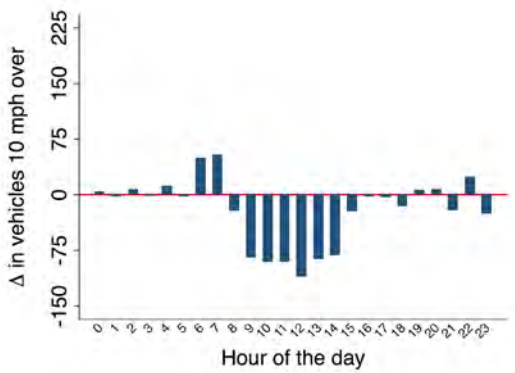
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 11: Willow, east of Lincoln		
		
Location 12: Coe, east of Riverside		
		

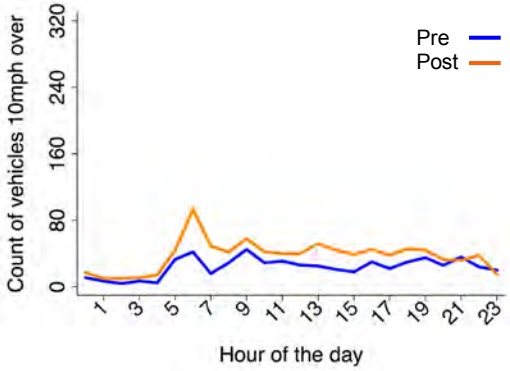
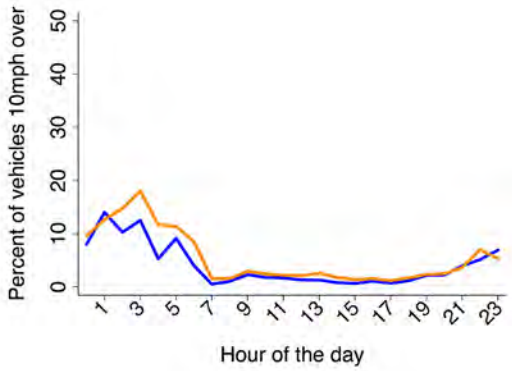
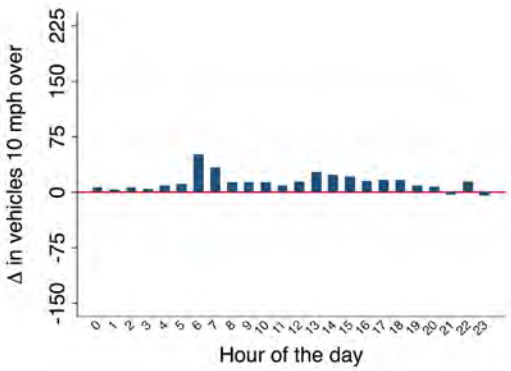
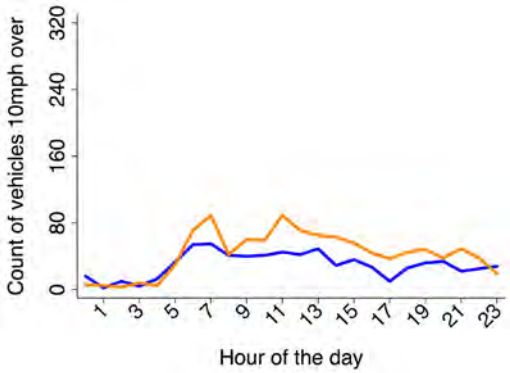
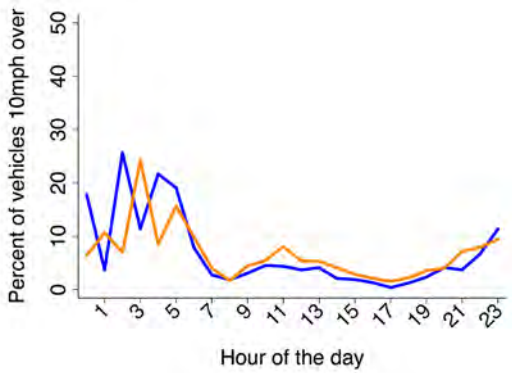
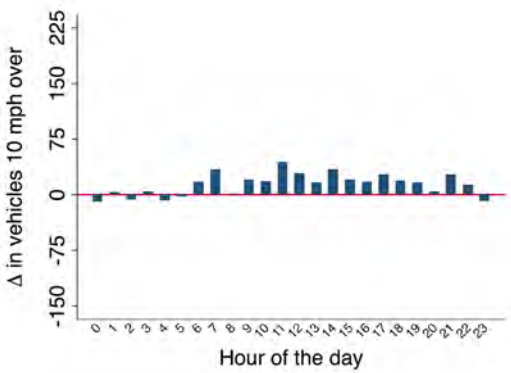
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 13: Bird, north of Coe		
		
Location 14: Bird, south of Willow		
		

Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 22: Meridian, north of Minnesota		
		
Location 23: Minnesota, east of Lincoln		
		

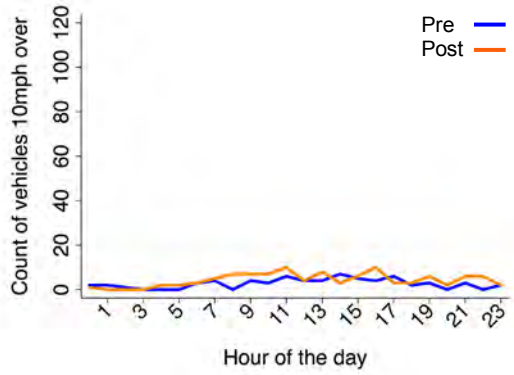
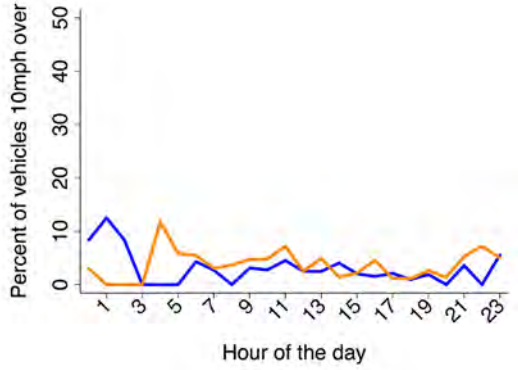
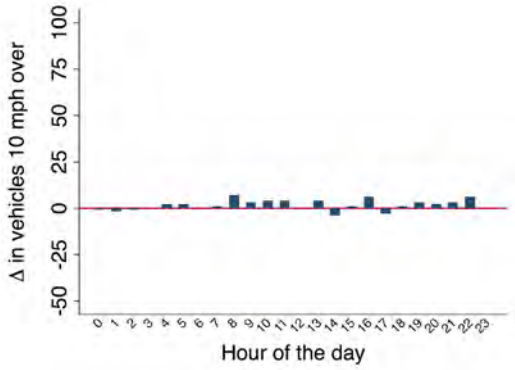
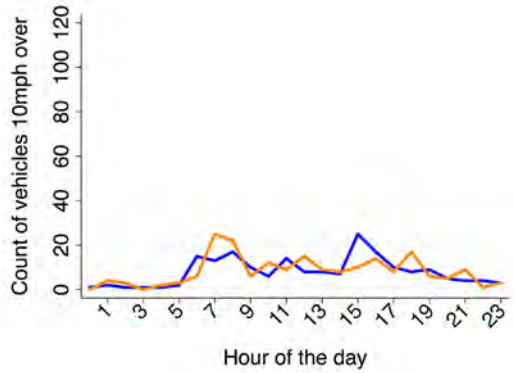
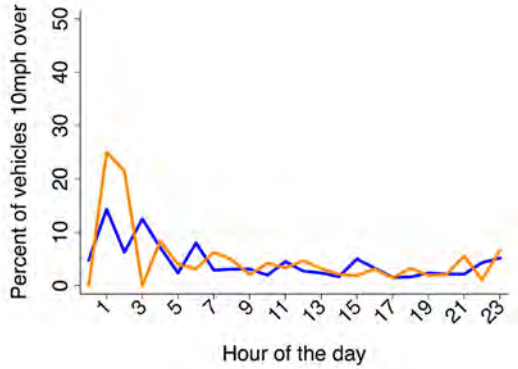
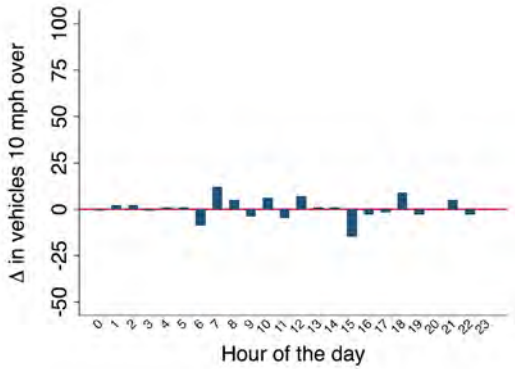
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 25: Minnesota, west of Lincoln		
		
Location 31: Pine, west of Lincoln		
		

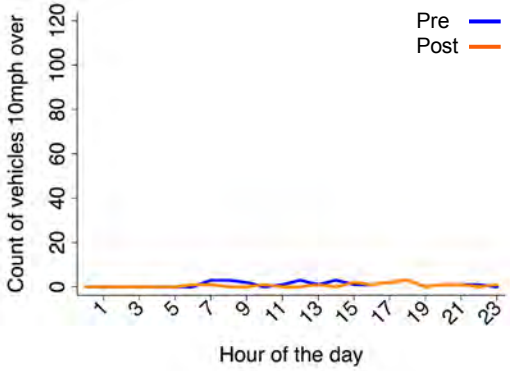
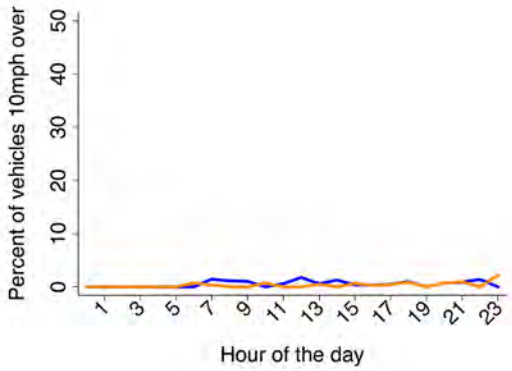
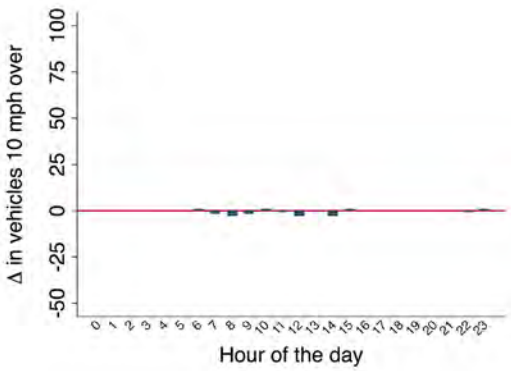
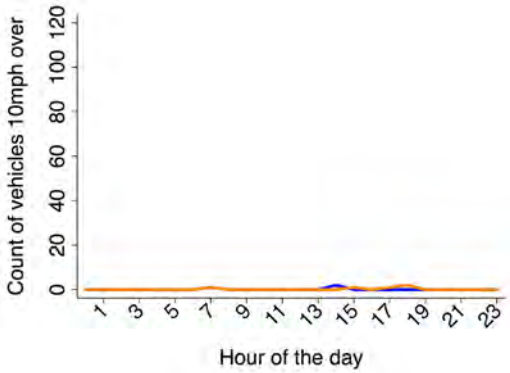
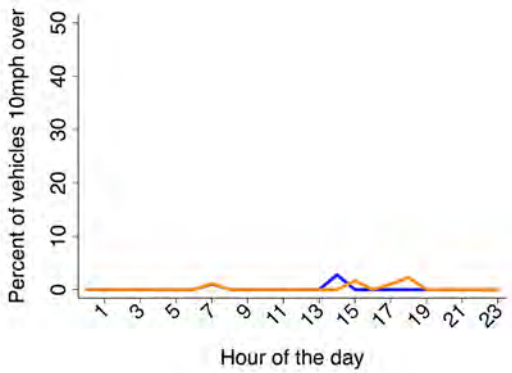
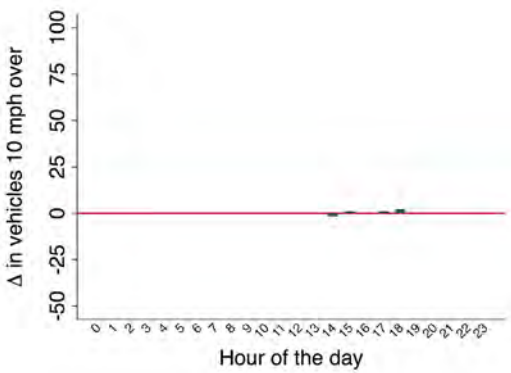
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 34: Pine, east of Lincoln		
		
Location 35: Bird, south of Willow Glen Way		
		

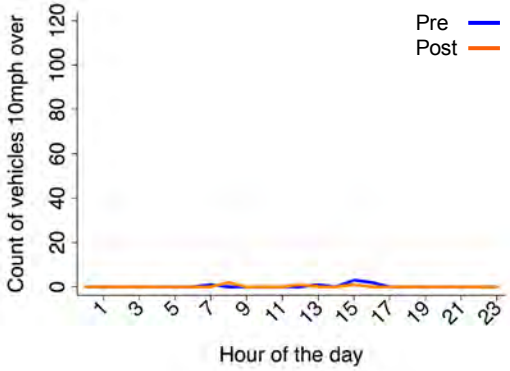
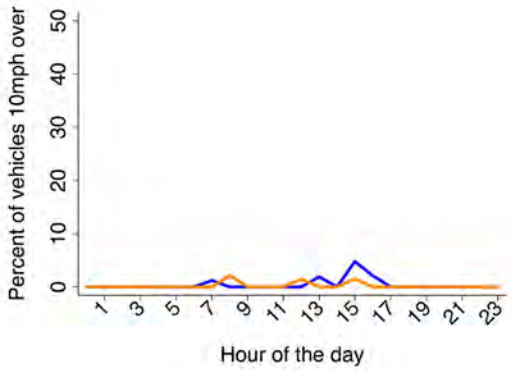
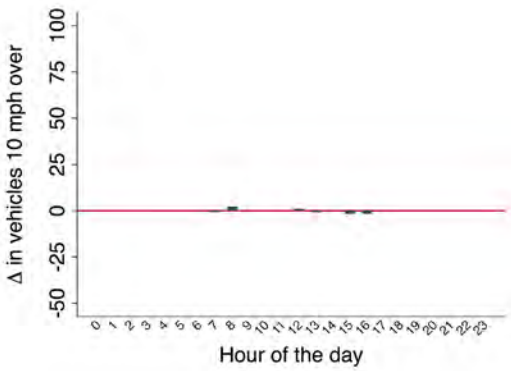
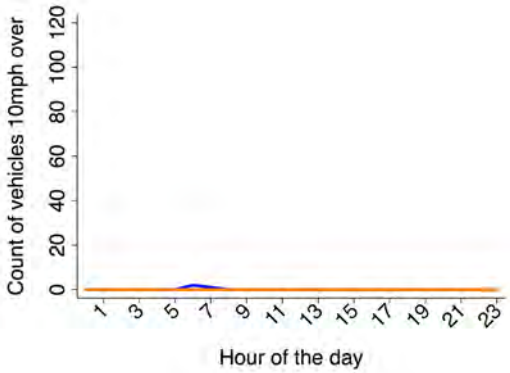
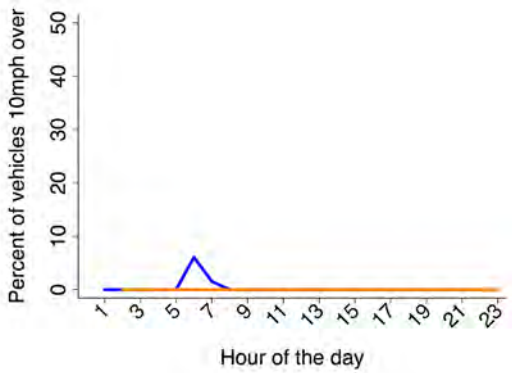
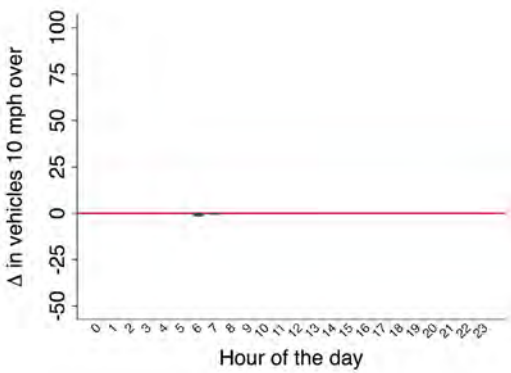
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 40: Almaden, north of Malone		
		
Location 41: Curtner, east of Lincoln		
		

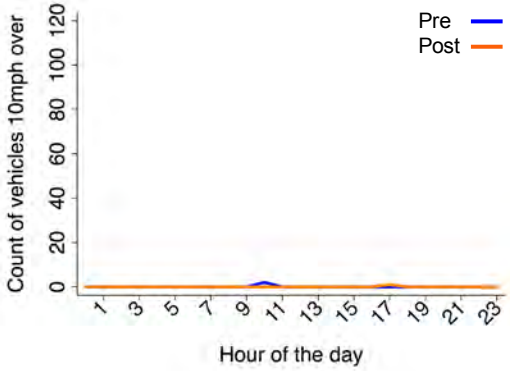
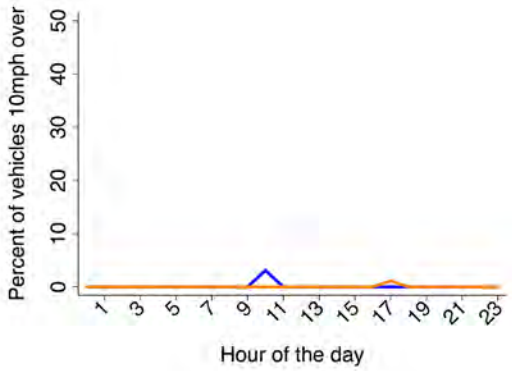
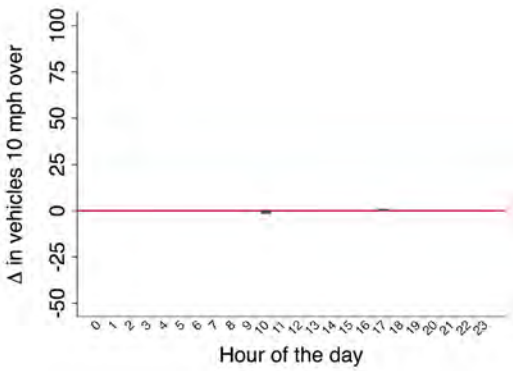
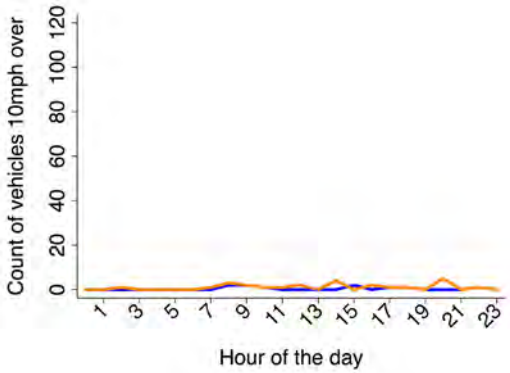
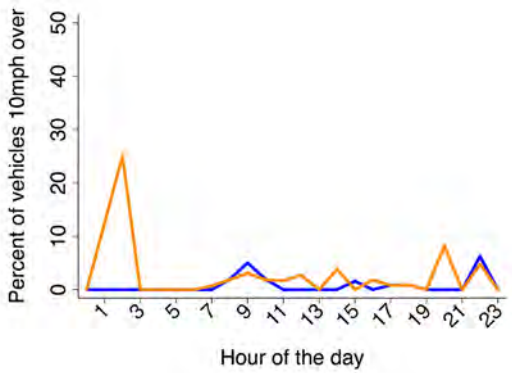
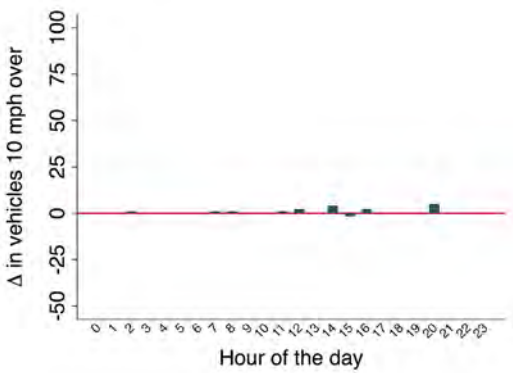
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 42: Curtner, west of Lincoln		
		
Location 45: Bird, north of Willow		
		

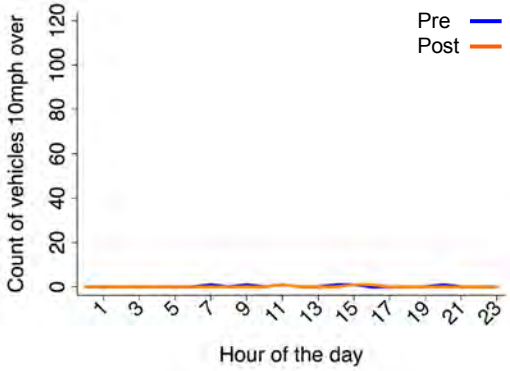
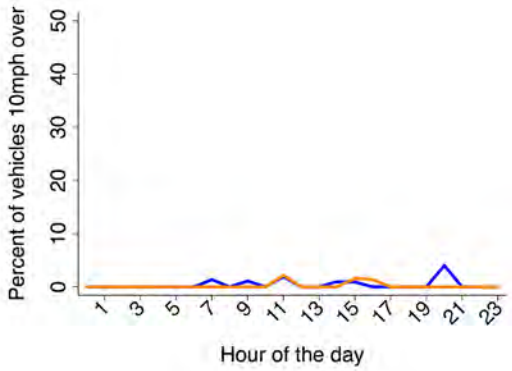
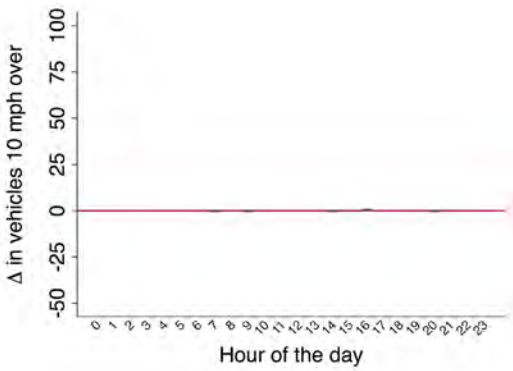
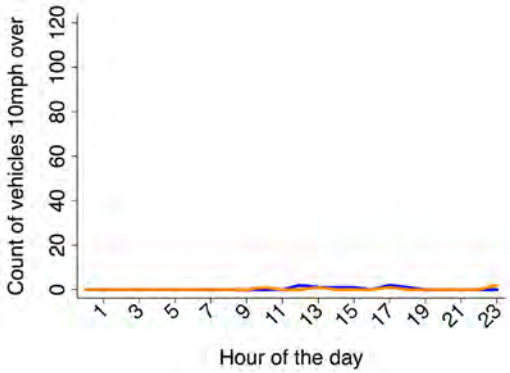
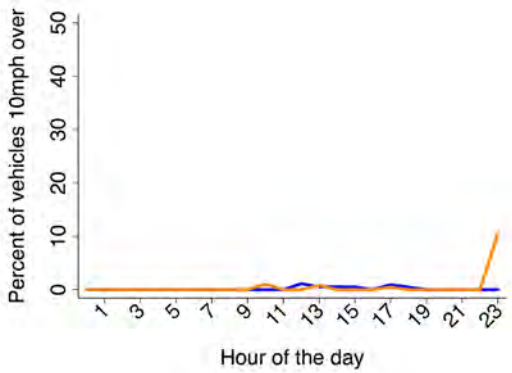
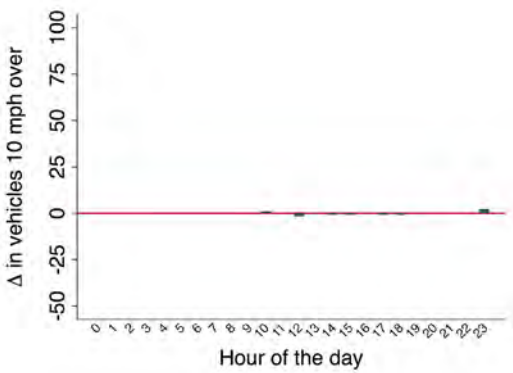
Neighborhood Streets Location Graphs: Before-and-after the road diet – total number of vehicles traveling 10mph+ over posted speed limit, percent of vehicles traveling 10mph+ over posted speed limit, and change in number of vehicles travelling 10mph+ over posted speed limit.

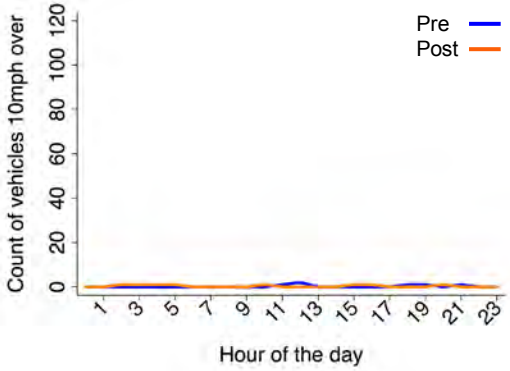
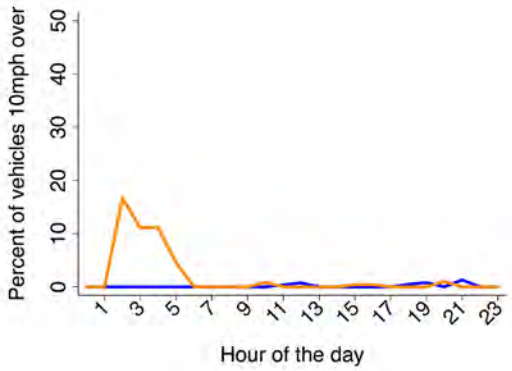
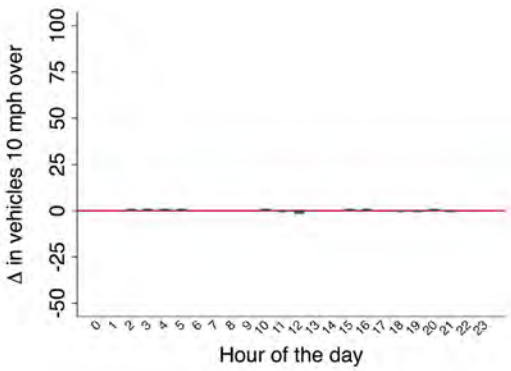
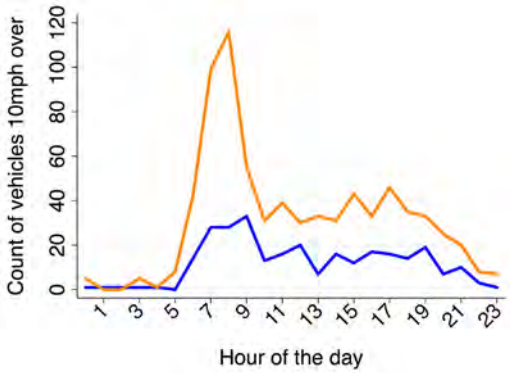
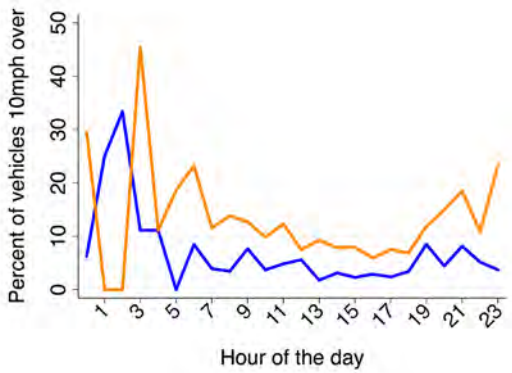
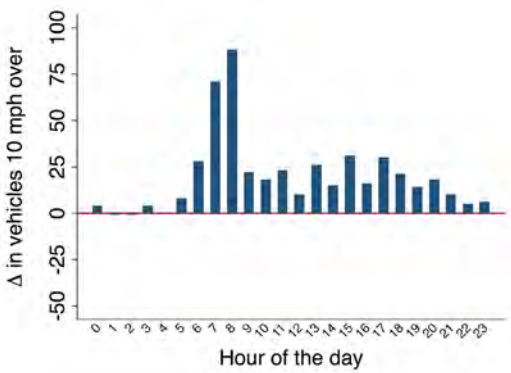
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 3: Paula, west of Lincoln		
		
Location 4: Pedro, west of Lincoln		
		

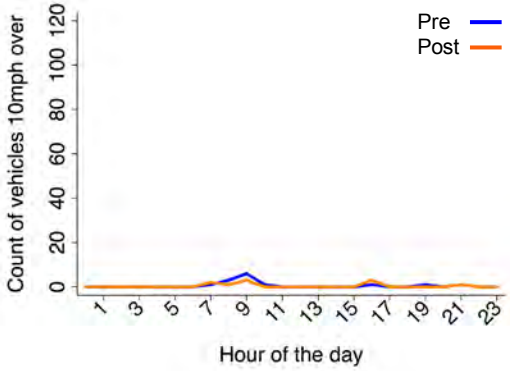
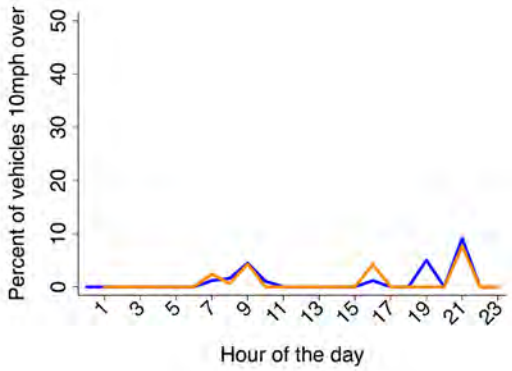
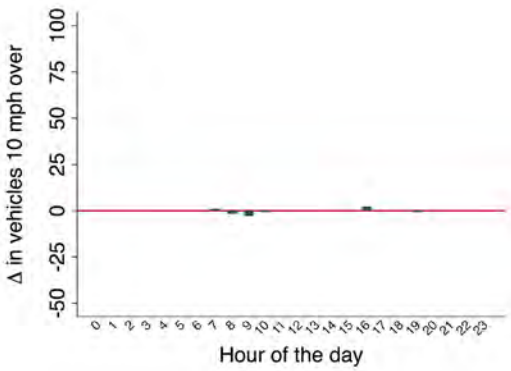
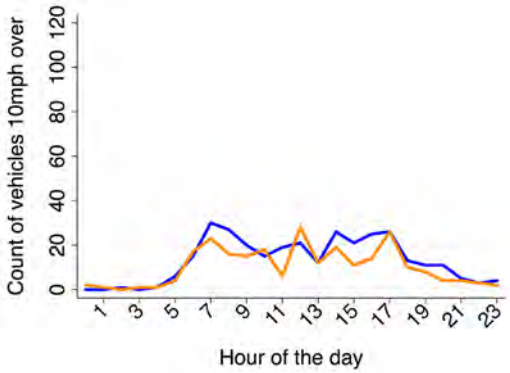
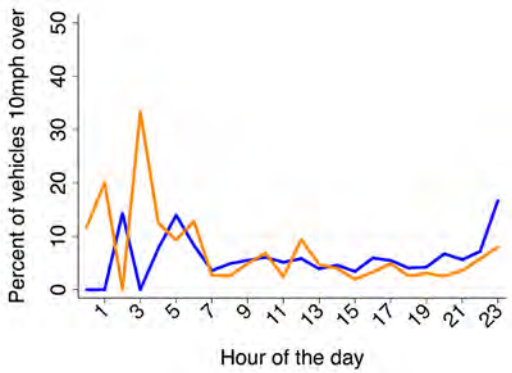
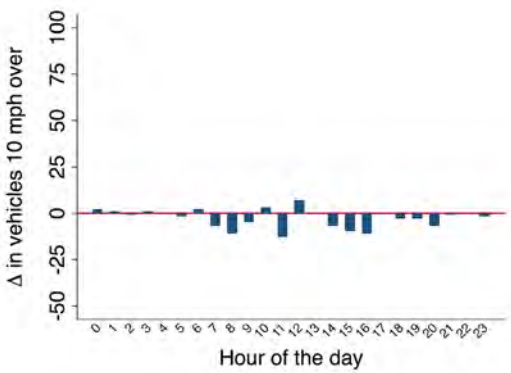
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 5: Glen Eyrie, west of Lincoln		
		
Location 7: Lester, west of Lincoln		
		

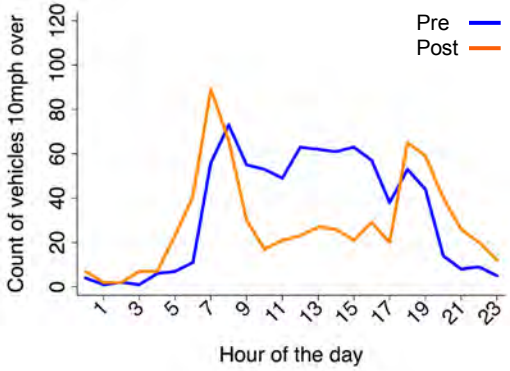
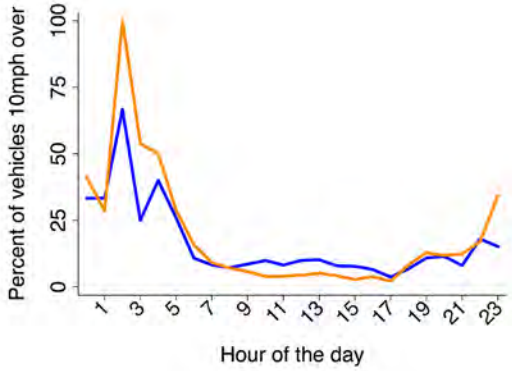
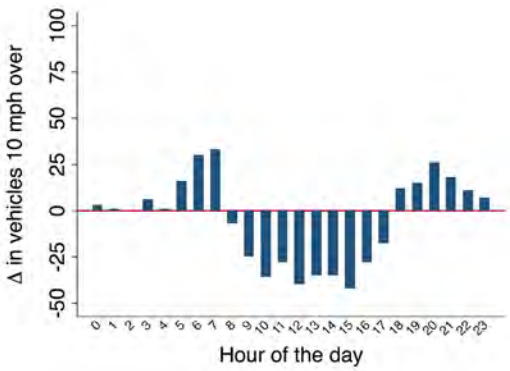
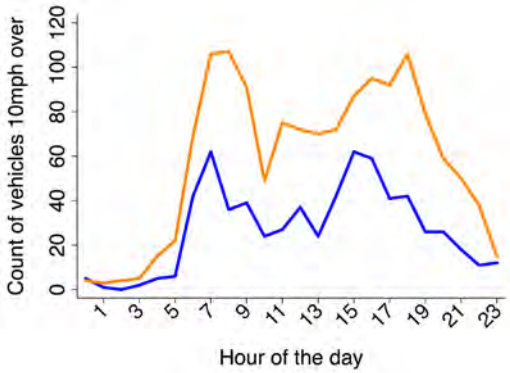
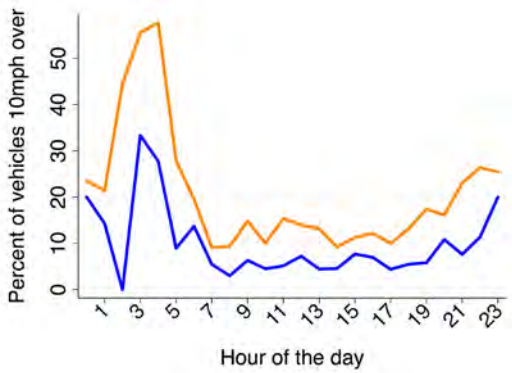
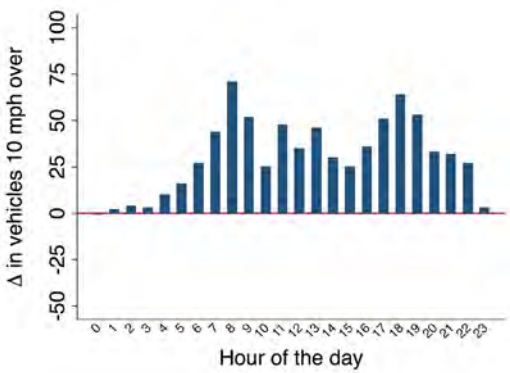
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 8: Garfield, west of Lincoln		
		
Location 9: El Abra, West of Lincoln		
		

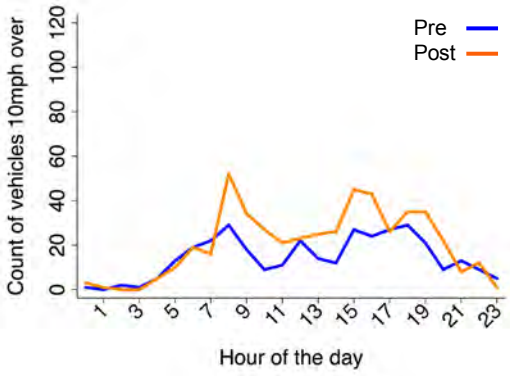
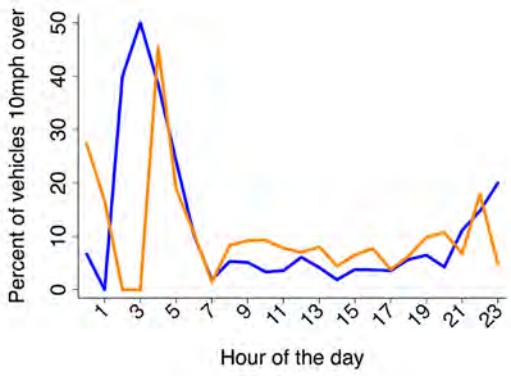
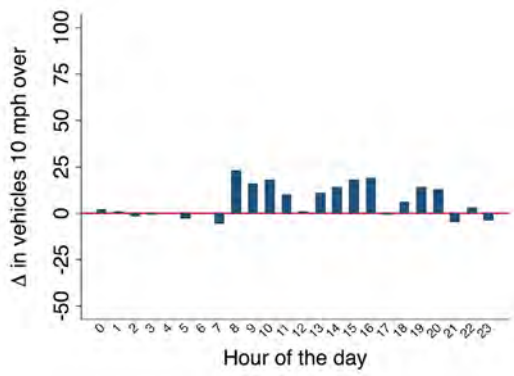
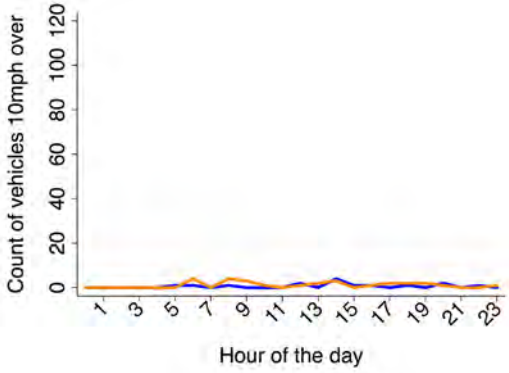
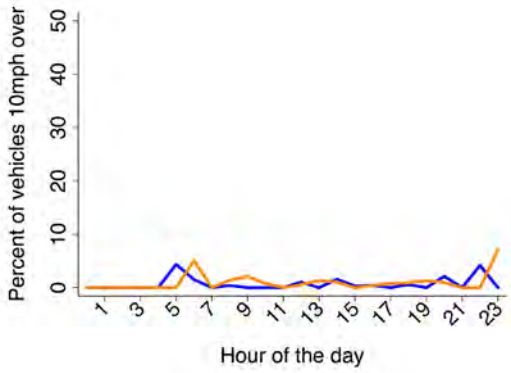
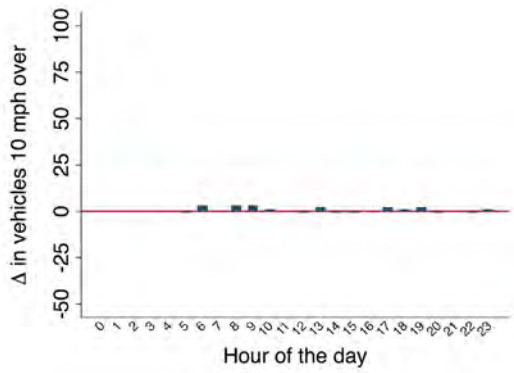
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 15: Curtiss, south of Willow		
		
Location 16: Kotenburg, south of Willow		
		

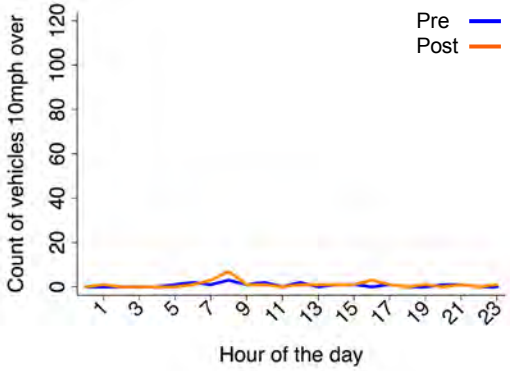
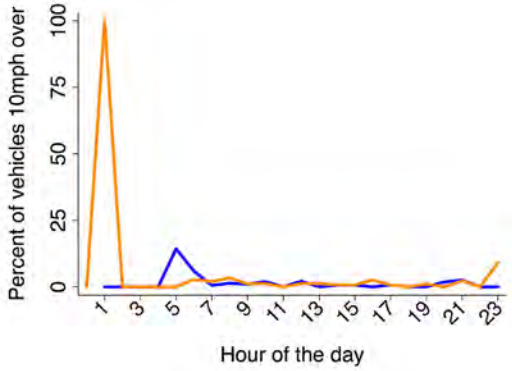
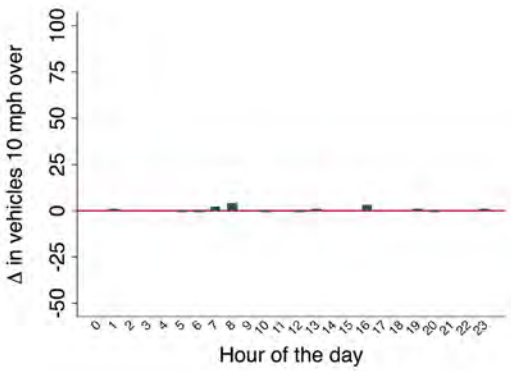
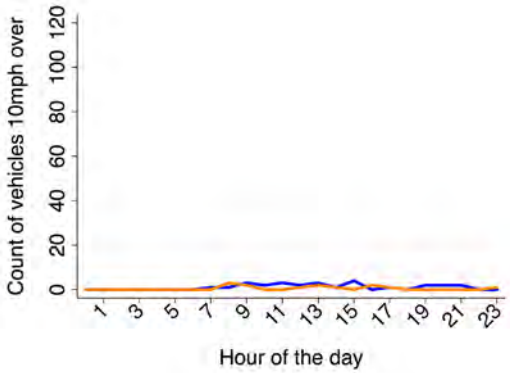
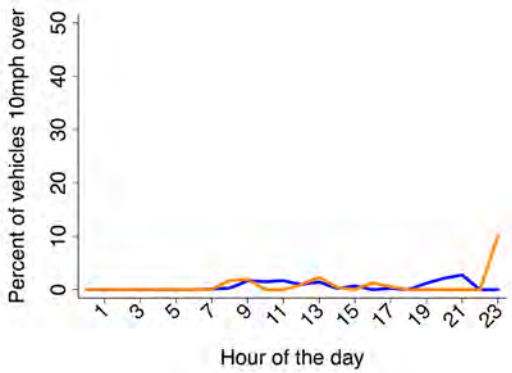
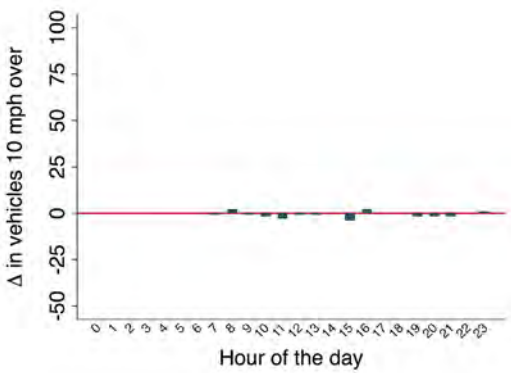
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 17: Settle, south of Willow		
		
Location 18: Blewett, south of Willow		
		

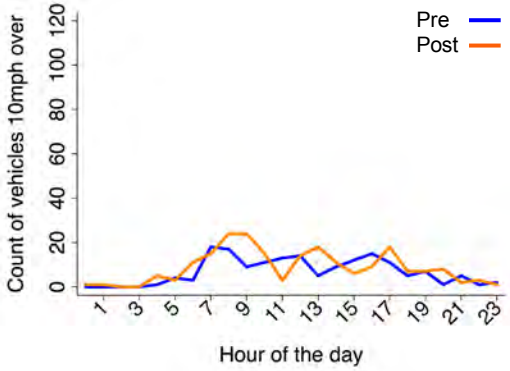
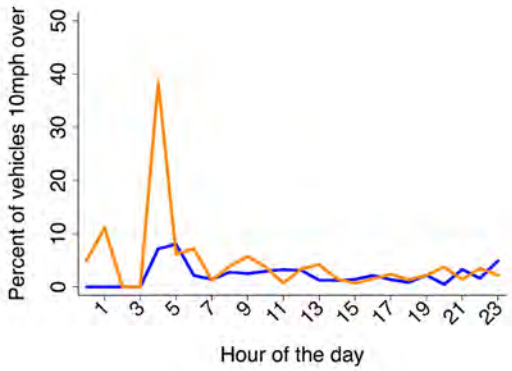
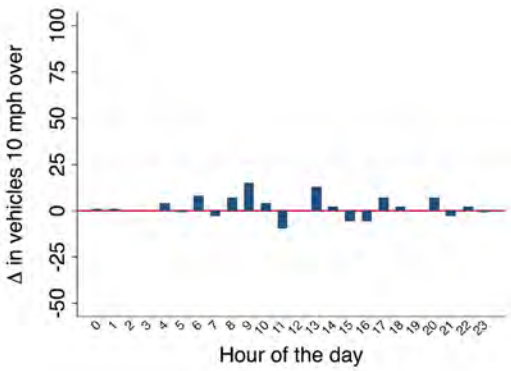
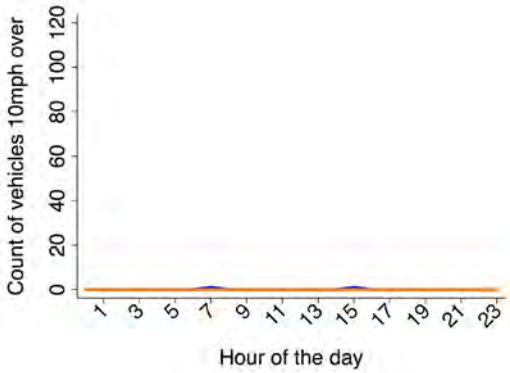
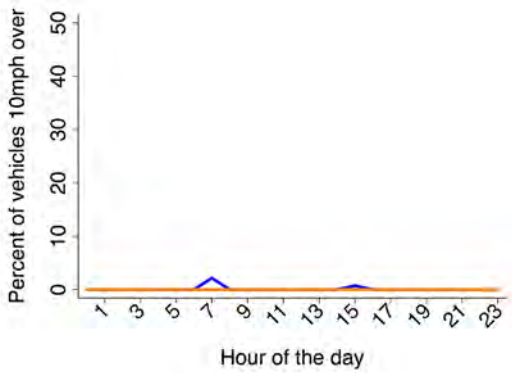
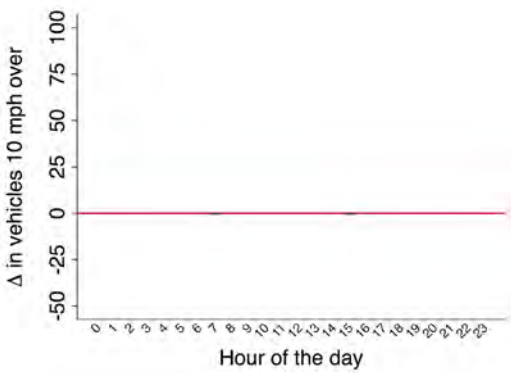
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 20: Brace, east of Coolidge		
		
Location 21: Camino Ramon, south of Willow		
		

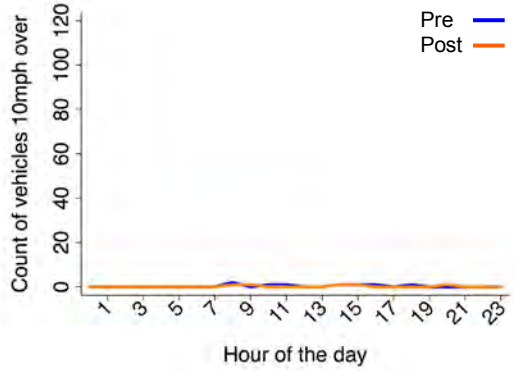
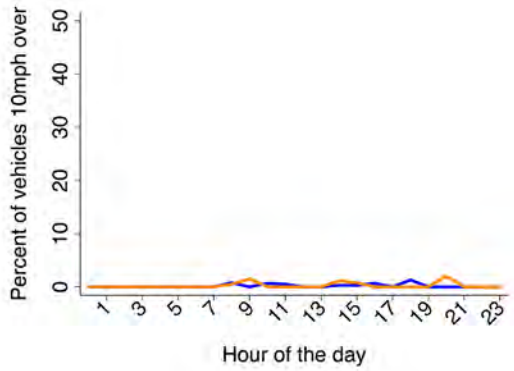
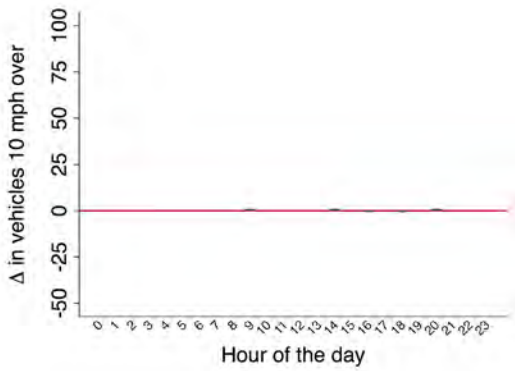
Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 24: Iris, south of Minnesota		
		
Location 26: Newport, south of Minnesota		
		

Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 27: Hicks, south of Cherry Valley		
		
Location 28: Hicks, south of Callecita		
		

Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 29: Cottle, south of Pine		
		
Location 30: Newport, south of Fairview		
		

Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 33: Willow Glen, west of Hill		
		
Location 38: Malone, west of Lincoln		
		

Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 39: Malone, east of Harmil		
		
Location 43: Michigan, east of Lincoln		
		

Total number of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Percent of vehicles traveling 10mph+ over posted speed limit, before-and-after the road diet, by hour	Change in number of vehicles travelling 10mph+ over posted speed limit, by hour
Location 44: California, east of Lincoln		
		

ACRONYMS AND ABBREVIATIONS

ADT	Average Daily Traffic
MPH	Miles Per Hour
MTI	Mineta Transportation Institute
WGBA	Willow Glen Business Association
WGNA	Willow Glen Neighborhood Association

ENDNOTES

1. For example, Arlington County; City of San Francisco; City of Seattle; City of Orlando; Nikiforos Stamatiadis, et al, *Guidelines for Road Diet Conversions* (Lexington, KY: Kentucky Transportation Center, November 2011); Eric Matthew Gudz, Kevin Fang, and Susan Handy, "When a Diet Prompts a Gain: Impact of a Road Diet on Bicycling in Davis, California," *Transportation Research Record* 2587 (2016): 61-67; Thomas B. Stoute, "Before and After Study of Some Impacts of 4-Lane to 3-Lane Roadway Conversions" (July 2005) accessed April 21, 2017, http://www.iowadot.gov/crashanalysis/pdfs/iowa4to3laneconversion_classicalbeforeafter_march2005.pdf; Michael D. Pawlovich et al., "Iowa's Experience with Road Diet Measures: Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates," *Transportation Research Record* 1953 (2006): 163-171; Ezra Hauer, et al., *Accident Modification Factors for Traffic Engineering and ITS Improvements*, NCHRP Report 617 (Washington, D.C.: Transportation Research Board, 2008).

2. Herman F. Huang, et al, "How Much Do You Lose When Your Road Goes on a Diet?" Paper presented at the 2nd Annual Urban Street Symposium, Anaheim, CA, 2003; Richard W. Lyles, et al., *Safety and Operational Analysis of 4-Lane to 3-Lane Conversions (Road Diets) in Michigan: Final Report* (East Lansing, MI: Michigan State University, January 2012).

3. Santa Clara County Public Health Department, 2016, "Willow Glen profile 2016," Accessed April 14, 2017 from: https://www.sccgov.org/sites/sccphd/en-us/Partners/Data/Documents/City%20Profiles/San%20Jose%20Neighborhoods/WillowGlen_neighprofilesPDF1011095.pdf

4. Karen Stevens, "Remove the Road Diet from Lincoln Avenue," (Change.org, no date), accessed May 7, 2017, https://www.change.org/p/sam-liccardo-san-jose-city-hall-remove-the-road-diet-from-lincoln-avenue

5. Mike Jennett, "Make the Lincoln Avenue Road Diet Permanent in Willow Glen," (Change.org, no date), accessed May 7, 2017, https://www.change.org/p/sam-liccardo-san-jose-dot-san-jose-city-hall-pierluigi-oliverio-wgba-wgna-make-the-lincoln-avenue-road-diet-permanent-in-willow-glen

6. City of San Jose, Department of Transportation, "Lincoln Avenue Road Diet Trial: Data Collection Report," accessed April 16, 2017, https://www.sanjoseca.gov/DocumentCenter/View/44259

7. Willow Glen Neighborhood Association, 2015, "WGNA Position on the Lincoln Avenue Road Diet," July 14, 2015. Accessed April 16, 2016 from http://www.wgna.net/lincoln_road_diet

8. Willow Glen Business Association, 2015, "Lincoln Avenue Lane Reconfiguration," Accessed April 16, 2017 from https://www.willowglen.org/road-diet

9. Pierluigi Oliverio, "Memorandum to Rules Committee: Lincoln Ave. Road Configuration," September 17, 2015, accessed April 16, 2017, http://sjdistrict6.com/wp-content/uploads/2012/10/Memorandum.pdf

10. Jim Ortbal, "Lincoln Avenue Roadway Configuration Pilot Project," (memorandum to the City of San Jose Mayor and City Council), June 6, 2016.

11. Gary Richards, 2016, "San Jose: Road Diet on Lincoln Avenue Made Permanent," *The Mercury News*, June 28, 2016, updated August 12, 2016. Accessed April 16, 2017 from http://www.mercurynews.com/2016/06/28/san-jose-road-diet-on-lincoln-avenue-made-permanent/

12. Due to technical errors, five locations (2, 9, 23, 25, & 33) were re-analyzed on February 11 and 12, 2015; those data were used for this analysis.

13. Due to technical errors, two locations (23 & 24) were re-analyzed on February 24-25, 2016. In addition, data was also collected for a third day (Tuesday, February 9, or Tuesday, February 23 in the case of locations 23 & 24). For consistency, we use only two days of data collection during the post-road diet period, with the exception of analysis of the 85th percentile speed. For the 85th percentile speeds we used the full set of three days of information because the data provided by the City did not allow for accurate calculation of a two-day 85th percentile speed. We had access only to each day's 85th percentile speed and the average 85th percentile speed for the 3-day post-road diet period. To calculate an accurate 85th percentile speed for the 2-day period would require exact vehicle speeds, not the speed bins provided.

14. Weather Underground (https://www.wunderground.com/) provides historical weather data. For San Jose, CA, during the data collection dates before the road diet, temperatures ranged from a low of 44°F to a high of 73°F, with no precipitation. During the data collection period after the road diet, temperatures ranged from a low of 42°F to a high of 73°F, with no precipitation.

15. The 85th percentile speed is the speed at or below which 85% of all vehicles are travelling.

16. Power refers the probability that a hypothesis test correctly rejects the null hypothesis when it is false. When one minimizes the probability of making a Type II error, one maximizes power.

17. J.C.F. de Winter, "Using the Student's t-test with Extremely Small Sample Sizes," *Practical Assessment, Research & Evaluation* 18, no. 10 (2013).

18. Huang, et al, 2003.

19. Keith Knaap, et al., *Road Diet Informational Guide* (Federal Highway Administration, April 2014), 46-47.

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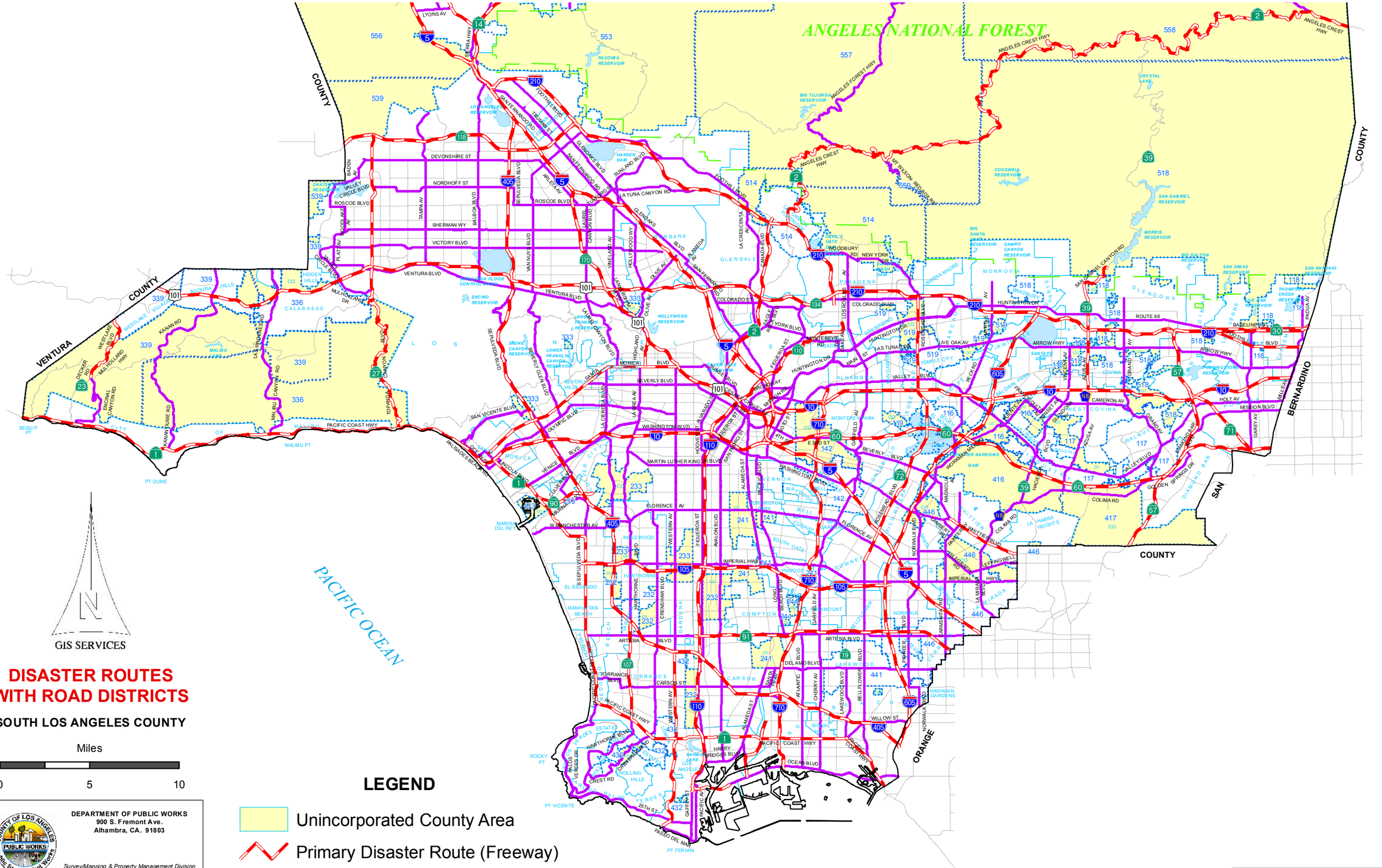

GIS SERVICES

DISASTER ROUTES WITH ROAD DISTRICTS

SOUTH LOS ANGELES COUNTY

Miles

0 5 10

DEPARTMENT OF PUBLIC WORKS
900 S. Fremont Ave.
Alhambra, CA. 91803

Survey/Mapping & Property Management Division
Mapping & GIS Services

LEGEND

- Unincorporated County Area
- Primary Disaster Route (Freeway)
- Secondary Disaster Route

Data contained in this map is produced in whole or part from the Los Angeles County Department of Public Works' digital database.

REF: \\pwgis\file\GIS Services\MPM\GISprojects\dsg\DisasterRoutes\disroutes southco rmd.mxd DATE: 09/24/2012

Long-Term Exposure to Traffic-Related Air Pollution and Lung Cancer Risk

Rob Beelen,[a] *Gerard Hoek,*[a] *Piet A. van den Brandt,*[b] *R. Alexandra Goldbohm,*[c] *Paul Fischer,*[d] *Leo J. Schouten,*[b] *Ben Armstrong,*[e] *and Bert Brunekreef*[a,f]

Background: Most studies on the association between lung cancer and air pollution have investigated mortality. There have been few studies of lung cancer incidence.

Methods: We used data from the ongoing Netherlands Cohort Study on Diet and Cancer for 114,378 subjects with follow-up from September 1986 to December 1997. Exposure to black smoke, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter ≤ 2.5 μm ($PM_{2.5}$) and traffic intensity variables (intensity on nearest road, intensity in a 100 m buffer, and an indicator variable for living close to a major road) were estimated at the home address. We conducted Cox proportional hazard analyses in the full cohort adjusting for age, sex, smoking status, and area-level socioeconomic status. We also carried out case-cohort analyses using more potential confounders on a subset of study participants for whom complete information from the baseline questionnaire had been processed.

Results: Adjusted analyses included 1940 cases for the full cohort and 1295 cases for the case-cohort analysis. Relative risks (RRs) for the overall air pollution concentrations were slightly below unity, and for the traffic variables RRs were slightly elevated. Risk was elevated among people who never smoked cigarettes (40,114 participants; 252 cases), with RRs of 1.47 (95% confidence interval = 1.01–2.16) for overall black smoke concentration, 1.11 (0.88–1.41) for traffic intensity on nearest road, and 1.55 (0.98–2.43) for living near a major road.

Conclusions: We found evidence for an association of exposure to black smoke and traffic with lung cancer incidence in people who had never smoked. No associations were found for the full cohort, or for other categories of smoking.

(*Epidemiology* 2008;19: 702–710)

Most studies on long-term exposure to air pollution and lung cancer risk have investigated the association with lung cancer mortality. Fine particles were predictors of lung cancer mortality in the extended follow-up of the Six Cities cohort study[1] and the American Cancer Society cohort study.[2] Evidence that air pollution is a (moderate) risk factor for lung cancer mortality has also been found in several case-control studies,[3,4] with effect estimates of the same order of magnitude as those estimated from cohort studies.[5]

Few studies have investigated the association between air pollution and lung cancer incidence.[6–9] In the Adventist Health Study on Smog cohort, incident lung cancer was found to be associated with long-term exposure to ambient concentrations of fine particles and sulfur dioxide.[6] This study was conducted among adult Seventh Day Adventists, who are largely nonsmoking. A nested case-control study within the European Prospective Investigation into Cancer and Nutrition, which analyzed nonsmokers, found associations between the nitrogen dioxide concentration and lung cancer incidence.[7] Two studies in Scandinavia found elevated relative risks for traffic-related air pollution assessed by nitrogen dioxide concentration at the home address and lung cancer incidence.[8,9]

Recently, we reported on the association between traffic-related air pollution and cause-specific mortality, including lung cancer, in an ongoing Dutch cohort study.[10] In the present paper, we report the effects of long-term exposure to traffic-related air pollution on lung cancer incidence in the same cohort. Cancer incidence data are preferred to mortality data in etiologic studies. Cancer registration in the Netherlands is both very complete[11] and of high quality.[12] Cases are coded by specially trained tumor registrars using national guidelines. Coders have access to pathology reports, clinical, and outpatient files. In case of doubt, the treating clinician is consulted.[13] The cause-of-death registry contains information

Submitted 12 December 2007; accepted 26 February 2008; posted 14 July 2008.
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Research was conducted under contract to the Health Effects Institute (HEI) (research grant 01-2), an organization jointly funded by the United States Environmental Protection Agency (EPA) and certain motor vehicle and engine manufacturers. The Netherlands Cohort Study on Diet and Cancer was supported by the Dutch Cancer Society.

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ISSN: 1044-3983/08/1905-0702
DOI: 10.1097/EDE.0b013e318181b3ca

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on all deceased Dutch citizens, as reported by the physician who established the death. This physician is not always informed on the complete disease history of the patient. The chances for misclassification (wrong primary site, missing primary site, or site of the metastasis as primary site) are much larger in the causes-of-death registry than in the cancer registry. The use of cancer registry data also allowed us to confine our analysis to the pathology-confirmed cases, reducing the possibilities of misclassification further. Further, due to a longer follow-up time for lung cancer incidence (11.3 years) compared with mortality (10 years), the lung cancer incidence analyses had more cases and more power.

METHODS

Study Design

The cohort has been described in detail.[14] Briefly, the Netherlands Cohort Study on Diet and Cancer was initiated in September 1986 with the enrollment of 120,852 subjects (58,279 men and 62,573 women) aged 55 to 69 years living in 204 municipalities throughout the country. The study was designed as a case-cohort study, ie, cases are derived from the entire cohort, whereas the person-years at risk are estimated from a random subcohort (N $\sim$ 5000).[15] This approach was chosen for efficient processing of the baseline questionnaire.

At baseline, all participants completed an 11-page questionnaire on dietary habits and other potential risk factors for cancer. For all participants, data from one machine-readable page of the questionnaire were entered at baseline (with information about smoking status). Further, for all participants information about sex and age at baseline was known. After recruitment, the entire cohort was followed-up for cancer. After the case-cohort design, the remaining 10 questionnaire pages (not machine-readable) were manually entered only for the emerging cases and the randomly selected subcohort. The exact residential address at baseline was available for all study participants, as were the previous cities of residence (not exact previous addresses).

Incident lung cancer cases (International Classification of Diseases for Oncology code [ICD-O-3] = C34) were identified by computerized record linkage of the entire cohort to the Netherlands Cancer Registry and the nationwide network and registry of histopathology and cytopathology in the Netherlands.[16] The completeness of cancer follow-up was over 96%,[17] with a follow-up period of 11.3 years (from September 1986 to December 1997). We excluded prevalent cancer other than skin cancer cases at baseline, resulting in 114,378 subjects and 2183 lung cancer cases available for analyses.

The study was approved by institutional review boards from Maastricht University and the Netherlands Organization for Applied Scientific Research. All cohort members consented to participation by completing the mailed, self-administered questionnaire.

Air Pollution Exposure Assessment

Details of the exposure assessment have been described previously.[18] In summary, long-term exposure to outdoor air pollution at the geographical coordinate of the 1986 home address was estimated for all participants as the sum of regional, urban, and local air pollution contributions. Ninety percent of participants had lived for 10 years or longer in their 1986 municipality.[19] Regional background concentrations were estimated using inverse distance weighted interpolation of concentrations measured at regional background sites in the National Air Quality Monitoring Network. The urban component was estimated using land-use regression models with concentrations for all regional and urban background monitoring sites as dependent variables. Predictor variables were population density and land use variables (residential or industrial). The sum of the regional and urban contributions was defined as background concentration. Background concentrations were estimated for nitrogen dioxide (NO_2), black smoke, and sulfur dioxide (SO_2). Average concentrations were estimated for 1976–1985 and 1987–1996 (in 1986 the Monitoring Network was reorganized, resulting in only limited days with valid measurements in that year). Correlations between estimated concentrations for different years were high, even over a period of 20 years (correlation coefficients >0.8).[18]

Local traffic contributions were characterized by traffic variables using a Geographic Information System (GIS) and a digital road network with linked traffic intensity data from 1986. We used (1) traffic intensity on the nearest road, (2) sum of traffic intensity in a 100 m buffer around each residential address, and (3) an indicator variable for living near a major road defined as "living within 100 m of a motorway and/or within 50 m of a local road with traffic intensity >10,000 motor vehicles per 24 hours (motor vehicles/24 hours)." Although absolute traffic intensities increased during the follow-up period, traffic intensity data obtained for different years were highly correlated (correlation coefficients >0.9), even over a period of 10 years.[18] Further, quantitative estimates for the local component were estimated for NO_2, black smoke and $PM_{2.5}$ using data from field monitoring campaigns and regression models with traffic variables as predictor variables.[18] We estimated no local traffic contribution for SO_2 because there is virtually no traffic contribution to this pollutant. These local-component concentrations were added to the background concentrations, resulting in an overall exposure estimate for each pollutant.

Statistical Analysis

Air pollution effects were analyzed for overall concentrations of pollutants and for a combination of background concentrations of the pollutants and traffic variables to identify effects of living near busy roads separately.

Relative risks (RRs) and 95% confidence intervals (95% CIs) were calculated for concentration and traffic vari-

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able differences between the 5th and the 95th percentiles of the distributions. For NO_2 this was rounded to 30 $\mu g/m^3$, for black smoke 10 $\mu g/m^3$, for SO_2 20 $\mu g/m^3$, and for $PM_{2.5}$ 10 $\mu g/m^3$. For traffic intensity on the nearest road, we used 10,000 motor vehicles/24 hours and for the sum of traffic intensity in a buffer of 100 m we used 335,000 motor vehicles/24 hours.

We initially conducted analyses in the full cohort using Cox proportional hazards models. Person-years were calculated for all participants from baseline until the date of lung cancer diagnosis, death, or end of follow-up. We adjusted for sex, age at baseline, and smoking status coded as never-smoker, ex-smoker, and current smoker separately for cigarette, cigar and pipe smoking. We further adjusted for area-level indicators assessed using GIS data from the Central Bureau of Statistics: percentage of persons with a low and with a high income at the neighborhood scale and the "COROP area scale." "COROP areas" have been defined in 1970 by the Coordination Commission for Regional Research Program as geographic regions consisting of a central point (eg, a city) and the surrounding economic and social region. The Netherlands is divided into 40 such areas. We chose 2 scales for area-level socioeconomic status because life expectancy varies considerably by area,[20] and the neighborhood scale does not capture such regional variations adequately. Low income was defined by the Central Bureau of Statistics as below the 40th percentile and high income as above the 80th percentile of the Dutch income distribution (Table 1). The adjusted full cohort analyses included 1940 cases.

For more complete confounder control (at the cost of some power), we also conducted case-cohort analyses that included only subcohort members and cases. Cases were enumerated from the entire cohort, whereas person-years for the entire cohort were estimated using the random subcohort of 4755 participants. Data were again analyzed with Cox proportional hazards models, but to account for additional variance introduced by sampling from the cohort, standard errors were estimated using the robust Huber-White sandwich estimator.[21]

In the case-cohort analyses, we adjusted for the variables chosen a priori for studying the association between air pollution and lung cancer incidence: sex; age at baseline; active cigarette, cigar and pipe smoking coded as current/noncurrent and number of cigarettes/cigars/pipes and number of years of smoking; passive smoking defined as whether the partner smoked; educational level in 3 categories: primary school, lower vocational education, and high school and higher; occupational exposure during the last occupation to biologic dust, mineral dust, and gases and fumes (coded as no, low and high exposure using the ALOHA-JEM coding scheme)[22]; alcohol consumption in 2 categories (0–30 and >30 g/d); dietary habits: intake of vegetables (continuous), fruit (in quintiles), and folate (continuous); and the area level indicators of socioeconomic status. The adjusted case-cohort analyses included 1295 cases.

TABLE 1. Descriptive Characteristics of Lung Cancer Cases and Noncases in the Full Cohort (Among Subjects for Whom Coordinate was Available n = 111,816)

Characteristic	Cases (n = 2183)	Noncases (n = 109,633)
Men (%)	86.2	48.4
Age at baseline (yrs); median (IQR)	63 (59–66)	61 (58–65)
Cigarette smoking status (%)		
Never-smoker	13.5	41.1
Ex-smoker	25.3	31.8
Current smoker	61.2	27.1
Cigar smoking status (%)		
Never-smoker	76.4	87.5
Ex-smoker	7.4	7.0
Current smoker	16.3	5.5
Pipe smoking status (%)		
Never-smoker	90.2	93.3
Ex-smoker	3.8	4.5
Current smoker	6.0	2.2
% persons with low income in neighborhood;[a] median (IQR)	41 (37–48)	41 (36–46)
% persons with high income in neighborhood;[a] median (IQR)	18 (12–24)	19 (13–25)
% persons with low income in a COROP area;[a] median (IQR)	41 (36–45)	41 (36–45)
% persons with high income in a COROP area;[a] median (IQR)	19 (18–23)	19 (18–23)

[a]Low income was defined as below the 40th percentile and high income as above the 80th percentile of the Dutch income distribution. COROP areas consist of a central point (eg, a city) and the surrounding economic and social region.
IQR indicates interquartile range.

As in other cohort studies of air pollution and lung cancer,[6,23] we conducted subgroup analyses for sex, educational level (3 categories: primary school, lower vocational education, and high school and higher), and fruit consumption (tertiles: low [0–96.8 g/d], medium [96.8–191.8 g/d], and high [>191.8 g/d]). Further, we conducted subgroup analyses for cigarette smoking status (never/ex/current). The never-smoker group is of particular interest in not being subject to possible residual confounding by the number of cigarettes and number of years of smoking cigarettes. Subgroup analyses by sex and cigarette smoking status were assessed in the full cohort, and subgroup analyses for educational level and fruit consumption were assessed in the case-cohort (information about education and fruit consumption was available only in the case-cohort sample). Heterogeneity in relative risks across subgroups was tested using Cochran's Q test.[24]

We conducted sensitivity analyses in the case-cohort for black smoke and the traffic variables to evaluate the potential confounding effect of the number of cigarettes, cigars and pipe, and the number of years of smoking, because

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no information about this was available in the full cohort. Further, we conducted sensitivity analyses adjusting for occupational exposure to biologic dust, mineral dust, and gases and fumes during the longest-held occupation rather than the last occupation, as occupational exposure earlier in life may be more important than recent exposure. We also conducted case-cohort analyses adjusted only for the limited confounder model used in the full cohort analyses, and compared the RRs with those obtained with the complete set of potential confounders.

Data management was done using SPSS 12.0 (SPSS Inc, Chicago, IL) and statistical analyses were conducted using STATA statistical software 8 (StataCorp, College Station). GIS calculations were conducted using ArcInfo (ESRI, Redlands, CA).

RESULTS

During 11.3 years of follow-up, 2183 lung cancer cases were reported. For 98% of the subjects, a geographical coordinate at baseline was identified (n = 111,816 in full cohort). Table 1 shows the characteristics of the subjects in the full cohort for whom a coordinate was available. Lung cancer cases were older, predominantly men, and more likely to be current smokers. Lung cancer cases did not differ from non-cancer cases in the area-level socioeconomic status.

Air Pollution Exposure Data

There was a considerable contrast in air pollution exposure among the full cohort (Table 2). Distributions for the traffic variables were skewed. In the full cohort 5481 subjects (4.9%) lived within 50 m of a road with more than 10,000 motor vehicles/24 hours or within 100 m of a motorway. Average exposure for all exposure variables was higher for current smokers, but differences were small. The black smoke average concentration was 16.8, 16.6, and 16.3 $\mu g/m^3$ for current, ex-, and never-smokers, respectively.

Distributions were similar for different time periods. For each pollutant the estimated concentrations between the periods 1976–1985 and 1987–1996 were highly correlated (correlation coefficients >0.9). The correlations between different pollutants within the same period were all >0.8, except for SO_2 for which correlations were >0.6.[18] Correlations of background black smoke with traffic intensity on the nearest road and sum of traffic intensity in a 100 m buffer were modest: 0.12 and 0.28, respectively. More detail on the exposure variables has been reported previously.[18]

Association Between Air Pollution Concentrations and Lung Cancer Incidence

Table 3 shows the relative risks for exposure to average black smoke, $PM_{2.5}$, NO_2, and SO_2 concentrations during the period 1987–1996. In both the full cohort and case-cohort analyses, effect estimates for all pollutants were below one. Average concentrations for the period 1976–1985 were available only for NO_2 and SO_2. The RRs for NO_2 were 0.91 (95% CI = 0.76–1.08) and 0.98 (0.69–1.40) for full cohort and case-cohort analyses, respectively. Corresponding figures for SO_2 during the period 1976–1985 were 0.94 (0.84–1.07) and 0.96 (0.75–1.21). There were no differences between the RRs for the 2 periods, consistent with the high correlation of the concentrations for the 2 time periods.

The RRs for the traffic variables were slightly elevated for both the full cohort and case-cohort analyses (Table 3). Risk estimates of the traffic variables did not depend on the specific background exposure with which it was modeled simultaneously, so we present results from models with just 1 pollutant—black smoke concentrations for the period 1987–1996.

Subgroup Analyses

In the full cohort analyses, RR estimates for overall concentrations of black smoke and traffic variables tended to differ for never-, ex-, and current cigarette smokers (Table 4). There were no differences between the effect estimates for men and women for both black smoke concentrations and traffic variables (data not shown).

In the case-cohort analyses, no consistent differences in effect estimates were found for different educational levels

TABLE 2. Distributions of Estimated Air Pollution Concentrations ($\mu g/m^3$) (Period 1987–1996), Traffic Intensity on the Nearest Road (Motor Vehicles/24 h) and the Sum of Traffic Intensity in a 100 m Buffer at the 1986 Home Address (Motor Vehicles/24 h), for the Full Study Population (n = 111,816)[a]

		Percentile				Percentile		
	Minimum	5	25	Median	Mean (SD)	75	95	Maximum
Black smoke	8.7	10.9	14.4	16.6	16.5 (3.5)	18.4	22.3	35.8
NO_2	14.6	21.8	31.6	37.8	36.9	42.5	49.0	66.7
$PM_{2.5}$	22.9	24.4	27.1	28.2	28.2 (2.1)	29.5	31.8	36.8
SO_2	4.4	6.3	10.2	12.8	13.7 (5.1)	17.0	22.4	33.8
Traffic intensity on the nearest road	1	787	1,225	1,225	2,282 (3,785)	1,225	9,224	104,275
Traffic intensity in a 100 m buffer	0	35,525	75,325	104,125	140,625 (115,875)	166,445	362,775	893,722

[a]Black smoke, $PM_{2.5}$ and NO_2 are quantitative overall concentrations. SO_2 is background concentration.

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(Fig. 1). Effect estimates tended to be higher for subjects with low fruit consumption, except for those living near a major road for whom no differences were found (Fig. 2).

Sensitivity Analyses

Adjusted case-cohort analyses showed that there were no differences in the effect estimates for overall concentrations of black smoke for models that included (RR = 1.03; CI = 0.78–1.34) or did not include (1.01; 0.78–1.32) the number of cigarettes, cigars and pipes, and the number of years of smoking. There were also no differences between the effect estimates for the traffic variables.

There was no difference in the RRs for black smoke concentrations and traffic variables when including occupational exposure to biologic dust, mineral dust, and gases and fumes during the longest-held occupation in the model (for black smoke, RR = 1.03 [CI = 0.78–1.34]) compared with a model that included occupational exposure during the last occupation (for black smoke; 1.01 [0.76–1.33]).

The RRs of case-cohort analyses adjusted for the limited confounder model used in the full cohort analyses were 0.92 (CI 0.74–1.13) for black smoke, 0.98 (0.86–1.10) for the traffic intensity on the nearest road, 1.07 (0.80–1.43) for living near a major road, and 1.10 (0.83–1.22) for the traffic intensity in a 100 m buffer.

TABLE 3. Association of Average Air Pollution Concentrations (Period 1987–1996) and Traffic Variables With Lung Cancer Incidence in Full Cohort and Case-Cohort Analyses[a]

Exposure Variable (Increment for RR Calculation)	Full Cohort	Case-Cohort
No. cases	1,940	1,295
No. person-years	1,053,330	31,536
	RR (95% CI)	RR (95% CI)
Pollutant		
Black smoke (10 $\mu g/m^3$)	0.96 (0.83–1.11)	1.03 (0.78–1.34)
NO_2 (30 $\mu g/m^3$)	0.86 (0.70–1.07)	0.86 (0.57–1.29)
$PM_{2.5}$ (10 $\mu g/m^3$)	0.81 (0.63–1.04)	0.65 (0.41–1.04)
SO_2 (20 $\mu g/m^3$)	0.90 (0.72–1.11)	1.01 (0.67–1.54)
Traffic variable		
Traffic intensity on the nearest road (10,000 mvh/24 h)	1.05 (0.94–1.16)	1.02 (0.87–1.18)
Traffic intensity in a 100-m buffer (335,000 mvh/24 h)	1.05 (0.92–1.19)	1.07 (0.84–1.36)
Living near a major road	1.11 (0.91–1.34)	1.10 (0.74–1.62)

Case-cohort analyses adjusted for age; sex; active cigarette, cigar and pipe smoking; passive smoking; educational level; occupational exposure to biological dust, mineral dust, and gases and fumes; alcohol consumption; intake of vegetables, fruit, and folate; and area level indicators of socioeconomic status.

Black smoke, $PM_{2.5}$, and NO_2 are quantitative overall concentrations. SO_2 is background concentration (including traffic intensity on nearest road in model). All models with a traffic variable included the black smoke background concentration for the period 1987–1996 as background concentration.

[a]Full cohort analyses adjusted for age; sex; cigarette, cigar and pipe smoking status; and area level indicators of socioeconomic status.

DISCUSSION

In the full cohort, we found no association of air pollution concentrations or traffic intensity with lung cancer incidence. Among people who had never smoked cigarettes, there were positive associations of black smoke concentrations and traffic variables with lung cancer incidence. No associations were found in the ex- and current cigarette smokers. Associations of black smoke and traffic variables with lung cancer incidence were suggestively stronger in subjects with low fruit consumption.

Stronger associations between air pollution and lung cancer in never-smokers have been observed in the American Cancer Society study, as well.[2] Relative risks associated with a 10 $\mu g/m^3$ increase in the concentration of fine particles were about 1.03, 1.09, and 1.13 in current, ex-, and never-smokers, respectively.[2] In a cohort study from Oslo, RRs per 10 $\mu g/m^3$ increase in the concentration of NO_x were 1.20, 1.25, 1.06, and 1.06 for never-smokers, and current smokers smoking 1 to 9 cigarettes/d, 10 to 19 cigarettes/d and more than 20 cigarettes/d, respectively.[9] In a case-control study

TABLE 4. Association of Black Smoke Overall Concentration (Period 1987–1996) and Traffic Variables With Lung Cancer Incidence Among Never-, Ex- and Current Cigarette Smokers (in Full Cohort)[a]

	Smoking Status			
Exposure	Never	Ex	Current	*P*
No. cases	252	500	1,188	
No. participants	40,114	32,022	28,030	
	RR (95% CI)	RR (95% CI)	RR (95% CI)	
Black smoke	1.47 (1.01–2.16)	0.91 (0.68–1.23)	0.85 (0.70–1.03)	0.04
Traffic intensity on the nearest road	1.11 (0.88–1.41)	0.98 (0.77–1.25)	1.04 (0.91–1.19)	0.77
Traffic intensity in a 100-m buffer	1.36 (0.99–1.87)	1.06 (0.82–1.38)	0.96 (0.81–1.14)	0.17
Living near a major road	1.55 (0.98–2.43)	1.24 (0.85–1.81)	0.95 (0.73–1.23)	0.15

[a]Adjusted for age; sex; cigarette, cigar and pipe smoking status; and area level indicators of socioeconomic status. *P* value is significant value of Cochran's Q test for heterogeneity. Increments used to calculate RRs are shown in Table 3.

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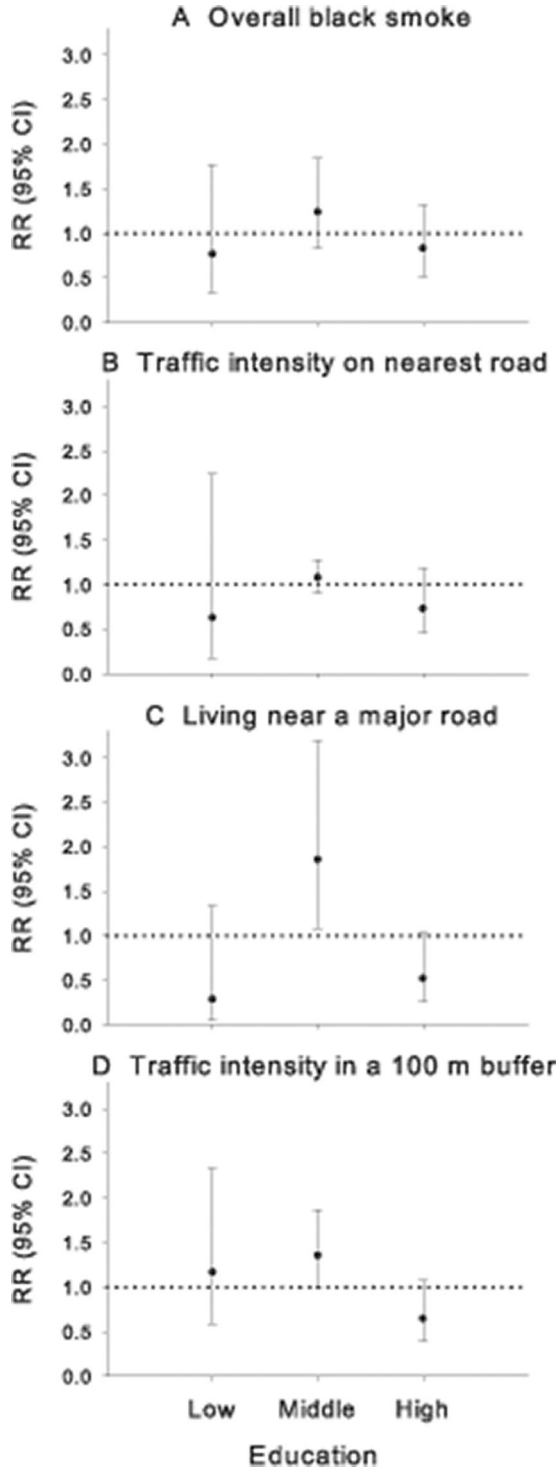

FIGURE 1. Association of black smoke overall concentration (period 1987–1996) and traffic variables with lung cancer incidence in the case-cohort dataset stratified by education. Black circles indicate RR; vertical lines, 95% CI. Highest education of the household coded as Low = only primary school; Middle = lower vocational education; and High = junior high school, senior high school, higher vocational education, and university. Adjusted for confounders listed in Table 3 footnotes.

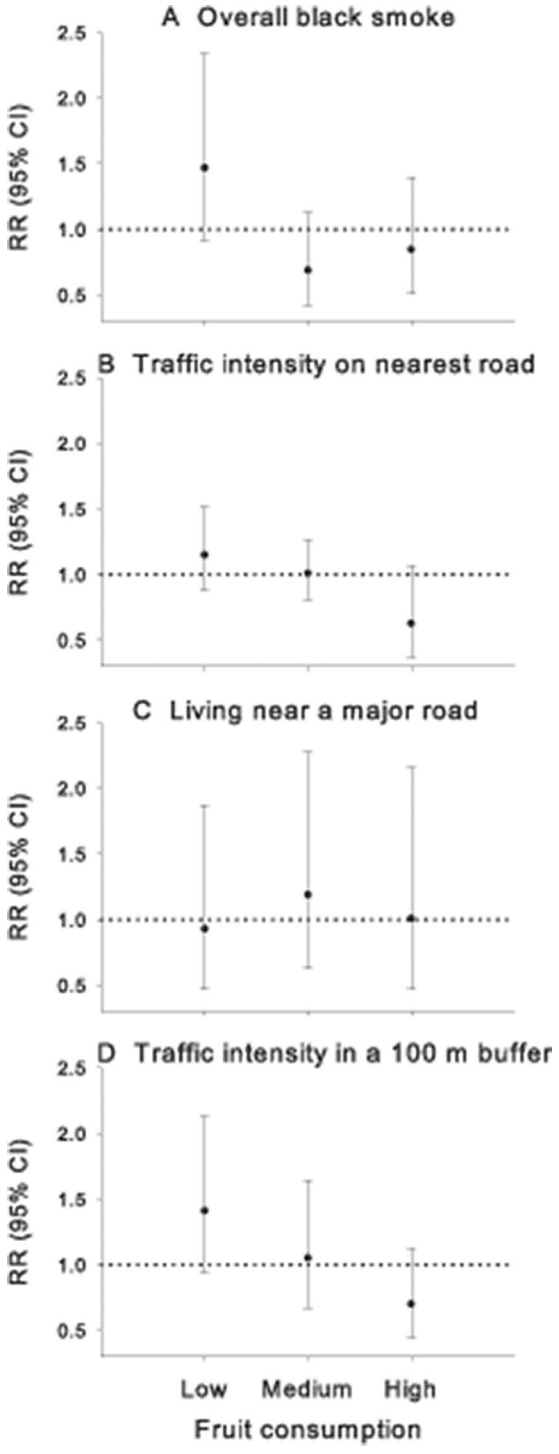

FIGURE 2. Association of black smoke overall concentration (period 1987–1996) and traffic variables with lung cancer incidence in the case-cohort dataset, stratified by fruit consumption. Fruit consumption divided in tertiles: Low = 0–96.8 g/d; Medium = 96.8–191.8 g/d; and High = >191.8 g/d. Other details as for Figure 1.

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from Stockholm, the RR for NO_2 above 29.3 $\mu g/m^3$ (the 90th percentile) was similar in never-smokers (RR 1.68), former smokers (RR 1.58) and those smoking 1 to 10 cigarettes per day (RR 1.36), but was smaller in current smokers smoking more than 20 cigarettes per day (RR 0.74).[8]

The lack of association found for ex- or current cigarette smokers in our study might be because the effect may be too small to measure in comparison with the (strong) association between cigarette smoking and lung cancer incidence. In the full cohort analyses, no information was available about the number of cigarettes, cigars and pipe, the number of years of smoking, the type of tobacco used, and the year when former smokers stopped smoking, which are all potentially important confounders. Sensitivity analyses in the case-cohort dataset showed small differences in effect estimates for air pollution variables for models with and without the number of cigarettes, cigars and pipes, and the number of years of smoking. This agrees with observations in the Swedish case-control study, in which the confounding effect of smoking was adequately addressed by a categorical variable.[8] There was also little difference between the effect estimates adjusted for the complete confounder model used in the case-cohort analyses, and adjusted for the limited confounder model used in the full cohort analyses. If the findings from the case-cohort analyses apply to the full cohort, it seems unlikely that residual confounding due to lack of detailed data on smoking and other potential confounders is the explanation of the lack of association in the ex- and current smokers.

A few studies have investigated the association between air pollution and lung cancer incidence in study populations consisting entirely of nonsmokers. A cohort study in the United States (Adventist Health Study on Smog) among 6338 nonsmoking adults found that incident lung cancer was elevated with increased PM_{10} and SO_2 concentrations.[6] In a recent case-control study nested within the European Prospective Investigation into Cancer and Nutrition among nonsmokers, lung cancer incidence was possibly increased with residence nearby heavy traffic roads (odds ratio = 1.46 [95% CI = 0.89–2.40]). The odds ratio for NO_2 was 1.14 (0.78–1.67) for an increase of 10 $\mu g/m^3$, and an odds ratio of 1.30 was found for concentrations greater than 30 $\mu g/m^3$. No clear association was found with PM_{10} and SO_2.[7] Our results in the full cohort analyses among never smokers are in agreement with the results among nonsmokers of those other 2 studies.

Some recent European studies investigated the association between air pollution exposure and lung cancer incidence using individual-level exposure assessments, with a focus on traffic-related air pollution. A case-control study in Stockholm on urban air pollution and lung cancer incidence found an RR of 1.05 (95% CI = 0.93–1.18) for an increase of 10 $\mu g/m^3$ in 30-year average NO_2 concentrations from traffic, and a stronger RR of 1.10 (0.97–1.23) when using a 20-year lag (ie, using a 10-year average NO_2 concentration over 21–30 years ago).[8] In a cohort study among 16,209 men aged 40 to 49 year living in Oslo, the adjusted incidence risk ratio for lung cancer was 1.08 (95% CI = 1.02–1.15) for a 10 $\mu g/m^3$ increase in average NO_x exposure between 1974 and 1978. The risk estimate for a 10 $\mu g/m^3$ increase in average SO_2 exposure between 1974 and 1978 was 1.01 (0.94–1.08).[9] These studies suggested an increased risk of lung cancer from traffic-related air pollution, in particular, assessed by either NO_x/NO_2 concentrations or indicator variables for living near a major road.[7–9,25,26] In the study by Nyberg et al,[8] heating-related SO_2 showed little effect in any time window, despite high exposure levels in the early years of the study period. Although averages of estimated individual SO_2 and NO_2 exposure showed reasonably high correlation, traffic-related NO_2 rather than heating-related SO_2 was consistently the stronger risk indicator.

Previous studies showed that the association between lung cancer and air pollution became weaker when more recent exposures were used in the analyses, and that exposures 20 years before the start of the study or even earlier in life were most important.[8,9] A limitation of our study is that we estimated exposure to air pollution during the latency period of lung cancer, ie, we estimated exposure based on the baseline 1986 address for 2 periods (1976–1985 and 1987–1996) and we used traffic intensity data for 1986. Correlations between estimated concentrations for different years were however high, even over a period of 20 years (correlation coefficients >0.8).[18] It was therefore not possible to evaluate the independent contributions of concentrations of different time periods. It is likely that the correlation with years and periods before 1976 would also be high. We further found that traffic counts from different years over a period of more than 10 years were highly correlated (correlation coefficients >0.9) and we focused mainly on busy roads that have likely been in place for a long period of time. Only the baseline address was available for all subjects, but no complete residential history including exact addresses was available. It was however estimated that 90% of the participants had lived for 10 years or longer in their 1986 municipality. Mean (SD) duration of residence was 35 (19.8) years.[19] These results support the use of our exposure estimate as a proxy for time periods further back in time.

A limitation of the exposure assessment method is that we assessed only outdoor concentrations, not taking into account factors related to infiltration of outdoor air pollution into the home, such as air exchange rate. Further, no information was available about the work address. However, approximately 85% of the population had no paid job at baseline. In addition, we had no information about the time participants spent at home or about the time commuting in traffic. The resulting misclassification is, however, likely to be nondifferential.

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In a reanalysis of 2 US cohort studies on mortality and long-term exposure to air pollution, higher air pollution effect estimates for lung cancer mortality were found in subjects without high school education.[23] We did not find higher effect estimates among subjects with low educational level.

We did find that effect estimates for air pollution and traffic intensity tended to be higher for subjects with low fruit consumption compared with subjects who had medium and high fruit consumption. Such results have not been reported before. Evidence of elevated effect estimates was also found for all-cause mortality among subjects with low fruit consumption.[27] Fruit consumption has been consistently inversely associated with lung cancer incidence, with the highest risks for the lowest quintile of fruit consumption.[28,29] One explanation is that diet is a source of antioxidants that may protect against oxidative stress.[29] It is thought that one of the potential mechanisms of effect of air pollution is also through oxidative stress. Hence, low fruit consumption may be associated with a low protection against oxidative stress effects of air pollution.[29]

In addition to smoking, occupational exposure to carcinogens, diet and radon exposure are the main determinants of lung cancer. Information about radon exposure was not available in our study. However, only a small percentage of the annual lung cancer cases can be attributed to radon exposure in the Netherlands, and it is principally smokers who are at risk.[30] Information about occupational exposure to carcinogens and about diet were available for the case-cohort dataset, but not for the full cohort dataset. Sensitivity analyses showed, however, that results of case-cohort analyses adjusted for the limited confounder model as used in the full cohort analyses are comparable with the case-cohort results adjusted for the complete confounder model including occupational exposure and diet. This suggests that occupational exposure and diet probably did not confound the association between air pollution and lung cancer in our study.

We previously presented results for the association between lung cancer mortality and air pollution in this same population.[10] In the full cohort dataset, the adjusted risk estimate for lung cancer mortality for the overall black smoke concentration (period 1987–1996) was 1.03 (0.88–1.20) and the adjusted RR for the traffic intensity on the nearest road was 1.07 (0.96–1.19). Among never smokers, RRs for lung cancer mortality were 1.48 (0.97–2.25) for black smoke overall; 1.15 (0.92–1.46) for the traffic intensity on the nearest road; 1.44 (0.86–2.42) for living near a major road; and 1.36 (0.96–1.93) for the traffic intensity in a 100 m buffer. Effect estimates for lung cancer mortality and lung cancer incidence were thus comparable, which is in agreement with the short time between diagnosis of lung cancer and death from lung cancer (on average 0.9 year [SD 1.0] in our study).

In conclusion, we found evidence for an association between black smoke and lung cancer incidence in people who had never smoked cigarettes. Exposure to traffic was also associated with borderline elevated risks among this group. No clear associations were found for the full cohort or other smoking categories.

ACKNOWLEDGMENTS

The authors are indebted to the participants of this study and further thank the cancer registries and the Netherlands nationwide registry of pathology. They also thank S. van de Crommert, H. Brants, J. Nelissen, C. de Zwart, W. van Dijk, M. Moll, A. Pisters, M. Jansen, H. van Montfort, T. van Moergastel, L. van den Bosch, and R. Schmeitz (Maastricht University/TNO) for assistance, Carla van Wiechen (National Institute of Public Health and the Environment) for advice on geographic information system calculations, and the National Institute of Public Health and the Environment for providing air pollution data monitored by the National Air Quality Monitoring Network in the Netherlands.

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07-LA-187-3.5/8.8
Venice Blvd from Lincoln Blvd
to Route 10
223-303001
District Agreement No. 07-5097

DRAFT RELINQUISHMENT AGREEMENT

This Agreement, entered into effective on _____, is between the STATE OF CALIFORNIA, acting by and through its Department of Transportation, referred to herein as "CALTRANS", and the

CITY OF LOS ANGELES, a body politic and a municipal corporation of the State of California, referred to herein as "CITY".

RECITALS

1. CALTRANS and CITY pursuant to Streets and Highways Code sections 73 and 487 are authorized to enter into a Cooperative Agreement in order to relinquish to CITY a portion of a State Highway within CITY's jurisdiction.

2. CALTRANS intends to relinquish to CITY that portion of State Route 187 (SR 187) between Lincoln Boulevard and Route 10 as shown in Exhibit A, attached to and made a part of this Agreement, referred to hereinafter as "RELINQUISHED FACILITIES". This relinquishment is based on Assembly Bill 810 (AB 810) which amended Streets and Highways Code section 487 . CITY is willing to accept said RELINQUISHED FACILITIES upon approval by the California Transportation Commission (CTC) of a Resolution of Relinquishment and CALTRANS's recording of said Resolution in the County Recorder's Office.3. CITY understands that CALTRANS has initiated SR 187 and Grand View Boulevard intersection project (Intersection Project). In lieu of mandating CALTRANS to complete the Intersection Project, CITY agrees to complete Intersection Project in return of the of payment of $500,000.

3. CALTRANS and CITY agree that RELINQUISHED FACILITIES are currently safe and operable. CALTRANS and CITY have negotiated an understanding that CITY will accept and assume full maintenance, ownership, responsibility, control and liability in perpetuity over the RELINQUISHED FACILITIES, including CITY's obligation (if any) of bringing RELINQUISHED FACILITIES to Americans with Disability Act (ADA) standards, in exchange for total payment of $14,500,000 (that includes $500,000 towards Intersection Project), or some other allocation made by CTC deemed to be in the best interest of CALTRANS.

4. Funds may not be available at the time of the CTC's Resolution of Relinquishment due to budgetary constraints. However, CALTRANS will make requests for allocation of the funds to CITY by the CTC when the funds become available.

5. The parties hereto intend to define herein the terms and conditions under which RELINQUISHED FACILITIES is to be accomplished.

SECTION I

CITY AGREES:

1. Execution of this Agreement constitutes CITY's waiver of CALTRANS's obligation to provide ninety (90) days prior notice of CALTRANS's "Intention to Relinquish" as set forth in Streets and Highways Code section 73.

2. To accept that allocation, determined by the CTC to be in the best interest of CALTRANS, as CALTRANS's only payment obligation for this RELINQUISHED FACILITIES.

3. Even if funds are not available with CALTRANS at the time of resolution of

relinquishment by CTC, to accept RELINQUISHED FACILITIES immediately upon recordation of CTC's Resolution in the County Recorder's Office and defer the receipt of payment for RELINQUISHED FACILITIES to a date when funding becomes available.

4. To accept ownership, including all of CALTRANS's current obligations, rights, title and interest in RELINQUISHED FACILITIES, including but not limited to maintenance, control, liability, obligation (if any) of bringing RELINQUISHED FACILITIES to ADA standards and to accept payment in lieu of CALTRANS completing the Intersection Project, upon recordation of the CTC's Resolution of Relinquishment in the County Recorder's Office and to thereafter operate, maintain, and be liable for RELINQUISHED FACILITIES at no additional cost to CALTRANS.

5. To accept RELINQUISHED FACILITIES in their current environmental condition and setting, including, but not limited to, the presence of hazardous materials as described in the "Environmental Literature Survey Investigation of Rosemead Boulevard (LA-164) Between Gallatin Road to 0.08 Mile South of Rush Street; Venice Boulevard (LA-187) Between State Route 1 (SR-1) to Cadillac Avenue", dated May 13, 2016, as shown in Exhibit B, attached to and made a part of this Agreement, referred to hereinafter as HAZARDOUS MATERIALS DISCLOSURE MEMO. CITY has received and reviewed a copy of the above-referenced HAZARDOUS MATERIAL DISCLOSURES MEMO. Upon recordation of the CTC's Resolution of Relinquishment in the County Recorder's Office, CALTRANS will not be responsible for any present or future remediation of said hazardous materials.

6. Upon recordation of the CTC's Resolution of Relinquishment in the County Recorder's Office, CITY agrees to accept ownership, including all rights, title and interest in said portion of SR 187 described in Article 2 of Recitals, including signal and safety lighting, and to thereafter maintain and be liable for said relinquished facility without any additional cost to STATE. Upon execution of this agreement, CITY shall authorize utility company to transfer utility accounts, more particularly described in Exhibit C, attached hereto and made a part of this Agreement, to CITY's name effective the date of recordation of the CTC's Resolution of Relinquishment.

7. To maintain within its jurisdiction, signs designating SR 187 as a Terminal Access Route Surface Transportation Assistance Act (STAA) which allows large trucks to operate on RELINQUISHED FACILITIES.

SECTION II

CALTRANS AGREES:

1. To relinquish, upon the approval of the CTC's Resolution of Relinquishment, the RELINQUISHED FACILITIES.

2. Funds may not be available at the time of the CTC's Resolution of Relinquishment due to

budgetary constraints and therefore CALTRANS will make requests for allocation of $14,500,000 to CITY by the CTC when the funds become available with the expectation that CTC will determine that this or some other allocation is in the best interest of CALTRANS.

3. To submit the CTC Resolution of Relinquishment to the County Recorder's Office for recording.

4. To pay CITY, within thirty (30) days of approval of funding by CTC, the amount of $14,500,000 or any other allocation approved by the CTC. The payment of those funds will represent CALTRANS's only payment obligation for the purpose of the RELINQUISHED FACILITIES.

5. Thereafter, upon CITY's specific request, to transfer to CITY within sixty (60) days of such request, copies of available CALTRANS records and files for RELINQUISHED FACILITIES, such as plans, survey data and right of way information.

SECTION III

IT IS MUTUALLY AGREED:

1. All obligations of CALTRANS under the terms of this Agreement are subject to the appropriation of resources by the Legislature, State Budget Act authority, and the allocation of any funds by the CTC.

2. CALTRANS reserves the right to enter, at no cost to CALTRANS, RELINQUISHED FACILITIES, to modify or add signage, drainage, and other improvements necessary for State Highway operations. CITY agrees to allow CALTRANS access to operate, maintain, add, remove, or modify CALTRANS's facilities retained in those collateral facilities.

3. CITY shall fully defend, indemnify and save harmless CALTRANS and all its officers and employees from all claims, suits or actions related to environmental theories or assertions of liability, including, but not limited to, claims or lawsuits related to the presence of hazardous materials as described in the HAZARDOUS MATERIALS DISCLOSURE MEMO, provided that the actions, events, injuries, damages, or losses giving rise to any claims, suits or actions occurred on or arise after the date of the recordation of the CTC's Resolution of Relinquishment.

4. CALTRANS shall fully defend, indemnify and save harmless CITY and all its officers and employees from all claims, suits or actions related to environmental theories or assertions of liability, including, but not limited to, claims or lawsuits related to the presence of hazardous materials as described in the HAZARDOUS MATERIALS DISCLOSURE MEMO, provided that the actions, events, injuries, damages, or losses giving rise to any claims, suits or actions occurred or arose before the date of recordation of the CTC's Resolution of Relinquishment.

5. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CITY and/or its agents under or in connection with any work, authority or jurisdiction conferred upon CITY under this Agreement. It is understood and agreed that CITY, to the extent permitted by law, will defend, indemnify and save harmless CALTRANS and all its officers and employees from all claims, suits or actions of every name, kind and description brought forth under, but not limited to, tortious, contractual, inverse condemnation or other theories or assertions of liability occurring by reason of anything done or omitted to be done by CITY and/or its agents under this Agreement.

6. Neither CITY nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under or in connection with any work, authority or jurisdiction conferred upon CALTRANS under this Agreement. It is understood and agreed that CALTRANS, to the extent permitted by law, will defend, indemnify and save harmless CITY and all its officers and employees from all claims, suits or actions of every name, kind and description brought forth under, but not limited to, tortious, contractual, inverse condemnation or other theories or assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under this Agreement.

7. No alteration of the terms of this Agreement shall be valid unless made in writing and signed by the parties hereto and no oral understanding or agreement not incorporated herein shall be binding on any of the parties hereto.

8. This Agreement shall terminate upon recordation of the CTC's Resolution of Relinquishment for RELINQUISHED FACILITIES in the County Recorder's Office and payment by CALTRANS of $14,500,000 or any other allocation by CTC to CITY, except for those provisions which relate to indemnification, ownership, operation, and maintenance, which shall remain in effect until terminated or modified in writing by mutual agreement.

SIGNATURES

PARTIES declare that:

1. Each PARTY is an authorized legal entity under California state law.
2. Each PARTY has the authority to enter into this agreement.
3. The people signing this agreement have the authority to do so on behalf of their public agencies.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

By: _____
Carrie L. Bowen
District Director

APPROVED AS TO FORM AND PROCEDURE:

_____
Attorney
Department of Transportation

CERTIFIRED AS TO FUNDS

_____
District Budget Manager

CERTIFIED AS TO FINANCIAL TERMS AND POLICIES:

_____
Accounting Administrator

CITY OF LOS ANGELES

By: _____
Mayor

Attest: _____
City Clerk

APPROVED AS TO FORM AND PROCEDURE:

_____
City Attorney

STATE	FEDERAL PROJECT NO.	DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
CALIF		07	LA	187	3.5/8.9	1	3

STATE OF CALIFORNIA

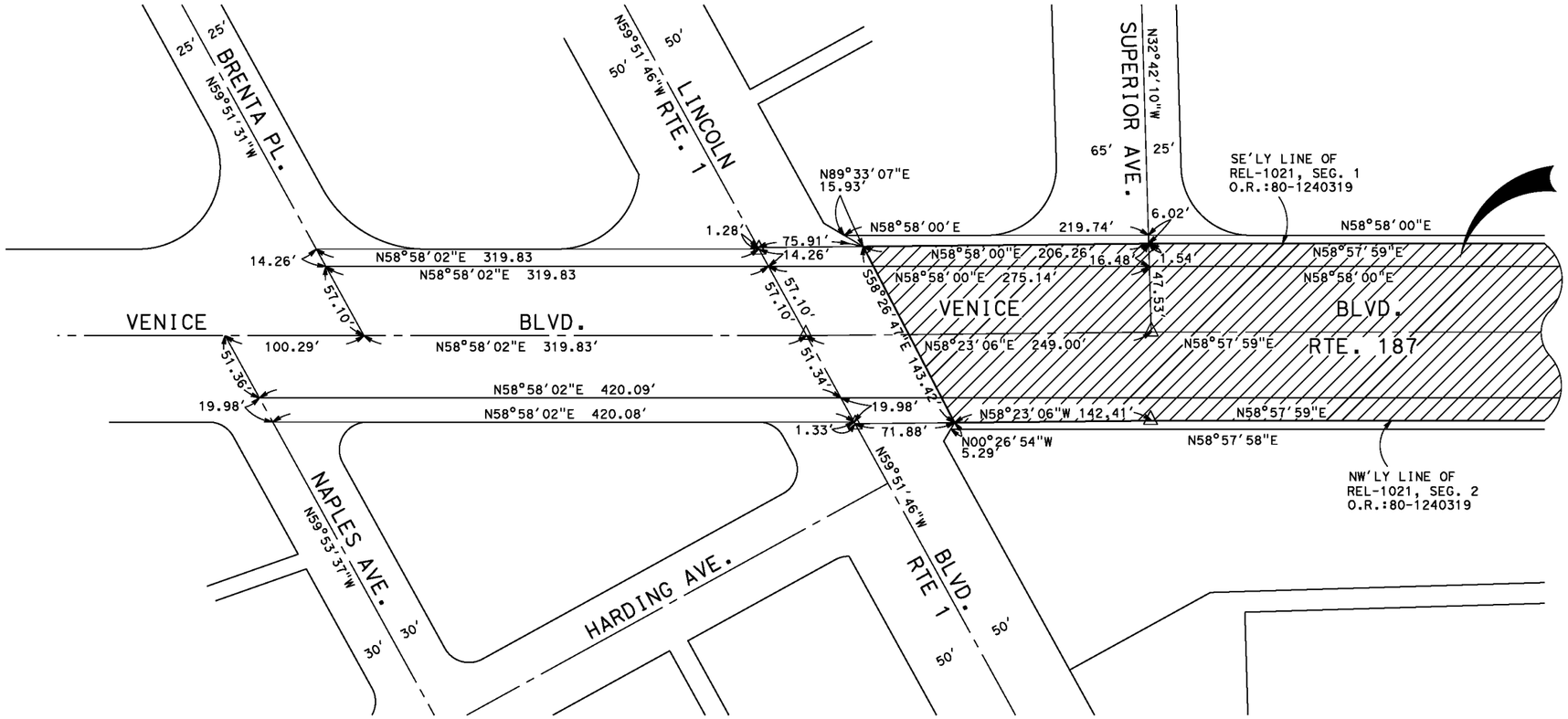
DEPARTMENT OF TRANSPORTATION

DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

APPROVAL DATE

PROFESSIONAL LAND SURVEYOR
D. DIANE WELLS
No. 7651
Exp. 12-31-16
STATE OF CALIFORNIA

IN THE CITY OF LOS ANGELES, ROUTE 187 (VENICE BOULEVARD) FROM LINCOLN BOULEVARD TO CADILLAC AVENUE



NOTE:
1. COORDINATES AND BEARINGS ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE 7, NORTH AMERICAN DATUM (NAD) OF 1927.
2. ALL DISTANCES ARE GRID. TO OBTAIN GROUND DISTANCE DIVIDE GRID DISTANCE BY COMBINATION FACTOR 0.99999I.

FILED FOR RECORD IN

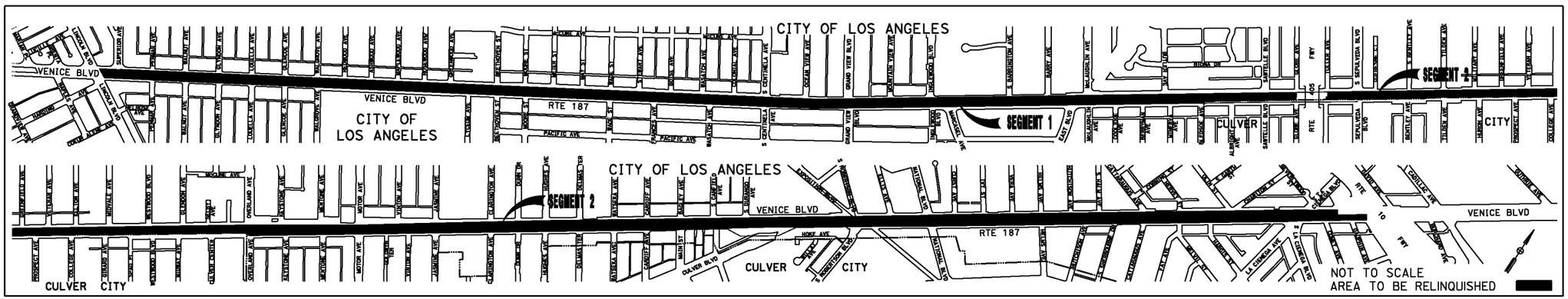
STATE HIGHWAY MAP BOOK NO. _____

DATE: _____ AT PAGE _____

RECORDERS INDEX NO. _____

RECORDS OF _____ COUNTY

NOTE: States rights are not extinguished or transfer of title is not effected until recordation of related CTC resolution. (In compliance with Sections 128 & 129 of the STREETS & HIGHWAYS Code)



CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY	JV	REL-1260	
REVISED			

Exhibit "A" Relinquishment Map -- 1 of 3

STATE	FEDERAL PROJECT NO.
CALIF	

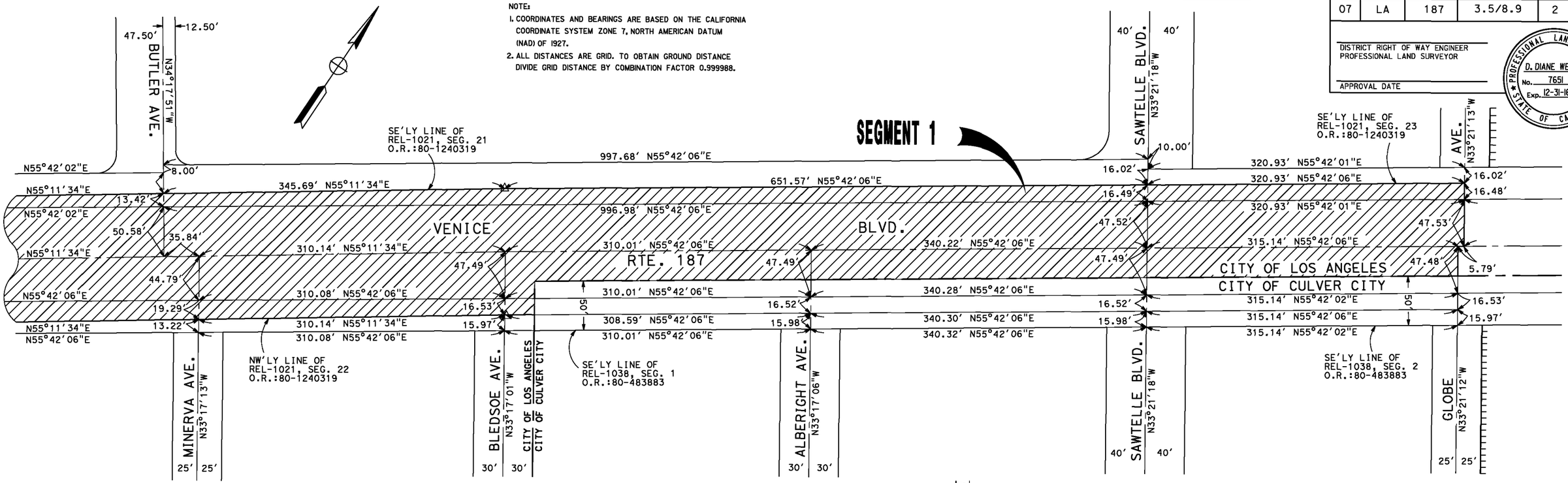
DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
07	LA	187	3.5/8.9	2	3

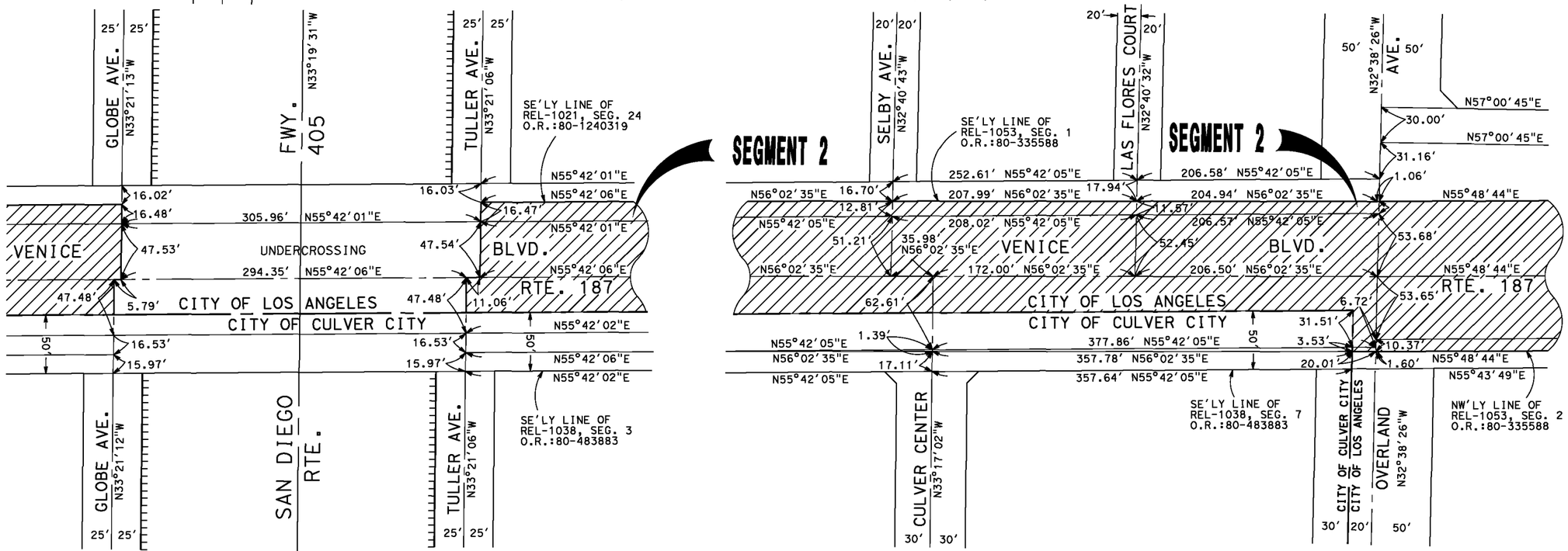
DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

APPROVAL DATE

PROFESSIONAL LAND SURVEYOR
D. DIANE WELLS
No. 7651
Exp. 12-31-16
STATE OF CALIFORNIA

NOTE:
1. COORDINATES AND BEARINGS ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE 7, NORTH AMERICAN DATUM (NAD) OF 1927.
2. ALL DISTANCES ARE GRID. TO OBTAIN GROUND DISTANCE DIVIDE GRID DISTANCE BY COMBINATION FACTOR 0.999988.





FILED FOR RECORD IN

STATE HIGHWAY MAP BOOK NO. _____

DATE: _____ AT PAGE _____

RECORDERS INDEX NO. _____

RECORDS OF _____ COUNTY

NOTE: States rights are not extinguished or transfer of title is not effected until recordation of related CTC resolution. (In compliance with Sections 128 & 129 of the STREETS & HIGHWAYS Code)

CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

ACCESS PROHIBITED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY	JV		
REVISED			

REL-1260

Exhibit "A" Relinquishment Map -- 2 of 3

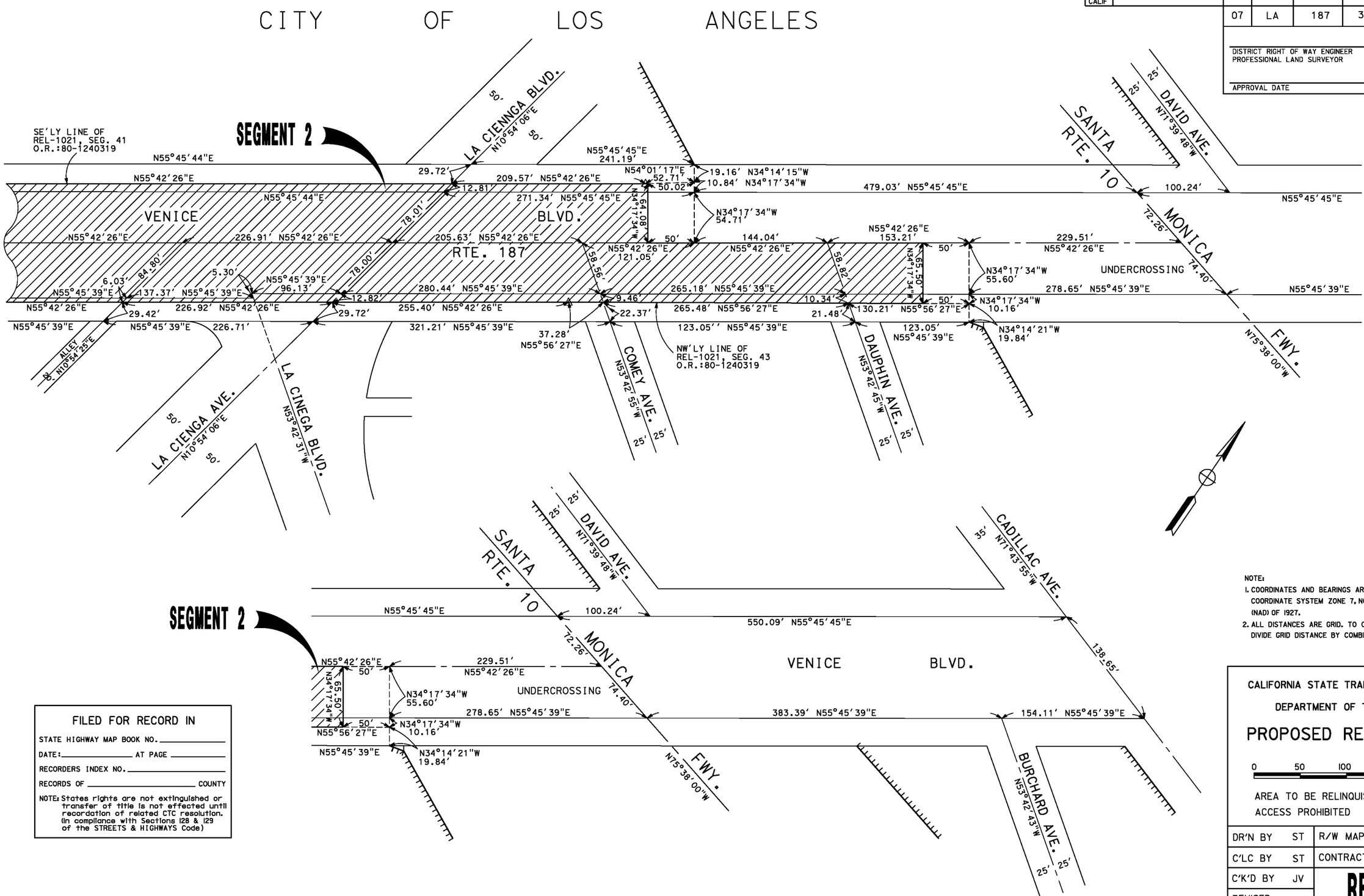
STATE	FEDERAL PROJECT NO.
CALIF	

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
07	LA	187	3.5/8.9	3	3

DISTRICT RIGHT OF WAY ENGINEER
PROFESSIONAL LAND SURVEYOR

APPROVAL DATE

PROFESSIONAL LAND SURVEYOR
D. DIANE WELLS
No. 7651
Exp. 12-31-16
STATE OF CALIFORNIA



NOTE:
1. COORDINATES AND BEARINGS ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE 7, NORTH AMERICAN DATUM (NAD) OF 1927.
2. ALL DISTANCES ARE GRID. TO OBTAIN GROUND DISTANCE DIVIDE GRID DISTANCE BY COMBINATION FACTOR 0.999986.

FILED FOR RECORD IN

STATE HIGHWAY MAP BOOK NO. _____

DATE: _____ AT PAGE _____

RECORDERS INDEX NO. _____

RECORDS OF _____ COUNTY

NOTE: States rights are not extinguished or transfer of title is not effected until recordation of related CTC resolution. (In compliance with Sections 128 & 129 of the STREETS & HIGHWAYS Code)

CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION

PROPOSED RELINQUISHMENT

0 50 100 150 200 FEET

AREA TO BE RELINQUISHED

ACCESS PROHIBITED

DR'N BY	ST	R/W MAP NO.	F2317, F2318, F1930 F1929-8, F2072-5&6
C'LC BY	ST	CONTRACT NO.	
C'K'D BY	JV	REL-1260	
REVISED			

Exhibit "A" Relinquishment Map -- 3 of 3

Memorandum

Serious drought.
Help Save Water!

To: Richard Chiang, STE
Office of Design A
Division of Design

Date: May 13, 2016

File: 07-LA-164
PM 1.39/3.98
07-LA-187
PM 3.5/8.9
Highway
Relinquishment

PN: **1846-0700000063-2**
EA: **07-333-0R0002**

From: DEPARTMENT OF TRANSPORTATION
OEE-HAZARDOUS WASTE BRANCH, SOUTH REGION
DIVISION OF ENVIRONMENTAL PLANNING

Subject: **ENVIRONEMENTAL LITERATURE SURVEY INVESTIGATION OF ROSEMEAD BOULEVARD (LA-164) BETWEEN GALLATIN ROAD TO 0.08 MILE SOUTH OF RUSH STREET; VENICE BOULEVARD (LA-187) BETWEEN STATE ROUTE 1 (SR-1) TO CADILLAC AVENUE**

As requested, the Office of Environmental Engineering (OEE) performed a limited environmental literature survey of multiple properties along two roadways, to evaluate the potential for release of hazardous substances or petroleum products. The roadways are as follows:

- Rosemead Boulevard (LA-164) between Gallatin Road and 0.08 south of Rush Street in the city of South El Monte in Los Angeles County.
- Venice Boulevard (LA-187) between State Route 1 and Cadillac Avenue in the city of Los Angeles in Los Angeles County.

The purpose of the environmental literature survey is for the proposed highway relinquishment of LA-164 and LA-187 (refer to Highway Relinquishment Agreements for terms and conditions for both corridors). The objective is to evaluate the potential that hazardous substances or petroleum products could have migrated to either of the two corridors (within the specified highway relinquishment limits). The Environmental information was collected from the California State Water Quality Control Board's Geotracker website (Geotracker) and the Department of Toxic Substances Control Envirostor website (Envirostor). This does not constitute a formal ASTM Environmental Site Assessment (ESA) report.

LA-164 (PM 1.385-3.975) ROSEMEAD BOULEVARD:

The properties along Rosemead Boulevard (LA-164) within the relinquishment limit are primarily used for commercial purposes. The literature search on Geotracker identified properties along Rosemead Boulevard that have affected groundwater and have documented releases of hazardous substances. Geotracker identified 14 open sites, 13 of which are inactive Cleanup program sites that

have impacted groundwater. One of the open sites is identified as a leaking underground storage tank (LUST) site, with no noted potential contaminated media of concern.

Geotracker also identified nine closed sites, seven of which are LUST sites, noting groundwater contamination from gasoline or organic compounds. Two of the nine closed sites are inactive cleanup program sites with unknown potential contaminated media of concern. The available environmental reports in Geotracker indicate groundwater in the area is approximately 30 feet below ground surface (bgs).

Attached is a screenshot of the Geotracker radius search map showing the hazardous waste sites in proximity to Rosemead Boulevard (LA-164).

LA-187 (PM 3.9-8.9) VENICE BOULEVARD:

The properties along Venice Boulevard (LA-187) within the highway relinquishment limit are primarily used for commercial purposes, including gasoline service stations, auto repair shops, and dry cleaner facilities. The literature search on Geotracker identified many of these properties with chemical releases that impacted both soil and groundwater. Geotracker identified 20 properties with groundwater contaminated with gasoline, benzene and fuel oxygenates. Eight of these sites are currently open. Geotracker also identified 14 closed LUST sites with only soil impacted by gasoline. These sites have no documented reports on Geotracker

Three of the 20 properties with groundwater contamination contained groundwater information on Geotracker. From the available documents, depth to groundwater ranged from approximately 11 feet (ft) bgs to approximately 80 ft bgs. The sites are as followed:

- Chevron #9-0545 is an open gasoline service station site that is eligible for closure and is approximately 10 feet away from the proposed project. The most recent monitoring report indicates low threat criteria met by the regional board. The maximum benzene concentration in groundwater is 0.88 micrograms per liter.
- TWS Products is an open-remediation site approximately 500 feet away from the proposed relinquishment with a groundwater depth ranging from 25-27 feet bgs. The gradient reported the direction of groundwater flow to be toward the Northeast with a hydraulic gradient of approximately of 0.02 feet per foot. A Phase II assessment concluded that soil and groundwater beneath the site have been impacted with fuel-related hydrocarbons and associated Volatile Organic Compounds (VOCs). A quarterly groundwater-monitoring program has been requested to obtain a better understanding of the affected groundwater beneath the site.
- Thrifty #247/Chevron is an open-remediation with a semi-annual groundwater monitoring and progress report available for review approximately 2,500 feet away from the proposed relinquishment. This gasoline service station report indicates that groundwater in the area is approximately 86 feet bgs. The gradient of the plume is flowing in a southwest direction toward the proposed relinquishment. According to the most recent monitoring report, groundwater samples collected during this event did not contain di-isopropyl ether (DIPE),

ethyl tertiarybutyl ether (EtBE), or tertiary-amyl methyl ether (TAME) at or above their respective method detection limits. Contamination from this site may have migrated and impacted groundwater beneath portions of Venice boulevard. Attached is a screenshot of the Geotracker radius search map showing the hazardous waste sites along Venice Boulevard.

If you have any questions, I can be reached at steve.chan@dot.ca.gov, (213) 897-3646, or contact Steve Friet of my staff at steve.friet@dot.ca.gov, (213) 897-7695.

Steve Chan

Steve Chan, P.E., STE
District Hazardous Waste Branch (South Region)
Office of Environmental Engineering (OEE)
Division of Environmental Planning

Attachments:

File
Cheryl Henderson, Division of Environmental Planning

GeoTracker

Save As... Ctrl+S

MAP LAYERS

- [x] Leaking Underground Storage Tank (LUST) Cleanup Sites
- [x] Cleanup Program Sites
- [x] Land Disposal Sites
- [x] Military Sites
- [x] WDR Sites
- [x] Irrigated Lands Regulatory Program
- [ ] Permitted Underground Storage Tank (UST) Facilities
- [ ] Oil and Gas Monitoring
- [ ] Non-Case Information / Project Sites
- [ ] Sampling Points - Public
- [ ] Zoom in to See Field Points
- [x] DTSC Cleanup Sites
- [ ] DTSC Haz Waste Permit
- [ ] DWR Groundwater Basins - INFO
- [ ] Zoom in to See Public Water Systems

☒ SIGNIFIES A CLOSED SITE

Measure a Distance View on GAMA

Gallatin Road, Pico Rivera, CA, United States

Map Address

Map Satellite

Rush Street

Gallatin Road

ROSEMEAD BLVD: Gallatin Rd to 0.08 mile south of Rush Street.

Exhibit "B" -- 4 of 5

Map data ©2016 Google 500 m Terms of Use Report a map error

SITES CURRENTLY VISIBLE ON MAP

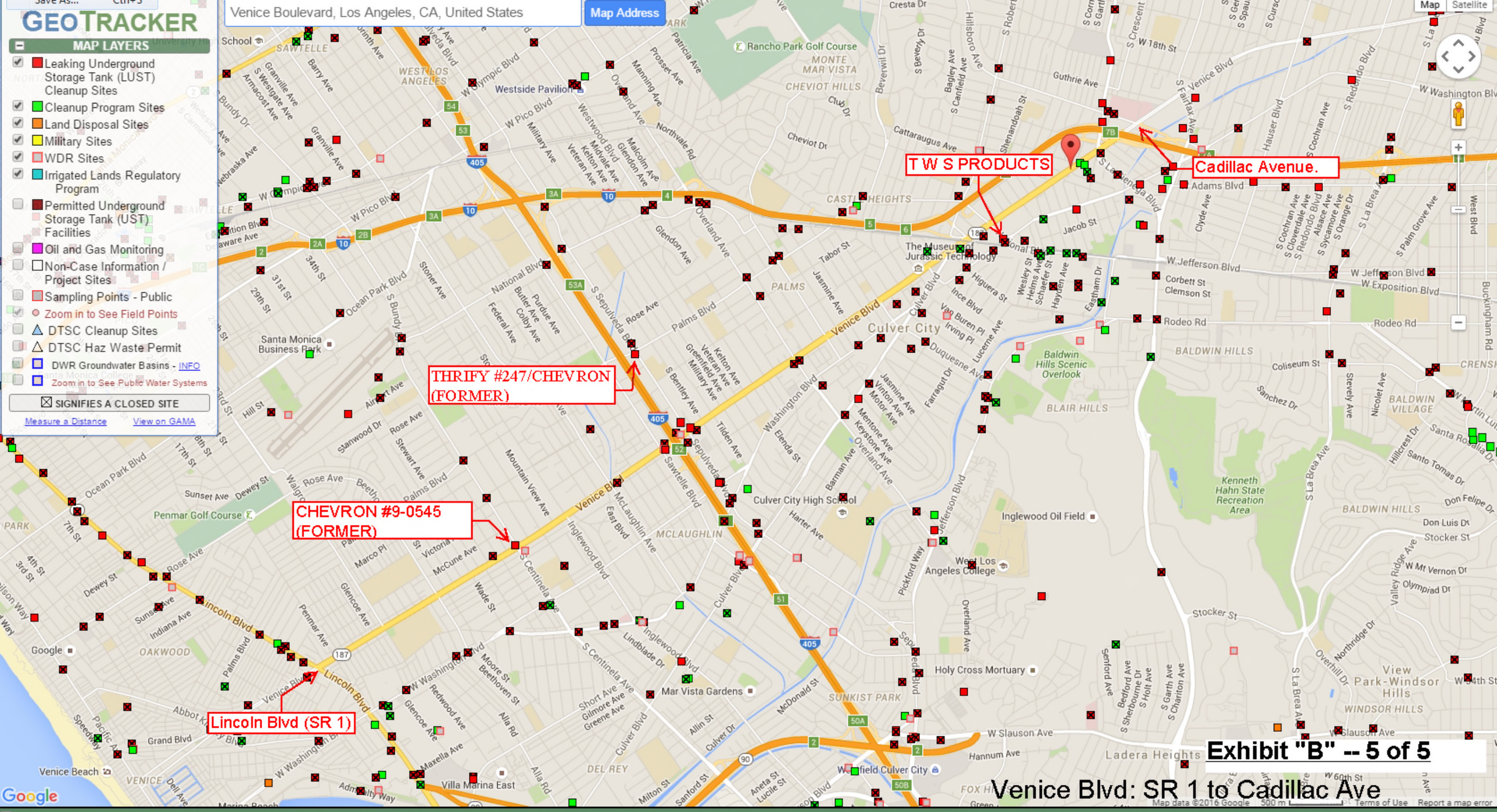

GEOTRACKER
MAP LAYERS
Leaking Underground Storage Tank (LUST) Cleanup Sites
Cleanup Program Sites
Land Disposal Sites
Military Sites
WDR Sites
Irrigated Lands Regulatory Program
Permitted Underground Storage Tank (UST) Facilities
Oil and Gas Monitoring
Non-Case Information / Project Sites
Sampling Points - Public
Zoom in to See Field Points
DTSC Cleanup Sites
DTSC Haz Waste Permit
DWR Groundwater Basins - INFO
Zoom in to See Public Water Systems
SIGNIFIES A CLOSED SITE
Measure a Distance
View on GAMA
Venice Boulevard, Los Angeles, CA, United States
Map Address
T W S PRODUCTS
Cadillac Avenue.
THRIFY #247/CHEVRON (FORMER)
CHEVRON #9-0545 (FORMER)
Lincoln Blvd (SR 1)
Exhibit "B" -- 5 of 5
Venice Blvd: SR 1 to Cadillac Ave
SITES CURRENTLY VISIBLE ON MAP

EXHIBIT "C"

Relinquishment of Traffic Signals on Route 187

From State to City of Los Angeles

Effective the date of recording of Relinquishment No. 1260

No	Rte	PM	Location	Asset	Meter #	Remarks
1	187	3.92	WALGROVE AVE	Signs/Safety Lighting	N/A	
2	187	4.08	MAPLEWOOD AVE	Signs/Safety Lighting	N/A	
3	187	4.27	BEETHOVEN ST	Signs/Safety Lighting	N/A	
4	187	4.48	WADE ST	Signs/Safety Lighting	N/A	
5	187	4.78	CENTINELA AVE	Signs/Safety Lighting	N/A	
6	187	4.94	GRANDVIEW BLVD	Signs/Safety Lighting	N/A	
7	187	5.1	INGLEWOOD BLVD	Signs/Safety Lighting	N/A	
8	187	5.4	MCLAUGHLIN AVE	Signs/Safety Lighting	N/A	
9	187	5.74	SAWTELLE BLVD	Signs/Safety Lighting	N/A	SE intersection in Culver City
10	187	5.91	SEPULVEDA BLVD	Signs/Safety Lighting	N/A	SE intersection in Culver City
11	187	6.35	GIRARD RT MIDVALE AVE LT	Signs/Safety Lighting	N/A	SE intersection in Culver City
12	187	6.49	MIDWAY LT GLENDON AVE LT	Signs/Safety Lighting	N/A	SE intersection in Culver City
13	187	6.62	OVERLAND AVE	Signs/Safety Lighting	N/A	SE intersection in Culver City
14	187	6.83	MOTOR AVE	Signs/Safety Lighting	N/A	
15	187	7.08	CLARINGTON AVE	Signs/Safety Lighting	N/A	
16	187	7.19	HUGHES AVE	Signs/Safety Lighting	N/A	
17	187	7.45	BAGLEY AVE LT / MAIN ST RT	Signs/Safety Lighting	N/A	
18	187	7.63	CULVER BLVD	Signs/Safety Lighting	N/A	
19	187	7.93	NATIONAL BLVD	Signs/Safety Lighting	N/A	
20	187	8.14	HELMS AVE	Signs/Safety Lighting	N/A	
21	187	8.33	CATTARAUGUS AVE	Signs/Safety Lighting	N/A	
22	187	8.64	LA CIENEGA BLVD	Signs/Safety Lighting	N/A	

Notes:

1. Traffic signals and Safety Lighting impacted by this Relinquishment (listed above) are on a existing Delegated Maintenance Agreement (DMA) with the City of Los Angeles. DMA to be updated upon completion of this Relinquishment.



Traffic Calming Study
Lexington, Massachusetts

Presented by
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May 25, 2016

Agenda

- Recap of October Meeting
- Mitigation Considerations
  - First Level Screening and Alternatives Analysis
  - Construction Mitigation

Recap of October Meeting – Primary Concerns Expressed by Neighbors

- High travel speeds on neighborhood streets
- Improper placement and/or lack of intersection control at neighborhood intersections
- Limited pedestrian accommodations
- Increase in neighborhood cut-through traffic, particularly during construction

Existing Conditions – Analysis Findings

- Travel speeds on neighborhood streets
  - 85th percentile
  - Exceeding 85th percentile
- Potential East Mass Ave project benefits/impacts
  - Reduced queuing along Mass Ave and along Pleasant Street should encourage motorists to remain on primary roadways
  - Potential increase in overall Mass Ave delay = vulnerability to Follen Road during evening peak hour
  - Vehicles headed northeast (towards Lowell St) may still utilize neighborhood(s) as cut-through during evening peak hour

Mitigation Considerations



First Level Screening

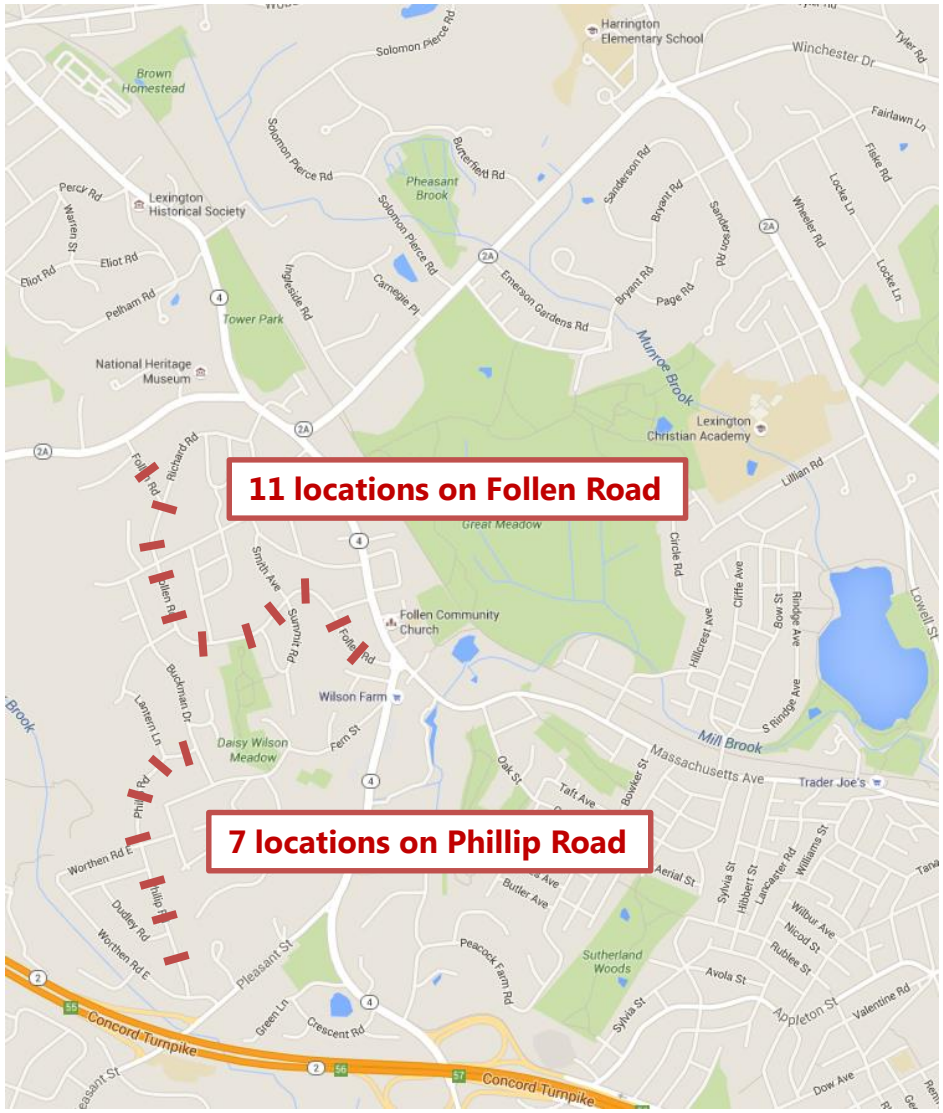
- Appropriate countermeasures were identified for implementation in the neighborhoods
- These countermeasures include:
  - Installing/relocating signage (stop signs, speed limit signs, warning signs, etc.)
  - Installing speed humps/tables or traffic circles
  - Restricting turns (on a time restricted or permanent basis)
  - Closing roads
  - Installing curb extensions/chicanes
  - Installing pedestrian accommodations

Countermeasure Matrix

✓ Positive Impact ● Neutral Impact ✖ Negative Impact	Phillip Road/Follen Road Neighborhood							Peacock Farm Road Neighborhood			Bow Street/Reservoir Neighborhood									
	Post advisory speed limit signs throughout neighborhood	Install speed humps along Phillip Road and Follen Road	Install raised intersections at five locations on Phillip Road and Follen Road	Install traffic circles at two locations on Follen Road	Install "Do Not Enter" signs, with weekday morning peak period time restrictions, at Follen Road and Tower Road	Install "Do Not Enter" signs, with weekday evening peak period time restrictions, at Follen Road and Worthern Road	Close Follen Road at Pleasant Street creating a cul-de-sac	Post advisory speed limit signs throughout neighborhood	Install "Do Not Enter" signs, with weekday evening peak period time restrictions, at Peacock Farm Road	Install a four-way stop at the intersection of Baker Avenue/Oak Street	Post advisory speed limit signs throughout neighborhood	Install speed humps along Bow Street	Install a raised intersection at Bow Street/Winn Avenue	Install a four-way stop at the intersection of Rawson Avenue/Albermarle Avenue	Install "Do Not Enter" signs, with weekday morning peak period time restrictions, at Lillian Road	Install "Do Not Enter" signs, with weekday evening peak period time restrictions, at Fottler Avenue and Bow Street	Relocate the westbound approach stop sign at the intersection of Bow Street/Rawson Road	Reduce turn radii at two locations	Install crosswalks at the intersection of Fottler Avenue/Hillcrest Avenue/Theresa Avenue	Create pedestrian waiting area at the intersection of Fottler Avenue/Hillcrest Avenue/Theresa Avenue
Mobility																				
Impact to residential access	●	●	●	●	✖	✖	✖	●	✖	●	●	●	●	●	✖	✖	●	●	●	●
Impact to school and/or church access	●	●	●	●	✖	✖	✖	●	●	●	●	●	●	●	●	●	●	●	●	●
Diversion of traffic to other neighborhood streets	●	●	●	●	✖	✖	✖	●	●	●	●	✖	●	●	●	●	●	●	●	●
Safety																				
Reduce vehicular travel speeds	●	✓	✓	✓	●	●	●	●	●	●	●	✓	✓	●	●	●	●	✓	●	●
Reduce vehicular "cut-through" traffic	●	✓	✓	●	✓	✓	✓	●	✓	●	●	✓	✓	●	✓	✓	●	●	●	●
Increase awareness of speed limit	✓	●	●	✓	●	●	●	✓	●	●	✓	●	●	●	●	●	●	●	●	●
Increase awareness of intersection	●	●	✓	✓	●	●	●	●	●	✓	●	●	✓	✓	●	●	✓	●	●	●
Increase awareness of non-motorist crossings	●	●	✓	✓	●	●	●	●	●	●	●	●	✓	●	●	●	●	●	✓	●
Impact to emergency vehicle access	●	✖	✖	✖	●	●	✖	●	●	●	●	✖	✖	●	●	●	●	●	●	●
Geometric																				
Impact to drainage	●	✖	✖	●	●	●	●	●	●	●	●	✖	✖	●	●	●	●	●	●	●
Impact to maintenance activities	●	✖	✖	✖	●	●	●	●	●	●	●	✖	✖	●	●	●	●	●	●	✖
Impact to parking	●	✖	●	●	●	●	●	●	●	●	●	✖	●	●	●	●	●	●	●	●
Impact to property	●	●	✖	●	●	●	●	●	●	●	●	●	✖	●	●	●	●	●	●	✖
Environmental																				
Reduce noise	●	✖	✖	●	✓	✓	✓	●	✓	✖	●	✖	✖	✖	✓	✓	●	●	●	●
Reduce air pollution	●	●	●	●	✓	✓	✓	●	✓	✖	●	●	●	✖	✓	✓	●	●	●	●
Schedule (months) includes public process, design and construction	1-3	18+	18+	18+	3-6	3-6	12+	1-3	3-6	3-6	1-3	3-6	18+	3-6	3-6	3-6	1-3	3-6	6-12	6-12
Cost	$	$$$	$$$	$$$	$	$	$$$	$	$	$	$	$$	$$$	$	$	$	$	$$	$$	$$

Speed Limit Signs and Speed Humps

- Post speed limit signs of 30 mph at select locations (advisory)
- Install speed humps
  - approximately 400-foot intervals
  - midpoint travel speed of 25 mph (design speed)
  - Can reduce vehicular speeds and vehicular “cut-through” traffic
  - May impact drainage, maintenance activities, property, emergency vehicle access, and increase noise
  - Locations not finalized



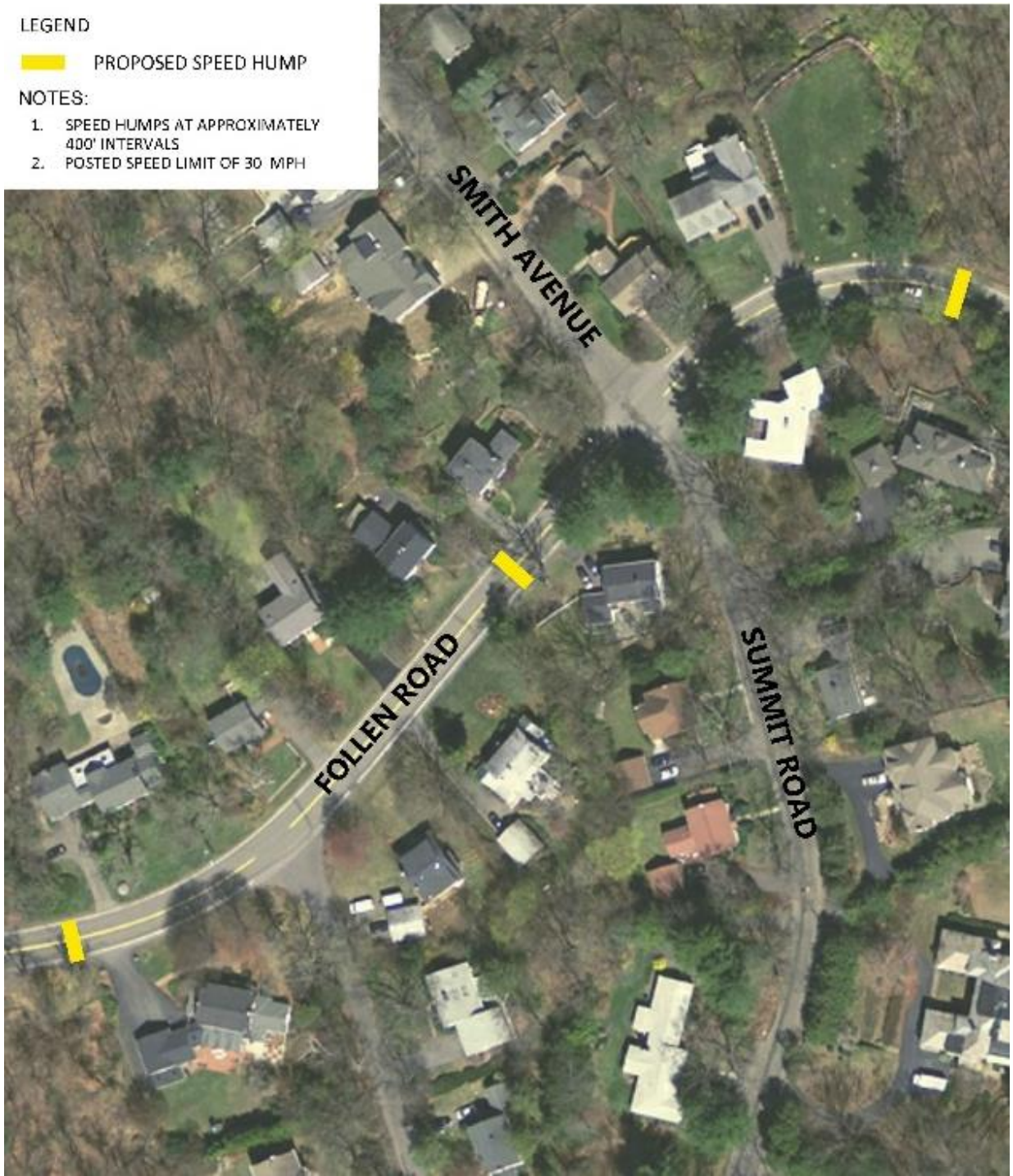
Follen Road
Marrett Road to Locust Avenue



Follen Road Locust Avenue to Lexington Avenue



Follen Road Lexington Ave to Gibson Road



Follen Road Gibson Road to Mass Ave



Phillip Road Buckman Drive to Worthern Road



Phillip Road Worthern Road to Goffe Road

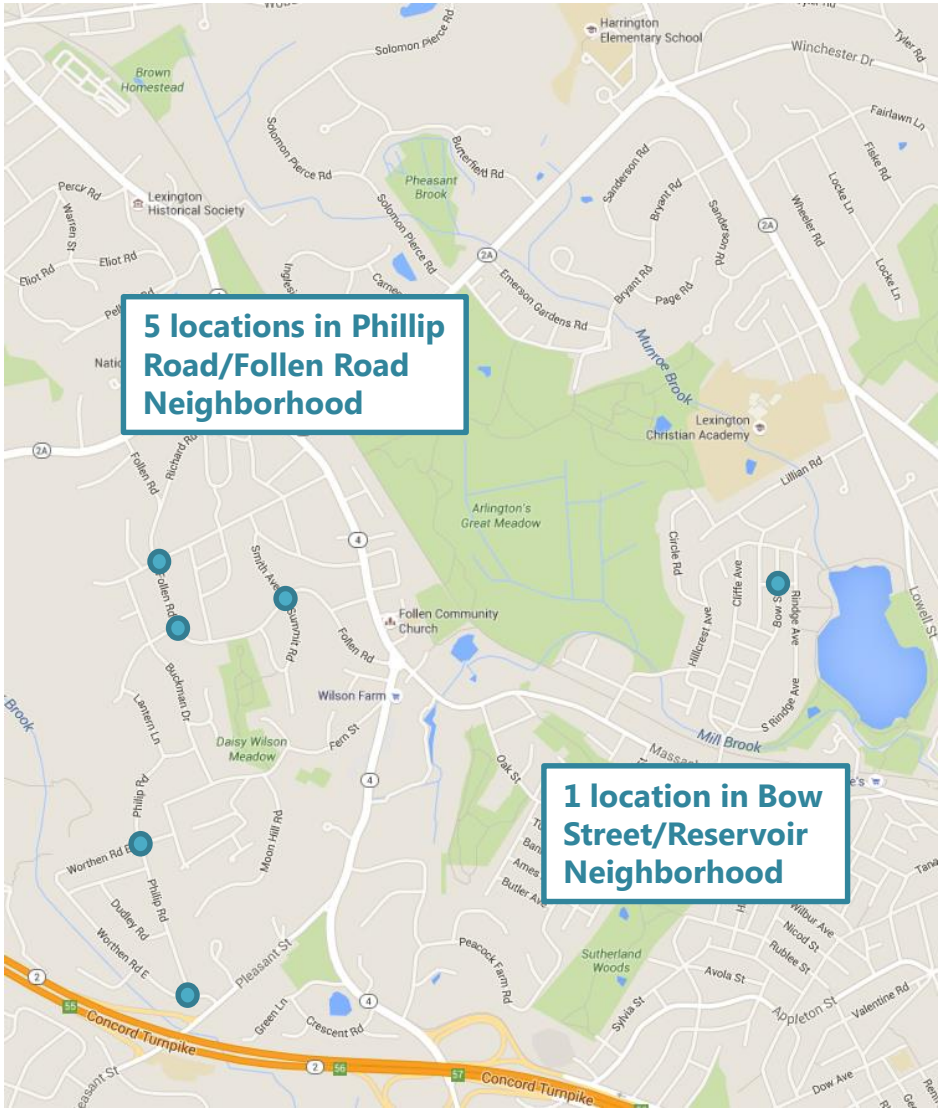


Phillip Road
Goffe Road to
Worthern Road



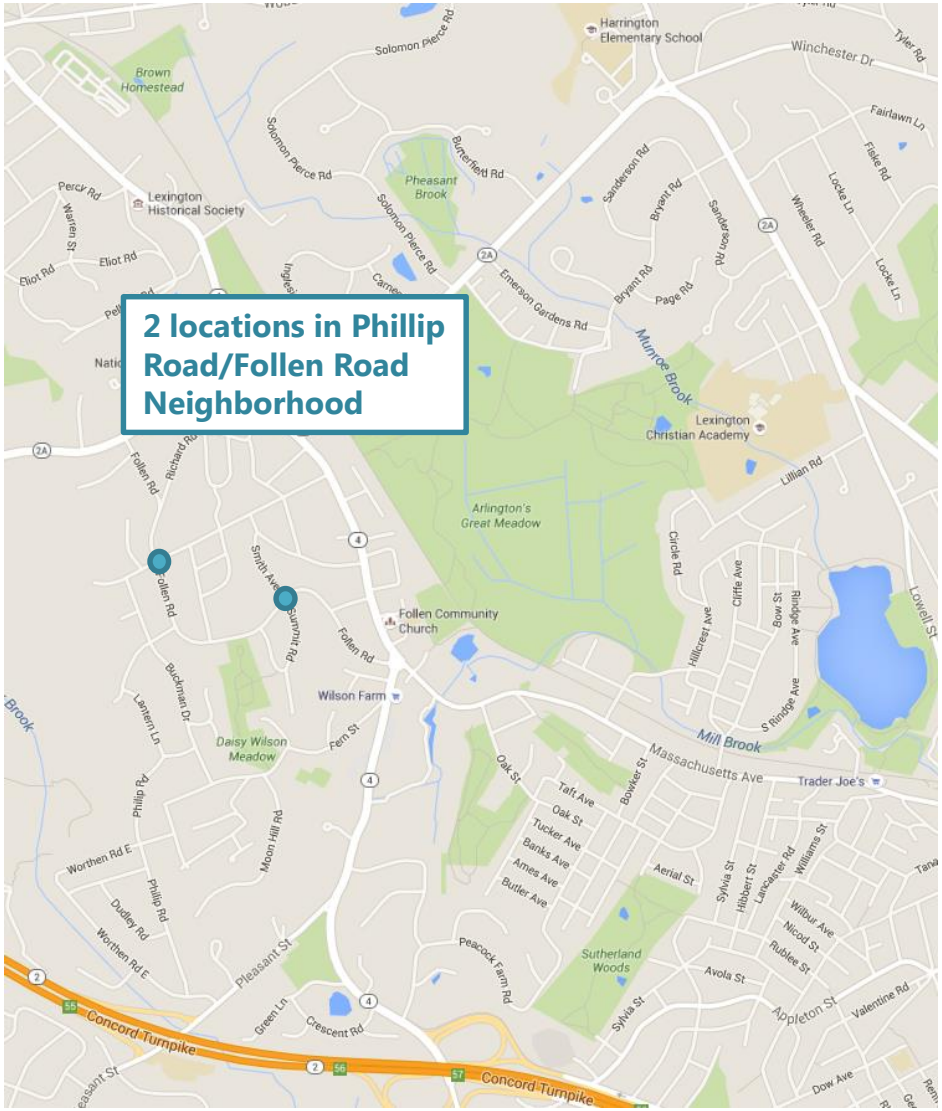
Raised Intersections

- Can reduce vehicular speeds and vehicular “cut-through” traffic
- Can increase awareness of intersections and non-motorist crossings
- May impact drainage, maintenance activities, property, emergency vehicle access, and increase noise
- Cost



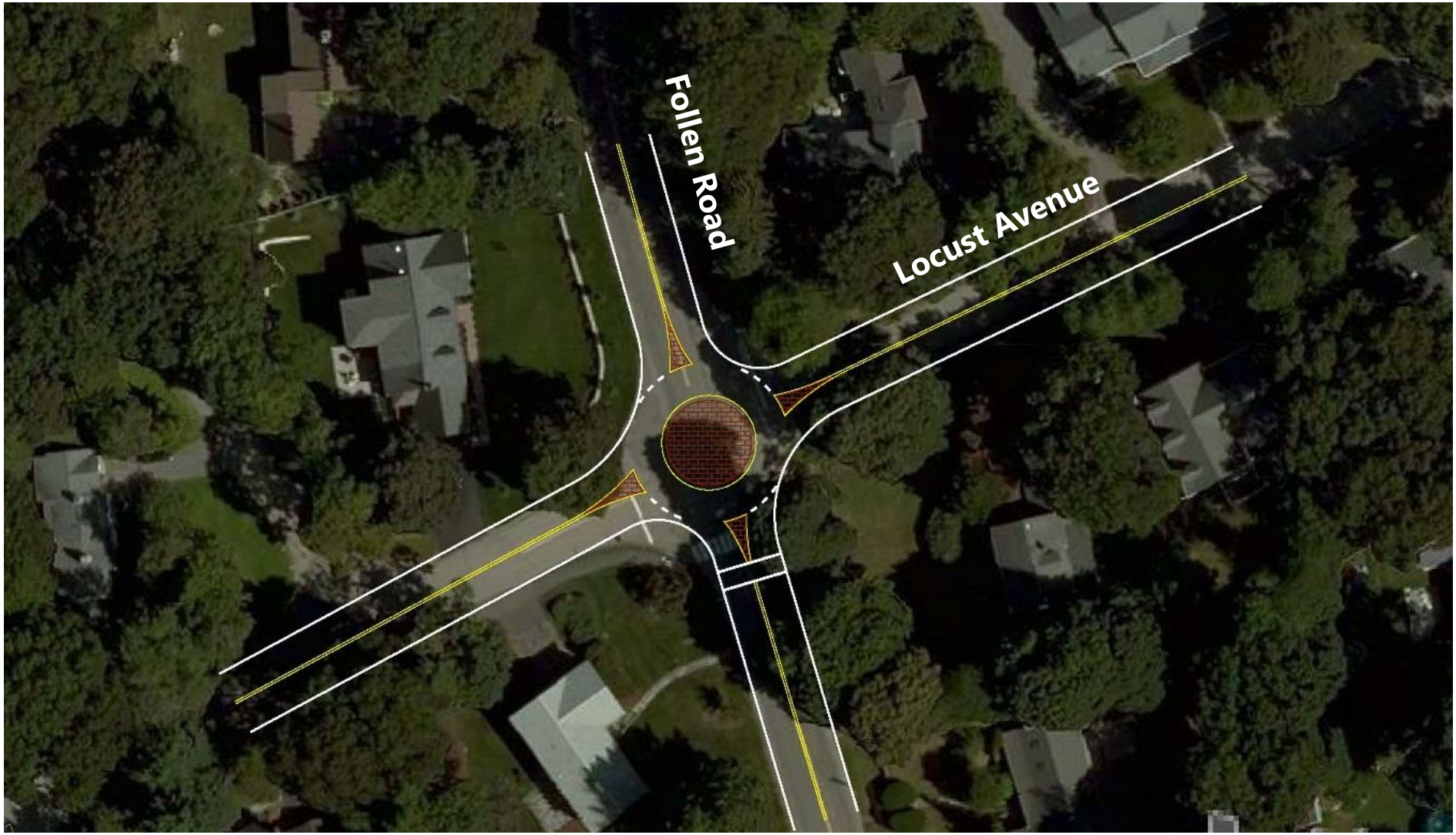
Traffic Circles

- Can reduce vehicular speeds and vehicular “cut-through” traffic
- May impact right-of-way and ease of vehicular turning movements
- Cost



Follen Road at Locust Avenue

Source: Bing Maps 2016



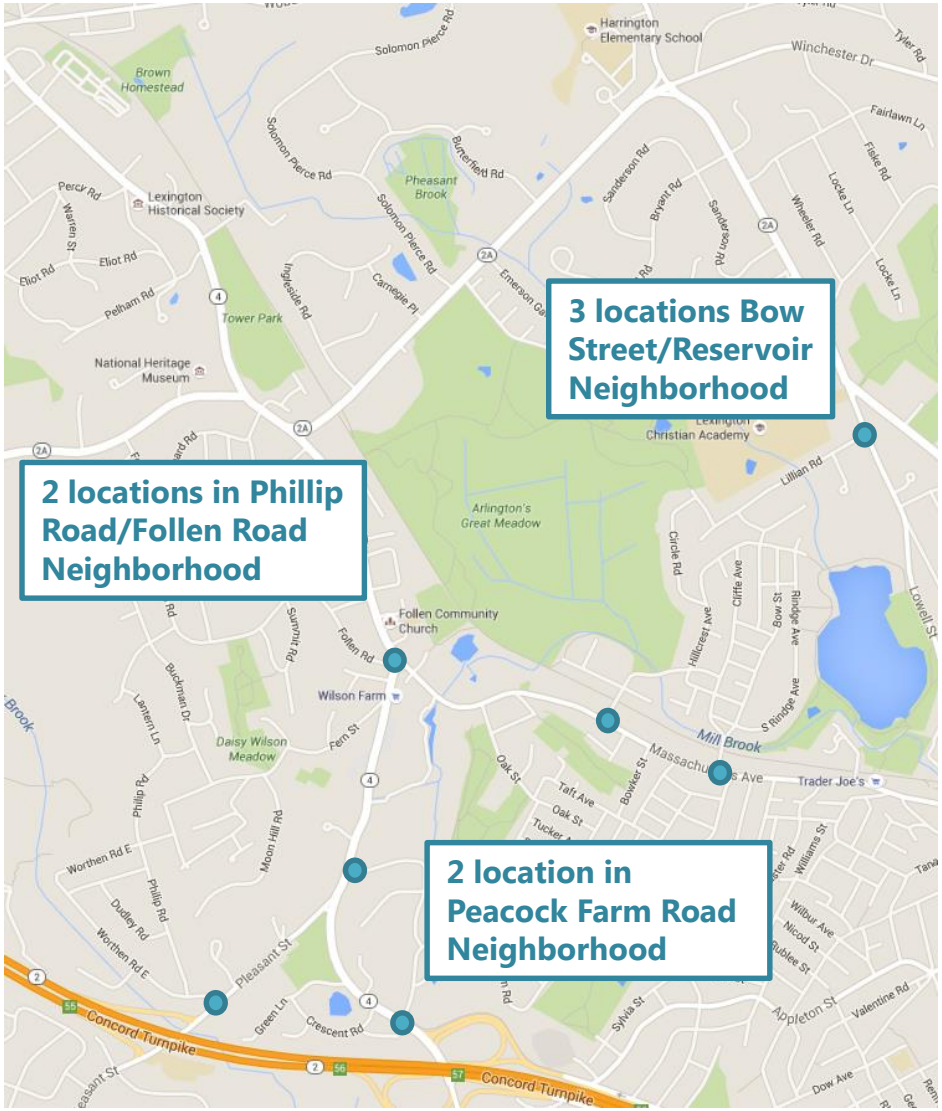
Follen Road at Smith Avenue/Summit Road

Source: Bing Maps 2016



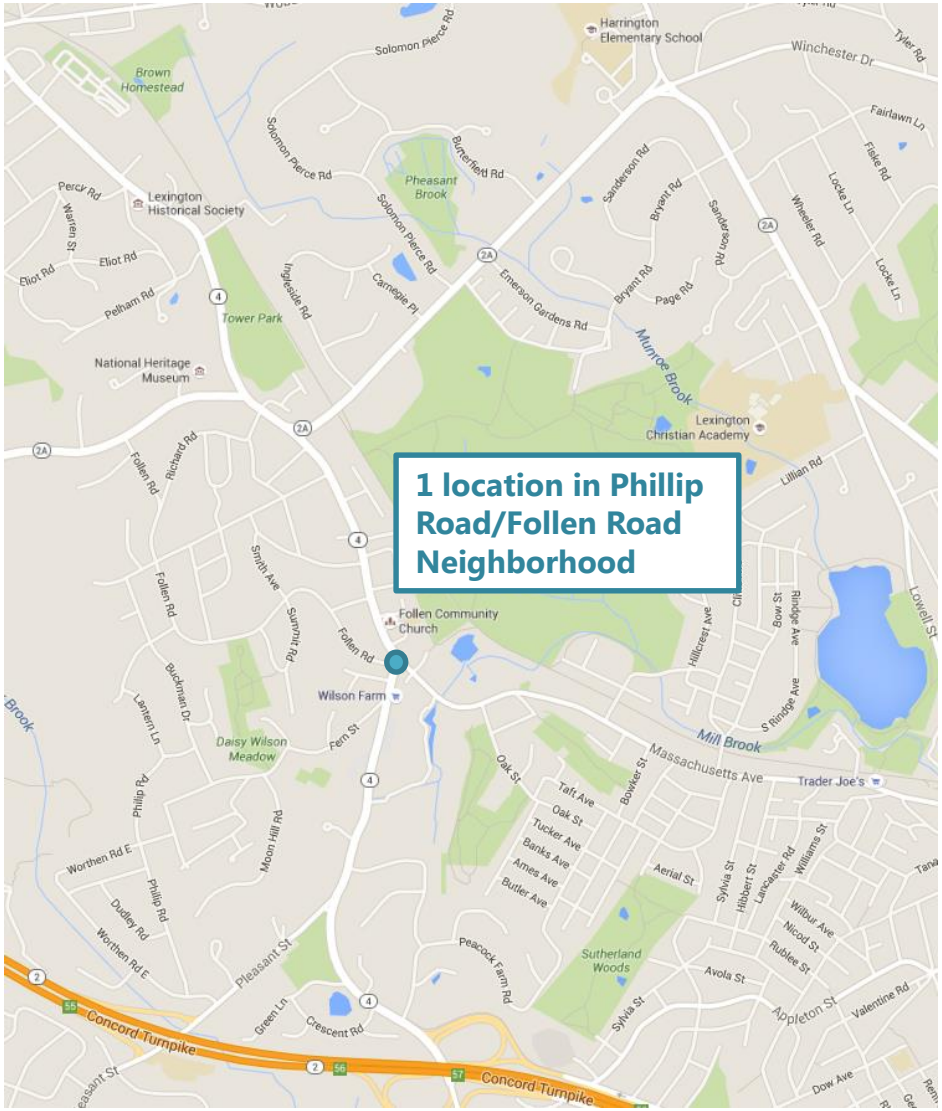
Turn Restrictions

- May reduce “cut-through” traffic, noise, and vehicle emissions
- Impacts access for residents and institutional users, and may divert traffic other neighborhood streets
- Success dependent on police enforcement



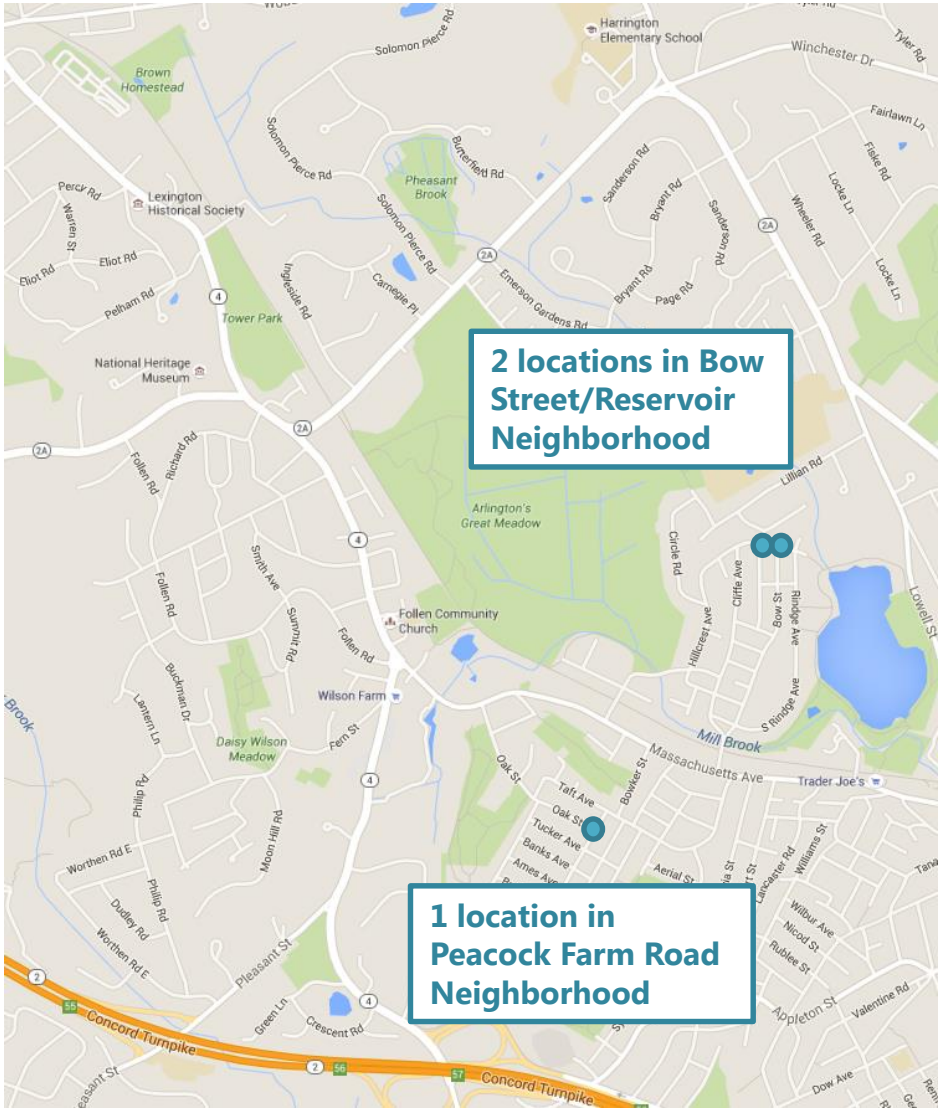
Road Closures

- Can reduce “cut-through” traffic, noise, and vehicle emissions
- Can create a friendlier pedestrian environment
- Impacts access for residents, institutional users, and emergency vehicles, and may divert traffic other neighborhood streets



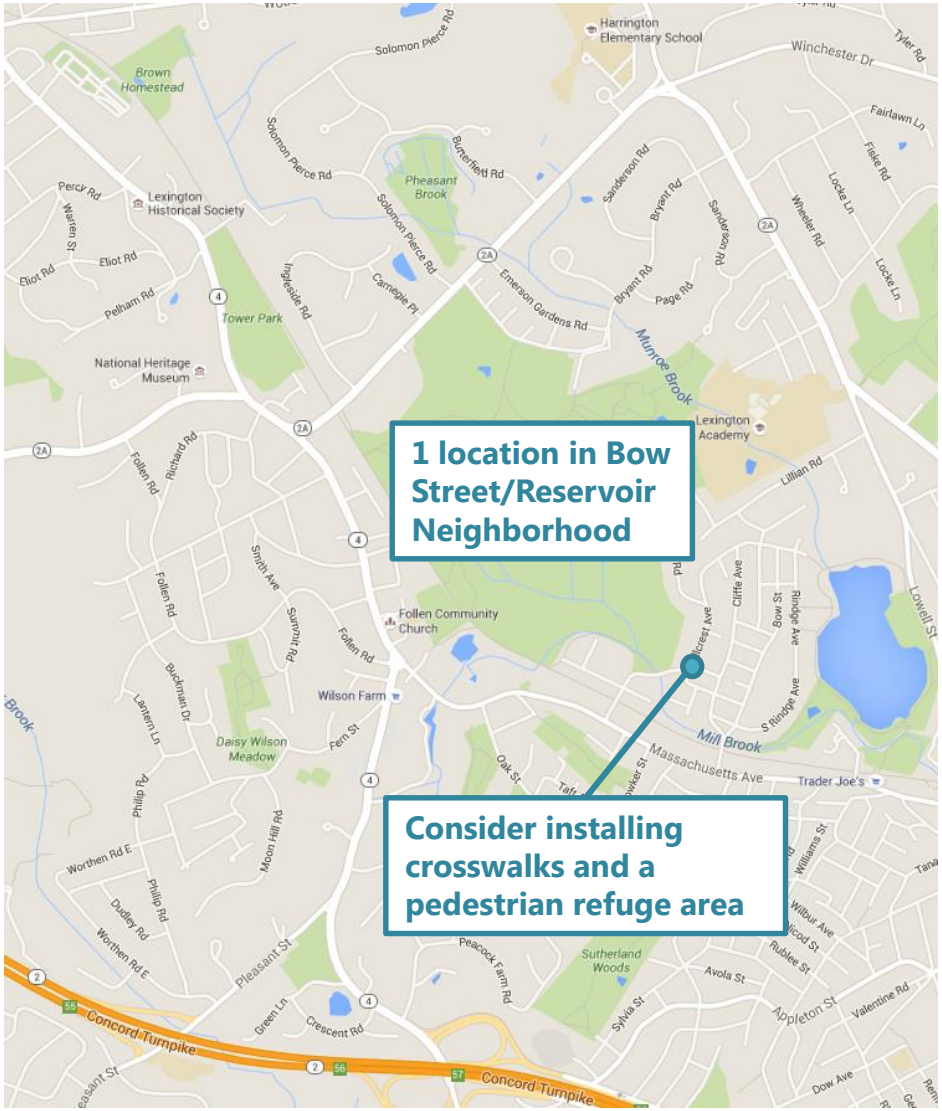
Stop Signs

- Helps increase awareness of the intersection
- Installation dependent on meeting criteria outlined by federal and state guidelines
- Tends to increase noise and vehicle emissions due to excessive starting and stopping



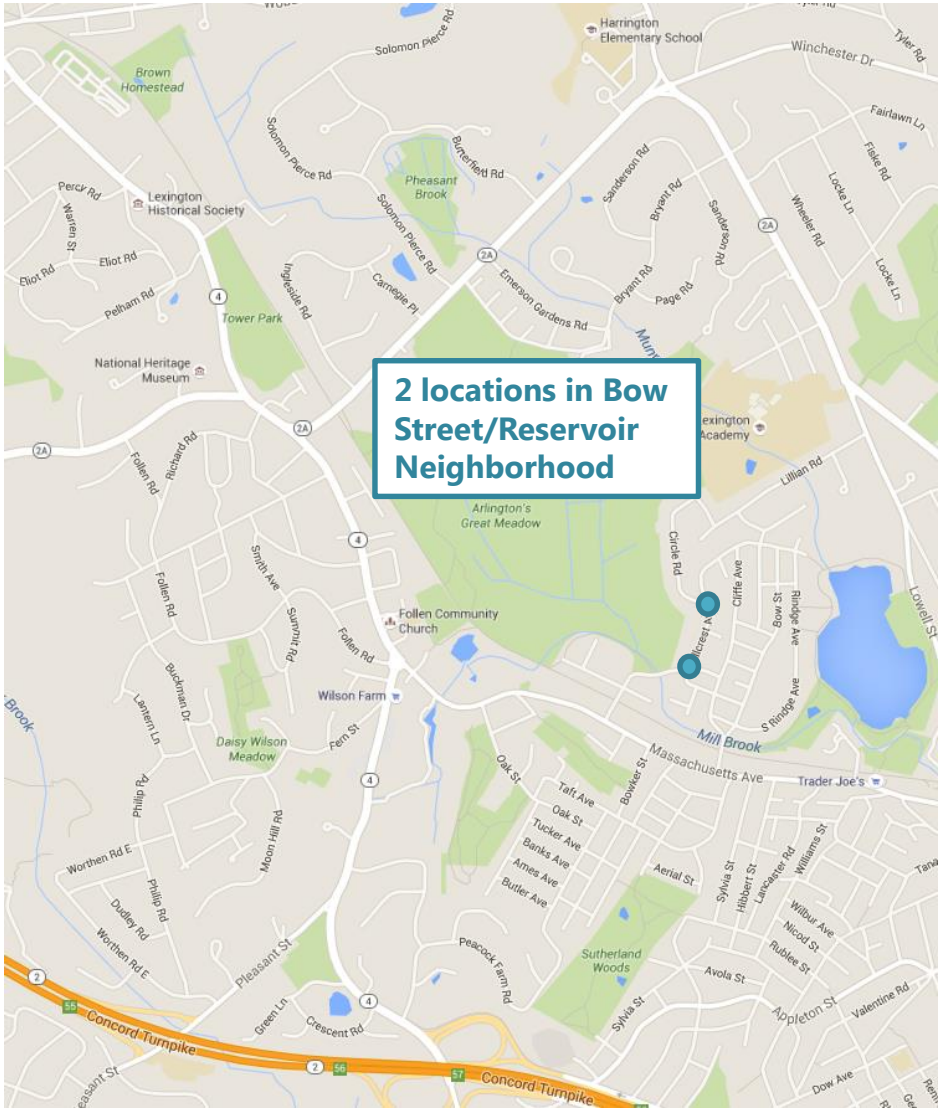
Pedestrian Accommodations

- Increases awareness of non-motorist crossings
- Advanced warning signage should be installed with crosswalks as outlined by federal and state guidelines
- Pedestrian refuge areas (student bus stop location(s)) may have property impacts and increased maintenance



Reduced Intersection Radii

- Can help control vehicular speeds



Construction Mitigation

- Develop construction mitigation plan
- Share with the public prior to construction activities
- Could include one or more of the following:
  - Installing temporary signage
  - Stationing police details along the corridor to help control traffic
  - Requiring regular coordination meetings

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The joint association of air pollution and noise from road traffic with cardiovascular mortality in a cohort study

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Occup. Environ. Med. published online 18 Nov 2008;
doi:10.1136/oem.2008.042358

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OEM Online First, published on November 18, 2008 as 10.1136/oem.2008.042358

The joint association of air pollution and noise from road traffic with cardiovascular mortality in a cohort study

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Keywords: air pollution, noise, cardiovascular mortality, cohort.

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ABSTRACT

Objectives

The authors investigated associations between cardiovascular mortality and air pollution and noise together.

Methods

Data from an ongoing Dutch cohort study on diet and cancer (NLCS, 120,852 subjects; follow-up 1987-1996) were used. Cox proportional hazard analyses were conducted for the association between cardiovascular mortality and exposure to black smoke (BS), traffic intensity on the nearest road and road traffic noise at the home address.

Results

The correlations between traffic noise and background BS, and traffic intensity on the nearest road were moderate at: 0.24 and 0.30 respectively. Traffic intensity was associated with cardiovascular mortality, with highest relative risk (95% confidence interval) for ischemic heart disease (IHD) mortality: 1.11 (1.03 - 1.20) (increment 10,000 mvh/24h). Relative risks for BS concentrations were elevated for cerebrovascular (1.39 (0.99 - 1.94)) and heart failure mortality (1.75 (1.00 - 3.05) (increment 10 $\mu g/m^3$). These associations were insensitive to adjustment for traffic noise. There was an excess of cardiovascular mortality in the highest noise category (>65 dB(A)), with elevated risks for IHD (1.15 (0.86 - 1.53) and heart failure mortality (1.99 (1.05 - 3.79). After adjustment for BS and traffic intensity noise risks became unity for IHD mortality and slightly reduced for heart failure mortality.

Conclusions

Associations between BS concentrations and traffic intensity on the nearest road with specific cardiovascular causes of death were not explained by traffic noise in this study.

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INTRODUCTION

Cohort studies have shown associations between long-term exposure to particulate matter air pollution and cardiovascular mortality (1-4). Cohort studies which were mostly conducted in Europe have reported associations between traffic-related air pollution and cardiovascular mortality (5-7). Exposure to traffic-related air pollution has been assessed using dispersion modeling (7), measured or modeled air pollution data and traffic variables assessed with geographic information systems (5,6,8,9).
Motorized traffic is not only an important source of air pollution, but also of noise (10,11). Exposure to traffic noise is associated with ischemic heart disease (10). Exposure to traffic noise is usually modeled using traffic intensity, traffic composition, speed, distance to roads, noise barriers and other factors as input variables.
The joint association of long-term exposure to air pollution and noise with cardiovascular mortality has not been reported before.

We earlier reported an association between traffic-related air pollution, traffic intensity and mortality in a Dutch cohort (12). In this paper, we study the joint association of long-term exposure to air pollution, traffic intensity and noise with cardiovascular mortality. Because air pollution and noise may be associated with different cardiovascular endpoints (7,9-11,13,14), we studied overall as well as subcategories of cardiovascular mortality.

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MATERIALS AND METHODS

Study design

The cohort has been described in detail (15). Briefly, the Netherlands Cohort Study on Diet and Cancer (NLCS) started in September 1986 with 120,852 subjects aged 55-69 years living in 204 municipalities located throughout the country. The NLCS study was designed as a case-cohort study, i.e. cases are derived from the entire cohort, while the person years at risk are estimated from a random subcohort (N ~ 5,000) (16). In our analyses we will however use data from all participants.

At baseline, all participants completed an 11-page questionnaire on risk factors for cancer. For all participants, data from one machine readable page of the questionnaire were entered (with information about age, gender and smoking status). The exact residential address at baseline was also available. The entire cohort was followed up for cancer incidence and mortality (17). For emerging cases and the randomly selected subcohort, the remaining 10 questionnaire pages (not machine readable) were manually entered. As a result, only limited confounder information is available for the full cohort.

Mortality data for the period 1987-1996 were obtained from the Dutch Central Bureau of Genealogy and Statistics Netherlands. Completeness of case ascertainment could be checked by using information from the subcohort. The subcohort (N = 5,000) has been followed biennially. The completeness of mortality follow-up was estimated to be over 99%. Cause of death information from death certificates which were filled in by a physician was available from Statistics Netherlands. For 99.7% of the cases a cause of death was available. The cause of death was coded according to ICD-9 for period 1986-1995 and ICD-10 for 1996. In our analyses we used the primary cause of death. The cause of death was coded according to ICD-9 for period 1986-1995 and ICD-10 for 1996. In our analyses we used the primary cause of death. Cardiovascular mortality was grouped into ischemic heart disease (IHD), cerebrovascular, heart failure, and cardiac dysrhythmia mortality (Table 1).

The NLCS study was approved by institutional review boards from Maastricht University and the Netherlands Organization for Applied Scientific Research (TNO). All cohort members consented to participation by completing the mailed, self-administered questionnaire.

Table 1. Number of deaths during follow-up.*

Cause	ICD-9 codes	ICD-10 codes	Number of deaths
Cardiovascular mortality	400 – 440	I10 – I70	6,137
Ischemic heart disease mortality	410 – 414	I20 – I25	3,521
Cerebrovascular mortality	430 – 438	I60 – I69	1,175
Heart failure mortality	428	I50	422
Cardiac dysrhythmia mortality	427	I44 - I49	339

* ICD is International Classification of Diseases

Air pollution

The air pollution exposure assessment method has been described previously (18). Long-term exposure to outdoor air pollution was estimated at the 1986 home addresses, which were geocoded into standard Dutch geographic coordinates (Address Coordinates Netherlands (ACN)) using a database with high geographical accuracy from 2000 (12).

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Exposure was estimated as the sum of regional, urban and local traffic contributions. Regional background concentrations were estimated using interpolation of data from regional background sites in the national monitoring network. The interpolation method was validated using cross-validation (18). The urban component was estimated using regression models relating measured urban concentrations to the number of inhabitants around a monitoring site. The sum of the regional and urban contributions was defined as background concentration. Average background concentrations for the period 1987-1996 were estimated for black smoke, nitrogen dioxide (NO_2), and fine particles less than 2.5 μm in diameter ($PM_{2.5}$). Average background concentrations were assigned to the 1986 home address. In this paper we used Black Smoke (BS) concentrations, as it is a measure of the traffic-related component of particles.

Local traffic contributions were characterized by traffic variables which were assessed using a Geographic Information System (GIS) and a digital road network (from the year 2001) with linked traffic intensities for 1986 (18). To roads without traffic intensities a background traffic intensity value of 1,225 mvh/24h was assigned assuming that these roads are not major. This was done to avoid underestimation of local traffic contributions for example when calculating traffic intensity in a buffer. A value of 1,225 mvh/24h was used, because this was half of the value of 2,450 mvh/24h that was used in the Dutch Environmental Traffic Maps to distinguish between roads for which air pollution assessments were and were not made. Approximately 80% of the participants had an assigned traffic intensity on the nearest road of 1,225 mvh/24h (18). Assessed traffic variables were the traffic intensity on the nearest road, sum of traffic intensity in a 100m buffer around a residential address, and an indicator variable for living near a major road (i.e. living within 100 m of a motorway and/or within 50 m of a local road with traffic intensity > 10,000 mvh/24h). In this paper we used traffic intensity on the nearest road as indicator for local traffic contributions, because it had the strongest association with cardiovascular mortality (12). In addition, studies have shown that there are important variations in the concentrations close to busy roads (18). Other studies have also used traffic variables as indicator for proximity to busy roads (5,6,8,9). Because addresses were geocoded with a database from 2000 and the digital road network was from 2001, coordinates and road network are compatible.

Urban background BS concentration and traffic intensity were separately analyzed to identify separate effects of living near a busy road.

Traffic noise

Road traffic noise at the 1986 home address was estimated for all subjects using EMPARA, a state-of-the-art model for noise mapping in the Netherlands (resolution 25x25m). Traffic noise was modeled as equivalent A-weighted yearly average sound pressure levels (dB(A)) (19). The model is based upon standard noise calculation methods in the Netherlands (20). Input variables for the model are traffic intensity, traffic composition and traffic speed (determining noise emission), distance to roads, land use (hard versus soft surface; density of built-up area), location of noise barriers and quiet asphalt (determining transmission) (19). Input data were collected for the period 2000-2001, because not all required data for 1986 were available. Traffic intensities are a major input variable in these models. We documented that while absolute traffic intensities increased during the follow-up period (1987- 1996), traffic intensity data for 1986 and

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1996 were highly correlated (>0.9) (18). Other important factors such as distance to roads and density of the built-up area were likely stable as well.
The validity of EMPARA has been evaluated for both rural and urban locations using measured data and calculations with more detailed noise models. Both the measured and calculated values differed on average less than 2-3 dB(A) from the EMPARA results (19). The range in modeled noise levels was 29-75 dB(A).
As noise exposure indicator, we used the standard measure for noise exposure in the Netherlands before the implementation of the European Noise Directive (21). This was defined as the maximum of the annual average noise level during the day (7 to 19h), or the evening (19 to 23 h) or the night (23 to 7 h). The levels during the evening and during the night receive a penalty of respectively 5 and 10 dB(A) (19). No information was available for other noise indicators like background noise or the number of noise events.

Statistical analysis
We conducted analyses in the full cohort using Cox proportional hazards models. Person-years were calculated for all participants from baseline until death or end of follow-up. Person-years for subjects who died from causes other than those being analyzed were defined censored at the time of death in cause-specific analyses.
We added urban background BS concentration and traffic intensity on the nearest road as continuous variables, to assess the potential confounding effects of adding traffic noise to especially the traffic intensity variables.
Effects of traffic noise exposure were analyzed with noise classified into categories of 5 dB(A), from ≤50 dB(A) to >65 dB(A). These categories were chosen to address thresholds which have been observed in previous studies (10).
Effects of air pollution and noise were investigated separately and in conjunction. Relative risks (RR) were calculated for black smoke concentration and traffic intensity differences between the 5th and the 95th percentile: this was rounded to 10 $\mu g/m^3$ and 10,000 motor vehicles/24h (mvh/24h), respectively. Relative risks for noise were calculated with ≤50 dB(A) as reference category.
We adjusted for gender, age at baseline, and smoking status coded as never, ex, and current smoking separately for cigarette, cigar and pipe smoking. We further adjusted for indicators of socioeconomic status at the neighborhood (average size 3.6 km^2) and COROP scale (40 areas; average size ~1,000 km^2) as in our previous paper (Table 2) (12).
Because we conducted analyses in the full cohort, only a limited number of confounders was available. Comparing this limited set of confounders with the full confounder set in case-cohort analyses gave evidence that this limited set of confounders was sufficient to adjust for confounding in the air pollution analyses in this cohort (12).
We did not adjust for spatial clustering as it was previously not found to be important (12).
Data management was done using SPSS 12.0 (SPSS Inc, Chicago, US), and statistical analyses were conducted using STATA statistical software 8 (STATA Corporation, College Station, US). GIS calculations were conducted using ArcInfo (ESRI, Redlands, US).

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Additional analyses

As sensitivity analyses we investigated traffic intensity on the nearest road as categorical variable (≤1,225 mvh/24h (reference category); 1,225 – 10,000 mvh/24h; and >10,000 mvh/24h).

Further, we conducted analyses with NO_2 and $PM_{2.5}$ background concentrations and with other traffic variables (living near a major road and traffic intensity in a 100 m buffer).

We investigated traffic noise as continuous variable in a linear model.

Sensitivity analyses with exclusion of observations with traffic noise above 65 dB(A) were conducted. We also conducted sensitivity analyses with exclusion of subjects for which no traffic data were available.

We conducted separate analyses for men and women because most previous studies investigated the noise effects in men only (10). We investigated effect modification by age (age < 62 years and age > 62 years), cigarette smoking status (never/ex/current) and percentage of persons with low income at the neighborhood scale (in tertiles). Heterogeneity in relative risk estimates between different subgroups was tested using Cochran's Q test (22).

Table 2. Descriptive characteristics of cardiovascular mortality cases and non-cases according to various baseline characteristics (among subjects for which geographical coordinates of the home address were available (N = 117,528)).
Values are number (percentage) or median (Inter Quartile Range).

Characteristic	**Cases** (N = 6,137)	**Non-cases in full cohort** (N = 111,391)
Gender (men)	4,243 (69.1 %)	52,558 (47.2 %)
Age (years)	64 (61 – 67)	62 (58 – 65)
Cigarette smoking status		
Never	1,620 (28.6 %)	43,281 (41.3 %)
Ex	1,859 (32.8 %)	33,103 (31.6 %)
Current	2,182 (38.5 %)	28,350 (27.1 %)
Cigar smoking status		
Never	4,822 (82.4%)	93,776 (87.8%)
Ex	552 (9.4%)	7,271 (6.8%)
Current	475 (8.1%)	5,807 (5.4%)
Pipe smoking status		
Never	5,381 (91.3%)	100,197 (93.4%)
Ex	318 (5.4%)	4,747 (4.4%)
Current	194 (3.3%)	2,305 (2.2%)
Percentage persons with low income in neighborhood	41 (36 – 47)	41 (36 – 46)
Percentage persons with high income in neighborhood	18 (12 – 24)	19 (13 – 25)
Percentage persons with low income in a COROP area*	41 (36 – 45)	41 (36 – 45)
Percentage persons with high income in a COROP area*	19 (18 – 23)	19 (18 – 23)

* COROP areas consist of a central point (e.g. a city) and the surrounding economic and social region. The Netherlands is divided in 40 COROP areas

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RESULTS

For 97 percent of the subjects we were able to estimate air pollution and noise at the home address (N = 117,528). About 57 percent of all cardiovascular deaths was caused by IHD (Table 1). Cardiovascular mortality cases were older and more likely to be male or current smoker compared to non-cases (Table 2).

Air pollution and traffic noise

Background BS, traffic intensity on the nearest road and noise varied substantially within the cohort (Figure 1). 7.5 percent of the subjects were exposed to traffic noise between 60 and 65 dB(A), and 1.6 percent to more than 65 dB(A). For 4.5 percent of the subjects traffic intensity on the nearest road was >10,000 mvh/24h.

Traffic noise exposure was higher for subjects who had a traffic intensity >10,000 mvh/24h on the nearest road (mean 60 dB(A)) compared to subjects who had a traffic intensity ≤10,000 mvh/24h on the nearest road (mean 52 dB(A)).

The correlations between traffic noise and background BS, and traffic intensity on the nearest road were moderate at: 0.24 and 0.30 respectively. The correlation between traffic noise and traffic intensity for subjects with noise levels above 65 dB(A) was slightly lower: 0.22.

Association of air pollution and traffic noise with cardiovascular mortality

Table 3 shows the associations between background BS, traffic intensity on the nearest road and traffic noise with cardiovascular mortality. Traffic intensity on the nearest road was associated with cardiovascular mortality, with the highest relative risk for IHD mortality. Relative risks for background BS concentrations were elevated for cerebrovascular and heart failure mortality. The associations for background BS concentrations and traffic intensity were insensitive to adjustment for traffic noise.

There was an excess of cardiovascular mortality in the highest noise category (>65 dB(A)), which was concentrated in especially heart failure mortality (RR 1.99 (95% confidence interval (CI): 1.05 - 3.79). This relative risk was based on only 10 cases, which is reflected in the wide confidence intervals. The number of cases in the highest noise category was for the other mortality outcomes: 94 for cardiovascular mortality, 49 for IHD mortality, 14 for stroke mortality, 10 for heart failure mortality and 6 for cardiac dysrhythmia mortality.

After adjustment for BS concentrations and traffic intensity the association for IHD mortality reduced to unity and the association for heart failure mortality was slightly reduced to 1.90.

Crude estimates (only age and gender adjusted) did only slightly differ from the adjusted estimates with RRs for cardiovascular mortality of 1.15 (95% CI 1.03 – 1.29) for background BS, 1.07 (95% CI 1.01 – 1.14) for traffic intensity on nearest road, and 1.13 (95% CI 0.92 – 1.39) for the highest noise category.

Additional analyses

When traffic intensity on the nearest road was modeled as a categorical variable, elevated relative risks were found for the category >10,000 mvh/24h for cardiovascular (1.12

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(95% CI: 0.99 - 1.28)) and IHD mortality (1.24 (95% CI: 1.05 - 1.46)) (Table 4). The associations for traffic intensity on the nearest road as a categorical variable were insensitive to adjustment for traffic noise. After adjustment for background BS and traffic intensity as a categorical variable, relative risks for traffic noise showed a similar pattern as when traffic intensity was modeled as a continuous variable.

Relative risks for IHD mortality were somewhat elevated for living near a major road (1.15 (95% CI: 0.99 – 1.34)) and for traffic intensity in a 100m buffer (1.05 (95% CI: 0.95 – 1.16)) (Table 4).

Relative risks for background NO_2 and $PM_{2.5}$ concentrations were elevated for cerebrovascular and heart failure mortality (Table 4), which is comparable with the results for background black smoke.

The relative risks of traffic noise were essentially unity when traffic noise was included as a continuous exposure variable. Relative risks for background BS and traffic intensity on the nearest road were not affected (data not shown).

After excluding the subjects with noise exposure >65 dB(A), effect estimates for cardiovascular mortality for background BS did not change whereas they slightly increased for traffic intensity on the nearest road from 1.05 (95% CI: 0.99 - 1.12) to 1.09 (95% CI: 1.02 - 1.17). These analyses were conducted to evaluate the independent air pollution effects in subjects with traffic noise levels for which no noise effects have been found.

After excluding the subjects without traffic intensities (~80% of the subjects) the multivariate RRs changed slightly, with RRs for cardiovascular mortality of 1.08 (95% CI 1.00 – 1.17) for traffic intensity on the nearest road, and 1.21 (95% CI 0.89 – 1.66) for the highest noise category. Similar to the main analyses, the RR for the highest noise category decreased when background BS and traffic intensity were included in the model: from 1.34 (95% CI 0.99 – 1.80) to 1.21 (95% CI 0.89 – 1.66).

Effect estimates of background BS, traffic intensity and noise for cardiovascular mortality did not differ between men and women, between subjects aged < 62 years and subjects aged > 62 years, between never, ex and current cigarette smokers, and between groups with different percentages of persons with a low income in a neighborhood (results not shown).

Table 3. Adjusted Relative Risks (95% Confidence Intervals) for association between overall cardiovascular mortality and more specific cardiovascular mortality causes, and background black smoke (continuous), traffic intensity on the nearest road (continuous) and traffic noise exposure (in categories) which are assessed separately and in conjunction.*

Model	**Exposure**	**Cardiovascular (N = 6,137)**	**Ischemic heart disease (N = 3,521)**	**Cerebrovascular (N = 1,175)**	**Heart failure (N = 422)**	**Cardiac dysrhythmia (N = 339)**
		RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Air pollution indicators	Background black smoke	1.11 (0.96 - 1.28)	1.01 (0.83 - 1.22)	1.39 (0.99 - 1.94)	1.75 (1.00 - 3.05)	0.96 (0.51 - 1.79)
	Traffic intensity on nearest road	1.05 (0.99 - 1.12)	1.11 (1.03 - 1.20)	0.82 (0.68 - 1.00)	1.07 (0.86 - 1.34)	1.04 (0.79 - 1.36)
Traffic noise exposure	Traffic noise 50 – 55 dB(A)	1.00 (0.94 - 1.07)	1.00 (0.92 - 1.09)	0.90 (0.78 - 1.04)	1.08 (0.85 - 1.38)	1.03 (0.78 - 1.36)
	Traffic noise 55 – 60 dB(A)	1.00 (0.93 - 1.08)	1.02 (0.93 - 1.12)	0.89 (0.76 - 1.05)	1.00 (0.76 - 1.32)	1.08 (0.80 - 1.46)
	Traffic noise 60 – 65 dB(A)	0.91 (0.81 - 1.03)	0.95 (0.82 - 1.11)	0.59 (0.43 - 0.80)	1.04 (0.67 - 1.61)	1.08 (0.67 - 1.72)
	Traffic noise > 65 dB(A)	1.25 (1.01 - 1.53)	1.15 (0.86 - 1.53)	0.88 (0.52 - 1.50)	1.99 (1.05 - 3.79)	1.23 (0.50 - 3.01)
Both air pollution indicators and traffic noise exposure	Background black smoke	1.11 (0.95 - 1.28)	1.01 (0.83 - 1.22)	1.41 (1.01 - 1.97)	1.76 (1.01 - 3.08)	0.94 (0.50 - 1.76)
	Traffic intensity on nearest road	1.06 (0.99 - 1.13)	1.12 (1.04 - 1.21)	0.90 (0.74 - 1.10)	1.02 (0.79 - 1.32)	1.01 (0.75 - 1.36)
	Traffic noise 50 – 55 dB(A)	1.00 (0.94 - 1.07)	1.00 (0.91 - 1.09)	0.90 (0.78 - 1.04)	1.07 (0.83 - 1.37)	1.03 (0.78 - 1.36)
	Traffic noise 55 – 60 dB(A)	0.99 (0.92 - 1.06)	1.00 (0.91 - 1.10)	0.89 (0.76 - 1.05)	0.97 (0.73 - 1.29)	1.09 (0.80 - 1.47)
	Traffic noise 60 – 65 dB(A)	0.88 (0.78 - 1.00)	0.90 (0.76 - 1.06)	0.61 (0.44 - 0.84)	1.01 (0.64 - 1.59)	1.07 (0.66 - 1.76)
	Traffic noise > 65 dB(A)	1.17 (0.94 - 1.45)	1.01 (0.74 - 1.36)	0.95 (0.55 - 1.66)	1.90 (0.96 - 3.78)	1.23 (0.48 - 3.13)

* Adjusted for age, gender, smoking status, and area level indicators of socio-economic status

Relative risks for continuous variables were calculated for changes from the 5th to the 95th percentile; for black smoke 10 μg/m^3, and for the traffic intensity on the nearest road 10,000 mvh/24h. RRs for traffic noise in categories were calculated with category ≤ 50 dB(A) as reference category. N is number of cases. dB(A) is A-weighted average sound pressure decibel levels

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Table 4. Adjusted Relative Risks (95% Confidence Intervals) for association between overall cardiovascular mortality and more specific cardiovascular mortality causes, with background NO_2 and $PM_{2.5}$, and traffic variables: traffic intensity on nearest road in categories, indicator variable for living near a major road and traffic intensity in a 100 m buffer.*

Exposure	**Cardiovascular (N = 6,137)**	**Ischemic heart disease (N = 3,521)**	**Cerebrovascular (N = 1,175)**	**Heart failure (N = 422)**	**Cardiac dysrhythmia (N = 339)**
	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Background concentrations					
Background NO_2	1.08 (0.94 – 1.26)	0.97 (0.80 – 1.18)	1.51 (1.07 – 2.12)	1.96 (1.11 – 3.46)	1.05 (0.56 – 1.95)
Background $PM_{2.5}$	1.11 (0.93 – 1.33)	0.96 (0.75 – 1.22)	1.62 (1.07 – 2.44)	2.69 (1.37 – 5.27)	0.66 (0.30 – 1.45)
Traffic variables					
Traffic intensity on nearest road					
1,225 – 10,000 mvh/24h	0.96 (0.88 – 1.03)	0.98 (0.89 – 1.09)	0.90 (0.75 – 1.07)	0.92 (0.69 – 1.24)	1.03 (0.75 – 1.41)
> 10,000 mvh/24h	1.11 (0.99 – 1.25)	1.21 (1.04 – 1.42)	0.75 (0.55 – 2.03)	1.36 (0.90 – 2.05)	1.10 (0.66 – 1.84)
Living near a major road	1.05 (0.93 – 1.18)	1.15 (0.99 – 1.34)	0.70 (0.51 – 0.96)	0.94 (0.59 – 1.49)	1.13 (0.70 – 1.82)
Traffic intensity in 100m buffer	1.00 (0.92 – 1.08)	1.05 (0.95 – 1.16)	0.81 (0.67 – 0.99)	0.97 (0.72 – 1.32)	1.07 (0.77 – 1.48)

* Adjusted for age, gender, smoking status, and area level indicators of socio-economic status. Relative risks were calculated for changes from the 5th to the 95th percentile: for NO_2 30 μg/m^3, for $PM_{2.5}$ 10 μg/m^3, and for traffic intensity in a 100m buffer 335,000 mvh/24h. RRs for traffic intensity on nearest road in categories were calculated with as reference category ≤ 1,225 mvh/24h. RRs for living near a major road were calculated with as reference category not living near a major road. Models for traffic variables included background black smoke (1987-1996). N is number of cases.

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DISCUSSION

For the first time, the joint association between long-term exposure to air pollution, traffic intensity and road traffic noise with cardiovascular mortality has been reported. Background BS concentrations, traffic intensity on the nearest road and traffic noise above 65 dB(A) were associated with specific cardiovascular causes of death. Associations with background BS and traffic intensity were insensitive to noise adjustment. Exclusion of observations with traffic noise above 65 dB(A), the only noise category for which some effect was found, did slightly increase the effect estimate for traffic intensity. After adjustment for BS concentrations and traffic intensity, traffic noise risks estimates became unity for IHD mortality, while the noise risk for heart failure mortality was more robust and only slightly reduced.

Traffic noise and air pollution

The moderate correlation of modeled traffic noise with background BS (0.24) and traffic intensity on the nearest road (0.30) allowed an assessment of their independent effects. Traffic on other nearby roads was included in the noise model. However, the correlation between traffic intensity in a 100 meter circle around the home and noise was only slightly larger (0.38). The observed correlations between modeled traffic noise and air pollution were only slightly lower than in Oslo between modeled noise and air pollution: 0.46 for NO_2 and 0.46 for residential traffic intensity (23). In addition, the correlation between measured traffic noise and NO_2 was 0.35 in Madrid (24), and 0.53 in an urban area in Canada (25). Although traffic intensity is an important input variable for the model, other variables such as road surface, location of noise barriers and traffic speed are also included in the noise model (19). The inclusion of these input variables likely explains the moderate correlation between modeled traffic noise and traffic intensity on the nearest road. Road surface and noise barriers affect noise much more than air pollution (19). Traffic speed also affects air pollution and noise emissions differently. For example, within urban areas, air pollution emissions *decrease* when speed increases and congestion is less whereas noise emissions *increase* in the same situation (26,27). The distance decay function used in the noise model differs from air pollution (larger impacted area; beyond first line of buildings). Further, noise levels behave very robust to increases in traffic intensity which may also explain the moderate correlation. Doubling of road traffic intensity results in just a 3 dB(A) higher average noise level (10).

Limitations of the exposure assessment for air pollution and noise have to be considered. Exposure was assessed for the 1986 address. It was estimated that 90 percent of the participants had lived for 10 years or longer, with mean duration of residence 35 years (SD 19.8), at their 1986 address before follow-up (5), and 70 percent of the participants did not move between 1986 and end of follow-up (12). Mean traffic noise levels and the percentage of subjects exposed to the highest noise category did not differ between movers and non-movers, which does not suggest that differential moving due to noise exposure occurred. Information about moving was only available for a subset of the full cohort, and therefore an analysis restricted to non-movers was not possible. We previously showed that relative risks among non-movers increased for the association between black smoke concentrations and mortality (12). Further, concentrations for the

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periods 1976-1985 and 1987-1996 were highly correlated (> 0.9) (18). These results support the use of our exposure estimate as a proxy for other time periods.
Traffic noise was estimated using traffic data from 2000-2001 whereas exposure was estimated for the 1986 address. This is likely not a major problem because traffic intensities for the period 1986-1996 were highly correlated (>0.9) (18). Correlations between traffic intensities for 1986 and 1997-2001 were high as well (> 0.87). Traffic intensities have increased over this period, mainly on motorways and in new urban areas (18). The increase on motorways had in general been compensated by measures to reduce (additional) noise. Therefore, we use the assumption that while absolute traffic intensities may have changed, relative differences are likely to be stable and busy roads with high traffic noise levels stayed busy during this time period. Further, we focused mainly on busy roads that have likely been in place between 1987 and 2001 (18).
We had no information about the time people spend at home or information about the work address. However, approximately 85 percent of the population had no paid job at baseline. This percentage resulted from the fact that most women did not have a job at baseline and because part of the men younger than 65 years also had no job at baseline.

Traffic noise exposure was estimated as the maximum level of the yearly average equivalent noise levels during the day, or evening or night. The levels during the evening and during the night receive a penalty of respectively 5 and 10 dB(A). Other studies analyzed daytime or 24-hours exposures and our modeled noise levels may on average be 1 to 5 dB(A) higher. Correlations between indicators for long-term exposure to equivalent noise levels from road traffic are however high (10), since traffic flows during day, evening and night are highly correlated. So the use of different indicators affects the risk observed at a certain noise level, but is unlikely to influence the associations. Due to the high correlation, it is difficult to distinguish the separate effects on mortality of noise exposure during the day, evening and night when information on room orientation is not available. Information about other characteristics of the noise exposure, like the number of events was not available in our study.
We did not have information about mediating factors like bedroom location, window opening habits or sound isolation. Studies have shown that noise effects were larger when such mediating factors were considered in the analyses (10). The implication is that the effect of true noise exposure (indoors) may be underestimated. However, for the population studied the associations with traffic intensity remained and are unlikely due to environmental noise levels possibly due to the exposure reduction strategies listed above. The difference between noise exposure and noise environmental levels may be different in other cities or populations.
Elevated risks of traffic noise on cardiovascular mortality were restricted to the highest noise category (>65 dB(A)), but only 1.6 percent of our participants were exposed to such noise levels. Subjects lived on average for a long period at their baseline address and have therefore been exposed to similar noise levels. From a biological point of view one would expect a continuous increase in risk with increasing noise level. Other studies that assessed exposure-effect relationships of noise on cardiovascular effects showed however also a threshold of effect (10). Physiological adaptation and coping may be reasons for an empirical threshold of effect (10).

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A recent Dutch study investigated road traffic noise and hypertension, adjusting for fine particles (PM_{10}) exposure (28). Variation in exposure to PM_{10} was however limited and this might be one of the explanations why there was no significant contribution to the relative risk for PM_{10}.

Specific causes of cardiovascular death

A few cohort studies evaluated the effects of long-term exposure to air pollution on specific causes of cardiovascular mortality, which can be compared with our results for the background black smoke concentration. Pope *et al.* found an elevated relative risk of 1.12 (95% CI: 1.08 - 1.15) for all cardiovascular diseases plus diabetes for a 10 $\mu g/m^3$ increase in $PM_{2.5}$ concentrations. Relative risks were 1.18 (95% CI: 1.14 - 1.23) for IHD and 1.13 (95% CI: 1.05 - 1.21) for dysrhythmia, heart failure and cardiac arrest. No elevated risk was found for cerebrovascular disease (13). A large cohort study among U.S. women found increased risks for overall cardiovascular mortality (RR 1.76; 95% CI: 1.25 - 2.47) and for coronary heart disease (RR 2.21; 95% CI: 1.17 - 4.16) for a 10 $\mu g/m^3$ increase in $PM_{2.5}$ exposure (4). In contrast with the Pope *et al.* study (13), cerebrovascular mortality was also significantly associated with exposure to $PM_{2.5}$ in this study (4) as in our study. In a small cohort of Norwegian men no association between cerebrovascular mortality and NO_x was found whereas IHD mortality was significantly associated with a 10 $\mu g/m^3$ increase in NO_x concentrations (RR 1.08; 95% CI 1.03 - 1.12) (7). In general, an association with overall cardiovascular mortality was found. However, results for more specific cardiovascular causes varied between studies. Varying results between studies may be explained by differences in used exposure assessment methods (average concentration for a city versus individual-level traffic-related exposure) and in the air pollutants used (traffic-related pollutants versus less traffic-related pollutants). Different types of air pollution may have different mechanisms of effect. In none of these studies were the results for air pollution adjusted for noise from road traffic.

Recent epidemiologic studies have increased the understanding of the linkage between air pollution and cardiovascular diseases, with a multitude of plausible mechanistic explanations having been demonstrated experimentally during the past few years (29). The physical and chemical characteristics of fresh vehicle exhaust particles are different from those of background particles influenced by atmospheric transformation and coagulation. This may affect the mechanisms of effect. The proposed biological mechanisms linking air pollution to cardiovascular disease involve direct effects of pollutants on the cardiovascular system, blood, and lung receptors, and/or indirect effects mediated through oxidative stress and inflammation (30). A cascade of physiological responses may follow including alterations in blood rheology, cardiac dysrhythmias, and development of atherosclerosis (30). Studies have shown associations between air pollution exposure and ST-depression, which possibly represents myocardial ischemia or inflammation (31,32). These findings suggest that ischemic mechanisms may explain the specific association between traffic exposure and IHD. Cerebrovascular mortality is more likely due to a thrombotic process (33), and possibly components of the background mixture are more related to thrombosis. The mechanisms of effect are however not exactly known yet and all of the mechanisms are likely inter-related.

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Traffic intensity near the home address was associated with only IHD mortality in our study. Sensitivity analyses showed that the association was restricted to the highest traffic intensity category (>10,000 mvh/24h). A recent study by Tonne *et al.* found an association between cumulative traffic near the home and acute myocardial infarction (9). Peters *et al.* found also an association between exposure to traffic and acute myocardial infarction (14). A German cross-sectional study found that living within 150 m of a major road was associated with the prevalence of coronary heart disease (odds ratio 1.85; 95% CI: 1.21 - 2.84) (8). The results of a study by Rosenlund et al. suggested also that residential traffic-related air pollution increases the risk of coronary heart disease, in particular fatal outcomes (34). The results of these studies suggest that traffic intensity is associated especially with IHD. Our results also suggested an association between IHD and traffic intensity.

Several epidemiological studies investigated the effects of road traffic noise exposure on different cardiovascular endpoints. Inconsistent effects were found for blood pressure and hypertension, but the evidence for IHD is much stronger (10). Cohort and case-control studies in Caerphilly, Speedwell and Berlin found relative risks for IHD ranging from 1.1 to 1.4, although non-significant, at traffic noise levels above 60 dB(A) (35-37). Our IHD risk estimate is in line with these results. Strongest noise effects in our study were found for heart failure mortality, but this association was based upon a small number of cases and has not been evaluated in previous studies. The suggested effect mechanism of noise is based on the general stress concept and works 'directly' through synaptic nervous interactions and 'indirectly' through the emotional and the cognitive perception of noise. Stress can result in changes in physiological functions and metabolism, including blood pressure, cardiac output, blood lipids, carbohydrates, electrolytes, blood clotting factors, leukocyte count and others. These can be acute changes, but in the long term functional changes and dysregulation may occur, thus increasing the risk of manifest diseases. Since many of these factors are known classical cardiovascular risk factors, chronic noise exposure can increase the risk of cardiovascular disease such as IHD (10,11).

Death certificates may not be a perfect source of information for cause of mortality (38). There may be a convergence towards the most common cardiovascular causes of death and the utility of death certificates may decrease when death occurs at a higher age (39). No recent information was found about the validity of death certification in The Netherlands. It is possible that misclassification of specific cardiovascular causes on death certificates contributes to inconsistency of results between different studies.

Both individual and area-level socioeconomic characteristics have been shown to be predictors of cardiovascular health (40). We adjusted for area-level socioeconomic characteristics, but not at the individual level which was only available for the case-cohort dataset. Analyses in the case-cohort dataset showed however that individual level socioeconomic characteristics did not confound the association (12). Of the area-level indicators of socioeconomic status, especially the percentages of persons with low and high income in a neighborhood were significantly associated with mortality. As air pollution is one mechanism through which low neighborhood socioeconomic status may affect mortality, we may have been over adjusting the effects of air pollution. We cannot

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exclude the possibility that traffic intensity is associated with other unmeasured risk factors other than air pollution and noise.

In conclusion, background BS concentrations, traffic intensity on the nearest road and traffic noise above 65 dB(A) were associated with specific cardiovascular causes of death. Associations with background BS and traffic intensity were insensitive to noise adjustment. Associations with traffic noise became unity for IHD mortality and slightly reduced for heart failure mortality after adjustment for background BS and traffic intensity on the nearest road. As this is the first study that reported the effects of long-term exposure to air pollution, traffic intensity and traffic noise on mortality together in one study, further studies are required to confirm or refute our findings.

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Main messages

- Motorized traffic is an important source for both air pollution and noise.
- This study reported for the first time the joint association between long-term exposure to air pollution, traffic intensity and road traffic noise with cardiovascular mortality.
- Background black smoke concentrations, traffic intensity on the nearest road and traffic noise above 65 dB(A) were associated with specific cardiovascular causes of death.
- However, associations between black smoke concentrations and traffic intensity on the nearest road with specific cardiovascular causes of death were insensitive for adjustment by traffic noise and were thus not explained by traffic noise in this study.

Policy implications

- Traffic-related air pollution is associated with cardiovascular mortality, while the independent contribution of exposure to traffic-related noise is less clear.

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Acknowledgments
We wish to thank the Dutch Central Bureau of Genealogy and the Dutch Central Bureau of Statistics for providing data. We thank the co-workers of the NLCS study (Maastricht University/TNO) for assistance. We thank Carla van Wiechen, Wim Swart (National Institute of Public Health and the Environment), Ton Dassen and Hans Nijland (Netherlands Environmental Assessment Agency) for advice on geographic information system calculations and noise modelling. We thank the National Institute of Public Health and the Environment for providing air pollution data monitored by the National Air Quality Monitoring Network in the Netherlands.

Competing interests
None declared.

Funding
Research described in this article was conducted under contract to the Health Effects Institute (HEI) (research grant 01-2), an organization jointly funded by the United States Environmental Protection Agency (EPA) and certain motor vehicle and engine manufacturers. The contents of this article do not necessarily reflect the views of HEI, or its sponsors, nor do they necessarily reflect the views and policies of EPA or motor vehicle and engine manufacturers. The Netherlands Cohort Study on Diet and Cancer was supported by the Dutch Cancer Society.

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Figure legends

Figure 1. Distribution of estimated background black smoke concentrations (period 1987-1996), traffic intensity on the nearest road and traffic noise exposure, at the 1986 home address (N = 117,528).*

* dB(A) is A-weighted average sound pressure decibel levels; and Mvh/24h is Motor vehicles/24h

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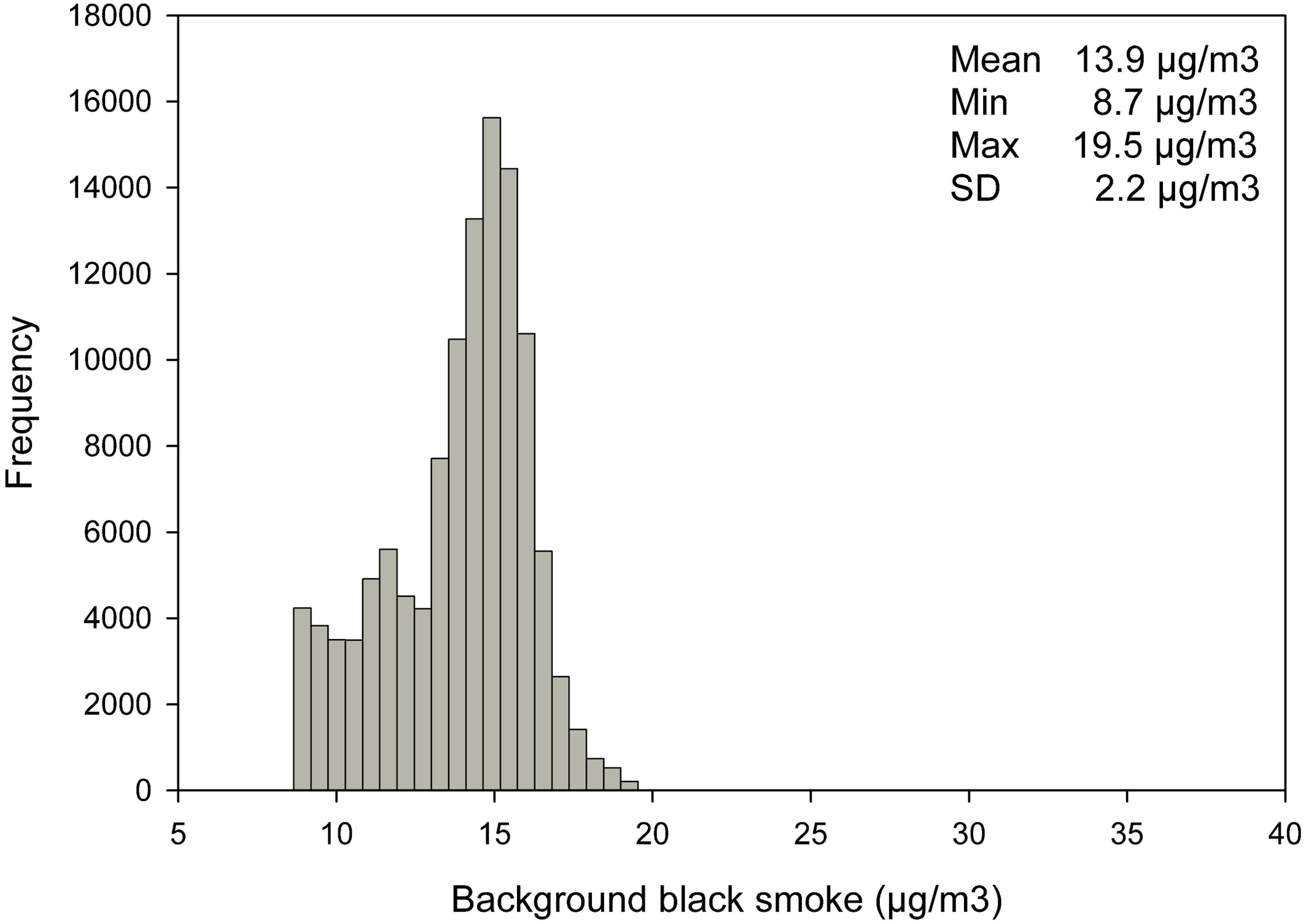
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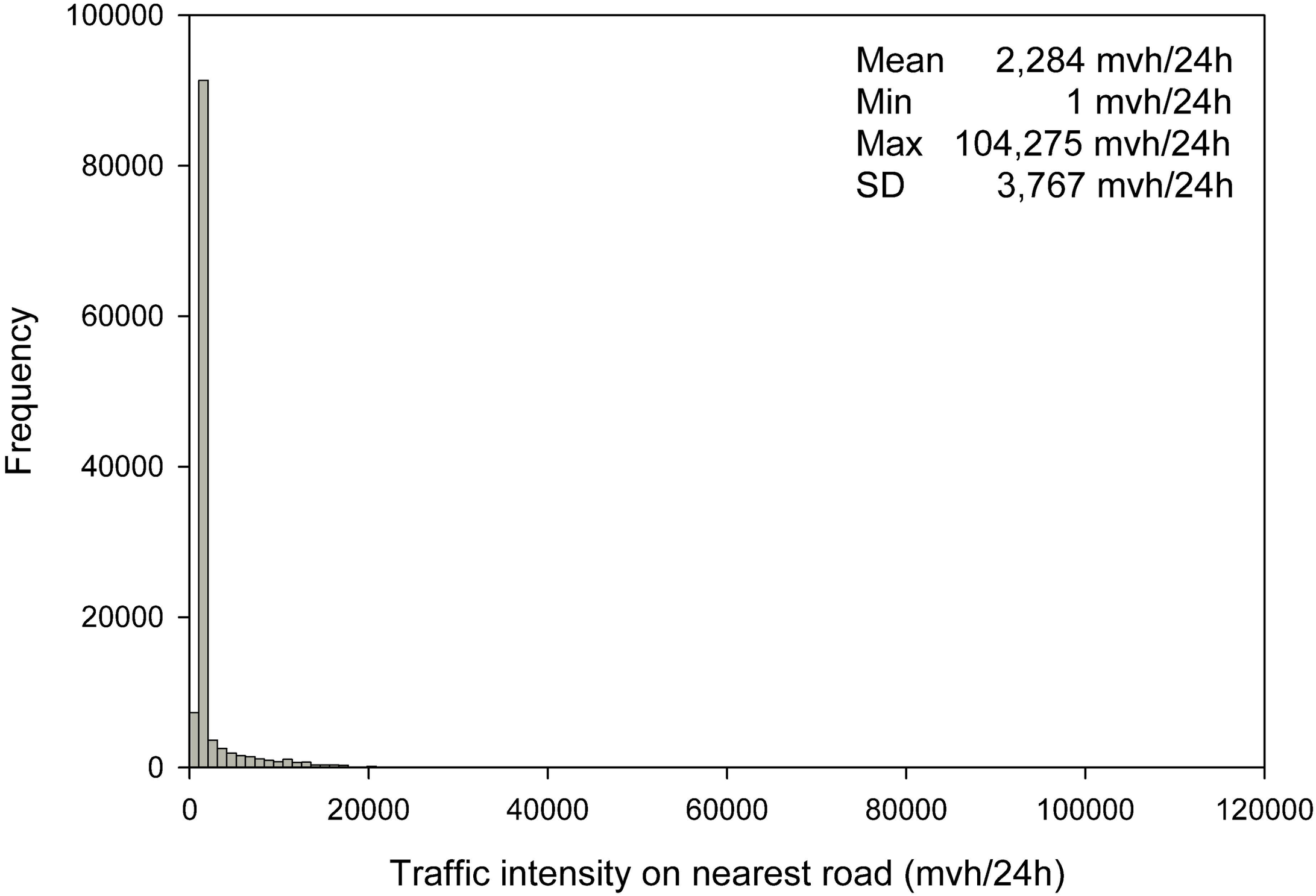
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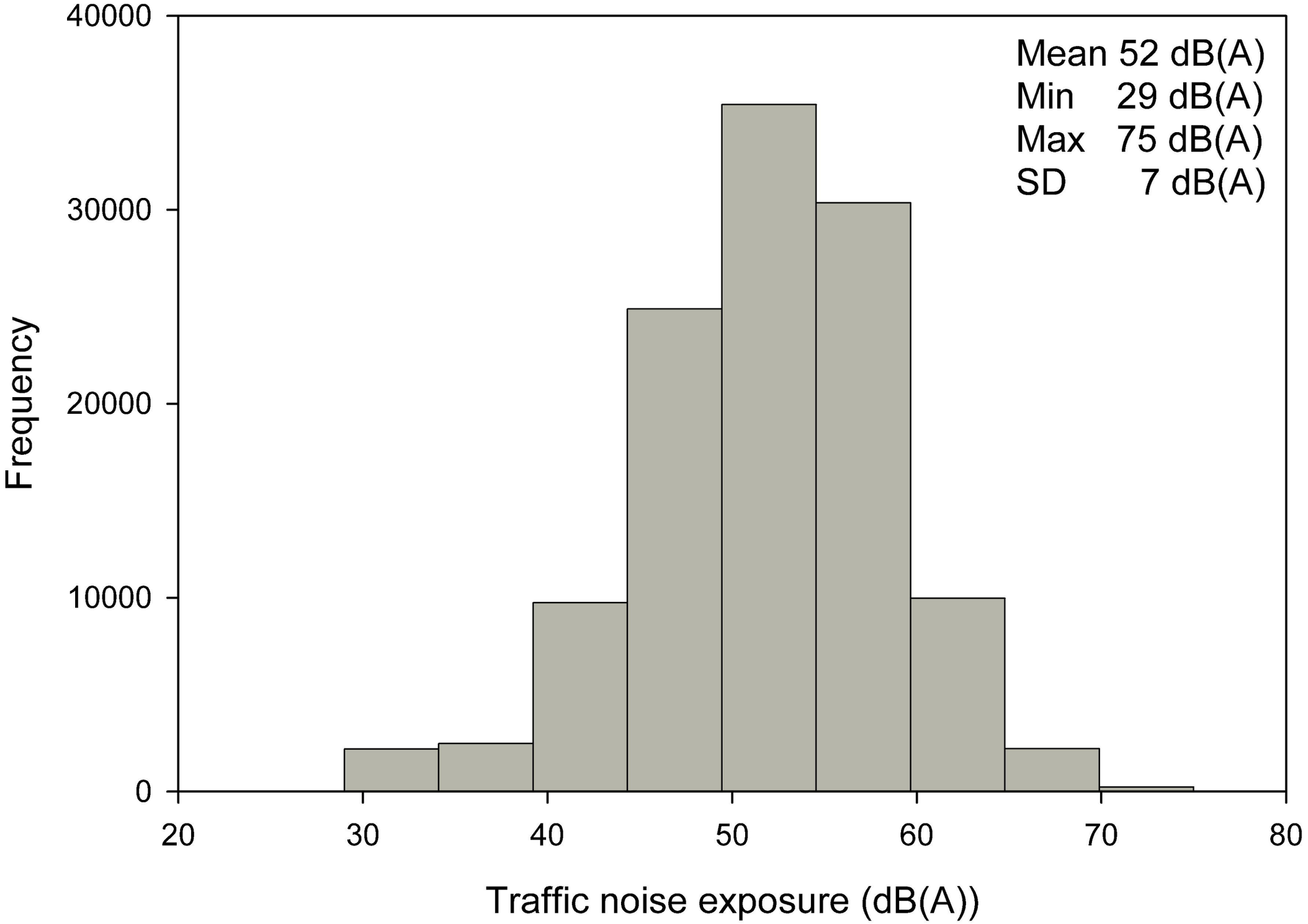
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60
70
80
Traffic noise exposure (dB(A))

Eastside

Traffic Calming Study

Prepared for:
City of West Hollywood

June 2016

Prepared by:

FEHR & PEERS

OC14-0308

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1. INTRODUCTION

This traffic calming study focused on identifying solutions to reduce cut-through traffic and speeds through the Eastside neighborhood area of the City of West Hollywood, bounded by:

- Fountain Avenue to the north
- Willoughby Avenue and Romaine Street to the south
- La Brea Avenue to the east
- Fairfax Avenue to the west

This study is part of a comprehensive approach to traffic calming undertaken by the City of West Hollywood across the City. In the Eastside neighborhood, the community raised concerns regarding cut-through traffic and speeding, particularly on streets between Santa Monica Boulevard and Fountain Avenue. The City worked with the community prior to initiating this traffic calming analysis, identifying concerns and determining that a comprehensive neighborhood-wide traffic calming study should be conducted. This plan was prepared to address traffic patterns within the neighborhood while minimizing the potential for trip diversion to other neighborhood streets. The study area land uses are primarily multi-family residential homes and some single family homes surrounded by heavily utilized commercial corridors. As a result, when congestion on the commercial corridors occurs, drivers may divert into the residential neighborhood to by-pass congestion and queues at busy intersections.

A series of steps were taken to determine community identified traffic issues, possible solutions, and recommendations. The process followed the City's traffic calming guidelines and focused on a grass-roots method for identifying solutions, as shown in **Figure 1**. Existing conditions data were collected to set the foundation for traffic conditions in the Eastside area. The data were presented at initial community meetings in October and November 2015. Community members discussed the traffic information and learned about potential traffic calming solutions. During the workshops, participants were encouraged to identify problems and potential treatments.



Figure 1: Projects Steps Taken

Fehr & Peers developed draft traffic calming solutions for the neighborhood, which integrated the comments from the community members and the data collected. These recommendations were then presented to the community at a meeting in February 2016, where community members were encouraged to share their thoughts about the recommendations. Fehr & Peers then prepared the final recommendations for the City based on input received at both of the community meetings. Community members are responsible for circulating petitions to gain support for the recommendations before individual traffic calming recommendations can be considered by the Transportation Commission and City Council.

This report outlines each of the key steps taken in the development of the Traffic Calming recommendations for the Eastside community.

2. EXISTING CONDITIONS

The Eastside community is bounded to the north by Fountain Avenue, to the south by Willoughby Avenue and Romaine Street, to the east by La Brea Avenue, and to the west by Fairfax Avenue. The project study area is illustrated in **Figure 3**.

Daily traffic volumes taken in 2014 on streets surrounding/within the study area are reported as vehicles per day (vpd) and are provided below rounded to the nearest hundred:

Highest volume roadways within the study area:

- Santa Monica Boulevard: 45,500 vpd
- Fountain Avenue: 35,600 vpd
- La Brea Avenue: 39,100 vpd
- Fairfax Avenue: 30,500 vpd

Neighborhood streets with over 2,000 vpd:

- Gardner Street: 7,000 vpd
- Willoughby Avenue: 5,400 vpd
- Vista Avenue: 5,000 vpd
- Formosa Avenue: 2,700 vpd
- Martel Avenue: 2,500 vpd
- Curson Avenue: 2,200 vpd
- Detroit Avenue: 2,200 vpd
- Lexington Avenue: 2,100 vpd
- Orange Grove Avenue: 2,100 vpd

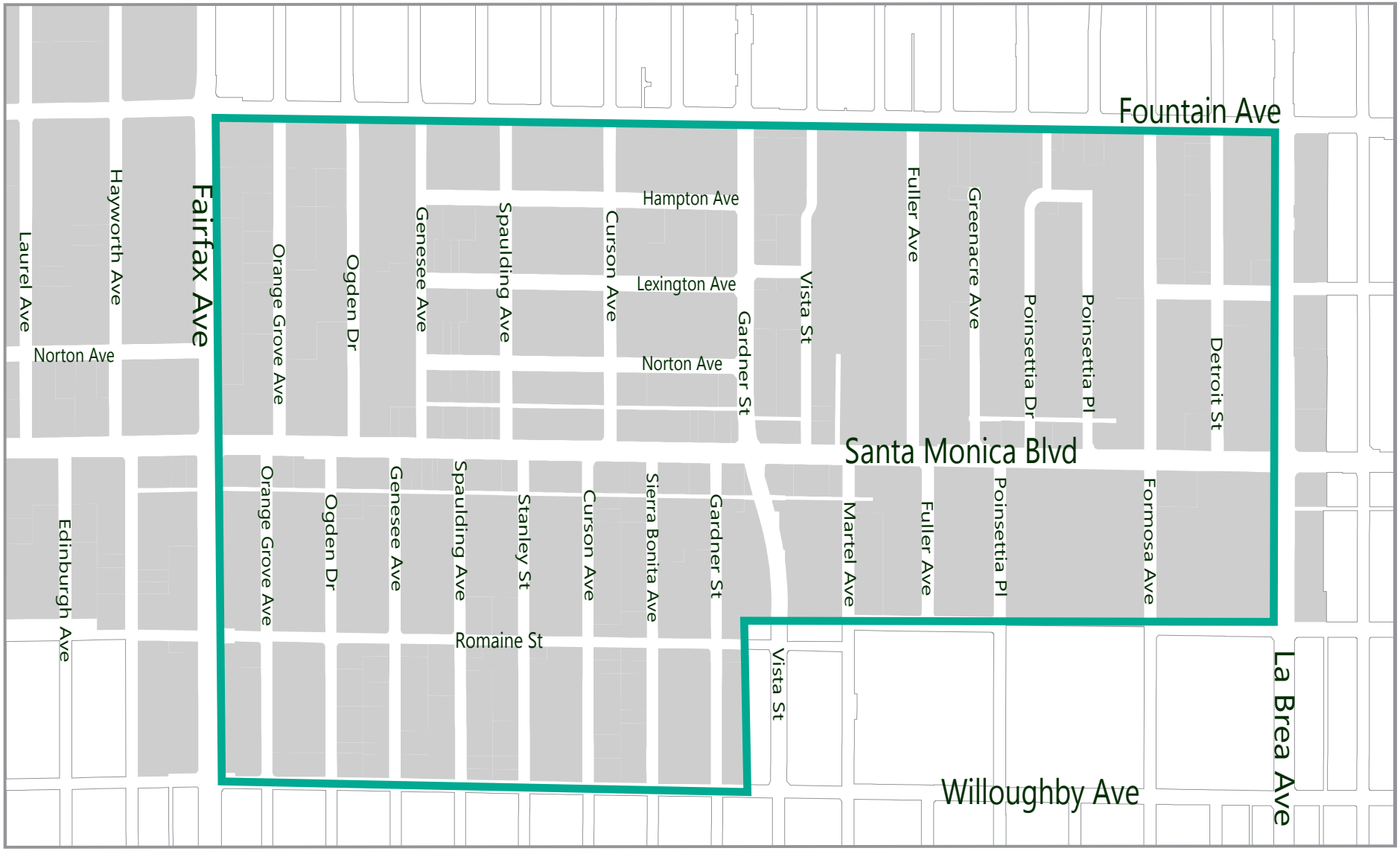




Figure 2. Sample Traffic Calming Devices

Traffic volumes for streets with less than 2,000 vpd are presented in **Figure 4**.

When traffic congestion builds on arterial streets, drivers sometimes divert onto the neighborhood streets within the Eastside community. A Citywide Engineering and Speed Survey was conducted in 2014 that collected daily traffic volumes and speeds for all streets within the city boundary. Based on the information collected, traffic volumes on the residential streets within Eastside are comparable to traffic volumes and speeds on residential streets throughout the City.



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EASTSIDE NEIGHBORHOOD

FEHR PEERS

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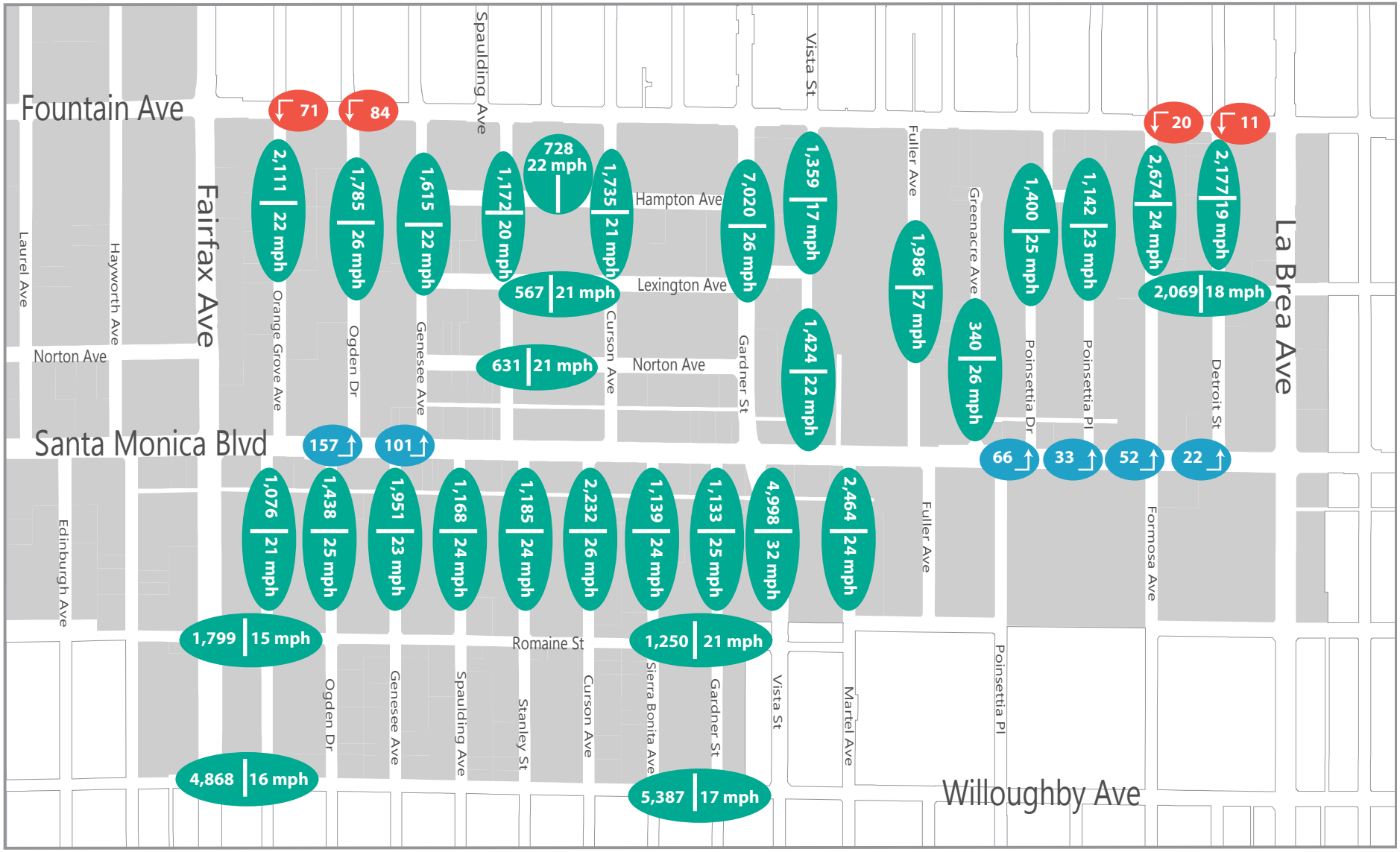

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24 hour Count Location

4,868 Daily Vehicle Volumes

16 mph 85th Percentile Speed

71 AM Peak Hour Westbound Left Turns*

66 PM Peak Hour Eastbound Left Turns*

* Peak Hour varies by intersection

Figure 4

EASTSIDE NEIGHBORHOOD

DAILY VEHICLE VOLUMES, 85TH PERCENTILE SPEED AND PEAK HOUR LEFT TURN COUNTS

FEHR PEERS

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As the Eastside neighborhood is located within an urbanized area, some drivers sometimes use residential streets in an attempt to avoid congestion. Some trips are due to drivers who are lost, others due to direction from navigation systems, and yet others are drivers who are familiar with the local street system. The goals of the traffic calming recommendations in this report are to manage the traffic regardless of its source, reduce cut-through volumes, and maintain 25 mph (85th percentile) speeds for all residential streets in the Eastside neighborhood.

Figure 4 illustrates the existing daily volumes within the neighborhood. As shown, daily traffic volumes range from a low of approximately 340 vpd on Greenacre Avenue to a high of 7,020 vpd on Gardner Street between Santa Monica Boulevard and Fountain Avenue. Daily traffic counts and 85th percentile speeds[1] were provided by the City as part of the Citywide Traffic Study. Peak hour volumes collected specifically for this project are provided in **Appendix A**.

Most streets within the Eastside community – with the exceptions of Fountain Avenue, Santa Monica Boulevard, Romaine Street, Willoughby Avenue, Fairfax Avenue and La Brea Avenue – are classified as residential streets with prima facie speed limits of 25 mph. As such, speed limit signs do not need to be posted for the speed limit to be enforced. Speed survey data collected citywide demonstrates that the 85th percentile speeds on the community's residential streets are generally at or below the speed limit. Although Willoughby Avenue and Romaine Street are classified as collectors by the City, they also maintain speed limits of 25 mph. However, several streets within the Eastside neighborhood do have 85th percentile speeds exceeding the posted or prima facie speed limit. Even on streets where the 85th percentile speeds are below the posted speed limit, some vehicles may travel at speeds that exceed the posted speed limit, causing concern amongst the residents. **Figure 4** illustrates the 85th percentile speeds for the Eastside community.

In addition, left turn counts were taken at several intersections along Santa Monica Boulevard and Fountain Avenue into the Eastside neighborhood. Turning counts were taken based on prevailing travel patterns (westbound in the AM peak period and eastbound in the PM peak period) to determine the prevalence of left turns from major streets onto neighborhood streets, which may be an indication of cut-through traffic. However, left-turn counts do not represent the number of cut-through drivers, as some drivers may have been accessing the neighborhood either as visitors or residents. The left-turn counts are shown in **Figure 4**.

Parking is permitted on both sides of all streets within the Eastside neighborhood with the exception of Romaine Street between Martel Avenue and Vista Street and in certain locations where angled parking exists. Permits are required for resident motorists to park on-street between 7:00 PM and 7:00 AM in most locations in residential areas. Parking restrictions vary by street, but for the most part, non-resident or commercial parking is restricted throughout the study areas. **Figure 5** displays average street widths within the study area and **Figure 6** shows the existing traffic control devices.

[1] 85th percentile speed is the speed at which 85% of the vehicles are traveling at that speed or less during an observation period. This speed is used to establish posted speed limits in accordance with the California Vehicle Code. Setting speeds lower than the 85th percentile speed can be considered a speed trap and speed limits may not be enforceable using radar speed detection.



Not to Scale

Figure 5

EASTSIDE NEIGHBORHOOD
AVERAGE STREET WIDTH

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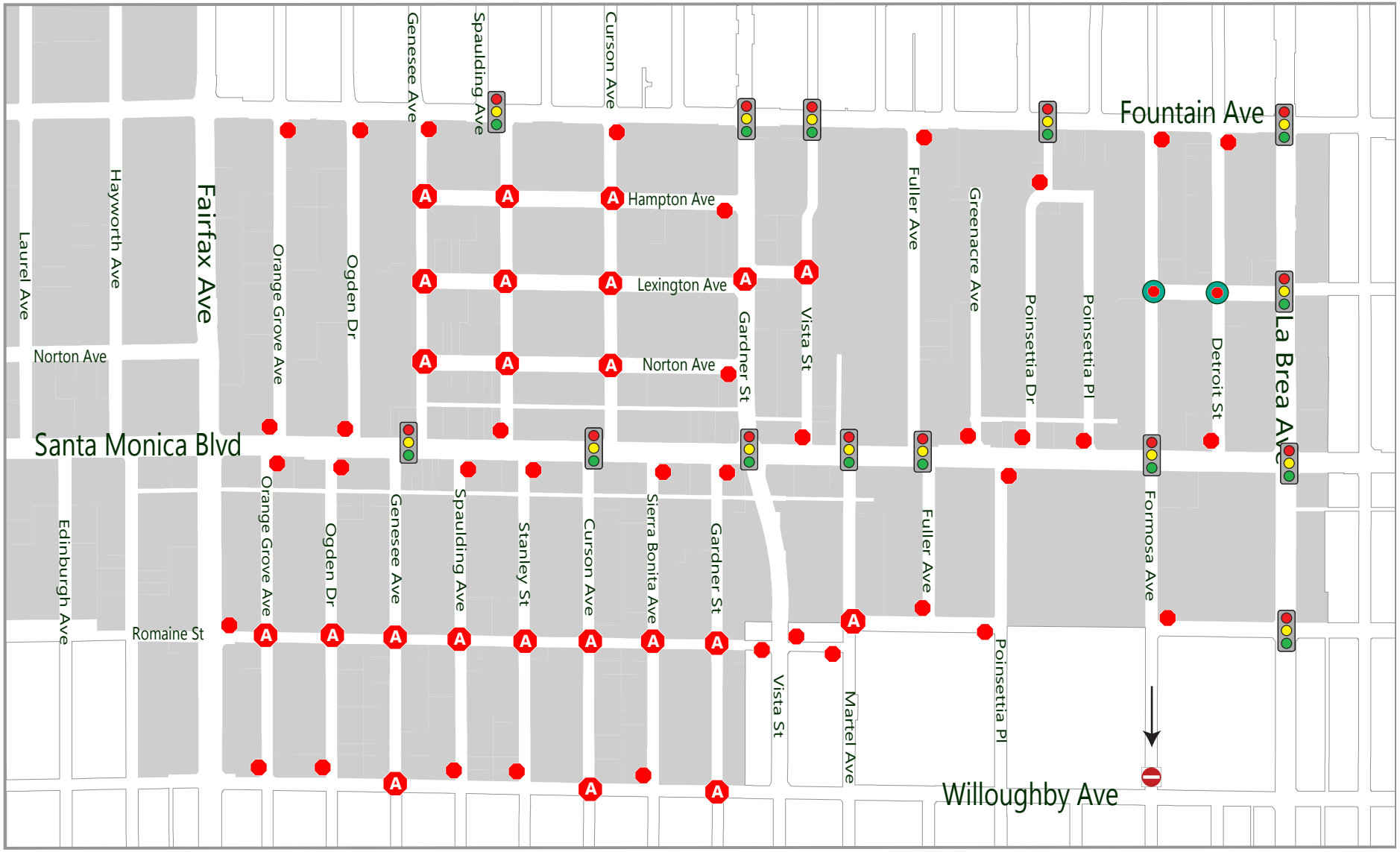

Figure 6

EASTSIDE NEIGHBORHOOD
TRAFFIC CONTROL TYPE BY INTERSECTION

FEHR PEERS

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OTHER CITY PROJECTS

The City is evaluating/considering development applications across the city, including projects in the Eastside. The following projects may produce additional transportation features that work in conjunction with the recommendations included in this Traffic Calming Study:

- **Development on the Eastside:** Several development projects are underway within the Eastside neighborhood:
    - 7300 Santa Monica Boulevard (under construction)
    - 7141 Santa Monica Blvd (under construction)
    - 1250 Fairfax Avenue (Approved)
    - 7811 Santa Monica Boulevard (under review)

  As part of the City review process, new developments undergo a traffic impact analysis to quantify the level of traffic that a project will produce and appropriate mitigations the City may elect to implement.

- **Eastside Community Plan:** The Eastside Community Plan seeks to catalog and prioritize the needs of the Eastside neighborhood, develop implementation strategies, and make recommendations to City Council regarding implementation of the Plan.
- **Ped + Bike Mobility Plan Update:** The Plan Update will assess the City's pedestrian and bicycle network and facilities and develop recommendations to make West Hollywood a more inviting and comfortable place to walk and bike for residents and visitors alike.

3. COMMUNITY OUTREACH

MEETING #1: OCTOBER 15, 2015

The initial community meeting for the Eastside neighborhood was held on Monday, October 15, 2015 at 7:00 PM at the Plummer Park Community Center. The meeting was attended by approximately 20 residents. Notices for the meeting were mailed by City of West Hollywood staff to all addresses within the study area.

The workshop provided community members a venue to share their concerns about traffic speed and volume on residential streets in their community. Maps illustrating the existing traffic volumes and speeds in their neighborhood were provided for the participants to review and provide comments (**Figures 4, 5 and 6**).



Figure 7. Area of concern identified at community meeting.

The meeting began with a welcome by City staff and a brief presentation by Fehr & Peers. Residents provided feedback, identified concerns and proposed potential traffic calming solutions that could be installed in their community. The format included an open discussion amongst attendees of problems and ideas to improve conditions within the community. City staff and Fehr & Peers facilitated the discussion and documented the concerns and solutions that were raised. **Figures 7 and 8** depict feedback provided by meeting attendees.

Key issues raised by residents during the initial meeting include:

<u>Traffic & Speeding in the Neighborhood</u>

- Speeding/rude drivers in the neighborhood.
- Quality of life concern related to traffic in the neighborhood.
- Poinsettia Drive and Poinsettia Place as key cut-through streets with high speeds.
- Stop sign running at intersections throughout the neighborhood.
- Difficulty for residents from Greenacre Avenue when trying to exit the neighborhood, leading to residents cutting through an alley to Poinsettia Drive in order to exit at Fountain Avenue.
- High speeds and cut-through traffic on Detroit Avenue and Formosa Avenue between Fountain Avenue and La Brea Avenue.
- Congestion along Fountain Avenue and Santa Monica Boulevard causing people to turn into the neighborhood.

- Vehicles mistake Greenacre Avenue as a through street.
- High speeds on Vista Street north of Santa Monica Boulevard.
- High speeds on Vista Street south of Santa Monica Boulevard.
- High speeds on Spaulding Avenue north of Norton Avenue.

Development Concerns

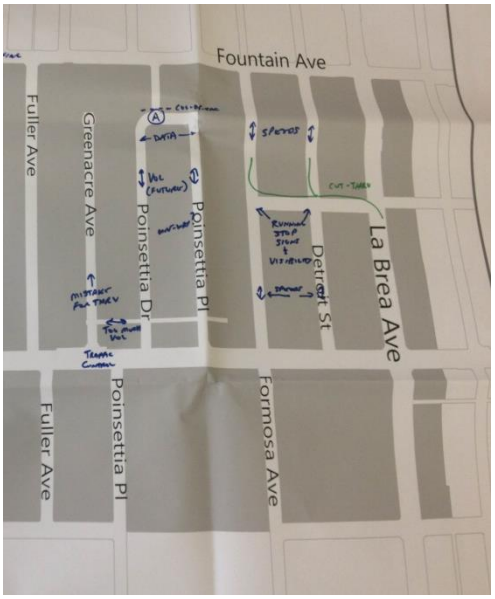

Figure 8. Areas of concern and potential solutions provided by residents.

- New development on Santa Monica Boulevard may add traffic to the arterials and increase cut-through traffic.
- With the increase in trips from new development, additional signals maybe needed to help residents exit their local streets onto arterials.
- Construction fatigue related to new developments in the neighborhood.

Driver Behavior/Enforcement

- Additional enforcement for speeding is needed on neighborhood streets.
- Stop sign running at intersections throughout the neighborhood is frequent and dangerous.
- Visibility is a concern for vehicles turning onto Gardner Street and along the eastern portion of Lexington Avenue.

Participants were encouraged to share their ideas for improving the conditions in the neighborhood. Several recommendations were made that the project team considered in developing the traffic calming plan including:

Traffic Calming Ideas (within Neighborhood)

- Adding a bulbout at the corner of Fountain Avenue & Formosa Avenue.
- Creating a cul-de-sac on Orange Grove Avenue between Fountain Avenue and Santa Monica Boulevard to eliminate the option of cut-through traffic.
- Installing a speed lump on Orange Grove Avenue between Fountain Avenue and Santa Monica Boulevard.
- Narrowing Vista Street south of Santa Monica Boulevard.
- Converting Vista Street north of Santa Monica Boulevard to one-way southbound south of Lexington Avenue and one-way northbound north of Lexington Avenue.
- Installing a traffic signal at Greenacre & Santa Monica Boulevard.
- Installing an all-way stop at the intersection of Hampton Avenue & Poinsettia Place.

Traffic Flow Ideas (outside Neighborhood)

- Narrowing Fountain Avenue between Ogden Drive and Spaulding Avenue to one lane in each direction.
- Reducing left turns from Fountain Avenue and Santa Monica Boulevard onto residential streets.

Participants were encouraged to mark up the maps provided and discuss their concerns with other members of their small groups.

MEETING #2: NOVEMBER 3, 2015

A second meeting was held at the Plummer Park Community Center to accommodate community members who were not able to attend the initial meeting due to conflicting City meetings. Seventeen community members attended the second meeting, of which eight were not present at the first meeting. Traffic concerns expressed at the second meeting were consistent with comments mentioned at the first meeting.

MEETING #3: FEBRUARY 29, 2016

A community meeting was held on February 29, 2016 at the Plummer Park Community Center to provide residents with an overview of the potential solutions that had been developed.

A brief presentation was given by the City and Fehr & Peers highlighting the recommended traffic calming treatments, as shown in **Figure 9**, and discussing the petition process. Following the presentation, participants were encouraged to ask questions and share their thoughts on the recommendations. There was general support for the recommendations in Figure 9 and residents asked that several additional solutions be analyzed that might alleviate the existing and potential traffic concerns in the Eastside neighborhood:

- Limiting access at the intersection of Poinsettia Place & Fountain Avenue so vehicles from Fountain Avenue would not be able to turn onto Poinsettia Place.
- Assessing the feasibility of eliminating left turns from Fountain Avenue and Santa Monica Boulevard at locations without turn pockets.
- Analyzing the type of signage and warning language that should be used near speed bumps and traffic circles.
- Evaluating the likely impact that installing pavement markings that imitate speed lumps would have on reducing vehicle speeds.

ELIMINATING SOUTHBOUND ACCESS AT POINSETTIA PLACE & FOUNTAIN AVENUE

Residents asked the project team to investigate the possibility of eliminating southbound access to Poinsettia Place from Fountain Avenue. Such a proposal would require drivers trying to access Poinsettia Drive or Poinsettia Place to do so via Santa Monica Boulevard. The partial closure at Poinsettia Place would require

vehicles to detour, either using adjacent residential streets or nearby arterials. Staff feels this is not an advisable treatment at this time for these reasons:

- Many drivers are likely to impact another residential street in order to travel southbound.
- Residents of Poinsettia Place and Poinsettia Drive would be significantly inconvenienced.

Staff recommends that the other treatments proposed for the neighborhood be implemented prior to this more aggressive approach being considered.

REDUCING LEFT TURNS FROM ARTERIAL TO NEIGHBORHOOD STREETS

Residents expressed concern that much of the congestion on Santa Monica Boulevard and Fountain Avenue can be attributed to vehicles turning left where there are no designated left-turn lanes. Residents asked that the project team investigate the feasibility of prohibiting left turns in locations without turn pockets, and how this might impact congestion. Adding additional left-turn pockets without removing parking is not possible at most intersections on Santa Monica Boulevard and Fountain Avenue. Prohibiting left turns at locations without turn pockets would greatly increase the difficulty of accessing several streets (Poinsettia Place, Spaulding Avenue, Ogden Drive and Orange Grove Avenue) that do not have left-turn pockets at the intersections with either Fountain Avenue or Santa Monica Boulevard. Finally, the streets with turn pockets would experience greater demand and congestion, increasing traffic volumes on residential streets. Shifting traffic from one residential street to another is not consistent with the City's Neighborhood Traffic Management Plan policies. Therefore, staff recommends this only be considered after the other proposals are implemented, as discussed in Chapter 4.

SIGNAGE AND PAVEMENT MARKINGS

Installing additional signage or pavement markings can help to alert motorist as they approach speed lumps or traffic circles, but should also be balanced with the aesthetic wishes of residents. Signage and pavement markings are low-cost supplements to other treatments, but their effectiveness varies based on context. Measures such as radar speed feedback signs, speed limit signs and pavement markings and signs announcing that motorist are entering a traffic calming area are discussed in more detail below. Due to both the low cost and relative ease at which they can be added or removed, staff recommends trial installations of additional signage and pavement markings to determine their effectiveness. Staff will work with adjacent residents during the design phase (if concepts are approved) on specific signage and marking treatments. Staff is willing to experiment on these items within the Eastside neighborhood.



Figure 9

EASTSIDE NEIGHBORHOOD
EXISTING TRAFFIC CONTROLS & RECOMMENDED TREATMENTS

FEHR PEERS

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IMITATION SPEED LUMPS

Residents expressed concerns regarding the amount of noise created by vehicles driving over speed lumps. One alternative is to replace some speed lumps with pavement markings that look like speed lumps. This type of treatment is usually done in pairs, with one set of speed lumps when a driver first enters a residential street and an imitation speed lump later in the block. Pavement markings that imitate speed lumps are only effective at reducing speeds for motorists who are infrequent users of a street. Once a motorist realizes that the pavement markings are not accompanied by an actual speed lump, they will not reduce their speed. Therefore, these staff does not recommend installation of an imitation speed lump within the neighborhood.

Based on the comments received at the workshop, minor modifications to the traffic calming recommendations were made as summarized in the recommendations and conclusion sections of this report.

4. RECOMMENDATIONS & COST ESTIMATES

RECOMMENDATIONS

The recommendations for traffic calming in the Eastside community were developed based on the assessment of existing data collected, field observations and community input. Input from both community meetings helped the team identify the key traffic-related issues in the community.

Concerns were raised about traffic on the major arterials surrounding this neighborhood, but because the City's traffic calming program aims to reduce cut-through and speed on *residential streets* and is not designed to address traffic congestion on major arterials, the following recommendations are targeted towards the residential streets.

As a robust, vibrant, and economically thriving community, West Hollywood suffers from traffic generated within and moving through the City. Treatments are possible along Fountain Avenue, Santa Monica Boulevard, La Brea Avenue and Fairfax Avenue that may aid in reducing congestion and/or improving pedestrian safety. However, these are outside the scope of this plan and addressed in other City processes.

By installing traffic calming devices in the Eastside neighborhood, the attractiveness of cutting through would be reduced and therefore more vehicles would remain on the major arterials. The traffic calming tools identified will both slow traffic speeds and reduce the traffic volumes on the streets identified during the first community workshop.

Figures 10 and 11 show examples of traffic circles and speed lumps, the devices being recommended. Detailed descriptions of the recommendations and estimated costs to construct these devices are provided in in the following section of this report.



Figure 10. Example of a Speed Lump



Figure 11. Example of a Traffic Circle

Orange Grove Avenue: Orange Grove Avenue is a north/south street that extends through the Eastside neighborhood and carries 2,100 vpd between Santa Monica Boulevard and Fountain Avenue. The 85th percentile speed along Orange Grove Avenue in this area is 22 mph. Although the street is primarily residential, it does provide access to a school, public parking lot and egress for the SanFair Shopping Center (Whole Foods). However, the varying width of the street and on-street parking combined with the higher traffic volume warrant consideration for potential volume reducing measures. **Therefore, two sets of speed lumps are recommended between Fountain Avenue and Santa Monica Boulevard.**

Ogden Drive: Ogden Drive is a north/south street that extends through the Eastside neighborhood. The street currently carries 1,800 vpd. The 85th percentile speed along Ogden Drive in this area is 26 mph, which is just above the prima facie speed limit of 25 mph. The current 85th percentile speeds and the lack of traffic controls between Santa Monica Boulevard and Fountain Avenue warrant consideration for potential speed reducing devices. **Therefore, two sets of speed lumps are recommended between Fountain Avenue and Santa Monica Boulevard.**

Genesee Avenue: Genesee Avenue is a north/south street that extends through the Eastside neighborhood and carries 1,600 vpd between Lexington Avenue and Hampton Avenue. The 85th percentile speed along Genesee Avenue in this area is 22 mph. Community members indicated that the portion of Genesee Avenue between Hampton Avenue and Norton Avenue was an area of concern. **Therefore, two sets of speed lumps are recommended on Genesee Avenue between Hampton Avenue and Norton Avenue.**

Spaulding Avenue: Spaulding Avenue is a north/south street that extends through the Eastside neighborhood and carries 1,200 vpd between Lexington Avenue and Hampton Avenue. The 85th percentile speed along Spaulding Avenue in this area is 20 mph. Community members highlighted the portion of Spaulding Avenue between Fountain Avenue and Santa Monica Boulevard as a cut-through street. **Therefore, a traffic circle is recommended at the intersection of Spaulding Avenue & Lexington Avenue.**

Curson Avenue: Curson Avenue is a north/south street that extends through the Eastside neighborhood and carries 1,700 vpd between Lexington Avenue and Hampton Avenue. The 85th percentile speed along this portion of Curson Avenue in this area is 21 mph. Community members at the first meeting highlighted the intersections with Norton Avenue, Lexington Avenue and Hampton Avenue as areas of concern. **Therefore, traffic circles are recommended at the intersections of Curson Avenue & Norton Avenue and Curson Avenue & Hampton Avenue.**

Curson Avenue south of Santa Monica Boulevard carries 2,300 vpd with an 85th percentile speed of 26 mph, which is just above the prima facie speed limit of 25 mph. **Due to the high volumes and speeds along Curson Avenue, two sets of speed lumps are recommended between Santa Monica Boulevard and Willoughby Avenue.**

Gardner Street: Gardner Street is a north/south street that extends through the Eastside neighborhood and carries 7,000 vpd between Lexington Avenue and Hampton Avenue, the highest of any residential street in the study area. The 85th percentile speed along Gardner Street in this area is 26 mph, which is just above the prima facie speed limit of 25 mph. Community members highlighted the intersections with Lexington Avenue as an area of concern and the portion of Gardner Street between Santa Monica Boulevard and Fountain

Avenue as a cut-through street. **Therefore, a traffic circle is recommended at the intersection of Gardner Street & Lexington Avenue.**

Vista Street: Vista Street is a north/south street that extends through the Eastside neighborhood and carries 1,400 vpd between Lexington Avenue and Santa Monica Boulevard. The 85th percentile speed along Vista Street in this area is 22 mph. Community members highlighted the portion of Vista Street between Santa Monica Boulevard and Fountain Avenue as an area of concern. **Therefore, two sets of speed lumps are recommended on Vista Street between Santa Monica Boulevard and Fountain Avenue.**

Fuller Avenue: Fuller Avenue is a north/south street that extends through the Eastside neighborhood and carries 2,000 vpd between Fountain Avenue and Santa Monica Boulevard. The 85th percentile speed along Gardner Street in this area is 27 mph, which is just above the prima facie speed limit of 25 mph. **Due to the high volumes and speeds along Fuller Avenue, two sets of speed lumps are recommended between Fountain Avenue and Santa Monica Boulevard.**

Greenacre Avenue: Greenacre Avenue is a north/south street that extends north from Santa Monica Boulevard approximately 1,000 feet until a cul-de-sac at the end of the street. The street carries 300 vpd with an 85th percentile speed of 26 mph, which is just above the prima facie speed limit of 25 mph. **Due to the speeds along Greenacre Avenue, one set of speed lumps is recommended north of Santa Monica Boulevard.**

Poinsettia Drive: Poinsettia Drive is a north/south street that extends from Hampton Avenue to Santa Monica Boulevard and carries 1,400 vpd with an average speed of 25 mph. The street was highlighted by community members as a cut-through street with high speeds. **Therefore, one set of speed lumps is recommended on Poinsettia Drive between Santa Monica Boulevard and Hampton Avenue.**

Poinsettia Place: Poinsettia Place is a north/south street that extends through the Eastside neighborhood and carries 1,100 vpd between Hampton Avenue and Santa Monica Boulevard. The 85th percentile speed along Gardner Street in this area is 23 mph. Community members indicated that the street is a cut-through street with high speeds. In addition, the intersection between Poinsettia Place and Hampton Avenue was highlighted as an area of concern. **Therefore, one set of speed lumps is recommended on Poinsettia Place between Santa Monica Boulevard and Hampton Avenue. In addition, staff will move forward with the installation of all-way stop sign control at the intersection of Poinsettia Place & Hampton Avenue. The installation of stop signs does not require a petition process.**

Martel Avenue: Martel Avenue is a north/south street that extends south from Santa Monica Boulevard. The street carries 2,500 vpd with an 85th percentile speed of 24 mph. **Due to the high volumes along Martel Avenue, one set of speed lumps is recommended between Romaine Street and Santa Monica Boulevard.**

Table 1 summarizes the street segments where traffic calming treatments are being proposed.

TABLE 1: STREET SEGMENT VPD, 85TH PERCENTILE SPEED AND PROPOSED TREATMENTS

Street	Segment	Vehicles per Day	85th Percentile Speed (mph)	Proposed Treatment
Orange Grove Avenue	Fountain Avenue to Santa Monica Boulevard	2,100	22	Two sets of speed lumps
Ogden Drive	Fountain Avenue to Santa Monica Boulevard	1,800	26	Two sets of speed lumps
Genesee Avenue	Hampton Avenue to Hampton Avenue	1,600	22	Two sets of speed lumps
Spaulding Avenue	Lexington Avenue to Hampton Avenue	1,200	20	Traffic Circles at Lexington Avenue
Curson Avenue	Norton Avenue to Hampton Avenue	1,700	21	Traffic Circles at Norton Avenue and Hampton Avenue
Curson Avenue	Santa Monica Boulevard to Willoughby Avenue	2,300	26	Two sets of speed lumps
Gardner Street	Lexington Avenue to Hampton Avenue	7,000	26	Traffic Circle at Lexington Avenue
Vista Street	Fountain Avenue to Santa Monica Boulevard	1,400	22	Two sets of speed lumps
Fuller Avenue	Fountain Avenue to Santa Monica Boulevard	2,000	27	Two sets of speed lumps
Greenacre Avenue	North of Santa Monica Boulevard	300	26	One set of speed lumps

Poinsettia Drive	Hampton Avenue to Santa Monica Boulevard	1,400	25	One set of speed lumps
Poinsettia Place	Hampton Avenue to Santa Monica Boulevard	1,100	23	One set of speed lumps
Martel Avenue	Romaine Street to Santa Monica Boulevard	2,500	24	One set of speed lumps

IMPLEMENTATION AND TESTING

Following the collection of petitions that demonstrate a majority community support, Transportation Commission review, and approval by City Council, elements of the traffic calming plan may be temporarily implemented in the community. These temporary measures will allow for evaluation of the effectiveness of the traffic calming measures, changes in traffic patterns as a result of implementation, and assessment of community support or concerns about the installed devices. The temporary traffic calming devices may be tested for a period of two to six months, followed by potential modification or relocation during the testing period as necessary in order to fully vet the impacts and benefits of each device.

During the testing period, the City will collect speed and traffic volume data near the location of the temporary installations. Should the implementation of the temporary traffic calming devices result in diversion on parallel or adjoining streets, the City will review the overall traffic calming plan and adjacent plans to determine if measures are planned for the community as a whole to offset those impacts. If diversion is occurring on routes where traffic calming is not planned, then additional traffic calming measures may be recommended and tested to reduce potential increases in traffic or speed on these local streets. The City will work with the community to resolve potential issues prior to installing permanent devices in the Eastside neighborhood.

COST ESTIMATES

Based on the final traffic calming recommendations outlined in this section, cost estimates were prepared for the study area. **Table 2** summarizes the estimated costs to construct the recommendations. The traffic calming elements identified in **Figure 10** have a collective construction cost of approximately **$241,000** to install, which does not include costs to relocate utilities, acquire right-of-way, landscape or irrigate, or provide for long-term maintenance. **The cost does not include a 25% contingency.**

None of the devices recommended will likely need additional environmental review. Therefore, the estimated cost does not include environmental studies or final design costs. It is assumed that typical design drawings can be used to design and construct most of these elements.

To establish the costs of the traffic calming concept plan, typical costs were used for each of the devices recommended based on the following:

- Neighborhood Traffic Circles: $40,000 per intersection/$50,000 including contingency
- Speed Lumps: $5,000 per lump/$6,250 including contingency
- Stop Sign: $1,000 per intersection, $1,250 including contingency

TABLE 2: FINAL TRAFFIC CALMING RECOMMENDATIONS AND ESTIMATED CONSTRUCTION COSTS

	Recommendation	Purpose	Anticipated Benefit	Estimated Base Cost	Estimated Cost with 25% Contingency
1.	Install neighborhood traffic circles and high-visibility crosswalks along Curson Avenue at Hampton Avenue and Norton Avenue, Spaulding Avenue at Lexington Avenue, and Gardner Street at Lexington Avenue (four total).	Narrow intersections and reduce traffic speeds through intersections. Existing stop signs will remain in place with circles.	Shown to improve safety while reducing speeds at intersections and between circles. Visual impedance helps discourage cut-through traffic.	$160,000	$200,000
2.	Install speed lumps along Orange Grove Avenue (two), Ogden Drive (two), Genesee Avenue (two) Vista Street (two), Fuller Avenue (two), Greenacre Avenue (one), Poinsettia Drive (one), Poinsettia Place (one), Curson Avenue (two) and Martel Avenue (one). A total of 16 speed lumps are proposed.	Reduce traffic speed and discourage cut-through traffic.	Reduces speed, which will also discourage cut-through traffic. Speed lumps are more favorable than humps for emergency vehicles.	$80,000	$100,000
3.	Install all-way stop signs and road markings at the intersection of Poinsettia Place and Hampton Avenue.	Increase safety by requiring all vehicles at intersection to stop before proceeding.	Reduces speed for vehicles traveling northbound, which will also discourage cut-through traffic in this direction. All-way stop will also facilitate easier crossing for pedestrians.	$1,000	$1,250
			TOTAL ESTIMATED RELATED COSTS	**$241,000**	**$301,250**

OTHER MEASURES



Figure 12. Speed Feedback Sign

In addition to the specific recommendations included in **Figure 10**, several supporting improvements could be installed, without a community survey or additional analysis, to address speeding and cut-through issues:

- **Radar Speed Feedback Signs**: Radar speed feedback signs provide drivers an instant response to their existing speed along a roadway. Coupled with a speed limit sign, these devices inform the driver if he or she is exceeding the speed limit. Speed trailers or pole mounted devices, installed on a temporary or rotational basis, can be effective at slowing drivers down and increasing driver awareness of travel speed. Long-term installation tends to be less effective, particularly in residential areas as drivers become accustomed to seeing the signs.

- **Install Speed Limit Signs and Pavement Markings:** Although the majority of the reported speeds within the community were within the 25 mph prima facie speed limit, installation of speed limit signs at key entry points would enforce the residential neighborhood speeds.

- **Traffic Calmed Area Signs:** In lieu of or in conjunction with speed limit signs, it is also feasible to install "Traffic Calming Devices Ahead" of "Traffic Calming Area" signs at key entry points to enforce the slower residential speeds desirable within the community.



Figure 13. Traffic Calming Sign

- **Improve Traffic Signal Timing and Operations Surrounding the Study Area:** The City of West Hollywood and City of Los Angeles maintain the traffic signals surrounding the Eastside community, and continually monitor performance to improve traffic flow. Continued monitoring is recommended to reduce the potential for cut-through traffic through Eastside.

- **Improve Pedestrian and Bicycle Access within the Eastside neighborhood:** An additional way to decrease the traffic congestion surrounding the Eastside community is to reduce the reliance on autos and encourage more pedestrian and bicycle trips. The City is currently updating the Pedestrian & Bicycle Mobility Plan, which will provide specific recommendations for the Eastside.

Some of these improvements may be implemented as part of other City projects. Traffic signal improvements, timing and pedestrian treatments are not included in the Traffic Calming program and would therefore be funded through other City resources.

5. NEXT STEPS

This report summarizes the traffic calming recommendations for the Eastside community. Approval of the plan, funding and implementation of the improvements are the subsequent steps of this project. As the planning process concludes with this report, City of West Hollywood staff will present the report to the Transportation Commission and City Council as an informational item.

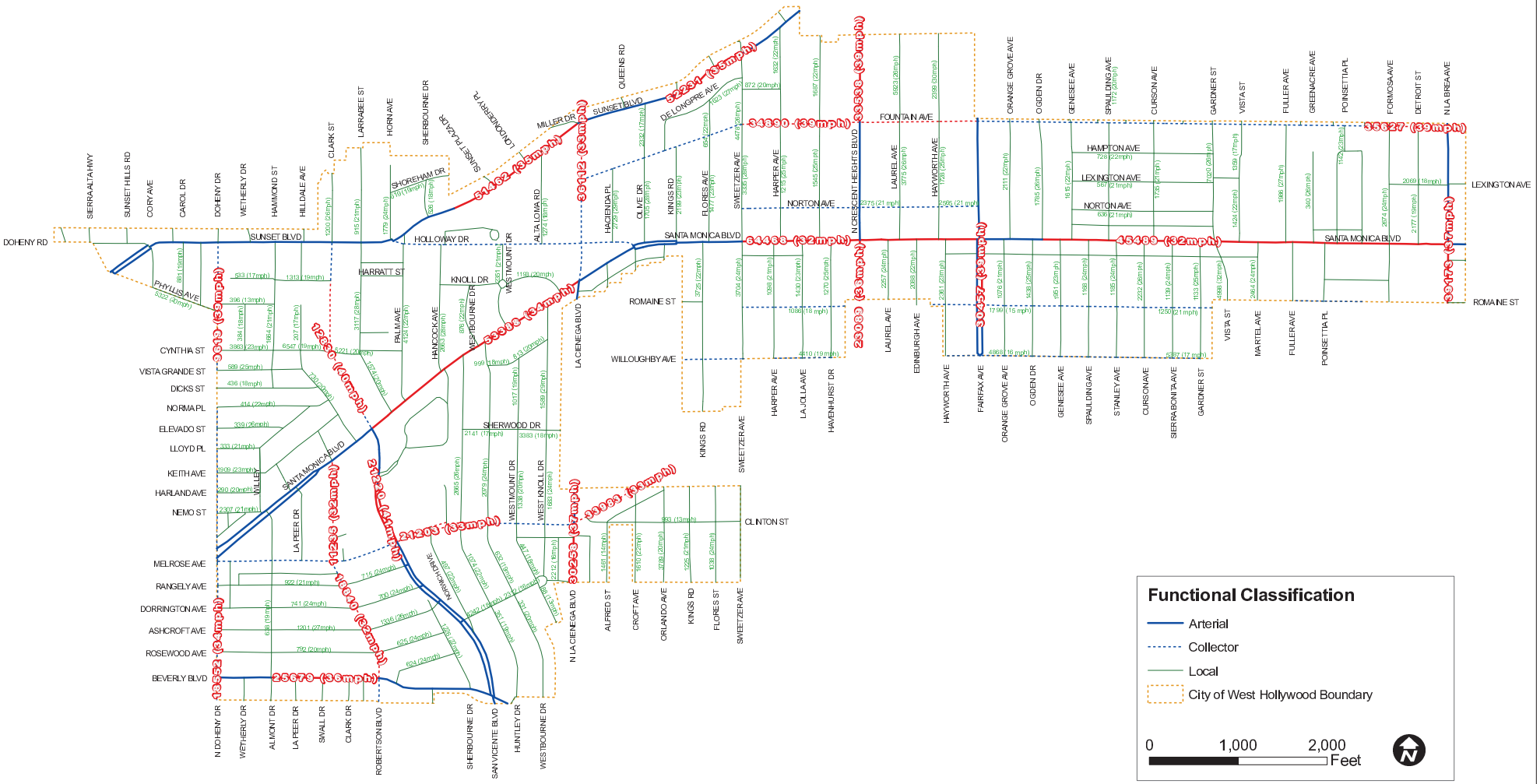
Following the presentation to Transportation Commission and City Council, community members will be tasked with circulating petitions within their community for the recommended traffic calming devices. The majority of the residents within the sphere of influence of the traffic calmed area (51% or more) will need to sign the petition in order for the City Council to consider implementation of the devices within that area.

APPENDIX A:

TRAFFIC COUNTS



City of West Hollywood Daily Traffic Volumes and 85th Percentile Speeds



Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Detroit St -- Fountain Ave (WBL Only)
CITY/STATE: West Hollywood, CA

QC JOB #: 13666401
DATE: Thu, Dec 10 2015

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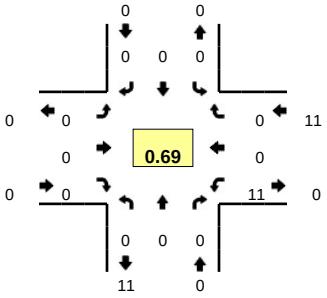
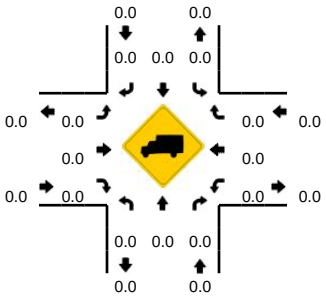
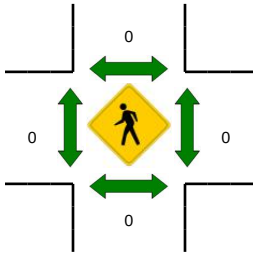
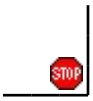
Peak 15-Min: 8:30 AM -- 8:45 AM

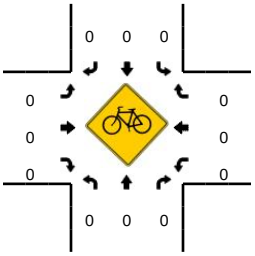


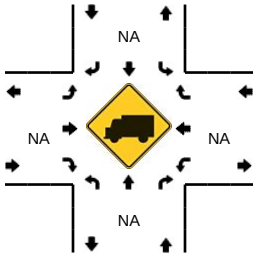






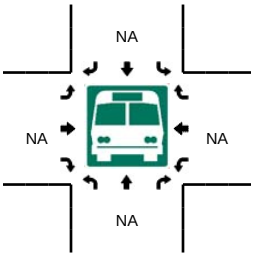












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	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
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7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	4
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Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
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All Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	16
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

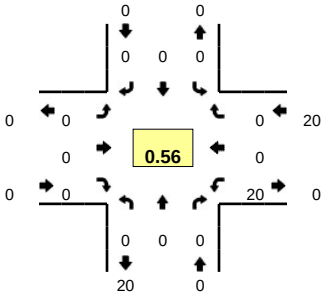
Type of peak hour being reported: Intersection Peak

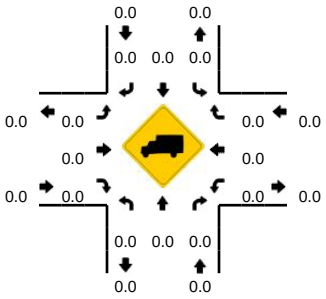
Method for determining peak hour: Total Entering Volume

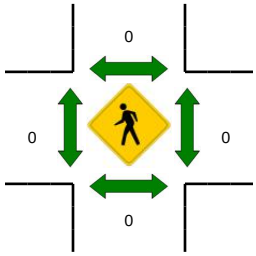
LOCATION: Formosa Ave -- Fountain Ave (WBL Only)
CITY/STATE: West Hollywood, CA

QC JOB #: 13666402
DATE: Thu, Dec 10 2015

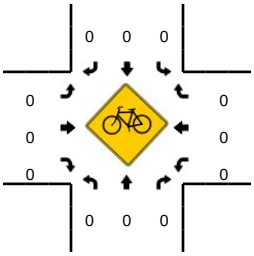
Peak-Hour: 9:00 AM -- 10:00 AM
Peak 15-Min: 9:00 AM -- 9:15 AM

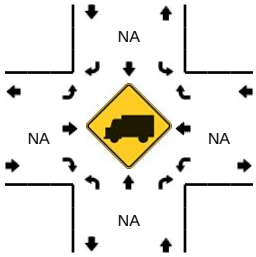




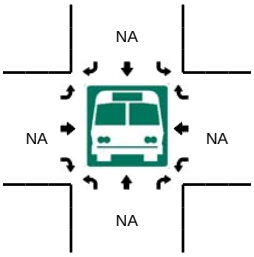












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Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
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Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

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CITY/STATE: West Hollywood, CA

QC JOB #: 13666403

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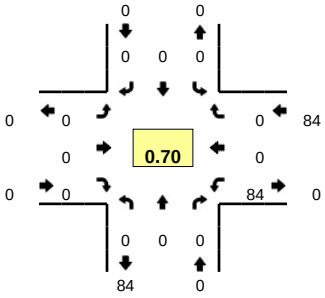
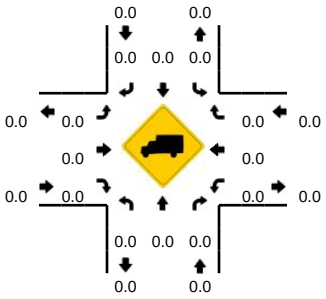
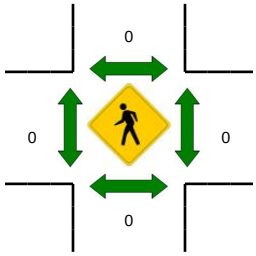
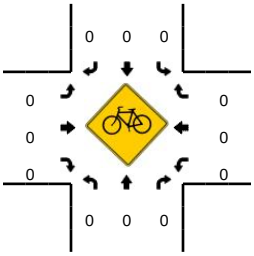
Peak 15-Min: 8:30 AM -- 8:45 AM

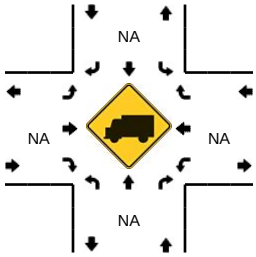




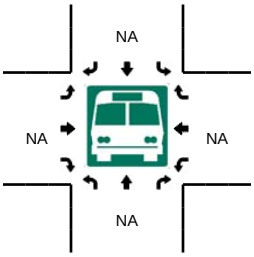












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8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	28	77
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13	84
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	77
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	54
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	11	37

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	120
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Orange Grove Ave -- Fountain Ave (WBL Only)

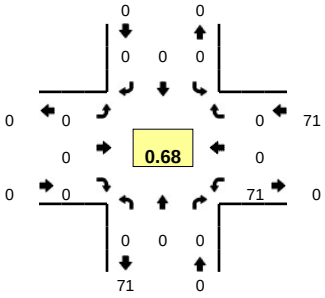
CITY/STATE: West Hollywood, CA

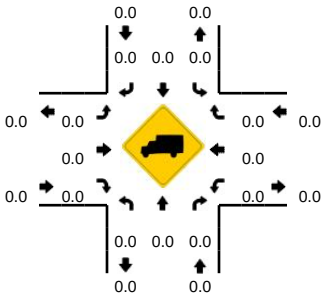
QC JOB #: 13666404

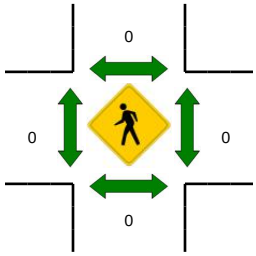
DATE: Thu, Dec 10 2015

Peak-Hour: 7:45 AM -- 8:45 AM

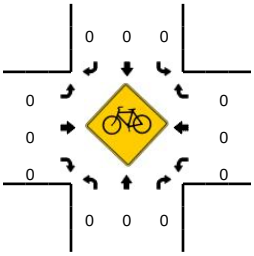
Peak 15-Min: 8:30 AM -- 8:45 AM

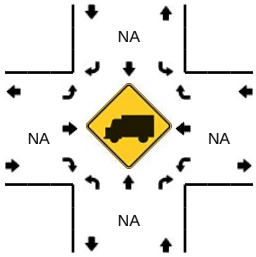




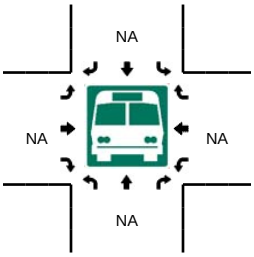












15-Min Count Period Beginning At	Orange Grove Ave (Northbound)				Orange Grove Ave (Southbound)				Fountain Ave (WBL Only) (Eastbound)				Fountain Ave (WBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	14	27
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	36
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	19	50
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	26	71
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	69
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13	70
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8	59
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	43
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	38

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	104	0	0	0	104
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

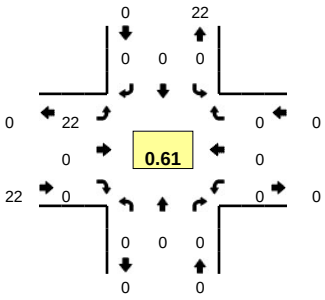
Type of peak hour being reported: Intersection Peak

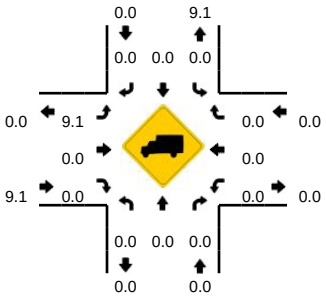
Method for determining peak hour: Total Entering Volume

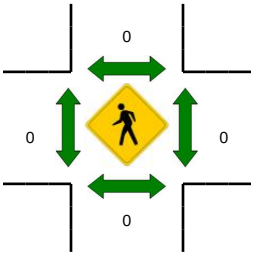
LOCATION: Detroit St -- Santa Monica Blvd (EBL Only)
CITY/STATE: West Hollywood, CA

QC JOB #: 13666405
DATE: Thu, Dec 10 2015

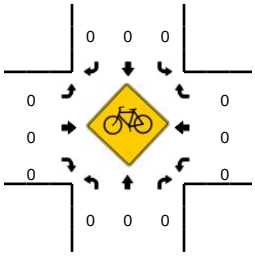
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:45 PM -- 6:00 PM

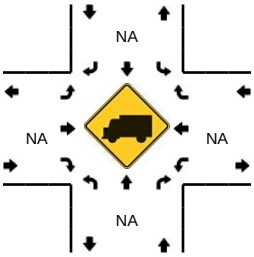




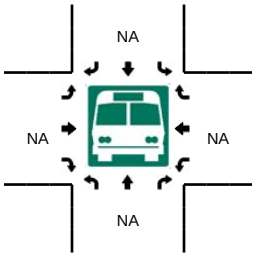












15-Min Count Period Beginning At	Detroit St (Northbound)				Detroit St (Southbound)				Santa Monica Blvd (EBL Only) (Eastbound)				Santa Monica Blvd (EBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	
4:45 PM	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	10
5:00 PM	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	7	14
5:15 PM	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	18
5:30 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	17
5:45 PM	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	9	22
6:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	17
6:15 PM	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	18
6:30 PM	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	21
6:45 PM	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	16

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	36
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Formosa Ave -- Santa Monica Blvd (EBL Only)

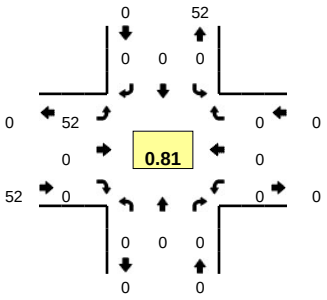
QC JOB #: 13666406

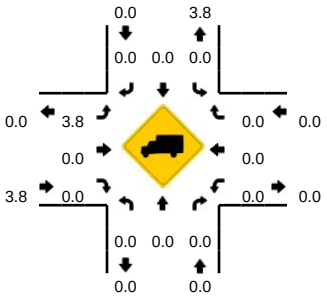
CITY/STATE: West Hollywood, CA

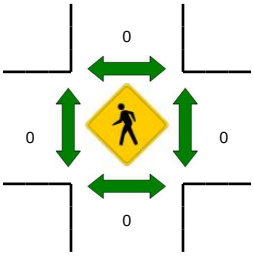
DATE: Thu, Dec 10 2015

Peak-Hour: 5:00 PM -- 6:00 PM

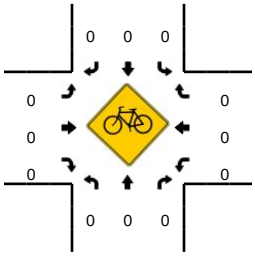
Peak 15-Min: 5:15 PM -- 5:30 PM

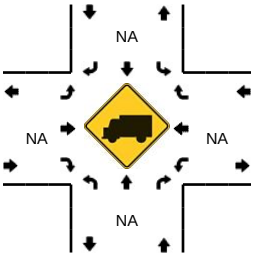




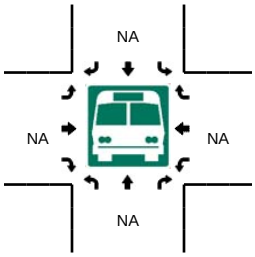












15-Min Count Period Beginning At	Formosa Ave (Northbound)				Formosa Ave (Southbound)				Santa Monica Blvd (EBL Only) (Eastbound)				Santa Monica Blvd (EBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	12	
4:15 PM	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	12	
4:30 PM	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	
4:45 PM	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	7	39
5:00 PM	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	35
5:15 PM	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	16	39
5:30 PM	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	12	43
5:45 PM	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	16	52
6:00 PM	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6	50
6:15 PM	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	13	47
6:30 PM	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	16	51
6:45 PM	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	12	47

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0	64
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

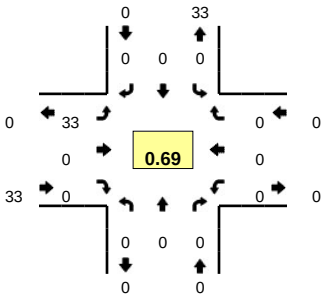
Type of peak hour being reported: Intersection Peak

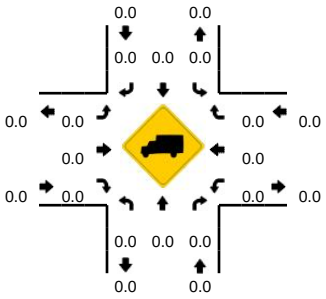
Method for determining peak hour: Total Entering Volume

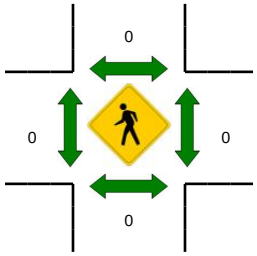
LOCATION: N Poinsettia Pl -- Santa Monica Blvd (EBL Only)
CITY/STATE: West Hollywood, CA

QC JOB #: 13666407
DATE: Thu, Dec 10 2015

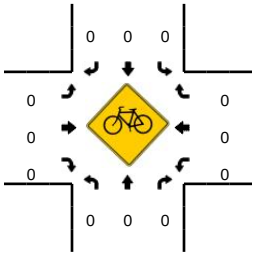
Peak-Hour: 5:30 PM -- 6:30 PM
Peak 15-Min: 5:45 PM -- 6:00 PM

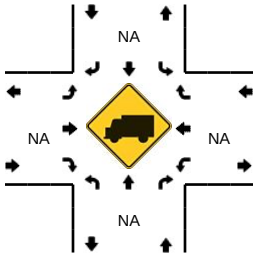




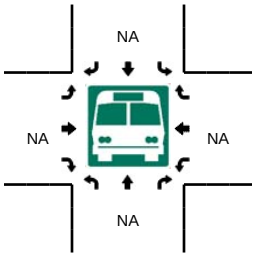












15-Min Count Period Beginning At	N Poinsettia Pl (Northbound)				N Poinsettia Pl (Southbound)				Santa Monica Blvd (EBL Only) (Eastbound)				Santa Monica Blvd (EBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	
4:15 PM	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	
4:30 PM	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	
4:45 PM	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	19
5:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	17
5:15 PM	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	16
5:30 PM	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6	17
5:45 PM	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	12	24
6:00 PM	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6	28
6:15 PM	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	9	33
6:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	28
6:45 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	19

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	48
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

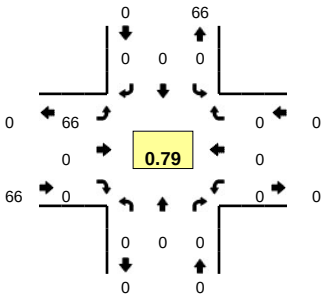
Type of peak hour being reported: Intersection Peak

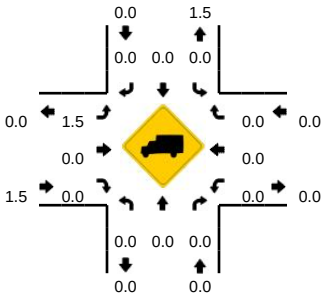
Method for determining peak hour: Total Entering Volume

LOCATION: Poinsettia Dr -- Santa Monica Blvd (EBL Only)
CITY/STATE: West Hollywood, CA

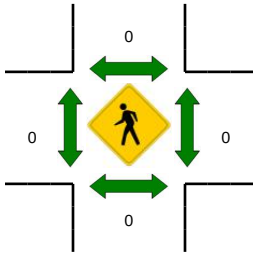
QC JOB #: 13666408
DATE: Thu, Dec 10 2015

Peak-Hour: 5:45 PM -- 6:45 PM
Peak 15-Min: 5:45 PM -- 6:00 PM

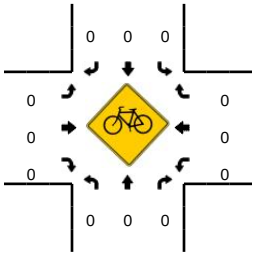


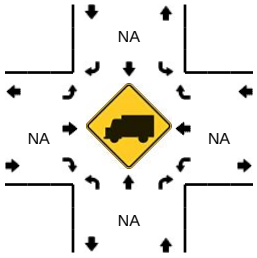


Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

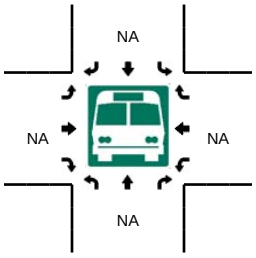












15-Min Count Period Beginning At	Poinsettia Dr (Northbound)				Poinsettia Dr (Southbound)				Santa Monica Blvd (EBL Only) (Eastbound)				Santa Monica Blvd (EBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	7	
4:15 PM	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	7	
4:30 PM	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	11	
4:45 PM	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	35
5:00 PM	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	13	41
5:15 PM	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	16	50
5:30 PM	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	49
5:45 PM	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	21	60
6:00 PM	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	13	60
6:15 PM	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	13	57
6:30 PM	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	19	66
6:45 PM	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	18	63

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	84	0	0	0	0	0	0	0	84
Heavy Trucks	0	0	0		0	0	0		4	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

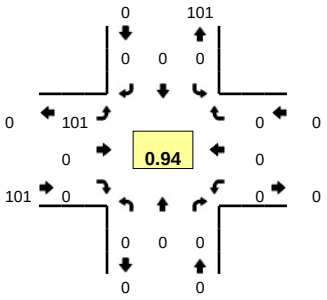
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

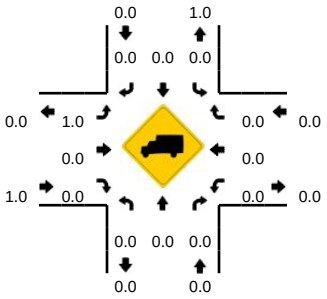
Method for determining peak hour: Total Entering Volume

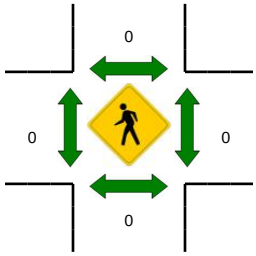
LOCATION: Genesee Ave -- Santa Monica Blvd (EBL Only)
CITY/STATE: West Hollywood, CA

QC JOB #: 13666409
DATE: Thu, Dec 10 2015

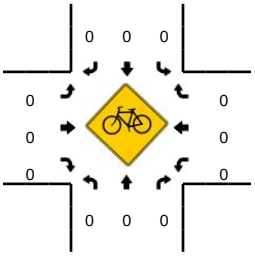


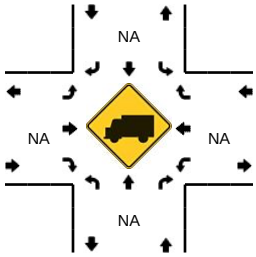
Peak-Hour: 6:00 PM -- 7:00 PM
Peak 15-Min: 6:30 PM -- 6:45 PM



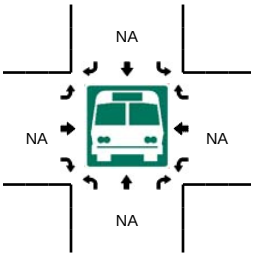












15-Min Count Period Beginning At	Genesee Ave (Northbound)				Genesee Ave (Southbound)				Santa Monica Blvd (EBL Only) (Eastbound)				Santa Monica Blvd (EBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	17	
4:15 PM	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	
4:30 PM	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	17	
4:45 PM	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	14	58
5:00 PM	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	23	64
5:15 PM	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	30	84
5:30 PM	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	25	92
5:45 PM	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	22	100
6:00 PM	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	23	100
6:15 PM	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	26	96
6:30 PM	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	27	98
6:45 PM	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	25	101

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	108	0	0	0	0	0	0	0	108
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

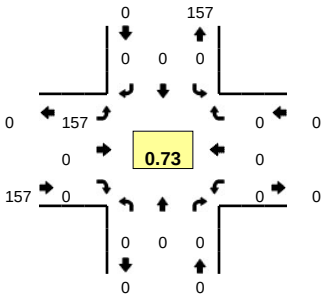
Method for determining peak hour: Total Entering Volume

LOCATION: N Ogden Dr -- Santa Monica Blvd (EBL Only)

CITY/STATE: West Hollywood, CA

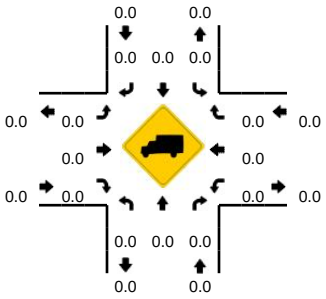
QC JOB #: 13666410

DATE: Thu, Dec 10 2015

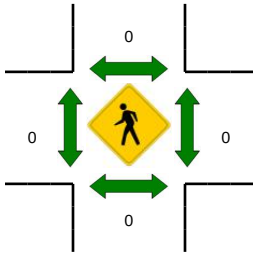


Peak-Hour: 4:30 PM -- 5:30 PM

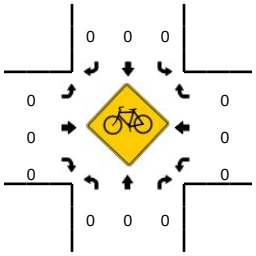
Peak 15-Min: 5:00 PM -- 5:15 PM

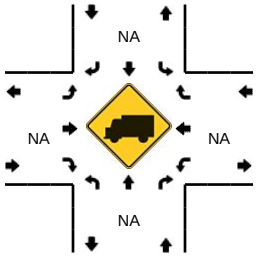




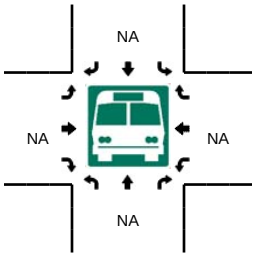












15-Min Count Period Beginning At	N Ogden Dr (Northbound)				N Ogden Dr (Southbound)				Santa Monica Blvd (EBL Only) (Eastbound)				Santa Monica Blvd (EBL Only) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	24	
4:15 PM	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	31	
4:30 PM	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	29	
4:45 PM	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	35	119
5:00 PM	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0	54	149
5:15 PM	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	39	157
5:30 PM	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	27	155
5:45 PM	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	26	146
6:00 PM	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	31	123
6:15 PM	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	31	115
6:30 PM	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	24	112
6:45 PM	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	37	123

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	216	0	0	0	0	0	0	0	216
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2015 5:07 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Association between Long-Term Exposure to Traffic-Related Air Pollution and Subclinical Atherosclerosis: The REGICOR Study

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Background: Epidemiological evidence of the effects of long-term exposure to air pollution on the chronic processes of atherogenesis is limited.

Objective: We investigated the association of long-term exposure to traffic-related air pollution with subclinical atherosclerosis, measured by carotid intima media thickness (IMT) and ankle–brachial index (ABI).

Methods: We performed a cross-sectional analysis using data collected during the reexamination (2007–2010) of 2,780 participants in the REGICOR (Registre Gironí del Cor: the Gerona Heart Register) study, a population-based prospective cohort in Girona, Spain. Long-term exposure across residences was calculated as the last 10 years' time-weighted average of residential nitrogen dioxide (NO_2) estimates (based on a local-scale land-use regression model), traffic intensity in the nearest street, and traffic intensity in a 100 m buffer. Associations with IMT and ABI were estimated using linear regression and multinomial logistic regression, respectively, controlling for sex, age, smoking status, education, marital status, and several other potential confounders or intermediates.

Results: Exposure contrasts between the 5th and 95th percentiles for NO_2 (25 μg/m^3), traffic intensity in the nearest street (15,000 vehicles/day), and traffic load within 100 m (7,200,000 vehicle-m/day) were associated with differences of 0.56% (95% CI: –1.5, 2.6%), 2.32% (95% CI: 0.48, 4.17%), and 1.91% (95% CI: –0.24, 4.06) percent difference in IMT, respectively. Exposures were positively associated with an ABI of > 1.3, but not an ABI of < 0.9. Stronger associations were observed among those with a high level of education and in men ≥ 60 years of age.

Conclusions: Long-term traffic-related exposures were associated with subclinical markers of atherosclerosis. Prospective studies are needed to confirm associations and further examine differences among population subgroups.

Key words: ankle–brachial index, average daily traffic, cardiovascular disease, exposure assessment, exposure to tailpipe emissions, intima media thickness, land use regression model, Mediterranean diet, nitrogen dioxide. *Environ Health Perspect* 121:223–230 (2013). http://dx.doi.org/10.1289/ehp.1205146 [Online 12 December 2012]

Air pollution from traffic and other sources is an established cause of premature mortality (Brook et al. 2010). A relevant part of this environmental burden of disease relates to cardiovascular diseases (CVDs), which were responsible for 10% of total disability-adjusted life years in 2004 and the leading causes of death worldwide in 2008 (World Health Organization 2008). A common feature of this group of diseases is atherosclerosis, a chronic and degenerative process that mainly occurs in large and medium-sized arteries and is characterized by asymmetric focal thickenings of the innermost layer of the artery, the intima. The development of atherosclerosis is the result of the total cumulative exposure to atherogenic risk factors such as hypertension, high cholesterol, diabetes, obesity, smoking, physical inactivity, and other lifestyle factors and their interactions with genetic susceptibility (Lusis 2000). Acute events such as myocardial infarction or stroke can be triggered by short-term exposure to air pollution (Brook et al. 2010). However, whether and how ambient air pollution contributes to atherogenesis is subject to debate. Although experimental studies on animals provide strong evidence for a causal atherogenic role of air pollution, particularly in obese mice (Sun et al. 2005), evidence from epidemiological studies is limited.

The long subclinical phase of atherosclerosis makes it possible to investigate the determinants of the vascular pathology long before its clinical manifestation. The association between air pollution and intima media thickness (IMT), an established marker of subclinical atherosclerosis, was reported for the first time in volunteers participating in two clinical trials in California (Künzli et al. 2005). Two population-based cross-sectional analyses, namely the Heinz Nixdorf Recall study in Germany (Bauer et al. 2010) and the Multi-Ethnic Study of Atherosclerosis (MESA) cohort in the United States (Diez Roux et al. 2008), also reported associations between air pollution and IMT, although a study of young adults in the Netherlands found no association (Lenters et al. 2010). So far, only one longitudinal study has been published, and it was based on heterogeneous samples of volunteers participating in five clinical trials (Künzli et al. 2010), including the two trials of the first cross-sectional study published on this topic (Künzli et al. 2005). Findings from the study suggested a possible role of ambient air pollutants, indicated by particulate matter (PM) ≤ 2.5 μm in diameter ($PM_{2.5}$) and living close to busy highways, in the progression of IMT (Künzli et al. 2010).

Most previous studies have reported that associations between air pollution and IMT differ among population subgroups (Künzli et al. 2011). However, subgroup patterns have not been consistent; thus a clear understanding of susceptibility factors is still lacking. Human studies have not investigated whether diet modifies the effects of air pollution—a plausible hypothesis given evidence from animal studies (Sun et al. 2005) and the effects of diet on oxidative stress and systemic inflammation that are likely to contribute to the systemic effects of ambient air pollution (Brook et al. 2010).

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Supplemental Material is available online (http://dx.doi.org/10.1289/ehp.1205146).

We thank M. Medina-Ramón, H. Schröder, M. Grau, J. Vila, P. Solanas, N. Pagès, M. Sidera, M. Pique, S. Tello, R. Martí, M. Cabañero, and L. Franco and the REGICOR team; and W. Hanselaar, J. Gort, M. Dorlijn-Pieterse, and C. van der Biezen-Terlouw of AMC Vascular Imaging, Academic Medical Centre, Amsterdam, the Netherlands, for IMT imaging analysis and training.

J.T. is employed by 4sfera Innova, Girona, Spain. The authors declare they have no actual or potential competing financial interests.

Received 24 February 2012; accepted 11 December 2012.

The Mediterranean region of Girona, and Spain in general, has one of the lowest cardiovascular mortality rates in Europe, despite very high prevalence of conventional cardiovascular risk factors (Masiá et al. 1998), a paradox that may be explained in part by protective effects of the Mediterranean diet (Martínez-González et al. 2011). We aimed to investigate the association between long-term exposure to traffic-related air pollution and subclinical atherosclerosis in Spain, and modification of this association by diet and other factors identified in previous studies (Künzli et al. 2011). We investigated this in the follow-up of participants of three population-based cohorts of the REGICOR (Registre Gironí del Cor: the Gerona Heart Register) study (Grau et al. 2007). Subclinical atherosclerosis was measured by carotid IMT, a validated marker of atherosclerosis (Coll and Feinstein 2008). In addition, we measured the ankle–brachial index (ABI), a marker of the presence and severity of peripheral artery disease. Both IMT and ABI are associated with cardiovascular events and mortality (Ankle Brachial Index Collaboration 2008; Lorenz et al. 2007). In the absence of PM measurements in this region, we used estimates of 10-year average home outdoor nitrogen dioxide (NO_2) concentrations and residential traffic intensity as markers of exposure to local traffic-related air pollutants.

Methods

REGICOR-Air is a cross-sectional study nested in the REGICOR cohort study (Grau et al. 2007) evaluating the association between air pollution and cardiovascular diseases. We used data from the follow-up of three population-based cohorts originally enrolled in 1995, 2000, and 2005 (with response rates of 72.4, 70.0, and 73.8%, respectively) from 12 towns that represent the geographic diversity of the Girona Province and have large contrasts in ambient air pollution levels [see map in Supplemental Material, Figure S1 (http://dx.doi.org/10.1289/ehp.1205146)]. During 2007–2010, the participants residing in these towns, who were alive and not institutionalized, were invited to participate in REGICOR-Air, and the response rate was approximately 82%. In addition to extensive health status reassessment, IMT and ABI were measured for the first time in this population. Address histories for the past 10 years were collected by questionnaire, and each address was geocoded at the front-door level. This study was approved by the Hospital del Mar Research Institute ethics committee, and participants gave written informed consent.

IMT was measured by three trained, certified sonographers using ultrasound examinations of the left and right carotid arteries. Standardized scan and image analyses protocols were used. The scan protocol entailed the right and left carotid arteries. In each artery, the following predefined longitudinal segments were imaged: *a*) the common carotid 1 cm proximal to the dilation, *b*) the carotid bulb, and *c*) the internal carotid 1 cm distal to the flow divider. For imaging, an Acuson Aspen ultrasound instrument (Acuson-Siemens, Erlangen, Germany) equipped with an L7 5-12MHz transducer and dedicated REGICOR application scan protocol (AMC IMAGELAB, University of Amsterdam, Amsterdam, and Technical University Eindhoven, Eindhoven, the Netherlands) were used. A still image of each arterial segment was saved as a DICOM (digital information and communication in medicine) file. These source files were locally stored and securely transferred to IMAGELAB, where trained and certified sonographers analyzed the images using validated "eTrack REGICOR" software (Department of Physiology and Vascular Medicine Academic Medical Centre, Amsterdam, the Netherlands) (de Groot et al. 2008). IMT was defined as the average distance between the lumen-intima and media-adventitia interfaces in a given 1 cm segment of the artery far wall. The main outcomes were *a*) the mean of the IMTs for the left and right common carotid arteries (IMTcca), and *b*) the mean of the IMTs for the left and right common carotid arteries, internal carotid arteries, and carotid bulbs (IMT6seg). These two outcomes were assessed separately because of differences in the segments' cellular constituents—with more foam cells in the common carotid artery and more cholesterol-rich plaques in the carotid bulb and the internal carotid artery (Gállego Pérez-Larraya et al. 2012)—and in risk factors for IMT (Polak et al. 2010), which suggest that etiology may differ according to location. Between-sonographer and between-visit variability were evaluated based on repeated IMT measurements conducted at two visits, 2 weeks apart, by up to three sonographers, in 42 participants.

Systolic blood pressure was measured in a supine position after a 5-min rest in the brachial artery of both arms and the posterior tibial and dorsalis pedis arteries of both legs, using a continuous Doppler device. Right and left ABI were calculated as the ratio of the highest leg pressure to the highest brachial pressure in the corresponding arm, and the lowest of the two ABI ratios were categorized as low (< 0.9), normal (0.9–1.3), or high (> 1.3) for analysis (Ankle Brachial Index Collaboration 2008; McDermott et al. 2005).

Adherence to the Mediterranean diet was measured by a 10-point index based on sex-specific intake tertiles of seven beneficial (cereals, fruits, vegetables, legumes, seafood, nuts, moderate red wine) and two detrimental (meats, dairy products) food groups, and categorized in quartiles. Modifications such as excluding low-fat dairy products or white meats from the detrimental foods, or incorporating additional unhealthy food groups (e.g., soft drinks, salty snacks, pastries) as detrimental components, had no meaningful impact on findings in sensitivity analyses (data not shown). A detailed description of the methodology used to measure adherence to the Mediterranean diet in the REGICOR study is given by Schröder et al. (2004). The plausibility of reported dietary intakes was assessed based on disparities between reported energy intakes and estimated energy requirements (Mendez et al. 2011).

Participants with a clinical history of CVD (myocardial infarction, stroke, angina, catheterization, angioplasty, bypass surgery, or amputation due to circulatory problems) were excluded (n = 227) because medication use or altered health behaviors among these participants may have influenced IMT/ABI measures obtained for this study.

Exposure assessment. We estimated the 10-year time-weighted average of the home outdoor concentrations of NO_2 for each participant using land use regression (LUR) models. In the absence of air quality data in most of these towns, we conducted an extensive monitoring campaign using NO_2 passive samplers to validate model estimates. We measured NO_2 in the balcony of 562 participants' homes for 1 month in the spring and again in the fall between June 2007 and July 2009. Homes were selected to cover a broad range of traffic-related pollution and urban settings (e.g., low- and high-building–density areas), to be representative of the residential locations of the cohort participants and to be well distributed across the towns. We adjusted for temporal variability using monthly mean NO_2 concentrations collected at a fixed location in each town for at least 1 year. NO_2 annual means were derived by multiplying the monthly means at each location by the ratio of the annual mean to the same month mean NO_2 at the town's fixed location.

To predict NO_2 at each participant's residence we used LUR models based on NO_2 annual means and data on traffic intensity, bus routes and stops, distance to traffic, land cover, building density, and other geographic information system (GIS)-derived variables. Given the geographic diversity of the study area and differences in the availability of GIS data among towns, we divided the study area into seven subareas, i.e., groups of adjacent towns. LUR models were derived for each group by supervised forward linear regression according to the methodology described by Rivera et al. (2012). The models explained between 33% and 63% of measured NO_2 (cross-validation R^2 0.32 and 0.61, respectively) [see Supplemental Material, Table S1 and Figure S2 (http://dx.doi.org/10.1289/ehp.1205146)].

We estimated the outdoor annual mean NO_2 at each residential location by applying the LUR models to the address geocode. NO_2 concentrations were back-extrapolated to the time period of residence in each address using daily means at a fixed urban background monitoring location. Finally, for each participant we calculated the time-weighted average of NO_2 estimates across all residences in the 10 years preceding the IMT measurement (10-year NO_2 exposure). Time periods when participants lived at addresses that were geocoded with low precision or were outside of the study area were excluded when deriving the 10-year NO_2 exposure. Participants who lived in the study towns for < 6 years or had high-precision geocodes (i.e., at the front-door level) for < 6 years (n = 365) were excluded from the main analyses.

We also used traffic proximity markers as surrogates of air pollution exposure in independent analyses. Traffic intensity, available from local registries and the Urban Mobility Plan for Girona (2007), was assigned to the central road network used within ESCAPE (European Study of Cohorts for Air Pollution Effects) (Hoek et al. 2012). Traffic counts were conducted at approximately 670 streets with missing traffic information to complete the traffic inventory. The traffic intensity assessment is described in detail elsewhere (Rivera et al. 2012). For each address, we calculated the traffic intensity at the nearest street and the traffic load (sum of traffic intensity multiplied by length of road segment in all segments) in a 100 m buffer and derived 10-year average values for each participant.

All GIS calculations were performed using ArcGIS 9.2 (ESRI, Redlands, CA, USA).

Statistical analysis. Crude and adjusted associations of IMT (which were natural log-transformed to reduce heteroscedasticity) with individually assigned air pollution exposures were estimated using linear regression models. Linear models were compared with additive models with smoothing splines using the generalized additive model (GAM) function in the MGCV R package (http://www.R-project.org) and linearity was confirmed. We analyzed ABI using multinomial logistic regression (Hosmer and Lemeshow 2004). We initially adjusted our models by age and sex. Age was a main determinant of both outcome and exposure. Thus, in a second step, we analyzed the association of the potential confounders with both outcome and exposure variables, adjusting by age and sex. Variables associated with both, namely, smoking status, education level (as a proxy of socioeconomic status), and marital status were included in a minimal adjustment set. The association between exposure and IMT was strongly confounded by age. To determine whether age was an effect modifier, the interaction term age × exposure was introduced in the model, and it was not statistically significant ($p > 0.05$). We also evaluated whether the effect of age differed for men and women. This was the case, so we added the sex × age interaction to our minimal adjustment set (model 1). We further adjusted by other potential confounders {physical activity [weekly energy expenditure in leisure time based on the Minnesota questionnaire (Elosua et al. 2000) expressed in tertiles of metabolic equivalents], diet [adherence to Mediterranean diet and plausibility of reported diet], SES at the census-tract level [percentage of residents with < secondary school education in the tract where participants resided the longest, based on the 2001 census], and occupational status}, and results (not shown) did not differ from those of model 1. Finally, in addition to the variables listed above, we also included potential intermediates [body mass index (BMI), high-density lipoprotein level (HDL), waist circumference, systolic and diastolic blood pressure, and medication treatment (lipid-lowering, antihypertensives, antiplatelets, or anticoagulants, based on self-report and medical records)] to explore the effects of air pollution that do not follow these pathways (model 2). Adjustment variables were entered in the models either as continuous variables or dummy variables for all categories according to Table 1. [Also see Supplemental Material, Table S2 (http://dx.doi.org/10.1289/ehp.1205146).]

We did not adjust the exposure–outcome associations for area of residence in the main analyses because the study area was relatively small (65 × 70 km), data collection in every town was done by the same team using the exact same procedures and because doing so would have partially removed the exposure contrast corresponding to between-town variability. However, we explored the sensitivity of the results to the inclusion of area of residence (corresponding to the address of longest residence) as a random effect variable. The trend of the associations remained the same, but the estimates were closer to the null and less precise (data not shown). This is consistent with a decrease in the exposure contrast, which makes the detection of an effect more difficult. Residual confounding by area is less likely because the estimates were adjusted by a large array of confounders, including area-level confounders such as education at the census-tract level.

Because living near busy roads is also associated with traffic-related noise, we adjusted for road traffic noise in a subsample of participants with available noise data (n = 1,084) (Foraster et al. 2011). However, results were not sensitive to adjustment for noise (data not shown).

Table 1. Descriptive statistics [n (%), unless otherwise indicated] of the study population characteristics included in main analyses (n = 2,780).

Characteristic	Value
IMTcca [mm (median ± IQR)]	0.68 ± 0.19
IMT6seg [mm (median ± IQR)]	0.67 ± 0.18
ABI (lower of left and right)	
ABI < 0.9	56 (2.0)
ABI > 1.3	116 (4.2)
Age [years (median ± IQR)]	58 ± 18
Sex (women)	1,491 (53.6)
Education level	
Primary school or illiterate	1,476 (53.1)
Secondary school	758 (27.3)
Technician or higher education degree	526 (18.9)
Occupational status	
Employed	1,447 (53.1)
Inactive or housekeeper	358 (12.9)
Retired	852 (30.7)
Unemployed	68 (2.5)
Smoking status	
Never smoker	1,202 (54.5)
Former smoker	628 (28,5)
Current smoker	377 (17.1)
Marital status	
Single	165 (5.9)
Married/living together	2,178 (78.4)
Divorced	171 (6.2)
Widow	247 (8.9)
Other	9 (0.3)
BMI [kg/m^2 (median ± IQR)]	26.6 ± 5.5
Waist circumference [cm (median ± IQR)]	93 ± 17
HDL [mg/dL (median ± IQR)]	52.9 ± 15.6
Any cardiovascular or antihypertensive medication treatment	1,137 (40.9)
Mediterranean diet index (median ± IQR)	25 ± 4
Energy expenditure in leasure time [MET-min/week (median ± IQR)]	1,515 ± 1,937
People with low education in the census tract [% (median ± IQR)]	11 ± 12.2
Living at the same address for 10 years before IMT measurement	2,252 (81)

Abbreviations: IQR, interquartile range; MET, metabolic equivalent.

Results are expressed as the cross-sectional percent difference in IMT, and the relative risk ratio (RRR) of high and low ABI, associated with a 10-year exposure contrast corresponding to the difference between the 5th and 95th percentiles in the study population. The RRR of high ABI is the prevalence of high ABI relative to normal ABI in exposed participants divided by the prevalence of high ABI relative to normal ABI in nonexposed participants.

We tested effect modification by diet, and factors identified as potential effect modifiers in previous studies, namely, age, sex, education level, smoking, diabetes, menopause, and medication treatment, using stratified analysis. We report the effect estimates of percent differences in IMT by strata of the potential effect modifiers.

To assess the sensitivity of the results to the NO_2 LUR models, we used the annual mean NO_2 at the closest monitor both within 100 m and within 200 m of the residence, instead of the 10-year modeled NO_2, in two separate sensitivity analyses. Median distance to the closest NO_2 monitoring site was 90 m. The sample size was restricted in these analyses because only those whose address of longest residence was within 100 m and within 200 m of a monitor were kept (e.g., 2,265 and 1,778 persons lived within 200 m of a monitor with data available on IMTcca and IMT6seg, respectively).

Analyses were performed using Stata version 10.1 (StataCorp, College Station, TX, USA) and R version 2.12 (http://www.R-project.org). The alpha level for statistical significance was set at 0.05.

Results

Information on IMTcca, IMT6seg, and ABI was available for 2,780, 2,188, and 2,738 participants, respectively. Fewer participants had IMT6seg measurements because of difficulties in analyzing the images to obtain measurements from the internal carotid artery and carotid bulb (Gállego Pérez-Larraya et al. 2012). The characteristics of the study populations are summarized in Table 1. Participants were 32–86 years of age. Percentages of participants with low, medium, and high education levels are consistent with Spain as a whole (Instituto Nacional de Estadística 2012). Participants included in the analyses did not differ from those excluded (participants who lived in the study towns for < 6 years or with clinical history of CVD) in terms of exposure levels (data not shown). The median IMTcca was 0.68 mm (range, 0.40–2.05 mm). The repeatability study showed intraclass correlation coefficients for sonographers and visits of 0.83 for the IMTcca and of 0.77 for the IMT6seg. ABI was on average 1.10 (range, 0.5–1.75) with 2.0% of the study population classified as having low ABI (< 0.9), and 4.2% with high ABI (> 1.3) (Table 1). Participants with low ABI were on average 9 years older than participants with normal ABI, whereas those with high ABI did not differ in age from participants with normal ABI (data not shown). Inter- and intraoperator variability of ABI measurements were low, with intraclass correlation coefficients of 0.92 and 0.94, respectively.

The 10-year average home outdoor NO_2 concentrations varied from 5 to 48 μg/m^3 [see Supplemental Material, Table S3 (http://dx.doi.org/10.1289/ehp.1205146)], and its correlation with NO_2 at the address of longest residence was > 0.99 over all participants (see Supplemental Material, Table S4) and 0.96 among those who moved at least once during the 10 years (data not shown). Ranges of 10-year time-weighted average values for traffic in the nearest street and traffic within 100 m indicated substantial variability among participants overall (see Supplemental Material, Table S3) and according to town of residence (see Supplemental Material, Table S5). Traffic intensity showed higher spatial variability than NO_2 [(75th percentile – 25th percentile)/50th percentile was 2.51 for 10-year traffic in the nearest street, 1.56 for 10-year traffic load in 100 m, and 0.73 for 10-year NO_2]. NO_2 and traffic exposure variables were moderately correlated (Pearson correlation coefficients, r = 0.52–0.72), and the two traffic variables had a correlation of 0.58 (see Supplemental Material, Table S4).

In unadjusted models, NO_2, traffic in the nearest street, and traffic in the 100 m buffer were strongly associated with the intima media thickness (both IMTcca and IMT6seg) (Table 2). Associations decreased after adjusting for age, and in general, further adjustment (model 1 and model 2) provided similar estimates. Associations between a 25 μg/m^3 increase in NO_2 (corresponding

Table 2. Estimated percent difference in IMT associated with a 10-year average exposure contrast between the 5th and 95th percentiles.

	IMTcca		IMT6seg	
Exposure (exposure contrast)	*n*	% change (95% CI)	*n*	% change (95% CI)
NO_2 (25 μg/m^3)				
Crude	2,780	3.67 (1.37, 5.98)	2,188	4.98 (2.65, 7.31)
Adjusted for sex	2,780	3.67 (1.38, 5.96)	2,188	4.88 (2.58, 7.18)
Adjusted for age × sex	2,780	0.04 (–1.83, 1.92)	2,188	0.84 (–1.02, 2.71)
Model 1[a]	2,738	0.35 (–1.63, 2.32)	2,155	0.71 (–1.25, 2.67)
Model 2[b] (possible intermediates)	2,632	0.56 (–1.47, 2.59)	2,074	0.52 (–1.52, 2.57)
Traffic load in a 100 m buffer[c] (7,200,000 veh-m/day)				
Crude	2,780	5.25 (2.76, 7.74)	2,188	6.38 (3.89, 8.88)
Adjusted for sex	2,780	5.21 (2.73, 7.68)	2,188	6.31 (3.85, 8.78)
Adjusted for age × sex	2,780	1.39 (–0.64, 3.42)	2,188	1.99 (–0.02, 4)
Model 1	2,738	1.78 (–0.33, 3.89)	2,155	2.08 (0, 4.17)
Model 2 (possible intermediates)	2,609	1.91 (–0.24, 4.06)	2,053	2.06 (–0.09, 4.21)
Traffic intensity in nearest street (15,000 veh/day)				
Crude	2,780	4.18 (2.01, 6.35)	2,188	4.55 (2.43, 6.68)
Adjusted for sex	2,780	4.13 (1.98, 6.29)	2,188	4.42 (2.32, 6.51)
Adjusted for age × sex	2,780	1.74 (–0.02, 3.5)	2,188	1.75 (0.05, 3.44)
Model 1	2,738	1.96 (0.14, 3.77)	2,155	1.7 (–0.04, 3.44)
Model 2 (possible intermediates)	2,632	2.32 (0.48, 4.17)	2,074	1.8 (0.01, 3.59)

veh, vehicle.
[a]Estimates adjusted by model 1: sex, age, sex–age interaction, smoking status, education, and marital status. [b]Estimates adjusted by model 2: model 1 plus BMI, HDL, waist circumference, systolic and diastolic blood pressure, weekly energy expenditure in physical activity during leisure time (tertiles), adherence to Mediterranean diet, plausibility of reported diet, medication treatment, and percentage of persons with low education at the census-tract level. [c]Models for traffic load were additionally adjusted for occupational status.

Table 3. RRRs (95% CIs) for low or high ABI (< 0.9 or > 1.3 versus ABI = 0.9 to 1.3, respectively) associated with 10-year average exposure contrasts between the 5th and 95th percentiles.

Exposure (exposure contrast)	*n*	ABI < 0.9	ABI > 1.3
NO_2 (25 μg/m^3)			
Model 1[a]	2,698	0.65 (0.28, 1.52)	1.91 (1.09, 3.33)
Model 2[b] (possible intermediates)	2,600	0.72 (0.29, 1.75)	1.98 (1.09, 3.6)
Traffic load in a 100 m buffer[c] (7,200,000 veh-m/day)			
Model 1	2,698	0.92 (0.37, 2.3)	1.89 (1.1, 3.26)
Model 2 (possible intermediates)	2,600	1.02 (0.4, 2.61)	1.89 (1.07, 3.34)
Traffic intensity in nearest street (15,000 veh/day)			
Model 1	2,698	0.47 (0.16, 1.41)	1.6 (1.08, 2.38)
Model 2 (possible intermediates)	2,600	0.48 (0.16, 1.46)	1.7 (1.13, 2.57)

veh, vehicle.
[a]Estimates adjusted by model 1: sex, age, sex–age interaction, smoking status, education, and marital status. [b]Estimates adjusted by model 2: sex, age, sex–age interaction, smoking status, education, marital status, BMI, HDL, waist circumference, systolic and diastolic blood pressure, weekly energy expenditure in physical activity during leisure time (tertiles), adherence to Mediterranean diet, plausibility of reported diet, medication treatment, and percentage of persons with low education at the census-tract level. [c]Models for traffic load were additionally adjusted for occupational status.

to the difference between the 5th and 95th percentiles of exposure) and both IMTcca and IMT6seg were positive, but small and non-significant after adjustment. Fully adjusted models—including potential intermediates (model 2)—indicated that a corresponding exposure contrast for traffic load within 100 m (7,200,000 vehicle-m/day) was associated with a 1.91% difference in IMTcca (95% CI: –0.24, 4.06) and a 2.06% difference in IMT6seg (95% CI: –0.09, 4.21). An increase of 15,000 vehicles/day on the nearest street was associated with a 2.32% difference in IMTcca (95% CI: 0.48, 4.17) and a 1.80% difference in IMT6seg (95% CI: 0.01, 3.59).

Ten-year NO_2 and both residential traffic indicators were associated with higher prevalence of high ABI (Table 3). Adjusted RRRs for high versus normal ABI were 1.98 (95% CI: 1.09, 3.60) for a 25 μg/m^3 increase in NO_2; 1.89 (95% CI: 1.07, 3.34) for a 7,200,000 vehicle-m/day increase in traffic load within 100 m; and 1.70 (95% CI: 1.13, 2.57) for an increase of 15,000 vehicles/day on the nearest street. The RRR of low ABI compared to normal ABI were consistent with the null hypothesis for all exposures.

Effect modification. The association of all exposure markers with IMT differed across education level (Figure 1). In persons with a higher level of education, the association of 10-year exposure to air pollution with IMT was stronger (model 2 with NO_2 and IMTcca). Increases of 25 μg/m^3 in NO_2, 7,200,000 vehicle-m/day in traffic load in 100 m, and 15,000 vehicles/day on the nearest street were associated with 4.6% (95% CI: 0.4, 8.9), 4.8% (95% CI: 0.7, 8.9), and 3.3% (95% CI: –0.02, 6.7) differences in IMTcca, respectively, among persons with a high education level; –1.5% (95% CI: –5.1, 2.1), 1.3% (95% CI: –2.4, 5.0), 1.3% (95% CI: –1.8, 4.4) among persons with a secondary school–level education; and 0.6% (95% CI: –2.8, 2.9), 0.5% (95% CI: –2.7, 3.8), 2.4% (95% CI: –0.6, 5.6) among persons with a primary school–level education. Similar patterns were observed for the associations of exposure to air pollutants with IMT6seg. Effects estimates were also stronger in men ≥ 60 years of age compared to younger men, showing significant associations of NO_2 and traffic load in 100 m with IMT (percent difference in IMTcca for NO_2, traffic load, and traffic intensity were 4.3% (95% CI: 0.2, 8.4), 5.9% (95% CI: 1.6, 10.3), and 3.4% (95% CI: –0.07, 7.0), respectively, among men ≥ 60 years of age, and –1.5% (95% CI: –5.7, 2.7), –1.5% (95% CI: –5.7, 2.6), and 1.2% (95% CI: –2.7, 5.0), respectively, among men < 60 years of age. No evidence of effect modification by smoking, medication treatment (Figure 1), menopause, diabetes (results not shown), or Mediterranean diet [see Supplemental Material, Figure S3 (http://dx.doi.org/10.1289/ehp.1205146)] was observed.

Discussion

Our multivariate models revealed positive associations between three markers of long-term exposure to traffic-related air pollution,

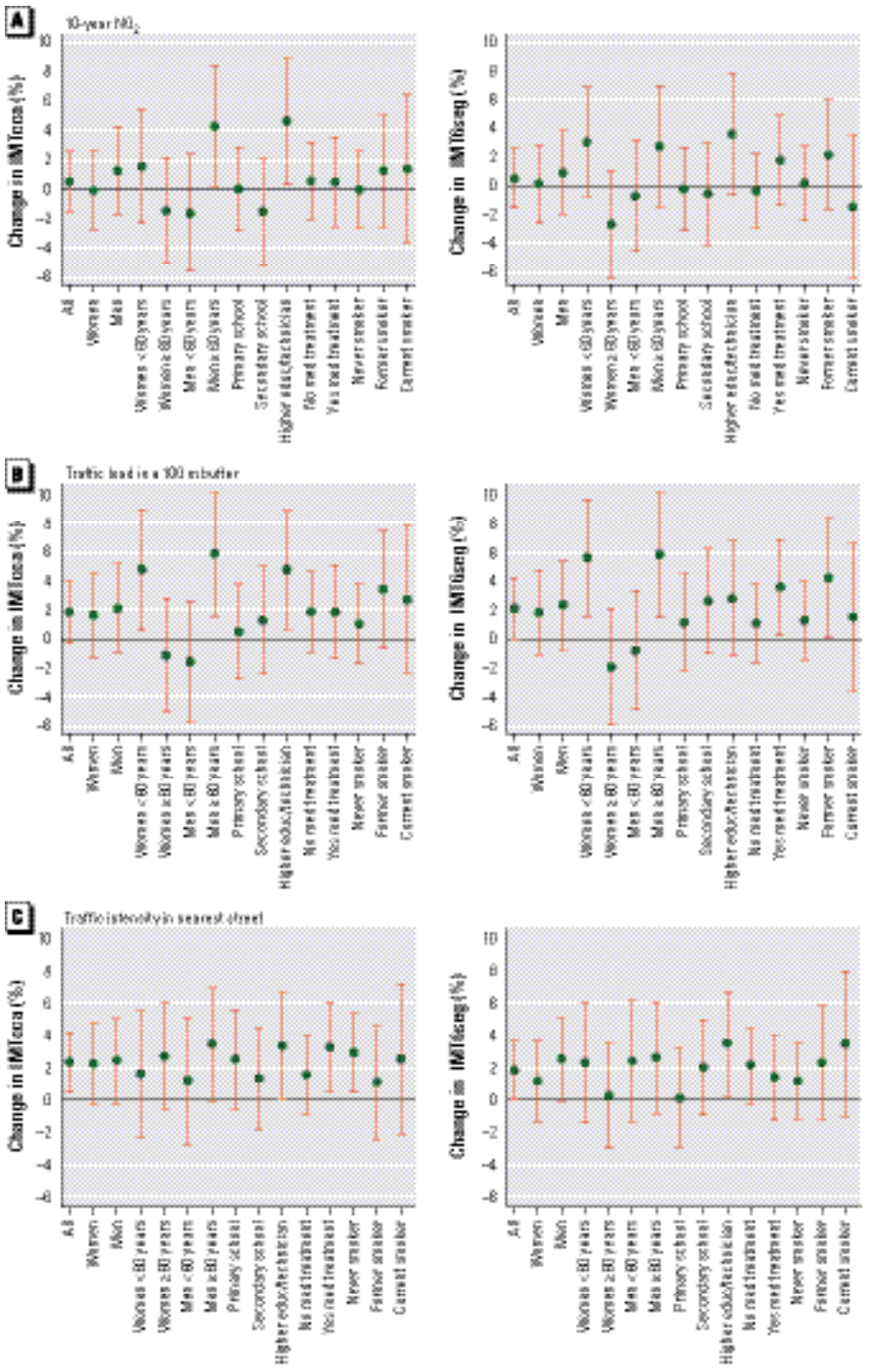

Figure 1. Subgroup analyses: estimates of percent differences (95% CIs) in IMTcca (left) and IMTseg (right) associated with exposure contrasts between the 5th and 95th percentiles for 10-year weighted average values of NO_2 (25 μg/m^3; *A*), traffic load within 100 m (7,200,000 vehicle-m/day; *B*), and traffic intensity on the nearest street (15,000 vehicles/day; *C*) according to sex, sex × age ≥ 60 years, education, medication treatment, and smoking status. Estimates adjusted by sex, age, sex × age interaction, smoking status, education, marital status, BMI, HDL, waist circumference, systolic and diastolic blood pressure, weekly energy expenditure in physical activity during leisure time (tertiles), adherence to Mediterranean diet, plausibility of reported diet, medication (med) treatment, and percentage of people with low education (educ) at the census-tract level. Models for traffic load were additionally adjusted for occupational status.

namely traffic load within 100 m of the residence, traffic intensity in the nearest street, and modeled concentration of home outdoor NO_2 and carotid subclinical atherosclerosis in a random healthy (no history or current signs of CVD) population sample of the Spanish Mediterranean region. However, associations with NO_2 were weak and reached statistical significance only in the subgroups of persons with a high education level (IMTcca and IMT6seg) and men ≥ 60 years of age (IMTcca). Both indicators of residential traffic were associated with approximately 2% thicker carotid intima-media. High exposures to NO_2 and traffic were also associated with higher prevalence of high ABI [RRR for high vs. normal ABI between 1.70 (95% CI: 1.13, 2.57) for traffic intensity in nearest street and 1.98 (95% CI: 1.09, 3.60) for NO_2]. To put these results in context with common risk factors for atherosclerosis, in the same study population included in main analyses, a 10-year difference in age, adjusted by confounders in model 2, was associated with an 8% (95% CI: 7.3, 9.0) difference in IMTcca and an RRR of 10.3 (95% CI: 10.0, 10.5) for high versus normal ABI. Interestingly, age strongly confounded the association of pollution with IMT. Removing age adjustment from the main multivariate models resulted in substantially larger estimates, very similar to the crude associations. Atherosclerosis is a lifetime process, thus age is a strong correlate of the cumulated lifetime exposure to air pollution as well as the main predictor of atherosclerosis. Therefore, adjustment for age may in part reflect overadjustment for exposure.

Our results suggest that long-term exposure to traffic-emitted pollution may contribute to carotid artery atherosclerosis. Given widespread exposure to high traffic intensity, the potential association of long-term pollution with atherosclerosis has important public health implications. Ninety-five percent of our study population was exposed to traffic intensity levels in the nearest street of < 15,000 vehicles/day, which is very low compared with other European cities. For example, in larger cities such as Barcelona, many people live within very short distances of streets with traffic intensities of 50,000–100,000 vehicles/day (Amato et al. 2009). Likewise, levels of NO_2 can exceed 100 μg/m^3 near streets with high traffic intensity. Expressing our results in terms of the 5th–95th percentile exposure contrast (25 μg/m^3 NO_2, 15,000 vehicles/day on the nearest street, or 7,200,000 vehicle-m/day within 100 m) thus reflects ranges that are frequently observed in European cities.

Our findings are consistent with previous reports of association of medium- to long-term exposure with subclinical atherosclerosis (Bauer et al. 2010; Diez Roux et al. 2008; Hoffmann et al. 2007; Künzli et al. 2005) and systemic inflammatory markers (Hoffmann et al. 2009a) although direct comparisons are limited given our use of NO_2 instead of PM mass as a marker of pollution. However, our effect estimates are within the same order of magnitude as seen in previous studies.

In contrast, the association between pollution and ABI was less clear. Low ABI (< 0.9) is more clearly associated with mortality and cardiovascular disease than high ABI, but only high ABI was associated with traffic-related exposure in our study. Only 56 participants (2%) were classified as having low ABI [compared with 116 (4.2%) with high ABI], resulting in low power to detect an association. In the MESA study, 20-year exposures to $PM_{2.5}$ and PM_{10} ($PM \leq 10$ μm in diameter) were not associated with ABI as a continuous outcome, whereas 1-year mean PM_{10} exposures were associated with higher ABI, "indicating less subclinical disease among persons with greater exposure" (Diez Roux et al. 2008). On the other hand, a study in Germany reported that living 50 m from a major road compared to living > 200 m away was associated with an odds ratio (OR) of 1.77 (95% CI: 1.01, 2.1) for peripheral arterial disease (ABI of < 0.9 or history of treatment for peripheral artery disease), whereas no associations were found with annual residential $PM_{2.5}$ (Hoffmann et al. 2009b).

The predictive power of an ABI of > 1.3 for cardiovascular risk has been less studied. It has been associated with calcification of the arterial wall, higher levels of many CVD risk factors (McDermott et al. 2005), and higher risk of all-cause mortality and foot ulcers; it has been weakly associated with heart failure and stroke (Allison et al. 2008). Thus, there is evidence of higher cardiovascular risk both at low and high levels of ABI. We found that traffic-related exposure was associated with high ABI. To our knowledge, the association of air pollution with high ABI has not been investigated previously. ABI is considered to be a marker for medial sclerosis, which is a specific form of arterial disease distinct from atherosclerosis (Alzamora et al. 2012). Because ABI is a ratio of systolic blood pressures, high ABI could result from low brachial pressure, or high ankle pressure, or both (Allison et al. 2008). Thus, if air pollution affects the upper and lower vascular beds differently, for example, by affecting brachial pressure at an earlier stage than ankle pressure, it could be associated with both high and low ABI. This hypothesis is consistent with our finding that high (vs. normal) ABI was not associated with IMT (adjusted RRR of 1.4; 95% CI: 0.3, 6.3 per 1 mm increase in IMTcca), whereas low (vs. normal) ABI was associated with thicker artery walls (adjusted RRR of 7.7; 95% CI: 1.6, 36.8, $p = 0.01$ per 1 mm increase in IMTcca).

In contrast to our findings, 20-year exposures to $PM_{2.5}$ and PM_{10}, in the MESA study were weakly associated with carotid IMT (1–3% differences in IMT for 12.5 and 21 μg/m^3 increases in 20-year average $PM_{2.5}$ and PM_{10}, respectively) but not with ABI (Diez Roux 2008). In Los Angeles, a 10 μg/m^3 increase in $PM_{2.5}$ at the current address was associated with a 4.2% (95% CI: –0.2, 8.9) increase in IMT (Künzli et al. 2005). In a longitudinal study that included the population of Künzli et al. (2005), a 10 μg/m^3 increase in $PM_{2.5}$ and living within 100 m of a highway were associated with 2.5 μm/year (95% CI; –0.31, 5.38) and 5.5 μm/year (95% CI; 0.13, 10.8) increases in IMT, respectively (Künzli et al. 2010). In the Heinz Nixdorf Recall study, a 4.2 μg/m^3 increase in 1-year average $PM_{2.5}$ and a 1,939 m increase in distance from a major road were associated with a 4.3% (95% CI: 1.9, 6.7%) and a 1.2% (95% CI: –0.2, 2.6%) difference in IMT, respectively (Bauer et al. 2010). Distance to traffic was used as a marker of traffic-related exposure; thus a negative association with IMT was expected. A 5.2 μg/m^3 increase in 1-year average PM_{10} was significantly associated with IMT in a study of > 2,000 civil servants in London (Tonne et al. 2012). Positive, though not significant, associations of IMT with measures of traffic intensity at the current address, but no association with a 25 μg/m^3 increase in NO_2, were observed in a population-based study of 745 young adults in Utrecht (Lenters et al. 2010).

Although associations with traffic as a surrogate of exposure appear to be more consistent across studies than associations with pollutants, more research is needed to clarify the role of specific constituents of air pollution on atherogenesis. In the study of young adults in Utrecht, associations of NO_2, black smoke, $PM_{2.5}$, and sulfur dioxide (SO_2) with IMT, pulse wave velocity, and augmentation index were investigated, but significant associations were found only for NO_2 with pulse wave velocity and augmentation index and for SO_2 with augmentation index (Lenters et al. 2010). The evidence on the health effects of NO_2 varies across studies. It has been reported to be more strongly associated with cardiovascular mortality than $PM_{2.5}$, black smoke, and SO_2 (Beelen et al. 2008) and with cardiopulmonary mortality than PM_{10}, total suspended particles, black smoke, and SO_2 (Gehring et al. 2006), but Pope et al. (2002) found no association between NO_2 and cardiopulmonary mortality. The different associations observed between NO_2 and cardiopulmonary and cardiovascular outcomes across studies might reflect the suitability of using NO_2 as a marker of traffic-related pollution. Although the general suitability of NO_2 has been questioned before, the possibility of it being site dependent has

not been studied. It has been reported that the correlation of NO_2 with traffic intensity varies across locations (Raaschou-Nielsen et al. 2000). The correlation of NO_2 with the components of the traffic emissions cocktail that promote (assuming the association was causal) or are truly associated with cardiovascular outcomes might also vary across locations.

Our exposure estimates (both NO_2 and traffic) were based on data collected at participants' residences, instead of data from air quality monitoring stations as far away as 10 km or more (Diez Roux et al. 2008). In addition, our traffic markers were based not only on proximity and road type classification (Allen et al. 2009; Hoffmann et al. 2009a), but also on actual traffic intensity derived from a dense traffic-count network. However, R^2s for our NO_2 models indicate some exposure measurement error (Basagaña et al. 2012). To evaluate the potential influence of measurement error (both bias and misclassification) introduced by the exposure models, we compared associations with our model-based estimates of 10-year average NO_2 with associations based on annual mean NO_2 at the closest monitor. Results (not shown) remained unchanged, suggesting that measurement error introduced by the model was negligible or comparable to the error associated with measures taken at the closest monitor.

Stronger positive associations in persons with a high education level were consistent across IMT measurements and across all markers of pollution. Larger estimated effects of traffic-related exposure on IMT were observed in men ≥ 60 years of age in all models. We did not find evidence of effect modification by Mediterranean diet, established risk factors for CVDs, or subclinical disease (indicated by medication treatment). Other studies have found heterogeneous associations across subgroups of age, sex, BMI, smoking status, socioeconomic status, town of residence, and other cardiovascular risks factors (Bauer et al. 2010; Künzli et al. 2005; Lenters et al. 2010). The detection of interactions in epidemiologic studies is often underpowered, and testing many interactions can lead to a multiple comparison problem. However, our subgroup analysis was designed a priori, and although our results may be subject to the aforementioned problems, the accumulated evidence over different studies will help to identify susceptible subgroups.

In Girona, exposure to traffic-related pollutants was higher for persons with a high education level. Higher NO_2 concentrations were also found at the most privileged census-tract locations [see Supplemental Material, Figure S4 (http://dx.doi.org/10.1289/ehp.1205146)]. This has been reported before for southern European cities (Cesaroni et al. 2010), where wealthy persons live in downtown areas that are more polluted, in sharp contrast to what has been observed in North America (Gunier et al. 2003) and northern Europe (Chaix et al. 2006), where the most deprived bear the highest air pollution concentrations.

The persons with higher levels of education were also younger, had lower blood pressure, BMI, glucose levels, and low-density lipoprotein levels; a higher percent had quit smoking; and a lower percent had never smoked compared to persons with low and medium education levels. Stronger associations between air pollution and IMT among those with high versus low education levels were not explained by age interactions. This may indicate higher susceptibility but, more likely, a better detectability among persons with fewer competing risks for atherosclerosis (due to less confounding). It is difficult to evaluate whether this is supported by previous studies given that results are very heterogeneous. No effect modification by education level has been observed before for the association of $PM_{2.5}$ with IMT, ABI, or coronary artery calcification (Diez Roux et al. 2008), nor for the association of NO_2 or $PM_{2.5}$ with IMT and arterial stiffness (Lenters et al. 2010). Whereas increasing effects of roadway proximity on aortic artery calcification have been reported for increasing income ($p_{trend} < 0.01$) (Allen et al. 2009).

Associations of $PM_{2.5}$ with systemic inflammation markers have been reported to be stronger in men, and more specifically in highly educated men, in Germany (Hoffmann 2009a). Slightly stronger associations with annual PM_{10} were estimated among men compared to women in the study of civil servants in London (Tonne et al. 2012). Contrary to our results for men ≥ 60 years of age, stronger associations between $PM_{2.5}$ and IMT were estimated for women ≥ 60 years of age in the study in Los Angeles (Künzli et al. 2005). The difference in augmentation index associated with increased levels of NO_2 and $PM_{2.5}$ was also higher for young women in Utrecht (Lenters et al. 2010).

Associations with NO_2 or traffic load or intensity at the current address (at the time of examination) were weaker and less precise (data not shown) than associations with 10-year weighted averages across addresses, indicating exposure misclassification. Similar results were observed in the London study in which exposure at current address gave less precise estimates compared to exposure averaged during 1 year before examination (Tonne et al. 2012). This highlights the relevance of using long-term exposure when studying effects on the IMT. On the other hand, our results remained unchanged when using exposure at the address of longest residence compared with 10-year averaged exposure (data not shown). Thus, for settings similar to the Spanish Mediterranean region, in terms of patterns of spatial distribution of NO_2 and low residential mobility (i.e., 80% of persons did not change address in the 10 years), the exposure at the address of longest residence may be a good proxy for long-term exposure.

Limitations of our study include the cross-sectional design and the possibility of unmeasured confounding, including confounding related to environmental tobacco smoke, and the lack of information on daily activity patterns to assess time spent at home. Strengths include the large population-based sample size and the availability of data on health and potential confounders, the 10-year address histories used to estimate long-term NO_2 and traffic exposure markers, and the dense NO_2 and traffic monitoring network data used to estimate exposures at each participant's residences.

Conclusions

We found evidence supporting an association between long-term exposure to traffic and subclinical carotid atherosclerosis and high ABI levels in our study population, with stronger associations in persons with a high level of education and in men ≥ 60 years of age. Longitudinal studies are needed to confirm whether air pollution contributes to the chronic processes of atherogenesis.

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Long-Term Exposure to Road Traffic Noise and Incident Diabetes: A Cohort Study

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Background: Road traffic noise at normal urban levels can lead to stress and sleep disturbances. Both excess of stress hormones and reduction in sleep quality and duration may lead to higher risk for type 2 diabetes.

Objective: We investigated whether long-term exposure to residential road traffic noise is associated with an increased risk of diabetes.

Methods: In the population-based Danish Diet, Cancer and Health cohort of 57,053 people 50–64 years of age at enrollment in 1993–1997, we identified 3,869 cases of incident diabetes in a national diabetes registry between enrollment and 2006. The mean follow-up time was 9.6 years. Present and historical residential addresses from 1988 through 2006 were identified using a national register, and exposure to road traffic noise was estimated for all addresses. Associations between exposure to road traffic noise and incident diabetes were analyzed in a Cox regression model.

Results: A 10-dB higher level of average road traffic noise at diagnosis and during the 5 years preceding diagnosis was associated with an increased risk of incident diabetes, with incidence rate ratios (IRR) of 1.08 (95% CI: 1.02, 1.14) and 1.11 (95% CI: 1.05, 1.18), respectively, after adjusting for potential confounders including age, body mass index, waist circumference, education, air pollution (nitrogen oxides), and lifestyle characteristics. After applying a stricter definition of diabetes (2,752 cases), we found IRRs of 1.11 (95% CI: 1.03, 1.19) and 1.14 (95% CI: 1.06, 1.22) per 10-dB increase in road traffic noise at diagnosis and during the 5 years preceding diagnosis, respectively.

Conclusion: Exposure to residential road traffic noise was associated with a higher risk of diabetes. This study provides further evidence that urban noise may adversely influence population health.

Key words: air pollution, cohort, diabetes, epidemiology, traffic noise. *Environ Health Perspect* 121:217–222 (2013). http://dx.doi.org/10.1289/ehp.1205503 [Online 10 December 2012]

Exposure to traffic noise has been associated with cardiovascular disease (Babisch 2006; Sørensen et al. 2011a). Noise acts as a stressor and, according to the general stress model, provokes a typical stress response, including hyperactivity of the sympathetic autonomic nervous system and activation of the hypothalamus–pituitary–adrenal axis, resulting in increased blood pressure, heart rate, and high levels of the glucocorticoid cortisol (Ising and Kruppa 2004; Lusk et al. 2004). Also, nighttime exposure to noise at normal urban levels has been associated with sleep disturbances, including short sleep duration and reduced sleep quality, and changes in sleep stages (Miedema and Vos 2007).

Until now research on traffic noise has focused on cardiovascular effects, although given the putative mechanisms of action, traffic noise might also contribute to type 2 diabetes. First, excess of glucocorticoids, as seen in Cushing syndrome, have been found to inhibit insulin secretion by pancreatic β cells and reduce insulin sensitivity in liver, skeletal muscle, and adipose tissue (Mazziotti et al. 2011), as well as increase the risk of diabetes (Chiodini et al. 2005; Clore and Thurby-Hay 2009). Second, experimental reduction in the duration or quality of sleep in human volunteers has been associated with alterations in glucose regulation including a drop in glucose tolerance (Spiegel et al. 1999), increased morning levels of glucose, and decreased levels of insulin (Spiegel et al. 2005) and reduced insulin sensitivity (Stamatakis and Punjabi 2010). Slow-wave sleep, which is associated with inhibition of cortisol secretion, decreased sympathetic nervous system activity, increased vagal tone, and stimulation of growth hormone release, is especially important for glucose regulation (Spiegel et al. 2009). A 90% reduction in slow-wave sleep caused by acoustic stimuli has been associated with decreased glucose tolerance and reduced insulin sensitivity (Buxton et al. 2010; Tasali et al. 2008). Third, hormones responsible for appetite regulation have been found to be affected by sleep reduction, with decreased leptin levels and elevated ghrelin levels resulting in up-regulation of appetite, which in turn may result in higher body mass index (BMI) and an increased risk of diabetes (Spiegel et al. 2004; Taheri et al. 2004).

Epidemiological studies also support a relationship between sleep disturbances and diabetes. In 2010, Cappuccio et al. conducted a meta-analyses of 10 prospective epidemiological studies that investigated the relationship between quantity and quality of sleep and the incidence of type 2 diabetes (Cappuccio et al. 2010). Their analysis of a total combined study sample of > 100,000 participants and 3,586 incident cases indicated that both the quality and quantity of sleep consistently and significantly predicted the risk of type 2 diabetes.

The aim of the present study was to investigate the hypothesis that exposure to residential road traffic noise increases the risk of incident diabetes.

Methods

Study population. The study was based on the Danish Diet, Cancer and Health cohort (Tjønneland et al. 2007). In total, 57,053 of 160,725 residents of Copenhagen or Aarhus who were 50–64 years of age without a history of cancer were enrolled into the cohort between 1993 and 1997. Participants had to have been born in Denmark. At enrollment, each participant completed self-administered, interviewer-checked questionnaires covering food intake, lifestyle habits including detailed information on present and previous smoking and physical activity, health status, and social factors. Height, weight, and waist circumference were measured by trained staff members according to standardized protocols. The study was conducted in accordance with the Helsinki Declaration and approved by the local ethical committees (Copenhagen and Frederiksberg), and all participants provided written informed consent.

Identification of outcome. Incident diabetes cases diagnosed between baseline and death, emigration, or the end of follow-up (27 June 2006) were identified by linking

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Supplemental Material is available online (http://dx.doi.org/10.1289/ehp.1205503).

The Danish Environmental Protection Agency and the Research Centre for Environmental Health, the Danish Ministry of the Interior and Health, and the European Research Council, EU 7th Research Framework Programme (grant 281760) funded the study.

The authors declare they have no actual or potential competing financial interests.

Received 22 May 2012; accepted 29 November 2012.

the unique personal identification number of each cohort member to the Danish National Diabetes Registry (NDR) (Carstensen et al. 2008). The NDR was established in 2006 by the National Board of Health by linking the following nationwide registries and data: the National Hospital Registry, for hospital discharge diagnoses since 1977; the National Health Insurance Registry, for information on all services provided by general and specialist practitioners since 1973; and the Register of Medicinal Product Statistics, for information on all prescriptions dispensed at Danish pharmacies since 1993. Inclusion criteria for the NDR were as follows: a hospital discharge diagnosis of diabetes in the National Patient Register {*International Classification of Diseases, 10th Revision* [ICD-10; World Health Organization (WHO) 1993]: DE10–14, DH36.0 and DO24}; National Health Insurance Registry information indicating podiatry (chiropody) for diabetic patients, five blood glucose measurements within 1 year, or two blood glucose measurements per year for 5 consecutive years; or > 1 purchase of insulin or oral glucose-lowering drugs within 6 months registered in the Register of Medicinal Product Statistics. The registry has been reported to have a positive predictive value of 89% (Carstensen et al. 2011). Among the 3,869 cases in the present study 55% met more than one inclusion criterion. The date of inclusion into the NDR has been found to be well defined only for persons entering after 1 January 1995 (Carstensen et al. 2008), so the incidence of diabetes is defined as the date of the earliest record in the NDR after 1 January 1995 and before 27 June 2006. Participants were excluded from the present analysis if they were diagnosed with diabetes before 1995, or were diagnosed before baseline if enrolled after 1995. In addition, we excluded participants diagnosed with cancer before baseline. We also applied a stricter incidence definition by excluding individuals registered in the NDR solely because of a history of blood glucose tests.

Exposure assessment. A complete residential address history between 1988 and diagnosis (i.e., the date of the first record in the NDR, as defined above) or censoring was collected for 93% of the cohort members. Road traffic noise exposure was calculated for the years 1990, 1995, 2000, and 2005 using SoundPLAN (version 6.5; http://www.soundplan.dk/) for all residential addresses at which cohort members had lived between 1988 and diagnosis/censoring. This noise calculation program implements the joint Nordic prediction method for road traffic noise, which has been the standard method for noise calculation in Scandinavia since the first version of the method was published in 1981 (Bendtsen 1999).

- The input variables for the noise model were as follows: point for noise estimation [geographical coordinates and height calculated as 2 m + 3 m × (floor level–1)]; road links with information on annual average daily traffic, vehicle distribution (of light and heavy vehicles), travel speed, and road type (motorway, express road, road wider than 6 m, road narrower than 6 m and wider than 3 m, and other road); and building of polygons for all buildings, including information on building height. We obtained traffic counts for all Danish roads with > 1,000 vehicles per day from a national road and traffic database (Jensen et al. 2009). This database is based on a number of different traffic data sources ranked as follows:
- traffic data from the 140 Danish municipalities with most residents, covering 97.5% of the addresses included in the present study; included roads typically have > 1,000 vehicles per day and are based on traffic counts as well as estimated/modeled numbers, and traffic data represent the period from 1995–1998.
- traffic data from a central database covering all the major state and county roads.
- traffic data for 1995–2000 for all major roads in the Greater Copenhagen Area.
- smoothed traffic data for 1995 for all roads based on a simple method where estimated figures for distribution of traffic by road type and by urban/rural zone are applied to the road network and subsequently calibrated against known traffic data at county level (traffic performance).

We assumed that the terrain was flat, which is a reasonable assumption in Denmark, and that urban areas, roads, and areas with water were hard surfaces, whereas all other areas were acoustically porous. No information was available on noise barriers or road surfaces. Road traffic noise was calculated as the equivalent continuous A-weighted sound pressure level (L_{Aeq}) at the most exposed facade of the dwelling at each address for the day (L_d; 0700–1900 hours), evening (L_e; 1900–2200 hours), and night (L_n; 2200–0700 hours), and was expressed as L_{den} (day, evening, night) by applying a 5-dB penalty for the evening and a 10-dB penalty for the night. Similar to a previous study, all values < 42 dB were set to 42 dB (Selander et al. 2009), because we considered this a lower limit of ambient noise.

Railway noise exposure was calculated as the A-weighted level (L_{Aeq}, 24 hr) outside the most exposed facade using the joint Nordic prediction method for railway noise (Lathi 1984), based on general information about rail traffic in 1993–2000. The model calculated exposures in the range of 60–80 dB. The estimated level of railway noise is assumed to be representative for the study period (1990–2006), because neither high-speed rail tracks nor other new rail tracks were in operation in Denmark, and cargo rail traffic was stable. Screening by designated noise screens or buildings was not considered. The noise impact from all Danish airports and airfields was determined from information about noise zones (5-dB categories) obtained from local authorities. The programs DANSIM (Danish Airport Noise Simulation Model) and INM3 (Integrated Noise Model), which fulfill the joint Nordic criteria for air traffic noise calculations, were used (Liasjø and Granøien 1993). The curves for railway and aircraft noise were transformed into digital maps and linked to each address by geocodes.

The concentration of nitrogen oxides (NO_x) in the air was calculated using the Danish AirGIS modeling system (http://www.dmu.dk/en/air/models/airgis/) for each year (1988–2006) at each address at which the cohort members had lived. AirGIS allows calculation of air pollution at a location as the sum of local air pollution from traffic in the streets based on the Operational Street Pollution Model; the urban background contribution based on an area source dispersion model; and a regional background contribution (Berkowicz et al. 2008). Input data for the AirGIS system included traffic data for individual road links (same input data as described for the noise modeling), emission factors for the Danish car fleet, street and building geometry, building height, and meteorological data (Jensen et al. 2001). The AirGIS system has been successfully validated and applied in several studies (Ketzel et al. 2011; Raaschou-Nielsen et al. 2011). For example, AirGIS-modeled estimates were highly correlated with 1-month mean concentrations of NO_x measured over an 8-year period (1998–2005) in a busy street in Copenhagen (Jagtvej; 25,000 vehicles/day, street canyon), with a correlation coefficient of 0.88 (Ketzel et al. 2011).

Statistical methods. The analyses were based on a Cox proportional hazards model with age as the underlying time metric (Thiebaut and Benichou 2004). This ensured comparison of individuals of the same age. We used left truncation at age of enrollment, so that people were considered at risk from the date of enrollment into the cohort, and right censoring at the age of diabetes diagnosis (event), death, emigration, or end of follow-up (27 June 2006), whichever came first. Exposure to road traffic noise and NO_x were modeled as time-weighted averages for the preceding 5 years (taking all present and historical addresses during that period into account), or as the average yearly exposure at the current residence. These exposures (1 and 5 years) were entered as time-dependent variables into the statistical risk model, so exposure was estimated for all cohort members who were at risk of diagnosis at exactly the same age as each case at diagnosis.

Incidence rate ratios (IRRs) for diabetes in association with road traffic noise were calculated for *a*) average yearly road traffic noise at the current residence, and *b*) time-weighted

mean road traffic noise during the previous 5 years. Estimates were adjusted for potential confounders defined *a priori*, most of which were classified at baseline, including sex, smoking status (never, former, current), smoking intensity (grams tobacco/day), smoking duration (years), environmental tobacco smoke (yes/no), intake of fruit (grams/day), intake of vegetables (grams/day), intake of saturated fat (grams/day), length of school attendance (< 8, 8–10, > 10 years), socioeconomic status of the participant's municipality (or district for Copenhagen; 10 districts in total) classified as low, medium low, medium high, or high based on municipality/district-level information on education, work market affiliation and income, occupational status (employed, unemployed/retired), alcohol consumption (yes/no), alcohol intake (grams/day), body mass index (BMI; kilograms per meter squared), waist circumference (centimeters), sport during leisure time (0, 0.5–1.5, > 1.5 hr/week), walking during leisure time (≤ 1, 1.5–5, > 5 hr/week), and bicycling during leisure time and transport to work (0, 0.5–2, > 2 hr/week). Also, we adjusted for calendar year to account for time trends in exposures and the outcome. The remaining covariates were specific for each address, including railway and airport noise [> 60 dB (yes/no)], and air pollution (NO_x, micrograms per cubic meter, calculated as the yearly mean at the current residential address or the time-weighted mean for the previous 5 years, consistent with the time period modeled for road traffic noise). Potential modification of the association between road traffic noise and diabetes by baseline characteristics and age at diagnosis were evaluated by introducing interaction terms into the model, and were tested by the Wald test.

In addition to modeling road traffic noise as a continuous variable, we estimated associations with six noise exposure categories [52–55 dB (714 cases), 55–58 dB (657 cases), 58–61 dB (518 cases), 61–64 dB (474 cases), 64–67 dB (330 cases), > 67–70 dB (498 cases)] relative to a common reference category (≤ 52 dB, 678 cases). An increase of 3 dB corresponds to a doubling in acoustical energy. The cut point of 52 dB for the reference group was chosen to obtain a stable reference group and at the same time be able to evaluate the dose–response relationship in a large part of the exposure span.

We also estimated IRRs for diabetes in association with exposure to railway noise of ≥ 60 dB.

The assumption of linearity of L_{den} in relation to risk of diabetes was evaluated both visually and by formal testing with linear spline models with boundaries placed at the nine deciles for cases. L_{den} did not deviate from linearity ($p = 0.18$). The procedure PHREG in SAS version 9.1 (SAS Institute Inc., Cary, NC, USA) was used for the statistical analyses. The graphical presentation of a functional form of an association between L_{den}/NO_x and diabetes was produced using restricted cubic spline in the design library (R 2.13.1 statistical software; http://cran.r-project.org/bin/windows/base/old/2.13.1/).

Results

Among the 57,053 cohort participants, 571 were excluded due to a diagnosis of cancer before enrollment. A complete residential address history from January 1988 to the event or censoring date was collected for 53,673 of the 56,482 remaining participants. Of these we excluded 1,136 participants with self-reported diabetes at baseline, 170 with a diabetes record in NDR before baseline, 10 with a diabetes diagnosis in the NDR between baseline and 1 January 1995, and 2,170 participants with missing data for one or more covariates. Diabetes was diagnosed in 3,869 of the 50,187 eligible participants during an average follow up of 9.6 years, including 1,117 registered in the NDR based only on blood glucose measurement. Excluding these cases for a more strict definition of diabetes resulted in 2,752 cases.

Compared with the cohort as a whole, cases were more likely to be men, were older at enrollment, had higher BMI and waist circumference, had lower education, smoked more, were more exposed to environmental tobacco smoke, ate less fruit and vegetables, were less physically active, and were exposed to higher levels of road traffic noise (Table 1). There was a positive correlation between L_{den} and NO_x during the study period ($R_S = 0.62$).

Table 1. Baseline characteristics of the Diet, Cancer and Health cohort by incident diabetes status at follow-up.

Characteristic at enrollment	Total cohort ($n = 50,187$)	All diabetes cases ($n = 3,869$)
Men (%)	47.1	56.1
Age (years)	56.1 (50.7–64.2)	57.3 (50.9–64.4)
BMI (kg/m^2)	25.5 (20.4–33.2)	28.6 (22.3–37.9)
Waist circumference (cm)	88 (69–110)	98 (75–120)
Years of school attendance (%)		
≤ 7	32.8	39.6
8–10	46.5	44.8
> 10	20.8	15.6
Occupational status (%)		
Employed	78.3	72.3
Unemployed/retired	21.8	27.7
Socioeconomic status (%)[a]		
Low	15.9	17.4
Medium low	46.4	44.2
Medium high	16.3	16.1
High	21.4	22.4
Smoking status (%)		
Never	36.2	30.2
Former	27.5	30.3
Current	36.3	39.6
Smoking duration (years)[b]	33.0 (7.0–46.0)	34.0 (9.0–47.0)
Smoking intensity (g/day)[b]	14.7 (3.75–34.1)	17.0 (4.94–36.3)
Environmental tobacco smoke (%)	63.9	68.3
Drink alcohol (%)	97.8	97.0
Alcohol intake (g/day)	13.4 (1.15–64.5)	13.3 (0.79–72.4)
Fruit intake (g/day)	169 (27.0–523)	162 (24.0–509)
Vegetable intake (g/day)	161 (49.0–363)	144 (41.9–348)
Saturated fat intake (g/day)	31.1 (15.8–55.1)	31.3 (15.7–56.8)
Sport during leisure time (%)		
No	45.5	55.9
Yes, ≤ 1.5 hr/week	25.5	20.6
Yes, > 1.5 hr/week	29.0	23.4
Bicycling during leisure time (%)		
No	31.8	38.3
Yes, ≤ 2 hr/week	36.0	33.7
Yes, > 2 hr/week	32.3	28.0
Walking during leisure time (%)		
0–1 hr/week	22.1	23.1
1.5–5 hr/week	54.2	51.8
> 5 hr/week	23.7	25.1
Road traffic noise (dB)	56.4 (48.5–70.0)	57.1 (48.5–70.7)
Air pollution, NO_x (μg/m^3)	20.8 (14.4–87.3)	20.8 (14.4–95.4)

Values are medians (5th–95th percentiles) unless otherwise stated.
[a]Socioeconomic status of municipalities based on municipality information on education, work market affiliation, and income. [b]Among present and former smokers.

A 10-dB higher level of exposure to road traffic noise at the current residence and during the previous 5 years was associated with statistically significant 8% (95% CI: 1.02, 1.14) and 11% (95% CI: 1.05, 1.18) higher risk of incident diabetes, respectively, based on fully adjusted models (model 3, Table 2). The analysis of road traffic noise as a categorical variable was generally consistent with a linear exposure–response relationship (Figure 1). When the stricter definition of diabetes was used, the IRRs were slightly higher (Table 2). Adjusting for NO_x resulted in small increases in the effect estimates (model 2 vs. model 3), but exposure–response curves based on restricted cubic splines were comparable before and after adjustment for NO_x [see Supplemental Material, Figure S1 (http://dx.doi.org/10.1289/ehp.1205503)].

We found no significant effect modification (all Wald *p*-values > 0.05), although there were indications of a stronger association with road traffic noise among women (1.11; 95% CI: 1.03, 1.20) compared with men (1.05; 95% CI: 0.98, 1.13) and among participants > 65 years of age (1.12; 95% CI: 1.03, 1.21) compared with younger participants (1.05; 95% CI: 0.98, 1.13). In addition, road traffic noise was not associated with diabetes in participants with > 10 years of education (1.00; 95% CI: 0.88, 1.14), but was associated with diabetes among those with less education (Table 3).

We found no associations between exposure to railway noise of ≥ 60 dB and risk of all diabetes (IRR = 0.97; 95% CI: 0.89, 1.05) or confirmed diabetes (IRR = 1.01; 95% CI: 0.91, 1.11).

Discussion

In this study, residential exposure to road traffic noise was associated with a higher risk of incident diabetes, with stronger associations at higher levels of exposure. Associations also were slightly stronger with longer-term exposure (5 years) than with shorter-term exposure (1 year).

The strengths of our study include the prospective design, the large number of cases, access to residential address histories, and diagnosis of incident diabetes using a nationwide register. Because all Danish citizens have free access to the health care system, capture of diabetes cases in the registry is assumed to be relatively unrelated to socioeconomic status. Another strength is adjustment for air pollution, which correlates with road traffic noise and has been associated with diabetes (Andersen et al. 2012; Coogan et al. 2012). In the present study, road traffic noise and NO_x were moderately correlated, with 38% of the variation in noise predicted by air pollution exposure. We found that exposure to road traffic noise was significantly associated with incident diabetes both before and after adjustment for air pollution, suggesting an independent effect of road traffic noise.

Some limitations also need to be considered. The diabetes registry does not contain information on whether the diabetes is of type 1 or type 2. Type 2 diabetes normally constitutes 90–95% of all diabetes cases. However, at enrollment all participants in the cohort reported whether they had been diagnosed with diabetes before enrollment from 50 years of age, and because type 1 diabetes is most commonly developed during childhood, most cases with type 1 diabetes would have been excluded from our study. Approximately 60% of individuals with diabetes among a Danish population 30–60 years of age were reported to be unaware of their disease (Glumer et al. 2003). Therefore, the date of diagnosis captured in the diabetes registry will, for many cases, only poorly reflect when they actually developed diabetes.

Noise exposure was estimated based on modeled values. The level of traffic noise varies over very short time periods due to, for example, movement of vehicles relative to the observer, and weather conditions also may strongly influence the propagation of traffic noise. It is therefore extremely difficult, if not impossible, to estimate reliable long-term noise exposure based on direct measurements. During the last four decades, increasingly accurate and reliable prediction methods for traffic noise have been developed. Nonetheless, although the Nordic prediction method has been used for many years, estimation of noise is inevitably associated with some degree of uncertainty. Inaccurate input data may contribute to exposure misclassification, but because the noise model does not distinguish between cases and noncases, such misclassification is likely to be nondifferential, and this, in most situations, would bias the relative risk estimate toward the null value. Also, we had no information on bedroom location, noise from neighbors and ventilation, or hearing impairment, all of which might influence exposure to noise. A previous study investigating effects of road traffic noise on myocardial infarction found a stronger association when several of these factors were considered (Selander et al. 2009), suggesting that the effect of noise might be underestimated in the present study.

It is estimated that > 30% of the population of the European Union is exposed to road traffic noise levels at their residence that exceed the WHO guidance limit for noise (Berglund et al. 1999; WHO 2009). Research on the health effects of exposure to traffic noise has focused on cardiovascular diseases, including three studies based on the cohort evaluated in the present study (Sørensen et al. 2011a, 2011b, 2012). The results have supported an effect of traffic

Table 2. IRRs (95% CIs) of diabetes per 10-dB higher level of exposure to road traffic noise based on 50,187 cohort participants.

Exposure to road traffic noise L_{den} (per 10 dB)	Cases (*n*)	Model 1: Adjusted for age	Model 2: Adjusted for age, sex, lifestyle confounders,[a] socioeconomic confounders,[b] calendar year, railway and airport noise	Model 3: model 2 + residential exposure to NO_x[c]
All diabetes[d]				
L_{den} at diagnosis	3,869	1.09 (1.04, 1.14)	1.06 (1.01, 1.11)	1.08 (1.02, 1.14)
L_{den} 5 years preceding diagnosis	3,869	1.11 (1.06, 1.16)	1.08 (1.02, 1.13)	1.11 (1.05, 1.18)
Confirmed diabetes[d]				
L_{den} at diagnosis	2,752	1.14 (1.08, 1.20)	1.08 (1.02, 1.14)	1.11 (1.03, 1.19)
L_{den} 5 years preceding diagnosis	2,752	1.16 (1.10, 1.23)	1.09 (1.03, 1.16)	1.14 (1.06, 1.22)

[a]BMI; waist circumference; smoking status; smoking duration; smoking intensity; environmental tobacco smoke; intake of saturated fat, fruits, vegetables, and alcohol; sport; bicycling and walking during leisure time. [b]Length of school attendance, occupational status and municipality SES. [c]Exposure calculations for NO_x follow the exposure calculation for road traffic noise, such that models of L_{den} at diagnosis are adjusted for NO_x at diagnosis and models of L_{den} during the 5 years preceding diagnosis are adjusted for NO_x during the 5 years preceding diagnosis. [d]All diabetes: all original criteria in the National Diabetes Registry: hospital admission, medication, reimbursement for chiropody due to diabetes, or glucose blood tests; confirmed diabetes: exclusion of cases only included in the National Diabetes Registry based on blood glucose tests.

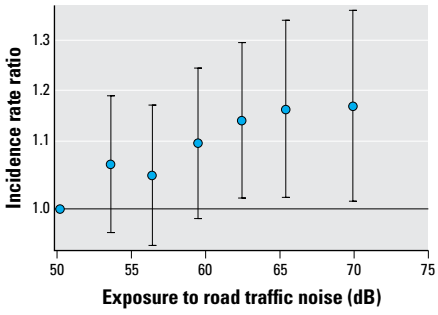

Figure 1. Association between exposure to road traffic noise (L_{den}) at the residence at the time of diagnosis and all incident diabetes adjusted for age; sex; BMI; waist circumference; smoking status, duration, and intensity; environmental tobacco smoke; intake of fruits, vegetables, saturated fat, and alcohol; sport; bicycling and walking; school attendance; occupational status; municipality socioeconomic status; railway and airport noise; air pollution; and calendar year. The vertical whiskers show incidence rate ratios (IRR) with 95% CIs at the median of six exposure categories (52–55, 55–58, 58–61, 61–64, 64–67, > 67 dB) when compared with the reference category of ≤ 52 dB.

noise on blood pressure (Dratva et al. 2011; Sørensen et al. 2011b), myocardial infarction (Babisch 2008; Sørensen et al. 2012), and stroke (Sørensen et al. 2011a). The present study suggests that exposure to road traffic noise may also be involved in the development of diabetes, which, given the assumed mechanisms of action of traffic noise, is supported by studies of effects of excess cortisol and sleep disturbances on glucose tolerance, insulin sensitivity and hormones responsible for regulation of appetite, and the risk of diabetes (Buxton et al. 2010; Chiodini et al. 2005; Clore and Thurby-Hay 2009; Mazziotti et al. 2011; Spiegel et al. 1999, 2005, 2009; Tasali et al. 2008, 2009). These proposed mechanisms might be more important for the development of type 2 diabetes than for cardiovascular disease. Because type 2 diabetes develops over many years (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus 2003) and is often diagnosed years after actual onset (Glumer et al. 2003), we would expect long-term exposure to road traffic noise to be more strongly associated with diabetes than shorter-term exposure, as our results suggest. However, only 28% of participants moved during follow-up in our study (1993–2006) causing a strong correlation between recent and more distant exposure, and it is therefore difficult to separate the effect of recent and distant noise exposure in relation to diabetes.

Our results also suggest that there was no association between road traffic noise and diabetes among participants with > 10 years of education, in contrast with participants who had less education. A possible explanation is that more educated participants may live in larger houses or flats than less educated participants, and therefore may be more likely to have the option to chose a bedroom oriented away from a busy street, resulting in lower exposure to road traffic noise during sleep and differential misclassification of exposure according to education. Another possible explanation is that the observed association between road traffic noise and diabetes among less-educated participants could reflect residual confounding by socioeconomic factors that were not accounted for in our analyses. The assumption that the highest educated were exposed to lower levels of traffic noise than the less-educated participants, combined with residual confounding by socioeconomic factors such as physical activity, could result in false positive associations between noise and diabetes among the lowest educated. On the other hand, differences in exposure to traffic noise according to socioeconomic status might not be pronounced because many highly educated people in Denmark live in central urban areas, evidenced by very high property prices in the inner cities of Copenhagen and Aarhus, with relatively high traffic noise. In the present study we estimated only small differences in road traffic noise exposure according to education (averages of 58.4, 58.1, and 57.5 dB for low, medium, and high education, respectively), which suggests that residual socioeconomic confounding is not a major problem in the present study. Residual confounding by dietary factors not accounted for might also be an issue, though adjusting for potential confounders related to socioeconomic status and diet, such as years of school attendance, BMI, physical activity, occupational status, and intake of fruit, vegetables, and saturated fat had little effect on estimated associations.

We found no association between exposure to railway noise and diabetes, consistent with previous studies reporting that road traffic noise is associated with more sleep disturbance than railway noise (Miedema and Vos 2007). However, exposure estimates for railway noise, which was classified in 5-dB categories for levels ≥ 60 dB only, were less accurate than estimates of road traffic noise exposure. Furthermore, in contrast to the road traffic noise model, the railway noise estimation included no information on screening by buildings.

Table 3. Modification of associations between yearly road traffic noise (per 10 dB) at the residential address at diagnosis and incident diabetes (all) by baseline characteristics and age at diagnosis.

Covariates	Cases (*n*)	IRR (95% CI)[a]	*p*-Interaction
Sex			0.24
Men	2,172	1.05 (0.98, 1.13)	
Women	1,697	1.11 (1.03, 1.20)	
Age at diabetes diagnosis (years)			0.21
< 65	2,323	1.05 (0.98, 1.13)	
≥ 65	1,546	1.12 (1.03, 1.21)	
BMI (kg/m^2)			0.95
Normal and underweight (< 25 kg/m^2)	727	1.09 (0.97, 1.23)	
Overweight (25–30 kg/m^2)	1,704	1.07 (0.99, 1.16)	
Obese (≥ 30 kg/m^2)	1,438	1.07 (0.99, 1.17)	
Years of education			0.39
≤ 7	1,553	1.10 (1.02, 1.20)	
8–10	1,734	1.08 (1.00, 1.17)	
> 10	602	1.00 (0.88, 1.14)	
Smoking status			0.35
Never	1,167	1.11 (1.01, 1.22)	
Former	1,172	1.02 (0.93, 1.12)	
Present	1,530	1.10 (1.01, 1.19)	
Cardiovascular disease[b]			0.42
Yes	199	0.99 (0.80, 1.22)	
No	3,664	1.08 (1.02, 1.15)	
Residential exposure to NO_x			0.66
< 14.1 μg/m^3	984	1.11 (0.97, 1.26)	
14.1–17.7 μg/m^3	1,004	1.09 (0.97, 1.22)	
17.7–25.1 μg/m^3	913	1.12 (0.99, 1.27)	
≥ 25.1 μg/m^3	968	1.02 (0.91, 1.14)	

[a]Adjusted for age; sex; BMI; waist circumference; smoking status; smoking duration; smoking intensity; environmental tobacco smoke; intake of fruits, vegetables, saturated fat, and alcohol; sport; bicycling and walking during leisure time; length of school attendance; occupational status; municipality socioeconomic status; railway and airport noise; exposure to air pollution (NO_x); and calendar year. [b]Stroke and/or myocardial infarction at enrollment.

Conclusions

This study provides further evidence that urban noise may adversely influence population health. We found a statistically significant positive association between long-term exposure to road traffic noise at the residence and the risk of incident diabetes. The results suggest that reducing population exposure to road traffic noise may improve health.

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A Section 508–conformant HTML version of this article is available at http://dx.doi.org/10.1289/ehp.1307156.

High Blood Pressure and Long-Term Exposure to Indoor Noise and Air Pollution from Road Traffic

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Background: Traffic noise has been associated with prevalence of hypertension, but reports are inconsistent for blood pressure (BP). To ascertain noise effects and to disentangle them from those suspected to be from traffic-related air pollution, it may be essential to estimate people's noise exposure indoors in bedrooms.

Objectives: We analyzed associations between long-term exposure to indoor traffic noise in bedrooms and prevalent hypertension and systolic (SBP) and diastolic (DBP) BP, considering long-term exposure to outdoor nitrogen dioxide (NO_2).

Methods: We evaluated 1,926 cohort participants at baseline (years 2003–2006; Girona, Spain). Outdoor annual average levels of nighttime traffic noise (L_{night}) and NO_2 were estimated at postal addresses with a detailed traffic noise model and a land-use regression model, respectively. Individual indoor traffic L_{night} levels were derived from outdoor L_{night} with application of insulations provided by reported noise-reducing factors. We assessed associations for hypertension and BP with multi-exposure logistic and linear regression models, respectively.

Results: Median levels were 27.1 dB(A) (indoor L_{night}), 56.7 dB(A) (outdoor L_{night}), and 26.8 μg/m^3 (NO_2). Spearman correlations between outdoor and indoor L_{night} with NO_2 were 0.75 and 0.23, respectively. Indoor L_{night} was associated both with hypertension (OR = 1.06; 95% CI: 0.99, 1.13) and SBP (β = 0.72; 95% CI: 0.29, 1.15) per 5 dB(A); and NO_2 was associated with hypertension (OR = 1.16; 95% CI: 0.99, 1.36), SBP (β = 1.23; 95% CI: 0.21, 2.25), and DBP (β = 0.56; 95% CI: –0.03, 1.14) per 10 μg/m^3. In the outdoor noise model, L_{night} was associated only with hypertension and NO_2 with BP only. The indoor noise–SBP association was stronger and statistically significant with a threshold at 30 dB(A).

Conclusion: Long-term exposure to indoor traffic noise was associated with prevalent hypertension and SBP, independently of NO_2. Associations were less consistent for outdoor traffic L_{night} and likely affected by collinearity.

Citation: Foraster M, Künzli N, Aguilera I, Rivera M, Agis D, Vila J, Bouso L, Deltell A, Marrugat J, Ramos R, Sunyer J, Elosua R, Basagaña X. 2014. High blood pressure and long-term exposure to indoor noise and air pollution from road traffic. Environ Health Perspect 122:1193–1200; http://dx.doi.org/10.1289/ehp.1307156

Introduction

Long-term exposure to outdoor traffic noise has been associated with cardiovascular disease (CVD) (Babisch 2006). The biological pathway involves noise–stress reactions related to hormonal and cardiovascular responses that, under long-term exposure, may contribute to hypertension and CVD—particularly during susceptible periods such as sleep at night (Babisch 2011).

Hypertension is the leading risk factor for morbidity and mortality worldwide (Lim et al. 2012). A recent comprehensive meta-analysis reported an increase in prevalence of hypertension per 5-dB(A) increase in daytime traffic noise levels ($L_{Aeq,16h}$) [range, 45–75 dB(A)] [odds ratio (OR) = 1.03; 95% confidence interval (CI): 1.01, 1.06] (van Kempen and Babisch 2012). However, studies on the association between long-term exposure to noise and the continuous trait of blood pressure (BP) are heterogeneous (Babisch 2006).

Traffic is also the primary source of local air pollution, and recent cross-sectional studies indicate associations between long-term exposure to markers of traffic-related pollution and high BP (Chuang et al. 2011; Dong et al. 2013; Foraster et al. 2014; Fuks et al. 2011; Schwartz et al. 2012). However, the evidence is still limited, particularly for hypertension (Coogan et al. 2012; Fuks et al. 2011; Sørensen et al. 2012).

A major unresolved concern is whether long-term effects of traffic-related air pollution and noise could be mutually confounded (Allen et al. 2009; Foraster et al. 2011). As emphasized in the literature (Babisch 2011), current studies rely on outdoor traffic noise estimates at the most exposed façade, whereas the true exposure may well differ depending on room orientation, noise shielding, and coping behaviors (Babisch et al. 2012). Understanding traffic noise exposure indoors, during sleep, could be essential to ascertaining the cardiovascular effects of noise and disentangling them from those of traffic-related air pollution.

We aimed to evaluate the association of long-term exposure to individually assigned estimates of indoor traffic noise levels in bedrooms at night (L_{night}), a susceptible period to noise exposure, with BP and hypertension. To derive indoor levels, we combined outdoor traffic noise levels with information about the bedroom's orientation and measures against noise. We also evaluated the confounding effect of traffic-related air pollution. The study was conducted within the well-defined population-based cohorts of the REGICOR (Registre Gironí del Cor; Girona Heart Registry) study in Girona, a dense Mediterranean city of nearly 100,000 inhabitants in northeast Spain.

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Supplemental Material is available online (http://dx.doi.org/10.1289/ehp.1307156).

We are grateful for the contribution of M. Medina-Ramón, M. Mendez, and the REGICOR team and participants.

This study was supported by funding from Marató 081632, Centre for Research in Environmental Epidemiology (CREAL) Pilot Project Funds 2009; Centro de Investigación Biomédica de Epidemiología y Salud Pública (CIBERESP) Pilot Project Funds 2008 (AA08_15); Instituto de Salud Carlos III (ISCIII): Fondo de Investigación Sanitaria (FIS) PI060258, Red de Investigación Cardiovascular–Programa Heracles RD 12/0042, Red de Investigación en Actividades Preventivas y Promoción de la Salud (RedIAPP) RD 06/0018, and a fellowship to M.F.; Agence Nationale de Sécurité Sanitaire de l'Alimentation, de l'Environnement et du Travail (ANSES) CREAL 0966C0331 for the "Projet Tri-national Trafic, Air, Bruit et Santé" (TRI-TABS) study; and the Young Researchers Exchange Programme of the European Network on Noise and Health (ENNAH).

The authors declare they have no actual or potential competing financial interests.

Received: 30 May 2013; Accepted: 7 July 2014; Advance Publication: 8 July 2014; Final Publication: 1 November 2014.

Methods

Study sample. The initial sample consisted of 2,067 participants, 36–82 years of age, who were evaluated at baseline (2003–2006) within a population-based cohort of the REGICOR study (Grau et al. 2007), and who had answered a questionnaire on nighttime noise exposure at the bedroom at follow-up (2009–2011). Briefly, the baseline sample was a random selection of noninstitutionalized inhabitants of Girona who were called in a randomized order for the follow-up visit. Because the noise questionnaire referred to the residence at follow-up, we selected nonmovers from baseline to follow-up (93.3% of the follow-up sample) to ensure that responses referred to the same baseline residences.

The study was approved by Parc de Salut Mar ethics committee, and participants signed written informed consent.

Outcomes and health assessment. Participants were examined from 0800 to 1100 hours at the primary care center and after fasting for 10 hr but being allowed regular medication. Trained nurses measured BP and heart rate following the Joint National Committee VII recommendations (Chobanian et al. 2003), in sitting position, and with a calibrated automatic device (OMRON 711; Omron Healthcare, Lake Forest, IL, USA). Two measurements were done after at least 10 and 3 min of rest, respectively. If measurements differed by ≥ 5 mmHg, a third one was taken. To minimize the "white coat" effect, we used the last measurement. The nurses also measured weight and height and drew blood. The samples were coded, shipped to a central laboratory, and frozen at –80°C until the assay. Serum glucose, total cholesterol, and triglycerides were determined by enzymatic methods (Roche Diagnostics, Basel, Switzerland) in a Cobas Mira Plus autoanalyzer (Roche Diagnostics). Whenever triglycerides were < 300 mg/dL, LDL (low-density lipoprotein) cholesterol was calculated by the Friedewald equation. Quality control was performed with the External Quality Assessment–WHO Lipid Program [World Health Organization (WHO), Prague, Czech Republic] and Monitrol–Quality Control Program (Baxter Diagnostics, Dudingen, Switzerland).

We defined hypertension as having systolic (SBP) or diastolic (DBP) BP levels ≥ 140/90 mmHg, respectively (Chobanian et al. 2003), or reporting antihypertensive treatment with a positive response to the question "Do you take or have you taken any doctor prescribed medication to reduce blood pressure in the last two weeks?" For BP analyses, we defined a variable accounting for any "BP-lowering medication," which included the self-reported antihypertensive treatment defined above or the use of "antihypertensives" or "beta-blockers" as coded by a physician from the medication list provided by participants, namely diuretics, ACE (angiotensin-converting enzyme) inhibitors, alpha or beta-blockers, angiotensin receptor II blockers, and calcium channel blockers. This variable was coded by a physician from the medication list provided by participants.

Exposure assessment. We derived individual long-term average levels of nighttime traffic noise (L_{night}, 2300 to 0700 hours) expressed in A-weighted decibels [dB(A)] at the geocoded residential addresses (hereafter called outdoor traffic L_{night}). Geocodes were separated 2 m from the postal address's façade and located at the floor's height of each dwelling. We derived the estimates with a detailed and validated city-specific traffic noise model (year 2005), described elsewhere (Foraster et al. 2011). This model complies with the European Noise Directive 2002/49/EC (END) (European Parliament and Council of the European Union 2002) and uses the interim European method NMPB routes-96 [CERTU (Centre d'Études sur les Réseaux, les Transports, l'Urbanisme et les Constructions Publiques) et al. 1997]. Estimates were computed at each receptor point by numerical calculations using CadnaA software (DataKustik, Greifenberg, Germany). The main input variables were speed limit, street slopes, type of asphalt, urban topography, and traffic density, also for small streets based on the Good Practice Guidelines for noise mapping (European Commission Working Group Assessment of Exposure to Noise 2003). Because railway noise may also be associated with BP (Dratva et al. 2012), and a single railway crosses dense traffic areas from North to South, we also derived individual residential railway noise estimates (L_{night}) from an END-based model according to the International Organization for Standardization (ISO; Geneva, Switzerland) standard 9613. The propagation model was built on source identification of railway noise with daytime and nighttime measurements of the noise frequencies (1/3-octave bands) and equivalent levels [in dB(A)] of freight and normal trains (a total of 72 measurements). Measurements were taken with an SC-30 sound level meter and a CB-5 calibrator (CESVA, Barcelona, Spain). Our study sample was not exposed to aircraft noise.

In a face-to-face interview we collected information on noise sensitivity (Weinstein 1978)—a 10-item score based on a nonverbal 6-point scale—and traffic noise annoyance (Fields et al. 2001)—nonverbal 11-point scales—in the bedroom during sleeping hours, as previously done (Babisch et al. 2012). We also evaluated *a*) type of glazing and type of window (single, double, laminated, or triple glazing; or double window), *b*) bedroom orientation (facing the postal address street/side street/backyard), and *c*) frequency of closing windows during sleeping hours (always/often/seldom/never). Availability of shutters and use of ear plugs was rarely reported and not used in this study.

We combined outdoor traffic L_{night} with the questionnaire data to calculate two estimates of "personal" noise exposure:

Outdoor traffic L_{night} at bedroom façade (step *a*). On the basis of refined modeling techniques for shielded areas (Salomons et al. 2009), we subtracted 20 dB(A) from the outdoor noise estimates at the postal address to obtain noise levels at the bedroom façade where participants slept. We left outdoor estimates unchanged for bedrooms facing the postal address street or a side street. Noise levels at the side street façade were difficult to quantify, and we assumed they were similar to those at the postal address street.

Indoor traffic L_{night} at the bedroom (step *b*). We corrected the outdoor traffic L_{night} levels at the bedroom façade (step *a*, above) by subtracting an insulation factor that we calculated according to the reported window types and the frequency of keeping windows closed at night. This is described in the *Good Practice Guide on Noise Exposure and Potential Health Effects* (European Environment Agency 2010). Levels of window insulation are commonly derived from laboratory acoustical measurements, and standard values are described in the Spanish Building Code and complementary technical information (Spanish Government 2010; Tremco Ltd. 2004). The insulation factors when "Always closing windows" (100% time) were –30 dB(A) for single and double glazing and –40 dB(A) for sound-proofed windows (triple or laminated glazing or double windows). If windows were "often" (75% of the time), "seldom" (25%), and "never" closed, the resulting insulation factors were –21 dB(A), –16 dB(A), and –15 dB(A), respectively, with no further contribution of the specific insulation of each window type.

We followed step *b* to obtain indoor railway L_{night} from outdoor estimates.

We also derived individual outdoor levels of annual average nitrogen dioxide (NO_2) concentrations (micrograms per cubic meter) at each geocoded address with a land use regression model (LUR) derived in 2010 for Girona, as described elsewhere (Rivera et al. 2013). Briefly, the LUR was based on a dense network of residential outdoor NO_2 measurements (years 2007–2009). The main predictor variables were the height above street and traffic-related variables within different buffers (from 25- to 1,000-m radii) around the sampling locations. The coefficient of determination (R^2) of the model was 0.63.

Other data collection. Based on questionnaires we also assessed smoking (smoker/ex-smoker of > 1 year/never smoker), weekly leisure time physical activity (in metabolic

equivalents) with Minnesota's questionnaire (Elosua et al. 2000), daily alcohol intake (grams per day), adherence score to Mediterranean diet (lowest to highest, from 10 to 30) (Schröder et al. 2004), family history of cardiovascular disease (yes/no), living alone (yes/no), and hearing loss (no/mild/severe). We assessed socioeconomic status at the individual level with educational level (university/secondary/primary/illiterate) and occupation (employed/homemaker-inactive/retired/unemployed), and at the census tract of residences with the deprivation index (Domínguez-Berjón and Borrell 2005). We defined diabetes as fasting blood glucose levels ≥ 126 mg/dL or reported treatment with antidiabetic drugs; body mass index (BMI) as weight/height squared (kilograms per meter squared); intake of anxiolytics as having ever taken tranquilizers, sedatives, anxiety pills, sleeping pills, or muscle relaxants in the last two weeks (yes/no); and CVD as having ever had a cardiovascular event (myocardial infarction or stroke) or cardiovascular-related surgery intervention (yes/no).

We derived daily means of NO_2 (micrograms per cubic meter) and temperature (degrees Celsius) 0–3 days before the day of examination (lags 0–3) at an urban background station from the regional air quality and meteorology monitoring networks to control for the short-term effects of temperature and air pollution on BP (Servei de Vigilància i Control de l'aire 2008; Servei Meteorològic de Catalunya 2011). Season was categorized as winter (January–March), spring (April–June), summer (July–September), and autumn (October–December).

Statistical analysis. We performed descriptive analyses of all variables, assessed their linearity against the outcomes with generalized additive models, and transformed them accordingly. We excluded missing observations on the outcomes, exposure, and covariates of the main models (n = 141, 6.8%), resulting in 1,926 cases with characteristics similar to those of the original sample. The inclusion of confounders in the multivariate logistic regression (for hypertension) and linear regression models (for BP) was based on the hypothesized causal pathway of traffic noise and air pollution on hypertension (Fuks et al. 2011) and previous literature. All single and multi-exposure models were controlled for age, age squared, sex, educational level, physical activity, diet, alcohol consumption, smoking, diabetes, BMI, deprivation, railway noise, and short-term effects of daily temperature (lag 0) on measured BP. Occupational status, living alone, temperature at lags 1–3, instead of lag 0, and daily NO_2 (lags 0–3) did not contribute further to models (i.e., effect estimates changed < 10%). We additionally adjusted for BP-lowering treatment in models for BP and checked regression diagnostics. Effect estimates changed < 10% by further inclusion of potential intermediates (traffic noise annoyance, family history of cardiovascular death, heart rate, and CVD), so these were not considered (data not shown).

We also assessed linear threshold models assuming noise effects to start at 30 dB(A) indoors, the recommended indoor noise levels at night (WHO 2009). For this, we created a new variable by subtracting 30 dB(A) to the noise levels and giving the value zero to the resulting negative values. This new variable was then used as the exposure variable in the models.

We tested population characteristics that could modify the association between traffic noise (indoors) and hypertension by including an interaction term (i.e., evaluated categorical or continuous variable × indoor traffic noise) in multivariate models and checking its statistical significance (i.e., p-value of interaction term) as well as the stratum-specific effect estimate of the studied association. The evaluated ordinal variables were coded with consecutive numbers, multiplied by indoor traffic noise, and the resulting continuous variable was used in the models to test for trends. We evaluated age, sex, educational level, BMI, diabetes, traffic annoyance, noise sensitivity with a cut-off at the median, hearing loss, and intake of anxiolytic medication. Anxiolytics have been linked to transportation noise exposure (Floud et al. 2011), and their mechanism of action may directly affect the suggested stress pathway by which noise affects CVD.

Because of the rather high correlation between outdoor traffic noise and NO_2, we evaluated collinearity in two-exposure models with the variance inflation factor (VIF). A simulation study to assess the effects of collinearity on effect estimates was implemented by repeatedly (10,000 times) simulating data sets and fitting our final model. All final model predictors were simulated from a multivariate normal distribution with mean and covariance matrices as observed in the original data set; SBP was simulated using the regression equation obtained in our study plus normally distributed random error with mean zero and variance equal to the estimated residual variance in the original data set. The correlation between estimated coefficients for outdoor (or indoor) traffic L_{night} and NO_2 were calculated. We carried out the same procedure with indoor traffic L_{night}.

We reported estimated changes in the outcomes per 5 dB(A) for all noise indicators and per 10 μg/m^3 for NO_2, unless otherwise specified. We defined statistical significance at an alpha level of 0.05.

Analyses were performed with Stata 12.0 (StataCorp, College Station, TX, USA) and R version 2.12 (http://www.r-project.org/).

Results

The main characteristics of the study sample are summarized in Table 1 and in the Supplemental Material, Table S1. The prevalence of hypertension was 36.6%, and 24.1% of the sample took BP-lowering medication. The median age of the participants was 56 years, and 45.5% were male. As expected, compared with nonhypertensive participants, hypertensive participants were older (median, 63 vs. 52 years old, respectively) and had a higher prevalence of diabetes and hearing loss. There were also fewer current smokers among hypertensive participants. Hypertensive participants were exposed to slightly higher levels of NO_2 [median, interquartile range (IQR): 26.3 (11.2) vs. 27.4 (12.2) μg/m^3] and noise. The median levels of outdoor traffic L_{night} and L_{night} at the bedroom façade were almost 30 dB(A) higher than indoors [56.7, 53.5, and 27.1 dB(A), respectively], but outdoor L_{night} had a narrower IQR than the other two.

Outdoor NO_2 concentrations were highly correlated with outdoor levels of traffic L_{night} (Spearman's correlation coefficient, r = 0.75), but not with traffic L_{night} at the bedroom façade and indoor traffic L_{night} (0.39 and 0.23, respectively) (Table 2).

Participants who always closed windows and had noise protections (i.e., with bedroom facing the backyard or sound-proofed windows; 15% of the participants) were exposed to slightly higher median outdoor L_{night} levels [57.2 dB(A)] compared with those who had none of these noise-reducing measures [56.1 dB(A), 34%], or those who only closed windows [56.9 dB(A), 31%] or only had protections [56.9 dB(A), 20%] (Kruskal–Wallis test p-value = 0.044). Median outdoor traffic L_{night} levels were also higher for those reporting higher traffic annoyance [not annoyed: 56.1 dB(A); moderately: 57.3 dB(A); highly annoyed: 58.1 dB(A); Kruskal–Wallis test p-value < 0.001], but not for those with higher noise sensitivity.

Traffic L_{night}, NO_2, and high BP. In single-exposure models, outdoor traffic L_{night} and NO_2 were associated with prevalent hypertension [OR = 1.18; 95% CI: 1.05, 1.32 per 5 dB(A) and OR = 1.16; 95% CI: 0.99, 1.36 per 10 μg/m^3, respectively] (Table 3). When combining both factors in two-exposure models, the association for outdoor traffic L_{night} was similar, whereas that for NO_2 was attenuated (OR = 0.98; 95% CI: 0.79, 1.22). In contrast, we observed associations of NO_2, traffic L_{night} at the bedroom façade and indoor traffic L_{night} with hypertension that were not confounded by noise or NO_2, correspondingly. Relationships with indoor traffic L_{night} and NO_2 did not reach statistical significance (OR = 1.06; 95% CI: 0.99, 1.13;

p = 0.073) and (OR = 1.16; 95% CI: 0.99, 1.36; p = 0.058), respectively.

Regarding SBP, we observed a nonsignificant increment of 0.51 mmHg (95% CI: –0.24, 1.25) per 5-dB(A) increase of outdoor traffic L_{night}, and a significant increment of 1.19 mmHg (95% CI: 0.17, 2.21) per 10 μg/m^3 of NO_2 in single-exposure models (Table 3). In contrast, in two-exposure models, the point estimate for noise was negative (β = –0.20; 95% CI: –1.25, 0.84), whereas the relationship with NO_2 became stronger but less precise (β = 1.39; 95% CI: –0.05, 2.82). This confounding was not present in two-exposure models for indoor traffic L_{night} and NO_2, and both yielded statistically significant associations with SBP, respectively: β = 0.72 (95% CI: 0.29, 1.15) and β = 1.23 (95% CI: 0.21, 2.25). L_{night} at the bedroom façade was positively associated with SBP, although the association did not reach statistical significance after adjustment for NO_2 (β = 0.36; 95% CI: –0.06, 0.77). Finally, we observed an association between NO_2 and DBP, but not with traffic L_{night}.

Threshold effect for indoor traffic noise. After we applied a threshold at 30 dB(A), indoor traffic L_{night} yielded stronger associations with hypertension: OR = 1.14 (95% CI: 0.99, 1.31) and particularly with SBP: β = 1.27 (95% CI: 0.34, 2.20) (tested in two-exposure models). Indeed, we observed a slight departure from linearity with a potential threshold at 30 dB(A) with SBP (see Supplemental Material, Figure S2). The associations between NO_2 and the outcomes in these models remained similar (see Supplemental Material, Table S2).

Effect modifiers. Associations between indoor traffic noise and hypertension were seen in subjects not taking anxiolytics (OR = 1.10; 95% CI: 1.02, 1.18) and not in those taking anxiolytics (OR = 0.99; 95% CI: 0.89, 1.09; p-value of interaction = 0.054). There was also a trend toward stronger associations between indoor traffic L_{night} and hypertension with increasing reported traffic annoyance: no annoyance (OR = 1.02; 95% CI: 0.95, 1.10), moderate annoyance (OR = 1.12; 95% CI: 1.0, 1.25), and high annoyance (OR = 1.18; 95% CI: 0.97, 1.43); all p-values of interaction (categorical variable) = 0.141, all p-values of interaction (continuous variable) = 0.033, all p-values for trend = 0.052. We found no indication for interactions by age, sex, educational level, BMI, diabetes, noise sensitivity, and hearing loss (all p-values of interaction > 0.31). See Figure 1 and Supplemental Material, Table S3.

Collinearity between traffic L_{night} and NO_2. The VIFs for outdoor traffic L_{night} and NO_2 when combined in two-exposure models were < 2.8 (common rule of thumb for collinearity is VIF > 5 or > 10).

The average beta coefficients of the 10,000 simulations were for NO_2, β = 1.19 and for outdoor traffic L_{night}, β = 0.51, and their Pearson correlation was –0.70 (see Supplemental Material, Figure S1A). In contrast, the resulting correlation between the simulated beta coefficients of NO_2 and indoor traffic L_{night} was 0.03 (see Supplemental Material, Figure S1B).

Discussion

This study combined long-term estimates of outdoor traffic noise levels at night (L_{night}) with information on bedroom orientation and measures to abate noise to derive an estimate of indoor traffic noise levels at each participant's bedroom. Besides attempting to get a more accurate estimate of the true relevant exposure, accounting for noise-reducing factors decreases the correlation observed between outdoor traffic noise and NO_2 levels (a marker of traffic-related air pollution). Thus it helps to disentangle the associations of these traffic-related stressors with high BP. Few studies to date have considered this mutual confounding on high BP (Coogan et al. 2012; de Kluizenaar

Table 1. Main characteristics of the study sample.

Characteristic	Total (n = 1,926)	Nonhypertensive (n = 1,222)	Hypertensive (n = 704)	p-Value[a]
Continuous variables [median (IQR)]				
Systolic blood pressure (mmHg)	123.0 (24.0)	117.0 (15.0)	143.0 (21.0)	< 0.001
Diastolic blood pressure (mmHg)	78.0 (13.0)	75.0 (10.0)	86.0 (13.0)	< 0.001
Age (years)	56.0 (18.0)	52.0 (15.0)	63.0 (15.0)	< 0.001
Mediterranean diet adherence score[b]	20.0 (4.00)	20.0 (4.00)	20.0 (4.00)	0.483
Deprivation index[c]	–1.95 (0.91)	–2.01 (1.00)	–1.82 (1.30)	< 0.001
Outdoor annual average NO_2 (μg/m^3)	26.8 (11.5)	26.3 (11.2)	27.4 (12.2)	0.017
Outdoor traffic L_{night} [dB(A)]	56.7 (6.80)	56.5 (6.70)	57.4 (7.00)	< 0.001
Outdoor traffic L_{night} at bedroom façade [dB(A)]	53.5 (17.2)	53.4 (16.9)	53.7 (17.6)	0.03
Indoor traffic L_{night} at bedroom [dB(A)]	27.1 (16.2)	26.9 (15.8)	27.6 (17.2)	0.061
Indoor railway L_{night} at bedroom [dB(A)]	10.5 (21.6)	10.0 (21.4)	11.1 (22.0)	0.572
Noise sensitivity score (10–60)[d]	33.0 (17.0)	34.0 (17.0)	30.0 (17.0)	< 0.001
Categorical variables [n (%)]				
Male sex	876 (45.5)	493 (40.3)	383 (54.4)	< 0.001
BMI (kg/m^2)				
< 20	68 (3.50)	60 (4.90)	8 (1.10)	< 0.001
20–25	605 (31.4)	477 (39.0)	128 (18.2)	
25.1–30	851 (44.2)	517 (42.3)	334 (47.4)	
> 30	402 (20.9)	168 (13.7)	234 (33.2)	
Educational level				
University or similar	596 (30.9)	438 (35.8)	158 (22.4)	< 0.001
Secondary	618 (32.1)	428 (35.0)	190 (27.0)	
Primary	681 (35.4)	346 (28.3)	335 (47.6)	
Illiterate	31 (1.60)	10 (0.80)	21 (3.00)	
Smoking				
Never smokers	981 (50.9)	613 (50.2)	368 (52.3)	0.004
Smokers	406 (21.1)	285 (23.3)	121 (17.2)	
Former smokers	539 (28.0)	324 (26.5)	215 (30.5)	
Diabetes, yes	261 (13.6)	97 (7.90)	164 (23.3)	< 0.001
Bedroom orientation, back yard[e]	582 (30.2)	369 (30.2)	213 (30.3)	0.978
Closing windows, yes[f]	885 (46.0)	574 (47.0)	311 (44.2)	0.236
Protections, yes[g]	666 (34.6)	419 (34.3)	247 (35.1)	0.723
Traffic annoyance (points)				
None (0)[h]	1,198 (62.6)	737 (60.6)	461 (66.0)	0.065
Moderate (1–5)	549 (28.7)	368 (30.3)	181 (25.9)	
High (6–10)	168 (8.80)	111 (9.10)	57 (8.20)	
Anxiolytics, yes	425 (22.2)	239 (19.6)	186 (26.6)	< 0.001

[a]Chi-square test and Kruskal–Wallis test for strata of hypertension with categorical or continuous variables, respectively. [b]10 (lowest) and 30 (highest) adherence to diet. [c]High deprivation corresponds to high values. [d]Higher noise sensitivity with higher values; 10.8% missing observations. [e]Versus bedroom facing postal address street or side-street. [f]Yes: always close windows (vs. no: never, seldom, often close windows). [g]Sound-proofed windows or bedroom facing the backyard. [h]n < 1,926 (< 1% missing observations).

Table 2. Spearman correlations[a] between annual average home outdoor NO_2 levels and outdoor and indoor traffic noise levels (L_{night}) in the city of Girona (n = 1,926).

Variable	Outdoor NO_2	Outdoor L_{night}	Outdoor L_{night} at façade	Indoor L_{night}
Outdoor annual average NO_2 (μg/m^3)	1.00			
Outdoor L_{night} [dB(A)]	0.75	1.00		
Outdoor L_{night} at bedroom façade [dB(A)]	0.39	0.55	1.00	
Indoor L_{night} [dB(A)]	0.23	0.35	0.78	1.00

[a]All correlations are statistically significant at α < 0.001.

et al. 2007; Fuks et al. 2011; Sørensen et al. 2011, 2012), and none have used indoor noise estimates. Moreover, few studies analyzed both hypertension and BP. We observed associations between indoor traffic noise and both hypertension and SBP, and between NO_2 and hypertension, SBP, and DBP. The associations of indoor traffic noise were not confounded by NO_2, and vice versa. In contrast, results for outdoor traffic L_{night} were less consistent, and associations between outdoor traffic L_{night} and NO_2 with the outcomes showed opposite tendencies after mutual adjustment.

The less consistent findings for outdoor traffic L_{night} agreed with the literature, which indicates associations with hypertension, but limited evidence with BP (Babisch 2006; Dratva et al. 2012; Sørensen et al. 2011; van Kempen and Babisch 2012). Regarding the estimated effect size, a recent meta-analysis reported an OR of 1.03 (95% CI: 1.01, 1.06) per 5-dB(A) change of daytime traffic noise (van Kempen and Babisch 2012). We observed a higher OR of 1.19 (95% CI: 1.02, 1.40), which may reflect a residual confounding by traffic-related air pollution in our study area, due to the high correlation between the two outdoor factors, and thus, the inability to disentangle associations even after adjustment for NO_2, as discussed below.

In contrast, indoor traffic L_{night} was suggestively associated with hypertension (OR = 1.06; 95% CI: 0.99, 1.13, p-value = 0.073) and the estimated effect size was closer to the above-mentioned meta-analysis (van Kempen and Babisch 2012). Furthermore, it was also associated with SBP. The null association for DBP was previously observed by Sørensen et al. (2011) with outdoor traffic noise. Further research is needed to clarify whether the chronic noise–stress biological pathway may promote vascular changes resulting in isolated increased SBP (Black and Elliott 2013).

To our knowledge, only one study has estimated indoor traffic noise (as a categorical variable) according to two terms: room orientation and always closing windows. Only the indoor estimates yielded an increase in the risk of ischemic heart disease, though it was not statistically significant (Babisch et al. 1999). Our assessment further computed the frequency of opening windows, and used more precise, continuous noise estimates with a wider exposure contrast. The other few attempts to account for noise-reducing factors consisted of stratification or interaction analysis by these factors on the noise–hypertension relationship, and only one study addressed this issue comprehensively (Babisch et al. 2012). However, results have been heterogeneous. We assessed similar interaction analyses with closing windows, protections, and a combination of the two, and did not identify differences among groups (data not shown). Stratified analyses have lower statistical power and might result in bias and spurious findings due to multiple comparisons. Furthermore, people may combine noise-reducing remedies, and findings for specific measures might be difficult to interpret if they co-vary with other shielding elements, annoyance, or outdoor traffic noise and air pollution levels.

Our findings for long-term exposure to near-road pollution (NO_2) also agreed with the emerging literature, which indicates associations with BP (Chuang et al. 2011; Dong et al. 2013; Foraster et al. 2014; Fuks et al. 2011; Schwartz et al. 2012), although not in all studies (Sørensen et al. 2012). Furthermore, we also observed a borderline statistically significant association for hypertension, which was independent of indoor

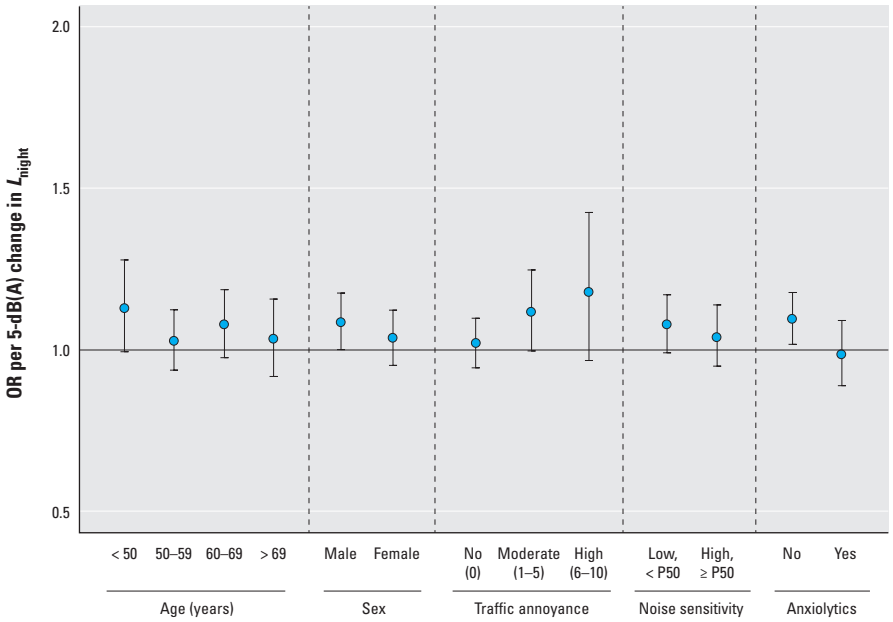

Figure 1. Estimated change in prevalent hypertension per increment of 5 dB(A) in annual average levels of nighttime indoor traffic noise at the bedroom by subgroups of population characteristics (n = 1,926). P50, 50th percentile. Each multivariate logistic regression model was adjusted for the corresponding interaction term, one at a time, and annual average NO_2 levels, age, age squared, sex, education, Mediterranean diet, exercise, alcohol consumption, smoking, BMI, diabetes, deprivation, daily temperature, and indoor railway L_{night}.

Table 3. Estimated change in the prevalence of hypertension, SBP, and DBP (mmHg) per increasing[a] residential levels of traffic noise (L_{night}) and annual average outdoor NO_2 (n = 1,926).

	Hypertension [OR (95% CI)]		SBP [β (95% CI)]		DBP [β (95% CI)]	
Models[b]	L_{night}	NO_2	L_{night}	NO_2	L_{night}	NO_2
Outdoor model[c]						
Single-exposure	1.18 (1.05, 1.32)**	1.16 (0.99, 1.36)*	0.51 (–0.24, 1.25)	1.19 (0.17, 2.21)**	0.20 (–0.23, 0.63)	0.55 (–0.04, 1.14)*
Multi-exposure	1.19 (1.02, 1.40)**	0.98 (0.79, 1.22)	–0.20 (–1.25, 0.84)	1.39 (–0.05, 2.82)*	–0.17 (–0.77, 0.44)	0.71 (–0.12, 1.54)*
Façade model[d]						
Single-exposure	1.08 (1.01, 1.15)**	1.16 (0.99, 1.36)*	0.42 (0.00, 0.83)**	1.19 (0.17, 2.21)**	0.08 (–0.16, 0.32)	0.55 (–0.04, 1.14)*
Multi-exposure	1.07 (1.01, 1.14)**	1.14 (0.97, 1.33)	0.36 (–0.06, 0.77)*	1.07 (0.04, 2.10)**	0.06 (–0.18, 0.29)	0.53 (–0.06, 1.13)*
Indoor model[e]						
Single-exposure	1.06 (0.99, 1.13)*	1.16 (0.99, 1.36)*	0.71 (0.28, 1.14)**	1.19 (0.17, 2.21)**	0.09 (–0.16, 0.34)	0.55 (–0.04, 1.14)*
Multi-exposure	1.06 (0.99, 1.13)*	1.16 (0.99, 1.36)*	0.72 (0.29, 1.15)**	1.23 (0.21, 2.25)**	0.10 (–0.15, 0.34)	0.56 (–0.03, 1.14)*

Single-exposure models were for NO_2 or the corresponding traffic noise indicator. Multi-exposure models were adjusted for NO_2 and the corresponding traffic noise indicator.
[a]Per 5 dB(A) of traffic L_{night} and 10 μg/m^3 of NO_2. [b]All models were adjusted for age, age squared, sex, education, Mediterranean diet, exercise, alcohol consumption, smoking, BMI, diabetes, deprivation, daily temperature, and indoor railway noise. BP models were additionally adjusted for BP-lowering treatment. [c]Noise indicator: outdoor traffic L_{night}. [d]Noise indicator: outdoor traffic L_{night} at the bedroom façade. [e]Noise indicator: indoor traffic L_{night} at the bedroom. *$p < 0.1$. **$p < 0.05$.

traffic noise, but tended to the null when adjusting for outdoor traffic L_{night}. To our knowledge, the association between NO_2 and prevalence of hypertension was observed in only two studies (Dong et al. 2013; Johnson and Parker 2009), whereas other studies found null or inverse effects (Foraster et al. 2014; Fuks et al. 2011; Sørensen et al. 2012). The evidence is more consistent for incidence of hypertension, but only based on two studies (Coogan et al. 2012; Sørensen et al. 2012).

In this study, the beta coefficients of outdoor traffic L_{night} and NO_2 tended to show opposite associations when combined in two-exposure models. We observed a Spearman correlation coefficient of 0.75 between outdoor traffic L_{night} and NO_2. However, according to the VIF and the commonly used thresholds, the tendencies were not explained by collinearity.

To further understand this issue, we implemented a simulation. The simulation showed unbiased average regression coefficients for the association of NO_2 and outdoor traffic L_{night} with SBP after 10,000 replications. This indicates that results from multiple studies (i.e., a meta-analysis) using linear regression and even with an NO_2–outdoor L_{night} correlation of 0.75 would provide unbiased estimates on average. However, the correlation between regression coefficients was –0.70. In other words, those individual replicates of the study finding a high regression coefficient for NO_2 found a low coefficient for outdoor traffic L_{night}, and vice versa (see Supplemental Material, Figure S1A). In particular, around 15.1% of studies had a reversed sign for outdoor traffic noise. In the current study, the tendency could be strong enough to reverse the sign of one of the two exposures. Similar results are expected in other studies of similar size and correlation (around 0.7 or higher) between NO_2 and noise. Therefore there is a risk that literature reporting an association for NO_2 does not find an association for outdoor traffic noise and vice versa, making it difficult to disentangle associations. This might have happened in three of the few studies combining both stressors, which observed a slight negative confounding, including a recent study of our group that focused on NO_2 and adjusted for outdoor traffic L_{night} as the only available exposure marker (de Kluizenaar et al. 2007; Foraster et al. 2014; Sørensen et al. 2012).

The present study further showed that these opposite tendencies in beta coefficients disappeared when assessing markers of personal exposure at the bedroom façade, which were less correlated with NO_2 (Table 3). This was also confirmed in the simulation study by a null correlation between the beta coefficients of indoor traffic L_{night} and NO_2 (see Supplemental Material, Figure S1B). This underscores the need for appropriate exposure measurements for both noise and air pollution to adequately disentangle their associations with common end points—to avoid spurious correlations and thus spurious adjustment patterns when one factor (noise in our case) is a poor proxy of exposure.

Threshold effects for indoor traffic $\mathbf{L_{night}}$. The association of indoor traffic noise with hypertension and SBP was stronger when we assumed a 30-dB(A) threshold effect for indoor traffic noise. Although departures from linearity were observed only for SBP (see Supplemental Material, Figure S2), a threshold might be possible because indoor noise sources at nighttime could well reach 30 dB(A), thus partly or totally masking the contribution of traffic noise levels < 30 dB(A) indoors. This low threshold indicates that even low traffic noise levels may affect BP and agrees with the WHO recommendations for nighttime noise at bedrooms [30 dB(A)] (WHO 2009).

Effect modification. We observed no association between indoor traffic L_{night} and hypertension among participants taking anxiolytics, which might indicate that anxiolytics block the stress response by which noise affects BP. This agrees with a laboratory study reporting fewer noise-induced sleep responses with intake of anxiolytic medication (Cluydts et al. 1995).

We also observed that increasing noise annoyance may potentially lead to stronger associations between indoor traffic noise and hypertension (Figure 1). Few studies to date have analyzed this pattern, which could relate to an interaction between the proposed direct and indirect mechanistic pathways of noise (Babisch et al. 2013).

Finally, we could not confirm previous reports of stronger associations in some age groups or in men (van Kempen and Babisch 2012).

Strengths and limitations. In this study, we derived markers of traffic noise exposure at the bedroom façade and indoors at night from questionnaire data on noise-reducing factors and the best available literature on insulation (European Environment Agency 2010; Salomons et al. 2009; Spanish Government 2010; Tremco Ltd. 2004). We acknowledge that these corrections may have introduced some error, resulting in less precise or biased estimates, which are difficult to predict. For instance, although we deducted standard values to adjust for window type, the true insulation provided by the different windows may vary because it also depends on proper window seals. Nevertheless, a small proportion of the participants had soundproofed windows (4.5%), and still 54% opened windows to some degree (a factor we also considered), thus heavily reducing the effect of window insulation. Besides, home construction is quite homogeneous in Girona, thus possibly yielding similar insulations in backyards. However, models that estimate noise at all building façades are needed to improve precision. In summary, in this study, both markers of noise exposure at the bedroom (particularly the indoor marker) provided more plausible results than outdoor noise at the postal address. Even though our novel questionnaire-based assessment seems suitable, future studies should confirm our results and could even improve questionnaires to obtain even more precise information.

We emphasize that the exposure misclassification now addressed for noise does not necessarily apply to the same extent to air pollution. Many exposure studies confirmed that indoor concentrations of pollutants from outdoor origin, as well as traffic-related particulate matter components such as black smoke (Gotschi et al. 2002), are highly correlated with the outdoor concentrations (Chen and Zhao 2011). This may particularly apply to Girona, where only 46% of participants always closed windows at night and where ventilation during the day is expected given the mild temperatures.

We relied on a detailed noise and LUR model for Girona. However, our exposure models were derived for a specific year and the current residence only, which could lead to exposure misclassification. Nevertheless, the city had no major changes in traffic during the years before the exposure assessment; therefore, we expect spatial distributions of both environmental factors to represent long-term exposure. Moreover, residential mobility was low, and restricting the analyses to nonmovers up to 10 years before the baseline examination had no influence on results (data not shown).

Regarding the noise questionnaire, responses referred to the time of the follow-up visit, but participants were nonmovers. Thus, we expect that most responses represent exposure at baseline. However, because noise-reducing factors may come later as a consequence of annoyance or disease, we may have underestimated the baseline exposure and the true associations for some participants. Finally, although reported noise-reducing remedies could vary across seasons, season of reexamination did not influence the association between indoor traffic noise and the outcomes (p-values of interaction > 0.34).

We assessed nighttime, a particularly susceptible period for the adverse health effects of noise (WHO 2009). Daytime indoor traffic noise should be estimated in rooms where activities may be disturbed, and this may be more difficult to determine. Moreover, we expect the daytime to account for a smaller proportion of the total relevant exposure. Besides, although long-term average traffic noise levels (available from current models) could be representative of peak values, given

their high correlation (WHO 2009), peaks might be more disturbing, and future efforts are needed to characterize and assess their health impact.

We also considered a comprehensive set of adjustment variables which had little influence on coefficients. However, residual confounding could always remain, particularly from other traffic-related air pollutants not well captured with our marker (NO_2).

As previously argued (Foraster et al. 2014), no perfect method exists to deal with the intake of BP-lowering medication in BP analyses. The stratified analyses by medication did not indicate a strong masking of the studied associations by medication in the treated group (see Supplemental Material, Table S4). Actually, these associations were even stronger in this group, suggesting that the most affected individuals tended to be medicated. Moreover, our results for BP were robust across all alternative methods (Tobin et al. 2005) in the entire sample, which is reassuring. Thus, for simplicity and to increase statistical power in this rather small study, we retained all study participants and presented the results with the commonly used approach of adjustment for medication.

A main limitation of this study was its cross-sectional design, so distinguishing causes from effects is not possible. Nevertheless, results for indoor traffic noise and NO_2 seem plausible and in line with the biological mechanisms (Babisch 2011; Brook et al. 2009). In addition, given the rather small sample size, we may lack statistical power, particularly for the binary variable of hypertension and the stratified analyses.

Another limitation is that we assessed BP with standard protocols of repeated measurements during one single examination, which does not allow a clinical diagnosis of hypertension. Nevertheless, we know that at least 50% of those with high BP in our cohort confirmed their hypertension in the following years (Foguet et al. 2008). Furthermore, most hypertensive subjects were classified according to their antihypertensive treatment, and we selected the last BP measurement available to minimize the "white-coat" effect. Despite the efforts to minimize variability in BP, we cannot exclude a remaining nondifferential misclassification, which would bias results toward the null.

Finally, we selected participants attending the follow-up, so some self-selection of healthier participants might have occurred, potentially biasing results toward the null too.

Public health implications. Even low levels of both traffic-related factors (noise and air pollution) may contribute to hypertension, and thus to CVD—a primary cause of morbidity and mortality. Although estimated effect sizes were small, these stressors are ubiquitous, so decreasing their levels could benefit millions of people. Our results further suggest that individual measures against noise in Girona were insufficient: Whether current noise protections reduce BP is unclear (Babisch et al. 2012).

Conclusions

In this cross-sectional study we identified an association between long-term exposure to indoor traffic noise at night and both prevalent hypertension and SBP, as well as an association between long-term exposure to NO_2—a marker of traffic-related air pollution—and both prevalent hypertension and BP. These results should be further confirmed, but they underscore the relevance of using detailed exposure assessment to identify the independent associations of traffic noise and traffic-related air pollution (Künzli 2013) on common outcomes. Questionnaires on measures against noise could be a useful tool to derive indoor noise markers in future studies.

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Particulate Matter Air Pollution Exposure, Distance to Road, and Incident Lung Cancer in the Nurses' Health Study Cohort

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Background: A body of literature has suggested an elevated risk of lung cancer associated with particulate matter and traffic-related pollutants.

Objective: We examined the relation of lung cancer incidence with long-term residential exposures to ambient particulate matter and residential distance to roadway, as a proxy for traffic-related exposures.

Methods: For participants in the Nurses' Health Study, a nationwide prospective cohort of women, we estimated 72-month average exposures to $PM_{2.5}$, $PM_{2.5–10}$, and PM_{10} and residential distance to road. Follow-up for incident cases of lung cancer occurred from 1994 through 2010. Cox proportional hazards models were adjusted for potential confounders. Effect modification by smoking status was examined.

Results: During 1,510,027 person-years, 2,155 incident cases of lung cancer were observed among 103,650 participants. In fully adjusted models, a 10-μg/m^3 increase in 72-month average PM_{10} [hazard ratio (HR) = 1.04; 95% CI: 0.95, 1.14], $PM_{2.5}$ (HR = 1.06; 95% CI: 0.91, 1.25), or $PM_{2.5–10}$ (HR = 1.05; 95% CI: 0.92, 1.20) was positively associated with lung cancer. When the cohort was restricted to never-smokers and to former smokers who had quit at least 10 years before, the associations appeared to increase and were strongest for $PM_{2.5}$ (PM_{10}: HR = 1.15; 95% CI: 1.00, 1.32; $PM_{2.5}$: HR = 1.37; 95% CI: 1.06, 1.77; $PM_{2.5–10}$: HR = 1.11; 95% CI: 0.90, 1.37). Results were most elevated when restricted to the most prevalent subtype, adenocarcinomas. Risks with roadway proximity were less consistent.

Conclusions: Our findings support those from other studies indicating increased risk of incident lung cancer associated with ambient PM exposures, especially among never- and long-term former smokers.

Citation: Puett RC, Hart JE, Yanosky JD, Spiegelman D, Wang M, Fisher JA, Hong B, Laden F. 2014. Particulate matter air pollution exposure, distance to road, and incident lung cancer in the Nurses' Health Study Cohort. Environ Health Perspect 122:926–932; http://dx.doi.org/10.1289/ehp.1307490

Introduction

A number of general population studies around the world have demonstrated adverse associations of chronic exposures to ambient particulate matter (PM) and/or traffic-related pollutants with lung cancer (Beelen et al. 2008a, 2008b; Beeson et al. 1998; Cao and Gao 2012; Carey et al. 2013; Cesaroni et al. 2013; Hales et al. 2013; Hart et al. 2011; Heinrich et al. 2013; Hystad et al. 2013; Jerrett et al. 2013; Katanoda et al. 2011; Krewski et al. 2009; Lepeule et al. 2012; Lipsett et al. 2011; McDonnell et al. 2000; Naess et al. 2007; Nafstad et al. 2003; Nyberg et al. 2000; Pope et al. 2002; Raaschou-Nielsen et al. 2010, 2011, 2013; Turner et al. 2011). Many of these studies have observed effect modification by smoking status, providing evidence for the link between PM exposure and lung cancer in the absence of the strong influence of smoking behavior. Based primarily on the findings of these studies and evidence from occupationally exposed populations, the International Agency for Research on Cancer (IARC) has recently declared outdoor air pollution generally, and PM specifically, as Group 1 human carcinogens (Loomis et al. 2013).

To date, the pollutants/exposures examined and the time periods and spatial scale of those exposures have been somewhat inconsistent across the literature. Most studies in the literature have focused primarily on PM ≤ 10 μm in aerodynamic diameter (PM_{10}) or ≤ 2.5 μm ($PM_{2.5}$); however, a number have also considered black carbon/black smoke, nitrogen dioxide (NO_2), nitrogen oxides (NO_x), sulfure dioxide, ozone, and volatile organic compounds (Beelen et al. 2008a, 2008b; Dockery et al. 1993; Filleul et al. 2005; Heinrich et al. 2013; Jerrett et al. 2013; Krewski et al. 2009; Nafstad et al. 2003; Nyberg et al. 2000; Raaschou-Nielsen et al. 2010, 2011; Villeneuve et al. 2013; Vineis et al. 2006). A few studies have focused on traffic exposures: modeling NO_2 from traffic sources alone (Nafstad et al. 2003; Nyberg et al. 2000; Raaschou-Nielsen et al. 2010, 2011) or using distance to major roadways or traffic volume surrounding a location (Beelen et al. 2008a, 2008b; Cesaroni et al. 2013; Hystad et al. 2013; Raaschou-Nielsen et al. 2011, 2013; Vineis et al. 2006). Many studies have relied on area-level assessment of exposure; however, some have also modeled air pollution at the residential level with the intent to decrease measurement error. Studies have also used a variety of periods of exposure relative to disease diagnosis, given that the relevant time period of exposure is unknown. Furthermore, with a few exceptions (Cao and Gao 2012; Lipsett et al. 2011), potential confounders have been assessed only once, even in prospective cohort studies. Despite these inconsistencies in the current body of literature, a link between lung cancer and ambient air pollution has been demonstrated.

The current study is based in the United States within the all-female Nurses' Health Study (NHS) cohort. Our objective is to examine the association of lung cancer incidence with residential-level chronic exposure to $PM_{2.5}$, PM between 2.5 and 10 μm in diameter ($PM_{2.5–10}$), PM_{10}, and residential distance to road. With a wealth of time-varying information on exposures and potential confounders, this cohort provides a unique opportunity to examine these associations.

Methods

Study population. The NHS is an ongoing prospective cohort of 121,700 female nurses who were enrolled in 1976 when they were

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Supplemental Material is available online (http://dx.doi.org/10.1289/ehp.1307490).

We thank the participants and staff of the Nurses' Health Study for their valuable contributions.

Financial support was provided by the National Institutes of Health [R01ES009411 and R01ES017017; and P01CA87969 (Nurses' Health Study cohort)].

The authors declare they have no actual or potential competing financial interests.

Received: 9 August 2013; Accepted: 2 June 2014; Advance Publication: 3 June 2014; Final Publication: 1 September 2014.

between 30 and 55 years of age. Participants initially were recruited from 11 states, but as of the mid-1990s nurses now reside in each of the 50 states. A map of all residential addresses in the 48 contiguous states is presented in the Supplemental Material, Figure S1. Participants complete mailed biennial questionnaires to provide information on potential risk factors and to self-report new diagnoses of health outcomes. The response rates are > 90% for each follow-up cycle. Vital status is ascertained through next of kin and the National Death Index (http://www.cdc.gov/nchs/ndi.htm); both methods have identified an estimated 98% of deaths in the cohort. The analytical population for this study excluded all women who were dead or had a previous diagnosis of cancer (except for non-melanoma skin cancer) before follow-up or did not have information for the exposures of interest. The study was approved by the Internal Review Board of Brigham and Women's Hospital; and informed consent was implied through return of the questionnaires. In addition, this study was approved by the Connecticut Department of Public Health (DPH) Human Investigations Committee. Certain data used in this publication were obtained from the DPH.

Case ascertainment. Lung cancers were self-reported by the participants or next of kin or were identified from death certificates; and first reports were subsequently confirmed with medical records by physicians blinded to exposure status. Medical records were obtained for 83% of reported cases; of those, 87% had primary lung cancer confirmed by pathology reports. However, because lung cancers were well reported in this cohort, we included any primary report reconfirmed by the participant where pathological reports were not available.

Exposure assessment. As part of the questionnaire mailing process, residential address information is updated every 2 years. All available addresses (1976, 1986–2010) have been geocoded to obtain the corresponding latitude and longitude. For women with a street segment–level geocode (i.e., highest quality, 80–90% of the available addresses in each follow-up cycle), we calculated distance to road at each address as a proxy for traffic-related exposures. Distance to the nearest road (meters) was determined using geographic information system (GIS) software (ArcGIS, version 9.3; ESRI, Redlands, CA) and the ESRI Streetmap Pro2007 data set. We calculated the shortest distances to the following road classes as defined by the U.S. Census Bureau (2001): A1 (primary roads, typically interstate highways, with limited access, division between the opposing directions of traffic, and defined exits), A2 (primary major, non-interstate highways and major roads without access restrictions), and A3 (smaller, secondary roads, usually with more than two lanes). Analyses were conducted using distance to the nearest of all three road types (A1–A3), distance to the two largest road types (A1, A2), and distance to the largest road type (A1). Given the distribution of distance to road in this cohort and previous exposure studies showing approximately exponential decay in exposures to traffic-related air pollutants with increasing distance from a road, we divided distance to road into the following categories: 0–50, 50–200, and ≥ 200 m (Adar and Kaufman 2007; Karner et al. 2010; Lipfert and Wyzga 2008; Lipfert et al. 2006, 2008; Sahlodin et al. 2007; Zhu et al. 2002). We also considered analyses of continuous distance to roads.

Ambient GIS-based spatiotemporal exposure model predictions of $PM_{2.5}$ and PM_{10} were available for all months between January 1988 and December 2007 for the continental United States. These values were generated for each address from nationwide expansions of previously validated spatiotemporal models (Weuve et al. 2012; Yanosky et al. 2008, 2009, in press). The models used monthly average $PM_{2.5}$ and/or PM_{10} data from the U.S. Environmental Protection Agency's (EPA) Air Quality System (U.S. EPA 2009), the IMPROVE network (Visibility Information Exchange Web System 2009) and various other sources (Spengler et al. 1996; Suh et al. 1997). Generalized additive mixed models with monthly penalized spline smooth spatial terms, penalized spline smooth terms of geospatial predictors (listed below), and terms for time were used to create separate PM prediction surfaces for each month and each PM size fraction (Yanosky et al. 2009). The following geospatial predictors used by the models were generated using a GIS: distance to nearest A1–A4 roads, percent urban land use within 1 km, elevation, point sources of PM ($PM_{2.5}$ emissions density within 7.5 km for $PM_{2.5}$ models, and PM_{10} emissions density within 7.5 km for PM_{10} models), smoothed county population density, tract population density (only for PM_{10}), and meteorological predictors: wind speed, total precipitation, temperature, and percent stagnant air days per month (Yanosky et al. 2009). Because monitoring data on $PM_{2.5}$ are limited before 1999, $PM_{2.5}$ in the period before 1999 was modeled using data on PM_{10} (Yanosky et al. 2008). By subtraction of the monthly PM_{10} and $PM_{2.5}$ estimates, information was also obtained on $PM_{2.5–10}$. Cross-validation results demonstrated that the models had high predictive accuracy (cross-validation R^2 values of 0.59, 0.76, and 0.77 for PM_{10}, pre-1999 $PM_{2.5}$, and post-1999 $PM_{2.5}$, respectively).

Potential confounders and effect modifiers. We selected *a priori* a number of potential confounders or effect modifiers previously associated with lung cancer or exposure in this cohort. Information on the following time-varying variables was available every 2 or 4 years from the follow-up questionnaires: body mass index (BMI; kilograms per meter squared, continuous), physical activity in metabolic equivalent hours per week (MET hr/week; < 3, 3 to < 18, ≥ 18), overall diet quality (Alternative Health Eating Index, continuous) (Chiuve et al. 2012), alcohol consumption (dichotomized at 0 g/day), smoking status (current, former, never), months since quitting for former smokers (continuous), and pack-years (continuous). In 1982 a question was included on exposure to secondhand smoke at home and work and during childhood. We considered census-tract median household income and median house value as measures of area-level socioeconomic status (SES). To account for differences in exposure and other unmeasured regional factors, we also controlled for U.S. geographic region of residence (Northeast, South, Midwest, West).

Statistical analysis. Time-varying Cox proportional hazards models were used to assess the relationship of incident lung cancer with residential distance to road and exposure to $PM_{2.5}$, PM_{10}, or $PM_{2.5–10}$. Hazard ratios (HRs) and 95% CIs were calculated for each category of roadway proximity compared with the furthest category. We examined the linearity of the association with distance to road using cubic splines, and considered models examining the linear dose response with distances of 0–499 m, compared with values ≥ 500 m. For the metrics of PM we calculated HRs and 95% CIs for a 10-μg/m^3 increase in each size fraction, after assessing linearity of the dose response. Because the appropriate averaging period is unknown, yet assumed to be more chronic than short-term, we considered 24-, 48-, 72-, 96-, and 120-month cumulative averages. We used Akaike's information criterion (AIC) (Akaike 1974) to determine the best fit cumulative average for $PM_{2.5}$ among individuals with at least 120 months of exposure, so that the AIC criteria were evaluated among a single population. In sensitivity analyses we considered the consistency of results for other possible averaging times. A p-value of 0.05 was used to determine statistical significance.

In the Cox models, person-months were calculated from the start of disease follow-up until June 2010, the end of follow-up, censoring at event, death from another cause, or loss to follow-up, whichever occurred first. We determined the start of disease follow-up based on the selected cumulative average. All models were based on a biennial time scale, were stratified by age in months and time period, and were adjusted for geographic region. Separate models were run for the

distance to road types and for each size fraction of PM. Potential confounders (or sets of confounders) were entered separately into the basic model to determine their influence on the association of the exposure with lung cancer. We included variables in the final models that changed the effect estimate for $PM_{2.5}$ and lung cancer at least 10%. For comparability, we used the same confounders across the different size fractions and distance to road models.

To examine effect modification by smoking status, we performed stratified models and created multiplicative interaction terms. Because of small numbers of cases among never-smokers, we also considered effect modification combining never-smokers with former smokers who had quit at least 10 years previously ("long-term former smokers"). Sensitivity analyses were performed restricted to nonmovers, defined as women who remained at the same address between 1976 and the start of follow-up. SAS version 9.2 (SAS Institute Inc., Cary, NC) was used for all analyses.

Results

Based on the assessment of averaging times described in the methods, the 72-month average was identified as the optimal cumulative average, and therefore we began disease follow-up for all analyses in 1994. A total of 103,650 participants were available for analysis of PM exposures (4,548 died before 1994, 10,710 had a previous diagnosis of cancer, and an additional 2,753 had no information on air pollution).

Age-adjusted characteristics during follow-up are presented overall and by smoking status in Table 1. The mean (± SD) age was 67.0 ± 8.3 years, the age-adjusted mean BMI was 25.6 ± 7.5 and about 39% reported between 3 and 18 MET hr/week of physical activity. About half of the women lived in the Northeast, and 52% of participants reported secondhand smoke exposure at work and from their parents and about 35% at home. More never-smokers were nondrinkers and were less exposed to secondhand smoke, whereas more current smokers reported < 3 MET hr/week of physical activity. Distributions of the three size fractions of PM overall and by region and correlations between the three size fractions within and across cumulative averages are presented in Supplemental Material, Tables S1 and S2, respectively.

All of our *a priori* potential confounders met our definition of confounding and were included in the final multivariable adjusted models. Physical activity, diet, and census-tract median income and median home value (U.S. Census Bureau 2001) attenuated the effect estimate when added to the basic

Table 1. Age-adjusted descriptive characteristics averaged over follow-up (1994–2010) among 103,650 participants in the Nurses' Health Study overall and stratified by smoking status.

Characteristic	All participants	Never-smokers	Former smokers	Current smokers
Person-years (%)[a]	1,510,027 (100)	668,581 (44)	663,062 (44)	175,563 (12)
Age [years (mean ± SD)][a]	67.0 ± 8.3	67.1 ± 8.5	67.4 ± 8.2	64.8 ± 7.9
BMI [kg/m^2 (mean ± SD)]	25.6 ± 7.5	25.8 ± 7.4	26.4 ± 6.8	22.1 ± 9.4
Pack-years of smoking (mean ± SD)	13.4 ± 20.0	0.0 ± 0.0	19.3 ± 18.5	43.0 ± 23.0
Months since quit smoking (mean ± SD)	123.9 ± 178.8	0.0 ± 0.0	279.2 ± 167.4	0.0 ± 0.0
Alternative healthy eating index (mean ± SD)	180.4 ± 108.5	182.8 ± 108.0	190.6 ± 106.5	129.4 ± 102.1
Census-tract median household income (mean ± SD)	63,518 ± 24,491	62,648 ± 23,194	64,849 ± 24,978	61,954 ± 23,644
Census-tract median home value (mean ± SD)	170,126 ± 125,261	166,431 ± 123,720	176,055 ± 128,455	161,998 ± 118,139
Moved between 1976 and 1994 (%)[a]				
No	65.4	66.1	64.1	67.4
Yes	34.6	33.9	35.9	32.6
Region (%)				
Northeast	51.1	48.0	53.2	54.6
Midwest	17.3	19.4	15.4	16.4
West	13.7	14.5	13.3	11.4
South	18.0	18.1	18.1	17.7
Alcohol category (%)				
Nondrinker (0 g/day)	15.0	22.1	9.3	9.7
Drinker	71.4	63.3	80.3	68.5
Missing	13.6	14.6	10.4	21.8
Physical activity (%)				
< 3 MET hr/week	21.5	20.5	21.2	26.0
3 to < 18 MET hr/week	38.8	39.7	39.4	33.2
≥ 18 MET hr/week	30.7	31.2	33.0	20.3
Missing	9.0	8.5	6.5	20.5
Secondhand smoke during childhood (%)				
None	25.1	30.9	21.8	15.7
From mother	3.8	3.1	4.4	3.8
From father	33.9	34.1	34.9	29.1
From both parents	14.7	11.2	17.5	17.0
Missing	22.6	20.7	21.4	34.4
Home secondhand smoke (%)				
None	33.2	38.6	31.8	17.7
Occasional	18.6	18.7	19.6	14.0
Regular	17.1	11.4	19.5	29.6
Missing	31.2	31.3	29.1	38.8
Occupational secondhand smoke (%)				
None	15.0	16.9	14.5	9.5
Occasional	29.3	33.0	28.6	17.7
Regular	22.6	19.2	24.5	28.1
Missing/not working	33.1	30.9	32.4	44.7

Women can be in multiple smoking status categories throughout follow-up.
[a]Not age-adjusted.

models, whereas estimates increased after control for alcohol consumption and BMI. We considered a number of combinations of smoking variables, including smoking status and pack-years; smoking status, pack-years, and months since quitting; smoking status, cigarettes per day, and duration of smoking; and smoking status, number of cigarettes per day, duration of smoking, and months since quitting. Adjustment for any of these combinations led to similar elevated effect estimates (data not shown); therefore, we included smoking status, pack-years, and months since quitting in all multivariable models.

There were a total of 1,510,027 person-years of follow-up and 2,155 lung cancer cases (1,930 definite) among the 103,650 women with information on 72-month cumulative average PM. Models of associations between lung cancer and 72-month average exposures to the different size fractions of PM are presented in Table 2. There were no statistically significant deviations from linearity; therefore, we present linear exposure–response functions. In basic models adjusted for age, calendar time, and region of the country, each 10-μg/m^3 increase in PM_{10}, $PM_{2.5}$, and $PM_{2.5–10}$ was associated with positive, but nonstatistically significant, HRs in the full cohort. The HRs from the multivariable models were similar to those from the basic models for PM_{10} and $PM_{2.5}$; however, the HRs in multivariable models for $PM_{2.5–10}$ were attenuated compared with those in the basic models. For all size fractions, the magnitude of the HRs increased in models restricted to never-smokers. There was a suggestion of effect modification comparing never-smokers and former smokers who had quit at least 10 years earlier with current smokers or former smokers who had quit < 10 years earlier (p for interaction: for PM_{10}, 0.09; for $PM_{2.5}$, 0.09; for $PM_{2.5–10}$, 0.26). For example, for each 10-μg/m^3 increase in $PM_{2.5}$, among never-smokers and former smokers who had quit at least 10 years earlier, the HR was 1.37 (95% CI: 1.06, 1.77), whereas among current and recent former smokers the HR was 0.94 (95% CI: 0.76, 1.15).

Among all lung cancer cases, 44% were adenocarcinoma, 14% were squamous, 14% were small cell, 16% were other histologies (large cell and non-small cell carcinoma, carcinoid, or papillary, mixed sarcoma), and 12% were unknown histology. There were sufficient numbers only of adenocarcinomas to perform subtype-specific analyses. In general, HRs for associations with adenocarcinomas were stronger than corresponding HRs for all lung cancer subtypes combined (Table 2).

In sensitivity analyses, the HRs for $PM_{2.5}$ and all lung cancers, the HRs for associations with adenocarcinomas specifically, and the HRs based on models restricted to never- or long-term former smokers were slightly stronger when analyses were restricted to 66,051 women who did not move residence between 1976 and 1994 (986,370 person-years, 1,441 total cases) (see Supplemental Material, Table S3). Furthermore, our conclusions were unchanged when we used the 24-, 48-, 96-, or 120-month cumulative averages for PM (data not shown).

There were a total of 1,291,229 person-years of follow-up and 1,841 lung cancer cases (1,654 definite) among the 88,596 women with information on distance to road in 1994 (i.e., with a street segment level geocode). Results from basic and multivariable adjusted models of associations with distance to road are presented in Table 3 for each of the different roadway size/distance category combinations. Living within 50 m of an A1 road versus > 200 m from an A1 road was positively associated with lung cancer, although estimates were very unstable due to the small number of cases (n = 10). When distance to road was modeled continuously, there was no apparent association with decreasing distance. In sensitivity analyses restricted to women who did not move between 1976 and 1994, results were similar (see Supplemental Material, Table S4).

Discussion

In this large prospective cohort study of women living in the contiguous United States, we observed positive associations between long-term exposures to ambient air pollution (PM_{10}, $PM_{2.5}$, and $PM_{2.5–10}$) and incident lung cancer after adjusting for time-varying information on known risk factors, including lifetime smoking history, diet, and physical activity. In the full cohort, a 10-μg/m^3 increase in the 72-month cumulative average of all three size fractions was associated with modest increases in risk [PM_{10}: HR = 1.04 (95% CI: 0.95, 1.14); $PM_{2.5}$: HR = 1.06 (95% CI: 0.91, 1.25); $PM_{2.5–10}$: HR = 1.05 (95% CI: 0.92, 1.20)]. However, associations were stronger when the cohort was restricted to never-smokers and former smokers who had quit at least 10 years before diagnosis, particularly for $PM_{2.5}$ [PM_{10}: HR = 1.15 (95% CI: 1.00, 1.32); $PM_{2.5}$: HR = 1.37 (95% CI: 1.06, 1.77); $PM_{2.5–10}$: HR = 1.11 (95% CI: 0.90, 1.37)]. In addition, associations were stronger when only the most common lung cancer subtype, adenocarcinoma, was considered. We also assessed distance to major roadways as a proxy for overall traffic exposures. Living within 50 m of an A1 road (versus > 200 m from an A1 road) was positively associated with lung cancer risk, but numbers of exposed participants were small and there was no evidence of an association with distance from a road modeled as a continuous variable.

Our estimated HRs for a 10-μg/m^3 increase in $PM_{2.5}$ and PM_{10} in the full cohort are at the lower end of the distribution of associations observed in most of the previous equivalent studies (Beelen et al. 2008a, 2008b; Beeson et al. 1998; Cao and Gao 2012; Carey et al. 2013; Cesaroni et al. 2013; Hales et al. 2013; Hart et al. 2011; Heinrich et al. 2013; Hystad et al. 2013; Jerrett et al. 2013; Katanoda et al. 2011; Krewski et al. 2009; Lepeule et al. 2012; Lipsett et al. 2011; McDonnell et al. 2000; Naess et al. 2007; Nafstad et al. 2003; Nyberg et al. 2000; Pope et al. 2002; Raaschou-Nielsen et al. 2010, 2011, 2013; Turner et al. 2011). These studies have reported associations in ranges of 0.95–1.40 for $PM_{2.5}$ and 0.93–2.40 for PM_{10} when estimated for increments of 10 μg/m^3. To our knowledge, to date, only one other study has presented assessment of $PM_{2.5–10}$ (Raaschou-Nielsen et al. 2013),

Table 2. HRs (95% CIs) of the association of incident lung cancer 1994–2010 per 10-μg/m^3 increase in 72-month cumulative average PM exposures among 103,650 members of the Nurses' Health Study.

			PM_{10}		$PM_{2.5}$		$PM_{2.5–10}$	
Case definition/cohort	Cases	Person-years	Basic[a]	Adjusted[b]	Basic[a]	Adjusted[b]	Basic[a]	Adjusted[b]
All cases								
Full cohort	2,155	1,510,027	1.06 (0.98, 1.16)	1.04 (0.95, 1.14)	1.05 (0.90, 1.23)	1.06 (0.91, 1.25)	1.12 (0.98, 1.27)	1.05 (0.92, 1.20)
Never-smokers	176	668,581	1.12 (0.85, 1.46)	1.11 (0.85, 1.46)	1.24 (0.74, 2.05)	1.25 (0.75, 2.07)	1.13 (0.75, 1.70)	1.11 (0.74, 1.68)
Never or quit smoking ≥ 10 years	828	1,203,946	1.11 (0.97, 1.28)	1.15 (1.00, 1.32)	1.22 (0.95, 1.57)	1.37 (1.06, 1.77)	1.11 (0.91, 1.37)	1.11 (0.90, 1.37)
Current or smoked in the last 10 years	1,327	306,081	0.97 (0.86, 1.08)	0.99 (0.88, 1.12)	0.88 (0.72, 1.08)	0.94 (0.76, 1.15)	1.01 (0.85, 1.21)	1.03 (0.86, 1.24)
Adenocarcinomas								
Full cohort	847	1,510,027	1.15 (0.95, 1.39)	1.18 (0.97, 1.45)	1.28 (0.89, 1.83)	1.33 (0.92, 1.93)	1.18 (0.87, 1.59)	1.23 (0.89, 1.70)
Never or quit smoking ≥ 10 years	425	1,203,946	1.18 (0.83, 1.67)	1.41 (0.95, 2.09)	1.41 (0.73, 2.72)	1.66 (0.81, 3.42)	1.14 (0.69, 1.86)	1.49 (0.85, 2.63)

[a]Models were adjusted for age, time period, and geographic region. [b]Additionally adjusted for BMI, alcohol consumption, physical activity, overall diet quality, smoking status (when not stratified by status) and pack-years, months since quitting smoking, secondhand smoke exposure at home, work, and during childhood, and census-tract median home value and median income.

and the HR was 1.19 (95% CI: 0.77, 1.82) if expressed as a 10-μg/m^3 increase.

In its recent assessment of the carcinogenicity of outdoor air pollution in general and particulate matter in particular, IARC determined that the evidence was remarkably consistent in epidemiological studies from Europe, North America, and Asia, in studies of experimental animals, and across a wide range of mechanisms related to cancer (Loomis et al. 2013). IARC determined that for lung cancer the most informative epidemiologic studies were the European Study of Cohorts for Air Pollution Effects (ESCAPE) and the American Cancer Society Study (ACS). ESCAPE combined data from 17 cohort studies based in nine European countries, including 312,944 individuals and 2,095 incident lung cancer cases over 12.8 years of follow-up (Raaschou-Nielsen et al. 2013). Using land-use regression models incorporating data from 2008–2011, they predicted PM exposures at the participants' baseline address (in the 1990s for most cohorts). They observed associations of lung cancer with PM_{10} (HR = 1.22; 95% CI 1.03, 1.45 per 10 μg/m^3), $PM_{2.5}$ (HR = 1.18; 95% CI: 0.96, 1.46 per 5 μg/m^3), and $PM_{2.5–10}$ (HR = 1.09; 95% CI: 0.88, 1.33 per 5 μg/m^3) after adjusting for sex, smoking variables, secondhand smoke, occupational variables, fruit intake, and area-level SES (Raaschou-Nielsen et al. 2013). The most recent updates of the full ACS Cancer Prevention Study II (CPS-II) study included about 500,000 individuals residing in metropolitan statistical areas (MSAs) throughout the United States with information on air pollution (Krewski et al. 2009; Pope et al. 2002). The investigators estimated MSA-level average baseline exposures to $PM_{2.5}$ from 1979–1983 and toward the end of the follow-up in 1999–2000. HRs were adjusted for sex, age, race, and baseline information on smoking, education, marital status, BMI, alcohol consumption, occupational exposure, and diet. With follow-up from 1982–1998, the adjusted HRs for a 10-μg/m^3 increase in $PM_{2.5}$ using the baseline average, the 1999–2000 average, or the average of the two time periods were 1.08 (95% CI: 1.01, 1.16), 1.13 (95% CI: 1.04, 1.22), and 1.14 (95% CI: 1.04, 1.23), respectively (Pope et al. 2002). The adjusted HR per 28.8 μg/m^3 for exposure to PM_{10} averaged from 1987–1996 was not elevated (HR = 0.94; 95% CI: 0.86, 1.02) (Krewski et al. 2009). An additional 2 years of follow-up and extensive consideration of additional individual-level and ecological-level covariates, as well as assessment of autocorrelation, did not materially change these results (Krewski et al. 2009).

There is no clear evidence in the literature of sex differences in the relation of PM with lung cancer. To date, only two other studies have focused specifically on women. In the California Teachers Study, a prospective cohort of 133,479 female public school professionals (20–80 years of age at baseline) residential-level cumulative exposures to $PM_{2.5}$ and PM_{10} were quantified. From 1997 through 2005, 234 and 275 participants with $PM_{2.5}$ and PM_{10} exposure information, respectively, died from lung cancer. Adjusted analyses showed no association with a 10-μg/m^3 change in $PM_{2.5}$ (HR = 0.95; 95% CI: 0.70–1.28) or PM_{10} (HR = 0.93; 95% CI: 0.81–1.07) (Lipsett et al. 2011). In a German cohort study of 4,800 women, air pollution exposure was assessed for up to 18 years using air monitoring–station data to calculate yearly averages of PM_{10}. Adjusted analysis showed an increase of 7 μg/m^3 PM_{10} was associated with an increased HR for lung cancer mortality (HR = 1.84; 95% CI: 1.23, 2.74) (Heinrich et al. 2013). In other studies that presented results stratified by sex, no clear patterns of effect modification emerged (Abbey et al. 1999; Cesaroni et al. 2013; Katanoda et al. 2011; Naess et al. 2007; Pope et al. 2002).

Our findings of stronger associations when we restricted to never-smokers and participants who had quit at least 10 years

Table 3. HRs (95% CIs) for incident lung cancer 1994–2010 in association with residential proximity to roads in 1994 among 88,596 members of the Nurses' Health Study.

Exposure category	Cases	Basic[a]	Adjusted[b]
Full cohort			
Distance to A1 (m)			
≥ 200	1,799	1.00 (Referent)	1.00 (Referent)
50–199	32	0.70 (0.49, 0.99)	0.73 (0.51, 1.04)
0–49	10	2.38 (1.27, 4.44)	2.01 (1.06, 3.80)
Continuous (per 100 m)	1,841	1.01 (0.95, 1.08)	1.01 (0.95, 1.07)
Distance to A1–A2 (m)			
≥ 200	1,699	1.00 (Referent)	1.00 (Referent)
50–199	105	0.93 (0.76, 1.13)	0.93 (0.76, 1.14)
0–49	37	1.14 (0.82, 1.58)	1.02 (0.73, 1.42)
Continuous (per 100 m)	1,841	1.00 (0.96, 1.04)	1.01 (0.97, 1.04)
Distance to A1–A3 (m)			
≥ 200	971	1.00 (Referent)	1.00 (Referent)
50–199	558	1.07 (0.96, 1.19)	1.05 (0.94, 1.17)
0–49	312	1.10 (0.97, 1.25)	1.05 (0.92, 1.19)
Continuous (per 100 m)	1,841	0.98 (0.95, 1.00)	0.99 (0.96, 1.02)
Current smoker or smoked in the last 10 years			
Distance to A1 (m)			
≥ 200	1,212	1.00 (Referent)	1.00 (Referent)
50–199	19	0.79 (0.48, 1.31)	0.86 (0.52, 1.42)
0–49	6	2.74 (1.19, 6.32)	2.48 (1.04, 5.90)
Continuous (per 100 m)	1,237	1.00 (0.91, 1.09)	0.98 (0.89, 1.07)
Distance to A1–A2 (m)			
≥ 200	1,142	1.00 (Referent)	1.00 (Referent)
50–199	69	0.96 (0.73, 1.28)	0.99 (0.75, 1.33)
0–49	26	1.01 (0.62, 1.62)	0.95 (0.58, 1.15)
Continuous (per 100 m)	1,237	1.02 (0.96, 1.08)	1.02 (0.96, 1.08)
Distance to A1–A3 (m)			
≥ 200	647	1.00 (Referent)	1.00 (Referent)
50–199	370	1.10 (0.94, 1.28)	1.10 (0.94, 1.29)
0–49	220	1.10 (0.91, 1.33)	1.11 (0.92, 1.34)
Continuous (per 100 m)	1,237	0.98 (0.94, 1.02)	0.97 (0.93, 1.01)
Never-smoker or quit smoking ≥ 10 years			
Distance to A1 (m)			
≥ 200	587	1.00 (Referent)	1.00 (Referent)
50–199	13	0.86 (0.49, 1.49)	0.90 (0.52, 1.57)
0–49	4	3.15 (1.16, 8.50)	3.26 (1.17, 9.11)
Continuous (per 100 m)	604	0.98 (0.88, 1.09)	0.98 (0.88, 1.09)
Distance to A1–A2 (m)			
≥ 200	557	1.00 (Referent)	1.00 (Referent)
50–199	36	0.99 (0.71, 1.39)	1.03 (0.73, 1.45)
0–49	11	1.05 (0.58, 1.91)	1.07 (0.59, 1.96)
Continuous (per 100 m)	604	0.98 (0.91, 1.04)	0.97 (0.90, 1.03)
Distance to A1–A3 (m)			
≥ 200	324	1.00 (Referent)	1.00 (Referent)
50–199	188	1.10 (0.91, 1.31)	1.09 (0.91, 1.31)
0–49	92	1.00 (0.79, 1.26)	1.03 (0.81, 1.30)
Continuous (per 100 m)	604	1.00 (0.95, 1.04)	0.99 (0.95, 1.04)

[a]Models were adjusted for age, time period, and geographic region. [b]Additionally adjusted for BMI, alcohol consumption, physical activity, overall diet quality, smoking status (when not stratified by status) and pack-years, months since quitting smoking, secondhand smoke exposure at home, work, and during childhood, and census-tract median home value and median income.

before diagnosis are consistent with the majority of the literature. After 26 years of follow-up in the ACS study, the adjusted HR for lung cancer mortality risk among never smokers was 1.27 (95% CI: 1.03, 1.56) for a 10-μg/m^3 change in $PM_{2.5}$ (1999–2000) (Turner et al. 2011). In ESCAPE, the HRs for a 10-μg/m^3 change in PM_{10} increased to 1.39 (95% CI: 0.94, 2.06) and for a 5-μg/m^3 increase in $PM_{2.5}$ to 1.21 (95% CI: 0.61, 2.40) (Raaschou-Nielsen et al. 2013). Although no association between PM and lung cancer mortality was observed in the California Teachers Study, when the population was restricted to never-smokers the adjusted HR for a 10-μg/m^3 change in $PM_{2.5}$, but not PM_{10}, showed an increased risk ($PM_{2.5}$ HR = 1.62; 95% CI 0.83, 3.16; PM_{10} HR = 1.00; 95% CI: 0.75, 1.31) (Lipsett et al. 2011). In the Harvard Six Cities Study (n = 8,096), adjusted HRs increased from 1.37 (95% CI: 1.07, 1.75) for a 10-μg/m^3 change overall, to 1.96 (95% CI: 1.29, 2.99) among former smokers. However, HRs for never- and current smokers were 1.25 (95% CI: 0.54, 2.89) and 1.25 (0.95, 1.64), respectively (Lepeule et al. 2012). Similarly, in a case–control study in Canada, adjusted HRs for the whole study were 1.29 (95% CI: 0.95, 1.76) per 10-μg/m^3 increase in $PM_{2.5}$, but HRs among never-, former, and current smokers were 0.95 (95% CI: 0.38, 2.34), 1.45 (95% CI: 0.96, 2.19), and 1.17 (95% CI: 0.75, 1.84), respectively (Hystad et al. 2013). In a Japanese cohort of 63,520 participants, all never-smokers were female. The adjusted HR for a 10-μg/m^3 increase in $PM_{2.5}$ was 1.16 (95% CI: 1.02, 1.33) in the never-smokers, whereas the HR for all females was 1.17 (95% CI: 0.98, 1.39) (Katanoda et al. 2011). Except for the ACS study (1,100 cases), in each individual study the numbers of lung cancer cases who had never smoked was quite small (< 200). Overall, however, because they reduce the potential for residual confounding by smoking, these analyses among never- and former smokers increase our confidence that exposure to air pollution is independently associated with lung cancer.

Very few studies have estimated associations of air pollution with histological subtypes of lung cancer. Hystad et al. (2013) reported increased risk of adenocarcinoma for each 10-μg/m^3 increase in $PM_{2.5}$ [odds ratio (OR) = 1.27; 95% CI: 0.84, 1.90]. Similar to our study, in ESCAPE results were stronger when the case definition was restricted to adenocarcinomas [5-μg/m^3 increase in $PM_{2.5}$ HR = 1.55 (95% CI: 1.05, 2.29) and 10-μg/m^3 increase in PM_{10} exposure HR = 1.51 (95% CI: 1.10, 2.08)] (Raaschou-Nielsen et al. 2013). In a hospital-based case–control study of > 1,200 patients in northern Spain, with residential area as a proxy for air pollution levels, residents in urban areas showed significantly increased risks for adenocarcinoma (OR = 1.92; 95% CI: 1.09, 3.38) compared with those in rural areas (López-Cima et al. 2011). Adenocarcinomas are the lung cancer subtype most commonly observed among nonsmokers (Schuller 2002), and time-trend and geographic studies have also suggested associations of this subtype with ambient air pollution (Chen et al. 2007, 2009).

Conclusions from studies specifically assessing the association of lung cancer with traffic exposures have been inconclusive. Six previous studies in Europe and Canada have looked at measures of distance to roadway or traffic intensity (Beelen et al. 2008a, 2008b; Cesaroni et al. 2013; Hystad et al. 2013; Raaschou-Nielsen et al. 2011, 2013; Vineis et al. 2006). Similar to our findings, the results have suggested a modest association, though the different metrics are difficult to compare and no results are statistically significant. Four studies, all in Europe, have modeled NO_2 or NO_x specifically from traffic sources (Nafstad et al. 2003; Nyberg et al. 2000; Raaschou-Nielsen et al. 2010, 2011). Overall, these studies indicate a possible contribution from traffic, but again they are difficult to compare due to differences in exposure assessment.

Our study has a number of limitations. We used a spatiotemporal model to assign monthly residential-level PM exposures for each participant. However, we do not account for differences in time–activity patterns, time spent outdoors, or time spent at the residence. Additionally, because of a paucity of monitoring for $PM_{2.5}$ before 1999, our models for $PM_{2.5}$ and $PM_{2.5–10}$ in the earlier years are less precise than our models in the later years. Although we had detailed residential history information during the course of the study when the women were all at least 58 years old, we were unable to assess exposures throughout the life course. Another source of exposure measurement error is the temporal mismatch of our road layer with the address information used in the distance to road analyses, which may partially explain our generally null results. Even though our study was conducted within a large cohort of women with a large number of total cases, we were limited by the small number of cases among certain subgroups of particular interest, including never-smokers, people living close to roadways, or cases of histological subtypes other than adenocarcinomas. As with all studies, residual confounding, particularly by active and passive smoking, is of concern. We controlled for secondhand smoke exposures; however, this information was available only at one time point and was not available for a large number of participants. Although modification by educational attainment has been reported (Raaschou-Nielsen et al. 2011), this cohort of predominantly Caucasian nurses allows very limited exploration of the influence of SES or race, although controlling for individual- and area-level SES along with other risk factors made little difference to the results.

This study also has several strengths, including our ability to control for time-varying exposures after baseline. Additionally, we were able to examine the effects of adjusting for a number of different parameterizations of smoking, incorporating time since quitting as well as duration and intensity. We were also able to adjust for exposures to secondhand smoke. Although the survival rate of lung cancer is low, we assessed lung cancer incidence as opposed to mortality. Finally, we had sufficient adenocarcinomas to be able to specifically examine this subtype of interest.

Conclusions

In the largest study of incident lung cancers among women to date, positive associations were observed with average PM exposures in the previous 72 months. Associations were stronger when analyses were restricted to adenocarcinomas, or to never- and long-term former smokers. This study provides additional support of an association of air pollution exposure and lung cancer, particularly among nonsmokers.

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A Section 508–conformant HTML version of this article is available at http://dx.doi.org/10.1289/ehp.1409052.

Road Traffic and Railway Noise Exposures and Adiposity in Adults: A Cross-Sectional Analysis of the Danish Diet, Cancer, and Health Cohort

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Background: Traffic noise has been associated with cardiovascular and metabolic disorders. Potential modes of action are through stress and sleep disturbance, which may lead to endocrine dysregulation and overweight.

Objectives: We aimed to investigate the relationship between residential traffic and railway noise and adiposity.

Methods: In this cross-sectional study of 57,053 middle-aged people, height, weight, waist circumference, and bioelectrical impedance were measured at enrollment (1993–1997). Body mass index (BMI), body fat mass index (BFMI), and lean body mass index (LBMI) were calculated. Residential exposure to road and railway traffic noise exposure was calculated using the Nordic prediction method. Associations between traffic noise and anthropometric measures at enrollment were analyzed using general linear models and logistic regression adjusted for demographic and lifestyle factors.

Results: Linear regression models adjusted for age, sex, and socioeconomic factors showed that 5-year mean road traffic noise exposure preceding enrollment was associated with a 0.35-cm wider waist circumference (95% CI: 0.21, 0.50) and a 0.18-point higher BMI (95% CI: 0.12, 0.23) per 10 dB. Small, significant increases were also found for BFMI and LBMI. All associations followed linear exposure–response relationships. Exposure to railway noise was not linearly associated with adiposity measures. However, exposure > 60 dB was associated with a 0.71-cm wider waist circumference (95% CI: 0.23, 1.19) and a 0.19-point higher BMI (95% CI: 0.0072, 0.37) compared with unexposed participants (0–20 dB).

Conclusions: The present study finds positive associations between residential exposure to road traffic and railway noise and adiposity.

Citation: Christensen JS, Raaschou-Nielsen O, Tjønneland A, Overvad K, Nordsborg RB, Ketzel M, Sørensen TI, Sørensen M. 2016. Road traffic and railway noise exposures and adiposity in adults: a cross-sectional analysis of the Danish Diet, Cancer, and Health cohort. Environ Health Perspect 124:329–335; http://dx.doi.org/10.1289/ehp.1409052

Introduction

Traffic noise has been related to adverse health effects including cardiovascular disease (Munzel et al. 2014; Sørensen et al. 2011) and metabolic disorders (Sørensen et al. 2013), and a recent study found aircraft noise to be associated with an increase in waist circumference (Eriksson et al. 2014). A proposed mode of action is through a stress response with activation of the hypothalamus–pituitary–adrenal (HPA) axis leading to increased levels of noradrenaline, adrenaline, and corticosteroids, and activation of the sympathetic autonomic nervous system (Babisch 2003; Maschke et al. 2000). This mode of action is supported by studies indicating that exposure to traffic noise is associated with higher levels of cortisol and adrenalin (Griefahn and Robens 2010; Schmidt et al. 2013; Selander et al. 2009). Chronically high levels of cortisol may lead to alterations in the metabolism (Björntorp and Rosmond 2000), and it has been suggested by some studies that stress-induced alterations in cortisol level are related to metabolic changes including weight gain (Rosmond et al. 1998; Vicennati et al. 2009). However, the overall role of cortisol in the development of adiposity is not clear because findings in recent experimental studies have been inconsistent (Abraham et al. 2013).

Traffic noise is known to disturb sleep (Miedema and Vos 2007), and in experimental human studies noise has been associated with higher body motility, sleep state changes, sleep onset latency, nocturnal awakenings, and early morning awakenings (Pirrera et al. 2010). Furthermore, total sleep deprivation has been associated with increased food intake in both animals and humans (Nedeltcheva et al. 2009; Rechtschaffen and Bergmann 1995). The underlying mechanism may be dysregulation of "hunger-hormones" because the levels of the anorexigenic hormone leptin have been negatively associated with sleep deprivation (Chaput et al. 2007; Spiegel et al. 2004; Taheri et al. 2004). Furthermore, increased levels of the orexigenic hormone ghrelin has also been associated with sleep deprivation (Spiegel et al. 2004; Taheri et al. 2004). Also, epidemiologic studies consistently find that short sleep duration is associated with development of obesity in children and young adults (Nielsen et al. 2011). Although the epidemiologic evidence with regard to adults is less clear, self-reported reduction in sleep quality and duration has been associated with larger waist circumference, higher body mass index (BMI) and percentage of body fat, as well as risk of metabolic syndrome and diabetes in adults (Cappuccio et al. 2010; Xi et al. 2014).

The aim of the present study was to investigate whether residential exposure to road traffic and railway noise was associated with measures of adiposity and body composition among middle-aged adults, and to investigate whether certain groups are more vulnerable than others to road traffic noise.

Methods

Study population. This cross-sectional study based on the Danish Diet, Cancer and Health cohort, which in the period 1993–1997 invited 160,725 persons 50–64 years of age to participate if they had no history of cancer (Tjønneland et al. 2007). In total, 57,053 chose to participate, yielding a response rate of 36% and representing 7% of the Danish population in this age group. At the time of enrollment, participants resided in either Aarhus or the greater Copenhagen area. In addition, study participants were born in Denmark and had no records of cancer before enrollment. Informed written consent was obtained from all participants, and the study was approved by local ethics committees.

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Supplemental Material is available online (http://dx.doi.org/10.1289/ehp.1409052).

N. Martinussen assisted with programming and data management and is acknowledged for his work.

The European Research Council, EU 7th Research Framework Programme funded this study (grant 281760).

The authors declare they have no actual or potential competing financial interests.

Received: 7 August 2014; Accepted: 29 July 2015; Advance Publication: 4 August 2015; Final Publication: 1 March 2016.

Anthropometry. All anthropometric data was collected by trained laboratory technicians at the two centers (Copenhagen and Aarhus). Height was measured with participants standing without shoes and rounded to the nearest half centimeter. Weight was measured on a digital scale with participants in light clothing and rounded to the nearest 100 g. Waist circumference was measured at the narrowest part between the lower rib and the iliac crest and rounded to the nearest half centimeter. BMI was calculated from height and weight [weight (kilograms)/height^2 (meters)] and analyzed both as a continuous and dichotomous variables (one with a cutoff at 25 kg/m^2 and one with a cutoff at 30 kg/m^2).

Body composition. For assessment of body composition bioelectrical impedance was measured using a BIA 101-F device (Akern/RJL), single frequency (50 Hz), with the participant in the supine position with legs ~ 45° apart and arms ~ 30° from the torso. Current electrodes were placed over the right metacarpals and metatarsals and sensing electrodes over the right wrist and ankle. The impedance measurements were used in sex-specific equations to calculate body fat mass:

$$\text{BF(female)} = 0.819\text{BW} - 0.279\text{Ht}^2/\text{R} - 0.231\text{Ht} + 0.077\text{age} + 14.941 \quad [1]$$

$$\text{BF(male)} = 0.755\text{BW} - 0.279\text{Ht}^2/\text{R} - 0.231\text{Ht} + 0.077\text{age} + 14.941. \quad [2]$$

The equations were developed and validated in a Danish population of similar age (Heitmann 1990) with BF (body fat in kilograms), BW (body weight in kilograms), Ht (height in centimeters), and R (resistance in ohms). Body fat mass index (BFMI) was calculated as BF divided by height squared, and lean body mass index (LBMI) was calculated as BFMI minus BMI (VanItallie et al. 1990).

Exposure assessment. Residential address history was collected for all cohort members for a period of 5 years preceding enrollment using the Danish civil registration system (Pedersen 2011). Road traffic noise exposure was calculated using SoundPLAN (http://www.soundplan.dk/), which implements the joint Nordic prediction method for road traffic noise (Bendtsen 1999). Equivalent noise levels were calculated for each address in a position on the most exposed facade of the building using the following input variables: point at which to estimate noise [geographical coordinate and height (floor) for each residential address], road links (information on annual average daily traffic, vehicle distribution, travel speed, and road type), and building polygons for all Danish buildings provided by the Danish Geodata Agency (http://www.gst.dk). We obtained traffic counts from a national road and traffic database (Jensen et al. 2009). This database is based on a number of different traffic data sources ranked as follows: *a*) traffic data (1995–1998) on municipal roads from 140 Danish municipalities, covering 97.5% of the addresses included in the present study; included roads typically have > 1,000 vehicles per day and are based on traffic counts as well as estimated/modeled numbers; *b*) traffic data from a central database covering all the major state and county roads; *c*) traffic data for 1995–2000 for all major roads in the greater Copenhagen area; *d*) smoothed traffic data for 1995 for all roads based on a simple method where estimated figures for distribution of traffic by road type and by urban–rural zone were applied to the road network and subsequently calibrated against known traffic data at county level. New roads were included in the calculations from the year they opened.

No information was available on noise barriers or road surfaces. Road traffic noise was calculated as the equivalent continuous A-weighted sound pressure level (L_{Aeq}) at the most exposed facade of the dwelling at each address for the day (L_d; 0700–1900 hours), evening (L_e; 1900–2200 hours), and night (L_n; 2200–0700 hours), and was expressed as L_{den} (den; day, evening, night). A 5- and 10-dB penalty was added to evening and night noise, respectively. Values < 42 dB were set to 42 dB because this is a realistic lower limit for ambient noise.

We calculated railway traffic noise exposure for all present and historical addresses within 300 m from a railway using SoundPLAN, implementing a Nordic calculation method for predicting noise propagation for railway traffic noise (NORD2000; http://www.soundplan.dk). The input variables for the noise model were point for noise estimation (geographical coordinate and height), railway links (information on annual average daily train lengths, train types, travel speed), and building polygons for all Danish buildings. All noise barriers along the railway were included in the model. Railway traffic noise was expressed as L_{den} at the most exposed facade of the dwelling and divided into four categories for the analyses (0–20; 20.1–50; 50.1–60; > 60 dB).

For the assessment of both road and railway traffic noise, the terrain was assumed flat, a reasonable assumption in Denmark; urban areas, roads, and areas with water were assumed to be hard surfaces, whereas all other areas were assumed acoustically porous.

The noise impact from all Danish airports and airfields was determined from information regarding noise zones calculated by local authorities from 1986 through 2003. The programs DANSIM (Danish Airport Noise Simulation Model) and INM3 (Integrated Noise Model), which meet joint Nordic criteria for air traffic noise calculations, were used (Liasjø and Granøien 1993). The curves for aircraft noise were transformed into digital maps and linked to each address by geocodes. A binary variable for aircraft noise was created from this information to indicate exposed and unexposed. Cut-off for exposure varied by airfield and level of detail of the obtained noise maps and was between 45 and 55 dB. Only 286 participants were exposed to aircraft noise at enrollment, and we did not have statistical power for an analysis of aircraft noise exposure.

Air pollution. We used the Danish AirGIS modeling system (dispersion model) to calculate the concentration of nitrogen oxides (NO_x) for 5 years before enrollment at the addresses of the participants. The system has been described in detail elsewhere (Raaschou-Nielsen et al. 2011). Briefly, input data for the AirGIS system included traffic data for individual road links (same input data as described for the noise modeling), emission factors for the Danish car fleet, street and building geometry, building height, and meteorological data. The AirGIS system has been applied in several studies and validated, showing good performance for both short- and long-term averages (Ketzel et al. 2011).

Covariates. Information regarding smoking (never, former, and present as well as grams per day), alcohol consumption (grams per day), physical activity (recreational sport, hours per week), and diet (average intake per day of red meat, processed meat, poultry, bread, and soft drinks over the preceding 12 months) were obtained from detailed questionnaires completed and validated by interviewers at the time of enrollment. These variables were chosen based on their predictive values for development of obesity in a European meta-analysis including the Danish Diet, Cancer and Health cohort (Steffen et al. 2013).

Information on individual socioeconomic position (SEP) was obtained by linking the personal identification number of all cohort participants to the nationwide registers at Statistics Denmark, which have yearly information since 1980 from the taxation authorities and the Register for Education Statistics. For the year of enrollment, two socioeconomic indicators were defined: level of highest attained education [basic school/high school education (7–12 years of primary, secondary, and grammar school education), vocational training (10–12 years), and higher education (> 13 years)] and disposable income (household income after taxation and interest per person, adjusted for number of persons in the household and divided into tertiles based on the Danish background population).

Municipality-level information was obtained based on enrollment address (or district for Copenhagen; 10 districts in total) classified as low, medium, or high based on municipality- or district-level information on education (proportion inhabitants with basic education), work market affiliation (proportion of inhabitants outside of the work market), and income (average income).

For analyses of effect modification we calculated a variable indicating whether participants had a comorbidity based on the Charlson comorbidity index. We created a dichotomous variable indicating whether the participant had a morbidity or not. Information regarding diseases was based on register information for hospitalizations from 1978 onward and included the following diseases: myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease, ulcer disease, mild liver disease, diabetes type 1, diabetes type 2, hemiplagia, moderate-to-severe renal disease, diabetes with end-organ damage type 1 or type 2, moderate-to-severe liver disease and AIDS. The variable was dichotomized to express whether the participant had a comorbidity or not.

Statistical analysis. Analyses were based on the general linear model for continuous outcome measures and logistic regression for being overweight (BMI ≥ 25) or obese (BMI > 30). The assumption of linearity between dependent and continuous independent variables was examined visually and tested using linear spline models, and the variance of the residuals was assessed visually by plotting them against the predicted values. We found deviations from linearity for railway noise only in association with waist circumference and LBMI (for a visual assessment see restricted cubic splines, see Supplemental Material, Figure S1), and railway noise was therefore included in the analyses as a categorical variable. The variance of the residuals in all analyses was homogeneous (data not shown). Correlations between variables were assessed using Spearman rank correlation coefficients (R_s). Exposures to road traffic noise and air pollution were modeled as time-weighted averages for 1 and 5 years preceding enrollment, taking into account the time of residence at each address. The procedures GLM and LOGISTIC in SAS version 9.3 (SAS Institute Inc.) were used for the statistical analyses. The graphical presentations of the association between road traffic noise and the adiposity measures were produced using restricted cubic spline in the rms library in the statistical software R 3.0.2 (R Core Team 2015).

Associations between 1- and 5-years mean exposure to road traffic noise and adiposity were analyzed in three models with increasing level of adjustment: model 1 adjusted for age and sex; model 2 further adjusted for SEP, railway and aircraft noise and model 3 added adjustment for lifestyle variables. Railway noise at enrollment was used as a proxy for prior exposure (the correlation between present and 5-year exposure to railway noise was R_s = 0.99) and analyzed as a categorical variable (0–20, 20.1–50, 50.1–60, and > 60 dB). Adjustment variables were chosen *a priori* using directed acyclic graphs (DAGs) as a visual and theoretical aid (Greenland et al. 1999), and the graphical tool DAGitty (http://www.dagitty.net) was used for constructing the DAGs (see Supplemental Material, Figure S2). The use of DAGs suggested a model adjusted for SEP for estimation of the total effect (no adjustment for potential causal intermediates) of traffic noise on adiposity (model 2); for the direct effect, a model adding adjustment for potential causal intermediates (alcohol consumption, smoking, diet, and physical activity) was suggested (model 3). We were interested primarily in the total effects of noise and place emphasized in model 2 when interpreting the results. Adjustment for age and sex was included in all models. To exclude the effect of competing noise sources, models 2 and 3 were adjusted for railway and aircraft noise. The analyses of railway noise exposure were adjusted for the same potential confounders as in the road traffic noise analyses, but also included continuous 5-year mean road traffic noise. Potential modification of the association between road traffic noise and adiposity measures by enrollment characteristics and age at diagnosis were evaluated by introducing interaction terms into the model, which were tested using the *F*-test statistic. Hypothesis testing for all analyses was based on two-tailed rejection regions, and an alpha level of 5% (p-value < 0.05) was applied to declare statistical significance.

Results

From the cohort of 57,053 the following exclusions were made: 572 (1.00%) with a cancer diagnosis before enrollment; 162 (0.28%) due to missing, negative, or implausible values on outcome variables (height < 130 cm, BMI < 15, fat percentage < 2%); 1,970 (3.45%) due to incomplete exposure data; 1,893 (3.32%) due to missing values on adjustment variables. The final total study population was 52,456 participants.

Table 1 shows the distribution of covariates in the study population with regard to noise exposure in tertiles (the 5-year average road traffic noise is shown in Supplemental Material, Figure S3). The participants exposed to highest levels of road traffic noise (> 60 dB) more often had only basic education, lower income, and municipal SEP. They were more often smokers and did less recreational sport, as compared with the least exposed (< 54 dB).

The correlation (R_s) between 5-year road traffic noise exposure and 5-year air pollution (NO_x) exposure was 0.70. One- and 5-year road traffic exposures were highly correlated (R_s = 0.97). Exposure to railway noise at the time of enrollment showed a correlation of 0.042 with road traffic noise exposure at enrollment. Measures of adiposity and body composition were generally highly correlated (R_s > 0.67) except the correlation between BFMI and LBMI, and between BFMI and waist circumference, for which R_s was 0.19 and 0.45, respectively.

We found residential road traffic noise to be statistically significantly associated with all measures of body composition regardless of adjustment and exposure window (Table 2). For example, we estimated that for each 10-dB increase in 5-year exposure the waist circumference increased by 0.35 cm [95% confidence interval (CI): 0.21, 0.50] (model 2). The largest changes in estimates occurred from model 1 to model 2, where SEP and competing noise source variables were added. For example, the estimate for waist circumference changed from 0.39 cm per 10 dB (95% CI: 0.26, 0.53) to 0.30 cm per 10 dB (95% CI: 0.16, 0.44) for 1-year road traffic noise exposure. The estimates were slightly higher for the exposure period of 5 years compared with the exposure period of 1 year. For example, the estimate for BMI in model 2 for 1-year exposure was 0.16 points per 10 dB (95% CI: 0.11, 0.21), whereas it was 0.18 points per 10 dB (95% CI: 0.12, 0.23) for 5-year exposure in model 2. Adjustment for lifestyle factors (model 3) did not alter the estimates much. Further adjustment for air pollution (NO_x) resulted in only minor changes in estimates (results not shown). When we modeled road traffic noise using restricted cubic splines, exposure–response relationships were positive and increased monotonically over the entire exposure range, with was no apparent threshold (Figure 1). For further analyses of BMI as a dichotomous outcome, the odds ratio (OR) for being overweight/obese (BMI ≥ 25 compared with < 25) with a 10-dB increase in road traffic noise was 1.10 (95% CI: 1.07, 1.14) for model 2 and 1.11 (95% CI: 1.08, 1.15) for model 3. Similarly, the OR for being obese (BMI > 30 compared with ≤ 30) was 1.09 (95% CI: 1.05, 1.14) based on models 2 and 3.

Table 3 shows the associations between exposure to residential railway noise at enrollment in three categories and measures of adiposity and body composition. The group with the highest exposure (> 60 dB)

had statistically significant larger mean waist circumference, mean BMI, and mean LBMI in all models. For example, mean waist circumference was 0.71 cm (95% CI: 0.23, 1.19) wider, mean BMI was 0.19 points (95% CI: 0.0072, 0.37) higher, and mean LBMI was 0.063 points (95% CI: 0.0016, 0.12) higher among those exposed to more than 60 dB railway noise at enrollment compared with the unexposed (model 2). The associations between railway noise and BFMI were not statistically significant in all models, but showed similar tendencies of increased estimates for the highly exposed.

For LBMI, we found a significant effect modification by age (p = 0.018), with higher estimates for the association between road traffic noise and LBMI among participants < 56 years of age (0.10; 95% CI: 0.075, 0.13) compared with older participants (0.016; 95% CI: 0.033, 0.089) (Table 4). We also found evidence of effect modification by comorbidity, with no association between road traffic noise and BMI and BFMI among participants with comorbidity, and a positive association among those without comorbidity (e.g., for BMI, 0.017; 95% CI: –0.17, 0.20; and 0.21; 95% CI: 0.14, 0.28, respectively, interaction p-value 0.04). Comorbidity was not a statistically significant effect modifier for other associations. We also found effect modification of the association between road traffic noise and adiposity measures by railway noise for BMI, waist circumference, and BFMI, with higher estimates for railway noise–exposed individuals. However, the associations were weakest for the middle stratum (railway noise: 20–60 dB), and only for waist circumference did the CIs for the lowest (0–19.9 dB) and highest strata (> 60 dB) not overlap. We found no effect modification for other covariates (sex, income, and education).

Discussion

In this large cross-sectional study of middle-aged Danish men and women, we found consistent and statistically significant positive associations between road traffic noise and waist circumference, BMI, BFMI, and LBMI. Road traffic noise was also associated with a higher prevalence of being overweight and obese. Furthermore, we estimated statistically significant positive associations between exposure to railway noise > 60 dB (vs. 0–20 dB) and BMI, waist circumference, and LBMI, and a nonsignificant positive association with BFMI. In addition, we found a significant effect modification by railway noise with a stronger association between road traffic noise and BMI, waist circumference, and BFMI among persons exposed to > 60 dB of railway noise. However, the observed associations did not increase with increasing railway noise, because associations were weakest for the middle stratum (railway noise, 20–60 dB).

Traffic noise has been associated with both cardiovascular disease (Babisch 2008; Sørensen et al. 2011) and diabetes (Sørensen et al. 2013), diseases for which adiposity is a major risk factor (Haslam and James 2005). A recent study addressed the associations between noise exposure and adiposity measures, finding a positive association between aircraft noise and increase in waist circumference (Eriksson et al. 2014). Taken

Table 1. Characteristics of the population according to road traffic noise (n = 52,456).

Characteristic	Road traffic noise (L_{den}) < 54 dB (n = 17,501)	Road traffic noise (L_{den}) 54–60 (n = 17,475)	Road traffic noise (L_{den}) > 60 dB (n = 17,480)
Age (years)	56.0 (50.7–64.1)	56.2 (50.7–64.2)	56.3 (50.8–64.3)
Sex (% men)	49.5	47.2	45.9
Highest attained education (%)			
Basic	24.4	27.6	31.6
Vocational	44.9	45.9	45.5
Higher	30.7	26.6	22.9
SEP, municipal (%)[a]			
Low	8.83	13.1	20.8
Medium	70.3	61.2	62.0
High	20.9	25.7	17.2
Disposable income (%)[b]			
Low	6.25	9.3	14.2
Medium	17.4	21.2	25.7
High	76.4	69.5	60.1
Smoking (%)			
Never	38.2	36.9	31.7
Former	29.6	28.2	26.8
Present	32.2	34.9	41.4
Smoking (g/day)[c]	15.0 (3.00–35.0)	15.0 (4.00–35.0)	16.0 (4.00–36.0)
Alcohol (g/day)	12.9 (0.92–61.1)	12.9 (0.71–62.9)	12.7 (0.51–69.0)
Red meat (g/day)	80.5 (34.4–165)	77.8 (31.8–164)	76.9 (29.6–166)
Processed meat (g/day)	25.3 (5.91–74.4)	24.2 (5.06–72.6)	24.4 (4.92–77.7)
Poultry (g/day)	18.3 (4.04–56.2)	18.2 (3.62–60.2)	17.2 (3.2–59.2)
Soft drinks (g/day)	7.96 (0.27–158)	7.96 (0.27–200)	7.17 (0.27–200)
Bread (g/day)	142 (55.3–270)	138 (52.1–267)	138 (49.8–264)
Recreational sport (hr/week) (%)			
0	42.8	44.4	50.0
> 0–2	30.1	29.8	26.7
> 2	27.1	25.8	23.3
Comorbidity (% with a comorbidity)[d]	7.81	7.86	9.04
Waist circumference (cm)	89.0 (69.0–109)	89.0 (69.0–110)	88.0 (69.0–111)
BMI (kg/m^2)	25.4 (20.5–32.8)	25.6 (20.5–33.5)	25.7 (20.4–33.9)
LBMI (kg/m^2)	17.7 (15.0–21.0)	17.7 (15.1–21.2)	17.7 (15.1–21.4)
BFMI (kg/m^2)	7.61 (4.20–13.5)	7.70 (4.19–13.9)	7.81 (4.13–14.2)
Road traffic noise (dB)	51.3 (46.7–53.8)	56.9 (54.3–60.0)	64.8 (60.8–73.0)
Railway noise (dB)[e]	50.8 (36.3–66.8)	50.6 (37.9–66.6)	51.5 (35.7–67.3)
Air pollution: NO_x (μg/m^3)	16.8 (14.2–25.2)	20.8 (14.7–35.3)	36.6 (16.9–139)

Continuous variables are described using medians (5th–95th percentiles). No data were missing for any of the variables. [a]Variable based on municipality level information. [b]Tertiles based on the Danish background population. [c]Among current and former smokers. [d]Based on the Charlson Comorbidity Index (disease, no disease). [e]Among railway noise–exposed participants.

Table 2. Linear associations between 1- and 5-years mean residential exposure to road traffic noise (Lden) and measures of adiposity [difference per 10 dB (95% CI)].

Per 10-dB higher road traffic noise exposure	Model 1[a]	Model 2[b]	Model 3[c]
1 year preceding enrollment			
BMI (kg/m^2)	0.23 (0.18, 0.28)	0.16 (0.11, 0.21)	0.17 (0.12, 0.22)
Waist circumference (cm)	0.39 (0.26, 0.53)	0.30 (0.16, 0.44)	0.25 (0.11, 0.39)
LBMI (kg/m^2)	0.15 (0.13, 0.16)	0.079 (0.061, 0.097)	0.084 (0.066, 0.10)
BFMI (kg/m^2)	0.089 (0.089, 0.13)	0.081 (0.042, 0.12)	0.083 (0.045, 0.12)
5 years preceding enrollment			
BMI (kg/m^2)	0.25 (0.20, 0.30)	0.18 (0.12, 0.23)	0.19 (0.13, 0.24)
Waist circumference (cm)	0.44 (0.30, 0.58)	0.35 (0.21, 0.50)	0.30 (0.16, 0.45)
LBMI (kg/m^2)	0.15 (0.13, 0.17)	0.085 (0.066, 0.10)	0.090 (0.072, 0.11)
BFMI (kg/m^2)	0.10 (0.066, 0.14)	0.097 (0.057, 0.14)	0.10 (0.061, 0.14)

[a]Adjusted for sex and age. [b]Model 1 plus adjustment for disposable income, municipality SEP, education, railway noise and aircraft noise (yes, no). [c]Model 2 plus adjustment for smoking (yes, no), tobacco (g/day), alcohol (yes, no), alcohol (g/day), red meat (g/day), processed meat (g/day), poultry (g/day), bread (g/day), soft drinks (g/day), recreational sport (yes, no), and recreational sport (hours/week).

together with the results of the current study, the evidence suggests that noise-related effects on adiposity may contribute to associations between traffic noise and major diseases. We found a clear exposure–response relationship between exposure to road traffic noise and all measures of body composition, with no indications of any lower threshold limit. We observe a positive association for LBMI. This is to be expected because the metabolically active lean body mass (LBM) increases with increasing body fat mass (BFM) (VanItallie et al. 1990), potentially because larger BFM requires larger organs and musculoskeletal system. LBMI and BFMI were positively correlated in this study (R_s = 0.75 among women and R_s = 0.70) as well as in other studies (Bosy-Westphal and Müller 2015). Some studies on road traffic noise and risk for cardiovascular disease have indicated a lower threshold limit of 55–60 dB (Babisch 2008; Sørensen et al. 2011), though a study on diabetes and a study on myocardial infarction similar to the present study indicated no lower threshold (Sørensen et al. 2012, 2013). More studies are needed to determine whether there is a lower threshold limit for the adverse effects of road traffic noise.

Railway and road traffic noise were very weakly correlated in this study (R_s = 0.04), which suggests that associations of the two exposures with adiposity were unlikely to be mutually confounded. For railway noise we found an association with adiposity only among participants exposed to > 60 dB.

Our results for road traffic noise were statistically significant regardless of adjustment level. The largest change in estimates occurred when we included adjustment for SEP variables and competing noise sources. Considering the proposed mechanisms of action—namely, stress and disturbance of sleep—several lifestyle factors such as diet and physical activity may be considered as being on the pathway between noise exposure and development of adiposity. To examine the effect of lifestyle on the association, we adjusted for diet, smoking, alcohol consumption, and physical activity. This adjustment did not alter the estimates markedly, and although the necessary assumptions for mediation analyses are not met, it may indicate that noise does not act primarily through these factors. However, information on lifestyle was obtained by questionnaires at the same point in time as the measurement of adiposity markers and are therefore possibly subject to recall bias, as possible associations between lifestyle and adiposity may be caused by reverse causality.

Road traffic noise is correlated with ambient air pollution; air pollution has been suggested to be associated with the development of obesity in mice (Xu et al. 2010); and recent results in humans suggest a possible association between air pollution and obesity among children (McConnell et al. 2015). To investigate potential confounding by air pollution, we adjusted for modeled NO_x (data not shown). We found that exposure to road traffic noise was significantly associated with adiposity both before and after adjustment for air pollution, suggesting an independent effect of road traffic noise.

We examined potential effect modification of sex, SEP (income and education), age, comorbidity, and railway noise. The results indicated that the association between road traffic noise and LBMI was weaker among those above the median age (56.2 years) compared with younger participants. However, this pattern was not present for other outcomes. Road traffic noise was not associated with BMI or BFMI among participants classified as having comorbidity based on the Charlson comorbidity index. Associations with waist circumference and LBMI also were close to the null for this

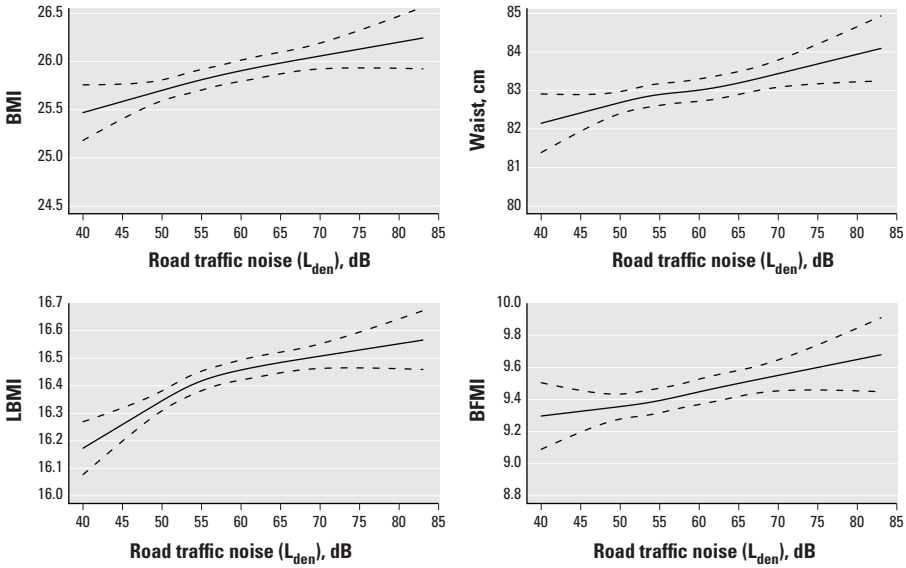

Figure 1. Associations between road traffic noise and measures of adiposity. Associations between 5-year exposure to residential road traffic noise and BMI, waist circumference, LBMI, and BFMI, adjusted for sex, age, disposable income, municipality SEP, education, railway noise, and aircraft noise (yes, no). Solid line indicates restricted cubic spline of the associations. Dotted lines indicate 95% CIs.

Table 3. Associations between average yearly residential exposure to railway traffic noise (L_{den}) at the time of enrollment and measures of adiposity.

Exposure	*n*	Model 1[a] estimate (95% CI)	Model 2[b] estimate (95% CI)	Model 3[c] estimate (95% CI)
BMI (kg/m^2)				
0–20 dB	42,747	Reference	Reference	Reference
20.1–50 dB	4,482	0.042 (–0.082, 0.17)	0.099 (–0.025, 0.22)	0.12 (0.0030, 0.25)
50.1–60 dB	3,308	0.053 (–0.090, 0.20)	0.024 (–0.12, 0.17)	0.031 (–0.11, 0.17)
> 60 dB	1,919	0.28 (0.10, 0.47)	0.19 (0.0072, 0.37)	0.18 (0.0034, 0.36)
Waist circumference (cm)				
0–20 dB	42,747	Reference	Reference	Reference
20.1–50 dB	4,482	0.025 (–0.30, 0.35)	0.22 (–0.10, 0.55)	0.27 (–0.054, 0.59)
50.1–60 dB	3,308	0.13 (–0.25, 0.50)	0.12 (–0.25, 0.49)	0.15 (–0.22, 0.51)
> 60 dB	1,919	0.89 (0.40, 1.37)	0.71 (0.23, 1.19)	0.62 (0.14, 1.09)
LBMI (kg/m^2)				
0–20 dB	42,747	Reference	Reference	Reference
20.1–50 dB	4,482	0.060 (0.019, 0.10)	0.048 (0.0063, 0.089)	0.057 (0, 016, 0.097)
50.1–60 dB	3,308	0.060 (0.0090, 0.10)	0.013 (–0.034, 0.060)	0.015 (–0.031, 0.062)
> 60 dB	1,919	0.12 (0.054, 0.18)	0.063 (0.0016, 0.12)	0.063 (0.0033, 0.12)
BFMI (kg/m^2)				
0–20 dB	42,747	Reference	Reference	Reference
20.1–50 dB	4,482	–0.018 (–0.11, 0.071)	0.051 (–0.038, 0.14)	0.068 (–0.019, 0.15)
50.1–60 dB	3,308	–0.0031 (–0.11, 0.10)	0.011 –0.091, 0.11)	0.016 (–0.084, 0.12)
> 60 dB	1,919	0.17 (0.033, 0.30)	0.13 (–0.0041, 0.26)	0.12 (–0.0097, 0.25)

[a]Adjusted for sex and age. [b]Model 1 plus adjustment for disposable income, municipality SEP, education, road traffic noise and aircraft noise (yes, no). [c]Model 2 plus adjustment for smoking (yes, no), tobacco (g/day), alcohol (yes, no), alcohol (g/day), red meat (g/day), processed meat (g/day), poultry (g/day), bread (g/day), soft drinks (g/day), recreational sport (yes, no), and recreational sport (hours/week).

group, though the *p*-value for effect modification was not statistically significant. This suggests that effects of road traffic noise on adiposity may be negligible compared with direct and indirect effects of illness on body composition, though noncausal explanations also are possible. Sex and SEP (education or income) did not appear to modify associations between road traffic noise and the adiposity measures.

We found associations between road traffic noise and BMI, waist circumference, and BFMI to be strongest among participants exposed to > 60 dB railway noise. However, the middle, not the lower, stratum consistently displayed the weakest associations. Furthermore, only the CIs for waist circumference did not overlap, indicating that there may not be a difference between the lowest and highest stratum for BMI and BFMI.

Major strengths of this study were its size and the availability of detailed information regarding diet, alcohol consumption, smoking, and recreational physical activity; the objective measurements of weight, height, and bioimpedance by trained staff; and access to individual-level register data on SEP, residential address history for noise assessment, and air pollution data for all study subjects. Exposure data are based on modeled levels of road and railway noise at addresses and therefore largely independent of information bias.

Some limitations deserve consideration. First, the participation rate in the study was low (36%), which can introduce bias if nonparticipation is associated with both exposure and outcome. The participants in the Danish Diet, Cancer and Health cohort are known to be of higher SEP than nonparticipants (Tjønneland et al. 2007). However, during the first years of follow-up (baseline to 31 December 2002) they did not develop cancer (all malignancies except non-melanoma skin cancer) at a different rate than the background population. Futhermore, their questionnaire responses were similar to those in studies with higher participation rates (Levnedsmiddelstyrelsen 1996). Taken together, these results may suggest that the study population is similar to the background population (Tjønneland et al. 2007). Second, this is a cross-sectional study, so the temporal relation between the exposures and outcomes is uncertain. Third, the largest changes in effect estimates were observed when we added adjustment for SEP, and the possibility of residual confounding cannot be excluded. Fourth, traffic noise is modeled and yields an exposure estimate at the most exposed facade of the residence, whereas a more relevant exposure may be at the bedroom facade when considering sleep disturbance as a mechanism. Finally, we did not have information on noise barriers for road traffic noise or individual-level noise modifiers such as building materials, and the noise modeling is therefore invariably associated with some degree of uncertainty leading to misclassification of exposure.

Although noise exposure modeling has some limitations, there are reasons to prefer modeling to measuring. Most important, modeling makes large-scale exposure assessment possible; a cohort study of this size would not be feasible using traditional measuring methods. Furthermore, measuring is usually performed during a relatively short period of time, and several factors influence measuring in the short term that may yield a flawed exposure estimate. First, the level of traffic noise varies over time due to the movement of particular vehicles relative to the observer. Second, the busy rush hours and quiet night period cause a characteristic diurnal variation. Last, the weather strongly influences the propagation of traffic noise and thereby the noise levels. The scale used to characterize traffic noise is the long-term average noise level, assuming standardized weather conditions. This quantity is difficult to measure directly. During the last four decades still more accurate and reliable prediction methods for traffic noise have been developed, and a Swedish report found that modeled values differed from the measured values by an average of only 0.3 dB for the Nordic Prediction Method (Ström et al. 1997).

Table 4. Modification of associations between 5-year road traffic noise exposure (L_{den}) and measures of adiposity by enrollment characteristics in model 2 [difference per 10 dB (95% CI)].

Potential effect modifier/ covariate level	*n*	BMI (kg/m^2)[a]	Waist circumference (cm)[a]	LBMI (kg/m^2)[a]	BFMI (kg/m^2)[a]
Sex					
Male	24,916	0.19 (0.10, 0.27)	0.40 (0.18, 0.63)	0.10 (0.067, 0.12)	0.093 (0.031, 0.115)
Female	27,540	0.20 (0.12, 0.28)	0.30 (0.084, 0.52)	0.07 (0.043, 0.10)	0.13 (0.071, 0.19)
p-Value		0.81	0.47	0.16	0.32
Income tertiles[b]					
Highest	36,005	0.22 (0.14, 0.29)	0.36 (0.073, 0.66)	0.094 (0.074, 0.12)	0.12 (0.070, 0.18)
Middle	11,244	0.19 (0.067, 0.31)	0.40 (0.17, 0.63)	0.059 (0.019, 0.10)	0.13 (0.041, 0.21)
Lowest	5,207	0.034 (–0.14, 0.20)	0.26 (–0.024, 0.54)	0.040 (–0.017, 0.10)	–0.0059 (–0.13, 0.12)
p-Value		0.11	0.36	0.075	0.11
Education					
Higher	14,020	0.20 (0.089, 0.31)	0.30 (0.014, 0.58)	0.086 (0.049, 0.12)	0.11 (0.034, 0.19)
Vocational	23,827	0.21 (0.13, 0.30)	0.35 (0.13, 0.58)	0.092 (0.063, 0.12)	0.12 (0.057, 0.18)
Basic	14,609	0.16 (0.055, 0.27)	0.25 (–0.025, 0.53)	0.061 (0.026, 0.097)	0.10 (0.024, 0.18)
p-Value		0.73	0.70	0.33	0.92
Age (years)					
≤ 56.2	26,228	0.22 (0.13, 0.30)	0.39 (0.17, 0.61)	0.10 (0.075, 0.13)	0.12 (0.054, 0.18)
> 56.2	26,228	0.17 (0.087, 0.26)	0.31 (0.090, 0.53)	0.061 (0.033, 0.089)	0.11 (0.050, 0.17)
p-Value		0.38	0.59	0.018	0.90
Comorbidity[c]					
Yes	4,320	0.017 (–0.17, 0.20)	–0.0086 (–0.49, 0.47)	0.044 (–0.017, 0.11)	–0.015 (–0.16, 0.10)
No	48,136	0.21 (0.14, 0.28)	0.37 (0.19, 0.55)	0.085 (0.063, 0.10)	0.12 (0.075, 0.17)
p-Value		0.042	0.13	0.19	0.027
Railway noise (dB)					
0–19.9	42,893	0.20 (0.14, 0.26)	0.40 (0.24, 0.56)	0.090 (0.070, 0.11)	0.11 (0.070, 0.49)
20–60	7,765	0.00057 (–0.14, 0.14)	–0.11 (–0.48, 0.26)	0.042 (–0.0046, 0.089)	–0.042 (–0.14, 0.059)
> 60	1,798	0.42 (0.13, 0.70)	1.33 (0.58, 2.08)	0.13 (0.039, 0.23)	0.28 (0.077, 0.49)
p-Value		0.0079	0.0014	0.10	0.0039

p-Values represent an *F*-test for the interaction term, the null hypothesis being no interaction.
[a]Adjusted for sex, age, disposable income, municipality SEP, education, railway noise and aircraft noise (yes, no). [b]Tertiles based on the Danish background population. [c]Based on the Charlson Comorbidity Index (disease, no disease).

Conclusions

In conclusion, this study based on data on middle-aged Danish adults from the 1990s adds to the mounting evidence that road traffic noise may have adverse health effects. We found statistically significant positive associations between road traffic noise and different markers of adiposity. We also found nonlinear positive association between railway noise and BMI, waist circumference, and LBMI for railway noise exposure > 60 dB. Because this area of research is relatively new, further research is needed to confirm the findings of this study.

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Memorandum

Serious drought.
Help Save Water!

To: Richard Chiang, STE
Office of Design A
Division of Design

Date: May 13, 2016

File: 07-LA-164
PM 1.39/3.98
07-LA-187
PM 3.5/8.9
Highway
Relinquishment

PN: **1846-0700000063-2**
EA: **07-333-0R0002**

From: DEPARTMENT OF TRANSPORTATION
OEE-HAZARDOUS WASTE BRANCH, SOUTH REGION
DIVISION OF ENVIRONMENTAL PLANNING

Subject: **ENVIRONEMENTAL LITERATURE SURVEY INVESTIGATION OF ROSEMEAD BOULEVARD (LA-164) BETWEEN GALLATIN ROAD TO 0.08 MILE SOUTH OF RUSH STREET; VENICE BOULEVARD (LA-187) BETWEEN STATE ROUTE 1 (SR-1) TO CADILLAC AVENUE**

As requested, the Office of Environmental Engineering (OEE) performed a limited environmental literature survey of multiple properties along two roadways, to evaluate the potential for release of hazardous substances or petroleum products. The roadways are as follows:

- Rosemead Boulevard (LA-164) between Gallatin Road and 0.08 south of Rush Street in the city of South El Monte in Los Angeles County.
- Venice Boulevard (LA-187) between State Route 1 and Cadillac Avenue in the city of Los Angeles in Los Angeles County.

The purpose of the environmental literature survey is for the proposed highway relinquishment of LA-164 and LA-187 (refer to Highway Relinquishment Agreements for terms and conditions for both corridors). The objective is to evaluate the potential that hazardous substances or petroleum products could have migrated to either of the two corridors (within the specified highway relinquishment limits). The Environmental information was collected from the California State Water Quality Control Board's Geotracker website (Geotracker) and the Department of Toxic Substances Control Envirostor website (Envirostor). This does not constitute a formal ASTM Environmental Site Assessment (ESA) report.

LA-164 (PM 1.385-3.975) ROSEMEAD BOULEVARD:

The properties along Rosemead Boulevard (LA-164) within the relinquishment limit are primarily used for commercial purposes. The literature search on Geotracker identified properties along Rosemead Boulevard that have affected groundwater and have documented releases of hazardous substances. Geotracker identified 14 open sites, 13 of which are inactive Cleanup program sites that

have impacted groundwater. One of the open sites is identified as a leaking underground storage tank (LUST) site, with no noted potential contaminated media of concern.

Geotracker also identified nine closed sites, seven of which are LUST sites, noting groundwater contamination from gasoline or organic compounds. Two of the nine closed sites are inactive cleanup program sites with unknown potential contaminated media of concern. The available environmental reports in Geotracker indicate groundwater in the area is approximately 30 feet below ground surface (bgs).

Attached is a screenshot of the Geotracker radius search map showing the hazardous waste sites in proximity to Rosemead Boulevard (LA-164).

LA-187 (PM 3.9-8.9) VENICE BOULEVARD:

The properties along Venice Boulevard (LA-187) within the highway relinquishment limit are primarily used for commercial purposes, including gasoline service stations, auto repair shops, and dry cleaner facilities. The literature search on Geotracker identified many of these properties with chemical releases that impacted both soil and groundwater. Geotracker identified 20 properties with groundwater contaminated with gasoline, benzene and fuel oxygenates. Eight of these sites are currently open. Geotracker also identified 14 closed LUST sites with only soil impacted by gasoline. These sites have no documented reports on Geotracker

Three of the 20 properties with groundwater contamination contained groundwater information on Geotracker. From the available documents, depth to groundwater ranged from approximately 11 feet (ft) bgs to approximately 80 ft bgs. The sites are as followed:

- Chevron #9-0545 is an open gasoline service station site that is eligible for closure and is approximately 10 feet away from the proposed project. The most recent monitoring report indicates low threat criteria met by the regional board. The maximum benzene concentration in groundwater is 0.88 micrograms per liter.
- TWS Products is an open-remediation site approximately 500 feet away from the proposed relinquishment with a groundwater depth ranging from 25-27 feet bgs. The gradient reported the direction of groundwater flow to be toward the Northeast with a hydraulic gradient of approximately of 0.02 feet per foot. A Phase II assessment concluded that soil and groundwater beneath the site have been impacted with fuel-related hydrocarbons and associated Volatile Organic Compounds (VOCs). A quarterly groundwater-monitoring program has been requested to obtain a better understanding of the affected groundwater beneath the site.
- Thrifty #247/Chevron is an open-remediation with a semi-annual groundwater monitoring and progress report available for review approximately 2,500 feet away from the proposed relinquishment. This gasoline service station report indicates that groundwater in the area is approximately 86 feet bgs. The gradient of the plume is flowing in a southwest direction toward the proposed relinquishment. According to the most recent monitoring report, groundwater samples collected during this event did not contain di-isopropyl ether (DIPE),

ethyl tertiarybutyl ether (EtBE), or tertiary-amyl methyl ether (TAME) at or above their respective method detection limits. Contamination from this site may have migrated and impacted groundwater beneath portions of Venice boulevard. Attached is a screenshot of the Geotracker radius search map showing the hazardous waste sites along Venice Boulevard.

If you have any questions, I can be reached at steve.chan@dot.ca.gov, (213) 897-3646, or contact Steve Friet of my staff at steve.friet@dot.ca.gov, (213) 897-7695.



Steve Chan, P.E., STE
District Hazardous Waste Branch (South Region)
Office of Environmental Engineering (OEE)
Division of Environmental Planning

Attachments:

File
Cheryl Henderson, Division of Environmental Planning

GeoTracker

Save As... Ctrl+S

MAP LAYERS

- [x] Leaking Underground Storage Tank (LUST) Cleanup Sites
- [x] Cleanup Program Sites
- [x] Land Disposal Sites
- [x] Military Sites
- [x] WDR Sites
- [x] Irrigated Lands Regulatory Program
- [ ] Permitted Underground Storage Tank (UST) Facilities
- [ ] Oil and Gas Monitoring
- [ ] Non-Case Information / Project Sites
- [ ] Sampling Points - Public
- [ ] Zoom in to See Field Points
- [x] DTSC Cleanup Sites
- [ ] DTSC Haz Waste Permit
- [ ] DWR Groundwater Basins - INFO
- [ ] Zoom in to See Public Water Systems

☒ SIGNIFIES A CLOSED SITE

Measure a Distance View on GAMA

Gallatin Road, Pico Rivera, CA, United States

Map Address

Map Satellite

Rush Street

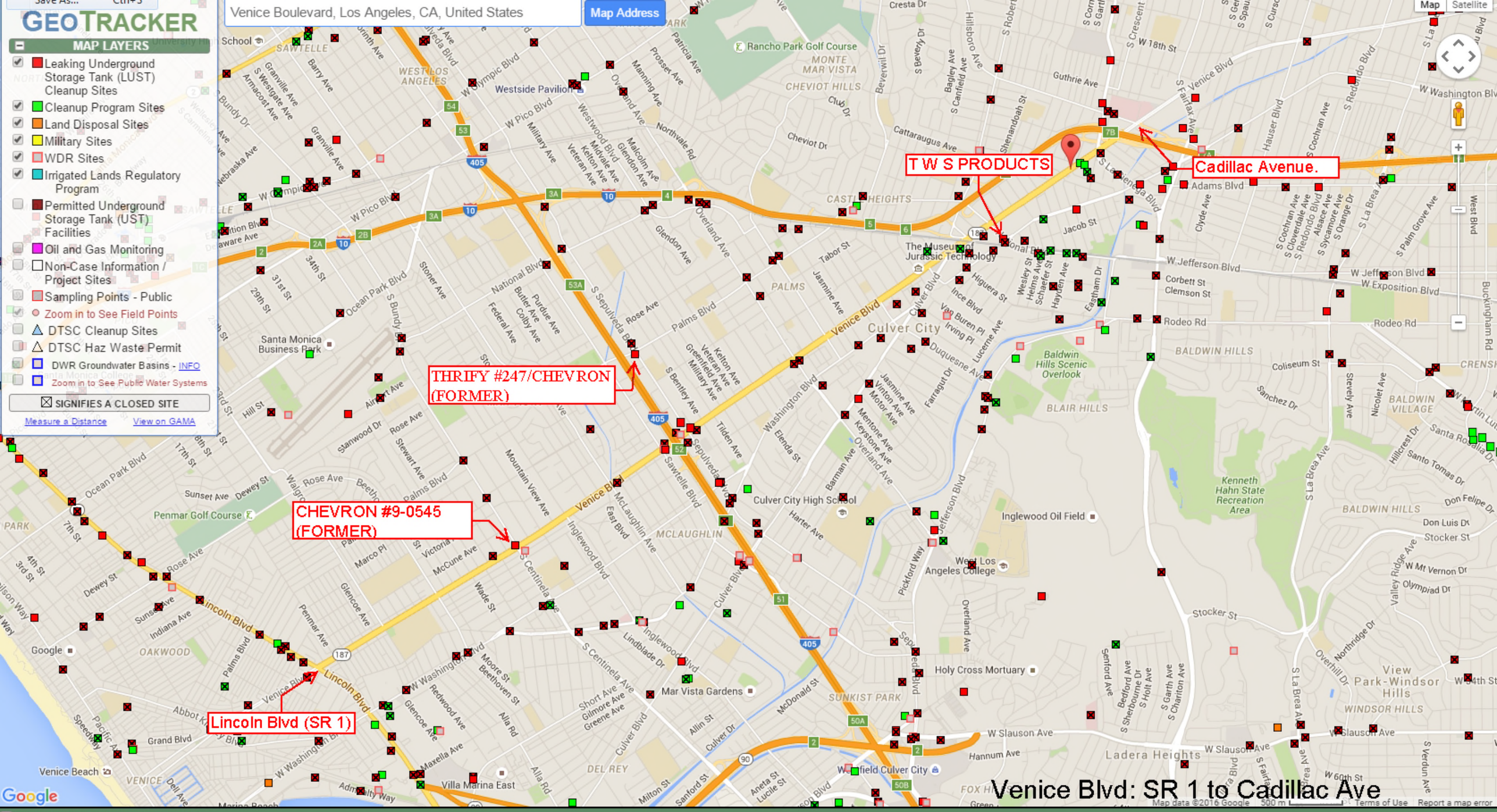
Gallatin Road

ROSEMEAD BLVD: Gallatin Rd to 0.08 mile south of Rush Street.

Google

Map data ©2016 Google 500 m Terms of Use Report a map error

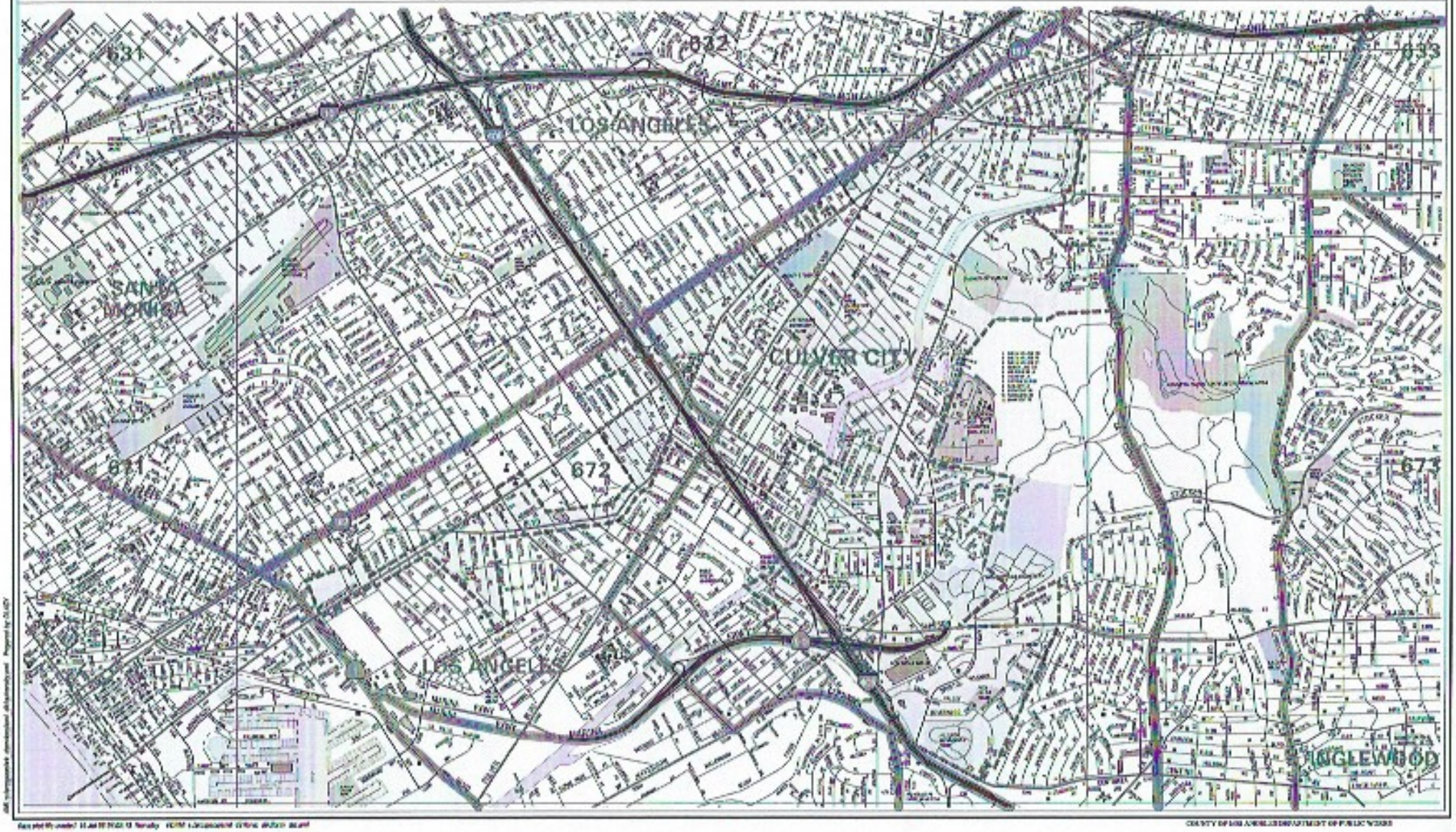
SITES CURRENTLY VISIBLE ON MAP


GEOTRACKER
MAP LAYERS
Leaking Underground Storage Tank (LUST) Cleanup Sites
Cleanup Program Sites
Land Disposal Sites
Military Sites
WDR Sites
Irrigated Lands Regulatory Program
Permitted Underground Storage Tank (UST) Facilities
Oil and Gas Monitoring
Non-Case Information / Project Sites
Sampling Points - Public
Zoom in to See Field Points
DTSC Cleanup Sites
DTSC Haz Waste Permit
DWR Groundwater Basins - INFO
Zoom in to See Public Water Systems
SIGNIFIES A CLOSED SITE
Measure a Distance
View on GAMA
Venice Boulevard, Los Angeles, CA, United States
Map Address
T W S PRODUCTS
Cadillac Avenue.
THRIFY #247/CHEVRON (FORMER)
CHEVRON #9-0545 (FORMER)
Lincoln Blvd (SR 1)
Venice Blvd: SR 1 to Cadillac Ave
SITES CURRENTLY VISIBLE ON MAP

CITY OF CULVER CITY

(Map Size: 17" x 11")

City Boundary
Freeway Disaster Route
Disaster Route
Thomas Guide Page Grid



Paper No. 02-2955

Evaluation of Lane Reduction "Road Diet" Measures on Crashes and Injuries

Herman F. Huang, J. Richard Stewart, and Charles V. Zegeer

"Road diets" are often conversions of four-lane undivided roads into three lanes (two through lanes plus a center turn lane). The fourth lane may be converted to bicycle lanes, sidewalks, or on-street parking. Road diets are sometimes implemented with the objective of reducing vehicle speeds as well as the number of motor vehicle crashes and injuries. A study was conducted to investigate the actual effects of road diets on motor vehicle crashes and injuries. Twelve road diets and 25 comparison sites in California and Washington cities were analyzed. Crash data were obtained for these road diet (2,068 crashes) and comparison sites (8,556 crashes). A "before" and "after" analysis using a "yoked comparison" study design found that the percent of road diet crashes occurring during the "after" period was about 6% lower than that of the matched comparison sites. However, a separate analysis in which a negative binomial model was used to control for possible differential changes in average daily traffic, study period, and other factors indicated no significant treatment effect. Crash severity was virtually the same at road diets and comparison sites. There were some differences in crash type distributions between road diets and comparison sites, but not between the "before" and "after" periods. Conversion to a road diet should be made on a case-by-case basis in which traffic flow, vehicle capacity, and safety are all considered. It is also recommended that the effects of road diets be further evaluated under a variety of traffic and roadway conditions.

Continued growth and decentralization throughout the United States has increased the number of cars on both residential and arterial streets. As a result, some cities in the United States have reduced the number of travel lanes on some of their arterial and collector streets. These conversions commonly involve restriping four-lane undivided roads as three lanes (two through lanes plus a two-way left-turn lane). The fourth lane may be converted to bicycle lanes, sidewalks, and/or on-street parking. In other words, the existing cross-section is reallocated. These lane-reduction conversions are often called "road diets" (Figures 1 and 2). A few road diets are conversions from four-lane roads into two-lane roads, by restriping and/or by adding landscaped median islands. According to Burden and Lagerwey (*1*), four-lane roads with average daily traffic (ADT) of up to 25,000 have been converted to road diets.

Road diets can potentially offer benefits to both vehicles and pedestrians. On a four-lane street, drivers change lanes to pass slower vehicles (e.g., vehicles stopped in the left lane waiting to make a left turn). By comparison, on a two-lane street, drivers' speeds are limited by the speed of the lead vehicle. Thus road diets may reduce vehicle speeds and vehicle interactions during lane changes, which could potentially reduce the number and severity of vehicle-to-vehicle crashes. Road diets may also benefit pedestrians, because they will have two lanes of traffic (instead of four) to cross and motor vehicle speeds are likely to be lower. Recent research by Zegeer et al. (*2*) on crosswalk safety found a reduction in pedestrian crash risk for two- and three-lane roads, compared to roads with four or more lanes. Bicyclists may also benefit, especially when bicycle lanes are added (*3*).

Road diets may result in lower vehicle capacity compared to four-lane streets. However, on a four-lane street, the left lane is often utilized as a left-turn lane. With high levels of oncoming traffic, left-turning motorists who are waiting for an adequate gap will cause considerable delay to through traffic. Therefore, the four-lane street will have less capacity than it could potentially have. Under most ADT conditions tested, road diets have minimal effects on vehicle capacity, because left-turning vehicles are moved into a common two-way left-turn lane (*1, 4*). However, for ADTs above approximately 20,000 on road diet sections, there is an increased likelihood that traffic congestion will increase to the point of diverting traffic to alternate routes.

The purpose of this paper is to investigate the actual effects of road diets on motor vehicle crashes and injuries.

PAST RESEARCH

This section summarizes case studies of road diets in U.S. and Canadian cities.

California

Knapp et al. evaluated two road diets in California (*5*). High Street in Oakland had an ADT of 22,000 to 24,000. After High Street was converted from four to three lanes, the number of crashes decreased from an annual average of 81 before the conversion to 68 in the 1 year after. The total number of crashes fell by 52% after East 14th Street in San Leandro was converted.

The conversion of Valencia Street in San Francisco reduced the ADT by 10%, to 19,979 (*6*). The ADTs on four parallel streets increased by 2% to 8%. The total number of crashes per year decreased from 73.2 to 62, and injury crashes per year fell from 58.8 to 50. The number of bicycles during the p.m. peak hour more than doubled, from 88 to 215. Bicycle crashes per year increased from 10.1 to 12.

Also in San Francisco, Polk Street was restriped from three lanes to two lanes (*7*). Bike lanes were added to the southern segment. After the conversion, the ADT fell by 2%, to 16,300. The number of bicycles during the a.m. peak hour increased from 37 to 52. The ADTs on two parallel streets increased by 8% and 15%. Insufficient crash data were available for analysis.

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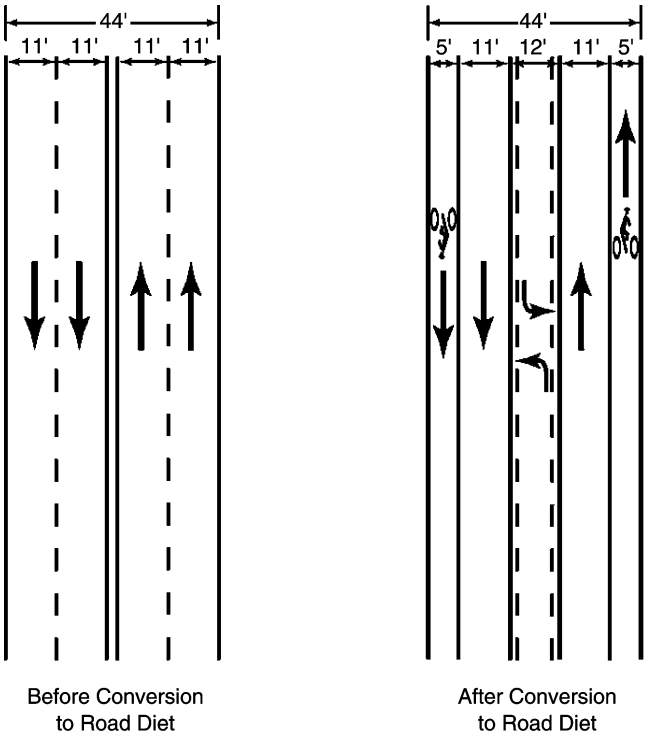

FIGURE 1 Representative road diet.

Iowa

A road diet on U.S. Highway 75 in Sioux Center resulted in a speed reduction of 2.7 km/h (1.7 mph) (*4*).

Michigan

In East Lansing, Burcham Road and Grand River Boulevard were converted. Burcham Road had four lanes and an ADT of 11,000 to 14,000, whereas Grand River Boulevard had four lanes and an ADT of 23,000. Both roads now have three lanes and new bicycle lanes (*1*).

Minnesota

Rice Street was converted from four lanes to three lanes, resulting in 33% fewer injury crashes (*8*).

Montana

For the road diet on 17th Street West in Billings, Montana, the total number of crashes in the "after" period was 62% lower than the number in the "before" period (*4*).

Ontario, Canada

St. George Street in Toronto passes through the University of Toronto campus. It previously operated as a four-lane road during peak periods and had an ADT of 15,000. In 1993, it was reconfigured to include bicycle lanes on both sides, a narrow painted median, and two travel lanes. Three years later, the street was narrowed from 14 m (46 ft) to 11 m (36 ft), with the extra right-of-way going to a wider sidewalk (*9*). Also in Toronto, a six-lane section of Davenport Road with an ADT of 30,000 was narrowed to four lanes in 1994. Bicycle lanes and parking were added on both sides (*9*).

Pennsylvania

A 1-mi section of Electric Avenue in Lewistown, Pennsylvania, was converted from four lanes to three lanes. The ADT was 13,000. Most local residents were initially opposed because they thought that their trip times would increase. Instead, it was found that overall trip times were unaffected. The number of crashes dropped to nearly zero (*1*).

Washington State

Lake Washington Boulevard in Kirkland formerly had four lanes and an ADT of 20,000. The multiple lanes of heavy traffic flow made it difficult for residents to find sufficient gaps to enter and exit their driveways. The boulevard was restriped with three lanes. As a result, speeding and noise levels were reduced. Moreover, residents had an easier time entering and exiting their driveways (*1*).

Seattle's first road diet dates back to 1972. Starting in 1991, more streets were converted. Burden and Lagerwey examined crash data for selected intersections and midblock sections along nine road diets. The "before" and "after" time periods were generally 3 years each. There was a 34.1% reduction in total crashes and a 7.4% drop in injury crashes in the "after" period, compared to the "before" period (*1*).

Summary of Past Research

Some of the case studies reviewed in this section included comparisons of the number of crashes before and after the conversion to a road diet. These comparisons have shown that road diets can reduce the total number and severity of crashes. However, some of these studies had certain limitations. First, only selected intersections and midblock sections were sometimes evaluated, instead of the entire road diet section. Second, no comparisons with non-road diet locations were made in any of the studies cited above. The observed reduction in crashes, therefore, could have been a citywide phenomenon (such as a reduction in crash reporting) and not necessarily the result of installing road diets.

A more extensive study is needed to investigate further the effects of road diet conversions on safety. Such a study would use detailed crash data from before and after the conversion to a road diet and would also compare road diets with similar streets that were not converted. This paper describes such a detailed investigation of crashes on road diet conversions in two states.

STUDY METHODOLOGY

Selected Sites

This study evaluated road diets at locations in several California and Washington cities that had installed road diets. These two states were selected for two reasons. First, it was learned that several cities



(a) **(b)**

(c) **(d)**

FIGURE 2 Examples of road diets.

in California and Washington had installed road diets. Second, both states are part of FHWA's Highway Safety Information System. Therefore, it was felt that the necessary high-quality crash data for a large number of crash, roadway, and vehicle variables would be available for study.

Research Designs

A four-group study design was utilized: a treatment and a comparison group were selected, and data were obtained for two time periods, one "before" the treatment was installed and one "after" installation for each site in each group. More specifically, the road diets (i.e., treatment sites) were matched with four-lane streets that were otherwise similar (i.e., comparison sites). Thus crash data were obtained for four groups: (*a*) road diets—"before" period, (*b*) road diets—"after" period, (*c*) comparison sites—"before" period, and (*d*) comparison sites—"after" period.

The data were analyzed using two different methods: (*a*) a site-by-site analysis in what is referred to as a "yoked comparison" design (since each treatment site had one or more matched comparison sites); and (*b*) a comparison site analysis, in which all treatment and comparison sites are essentially combined into two groups for each time period, and a negative binomial model of crashes per mile is developed such that the treatment effect can be examined while controlling for other variables such as ADT, city, and length of study period.

Most comparison sites were four-lane undivided roads that were near the road diets (such as a parallel road one or two blocks away or a road perpendicular to the road diet). A few comparison sites were unconverted (i.e., four-lane undivided) sections of the same road beyond where the road diet was installed. The comparison sites were selected to be similar to the road diets in terms of roadway functional class, type of development (e.g., commercial or residential), speed limit, intersection spacing, and access control.

Many streets, especially in Seattle, had cross sections that were wide enough for four lanes [13.4 m (44 ft)] but were only striped for two lanes. That is, the streets had 6.7-m (22-ft) lanes. The lanes accommodated both through traffic and on-street parking. These streets were not selected as comparison sites because these streets would operate as two-lane streets when vehicles were parked along the curb.

It was thought that the road diets could possibly prompt some motorists to divert onto nearby four-lane roads (including comparison sites) so as to avoid the slower road diet route. These comparison sites were considered to be "nearby comparison sites" because motorists who wanted to use alternate routes could travel along the nearby comparison sites instead. The additional traffic could possibly influence the number, types, and severity of crashes at the nearby comparison site.

On the other hand, "faraway comparison sites" were comparison sites that were in other areas of the city and would not be candidates for motorists to use as an alternate route to avoid a road diet section. Any increases in ADTs at faraway comparison sites were presumed to result from other factors and not the installation of road diets.

Site Selection

Local traffic engineers in California and Washington were contacted to determine where road diets were located. Road diets were identified in eight cities: Bellevue (Washington), Mountain View (California), Oakland (California), Sacramento (California), San Francisco (California), San Leandro (California), Seattle (Washington), and Sunnyvale (California). The reader is advised that these are not the only cities in California and Washington that have road diets.

Candidate comparison sites were identified through a review of maps and discussions with local traffic engineers. Field visits to the eight cities were made to verify that the candidate comparison sites were suitable. Subsequently, one or more nearby comparison sites was selected for each road diet. Faraway comparison sites were also selected, but suitable faraway comparison sites could not be found for every road diet. Some road diets were rejected because they were installed before 1990 or because a suitable nearby comparison site could not be found.

The final list of sites contained 30 road diets and 50 total matching comparison sites in eight cities. (As noted below, 12 road diets and 25 comparison sites are included in this paper.) The road diets ranged in length from 0.13 km (0.08 mi) to 4.09 km (2.54 mi). The comparison sites ranged in length from 0.21 km (0.13 mi) to 4.88 km (3.03 mi). Local traffic engineers did not have complete "before" and "after" ADT data for every road diet and comparison site. At a few locations, the ADTs were of questionable accuracy, perhaps due to irregularities in how the ADTs were obtained.

Crash Variables

Local traffic engineers provided crash data for the road diets and comparison sites. The crash data were not hard-copy police crash reports, but rather computer-generated summary lists of crashes and their characteristics.

The following crash variables were used in the analyses that are reported in this paper:

1. Date of crash (day, month, and year);
2. Crash type (angle/turning, head-on, rear-end, sideswipe, etc.);
3. Number of injuries; and
4. Number of fatalities.

Crash Data Periods

In this study, a 3-month transition period was defined: the month before road diet installation, the month of installation, and the month after installation. The transition period was defined for two reasons: (*a*) work on the road diet may have started the month before, and (*b*) motorists need some time to become familiar with the new traffic patterns of the road diet. The transition period separates the "before" period from the "after" period. Crashes that occurred during the 3-month transition period were excluded from the analysis.

Three years (36 months) of "before" and 3 years of "after" data were considered desirable for each road diet and comparison site. The actual amount of data varied considerably from site to site, depending on how much data the city had available, and when the road diet was installed. At most locations, one or more years of data were obtained for each of the "before" and "after" periods. Because all four seasons were represented, seasonal variations in crashes caused by weather conditions were accounted for.

Data Coding

The values for each crash variable were obtained from the crash summaries and keyed into a database. Each record in the database is a specific crash and contains the name of the street where the crash occurred, location type (road diet, transition, nearby comparison, or faraway comparison), whether the crash occurred before or after the road diet was installed, and the values for each crash variable.

The intersections at either end of a road diet are locations where motorists are entering and exiting (i.e., transitioning in and out of) the road diet. At these intersections, motorists may be switching lanes or adjusting their speeds in response to different operational conditions downstream. Hence the intersections at either end of a road diet were regarded as "transition" areas and were excluded from the analysis.

Where one section of a street was a road diet and an adjacent section of the same street was a nearby comparison site, the intersection separating the road diet from the comparison site was regarded as a transition area. The section of the nearby comparison site immediately adjoining the road diet was regarded as a buffer area, defined as extending one average city block (about 91 m or 300 ft) from the transition area. Crashes occurring in the buffer area were also excluded from the analysis.

ANALYSIS

As mentioned above, crash data were initially obtained for 30 road diets and 50 comparison sites. However, many locations had small sample sizes of crashes because of short segment lengths, short data periods, or low ADTs. Therefore, a subset of 12 road diets (2,068 crashes) and 25 comparison sites (8,556 crashes) was chosen for the analyses that are reported in this paper. These locations generally had segment lengths of at least 0.81 km (0.50 mi). The road diets and comparison sites were placed into 11 groups, each consisting of one or two road diets and their matching comparison site(s). The road diets and comparison sites in each group were located in the same

city, thereby accounting for possible differences in crash reporting practices among cities. Preliminary crash analyses revealed that nearby and faraway comparison sites were similar, so the nearby and faraway comparison sites in each group were combined for the analyses that are reported in this paper.

Before the basic analyses were conducted, changes in the road diet and comparison site ADTs were examined to determine whether motorists were diverting off road diets and onto nearby comparison sites. ADT data for the years immediately before and after road diet installation were available for four road diets, five matching nearby comparison sites, and four matching faraway comparison sites. For example, if the road diet was installed in August 1995, then ADT data were available for 1994 and 1996 (the years before and after installation, respectively). The "before" period ADTs on the road diets ranged from 10,179 and 16,070; on the nearby comparison sites, 14,003 and 17,000; and on the faraway comparison sites, 5,480 and 22,600. A comparison of the ADTs found that, on average, the ADTs on the four road diets increased by 6.4%. A slightly higher increase of 9.4% occurred on the five nearby comparison sites. The ADTs on the four faraway comparison sites increased by 6.7%. For the sites included in this analysis, any diversionary effect of road diets is limited. Instead, the dominant phenomenon is an overall increase in ADT, the result of population growth and other factors.

The crash-related analyses were divided into five categories:

1. Crash trends in the "before" period to determine the validity of the comparison sites,
2. "Before" and "after" crashes at individual groups of treatment/comparison sites,
3. Analyses involving crashes as a function of traffic volumes,
4. Crash severity, and
5. Crash types.

FINDINGS

Crash Trends in "Before" Period

Year-by-year crash trends in the "before" period were examined for all 11 groups of road diets and comparison sites. The objective was to see whether the comparison sites were a good match with the treatment sites in terms of having similar crash trends.

Crash data were available for the same years for all sites within a group. Because the road diets were installed over a period of several years, the "before" intervals differed considerably from site to site. Within most groups, the road diet and comparison sites had quite parallel trends in crashes per month. Crashes per month were plotted instead of crash rates, because ADTs were not always available. A sample plot is shown in Figure 3.

The proportion of crashes that occurred at road diet sites among all crashes occurring at either road diet or comparison sites was then examined, on a year-by-year basis. Trends in these proportions would indicate that crashes at road diets and comparison sites were not following parallel trends. To provide an estimate and test of significance of a trend component, logistic regression models were fit to three groups of sites with a total of four road diets and seven comparison sites (Groups 2, 9, and 11 in Table 1). These groups had five or more years of "before" data.

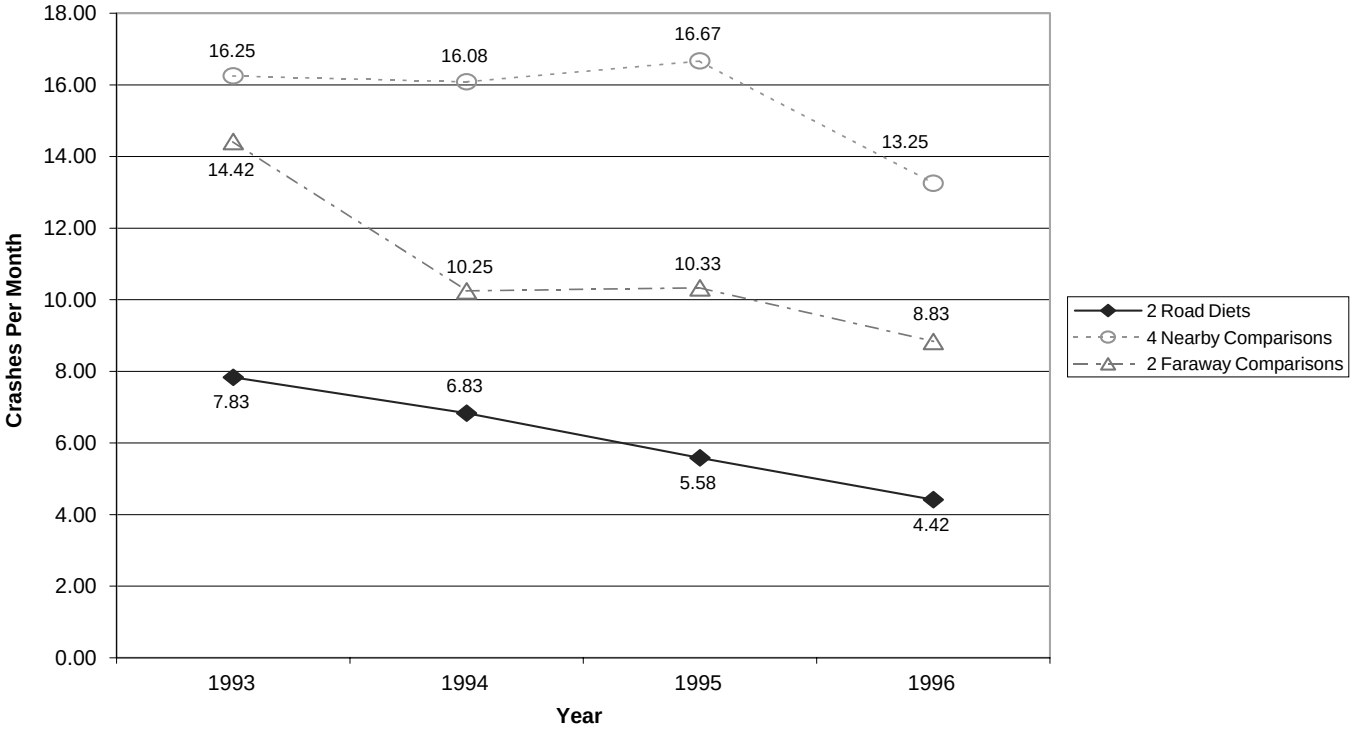

FIGURE 3 Crashes per month on road diets and comparison sites in Oakland.

The trend components were not statistically significant (p = .2815, .6131, and .1196, respectively). In other words, there were no significant differences in crash trends between the road diet sites and their matching comparison sites. For the sites in other cities, the proportions were not consistently increasing or decreasing over the years for which "before" data were available. To summarize, it does not appear that crashes at the comparison sites behaved very differently over time from those at the road diet sites in the "before" period. Thus, it was concluded that the comparison sites were a good match to the road diet sites.

"Before" and "After" Crashes

Using standard yoked comparison analysis techniques, a three-way contingency table analysis was done using 10 groups, with 11 road diets and 24 matching comparison sites. Table 1 shows before-and-after crash frequencies (i.e., total number of crashes) and the percent occurring in the "after" period for road diets and comparison sites within each group. In all 10 groups, the percent of road diet crashes occurring in the "after" period was the same or lower than the corresponding percent for the comparison sites. In four groups, this difference was at least marginally statistically significant.

When data from all 10 groups are pooled, a somewhat higher percent of crashes at the comparison sites occurred in the "after" period than at the road diet sites (41.0% versus 35.8%). Crash frequencies were generally higher at comparison sites than at road diet sites. A Cochran–Mantel–Haenszel test of overall significance across the 10 groups was statistically significant ($\chi^2_{1df} = 7.5307$, $p = .0061$) (df = degrees of freedom). The estimated risk ratio indicates that the percent of crashes at road diet sites in the "after" period to be about 6% less likely than a crash at a comparison site, with 95%

TABLE 1 "Before" and "After" Crashes at 10 Groups of Road Diets and Matched Comparison Sites

Group Number	Site Type[a]	Months of Data		Crashes		Percent		P-value
		Before	After	Before	After	After	χ^2_{1df}	
1	R	40	106	63	164	72.3	.009	.9255
1	C	40	106	347	917	72.6		
2	R	91	25	102	32	23.9	.039	.8444
2	C	91	26	231	76	24.8		
3[b]								
4	R	56	56	82	74	47.4	.014	.9048
4	C	56	56	583	537	48.0		
5	R	35	75	152	252	62.4	2.995	.0835
5	C	35	75	95	208	68.7		
6	R	50	60	85	97	53.0	.538	.4632
6	C	50	60	793	1005	55.8		
7	R	74	19	44	8	15.4	.015	.9030
7	C	74	19	188	36	16.1		
8	R	42	48	16	4	20.0	8.275	.0040
8	C	42	48	61	73	54.5		
9	R	66	12	255	28	9.9	3.479	.0621
9	C	66	12	661	110	14.3		
10	R	53	25	121	39	24.4	4.180	.0409
10	C	53	25	877	419	32.3		
11	R	61	8	407	43	9.6	.002	.9610
11	C	61	8	1210	129	9.6		
Total	R			1327	741	35.8	[c]	[c]
Total	C			5045	3510	41.0		

NOTE: *Risk of Crash in After Period at Road Diet Site Relative to Comparison Site: Risk Ratio = .944, 95% confidence limits for risk ratio = .894, .997.*

[a] *R = Road diet, C = Comparison site*

[b] *The road diet in Group 3 consisted of two sections with different "before" and "after" periods, so this group was excluded from the before-and-after analysis.*

[c] *Overall test of association: $\chi^2_{1df} = 7.5307$, $p = .0061$.*

confidence limits of .003 and .106. Thus, on average, crash frequencies at road diets in the "after" period were approximately 6% lower than at the corresponding comparison sites.

ADTs generally increased on road diets and comparison sites, but there was no clear pattern as to whether road diets or comparison sites had greater increases. Before-and-after data on speed variance, turning queues, and other traffic flow characteristics were not available. Further research is needed to find out whether the crash reductions observed on road diets can be attributed to lower speeds, fewer conflicts, or possibly other factors.

Analyses Involving Crashes as a Function of Traffic Volumes

The before-and-after analysis described above was based solely on crash counts and did not require ADT data. For those sites that had reliable ADT data, it was possible to analyze crashes further as a function of ADT at road diets and comparison sites in the "before" and "after" time periods. ADT data were not available for sites in Oakland or San Francisco, so three of the groups from the before-and-after analysis were excluded from the crash rate analysis. However, a group of sites in Seattle that was not used in the before-and-after analysis because of differing "before" and "after" time periods for the road diets and comparison sites was included. Thus these current analyses included 8 groups, with 8 road diets and 14 comparison sites. The ADTs on the road diets ranged from 8,133 to 15,658 in the "before" period and from 8,300 to 16,482 in the "after" period. The ADTs on the comparison sites ranged from 5,480 to 24,183 in the "before" period and from 7,006 to 26,100 in the "after" period.

In this set of analyses, raw crash rates were first examined to see if meaningful findings might emerge. Here, crashes, ADT, and study period length were combined to calculate a crash rate per million vehicle miles of travel for each site in both the "before" and "after" periods. Figure 4 shows the distributions of these crash rates for road diets and comparison sites in the "before" and "after" periods. The boxes extend from the 25th to the 75th percentiles of the distributions, whereas the vertical lines extend to the extreme values of the distributions. The horizontal lines across the boxes show the median values. The "+" signs represent the means of the distributions. This figure shows that the distributions of crash rates at the road diets are less variable than those at the comparison sites. The mean crash rates at the road diets are slightly lower than at the comparison sites. The means decrease (slightly) from the "before" period to the "after" period at both road diets and comparison sites, but not differentially.

While these raw crash rates are somewhat useful, as noted by Hauer (*10*) and others, an examination of rates such as these cannot control for the effect of volume changes across time, and can result in somewhat misleading results. For this reason, the primary analyses of crashes as a function of traffic volume were carried out by fitting negative binomial regression models to the crash frequencies at each site, and using ADT and other factors as independent variables. The negative binomial model is a form of a generalized linear model. In this application, crash frequencies y_j at sites $j = 1, \ldots, N$ are assumed to follow a negative binomial distribution. It is further assumed that the log transform of the expected value of y_j can be modeled as a linear function of the explanatory variables. Thus the model has the form

$$\log[E(y_i)] = \beta_0 + \beta_1 X_{1j} + \cdots + \beta_{kj}$$

The model parameters $\beta_0, \beta_1, \ldots, \beta_k$ are estimated by maximum likelihood.

The explanatory variables were traffic volume (millions of vehicles), city or alternatively group, site type (road diet or comparison site), time period (before or after), and a site type by time period interaction. Segment length was included as a constant factor (i.e., the number of crashes on a segment was proportional to its length). More information about negative binomial regression models can be found in McCullagh and Nelder (*11*).

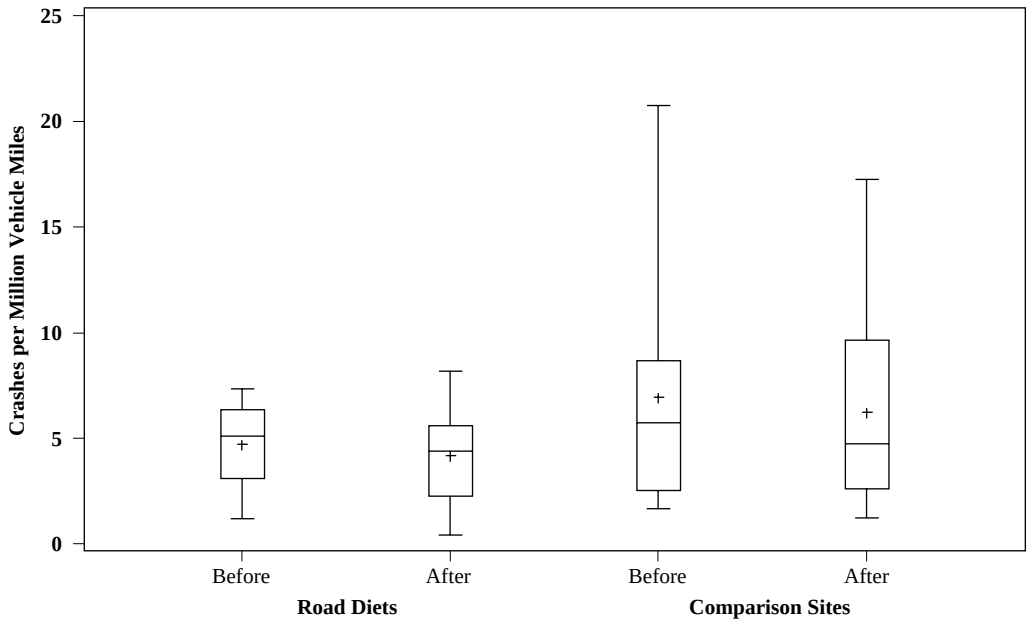

FIGURE 4 Crash rates per million vehicle miles.

Table 2 shows results from the final model. These results show highly significant variation in crash rates with traffic volume and city, and lesser variation with site type. The city-by-city variations are probably the result of different operational conditions and crash reporting practices. Neither the period effect nor the period by site type interaction was statistically significant. A significant interaction effect would have indicated that crash rates changed from the "before" period to the "after" period differently on road diets than on the comparison sites (and thus that the road diets had an effect on crashes while controlling for ADT and city).

Parameter estimates for site type, time period, and their interaction are also shown at the bottom of Table 2. These estimates show crash rates per mile to be somewhat higher on comparison sites relative to the road diet sites, to decrease slightly from the "before" to the "after" time period and to decrease somewhat less on comparison sites than on road diet sites. The last two estimates were not statistically significant, however, again indicating the lack of a road diet effect on crashes per mile.

Crash Severity

A crash was classified as property damage only (PDO) if no injuries and no fatalities occurred. Otherwise, it was classified as injury and fatal. It was expected that crashes on road diets would be less severe (i.e., a higher percentage of PDOs) in the "after" period, if motorists were indeed driving more slowly after the road diets were installed than when there were four-lane streets. However, no actual vehicle speed data were collected before and after the road diets were installed.

The severity analysis included 10 groups, with 10 road diets and 20 comparison sites. The total number of crashes was 7,919. San Francisco was excluded from this analysis because the majority of its crashes resulted in injuries and fatalities. Due to local reporting practices, many PDO crashes are not reported. The effects of changing reporting thresholds are discussed in Zegeer et al. (*12*). In this analysis, the "after" period in Seattle extended through December 31, 1996 only, because the number of injuries and fatalities was not available for crashes occurring on January 1, 1997 or later.

Overall, approximately 63% (5,007) of the crashes resulted in no injuries or fatalities. The remaining 37% (2,912) of the crashes had at least one injury or fatality. These percentages were quite similar for both road diet and comparison sites, and in both the "before" and "after" time periods. Injury rates did, however, tend to vary somewhat from city to city and among the matched groups of sites. To take this variation into account, a logistic regression model was fit to the injury severity data (coded as no injury versus injury or fatality). Logistic regression is another form of a generalized linear model. In this case, the injury classification variable (yes or no) is taken to be a Bernoulli random variable with a mean value (or proportion injured at site j) of p_j. The logit transform of p_j, $\log [p_j / (1 - p_j)]$, is then modeled as a linear function of the explanatory variables, and the parameters are estimated by the method of maximum likelihood. The explanatory variables in the model were: (*a*) matched group (1 to 11), (*b*) site type (road diet or comparison), (*c*) time period (before or after), and (*d*) site type by time period interaction. McCullagh and Nelder provide a fuller explanation of logistic regression models (*11*).

The crash severity model found that group was the only significant factor ($\chi^2_{9df} = 347.69$, $p < .0001$). Crash severity was virtually the same at road diets and comparison sites and did not change from the "before" to the "after" time period. The city-by-city variations are most likely the result of different crash reporting practices in each city.

It was thought that injury and fatal crashes would decrease on road diets relative to comparison sites, assuming lower vehicle speeds on road diets in the "after" period. Perhaps speeds did not decrease on the road diets included in this study. However, before-and-after speed data were not available, so it cannot be determined what

TABLE 2 Crash Rate Model: Likelihood Ratio Statistics and Parameter Estimates

Likelihood Ratio Statistics			
Source	df	χ^2	P-value
Traffic Volume	1	18.34	<.0001
City	3	44.90	<.0001
Time Period	1	2.01	.1564
Site Type	1	8.11	.0044
Period X Type	1	.40	.5278
Parameter Estimates			
Parameter	Estimate	95% Confidence Limits (Lower, Upper)	P-value
Comparison Site vs. Road Diet	.34	-.04, .73	.0794
After vs. Before	-.28	-.73, .17	.2267
Comparison Site in "After" Period	.17	-.36, .70	.5337

NOTE: df = degrees of freedom.

happened to vehicle speeds. Also, the crash summaries only listed the number of injuries and fatalities in each crash. None of the summaries categorized the injuries as an "A" (incapacitating), "B" (nonincapacitating), or "C" (possible) injury. It is possible that road diets could have resulted in fewer A injuries (and more B and C injuries) compared to comparison sites. Such a result would not be apparent in an analysis of PDO versus injury and fatal crashes.

Crash Types

Another question of interest concerned whether or not crash types would be different after road diets were in place relative to comparison sites. The three most prevalent crash types at all sites were angle, rear-end, and sideswipe (Figure 5). While the crash type distributions were quite similar for the site type by period interaction, angle collisions were somewhat higher for the road diets and perhaps decreased somewhat less in the "after" period relative to the comparison sites. To investigate this, a logistic regression model was fit to a crash type variable (angle versus all other) using the same explanatory variables as the crash severity model. The results from this model again indicated a highly significant effect due to group ($\chi^2_{9df} = 199.24$, $p < .0001$). Site type was also statistically significant ($\chi^2_{1df} = 13.24$, $p = .0003$), with the proportion of angle collisions higher on road diets than on comparison sites. Neither time period nor the period by site type interaction was significant ($p = .5862$ and $p = .9575$, respectively).

A similar model showed the proportion of rear-end crashes to be higher for the comparison sites, again with no significant interaction or period effects. The only significant effect in a model for sideswipe crashes was that due to group.

It is not clear why the crash type distributions were different between the road diets and the comparison sites; crash severity was virtually the same at road diets and comparison sites. One possible reason is that such differences do exist from one roadway section to another because of variations in the numbers of driveways and intersections, vehicle speeds, vehicle mix, area type, and other factors. It may be that cities selected roadway sections for road diet installation at least partly because of such factors.

The variations in the crash type distributions among cities are likely the result of (*a*) how each city classifies crashes, and (*b*) what each city's reporting practices are. For example, Bellevue has a separate crash type for "parked vehicle." Several other cities usually classify crashes involving parked vehicles as "sideswipe." As another example, all of the California cities included "angle/turning" crashes in the total number of "right angle" crashes. In Bellevue and Seattle, "angle/turning" and "right angle" crashes were two separate crash types.

Summary of Findings

The key findings of this study are summarized as follows and in Table 3.

1. The road diets and comparison sites had similar year-by-year trends in crash frequencies in the "before" period. This finding is evidence that the comparison sites were a good match with the road diets.

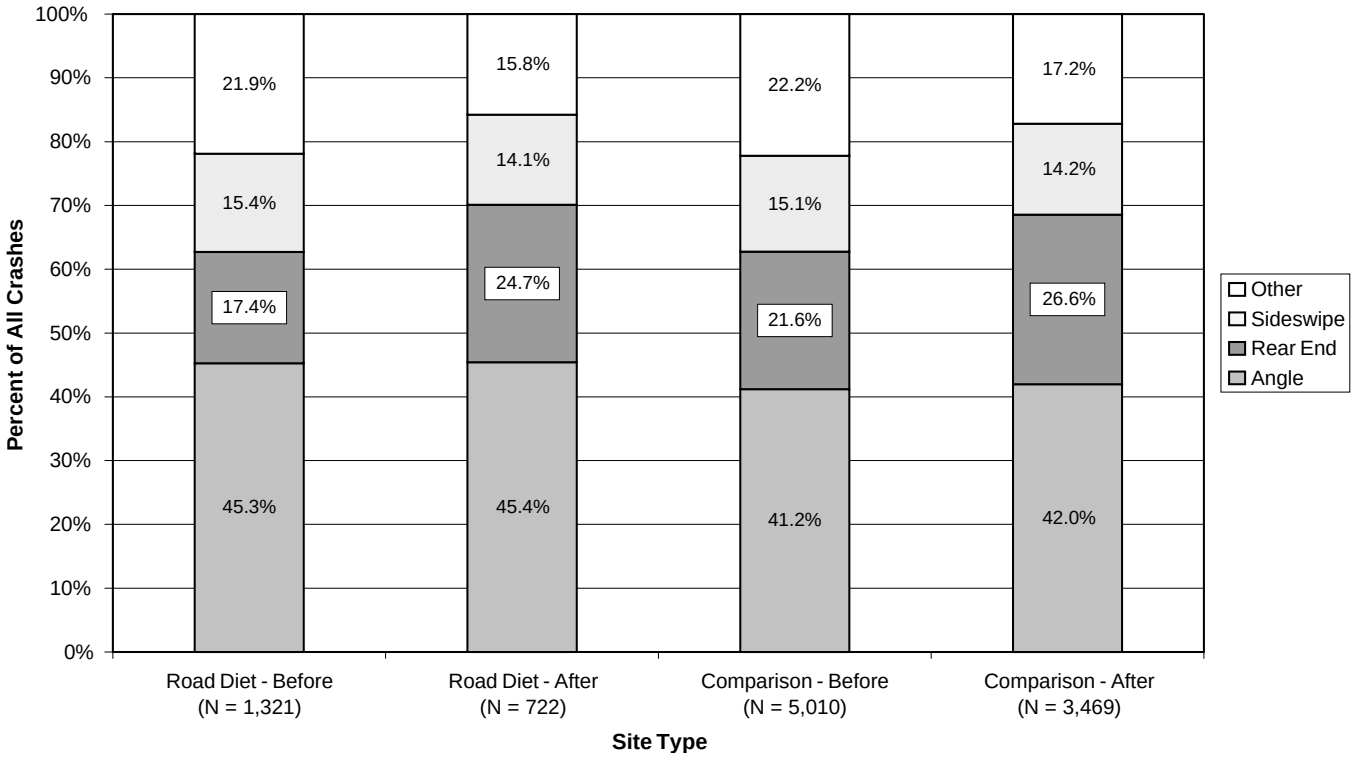

FIGURE 5 Distribution of crash types for road diet and comparison sites (N = number of crashes).

TABLE 3 Summary of Findings

Analysis Category	Comparison			
	Road Diets Before vs. After	Comparison Sites Before vs. After	"Before" Period Road Diets vs. Comparison Sites	"After" Period Road Diets vs. Comparison Sites
Crash Frequency	Reduction in "After" Period	No Change	No Difference	Road Diets Lower
Crash Rates	No Change	No Change	Road Diets Lower	Road Diets Lower
Crash Severity	No Change	No Change	No Difference	No Difference
Crash Type	No Change	No Change	Difference: 1. Road diets had a higher percentage of angle crashes 2. Road diets had a lower percentage of rear-end crashes	Difference: 1. Road diets had a higher percentage of angle crashes 2. Road diets had a lower percentage of rear-end crashes

2. Given the total number of crashes that occurred at the road diets and comparison sites, a higher percentage of the crashes at comparison sites (41.0%) occurred in the "after" period than at the road diets (35.8%) (Table 1). Crash frequencies at road diets in the "after" period were approximately 6% lower than at the corresponding comparison sites.

3. Crash rates did not change significantly from the "before" period to the "after" period. Crash rates were lower at road diets than at comparison sites, but road diets did not perform better or worse over time (from the "before" period to the "after" period) relative to comparison sites.

4. Road diet conversions did not affect crash severity. About 37% of the crashes resulted in an injury or fatality. The percentages were quite similar for road diets and comparison sites, and for both the "before" and "after" periods.

5. Road diet conversions did not result in a significant change in crash types. Three crash types—angle, rear-end, and sideswipe—accounted for about 80% of all crashes. Road diets had a somewhat higher percentage of angle collisions than the comparison sites had. On the other hand, the comparison sites had a higher percentage of rear-end collisions than the road diets had. Both differences were significant. However, the changes between the "before" and "after" periods were not significant.

CONCLUSIONS

Because there are no data available on a large reference group of similar sites in these cities (i.e., all these data were manually collected), this study could not be collected using the more robust before-and-after design involving empirical Bayes methods as proposed by Hauer (*10*). However, the previously discussed techniques did control for the most prevalent possible biases—different study periods for the groups and differential changes across time in ADT between the treatment and comparison groups. The former was controlled for in the initial yoked comparison analyses, and both were controlled for in the negative binomial modeling. It is also noted that the fact that the rates are higher for the comparison sites than for the treatment sites (as shown in Figure 4) is an indication that regression to the mean is probably less of a potential bias in this data set; the treatment sites do not appear to have been chosen solely because of high prior crash rates or frequencies. For these reasons, the authors believe that the study results are soundly based.

This study found that a significantly lower (approximately 6%) proportion of crashes occurred at road diets in the "after" period than at comparison sites in the "after" period. Thus one may expect that converting a roadway segment from four-lane undivided to three lanes would likely reduce total crashes by 6% or less. Road diets were no better or worse than comparison sites with regard to crash rates and severity. Further research is needed to find out whether the crash reductions observed on road diets can be attributed to lower speeds, fewer conflicts, or possibly other factors.

It was beyond the scope of this study to examine potential nonsafety benefits of road diets, such as creating the impression that cars are less dominant, enhancing the urban landscape, and improving the overall quality of life along the street. These nonsafety benefits should be evaluated more thoroughly in future research. It should be mentioned that traffic operations and capacity issues need to be considered fully at a given site prior to implementing road diets and other lane reduction measures.

Local traffic engineers should attempt to evaluate road diet conversions, whenever possible, in terms of safety and operational effects. In particular, it would be useful to conduct further studies of motor vehicle speeds, congestion, traffic volume, and traffic flow resulting from road diet conversions. Future operational studies under a range of traffic volumes and other conditions would be useful to help quantify the conditions for which road diets would be appropriate.

ACKNOWLEDGMENTS

This study was conducted as part of the Highway Safety Information System, funded by FHWA. Mike Griffith of FHWA serves as the Contracting Officer's Technical Representative. Forrest Council of the University of North Carolina Highway Safety Research Center (HSRC) is the Principal Investigator. Thanks are due to the many local traffic engineers and their staff, too numerous to list here, who generously gave their time to identify road diets and comparison sites and to supply crash data. Bradley Keadey, Yan Jia, and Charles Hamlett (all of HSRC) provided invaluable research assistance. Carolyn Williams contributed computer expertise.

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Publication of this paper sponsored by Committee on Safety Data, Analysis, and Evaluation.

The Facts About Venice Blvd.

5 fatalities in the last 14 years (2004 to 2017)

Last pedestrian fatality: 2005

Last bicyclist fatality : 2008

Average Pedestrian/Bicyclist Kills or Serious Injuries per Mile: 1



Priority Corridor
(alphabetical order)

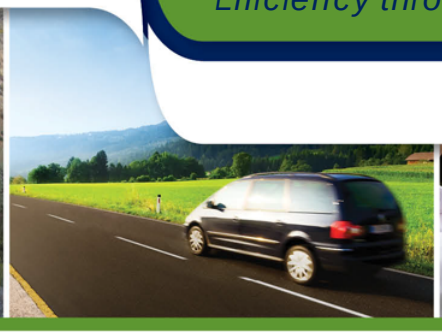
		Average Ped/Bike KSI per Mile	Street Mile
33	**Venice Boulevard** | Beethoven Street to Inglewood Boulevard	1	0.8

ACTION PLAN 2017 | VISION ZERO LA

†CHP SWITRS accident database

ROAD DIET

Efficiency through technology and collaboration



Every Day Counts — innovation, ingenuity, invention, imagination

Becky Crowe - FHWA

Brian Chandler, P.E., PTOE – Leidos

DeWayne Carver, AICP – Florida DOT

U.S. Department of Transportation
Federal Highway Administration

Safety – A Central Goal for USDOT



Photo Source: VHB

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News

FHWA 30-14
Friday, August 29, 2014
Contact: Doug Hecox
Tel: 202-366-0660

New Data Show U.S. Driving at Highest Level in Six Years

Nearly Three Trillion Miles Traveled Over Last 12 Months
Supports Call for Greater Transportation Investment

WASHINGTON - New estimates released today by the U.S. Department of Transportation's Federal Highway Administration (FHWA) show that American driving between July 2013 and June 2014 is at levels not seen since 2008, fueling calls for greater investment in highways that must bear growing

Road Diets – A Proven Safety Countermeasure



Roundabouts

Corridor Access Management

Backplates with Retroreflective Borders

Longitudinal Rumble Strips and Stripes on Two-Lane Roads

Enhanced Delineation and Friction for Horizontal Curves

Safety Edge$_{SM}$

Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

Pedestrian Hybrid Beacon

Road Diet

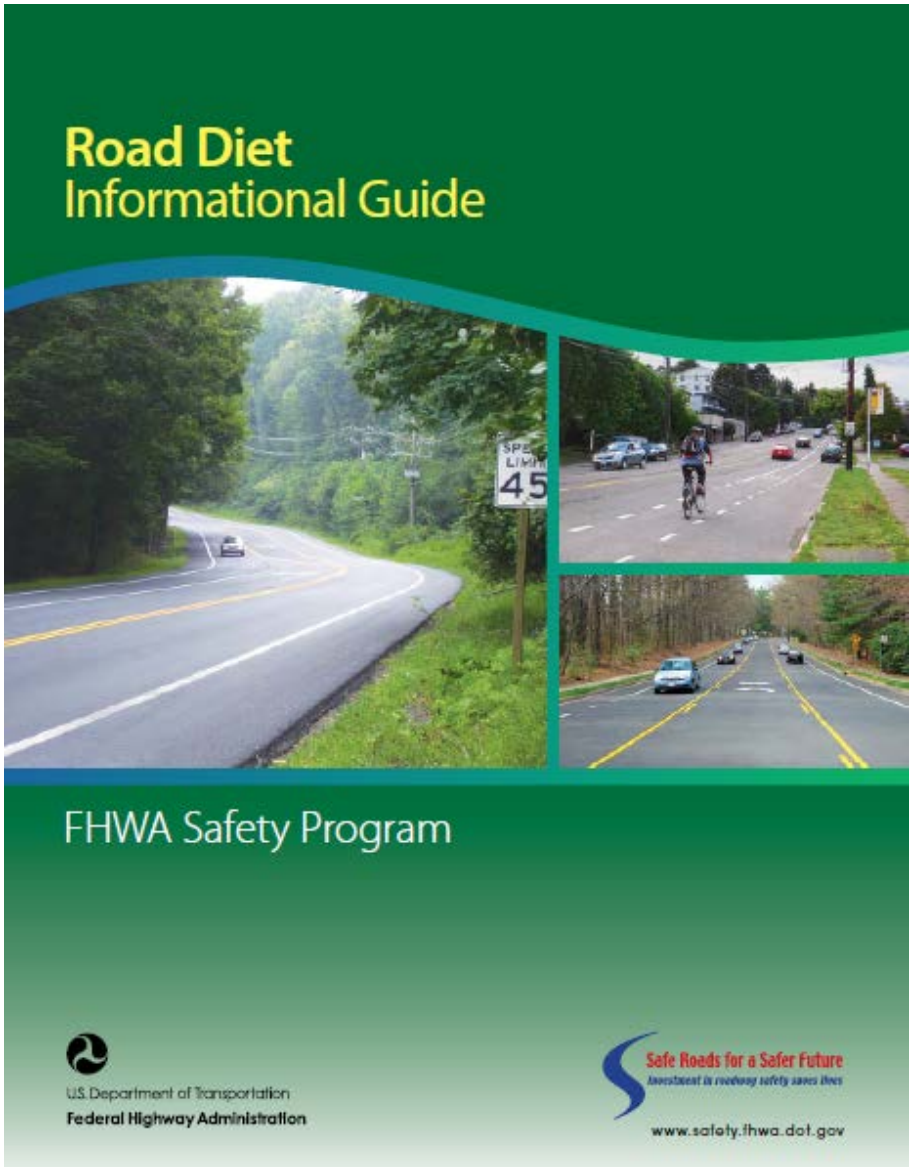
Safety – A Central Goal for USDOT



Photo Source: USDOT

"Safety is our highest priority and that commitment is the same regardless of which form of transportation people choose, including walking and biking."

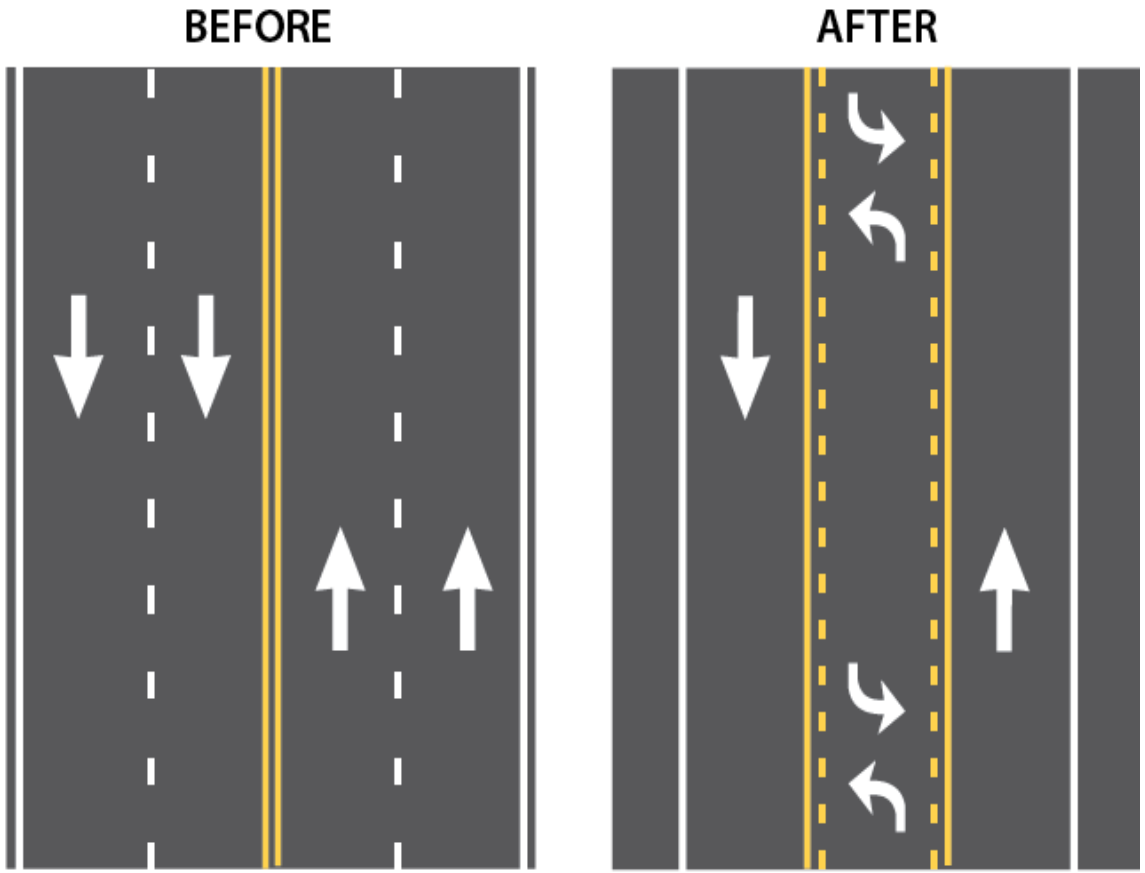
Secretary Anthony Foxx
ProWalk ProBike ProPlace Conference
September 10, 2014


Road Diet
Informational Guide
FHWA Safety Program
U.S. Department of Transportation
Federal Highway Administration
Safe Roads for a Safer Future
Investment in roadway safety saves lives
www.safety.fhwa.dot.gov

Road Diet Informational Guide: Contents

1. Introduction
2. Why Consider a Road Diet?
3. Road Diet Feasibility Determination
4. Designing a Road Diet
5. Determining if a Road Diet is Effective

What is a Road Diet?



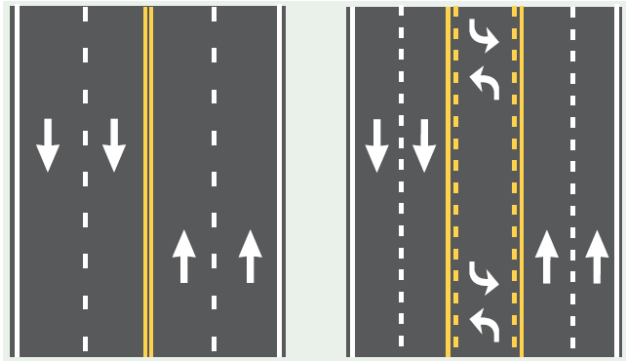
What is a Road Diet?



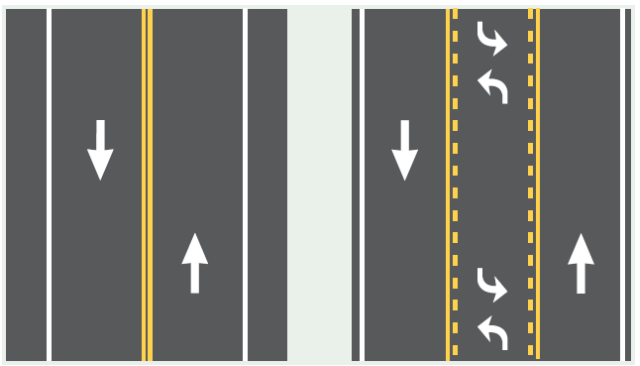
Photo Source: Virginia DOT

Other Roadway Reconfigurations

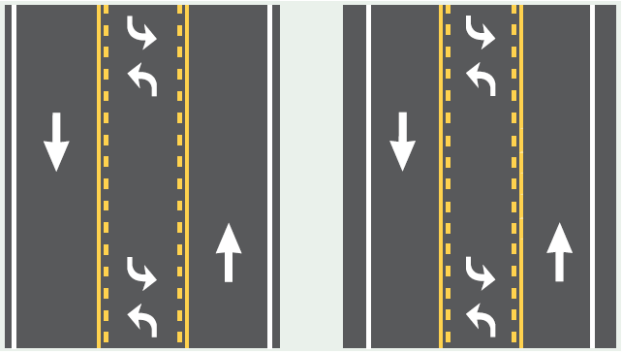
4-Lane to 5-Lane



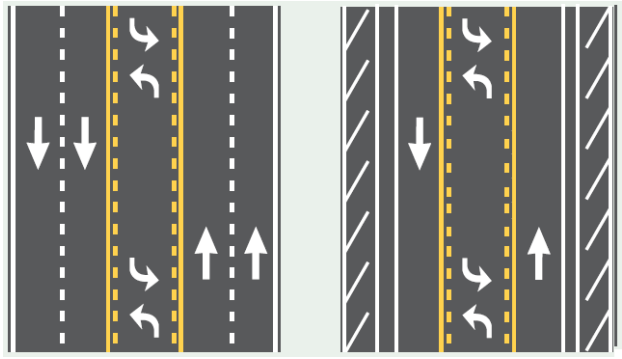
2-Lane to 3-Lane



3-Lane to 3-Lane



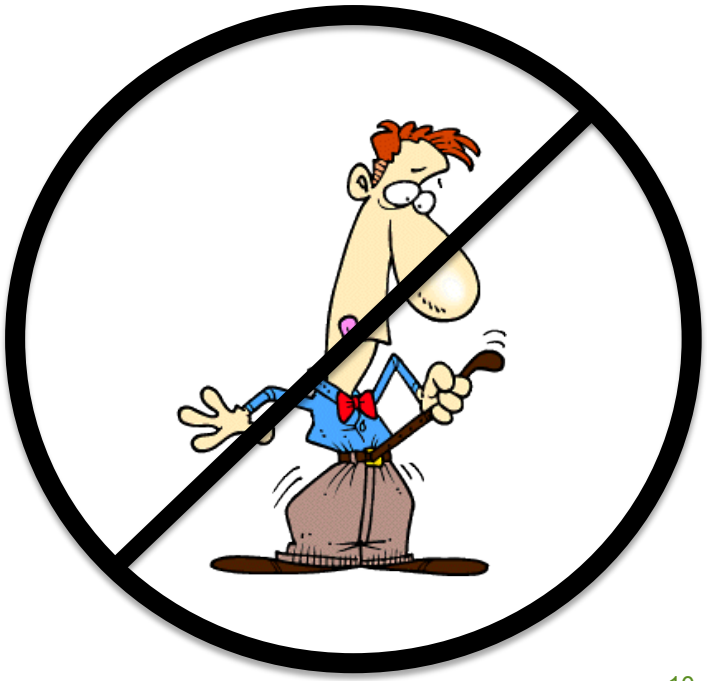
5-Lane to 3-Lane



What a Road Diet is NOT

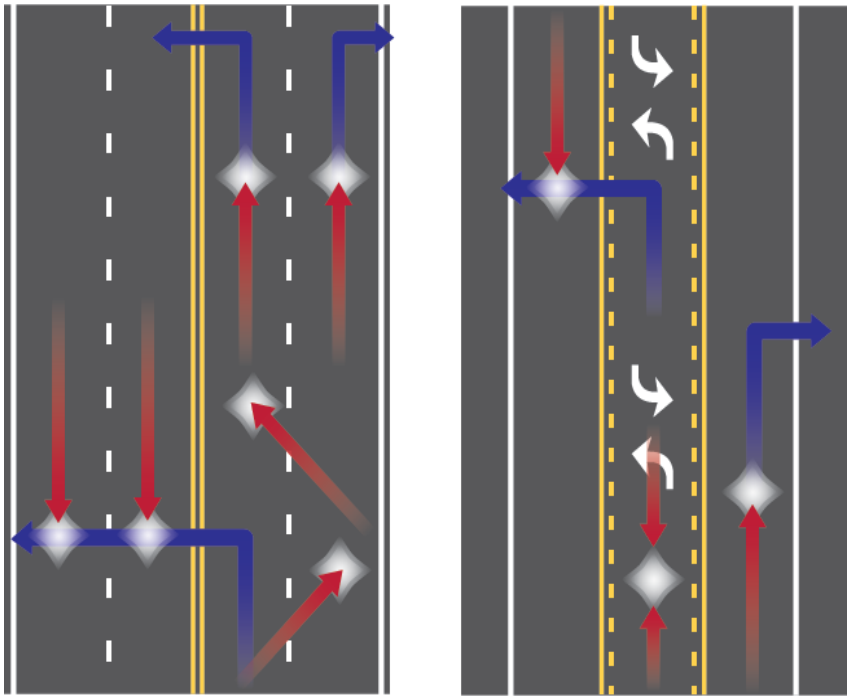
- No cross section reduction
- No lane width reduction required
  - Though not disallowed

- Think about it like this:
  - Lane Reallocation
  - Lane Rebalancing
  - Conversion



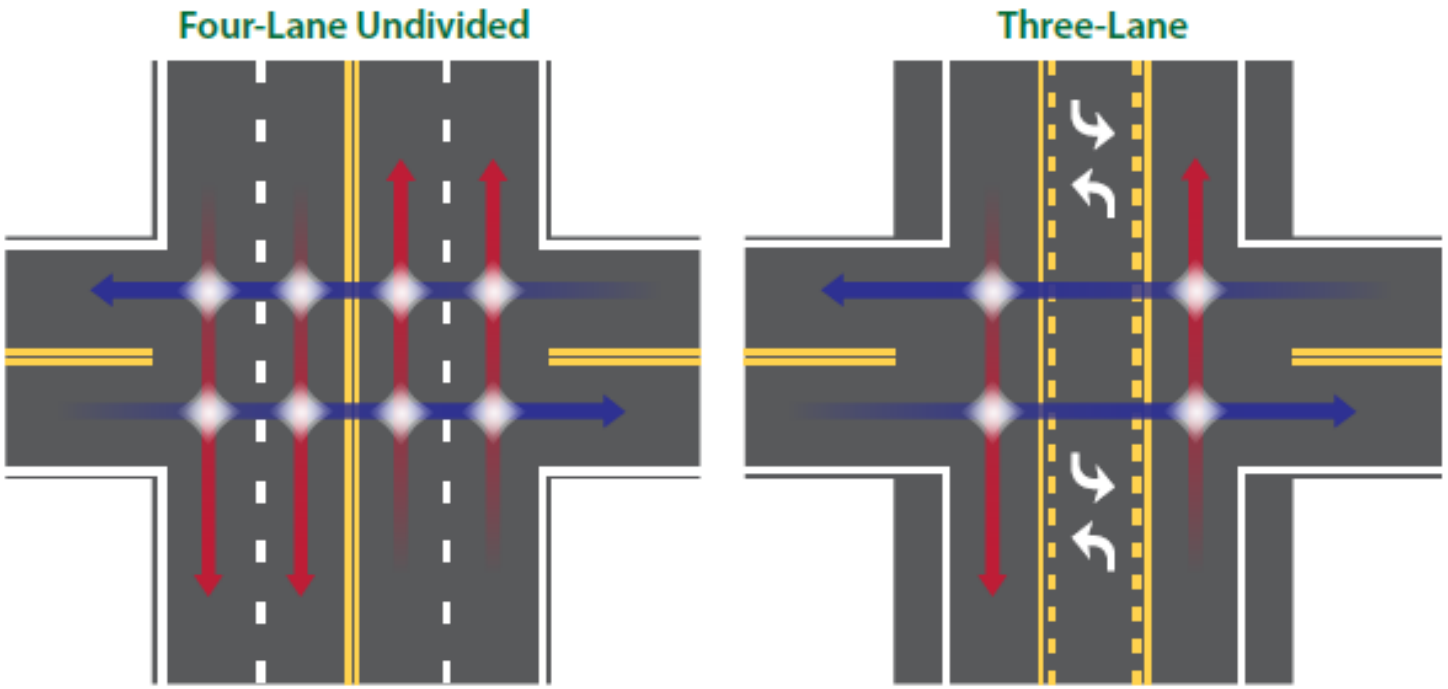
Benefits: Safety

4-Lane 3-Lane



19 - 47% overall crash reduction

Benefits: Reduced Conflict Points



Benefits: Non-motorized Safety & Accessibility



Photo Source: Stacy Meekins



Photo Source: City of Seattle

Benefits: Livability



Photo Source: Jennifer Atkinson

Benefits: Low-cost Installation

Most Road Diets are installed on existing pavement within the right-of-way.

Reston, Virginia



Lawyers Road

Photo Credit: VDOT

Objective: Improve Safety



Photo Credit: VDOT

Soapstone Road

Grand Rapids, Michigan

Objective: Improve Livability



Photo Credit: City of Grand Rapids

Division Street

Grand Rapids, Michigan

Objective: Accommodate Transit

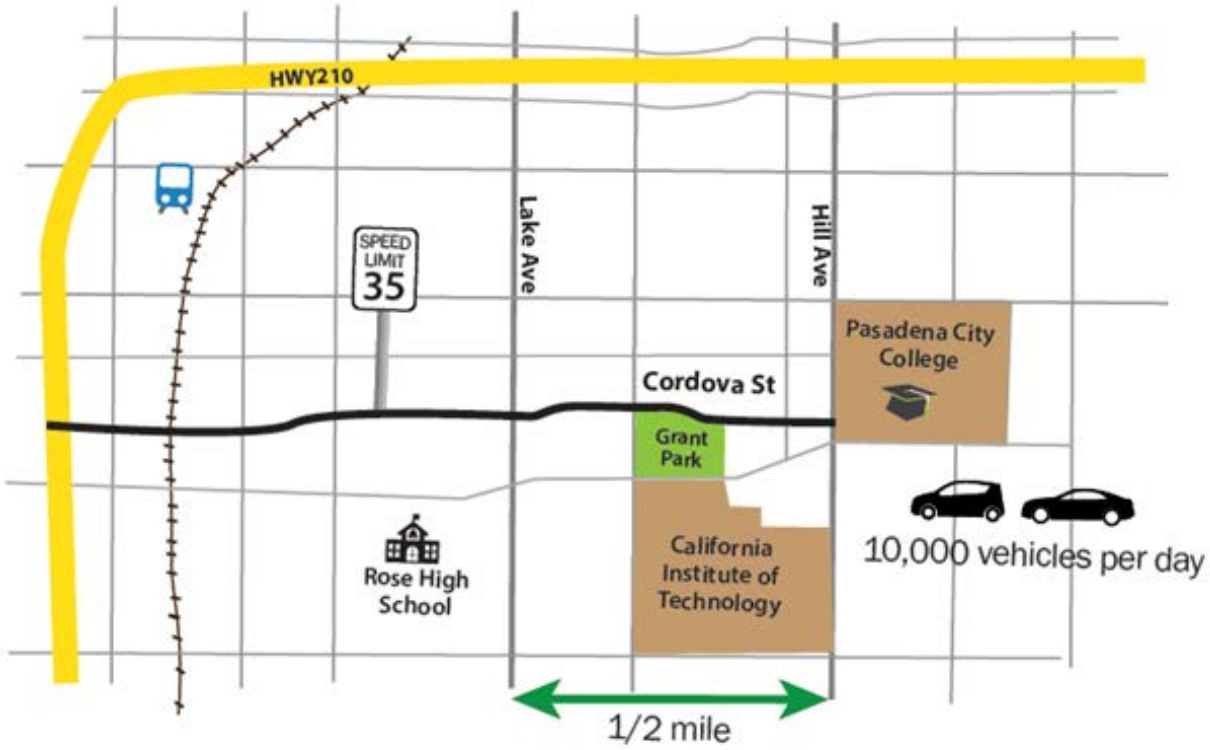


Burton Street

Photo Credit: City of Grand Rapids

Los Angeles, California

Objective: Increase Bicycle Use



Los Angeles, California



Photo Credit: LADOT

Bicycle use TRIPLED

7th Street

New York City

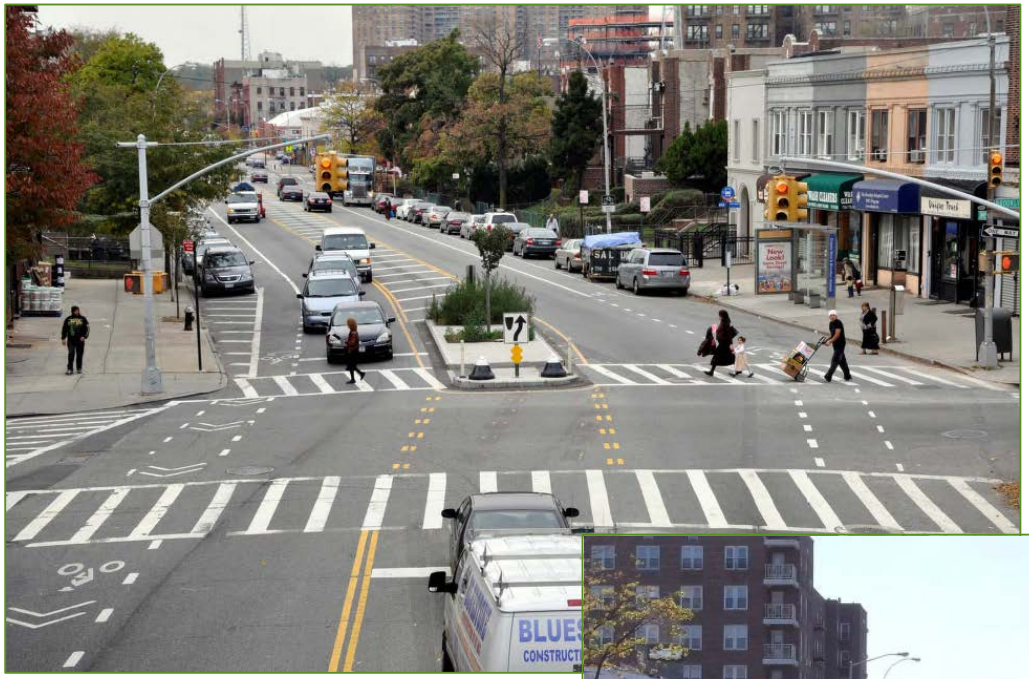


Photo Credit: NYCDOT

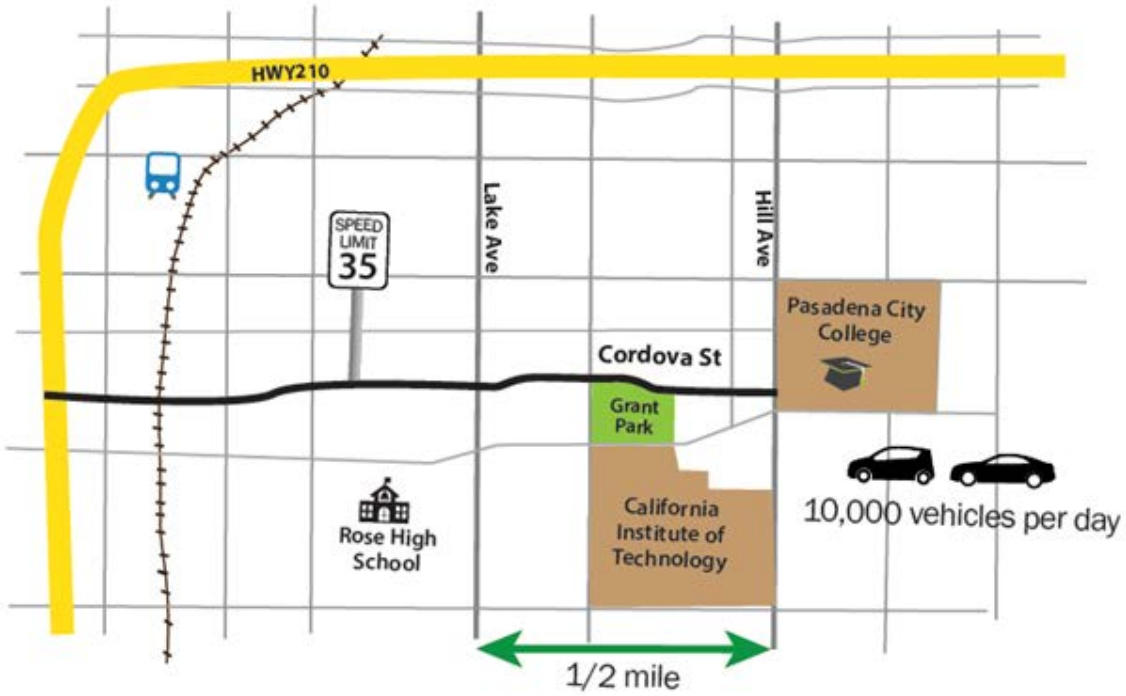
Objective: Improve Pedestrian Safety



Photo Credit: NYCDOT

Pasadena, California

Objectives: Increase Ped Safety, Enhance Curb Parking



Pasadena, California

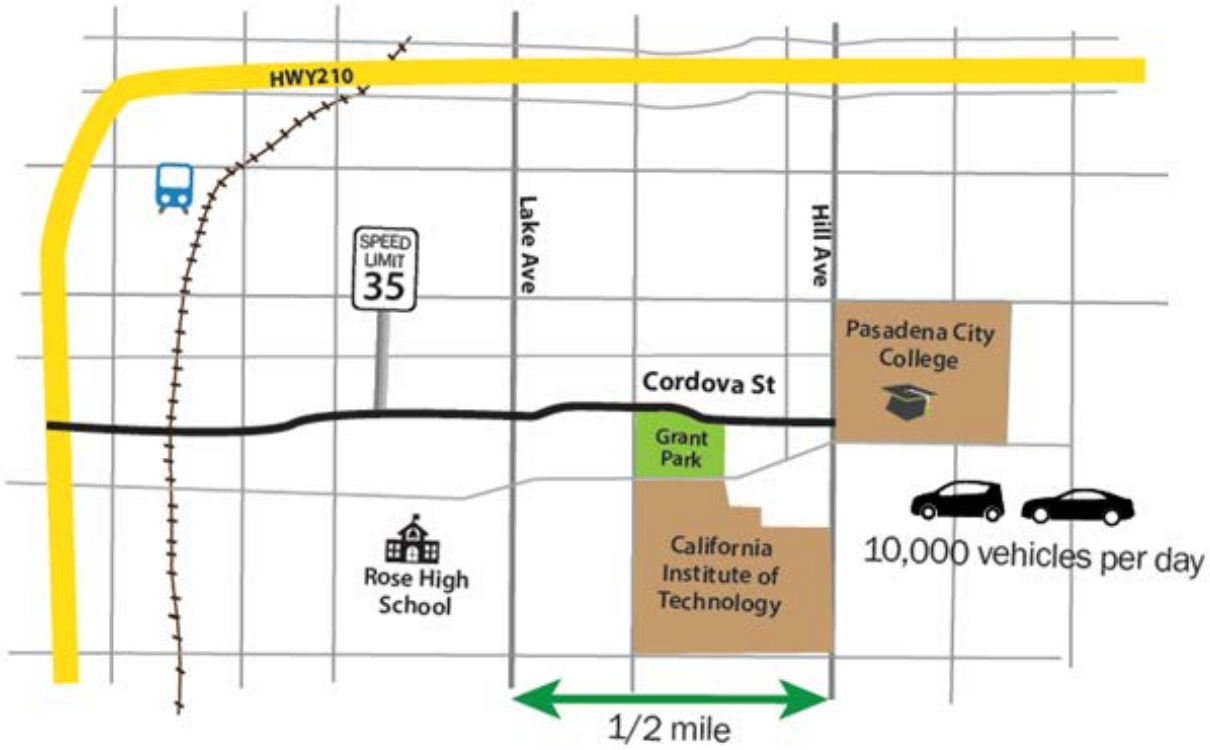


Photo Credit: City of Pasadena

Cordova Street

Los Angeles, California

Objective: Increase Bicycle Use



Los Angeles, California



Photo Credit: LADOT

Bicycle use TRIPLED

7th Street

Determining Road Diet Feasibility

Identify the Road Diet's objectives:

- Improve safety
- Reduce speed differential
- Reduce queues caused with left-turners
- Improve pedestrian environment
- Improve bicyclist accessibility
- Enhance transit stops

Determining Road Diet Feasibility

Context Sensitive Solutions and Complete Streets

- The street network should be planned, designed, maintained, and operated in a way that accommodates all road users and those who use the surrounding environment.



Photo Credit: City of Chicago

Complete Streets Commitment

More than 600 State, regional, and local jurisdictions have adopted Complete Streets policies or have made a written commitment to do so.

Determining Road Diet Feasibility

Traffic Operations: What about Capacity?

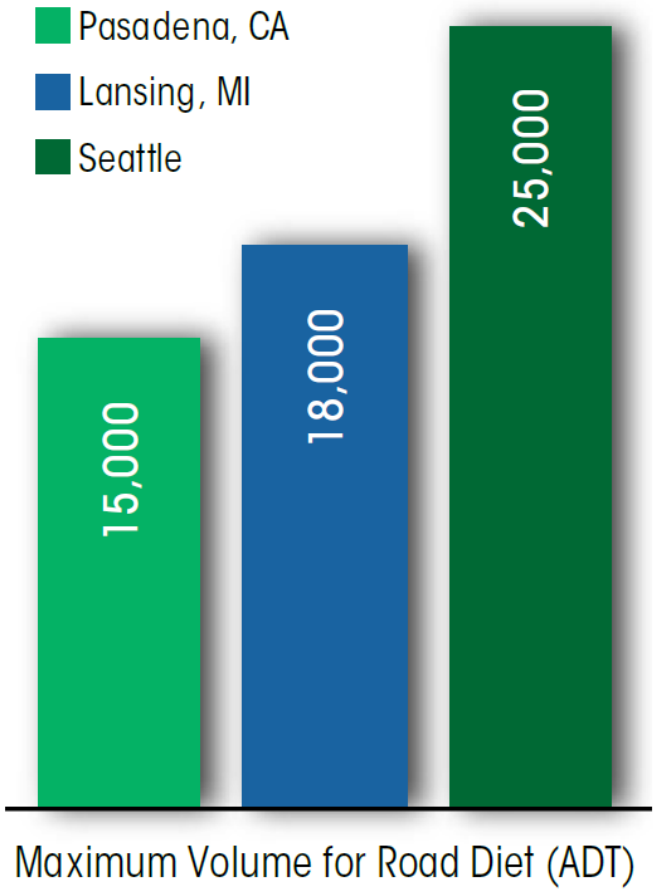
- Some 4-lane roads = “de facto 3-lane roads”
- Case-by-case analysis
- Meet the current and expected needs



Photo Credit: Tom Welch

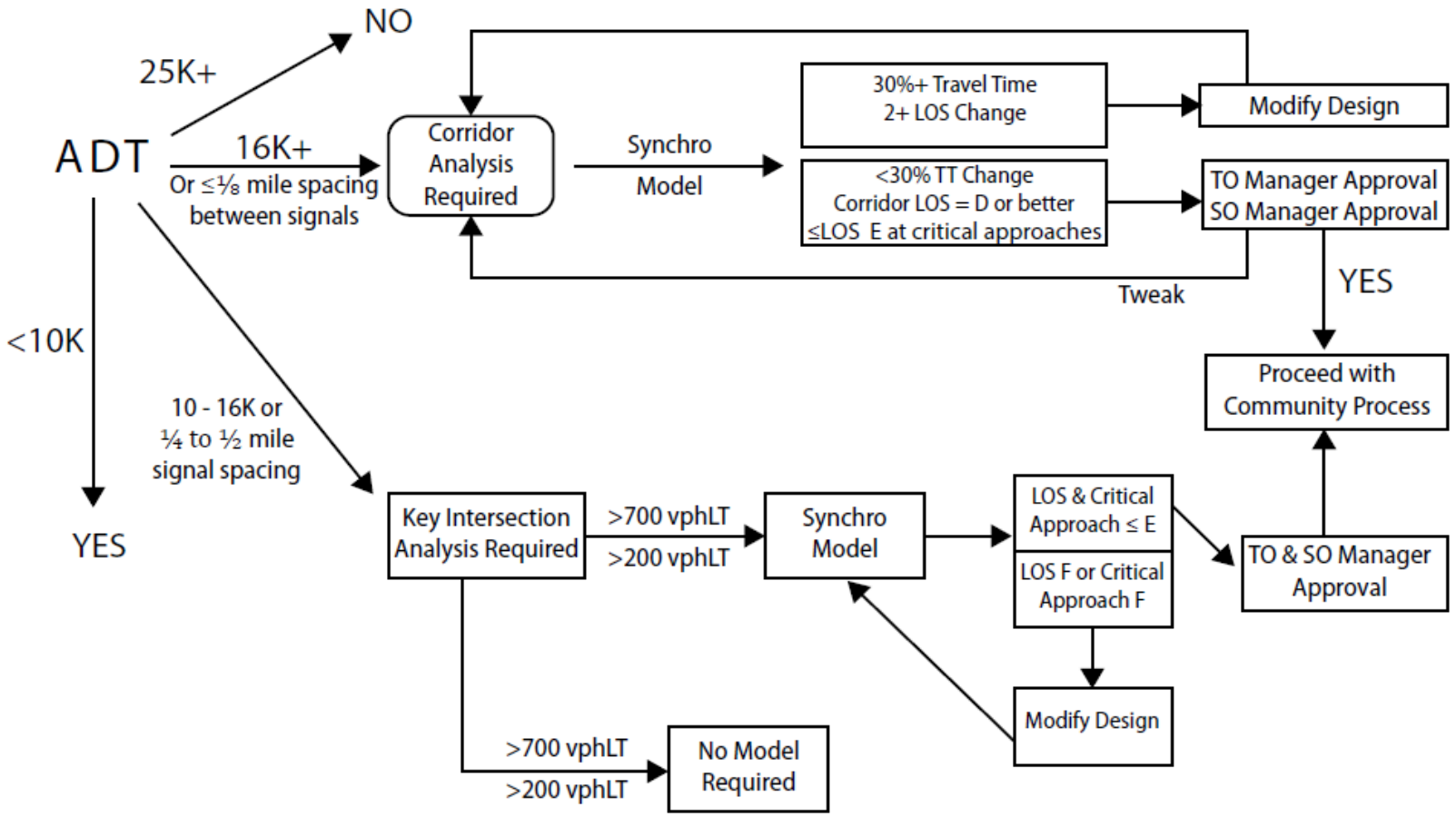
Determining Road Diet Feasibility

Operational Factors: How many vehicles?



Determining Road Diet Feasibility

Seattle Flow Chart



NOTE: vphpd is vehicle per hour per direction ADT is average daily traffic

Determining Road Diet Feasibility

Transit Factors

- A Road Diet should not result in undue traffic delay due to transit stops
- Bus stops can be located along the curb with on-street parking removed
  - This is sometimes not desired by bus drivers
- Tapered pull-outs can help transit ingress

Photo Credit: Stacy Meekins



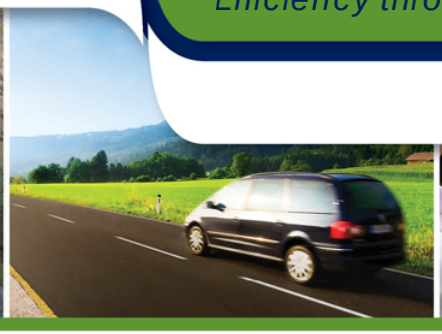


Photo Credit: City of Seattle

Florida DOT

ROAD DIET

Efficiency through technology and collaboration



innovation ingenuity imagination invention
Every Day Counts

U.S. Department of Transportation
Federal Highway Administration

Determining Effectiveness: Re-visit Objectives

- Safety
  - Crash reduction?
  - Certain crash types reduced?
  - Speed differential changed?
- Operations
  - Level of service? For all users?
- How were these road users affected?
  - Bicyclists
  - Pedestrians
  - Transit
  - Others

Resources

Road Diet Informational Guide

http://safety.fhwa.dot.gov/road_diets/info_guide/

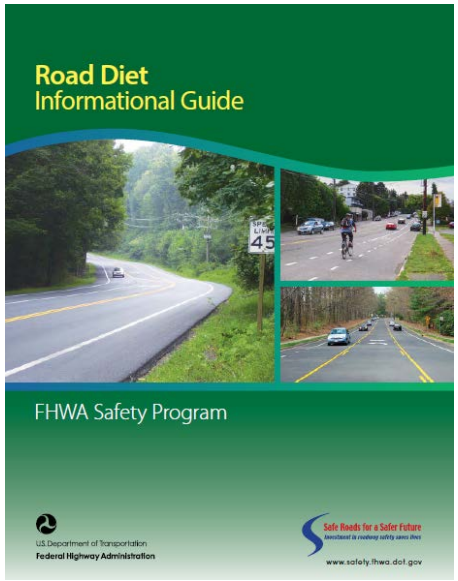
Road Diet Brochure

http://safety.fhwa.dot.gov/road_diets/brochure/

Road Diet Case Studies & Desk Reference

Coming Soon

http://safety.fhwa.dot.gov/road_diets



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Slow the Cars:

A Professional's Primer for Building Prosperous, Successful Streets

Strong Towns

This book—created by engineers on the forefront of the Strong Towns movement—will explain why slower traffic speeds are desperately needed in our cities, and give you a practical approach to making slow streets a reality.

The data is clear: without better design by planners and engineers, we'll never pull our cities and towns out of the financial insolvency that has resulted from our current road design, much less stop the daily occurrence of tragic deaths on our roadways. In the essays that follow, we break down the problems with forgiving design and high speed thoroughfares in our city centers, and share a more affordable set of solutions that any community can employ. We need people like you to hear the Strong Towns message and start implementing real, no-nonsense approaches to slowing down our cars. This book will start you on that journey.

Slow the Cars

By Charles Marohn, PE, AICP

We design our streets like roads, as if their primary—and sometimes sole—function is the movement of automobiles.

Many people don't grasp the difference between a street and a road. They think the terms are interchangeable, and rightly so. In the United States, we've spent decades and trillions of dollars blurring the distinctions.

Streets and Roads

To make our cities financially strong and successful, we need to reclaim the lost art of building great streets, and we must empower our transportation professionals to build high-performance roadways. There is a serious difference between those two pursuits.



A classic street

Streets: *The function of a street is to serve as a platform for building wealth. On a street, we're attempting to grow the complex ecosystem of businesses and homes that produces community wealth. In these environments, people (outside of their automobiles) are the indicator species of success. Successful streets are environments where humans and human interaction flourish.*



A standard road

Roads: *In contrast, the function of a road is to connect productive places to one another. You can think of a road as a refinement of the railroad—a road on rails—where people board in one place, depart in another and have a high-speed connection between the two.*

With a street, we're trying to build a place. With a road, we're trying to get from one place to another. Streets emphasize wealth creation. Roads are about movement.

WHY IS THIS DISTINCTION IMPORTANT?

Designing our streets as if they were roads creates three fundamental and interrelated problems.

First, it's really expensive. We spend a lot more money on everything from engineering to asphalt when we overbuild our streets. And because poorly designed streets suppress demand for biking and walking—two lower cost alternatives to driving—they actually induce even more demand for transportation spending.

Second, poorly designed streets drive down the taxpayers' return on investment. In general, the more auto-oriented a development pattern is, the higher the cost to provide public services and the lower the value per acre.

The kind of streets that are typically located in auto-centric areas are not only less financially productive, they also tend to be less adaptable, less flexible, and thus, more financially fragile. The financial struggles our cities face are directly related to the poor financial productivity of our auto-based development pattern.

Third, designing our streets as if they were roads is not safe. These environments combine fast speeds with randomness and complexity, a condition unsafe for drivers and particularly unsafe for anyone outside of a vehicle.



A street/road hybrid. The futon of transportation investments.

STROADS: THE FUTON OF TRANSPORTATION

A stroad is a hybrid of a street and a road. Much like a futon, it tries to do two things at once and is forced to compromise on both. A stroad tries to move cars kind of quickly along a corridor that also builds some wealth. The result is expensive infrastructure serving low-returning properties that fails to move traffic quickly while being particularly dangerous.

A stroad is the worst kind of transportation investment we can make, yet we build them all the time. If you are driving between 25 and 50 miles per hour, you are probably on a stroad. They are everywhere.

That's because of the way in which transportation professionals approach street construction. As they do with roads, they start the process by selecting a design speed. They then establish the volume of traffic they are designing to accommodate. Given the speed and volume, they then reference a road design manual to provide recommended dimensions for safe automobile travel. Finally, they calculate the cost of the project.

The order of these values—speed, volume, safety, then cost—works well for roads, but it is nearly the complete inverse of what is needed to build a productive and safe street. Successful streets emphasize safety first—and that's safety for everyone, not just drivers and their passengers—and then focus on cost, volume and, finally, speed.

If we want a place to be successful, automobile speed can't be the top priority of street designers. It actually needs to be their lowest priority.

#SLOWTHECARS

The most compelling thing we can do today to make our cities wealthier and more successful is to substantially slow automobile speeds on our streets.

We need to incrementally shift each of our stroads to become either a street or a road, distinguishing the parts of our existing transportation network over time to emphasize either a street function (wealth creation/complexity) or a road function (traffic movement/simplicity).

And while the fragile financial condition of our local governments is what compels us to make this change, it is clear that building lower cost, higher returning streets will also save lives and improve the quality of life for our citizens.

That is why #slowthecars is such a critical part of implementing a Strong Towns approach.

Forgiving Design vs. the Forgiveness of Slow Speeds

By Jon Larsen, PE

When something works in one situation, it risks being misapplied in other situations. In the transportation world, it's common to apply safety standards and designs from high-speed highways to city streets. Ironically, these "safety features" can be downright dangerous. I want to explain how we got here, why this is a problem, and what we can do about it.

The concept of forgiving design was developed by transportation engineers to lessen or avoid the impact of "run off the road" crashes. The general premise is that highways should have broad shoulders with gentle slopes and a roadside clear zone, which is free of fixed objects such as light poles. These design elements give drivers time to make corrective action if they start to drift off the road, and if they do crash, forgiving design makes the impact less severe.

Civil engineering students across the country learn these principles when studying the geometric design of highways. They learn about the impact of shoulder widths, clear zones, slopes, and drainage features, as well as how to mitigate the dangers of fixed roadside objects through the use of barriers and crash attenuators. I have no doubt that lives have been saved on our high-speed highways as a result of these concepts, but they have been misapplied—resulting in negative unintended consequences—elsewhere.

I think at least part of the problem stems from the fact that minimal attention or training for engineers is given to the design of urban and local streets, resulting in a tendency to apply highway design principles to these streets in the name of safety. This backfires, because forgiving design features encourage speeding in places where people should be driving slow. When drivers see wide, straight stretches of pavement with no obstructions on either side, they intuitively think that it's safe to drive fast. This is a big problem on streets (as opposed to highways or roads), because streets are places where people walk, bike, shop, live, work, etc. These activities are incompatible with and downright dangerous when mixed with high-speed traffic. The bottom line is this: On streets, the design objective needs to flip from forgiving design to the forgiveness of slow speeds.

The good news is that traffic engineers are increasingly talking about forgiving design vs. the forgiveness of slow speeds and Strong Towns is at the forefront with the #Slowthe-Cars movement. Attitudes are changing worldwide as we realize the power of slow.

The danger of mixing design standards was discussed in an article published several years ago in the Transportation Research Record (TRR):

> *Rather than attempting to function as freeways, the livable streets... instead address safety by discouraging the high-speed operating behavior that produces systematic error.*[1]

The author goes on to state that European designers have long recognized that crashes at lower speeds are, by definition, more forgiving. This is why Vision Zero efforts in places like Sweden have been so effective. Meanwhile, safety efforts in the United States have focused more heavily on education and enforcement to the point of victim blaming. This has been less effective than focusing on design. The result is that the US is falling behind on traffic safety. Education campaigns are important, but their effectiveness is limited unless they are accompanied with systematic design changes.

Here are some questions to help you decide if you should design your street with forgiving design or the forgiveness of slow speeds:

- *Do homes have direct access (via curb cut, driveway, etc) to the street?*
- *Do businesses have direct access to the street?*
- *Do schools, libraries, parks, senior centers, or other land uses which serve vulnerable populations have direct access to the street?*
- *Will people be walking along or across the street?*

If you answered yes to any of these questions, you have a street, not a highway, and you should design for the forgiveness of slow speeds instead of applying forgiving design. The following table contrasts the difference:

Forgiving Design	Forgiveness of Slow Speeds
Increases safety at high speeds	Fosters the safety of slow speeds
Wide travel lanes	Narrow travel lanes
Broad, smooth curves	Short, tight curves
Clear zone free of fixed objects	Variety of fixed objects (light poles, trees, mail boxes, planter boxes, etc) directly adjacent to the travel way
Wide shoulders	Shoulders are used for parking, bike lanes, and loading zones
Feels comfortable to drive fast	Feels dangerous to drive fast



Here are a couple examples of forgiving design in action in my home state of Utah:

This is I-80, west of the Salt Lake City International Airport. It has wide lanes, wide shoulders, a clear zone with a gentle slope, a wide median to separate opposing traffic and a cable barrier down the middle as an added precaution. If you're going to let people propel themselves forward inside of high-tech machinery at speeds exceeding 70 mph (which we do daily), this is about as safe as it gets.



This is a parkway in Taylorsville, Utah. Vehicles travel at high speeds, but not nearly as fast as on the interstate system. Notice the wide shoulders and the clear zone with power poles pushed as far away from the travel lanes as possible. As with I-80, this highway is designed for vehicles. People outside of vehicles are not safe here and this is pretty clearly understood by everyone. There is a sidewalk on one side of this street, but it's rarely used. It has some physical separation from the travel lanes, which helps make it safer, but it could probably use either a barrier or additional separation to make it more comfortable for pedestrians and cyclists.

Here are some examples showing the forgiveness of slow speeds:



This is a residential street in Salt Lake City, Utah. This street was developed in the 1940's and 50's. This is the street where my grandparents built their first home. My dad and his siblings roamed freely and safely around this neighborhood as kids. This street has cars parked on it and a variety of fixed objects alongside it: poles, streetlamps, and trees. These all tell drivers to slow down and be alert. It is a classic, safe, charming residential street that has aged well.



This is State Street near downtown Salt Lake City. It's a street in transition. It has carried high levels of vehicular traffic for decades, but is increasingly being reworked to be comfortable and inviting for people on foot. It carries the same amount of traffic as before; those cars simply travel slower.

Forgiving design and the forgiveness of slow speed are two very different approaches because they serve two very different needs. When working on any road project, it is critical to clearly identify if you are dealing with a high-speed highway or a low speed street.

Make that commitment, go all in, and avoid the messy, dangerous middle.

Speed kills, so why do we keep building for it?

By Bryan Jones, PE, AICP

Are we being precise, yet aiming at the wrong target when it comes to posted speed limits? Or are we using the wrong tool, research, or approach when identifying the appropriate posted speed limit, especially when it comes to safety for all roadway users in our communities?

I find it deeply alarming that it's 2017 and approximately 40,000 people died on our roadways last year—the highest number of traffic fatalities in the US in the last two decades. This shouldn't be news to anyone, though; we highlight these fatalities and severe injury collisions on the evening television news almost nightly, and you can see and hear emergency vehicles speeding toward carnage on our roadways on a daily basis.

We often call these "accidents" so we can feel better about them or complacent about them. However, a majority of the severe injury and fatal collisions are preventable, so they are not accidents. We cannot neglect this. What is your state or city doing to address this safety issue and prevent severe injuries and fatalities?

Speeding—defined as traveling too fast for conditions or in excess of the posted speed limit—contributes to nearly one-third of all roadway fatalities. This proportion has remained largely unchanged for decades.

High speed kills when it comes to vehicle speeds, and low speed kills when it comes to addressing the issue of speeding and public safety. We need a sense of urgency to both understanding why the number of fatalities is trending upward, and a sense of urgency to reduce the number of total fatalities.

It is not good enough to lower the fatalities per million miles travelled because the total deaths could still be on the rise if vehicle miles are increasing, too. While the rest of the United States is trending upwards with fatalities on their roadways, the Cities of San Francisco and New York, who both adopted Vision Zero programs to eliminate fatalities, are trending downward, and in 2017, experienced their lowest number of traffic fatalities since 1915 and 1910 respectively.

Safety is often what elected officials hear from their constituents as their #1 priority in their communities, yet many cities experience more fatalities on their roadways than as a result of violent crime. Are we addressing the right safety issues in our communities?

UNRAVELING THE RELATIONSHIP BETWEEN SPEED AND CRASH RISK

Most fatal crashes are caused by one of three driver behaviors: driving under the influence, speeding, and not wearing a seat belt. The relationship between speed and crash risk depends on many factors. What we do know is that speeding increases the likelihood of being involved in a crash and the severity of injuries sustained in a crash. Drivers who exceed the posted speed limit or drive too fast for conditions are involved in nearly one-third of all fatal crashes, according to data from the Fatality Analysis Reporting System (FARS). Due to inconsistencies in police crash reporting, it is likely that the proportion of speeding-related traffic fatalities is actually much higher.

Moreover, let's not forget the hundreds of thousands of people who sustain incapacitating, life-altering injuries from motor vehicle crashes involving speeding. The higher the collision speed, the more serious the consequences in terms of injury and material damage. The total national economic cost of traffic crashes (2010) is estimated at $242 billion.

We also know that speed increases the risk of serious or fatal injury for the most vulnerable users of the roadway—people walking and biking. A study by the Governors Highway Safety Association (GHSA) found that 720 bicyclists were killed and 45,000 bicyclists—12,000 youth and 33,000 adults—were injured on US roadways in 2015. The GHSA also reports that the number of pedestrian fatalities in the United States increased by 25 percent from 2010 to 2015. According to a National Highway Traffic Safety Administration (NHTSA) report, there were 5,376 pedestrian fatalities as a result of traffic crashes in 2015.



Unfortunately, the public is less aware of the risks of speeding compared with other risky driving behaviors. This is not a surprise considering that National Priority Safety Programs funds do not prioritize speeding. In 2016, nearly all funding went toward addressing issues of impaired driving.

Why do we design streets within our communities where, when human beings make poor decisions or mistakes (speeding or driving impaired), the results are fatal?

DESIGN SPEED MATTERS

Speed limits are not necessarily known during the design process of a new road as they are determined after the roadway is built by evaluating how motorists use the roadway.

Before a new road is built, engineers choose a design speed to guide their decisions about the various geometric design features of the roadway. The geometric design criteria were developed in the 1940s. And for much of the time since, engineering practices have focused on moving cars quickly and efficiently. In other words, engineers value speed and volume over safety and cost.

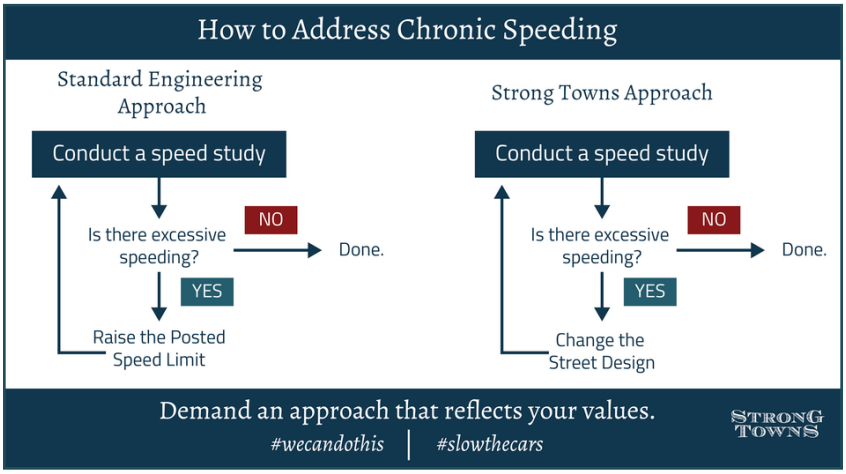
However, if you have attended one of Chuck Marohn's Strong Town presentations, you know that the public consistently values safety and cost far above speed and volume. In other words, the values for an engineering approach are upside down from what the public approach would be based on their values. Yet, we continue to design, advertise, and defend our engineering approach to setting speed limits established in the 1960s.

SETTING SPEED LIMITS WITHIN COMMUNITIES

Typically, speed limits are set by statute in a vehicle code and adjustments to statutory speed limits are based on the observed operating speeds for each road segment—specifically, the 85th percentile speed of free-flowing traffic. 85th percentile speed, that by which 85 out of 100 motorists drive under good weather and visibility conditions, is considered the maximum safe speed for any given location.

State and local transportation departments use the 85th percentile speed as the primary factor in setting speed limits. Neither the Federal Highway Administration nor the US Department of Transportation require the utilization of the 85th percentile for communities setting posted speed limits, and yet it is constantly used. More on that history in a moment.

Many, if not most agencies, set posted speed limits by what 85 percent of the people (motorists) feel is comfortable and safe for the conditions of the roadway. This is often referred to as the "engineering approach" for setting speed limits. Then, those agencies concentrate enforcement on "irresponsible" driving above that posted speed limit.



However, when these agencies recognize that 85 percent of people are driving faster than the posted speed limit (a frequent occurrence), they often choose to raise the limit so that more people will be in compliance and enforcement will be easier. In this way, raising the speed limit to match the 85th percentile speed may lead to even higher operating speeds and thus contribute to a cycle of speed escalation and reduced levels of safety.

One could even argue that motorists believe the posted speed limit is just the suggested maximum and more frequently treat it as the minimum, knowing that many law enforcement professionals and courts will not "strictly" enforce the maximum posted speed limit but rather something 9-15 MPH over the posted speed limit. A recent survey conducted by EverQuote found that more than half of all driving time is spent at least 10 MPH over the legal limit, and 42 percent of surveyed drivers said they don't consider going 10 mph over the speed limit to be speeding.

Why not design a street to the desired maximum speed so it is truly the maximum speed? We as a transportation profession have that ability and all the tools and guidelines are in place; we just have to apply them differently in our approaches and practices.

The National Transportation Safety Board (NTSB) Safety Study: Reducing Speeding-Related Crashes Involving Passenger Vehicles states:

> *Raising speed limits to match the 85th percentile speed can result in unintended consequences. It may lead to higher operating speeds, and thus a higher 85th percentile speed. In general, there is not strong evidence that the 85th percentile speed within a given traffic flow equates to the speed with the lowest crash involvement rate for all road types.*

THE "85TH PERCENTILE RULE"

The "85th percentile rule" is based on a 1964 published study by David Solomon called "Accidents on Main Rural Highways Related to Speed, Driver, and Vehicle." The study looked at speed and crashes involving 10,000 drivers on 600 miles of rural highways. Solomon found a relationship between vehicle speed and crash incidence, illustrated by a U–shaped curve, and discovered that the likelihood of being involved in a crash increases with deviation from the mean speed of traffic on the facility. This U-shaped relationship, otherwise known as the Solomon curve, is the dominant factor in establishing speed limits in the US.

Solomon reported that the results of his study showed that "low speed drivers are more likely to be involved in 'accidents' than relatively high-speed drivers." However, Solomon's original research is dated, may not be valid under scrutiny, and was conducted on rural highways only, not streets with people in communities. So, are we as a transportation profession not appropriately interpreting and applying research for which it was intended?

The 85th percentile method presents several disadvantages[2]:

- *it unrealistically assumes that drivers select their travel speed taking adequate and objective consideration of road safety issues;*
- *it is considered to be the cause of a gradual increase of the average operating speed;*
- *it produces an inadequate measure of speed consistency;*
- *it tends to be less effective the more residential the surrounding environment is; andit cannot be considered as objectively rational, since it considers an erroneous driver perception of speed impacts.*

Let's think about this for a second, a rural highway has about as much in common with a city street as a tractor has with a minivan. Put another way, if you needed brain surgery, would you go to a general practice physician or a neurosurgeon? The complexity of a street within a community has so many unique challenges and opportunities that rarely present themselves on rural highways. Yet, too often, we apply the same principles when it comes to speed on both rural and urban roadways.

Alternative approaches for setting speed limits, which incorporate factors such as crash history and the presence of people walking and biking are readily available.

While it's perfectly reasonable to assume that uniformity of vehicle speeds reduces the risk of vehicle collisions on rural roadways, should the "85th percentile rule" remain the

dominant factor in establishing speed limits on all streets and in all communities? If our goal is to build safe and productive communities, we must reconsider our approach to design speed and how we set speed limits, as they are both directly tied to speeding-related crashes.

We must focus on designing streets that enhance safety for all roadway users and improve the livability, connectedness, health, prosperity, and access in our towns. Why not design streets that don't require police enforcement or ambulance visits and instead, have safety built right into them?

Design Speed is a Value Statement

By Charles Marohn, PE, AICP

When engineers design streets, we start the process using the values of the engineering profession.

As engineers, we don't stop to consider that our core values might be questioned by others and might, in fact, be rejected by most of society. For most engineers, it never crosses their minds that the values embedded in the approach they use would actually be abhorrent to many, if not most, non-professionals. It's not because engineers are immoral but, rather, because we don't recognize our values as values.

For the engineer, it's just the way things are done. It's standard practice.

When engineers sit down to design a street, they begin the process with the design speed. I've been in countless meetings where engineers presented design plans and even preliminary studies for a street project. Never, and I mean *never*, was any elected official or any member of the public asked to weigh in on the design speed.

Never once did I hear one of my fellow professional engineers say, "So what are you trying to accomplish with this street in terms of speed?"

No. The design speed is solely the purview of the engineering professional. Why?

Choosing a design speed is, by its nature, an application of core values. When we pick a speed, we are selecting among different, competing priorities. Is it more important that peak traffic move quickly or is it more important to maximize the development potential of the street? Do we compromise the safety of people crossing on foot to obtain a higher automobile speed, or do we reduce speeds in order to improve safety for people outside of a vehicle?



This environment has been designed to value the safety, productivity and enjoyment of people.



This environment has been designed to value the fast movement of cars.

These are policy decisions. Shouldn't public officials be given the broad range of options and be allowed to weigh them against each other? Of course they should! So, why aren't they?

Many of my engineering colleagues will reply that they—the engineers who design streets—don't control the speed at which people drive and that speeding is an enforcement issue. Such an assertion should be professional malpractice. It selectively denies both what engineers know and how they act on that knowledge.

For example, professional engineers understand how to design for high speeds. When building a high-speed roadway, an engineer will design wider lanes, more sweeping curves, wider recovery areas and broader clear zones than they will on lower-speed roadways. There is a clear design objective—high speed—and a professional understanding of how to achieve it safely.

There is rarely any acknowledgement of the opposite, however: that slow traffic speeds can be obtained by narrowing lanes, creating tighter curves and reducing or eliminating clear zones. High speeds are seen as a design issue but low speeds are seen as an enforcement issue. That's incoherent.

The other pushback often given by professional engineers for why they—and not public officials—should set the design speed is that non-professionals are not qualified to do so. Two years ago I wrote "Engineers Should Not Design Streets,"[3] an article for which many of my fellow professionals accused me of being gratuitously provocative. I was not.

The design of streets begins with the establishment of priorities. It begins with an application of core values. Engineers generally lack the background, training and understanding to make such a complex decision. Indeed, I think engineers have become uniquely *unqualified* to do so.

For local streets, setting the design speed is something that should be done only by policymakers—elected officials—and only after a broad and deep dialogue with the community about values and priorities. This is not a decision to be made through the prism of one professional silo. It is too important for that.

So as engineering professionals, it's time to recognize that establishing the design speed for a particular street is something you have an obligation to discuss with, at a minimum, the elected officials in the community and ideally the residents too. You must give them options and inform them of the full range of alternatives and tradeoffs. Humble yourself to serve their priorities and resist the temptation to bully them into following yours.

In a Strong Town, setting priorities—imposing a set of values—is not the engineer's sole responsibility. It's the responsibility of the entire community.

How to Turn a Stroad into a Street or a Road

By Charles Marohn, PE, AICP

Our national transportation conversation has us obsessing over finding more money to continue to do the same thing. This is only making us poorer.

Instead, we need to focus on finding ways to make better use of our existing investments. This means we need to spend our energy converting our most expensive, least productive and most dangerous transportation investment—our stroads—into either wealth-producing streets (to create a place) or highly productive roads (to connect productive places).



From a technical standpoint, this is very easy. From a cultural standpoint, it is near impossible. If we want to build financially productive places, we need to recognize our stroads and support actions to eliminate them.

HOW TO TURN A STROAD INTO A STREET

When we convert a stroad to a street, the emphasis should be on creating a successful place. This means we have to slow down traffic—actually constrict the speed that people can drive—to make the place safe and inviting for people outside of cars.

We must also prioritize the activity and safety of people over the movement of traffic. This impacts our street design but also the placement, scale and orientation of buildings. The environment should be reconfigured to a human scale, not a car scale. A street is human habitat and humans, outside of their vehicles, are the indicator species of success.

To build wealth, we actually need to build. We must allow, by right, the next increment of development everywhere and at all times. A successful place will experience development pressure to incrementally improve, intensify and expand existing structures, as well as to fill in any gaps that might exist. Our regulatory approach needs to recognize and facilitate these investments.

Finally, we must be aware that productive places change over time. Street transformation projects that try to jumpstart development by building a finished streetscape are, more often than not, counterproductive. Focus on the development—on attracting incremental investment—and then modify the street over time, responding to the level of private investment that has been made.

HOW TO TURN A STROAD INTO A ROAD

When we're building a great road, we're trying to move people and goods over distance at speed. This is a simple undertaking, and we need to discipline ourselves to hold to this simple task.

We should not allow extraneous accesses onto our roads. Intersections, on-ramps and exit ramps to slow down traffic and artificially create congestion. Interchanges should be many miles apart and should focus on moving traffic, not facilitating development. We should not mine—or allow others to mine—the large public investment in roadway capacity for the short-term economic gain of a few (i.e. those who live or work near the on- and off-ramps or intersections). That is what we are doing when we add accesses to our roads. We are stealing pennies from everyone and throwing most of them away while giving a handful to the adjacent landowners. It's bankrupting us.

Where we anticipate, or desire, people outside of automobiles (walking, biking, etc.) we need to do that on separate facilities. There is no way to safely bike five or ten feet away from automobiles moving 40+ miles per hour. The margin of error is unacceptably small. Biking and walking should be completely separated from a road.

With a road, just focus on moving vehicles. Resist the temptation to build a Swiss Army gadget that tries to do everything. It doesn't work.

In short, we can turn a stroad into a street by slowing down cars and intensifying the land use, allowing for incremental development along the way. We can turn a stroad into a road by limiting access, simplifying the landscape and completely separating other uses. Take these steps and you're on your way to building a stronger town.

Endnotes

[1] Eric Dumbaugh, "Design of Safe Urban Roadsides," TRR No 1961, pp 74-822

[2] Elvik, 2010; Park and Saccomanno, 2006; TRB, 1998

[3] Read the essay here: https://www.strongtowns.org/journal/2016/5/22/engineers-should-not-design-streets

Cover photo by Richard Drdul.

The mission of Strong Towns is to support a model of development that allows America's cities, towns and neighborhoods to become financially strong and resilient. For the United States to be a prosperous country, it must have strong cities, towns and neighborhoods. Enduring prosperity for our communities cannot be artificially created from the outside but must be built from within, incrementally over time. For the latest on slowing the cars from Strong Towns, visit www.strongtowns.org/slowthecars.

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THE SUPREME COURT'S CIVIL RIGHTS ROLL CONTINUES: CERTIORARI DENIED IN LOMITA V. FORTYUNE

POSTED BY MARK POTTER ON JUNE 29, 2015 WITH 0 COMMENT



On June 29, 2015, the Supreme Court denied the City of Lomita's petition for certiorari in the Potter Handy, LLP case, City of Lomita, California v. Robin Fortyune, No. 14-920, leaving undisturbed the 9th Circuit's September 5, 2014 decision holding that Title II of the Americans with Disabilities Act ("ADA") requires local governments to provide accessible on-street parking in the absence of regulatory design specifications for on-street parking facilities.

As earlier reported by Potter Handy, the 9th Circuit panel stated that the text of the ADA, the relevant implementing regulations, and the Department of Justice's interpretation of its own regulations all led it to conclude that public entities must ensure that all normal governmental functions are reasonably accessible to disabled persons, irrespective of whether the DOJ has adopted technical specifications for the particular types of facilities involved.



As background, Robin Fortyune, now deceased, represented by Potter Handy, LLP, filed a state court complaint against the City of Lomita nearly four years ago, on July 1, 2011, alleging that the City has no accessible diagonal stall parking on its streets. The City removed the case to the Federal Court for the Central District of California on August 12, 2011, and promptly filed a motion to dismiss Mr. Fortyune's complaint, arguing that the absence of regulatory design specification for on street parking facilities precluded liability. In an order dated October 28, 2011, U.S. District Judge Dean D. Pregerson denied the City's motion, holding that "all public services must be readily accessible" to individuals with disabilities, "whether or not a federal agency has created specific guidelines for a particular service." Judge Pregerson went on to say that although "detailed regulations can help public entities and courts determine compliance, … where none are on point, we fall back to the [ADA's] general statutory requirement" making it unlawful to deny a public service to individuals with disabilities. (Citing 42 U.S.C. § 12132.) The City filed an interlocutory appeal to the Ninth Circuit.

On September 5, 2014, the Ninth Circuit (panel of Paez, Nguyen, and Motz with Paez writing the opinion), upheld Judge Pregerson's decision, holding that the absence of architectural guidelines does not obviate the City from making its on street parking facilities accessible to people with disabilities. The Panel observed, among other things, that:

1. The ADA is a broad remedial statute, enacted to remedy widespread discrimination against persons with disabilities by providing a comprehensive broad mandate to eliminate discrimination against persons with disabilities through addressing both outright intentional exclusion as well as the failure to make modifications to existing facilities and practices. Citing 42 U.S.C. § 12101(b)(1).
2. The ADA has been interpreted to "bring within its scope anything a public entity does." Citing Barden v. City of Sacramento, 292 F.3d 1073, 1076 (9th Cir. 2002).
3. On-street parking is a "program, service or activity" for purposes of Title II. The Ninth Circuit has previously recognized sidewalks to be a program, service or activity that public entities have to ensure the accessibility of, even though the Title II regulations do not specifically address sidewalks. Barden, 292 F.3d 1073. The obligation to provide on street parking is analogous.
4. The lack of a specific regulation cannot eliminate a statutory obligation; nothing in relevant case law, the Department of Justice regulations or technical assistance materials suggest otherwise.

As a practical matter, denial of the City of Lomita's petition for certiorari of the above-described Ninth Circuit's decision means that cities must now re-evaluate and address the accessibility of their on-street parking, as well as their other programs, services and activities, to ensure compliance with long-standing statutory obligations to avoid discrimination against individuals with disabilities, regardless of whether detailed regulations or specific guidelines addressing those programs, services and activities exist.

###

If you are a person with a disability and encounter barriers to access, whether policy based or architectural in nature, please do not hesitate to consider your role as an advocate. Your decision to challenge unfair and discriminatory practices benefits numerous people that you will never meet. You have an effective and willing partner in this endeavor. The Center for Disability Access has been litigating these cases for two full decades. Whether it be consultation or representation, we represent our clients for free. Pl



KUNGL
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Traffic Noise and Property Values

MATS WILHELMSSON

Stockholm 2000

MEMORANDUM 5:50
DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT
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Memorandum 5:50

ISBN 91-973776-2-7
ISSN 1106-4101

TRITA-BFE-M-1050
ISRN KTH/BFE/M-1050-SE

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Traffic Noise and Property Values

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Doctoral thesis for the
Doctoral Degree of Technology
to be publicly defended in
hall D3 at the Royal Institute of Technology
on Friday, at June 2, 2000, 13:00

Abstract

This thesis consists of five papers about traffic noise and property values. Their aim was to analyze the impact of traffic noise on property values and to translate this effect into a monetary value. The method used was the hedonic technique in which the price of the property is assumed to be a function of its attributes (e.g. living area and indoor quality). It is possible to estimate implicit prices of all the attributes by regressing the property prices on housing and location attributes. These implicit prices could then be used to estimate the price and income sensitivity of the different attributes.

Essay 1, written together with my colleagues Kicki Björklund and Bo Söderberg, investigates the purposes, data sources, presentations and methodologies of published empirical works. Overall, these works exemplify good scientific practice. *Essay 2* is an analysis that estimates the marginal willingness-to-pay for a reduction in traffic noise. Noise is negatively capitalized into house values and the analysis shows that a house relatively far away from a nearby road would sell for 15-20 percent more than a house near the road. *Essay 3* presents a methodology for estimating the price and income elasticity of different housing attributes. This entails estimating a system of expenditure functions based on an additive preference function. The analysis indicates that housing attributes are relatively insensitive to price and income changes. *Essay 4* discusses whether an investment in noise abatements was justified economically. By analyzing house sales that has occurred more than once, where some of the houses were sold before and after the investment, it is possible to estimate the effect of the traffic noise barrier. The conclusion, in this particular case, is that investment in noise barriers is highly justified. *Essay 5* is my licentiate thesis that has already been presented.

Trafikbullers kapitalisering i fastighetsvärden

MATS WILHELMSSON

Institutionen för fastigheter och byggande
Kungliga Tekniska Högskolan

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Stockholm 2000

Akademisk avhandling (sammanläggning)
framlagd till offentlig granskning med tillstånd av
delfakultet ALV för vinnande av
teknologie doktorexamen
i sal D3 vid Kungliga tekniska Högskolan
Fredagen den 2 juni 2000, klockan 13:00.

Referat

Denna doktorsavhandling är en sammanläggningsavhandling bestående av fem artiklar. Samtliga behandlar området trafikbullers kapitalisering i fastighetsvärden. Avsikten med avhandlingen är dels att analysera kapitaliseringseffekten, dels ”översätta” den till en samhällsekonomisk värdering. Metodiken som har används är den s k hedoniska tekniken i vilken man skattar den hedoniska prisekvationen. Det innebär att priset på fastigheten sätts i relation till ett antal egenskaper hos fastigheten där förekomsten av trafikbuller är ett av dessa egenskaper. De relativa betydelserna mellan olika egenskaper kan sedan tolkas som de marginella betalningsviljorna för respektive egenskap. I ett nästa steget utnyttjas betalningsviljorna för att skatta pris- och inkomstkänsligheten hos de olika egenskaperna, vilket tillsammans med den marginella betalningsviljan för t ex egenskapen förekomst av trafikbuller möjliggör skattningar av det samhällsekonomiska värdet som bl a används i trafikverkens samhällsekonomiska bedömningar.

Uppsats 1 är en rapport skriven tillsammans med mina kollegor Kicki Björklund och Bo Söderberg. Uppsatsen är en undersökning av tidigare gjorda empiriska analyser. *Uppsats 2* är en empirisk analys där den hedoniska prisekvationen skattas. Genom statistisk analys är det möjligt att skatta marginella betalningsviljor för respektive egenskap. I analysen testas modellens implicita antagandena om jämviktspriser på bostadsmarknaden samt symmetrisk information mellan säljare och köpare. I *uppsats 3* estimeras de enskilda egenskapernas pris- och inkomstkänslighet m h a ett system av utgiftsfunktioner. Slutsatsen är att samtliga undersökta egenskaper är relativt pris- och inkomstokänsliga. Känsligheten ökar dock vid ökad inkomst och familjestorlek. *Uppsats 4* är en undersökning som analyserar hur byggnationen av en bullerbarriär påverkar fastighetspriserna. Skillnaden i priserna före och efter byggandet av bullerbarriären utgör den samhällsekonomiska nyttan av investeringen som sedan jämförs med kostnaden. Slutsatsen är i detta fall att investeringen i bullerbarriär är samhällsekonomiskt motiverad. *Uppsats 5* är min tidigare framlagda licentiat avhandling.

Acknowledgements

A small step for mankind, but a large step for me. Naturally, I owe a lot of people a big gratitude for making it possible for to me take this step. First, I would like to thank my supervisor Professor Roland Andersson. Without his help, writing this thesis would have taken many more years to complete. I want to thank him for all his encouragement and comments that have considerably improved this thesis and for all his trust in me and what I am doing. I also would like to express my gratitude to Margareta Johannesson for making Economics such an interesting subject and to Mats Bohman for all his time and efforts in improving my thesis.

Second, I also send big thanks to all my former and current colleagues at the Section of Building and Real Estate Economics, KTH, especially Samuel Azasu, Kicki Björklund, Åke Gunnelin, Sigrid Katzler, Kerstin Klingborg-Stark, Svante Mandell, Ann Sjöberg, Bo Söderberg and Yang Zan for creating a supportive and inspiring environment.

Moreover, I would also like to express my gratitude to Professors John Quigley, Nancy Wallace and Robert Edelstein, and Chris Redfearn at University of California, Berkeley, for inviting me and making my one-year stay in Berkeley so instructive and pleasant. I also would like to thank all the nice people I met in Berkeley, especially Ryuhei Sakamoto, for making my visit to the U.S. so enjoyable.

Finally, I would like to thank my mother, Mai-Britt Wilhelmsson, my brothers, Kent and Jan, and my nieces, Ramona and Rebecca for all their love and support throughout the years. Equal thanks go to my dear friend since childhood, Kenneth Lund, and to his family, to my college friend Ulf Ericsson and my friends Carin Wilhelmsson and Pontus Åberg.

A thought goes also to my father Boo Wilhelmsson, who I know, would had been proud today.

Financial support from the Swedish Transport & Communications Research Board (KFB) and the Swedish Road Association (Vägverket) is gratefully acknowledged.

Stockholm, April 2000.

Mats Wilhelmsson

Traffic Noise and Property Values

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Traffic Noise and Property Values[1]

1. Introduction

This thesis is made up of five different papers, which concern the following problems: Is traffic noise capitalized into the value of houses and how much reduction in price can you in that case expect? Is it possible to "translate" this capitalization effect into a willingness-to-pay measure for a reduction in traffic noise? Does the household size, income or level of mortgages affect the willingness-to-pay? Does the construction of a noise barrier have a positive effect on value and is it justified economically to build noise barriers? These, and many more, are questions I try to answer in this thesis. In this introductory chapter of my thesis, I will put all the papers in perspective of economic theory and summarize their content.

Road traffic is one of the most common sources of noise in Sweden and almost 1.6 million people were affected by it in their homes 1990. Nearly 20 percent of these people live in residential areas where the level of noise is above 65 dBA, that is, highly noise-polluted areas. It is, however, not easy to define noise. One definition is that noise is "unwanted sound", which means that the same level of sound is sometimes regarded as noise and sometimes not. High levels of noise can have serious health effects, but usually the sole existence of noise leads to only minor health problems. This can result in, e.g., sleeping problems and high blood pressure, but the main effect of traffic noise is mainly a nuisance. The non-existence of silence is, however, one of the highest ranked environmental problems in society and a number of surveys in different countries support this (SOU 1993:65). Therefore, the Swedish society has allocated many resources to reduce traffic noise in residential areas. However, in many cases no estimation of the benefits of such reduction has been carried out.

Furthermore, cost-benefit analysis concerning investments in roads use a monetary value of traffic noise and the analyses presented here form part of a total revision of all the monetary values in them. By analyzing the price difference of houses in quiet and noisy locations, such monetary values can been revealed. Moreover, it is possible to interpret the difference as the marginal willingness-to-pay for a reduction of traffic noise. However, it is a risk that its use can overstate the benefits of an improvement if the changes are non-marginal. A more general valuation needs information about the price- and income sensitivity. An alternative estimation of the benefit can be achieved by analyzing the price of the *same* house before and after the improvement, where the difference in price is interpreted as the benefit of the improvement.

The thesis consists of five different papers. I have written four of them on my own and the first of the five papers presented here, I have written together with Kicki Björklund and Bo Söderberg. It is not the first paper written but I have chosen to put it first because it is the starting point of the second phase of my research work for a doctoral degree. It is a review paper of econometric analyses made by other researchers, which were presented and published, in international journals. The second paper in my thesis is, in a sense, a summary paper of my licentiate thesis, even if I have improved the empirical part where marginal willingness-to-pay is estimated. The third paper I wrote during my one-year stay in Berkeley. In this paper, I estimate the income and own-price sensitivities for different housing attributes. In the fourth paper, I use the repeated-sales method to estimate benefits of the construction of noise barriers, which is compared with the costs. The fifth paper is my licentiate thesis.

[1] Comments from Roland Andersson, Samual Azasu and Svante Mandell are gratefully acknowledged.

2. The Hedonic Price Equation

A number of questions arise during the process of a household's choice of a dwelling place. First, the household must determine which type of housing it prefers. Does the household want to buy or rent, live in an apartment or in a single-family house? Secondly, if the household has decided to buy a single-family house, where should the property be located? Besides a large number of location attributes, there are a number of housing attributes that matters for the household. All the housing and location attributes, together with financial restrictions, determine how much the household wants to bid for a certain property available on the market. If this bid results in a transfer of the house, from the seller to the buyer, the price can be seen to be a function of a number of housing and location attributes. This relationship between price and attributes is often called *the hedonic price equation* and, by estimating this equation, something can be revealed about the relative dependency between the attributes. The implicit prices of the different attributes can then be calculated.

Court (1939) presented one of the first analyses that used the hedonic price method and he also defined the concept of *hedonic price comparisons* as "those which recognize the potential contribution of any commodity, a motor car in this instance, to the welfare and happiness of its purchasers and the community." The present thesis follows a long tradition of dissertations and papers that use the hedonic technique. Rosen's (1974) theoretical article formalized the technique and his article was very much the starting point of a revolution in this field. Since the middle of the 1970s, a large number of articles have been published.

To put it simply, Rosen theoretically shows that one can interpret the relative dependency between the attributes as the marginal willingness-to-pay. He also presented a procedure of how to use the estimated parameters in the estimation of the demand equation, that is, the demands for different attributes of the house in this case. By estimating the demand equation, it is possible to analyze how sensitive the household is to changes in the implicit prices (price elasticity) or household income (income elasticity). It is also possible to investigate how other socioeconomic characteristics of the household (e.g. family size) affect the price and income elasticities.

Maclennan (1977) discusses a number of theoretical and empirical problems related to the estimation of the hedonic price equation. In particular, the implicit assumptions that usually underlie hedonic price equation are questioned. Generally, the market is assumed to be in equilibrium, though this is not always a realistic assumption. However, it seems to be relatively reasonable to assume equilibrium in the housing market when the sample is restricted in both time and space. Furthermore, he concludes that the possible existence of sub-markets is often ignored, as is the role of transaction and search costs. Maclennan also stresses the risk that omission of important variables causes estimation bias. Normally, it is assumed that the omitted attributes in the hedonic price equation are not correlated with the included one, which is not always the case.

The functional form of the hedonic price equation has been subject to some debate over the years and the commonly used linear hedonic price equation relies on implicit assumptions that are not likely to be realistic. For example, the linear form implies that the marginal valuation of an attribute is invariant with the quantity level. There is, however, nothing in economic

theory that postulates any particular functional form and Halvorsen and Pollakowski (1980), for example, use a Box-Cox transformation that empirically finds the best functional form.

Miller (1982) reviewed a number of empirical works. The purpose of his review was to focus on attributes that affect house values and on limitations of the hedonic method. His conclusion is that the understanding of how housing and location attributes influence house values is well established and that our attention must now focus on financial factors and transaction costs. Regarding the limitations, he especially emphasises that the problem with multicollinearity must be fully recognised.

The first two essays presented in this thesis very much follow the path of Rosen and address the problems raised by Maclennan and Miller. The first essay is a review article that investigates how published empirical work is presented, how the work is connected to previous theoretical discussion and how the result is presented and interpreted. The second essay is an analysis that employs the hedonic technique, but it tries to take some of the objections raised by Maclennan and Miller into consideration. Especially, the implicit assumption about equilibrium and symmetric information is thoroughly analysed and so is the question of multicollinearity.

Essay 1: An Investigation of Property Price Studies

The first essay presented in this thesis is a review written together with my colleagues Kicki Björklund and Bo Söderberg. The aim of the paper was to analyze published property price studies with respect to purpose, data sources, presentation and methodology.

A review article by McCloskey and Ziliak (1996) inspired the essay. Their study focused on the distinction between economic and statistical significance and their point was that an independent variable could be statistically significant without being significant or of importance in economic terms. Their findings indicate that the authors of the reviewed paper largely misunderstand the concept of statistical significance. Our paper followed McCloskey and Ziliak, but we considered a broader number of issues that fall in the category of good scientific practice. We discussed a number of basic guidelines concerning the reporting of research in general and in econometrics in particular and for each of these guidelines, a question was formulated. All the questions were constructed so that a “yes” indicated that the empirical analysis is in accordance to good scientific practice.

Two of the questions were related to the presentation of the work and how it was connected to previous research and theoretical discussion. Six questions were associated with how the considerations underlying the modeling procedure were presented and four questions with how the data was presented. Six questions were related to how the results were presented and interpreted. These 18 questions were then explored using a sample of published empirical studies.

Our selection of journals included the leading ones in real estate, housing and urban economics. The sampled articles consisted of property price or rent studies applying regression techniques. The total number of articles, published between 1990 and 1995, was 1,882 and the sample consisted of 145 articles (8 percent). Almost 85 percent of these were published in six of the twelve journals under consideration. As many as 100 of the 145 articles

were primarily focused on individual attributes and 45 on the model as a whole. Though this research area is well established and has been investigated for decades, a number of real estate sub-markets appear to have been sparsely investigated. This is particularly true regarding applications on income properties. Only 20 percent of the sample used return as the dependent variable and less than 30 percent presented empirical analysis employed on income properties. The increasing importance of the real estate market in connection to financial analysis supports our view that income properties should be studied by increasing the use of the hedonic technique.

The results from the different questions varied considerably. Under the assumption that all researchers follow the recommendations found in econometric textbooks and critical reviews, we expected the frequency of ”yes” answers to come rather close to 100 percent for most of the 18 questions. This was, however, not the case. The result was in some cases much lower. The frequency of “yes” answers ranged from 20 percent on each question up to over 90 percent, with an average of 58 percent. The total number of “yes” answers per article ranged from 5 to 15, with an average of 10. However, as a whole, the selected articles give recognition to the issues raised in our questionnaire and when we matched the results with those of McCloskey and Ziliak, we got the impression that the results were of a comparable nature.

Almost every empirical work in the articles rested on a theoretical discussion and comparisons to other studies were also common. However, only a small share of the papers, 27 percent, motivated the choice of functional form. The corresponding percentage for articles using a linear function was even lower, 18 percent. In almost 50 percent of the articles the choice of independent variables were motivated and a slightly larger group presented assumptions for the variables chosen. However, they did not discuss the risks connected with excluding possible relevant variables to the same extent. The presentations of the data were generally rather substantial, e.g. almost every article presented the number of observations and the data sources. The number of articles that presented descriptive statistics was lower and only 20 percent of the papers discussed the validity of the data, possibly indicating the assumed absence of measurement error in the data. Almost all articles, presented the explanatory power, but as few as 30 percent interpreted it. A large number of articles commented on significant figures and discussed the economic interpretation of estimated coefficients, but only 30 percent of them explicitly gave recognition to the multicollinearity problem, and only 25 percent presented a residual analysis.

Essay 2: The Impact of Traffic Noise on the Values of Single-Family Houses

The second essay in the thesis is an analysis that uses the first step in the estimation procedure proposed by Rosen’s (1974).

In this study, the impact of traffic noise on the prices of single-family houses was analyzed. The major difference between this study and earlier studies was the inclusion of the noise variable in the hedonic price equation. Normally, the existence of roads generates both positive and negative effects (e.g. access to the city, air pollution and aesthetic effects). By including only one variable that indicates the level of noise at each house, the estimated parameter will measure the net effect. Thus, both the positive effects and other negative externalities apart from traffic noise will influence the parameter. In the estimation of the

marginal willingness-to-pay, I tried to distinguish the effects of the noise and all other effects that the road generates by decomposing the noise variable into two separate variables. The first variable measured the level of noise at each house and the second variable the level of excess noise at each house that has a view of the major road. Hence, the first noise variable measures only the noise effects while the second variable measures all the negative effects. Furthermore, by restricting the sample relatively narrow in space I was able implicitly to assume that the positive effect is constant.

In the empirical part of the analysis, I estimated the hedonic price equation, that is, the transaction price as a function of housing and location attributes. Living area, lot size and indoor quality were used as housing attributes and the level of noise from the major road was used as a location attribute. Distances to minor roads, corner lot and closeness to park were other attributes I tested but these did not statistically improve the model. I used a variant of the Box-Cox transformation to find the statistically best fitting specification. It was, however, not possible to reject the log-linear specification. This specification results in implicit prices that are a function not only of the consumed quantity of the attribute in question, but also of the consumed quantity and paid implicit prices of all other housing and location attributes.

The implicit prices for all the attributes were estimated and the constancy over time was tested by a Chow-test. The formal statistical test indicated that the parameters were not constant over time. My conclusion, in this case, was that the main reason for non-constant parameters was non-equilibrium prices on the housing market during the first period (1986-1989) in the sample due to rapid changes in housing demand. As it is not possible to interpret the implicit price as marginal willingness-to-pay during periods when prices are not equilibrium prices, I did not use the first period further in the analysis.

In the empirical part, I also tested the assumption about symmetric information between buyers and sellers. It was carried out by analyzing the turnover rates between houses that are located close to the major road compared to houses far away. My hypothesis was that if asymmetric information exists the turnover rate should be higher for the properties close to the road. This hypothesis was rejected and, thus, symmetric information was a reasonable assumption to make.

As the implicit price of noise should be used in cost-benefit analyses of road investments, the property tax should be taken into consideration. The difference in the price of the houses, due to traffic noise, is only one part of the total cost for the society. The other part is the reduction in total sum of property tax collected by the government. If this part is not included, the cost (increasing noise level) or the benefit (reduction in noise level) will be underestimated. One condition is that the property tax is non-local as it is in Sweden. That is, there is no connection between property tax and the supply of locally available public goods. In the empirical analysis, I also tested if the property tax was fully capitalized into property values. The result indicated that the extent of underestimation is as high as 30 percent if property tax is not included in the valuation of traffic noise.

The estimated effect of noise on property prices was considerable. The empirical analysis suggested an average noise discount of 0.6 percent per decibel. This implies that a house located in a quiet area would sell for SEK 975,000, and SEK 650,000 if located near a road where noise is considerable. This is equivalent to a total discount of 30 percent. The estimated

willingness-to-pay for a reduction or willingness-to-accept an increase in the level of traffic noise should, however, only be used for non-marginal changes as the implicit price equation is not equal to the demand function.

3. The Estimation of the Demand Equation

Follain and Jiminez' (1985) article is an extensive review of work aimed at estimating the demand for housing and location attributes. They especially discuss and analyze if it is possible to use Rosen's second step. The result indicates that it is possible, but a number of potential problems may arise. For example, it may be impossible to identify the parameters in the demand equation, as the variation in the implicit price is only a result of the assumption of the functional form of the hedonic price equation. Another problem that may arise is the fact that the household simultaneously chooses implicit price and quantity of the attribute, which induces an endogeneity problem in the estimation of the parameters in the demand equation. One solution to the latter problem is to use instrumental variables, such as income and other socioeconomic characteristics of the household. That is, to find variables that are correlated to the attribute in question but not to the stochastic term in the demand equation. Epple (1987) questions this procedure, or more correctly the use of socioeconomic characteristics as instrument variables. However, he also concludes that socioeconomic characteristics of the household can be suitable instruments if all housing attributes are measured and no measurement error in the variables exists.

Mayo's (1982) article is an overview of the estimation of demand equations. He especially discusses the log-linear specification of the demand equation and the difference between the use of aggregated and individual data. The review indicates that aggregation bias exists and, thus, that estimates of own-price and income elasticity are usually higher with the use of aggregated data. He also discusses the potential bias arising from the definition of the income variable in the demand equation. Current income is commonly used in the demand equation, but if the transitory income is high, it seems that the use of current income results in a downward bias of the income elasticity. In the second half of Mayo's article, he strongly recommends the use of linear expenditure functions instead of log-linear demand equations. The main reasons are as follows. In the first place, the linear expenditure system is more flexible, especially for the inclusion of demographic variables. Secondly, it does not concentrate on estimating *the* price and income elasticity and it is better grounded in economic theory. He emphasizes the possibility that price and income elasticity can differ among households, something the linear demand equation cannot easily handle.

My third essay presented in the present thesis and summarized below explores Rosen's second step by making an explicit assumption about the utility function. The price and income elasticities concerning three different housing attributes are estimated by a system of linear expenditure functions.

Essay 3: Household Expenditure Pattern of Housing Attributes

This paper presents estimates of income and own-price elasticities for a number of housing attributes. The method used relies on Rosen's (1974) proposed two-step estimation procedure. To be able to identify the structural parameters a restriction of the utility function has been imposed. By maximizing a utility function subject to a budget restriction, it is possible to derive a number of expenditure functions concerning all the housing attributes and all other

goods. Solving this system of expenditure functions makes it possible to estimate price and income elasticities. Surprisingly, the linear expenditure system has not been employed before in this type of study.

The system of household expenditure function of housing attributes is based on the additive Stone-Geary utility function, which is a reasonable assumption if households base their decision on budget shares. The expenditure function consists of two different parts, namely the base amount and the marginal budget share. The base amount is defined as the household's minimum need of different goods and the marginal budget share is defined as how much the household would increase the consumption of an attribute if income increases by one unit. By allowing the base amounts and the marginal budget shares to vary linearly with family size, I extend the traditionally linear expenditure system. To my knowledge, the latter has not been done before. Furthermore, savings are included in the household budget constraint. That is, the household equity position is included in the expenditure functions.

The system of expenditure has been estimated for four different housing attributes, namely living area, lot size, and indoor and outdoor quality. Outdoor quality is defined as the absence of traffic noise. Besides the consumption of housing attributes, the household consumes other goods, which is defined as the difference between permanent income and mortgages on the house. The difference between price and mortgage is naturally the households' equity, that is, their savings.

The implicit prices for all the housing attributes have been estimated by a Box-Cox transformed hedonic price equation. A log-linear specification cannot be rejected. The parameters have also been formally tested for constancy over time, which cannot be rejected. Furthermore, the robustness of the estimates in the linear expenditure system has been tested for different choices of specifications of the hedonic price equation and different specifications in different periods. The conclusion is that the estimated parameters are rather insensitive to the choice of functional form.

The results indicate that the minimum need of housing attributes as well as all the other goods and the marginal budget shares vary linearly with family size. If income increases marginally, the household would allocate more resources to living area and indoor quality than to lot size and outdoor quality. That is, the living-area and indoor-quality attributes are more sensitive to changes in income.

All the estimates of the income elasticities are of a reasonable magnitude and the results indicate that living area and outdoor quality are more income elastic than the attributes lot size and indoor quality. The overall price elasticity of housing is estimated to be -0.4 and the income elasticity to be around 0.5. The income elasticity increases with available income, family size and loan-to-value ratio. Especially, households' with children and low down payments have higher income elasticity with respect to the housing attributes living area and outdoor quality and the income elasticity for this subgroup is estimated to be around 0.7 for the attribute living area and 0.6 for the attribute outdoor quality.

4. A Case Study of Traffic Noise Abatement

In Essay 4 the following question is investigated: Is an investment in traffic noise barrier economically justified or not? Of course, it would be possible to answer the question by using the estimate of the marginal willingness-to-pay for a reduction in noise level, estimated in Essay 2, together with information on price and income elasticity, estimated in Essay 3. However, it is sometimes difficult to estimate accurately the noise level before and after the investment. Thus, it is difficult to quantify the environmental improvement. One method that does not need information about the exact change in environmental quality is a method that analyzes house prices before and after the environmental improvement, the so-called repeated-sales method. One of the disadvantages with the method is that the method could only be used ex post, that is, when the investment has already been carried out.

Bailey, Muth and Nourse (1963) introduced the method of the repeated-sales. They addressed the problem concerning variations in quality among houses over time and its consequences in the construction of property price indices. The standard way to address this problem is by applying the hedonic technique. However, when the changes in quality have been large or are difficult to identify and quantify, the hedonic price index can be biased. If, however, changes in quality of the same property can be assumed to be zero and by only analyzing properties that have been sold more than once, an unbiased price index can be constructed. By analyzing the ratio in prices (final sale and initial sale price) between two sales of the same property, the price indices can be estimated using regression techniques.

Few studies have employed the repeated-sales method in the estimation of the benefit of environmental changes. Nourse (1963) used a price index approach in a study where he analyzed if public housing had a positive benefit on surrounding houses. He concludes that there was some positive difference in price trend, that is, in favor of public housing. Palmquist (1982) used the repeated-sales method to estimate the effect on house values of an environmental change (reduction in highway noise) while controlling for the overall changes in real estate price level. Mendelsohn (1987) also used the same method, but treated the overall price change differently compared to Palmquist. Instead of estimating the general price change, he used gross national product as a deflator. His conclusion was that environmental change had a significant effect on property values.

Essay 4: Valuation of Traffic-Noise Abatements

The fourth essay investigates whether or not an investment in a traffic noise barrier is economically justified. I have used the repeated-sales method to estimate the benefits of building a traffic noise barrier. The repeated-sales method use transaction data, but only those sales for which the same house has been sold at least twice. Thus, for every house I have data on an initial sale and a final sale. The price movement that has occurred between the first and second sale is compared with the price change in the total housing market. For a number of sales, I have properties where the initial sales took place before the noise barrier investment and the final sale after. By including a dummy variable in the regression model, it is possible to isolate the noise barrier effect. Two hypotheses were tested and verified. The first concerns if there is a capitalization effect and the second whether the capitalization effect depends on the distance from the house to the road.

The repeated-sales method is especially suitable when there is a large improvement in the environment. Compared to the hedonic method, the repeated-sales method is not affected by

the misspecification of the functional form and the omission of the relevant housing attributes as long as they do not change over time. The disadvantage with the repeated-sales method is that the estimation is based on a smaller sample, that is, there is a problem of sample selection bias. Another problem is the implicit assumption of the constancy of the parameters over time. Both these potential problems were investigated using formal statistical tests. I have also tested if multiple repeated-sales differ from single repeated-sales and included observed changes in housing attributes in the specification of the repeated-sale function.

By estimating the hedonic price equation, I tested if a sample selection bias exists and if the assumption of constancy in parameters over time holds. In addition to including the housing attributes in the hedonic price equation I also included a dummy variable where the value one (1) indicated if the sale belonged to a repeated-sale and zero (0) otherwise. I further included a number of interaction variables where all the housing attributes were multiplied with a set of time dummies. The conclusions, in this case, are that sample selection bias did not exist and the assumption about constancy in the parameters over time could not be rejected.

The result is highly statistically significant and none of the two hypotheses can be rejected. That is, there seems to be a capitalization effect and it is distance dependent as expected. The benefit has been computed as the total price increases, due to the noise barrier alone, multiplied with the number of houses in the stock. The benefit is estimated to be around SEK 25,500 per meter noise barrier, which should be compared to a construction cost of only SEK 5,400 per meter. Therefore, the investment in a noise barrier is justified economically in this particular case.

Appendix

Essay 5: Traffic Noise and Property Value (Trafikbuller och fastighetsvärden)

The fifth essay is written in Swedish and has been presented and accepted as a Licentiate Degree in Engineering in 1997.

Chapter 1 discusses the background, the choice of method and the definition of noise. Why is it necessarily to have an estimation of the monetary value of traffic noise? Since the beginning of 1980s, the Swedish Road Association has performed a cost-benefit analysis before investments in roads. One component in these analyses is of course the negative externality of traffic noise. An early monetary valuation of traffic noise was based on a property value study carried out in 1974. The aim of essay 5 was to revise this valuation. The analysis presented is also based on property values and the reason for this choice of method is that the hedonic method analyzes observed individual choices. Alternative methods are usually based on hypothetical questions, which can create a bias in the estimated willingness-to-pay for a reduction in traffic noise. Another question discussed in chapter one is about the definition of noise. Sometimes noise is defined as “all unwanted sound”, which is not a very clear definition. The definition indicates that noise is very much a question of experience. Noise is usually measured in the logarithm unit decibel. Decibel A (dBA) is a filter that tries to imitate the human ear.

Chapter 2 discusses different welfare measures. Three different measures is described, namely the consumer surplus (CS), compensating variation (CV) and equivalent variation (EV). CS is calculated by integrating the demand equation over the relevant price change, that is, the

measure will include both price and income effect. CV and EV on the other hand only measure the price effect. CV is based on the initial utility level and EV on the final utility level. The conclusion is that compensating variation (CV) is the preferred welfare measure, but the use of consumer surplus can be used as an approximation if the income elasticity is low.

Chapter 3 presents a thorough analysis of the hedonic technique. The first two sections describe Rosen's (1974) proposed two-step approach. The following two sections discuss some of the objection that has been raised against the hedonic model. I especially elaborate on the objection that has been raised against the equilibrium condition, the interpretation of the non-linear budget restriction implied by the non-linear price equation, the assumption about continuous housing attributes, and the question of market segmentation. Further, I briefly present the critique against Rosen's second step, namely the identification and endogeneity problem. The main conclusion is that: first, it is important to investigate if the market is in equilibrium. If not, it is not possible to interpret the estimated implicit prices as marginal willingness-to-pay. Second, it is equally important to analyze whether or not the housing market consists of any sub-markets and third, whether it is reasonable to assume that the implicit assumption about continuity in housing attributes holds. It has, however, been shown that a continuous approach performs as well as a discrete approach.

In chapter 4, I discuss the hedonic price equation, that is, the choice of functional form and the choice of attributes. I first conclude that there is nothing in the theory that postulates any particular functional form of the hedonic price equation. The choice of functional form is very much an empirical question. Second, housing and location attributes such as living area, lot size, indoor quality are attributes that are typically used in this type of studies. Finally, the inclusion of the noise variable is not without problems. If the noise level at each house is directly included in the hedonic price equation there is a risk that the estimated parameter not only measures the effect of noise, but also other negative externalities as well as positive externalities that the road generates. I have solved this problem by restricting the sample area to be relative small and, thus, implicitly assumed that the positive effects are constant. Further, I have decomposed the noise variable into two separate variables. One that measures the level of noise at each house and one that measures the excess of noise for visually exposed houses.

Chapter 5 to 7 presents the empirical analysis. I have estimated the hedonic price equation, tested for asymmetric information between seller and buyer, tested the equilibrium condition, and analyzed the residuals. The main conclusion is that traffic noise is capitalized into property values and that the estimated parameters are statistically significant. That is, the data supports the hypothesis about capitalization. The results also seem to be rather robust.

In chapter 8, I transform the implicit price of traffic noise into a cost-benefit valuation. The analysis indicates a noise discount in the range of 0.5 to 5.0 percent per decibel. The valuation supports the valuation used today, but the estimates also suggest a slightly higher valuation for houses exposed to very high noise levels and a lower valuation for houses that are not so noise polluted. The recommended noise valuation is less linear compared to the valuation that has been previously used.

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Neighborhood Traffic Intrusion

The clean, expansive beaches in Manhattan Beach attract visitors from far away to enjoy the splendid amenities of the Pacific Ocean, particularly during the summer. This attraction generates significant outside traffic and parking demands along the beach. While beneficial to the local economy, the beachgoers can impact residential neighborhoods by using local streets to avoid congested thoroughfares and parking in quiet residential areas.

Manhattan Beach lies between major employment centers to the north and South Bay residential communities and Palos Verdes Peninsula to the south. As described above, through north-south traffic significantly impacts Sepulveda and Aviation Boulevards, which carry volumes over their design capacity during morning and evening commute hours. This effect is intensified whenever I-405 experiences substantial delays.

When arterial and collector roadways become over-congested and vehicular movement is limited, motorists look for alternative routes to bypass the heavily congested streets. Regular commuters use the alternative routes regularly. Manhattan Beach's grid street pattern established in the early 1900s is conducive to cut-through traffic, which creates noise impacts and compromises pedestrian and vehicular safety in these neighborhoods. Local streets that intersect with congested arterials and collector streets experience the most cut-through problems.



2nd Street is a popular street for motorist to cut through. The uses on 2nd Street are all residential. A slight grade change is conducive to higher vehicle speeds as motorists travel downhill.

Motorists also look to avoid major intersections where excessive queuing occurs. Intersections along Sepulveda Boulevard in particular are heavily congested during peak hours, and connecting streets facilitate motorists cutting through to other north-south routes.

Neighborhood Traffic Issue Areas

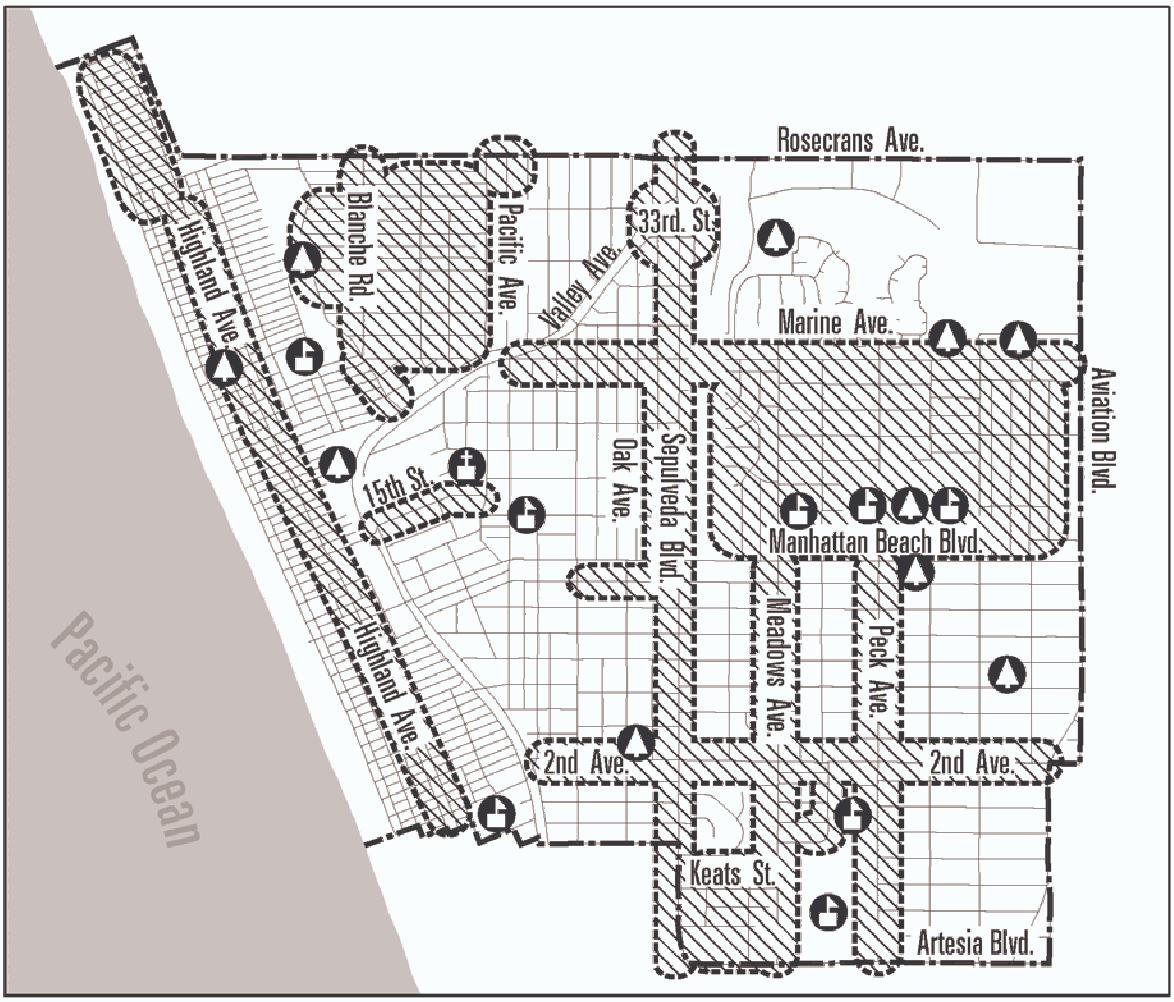
Marine Avenue (residential section west of Sepulveda Boulevard) and 2nd Street have experienced significant traffic impacts, including speeding, excessive volumes, truck traffic, and cut-through traffic during the peak hours of the day. Traffic studies have been conducted to determine the needed street measures that will help reduce traffic impacts on both streets. Marine Avenue measures included stop signs, increased enforcement, signage directing commuters to arterials, and modification to the centerline. 2nd Street has also gone through extensive street experimenting with street chokers and diverters aimed at reducing cut-through traffic.

Residents are concerned about excessive speed and volume resulting from Meadows Avenue being used as an alternative to Sepulveda Boulevard. Complaints from residents originated from persons with homes between Marine Avenue and Manhattan Beach Boulevard. The intersection is posted to only allow right or left turns onto Marine Avenue from Meadows Avenue, both directions; no through traffic is allowed. Residents surrounding Sand Dune Park have voiced their concern to the City about traffic volumes and lack of parking for park users.

Local streets directly adjacent to schools experience traffic impacts as well, such as cut-through traffic (vehicles and buses) and speeding, and pick-up and drop-off trips during morning and mid-afternoon hours. Parents shuttling children to school significantly increase traffic on local streets that surround the schools. Student parking for Mira Costa High School can encroach into surrounding residential areas, creating significant impacts.

Other areas have been identified as having traffic issues and some of these areas have been studied (see Figure 1-6). In many of these areas where traffic issues have identified, the City continues to experiment with options and has taken proactive measures to reduce impacts on the surrounding residential neighborhood.

Figure I-6:
Residential Streets/Neighborhoods with Traffic Issues



Source: Meyer, Mohaddes, Inc. and Neighborhood Traffic Committee; November 2002

Residential/Neighborhood Traffic Issue Areas

Schools

Public

Private

Parks

Neighborhood Traffic Management Program

In response to continued residents' concerns regarding traffic impacts in neighborhoods, in 2002 the City instituted a Neighborhood Traffic Management Program designed to identify specific issues at a local neighborhood level, and to allow residents to help define mitigation strategies appropriate to the identified and documented problem. The overall objective of the Neighborhood Traffic Management Program is to improve the livability of neighborhoods by mitigating the impacts of vehicular

traffic in residential areas. Specific impacts addressed by the Program include high non-local cut-through traffic volumes, excessive speeds, truck traffic intrusion, demonstrated accident history, and related problems.

The process will ensure that neighborhoods with demonstrated problems and community support for traffic improvements have equal access to neighborhood traffic management measures. The Program depends upon resident involvement and may vary from year-to-year based upon funding available for installation of neighborhood traffic improvements. The process includes the following steps:

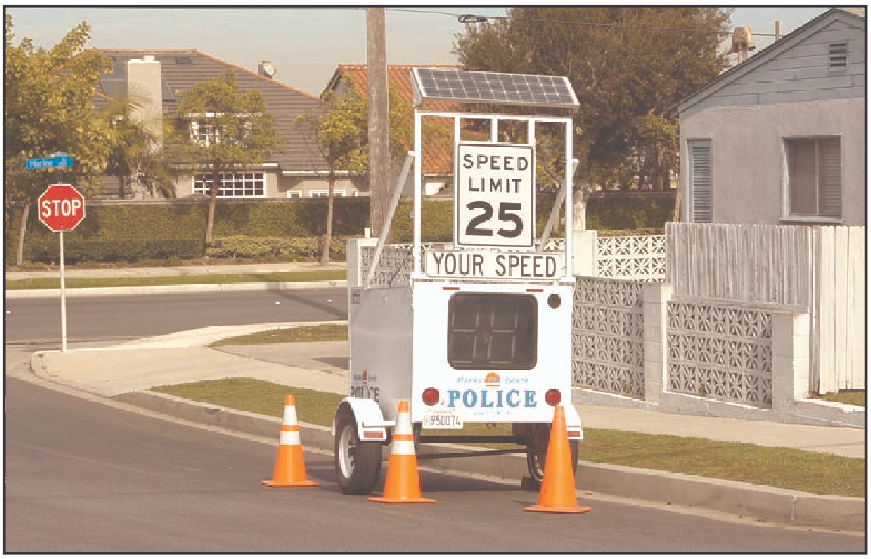
Step 1 - Identify Candidate Streets/Neighborhoods
Step 2 - Preliminary Screening and Evaluation
Step 3 - Engineering Analysis/Preliminary Recommendations
Step 4 - Neighborhood Meetings and Survey/Petitions
Step 5 - Develop, Install, and Evaluate Test Projects
Step 6 - Determination of Permanent Project
Step 7 - Monitoring

Various traffic management measures can be placed within a neighborhood street to help alleviate traffic; however, each control measure can have an impact on or divert traffic to adjacent streets. The Neighborhood Traffic Management Program requires extensive evaluation, analysis, and monitoring to prevent additional traffic problems elsewhere within a neighborhood.

Figure I-7 and Table I-1 present some of the different traffic management measures that can be used to ease traffic issues on local neighborhood streets. Efforts to apply Level 1 toolbox measures will be made first where feasible, then proceeding to Level 2 and Level 3 only when applicable Level 1 tools have been demonstrated as inadequate to solve the problems.



At Meadows Elementary School, both a speed limit sign and a temporary electronic message board warn drivers to slow down and drive safely.

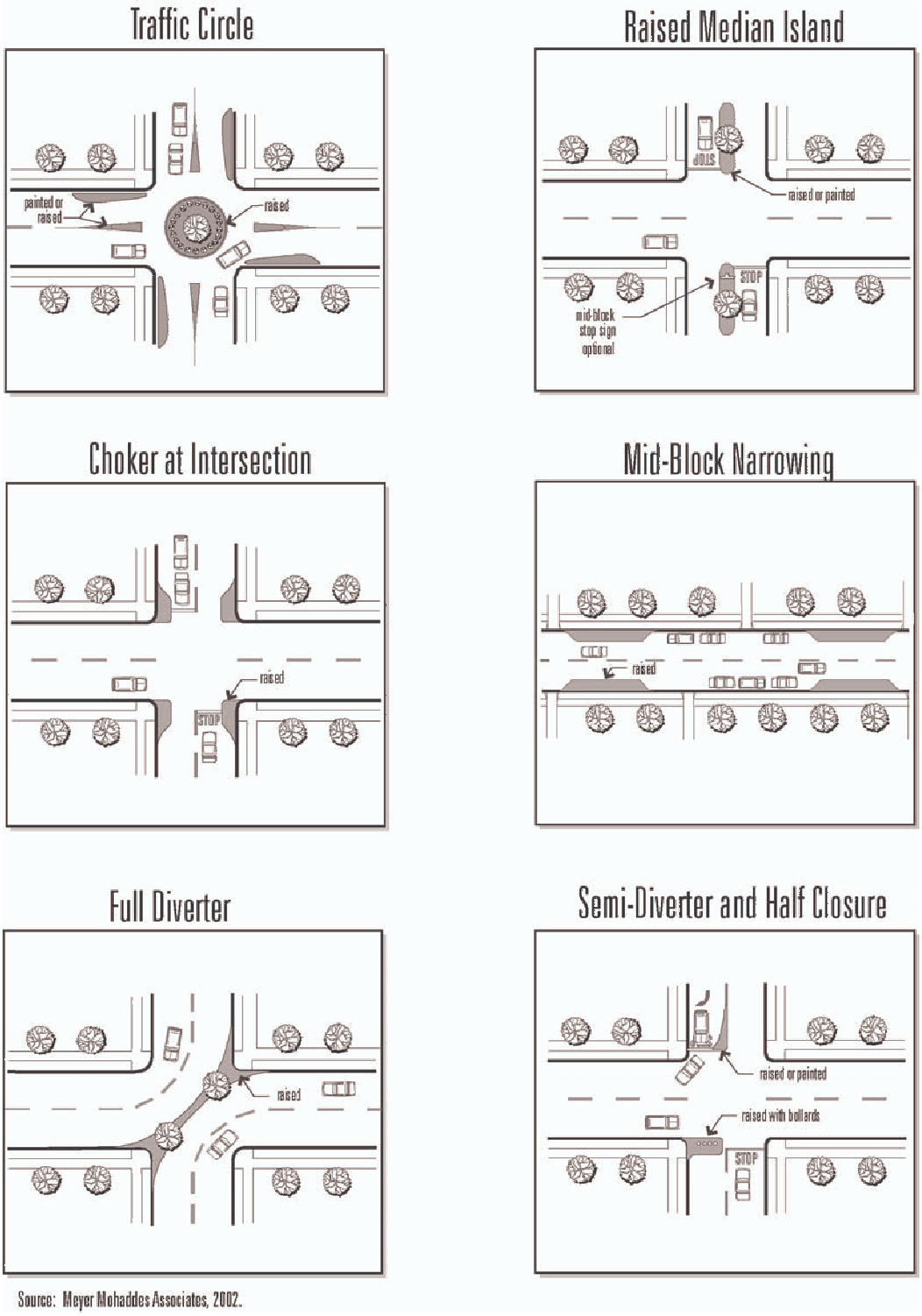


This speed monitoring trailer, provided by the Manhattan Beach Police Department, is an example of a Level 1 Toolbox measure.

Table I-1
Traffic Management Measures

Level 1	Level 2	Level 3
▪ Enhanced Police Enforcement ▪ Speed Monitoring Trailer ▪ Neighborhood Traffic Watch Program ▪ Higher Visibility Crosswalk ▪ Pedestrian Crossing Signs ▪ Electronic Speed Limit Signs/Larger Static Speed Limit Signs	▪ Traffic Signal Adjustments to Discourage Cut-Through Traffic ▪ Turn Restrictions Via Signage ▪ Rumble Strips/Dots ▪ Crosswalk Warning System ▪ Raised Median Island ▪ Entry Island (Neighborhood Identification Island) ▪ Mid-Block Narrowing ▪ Chokers at Intersections ▪ Lane Reduction/Lane Narrowing/Restriping ▪ Stop Sign as Neighborhood Traffic Control Measure ▪ Parking Restrictions	▪ Raised Crosswalk ▪ Raised Intersection ▪ Traffic Circle ▪ Restricted Movement Barrier ▪ Entrance Barrier-Half Closure ▪ Diagonal Diverter

Some traffic management measures can limit or affect access of emergency vehicles. Specific measures can negatively impact response time, such as diagonal diverter or half closure. Many of Manhattan Beach's roadways are very narrow; adding traffic measures can further limit emergency vehicle access. Public Works, Fire, Traffic Engineering, Community Development staff, and the Police Traffic Division review traffic improvement related requests and make recommendations to the to the Parking and Public Improvements Commission. The Commission members, who are appointed by the City Council, make recommendations and the City Council then takes action on the request.



Source: Meyer Mohaddes Associates, 2002.

Figure I-7

Examples of Neighborhood Traffic Management Measures

Police Department Traffic Team

In addition to the physical improvement strategies offered by the Neighborhood Traffic Management Program, the City will continue to use the Police Department's Traffic Team to patrol the streets of Manhattan Beach, investigating and resolving traffic-related concerns or complaints and enforcing traffic laws. Traffic officers are assigned to neighborhood patrol areas and solicit the support of the patrol officers, and to work as a team to address issues within their assigned area. The intent of the strategy is to have traffic officers become aware of and be more responsive to community concerns. This program also encourages officers to establish relationships with community residents and businesses, creating a heightened awareness of the people and activities in their assigned area. Contact with the community provides familiarity and allows the officers to develop a sense of ownership, thereby positively impacting traffic issues. It also provides residents a means to express traffic issues within their neighborhoods.

Goals and Policies: Preventing Neighborhood Traffic Intrusion

Goal I-2:	**Move commuter traffic through the City primarily on arterial streets, and on collector streets as appropriate, to protect other streets from the intrusion of commuter traffic.**
Policy I-2.1:	Encourage the use of the Neighborhood Traffic Management Program and utilize neighborhood traffic management tools to mitigate neighborhood intrusion by commuter traffic.
Policy I-2.2:	Establish priorities and determine funding available for implementing the Neighborhood Traffic Management Program.

Policy Discussion

Levels 2 and 3 traffic measures can be considerable in costs. With limited funding resources, planning and prioritizing the implementation of traffic measures is important, and will be established by the City Council.

Policy I-2.3:	Upgrade all major intersections and arterial streets to keep traffic moving efficiently.

Policy I-2.4: Require additional traffic lanes and/or other traffic improvements for ingress and egress for new development along arterials where necessary for traffic and safety reasons.

Policy I- 2.5: Work with neighboring cities and regional and sub-regional agencies to widen and upgrade all major intersections and associated street segments within the City and adjacent jurisdictions to optimize traffic flow.

Policy Discussion

Manhattan Beach is working with the cities of El Segundo, Hawthorne, and Redondo Beach to synchronize traffic signals using real time information and develop traffic management plans to combat congestion. Manhattan Beach consistently works with the MTA, South Bay Cities Council of Governments, Caltrans, employees associations, and neighboring jurisdictions on projects such as the Sepulveda Boulevard widening, Aviation Boulevard widening, Rosecrans Corridor Study and, the Douglas Street extension. Public Works has a number of CIP projects in the City that address subregional and regional traffic issues.

Policy I-2.6: Encourage the use of Intelligent Transportation Systems (ITS), such as advanced signalization, motorist information, advanced transit, advanced emergency vehicle access, and intelligent parking systems, as well as other appropriate communication technologies, to direct through traffic.

Policy Discussion

Intelligent Transportation Systems include the application of advanced information processing (computers), communications, technologies, and management strategies in an integrated manner to improve the safety, capacity, and efficiency of a transportation system. As mentioned in Policy I-2.5, Manhattan Beach is working with neighboring cities to coordinate traffic signals to move traffic through cities faster.

Policy I- 2.7: Monitor and minimize traffic issues associated with construction activities.

Policy Discussion

Construction activity can cause significant traffic congestion due to the need to close lanes or streets, limiting vehicle capacity or creating detours. More than one construction site on a street simultaneously can pose serious traffic impacts on surrounding streets.

What we were promised and what we got: how did a boulevard beautification project turn into a road diet?

NO Improved access and mobility
- gridlock, cut through traffic

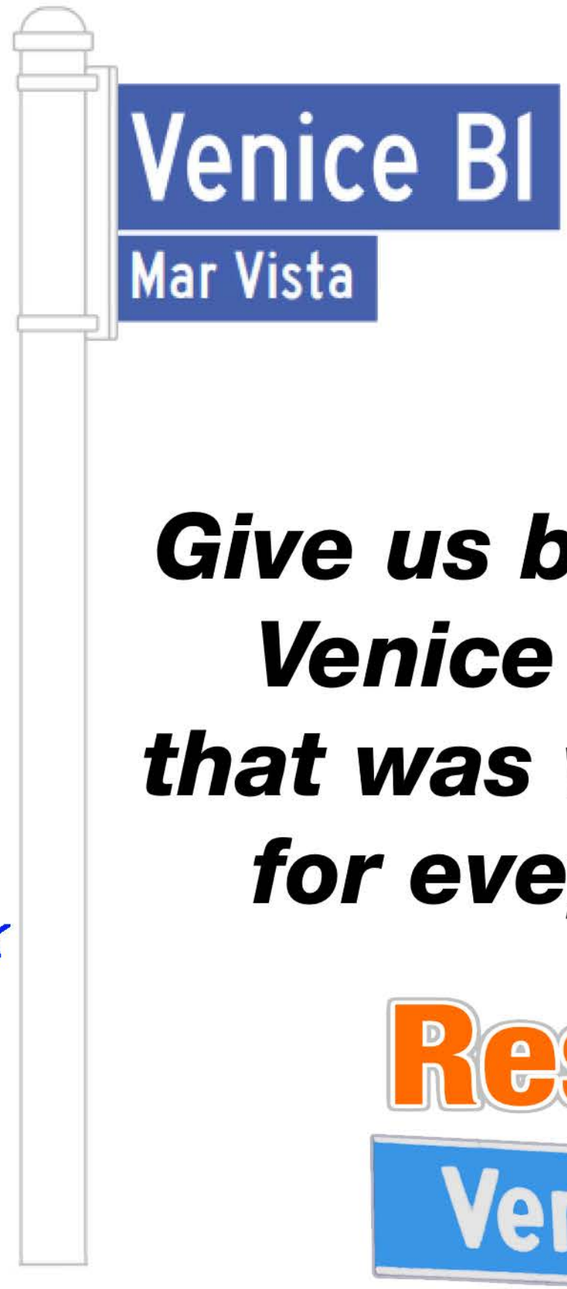
NO Increased economic activity
- business revenues down, up to 30%

NO Enhanced neighborhood character
- no boulevard beautification

NO Greater community engagement
- community in conflict over this project

NO Improved environmental resilience
- more air pollution from cars stuck in gridlock

NO Safer and secure communities
- 50 accidents since May 20, 2017
- emergency vehicles stuck in gridlock
- reconfigured parking less safe for seniors, the disabled and young children



Give us back the Venice Blvd. that was working for eveyone!

Restore



BIKEWAYS

Which types of bikeways would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: The bike lane on Venice Blvd is located between parked cars and motor vehicles, providing minimal separation from the travel lane



Like:

Dislike:

Buffered Bike Lanes: Buffered bike lanes separate bicyclists from motor vehicles by a painted buffer, providing bicyclists more space from the vehicle travel lane than the existing bike lane (would not result in loss of parking)



Like:

Dislike:

Green Bike Lanes: Green bike lanes make people on bikes more visible to drivers by coloring the bike lane green, making drivers more aware of where bicyclists are riding (would not result in a loss of parking)



Like:

Dislike:

Protected Bike Lanes: Protected bike lanes physically separate bicyclists from motor vehicles by posts, curbs, parked cars, or other elements (may result in the loss of some parking stalls when constructing separation)



Like:

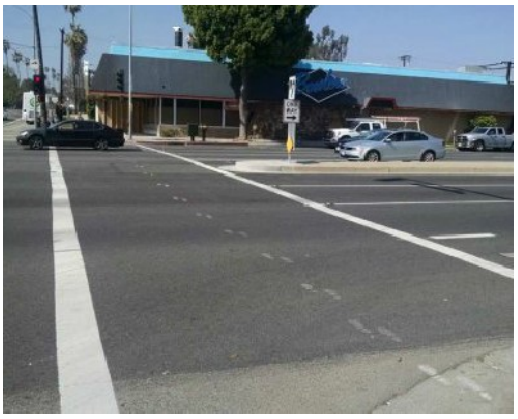
Dislike:

Protected Intersections: Protected intersections physically separate bicyclists up to the street corner and provide bicycle-only signals and signal phases (may result in the loss of parking stalls near intersections if sidewalks are widened)

None of the Above? Other Comments?

STREET CROSSINGS

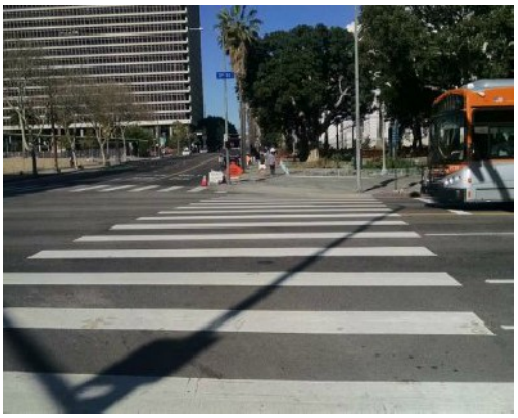
Which types of street crossings would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Most pedestrian crossings on Venice Blvd are located at signalized intersections and are bounded by two white lines between the curbs



Like:

Dislike:

High Visibility Crosswalks: High visibility crosswalks are painted with thick white bars, making the pedestrian crossing area more visible to drivers



Like:

Dislike:

Flashing Beacons: Flashing yellow lights at intersections without traffic signals make drivers more aware that pedestrians are crossing



Like:

Dislike:

Mid-block Crossings: Mid-block crossings help pedestrians cross the street between long blocks by providing traffic signals and crosswalks between intersections



Like:

Dislike:

Pedestrian Refuge Islands: Pedestrian refuge islands let pedestrians cross the street in two stages by providing a place to wait for gaps in traffic



Like:

Dislike:

Curb extensions: Curb extensions at intersections extend the sidewalk past parked vehicles, shortening the distance that pedestrians need to cross

BIKE PARKING

Which types of bike parking would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Singular bike racks on Venice Blvd are located on sidewalks near the entrances of businesses and other destinations: each bike rack can hold up to two bicycles



Like:

Dislike:

Off-street Rack Cluster: Clustering bike racks in courtyards and plazas provides a concentration of bike parking spaces near popular destinations



Like:

Dislike:

Bike Lockers: Bike lockers provide long-term bike storage for large employers, at transit stations, and other popular destinations



Like:

Dislike:

Bicycle Corral: A bicycle corral replaces red curb or an on-street parking space with a cluster of bike racks to increase parking at popular destinations and reserve sidewalk space for pedestrians



Like:

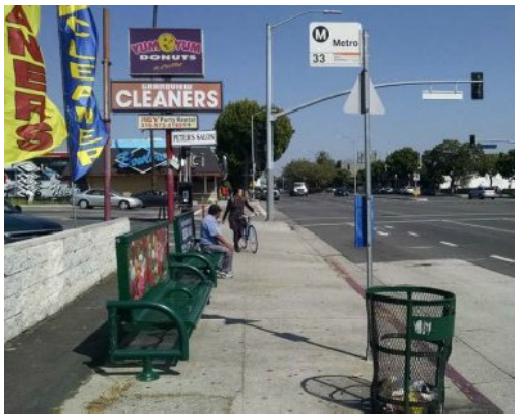
Dislike:

Secure Bicycle Parking Area: Secure bike parking areas provide long-term bike storage accessible by key or key code and can include amenities like showers and bike maintenance supplies

None of the Above? Other Comments?

BUS STOP AMENITIES

Which types of bus stop amenities would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Bus stops on Venice Blvd have signs with route information and benches for resting; some stops have trash bins; rapid stops have system route maps



Like:

Dislike:

Trash Bins: Trash bins at every bus stop help keep stops clean by providing places for people to throw away litter before boarding the bus



Like:

Dislike:

Shelters: Bus shelters provide shade and weather protection for people waiting for the bus



Like:

Dislike:

Lighting: Lighting at bus stops enhances safety and security for people traveling at night



Like:

Dislike:

System Maps and Schedules: System maps and schedules at every stop tell transit riders where the buses are going and when they are scheduled to arrive



Like:

Dislike:

Real Time Information: Real time arrival information uses GPS to track where buses are and more accurately tell people when the buses will arrive

TRANSIT BUSES

Which bus improvements would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Buses share travel lanes with motor vehicles and experience the same delays from traffic congestion as other drivers do



Like:

Dislike:

Bus / Bike Shared Lanes: Buses and bicyclists share their own travel lane separate from other motor vehicles; buses avoid traffic congestion but must safely navigate around bicyclists (may result in the loss of parking or travel lanes)



Like:

Dislike:

Peak Hour Bus Lanes: Buses have their own travel lane during morning and evening commute times to help them stay on schedule and get passengers to their destinations faster (may result in the loss of parking or travel lanes during commute times)



Like:

Dislike:

Curb-adjacent Bus Only Lanes: Buses have their own travel lane next to the curb to help them stay on schedule and get passengers to their destinations faster (may result in the loss of parking or travel lanes)



Like:

Dislike:

Center-Running Bus Only Lanes: Buses have their own travel lane in the center lanes to help them stay on schedule and get passengers to their destinations faster (long-term improvement; may result in the loss of parking or travel lanes)

None of the Above? Other Comments?

LANDSCAPING

Which types of landscaping would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Venice Blvd has some trees on the sidewalk, grass in front of residences, and a center median with trees and plants in some locations



Like:

Dislike:

Street Trees: Additional, continuous trees along sidewalks provide shade for pedestrians and create a buffer between people walking and people driving



Like:

Dislike:

Planted Parkway: Continuous plants and flowers along the sidewalk creates a buffer between people walking and people driving



Like:

Dislike:

Drought Tolerant Landscaping: Trees and plants that need less water help beautify the community while conserving resources for future use



Like:

Dislike:

Stormwater Collection: Methods of collecting stormwater for future use can be built into landscaping designs

None of the Above? Other Comments?

STREET FURNITURE

Which street furniture elements would you like to see on Venice Blvd?





Like:

Dislike:

What's There Today: Seating is mostly provided at bus stops; some trash bins are provided; lights are tall and directed toward the street; there is no consistent community design theme



Like:

Dislike:

Benches and Seating: Benches and seating along the sidewalk provide places for people to rest and gather



Like:

Dislike:

Trash Bins: Trash bins help keep neighborhoods clean by providing places to throw away litter



Like:

Dislike:

Drinking Fountains: Providing drinking water for pedestrians can encourage activity by making it more comfortable for people to walk





Like:

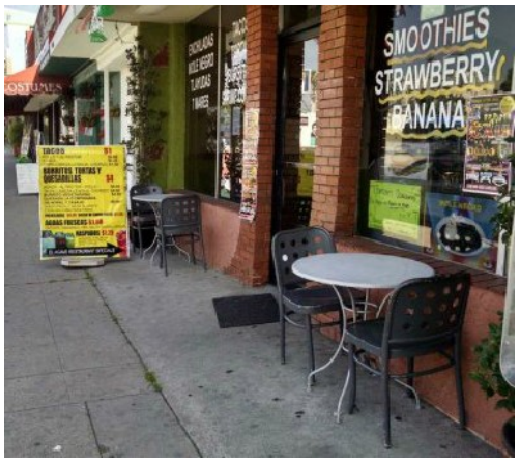
Dislike:

Pedestrian Lighting: Lightposts that are shorter than street lights and directed toward the sidewalk help people feel more secure when walking at night

None of the Above? Other Comments?

GATHERING SPACES

Which types of gathering spaces would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Some businesses on Venice Blvd provide tables and chairs for their customers to eat, play, and rest



Like:

Dislike:

Parklets: A parklet converts an on-street parking space to a gathering space for people



Like:

Dislike:

Off-street Plazas: Off-street plazas convert sidewalks and courtyards to gathering spaces for people



Like:

Dislike:

On-street Plazas: On-street plazas convert underused or redundant roadways to gathering spaces for people



Like:

Dislike:

Sidewalk Seating: Moveable tables and chairs provide places for people to eat, play, and gather near restaurants and businesses

None of the Above? Other Comments?

EVENTS AND PROGRAMMING

Which types of events would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: The Mar Vista Farmer's Market operates every Sunday by closing streets to motor vehicles



Like:

Dislike:

Live Music



Like:

Dislike:

Outdoor Movie Screenings



Like:

Dislike:

Speakers and Readings



Like:

Dislike:

Open Streets / Block Parties: Temporarily closing streets to motor vehicles repurposes public space for community events

None of the Above? Other Comments?

ART AND IDENTITY

Which public art and community identity elements would you like to see on Venice Blvd?



Like:

Dislike:

What's There Today: Some buildings have murals painted on the sides of them



Like:

Dislike:

Statues and Sculptures



Like:

Dislike:

Wall Murals



Like:

Dislike:

Sidewalk Art



Like:

Dislike:

Street and Streetlight Banners



Like:

Dislike:

Community Branding: Street furniture elements have a consistent color or style throughout the corridor

MEDIANS

Which elements would you like to see on medians on Venice Blvd?



Like:

Dislike:

What's There Today: Center medians have some landscaping and large, vehicle-oriented street lights



Like:

Dislike:

Median Shared Use Paths: Converting center medians to shared use paths provides a comfortable place for bicyclists and pedestrians to travel for recreation and transportation



Like:

Dislike:

Median Street Furniture: Providing seating, trash bins, and pedestrian lighting in the center median can activate the space for the community to use



Like:

Dislike:

Median Gateway Features: Artwork at community boundaries tells people when they are entering the community and helps build neighborhood identity



Like:

Dislike:

Median Amenities: Small businesses on medians, like coffee shops and snack stands, can activate the space for the community to use



Like:

Dislike:

Landscaped Median: Continuous trees and plants in the center median help beautify the community and can be enhanced with public art and other community branding elements

GREENING THE BOULEVARD

Master Plan Concepts for Venice Boulevard between Lincoln and Sawtelle



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Fax 574 4462

January 2008

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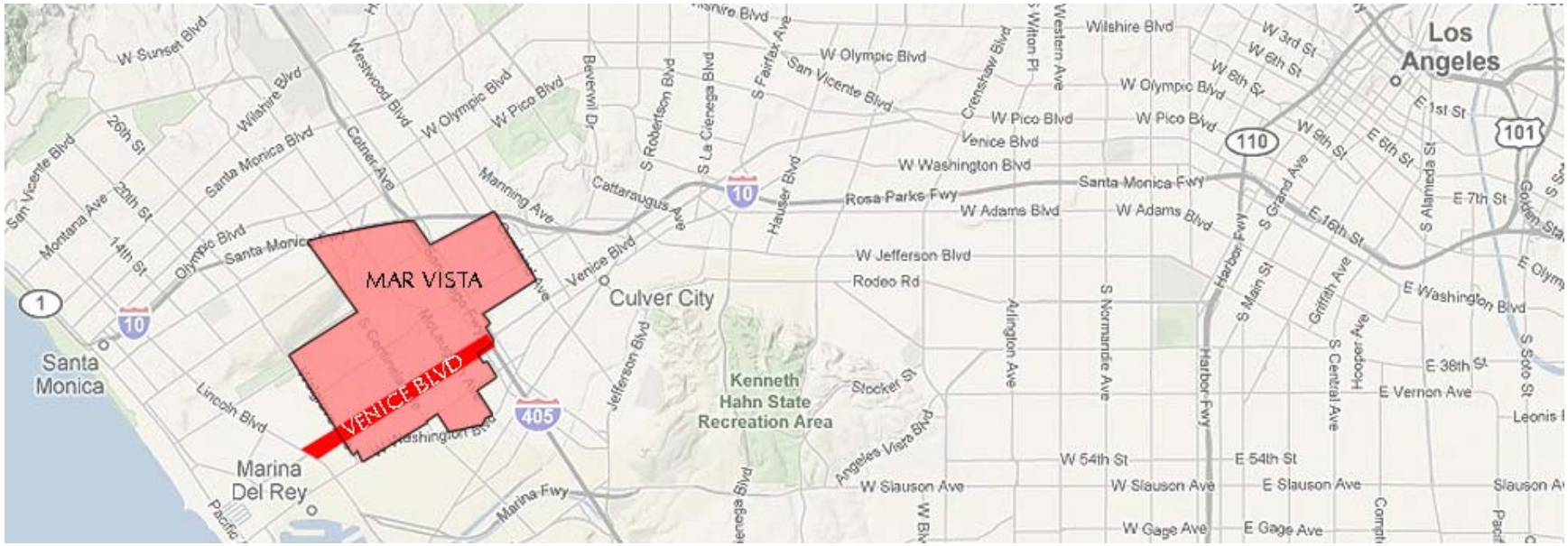
Overview

Project Location

Venice Boulevard stretches eastward from the Pacific Ocean to downtown Los Angeles, California. Along its 13-mile length it traverses many diverse urban communities. This master plan concerns itself with the portion of the boulevard that transects the historic core of the Mar Vista neighborhood from Lincoln Boulevard to Sawtelle Boulevard.

Mar Vista History

The community of Mar Vista was first named and annexed as a district of the City of Los Angeles in the 1920s. During the first half of the 20th century, it was an integral component of the Pacific Electric Railway mass transit system that connected much of southern California. The Venice Short Line streetcar or the "Red Car" travelled through Mar Vista along Venice Boulevard. Today Mar Vista is an economically diverse neighborhood and its boundaries as defined by the Mar Vista Community Council (MVCC) are shown on the diagram below.



Master Plan Background

This master plan is the result of community efforts commencing in 2002 with the founding of the "Merchants of Venice" group. Since then the master plan has been guided and developed through the efforts of these community members and the subsequent commitments of time and effort by city staff, council office and additional community members and groups.

Overview (cont'd)

Master Plan Implementation Goals

The master plan demonstrates strategies for transforming Venice Boulevard in Mar Vista into a vibrant, successful and sustainable neighborhood street. The master plan design improvements are to be implemented in several phases over a period of time. The purpose of the master plan is multifold. It will establish a framework for a series of future streetscape improvements. Secondly, it will help determine the following criteria for the proposed components:

- Ability to be funded
- Ease of implementation
- Degree of independence from other proposed components

It will also help realize and participate in specific 'catalytic events' to provide energy and enthusiasm for the future fundraising of the proposed components. Several of these events have already been implemented. The year-round Mar Vista Farmers' Market on Grand View Boulevard at Venice Boulevard started in August 2006. This Sunday market has been used several times as a forum to collect community input on overarching concepts and individual components of the master plan. The newly landscaped medians along Venice Boulevard between Centinela Boulevard and Inglewood Boulevard, implemented as a preview of the master plan, were another a 'catalytic event'. Most recently, several sidewalk parkway plantings outlined in the master plan were installed by community volunteers during the 2008 Mar Vista, Venice, Del Rey Mayor's Day of Service.

Urban Design Strategies

We envision Mar Vista as an outdoor dining destination with attractive and successful shops, lively evening uses and an expanding farmers' market, rather than a district where vehicular traffic speeds through en route to other destinations. Venice Boulevard in Mar Vista is a unique street with its broad dimensions and continuous median. Its wide sidewalks, traffic lanes and parking lanes can easily accommodate reconfigured bike and vehicular traffic lanes, enhanced stormwater percolation, a drought-tolerant plant palette, energy-efficient pedestrian lighting, pedestrian-friendly intersections, additional trees with overhead canopy and festive banners and street furniture. The subsequent pages of this booklet illustrate the two major design thrusts of the master plan:

- Create a sustainable, green street
- Create a vibrant, beautiful neighborhood street that will be a magnet for Mar Vista

These illustrations have been previewed by the community at both the Mar Vista Farmers' Market and the Mar Vista Public Library to start to gather input and garner enthusiasm for the master plan.

Proposed Design Improvements

The numbers below correspond with the numbers on *Illustration 1 - Venice Boulevard between Lincoln and Sawtelle Master Plan*.

1 *Sidewalk Improvements*
Create social spaces for informal gatherings and sidewalk cafes with 7′ minimum width
Provide public amenities such as benches, trash receptacles and pet-friendly waste stations
Incorporate public art and enhanced pavement
Encourage economic investment

2 *New Sidewalk Trees*
Establish a strong identity for the district
Create a street that looks cared for and well-maintained
Replace existing diseased or mutilated sidewalk trees while increasing total number of trees
Provide dappled shade for pedestrians, sidewalk cafes and parked cars
Allow visibility of commercial storefronts

3 *New Stormwater Parkways*
Reduce stormwater runoff with linear gardens or permeable paving
Provide a vibrant setting for civic gathering spaces

4 *Sidewalk Bike Lanes*
Separate bicycle riders completely from vehicular traffic
Encourage alternate, sustainable transit
Provide a wide, planted buffer zone between pedestrian and vehicular circulation
Incorporate solar-powered lighting to illuminate path at night

5 *New Pedestrian-scale Sidewalk Lighting*
Creates safer and brighter pedestrian and biking environment at night
Encourages desirable nighttime activity such as sidewalk cafes
Recalls pre-WWII era Venice Boulevard Pacific Electric Railway “Red Car”

6 *New Bus Stops*
Provide new seating, planting and shelters
Encourage use of the public transportation
Integrate sustainable, solar-powered LED lighting

Proposed Design Improvements (cont'd)

The numbers below correspond with the numbers on *Illustration 1 - Venice Boulevard between Lincoln and Sawtelle Master Plan*.

7 *Curb Extensions at Intersections*
Promote pedestrian safety by shortening crosswalk distance
Provide additional areas for plantings along sidewalks
Reduce apparent width of roadway from the driver's perspective

8 *Crosswalks Paving Enhancements*
Provide clearly marked and more continuous pedestrian environment
Ensure safer pedestrian circulation
Recall pre-WWII era Venice Boulevard Pacific Electric Railway "Red Car"

9 *New Median Plantings*
Establish a strong identity for the district
Create a street that looks cared for and well-maintained
Replace existing concrete with plantings
Increase total number of trees along the boulevard
Minimize glare and eye strain from on-coming traffic for drivers

10 *New Signage and Banners*
Strengthen neighborhood identity
Announce local events along boulevard such as the farmers market

11 *New Gateways*
Emphasize significant intersections along the boulevard
Create opportunity for public art or specimen tree plantings

12 *New Hedges or Low Walls with Vines at Existing Parking Lots*
Screen existing parking lots adjacent to Venice Boulevard
Provide additional areas for new plantings

13 *Lighter-colored Roadway Pavement*
Reduces urban heat island effect

14 *Pocket Park at Venice Boulevard and McLaughlin*
Provides potential pet-friendly open space

GREENING THE BOULEVARD

Master Plan Concepts for Venice Boulevard between Lincoln and Sawtelle

Goals
- Green the boulevard
- Create a vibrant, people-friendly street

Process
- Involve community in design development of master plan
- Implement master plan design improvements in several phases over a period of time

1 Sidewalk Improvements
Create social spaces for informal gatherings and sidewalk cafes with 7' minimum width
Provide public amenities such as benches, trash receptacles and pet-friendly waste stations
Incorporate public art and enhanced pavement
Encourage economic investment

2 New Sidewalk Trees
Establish a strong identity for the district
Create a street that looks cared for and well-maintained
Replace existing diseased or mutilated sidewalk trees while increasing total number of trees
Provide dappled shade for pedestrians, sidewalk cafes and parked cars
Allow visibility of commercial storefronts

3 New Stormwater Parkways
Reduce stormwater runoff with linear gardens or permeable paving
Provide a vibrant setting for civic gathering spaces

4 Sidewalk Bike Lanes
Separate bicycle riders completely from vehicular traffic
Encourage alternate, sustainable transit
Provide a wide, planted buffer zone between pedestrian and vehicular circulation
Incorporate solar-powered lighting to illuminate path at night

5 New Pedestrian-scale Sidewalk Lighting
Creates safer and brighter pedestrian and biking environment at night
Encourages desirable nighttime activity such as sidewalk cafes
Recalls pre-WWII era Venice Boulevard Pacific Electric Railway Red Car

6 New Bus Stops
Provide new seating, planting and shelters
Encourage use of the public transportation
Integrate sustainable, solar-powered LED lighting

7 Curb Extensions at Intersections
Promote pedestrian safety by shortening crosswalk distance
Provide additional areas for plantings along sidewalks
Reduce apparent width of roadway from the driver's perspective

8 Crosswalks Paving Enhancements
Provide clearly marked and more continuous pedestrian environment
Ensure safer pedestrian circulation
Recall pre-WWII era Venice Boulevard Pacific Electric Railway Red Car

9 New Median Plantings
(a pilot project for the medians between Centinela and Inglewood designed by KSA has already been installed)
Establish a strong identity for the district
Create a street that looks cared for and well-maintained
Replace existing concrete with plantings
Increase total number of trees along boulevard
Minimize glare and eye strain from on-coming traffic for drivers

10 New Signage and Banners
Strengthen neighborhood identity
Announce local events along boulevard

11 New Gateway at Beethoven
Emphasizes significant intersections along the boulevard
Creates an opportunity for public art or specimen tree plantings

11 New Gateway at Inglewood
Emphasizes significant intersections along the boulevard
Creates an opportunity for public art or specimen tree plantings

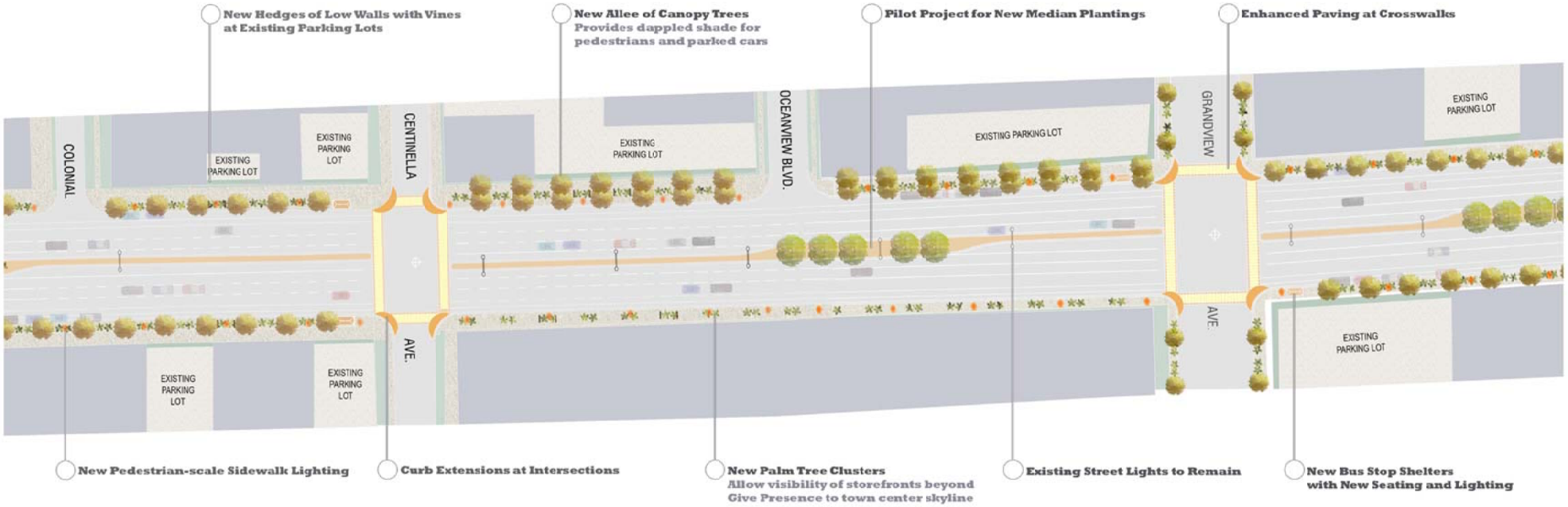
12 New Hedges or Low Walls with Vines at Existing Parking Lots
Screen existing parking lots adjacent to Venice Boulevard
Provide additional areas for new plantings

13 Lighter-colored Roadway Pavement
Reduces urban heat island effect

14 Pocket Park at Venice and McLaughlin
Provides potential pet-friendly open space



Katherine Spitz Associates, Inc. Landscape Architecture
4212 1/2 GLENCOE AVE, MARINA DEL REY, CA 90292 310.547.4460


New Hedges of Low Walls with Vines at Existing Parking Lots
New Allee of Canopy Trees
Provides dappled shade for pedestrians and parked cars
Pilot Project for New Median Plantings
Enhanced Paving at Crosswalks
COLONIAL
EXISTING PARKING LOT
EXISTING PARKING LOT
CENTINELLA
AVE.
EXISTING PARKING LOT
OCEANVIEW BLVD.
EXISTING PARKING LOT
GRANDVIEW
AVE.
EXISTING PARKING LOT
EXISTING PARKING LOT
EXISTING PARKING LOT
EXISTING PARKING LOT
New Pedestrian-scale Sidewalk Lighting
Curb Extensions at Intersections
New Palm Tree Clusters
Allow visibility of storefronts beyond
Give Presence to town center skyline
Existing Street Lights to Remain
New Bus Stop Shelters
with New Seating and Lighting


Town
Center


0
40
80'



EXISTING STREETSCAPE OF MAR VISTA TOWN CENTER



PROPOSED STREETSCAPE OF MAR VISTA TOWN CENTER at Grand View Avenue and Venice Boulevard creates a friendlier pedestrian environment with pedestrian-scale lighting, palm trees and colorful shrubs.



EXISTING STREETSCAPE OF RESIDENTIAL DISTRICT



PROPOSED STREETSCAPE OF RESIDENTIAL DISTRICT along Venice Boulevard near Walgrove Avenue creates a more vibrant district with new median plantings, sidewalk shade trees, pedestrian-scale lighting and benches.



EXISTING SIDEWALK TREES ALONG VENICE BOULEVARD



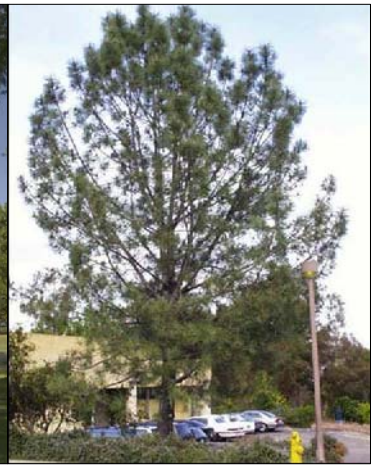
PROPOSED TOWN CENTER TREE
Phoenix dactylifera, Phoenix Palm



PROPSED RESIDENTIAL TREE - OPTION 1
Cedrus deodara, Deodar Cedar



PROPOSED RESIDENTIAL TREE - OPTION 2
Platanus racemosa, California Sycamore



PROPOSED RESIDENTIAL TREE - OPTION 3
Pinus torreyana, Torrey Pine



TWO DISTRICTS ALONG VENICE BOULEVARD exist in Mar Vista where the residential communities flank the commercial town center district. The two types of districts will be planted with a unique sidewalk tree as shown above. This scheme celebrates and strengthens the identity of the commercial and residential districts. At the town center, new sidewalk plantings of palm tree clusters will allow visibility of the storefronts beyond while giving presence to the skyline above. In the residential areas, new sidewalk plantings of canopy trees will provide dappled shade for pedestrians and parked cars.

SIDEWALK TREE PLANTINGS

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PROPOSED MEDIAN PLANTING WITH SPATHODEA CAMPANULATA CANOPY TREES

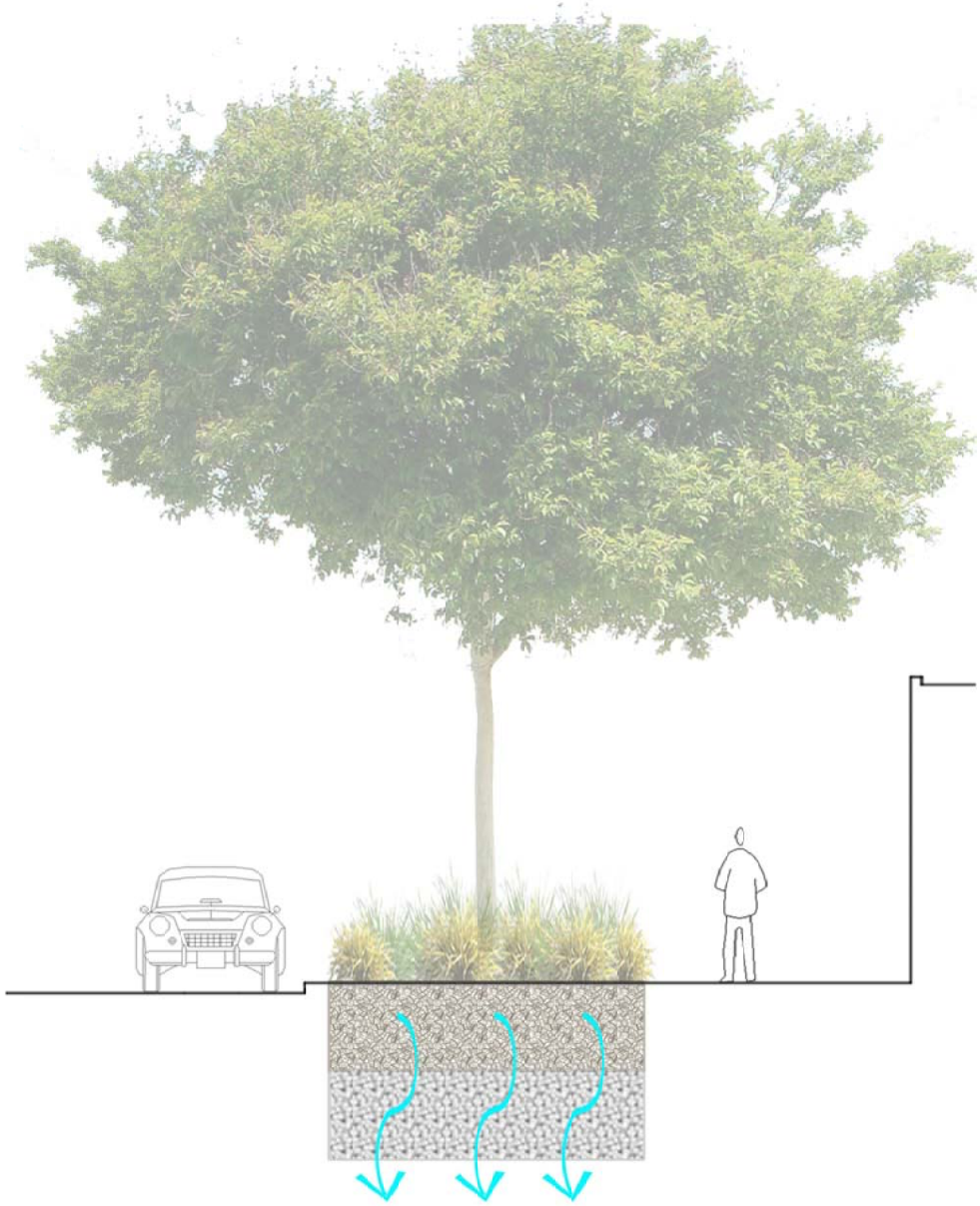


EXISTING MEDIAN PLANTING ALONG VENICE BOULEVARD



PROPOSED MEDIAN PLANTING WITH TIPUANA TIPU CANOPY TREES

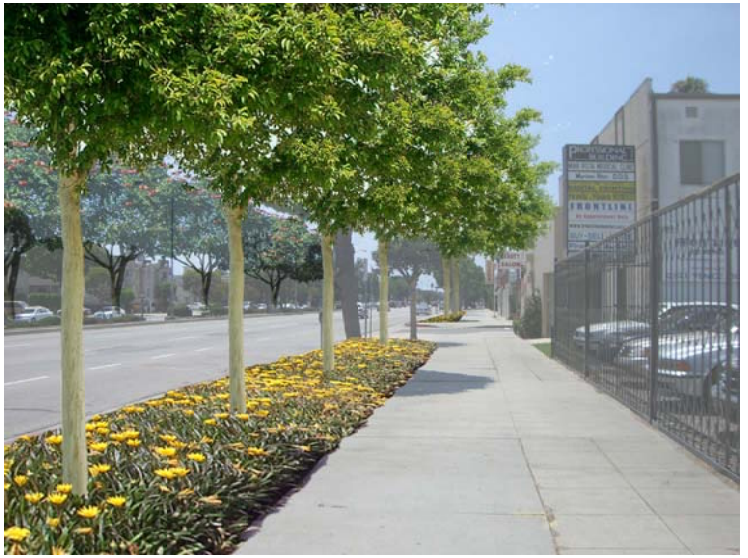
PROPOSED MEDIAN PLANTINGS ALONG VENICE BOULEVARD will replace existing areas of concrete median with new canopy trees, shrubs and groudcovers. These plantings will create a street that looks cared for and well-maintained. Not only will the new plantings increase the total number of trees along Venice Boulevard, but they will minimize glare and eye strain from on-coming traffic for drivers.



PROPOSED STORMWATER PARKWAYS will reduce and clean stormwater runoff that percolates down through the layers of soil and gravel in the planting bed.



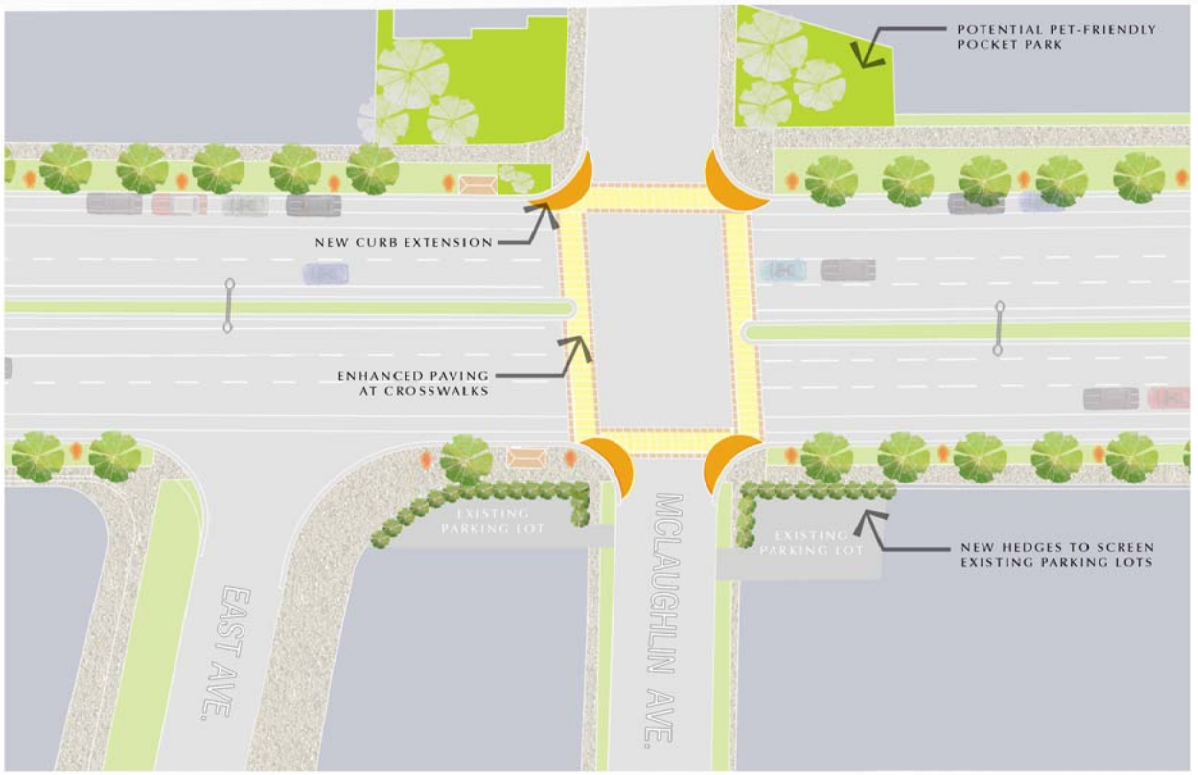
EXISTING SIDEWALK along Venice Boulevard with its vast expanse of concrete sidewalk paving



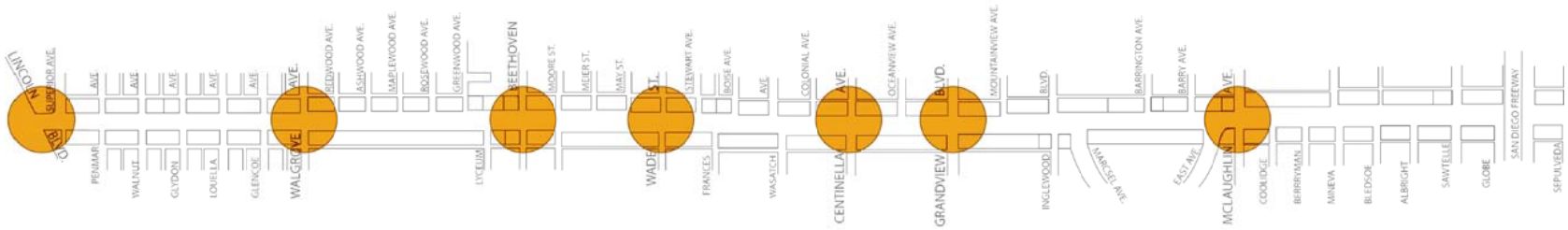
PROPOSED STORMWATER PARKWAYS replace existing areas of paving to create a more vibrant setting along Venice Boulevard. In more commercial areas along Venice Boulevard, porous paving will be used instead of planting beds to further reduce stormwater runoff. Reengineering the soil will assist drainage as well.



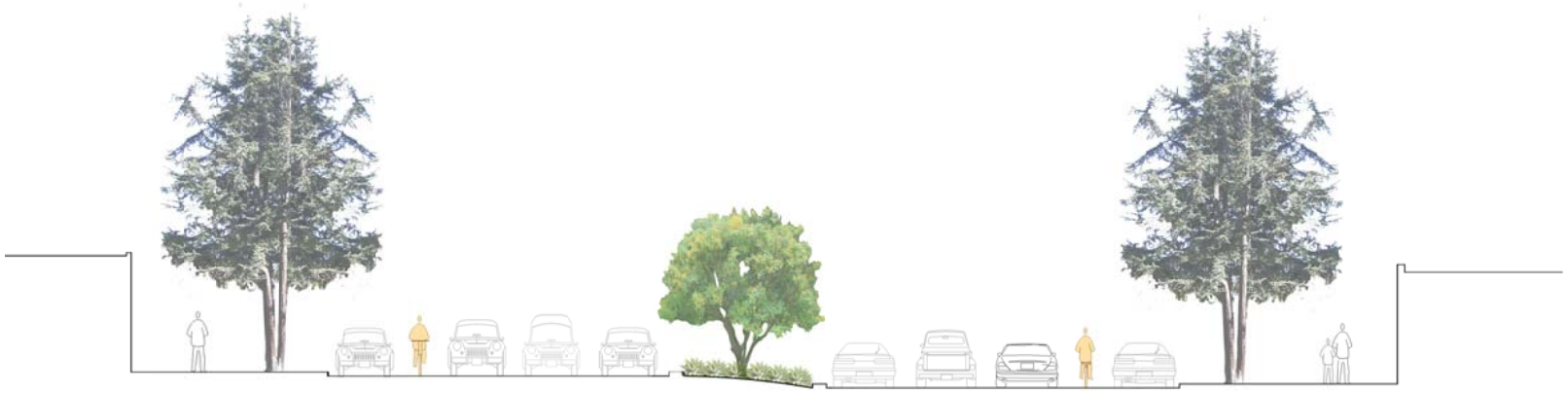
CORNER CURB EXTENSIONS extend the curb and pedestrian ramp further into the roadway and allow greater visibility for crossing pedestrians. As shown above, they create an opportunity for planting.



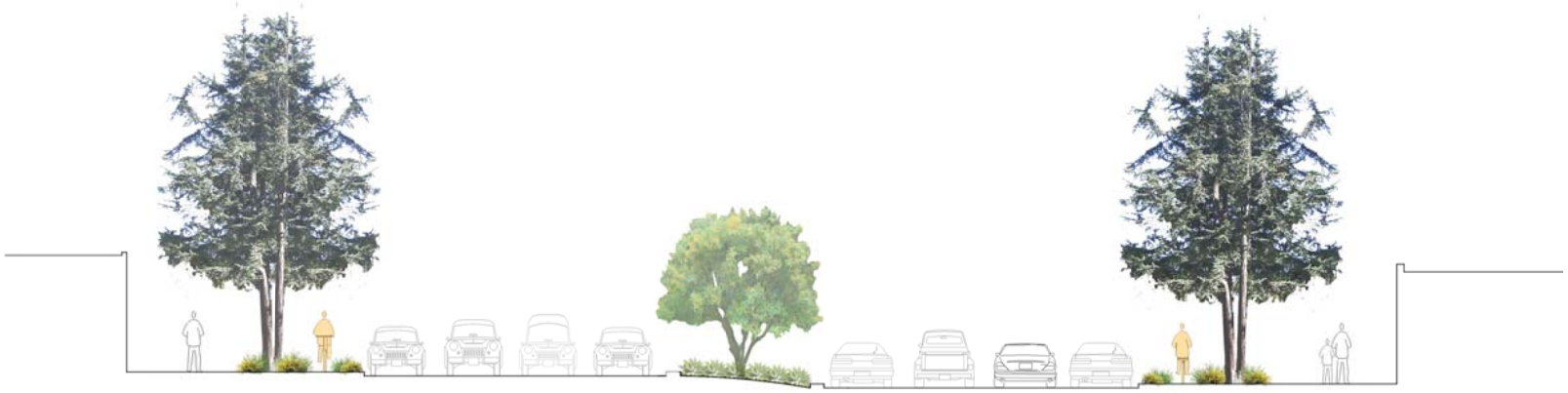
PROPOSED CORNER CURB EXTENSIONS along Venice Boulevard create a safer crossing for pedestrians by reducing the length of the crosswalk. Enhanced crosswalk paving at these intersections clearly mark the major pedestrian circulation paths.



PROPOSED CORNER CURB EXTENSIONS that occur at intersections of higher foot traffic will create a more pedestrian-friendly environment along Venice Boulevard. The intersections highlighted above indicate the proposed corner curb extensions.

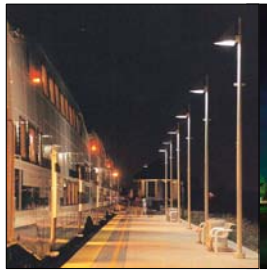


EXISTING BIKE LANES on Venice Boulevard are currently located at the same level as the roadway between parked cars and three lanes of moving vehicular traffic. The doors of parked vehicles open into the bicycle lane. Bicycle riders also have an unpleasant proximity to moving traffic.



PROPOSED SIDEWALK BIKE LANES along Venice Boulevard are safer since they separate bicycle riders completely from both vehicular traffic and pedestrians. By slightly reducing the width of each driving lane, the width of the sidewalk can be increased to allow space for a bike lane. The sidewalk bike lanes are further separated from pedestrians and cars with plantings.

Pedestrian Lighting

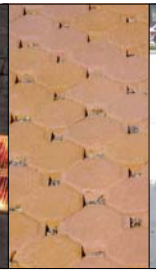




Solar Lighting



Permeable Pavement



Trash Receptacles





Signs and Banners





Public Art





Median Trees

Continuous though all zones



tipuana tipu

tipu tree



spathodea campanulata

african tulip tree

Benches





Bike Racks





Bus Shelters



Dog Bag Stations



Shrubs, Grasses and Succulents



pennisetum setaceum

fountain grass



festuca glauca

blue fescue



muhlenbergia rigens

deergrass



phormium 'yellow wave'

flax



agave attenuata

fox tail agave



aloe vera

medicinal aloe

Drought Tolerant Shrubs and Groundcovers



salvia leucantha

mexican bush sage



lantana camera

gold lantana



senecio douglasii

creek senecio



rosemarinus officinalis 'prostratus'

rosemary



ceanothus 'yankee point'

wild lilac



myoporum parvifolium

creeping myoporum



dietes bicolour

bi-colored fifty

Cost Estimate

Item	Unit Cost	Sub-item Cost	Subtotal
1 Sidewalk Improvements			$1,666,000
Benches every 40′ (450 total)	$3,000	$1,350,000	
Trash Receptacles every 150′ (120 total)	$2,300	$276,000	
Bike Racks every 500′ (40 total)	$500	$20,000	
Pet-friendly Waste Stations every 500′ (40 total)	$500	$20,000	
Public Art*			
Enhanced Pavement*			
2 New Sidewalk Trees			$1,800,000
Shade Trees, 36″ Box, 12′ at Installation (520 total)	$2,500	$1,300,000	
Palm Trees, 12′ Brown Trunk (250 total)	$2,000	$500,000	
3 New Stormwater Parkways			$2,048,000
Stormwater Parkway Plantings (128,000 s.f.)	$8	$1,024,000	
Allowance for Excavation and Replacement of Existing Soil (128,000 s.f.)	$8	$1,024,000	
4 Sidewalk Bike Lanes*			NIC
5 New Pedestrian-Scale Lighting			$1,550,000
Light Fixtures every 60′ (310 total)	$5,000	$1,550,000	
6 New Bus Shelters			$484,000
Bus Shelters (22 total)	$22,000	$484,000	
Bus Shelter Planting			
7 Curb Extensions at Intersection			$450,000
Curb Bulbouts at 4 corners of 9 Intersections (36 total)	$12,500	$450,000	

Cost Estimate (cont'd)

Item	Unit Cost	Sub-item Cost	Subtotal
8 Enhanced Paving at Crosswalks			$1,850,000
Crosswalks w/ Interlocking Pavers at 9 Intersections and 1 Mid-Block (37 total)	$50,000	$1,850,000	
Deduct. Alt. - Crosswalks w/ Stamped Asphalt at 9 Intersections and 1 Mid-Block (37 total)	$25,000	$925,000	
9 New Median Plantings			$1,735,000
Shade Trees, 36" Box, 12' at Installation (200 total)	$2,500	$500,000	
Shrubs and Groundcovers (95,000 s.f.)	$10	$950,000	
Irrigation (95,000 s.f.)	$3	$285,000	
10 New Signs and Banners*			NIC
11 New Gateways*			NIC
12 New Hedges or Low Walls w/ Vines at Existing Parking Lots			$550,000
Low Walls w/ Vines (2,200 l.f.)	$250	$550,000	
Deduct. Alt. - Hedge Plantings (2,200 l.f.)	$75	$165,000	
13 Lighter Colored Roadway Pavement			NIC
14 Pocket Park at Venice Boulevard and McLaughlin			$77,500
Shade Trees, 36" Box, 12' at Installation (5 total)	$2,500	$12,500	
Benches (10 total)	$3,000	$30,000	
Shrubs and Groundcover (7,000 s.f.)	$5	$35,000	
Grand Total			**$12,210,500***

*Cost Estimate Grand Total does not include the cost for public art, enhanced pavement, sidewalk bike lanes, gateways, lighter colored roadway pavement, roadway striping, site utilities, site demolition, site preparation, soil, irrigation and construction unless otherwise noted.

References

- Electric Railway Historical Association of Southern California
  www.erha.org

- Mar Vista Community Council
  www.marvistacc.org

- Mar Vista Historical Society
  www.marvistahistoricalsociety.net

Acknowledgements

This booklet was prepared by Katherine Spitz Associates, Inc. Landscape Architecture for the Mar Vista community. We look forward to Venice Boulevard becoming a more lively, friendly center for Mar Vista. We thank the many community members who have given their time and consideration to the project over the last 6 years.

GREENING THE BOULEVARD

Master Plan Concepts for Venice Boulevard between Lincoln and Sawtelle



The Groves

Cut-Through Traffic Mitigation Plan


Lakeview
Cliffwood
Tall Pine
Lansing
JDB Frontage Road
Coleman Blvd
Lakeview Dr
Jaguar Rd
Shannon Dr
Palm St
Groves Manor Ct
Tall Pine Rd
Cliffwood Dr
Lansing Dr
Coleman Blvd
Broadway St
Johnnie Dodds Blvd
17
703
North

The Groves

The Groves

The Groves is one of only two neighborhoods in the Town with a significant and documented cut-through traffic issue.

Traffic Calming History

- Residents in The Groves applied for traffic calming in early 2003. (Cliffwood Drive did not qualify at that time for speed (29.1 @ the 85$^{th)}$ or volume 256 AADT)
- When residents voiced concerns of increased speed and volume prior to Traders Joes opening, Pre- and Post traffic studies were completed.
- A neighborhood committee was established to pursue mitigation strategies for cut-through and speed.
- An Origin/Destination (OD) study was performed by the Town in 2013 and indicates cut-through traffic is 42% for The Groves subdivision.

Lansing Volume Data

Lansing Drive - Groves			Notes
Station Type	Date	Volume	
SCDOT	2001	900	
"	2002	850	
"	2003	850	
"	2004	800	
"	2005	900	
"	2006	1000	
"	2007	1100	
"	2008	1250	
"	2009	1000	
"	2010	1000	
"	2011	1250	
	2012	1250	
Town	3/9-17/2011	1134	Pre-opening (Traders Joes)
Town	Sept 28 - Oct 3, 2011	1359	Post - opening (Traders Joes)
Town	4/10/2013	1712	
Town	4/17/2013	1661	
Stantec	5/23/2013	1540	

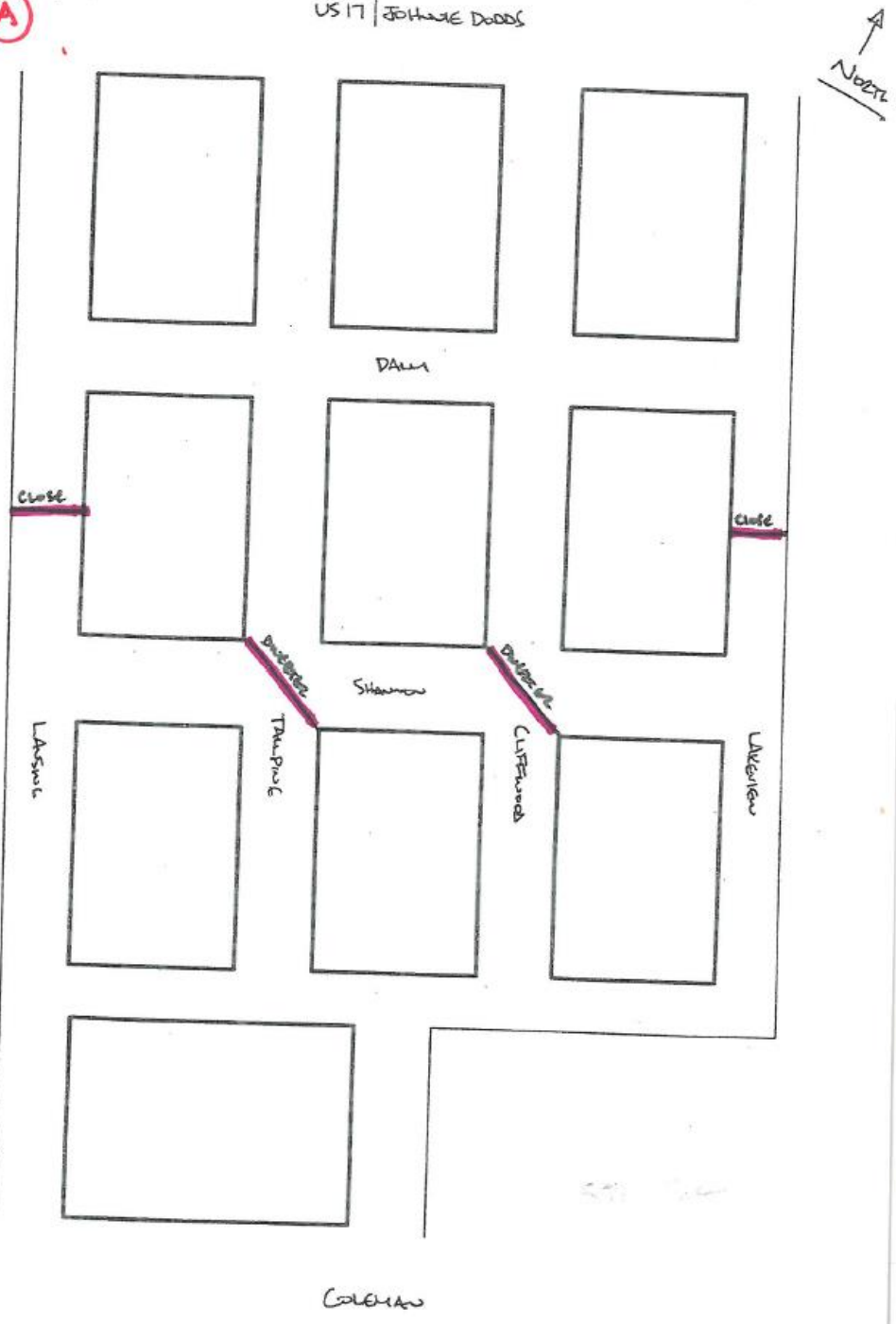
Neighborhood/Staff Interaction

- Since 2012, multiple scenarios for network modifications and devices were investigated by Staff, the neighborhood committee and an engineering consultant.
- Scenarios included:
  - Neighborhood Entry Features
  - One-way street operations
  - Partial street closures
  - Diverters
  - Full street closures
- In 2014, two plans (A and F) were proposed by Staff for the committee to pursue neighborhood-wide feedback.

#1 (A)

2 CLOSURES

2 DIVERTERS



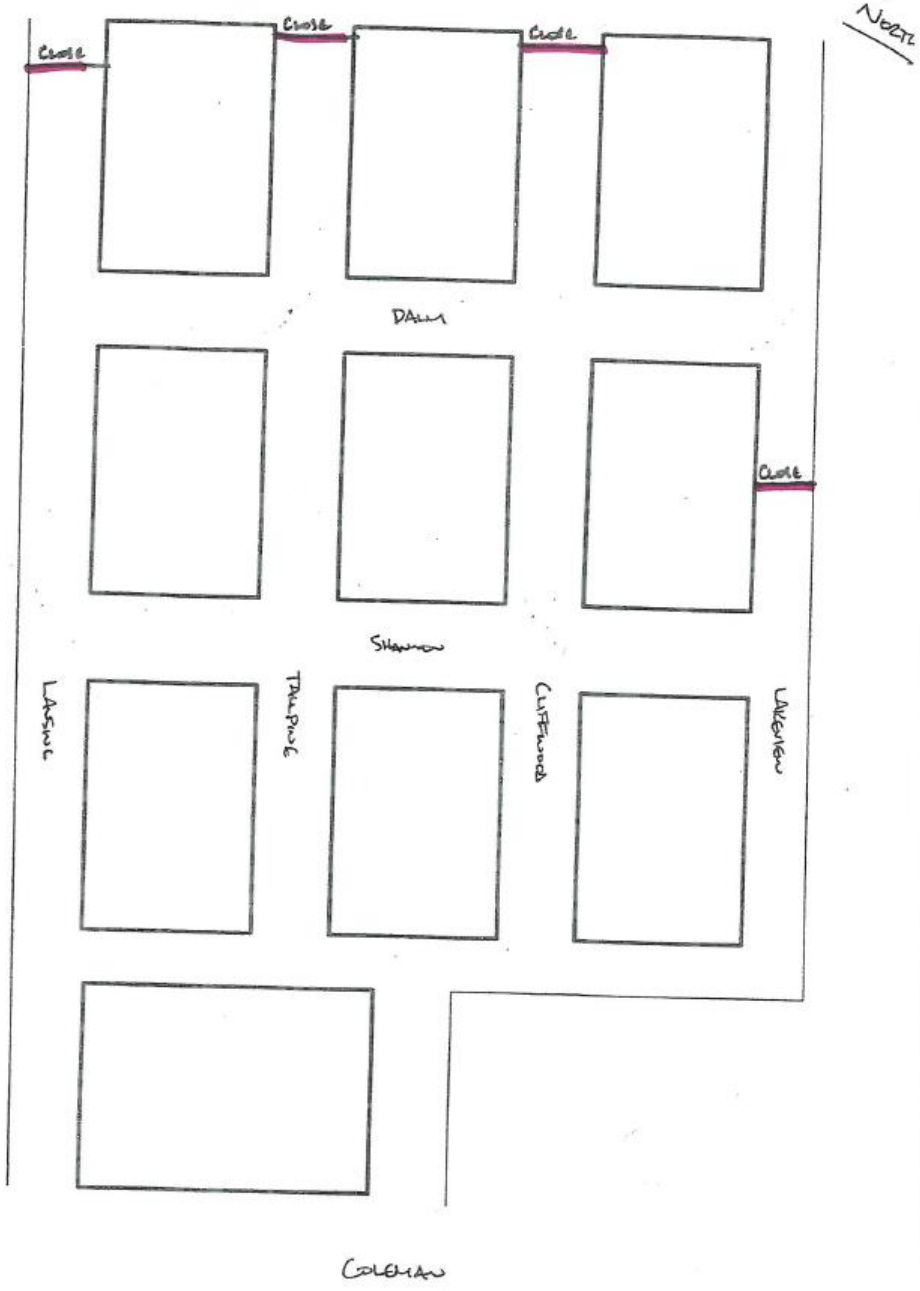
(F)

#3

4 CLOSURES

US 17 | JOHNNIE DODDS

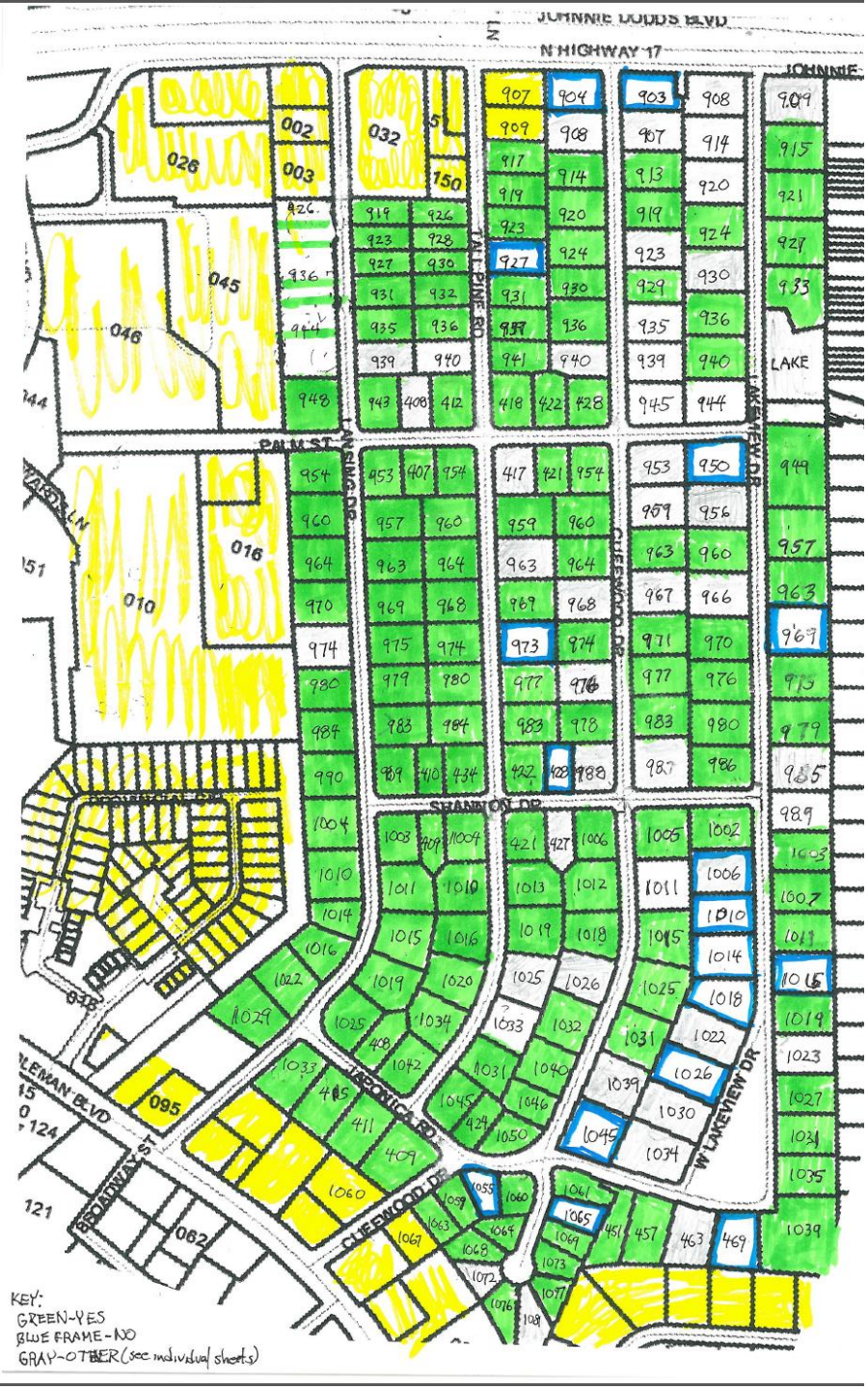
NORTH



Neighborhood/Staff Interaction

- The committee felt closures would be most effective and modified *Plan F* to propose full closures at all four of the Johnnie Dodds Boulevard frontage road.
- The Groves Neighborhood committee attempted contact with every dwelling in the neighborhood to survey support for the 4 closure concept.


Lakeview Dr
Jordan Rd
Shannon Dr
Palm St
Groves Manor Ct
Tall Pine Rd
Cliffwood Dr
Lansing Dr
Coleman Blvd
703
17
Johnnie Dodds Blvd
Broadway St



Percentages provided by The Groves committee:

153	Yes	90 %	(based on the signed surveys)
17	No	10 %	(based on the signed surveys)

90% of 170 dwelling units contacted supported closure
10% of 170 dwelling units contacted opposed closure

58 of 228 total dwelling units did not respond

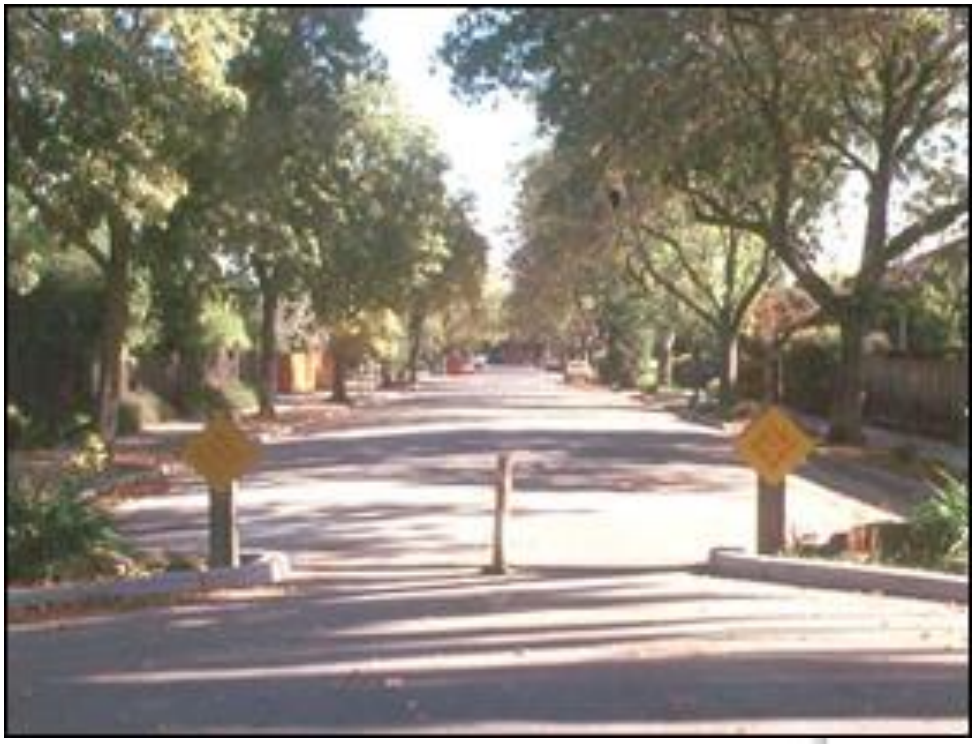
Did not Respond = vacant, under construction, not a primary residence, uncertain (owner deceased, elderly not coming to door, seldom at home)

All Groves residences (228 units includes 20 Apts.)

153	Yes	67 %
17	No	8 %
58	No contact	25 %

Legend:

Green	=	Yes
Blue frame	=	No
Grey	=	Did not respond
Yellow	=	Commercial / or outside of project area





Estimated Costs and Next Steps

- Concept level estimate for each closure is $15-20K
- Engineering is $15-25K
- Total Cost $75-105K
- Public Hearing
- Design in coordination with fire and police
- Public Services and Charleston County Recycling route modifications
- Emergency responders, USPS, utilities, etc. coordination
- Permit and construct

Lansing Drive



Tall Pine Road



Cliffwood Drive



Lakeview Drive





Double click on above image to view full picture

MORE VIEWS





Two-Way Collapsible Bollard Yellow 2"x6"x36"

Email to a Friend

Be the first to review this product

$438.00

Qty: 0 Add to Cart Add to Quote O

Add to Wishlist

Add to Compare

Quick Overview

- Manufactured from ¼"" steel tube in 2"" x 6"" x 36""
- Collapses in two directions for ultimate functionality
- 4" clearance height in down position



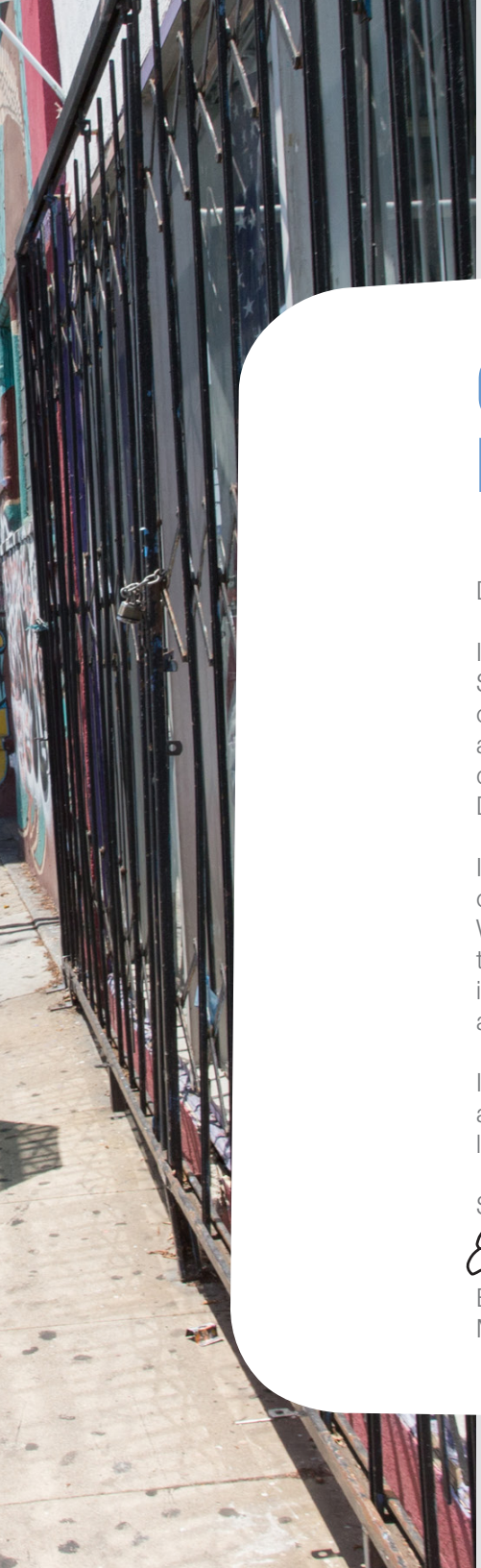
BENCHMARKING GREAT STREETS

VENICE BOULEVARD

PART 11 IN A PRE-PROJECT EVALUATION OF OUR FIRST 15 GREAT STREETS
FALL, 2016

1 2 3 4 5 6 7 8 9 10 **11** 12 13 14 15


Fickett St
300 N
NOTARY



GREAT STREETS FOR LOS ANGELES



Dear Fellow Angelenos,

I am pleased to present this snapshot of the City's first 15 Great Streets corridors as they looked before we began partnering with communities to activate public spaces and support local culture and economies. This report provides an unprecedented level of detail about neighborhood streets by tapping into the City's Open Data Portal and interviewing Angelenos and business owners.

I launched the Great Streets Initiative as a partnership with local communities to strengthen neighborhoods one main street at a time. With this benchmark in hand, we can develop an understanding of the needs and opportunities on Great Streets. As we begin to deliver improvements on these corridors, we can track the economic, social, and environmental quality of our city—one Great Street at a time.

I invite you to read these data-driven stories, and learn about how you can partner with the City to transform your local Great Street by visiting www.lagreatstreets.org.

Sincerely,

Eric M. Garcetti
Mayor

Eric Garcetti
#lamayor

TABLE OF CONTENTS

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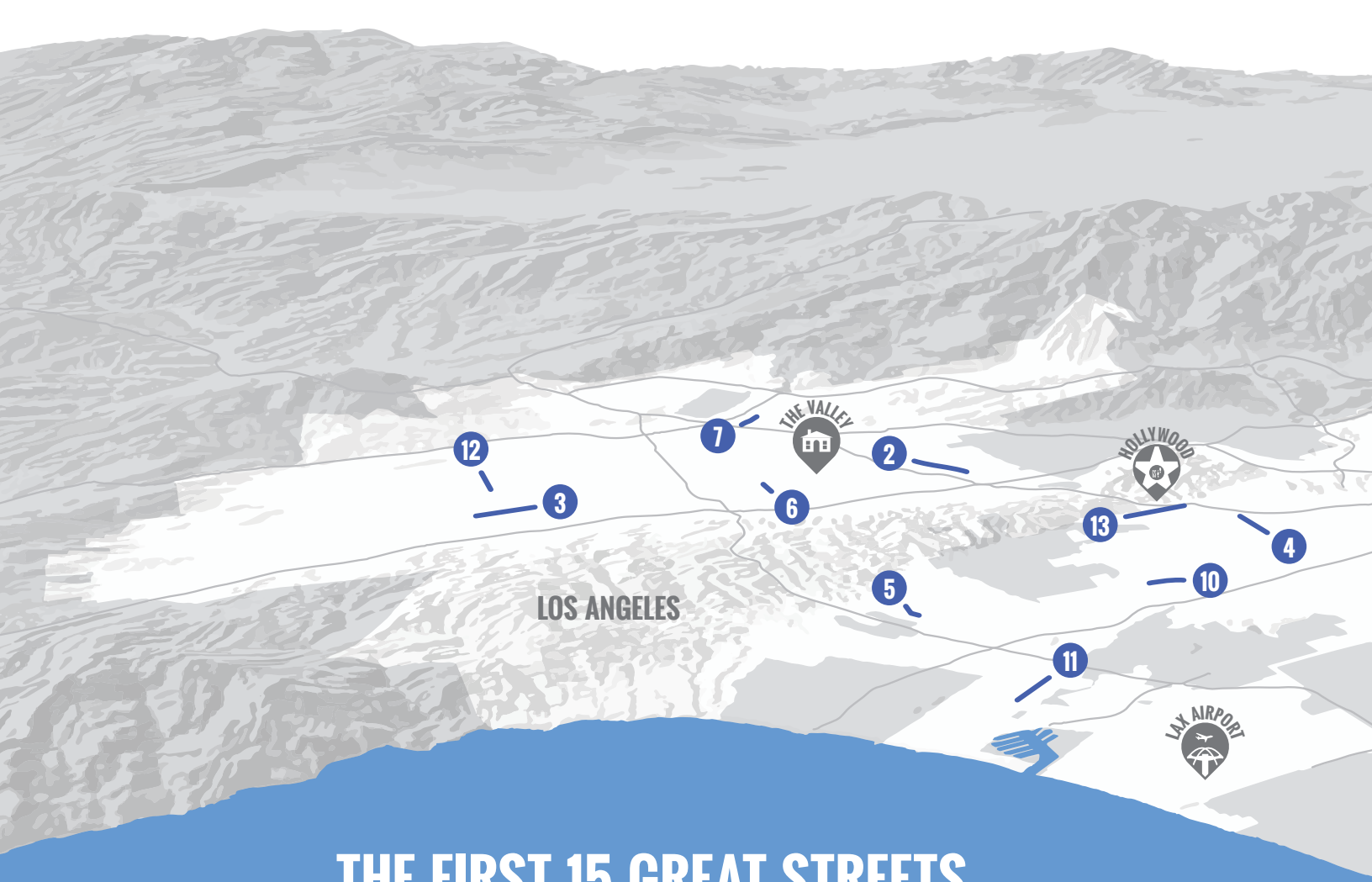
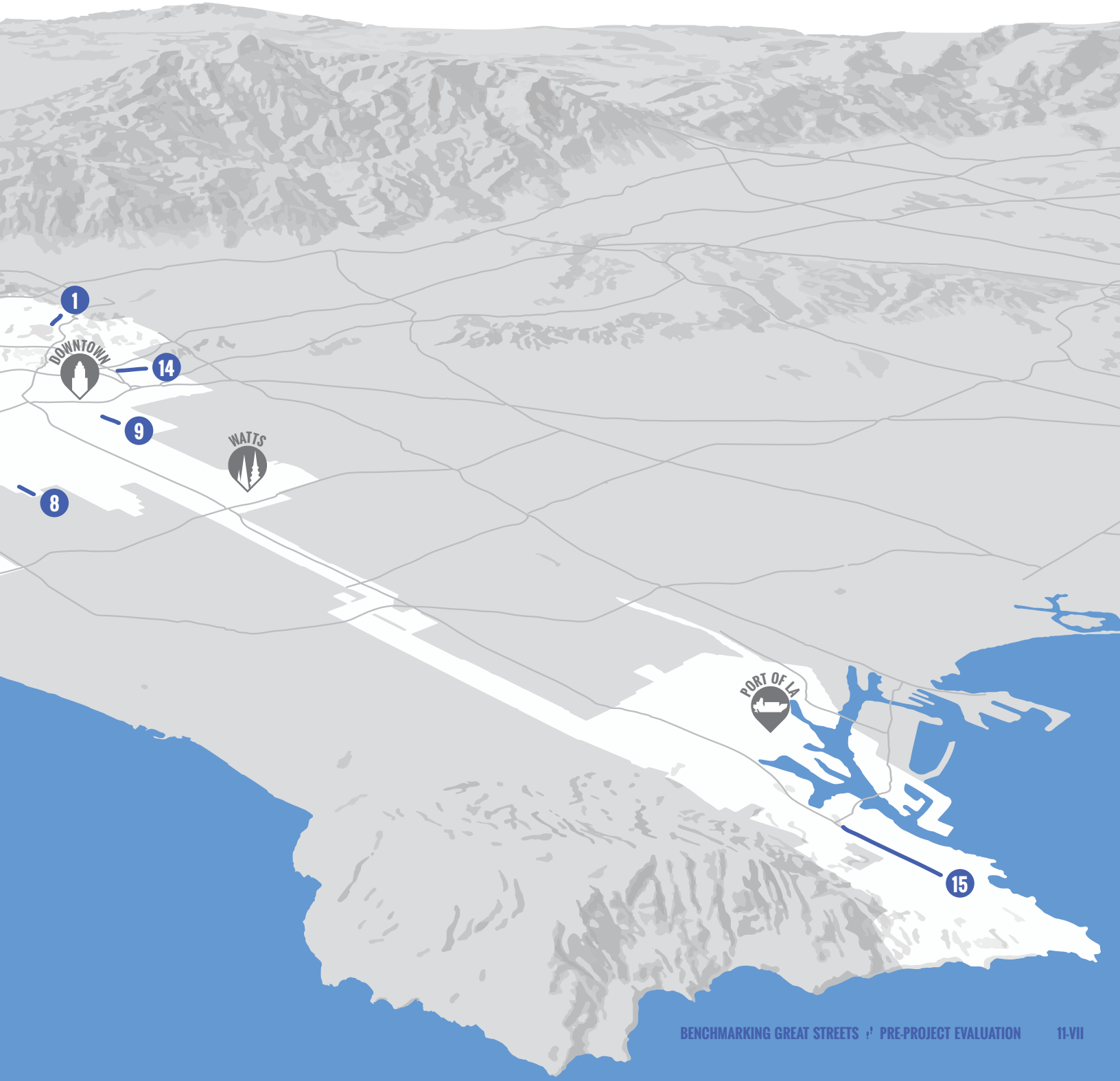


THE FIRST 15 GREAT STREETS

1. **NORTH FIGUEROA ST** — Highland Park
2. **LANKERSHIM BLVD** — North Hollywood
3. **SHERMAN WAY** — Reseda
4. **WESTERN AVE** — Koreatown/Larchmont
5. **WESTWOOD BLVD** — Westwood Village
6. **VAN NUYS BLVD** — Van Nuys
7. **VAN NUYS BLVD** — Pacoima
8. **CRENSHAW BLVD** — Hyde Park
9. **CENTRAL AVE** — Historic South Central
10. **PICO BLVD** — Mid-City
11. **VENICE BLVD** — Mar Vista
12. **RESEDA BLVD** — Northridge
13. **HOLLYWOOD BLVD** — Hollywood
14. **CÉSAR CHÁVEZ AVE** — Boyle Heights
15. **GAFFEY ST** — San Pedro


1
DOWNTOWN
14
9
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PORT OF LA
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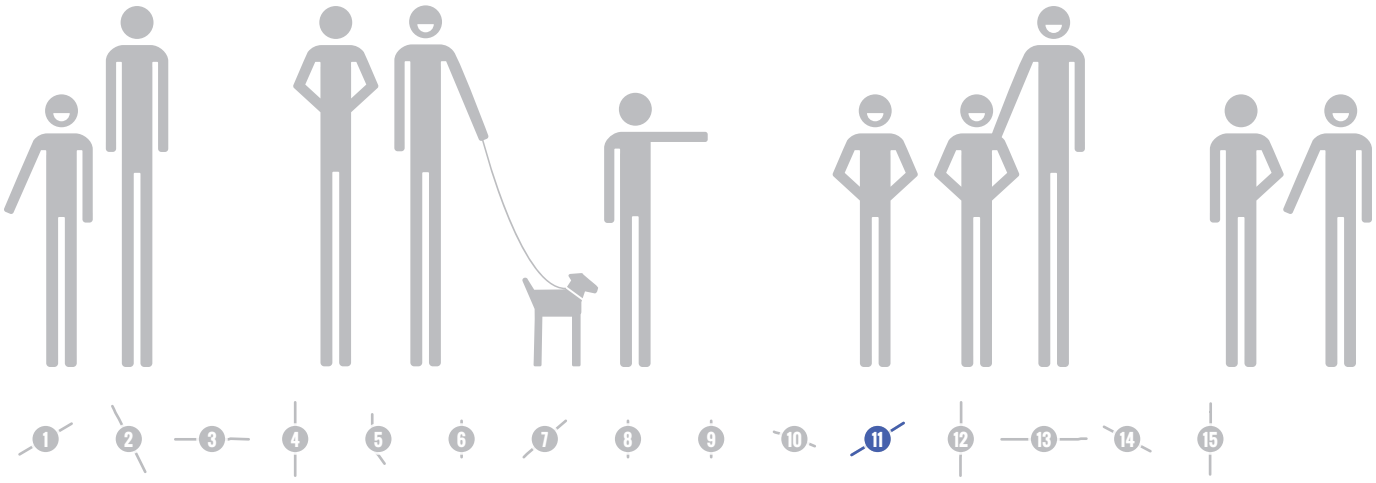
WHAT IS THE GREAT STREETS INITIATIVE?

MAYOR ERIC GARCETTI launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. Our streets are the backbone of our neighborhoods—the places where we live, work, learn, and recreate on a daily basis. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people. And that's why we chose one Great Street from each of Los Angeles' 15 City Council districts as our first 15 corridors.

In partnership with the Mayor's Office and City Council, a team of diverse stakeholders identified these first-phase project areas to develop community partnerships. The Great Streets will also receive targeted city services to activate the streets as public spaces. Our partnership of neighbors, business owners, local organizations, City staff, and elected officials is also working to transform the Great Streets. Based on input we hear from you, we will enhance these corridors as public spaces. Have an idea? Let us know at http://lagreatstreets.org.



WHY ARE WE BENCHMARKING THE GREAT STREETS?

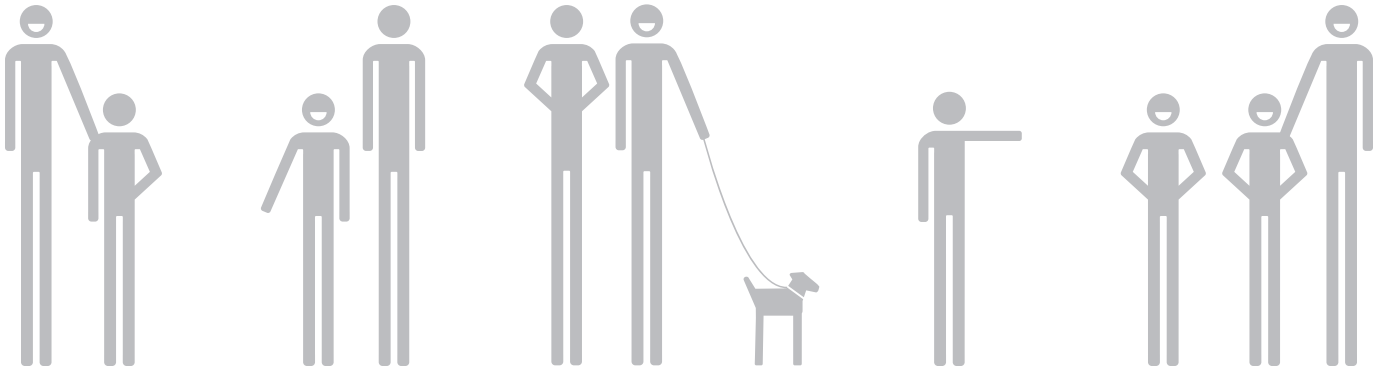
THE GOAL of this benchmarking report is to measure and document neighborhood conditions as they exist before any Great Streets projects are built. We're striving for a holistic snapshot of conditions along the Great Streets, so we're looking at a broad spectrum of data ranging from economics; to safety; to opinions of merchants, residents, and visitors. We may have even spoken with you! This report represents the City's first effort to comprehensively evaluate how streets and neighborhoods change when the City invests in improvements.

Generally, we're looking at data from 2013-2014—a two-year window leading up to the start of Great Streets project construction—although this time period varies for some data sets. We will repeat this analysis again two years after Great Streets projects are built so we have an even, "apples to apples" comparison of how conditions have changed over time. This comparison will help us to better understand how our city is growing and better serve all Angelenos based on what we learn.

As you'll see on the next pages, we've established a set of goals to help us track our performance over time.

SOMETHING TO CONSIDER

While the goal of the Great Streets Initiative is to strengthen our communities and enhance quality of life for Angelenos, the Great Streets projects themselves may not necessarily be the driving force behind all the neighborhood changes that happen along the Great Streets. Broader economic factors, inter- and intra-city migration, and the context of each Great Street all influence neighborhood dynamics. We recommend keeping these factors in mind as you read through this report.



GREAT STREETS GOALS: MOVING THE NEEDLE

ENHANCED NEIGHBORHOOD CHARACTER

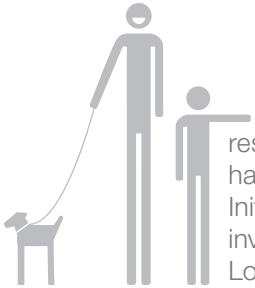
Are we contributing to the unique identities that define our neighborhoods and make them great places to live and work?

IMPROVED ACCESS & MOBILITY

Are we able to access the destinations that matter most to us in a safe and convenient manner?

INCREASED ECONOMIC ACTIVITY

Are we growing our local economies in beneficial ways that allow all Angelenos to prosper?



LOS ANGELES must carefully consider how to leverage and invest our limited resources, and we must strategically coordinate our investments in a way that has the most meaningful benefit for Angelenos. A hallmark of the Great Streets Initiative is a dedication to tracking our progress. Great Streets is a platform for investing in our communities that cuts across the many aspects that define life in Los Angeles. We're tracking our progress towards achieving the goals below.



GREATER COMMUNITY ENGAGEMENT

Do all Angelenos feel that they have a say in how our city grows and are they able to participate in decision-making?



IMPROVED ENVIRONMENTAL RESILIENCE

Are we fostering a healthy environment for all, one with the ability to sustain itself and the capacity to adapt to changes?

SAFER & MORE SECURE COMMUNITIES

Do we have communities where people from all backgrounds feel comfortable participating in civic life?

DATA SOURCES BY CORRIDOR & GOAL

WHAT YOU SEE IN THIS TABLE

These are the data sources that form the backbone of this report. We've collected data from City departments, published archival sources, observations of travel patterns, and firsthand accounts from survey respondents

		NORTH FIGUEROA	LANKERSHIM	SHERMAN	WESTERN	WESTWOOD	VAN NUYS (VAN NUYS)	VAN NUYS (PACOIMA)	CRENSHAW	CENTRAL	PICO	VENICE	RESEDA	HOLLYWOOD	CÉSAR CHÁVEZ	GAFFEY
INCREASED ECONOMIC ACTIVITY	*Building permits*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Business operator & customer perceptions							✓		✓		✓	✓	✓	✓	
	Business revenue	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Commercial real estate data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Median household income	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Number & type of businesses	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Parking meter revenue	✓		✓		✓	✓				✓	✓		✓	✓	
IMPROVED ACCESS & MOBILITY	*Driving, walking, & biking traffic volumes*	✓			✓			✓	✓	✓		✓	✓	✓	✓	✓
	Pavement condition index	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Speeding vehicles							✓		✓		✓	✓	✓	✓	
	Transit ridership	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Travel mode to Great Street							✓		✓		✓	✓	✓	✓	
	Travel mode split							✓		✓		✓	✓	✓	✓	
	Pedestrian and bike rider observations							✓		✓		✓	✓	✓	✓	
	Vehicle travel speed							✓		✓		✓	✓	✓	✓	
ENHANCED NEIGHBORHOOD CHARACTER	*Neighborhood perceptions*							✓		✓		✓	✓	✓	✓	
	Streetscape elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

		NORTH FIGUEROA	LANKERSHIM	SHERMAN	WESTERN	WESTWOOD	VAN NUYS (VAN NUYS)	VAN NUYS (PACOIMA)	CRENSHAW	CENTRAL	PICO	VENICE	RESEDA	HOLLYWOOD	CÉSAR CHÁVEZ	GAFFEY
GREATER COMMUNITY ENGAGEMENT	*MyLA 311 service requests*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IMPROVED ENVIRONMENTAL RESILIENCE	*CalEnviroScreen 2.0 data*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Environmental quality of life	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Obesity rates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Physical activity rates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAFER & MORE SECURE COMMUNITIES	*Collisions*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Crime statistics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Female, youth, & elderly presence							✓		✓		✓	✓	✓	✓	
	Safety perceptions							✓		✓		✓	✓	✓	✓	
	Streetlight availability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

HOW GREAT STREETS CAN IMPROVE PUBLIC HEALTH

AN UNDERLYING PHILOSOPHY of the Great Streets Initiative is that our streets can do more than just get us from point A to point B. By making neighborhoods safer, more prosperous, and more inviting, Great Streets have the potential to improve health, too. Health—good or poor—is the result of many factors, from individual behavior like diet and exercise, to the physical environment of our communities, as well as access to quality health care. Together, all these factors contribute to how long and how well we live.[i] As the graphic on the facing page shows, the conditions in our local neighborhoods influence individual behaviors and opportunities to be healthy.

Preventing chronic diseases is at the forefront of public health. Chronic diseases, such as coronary heart disease, stroke, diabetes, and obesity, are responsible for 70% of all deaths; and in Los Angeles County, 1 in 3 adults have at least one chronic disease.[ii] Engaging in physical activity is one of the most important ways to prevent and treat chronic diseases;[iii] however, in Los Angeles, only 62% of residents get enough physical activity each week.[iv] One way that Great Streets can help improve health is by creating places for Angelenos to be physically active.

Walking is a simple and affordable way to get the recommended amount of physical activity.[v] Studies have shown that residents of walkable neighborhoods report twice as many walking trips per week than residents of less walkable neighborhoods.[vi] By promoting safe, beautiful, and vibrant streets, Great Streets have the potential to positively impact levels of walking in neighborhoods across Los Angeles.[vii]

The vision of the Los Angeles County Department of Public Health is “healthy people in healthy communities.” Changing health outcomes is a complex undertaking that goes beyond what any one individual, community-based organization, government agency, or private sector partner can do. Collaboration and coordination to create strategies that meet multiple goals—including health—can make the difference. Great Streets present an opportunity to create healthier communities, one neighborhood at a time. In this benchmarking report, we have included indicators for obesity and walking for the zip code of each Great Street. We hope that these indicators will improve over time as Great Streets and other complementary initiatives are implemented.

IF WE CAN FACILITATE...

SAFER STREETS & NEIGHBORHOODS

Improved roads, sidewalks, and lighting

COMMUNITY RESOURCES

Thriving businesses, attractive housing & neighborhoods, and mixed land uses

HEALTHY PHYSICAL ENVIRONMENTS

Cleaner air & less noise

WE WOULD EXPECT TO SEE...

HEALTHIER BEHAVIORS

Increased physical activity & healthier eating

IMPROVED SAFETY

Increased law abidance & safer behaviors

SOCIAL COHESION

Increased interactions among neighbors, friends, and others in the community

ACCESS TO ECONOMIC OPPORTUNITIES

Better exposure to economic opportunities

WHICH ALL SUPPORT IMPROVED HEALTH

DECREASED CHRONIC DISEASE

Obesity, hypertension, diabetes, and asthma

DECREASED INJURY & CRIME

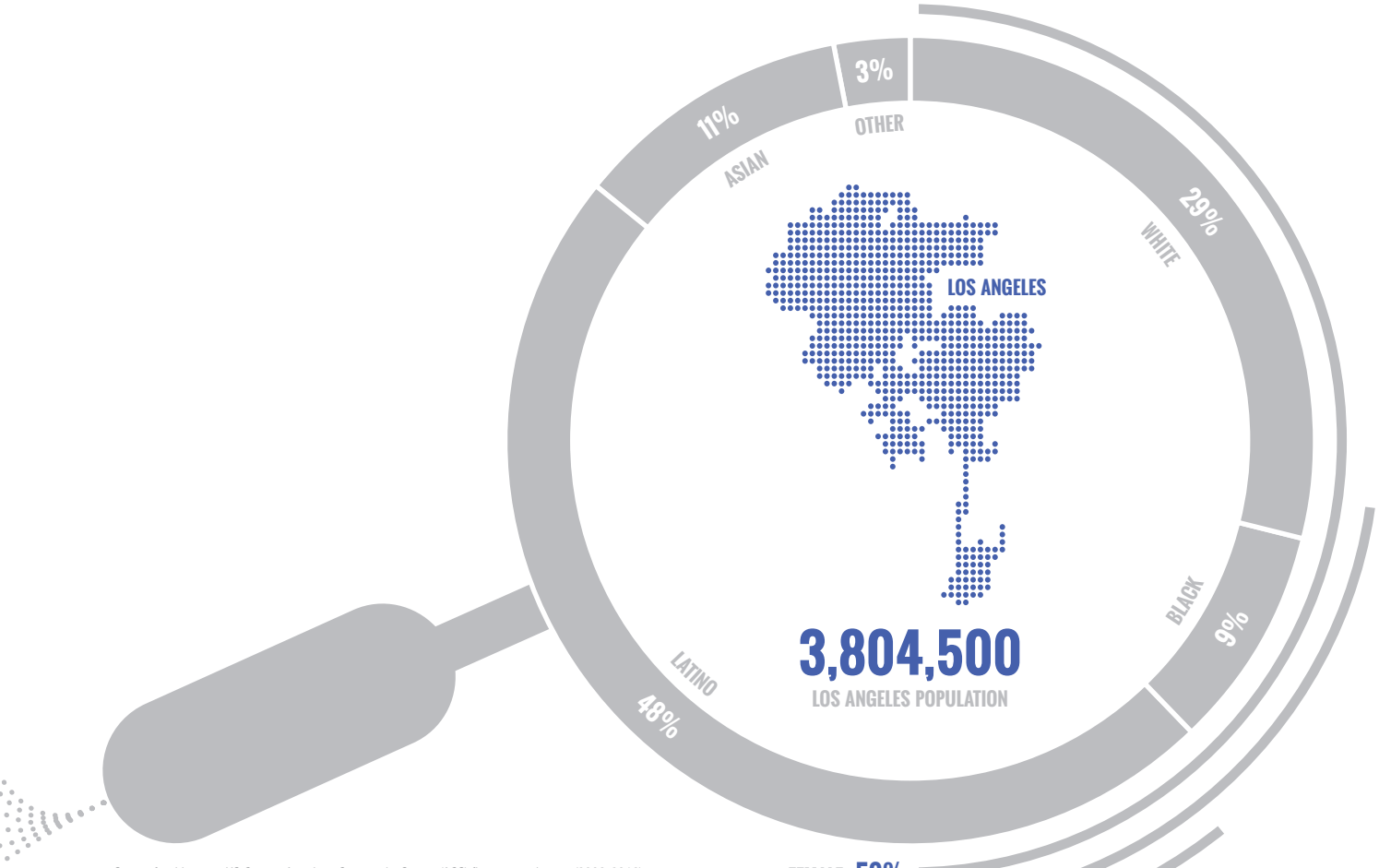
IMPROVED MENTAL HEALTH

i. *Senterfitt JW, Long A, Shih M, Teutsch SM. How Social and Economic Factors Affect Health. Social Determinants of Health, Issue no. 1. Los Angeles: Los Angeles County Department of Public Health. January 2013.*
ii. *Lui CL, Wallace SP. Chronic Conditions of Californians: 2007 California Health Interview Survey. California Health Care Foundation: 2010*
iii. *Chakravarthy, MV. "An obligation for primary care physicians to prescribe physical activity to sedentary patients to reduce the risk of chronic health conditions." Mayo Clinic Proceedings. Vol. 77. No. 2. Elsevier, 2002.*
iv. *Los Angeles County Department of Public Health, Office of Health Assessment and Epidemiology. Mortality in Los Angeles County 2011: Leading causes of death and premature death with trends for 2002-2011. August 2014.*
v. *Audrey, Suzanne, Sunita Procter, and Ashley R. Cooper. "The contribution of walking to work to adult physical activity levels: a cross sectional study." Int J Behav Nutr Phys Act 11 (2014): 37*
vi. *Khan LK, et al. Recommended community strategies and measurements to prevent obesity in the United States. Vol. 58. US Department of Health & Human Services, Centers for Disease Control and Prevention, 2009.*
vii. *Brownson, Ross C., et al. "Environmental and policy determinants of physical activity in the United States." American Journal of Public Health 91.12 (2001): 1995-2003.*

CITYWIDE CONTEXT

THE DATA YOU SEE ON THESE PAGES offer a citywide perspective for each of the six Great Streets goals and for demographic trends across the city. The numbers here are totals for the entire City of Los Angeles. We've included them to provide additional context for the data that follow in this benchmarking report.

INCREASED ECONOMIC ACTIVITY	**$49,745** MEDIAN HOUSEHOLD INCOME (2008-2012)	**395,900** TAXED BUSINESSES (2014)	**259,300** BUILDING PERMITS ISSUED (2013-2014)	
IMPROVED ACCESS & MOBILITY	**77%** DRIVE TO WORK (2008-2012)	**11%** TAKE PUBLIC TRANSIT TO WORK (2008-2012)	**5%** WALK OR BIKE TO WORK (2008-2012)	
ENHANCED NEIGHBORHOOD CHARACTER	**96** NEIGHBORHOOD COUNCILS (2016)	**41** BUSINESS IMPROVEMENT DISTRICTS (2016)	**257** CULTURAL GRANT AWARDS (2014)	
GREATER COMMUNITY ENGAGEMENT	**1,820,500** REGISTERED VOTERS (2015)	**1,256,500** MYLA 311 SERVICE REQUESTS (2013-2014)	**99,700** MAYOR'S OFFICE TWITTER FOLLOWERS (2016)	
IMPROVED ENVIRONMENTAL RESILIENCE	**24%** ADULTS WHO ARE OBESE (2011-2012)	**37%** ADULTS WHO WALK AT LEAST 150 MINUTES PER WEEK (2011-2012)		
SAFER & MORE SECURE COMMUNITIES	**236,000** CRIMES (2014)	**25,024** TRAFFIC COLLISIONS (2013)		



FEMALE **50%**
UNDER 18 **23%**
OVER 65 **11%**

Source for this page: US Census American Community Survey (ACS) five-year estimates (2008-2012)
Sources for previous page (left to right, top to bottom): ACS five-year estimates, Los Angeles Office of Finance, Los Angeles Department of Building & Safety, ACS five-year estimates, ACS five-year estimates, ACS five-year estimates, Los Angeles Department of Neighborhood Empowerment, Los Angeles City Clerk, Los Angeles Department of Cultural Affairs, Los Angeles City Clerk, Los Angeles Information Technology Agency, Twitter, California Health Interview Survey, California Health Interview Survey, Los Angeles Police Department, California Statewide Integrated Traffic Records System


12224
OPEN
{ Soaptopia }
VENICE
GRIND
follow us on!



COUNCIL DISTRICT 11

VENICE BOULEVARD



Venice Bl

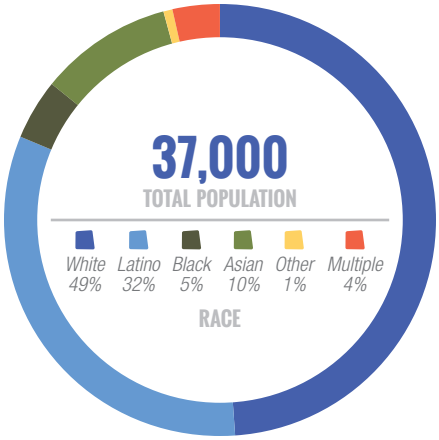
Mar Vista

OVERVIEW

The heart of Mar Vista, Venice Boulevard offers a special blend of local retail and community-serving uses, including unique coffee shops and restaurants, art and architecture studios, and other creative and vital businesses. Every Sunday, the Mar Vista Farmers Market brings hundreds of Angelenos to this sunny stretch of Venice Boulevard.

According to the US Census American Community Survey (ACS) five-year estimates (2008-2012), there are about 37,000 people living in the Census block groups within one-half mile of the Great Streets corridor. The charts below provide more demographic information using the same source.

DEMOGRAPHICS AROUND THE GREAT STREET



18%
UNDER 18

11%
OVER 65

50%
FEMALE

AT A GLANCE

BEETHOVEN - INGLEWOOD
Area of analysis

0.8 MI
Corridor Length

MIKE BONIN
City Councilmember, District 11

MAR VISTA
Neighborhood Council

PALMS - MAR VISTA - DEL REY
Community Plan Area

AREA OF ANALYSIS



VENICE BOULEVARD

IN PICTURES










Venice Bl


COFFEE




CICLAVIA
PEDESTRIAN
ZONE
Please dismount and walk
ciclavia.org

INCREASED ECONOMIC ACTIVITY

INCREASED ECONOMIC ACTIVITY

measures the degree to which we are providing more opportunities for local residents and businesses to prosper as a result of inclusive community investment.

In terms of businesses, we're tracking this goal through the types of businesses that choose to locate on the Great Street, business revenues, merchant and customer surveys, and other commercial real estate trends. We see that the proportions of business types on the Great Street are generally similar to citywide proportions.

Reported business revenues have remained relatively stable over the last 10 years while the number of taxed businesses on the Great Street has grown. While commercial rents have risen and fallen, they have seen an overall upward trend. Vacant commercial buildings make up a very small amount of available commercial real estate.

We surveyed a sample of merchants and people along the Great Street to learn more about the perceptions of those who live, shop, work, and play in the area. Through the surveys, we saw that weekday midday/evenings and weekend midday/afternoons tend to be the busiest times for surveyed merchants. We also saw that people who walk and drive to the Great Street tend to visit most frequently.

Parking meter revenues are another way of approximating how many people visit the Great Street. The amount of parking meter revenue increased between 2013 and 2014 while the number of meters decreased, which could suggest that the number of people visiting the Great Street is growing.

Finally, we're keeping an eye on median household income. We see that the median income in the area is generally above the citywide average.

TYPES OF BUSINESSES

LEGEND

Categories are listed clockwise from top

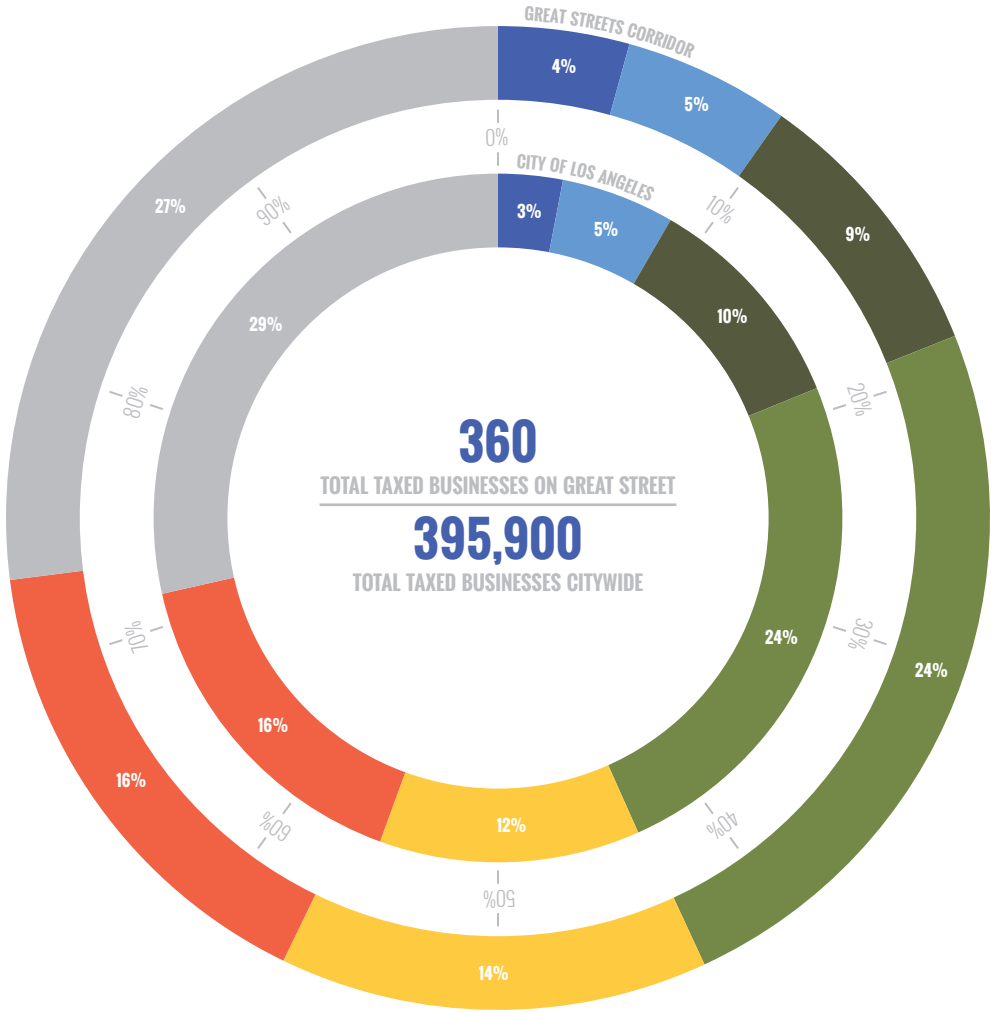
- *Accommodation, Food Services*
- *Healthcare*
- *Industrial (Agriculture, Construction, Manufacturing, Natural Resources, Transportation, Utilities, Warehousing)*
- *Professional Services (Administrative Support, Education, Finance, Information Technology, Insurance)*
- *Real Estate Rental & Leasing*
- *Retail & Wholesale Trade*
- *Other or Not Stated*

WHAT YOU SEE BELOW

Distribution of taxed businesses along the Great Streets corridor (outside ring) and City of Los Angeles as a whole (inside ring). While not all businesses are included, this measure helps give a sense of the number of active businesses located along the Great Street

SOURCE & DATES

Los Angeles Office of Finance, 2014



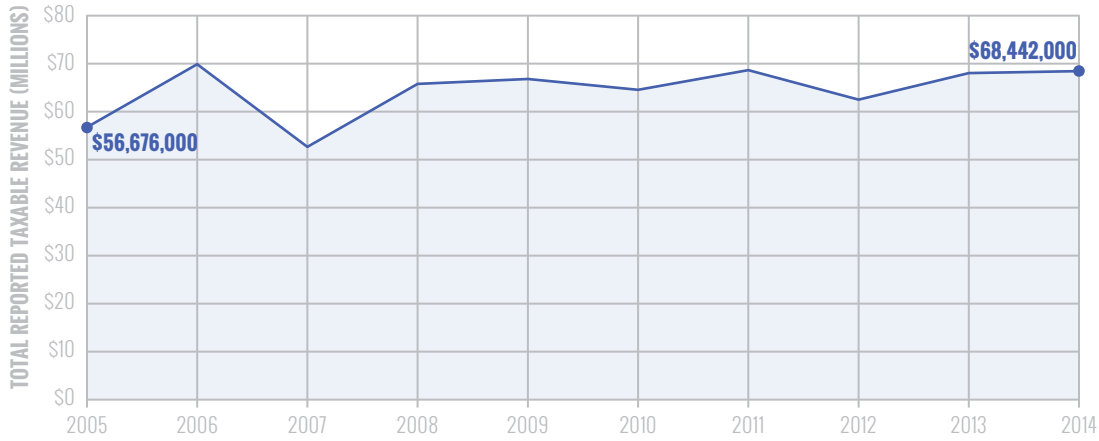
BUSINESS REVENUE & NUMBER OF BUSINESSES

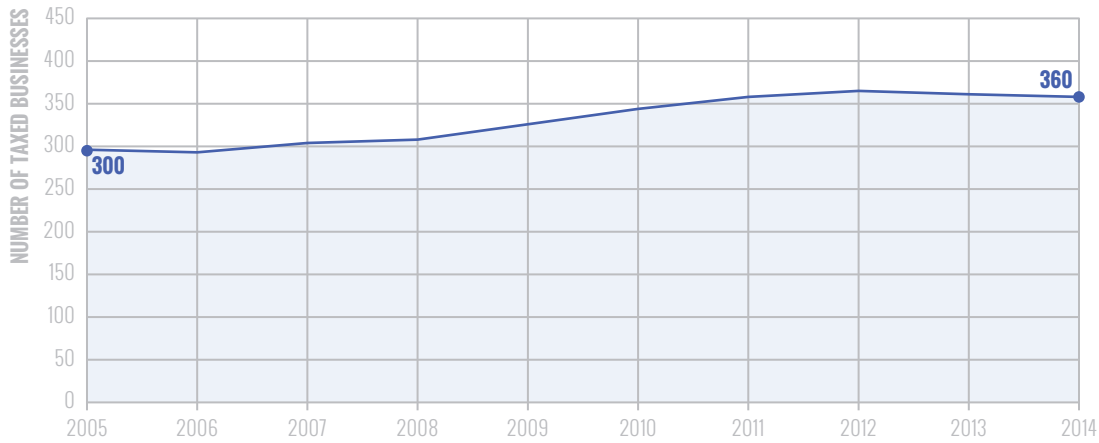
SOURCE & DATES

Los Angeles Office of Finance, 2005 - 2014

WHAT YOU SEE BELOW

Top: Total reported taxable revenue over the last 10 years (in 2014 inflation-adjusted dollars) for all eligible businesses on the Great Street. Taxable revenue typically includes retail/wholesale sales or payments for services received, and not all types of businesses are taxed
Bottom: Number of taxed businesses on the Great Streets corridor. While not all businesses are included, this measure helps give a sense of the number of active businesses located along the Great Street





COMMERCIAL REAL ESTATE

WHAT YOU SEE BELOW

Summary of key real estate development indicators for properties directly fronting the Great Street (all except building permit data) and half-mile area around the Great Street (building permit data)

SOURCE

CoStar/City of Los Angeles (all except building permit data); Los Angeles Department of Building & Safety (LADBS) (building permit data)

DATES

2013-2014, unless otherwise noted

244,861
TOTAL RETAIL SQUARE FOOTAGE

1% VACANT



AVERAGE ANNUAL COMMERCIAL RENT PER SQUARE FOOT

LEASING DEALS
8

COMMERCIAL PROPERTY SALES
4

MEDIAN COMMERCIAL PROPERTY SALE PRICE
$1,024,000

BUILDING PERMITS ISSUED
1,221

49
COMMERCIAL BUILDINGS

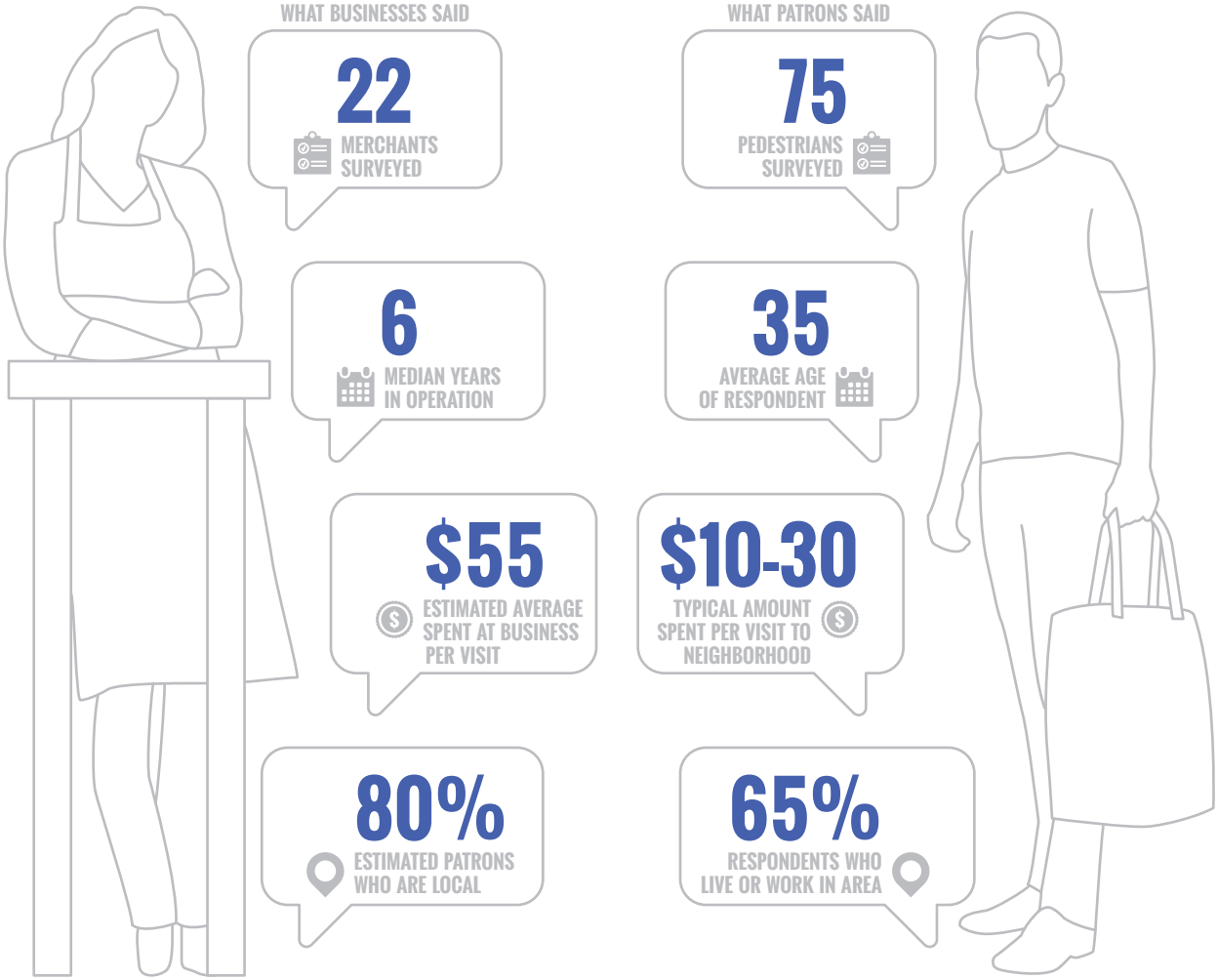
BUSINESS PERCEPTIONS

WHAT YOU SEE BELOW

Summary of the most common responses we heard from surveyed businesses and patrons of the area

SOURCE & DATES

Survey of 22 merchants and 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015



BUSINESS PERCEPTIONS (CONTINUED)

WHAT YOU SEE BELOW

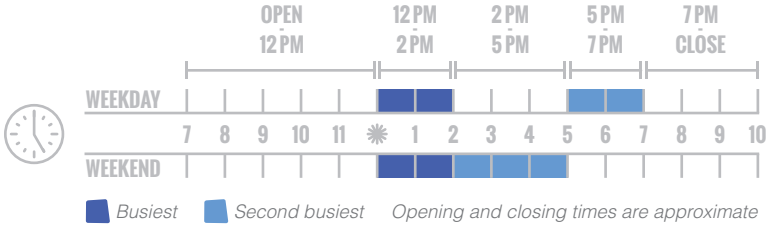
Summary of the most common responses we heard from surveyed businesses and patrons of the area

SOURCE & DATES

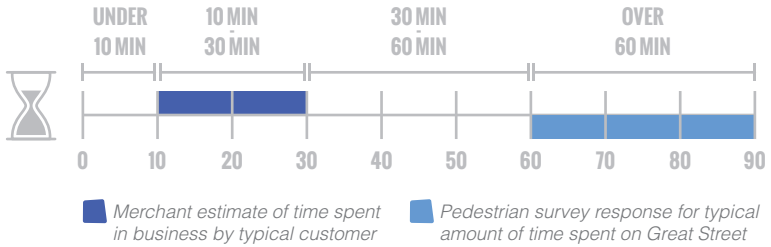
Survey of 22 merchants and 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015

BUSIEST TIMES OF DAY

Based on merchant survey responses



MOST COMMON LENGTH OF VISIT



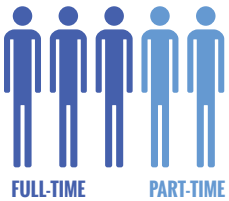
ANTICIPATED TRENDS

Shown in number of survey responses



AVERAGE NUMBER OF EMPLOYEES

Not including business owner



BUSINESS PERCEPTIONS (CONTINUED)

WHAT YOU SEE BELOW

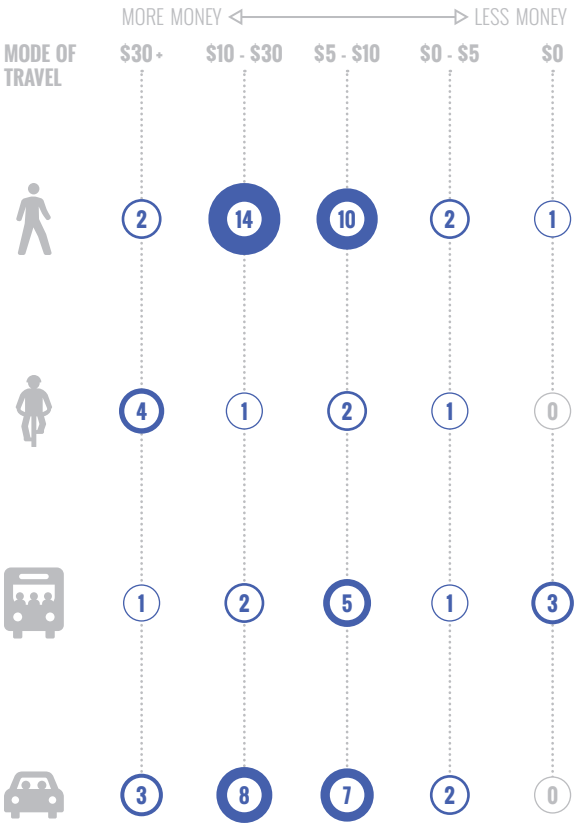
Summary of the most common responses we heard from surveyed patrons of the area

SOURCE & DATES

Survey of 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015

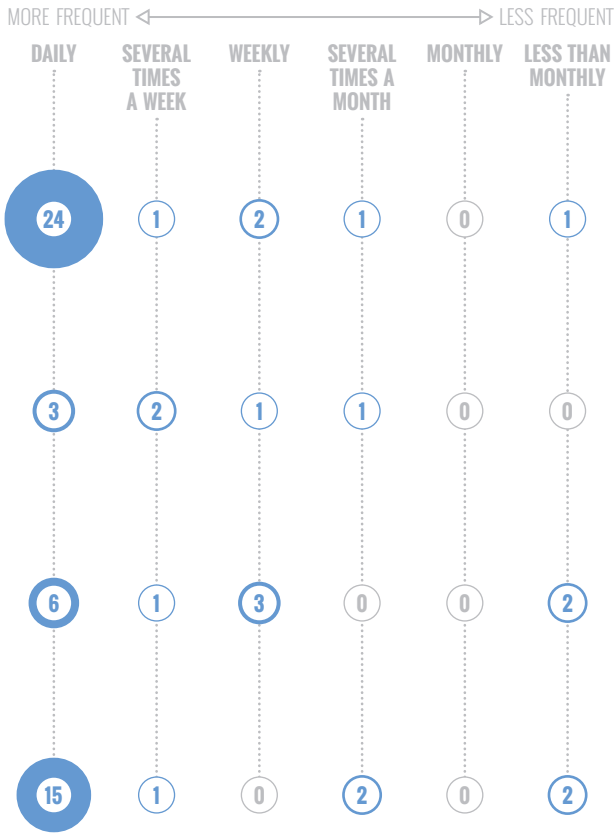
AVERAGE AMOUNT SPENT PER VISIT

As stated by pedestrian survey respondents; shown in number of survey responses



FREQUENCY OF VISITS TO GREAT STREET

As stated by pedestrian survey respondents; shown in number of survey responses




MEDIAN HOUSEHOLD INCOME
WHAT YOU SEE ON THIS MAP
Median household income for all census block groups within one-half mile of the Great Streets corridor
SOURCE
US Census American Community Survey (ACS) five-year estimates
DATES
2008-2012
MAR VISTA
CULVER CITY
LEGEND
$0 - $25,000
$25,000 - $50,000
$50,000 - $75,000
$75,000 - $100,000
$100,000 - $125,000
The citywide median household income is $49,745
NORTH
PALMS BLVD
WOODGREEN ST
STEWART AVE
WESTMINSTER AVE
COLONIAL AVE
CHARNOCK RD
VICTORIA AVE
BARRINGTON AVE
MC CUNE AVE
INGLEWOOD BLVD
MOUNTAIN VIEW AVE
MARCASEL AVE
MAY ST
MARCO PL
GRAND VIEW BLVD
OCEAN VIEW AVE
CENTINELA AVE
KEESHEN DR
PACIFIC AVE
WASATCH AVE
BOISE AVE
STEWART AVE
WADE ST
MAY ST
MEIER ST
MOORE ST
BEETHOVEN ST
FRANCES AVE
MATTESON AVE
BARBARA AVE
MITCHELL AVE
187
LYCEUM AVE
MANOR LN
CASWELL AVE
ZANJA ST
HERBERT ST
WASHINGTON BLVD

PARKING METER REVENUE

WHAT YOU SEE HERE

Meter revenue collected by the City of Los Angeles for all parking meters along this Great Streets corridor. Meter revenues help maintain and improve the City's parking infrastructure and fund other City services

SOURCE & DATES

Los Angeles Department of Transportation (LADOT), 2013-2014

2013

METERS ON GREAT STREET
94

METER REVENUE
$127,000

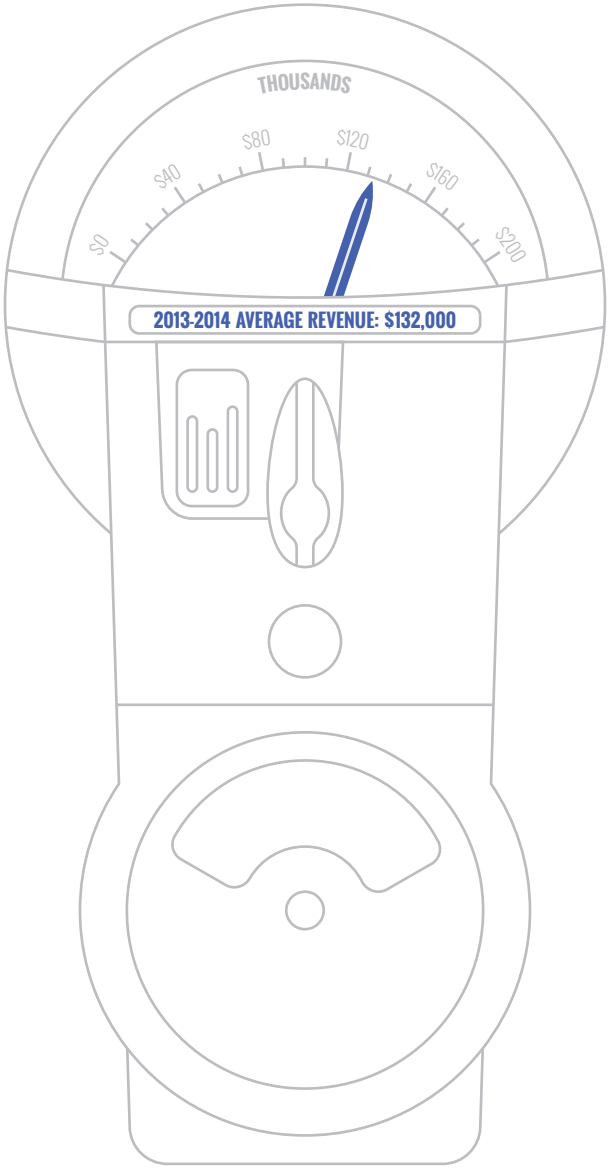
REVENUE PER METER
$1,350

2014

METERS ON GREAT STREET
89

METER REVENUE
$136,000

REVENUE PER METER
$1,530



VENICE BOULEVARD

IMPROVED ACCESS & MOBILITY

IMPROVED ACCESS & MOBILITY

assesses how well we can reach the destinations that matter most to us in a safe and convenient manner.

To gauge our performance toward this goal, we collected data on the number of people driving, walking, and biking along the Great Street as well as general characteristics of people walking and biking. We see that about 18,000 to 19,000 vehicles drive in each direction along the Great Street on a typical weekday. No drivers were observed speeding.

We saw approximately 85 people walking and 80 people biking per hour. We consider this a very high level of biking activity. While we saw more men walking than women, we observed comparatively high levels of women riding bikes and comparatively low levels of bike riding on the sidewalk.

We also surveyed merchants and pedestrians about the different ways that people travel to the neighborhood. While surveyed merchants estimated most of their customers arrive in car, we saw that a large percent of surveyed people also traveled to the area on foot.

Additionally, we examined transit ridership and the condition of pavement on city streets in the area. Transit ridership for routes traveling on the Great Street is measured in terms of people getting on and off transit vehicles along the Great Street. We see that boardings and alightings are mostly concentrated at Centinela Avenue.

This section of Venice Boulevard is currently designated as a state highway. Since Caltrans maintains state highways rather than the City of Los Angeles, pavement condition information is not available for the Great Street.

VEHICLE VOLUMES

WHAT YOU SEE BELOW

Weekday 24-hour auto counts & 6-hour walking and biking counts (7am-10am, 3pm-6pm)

SOURCE & DATES

Collected by National Data and Surveying Services (NDS) on Tuesday, September 22, 2015

LEGEND

Weekday

BETWEEN

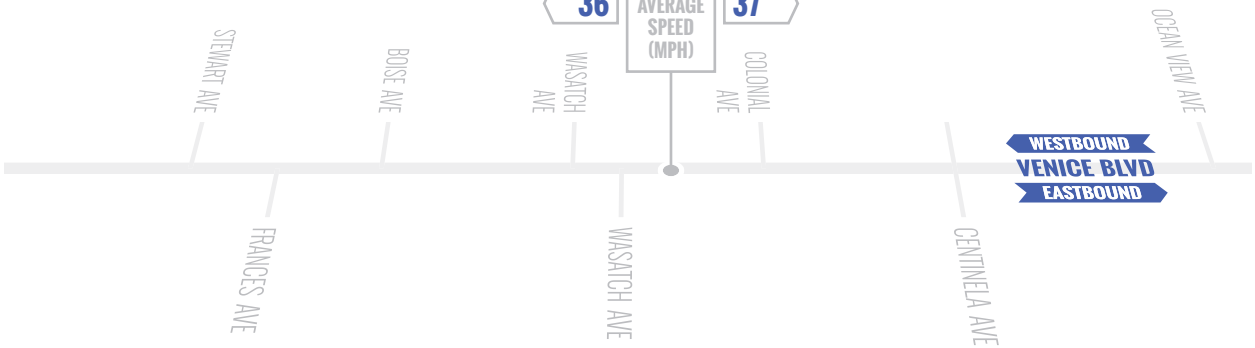
WASATCH AVE & COLONIAL AVE

	NORTH SIDE	SOUTH SIDE
6 HR	232	266
6 HR	261	222

	WESTBOUND	EASTBOUND
24 HR	19,191	18,480
PERCENT SPEEDING DRIVERS	18%	15%
AVERAGE SPEED (MPH)	36	37

SPEED LIMIT 40

Posted speed limit. Driving 5 or more miles over the speed limit is considered speeding.



TRAVEL MODE SPLIT AND PEDESTRIAN & BIKE RIDER OBSERVATIONS

WHAT YOU SEE BELOW

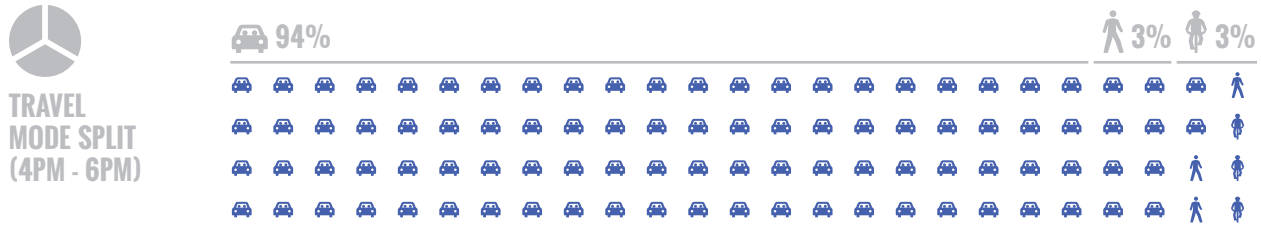
Top: Percentages of people observed traveling along the Great Street in vehicle (including bus), on foot, and by bike. The data below do not isolate transit ridership
Bottom: Characteristics of people observed walking and biking along the Great Street

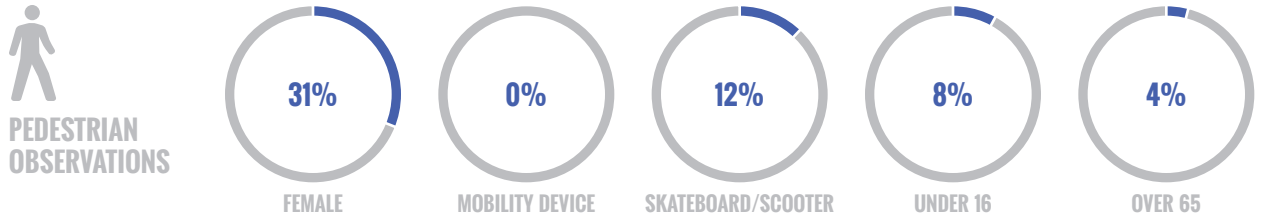
SOURCE & DATES

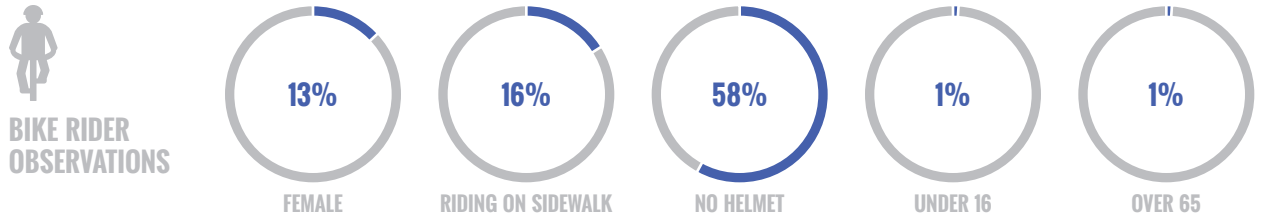
Collected by NDS on Tuesday, September 22, 2015

LEGEND

Weekday







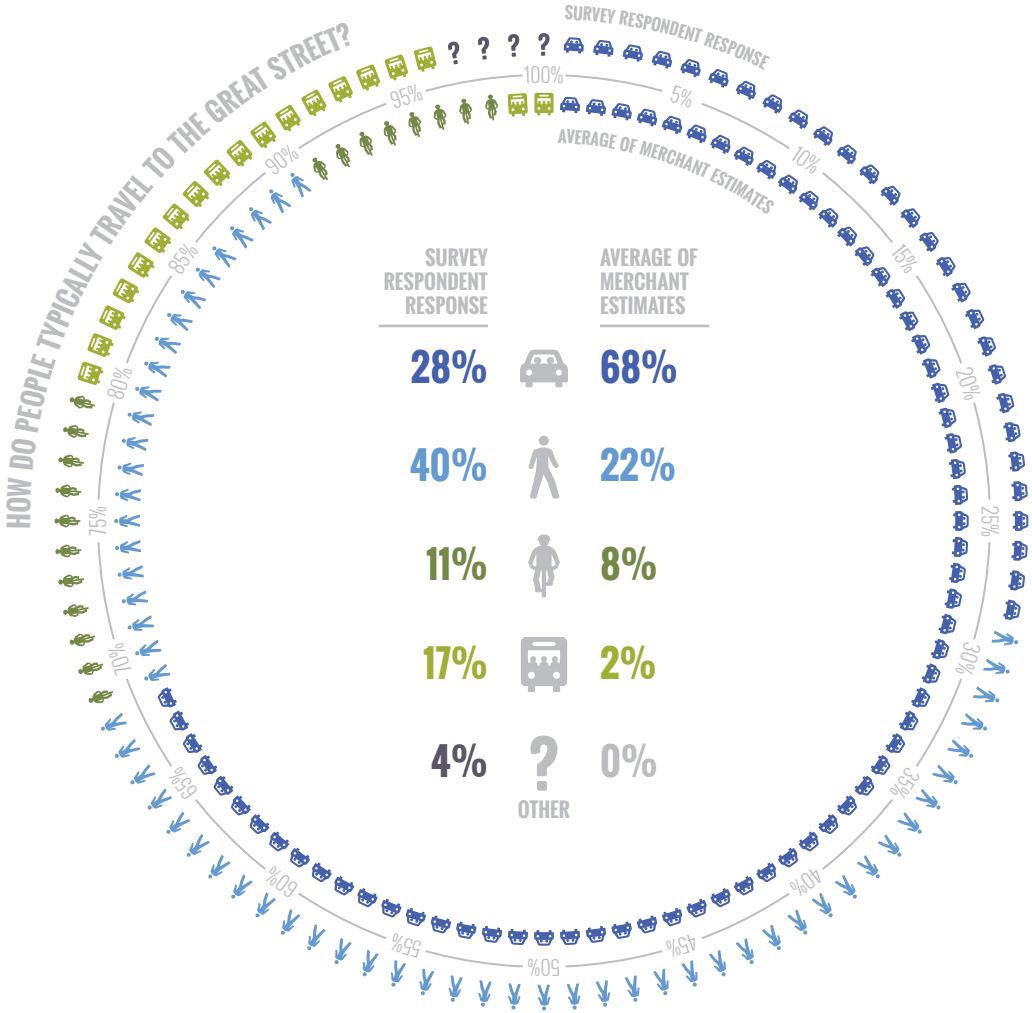
TRAVEL MODE TO GREAT STREET

WHAT YOU SEE BELOW

Comparison of pedestrian survey respondents' stated mode of travel to the Great Street and surveyed merchants' estimates of how their customers travel to the Great Street

SOURCE & DATES

Survey of 22 merchants and 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015



TRANSIT RIDERSHIP

WHAT YOU SEE ON THIS MAP

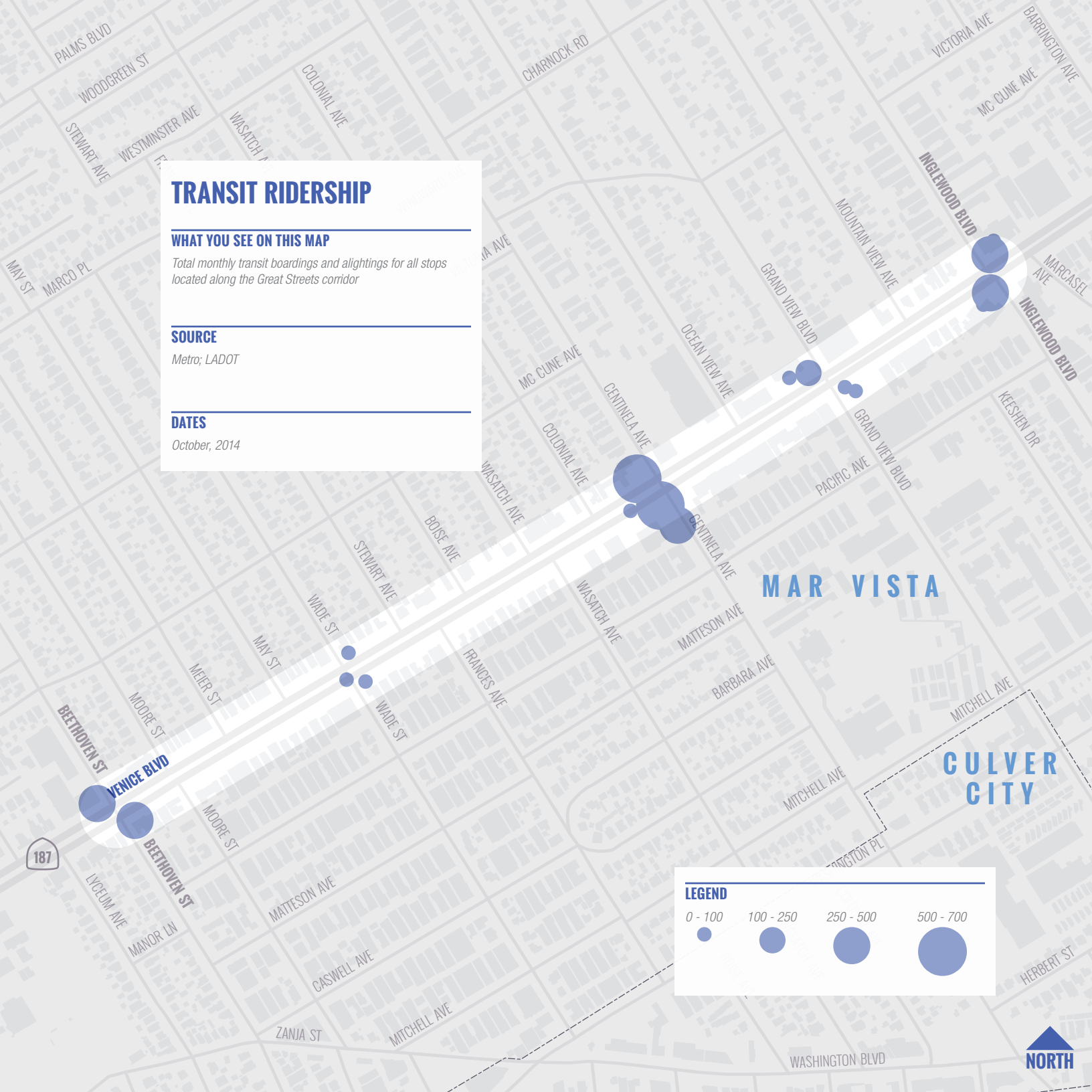
Total monthly transit boardings and alightings for all stops located along the Great Streets corridor

SOURCE

Metro; LADOT

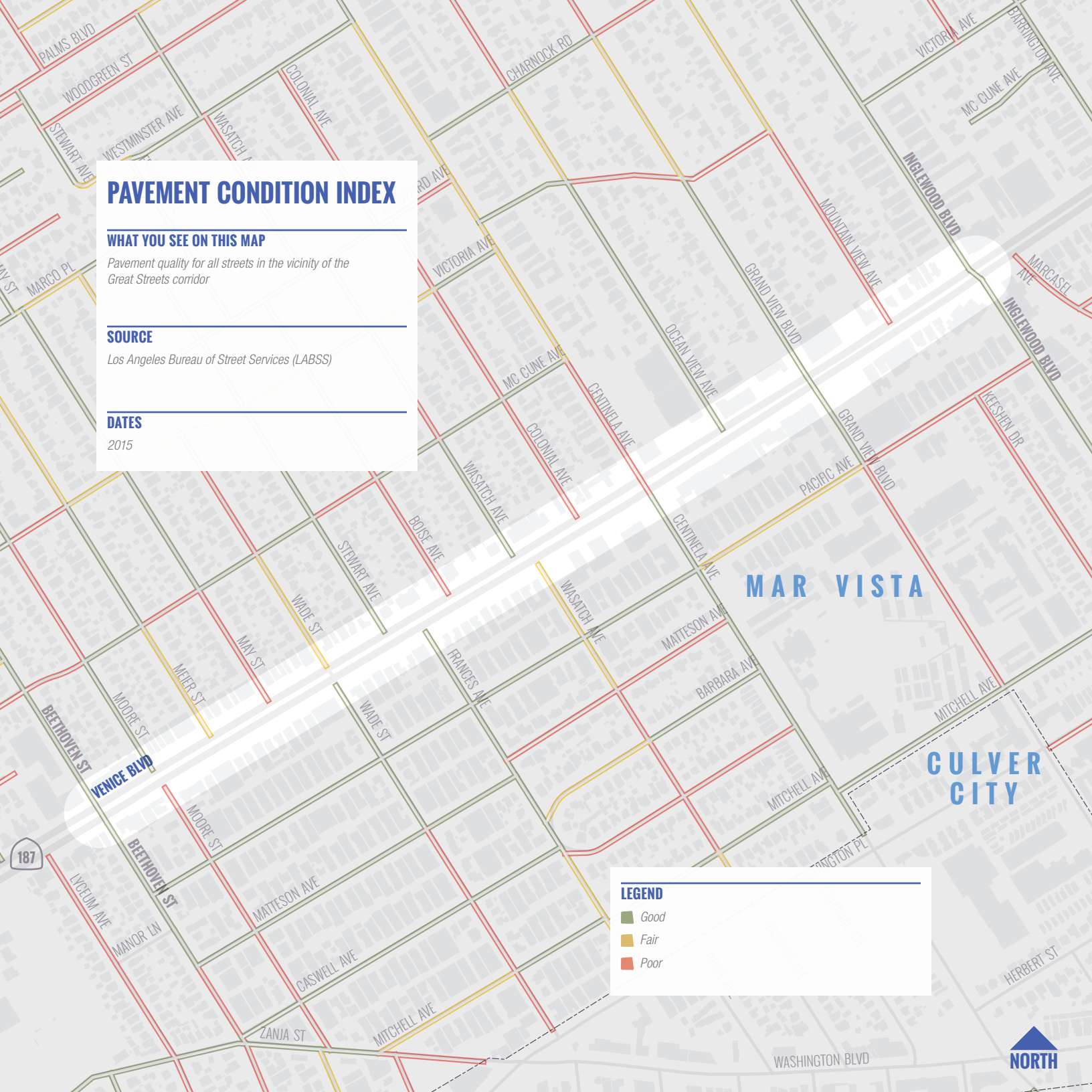
DATES

October, 2014



LEGEND

0 - 100 | 100 - 250 | 250 - 500 | 500 - 700


PAVEMENT CONDITION INDEX
WHAT YOU SEE ON THIS MAP
Pavement quality for all streets in the vicinity of the Great Streets corridor
SOURCE
Los Angeles Bureau of Street Services (LABSS)
DATES
2015
PALMS BLVD
WOODGREEN ST
STEWART AVE
WESTMINSTER AVE
COLONIAL AVE
CHARNOCK RD
VICTORIA AVE
BARRINGTON AVE
MC CUNE AVE
INGLEWOOD BLVD
MOUNTAIN VIEW AVE
MARCO PL
GRAND VIEW BLVD
OCEAN VIEW AVE
CENTINELA AVE
KEESHEN DR
PACIFIC AVE
WASATCH AVE
BOISE AVE
STEWART AVE
WADE ST
MAY ST
MEIER ST
MOORE ST
FRANCES AVE
MATTESON AVE
BARBARA AVE
MITCHELL AVE
MAR VISTA
CULVER CITY
BEETHOVEN ST
VENICE BLVD
187
LYCEUM AVE
MANOR LN
CASWELL AVE
ZANJA ST
HERBERT ST
WASHINGTON BLVD
LEGEND
Good
Fair
Poor
NORTH

VENICE BOULEVARD

ENHANCED NEIGHBORHOOD CHARACTER

ENHANCED NEIGHBORHOOD CHARACTER charts our progress in contributing to the unique identities that define our neighborhoods and make them great places to live and work.

We surveyed pedestrians about their feelings of the neighborhood and the things they come to do on the Great Street. Most survey respondents agreed the neighborhood is clean, safe, attractive, and active. More than half of all survey respondents also felt the neighborhood has a strong identity.

When asked their reason for visiting the Great Street, survey participants most commonly responded that they live or work in the area.

While it's not possible to quantify every feature that contributes to a Great Street, we've created a list of key amenities that help express neighborhood character and make our streets quality places to live, work, and socialize. We see that some of these features—like street trees, civic art, and regular special events—are already present along the Great Street, but opportunities exist to expand the offering of these and other amenities.

NEIGHBORHOOD PERCEPTIONS

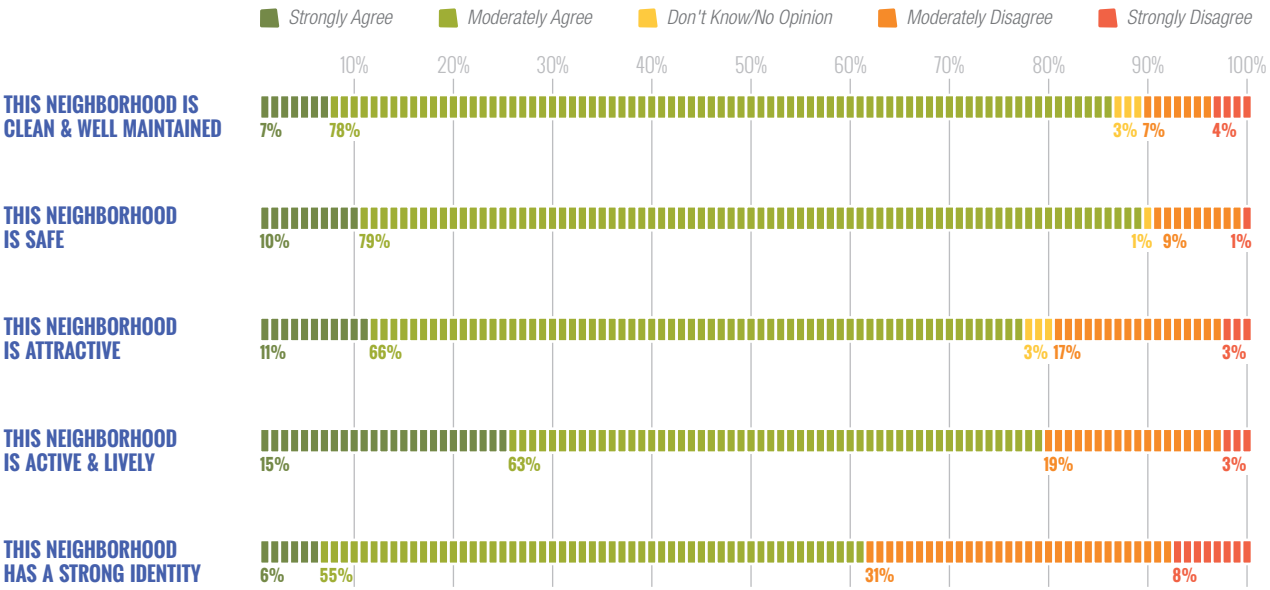
WHAT YOU SEE BELOW

Top: Perceptions of the Great Street and surrounding neighborhood
Bottom: Reasons stated for visiting this neighborhood

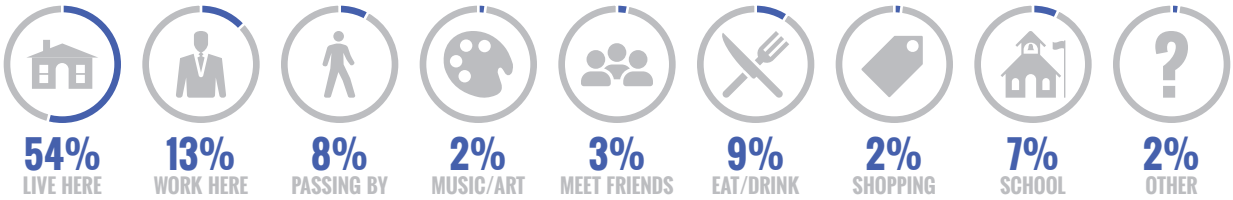
SOURCE & DATES

Survey of 75 pedestrians along the Great Street, collected by Fehr & Peers on representative weekdays and weekends, May - June, 2015

PERCEPTIONS



REASON FOR VISIT



GREAT STREETS STREETSCAPE ELEMENTS

LEGEND

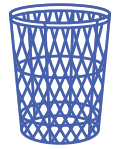
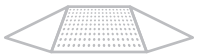
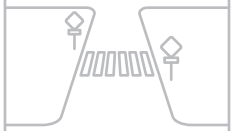
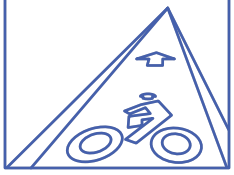
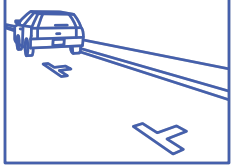
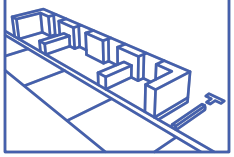
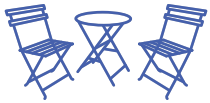
PRESENT | ABSENT

WHAT YOU SEE BELOW

Great Streets include a host of amenities that help express their character and make them quality places to live, work, and socialize. While it's not possible to quantify every feature that contributes to a Great Street, the matrix below shows whether certain key attributes can be found along this corridor

SOURCE & DATES

Physical inventory of corridor, collected by Fehr & Peers, 2015

IMPROVED ENVIRONMENTAL RESILIENCE	**STREET TREES** 	DROUGHT-TOLERANT LANDSCAPING 	**TRASH CANS** 	**ACCESS TO HEALTHY FOOD** 
SAFER & MORE SECURE COMMUNITIES	HIGH-VISIBILITY CROSSWALKS 	ACCESSIBLE CURB RAMPS 	PEDESTRIAN-SCALE LIGHTING 	MID-BLOCK CROSSINGS 
IMPROVED ACCESS & MOBILITY	SMOOTH & ACCESSIBLE SIDEWALKS 	TRANSIT STOP SEATING & SHELTER 	**DEDICATED BIKEWAYS** 	**AVAILABLE PARKING** 
ENHANCED NEIGHBORHOOD CHARACTER	**PUBLIC GATHERING SPACES** 	**OUTDOOR SEATING AT BUSINESSES** 	**REGULAR SPECIAL EVENTS** 	**CIVIC ART** 

GREATER COMMUNITY ENGAGEMENT

GREATER COMMUNITY ENGAGEMENT

measures the degree to which all Angelenos feel they have a say in how our city grows and are able to participate in decision-making.

Each year, the City receives over a million requests for services through MyLA 311, a one-stop portal for citizens to request many of the most sought-after City services. The City keeps data on these requests, which provides a snapshot of the services Angelenos need and the ways they choose to involve themselves in their communities.

We see that sanitation and cleanliness, as well as planning, zoning, and building rank among the top requested services. When comparing the types of service requests around the Great Street to citywide averages, we see there were proportionally more requests for planning, zoning, and building and fewer requests for sanitation and cleanliness around the Great Street than there were citywide.

MYLA 311 SERVICE REQUESTS

WHAT YOU SEE BELOW

MyLA 311 requests for the half-mile area surrounding the Great Streets corridor categorized by type. MyLA 311 is a one-stop portal for citizens to request many of the most sought-after City services. From 2013-2014, there were 1,256,500 MyLA 311 requests citywide

SOURCE

Los Angeles Information Technology Agency (ITA)

DATES

2013-2014



ANIMAL SERVICES

359



ARTS & ENTERTAINMENT

1



COMPLAINTS

117



CONSERVATION EFFORTS

11



ECONOMIC & WORKFORCE DEVELOPMENT

243



ENFORCEMENT & VIOLATION REPORTING

2,748



EVENTS

10



GANG DIVISION

0



GRAFFITI REMOVAL

2,260



HEALTH, FAMILY, & SOCIAL SERVICES

57



HOUSING ASSISTANCE

349



OTHER

3,417



PLANNING, ZONING, & BUILDING

16,584



PUBLIC SAFETY & EMERGENCY SERVICES

353



PUBLIC SERVICES, POTHOLE REPAIR, & TREE TRIMMING

2,469



PUBLIC WORKS & UTILITIES

1,084



RECREATION

64



SANITATION & CLEANLINESS

5,589



TRANSPORTATION & PARKING

1,814



VOLUNTEER & CHARITY

41

MYLA 311 SERVICE REQUESTS (CONTINUED)

LEGEND

Categories are listed clockwise from top

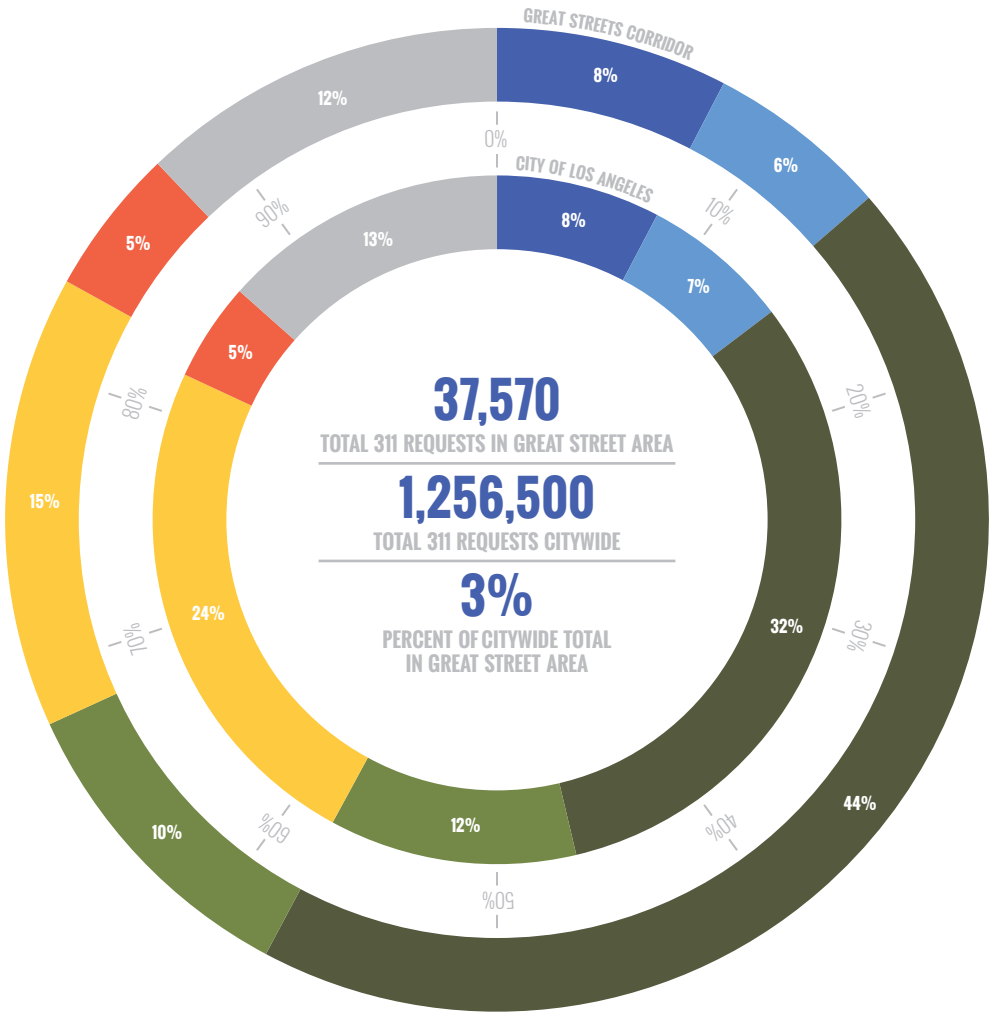
- *Enforcement, Violation Reporting, Complaints*
- *Graffiti Removal*
- *Planning, Zoning, Building*
- *Public Services, Public Works, Public Safety*
- *Sanitation, Cleanliness*
- *Transportation, Parking*
- *Other*

WHAT YOU SEE BELOW

Distribution of MyLA 311 requests for the half-mile area surrounding the Great Streets corridor (outside ring) and City of Los Angeles as a whole (inside ring)

SOURCE & DATES

ITA, 2013-2014



IMPROVED ENVIRONMENTAL RESILIENCE

IMPROVED ENVIRONMENTAL RESILIENCE measures our progress toward fostering a healthy environment for all—one with the ability to sustain itself and the capacity to adapt to changes. We're tracking this goal through a variety of sources.

From a public health perspective, we see that obesity rates around the Great Street are lower than citywide levels while physical activity rates are comparable to the citywide average.

Environmental quality of life is the notion that our neighborhoods should be clean and healthy places, free of trash, and with appropriate resources to maintain these conditions.

As measured through MyLA 311 service requests, we see that requests to remove bulky items, collect trash, and maintain landscaping were highest.

CalEnviroScreen 2.0 is a composite score showing the level to which communities are economically disadvantaged and burdened by pollution. It uses a 100-point scale, where lower scores indicate better economic stature and less exposure to pollution. Scores for the majority of the Great Street fall toward the lower range of the 100-point continuum, indicating a low exposure to pollution.

PUBLIC HEALTH INDICATORS

WHAT YOU SEE BELOW

Left: Percent of adults (18 and older) who are obese in the zip code(s) encompassing the Great Streets corridor and the City of Los Angeles as a whole. Obesity is defined as having a body mass index (BMI) of 30.0 or above, and BMI was calculated using survey respondents' self-reported weight and height
Right: Percent of adults (18 and older) who walked for at least 150 minutes in the past week (at time survey was administered) in the zip code(s) encompassing the Great Streets corridor and the City of Los Angeles as a whole

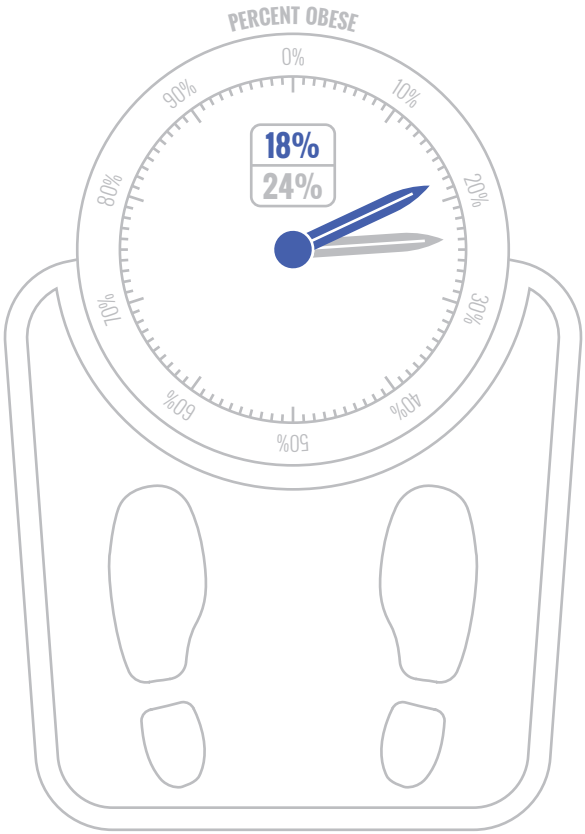
LEGEND

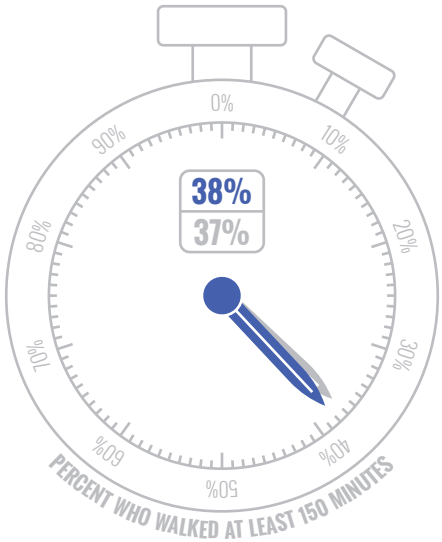
Great Street zip code(s)

City of Los Angeles

SOURCE & DATES

California Health Interview Survey, Neighborhood Edition, 2011 - 2012





ENVIRONMENTAL QUALITY OF LIFE

WHAT YOU SEE BELOW

Requests for various environmental quality of life services via MyLA 311 for the half-mile area surrounding the Great Streets corridor

SOURCE

Los Angeles Information Technology Agency (ITA)

DATES

2013-2014



BULKY ITEM PICKUP

4,207



ENERGY & WATER CONSERVATION

10



E-WASTE

17



HANGING SHOE REMOVAL

12



HAZARDOUS MATERIAL PICKUP

39



ILLEGAL DUMPING

57



NEIGHBORHOOD CLEANUP

7



RECYCLING

15



TRASH COLLECTION & REMOVAL

719



TREES & LANDSCAPING

591


CAL ENVIROSCREEN 2.0
WHAT YOU SEE ON THIS MAP
CalEnviroScreen 2.0 is a composite score showing the level to which communities are economically disadvantaged and burdened by pollution. It uses a 100-point scale, where lower scores indicate better economic stature and less exposure to pollution
SOURCE
California Environmental Health Hazard Assessment (OEHHA)
DATES
2014
MAR VISTA
CULVER CITY
LEGEND
0 - 20th percentile
20 - 40th percentile
40 - 60th percentile
60 - 80th percentile
80 - 100th percentile
Statewide highest score (90 - 100th percentile)
NORTH
PALMS BLVD
WOODGREEN ST
STEWART AVE
WESTMINSTER AVE
COLONIAL AVE
CHARNOCK RD
VICTORIA AVE
BARRINGTON AVE
MC CUNE AVE
INGLEWOOD BLVD
MOUNTAIN VIEW AVE
MARCO PL
GRAND VIEW BLVD
OCEAN VIEW AVE
CENTINELA AVE
WASATCH AVE
KEESHEN DR
PACIFIC AVE
MARCASEL AVE
MATTESON AVE
BARBARA AVE
MITCHELL AVE
FRANCES AVE
WADE ST
MAY ST
MEIER ST
MOORE ST
BEETHOVEN ST
LYCEUM AVE
MANOR LN
CASWELL AVE
ZANJA ST
HERBERT ST
WASHINGTON BLVD
187

SAFER & MORE SECURE COMMUNITIES

SAFER & MORE SECURE COMMUNITIES

tracks our progress toward communities where people from all backgrounds feel comfortable participating in civic life.

We are measuring these trends through public perceptions of safety as measured by surveys we conducted along the Great Street and by the observed presence of youth, the elderly, and women. Research on public space use suggests these groups may be less likely to frequent an area if they perceive it to be unsafe. We are also examining data on crime, traffic collisions, and the availability of streetlights.

We see that women represent less than half of the observed population in the traffic counts we conducted and the people we spoke with in our surveys. As measured by the US Census American Community Survey (ACS), half the people living in the area are women. Proportions of elderly and youth in our surveys and traffic counts were also lower than proportions in the ACS. Most of the people we surveyed perceived the neighborhood around the Great Street as being relatively safe.

We looked at crime data for the Los Angeles Police Department division in which the Great Street is located and the City of Los Angeles as a whole. We see that financial crimes like robbery and theft make up the largest volume of reported crimes in the area surrounding the Great Street. Around the Great Street, the proportion of special crimes is lower and the proportion of financial crimes is higher than the citywide distributions of these crime types.

In reviewing traffic collisions along the Great Street, we see higher concentrations of collisions of all types at and to the east of Centinela Avenue.

Streetlights are essential to safety after dark. In reviewing streetlight locations and approximate lighting coverage, we see there is a consistent provision of streetlights along the Great Street. Yet, the streetlights are mostly located in the median of Venice Boulevard, so they provide less coverage of sidewalks.

SAFETY PERCEPTIONS

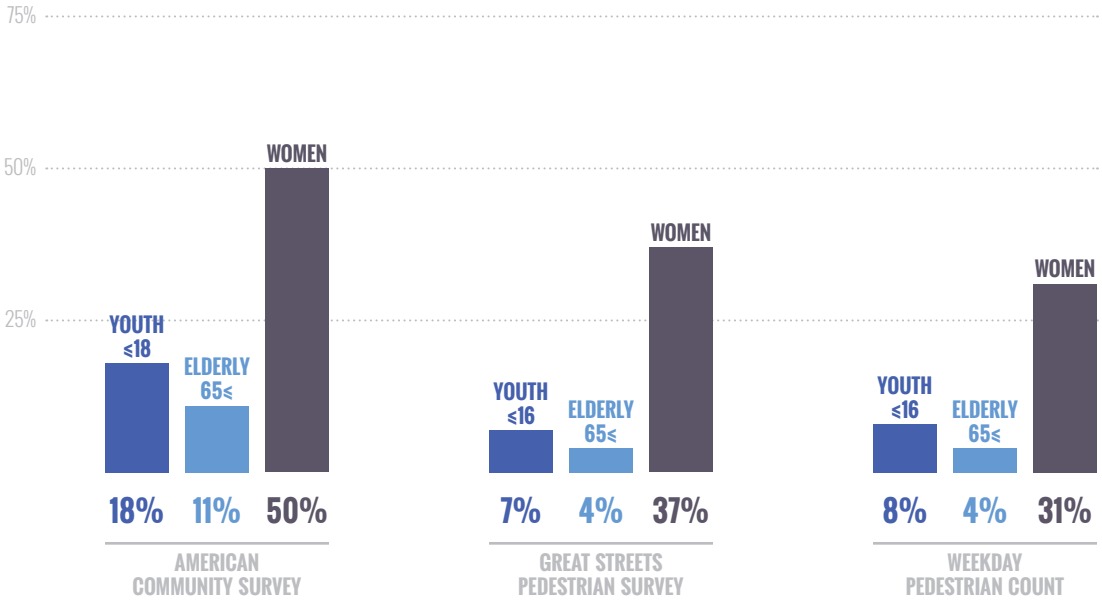
WHAT YOU SEE BELOW

Top: Observed percentages of youth, elderly, and women along the Great Street. Research on public space use suggests these groups may be less likely to frequent an area if they perceive it to be unsafe
Bottom: Perceptions of neighborhood safety as stated in pedestrian surveys

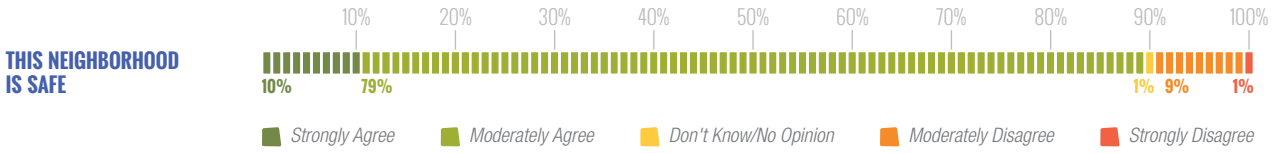
SOURCE & DATES

American Community Survey: US Census, 2008-2012
Pedestrian surveys & safety perceptions: Fehr & Peers, 2015
Pedestrian counts: NDS, 2015

PRESENCE OF YOUTH, ELDERLY, OR WOMEN



PERCEPTION OF SAFETY



CRIME STATISTICS

WHAT YOU SEE BELOW

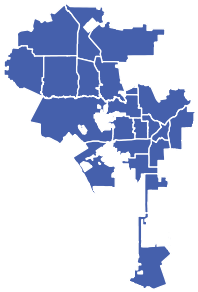
Left number: Los Angeles Police Department (LAPD) crime data, categorized by type, for the entire City of Los Angeles
Center number: LAPD crime data by type for the LAPD division within which the Great Streets corridor is located
Right number: Percent of citywide crime occurring in the LAPD division containing the Great Street

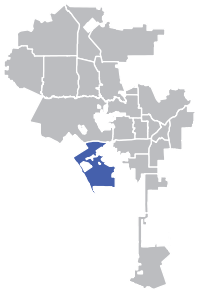
SOURCE

Los Angeles Police Department (LAPD)

DATES

2013-2014





	CITYWIDE TOTAL	LAPD PACIFIC DIVISION	PERCENT OF CITYWIDE TOTAL
VIOLENT CRIMES (ASSAULT, HOMICIDE, OTHER BODILY HARM)	54,400	2,300	4%
FINANCIAL CRIMES (EXTORTION, EMBEZZLEMENT, FRAUD, ROBBERY, THEFT)	215,400	13,600	6%
QUALITY OF LIFE CRIMES (ARSON, VANDALISM, DISTURBING THE PEACE, WEAPONS/DRUGS, POSSESSION/INTOXICATION)	56,900	2,800	5%
SPECIAL CRIMES (MINORS, SEXUAL, GENDER-BASED)	38,500	1,000	3%
OTHER CRIMES	104,700	5,800	6%

CRIME STATISTICS (CONTINUED)

LEGEND

Categories are listed clockwise from top

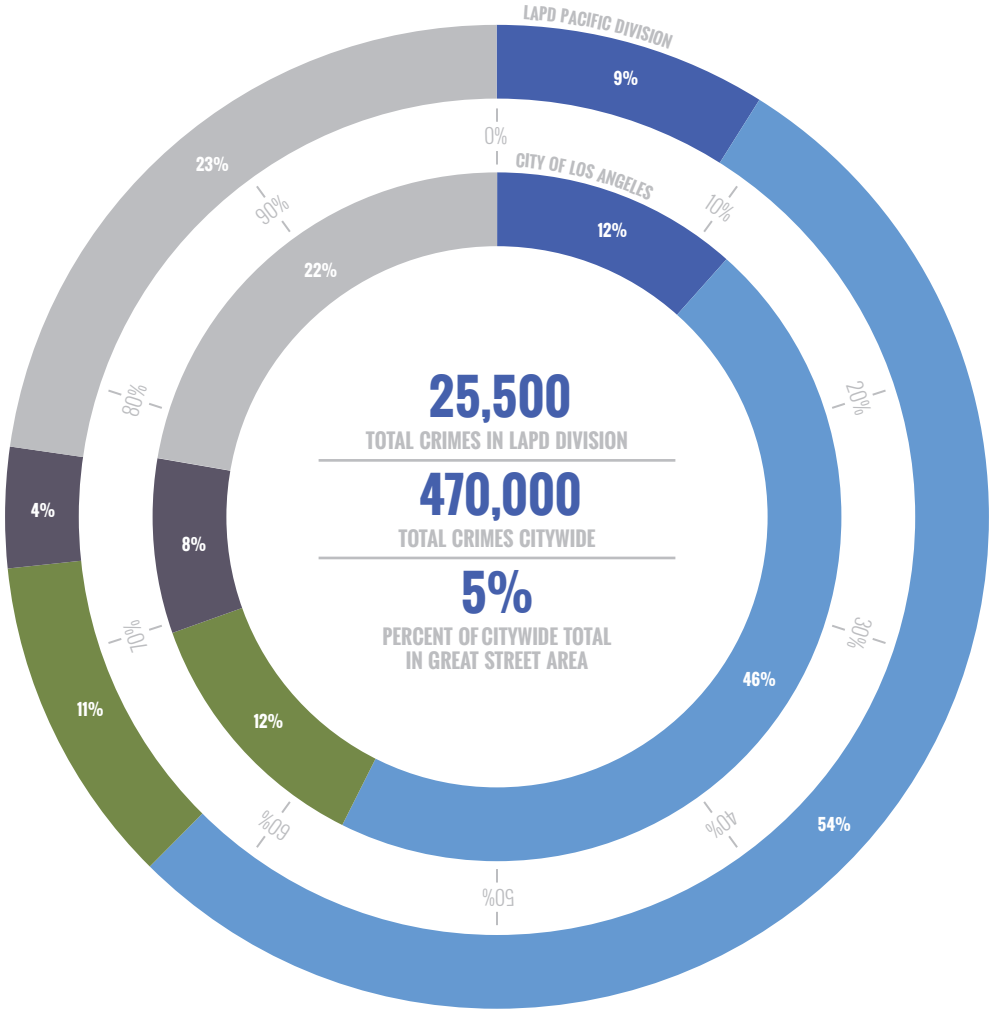
- *Violent Crimes (Assault, Homicide, Other Bodily Harm)*
- *Financial Crimes (Extortion, Embezzlement, Fraud, Robbery, Theft)*
- *Quality of Life Crimes (Arson, Vandalism, Disturbing the Peace, Weapons/Drugs Possession/Intoxication)*
- *Special Crimes (Minors, Sexual, Gender-Based)*
- *Other Crimes*

WHAT YOU SEE BELOW

Distribution of LAPD crime data for the LAPD division within which the Great Streets corridor is located (outside ring) and City of Los Angeles as a whole (inside ring)

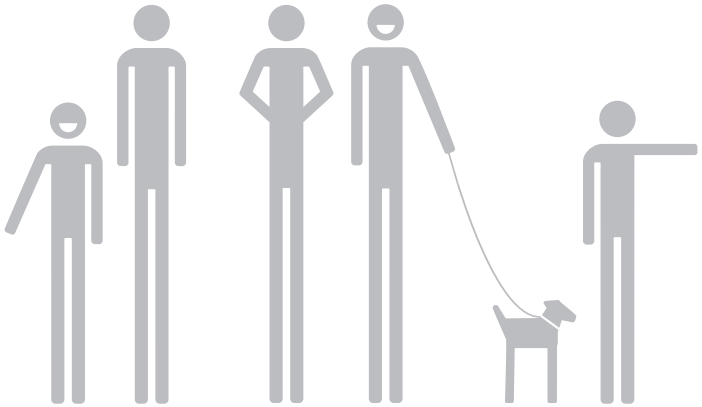
SOURCE & DATES

LAPD, 2013-2014




COLLISIONS
WHAT YOU SEE ON THIS MAP
Auto, bicycle, and pedestrian traffic collisions occurring along the Great Street. For clarity, overlapping circles are offset
SOURCE
California Statewide Integrated Traffic Records System (SWITRS); UC Berkeley Transportation Injury Mapping System (TIMS)
DATES
2009 - 2013
MAR VISTA
CULVER CITY
INGLEWOOD BLVD
VENICE BLVD
BEETHOVEN ST
WASHINGTON BLVD
LEGEND
Pedestrian
Bicycle
Auto
1
2 - 5
5 - 15
15 - 30
More than 30
NORTH


STREETLIGHT AVAILABILITY
WHAT YOU SEE ON THIS MAP
Location and approximate lighting coverage for all streetlights on the Great Streets corridor
SOURCE
Los Angeles Bureau of Street Lighting (LABSL)
DATES
2014
LEGEND
Approximate streetlight coverage
MAR VISTA
CULVER CITY
VENICE BLVD
BEETHOVEN ST
INGLEWOOD BLVD
PALMS BLVD
WOODGREEN ST
STEWART AVE
WESTMINSTER AVE
COLONIAL AVE
CHARNOCK RD
VICTORIA AVE
BARRINGTON AVE
MC CUNE AVE
MOUNTAIN VIEW AVE
MARCASEL AVE
MARCO PL
GRAND VIEW BLVD
OCEAN VIEW AVE
CENTINELA AVE
KEESHEN DR
PACIFIC AVE
WASATCH AVE
BOISE AVE
WADE ST
MAY ST
MEIER ST
MOORE ST
FRANCES AVE
MATTESON AVE
BARBARA AVE
MITCHELL AVE
WASHINGTON PL
HERBERT ST
LYCEUM AVE
MANOR LN
CASWELL AVE
ZANJA ST
WASHINGTON BLVD
187
NORTH



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ACKNOWLEDGMENTS

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This project is in part supported by funding from the Centers for Disease Control and Prevention, Cooperative Agreement No. 1U58DP005509-01, through the Los Angeles County Department of Public Health.

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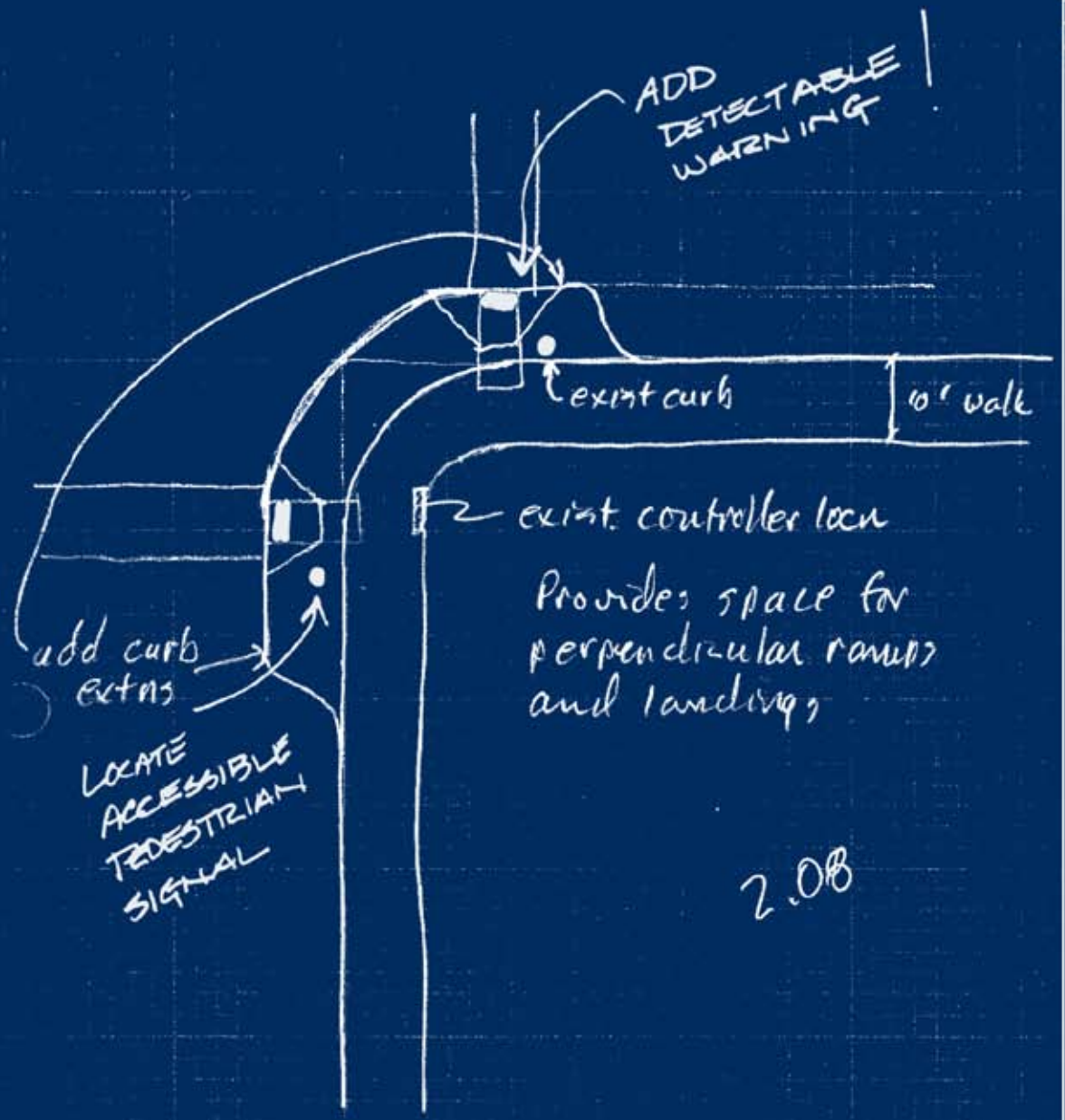
GREAT
LA
STREETS

Public Rights-of-Way Access Advisory Committee

Special Report:

ACCESSIBLE PUBLIC RIGHTS-OF-WAY

PLANNING and DESIGNING for ALTERATIONS



July 2007

SPECIAL REPORT:
ACCESSIBLE PUBLIC RIGHTS-OF-WAY PLANNING AND DESIGN FOR ALTERATIONS

This report and its recommendations are the work of a subcommittee of the Public Rights-of-Way Access Advisory Committee (PROWAAC) and are intended to provide technical assistance only. The report is not a rule and has no legal effect; it has not been endorsed by the U.S. Access Board, the Department of Justice, or the Federal Highway Administration of the Department of Transportation.

Public Rights-of-Way Access Advisory Committee (PROWAAC)
Subcommittee on Technical Assistance
Jerry Markesino, PROWAAC Chair, Portland, OR
Janet Barlow, TAM Subcommittee Chair, Atlanta, GA

Document Produced by
Otak, Inc.

Cover: *Sketch of improvements to a corner to add a bulb-out, new curb ramps, and APS pedbuttons.*

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ABBREVIATIONS

AASHTO—American Association of State Highway and Transportation Officials

ADA—Americans with Disabilities Act

ADAAG—ADA Accessibility Guidelines

APS—Accessible Pedestrian Signal(s)

APWA—American Public Works Association

CIP—Capital Improvement Program

DOJ/USDOJ—United States Department of Justice

DOT/USDOT—United States Department of Transportation

DWS—Detectable Warning Surfaces

FHWA—Federal Highway Administration

ITE—Institute of Transportation Engineers

MUTCD—Manual on Uniform Traffic Control Devices

NCHRP—National Cooperative Highway Research Program

PAR—Pedestrian Access Route

PBIC – Pedestrian and Bicycle Information Center (*http://www.pedbikeinfo.org/htm*), an FHWA grantee/transportation institute at the University of North Carolina. The PBIC is made up of the core staff of professionals at the UNC Highway Safety Research Center, including engineers and planners who are knowledgeable on walking and bicycling issues.

PROWAAC—Public Rights-of-Way Access Advisory Committee

PROWAG—Draft Proposed Right-of-Way Accessibility Guidelines

STIP—State Transportation Improvement Program

STP—Surface Transportation Program

TIP—Transportation Improvement Program

Title II—ADA implementing regulation for title II, as printed in the Federal Register (7/26/91). The Department of Justice's regulation implementing Title II, Subtitle A, of the ADA, which prohibits discrimination on the basis of disability in all services, programs, and activities provided to the public by State and local governments, except public transportation services (which are covered by Subtitle B, the DOT regulation).

INTRODUCTION

by Mary O'Connor, Transportation General Manager, City of Scottsdale, AZ; Barbara McMillen, Pedestrian Accessibility Specialist

The Public Right-of-Way

The public right-of-way is a complex space serving multiple users and functions. The sidewalk and street crossing network is the basic unit of pedestrian mobility and its surfaces support all of us—from children to elders—in both pleasant and inclement weather. Private, transit, and commercial vehicles vie with pedestrians for right-of-way width. All modes of travel, including motor vehicles, rail transit, and foot traffic share time and space at intersections. Power companies maintain above-ground and below-ground transmission lines; municipalities own and operate surface streets and sidewalks; and utility companies and public agencies oversee below-grade sewers, water mains, gas mains, and data and telecommunication networks. The public right-of-way in large cities may include both air rights and underground circulation routes used by pedestrians. Adjacent to the right-of-way, private property owners construct, maintain, and operate buildings, entries, driveways, sidewalk vaults, basements, and other improvements and expect usable connections to and from public sidewalks and streets.

Over the last decade, roadway design principles have been expanded to include pedestrian travel accommodations that are increasingly being sought in residential neighborhoods and commercial centers in suburban and urban development. Designs are now expected to reflect equity and context and to balance pedestrian and vehicular use. The design pedestrian is now understood to be not an individual but a range of users—children, elders, people pushing or pulling strollers and delivery carts, using a wheelchair or scooter, or traveling with a long/white cane or a service animal—for all of whom the roadway and pedestrian environment must function effectively.



Photograph of a sidewalk widened to go around an obstruction.

Many of right-of-way users are people whose independent mobility requires pedestrian travel; they are best served by a network of accessible facilities that can provide efficient and safe route choices for a wide range of trip types.

Our extensive system of existing roadways is constantly being improved. The vast majority of work in the public right-of-way environment is reconstruction, alteration work, not new construction. The bulk of public works funds are used to maintain and to make changes in those existing environments, rather than to create new facilities. Each altered element must be accessible to and usable by people who have disabilities, to the maximum extent feasible. Integrating accessible features in planned alterations projects requires an understanding of both regulatory and usability concepts. This technical assistance publication has been developed to provide guidance in the planning and design of pedestrian improvements constructed as part of an alteration project. Its text, illustrations, and case studies aim to expand the reader's body of knowledge in accessible right-of-way design.

Case Study Examples

Throughout this Special Report are case study examples that illustrate alteration challenges and solutions applied to these challenges. Comments are provided to clarify the particular application and to provide the reader with background conditions to better understand the solution. Look for case study examples in a box similar to this one.

1 INTRODUCTION

Accessibility Regulation

The Americans with Disabilities Act (ADA) of 1990 is a civil rights statute that prohibits discrimination against people with disabilities. ADA implementing regulations for Title II prohibit discrimination in the provision of services, programs, and activities by state and local governments. Designing and constructing pedestrian facilities in the public right-of-way that are not usable by people with disabilities may constitute discrimination. Section 504 of the Rehabilitation Act of 1973 (504) includes similar prohibitions in the conduct of federally-funded programs.

Thus, the accessibility objective in a new project is to design and build facilities that are 'readily accessible to and usable by' people with disabilities. Compliance is measured against the referenced standards. From the ADA Title II implementing regulation:

> *(c) Accessibility standards. Design, construction, or alteration of facilities in conformance with [UFAS] or [ADAAG] shall be deemed to comply with the requirements of this section with respect to those facilities …*

Furthermore, equivalent facilitation—achieving accessibility's objectives by other means than are described in the standard—is recognized:



The PROWAAC Committee at its January 2001 presentation of its recommendations for new PROW guidelines, "Building a True Community."

> *… Departures from particular requirements of either standard by the use of other methods shall be permitted when it is clearly evident that equivalent access to the facility or part of the facility is thereby provided.*

However, ADA standards for new construction and alterations promulgated (as guidelines) by the U.S. Access Board and adopted by the U.S. Department of Justice (DOJ) in 1991 were principally developed for buildings and site work and are not easily applicable to sidewalks, street crossings, and related pedestrian facilities in the public right-of-way. Similarly, Section 504 standards (UFAS or ADAAG for USDOT, depending on the agency) did not offer guidance appropriate for rights-of-way construction. The need to address rights-of-way accessibility in a more specific way is apparent from the difficulties practitioners and agencies have in applying ADAAG to this very different environment.

Case Study—Narrow Right-of-Way

- A midblock crossing and perpendicular curb ramp are aligned with an existing building entrance walkway. The walkway serves as the level landing for the curb ramp and the work was coordinated with the abutting property owner.
- Pedestrians can use the landing to bypass the descending ramp and its flares if they are continuing along the sidewalk.
- The midblock crossing has a pedestrian signal with a call button and an APS with a locator tone.
- Still needed: detectable warnings at the street edge.





Progress Towards Accessibility Standards for New Construction and Alterations in the Public Right-of-Way

The Access Board is the Federal government's specialist in accessible design. Under the ADA, the Board is responsible for developing the minimum accessibility guidelines needed to measure compliance with ADA obligations when new construction and alterations projects are planned and engineered.

In 1999, the Access Board started the rulemaking process for accessible pedestrian facilities in public rights-of-way by convening a Federal advisory committee of key stakeholders to develop recommendations that could supplement or replace the current standard. The Public Rights-of-Way Access Advisory Committee (PROWAAC) completed its initial work in 2000 and published its recommendations for new guidelines in a report, *Building a True Community*, which was presented at the 2001 Transportation Research Board Annual Meeting.

Resource: PROWAAC Report at:
http://www.access-board.gov/prowac/commrept/index.htm.

On June 17, 2002, the Access Board issued a Notice of Availability of Draft Public Rights-of-Way Accessibility Guidelines (PROWAG) based on the PROWAAC report. Comments from consumers and design professionals led to the issuance of a second draft on November 23, 2005. A Notice of Proposed Rulemaking (NPRM) will follow seeking public comment prior to publication of a final rule.

Resource: November 23, 2005 draft PROWAG at:
http://www.access-board.gov/prowac/draft.htm.

The DOJ and U.S. Department of Transportation (DOT) are authorized by law to adopt standards consistent with the Access Board's guidelines for use in enforcing the ADA. The DOT has a similar authority under its Rehabilitation Act/504 regulation. The DOJ reviews 504 regulations issued by Federal agencies. When standards consistent with the final PROWAG guidelines are adopted by the DOJ, they will become the new minimum design standards under the ADA for both new construction and alterations of pedestrian facilities in the public right-of-way. The DOT has already indicated its intent to adopt the PROWAG, when completed, into its 504 standard.

In the interim, jurisdictions must continue to design and construct new and altered pedestrian facilities that are accessible to and usable by people with disabilities. The 2005 draft PROWAG has been identified by DOT as the current best practice in accessible pedestrian design under the Federal Highway Administration's Federal-aid (504) regulation.

Resource: FHWA Memorandum of January 2006 at:
http://www.fhwa.dot.gov/environment/bikeped/prwaa.htm.

Case Study—Narrow Right-of-Way

- The roadway travel lane was narrowed to add width to the pedestrian sidewalk and to accommodate the relocated parking meters.
- At the corner, a curb extension (bulb-out) into the parking lane provides the necessary space for a curb ramp and landing.
- The curb radius was omitted at this non-turning corner.
- Still needed: detectable warnings at the street edge.





1 INTRODUCTION





San Francisco uses plywood curb ramps with edge protection for temporary sidewalk detours. Here PROWAAC member Ken Stewart of CCLVI (wih white cane) tests a model while Lukas Franck of The Seeing Eye looks on.

Following completion of *Building a True Community*, the Access Board asked PROWAAC to develop guidance and recommendations focused on achieving accessibility in alteration projects within the public right-of-way. This advisory, *Special Report: Accessible Public Rights-of-Way—Planning and Designing for Alterations*, compiles the recommendations of a subcommittee of PROWAAC that worked to develop and highlight model rights-of-way design alternatives, design processes for making alterations, design solutions to specific problems, and case studies demonstrating examples of accessible design practices from across the country.

Alterations

The focus of this report is on improvement projects in the public right-of-way that are classified as alterations under the ADA.

Alterations are discretionary changes, which the agency chooses to fund, to existing facilities within an already-developed right-of-way where the work affects, or could affect, the usability of that facility. ADA Title II implementing regulations require that each part of a facility altered by, on behalf of, or for the use of a public entity after January 26, 1992, be designed and constructed so that the altered parts are readily accessible to and usable by individuals with disabilities to the maximum extent feasible. While the following quote is from the ADA Title III regulation it is a useful explanation of alteration and existing facilities.

Case Study—Downtown Redevelopment

- The project required other improvements that offered opportunities for increased access: re-striping, new controllers and vehicle and pedestrian signals (existing equipment did not meet new MUTCD standards), and new curb ramps where bulb-outs were added.
- New accessible parking spaces were located near intersections to take advantage of the curb ramp serving the crossing.







The before photo (left) is a downtown streetscape in Pottstown, PA that was the subject of an improvement project to invigorate downtown retail, add bike lanes, and increase parking. The after photos (right) show the changes: new angled parking, bike lanes and more visible markings.

b) Alteration. For the purposes of this part, an alteration is a change to a […] facility that affects or could affect the usability of the building or facility or any part thereof.

(1) Alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, changes or rearrangement in structural parts or elements, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, asbestos removal, or changes to mechanical and electrical systems are not alterations unless they affect the usability of the building or facility.

(2) If existing elements, spaces, or common areas are altered, then each such altered element, space, or area shall comply with the applicable provisions of appendix A to this part.

(c) To the maximum extent feasible. The phrase "to the maximum extent feasible," as used in this section, applies to the occasional case where the nature of an existing facility makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alteration shall provide the maximum physical accessibility feasible. Any altered features of the facility that can be made accessible shall be made accessible. If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would not be feasible, the facility shall be made accessible to persons with other types of disabilities (e.g., those who use crutches, those who have impaired vision or hearing, or those who have other impairments).

All state and local government entities are covered by this requirement. Regardless of whether state or local governments directly manage or delegate the development of facilities in the public right-of-way to the private sector, the same obligations apply.

Federal-aid facilities covered by 504 regulations follow a somewhat different approach, relating the scope of required accessibility improvements in an alteration to the scope of the overall project. When PROWAG is final, it is expected that FHWA Federal-aid regulations will be changed to reference the new document.

The Civil Rights Restoration Act of 1987 clarified that all programs and activities of Federal-aid recipients, subrecipients, and contractors are covered by 504 requirements. From a 1992 FHWA memo:

> *The efforts to prevent discrimination must address, but not be limited to, a program's impacts, access, benefits, participation, treatment, services, contracting opportunities, training opportunities, investigations of complaints, allocations of funds, prioritization of projects, and the functions of right-of-way, research, planning, and design.*

Case Study—Work Zone Accessibility

- The photograph shows a same-side temporary pedestrian route that bypasses construction on the sidewalk.
- Plywood surfacing is used where the route crosses grassy terrain; the joint is highlighted with contrasting paint. Still needed: a better bevel at the joint.
- The edge of the plywood walkway provides an adequate wayfinding cue on the opposite side (it provides good sound-on-cane information.) Chain link fencing is poor as a channelization enclosure, since it is not easy to follow with a cane and usually requires 'feet' that narrow the walkway.



1 INTRODUCTION

Existing Facilities

Requirements for existing facilities and programs are stipulated in the DOJ ADA Title II regulation and the DOT/FHWA section 504 regulation. They apply a separate obligation for 'program access' to existing facilities not otherwise being altered. From DOJ's ADA Title II technical assistance manual:

> *The Title II regulations impose a more generalized standard with respect to facilities covered by the ADA that were in existence in January 1992. Rather than applying the accessibility requirements to "[e]ach facility" that is covered (28 C.F.R. 35.151(a)), the regulations provide that a "public entity shall operate each service, program, or activity, so that the service, program, or activity, when viewed in its entirety, is readily accessible to and usable by individuals with disabilities." 28 C.F.R. 35.150(a) (emphasis added). In addition, the regulations further provide that, even under this "entirety" approach, a public entity is not required "to take any action that it can demonstrate would result in * * * undue financial and administrative burdens." 28 C.F.R. 35.150(a)(3).*
>
> *The regulation governing existing facilities also provides that any "structural changes to facilities" necessary to comply with title II were to be made in accordance with a transition plan. 28 C.F.R. 35.150(d)(1). In particular, the regulation provides that such a "transition plan shall include a schedule for providing curb ramps" on "walkways" controlled by the public entity, "giving priority to walkways serving entities covered by the Act, including State and local government offices and facilities, transportation, places of public accommodation, and employers, followed by walkways serving other areas." 28 C.F.R. 35.151(d)(2).*

In assessing and addressing their responsibilities for existing facilities, many jurisdictions have relied heavily on two helpful tools—the self-evaluation and the transition plan. These tools were initially required under both 504 and ADA Title II regulations. Many jurisdictions have continued to use these tools to plan for addressing accessibility issues, assessing progress, and managing changing circumstances. In addition, DOT's 504 regulation requires that jurisdictions establish a system for periodically reviewing and updating the self-evaluation that forms the basis for the Federal-aid transition plan.



An urban intersection with paired perpendicular curb ramps, each with a 2-foot strip of detectable warnings at the toe. The flares have been shortened so that the ramps will both fit on the corner (flares are not a part of the pedestrian access route.)

A transition plan can provide decision-makers with an efficient tool for complying with section 504 and ADA requirements and holds information that often is not available in other planning documents. An updated transition plan will identify and locate elements and features that need to be added or altered, processes for determining accessibility priorities, and information that can be used in assessing the 'undue burden' cost limitation in existing facilities. Cost is not a determinant in new construction and alterations.

While many methods may be utilized to achieve program access in existing facilities, ensuring usability in an already-developed pedestrian circulation system (a program) is likely to require remedial construction. In some cases, a new construction or alterations project will give rise to a program access obligation, as, for example, when a bus stop sign is placed in a hitherto-undeveloped environment. The presence of an existing bus stop that is not yet served by the pedestrian facilities needed to make it accessible—a pad for the deployment of a bus lift, a sidewalk for access to the stop—is a clear indicator of program access improvements that may need to be constructed for full use of the transportation system. It makes good economic and civil rights sense to look broadly

at both responsibilities when new work is being planned and engineered.

Resources: DOJ's ADA title II regulation at: http://www.ada.gov/reg2.html; and a technical assistance manual at: http://www.ada.gov/taman2.html; DOJ's 'Best Practices Toolkit for State and Local Governments' at: http://www.ada.gov/pcatoolkit/toolkitmain.htm; FHWA 504 regulation at: http://www.fta.dot.gov/civilrights/ada/civil_rights_3907.html; DOT planning documents at: http://www.planning.dot.gov/documents/BriefingBook/BBook.htm; DOT technical assistance at: http://www.fhwa.dot.gov/civilrights/ada_memo_clarificationa.htm; DOT memo on the Civil Rights Restoration Act at: http://www.fhwa.dot.gov/legsregs/directives/notices/n4720-6.htm.

The following chapters provide an overview of alterations projects from a regulatory and practical perspective. We hope it will help you implement accessible and usable pedestrian facilities under the most stringent of conditions—within the constraints of existing developed streetscapes. We include useful information on the planning and pre-design process for public right-of-way alteration projects; engineering drawings illustrating typical barriers in a range of roadway conditions; case studies of real-world solutions to access constraints; plans that demonstrate how accessible features can be incorporated into sidewalks of varying widths; model curb ramp examples; and resources from local, state, and Federal agencies.

This guidance has been drawn from expert practitioners across the U.S. and is focused entirely on improvement projects in the public right-of-way that can be considered alterations under the ADA. The design process for making accessibility improvements in alteration projects is not any different from the design process for traditional street modification projects. It involves the same use of standards, technical guidance, and product information that designers follow in every roadway design project. One key to success: recognition that ADA design standards are minima and maxima describing a range rather than design or engineering objectives. The running slope of a complying curb ramp may range between 0 and 1:12, but we suggest that designers set their calculations to fall within that range, not at its extreme, lest a construction or other anomaly affect compliance.

ALTERATIONS

by Jerry Markesino, PE, Otak, Inc.; Michele Ohmes, APWA

Alteration projects in the public right-of-way present particular challenges because of the limits of width and grade already established in the existing developed environment. Doorways cannot be readily changed because the threshold elevation is linked to the finished floor elevation of the building, which is not part of the project scope. Underground vaults and utility services cannot easily be relocated. Mature trees cannot be moved and will die if adjacent grade is raised or lowered or root growth is affected by construction. A railroad overpass pinches a narrow roadway and leaves no space for sidewalks to be added. Accessibility features that can easily be provided in the course of a new construction project are more difficult to incorporate in alterations because of such physical constraints.

An alteration project may differ from a new construction project because of existing development, which limits available space and has fixed access points and elevations that must be addressed. Where existing constraints in an alteration project prevent the full implementation of accessibility objectives (whether measured by appropriate standards, where they exist, or by usability if they do not), the ADA and 504 regulations provide a degree of flexibility to designers and agencies. From the ADA Title II regulation:

> *35.151 **New construction and alterations.** (b) Alteration. Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992.*

Here is the text on infeasibility in alterations projects from the ADA Standards (Section 4.1.6 (j) of Appendix A, 28 CFR Part 36):

> *(j) EXCEPTION: In alteration work, if compliance with 4.1.6 is technically infeasible, the alteration shall provide accessibility to the maximum extent feasible. Any elements or features of the building or facility that are being altered and can be made accessible shall be made accessible within the scope of the alteration.*
>
> ***Technically Infeasible.** Means, with respect to an alteration of a building or a facility, that it has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member which is an essential part of the structural frame; or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features which are in full and strict compliance with the minimum requirements for*

Note, that cost is not a trigger of infeasibility in alterations.

Since alterations under the ADA are required to meet new construction criteria to the maximum extent feasible, extensive reconstruction work can and should approach the accessibility required of new construction. For example, a project that calls for the removal of pavement and sidewalks to subgrade, followed by the installation of new walks and pavement, is an alteration whose broad scope



This urban alteration to replace a block of sidewalk and curbing is constrained by right-of-way width, existing adjacent entrances, and the presence of a bus stop requiring a deployment area for a lift. At pedestrian crossings, the project must incorporate (or improve, as feasible) curb ramps. Note that print signage and plastic tape do not adequately protect the excavation—a detectable barrier is needed. Consider also a proximity-activated 'audible sign' to give notice of the blocked sidewalk. These are available from several barricade manufacturers and can be locally recorded with a specific detour message.

offers significant opportunity to incorporate the full range of accessible features. On the other hand, the installation of a single curb ramp at an existing intersection is an alteration with limited scope for correcting adjacent inaccessible conditions.

Terminology

In the transportation industry, construction work may be classified as new construction—the installation of improvements where none currently exist—or reconstruction. State agencies often use '4R' terminology: reconstruction, rehabilitation, restoration and resurfacing. Local agencies may refer to reconstruction work as modification, renovation, upgrading, rebuilding, and modernization. Federal highway agency nomenclature relies on new construction, reconstruction, and '3R (resurfacing, rehabilitation, and restoration of pavements)'. Whatever term is used, the removal of some existing improvements and installation of replacement improvements constitutes an alteration under the ADA.

The reconstruction of a roadway, the upgrading of a sidewalk, or the installation of other elements are alterations when they affect usability, temporarily or permanently, for pedestrians or vehicles.

Transportation agencies may consider resurfacing a roadway a maintenance item, for ADA purposes it has been considered an alteration with respect to the special Title II obligation at 35.151(e) to install curb ramps.

Resources: Yerusalim at:
http://www.access-board.gov/prowac/yerusalim.htm
DOJ 'Common Problems' at:
http://www.ada.gov/comprob.htm
Project Civic Access Agreements at:
http://www.ada.gov/civicac.htm
Memorandum Clarifying FHWA Oversight Role in Accessibility at:
http://www.fhwa.dot.gov/civilrights/ada_memo_clarificationa.htm
FHWA Questions and Answers About ADA and Section 504 at:
http://www.fhwa.dot.gov/civilrights/ada_qa.htm
FHWA Memorandum on Detectable Warning Requirements at:
http://www.fhwa.dot.gov/environment/bikeped/dwm.htm

Curb Ramps

Under the ADA, an alteration to a sidewalk or street will give rise to an additional obligation to include curb ramps in the scope of the project. From the Title II regulation:

Case Study—Steep Terrain at Corner

- Before and after photos show a new segment of sidewalk, with a 2% cross slope and curbs for drainage/erosion control, built to facilitate use of a newly installed curb ramp.
- A level landing on the curbed sidewalk connects to the curb ramp.
- The curb ramp is placed at the flattest portion of the street gutter grade along the radius to minimize warp in the curb ramp to the street.
- Still needed: detectable warnings at street edge.







This new parallel curb ramp on a large-radius suburban corner curves down to the street and is otherwise usable, but the pedbutton isn't. Installed on a signal pole, it is out of horizontal reach range for this pedestrian. A better installation can be seen across the street, where a stub pole has been installed in a more usable location.

> *35.151(e)(2)* ***Curb Ramps****. (1) Newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway. Newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads, or highways.*

In addition, the Title II regulation requires that jurisdictions prepare and implement a curb ramp schedule for their existing facilities, subject to certain time and cost limits:

> *35.150(d)(2)* ***Transition plan****. If a public entity has responsibility or authority over streets, roads, or walkways, its transition plan shall include a schedule for providing curb ramps or other sloped areas where pedestrian walks cross curbs, giving priority to walkways serving entities covered by the Act, including State and local government offices and facilities, transportation, places of public accommodation, and employers, followed by walkways serving other areas.*

Project Physical Constraints

Since alteration projects are always constructed within an existing developed environment, there will always be existing facilities to deal with. Roadways, sidewalks, trees, utilities, adjacent private improvements, street lights, traffic signals, and a multitude of other facilities are already there. When one of the items is identified for reconstruction, it is likely that other facilities will be involved. This is simply the nature of this type of work.

Depending on the scope of the project, these existing facilities need to be considered in the project design. In some cases, desirable changes can be included with a small expansion in project scope and designed and built with little impact on the primary project. In other cases, removal of barriers to program access or correction of inaccessible adjacent construction should remain outside the scope of work.

Existing facilities can become physical constraints that impose a limit on the extent of any right-of-way improvement. When a new streetcar trackway is being planned, the preferred alignment may lie directly over a shallow steel water main. If the trackway is built over the water main, the electric powered train will discharge power to the ground and cause corrosion to the water pipe. After a few years of operation, the electrical discharge will destroy the water main. A decision must be made to either realign the trackway or rebuild the water main and protect it from being destroyed by the electrical discharge. In this case, the water main has become a physical constraint that imposes limitations on the streetcar project, perhaps requiring an expansion in the project scope of work.



Ooops! Where's the wheelchair accessible route? Much better coordination is needed at this urban bus shelter location. Even though the sidewalk width is generous, tree boxes crowd the shelter on either side and a fixed trash can on one side and the bus stop sign on the other complete the job—it looks good but isn't usable because there's no pedestrian access route or pad of sufficient size to deploy a bus lift. The bicycle chained to the sign is the last straw! Best fix: move the trash can and bus stop sign.

In another example, an additional travel lane is proposed in the project scope and existing street trees occupy the space needed for the travel lane. The trees are a physical constraint. However, the scope of the project requires a new travel lane. It is likely that the trees will need to be removed. In this case, the tree removal and new tree planting elsewhere becomes part of the scope of the project. Ensuring that pedestrian facilities are accessible is just as important as meeting roadway design and operational guidelines. Where existing physical constraints are encountered, the project design should deal with them and deal with them in ways that are commensurate with the overall undertaking. For example, sight distance obstructions that affect intersection safety are routinely removed in an intersection modification project. Likewise, physical constraints that affect sidewalk usability should also be handled as a routine design practice.

When existing physical conditions affect the feasibility of achieving full conformance with accessibility criteria in an alteration, the design engineer should determine, on an element-by-element basis, what degree of usability can reasonably be achieved within the scope of the planned project.

The challenge of dealing with project physical constraints in alteration projects has been recognized by the authors of accessibility standards for years. In 1992, in the development of proposed regulations, the Access Board identified a number of possible physical constraints that might bear on the feasibility of certain accessibility features, including:

- the existence of an underground structure, such as a utility vault, manhole, or sewer inlet at a street crossing that may preclude the installation of a new public sidewalk curb ramp in full compliance with provisions for new construction;
- the geometric design of existing roadways, bridges, or tunnels constrained by structural elements that, even when altered, may not accommodate a public sidewalk with adequate width for wheelchair users;
- differences in finished grade at curbside and elevations at existing building entrances at the back-of-sidewalk that may preclude compliance with cross slope provisions across the entire public sidewalk width;
- existing fixed equipment, such as fire hydrants or street lighting standards, located on a public sidewalk and connected to below-grade water, power, signal, and similar distribution systems that may prevent full compliance with public sidewalk curb ramp provisions if the equipment cannot be relocated in the course of the work;
- existing narrow public sidewalks or rights-of-way that might preclude the maintenance of a continuous passage free of gratings required for new subway construction; or
- the existence of an established landscaping feature, such as a large tree or grouping of trees that may preclude the provision of a parallel access aisle at a newly-established on-street parking space. Furthermore, a pre-existing commercial use of the public sidewalk, as for a sidewalk café, may also constitute a physical constraint if no other location for an accessible parking space is feasible within the scope of the alterations project.

Public agencies and designers need to be creative and flexible in developing solutions that promote accessible travel. Adjusting the geometrics in an existing system takes a greater degree of creativity, thought, and engineering know-how than when starting from scratch on a new project.

Case Study—Ponding at a Combined Curb Ramp

- The existing surface drainage conditions were not considered fully when the combination curb ramp shown was selected for this location and ponding resulted.



An understanding of accessibility criteria and rationale, skills enhanced from engineering study, and design experience with accessible facilities will enable practitioners to develop and deploy a toolbox of approaches appropriate to a wide range of project conditions. Designers should consider the entire right-of-way that is available as they work to balance facilities between vehicle, bicycle, and pedestrian use.

Desirable objectives in the public right-of-way include curb ramps that are flatter than a 1:12 slope; adjacent landings that are near-level; signal call buttons within easy reach ranges of a person who uses a wheelchair; equipment installations that accommodate the techniques of low-vision and white cane travel; and crossing information that is usable by all pedestrians. Armed with an understanding of the rationale behind accessibility provisions and guidance available in industry documents, the street design professional will be well-prepared for the planning and engineering of alteration projects that include usable pedestrian facilities.

Resources:
AASHTO: "A Policy on Geometric Design of Highways and Streets", 2004
"Guide for the Planning, Design, and Operation of Pedestrian Facilities", 2004 (AASHTO bookstore at: https://bookstore.transportation.org/)
FHWA: "Manual on Uniform Traffic Control Devices", 2003 http://mutcd.fhwa.dot.gov/.



Plenty of street width is available for an imaginative solution to curb ramp installation at this small town intersection. Open culverts extend several feet from the curb at cross streets and are bridged with concrete ramps, open below for drainage, and handrails for edge protection. Beginning at the top of the curb almost 15 inches above road grade, these flying ramps both protect the culvert and provide access to the crosswalk. Edge protection is needed, however, and detectable warnings at the street edge.

Analyzing Accessibility Alternatives

When physical constraints limit the application of new construction criteria, several potential approaches may be analyzed before selecting the solution that will optimize accessibility. Here is a simple two-step process for making decisions on selecting accessibility alternatives.

[In general, 'accessible' is used in this document to mean elements or facilities that comply with applicable standards—this is the definition in ADAAG—and 'usable' to characterize elements or facilities that are not addressed in the standard, which represent equivalent facilitation, or that fall short of full

Case Study—Returned Curb Aids Wayfinding

- This photograph shows a new downtown traffic calming project in Vancouver, WA
- Returned curbs against the landscaped setback provide good orientation cues to crossing pedestrians
- Flares have been minimized in order to make preferred incline/directional ramps possible at this small curb radius



compliance with scoping or technical provisions for new construction. Note that the ADA implementing regulations require new facilities to be both 'accessible to' and 'usable by' people with disabilities.]

First: Consider the use of work-around alternatives that do not affect usability by pedestrians who have disabilities. For example, where there is a problem placing a curb ramp in a preferred location, consider:

- using an alternate form of curb ramp (parallel, combination, or perpendicular);
- identifying an alternate location for the ramp;
- widening the crosswalk to include the curb ramp;
- borrowing space from the parking lane or the roadway;
- adjusting the horizontal and/or vertical roadway geometries;
- extending a curb ramp through the gutter-pan area;
- raising the roadway surface at the gutter;
- lowering the curb height;
- raising the crosswalk;
- adding a curb extension to 'grab' needed (and often more level) space for pedestrian facilities at corners;
- shielding the sides of a ramp with signs, sidewalk furnishings, and setbacks to eliminate the need for space-intensive flared sides; or
- ramping a sidewalk down to an intermediate level landing.



This curb ramp retrofit combines a parallel and a perpendicular ramp to stay within running slope limits. Curbed edges provide useful non-visual wayfinding cues. California State provisions (this is in Sacramento) require the corduroy markings at the intermediate landing, but research shows that the truncated domes required at the toe of the ramp (ADAAG 4.7) would provide a significantly more detectable indicator of the upcoming street crossing.

Second: If an alternative does not meet project constraints, favor approaches that have lesser usability implications. For example:

- modify curb ramp flare space requirements (the flare is not part of the required pedestrian access route [PAR]) or use returned curbs;
- construct a single curb ramp that can do the work of two;
- shave millimeters from a landing or decimals from the running or cross slope of a ramp;
- use a short length of blended or warped sidewalk that can be replaced during a future improvement to connect to existing undisturbed facilities; or
- blend non-conforming pavements in segments that provide as much planarity as possible for the wheelbase of a mobility device (~760 mm x 1220 mm).

Note that manipulating scoping requirements (one ramp where two will not work, a lesser number of accessible on-street parking spaces where construction is constrained) may also provide needed flexibility in conditions of infeasibility. Equivalent facilitation, obtaining the prescribed ends in another way, is also permitted. For example:



Driveway crossings with excessive cross slope are one of the most common problems in alterations projects. Here, an existing driveway apron has been reconstructed to provide a level pedestrian route across it that is narrower than the sidewalk it connects to but adequate for travel over a short distance. In more constrained rights-of-way or where driveway slopes are steeper, a more complex intervention will be needed. Usability can be optimized by ramping the sidewalk down to an intermediate level at the driveway crossing and accepting a lip between apron and roadway.

- use of an existing corner curb ramp to serve as an added accessible parking space where sidewalk space is limited;
- use of a leading-pedestrian interval (LPI) or all-red signal to provide crossing opportunities where other timings are not feasible;
- use of a voice message where pedbuttons cannot be separated by the necessary ten feet; or
- use of audible signage where there is insufficient room for tactile text.

The design engineer who is well-versed in accessibility rationale will recognize that some features of accessibility have greater safety and usability effects than others. For example, a lip at the toe of a curb ramp is a significant barrier because users may be crossing at speed, the grade break may be obscured by ponding, and a sudden drop or stop can propel a pedestrian from his or her mobility device. In contrast, the slope or length of a flared side of a ramp is not part of the pedestrian access route, and thus a lack of compliance with the standards is of little significance to usability. A narrow walkway adjacent to an active travel lane requires tighter control of the cross-slope on the sidewalk and curb than does a separated sidewalk set back from the roadway. Level landing areas are critically important where turns must be made.

PROJECT SCOPE

In the most basic terms, the project scope describes the purpose of the project. The physical constraints of any project are challenges that may make project engineering complex, excessively expensive, or difficult to build. These challenges may require additional funds, cause the scope of work to expand, or kill the project altogether. The scope of work defines a project by answering the questions of What, Why, Where, When, and How. It includes the purpose and justification for the project. It also includes the physical and/or contractual limits of the work. With respect to pedestrian accessibility, the scope of a project must also address the obligations set by ADA Title II and 504 implementing regulations.

The project scope should consider the jurisdiction's transition plan, if one has been prepared. If inaccessible or unusable facilities within the project area have been identified in the transition plan for correction in the future, it is likely that they can most easily be corrected within the scope of the proposed alteration project, as it will generally be more cost effective to correct a known barrier by including it in a planned alteration project rather than wait and fix the problem at a later date. The limitation of project scope or boundary to avoid a program access improvement could give rise to a complaint.

The scope of accessibility improvements should be related to and commensurate with the scope of the

Case Study—Steep Terrain at Corner

- This new combination (parallel and perpendicular) ramp is installed in an existing sidewalk network as a consequence of resurfacing alterations. It is located at the apex of the corner to insure that pedestrians do not enter the crossing in an active traffic lane.
- Roadway surface and gutter have been raised and blended to meet the new parallel ramp, making this a good example of a combination ramp.
- Where true level landings cannot be provided in alterations, it is particularly important to limit sidewalk cross slope to 2%.

Note: DWS needed.



overall project, particularly with regard to roadway improvements. Each element that is altered as part of the project must be designed and constructed to be accessible to and usable by people with disabilities to the maximum extent that this is feasible. Failure to provide accessible alteration project improvements may require a public entity, including responsible individuals, to defend their decision-making in court.

How do you know when you've maximized accessibility?

In roadway design, there are many ways to solve a problem. The confidence that a designer has properly applied good engineering judgment in a specific case can only come when accessible design has been fully integrated into the engineer's toolbox.

Designer A develops one solution; engineer B another for the same problem. How can agencies determine which design solution should be used? The U.S. Access Board, the U.S. DOJ, and the U.S. DOT do not approve project designs (or police construction) to ensure that the 'best' solution is chosen. If the using public believes that a more accessible result might have been achieved, designers may have to defend their decision-making in court. If reasonable care can be demonstrated, then accessible design carries no more risks for public agencies than the design of other roadway features. A few states have a regulatory agency that reviews the design and construction of pedestrian elements to ensure accessibility. They may also have the authority to approve deviations to any state accessibility standards. However, Federal or private litigants are not bound by state or local approvals and may challenge such a decision in a complaint to DOJ or FHWA or an action in court. The best guidance is to approach accessible design and construction with the same care and commitment as all agency initiatives and to document staff training, planning and design procedures, and decision-making processes.

Members of the PROWAAC make the following recommendations:

- Designers need to expand the depth of their analysis and think outside the box.
- Designers should seek assistance from people with disabilities in the community. Consider their opinions and recommendations. Get input, advice, and support from local advisory committees.
- Designers must recognize that the first solution to a problem will not often be the best. Look hard and wide for creative solutions.
- Keep track of everything considered. Document the analysis work, findings, and decisions. Save them in the permanent project record file.
- Select the solution that best balances the needs of all users: people who use wheelchairs, people who have vision impairments, and other pedestrians, young and old. Avoid solutions where roadway improvements are fully realized at the expense of pedestrian accessibility.
- Network with others. Consult with peers in other agencies and firms. Share ideas and solutions.
- Attend continuing education classes that focus on accessible design.
- Develop, adopt, and use a standard method of design review and approval.
- Be prepared to defend your decisions in a potentially adversarial situation.

The recommendations above provide no guarantee that a project design will not be challenged. There will always be someone with a second opinion or a better design solution. However, if the scope of the project is clearly defined, research is adequate, and the method of selecting the preferred alternative is clearly documented, the solution can be adequately defended. It is the designer's responsibility to develop the expertise needed to evaluate potential alternatives before confirming an engineering solution. Note that cost cannot be the basis for eliminating workable alternatives in a planned alteration (however, there is a cost defense related to program access improvements; see 28 CFR 35.150(a)(3) of the Title II regulation).

Project Approach

Engineering judgment is defined in industry literature as the evaluation of available pertinent information and the application of appropriate principles, standards, guidance, and practices for the purpose of

deciding upon the applicability, design, operation, or installation of public improvements.

The exercise of engineering judgment directs all the skills of the professional toward the solution of an engineering problem. Accessible pedestrian design practices are only now beginning to develop within the transportation engineering field. Over time, it is expected that a full body of knowledge will be established as the profession takes responsibility for this new aspect of roadway design. Designers should seek out and use currently available resources to assist them in their design efforts. As with any new skill—and this is true for the individual designer as well as for the leadership of the profession—competency in accessible pedestrian design can be gained through education, training, and practice and then be integrated into the current professional skill set. It must be noted that engineering judgement on its own is not a defense against an accessibility complaint.

The design recommendations in this technical assistance manual can help engineers integrate accessible design into the toolbox that is used every day as engineering judgment. However, it is impossible to give guidance specific to every situation, since there are many variables in even the simplest of projects. Seldom will existing conditions be comparable between even two similar projects. It is the intent of this manual to provide an awareness of the rationale behind accessible design provisions, with specific application to alteration projects, and to suggest methods and techniques that will advance current understanding and practice. Particular emphasis has been given to the civil rights concepts that underlie the ADA implementing regulation.



In this photo, ITE wayfinding workshop participants work in small groups to develop curb ramp location recommendations based upon intersection corner radius (see the ITE Journal, July 2004).

Frequently-asked Questions

When the revised draft guidelines for accessibility in the public right-of-way were published by the Access Board on November 23, 2005, the preamble to the draft (discussion) contained a set of questions and answers intended to help clarify the relationship between the scope of a planned alteration project and related physical constraints. The questions/answers did not address program access requirements (the Access Board mandate is the development of guidelines that can be adopted as Federal standards for new construction and alterations; the Board has no responsibility for ADA provisions governing existing facilities not otherwise being altered).

The same questions are repeated below. The answers have been expanded by the PROWAAC Subcommittee to identify areas where program access requirements may arise, in an attempt to provide a more complete picture of agency and jurisdictional obligations under Title II of the ADA and section 504 of the Rehabilitation Act.

Curb Ramps

1. **Question:** A multi-block length of roadway is being resurfaced. Existing sidewalk corners have curb ramps, but some of them don't meet current specifications. Must the curb ramps be reconstructed as part of the resurfacing project?

   Answer: Resurfacing is considered an alteration and compliant features must be installed to the extent that it is feasible to do so. This work is required by 35.151(e) of the Title II regulation, not by ADA standards for construction, and must be done at the same time as the resurfacing. *Discussion:* This requirement is analogous to the 'path-of-travel' requirement for buildings and facilities under which additional work is occasioned by a planned alteration. Curb ramps

are the only item of construction specifically required by this provision in Title II, and only as a consequence of an alteration to a roadway or pedestrian walkway. DOJ technical assistance describes resurfacing as an alteration. Kinney vs. Yerusalim, a Federal court decision binding on the Third District, took a similar view, holding that roadway resurfacing constituted an alteration that required the installation of curb ramps. If it is feasible (see the Introduction for the ADA discussion of 'maximum extent feasible') to provide greater usability/compliance with curb ramp standards, that should be done.

2a. Question: New curb ramps are being installed in an existing sidewalk that is being widened and resurfaced as part of a downtown improvement program. On one corner, an existing underground utility vault is located in the best spot for a curb ramp. Must the utility vault be moved to ensure that the toe of the curb ramp falls within the marked crossing?

Answer: The scope of this project will determine the answer. If utilities are being moved for other reasons within the project scope or limits, it may be feasible to alter or relocate the vault. If planned project construction does not involve the vault, it may not be feasible to locate the curb ramp in as optimal a spot as new construction standards would require. If at some future time the intersection is reconstructed and the utility vault is modified or relocated, there may be an opportunity to locate the curb ramp in the ideal location. *Discussion:* There are many work-arounds for barriers in the public right-of-way. Consider widening the crosswalk markings to include the new curb ramp location, raising the crosswalk if roadway use permits, or installing an apex ramp as a last resort.

2b. Question: What if the curb ramp can be placed over the vault, but an access cover would have to be located on the curb ramp to do so?

Answer: An access cover on the curb ramp is not prohibited if it conforms to the surface requirements (stable, firm, slip resistant; no changes in level that exceed ADA standards, etc.) for the pedestrian route.

3. Question: One corner of an intersection is being altered by curb and gutter reconstruction to add a curb extension for traffic calming. Paired curb ramps will be installed as part of this project. The other three corners of the intersection are not being altered. Must curb ramps be provided (or improved) at the unaltered corners as part of this work?

Case Study—Adding Pedestrian Signals

- Stub poles are used at these new curb ramps to properly locate the pedbutton near the departure curb.
- For maximum signal discrimination, each crossing direction should have a separately-mounted device; MUTCD standards require a 10-foot minimum between APS.
- While not specified in ADA or 504 Standards, greater accessibility for those with low vision would be provided if the new signal posts were darker and contrasted with the light sidewalk paving.





In this downtown improvement project in Auburn, AL, splitting the sidewalk allowed two objectives to be served: the upper level provides stepless access to shops and the lower level maintains access to the street. Landscaping, benches, and decorative wrought iron railings separate the two levels, which are connected by a ramp at midblock and blended to a common level at corners. The reconstruction borrowed street space to provide the sidewalk width needed for this imaginative solution in a daunting hilly streetscape.

Answer: No, although it may be more cost-effective to do so, since most corners should be fitted with curb ramps eventually. Curb ramps within the limits of the project at the altered corner are a required part of this work. *Discussion:* Existing corners without curb ramps are subject to section 504 and ADA Title II program access requirements; broadening the current project's scope of work to include them now may make good economic sense (unless future construction at other corners is already scheduled).

Sidewalks

4. **Question:** A project will be undertaken to connect a series of sidewalk segments near a school in support of a Federally-funded Safe-Routes-to-School (SR2S) program. Must the existing segments of sidewalk be modified if they do not meet width or cross slope provisions?

   Answer: This is an alteration to an existing pedestrian circulation system and compliant features must be installed to the extent that it is feasible to do so within the scope of the project. *Discussion:* Since this is an area-wide project intended to provide student circulation routes between homes and school, and not just to link two separated segments of an existing walkway together, the project should be planned to include improvements to existing sidewalk segments that can feasibly be corrected within the scope of a sidewalk improvement project. Students with disabilities cannot be excluded from SR2S programs, which by their nature encourage walking and bicycling, and such programs carry their own program access responsibilities.

5. **Question:** A new sidewalk is being built along an existing road that contains many driveway access points. Must those driveways be modified if their cross slope exceeds 2%?

   Answer: Yes, to the maximum extent feasible within the scope of the project. A new sidewalk, even when constructed as an alteration, must be designed to conform to accessibility standards to the extent that it is feasible to do so. Design guidance from the Access Board includes several driveway apron retrofit schemes (see Case Studies for details).

6. **Question:** A city is resurfacing a sidewalk along Main Street. The distance between the edge of the right-of-way and the existing roadway does not provide sufficient room for a four-foot-wide pedestrian access route. Does the municipality have to acquire more right-of-way from private property owners or narrow the roadway to provide a more conforming walkway?

   Answer: No, accessibility guidelines do not require the municipality to obtain right-of-way or to narrow roadways in the limited scope of work of a sidewalk resurfacing project. However, if a municipality plans to narrow a roadway for traffic-calming purposes or acquire additional right-of-way as part of a downtown improvement project, it should plan the project in such a way as to accommodate new construction standards for sidewalk width. Note that ADA title II regulations will require the addition of curb ramps as part of this project, since it is an alteration to a sidewalk.

Signals

7. **Question:** Curb ramps are being installed at a signalized intersection as part of a roadway resurfacing project. Existing pedestrian push buttons (pedbuttons) are not accessible or placed in accessible locations. Must the pedbuttons be replaced with accessible models? Must accessible pedestrian signals be installed as part of this project?

   Answer: The resurfacing alteration triggers the addition of curb ramps under the ADA Title II regulation. However, there is no requirement to expand the project scope to include other features of accessibility. On the other hand, pedbuttons which are too high, too far from the sidewalk, or are otherwise inaccessible will preclude use by residents with disabilities, raising program access issues. It may be more cost effective to fix them under the proposed project rather than make the improvements at some later date. *Discussion:* If the pedbuttons are being replaced as part of this project, the new equipment must meet accessibility standards for operating force, reach range, clear ground space, connection to the pedestrian route, etc. Existing pedbuttons may be relocated, subject to installation standards, but if they are of an inaccessible design, it may be a wiser course to replace them rather than risk a program access complaint.

8. **Question:** The pedestrian signals in a downtown corridor are being replaced with a new system combining WALK/DON'T WALK and count-down signals. Must Accessible Pedestrian Signals (APS) be included in the new system?

   Answer: Yes. The installation of a new system is an alteration that must be accessible to and usable by people with disabilities to the maximum extent feasible. APS are widely available. *Discussion:* When a complete system is upgraded, controller and push button improvements that include APS capability can be added. Providing crossing information in usable formats should be included in the scope of work for a project of this size, complexity, and cost.

9. **Question:** Count-down signal displays are being added to some existing pedestrian signal heads at an intersection, but the software and signal controller are not being altered. Must APS be installed?

   Answer: No, simply adding a display to the existing WALK/DON'T WALK signal would not involve the system changes needed to implement APS. *Discussion:* Note that program access provisions governing existing facilities may apply at any location, regardless of whether alterations are planned. If a resident with a disability requests APS information at a crossing, a jurisdiction

Case Study—Combination Curb Ramp

- Existing surface drainage patterns along this corner suggested the likelihood of flooding at the central landing of a parallel ramp so a new combination curb ramp design was specified.
- This is a good approach in limited right-of-way. The short perpendicular curb ramp raises the central landing a few inches above the gutter flow line so it is not flooded.
- The design allows for a level bypass space at the top of the flared side ramp while accommodating the limited width of the existing sidewalk.
- Still needed: detectable warnings at toe.



must give consideration to installing them if necessary to provide accessibility. Maintaining a citizen request program, and acting on it, is one way that jurisdictions may satisfy program access requirements for existing facilities not otherwise being altered.

10. **Question:** An intersection is being signalized and will include APS. The installation of stub poles on the existing sidewalks to mount the new pedbuttons will disturb a limited area of sidewalk. Must curb ramps be installed if none existed?

    Answer: No. The scope of this project is to install pedbuttons; it is not an alteration to the sidewalk or the street that would require the installation of curb ramps, as required by the ADA Title II regulation. *Discussion:* Curb ramps at this location would clearly be required under the section 504 and ADA Title II regulation and should have been included in the agency's transition plan. Their addition is an improvement that might well be scoped and scheduled as a part of this project.

11. **Question:** The push button on an existing pedestrian signal is being replaced with a sturdier model. Must APS be installed?

    Answer: No, but the new push button must conform to applicable accessibility criteria (location, height, operating force limits). *Discussion:* Modern APS devices are usually integrated into the pedbutton. If every pedbutton at a corner is being replaced as part of this project and controller changes would not be required to support APS, it would be a wise use of public funds to consider APS installation, since a program access need can be anticipated to exist at most locations where pedestrian signals are provided.

12. **Question:** An intersection with existing sidewalks and pedestrian signals is being widened to include a right-turn lane. Must APS be installed as a consequence of the widening?

    Answer: No, installing APS is not within the scope of this project. New pedestrian push buttons installed in the course of the work must meet applicable requirements (or existing ones may be re-installed; see Question 7). However, since this project is an alteration to the street and sidewalk, curb ramps must be installed or improved to the maximum extent feasible.

General

13. **Question:** The local public transit agency has designated a bus stop by placing a sign in the ground along a roadway that has no sidewalk. Must a concrete or another improved surface be provided in the course of the work?

Case Study—Midblock Crossing Criteria

- This APS provides audible and vibrotactile notice of the crossing phase at a midblock crossing where there is no parallel traffic surge to provide a cue. Its locator tone also identifies it as an actuated crossing.
- The pedbutton is installed as close to the departure curb as feasible and is operable from the level landing.
- The pedbutton and tactile arrow are oriented parallel to the crosswalk.



Answer: No, the placement of a bus stop sign alone does not require other site improvements. However, the designation of the bus stop places future program access responsibilities on the jurisdiction, which must ensure system usability by residents who have disabilities. *Discussion:* While program access obligations may arise out of an expressed individual need for accommodation at a specific location, required transit system usability is dependent on having accessible bus stops where people want to go. In urban areas, jurisdictions should not wait for a resident request to improve a bus stop. In rural and suburban areas, a prompt response to the request of a passenger with a disability for accommodation may be sufficient. Residents who are not able to use a public transit system because of bus stop inaccessibility may be eligible for paratransit, but it is often more cost effective to improve the accessibility of bus stops instead. The Title II regulation requires structural improvements for program access to conform to alterations standards.

14. **Question:** Sidewalks will be redesigned and replaced as part of a Main Street improvement program. The existing sidewalk has a cross slope of 5% (1:20). Reducing that cross slope could result in steps at the entrances to abutting businesses. May the steep cross-slope be retained?

    Answer: No. While it is usual to coordinate sidewalk improvements with adjacent property owners, a jurisdiction's first responsibility is to the accessibility of its sidewalks. If a comprehensive project is undertaken to improve sidewalks, the municipality must take the steps necessary to provide usable new sidewalks. It is likely that both usable sidewalks and accessible entrances can be obtained through careful engineering. If existing conditions are extreme, a complex solution that makes use of both public (including roadway) and private space may be required. *Discussion:* There are many ways of maintaining access without exceeding cross slope limits. Narrow sidewalks may be divided lengthwise into conforming and nonconforming widths, with the non-conforming sections serving as entrance ramps; the entire sidewalk may be raised, with steps at the curb if there is parking; or extra width may be borrowed from a roadway or parking lane. Remember that the cross slope requirement applies only to the Pedestrian Access Route. If there is sufficient sidewalk width, steeper cross slopes can be accommodated in the frontage or furnishing zones to match existing building entrances. Community development block grant money may be available to assist adjacent property owners with building ramps on private property.

PROWAAC Subcommittee members developing these recommendations suggested several new FAQs, developed from their project experiences, to expand the breadth of discussion on alterations. Although not part of the Access Board preamble to the draft PROWAG, they may provide useful guidance:

15. **Question:** State and local governments are covered by Title II of the ADA, but what about Section 504 of the Rehabilitation Act? If a specific project isn't using Federal funds, do the FHWA 504 regulations and associated policies affect the project?

    Answer: Yes. As a result of the Civil Rights Restoration Act (CRRA) of 1987, if state or local government public works or highway departments receive any Federal money from any source, not just highway funds, including pass-through funds from the state, the entire program of that local agency is covered. This includes projects undertaken by that agency that do not themselves involve Federal funds. For a full discussion of the impact go to: http://www.fhwa.dot.gov/legsregs/directives/notices/n4720-6.htm.

16. **Question:** We're re-paving a street. We will be adding/improving curb ramps where needed, but are we required to add accessible on-street parking spaces as part of this project? The parking lane will be re-striped after resurfacing is complete.

    Answer: Re-striping on-street parallel parking spaces does not offer any accessibility opportunity (there is no guidance on striping accessibility). However, where perpendicular or angled parking has been provided on a street, it may

be feasible after a resurfacing to re-stripe to provide an access aisle for an accessible space (or two) if your jurisdiction doesn't provide sufficient accessible on-street parking (use the new construction scoping to determine the desirable number overall) or if the adjacent land use makes accessible parking particularly desirable in that location. *Discussion:* The preamble to the DOJ Title II regulation cites adding accessible parking as a program access obligation. Adding accessible parking signs, meters, and curb ramps and relocating curbside barriers, if needed, may be undertaken as program access improvements separately from the resurfacing project, but the striping of an accessible space will give these related needs a higher priority.

DESIGN PROCESS

by Andrew Davis, PE, City of Akron, OH; Jerry Markesino, PE, Otak, Inc.; Jim McDonnell, PE, AASHTO; Bob Sexton, PE, HR Gray (Columbus, OH); Bill Hecker, AIA (Birmingham, AL), Ken Stewart, Council on Citizens with Low Vision, International

The design process for making accessibility improvements in alteration projects is not any different from the design process for traditional street modification projects. Incorporating accessible pedestrian elements in the public right-of-way requires the same reference to standards, technical guidance, and product information that designers follow in every roadway design project. The design and placement of curb ramps into an existing developed streetscape is governed by many of the same considerations as roadway design: controlling horizontal and vertical geometries, surface conditions, and access to intersections, all at the scale of the pedestrian rather than the vehicle.

In an alteration, a balance needs to be struck between pedestrian and vehicle users vying for travel space (and time) within a limited right-of-way already constrained by existing development. A good understanding of the rationale behind accessibility standards will help the designer integrate usability for pedestrians who have disabilities into agency decision making.

Resource: FHWA's 'Designing Sidewalks and Trails for Access, Part 2' at:
http://www.fhwa.dot.gov/environment/sidewalk2/index.htm

Gathering Information

A planned alteration project may arise from a long-planned Capital Improvements Program or be a more immediate response to local conditions or community advocacy. When such construction is undertaken, the new work must incorporate accessibility features. Jurisdictions may have additional obligations for existing facilities under the Title II and 504 regulations (see Chapter 2, Alterations).

Therefore, before developing the scope of work for a planned new project, the design team should contact the jurisdiction or agency ADA/504 Coordinator



This urban arterial passes through a neighborhood that is undergoing rapid revitalization, with many projects under construction temporarily occupying existing sidewalk space. In this example, the contractor has provided a temporary pedestrian route in the curb lane of the roadway, separating it with Jersey barriers and installing a temporary concrete ramp to the street level walkway. Still needed: detectable warnings at the cross street.

to identify accessibility improvements that may be needed within or near proposed project boundaries, such as:

- curb ramp transition plans and schedules;
- requested individual accommodations, including APS, parking, curb ramps, and sidewalk repairs; and
- bus stop/transit accessibility improvements.

Often, such improvements can be included in a pending project at a more modest cost than undertaking them independently. Evaluate existing conditions near the project site to determine if key accessibility features or needed maintenance could be provided more economically by slightly expanding the project scope of work. Some agencies have developed 'spot improvement' programs that use resident requests as input to project scoping. Coordination with transit agencies, which have their own ADA obligations for new construction, alterations, and existing facilities and programs, will indicate whether bus stop locations and shelter space and access requirements would best be addressed within a planned project scope. By gathering this information during preliminary project planning, the engineer can avoid potentially costly oversights and under-designs.

Resources: FHWA's 'Metropolitan Planning' at:
http://www.fhwa.dot.gov/hep/metropol.htm
FTA's civil rights/accessibility page at:
http://www.fta.dot.gov/civilrights/civil_rights_2360.html
Transition Plan, City of Nashville, TN at:
http://www.nashville.gov/gsa/ADA/doj_2047143_final_textonly.htm (see Section VIII: Compliance Strategies for Public Right-of-Way)
State of Hawaii Title II Self Evaluation and Transition Plan at:
http://www.state.hi.us/dlnr/dsp-dp/dsp/rules/draft-transition-plan-self-evaluation.pdf
A newly-funded (2006) National Cooperative Highway Research Project developing guidance for highway agencies on preparing transition plans and meeting program access expectations at:
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1247

Planning the Scope of Work

Defining the scope of a planned alteration project establishes the physical and contractual parameters of the work. If right-of-way is to be acquired for a project, it is important to purchase enough to accomplish all project objectives; if an existing right-of-way is to be reapportioned, the scope of work will fix the balance between motor vehicle, cycling, and pedestrian uses. Under-scoping a project may leave or create barriers that will have to be corrected; an oversight that renders a significant part of a planned project inaccessible can entail costly remediation.

New technologies such as central on-street parking pay stations and pedbutton-integrated APS must be carefully placed for usability. Signaling and utility equipment locations and sizes must be anticipated and the accessibility effects of street furniture (benches, bike racks, bus shelters, signage and other appurtenances) must be assessed before right-of-way needs can b e finalized. Private uses of public space for ATM access, sidewalk dining, and newspaper vending all have space and geometric design implications for accessibility.

Street and sidewalk modifications may also affect access to abutting properties. This can raise complex issues of engineering, coordination, and policy, particularly with private sector entities that have obligations under Title III of the ADA to provide accessible approaches and entrances. For example, correcting excessive cross slope as part of a sidewalk improvement project should not result in new steps at entrances to adjacent businesses. A detailed site study that includes consideration of beyond-the-right-of-way implications will best serve public/private coordination efforts and suggest design approaches and solutions (see Chapter 4), which will be helpful in addressing existing constraints in alterations, particularly those of modest scope.

A comprehensive scope of work description will include the following:

- WHAT the proposed project is intended to do, including pedestrian accessibility objectives;
- WHERE the project limits and bounds will be and how new and existing facilities will meet; and
- HOW the project will be funded, including sources, availability, and limitations arrayed against estimates of design and construction costs (note the overview of funding sources for accessibility improvements included in the Appendix).



This streetscape improvement in a historic downtown works with the street slope to provide individual entrance platforms at existing businesses. Level landings on the upside connect back to the downside with steps. A clear passage of 1.5 m (5 feet) is maintained between the furniture zone at the curb and the stepped entrance platforms.

From this, the planning team will identify possible constraints that may affect roadway, pedestrian, and accessibility objectives. Several design schemes may have to be developed and analyzed before the project scope can be fully determined. The designer should document the decision making process, including the evaluation that led to the selection of the preferred alternative(s).

The scope of work that is defined for an alterations project should reflect pedestrian planning and analysis for accessibility/usability that is commensurate with the overall roadway design work effort.

Examples

Let's use the classic 4Rs of highway design to illustrate how establishing the scope of work relates to access planning (see Appendix for TxDOT's definitions). Most 4R projects involve roadway pavement, although many other elements of construction can also be included:

1. Reconstruction

Reconstruction of roadway facilities is an ambitious undertaking of comprehensive scope under which most objectives can be fully realized for both roadway and sidewalk design. Projects of this complexity should be able to meet or exceed minimum accessibility criteria.

Example: A 1.5-mile length of residential street was reconstructed and re-aligned and water, fire hydrant, and sanitary and storm sewers rehabilitated as part of the project. New curbs and gutters were provided throughout. Accessibility features included new aligned curb ramps with detectable warnings at all crossings. Sidewalks were replaced and driveway aprons reconstructed where needed to meet cross slope limits.

2. Rehabilitation

Rehabilitation projects typically raise subgrade issues. Feasibility is a factor here and 'work-arounds' will require case-by-case design solutions.

Example: Storm drainage improvements (new inlets) are planned for one side of an existing developed streetscape. Sidewalk and roadway surfaces and subgrade facilities are removed at each corner, but the sidewalks they connect to will remain. When sidewalk segments are replaced or repaired, the new work must provide accessibility/usability. But it must also meet the grades of existing sidewalks at the project boundary. Providing intermediate transition segments between the new and existing work (rather than matching the old) will serve users best. Future work then need only improve the transition segment and the existing sidewalk. In addition, the scope of work for this alteration must include new curb ramps (and the improvement of existing ones, as feasible). The agency should consider adding opposite-side curb ramps to the scope of work, as well.

3. Restoration

Restoration projects return pavement structure, riding quality, or other roadway characteristic in an existing cross-section to near-new condition. Because the work affects the usability of the surface, it is considered an alteration and must include curb ramps at pedestrian crossings.

Example: An existing rutted roadway surface will be restored. Subgrade structure will be improved and a new surface added without disturbing adjacent existing sidewalks. Curb ramps added in an alteration of this limited scope will be usable by many, but may not be optimal in location, wayfinding, slope, width, or other feature until a later alteration to the sidewalk is undertaken.

Case Study—Narrow Sidewalks

- When this roadway in Washington, DC was resurfaced, existing non-compliant curb ramps were replaced.
- The counterslope of the brick gutter at the toe of this curb ramp was eliminated in order to extend the ramp through the gutter. This allows the ramp to be shorter, because it meets the crown of the roadway at a higher point.
- It also eliminates ponding at the toe.



4. Resurfacing

Most resurfacing will be viewed as an alteration—a change that affects surface usability. However, spot patching and liquid-applied seals are described as maintenance not requiring curb ramps in DOJ technical assistance publications. FHWA guidance distinguishes between structural and non-structural resurfacing.

Temporary Routes

Interim pedestrian accommodations put in place as part of a temporary traffic control plan are considered alterations subject to the 'maximum extent feasible' limit in the standard. The Manual on Uniform Traffic Control Devices (MUTCD) includes detailed requirements on maintaining pedestrian access through or around a work zone. Project planning must include a temporary usable route that provides the accessible features of the disrupted route, perhaps even including APS.

Resources: MUTCD Chapter 6 at:
http://mutcd.fhwa.dot.gov/HTM/2003r1/part6/part6d.htm
ATSSA work zone safety grant at:
http://www.atssa.com/cs/Federal-Highway-Administration-work-zone-safety

Identification of Constraints and Opportunities

An on-the-spot survey of existing development at the project location is the first step in identifying physical constraints that may require work-arounds or feasibility assessment. There will be a need to evaluate the pedestrian route with respect to width, setback, running grades, cross slopes, lateral and vertical clearances, and sidewalk appurtenances and to identify opportunities to work with the current grade or make use of the parking lane or roadway space, tighter corner radii, and other potential sources of flexibility.

FHWA has developed an inventory process to document existing sidewalk conditions that includes forms and checklists for field information to aid in project scoping, analysis, and design. The forms can be adapted to meet the needs of a particular agency and will be particularly useful in project planning. Because the survey forms do not include pedestrian signalization considerations, agencies adapting its format for local use should add the APS criteria outlined in the NCHRP 3-62 report posted to the website of the Pedestrian and Bicycling Information Center. A separate chapter addresses retrofitting an intersection with APS.

Resources: Sidewalk Inventory Form, in 'Designing Sidewalks and Trails for Access' at:
http://www.fhwa.dot.gov/environment/bikeped/Access-1.htm
APS criteria in NCHRP 3-62 at:
http://www.walkinginfo.org/aps/home.cfm

Complex engineering design utilizes topographic, elevation, and geometric design information for the design of curb ramps, landings, slopes, clearances, and signal locations in a substantial project. It is important that such surveys include entrance elevations for abutting facilities. Many agencies use an inexpensive rotating laser for this purpose. An electronic level can pinpoint excessive slope and cross slope locations.

During the site design survey and pedestrian route assessment for an alteration project, carefully identify

Case Study—Typical Parallel Curb Ramp

- The limited width of the right-of-way along this street dictated the need for a parallel curb ramp.
- Detectable warnings are shown along the leading edge of the central landing as specified in the draft PROWAG.



any condition that is likely to affect route accessibility. Examples of existing infrastructure elements that may influence project planning include drainage structures, manholes, utility poles, sewers, water mains, and underground conduits and vaults. In narrow rights-of-way, street trees, building entrances, and basement extensions from adjacent buildings will limit design flexibility unless relocation has been included in the project scope.

Development of Alternatives

When the designer is faced with constraints that affect conformance with accessibility objectives, alternative designs need to be developed and assessed. Chapter 5 addresses accessible design alternatives under a wide range of existing conditions.

Project Documentation

It is common practice in all project designs to document the analysis of certain problem types, including a description of the alternatives considered and decisions made. A street pavement thickness design, for example, will consider the bearing soils, the future truck traffic loads, pavement type, amount of excavation, cost of pavement materials, and other variables. The final selected pavement thickness will be justified by this analysis of relevant variables and their effects on each other. The engineering judgment(s) that lead to the final decision are documented and become part of the permanent project record.

For alteration projects where some improvements may fall short of new construction standards, documentation is very important. The structural design of a bridge includes a very careful analysis of all the components to assure that the bridge will not collapse and cause injury or death. This same standard of care should be exercised with respect to accessible design. Documentation reveals the standard of care that guided engineering judgments made in the course of the work. In the event of a challenge at a future time, documentation can be retrieved from project archives in support of the agency's decisions.

Example: As part of a SR25, several existing sidewalk segments will be connected through a small neighborhood commercial area. A tree of substantial caliper shades a 30-inch-wide sidewalk; a retaining wall occupies the property line. The two-lane roadway is also narrow and provides no parking lane. Providing an accessible crossing to a more generous sidewalk on the other side of the street may be an acceptable solution in this instance if the pedestrian crossing is improved and safety considerations are addressed. Alternatively, the town may determine that a preferable course for student safety is to acquire right-of-way and relocate the retaining wall to provide adequate sidewalk width. At the tree, a lesser walkway



This reconstructed residential street in Ohio curves through several intersections skewed by as much as 30 degrees. Although aesthetically pleasing, this posed some design challenges for accessibility. As can be seen in the photograph, low retaining walls were required on many corners. The project included new water mains, fire hydrants and services, sanitary and storm sewer rehabilitation, new curbs and gutters, driveway entrance replacements (to allow ADA-compliant sidewalks across the driveways), and full-depth street reconstruction for approximately 1.5 miles of suburban streets. Paired curb ramps with detectable warnings were constructed at all intersections.

width (32 inches is the ADAAG minimum for a 24-inch length) can provide the required usability for this limited distance in an existing facility (it wouldn't be an acceptable choice in new construction, however). In the permanent record file for the project, the city engineer should document his efforts to conform to the ADA criteria and his/her decision to build a portion of the sidewalk that is not in strict compliance with new construction standards.

Several state highway agencies have established processes to document infeasibility in a project element or elements under state code requirements or regulations. They offer an opportunity to explain the existing physical or right-of-way constraints that limited conformance to the ADA standards and may be called Design Details of Nonconforming Elements, Design Deviations, Modification of Standards, or other. While useful in the project record, there is no process at the Federal level (where the ADA and Rehabilitation Act are principally enforced) by which review and approval, exceptions, or variances can be granted. For a typical city agency, the designer or the project manager would make the determination of 'maximum extent feasible', document the engineering judgment that was used in the evaluation of alternatives, and describe the solution that was selected.

The ADA is a civil rights law and by nature it gains clarity through litigation. Careful documentation will not protect against complaint, but evidence of the considerations that led to the specific project solution may be persuasive in court or in discussions with users. Taking a proactive stance towards solving access issues in the right-of-way may allow issues to be addressed and solved without risking a complaint.

Resources: Texas Department of Licensing and Regulation (TDLR) at:
http://www.tdlr.state.tx.us/ab/abrules.htm#6831
Maryland State Department of Transportation at:
http://www.sha.state.md.us/businessWithSHA/bizStdsSpecs/ohd/ada/adaguidelines.asp
Nashville, TN at:
http://www.nashville.gov/gsa/ADA/procedures-forms.htm

Case Study—Crowded Corners

- This urban corner is crowded with existing signal poles, signal boxes, and utility boxes that limit curb ramp design and placement.
- One solution, shown in the first photo: reduce curb radius to maximize available corner area and ease flares to fit the available space. Still needed: detectable warnings.
- Another option, shown in lower photo: shield ramp sides against pedestrian travel with pedbutton poles and sidewalk furnishings. By eliminating the flares, more corner area is gained. Bonus: returned curb offers useful wayfinding cues for non-visual travel. Note that the curb ramp here is the full width of the crosswalk, another pedestrian benefit. This example is from Barcelona, Spain.





DESIGN SOLUTIONS

by Daniel L. Dawson, PE, Otak, Inc & ITE; Elizabeth Hilton, PE, Texas Department of Transportation; Lee R. Kenderdine, PE, and Chuck Yancey, Metropolitan Government of Nashville and Davidson County, Tennessee

Until recently, there have been few design tools available to transportation practitioners for creating accessible pedestrian facilities. For the most part, pedestrian systems have been designed for a user who is agile and who sees, hears, and understands the roadway environment. But just as vehicular ways are engineered for users who have particular requirements—transit, large trucks, and emergency vehicles—so, too do sidewalks need to be planned for a broad range of pedestrians. Implementing accessible design results in a safer and more usable system for all, not just those with disabilities, in part because it requires that a greater level of detail and attention be given to pedestrian issues and improvements.

In the past, design of accessible pedestrian features has been inconsistent because authoritative design guidance has been lacking. And adjusting the geometrics in an existing system—the subject of this technical assistance—takes a much greater degree of creativity, thought, and engineering know-how than starting from scratch on a new project.



PROWAAC members observe a thin-film detectable warning retrofit on an existing curb ramp in a pilot project in Portland, OR

Resources

This section includes hypothetical situations and potential design solutions that will vary depending on roadway conditions. The discussions and solutions in this chapter are based on practical applications, research, recommendations, and existing design standards from:

- *Building a True Community* (January 2001), Public Rights-of-Way Access Advisory Committee's report to the US Access Board;
- *Designing Sidewalks and Trails for Access, Part II* (August 2001), Federal Highway Administration;
- *Notice of Availability of Draft Public Rights-of-Way Accessibility Guidelines* (June 2005), US Access Board;
- *Manual on Uniform Traffic Control Devices* and draft changes approved for 2008;
- *Guidelines for Accessible Pedestrian Signals*, NCHRP 3-62, University of North Carolina Highway Safety Research Center;
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities* (July 2004), American Association of State Highway and Transportation Officials; and
- Chapter 6 of this special report

Accessible Design is a Safety Best Practice

Pedestrian interactions with motor vehicles bring safety risks. For instance, the lack of pedestrian signage and signal information in usable formats puts people with visual disabilities at a greater risk than those who can see. The 30-year-old cuckoo-chirp technology for providing crossing information to people with visual disabilities has been replaced by modern electronics that tick, talk, vibrate, audibly advertise their presence, adjust to ambient sound, and provide a wide range of other information (mapping, street names, special messaging, audio beaconing). Over 30 manufacturers now provide stand-alone or pedbutton integrated APS devices, including some that are receiver based for individual use.

The MUTCD includes standards and guidance for the placement and application of APS in Chapter 4. APS technology can significantly improve the access and safety of pedestrians with impaired vision because the

crossing information is provided in multiple formats. As with other accessible design criteria, the usability of APS technology will depend on attention to detail and consistent inclusion of APS when designing and constructing signal systems. Where push buttons are placed at crosswalks and curb ramps, two buttons at each corner (one at each curb ramp) are critical for people with disabilities to understand which street crossing has the 'walk' phase and to position themselves at the crossing before the walk phase starts.

The boundary between the sidewalk and roadway is not easy to detect if a person cannot see it, and stepping into the street without knowing it can be a significant safety problem. People with visual disabilities relied on curbs for that information before the advent of curb ramps. Detectable warnings (DWs), a pattern of low truncated domes, placed where the curb has been eliminated to provide wheelchair access, provide underfoot information on where the sidewalk ends and the street begins.

The safety of wheelchair users is compromised when all four wheels do not maintain contact with the ground. This happens when sidewalk surfaces and transitions to the curb ramp and crosswalk are warped or there is a change in level—very common occurrences in the pedestrian environment. Steep grades and cross slopes can create similar stability, control, and tipping and falling problems for ambulatory pedestrians who use mobility devices. Many of these situations could be eliminated with greater attention paid to detailing pedestrian facilities during the design phase.

All these issues are accessibility and safety issues; the two are difficult to separate from one another in the pedestrian environment.



Curb ramp with returned curb adjacent to landscape strip

Information in This Chapter

The Case Studies used as examples in this report represent different, and not always optimal, approaches to streetscape alterations under a range of existing conditions. Some solutions are more successful than others and PROWAAC Subcommittee members did not agree on every photograph included here. Their use in this document should not be interpreted to indicate that they represent satisfactory or complete solutions. Each situation needs to be evaluated on a case-by-case basis using applicable standards, or, where standards are absent or inapplicable, best practices developed in concert with users and other experts.

Please note that in most design solutions, crosswalk markings are shown. To avoid giving the user the impression that a certain type of crosswalk marking is preferred, different types of markings are shown. These illustrated crosswalk markings are applied at random in the illustrations and aren't intended to convey that one is preferable over another for the specific design solution.

We have tried to use common industry terms, but you may find regionalisms in the text (we have used 'bulb-out' instead of 'curb extension', for instance). Your agency or firm may also characterize alterations differently. Our use of 'alterations' is derived from the civil rights legislation and does not conform with the common industry practice of viewing 're-surfacing' as a maintenance item.

It isn't always possible to find photo illustrations that comply fully with accessibility criteria. So you will see in these pages curb ramps without detectable warnings and pedestrian signals and push buttons that provide only visual information. We've tried to note these discrepancies in the text and captions.

Design approaches illustrated here are familiar ones that exist in every pedestrian engineering toolbox.

Legend for Chapter 4 Design Solutions

APS*		Curb	
DWS		R.O.W	Right-of-Way

** Face of pushbutton device should be aligned with crosswalk direction.*

Reducing Curb Radius

In many solutions offered here, the curb return radius has been reduced to aid in solving the design issues. If curb or roadway reconstruction can be included in a project's scope, it may be possible to reduce the curb radius and so improve pedestrian access and safety. Reduced curb radii generally provide a larger area for pedestrian space (including curb ramps) at an intersection and are encouraged where turning movements and street widths allow. This is generally a benefit for all pedestrians and may even reduce delay for vehicles if crossing distances are less. However, designers will need to consider ways of satisfying turning radius requirements for larger vehicles.

Installing Accessible Pedestrian Signals

Wayfinding for pedestrians with visual impairments is significantly improved with the incorporation of APS at signalized intersections; APS are the most commonly-requested accommodation under FHWA's 504 regulation. Draft PROWAG specifies APS that are integrated with the pedestrian push button and include a tactile arrow and audible and vibrotactile indications. Audible signals mounted on the pedestrian signal head (as has been typical in the U.S.) would not meet the PROWAG provisions for placement or for vibrotactile indications. These new types of devices are intended to be installed close to the departure location and are typically only audible 6 to 12 feet from the push button, unless special beaconing features are installed. Push button locator tones are also a required feature and volumes of the walk indication and push button locator tone automatically adjust in response to ambient sound (+2-5dB).

The drawings in this chapter and in Chapter 6 show ideal placement of the push button-integrated APS in each illustrated solution. Placing the APS close to the landing and on the side away from the center of the intersection is best. The process of determining APS placement should include a careful study of:



APS may need to be installed on a new stub pole at the departure curb for optimum usability.

Case Study—Narrow Right-of-Way

- When this roadway was widened, only a 6-foot sidewalk remained. A parallel curb ramp was the only choice.
- The pedestrian signal is well located at the back of the sidewalk, although APS have not been installed here.
- Children walk this route to school. Because it is a high-speed arterial. a protective barrier was installed.



- directionality (aligning the tactile arrow with the direction of travel on the crosswalk);
- avoiding ambiguity caused by placing two APS close together, where which button is sounding cannot be distinguished;
- limiting the need for significant reorientation from the push button to the curb; and
- reach and surface conditions for a pedestrian using a wheelchair.

The MUTCD 2003 specifies that two APS devices on a corner should be separated by at least ten feet. The separation often can be provided by installation of a stub pole for at least one of the APS devices, with the other located on the signal pole. In alterations situations, constraints may prevent this separation of devices. If two APS on a corner must be placed closer than ten feet, speech walk messages and additional custom features providing specific information about the crossing are recommended. Additional information can be found in the final report of the National Cooperative Highway Research Program Project 3-62, Guidelines for Accessible Pedestrian Signals.

When installing APS, the designer should select a unit with a push button locator tone, audible and vibrotactile WALK indications, tactile arrow, and automatic volume adjustment. Other features, such as audible beaconing upon request should also be analyzed and considered during the design phase. In all cases, the face of the device and the tactile arrow should be aligned with the direction of travel on the crosswalk, not aimed at the crosswalk or aligned with the ramp orientation. This becomes increasingly important if the location of the button is compromised by some existing physical constraint that prevents the use of an 'ideal' location in an alteration.

Bulb-outs/Curb Extensions

In several design solutions, the use of bulb-outs is proposed. Extending the curb at a crossing works well at locations with on-street parking. Other design solutions suggest tapering the street width to allow additional space at the curb returns. In each of these applications, the curb has been moved closer to the centerline of the street. This will likely result in a change in the drainage flow along the street surface. Sidewalk cross slope may be improved, since it is likely

Case Study—Narrow Right-of-Way

- Two curb ramps were installed in the very narrow sidewalks at this intersection by acquiring unused right-of-way from an abutter.
- A level landing for the curb ramps and a bypass route for pedestrians continuing around the corner were created without significant cost; the city engineer reported the ROW purchase at less than $1,000.
- Still needed: detectable warnings.



Before



After



This wide Main Street in a historic town has been improved with the addition of medians and parking-lane landscaping at a midblock crossing. The curbed planters have been cut through at the crossing and along the curb to maintain drainage; the edges provide good non-visual wayfinding cues. Still needed: detectable warnings at the street edge, where there is no indication of the change from pedestrian to vehicular way.

that the roadway surface being used is more level. Some curb height may be sacrificed.

Combination Curb Ramps

The use of combination curb ramps (combining a parallel ramp in the sidewalk, a level landing for a turn, and a short perpendicular run to the street) can make the most of limited sidewalk width.

Reduced Curb Height and Installation of Bollards

Reducing curb face exposure to limit the need for a longer curb ramp can lead to vehicles riding up on the curb corners as in flush curb applications. Some jurisdictions may use bollards to avoid such incursions. If they are provided, it is critical that the bollards have high visual contrast with the background.

Extending the Curb Ramp Across the Gutter Pan

Some of the design solutions include extending the curb ramp across the gutter pan where insufficient space exists to provide both a curb ramp and a landing. In most cases, the height of the curb ramp across the gutter pan will be minimal (two inches or less) but the side slopes of this extension should be tapered out at a minimum slope of three horizontal to one vertical. Generally, placing an obstruction in



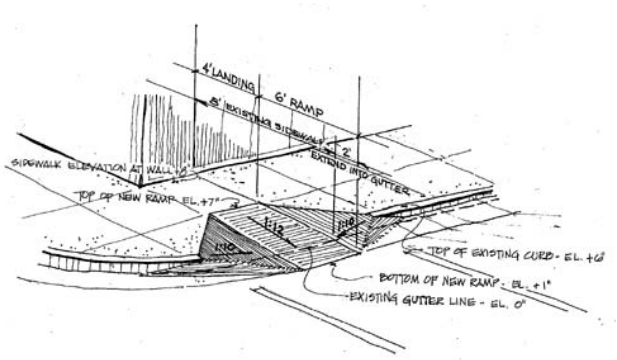
Sometimes difficult topography requires extraordinary solutions. In this photograph of an older Ohio residential neighborhood, the existing roadways are much lower than the sidewalks and separated by wide sloping lawns. New stairs and ramps—both with handrails—make the connection to the street crossing for pedestrians.

Case Study—Large Radius Corners

- Try blended transitions (running slope less than 5%) for suburban locations like this with large corner radii.
- Brick unit detectable warnings take a curve nicely and are easy to install.
- Also available: cast iron and masonry pavers with radial domes.



the flow line of the gutter is undesirable, but it is a small sacrifice for providing a suitable curb ramp and does avoid ponding at the toe, which can hide a problematic lip or freeze in cold weather. Consider the drainage impacts of the installation and consider adding a catch basin just upstream of the obstructed gutter pan. Another solution is a narrow (one inch) cast iron trench drain across the ramp toe to collect drainage.



A perpendicular curb ramp with side flares and a top landing is shown. The ramp run does not end at the curb, but extends across the gutter to meet the street at a higher elevation, making it possible to accommodate a perpendicular ramp and landing in a narrow sidewalk and eliminating the effects of the gutter counterslope. Short reverse flares extend back to the curb face.

Design Problems

The design solutions for the hypothetical problems described in the following pages have been developed in conformance with recommendations of the PROWAAC (*Building a True Community*) and the draft PROWAG published by the Access Board in November 2005. During the PROWAAC meetings, relevant MUTCD 2003 provisions were harmonized with PROWAG technical specifications, a process that continues with the preparation of the 2008 MUTCD. The Subcommittee also coordinated its work with development of the AASHTO pedestrian guide.

The problem statements are organized as five different types, based largely upon the nature of the principal constraint:

1. Limited right-of-way
2. Above-ground obstructions
3. Push buttons are not accessible
4. Excessive roadway slope
5. Underground obstructions

CONSTRAINT—LIMITED RIGHT-OF-WAY

Acquire Additional Right-of-Way

Problem Statement

Not enough room for curb ramp and landing

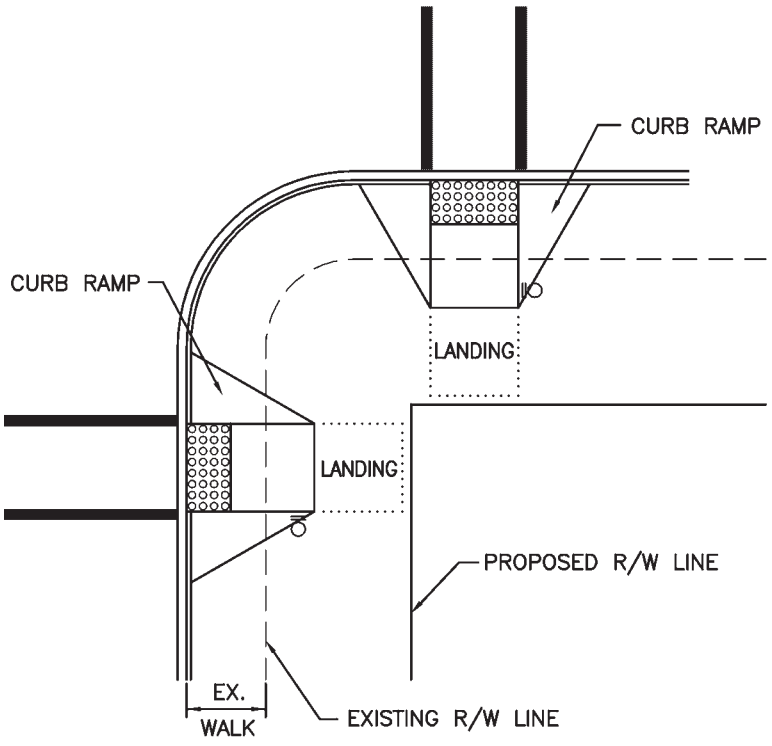
Problem and Design Solution Discussion

Existing street improvements, including vehicle lanes and sidewalks, consume the entire right-of-way. Often there is insufficient space for the installation of an accessible curb ramp and landing at a street intersection that will meet new construction standards. Increasing right-of-way width can provide sufficient space to create curb ramp and landing dimensions that provide ideal construction solutions. Often adjacent private developments in the permitting stage offer opportunities to acquire the right-of-way at no cost.

Application Considerations

- Acquire sidewalk easements.
- Acquire right-of-way dedication.
- Purchase additional right-of-way.
- Expanded sidewalk area will provide a larger area for pedestrians to gather/wait, and more room for curb ramps, landing, signal equipment, etc.
- May require alterations to building and/or other structural features located at or near corner.
- Sometimes acquisition of right-of-way is a long and costly process or not feasible.

Design Solution 1.01



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Elevate Intersection to Sidewalk Level

Problem Statement

Not enough room for landing and curb ramp slope will be too steep.

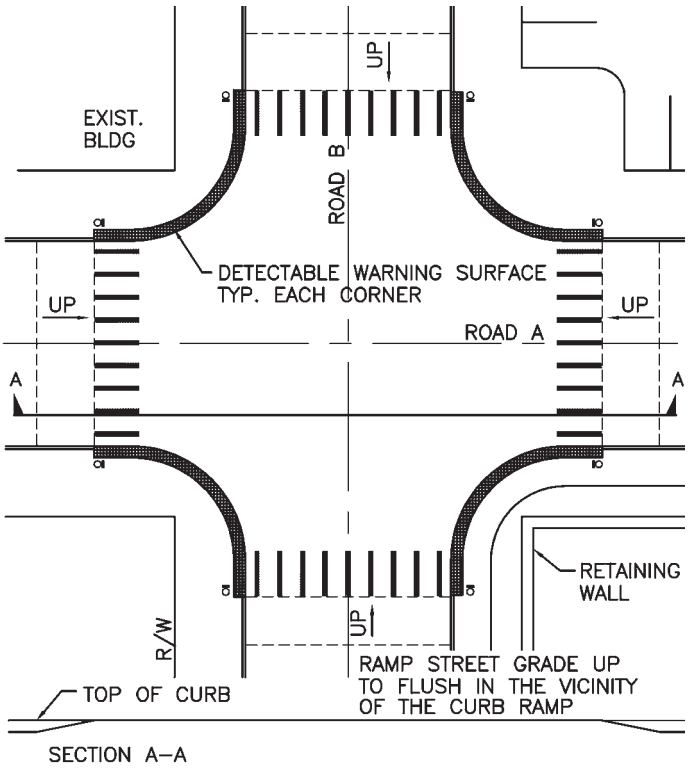
Problem and Design Solution Discussion

Existing street improvements, including vehicle lanes and sidewalks, consume the entire right-of-way. Often there is insufficient space for the installation of an accessible curb ramp and landing at a street intersection that will meet new construction standards. Another potential solution is to raise the entire street grade at the intersection to make the sidewalk elevation flush with the street elevation, thus eliminating the spatial needs for curb ramps. It is critical in this application to provide detectable warning surfaces to provide a detectable alert to blind and visually impaired travelers, which indicate that they are entering a street. Raising the entire intesection can be a wayfinding issue for the blind; raised crosswalks alone are better as blind pedestrians can recognize the curb between the raised crosswalks.

Applicacion Considerations

- Potentially increases construction costs.
- May require street drainage changes/additions.
- Continuous detectable warning surfaces are required to delineate pedestrian area from the street area.
- May require the installation of APS signal equipment.
- Consider raised crosswalks as an alternative.
- If provided, bollards should have high visual contrast to background (dark/light or light/dark).

Design Solution 1.02



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Extend Curb Ramp Over Gutter Pan

Problem Statement

Not enough room for landing and curb ramp.

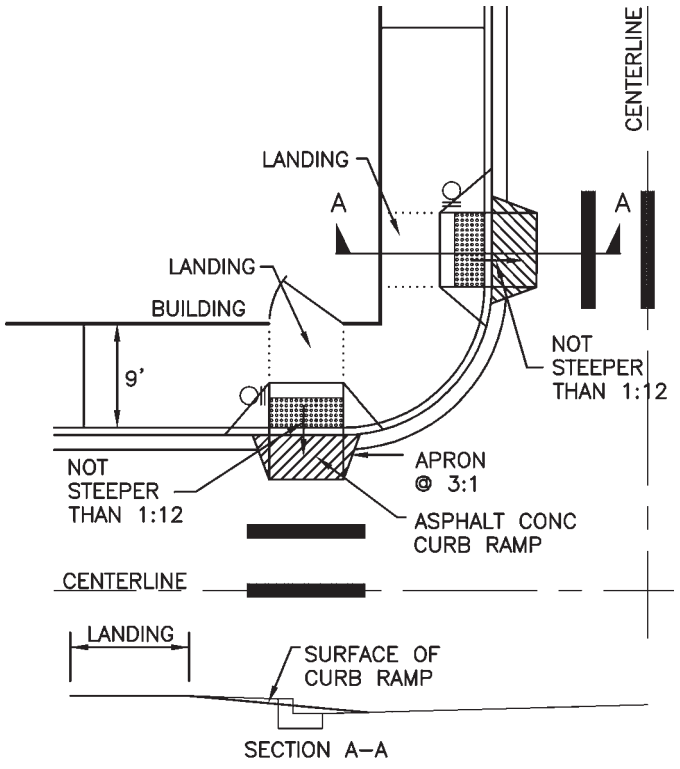
Problem and Design Solution Discussion

Existing street improvements, including vehicle lanes and sidewalks, consume the entire right-of-way. Often there is insufficient space for the installation of an accessible curb ramp and landing at a street intersection that will meet new construction standards. In this case, a building with entry is located in the area where a curb ramp needs to be constructed. As a result, the back of the sidewalk is constrained and cannot be lowered. Thus, a parallel curb ramp is not possible. A solution is to construct a curb ramp that extends through the curb and over the gutter pan.

Application Considerations

- The extension of the curb ramp through the gutter may have an impact on drainage.
- Detectable warnings must be placed at the back of curb line even though the curb ramp extends beyond this point to alert pedestrians with limited vision that they are stepping into the street.
- May require the installation of APS signal equipment.
- Avoid extending projecting curb ramp into travel lane.
- May encourage pedestrians to wait in the street portion of curb ramp.
- Stop bar may increase driver awareness of curb ramp.
- Consider using in conjunction with on-street parking to allow room for projecting curb ramp.

Design Solution 1.03



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Use Combination Curb Ramp

Problem Statement

Not enough room for landing and curb ramp.

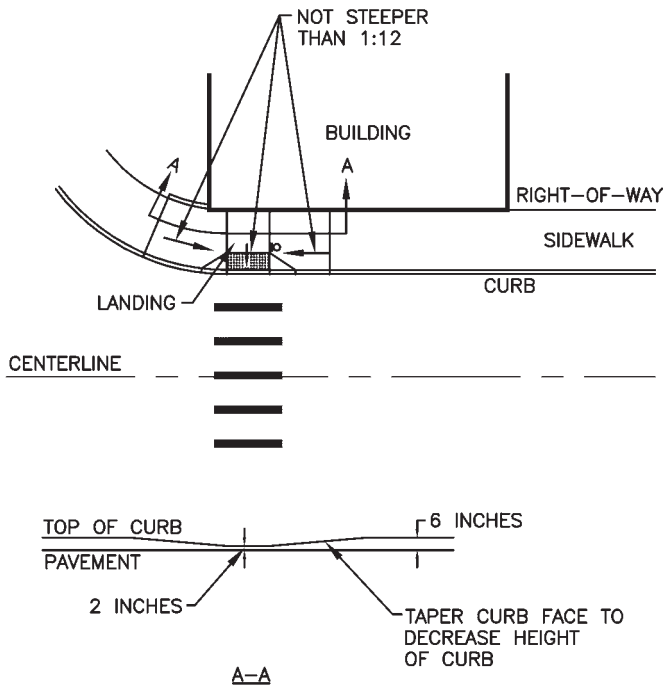
Problem and Design Solution Discussion

Existing street improvements, including vehicle lanes and sidewalks, consume the entire right-of-way. Often there is insufficient space for the installation of an accessible curb ramp and landing at a street intersection that will meet new construction standards. In this example, the combination of lowering the sidewalk and shortening the length of the curb ramp allows for sufficient space for a landing behind the curb ramp.

Application Considerations

- The face of the building must accommodate the additional exposure of lowering the sidewalk four inches in front. Detectable warning placement is important to alert pedestrians with visual impairment that they are about to cross the street.
- Providing some perpendicular ramping eliminates the potential for ponding at the landing.
- If provided, bollards should have high visual contrast to background (dark/light or light/dark).
- Placement of APS close to buildings and other hard vertical surfaces creates directional sound interpretation issues for blind pedestrians and should be avoided.

Design Solution 1.04



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Lower Sidewalk to Street Surface (Blended Transition)

Problem Statement

Not enough room for landing and curb ramp.

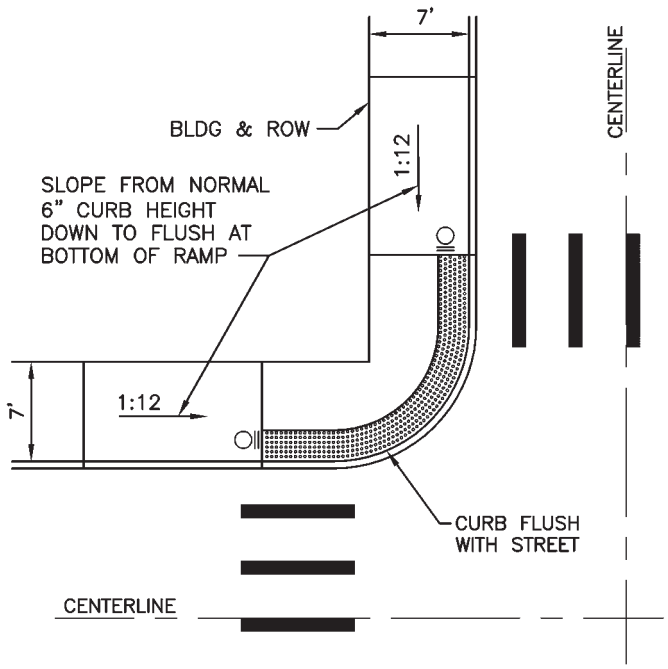
Problem and Design Solution Discussion

Existing street improvements, including vehicle lanes and sidewalks, consume the entire right-of-way. Often there is insufficient space for the installation of an accessible curb ramp and landing at a street intersection that will meet new construction standards. Another potential solution is to lower the sidewalk grade at the intersection to make the sidewalk elevation flush with the street elevation, thus eliminating the spatial needs for curb ramps. Detectable warning surfaces provide a critical message to blind travelers where the sidewalk is flush with the street.

Application Considerations

- Potentially increases construction costs.
- May require street drainage changes/additions.
- Continuous detectable warnings are required to delineate pedestrian area from the street area.
- Placement of APS close to buildings and other hard vertical surfaces creates directional sound interpretation issues for blind pedestrians and should be avoided.
- If provided, bollards should have high visual contrast to background (dark/light or light/dark).

Design Solution 1.05



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Parallel Curb Ramp

Problem Statement

Not enough room for landing and curb ramp.

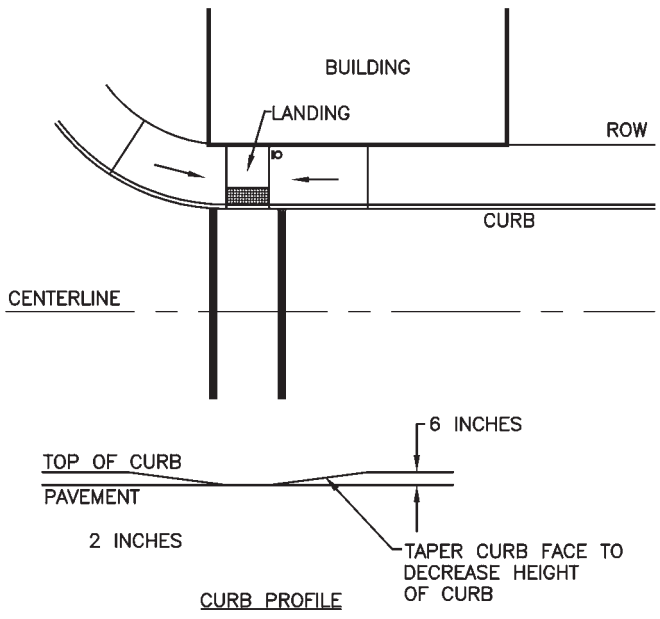
Problem and Design Solution Discussion

Existing street improvements, including vehicle lanes and sidewalks, consume the entire right-of-way. Often there is insufficient space for the installation of a perpendicular curb ramp and landing at a street intersection that will meet new construction standards. A potential solution would be to design a parallel curb ramp instead of a perpendicular curb ramp.

Application Considerations

- All users of the sidewalk will have to traverse the curb ramp. If bypassing the crossing, the user would have to descend to the landing and ascend back to the sidewalk level.
- Possible variations on the parallel curb ramp that could be used if sufficient space is available are a split sidewalk or a combination curb ramp.
- If existing drainage is poor, debris and silt can accumulate in the landing.

Design Solution 1.06



Related Design Standards

- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Reduce Street Width and Provide Combination Curb Ramp

Problem Statement

Not enough room for landing and curb ramp.

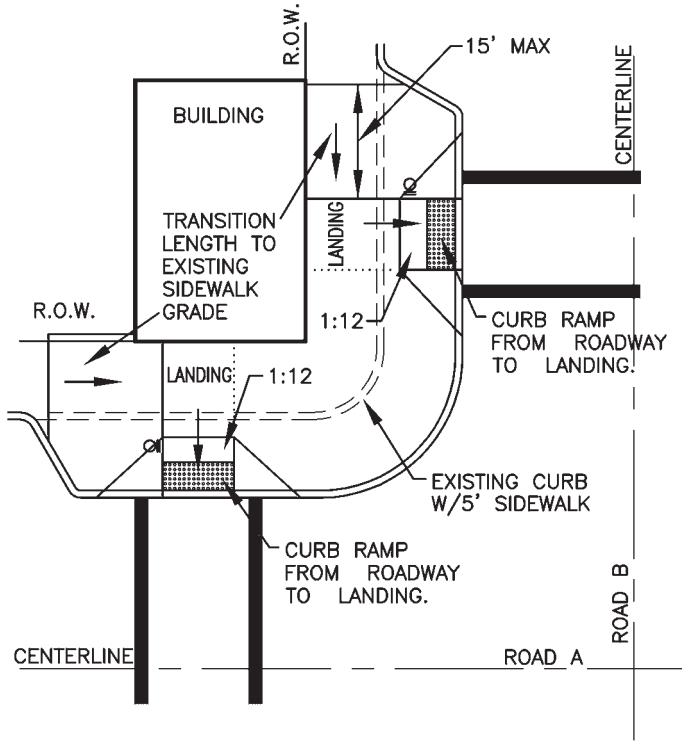
Problem and Design Solution Discussion

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners. The building location has limited the location of curb ramps and landings. Existing street improvements consume the entire right-of-way. In this example, street width has been reduced to provide adequate space to use a combination sidewalk ramp and curb ramp to achieve the required 1:12 slope from curb height to street grade.

Application Considerations

- May require street drainage changes/additions.
- Significantly increases construction costs.
- Expanded sidewalk area will provide a larger area for pedestrians to gather/wait, and more room for curb ramps, landing, and signal equipment.
- Providing curb extensions reduces roadway width, which works well if the street has on-street parking. If not, then this solution may not be possible.
- This application assumes that the sidewalk can slope adjacent to the building.
- Reduces crossing distance for pedestrians.
- Curb extensions normally provide effective traffic calming.
- The transition from the existing sidewalk to the curb ramp landing elevation is not required to exceed 15 feet in length.
- Placement of APS close to buildings and other hard vertical surfaces creates directional sound interpretation issues for blind pedestrians and should be avoided.

Design Solution 1.07



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Reduce Street Width and Provide Combination Curb Ramp

Problem Statement

Not enough room for landing and curb ramp.

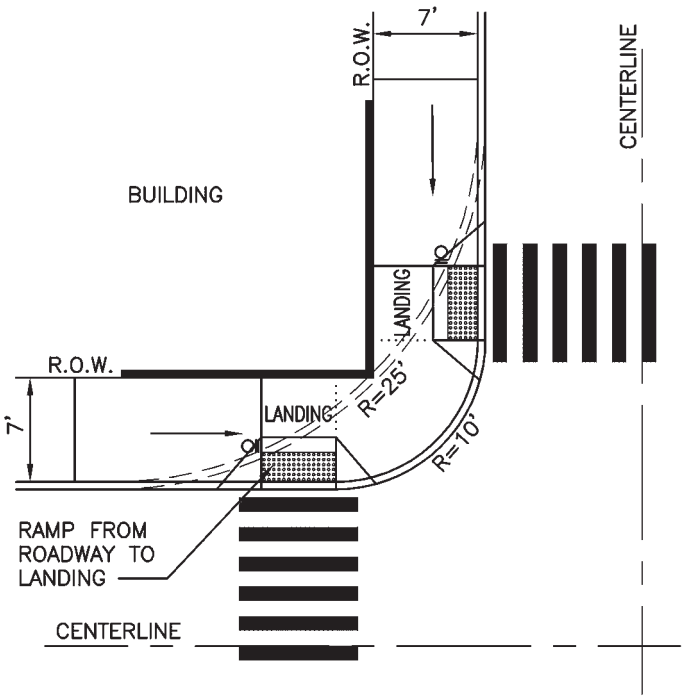
Problem and Design Solution Discussion

Existing street improvements consume the entire right-of-way. In this example, the building is built out to the right-of-way and there is inadequate space to provide curb ramps. This solution uses a reduced curb radius and combination curb ramp to accommodate the shortened perpendicular portion of the curb ramp.

Application Considerations

- Expanded sidewalk area will provide a larger area for pedestrians to gather/wait, and more room for curb ramps, landing, signal equipment.
- May require alterations to building doorways located at or near corner.
- Increases motorist's visibility of pedestrians at the corner.
- May require street drainage changes/additions and increased construction costs.
- May not accommodate all right turning vehicles. Check vehicle types for turning radius requirements. If receiving street is multi-lane, a smaller right turn radius is less problematic.
- Placement of APS close to buildings and other hard vertical surfaces creates directional sound interpretation issues for blind pedestrians and should be avoided.

Design Solution 1.08



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—LIMITED RIGHT-OF-WAY

Parallel Curb Ramps Provide Access to Parking Space

Problem Statement

Insufficient sidewalk space to accommodate a perpendicular curb ramp to serve the 13-foot wide on-street accessible parking space.

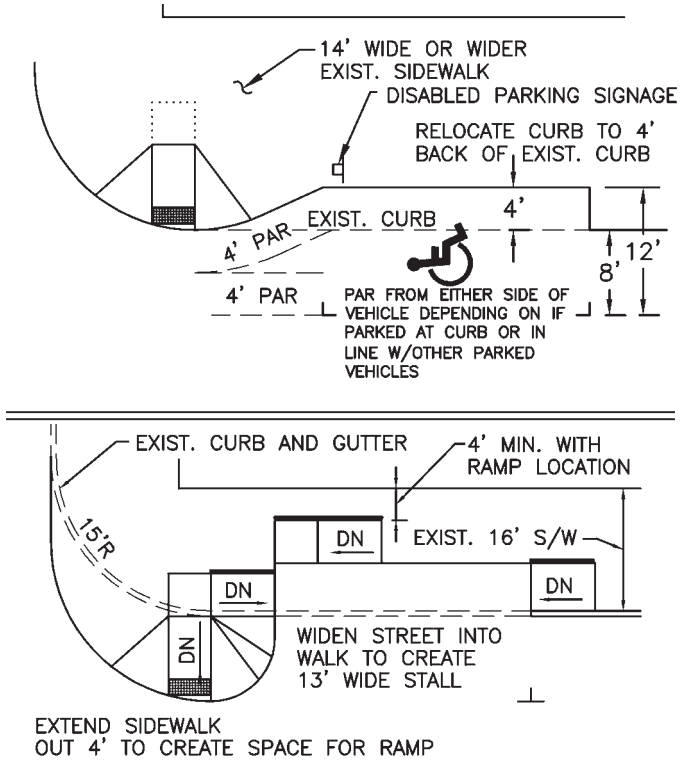
Problem and Design Solution Discussion

Accessible parking spaces with access aisles and accessible connections to the sidewalk must be provided at on-street parking locations where the existing sidewalk widths are 14 feet or greater. For sidewalks less than 14 feet in width, accessible parking spaces must be provided, but access aisles are not required. When access aisles are not provided to connect to the PAR, the accessible parking space must be located at the end of a block face to utilize the corner curb ramps. Where adequate sidewalk width exists, accessible sidewalk connections and the PAR can be created by either providing a curb extension out to the edge of the parking lane and reducing the sidewalk width to provide space for unloading and using the PAR. Another option is to simply reduce the sidewalk width by four feet and use this reduced width as the PAR and unloading area.

Application Considerations

- May require some regrading of street to accommodate revised drainage flow patterns.
- May require the addition of new storm drainage collection facilities.
- Provides ability for wheelchair and scooter users to unload on the street pavement outside of traffic lanes and have ramped connections to the sidewalk.
- Reduces the width of sidewalk available for general use.
- Parking space should be set back from the crosswalk and/or stop sign (if one exists) to maintain safe visibility.

Design Solution 1.09



Related Design Standards

- Local Municipal Parking Codes
- Local Municipal Design Standards
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Relocate Obstruction

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

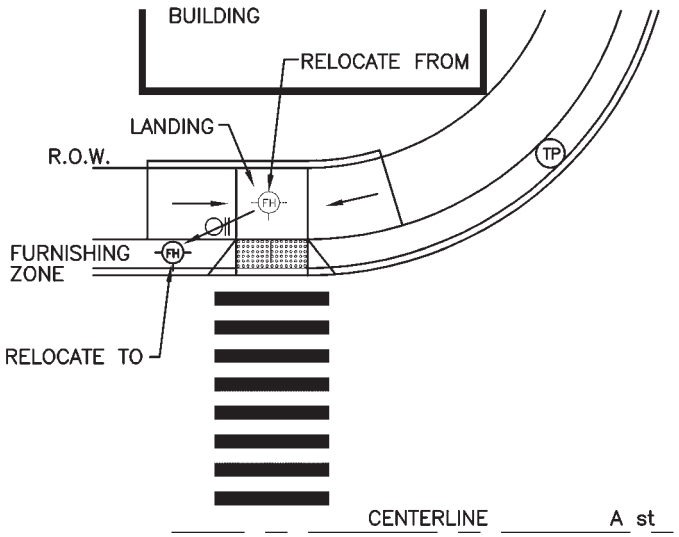
Problem and Design Solution Discussion

Existing elements at a corner cannot be eliminated. In this example, the fire hydrant was moved to a location that eliminated its interference with the curb ramp installation. Because there is insufficient space for a full landing and conventional curb ramp, some ramping is provided in the sidewalk and some ramping is provided in the furnishing area.

Application Considerations

- Increased cost to relocate existing fire hydrants, power poles, utilities, vaults, furniture, signage, etc.
- Combination curb ramp avoids conflict with stairway and provides perpendicular section of curb ramp, with related drainage benefits.
- Utility relocations can require extensive coordination.

Design Solution 2.01



Related Design Standards

- MUTCD
- AWWA
- Local Municipal Specifications and Standards

Related Design Guidelines

- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Single Curb Ramp at Apex

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

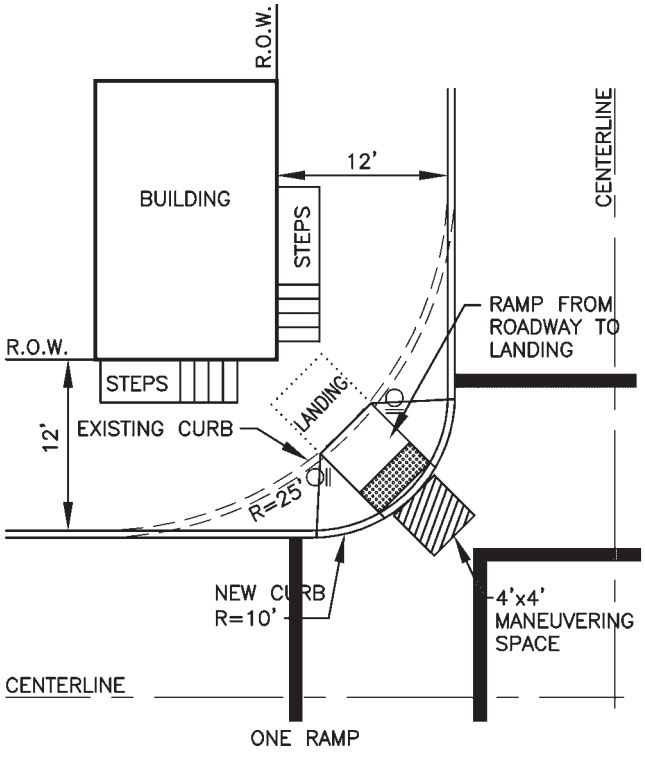
Problem and Design Solution Discussion

Obstructions in the intended paths of travel prevent the construction of a curb ramp for each direction of travel. However, the area at the apex of the corner is clear of existing obstructions. A single perpendicular curb ramp that serves both crossings may be the only alternative. Keep in mind, however, that two curb ramps, if possible, are always preferable to a single curb ramp at the apex.

Application Considerations

- Single curb ramps serving two crossings are the least preferred.
- Will not provide directional cue to pedestrians with visual impairments.
- May not accommodate all right turning vehicles. Check vehicle types for turning radius requirements. If receiving street is multi-lane, a smaller right turn radius is less problematic.
- Push buttons have been located as far apart as possible while maintaining close proximity to the crosswalk and the curb ramp landing. Separation of push buttons is desirable to clearly indicate which crossing is served by each button.

Design Solution 2.02



Related Design Standards

- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Install Combination Curb Ramp

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

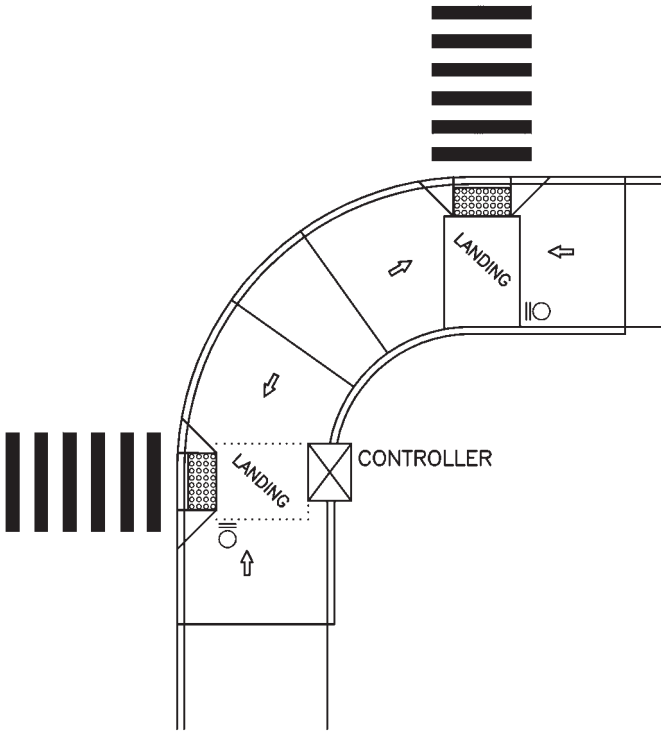
Problem and Design Solution Discussion

Placement of signal controller cabinets in the past failed to take into consideration the needs of pedestrians. Signal controller cabinets have been located for reasons of economy and convenience. Many of these units now block, or to a lesser degree, project into the PAR. If the base of the cabinet is sufficiently deep, it may be possible to use a combination sidewalk and curb ramp to achieve the appropriate layout. By ramping the sidewalk down three inches in the vicinity of the cabinet, it will be possible to reduce the length of curb ramp about three feet, thus providing adequate space for a landing.

Application Considerations

- Will require a suitable cabinet base to work around.
- Does not require acquisition of additional right-of-way.
- Does not require rewiring of the controller.
- Since APS post at back of landing would be too close to controller, move to front of landing at back of flare.

Design Solution 2.03



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Relocate Signal Control Cabinet

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

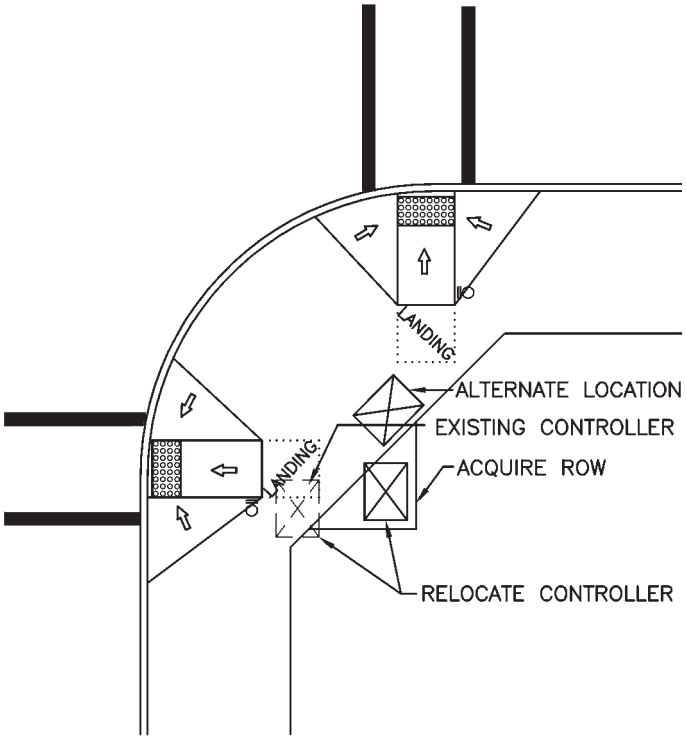
Problem and Design Solution Discussion

Placement of signal controller cabinets in the past failed to take into consideration the needs of pedestrians. Signal controller cabinets have been located for reasons of economy and convenience. Many of these units now block, or to a lesser degree, project into the PAR. The cabinet can be moved back to provide sufficient clearance for a landing at the back of the curb ramp. In this example, the sidewalk has also been extended to provide the landing space.

Application Considerations

- May require rewiring of the signal to the cabinet.
- Results in a typical curb ramp and landing installation.
- May require purchase of additional right-of-way.

Design Solution 2.04



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Relocate Signal Control Cabinet

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

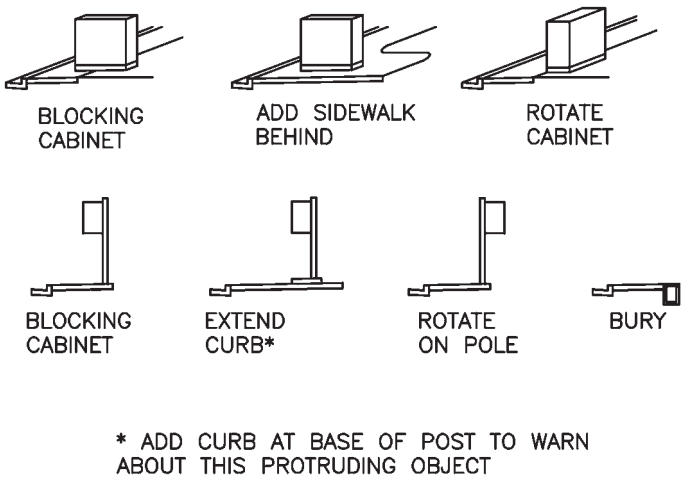
Problem and Design Solution Discussion

Placement of signal controller cabinets in the past failed to take into consideration the needs of pedestrians. Signal controller cabinets have been located for reasons of economy and convenience. Many of these units now block, or to a lesser degree, project into the PAR. When a cabinet blocks passage along a sidewalk or at an intersection, several options exist to achieve adequate clearance. Sidewalk can be extended to wrap around the back of the cabinet, or the cabinet may be rotated to provide clearance. If the cabinet is a pole-mounted cabinet, it could be relocated to a pedestal-mounted cabinet (built over a base, not mounted on the pole), or it could be rotated to be on the side of the pole that provides maximum passage clearance to the sidewalk.

Application Considerations

- If a cabinet is pole mounted more than 27 inches above the ground and projects into the traveled way, a detectable curb or other cane detectable feature must be located beneath the cabinet for detectability.
- Rotation of cabinets may require rewiring of the signal system.

Design Solution 2.05



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Use Parallel Curb Ramps

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

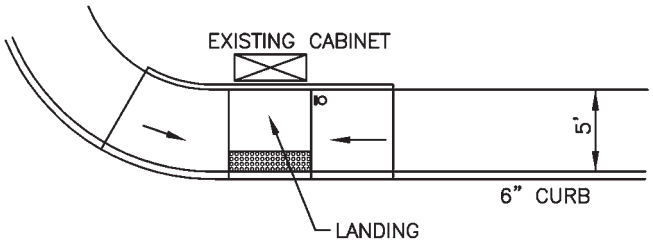
Problem and Design Solution Discussion

Placement of signal controller cabinets in the past failed to take into consideration the needs of pedestrians. Signal controller cabinets have been located for reasons of economy and convenience. Many of these units now block, or to a lesser degree, project into the PAR. If the cabinet blocks the space needed for a landing at the upper end of a curb ramp, but provides adequate width for the PAR, use of parallel curb ramps could provide an accessible corner.

Application Considerations

- Since the sidewalk will be lower adjacent to the cabinet, the cabinet base may require modification.
- Earth cover over existing conduits running to the cabinet may be less than desirable.
- Detectable warnings required to delineate pedestrian area from the street area.

Design Solution 2.06



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Add Curb Extensions/Bulb-outs

Problem Statement

Existing appurtenances limit travel space and installation of accessible landings and curb ramps at corners.

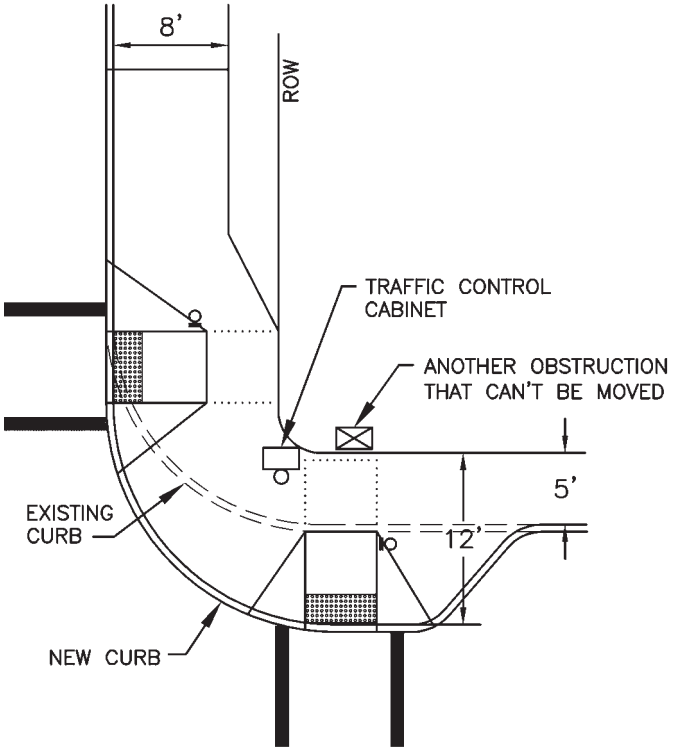
Problem and Design Solution Discussion

Placement of signal controller cabinets in the past failed to take into consideration the needs of pedestrians. Signal controller cabinets have been located for reasons of economy and convenience. Many of these units now block, or to a lesser degree, project into the pedestrian access route. Additional space for accessibility features can be created by installing curb extensions (bulb-outs) where it is possible to reduce the width of the street.

Application Considerations

- May require street drainage changes/additions.
- Significantly increases construction costs.
- Expanded sidewalk area will provide a larger area for pedestrians to gather/wait, and more room for curb ramps, landing, and signal equipment.
- Providing curb extensions reduces roadway width and this will work well if the street has on-street parking.
- Pedestrians will be more visible to motorists.
- Motorists will be more visible to pedestrians.
- Curb extensions normally provide a traffic calming effect.
- Reduces crossing distance for pedestrians.

Design Solution 2.07



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—ABOVE GROUND OBSTRUCTIONS

Provide Blended Transition

Problem Statement

Accessible curb ramps and landings constrained by features that can't be modified.

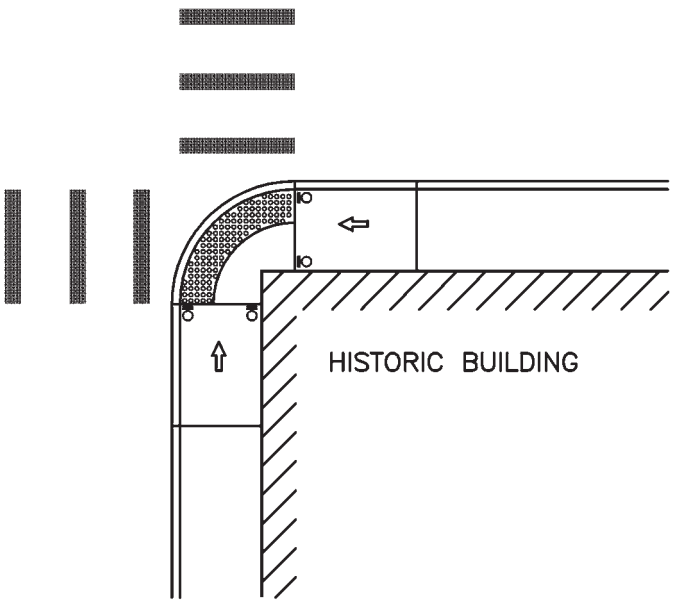
Problem and Design Solution Discussion

Existing historic features or significant trees limit travel space and the installation of accessible landings and curb ramps at corners. In this example, a historic building is located close to the curb face at the intersection. The solution here is to provide a transition ramp from each approach direction and provide a blended transition at the corner.

Application Considerations

- Will decrease pedestrian travel capacity. (Pedestrian pairs and groups will need to travel in single file.)
- Increases conflicts between pedestrians traveling in opposite directions.
- Building face/foundation must be able to accommodate changing sidewalk grades.
- A similar solution would be to raise the intersection to sidewalk level.
- More difficulty for blind travelers to determine directionality.
- For APS, provide audible message at this location since inadequate separation between push button locations makes it difficult for blind people to determine which push button guides each crossing.
- Pushbutton location either at curb or near face of building.

Design Solution 2.08



Related Design Standards

- Uniform Building Code
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—PUSH BUTTONS ARE NOT ACCESSIBLE

Add Stub Poles

Problem Statement

Pedestrian actuated signal push buttons at inappropriate locations.

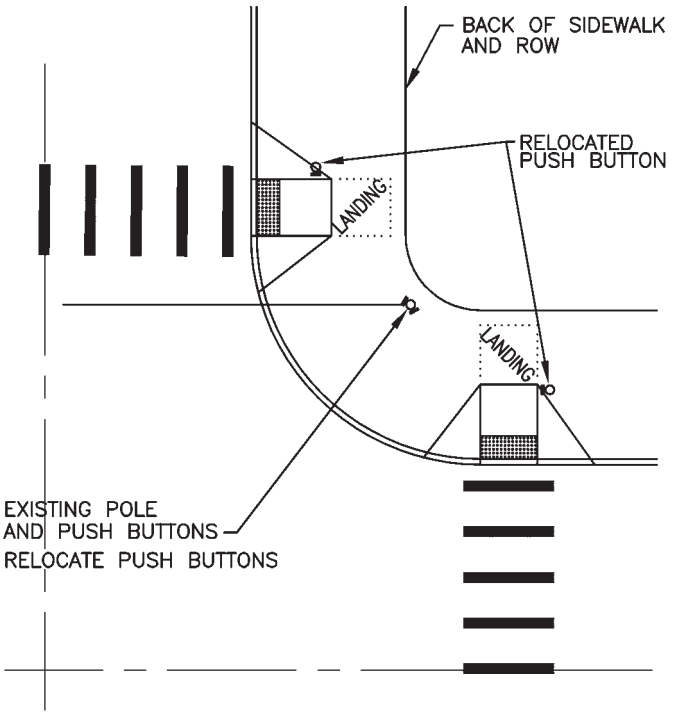
Problem and Design Solution Discussion

Pedestrian actuated push buttons are often located on a central signal pole away from the curb ramps and do not facilitate efficient use by all pedestrians, including those with disabilities. Often the travel distance from the button location to the street is excessive. Also, crossing orientation is difficult for a blind pedestrian since the locator tone and both buttons are at the same location. Installation of stub poles with APS equipment and push buttons closer to the crossing solve these problems.

Application Considerations

- Locate stub poles adjacent to level landing areas of curb ramps so wheelchair users can access buttons at a location where the wheelchair will remain stationary.
- Higher cost due to removal and replacement of sidewalk to install underground connections to stub pole.
- For parallel curb ramps, locate the stub poles at the back of sidewalk (landing).

Design Solution 3.01



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—PUSH BUTTONS ARE NOT ACCESSIBLE

Add Curb Extensions/Bulb-outs

Problem Statement

Pedestrian actuated signal push buttons not at optimal locations.

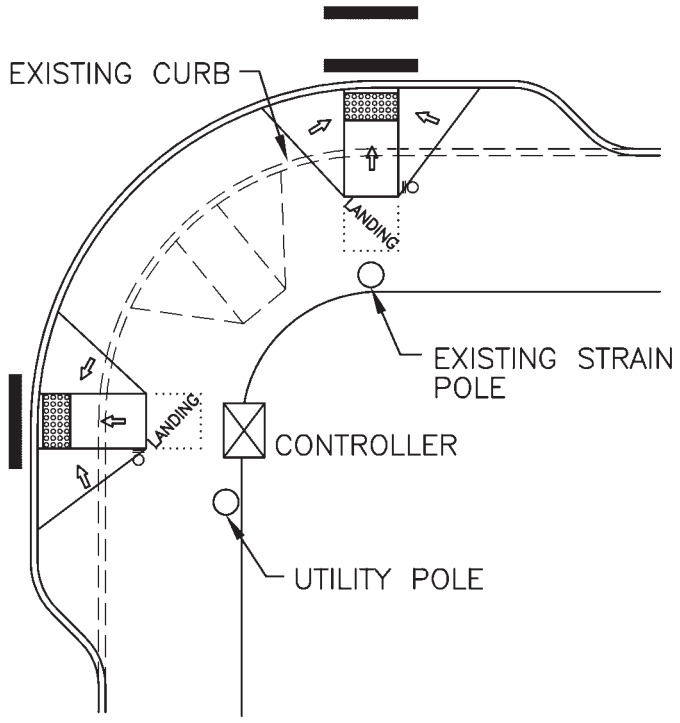
Problem and Design Solution Discussion

Pedestrian actuated push buttons are often located on a central signal pole away from the curb ramps and do not facilitate efficient use by all pedestrians, including those with disabilities. In addition, corners often become the location for multiple poles that block the installation of curb ramps. One solution is to add curb extensions at the intersection to provide sufficient space for curb ramps and stub poles for APS and push buttons.

Application Considerations

- Locate stub poles adjacent to level landing areas of curb ramps so wheelchair users can access buttons.
- Higher cost due to removal and replacement of sidewalk to install underground connections to stub pole, but also could be a cost savings compared to the cost of multiple pole relocations.
- Potential street drainage impacts.
- Reduces crossing distances and times for pedestrians.
- Pedestrians will be more visible to motorists.
- Curb extensions normally provide a traffic calming effect.
- Works well if there is on-street parking.

Design Solution 3.02



Related Design Standards

- MUTCD
- Local Codes and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—EXCESSIVE ROADWAY SLOPE

Add Curb Extensions/Bulb-outs

Problem Statement

Existing street running grade does not support level landings.

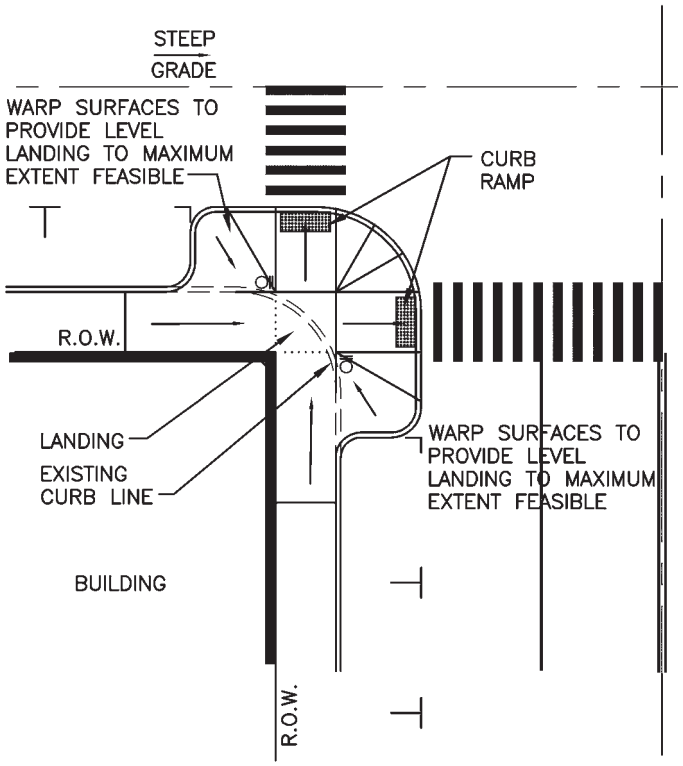
Problem and Design Solution Discussion

Street running grades in excess of 5% create challenges in the design and construction of accessible features at intersections. In some situations, the use of bulb-outs can create larger and flatter pedestrian areas at corners, which can accommodate flat landings and acceptable slopes on curb ramps.

Application Considerations

- Corner curb extensions, or bulb-outs will provide additional space and allow for construction of a level landing.
- Expanded sidewalk area will provide a larger area for pedestrians to gather/wait, and more room for curb ramps, landing, and signal equipment.
- May require alterations to building doorways located at or near corner. Improves motorist's view of pedestrians at the corner.
- Increases construction costs.
- May provide an option to alter vehicle turning geometry and increase pedestrian gathering area.
- The turning radius in this example is effectively shortened and may not accommodate all right turning vehicles. Check vehicle types for turning radius requirements. If receiving street is multi-lane, a smaller right turn radius is less problematic.

Design Solution 4.01



Related Design Standards

- MUTCD
- AASHTO
- PROWAAC
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—EXCESSIVE ROADWAY SLOPE

Problem Statement

Existing street running grade does not support level landings and acceptable crossslopes on crosswalks.

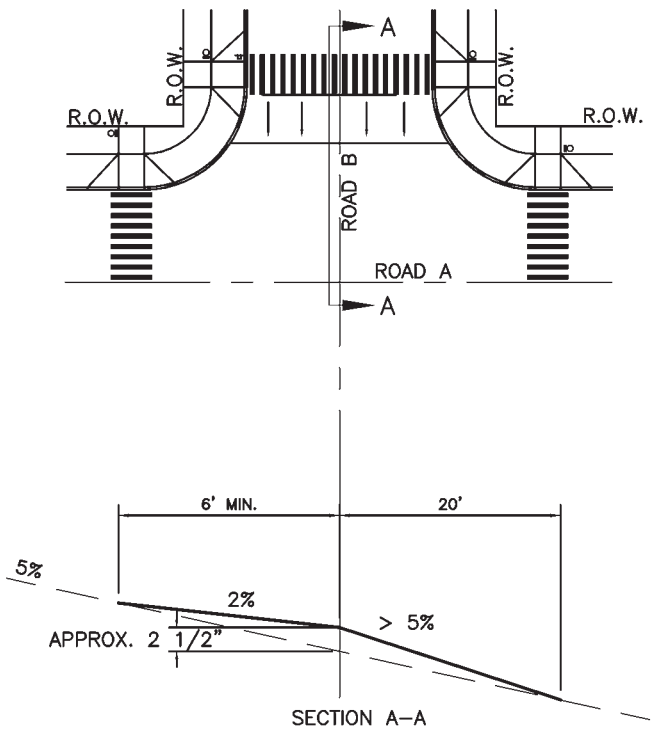
Problem and Design Solution Discussion

Street running grades in excess of 5% create challenges in the design and construction of accessible features at intersections. Modifying the street profile for the stop controlled street to 'table' the crosswalk providing a 2% or less cross slope in the crosswalk improves the crosswalk and allows for acceptable curb ramp at each end of the crosswalk. Note that the 2% cross slope only needs to be achieved within the 4-foot PAR, not across the entire crosswalk.

Application Considerations

- Revise intersection grades to create raised crosswalk.
- May create less desirable profile for vehicular traffic.
- May require street drainage changes/additions.
- Increases construction costs.
- Added difficulty in application of future pavement overlays.
- May introduce travel/grade change problems for bicycles.
- For steeper grades, longer grade transitions including vertical curves may be required.
- May have to rebuild subgrade.
- May impact drainage.

Design Solution 4.02



Related Design Standards

- MUTCD
- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—EXCESSIVE ROADWAY SLOPE

Regrade Roadway Profile to Provide Acceptable Cross Slope Across Intersection

Problem Statement

Existing street grade does not support acceptable crossslopes on crosswalks.

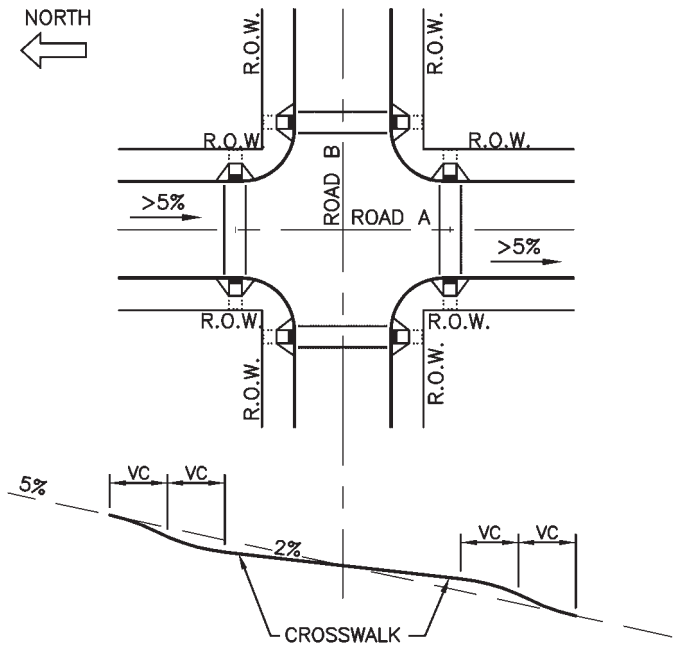
Problem and Design Solution Discussion

In this example the existing north-south leg of the intersection has a 5% grade. One solution is to table the entire intersection approaches to accommodate flattened crosswalk cross slopes for both the north and south approaches to the intersection. Ideally, the tabling would be accomplished by lowering the upper half of the intersection and raising the lower half of the intersection. The achieved grade through the intersection would be 2%.

Application Considerations

- Most appropriate when street is being reconstructed.
- Most appropriate for lower speed roadway.
- Revise entire intersection to create a level or flat surface.
- Alteration of all approaches may be necessary to vertically blend grades with the intersection.
- May require street drainage changes/additions.
- Will likely result in significant engineering and construction costs.
- Construction of flat intersection surface will potentially affect underground utilities, surface facilities, building entrances, transit facilities, and landscape features.
- More suitable with fewer lanes.

Design Solution 4.03



Related Design Standards

- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—EXCESSIVE ROADWAY SLOPE

Mill Street Crown to Reduce Crosswalk Running Slope

Problem Statement

Existing street running grade does not support accessible crossings.

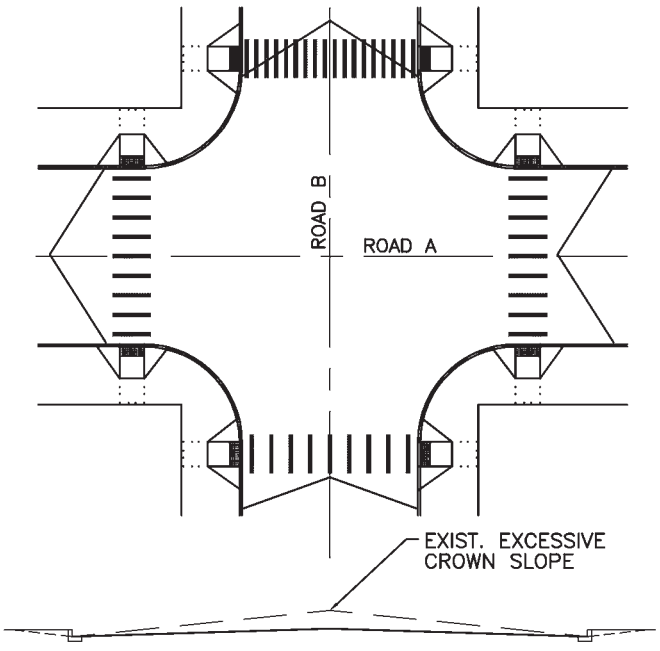
Problem and Design Solution Discussion

Many existing streets have been resurfaced several times and the resurfacing has resulted in the crown slope of the street getting steeper and steeper. As a result, crossing streets with steep crowns can become physically challenging when overlays have steepened the crown to more than 5%. One solution to reduce the crown slope and the resulting effort of a pedestrian in a manual wheelchair, is to mill the pavement surface back to a 2% crown as part of the resurfacing process.

Application Considerations

- Reduces the crossing time of a pedestrian in a manual wheelchair.
- Improves entrance and exit characteristics for vehicles parked at the curb.
- Milled asphalt concrete pavement can be recycled as base material or as part of the asphalt concrete mix.
- Increases the cost of overlay projects due to increased cost of pavement milling.
- Makes the transition from the gutter to the street crown smoother, reducing the angle point.
- Transition back to existing crown over the appropriate length of roadway for vehicular operations.
- New pavement surface must be flush with curb ramp.

Design Solution 4.04



Related Design Standards

- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO

CONSTRAINT—EXCESSIVE ROADWAY SLOPE

Provide Median Refuge Area

Problem Statement

Existing street running grade does not support accessible crossings.

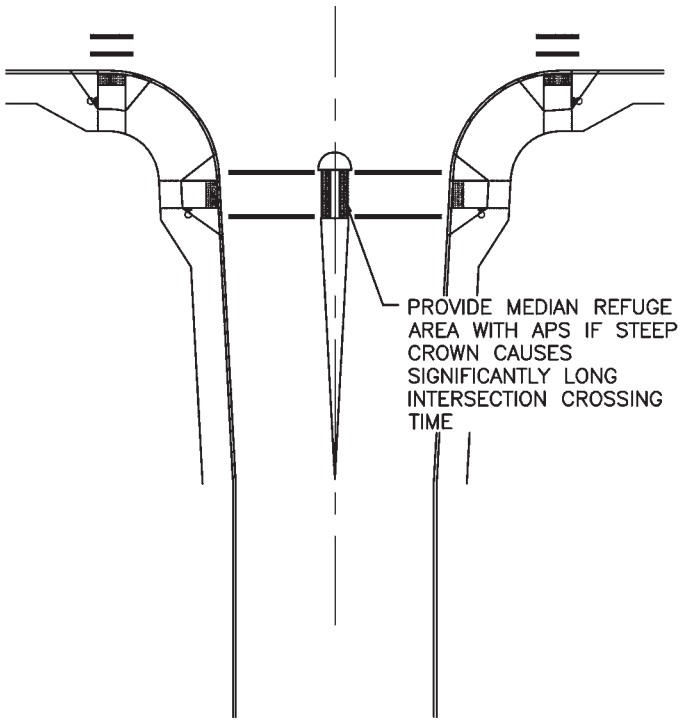
Problem and Design Solution Discussion

Many existing streets have been resurfaced several times and the resurfacing has resulted in the crown slope of the street getting steeper and steeper. As a result, crossing streets with steep crowns can become physically challenging when overlays have steepened the crown to more than 5%. If it is not feasible to re-crown the street, it may help to provide a median refuge area for pedestrians, particularly on wider streets, as the steeper cross slope causes manual wheelchair users and others with little stamina, to take more time to cross the street and expend more energy.

Application Considerations

- At signalized intersections, may allow for reduced pedestrian clearance interval since pedestrians can stop in the median.
- At signalized intersections, provide pedestrian push buttons at median refuge area.
- More benefit accrues for wider street applications.
- At uncontrolled or stop controlled intersections, provides more crossing opportunities and less waiting time for all pedestrians.
- Detectable warning surfaces are required for each edge of the refuge area.

Design Solution 4.05



Related Design Standards

- MUTCD
- Local Municipal Design Standards

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—UNDERGROUND OBSTRUCTIONS

Modify Structure

Problem Statement

Existing structures limit curb ramp alignment and usability.

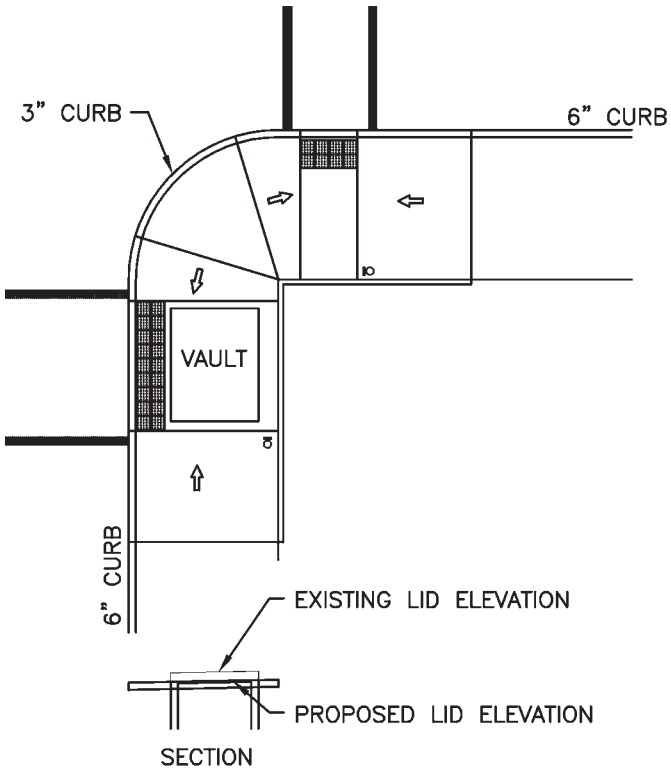
Problem and Design Solution Discussion

Existing underground obstructions limit the installation of accessible features at intersection corners. These obstructions frequently include drainage structures, basement below sidewalks, utility vaults, and other similar structures. Often, the upper portions of these structures can be modified to accept the installation of landings and curb ramps. In this example, the intersection corner has been modified to use parallel curb ramps and the interfering vault has been modified by trimming the top walls and resetting the lid at the appropriate grade.

Application Considerations

- Consult with vault manufacturer to determine if trimming sidewalls will compromise structure integrity of vault.
- Consult with utility to determine if facilities contained within the vault will interfere with the sidewall trimming.
- It is preferable to avoid locating the vault lid within the PAR. This alternative of trimming the sidewalls should only be done if it is not feasible to move the vault.
- Can be a difficult and expensive solution.
- An option would be to lower the vault lid four inches, and take up the remaining two-inch elevation change in the perpendicular portion of the combination curb ramp.

Design Solution 5.01



Related Design Standards

- Uniform Building Code
- Local Codes and Standards
- National Electrical Code

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—UNDERGROUND OBSTRUCTIONS

Relocate Existing Vault

Problem Statement

Existing structures limit curb ramp alignment and usability.

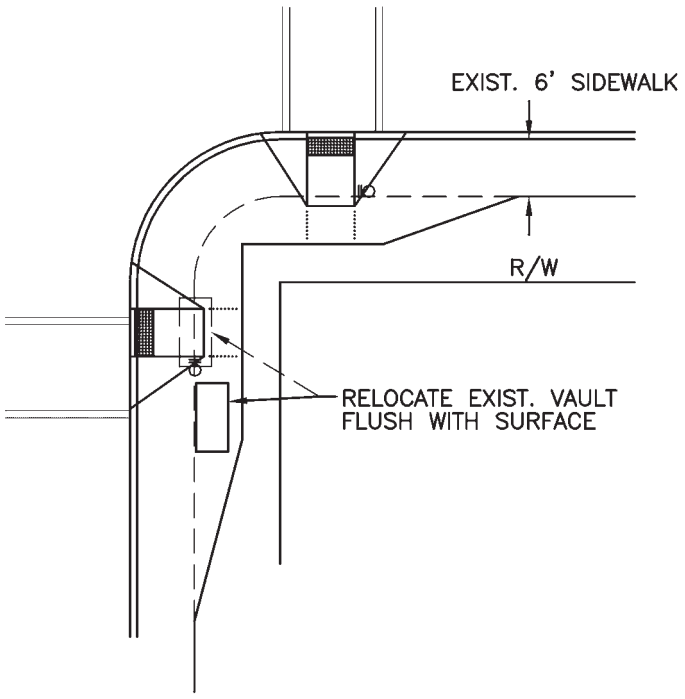
Problem and Design Solution Discussion

Existing underground obstructions limit the installation of accessible features at intersection corners. These structures frequently include drainage obstructions, basement below sidewalks, utility vaults, and other similar structures. Occasionally these structures can be relocated so that space will be available to accept the installation and far enough to allow the construction of the parallel curb ramp slope to the landing.

Application Considerations

- Can be a difficult and expensive solution.
- Preference for vault to be moved out of the pedestrian travel route to behind sidewalk, into street, or another location that keeps it out of the path of travel.
- Involvement with utility companies complicates and can slow down the implementation process.
- Often relocation of utility structures is not feasible.

Design Solution 5.02



Related Design Standards

- National Electrical Code
- Local Municipal Specifications and Standards

Related Design Guidelines

- PROWAG

CONSTRAINT—UNDERGROUND OBSTRUCTIONS

Reduce Curb Radius

Problem Statement

Existing structures limit curb ramp alignment and usability.

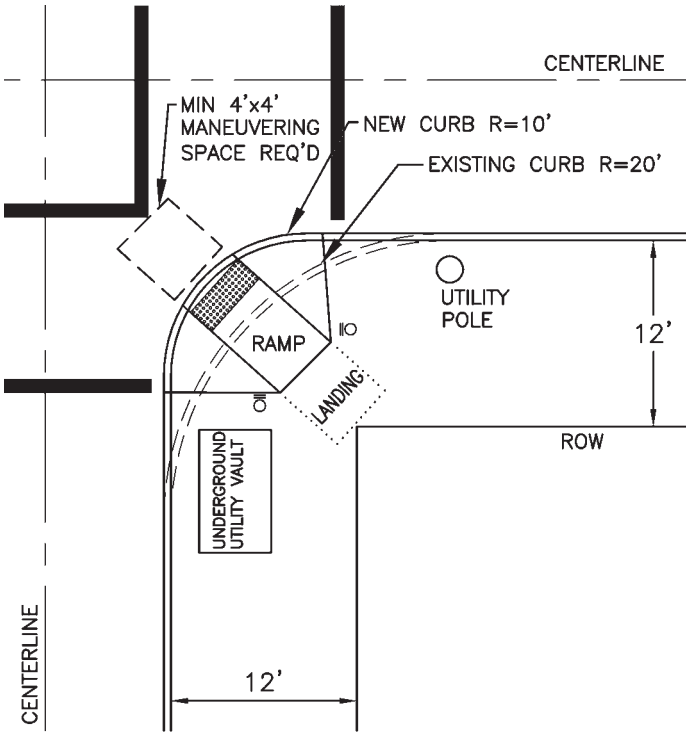
Problem and Design Solution Discussion

Existing underground obstructions limit the installation of accessible features at intersection corners. Often these obstructions cannot be modified or relocated. In this example, the large radius of the intersection combined with the location of a large underground vault has limited the ability to provide an acceptable curb ramp and landing in the south portion of the corner. The solution is to reduce the curb return radius from 20 feet to 10 feet, thus creating space for the standard curb ramp and landing, using a shared curb ramp.

Application Considerations

- Decreasing the curb radius may provide additional space and allow for construction of a level landing and curb ramps.
- Expanded sidewalk area will provide a larger area for pedestrians to gather/wait, and more room for curb ramps, landing, and signal equipment.
- Increases motorist's visibility of pedestrians at the corner.
- Verify that reduced radius can accommodate typical intersection traffic.
- Potentially increases construction costs.
- May require street drainage changes/additions.

Design Solution 5.03



Related Design Standards

- Local Municipal Design Standards
- National Electrical Code

Related Design Guidelines

- AASHTO
- PROWAG

CONSTRAINT—UNDERGROUND OBSTRUCTIONS

Use Returned Curb Ramp

Problem Statement

Existing structures limit curb ramp alignment and usability.

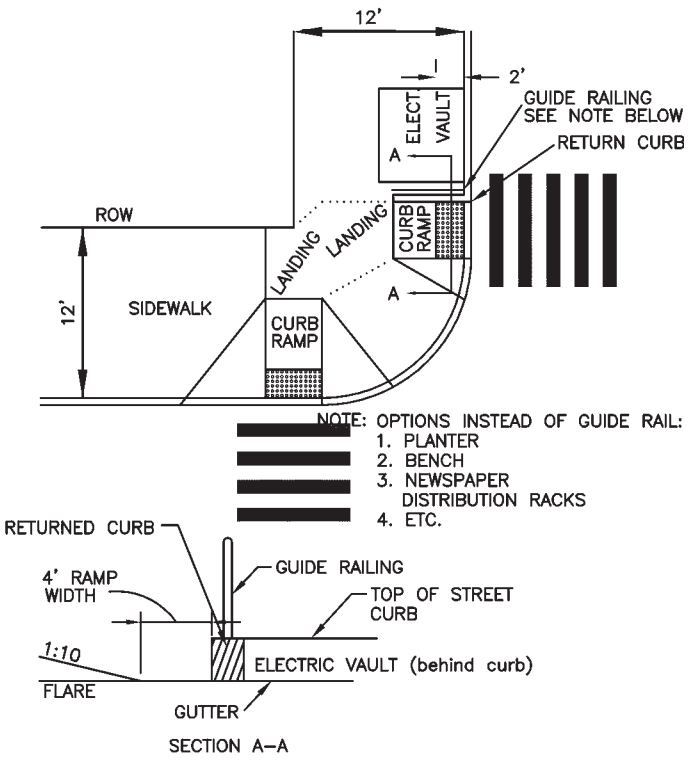
Problem and Design Solution Discussion

Existing underground obstructions limit the installation of accessible features at intersection corners. Often these obstructions cannot be modified or relocated. Flared wings of curb ramps consume a large amount of space. Where the flare would otherwise require significant modification to the location or modification to the cover of an underground facility, the use of returned curbs adjacent to the obstruction may create a curb ramp that is narrow enough to fit adjacent to existing structures. Additional railing or other physical barrier may be needed to isolate this type of curb ramp and prevent trip/fall accidents at the location of the returned curb.

Application Considerations

- Considerably less expensive than removing or modifying an underground structure.
- Depending on the size and number of existing underground structures, two individual curb ramps may not be possible.
- May result in additional maintenance cost for guide rails or other barriers used to isolate the curb ramp.
- Potentially increases construction costs.
- Provides an appurtenance close to the driving edge of the travel lane, which may be struck by an errant vehicle.

Design Solution 5.04



Related Design Standards

- Local Municipal Specifications and Standards

Related Design Guidelines

- AASHTO
- PROWAG

ACCESSIBLE PARKING SPACES GENERAL DISCUSSION

Problem Statement

Variable distribution of accessible on-street parking spaces.

Problem and Design Solution Discussion

Location and availability of parking is a critical aspect of travel. The lack of accessible parking is a barrier to arriving at a destination if a person with a disability cannot park and exit from the vehicle. Limiting accessible parking to a central location may not be effective for someone with a disability because of a lengthy distance between the parking space and desired destination. Providing ample spaces at a variety of locations allows for access to work, shopping, recreation, and other activities.

Design Considerations

- Some locations such as central business districts and civic centers may have more of a demand for accessible spaces.
- Evaluate the topography. Select locations with minimal grades and cross slopes for ease of getting in and out of vehicles and traversing the surrounding area. Van lifts need a flat area for operation.
- Analyze the condition of the surrounding curb ramps, landings, and sidewalks. Repair pedestrian elements that could be barriers.
- Analyze the surrounding area for elements such as street furniture, landscaping, parking meters, and utilities that may block a person from entering and exiting a vehicle.
- Provide space for parking larger vehicles and vans with adequate access aisle space for lifts and transferring when exiting and entering the vehicle.

Case Study—No 'Good' Location for Curb Ramp

- An existing storm sewer inlet made optimal location of an opposite side curb ramp problematic. The new curb ramps adjoin the two new APS signal posts on this corner and are situated at the edge of the marked crosswalk farthest from the center of the intersection.
- An 'all-red' signal enables crossing pedestrians to use the other curb ramp on the corner. Right turn on red is prohibited; signals and markings are installed for diagonal crossing.
- An APS is needed to provide the necessary cue to crossing phase, since there is no parallel traffic stream to provide that information. Also needed: detectable warnings.





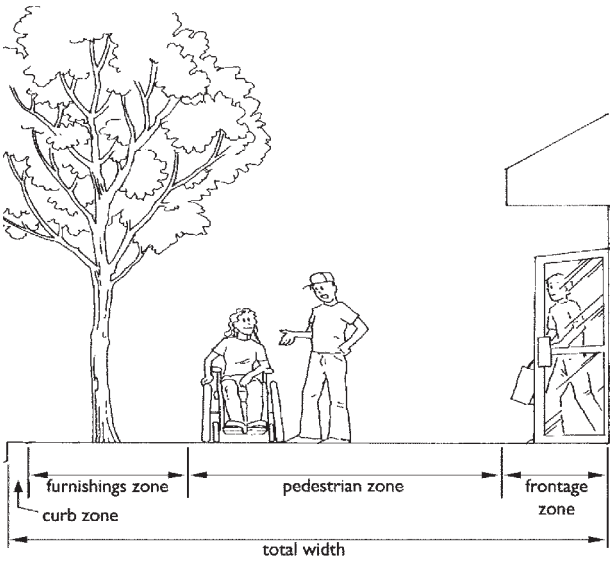
MODEL SIDEWALKS

by Gina Hilberry, AIA, Cohen Hilberry Architects; Elizabeth Hilton, PE, TXDOT; William Prosser, FHWA; Lukas Franck, The Seeing Eye

Introduction

The purpose of this section is to illustrate the basic elements comprising the public right-of-way and look at the sidewalk environment as a whole. To effectively design and/or alter the public right-of-way, the components must be analyzed in relationship to each other. The inter-relationships of existing slopes and objects, vehicular demands, timing requirements, and pedestrian needs can create a challengingt design context.

In many jurisdictions, the right-of-way is divided into four zones: the frontage zone, the pedestrian zone, the furnishing zone, and the curb zone. The frontage zone is the strip along the inside (non-vehicular) edge and is frequently the location for signage, building-related construction (e.g. ramps, walls, and entries) and other pedestrian amenities. The pedestrian zone includes the PAR as described below. The furnishing zone is adjacent to the curb line and is the location most frequently used for bus stops, parking meters, utility connections, light poles, and similar appurtenances. The curb zone is literally the top of the curb.



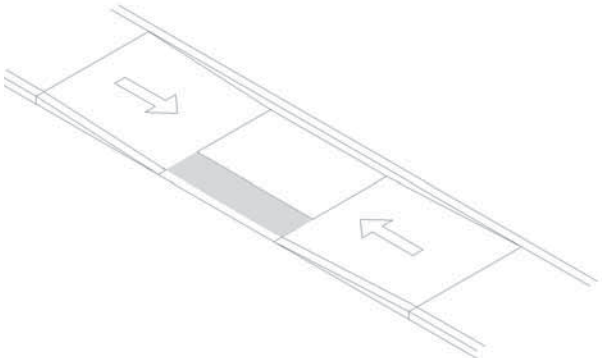
This illustration from "Designing Sidewalks and Trails for Access" shows the divisons of sidewalk width by function—furnishings zone, pedestrian zone, and frontage zone.

Understanding the terminology and the requirements that relate to each of the major components of the pedestrian environment is the first step toward development of a successful design system that addresses the public right-of-way as a whole. The components that are illustrated in this chapter include:

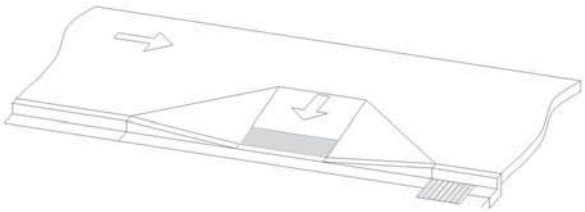
- **Public right-of-way**: land or property, usually in a corridor, that is acquired for or devoted to transportation purposes.
- **Sidewalk**: that portion of a public right-of-way between the curb line or lateral line of a roadway and the adjacent property line that is improved for use by pedestrians. Total sidewalk width is the surfaced (paved) area measured from back of curb to right-of-way line.
- **Curb line**: a line at the face of the curb that marks the transition between the sidewalk and gutter or roadway.
- **PAR**: an accessible corridor for pedestrian use within the pedestrian zone of the public right-of-way. The PAR is the path that provides continuous connection from the public right-of-way to building or property entry points, parking areas, public transportation, and/or other destinations. This route should be firm, stable, and slip-resistant and should comply with maximum cross slope requirements. All transitions (e.g. from street to ramp, ramp to landing) must be flush and free of changes in level. The PAR should be at least four feet wide, although five feet is preferred since it provides adequate space for two pedestrians to pass and space for two pedestrians traveling in the same direction to walk side-by-side. A five-foot PAR width eliminates the need to provide passing areas at 200-foot intervals and is a more comfortable walking environment. For many users, a path of reduced vibration significantly increases the accessibility of the environment. Decorative pavers, beveled edges, and other surface treatments can create a painfully bumpy surface and are best used at edges. The PAR should also be free of obstacles and protrusions.
- **Detectable warnings**: a surface feature built in or applied to walking surfaces or other elements to warn of hazards on a circulation path. The warning feature should be six inches back from the curb line, at least 24 inches deep and extend

over the entire side-to-side surface of the ramp or blended transition. The pattern and spacing of the detectable warning surface is described in section R304 of the Draft PROWAG. The detectable warning surface must be in visual contrast to the surrounding ramp surfaces.

- **Curb ramps**: short ramps cutting through a curb or built up to it. The locations and shapes of the ramped surfaces define the types that are generally used. Ramp edges may be either flared or returned, although if edge returns are used, the adjacent surface should not be a pedestrian circulation path. Ramps have four-foot by four-foot landings at top and bottom, although five-foot by five-foot is preferable. Ramp flares can not be considered part of the PAR.



Parallel curb ramps have the running slope parallel to the curb line.



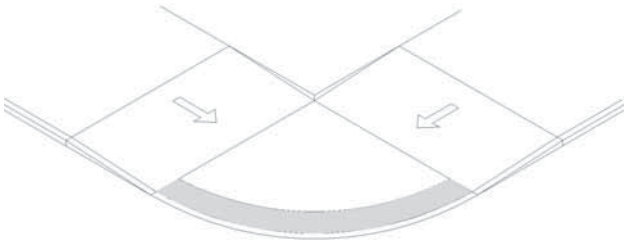
Perpendicular curb ramps have the running slope perpendicular to the curb line.

Case Study—Wayfinding at Roundabouts

- In this conversion to a roundabout, landscaping separates and delineates the pedestrian route, providing guidance to the crosswalk location for pedestrians who are visually impaired.
- Detectable warnings are correctly installed in pairs, clearly defining the pedestrian refuge space at the splitter island.
- Crosswalk is well-marked for contrast (although its brick surface will be high-maintenance.)







Blended transitions are situations where either the entire sidewalk has been brought down to the street or crosswalk level or the street has been brought up to the sidewalk level.

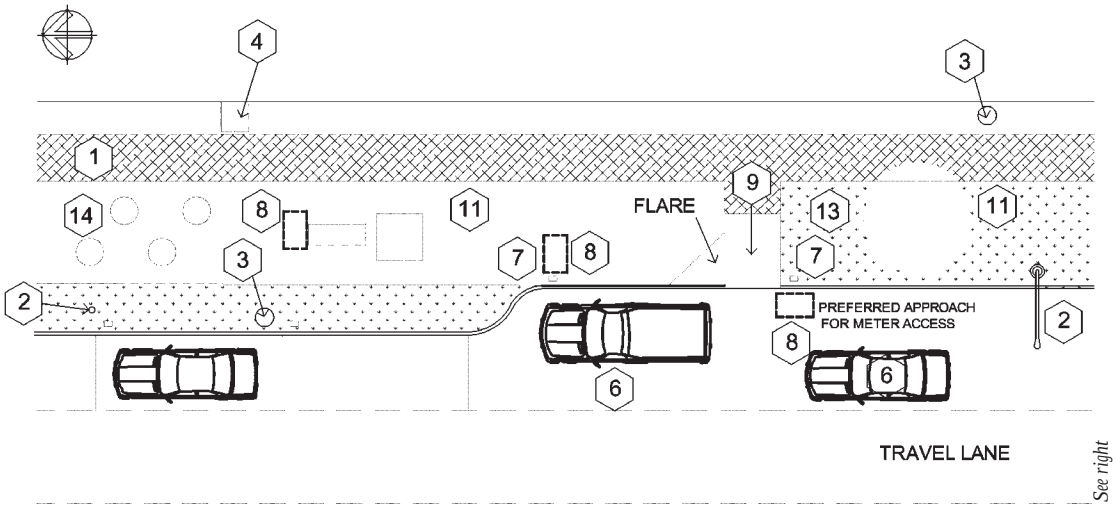
Combinations of these types of ramps can be used effectively. For additional examples of the shapes and combinations, see Chapter 6, Curb Ramp Examples. The models that are presented in this chapter begin with an illustration of a nearly ideal 15- to 20-foot-wide sidewalk section in an urban area. The width of the right-of-way permits easy development of a five-foot-wide PAR with plenty of area left for bus stops, outdoor furnishings, tree areas, accessible parking, utility poles, hydrants, and other elements. The width of the PAR is constrained in each succeeding model illustrating typical relationships of the same elements in 12-foot, 8-foot, and 4- to 5-foot-wide pedestrian zone conditions. All sidewalks are measured from the back of the curb to the edge of the right-of-way. These illustrations are not intended to be an exhaustive analysis of all possible solutions to the problem posed by narrow right-of-way conditions, but rather to begin the process of suggesting alternates and methods for prioritizing improvements.

Case Study—Parallel Curb Ramps and Road Grade



- The parallel curb ramp shown was placed into a sidewalk/roadway with an existing grade of approximately 4%. The design thus called for a longer uphill ramp run from the central landing than required for the downhill ramp run to achieve acceptable ramp slopes.
- Both ramp runs slope at 8.3% maximum. On a steeper roadway, it may be necessary to limit the longer ramp run to avoid 'chasing grade' indefinitely. PROWAAC suggests 15 feet as a practical limit.
- Still needed: detectable warnings

15- TO 20-FOOT CURB TO RIGHT-OF-WAY LINE



See right

1. PAR (Pedestrian Access Route)
- 4-foot-wide minimum, 5-foot width recommended.
- Set PAR back from curb to allow for street furnishings and pedestrian comfort.
- Set PAR back from building face/right-of-way line.

2. Utility Pole/Street Light
- Locate between curb and improved area, well outside PAR.
- Locate outside the recommended horizontal clearance to obstructions, 18 inches from face of curb minimum.

3. Utility Meter/Underground Vault/Manhole
- Locate outside PAR in furniture or frontage zones.
- Grates and covers should comply with surface characteristics guidelines if located within the pedestrian circulation path.

4. Hatch (At-grade Access Door for Deliveries and Access to Building)
- Locate between PAR and building in frontage zone.

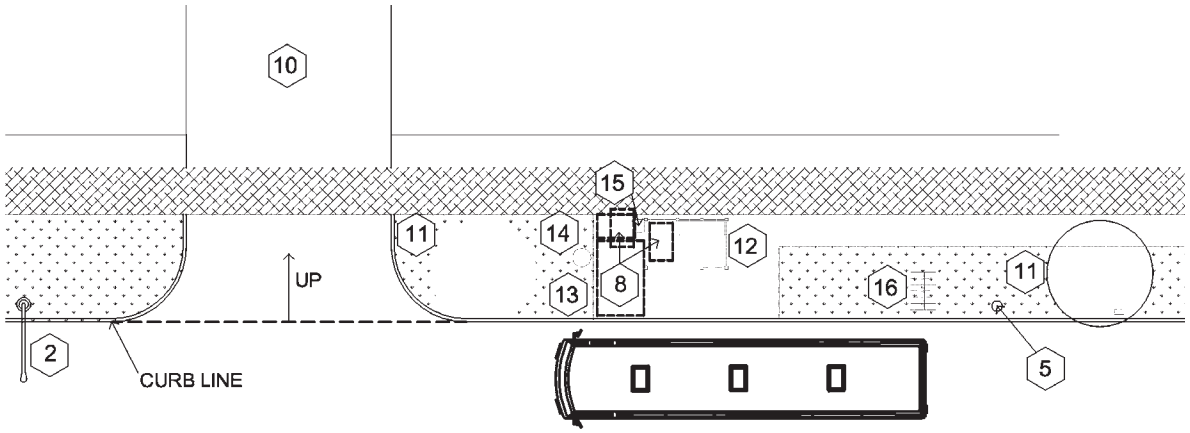
5. Fire Hydrant
- Locate outside PAR, typically in furnishing zone.

6. Accessible Parallel Parking
- Locate in most level area of block (recommended practice) to maximize usability.
- Provide 8 feet of space with 5-foot minimum obstruction-free access aisle adjacent to space for parallel parking.
- Curb line shifts toward right-of-way to accommodate access aisle.
- Space and access aisle should have smooth surface for lift deployment. Minimize cross slope for lift operation.

7. Parking Meter for Accessible Space
- Locate at head of space or other nearby area with accessible connection to PAR and access aisle.
- Instructions visible from 40-inch height at center of clear approach area.
- Coin drop at 48-inch maximum height.

8. Clear Approach Area
- Minimum 30-inch by 48-inch obstruction-free area centered on object being used (e.g. meter, phone).
- Slope area less than 2% in all directions.
- Space should be firm, stable, and slip-resistant.

9. Curb Ramp
- 4-foot-wide (minimum) ramp.
- 1:12 maximum grade on ramp.
- Connect to PAR and to access aisle.
- Provide side flare at 1:10 maximum on both sides of curb ramp where adjacent to improved surface. A returned curb can be used where the curb ramp is adjacent to landscaping other than non-walking surface. No detectable warning is used where ramp connects PAR to an access aisle or other non-vehicular surface.
- Landing can overlap PAR.



See left

10. Driveway
- Maintain PAR elevation across driveway.
- Provide good visibility and sight distance for pedestrians and vehicles.
- Detectable warnings at the pedestrian crossing should be provided only if driveway or alley is signalized.

11. Tree
- Avoid species known to produce surface roots, which may buckle sidewalk.
- Keep tree grates clear of PAR.
- Trim low hanging limbs to avoid creating protruding objects (hazardous especially to visually impaired pedestrians). Use species that do not obstruct sightlines for pedestrians and vehicle operators.

12. Bus Stop and Shelter
- Provide bus boarding and alighting area 5-feet-wide by 8-feet-deep (minimum from curb) for lift deployment.
- Connect waiting and boarding areas to PAR.
- If there is a bench, provide a 30-inch by 48-inch clear approach area adjacent to the bench and connected to bus boarding and alighting area.
- Keep signage from protruding into clear approach areas and/or PAR.
- Provide raised and Braille characters for route identification only (schedules, timetables, and maps are not required to have raised and Braille characters).
- For all signage (including schedules, timetables and maps) comply with current ADAAG for finish and contrast, case, style, character proportions and spacing, and stroke thickness.

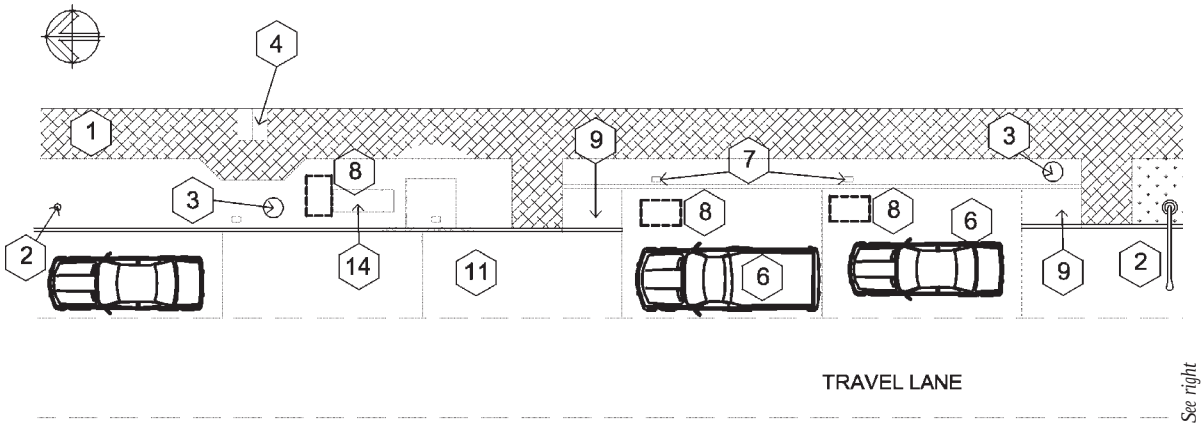
13. Landscaping
- Maintain appropriate sight distances. Use low ground cover and similar plantings so as to not obstruct sightlines for pedestrians and vehicle operators.

14. Sidewalk Furnishings, Trash Receptacle, and Similar Items
- Locate outside PAR.
- 30-inch by 48-inch clear approach area adjacent to benches and tables connected to the PAR.
- Trash receptacle openings within reach range requirements.

15. Telephone
- 30-inch by 48-inch clear approach area that may overlap with other clear spaces.
- Provide phone that complies with TTY and is accessible to wheelchair users.

16. Bike Rack
- Locate outside PAR.
- Orient so bikes on rack are not encroaching on PAR.

12-FOOT CURB TO RIGHT-OF-WAY LINE



See right

1. PAR (Pedestrian Access Route)
- 4-foot-wide minimum, 5-foot width recommended.
- Set PAR back from curb to allow for street furnishings and pedestrian comfort.
- PAR is adjacent to the building face/right-of-way line (no frontage zone).

2. Utility Pole/Street Light
- Locate between curb and improved area, well outside PAR.
- Locate outside the recommended horizontal clearance to obstructions, 18 inches from face of curb minimum.

3. Utility Meter/Underground Vault/Manhole
- Locate outside PAR in furniture or frontage zones.
- Grates and covers should comply with surface characteristics guidelines if located with pedestrian circulation path.

4. Hatch (At-grade Access Door for Deliveries and Access to Building)
- Offset PAR as needed to provide minimum 4-foot path around the hatch.

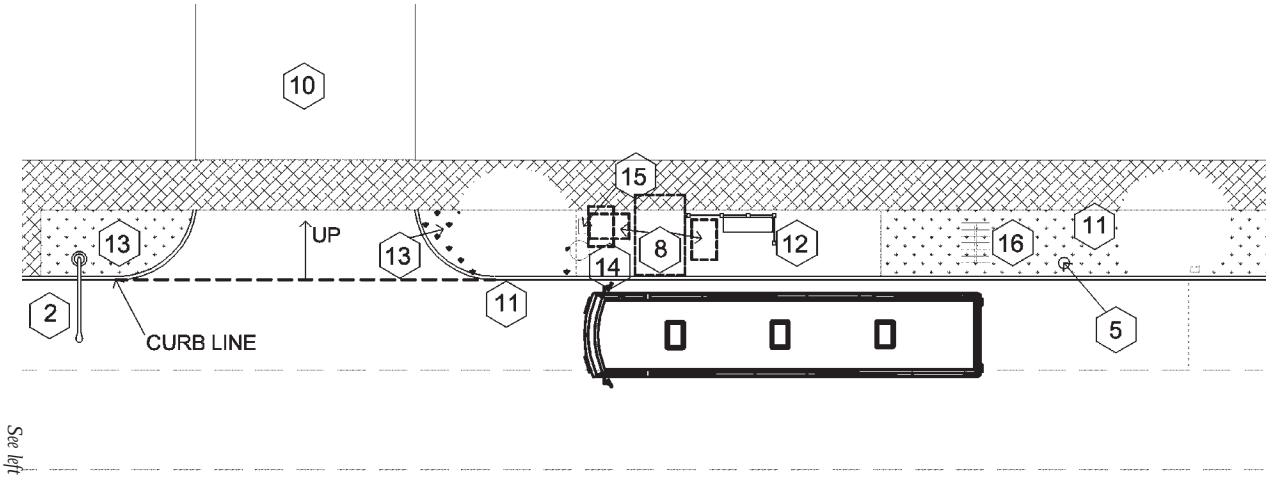
5. Fire Hydrant
- Locate outside PAR, typically in furnishing zone.

6. Accessible Parallel Parking
- Locate in most level area of block (recommended practice) to maximize usability.
- Provide 8 feet of space with 5-foot minimum obstruction-free access aisle adjacent to space for parallel parking.
- Curb line shifts toward right-of-way to accommodate access aisle.
- Space and access aisle should have smooth surface for lift deployment. Minimize cross slope for lift operation.

7. Parking Meter for Accessible Space
- Locate at head of space or other nearby area with accessible connection to PAR and access aisle.
- Instructions visible from 40-inch height at center of clear approach area.
- Coin drop at 48-inch maximum height.

8. Clear Approach Area
- Minimum 30-inch by 48-inch obstruction-free area centered on object being used (e.g. meter, phone).
- Slope area less than 2% in all directions.
- Space should be firm, stable, and slip-resistant.

9. Curb Ramp
- 4-foot-wide (minimum) ramp.
- 1:12 maximum grade on ramp.
- Connect to PAR and to access aisle.
- Parallel-type ramps required due to limited available right-of-way width.
- Landing can overlap PAR.



10. Driveway
- Maintain PAR elevation across driveway.
- Provide good visibility and sight distance for pedestrians and vehicles.
- Detectable warnings should be provided only if driveway or alley is signalized.

11. Tree
- Avoid species known to produce surface roots, which may buckle sidewalk.
- Keep tree grates clear of PAR.
- Trim low hanging limbs to avoid creating protruding objects (hazardous especially to visually impaired pedestrians). Use species that do not obstruct sightlines for pedestrians and vehicle operators.

12. Bus Stop and Shelter
- Provide bus boarding and alighting area 5-feet-wide by 8-feet-deep (minimum from curb) for lift deployment.
- Connect waiting and boarding areas to PAR.
- If there is a bench, provide a 30-inch by 48-inch clear approach area adjacent to the bench and connected to bus boarding and alighting area.
- Keep signage from protruding into clear approach areas and/or PAR.
- Provide raised and Braille characters for route identification only (schedules, timetables, and maps are not required to have raised and Braille characters).
- For all signage (including schedules, timetables and maps) comply with current ADAAG for finish and contrast, case, style, character proportions and spacing, and stroke thickness.

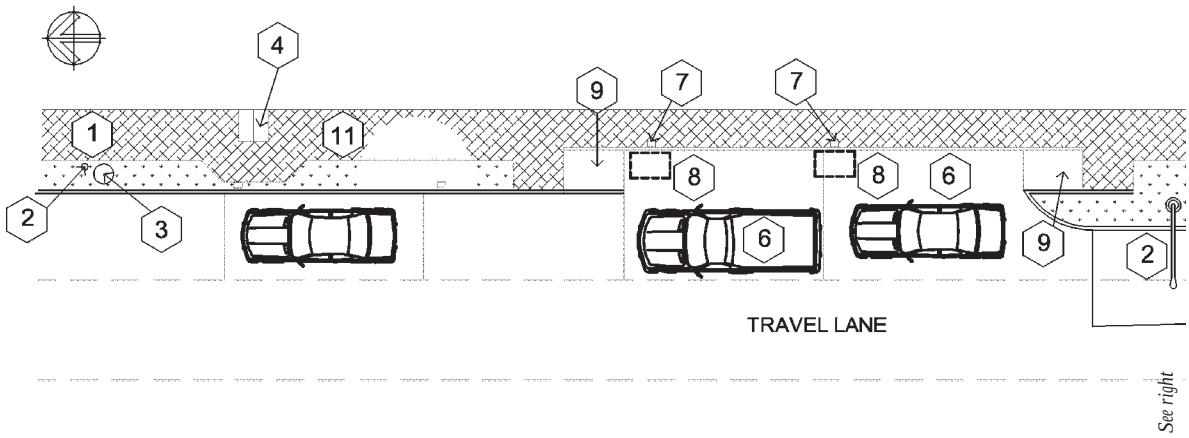
13. Landscaping
- Maintain appropriate sight distances. Use low ground cover and similar plantings so as to not obstruct sightlines for pedestrians and vehicle operators.

14. Sidewalk Furnishings, Trash Receptacle, and Similar Items
- Locate outside PAR.
- 30-inch by 48-inch clear approach area adjacent to benches and tables connected to the PAR.
- Trash receptacle openings within reach range requirements.

15. Telephone
- 30-inch by 48-inch clear approach area that may overlap with other clear spaces.
- Provide phone that complies with TTY and is accessible to wheelchair users.

16. Bike Rack
- Locate outside PAR.
- Orient so bikes on rack are not encroaching on PAR.

8- TO 9-FOOT CURB TO RIGHT-OF-WAY LINE



1. PAR (Pedestrian Access Route)
- 4-foot-wide minimum, 5-foot-width recommended.
- Set PAR back from curb to allow for street furnishings and pedestrian comfort.
- PAR is adjacent to the building face/right-of-way line (no frontage zone).

2. Utility Pole/Street Light
- Locate between curb and improved area, well outside PAR.
- Locate outside the recommended horizontal clearance to obstructions, 18 inches from face of curb minimum.

3. Utility Meter/Underground Vault/Manhole
- Locate outside PAR in furniture or frontage zones wherever possible.
- When in the sidewalk area, grates, and covers should have firm, stable, and slip resistant covers that are free from level changes.

4. Hatch (At-grade Access Door for Deliveries and Access to Building)
- Offset PAR as needed to provide minimum 4-foot clear path around the hatch.

5. Fire Hydrant
- Locate outside PAR, typically in furnishing zone.

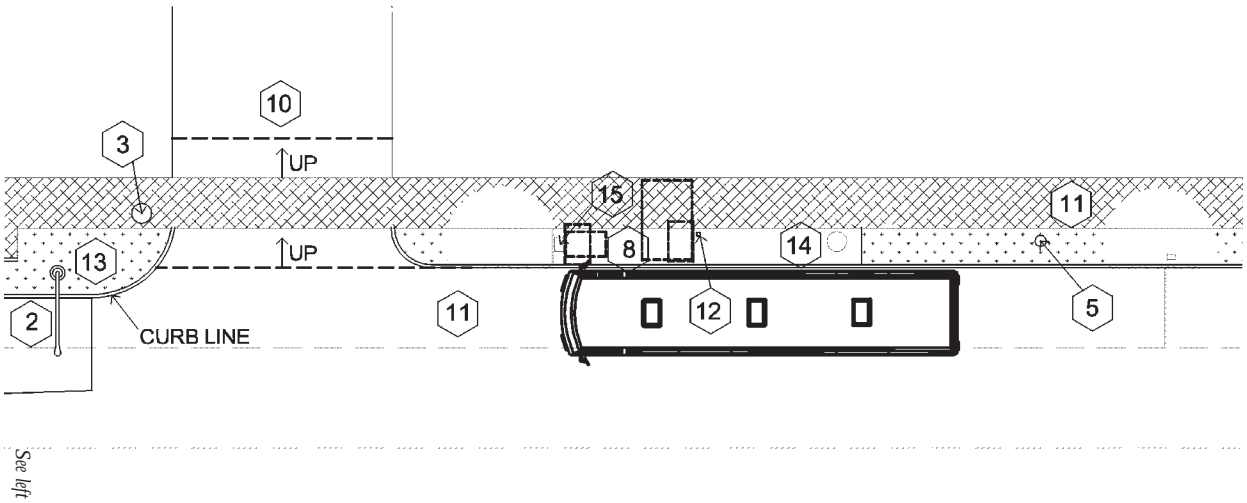
6. Accessible Parallel Parking
- Locate in most level area of block (recommended practice) to maximize usability.
- Provide 8 feet of space with 5-foot minimum obstruction-free access aisle adjacent to space for parallel parking.
- Sidewalk width narrows toward right-of-way to accommodate access aisle.
- Space and access aisle should have smooth surface for lift deployment. Minimize cross slope for lift operation.

7. Parking Meter for Accessible Space
- Locate at head of space or other nearby area with accessible connection to PAR and access aisle.
- Instructions visible from 40-inch height at center of clear approach area.
- Coin drop at 48-inch maximum height.

8. Clear Approach Area
- Minimum 30-inch by 48-inch obstruction free area centered on object being used (e.g. meter, phone).
- Slope area less than 2% in all directions.
- Space should be firm, stable, and slip-resistant.

9. Curb Ramp
- 4-foot wide (minimum) ramp.
- 1:12 maximum grade on ramp.
- Connect to PAR and to access aisle.
- Parallel type curb ramps required due to limited available right-of-way width.
- Landing can overlap PAR.

10. Driveway
- Maintain PAR elevation across driveway.



- To maintain less than 2% cross slope on the PAR, the ramped vehicular entry into the driveway must be split into two sections. Some of the required rise is accommodated between the curb line and the edge of the PAR; the balance is located on far side (non-street side) of the PAR. For the purposes of this illustration, it is assumed that the PAR can meet this elevation without adding curb ramps. If this is not possible, a solution similar to that shown in the 4- to 5-foot sidewalk model would be required.
- Provide good visibility and sight distance for pedestrians and vehicles.
- Detectable warnings should be provided only if driveway or alley is signalized.

11. Tree
- Avoid species known to produce surface roots, which may buckle sidewalk.
- Keep tree grates clear of PAR.
- Trim low hanging limbs to avoid creating protruding objects (hazardous especially to visually impaired pedestrians). Use species that do not obstruct sightlines for pedestrians and vehicle operators.

12. Bus Stop (No Shelter)
- Provide bus boarding and alighting area 5-feet wide by 8-foot deep (minimum from curb) for lift deployment.
- Connect waiting and boarding areas to PAR.
- If there is a bench, provide a 30-inch by 48-inch clear approach area adjacent to the bench and connected to bus boarding and alighting area.
- Keep signage from protruding into clear approach areas and/or PAR.
- Provide raised and Braille characters for route identification only (schedules, timetables, and maps are not required to have raised and Braille characters).

13. Landscaping
- Maintain appropriate sight distances. Use low ground cover and similar plantings so as to not obstruct sightlines for pedestrians and vehicle operators.

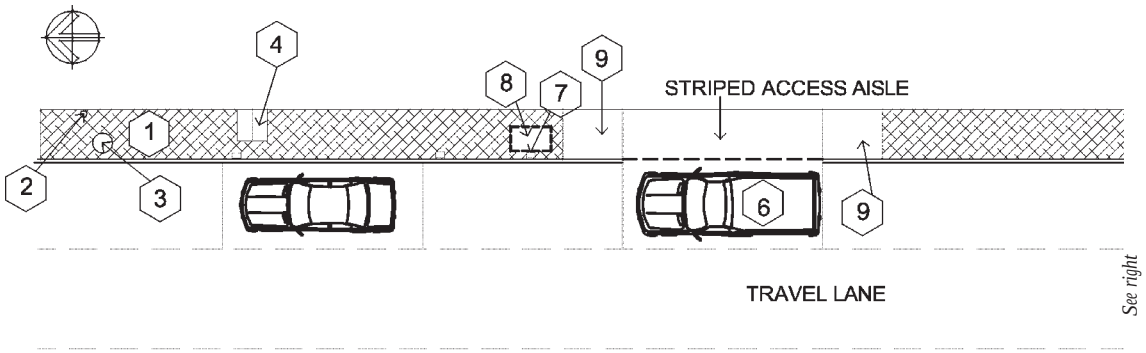
14. Sidewalk Furnishings, Trash Receptacle, and Similar Items
- Locate outside PAR.
- 30-inch by 48-inch clear approach area adjacent to furnishings.
- Trash receptacle openings within reach range requirements.

15. Telephone
- 30-inch by 48-inch clear approach area that may overlap with other clear spaces.
- Provide phone that complies with TTY and is accessible to wheelchair users.

Items Not Accommodated at this Width:

16. Bike Rack

4- TO 5-FOOT CURB TO RIGHT-OF-WAY LINE



1. PAR (Pedestrian Access Route)
- 4-feet-wide minimum, 5-foot width recommended. If the PAR is reduced to 4-foot width, a passing space must be provided at a maximum of 200-foot intervals. Passing spaces can be located in bulbouts, recaptured landscaping areas, widened sidewalks, and other similar areas.
- No frontage or furnishing zone is provided.

2. Utility Pole / Street Light
- Locate outside PAR. Maintain minimum 4-foot-wide PAR.
- Locate as close to right-of-way as possible (outside recommended horizontal clearance to obstructions and with minimum impact on the PAR). An absolute minimum of 32-inch clear width is needed for passage around the obstacle.

3. Utility Meter / Underground Vault / Manhole
- Locate outside PAR wherever possible.
- When in the sidewalk area, grates and covers should have firm, stable, and slip resistant covers that are free from level changes.

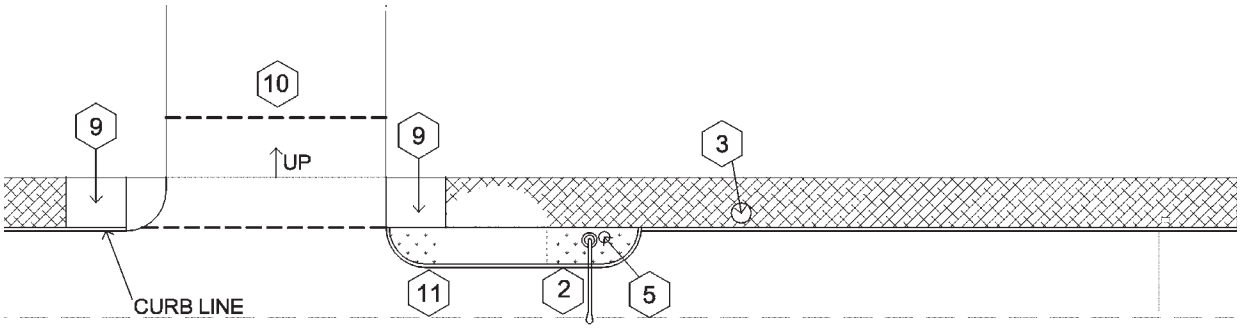
4. Hatch (At-grade Access Door for Deliveries and Access to Building)
- When in the sidewalk area, covers should have firm, stable, and slip resistant covers that are free from level changes. This includes edges and hardware.

5. Fire Hydrant
- Locate outside PAR if possible or provide at least 32 inches of clear width for passage around the hydrant.

6. Accessible Parallel Parking
- Locate in most level area of block (recommended practice) to maximize usability.
- Provide 8-foot space with 5-foot minimum obstruction-free access aisle adjacent to space for parallel parking.
- PAR ramps down to parking level in order to provide sufficient width for space.
- Space and access aisle should have smooth surface for lift deployment. Minimize cross slope for lift operation.

7. Parking Meter for Accessible Space
- Locate at nearby area with accessible connection to PAR and access aisle.
- Instructions visible from 40-inch height at center of clear approach area.
- Coin drop at 48-inch maximum height.

8. Clear Approach Area
- Minimum 30-inch by 48-inch obstruction-free area centered on object being used (e.g. meter, phone).
- Slope area less than 2% in all directions.
- Space should be firm, stable, and slip-resistant.



See left

9. Curb Ramp
- 4-foot-wide (minimum) ramp.
- 1:12 maximum grade on ramp.
- Connect to PAR and to access aisle.
- Parallel-type ramps required due to limited available right-of-way width.

10. Driveway
- Maintain street elevation across the driveway width where PAR crosses. The PAR must ramp down to the street elevation in order to maintain less than 2% cross slope.
- Provide good visibility and sight distance for pedestrians and vehicles.
- Detectable warnings should be provided only if driveway or alley is signalized.

11. Tree
- Avoid species known to produce surface roots, which may buckle sidewalk.
- Keep tree grates clear of PAR.
- Trim low hanging limbs to avoid creating protruding objects (hazardous especially to visually impaired pedestrians). Use species that do not obstruct sightlines for pedestrians and vehicle operators.

Items Not Accommodated at this Width:

12. Bus Stop
- No adequate space is available for lift deployment. If a bus stop must be located in an area where sidewalks are this narrow, the stop should be located at a curb ramp and no parking zone where the lift can be safely deployed and passengers can access the PAR immediately. Keep signage from protruding into clear approach areas and/or PAR.
- Provide raised and Braille characters for route identification only (schedules, timetables, and maps are not required to have raised and Braille characters).

13. Landscaping

14. Sidewalk Furnishings, Trash Receptacle, and Similar Items

15. Telephone

16. Bike Rack

CURB RAMP EXAMPLES

by Lee R. Kenderdine, Metropolitan Government of Nashville and Davidson County, Tennessee; Janet Barlow, Accessible Design for the Blind; Laurie Kozisek, PE, City of Anchorage and Alaska Department of Transportation; and Chuck Yancey, Metropolitan Government of Nashville and Davidson County, Tennessee

Introduction

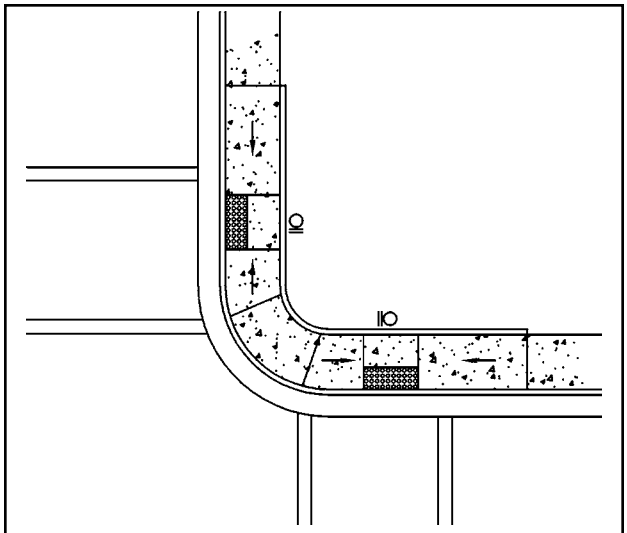
When engineers and architects work on a project that includes alterations within the rights-of-way, the construction of the curb ramps will require thought and planning. There is no standard layout for a curb ramp—each and every curb ramp is unique. The curb ramp must be designed to meet the existing topographical and physical constraints, and the requirements for curb ramp slope, cross slope, landings, and connection to the street.

Several factors need to be achieved to construct a curb ramp that will be usable by ALL pedestrians. For perpendicular curb ramps, the ramp slope must be perpendicular to the grade break at the gutter line. The curb ramp landing and gutter connection need to be designed and constructed so water does not pond at the base of the ramp or on the landing and debris does not accumulate. Debris and water reduce the usability of a curb ramp. The ramp and the landing need to be wide enough to be used by all users of the sidewalk system. If at all possible, the curb ramp slope needs to be aligned with the sidewalk and crosswalk to provide an additional cue to assist the visually impaired and blind persons in aligning to cross the street. Paired curb ramps on a corner allow better alignment for people using mobility aids and for pedestrians with vision impairments and make it easier to separate the APS.

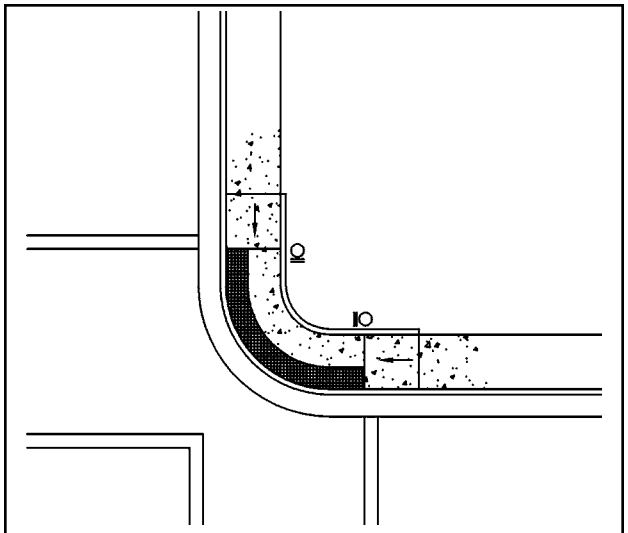
This chapter provides examples of curb ramp designs that may be useful on 10 foot radius curb returns and 30 foot curb returns. In addition to topographical issues, width of the sidewalk and the distance between the sidewalk and curb can affect curb ramp design. Variations of these factors are also shown in the examples.

CURB RAMP EXAMPLES

10-FOOT RADIUS CURB RETURNS



Parallel Curb Ramp—5-foot sidewalk on tangents



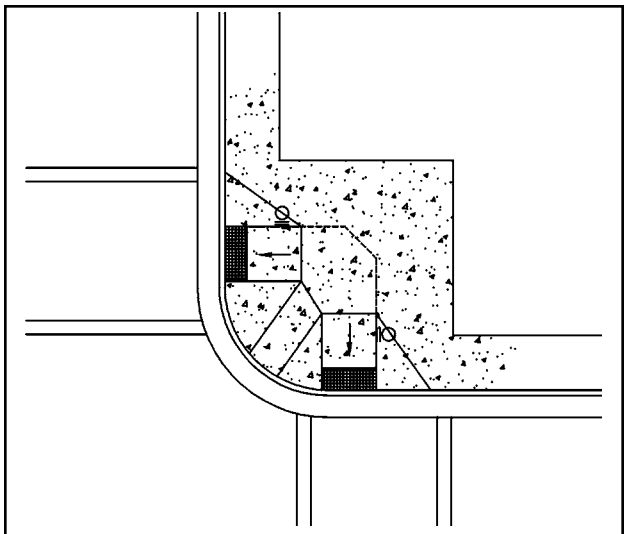
Blended Transition Curb Ramp—5-foot sidewalk on fan

Example 1—Parallel Curb Ramp

- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb.
- The use of parallel curb ramps will assist the designer to construct curb ramps where the intersecting streets have considerable grade differences.
- Landing at gutter elevation increases possibility of ponding and accumulation of debris on the landing.
- Layout enables area between the two curb ramps to retain some of the curb height, which assists in drainage and discourages vehicles cutting across the corner. The use of parallel curb ramps require the sidewalk to be raised/lowered to the landing. This will cause the pedestrians using the sidewalk system to go up and down several times when going through the area of the two curb ramps.
- APS push button locator tone will assist blind or visually impaired persons in finding crossing location and the tactile arrow may provide some assistance with aligning to cross.
- The use of paired curb ramps (a separate curb ramp and landing for each direction of crosswalk) will allow pedestrians with disabilities to be aligned with the crossing direction while waiting to cross the street.
- Paired curb ramps help meet the separation requirements for APS.

Example 2—Parallel Curb Ramp, Large Shared Landing

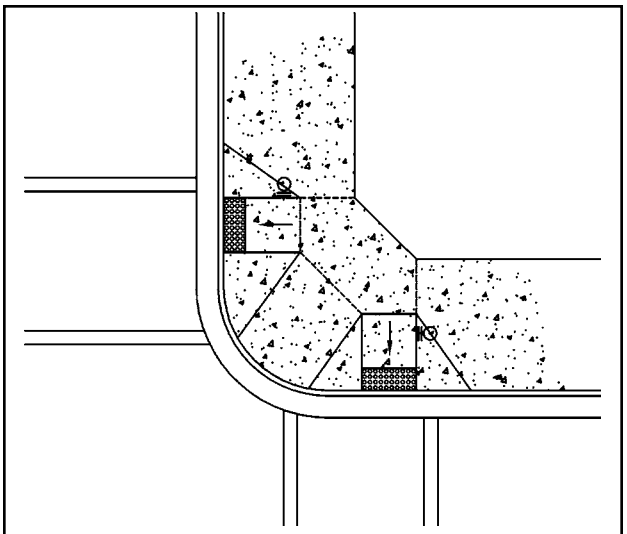
- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb.
- Layout moves the crosswalk closer to the intersection.
- Landing at gutter elevation increases potential for ponding and accumulation of debris on the landing.
- Slope of parallel curb ramps in sidewalk may provide a directional cue to pedestrians who are visually impaired or blind.
- APS push button locator tone will assist blind or visually impaired persons in finding crossing location and and tactile arrow may provide some assistance with aligning to cross.
- If landing is small, it may eliminate the ability to separate the APS push buttons and speakers by more than 10 feet. If APS pairs are closer than 10 feet, speech walk messages and additional features are needed to clarify walk indication.



Perpendicular Curb Ramp—5-foot sidewalk on tangents

Example 3—Perpendicular Curb Ramp

- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb, if additional right-of-way is available.
- This design will require the use of additional/available right-of-way.
- Layout enables area between the two curb ramps to retain the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp must lie entirely within the crosswalk limits; flares are not part of PAR and can lie outside crosswalk markings.
- Curb ramp slope aligned with crosswalk direction will provide a directional cue for the visually impaired and blind pedestrians, particularly when combined with tactile arrow of APS.
- The use of paired curb ramps (a separate curb ramp and landing for each direction of crosswalk) will allow pedestrians with disabilities to be aligned with the crossing direction while waiting to cross the street.
- Paired curb ramps will help meet the separation requirements for APS.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrows may provide some assistance with aligning to cross.

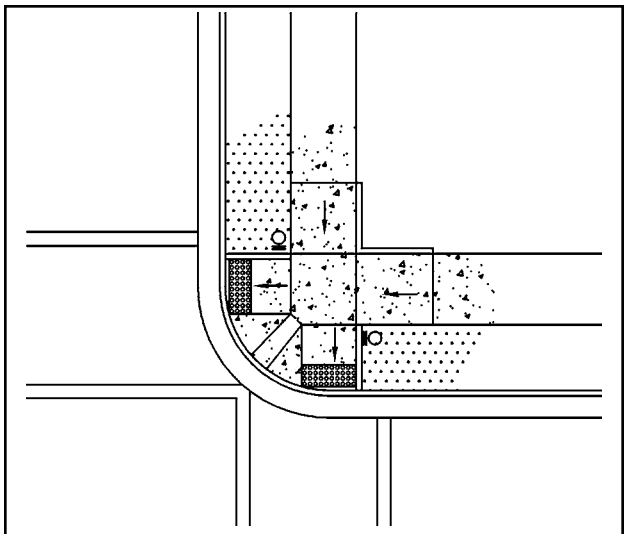


Perpendicular Curb Ramp—12-foot sidewalk on tangents

Example 4—Perpendicular Curb Ramp

- 12-foot sidewalk at back of curb provides more room for directional curb ramps.
- Layout enables area between the two curb ramps to retain the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp must lie entirely within the crosswalk limits; flares are not part of PAR and can lie outside crosswalk markings.
- Curb ramp slope aligned with crosswalk direction will provide directional cue for the visually impaired and blind, particularly when combined with tactile arrow of APS.
- Paired curb ramps will help to meet the separation requirements for APS.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrow may provide some assistance with aligning to cross.

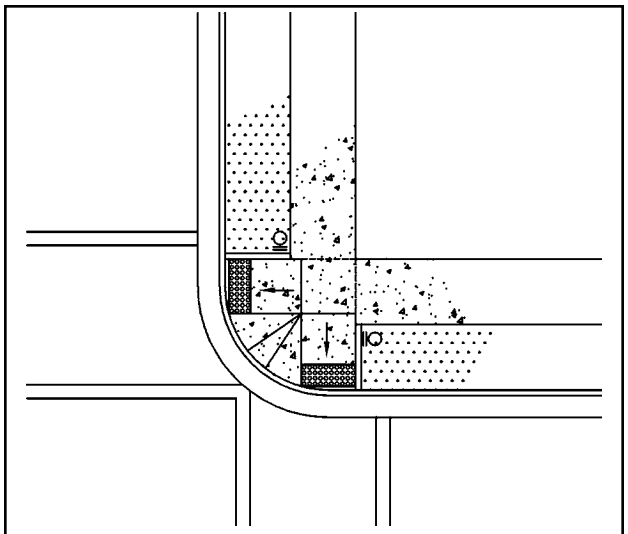
10-FOOT RADIUS CURB RETURNS



Combination Curb Ramp—6-foot parkway with 6-foot sidewalk on curve

Example 5—Combination Parallel and Perpendicular Curb Ramps

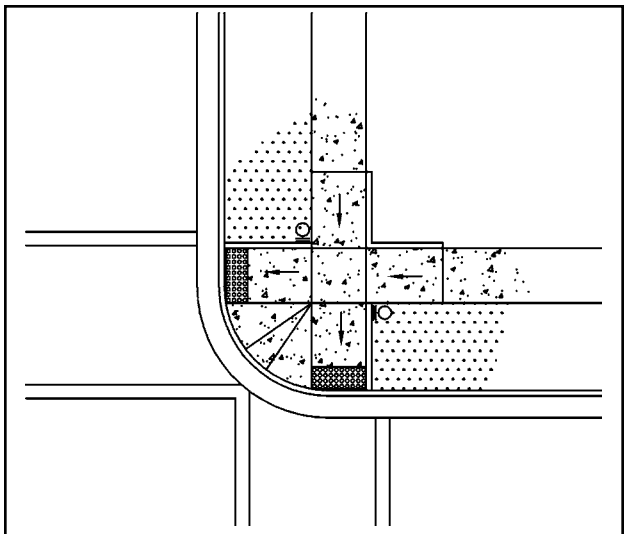
- 6-foot grass area or furnishing zone between curb and PAR provides additional space for perpendicular curb ramps.
- Combination of parallel and perpendicular curb ramps will allow designers to adjust the elevation of the sidewalk to meet the landing. This may be required by constraints behind the sidewalk.
- Layout enables area between the two curb ramps to retain some of the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp slope in line with sidewalk and crosswalks, and edge of landscaping aligned with crosswalk provides excellent direction cues to pedestrians who are blind or visually impaired.
- Paired curb ramps will help meet the separation requirements for APS.
- APS push button locator tone and tactile arrow will assist blind or visually impaired persons in finding crossing location and may provide some assistance with aligning to cross.



Perpendicular Curb Ramp—6-foot parkway with 6-foot sidewalk on curve

Example 6—Perpendicular Curb Ramps

- 6-foot grass area or furnishing zone between curb and PAR provides additional space for directional perpendicular curb ramps.
- Layout enables area between the two curb ramps to retain majority of the curb height which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp slope aligned with crosswalk direction will provide directional cue for the visually impaired and blind pedestrians, particularly when combined with tactile arrow of APS.
- Paired curb ramps will help meet the separation requirements for APS.
- APS push button locator tone will assist blind or visually impaired persons in finding crossing location and tactile arrow may provide some assistance with aligning to cross.

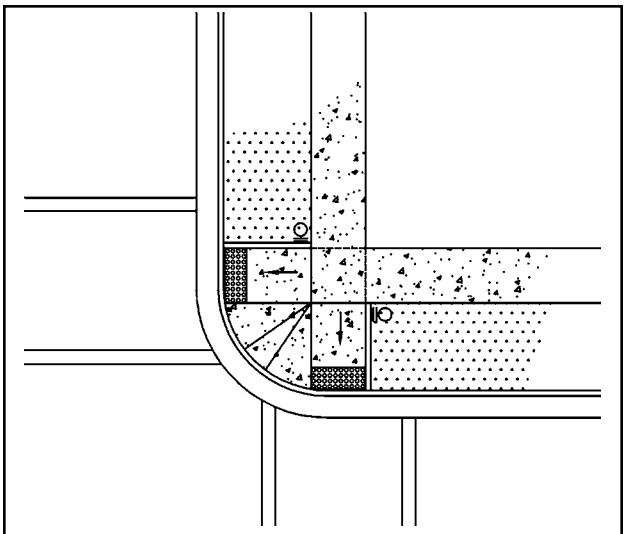


Combination Curb Ramp—8-foot parkway with 5-foot sidewalk on curve

Example 7—Combination Parallel and Perpendicular Curb Ramps

(slope in sidewalk approach and curb ramp perpendicular to the street)

- Grass area or furnishing zone between curb and PAR allows room for perpendicular curb ramps.
- Parallel ramps in sidewalk allow designer to adjust the elevation of the sidewalk to meet the landing. This may assist in areas where there are constraints behind the sidewalk.
- Layout enables area between the two curb ramps to retain most of the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramps in line with sidewalk and crosswalks, and edge of landscaping aligned with direction of travel on the crosswalk provide excellent direction cues to pedestrians who are blind or visually impaired.
- Care must be taken to keep APS push buttons at the edge of the parkway and close enough to the landing so they are within the reach range.
- In this example, closeness of the APS to each other will require the use of speech walk messages and additional features to clarify walk indication. If curb ramps are moved further from the corner apex, so the APS are more than 10 feet apart, speech walk messages and additional features will not be necessary.

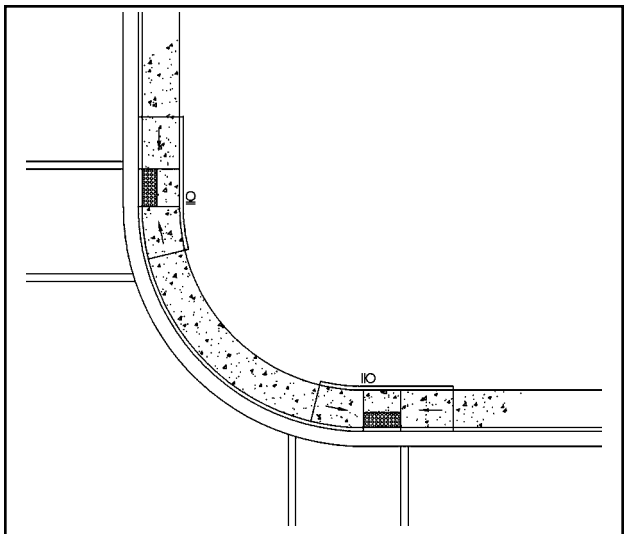


Perpendicular Curb Ramp—8-foot parkway with 5-foot sidewalk on curve

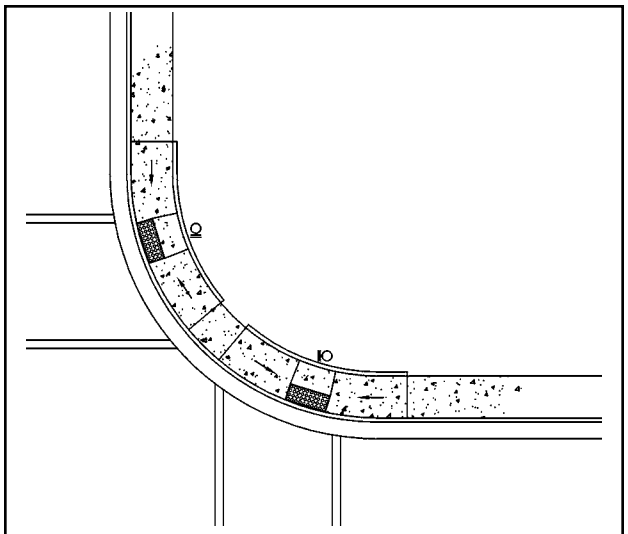
Example 8—Perpendicular Curb Ramps

- 8-foot grass area or furnishing zone between curb and PAR allows adequate room for directional perpendicular curb ramps.
- Layout enables area between the two curb ramps to retain the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp slope in line with sidewalk and crosswalks, and edge of landscaping aligned with crosswalk provides excellent directional cues to pedestrians who are blind or visually impaired.
- The use of directional curb ramps will allow pedestrians with disabilities to be aligned with the crossing while waiting to cross the street and when entering the street.
- Paired curb ramps will help meet the separation requirements for APS.
- In this example, the APS pair are closer than 10 feet, thus requiring the use of speech walk messages and additional features to clarify walk indication. If landing area is enlarged and ramps are moved to the outside edge of the crosswalks, this may not be necessary.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrows may provide some assistance with aligning to cross.

30-FOOT RADIUS CURB RETURNS



Parallel Curb Ramp—5-foot sidewalk on tangents



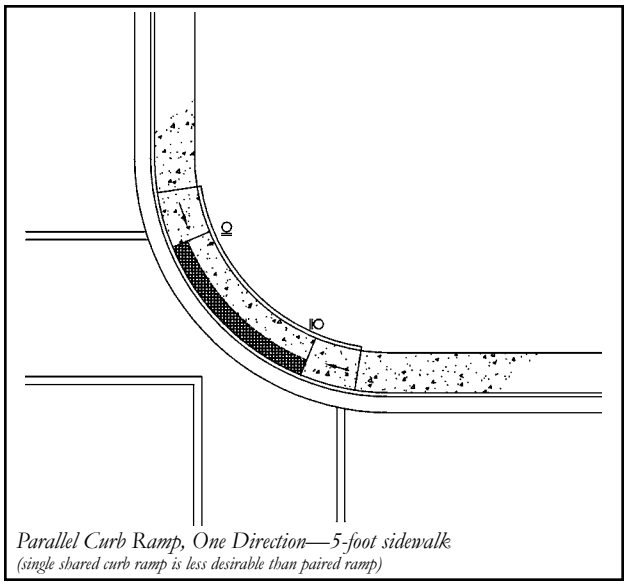
Parallel Curb Ramp—5-foot sidewalk on curve

Example 9—Parallel Curb Ramps

- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb.
- The use of parallel curb ramps will assist the designer to construct curb ramps where the intersecting streets have considerable grade differences.
- Landing at gutter height with less than 2% slope increases potential for ponding and accumulation of debris on the landing.
- Layout enables area between the two curb ramps to retain some of the curb height, which discourages vehicles cutting across the corner.
- The use of a parallel curb ramp will require that the sidewalk be sloped to the landing. This will cause the pedestrians using the sidewalk system to go up and down several times when going through the area of the two curb ramps.
- Crosswalk set back from intersection, but crosswalk distance is shorter due to location away from apex.
- Level landing at crosswalk location may provide a directional cue for the visually impaired and blind persons, particularly when combined with tactile arrow of APS.
- APS push button locator tone will assist blind or visually impaired persons in finding crossing location and the tactile arrow may provide some assistance with aligning to cross.
- The use of paired curb ramps (a separate curb ramp and landing for each direction of crosswalk) will allow pedestrians with disabilities to be aligned with the crossing direction while waiting to cross the street.
- Paired curb ramps help assist to meet the separation requirements for APS.

Example 10—Parallel Curb Ramps

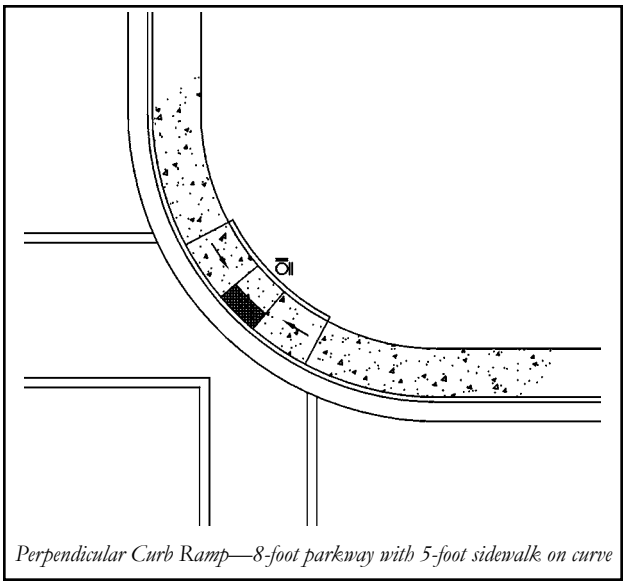
- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb.
- Landing at gutter height with less than 2% slope increases possibility of drainage problems, ponding, and accumulation of debris on the landing.
- The use of parallel curb ramps will assist the designer to construct curb ramps where the intersecting streets have considerable grade differences.
- Layout enables area between the two curb ramps to retain some of the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- The use of a parallel curb ramp will require that the sidewalk be sloped to the landing. This will cause the pedestrians using the sidewalk system to go up and down several times when going through the area of the two curb ramps.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Layout moves the crosswalks closer to the intersection.
- Paired curb ramps will help meet the separation requirements for APS.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrows may provide some assistance with aligning to cross. Care must be taken to keep APS push buttons close enough to the landing so they are within the reach range. Tactile arrows should be aligned with direction of travel on the crosswalk.



Parallel Curb Ramp, One Direction—5-foot sidewalk
(single shared curb ramp is less desirable than paired ramp)

Example 11—Parallel Curb Ramps, Shared Landing

- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb.
- The use of parallel curb ramps will assist the designer to construct curb ramps where the intersecting streets have considerable grade differences.
- Layout moves the crosswalk closer to the intersection.
- Landing at gutter height with less than 2% slope increases possibility of drainage problems, ponding, and accumulation of debris on the landing.
- Parallel ramps and shared landing don't provide a directional cue for pedestrians who are visually impaired or blind.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and the wheelchair users have to make a directional adjustment in the roadway.
- APS push buttons at each end of the landing will generally be more than 10 feet apart and meet separation requirements. If APS are closer than 10 feet to each other, speech walk messages and additional features will be needed to clarify walk indication. Tactile arrows should be aligned with direction of travel on the crosswalk.



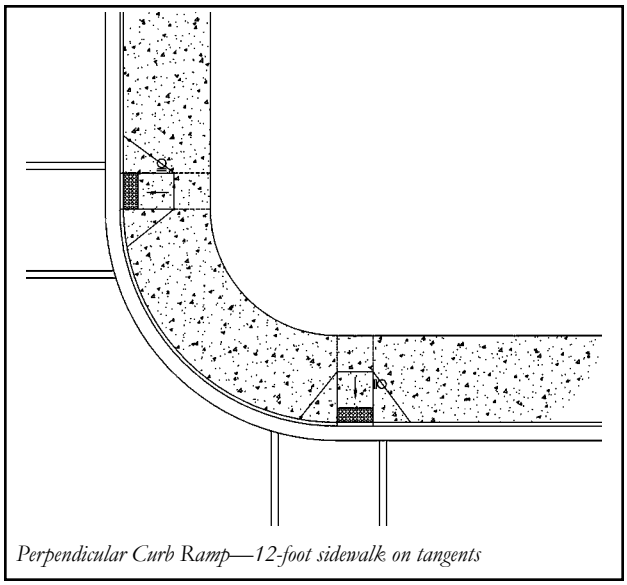
Perpendicular Curb Ramp—8-foot parkway with 5-foot sidewalk on curve

Example 12—Parallel Ramps, One Shared Landing

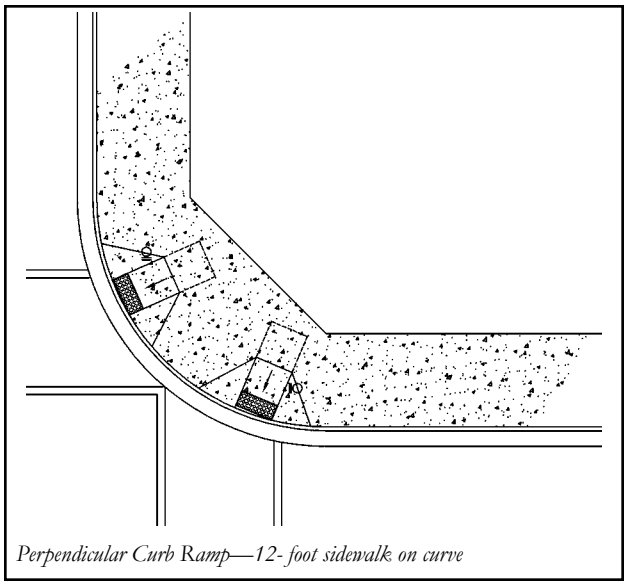
- Do not use this design unless constraints, such as drainage structures, vaults, etc. require it; paired ramps are always preferred.
- Provides usable curb ramps where narrow (4-5') sidewalk is at back of curb.
- Landing at gutter elevation increases possibility of drainage problems, ponding, and accumulation of debris on the landing.
- Location of landing moves the crosswalk closer to the intersection.
- Landing location requires that wheelchair users enter street at an angle, then turn in crosswalk direction.
- 4-foot by 4-foot maneuvering area required in street where crosswalks meet.
- Single shared landing eliminates the ability to separate the APS push buttons on two poles. Will require the use of speech walk messages and additional features to clarify walk indication.

CURB RAMP EXAMPLES

30-FOOT RADIUS CURB RETURNS



Perpendicular Curb Ramp—12-foot sidewalk on tangents



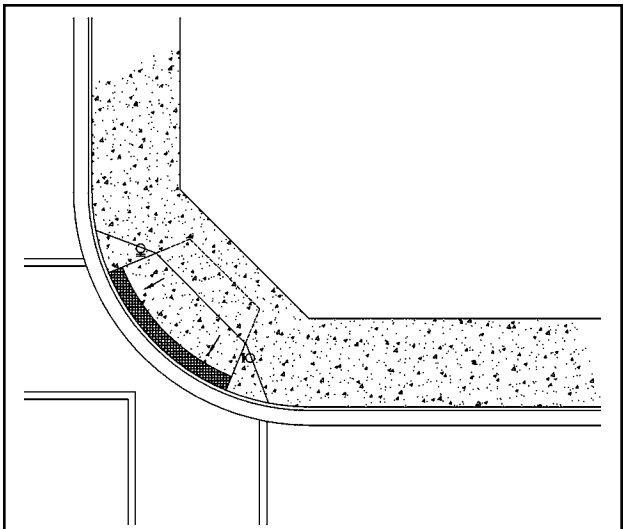
Perpendicular Curb Ramp—12- foot sidewalk on curve

Example 13—Perpendicular Curb Ramps

- 12-foot sidewalk at back of curb provides more room for directional curb ramps.
- Crosswalks are a greater distance from intersection, but crosswalk distance is shorter due to location away from apex.
- Curb ramp must lie entirely within the crosswalk limits; flares are not part of PAR and can lie outside crosswalk markings.
- Layout enables area between the two curb ramps to retain curb height; assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp slope aligned with crosswalk direction will provide directional cue for the visually impaired and blind, particularly when combined with tactile arrow of APS.
- Paired curb ramps will help meet the separation requirements for APS.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrow may provide some assistance with aligning to cross.

Example 14—Perpendicular Curb Ramps

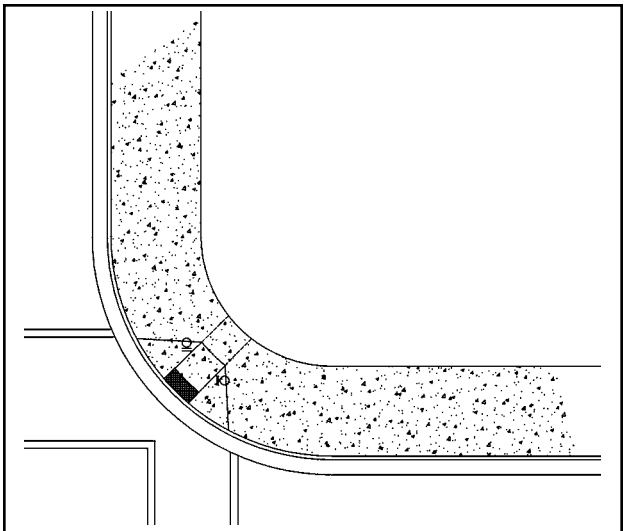
- 12-foot sidewalk at back of curb provides more room for directional curb ramps.
- May be necessary to move curb ramps close to the apex, as shown here, due to the grades of the two cross streets or crosswalk location.
- This design moves the crosswalk closer to the intersection.
- Curb ramp must lie entirely within the crosswalk limits; flares are not part of PAR and can lie outside crosswalk markings.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Curb ramp and landing locations allow separation of APS push buttons and sounds by more than 10 feet.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrow may provide some assistance with aligning to cross. Tactile arrow should be aligned with direction of travel on the crosswalk.



Perpendicular Curb Ramp—12-foot sidewalk on fan

Example 15—Perpendicular Curb Ramps

- No separation of 12-foot sidewalk with curb.
- Possible use due to the grades of the two cross streets.
- Moves the crosswalk closer to the intersection.
- Single curb ramp as shown may increase possibility of drainage problems.
- Ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Lack of curb at apex of curb return radius eliminates curb protection for pedestrians from vehicles cutting the corner.
- APS push buttons at each end of the landing will generally be more than 10 feet apart and meet separation requirements. If APS are closer than 10 feet to each other, speech walk messages and additional features will be needed to clarify walk indication. Tactile arrows should be aligned with direction of travel on the crosswalk.

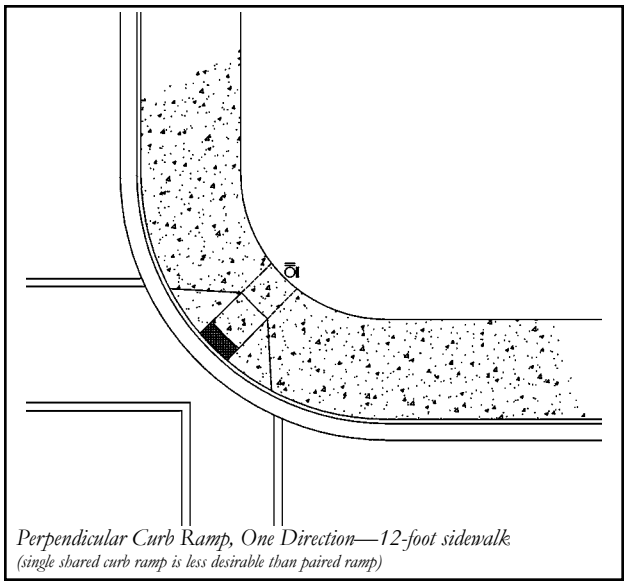


Perpendicular Curb Ramp, One Direction—12-foot sidewalk
(single shared curb ramp is less desirable than paired ramp)

Example 16—One Perpendicular Curb Ramp

- Do not use this design unless constraints, such as drainage structures, vaults, etc. require it.
- No separation of 12-foot sidewalk with curb.
- Sidewalk elevation stays the same for pedestrians traveling around the corner.
- Moves the crosswalk closer to the intersection.
- Ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Single shared landing eliminates the ability to separate the APS push buttons on two poles. Will require the use of speech walk messages and additional features to clarify walk indication.

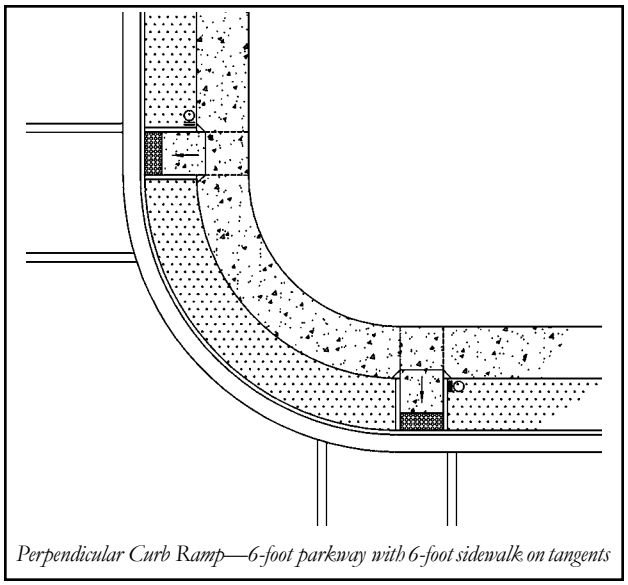
30-FOOT RADIUS CURB RETURNS



Perpendicular Curb Ramp, One Direction—12-foot sidewalk
(single shared curb ramp is less desirable than paired ramp)

Example 17—One Perpendicular Curb Ramp

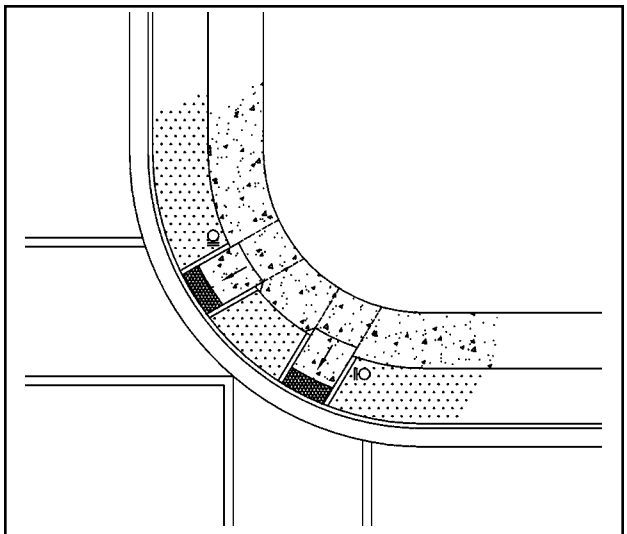
- Do not use this design unless constraints, such as drainage structures, vaults, etc. require it; paired ramps are always preferred.
- 12-foot sidewalk at back of curb.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Design moves the crosswalk closer to the intersection, but landing is needed at the base of the ramp, outside the travel lanes.
- Where curb ramps are the sole connection to the street, designers should consider providing wider curb ramps where pedestrian volumes are high.
- 4-foot by 4-foot maneuvering area required in street where crosswalks meet.
- APS push buttons and speakers are located in line with crosswalk lines with more than 10 feet of required separation. Level landing is needed beside the push buttons, as well as at the top of the ramp. Tactile arrows on APS should be aligned with the direction of travel on the crosswalk.



Perpendicular Curb Ramp—6-foot parkway with 6-foot sidewalk on tangents

Example 18—Perpendicular Curb Ramp

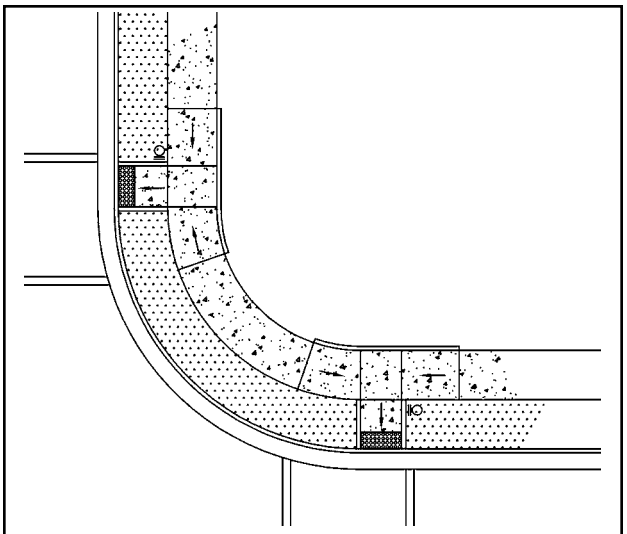
- 6-foot grass area or furnishing zone between curb and PAR.
- Sidewalk elevation stays the same for pedestrians traveling around the corner.
- Crosswalks are a greater distance from intersection.
- Landscaping layout enables area between the two curb ramps to retain majority of the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp slope aligned with crosswalk direction will provide directional cue for the visually impaired and blind, particularly when combined with tactile arrow of APS.
- The use of paired curb ramps will allow pedestrians with disabilities to be aligned with the crossing while waiting to cross the street.
- Paired curb ramps will help meet the separation requirements for APS. Care must be taken to keep APS push buttons close enough to the landing and edge of landscaping so they are within the reach range.



Perpendicular Curb Ramp—6-foot parkway with 6-foot sidewalk on curve

Example 19—Perpendicular Curb Ramp

- 6-foot grass area or furnishing zone between curb and PAR.
- Landscaping enables area between the two curb ramps to retain the curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Layout moves the crosswalks closer to the intersection.
- Landscaping edge aligned with the direction of travel on the crosswalk and tactile arrow on APS can provide a directional cue for the visually impaired and blind persons.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and the wheelchair users have to make a directional adjustment in the roadway.
- In this example, APS are more than 10 feet apart. If curb ramps and landings are moved closer to the corner that separation distance may not be met and APS will require the use of speech walk messages and additional features to clarify walk indication.
- Tactile arrows should be aligned with direction of travel on the crosswalk.



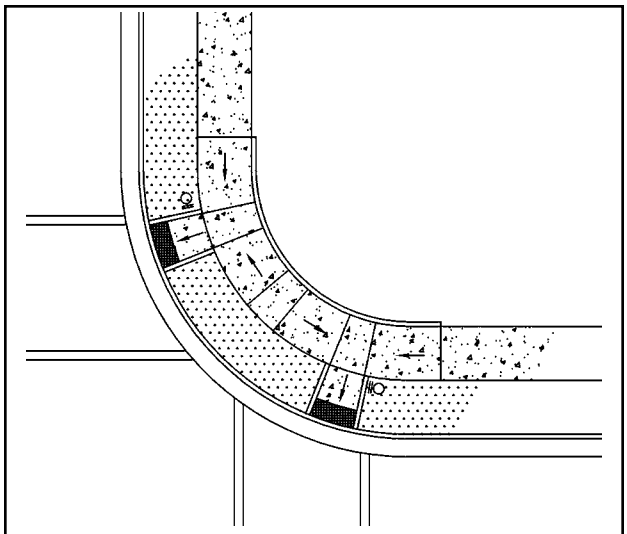
Combination Curb Ramp—6-foot parkway with 6-foot sidewalk on tangents

Example 20—Combination Parallel and Perpendicular Curb Ramps

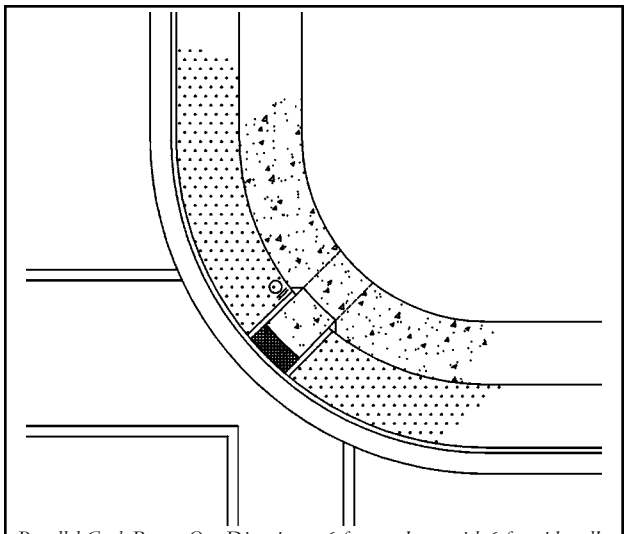
- 6-foot grass area or furnishing zone between curb and PAR.
- Parallel ramps will allow designer to adjust the elevation of the sidewalk to meet the landing. This may be due to constraints behind the sidewalks.
- Layout enables area between the two curb ramps to retain curb height, which assists in drainage and discourages vehicles cutting across the corner.
- The use of a parallel curb ramp will require that the sidewalk to be sloped to the landing. This will cause the pedestrians using the sidewalk system to go up and down several times when going through the area of the two curb ramps.
- Crosswalks are a greater distance from intersection but crosswalk distance is shorter due to location away from apex.
- Curb ramp slope aligned with crosswalk direction will provide directional cue for the visually impaired and blind, particularly when combined with tactile arrow of APS.
- Paired curb ramps will help meet the separation requirements for APS.
- Care must be taken to keep APS push buttons close enough to the landing and edge of landscaping so they are within the reach range.

CURB RAMP EXAMPLES

30-FOOT RADIUS CURB RETURNS



Combination Curb Ramp—6-foot parkway with 6-foot sidewalk on curve



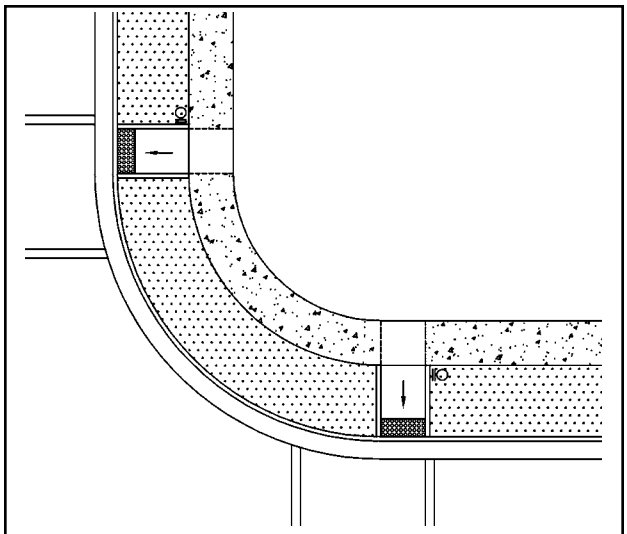
Parallel Curb Ramp, One Direction—6-foot parkway with 6-foot sidewalk
(single shared curb ramp is less desirable than paired ramps)

Example 21—Combination Parallel and Perpendicular Curb Ramps

- 6-foot grass area or furnishing zone between curb and PAR.
- Parallel curb ramps will allow the designer to slope the sidewalk to meet the landing. This may be needed due to constraints behind the sidewalk. The use of parallel curb ramps will assist the designer to construct curb ramps where the intersecting streets have considerable grade differences.
- Layout enables area between the two curb ramps to retain curb height, which assists in drainage and discourages vehicles cutting across the corner.
- The use of a parallel curb ramp will require that the sidewalk to be raised/lowered to the landing. This will cause the pedestrians using the sidewalk system to go up and down several times when going through the area of the two curb ramps.
- Layout moves the crosswalk closer to the intersection.
- Ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Paired curb ramps will help meet the separation requirements for APS.
- Care must be taken to keep APS push buttons close enough to the landing and edge of landscaping so they are within the reach range.

Example 22—One Perpendicular Curb Ramp

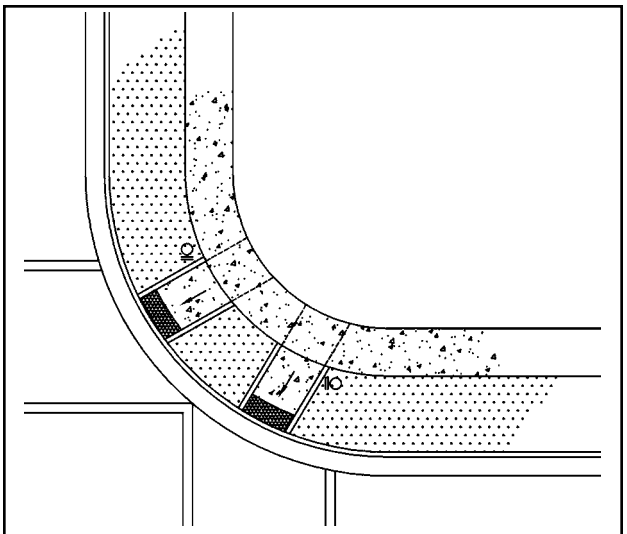
- Do not use this design unless constraints, such as drainage structures, vaults, etc. require it; paired ramps are always preferred.
- 6-foot grass area or furnishing zone between curb and PAR.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Moves the crosswalk closer to the intersection, but landing is needed at the base of the curb ramp, outside the travel lanes.
- Single shared landing eliminates the ability to separate the APS push buttons on two poles. Will require the use of speech walk messages and additional features to clarify walk indication.
- Where curb ramps are the sole connection to the street, designers should consider providing wider curb ramps where pedestrian volumes are high.
- 4-foot by 4-foot maneuvering area required in street where crosswalks meet.



Perpendicular Curb Ramp—8-foot parkway with 5-foot sidewalk on tangents

Example 23—Perpendicular Curb Ramps

- 8-foot grass area or furnishing zone between curb and PAR allows for perpendicular curb ramps.
- Crosswalk is a greater distance from intersection, but crosswalk distance is shorter due to location away from apex.
- Layout enables area between the two curb ramps to retain curb height, which assists in drainage and discourages vehicles cutting across the corner.
- Curb ramp slope in line with sidewalk and crosswalks and edge of landscaping aligned with crosswalk provides excellent direction cues to pedestrians who are blind or visually impaired.
- Paired curb ramps will help meet the more than 10 foot separation requirements for APS.
- APS push button locator tone will assist blind or visually impaired persons in finding crossing location and tactile arrow may provide some assistance with aligning to cross.

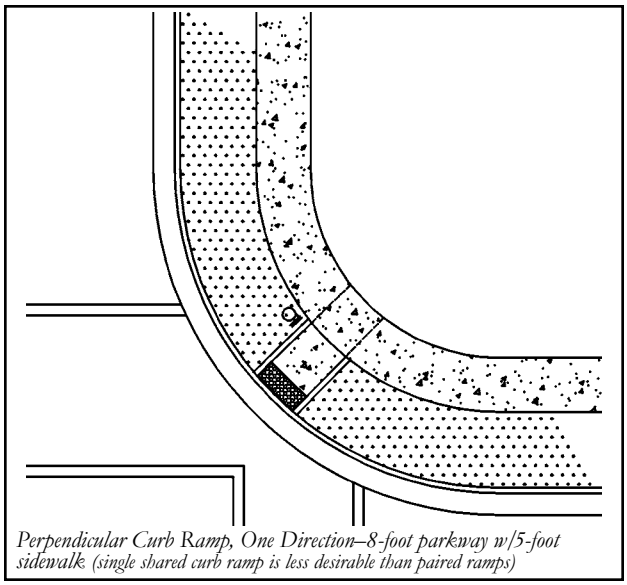


Perpendicular Curb Ramp—8-foot parkway with 5-foot sidewalk on curve

Example 24—Perpendicular Curb Ramps

- 8-foot grass area or furnishing zone between curb and PAR allows room for perpendicular curb ramps.
- Location of curb ramps allows moving the crosswalk closer to the intersection.
- Landscaping around corner allows full height curb at corner.
- Tactile arrow on APS pushbutton will provide directional cue for visually impaired and blind pedestrians.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Where curb ramps are the sole connection to the street, designers should consider providing wider curb ramps where pedestrian volumes are high.
- APS push button locator tones will assist blind or visually impaired persons in finding crossing location and tactile arrows may provide some assistance with aligning to cross. Tactile arrows should be aligned with direction of travel on the crosswalk.

30-FOOT RADIUS CURB RETURNS



Perpendicular Curb Ramp, One Direction–8-foot parkway w/5-foot sidewalk (single shared curb ramp is less desirable than paired ramps)

Example 25—One Perpendicular Curb Ramp

- Do not use this design unless constraints, such as drainage structures, vaults, etc. require its use; paired ramps area always preferred.
- 8-foot grass area or furnishing zone between curb and PAR.
- Moves the crosswalk closer to the intersection.
- Where curb ramps are the sole connection to the street, designers should consider providing wider curb ramps where pedestrian volumes are high.
- Curb ramps that do not align with the direction of travel on the crosswalk direct visually impaired and blind pedestrians toward the center of the intersection and wheelchair users have to make a directional adjustment in the roadway.
- Single shared landing eliminates the ability to separate the APS push buttons on two poles. Will require the use of speech walk messages and additional features to clarify walk indication.

Case Study—Linking to Shop Entrances

- When this sidewalk was reconstructed, new level platforms were included that link the store entrances to the sloping city sidewalk.
- This design minimizes warping of the sidewalk surface near the bottom steps so wheelchairs can stay on all four wheels when approaching the shops.



RESOURCE LIST

by Barbara McMillen, Pedestrian Accessibility Specialist, and others

US Department of Justice

website http://www.ada.gov/

Americans with Disabilities Act (ADA), (Pub. L. 101-336), Title II, implementing regulations for Nondiscrimination on the Basis of Disability in State and Local Government Services, 28 CFR PART 35, Final rule, which prohibits discrimination on the basis of disability by public entities.
http://www.ada.gov/reg2.html

- ADA Standards for Accessible Design (1991). The ADA Standards for Accessible Design are the Access Board's 1991 ADA Accessibility Guidelines (ADAAG), adopted on July 26, 1991: http://www.ada.gov/stdspdf.htm
- Title II Technical Assistance Manual (1993) and Yearly Supplements. A 56-page manual that explains in lay terms what state and local governments must do to ensure that their services, programs, and activities are provided to the public in a nondiscriminatory manner. Many examples are provided for practical guidance: http://www.ada.gov/taman2.html
- Title II Highlights. An 8-page outline of the key requirements of the ADA for State and local governments. This publication provides detailed information in bullet format for quick reference: http://www.ada.gov/t2hlt95.htm
- *ADA Guide for Small Towns*. A 21-page guide that presents an informal overview of some basic ADA requirements and provides cost-effective tips on how small towns can comply with the ADA.
  - ADA Guide for Small Towns (HTML): http://www.ada.gov/smtown.htm
  - ADA Guide for Small Towns (PDF): http://www.ada.gov/smtown.pdf
- *The ADA and City Governments: Common Problems*. A 9-page document that contains a sampling of common problems shared by city governments of all sizes, provides examples of common deficiencies and explains how these problems affect persons with disabilities.
  - ADA and City Government: Common Problems (HTML): http://www.ada.gov/comprob.htm
  - ADA and City Government: Common Problems (PDF): http://www.ada.gov/comprob.pdf
- An ADA Guide for Local Governments: Making Community Emergency Preparedness and Response Programs Accessible to People with Disabilities. A publication that provides guidance on preparing for and carrying out emergency response programs in a manner that results in the services being accessible to people with disabilities: http://www.ada.gov/emergencyprep.htm

US Department of Justice Technical Assistance Letters. Covers state and local government's responsibilities for complying with provisions in the ADA, Title II regulations. Compliance topics:

- Sidewalks, transition plans, alterations, new constructions: http://www.usdoj.gov/crt/foia/ltr205.htm
- Obligations to follow design standards for sidewalks: http://www.usdoj.gov/crt/foia/tal680.txt
- Snow removal on sidewalks: http://www.usdoj.gov/crt/foia/tal684.txt
- Roadway resurfacing and the need to provide curb ramps in alterations: http://www.usdoj.gov/crt/foia/tal679.txt

US DOJ Settlement Agreements. Involve public rights-of-way, State of Delaware, Voluntary Agreement with terms and conditions to bring certain roads under the jurisdiction of the state into further compliance with the Americans with Disabilities Act of 1990: http://www.usdoj.gov/crt/ada/deldot.htm

Project Civic Access. A Title II compliance program that includes:

- Settlement agreements with over 150 towns, cities, counties, and States (See "Sidewalks" in each for those that include public right-of-way issues: http://www.ada.gov/civicac.htm)
- Fact sheets: http://www.ada.gov/civicfac.htm
- Tool Kit for State and Local Governments (Chapter 6 covers curb ramps): http://www.ada.gov/pcatoolkit/chap6toolkit.htm

Precedent-setting Court Cases

Kinney v. Yerusalim, 9 F.3d 1067 (1993)

Court finding that resurfacing of city streets is an alteration requiring installation of curb ramps to comply with regulations promulgated under ADA: *http://www.access-board.gov/prowac/yerusalim.htm*

- USDOJ amicus curiae for Yerusalim *http://www.usdoj.gov/crt/foia/pa2.txt*

Barden v. City of Sacramento, CA

On January 22, 2004, the court granted final approval of the settlement in Barden v. Sacramento. This case set a nationwide precedent requiring cities and other public entities to make all public sidewalks accessible. As a result of the court's ruling in this case, public entities must address barriers such as missing or unsafe curb cuts throughout the public sidewalk system, as well as barriers that block access along the length of the sidewalks. Following the court victory, the parties reached a settlement addressing all sidewalk barrier issues City-wide. The settlement provides that for up to 30 years, the City of Sacramento will allocate 20% of its annual Transportation Fund to make the City's pedestrian rights-of-way accessible to individuals with vision and/or mobility disabilities. This will include installation of compliant curb ramps at intersections; removal of barriers that obstruct the sidewalk, including narrow pathways, abrupt changes in level, excessive cross slopes, and overhanging obstructions; and improvements in crosswalk access. *http://www.dralegal.org/downloads/cases/barden/usca_opinion.txt*

- USDOJ amicus briefs filed with the courts in support of the appellants (Barden):
  - *http://www.usdoj.gov/crt/briefs/barden.htm*
  - *http://www.usdoj.gov/osg/briefs/2002/2pet/6invit/2002-0815.pet.ami.inv.html*

Metro Nashville, Davidson County, Tennessee

In January 2000, the Metropolitan Government of Nashville and Davidson County voluntarily contacted the United States Department of Justice to discuss its plans for achieving compliance with Title II of the ADA. A formal agreement was reached between the two parties in July 2000. The Final Settlement Agreement was reached in 2004. Metropolitan Government of Nashville and Davidson County has conducted extensive reviews of their policies and procedures and made substantial changes to ensure the integration of accessibility into the activities conducted in the public rights-of-ways. Processes have been developed that are transferable to any state and other local governments as models for complying with ADA obligations and regulations.

Final Settlement Agreement between the United States of America and Metropolitan Government of Nashville and Davison County Tennessee for Structural Changes to Public Buildings and Facilities: *http://www.usdoj.gov/crt/ada/nashvil2.htm*

Final Transition Plan For Achieving Program Access as Required by the Americans with Disabilities Act, 1990, and Section 504 of the Rehabilitation Act, 1973, as amended December 10, 2003: *http://www.nashville.gov/finance/support_services/ada/doj_2047143_final_textonly.htm*

Policy and procedure forms for projects in the public rights-of-way: *http://www.nashville.gov/gsa/ADA/procedures-forms.htm*

- Facility Construction and Rehabilitation Project Procedures for Integration of ADA Compliance Requirements, process that ensures ADA requirements are integrated in the business processes through the government, for new construction or rehabilitation of existing facilities, including recreational areas: *ftp://ftp.nashville.gov/web/gsa/ADA/forms/proced_for_integ_of_ada_compl_reqs_accomp_projsubmform_pdftagged.pdf*
- Project Submittal Form, requires sign-off on processes and procedures for ADA compliance in projects: *ftp://ftp.nashville.gov/web/finance/support-services/ada/ProjSubmitFormRev01-22-04.pdf*
- 20% Rule for Work Completed in the Public right-of-way. This policy applies 20% of the funds for any activities occurring within the right-of-way of any street, highway, or alley in Metro Nashville, Davidson County to be applied to provide pedestrian accessibility. The priority for using the

20% funds is crosswalks, sidewalk obstructions, and sidewalks. The 20% Rule excludes the cost of curb ramp installations, which are included as part of the standard project bid: *ftp://ftp.nashville.gov/web/gsa/ADA/forms/20percent-row_pdftagged.pdf*

- Right-of-way Accessibility Review Form, project checklist: *ftp://ftp.nashville.gov/web/gsa/ADA/forms/right-of-way_rvw_pdftagged.pdf*
- Technical Infeasibility Statement Form, ADAAG contains a provision relating to "technical infeasibility" applicable only in alterations (does not apply to new construction). If compliance cannot be achieved to the maximum extent feasible it must be documented and receive sign-off before proceeding with the project: *ftp://ftp.nashville.gov/web/gsa/ADA/forms/tech_infeas_pdftagged.pdf*
- Common ADA Errors and Omissions in New Construction and Alterations. The ADA requires that new construction and alterations to existing facilities comply with the ADA Standards for Accessible Design (Standards). This document lists a sampling of common accessibility errors or omissions that have been identified through the DOJ's ongoing enforcement efforts. ADA requirements for new construction and alterations include detailed provisions for elements, spaces, and facilities. Successful accessibility is often measured in inches, so attention to detail can make the difference between achieving access and excluding or injuring someone. When the ADA's minimum requirements are not met, the results can limit or exclude a person with a disability and can be dangerous: *ftp://ftp.nashville.gov/web/gsa/ADA/forms/common_e-o_newconstr-alts_pdftagged.pdf*
- Nashville-Davidson County Strategic Plan For Sidewalks & Bikeways, March 2003: *http://www.nashville.gov/mpc/sidewalks/finalplan_march03.htm*
  - Provides and extensive discussion of pedestrian access issues in the Appendix B, Pedestrian Facilities Design Guidelines: *ftp://ftp.nashville.org/web/mpc/sidewalks/Mar2003/appendix_b.pdf*

US Access Board *http://www.access-board.gov*

Building a True Community: Final Report (January 2001), PROWAAC's report to the US Access Board: *http://www.access-board.gov/prowac/commrept/index.htm*

Revised Draft Guidelines for Accessible Public Rights-of-Way (HTML Version), November 23, 2005. Second draft of PROWAG—provisions specific to public rights-of-way to supplement the Board's ADA and ABA accessibility guidelines (2004). The guidelines become enforceable when they are adopted by the standard setting agencies—the DOJ and the DOT: *http://www.access-board.gov/prowac/draft.htm*

Notice of availability of draft guidelines for the ADA Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; Public Rights-of-Way, Published in the Federal Register on November 23, 2005: *http://www.access-board.gov/prowac/noa.htm*

FHWA notice of the draft guidelines, January 23, 2006: *http://www.fhwa.dot.gov/environment/bikeped/prwaa.htm*

Accessible Rights-of-Way: A Design Guide. Developed by the U.S. Access Board in collaboration with the USDOT/FHWA to assist public works and transportation agencies covered by Title II of the ADA in designing and constructing public sidewalks and street crossings: *http://www.access-board.gov/prowac/guide/PROWGuide.htm*

Interfacing Audible Pedestrian Signals and Traffic Signal Controllers. Provides detailed APS product information specifically focused on the interfacing of APS devices and traffic signal controllers. Information on the various traffic signal controllers used today is also provided. The information is intended for traffic engineers, traffic signal technicians, and others who are implementing APS technologies: *http://www.access-board.gov/research/APS/report.htm*

Pedestrian Access to Modern Roundabouts. Provides research on improving accessibility of roundabouts to blind pedestrians, suggested approaches, differences in access issues between roundabouts and traditional intersections, and orientation and mobility techniques used by pedestrians who are blind in traveling

independently across streets:
http://www.access-board.gov/research/roundabouts/bulletin.htm

Detectable Warnings Update:
http://www.access-board.gov/adaag/dws/update.htm
Detectable Warnings: Synthesis of U.S. and International Practice. This synthesis summarizes the state-of-the-art regarding the design, installation, and effectiveness of detectable warning surfaces used in the U.S. and abroad:
http://www.access-board.gov/research/DWSynthesis/report.htm

Accessible Sidewalks (DVD). A four-part video developed by the Access Board to illustrate access issues and considerations; is available free from the Board on DVD. The DVD contains:

- Program 1: Pedestrians Who Use Wheelchairs
- Program 2: Pedestrians Who Have Ambulatory Impairments
- Program 3: Pedestrians Who Have Low Vision
- Program 4: Pedestrians Who Are Blind

http://www.access-board.gov/prowac/video/index.htm

Federal Highway Administration (FHWA) Bicycle and Pedestrian Program
http://www.fhwa.dot.gov/environment/bikeped/index.htm

FHWA program offices have resources that promote pedestrian transportation accessibility, use, and safety.

The Bicycle & Pedestrian Program of Office of Natural and Human Environment:
http://www.fhwa.dot.gov/environment/bikeped/index.htm

FHWA POLICY MEMORANDA

The Americans with Disabilities Act Policy promotes universal design and the development of a fully accessible transportation system. This document calls for mainstreaming facilities for people with disabilities in our nation's transportation system:
http://www.fhwa.dot.gov/environment/bikeped/atl.htm

Use of 2005 PROWAG draft:
http://www.fhwa.dot.gov/environment/bikeped/prwaa.htm

Detectable Warnings: FHWA and the US Access Board encourage the use of the latest recommended design for truncated domes:
http://www.fhwa.dot.gov/environment/bikeped/dwm04.htm (2004)
http://www.fhwa.dot.gov/environment/bikeped/dwm.htm (2002)

The Manual on Uniform Traffic Control Devices (MUTCD). Defines the standards used by road managers nationwide to install and maintain traffic control devices (signs, signals, and markings) on all streets and highways. The MUTCD is published by the FHWA under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. The MUTCD audience includes the insurance industry, law enforcement agencies, academic institutions, private industry, and construction and engineering concerns:
http://mutcd.fhwa.dot.gov/kno-2003r1.htm;
http://mutcd.fhwa.dot.gov/HTM/2003r1/html-index.htm

Designing Sidewalks and Trails for Access Part I of II: Review of Existing Guidelines and Practices
http://www.fhwa.dot.gov/environment/bikeped/Access-1.htm

Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide
http://www.fhwa.dot.gov/environment/sidewalk2/index.htm

FHWA two-part guidebook on planning and designing sidewalks and trails for access. Created to provide planners, designers, and transportation engineers with a better understanding of how sidewalks and trails should be developed to promote pedestrian access for all users, including people with disabilities.

Design Guidance Accommodating Bicycle and Pedestrian Travel: A Recommended Approach. A policy statement adopted by the United States Department of Transportation. USDOT encourages public agencies, professional associations, advocacy groups, and others to integrate bicycling and walking into the transportation mainstream:
http://www.fhwa.dot.gov/environment/bikeped/Design.htm

Freedom to Travel Survey. The Bureau of Transportation Statistics (BTS),(USDOT), survey designed to identify the impact of transportation on the work and social

lives of people with disabilities, and the extent to which such impact is unique to that population. http://www.bts.gov/publications/freedom_to_travel/

Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines. Includes recommendations on how to provide safer crossings for pedestrians: http://www.tfhrc.gov/safety/pubs/04100/index.htm

How to Develop a Pedestrian Safety Action Plan. Guide and resource for improving pedestrian safety intended to assist agencies in enhancing their existing pedestrian safety programs and activities, including identifying safety problems and selecting optimal solutions through redesign and engineering countermeasures. http://www.walkinginfo.org/pp/howtoguide2006.pdf

Accommodating Pedestrians in Work Zones. Illustrated brochure: http://safety.fhwa.dot.gov/wz/wzp3.htm

OTHER RESOURCES
Guides, Manuals, Reports, Research, Data

AASHTO guides can be purchased through the AASHTO web site at: http://www.transportation.org

- *Guide for the Planning, Design and Operation of Pedestrian Facilities* (2004). The American Association of State and Highway Transportation Officials (AASHTO), presents effective measures for accommodating pedestrians on public rights-of-way. The guide recognizes the profound effect that land use planning and site design have on pedestrian mobility and addresses these topics as well.
- *A Policy on Geometric Design of Highways and Streets*, (Green Book), AASHTO, 2001

Accessible Design for the Blind website contains information on detectable warnings and APS: http://www.accessforblind.org/

Institute of Transportation Engineers (ITE)

- *Accessible Public Rights-of-Way: Planning and Design for Alternatives:* http://www.ite.org/accessible/PROWAAC/PROWAAC_SpecialReport.htm
- *Electronic Toolbox for Making Intersections More Accessible for Pedestrians Who Are Blind or Visually Impaired*: http://www.ite.org/accessible/

The following publications can be purchased through the ITE web site at http://www.ite.org:

- *Design and Safety of Pedestrian Facilities: A Proposed Recommended Practice of the Institute of Transportation Engineers*, ITE Technical Council Committee 5A-5.
- *Alternative Treatments for At-Grade Pedestrian Crossings*, an informational report documenting studies on pedestrian crossings.
- *Improving the Pedestrian Environment Through Innovative Transportation Design*.

Pedestrian and Bicycle Information Center (PBIC), a clearinghouse with information on pedestrian design, planning, research, safety and education: http://www.walkinginfo.org/

American Council of the Blind (ACB) Pedestrian Safety Website, a clearinghouse with resources for pedestrian safety, wayfinding, and accessible travel: http://www.acb.org/pedestrian/index.html

- *Pedestrian Safety Handbook* provides resources on understanding and details for improving travel for people with visual disabilities: http://www.acb.org/pedestrian/handbook.html
- Survey of Signalized Intersection Accessibility. ACB surveyed 158 pedestrians who are legally blind regarding their experiences in independently crossing at intersections with and without audible signals.
  - 91% of respondents indicated that they sometimes had difficulty knowing when to begin crossing (difficulty hearing surge of traffic on street beside them), which they attributed to one or more of four reasons.
  - 79% of respondents indicated that they sometimes had difficulty traveling straight across the street, for one or more of three reasons.
  - 90% of respondents had experienced one or more problems with pushbuttons.

- 71% of respondents had experienced one or more difficulties with existing accessible pedestrian signals.

http://www.acb.org/pedestrian/phd2a.html#ped09

NCHRP, an industry research program overseen by TRB

Accessible Pedestrian Signals; A Synthesis and Guide to Best Practices, NCHRP Research Project 3-62, Guidelines for Accessible Pedestrian Signals provides an introduction to APS research: http://www.walkinginfo.org/aps/home.cfm

State DOTs

Wisconsin DOT, Curb Ramp Detectable Warning Fields: Truncated Warning Dome Installations Technical Note (June 2005). Provides technical information on installations of curb ramp detectable warnings/truncated domes: http://www.dot.wisconsin.gov/library/research/docs/finalreports/tau-finalreports/warningdomestechnote.pdf

WisDOT Truncated Warning Dome Systems for Handicap Access Ramps (Nov. 2003). Product trials—A study in partnership with the FHWA and the City of Madison Engineering Division. Product trials of truncated dome warning systems for ramps to evaluate constructability, durability, aesthetics, cost, and conformance to the standard: http://www.dot.wisconsin.gov/library/research/docs/finalreports/tau-finalreports/warningdomes.pdf

Georgia DOT Pedestrian & Streetscape Guide. Provides a tool kit and technical information on "best practices" that apply to situations encountered in project development, examination of pedestrian characteristics, and other factors that influence pedestrian travel, spatial analysis, ways to prioritize projects using Geographic Information Systems (GIS), referencing the Latent Demand Model and Portland, OR's Pedestrian Potential Index: http://www.dot.state.ga.us/dot/plan-prog/planning/projects/bicycle/ped_streetscape_guide/toolkit%202%20final.pdf

Indiana DOT Standard Specifications (2006). Section 604, Sidewalks, Curb ramps, Steps and Handrails: http://www.in.gov/dot/div/contracts/standards/book/2006MasterSpecBook.pdf

Oregon DOT, Standard Drawings for Sidewalks & Ramps (Roadway 700—Curbs, Islands, Sidewalks, and Driveways): http://egov.oregon.gov/ODOT/HWY/ENGSERVICES/roadway_drawings.shtml#Roadway_700_Curbs_etc_

Washington State DOT Pedestrian Design Considerations Design Manual, May 2006. Planning, design, and operations guidance: http://www.wsdot.wa.gov/EESC/Design/DesignManual/desEnglish/1025-E.pdf

Arizona DOT Statewide Bicycle and Pedestrian Plan (2003). A guide for making pedestrian-related transportation decisions at the state and local level: http://www.azbikeped.org/statewide-bicycle-pedestrian-intro.html

Pedestrian planning, design, and operation policies: http://www.azbikeped.org/appendix%20c/08_DG.pdf

Vermont DOT Pedestrian and Bicycle Facility Planning and Design Manual, Chapter 3, Pedestrian Facilities. Provides policy, planning and design guidance for sidewalks and walkways, street corners and intersections, and street and driveway crossings: http://www.aot.state.vt.us/progdev/Documents/LTF/FinalPedestrianAndBicycleFacility/Chap3.pdf

California DOT Pedestrian and Bicycle Facilities in California, Technical Reference Report (2005). Provides guidance on policy, planning, and design: http://www.dot.ca.gov/hq/traffops/survey/pedestrian/TR_MAY0405.pdf

Colorado DOT directive for *ADA Accessibility Requirements for CDOT Transportation Projects*. Includes policies and procedures for pedestrian accessibility in roadway resurfacing projects: http://www.dot.state.co.us/DesignSupport/ADA/ADA%20Accessibility%20Requirements%20in%20CDOT%20Transportation%20Projects%2010-20-2003%20.pdf

Colorado DOT *Standard Specifications for Detectable Warnings*, Section 608, May 26, 2005 Revision: http://www.dot.state.co.us/DesignSupport/Construction/1999PSP/608dw.doc

Maryland State Highway Administration *Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways*: *http://www.sha.state.md.us/businesswithSHA/bizstdsspecs/ohd/ada/policy.asp*

TRAINING, COURSES, PRESENTATIONS

Accessible Sidewalks (DVD), a 4-part video developed by the Access Board to illustrate access issues and considerations, is available free from the Board on DVD. The DVD contains:

- Program 1: Pedestrians Who Use Wheelchairs
- Program 2: Pedestrians Who Have Ambulatory Impairments
- Program 3: Pedestrians Who Have Low Vision
- Program 4: Pedestrians Who Are Blind

http://www.access-board.gov/prowac/video/index.htm

Designing and Planning Accessible Pedestrian Facilities training course, developed in cooperation with FHWA and the Association of Pedestrian and Bicycle Professionals (APBP), contact info@apbp.org.

Designing Accessible Pedestrian Facilities in the Public Rights-of-Way Series. This series of four individual courses is intended to provide practicing traffic and highway engineers, planners, and transportation managers with a better understanding of the latest public rights-of-way guidelines developed by the U.S. Access Board, and how they can be applied in better designing sidewalks and intersections to accommodate persons with disabilities. Each of the four course modules is designed to be informative in the area of identifying the needs of persons with disabilities, provide practical engineering approaches to successfully addressing these needs on existing facilities, and serve as catalysts in promoting innovative solutions to similar challenges at future locations. ITE: *http://www.ite.org/education/olg.asp*

Michael Moule, P.E., PTOE, Livable Streets, Inc., (813) 221-5223; fax (813) 354-4422 *moule@livablestreetsinc.com*

Pedestrians with Vision Loss or Blindness, powerpoint presentation: *http://safety.fhwa.dot.gov/intersections/roundaboutsummit/rndabtatt4.htm*

Accessible Pedestrian Signal Features New Possibilities for Access in the US, Janet Barlow, Accessible Design for the Blind, powerpoint presentation: *http://www.accessforblind.org/presentations/aps/Accessible_Signals_Presentation.pps*

Transportation Prescription for Healthy Cities, by Ian M. Lockwood, P.E., Presentation that includes a discussion in Section 3 on how traditional language used by engineers can unknowingly contain biases; recommendations for the use of unbiased terminology. Prepared for the Robert Wood Johnson Foundation and the New Jersey Department of Transportation: *http://policy.rutgers.edu/vtc/documents/Events.ComGrnd-Lockwood_trans_perscript.pdf#search='TRANSPORTATION%20PRESCRIPTION%20FOR%20healthy%20cities%20Ian%20lockwood*

PLANNING AGENCIES

Nashville-Davidson County Strategic Plan For Sidewalks & Bikeways, March 2003: *http://www.nashville.gov/mpc/sidewalks/finalplan_march03.htm*

Provides an extensive discussion of pedestrian access issues in Appendix B, Pedestrian Facilities Design Guidelines: *ftp://ftp.nashville.org/web/mpc/sidewalks/Mar2003/appendix_b.pdf*

City of Tucson *Land Use Ordinance Code*, Section 3.2.8 Access Provision provides design standards for pedestrian circulation paths, access to streets, and improvements for pedestrian facilities to increase public safety by lessening the conflict between vehicular and pedestrian activities:

http://www.tucsonaz.gov/planning/codes/luc/lucweb/Art3div2.html#TopOfPage

San Diego, CA *Pedestrian Master Plan* (2004): http://www.sandag.cog.ca.us/uploads/publicationid/publicationid_713_3269.pdf

City of Sacramento *Pedestrian Master Plan, Making Sacramento the Walking Capital*, Public Review Draft, (November 2005): http://www.cityofsacramento.org/pedestrian_master_plan/Draft_Ped_Master_Plan_11.02.05.pdf

Pedestrian Safety Guidelines for the City of Sacramento Public Works Department Traffic Engineering Division (January 9, 2003): http://www.cityofsacramento.org/dsd/dev_eng_finance/entitlements/pdfs/Ped_Safety.pdf

Portland, OR *Pedestrian Master Plan* (1998): www.portlandonline.com/transportation/index.cfm?c=37064

"Portland Pedestrian Design Guide," an element of the *Pedestrian Master Plan* for the City of Portland, Oregon: http://www.portlandonline.com/shared/cfm/image.cfm?id=84048

Oakland, CA *Pedestrian Master Plan* (Nov. 2002), Part of the Land Use and Transportation Element of the City of Oakland's General Plan: http://www.oaklandnet.com/government/pedestrian/PedMasterPlan.pdf

City of Cambridge, MA: *Pedestrian Plan* (2000): http://www.cambridgema.gov/~CDD/et/ped/plan/ped_plan.html.

"City of Seattle *Right-of-Way Improvements Manual*" provisions for incorporating pedestrian travel into the process, procedures, design criteria for grading, design cross section, intersections, driveways, curbs, sidewalks and crosswalks: http://www.seattle.gov/transportation/rowmanual/manual/

The City of Seattle *Standard Plans and Standard Specifications for Road, Bridge, and Municipal Construction* http://www.seattle.gov/util/Engineering/Standard_Plans_&_Specs/index.asp

400 Street Paving & Appurtenance, includes curb ramps http://www2.cityofseattle.net/util/standardplans/plans2005/400Series.pdf

Boulder, CO: *Transportation Master Plan* (2003), fully integrates pedestrian travel into the transportation plan: http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=331&itemid=1201.

"Chapter 6, Pedestrian Policies" includes a snow removal policy provision for pedestrian travel: http://www.ci.boulder.co.us/files/Transportation_Master_Plan/Chapter6_1.pdf

"City of Boulder Pedestrian Crossing Treatment Warrants," provisions and criteria for improving pedestrian street crossing warrants for better access and safety compared to the MUTCD criteria: http://www.ci.boulder.co.us/files/Transportation_Master_Plan/Boulder_Ped_Xing_Warrants.pdf

PLANNING AND FUNDING ACCESSIBLE PEDESTRIAN FACILITIES

From http://www.ite.org/accessible/accessibleped.asp; http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm

Funding Availability and Design Philosophy

The combined funding of Federal, state and local government on surface transportation is one of this country's largest domestic spending programs. The funding for pedestrian issues has increased dramatically since 1991. This increase was spurred by transportation legislation, grassroots support, and accessibility policies. Pedestrian projects and programs are eligible for funding in almost every major federal-aid surface transportation category. Transportation legislation, including the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) calls for mainstreaming pedestrian (and bicycle) projects into planning, design,

and operation of our nation's transportation system. Transportation facilities must include features that will allow people of all abilities to use them. The federal-aid highway program can work hand-in-hand with the ADA of 1990, which requires all pedestrian facilities be accessible for people with disabilities. Accessibility is not an exclusive or separate issue. Rather, accessibility design is fundamental to the walking environment because all pedestrians with or without disabilities benefit from accessibility design. Accessibility is an intrinsic part of planning, retrofitting, and constructing pedestrian facilities, along with safe accommodation and good design. Accessibility is a safety issue because if a facility is not accessible, then it is not safe for more than 54 million people in this country who have some form of disability. The USDOT's policy on accessibility states, "Accessibility is a civil right. The key function of transportation, at its most fundamental level, is to provide basic mobility to society. It is our responsibility to strive to ensure that transportation systems are not only safe and efficient, but also usable by all-including persons with disabilities." The USDOT's Accessibility Policy Statement can be reviewed at *www.dot.gov/accessibility/polfin.htm*.

Accessibility requirements are not new and these obligations have been around long before the ADA in 1990. States and localities were first required to place curb ramps at street crossings in 1973 by Section 504 of the Rehabilitation Act. Also, the DOJ has ruled that resurfacing a roadway (beyond filling pot holes) is an alteration, thus triggering the requirement to place curb ramps at roadway intersections.

Funding Sources for Pedestrian Projects

Pedestrian projects are broadly eligible for funding from almost all the major federal-aid highway, transit, safety and other programs. The matrix at the end of this section denotes the FHWA and FTA funding programs that can be used to fund pedestrian projects and activities.

Federal-Aid Highway Programs

National Highway System funds may be used to construct pedestrian walkways and facilities on land adjacent to any highway on the National Highway System, including Interstate highways.

Surface Transportation Program (STP) funds may be used for either the construction of pedestrian walkways, or nonconstruction projects (such as maps, brochures, and public service announcements) related to safety. TEA 21 adds "the modification of public sidewalks to comply with the Americans with Disabilities Act" as an activity that is specifically eligible for the use of these funds.

Ten percent of each state's annual STP funds is set-aside for Transportation Enhancement Activities (TEAs). The law provides a specific list of activities that are eligible TEAs and this includes "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails)." Another 10% of each state's STP funds is set aside for the Hazard Elimination and Railway–Highway Crossing programs, which address pedestrian safety issues. Each state is required to implement a Hazard Elimination Program to identify and correct locations that may constitute a danger to motorists, bicyclists, and pedestrians. Funds may be used for activities including a survey of hazardous locations and for projects on any publicly owned, shared-use path, pedestrian pathway or trail, or any safety-related traffic calming measure.

Congestion Mitigation and Air Quality Improvement Program funds may be used for either the construction of pedestrian walkways or nonconstruction projects (such as maps, brochures and public service announcements).

Recreational Trails Program funds may be used for all kinds of trail projects. Of the funds apportioned to a state, 30% must be used for motorized trail uses, 30% for nonmotorized trail uses and 40% for diverse trail uses (any combination).

Provisions for pedestrians are eligible under the various categories of the Federal Lands Highway Program in conjunction with roads, highways, and parkways. Priority for funding projects is determined by the appropriate Federal Land Agency or Tribal government.

National Scenic Byways Program funds may be used for "construction along a scenic byway of a facility for pedestrians."

High-Priority Projects and Designated Transportation Enhancement Activities identified by SAFETEA-LU include numerous pedestrian, trail, and traffic calming projects in communities throughout the country.

Safe Routes to School funds are provided to the states to substantially improve the ability of primary and middle school students to walk and bicycle to school safely. The purposes of the program are:

1. to enable and encourage children, including those with disabilities, to walk and bicycle to school;
2. to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age; and
3. to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately 2 miles) of primary and middle schools (Grades K-8).

Each state administers its own program and develops its own procedures to solicit and select projects for funding. The program establishes two distinct types of funding opportunities: infrastructure projects (engineering improvements) and non-infrastructure related activities (such as education, enforcement, and encouragement programs

Federal Transit Program

Title 49 U.S.C. (as amended by SAFETEA-LU) allows the Urbanized-Area Formula Grants, Capital Investment Grants and Loans, and Formula Program for Other Than Urbanized Area transit funds to be used for improving pedestrian access to transit facilities and vehicles. Eligible activities include investments in "pedestrian and bicycle access to a mass transportation facility" that establishes or enhances coordination between mass transportation and other transportation.

SAFETEA-LU also created a Transit Enhancement Activity program with a one percent set-aside of

Matrix of FHWA and FTA Funding Opportunities for Pedestrian Facilities

SAFETEA-LU Bicycle/Pedestrian Funding Opportunities																
	NHA	STP	HEP	RHC	TEA	CMAQ	RTP	FTA	TE	BRI	402	PLA	TCSP	JOBS	FLH	BYW
Bicycle and pedestrian plan		*				*						*	*			
Bicycle lanes on roadway	*	*	*	*	*	*		*	*	*					*	*
Paved shoulders	*	*	*	*	*	*				*					*	*
Signed bike route	*	*			*	*									*	*
Shared-use path/trail	*	*			*	*	*			*					*	*
Single track hike/bike trail							*									
Spot improvement program		*	*		*	*										
Maps		*				*					*					
Bike racks on buses		*			*	*		*	*							
Bicycle parking facilities		*			*	*		*	*							*
Trail/highway intersection	*	*	*		*	*	*								*	*
Bicycle storage/service center		*			*	*		*	*				*	*		
Sidewalks, new or retrofit	*	*	*	*	*	*		*	*	*					*	*
Crosswalks, new or retrofit	*	*	*	*	*	*		*	*						*	*

SAFETEA-LU Bicycle/Pedestrian Funding Opportunities																
	NHA	STP	HEP	RHC	TEA	CMAQ	RTP	FTA	TE	BRI	402	PLA	TCSP	JOBS	FLH	BYW
Signal improvements	*	*	*	*	*	*										
Curb cuts and ramps	*	*	*	*	*	*										
Traffic calming		*	*	*		*							*			
Coordinator position		*				*							*			
Safety/education position		*				*					*					
Police patrol		*				*					*					
Helmet promotion		*			*						*					
Safety brochure/book		*			*	*					*					
Training						*					*					

Key

NHS	National Highway System	CMAQ	Congestion Mitigation/Air Quality Program	TCSP	Transportation and Community and System Preservation Pilot Program
STP	Surface Transportation Program	FLH	Federal Lands Highways Program	JOBS	Access to Jobs/Reverse Commute Program
HEP	Hazard Elimination Program	BYW	Scenic Byways	RTP	Recreational Trails Program
RHC	Railway-Highway Crossing Program	BRI	Bridge	FTA	Federal Transit Capital, Urban & Rural Funds
TEA	Transportation Enhancement Activities	402	State and Community Traffic Safety Program	TE	Transit Enhancements
		PLA	State/Metropolitan Planning Funds		

Urbanized-Area Formula Grant funds designated for, among other things, pedestrian access and walkways.

Highway Safety Programs

Pedestrian and bicyclist safety remain priority areas for State and Community Highway Safety Grants funded by the Section 402 formula grant program. A state is eligible for these grants by submitting a performance plan (establishing goals and performance measures for improving highway safety) and a highway safety plan (describing activities to achieve those goals). Research, development, demonstrations, and training to improve highway safety (including pedestrian safety) is carried out under the Highway Safety Research and Development (Section 403) program.

SELF-EVALUATIONS AND TRANSITION PLANS

The purpose of the self-evaluation is to review jurisdiction/agency policies, practices, and procedures to identify those that may discriminate against or prevent participation of persons with disabilities. Public input, including the participation of residents with disabilities, is part of the self-evaluation process

Process:

- Conduct an evaluation of current programs, services, and activities as well as employment practices and procedures to ensure they do not discriminate against people with disabilities.
- Undertake modifications to any programs, services, activities, or employment provisions that may have the affect of discriminating.
- Provide an opportunity for interested groups and individuals with disabilities to provide input on the self-evaluation process.

For public entities that have more than 50 employees, the self-evaluation must be kept on file and available for public inspection for at least three years. The self-evaluation plan must include the names of the interested persons consulted, a description of the areas examined, and the problems identified, as well as a description of any modifications made or planned. Additionally, an ADA Coordinator must be appointed to coordinate compliance efforts; a grievance procedure adopted and published; and a transition plan developed identifying structural changes needed to facilities to ensure program accessibility.

The transition plan must identify and schedule all structural modifications that are needed to buildings

and facilities to ensure that programs, services, and activities are accessible to people with disabilities.

A 2006 NCHRP project will develop model transition planning recommendations for transportation industry agencies:
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1247

State of Hawaii DOT, *Transition Plan*, includes a curb cut replacement schedule:
http://www.state.hi.us/dot/administration/ada/transitionplan.pdf

Monmouth County, NJ developed a boiler-plate *ADA Self Evaluation/Transition Plan Guidelines* for municipal governments. It includes procedural requirements such as grievance procedures, appointment of ADA officer, and complaint investigations:
http://monmouthhumanservices.org/Acrobat/ADA_GUIDELINES.PDF

Sacramento County *ADA Transition Plan*:
http://www.sacdot.com/projects/ADA%20and%20Pedestrian%20Projects/ADA_Plan/

Documents and resources:
http://www.sacdot.com/projects/ADA%20and%20Pedestrian%20Projects/ADA_Plan/docs.asp

FEDERAL TRANSPORTATION LAW RESOURCES

Federal Surface Transportation Laws:
http://www.fhwa.dot.gov/legsregs/legislat.html

49 CFR Part 27 (Authority: Section 504 of the Rehabilitation Act of 1973, as amended – 29 USC 794)

Title 23, CFR Sec §450.214 (b) (3) The State shall develop a statewide transportation plan for all areas of the State that shall contain, as an element, a plan for bicycle transportation, pedestrian walkways and trails which is appropriately interconnected with other modes.

Title 23, CFR Sec §450.214 (b) (4) The State shall develop a statewide transportation plan that is coordinated with the metropolitan transportation plans required under 23 U.S.C. 134.

Title 23, CFR §450.322 The Metropolitan Transportation Plan shall include adopted congestion management strategies including, as appropriate, traffic operations, ridesharing, pedestrian and bicycle facilities, alternative work schedules, freight movement options, high occupancy vehicle treatments, telecommuting, and public transportation improvements (including regulatory, pricing, management, and operational options), that demonstrate a systematic approach in addressing current and future transportation demand and identify pedestrian walkway and bicycle transportation facilities in accordance with 23 U.S.C. 217(g).

Title 23, U.S.C. Sec.134 (a) (3) The plans and programs for each metropolitan area shall provide for the development and integrated management and operation of transportation systems and facilities (including pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system for the metropolitan area and as an integral part of an intermodal transportation system for the State and the United States.

23 U.S.C. § 109(n)The Secretary shall not approve any project or take any regulatory action under this title that will result in the severance of an existing major route or have significant adverse impact on the safety for nonmotorized transportation traffic and light motorcycles, unless such project or regulatory action provides for a reasonable alternate route or such a route exists

Title 23, U.S.C. Sec. 135 (a) (3) The plans and programs for each State shall provide for the development and integrated management and operation of transportation systems and facilities (including pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system for the State and an

integral part of an intermodal transportation system for the United States.

Title 23 U.S.C. 217(g) Planning and Design. Bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans developed by each metropolitan planning organization and state in accordance with sections 134 and 135, respectively. Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation facilities, except where bicycle and pedestrian use are not permitted.

TEA-21, § 1202(a): http://www.fhwa.dot.gov/tea21/ Bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans developed by each metropolitan planning organization and State.

Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction and transportation facilities, except where bicycle and pedestrian use are not permitted.

Transportation plans and projects shall provide due consideration for safety and contiguous routes for bicyclists and pedestrians.

Safety considerations shall include the installation, where appropriate, and maintenance of audible traffic signals and audible signs at street crossings.

MUTCD, FHWA 23, CFR:
http://mutcd.fhwa.dot.gov/

4R DEFINITIONS

Reconstruction (4R) Project

Reconstruction is work proposed on the approximate alignment of an existing route that meets the geometric criteria for a new facility. Includes new location projects or projects that provide substantial changes in the general geometric character of a highway, such as widening to provide additional through travel lanes, horizontal or vertical re-alignment, etc. Reconstruction work includes bridge replacement work.

Rehabilitation (3R) Project

Rehabilitation is work proposed to improve serviceability and extend the service life of existing highways and streets and to enhance safety. Work is usually accomplished within the existing right-of-way and does not include the addition of through travel lanes. Work may include the upgrading of geometric features such as roadway widening, minor horizontal re-alignment, and improving bridges to meet current standards for structural loading and to accommodate the approach roadway width.

Restoration (2R) Project

Restoration is work proposed to restore the pavement structure, riding quality, or other necessary components to their existing cross section configuration. Upgrading roadway components as needed to maintain the roadway in an acceptable condition that may be included in restoration work. The addition of through travel lanes is not permitted under a restoration project.

Resurfacing

Resurfacing is the application of an additional surface to an existing base pavement or wearing surface to improve the ride, strength, or safety of the pavement.

ADA COMMON PROBLEMS

From the ADA and City Governments: Common Problems (USDOJ): http://www.ada.gov/comprob.htm

Issue: Program Accessibility

Common Problem

City governments often have failed to ensure that the whole range of a city's services, municipal buildings, and programs meet Title II's program access requirements.



A ramp was installed to provide access to the city activities conducted in this facility.

Result

People with disabilities are unable to participate in the activities of city government, such as public meetings, city functions, and are unable to gain access to the city's various programs and services. If a municipal building such as a courthouse is inaccessible, people with disabilities who use wheelchairs are unable to participate in jury duty, attend hearings, and gain access to other services because doorways are too narrow, restroom facilities are inaccessible, and steps are the only way to get to all or portions of a facility.

Requirement

Title II requires city governments to ensure that all of their programs, services, and activities, when viewed in their entirety, are accessible to people with disabilities. Program access is intended to remove physical barriers to city services, programs, and activities, but it generally does not require that a city government make each facility, or each part of a facility, accessible. For example, each restroom in a facility need not be made accessible. However, signage directing people with disabilities to the accessible features and spaces in a facility should be provided. Program accessibility may be achieved in a variety of ways. City governments may choose to make structural changes to existing facilities to achieve access. But city governments can also pursue alternatives to structural changes to achieve program accessibility. For example, city governments can move public meetings to accessible buildings and can relocate services for individuals with disabilities to accessible levels or parts of buildings. When choosing between possible methods of program accessibility, however, city governments must give priority to the choices that offer services, programs, and activities in the most integrated setting appropriate. In addition, all newly constructed city facilities must be fully accessible to people with disabilities.
28 C.F.R. §§ 35.149, 35.150, 35.151, 35.163.

Issue: Curb Ramps

Common Problem

City governments often do not provide necessary curb ramps to ensure that people with disabilities can travel throughout the city in a safe and convenient manner.

Result

Without the required curb ramps, sidewalk travel in urban areas is dangerous, difficult, and in some cases impossible for people who use wheelchairs, scooters, and other mobility aids. Curb ramps allow people with mobility impairments to gain access to the sidewalks and to pass through center islands in streets. Otherwise, these individuals are forced to travel in streets and roadways and are put in danger or are prevented from reaching their destination.



Curb ramps provide basic access at intersections and pedestrian crossings.

Requirement

When streets and roads are newly built or altered, they must have ramps wherever there are curbs or other barriers to enter from a pedestrian walkway. Likewise, when new sidewalks or walkways are built or altered, they must contain curb ramps or sloped areas wherever they intersect with streets or roads. While resurfacing a street or sidewalk is considered an alteration for these purposes, filling in potholes alone will not trigger the alterations requirements. At existing roads and sidewalks that have not been

altered, however, city governments may choose to construct curb ramps at every point where a pedestrian walkway intersects a curb, but they are not necessarily required to do so. Under program access, alternative routes to buildings that make use of existing curb ramps may be acceptable where people with disabilities must only travel a marginally longer route. One way to ensure the proper integration of curb ramps throughout a city is to set a series of milestones for curb ramp compliance in the city's transition plan. Milestones are progress dates for meeting curb ramp compliance throughout the municipality. Milestones should occur on a regular basis throughout the course of the transition plan and must reflect a priority to walkways serving government buildings and facilities, bus stops and other transportation services, places of public accommodation, and business districts, followed by walkways serving residential areas. It also may be appropriate for a city government to establish an ongoing procedure for installing curb ramps upon request in both residential and nonresidential areas frequented by individuals with disabilities. 28 C.F.R. §§ 35.150(d)(2); 35.151(e). In setting milestones and in implementing a curb cut transition plan for existing sidewalks, the actual number of curb cuts installed in any given year may be limited by the fundamental alteration and undue burden limitations.

Issue: Self-Evaluation and Transition Plans

Common Problem

City governments often have not conducted thorough self-evaluations of their current facilities, programs, policies, and practices to determine what changes are necessary to meet the ADA's requirements, and have not developed transition plans to implement these changes.

Result

When self-evaluations are not conducted and transition plans not developed, city governments are ill-equipped to implement accessibility changes required by the ADA. Without a complete assessment of a city's various facilities, services, and programs it is difficult to plan or budget for necessary changes, and the city can only react to problems rather than anticipate and correct them in advance. As a result, people with disabilities cannot participate in or benefit from the city's services, programs, and activities.



City policies, including those affecting service animals, should be reviewed during the self-evaluation.

Requirement

All city governments were required to complete a self-evaluation of their facilities, programs, policies, and practices by January 26, 1993. The self-evaluation identifies and corrects those policies and practices that are inconsistent with Title II's requirements. Self-evaluations should consider all of a city's programs, activities, and services, as well as the policies and practices that a city has put in place to implement its various programs and services. Remedial measures necessary to bring the programs, policies, and services into compliance with Title II should be specified—including, but not limited to: relocation of programs to accessible facilities; offering programs in an alternative accessible manner; structural changes to provide program access; policy modifications to ensure nondiscrimination; and auxiliary aids needed to provide effective communication. If a city that employs 50 or more persons decides to make structural changes to achieve program access, it must develop a transition plan that identifies those changes and sets a schedule for implementing them. Both the self-evaluation and transition plans must be available to the public.
28 C.F.R. §§ 35.105, 35.150(d).

Transportation

Kentucky Transportation Center Research Report

University of Kentucky *Year* 2011

Guidelines for Road Diet Conversions

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This paper is posted at UKnowledge.
https://uknowledge.uky.edu/ktc_researchreports/16

Research Report
KTC-11-19/SPR415-11-1F

KENTUCKY TRANSPORTATION CENTER

GUIDELINES FOR ROAD DIET CONVERSIONS

UNIVERSITY OF KENTUCKY
College of Engineering



OUR MISSION

We provide services to the transportation community through research, technology transfer and education. We create and participate in partnerships to promote safe and effective transportation systems.

OUR VALUES

Teamwork
Listening and communicating along with courtesy and respect for others.

Honesty and Ethical Behavior
Delivering the highest quality products and services.

Continuous Improvement
In all that we do.

Research Report
KTC-11-19 / SPR415-11-1F

GUIDELINES FOR ROAD DIET CONVERSIONS

Final Report

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The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views of policies of the University of Kentucky, the Kentucky Transportation Cabinet, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. The inclusion of manufacture names and trade names is for identification purposes and is not to be considered an endorsement.

November 2011

1. **Report Number** KTC-11-19 / SPR415-11-1F	**2. Government Accession No.**	**3. Recipient's Catalog No.**
4. Title and Subtitle Guidelines for Road Diet Conversions		**5. Report Date** November 2011 **6. Performing Organization Code**
7. Author(s) N. Stamatiadis, A. Kirk, C. Wang, and A. Cull		**8. Performing Organization Report No.** KTC-11-19 / SPR415-11-1F
9. **Performing Organization Name and Address** Kentucky Transportation Center College of Engineering University of Kentucky Lexington, Kentucky 40506-0281		**10. Work Unit No.** **11. Contract or Grant No.** SPR316
12. Sponsoring Agency Name and Address Kentucky Transportation Cabinet 200 Mero Street Frankfort, KY		**13. Type of Report and Period Covered:** Final Report; 07/10 – 12/11 **14. Sponsoring Agency Code**
15. Supplementary Notes		

16. Abstract

The purpose of this report is to document the development of the guidelines for the road diet conversions prepared for the Kentucky Transportation Cabinet. The guidelines consider operational and safety aspects of the conversions to assist in the preliminary determination of whether a road diet conversion is appropriate for a given roadway segment. The guidelines provide suggested cross section designs, transition to and from the road diet section and a flow chart for determining the appropriate actions.

17. Key Words Intersection Design, Roundabout, Inside left-turn, median u-turn, superstreet, continuous flow, jughandle, bowtie, intersection evaluation	**18. Distribution Statement** Unlimited		
19. Security Classification (report) Unclassified	20. **Security Classification (this page)** Unclassified	**21. No. of Pg: 94**	**22. Price $0**

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EXECUTIVE SUMMARY

The need for innovative solutions in addressing mobility and safety concerns in an environment with budgetary constraints is paramount. Road diets are one such innovative solution, seeking to develop multimodal corridors while retaining the original right of way. Road diets usually involve restriping a four-lane undivided road as a three-lane road with two through lanes and a two-way left-turn lane. The extra roadway width can be converted to widen existing lanes, create bicycle lanes, supply on street parking, widen sidewalks, or provide opportunities for landscaped median islands. The main focus of past research on road diets has been on evaluating their safety and very little exists in providing design guidance on when such conversions will work. This report provides such guidance in determining the appropriateness of road diet conversions and identified parameters to be considered during such evaluations.

Typically, road diet conversions will operate at acceptable levels as long as the signalized intersections do not present any operational problems. The development of the guidelines analysis focused on evaluating and comparing the operation of three- and four-lane roads at signalized intersections. The critical aspect in this approach is to determine the scenarios and provide basic guidance as to when the road diet conversion is appropriate. The research team used methodologies that could be used to directly link the traffic demand, i.e., design hour volumes and turning movement volumes, to the comparative operation of the two designs. A series of simulations were undertaken to establish the required guidelines for road diet conversions. These simulations were performed with the CORridor SIMulation (CORSIM) and VISSIM software as well as the Safety Surrogate Assessment Model (SSAM).

An important aspect of the work completed here is the extension of the usable range of volumes where road diets could be beneficial. Past work recommended their application for roads with an ADT up to 17,000 vehicles per day (vpd). The current research indicates that such conversions could work for roads with significantly greater volumes, up to 23,000 vpd. Moreover, the findings here identify the effect of the side street volume, indicating that both volumes need to be considered when determining whether such a conversion should be considered.

The simulation results from CORSIM support the assumption that a four-lane option will have a critical lane volume lower than that of a three-lane alternative. This could indicate an operational advantage of the four-lane option when compared to that of the three-lane. For signalized intersections, there are certain conditions where the road diet could be the preferred option over a four-lane alternative. The data also indicates that there is an effect of the side street volume in determining these conditions and that the combination of main and side street volumes needs to be considered in determining whether the road diet is appropriate. Another aspect that could be of interest regarding the operational efficiency of road diets is the resulting queue lengths. An evaluation was completed for this aspect using the same data. The analysis showed that in general the road diet produced smaller or the same average queue lengths than the four-lane roads.

A similar analysis for unsignalized intersections showed that all delays along the major road were very small and the three-lane option had slightly higher delays than the four-lane option. However, these differences were very small and most were less than 2.5 sec/veh with the majority (56 percent of the cases) of the delay differences being 1 sec/veh or less. The significant differences in the unsignalized intersections were noted for the delays along the side street. For all scenarios tested, the delays on the side street for a road diet conversion were smaller than those observed for the four-lane road.

An analysis of the safety aspects of road diets was also conducted using the simulation models. It should be noted that the analysis presented uses a surrogate measure for safety, i.e. potential number of conflicts, and not crashes. The simulation results showed that, in general, the number of rear end conflicts at the signalized intersections will increase with a road diet, when left-turn percentages are low, and will decrease with a road diet when left-turn percentages are high. This was an expected result, since the left-turn vehicles can block the through lane increasing the probability of rear end conflicts.

The analysis for the lane change conflicts showed that at low volumes neither the 3-lane or 4-lane alternative had a high number of conflicts, and the road diet produced less lane change conflicts at higher volumes. This was an expected result, since the number of lanes is reduced and thus the opportunity for such conflicts is also reduced. Left-turn percentage was not identified as a significant predictor for lane change conflicts.

Angle crashes were not modeled using conflict analysis due to software limitations, but case studies evaluated in Kentucky and presented below indicate a general reduction in angle crashes as the result of road diets.

Four road diet conversions in Kentucky were identified and evaluated to determine their overall effects and identify elements that could also assist in the development of the guidelines. In general, it was concluded that the four cases evaluated are successful road diet conversions. The installations covered roadway lengths between 0.82 to 1.41 miles and a variety of conditions. The ADT range of 7,400 to 13,700 vehicles per day also indicates a wide range of volumes where road diets have been implemented. In three of the four cases, safety improved significantly and sideswipe and rear end crashes showed large reductions. There were no significant congestion issues resulting from the installation, and traffic volumes showed a slight decrease after the conversion. One of the cases that showed an increase in crashes after the installation points to the need for developing proper designs for the transition into and out of the road diet. This is critical to avoid potential safety problems associated with merging of traffic and thus creating an inappropriate environment. The same case also identifies access management as an issue for review to avoid potential safety problems.

A set of guidelines was developed using the analysis completed here. One of the important findings of this research is the expansion of the usable range for road diets. Prior experience has limited their application to roadways with an ADT of 17,000 vehicles per day. This research identifies the importance of side street volumes and supports the utilization of road diets on roadways with volumes up to 23,000 vehicles per day. A flow chart identifying required steps to be undertaken to evaluate whether a road diet conversion is appropriate is also provided as part of the guidelines. Problems correctable with a road diet are also identified and a list of required elements to be studied for an in-depth evaluation of road diet installation is also presented.

INTRODUCTION

Rural and urban roadways are becoming increasingly congested throughout the US and other countries and solutions are sought that could facilitate mobility along these facilities. A typical approach for solving this problem has been the addition of lanes but this approach has limited success. At the same time, roadway widening is a very expensive and environmentally disruptive practice that frequently offers only short term relief. The need for innovative solutions in addressing mobility and safety concerns in an environment with budgetary constraints is paramount. Such innovative solutions seek to develop multimodal corridors while retaining the original right of way and among them is the concept of road diet, where the number of travel lanes is reduced. Road diets usually involve restriping a four-lane undivided road as a three-lane road with two through lanes and a two-way left-turn lane. The extra roadway width can be converted to widen existing lanes, create bicycle lanes, supply on street parking, widen sidewalks, or provide opportunities for landscaped median islands.

The road diet approach is a relatively new concept that may improve mobility on a roadway without requiring additional right-of-way. Often the inside through lane on a four-lane undivided roadway acts like a de facto turn-lane, diminishing through capacity. The introduction of a two-way left-turn lane (TWLTL) can often meet the left-turn demand for both directions of travel. Therefore, road diets are a design tool that can be used within existing right of way at a very low cost to improve mobility, and they frequently have no or few negative impacts.

Recently completed studies throughout the US indicate that this alternative is successful in improving both safety and operations along corridors. Such conversions are often considered when there are a significant number of crashes associated with a large number of left-turning vehicles with no turning lanes present. These conversions not only improve the mobility for vehicles, but for non-motorized users (pedestrians and bicyclists) as well, and they also enhance their safety.

Past research has focused on evaluating mainly the safety of road diets. However, there is practically no literature providing guidance on the details of the designs or information as to when such conversions will work. The need to identify criteria to be considered for establishing road diets is critical and should be addressed. This report provides such guidance in determining the appropriateness of road diet conversions and identified parameters to be considered during such evaluations.

LITERATURE REVIEW

Past research has primarily focused on evaluating the safety of road diets. However, there is practically no literature providing guidance on the details of the geometric designs or information as to when such conversions will work from an operational standpoint. A review of all State DOT design manuals and guides did not reveal any guidance regarding road diet conversions.

Road diets can improve operating efficiency and safety for all users. The operational efficiency is the result of removing left-turning traffic and thus avoiding queues behind such vehicles while at the same time lane changes are eliminated (due to the single through lane). The potential for lower operating speeds typically exists in such conversions but this could be viewed as beneficial for the safety of the segment, resulting in lower severity crashes and providing longer reaction time (Huang et al. 2002). The safety of other users could also improve. Bicyclists can have a separate lane which typically improves safety and pedestrians have shorter widths to cross.

A more recent study in Iowa evaluated crash data for 30 sites (15 road diets and 15 comparison sites) over a 23 year period (Pawlovich et al 2006). The study concluded that, after conversion, there was a 25.2 percent reduction in crash frequency and an 18.8 percent reduction in crash rate. Another study using Minnesota road diet conversions also supported safety gains for such roadways (Gates et al 2007). Their study showed reductions of approximately 44 percent in the total number of crashes. In addition, the results showed reductions for injury crashes (45.7 percent) and right angle crashes (37 percent). Reductions were also noted for rear end and left-turn crashes but these reductions were not statistically significant. The study also evaluated before-and-after speeds showing reductions both in mean and 85th-percentile speeds after the roadway conversion.

A study evaluated recent road diet conversions and developed crash modification factors (CMF) for such conversions (FHWA 2010). The study identifies basic benefits of road diets, such as speed reduction, improved safety, and reduced vehicle-pedestrian conflicts. A main goal of the study was to update an earlier study that documented an 18.8 percent reduction in crash rates for road diet conversions (FHWA 2004). The study used a Bayesian approach to compare untreated sites to those where a road diet was implemented. The results clearly indicate that there are safety benefits from these conversions and the magnitude of the benefits depends on the characteristics of the site. The study found an average of 29 percent reduction in total crashes for the treated sites which was attributed to the road diet. Other results include an average reduction of 5 mph in the average speed of motorists and a decrease in percent of drivers driving over 5 mph above the speed limit. The study recommends a CMF of 0.71 for road diet conversions indicating a 29 percent reduction in overall crashes after a road diet installation.

Road diets have been used on roads with an average daily traffic (ADT) of up to 25,000 (Burden and Lagerwey 1999). Other studies have also indicated that capacity is not affected by the elimination of the lane and often no increase in congestion is observed (Welch 1999). An issue of some concern is the potential for diverting traffic to other streets parallel to the converted facility, and this is an aspect that should be monitored over time when evaluating such an option (Rosales 2006).

Improvements in livability conditions and associated benefits are elements to be considered during road diet conversions, as review of past case studies has indicated (Rosales and Knapp 2005). The reduction of the roadway width will make it easier for pedestrians to cross the road

at both signalized and unsignalized intersections, increase feeling of a “safer and more comfortable” street, encourage an increase in pedestrian and bicyclist traffic, and encourage economic growth and redevelopment at a quicker pace (Rosales and Knapp 2005).

The first attempt in defining guidelines for road diet conversions was completed in 2001 (Knapp and Giese 2001). This effort relied on evaluating before-after conditions on existing road diet projects completed at that time and documented several of the benefits from such conversions. The case studies reviewed showed that the 85th-percentile speeds were in general reduced by less than five miles per hour and there was a significant decrease for speeds above the posted speed limit. The review also identified safety improvements with total crash reductions between 17 to 62 percent. The 13 roadway conversions reviewed had ADT volumes of 8,400 to 24,000 vehicles per day (vpd). Simulation was also used to identify potential factors that could be used in determining whether a road diet conversion would be appropriate. The study recommended that a road diet conversion could be considered feasible for roads with an ADT between 15,000 and 17,500 vpd. The authors also emphasized that individual detailed analysis is required once such conversions are considered feasible in order to evaluate the corridor conditions and details, such as access frequency and left-turn percentages. The study also identified a list of elements that need to be considered during the evaluation process.

A more recent attempt to improve on the prior guidelines for road diets was completed in 2006 (Rosales 2006). The main effort was to assess exiting road diets and identify the livability benefits from such roadway conversions considering improved mobility for all users and enhanced street character. The resulting effort developed a step by step process in planning, analysis, and implementation of road diet projects and provided a guide for decision-makers. However, the processes developed remained very general in nature and did not provide specific guidance regarding volumes or left-turn percentages indicating when such a project could result in improved operational and safety conditions.

The review concluded that the literature is inadequate with respect to providing guidance on implementing road diets. The need to identify criteria to be considered for establishing road diets is critical and should be addressed. Issues regarding geometric features of the road to be converted and operational elements to be analyzed should be identified.

METHODOLOGY

Typically, road diet conversions will operate at acceptable levels as long as the signalized intersections do not present any operational problems (Welch 1999). Therefore, this analysis focused on evaluating and comparing the operation of three- and four-lane roads at signalized intersections. The critical aspect in this approach is to determine the scenarios and provide basic guidance as to when the road diet conversion is appropriate. The research team used methodologies that could be used to directly link the traffic demand, i.e. turning movement volumes, to the comparative operation of the two designs.

The most promising approach that could be used here for evaluating and comparing the two alternatives was determined to be Critical Lane Analysis (CLA). Critical Lane Analysis, as developed by Messer and Fambro (1977), uses the geometry of the intersection along with intersection traffic volumes as the basis for establishing a measure of potential performance and, by extent, of capacity. The method apportions traffic volumes to each of the available lanes and considers the phasing plans that could be appropriate to accommodate the intersection movements. A critical volume (i.e. heaviest lane volume or combination of lane volumes) for each phase is calculated and the sum of these volumes is the total critical volume for the intersection. This sum can then be directly related to the level of service definition for signalized intersections (Table 1). This methodology establishes the capacity of the intersection based on the volume of conflicting flows for different phasing options and geometry. In general, a critical sum of 1,400 vehicles per hour (vph) is assumed to allow for under capacity operation for a signalized intersection.

Table 1 Level of service and maximum sum of critical lane volumes at signalized intersections

Level of Service	Traffic Flow Condition	Volume to Capacity Ratio	Critical Lane Volumes (vph)		
			Two-Phase	Three-Phase	Multiphase
A	Stable	<.6	900	855	825
B	Stable	<.7	1050	1000	965
C	Stable	<.8	1200	1140	1100
D	Unstable	<.85	1275	1200	1175
E	Capacity	<1.0	1500	1425	1375

Source: Messer and Fambro, 1977

A series of simulations were undertaken to establish the required guidelines for road diet conversions. These simulations were performed with the CORridor SIMulation (CORSIM) and VISSIM software and were also evaluated using the Safety Surrogate Assessment Model (SSAM).

The literature identifies that road diets have been implemented for roadways with ADT as high as 24,000 vehicles per day (vpd). However, in Kentucky most of the existing conversions range between 7,400 to 13,700 vpd. Preliminary capacity analysis indicated a theoretical maximum capacity of 2,400 vph on a three-lane section. Therefore, this was used to set the upper threshold of evaluated traffic volumes. The 2,400 vph threshold relates to an ADT of approximately 24,000 ADT assuming a K factor of 10 percent. ADTs ranging from 6,000 to 24,000 vpd were evaluated in the study using an increment of 2,000 vpd. One directional split (50/50) was utilized. While 24,000 ADT was set as the maximum, these volumes produced unreliable and scattered results indicative of oversaturated conditions. Therefore, results and trends are only developed based on a maximum of 22,000 vpd or lower depending on side street volumes and signalization.

Another aspect that could influence operations is the percentage of left-turns, since large numbers of left-turning vehicles have the potential to block traffic and cause the inside through lanes to operate as exclusive (de facto) left-turn lanes. A series of left-turn percentages were used ranging between 5 to 40 percent with increments of 5 percent. Finally, the percent of right turns used was set at 15 without any exclusive right turn lanes or bays. These values represent average operating parameters and are reflective of the majority of roadways.

The volumes of the cross streets were also varied to reflect possible trends and effects. These volumes varied between 3,000 to 13,000 vpd with 2,000 vpd increments. There was only one directional split (50/50) and a 10 percent estimate of left and right turns was used.

For unsignalized intersections, the main street volume was limited to 1,600 vph, since this would be the highest volume when the intersection will not require signalization based on Warrant 3 Peak Hour Volume (FHWA 2009). The same warrant also limits the maximum side street volume to 300 vph. Additional simulations were conducted for lower side street volumes of 100 vph and 200 vph to allow for a complete evaluation of the unisgnalized intersection changes.

A total of 480 combinations were used for simulating signalized intersections, i.e. 10 volume scenarios for eight left-turn percentages and six cross street volumes. For unsignalized intersections, the total number of simulations was 144, i.e. six volume scenarios for eight left-turn percentages and three cross street volumes.

An issue to be noted here is the fact that at certain times a four-lane roadway may operate as a three-lane road because the inside lanes will be required to accommodate significant left-turn volumes and act as left-turn lanes (a de facto left-turn lane). In this case, both the three and four-lane roads will produce the same critical volume for the main street, since this is the sum of the through traffic (allocated in one lane in both cases) and the left-turn traffic (also allocated in one lane). The presence of shared left and through lanes requires the use of left-turn equivalents (TRB 1985). These equivalents can then be used to define the point when the lane operations on a four-lane road shift from a shared lane to a de facto left-turn lane. This concept is demonstrated below, assuming a 50/50 split on the main street and equal percentages of left-turns. The critical volume for the four-lane option, CV_4, and the three-lane, CV_3, will be

$CV_4 = LT + (LT(LTE)+TH)/2$ and

$CV_3 = LT + TH$

where LT = left-turn volume,
TH = through volume
LTE = left-turn equivalency factor.

Setting CV_4 equal to CV_3 derives the equation:

$LT + (LT(LTE)+TH)/2 = LT + TH \Rightarrow LT(LTE) = TH$

and since the total volume V = LT+TH, then V = LT(LTE+1). In this case, if the LTE is two, then the conversion will occur when left-turns exceed 33 percent; if the LTE is three then this will occur at 25 percent of left-turns; and if the LTE is four then this will occur at 20 percent of left-turns. The LTE is determined based on the magnitude of the opposing traffic, since it is assumed that left turns will block through traffic while waiting to complete the turn in the available gaps. Therefore, greater opposing volumes will result in fewer gaps and thus greater LTEs. It should be noted here that in these calculations, the critical volume of the four-lane road

will always be lower than that of the three lanes, since the through traffic is distributed in more than one lane until the inside lane becomes a de facto left-turn. This analysis demonstrates that at low left-turn percentages, the four-lane roadway will operate more efficiently than a three-lane roadway, but at high percentages of left-turns there would be no fundamental difference in their operation.

In addition to the operational analysis, an evaluation of intersection safety was also completed using VISSIM and SSAM to determine the potential number of conflicts between the two options. SSAM is a tool developed by the Federal Highway Administration which analyzes vehicle trajectory output from the VISSIM micro-simulation model. SSAM identifies “conflicts” between vehicles, which are defined as instances of near misses between two vehicles. SSAM is capable of categorizing the conflicts as either rear-end or crossing angle and lane changing (sideswipe) crashes. It should be noted here that the estimate of conflicts is considered a safety surrogate measure and does reflect the actual number of crashes at an intersection or on a roadway segment. The number of conflicts is used to indicate potential relative changes in specific types of conflicts that could result in a crash. Two major categories are provided which include rear end and lane change conflicts. Lane change conflicts can lead to sideswipe crashes. Each potential conflict type was evaluated alone to determine the differential impact it could have on the safety performance of the two options.

The data obtained from both operational and safety analyses were used to develop predictive models that could be used in establishing potential guidelines for the implementation of road diets. The Statistical Package for the Social Sciences (SPSS) was utilized to develop these models.

RESULTS

Signalized Intersections

The simulation results from CORSIM support the assumption that a four-lane option will have a critical lane volume lower than that of a three-lane alternative. This could indicate an operational advantage of the four-lane option when compared to that of the three-lane. These results are discussed below by examining the delay difference between the three- and four-lane options for a signalized intersection. The difference is calculated as the delay of the three-lane minus that of four-lane option. Therefore, a **negative** number indicates that the three-lane option has a **lower** delay than the four-lane option for the specific volume combination. Another issue to be noted in the analysis is that the peak hour volume used is the bidirectional traffic for the street.

The delay differences for the 300 vph side street volume show different trends for each percent of left-turns evaluated (Figure 1). For low left-turn percentages, the trend shows that at low volumes the three-lane option is "better" than the four-lane (i.e. negative delay differences) and as the volumes increase the delay differences become smaller. At approximately 1,500 vph on the main street, the four-lane option becomes "better" (i.e. delay differences are positive) indicating that the delay with the three-lane option is greater than that of the four-lane. For the higher percentages of left-turns, delay differences remained practically the same as the volumes on the main street increased and for all combinations the four-lane option was "better" than the three-lane alternative. These data indicate that there is a region for low volumes on the main and side streets that the road diet option will result in an operational advantage, i.e. lower delays, than the four-lane option.

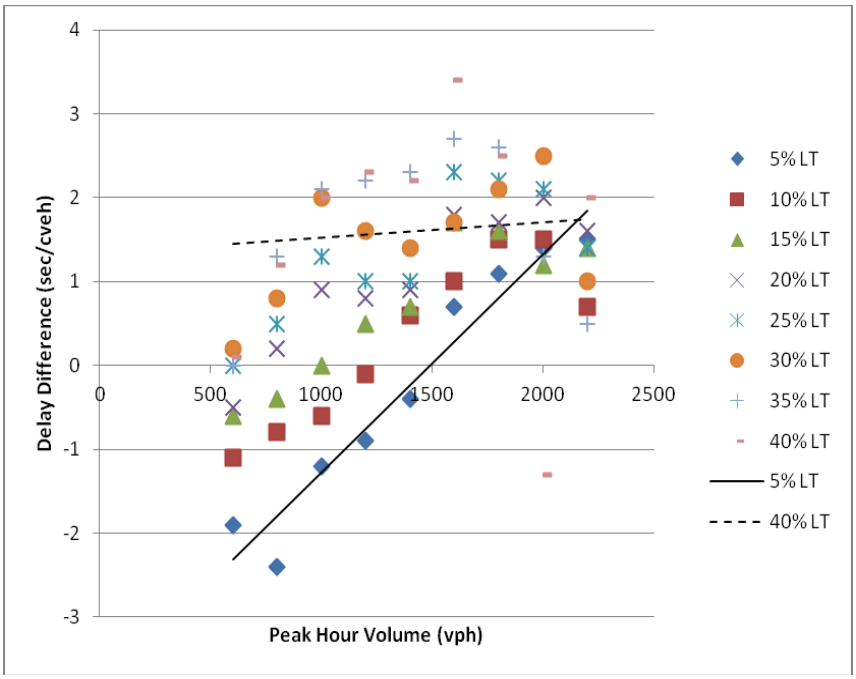

Figure 1 Signalized intersection delay differences (3-4), 300 vph side street volume

The cross street volume of 700 vph also showed similar trends for the low left-turn percentages (Figure 2). The data shows that at low volumes the three-lane option is "better" than the four-lane (i.e. negative delay differences) and as the volumes increase the delay differences become smaller. At approximately 1,750 vph on the main street, the four-lane option becomes "better"

(i.e. delay differences are positive) indicating that the delay with the three-lane option is greater than that of the four-lane. For the higher percentages of left-turns, delay differences showed a reducing trend as the volumes in the main street increased and for all combinations the four-lane option was “better” than the three-lane alternative. The data indicates the advantage of the three-lane option for certain combinations of left-turn percentages and main street volume for this side street volume.

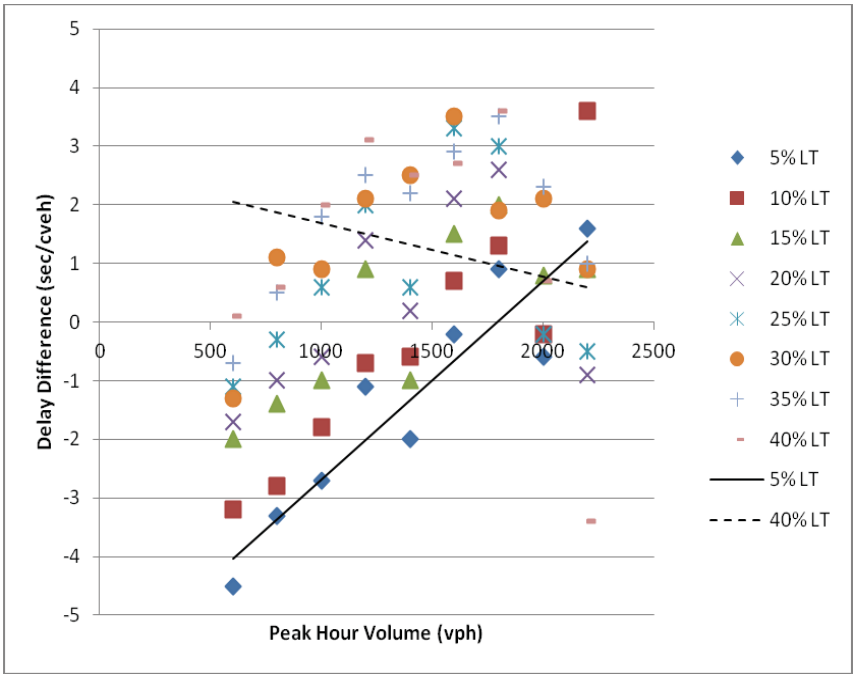

Figure 2 Signalized intersection delay differences (3-4), 700 vph side street volume

The effect of high side street volumes was evaluated to determine whether the noted trends hold (Figure 3). The data shows similar trends for both low and high left-turn percentages as those observed in the other side street volumes. It should be noted that this analysis only includes volumes up to 1,800 vph along the major street as the high side street volumes create lower capacity on the main street thus resulting in oversaturated conditions.

The data in Figures 1, 2, and 3 indicates that there are certain conditions where the road diet could be the preferred option over a four-lane alternative. The data also indicates that there is an effect of the side street volume in determining these conditions and that the combination of main and side street volumes needs to be considered in determining whether the road diet is appropriate. Finally, the left-turn percentage has an effect and this should be considered in conjunction with the traffic volumes.

Of interest is also the magnitude of the differences in delays observed in this analysis. Most delay differences were small (less than 5 seconds for the low side street volumes), indicating practically no significant operational gains or losses between the two options (Table 2). The average values for each side street volume for all left-turn percentages evaluated were less than 1.0 sec/veh indicating again that the delay differences are not significant.

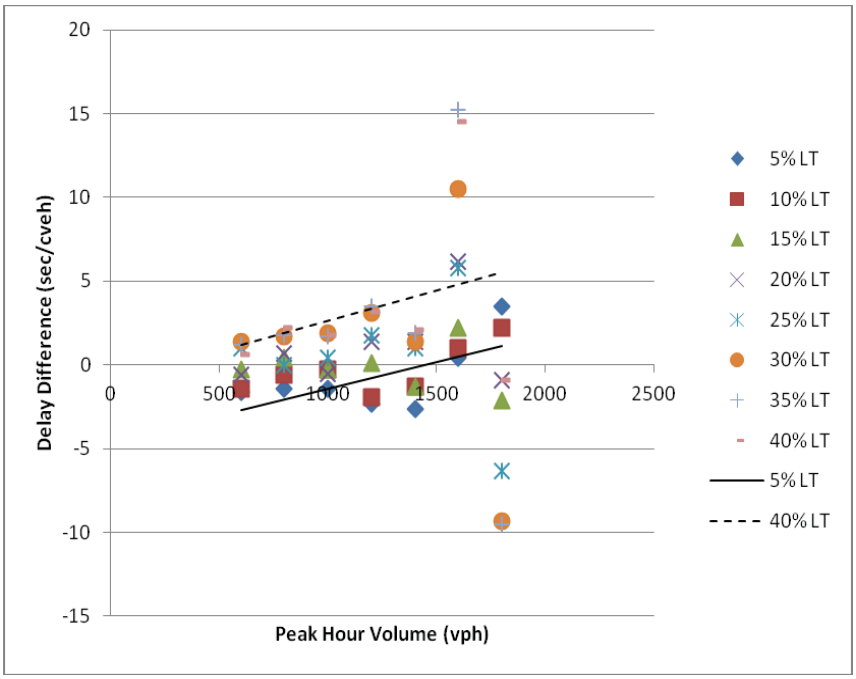

Figure 3 Signalized intersection delay differences (3-4), 1,300 vph side street volume

Table 2 Range of delay differences by side street volume

Side Street (vph)	Min (sec)	Max (sec)	Avg (sec)
300	-2.4	3.4	0.98
700	-4.5	3.6	0.50
1300	-9.5	15.5	0.94

Another aspect that could be of interest regarding the operational efficiency of road diets is the resulting queue lengths. A queuing evaluation was completed using the same simulation scenarios presented above. The analysis showed that overall the road diet produced similar or smaller queue lengths than the four-lane roads. The effect of the side street volume was considered here as well and the results for the same three volumes used in the delay analysis are shown. It should be noted again that a **negative** number indicates that the three-lane road will produce **shorter** average queues than the four-lane option. The simulation output provides an estimate of the average queue by lane. The average queue difference here was taken as difference between the maximum average queue lengths for the three-lane, i.e. considering the queue lengths of the through and left-turn lane, to the maximum average queue length for the four-lane, where both lanes are evaluated.

For the 300 vph side street volume and low left-turn percentages scenario, the four-lane option will result in shorter average queues than the three-lane option (Figure 4). For the high left-turn percentages, the three-lane is a better option than the four-lane demonstrating lower queue lengths, and these gains increase (as the slope of the line indicates) with increasing main street volumes.

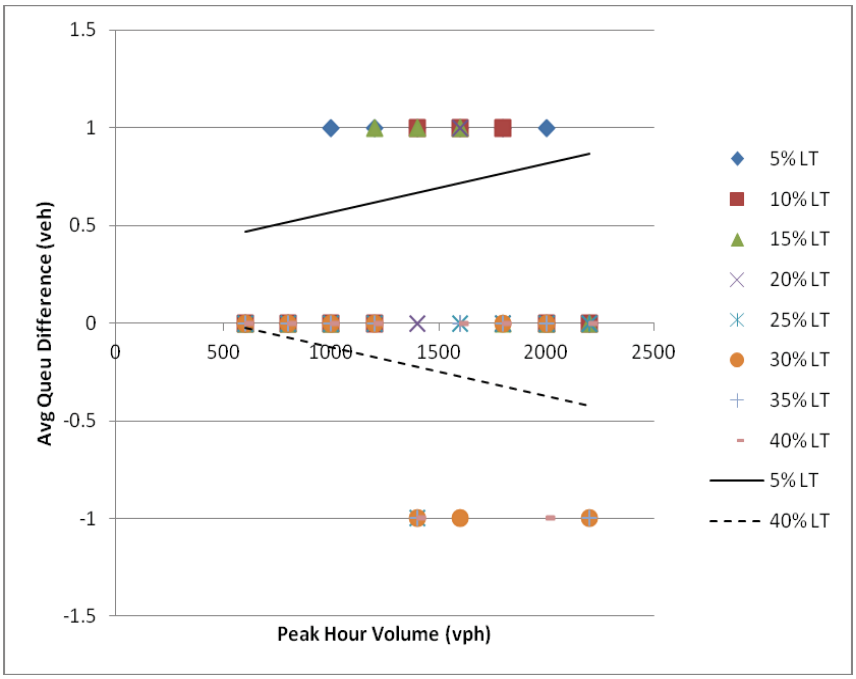

Figure 4 Signalized intersection average queue differences (3-4), 300 vph side street volume

The evaluation of the 700 vph side street volume showed a similar trend (Figure 5). Low left-turn percentages showed that the road diet is the better option for low main street volumes. At about 750 vph the four-lane option shows shorter queues. High left-turn percentages showed that the road diet is the better option for all main street volumes and the gains increased with increasing main street volumes.

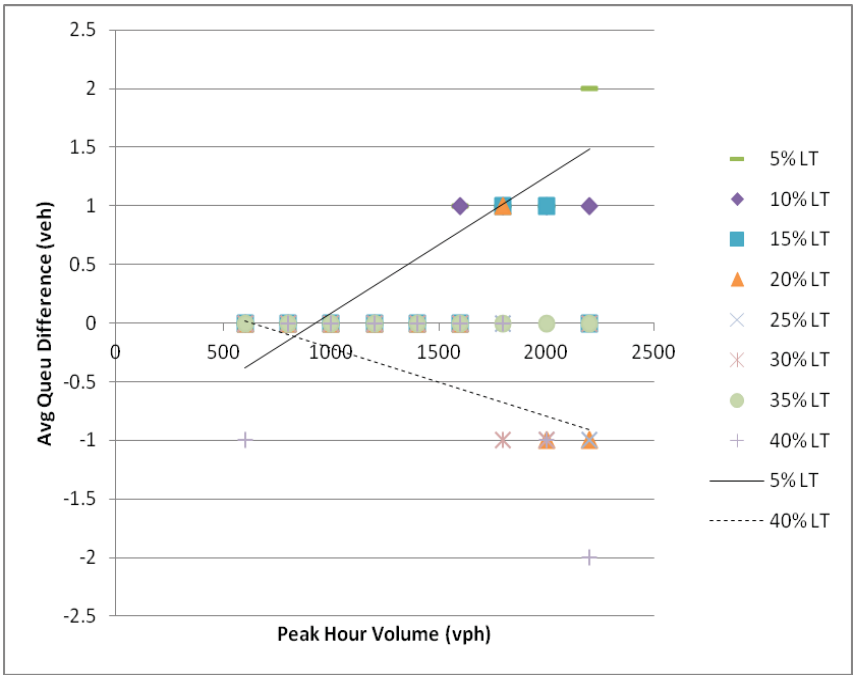

Figure 5 Signalized intersection average queue differences (3-4), 700 vph side street volume

The consideration of the same data for the 1,300 vph side street volume produced similar trends but with larger differences between the two options (Figure 6). The data here again shows that the road diet will be a "better" option than the four-lane alternative for the high left-turn percentages, but the differences in queues were smaller than those noted in the other side street volume scenarios.

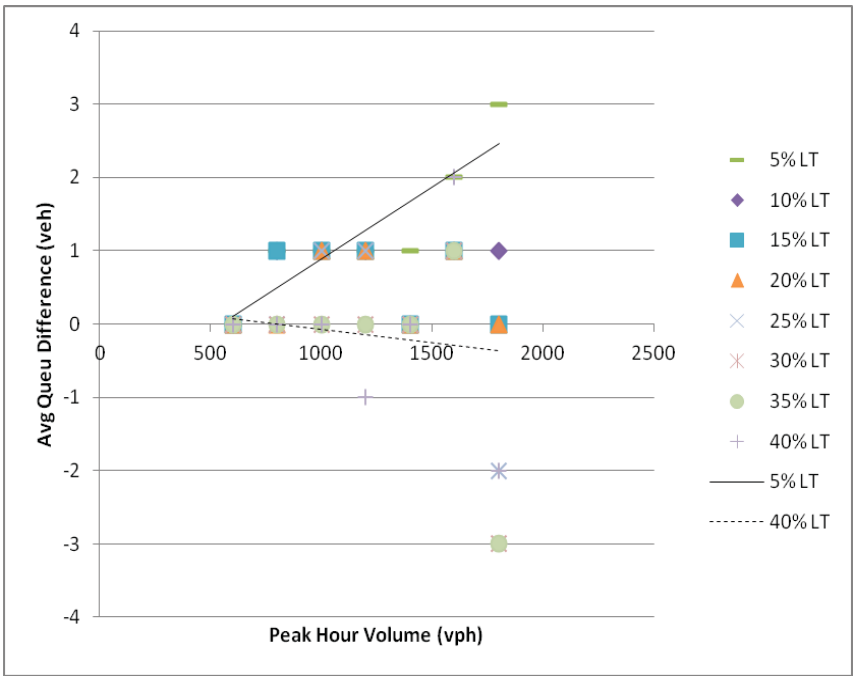

Figure 6 Signalized intersection average queue differences (3-4), 1,300 vph side street volume

A review of the range of values noted here also indicates that overall there are no significant differences between the two options when the average queue lengths are considered (Table 3). The largest differences were noted for the 1,300 vph side street volume scenario, and the averages for each side street volume were less than 0.5 vehicles, again virtually the same.

Table 3 Range of average queue differences by side street volume

Side Street (vph)	Min (veh)	Max (veh)	Avg (veh)
300	-1	1	0.07
700	-2	2	0.03
1300	-3	3	0.30

Unsignalized Intersections

Delay and queuing analysis was also conducted for unsignalized intersections. In this case, all delays along the major road were very small (less than 4.5 sec/veh) and the three-lane option had slightly higher delays than the four-lane option. However, these differences were very small and most were less than 2.5 sec/veh, with the majority (56 percent of the cases) of the delay differences being 1 sec/veh or less.

The significant differences in the unsignalized intersections were noted for the delays on the side street approaches. For all scenarios tested, the delays on the side street for a road diet conversion were smaller than those observed for the four-lane road. The data was analyzed in a similar manner as that of the signalized intersections to evaluate the effect of left-turn percentages in conjunction with the main street volumes. The delay difference noted here is computed in the same manner as above, i.e. delay of three-lane minus delay of four-lane option. In this case, also, **negative** differences indicate that the three-lane alternative results in **lower** delays than the four-lane alternative for the side street approach.

As shown in Figure 7, the road diet produces lower delays for the side street than the four-lane option for all left turn percentages with a total approach volume of 300 vph. The data also indicate that as the main street volumes increase, the differences in delays increase for all left-turn percentages. .

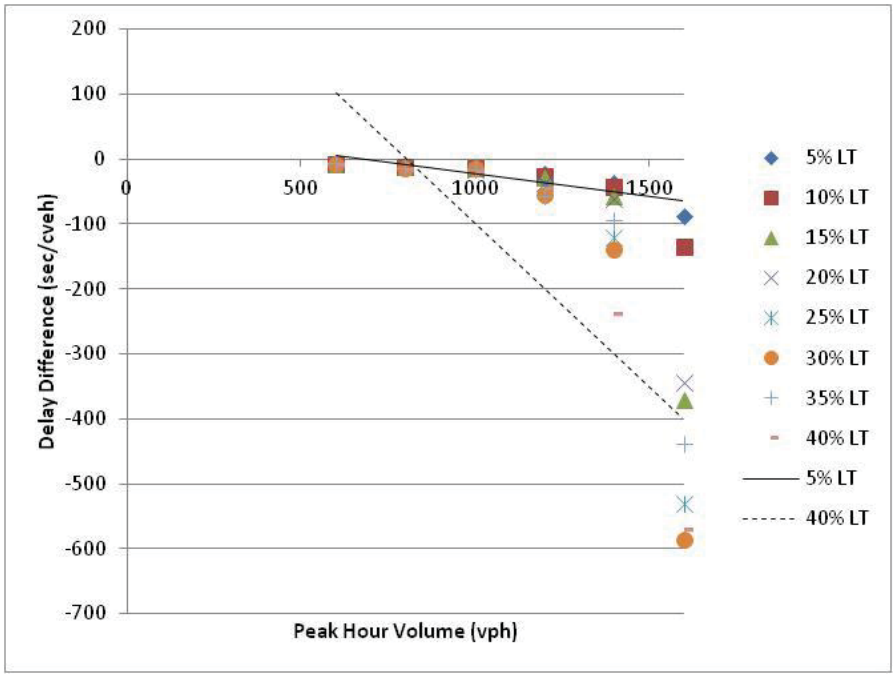

Figure 7 Unsignalized intersection side street delay differences (3-4), 300 vph side street volume

The same trend was noted for the lower side street volumes, where for all cases examined, the side street delays improved for any combination of main street volume and left-turn percentages and these differences increased as both volumes and left-turn percentages increased. It is apparent that significant gains could materialize from road diet conversions for unsignalized intersections; an aspect that may outweigh the minor delay increases at signalized intersections as was discussed above.

The average queue length for side street approaches was also examined to determine the potential effect of the road diet conversions. The data shows that in all cases the road diet will result in smaller queues (Figure 8). The data shows that as traffic volumes along the main street increase, the differences in the average queue length along the side street are diminishing.

However, road diets maintain the advantage (i.e. shorter average queues on the side street) for almost all main street volumes examined. This indicates that benefits from road diets could materialize for most situations. It should be noted that for all side street volumes similar trends are observed, and only the trend of the 300 vph side street volume is presented.

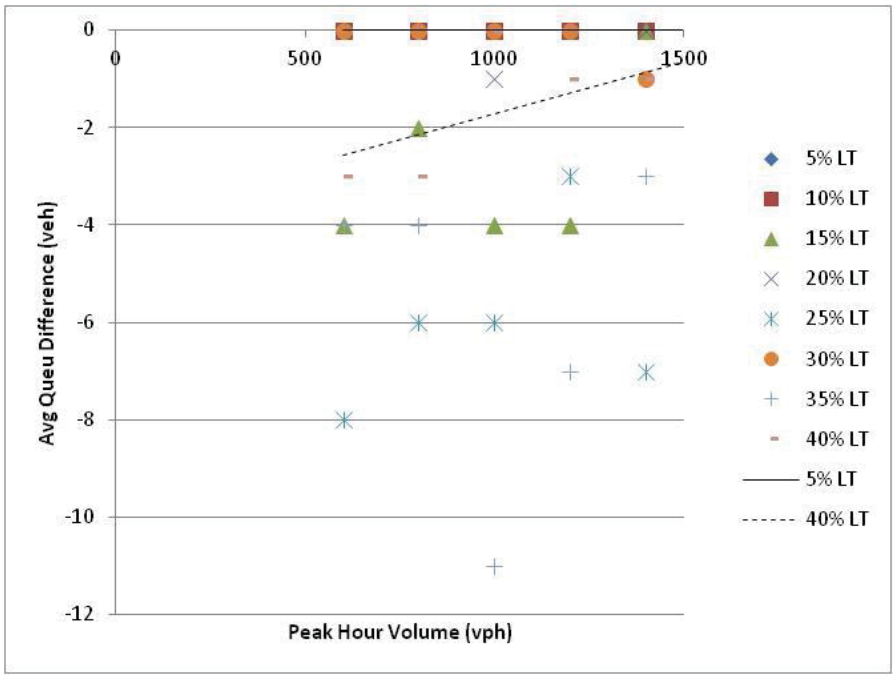

Figure 8 Unsignalized intersection average side street queue differences (3-4), 300 vph side street volume

Operations Models

The analysis completed here was also used to develop prediction models that could allow for establishing guidelines and identifying the conditions under which road diets could improve the operational efficiency of the roadway. The Statistical Package for Social Sciences (SPSS) was utilized to develop these models. Linear regression models were used to model the delay for each condition, i.e. three- and four-lane options, and identify the variables that could predict these differences. The variables considered include the volumes of the main and side streets as well as left-turn percentage.

The model for the three-lane included all three variables of concern and had a good predictive power with an R^2 of 0.48. The model coefficients are summarized in Table 4. The four-lane model also utilized all three variables but the predictive power was lower (R^2=0.28). The variables included in the equations reflect the effect of traffic volumes on delays and their signs indicate that increasing volumes will result in greater delays.

Table 4 Coefficients for predictive models

Variable	Three-lane		Four-lane	
	Parameter	P value	Parameter	P value
Intercept	-29.113	0.00	-47.968	0.00
Main street volume (vph)	0.013	0.00	0.022	0.00
Side street volume (vph)	0.025	0/00	0.037	0.00
Left-turn percentage (number)	0.313	0/00	0.314	0.00

These models can be used to define the scenarios where the three- and four-lane options produce a delay difference of zero, i.e. both options will perform equally well. This will produce the line of equality which can then be used to establish the regions where road diets are advisable and those where they are not. Figure 9 presents this concept where to the right of the line, road diets are not recommended, while to the left of the line road diets are considered appropriate.

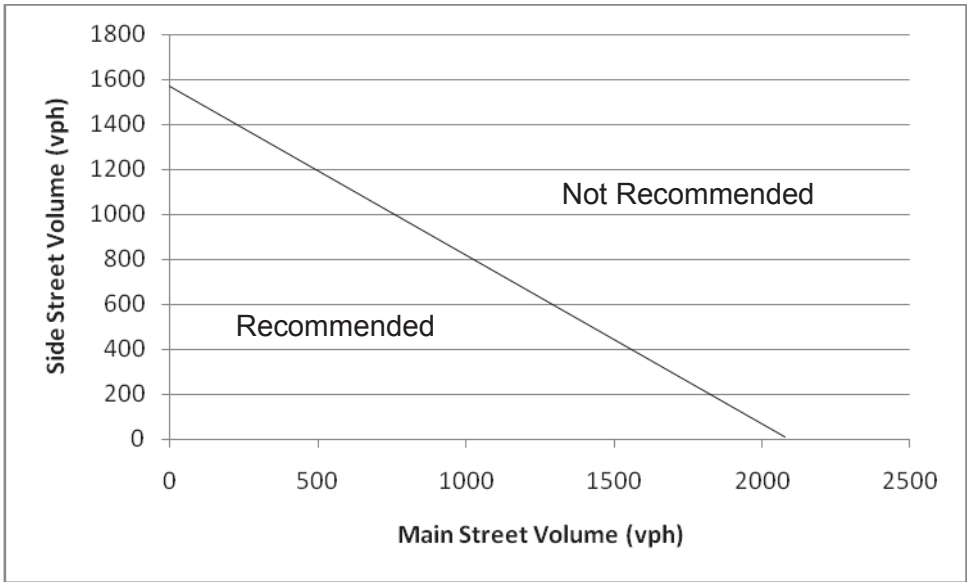

Figure 9 Guideline for operational performance at signalized intersections

The guideline developed is based only on main and side street volumes, since it was determined that the operation of the signalized intersection is the critical aspect for a road diet conversion. While left turn percentage was shown to be a significant parameter for the capacity and delay of an intersection, it has the same effect for both the four-lane and three-lane sections and therefore provides no differentiation between the alternatives. In other words, once the effect of the main and side street volumes on delays have been accounted for, the left-turn percentage does not contribute any additional delay to the difference between the two options.

As unsignalized access points do not interrupt traffic flow on the primary street, they are not a significant determinant of the success or failure or a road diet project. Even unsignalized access points with high volumes of left turn traffic on the major street will continue to operate at acceptable levels of service while signalized intersections may fail due to the reduced mainline capacity. The primary concern for unsignalized access points is overlapping left turn movements within the two-way left turn lane, which is avoided with the four-lane section. The existing KYTC

auxiliary turn lane policy currently addresses this concern by recommending against the use of TWLTLs for access point densities greater than 85 access points per mile (KYTC 2009).

Signalized Intersection Safety

Safety analysis of road diet performance was also conducted using the same simulated scenarios through application of SSAM software. It should be noted that this analysis uses a surrogate measure for safety, i.e. number of conflicts in the traffic stream, and does not directly predict the number of crashes, though research has shown a direct correlation between the two measures (Gettman et al 2008). The results presented here also use the same relationship between the two options as was done with the operational analysis, i.e. negative differences in conflict numbers indicate that the three-lane option will perform better than the four-lane option, while positive numbers indicate better performance by the four-lane cross-section. This analysis only considered main street conflicts, since these are the safety impacts of major concern.

The use of the simulation models in developing a safety analysis in lieu of using before-and-after data was considered more appropriate for several reasons. First, the models allow for an evaluation of a greater range of volumes than the available case studies. Second, there are not many road diet implementations in Kentucky that would provide for a robust analysis and allow for drawing any conclusions regarding the safety implications of road diet installations. Third, the road diet implementations have a variety of other factors (such as varied number of access points, land use, turning percentages, and cross sectional elements) that could create greater uncertainty than the models with their controlled environment. Finally, safety consequences from the road diet implementation could not be easily separated from other issues stemming from prior problems (such as access control and improper transition to and from the road diet section) on the site.

Safety analysis was conducted for rear end and sideswipe conflicts. It did not include the analysis of angle crashes as the simulation methodology used is not capable of accurately reflecting angle crash exposure. The primary reason for this is that angle crashes often result from poor sight distance, which is not able to be modeled effectively within the simulation programs. A review of the case studies discussed in Appendix A indicates that road diets are effective in reducing left turn angle crashes resulting from offset left turn lanes. However, an increase in angle crashes was observed at an access point that was placed near the transition zone between the three- and four-lane sections. Therefore, road diets may be effective in addressing angle crash problems, but careful review of the individual site should be performed.

<u>Rear End Conflicts</u>

The simulation results analyzed indicated that road diets may have mixed results in terms of rear end conflicts. In general, rear end conflicts may increase as the result of road diets on roadways with a low volume of left turning vehicles (Figure 10). This increase is due to the decreased capacity of the through movement, brought about by the removal of one through lane. This finding is consistent with other studies which show an increase in rear end crashes with increasing volumes (Geedipaly et al 2010).

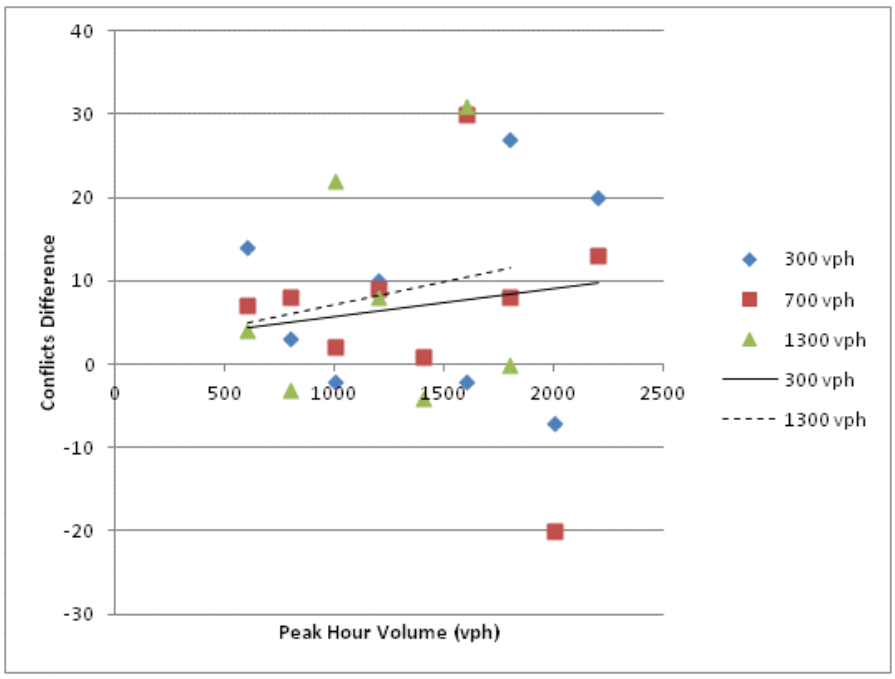

Figure 10 Difference in main street rear end conflicts between four- and three-lane signalized intersections (3-4) by side street volume, 5 percent left turns

For moderate left turn percentages (15-25 percent), road diets generally showed a reduction in rear end conflicts compared to the four-lane option (Figure 11). This reduction can be attributed to the removal of speed differential between left turn vehicles and through vehicles which offsets the potential for rear end conflicts in the through lane. For this range of volumes, this may be considered an indication that road diets could reduce such conflicts even though both options could operationally be the same. For high side street volumes (e.g., 1,300 vph) the differences between the two options decrease demonstrating the effect of the side street volume (and increased congestion on the safety performance of the road).

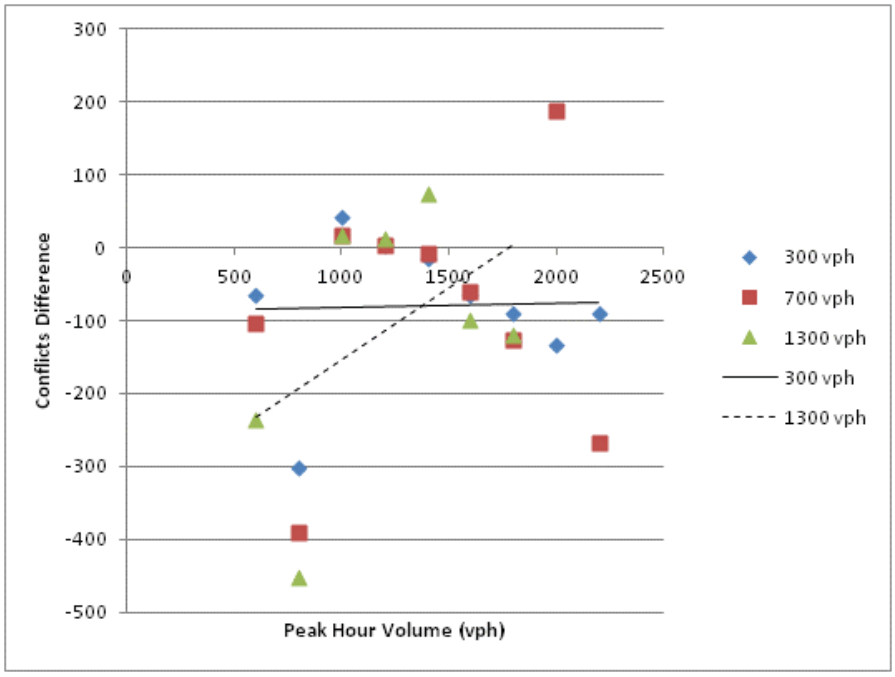

Figure 11 Difference in main street rear end conflicts between four- and three-lane signalized intersections (3-4) by side street volume, 20 perecnt left turns

Finally, for high percentages of left turns (e.g., 35 percent) the road diet will result in more rear end conflicts than the four-lane option (Figure 12). In this case for most volume scenarios the difference is positive, i.e. more conflicts with the road diet. The overall trend of increasing conflicts with increasing volumes is observed here as well.

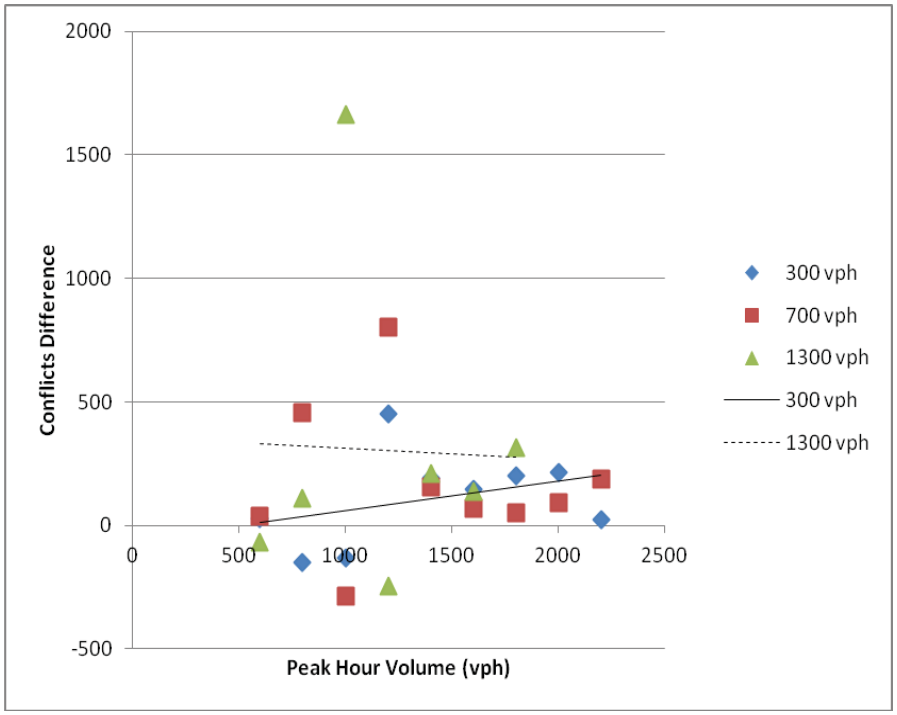

Figure 12 Difference in main street rear end conflicts between four- and three-lane signalized intersections (3-4) by side street volume, 35 percent left turns

It should be noted that the 40 percent left-turns produced high variations and were considered as outliers in the analysis and thus were excluded in the results discussed here.

In summary, the data indicates that there are scenarios when the road diet will result in lower rear end conflicts and these include mid-range volumes and mid-range left-turn percentages. At high volumes with high left-turn percentages the road diet may increase congestion and thus rear end conflicts. Roadways with low volumes and low left turn percentages do not typically have rear end problems and thus the reduction in capacity may cause a slight uptick in rear end conflicts.

Lane Change Conflicts

The simulation results analyzed showed that the number of lane change conflicts for the main street will decrease with a road diet at the signalized intersections. This was an expected result, since the number of lanes is reduced and thus the opportunity for such conflicts is reduced or even eliminated. The difference in the number of conflicts is affected again by the left-turn percentages where the difference in the number of conflicts increases (greater negative numbers indicate a larger benefit for the road diet scenario) as the volume increases (Figure 13). This could be attributed to the lack of the extra lane in the road diet which results in fewer opportunities for lane change conflicts. The data also shows that, in general, increasing left-turn percentages resulted in larger differences between the two options, in favor of the road diets. There was no discernible effect of the side street volume for these conflicts and all showed similar trends as those presented in Figure 13.

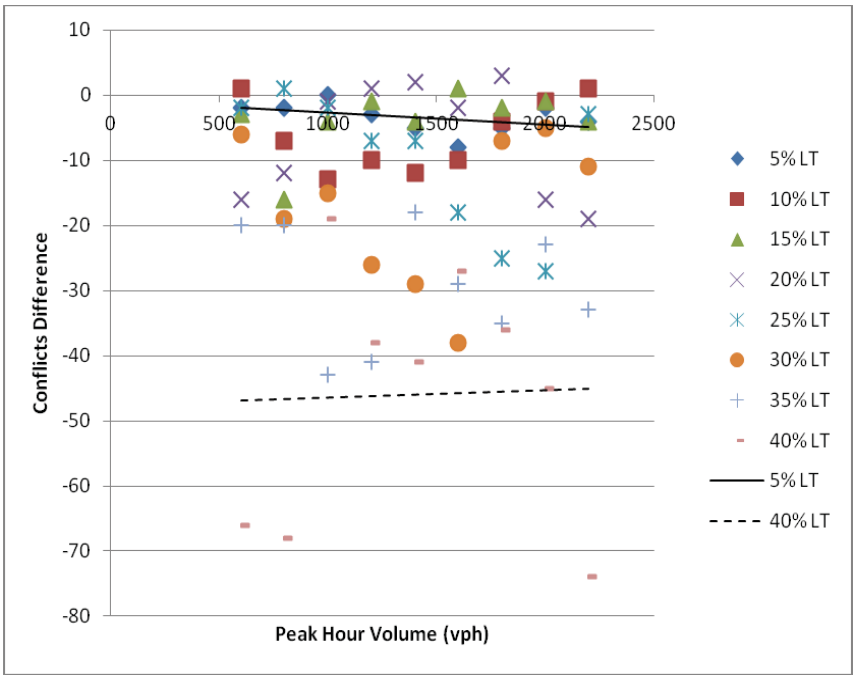

Figure 13 Difference in main street lane change conflicts between four- and three-lane signalized intersections (3-4), 700 vph side street volume

Unsignalized Intersection Safety

A similar evaluation of main street safety performance was completed for unsignalized intersections to evaluate the road diet effect. Similarly, the difference in the number of conflicts along the main street is considered as the metric here and a negative difference indicates a "safer" performance for the road diets.

Rear End Conflicts

The simulation analysis showed that for unsignalized intersections rear end conflicts will increase for most combinations with a road diet installation. For low left-turn percentages, a small increase is noted in rear end conflicts with increasing main street volume (Figure 14). This trend reversed for higher left-turn percentages where the differences decrease with increasing main street volumes. This could be attributed to the presence of the two-way left-turn lane which could have a greater effect in higher volumes and left-turn percentages.

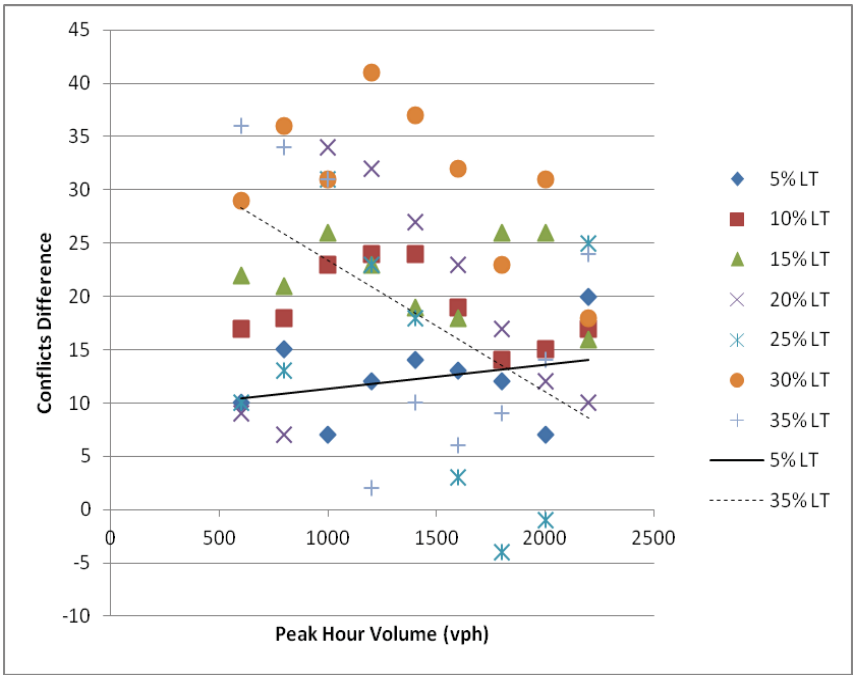

Figure 14 Difference in main street rear end conflicts between four- and three-lane unsignalized intersections (3-4), 700 vph side street volume

Lane Change Conflicts

The simulation results analyzed showed overall that the number of lane change conflicts along the main street will increase with a road diet at the unsignalized intersections (Figure 15). However, there were combinations of main street volumes and left-turn percentages for which the three-lane option resulted in fewer conflicts than the four-lane option. The data shows that greater left-turn percentages resulted in larger differences between the two options in favor of the road diet option.

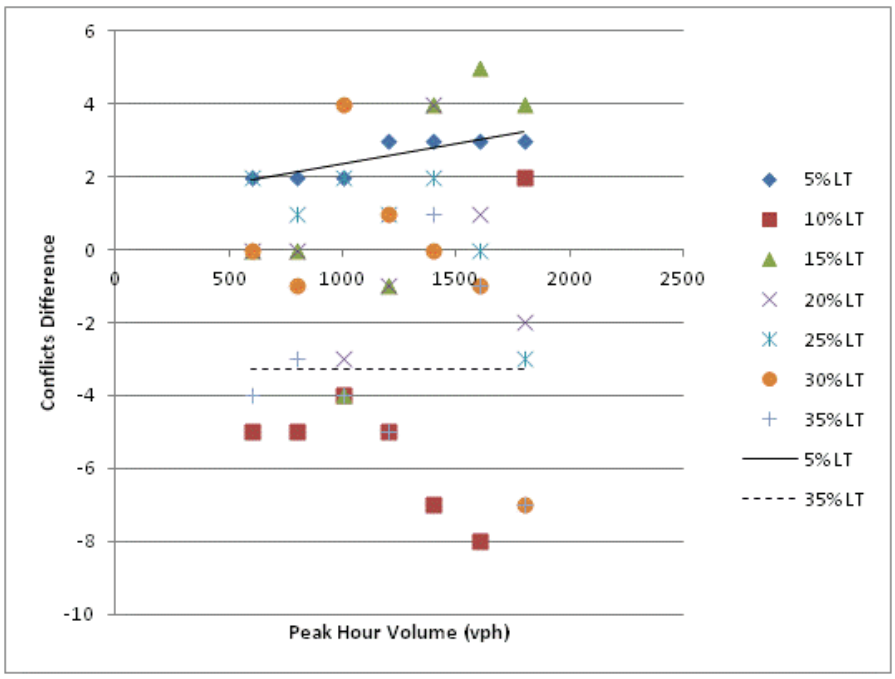

Figure 15 Difference in main street lane change conflicts between four- and three-lane unsignalized intersections (3-4), 700 vph side street volume

Safety Models

The analysis completed here was also used to develop conflict prediction models for both the three-lane and four-lane conditions to assist in identifying the conditions under which road diets could improve the roadway safety. The Statistical Package for Social Sciences (SPSS) was utilized to develop these models. Linear regression models were used to model the conflicts and identify the significant variables. The variables considered include the main street volume, side street volume and left-turn percentage.

Model variables and R^2 values are provided for the three-lane and four-lane models for both rear end and lane change conflicts (Table 9). All models developed included all variables, except for the three-lane rear end conflicts, which did not include the left turn percentage as a significant parameter. The positive signs of the coefficients for all variables in all models indicate that increasing volumes will result in a greater number of conflicts. All models had R^2 values greater than 0.70 indicating the included variables explain over 70 percent of the variability in the data set.

Table 5 Coefficients for predictive models

Conflict	Variable	Three-lane		Four-lane	
		Parameter	P value	Parameter	P value
Rear end	Constant	88.322	0.00	81.037	0.00
	v/c ration exponent	2.0433	0.00	1.8927	0.00
	R^2	0.93		0.87	
Lane change	Intercept	-8.777	0.00	-46.072	0.00
	Main street volume (vph)	0.005	0.00	0.027	0.00
	Side street volume (vph)	0.003	0.00	0.025	0.00
	Left-turn percentage (percent)	0.271	0.00	0.440	0.00
	R^2	0.72		0.76	

These models can be used to define the scenarios where the three- and four-lane options produce a conflict difference of zero, i.e. both options will perform equally well. This will produce the line of equality which can then be used to establish the regions where road diets are advisable and those where they are not.

In addition to major and minor street volumes, left-turn percentage was shown to be a significant factor in predicting rear end crashes. As noted above, there are scenarios where the four-lane section will produce fewer rear end conflicts than the road diet. This is primarily due to the increased congestion resulting from the reduction in the number of through lanes. However, as the left-turn percentage increases the road diet is shown to reduce rear end conflicts. Figure 16 shows the line of equality for five percent, 20 percent and 35 percent left-turns as a function of the main and side street volumes. In the figure, the main and side street volume combinations below the line indicate that rear end conflicts would be anticipated to be reduced with a three-lane section, compared to a four-lane section.

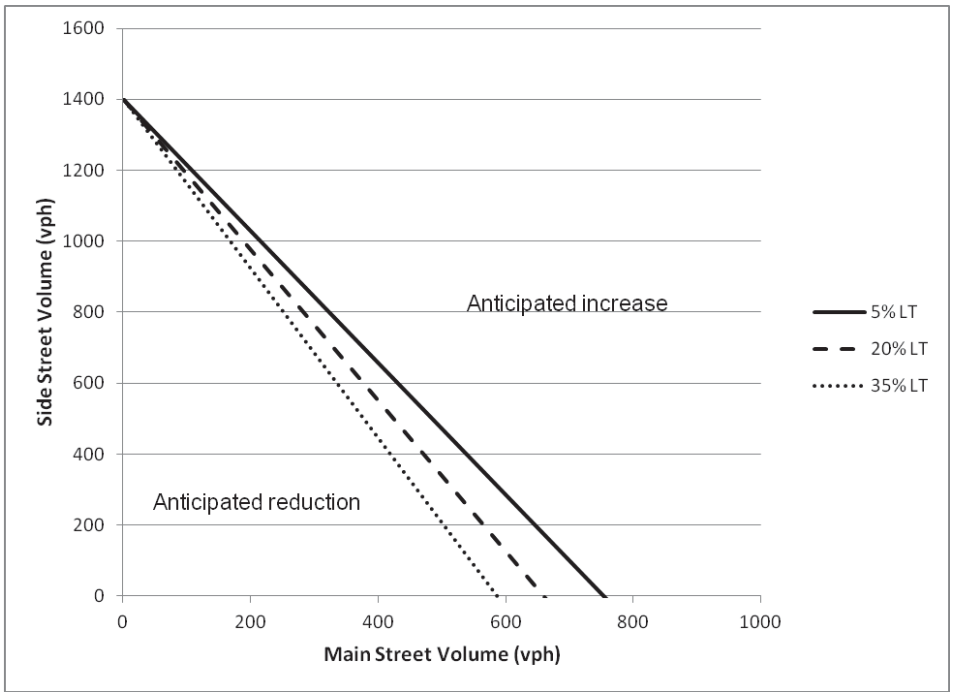

Figure 16 Guidelines for rear end conflicts by main and side street volume and percent left-turns

A similar model was developed for lane change conflicts. The results of this analysis are shown in Figure 17. Left-turn percentage does not have as significant of an effect on lane changes as was evident for rear end conflicts. As shown in the figure, to the right of the line three-lane sections are anticipated to experience lower lane change conflicts, while to the left of the line, road diets are expected to have higher lane change conflicts than the four-lane section. Review of the lane change models, indicate that both the three-lane and four-lane sections have low lane change volumes in the lower volume areas below the equality lines; however, the four-lane section shows a significant increase in lane change conflicts at high volumes. Therefore, the potential for lane change conflicts is minimal in the lower volume range.

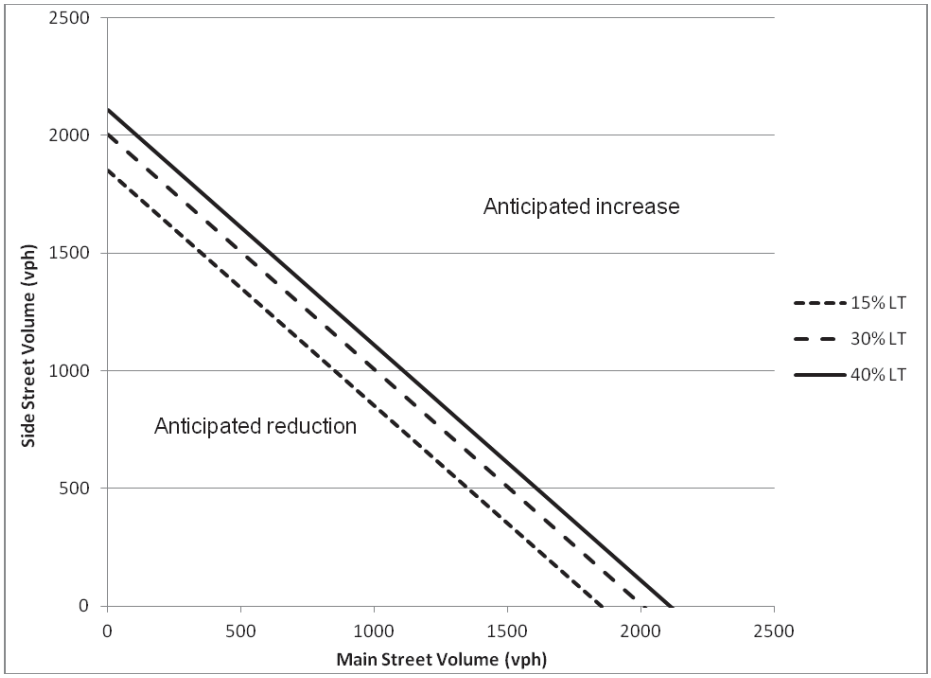

Figure 17 Guidelines for lane change conflicts by major/minor street volumes and percent left-turns

Summary

The simulation results from CORSIM support the assumption that a four-lane option will have a critical lane volume lower than that of a three-lane alternative. This could indicate an operational advantage of the four-lane option when compared to that of the three-lane. For signalized intersections, there are certain conditions where the road diet could be the preferred option over a four-lane alternative. The data also indicates that there is an effect of the side street volume in determining these conditions and that the combination of main and side street volumes needs to be considered in determining whether the road diet is appropriate. Another aspect that could be of interest regarding the operational efficiency of road diets is the resulting queue lengths. An evaluation was completed for this aspect using the same data. The analysis showed that overall the road diet produced smaller or the same average queue lengths than the four-lane roads.

A similar analysis for unsignalized intersections showed that all delays along the major road were very small and the three-lane option had slightly higher delays than the four-lane option. However, these differences were very small and most were less than 2.5 sec/veh with the

majority (56 percent of the cases) of the delay differences being 1 sec/veh or less. The significant differences in the unsignalized intersections were noted for the delays along the side street. For all scenarios tested, the delays on the side street for a road diet conversion were smaller than those observed for the four-lane road, as a result of two-stage turning maneuvers provided by the two-way left-turn lane.

A review of safety aspects of the road diets was also conducted using the simulated cases. It should be noted that the analysis presented uses a surrogate measure for safety, i.e. potential number of conflicts, and not crashes. The simulation results showed that, in general, road diets will result in lower rear end conflicts for mid-range volumes and mid-range left-turn percentages. At high volumes with high left-turn percentages the road diet may increase congestion and thus rear end conflicts. Roadways with low volumes and low left-turn percentages do not typically have rear end problems and thus the reduction in capacity may cause a slight uptick in rear end conflicts. This was an expected result, since the left-turn vehicles can block the through lane increasing the probability of rear end conflicts.

The analysis for the lane change conflicts along the main street showed that at low volumes neither the three-lane or four-lane alternative had a high number of conflicts and the road diet produced less lane change conflicts at higher volumes. This was an expected result, since the number of lanes is reduced and thus the opportunity for such conflicts is also reduced. The difference in the number of conflicts is less affected by the left-turn percentages as was the rear end conflicts where the difference in the number of conflicts increases as the volume increases. This could be attributed to the lack of the extra lane in the road diet which results in fewer opportunities for lane change conflicts.

The analysis for the unsignalized intersections showed mixed trends for rear end conflicts indicating that there are combinations where the number of rear end conflicts will increase with a road diet while for others they decrease. This trend was dependent upon the cross street volume. For low cross street volumes, an increase is noted in read end conflicts with increasing main street volume. This trend was true for both low and high left-turn percentages where the differences increase with increasing left-turn percentages. The analysis of the lane changes for unsignalized intersections showed overall that the number of lane change conflicts along the main street will decrease with a road diet at the unsignalized intersections. For unsignalized intersections though, there were combinations of main street volumes and left-turn percentages for which the four-lane option resulted in fewer conflicts than the three-lane option.

CASE STUDIES

Five road diet conversions in Kentucky were identified and evaluated to determine their overall effects and identify elements that could also assist in the development of the guidelines. A summary of each case study is presented here and an extended discussion of each case study is presented in Appendix A.

US 27 Campbell County

The road diet was completed in 2008 and covers 1.4 miles of the highway. The main cross section has two 11-foot lanes with a 12-foot two-way left-turn lane and 5-foot bicycle lanes in both directions. The before-after crash analysis conducted showed a 68 percent overall decrease in crashes with an accompanying decrease of 53 percent in rear end and 80 percent in sideswipe crashes. Between 2004 and 2010, there was a reduction in the ADT (from 10,600 vpd to 7,410 vpd) along this roadway section, though it should be noted that vehicles miles of travel statewide have stagnated or reduced during that time due to other economic factors. Examination of the crash rates indicated that the total crash rates as well as the total number of crashes was reduced, indicating that the crash reduction was due to the road diet installation. The travel time studies conducted did not demonstrate any significant congestion issues with an average travel speed of 21 mph during the PM peak period. Overall, this road diet conversion could be considered as a successful installation.

Euclid Ave. Fayette County

The road diet was completed in 2000 and covers 1.13 miles of the highway. The main cross section has two 12-foot lanes with a 14-foot two-way left-turn lane and 7-foot bicycle lanes in both directions. The before-after crash analysis conducted showed a 56 percent overall decrease in crashes with an accompanying decrease of 77 percent in rear end and 88 percent in sideswipe crashes. There was a reduction in the ADT (from 15,900 vpd in 1996 to 13,700 vpd in 2004) along this roadway section, which is likely due to the closure of Rose Street in the vicinity of Euclid Avenue and not the result of the road diet. Examination of the crash rates indicated that the total crash rates as well as the total number of crashes was reduced indicating that the crash reduction was due to the road diet installation. The travel time studies conducted showed some congestion issues with an average travel speed of 12 mph during the PM peak period. Overall, this road diet conversion could be considered as a successful installation.

KY 1428 Floyd County

The road diet was completed in 2005 and covers 0.93 miles of the highway. The main cross section has two 12-foot lanes with a 12-foot two-way left-turn lane in the north and two-11-foot lanes and an 11-foot two-way left tur n lane in the south section. The before-after crash analysis conducted showed a 55 percent overall decrease in crashes with an accompanying decrease of 17 percent in rear end, 76 percent in angle crashes, and 40 percent in sideswipe crashes. There was an increase in the ADT (from 15,939 vpd in 2005 to 16,159 vpd in 2009) along this roadway section. However, a reduction in crash rates was observed indicating that the crash reduction was due to the road diet installation. The travel time studies conducted showed no congestion issues with an average travel speed of 21 mph during the PM peak period. Overall, this road diet conversion could be considered as a successful installation.

US 172 Mercer County

The road diet was completed in 2006 and covers 0.82 miles of the highway. The main cross section has two 15-foot lanes with a 12-foot two-way left-turn lane. The before-after crash analysis conducted showed a 41 percent overall decrease in crashes with an accompanying decrease of 23 percent in rear end crashes and 66 percent in sideswipe crashes. ADT was

relatively stable on the corridor between 2002 (12,600 vpd) and 2009 (11,300 vpd) Examination of the crash rates indicated that the total crash rates as well as the total number of crashes was reduced indicating that the crash reduction was due to the road diet installation. The travel time studies conducted did not demonstrate any significant congestion issues with an average travel speed of 13 mph during the PM peak period. Overall, this road diet conversion could be considered as a successful installation.

US 60 Woodford County

The road diet was completed in 2008 and covers 0.83 miles of the highway. The main cross section has two 11-foot lanes with a 12-foot two-way left-turn lane and 5-foot bicycle lanes in both directions. Some sections of the roadway also include a 7-foot shoulder and the conversion of the bicycle lane to parking. There was no change in the ADT of 11,00 vpd along this roadway section. The travel time studies conducted did not demonstrate any significant congestion issues with an average travel speed of 22 mph during the PM peak period.

The before-after crash analysis conducted showed a 25 percent overall increase in crashes with an accompanying increase of 80 percent in rear end and 50 percent in sideswipe crashes. The analysis showed that most of the after crashes were in the vicinity the US 60 Bypass and Wilson Avenue intersection, i.e. the west terminus of the project (Figure 18). The review showed that these crashes are associated with design issues of improper transition of the road diet terminus and access management at the same location. As shown below, westbound traffic in the right lane merges into the inner lane. At the same time westbound vehicles turning into the access points on the south side of the roadway will stop in the inner lane waiting to turn. Overall, this road diet conversion could be considered as a successful installation with the exception of the transition and access management issues at the west terminus of the road diet.



Figure 18 Western terminus of US 60 road diet

Summary

In general, it can be concluded that the five cases evaluated are successful road diet conversions. The installations covered roadway lengths between 0.82 to 1.41 miles and a variety of conditions. The ADT ranges between 7,400 to 16,150 vpd indicate also a wide range of volumes where road diets have been implemented. In three of the four cases, safety improved significantly and sideswipe and rear end crashes showed large reductions. There were no significant congestion issues resulting from the installation and traffic volumes showed a slight decrease after the conversion.

One of the cases that showed an increase in crashes after the installation points to the need for developing proper designs for the transition into and out of the road diet. This is critical to avoid potential safety problems associated with merging of traffic and thus creating an inappropriate environment. The same case also identifies access management as an issue for review to avoid potential safety problems.

GUIDELINES

The data analyzed here was utilized to develop guidelines for road diet conversions. The guidelines are presented in Appendix B as a standalone document and they will refer the user to this report for additional background information. A brief description of the guidelines is provided here.

Road Diet Conversions

The guidelines focus on the determination of whether a road diet application is appropriate considering operational, safety, and other factors that could have a bearing on the decision to implement a road diet conversion. To achieve this, a flow chart was developed that identifies the various steps to be taken when such decision is evaluated (Figure 19).

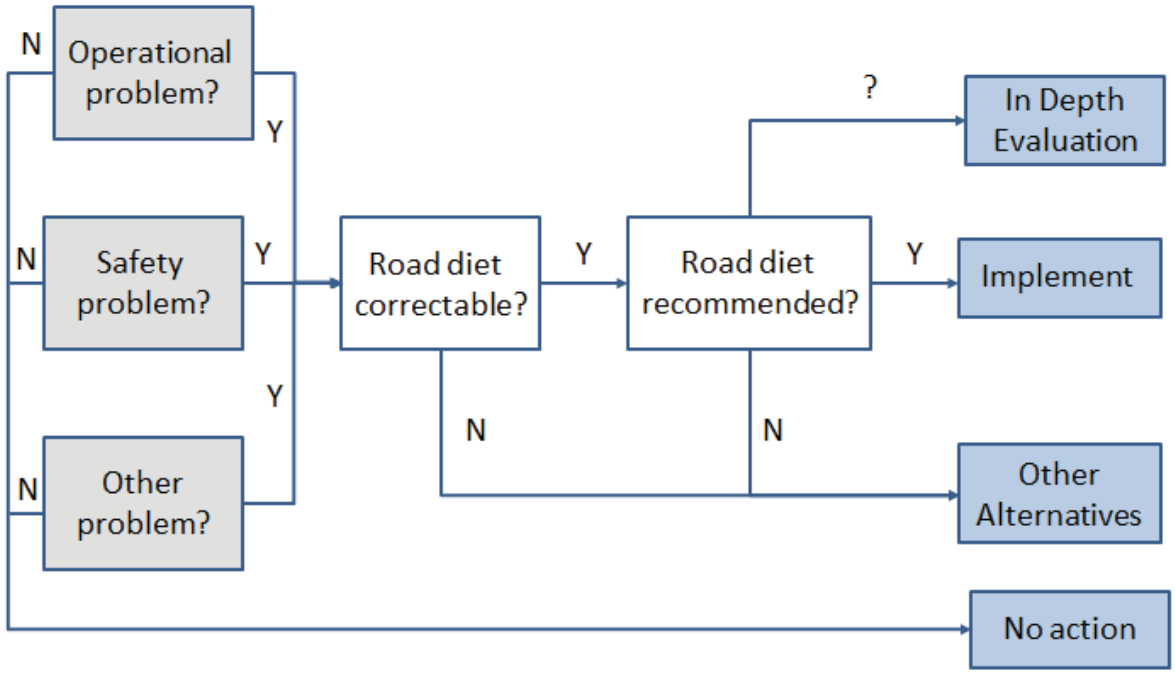

Figure 19 Decision-action flow chart for road diet evaluations

The flow chart allows the user to identify the appropriate action to be undertaken in order to determine whether the road diet will improve the operations, safety or other performance issues associated with the road. To address this, lists of possible problems correctable by a road diet implementation are identified. In addition to these lists, the required items for conducting an in-depth evaluation are also identified in order to allow for a complete evaluation of the implications from a road diet implementation.

CONCLUSIONS AND SUMMARY

This report provides design guidance on when road diet conversions are feasible alternatives and provides the required support for determining the appropriateness of road diet conversions. A structured approach was followed that considered the operational and safety evaluation of comparisons between three- and four-lane roads and identified parameters to be considered during such evaluations.

Typically, road diet conversions will operate at acceptable levels as long as the signalized intersections do not present any operational problems. Therefore, the development of the guidelines focused on evaluating and comparing the operation of three- and four-lane roads at signalized intersections. The general approach utilized a series of simulations for developing the required guidelines for road diet conversions. These simulations were performed with the CORridor SIMulation (CORSIM) and VISSIM software. Statistical analysis was employed to identify trends and develop potential ranges of feasible and un-feasible conditions as well as volume combinations where additional evaluation and analysis are needed.

An important aspect of the work completed here is the extension of the usable range of volumes where road diets could be beneficial. Past work recommended their application for roads with an ADT up to 17,000 vpd. The current research indicates that such conversions could work for roads with significantly greater volumes, up to 23,000 vpd. Moreover, the findings here identify the effect of the side street volume, indicating that both volumes need to be considered when determining whether such a conversion should be considered.

Safety analysis was also completed using the micro-simulation results from VISSIM and processing the trajectory files with the SSAM. SSAM then provided an estimate of rear end and lane change conflicts for both the three-lane and four-lane sections. Analysis indicated that at signalized intersections with moderate left-turn percentages, the road diet decreased the potential for rear end conflicts, but when low or very high left-turn percentages were present, the four-lane section performed better. When examining lane change conflicts, both the three- and four-lane sections had low frequencies of conflicts at low volumes, but at higher volumes, the three-lane section maintained low overall conflicts, while the 4-lane saw a significant increase in conflicts.

Typical considerations for road diet conversions include traffic volumes of the minor and main streets, main street left-turn percentages, functional classification, access frequency and land use. Among these factors, functional classification is an important consideration but has limited effect on the decision of a road diet conversion. The roadway classification is meaningful for a variety of aspects, but the traffic volumes along the roadway are more critical than its classification. There is a wide range of volumes for roadways that are classified within a single category practically rendering this factor unusable for consideration in road diet conversions. The effect of access points is also important in determining operational efficiency and performance of a roadway. However, the existing cases reviewed along with some of the proposed cases evaluated indicated that there are great differences in access frequencies and this factor has a minor influence on the operational performance of the road diet (although it has been observed that a road diet cross-section can facilitate left-turn egress from access points). Finally, land use along the corridors reviewed was mixed with predominantly residential and commercial uses and had no discernable effect on the road diet performance. Given these considerations, the factors utilized here include traffic volumes and left-turn percentages as predictors for the operational performance of the road diet conversion. However, the other

factors noted here need to be considered when determining the overall feasibility of a road diet as the final checklist presented later indicates.

Five road diet conversions in Kentucky were identified and evaluated to determine their overall effects and identify elements that could also assist in the development of the guidelines. In general, it was concluded that the four cases evaluated are successful road diet conversions. The installations covered roadway lengths from 0.82 to 1.41 with ADT ranges from 7,400 to 13,700 vehicles per day indicating also a wide range of conditions where road diets have been implemented. In three of the four cases, safety improved significantly and sideswipe and rear end crashes showed large reductions. There were no significant congestion issues resulting from the road diets. One of the cases did show an increase in crashes after the installation, but further analysis of the crash patterns identified the need for developing proper transitions into the road diet. The transition design is critical to avoid potential safety problems associated with merging of traffic and thus creating an inappropriate environment. The same case also identifies access management as an issue for review to avoid potential safety problems.

Road diets may also improve the operational efficiency of signalized and unsignalized intersections on a corridor. Operational improvements are typically seen when high ADTs and high left-turn percentages are present on the primary and cross-street. Typically road diets are shown to have reduced delays and reduced queues when high left-turn percentages AND high volumes are present.

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APPENDIX A

Kentucky Case Studies

ROAD DIET CASE STUDY EVALUATION
US 60 VERSAILLES, KY
(FINAL) REPORT

Prepared by
Kentucky Transportation Center

Prepared for:
Kentucky Transportation Cabinet
Division of Planning

Date:
August 2011

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INTRODUCTION

The purpose of this report is to evaluate and present the effects associated with the conversion of a section of US 60 in Versailles, Woodford County KY. This section underwent a "road diet" in 2008 in which the road was reduced from a 4-lane facility to a 3-lane facility. The area considered in this study extends on US 60 from Main Street to the US 60 Bypass (MP 0.960 to MP 1.790) for a distance of .83 miles. The location of the study area is shown below in **Figure 1**.

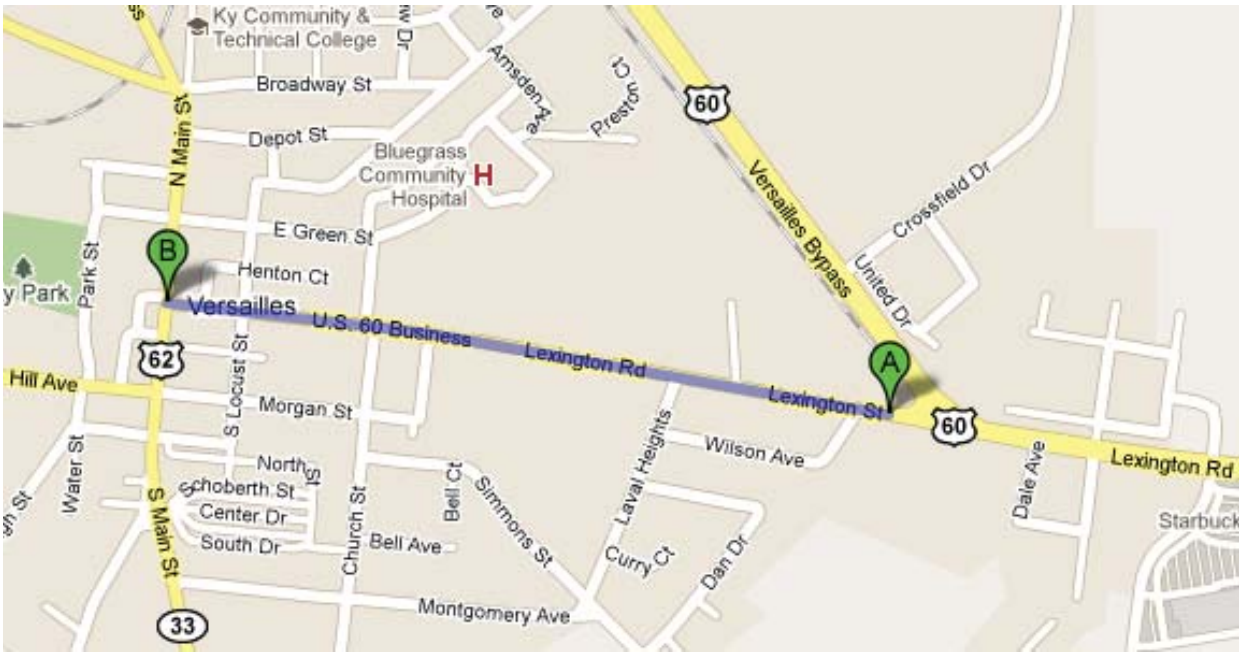

Figure 1: Study Area

This report summarizes the results of the road diet on this corridor while concentrating on aspects such as travel times, crash records, and safety. As well as resulting conditions, former conditions will be discussed.

ROAD DIET IMPLEMENTATION

The study section was originally four or five lanes wide, each about 11 ft in width, with two lanes in each direction, and sometimes contained a median. Typical cross sections are shown in **Figure 2.** It should also be noted that along the .8 mile section there are about 75 residential or commercial entrances/exits. Furthermore, there are 3 signalized intersections: at Main Street, Locust, and the US60 bypass. The frequency of access points indicates that there are several left turns along the corridor. This resulted in frequent backed up traffic in the inside lanes in each direction resulting in the use of these lanes as exclusive left-turn lanes at peak conditions. There is also the potential for unsafe conditions due to the need of through vehicles to avoid the blocked lanes.

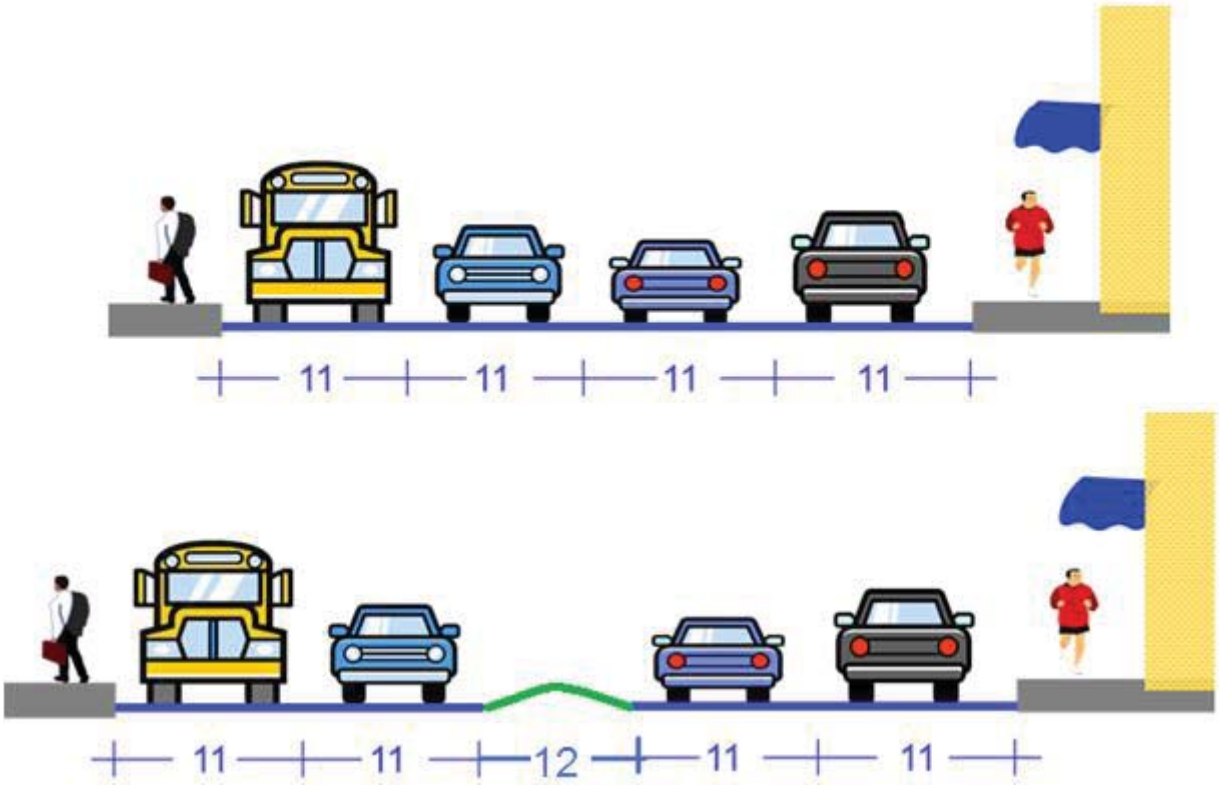

Figure 2: Typical Sections

The road diet approach distributed the available roadway width differently to address these issues. It should be noted that there was not a uniform cross section for the entire corridor. The most typical cross section creates only one 11-foot lane in each direction while a 12-foot two-way-left-turn lane (TWLTL) was added in the center. Additionally, 5-foot bike lanes were added on each side in hopes of increasing multimodal transportation. An example of this cross-section can be seen in **Figure 3** and a constructed example is shown in **Figure 4.**

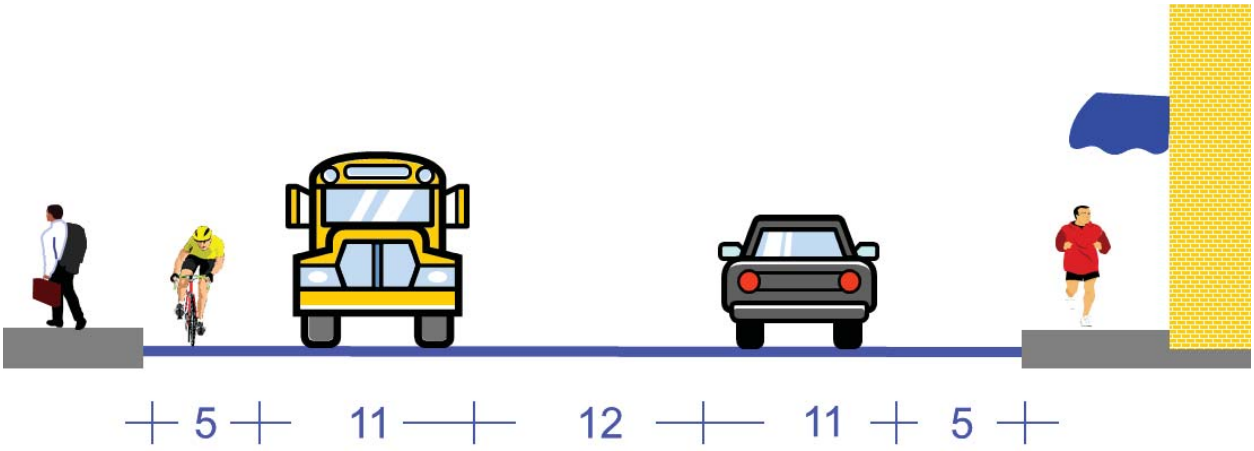

Figure 3: Road Diet Cross-Section



Figure 4: US 60 with Standard Road Diet

Another option similar to the one described above adds 7-foot shoulders to each side. This was done where there was a median previously, fewer access points were present, and a wider paved surface existed. An example of this can be seen in **Figure 5.**



Figure 5: US 60 with Added Shoulders

Finally, a third cross section was utilized where the bike lanes were removed to provide for parking spaces. This cross section is utilized in the section in the vicinity of the downtown area to create more parking. An example of this can be seen in **Figure 6** below. **Figure 7** summarizes the use of each cross section along the corridor.



Figure 6: US 60 with Parking



Figure 7: US 60 Road Diet Types and Locations

One of the main goals of the road diet was to improve safety along with improving efficiency. The two-way left-turn lane provides motorists with a refuge area and removes them form the traffic while waiting to complete their turns.

RESULTING CONDITIONS

This section contains the results concerning travel times and crash history.

Travel Times

Travel times were collected along the corridor to determine average travel times as well as average speeds for peak travel. Travel times for each direction are shown in **Table 1**. The travel times were calculated based on 5 runs in each direction.

Table 1: Travel Time Study

	Travel Time (Seconds)	
Run	West	East
1	130	130
2	120	90
3	140	150
4	160	140
5	120	120
Average	134	126

The average westbound travel time was 134 seconds (or 2.23 minutes) and the average eastbound travel time was 126 seconds (or 2.1 minutes). This means the combined average is 130 seconds (or 2.17 minutes), thus, the average directional trip speed is 23 miles per hour. It should be noted that the existing speed limit is 35 miles per hour.

Crash History

A three-year crash history was collected and analyzed along the corridor. The period evaluated was between January 1, 2005 and December 31, 2007 and there were 39 crashes recorded in this period. **Table 2** summarizes the crashes by type and location. Crashes are disaggregated by signalized and midblock crashes to assist in identifying crash patterns that may be affected by the implementation of the road diet. **Table 3** summarizes crashes for the two years following the road diet change and the date is similarly arranged as in **Table 2.** The dates of the crashes evaluated extend from January 1, 2009 to December 31, 2010.

Table 2: Pre- Road Diet Three-Year Crash Summary (2005-2007)

Crash Type	Total	Signalized	Midblock
Head On	3	2	1
Backing	1	0	1
Opposing left turn	3	3	0
Rear end	8	3	5
Sideswipe-Opposite direction	0	0	0
Sideswipe- Same direction	3	1	2
Single vehicle	1	0	1
Pedestrian-Bicyclist	0	0	0
Other	20	6	14
Total	**39**	**15**	**24**

Table 3: Post- Road Diet Three-Year Crash Summary (2009-2010)

Crash Type	Total	Signalized	Midblock
Head On	1	1	0
Backing	5	2	3
Opposing left turn	5	5	0
Rear end	18	4	14
Sideswipe-Opposite direction	1	0	1
Sideswipe- Same direction	4	0	4
Single vehicle	1	0	1
Pedestrian-Bicyclist	0	0	0
Other	14	4	10
Total	**49**	**16**	**33**

The data in Tables 3 and 4 indicate that there is an overall increase in crashes for the after the installation period. This difference is even greater when considering that the after period is only for two years. In this case, the average number of crashes before is 13 per year while after the road diet the number of crashes is 24.5 per year. This is an 88% increase.

EVALUATION METHODOLOGY

Safety and operational improvements are typically the reasons for a road diet implementation. Therefore, the evaluation should consider metrics that could allow for comparisons of the before and after conditions as well determine the level of performance for the current conditions. These measures include crash changes and travel times and speeds.

Safety Evaluation

The comparison of the before and after the road diet periods showed that traffic crashes almost doubled per year. The data shows that crashes increased 88% per year and rear end crashes increased 225% per year. The anticipated pattern is different than the observed, i.e. rear ends and overall number of crashes are expected to decrease. An examination of the injury crashes showed a 10% reduction, indicating that a smaller percentage of crashes are injuries.

A detailed examination of the crashes along the corridor revealed that all rear end crashes in the after period were at the vicinity of the US 60 Bypass and Wilson Avenue intersection. The analysis showed that most of the westbound crashes (i.e. towards Versailles) were caused from motorists stopping to allow other motorists in the right lane to merge as the lane ended, i.e. at the transition to the road diet. In the eastbound direction, most crashes were cause by a speed differential and occupancy between the available lanes. The left lane seemed to be less occupied than the right lane, which typically will demonstrate longer queues resulting in rear end crashes. Moreover, many vehicles exiting the adjacent parking lots and making left turns were also involved in crashes with vehicles traveling eastbound. This area accounts for 35% of total crashes post-road diet while before it was only 15% of total crashes.

It was also observed that ADT remained virtually unchanged. In 2005, the volume was 10,900 vehicles per day and in 2009 11,000 vehicles per day. Therefore the increase in crashes cannot be attributed to the changes in ADT. The crash rates also showed a similar increase of 87% over the same period (average crash rate of 331 crashes/100 million vehicle-miles traveled per year in before period and 618 crashes/100 million vehicle-miles traveled per year in the after period).

Another important aspect is the changes in the crashes for pedestrians and bicyclists. Even though the before and after the road diet implementation data showed no crashes, this could be indicative either of lack of any such users or a safe environment for them. It is more likely that there is only a small number of users that use the facility and efforts to increase and promote its use may be needed.

Operations Evaluation

There is no travel time data available for the before period to allow for a before-after comparison. The current speeds are below the speed limit indicating that there may be some delays during the peak period. The presence of the signalized intersections could

induce operational delays which could explain the increased travel time. However, the increased travel times are small and no congestion was observed during the data collection indicating acceptable operation.

EVALUATION SUMMARY

The analysis shown here helps one to see the benefits and disadvantages of the road diet, allowing them to decide if it was the correct decision. **Table 4** presents a summary of the evaluation parameters considered.

Table 4: Summary of Road Diet Installation Effects

Aspect	Effect
Travel times and Intersection delays	Successful, possibly improved
Overall safety	Declined; reduced conflict points; increased crashes, especially rear end; reduced crashes with injuries;
Travel speeds	Most likely improved uniformity; traffic calming potential
Pedestrian safety	No Change
Multimodal operations	No Change, encourages bicyclists more
Access management	Improved potential

The travel times show an improvement overall for this road diet installation. The increase in the number of crashes is directly attributed to the lack of proper design for the transition of the existing cross section to the road diet cross section in the east end of the project. Moreover, the lack of any access management in the south side of the project contributes to the higher number of crashes in the after period. It should be noted that if the east end of the project is excluded, the safety performance of the remaining corridor is as typically anticipated, i.e. there is an overall reduction in crashes and an improvement in safety. Other aspects associated with most road diets such as improved traffic calming, improved access management potential, and improved multimodal operations could also be viewed as additional benefits for this corridor. The safety performance of this corridor points to the need for developing proper designs for the transition into and out of the road diet and therefore, a review of this may be needed.

ROAD DIET CASE STUDY EVALUATION
EUCLID AVE. LEXINGTON, KY
(FINAL) REPORT

Prepared by
Kentucky Transportation Center

Prepared for:
Kentucky Transportation Cabinet
Division of Planning

Date:
August 2011

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INTRODUCTION

The purpose of this report is to evaluate and present the effects associated with the conversion of a section of Euclid Avenue in Lexington, Fayette County KY. This section underwent a “road diet” in 2000 in which the road was reduced from a 4-lane facility to a 3-lane facility. The area considered in this study extends on Euclid Avenue from Ashland Avenue to S. Limestone Street (MP 12.125 to MP 13.255) for a distance a of 1.13 miles. The location of the study area is shown below in **Figure 1**.

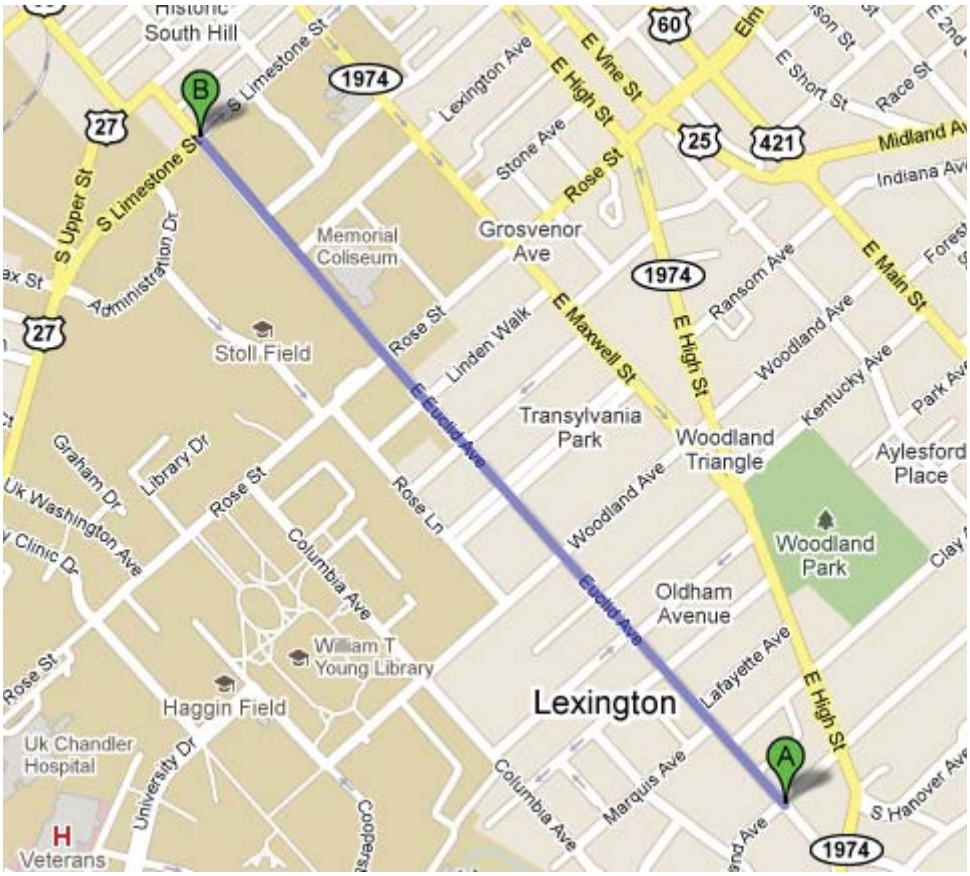

Figure 1: Study Area

This report summarizes the results of the road diet on Euclid while concentrating on aspects such as travel times, crash records, and safety. As well as resulting conditions, former conditions will be discussed.

ROAD DIET IMPLEMENTATION

The study section was originally four lanes wide, each about 13 ft in width, with two lanes in each direction. This cross section is shown in **Figure 2.** It should also be noted that along the 1.13 mile section there are 51 residential or commercial entrances/exits. Furthermore, there are five intersections with traffic signals at Limestone Street, Martin Luther King Boulevard, Rose Street, Woodland Avenue, and Ashland Avenue. The frequency of access points indicates that there are several left turns along the corridor. This resulted in frequent backed up traffic in the inside lanes in each direction resulting in the use of these lanes as exclusive left-turn lanes at peak conditions. There is also the potential for unsafe conditions due to the need of through vehicles to avoid the blocked lanes.

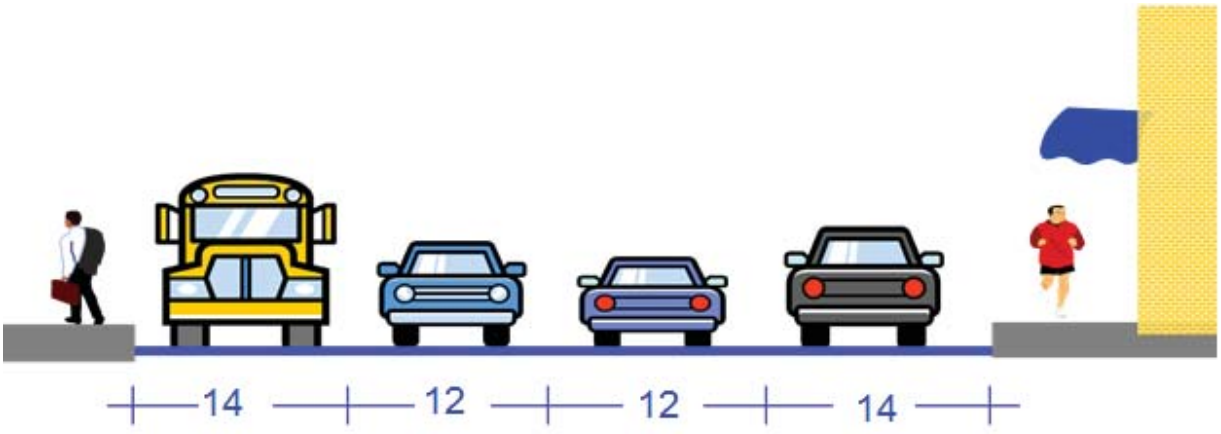

Figure 2: Typical Section

For Euclid, rear end crashes were becoming a problem as was congestion. A road diet was implemented to address these issues. A significant number of pedestrians and cyclist was also present due to the proximity of the road to the University of Kentucky campus. This solution utilized the existing paved roadway and re-divided it so that only one 12-foot lane remained in each direction while a 14-foot two-way-left-turn lane was added in the center. Additionally, 7-foot bike lanes were added on each side aiming to increase multimodal transportation. An example of this cross-section can be seen in **Figure 3**.

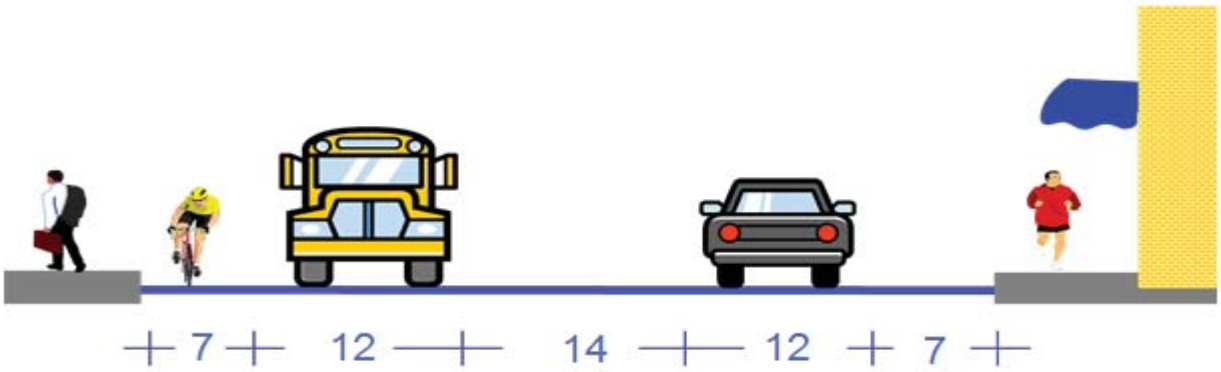

Figure 3: Road Diet Cross-Section

One of the main goals of the road diet was to improve safety along with improving efficiency. The two-way left turn lane provides motorists with a refuge area and removes them form the traffic while waiting to complete their turns. A constructed example showing these changes is displayed in **Figure 4.**



Figure 4: Euclid Post-Road Diet Transformation

RESULTING CONDITIONS

This section contains the results concerning travel times and crash history.

Travel Times

Travel times were collected along the corridor to determine average travel times as well as average speeds for peak travel. Travel times for each direction are shown in **Table 1**. The travel times were calculated based on 5 runs in each direction.

Table 1: Travel Time Study

	Travel Time (Seconds)	
Run	Northwest	Southeast
1	256	366
2	350	342
3	372	202
4	329	290
5	358	348
Average	333	310

The average northwest travel time was 333 seconds (or 5.55 minutes) and the average southeast travel time was 310 seconds (or 5.16 minutes). This means the combined average is 321 seconds (or 5.36 minutes), thus, the average directional trip speed is 12.3 miles per hour. It should be noted that the existing speed limit is 35 miles per hour.

Crash History

A three-year crash history was collected and analyzed along the corridor. The period evaluated was between January 1, 1997 and December 31, 1999 and there were 236 crashes recorded in this period. **Table 2** summarizes the crashes by type and location. Crashes are disaggregated by signalized and midblock crashes to assist in identifying crash patterns that may be affected by the implementation of the road diet. **Table 3** summarizes crashes for the three years following the road diet change and the data is similarly arranged as in **Table 2.** The dates of the crashes evaluated extend from January 1, 2001 to December 31, 2003 and there were 104 crashes during that period.

Table 2: Pre- Road Diet Three-Year Crash Summary (1997-1999)

Crash Type	Total	Signalized	Midblock
Head On	2	1	1
Backing	0	0	0
Opposing left turn	0	0	0
Rear end	170	115	55
Sideswipe-Opposite direction	1	0	1
Sideswipe- Same direction	9	1	8
Single vehicle	2	0	2
Pedestrian-Bicyclist	21	17	4
Other	31	6	25
Total	**236**	**140**	**96**

Table 3: Post- Road Diet Three-Year Crash Summary (2001-2003)

Crash Type	Total	Signalized	Midblock
Head On	3	0	3
Backing	1	0	1
Opposing left turn	19	19	0
Rear end	36	9	27
Sideswipe-Opposite direction	3	2	1
Sideswipe- Same direction	4	1	3
Single vehicle	1	0	1
Pedestrian-Bicyclist	2	1	1
Other	35	17	18
Total	**104**	**49**	**55**

The primary crash type at both intersection and midblock locations, and both before and after the road-diet transformation, is rear ends. This is mainly attributed to vehicles slowing to turn left or right. Though this is still the highest type of crash after the road diet is implemented, one can see a significant reduction in the number of crashes. The data shows a 56 % decrease in total crashes (less than half after the road diet) and an accompanying 79% decrease in rear ends and 30% decrease in sideswipes.

EVALUATION METHODOLOGY

Safety and operational improvements are typically the reasons for a road diet implementation. Therefore, the evaluation should consider metrics that could allow for comparisons of the before and after conditions as well determine the level of performance for the current conditions. These measures include crash changes and travel times and speeds.

Safety Evaluation

The before and after the road diet comparison of traffic crashes shows a decrease by 56% in the after period accompanied by a 79% decrease in rear end crashes and 30% decrease in sideswipes. It was also found that the percent of crashes with injuries has stayed about the same, but since overall crashes have decrease so have total injuries. These data indicate that the safety of the corridor has improved with the road diet conversion.

It should also be noted that ADT on this section did not increase. In 1996 the ADT was 15,900 vehicles per day and, in 2004 after the road diet, the ADT was 13,700 vehicles per day. This shows that volume has remained virtually the same. The reduction in the ADT does not affect the crash comparison, since the crash rates were also reduced over the same period by 49% (average crash rate of 1374 crashes/100 million vehicle-miles traveled per year in before period and 703 crashes/100 million vehicle-miles traveled per year in the after period).

Another important aspect is the changes in the crashes for pedestrians and bicyclists. These crashes decreased from 21 to 2, showing a decrease of 90%. This greatly encourages more bicyclists and pedestrians while making the area safer for them as well as for motorists.

Operations Evaluation

There is no travel time data available for the before period to allow for a before-after comparison. The current speeds are below the speed limit indicating that there may be some delays during the peak period. The presence of the signalized intersections could induce operational delays which could explain the increased travel time. However, the increased travel times are small and no congestion was observed during the data collection indicating acceptable operation.

EVALUATION SUMMARY

The analysis shown here helps one to see the benefits and disadvantages of the road diet, allowing them to decide if it was the correct decision. **Table 4** presents a summary of the evaluation parameters considered.

Table 4: Summary of Road Diet Installation Effects

Aspect	Effect
Travel times and Intersection delays	Undocumented but could be a problem
Overall safety	Improved; reduced conflict points; reduced crashes, especially sideswipe and rear end; reduced crashes with injuries; potential to increase rear end crashes at intersections
Travel speeds	Most likely improved uniformity; traffic calming potential
Pedestrian safety	Improved
Multimodal operations	Improved for bicycles and transit
Access management	Improved potential

Though travel times and intersection delays remain a problem for the corridor at peak times, there are several improvements, especially in safety, that could outweigh the operational delays. The safety reductions both in total crashes and rear end crashes show that there has been a significant safety improvement along the corridor. This is even more so for pedestrian and bicyclists for which the crashes reduced by 90%. Moreover, the aspects that come along with most road diets such as improved traffic calming, improved access management potential, and improved multimodal operations could also be viewed as additional benefits for this corridor. Therefore, it is deemed appropriate to consider this as a successful conversion.

ROAD DIET CASE STUDY EVALUATION
US 27 CAMPBELL COUNTY, KY
(FINAL) REPORT

Prepared by
Kentucky Transportation Center

Prepared for:
Kentucky Transportation Cabinet
Division of Planning

Date:
August 2011

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INTRODUCTION

The purpose of this report is to evaluate and present the effects associated with the conversion of a section of US 27, Campbell County KY which occurred in 2008. This section underwent a "road diet" in which the road was reduced from a 4-lane facility to a 3-lane facility. The area considered in this study extends on US 27 from Camp to Ft. Thomas Avenue (MP 16.721 to MP 18.133) for a distance of 1.412 miles. The location of the study area is shown below in **Figure 1**.

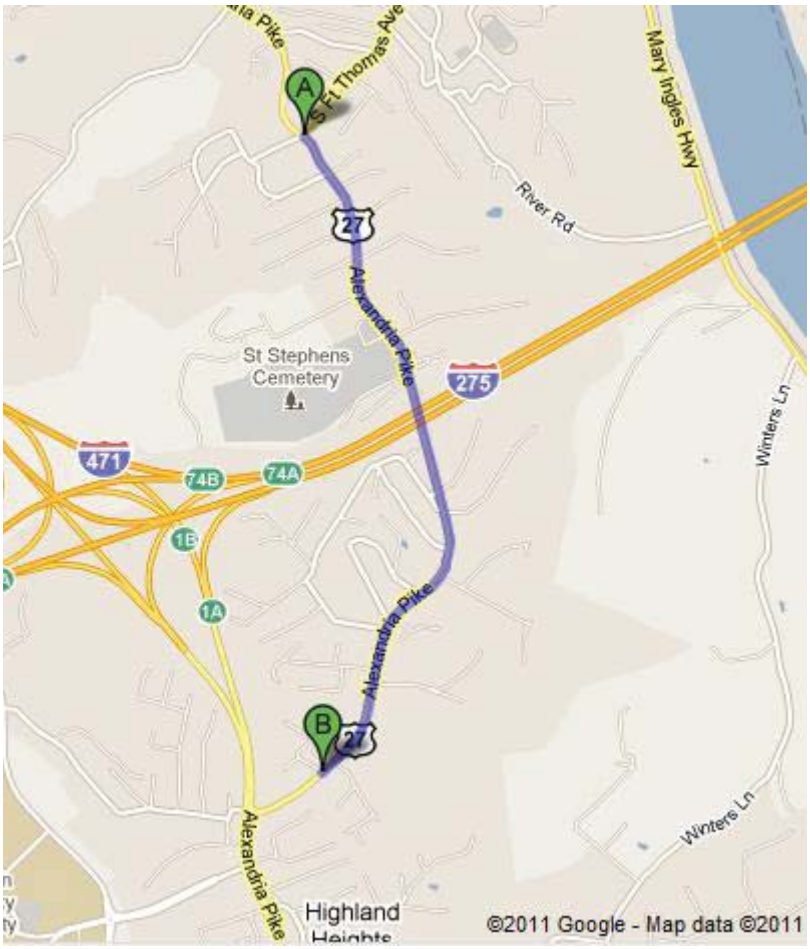

Figure 1: Study Area

This report summarizes the results of the road diet on US 27 while concentrating on aspects such as travel times, crash records, and safety. As well as resulting conditions, former conditions will be discussed.

ROAD DIET IMPLEMENTATION

The study section was originally four lanes wide, each about 11 ft in width, with two lanes in each direction. This cross section is shown in **Figure 2.** It should also be noted that along the 1.412 mile section there are 104 residential or commercial entrances/exits. Furthermore, there are six intersections with traffic signals at Lowes Road, Renshaw Road, Holly Woods Drive, Crowell Avenue, Concord Avenue, and Ft. Thomas Avenue. The frequency of access points indicates that there are several left turns along the corridor. This resulted in frequent backed up traffic in the inside lanes in each direction resulting in the use of these lanes as exclusive left-turn lanes at peak conditions. There is also the potential for unsafe conditions due to the need of through vehicles to avoid the blocked lanes.

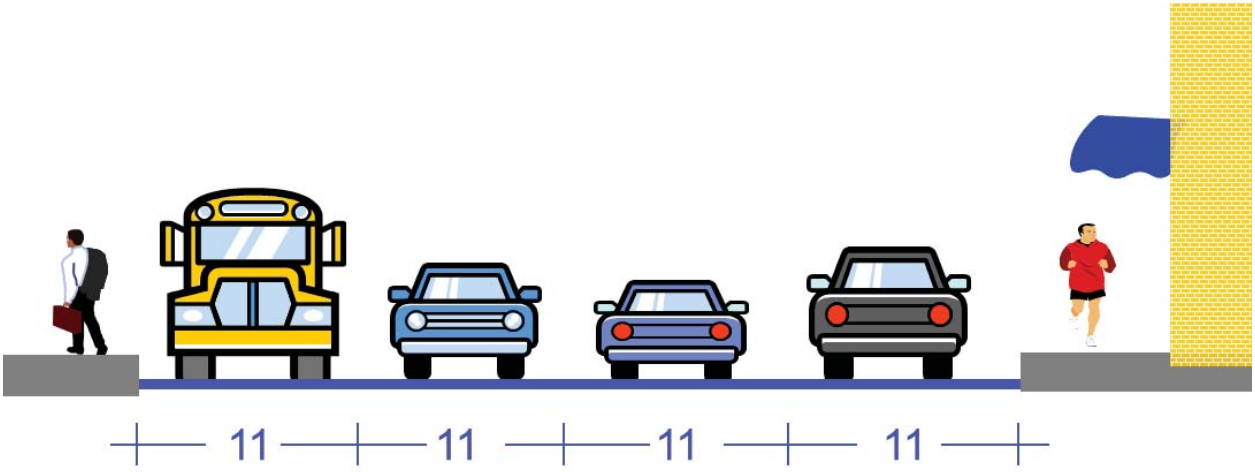

Figure 2: Typical Section

The road diet approach distributed the available roadway width differently to address these issues. This solution took the paved roadway and made it so that only one 11 foot lane remained in each direction while a 12 foot two-way-left-turn lane was added in the center. Additionally, 5-foot bike lanes were added on each side in hopes of increasing multimodal transportation. An example of this cross-section can be seen in **Figure3**.

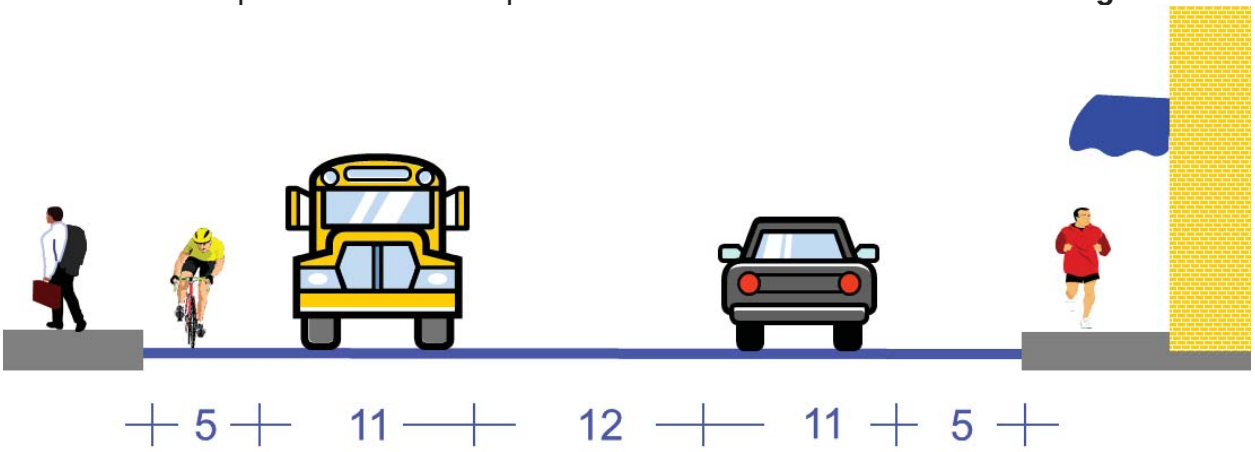

Figure 3: Road Diet Cross-Section

One of the main goals of the road diet was to improve safety along with improving efficiency. The two-way left turn lane provides motorists with a refuge area and removes them from the traffic while waiting to complete their turns. Constructed examples of the resulting corridor can be seen in **Figures 4** and **5.**



Figure 4: US 27 Post-Road Diet Transformation (Near Ends with More Entrances)



Figure 5: US 27 Post-Road Diet Transformation (In Middle with Few Entrances)

RESULTING CONDITIONS

This section contains the results concerning travel times and crash history.

Travel Times

Travel times were collected along the corridor to determine average travel times as well as average speeds for peak travel. Travel times for each direction are shown in **Table 1**. The travel times were calculated based on 6 runs in each direction.

Table 1: Travel Time Study

	Travel Time (Seconds)	
Run	North	South
1	220	190
2	210	250
3	250	250
4	230	320
5	310	280
6	210	190
Average	238	247

The average northbound travel time was 238 seconds (or 3.97 minutes) and the average southbound travel time was 247 seconds (or 4.12 minutes). This means the combined average is 242.5 seconds (or 4.04 minutes), thus, the average directional trip speed is 21 miles per hour. It should be noted that the existing speed limit is 35 miles per hour.

Crash History

A three-year crash history was collected and analyzed along the corridor. The period evaluated was between January 1, 2005 and December 31, 2007 and there were 60 crashes recorded in this period. **Table 2** summarizes the crashes by type and location. Crashes are disaggregated by signalized and midblock crashes to assist in identifying crash patterns that may be affected by the implementation of the road diet. **Table 3** summarizes crashes for the two years following the road diet change and the data is similarly arranged as in **Table 2.** The dates of the crashes evaluated extend from January 1, 2009 to December 31, 2010 and there were a total of 19 crashes for this period.

Table 2: Pre- Road Diet Three-Year Crash Summary (2005-2007)

Crash Type	Total	Signalized	Midblock
Head On	1	1	0
Backing	5	0	5
Opposing left turn	4	4	0
Rear end	21	4	17
Sideswipe-Opposite direction	2	0	2
Sideswipe- Same direction	5	1	5
Single vehicle	1	1	0
Pedestrian-Bicyclist	0	0	0
Other	19	2	17
Total	**60**	**15**	**47**

Table 3: Post- Road Diet Three-Year Crash Summary (2009-2010)

Crash Type	Total	Signalized	Midblock
Head On	1	0	1
Backing	0	0	0
Opposing left turn	1	1	0
Rear end	8	0	8
Sideswipe-Opposite direction	0	0	0
Sideswipe- Same direction	2	0	2
Single vehicle	1	0	1
Pedestrian-Bicyclist	1	0	1
Other	5	0	5
Total	**19**	**1**	**18**

The primary crash type at both intersection and midblock locations, and both before and after the road-diet transformation, is rear ends. This is mainly attributed to vehicles slowing to turn left or right. Average crashes per year are used for the comparison, since the two time periods were not the same. These averages show a significant reduction in crashes with a 58% decrease in total crashes, 43% decrease in rear ends and 57% decrease in sideswipes.

EVALUATION METHODOLOGY

Safety and operational improvements are typically the reasons for a road diet implementation. Therefore, the evaluation should consider metrics that could allow for comparisons of the before and after conditions as well determine the level of performance for the current conditions. These measures include crash changes and travel times and speeds.

Safety Evaluation

The comparison of the before and after the road diet periods showed that traffic crashes and rear ends alike decreased greatly. With total crashes decreasing 58%, rear ends decreasing 43% and sideswipes deceasing 57%, it could easily be concluded that the road diet has increased vehicular safety. At the same time there was a reduction in the ADT from 10,600 in 2004 to 7,410 in 2010. The reduction in the ADT does not affect the crash comparison, since the crash rates were also reduced over the same period by 32% (average crash rate of 524 crashes/100 million vehicle-miles traveled per year in before period and 356 crashes/100 million vehicle-miles traveled per year in the after period).

The crash data shows that there were no bicycle crashes before the road diet implementation and one after. It could be hypothesized that this is due to increased numbers of bicyclists along the corridor but this cannot be substantiated, since there are no available bicycle counts along the corridor.

Operations Evaluation

There is no travel time data available for the before period to allow for a before-after comparison. The current speeds are below the speed limit indicating that there may be some delays during the peak period. The presence of the signalized intersections could induce operational delays which could explain the increased travel time. However, the increased travel times are small and no congestion was observed during the data collection indicating acceptable operation.

EVALUATION SUMMARY

The analysis shown here helps one to see the benefits and disadvantages of the road diet, allowing them to decide if it was the correct decision. **Table 4** presents a summary of the evaluation parameters considered.

Table 4: Summary of Road Diet Installation Effects

Aspect	Effect
Travel times and Intersection delays	Unsure of change, but no congestion so seems successful in this area
Overall safety	Improved; reduced conflict points; reduced crashes and crash rates, especially sideswipe and rear end; potential to increase rear end crashes at intersections
Travel speeds	Most likely improved uniformity; traffic calming potential
Pedestrian safety	Unsure
Multimodal operations	Improved for bicycles and transit
Access management	Improved potential

It has been made evident that safety has increased, which in itself is enough reason to support the road diet. However, there are aspects that come along with most road diets such as improved traffic calming, improved access management potential, and improved multimodal operations that cannot be measured. With this said, the value behind this road diet is evident. Also, to users, the value of efficient travel times can be invaluable. Therefore, the absence of visible congestion seems to justify the road diet conversion.

The increased safety and efficient travel times indicate a successful road diet application. The travel time studies conducted during peak hour traffic show the lack of any congestion and indicate efficient operations. For cases similar to this, a road diet conversion seems a very sensible and helpful solution that could be implemented.

ROAD DIET CASE STUDY EVALUATION
KY 1428 FLOYD COUNTY, KY
(FINAL) REPORT

Prepared by
Kentucky Transportation Center

Prepared for:
Kentucky Transportation Cabinet
Division of Planning

Date:
November 2011

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INTRODUCTION

The purpose of this report is to evaluate and present the effects associated with the conversion of a section of KY 1428, Floyd County, KY. The project took place between August 2005 and June 2006. This section underwent a “road diet” in which the road was reduced from a 4-lane facility to a 3-lane facility on some parts and grew from a 2-lane facility to a 3-lane facility on the other. The area considered in this study extends on KY 1428 from East Graham Ave to Black Cat Ally (MP 15.153 to MP 16.091) for a distance of 0.928 miles. The location of the study area is shown below in **Figure 1**.

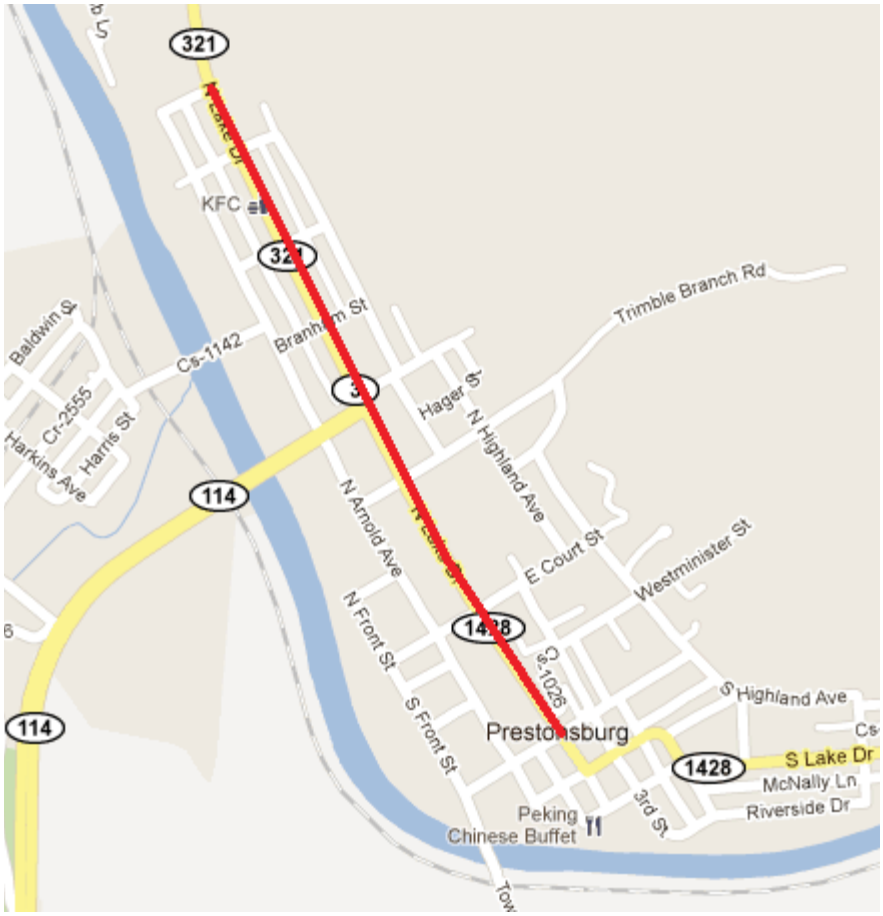

Figure 1: Study Area

This report summarizes the results of the road diet on KY 1428 while concentrating on aspects such as travel times, crash records, and safety. As well as resulting conditions, former conditions will be discussed.

ROAD DIET IMPLEMENTATION

The study section south of KY 114 was originally four lanes wide, each about 9 feet wide. The section north of KY 114 was two lanes wide, each about 16 feet wide. These cross sections are shown in **Figure 2 and Figure 3.** It should also be noted that along the 0.928 mile section there are 8 intersections; CS-1026, CR-2556, Friend Street, KY-114, Dingus Street, Branham Street, Patton Street, and Music Street. There are also a number of residential and commercial entrances along the study section. The frequency of access points indicates that there are several left turns along the corridor. This resulted in frequent backed up traffic in the inside lanes in each direction resulting in the use of these lanes as exclusive left-turn lanes at peak conditions. There is also the potential for unsafe conditions due to the need of through vehicles to avoid the blocked lanes.

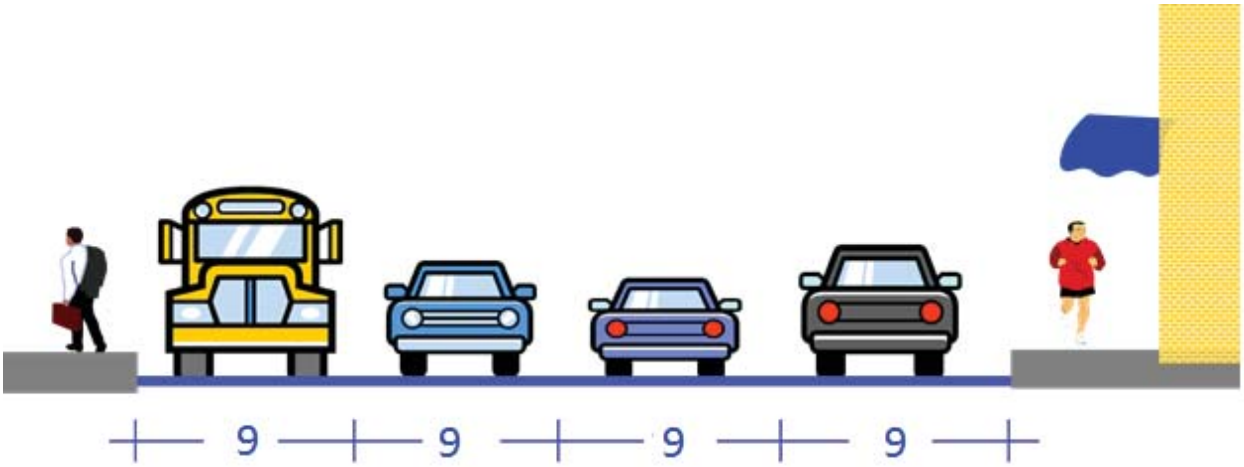

Figure 2: Initial Four Lane Section (North of KY 114)

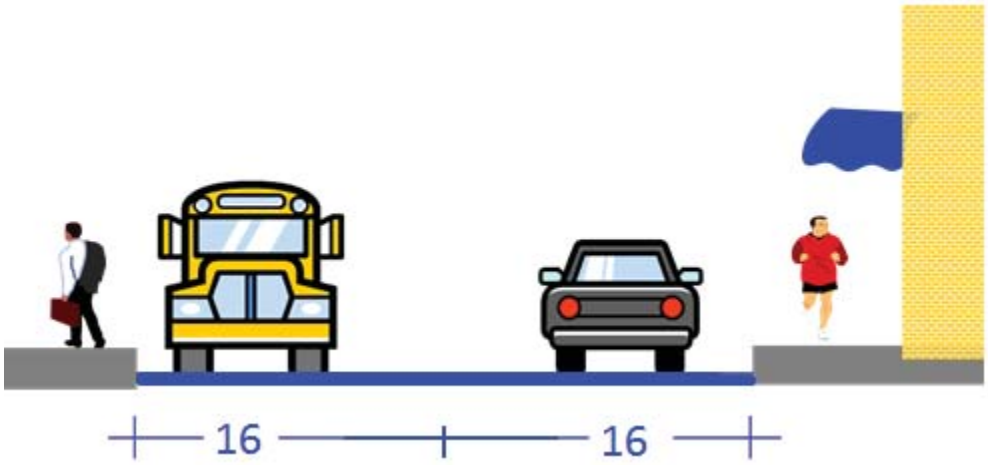

Figure 3: Initial Two Lane Section (South of KY 114)

The road diet approach distributed the available roadway width differently to address these issues. This solution took the paved roadway on the northern half of the project and converted it into one 12 foot lane in each direction with a 12 foot two-way-left-turn lane in the center. The same thing was done with the southern half of the project utilizing 11 feet lanes instead of 12 feet lanes. An example of these cross-sections can be seen in **Figure 4** and **Figure 5**.

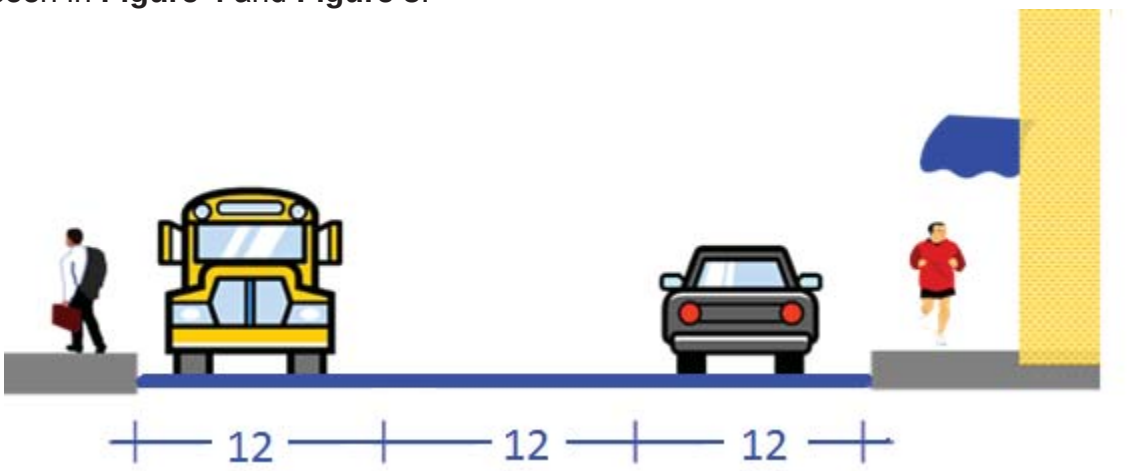

Figure 4: Road Diet Cross-Section (North of 114)

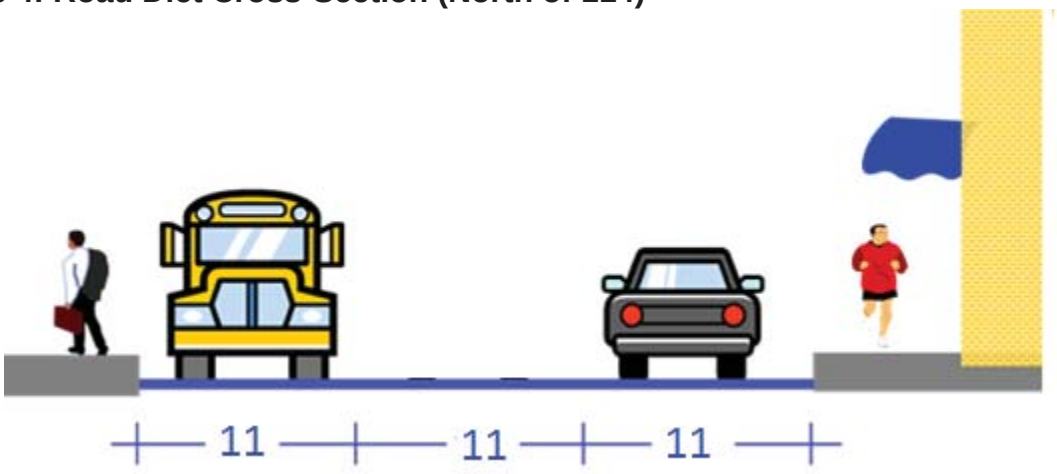

Figure 5: Road Diet Cross-Section (South of 114)

One of the main goals of the road diet was to improve safety along with improving efficiency. The two-way left-turn lane provides motorists with a refuge area and removes them from the traffic while waiting to complete their turns. Constructed examples of the resulting corridor can be seen in **Figures 6** and **Figure 7.**



Figure 6: KY 1428 Post-Road Diet Transformation



Figure 7: KY 1428 Post-Road Diet Transformation (Transition from Two Lanes)

RESULTING CONDITIONS

This section contains the results concerning travel times and crash history.

Travel Times

Travel times were collected along the corridor to determine average travel times as well as average speeds for peak travel. Travel times for each direction are shown in **Table 1**.

Table 1: Travel Time Study

		Travel Time (Seconds)	
Section	Distance(ft)	Northbound	Southbound
MP 15.153 to Court Street	689	27	18
Court Street to Friend Street	924	29	31
Friend Street to KY 114	646	20	17
KY 114 to Music Street	1745	64	71
Music Street to MP 16.091	823	8	33
Total	4827	148	170

The total northbound travel time was 148 seconds (or 2.47minutes) and the total southbound travel time was 170 seconds (or 2.83 minutes). This means the combined average is 159 seconds (or 2.65 minutes), thus, the average directional trip speed is 21 miles per hour. It should be noted that the existing speed limit is 35 miles per hour.

Crash History

A three-year crash history was collected and analyzed along the corridor. The period evaluated was between January 1, 2002 and December 31, 2004 and there were 115 crashes recorded in this period. **Table 2** summarizes the crashes by type and location. Crashes are disaggregated by signalized and midblock crashes to assist in identifying crash patterns that may be affected by the implementation of the road diet. **Table 3** summarizes crashes for the three years following the road diet change and the data is similarly arranged as in **Table 2.** The dates of the crashes evaluated extend from January 1, 2007 to December 31, 2009 and there were a total of 52 crashes for this period.

Table 2: Pre- Road Diet Three-Year Crash Summary (2002-2004)

Crash Type	Total	Signalized	Midblock
Head On	1	0	1
Angle	29	1	28
Opposing left turn	5	5	0
Rear end	35	7	28
Sideswipe-Opposite direction	1	0	1
Sideswipe- Same direction	9	0	9
Single vehicle	6	2	4
Pedestrian-Bicyclist	1	0	1
Other	28	2	26
Total	**115**	**17**	**98**

Table 3: Post- Road Diet Three-Year Crash Summary (2007-2009)

Crash Type	Total	Signalized	Midblock
Head On	0	0	0
Angle	7	3	4
Opposing left turn	4	4	0
Rear end	29	4	25
Sideswipe-Opposite direction	2	1	1
Sideswipe- Same direction	4	0	4
Single vehicle	1	0	1
Pedestrian-Bicyclist	1	0	1
Other	4	0	4
Total	**52**	**12**	**40**

The primary crash type at both intersection and midblock locations, and both before and after the road-diet transformation, is rear ends. This is mainly attributed to vehicles slowing to turn left or right. The data's yearly averages show a significant reduction in crashes with a 55% decrease in total crashes, 17% decrease in rear ends, and 76% decrease in angle collisions.

EVALUATION METHODOLOGY

Safety and operational improvements are typically the reasons for a road diet implementation. Therefore, the evaluation should consider metrics that could allow for comparisons of the before and after conditions as well determine the level of performance for the current conditions. These measures include crash changes and travel times and speeds.

Safety Evaluation

The comparison of the before and after the road diet periods showed that traffic crashes and angle collisions alike decreased greatly. With total crashes decreasing 55%, rear ends decreasing 17% and angle collisions decreasing 76%, it could easily be concluded that the road diet has increased vehicular safety. At the same time there was little change in the ADT from 15,939 in 2005 to 16,159 in 2009. The small growth in the ADT show that a decrease in traffic is not the cause of improved safety, since the crash rates were reduced over the same period by 55% (average crash rate of 618 crashes/100 million vehicle-miles traveled in before period and 281 crashes per 100 million vehicle-miles traveled in the after period). It should also be noted that the number of injury crashes was also reduced from 34 to 14. This decrease of 59% is even larger than the decrease in total crashes and suggests that the road diet has impacted severe crashes as well.

The crash data shows that there was one bicycle/pedestrian crash before the road diet implementation and one after. It could be hypothesized that this is due to increased numbers of bicyclists and pedestrians along the corridor but this cannot be substantiated, since there are no available bicycle/pedestrian counts along the corridor.

Operations Evaluation

There is no travel time data available for the before period to allow for a before-after comparison. The current speeds are below the speed limit indicating that there may be some delays during the peak period. The presence of the signalized intersections could induce operational delays which could explain the increased travel time. However, the increased travel times are small and no congestion was observed during the data collection indicating acceptable operation.

EVALUATION SUMMARY

The analysis shown here helps one to see the benefits and disadvantages of the road diet, allowing them to decide if it was the correct decision. **Table 4** presents a summary of the evaluation parameters considered.

Table 4: Summary of Road Diet Installation Effects

Aspect	Effect
Travel times and Intersection delays	Unsure of change, but no congestion so seems successful in this area
Overall safety	Improved; reduced conflict points; reduced crashes and crash rates, especially angle and rear end collisions; potential to increase rear end crashes at intersections
Travel speeds	Most likely improved uniformity; traffic calming potential
Pedestrian safety	Unsure but shoulder gives more space from traffic
Multimodal operations	Unsure
Access management	Improved potential

It has been made evident that safety has increased, which in itself is enough reason to support the road diet. However, there are aspects that come along with most road diets such as improved traffic calming, improved access management potential, and improved multimodal operations that cannot be measured. With this said, the value behind this road diet is evident. Also, to users, the value of efficient travel times can be invaluable. Therefore, the absence of visible congestion seems to justify the road diet conversion.

The increased safety and efficient travel times indicate a successful road diet application. The travel time studies conducted during peak hour traffic show the lack of any congestion and indicate efficient operations. For cases similar to this, a road diet conversion seems a very sensible and helpful solution that could be implemented.

ROAD DIET CASE STUDY EVALUATION
US 127 HARRODSBURG, KY
(FINAL) REPORT

Prepared by
Kentucky Transportation Center



Prepared for:
Kentucky Transportation Cabinet
Division of Planning



Date:
August 2011

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INTRODUCTION

The purpose of this report is to evaluate and present the effects associated with the conversion of a section of US 127 in Harrodsburg, Mercer County KY. This section underwent a "road diet" in 2006 in which the road was reduced from a 4-lane facility to a 3-lane facility. The area considered in this study extends on US 127 from KY 1989 to Chestnut Street (MP 4.076 to MP 4.893) for a distance of 0.817 miles. The location of the study area is shown below in **Figure 1**.



Figure 1: Study Area

This report summarizes the results of the road diet on College Street while concentrating on aspects such as travel times, crash records, and safety. As well as resulting conditions, former conditions will be discussed.

ROAD DIET IMPLEMENTATION

The study section was originally four lanes wide, each about 10 or 11 ft in width, with two lanes in each direction. This cross section is shown in **Figure 2.** It should also be noted that along the 0.817 mile section there are 117 unsignalized entrances/exits. Furthermore, there are two signalized intersections at Lexington Street and Mooreland Avenue. The frequency of access points indicates that there are several left turns along the corridor. This resulted in frequent backed up traffic in the inside lanes in each direction resulting in the use of these lanes as exclusive left-turn lanes at peak conditions. There is also the potential for unsafe conditions due to the need of through vehicles to avoid the blocked lanes.

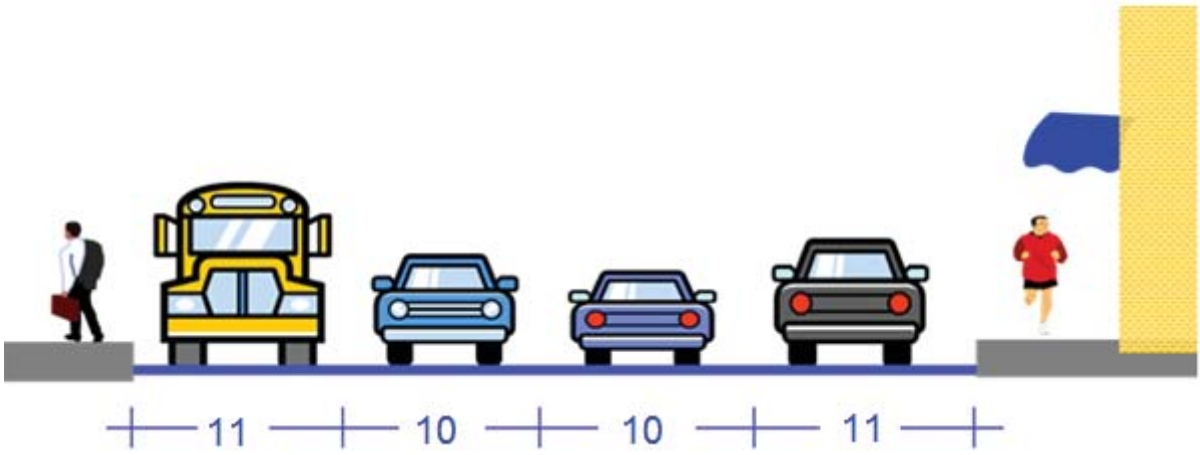

Figure 2: Typical Section

For US 127, rear end crashes were becoming a problem as was congestion. The road diet conversion was implemented to address these issues. The new design distributed the available roadway by providing one 15-foot lane in each direction while adding a 12-foot two-way-left-turn lane in the center. The wider travel lanes provide somewhat of a "shoulder" so cars will be farther away from pedestrians. This shoulder also helps make bicyclists traveling on the road feel safer. An example of this cross-section can be seen in **Figure3**.

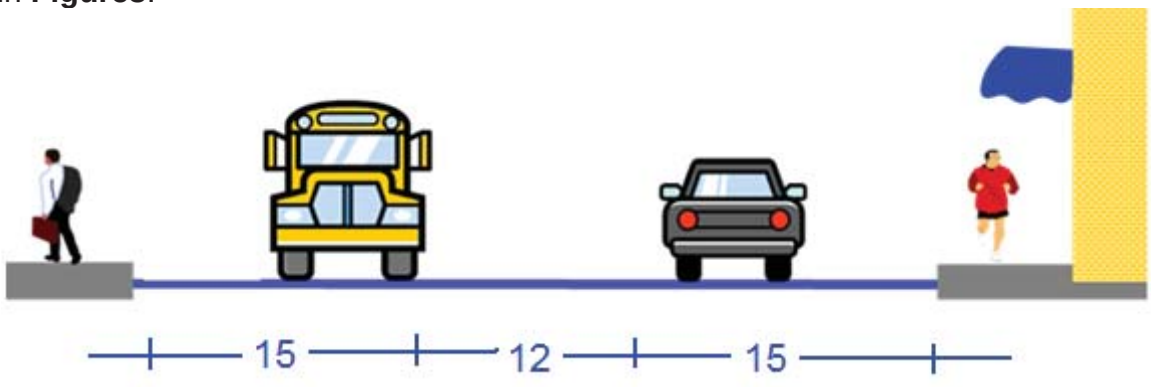

Figure 3: Road Diet Cross-Section

One of the main goals of the road diet was to improve safety along with improving efficiency. The two-way left turn lane provides motorists with a refuge area and removes them form the traffic while waiting to complete their turns. A constructed example of these changes can be seen in **Figure 4.**



Figure 4: US 127 Post-Road Diet Transformation

RESULTING CONDITIONS

This section contains the results concerning travel times and crash history.

Travel Times

Travel times were collected along the corridor to determine average travel times as well as average speeds for rush hour travel. Travel times for each direction are shown in **Table 1**. The travel times were calculated based on 5 runs in each direction.

Table 1: Travel Time Study

	Travel Time (Seconds)	
Run	South	North
1	200	230
2	220	260
3	240	170
4	270	180
5	240	200
Average	234	208

The average southbound travel time was 234 seconds (or 3.90 minutes) and the average northbound travel time was 208 seconds (or 3.47 minutes). This means the combined average is 221 seconds (or 3.68 minutes), thus, the average directional trip speed is 13 miles per hour. It should be noted that the existing speed limit is 35 miles per hour.

Crash History

A three-year crash history was collected and analyzed along the corridor. The period evaluated was between January 1, 2003 and December 31, 2005 and there were 164 crashes recorded in this period. **Table 2** summarizes the crashes by type and location. Crashes are disaggregated by signalized and midblock crashes to assist in identifying crash patterns that may be affected by the implementation of the road diet. **Table 3** summarizes crashes for the three years following the road diet change and the data is similarly arranged as in **Table 2.** The dates of the crashes evaluated extend from January 1, 2007 to December 31, 2009 with a total of 97 crashes for the period.

Table 2: Pre- Road Diet Three-Year Crash Summary (2003-2005)

Crash Type	Total	Signalized	Midblock
Head On	5	5	0
Backing	2	1	1
Opposing left turn	21	20	1
Rear end	60	20	40
Sideswipe-Opposite direction	4	0	4
Sideswipe- Same direction	13	7	6
Single vehicle	3	2	1
Pedestrian-Bicyclist	0	0	0
Other	56	34	22
Total	**164**	**89**	**75**

Table 3: Post- Road Diet Three-Year Crash Summary (2007-2009)

Crash Type	Total	Signalized	Midblock
Head On	0	0	0
Backing	5	1	4
Opposing left turn	13	13	0
Rear end	46	9	37
Sideswipe-Opposite direction	0	0	0
Sideswipe- Same direction	4	2	2
Single vehicle	2	1	1
Pedestrian-Bicyclist	0	0	0
Other	27	10	17
Total	**97**	**36**	**61**

The primary crash type at both intersection and midblock locations, and both before and after the road-diet transformation, is rear ends. This is mainly attributed to vehicles slowing to turn left or right. Though this is still the highest type of crash after the road diet is implemented, a significant reduction in the number of crashes is noted. The data shows that there a 41% decrease in total crashes, a 23% reduction in rear ends and a 76% reduction in sideswipes.

EVALUATION METHODOLOGY

Safety and operational improvements are typically the reasons for a road diet implementation. Therefore, the evaluation should consider metrics that could allow for comparisons of the before and after conditions as well determine the level of performance for the current conditions. These measures include crash changes and travel times and speeds.

Safety Evaluation

The comparison of the before and after the road diet periods showed that traffic crashes decrease by 41% and the leading cause of these crashes, rear ends, decreased by 23%. Also, sideswipe crashes were reduced by 76%. The injury crashes also reduced from 44 in the before period to 10 after indicating a significant decrease (77%). The data shows that a significant safety improvement along US 127 occurred due to the road diet conversion.

It should also be noted that ADT on this section did not increase. In 2002 the ADT was 12,600 vehicles per day and in 2009 after the road diet, the ADT was 11,300 vehicles per day. This shows that volume has remained virtually unchanged. The reduction in the ADT does not affect the crash comparison, since the crash rates were also reduced over the same period by 34% (average crash rate of 1205 crashes/100 million vehicle-miles traveled per year in before period and 795 crashes/100 million vehicle-miles traveled per year in the after period).

The data in **Tables 2** and **3** indicate that there were no pedestrian and bicycle crashes before or after the road diet implementation. This could either indicate the absence of any problems or the absence of these users. The lack of any pedestrian and bicycle traffic counts does not allow for any additional conclusions.

Operations Evaluation

There is no travel time data available for the before period to allow for a before-after comparison. The current speeds are below the speed limit indicating that there may be some delays during the peak period. The presence of the signalized intersections could induce operational delays which could explain the increased travel time. However, the increased travel times are small and no congestion was observed during the data collection indicating acceptable operation.

EVALUATION SUMMARY

The analysis shown here helps one to see the benefits and disadvantages of the road diet, helping decide if it was the correct decision. **Table 4** presents a summary of the evaluation parameters considered.

Table 4: Summary of Road Diet Installation Effects

Aspect	Effect
Travel times and Intersection delays	Seems to run smooth.
Overall safety	Improved; reduced conflict points; reduced crashes, especially sideswipe; reduced crashes with injuries; potential to increase rear end crashes at intersections
Travel speeds	Most likely improved uniformity; traffic calming potential
Pedestrian safety	Unchanged
Multimodal operations	Unchanged but encourage bicyclists more
Access management	Improved potential

The before and after crash data indicate a significant safety improvement along this corridor supporting the road diet conversion. In addition, the intangible benefits of road diets such as improved traffic calming, improved access management potential, and improved multimodal operations, could further support the benefits of the conversion. Though an increase in bicyclists is not evident, at least the road diet (with its wider lanes) encourages more bicyclists to use the roads. With this said, the value behind this road diet is evident.

The travel time studies show that the road diet has helped traffic move smoothly as well as safely. The safety improvements are significant and the road diet conversion has contributed to this and thus it is would be recommended for cases similar to this for implementation.

ROAD DIET CASE STUDY EVALUATION
KY 74 MIDDLESBORO, KY
KYTC DISTRICT 11
FINAL REPORT

Prepared by
Kentucky Transportation Center

Prepared for:
Kentucky Transportation Cabinet
Division of Planning

Date:
December 2010

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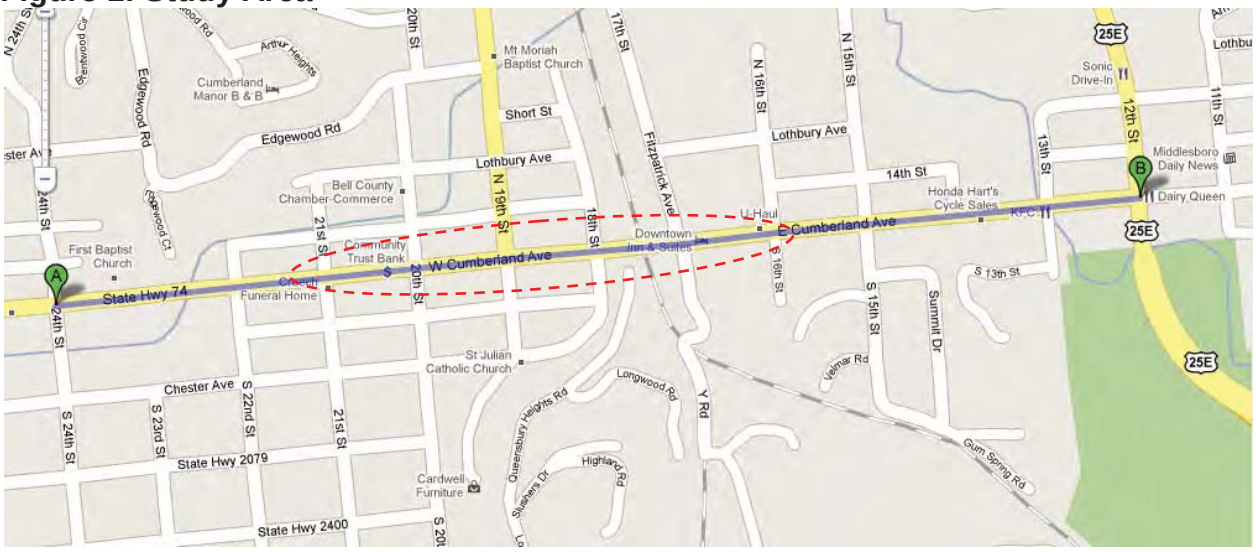
INTRODUCTION

The purpose of this report is to evaluate and present the potential operational and safety impacts associated with the conversion of KY 74 in Middlesboro, Bell County KY from a 4-lane section to a reduced 3-lane section; a treatment referred to as a "road diet." The study area extends from the intersection of 24st Street to the intersection of US 25E (MP 15.712 to MP 16.753); however, the road diet is being considered for the section through downtown Middlesboro from 21st Street to 18th Street. A general location of the study area is shown in **Figure 1**. This treatment is being considered to increase walkability and serve as a method of traffic calming for traffic traveling through downtown Middlesboro on KY 74.

Figure 1: Study Area



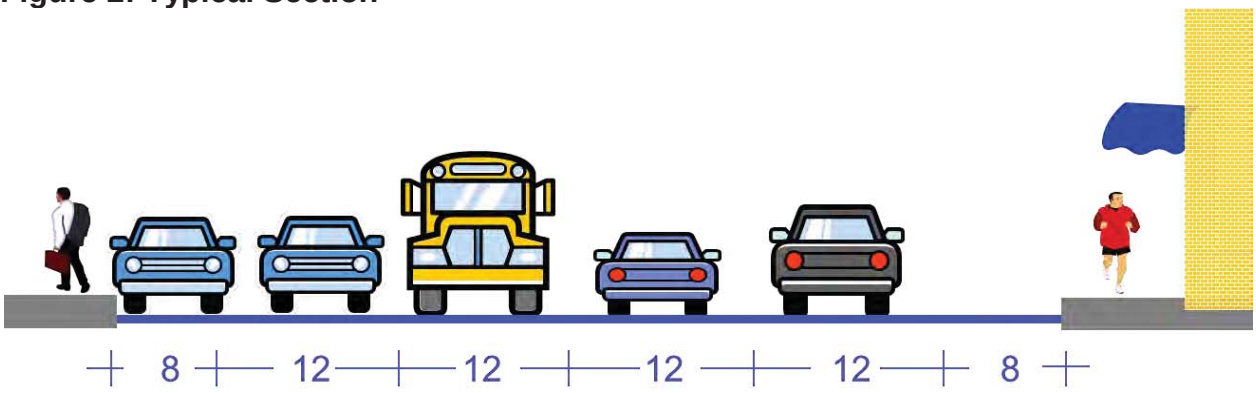
This report summarizes the methodologies used to evaluate the road diet concept and the results of the operational and safety analysis. In addition, special design considerations with the implementation of the treatment on KY 74 are presented and discussed.

EXISTING CONDITIONS

The study section KY 74 is characterized as an urban minor arterial with an average daily traffic (ADT) of approximately 12,500 vehicles. The study section has four signalized intersections at 21st Street, 20th Street, 19th Street and 18th Street. The posted speed limit on KY 74 is 35 mph.

Through the majority of the study section, KY 74 maintains a 4-lane section with two travel lanes in each direction. Left-turn lanes are provided on KY 74 at South 24th Street and 18th Street. West of 24th Street and east of 18th Street, KY 74 has a 5-lane section with a full two-way left-turn lane or raised median. Parking is permitted on both sides of the street from 22nd Street to 18th Street. The cross-section is typically 64 feet wide with 12-foot lanes and 8-foot parking lanes. **Figure 2** shows the typical section of the corridor.

Figure 2: Typical Section



Land use around the study area is primarily commercial as this section of KY 74 represents the commercial center of Middlesboro. There are four signalized intersections and eight commercial access points in the project area. Access points are distributed evenly on the north and south sides of the road.

Appendix A shows the existing lane geometry along the corridor.

Traffic Volumes

Turn movement counts were conducted by KYTC District 11 for the PM peak period to be used in the evaluation process. This period was chosen by the district as it represents the highest travel demand on the corridor. **Appendix B** summarizes the peak hour turn movement counts at the signalized intersections.

The ITE Trip Generation Manual was used to estimate turn counts at the unsignalized access points. This process was considered acceptable in estimating the entering to and exiting from the commercial access points, since traffic counts at each point were not available. Trip generation land use codes and facility sizes are summarized in **Appendix B.**

Travel Times

Travel times were collected along the corridor to assist in the calibration of the micro-simulation modeling efforts. Average travel times for the corridor are shown in **Table 1**. The travel times were based on eight runs per direction. The PM peak travel times were 52 seconds for the eastbound and 43 seconds for the westbound direction.

Table 1: Travel Time Study

Travel Segment / Direction (KY 74)	Travel Time (sec)		
	AM	Noon	PM
Westbound			
18th St. To 19th St.	19	19	15
19th St. to 20th St.	17	13	13
20th St. to 21st St	13	15	15
Total	**48**	**47**	**43**
Eastbound			
21st St. To 20th St.	15	18	19
20th St. To 19th St.	21	14	18
19th St. To 18th St.	15	17	15
Total	**51**	**49**	**52**

Crash History

A three-year crash history was collected and analyzed along the corridor. The period evaluated was between January 1, 2007 and December 31, 2009 and there were 135 crashes recorded in this period. The section has a crash rate of 819.9 crashes per 100 million vehicle-miles of travel (MVMT) while the average sate rate for similar roads (four-lane urban arterials) is 475.5 crashes per 100 MVMT. The critical crash rate factor for these roads is 617.5 crashes per 100 MVMT and this indicates that the section has a Crash Rate Factor of 1.33. **Table 2** summarizes the crashes by type and location. Crashes are disaggregated by signalized and midblock crashes to assist in identifying crash patterns that may be affected by the implementation of the road diet. Road diets typically can reduce midblock crashes, such as sideswipes and rear ends, as well as intersection crashes, such as angle. However, there is a likelihood of increased number of rear end crashes at intersections.

Table 2: Three-Year Crash Summary (2007-2009)

Crash Type	Total	Signalized	Midblock
Angle	48	44	4
Backing	5	5	0
Head on	2	0	2
Opposing left turn	5	5	0
Rear end	34	24	10
Sideswipe-Opposite direction	3	3	0
Sideswipe- Same direction	25	11	14
Single vehicle	9	5	4
Other	4	3	1
Total	**135**	**100**	**35**

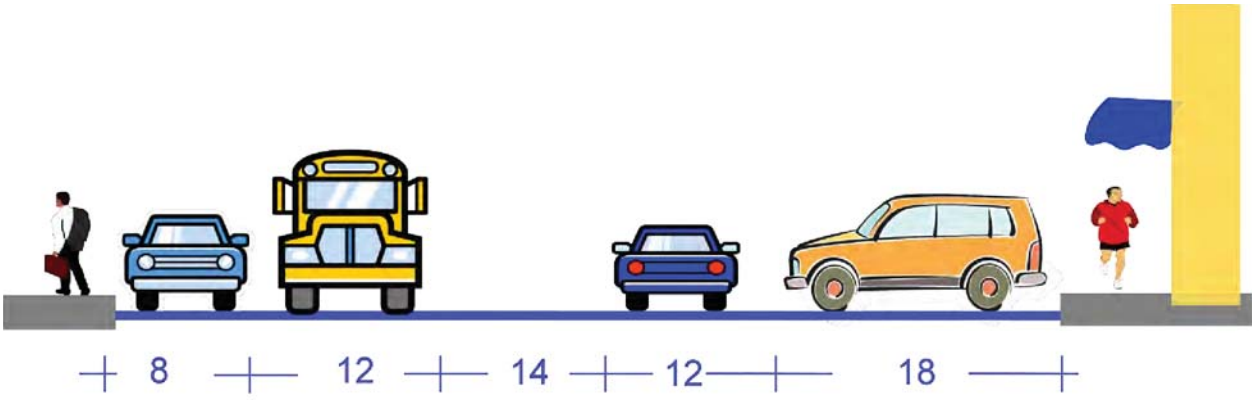
The data in Table 2 shows that the majority of the crashes on the corridor occur at the signalized intersections. The primary crash type at the signalized intersections is an angle crash, which may be due to the absence of left-turn lanes at the intersections, which will allow for vehicles travelling through seeing left-turning vehicles. This scenario restricts sight distance which can lead to the occurrence of angle crashes.

Crash diagrams showing the location and type of each crash on the corridor are provided in **Appendix C**.

ROAD DIET ALTERNATIVE

The road diet alternative evaluated would reduce the number of lanes from four to three. The new cross section would consist of a single travel lane in each direction and a center two-way left-turn lane. At major intersections the two-way left-turn lane would be operated as a dedicated left-turn lane of the primary intersection. Parallel parking would remain on one side of the road and reverse angle parking will be added on the other side of the roadway. This potential cross-section is shown in **Figure 3**. The final configuration should be determined by KYTC in conjunction with the city of Middlesboro to provide the best and safest use of the additional space created by the removal of one lane of travel.

Figure 3: Typical Cross-Section



EVALUATION METHODOLOGY

The road diet on KY 74 was evaluated using the VISSIM 5.1 micro-simulation software. VISSIM is a microscopic simulation model and a component of the PTV Vision® suite. Its flexible network structure provides the ability to model any type of geometric configuration and as such was the preferred software by KYTC to evaluate the operation of a two-way left-turn lane as part of the road diet.

Two models were developed for the corridor. The first was designed to reflect the existing 4-lane cross-section of the corridor. This model was calibrated based on the travel time studies completed by the project team and it represents the existing conditions. The calibration assured that the user characteristics of the model were reflective of drivers and the geometric conditions of the corridor. Based on the calibrated model, an alternative model was developed which assumed implementation of the road diet. Each of the models was evaluated for the AM, Noon and PM peak hours of operations.

The sections below summarize the calibration and measures of effectiveness used to evaluate the VISSIM models.

Calibration

The existing model was calibrated using the travel time studies (Table 1) in the existing conditions. A threshold of 10 percent above or below the existing travel times was used to determine the effectiveness of the calibrated model. The VISSIM model was calibrated by adjusting turning volumes, turning speeds and travel speeds through the corridor. **Table 3** summarizes the travel time calibration for the KY 74 corridor.

Table 3: VISSIM Travel Time Calibration

Travel Segment (KY 74)	Travel Time(sec)					
	AM		Noon		PM	
	Field	VISSIM	Field	VISSIM	Field	VISSIM
Westbound						
18th St. To 19th St.	19	17	19	18	15	18
19th St. to 20th St.	17	14	13	16	13	18
20th St. to 21st St	13	16	15	14	15	18
Total	**48**	**47**	**47**	**49**	**43**	**54**
Eastbound						
21st St. To 20th St.	15	14	18	15	19	15
20th St. To 19th St.	21	17	14	18	18	22
19th St. To 18th St.	15	19	17	18	15	22
Total	**51**	**50**	**49**	**51**	**52**	**59**

The calibration is within the acceptable 10 percent variation. Moreover, this calibration and recordings of the VISSIM model were provided to District 11 and approved as accurately representing the existing conditions on the corridor.

Measures of Effectiveness

Operational performance of the road diet alternative was evaluated for both corridor operations as well as individual signalized intersections on the corridor. Corridor operations were evaluated using travel times through the entire section. Intersection operations were evaluated using the following four measures of effectiveness, which are for the entire intersection.

- Delay (Seconds)
- Stopped Delay (Seconds)
- Number of Stops
- Average Queue Length (feet)

RESULTS

Operational Analysis

Table 4 summarizes the results of corridor level analysis for the implementation of a road diet on KY 74. The data in the table indicates that there is a slight decrease in travel times after the implementation of the road diet. This decrease is between 1 to 9 seconds during the peak periods, representing approximately a 2 to 18 percent decrease in travel times.

Table 4: Travel Time Corridor Level

Travel Segment (KY 74)	Travel Time(sec)					
	AM		Noon		PM	
	4-Lane	3-Lane	4-Lane	3-Lane	4-Lane	3-Lane
Westbound						
18th St. To 19th St.	17	11	18	11	18	14
19th St. to 20th St.	14	15	16	14	18	16
20th St. to 21st St	16	15	14	15	18	19
Total	**47**	**41**	**49**	**40**	**54**	**49**
Eastbound						
21st St. To 20th St.	14	18	15	18	15	20
20th St. To 19th St.	17	15	18	15	22	19
19th St. To 18th St.	19	16	18	16	22	15
Total	**50**	**50**	**51**	**50**	**59**	**54**

Table 5 summarizes the intersection delay and queue estimates for the PM peak hour. The overall pattern in the data presented in Table 5 indicates no significant changes in delays for the PM peak period after the installation of the road diet. Intersection delays will increase by 1 to 2 sec/veh at the various intersections representing an increase between 3 to 19 percent increase. Queue lengths at all intersections are reduced significantly—for three of the four at about one-third of the original length. This could be attributed to the presence of the left-turn auxiliary lane at the intersections separating left-turning and through movements. An issue that should be noted here is the lack of significant changes in delays and significant improvements in queue lengths indicating that the road diet application will not impact negatively operations.

Table 5: PM Peak Hour Intersection Operations Summary

Intersection	Delay (sec)		Average Queue (ft)	
	Existing	Road Diet	Existing	Road Diet
KY 74 at 21st Street	10.09	12.06	12.98	5.64
KY 74 at 20th Street	9.95	10.89	17.74	5.14
KY 74 at 19th Street	13.09	14.42	24.63	7.89
KY 74 at 18th Street	29.38	30.56	43.55	14.39

Safety Analysis

The primary crash type on the corridor is an angle crash at an intersection (Table 2). This crash type is likely caused by the absence of left-turn lanes that could provide unrestricted sight distance to oncoming traffic. The implementation of a left-turn lane at these intersections through the road diet will correct this problem and significantly improve sight distance for left-turning vehicles. This should result in a reduction of angle crashes.

The second most frequent crash type on the corridor is rear end crashes and most of ~~they~~ are occurring at intersections. This crash type is typically attributed to a combination of the lack of left-turn lanes (causing rear end crashes when a vehicle stops to turn left) and congestion on the corridor. The operational analysis presented in Tables 4 and 5 indicate that there will be no changes in the level of congestion and therefore no changes are anticipated in crashes resulting from congestion. However, the introduction of left-turn lanes and the separation of through and left-turning vehicles will likely have a positive effect of reducing some of the rear end crashes at the signalized intersections. It should be ~~pointed~~ though that this effect will not apply at those intersections which already have left-turn lanes.

Approximately 30 percent of the crashes are at midblock locations and the road diet can potentially address several of these crashes. Rear end and sideswipes are the two primary crash types that road diets typically reduce by eliminating the friction created by stopped left-turning vehicles in traffic. The removal of left-turning vehicles from the main stream of traffic eliminates unexpected stopped vehicles that could lead to rear ends or the need to swerve to avoid the stopped vehicles resulting in sideswipes. **Table 6** summarizes the potential effects of road diet implementation on crashes for KY 74.

Table 6: Safety Effects of Road Diet

Crash Type	Signalized		Midblock	
	Number	Effect	Number	Effect
Angle	12	-	1	-
Backing	1		0	
Head on	0		1	-
Opposing left turn	1	-	0	
Rear end	7	+/-	3	-
Rear to rear	1		0	-
Sideswipe-Opposite direction	2		0	
Sideswipe- Same direction	4	-	5	-
Single vehicle	2		2	
Total	**27**	**-**	**11**	**-**

Legend: (-) indicates reduction in crashes; (+/-) indicates mixed impact based on causal factors of the crash.

DESIGN CONSIDERATIONS

Two primary considerations need to be addressed with respect to road diet implementation. The first is to identify the preferred utilization of the additional space created by the reduction in travel lanes. The proposed cross sections shown in Figure 3 provide a preliminary recommendation for the utilization of the additional space. For most sections of the project, the extra space can be used to provide additional parking opportunity in both sides of the corridor. In this case, 12-foot lanes will be implemented with a 14-foot two-way left-turn lane and an 8-foot parking strip in one side and an 18-foot reverse angle parking in the other side.

The second consideration is to properly locate and design the transition from the existing 4- and 5-lane sections to the reduced 3-lane section. For the east end of the corridor, the transition should occur at the 22nd and 23rd Streets. For the west end of the corridor, the transition should occur at the 18th Street. The additional inbound lane to the study corridor is recommended to be dropped as a right-turn lane at these intersections. A conceptual plan for the transition at 22nd and 23rd Streets is shown in **Figure 4**.


22nd st.

EVALUATION SUMMARY

The analysis presented here evaluates the feasibility of converting the 4-lane section of KY 74 in Middlesboro to a 3-lane cross-section with one lane in each direction and a two-way left-turn lane. The simulation models developed in VISSIM were calibrated to reflect the field conditions. The analysis completed evaluated the operational and safety effects of this potential change. A summary of the overall potential effects of the installation is shown in **Table 7**.

Table 7: Summary of Road Diet Installation Effects

Aspect	Effect
Travel times	None or negligent
Intersection delays	None or negligent
Overall safety	Improved; reduced conflict points; reduced angle and sideswipe crashes; potential to increase rear end crashes at intersections
Travel speeds	Improved uniformity; traffic calming potential
Pedestrian safety	Improved
Multimodal operations	Improved for bicycles and transit
Access management	Improved potential

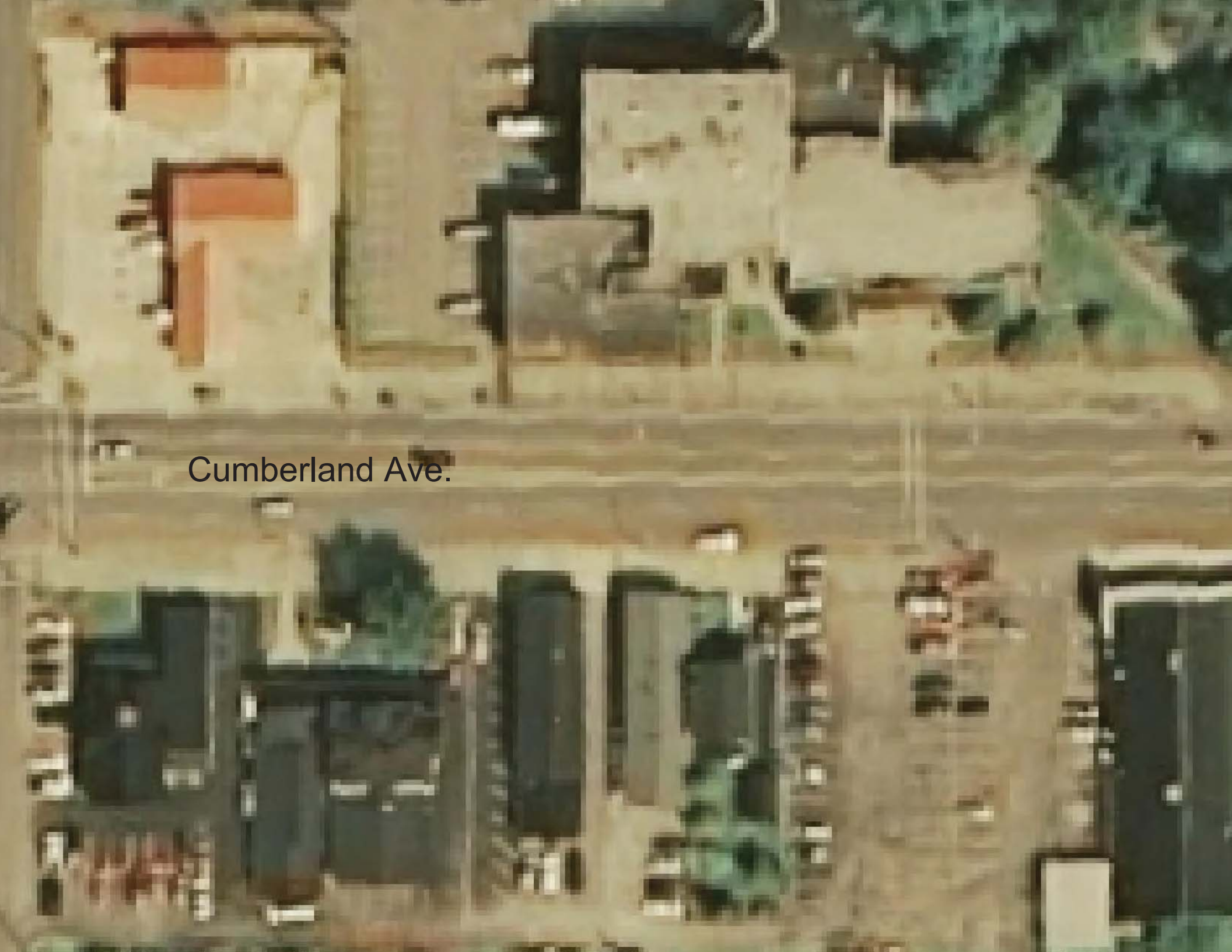
The operational analysis showed that travel times will remain virtually unchanged with the conversion. The comparison of travel times from Table 4 shows a decrease of approximately 10 percent for both directions in the PM peak hours (along with lower reductions in the other peak periods). All signalized intersections along the corridor will experience a slight increase in overall delays indicating that the conversion will have no negative effects on the operation of the corridor. Queue lengths at the signalized intersections will be significantly reduced to approximately one-third of current lengths. It should be noted that there are additional benefits that could materialize from the conversion that the simulation was not able to quantify. These benefits include the potential for more uniform speeds along the corridor, elimination of unbalanced speeds by travel lanes and potential speed reductions (road diet is acting as traffic calming). Additionally, pedestrian comfort and safety may be improved by reducing the number lanes to be crossed, providing a refuge within the two-way left-turn lane and reducing the speed differential in the travel lanes. Road diets also improve multimodal operations (bicycles and transit) through the presence of either wider lanes or exclusive bicycle lanes as well as improve access management potential.

The safety analysis showed that there is the potential for improvements both at the signalized intersections and midblock areas along the corridor. The road diet installation is expected to reduce angle and sideswipe crashes due to the removal of the left-turning vehicles for the travel lanes. Rear end crashes at midblock sections are also expected to reduce while rear end crashes at intersections could be affected as well but there is also the potential of increasing them with the placement of the left-turn lanes at the intersections. The road diet installation can therefore reduce the number of crashes and

thus impact the crash rate factor if 1.33 noted for this section. Additional safety gains that could materialize from road diet installations include reduced number of conflict points, improved pedestrian safety (through provision of median refuge), and potential for lower severity crashes due to reduced travel speeds.

One potential disadvantage of the road diet would be the ability to handle disruptions in the traffic flow resulting from incidents. The reduced number of travel lanes could impact operations if one lane is blocked through a crash occurrence or other intermittent incidents, such as train movements. During these abbreviated times, queues are expected to be longer, potentially impacting side street operations. The longer queues would also take longer to dissipate after an incident.

APPENDIX A
Existing Conditions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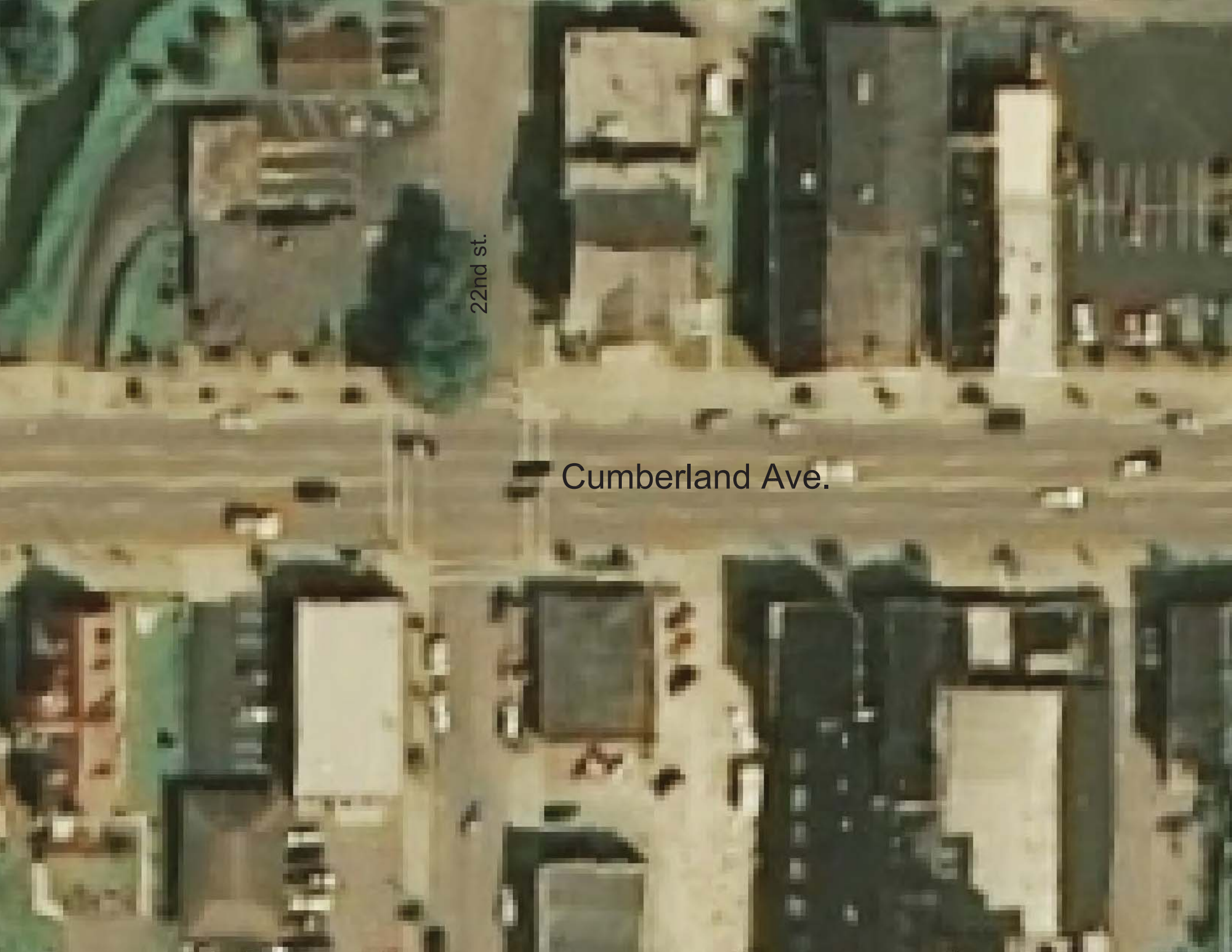
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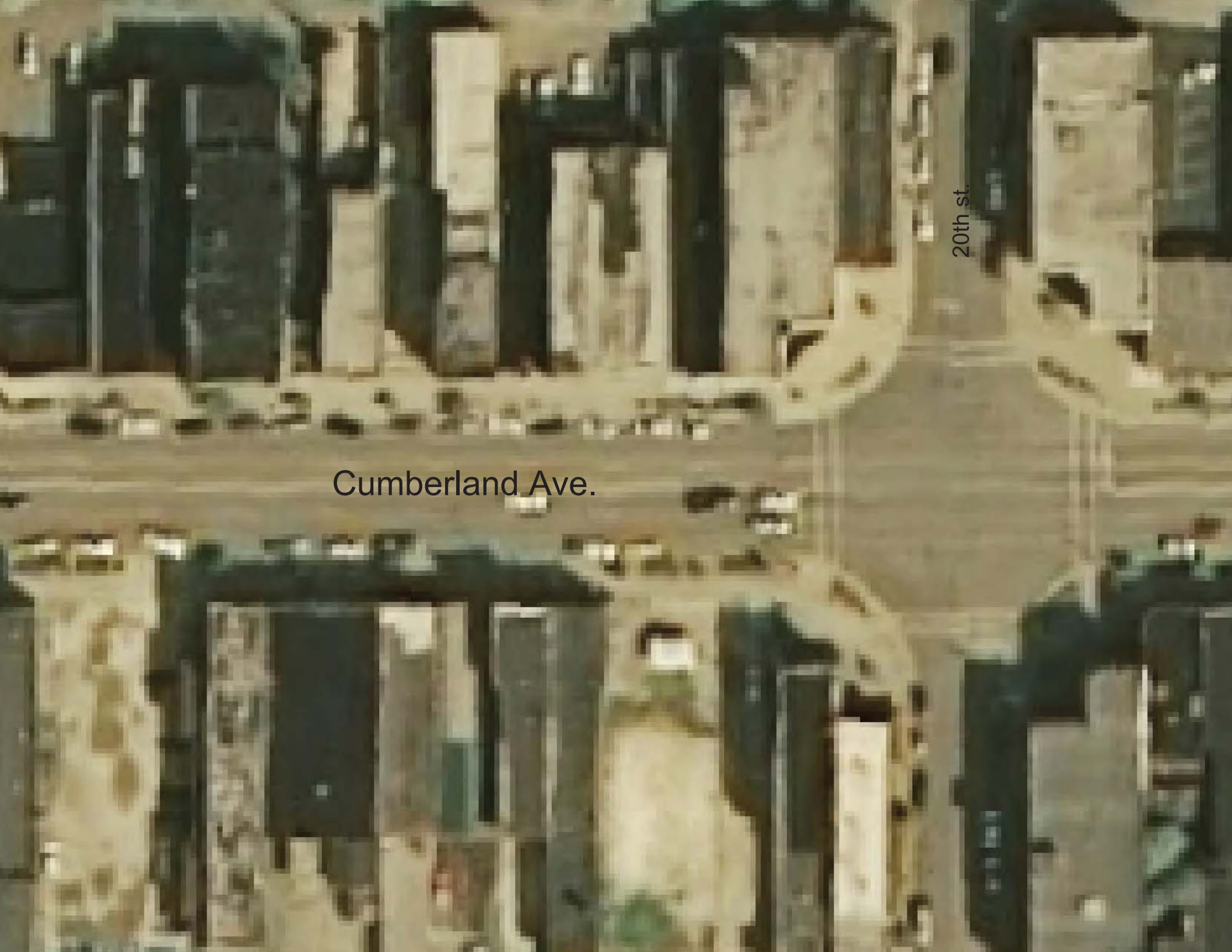
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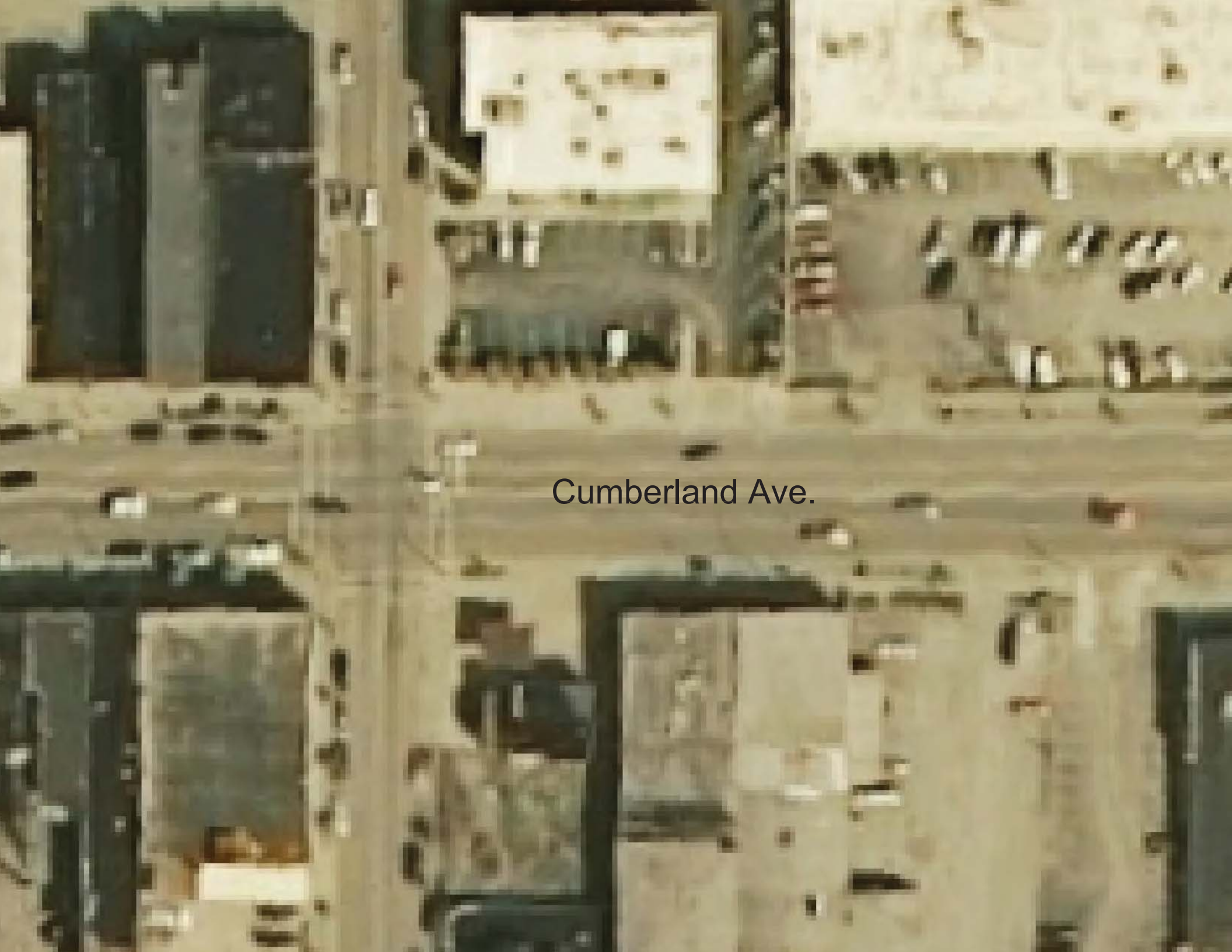
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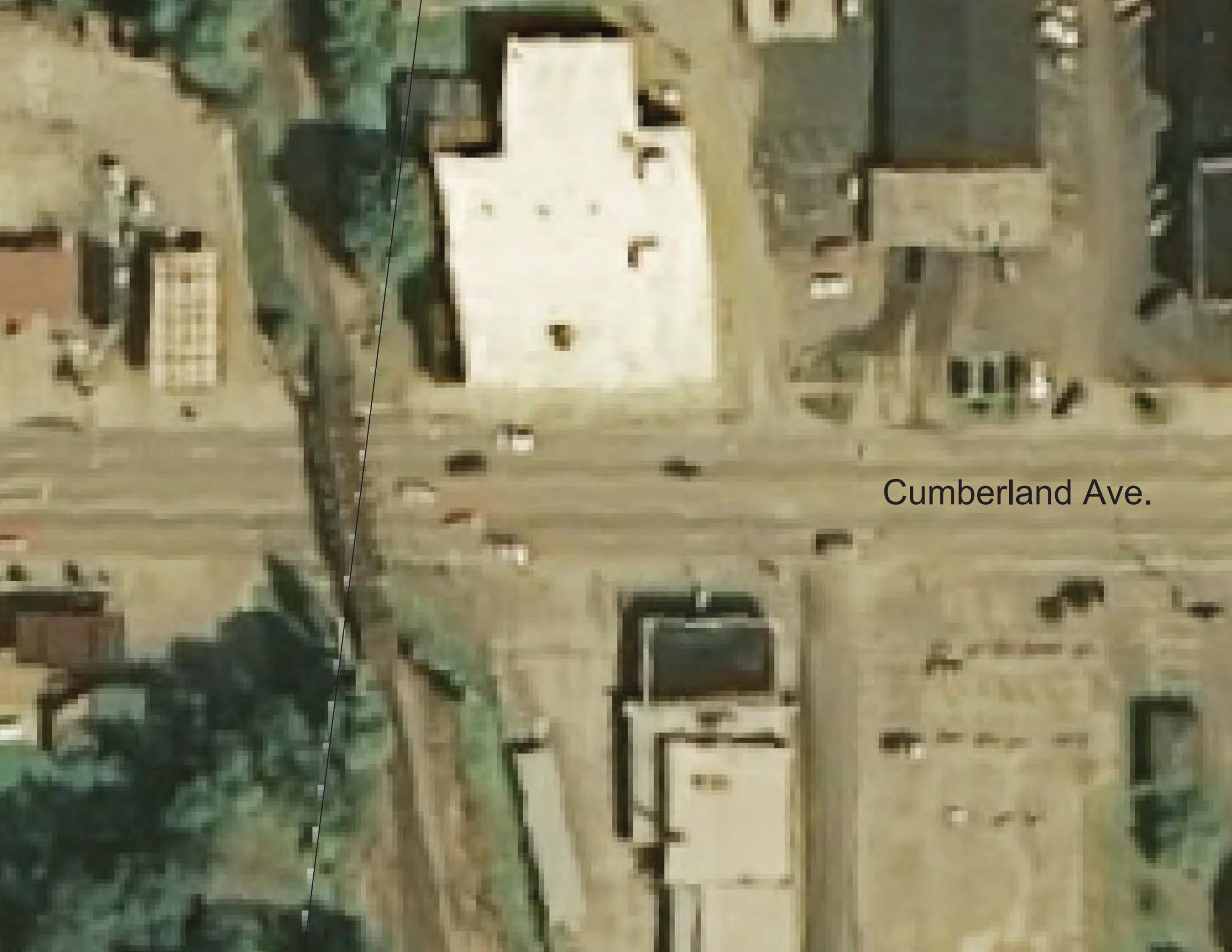
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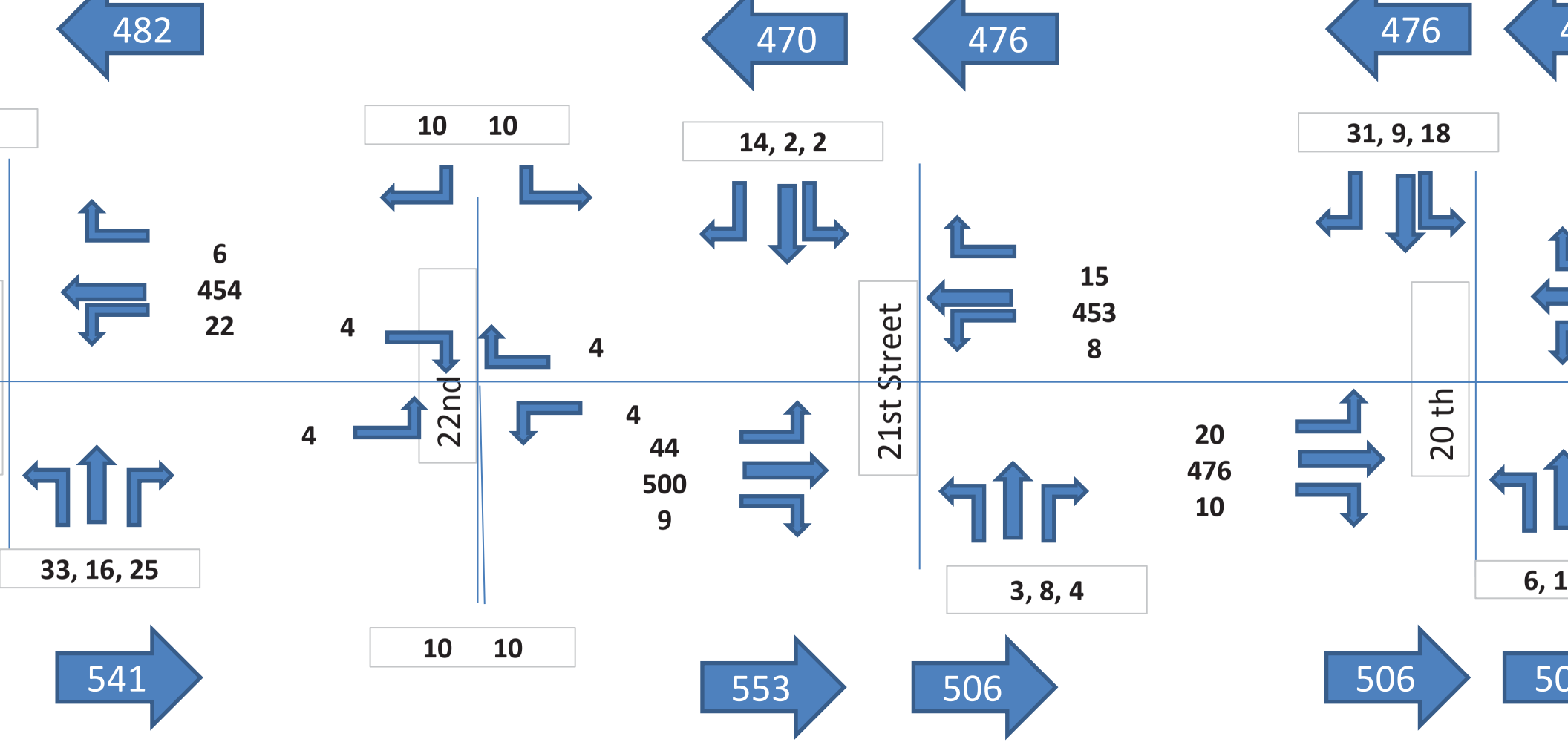
APPENDIX B
Traffic Volumes



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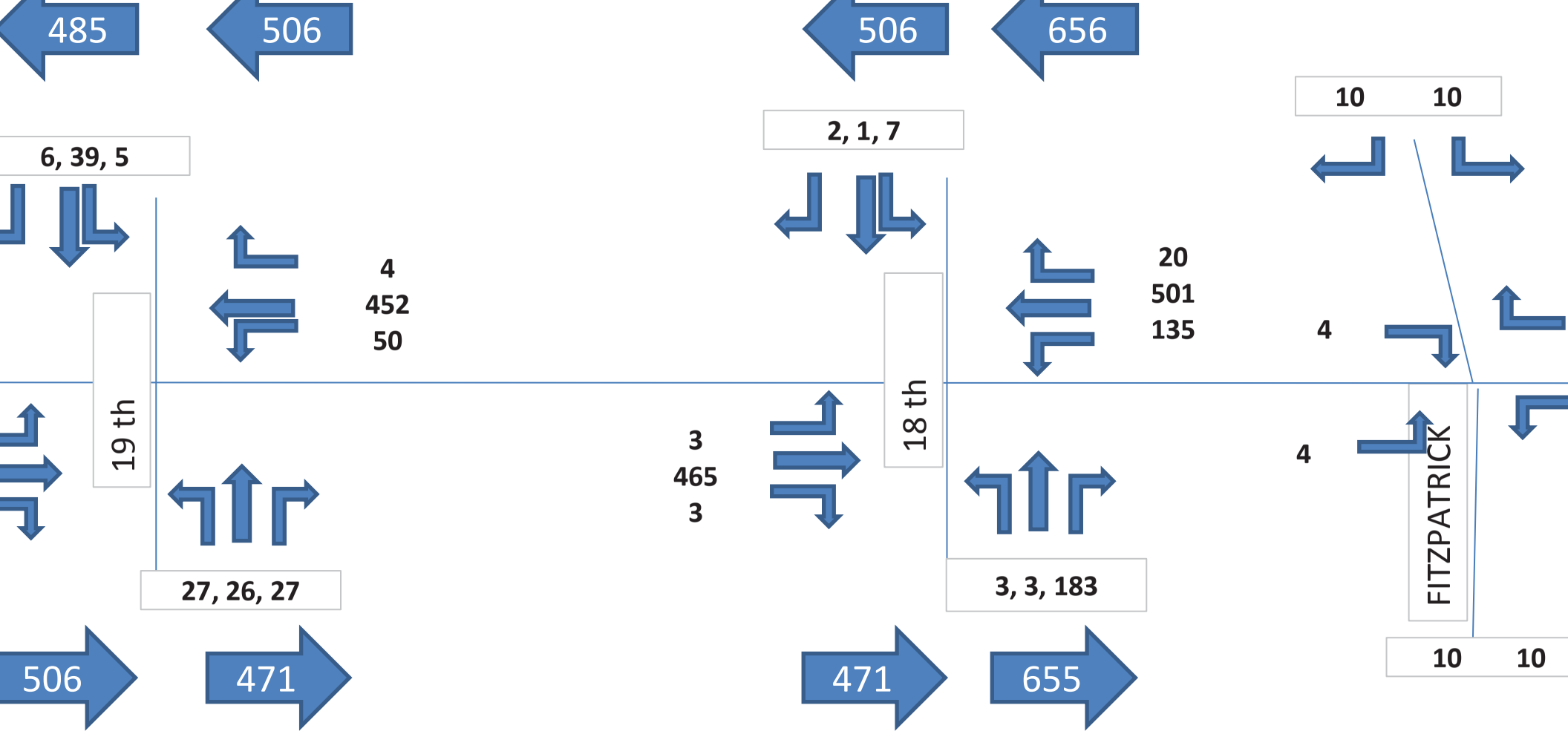
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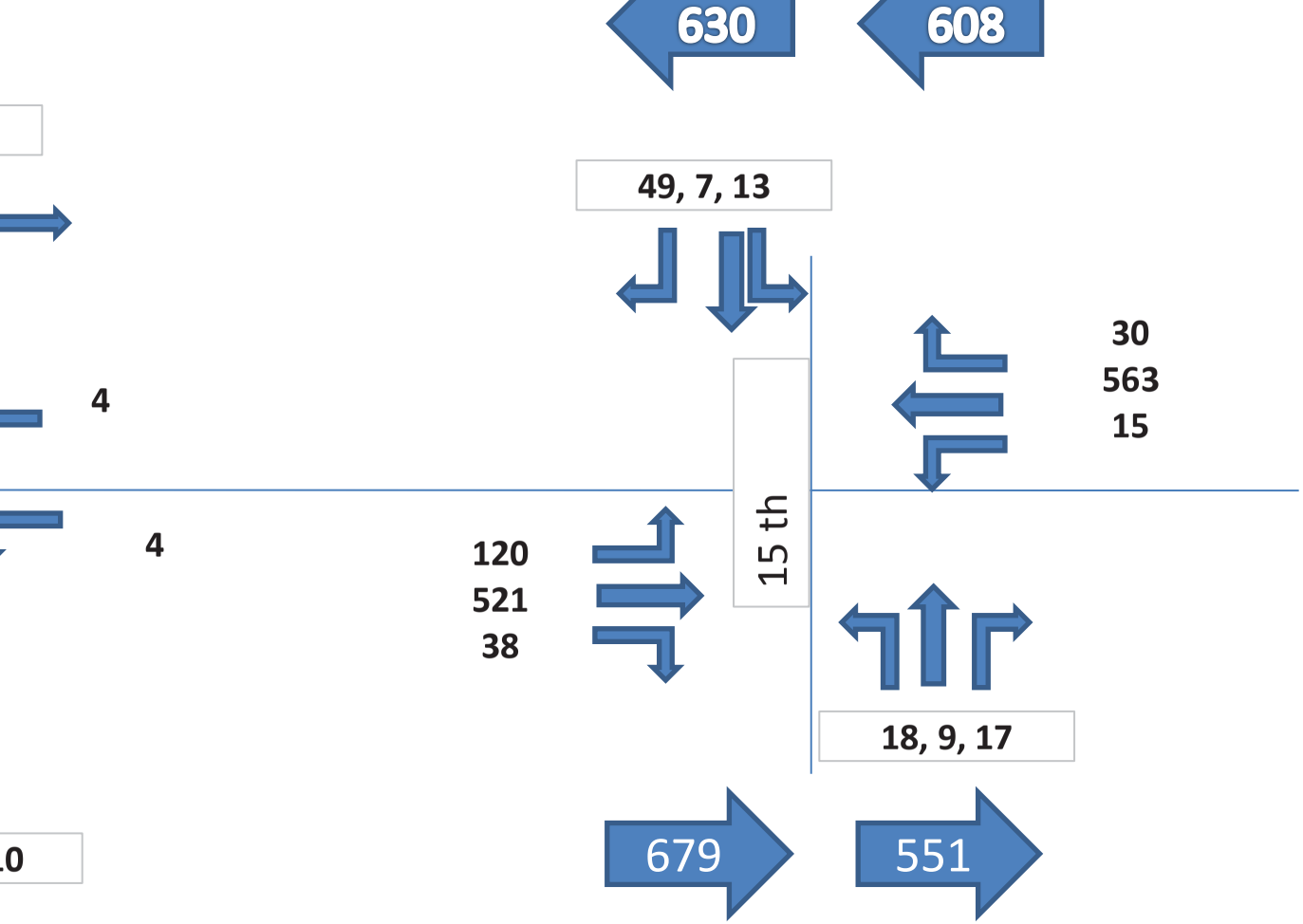
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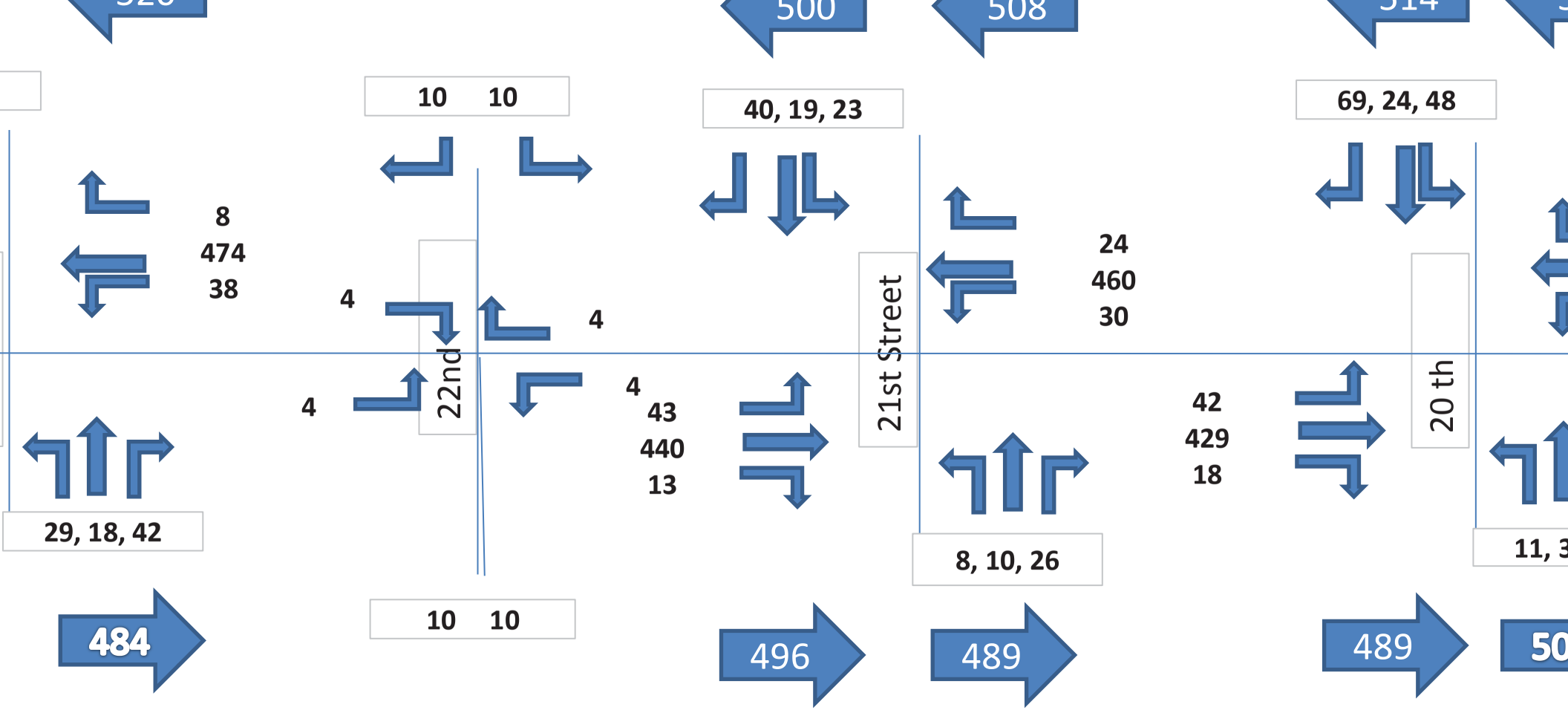
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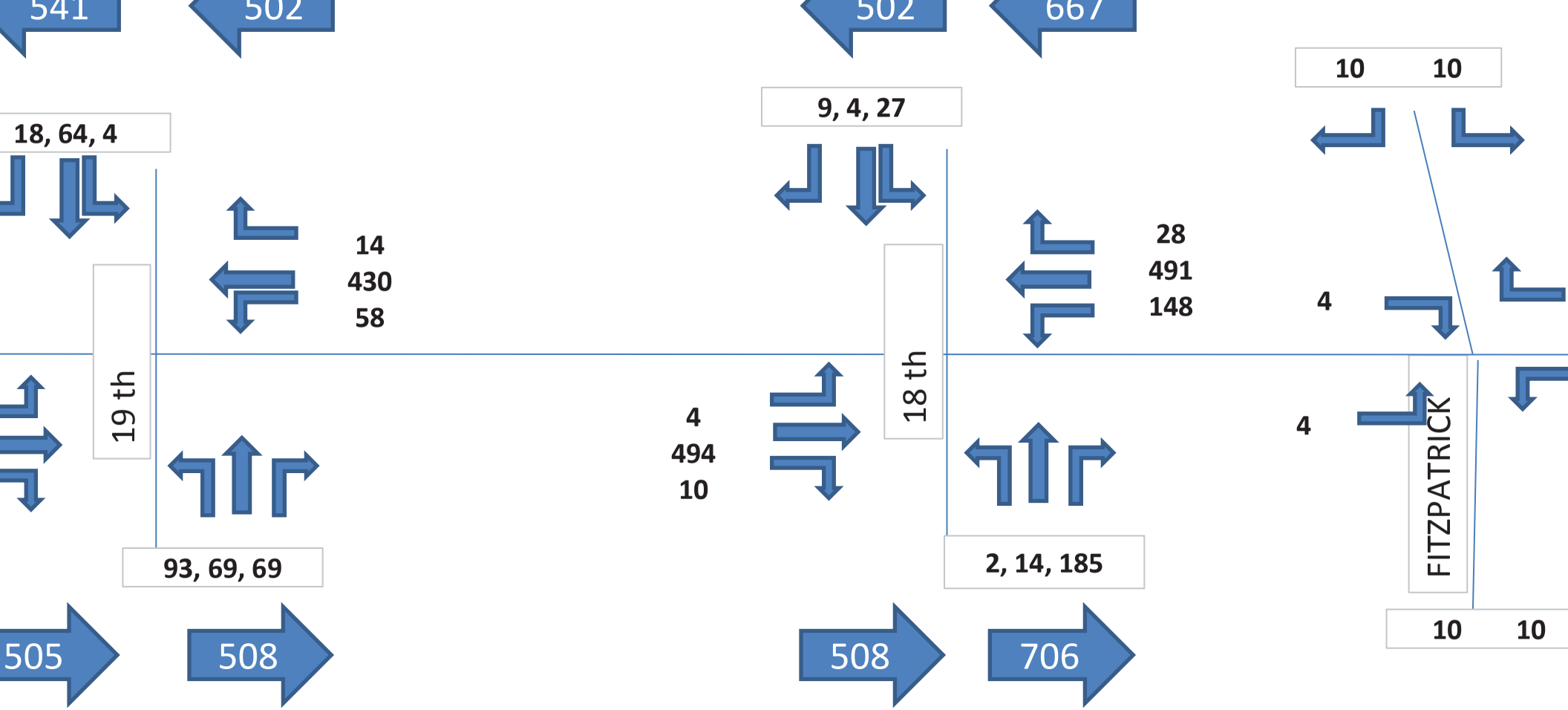
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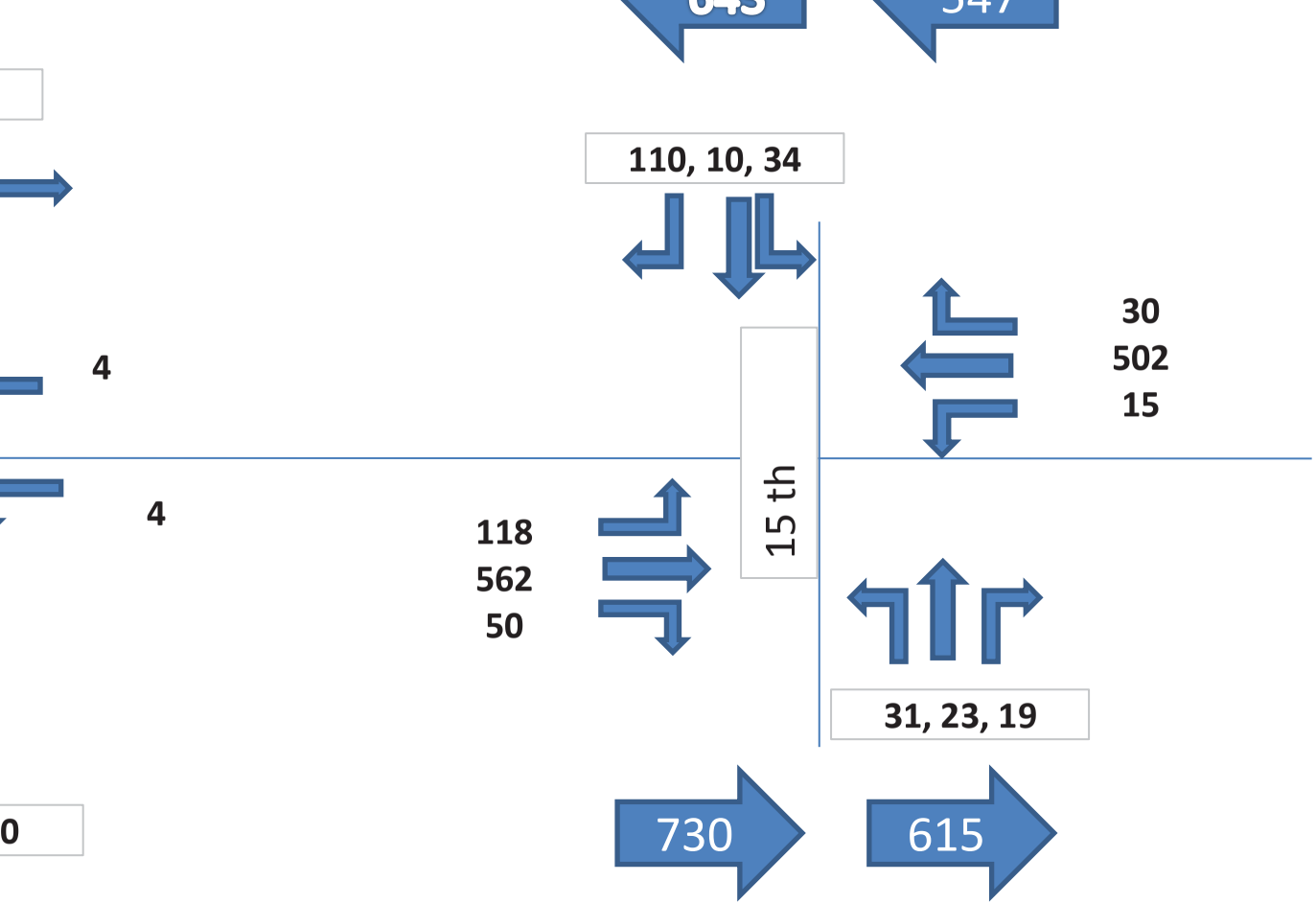
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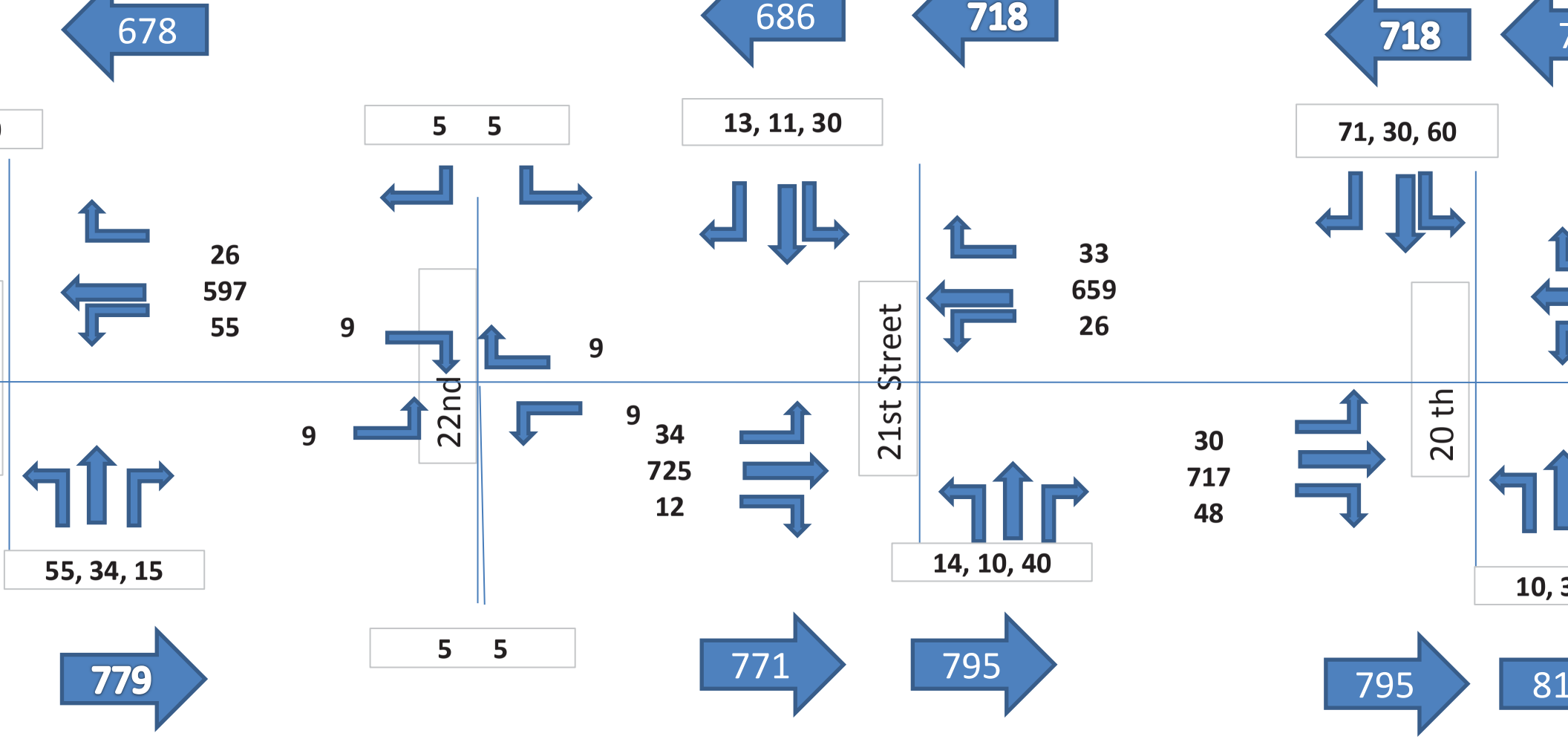
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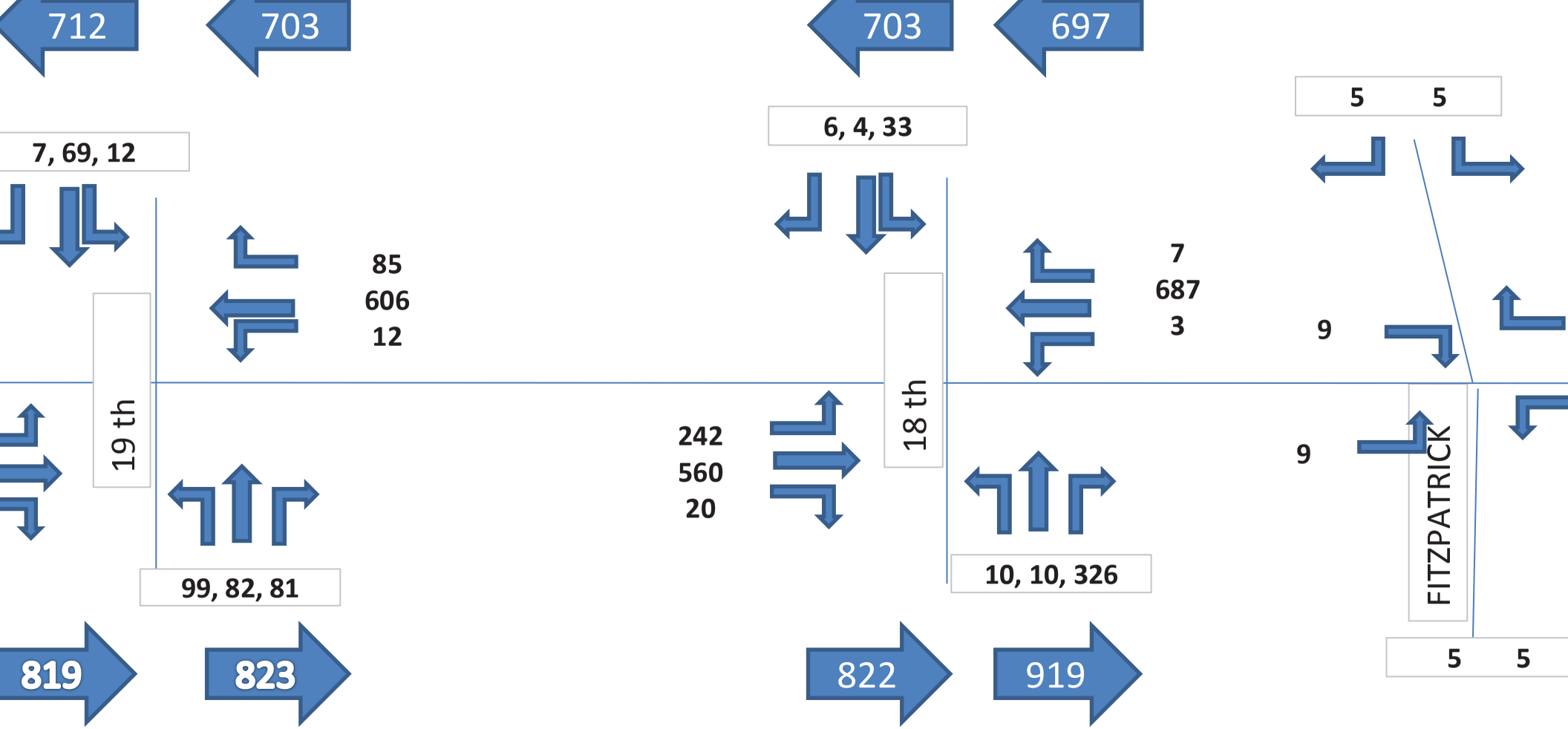
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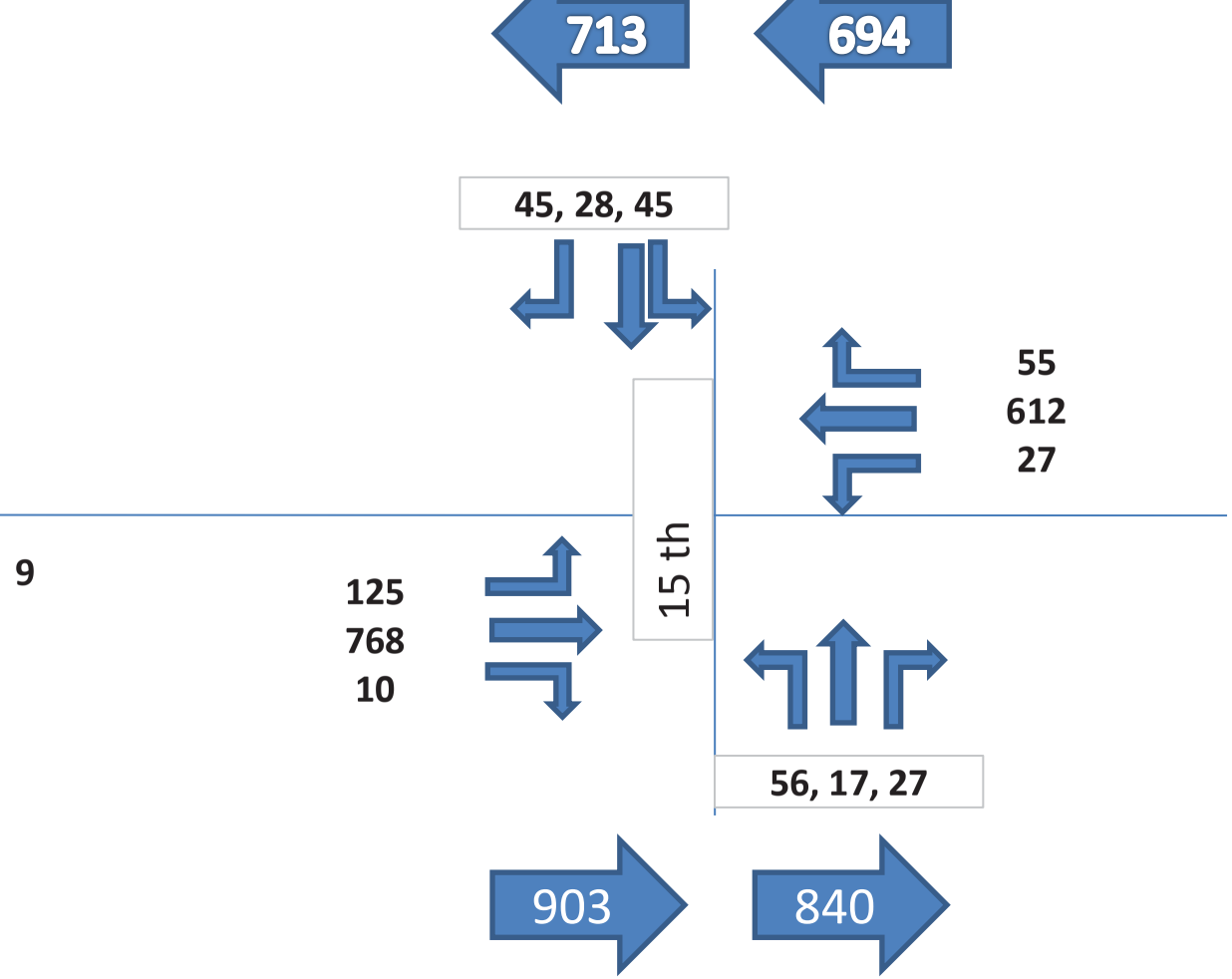
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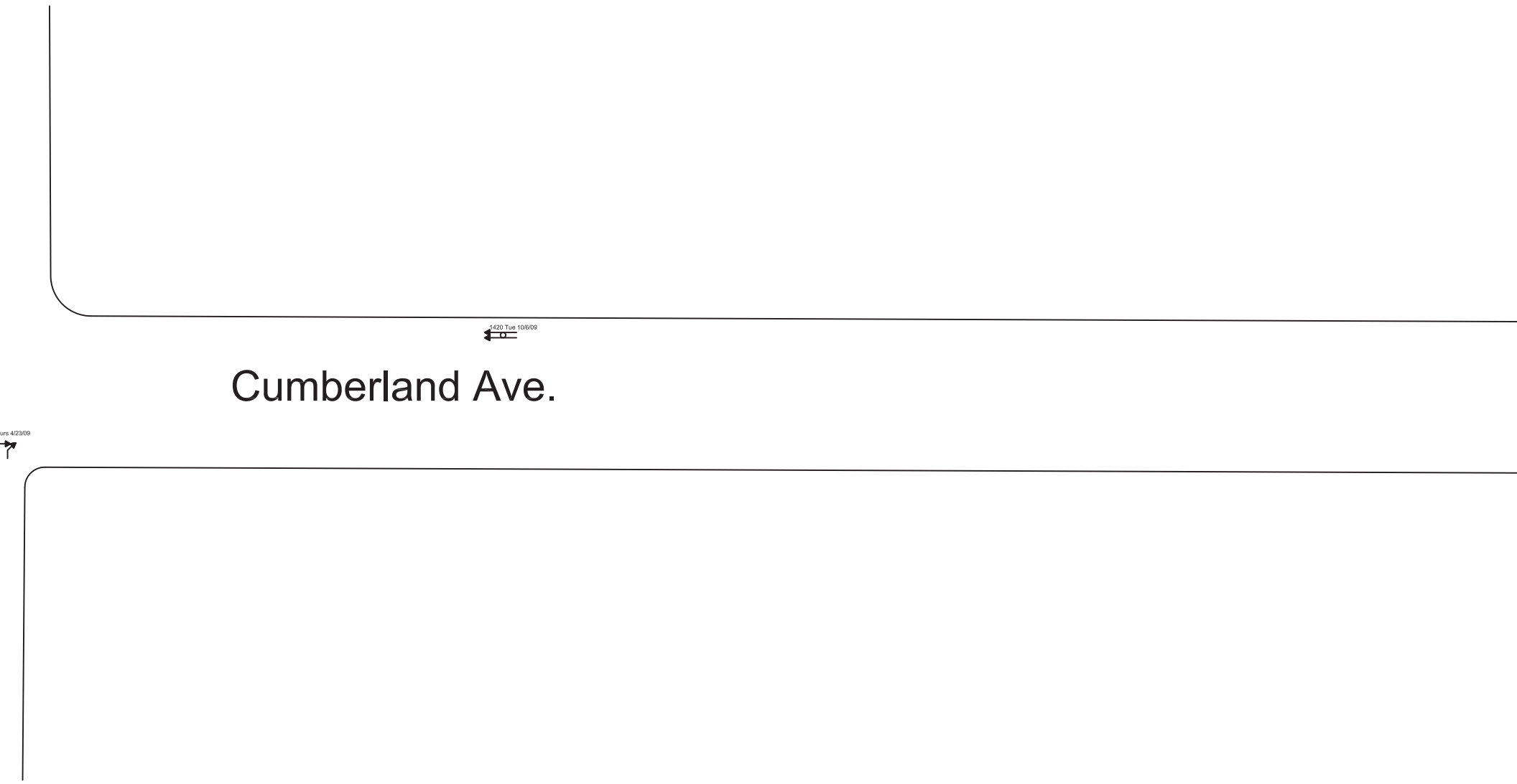
APPENDIX C
Crash Diagrams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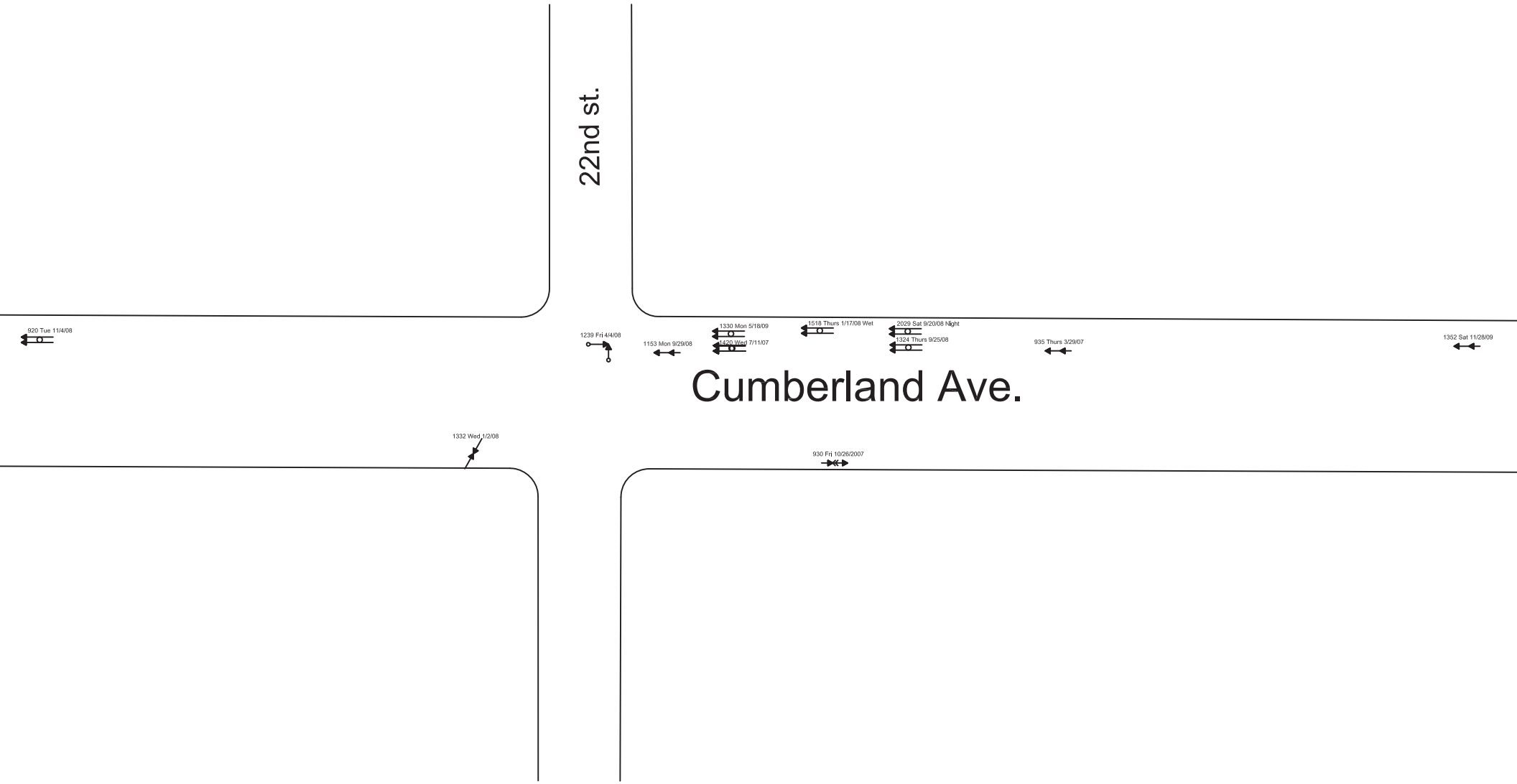
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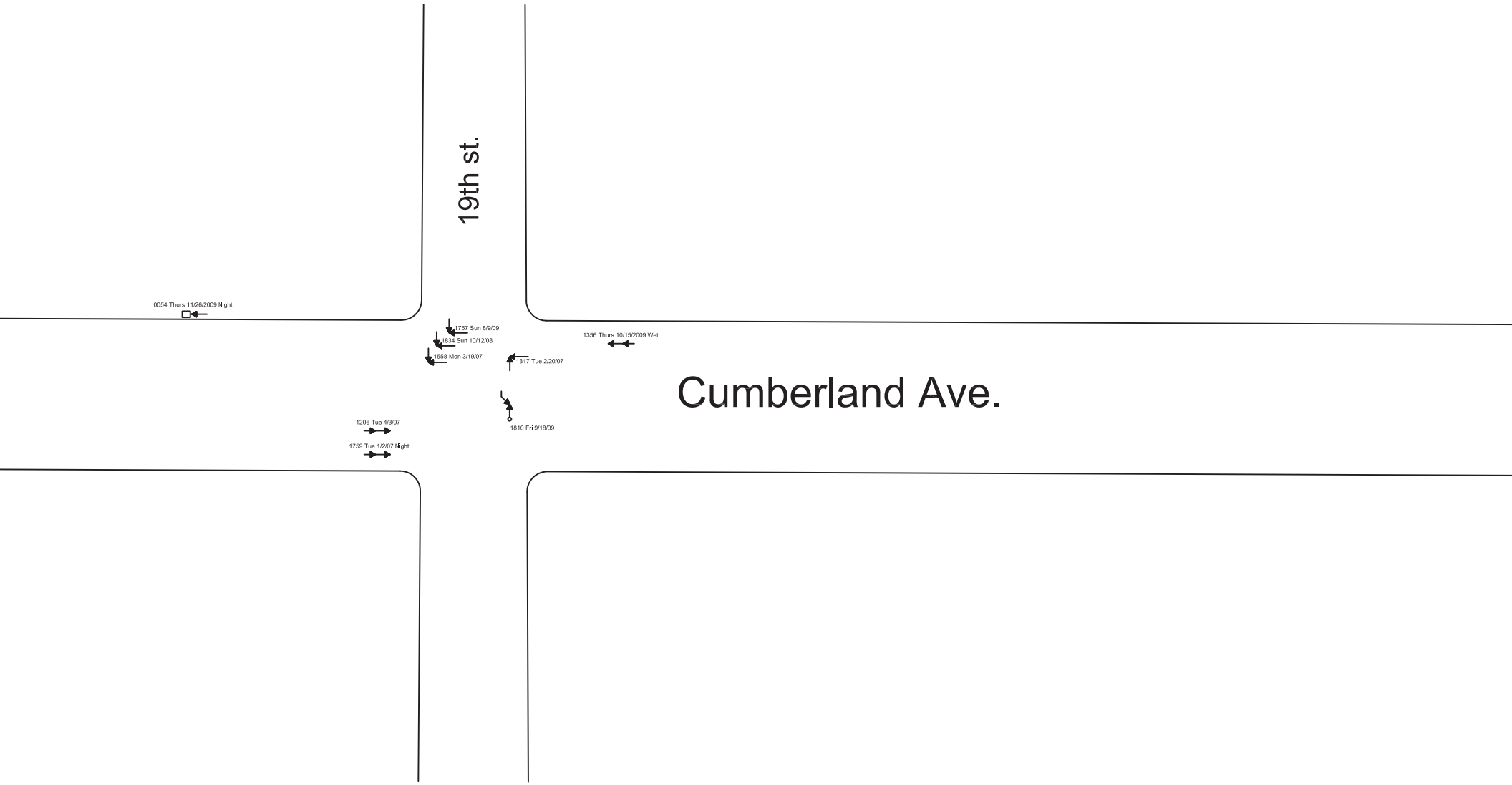
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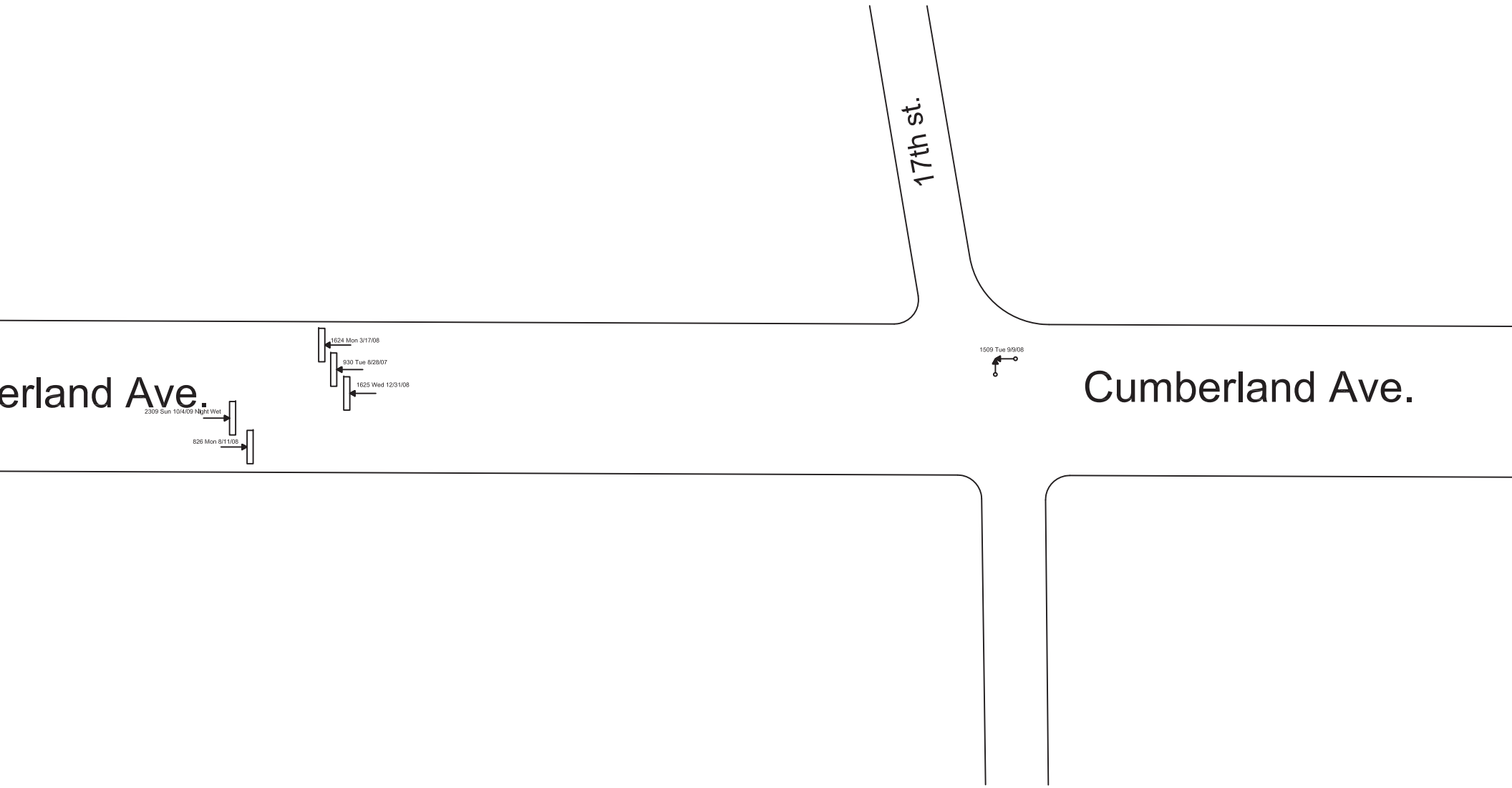
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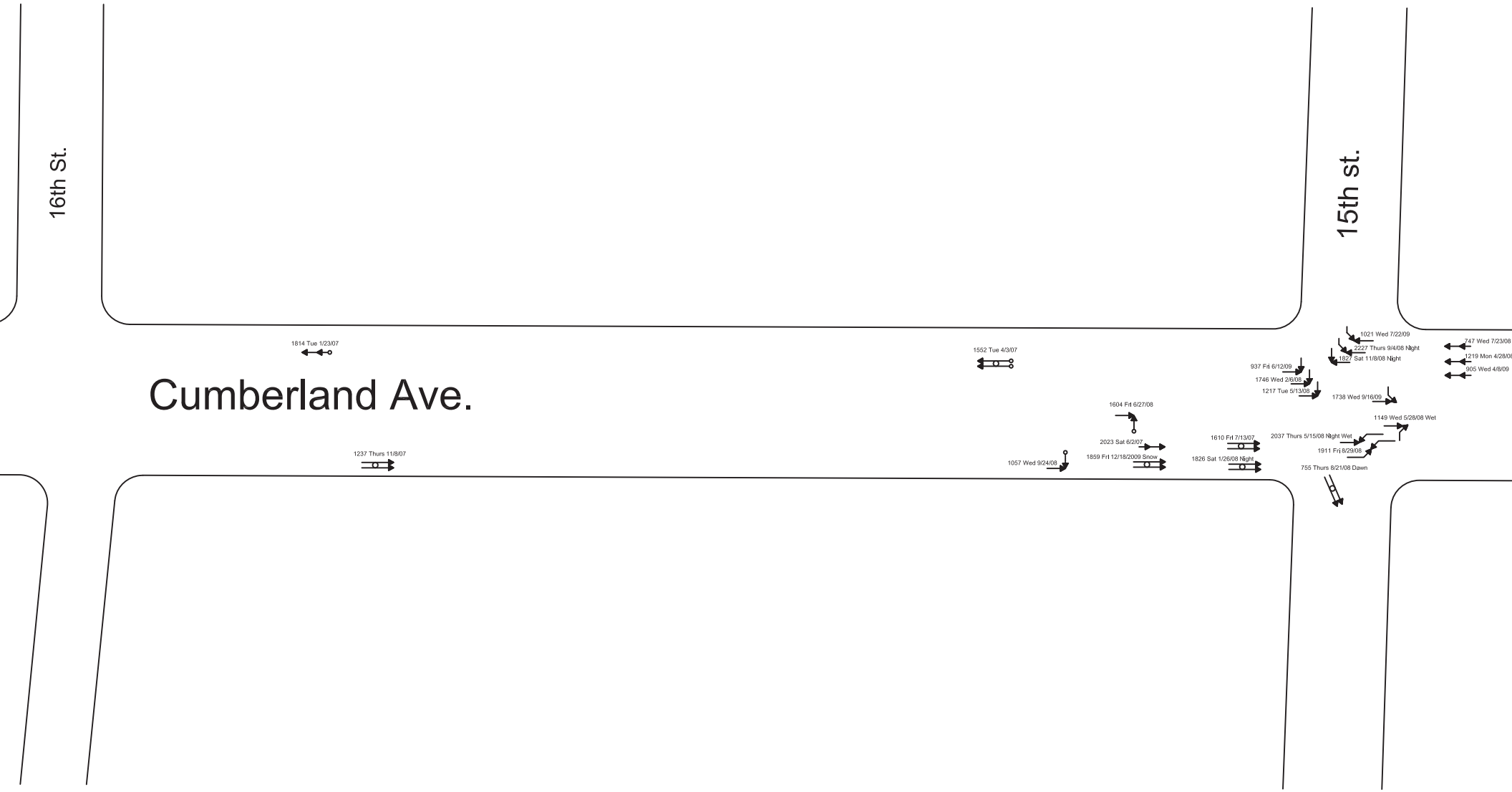
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2023 Sat 6/2/07
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755 Thurs 8/21/08 Dawn
1237 Thurs 11/8/07

APPENDIX B

Road Diet Guidelines

INTRODUCTION

Road diets usually involve restriping a four-lane undivided road as a three-lane road with two through lanes and a two-way left-turn lane. The extra roadway width can be used to widen existing lanes, create bicycle lanes, supply on street parking, widen sidewalks, or provide opportunities for landscaped median islands.

Typical considerations for road diet conversions include traffic volumes of the minor and main streets and main street left-turn percentages. However, compatibility of the treatment with roadway functional classification, access frequency and land use should also be considered when determining the feasibility of a road.

ROAD DIET CONVERSIONS

Process

Road diets may be proposed to address both safety and operational issues on roadways. The following flow chart provides an overview of the process to be followed to determine whether a road diet is appropriate (Figure 1).

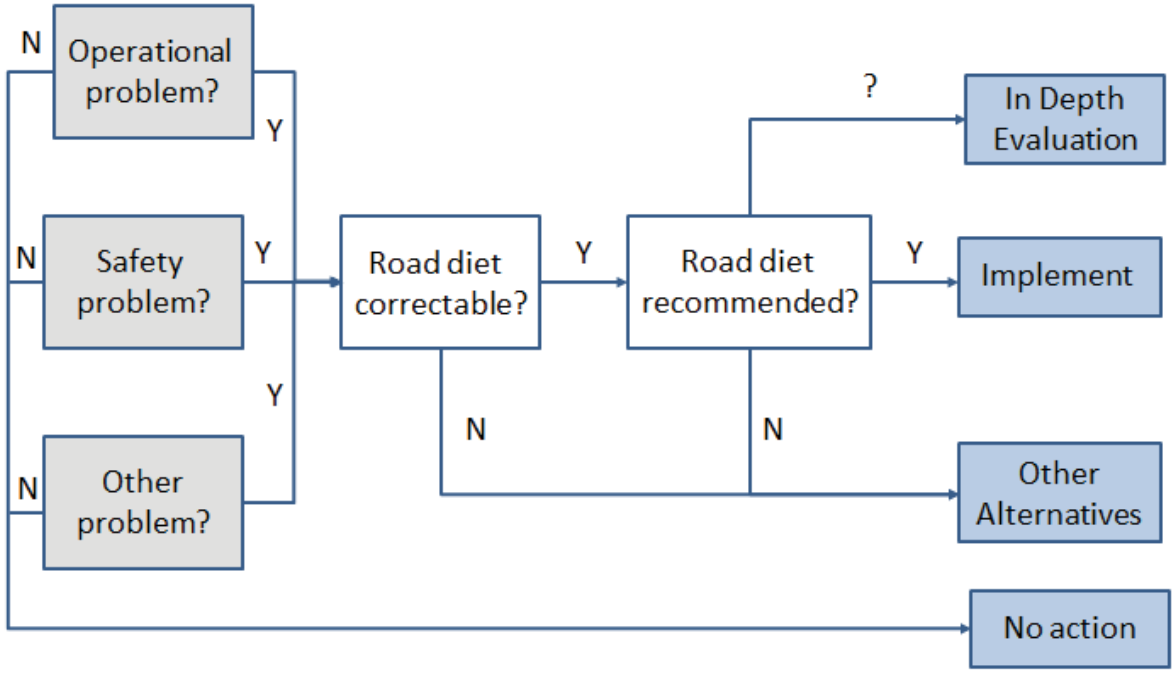

Figure 1 Decision-action flow chart for road diet evaluations

The flow chart allows the user to identify the appropriate action to be undertaken in order to determine whether the road diet will improve the operations, safety or other performance issues associated with the road. To address this, a list of possible problems correctable by a road diet implementation is presented below (Table 1). In addition, the required items for conducting an

in-depth evaluation are also identified in order to allow for a complete evaluation of the implications from a road diet implementation (Table 2).

Table 1 Road diet correctable problems

Category	Problem	Rationale
Operational	Delays associated with left-turning traffic	Separation of left-turning traffic have shown to improve delays at signalized intersections
	High side street delays at unsignalized intersections	Side street traffic requires shorter gaps to complete movements due to the consolidation of left-turns into one lane
	Bicycle delays	Potential for including a bike lane eliminates such delays
Safety	Rear end crashes with left-turning traffic	Removal of stopped turning vehicles from the through lane could reduce rear end crashes
	Sideswipe crashes	Elimination of need to change lanes to avoid delays behind a left-turning vehicle in the inside through lane reduces sideswipe crashes
	Left-turn crashes due to offset left turns	Elimination of the negative offset between opposing left-turn vehicles and increase of available sight distance reduces left-turn crashes
	Bicycle and pedestrian crashes	Bicycle lane separates bicycles from traffic; pedestrians have shorter distance to cross and can use a refuge area (if one provided)
Other	Bicycle and pedestrian accommodation due to lack of facilities	Opportunity to provide appropriate or required facilities increasing use by such users
	Aesthetics	Provision for landscaped medians and other treatments as see fit
	Traffic calming	Potential for uniform speeds and consistency; opportunity to encourage pedestrian activity

Table 2 In-depth evaluation items

Operational evaluation
Travel times
Intersection delays
Travel speeds
Minor street operations
Railroad crossings
Safety evaluation
Angle crashes
Left turn crashes
Rear end crashes
Pedestrian safety
Bicyclists safety

Operational Performance

Road diets may be a feasible alternative on roadways with ADTs as high as 23,000 vehicles per day (vpd) but may also fail on roadways with low ADT (e.g., 5000, depending upon side street volume at major intersections. Figure 2 summarizes the range of operating parameters that would support a road diet project.

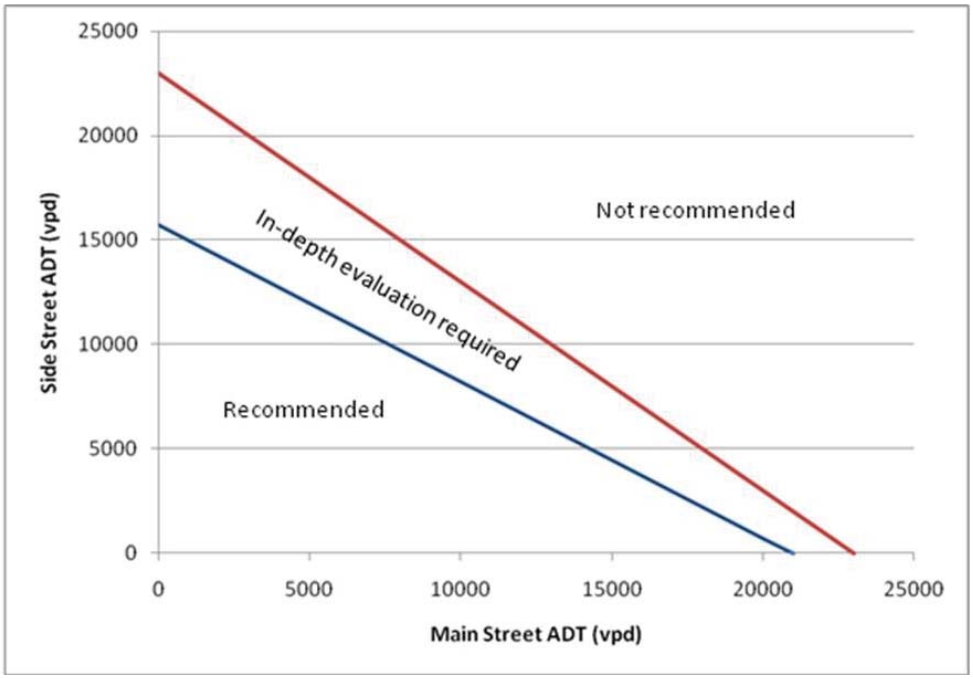

Figure 2 Operational performance guideline for road diet implementation

The red line in the figure identifies the volume combinations where the roadway will operate under capacity with a road diet. The blue line identifies the point where the operational performance, i.e. delays, is equal between a four-lane and three-lane cross-section. The combinations below the blue line indicate lower delays associated with the implementation of a road diet. Utilizing these concepts, Figure 2 defines three areas with respect to road diet installations. The lower area called “Recommended” identifies the volume combinations where the road-diet will perform below capacity and result in operational gains. The upper area “Not-recommended” identifies the volume combinations where the roadway will operate above capacity, and will have higher delays than the four-lane alternative. A road diet operating in this range will likely result in undesired congestion. The area between the two lines is considered as the area requiring additional investigation to determine the feasibility of a road diet conversion. A road diet in this area will operate under capacity, but may have higher delays than the four-lane section. Thus analysis should be completed to determine the impacts that would result from the road diet.

Safety Performance

Based on before and after analysis of case studies in Kentucky, road diets have demonstrated an average 36 percent reduction in total crashes compared to four-lane cross sections. National research has developed a crash modification factor of 0.71 based due to the introduction of a continuous left-turn lane on a roadway indicating a 29 percent reduction in crashes. While road diets can be effective in addressing crash problems, a safety analysis should be completed to

determine the type of crashes on the corridor and ensure that they are correctable by the implementation of a road diet. The following crash types are common types that may be addressed by a road diet.

- Sideswipe Crashes. Sideswipe crashes can result from vehicles changing lanes to avoid delays behind a left-turning vehicle in the inside through lane. These types of crashes can occur at midblock access points and major intersections. Road diets eliminate these types of crashes by removing the turning vehicle from the through lane. Sideswipes can also occur between vehicles traveling on the two-way left-turn lane and those attempting to enter it but these crashes are not a frequent occurrence as prior research and case studies indicate. Figure 3 shows the region of decreased sideswipe conflicts, as a combination of major and minor street volumes and left-turn percentage.

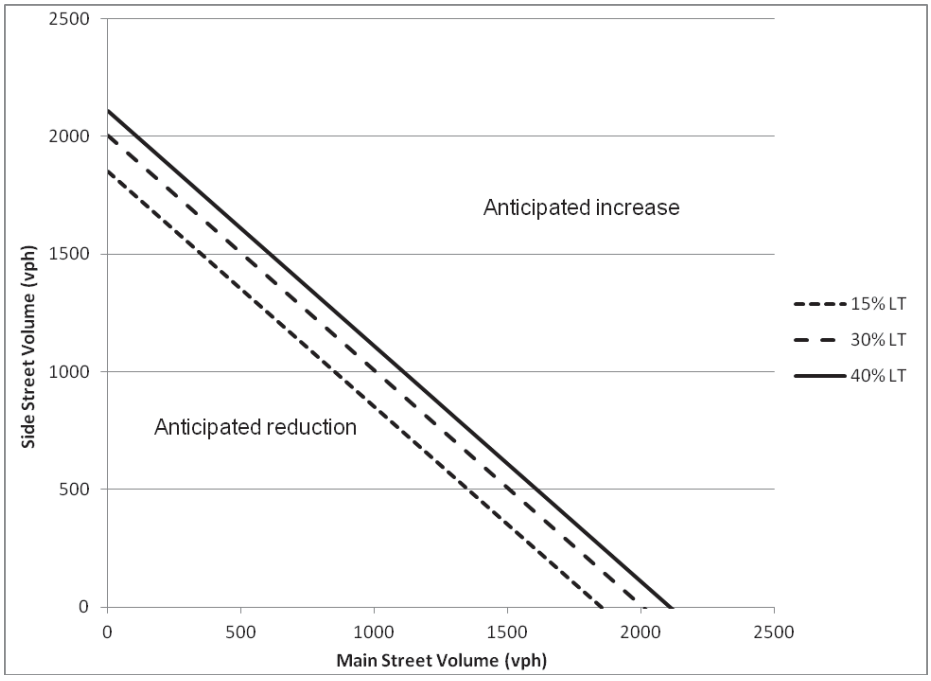

Figure 3 Sideswipe conflict guidance by major/minor street volume and left-turn percent

- Rear End Crashes. Rear end crashes can result from vehicles traveling in the inside through lane behind a stopping or stopped left-turning vehicle. A road diet reduces these types of crashes by removing the stopped turning vehicle from the through lane. Road diets are anticipated to reduce rear end crashes on roadways with high volumes of left-turn traffic; however, increased congestion resulting from the lane reduction may increase rear end crashes on the main street under other conditions. Figure 4 shows the region of decreased rear end conflicts, as a combination of major and minor street volumes and left-turn percentage.

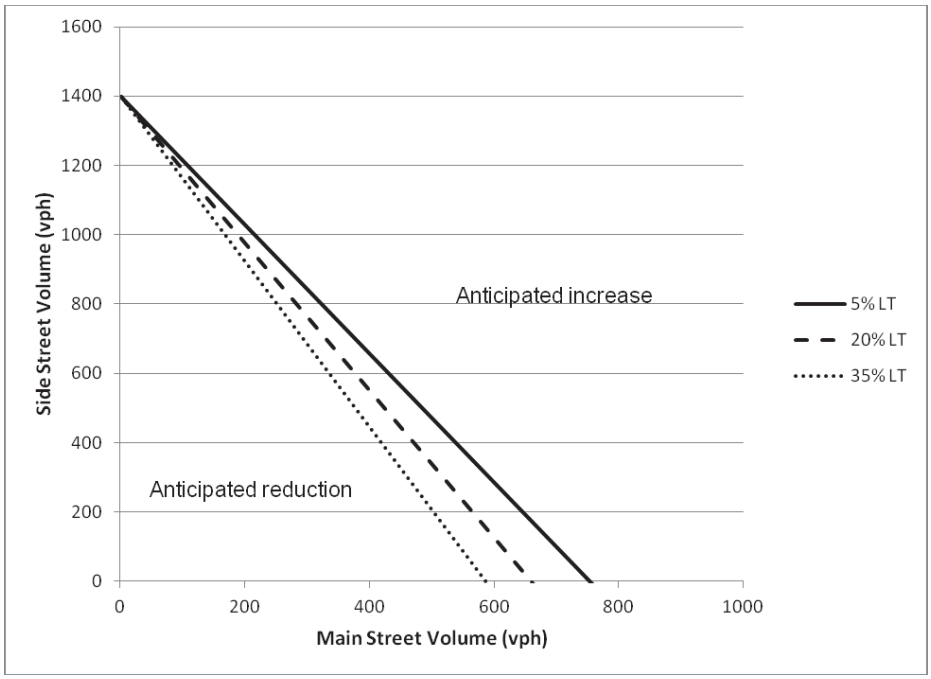

Figure 4 Rear end conflict guidance by major/minor street volume and left-turn percent

- Left-turn angle crashes. When moderate to high volumes of left-turn traffic exist on a roadway without dedicated left-turn lanes, a significant increase in crashes between major street left-turns and opposing through volumes can occur. This is due to the restricted sight distance that can occur when an opposing left-turn vehicle restricts sight distance to approaching through vehicles in the outside lane. Road diets address this type of crash by correcting the negative offset between opposing left-turn vehicles and significantly increasing available sight distance.

Other Considerations

There are additional elements that should be considered when road diets are evaluated. The following list identifies these elements and provides a brief overview of their potential implications.

- Multimodal operations: Road diets improve multimodal operations (bicycles and transit) through the presence of either wider lanes or exclusive bicycle lanes.
- Pedestrian safety: Road diets can increase pedestrian comfort and safety by reducing the number of lanes to be crossed, providing a refuge within the two-way left-turn lane and reducing the speed differential in the travel lanes
- Operational consistency: This aspect addresses the potential for more uniform speeds along the corridor, elimination of unbalanced speeds by travel lanes and potential speed reductions (road diet is acting as traffic calming) after the road diet conversion.
- Livability: Road diets have the potential to improve corridor livability and provide opportunities for residential and commercial growth. Reduced speeds encourage pedestrian and bicycle traffic and create a pedestrian friendly environment.

Design Considerations

Transition

One of the primary considerations in the design of a road diet is the transition from a four-lane cross section to a three-lane cross section. This transition can serve as a capacity and safety concern if not designed properly. Ideally, a road diet would replace the entire four-lane section of roadway eliminating the need for a transition. However, if necessary the transition can be placed at either a major intersection or midblock.

If transitioning at a major intersection, the entering through lane should be dropped as a turn lane serving a significant volume of traffic, such as a heavy right turn movement. Dropping the lane as a right or left-turn lane for a minimal volume may be counterproductive as the weaving and merging operations associated with the lane drop occur simultaneously with the increased demands of the intersection. Figure 5 shows a lane drop as a right turn lane at an intersection.

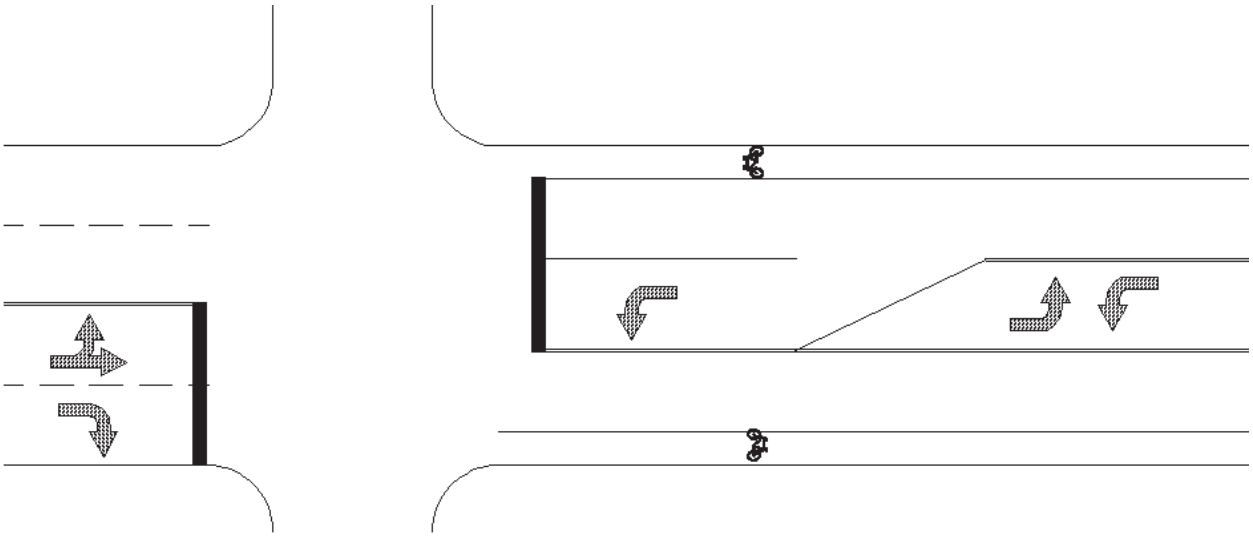

Figure 5 Right turn lane drop as road diet transition

A proper transition may also take place midblock on the roadway. When placing the transition midblock, it should occur away from intersections and/or high volume access points that would place stopped turning traffic in the through lanes of the merging traffic. Figure 6 shows a midblock transition.

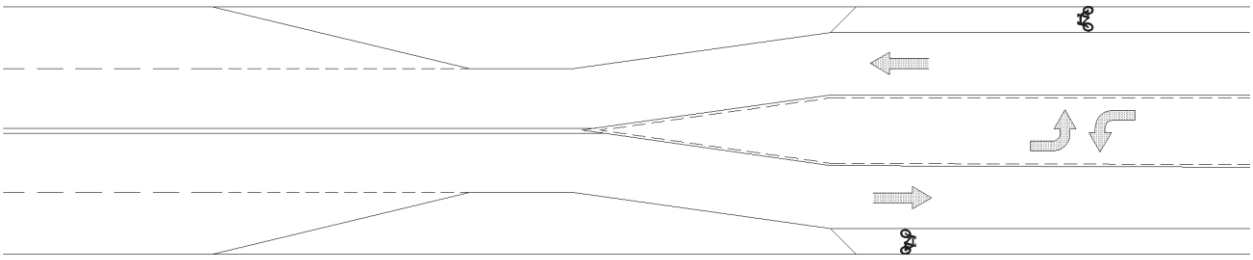

Figure 6 Midblock lane drop as road diet transition

If not designed properly, these transitions can significantly increase crashes removing any safety benefit of the road diet. All transitions should follow AASHTO's Policy on Geometric Design for Highways and Streets and MUTCD guidance for the reduction of through lanes.

Cross Section

The cross section of a four-lane roadway can vary widely from a 40 foot section with narrow lanes to a wide 60 foot section. The proposed cross section for the road diet should utilize the available space in the most efficient manner while properly channelizing intended movements. The following figures show possible configurations for road diet sections.

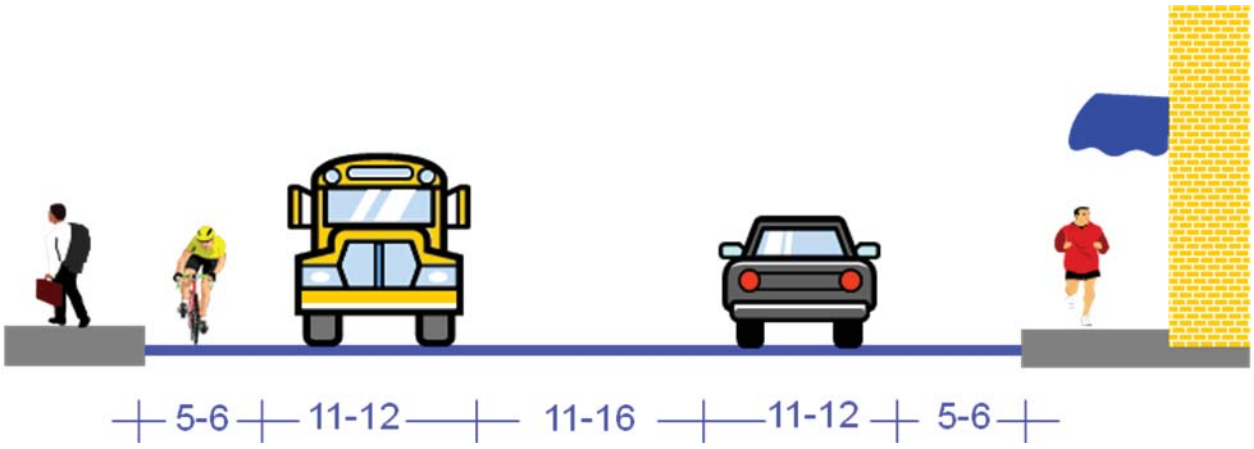

Figure 7 Example cross section with a two-way left-turn lane and bicycle lanes

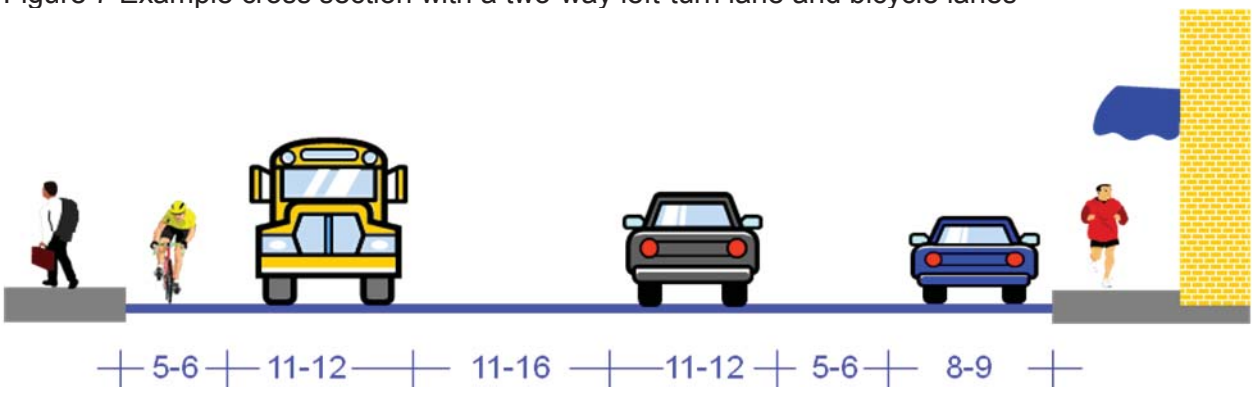

Figure 8 Example cross section with two-way left-turn lane, bicycle lanes and parking

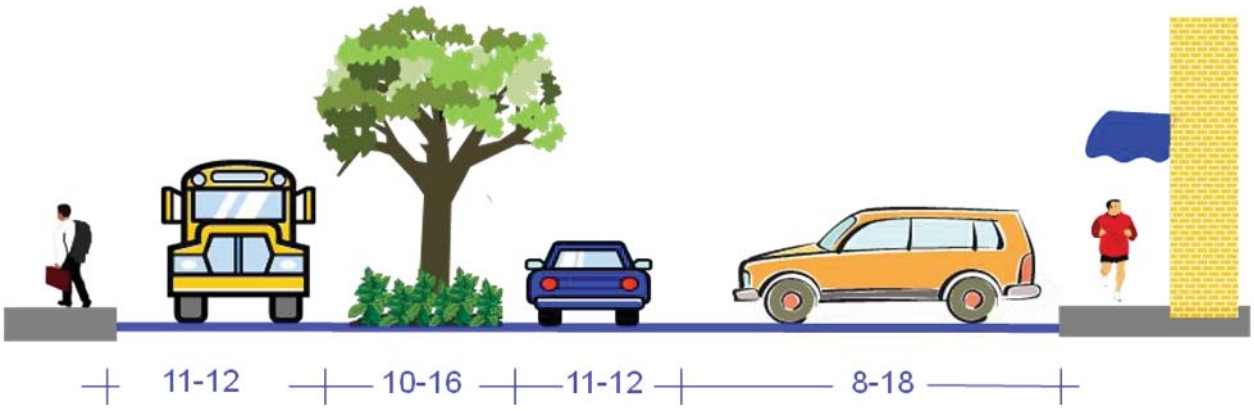

Figure 9 Example cross section with landscaped median and parking (back into shown)

Access Density

While access density can have a significant impact on angle and rear end crashes as vehicles slow to enter and exit an access point, no case studies have shown that this impact is greater on road diets than a four-lane cross-section. One area of concern for the operation of a two-way left turn lane is the potential for overlapping left-turn paths between the main street and adjacent access points. According to KTC Auxiliary Turn Lane Policy (2), a non-traversable median and turn restrictions are recommended when a corridor exceeds 85 access points per mile (based on number of access points on both sides of the street). Depending on the ingress and egress volumes of major access points, the four-lane section may outperform the three-lane section in some instances.

Performance Evaluation

Prior to the implementation of a road diet, it is recommended that a capacity analysis be completed for the major signalized intersections on the corridor to ensure that they would operate acceptably with a revised lane configuration. Analysis based on Highway Capacity Manual (HCM) methodologies is sufficient to check intersection capacities. For special cases, such as closely spaced intersections, coordinated signal systems, or corridors with at-grade rail crossings, micro-simulation is recommended to adequately evaluate arrival patterns and queue formation and dissipation.

When Not to Convert

There are cases where a road diet may not be the appropriate solution. These cases include scenarios where the road diet will not improve the operational efficiency of the corridor or corridors where at-grade rail crossing or other conditions, such as a high frequency of bus stops may create queues that require a long time to dissipate.

Road diets only address the specific crash types identified in the safety performance section. These crashes include rear end and sideswipes that result from an inside through lane that is blocked by left-turning traffic and left-turn angle crashes that result from offset left-turn lanes. If these crash types do not exist, a safety benefit would not be realized.

If an adequate transition cannot be designed for the road diet, it should be reconsidered, as this may cause an increase in crashes, and outweigh any derived benefit along the corridor.

If left-turn lanes already exist on the corridor, even in limited locations at major intersections, the introduction of a road diet would adversely impact capacity and safety benefits may not be realized.

Analysis Checklist

The following checklist is provided in order to allow for a systematic consideration of the various elements to be evaluated and considered prior to a road diet implementation (Table 3). The checklist identifies analysis to be completed and data to be collected that may be used to assist in evaluating the road diet conversion for a specific section of roadway. Where applicable the guidance in this document may be used to address many of these issues.

Table 3 Checklist for implementation considerations

Operational aspects
Travel times
Intersection delays
Travel speeds
Minor street operations
Railroad crossings
Safety aspects
Angle crashes
Left turn crashes
Rear end crashes
Pedestrian safety
Bicyclists safety
Multimodal operations
Public transportation
Bicycle
Pedestrian
Access management
Livability
Operational consistency
Transition design
Cross section elements
Number of lanes
Bicycle lanes
Parking
Sidewalks
Buffers

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Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

Policy Brief

Susan Handy, University of California, Davis
Marlon G. Boarnet, University of Southern California

September 30, 2014

Policy Brief:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf

Technical Background Document:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkgd.pdf

California Environmental Protection Agency
Air Resources Board

Policy Brief on the Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

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Policy Description

Because stop-and-go traffic reduces fuel efficiency and increases greenhouse gas (GHG) emissions, strategies to reduce traffic congestion are sometimes proposed as effective ways to also reduce GHG emissions. Although transportation system management (TSM) strategies are one approach to alleviating traffic congestion,[1] traffic congestion has traditionally been addressed through the expansion of roadway vehicle capacity, defined as the maximum possible number of vehicles passing a point on the roadway per hour. Capacity expansion can take the form of the construction of entirely new roadways, the addition of lanes to existing roadways, or the upgrade of existing highways to controlled-access freeways.

One concern with this strategy is that the additional capacity may lead to additional vehicle travel. The basic economic principles of supply and demand explain this phenomenon: adding capacity decreases travel time, in effect lowering the "price" of driving; when prices go down, the quantity of driving goes up (Noland and Lem, 2002). An increase in vehicle miles traveled (VMT) attributable to increases in capacity is called "induced travel." Any induced travel that occurs reduces the effectiveness of capacity expansion as a strategy for alleviating traffic congestion and offsets any reductions in GHG emissions that would result from reduced congestion. If the percentage increase in VMT matches the percentage increase in capacity, congestion (a function of the ratio of VMT to capacity) is not alleviated at all.

Conversely, some communities have decreased roadway capacity, in part motivated by the goal of reducing VMT. While temporary reductions in highway capacity are common (e.g. through the closure of lanes for construction or emergencies), permanent reductions are relatively rare. San Francisco eventually removed two elevated freeway segments damaged in the 1989 Loma Prieta earthquake, replacing them with street-level boulevards. Many European cities have closed selected streets in their

[1] See the separate policy brief on traffic incident clearance programs: http://arb.ca.gov/cc/sb375/policies/policies.htm

commercial cores to car traffic. This strategy is less common in U.S. cities, but one notable example is the recent elimination of vehicle traffic in Times Square in New York City. Increasingly common in the U.S. are "road diet" projects that re-allocate a portion of the public right-of-way for modes other than cars, though such projects do not necessarily decrease the capacity of the roadway as measured by vehicle throughput.

Impacts of Highway Capacity Expansion

Increased highway capacity can lead to increased VMT in the short run in several ways: if people shift from other modes to driving, if drivers make longer trips (by choosing longer routes and/or more distant destinations), or if drivers make more frequent trips (Noland and Lem, 2002; Gorham, 2009; Litman, 2010). Longer-term effects may also occur if households and businesses move to more distant locations or if development patterns become more dispersed in response to the capacity increase. Capacity expansion can lead to increases in commercial traffic as well as passenger travel (Duranton and Turner, 2011).

The induced-travel impact of capacity expansion is generally measured with respect to the change in VMT that results from an increase in lane miles, determined by the length of a road segment and its number of lanes (e.g. a two mile segment of a four-lane highway equates to eight lane miles). Effect sizes are usually presented as the ratio of the percent change in VMT associated with a one percent change in lane miles. The expectation is that this ratio, also called an "elasticity," will be positive: an increase in lane miles will lead to an increase in VMT. An elasticity of 1 or greater means that the new capacity is entirely filled by additional VMT, producing no reduction in congestion or GHG emissions; for elasticities between 0 and 1, the closer the elasticity is to zero, the smaller the increase in VMT relative to the increase in capacity, and thus the greater the reduction in congestion and GHG emissions.

Impacts are also sometimes measured as the change in VMT associated with the change in travel time (that results from the change in highway capacity). Many studies analyze the change in the number of vehicles per day on that road segment (a metric called "average daily traffic"). No studies focused on travel time or average daily traffic are included here.

Effect Size

Studies consistently show that increased capacity induces additional VMT. Elasticity estimates of the short-run effect of increased highway capacity range from 0.3 to 0.6,

though one study produced a lower estimate of 0.1 (Table 1). Estimates of the long-run effect of increased highway capacity are considerably higher, mostly falling into the range from 0.6 to just over 1.0. The more recent studies have produced the highest estimates of long-run elasticities using more sophisticated methodologies that are better able to illuminate the impact of highway capacity on VMT (as discussed in the accompanying Technical Background Document). Thus, the best estimate for the long-run effect of highway capacity on VMT is an elasticity close to 1.0, implying that in congested metropolitan areas, adding new capacity to the existing system of limited-access highways is unlikely to reduce congestion or associated GHG in the long-run.

Table 1. Impact of Capacity Expansion on VMT

Study	Study location	Study year(s)	Results	
			Change in VMT/ change in lane miles	*Time period*
Duranton and Turner, 2011	U.S.	1983 - 2003	1.03	10 years
Cervero, 2003	California	1980 - 1994	0.10	Short term
			0.39	Long term
Cervero and Hansen, 2002	California	1976 - 1997	0.59	Short term (1 year)
			0.79	Intermediate term (5 years)
Noland, 2001	U.S.	1984 - 1996	0.30 to 0.60	Short term
			0.70 to 1.00	Long term
Noland and Cowart, 2000	U.S.	1982 - 1996	0.28	Short term
			0.90	Long term
Hansen and Huang, 1997	California	1973 - 1990	0.20	Short term
			0.60 to 0.70	Long term – counties
			0.90	Long term – metro areas

Even the earlier studies were skeptical about the potential of capacity expansion to reduce VMT, particularly in the long-run. In 1997, Hansen and Huang found that population growth is the most consistent contributor to VMT growth, but that the contribution from increases in lane miles is significant: "…Our results suggest that the urban [state highway lane miles] added since 1970 have, on the whole, yielded little in the way of level of service improvements." Noland (2001) concluded that "Increased capacity clearly increases vehicle miles of travel beyond any short run congestion relief

that may be obtained." More recently, Duranton and Turner (2011) echoed these earlier studies: "We conclude that increased provision of roads… is unlikely to relieve congestion."
The effect size appears to depend on the size (whether in terms of population or geographic extent) of the metropolitan area. On a percentage basis, the effects are larger for smaller areas (Schiffer, et al. 2005), likely for a number of reasons. In smaller areas, capacity increases are likely to represent larger percentage increases in total capacity, which then produce larger percentage increases in VMT (Noland and Cowart, 2000). Note that the amount (rather than the percentage) of induced travel is likely to be greater in larger areas than in smaller areas (Hansen and Huang, 1997).

Other factors may also influence the effect size. As noted above, the effect is larger in the long-run than in the short-run, with one study concluding that the full impact of capacity expansion on VMT materializes within five years (Hansen and Huang, 1997) and another concluding that the full effect takes as long as ten years (Durantan and Turner, 2011). The level of congestion is important, as capacity expansion will produce a larger reduction in travel time and thus a larger increase in VMT when congestion is high than when it is low and driving speeds are unconstrained (Schiffer, et al. 2005). In addition, the effect size may depend on fuel prices: when fuel prices are lower, the induced travel effects of expanded capacity tend to be higher, as travel time is a greater share of the cost of travel in this situation (Noland and Lem, 2002). Whether the form of capacity expansion (i.e. new roads or expanded roads) matters is not clear (Schiffer, et al., 2005).

An important question is whether increased VMT on highways following capacity expansion is partially offset by decreases in VMT on other roads. This would be the case if drivers shifted from slower and more congested roads to the new or newly expanded highways. However, Hansen and Huang (1997) found "no conclusive evidence that increases in state highway lane-miles have affected traffic on other roads," while more recently Duranton and Turner (2011) concluded that "increasing lane kilometers for one type of road diverts little traffic from other types of road." In other words, capacity expansion leads to a net increase in VMT, not simply a shifting of VMT from one road to another.

Another important question is whether increased highway capacity impacts public transit ridership, or vice versa. The potential interactions are complex. Increased highway capacity could lead public transit riders to shift to driving, thereby contributing to the induced travel effect. Conversely, increased public transit service could entice drivers to replace some driving with public transit, thereby reducing highway traffic and in effect freeing up additional capacity that could then lead to induced traffic. Duranton and

Turner (2011) found no evidence that public transit service affects VMT, suggesting that whatever interactions do occur tend to cancel each other out. In other words, adding transit capacity does not help to reduce congestion, as any freed up capacity is consumed by additional driving.

As noted, some communities have decreased roadway capacity, in part motivated by the goal of reducing VMT. Evidence on the effects of roadway removals or capacity decreases is sparse, however. A 1998 study of 60 locations where road space was taken away from cars in the UK, Canada, Tasmania, and Japan found that, on average, 25 percent of VMT seemed to go away, though the effect size varied widely (Goodwin, et al. 1998). A study of a fourteen-month closure of an important bridge in Calgary, Canada found only a small reduction in trips and little change in behavior with respect to mode (Hunt et al., 2001). Researchers also found limited changes in behavior during the temporary closing for construction of a stretch of Interstate 5 through downtown Sacramento in 2008 (Ye et al., 2012). Studies of the removal of the Central Freeway in San Francisco documented a significant drop in traffic: counts on the boulevard that replaced the freeway were roughly 50 percent less than counts on the freeway (Cervero et al., 2009). Effects on VMT rather than traffic counts have not been assessed.

Evidence Quality

The quality of the evidence linking highway capacity expansion to VMT increases is relatively high, although tying changes in VMT to changes in capacity is challenging. The cited studies use time-series data and sophisticated econometric techniques to estimate the effect size. These studies control for other factors that might also affect VMT, including population growth, increases in income, other demographic effects, and changes in transit service (Noland and Lem, 2002).

Although these studies show a strong correlation between capacity increases and increases in VMT, the direction of causality is an important question in that the anticipation of growth in VMT is generally the rationale for capacity expansion. One study showed that a 10 percent increase in VMT is associated with a 3.3 percent increase in lane-miles (Cervero and Hansen, 2002). However, Fulton, et al. (2000) found that growth in lane-miles precedes growth in VMT, and Duranton and Turner (2011) concluded that “roads are assigned to [metropolitan areas] with little or no regard for the prevailing level of traffic.” The cited studies have found a significant influence of capacity expansion on VMT even after accounting for the reverse effect.

Caveats

Many of the studies focus on California, and the results for these studies are similar to those for the national studies, suggesting that the effects are relatively uniform across the U.S. However, as noted above, the effect size may depend on size of the metropolitan area, existing levels of congestion, and fuel prices, and it is likely to be higher in the long run than in the short run.

GHG Emissions

The effect of capacity expansion on GHG emissions depends on two competing effects: the increase in VMT (which increases GHG emissions), and the reduction in traffic congestion (which tends to decrease GHG emissions). As noted above, any induced travel that occurs reduces the effectiveness of capacity expansion as a strategy for alleviating traffic congestion and offsets any reductions in GHG emissions that would result from improved traffic flow. Noland (2001) predicted that the growth in VMT attributable to increased lane miles would produce an additional 43 million metric tons of CO_2 emissions in 2012 nationwide. Conversely, any reductions in VMT resulting from reductions in capacity will reduce GHG emissions, though if traffic congestion increases as a result of the capacity reduction, the benefits will be offset to some degree.

Co-benefits

Given the induced travel effect, capacity expansion has limited potential as a strategy for reducing congestion. The additional vehicle travel induced by capacity expansion increases GHG emissions as well as other environmental effects, including increased air, water, and noise pollution. On the other hand, capacity expansion potentially generates economic and social benefits, at least in the short run, even if the new capacity is completely filled by induced travel. The additional benefits derive from the fact that the expanded highway is carrying more people, each of whom benefits from his or her travel. However, most studies of the impact of capacity expansion on development in a metropolitan region find no net increase in employment or other economic activity, though highway investments do influence where within a region development occurs (Handy, 2005; Funderberg et al., 2010).

In addition, the construction process itself generates both positive and negative effects. Most obviously, highway construction projects create jobs that can boost the local economy. On the other hand, highway construction projects often have substantial negative effects on the communities through which they are sited, particularly if construction necessitates the removal of homes or businesses. Historically, low-income

and/or minority communities were and continue to be disproportionately affected by such projects.

In contrast, reductions in road capacity tend to produce positive social and environmental effects, and they can also generate economic benefits. For example, many cities in Europe have adopted the strategy of closing streets in the central business district to vehicle traffic as an approach to economic revitalization (Hajdu, 1988; Rodriguez, 2011). Road diet projects are becoming increasingly popular in California and elsewhere in the U.S. as a way to support modes other than driving and enhance the local environment, though their economic impacts have not yet been systematically documented.

Examples

California continues to expand its highway system, though at a far slower rate than during the era of interstate highway construction. According to the national Bureau of Transportation Statistics, California had 31,435 miles of freeways, highways, and arterial roadways in 2010, a 1.6 percent increase from 2005.

As noted above, San Francisco removed two segments of elevated freeway damaged in the 1989 Loma Prieta earthquake. The Central Freeway was replaced with Octavia Boulevard, while the removal of the Embarcadero Freeway enabled substantial improvements to the at-grade Embarcadero Boulevard. Both projects sparked an on-going revitalization of their surrounding areas (Cervero, et al. 2009).

The strategy of closing central business district streets to car traffic is uncommon in California but not unknown. Cities in California that have or have had “pedestrian malls” include Burbank, Oxnard, Pomona, Redding, Redlands, Sacramento, and Santa Cruz. The Fulton Mall in downtown Fresno, closed to traffic in the 1960s, has struggled, despite several revitalization efforts. In contrast, Santa Monica’s Third Street Promenade, closed to traffic in the 1960s, is widely seen as a success in promoting economic activity and creating a thriving community core.

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Acknowledgements

This document was produced through an interagency agreement with the California Air Resources Board with additional funding provided by the University of California Institute of Transportation Studies MultiCampus Research Program on Sustainable Transportation.

How Much Is Too Much (Traffic)

Salem Spitz, P.E.

In the August 1981 ITE Journal, ITE Technical Council 5A-25 presented a summary of changes proposed for "Recommended Practices for Subdivision Streets." Among the changes is a functional description of "Local Streets" in which it states that typical residential ADT ranges to 1500 with P.M. peak hour about 10%. Others have used similar levels of ADT as upper limits for satisfactory local residential streets and similar purposes.*

In contrast, however, various agencies have been called upon by residents to implement neighborhood traffic programs for local streets with substantially smaller traffic flows. The 1971-73 Seattle Project, for example, involved streets with daily traffic from about 300 to 1,000 vehicles.[1]

Proponents of objective analyses have, unfortunately, had very little to go by relative to traffic flows versus environmental quality on local residential streets. Whether the following will provide meaningful answers is hard to say; it's a rather analytical approach to a very subjective matter and would require extensive pragmatic study for validation. Perhaps, however, its publication can aid in obtaining such study—whatever the final outcome.

In 1963, Professor Colin Buchanan authored "Traffic in Towns"[2], one of the first and still one of the foremost studies of vehicle traffic and the environment. The statement from this book that there is a need "to contrive the efficient distribution . . . of large numbers of vehicles to large numbers of buildings, and to do it in such a way that a satisfactory standard of environment is achieved" remains a fundamental objective of transportation.

The concept set forth to reach this goal was illustrated by an analogy of corridors and rooms. "There must be areas of good environment (urban rooms) where people can live, work and move about in freedom from the hazards of motor traffic; and there must be a complementary network of roads (urban corridors) for effecting the primary distribution of traffic to the environmental areas."[3]

To evaluate the environment in an "urban room", or environmental area, the concept of "environmental capacity", based on *pedestrian* freedom of safe mobility, was introduced. Surveys were made and traffic flows, in passenger car units (p.c.u.), for various roadway widths developed to identify the limit of "good environment". On a 30 foot roadway this limit was stated to be about 130 p.c.u./hour, equivalent to some 1,300 per day.

But working with daily flow and even with hourly flow has failed to give me a satisfactory "feel" for traffic environment when dealing with low volume residential streets. Recently, in reviewing some residential subdivisions, a much finer-grained parameter—vehicles per minute—was used with considerable success in developing such a feel for both pedestrian/vehicle and vehicle/vehicle relationships.

At local residential street travel speeds of 20 to 30 mph a typical modern block length of some 1,000 feet to a quarter mile will be traversed, end to end, in about 0.4 to 0.75 minute. At an average flow rate of one vehicle per minute (vpm) it is quite likely that, *within that block,* vehicles moving in opposite directions will not encounter one another. At two or two-and-one-half vpm (i.e., one vehicle per 0.4 to 0.5 minute) it is quite likely that such a meet will occur. This condition during the peak hour is equivalent to about 1,200 to 1,500 vehicles per day (vpd) with a 10% peak, while the first case—no meet within the block—would equate to about 600 vpd. Although this gives a glimmer of a vehicle/vehicle connection to flow, it reveals nothing about pedestrian/vehicle relationships.

To look at these, "impact" was defined as the [average] percent of time a chosen location within the roadway would be subject to vehicle "exposure." Exposure was defined as the time distance from the chosen location that an approaching vehicle would affect the freedom of safe mobility of a pedestrian at that location. The choice of time distance would be up to the analyst and should reflect some of the other factors in Buchanan's concepts:

- "Vulnerability"—Proportion of old and young pedestrians
- "Protection"—Visibility, parked cars, sidewalks, etc.
- "Activity"—Quantity of pedestrians, especially children playing in or alongside the roadway

Figure 1 shows the relationship of "impact" to traffic flow (vpm and vpd) for several "exposure" times. Using vpm corresponding to the ones above for vehicle/vehicle relations and a 12 second exposure (i.e., 440 feet at 25 mph.) the impact of one vpm (600 vpd) is 20% and 2.5 vpm (1,500 vpd), 50%. To look at it another way, at one vpm freedom of safe pedestrian mobility would occur 80% of the time and drop to 50% of the time at 2.5 vpm.

Putting things together, traffic flow of 2 to 2.5 vpm (1,200-1,500 vpd) appears to be a reasonable threshold between an acceptable high volume local residential street and a low volume collector street

*In Orange County, CA, for example, new subdivisions are not permitted driveways on residential streets where existing or projected ADT exceeds 1200 vehicles. Side lots with driveways on the local cross street are the most common solution to access the properties.

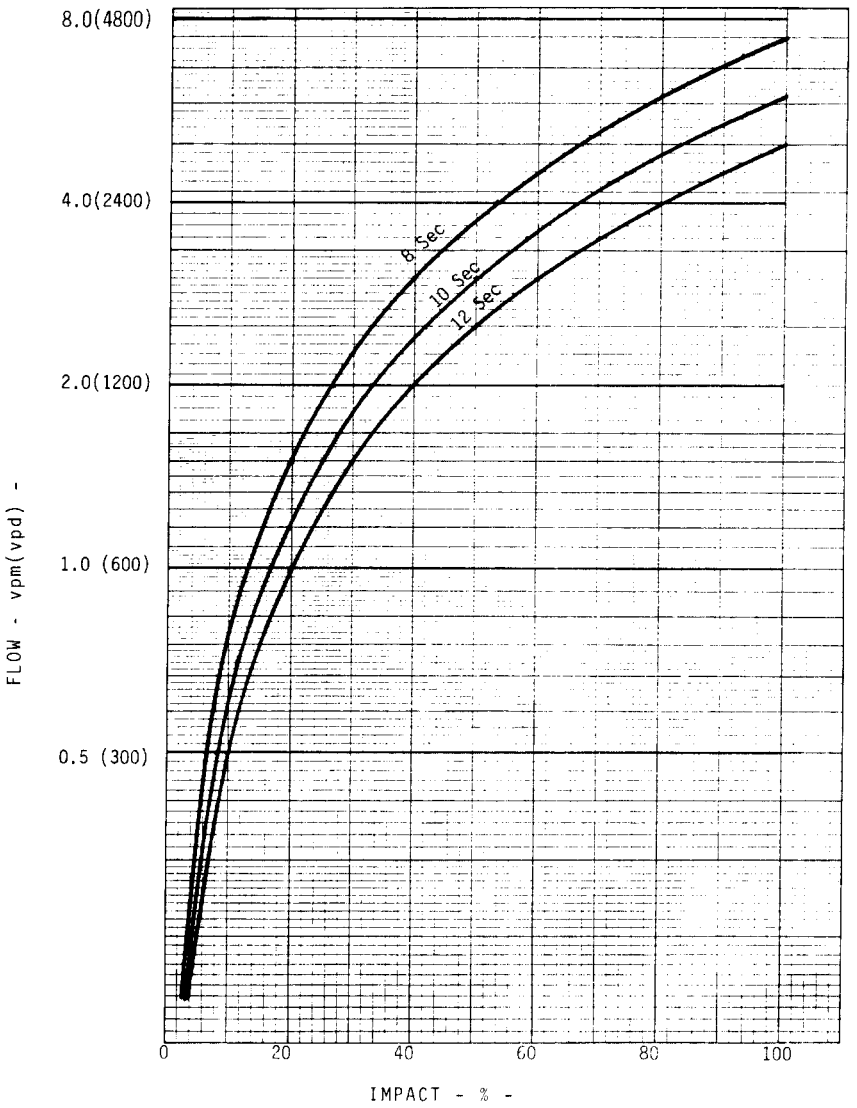

Figure 1. *Impact vs Flow by Exposure*

NOTE: Exposure is the time-distance that an approaching vehicle would affect a pedestrian in the roadway; at 30 mph, 8 sec is 350 feet, 10 sec is 440 feet, and 12 sec is 530 feet.

(which could still support some residences, especially if characteristics include low vulnerability and activity and the street provides a high protection design). It also points to some lower flow level, at about one vpm, as a threshold of some kind for vehicle/vehicle relationships, perhaps between a good environment condition and one rated as only acceptable. But, historically, even this flow is subject to resident objection and another, lower flow, threshold appears to be necessary.

In the existing "Recommended Practice"[4] the maximum length of a cul-de-sac refers to 20 dwelling units as one control element. From the "Trip Generation Report"[5] this would equate to some 90 to 440 vpd for single family detached unit development. From Figure 1, at 12 second exposure, impact for such flows (assuming 10% peak hour) would range from about 3% to 15%. Although it is unknown exactly where the 20 DU value originated, it is interesting to note that the traffic flow result is reasonably close to 0.5 vpm—with a 10% impact. Perhaps this would be a useful threshold between "excellent" and "good" environment? If so, we could be looking at three thresholds for local residential street traffic environmental quality as in Table 1.

Carrying the apparent sequence one step further could put another threshold at 4.0 or 5.0 vpm (2400-3000 vpd) with 80-100% impact, above which the street is unacceptable as a residential street!

So, how much traffic is too much traffic? Well, when we're dealing with traffic carriers such as arterials and most collectors the answer is all tied up in matters of capacity and congestion and collisions. But when it's a local residential street we're looking at, a whole new set of parameters takes precedence; all related to the achievement of a satisfactory environment from the perspective of the residents of the street. These are the people who wish their neighborhood to reflect Buchanan's goal of an area of good environment where they and their children and their neighbors "can live, work and move about in freedom from the hazards of motor traffic."

Hopefully this material will help you find a starting point for *your* answer on *your* streets.

Table 1

Traffic Flow	Environment
Below 0.5 vpm (300 vpd)	Excellent
0.5 to 1.0 vpm (300-600 vpd)	Good
1.0 to 2.0 vpm (600-1200 vpd)	Acceptable
Above 2.0 vpm (1200 vpd)	Poor

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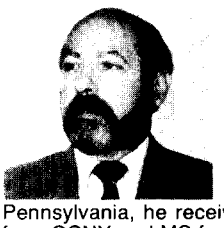

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Highway Safety Manual Knowledge Base

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The original document prepared by the NCHRP 17-27 project team included a review of studies that were published until December 2004. This updated version includes accident modification factors (AMFs) based on a review of studies from January 2005 until April 2008. The update was done by the following individuals based on funding from the Federal Highway Administration:

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November 2009

Preface

The Knowledge Base forms the foundation for the contents of each chapter of Part D of the First Edition of the Highway Safety Manual (HSM). It is expected that this Knowledge Base, which documents the extensive literature review completed, will be of interest to highway safety professionals, and will be of use for the development of future editions of the HSM.

The following chapters are included in this document:

- Chapter 3: Roadway Segments
- Chapter 4: Intersections
- Chapter 5: Interchanges
- Chapter 6: Special Facilities and Geometric Situations
- Chapter 7: Road Networks

In this document, safety effects are presented as Accident Modification Factors or Functions (AMFs). AMFs are typically estimated for three accident severities: fatal, injury, and non-injury. Fatal and injury are generally combined and noted as injury. Where distinct AMFs are available for fatal and injury severities, they are presented separately. Non-injury severity is also known as property-damage-only severity.

Each AMF is accompanied by a measure of accuracy, the standard error. A small standard error indicates that an AMF is accurate. The development of the Knowledge Base of the Highway Safety Manual (HSM) required a formalized process and procedure to review, document, and filter the multitude of safety information published in the last 50 years until April 2008. The procedures that were applied in the development of the Knowledge Base including the method correction factors (MCFs) are provided in a companion document: “Inclusion Process and Literature Review Procedure for Part D”

Chapter 3: Roadway Segments

Chapter 3. Roadway Segments

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3.1. Safety Effects of Roadway Segment Design Elements

The following sections provide information on the safety effect of design elements on roadway segments. Design components are organized by cross-section elements, roadside elements, and alignment elements.

3.1.1. Roadway Elements

The following sections contain information on the safety effects of:

1. Lanes
2. Shoulders
3. Medians

3.1.1.1. Lanes

In the past, wider lanes have been assumed to be beneficial to safety for two reasons. First, wider lanes should increase the average separation between vehicles in adjacent lanes. This may provide a wider buffer to absorb any deviation of vehicles from their intended path. However, drivers adapt to the road they see. Wider lanes tend to induce somewhat faster travel speeds (as evident in the relationship between lane width and free flow speed (*1*), pg 20-5) and may induce closer following. Whether this complex adaptation to wider lanes increases or decreases safety cannot be determined using intuition or engineering judgment.

Second, wider lanes may provide more room for driver correction in near-accident circumstances. For example, on a roadway with narrow lanes, a moment's inattention may lead a vehicle over the pavement edge-drop and onto a gravel shoulder, but if the lane is wider and the shoulder paved, the same inattention will provide greater opportunity to maintain the vehicle on the paved surface. In these near-accident circumstances, it will be difficult to separate between the effect of lane width, shoulder width, shoulder paving, edge-drops, etc.

It is likely that lane width plays a somewhat different role in single and multi-lane roads. The lane width requirements for single-lane roads were originally derived from the observation of driver behavior. The lane width at which drivers did not feel the need to shift to the right when meeting an oncoming truck was deemed appropriate. The same criterion may apply to the inner lane of an undivided multi-lane lane road, but it may not apply to the other lanes or to divided roads. [Adapted from Hauer, 2000 (*2*).]

Bicycle lane considerations are discussed in Section 3.3, and Chapter 6 provides information on work zone design including lanes.

Exhibit 3-1: Resources examined to investigate the safety effect of lane attributes on road segments

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D.L., Srinivasan, R., Baek, J., Persaud, B., Lyon, C., Council, F.M., Eccles, K., Lefler, N., Gross, F., Hauer, E., and Bonneson, J., "Crash Reduction Factors for Traffic Engineering and ITS Improvements." NCHRP Project 17-25 Final Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2008))	Researched and/or developed AMF values for a number of roadway segment treatments including increasing lane width and four to three lane conversions (i.e., Road Diets).	Modified lane width and road diet AMF.
(Lord, D., and Bonneson, J.A., "Development of Accident Modification Factors for Rural Frontage Road Segments in Texas." Transportation Research Board 86th Annual Meeting, Washington D.C., (2007))	Developed AMF values for lane width along rural frontage roads in Texas.	AMF added to synthesis
(*3*) (Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))	Used four years of HSIS crash, traffic and inventory data for urban undivided four-lane roadways in Washington State to develop cross-sectional models of safety.	Added to synthesis (multi-lane lane width).
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies to reduce crashes on horizontal curves.	No additional information; not added to synthesis.
(*4*) (Bauer, K. M., Harwood, D. W., Hughes, W. E., and Richard, K. R., "Safety Effects of Using Narrow Lanes and Shoulder-Use Lanes to Increase the Capacity of Urban Freeways." Washington, D.C., 83rd Transportation Research Board Annual Meeting, (2004))	Used HSIS data to examine 50 miles of a variety of projects on California urban freeways. Applied empirical-Bayes before/after methodology.	AMFs added to synthesis.
(Harwood, D. W., "Methodology to Predict the Safety Performance of Urban and Suburban Arterials." NCHRP Project 17-26 Interim Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2004))	Literature review is included in this report, including some discussion of past work on lanes.	No new knowledge. Not added to synthesis.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of lane width based on findings of three studies	All studies used were pre-1985 studies. Not added to synthesis.
(*5*) (Harwood, D. W., Rabbani, E. R., Richard, K. R., McGee, H. W., and Gittings, G. L., "NCHRP Report 486: Systemwide Impact of Safety and Traffic Operations Design Decisions for 3R Projects." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Study of the effects of roadway factors on safety in 3R projects	Added to synthesis (multi-lane lane width).

DOCUMENT	DESCRIPTION	COMMENT
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Several strategies to reduce run-off-road crashes.	No additional information; not added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., McGee, H., Prothe, L., Eccles, K., and Council, F. M., "NCHRP Report 500 Volume 4: A Guide for Addressing Head-On Collisions ." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Several strategies to reduce head-on crashes.	No additional information; not added to synthesis.
(Wooldridge, M. D., Fitzpatrick, K., Harwood, D. W., Potts, I. B., Elefteriadou, L., and Torbic, D. J., "NCHRP Report 502: Geometric Design Consistency on High-Speed Rural Two-Lane Roadways." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Study complements work done for IHSDM; focus is on geometric design consistency of two-lane rural roads.	Same AMFs for lane width as Harwood et al. (2000) used in IHSDM. Not added to synthesis.
(*6*) (Huang, H. F., Stewart, J. R., and Zegeer, C. V., "Evaluation of Lane Reduction "Road Diet" Measures on Crashes and Injuries." Transportation Research Record, No. 1784, Washington, D.C., Transportation Research Board, National Research Council, (2002) pp. 80-90.)	Examined 11 road diet sites and 25 similar comparison sites in six California and two Washington cities	Added to synthesis.
(Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))	Investigated statistical relationship between crashes and roadway design attributes on the Oregon state highway system; developed crash models (freeway v. non-freeway) (urban v. non-urban).	Not added to synthesis, questions regarding model form and parameters.
(*7*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Research on rural two-lane highways for Part III of the HSM addressed the relationship between lane width and safety.	Added to synthesis. Suggested by NHCRP 17-18(4).
(*2*) (Hauer, E., "Lane Width and Safety." (2000))	Detailed review of literature on lane width from the 1950's through 1999, mostly two-lane rural.	Added to synthesis. Suggested by NHCRP 17-18(4).
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Review of past literature, two-lane roads only.	No additional information; not added to synthesis.
(Council, F. M. and Stewart, J. R., "Safety effects of the conversion of rural two-lane to four-lane roadways based on cross-sectional models." Transportation Research Record, No. 1665, Washington, D.C., Transportation Research Board, National Research Council, (1999) pp. 35-43.)	Developed models to predict crashes/km-year for typical four-lane divided and undivided roads using HSIS data from four states	As reviewed by Hauer 2000 (multi-lane lane width). Surface width was not found to be a significant predictor for 4-lane undivided roads. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Gibreel, G. M, Easa, S. M, Hassan, Y., and El-Dimeery, I. A., "State of the Art Review of Highway Geometric Design Consistency." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1999) pp. 305-313.)	Literature review of highway geometric design consistency, primarily on two-lane rural highways. Discussion of speed, safety, and performance.	Limited quantitative safety effect information on lanes; from older studies (1973-1975). Not added to synthesis.
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))	Analysis of several roadside characteristics on about 100 km of State Route 3 in Washington State using negative binomial models.	Due to uncertainty of lane elements in models, not added to synthesis.
(Stewart, D. and Council, F. M., "To smooth or not to smooth, that is the question. An analysis of accidents on rural NC two-lane and four-lane roads." (1998))	Examined the safety effects of conversion from two-lanes to four-lanes using cross-sectional models	As reviewed by Hauer 2000 (multi-lane lane width). Lane width was not part of final models. Not added to synthesis.
(Wang, J., Hughes, W. E., and Stewart, R., "Safety effects of cross-section design on rural multi-lane highways." FHWA-RD-98-071, McLean, Va., Federal Highway Administration, (1998))	Developed negative-binomial and Poisson models for non-freeway multi-lane roads	As reviewed by Hauer 2000 (multi-lane lane width). Lane width was not part of final models. Not added to synthesis.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	Limited information on improvements.	No quantitative information; not added to synthesis.
(Curren, J. E., "NCHRP Report 369: Use of Shoulders and Narrow Lanes to Increase Freeway Capacity." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Analyzed crash data to determine the effect on safety of using shoulders with or without narrows lanes to increase freeway capacity; safety evaluation was conducted on five corridors	Suggested by NHCRP 17-18(4). As reviewed by Hauer 2000. Not added to synthesis.
(Hadi, M. A., Aruldhas, J., Chow, L., and Wattleworth, J., "Estimating Safety Effects of Cross-Section Design for Various Highway Types Using Negative Binomial Regression." Transportation Research Record 1500, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 169-177.)	Analyzed FL crash data to estimate the effect of cross-section design elements (including lane width) on the safety of urban highways	Suggested by NHCRP 17-18(4). As reviewed by Hauer 2000 (multi-lane lane width). Not added to synthesis.
(Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))	Discussion of safety effect of various cross-section elements.	No additional information; not added to synthesis.
(McCoy, T. A., McCoy, P. T., Haden, R. J., and Singh, V. A., "Safety Evaluation of Converting On-Street Parking from Parallel to Angle." Transportation Research Record 1327, Washington, D.C., Transportation Research Board, National Research Council, (1991) pp. 36-41.)	Studied removal of lanes to provide on-street angle parking in CBD of Lincoln, Nebraska.	Not added to synthesis.
(Harwood, D. W., "NCHRP Report 330: Effective Utilization of Street Width on Urban Arterials." Washington, D.C., Transportation Research Board, National Research Council, (1990))	Evaluated the safety effect of reallocating urban arterial street width to create more lanes; 35 improvement projects	Suggested by NHCRP 17-18(4). As reviewed by Hauer 2000. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Zegeer, C. V., Reinfurt, D. W., Hummer, J., Herf, L., and Hunter, W., "Safety Effects of Cross-Section Design for Two-Lane Roads." Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 20-32.)	Cross-sectional analysis of data from seven states to study the effects of various roadway parameters including lane width.	As reviewed by Hauer 2000 (two-lane lane width). Not added to synthesis.
(Urbanik, T. and Bonilla, C. R., "Safety and Operational Evaluation of Shoulders on Urban Freeways." FHWA/TX-87/32+395-1, Austin, Tex., Texas State Department of Highways and Public Transportation, (1986))	Summarizes past studies	Suggested by NHCRP 17-18(4). No new research on lanes. Not added to synthesis.
(Harwood, D. W., "NCHRP Report 282: Multilane Design Alternatives for Improving Suburban Highways." Washington, D.C., Transportation Research Board, National Research Council, (1986))	Cross-sectional models for suburban multi-lane roadways	As reviewed by Hauer 2000 (multi-lane lane width). Lane width not a statistically significant predictor; not added to synthesis.
(Glennon, J. C., "Accident Effects of Centerline Markings on Low-Volume Rural Roads." Transportation Research Record 1027, Washington, D.C., Transportation Research Board, National Research Council, (1985) pp. 7-13.)	Comparison of low-volume rural roads that were either unmarked, marked with dashed centerline, or marked with both dashed centerline and no-passing zone stripes.	More relevant to pavement marking discussion. Not added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis of various studies for several traffic control and roadway elements.	No additional knowledge, not added to synthesis.
(McCasland, W. R., "Modifying Freeway Geometrics to Increase Capacity." Transportation Engineering Journal, Vol. 106, No. 6, New York, N.Y., American Society of Civil Engineers, (1980) pp. 787-801.)	Summarizes safety experiences, from past projects from various states that increased lanes by reducing shoulder width	Suggested by NHCRP 17-18(4). Hauer's review indicated simple comparison of accident rates. Not added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Review of the safety effect of cross-sectional elements.	No additional information, not added to synthesis.

Treatment: Widen lanes

Rural two-lane roads

Hauer (2000) (*2*) conducted a detailed review of literature on lane width from the 1950s through 1999. Hauer also reanalyzed some of the data using improved research methods than available when the original studies were completed. Hauer's review is felt to be the best of many syntheses and reviews conducted. Hauer concluded (*2*):

1. A great deal of empirical evidence has been accumulated over several decades. The bulk of it pertains to two-lane rural roads. Little is known about the effect of lane width on multi-lane roads or urban roads.

2. When road sections differ in lane width they tend to differ also in other important respects. This makes the isolation of the safety effect of lane width difficult.
3. In spite of this difficulty, there is a great deal of congruence between the results. Thus, the AMFs obtained by Belmont (1954), Cope (1955), Roy Jorgensen (1978), Zegeer et al. (1987) and Miaou (1996) are very similar when brought to the common denominator of 'all accidents'.
4. There is, however, one issue on which opinions differ. Most early researchers found that the safety benefit of lane widening bottoms out somewhere between 11 ft and 12 ft. Further widening seemed to be to the detriment of safety. Later researchers, using perhaps better data and methods of analysis, unfortunately choose to use in their models a functional form that can never reach a 'bottom'. Nor is there any evidence in their work that before choosing this functional form they examined whether their data indicated an increase in crashes for wider lanes. For this reason, in Hauer's opinion, the weight of the extant empirical evidence indicates that there is little safety benefit to be obtained from widening lanes beyond 11 ft and that widening beyond 12 ft may be to the detriment of safety (on two-lane roads).
5. There is some empirical evidence about the safety effect of reducing lane width on urban arterials and freeways when the aim is to add a lane to increase capacity. This evidence is difficult to interpret in terms of the safety effect of lane width because when a lane is added (even when no other changes are made) the flow/lane is significantly changed.

Unfortunately, even though Hauer's third conclusion notes similar findings for "all accidents" from several studies, an AMF was not specified for any changes in lane parameters. The following summary of studies is based on Hauer's synthesis.

Belmont (1954) analyzed data that pertains to rural two-lane tangents, without structures or intersections, predominantly straight and level and with a 55 mph posted speed limit (*2*). Using Poisson regression, Hauer reanalyzed the data and developed the following AMFs:

Pavement Width (in ft)	18	20	22	24	26	28	30
AMF	1.21	1.05	1.00	1.01	1.06	1.13	1.21

Standard deviations were not reported for these estimates, and could not be calculated based on available knowledge. In addition, since the original data included some paved shoulders, it is not possible to simply assume that dividing these pavement widths in half will provide lane widths.

Cope (1955) analyzed before/after data for 22 pavement widening projects (*2*). Most of the projects involved widening from 18 to 22 ft. Accidents that occurred at driveways, intersections, and entrances were extracted. Hauer notes that the large accident reductions found in the analysis were partially due to regression-to-mean (RTM), since the mean "before" accident rates were higher than the state average, and because a greater reduction was seen for the projects with higher "before" period rates (*2*). Hauer omitted some of the projects with the most obvious RTM biases and estimated an AMF of 0.7 for widening from 18 to 22 ft; an approximate 8% crash reduction per foot of pavement widening up to 22 ft. This is higher than seen in the Belmont figures noted above (perhaps because all RTM was not removed, and because the "total"

accidents here are actually a smaller subset; the driveway crashes were deleted). Using 22 ft as the "base", the AMFs are estimated to be:

Pavement Width (in ft)	18	20	22	24	26	28	30
AMF	1.43	1.16	1.00	?	?	?	?

Standard deviations were not reported for these estimates, and could not be calculated based on available knowledge.

Hauer notes that Roy Jorgensen Associates (1978) originally attempted an elaborated linear regression modeling effort using data from Maryland, New York and Washington (*2*). When the linear modeling did not produce satisfactory results, a multiplicative model was used to produce accident modification factors. Hauer further notes that even though the authors noted a consistent increase in accident rate between lane widths of 21 to 22 ft and pavement widths of 23 ft and greater, they merged these two cells ("…for conservatism in estimating the geometric effects on safety") (*2*). Hauer and other authors believe this result to be questionable, and Hauer presents the unadjusted AMFs from their work as:

Pavement Width (in ft)	18 or less	19-20	21-22	>23
AMF	1.25	1.10	1.00	1.11

Standard deviations were not reported for these estimates, and could not be calculated based on available knowledge.

Zegeer et al. (1987) conducted a cross-sectional analysis of data from seven states to study the effects of various roadway parameters including lane width (*2*). Hauer notes that the form of the function for lane width in the resulting model forced the effect to be the same per foot of lane width increase, regardless of the initial lane width. Thus, the form did not allow an increase in the AMFs for the wider lane widths as was seen in the studies above. (Subsequent conversations with the authors indicated that forms other than those in the final paper were used, and that the 12 ft lanes did indeed exhibit a slightly lower crash rate.) Hauer also noted that Zegeer's finding of an 11% reduction in total crashes per foot of lane width increase could have been the result of lane width, curvature and driveway frequency, since these latter two variables are correlated with lane width and thus dropped from the final model (*2*). If the 11% reduction is correct, using 22 ft pavement width as the base again, the following values would result. Once more, standard deviations were not reported for these estimates, and could not be calculated based on available knowledge.

Pavement Width (in ft)	18	20	22	24	26	28	30
AMF	1.26	1.12	1.00	0.89	?	?	?

Miaou (1996a) analyzed data from two-lane rural roads in Alabama, Michigan, and Washington (*2*). Hauer does not document the type of analysis conducted, but it is assumed that this was a cross section (regression) study. The form of the model used was not described. Miaou finds a 14% reduction in single-vehicle run-off-road crashes for each foot of lane width increase (*2*). Converting this finding to reduction in total crashes requires an estimate of the percent of total crashes that are single-vehicle run-off-road. If one assumes a figure of 66% (*7*), and assumes no effect of lane width on multi-vehicle crashes, the resulting AMF would be approximately 9% per foot of lane widening (or 18% per 2 ft pavement width widening). The resulting values are

shown below. Again, standard deviations were not reported for these estimates, and could not be calculated based on available knowledge.

Pavement Width (in ft)	18	20	22	24	26	28	30
AMF	1.18	1.09	1.00	.92	?	?	?

Miaou (1996b) also reanalyzed a subset of 1,282 pure rural road sections from the original data analyzed by Zegeer et al. in 1987 (*2*). Again, the form of the regression model was not indicated, but it appears that the form did not allow a "bottom" in crashes per mile. Covariates included a dummy variable for State, AADT per lane, lane width, shoulder width, roadside recovery distance, horizontal curvature, terrain type, vertical grade, sideslope, intersections per mile, driveways per mile, bridges per mile, and roadside hazard rating. Hauer notes that the findings indicate an AMF of $e^{-0.078(\text{lane width change in ft.})}$ (*2*).

This would translate into approximately 7.5% reduction in total crashes per foot of increase in lane width. The resulting values are shown below, again using 22 ft as the base value. Standard deviations were not reported for these estimates, and could not be calculated based on available knowledge.

Pavement Width (in ft)	18	20	22	24	26	28	30
AMF	1.17	1.08	1.00	.84	?	?	?

Exhibit 3-2 combines the findings of the above studies, presenting the indices of effectiveness derived from each of the studies for various pavement widths for all crash types and severities.

If one accepts Hauer's and others' judgment of an increase in crash risk for lane widths of over 12 ft, and no difference between 11 and 12 ft lanes, then the first three columns in Exhibit 3-2 are most relevant. If one further hypothesizes that the amount of RTM bias in the results is negligible to some extent (or has been minimized by Hauer's reanalysis in some cases), then, except for the Cope study, the study findings are somewhat consistent. Since standard errors for each study result were not available or calculable, the combined average was calculated as the arithmetic average of the studies, excluding Cope (e.g., for 18 ft, (1.21+1.25+1.26+1.18+1.17) / 5 = 1.21). An estimate of the standard error for the combined average was computed based on Equation 3-1, and then a method correction factor of 3 was applied due to the variations in site characteristics between the studies.

Equation 3-1: Estimate of s ideal for arithmetic average of studies

$$s = \sqrt{\frac{1}{n-1}\left[\sum x_i^2 - \frac{1}{n}\left(\sum x_i\right)^2\right]}$$

where n = sample size (in this case 5 studies)

x_i = index of effectiveness of study i

Exhibit 3-2: Individual and combined AMFs for lane width for all crash types on two-lane rural roads as reviewed by (Hauer, 2000) (2)

Study	Pavement width in feet (Lane width in ft)			
	18 (9)	**20 (10)**	**22 (11)**	**24 (12)**
Belmont	1.21	1.05	1.00	1.01
Cope	*1.43*	*1.16*	*1.00*	*?*
Jorgenson	1.25	1.10	1.00	1.11
Zegeer	1.26	1.12	1.00	0.89
Miaou(a)	1.18	1.09	1.00	0.92
Miaou(b)	1.17	1.08	1.00	0.84
Average of all studies excl. Cope	**1.21**	**1.09**	**1.00**	**0.95**
S ideal	0.040	0.026	0	0.107
MCF	3	3	3	3
S	**0.121**	**0.078**	**0.000**	**0.321**

As part of the development of the accident prediction module for FHWA's Interactive Highway Safety Design Model (IHSDM), a panel of experts used a combination of the Hauer review and their personal knowledge to define the AMFs for lane width on two-lane rural roads (*7*).

As noted in Exhibit 3-3, the AMFs provided are for selected crash types (i.e., single-vehicle run-off-road, multiple-vehicle same-direction sideswipe, and multiple-vehicle opposite-direction). However, a conversion equation was provided by Harwood et al. to convert these to AMFs for total crashes (*7*). Using that equation, and converting the findings for AADT of 2,000 veh/day and above to an 11 ft lane width base of 1.0 to correspond with the earlier findings, the following AMFs are derived (Exhibit 3-4).

Exhibit 3-3: AMFs for lane width for selected crash types on two-lane rural roads (7)

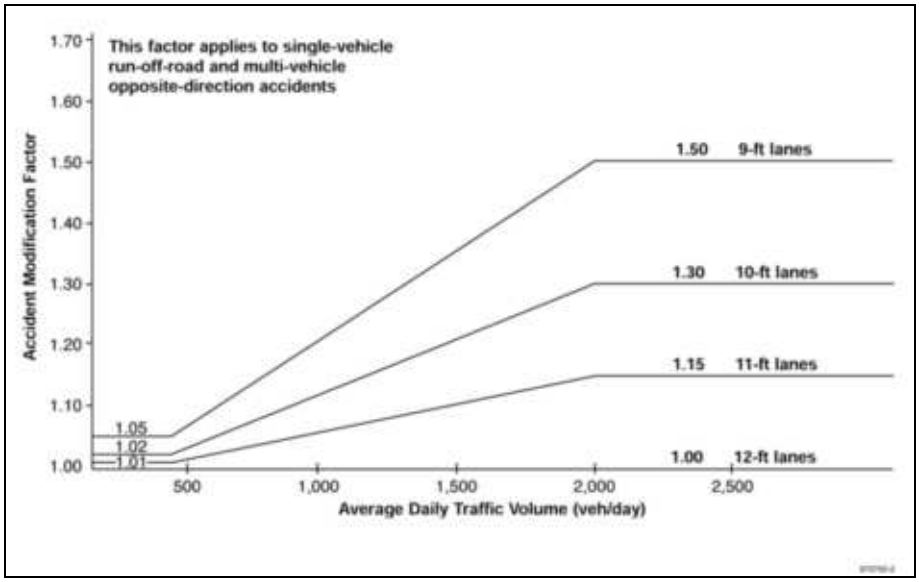


Exhibit 3-4: AMFs for lane width on two-lane rural roads with AADT of 2,000 veh/day or more (7)

	Pavement width (ft) [Lane width (Ft)]			
	18 [9]	**20 [10]**	**22 [11]**	**24 [12]**
Selected crash types	1.42	1.23	1.00	0.95
Total crashes	1.15	1.08	1.00	0.98

It is noted that the results for total crashes here are similar to, but slightly lower than, the AMFs derived for 9 ft and 10 ft lanes in Exhibit 3-2. In all probability, the values in Exhibit 3-3 and Exhibit 3-4 are used more often than any others, since these values are incorporated into IHSDM, the draft prototype chapter of the HSM, and other current references such as the NCHRP Report 500 series. Exhibit 3-3 provides an AMF for different AADT levels; therefore, it is suggested that the AMFs used in the IHSDM also be used in the HSM (i.e., Exhibit 3-3 and Exhibit 3-4). However, it is noted that the crash reductions shown for a conversion from 11 to 12 ft lanes is questionable. In lieu of further research, the solution is to rely on the AMFs developed for Chapter 8 of the HSM (Exhibit 3-3).

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Hauer (2000) noted in his review of literature up to 1999 that, "Little is known about the effect of lane width on multi-lane roads or urban roads" (*2*). Hauer reviewed five studies of lane and surface width on multi-lane roads: Harwood, 1986; Hadi et al., 1995; Stewart and Council, 1998; Wang et al., 1998; and Stewart and Council, 1999. None of the studies provided sufficient

quantification of the safety effect of lane width on multi-lane highways, freeways, or arterials (*2*). Only the Hadi et al. study included lane width as a variable in models developed; the following summary is based on Hauer's review.

Hadi et al. (1995) developed negative binomial cross-sectional models predicting safety for nine classes of roadway. (*2*) While both lane width and pavement width were examined for inclusion in the final multi-lane models, lane width was only found to be a statistically significant predictor in three of the seven multi-lane models, and pavement width was not found to be a statistically significant predictor in any of the four models where it was analyzed. Hauer noted that this only meant that these variables were not statistically important enough for inclusion in the models (*2*). Where statistical significance was reached, findings would indicate an 11% reduction in crashes per foot of lane width on four-lane undivided roads, and over 35% reduction in crashes per foot of lane width for urban freeways. Hauer notes that these latter findings are clearly excessive, and that the form of the model forced lane width to have a continuing effect no matter how wide the lane (i.e., 12 ft lanes would be forced to be safer than 11 ft lanes, 13 ft safer than 12 ft, etc.), a conclusion Hauer questions (*2*).

Elvik and Vaa's (2004) meta-analysis of lane width used the findings from three studies (*8*). All were pre-1985 studies, and the one U.S. study used was reviewed by Hauer, but not considered a "key" study. Elvik and Vaa did not search for safety effects by lane width; rather, they reviewed the studies' findings based on changes from less than "design standards" to a width meeting standards. In their summary, Elvik and Vaa indicate that the findings were "inconsistent". No information was added to this synthesis of knowledge.

*In a recent study of the effects of roadway factors on safety in 3R projects, Harwood et al. (2003) reviewed in detail past AMFs (*5*). For lane width, the authors used the AMFs from Harwood et al. (2000) (7) which were developed for two-lane rural roads. For multi-lane roads, the original AMFs were subjected to a correction factor for total crashes for each roadway type. For 4-lane undivided roads, the correction factor applied was 0.75. For 4-lane divided roads, the correction factor was 0.5. While there is no information in the report concerning how these correction factors were developed, consultation with the author indicated that an expert panel developed the correction factors. Using these factors to adjust the total accident AMFs in Exhibit 3-4, the following AMFs for total crashes on four-lane roads are developed (*
Exhibit 3-5). As illustrated in Harkey et al. (2008), the AMF values for the effect of lane width on rural multilane highways are calculated using Equation 3-2 (168):

Equation 3-2: Lane width AMF estimate for rural multilane highways

$$AMF = f\,(AMF_{RA} - 1.0)P_{RA} + 1.0$$

where
- f = factor for roadway type (0.75 for multilane undivided and 0.50 for divided)
- AMF_{RA} = accident modification factor for related accidents (as determined for rural two-lane roads)
- P_{RA} = proportion of total accidents constituted by related accidents

Harkey et al. (2008) note there is less confidence in the rural multilane AMF than the AMF for rural two-lane roads.

Exhibit 3-5: AMFs for lane width for four-lane roads (5)

	Lane width (ft)			
	9	**10**	**11**	**12**
Four-lane undivided	1.11	1.06	1.00	0.99
Four-lane divided	1.08	1.04	1.00	0.99

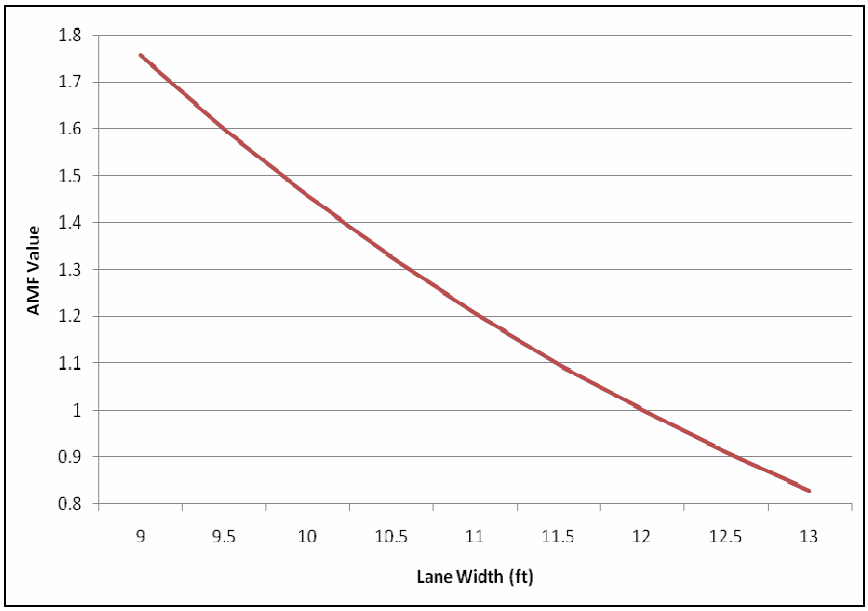
Hauer et al. (2004) used four years of HSIS crash, traffic and inventory data for urban undivided four-lane roadways in Washington State to develop cross-sectional models of safety (*3*). In addition to the standard roadway cross-section (e.g., lane and shoulder width) and alignment (e.g., horizontal curvature and grade), supplemental databases and videolog reviews were used to add data on such items as roadside clear zone and roadside hazard rating, driveway and access point counts, the presence of parking, and two-lane-left-turn lanes. Since lane width was not in the original data, it was developed from surface width and number of lanes, with a parking width correction (where parking was allowed). The range was 10 ft to 12 ft. Negative multinomial models were developed separately for off-road and on-road crashes. The choice of which predictor variables to include in the final model and the choice of the *functional form of each predictor* were based on an analysis of the predictor's relationship to crashes given previously included parameters – an iterative process not seen in other modeling efforts. Lane width was not found to be related to off-road crashes on these urban undivided four-lane roads. In the on-road accident model, the authors noted a very weak relationship between lane width and safety, with crashes increasing approximately 1.5% per foot as lane width increased from 10 to 12 ft (*3*).

In summary, there is little evidence in the literature that lane width affects crash rate per mile on multi-lane roads. All of the findings are derived from cross-sectional studies, where lane width effects could possibly be masked by correlation with other predictors. The only definitive AMFs stated in the literature are those from Harwood et al. (
Exhibit 3-5), which are based on expert-panel modification of rural two-lane road AMFs (which were based on an earlier expert panels' review of literature). At this time, this is the best available knowledge for the HSM.

Rural frontage roads

Lord and Bonneson (2007) developed AMFs for rural frontage roads using Texas data (*169*). Lord and Bonneson investigated rural frontage roads independent of typical two-lane roads because they have restricted access along at least one side of the road, a higher percentage of turning traffic, and periodic ramp-frontage-road terminals with yield control. Due to these differences, a given treatment likely has a different effect on rural frontage road safety than on rural two-lane road safety. Exhibit 3-6 illustrates the AMFs for lane width on rural frontage roads between successive interchanges.

Exhibit 3-6: Safety Effects of Lane Width for Rural Frontage Roads (169)



The average lane width represents the total width of the traveled way divided by the number of through lanes on the frontage road. Relative to 12-ft lanes, 9-ft wide lanes increase the number or accidents more than either 10-ft or 11-ft lanes.

Both one-way and two-way frontage roads were considered in the development of this AMF. Development of this AMF was limited to lane widths ranging from 9 to 13 ft and ADT values from 110 to 6,168 veh/day.

In summary, the research by Lord and Bonneson (2007) presents the only definitive AMFs for lane width on rural frontage roads. At this time, this is the best available knowledge for the HSM.

Treatment: Add lanes in existing ROW by narrowing existing lanes and shoulders

Rural two-lane roads

Not applicable.

Rural multi-lane highways; Freeways; Expressways

Hauer's review of Curren (1995) reveals some information of the safety effect of adding lanes in an existing right-of-way by narrowing the existing lanes and shoulders (*2*). Curren (1995) examined the safety effects of adding freeway lanes by narrowing lanes and shoulders, comparing approximately 50 miles of "altered" interstate corridors in four states with 35 miles of "unaltered"

sections on the same route. Citing problems with the original analysis methodology, Hauer reanalyzed the one route where a before/after with comparison group analysis could be conducted. Hauer found that accident rate per mile increased by 68% on suburban freeways, and increased by 26% on urban freeways (*2*). Insufficient information was reported to determine a standard error for these increases.

In the most recent study of defining new lanes from existing pavement width, Bauer et al. (2004) used HSIS data to examine 50 miles of projects on California urban freeways (*4*). Projects involved conversion from either four lanes to five in one direction or from five lanes to six lanes in one direction. In almost all cases, the added lane was an HOV lane for at least part of each day. While the lane and shoulder widths differed among the projects, the majority involved narrowing lanes from 12 ft to 11 ft, with inside shoulders narrowed to capture the needed additional width for the extra lane. All treatment, reference, and upstream and downstream control roadways had median barriers in both the before and after periods.

Using the empirical-Bayes before-after methodology, Bauer et al. found that the four- to five-lane conversions, on the average, resulted in a statistically significant average increase in total accident frequency of 11% (*4*). The five-lane to six-lane conversion projects resulted in an average increase in total accident frequency of 3%, which was not statistically significant. The standard errors reported by Bauer et al. for the average changes to accident frequency were multiplied by a factor of 1.8 (medium-high rating); the resulting values are presented in Exhibit 3-7.

Bauer et al. also found possible "accident migration" to adjacent downstream sites (where the extra lane no longer existed) to be a non-statistically significant crash increase for the four-lane to five-lane conversions of 1% to 9%, and a statistically significant increase of 17% to 21% downstream from the five-lane to six-lane conversions (Exhibit 3-7) (*4*). An effect that potentially offsets the accident migration on the five-lane to six-lane conversions was a non-significant decrease in crash frequencies for freeway segments upstream of the conversion site (where the added lane may have relieved congestion and queuing). Bauer et al. note that because of the differences in the findings for the two types of projects, the results obtained are difficult to generalize to urban freeways as a whole (*4*).

Exhibit 3-7: AMFs for providing an additional lane on urban freeways by narrowing 12 ft lanes to 11 ft or wider and narrowing the inside shoulder (4)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s	Possible accident migration
Bauer et al, 2004	Four to five lane conversion	Urban	Freeway, 79,000 to 128,000 vpd, one direction	All types, all severities	1.11	0.05	0.80% (not statistically significant)
Bauer et al, 2004	Four to five lane conversion	Urban	Freeway, 79,000 to 128,000 vpd, one direction	All types; fatal, injury and PDO tow-away	1.10	0.07	7.56% (not statistically significant)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s	Possible accident migration
Bauer et al, 2004	Four to five lane conversion	Urban	Freeway, 79,000 to 128,000 vpd, one direction	All types, fatal and injury	1.11	0.08	8.81% (not statistically significant)
Bauer et al, 2004	Five to six lane conversion	Urban	Freeway, 77,000 to 126,000 vpd, one direction	All types, all severities	1.03	0.08	18.11% (statistically significant)
Bauer et al, 2004	Five to six lane conversion	Urban	Freeway, 77,000 to 126,000 vpd, one direction	All types; fatal, injury and PDO tow-away	1.04	0.11	17.33% (statistically significant)
Bauer et al, 2004	Five to six lane conversion	Urban	Freeway, 77,000 to 126,000 vpd, one direction	All types, fatal and injury	1.07	0.13	21.33% (statistically significant)

In summary, the congestion and delay reductions that result from defining additional lanes within a given surface width may result in an increase in crashes. Given the methodology used in the two available studies, the best estimate of the safety effect for freeways where HOV lanes are added to freeways by reassigning the existing pavement width is based on the Bauer et al. study (Exhibit 3-7).

Urban and suburban arterials

Hauer (2000) concluded that, "There is some empirical evidence about the safety effect of reducing lane width on urban arterials and freeways when the aim is to add a lane to increase capacity. This evidence is difficult to interpret in terms of the safety effect of lane width because when a lane is added (even when no other changes are made) the flow/lane is significantly changed" (*2*). Hauer reviewed Harwood (1990), and the following summary is based on that review.

Harwood (1990) analyzed before-after data for 35 projects on urban arterials where existing lanes were narrowed to add additional lanes. Harwood found large accident increases in the conversion of a two-lane road to an undivided four-lane road, but the crash increases were mainly at driveways and intersections, which reflect other factors (*2*). When a 5-lane (with TWLTL) was converted to 7-lanes (with TWLTL), there was an increase in both mid-block and intersection crash rates. When a 6-lane divided road was converted to 8-lane divided, the crash increase was only at intersections. Hauer noted that it is not possible to separate out the effects of lane width changes from other effects (such as addition of TWLTL or median) (*2*). AMFs could not be developed from this study.

Treatment: "Road diets" (remove through lanes from existing ROW)

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials

"Road diets" are generally conversions of four-lane undivided roads into three lanes (two through plus a center two-way left-turn lane). The remaining roadway may be converted to bicycle lanes, sidewalks, or on-street parking (*6*).

Huang et al. (2002) examined 11 "road diet" sites and 25 similar comparison sites in six California and two Washington cities. Using a paired-comparison before-after method in the examination of crash frequencies, Huang et al. found that, "The estimated risk ratio indicates that the percent of crashes at road diet sites in the "after" period to be about 6% less likely than a crash at a comparison site, with 95% confidence limits of 0.003 and 0.106. Thus, on average, crash frequencies at "road diets" in the "after" period were approximately 6% lower than at the corresponding comparison sites" (*6*). This translates to an index of effectiveness of 0.94. The standard error is based on the 95% confidence limits (divided by 4) provided by Huang et al., multiplied by a method correction factor of 3 (low rating), due to the likely selection of sites for implementing the "road diet" based on high accident counts, resulting in a standard error estimate of 0.078.

A second analysis attempted to correct for possible differences in exposure between the "road diet" treatment and comparisons sites, and between the before and after periods. Huang et al. developed negative-binomial regression models for sites where ADT was available (eight "road diet" sites and 14 comparison sites). This analysis showed no difference in crashes between the before and after periods for the treatment vs. the comparison sites (*6*). Further analysis of crash severity and crash types shows no statistically significant differences due to the "road diet" treatment. Huang et al. concluded that "road diets" appear to decrease total crashes "by six percent or less" (*6*).

Huang et al. were not able to conduct an empirical Bayes (EB) analysis due to data limitations, and the rate-based modeling was on a limited sample.

Harkey et al. (2008) used the data from the Huang et al. (6) study along with additional data collected by Pawlovich et al. (*170*) and conducted an EB analysis of the aggregated data sets. This provided for a large group of sites that spanned a number of roadway environments in which the "road diets" were implemented. Exhibit 3-8 presents the results of the analysis for each data set along with the aggregated results. The sites in Iowa ranged in AADT from 3,718 to 13,908 and were predominantly on US or State routes in small urban towns with an average population of 17,000. The sites in Washington and California ranged in AADT from 6,194 to 26,376 and were predominantly on corridors in suburban environments that surrounded larger cities with an average population of 269,000.

Exhibit 3-8: AMFs for "Road Diets" (168)

Dataset	AMF	Standard error
IA	0.534	0.020

CA and WA	0.811	0.025
All	0.707	0.016

The research by Harkey et al. (2008) is a more definitive study in that it is based on a much larger data set and used an EB analysis approach.

3.1.1.2. Shoulders

The principal purposes of providing shoulders are to:

- Accommodate stopped vehicles so that they do not encroach on the traveled lane
- Facilitate roadway maintenance
- Facilitate access by emergency vehicles
- Protect the structural integrity of the pavement
- Provide space for slower vehicles to move over and allow faster vehicles to pass (in some driving cultures)

The main purposes of paving shoulders are: to protect the physical road structure from water damage, to protect the shoulder from erosion by stray vehicles, and to enhance controllability of stray vehicles. As a by-product of these purposes, the paved shoulder provides a fairly even and obstacle free surface.

While the original intent of shoulders was to provide for vehicles that have to stop (i.e., involuntary or emergency stops), the fully paved shoulder also induces some amount of voluntary stopping. Vehicles stopped on shoulders pose a substantial hazard. It has been estimated that more than 10% of all fatal freeway accidents are associated with stopped-on-shoulder vehicles or with the maneuvers associated with leaving and returning to the outer lane.

Other concerns with providing wider shoulders include:

- The possibility that wider shoulders result in higher operating speeds, which in turn may impact accident severity
- Steeper side or backslopes that may result from wider roadway width and limited right-of-way
- Drivers who may choose to use the wider shoulder as a travel lane

It follows that the net safety effect of shoulders is a sum of several possibly opposite tendencies: the beneficial effect of allowing for the safe recovery of stray vehicles, and the detrimental tendencies of inviting some voluntary shoulder stops, faster travel, the possibility of steeper roadside slopes, and shoulder use for travel.

Several factors make it difficult to extract the safety effect of shoulder width and shoulder paving from empirical evidence. For example, narrow lanes, narrow unpaved shoulders, and an unforgiving roadside often go hand-in-hand. This tendency comes about for three reasons. First, many geometric design standards relate to the amount of traffic. Roads with little traffic tend to have narrower lanes and shoulders, steeper side-slopes, sharper curves, shorter sight-distances, etc. Second, if a cross-section has to fit within a given right-of-way width, making the shoulder wider must mean that the side-slope will be steeper or the lane narrower. The third reason for the close association between road features is temporal. There has been a historical

evolution towards more generous highway design standards. Thus, older roads tend to have narrower lanes and shoulders than newly designed roads. *[Adapted from Hauer (2000) (9).]*

This section includes discussion of shoulder width for two-lane and multi-lane roads, and a discussion of the safety effectiveness of various shoulder types. Pedestrians and bicyclists are discussed in detail in Section 3.3.

Exhibit 3-9: Resources examined to investigate the safety effect of shoulder attributes on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D.L., R. Srinivasan, J. Baek, B. Persaud, C. Lyon, F.M. Council, K. Eccles, N. Lefler, F. Gross, E. Hauer, J. Bonneson, "Crash Reduction Factors for Traffic Engineering and ITS Improvements", NCHRP Project 17-25 Final Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2008))	Researched and/or developed AMF values for a number of roadway segment treatments including adding or widening a paved shoulder on rural multilane highways	No new knowledge. Not added to synthesis.
(Lord, D., J.A. Bonneson, "Development of Accident Modification Factors for Rural Frontage Road Segments in Texas", Transportation Research Board 86th Annual Meeting, Washington D.C., (2007))	Developed AMF values for shoulder width along rural frontage roads in Texas.	AMF added to synthesis
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Refers to strategies in ROR Guide, which referred to Harwood, et al., 2000, reviewed above for shoulder width/type AMFs	No new knowledge. Not added to synthesis.
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results not available.
(*3*) (Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))	Developed negative multinomial models relating off- and on-road crashes to design elements on four-lane undivided highways	Added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Referred to Harwood et al., 2000, reviewed above for shoulder width/type AMFs	No new knowledge. Not added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., McGee, H., Prothe, L., Eccles, K., and Council, F. M., "NCHRP Report 500 Volume 4: A Guide for Addressing Head-On Collisions ." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Referred to Harwood et al., 2000, reviewed above for shoulder width/type AMFs	No new knowledge. Not added to synthesis.
(Wooldridge, M. D., Fitzpatrick, K., Harwood, D. W., Potts, I. B., Elefteriadou, L., and Torbic, D. J., "NCHRP Report 502: Geometric Design Consistency on High-Speed Rural Two-Lane Roadways." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Study complements work done for IHSDM; focus is on geometric design consistency of two-lane rural roads.	Same AMFs for lane width as Harwood et al. (2000) used in IHSDM. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*5*) (Harwood, D. W., Rabbani, E. R., Richard, K. R., McGee, H. W., and Gittings, G. L., "NCHRP Report 486: Systemwide Impact of Safety and Traffic Operations Design Decisions for 3R Projects." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Reviewed past studies and extracted or defined AMFs for various design elements on multi-lane roads	Added to synthesis, shoulder width and shoulder type.
(Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))	Developed AMFs based on NB and ZINB model coefficients for design elements on freeways and non-freeways	Suggested by NCHRP 17-18(4). Not added to synthesis, questions regarding model form and parameters.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Referred to Zegeer (1987) and Harwood (2000) – both reviewed above	No new knowledge. Not added to synthesis.
(*7*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Developed SPFs and AMFs for a variety of design elements on two-lane rural segments.	Suggested by NCHRP 17-18(4). Added to synthesis.
(*9*) (Hauer, E., "Shoulder Width, Shoulder Paving and Safety." (2000))	Reviewed AMF and SPF literature on SW and reanalyzed some data sets	Suggested by NCHRP 17-18(4). Evaluation of several studies added to synthesis and expanded.
(Hanley, K. E., Gibby, A. R., and Ferrara, T. C., "Analysis of Accident Reduction Factors on California State Highways." Transportation Research Record, No. 1717, Washington, D.C., Transportation Research Board, National Research Council, (2000) pp. 37-45.)	Conducted EB before/after analysis of two shoulder widening projects	Not added to synthesis. Small sample size, result is much higher than all other studies.
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))	Developed AMFs for ROR crashes based on NB and ZINB model coefficients related to design elements of two-lane rural highway	Not added to synthesis due to uncertainty in modeling methodology.
(Gibreel, G. M, Easa, S. M, Hassan, Y., and El-Dimeery, I. A., "State of the Art Review of Highway Geometric Design Consistency." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1999) pp. 305-313.)	Literature review of highway geometric design consistency, primarily on two-lane rural highways. Discussion of speed, safety, and performance.	No quantitative safety effect information on shoulders. Not added to synthesis.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	Limited information on improvements.	No quantitative information; not added to synthesis.
(Curren, J. E., "NCHRP Report 369: Use of Shoulders and Narrow Lanes to Increase Freeway Capacity." Washington, D.C., Transportation Research Board, National Research Council, (1995))	As reviewed by Hauer, 2000.	No new knowledge. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*10*) (Hadi, M. A., Aruldhas, J., Chow, L., and Wattleworth, J., "Estimating Safety Effects of Cross-Section Design for Various Highway Types Using Negative Binomial Regression." Transportation Research Record 1500, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 169-177.)	Developed NB cross-sectional models for various design elements on different road classes	Suggested by NCHRP 17-18(4). As reviewed by Hauer 2000 (two-lane, and multi-lane), added to synthesis.
(Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))	As reviewed by Hauer, 2000.	No new knowledge. Not added to synthesis.
(*11*) (Zegeer, C. V., Reinfurt, D. W., Hummer, J., Herf, L., and Hunter, W., "Safety Effects of Cross-Section Design for Two-Lane Roads." Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 20-32.)	Developed cross-sectional models and AMFs for various design elements on two-lane roads	As reviewed by Hauer 2000 (two-lane shoulder width and shoulder type), added to synthesis.
(Urbanik, T. and Bonilla, C. R., "Safety and Operational Evaluation of Shoulders on Urban Freeways." FHWA/TX-87/32+395-1, Austin, Tex., Texas State Department of Highways and Public Transportation, (1986))	As reviewed by Hauer, 2000.	No new knowledge. Not added to synthesis.
(*12*) (Harwood, D. W., "NCHRP Report 282: Multilane Design Alternatives for Improving Suburban Highways." Washington, D.C., Transportation Research Board, National Research Council, (1986))	Cross-sectional model of various design elements on multi-lane suburban roads	Suggested by NCHRP 17-18(4). As reviewed by Hauer 2000 (multi-lane). Added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis of past studies.	No new knowledge. Not added to synthesis.
(*13*) (Rogness, R. O., Fambro, D. B., and Turner, D. S., "Before-After Accident Analysis for Two Shoulder Upgrading Alternatives." Transportation Research Record 855, Washington, D.C., Transportation Research Board, National Research Council, (1982) pp. 41-47.)	Developed AMFs for adding paved shoulders to two-lane rural roads based on a simple before/after analysis	Reviewed for shoulder type, added to synthesis.
(*14*) (Heimbach, C. L., Hunter, W. W., and Chao, G. C., "Paved Highway Shoulders and Accident Experience." Transportation Engineering Journal, Vol. 4, New York, N.Y., American Society of Civil Engineers, (1974) pp. 889-905.)	Developed AMF for paving 3-4 ft. of existing sod shoulders on two-lane rural roads, based on comparison of match sites.	Reviewed for shoulder type, added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Synthesis of past studies.	No new knowledge. Not added to synthesis.

Treatment: Increase shoulder width

Rural two-lane roads

Hauer (2000) conducted a detailed review of 1953 to 1999 literature on shoulder width and type, sometimes reanalyzing the data in the study (Exhibit 3-10) (*9*). The majority of the studies concerned two-lane rural roads. Unfortunately, Hauer did not highlight any studies as

"excellent" and had methodological and other issues with all of the studies reviewed. Hauer notes that the study results were "diverse and confusing", with the following conclusions (*9*):

- Several studies point to the fact that shoulder width is more beneficial to safety at higher traffic volumes than at lower ones;
- There is an indication that roads with wider shoulders tend to have more severe accidents;
- There is an indication that wider shoulders are associated with fewer run-off-road and opposite-direction accidents that are some 40%-60% of all accidents (on two-lane roads). However, wider shoulders may be associated with more of the 'other' accidents;
- It is possible that for injury accidents, there is a certain shoulder width (perhaps between 6 and 8 ft) beyond which the number of injury accidents increases;
- The safety effect of shoulders for level and straight roads is probably substantially less than on sharp horizontal curves and on roads with substantive grades;
- Roads with paved shoulders are associated with fewer accidents than similar roads with sod shoulders;
- Provision of full shoulders instead of only curb-and-gutter on multi-lane suburban highways is associated with a 10% lower accident rate.

Hauer did not draw any conclusion concerning the size of the effect of increasing the shoulder width. "Critical" studies identified by Hauer are included in Exhibit 3-10 (i.e., no "major" methodological problems were noted, or the data were reanalyzed). In addition, the focus for this synthesis of knowledge is on studies where intersection crashes were omitted and studies with results related to changes in total crashes. Finally, only U.S. studies were included in Exhibit 3-10, since the use of paved shoulders in non-U.S. countries may differ from the U.S. (e.g., use of shoulder to allow passing in non-U.S. countries). Standard errors could not be calculated for the indices of effectiveness summarized in Exhibit 3-10.

Exhibit 3-10: Summary of study characteristics for shoulder width on two-lane rural roads

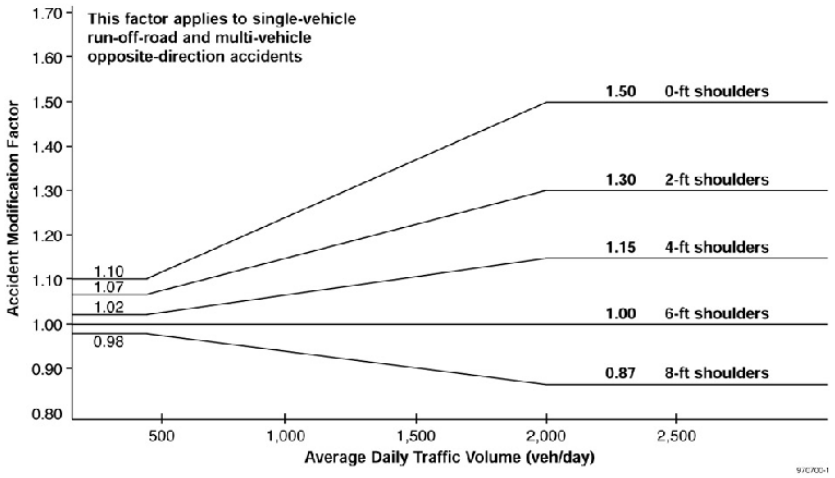
Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Belmont, 1954 (Hauer re-analysis) (*9*)	Widen gravel shoulders by 1 ft	Rural	Two-lane, volumes not reported	All types, all severities	1.0	Unable to calculate.
Belmont 1956 (Hauer Re-analysis) (*9*)	Widen gravel shoulders by 1 ft	Rural	Two-lane, volumes not reported	All types, all severities	1.0	Unable to calculate.
Head and Kaestner, 1956 (*9*)	Widen gravel shoulders by 1 ft	Rural	Two-lane, AADT < 3600	All types, all severities	0.98	Unable to calculate.
Head and Kaestner, 1956 (*9*)	Widen gravel shoulders by 1 ft	Rural	Two-lane, AADT > 3600	All types, all severities	0.95 to 0.89	Unable to calculate.
Zegeer et al., 1987 (*11*)	Widen shoulders by 1 ft	Not reported	Two-lane, volumes not reported	All types, all severities (includes	0.95 to 0.94	Unable to calculate.

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
				intersection crashes)		
Hadi et al., 1995 (*10*)	Widen shoulders by 1 ft	Rural	Two-lane, volumes not reported	All types, all severities	0.985	Unable to calculate.
Miaou, 1996 (*9*)	Widen shoulders by 1 ft	Rural	Two-lane, volumes not reported	All types, all severities	0.970	Unable to calculate.
Vogt and Bared, 1998 (*9*)	Widen shoulders by 1 ft	Rural	Two-lane, volumes not reported	All types, all severities	0.944	Unable to calculate.

Only one study reviewed by Hauer (Head and Kaestner, 1956) examined the effect of widening gravel shoulders. Although a positive safety effect is indicated by the results of that study (based on Hauer's reanalysis), AMFs could not be developed for gravel shoulder widening.

As part of the development of the accident prediction module for FHWA's Interactive Highway Safety Design Model (IHSDM), a panel of experts used the Hauer review and their knowledge to define the AMFs for shoulder width on two-lane rural roads (*7*). The results were based primarily on Zegeer et al. (1987) and Miaou (1996) (Exhibit 3-11).

Exhibit 3-11: AMFs for shoulder width for related accidents on two-lane rural roads (7)



Note that the results in Exhibit 3-11 are for "related accidents" (i.e., single-vehicle run-off-road and multi-vehicle opposite-direction accidents) rather than total accidents. As can be seen, there is an AADT effect. Hauer argues that there may be adverse effects on "non-related accidents". However, assuming no adverse effect, these "related-accident" effects were extrapolated to effects on total crashes as prescribed by Harwood et al. (*7*). The total-crash effects

were then converted such that the crash reductions were based on a 3 ft shoulder "base" rather than the 6 ft base shown in the figure. The results are presented in Exhibit 3-12.

Exhibit 3-12: AMFs for total crashes on two-lane rural roads with ADT of 2,500 veh/day or greater (7)

Study	Paved shoulder width in ft (on one side)					
	3	4	5	6	7	8
Harwood et al., 2000 (total crashes)	1.0	0.97	0.95	0.93	0.91	0.90

The indices of effectiveness for paved shoulder width in Exhibit 3-13 are related to total accidents. It is noted that the minimum and maximum shoulder widths were not always mentioned in the reviewed studies. Despite this fact, in Exhibit 3-13, it is assumed that the effects noted in the studies apply at least to the 3 ft to 8 ft widths. Taking the arithmetic average of the study results, and using Equation 3-1 in conjunction with a method correction factor of 3 (low rating), the results of the various studies reviewed by Hauer and the results from Harwood et al. were combined.

Exhibit 3-13: Summary of AMFs for paved shoulder widening on total crashes on two-lane rural roads with any volume

Study	Paved Shoulder width in ft (on one side)					
	3	4	5	6	7	8
Belmont, 1954 (Hauer re-analysis)	1.0	1.0	1.0	1.0	1.0	1.0
Belmont 1956 (Hauer Re-analysis)	1.0	1.0	1.0	1.0	1.0	1.0
Zegeer et al., 1987	1.0	0.95	0.90	0.85	0.80	0.75
Hadi et al. 1995	1.0	0.98	0.97	0.96	0.94	0.92
Miaou, 1996	1.0	0.97	0.94	0.91	0.89	0.86
Vogt and Bared, 1998	1.0	0.94	0.89	0.84	0.79	0.74
Harwood et al. 2000 (ADT ≥ 2500 veh/day)	1.0	0.97	0.95	0.93	0.91	0.90
Combined AMF	**1.00**	**0.97**	**0.95**	**0.93**	**0.90**	**0.88**
S	**0.000**	**0.069**	**0.132**	**0.196**	**0.256**	**0.319**

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Hauer (2000) conducted a detailed review of 1953 to 1999 literature on shoulder width and type, sometimes reanalyzing the data in the study (*9*). The results of three studies that examined shoulder width on multi-lane roads are summarized in Exhibit 3-14.

Exhibit 3-14: Summary of study characteristics for shoulder width on multi-lane roads (9)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood, et al. 1986 (*12*)	Full paved shoulders instead of curb-and-gutter	Suburban	Multi-lane roads, ADT>7500	All crashes, all severities	0.90	Unable to calculate.
Hadi et al., 1995	Widen shoulders by 1 ft	Rural	Four-lane divided, volumes not reported	All crashes, all severities	Shoulder width not statistically significant	Unable to calculate.
Hadi et al., 1995	Widen shoulders by 1 ft	Urban	Four-lane undivided, volumes not reported	All crashes, all severities	0.97	Unable to calculate.

In a recent study of the effects of roadway factors on safety in 3R projects, Harwood et al. (2003) reviewed in detail past AMFs (*5*). For shoulder width, the authors used the AMFs from Harwood et al. (2000). The report did not include a correction factor to convert the AMF for total crashes on two-lane roads to multi-lane roads (Exhibit 3-15). Communications with the author and review of an internal progress report indicated that the expert panel concluded that the effects of shoulder width on rural multi-lane roads should be the same as on two-lane roads. Thus, under the same assumptions stated above related to the conversion of effects on related crashes versus total crashes, the shoulder width effect for multi-lane roads would be assumed to be the same as for two-lane roads. Insufficient information was available to calculate standard errors for these values.

Exhibit 3-15: AMFs for total crashes on urban or rural multi-lane roads with ADT of 2,500 veh/day or greater (5)

Study	Paved shoulder width in ft (on One side)					
	3	4	5	6	7	8
Harwood et al., 2003 (total crashes)	1.0	0.97	0.95	0.93	0.91	0.90

Hauer et al. (2004) used four years of HSIS crash, traffic and inventory data for urban undivided four-lane roadways in Washington State to develop negative multinomial cross-sectional models of safety (*3*). In addition to the standard roadway cross-section (e.g., lane and shoulder width) and alignment (e.g., horizontal curvature and grade), supplemental databases and videolog reviews were used to add data on such items as roadside clear zone and roadside hazard rating, driveway and access point counts, the presence of parking, and two-way-left-turn lanes.

The choice of which predictor variables to include in the final model and the choice of the functional form of each predictor were based on an analysis of the predictor's relationship to crashes given previous parameters had already been included – an iterative process not seen in other modeling efforts. Hauer et al. categorized shoulders as either curb/wall, or flush of widths 2 to 3 ft, 4 to 6 ft, 7 to 9 ft, 10 to 11 ft, and over 11 ft. The shoulder-width findings for flush

shoulders were counter-intuitive, in that the wider the shoulder, the more crashes for both off-road and on-road crashes. Total off-road crashes increased approximately 15% per 2 ft increase in flush shoulder width, while on-road crashes increased by approximately 4% per 2 ft increase (*3*). Hauer notes that it is difficult to determine whether these findings are true cause and effect, or the result of common modeling issues such as imprecise functional form and correlation with other variables.

Exhibit 3-16: AMFs for crashes on urban or rural multi-lane roads (3)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hauer et al., 2004	Widen shoulders by 1 ft	Urban	Four-lane undivided, volume not reported	Off-road crashes, all severities	1.07	Unable to calculate.
Hauer et al., 2004	Widen shoulders by 1 ft	Urban	Four-lane undivided, volume not reported	On-road crashes, all severities	1.03	Unable to calculate.
Hauer et al., 2004	Widen shoulders by 1 ft	Urban	Four-lane undivided, volume not reported	All crashes, all severities (Assume off-road crashes = 15% of total)	1.03	Unable to calculate.

As part of NCHRP Project 17-25, an expert panel was convened and considered the effect of shoulder width on rural multilane highways and urban/suburban multilane arterials (*168*). The expert panel reached consensus that the shoulder width AMF for rural multilane highways developed by Harwood et al. (2003) was an acceptable AMF for this roadway type. For the other roadway types, the effect of shoulder width on multi-lane roads is not yet fully established. It appears that there is a general safety benefit when providing wider shoulders. The opposite appears to be the case for urban road segments.

Rural frontage roads

Lord and Bonneson (2007) developed AMFs for rural frontage roads in Texas. It was determined to investigate rural frontage roads independent of typical two-lane roads because rural frontage roads have restricted access along at least one side of the road, a higher percentage of turning traffic, and periodic ramp-frontage-road terminals with yield control (*169*). Due to these differences, a given treatment likely has a different effect on rural frontage road safety than on rural two-lane road safety.

Equation 3-3 presents the AMF for shoulder width on rural frontage roads between successive interchanges (*169*). Exhibit 3-17 is based on Equation 3-3.

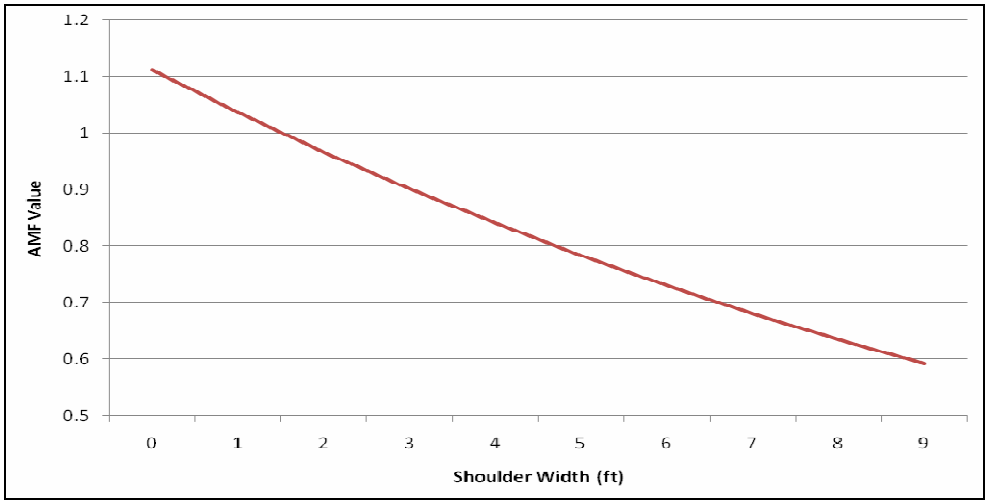
Equation 3-3: Shoulder width AMF estimate for rural multilane highways

$$AMF_{SW}=e^{-0.070(SW-1.5)} \quad (3\text{-}1B)$$

where:

SW = average paved shoulder width ([left shoulder width + right shoulder width]/2) (ft)

***Exhibit 3-17**: Safety Effects of Paved Shoulder Width on Rural Frontage Roads (169)*



The average paved shoulder width represents the sum of the left shoulder width and the right shoulder width on the frontage road divided by two. Both one-way and two-way frontage roads were considered in the development of this AMF. Development of this AMF was limited to shoulder widths ranging from 0 to 9 ft and ADT values from 110 to 6,168 veh/day.

Treatment: Improve shoulder type (paved vs. unpaved)

Rural two-lane roads

Hauer (2000) conducted a detailed review of 1953 to 1999 literature on shoulder width and type, sometimes reanalyzing the data in the study (Exhibit 3-18) (*9*). Standard deviations were provided by Hauer for the Heimbach et al. results; the standard deviation was multiplied by a method correction factor of 3 (a medium-low rating for cross-section studies) to estimate the standard error. Standard errors could not be determined for the other studies.

Exhibit 3-18 also includes the results of the Harwood et al. (2000) study, which is the basis for the shoulder type AMFs in FHWA's Interactive Highway Safety Design Model (IHSDM) (*7*). Harwood et al.'s results are based on expert panel findings, and are primarily based on Zegeer et al. (1987) and Miaou (1996) (Exhibit 3-18). While the original tabular results in Harwood et al. were referenced as "related crashes" (i.e., single-vehicle run-off-road and multi-vehicle opposite-direction accidents); assuming no adverse effects, the related crash effects were extrapolated to effects on total crashes as prescribed by Harwood (Exhibit 3-18).

Exhibit 3-18: Summary of study characteristics for shoulder type (7,9)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Heimbach et al., 1974 (*14*)	Pave a 3 to 4 ft sod shoulder	Rural	Two-lane, volumes not reported	All crashes, fatal	0.86	0.57
Heimbach et al., 1974 (*14*)	Pave a 3 to 4 ft sod shoulder	Rural	Two-lane, volumes not reported	All crashes, injury	0.86	0.18
Heimbach et al., 1974 (*14*)	Pave a 3 to 4 ft sod shoulder	Rural	Two-lane, volumes not reported	All crashes, PDO	0.78	0.12
Heimbach et al., 1974 (*14*)	Pave a 3 to 4 ft sod shoulder	Rural	Two-lane, volumes not reported	All crashes, all severities	0.81	0.09
Rogness, 1982 (*13*)	Pave a "full shoulder"	Rural	Two-lane, volumes not reported	All crashes, all severities	0.815	Unable to calculate.
Zegeer et al., 1987	Pave shoulder (per 1 ft)	Rural	Two-lane, volumes not reported	All crashes, all severities (includes intersections)	0.98	Unable to calculate.
Harwood, et al, 2000	Change paved shoulder to turf	Rural	Two-lane, volumes not reported	All crashes, all severities	1.01	Unable to calculate.

Exhibit 3-19 provides AMFs for different shoulder widths and shoulder types also from the Harwood et al. (2000) publication. The base condition for shoulder types is assumed to be a paved shoulder (*7*).

Exhibit 3-19: Accident Modification Factors for Shoulder Types on Two-Lane Highways for single-vehicle run-off-the-road and opposite-direction accidents (7)

Shoulder type	Shoulder width (ft)							
	0	1	2	3	4	6	8	10
Paved	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gravel	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03
Composite	1.00	1.01	1.02	1.02	1.03	1.04	1.06	1.07
Turf	1.00	1.01	1.03	1.04	1.05	1.08	1.11	1.14

Note: The values for composite shoulders in this table represent a shoulder for which 50 percent of the shoulder width is paved and 50 percent of the shoulder width is turf.

As can be seen in Exhibit 3-19, gravel shoulders appear to be very similar to paved shoulders. Turf shoulders increase total crashes by approximately one percent on 3 ft shoulders and fourteen percent on 8 ft shoulders.

Standard errors for the AMFs summarized in Exhibit 3-20 could not be determined from the literature. These AMFs provide estimates of effect for converting turf shoulders to paved or composite, or gravel shoulders to paved.

Exhibit 3-20: AMFs for total crashes for conversion to/from different shoulder types on two-lane rural roads

	Shoulder width in ft (on one side)					
Treatment	**3**	**4**	**5**	**6**	**7**	**8**
Convert turf to paved	0.99	0.98	0.97	0.97	0.97	0.96
Convert gravel to paved	1.00	1.00	1.00	0.99	0.99	0.99
Convert turf to composite (partially paved)	1.00	0.99	0.98	0.97	0.98	0.98

Note: The values for composite shoulders in this table represent a shoulder for which 50 percent of the shoulder width is paved and 50 percent of the shoulder width is turf.

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Harwood et al. (2003) is the only study found to provide an AMF for shoulder type on multi-lane roads (*5*). An expert panel reviewed the results of the Harwood et al. (2000) study for two-lane rural roads and concluded that the same AMFs were appropriate for both divided and undivided multi-lane roads. As part of NCHRP Project 17-25, another expert panel was convened and considered the effect of shoulder type on rural multilane highways and urban/suburban multilane arterials (*168*). The expert panel reached consensus that the shoulder type AMF for rural multilane highways developed by Harwood et al. (2003) was an acceptable AMF for this roadway type.

3.1.1.3. Medians

The principal purposes of providing medians are to:

- Separate opposing traffic streams;
- Provide a recovery area for out-of-control vehicles;
- Provide a place where vehicles can stop in emergencies;
- Allow for the accommodation of left-turn lanes and openings for left or U-turn maneuvers;
- Reduce oncoming-vehicle headlight glare (median barrier); and,
- Serve as a reserve for additional future travel lanes.

The design of a median requires several decisions, including:

1. Whether to provide a median (i.e., whether the roadway is to be divided or undivided);
2. How wide the median should be;
3. The shape of the median – flush, depressed or raised;
4. Whether to include a median barrier; and

5. How to design median crossovers.

[Adapted from Hauer (2000) (15).]

This section includes discussion of the three main elements: median presence, median width, and median shape. The safety effects of two-way left turn lanes (a type of "median") are covered in Chapter 6. Other cross-sectional elements of highway medians are discussed in other sections of Chapter 3, including:

- Median geometry, sideslopes, ditches, culverts, other features, and barriers (Section 3.1.2);
- Median refuge islands for pedestrians (Section 3.3); and,
- Median crossovers for access points (Section 3.4.2).

Exhibit 3-21: Resources examined to investigate the safety effect of medians on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D.L., R. Srinivasan, J. Baek, B. Persaud, C. Lyon, F.M. Council, K. Eccles, N. Lefler, F. Gross, E. Hauer, J. Bonneson, "Crash Reduction Factors for Traffic Engineering and ITS Improvements", NCHRP Project 17-25 Final Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2008))	Researched and/or developed AMF values for a number of roadway segment treatments including changing the width of an existing median along rural and urban multilane highways	AMFs added to synthesis
NCHRP Project 17-14, FY 1996 http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-14	Improved Guidelines for Median Safety.	Suggested by NHCRP 17-18(4). Not published as of Mar 8/05.
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of 16 median presence studies (1968-1997) Review of two studies on median width. No meta-analysis conducted	Added to synthesis (median presence).
Donnel, T. Eric.; and Masson, Jr. M. John. Predicting the Severity of Median-Related Crashes in Pennsylvania by Using Logistic Regression. Transportation Research Record 1897, TRB, National Research Council, Washington, D.C., 2004, pp. 55-63.	The purpose of the paper was to highlight the probability (odds) of having a fatal, injury or PDO collisions when one or more of the 13 explanatory variables is present.	The safety effect of barriers was not estimated in this study. Not added to synthesis.
(Chayanan, S., Nebergall, M., Shankar, V., Juvva, N., and Ouyang, Y., "Interaction Between the Roadway and Roadside - An Econometric Analysis of Design and Environmental Factors Affecting Segment Accident Rates." WA-RD 562.1, Seattle, Washington State Transportation Center, University of Washington, (2003))	Examination of two different cross-sectional model forms based on 500 1-mile randomly selected sections of WA highways.	Limited review, no AMFs for median variable produced. Not added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., McGee, H., Prothe, L., Eccles, K., and Council, F. M., "NCHRP Report 500 Volume 4: A Guide for Addressing Head-On Collisions ." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Literature review and several strategies to reduce head-on crashes on two-lane rural roads.	No relevant information. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*16*) (Neuman,T.R., Pfefer,R., Slack,K.L., Hardy,K.K., Council,F.M., McGee,H., Prothe,L., Eccles,K.A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions" Washington, D.C., Transportation Research Board, National Research Council, (2003))	Literature review and several strategies to reduce run-off-road crashes on two-lane rural roads.	Limited qualitative information added to synthesis.
Donnel,T. E.; Harwood, W. D.; Bauer, M. K.; Mason, M. H. Jr.; and Pietrucha, T. Martin. Cross-Median Collisions on Pennsylvania Interstates and Expressways. Transportation Research Record 1784, TRB, National Research Council, Washington, D.C., 1993, pp. 91-99.	This paper examined the safety issues with cross-median collisions on Pennsylvania Interstates and Expressways. This paper didn't set out to develop or estimate the safety effects of treatments used to counter cross-median collisions. Rather the paper aim to quantify collision frequency based on 3 types of median.	Not added to synthesis
(*17*) (Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))	Developed AMFs based on NB and ZINB model coefficients for design elements on freeways and non-freeways	While there are questions regarding model form and parameters, added to synthesis (median presence).
(Hunter, W. W., Stewart, J. R., Eccles, K. A., Huang, H. F., Council, F. M., and Harkey, D. L., "Three-Strand Cable Median Barrier in North Carolina: In-Service Evaluation." Transportation Research Record, No. 1743, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 97-103.)	Used crash data to evaluate the effect of the installation of cable median barrier on crash rates in NC; only used Interstate locations	No relevant information. Not added to synthesis.
(*15*) (Hauer, E., "The Median and Safety." (2000))	Reviewed AMF and SPF literature on median presence, width, and shape and reanalyzed some data sets	Suggested by NHCRP 17-18(4). No conclusions on AMFs, evaluation of several studies added to synthesis (median presence, median width, median shape) and expanded.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Review of past literature, two-lane roads only.	Not relevant to medians on multi-lane roads. Not added to synthesis.
(*18*) (Council, F. M. and Stewart, J. R., "Safety effects of the conversion of rural two-lane to four-lane roadways based on cross-sectional models." Transportation Research Record, No. 1665, Washington, D.C., Transportation Research Board, National Research Council, (1999) pp. 35-43.)	Cross-sectional models for "typical sections" of three road classes	As reviewed by Hauer, 2000, added to synthesis (median presence).
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))	Developed AMFs for ROR crashes based on NB and ZINB model coefficients related to design elements of 96 km of one state route	Not added to synthesis due to uncertainty in modeling methodology.

DOCUMENT	DESCRIPTION	COMMENT
(Castronovo, S., Dorothy, P. W., and Maleck, T. L., "An Investigation of the Effectiveness of Boulevard Roadways." Washington, D.C., 77th Transportation Research Board Annual Meeting, (1998))	Used boulevards in Michigan to compare the crash rate of roadway with continuous center left-turn lanes to boulevards	Suggested by NHCRP 17-18(4). Not relevant as this section does not cover TWLTLs. Not added to synthesis.
(*19*) (Nystrom, K., "Median Barrier Study Warrant Review." TE-97-02, Sacramento, California Department of Transportation, (1997))	Developed cross-sectional models built on findings and data from Seamons and Smith 1991 with additional years and examination of more than just cross-median crashes	As reviewed by Hauer, 2000. Hauer's reanalysis results added to synthesis (median width).
(*20*) (Miaou, S. P., "Measuring the Goodness of Fit of Accident Prediction Models." FHWA-RD-96-040, McLean, Va., Federal Highway Administration, (1996))	Developed multivariate model of effect of sideslope on single-vehicle crashes on two-lane undivided roads.	As reviewed by Hauer, 2000, added to median shape synthesis
(Elvik, R., "The Safety Value of Guardrails and Crash Cushions: A Meta-Analysis Of Evidence From Evaluation Studies." Accident Analysis and Prevention, Vol. 27, No. 4, Oxford, N.Y., Pergamon Press, (1995) pp. 523-536.)	Meta-analysis of 32 studies that evaluated the safety effect of median barriers (and guardrails and impact attenuators)	Suggested by NHCRP 17-18(4). No relevant information; barriers are not included in this section. Not added to synthesis.
(*10*) (Hadi, M. A., Aruldhas, J., Chow, L., and Wattleworth, J., "Estimating Safety Effects of Cross-Section Design for Various Highway Types Using Negative Binomial Regression." Transportation Research Record 1500, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 169-177.)	Analyzed FL crash data to develop NB cross-sectional models for various design elements on different road classes	Suggested by NHCRP 17-18(4). As reviewed by Hauer 2000 (two-lane, and multi-lane), added to synthesis (median width).
(Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Study of the operational and safety considerations of median widths at 40 rural and suburban divided highway intersections	No AMFs. Not added to synthesis.
(Bowman, B. L. and Vecellio, R. L., "Effects of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety." Transportation Research Record 1445, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 169-179.)	Evaluated the safety effect of various medians on vehicular and pedestrian safety; analyzed over 30,000 crashes; 3 cities	Suggested by NHCRP 17-18(4). Included in meta-analysis by Elvik and Vaa (2004). Not added to synthesis.
(Long, G., Gan, C., and Morrison, B. S., "Safety Impacts of Selected Median and Access Design Features." Gainesville, Transportation Research Center, University of Florida, (1993))	Cross-sectional evaluation of effect of median on crashes on urban arterials; various types of medians, no medians, restrictive medians; 400 miles of urban roads in FL	Suggested by NHCRP 17-18(4). Reviewed by Hauer (2000). Simple comparison of raw crash rates without control for other variables; not added to synthesis.
(*21*) (Knuiman, M. W., Council, F. M., and Reinfurt, D. W., "Association of median width and highway accident rates." Transportation Research Record 1401, Washington, D.C., Transportation Research Board, National Research Council, (1993) pp. 70-82.)	Developed log-linear multivariate cross-sectional models (assuming NB variance function) of *accident rate/mvm* on divided freeways and non-freeways	Reviewed by Council and by Hauer (2000), added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))	Overview of impact on safety of various cross-section elements.	No additional information on medians; relevant studies reviewed by Hauer (2000); not added to synthesis.
(*22*) (Seamons, L. L. and Smith, R. N., "Past and Current Median Barrier Practice in California." TE-90-2, Sacramento, Calif., CalTrans, (1991))	Developed cross-sectional models of cross-median crash rates on freeways.	As reviewed by Hauer 2000, Hauer's reanalysis added to synthesis (median width).
(Harwood, D. W., "NCHRP Report 330: Effective Utilization of Street Width on Urban Arterials." Washington, D.C., Transportation Research Board, National Research Council, (1990))	Evaluated the safety effect of reallocating urban arterial street width to create more lanes; 35 improvement projects	No relevant information. Not added to synthesis.
(*12*) (Harwood, D. W., "NCHRP Report 282: Multilane Design Alternatives for Improving Suburban Highways." Washington, D.C., Transportation Research Board, National Research Council, (1986))	Developed cross-sectional models for various design alternatives on suburban highways	As reviewed by Hauer, 2000, added to synthesis (median presence). Included in meta-analysis by Elvik and Vaa (2004)
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Summary of safety research of various traffic control and cross-section elements.	No additional quantitative information; relevant studies reviewed by Hauer (2000); not added to synthesis.
(*23*) (Foody, T. J. and Culp, T. B., "A comparison of the safety potential of the raised versus depressed median design." Transportation Research Record 514, Washington, D.C., Transportation Research Board, National Research Council, (1974) pp. 1-14.)	Examined total and fatal crash rates per MVM on raised and depressed medians of 84-ft width on Interstate roadway.	As reviewed by Hauer, 2000, added to synthesis (median shape)
(*24*) (Garner, G. R. and Deen, R. C., "Elements of Median Design in Relation to Accident Occurrence." Highway Research Record 432, Highway Research Board, (1973) pp. 1-11.)	Examined accident rates for various medians types and widths on Interstate and turnpike roads in Kentucky	As reviewed by Hauer, 2000. added to synthesis (median shape)
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Reviews highway safety aspects of cross-section elements.	No additional quantitative information; relevant studies reviewed by Hauer (2000); not added to synthesis.

Target crashes for median treatments are head-on, opposite-direction sideswipe, and run-off-road-left, generalized as median-related crashes in the following discussion.

Treatment: Provide a median

Rural (and urban) two-lane roads

Elvik and Vaa provide estimates of the safety effect of constructing "central reservations" on the basis of 9 international and 7 U.S. studies (*8*) (pg 326). Although uncommon in North America, Elvik and Vaa found that on rural two-lane roads, medians increase the number of all accident types, both injury and PDO, possibly due to the hindrance of overtaking maneuvers, and the presence of a new hazard (i.e., the median is generally raised or a barrier) (*8*). On two-lane roads in urban areas, Elvik and Vaa found that medians reduced injury accidents of

all types by about 40%. This effect is likely related to the restriction of turning maneuvers at minor intersections and accesses (*8*).

Elvik and Vaa's findings are summarized in Exhibit 3-22; the standard error of the safety effect estimates are based on the 95% confidence interval reported by Elvik and Vaa, multiplied by a factor of 1.8, representing a medium-high rating for the meta-analysis.

Exhibit 3-22: Summary of study characteristics for median presence on two-lane roads

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Provide a median	Rural	Two-lane, volume not reported	All types, fatal and injury	1.94	0.558
Elvik and Vaa, 2004	Provide a median	Rural	Two-lane, volume not reported	All types, PDO	2.28	0.549
Elvik and Vaa, 2004	Provide a median	Urban	Two-lane, volume not reported	All types, fatal and injury	0.61	0.099

Rural multi-lane highways; Urban and suburban arterials

Hauer (2000) conducted a detailed review of 1953 to 1999 literature on median presence, and reanalyzed data in some cases (*15*). Hauer did not draw overall conclusions from the studies he reviewed. Exhibit 3-23 includes two of the six studies reviewed by Hauer (2000) that were methodologically sound (Harwood, 1986; Council and Stewart, 1999), a meta-analysis by Elvik and Vaa (2004), and a more recent study by Strathman et al. (2001).

Harwood (1986) found that non-intersection accident rates (per MVM) were approximately 43% higher on divided than undivided suburban residential roads, and approximately 2% higher on suburban commercial roads (*12*). (When total crashes were examined, Harwood found very little difference between the crash rates for divided vs. undivided suburban roads of either type). Although the results of the Harwood (1986) study were included in the meta-analysis by Elvik and Vaa (2004), the results are documented here to provide some knowledge of the suburban setting. This single study of suburban roads would indicate an AMF for median presence of 1.0 for total crashes on both commercial and residential roads and for non-intersection crashes on commercial roads (i.e., no effect), and an AMF of 1.40 for non-intersection crashes on suburban residential roads.

Elvik and Vaa (*8*) (pg 327) present findings for median presence on multi-lane roads for injury and non-injury crashes separately. Elvik and Vaa's findings for rural roads with a median indicate a decrease in crashes of 12% for injury and 18% for PDO crashes. The urban road findings indicate a decrease in crashes for injury (22%) but an increase in PDO crashes (9%). The standard errors presented in Exhibit 3-23 for Elvik and Vaa's findings are based on the 95% confidence intervals reported by the authors, multiplied by a method correction factor of 1.8, as the results of the meta-analysis methodology are deemed to be of medium-high quality.

Using negative binomial and zero-inflated negative binomial models, Strathman, et al. (2001) (*17*) examined the effects of various roadway variables on crashes on Oregon roadways.

Separate models were developed for urban vs. rural, and freeway vs. non-freeway, but not for different road classes (e.g., two-lane vs. multi-lane) within the non-freeway group. It was not possible to determine how the functional form of each variable was derived, or how parameters were excluded from the model (if at all). The models included dummy variables for the presence of vegetative medians, curbed medians, and medians with barriers. While difficult to interpret, the findings appear to indicate that the presence of a vegetative median reduces crashes by approximately 57% on rural non-freeways (regardless of median width). A standard error could not be computed for this value.

Exhibit 3-23: Summary of study characteristics for median presence

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood, 1986 Included in meta-analysis by Elvik and Vaa (2004)	Add median	Suburban (California and Michigan)	Commercial roads, lanes and volume not reported	Non-intersection, all severities	1.02	Unable to calculate.
Harwood, 1986 Included in meta-analysis by Elvik and Vaa (2004)	Add median	Suburban (California and Michigan)	Residential roads, lanes and volume not reported	Non-intersection, all severities	1.43	Unable to calculate.
Council and Stewart, 1999 (*18*)	Add median	Rural (California)	Four-lane, volume not reported	Non-intersection, all severities	$= 0.76 \times ADT^{-0.05}$	Unable to calculate.
Elvik and Vaa, 2004	Add median	Urban	Multi-lane, volume not reported, includes minor intersections	All types, injury	0.78	0.018
Elvik and Vaa, 2004	Add median	Urban	Multi-lane, volume not reported, includes minor intersections	All types, PDO	1.09	0.018
Elvik and Vaa, 2004	Add median	Rural	Multi-lane, volume not reported, includes minor intersections	All types, injury	0.88	0.0315
Elvik and Vaa, 2004	Add median	Rural	Multi-lane, volume not reported, includes minor intersections	All types, PDO	0.82	0.0315
Strathman et al. 2001	Vegetative medians	Rural	Non-freeways, volumes not reported	Non-intersection, all severities	0.43	Unable to calculate.

The results of the four studies that provided AMFs are distinct. Three of the studies examined non-intersection crashes (Harwood, Council and Stewart, and Strathman), and Elvik examined total crashes (intersection and non-intersection combined) by severity class.

Findings from the studies of rural roads by Council and Stewart, and Strathman et al. are somewhat consistent with each other, but disagree significantly in both degree and direction from the Harwood findings for suburban roads.

The single study of suburban roads would indicate an index of effectiveness for median presence of 1.02 for total crashes on both commercial and residential roads and for non-intersection crashes on commercial roads (i.e., no effect), and an index of effectiveness of 1.43 for non-intersection crashes on suburban residential roads. Standard errors could not be calculated for these values.

Freeways; Expressways

No studies found.

Treatment: Widen median

Rural two-lane roads

No studies found.

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Hauer (2000) (*15*) reviewed eleven studies and reanalyzed the data gathered in some of the studies. Hauer concluded with no specific AMFs; however the following general conclusions concerning the safety effects of median width were documented (*15*):

- As median width increases, cross-median crashes (where an opposing vehicle is struck) decrease, particularly for medians wider than 50 ft (15 m);
- As median width increases, median-related crashes may increase, reaching a peak at around 30 ft (9 m) and then decrease for medians wider than 30 ft (9 m); and,
- The effect of increasing median width on total crashes is still in question. Simple comparative studies show no change in total crashes with width, while a single study showed a decrease in total crashes with an increase in median width.

Hauer's results for three studies are included in Exhibit 3-24 (Seamons and Smith, 1991; Hadi et al., 1995; Nystrom et al., 1997) (*15*). These three studies were selected for inclusion in this synthesis either because the original data of the study was reanalyzed, or because "major" methodological problems were not noted. It was not possible to compute standard error values.

Hauer's reanalysis of the Seamons and Smith data for freeways accounted for ADT, but was unable to account for other possible factors (e.g., median shape, inside shoulder width) (*15*).

Hadi et al. developed negative binomial cross-section models for a variety of road types and settings, for both midblock and total crashes. Hauer notes a bias due to the fact that variables were excluded from the models on the basis of statistical significance only, thus some confounding probably occurs (*15*).

Hauer's review of the Nystrom et al. (*19*) data controlled only for ADT. As Hauer notes, there was no control for other factors that would differ with median width (e.g., median

type, terrain, curvature, land use, etc.). Hauer was able to develop indices of effectiveness for widening medians from 10 ft to 80 ft. Note that roads with 30 ft medians without barriers appear to have about twice as many crashes as would be predicted by traffic and length alone. Hauer goes on to say that the reason for this increase in crashes for 30 ft medians is not clear, and may not be attributable to median width alone. For example, there may be an effect of median width on operating speed, or perhaps 30 ft medians are usually of the depressed type with slopes that cause overturning (*15*).

Exhibit 3-24: Summary of study characteristics for median width

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Seamons and Smith, 1991 (*22*)	Increase median width, no median barrier, for medians ≥ 50 ft	Not reported	Freeway, 20,000 to 130,000 veh/day	Multi-vehicle cross-median impacts, all severities	$\exp(-0.041 (MW_{after} - MW_{before}))$	Unable to compute
Hadi et al., 1995 (*10*)	Increase median width	Rural	4-lane non-freeway, 1.1K-40K	Midblock, all severities	$\exp(-.0458MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Rural	4/6-lane freeway, 5K-60K	Midblock, all severities	$\exp(-.0252MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Urban	4-lane non-freeway, 10K-50K	Midblock, all severities	$\exp(-.0588MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Urban	6-lane non-freeway, 10K-100K	Midblock, all severities	$\exp(-.0412MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Urban	4-lane freeway, 4.2K-137K	Midblock, all severities	$\exp(-.0801MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Urban	6-lane freeway, 20K-200K	Midblock, all severities	$\exp(-.0345MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Rural	4-lane non-freeway, 1.1K-40K	All crashes, all severities	$\exp(-.0688MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Rural	4/6-lane freeway, 5K-60K	All crashes, all severities	$\exp(-.0472MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Urban	4-lane non-freeway, 10K-50K	All crashes, all severities	$\exp(-.1060MW^{0.5})$	Unable to compute
Hadi et al., 1995	Increase median width	Urban	6-lane non-freeway, 10K-100K	All crashes, all severities	No statistically significant effect	n/a
Hadi et al., 1995	Increase median width	Urban	4-lane freeway, 4.2K-137K	All crashes, all severities	$\exp(-.0926MW^{.5})$	Unable to compute

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hadi et al., 1995	Increase median width	Urban	6-lane freeway, 20K-200K	All crashes, all severities	No statistically significant effect	n/a
Nystrom et al., 1997	Increase median width, within 0 to 85 ft range, no median barriers	Not reported	Freeway, 20,000 to 130,000 veh/day	Cross-median multi-vehicle, cross-median single vehicle, and median encroachment and recovery crashes, all severities	10 ft – 0.8 20 ft – 0.9 30 ft – 1.9 40 ft – 1.4 50 ft – 0.9 60 ft – 0.8 70 ft – 0.75 80 ft – 0.75	Unable to compute

NOTE: all measurements of median width (MW) for equations in this exhibit are in feet.

Exhibit 3-25 converts the above findings to a common basis for example median widths, assuming a 10 ft median has an AMF of 1.0 (i.e., same effect as no median).

Exhibit 3-25: Summary of findings concerning AMFs for increasing median width

Road type and Crash type	Median width (ft)								
	10	20	30	40	50	60	70	80	90
Cross-median multi-vehicle crashes – freeways	-	-	-	-	0.20	0.13	0.09	0.06	0.04
Median-related crashes (single or multi-vehicle) – freeways	1.00	1.12	2.38	1.75	1.12	1.0	0.94	0.94	-
Total crashes 4-lane rural non-freeway	*1.00*	*0.91*	*0.85*	*0.80*	*0.76*	*0.73*	*0.70*	*0.67*	*0.65*
Total crashes 4/6-lane rural freeway	*1.00*	*0.94*	*0.90*	*0.86*	*0.83*	*0.81*	*0.78*	*0.76*	*0.74*
Total crashes 4-lane urban non-freeway	*1.00*	*0.87*	*0.78*	*0.72*	*0.66*	*0.62*	*0.58*	*0.54*	*0.51*
Total crashes 4-lane urban freeway	*1.00*	*0.89*	*0.81*	*0.75*	*0.70*	*0.65*	*0.62*	*0.59*	*0.56*

It is difficult to summarize the findings since the studies examined different road types (e.g., freeway, non-freeway), and crash types (e.g., cross-median multi-vehicle, run-off-road, total). Cross-median multi-vehicle crashes are clearly reduced by increasing median width, but the amount of estimated reduction for a given width varies significantly.

Findings concerning median-related (i.e., single or multiple vehicle crashes involving the median) are inconsistent with results for other crash types. Hauer's reanalysis of the Nystrom et al. (1997) data indicates that 20 ft to 50 ft medians have more median-related crashes than 10 ft medians, and that there is no safety benefit for these crash types except in medians of 70 ft and wider.

Perhaps the more consistent findings are for total crashes. However, it is noted that all these findings are taken from one study. Hadi et al. found that while there may be a difference between median width effects on rural freeways vs. non-freeways, the effects are very similar on the urban freeways and non-freeways studied.

Neuman et al. report that "Knuiman et al. (1993) (*21*) found that accident rates continued to decrease as median widths increased up to about 80 feet (25 m). The effect was seen for head-on/opposite direction sideswipe crashes, as expected. A similar effect was also found for single- and multiple-vehicle crashes." (*16*). No comment was made by Neuman et al. about the effect of median widths wider than 80 ft (25 m). It is not clear if a distinction was made here between multiple-vehicle crashes and head-on/opposite direction crashes.

Harkey et al. (2008) utilized a cross-sectional analysis of HSIS data to develop AMF values over a range of roadway types and conditions. The results account for area type (rural vs urban), access-control (full access vs partial or no access) and provide AMFs for both total crashes and cross-median crashes. It is also important to note that the data set used to develop the AMFs did not include barriers so the AMFs from Harkey et al. 2008, are for medians without barriers. The range of AMFs developed is consistent with previous work in this area (e.g., Knuiman et al. (1993) and Hadi et al. (1995)). The AMFs for roadways with full access control and partial or no access control are presented in Exhibits 3-26 and 3-27, respectively. The baseline condition for the AMFs is a 10 ft median.

*Exhibit 3-26: AMFs for changing median widths on full access control roadways (*168*)*

Median Width	**Rural 4 Lanes**		**Urban 4 Lanes**		**Urban 5+ Lanes**	
	All	**CM**	**All**	**CM**	**All**	**CM**
10	1.00	1.00	1.00	1.00	1.00	1.00
20	0.96	0.86	0.95	0.89	0.93	0.89
30	0.93	0.74	0.90	0.80	0.86	0.79
40	0.90	0.63	0.85	0.71	0.80	0.71
50	0.87	0.54	0.80	0.64	0.74	0.63
60	0.84	0.46	0.76	0.57	0.69	0.56
70	0.81	0.40	0.72	0.51	0.64	0.50
80	0.78	0.34	0.68	0.46	0.59	0.45
90	0.75	0.29	0.65	0.41	0.55	0.40
100	0.73	0.25	0.61	0.36	0.51	0.35
All = total crashes, all severities CM = cross median crashes, all severities						

Exhibit 3-27: AMFs for changing median widths on partial or no access control roadways (168)

Median Width	**Rural 4 Lanes**		**Urban 4 Lanes**	
	All	**CM**	**All**	**CM**
10	1.00	1.00	1.00	1.00
20	0.95	0.84	0.95	0.87
30	0.91	0.71	0.90	0.76
40	0.87	0.60	0.85	0.67
50	0.83	0.51	0.81	0.59
60	0.79	0.43	0.77	0.51
70	0.76	0.36	0.73	0.45

80	0.72	0.31	0.69	0.39
90	0.69	0.26	0.65	0.34
100	0.66	0.22	0.62	0.30
All = total crashes, all severities CM = cross median crashes, all severities				

Treatment: Change median shape or type

"Median shape" is defined here to include depressed vs. raised medians. Median slopes are briefly discussed here, with more detailed discussion with roadside geometry in Section 3.1.2.

Rural two-lane roads

No studies found.

Rural multi-lane highways; Freeways; Expressways

Based on Hauer's review of studies from 1960 to 1996, it is difficult to draw conclusions based on the few and varied studies (*15*).

With respect to the issue of raised versus depressed medians (median type), the one study reviewed by Hauer (Foody and Culp, 1974, (*23*)) provided contrasting findings. Foody and Culp concentrated on one accident type – median-related single vehicle crashes – and concluded that depressed medians were superior. Hauer notes that raised medians had lower crash rates for all other crash types, and lower fatal crash rates for all types (*15*). It is very possible that a more rigorous study of more recent data might provide a different answer. Thus no conclusion can be drawn for median type based on the available literature.

With respect to the issue of median slope, two studies reviewed by Hauer (Garner and Deen, 1976, (*24*); Miaou, 1996, (*20*)) indicate that the steeper the median slope for depressed medians, the higher the median-related crash rate. However, no quantification of safety for changes to median slopes was found in the literature.

While some of the risk factors for accidents are different for cross-median vs. run-off-road-right crashes, evidence regarding the safety effects of roadside slope is perhaps the closest one can get to median slope. Additional discussion of roadside slope can be found in Section 3.1.2.

Urban and suburban arterials

No studies found.

3.1.2. Roadside Elements

The roadside is defined as "that area between the outside shoulder edge and the right-of-way limits" (*25*).

The following sections discuss of the safety effect of various roadside characteristics. Sections include the clear roadside concept, roadside geometry (including sideslopes and ditches, for roadsides and median), roadside features (such as signs, supports, and utility poles), and roadside barriers. Two tools for improving roadside safety are also discussed: the Roadside Safety Analysis Program (RSAP), and the Roadside Hazard Rating method.

The AASHTO Roadside Design Guide (*25*) is an invaluable resource for roadside design, including clear zones, geometry, features and barriers.

3.1.2.1. Roadside Geometry

Roadside geometry refers to the physical layout of the area between the outside shoulder edge and the right-of-way limits, or the area between roadways of a divided highway (i.e., the roadside or the median).

A roadside environment clear of fixed objects with stable flattened slopes is intended to increase the opportunity for errant vehicles to regain the roadway safely, or come to a stop on the roadside, and reduce the chance of serious consequences. The concept of a "forgiving roadside" is detailed in Chapter 1 of AASHTO's Roadside Design Guide (*25*).

The clear zone is defined by the AASHTO Roadside Design Guide as the "total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area" (*25*).

A well-designed clear zone will (*16*):

- Be of sufficient width that most vehicles that leave the road do not exceed its limits;
- Have up and down slopes that do not cause vehicle rollovers; and,
- Possess soil characteristics that do not lead to vehicle tripping and thus rollovers.

It is generally accepted that a wider clear zone creates a safer environment for potentially errant vehicles. However, there are often many constraints that limit the available clear zone.

Neuman et al. state that although the Roadside Design Guide implies that a "safe clear zone width" on higher-speed roads is approximately 30 ft, there is no single width that defines maximum safety. Errant vehicles may exceed any given width; speeds and roadside elements play a significant role in the dynamics of these movements. Several factors are involved in the calculation of clear zone width, such as design speed, design ADT, prevailing sideslope, and curvature. In general, "the wider the better", up to some cost-effective limit beyond which no significant number of vehicles will encroach (*16*).

The AASHTO Roadside Design Guide provides a 6-step approach to applying the clear zone concept (*25*):

1. Remove the obstacle
2. Redesign the obstacle so it can be safely traversed
3. Relocate the obstacle to a point where it is less likely to be struck
4. Reduce impact severity by using an appropriate breakaway device
5. Shield the obstacle with a longitudinal traffic barrier designed for redirection or use a crash cushion
6. Delineate the obstacle if the above alternatives are not appropriate.

The AASHTO Roadside Design Guide contains substantial information to determine the suggested clear-zone distance approximation for roadways based on traffic volumes and speeds (Figure 3.1 or Table 3.1 of that publication), as well as a decision process to determine if a treatment is suitable for a given fixed object or non-traversable terrain feature (*25*).

The AASHTO Roadside Design Guide also provides detailed information about roadside design, particularly Chapter 3: Roadside Topography and Drainage Features (*25*). This information includes:

- Foreslopes (recoverable, non-recoverable, critical)
- Backslopes
- Transverse slopes
- Drainage channels

A recoverable slope is defined as "a slope on which a motorist may, to a greater or lesser extent, retain or regain control of a vehicle. Slopes flatter than 1V:4H are generally considered recoverable" (*25*).

A traversable slope is defined as "a slope from which a motorist will be unlikely to steer back to the roadway but may be able to slow and stop safely. Slopes between 1V:3H and 1V:4H generally fall into this category" (*25*).

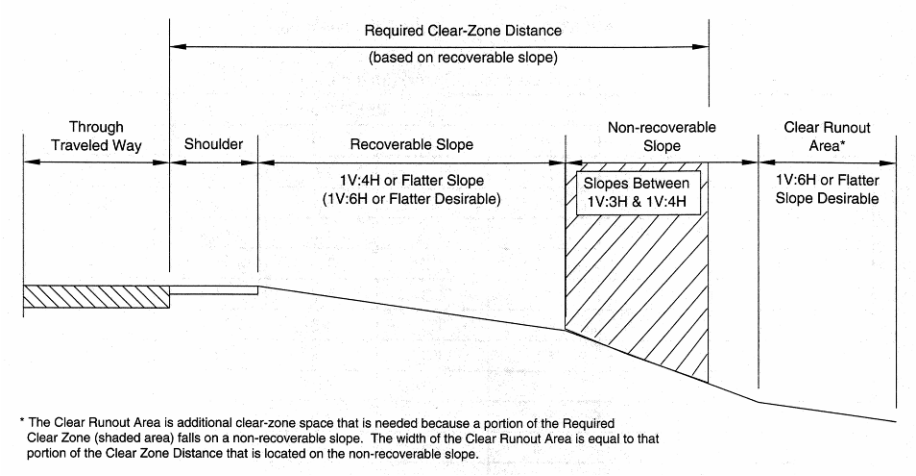
A non-recoverable slope is defined as "a slope which is considered traversable but on which the errant vehicle will continue on to the bottom. Embankment slopes between 1V:3H and 1V:4H may be considered traversable but non-recoverable if they are smooth and free of fixed objects" (*25*).

"Critical foreslopes are those steeper than 1V:3H. They will cause most vehicles to overturn" and may be candidates for treatment if the slope begins within the clear zone distance of the highway. Warrants for shielding are provided in Chapter 5 of the Roadside Design Guide (*25*).

A transverse slope is a common obstacle created by median crossovers, berms, driveways, or intersecting side roads. Transverse slopes of 1V:6H or flatter are suggested for high-speed roads, which can be transitioned to a steeper slope further from the travel lane (*25*).

A drainage channel is "an open channel usually paralleling the highway embankment and within the limits of the highway right-of-way" (*25*). These terms are illustrated in Exhibit 3-28.

Exhibit 3-28: Roadside geometry (25)



As stated in AASHTO's Policy on Geometric Design, "a curb, by definition, incorporates some raised or vertical element" (pg 323) (*26*). Curbs are used primarily on all types of low-speed urban highways (i.e., design speed less than 45 mph (70 km/h) (pg 72) (*26*)). There are two types of curb design: vertical and sloping. Vertical curbs are designed to deter vehicles from leaving the roadway. Sloping curbs (also called "mountable curbs") are designed to permit vehicles to cross them readily when needed (pg 324) (*26*). Materials that may be used to construct curbs include cement concrete, granite, and bituminous (asphalt) concrete.

While cement and bituminous concrete curbs are used extensively, it should be noted that the visibility of these types of curbs offer little visible contrast to normal pavements particularly during foggy conditions or at night when surfaces are wet. The visibility of curbs may be improved through the use of reflectorized markers that are attached to the top of the curb, or marked with reflectorized materials such as paints and thermoplastics in accordance with the guidelines outlined in the MUTCD (*26*). Delineation is discussed in Section 3.2. Curbs at intersections are discussed in Chapter 4.

This section includes discussion of the safety impact of the various roadside geometric elements discussed above. Details on other roadside elements, such as trees, poles, and barriers can be found in the following sections.

Exhibit 3-29: Resources examined to investigate the safety effect of roadside geometry on segments

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D.L., R. Srinivasan, J. Baek, B. Persaud, C. Lyon, F.M. Council, K. Eccles, N. Lefler, F. Gross, E. Hauer, J. Bonneson, "Crash Reduction Factors for Traffic Engineering and ITS Improvements", NCHRP Project 17-25 Final Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2008))	Researched and/or developed AMF values for a number of roadway segment treatments including flattening side slopes on rural two-lane and multilane roads	Expert panel's opinions added to synthesis
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results not available.
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of past studies for various road elements and safety improvements.	Provision of 95% confidence interval allows determination of standard error. Added to synthesis.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Strategy 15.2 B1 Design safer slopes and ditches to prevent rollovers	Strategies are discussed in ROR guide (Vol 6). No information not provided by Neuman et al., 2003. Not added to synthesis.
(*27*) (Plaxico, C. A., Ray, M. H., Weir, J. A., Orengo, F., Tiso, P., McGee, H., Council, F. M., and Eccles, K., "Recommended Guidelines for Curbs and Curb-Barrier Installations." 22-17, Washington, D.C., Transportation Research Board, National Research Council, (2004))	Study of the use of curbs and curb-barrier combinations on higher-speed roads.	No AMFs. Qualitative discussion added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*3*) (Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))	Used four years of HSIS crash, traffic and inventory data for urban undivided four-lane roadways in Washington State to develop cross-sectional models of safety.	Added to synthesis.
(*16*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Strategies to reduce run-off-road crashes, including minimizing the likelihood of crashing into an object or overturning if the vehicle travels off the shoulder.	Qualitative description of attributes of well-designed clear zone added to synthesis. Qualitative information and AMFS from Zegeer added to synthesis.
("Roadside Design Guide." Washington, D.C., AASHTO, (2002))	Forgiving roadside concept, detailed chapters on topography and drainage, supports, trees, barriers, bridges, barrier end treatments, control devices, etc.	Material from Chapter 1 added to section introduction (definition of clear zone concept).
(American Association of State Highway and Transportation Officials, "A Policy on Geometric Design of Highways and Streets, 4th ed. Second Printing." Washington, D.C., (2001))	Guidance for roadway designers based on established practices and recent research.	Material from Chapter 4 on clear zone added to section introduction.
(*28*) (Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Review of past literature for several road elements for two-lane rural roads.	Relationship between accident rate, ADT, and clear zone policy added to synthesis. No AMFs.
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))	Analysis of several roadside characteristics on about 100 km of State Route 3 in Washington State using negative binomial models.	Due to uncertainty of models with respect to the variables' individual effects, not added to synthesis.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	This report is a brief summary of several projects conducted in Australia.	Primarily qualitative information, quantitative values have insufficient data to determine standard error. Not added to synthesis.
(Allaire, C., Ahner, D., Abarca, M., Adgar, P., and Long, S., "Relationship Between Side Slope Conditions and Collision Records in Washington State." WA-RD 425.1, Olympia, Washington State Department of Transportation, (1996))	Naïve before/after study of 60 3R projects in Washington State.	Reviewed by Neuman et al. 2003 (Vol 6). Not added to synthesis.
(*20*) (Miaou, S. P., "Measuring the Goodness of Fit of Accident Prediction Models." FHWA-RD-96-040, McLean, Va., Federal Highway Administration, (1996))	Reviews relationship between roadside accident frequency and hazards exploring the complementary nature of accident and encroachment-based approaches	Negative binomial model results added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*29*) (Lienau, K., "Safety Effect of Barrier Curb on High Speed Suburban MultiLane Highways." TTI-04690-6, McLean, Va., Federal Highway Administration, (1996))	Used crash data in a before and after matched comparison study to evaluate the effect of barrier curb on safety; high-speed suburban multilane highways; sites in TX and IL	Suggested by NCHRP 17-18(4). Added to synthesis.
(Fambro, D. B., Nowlin, R. L., Warren, S. P., Lienau, K. A., Mounce, J. M., Bligh, R. P., Mak, K. K., and Ross, H. E., "Geometric Design Guidelines for Suburban High-Speed Curb and Gutter Roadways." FHWA/TX-95/1347-1F, College Station, Texas A&M University, (1995))	Study of geometric design elements of high-speed suburban roadways with curb and gutter. Safety study used rates, severities and frequencies.	Suggested by NCHRP 17-18(4). Same Texas data as Lienau (1996).No additional information on roadside geometry. Not added to synthesis.
(Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))	Overview of impact on safety of various cross section elements.	Limited information. Not added to synthesis.
(Zegeer, C. V., Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume II - Alignment." FHWA-RD-91-045, Washington, D.C., Federal Highway Administration, (1992))	Primarily discussion of horizontal and vertical alignment.	AMFs for flattening sideslopes same as Zegeer et al., 1987. Not added to synthesis.
(Zegeer, C. V., Reinfurt, D. W., Hummer, J., Herf, L., and Hunter, W., "Safety Effects of Cross-Section Design for Two-Lane Roads." Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 20-32.)	This study is quoted by several of the studies reviewed above; not reviewed.	Added to synthesis as cited by (*16*).
(Zegeer, C.V., Reinfurt,D.W., Hunter,W.W., Hummer,J., Stewart,R., Herf,L., "Accident Effects of Sideslope and Other Roadside Features on Two-Lane Roads" Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 33-47)	This study is quoted by several of the studies reviewed above; not reviewed.	Added to synthesis as cited by other authors.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Summary of safety research of various traffic control and cross-section elements.	Primarily qualitative information, quantitative values have insufficient data to determine standard error. Superceded by Roadside Design Guide; not added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Summary of significant findings for several cross section elements.	No additional information on roadside geometry. Not added to synthesis.

Treatment: Increase clear roadside recovery distance

Rural two-lane roads

Miaou (1996) (*20*) found that increasing the clear roadside recovery distance will have a positive safety effect on two-lane rural undivided roads (Equation 3-4). Miaou developed

negative binomial regression models to accident data collected for five years on 596 sections of two-lane rural undivided road sections (totaling about 1,800 miles) in three states (Alabama, Michigan, and Washington). Miaou notes that 530 out of 596 miles of road had a posted speed limit of 55 mph, and that the 50th percentile sideslope measured value of each section was used in the model development, though the actual sideslope may vary considerably within a given section. This model limitation may explain the small magnitude of effect even with substantial increases to roadside recovery distance. A baseline clear zone width and the volume range at the sites used are not specified by Miaou. A standard error is difficult to articulate for this AMF as it varies depending on clear roadside recovery distances used in the model (d1 and d2), and it is therefore not provided (t-statistic reported by Miaou (page 104) is -1.97) (*20*).

Equation 3-4: Safety effectiveness of increasing the clear zone width for single-vehicle run-off-road accidents

$$AMF\ (\text{single-vehicle run-off-road accidents}) = e^{-0.01375(d2-d1)}$$

Where: d2 = clear roadside recovery distance after widening (in ft)

d1 = clear roadside recovery distance before widening (in ft)

For example, using Equation 3-4, widening the clear roadside recovery distance from 5 ft to 10 ft yields an AMF for single-vehicle run-off-road accidents of:

$$AMF = e^{-0.01375(d2-d1)} = e^{-0.01375(10-5)} = 0.934$$

Zegeer et al. (1988) also estimated the effects of clear zone widening on two-lane rural roads, and calculated the expected percentage reduction of "related crashes" (i.e., the total of ROR, head-on, and sideswipe). This estimate is conditioned by the existing recovery area being less than 15 ft (4.6 m) when measured from the edgeline (Exhibit 3-30) (as cited in (*16*)). There is insufficient information to calculate the standard error of these values.

Zegeer et al. focused on a different set of target crashes; therefore, the safety effects in Exhibit 3-30 are not combined with the values from Miaou (1996). In comparing the results, it is evident that Zegeer et al. found greater safety benefits than Miaou for the same increase in clear zone width (e.g., increasing clear zone by 5 ft yields an AMF of 0.934 for Miaou, and a 13% accident reduction for Zegeer). This is likely partially due to the fact that Zegeer et al. included additional crash types, such as head-on and sideswipe, whereas Miaou modeled only single-vehicle run-off-road accidents.

Exhibit 3-30: Percent reductions in "related accidents" due to increasing the roadside clear recovery distance on two-lane rural roads (Zegeer et al., 1988 as cited in (16))

Amount of increased roadside recovery distance in ft (m)	% Reduction in related accident types (total of run-off-road, head-on, and sideswipe)
5 (1.5)	13
8 (2.4)	21
10 (3.1)	25
12 (3.7)	29
15 (4.6)	35
20 (6.2)	44

As stated by Neuman et al., "While additional guidance on [clear zone] widths and slopes and economic analysis techniques should be developed within the next 1 to 5 years, the best current guidance on widths and slopes is in the AASHTO Roadside Design Guide" (*16*).

In summary, both Miaou and Zegeer find a similar safety effect trend due to increasing clear zone distance on two-lane rural roads.

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

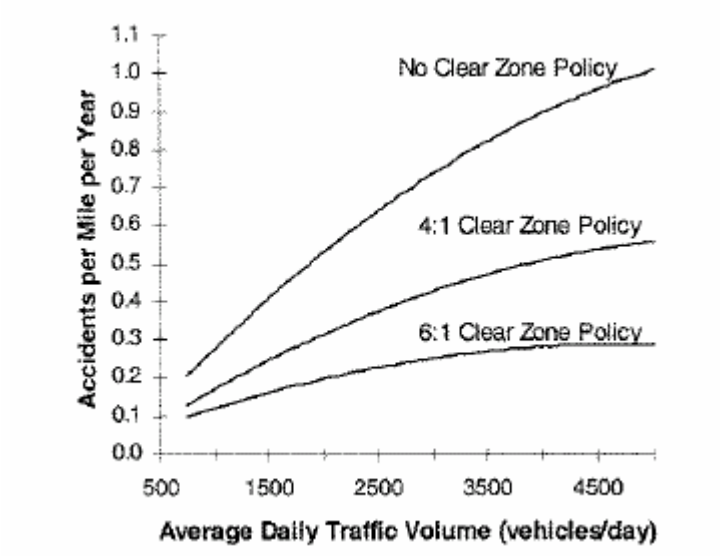
No studies found.

Treatment: Implement clear zone policy

All roads

As noted by Fitzpatrick et al., Graham and Harwood (1982) found that "single-vehicle accidents per mile per year are highest for roads with no clear zone policy, lower for a 1V:4H clear zone policy (i.e., clear area with a 1V:4H sideslope), and lowest for a 1V:6H clear zone policy for various ADTs" (*28*) (pg 59). The relationship is shown in Exhibit 3-31. Although Graham and Harwood note that the field conditions may not necessarily match the clear zone policy, the study indicates a potential for safety benefits from increased clear zones and flatter sideslopes. Although not noted by Fitzpatrick et al., or Graham and Harwood, it is also possible that the roads with smaller clear zones used lower design standards which may have confounded the results noted here (e.g. narrow lanes, no pavement markings, etc.).

Exhibit 3-31: Relationship between single-vehicle accident rate (run-off-road; per mile per year) and ADT for two-lane highways with various clear zone policies (28)



Discussion: Safety effect of increased clear zone

Other information about clear zone safety effect found in current literature is summarized here.

Fambro et al. (1995) used benefit-cost approach for clear zone guidelines on suburban high-speed (50 or 55 mph posted speed limit) roadways with curb and gutter, focused on roadways with growth in traffic volume and turning movements requiring widening of existing two-lane highway to four or more lanes. Baseline minimum clear zone was 10 ft (3 m) after widening. Study found that the following scenarios are not cost-beneficial:

- To purchase 5 ft (1.5 m) or less of additional right-of-way (with existing clear zone of 10 ft or more) primarily due to high cost of relocation of utility poles
- To purchase of additional right-of-way for costs greater than $4 / ft2 ($43.06 / m2)
- To provide more than the 10 ft baseline clear zone for roadways with low roadside hazard rating

However, the benefit for avoiding a fatality was estimated to be $500,000 for this analysis, a value that is much higher today and would likely change the conclusions (*16*).

Treatment: Flatten sideslopes

Rural two-lane roads

Elvik and Vaa (*8*) found that flattening sideslopes "reduces both the number and severity of accidents" based on three American studies (Dotson, 1974; Missouri Dept of Transportation, 1980; Graham and Harwood, 1982). The index of effectiveness is as given by Elvik and Vaa; the standard error is based on the 95% confidence interval, with a method correction factor of 1.8.

Miaou also found that a "steeper sideslope is associated with a higher single-vehicle run-off-road accident rate" on two-lane rural roads (*20*). Miaou notes that the 50th percentile sideslope measurement was used, though the actual sideslope may vary considerably within a given section. This study was rated medium-high and assigned a method correction factor of 1.5.

These two studies provide the only AMFs found with sufficient information to provide estimates of their standard errors (Exhibit 3-32 and Exhibit 3-33).

Exhibit 3-32: Safety effectiveness of flattening sideslopes from 1V:3H to 1V:4H (8) (20)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik, 2004	Flatten sideslope from 1V:3H to 1V:4H	Rural	Mostly two-lane, volume unknown	All types, injury	0.58	0.036
Elvik, 2004	Flatten sideslope from 1V:3H to 1V:4H	Rural	Mostly two-lane, volume unknown	All types, PDO	0.71	0.036
Miaou, 1996	Flatten sideslope from 1V:3H to 1V:4H	Rural	Two-lane, unknown volume	Single-vehicle run-off-road, all severities	0.82	0.159

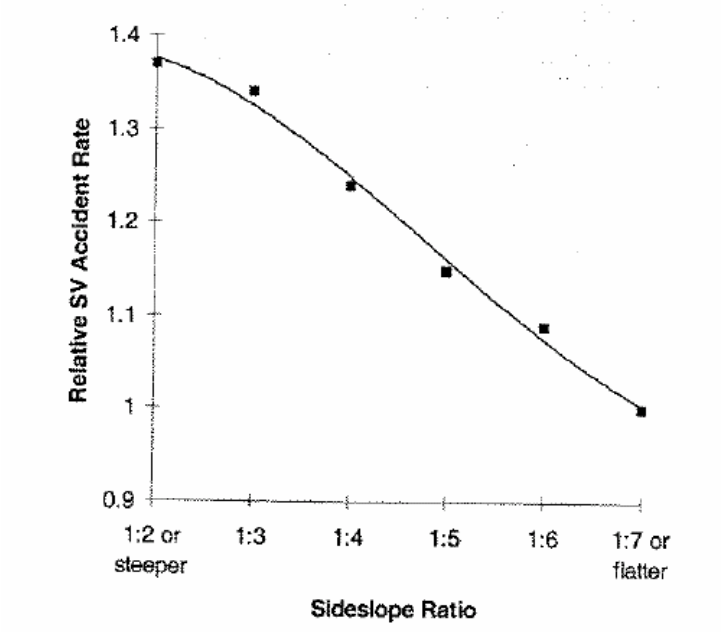
Exhibit 3-33: Safety effectiveness of flattening sideslopes from 1V:4H to 1V:6H (8) (20)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik, 2004	Flatten sideslope from 1V:4H to 1V:6H	Rural	Mostly two-lane undivided, volume unknown	All types, injury	0.78	0.036
Elvik, 2004	Flatten sideslope from 1V:4H to 1V:6H	Rural	Mostly two-lane undivided, volume unknown	All types, PDO	0.76	0.023
Miaou, 1996	Flatten sideslope from 1V:4H to 1V:6H	Rural	Two-lane undivided, unknown volume	Single-vehicle run-off-road, all severities	0.76	0.208

The following studies provide additional qualitative knowledge with some indices of effectiveness, but have insufficient information to determine the standard error of the estimates.

Zegeer et al. (1987) estimated the relationship between single-vehicle accidents and field-measured sideslopes (Exhibit 3-34), as cited in (*28*).

Exhibit 3-34: Relationship between single-vehicle accident rate and sideslope, relative to accident rate for a sideslope of 7:1 [1V:7H] or flatter (Zegeer et al., 1987 as cited by (28))



Note: Sideslope Ratios in Exhibit 3-34 are referring to a V:H relationship

Zegeer et al. (1987) examined sideslope effects on rollover and all single-vehicle ROR crashes using field-measured data from approximately 1,800 miles of rural two-lane roads in three states. Neuman et al. report that "the authors found that rollover rates were significantly higher on slopes of 1[V]:4[H] or steeper as compared with slopes of 1[V]:5[H] or flatter … it is concluded that single-vehicle ROR crashes (which include, but are not limited to, rollovers) can be significantly reduced by flattening existing sideslopes to 1[V]:4[H] or flatter". Neuman et al. also find that "the corresponding decrease in total crashes for this example is an estimated 15 percent. These estimates are made under the assumption that the clear zone width stays the same and that the resulting sideslope is relatively free of rigid objects", based on Zegeer et al. (Exhibit 3-35) (as cited in (*16*)).

Allaire et al. (1996) studied sideslope flattening projects and ROR collision frequency and severity using a before-after study of 60 projects that involved sideslope flattening for at least some portion of the project. By comparing to "control" changes, Allaire et al. found a statistically significant benefit for slope flattening. "The percent reduction in ROR collision rates varied by comparison and by injury severity class from approximately 3 to 50 percent. Based upon examination of the tables, the estimated "median" reduction in ROR crash rate is approximately 25 to 45 percent." (as cited in (*16*)).

Exhibit 3-35: Percentage reduction of single-vehicle and total crashes due to sideslope flattening on two-lane rural roads (Zegeer et al., 1987 as cited by (16)).

Sideslope Before Condition	Sideslope After Condition							
	1:4		1:5		1:6		1:7 or Flatter	
	SV	Total	SV	Total	SV	Total	SV	Total
1:2	10	6	15	9	21	12	27	15
1:3	8	5	14	8	19	11	26	15
1:4	0	-	6	3	12	7	19	11
1:5	-	-	0	-	6	3	14	8
1:6	-	-	-	-	0	-	8	5

Note: Sideslope Ratios in Exhibit 3-35 are referring to a V:H relationship

An expert panel was convened as part of Harkey et al. (2008) to determine the best available AMF values for changing roadside sideslopes. The expert panel's assessment was that the AMFs developed by Zegeer et al. (see Exhibit 3-35) are the most accurate, consistent, and cover more cases than other research.

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

The expert panel on rural multilane highways convened as part of Harkey et al. (2008) concluded that the AMFs from Zegeer et al. (1987) were valid and the best available for both rural two-lane roads and rural multilane highways. The discussion of this study and recommended results are found above for rural two-lane roads.

Treatment: Install vertical curb instead of parallel drainage ditch design

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

No studies found.

Urban and suburban arterials

Using data from Washington State (1993 to 1996), multivariate statistical models were developed by Hauer et al. in order to predict the non-intersection accident frequency of urban four-lane undivided roads (*3*). Six separate models were estimated for "off-the-road" and "on-the-road" property damage only (PDO), Injury, and Total accidents. "Off-the-road" accidents were identified using the Impact Location Code in the HSIS database on which the models were derived. Accidents occurring "Off Road Past Shoulder" and "On Shoulder" were classified as off-the-road accidents. The traffic volumes for the sites studied had a range of 2,500 to 68,500 veh/day with the mean being 24,900 veh/day (*3*). Hauer et al. categorized shoulders as either curb/wall, or flush of various widths.

Based on the results from the study by Hauer et al., it appears that the presence of curbs instead of narrow flush shoulders results in increased crashes. The study results are summarized in Exhibit 3-36. There were insufficient data to calculate standard error values for these values.

Exhibit 3-36: Safety effectiveness of raised curbs on urban four-lane undivided roads (3)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hauer et al., 2004	Curbs instead of 2 to 3 ft flush shoulders	Urban Washington	Four-lane undivided, 2,500 to 68,500 veh/day	Off-the-road accidents, PDO	1.38	Unable to calculate.
Hauer et al., 2004	Curbs instead of 2 to 3 ft flush shoulders	Urban Washington	Four-lane undivided, 2,500 to 68,500 veh/day	Off-the-road accidents, Injury	1.25	Unable to calculate.
Hauer et al., 2004	Curbs instead of 2 to 3 ft flush shoulders	Urban Washington	Four-lane undivided, 2,500 to 68,500 veh/day	Off-the-road accidents, Total	1.32	Unable to calculate.
Hauer et al., 2004	Curbs instead of 2 ft flush shoulders	Urban Washington	Four-lane undivided, 2,500 to 68,500 veh/day	On-the-road accidents, PDO	1.19	Unable to calculate.
Hauer et al., 2004	Curbs instead of 2 ft flush shoulders	Urban Washington	Four-lane undivided, 2,500 to 68,500 veh/day	On-the-road accidents, Injury	1.08	Unable to calculate.

Hauer et al., 2004	Curbs instead of 2 ft flush shoulders	Urban Washington	Four-lane undivided, 2,500 to 68,500 veh/day	On-the-road accidents, Total	1.13	Unable to calculate.

Lienau et al. (1996) attempted to quantify the safety effects of barrier curb (i.e., vertical curb) on high-speed suburban multilane highways, compared with a rural parallel drainage ditch design (*29*). Using TXDOT and HSIS data, Lienau et al. studied sites in Texas and Illinois.

The Texas data comprised 10 sections, varied in length and driveway density, with at least two through lanes in each direction. The posted speed limit of all sections was 50 mph or greater, none had paved shoulders, one had a flush median, two had a raised median, and six had TWLTL; volumes ranged from 5,900 to 18,300 veh/day. A minimum of two years of before and two years of after data were included in the analysis (*29*).

The Illinois data comprised nine multilane (non-freeway) sections with curb and gutter, and homogeneous volumes, median design, and number of lanes for comparative analysis. Comparison sites were then matched to these nine sections. The curbed study sites had posted speed limits of 50 mph or greater, none had shoulders, one had a curbed median, one had a mountable median, one had an unprotected median, two had rumble strip medians, and four had no median; volumes ranged from 14,500 to 34,900 veh/day. The comparison sites had similar characteristics (*29*).

Lienau et al. used accident rates before/after curb installation in Texas, and with/without curbs in Illinois. The accident frequencies are also provided in an appendix to their report. However, the AADT and length of each site is not reported; therefore, the best estimate of an AMF from these studies was determined from the accident rates computed by Lienau et al. (accidents/mile/year) (*29*), and are summarized in Exhibit 3-37. The indices of effectiveness were calculated by taking the arithmetic average of the results of the sites for each method (i.e., Texas and Illinois results were kept separate), and estimates of standard error for each method were based on Equation 3-1, where n=10 for Texas and n=9 for Illinois, and x_i is the change in accident rate at each site. A method correction factor of 3 was then applied, as the study does not account for confounding factors (e.g., driveway density, volumes, etc.), and the small sample sizes used in the study.

Note that the large standard error for the Illinois data (26.48) is primarily due to one set of sites where the non-curbed site experienced 3.08 acc/mi/yr and the curbed site experienced 83.39 acc/mi/yr (Exhibit 3-37). The factors involved in this substantial difference in crash experience are unclear, but it skews the Illinois results. In an attempt to learn from the study results, the Illinois data were reanalyzed excluding that site; however, the standard error is still large.

Exhibit 3-37: Safety Effectiveness of raised curbs on high-speed suburban multi-lane highways (non-freeways) (29)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s

Lienau et al., 1996	Barrier curb on the road edge	Suburban Texas	Multilane highways, 5,900 to 18,300 veh/day	All accidents, all types	1.09	1.26
Lienau et al., 1996	Barrier curb on the road edge	Suburban Illinois	Multilane highways, 14,500 to 34,900 veh/day	All accidents, all types	3.57	26.48
Lienau et al., 1996	Barrier curb on the road edge	Suburban Illinois	Multilane highways, 14,500 to 34,900 veh/day	All accidents, all types*	0.64*	1.64*

* One set of sites where the non-curbed site experienced substantially fewer accidents than the curbed site was removed from this calculation

Treatment: Install curb-barrier system

All roads

Plaxico et al. studied curbs and curb-barrier systems along roads with operating speeds greater than 60 km/h (*27*). Guidelines were developed as a result of the study, such as (page 151):

- *"When curbs must be used on high-speed roads, the smallest possible curb height and flattest slope should be used in order to minimize the risk of tripping the vehicle in a non-tracking collision"*
- *"Any combination of a sloping-faced curb that is 150 mm or smaller and a strong-post guardrail can be used where the curb is flush with the face of the guardrail up to an operating speed of 85 km/h"*
- *"Guardrails installed behind curbs should not be located closer than 2.5 m for any operating speed in excess of 60 km/h"*

Additional guidelines are provided in that document regarding the implementation of curbs and curb-barrier systems. However, no quantification of safety effect was reported (*27*).

3.1.2.2. Roadside Features

Roadside features may include signs, signals, luminaire supports, utility poles, trees, motorist-aid call boxes, railroad crossing warning devices, fire hydrants, mailboxes, and other similar roadside features.

The AASHTO Roadside Design Guide contains information about the placement of these features, criteria for breakaway supports, base designs, etc. (*25*).

Providing barriers in front of roadside features that cannot be relocated is discussed in Section 3.1.2.3.

A discussion of the safety effects of illumination pole positions will take place here while the safety effect of the presence of illumination is found in Section 3.4.1.

Exhibit 3-38: Resources examined to investigate the safety effect of roadside features on segments

DOCUMENT	DESCRIPTION	COMMENT

DOCUMENT	DESCRIPTION	COMMENT
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	15.2 B2 Remove/relocate objects in hazardous locations 15.2 B4 Add or improve roadside hardware	These strategies are discussed in the Run-off-Road guide (Vol 6) – see below. Not added to synthesis.
(*30*) (Lacy, K., Srinivasan, R., Zegeer, C. V., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 8: A Guide for Addressing Collisions Involving Utility Poles." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies to mitigate crashes with utility poles.	Qualitative discussion of strategies. No AMFs. Limited information added to synthesis.
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of past studies for various road elements and safety improvements.	AMFs for removing and marking roadside obstacles. Added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Lacy, K., and Zegeer, C., "NCHRP Report 500 Volume 3: A Guide for Addressing Collisions with Trees in Hazardous Locations." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2003))	16.1 B4 Delineate Trees in Hazardous locations 16.1 B1 Remove trees in hazardous locations	Qualitative discussion of strategies. Not added to synthesis.
(*16*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Strategies to reduce run-off-road crashes, including minimizing the likelihood of crashing into an object or overturning if the vehicle travels off the shoulder.	Qualitative information on feature placement added to synthesis. AMFs found by Zegeer 1990 added to synthesis.
(Mak, K. K. and Sicking, D. L., "NCHRP Report 492: Roadside Safety Analysis Program (RSAP) - Engineer's Manual." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Discussion of RSAP software and approach.	No information relevant to this section, used in section on RSAP. Not added to synthesis.
("Roadside Design Guide." Washington, D.C., AASHTO, (2002))	Guidebook that readers may refer to.	Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Review of past literature for several road elements for two-lane rural roads.	No new information – all provided by other references. Not added to synthesis.
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))	Analysis of several roadside characteristics on about 100 km of State Route 3 in Washington State using negative binomial models.	Due to uncertainty of models with respect to the variables' individual effects, not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Allaire, C., Ahner, D., Abarca, M., Adgar, P., and Long, S., "Relationship Between Side Slope Conditions and Collision Records in Washington State." WA-RD 425.1, Olympia, Washington State Department of Transportation, (1996))	Naïve before/after study of 60 3R projects in Washington State.	Reviewed by Neuman et al. 2003 (Vol 6). Not added to synthesis.
(Miaou, S. P., "Measuring the Goodness of Fit of Accident Prediction Models." FHWA-RD-96-040, McLean, Va., Federal Highway Administration, (1996))	The study reviews the relationship between roadside accident frequency and hazards exploring the complementary nature of accident and encroachment-based approaches	Roadside features were not modeled. Not added to synthesis of this section. Relevant info added to syntheses of other roadside sections.
(Zegeer, C. V., Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume II - Alignment." FHWA-RD-91-045, Washington, D.C., Federal Highway Administration, (1992))	Primarily discussion of horizontal and vertical alignment.	AMFs for increased roadside recovery distance. Information insufficient to calculate standard error; no baseline given. Not added to synthesis.
(*31*) (Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))	Overview of impact on safety of various cross section elements.	No new information on roadside geometry. Not added to synthesis.
(Zegeer, C. V., Reinfurt, D. W., Hummer, J., Herf, L., and Hunter, W., "Safety Effects of Cross-Section Design for Two-Lane Roads." Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 20-32.)	This study is quoted by several of the studies reviewed above; not reviewed.	Results included in meta-analysis by Elvik and Vaa (2004).
(*32*) (Zegeer, C.V., Reinfurt,D.W., Hunter,W.W., Hummer,J., Stewart,R., Herf,L., "Accident Effects of Sideslope and Other Roadside Features on Two-Lane Roads" Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 33-47)	This study is quoted by several of the studies reviewed above; not reviewed.	Added to synthesis as cited by other authors.
(*33*) (Zegeer, C. V. and Cynecki, M. J., "Determination of Cost-Effective Roadway Treatments for Utility Pole Accidents." Transportation Research Record 970, Washington, D.C., Transportation Research Board, National Research Council, (1984) pp. 52-64.)	Article summarizing the development of a model to predict utility pole accidents based on ADT, pole density, and pole offset.	Model results added to synthesis.
(*34*) (Zegeer, C. V. and Parker, M. R., Jr., "Effect of Traffic and Roadway Features on Utility Pole Accidents." Transportation Research Record 970, Washington, D.C., Transportation Research Board, National Research Council, (1984) pp. 65-76.)	Article summarizing various costs for utility pole countermeasures.	Roadside adjustment factor for model results added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Summary of safety research of various traffic control and cross-section elements.	Primarily qualitative information, quantitative values have insufficient data to determine standard error. Not added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Summary of significant findings for several cross section elements.	No additional information on roadside geometry. Not added to synthesis.

Discussion: Roadside features in the clear zone area

Neuman et al. state, “The clear zone concept requires that no objects that can result in crashes be located in the zone” (*16*). It is recognized that there is often a need for some objects to be located in the desired clear zone, such as sign supports, barriers, culverts, or utility poles. “Regardless of the reason, the best treatment for all objects is to remove them from the zone.” Neuman et al. suggest that if this cannot be done, alternative strategies include:

- Relocating the objects either farther from the traffic flow or to less hazardous locations
- Shielding or replacing “harder” objects with less hazardous breakaway devices

Information about the implementation of these strategies can be found in the AASHTO Roadside Design Guide (*25*).

The Code of Federal Regulations [23 CFR 645.209(k)] requires that when a transportation agency “determines that existing utility facilities are likely to be associated with injury or accident to the highway user, as indicated by accident history or safety studies, the transportation department shall initiate or cause to be initiated in consultation with the affected utilities, corrective measures to provide for a safer traffic environment” (*35*).

Treatment: Increase the distance to roadside obstacles

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Elvik and Vaa estimated the safety effect for increasing the distance to roadside obstacles, based on American studies by Cirillo (1967) and Zegeer et al. (1988). It is unclear if the distance is measured from the travel lane or shoulder edge for the Cirillo study, but the Zegeer et al. study notes that the distance was measured from the edgeline or edge of the travel lane(*32*). The road types, traffic volumes, and environments were reported as noted in Exhibit 3-39. It is noted that only two studies are included in this exhibit. Elvik and Vaa state that it is unknown if the results include the effect of other improvements, such as improved sight distance (*8*). The estimates of standard error are calculated based on the 95% C.I. reported by Elvik and Vaa, multiplied by a method correction factor of 1.8.

Exhibit 3-39: Safety effects of increased distance to roadside features (8)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik, 2004	Increase distance to obstacle from around 1 m to around 5 m	Rural	Mixture of freeways and two-lane, volume unknown	All types, unknown severity	0.780	0.018
Elvik, 2004	Increase distance to obstacle from around 5 m to around 9 m	Rural	Mixture of freeways and two-lane, volume unknown	All types, unknown severity	0.560	0.014

Note: Distance measured from the edgeline or edge of travel lane.

Zegeer et al. (1992) provides percent accident reduction values for increased roadside recovery distance (which is defined by those authors as including removing trees, relocating utility poles and other obstacles, providing traversable drainage structures, and flattening roadside slopes) (*31*). However, a baseline for these values is not provided, and more recent studies have indicated that the benefit of widening the roadside recovery distance depends not only on the amount of widening, but also the amount of recovery distance prior to widening. Therefore, the results of Zegeer et al. (1992) are not included in this synthesis.

Zegeer et al. (1990) developed safety effectiveness estimates for removing roadside hardware from the clear zone or relocating it farther from the travel way for two-lane rural roads (Exhibit 3-40). These estimates are based on the assumption that removing a specific object increases the clear zone width, and that other objects do not remain at the distance that the specific object was moved from (close to the travel way) (*16*). There is insufficient information to calculate standard errors for these AMFs. The traffic volumes and other cross-sectional elements for these values are unknown.

Exhibit 3-40: AMFs for specific types of obstacle accidents due to clearing/relocating obstacles farther from the roadway on two-lane rural roads (Zegeer et al., 1990 as cited in (16))

Increase in obstacle distance in ft (m)	Trees	Mailboxes, culverts, and signs	Guardrails	Fences/Gates
3 (0.9)	0.78	0.86	0.64	0.80
5 (1.5)	0.66	0.77	0.47	0.70
8 (2.4)	0.51	0.66	0.30	0.56
10 (3.1)	0.43	0.60	0.22	0.48
13 (4.0)	0.34	NF	NF	NF
15 (4.6)	0.29	NF	NF	NF

Notes: NF = generally not feasible to relocate obstacles to specified distance.
These values are only appropriate for obstacle distance of 30 ft or less on two-lane rural roadways.

The values developed by Zegeer et al. are somewhat counterintuitive, as it seems reasonable to expect that the magnitude of safety effect will vary depending how far away the obstacle is from the roadway prior to relocation, not just on the increase in obstacle distance. In other words moving a mailbox from 3 ft to 8 ft is likely more beneficial than moving the same mailbox from 8 ft to 13 ft.

Discussion: Remove roadside obstacles

Elvik and Vaa cite an Australian study (Corben et al., 1997) that investigated the impact of removing roadside obstacles. This study found an index of effectiveness of 0.98 (S=0.3, based on 95% C.I. given by Elvik and Vaa and a method correction factor of 3 due to the lack of detail known about the Corben study) for all accident types of injury severity. The road type, volume, and environment are not stated. The results of the study were not statistically significant (*8*).

No other AMFs were found for the removal of roadside obstacles.

Treatment: Increase the distance to utility poles and decrease utility pole density

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Zegeer and Parker (1984) (*34*) and Zegeer and Cynecki (1984) found that crashes decrease as pole offsets are increased, and as pole density is reduced (*30*) based on a predictive model using 9,600 utility pole crashes in four states, which relates the number of pole crashes to the average offset from the travel lane, ADT, and pole density. Substantial effects were observed by relocating the poles at least 10 ft from the roadway. As the offset (distance between roadway edgeline and utility pole) increases beyond 10 ft, the safety benefit continues to increase, but at a slower rate. The best-fit regression model is provided here as Equation 3-5.

Equation 3-5: Utility pole accident predictive model (33)

$$\text{Acc/mi/yr} = ([9.84 \times 10^{-5} (\text{ADT}) + 3.54 \times 10^{-2} (\text{Density})] / (\text{Offset})^{0.6}) - 0.04$$

Where:

Acc/mi/yr = number of predicted utility pole accidents per mile (1.6 km) per year

ADT = annual average daily traffic volume

Density = number of utility poles per mile within 30 ft (10 m) of the roadway

Offset = average lateral offset of the utility poles (ft) from the roadway edge

Note: It is not indicated if the model is intended for two-lane or multilane, rural or urban settings.

The above model can be used for any combination of ADT, pole density or pole offset. An AMF can be calculated by taking the ratio of the approximate frequency of predicted accidents (acc/mi/yr) with the after conditions divided by the observed accidents (acc/mi/yr) with the before conditions, assuming no significant changes in traffic volumes. For example, Exhibit 3-41 shows the expected safety effect as poles are moved away from the roadway for ADT of 10,000 veh/day and pole density of 40 poles/mile. These AMFs assume that no other roadside fixed objects are present apart from the utility poles.

Exhibit 3-41: AMFs for utility poles accidents for moving poles farther from the roadway (Zegeer and Cynecki, 1984 as cited in (30))

Pole offset before (ft)	Pole offset after (ft)								
	6	8	10	12	15	17	20	25	30
2	0.50	0.42	0.36	0.32	0.28	0.26	0.23	0.20	0.18
3	0.65	0.54	0.47	0.42	0.36	0.33	0.30	0.26	0.23
4	0.78	0.65	0.56	0.50	0.43	0.40	0.35	0.31	0.27
5	0.89	0.74	0.64	0.57	0.49	0.45	0.41	0.35	0.31
6		0.83	0.72	0.64	0.55	0.51	0.46	0.39	0.35
7		0.92	0.80	0.71	0.61	0.56	0.50	0.43	0.38
8			0.87	0.77	0.67	0.61	0.55	0.47	0.42
10				0.89	0.77	0.71	0.63	0.55	0.48
11				0.95	0.82	0.75	0.67	0.58	0.51
12					0.86	0.80	0.71	0.61	0.54
13					0.91	0.84	0.75	0.65	0.57
14					0.96	0.88	0.79	0.68	0.60
15						0.92	0.83	0.71	0.63

NOTE: Pole offset is defined as the distance between the roadway edgeline and the utility pole.

To account for the presence of other roadside objects, Zegeer and Cynecki (1984) developed adjustment factors, which adjust the predicted utility pole accidents for various types of roadsides and the presence of other fixed objects along the road. An example of roadside

adjustment factors for placing poles underground, increasing lateral pole offsets, and reducing pole density through multiple pole use is shown in Exhibit 3-42.

Exhibit 3-42: Roadside adjustment factors for placing utility lines underground, increasing lateral offsets, and multiple pole use; for use in conjunction with Exhibit 3-41 (33)

Utility Lines Undergrounding

Pole Offset (Feet)	Rural Areas			Urban Areas		
	Coverage of Fixed-Objects			Coverage of Fixed-Objects		
	10%	35%	60%	10%	35%	60%
2	0.619	0.497	0.374	0.706	0.574	0.443
5	0.611	0.486	0.361	0.670	0.513	0.356
10	0.564	0.433	0.295	0.611	0.441	0.271
15	0.543	0.407	0.241	0.530	0.383	0.236
20	0.521	0.376	0.231	0.400	0.289	0.178
25	0.471	0.340	0.210			
30	0.400	0.289	0.178			

Increasing Lateral Pole Offset

Pole Offset (Feet)		Area Type (Urban or Rural)	Coverage of Fixed-Objects		
Before Improvement	After Improvement		10%	35%	60%
2	30	R	0.716	0.589	0.461
5	30	R	0.708	0.576	0.445
10	30	R	0.661	0.509	0.357
15	30	R	0.650	0.469	0.277
20	30	R	0.650	0.469	0.289
25	30	R	0.650	0.469	0.289
2	20	R	0.763	0.672	0.582
5	20	R	0.703	0.655	0.560
10	20	R	0.672	0.548	0.423
15	20	R	0.650	0.469	0.289
2	20	U	0.833	0.693	0.552
5	20	U	0.816	0.634	0.452
10	20	U	0.800	0.578	0.356
15	20	U	0.800	0.578	0.356
2	10	U	0.861	0.791	0.721
5	10	U	0.840	0.718	0.596

Multiple Pole Use

Pole Offset (Feet)	Rural Areas			Urban Areas		
	Coverage of Fixed-Objects			Coverage of Fixed-Objects		
	10%	35%	60%	10%	35%	60%
2	0.619	0.497	0.374	0.823	0.659	0.495
5	0.611	0.486	0.361	0.810	0.614	0.418
10	0.571	0.433	0.295	0.800	0.578	0.356
15	0.543	0.392	0.241	0.800	0.578	0.356
20	0.521	0.376	0.231			
25	0.471	0.340	0.210			
30	0.400	0.289	0.178			

Note: 1 foot = 0.3 m

NCHRP Report 500 Volume 8 has identified several other strategies to address crashes involving utility poles (*30*). Details on these strategies are not repeated here. AMFs are not available.

Discussion: Use breakaway devices

The use of breakaway devices may be considered if relocating or removing the poles is not feasible or cost-effective and the location of the pole meets the following criteria (*30*):

- Pole is located in the clear zone
- Alternatives for removing or relocating the pole is not practical due to right-of-way, roadside, or economic constraints
- Pole is class 4-40 or smaller and does not have attached heavy devices
- There is a safe recovery area behind the pole, free of roadside hazards
- Pole is not located near a zone of significant pedestrian activity
- Final position of pole and conductors (wires) should not create a hazard for pedestrians, other vehicles, and adjacent property owners

AMFs were not found for the introduction of breakaway utility poles.

Discussion: Delineate roadside features

Elvik and Vaa report the only quantified safety effect for marking roadside obstacles to increase their visibility based on a study conducted in Australia (Corben et al., 1997). An index of effectiveness of 0.77 (s=1.01, based on 95% C.I. reported by Elvik, multiplied by MCF of 3 due to lack of detail reported for the original study) is provided for injury accident for all types; the results of the study are not statistically significant (*8*). The road type, volume, and environment are not stated. "At least two states are currently pilot testing a low-cost experimental strategy where roadside objects are delineated so that they are more visible to drivers at night" (*16*). Pennsylvania and Iowa are testing a strategy at sites where it is not feasible to remove or relocate the objects (utility-poles, trees). The effectiveness of this delineation has not yet been quantified; it is unknown if this treatment will be beneficial or confusing to road users. The hypothesis is that the added delineation could provide additional guidance to drivers to assist in maintaining the travel way, make the hazard more visible, or provide information to allow the driver to navigate the roadside (assuming the driver is able to react and control the vehicle after leaving the travel way). "This should not be used in place of other non-experimental treatment and should be pilot tested and evaluated before widespread use in any jurisdiction" (*16*)

Lacy et al. provide some discussion regarding the safety effect of delineating poles to improve the drivers' ability to see poles in high-crash locations. "A major problem with this strategy is that its low cost may make it appear attractive, but it may not provide any real improvement in safety. Application of this strategy should be limited to poles where other strategies cannot be applied" (pg V-19) (*30*).

3.1.2.3. Roadside Barriers

As defined by AASHTO's Roadside Design Guide, a roadside barrier (guardrail, guiderail) is "a longitudinal barrier used to shield motorists from natural or man-made obstacles located along either side of a traveled way. It may also be used to protect bystanders, pedestrians, and cyclists from vehicular traffic under special conditions" (*25*). This section will discuss the safety effect of implementing roadside barriers to provide a buffer between motorists and roadside features (Roadside Features are discussed in Section 3.1.2.2). Median barriers are

included in this discussion. Bridge railings are not included in this discussion; the reader is referred to Section 6.3 Bridges [Future Edition]. Clear zone, roadside geometry, roadside features, use of the Roadside Safety Analysis Program, and applying the roadside hazard rating are discussed later.

At this time, no literature was found describing the safety effect of the use of roadside barriers to protect bystanders, pedestrians, and bicyclists. Future editions of the HSM may discuss this treatment.

Warrants for barrier installation can be found in AASHTO's Roadside Design Guide, along with performance requirements, placement guidelines, and a methodology for identifying and upgrading existing installations (*25*).

Barrier end treatments or terminals are "normally used at the end of a roadside barrier where traffic passes on one side of the barrier and in one direction only. A crash cushion is normally used to shield the end of a median barrier or a fixed object located in a gore area. A crash cushion may also be used to shield a fixed object on either side of a roadway if a designer decides that a crash cushion is more cost-effective than a traffic barrier" (*25*). A crashworthy end treatment is considered valuable if a roadside barrier terminates within the clear zone or an area likely to be struck by errant vehicles. "Crashworthy" implies that the end treatment "should not spear, vault, or roll a vehicle for head-on or angled impacts" (*25*).

AASHTO's Roadside Design Guide contains barrier end treatment and crash cushion installation warrants, structural and performance requirements, selection guidelines, and placement recommendations (*25*).

Exhibit 3-43: Resources examined to investigate the safety effect of roadside barriers on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of the safety effect of placing guardrails along the roadside; placing guardrails in the median of divided highways; guardrails placed between opposing lanes of undivided highways; crash cushion installation	Results for roadside, divided median, undivided median and crash cushions added to synthesis.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	15.2 B5 Improve design and application of barrier and attenuation systems	Strategies are fully discussed in Vol 6 (ROR guide). Not added to synthesis.
(*16*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	15.1 C2 Improve Design and Application of Barrier and Attenuation Systems	Discussion of past research added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*36*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Lacy, K., and Zegeer, C., "NCHRP Report 500 Volume 3: A Guide for Addressing Collisions with Trees in Hazardous Locations." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2003))	16.1 B2 Shield motorists from striking trees	Qualitative discussion added to synthesis. No quantitative information
Srinivasan, Raghavan.; Lacy, Kevin.; Feaganes, John.; and Hunter, William. Effects of Continuous Median Barriers on Highway speeds, emergency response times, and Transport Times on North Carolina Highways. Final Report, FHWA A/NC/2003-05, November 2003.	This study examines the effect of various types of median barriers in terms of speeding, speeding related crashes and emergency response time. 51 freeway segments with 4 types of median barriers were studied.	Statistical models were calibrated to help predict collision frequency at any one of the 4 median types. No AMFs. Not added to synthesis.
("Roadside Design Guide." Washington, D.C., AASHTO, (2002))	Guidebook that contains substantial information on barriers and roadside design.	No AMFs. Not added to synthesis.
(*37*) (Ray, M. H., Weir, J., and Hopp, J., "In-Service Performance of Traffic Barriers." 22-13, Washington, D.C., Transportation Research Board, National Research Council, (2002))	In-service safety performance evaluation of common guardrails and guardrail terminals in NC, IA, and CT	Suggested by NCHRP 17-18(4). No information about overall impact on safety. Not added to synthesis.
(*38*) (Hunter, W. W., Stewart, J. R., Eccles, K. A., Huang, H. F., Council, F. M., and Harkey, D. L., "Three-Strand Cable Median Barrier in North Carolina: In-Service Evaluation." Transportation Research Record, No. 1743, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 97-103.)	Used crash data to evaluate the effect of the installation of cable median barrier on crash rates in NC; only used Interstate locations	Suggested by NCHRP 17-18(4). Insufficient information to determine safety effect. Not added to synthesis.
(*15*) (Hauer, E., "The Median and Safety." (2000))	Addresses the use of guardrail as a median barrier	Suggested by NCHRP 17-18(4). Added to synthesis.
(*39*) (Ray, M. H., "Safety Effectiveness of Upgrading Guardrail Terminals to Report 350 Standards." Transportation Research Record, No. 1720, Washington, D.C., Transportation Research Board, National Research Council, (2000))	Reviews previous in-service evaluations of the safety effect of guardrail terminals	Suggested by NCHRP 17-18(4). As reviewed by Neuman et al. (2003) Vol 6. Qualitative information added to synthesis.
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Model of safety performance of two-lane rural roads.	Roadside barriers are not explicitly considered. Not added to synthesis
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Guardrails discussed with other roadside features that errant vehicles may strike.	No relevant information. Not added to synthesis.
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))	Analysis of several roadside characteristics on about 100 km of State Route 3 in Washington State using negative binomial models.	Due to uncertainty of models, in the estimation of AMFs, not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Miaou, S. P., "Measuring the Goodness of Fit of Accident Prediction Models." FHWA-RD-96-040, McLean, Va., Federal Highway Administration, (1996))	The study reviews the relationship between roadside accident frequency and hazards exploring the complementary nature of accident and encroachment-based approaches	Roadside barriers were not modeled. Not added to synthesis of this section. Relevant info added to syntheses of other roadside sections.
(Elvik, R., "The Safety Value of Guardrails and Crash Cushions: A Meta-Analysis Of Evidence From Evaluation Studies." Accident Analysis and Prevention, Vol. 27, No. 4, Oxford, N.Y., Pergamon Press, (1995) pp. 523-536.)	Meta-analysis of 32 studies that evaluated the safety effect of guardrails along the edge of the road and impact attenuators	Suggested by NCHRP 17-18(4); reviewed by Hauer (2000); conclusions taken from Elvik (2004) as they have CI indicated. Not added to synthesis.
(Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))	Overview of impact on safety of various cross-section elements.	No additional information on barriers; not added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Summary of safety research of various traffic control and cross-section elements.	No additional quantitative information; not added to synthesis.
(Dawson, R. F. and Oppenlander, J. C., "General Design." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 11, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Reports the relationship between safety and general design features of highways.	Before/after values for guardrail installation from California improvement projects; very limited and outdated information; not added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Reviews highway safety aspects of cross-section elements.	Some discussion of the merits of median and roadside barriers and guardrails; appears to be superseded by Roadside Design Guide (warrants). Not added to synthesis.

Treatment: Install shoulder guardrails along embankments or changing to softer guardrails

All road types

Elvik and Vaa (2004) performed meta-analyses of studies on guardrails along embankments, including both U.S. and International studies (*8*). The range of traffic volumes and road types were mixed in the study. Details such as the distance to the guardrail were not stated in the source studies.

Elvik and Vaa note that “changing to more pliant guardrails also has a damage-reducing effect, but this is smaller than the effect of setting up guardrails in places where previously there were none” (pg 350) (*8*). Elvik and Vaa also state “guardrails do not have an equally great effect on all types of obstacles… a significant reduction in the severity of injuries sustained in crashes with trees, rock faces and driving off the road in steep slopes. The reduction in injuries is, however, smaller with regard to hitting signposts or ditches” (pg 350) (*8*).

The type of roadside barrier applied can vary from very rigid to less rigid. In order of rigidity, the following generic types of barriers may be considered: (*8*)

- Bridge rail (most rigid)
- Concrete
- Steel
- Wire (least rigid)

Based on the information provided by Elvik and Vaa (2004), the s ideal for these values are based on the 95% confidence interval, and then modified by a method correction factor of 1.8. The resulting indices of effectiveness and standard error values are summarized in Exhibit 3-44.

Exhibit 3-44: Safety effect of guardrails along the roadside (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	New guardrail along embankment	Not reported	Mixed	Run-off-road, fatal	0.56	0.099
Elvik and Vaa, 2004	New guardrail along embankment	Not reported	Mixed	Run-off-road, injury	0.53	0.050
Elvik and Vaa, 2004	New guardrail along embankment	Not reported	Mixed	Run-off-road, all severities	0.93	0.306
Elvik and Vaa, 2004	Changing to softer guardrails	Not reported	Mixed	Run-off-road, fatal	0.59	0.306
Elvik and Vaa, 2004	Changing to softer guardrails	Not reported	Mixed	Run-off-road, injury	0.68	0.099

Treatment: Install median guardrails

Rural two-lane roads

Not applicable.

Rural multi-lane highways; Freeways; Expressways

Elvik and Vaa performed a meta-analysis of the safety effect of median guardrails on divided highways, based on the results of 22 studies (15 U.S., 7 international). The analysis includes some information on the type of guardrail placed in the median (*8*). These values are for all accidents on divided multi-lane roads. Elvik and Vaa state that "median guardrails are seen to prevent nearly all accidents in which vehicles actually cross the median and reduce the severity of accidents greatly" (*8*) (pg 352).

Traffic volume is rarely stated in source studies, but it is reasonable to assume that it is in the range of 20,000 to 60,000 veh/day. Based on the information provided by Elvik and Vaa (2004), the s ideal for these studies was based on the 95% confidence interval, and then modified by a method correction factor of 1.8. The resulting t and s values are summarized in (Exhibit 3-45).

Exhibit 3-45: Safety effect of guardrails and guardrail type in the median of multi-lane divided highways (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Median guardrail	Not reported	Multi-lane divided highways, volume not reported	All types, fatal	0.57	0.099
Elvik and Vaa, 2004	Median guardrail	Not reported	Multi-lane divided highways, volume not reported	All types, injury	0.70	0.059
Elvik and Vaa, 2004	Median guardrail	Not reported	Multi-lane divided highways, volume not reported	All types, all severities	1.24	0.027
Elvik and Vaa, 2004	Install concrete guardrail in median	Not reported	Multi-lane divided highways, volume not reported	All types, injury	1.15	0.356
Elvik and Vaa, 2004	Install steel guardrail in median	Not reported	Multi-lane divided highways, volume not reported	All types, injury	0.65	0.077
Elvik and Vaa, 2004	Install wire (cable) guardrail in median	Not reported	Multi-lane divided highways, volume not reported	All types, injury	0.71	0.113

Hauer (2000) performed a critical review of literature from 1953 to 1997 which studied the use of guardrails as a median barrier (*15*). Based on the studies available, Hauer draws some conclusions regarding median barriers, however no quantitative solution is reached. Only one study had sufficient information to determine a quantitative conclusion, Sacks (1965) studied the safety effect of placing a beam barrier in a 4 ft median on an expressway with ADT 130,000 veh/day or greater. The results of that study are shown in Exhibit 3-46. This study had a known increase in volume, and was rated low (method correction factor of 3).

These results are indicative of the other findings reviewed by Hauer. Hauer states “The basic trade-off is clear. Placing a barrier in the median will largely eliminate the severe cross-median accidents. These are the very accidents that tend to create adverse publicity for the highway agency and are the impetus for public pressure to erect a median barrier. At the same time, the barrier will become the target of crashes that would otherwise not occur. It will cause additional accidents by deflecting vehicles back into the traffic stream. In addition, for narrow medians, the barrier seems to cause increases in speed in the median lane and changes in vehicle placement that reduce the clearance between parallel streams. The net effect of placing a barrier in the median is usually an increase in total accidents; an increase in injury accidents and its effect on the total number of fatal accidents is at present unclear. Traditionally, highway agencies took the position that it is the total accident impact that matters. This position may be eroding under the pressure of adverse publicity” (pg 6.52) (*15*).

Exhibit 3-46: Safety effect of placing beam barrier in 4 ft median on expressway with ADT 130,000 veh/day (15)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Sacks (1965) as cited in Hauer (2000)	Install beam barrier in 4 ft median	Not reported	Expressway, 130,000 veh/day	All types, fatal	0.13	0.414
Sacks (1965) as cited in Hauer (2000)	Install beam barrier in 4 ft median	Not reported	Expressway, 130,000 veh/day	All types, injury	1.18	0.462
Sacks (1965) as cited in Hauer (2000)	Install beam barrier in 4 ft median	Not reported	Expressway, 130,000 veh/day	All types, PDO	1.40	0.344
Sacks (1965) as cited in Hauer (2000)	Install beam barrier in 4 ft median	Not reported	Expressway, 130,000 veh/day	Cross-median, all severities	0.22	0.194

The following points are excerpts from Hauer's review of the literature (*15*):

- For ADT<130,000 veh/day, both the injury and the total accident rate are higher when a median barrier is installed. No attempt has been made to examine the validity of this assertion as a function of median width. Also, fatal and injury accidents were lumped together and this does not allow one to account properly for the larger mortality of cross-median accidents.
- A before/after study by Johnson (1964) shows that the installation of a cable or beam barrier resulted in an increase in total accidents (22% for cable, 32% for beam), increase in injury accidents (18% for cable and 30% for beam) and no change in fatal accidents. This is similar in direction and magnitude to the results summarized in Exhibit 3-46 for injury and PDO accidents.
- A statewide with/without comparison shows that urban freeways with ADT>50,000 and with no barrier have considerably fewer accidents. The same seems to be true for the fatal accident rates but the numbers are too small to tell.
- Whether barrier installation on a freeway is of safety benefit seems to depend on the width of the median. The impression is that in medians up to 36' the barrier was beneficial. For wider medians in the 40-46 foot range it was detrimental. Thus, differentiation by median width is important.
- One must differentiate between median barriers on freeways and non-freeways. On non-freeway projects, the use of a median barrier was harmful.
- The use of a barrier in the conditions where the barrier is now not warranted can be expected to increase the number of accidents, increase the number of injury accidents, and perhaps decrease the number of fatal accidents. The increase in PDO and injury accidents is very consistent. The savings in fatal accidents cannot be confidently estimated because the number in each cell is small.

Also, Hauer notes, "Because little can be said about the impact of median barriers on fatal accidents, many early studies lumped fatal and injury accidents together. In retrospect, this was a mistake. The essence of a median barrier seems to be that in some conditions it may save

fatalities whilst increasing injuries and property damage. Therefore the distinction between fatal and non-fatal injury accidents is all-important. By lumping the two these early studies developed powerful prejudices against the use of median barriers" (pg 6.52) (*15*).

Urban and suburban arterials

No studies found.

Treatment: Install wire guardrails between lanes of opposing traffic

Three-lane undivided roads (uncommon in North America)

Elvik and Vaa (2004) reviewed a Swedish study (Carlsson et al., 2000) that evaluated the placement of wire guardrails between the lanes of opposing traffic on undivided three lane highways in Sweden (i.e., two lanes in one direction, one in the other, alternating every few kilometers) (*8*). These kinds of highways may not be very common in North America. Typical traffic volume is 5,000 to 20,000 veh/day. The guardrails are intended to prevent, or reduce the severity of, head-on crashes. Elvik and Vaa found a 100% reduction in fatal crashes (AMF=0.0, s=2.5), a 26% reduction in serious and slight injuries (AMF=0.74, s=0.84), and an increase of 34% of all accidents (fatal, injury and PDO combined) (AMF=1.34, s=0.74) (Exhibit 3-47). The standard errors were calculated based on the number of accidents before and after the treatment, and a method correction factor of 5 (rating of very low) was applied due to the lack of detail reported in the original study, the likely influence of regression-to-mean, and the limitation of only one study performed.

Exhibit 3-47: Safety effect of wire guardrails between opposing lanes of traffic on three-lane undivided roads (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Wire guardrail between lanes of opposing traffic	Not reported	Three lane undivided highway, 5,000 to 20,000 veh/day	All types, fatal	0.00[(a)]	2.54
Elvik and Vaa, 2004	Wire guardrail between lanes of opposing traffic	Not reported	Three lane undivided highway, 5,000 to 20,000 veh/day	All types, injury	0.74	0.835
Elvik and Vaa, 2004	Wire guardrail between lanes of opposing traffic	Not reported	Three lane undivided highway, 5,000 to 20,000 veh/day	All types, all severities	1.34	0.743

NOTE: (a) AMF for fatal crashes has large standard error

Hunter et al. (2001) developed regression-type models in an attempt to estimate the safety effect of installing three-strand cable median barriers on North Carolina Interstate highway

(*38*). Negative binomial models were used to produce the predicted values, and (over dispersed) Poisson models were used to estimate and test the treatment effects (pg 99). Insufficient information is provided in the TRR article to determine the parameter estimates used in the various models for the various crash types and treatment levels (pre-treatment, transition, post-treatment). This study is not added to the synthesis.

Treatment: Install crash cushions

All road types

Elvik and Vaa (2004) performed a meta-analysis of the safety effect of crash cushions, based on 5 studies (3 U.S., 2 international) (Exhibit 3-48) (*8*). The placement and type of crash cushions, setting, road type, traffic volumes, and other cross-sectional elements of the studied sites are not reported. The standard error is calculated based on the confidence interval of the effect noted by Elvik and Vaa, modified by a factor of 3 due to the uncertainty of the original studies. The results are summarized in Exhibit 3-48.

As noted by Elvik and Vaa "Only two studies that included property damage only accidents are available. One, carried out on an accident black spot, found a strong reduction in the number of accidents. The other, carried out on motorways in Great Britain, found a strong increase in the number of accidents" (pg 353) (*8*). Elvik and Vaa also note that "no studies are available which have evaluated the effect of different types of crash cushions" (pg 353) (*8*).

Exhibit 3-48: Safety effect of new crash cushions at permanent objects (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik, 2004	New crash cushions at permanent objects	Not reported	Not reported	Fixed object, fatal	0.31	0.278
Elvik, 2004	New crash cushions at permanent objects	Not reported	Not reported	Fixed object, injury	0.31	0.098
Elvik, 2004	New crash cushions at permanent objects	Not reported	Not reported	Fixed object, PDO	0.54	0.300

Discussion: Other roadside barrier information

Ray et al. (2002) conducted in-service performance evaluation of the BCT (breakaway cable terminal) and MELT (modified eccentric loader terminal) guardrail terminals in North Carolina, Iowa, and Connecticut. During the 24-month data collection period, the authors collected 169 MELT and BCT cases, including 144 crashes. Ray notes, "in general, these terminals are performing reasonably well. Over 60 percent of the 115 police-reported MELT and BCT crashes resulted in only property damage, and only five involved severe occupant injuries" (pg 115) (*37*). Also "it was shown that about 90 percent of crashes with BCT terminals are minor crashes that results in little property damage, no occupant injury, and are not reported to the police" (pg 115) (*37*). This study does not provide data that can be used to determine an AMF.

AASHTO's Roadside Design Guide contains detailed discussion of guardrail terminal treatments (*26*).

In a previous study, Ray (2000) examined the possible effects of upgrading guardrail terminals (e.g., BCT and MELT) to a newer design (ET-2000) using both police reported and maintenance data in five states(*39*). Ray notes no statistically significant difference in injury severity among three designs, and stresses the need for proper installment. Ray refers to previous studies by Morena and Schroeder (1994) and Agent and Pigman (1991) that also indicate the potential negative safety impact when installed improperly. (*16*)

According to Neuman et al. "Guardrail installations in front of trees will typically reduce crash severity of ROR crashes, although crash frequency may increase in some cases, since a rigid object is placed closer to the roadway than are the trees or other objects being shielded" (*36*). AMFs were not provided. AASHTO's Roadside Design Guide contains further information on barrier installation (*25*).

NCHRP Report 500 Volume 8 contains criteria for the application of barriers or crash cushions to shield utility poles (*30*).

3.1.2.4. Roadside Safety Analysis Program

It is important to implement roadside treatments at sites that will benefit most.(*36*) The above sections have discussed the effects of changes to various individual components of the roadside. Decisions concerning alternative roadside designs with multiple components (e.g., different possible slopes, barrier placement, hardware location, clearzone width, etc.) are often required. As pointed out by Neuman et al. (2003), it is important that the choice of the various roadside strategies that can be implemented at a site be based on optimizing safety benefits. (*36*) The application of the Roadside Safety Analysis Program (RSAP) – a computerized algorithm – predicts roadside crashes based upon roadway, roadside, and traffic descriptors, and examines the benefits and costs of various alternatives. Additional information on the development of RSAP can be found in NCHRP Report 492 "Roadside Safety Analysis Program (RSAP) – Engineer's Manual", which is available at http://trb.org/publications/nchrp/nchrp_rpt_492.pdf.".(*40*)

A description of the RSAP program with a number of proposed applications will be provided in this section. No AMFs will be provided in this section.

Exhibit 3-49: Resources examined for the Roadside Safety Analysis Program

DOCUMENT	DESCRIPTION	COMMENT
(*36*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Lacy, K., and Zegeer, C., "NCHRP Report 500 Volume 3: A Guide for Addressing Collisions with Trees in Hazardous Locations." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2003))	Various strategies aimed to reduce crashes with trees.	Discussion of the benefits of RSAP; added to synthesis.
(*40*) (Mak, K. K. and Sicking, D. L., "NCHRP Report 492: Roadside Safety Analysis Program (RSAP) - Engineer's Manual." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Developed an improved cost-effective analysis procedure to assess roadside safety improvements, the Roadside Safety Analysis Program (RSAP).	Description of RSAP and some applications; added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
("Roadside Design Guide." Washington, D.C., AASHTO, (2002))	Primary resource for roadside element guidance.	Linked to RSAP; not added to synthesis.

Mak et al. (2003) developed a cost-effective analysis procedure to assess roadside safety improvements, culminating in the development of the Roadside Safety Analysis Program (RSAP). Details about the program and its development are documented in "Roadside Safety Analysis Program (RSAP) – Engineer's Manual" for details on program functionality, advantages, and limitations (*40*); and the User's Manual discusses the interface and application. Both manuals and the software are available at http://trb.org/news/blurb_detail.asp?id=1519. The following discussion is adapted from the Engineer's Manual (pg 1-2):

"When determining locations and types of roadside safety devices to be used, the risk of death or injury to road users is weighed against the initial cost of installing and maintaining safety improvements. Sometimes, the choice of safety treatment is not readily apparent, such as for low-volume and/or low-speed roadways. In addition, a performance level must be selected for each situation. Incremental benefit/cost analysis has been widely accepted as the most appropriate method for evaluating safety alternatives. Benefits are measured in terms of expected crash savings or societal benefits associated with a safety improvement; costs are defined as the increase in direct highway agency expenditures associated with the improvement(s). For example, the ROADSIDE program (presented in Appendix A of the 1988 and 1996 editions of AASHTO's Roadside Design Guide) is a benefit/cost analysis program intended for use with site-specific decision-making processes. The Roadside Safety Analysis Program (RSAP) was developed as a new improved cost-effectiveness procedure. RSAP is based on the encroachment probability approach, using a stochastic Monte Carlo simulation technique." (*40*)

RSAP consists of 4 modules, which are described in more detail in "NCHRP Report 492: Roadside Safety Analysis Program (RSAP) – Engineer's Manual" (*40*):

1. Encroachment Probability – uses roadway and traffic information to estimate the expected roadside encroachment frequency along a highway segment. The Cooper encroachment data used by RSAP is also used in the AASHTO Roadside Design Guide (2002).
2. Crash prediction – given that an encroachment has occurred, assesses if the encroachment would result in a crash, using a function for vehicle path (function of encroachment angle, vehicle size, and vehicle orientation), the locations of roadside features, and the probability that the vehicle may return to the roadway or come to a stop before reaching the roadside feature. If a crash is predicted, impact conditions are estimated
3. Severity prediction – for each predicted crash (Module 2) the severity of the crash is estimated using a traditional severity index (SI) approach, similar to that used in the ROADSIDE program (AASHTO Roadside Design Guide 1996), related to impact speed instead of roadway design speed, for each roadside object
4. Benefit/Cost analysis – crash severity estimate is converted to crash cost using values from either the AASHTO Roadside Design Guide or the FHWA comprehensive cost figures based on willingness-to-pay (user's choice)

RSAP is believed to provide much advancement over its predecessors; however, there are also some limitations to the software and prediction modules, such as the age of the encroachment data used in the improved encroachment probability model. In spite of the shortcomings of the current version, RSAP is currently the best tool when considering the safety of highway roadsides.

3.1.2.5. Roadside Hazard Rating

The AASHTO Roadside Design Guide discusses clear zone widths related to speed, traffic volume, and embankment slope. The Roadside Hazard Rating (RHR) system considers the clear zone in conjunction with the roadside slope, roadside surface roughness, recoverability of the roadside, and other elements beyond the clear zone such as barriers or trees (*7*). The Roadside Hazard Rating (RHR) was developed to characterize the accident potential for roadside designs found on two-lane highways (*7*). As the Roadside Hazard Rating increases, from 1 to 7, the crash risk for frequency and/or severity increases. This seven-point categorical scale is discussed in this section.

Exhibit 3-50: Resources examined for the Roadside Hazard Rating

DOCUMENT	DESCRIPTION	COMMENT
(*7*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Prediction models developed for two-lane rural roads, incorporating RHR in one of the models.	Added to synthesis.
(*11*) (Zegeer, C. V., Reinfurt, D. W., Hummer, J., Herf, L., and Hunter, W., "Safety Effects of Cross-Section Design for Two-Lane Roads." Transportation Research Record 1195, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 20-32.)	Studied effect on accidents of lane widening, shoulder widening, and shoulder surfacing; used detailed traffic, accident, roadway and roadside data.	Original source of RHR, as cited by Harwood (2000). Added to synthesis.

For the purposes of the accident prediction algorithm for two-lane rural roads (HSM Part III, Chapter 8), roadside design is described by the Roadside Hazard Rating (RHR), a 1 to 7 scale developed by Zegeer et al. (*11*). Quantitative descriptors for the seven RHR levels are summarized in Exhibit 3-51. Exhibit 3-52 to Exhibit 3-58 are photographs illustrating the seven RHR categories.

For the development of the IHSDM, the quality of roadside design was represented by the RHR, as documented in Chapter 8 (HSM Part III) (*7*). Harwood et al. developed the AMF for total accidents based on roadside design directly from their base model for roadway sections (Chapter 8), using the nominal or base value of RHR of 3 (Exhibit 3-54). That is, the AMF is based on the ratio of the accident experience predicted by base model using the actual roadway section in question to the accident experience predicted by the base model using the nominal value of RHR of 3, and can be calculated using Equation 3-6. An estimate of the standard error for this AMF could not be determined.

Equation 3-6: AMF for total accidents on rural two-lane highways based on roadside hazard rating (7)

$$AMF = \frac{\exp(-0.6869 + 0.0668RHR)}{\exp(-0.4865)}$$

Where:

RHR = Roadside hazard rating for the roadway segment

The expert panel that developed this AMF encourages the development of AMFs for specific roadside design elements (*7*). The Roadside Safety Analysis Program (RSAP) was not complete at the time of the development of the rural two-lane model (Chapter 8), and it is recommended that RSAP be used in place of the RHR where the data are available for the road segment in question. (RSAP is discussed in Section 3.1.2.4.) However, the use of RHR data, which can be collected from existing videologs, appears to be a feasible alternative in other applications where detailed roadside inventory data are not available.

Exhibit 3-51: Quantitative descriptors for the seven Roadside Hazard Ratings (7)

Rating	Clear zone width	Sideslope	Roadside
1	Greater than or equal to 30 ft (9 m)	Flatter than 1V:4H; recoverable	N/A
2	Between 20 and 25 ft (6 to 7.5 m)	About 1V:4H; recoverable	N/A
3	About 10 ft (3 m)	About 1V:3H or 1V:4H; marginally recoverable	Rough roadside surface
4	Between 5 and 10 ft (1.5 to 3 m)	About 1V:3H or 1V:4H; marginally forgiving, increased chance of reportable roadside collision	May have guardrail (offset 5 to 6.5 ft, 1.5 to 2 m) May have exposed trees, poles, other objects (offset 10 ft, 3 m)
5	Between 5 and 10 ft (1.5 to 3 m)	About 1V:3H; virtually non-recoverable	May have guardrail (offset 0 to 5 ft, 0 to 1.5 m) May have rigid obstacles or embankment offset 6.5 to 10 ft (2 to 3 m)
6	Less than or equal to 5 ft (1.5 m)	About 1V:2H; non-recoverable	No guardrail Exposed rigid obstacles offset 0 to 6.5 ft (0 to 2 m)
7	Less than or equal to 5 ft (1.5 m)	1V:2H or steeper; non-recoverable with high likelihood of severe injuries from roadside collision	No guardrail Cliff or vertical rock cut

Note: clear zone width, guardrail offset, and object offset are measured from the pavement edgeline

N/A = no description of roadside is provided.

Exhibit 3-52: Typical roadway with Roadside Hazard Rating of 1



Exhibit 3-53: Typical roadway with Roadside Hazard Rating of 2



Exhibit 3-54: Typical roadway with Roadside Hazard Rating of 3



Exhibit 3-55: Typical roadway with Roadside Hazard Rating of 4



Exhibit 3-56: Typical roadway with Roadside Hazard Rating of 5



Exhibit 3-57: Typical roadway with Roadside Hazard Rating of 6



Exhibit 3-58: Typical roadway with Roadside Hazard Rating of 7



3.1.3. Alignment Elements

The following sections describe the elements of the horizontal and vertical alignment of roadway segments and the effect on safety; a future HSM edition will include the effect of combined horizontal and vertical alignments.

A key, but dated comprehensive background reference is "Safety Effectiveness of Highway Design Features: Volume II Alignment" (*41*).

3.1.3.1. Horizontal Alignment

There are several elements of horizontal alignment that may be associated with the safety performance (i.e., accident frequency and severity on the curve) of a horizontal curve, including the internal features (e.g., radius or degree of curve, superelevation, spiral, etc.) and the external features (e.g., density of curves upstream, length of the connecting tangent sections, sight distance, etc.).

The degree of curvature (or curve radius) is defined as the number of degrees of arc subtended by 100 feet of curve length (D). The radius of a curve (R) in meters equals 1748/D. Accident occurrence on a curve is believed to be a function of its degree or, equivalently, of its radius. The radius or degree of curve is a factor 'internal' to the curve.

Safety performance of a horizontal curve is also believed to be also a function of the speed, attitudes, and expectations with which road users approach the curve. These are fashioned by what the road users have experienced before reaching the specific curve. Speed choice, driver attitude, and driver expectations may depend on variables such as the length of the preceding tangent or the preceding curve density. These are factors 'external' to the curve. *[Adapted from (42).]*

Coverage of this topic would ideally include the safety effects of horizontal alignment and horizontal sight distance, while addressing the safety effects of horizontal design elements such as tangents, curves, superelevation, and spirals, as well as lane and shoulder widening at curves, tangent length between curves, sight distances to entrances on or adjacent to curves,

alignment approaches and left-turn movements, and the design for larger vehicles (trucks, buses, etc.). However, because of limitations in the existing knowledge base, it is only effective to address selected aspects in this edition. Specifically, these relate to curve length, curve radius, superelevation, and presence of spirals.

Exhibit 3-59: Resources examined to investigate the safety effect of horizontal alignment on road segments

DOCUMENT	DESCRIPTION	COMMENT
(*43*) (Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	One document from the recent NCHRP Guidebook series; summarizes past research rather than add new knowledge	Added to synthesis
(Harwood, D. W., "Methodology to Predict the Safety Performance of Urban and Suburban Arterials." NCHRP Project 17-26 Interim Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2004))	Interim report summarizes knowledge on safety of design elements for a specific road class	No new results available. Not added to synthesis.
(*3*) (Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))	Cross-sectional models for a specific road class using HSIS data	Added to synthesis
(Kockelman, K., Lave, C., and Charles River Associates Inc., "Safety Impacts and Other Implications of Raised Speed Limits on High-Speed Roads." NCHRP Project 17-23 Interim Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2003))	On going research. No products of value available	Not added to synthesis
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	One document from the recent NCHRP Guidebook series; summarizes past research rather than add new knowledge	Not added to synthesis – material not relevant or covered elsewhere
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Summarizes AMF knowledge for mainly traffic engineering/operations measures	Not added to synthesis – material not relevant or covered elsewhere
(Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))	Ross-sectional analysis of a database in one State -- deemed likely to be of little value	Not added to synthesis
(*7*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Provides expert panel AMFs for several horizontal alignment variables	Added to synthesis
(*42*) (Hauer, E., "Safety of Horizontal Curves." (2000))	Synthesizes AMF knowledge fro several horizontal alignment variables	Added to synthesis
(Storm, R., "Pavement Markings and Incident Reduction." Ames, Iowa, 2000 MTC Transportation Scholars Conference, (2000) pp. 152-162.)	Unclear why this is of relevance so it was deemed irrelevant on the basis of the title alone	Not added to synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Hanley, K. E., Gibby, A. R., and Ferrara, T. C., "Analysis of Accident Reduction Factors on California State Highways." Transportation Research Record, No. 1717, Washington, D.C., Transportation Research Board, National Research Council, (2000) pp. 37-45.)	Provides some AMFs but none of particular relevance – mostly combination measures	Not added to synthesis
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Not reviewed. Likely to be covered in Harwood et al. 2000	Not added to synthesis
(Potts, I. B., Harwood, D. W., and Bauer, K. M., "Effect Of Preceding Tangent Length On Safety For Horizontal Curves." Mainz, Germany, 2nd International Symposium on Highway Geometric Design, (2000) pp. 279-287.)	Cross-sectional analysis of HSIS data for two-lane rural roads in Washington	Not added to synthesis
(Gibreel, G. M, Easa, S. M, Hassan, Y., and El-Dimeery, I. A., "State of the Art Review of Highway Geometric Design Consistency." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1999) pp. 305-313.)	Knowledge on consistency that is not relevant to the 1st HSM edition	Not added to synthesis
(Preston, H. and Schoenecker, T., "Potential Safety Effects of Dynamic Signing at Rural Horizontal Curves." MN/RC-2000-14, St. Paul, Minnesota Department of Transportation, (1999))	Addresses an irrelevant topic – so not reviewed	Not added to synthesis
(Hassan, Y. and Easa, S. M., "Design Considerations of Sight Distance Red Zones on Crest Curves." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1998) pp. 343-351.)	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Lamm, R. and Heger, R., "Recommendations Relevant to International Design Standards for Improving Existing (Old) Alinements Based on Speed and Safety Related Research." Toronto, Ontario, Canada, International Road Federation 13th World Meeting, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Lamm, R., Heger, R., and Eberhard, O., "Operating Speed and Relation Design Backgrounds: Important Issues to be Regarded in Modern Highway Alignment Design." Toronto, Ontario, Canada, International Road Federation 13th World Meeting, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Fambro, D. B., Nowlin, R. L., Warren, S. P., Lienau, K. A., Mounce, J. M., Bligh, R. P., Mak, K. K., and Ross, H. E., "Geometric Design Guidelines for Suburban High-Speed Curb and Gutter Roadways." FHWA/TX-95/1347-1F, College Station, Texas A&M University, (1995))	Does not provide relevant AMF information so not reviewed	Not added to synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Zegeer, C. V., Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume II - Alignment." FHWA-RD-91-045, Washington, D.C., Federal Highway Administration, (1992))	Comprehensive FHWA project report that contains horizontal alignment AMF information covered in Zegeer, Stewart et al. 1992)	Not added to synthesis
(*44*) (Zegeer, C. V., Stewart, J. R., Council, F. M., Reinfurt, D. W., and Hamilton, E., "Safety Effects of Geometric Improvements on Horizontal Curves." Transportation Research Record 1356, Washington, D.C., Transportation Research Board, National Research Council, (1992))	Provides AMH for several horizontal alignment elements based on cross-sectional regression models	Added to synthesis
(*45*) (Zegeer, C. V., Stewart, R., Reinfurt, D. W., Council, F. M., Neuman, T. R., Hamilton, E., Miller, T., and Hunter, W., "Cost-Effective Geometric Improvements for Safety Upgrading of Horizontal Curves." FHWA-R0-90-021, Federal Highway Administration, (1991))	Superceded by AMF information covered in Zegeer, Stewart et al. 1992)	Not added to synthesis
(Zegeer, C. V., Reinfurt, D., Neuman, T. R., Stewart, R., and Council, F. M., "Safety Improvements on Horizontal Curves for Two-Lane Rural Roads - Informational Guide." FHWA-RD-90-074, McLean, Va., Federal Highway Administration, (1990))	Superceded by AMF information covered in Zegeer, Stewart et al. 1992)	Not added to synthesis
(Agent, K. R. and Creasey, F. T., "Delineation of Horizontal Curves." UKTRP-86-4, Frankfort, Ky., Kentucky Transportation Cabinet, (1986))	Dated and likely irrelevant	Not added to synthesis
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Dated and likely irrelevant. Studies are likely covered in Hauer (2000)	Not added to synthesis
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Dated and likely irrelevant. Studies are likely covered in Hauer (2000)	Not added to synthesis

Treatment: Flatten horizontal curves

Rural two-lane roads

Research on rural two-lane highways for Chapter 8 in HSM Part III (*7*) identified the relationship between horizontal alignment and safety. In the base model, curves in roadway segments were included based on their degree of curvature with a tangent roadway section as the nominal condition. This was modified using two Accident Modification Functions. The first Accident Modification Function accounts for the length and radius of curves, and the presence or absence of spiral transitions. Generally, accident risk decreases with longer radii, longer lengths of horizontal curves, and the presence of spirals.

In Harwood et al. (2000), the AMF for horizontal curves has been determined from the regression model developed by Zegeer et al. (1992) that included the safety effects of length of horizontal curve, degree of horizontal curve, and presence or absence of spiral transition curves (*7*). The AMF for horizontal curvature is in the form of an Accident Modification Function rather

than an Accident Modification Factor. The AMF for length, radius, and presence or absence of spiral transitions for total accidents on horizontal curves is shown in Equation 3-7.

Equation 3-7: AMF for length, radius, and presence or absence of spiral transitions on horizontal curves on two-lane rural roads (7)

$$AMF = 1.55L_c + (80.2/R) - 0.012S] / 1.55L_c$$

Where:

L_c = Length of horizontal curve (mi);

R = Radius of curvature (ft); and

S = 1 if spiral transition curve is present

0 if spiral transition curve is not present

In applying the Accident Modification Functions for curves with spiral transitions, the length variable (L_c) should represent the length of the circular portion of the curve. P-values of 0.0001 for length and radius, and 0.148 for the spiral presence variable were reported in Zegeer et al. (1992) (as cited in (*7*)). Chapter 8 of the HSM contains further discussion of the models developed for two-lane rural roads.

Rural multi-lane highways; Freeways; Expressways

No studies found.

Urban and suburban arterials

Hauer et al. (2004) calibrated models to data from Washington State in order to predict the non-intersection accident frequency of urban four-lane undivided roads (*3*). Separate models were estimated for 'off-the-road' and 'on-the-road' Property Damage Only (PDO), Injury, and Total accidents: a total of six models. The data came from the files maintained by the Highway Safety Information System (HSIS) entailing 121.95 miles of road over the four years 1993 to 1996 during which there were 895 off-the-road and 5288 on-the-road accidents, split approximately equally between PDO and Injury accidents.

For off-the-road accidents, the effect of the degree of horizontal curvature was captured by the multiplier exp (β× Degree of Curve) where β took values of 0.041, 0.056 and 0.051, respectively, for PDO, injury and total accidents. The AMFs implied are, respectively, 1.04, 1.06, and 1.05 for PDO, injury, and total accidents for an increase of one degree of curvature, summarized in Exhibit 3-60. Hauer estimated standard errors of each parameter, and a method correction factor of 1.5 was applied to the estimate the standard error.

Exhibit 3-60: AMFs for off-the-road accidents for one degree increase in horizontal curvature on urban and suburban arterials (3)

Off-the-road accident severity	AMF	S
PDO	1.04	0.01
Injury+Fatal	1.06	0.01
Total	1.05	0.01

For on-the-road accidents, the relationship appeared to be more complex since the number of on-the-road accidents/mile-year for horizontal curves was considerably and unexpectedly lower than that for straight miles of road. Since the on-the-road accidents dominate for this roadway class, Hauer concluded that the role of horizontal curvature in road safety for four-lane undivided arterials may need rethinking.

Treatment: Improve superelevation of horizontal curve

Rural two-lane roads

The AMF for superelevation provided by Harwood et al. (2000) is based on the superelevation deficiency of a horizontal curve (i.e., the difference between the actual superelevation and the superelevation required by AASHTO policy) (*7*). When the actual superelevation meets or exceeds that required by AASHTO policy, the value of the superelevation AMF is 1.00. The expert panel made a judgment that there would be no effect of superelevation deficiency on safety until the superelevation deficiency exceeds 0.01. AMFs are given in Exhibit 3-61. Insufficient information was reported for the derivation of standard errors.

Selected AMFs based on these equations are presented in Exhibit 3-62 below. All AMFs in Harwood et al. apply only to total roadway segment accidents for roadway segments located on horizontal curves of two-lane roads. Chapter 8 of the HSM contains further discussion of the models developed for two-lane rural roads.

Exhibit 3-61: AMFs for superelevation deficiency (SD) of horizontal curves on two-lane rural roads (7)

Superelevation deficiency (SD)	AMF
SD < 0.01	= 1.00
0.01 ≤ SD < 0.02	= 1.00 + 6 (SD - 0.01)
SD > 0.02	= 1.06 + 3 (SD - 0.02)

Exhibit 3-62: AMFs for superelevation deficiency (SD) of horizontal curves on two-lane rural roads (7)

Superelevation deficiency (SD)	AMF
0.01	1.00
0.02	1.06
0.03	1.09
0.04	1.12
0.05	1.15

Treatment: Increase tangent length in advance of curve

All road types

Hauer (2000) postulates that accident occurrence on a curve is believed to be a function of the speed, attitudes and expectations with which road users approach the curve which, in turn, may depend on variables such as 'the length of the preceding tangent' or the 'preceding curve density' (*42*). After reviewing a number of studies, Hauer (2000) concludes that the weight of empirical evidence is that when a long tangent is followed by a sharp curve, the number of accidents is elevated. The AMF in Equation 3-8 was derived by Hauer from data and equations in Matthew and Barnes (1988)[1] and was seen by Hauer to capture this phenomenon for curves with R<500 m and T<1200 m. This AMF is based on data from New Zealand State Highway #1; the characteristics of this highway are not reported.

Equation 3-8: AMF for a tangent section followed by a sharp curve (42)

$$AMF = \exp[-(6.2\times10^{-4} - 1.2\times10^{-6}R)\times(1200-T)]$$

Where R is the radius in meters

T is the length of the tangent in meters

Thus, for example, if the 250 m radius horizontal curve is preceded by a 400 m tangent it will have 0.77×number of accidents of a 250 m radius curve preceded by a very long tangent (longer than 1200 m), as summarized in Exhibit 3-63. In the absence of specific information, and based on logical considerations, it can be presumed that this AMF information can be applied with caution to all crash severities for all impact types combined and to accidents occurring on the curve.

Exhibit 3-63: AMFs for short tangents (T) followed by a sharp curve (R = radius) (42)

	T[m]														
R[m]	50	100	150	200	250	300	400	500	600	700	800	900	1000	1100	1200
50	0.53	0.54	0.56	0.57	0.59	0.60	0.64	0.68	0.71	0.76	0.80	0.85	0.89	0.95	1.00
100	0.56	0.58	0.59	0.61	0.62	0.64	0.67	0.70	0.74	0.78	0.82	0.86	0.90	0.95	1.00
150	0.60	0.62	0.63	0.64	0.66	0.67	0.70	0.73	0.77	0.80	0.84	0.88	0.92	0.96	1.00
200	0.65	0.66	0.67	0.68	0.70	0.71	0.74	0.77	0.80	0.83	0.86	0.89	0.93	0.96	1.00
250	0.69	0.70	0.71	0.73	0.74	0.75	0.77	0.80	0.83	0.85	0.88	0.91	0.94	0.97	1.00
300	0.74	0.75	0.76	0.77	0.78	0.79	0.81	0.83	0.86	0.88	0.90	0.92	0.95	0.97	1.00
350	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.89	0.90	0.92	0.94	0.96	0.98	1.00
400	0.85	0.86	0.86	0.87	0.88	0.88	0.89	0.91	0.92	0.93	0.95	0.96	0.97	0.99	1.00
450	0.91	0.92	0.92	0.92	0.93	0.93	0.94	0.95	0.95	0.96	0.97	0.98	0.98	0.99	1.00
500	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00

1 Matthews, L.R., and Barnes, J.W., (1988). Relation between road environment and curve accidents. Proceedings, 14 ARRB Conference, Part 4, pp. 105-120.

Discussion: Effect of degree (or radius) of curve

Hauer (2000) summarized a large number of studies (*42*) and concluded that "most research showed that the relationship between the curve accident rate 'r' and degree of curve D is of the linear form" shown in Equation 3-9.

Equation 3-9: Linear relationship between accident rate and degree of curvature (42)

$$r = r_o + \alpha D$$

Where *ro* is the accident rate on tangents (accidents / million-vehicle-miles).

An alternative model form was developed by Zegeer et al. (1991, 1992) (*44,45*) from a database of 10,900 horizontal curves in Washington State. The model shown as Equation 3-10 was adopted. However, further research on the effect of degree (or radius) of curve is needed to determine a definitive AMF.

Equation 3-10: Relationship between accidents, degree of curve, presence of spirals, volume and roadway width (44,45)

$$A = (1.552L + 0.014D - 0.012S) \times V \times 0.978^{W-30}$$

Where A is the number of accidents/year

L is length of curve in miles

D is degree of curve

S = 1 if spirals exist and 0 otherwise

V is volume of vehicles/year in millions (both directions)

W is 'roadway width in feet' - the total width of lanes +shoulders

Hauer finds that if the functional form in Equation 3-10 is correct, when a curve of degree D_1 is replaced by a less sharp curve of degree D_2 then the annual reduction in accidents is shown in Equation 3-11.

Equation 3-11: Annual accident savings due to curve flattening

$$\text{Annual Accident Savings} = V [r_o (1/D_1 - 1/D_2) (2\tan (I/2) - I) + 0.014(D_2 - D_1)]$$

Where V is volume of vehicles/year in millions (both directions)

r_o is the accident rate on a straight section of that road

I is the deflection angle

If, on the other hand, the model form in Equation 3-9 is correct, then the last term in Equation 3-11 needs to be omitted.

Discussion: Relationships between safety and stopping sight distance (SSD), and preview sight distance (PVSD)

Torbic et al.'s review for the NCHRP 500 Series Guidebook concludes: "It is difficult to determine the expected safety benefits of improving the sight distance at a horizontal curve when the available sight distance is slightly less than the minimum stopping sight distance. The accident statistics do not provide a sufficient amount of information to determine the expected safety benefits. There is some indication from research (see NCHRP Report 400) that improving locations with substantial sight distance restrictions offers safety benefits" (*43*).

3.1.3.2. Vertical Alignment

The vertical alignment (also referred to as grade, gradient, or slope) of a road is likely to affect safety by various mechanisms. Vehicles tend to slow down going upgrade and speed up going downgrade. Speed is known to affect accident severity. The more severe an accident, the more likely it is to be reported to the police and thus to enter the official statistics. It follows that the number of reported accidents depends on speed and thereby on grade. In addition, it is possible that the frequency of accident occurrence increases when the diversity of speed increases. Since road grade affects the diversity of speeds, it may affect accident frequency. Also, grade affects braking distance. This too may have an effect on accident frequency and severity. Grade also influences the rate at which water drains from the pavement surface and thus may have an effect on safety.

The existence of several diverse mechanisms working together means that the final outcome (accidents) may be a complex superposition of many processes. For some processes (e.g., drainage) the distinction between upgrade and downgrade is immaterial. For other processes (e.g., the change in average speed) the distinction between up and down-grade is crucial. The length over which the grade prevails may have a substantial influence on the safety effect of a grade. While speed may be unaffected by a short downgrade it may be significantly affected by a longer one. Yet, in the various studies to date there may has been little distinction in between a 1/2 mile and a 5 mile downgrade. Furthermore, while the grade on a crest curve or in a sag curve may be similar, the speed distribution at the two locations is likely to be very different. In short, the safety effect of grade can be understood only in the context of the road profile and its influence on the speed distribution profile. *[Adapted from Hauer (2001) (46).]*

This section would ideally include information on the safety effect of roadway segments due to changes in vertical alignment. This could include the effect of modifying grades along sag and crest vertical curves. Nighttime sight distances and presence of driveways along vertical curves are some of the elements that may be covered in future versions of this section. At this time, there is sufficient information in the literature to discuss the safety effect of reducing vertical grade of roadway segments.

Exhibit 3-64: Resources examined to investigate the safety effect of vertical grade on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))	Examined effect of grade and vertical curves but results were inconclusive or unreliable	Not added to synthesis
(*47*) (Miaou, S.P., "Estimating Roadside Encroachment Rates with the Combined Strengths of Accident- and Encroachment-Based Approaches, Final Report" FHWA-RD-01-124, Federal Highway Administration, Washington, D.C. (2001))	NB regression models for *single-vehicle-run-off-road* on two-lane rural road segments in Washington and Minnesota	Added to synthesis.
(*46*) (Hauer, E., "Road Grade and Safety." (2001))	Reviewed a number of early studies on the safety effect of road grade	Used to develop AMFs in Harwood et al. (2000). Added to synthesis.
(Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))	Cross-sectional analysis of design attributes and crash data in Oregon.	Not added to synthesis
(*7*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Development of safety effect estimates for two-lane rural roads.	Added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Review of past literature – deemed to be irrelevant	Not added to synthesis
(Gibreel, G. M, Easa, S. M, Hassan, Y., and El-Dimeery, I. A., "State of the Art Review of Highway Geometric Design Consistency." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1999) pp. 305-313.)	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Hassan, Y. and Easa, S. M., "Design Considerations of Sight Distance Red Zones on Crest Curves." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1998) pp. 343-351.)	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(*48*) (Miaou, S.P. "Vertical Grade Analysis Summary "Center for Transportation Analysis,Oak Ridge National Laboratory, (1998))	Analysis of two-lane highway grades in Utah	Added to synthesis.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Lamm, R., Heger, R., and Eberhard, O., "Operating Speed and Relation Design Backgrounds: Important Issues to be Regarded in Modern Highway Alignment Design." Toronto, Ontario, Canada, International Road Federation 13th World Meeting, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Lamm, R. and Heger, R., "Recommendations Relevant to International Design Standards for Improving Existing (Old) Alinements Based on Speed and Safety Related Research." Toronto, Ontario, Canada, International Road Federation 13th World Meeting, (1997))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(*49*) Miaou, S.P. "Development of Adjustment Factors for Single Vehicle Run-off-the-road Accident Rates by Horizontal Curvature and Vertical Grade" Center for Transportation Analysis,Oak Ridge National Laboratory, (1995)	Cross-sectional study of multi-lane roads in Utah.	Added to synthesis.
(Curren, J. E., "NCHRP Report 369: Use of Shoulders and Narrow Lanes to Increase Freeway Capacity." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Fambro, D. B., Nowlin, R. L., Warren, S. P., Lienau, K. A., Mounce, J. M., Bligh, R. P., Mak, K. K., and Ross, H. E., "Geometric Design Guidelines for Suburban High-Speed Curb and Gutter Roadways." FHWA/TX-95/1347-1F, College Station, Texas A&M University, (1995))	Does not provide relevant AMF information so not reviewed	Not added to synthesis
(Zegeer, C. V., Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume II - Alignment." FHWA-RD-91-045, Washington, D.C., Federal Highway Administration, (1992))	Likely superceded by, and considered in reviews by Hauer (2001) and Harwood et al. 2000	Not added to synthesis
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Dated. Studies are likely covered in other reviews	Not added to synthesis.
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Dated and likely irrelevant. Studies are likely covered in other reviews	Not added to synthesis

Hauer (2001) reviewed a number of early studies of the safety effects of modifying grades that do not seem to provide useful AMF information in that they are either dated or are methodologically flawed. Therefore, these studies are not reviewed here, but are summarized in Exhibit 3-65, which has been extracted from Hauer (*46*).

Exhibit 3-65: List of studies reviewed by Hauer (Table 7.18 from (46))

Year/ Ref.	Method	Size	Accident modification functions	Acc. type	Conf. rating	Conditions	Comments
Raff 1953	C/S Uni and bi-variate	15 states	"on tangent highway sections there does not appear to be any relation between grade and accident rates.	all	0.5	Sample from 15 states	Pooled data does not allow any inferences
Bitzel, 1956	C/S Uni-variate	German Freeways	0%-2% 2%-4% 4%-6% 6%-8% 1.00 1.45 4.08 4.52	all	0.5		Out of line with other results. Most likely due to confounding with other variables
Mullins & Keese, 1961	C/S collision diagrams	54 miles of freeway, 10,000 accidents	Accidents/MVM seem to vary as speed varies: diminish from sag towards crest and then increase towards sag.	All	1.5	Texas cities	
Hillier & Wardrop, 1966	C/S along one road	55 miles of motor-way	If curve B then 0% 0.5% 1% 1.5% 2.0% 1.00 1.02 1.09 1.19 1.39 AMF=(1-0.068*%grade^2)$^{-1}$	Injury	2	London to Birmingham Straight sections	Different rates between upgrade and downgrade lanes
Crosstown Associates 1968	C/S Along freeway	Chicago Expressway	Accidents/MVM Upgrade 1.87 +/- 0.5% 1.10 Downgrade 2.49	All	1		
Vostrez & Lundy, 1969	C/S accident rate		Accidents/MVM 4-5% trucks 11% trucks Level 0.84 1.17 Up grade 0.71 1.51 Down grade 1.07 1.29	All	1.5	Straight freeway sections in California	When proportion of truck is large, upgrade accident rate grows
Cirillo 1969	C/S Multivariate regressio n	Interstate system	Grade was significant in one of two models. Annual accidents increase by 0.01 for each 1000 ADT for each 1% of grade	all	1		
Dunlap et al., 1978	Ohio and Pennsylv ania turnpikes		Accident rate increases with downgrade and remains constant with upgrade. AMF is about 1.10/%grade	all	1.5		
Hedman, 1990	C/S	Swedish roads.	Study by Brude at al. AMF= 1.044/%grade	?	2		
Li et al. 1994	C/S Multi-variate	163 sections 560 km	AMF(Δ_{grade})= 1+0.136 Δ_{grade} √Accid/km Ex.: Increase of grade from 2% to 3% when 0.6 accid/km, AMF=1+0.136/0.6=1.23	Fat+InjS EVD*	2		Model equation includes ADT in additive form. This is illogical.
Miaou 1995	C/S Multi-variate	11539 road sections 1985-92 Utah 6680 SV.	0.919±0.009 for 1% — All roads 0.960±0.015 for 1% — Speed limit=55 mph 0.892±0.013 for 1% — Speed limit<55 mph	Single veh.. off-the road	2	mainly rural two-lane but including HPMS 2,6,7,8,9 Non-intersection accident	Lane width is not included in variables. Section length is variable with negative coefficient

Treatment: Reduce vertical grade of roadway segment

Rural two-lane roads

The latest AMF information for road grade is in Harwood et al. (2000) and is intended for use in IHSDM and in the HSM two-lane rural highway methodology (Chapter 8) (*7*). In view of the latter context, the relevant paragraphs from this source are reproduced below almost verbatim. Chapter 8 in Part III contains more details of the models developed.

The nominal or base condition for grade is a level roadway (0% grade). Exhibit 3-66 presents the accident modification factor for grades based on an analysis of two-lane highway grades in Utah conducted by Miaou(*48*). This analysis considered accident and geometric data for approximately 2,500 mi (4,000 km) of two-lane roads with 55 mph (88.5 km/h) speed limits, 12 ft (3.6 m) lanes, and tangent alignment. Two analysis approaches were used: univariate analysis using smoothing techniques, and negative binomial regression modeling. Both methods estimated the effect of vertical grade on accidents as approximately a 1.6 percent increase in accidents per one percent increase in grade. However, both studies found this effect to be not statistically significant.

Despite the lack of statistical significance of the results, a decision was reached by the expert panel charged with deriving the rural two-lane road AMFs to use the observed effect as the basis for an AMF because the result appeared reasonable to the expert panel and because no more reliable results are available. Exhibit 3-66 presents AMFs for grade based on the observed 1.6% increase in accidents per 1% increase in grade. The AMFs in this table are applied to each individual grade section on the roadway being evaluated without respect to the sign of the grade (i.e., upgrade or downgrade). The sign of the grade is irrelevant because each grade on a two-lane highway is an upgrade for one direction of travel and a downgrade for the other. The grade factors are applied to the entire grade from one point of vertical intersectional (PVI) to the next (i.e., there is no special account taken of vertical curves). The AMFs in Exhibit 3-66 apply to total roadway segment accidents. For example, increasing the roadway grade by 2% means an increase in total roadway crashes of 3%.

Exhibit 3-66: Accident Modification Factors for all accidents for Increased Grade of Two-Lane Rural Roadway Sections (7)

Grade (%)				
0	**2**	**4**	**6**	**8**
1.00	1.03	1.07	1.10	1.14

In assessing the relevance of these AMFs, it should be noted that standard errors, though said to be large by Harwood et al., are not available. The following studies were reviewed to determine the appropriateness of the values recommended by Harwood et al.:

- Hedman (1990) (p. 231) as referred to in the table from Hauer (2001) mentions a study by Brüde et al. (1980) that found for Swedish roads that "Grades of 2.5% and 4% increase accidents by 10% and 20% respectively, compared to near horizontal roads" (*46*). Using an exponential form to estimate the index of effectiveness:
  - if $x^{2.5} = 1.10$; then $x = 1.038$
  - if $x^{4} = 1.20$; then $x = 1.046$
    These results point to an AMF of about 1.044 which seems to support the value of 1.6%(or an AMF of 1.016) increase in accidents per 1% increase in grade noted by the expert panel in Harwood et al. (2000).

- Hauer also cites Li et al. (1994) who, using data for 560 km of the British Columbia provincial primary two-lane highway system calibrated a multivariate model for fatal+injury accidents in which grade is one of the variables (*46*). Based on their model, a change of 1% in grade results in a change of approximately 10% in accident frequency, which is somewhat higher than the 1.6% change noted by the expert panel in Harwood et al. (2000) (Exhibit 3-66)
- Hauer also cites earlier work by Miaou (1995) who used data from 11,539 road sections and 6,680 *single-vehicle-run-off-road* accidents to imply an AMF that is such that decreasing the grade by 1% diminishes the number of accidents by 8.1% (*46*). Again, this is somewhat higher than the 1.6% value noted by the expert panel in Harwood et al. (2000) (Exhibit 3-66)
- Miaou (2001), subsequent to his earlier work, constructed negative binomial regression models for *single-vehicle-run-off-road* on two-lane rural road segments in Washington (680 segments) and Minnesota (608 segments) (*47*). Only road segments with average annual daily traffic volumes less than 12,000 and with all horizontal curvatures within a segment less than 30 degrees were selected. The AMF for a 1% increase in grade in Washington was 1.016 (95% C.I. from 0.99 to 1.05) and for Minnesota 1.25 (95% C.I. from 1.19 to 1.31).

Based on the vertical grade analysis completed by Miaou in 1998 for rural two-lane roads with a posted speed limit of 55 mph, lane width of 12 ft and horizontal curvature of 0 degrees, increasing vertical grade by 1% has an AMF of 1.016 for all crashes.(*48*) A standard error for this AMF could not be determined, but this value is adopted in the IHSDM software.

Returning to Miaou's work from 1995 and 1998 provides additional insight. Based on the negative binomial models developed in 1995 for rural two-lane roads, with no median and either surfaced or stabilized shoulders, and a posted speed limit of 55 mph indicates an AMF of 1.041 for a 1% increase in vertical grade with an estimated standard error of about 0.016.(*49*) This AMF and standard error are for single-vehicle run-off-road crashes only, and were derived by the author using on a log-normal assumption. Applying a method correction factor of 1.5 (medium high) results in a standard error of 0.024.

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Studies for other than two-lane roads are few, dated, and inconsistent. Thus no credible AMF can be said to exist for these, a view supported by an expert panel drawn to look at AMFs for 4-lane roads subsequent to the two-lane road panel. The two-lane rural road AMFs for vertical grade may not be applicable to other road types. The expert panel recommended that an analysis of grade effects on multi-lane highways similar to that performed for two-lane highways by Miaou (1998) be conducted (*7*).

3.1.3.3. Combination Horizontal and Vertical Alignment [Future Edition]

In future editions of the HSM, this section will discuss the safety impact of combined horizontal and vertical alignment. This section may also discuss design consistency, and speed profile issues. Potential resources are listed in Exhibit 3-67.

Exhibit 3-67: Potential resources for the relationship between combined horizontal and vertical alignment and safety

DOCUMENT
(Hauer, E., "Road Grade and Safety." (2001))
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))
(Hassan, Y. and Easa, S. M., "Design Considerations of Sight Distance Red Zones on Crest Curves." Journal of Transportation Engineering, Vol. 124, No. 4, New York, N.Y., American Society of Civil Engineers, (1998) pp. 343-351.)
(Zegeer, C. V., Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume II - Alignment." FHWA-RD-91-045, Washington, D.C., Federal Highway Administration, (1992))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))

3.2. Safety Effects of Roadway Segment Traffic Control and Operational Elements

The following sections contain information on the safety effects of traffic control devices and operational elements such as signs, pavement markings and markers, rumble strips, traffic calming and speed zoning, on roadway segments. Traffic control devices for intersections are discussed in Chapter 4.

The “Manual on Uniform Traffic Control Devices” contains details on the implementation of design of traffic control devices, and can be found at http://mutcd.fhwa.dot.gov/ (*50*).

3.2.1. Signs

Traffic signs are typically classified as one of three categories: regulatory signs; warning signs; and guide signs. As defined in the Manual on Uniform Traffic Control Devices (MUTCD) (*50*), regulatory signs provide notice of traffic laws or regulations, warning signs give notice of a situation that might not be readily apparent, and guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational or cultural information. While the MUTCD provides the standards, as well as guidance and options necessary for signing within the right-of-way of all types of highways open to public travel, many agencies supplement the information contained in the MUTCD with their own guidelines and standards. It should be noted that the MUTCD does not specify the conditions (traffic, road geometry, etc.) under which the signs are to be used.

This section examines the safety effects of signage along roadway segments and excludes any consideration for signs at intersections.

Chapter 4 contains additional discussion on the safety impacts of signage at intersections and roundabouts. Given that a large number of studies that investigate the safety impacts of signs on urban road segments are related to pedestrian crosswalks, Section 3.3 Pedestrian and Bicyclist Safety contains relevant information. Chapter 6 contains information on signage within work zones.

Exhibit 3-68: Resources examined to investigate the safety effect of Signs on Roadway Segments

DOCUMENT	DESCRIPTION	COMMENT
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics	Added to synthesis. Accident reduction values found for advance curve warning and recommended speed signs.
("Manual on Uniform Traffic Control Devices for Streets and Highways." Washington, D.C., Federal Highway Administration, (2003))	The national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.	No safety information provided. Used as reference for definitions and guidelines on usage of signs. Not added to synthesis.
(Knipling, R. R., Waller, P., Peck, R. C., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP 500 Report Volume 13: A Guide for Addressing Collisions Involving Heavy Trucks." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Strategy 12.1 E2 proposes the installation of interactive truck rollover signing to reduce rollover crashes on ramps. However, no safety effect information is given.	No safety information provided – not added to synthesis.
(*51*) (Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Study reviews and brings together the best available evidence on the safety impact of traffic operations. All the studies reviewed report on crash occurrence, severity or proven crash surrogates	Added to synthesis. Several studies reviewed offer quantitative data.
(Harmelink, M., Edwards, R., Lovicsek, M., Quinton, M., Smiley, A., Bahar, G., McGowan, G., and Pacheco-Phillips, K., "Ontario Traffic Manual Book 1A: Illustrated Sign and Signal Display Index." Toronto, Ontario, Canada, Queen's Printer for Ontario, (2001))	Illustrated guide to standard traffic signs	No safety information provided. Used as reference for definitions and guidelines on usage of signs. Not added to synthesis.
(Van Houten, R., Malenfant, J. E., and McCusker, D., "Advance Yield Markings: Reducing Motor Vehicle-Pedestrian Conflicts at Multilane Crosswalks with Uncontrolled Approach." Transportation Research Record, No. 1773, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 69-74.)	Evaluated the effect of advance yield markings and a symbol sign on pedestrian safety at intersections; used conflicts, pedestrian and motorist behavior as surrogate.	Not added to synthesis since more relevant to Pedestrian and Bicyclist Safety at Intersections).
(*28*) (Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways through a review of previous studies.	Added to synthesis. Some anecdotal evidence of speed reductions resulting from signs at horizontal curves but no quantitative information provided about safety impacts.

DOCUMENT	DESCRIPTION	COMMENT
(*52*) (Tribbet, L., McGowen, P., and Mounce, J., "An Evaluation of Dynamic Curve Warning Systems in the Sacramento River Canyon." Sacramento, California Department of Transportation, (2000))	Investigated the safety effectiveness of dynamic curve warning systems (changeable message signs)	Added to synthesis. No AMFs presented but there is sufficient quantitative data to calculate t and s values.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Reviews existing research and attempts to provide guidelines on highway engineering improvements that would help older drivers and pedestrians.	Not added to synthesis. No discussion on safety impacts of signs.
(McGee, H.W., Strickland, R.R., "An Automatic Warning System to Prevent Truck Rollover on Curved Ramps" Public Roads, Vol. 57· No. 4 Washington, D.C., Federal Highway Administration, (1984))	Assessed the details of creating and implementing an automated warning system.	Not added to synthesis. Insufficient information on crash reductions due to sign installation.
(*53*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis study reviewing 17 safety research areas	Added to synthesis. Qualitative evidence of speed reduction at horizontal curves due to skid warning signs. No other information about safety impacts.
(Dawson, R. F. and Oppenlander, J. C., "General Design." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 11, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Reference discusses the relationship between safety and general design features of highways mainly in terms of accident rates and costs	Not added to synthesis. Quantitative information on crash reductions due to signs but insufficient information about specific type of treatment, type of facility etc. to assign t and s values.
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Reference discusses the relationship between safety and horizontal and vertical alignment	Not added to synthesis. Some qualitative about crash and speed reductions resulting from the implementation of signs at horizontal curves but insufficient information to calculate t and s values

Based on review of the identified references, it is apparent that there are very few studies that explicitly investigate the safety impacts of signage. Where available, the effectiveness of a variety of regulatory and warning signs has been quantified for both urban and rural roadways. Given the limited information available from the references reviewed, it was not possible at times to discern the specific types of roadways these safety effectiveness indices are applicable. In addition, volume ranges were not always available.

Treatment: Install signs to conform to MUTCD

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Urban local streets

Elvik and Vaa reviewed a study by Lyles et al. (1986) and found that replacing existing signs with signs that conform to MUTCD appear to reduce the number of injury and PDO accidents (p. 446) (*8*). The study found that improvements to make traffic signs on local streets conform to the MUTCD led to a 15% decrease in injury accidents, and a 7% decrease in PDO accidents. As a result of this one study being unique when reviewed as part of the meta-analysis process, Elvik and Vaa suggest using these values with caution. As shown in Exhibit 3-69, these percentages translate into AMF values of 0.85 (S=0.1) and 0.93 (S=0.06) for injury accidents and PDO accidents respectively. This study was considered to be of medium-high quality and the standard error values based on the confidence intervals reported by Elvik and Vaa have been multiplied with a method correction factor of 1.8 accordingly.

Exhibit 3-69: Safety effectiveness of installing signs to conform to MUTCD (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install signs to conform to MUTCD	Urban	Local streets, volume not reported	All types, Injury	0.85	0.1
Elvik and Vaa, 2004	Install signs to conform to MUTCD	Urban	Local streets, volume not reported	All types, PDO	0.93	0.06

Treatment: Install active close-following warning signs

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Elvik and Vaa conducted a meta-analysis of the safety impacts of a variety of signs and reported on a study by Helliar-Symon and Ray (1986) that investigated active close-following warning signs. These signs became illuminated and remained lit for 2 seconds when the gap between vehicles at an upstream detector was less than 1.6 seconds (p. 575) (*8*). The active message signs were rectangular in shape and were supplemented with four flashing amber beacons at each corner. Based on the findings from the meta-analysis by Elvik and Vaa, implementing active close-following warning signs on roadways has an AMF of 0.94 for total rear-end collisions (S = 0.72). This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 accordingly. The road type and traffic volumes for the study were not reported. The safety effects found are summarized in Exhibit 3-70.

Exhibit 3-70: Safety effectiveness of active close-following warning signs on road segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Active close-following warning signs	Not specified	Not specified	Rear-end crashes, severity not specified	0.94	0.72

Treatment: Install limited sight distance (LSD) warning signs

Rural two-lane roads

Forbes (2003) reports on a study by Kostyniuk and Cleveland (1986) of the effectiveness of "Limited Sight Distance" signs on paved two-lane roadways in Michigan (as cited in (*51*)). The traffic volumes were not reported in the study by Forbes. The signs comprised of a standard diamond-shaped, black on yellow warning sign with the legend "Limited Sight Distance". Using data available from the before-after study with a control group that was carried out by Kostyniuk and Cleveland, results show that installing limited sight distance signs on roadway segments has an AMF of 1.07 for total crashes (S = 0.67). The index of effectiveness and standard error values were estimated using the C-G method found in Hauer (*54*). The AMF value was increased by a factor of 0.05 to account for the effects of regression-to-mean (RTM) and a method correction factor of 1.5 was used to account for the study approach. The safety effects found are summarized in Exhibit 3-71.

Exhibit 3-71: Safety effectiveness of limited sight distance signs on road segments(as cited in (51))

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Kostyniuk and Cleveland, 1986	Limited Sight Distance signs	Rural	Paved 2-lane roadways, volumes not reported	All types, all severities	1.07	0.67

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Install changeable curve speed warning signs on horizontal curves

Rural two-lane roads

No studies found.

Rural multi-lane highways

Tribett et al. (2000) conducted a naïve before-after study that investigated the safety effects of using dynamic message signs (with varying messages depending on measured vehicle speeds upstream) to supplement existing static warning signs at horizontal curves in rural, mountainous areas (*52*). The message displayed was either the advisory speed for the curve or the operating speed of the approaching vehicle as measured using a radar speed-measuring device. The changeable message signs were 10 ft wide by 7 ft high with 18-inch lettering consisting of full matrix light-emitting diodes. At all five sites examined in the study, the speed limit was 65 mph (105 km/h) for passenger cars and 55 mph (89 km/h) for commercial trucks, while the advisory curve speed was 50 mph (80 km/h) at four of the five sites (the last site had a advisory curve speed of 60 mph or 97 km/h).

During the study, the speed limit for passenger cars was changed from 55 mph (89 km/h) to 65 mph (105 km/h) sometime during the before period at three of the five sites examined. Although the effect of this speed limit change on the results cannot be adequately quantified, it is likely that the non-truck-related crashes may have increased following the change.

Results from a naïve before-after comparison of the crash histories show that implementing changeable curve speed warning signs on rural highways with AADTs between 7,650 and 9,300 veh/day and a high percentage (35%) of truck volumes resulted in the AMFs summarized in Exhibit 3-72. This study was considered to be of low quality (5 years of data before, 6 months data after) and the standard error values have been multiplied with a method correction factor of 3 to account for this. In addition, the AMF values have been increased by a factor of 0.1 to account for RTM effects since the study sites were selected on the basis of high crash frequencies involving trucks. The use of this particular treatment appears to be effective in reducing truck-related crashes.

Exhibit 3-72: Safety effectiveness of changeable curve speed warning signs on horizontal curves

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Tribett et al., 2000	Changeable Curve Speed Warning signs	Rural, Mountainous	Multi-lane highways, 7650 to 9300 veh/day (with approx. 35% trucks)	All types, all severities	1.13	1.19
Tribett et al., 2000	Changeable Curve Speed Warning signs	Rural, Mountainous	Multi-lane highways, 7650 to 9300 veh/day (with approx. 35% trucks)	All types, injury	1.47	2.35
Tribett et al., 2000	Changeable Curve Speed Warning signs	Rural, Mountainous	Multi-lane highways, 7650 to 9300 veh/day (with approx. 35% trucks)	All types, PDO	0.98	1.38

Tribett et al., 2000	Changeable Curve Speed Warning signs	Rural, Mountainous	Multi-lane highways, 7650 to 9300 veh/day (with approx. 35% trucks)	Speed-related crashes, all severities	1.31	1.87
Tribett et al., 2000	Changeable Curve Speed Warning signs	Rural, Mountainous	Multi-lane highways, 7650 to 9300 veh/day (with approx. 35% trucks)	Truck-related crashes, all severities	0.29	0.96

Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Install horizontal alignment or combination horizontal alignment/ advisory speed signs (W1-1a, W1-2a)

Unspecified road type (Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials)

Elvik and Vaa (p. 361) (*8*) carried out a meta-analysis of a number of studies that examined the safety effects of static curve warning and recommended speed signs on horizontal curves. The road type, traffic volumes and other geometric features of the study sites were not reported by Elvik and Vaa. The results are summarized in Exhibit 3-73 and Exhibit 3-74. Based on the results from the meta-analysis conducted by Elvik and Vaa:

- Implementing static advance curve warning signs results in an AMF of 0.70 for injury accidents (S = 0.71).
- Implementing static advance curve warning signs results in an AMF of 0.92 for PDO accidents (S = 0.76).
- Implementing static recommended speed warning signs at horizontal curves results in an AMF of 0.87 for injury accidents (S = 0.09).
- Implementing static recommended speed warning signs results in an AMF of 0.71 for PDO accidents (S = 0.23).

Elvik and Vaa's meta-analysis was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-73: Safety effectiveness of horizontal alignment signs

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Advance curve warning signs	Not specified	Not specified	All types, Injury	0.70	0.71
Elvik and Vaa, 2004	Advance curve warning signs	Not specified	Not specified	All types, PDO	0.92	0.76

Exhibit 3-74: Safety effectiveness of combination horizontal alignment/ advisory speed signs (W1-1a, W1-2a)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Combination horizontal alignment/ advisory speed signs	Not specified	Not specified	All types, Injury	0.87	0.09
Elvik and Vaa, 2004	Combination horizontal alignment/ advisory speed signs	Not specified	Not specified	All types, PDO	0.71	0.23

Discussion: Qualitative evidence of safety improvements resulting from the implementation of signs at horizontal curves

All of the other research studies reviewed addressed the safety impacts of signs from the standpoint of reductions in vehicle speed rather than actual crashes. Although the link between surrogate measures such as speed and actual crashes has not been wholly established, it appears that the findings from these other studies that examine the effects of signing on speeds are counter-intuitive in light of the results established by Elvik and Vaa. However, this is not conclusive given the large standard errors associated with the results from the study by Elvik and Vaa.

Fitzpatrick et al. reviewed a previous study by Zwahlen (1987) that examined the effectiveness of advisory speed signs in conjunction with curve warning signs and found that advisory speed signs are not more effective in causing drivers to reduce their speeds through curves than curve and turn signs alone. Other studies by Lyles (1980a) and Agent (1975) that were reviewed and cited by Fitzpatrick et al. (*28*) appear to substantiate this finding. According to Fitzpatrick et al. (*28*), these studies found that various sign treatments for reducing traffic speeds in the vicinity of horizontal curves have generally been ineffective.

The Federal Highways Administration (FHWA) reviewed a study by Hanscom (1974) that examined the impacts of various types of skid warning signs at horizontal curves (*53*). Although Hanscom (1974) did not examine any crashes, the researcher reported that various configurations for "Slippery When Wet" signs resulted in reductions in the highest quartile mean speeds of vehicles in the vicinity of the curves. The researcher also found that these signs, with the addition of flashing lights and an advisory speed plate resulted in the largest decreases in vehicle speeds.

Treatment: Install changeable accident warning signs

Rural two-lane roads; Rural multi-lane highways; Expressways; Urban and suburban arterials

No studies found.

Freeways

Elvik and Vaa (p. 575) (*8*) examined one study that investigated the effect of dynamic accident warning signs on freeways and found that implementing dynamic/variable accident warning signs results in an AMF of 0.56 for injury accidents (S = 0.17). The traffic volumes were not reported. Elvik and Vaa's meta-analysis was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 to account for this. The safety effects are shown in Exhibit 3-75.

Exhibit 3-75: Safety effectiveness of dynamic/variable accident warning signs on roadway segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install changeable accident warning signs	Urban	Freeways, volume not reported	All types, Injury	0.56	0.17

Urban and suburban arterials

No studies found.

Treatment: Install changeable queue warning signs

Rural two-lane roads; Rural multi-lane highways; Expressways; Urban and suburban arterials

No studies found.

Freeways

Elvik and Vaa (p. 575) (*8*) carried out a meta-analysis of a number of studies that examined the safety effects of variable queue warning signs on freeways and reported that implementing these signs results in AMFs of 0.84 (S = 0.10) and 1.16 (S = 0.15) for rear-end injury and rear-end PDO accidents, respectively. The traffic volumes were not reported. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 to account for this. The safety effects are summarized in Exhibit 3-76.

Exhibit 3-76: Safety effectiveness of changeable queue warning signs on roadway segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Changeable queue warning signs	Not specified	Freeways, volume not reported	Rear-end, injury	0.84	0.10
Elvik and Vaa, 2004	Changeable queue warning signs	Not specified	Freeways, volume not reported	Rear-end, PDO	1.16	0.15

Urban and suburban arterials

No studies found.

Treatment: Install changeable speed warning signs

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Elvik and Vaa (p. 575) (*8*) conducted a meta-analysis of a number of studies that examined the safety effects of dynamic/variable speed warning signs on roadways segments and reported that:

- Implementing dynamic collective speed warning signs results in an AMF of 0.54 (S = 0.17) for total accidents.
- Implementing dynamic individual speed warning signs results in an AMF of 0.59 (S = 0.62) for injury accidents.

Elvik and Vaa defined individual feedback signs as those signs that provide information to the individual driver on his or her behavior (speed information, etc.) and collective signs as those that inform all drivers about the proportion of road users who have kept or broken a specific traffic rule such as the prevailing speed limit. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 to account for this. The road type, traffic volume and other geometric features of the study sites were not reported. The safety effects of this particular treatment are summarized in Exhibit 3-77. From the results reported by the authors, it appears that the use of collective and individual dynamic speed warning signs improve safety.

Exhibit 3-77: Safety effectiveness of changeable speed warning signs on road segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Collective [1] changeable speed warning signs	Not specified	Not specified	All types, all severities	0.54	0.17
Elvik and Vaa, 2004	Individual [1] changeable speed warning signs	Not specified	Not specified	All types, Injury	0.59	0.62

Note: 1 - Individual feedback signs give the individual information about his or her behavior while collective feedback signs give information showing the proportion of road users who have kept or broken a specific traffic rule (*8*).

3.2.2. Delineation

Delineation has long been considered an essential element for providing effective guidance to drivers on highways. Delineation typically refers to any method of defining the roadway operating area for drivers and may include delineation devices such as pavement markings made from a variety of marking materials, raised pavement markers (RPMs), pavement markers, and post-mounted delineators (PMDs) (*55*).

The MUTCD states that markings on highways have important functions in providing guidance and information for the road user. Major marking types include pavement and curb

markings, object markers, delineators, colored pavements, barricades, channelizing devices and islands. In some cases, markings are used to supplement other traffic control devices such as signs, signals and other markings. In other instances, markings are used alone to effectively convey regulations, guidance, or warnings in ways not obtainable by the use of other devices (*50*).

The MUTCD adds that the visibility of pavement markings can be obscured by snow, debris, and water on or adjacent to the markings. Visibility can also be compromised since the durability of the pavement marking is affected by weather, its material properties, traffic volumes and location, and subsequently degrades (*50*).

In the case of delineation devices such as post-mounted delineators, the MUTCD states that they can be particularly beneficial at locations where the alignment might be confusing or unexpected, such as at lane reduction transitions and curves. Delineators are effective guidance devices at night and during adverse weather. An important advantage of some delineators in certain locations is that they remain visible when the roadway is wet or snow covered since they are required to be retroreflective and mounted above the roadway surface and along the side of the roadway in a series to indicate the alignment.

The MUTCD presents standard ways of conveying information to the driver through the design, color, pattern and width of the pavement marking. For example, yellow lines separate traffic flowing in opposing directions, whereas white lines denote traffic flowing in the same direction (*55*). A double line indicates maximum or special restrictions; a solid line discourages or prohibits crossing (depending on the specific application); a broken line indicates a permissive condition; and a dotted line provides guidance (*50*). The MUTCD contains detailed standards related to color, pattern, and width of pavement markings, which are not repeated here.

In terms of retroreflectivity requirements, the MUTCD stipulates that delineators are required to have retroreflective elements with a minimum dimension of 3 in (75 mm) and be capable of retroreflecting light under normal atmospheric conditions from a distance of 1,000 ft (300 m) when illuminated by the high beams of standard automobile lights.

This section investigates the safety effects of the different delineation practices typically used to regulate, warn or provide guidance to drivers when traversing any particular road segment, and excludes any examination of intersections. The treatments examined here include post-mounted delineators, chevron signs, raised buttons, high-visibility stripes, pavement markers (including snowplowable, recessed, raised, and illuminated/solar markers), various types of longitudinal and transverse pavement markings and combinations of these treatments. In addition, this section also attempts to address the safety impacts of maintenance practices associated with these types of delineation treatments.

The safety effectiveness of delineation treatments at intersections is discussed in Chapter 4.

Exhibit 3-78: Resources examined to investigate the safety effect of delineation on road segments

DOCUMENT	DESCRIPTION	COMMENT
(Lord, D., J.A. Bonneson, "Development of Accident Modification Factors for Rural Frontage Road Segments in Texas", Transportation Research Board 86th Annual Meeting, Washington D.C., (2007))	Developed AMF values for the presence of edge line delineation along rural frontage roads in Texas.	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
NCHRP Project 17-28 "Pavement Marking Materials and Markers: Safety Impact and Cost-Effectiveness" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-28	On-going project.	Results not available.
Transportation Association of Canada "Best Practice Guidelines for the Design and Application of Transverse Rumble Strips" (2005)	Synthesis of other research.	No new results. Not added to synthesis.
(Smiley, A., "Speed-Reducing Countermeasures." (2004))	The paper reviews various studies of countermeasures designed to reduce speed and crashes.	Not added to synthesis. No AMFs found.
(*57*) (Bahar, G., Mollett, C., Persaud, B., Lyon, C., Smiley, A., Smahel, T., and McGee, H., "NCHRP Report 518: Safety Evaluation of Permanent Raised Pavement Markers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Study involved an empirical Bayesian before-after safety analysis to quantify safety effectiveness of snowplowable PRPMs.	Added to synthesis; t values taken directly from report, s values calculated using procedure.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Report focuses on strategies to prevent the crash types prevalent on horizontal curves.	Not added to synthesis. Improvements in surrogate measures (such as vehicle speeds entering the curves and the lateral placements of vehicles along the horizontal curve) resulting from treatments such as post-mounted delineators and chevrons were discussed in review of study by Neuman et al. (2003)
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis.
(*16*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Review of past studies researching the effectiveness of various treatments to address run-off-road crashes.	Added to synthesis. Quantitative evidence of crash reduction found although there is insufficient data to calculate t and s values. Surrogate measures (i.e., speed and lateral position of vehicles) is presented.
(*51*) (Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Study reviews and brings together the best available evidence on the safety impact of traffic operations. All the studies reviewed report on crash occurrence, severity or proven crash surrogates.	Added to synthesis. Only qualitative information used. Several studies reviewed offer quantitative data but went back to original studies for data to calculate t and s.

DOCUMENT	DESCRIPTION	COMMENT
(Storm, R., "Pavement Markings and Incident Reduction." Ames, Iowa, 2000 MTC Transportation Scholars Conference, (2000) pp. 152-162.)	Reference identifies the areas where pavement markings are most likely to reduce crashes and focuses on the application of pavement markings in three areas: horizontal curvature, turning movements, and pedestrian crosswalks.	Suggested by NCHRP 17-18(4). Not added to synthesis. Limited quantitative information found.
(*28*) (Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways through a review of previous studies.	Added to synthesis. No AMFs related to delineation were found although there is anecdotal evidence of crash reductions due to PMDs.
(*58*) (Reinfurt, D., Zegeer, C., Shelton, B., Neuman, T.R., "Analysis of Vehicle Operations on Horizontal Curves" Transportation Research Record 1318 (1998))	The study investigated vehicle operations such as encroachment on left and right curves.	Limited qualitative information added to synthesis.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Reviews existing research and attempts to provide guidelines on highway engineering improvements that would help older drivers and pedestrians.	Not added to synthesis.
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))	Study reviewed the relationships between safety, speed limits and speed zoning practices through a review of previous research efforts.	Not added to synthesis. Used data from original study by Griffin and Reinhardt to calculate t and s values.
(*60*) (Griffin, L. I. and Reinhardt, R. N., "A Review of Two Innovative Pavement Patterns that Have Been Developed to Reduce Traffic Speeds and Crashes." Washington, D.C., AAA Foundation for Traffic Safety, (1996))	Study reviews the effectiveness of converging chevron pattern road markings and transverse bar pattern markings.	Added to synthesis. t and s values calculated using reduction in crashes and 95% confidence interval range provided by researchers
(*55*) (Migletz, J., Fish, J. K, and Graham, J. L., "Roadway Delineation Practices Handbook." FHWA-SA-93-001, Washington, D.C., Federal Highway Administration, (1994))	Supplemental reference document to the policies and standards pertaining to delineation treatments provided in the MUTCD.	Added to synthesis. No AMFs found although according to the researchers, the implementation of PMDs has resulted in a reduction in accident rates.
(*61*) (Al-Masaeid, H. R. and Sinha, H., "An Analysis of Accident Reduction Potentials of Pavement Marking." (1993))	Evaluated the effect of safety of pavement markings used on undivided rural roads; 100 roads in Indiana	Suggested by NCHRP 17-18(4). Added to synthesis; t and s values relevant to Pavement Markings and Markers calculated using procedure.

DOCUMENT	DESCRIPTION	COMMENT
(Miller, T. R., "Benefit-Cost Analysis of Lane Marking." Transportation Research Record 1334, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 38-45.)	Evaluated the safety benefits of longitudinal pavement markings, in particular for high solvent paint and thermoplastic markings	Suggested by NCHRP 17-18(4). Not added to synthesis. Quantitative evidence of crash reduction found although there is insufficient data to calculate t and s values using our procedures.
(*62*) (Lalani, N, "Comprehensive Safety Program Produces Dramatic Results." ITE Journal, Vol. 61, No. 10, Washington, D.C., Institute of Transportation Engineers, (1991) pp. 31-34.)	Study included a naïve before-after study of a variety of treatments including installation of traffic signals, signal coordination, and installation of chevron signs among others.	Added to synthesis; t and s values calculated using available before and after accident data.
(*63*) (Kallberg, V., "Reflector Posts - Signs of Danger?" Transportation Research Record 1403, Washington, D.C., Transportation Research Board, National Research Council, (1990) pp. 57-66.)	Study investigated the impacts of reflector posts (post-mounted delineators) on speeds and nighttime accidents	Added to synthesis for additional information. Quantitative evidence of safety impacts from this research work already summarized as part of meta-analysis by Elvik and Vaa in their Handbook.
(*64*) (Agent, K. R. and Creasey, F. T., "Delineation of Horizontal Curves." UKTRP-86-4, Frankfort, Ky., Kentucky Transportation Cabinet, (1986))	Investigates the effect of traffic control devices such as raised pavement markings and signs on driver behavior at horizontal curves	Suggested by NCHRP 17-18(4). Added to synthesis.
(Glennon, J. C., "Accident Effects of Centerline Markings on Low-Volume Rural Roads." Transportation Research Record 1027, Washington, D.C., Transportation Research Board, National Research Council, (1985) pp. 7-13.)	Compared the crash experience of various centerline treatments used on low-volume rural roads; used Pavement Marking Demonstration Program data	Suggested by NCHRP 17-18(4). Not added to synthesis. Insufficient data needed for calculation of t and s values.
(*53*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis study reviewing 17 safety research areas.	Added to synthesis. Quantitative evidence of crash reduction found although there is insufficient data to calculate t and s values.
(Dawson, R. F. and Oppenlander, J. C., "General Design." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 11, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Reference discusses the relationship between safety and general design features of highways mainly in terms of accident rates and costs.	Not added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Reference discusses the relationship between accidents and cross sectional elements.	Not added to synthesis.

Based on the critical review, few studies have investigated the safety impacts of delineation treatments other than post-mounted delineators and chevron signs for road segments. The large majority of safety studies related to delineation treatments on road segments typically deal with pavement markings or markers. The majority of safety studies are limited to anecdotal information.

Very few of the references identified provide sufficient information to quantify the safety impacts of pavement marking and markers on roadway segments. The quantitative information contained for pavement markings within this section is largely derived from the meta-analysis research conducted by Elvik and Vaa (*8*) while the quantified safety impacts of snowplowable PRPMs is taken from a recent NCHRP study (*57*). Where available, the effectiveness of a variety of pavement markings and markers has been distinguished by setting, roadway type, and in the case of horizontal curves, the degree of curvature. Given the heavy reliance on meta-analysis studies that essentially combined studies with varying traffic volumes, road types and setting, it was not always possible to discern the specific ranges of applicability such as the road class, environment type, and traffic volume ranges.

Treatment: Install post-mounted delineators (PMDs)

Rural two-lane roads

From the review of studies, it appears that few researchers have investigated the safety impacts of post-mounted delineators in isolation from other treatments. The majority of studies have typically examined sites where PMDs were used in conjunction with other delineation treatments such as chevrons, raised pavement markers (RPMs) and pavement markings. Only the study by Elvik and Vaa (p. 541) (*8*) provided sufficient quantitative data to calculate indices of effectiveness and standard error values to quantify the safety effectiveness of post-mounted delineators.

Elvik and Vaa (*8*) estimated the safety effect of installing post-mounted delineators on two-lane, undivided rural roads. Based on the meta-analysis that was conducted, the implementation of this particular treatment results in AMF values of 1.04 (S = 0.10) and 1.05 (S = 0.07) for injury accidents and PDO accidents, respectively. Note that Elvik and Vaa combined studies that investigated the safety effect of post-mounted delineators installed along tangents as well as curves.

This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this. The safety effects for this particular treatment are summarized in Exhibit 3-79.

Exhibit 3-79: Safety effectiveness of post-mounted delineators on roadway segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install post-mounted delineators	Rural	Two-lane undivided, volumes not reported	All types, Injury	1.04	0.10
Elvik and Vaa, 2004	Install post-mounted delineators	Rural	Two-lane undivided, volumes not reported	All types, PDO	1.05	0.07

Although Elvik and Vaa did not provide any additional information on the road class, traffic volume ranges and environment type for the sites examined, further review of one of the original studies that formed part of the meta-analysis by Elvik and Vaa suggests that the negative impacts of post-mounted delineators occur on roads with lower geometric standards. The original study by Kallberg (*63*) concluded that on roads with comparatively low geometric standards, "reflector posts have a negative effect on driving behavior that significantly increases accident risk" while on wider roads with higher geometric standards, "such negative effects are rare and reflector posts do not necessarily reduce safety". It should be noted that the study was conducted in Finland and there are potential differences in driver behavior and attitude. As Kallberg explains, drivers in Finland generally consider 62 mph (100 km/h) as an ideal or target speed, irrespective of the geometric design of the roadway (*63*), suggesting that Finnish drivers may be more inclined to drive at higher speeds. In some cases, the improved visual guidance provided by reflector posts/post-mounted delineators actually encourages drivers to drive faster as they are naturally inclined to do, regardless of the prevailing geometric design standards of the roadway (*63*).

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Discussion: Implementation of post-mounted delineators at horizontal curves and crashes

Other studies reviewed do not provide sufficient information to calculate indices of effectiveness and standard error values but they did provide some additional quantitative information on the safety effectiveness of post-mounted delineators. Neuman et al. (2003) reviewed a previous research study conducted by Foody and Taylor (1966) and found that implementing post-mounted delineators on sharp curves reduced run-off-road (ROR) crashes by 15% (*16*). Another recently-published reference by Fitzpatrick et al. (2000) presented the findings from a literature review of previous research efforts by Hall (1987), Longenecker (1980), Tamburri et al. (1967), Taylor et al. (1972), and reported that "post-mounted roadside delineation reduced the accident rate only on relatively sharp curves during periods of darkness" (*28*). On the basis of findings from a study by the Arizona Highway Department (1963), Fitzpatrick et al. further added that PMDs did not have "any significant effect" on the accident rates of open tangent sections.

These conclusions appear to be in conflict with another study that was conducted by Capelle (1978) and reviewed by Fitzpatrick et al. (*28*). Findings from that particular study appear to indicate that PMDs do have an effect on safety and that "the highways with PMDs (in the absence or presence of edgelines) have lower accident rates than those without PMDs" (*28*).

Migletz et al. (1994) appeared to concur stating that accident rates are significantly lower where PMDs are used and that "a reduction of approximately 1 accident per million vehicle-miles (0.6 accidents per million vehicle-kilometers) has been demonstrated" (*55*). Migletz et al. also stated that accident analyses have shown a lower accident rate at isolated horizontal curves where PMDs supplemented standard painted markings but did not provide any quantifiable measures since the sample size used was "too small to make a definitive conclusion" (*55*).

A synthesis study by the FHWA (1982) reviewed the work of Niessner (1982) who evaluated the impacts of using PMDs and found that the accident data collected "indicates a trend toward reducing ROR accidents where PMDs are installed" (*53*). It is unclear how conclusive these particular findings are, given the lack of information about the local policies related to the implementation of such delineation treatments, the road types in question, the geometric elements of the roadway, and the traffic volumes among other issues.

Discussion: Implementation of post-mounted delineators at horizontal curves and other measures (speed, lateral placement of vehicle, etc.)

From the review of references, it appears that many researchers have investigated the impacts of PMDs using surrogate measures such as the speeds of vehicles approaching and traversing horizontal curves, and/or the lateral placement of these vehicles. The study by Neuman et al. (2003) reviewed a number of studies [Zador et al. (1987); Kallberg (1993); Retting and Farmer (1998); Retting (1999); Meyer (2001); Agent (1980); Retting et al. (2000); Steyvers and Ward (1997)] and concluded that even though the "specific effects of reflector posts on the lateral position remain unclear, it is clear that the shift in lateral position (if there is a significant shift) is toward the edge of the road" (*16*).

This finding should be viewed in light of the results from a number of previous research studies that have established that in general, there are few edgeline encroachments regardless of whether the horizontal curve is to the left or right, except at locations where there are sharp, right curves. These studies have shown that the greater the deflection angle, the more edgeline encroachments for right curves and centerline encroachments for left curves. This phenomenon can be attributed to the tendency of drivers to undercut the curve and potentially increase the risk of run-off-road crashes on right curves and head-on crashes on left curves (*58*).

A more recent review by Forbes of a study conducted by Zador et al. (1987) shows the authors concluding that the implementation of PMDs, chevrons and raised pavement markers (RPMs) on horizontal curves all resulted in increased night-time driving speeds (*51*). These results appear to be similar to the findings from another recent study by Bahar et al. that examined the safety effects of PRPMs at horizontal curves and concluded that drivers tend to under compensate (i.e., not reduce speeds enough) in poor visibility conditions and for roadway segments with lower geometric standards (*57*). Bahar et al. state that the implementation of treatments such as PRPMs caused drivers to move away from the delineation measures when driving at night or under poor visibility conditions. For example, in the case of centerline PRPMs, drivers will move away from the centerline toward the shoulder. While this behavior may reduce the incidence of opposing direction (e.g., head-on) crashes, it may increase run-off-road crashes, especially on roads with lower design standards (i.e., with narrow and/or gravel shoulders). A human factors review by Bahar et al. also found some evidence that PRPMs may actually cause drivers to increase their speeds (*57*). Speed increases at locations where drivers already operate close to the margin of safety (e.g., sharp curves) may result in an increased number of crashes.

Treatment: Install chevron signs on horizontal curves

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

No studies found.

Urban and suburban arterials

Lalani investigated the safety impacts of a variety of treatments in the City of San Buenaventura (California), including the installation of chevron signs on horizontal curves using a naïve before-after study approach (*62*). As shown in Exhibit 3-80, adding chevron signs to horizontal curves in an urban setting has an AMF of 0.36 (S=0.49) for total crashes. This study was considered to be of low quality (naïve before-after study with 1 year of data before, 1 year of data after) and the standard error values have been multiplied with a method correction factor of 3.0 to account for this. In addition, the AMF values have been increased by a factor of 0.25 to account for RTM effects resulting from the short before and after study periods, and the fact that the study sites were selected on the basis of high crash frequencies.

Exhibit 3-80: Safety effectiveness of chevron signs on horizontal curves (62)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lalani (1991)	Chevron signs on curves	Urban	Urban/suburban arterials, volume not reported	All accidents, all severities	0.36	0.48

Discussion: Chevrons at horizontal curves on other measures (speed, lateral placement of vehicle, etc.)

Bahar et al. reviewed a human factors study by Zwahlen and Park (1995) that investigated the impact of chevrons and reported that chevrons can be seen considerably further than PRPMs because of their orientation, and there is no reduction in visibility with rain (*57*). On the basis of the findings from Zwahlen and Park, Bahar et al. concluded that chevrons seem to be preferable to PRPMs on sharp curves (*57*). Studies of the relationship between speed in curves and curve geometry show that curve radius and curve angle are important predictors of speed. Studies of driver response show that drivers viewing images of curves (i.e. equivalent to unfamiliar drivers with no experience of the curve) indicate that the deflection angle curve is more important than the radius in determining approach speed.

For these reasons, chevron markers which delineate the entire curve angle are generally recommended on sharp curves. Studies of the effect of chevron signs on lateral placement, speed and speed variance indicate that their effects are modest. A before-after study of chevrons, post mounted delineators and other road edge delineators showed chevrons to be best on curves with deflection angles greater than seven degrees (Jenning & Demetsky, 1985 as cited in (*57*)). On these curves, after installation, lane encroachment was reduced. Speeds, although slightly higher than for the other markings (by a maximum of two percent), were less variable.

Treatment: Place standard edgeline markings (100 to 150 mm or 4 to 6 in)

Rural two-lane roads

Elvik and Vaa conducted a meta-analysis of studies related to the installation of normal edgelines with widths ranging between 100 to 150 mm (4 to 6 in.) and found that implementing this treatment on two-lane, undivided rural roads reduces the number of injury and PDO accidents (p. 541) (*8*). As shown in Exhibit 3-81, Elvik and Vaa found that the installation of normal edgelines on roadway segments has AMF values of 0.97 (S=0.04) and 0.97 (S=0.11) for injury

accidents and PDO accidents respectively. The traffic volumes at the sites examined were not reported. Elvik and Vaa's meta-analysis was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 accordingly.

Exhibit 3-81: Safety effectiveness of placing standard edgeline markings (8)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, tadjusted	Estimate of Std. Error, s
Elvik and Vaa, 2004	Placing standard edgeline markings	Rural	Mostly two-lane undivided, volume not specified	All types, Injury	0.97	0.04
Elvik and Vaa, 2004	Placing standard edgeline markings	Rural	Mostly two-lane undivided, volume not specified	All types, PDO	0.97	0.11

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Place wide edgeline markings (200 mm or 8 in)

Rural two-lane roads

Elvik and Vaa conducted a meta-analysis of studies related to the installation of wide edgelines (200 mm or 8 in.) and based on the best estimates for percentage change in accidents, found that implementing this particular treatment results in modest changes to both injury and PDO accidents (p. 541) (*8*). The results are inconclusive with respect to whether the treatments actually reduce or increase accidents, given the values of the AMFs developed and corresponding standard error values. As shown in Exhibit 3-82, Elvik and Vaa found that the installation of wide edgelines on roadway segments has AMF values of 1.05 (S=0.08) and 0.99 (S=0.15) for injury accidents and PDO accidents respectively. The traffic volumes at the sites examined were not reported. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 accordingly.

Exhibit 3-82: Safety effectiveness of placing wide edgeline markings (8)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Placing wide edgeline markings	Rural	Mostly two-lane undivided, volume not specified	All types, Injury	1.05	0.08
Elvik and Vaa, 2004	Placing wide edgeline markings	Rural	Mostly two-lane undivided, volume not specified	All types, PDO	0.99	0.15

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Place centerline markings on roadway segments

Rural two-lane roads

Elvik and Vaa conducted a meta-analysis of studies related to the installation of centerlines on undivided highways and based on the best estimates for percentage change in accidents, found that implementing this treatment results in modest changes to injury and PDO accidents (p. 541) (*8*). Given the AMF and standard error values developed using the results from the study, it is inconclusive as to whether the treatments increase or decrease the number of accidents. As shown in Exhibit 3-83, Elvik and Vaa found that the installation of centerlines on undivided roadway segments has AMF values of 0.99 (S=0.06) and 1.01 (S=0.05) for injury accidents and PDO accidents respectively. The traffic volumes were not reported. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 accordingly.

Exhibit 3-83: Safety effectiveness of placing centerline markings (8)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Placing centerline markings	Mixed urban and rural	Mostly two-lane undivided, volume not specified	All types, Injury	0.99	0.06
Elvik and Vaa, 2004	Placing centerline markings	Mixed urban and rural	Mostly two-lane undivided, volume not specified	All types, PDO	1.01	0.05

Rural multi-lane highways; Urban and suburban arterials

No studies found.

Treatment: Add lane line markings on multi-lane roadway segments

Rural two-lane roads

Not applicable.

Rural multi-lane highways; Freeways; Expressways

No studies found.

Urban and suburban arterials

Elvik and Vaa conducted a meta-analysis of studies related to the addition of lane lines on multilane urban roadways and based on the best estimates for percentage change in accidents, found that implementing this treatment reduces the total accidents (p. 541) (*8*). As shown in

Exhibit 3-84, Elvik and Vaa found that the installation of lane lines on multilane roadway segments in an urban environment has an AMF value of 0.82 (S=0.39) for total accidents. The traffic volumes were not reported. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 accordingly. In the United States, most multi-lane facitilities have lane line markings according the MUTCD; thus the treatment may not be applicable.

Exhibit 3-84: Safety effectiveness of installing lane lines on multilane roadway segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing lane lines	Urban	Multilane, volume not specified	All types, all severities	0.82	0.39

Treatment: Provide distance markers

Rural two-lane roads; Rural multi-lane highways; Expressways; Urban and suburban arterials

No studies found.

Freeways

Elvik and Vaa reviewed one British study by Helliar-Symons et al. (1995) that investigated the installation of distance markers on motorways (the British equivalent to freeways) and based on the best estimates for percentage change in accidents, found that implementing this treatment significantly reduces the injury accidents. Distance markers are angle or chevron symbols marked on the carriageway to help drivers maintain an adequate distance from the vehicles in front (p. 541) (*8*). As shown in Exhibit 3-85, Elvik and Vaa found that the installation of distance markers (angle symbols) on motorways/expressways has an AMF value of 0.44 (S=0.26) for injury accidents. The traffic volumes were not reported. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 to accordingly.

Exhibit 3-85: Safety effectiveness of installing distance markers (angle symbols) on roadway segments (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing distance markers	Not specified	Freeways, volume not specified	All types, Injury	0.44	0.26

Urban and suburban arterials

No studies found.

Treatment: Place combination of edgelines and background/ directional markings on horizontal curves

Rural two-lane roads

Elvik and Vaa conducted a meta-analysis of studies related to the installation of edgelines and background/directional markings on horizontal curves. Based on the best estimates for percentage change in accidents, the researchers found that implementing this combined treatment is expected to reduce the number of single-vehicle run-off-road (SV ROR) injury accidents (p. 541) (*8*). As shown in Exhibit 3-86, Elvik and Vaa found that the installation of edgelines and background/directional markings on horizontal curves for two-lane, undivided rural roads has an AMF value of 0.81 (S=0.31) for injury accidents. Although the traffic volumes were not reported, it is expected that they were likely to be in the lower range (AADT < 5,000 veh/day). This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 accordingly.

Exhibit 3-86: Safety effectiveness of edgelines and background/directional markings on horizontal curves (8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Placing edgelines and background/ directional markings on horizontal curves	Rural	Two-lane undivided, not specified	Single-vehicle run-off-road (SV ROR), Injury	0.81	0.31

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Install raised pavement markers and transverse rumble strips on approach to horizontal curves

Rural two-lane roads

Elvik and Vaa conducted a meta-analysis of studies related to the installation of raised pavement markers (RPMs) and transverse rumble strips on the approach to horizontal curves. Based on the best estimates for change in accidents, the researchers found that implementing this combined treatment reduces SV ROR injury accidents (p. 541) (*8*). As shown in Exhibit 3-87, Elvik and Vaa found that the installation of RPMs and background/directional markings on horizontal curves has an AMF value of 0.94 (S=0.49) for SV ROR injury accidents. The traffic volumes were not reported. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 accordingly.

Agent and Creasey (*64*) investigated the use of transverse markings, rumble strips and raised pavement markers to delineate horizontal curves on two-lane, undivided rural roads. The type and design of the rumble strips and raised pavement markers, and the volumes and posted speeds at the study sites were not specified in the paper. Although the traffic volumes were not

reported, it is expected that they were likely to be in the lower range (AADT < 5,000 veh/day). Regression to the mean is likely due to site selection bias; therefore the AMFs were corrected by a multiplicative factor of 0.1. This study was considered to be of low quality and the standard error values have been multiplied with a method correction factor of 3.0 accordingly, and then corrected for the RTM bias. The resulting standard errors are quite large, primarily due to the small number of crashes in the study.

Exhibit 3-87: Safety effectiveness of combination of raised pavement markers and transverse rumble strips on approach to horizontal curves

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing RPMs and background/ directional markings on horizontal curves	Rural	Two-lane undivided, volume not reported	Single-vehicle run-off-road (SV ROR), Injury Accidents	0.94	0.49
Agent and Creasey, 1986	Transverse rumble strips, RPMs, transverse markings*	Rural	Two-lane, horizontal curve, volume not reported	All types, all severities	1.10	1.26
Agent and Creasey, 1986	Transverse rumble strips, RPMs, transverse markings*	Rural	Two-lane, horizontal curve, volume not reported	Wet accidents, all severities	0.91	1.16
Agent and Creasey, 1986	Transverse rumble strips, RPMs, transverse markings*	Rural	Two-lane, horizontal curve, volume not reported	Nighttime accidents, all severities	0.83	1.88
Agent and Creasey, 1986	Transverse rumble strips, RPMs	Rural	Two-lane, horizontal curve, volume not reported	All types, all severities	0.47	0.50
Agent and Creasey, 1986	Transverse rumble strips, RPMs	Rural	Two-lane, horizontal curve, volume not reported	Wet accidents, all severities	0.51	0.55
Agent and Creasey, 1986	Transverse rumble strips, RPMs	Rural	Two-lane, horizontal curve, volume not reported	Nighttime accidents, all severities	0.36	1.37

NOTE: *For this site, the westbound direction had transverse rumble strips and RPMs while the eastbound direction had transverse pavement markings and RPMs

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Place edgelines and centerlines on roadway segments

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Elvik and Vaa conducted a meta-analysis of studies related to the addition of both edgelines and centerlines on previously unmarked roadway segments and based on the best estimates for change in accidents, the researchers found that implementing this combined treatment significantly reduces the injury accidents (p. 541) (*8*). The sites used in the studies that were meta-analyzed represented a mixture of urban and rural, two-lane and multi-lane roadways. The traffic volumes were not reported. Elvik and Vaa found that the installation of edgelines and centerlines has an AMF value of 0.76 (S=0.11) for injury accidents. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 accordingly (Exhibit 3-88).

Al-Masaeid and Sinha (p. 9) (*61*) investigated the safety effectiveness of edgelines and centerlines on undivided rural roads and concluded that overall, the use of such treatments were not effective in reducing accident rates and may in fact result in a slight increase in total crashes but for "hazardous sites"[2], they appeared to reduce the total number of crashes. The researchers found that the installation of edgelines and centerlines resulted in an AMF value of 1.034 (S=0.25) for total accidents when all sites were considered and an AMF value of 0.865 (S=0.25) for total accidents for hazardous sites only. This study was considered to be of low quality (markings in before period not reported) and the standard error values have been multiplied with a method correction factor of 3 accordingly.

The study results were not combined due to the differences in crash severity, and are provided in Exhibit 3-88.

[2] Al-Masaeid and Sinha defined hazardous sites as sites which had accident rates exceeding the overall mean in the before period (*61*).

Exhibit 3-88: Safety effectiveness of edgelines and centerlines on roadway segments

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing edgelines and centerlines	Mixed urban and rural	Mixed two-lane and multilane, volume not specified	All types, Injury	0.76	0.11
Al-Masaeid and Sinha, 1993	Installing edgelines and centerlines	Rural	Undivided, 1,000 to 4,000 veh/day	All types, all severities	1.03	0.25
Al-Masaeid and Sinha, 1993	Installing edgelines and centerlines at sites with higher incidences of crashes	Rural	Undivided, 1,000 to 4,000 veh/day	All types, all severities	0.87	0.14

Freeways; Expressways

No studies found.

Treatment: Install edgelines, centerlines and post-mounted delineators on roadway segments

Rural two-lane roads; Rural multi-lane highways

Elvik and Vaa conducted a meta-analysis of studies related to the installation of edgelines, centerlines and delineators on roadway segments and based on the best estimates for change in accidents, the researchers concluded that implementing this combined treatment significantly reduces the injury accidents (p. 541) (*8*). The sites used in the studies that were meta-analyzed were comprised of a mixture of urban and rural, two-lane and multi-lane roadways. The traffic volumes were not reported. As shown in Exhibit 3-89, Elvik and Vaa found that the installation of edgelines, centerlines and delineators has an AMF value of 0.55 (S=0.11) for injury accidents. This study was considered to be of medium-high quality and the standard error value has been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-89: Safety effectiveness of edgelines, centerlines and post-mounted delineators

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install edgelines, centerlines and delineators	Mixed urban and rural	Mixed two-lane and multilane, volume not specified	All types, Injury	0.55	0.11

Freeways; Expressways; Urban and suburban arterials

No studies found.

Treatment: Install snowplowable permanent RPMs on roadway segments

Rural two-lane roads; Freeways

Bahar et al. conducted a study investigating the safety impacts of snowplowable RPMs on two-lane roadways, four-lane freeways and four-lane divided expressways using an empirical Bayesian before-after study approach (*57*). Using regression techniques, safety performance functions (SPFs) and accident modification functions (AMFs) were developed for two-lane roadways and four-lane freeways. Although the study by Bahar et al. (*57*) also attempted to quantify the safety effects of snowplowable RPMs for four-lane divided expressways, the effort was unsuccessful due to data constraints.

Bahar et al. reported that the selective implementation of RPMs requires careful consideration of traffic volumes and roadway geometry seeing that the results from the study show that RPMs can in fact be associated with a negative safety effect, particularly in the presence of sharp curves (*57*). The indices of effectiveness of snowplowable RPMs on nighttime crashes and the corresponding values of standard error for two-lane roadways and four-lane freeways are summarized in Exhibit 3-90 and Exhibit 3-91, respectively. Due to the rigorous methodology applied, this study was considered to be of high quality and the standard error value has been multiplied with a method correction factor of 1.2 accordingly.

Exhibit 3-90: Safety effectiveness of snowplowable permanent RPMs on two-lane roadway segments (57)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	2-lane roadways with DOC ≤ 3.5, AADT = 0 to 5000	Nighttime, all severities	1.16	0.03
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	2-lane roadways with DOC > 3.5, AADT = 0 to 5000	Nighttime, all severities	1.43	0.10
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	2-lane roadways with DOC ≤ 3.5, AADT = 5001 to 15000	Nighttime, all severities	0.99	0.06
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	2-lane roadways with DOC > 3.5, AADT = 5001 to 15000	Nighttime, all severities	1.26	0.11
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	2-lane roadways with DOC ≤ 3.5, AADT = 15001 to 20000	Nighttime, all severities	0.76	0.08
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	2-lane roadways with DOC > 3.5, AADT = 15001 to 20000	Nighttime, all severities	1.03	0.13

DOC = Degree of Curvature

Exhibit 3-91: Safety Effectiveness of Snowplowable PRPMs on Four-Lane Freeways

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	4-lane freeways with controlled access, AADT < 20000	Nighttime, all severities	1.13	0.16
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	4-lane freeways with controlled access, AADT = 20001 to 60000	Nighttime, all severities	0.94	0.25
Bahar et al., 2004	Implementation of snowplowable PRPMs	Primarily rural	4-lane freeways with controlled access, AADT < 60000	Nighttime, all severities	0.67	0.25

Urban and suburban arterials; Rural multi-lane highways; Expressways

No studies found.

Discussion: Differences in the impact of PRPMs on roads with high and low design standards

As part of the study conducted by Bahar et al. (*57*), the researchers provided a detailed discussion on the effects of implementing PRPMs on the number of crashes as well as other surrogate measures such as vehicle speeds and lane positioning as reported by other publications. Through a review of previous research studies and on the basis of their own study results, Bahar et al. proposed that vehicle speeds generally increased at night following improved delineation, resulting in increased crash frequency, particularly for roads with low design standards. The researchers further noted that there are indications through other studies that drivers are reluctant to decrease their speeds by too much and are often willing to trade off comfort for time savings. Subsequently, on sharper horizontal curves (i.e. with a higher degree of curvature), it seems that the negative safety impact of speed increases is not offset by the positive safety impact of improved visibility (*57*).

Treatment: Apply converging chevron pattern markings on roadway segments

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

No studies found.

Urban and suburban arterials

Griffin and Reinhardt carried out a study that investigated the impacts of implementing converging chevron pavement marking patterns on urban roadways and found a 38.4 percent reduction in total crashes (*60*). The chevrons used in the study were comprised of both standard and anti-skid materials. The standard chevron is a white, painted or thermoplastic "V" that points in the direction of travel. The researchers reported an overall reduction of 38.4 percent in total crashes with 95 percent confidence that the true reduction factor is between 25.3 percent and 49.2

percent. The study approach comprised of a simple before-after study and the reviewers provided a warning about the possibility of the presence of a regression-to-the-mean bias in the findings. Subsequently, the index of effectiveness from this particular reference was increased by a multiplicative factor of 0.1 to account for the regression-to-the-mean phenomenon. This study was considered to be of low quality and the standard error value has been multiplied with a method correction factor of 3 to account for the study approach. As shown in Exhibit 3-92, the reported percentage reduction translates into an AMF values of 0.68 (S=0.19) for total accidents. The traffic volumes were not reported.

Exhibit 3-92: Safety effectiveness of converging chevron pattern markings on roadway segments

Study, date	Treatment/ element	Setting	Road type, volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Griffin and Reinhardt (1996)	Implementation of converging chevron pattern on road surface.	Urban	Unspecified	All types, all severities	0.68	0.19

3.2.3. Rumble Strips

Rumble strips are used to provide a vibrotactile or audible warning to motorists. They are intended to reduce crashes caused by drowsy or inattentive motorists. In this edition of the HSM, this section will provide information on the safety effects of using shoulder, centerline or transverse rumble strips on roadway segments. Future editions of the HSM may address other types of rumble strip applications on sections, such as edgeline or mid-lane rumble strips.

Several concerns have been identified regarding the use of rumble strips, which apply to all types of rumble strips:

- Noise
- Maintenance
- Bicyclists
- Motorcyclists
- Improper driver reaction
- Crash migration

Noise is a valid concern, as rumble strips cause noise external to the vehicle, and may affect surrounding residents. It is generally accepted that rumble strips should not be used near residences or in other locations where the noise they generate is likely to disturb people. Agencies including Alaska, Colorado, Delaware, and Pennsylvania consider noise impacts before implementing in residential or urban areas (based on a survey conducted for NCHRP 34-01 by Russell, E. R. and Rys, M. J., "Centerline Rumble Strips." (draft unpublished 2004)). Studies show that rumble strips that are terminated 200 m prior to residential or urban areas produce tolerable noise impacts on residences. At an offset of 500 m, the noise from rumble strips is negligible (*66*).

The remaining concerns have not been substantiated with empirical evidence. In many cases, these concerns have proven to be unfounded by researchers and practitioners. In summary:

- Maintenance: "States that use rumble strips (on the roadway shoulder or otherwise) have not reported any additional maintenance requirements as long as the rumble strips are placed on pavement that is in good condition." (*67*).
- Bicyclists: Rumble strips can be designed to minimize the discomfort to bicyclists, as determined by Torbic et al. (*68*). The decision to implement rumble strips may depend on the presence of bicyclists on the route.
- Motorcyclists: "Pennsylvania has worked with motorcycle groups, and no major concerns were raised by these groups." (*67*).
- Improper driver reaction: Several studies have found that although some driver's initially react incorrectly to rumble strips, the majority of drivers react in the desired way. It is anticipated that as the driving public become more familiar with rumble strips, the percentage of driver's with an initial incorrect reaction will decline (*69*).
- Crash migration: Analysis of downstream collision data by Griffith found migration/spillover of crashes to be unlikely (*69*).

Overall, the advantages of rumble strips are generally accepted to outweigh the disadvantages (*70*,*69*):

- Rumble strip installation costs are low
- There is no noticeable degradation of pavement due to rumble strips
- Rumble strips require little or no maintenance
- Rumble strips are effective in snow and icy conditions and may act as a guide in inclement weather for truck drivers

FHWA Office of Safety's extensive website regarding rumble strips is a valuable resource (http://safety.fhwa.dot.gov/programs/rumble.htm). New research is beginning under NCHRP 17-32, which may provide additional insight into rumble strip applications.

Based on the literature review in the following sections, there is a need to conduct research to quantify the safety effect of the following elements of rumble strips:

- Various traffic volume ranges on all road types
- Potential influence of different shoulder widths and lane widths
- Potential influence of different strip dimensions or types; at this time there is no indication that different dimensions or types have an effect on safety
- Motorcycles, pedestrians, and cyclists in terms of crash experience

The following sections discuss the safety impact of shoulder, centerline, and transverse rumble strips on roadway segments. Mid-lane and edgeline rumble strips may be included in future editions of the HSM.

3.2.3.1. Shoulder Rumble Strips

Shoulder rumble strips are defined by the FHWA as "a longitudinal design feature installed on a paved roadway shoulder near the travel lane. It is made of a series of indented or raised elements intended to alert inattentive drivers through vibration and sound that their vehicles have left the travel lane. On divided highways, they are typically installed on the median side of the roadway as well as on the outside (right) shoulder" (*71*).

The target crash type for shoulder rumble strips is typically single-vehicle run-off-road (SV ROR); however there is discussion that there may be benefits for head-on crashes as well.

For example, if a driver leaves the roadway (to the right) and overcompensates while trying to recover control of vehicle, the driver may head into the opposing direction of traffic (*43*). Shoulder rumble strips may reduce head-on crashes results from such a scenario by reducing the likelihood that the driver leaves the roadway.

Shoulder rumble strips have been implemented extensively on freeways, and are being implemented more commonly on two-lane and multi-lane rural roads. The intent is to alert the driver of an errant vehicle, using sound and vibration, that they are leaving or are about to leave the roadway.

The reader is directed to the Technical Advisory on Shoulder Rumble Strips issued by the FHWA, which can be found on-line at http://www.fhwa.dot.gov/legsregs/directives/techadvs/t504035.htm (*71*). This technical advisory contains the recommendation that rumble strips are not to be placed on shoulders used by bicyclists "unless there is a minimum clear path of 1 ft (0.3 m) from the rumble strip to the traveled way, 4 ft (1.2 m) from the rumble strip to the outside edge of the paved shoulder, or 5 ft (1.5 m) to adjacent guardrail, curb or other obstacle". This is in agreement with the 1999 American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities. Other details regarding the accommodation of bicyclists can be found in the Technical Advisory.

The reader is directed to NCHRP Report 500 Volume 6 for additional discussion of implementation issues such as noise, motorcyclists, and winter maintenance (*16*).

The reader is also referred to the Science Applications International Corporation (SAIC) "Synthesis of Shoulder Rumble Strip Practices and Policies" which includes a review of shoulder rumble strip studies, motorist and bicyclist perceptions, results of nationwide surveys conducted in 2000, and a comparison of policies, practices, and alternative designs (*72*).

This section discusses the safety effect of shoulder rumble strips on rural multi-lane highways, including freeways; no conclusive safety studies were found for rural two-lane roads or urban and suburban arterials.

Shoulder widening in conjunction with shoulder rumble strip installation on rural multi-lane highways, including freeways is also included in this subsection. Again, no conclusive safety studies were found for this treatment on rural two-lane roads or urban and suburban arterials.

A brief discussion of the impact of shoulder rumble strips on motorcycles, pedestrians, and cyclists is also included here. Section 3.3 provides additional discussion of pedestrian and bicyclist considerations.

In future editions, this section may cover the safety effect of shoulder rumble strips on all road classes, at different traffic volume ranges; with varying shoulder width, lane width; for different rumble strip dimensions, types, and patterns (milled, rolled, formed, which require different times to construct and open to the traffic), etc. The safety impact on motorcycles, pedestrians, and cyclists may be quantified.

Exhibit 3-93: Resources examined to investigate the safety effect of shoulder rumble strips

DOCUMENT	DESCRIPTION	COMMENT
NCHRP Project 17-32 "Guidance for the Design and Application of Shoulder and Centerline Rumble Strips" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-32	On-going project.	Results not available.
(*73*) (Carrasco, O., McFadden, J., and Chandhok, P., "Evaluation of the Effectiveness of Shoulder Rumble Strips on Rural Multi-lane Divided Highways In Minnesota." Washington D.C., 83rd Transportation Research Board Annual Meeting, (2004))	The study examined the safety effects of milled-in shoulder rumble strips on rural multi-lane divided highways at 23 sites and eight comparison sites in Minnesota, from 1991 to 1998. Also summarizes some previous results by other researchers.	Added to synthesis.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Strategy 15.2 A4 Shoulder rumble strips on horizontal curves.	No additional safety information provided (given in ROR guide) – not added to synthesis.
(Knipling, R. R., Waller, P., Peck, R. C., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP 500 Report Volume 13: A Guide for Addressing Collisions Involving Heavy Trucks." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Strategy 12.1 A3 Incorporate rumble strips into new and existing roadways. However, no safety effect information is given.	No safety information provided – not added to synthesis.
(*16*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	The study focuses on 3 objectives to prevent vehicles from leaving the road. Synthesis of existing safety knowledge, with additional information on potential difficulties, implementation, and costs.	Safety effect noted by 3 other studies are provided – added to synthesis.
(*68*) (Torbic, D. J., Elefteriadou, L., and El-Gindy, M., "Development of More Bicycle-Friendly Rumble Strip Configurations." Washington, D.C., 80th Transportation Research Board Annual Meeting, (2001))	The study evaluated rumble strip patterns on non-freeway roads to establish which were the most effective for motorists and the friendliest for bicyclists. Tests were performed using simulator models; field tests were then performed with different bicycles, speeds, approach angles, and bicyclists. Motor vehicle testing was also conducted.	Suggested by NCHRP 17-18(4). No quantification of safety effect. However, two recommended patterns for bicyclists are added to HSM content.
(Transportation Association of Canada, "Best Practices for the Implementation of Shoulder and Centreline Rumble Strips." Ottawa, Ontario, Canada, Transportation Association of Canada, (2001))	The purpose of this document is to provide highway agencies with a summary of current practices to assist these agencies in the development of local guidelines and policies.	No additional safety information provided (given in other refs) – not added to synthesis.
(*74*) (Hanley, K. E., Gibby, A. R., and Ferrara, T. C., "Analysis of Accident Reduction Factors on California State Highways." Transportation Research Record, No. 1717, Washington, D.C., Transportation Research Board, National Research Council, (2000) pp. 37-45.)	The study reviewed rumble strips, shoulders (widening), superelevation, horizontal curves and wet pavement treatments. Used Bayesian Estimation of Accidents in Transportation Studies software; before and after analysis with comparison groups. In all cases, shoulders on freeways were widened in conjunction with shoulder rumble strips.	Suggested by NCHRP 17-18(4). Limited to California data. Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways.	Limited quantitative information. Not added to synthesis.
(*69*) (Griffith, M. S., "Safety Evaluation of Rolled-In Continuous Shoulder Rumble Strips Installed on Freeways." Washington, D.C., 78th Transportation Research Board Annual Meeting, (1999))	The study examined the safety effects of continuous shoulder rumble strips using a before-after approach at 63 sites in Illinois and 28 sites in California.	Added to synthesis.
Moeur, C. Richard. Rumble Strip Gap Study. Final Report, May 1999.	This study examines the effect of placing gaps in rumble strips to allow bicycle to traverse smoothly. There was no mention of safety in this paper.	Not added to synthesis.
(*70*) (Perrillo, K., "The Effectiveness and Use of Continuous Shoulder Rumble Strips." Albany, N.Y., Federal Highway Administration, (1998))	Background of shoulder rumble strips, including discussion of possible negative impacts. Before/after crash data studied on New York Thruway.	Suggested by NCHRP 17-18(4). Results added to synthesis.
(Hickey Jr., J. J., "Shoulder Rumble Strip Effectiveness: Drift-off-Road Accident Reductions on the Pennsylvania Turnpike." Washington, D.C., 76th Transportation Research Board Annual Meeting, (1997))	The study examined the safety effects of Sonic Nap Alert Pattern in Pennsylvania. It is a follow up to the study done by Wood (1984). Studied reportable accidents (those involving fatality, injury or vehicle damage requiring towing). Drift off road (DOR) accidents include single vehicles striking objects off the right side of the roadway where SNAP was installed, and did not result from mechanical default of blowout.	Suggested by NCHRP 17-18(4). Results already added to synthesis as cited in Carrasco 2004.
(Harwood, D. W., "NCHRP Synthesis of Highway Practice Report 191: Use of Rumble Strips to Enhance Safety." Washington, D.C., Transportation Research Board, National Research Council, (1993))	Synthesis of the application of rumble strips to enhance highway safety, including operations, potential adverse effects, design and installation specifications, estimated cost and service life.	Limited quantitative information. Not added to synthesis.
(Agent, K. R. and Creasey, F. T., "Delineation of Horizontal Curves." UKTRP-86-4, Frankfort, Ky., Kentucky Transportation Cabinet, (1986))	Study of various delineation methods including chevrons, post mounted delineators, raised pavement markers, and transverse rumble strips in combination to enhance safety of horizontal curves. Simple before-after study of 4 sites.	No shoulder rumble strips. Added to transverse rumble strips section.
(Ligon, C. M., Carter, E. C., Joost, D. B., and Wolman, W. W., "Effects of Shoulder Textured Treatment on Safety." FHWA/RD-85/027, Washington, D.C., Federal Highway Administration, (1985))	The objective of the study was to determine the safety effects of shoulder textured treatments in reducing run-off-the road accidents on high volume rural freeways. The study compared 24 textured shoulder sites with corresponding control sections.	Suggested by NCHRP 17-18(4). Results already added to synthesis as cited in Carrasco 2004.

DOCUMENT	DESCRIPTION	COMMENT
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	The chapter discusses the relationship between accidents and cross sectional elements	No relevant information. Not added to synthesis.

The effectiveness of shoulder rumble strips has been quantified for freeways and rural multi-lane divided roadways. No studies of effectiveness for rural two-lane highways were found. Volume ranges are provided here where available. All studies added to the synthesis did not consider or did not provide data on shoulder width, lane width, dimensions of strips, or different types (milled, rolled, and formed).

The impact of shoulder rumble strips on motorcycles, pedestrians, or cyclists has not been quantified in terms of crash experience; however, surrogate measures and qualitative information are provided in several studies, and summarized at the end of this section.

Treatment: Install continuous shoulder rumble strips

Rural two-lane roads; Urban and suburban arterials; Expressways

No studies found.

Rural divided multi-lane highways; Freeways

Griffith (1999) studied continuous rolled-in shoulder rumble strips on urban and rural freeways in Illinois and California (*69*). It is not clear from the study if rumble strips were applied to all 4 shoulders of the freeway, but it is likely. The traffic volumes and speed limits of the study areas were not provided in the paper. The results of the study based on the Illinois data are summarized in Exhibit 3-94. These results were assigned a medium-high rating. The index of effectiveness is as stated by Griffith; the standard error is based on the standard deviations given by the author, adjusted by a method correction factor of 1.8 based on a medium-high rating for this study.

Griffith also notes that there is no evidence that SRS cause an increase in multi-vehicle accidents within the boundaries of the treatment area (i.e., no negative effect by SRS); also indicates no positive effect of SRS on multi-vehicle accidents (pg 13, (*69*)).

Carrasco et al. (2004) studied continuous milled-in shoulder rumble strips on all four shoulders with varying designs on rural multi-lane divided roads. The road segments studied had a volume range of approximately 2,000 to 50,000 veh/day, and posted speeds of 55 to 70 mph (88 to 112 km/h). The results of the study are summarized in Exhibit 3-94. This study was rated medium-low; the MCF of 2.2 was applied to the s ideal calculated based on the number of before crashes and the ratio of before/after duration to reach an estimate of the standard error (*73*).

Perillo (1998) investigated continuous milled-in shoulder rumble strips on all four shoulders of New York Thruways (multi-lane divided), focusing on selected SV ROR crashes with certain causes, including alcohol, drugs, inattention, inexperience, fatigue, illness, distraction, and glare. This study was considered of low quality (simple before/after, one year data before, one year data after) and a method correction factor of 3 (low rating) was applied to

reach an estimate of standard error. The posted speed limit and traffic volumes were not provided in the report. The safety effects are summarized in Exhibit 3-94. Note that the magnitude of this AMF is quite large, likely due to the very specific crash type; the standard error is low due to the large number of crashes included in the study (*70*).

Exhibit 3-94: Safety effectiveness of shoulder rumble strips on rural multi-lane highways, including freeways

Author, date	Treatment/ Element	Setting	Road type	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Carrasco et al., 2004	Continuous milled-in shoulder rumble strips on all four shoulders with varying designs	Rural	Multi-lane divided	All types, all severities	0.84	0.13
Carrasco et al., 2004	Continuous milled-in shoulder rumble strips on all four shoulders with varying designs	Rural	Multi-lane divided	All types, injury	0.83	0.19
Carrasco et al., 2004	Continuous milled-in shoulder rumble strips on all four shoulders with varying designs	Rural	Multi-lane divided	All SV ROR, all severities	0.90	0.25
Carrasco et al., 2004	Continuous milled-in shoulder rumble strips on all four shoulders with varying designs	Rural	Multi-lane divided	All SV ROR, injury	0.78	0.33
Perillo, 1998	Continuous milled-in shoulder rumble strips on all four shoulders	Unknown	Thruway (multi-lane divided)	Selected SV ROR, all severities	0.21	0.07
Griffith, 1999	Continuous rolled-in shoulder rumble strips	Urban and Rural	Freeway	All SV ROR, all severities	0.82	0.12
Griffith, 1999	Continuous rolled-in shoulder rumble strips	Urban and Rural	Freeway	All SV ROR, injury	0.87	0.21
Griffith, 1999	Continuous rolled-in shoulder rumble strips	Rural	Freeway	All SV ROR, all severities	0.79	0.18
Griffith, 1999	Continuous rolled-in shoulder rumble strips	Rural	Freeway	All SV ROR, injury	0.93	0.28

Notes:

Griffith, 1999: Setting of urban and rural indicates rural data combined with urban data for analysis. Setting of rural is a subset of combined urban and rural data.

Perrillo, 1998: selected SV ROR crashes with certain causes, including alcohol, drugs, inattention, inexperience, fatigue, illness, distraction, and glare.

Treatment: Install continuous shoulder rumble strips and wider shoulders

Rural two-lane roads; **Rural multi-lane highways; Urban and suburban arterials; Expressways**

No studies found.

Freeways

Hanley et al. computed the safety effect of shoulder widening in conjunction with shoulder rumble strip installation on freeways in California. The posted speed limit and traffic volumes were not provided in the report. The ideal standard error was estimated by dividing the estimated percent reduction in accidents by the t-test values provided by Hanley et al. This study was considered of medium-high quality and an MCF of 1.8 was applied to reach an estimate of standard error. The safety effects found are summarized in Exhibit 3-95 (*74*).

Exhibit 3-95: Safety effectiveness of shoulder rumble strips in conjunction with shoulder widening on freeways (74)

Author, date	Treatment/ Element	Setting	Road type	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hanley et al, 2000	Shoulder widening with shoulder rumble strip installation	Unknown	Freeway	All types, all severities	0.81	0.20
Hanley et al, 2000	Shoulder widening with shoulder rumble strip installation	Unknown	Freeway	Drift-off-road, all severities	0.87	0.24

Urban and suburban arterials

No studies found.

Discussion: Impact of shoulder rumble strips on motorcycles, pedestrians, and cyclists

According to NCHRP Report 500 Volume 6, experience has shown that potential difficulties for SRS (including snow removal, drainage, maintenance, noise, motorcycles) can be addressed or dismissed through sensible policies and targeted application. Practitioners may wish to consider the presence of bicyclist users when considering shoulder rumble strips. Three studies were conducted in Pennsylvania, California, Colorado to test bicycle and motor vehicle testing of various rumble strip designs and recommended compromise between designs that provide the most noise and vibration for motorists, and the most comfort for cyclists (*16*).

Torbic et al. evaluated rumble strip patterns on non-freeway roads to establish which were the most effective for motorists and the most friendly for bicyclists (*68*). The authors recommend two patterns:

1. 127 mm wide, 178 mm edge to edge between cuts, 10 mm deep for operating speed of 55 mph (88 km/h)
2. 127 mm wide, 178 mm edge to edge between cuts, 6.3mm deep for operating speed of 45 mph (72 km/h)

Torbic et al. provide detailed discussion on the evaluation process. Section 3.3 contains further discussion of cyclist accommodation.

In conclusion, the impact of shoulder rumble strips on pedestrians and cyclists have not been adequately quantified; the safety professional may wish to consider the presence of cyclists when considering the implementation of shoulder rumble strips. There are potential design alternatives that provide adequate warning to motorists while not adversely affecting bicycle operations. There is no quantified negative impact on motorcyclists.

3.2.3.2. Centerline Rumble Strips

Centerline rumble strips can be implemented on undivided roadways to reduce opposing-direction crashes. Target crashes for centerline rumble strips include head-on and opposite-direction sideswipe, with a secondary target crash of run-off-road-to-the-left.

Torbic et al. state, "Centerline rumble strips are installed primarily to reduce head-on and sideswipe crashes along undivided roadways. Their primary function is to alert drowsy or otherwise inattentive drivers that their vehicles are encroaching upon the opposing lane through tactile and auditory stimulation." (*43*)

Centerline rumble strips may somewhat reduce risky passing or other maneuvers, but this is not the primary intent of their application. As noted by Torbic et al., "centerline rumble strips may also discourage drivers from cutting across the inside of a curve" (*43*).

Currently, there are no national guidelines for the application of centerline rumble strips; the FHWA Rumble Strips website is a valuable source of current information (http://safety.fhwa.dot.gov/roadway_dept/rumble/index.htm).

This section discusses the safety effects of the implementation of centerline rumble strips. Centerline pavement markings (paint or raised thermoplastic stripes) are also discussed in this section.

General issues with rumble strips, such as noise, maintenance, driver reaction, bicyclists, and motorcyclists are discussed above in Section 3.2.3.

Exhibit 3-96: Resources examined to investigate the safety effect of centerline rumble strips on undivided roadways

DOCUMENT	DESCRIPTION	COMMENT
NCHRP 34-01 synthesis (Gene Russell, Margaret Rys)	Project is on-going	Results not available.
(*76*) Transportation Association of Canada "Centreline Rumble Strips Synthesis"	Synthesis of practices and research.	Some qualitative information added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Noyce, D. A. and Elango, V. V., "Safety Evaluation of Centerline Rumble Strips: A Crash and Driver Behavior Analysis." Washington, D.C., 83rd Annual Meeting of the Transportation Research Board, (2004))	The study evaluated the safety impact of centerline rumble strips on undivided roadways in Massachusetts. Driver behavior was evaluated using a full-scale driving simulator.	Insufficient data to calculate t and s. Not added to synthesis.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	The report focuses on strategies to prevent the crash types prevalent on horizontal curves.	No additional quantitative information. Not added to synthesis.
(*75*) (Persaud, B. N., Retting, R. A., and Lyon, C., "Crash Reduction Following Installation of Centerline Rumble Strips on Rural Two-Lane Roads." Arlington, Va., Insurance Institute for Highway Safety, (2003))	The study examined 210 miles of two-lane rural roads in seven states before and after the installation of centerline rumble strips (California, Colorado, Delaware, Maryland, Minnesota, Oregon, and Washington).	Added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., McGee, H., Prothe, L., Eccles, K., and Council, F. M., "NCHRP Report 500 Volume 4: A Guide for Addressing Head-On Collisions ." Washington, D.C., Transportation Research Board, National Research Council, (2003))	The report focuses on strategies to prevent head-on crashes.	Only quantitative results are from Delaware, and superseded by Persaud et al (2003). Not added to synthesis.
(Knipling, R. R., Waller, P., Peck, R. C., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP 500 Report Volume 13: A Guide for Addressing Collisions Involving Heavy Trucks." Washington, D.C., Transportation Research Board, National Research Council, (2003))	The report focuses on strategies to prevent crashes involving heavy trucks.	No additional quantitative information provided that wasn't in NCHRP 500 V7. Not added to synthesis.
(Outcalt, W., "Centerline Rumble Strips." CDOT-DTD-R-2001-8, Denver, Colorado Department of Transportation, (2001))	Evaluation of centerline rumble strips on two-lane mountain highway.	Colorado is included in Persaud et al, 2003. Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways.	Reviewed in NCHRP 500 V4 [Neuman et al (2003)]. Not added to synthesis.
(Perrillo, K., "The Effectiveness and Use of Continuous Shoulder Rumble Strips." Albany, N.Y., Federal Highway Administration, (1998))	Limited information on centerline rumble strips; summarizes CLRS findings in Delaware.	Only quantitative results are from Delaware, and superseded by Persaud et al (2003). Not added to synthesis.
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	The chapter discusses the relationship between accidents and cross sectional elements.	Use in transverse rumble strip section. No use for centerline rumble strips. Not added to synthesis.

Information on the effectiveness of centerline rumble strips is limited. Few studies were found with sufficient data to determine an index of effectiveness.

Treatment: Install centerline rumble strips

Rural two-lane roads

Persaud et al. (2003) found that centerline rumble strips on two-lane rural roads had a positive effect on safety, as summarized in Exhibit 3-97. This study was based on various centerline rumble strip designs in seven states (California, Colorado, Delaware, Maryland, Minnesota, Oregon, and Washington); the average segment length in the study was 2 miles, with traffic volumes from 5,000 to 22,000 veh/day, and included both horizontal curves and tangent sections (*75*).

Persaud et al. provided the 95% confidence intervals of the results, which were used to compute standard errors of the estimates, and a method correction factor of 1.8 (EB medium-high rating) was applied. Note that the data set used in this study was not homogeneous; elements such as rumble strip types and designs, roadway geometry, traffic volumes, environmental conditions varied in the data set. In addition, in some cases other treatments were applied in conjunction with the centerline rumble strips (e.g., raised pavement markers, signs requiring daytime headlight), and the potential effects of additional treatments were not studied. Persaud et al. note that the small sample sizes that result from disaggregating the data did not permit studying the safety effects of varying elements.

Exhibit 3-97: Safety effectiveness of centerline rumble strips on rural two-lane roads (75)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Persaud et al, 2003	Centerline rumble strips	Rural	Two-lane, 5,000 to 22,000 veh/day	All types, all severities	0.86	0.05
Persaud et al, 2003	Centerline rumble strips	Rural	Two-lane, 5,000 to 22,000 veh/day	All types, injury	0.85	0.09
Persaud et al, 2003	Centerline rumble strips	Rural	Two-lane, 5,000 to 22,000 veh/day	Frontal and opposing-direction sideswipe, all severities	0.79	0.14
Persaud et al, 2003	Centerline rumble strips	Rural	Two-lane, 5,000 to 22,000 veh/day	Frontal and opposing-direction sideswipe, injury	0.75	0.18

Torbic et al. note "It is possible that the use of a centerline rumble strip might have some negative operational effects by inhibiting passing maneuvers (due to the look and noise of the strips). However, states currently using these rumble strips have not reported such problems" (pg v-7 (*43*)). No studies were found that measure an effect on passing behavior.

Based on a synthesis of current practices, there is some debate about the effect of painting the centerline on top of centerline rumble strips. According to some studies, retroreflectivity of the centerline marking is not reduced if the line is painted on top of the rumble

strip; it may even be enhanced (e.g., Alberta, Michigan, Texas). Other studies conclude that there may be a reduction in the visibility of the centerline marking, particularly if some debris settles in the rumble strip groove (e.g., snow, salt, sand) (e.g., Massachusetts, Minnesota, Saskatchewan). None of the studies provide conclusive results (*76*).

As an alternative, it is current practice by some highway agencies to paint the centerline on either side of the centerline rumble strip (e.g., Massachusetts), creating a narrow flush median. Other jurisdictions install the centerline rumble strips on either side of the centerline pavement marking (e.g., Minnesota) (*76*). The safety impact of these alternatives has not been reported.

Based on the review of current practices, it is evident that CLRS are generally not placed through intersections or at access points (*76*).

Rural multi-lane highways; Urban and suburban arterials

No studies found.

Discussion: Install centerline raised thermoplastic stripes

This treatment is discussed in NCHRP Report 500 Volume 7 (Strategy 18.1 A2 – Profiled Thermoplastic Stripes for Centerline). This treatment has been implemented on two-lane roads by two states, California and Texas; however, no formal safety effect evaluation has been conducted to date. This treatment is likely to be applied only in climates that rarely experience snow fall, as snow removal equipment may damage the raised thermoplastic stripes.

Rural multi-lane highways; Urban and suburban arterials

No studies found.

3.2.3.3. Transverse Rumble Strips

Transverse rumble strips (also known as “in-lane” rumble strips or “rumble strips in the traveled way”) are applied to the road surface perpendicular to the direction of travel, across the travel lane. The intent is for each vehicle to encounter the transverse rumble strips to warn them of an upcoming change in the roadway. Transverse rumble strips have been used as part of traffic calming schemes, in work zones, in advance of toll plazas, and in advance of intersections, railroad-highway grade crossings, bridges and tunnels.

There are concerns that drivers will cross into opposing lanes of traffic in order to avoid contacting transverse rumble strips. Similar to other rumble strips, there are also concerns for noise, motorcyclists, bicyclists, and maintenance, as previously discussed in Section 3.2.3.

Currently, there are no national guidelines for the application of transverse rumble strips; the FHWA Rumble Strips website is a valuable source of current information (http://safety.fhwa.dot.gov/roadway_dept/rumble/index.htm).

Other sections of the HSM contain information on the use of transverse rumble strips in advance of intersections (Section 4.2.8), railroad-highway grade crossings (Section 6.1), bridges (Section 6.3), tunnels (Section 6.4), or toll plazas (Section 6.17). Transverse rumble strips applied for speed reduction purposes (including in advance of speed transition zones) on segments are discussed in Section 3.2.7 and applications at mid-block pedestrian crossings or in school zones are discussed in Section 3.3.

Exhibit 3-98: Resources examined to investigate the safety effect of transverse rumble strips on segments

DOCUMENT	DESCRIPTION	COMMENT
(*77*) Transportation Association of Canada "Best Practice Guidelines for the Design and Application of Transverse Rumble Strips"	On-going project. Not yet published. Reviewed Final Draft Report.	Added to synthesis.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Overview of current knowledge on effects of road safety measures.	Transverse rumble strips in advance of intersections for reducing speed. Not added to synthesis.
(Smiley, A., "Rumble Strip Impact on Speed Variance." (2004))	The paper discusses the impact on drivers of transverse rumble strips, particularly regarding speed, speed variance, accidents, and design on intersection approaches.	No AMFs. No relevant information for transverse rumble strips on segments. Not added to synthesis.
(Knipling, R. R., Waller, P., Peck, R. C., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP 500 Report Volume 13: A Guide for Addressing Collisions Involving Heavy Trucks." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Strategy 12.1 A3 Incorporate rumble strips into new and existing roadways. However, no safety effect information is given.	No information on transverse rumble strips. Not added to synthesis.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	The report review and brings together available evidence on the safety impact of traffic operations. The study focuses on traffic operations and control strategies and providing useful information.	Transverse rumble strips in advance of rural intersections. Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways.	No accident data for transverse rumble strips. Not added to synthesis.
(Perrillo, K., "The Effectiveness and Use of Continuous Shoulder Rumble Strips." Albany, N.Y., Federal Highway Administration, (1998))	Primarily focused on shoulder rumble strips. Limited discussion of transverse and centerline applications.	No quantitative results for transverse, only shoulder. Used in SRS section. Not added to synthesis.
(*78*) (Harwood, D. W., "NCHRP Synthesis of Highway Practice Report 191: Use of Rumble Strips to Enhance Safety." Washington, D.C., Transportation Research Board, National Research Council, (1993))	Synthesis of rumble strip applications, operational and safety effectiveness, design, and other issues.	Qualitative discussion added to synthesis. No AMFs for segment application.
(*64*) (Agent, K. R. and Creasey, F. T., "Delineation of Horizontal Curves." UKTRP-86-4, Frankfort, Ky., Kentucky Transportation Cabinet, (1986))	Study of various delineation methods including chevrons, post mounted delineators, raised pavement markers, and transverse rumble strips in combination to enhance safety of horizontal curves. Simple before-after study of 4 sites.	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	This chapter discusses cross section and pavement surface elements at segments and intersections.	Transverse rumble strips in advance of rural intersections. Not added to synthesis.

The bulk of the research reviewed discusses transverse rumble strips applied in advance of intersections, and is not added to the discussion here.

The following general findings are based on a synthesis of practices and extensive literature review performed for the Transportation Association of Canada (*77*). Although inconclusive, the authors of that paper note several key, and often subtle, findings:

- Speed reduction effect ranges from minimal to no effect; studies are inconclusive
- Effect of transverse rumble strips diminishes with decreasing average operating speed, thus transverse rumble strips has a greater effect in areas with higher speeds/posted speed limits
- Transverse rumble strips, as a warning device, maintain effectiveness over time for familiar and even more so for unfamiliar drivers
- With the installation of transverse rumble strips across the full lane width, drivers brake more and earlier, which could result in greater compliance of traffic control devices ahead. Thus, transverse rumble strips should always be used in conjunction with other traffic control measures, such as warning beacons, additional signage, etc, to assist the driver to interpret the warning message.
- Transverse rumble strips with a depth less than 0.24 inches (6 mm) are largely ineffective
- Effect of transverse rumble strips on speed and pedestrian accidents at pedestrian crossings was inconclusive
- Transverse rumble strips are effective in reducing injury crashes when specifically analyzing target crashes (i.e., crashes that are the result of failing to obey the traffic control device or failing to adapt to new conditions at the specific location)
- Transverse rumble strips work best when they are unexpected and therefore converging patterns are not recommended. Converging patterns can create a lull effect and therefore fail in raising awareness of the driver's surroundings
- Intermittent (as opposed to continuous), full-lane (as opposed to "partial' or "wheel-width") transverse rumble strips are more effective and less likely to produce undesirable driver behavior such as lane deviation and inconsistent and/or hard braking maneuvers
- Painted transverse rumble strips have not been proven more effective, and they contribute to higher installation and maintenance costs
- Transverse rumble strips should be used sparingly and selectively because over-application of transverse rumble strips may create driver expectation issues and may desensitize drivers to the audible and vibratory effect

Treatment: Install transverse rumble strips and raised pavement markers on approach to horizontal curves

Rural two-lane roads

Agent and Creasey (*64*) investigated the use of transverse markings, rumble strips and raised pavement markers to delineate horizontal curves on two-lane, undivided rural roads. The type and design of the rumble strips and raised pavement markers, and the volumes and posted speeds at the study sites were not specified in the paper. Although the traffic volumes were not reported, it is expected that they were likely to be in the lower range (AADT < 5,000 veh/day).

This study was considered to be of low quality and the standard error values have been multiplied with a method correction factor of 3.0 accordingly. The resulting standard errors are quite large, primarily due to the small number of crashes in the study, and instill little confidence in the indices of effectiveness (Exhibit 3-99).

Exhibit 3-99: Safety effectiveness of transverse rumble strips and raised pavement markers on approach to horizontal curves on rural two-lane roads

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing RPMs and background/ directional markings on horizontal curves	Rural	Two-lane undivided, volume not reported	Single-vehicle run-off-road (SV ROR), Injury Accidents	0.94	0.49
Agent and Creasey, 1986	Transverse rumble strips, RPMs, transverse markings*	Rural	Two-lane, horizontal curve, volume not reported	All types, all severities	1.10	1.26
Agent and Creasey, 1986	Transverse rumble strips, RPMs, transverse markings*	Rural	Two-lane, horizontal curve, volume not reported	Wet accidents, all severities	0.91	1.16
Agent and Creasey, 1986	Transverse rumble strips, RPMs, transverse markings*	Rural	Two-lane, horizontal curve, volume not reported	Nighttime accidents, all severities	0.83	1.88
Agent and Creasey, 1986	Transverse rumble strips, RPMs	Rural	Two-lane, horizontal curve, volume not reported	All types, all severities	0.47	0.50
Agent and Creasey, 1986	Transverse rumble strips, RPMs	Rural	Two-lane, horizontal curve, volume not reported	Wet accidents, all severities	0.51	0.55
Agent and Creasey, 1986	Transverse rumble strips, RPMs	Rural	Two-lane, horizontal curve, volume not reported	Nighttime accidents, all severities	0.36	1.37

NOTE: *For this site, the westbound direction had transverse rumble strips and RPMs while the eastbound direction had transverse pavement markings and RPMs

Harwood discusses the application of rumble strips in advance of horizontal curves on segments, used by a few agencies, particularly curves with advisory speed limits or at the end of long tangent sections ((*78*), pg 6). "Rumble strip usage on the approach to a horizontal curve is intended to reduce skidding or run-off-road accidents involving drivers who do not see the curve or who enter the curve at too high a speed" ((*78*), pg 6).

Rural multi-lane highways; **Freeways; Expressways; Urban and suburban arterials**

No studies found.

Discussion: Install transverse rumble strips on approach to lane drop

According to Harwood, a few highway agencies have applied transverse rumble strips on freeways in advance of the termination of a right or left lane on freeways (*78*). In this application, transverse rumble strips are placed in the lane that is ending to prompt drivers to merge into remaining lanes. No studies were found that provide AMFs for this treatment.

Discussion: Install transverse rumble strips at freeway termination

As reported by Harwood, some highway agencies have implemented transverse rumble strips in the traveled way at the end of a freeway where all freeway traffic is directed onto a conventional highway. No studies were found on the safety effect of this type of treatment.

3.2.3.4. Mid-lane Rumble Strips [Future Edition]

Mid-lane rumble strips are applied along the centre of a travel lane, parallel to the direction of travel. In future editions of the HSM, the safety effect of the implementation of such rumble strips may be discussed in this section. Potential resources are listed in Exhibit 3-100.

Exhibit 3-100: Potential resources on the relationship between mid-lane rumble strips and safety

DOCUMENT
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))

3.2.3.5. Edgeline Rumble Strips [Future Edition]

Edgeline or "lane line" rumble strips, also known as "rumble stripes" are applied between lanes of the same direction of travel. In future editions of the HSM, the safety effect of the implementation of such rumble strips may be discussed in this section. Potential resources are listed in Exhibit 3-101.

Exhibit 3-101: Potential resources on the relationship between edgeline rumble strips and safety

DOCUMENT
(J.K. Lindly and R.K. Wijesundera, "Evaluation of profiled pavement markings", University Transportation Center for Alabama, Submitted to Alabama Department of Transportation, UTCA Final Report 01465, Alabama DOT Research Project No. 930-506, November 13, 2003)

3.2.4. Passing Zones on Two-Lane Roads

A no-passing zone is established on a two-lane roadway wherever restricted sight distance makes overtaking and passing inappropriate. The passing maneuver on two-lane highways is demanding and potentially hazardous, as the passing vehicle must occupy the opposing lane of traffic to complete the maneuver. Sight distance may be restricted by horizontal curves or by crest vertical curves. Passing zones exist on two-lane roadways where no-passing zones are not warranted.

The passing maneuver is complex as it involves three moving vehicles (the passing vehicle, the passed vehicle and any oncoming vehicle) and the passing driver's dynamic interpretation of sight distance. Sight distance factors include change of grade, the length of the curve, the height above the ground of the driver's eye, and the height of the obstacle to be seen. Drivers must also have adequate stopping sight distance (SSD). SSD is determined by reaction time, the speed of vehicle, and the tire-pavement coefficient of friction (*50*).

The MUTCD provides general guidance for road markings for passing zones and no-passing zones on two-lane roadways (*50*). There are three possibilities:

- Two-direction passing zone markings - a normal broken yellow line. Crossing the centerline markings with care when passing is permitted for traffic traveling in either direction;
- One-direction no-passing zone markings - a normal broken yellow line and a normal solid yellow line. Crossing the centerline markings with care when passing is permitted for the traffic traveling adjacent to the broken line, but is prohibited for traffic traveling adjacent to the solid line.
- Two-direction no-passing zone markings - two normal solid yellow lines. Crossing the centerline markings for passing is prohibited for traffic traveling in either direction.

A "DO NOT PASS" sign may be used in addition to pavement markings to emphasize the restriction on passing. A "NO PASSING ZONE" sign may also be installed on the left side of the roadway at the beginning of no-passing zones identified by pavement markings, "DO NOT PASS" signs or both (*50*).

The minimum length of no-passing zones, and the minimum length between adjacent no-passing zones (passing zone frequency) are not clearly established (and are currently being investigated in NCHRP Project 20-5 (Synthesis 36-06), expected completion date of April 2006). The length of a no-passing zone will vary with the sight distance, volume, delays, speed, acceleration rate, and directional split of the traffic. Passing zone frequency varies with physical and cost limitations.

This section examines the safety effect of using passing zones to permit passing on two-lane roads where appropriate. Passing lanes are discussed in Chapter 6.

Exhibit 3-102: Resources examined to investigate the relationship between passing zones and safety

DOCUMENT	DESCRIPTION	COMMENT
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, UK, Elsevier, (2004))	The book provides a systematic overview of the effects of road safety measures (translated from 1997 Norwegian edition, partly updated).	No relevant information. Not added to synthesis
(Hassan, Y. and Easa, S. M., "Design Considerations of Sight Distance Red Zones on Crest Curves." Journal of Transportation Engineering, No. July/August, (1998) pp. 343-351.)	The study used 3D analysis to investigate the introduction of a horizontal curve at or near the top of a crest vertical curve. The relevance to safety is suggested, but not directly investigated.	No AMFs. Not added to synthesis.
(*79*) (Glennon, J. C., "Accident Effects of Centerline Markings on Low-Volume Rural Roads." Transportation Research Record 1027, (1985) pp. 7-13.)	The study's objective was to verify or modify NCHRP warrants for centerline and no-passing zones on low volume rural roads.	Very limited qualitative and quantitative information. Added to synthesis.
(Harwood, D. W. and Glennon, J. C, "Framework for Design and Operation of Passing Zones on Two-Lane Highways." Transportation Research Record, No. 601, (1977) pp. 45-50.)	The authors noted the need to develop design and marking standards that consider both passing sight distance and passing zone length.	No safety studies. No AMFs. Not added to synthesis.
Jones, "An Evaluation of the Safety and Utilization of Short Passing Sections"	Identified by Hassan as applicable study	Suggested by NCHRP 17-18(4). Unable to obtain a copy. Not pursued due to age of study (1970).

Glennon examined low-volume two-lane rural roads with 10 to 11 ft lanes where no-passing zone markings were added to roads previously marked with a dashed centerline only or a dashed centerline with edgelines (*79*). Glennon concludes that the application of centerline markings on previously unmarked, low volume, two-lane rural roads appears to have a negative impact on injury crashes. Glennon goes on to say that "despite this seemingly negative result", there is a potential safety benefit from applying centerline markings to "wider roads that carry higher traffic volumes … both for adding centerline and no-passing zone markings to previously unmarked roads and for adding no-passing zone marking to roads previously marked with only a dashed centerline". Insufficient information was reported to determine an index of effectiveness and standard error for the study's findings.

The safety effects of using passing zones to permit passing on two-lane roads have scarcely been investigated. No studies that investigated and compared crashes in passing zones and crashes in no-passing zones were found.

3.2.5. Speed Limits [Future Edition]

In future editions of the HSM, the safety effects of speed limits may be discussed here. This section may include posted, variable and differential speed limits, operational speeds, and design speeds if available. Potential resources are listed in Exhibit 3-103.

Exhibit 3-103: Potential resources on the relationship between speed limits and safety

DOCUMENT
(Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))
(Knipling, R. R., Waller, P., Peck, R. C., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP 500 Report Volume 13: A Guide for Addressing Collisions Involving Heavy Trucks." Washington, D.C., Transportation Research Board, National Research Council, (2003))
(Kockelman, K., Lave, C., and Charles River Associates Inc., "Safety Impacts and Other Implications of Raised Speed Limits on High-Speed Roads." NCHRP Project 17-23 Interim Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2003))
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))
(Alicandri, E., Warren, D.L., "Managing Speed" Public Roads Vol. 66 No. 4 (2003))
(Weiss, A. and Schifer, J. L., "Assessment of Variable Speed Limit Implementation Issues." NCHRP 3-59, Washington, D.C., Transportation Research Board, National Research Council, (2001))

3.2.6. Traffic Calming

The objective of traffic calming is usually to reduce speed or traffic volume, in order to reduce conflicts between local traffic and through traffic, make it easier for pedestrians to cross the road and reduce traffic noise. Traffic calming can be applied both in residential areas and on roads that have commercial roadside development.

Traffic calming of main highways serving through traffic has been applied in many European towns, usually as an alternative to, or in addition to, the construction of bypasses. Following traffic calming, these highways are sometimes referred to as "environmental streets", since one of the purposes of traffic calming has been to provide a more pleasant environment for pedestrians and cyclists and encourage residents and shoppers to walk along the roads and stay more outdoors. To date, this concept does not seem to have gained a wide application in the United States. Hence, most of the studies that have evaluated the safety effects of traffic calming on roadway segments have been made in Europe.

Evidence from studies that have evaluated the safety effects of traffic calming will first be presented on streets with the application of several of the design elements listed above (lane narrowing, humps, parking bays, etc.). Then, evidence will be presented concerning the safety effects of specific treatments, in particular raised crosswalks, speed humps, and transverse rumble strips.

The main source of evaluation studies is the Handbook of Road Safety Measures (*8*). The studies referred to in that book have been updated by more recent studies that are easily available. An extensive literature search has not been performed.

Exhibit 3-104: Resources examined on the safety effect of traffic calming

DOCUMENT	DESCRIPTION	COMMENT
(Smiley, A., "Speed-Reducing Countermeasures." (2004))	Review of countermeasures, including pavement markings, medians, landscaping/side friction, signing, enforcement, and measures specific to rural isolated intersections	No AMFs. Not added to synthesis
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	A compilation of research, workshops, and actual demonstration of the guides by agencies provided for the resulting best practices summary for each individual safety emphasis area	No AMFs. Not added to synthesis
(8) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Overview of current knowledge on effects of road safety measures.	Transverse rumble strips in advance of intersections for reducing speed. Not added to synthesis.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	A synthesis of studies and research projects on the safety impacts of traffic operations and control strategies	No AMFs. Not added to synthesis
(Elvik, R., "Area-wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects." Accident Analysis and Prevention, Vol. 33, No. 3, Oxford, N.Y., Pergamon Press, (2001) pp. 327-336.)	A meta-analysis of 33 studies that evaluated the effect of traffic calming on safety	Suggested by NCHRP 17-18(4). Added to Chapter 7.
(Huang, H. F. and Cynecki, M. J., "The Effects of Traffic Calming Measures on Pedestrian and Motorist Behavior." FHWA-RD-00-104, McLean, Va., Federal Highway Administration, (2001))	Evaluated numerous traffic calming measures using before and after studies in 3 cities, and cross-sectional studies in 5 cities; employed surrogates (e.g., speeds and compliance)	Suggested by NCHRP 17-18(4). Uses surrogate measures for safety; not added to synthesis.
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Conducted a study of the safety benefits of providing marked or unmarked pedestrian crossings at various intersection types; information was pooled from the USA and Europe	No AMFs. Not added to synthesis.
(Wilbur Smith Associates, "Bicycle Boulevard Design Tools and Guidelines." Berkeley, Calif., City of Berkeley Planning and Development Department, (2000))	Review of the impacts of selected traffic calming devices on traffic, volume, and on collisions based on three individual sources	No AMFs. Not added to synthesis
(Cairney, P., "Pedestrian Safety in Australia." FHWA-RD-99-093, McLean, Va., Federal Highway Administration, (1999))	An independent report in a series of pedestrian safety synthesis reports to document pedestrian safety in other countries	No AMFs. Not added to synthesis.
(Davies, D. G., "Research, Development and Implementation of Pedestrian Safety Facilities in the United Kingdom." FHWA-RD-99-089, McLean, Va., Federal Highway Administration, (1999))	A compilation of the most relevant research from the United Kingdom; including a literature search, technical expertise, consultation with various academics and practitioners and a 5 year review of relevant literature from a variety of sources.	No AMFs. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Ewing, R., "Impacts of Traffic Calming." Transportation Quarterly, Vol. 55, No. 1, Washington, D.C, Eno Foundation for Transportation Inc., (2000) pp. 33-46.)	Summarizes the results of hundreds of before-and-after studies of traffic calming	Suggested by NCHRP 17-18(4). Duplicates report FHWA-RD-99-135. Not added to synthesis.
(Ewing, R. H., "Traffic Calming: State of the Practice." FHWA-RD-99-135, Washington, D.C., Federal Highway Administration, (1999))	Research of traffic calming measures and their inherent impacts on the immediate environment as well as the study of legal, emergency, and public effects	No AMFs. Not added to synthesis.
(Leaf, W. A. and Preusser, D. F., "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups." DOT HS 908 021, Washington, D.C., National Highway Traffic Safety Administration, (1999))	A review of relationships that exist between vehicle travel speeds and resulting pedestrian injury using available literature and data sets	No AMFs. Not added to synthesis
(Garder, P., Leden, L., and Pulkkinen, U., "Measuring the Safety Effect of Raised Bicycle Crossings Using a New Research Methodology." Transportation Research Record 1636, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 64-70.)	Before and after study of raised urban bicycle crossings in Sweden	Suggested by NCHRP 17-18(4). Not added to synthesis. Used in the HSM bike intersection synthesis.
(Mertner, J. and Jorgensen, L., "Effects of Traffic Calming Schemes in Denmark." Transactions on the Built Environment, Vol. 33, Southampton, United Kingdom, WIT Press, (1998) pp. 213-223.)	Before and after study of traffic calming in Denmark, evaluated safety	Suggested by NCHRP 17-18(4). Uses surrogate measures, not added to synthesis.
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))	Conducted a literature review and surveys of Canadian jurisdictions for the purpose of evaluating the contribution of non-enforcement measures to the overall approach to speed control	Uses surrogate measures, not added to synthesis.
(Zein, S. R., Geddes, E., Hemsing, S., and Johnson, M., "Safety Benefits of Traffic Calming." Transportation Research Record 1578, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 3-10.)	Conducted a study of the safety benefits of traffic calming at four sites in Vancouver; also reviewed 85 case studies from Europe, Australia and North America	Suggested by NCHRP 17-18(4). Reviewed by Elvik 2001. Too few data to be included in meta-analysis
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	A review incorporating a variety of studies including accident data, facility design guidelines, route designation criteria, and evaluations of facilities based on observational analysis accident data	No AMFs. Not added to synthesis.

The following thirteen studies, as reviewed by Elvik and Vaa (*8*), have been included in the synthesis of evidence for traffic calming on road segments (Exhibit 3-105).

Exhibit 3-106 lists studies that have evaluated the effects of speed humps, raised pedestrian crosswalks and transverse rumble strips on safety, and are included in this synthesis, as reviewed by Elvik and Vaa (*8*).

Exhibit 3-105: Studies included in synthesis of evidence of safety effects of traffic calming (8)

Study	Country	Design	Number of estimates
Borges et al 1985	Denmark	Simple before-after	9
Stølan 1988	Norway	Simple before-after	2
Angenendt 1991	Germany	Simple before-after	2
Freiholtz 1991	Sweden	Simple before-after	2
Baier et al 1992	Germany	Simple before-after	2
Schnüll and Lange 1992	Germany	Simple before-after	2
Aakjer Nielsen and Herrstedt 1993	Denmark	Before-after with comparison group	6
Herrstedt et al 1993	Denmark	Simple before-after	29
Engel and Andersen 1994	Denmark	Simple before-after	1
Wheeler and Taylor 1995	Great Britain	Simple before-after	6
Wheeler and Taylor 1999	Great Britain	Simple before-after	6
Grendstad et al 2003	Norway	Empirical Bayes before-after	1
Hirst et al 2004	Great Britain	Empirical Bayes before-after	1

Exhibit 3-106: Studies that have evaluated effects of speed humps, raised pedestrian crosswalks and transverse rumble strips (8)

Study	Country	Design	Number of estimates
Studies that have evaluated speed humps			
Baguley 1982	Great Britain	Before-after with comparison group	9
Blakstad and Giæver 1989	Norway	Case-control study	2
Giæver and Meland 1990	Norway	Before-after with comparison group	2
Webster 1993	Great Britain	Simple before-after	32
Webster and Mackie 1996	Great Britain	Simple before-after	1
ETSC 1996	Denmark	Simple before-after	10
Al-Masaeid 1997	Jordan	Before-after, matched comparison	1
Eriksson and Agustsson 1999	Denmark	Simple before-after	1
Ewing 1999	United States	Simple before-after	2
Agustsson 2001	Denmark	Simple before-after	1
Studies that have evaluated raised pedestrian crosswalks			
Engel and Thomsen 1983	Denmark	Simple before-after	2
Jones and Farmer 1988	Great Britain	Simple before-after	4
Downing et al 1993	Pakistan	Before-after with comparison group	2
Blakstad 1993	Norway	Simple before-after	2

Studies that have evaluated transverse rumble strips			
Kermit and Hein 1962	United States	Simple before-after	2
Owens 1967	United States	Simple before-after	2
Kermit 1968	United States	Simple before-after	1
Hoyt 1968	United States	Simple before-after	2
Bellis 1969	United States	Before-after, matched comparison	2
Illinois Div. of Highways 1970	United States	Simple before-after	1
Sumner and Shippey 1977	Great Britain	Simple before-after	1
Helliar-Symons 1981	Great Britain	Before-after with comparison group	4
Moore 1987	United States	Simple before-after	36
Virginia Dept. of Highways 1991	United States	Simple before-after	2
Webster and Layfield 1993	Great Britain	Simple before-after	12

Treatment: Apply several traffic calming measures to a road segment

Measures that are part of traffic calming typically include:

- Narrowing driving lanes, often by widening sidewalks
- Installing chokers or curb bulbs
- Using cobblestone in short sections of the road
- Providing raised crosswalks or speed humps
- Installing transverse rumble strips, usually at the start of the treated roadway segment
- Providing parking bays

A traffic calmed street is typically about 0.6 mi long (1 km), has two lanes and a very high access point density. Land use is usually mixed, with small shops and dwellings dominating. The speed limit before conversion is usually 31 or 37 mph (50 or 60 km/h).

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Not applicable.

Urban two-lane roads

In Europe (where the studies were performed), traffic calming is generally applied to two-lane highways and the speed limit is usually 31 or 37 mph (50 or 60 km/h). Land use is urban, often consisting of a mixture of shops and dwellings. Typical traffic volume (AADT) is 6,000 to 8,000 veh/day.

Thirteen studies have been identified, providing a total of 69 estimates of effect. Forty-five estimates of effect refer to injury accidents, 24 estimates of effect refer to property-damage-only accidents. Most of the studies are simple before-after studies that did not control for regression-to-the-mean or long-term trends. All these studies did, however, provide data on mean speed and traffic volume (AADT) before and after traffic calming. Only the two most recent studies have employed a full empirical Bayes (EB) design, controlling for regression-to-the-

mean, long-term trends and local changes in traffic volume (i.e., changes that depart from the overall trend, whose effects are therefore not accounted for by means of a comparison group).

With respect to study quality, 61 of the estimates have been rated as low, 6 as medium low and 2 as high. The standard error has been adjusted by a method correction factor of 3 for low quality estimates of effect, 2.2 for medium low quality estimates of effect, and 1.2 for high quality estimates of effect.

Exhibit 3-107 provides summary estimates of the effects on accidents, employing a random-effects model of meta-analysis (*8*). Uncertainty in summary estimates is stated as the standard error. The estimates refer to all accidents occurring along the highway segments that have been converted.

Exhibit 3-107: Summary estimates of the effect on accidents of traffic calming (8)

Author, date	Treatment/ Element	Setting	Road type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Traffic calming	Urban	Two-lane, 6,000 to 8,000 veh/day	All types, all severities	0.680	0.078
Elvik and Vaa, 2004	Traffic calming	Urban	Two-lane, 6,000 to 8,000 veh/day	All types, injury	0.667	0.085
Elvik and Vaa, 2004	Traffic calming	Urban	Two-lane, 6,000 to 8,000 veh/day	All types, PDO	0.747	0.188
Elvik and Vaa, 2004	Traffic calming	Urban	Two-lane, 6,000 to 8,000 veh/day	All types, injury	0.672	0.094

All summary estimates of effect are close to each other, indicating that the number of accidents is reduced by about 30 percent. The effects on injury accidents appear to be somewhat larger than the effects on property-damage-only accidents.

The effects of traffic calming on accidents depend on the size of their effect on speed. Exhibit 3-108 summarises the relationship between the effect on speed and the effect on accidents for injury accidents. There were too few estimates to develop a similar relationship for property-damage-only accidents. Exhibit 3-108 is based on the same studies as those listed in Exhibit 3-105. For the traffic calmed streets included in this review, mean speed was reduced from an average of 55.7 km/h before conversion to 46.9 km/h after conversion.

Traffic calming does not seem to improve safety if speed is not reduced. If speed is reduced, there is an increasing reduction in the number of injury accidents as the reduction in mean speed increases. Many of the estimates in Exhibit 3-108 are likely to be confounded by regression-to-mean effects. Some of the estimates are based on few studies and are associated with large standard errors. The relationship between the size of the reduction in speed and the size of the reduction in accidents is nevertheless quite systematic, suggesting that the changes in the number of accidents are not fully attributable to the effects of confounding factors not controlled for.

Exhibit 3-108: Relationship between effect on speed and effect on injury accidents of traffic calming (8)

Change in mean speed	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
No change	1.562	0.857
Down 0-5% (mean –3.3%)	0.811	0.532
Down 5-10% (mean –7.1%)	0.678	0.371
Down 10-15% (mean –11.0%)	0.834	0.198
Down 15-20% (mean –16.8%)	0.625	0.103
Down 20-25% (mean –20.7%)	0.480	0.554
Down >25% (mean –41.2%)	0.542	0.565

The possibility of accident migration has been mentioned in the case of traffic calming. It has been suggested that drivers who are delayed by having to slow down through a small town, will try to catch up by speeding up once they have passed the town. Unfortunately, none of the studies that have been reviewed have tried to evaluate whether there is such an effect. It therefore remains a conjecture only.

Treatment: Install speed humps

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Not applicable.

Urban and suburban residential two-lane roads

Speed humps are most commonly used in residential access roads, in a suburban environment. Some of these roads have just a single lane, but most of them are narrow two lane roads, where two cars can pass each other, but not two trucks.

The Institute of Traffic Engineers explains that speed humps are effective in part because they are self-enforcing and create a visual impression that a roadway is not intended for speeding or for through traffic (*83*). Some of the drawbacks of speed humps and speed tables are: the expense of construction and maintenance; potential negative impacts on emergency and service vehicles; increased vehicular noise; inconvenient access; and unsightliness. The ITE also stresses the importance of using signs and/or pavement markings to warn motorists of speed humps in the roadway ahead. Furthermore, speed humps can adversely affect drainage and snow removal.

A total of ten studies that have evaluated the effects of humps have been retrieved. These studies contain a total of 62 estimates of effect. None of the studies have employed state-of-the-art methodology to control for regression-to-the-mean or long-term trends. Some of the studies do, however, provide data on changes in traffic volume associated with the use of humps. Moreover, three studies (Baguley 1982, Webster 1993, Webster and Mackie 1996) have investigated the possibility of accident migration, by studying whether traffic and accidents has increased in roads surrounding those in which humps have been installed. Despite the somewhat

disappointing quality of the studies, they have been included as more rigorous studies have not been found.

Forty-nine of the 62 estimates of effect of humps have been rated as low quality and 13 as medium low quality. Thus, a high quality quantification of safety is not available for this measure.

The safety effects of humps stated in Exhibit 3-109 refer to all injury accidents, including single vehicle accidents. There are no estimates of the effect of humps for property-damage-only accidents. It cannot be ruled out that the summary estimates presented in Exhibit 3-109 are confounded by uncontrolled regression-to-the-mean and uncontrolled long-term trends in accident occurrence. Standard errors have been adjusted by a factor of 3 for each low quality estimate of effect and a factor of 2.2 for each medium low quality estimate of effect.

Exhibit 3-109: Effects on injury accidents of speed humps (8)

Author, date	Treatment/ Element	Setting	Road type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Adjacent to roads with speed humps	Urban/ Suburban	Residential Two-lane, Volume not reported	All types Injury	0.950	0.059
Elvik and Vaa, 2004	Install speed humps	Urban/ Suburban	Residential Two-lane, Volume not reported	All types Injury [1]	0.496	0.130
Elvik and Vaa, 2004	Install speed humps	Urban/ Suburban	Residential Two-lane, Volume not reported	All types Injury [2]	0.600	0.163

Notes: 1) All studies (62 estimates);
2) Adjusted for changes in traffic volume (41 estimates)

Humps have been found to deter traffic. If the summary estimate of effect is adjusted for this, showing the effect of humps on accidents if traffic volume remains unchanged, there is a reduction of injury accidents of 40 percent. Since humps deter traffic, there has been a concern that traffic migrates to alternative routes, leading to an increase of accidents on these routes. This does not appear to be the case, as the number of accidents has been found to go down slightly even on roads surrounding those where humps have been installed. The studies did not control for regression-to-the-mean. The estimates given in Exhibit 3-109 may therefore overstate the true effect of humps. In studies stating speed, mean speed was reduced from an average of 47.7 km/h before humps were installed to 36.3 km/h after humps were installed (29.6 miles/h to 22.6 miles/h). This suggests that the observed accident reduction was not entirely attributable to regression-to-mean.

Treatment: Install raised pedestrian crosswalks

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Not applicable.

Urban and suburban residential two-lane roads

Raised pedestrian crossings tend to be applied most often on business streets, in an urban environment. These streets would usually be two-lane roadways. Raised pedestrian crossings are applied both at intersections and midblock. The results presented include both cases, as most studies do not state whether the crossings were at intersections or midblock.

Four studies have been found, that have evaluated the safety effects of raised pedestrian crossings. These studies contain a total of ten estimates of effect. None of the studies have controlled for regression-to-the-mean or long-term trends in accident occurrence. For raised pedestrian crosswalks, 8 estimates have been rated as low quality and 2 as medium low quality. Thus, a high quality quantification of safety is not available for this measure.

The safety effects of raised pedestrian crosswalks in Exhibit 3-110 refer to pedestrian accidents or accidents involving motor vehicles only. The latter category includes all accidents that involve one or more motor vehicles, but not a pedestrian. It cannot be ruled out that the summary estimates presented in Exhibit 3-110 are confounded by uncontrolled regression-to-the-mean and uncontrolled long-term trends in accident occurrence. Standard errors have been adjusted by a factor of 3 for each low quality estimate of effect and a factor of 2.2 for each medium low quality estimate of effect.

Exhibit 3-110: Effects on injury accidents of raised pedestrian crosswalks (8)

Author, date	Treatment/ Element	Setting	Road type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install raised pedestrian crosswalk	Urban and suburban	Residential two-lane roads, volume not reported	All accidents, Injury	0.642	0.543
Elvik and Vaa, 2004	Install raised pedestrian crosswalk	Urban and suburban	Residential two-lane roads, volume not reported	Pedestrian accidents, Injury	0.545	0.937
Elvik and Vaa, 2004	Install raised pedestrian crosswalk	Urban and suburban	Residential two-lane roads, volume not reported	Vehicle accidents, Injury	0.697	0.667

Raised pedestrian crossings appear to reduce both pedestrian accidents and vehicle accidents. There are few studies and these have not controlled adequately for potentially confounding factors. The adjusted standard errors are of the same magnitude as the summary estimate of effect, indicating that there is very large uncertainty in these estimates. Despite this, it is not implausible to believe that raised pedestrian crossings do reduce accidents, since they reduce speed.

Treatment: Install transverse rumble strips as a traffic calming device

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials; Freeways; Expressways

Not applicable.

Urban and suburban residential two-lane roads

Transverse rumble strips have, in most of the evaluation studies reviewed and included here, been applied on the approaches to intersections. This measure is also included in the section dealing with traffic calming in intersections.

Eleven studies have been identified that have evaluated transverse rumble strips. These studies contain a total of 65 estimates of effect. Nearly all the studies are simple before-after studies. None of these studies have controlled for regression-to-the-mean or long-term trends in safety. One study employed a matched comparison group. However, this study did not explicitly control for any confounding factors, and the accident samples that were matched were both very small.

Of the 65 estimates of effect of transverse rumble strips, 59 have been rated as low quality, 2 as medium low quality, and 4 as medium high quality. Thus, a high quality quantification of safety is not available for this measure.

The safety effects of transverse rumble strips in Exhibit 3-111 refer to all accidents. This is likely to include both accidents on the approaches to intersections and accidents in the intersections. It cannot be ruled out that the summary estimates presented in Exhibit 3-111 are confounded by uncontrolled regression-to-the-mean and uncontrolled long-term trends in accident occurrence. Standard errors have been adjusted by a factor of 3 for each low quality estimate of effect, a factor of 2.2 for each medium-low quality estimate of effect, and factor of 1.8 for each medium-high quality estimate of effect.

Exhibit 3-111: Effects on accidents of transverse rumble strips (8)

Author, date	Treatment/ Element	Setting	Road type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install transverse rumble strips	Urban and suburban	Residential two-lane roads, volume not reported	All accidents, all severities	0.663	0.105
Elvik and Vaa, 2004	Install transverse rumble strips	Urban and suburban	Residential two-lane roads, volume not reported	All accidents, Injury	0.643	0.118
Elvik and Vaa, 2004	Install transverse rumble strips	Urban and suburban	Residential two-lane roads, volume not reported	All accidents, PDO	0.725	0.414

Transverse rumble strips in traffic calming appear to reduce accidents by about 30 percent. Again, studies do not control adequately for potentially confounding factors. None of the studies listed in Table 4 have controlled for regression-to-the-mean or long-term trends. A few studies have evaluated effects on speed, as well as effects on accidents. On the average, these studies find that mean speed has been reduced from 40 mph to 35.3 mph (64.3 km/h to 56.8 km/h), which lends some plausibility to the observed accident reduction.

3.2.7. Speed Zoning

Speed zoning refers to the practice of applying a speed limit to a section of highway that is different from the speed limit applying to adjacent roadway segments. One would, as an example, typically lower the speed limit on a main highway passing through small town. The highway would, for example, have a speed limit of 80 km/h (50 mph) outside the town, reduced to 50 km/h (31 mph) for, say, 2 kilometres through the town. This type of speed zoning is very widely applied in nearly all motorized countries. In this section, the expected effects on safety of speed zoning will be summarised.

For future editions of the HSM, the safety effects of targeted and automated speed enforcement at these corridors could be found in this section.

This section discusses the effect of speed zoning on accidents. These effects have been evaluated in many studies. Relevant studies have been reviewed by Elvik et al. (2004). The results of this review will be used in this section.

Exhibit 3-112: Resources examined to investigate the safety effect of speed zoning on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(*84*) (Elvik, R., Christensen, P., and Amundsen, A., "Speed and Road Accidents An Evaluation of the Power Model." Oslo, Norway, Transportokonomisk Institutt, (2004))	A meta-analysis of a large number of studies that have evaluated the effects of changes in speeds on the number and severity of accidents	Added to synthesis.
(Stuster, J., Coffman, Z., and Warren, D., "Synthesis of Safety Research Related to Speed and Speed Management." FHWA-RD-98-154, McLean, Va., Federal Highway Administration, (1998))	A synthesis of research findings on the safety effects of measures including speed limits used to manage speed	Suggested by 17-18(4). Duplicates many of the studies reviewed in Elvik et al. (2004) meta-analysis. Not added to synthesis.
(Transportation Research Board, "Special Report 254: Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits." Washington, D.C., Transportation Research Board, National Research Council, (1998))	Reviews studies that provide information o the effectiveness of speed zoning	Suggested by 17-18(4). Reviewed. Relevant studies included in Elvik et al. (2004) meta-analysis. Not added to synthesis.
(Agent, K. R., Pigman, J. G., and Weber, J. M., "Evaluation of Speed Limits in Kentucky." Lexington, Kentucky Transportation Center, University of Kentucky, (1997))	Evaluated the effect on crash rates of 100 speed zones in KY by comparing the speed zones to adjacent sections where the speed limit was not lowered.	Suggested by 17-18(4). Reviewed. Too few data to be included in meta-analysis
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))	Citation from the Ministry of Transportation of British Columbia library e-catalogue	Suggested by 17-18(4). No AMFs. Not added to synthesis.
(Taylor, W. C. and Coleman, F., "Analysis of Speed Zoning Effectiveness." FHWA-MI-RD-88-01, Washington, D.C., Federal Highway Administration, (1988))	Conducted a before/after w/control study on the effect on crashes in twenty speed zones.	Suggested by 17-18(4). Too few data to be included in meta-analysis
(Kadell, D. J., "Traffic Safety Impact of Driver Improvement Countermeasures Targeting 55-MPH Speed Limit Compliance." Sacramento, Calif., California State Department of Motor Vehicles, (1984))	Citation from the Ministry of Transportation of British Columbia library e-catalogue	Suggested by 17-18(4). Enforcement measures, no AMFs. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Cleveland, D. E., "Speed and Speed Control." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 6, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	This is the sixth in a series of publications and provides research findings on the safety effects of specific design and control features	Too few details to be included in meta-analysis.

The review reported by Elvik, Christensen and Amundsen (2004) summarises the findings of 97 studies that have evaluated the relationship between changes in speed and changes in the number of accidents or the severity of injuries (*84*). The results of this review will be presented here. Evidence is based on the best studies. This study is considered to be of high quality; therefore the standard error has been adjusted by a factor of 1.2.

Exhibit 3-113 shows the expected effects of changes in speed on the number of accidents. Changes in speed are stated as the percentage change in the mean speed of traffic. Changes in accidents are stated as odds ratios. Uncertainty is stated as the adjusted standard error.

The range of changes in speed included in Exhibit 3-113 goes from a 5% increase to a 15% reduction. It has been assumed that the normal application of speed zoning would be as a measure designed to reduce speed. In most cases, however, the change in mean speed resulting from the introduction of a new speed limit is smaller than 15%. A 15% reduction corresponds, for example, to a reduction of mean speed from 60 km/h to 51 km/h (37 to 32 mph).

The results presented in Exhibit 3-113 are all based on the so-called Power Model of the relationship between changes in speed and changes in road safety (*85*). According to this model, the relative change in the number of accidents is a power function of the relative change in the mean speed of traffic. The study reported by Elvik et al. (2004) was designed to evaluate the Power Model, and relied on a much larger set of studies than those used by Nilsson (*85*) to develop the model.

The results listed in Exhibit 3-113 include all types of traffic environments and all types of highways. Meta-regression models applied to the data indicate that the relationship between changes in speed and changes in accidents is constant and does not depend on local characteristics of highways or the traffic environment. Indeed, one can reasonably interpret the Power Model as a statement of universal laws of physics, applicable everywhere, but of course never observed in ideal form in real data.

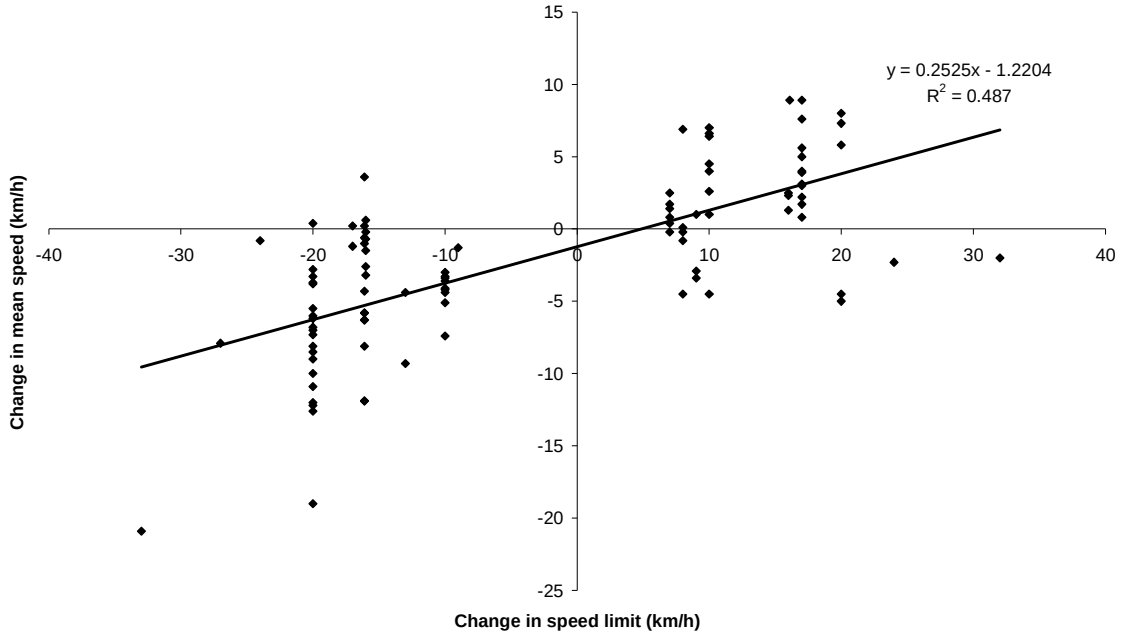
Exhibit 3-113: Effects on accidents of changes in the mean speed of traffic (84)

Change in mean speed	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
5% down	All types, Fatal	0.831	0.045
	All types, Injury	0.926	0.026
	All types, PDO	0.950	0.038
10% down	All types, Fatal	0.684	0.093
	All types, Injury	0.854	0.054
	All types, PDO	0.900	0.077
15% down	All types, Fatal	0.557	0.143
	All types, Injury	0.784	0.084
	All types, PDO	0.850	0.119
5% up	All types, Fatal	1.192	0.043
	All types, Injury	1.076	0.025
	All types, PDO	1.050	0.036

The Power Model has been found to describe the relationship between changes in speed and changes in road safety quite well. The next question that must be answered is "What is the likely effect of changes in speed limit on the mean speed of traffic?" Exhibit 3-114 is intended to shed light on this question.

Change in speed limit is plotted horizontally; change in mean speed is plotted vertically. It is seen that there is a positive relationship between changes in speed limits and changes in mean speed, but the data are fairly widely scattered around the fitted line. On the average, the change in the mean speed of traffic is close to 25% of the change in speed limit. This means that if the speed limit is reduced by 6 mph (10 km/h), mean speed is likely to change by about 1.6 mph (2.5 km/h). This is a rule of thumb only, but it reflects the fact that there is rarely a fully proportional change in mean speed if the speed limit is changed.

Exhibit 3-114: Relationship between changes in speed limits (km/h) and change in the mean speed of traffic (km/h). Based on studies reviewed by Elvik et al. (84)



3.2.8. On-Street Parking

Parking facilities are defined as terminals that are used for temporary vehicle storage. There are two general types of parking facilities: at the curb or on-street parking, and in off-street lots or structures (*86*). Parking safety is influenced by an extremely complex set of driver and pedestrian attitudinal and behavioral patterns (*53*). According to Box, certain kinds of accidents are typically caused by curb-parking operations: sideswipe and rear-end crashes resulting from lane changes due to the physical presence of the parking vehicle or contact with the parked car; sideswipe and rear-end crashes resulting from vehicles stopping prior to entering the curb space; sideswipe and rear-end crashes resulting from vehicles exiting parking stalls and making lane changes; crashes resulting from passengers alighting from parked vehicles street-side doors; crashes with vehicles pulling out of side streets/driveways and pedestrians obscured by parked vehicles (*87*).

The conventional wisdom in traffic engineering has always been that angle parking results in high accident rates (*88*). Box adds that many traffic engineers are opposed to the use of angle parking due to safety concerns and have worked towards its removal or replacement with parallel parking (*87*). Despite this concern, some cities have implemented angle parking to provide additional parking spaces on streets that are sufficiently wide enough in order to meet parking demands (*89*).

This section will provide information on the safety effect of on-street parking on roadway segments. The effect on the safety of motorists, pedestrians, and bicyclists will be addressed. Crashes on roadway segments with on-street parking will be compared to crashes on similar roadway segments without on-street parking. On-street parking configuration (angle, parallel) and parking on one side versus both sides will also be addressed. Some of the issues to

consider here include: adjacent land use (schools, commercial, type of pedestrians, traffic mix) loading zones; time of day, length of time parking, parking frequency and turnover rate, and bicycle on-street parking.

Exhibit 3-115: Resources examined to investigate the safety effect of on-street parking on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(Bonneson, J., Zimmerman, K, and Fitzpatrick, K., "Roadway Safety Design Synthesis." College Station, Texas Transportation Institute, Texas A&M University, (2005))	Conducted a critical review of the literature and an evaluation of reported trends and safety relationshiops.	Added to synthesis for effect of angle versus parallel parking.
(*3*) (Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004))	Study developed a statistical model to estimate the frequency of non-intersection accidents on urban four-lane undivided roads.	Added to synthesis for On-street Parking. Only used models for off-the-road accidents since they were the only models to include parking as a predictor variable.
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis; t and s values were calculated using data from Table 3.15.1 (p. 555).
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Study reviews and brings together the best available evidence on the safety impact of traffic operations. All the studies reviewed report on crash occurrence, severity or proven crash surrogates.	Not added to synthesis. The two studies reviewed by (Main, 1984; McCoy et al., 1990) were already included in the meta-analysis by Elvik and Vaa.
(Nawn, J. A., "Back-in Angle Parking in the Central Business District." Seattle, Wash., 2003 Institute of Transportation Engineers Annual Conference, (2003))	Study examines the operational and capacity issues related to back-in, angle parking.	Not added to synthesis. No information on safety, only capacity and operational issues were considered.
(*87*) (Box, P., "Angle Parking Issues Revisited, 2001." ITE Journal, Vol. 72, No. 3, Washington, D.C., Institute of Transportation Engineers, (2002) pp. 36-47.)	Summarizes data from published and unpublished data on the safety effect of parking; compares findings to 1978 FHWA findings; considers street classification	Added to synthesis. Suggested by NCHRP 17-18(4). Only 1 study cited by Box is before-after evaluation of parking; remaining studies only present accident rates; t and s values calculated using data available from single before-after study.
(Hunter, W. W. and Stewart, J. R., "An Evaluation Of Bike Lanes Adjacent To Motor Vehicle Parking." Chapel Hill, Highway Safety Research Center, University of North Carolina, (1999))	Cross sectional study of two configurations of bicycle lanes in combination with on-street parking	Not added to synthesis. Suggested by NCHRP 17-18(4). Reference focused on bicycle operations and does not provide quantitative evidence of safety effects of parking.

DOCUMENT	DESCRIPTION	COMMENT
(*89*) (McCoy, T. A., McCoy, P. T., Haden, R. J., and Singh, V. A., "Safety Evaluation of Converting On-Street Parking from Parallel to Angle." Transportation Research Record 1327, Washington, D.C., Transportation Research Board, National Research Council, (1991) pp. 36-41.)	Before and after study evaluated the effects of converted on-street parallel parking to angle parking in Lincoln, Nebraska	Added to synthesis. Suggested by NCHRP 17-18(4). Only discussion about previous before-after studies added, actual analysis was not used because this study was part of the meta-analysis by Elvik and Vaa that has already been included in this synthesis.
(Humphreys, J. B., Box, P. C., Sullivan, T. D., and Wheeler, D. J., "Safety Aspects of Curb Parking-Executive Summary." FHWA-RD-79-75, Washington, D.C., Federal Highway Administration, (1978))	FHWA report analyzed the relationship between on-street parking and crashes using data from 10 cities. Focus of study is on capacity and operational issues, not safety.	Suggested by NCHRP 17-18(4). Very limited information on safety.
(*53*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Report is a synthesis of 17 safety research areas, including a review of previous research studies dealing with on-street parking.	Added to synthesis. Crash data from Tables 11, 17, and 19 were used. Data from other tables were not used because they either provided insufficient data to calculate t and s values or were already included in the meta-analysis by Elvik and Vaa (2004).
(Mayer, P. A. and Rankin, W. W., "One-Way Streets and Parking." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 10, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Study discusses parking and accident rates using findings from previous studies. Reference cites one study by Seburn that compared accident rates for different types of parking controls and roadway widths. However, based on the information provided, it is unclear if such comparisons are appropriate, particularly since the study does not mention if any other potential confounding factors are accounted for.	Not added to synthesis. Insufficient data provided to calculate t and s values

Although there have been a number of studies that have examined the issue of accident rates or frequencies associated with different types of parking configurations, the large majority are naïve before-after studies that involve changes from angle to parallel parking (*89*).

While the results from the synthesis of studies as shown below appear to indicate that by and large, the reduction or elimination of on-street parking reduces the number of accidents, there are two major issues for consideration: accident migration; and the appropriateness of the methods used in previous studies.

With regards to the issue of accident migration or spillover, it should be noted that all of the studies only show how the parking restrictions have affected the street or streets where the treatments are introduced. According to Elvik and Vaa, parking may simply be transferred to other streets, and it cannot be ruled out that the number of accidents may actually increase on streets where parking demand increases (*8*). It may be necessary to conduct area-wide studies (including an examination of off-street parking in the vicinity of the treatment sites) to properly assess the safety effects of any changes to parking regulations and policies (*53*).

In terms of the shortcomings of the methodologies adopted in previous research studies, as McCoy et al. point out, many of these before-after studies do not account for the change in accident exposure associate with the change in parking configuration. For example, when angle parking is changed to parallel parking, accident exposure is reduced because there are few parking spaces remaining after the conversion. Therefore, reductions in accidents that have been associated with changes from angle to parallel parking may have been caused by changes in accident exposure rather than by differences in the types of parking maneuvers associated with different parking configurations (*89*).

In fact, by comparing the parking-related accident rates before and after the conversion of 27 downtown blocks from parallel to angle parking, and taking into account the accident exposure (by calculating before and after accident rates in terms of accidents per million space-hours per 1,000 parkers per million vehicle miles), McCoy et al. demonstrated that there was no significant difference in the mean parking-related accident rates (*89*). Results from the study by McCoy et al. have been incorporated into the meta-analysis by Elvik and Vaa. Elvik and Vaa concur by stating that many of the previous studies investigating the safety effects of parking are naïve before-after studies that do not account or control for regression-to-the-mean and in many cases, parking control measures have been combined with other measures so the effect of the parking regulations themselves alone cannot be determined (*8*).

Although the safety effects of these factors have not been quantified in any studies to date, several previous research efforts such as those by Box (1964; 1968), Seburn (1967), and Humphreys et al. (1978) have reported that street width, the surrounding land use (which affect the volume of vehicle, pedestrians and bicyclists), and parking utilization may be significant factors (*53*).

Treatment: Prohibit on-street parking

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials

Hoffman et al. conducted a simple before-after comparison of accident frequencies resulting from the prohibition of parking on a 64-foot wide major arterial (*53*). The results from the study are shown in Exhibit 3-116. The index of effectiveness was adjusted to account the 32% increase in traffic volume to 30,000 veh/day, thus the index of effectiveness was divided by 1.32.The study was assigned a medium-low rating; the values for the indices of effectiveness were calculated using available crash data and a MCF of 2.2 was applied to the s ideal calculated based on the number of before crashes and the ratio of after/before duration.

Elvik and Vaa conducted a meta-analysis of a number of studies related to the prohibition of parking on urban arterials and collectors, and found that this change in parking policy reduces the number of total, injury and PDO accidents (p. 555) (*8*). The authors remarked that although the traffic volumes varied greatly at the different sites examined, this particular treatment tended to be implemented on higher volume arterials that experienced traffic volumes in the 40,000 veh/day range. The results from the meta-analysis are summarized in Exhibit 3-116. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Combining the results of Hoffman et al. with Elvik and Vaa for urban arterials results in AMF values of 0.78 (S=0.05) and 0.72 (S=0.02) for injury accidents and PDO accidents respectively. Note that while both studies quantified the safety impacts of prohibiting on-street parking at the sites examined, neither accounted for the potential effects of accident migration or spillover to adjacent roads with parking (Exhibit 3-116).

Exhibit 3-116: Safety effectiveness of prohibiting on-street parking on urban roadway segments

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hoffman et al as cited in Various, 1982	Prohibit on-street parking	Urban	Major Arterial (64-ft wide), AADT = 30,000	All types, all severities	0.58	0.08
Hoffman et al as cited in Various, 1982	Prohibit on-street parking	Urban	Major Arterial (64-ft wide), AADT = 30,000	All types, injury	0.65	0.14
Elvik and Vaa, 2004	Prohibit on-street parking	Urban	Mostly Arterial	All types, injury	0.80	0.05
			All types, injury	**Combined**	**0.78**	**0.05**
Hoffman et al as cited in Various, 1982	Prohibit on-street parking	Urban	Major Arterial (64-ft wide), AADT = 30,000	All types, PDO	0.52	0.10
Elvik and Vaa, 2004	Prohibit on-street parking	Urban	Mostly Arterial	All types, PDO	0.73	0.02
			All types, PDO	**Combined**	**0.72**	**0.02**

Using data from Washington State (1993 to 1996), multivariate statistical models were developed by Hauer et al. in order to predict the non-intersection accident frequency of urban four-lane undivided roads. Six separate models were estimated for “off-the-road” and “on-the-road” Property Damage Only (PDO), Injury, and Total accidents. “Off-the-road” accidents were identified using the Impact Location Code in the HSIS database on which the models were derived. Accidents occurring “Off Road Past Shoulder” and “On Shoulder” were classified as off-the-road accidents. The traffic volumes for the sites studied had a range of 2,500 to 68,500 veh/day with the mean being 24,900 veh/day. The models derived for off-the-road accidents are shown in Equation 3-12 through Equation 3-14. Models used to predict on-the-road accidents have been omitted because parking was not used as a predictor variable in those models.

Equation 3-12: Regression model for off-the-road PDO accidents (3).

Off-the-road PDO Accidents:

$$y = \alpha_{year} \left(\begin{array}{l} \text{Segment Length for Prediction x } (X^{0.520} e^{0.003xX}) \text{ x} \\ \text{(1.19 if ST = Curb or Wall, otherwise 0.48 + 0.19 x SWC) x} \\ \text{(1.10 if PC, 1.51 if NPC, 0.42 if VS, 0.81 if NVS) x} \\ e^{0.041 \times \text{Degree of Curve}} \text{ x (1.079 if parking is prohibited and otherwise 1) x} \\ \text{(0.759 if TWLT and otherwise 1) x} \\ \text{(2.087 if Speed Limit} \leq \text{30 mph, 1.213 if Speed Limit} \geq \text{45 mph and otherwise 1)} \end{array} \right)$$

Equation 3-13: Regression model for off-the-road Injury accidents (3).

Off-the-road Injury Accidents:

$$y = \alpha_{year} \left(\begin{array}{l} \text{Segment Length for Prediction x } (X^{0.815} e^{-0.069xX}) \text{ x} \\ \text{(1.16 if ST = Curb or Wall, otherwise 0.76 + 0.83 x SWC) x} \\ \text{(1.35 if PC, 1.03 if NPC, 1.31 if VS, 0.62 if NVS) x} \\ e^{0.056 \times \text{Degree of Curve}} \text{ x (1.258 if parking is prohibited and otherwise 1) x} \\ \text{(0.832 if TWLT and otherwise 1) x} \\ \text{(1.287 if Speed Limit} \leq \text{30 mph, 1.374 if Speed Limit} \geq \text{45 mph and otherwise 1)} \end{array} \right)$$

Equation 3-14: Regression model for total off-the-road accidents (3).

Total Off-the-road Accidents:

$$y = \alpha_{year} \left(\begin{array}{l} \text{Segment Length for Prediction x } (X^{0.631} e^{-0.020xX}) \text{ x} \\ \text{(1.03 if ST = Curb or Wall, otherwise 0.52 + 0.125 x SWC) x} \\ \text{(1.20 if PC, 1.28 if NPC, 0.93 if VS, 0.72 if NVS) x} \\ e^{0.051 \times \text{Degree of Curve}} \text{ x (1.153 if parking is prohibited and otherwise 1) x} \\ \text{(0.797 if TWLT and otherwise 1) x} \\ \text{(1.70 if Speed Limit} \leq \text{30 mph, 1.29 if Speed Limit} \geq \text{45 mph and otherwise 1)} \end{array} \right)$$

Given the multiplicative form of the regression equations, calculation of AMF values by taking the ratio of the number of accidents following the prohibition of parking over the number of accidents when parking is allowed, results in each of the remaining terms canceling out, leaving only the parameter for parking. For example, in the calculation of the AMF for off-the-road PDO accidents, the ratio $y_{\text{parking prohibited}}/y_{\text{parking allowed}}$ results in all terms canceling out except for the parameter for parking (which in this case is 1.079). This means that prohibiting parking will result in an AMF value of 1.079 for off-the-road accidents. Based on the results from the study by Hauer et al., it appears that prohibiting parking on urban four-lane undivided roads increased the number of off-the-road accidents. There were insufficient data to calculate standard error values for these AMF values. The results from the study are summarized in Exhibit 3-117.

Exhibit 3-117: Safety effectiveness of prohibiting on-street parking on urban roadway segments to off-the-road areas

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hauer et al., 2004	Prohibit on-street parking	Urban	Four-lane undivided roads, AADT 2,500-68,500	Off-the-road PDO Accidents	1.079	n/a
Hauer et al., 2004	Prohibit on-street parking	Urban	Four-lane undivided roads, AADT 2,500-68,500	Off-the-road Injury Accidents	1.258	n/a
Hauer et al., 2004	Prohibit on-street parking	Urban	Four-lane undivided roads, AADT 2,500-68,500	Off-the-road all severities	1.153	n/a

Treatment: Prohibit on-street parking on one side of the road

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials

Elvik and Vaa meta-analyzed a number of studies that investigated the safety effects of prohibiting parking on one-side of urban arterials and collectors (p. 555) (*8*). The traffic volumes at the sites examined were not reported. The results from the meta-analysis are summarized in Exhibit 3-118. As shown, Elvik and Vaa found that this particular treatment appeared to increase the number of injury accidents and resulted in an AMF value of 1.49 (S=0.78) for injury accidents. Elvik and Vaa added that the explanation for this increase is not known. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-118: Safety effectiveness of prohibit on-street parking on one side of urban roadway segments

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Prohibit parking on one side of road	Urban	Arterials and Collectors, volume not reported	All types, Injury	1.49	0.78

Treatment: Convert free to regulated on-street parking

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials

Elvik and Vaa carried out a meta-analysis of a number of studies that examined the safety effects of regulating previously unrestricted parking (such as time limited parking, reserved parking, area/place limited parking, or implementing parking charges) on urban arterials and collectors (p. 555) (*8*). The traffic volumes at the sites examined were not reported. The results from the meta-analysis are summarized in Exhibit 3-119. As shown, Elvik and Vaa found that this particular treatment appears to slightly reduce injury accidents but increase property damage only accidents, resulting in AMF values of 0.94 (S=0.08) and 1.19 (S=0.05) for injury accidents and PDO accidents, respectively. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-119: Safety effectiveness of converting free to regulated on-street parkings (8)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Convert free to regulated parking	Urban	Mostly Arterial, volume not reported	All types, Injury	0.94	0.08
Elvik and Vaa, 2004	Convert free to regulated parking	Urban	Mostly Arterial, volume not reported	All types, PDO	1.19	0.05

Treatment: Implement time-limited on-street parking restrictions

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials and collectors

Through a meta-analysis of a number of studies, Elvik and Vaa examined the safety effects of implementing time-limited parking restrictions to regulate previously unrestricted parking on urban arterials and collectors (p. 555) (*8*). The traffic volumes at the sites examined were not reported. The results from the meta-analysis are summarized in Exhibit 3-120. Elvik and Vaa found that this particular treatment appears to reduce the number of accidents, particularly parking-related accidents, resulting in AMF values of 0.89 (S=0.06) and 0.21 (S=0.09) for total accidents and parking-related accidents, respectively. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-120: Safety effectiveness of implementing time-limited on-street parking (8)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Implementing time-limited parking restrictions	Urban	Mostly Arterial, volume not reported	All types, all severities	0.89	0.06
Elvik and Vaa, 2004	Implementing time-limited parking restrictions	Urban	Mostly Arterial, volume not reported	Parking-related Accidents, all severities	0.21	0.09

Treatment: Convert angle parking to parallel parking

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials; Urban two-lane roads

The Utah Department of Transportation (DOT) conducted a simple before-after comparison of accident frequencies resulting from the conversion of angle parking to parallel parking on urban streets with widths ranging from 58 to 108 ft (*53*). Traffic volumes were not reported. The results from the study are summarized in Exhibit 3-121. The study was assigned a medium-low rating; the values for the indices of effectiveness were calculated using available crash data and a method correction factor of 2.2 was applied to the s ideal calculated based on the number of before crashes and the ratio of after/before duration .

Crandall investigated the safety effects of the same treatment through a cross-section study that matched two similar blocks using traffic volume (7,500 veh/day) and width (59 feet) of the rights-of-way (*53*). The results from the study are summarized in Exhibit 3-121. The study was assigned a low rating; the values for the indices of effectiveness were calculated using available crash data and a method correction factor of 5.0 was applied to the s ideal calculated based on the number of before crashes and the exposure ratio.

Elvik and Vaa conducted a meta-analysis of a number of studies that focused on this treatment and these results are summarized in Exhibit 3-121 (p. 555) (*8*). The sites examined were mostly local residential streets. The traffic volumes at the sites examined were not reported. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Combining the results of Crandall and the Utah DOT with the results from the meta-analysis by Elvik and Vaa for urban arterials results in AMF values of 0.67 (S=0.06), 0.38 (S=0.06) and 0.60 (S=0.26) for total accidents, parking-related accidents and injury/fatal accidents respectively (Exhibit 3-121). None of the three studies addressed the issue of potential accident migration or spillover onto adjacent roadways with on-street parking facilities.

Exhibit 3-121: Safety effectiveness of converting angle parking to parallel parking on urban roadway segments

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Utah DOT as cited in Various, 1982	Transition from angle (diagonal) to parallel parking	Urban	Not specified	All types, all severities	0.72	0.11
Crandall as cited in Various, 1982	Transition from angle (diagonal) to parallel parking	Urban	Major Arterial (58-ft wide), AADT = 7,500	All types, all severities	0.47	0.47
Elvik and Vaa, 2004	Transition from angle (diagonal) to parallel parking	Urban	Mostly local (residential) streets, volume not reported	All types, all severities	0.65	0.07
			All types, all severities	**Combined**	**0.67**	**0.06**
Utah DOT as cited in Various, 1982	Transition from angle (diagonal) to parallel parking	Urban	Not specified	Parking-related Accidents, all severities	0.43	0.18
Crandall as cited in Various, 1982	Transition from angle (diagonal) to parallel parking	Urban	Major Arterial (58-ft wide), AADT = 7,500	Parking-related Accidents, all severities	0.35	0.46
Elvik and Vaa, 2004	Transition from angle (diagonal) to parallel parking	Urban	Mostly local (residential) streets, volume not reported	Parking-related Accidents, all severities	0.37	0.07
			Parking-related Accidents, all severities	**Combined**	**0.38**	**0.06**
Utah DOT as cited in Various, 1982	Transition from angle (diagonal) to parallel parking	Urban	Not specified	All types, Injury and fatal Accidents	0.59	0.27
Crandall as cited in Various, 1982	Transition from angle (diagonal) to parallel parking	Urban	Major Arterial (58-ft wide), AADT = 7,500	All types, Injury and fatal Accidents	0.80	1.34
			All types, Injury and fatal Accidents	**Combined**	**0.60**	**0.26**

Bonneson (2005) developed an AMF for on-street parking based upon previous work by Box *(87)* and McCoy et al. (*171*) (*172*). The AMF for on-street parking includes the crash effects for angle vs. parallel parking, the type of development along the street, and the proportion of curb length with on-street parking. The AMF for on-street parking as formulated by Bonneson et al. is as follows:

$$AMF_{pk} = 1 + p_{pk} (f_{pk} - 1)$$

$$f_{pk} = (1.10 + 0.365I_{cs} + 0.609p_{b/o}) [(f_{ap/pp} - 1.0) p_{ap} + 1.0]$$

where:

AMF_{pk}	=	accident modification factor for on-street parking
p_{pk}	=	proportion of curb length with on-street parking (= 0.5 L_{pk}/L)
L_{pk}	=	curb length with on-street parking (mi)
L	=	roadway segment length (mi)
I_{cs}	=	indicator variable for cross-section (= 1 for two-lane street; 0 otherwise)
$p_{b/o}$	=	for that part of the street with parking, the proportion that has business or office as adjacent land use
$f_{ap/pp}$	=	ratio of crashes on streets with angle parking to crashes on streets with parallel parking (assume a value of 2.34)
p_{ap}	=	for that part of the street with parking, the proportion with angle parking

The base condition for this AMF is "no parking." Bonneson derived the value of 2.34 for $f_{ap/pp}$ based upon data from Box *(87)* and McCoy et al. (*171*).

Treatment: Convert parallel parking to angle parking

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials

Box reviewed a number of previous research studies, including a simple before-after comparison by Brazelton that investigated the safety effects of converting parallel parking to angle parking on streets in the central business district (*87*). Traffic volumes were not reported. The results from the study are summarized in Exhibit 3-122. The study was assigned a low rating (simple before-after study with 1.5 year before and after period); the values for the indices of effectiveness were calculated using available crash data and a method correction factor of 3.0 was applied to the s ideal calculated based on the number of before crashes and the ratio of after/before duration. The AMF and standard error values are noticeably large due to the small sample size in crash data used, as well as the large method correction factor applied.

Exhibit 3-122: Safety effectiveness of converting parallel parking to angle parking on urban roadway segments

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Brazelton as cited in Box, 2001	Transition from parallel parking to angle (diagonal) parking	Urban	Major streets in the Central Business District, volume not reported	All types, all severities	2.11	2.56
Brazelton as cited in Box, 2001	Transition from parallel parking to angle (diagonal) parking	Urban	Major streets in the Central Business District, volume not reported	Parking-related Accidents, all severities	1.18	0.73

Treatment: Place pavement markings to delineate parking stalls

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways

Not applicable.

Urban and suburban arterials, collectors, and local streets

Elvik and Vaa carried out a meta-analysis of a number of studies that examined the safety effects of marking parking spaces on urban arterials, collectors and local streets (p. 555) (*8*). The large majority of the sites used in the study comprised of local residential streets with lower traffic volumes. However, the traffic volume range was not reported. The results from the meta-analysis are summarized in Exhibit 3-123. As shown, Elvik and Vaa found that this particular treatment appears to significantly increase total accidents and parking-related accidents, resulting in AMF values of 1.51 (S=0.20) and 2.28 (S=0.53) for total accidents and parking-related accidents, respectively. Elvik and Vaa stated that the reason behind this increase is not known. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-123: Safety effectiveness of marking parking spaces on urban roadway segments

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Marking parking places	Urban	Mostly local (residential) streets, volume not reported	All types, all severities	1.51	0.20
Elvik and Vaa, 2004	Marking parking places	Urban	Mostly local (residential) streets, volume not reported	Parking-related Accidents, all severities	2.28	0.53

3.2.9. Intelligent Transportation Systems and Traffic Management Systems [Future Edition]

In future editions of the HSM, this section may provide information on the safety effects of intelligent transportation systems and traffic management systems. This may include traffic management systems, automated speed enforcement, incident management systems, and traffic signal progression. Related roadway network information is provided in Chapter 7. This section may also build on information provided in Chapter 4 for intersection ITS treatments. Potential resources are listed in Exhibit 3-124

Exhibit 3-124: Potential resources on the relationship between intelligent transportation systems and safety

DOCUMENT
(Minnesota DOT Traffic Management Center, "Minnesota Department of Transportation Freeway Traffic Management Program." MDOT, (2003))
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))
(Kyte, M., Shannon, P., and Kitchener, F., "Idaho Storm Warning System Operational Test." ITD No. IVH9316 (601), Boise, Idaho Transportation Department, (2000))
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))
(Jernigan, J. D., "Expected Safety Benefits of Implementing Intelligent Transportation Systems in Virginia: A Synthesis of the Literature." FHWA/VTRC 99-R2, Richmond, Virginia Department of Transportation, (1998))
(Sinha, K. C., Peeta, S., Sultan, M. A., Poonuru, K., and Richards, N., "Evaluation of the Impacts of ITS Technologies on The Borman Expressway Network." FHWA/IN/JTRP-98/5, West Lafayette, Indiana Department of Transportation, (1998))
Annino, "The Effects of ITS Technologies on Accident Rates" 1998
Zein, et al. [Title unknown] 1997
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))
Henk, "San Antonio's Transguide: Analysis of the Benefits" 1997
Persaud et al., "Safety Evaluation of Freeway Traffic Management System in Toronto, Canada" 1996

3.3. Pedestrian and Bicyclist Safety on Roadway Segments

Pedestrians and bicyclists are more vulnerable road users, and consideration of their needs on roadway segments may impact the overall safety performance of a roadway. Several sources are available for information on pedestrian and bicyclist accommodation, such as:

- www.walkinginfo.org
- www.bicycleinfo.org
- AASHTO "Guide for the Planning, Design and Operations of Pedestrian Facilities", 2004 (91)
- "ADA and ABA Accessibility Guidelines for Buildings and Facilities", 2004 (92)

- "NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians" by Zegeer et al., 2004 (93)
- "Pedestrian Facilities Users Guide – Providing Safety and Mobility" by Zegeer et al., 2002 (94)
- Parts I and II of "Designing Sidewalks and Trails for Access" by Axelson, Kirschbaum, et al., 1999 and 2001 (95,96)
- "Design and Safety of Pedestrian Facilities: A Recommended Practice of the ITE", 1998 (97)
- "The Effects of Bicycle Accommodations on Bicycle/Motor Vehicle Safety and Traffic Operations" by Wilkinson et al., 1994 (98)
- "Americans with Disabilities Act (ADA) of 1990" (99)

One of the most comprehensive guides to date to describe a wide range of treatments to enhance pedestrian safety and mobility is the PEDSAFE Guide, sponsored by the Federal Highway Administration (*100*). This report provides details of 47 different types of engineering and roadway treatments, in addition to enforcement and educational measures. It also includes a description of 71 "case studies" (or success stories) of various pedestrian treatments which have been implemented in communities throughout the U.S.

The PEDSAFE Guide includes expert system software, which is available at http://safety.fhwa.dot.gov/pedsafe and also at www.walkinginfo.org/pedsafe. This software is a diagnostic tool which allows a user to select treatments based on the types of crash or operating problems at a site, as well as site characteristics (e.g., number of lanes, type of roadway, traffic volume, area type, traffic control devices, intersection or midblock, presence and type of median, speed limit). The system provides information to help identify safety and operational needs. The PEDSAFE Guide and software are intended primarily for engineers, planners, safety officials, but may also be useful to citizens in determining needed pedestrian improvements on streets and highways.

The following sections discussed pedestrian and bicyclist elements on roadway segments, such as sidewalks or shoulders, mid-block crossing design, refuge islands/medians, and bicycle routes.

Future editions of the HSM may include sections on pedestrians and bicyclists in school routes and school zones, and the impact of weather issues on pedestrians and bicyclists on roadway segments.

3.3.1. Sidewalks and Shoulders

According to the Uniform Vehicle Code (1992), a sidewalk is defined as (*101*):

"that portion of a street between the curblines, or the lateral lines of a roadway, and the adjacent property lines, intended for use by pedestrians."

NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians describes sidewalks and walkways, as follows (*93*):

"Sidewalks and walkways provide people with space to travel within the public right-of-way that is separated from roadway vehicles. They also provide places for children to walk, run, skate, ride bikes, and play away from the street. Such facilities also improve mobility for pedestrians and provide access for all types of pedestrian travel to and from home, work, parks, schools, shopping areas, transit stops, etc. Walkways should be part of every new and renovated

roadway, and every effort should be made to retrofit streets that currently do not have sidewalks or walkways."

Providing sidewalks and walkways should incorporate proper facility design with respect to sidewalk or walkway width, separation between the walkway and the roadway (i.e., the "buffer zone"), the type of walking surface, sidewalk slope and grade, the proper placement of poles, posts, news racks, trees, and other street furniture, and other considerations, as discussed in the 2002 "Pedestrian Facilities User Guide - Providing Safety and Mobility" (*94*). In addition, guidelines for providing accessible sidewalks and trails for all pedestrians, including people with disabilities, are provided by the U.S. Access Board in "Designing Sidewalks and Trails for Access, Parts 1 and 2" (*95*,*96*). Good design practices are covered in these guidelines, including such issues as sidewalk design features (grades, slopes, surfaces, lighting), driveway crossings, pedestrian information, curb ramp design, pedestrian crossings, traffic calming measures, and trail planning and design, among other things.

For future editions of the HSM, there is a need to quantify the safety effect of the following elements:

- Sidewalk or walkway width
- Separation between the walkway and the roadway (i.e., the "buffer zone")
- Type of walking surface
- Sidewalk slope and grade, curb ramp design
- Placement of poles, posts, news racks, trees, and other street furniture
- Sidewalk lighting and midblock crosswalk illumination
- Driveway crossings
- Pedestrian and bicyclist information
- Trail planning and design

Exhibit 3-125: Resources examined to investigate the relationship between the provision of sidewalks or shoulders and safety

DOCUMENT	DESCRIPTION	COMMENT
(Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research on pedestrians including the effect on pedestrian safety of sidewalks	Suggested by NCHRP 17-18(4). No additional quantitative information. Not added to synthesis.
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies aimed at reducing pedestrian crashes.	Description of sidewalk added. No additional quantitative information. Not added to synthesis.
(Zegeer, C. V., Seiderman, C., Lagerwey, P., Cynecki, M. J., Ronkin, M., and Schneider, R., "Pedestrian Facilities Users Guide - Providing Safety and Mobility." FHWA-RD-01-102, McLean, Va., Federal Highway Administration, (2002))	Detailed discussion of pedestrian needs and facilities.	No new research results. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*102*) (McMahon, P. J., Zegeer, C. V., Duncan, C., Knoblauch, R. L., Stewart, J. R., and Khattak, A. J., "An Analysis of Factors Contributing to "Walking Along Roadway" Crashes: Research Study and Guidelines for Sidewalks and Walkways." FHWA-RD-01-101, McLean, Va., Federal Highway Administration, (2002))	Analyzed crash data at 47 crash sites and 94 comparison sites; identified the relationship between the provision of sidewalks and 'walking along roadway' crashes	Suggested by NCHRP 17-18(4). Added to synthesis.
(Kirschbaum, J. B., Axelson, P. W., Longmuir, P. E., Mispagel, K. M., Stein, J. A., and Yamada, D. A., "Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide." Washington, D.C., Federal Highway Administration, (2001))	Guidelines for providing accessible sidewalks and trails for all pedestrians, including people with disabilities	Not added to synthesis.
(Cairney, P., "Pedestrian Safety in Australia." FHWA-RD-99-093, McLean, Va., Federal Highway Administration, (1999))	Summary of safety research study results from Australia.	No new research results. Not added to synthesis.
(Axelson, P. W., Chesney, D. A., Galvan, D. V., Kirschbaum, J. B., Longmuir, P. E., Lyons, C., and Wong, K. M., "Designing Sidewalks and Trails for Access, Part I of II: Review of Existing Guidelines and Practices." Washington, D.C., Federal Highway Administration, (1999))	Guidelines for providing accessible sidewalks and trails for all pedestrians, including people with disabilities	Not added to synthesis.
(*103*) (Hunter, W. W., Stutts, J. S., Pein, W. E., and Cox, C. L., "Pedestrian and Bicycle Crash Types of the Early 1990's." FHWA-RD-95-163, McLean, Va., Federal Highway Administration, (1995))	Contains summary information based on a critical review of safety research on bicycle and pedestrian facilities.	No new research results. Crash statistics added to synthesis.
(Knoblauch, R. L., Tustin, B. H., Smith, S. A., and Pietrucha, M. T., "Investigation of Exposure Based Pedestrian Accident Areas: Crosswalks, Sidewalks, Local Streets and Major Arterials." FHWA/RD/88/038, Washington, D.C., Federal Highway Administration, (1988))	Analyzed pedestrian crashes and exposure under various roadway situations, identified a relationship between pedestrian crashes and the provision of sidewalks by functional class	Suggested by NCHRP 17-18(4). No new research results. Not added to synthesis.
(*104*) (Knoblauch, R. L., Tustin, B. H., Smith, S. A., and Pietrucha, M. T., "Investigation of Exposure Based Pedestrian Accident Areas: Crosswalks, Sidewalks, Local Streets and Major Arterials." FHWA/RD/88/038, Washington, D.C., Federal Highway Administration, (1988))	Compared hazard scores for groups of sites with sidewalks on both sides of the road vs. sites with no sidewalks.	Added to synthesis.
(*105*) (Tobey, H. N., Shunamen, E. M., and Knoblauch, R. L., "Pedestrian Trip Making Characteristics and Exposure Measures." DTFH61-81-00020, Washington, D.C., Federal Highway Administration, (1983))	Study analyzed the safety effects of various traffic and roadway features on pedestrian safety based on exposure and pedestrian crash data.	Added to synthesis.

Treatment: Provide a sidewalk

Very few studies were found that have quantified the effects of sidewalks or walkways on pedestrian crashes or crash risk. This is likely due in part to the fact that pedestrian crashes are relatively rare at any given location and because of the difficulty of finding enough new sidewalk additions to conduct a proper before-after evaluation. Furthermore, installing sidewalks or walkways is more likely to reduce certain types of pedestrian crashes, such as where pedestrians

are walking along roadways and are struck by a motor vehicle. In fact, a 1996 study by Hunter, Stutts, Pein, and Cox of pedestrian crash types in six states, found that approximately 7.9 percent (400 of 5,073) of pedestrian crashes involved a pedestrian walking along the roadway (*103*). Since many of these types of pedestrian crashes occur at night and also where no sidewalks or paved shoulders exist, one may expect that providing appropriate sidewalks or shoulders would reduce the probability of such crashes in many situations.

A 2002 study by McMahon, Zegeer, Duncan, Knoblauch, Stewart, and Khattak was conducted to identify the types of risks to pedestrians who are "walking along a roadway" and to quantify the relationship of such crash risks with roadway and neighborhood factors (*102*). The study used a case-control methodology and applied conditional and binary logistic models to determine the effects of various roadway features and socioeconomic and other census data on the likelihood that a site is a pedestrian crash site. A total of 47 crash sites were found, which were matched with 94 comparison sites (i.e., one nearby and one far-away matched comparison site for each crash site) for analysis purposes. Comparison sites were selected which were similar to the crash sites in terms of number of lanes, traffic volume, roadway and shoulder width, vehicle speeds, area type, etc. Nearby comparison sites were selected within the same neighborhood and/or within approximately one mile of the crash site. Far-away sites were matched sites that were selected in neighborhoods or areas on the other side of the county (*102*).

Physical roadway features found to be associated with a significantly higher likelihood of having a "walking along roadway" pedestrian crash included lack of a walkable area, and the absence of sidewalk augmented by higher traffic volume and higher speed limits. Using "risk ratio" and controlling for other roadway factors, the likelihood of a site with a sidewalk or wide shoulder (of 4 feet or wider) having a "walking along roadway" pedestrian crash was 88.2 percent lower than a site without a sidewalk or wide shoulder at the sites studied (*102*). Increased pedestrian crash risk existed for higher speed limits and for higher traffic volumes, as shown in Exhibit 3-126. The authors state that these results "should not be interpreted to mean that installing sidewalks would necessarily reduce the likelihood of pedestrian/motor vehicle crashes by 88.2 percent in all situations. However, the presence of a sidewalk clearly has a strong beneficial effect of reducing the risk of a "walking along roadway" pedestrian/motor vehicle crash" (*102*). Therefore, AMFs were not developed from the results.

When the authors controlled for roadway features, socio-economic factors found to be associated with significantly higher risk of such pedestrian crashes include: high levels of unemployment, older housing units, lower proportions of families within households, and more single-parent households. The authors concluded that such results may suggest that some neighborhoods, due to increased pedestrian exposure or certain types of exposure, may be especially appropriate for adding such pedestrian safety measures as sidewalks, wide grassy shoulders, traffic calming measures, and/or other such treatments. The study also developed guidelines and priorities for installing sidewalks and walkways, based on roadway and land use characteristics (*102*).

Exhibit 3-126: Model results for three variables (Table 4 of (102))

Variable	Coefficient (Estimate)	Standard Error	Chi Square	p-value	Risk Ratio	95% Confidence Intervals
Speed Limit	0.1094	0.0381	8.22	0.0041	1.116	(1.035, 1.202)
Paved Sidewalk	-2.1346	1.077	3.93	0.0474	0.118	(0.014, 0.976)

Traffic Volume	0.0019	0.0010	3.69	0.0549	1.002	(1.000, 1.004)

Note: these results not to be used as AMFs

Discussion: "Hazard scores" with and without sidewalks

A study by Tobey et al. (1983) investigated the relative risks of sidewalks and other traffic and roadway characteristics, using two different measures of pedestrian exposure: pedestrian volume (P), and pedestrian volume multiplied by vehicle volume (P x V). The percent of pedestrian crashes divided by the percent of pedestrian exposure was defined as the "hazard score" for each site, and "hazard scores" were compared for sites with various traffic and roadway characteristics. If the percent of pedestrian crashes was greater than the percent of pedestrian exposure, then the "hazard score" was greater than 1.0, or a pedestrian crash risk greater than average. Where the percent of crashes was less than the percent of exposure, the "hazard score" was computed as the percentage of exposure divided by the percent of crashes and assigned a negative sign (i.e., a negative sign represents a safer than average condition) (*105*).

Sites with no sidewalks or pathways had the highest "hazard scores", with values of +2.6 (using P as the exposure measure) and +2.2 (using P x V as the exposure measure). This compared to "hazard scores" of +1.2 and +1.1 (using exposure measures of P, or (PxV), respectively) for sites with a sidewalk on one side of the road only. Sites with sidewalks on both sides of the road had "hazard scores" of -1.2 (using exposure measures of P and also P x V), which represents a safer condition than having sidewalks on one side or no sidewalks at all (*105*).

A 1988 study by Knoblauch, Tustin, Smith, and Pietrucha involved, among other things, conducting further analyses to compare hazard scores for groups of sites with sidewalks on both sides of the road vs. sites with no sidewalks (*104*). Comparisons were made separately for residential, commercial, and mixed residential areas. The lack of sidewalks was associated with much greater hazard scores (compared to sites with sidewalks) on residential streets (hazard scores of + 8.7 vs. – 1.4) as compared to sites in mixed residential areas (hazard scores of + 4.5 vs. – 1.4) and commercial areas (hazard scores of + 1.2 vs. – 1.1) (*104*).

Conclusions

Providing well-planned and properly designed sidewalks and walkways is an essential element for accommodating safe travel by pedestrians. Although the number of crash-based studies is limited on the relative effectiveness of sidewalks and walkways, there is strong evidence to support the logical assumption that having sidewalks and/or walkways along streets and highways is associated with a substantial reduction in pedestrian "walking along roadway " crashes. Furthermore, there are certain types of locations where the addition of sidewalks or walkways is likely to be particularly effective, such as on neighborhood streets and/or where there is likely to be regular pedestrian activity at night.

3.3.2. Mid-block Crossing Design and Traffic Control

Mid-block pedestrian crossings are often provided along roadway segments in response to a significant number of pedestrians crossing the road. Mid-block pedestrian crossings may have a variety of traffic control devices (i.e., pavement markings and signage).

More research is needed to quantify the effects of mid-block pedestrian crossing designs on pedestrian and motorist behaviors, as well as pedestrian crashes. In particular, there is a need to evaluate various types of crossings, such as zebra, signal-controlled (Pelican) and signalized

crossings with pedestrian push-buttons and technology to extend the walk (or clearance) interval when needed for a slow-moving pedestrian (Puffin crossings). More research is also needed on overhead illuminated and flashing pedestrian signs, as well as LED “animated eyes” displays and advance stop lines (or yield lines). Finally, there is a need to evaluate a wide range of traffic calming measures on pedestrian and vehicle crashes.

Exhibit 3-127: Potential resources on the relationship between the mid-block pedestrian crossings and safety

DOCUMENT	DESCRIPTION	COMMENT
(*83*) (Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research on pedestrians including the effect on pedestrian safety of crosswalks	Suggested by NCHRP 17-18(4). Added to synthesis.
(*93*) (Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Includes a discussion of pedestrian strategies and relevant research, including midblock pedestrian treatments	Referenced and some qualitative information added to synthesis.
(*106*) (Nee, J. and Hallenbeck, M. E., "A Motorist and Pedestrian Behavioral Analysis Relating to Pedestrian Safety Improvements - Final Report." Seattle, Washington State Transportation Commission, (2003))	Evaluated motorist and pedestrian behavioral changes that resulted from changes in the roadway environment, traffic enforcement activities, and a public information campaign	Limited qualitative information added to synthesis.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Summarizes research results from a wide variety of research topics	Not added to synthesis. No additional information on pedestrian crossing research
(*107*) (Zegeer, C. V., Stewart, R., Huang, H., and Lagerwey, P., "Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines." FHWA-RD-01-075, McLean, Va., Federal Highway Administration, (2002))	Matched comparison of 5 years of crash data at 1,000 marked crosswalks and 1,000 unmarked crosswalks	Suggested by NCHRP 17-18(4). Added to synthesis.
(*108*) (Huang, H. F. and Cynecki, M. J., "The Effects of Traffic Calming Measures on Pedestrian and Motorist Behavior." FHWA-RD-00-104, McLean, Va., Federal Highway Administration, (2001))	Evaluated the effects of selected traffic calming treatments, at both intersection and mid-block locations, on pedestrian and motorist behavior	Added to synthesis.
(*109*) (Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Summarizes research and practice related to uncontrolled crossings	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*110*) (Nitzburg, M. and Knoblauch, R. L., "An Evaluation of High-Visibility Crosswalk Treatment - Clearwater Florida." FHWA-RD-00-105, McLean, Va., Federal Highway Administration, (2001))	Before and after study with control on the effect of novel high visibility crosswalk, evaluated driver yielding, pedestrian behavior, and conflicts	Suggested by NCHRP 17-18(4) although novel system. This treatment was used at intersections, so it is referenced in the HSM chapter on intersection crossings. Limited qualitative information added to synthesis.
(Van Houten, R., Malenfant, J. E., and McCusker, D., "Advance Yield Markings: Reducing Motor Vehicle-Pedestrian Conflicts at Multilane Crosswalks with Uncontrolled Approach." Transportation Research Record, No. 1773, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 69-74.)	Evaluated the effect of advance yield markings and a symbol sign on pedestrian safety at intersections; used pedestrian and motorist behavior as surrogates	Added to Chapter 4.
(Bacquie, R., Mollett, C., Musacchio, V., Wales, J., and Moraes, R., "Review of Refuge Islands and Split Pedestrian Crossovers - Phase 2." Toronto, Ontario, Canada, City of Toronto, (2001))	Evaluation in Toronto of the relative safety performance of 30 mid-block pedestrian refuge islands (PRIs) and 20 mid-block split pedestrian crossovers (SPXOs)	Focus is on median treatment. Not added to synthesis.
(*112*) (Huang, H., "An Evaluation of Flashing Crosswalks in Gainesville and Lakeland." Florida Department of Transportation, (2000))	Evaluated flashing crosswalk systems in Gainesville, FL and Lakeland, FL.	No AMFs. Added to synthesis.
(Storm, R., "Pavement Markings and Incident Reduction." Ames, Iowa, 2000 MTC Transportation Scholars Conference, (2000) pp. 152-162.)	Summarized studies on safety effects of pavement markings on pedestrian treatments at intersections	Referenced in the HSM chapter on intersection crossings. Not added to synthesis.
(Hunter, W. W. and Stewart, J. R., "An Evaluation Of Bike Lanes Adjacent To Motor Vehicle Parking." Chapel Hill, Highway Safety Research Center, University of North Carolina, (1999))	Analyzes bicyclist conflicts and behaviors on bike lanes next to parking lanes	Not added to synthesis. Information is not provided on pedestrian crossings.
(Cairney, P., "Pedestrian Safety in Australia." FHWA-RD-99-093, McLean, Va., Federal Highway Administration, (1999))	Discusses results from Australian research studies	Added to pedestrian refuges synthesis
(*114*) (Davies, D. G., "Research, Development and Implementation of Pedestrian Safety Facilities in the United Kingdom." FHWA-RD-99-089, McLean, Va., Federal Highway Administration, (1999))	Discusses research findings from pedestrian research in the U.K.	Added to synthesis.
(*115*) (Godfrey, D. and Mazella, T., "Kirkland's Experience with In-Pavement Flashing Lights at Crosswalks." Lynnwood, Washington, ITE/IMSA Annual Meeting, (1999))	Documents some initial results from 2 locations of in-pavement crosswalk lights. Developed installation criteria.	No AMFs. Added to synthesis.
(Leaf, W. A. and Preusser, D. F., "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups." DOT HS 908 021, Washington, D.C., National Highway Traffic Safety Administration, (1999))	Summarizes pedestrian safety research and countermeasure evaluation studies	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(McMahon, P. J., Duncan, C., Stewart, D., Zegeer, C. V., and Khattak, A., "An Analysis of Factors Contributing to "Walking Along Roadway" Crashes." Washington, D.C., 78th Annual Meeting Transportation Research Board, (1999))	Analyzed pedestrian crash data at 47 crash sites and 94 comparison sites; identified the relationship between the provision of sidewalks and "walking along roadway" crashes	Not added to synthesis. Did not specifically analyze pedestrian crossings.
(Hummel, T., "Dutch Pedestrian Safety Research Review." FHWA-RD-99-092, McLean, Va., Federal Highway Administration, (1999))	Summarizes Dutch pedestrian safety research results	Not relevant to this section. Not added to synthesis.
(*116*) (Van Houten, R., Healey, K., Malenfant, J. E., and Retting, R. A., "Use of Signs and Symbols to Increase the Efficacy of Pedestrian Activated Flashing Beacons at Crosswalks." Transportation Research Record 1636, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 92-95.)	This experiment evaluated two strategies for increasing the percentage of motorists yielding to pedestrians at crosswalks equipped with pedestrian-activated flashing beacons	Limited qualitative information added to synthesis.
(Hunt, J., "A Review of the Comparative Safety of Uncontrolled and Signal Controlled Midblock Pedestrian Crossings in Great Britain." Cologne, Germany, 9th International Conference on Road Safety in Europe, (1998))	Review of performance of Pelican and Zebra crossings in Kent (U.K.).	No AMFs, conflicting results. Not added to synthesis.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Summarizes information from other research studies, with minimal mention of midblock treatments	Not added to synthesis.
(Bowman, B. L. and Vecellio, R. L., "Effects of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety." Transportation Research Record 1445, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 169-179.)	Evaluated the safety effect of various median types on both vehicular and pedestrian safety; analyzed over 30,000 crashes; 3 cities	Suggested by NCHRP 17-18(4). Added to pedestrian refuges synthesis.
(*118*) (Kemper, B. and Fernandez, P., "Design and Safety of Pedestrian Facilities." Washington, D.C., Institute of Transportation Engineers, (1994))	Summarizes thirteen types of traffic-calming measures.	Limited qualitative information added to synthesis.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	Summarized research on geometric pedestrian treatments, including overpasses and underpasses and traffic calming measures	Not added to synthesis.
(Mueller, E. A. and Rankin, W. W., "Pedestrians." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 8, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Summarizes pedestrian research prior to 1970	Not added to synthesis.

The majority of studies included in this synthesis are based on the effect on behavior of the various treatments. Limited crash analysis has been performed for mid-block pedestrian crossing treatments. Due to the limited research available, each treatment is discussed in terms of

all road types that may experience pedestrian traffic. Where specific site characteristics are known they are stated.

Discussion: Use alternative crosswalk markings and traffic control devices at uncontrolled locations (Continental, Ladder, Zebra, Pelican, Puffin, and Toucan)

The MUTCD defines three types of crosswalk markings: standard parallel lines, ladder or continental stripes, and diagonal stripes (*50*).

A study by Zegeer et al. found no statistically significant difference in pedestrian crash risk for various types of crosswalk markings (standard parallel lines, ladder, zebra, or continental style) (*107*).

In his 1999 summary of pedestrian safety facilities in the United Kingdom, Davies describes several interesting variations of the crosswalk concept. The following four crosswalk marking types are typically installed at midblock crossings in the U.K. (*114*):

1. Zebra – This type of crossing is marked with black and white stripes. Pedestrians on a zebra crossing have priority over vehicles.
2. Pelican – In this type of crossing, the pedestrian pushes a button which activates a "red/green man" signal light on the far side of the road that shows the pedestrian when to cross.
3. Puffin – Created to replace the pelican crossing, the puffin is also controlled by a pedestrian push-button. However, the "red/green man" signal is located on the same side of the road as the pedestrian; and the crossing is considered "intelligent" because it monitors the presence of pedestrians waiting and crossing and can modify the amount of time provided to cross the road as needed.
4. Toucan – This type of crossing is similar to both the pelican and the puffin but is based on the concept of pedestrians and bicyclists sharing the crossing (i.e., "Two can cross").

Zebra, Pelican, Puffin, and Toucan crossings are discussed below. Pedestrian signal options commonly used in the U.S. are also discussed in Chapter 4.

Zebra crossings

According to Hunt (1998), Zebras create far less delay for pedestrians in crossing a road than Pelicans and are more cost-effective to install and maintain than their signalized counterparts (*120*). Despite these advantages, however, traffic engineers during the past decade have tended to replace Zebra crossings with Pelican crossings and to opt for Pelican crossings rather than Zebra crossings at new installations for the following reasons:

- Signal-controlled pedestrian crossings seem more consistent with increasingly signalized roadways and intersections where drivers are conditioned to stop for signals rather than other visual cues;
- Signal-controlled Pelican crossings allow for the smooth flow of vehicular traffic in areas of heavy pedestrian activity; and
- Both traffic engineers and the public seem to feel that Pelican crossings are safer because drivers are controlled by signals rather than their own discretion.

However, the tendency to replace Zebra crossings with Pelican crossings after an accident occurs has not necessarily improved either safety or convenience for pedestrians at the locations where this has been done. Some experts feel that Pelican crossings encourage drivers to

rely on signals rather than watching for pedestrians. In traffic-calmed areas, Zebra crossings may be making a comeback because they give pedestrians greater priority, are less expensive, and are more visually appealing.

Davies mentions the recent installation of Zebra crossings at three busy roundabouts in downtown Edinburgh, Scotland, the first Zebra crossings to be installed in that city in 30 years (*114*). This was done because it would have been difficult to put in Pelican crossings at these particular locations, and it was felt that the Zebra crossings gave priority to pedestrians and reduced pedestrian delay. Officials are monitoring how well the Zebra crossings perform, but initial results have been favorable. It was even noted that when a long line of cars developed, pedestrians would sometimes forego their legal right-of-way and stop to allow the vehicles to pass.

There seems to be mixed results on the use of Zebra (unsignalized) and Pelican (signalized) crossings in the U.K. Although jurisdictions have often replaced or installed Pelican crossings in many towns and cities, Zebra crossings are still preferred in some situations, such as at downtown locations to reduce pedestrian and motorist delay.

Pelican crossings

The Pelican crossing was introduced in the United Kingdom in 1969 and is the main type of independent or stand-alone signal-controlled pedestrian crossing.

Davies points out that installation of a Pelican or other type of crossing does not necessarily reduce pedestrian accidents and may sometimes produce increased accidents due to increased activity or other factors (*114*). A recent study (CSS, 1997 as cited in (*114*)) found no correlation between accident rates and levels of pedestrian and vehicle flow.

Puffin crossings

Davies reports that during the 1990's the UK DOT sponsored experiments with other types of signal-controlled crossings such as the Puffin and the Toucan (*114*). The Puffin crossing was developed to replace Pelican crossings that, according to Billings and Walsh (1991), need to be improved because Pelican crossings:

- Do not allow sufficient time for slow pedestrians to cross;
- The flashing green man phase is stressful and confusing;
- Cause unnecessary delay for vehicles when pedestrians are able to cross quickly; and
- The fixed minimum time between pedestrian phases creates excessive delay for people crossing at these locations.

Research on the newly developed Puffin crossings (Davies, 1992 as cited in (*114*)) provided sufficiently positive feedback to encourage continued development. The Puffin crossings that Davies studied had pressure-sensitive mats near the curb to detect waiting pedestrians as well as infrared sensors to adjust crossing time.

Davies also summarizes the following work on this topic (*114*). Further research on user behavior and pedestrian detection at Puffin crossings was undertaken by Reading et al. (Reading, Dickinson, and Barker, 1995). Unfortunately, some experiments on the Puffin crossings were plagued by unreliable equipment. Reading, Wan, and Dickinson (1995) looked at the potential for using computer vision-based pedestrian detection systems, which would take into account not

only the presence but also the volume of pedestrians at a crossing. However, the authors of that study decided that computer systems available at that time were inadequate to the task.

Crabtree (1997) furthered the research into computer applications at Puffin crossings (as cited in (*114*)). With some of his modifications, he found that pedestrians were more likely to look at traffic rather than straight ahead (where the green man would be located on a Pelican crossing signal). Crabtree noted fewer serious crossing infringements such as crossing when vehicles had the green light, which he attributed to the reduced delay pedestrians experienced with Puffin crossings. Yet there were more of what Crabtree considered to be slight infringements such as pedestrians crossing when vehicles had the red light but the green man was no longer showing on the pedestrian signal.

In conclusion, at the time that Davies wrote his report (1999), there were over 60 Puffin test sites. In spite of equipment problems, it seemed clear that the Puffin crossing technology was superior to the Pelican crossing and more amenable to adjustment to suit the needs of various localities. At the end of 1997, regulations were passed (in the U.K.) which gave local authorities the right to install Puffin crossings without Government approval (*114*).

Toucan crossings

The 1980s saw development of a parallel signal-controlled type of crossing for pedestrians and cyclists. However, this approach was expensive and took up more space. In 1989, Trevelyan and Ginger found no safety or practical issues for pedestrians where cyclists were allowed to ride over Zebra or Pelican crossings. This led to the design of a shared type of crossing: the Toucan (Morgan, 1993), with a red man/green man and a green bicycle on a single far-side pole. The Toucan signal is operated by a push-button and often has an additional vehicle actuation for pedal cycles. At the time of Davies' report (1999), there were over 200 Toucan crossings in the UK, even though they required special authorization (*114*). Some of the crossings feature infrared on-crossing detection and nearside aspects, like the Puffin crossing does. Taylor and Halliday (1997) have done more recent studies of various technical and user issues for the Toucan crossings. Responses from pedestrians and cyclists using the Toucans were favorable, in spite of problems with equipment reliability (*114*). Future versions of the Toucan will probably resemble the Puffin but will include cycle aspects.

Discussion: Experimental measures at uncontrolled mid-block crossings

In 1971, Malo et al. studied innovative safety devices installed at thirteen pedestrian crossings in Detroit, Michigan that had either a history of crashes or what was felt to be an unusual hazard (as cited in (*83*)). Various types of signing, marking, lighting, and pedestrian signal actuation were evaluated. Prior to the study, a major effort was made to publicize the upcoming changes and educate the public. Approach speeds, gaps, volumes, driver response, pedestrian attributes, gap acceptance, and behavior were measured. Drivers and pedestrians were interviewed to determine their opinions about the site modifications. According to Campbell et al., Malo found that (*83*):

- After the safety devices were installed, there was a statistically significant increase in crosswalk usage, especially during the daytime.
- There was no substantial change in the speed distribution of free-flow vehicles in the area near the crosswalk.
- More drivers slowed down in response to pedestrians waiting to cross.
- Pedestrians used the push buttons more often, but not as much as anticipated.

- Although drivers who were surveyed expressed satisfaction with the safety devices, pedestrians were not content with driver response. Pedestrians thought that motorists would slow down when a device was actuated, but drivers did not expect to slow down much or to stop unless there was a traffic signal or stop sign.

A 2001 report entitled "Alternative Treatments for At-Grade Pedestrian Crossings" (*109*) contains a discussion of experimental measures used at uncontrolled crossings. However, the effectiveness of these devices on pedestrian crash rates in real situations is unknown.

Treatment: Install raised pedestrian crosswalks

Rural two-lane roads; Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

Not applicable.

Urban and suburban residential two-lane roads

Raised pedestrian crossings tend to be applied most often on business streets, in an urban environment. These streets would usually be two-lane roadways. Raised pedestrian crossings are applied both at intersections and midblock. The results presented include both cases, as most studies do not state whether the crossings were at intersections or midblock.

Four studies have been found, that have evaluated the safety effects of raised pedestrian crossings. These studies contain a total of ten estimates of effect. None of the studies have controlled for regression-to-the-mean or long-term trends in accident occurrence. For raised pedestrian crosswalks, 8 estimates have been rated as low quality and 2 as medium low quality. Thus, a high quality quantification of safety is not available for this measure.

The safety effects of raised pedestrian crosswalks in Exhibit 3-128 refer to pedestrian accidents or accidents involving motor vehicles only. The latter category includes all accidents that involve one or more motor vehicles, but not a pedestrian. It cannot be ruled out that the summary estimates presented in Exhibit 3-128 are confounded by uncontrolled regression-to-the-mean and uncontrolled long-term trends in accident occurrence. Standard errors have been adjusted by a factor of 3 for each low quality estimate of effect and a factor of 2.2 for each medium low quality estimate of effect.

Exhibit 3-128: Effects on injury accidents of raised pedestrian crosswalks (8)

Author, date	Treatment/ Element	Setting	Road type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Install raised pedestrian crosswalk	Urban and suburban	Residential two-lane roads, volume not reported	All accidents, Injury	0.642	0.543
Elvik and Vaa, 2004	Install raised pedestrian crosswalk	Urban and suburban	Residential two-lane roads, volume not reported	Pedestrian accidents, Injury	0.545	0.937
Elvik and Vaa, 2004	Install raised pedestrian crosswalk	Urban and suburban	Residential two-lane roads, volume not reported	Vehicle accidents, Injury	0.697	0.667

Raised pedestrian crossings appear to reduce both pedestrian accidents and vehicle accidents. There are few studies and these have not controlled adequately for potentially confounding factors. The adjusted standard errors are of the same magnitude as the summary estimate of effect, indicating that there is very large uncertainty in these estimates. Despite this, it is not implausible to believe that raised pedestrian crossings do reduce accidents, since they reduce speed.

Huang and Cynecki looked at how various traffic-calming techniques affected the behavior of pedestrians and drivers at midblock and intersection locations in seven states in the U.S. (*108*). Traffic-calming devices resulted in lower overall vehicle speeds. Combining a raised crosswalk with an overhead flasher increased motorist yielding behavior, although it was not possible to separate the relative effect of the two aspects of this modification. No other treatments significantly changed the percentage of pedestrians for who the drivers yielded. The various traffic-calming measures did not produce a statistically significant effect on average pedestrian waiting time. It was found that refuge islands channelized people into marked crosswalks and that a raised intersection in one location had the same effect.

Raised pedestrian crossings appear to reduce both pedestrian accidents and vehicle accidents. There are few studies and these have not controlled adequately for potentially confounding factors. The adjusted standard errors are of the same magnitude as the summary estimate of effect, indicating that there is very large uncertainty in these estimates. Despite this, it is not implausible to believe that raised pedestrian crossings do reduce accidents, since they reduce speed.

Discussion: Install pedestrian-activated flashing yellow beacons only

Pedestrian-activated yellow beacons are sometimes used to alert motorists that pedestrians are crossing the roadway. Research has shown that overhead pedestrian signs with flashing beacons do encourage motorists to yield for pedestrians more often (*110*,*121*,*122*). These positive effects, however, are modest because 1) yellow warning beacons are not exclusive to pedestrian crossings, so drivers do not necessarily expect a pedestrian when they see a flashing beacon; and 2) motorists learn that many pedestrians are able to cross the road more quickly than the timing on the beacon allows and therefore may think the person has already finished crossing the road if a yielding or stopped car blocks the pedestrian from sight.

In 1976, Braaksma evaluated the safety, delay, aesthetics, and cost of “special crosswalks” in five major Canadian cities (as cited by (*83*)). In Calgary, standard crosswalk markings were used, but the system featured an overhead “PEDESTRIAN” sign with a large “X” and 8 inch amber flasher units on either side of the word, plus a smaller flasher below it that the pedestrian could see. A sign next to the activation button advised pedestrians to push it and to use caution in crossing the street. A roadside sign located 150 to 250 ft prior to the crosswalk read “WHEN LIGHT FLASHING – MAXIMUM 20 (KPH) – DO NOT PASS – HERE TO CROSSWALK”. The flasher above this sign was also activated by the pedestrian button (*83*). There are no quantified effects of this treatment.

Discussion: Install pedestrian-activated flashing yellow beacons and extra pavement markings in advance of crosswalks

In 1976, Braaksma evaluated the safety, delay, aesthetics, and cost of “special crosswalks” in five major Canadian cities (as cited by (*83*)). “Special crosswalks” reviewed in

this study were those with extra features like overhead signs and lighting, pedestrian-activated flashing yellow beacons, pavement markings, parking prohibitions, or special laws. In Toronto, each traffic lane was marked with a large white "X" 100 ft in advance of the crosswalk and a standard advanced pedestrian crossing warning sign was installed on the roadside nearby. The "X" was 20 ft long, with each of its lines being 12 to 20 inches wide. The crosswalk itself was no less than 8 ft wide with edgelines of 6 to 8 inches in width (*83*).

Pedestrian fatalities decreased in Toronto after installation of the system described above. However, two hazardous behavior patterns emerged. Some pedestrians would step off the curb without signaling to drivers that they intended to cross the road, perhaps assuming that cars would stop instantaneously. Also, it was observed that motorists initiated overtaking maneuvers just prior to the crosswalk, which suggests a need for improved education and enforcement (*83*).

Discussion: Install illuminated crosswalk signs

Campbell et al. note a before- after study conducted on 20 sites in Tokyo, Japan, where illuminated crosswalk signs were installed (*83*). Pedestrian crashes increased by 4.8% and other crashes went up 2.4% in 218 yard (200 m) sections on either side of the installation. In 55 yard (50 m) sections, both pedestrian and other types of crashes increased 11.4%. The authors concluded that the illuminated crosswalk signs were not effective in reducing crashes, although the reason for the crash increase may be related to factors such as increased volumes or other confounding factors.

Discussion: Install overhead electronic LED signs

Overhead electronic LED pedestrian signs that show motorists which direction the pedestrian is crossing from and remind the driver to look out for pedestrians are effective in increasing driver yielding behavior (*106,116*). These signs have animated eyes that instruct motorists to watch for pedestrians coming from a particular direction. There is no known safety evaluation of this treatment.

Van Houten et al. evaluated two strategies for increasing the percentage of motorists yielding to pedestrians at crosswalks equipped with pedestrian-activated flashing beacons. One strategy involved adding an illuminated sign, with the standard pedestrian symbol next to the beacons. The second strategy involved placing signs 50 m before the crosswalk that displayed the pedestrian symbol and requested motorists to yield when the beacons were flashing. Both interventions increased yielding behavior and the effect of both together was greater than either alone. However, only the sign requesting motorists to yield when the beacons were flashing was effective in reducing motor vehicle-pedestrian conflicts (*116*). This is probably due to the following: 1) electronic signs display the actual pedestrian symbol when someone is in the crosswalk, so these signs are associated with pedestrian activity rather than other traffic situations; 2) by showing which direction a person is crossing, the electronic sign alerts the driver to look vigilantly in the appropriate direction; and 3) the electronic sign also lets drivers know when pedestrians are crossing from both directions simultaneously (*116*).

Discussion: Install in-pavement lighting at uncontrolled locations

In-pavement lighting is sometimes used to alert motorists to the presence of a crosswalk at uncontrolled locations. Both sides of the crosswalk are lined with encased raised pavement markers, which sometimes contain LED strobe lighting. In-pavement lighting has shown positive results (such as increase driver compliance, motorists yielding to pedestrians) in Washington State but not in Florida {Huang, 2000 3345 /id;Godfrey, 1999 3344 /id}.

There are several drawbacks to this method. For example, the whole system must be replaced whenever road surfacing or utility repairs occur. Also, in-pavement lights are generally visible to only the first car in a platoon. Headlights from oncoming traffic may obscure a driver's view of the entire crossing. Furthermore, in-pavement lighting does not indicate the direction of a pedestrian's travel or if people are crossing simultaneously from both sides of the road. Finally, the in-pavement flashers may be difficult to see during bright daylight hours.

The available studies on in-pavement flashing lights provided no data from which to derive AMFs. Much more evaluation is needed to fully understand the effects of in-pavement flashing lights (at uncontrolled locations) on traffic, pedestrian behavior, and pedestrian safety for a variety of traffic volumes, vehicle speeds, light conditions (day vs. night), number of lanes, and other factors.

Discussion: Reduce posted speed through school zones during school times

In 1978, Zegeer and Deen evaluated the "25 MPH WHEN FLASHING" sign at 48 school zone locations with yellow flashing beacons in Kentucky (as cited in (*83*)). Speeds ranged from 35 to 45 mph (56 to 72 km/h) without the flasher. Only 18% of all motorists complied with the 25 mph speed limit during times when the flashers were activated. Overall vehicle speeds averaged just 3.6 mph less during flashing periods than during times when the flashers were off, and only two sites experienced average speed reductions of 10 mph or more. The researchers concluded that the regulatory flashing signs were not effective in reducing vehicle speeds to the mandated 25 mph. In rural locations, the flashers increased speed variance, which elevated the potential for rear-end crashes. School crossing guards and police enforcement did promote driver compliance with speed limits (*83*). Additional information on treatments for school zones will be included in Section 3.3.5 School Routes and School Zones, in a future HSM edition.

Treatment: Provide pedestrian overpasses and underpasses

All road types

Exhibit 3-129 shows the results of a before- after comparison of pedestrian crashes made at 31 locations in Tokyo, Japan, where pedestrian overpasses had been installed (as cited in (*83*)). Crashes occurring in 200 m (218 yard) and 100 m (109 yard) sections on either side of each site were tabulated. After overpasses were installed, pedestrian crossing accidents decreased substantially, although non-related accidents increased by 23% in the 200 m sections. It is not known whether this increase could have been the results of other factors unrelated to the overpass. The researchers also found that daytime pedestrian crashes were reduced more than nighttime ones by the installation of pedestrian overpasses (*83*). This may be related to the volumes of pedestrians crossing the road. No other details about the site characteristics were reported. Standard errors could not be developed for these values.

Exhibit 3-129: Comparison of crashes before and after installation of pedestrian overpasses (Tokyo, Japan) (83)

Type of Crash	200 m sections			100 m sections		
	Before	After	Index of Effectiveness	Before	After	Index of Effectiveness
Pedestrian crossing crashes	2.16	0.31	0.144	1.81	0.16	0.088
Non-pedestrian	2.26	2.77	1.23	1.65	1.87	1.133

crossing crashes						
Total	4.42	3.09	0.699	3.46	2.03	0.567

The amount of use of a pedestrian overpass by pedestrians is one measure of its effectiveness. According to Moore and Older (1965), that usage depends on walking distances and how convenient the overpass is for potential users (as cited in (*83*)). Moore and Older developed a measure of convenience (R), defined by the ratio of the time it took to cross the street on an overpass divided by the time it took to cross at street level. According to this study, about 95% of pedestrians opt for the overpass if R=1, meaning that it takes the same amount of time to cross using the overpass as it does at street level. If the overpass route takes 50% longer (R=1.5), almost no one uses it. For similar values of R, the use of underpasses by pedestrians was not as high as for overpasses (*83*).

Overpasses can present certain problems for pedestrians, as suggested by a panel of disabled residents commenting on three pedestrian overpasses in San Francisco (Swan, 1978 as cited in (*83*). Potential hazards or barriers include: inadequate or nonexistent railings on bridge approaches; steep cross slopes; lack of a level platform at the base on bridge ramps where wheelchairs can stop prior to entering the street; inadequate sight distance to see opposing flow of pedestrians and also lack of level rest areas on spiral ramps; maze-like barriers on bridge approaches which are used to slow down bike traffic but can also impede the progress of wheelchair-bound or visually impaired users; and lack of sound screening on the overpass so that the visually impaired can hear people coming the other way and avoid crashes (*83*).

Templer et al. (1980) evaluated the accessibility of 124 existing overpasses and underpasses (as cited in (*83*)). Eighty-six percent of the structures had at least one major barrier to physically handicapped pedestrians. Among the obstacles were: no ramps (only stairs) leading to the crossing; ramps that were too long or steep; actual physical barriers that blocked the access paths; too narrow sidewalk on the overpass or underpass; and steep cross slopes. Templer et al. suggested solutions to these obstacles and provided a cost-effective comparison of the various options presented. The Americans with Disabilities Act (*99*) required gentler slopes to be used on approaches to crossing structures, which has enhanced accessibility for wheelchair users and bicyclists, but the resultant lengthening of ramps has also been found to discourage use of the facilities. On the other hand, devices such as fencing are sometimes employed to channel pedestrians toward overpasses and underpasses.

In the end, grade-separated crossings are very expensive structures and may not be used by pedestrians if not perceived as safer and more convenient than their street-level counterparts.

Discussion: Apply traffic calming measures on residential streets

The purpose of traffic calming is to reduce vehicular volumes and speeds on residential streets, which, in turn, promotes a more pedestrian-friendly environment. Thirteen types of traffic-calming measures were listed in a 1994 ITE document (*118*). Those measures were: street closures, cul-de-sacs, diverters, traffic circles, woonerfs, chicanes, flares/chokers, speed humps, speed limit signs and speed zones, speed watch and enforcement programs, walkways, parking controls, and other signage.

Huang and Cynecki looked at how various traffic-calming techniques affected the behavior of pedestrians and drivers at midblock and intersection locations in seven states in the U.S. (*108*). Traffic-calming devices resulted in lower overall vehicle speeds. Combining a raised crosswalk with an overhead flasher increased motorist yielding behavior, although it was not possible to separate the relative effect of the two aspects of this modification. No other treatments significantly changed the percentage of pedestrians for who the drivers yielded. The various traffic-calming measures did not produce a statistically significant effect on average pedestrian waiting time. It was found that refuge islands channelized people into marked crosswalks and that a raised intersection in one location had the same effect.

The safety effects of traffic calming on roadway segments and at intersections are discussed in Section 3.2.6 and Chapter 4, respectively.

The Transport and Road Research Laboratory of Great Britain developed the concept of speed humps, also known as road humps, undulations, or "sleeping policemen", which are intended to reduce traffic speeds to 20 to 25 mph. A speed hump extends across the full width of the road and has a rounded surface, while the speed table is flat-topped. Speed tables are sometimes used in conjunction with crosswalks and can be built with brick pavers. Speed tables are more often found in Europe and Australia than in the U.S. Speed humps are further discussed in Section 3.2.6.

Summary

In terms of the effects of mid-block pedestrian crossing design, research in Great Britain has found that replacing zebra (un-signalized) crossings with Pelican (signal-controlled) crossings does not necessarily reduce pedestrian crashes, although the precise effects are not well established for various conditions. A Puffin crossing is signalized with a pedestrian push button and the red/green man symbol on the same side of the street as the pedestrian, and the signal considered "intelligent" because it can modify the amount of crossing time provided for a pedestrian to cross the road as needed. Of the 60 Puffin test sites in Great Britain, they were determined to be superior to the Pelican crossings, although crash effects were not documented.

Some types of overhead flashing signs have been found to improve motorist yielding to pedestrians on low-speed, two-lane roads. An overhead, electronic LED pedestrian sign ("animated eyes" display, which shows the direction that the pedestrian is coming from) has shown promising results in terms of improved motorist yielding to pedestrians. This was particularly effective when yield signs and/or markings were placed 50 m before the crosswalk. Flashing "25 mph When Flashing" signs in school zones have been found to significantly reduce vehicle speeds in school zones but did not reduce speeds to the 25 mph speed limit. However, school crossing guards and police enforcement were much more effective in reducing vehicle speeds than the regulatory speed limit signs alone.

Pedestrian overpasses and underpasses can be effective in reducing pedestrian crashes in certain locations. However, grade-separated crossings are very expensive structures and may not be used by pedestrians if not perceived to be safer and more convenient than crossing at street level. There are various types of speed management measures that can also successfully slow down vehicle speeds and therefore have a positive effect on pedestrian safety. Such measures include street closures, diverters, traffic circles, chicanes, speed humps, speed tables, speed zones, and others. Many of these measures have shown to reduce vehicle speeds along streets, but there is limited information on the effects on pedestrian crashes.

3.3.3. Pedestrian Refuges

According to the AASHTO Guide, a highway median is defined as: "the portion of a divided highway separating the traveled way for traffic in opposing directions" (*26*). In terms of motor vehicle safety, the benefits of separating opposite-direction traffic are obvious. Medians and islands can also enhance pedestrian safety because they provide a place of refuge for people crossing the street, whether at an intersection or midblock. With a median or refuge island available, pedestrians initially only have to concentrate on traffic coming from their left. After reaching the median/island, they can wait for an acceptable gap in traffic to the right before continuing to cross the road. Medians may be painted on the pavement, or the median may be raised with curbs.

If properly planned, medians and islands provide space for landscaping that can enhance the character of a street and also help to reduce vehicular speeds. However, landscaping should be installed and maintained so as not to block sight distance between motorists and pedestrians. Vehicle turning movements must also be taken into account, with medians designed to discourage U-turns and unwanted through traffic on residential streets. Installation of a median also necessitates proper design and placement of other cross-sectional elements such as sidewalks and planting strips, bike lanes, curb ramps, travel lane widths, roadside plantings, and other features (*93*).

The following is a discussion of literature pertaining to medians and refuge islands along roadway segments.

Exhibit 3-130: Resources examined for the relationship between pedestrian refuge islands (medians) and safety

DOCUMENT	DESCRIPTION	COMMENT
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Compilation of research effectiveness information and other details of a wide range of pedestrian treatments, including medians and refuge islands.	No AMFs. Not added to synthesis.
(Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research on pedestrians and pedestrian facility effectiveness, including the effect of sidewalks on pedestrian safety.	Identifies potential resources. Not added to synthesis
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Synthesis of past research of several treatments.	No new information. Not added to synthesis.
(*107*) (Zegeer, C. V., Stewart, R., Huang, H., and Lagerwey, P., "Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines." FHWA-RD-01-075, McLean, Va., Federal Highway Administration, (2002))	Primarily intended to determine the safety effects of marked vs. unmarked crosswalks on pedestrian crashes	AMFs for raised medians on multilane roads added to synthesis.
(*123*) (Bacquie, R., Egan, D., and Ing, L., "Pedestrian Refuge Island Safety Audit." Monterey, Calif., Presented at 2001 ITE Spring Conference and Exhibit, (2001))	Comprehensive safety review of pedestrian refuge islands in Toronto, Canada, assessing collision history, human factors aspects, design, and operational characteristics.	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Huang, H. F. and Cynecki, M. J., "The Effects of Traffic Calming Measures on Pedestrian and Motorist Behavior." FHWA-RD-00-104, McLean, Va., Federal Highway Administration, (2001))	Includes a before/after operational evaluation of 5 intersections where refuge islands were added in Corvallis, Oregon and Sacramento, California.	Discussed under Pedestrian and bicycle intersections-refuge islands. Not added to synthesis.
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Includes a synthesis of research and practice related to roadway treatments at-grade pedestrian crossings.	Discussed under Pedestrian and bicycle intersections-refuge islands. Not added to synthesis.
(*113*) (Cairney, P., "Pedestrian Safety in Australia." FHWA-RD-99-093, McLean, Va., Federal Highway Administration, (1999))	Compiled results of pedestrian safety research in Australia including summary of studies that investigated effects of medians and refuge islands	Conclusions added to synthesis. No AMFs.
(McMahon, P. J., Duncan, C., Stewart, D., Zegeer, C. V., and Khattak, A., "An Analysis of Factors Contributing to "Walking Along Roadway" Crashes." Washington, D.C., 78th Annual Meeting Transportation Research Board, (1999))	The study analyzed pedestrian crash data at 47 crash sites and 94 comparison sites; identified the relationship between the presence of sidewalks/walkways and "walking along roadway" pedestrian crashes.	Not a research source for median/refuge island effects (nearly all sites are 2-lane). Not added to synthesis.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	This study provides recommendations based on a synthesis of information from other studies.	Identifies other potential sources. Not added to synthesis.
(*117*) (Bowman, B. L. and Vecellio, R. L., "Effects of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety." Transportation Research Record 1445, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 169-179.)	Evaluated the safety effects of various median types on vehicular and pedestrian safety; analyzed over 30,000 crashes in Phoenix, Los Angeles, and Atlanta.	Conclusions added to synthesis. No AMFs.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	Summary report based on a critical review of literature on safety effects of various pedestrian and bicycle treatments. Refers to Bowman study, which was underway.	Refers to other pedestrian safety studies. Not added to synthesis.
(Garder, P., "Pedestrian Safety at Traffic Signals." Accident Analysis and Prevention, Vol. 21, No. 5, Oxford, N.Y., Pergamon Press, (1989) pp. 435-444.)	Study of intersections in Stockholm and Malmo, Sweden where refuge islands were installed. The study includes an analysis of pedestrian crash data and behavioral data.	Discussed under Pedestrian and bicycle intersections-refuge islands. Not added to synthesis.
(*119*) (Lalani, N., "Road Safety at Pedestrian Refuges." Traffic Engineering & Control, Vol. 18, No. 9, London, United Kingdom, Hemming Information Services, (1977) pp. 429-431.)	Before and after studies of the effect of pedestrian refuges on crashes: sites in London	Added to synthesis.
(Mueller, E. A. and Rankin, W. W., "Pedestrians." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 8, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Synthesis of pedestrian safety literature as of 1970, but does not include any reference to studies on medians.	Not added to synthesis.

Treatment: Install raised medians at marked and unmarked crosswalks

All road types

A study by Zegeer, Stewart, Huang, and Lagerwey for FHWA in 2002, was primarily intended to determine the safety effects of marked vs. unmarked crosswalks on pedestrian crashes (*107*). This FHWA study involved the collection and analysis of data at 1,000 marked crosswalk sites and 1,000 unmarked crosswalk comparison sites in 30 U.S. cities. All of the sites were at uncontrolled approaches; that is, none of the sites had stop signs or traffic signals facing the crosswalks for approaching vehicles. Sites included midblock as well as intersection locations under a variety of traffic and roadway situations. For each site, data were collected on pedestrian exposure, traffic volume, number of lanes, median type, speed limit, and other site features, along with five years of pedestrian crash data. Poisson and negative binomial regression models were used to quantify the effects of various traffic and roadway features on pedestrian crashes (*107*).

In addition to determining the effects of crosswalk markings, number of lanes, and other roadway features (as discussed earlier), Zegeer et al. found that the presence of a raised median or crossing island was associated with a significantly lower rate of pedestrian crashes on multi-lane roads (having either marked or unmarked crosswalks). Specifically, comparing urban or suburban multi-lane roads (i.e., roads with 4 to 8 lanes) with ADT of 15,000 veh/day and above and marked crosswalks, the pedestrian crash rate (i.e., pedestrian crashes per million crossings) was 0.74 with a raised median, compared to 1.37 for sites without a raised median. Thus, having a raised median was associated with a 46% (i.e., 1.37 - 0.74 divided by 1.37) reduction in pedestrian crashes, compared to sites without a raised median. (Exhibit 3-131) (*107*). These results were used to develop an AMF of 0.54. The standard error of this value was calculated using Hauer's Eqn 7.3 (*54*), and applying a method correction factor of 5 (Exhibit 3-131).

For similar sites (multi-lane with ADT above 15,000 veh/day) at unmarked crosswalk locations, the pedestrian crash rate was 0.17 with a raised median, compared to 0.28 for sites without a raised median. Thus, having a raised median was associated with a 39% reduction (0.28 - 0.17 divided by 0.28) in pedestrian crash rate, compared to sites without a raised median (*107*). These results were used to develop an AMF of 0.60. The standard error of this value was calculated using Hauer's Eqn 7.3 (*54*), and applying a method correction factor of 5 (Exhibit 3-131). This standard error is larger due to the fewer pedestrian crashes observed at unmarked crosswalks with a raised median.

Furthermore, multi-lane road sites that had a center two-way-left-turn lane (TWLTL) or painted (but not raised) median did not correspond to safety benefits to pedestrians, compared to multi-lane roads with no medians at all. Thus, this study found that raised medians clearly provide a significant safety benefit to pedestrians on multi-lane roads, particularly on such roads with ADT above 15,000 veh/day (*107*).

Exhibit 3-131: Safety effectiveness of raised medians on pedestrian crashes on segments

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Zegeer et al., 2002	Raised median with marked crosswalk (uncontrolled)	Urban or suburban	4 to 8 lanes, 15,000 veh/day or more	Pedestrian crashes, all severities	0.54	0.48
Zegeer et al., 2002	Raised median with unmarked crosswalk (uncontrolled)	Urban or suburban	4 to 8 lanes, 15,000 veh/day or more	Pedestrian crashes, all severities	0.61	2.02

NOTE: The Zegeer et al., 2002, study included some 3 lane roadways, however the effects of refuge islands on 3-lane roads is less clear and not as well documented; therefore this AMF is relevant for 4 to 8 lane roads.

Treatment: Install pedestrian refuge islands or split pedestrian crossovers

All road types

A study by Bacquie et al. (2001) involved an evaluation in the City of Toronto, which compared the relative safety performance of 30 mid-block pedestrian refuge islands (PRIs) and 20 mid-block split pedestrian crossovers (SPXOs) (*123*).

The following is a specific description of the two safety devices examined by Bacquie et al. (*123*):

- Raised pedestrian refuge islands (PRIs) are approximately 1.8 meters wide and 11 meters long, located in the center of roads that are 16 meters wide. Pedestrian warning signs alert approaching motorists, with further guidance provided by end island markers and keep right signs posted at both ends of the island. Pedestrians who use the islands are advised with "Wait for Gap" and "Cross Here" signs. Pedestrians do not have the legal right-of-way.
- Split pedestrian crossovers (SPXOs) are a traffic control device unique to Ontario and described in its MUTCD. In addition to providing a refuge island, the SPXO combines static traffic signs, an internally illuminated overhead "pedestrian crossing" sign, and pedestrian-activated flashing amber beacons. Motorists approaching an activated SPXO must yield the right-of-way to the pedestrian until the pedestrian clears the driver's half of the road and reaches the island. Like the pedestrian refuges described above, SPXOs include pedestrian warning signs, keep right signs, and end island markers to guide motorists; however, the pedestrian signing reads, "Caution Push Button to Activate Early Warning System".

Exhibit 3-132 shows a direct comparison of the safety performance of these two devices. As the table indicates, the SPXO locations had a frequency of total crashes which was 5.5 times higher than the pedestrian refuge islands, perhaps accounted for in part by pedestrian volumes that averaged four times higher at the SPXOs.

*Exhibit 3-132: Safety Performance of Pedestrian Devices in Toronto (*123*)*

Traffic Control	Average Crashes per Location (crashes/year) (all crash types)	Crash Severity (%)		
		Fatal	Injury	PDO
PRI	0.67	3	42	55
SPXO	3.63	1	47	52

Exhibit 3-133 shows the types of crashes occurring at each location and suggests that refuge islands are associated with more vehicle-island crashes, while SPXOs are associated with more vehicle-vehicle accidents.

*Exhibit 3-133: Types of Crashes at Pedestrian Refuge Islands and Split Pedestrian Crossovers (*123*)*

Location	Frequency of Crash Types (and percent)			
	Vehicle-Vehicle	Vehicle-Pedestrian	Vehicle-Island	Other
PRI	5 (8%)	6 (10%)	47 (80%)	1 (2%)
SPXO	148 (68%)	35 (16%)	28 (13%)	6 (3%)

Bacquie et al. (2001) also conducted a before-after study to evaluate the safety effectiveness of pedestrian refuge islands (*123*). Pedestrian accidents that could have been prevented by a PRI were reduced at 28 sites for which data was available from 22 in the three years before installation to 6 during the three years after installation of the PRIs. However, there were 46 vehicle-island crashes during the after period (these were not possible during the three years prior to island installation). The study authors concluded that pedestrian safety had been enhanced by addition of the islands (73% reduction in mid-block pedestrian crashes or index of effectiveness of 0.27), but overall safety as reflected in crash frequency had decreased (136% increase in total crashes or index of effectiveness of 1.36). It was noted that the decrease in safety related to vehicle-island crashes might be helped by better island design and lane alignment (*123*). It is likely that the sites where PRI were implemented were selected based on accident history. Therefore, regression-to-mean is a likely factor. This study does not provide conclusive evidence for an AMF.

A before-after analysis was not conducted by Bacquie et al. for the SPXO locations (pg 19) (*124*).

Results of some studies have suggested that the safety benefits of refuge islands are debatable. In the 1994 Australian Geoplan study, as reported by Cairney in 1999, none of the four types of refuge islands examined was found to be very effective from a safety perspective. In fact, three of the types caused large increases in the adjusted pedestrian crash rate (the calculation of and adjustments made to the pedestrian crash rate were not reported), while only one type resulted in a slight reduction (2% reduction) (*113*). However, according to Cairney, "…it seems inherently unlikely that pedestrian refuges did not reduce crashes. The method used in the Geoplan study compared crashes occurring at the site of the facility, before and after. Where pedestrian refuges are provided, it would be expected that pedestrians would be attracted to cross at this point – pedestrians who would otherwise have crossed some distance along the road, so

that pedestrian flow is greatly increased at the refuge. A study of the crash history of the whole street where pedestrian refuges have been installed would therefore be necessary to determine whether there had been a reduction in pedestrian crashes".

Lalani also determined that (*119*):

- At intersections, vehicular collision frequency was significantly reduced only when the refuge islands were reinforced with hatch markings to channelize motor traffic;
- At midblock locations, vehicular accidents were only reduced where the islands had internally illuminated bollards; and
- Pedestrian accidents were only reduced at sites where the refuge islands were constructed on roads next to high pedestrian generators. (It is unclear if this statement applies to intersection or midblock or both.)

As Cairney suggested with regard to the Australian research by Geoplan described earlier, it is possible that the results of the Lalani study (i.e., the increase in pedestrian crashes after installation of refuge islands) may be a manifestation of the fact that more pedestrians are drawn to use the crossing after a refuge island is installed. A study of all of the pedestrian crashes along a road section (with corresponding pedestrian exposure) and controlling for pedestrian exposure at the crossings would allow for quantifying this effect.

Discussion: Effect of median type on pedestrian safety

A 1994 study by Bowman and Vecellio was conducted to determine the effects of urban and suburban median types on the safety of vehicles and pedestrians (*117*). The study involved an analysis of 32,894 vehicular crashes and 1,012 pedestrian crashes that occurred in three U.S. cities (Atlanta, Georgia; Phoenix, Arizona; and Los Angeles/Pasadena, California). The median types which were compared were: (a) raised, (b) flush or two-way-left-turn-lane (TWLTL), and (c) no existing median (undivided). A variety of statistical tests were used, including t-tests, analysis of variance, and the Scheffe multiple comparison test. The authors did not have pedestrian volume data, but used area type (CBD and suburban areas) and land use as surrogate measures for pedestrian activity and developed pedestrian crash prediction models separately for the two area types(*117*).

The results of this analysis provide evidence that having some area of refuge (either a raised median or TWLTL) on an arterial CBD or suburban street provides a safer condition for pedestrians than having an undivided road (i.e., with no refuge for pedestrians in the middle of the street) (*117*). Furthermore, while this study found that suburban arterial streets with raised-curb medians had lower pedestrian crash rates, as compared to TWLTL medians, this difference was not statistically significant. This may be a clear indication that some refuge area (in the middle of wide streets) is more beneficial to pedestrian safety when crossing streets than having no refuge area. However, the safety benefits for a raised median vs. a TWLTL were not quantified in this study (*117*). Based on the study results, Bowman and Vecellio suggest that in CBD areas, whenever possible, divided cross-sections should be used due to their lower crash rates for pedestrians and motor vehicles.

A 1999 study by Cairney compiled the results of pedestrian safety research in Australia and included a summary of studies that investigated the effects of medians and refuge islands (*113*). Cairney cites the following studies related to medians:

- A study by Moore and McLean (125) which reports early research in New South Wales by Johnson in 1962 (126) and Leong in 1970 (127). These studies found that providing narrow medians reduced vehicle-to-vehicle crashes but had no effect on pedestrian crashes. The author did not report the sample size of the studies, the type of statistical analysis, or whether data variables such as pedestrian exposure were collected and controlled for. Accident data were not reported.
- A 1986 study by Scriven in Adelaide, South Australia (128), found that medians were effective in reducing pedestrian crashes. On arterial roads, pedestrian crash rates were directly related to median width. Roads with the narrowest (4 ft, 1.2 m) medians had pedestrian crash rates that were four times higher than routes with the widest (10 ft, 3.05 m) medians.
- A 1994 study by Claessen and Jones (129) found that replacing a 6 ft (1.8 m) painted median with a wide raised median reduced pedestrian crashes by 23 percent. According to Cairney, this conclusion was consistent with Scriven's finding that pedestrian crash rates for roads with 10 ft (3.05 m) medians were 33 percent lower than for roads with 4 ft (1.2 m) painted medians (128).

Summary

Studies from the U.S. and Australia were found in the literature that analyzed the safety effects of medians which may be used for pedestrian refuge on roadway sections. There is clear evidence that on multi-lane roads (i.e., 4 or more lanes), the presence of a median (either raised median or flush median) is associated with a significant reduction in pedestrian crashes when compared to an undivided road. In fact, pedestrian crashes were found in one major U.S. study to be associated with approximately a 40% reduction when raised medians are installed (compared to having no raised median) on multi-lane roads having ADT of 15,000 veh/day or higher (*107*).

Having a flush median on a multi-lane road does not appear to provide as much safety to pedestrians as having a raised median, based on research in the U.S. and Australia. Although a limited number of research studies are included herein which investigated the safety effects of medians on pedestrian crashes, there are several additional studies that have analyzed the safety effects of crossing islands (pedestrian refuge islands) at intersections. These studies are discussed in detail in Section 4.3.

3.3.4. Bicycle Routes

Guidelines for the planning, design, and operation of bicycle facilities are provided in the 1999 "Guide for the Development of Bicycle Facilities" report by AASHTO (*130*). Specific design information is given in that document on shared roadways (e.g., lane width, on-street parking pavement surface quality), signed shared roadways (e.g., designing sidewalks as bikeways, signing), bike lanes (e.g., bike lane widths, bike lanes at intersections and driveways), and shared use paths (e.g., widths and clearances, design speed, horizontal alignment, grades, signing and marking, lighting). Other design considerations are given on such topics as bikes on freeways, interchange areas, roundabouts, traffic signals, bike parking facilities, and accessibility requirements.

A bicycle lane (BL) is defined as a part of the roadway designated for bicycle traffic and separated from motor vehicles in adjacent lanes by pavement markings. Most often, bike lanes are installed near the right edge of the road, although they are sometimes placed to the left of right-turn lanes or on-street parking.

The 1994 FHWA report entitled *Selecting Roadway Design Treatments to Accommodate Bicycles* suggests the installation of BLs in areas with a primarily inexperienced cyclist population (*131*). The authors of that report offer a list of factors to consider when choosing safety countermeasures aimed at bicycle traffic, including:

- Defining the types of bicyclists ("design bicyclists") expected to use the facility;
- Type of roadway;
- Traffic volume;
- Average motor vehicle operating speeds;
- Traffic mix;
- On-street parking;
- Sight distance; and
- Number of intersections and entrances.

The reader may wish to refer to this and other documents for further guidance on the design and traffic control elements of bicycle facilities on roadway segments.

This section provides information on the safety effects of various types of bicycle facilities on roadways segments, such as bike lanes, wide curb lanes, combined bike/bus lanes, bike lanes next to motor vehicle parking, and wide paved shoulders.

Also included in this chapter is a summary of studies related to other bicycle-related measures along routes, including shoulder rumble strips (along roadway edgelines), traffic calming, bicycle boulevards, and bicycle paths (separated from the roadway).

Driver and cyclist reaction to the presence of various bicycle facilities are discussed where information is available.

This section involves a review of pertinent research studies on bicyclist safety from the U.S. and abroad. Some of the research results contained in this chapter were adapted or summarized from Clarke and Tracy (1995) (*132*) and also Hunter et al. (1999) (*133*).

Further research could be conducted on a city-wide basis on the effect of adding bike lanes along major corridors and the long-term effects on bicycle travel and crashes. Quantifying the effect of bike lanes, bike/bus lanes, and bike lanes next to parking on bike safety under a variety of traffic and roadway conditions would also be highly desirable. Further research is also needed on the safety effects of various types of rumble strips and traffic calming measures on bicyclist safety.

Exhibit 3-134: Resources examined to investigate the safety effect of bicycle facilities on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results not available.

DOCUMENT	DESCRIPTION	COMMENT
San Francisco's Department of Parking & Traffic.; and Alta Planning Design. San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety. Final Report, 2004	This study examines the effectiveness of shared-lane markings as used by both vehicles and cyclists. A before-and-after video analysis was used to evaluate the effectiveness of shared-lane markings. Examines the perception of drivers and cyclists using the share-lane.	Not added to synthesis.
(*68*) (Torbic, D. J., Elefteriadou, L., and El-Gindy, M., "Development of More Bicycle-Friendly Rumble Strip Configurations." Washington, D.C., 80th Transportation Research Board Annual Meeting, (2001))	Compared bicycle-friendliness of newly simulated rumble strip configurations at a test track in PA; both bicycles and motor vehicles tested the configurations	Added to synthesis.
(*134*) (Wilbur Smith Associates, "Bicycle Boulevard Design Tools and Guidelines." Berkeley, Calif., City of Berkeley Planning and Development Department, (2000))	Design manual developed by consultant for Berkeley, CA; general discussion of bicycle boulevards plus specific guidelines for implementation of a network of seven bicycle boulevards in the city of Berkeley	Limited qualitative information. Added to synthesis.
(*136*) (Hunter, W. W. and Stewart, J. R., "An Evaluation Of Bike Lanes Adjacent To Motor Vehicle Parking." Chapel Hill, Highway Safety Research Center, University of North Carolina, (1999))	Comparative study of conflicts and lateral positioning of bicycles at two FL sites with BLs and on-street parking; one site had a narrow traffic lane adjacent to the BL	Added to synthesis.
(*133*) (Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. F., and Pein, W. E., "A Comparative Analysis of Bicycle Lanes versus Wide Curb Lanes: Final Report." FHWA-RD-99-034, McLean, Va., Federal Highway Administration, (1999))	Comparative analysis of bicycle lanes versus wide curb lanes, sites in CA, FL, and TX, used conflicts as surrogate for safety	Added to synthesis.
(Hunter, W. W., Stewart, J. R., and Stutts, J. C., "A Study of Bicycle Lanes Versus Wide Curb Lanes." Transportation Research Record: Journal of the Transportation Research Board, No. 1667, Washington, D.C., Transportation Research Board, (1999) pp. 70-77.)	Same study as Hunter et al. 1999 (above)	Suggested by NCHRP 17-18(4). No new information. Not added to synthesis.
(Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. H., and Pein, W. E., "Bicycle Lanes Versus Wide Curb Lanes: Operational and Safety Findings and Countermeasure Recommendations." FHWA-RD-99-035, McLean, Va., Federal Highway Administration, (1999))	Same study as Hunter et al. 1999 (above)	No new information. Not added to synthesis.
(Garder, P., Leden, L., and Pulkkinen, U., "Measuring the Safety Effect of Raised Bicycle Crossings Using a New Research Methodology." Transportation Research Record 1636, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 64-70.)	A before/after methodology was applied to evaluate raised bike crossings at 44 intersections in Gothenburg, Sweden	Not added to synthesis. Used in the HSM bike intersection synthesis.
(*138*) (Harkey, D. L. and Stewart, J. R., "Evaluation of Shared-Use Facilities for Bicycles and Motor Vehicles." Transportation Research Record 1578, Washington, D.C., Transportation Research Board, National Research Council, (1997) pp. 111-118.)	Used observations of bicyclist and motor vehicle interactions in FL to evaluate the safety of shared-use facilities; wide curb lanes, bicycle lanes, and paved shoulders	Suggested by NCHRP 17-18(4). Added to synthesis.
(*139*) (Jensen, S. U., "Junctions and Cyclists." Barcelona, Spain, Proc. Velo City '97 - 10th International Bicycle Planning Conference, (1997))	Danish study of the effect of BLs on collision rates at signalized intersections and at priority intersections.	Limited qualitative information. Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D. and Stewart, R., "Bicycle and Motor Vehicle Operations on Wide Curb Lanes, Bicycle Lanes and Paved Shoulders." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 139-145.)	Analysis of bicyclists riding in midblock locations which had a bike lane, wide curb lane or shoulder. Behaviors and separation distances were recorded for motorists and bicyclists.	No quantitative information. Not added to synthesis.
(Florida DOT, "Florida Bicycle Facilities Planning and Design Manual, Final Draft." Tallahassee, Florida Department of Transportation, (1995))	Florida DOT design manual	Limited qualitative information. Not added to synthesis.
(*142*) (Garder, P., "Rumble Strips or Not Along Wide Shoulders Designated for Bicycle Traffic?" Transportation Research Record 1502, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 1-7.)	Discussion of the implementation of shoulder rumble strips along roadways with cycle traffic using the shoulder.	Limited qualitative information. Added to synthesis.
(Diepens and Okkema Traffic Consultants, "International Handbook for Cycle Network Design." The Netherlands, Delft University of Technology, (1995))	Handbook of bicycle treatment designs includes discussion of separate bike paths used in the Netherlands.	Limited qualitative information. Not added to synthesis.
(Herrstedt, L., Nielsen, M. A., Agustson, L., Krogsgaard, K. M. L., Jorgensen, E., and Jorgensen, N. O., "Safety of Cyclists in Urban Areas: Danish Experiences." Copenhagen, Denmark, Danish Road Directorate, (1994))	Evaluated various bike lane designs in an attempt to reduce potential conflicts between bus passengers and bikes.	Limited qualitative information. Not added to synthesis.
(Wilkinson, W. C., Clarke, A., Epperson, B., and Knoblauch, R., "The Effects of Bicycle Accommodations on Bicycle/Motor Vehicle Safety and Traffic Operations." FHWA-RD-92-069, Washington, D.C., Federal Highway Administration, (1994))	Conclusions are provided on bicycle planning and design based on the current state of the practice; recommendations are based on a literature review	Used as a reference (no original safety research conducted). Not added to synthesis.
(C.R.O.W., "Sign Up for the Bike: Design Manual for a Cycle-Friendly Infrastructure." C.R.O.W. Record 10, The Netherlands, Centre for Research and Contact Standardization in Civil and Traffic Engineering, (1994))	1994 Dutch design manual	Limited qualitative information. Not added to synthesis.
(Botma, H. and Mulder, W., "Required Widths of Paths, Lanes, Roads and Streets for Bicycle Traffic." The Netherlands, Grontmij Consulting Engineers, (1993))	Dutch study of bike lanes.	Limited qualitative information. Not added to synthesis.
(*147*) (Laursen, J. G., "Nordic Experience with the Safety of Bicycling." Denmark, Bicycle Federation of America, (1993))	Evaluated the safety benefits of bike lanes in Denmark	Limited qualitative information. Added to synthesis.
(*148*) (Ronkin, M. P., "Bike Lane or Shared Roadway?" Pro Bike News, Vol. 13, No. 3, Washington, D.C., Bicycle Federation of America, (1993) pp. 4-5.)	Analysis of bike lanes and shared lanes	Limited qualitative information. Added to synthesis.
(Egan, D., "A Bicycle and Bus Success Story." Montreal, Quebec, Canada, The Bicycle: Global Perspectives, (1992))	Study of shared bus and bike lanes in Toronto, Canada.	Limited qualitative information. Not added to synthesis.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	Summarizes the safety effectiveness of various geometric features on pedestrian and bicycle safety, based on critical reviews of the literature	Used as a reference (no original safety research conducted). Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*150*) (Hass-Klau, C., Nold, I., Bocker, G., and Crampton, G., "Civilized Streets; A Guide to Traffic Calming." Brighton, United Kingdom, Environmental & Transport Planning, (1992))	Comprehensive discussion of traffic calming and cyclists.	Limited qualitative information. Added to synthesis.
(*151*) (Cyclists' Touring Club, "Cyclists and Traffic Calming." Godalming, United Kingdom, Cyclists' Touring Club; (1991)).	Advice for implementing traffic calming techniques without discouraging cyclists.	Limited qualitative information. Added to synthesis.
(*152*) (Tolley, R., "Calming Traffic in Residential Areas." Dyfed, Wales, United Kingdom, Brefi Press, (1990))	Study of traffic calming impacts on cyclists, volumes, delays, and speeds in Germany	Limited qualitative information. Added to synthesis.
(Harrison, J. H., Hall, R. D., and Harland, D. G., "Literature Review of Accident Analysis Methodologies and Cycle Facilities." Contractor Report 163, Berkshire, England, Transport and Road Research Laboratory, (1989))	Study of bus and bike shared lanes.	Limited qualitative information. Not added to synthesis.
(*154*) (Smith, R. L. and Walsh, T., "Safety Impacts of Bicycle Lanes." Transportation Research Record 1168, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 49-59.)	Evaluation of bicycle-motor vehicle crashes before and after BL installation.	Limited qualitative information. Added to synthesis.
(*155*) (Berchem, S. and Somerfeld, W. O., "Unique Roadway Design Reduces Bus-Bike Conflicts." TR News, No. 177, Washington, D.C., Transportation Research Board, National Research Council, (1985) pp. 2-3.)	Discussion of one design option for accommodating bus and bike traffic.	Limited qualitative information. Added to synthesis.
(*156*) (McHenry, S. R. and Wallace, M. J., "Evaluation of Wide Curb Lanes as Shared Lane Bicycle Facilities." Baltimore, Maryland State Highway Administration, (1985))	Studied wide curb lanes used by cyclists and motor vehicles.	Limited qualitative information. Added to synthesis.
(*157*) (City of Eugene, "18th Avenue Bike Lanes - One Year Report, Memorandum to City Council." Eugene, Oregon, (1980))	Evaluation of bike lanes in Eugene, Oregon	Limited qualitative information. Added to synthesis.
(*158*) (Lott, D. F. and Lott, D. Y., "Differential Effect of Bicycle Lanes on Ten Classes of Bicycle-Automobile Accidents." Transportation Research Record 605, Washington, D.C., Transportation Research Board, National Research Council, (1976) pp. 20-24.)	One of the earlier statistical analyses of the role that BLs played with regard to various types of bicycle-motor vehicle accidents	Limited qualitative information. Added to synthesis.
(Kroll, B. and Sommer, R., "Bicyclists Response to Urban Bikeways." Journal of the American Institute of Planners, Baltimore, American Institute of Planners, (1976) pp. 42-51.)	A survey of bike riders in the U.S. in 1976	Limited qualitative information. Not added to synthesis.

In general, the studies discussed below relate to bicycle treatments on urban roads, unless otherwise specified.

Discussion: Provide dedicated bicycle lanes

When bicycle lanes (BLs) were first becoming popular in the United States, assumptions were made about their implied safety benefits, although many people challenged these beliefs. Lott and Lott (1976) performed one of the earlier statistical analyses of the role that BLs played with regard to various types of bicycle-motor vehicle accidents (*158*). At that time, the City of Davis, CA, already had an extensive network of heavily used BLs, as well as many

streets without them. The study included all functional types of the Davis street network. One phase of the Lott study compared the four-year accident experience revealed in police records for the roads that had BLs to those without BLs. Additionally, crash records in Davis were compared with those of Santa Barbara, CA, a comparable city that did not use BLs.

All of the accidents were categorized into a ten-class system, and the relative frequency with which each type of accident occurred in BL segments vs. non-BL segments was assessed. Three types of bicycle-motor vehicle accidents that seemed unaffected by BLs were used as a standard for evaluating the role of BLs in other categories of accidents; specifically (1) where a bicyclists failed to stop or yield at a controlled intersection, (2) where a motorist failed to stop or yield at a controlled intersection, and (3) where a motorist made an improper left-turn. The analysis found lower crash frequencies at locations with BLs in six classes of bicycle-motor vehicle accidents and higher frequencies in one class. The overall frequency of accident types that were considered to be affected by the presence or absence of BLs went down 51%. The frequency of all accident types combined decreased by 29% in area with BLs. Based on this evidence, Lott and Lott concluded that BLs do indeed offer positive safety benefits (*158*).

In Corvallis, Oregon, BLs were credited with decreasing bicycle-motor vehicle crashes by more than 50% (*148*). In Eugene, Oregon, a two-thirds reduction in bicycle-motor vehicle crashes was attributed to bike lanes (*157*).

In Madison, Wisconsin, BLs installed along a one-way arterial pair resulted in a statistically significant increase in the number of bicycle-motor vehicle crashes associated with turning movements during the first year after BL installation; but the number dropped sharply after the first year that the BLs had been in operation (*154*). The authors concluded that, overall, the BLs did not have an adverse effect on bike safety. In fact, the one roadway section where crashes increased during the first year was something of an anomaly in that it was installed on the left side of a one-way street.

Researchers in Denmark have evaluated the effectiveness of BLs as a bike safety measure. One study found a lower frequency of crashes resulting in injuries to cyclists on roadways that had a BL or bicycle path, compared with roadways that did not provide these facilities (Herrstedt et al., 1994 as cited by Hunter et al. (*133*)).

Another Danish study looked at the effect of BLs on collision rates at signalized intersections and at priority intersections (at priority intersections, traffic is controlled by signage rather than signals and one road has priority over the other). Results indicated that the implementation of BLs caused no change in the number of either bicycle-motor vehicle or overall crashes at signalized intersections. However, there was an increase in bicycle-motor vehicle crashes at priority intersections. The study also found a reduction in all crashes along the stretches of roadway between intersections (*139*).

Many of the above studies indicate a safety benefit after the installation of bicycle lanes. However, regression-to-the-mean may play a part in these studies; therefore the magnitude of safety effect is not known at this time.

Discussion: Width of bicycle lanes

Several State Departments of Transportation in the U.S., including New Jersey, North Carolina, and Oregon, suggest that bicycle lanes may generally be 4 to 6 ft (1.2 to 1.8 m) wide (*133*). Back in 1976, a survey of bike riders in the U.S. found that 85% of them considered BLs

wider than 1.8 m to be adequate while only 41% felt that lanes less than 1.5 m wide were sufficient (Kroll et al., 1976 as cited by (*133*)).

The literature suggests that Dutch experts generally prefer wider BLs than their American counterparts. A 1994 Dutch design manual suggests lanes that are 2.0 m wide in order to accommodate cyclists who ride side-by-side (*133*). To allow for passing maneuvers within the bike lane, a 1993 Dutch study suggested providing lanes that are 2.5 m wide in locations where the one-hour peak volume is greater than 150 bicycles (Botma and Mulder, 1993 as cited by (*133*)).

Discussion: Bicyclist and motor vehicle driver reaction to bicycle lanes

In a nationwide survey of U.S. cyclists in 1976, 93% of the people using BLs felt that the roadway was safer with BLs than without those lanes (Kroll et al., 1976 as cited by (*133*)). However, Kroll et al. could offer no conclusive evidence that BLs improve the safety of people who use them.

A pavement marking stripe at the side of the road may be used to denote either a bicycle lane or a paved shoulder. In either case, research has shown that a stripe separating motor vehicle traffic from bicycles results in fewer erratic maneuvers on the part of motorists, more predictable riding movements by the cyclists, and higher levels of comfort for both bicyclists and motor vehicle drivers compared to a wide curb lane (*138*).

Discussion: Provide wide curb lanes (WCLs)

In cases where right-of-way limitations prevent installation of a full-width BL, one alternative is to design the curb lane wide enough to accommodate both bicyclists and motor vehicles and facilitate passing maneuvers. According to McHenry and Wallace, the ideal width for a wide curb lane (WCL) is between 4.0 and 4.6 m; this allows enough room for lane sharing but not so much that motorists double up in the lane at intersections (*156*). A study completed in 1994 suggested that WCLs are effective on roadways where the cycling population consists of mostly experienced riders (*131*). Harkey and Stewart found that motorists are much more likely to encroach into the adjacent lane of motor vehicle traffic when passing cyclists in a WCL than a delineated BL (*138*).

Currently, state and local officials appear more likely to install BLs than WCLs. This may be due to the influence of cyclists, who seem to prefer BLs. The Florida DOT, for example, states that because only 5% of bicyclists “feel comfortable” using WCLs, the WCL should be considered a last-resort treatment where BLs are not feasible (*133*).

A 1985 Maryland study suggested that curb lanes intended for shared use by bicyclists and motor vehicles need to be 15 to 15.5 ft (4.6 to 4.7 m) wide (*156*). McHenry et al. also found that a width of more than 12 ft (3.67 m) improves the interaction between bikes and motor vehicles in a shared lane, but the report cautioned that excessive width could be counterproductive. Wide curb lanes were also found to have a positive effect on both bicycle and motor vehicle flow patterns at midblock as well as allowing the greatest uniformity of tracking. McHenry et al. found that WCLs also caused the least amount of vehicle displacement (*156*), although this finding contradicts Harkey and Stewart’s conclusion, noted above, that motorists are more likely to encroach in the adjacent lane of motor vehicle traffic when passing cyclists in a WCL.

Overall, the safety effect of wide curb lanes has not been quantified, although the majority of research indicates that WCL improve safety, there are potential negative aspects to be considered prior to implementation.

Discussion: Bike lanes versus wide curb lanes

Harkey and Stewart did a study for the Florida DOT that focused on bicyclists riding in midblock locations that had a BL, a WCL (wide curb lane), or a paved shoulder (*138*):

- Bicyclists and motorists were separated by a distance of 1.8 m, with slight variation dependent upon the type of facility present (i.e., BL, WCL, or paved shoulder)
- In the case of BLs and paved shoulders, the distance between a cyclist and the roadway edge was greater (0.8 m) than on WCLs (0.4 m)
- When passing a bicyclist in a BL, motor vehicles shifted about 0.3 m laterally regardless of the BL width
- When passing a bicyclist using a WCL, motorists moved over to the left 0.4 m more than when passing someone using a BL or paved shoulder
- When passing a bicyclist using a WCL, motorists encroached 22.3% more into the adjacent lane to their left than when the cyclist was riding in a BL (8.9%) or a paved shoulder (3.4%)

A comparative analysis of bicycle lanes (BLs) versus wide curb lanes (WCLs) was conducted for the FHWA in 1999 (*133*). In the cities of Santa Barbara, CA, Gainesville, FL, and Austin, TX, videotapes were made of bicyclists approaching and riding through eight intersections that had BLs and eight others that had WCLs. At the BL locations, 2,700 cyclists were observed, while 1,900 cyclists were taped going through the WCL intersections. In addition, brief on-site interviews of 2,900 bicyclists were conducted; and an analysis was performed on crash data from bicycle-motor vehicle crashes (*133*).

Hunter et al. showed that 5.6% of all bicyclists on the videotapes were riding the wrong way, against traffic. One-third of the bicyclists at both types of facilities claimed to be experienced riders (*133*).

The videotapes of motor vehicle and bicycle traffic approaching the intersections (i.e., at midblock) revealed that a statistically significant higher percentage of vehicles passing bicyclists on the left encroached into the adjacent traffic lane at WCL locations (17%) than at BL sites (7%) (*133*), which agrees with findings from the Florida DOT study done in 1997 (*138*). Fortunately, the lane encroachments hardly ever caused conflict with motor vehicles using the other lane (*133*).

In cases where bicyclists were <u>not</u> being passed by motorists and the BL width was 1.6 m or less, the average bicyclist distance from the curb or gutter pan seam was less than for WCLs with the same amount of motor vehicle traffic volume. At locations where bicyclists were <u>not</u> being passed by motorists and the BL width was 1.6 m or greater, the average bicyclist distance from the curb was greater than for WCLs with the same amount of motor vehicle traffic volume (*133*). Comparable results were found in situations where cyclists <u>were</u> being passed by motorists; that is, the results were similar for both passing and no passing when the BL width is greater than 1.6 m. Test sections used in this study were from Santa Barbara, CA, Gainesville, FL, and Austin, TX, where a considerable amount of commuter bicycling occurred related to universities. Sites included a variety of traffic and roadway conditions.

The videotape evidence showed a total of 188 midblock conflicts. Broken down into percentages, 71% were bicycle/motor vehicle conflicts, 10% were bicycle/bicycle conflicts, and 19% were bicycle/pedestrian conflicts. Most of the conflicts between bikes happened in BLs, but there were more problems between bikes and pedestrians in WCLs (perhaps due to greater amount of cyclists riding on sidewalks in WCL locations) (*133*).

In their comment section, Hunter et al. suggest the findings contradict prevailing assumptions about the differences between WCLs and BLs. Many experts think that more experienced riders tend to use the WCLs and less proficient cyclists opt for BLs or sidewalks; survey results in this study found no difference in cyclist experience according to type of facility. Similarly, the common belief that riding the wrong way is more common among BL users was called to question by results of this study, which found a higher proportion of people going against traffic at the WCL sites. Of course, this might be due to the fact that WCLs are often found on higher volume roadways, where cyclists seek what they think is the safest route possible. Data from both BL and WCL locations suggest the need for educating cyclists about the safest way to make both left and right turns at intersections (*133*).

Hunter et al. state that (*133*):

"The overall conclusion of this research is that both BL and WCL facilities can and should be used to improve riding conditions for bicyclists, and this should be viewed as a positive finding for the bicycling community. The identified differences in operations and conflicts were related to the specific destination patterns of bicyclists riding through the intersection areas studied."

The authors suggest the use of BLs "…where there is adequate width, in that BLs are more likely to increase the amount of bicycling than WCLs" (*133*).

Another Danish study evaluated the safety benefits of bike lanes determined that, "for some reason" BLs were just as effective as separate bike paths ("cycle tracks"), although bicyclists claimed to feel less safe on BLs (Hansen, 1983 as cited by (*147*)). Even when the lanes were barely wide enough for a bicycle (0.5 m or 19.7 inches), Laursen found that a BL reduced bicyclist crash risk by up to one-third, with lanes that were a little wider (0.6 m or 2 ft) reducing bicyclist crash risk 70 to 80%.

Discussion: Combined bus and bicycle lanes; bus and bicycle interaction

In Toronto, the installation of a lane shared by buses and bicycles lowered crash rates. Bicycle traffic increased after the lane was added, and over 75% of the cyclists surveyed claimed to feel safer riding in this newly provided space, compared to riding on a street with standard lanes (Egan, 1992 as cited in (*133*)).

Recognizing the potential danger of conflicts between the two modes of transportation at crossing points, one design option designates a bike lane to the right of the through traffic lanes but to the left of the bus and right-turn lane. This design permits the continuous flow of bicycle traffic while accommodating the need for bus stops (*155*).

Addressing the high crash rate for various road users in bus stop areas, Danish researchers have tried to reduce potential conflicts between bus passengers and bikes by using unique pavement markings to highlight the conflict area at bus stops and divert cyclists away from passengers disembarking from the stopped buses. The designs evaluated in a 1994 study by Herrstedt included (as cited in (*133*)):

- Combining a pedestrian crossing with profiled pavement markings;
- Placing a profiled marking on the offside of the bike path; and
- Painting a pattern that included a visual brake.

As it turned out, none of these designs increased the percentage of bicyclists who yielded to bus passengers crossing the bike path; but all three designs encouraged cyclists to slow down when a bus was present at the stop. With the special pavement markings in place, cyclists reacted sooner when they saw a bus at the stop, which reduced the distance between point of initial reaction and the closest potential conflict area. The painted pattern actually lowered the number of serious conflicts that occurred (Herrstedt et al., 1994 as cited in (*133*)). No details regarding road type, volumes, speeds, or study methodology were reported.

Discussion: Bike lanes adjacent to motor vehicle parking

Where on-street parking exists, retrofitting the roadway to accommodate a bike lane may result in a traffic lane next to the BL that is somewhat narrower than standard. A study in Florida compared roadways in Ft. Lauderdale (Route AIA) and Hollywood (Hollywood Blvd) that have BLs adjacent to motor vehicle parallel parking (*136*). Both BLs are about five feet wide, but restriping to add the BL in Ft. Lauderdale reduced the width of the traffic lane next to it to 10.5 ft, whereas the Hollywood location has a standard 12-ft lane beside the BL.

Hunter et al. gathered videotape data on conflicts between bicyclists and motorists, pedestrians, and other bicyclists, with a conflict being defined as a sudden change in speed or direction of travel to avoid a collision. As it turned out, conflicts were rare, minor, and occurred mostly in the BLs. Six of the eight conflicts (75%) observed in Ft. Lauderdale were related to parking maneuvers, not surprising given the frequent turnover in parking spaces so close to the beach. At the Hollywood site, four of the five conflicts (80%) involved side street traffic rather than parking maneuvers (*136*).

Lateral positioning of the bicycles was also evaluated in order to identify issues stemming from the narrow traffic lane next to the Ft. Lauderdale BL. At both locations, however, it was found that cyclists favored the center of the BL when parked cars were present. Cyclists were also a little more likely to ride farther away from traffic if the parked vehicles were closer to the curb, but the position of a parked vehicle did not affect the tendency at both locations to ride farther away from traffic when being passed (*136*).

Average separation between bicyclists and passing vehicles was 5.77 ft on Route A1A (i.e., with the narrow travel lane) and 7.52 ft on Hollywood Boulevard (i.e., with the 12 ft motor vehicle lane) a difference of approximately 1.8 ft (which was statistically significant at the .001 level). The authors felt that, despite busier conditions, a narrower BL, and a narrower adjacent traffic lane, the cyclists in Ft. Lauderdale adjusted easily to the situation. The bicycles were never spaced less than an acceptable three feet from ongoing traffic. Overall, the researchers concluded that narrowing the traffic lane to 10.5 ft to accommodate a BL next to on-street parallel parking had succeeded (*136*).

Discussion: Paved highway shoulders used by cyclists, and shoulder rumble strips

According to Harkey and Stewart, Khan and Bacchus (1995) found that the expected number of bicycle-motor vehicle crashes is greatly reduced when cyclists ride on paved highway shoulders instead of sharing a lane with motorists. Paved shoulders affect the interaction between bicycles and motor vehicles basically the same as BLs in that the strip which separates the two modes of traffic promotes lowered risk for both (*138*).

Additional evaluations are needed to confirm the safety effect of cyclists using a paved shoulder on various road types with different volumes and operational characteristics.

There is a potential danger to cyclists riding on a paved shoulder if inattentive or sleepy motorists drift off the road. A shoulder rumble strip is one countermeasure used to address this problem, although the most effective design has not yet been determined (*142*). At least 1.5m in width is necessary to allow enough space for both a rumble strip and bicyclists on highways with speeds of less than 100 km/h (Khan and Bacchus, 1995 as cited in (*133*)).

Since bicyclists are usually prohibited from riding alongside freeways, the use of rumble strips on these roadways is not typically a problem for the cycling population. However, with the increasing use of rumble strips on other types of roads, the authors of one study chose to evaluate newer designs that would be safer and more comfortable for cyclists while still effective in preventing run-off-road accidents by alerting inattentive or sleepy motorists (*68*). New rumble strip models were simulated, installed, and evaluated on a test track in Pennsylvania. The models were subjected to testing with both bicycles and motor vehicles. Results led to a new rumble strip configuration for use along high-speed non-freeway facilities and another for use on lower-speed roadways (*68*):

1. 127 mm wide, 178 mm edge to edge between cuts, 10 mm deep for operating speed of 55 mph (88 km/h)
2. 127 mm wide, 178 mm edge to edge between cuts, 6.3 mm deep for operating speed of 45 mph (72 km/h)

Torbic et al. provide detailed discussion on the evaluation process (*68*). Section 3.2.4 contains further discussion of shoulder rumble strips.

Discussion: Traffic calming

German planners have implemented a number of traffic-calming techniques that have affected bicyclist as well as motor and pedestrian safety. In some urban areas, arterials with a maximum speed of 50 km/h (33 mph) have been fitted with synchronized traffic signals, bike lanes, marked crosswalks, wide sidewalks, and medians. On collector roads having a maximum speed of 30 km/h (18 mph), designers have installed narrow lanes, bike lanes, speed tables, and wider sidewalks that force motorists to obey the speed limit. Movement along residential streets has been slowed down through the use of managed parking, chicanes, reclaimed play areas, speed humps, and road closures.

In Germany and other countries, the use of traffic-calming techniques like these has increased bicycling, walking, and other kinds of street activity. In some cases, both fatal and injury crashes among all road users have been lowered as much as 60%. One major study showed that even though traffic volume did not change and speeds were reduced, motorists had only faced an average 33 second delay (*152*). Traffic calming has proven popular with citizens and beneficial to the environment. Tolley says that, in Germany, savings in accident costs alone will counteract the expense of installing traffic calming.

Probably the most comprehensive discussion on this topic is “Civilized Streets: A Guide to Traffic Calming” (*150*). Many locations in Germany, the United Kingdom, the Netherlands, and Denmark have developed standards and guidelines for traffic calming. The Cyclists Touring Club (1991) has offered advice for implementing these techniques in the United Kingdom without discouraging bicycling (*151*).

Traffic calming on roadway segments is also discussed in Section 3.2.6.

Discussion: Bicycle boulevards

In an effort to make itself more bicycle-friendly, the City of Berkeley, CA, has designed a network of seven bicycle boulevards. The city's design consultant describes a bicycle boulevard as "a roadway that has been modified as needed to enhance bicyclists' safety and convenience" (*134*). This type of facility can help solve the problem of providing safe, efficient bikeways in urban areas with limited street space. Collaborating with neighborhood residents and cyclists, Wilbur Smith Associates created a toolbox of site-specific strategies for developing the seven bicycle boulevards within the city of Berkeley.

A bicycle boulevard includes a number of unique features. Although a BL can be provided if necessary, a bicycle boulevard is usually designed as a shared facility where motor vehicle traffic is low in volume and limited to local traffic. Ambiance, traffic control, and intersection features make it clear to both cyclists and motorists that the boulevard is intended to give priority to bicyclists. Overall, the purpose of a bicycle boulevard is to provide a place where almost anyone would feel safe riding and to provide a network of roadways on which cyclists can move efficiently through the city (*134*).

A bicycle boulevard shares many of the safety benefits found with other forms of traffic calming. Lower motor vehicle traffic volumes and speeds, as well as the priority given to cyclists at crossings, combine to reduce potential conflicts between these two modes of transportation and the severity of such conflicts if they do occur. However, these assumed benefits would be hard to prove empirically since the roadways selected for conversion to bicycle boulevards tend to be low-accident areas anyway (*134*).

A network of bicycle boulevards provides riders with a more continuous, direct route with fewer stops and delays. Use of the boulevards can make bicyclists more visible in the community, which in turn makes them feel safer and motorists more aware of their presence. In addition, the reduction in motor vehicle volume, speed, and noise, plus easier street crossings along bicycle boulevards, can have obvious benefits for pedestrians and for the local neighborhoods in which these facilities are located. The report contained no formal evaluation on the effectiveness of bicycle boulevards on bike crashes (*134*).

Discussion: Bicycle paths

Dutch designers suggest installation of a separate bicycle path where motor vehicle speeds are greater than 50 km/h or traffic volumes are higher than 1,200 veh/hr. A space at least 1.8 m wide should be allotted for one-way bike paths, while 2.8 m is necessary for two-way paths (Diepens and Okkema, 1995 as cited in (*133*)). American cyclists surveyed in 1976 by Kroll and Sommer felt that bike paths were safer than bike lanes and considered 2.8 m to be a good width for a bike path (Kroll and Sommer, 1976, as cited in (*133*)).

Although there is some evidence that separate bike paths can provide a relatively safe facility along a roadway segment, particularly in a rural or outlying area, the crossings of the paths at intersections result in an overall higher rate of bicycle crashes along most routes, particularly in urban and suburban areas.

Summary

The majority of research on bike lanes suggests that the addition of well-planned and well-designed bike lanes can improve bicyclist safety compared to wide curb lanes. Bike lanes

should be a minimum of 5 ft wide and properly signed and marked. Bike lanes have also been found to result in more consistent lateral placement between bicyclists and passing motorists, and most bicyclists prefer riding in bike lanes, compared to riding in travel lanes without bike lanes. Wide curb lanes (greater than 15 ft) provide for safer movements of bicyclists than lanes of 12 feet or less. Providing paved shoulders provides a safer riding environment for bicyclists, compared to travel lanes without a paved shoulder.

The question of whether to install bike lanes next to motor-vehicle parking is somewhat controversial. However, there is evidence that it can be done successfully for a 5-foot bike lane. A combined bus/bike lane has shown to be a reasonable measure to help promote safe interaction between bicyclists and buses along bus routes if proper pavement marking is used.

There has also been controversy on the use of edgeline rumble strips, in terms of how it affects bicyclists on paved shoulders. While some rumble strip designs create a problem for bicyclists, some newer rumble strip designs have been found to reduce the likelihood of a motor vehicle running off the road (and thus less likely to strike a bicyclist), while also being less of an obstruction for bicyclists who ride on the shoulder.

Separated bike paths are discussed briefly in this chapter. There is evidence that although they can provide a relatively safe facility along a route, particularly in a rural or outlying area, the crossings of the paths at intersections result in an overall higher rate of bicycle crashes along most routes, particularly in urban and suburban areas. Bike boulevards (i.e., bike-friendly streets with low vehicle speeds where bike have priority over motor vehicles) have been used in some cities. Bike boulevards have the potential for providing a safer bicyclist environment, although no quantitative studies were found which has conducted such an analysis. Certain types of traffic calming measures can reduce vehicle speeds and create a safer environment for bicycling.

3.3.5. School Routes and School Zones [Future Edition]

In future editions of the HSM, this section may provide discussion of the safety effects of various conditions related to elementary and high school transportation, including but not limited to: bus stops, use of the “walking bus”, special signage, the presence of crossing guards, traffic calming devices, school zone enforcement, and presence of sidewalks. Potential resources are listed in Exhibit 3-135.

Exhibit 3-135: Potential resources on safety of school routes and school zones

DOCUMENT
(Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Collisions Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))

(Weiss, A. and Schifer, J. L., "Assessment of Variable Speed Limit Implementation Issues." NCHRP 3-59, Washington, D.C., Transportation Research Board, National Research Council, (2001))
(Cairney, P., "Pedestrian Safety in Australia." FHWA-RD-99-093, McLean, Va., Federal Highway Administration, (1999))
(Davies, D. G., "Research, Development and Implementation of Pedestrian Safety Facilities in the United Kingdom." FHWA-RD-99-089, McLean, Va., Federal Highway Administration, (1999))
(Leaf, W. A. and Preusser, D. F., "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups." DOT HS 908 021, Washington, D.C., National Highway Traffic Safety Administration, (1999))

3.3.6. Weather Issues [Future Edition]

The safety implications of weather issues on pedestrians and bicyclists may be discussed in this section in future editions of the HSM. Discussion of snow/slush/ice control may be of interest on sidewalks, crosswalks, and paths. This section will add to the discussion of Section 3.4. Potential resources are listed in Exhibit 3-136.

Exhibit 3-136: Potential resources on weather issues and pedestrian and bicycle safety on segments

DOCUMENT
(Leaf, W. A. and Preusser, D. F., "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups." DOT HS 908 021, Washington, D.C., National Highway Traffic Safety Administration, (1999))

3.4. Safety Effects of Other Roadway Segment Elements

Other roadway segment elements include illumination, access points, transit stops, weather, pavement materials, and wild animals. The safety effect of characteristics contained in these elements will be addressed in the following sections.

3.4.1. Highway Illumination

Artificial illumination is often provided on road segments in urban and suburban areas, and also at locations in rural settings where drivers may need to make a decision.

This section presents evidence regarding the safety effect of public lighting on roadway segments. This refers to the introduction of lighting on highways that were not previously illuminated.

The reader may wish to review Section 2.4, Human Factors in Road Safety, for a discussion on conspicuity and lighting.

A meta-analysis of 37 evaluation studies containing 142 estimates of effect has been reported by Elvik (1995) (*160*). This analysis serves as the main source of evidence used in this section. The analysis has been updated by adding the studies of Griffith (1994) (*161*), Preston (1999) (*162*) and Wanvik (2004), the latter subject to a re-analysis by Elvik (2004) (*8*).This brings the total number of studies to 40 and the total number of estimates of effect to 152. This includes estimates of the effects of illumination both on highway segments and at intersections. Most studies do not specify whether the estimates of effect refer to highway segments only or

include intersections as well. It was therefore decided to make use of all available evidence. State-of-the-art techniques of meta-analysis have been applied to summarize evidence from these studies.

Studies have been classified in three groups according to study quality. Studies rated as high quality include studies using both an internal and external comparison group (the distinction between external and internal comparison is explained below) and matched case-control studies. Studies rated as medium quality include studies that provide data on traffic volumes in addition to accident data, and studies using an external comparison group only. Studies rated as low quality include studies that use only an internal comparison group and simple (as opposed to matched) case-control studies. Most studies, representing 74% of the estimates of effect, have been rated as low quality. Standard errors have been adjusted by a factor of 1.2 in high quality studies (all study designs), 2 in medium quality before-and-after studies, and 3 in low quality before-and-after studies. In case-control or cross-section studies, standard errors were adjusted by a factor of 3 in medium quality studies and a factor of 5 in low quality studies.

An internal comparison group refers to the use of daytime accidents as a comparison group when estimating the effect on lighting. As an example, suppose there were 80 accidents in daytime and 55 in darkness at a location before lighting was installed. Further, suppose the number of accidents in daytime increased to 84 and the number of accidents in darkness declined to 39 after lighting was installed. The effect would then be estimated to be: (39/55)/(84/80) = 0.675.

This study design does not control for two potential confounding factors: (1) Long-term trends in the proportion of accidents occurring in darkness, and (2) Regression-to-the-mean, in particular with respect to an abnormally high proportion of accidents in darkness. To some extent, both these confounding factors can be controlled for by using an external comparison group, i.e. highway sections where lighting has not been installed. Suppose, for example, that for comparison roadway segments where lighting was not installed, the following numbers were observed during before and after periods matching the location above where lighting was installed: daytime before = 112; daytime after = 119; darkness before = 58; darkness after = 54. Then, in the comparison group, the odds ratio would be: (54/58)/(119/112) = 0.876. The adjusted estimate of effect (ratio of odds ratios) would be: 0.675/0.876 = 0.771.

Exhibit 3-137: Resources examined to investigate the safety effect of illumination on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D.L., R. Srinivasan, J. Baek, B. Persaud, C. Lyon, F.M. Council, K. Eccles, N. Lefler, F. Gross, E. Hauer, J. Bonneson, "Crash Reduction Factors for Traffic Engineering and ITS Improvements", NCHRP Project 17-25 Final Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2008))	Researched and/or developed AMF values for a number of roadway segment treatments including providing highway lighting along all roadway settings	Added to synthesis. Includes AMF.
(Campbell, B. J, Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	An overview of research studies on pedestrian safety, and this particular report is an update of two earlier reports	No new information. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Collisions Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies aimed at reducing crashes involving older drivers.	No AMFs. Not added to synthesis.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Synthesis of a variety of reports on the reduction of crashes on horizontal curves	No AMFs. Not added to synthesis.
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of many treatments, including illumination. Reanalysis of Wanvik (2004).	Added to synthesis.
(Wanvik, P.O., "En undersøkelse av sammenhengen mellom vegbelysning og trafikkulykker på 35 strekninger i Region sør", Statens vegvesen, Region sør, Drammen (2004))	Added to Elvik and Vaa's metanalysis.	Added to synthesis.
(Sullivan, J. M. and Flannagan, M. J., "The Role of Ambient Light Level in Fatal Crashes: Inferences from Daylight Saving Time Transitions." Accident Analysis and Prevention, Vol. 34, No. 4, Oxford, N.Y., Pergamon Press, (2002) pp. 487-498.)	Three specific countermeasures were tested against each other in a single scenario that would be reasonable match to each	Does not address the effects of lighting. Not added to synthesis.
Yi, Ping.; John, L. J.; Dissanayake, S.; and Zang, Y. Impact of highway Illumination on Traffic Fatality in Various Roadway and Environmental Conditions. Transportation Research Record, TRB, National Research Council, Washington, D.C., 2002	This study compares collisions in lighted and unlighted conditions by evaluating the interaction of roadway, traffic, weather conditions and age of driver at the time of collisions. The two-way ANOVA technique was used to evaluate the interactions.	No safety effects reported. Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Compilation of data including safety, geometric, and traffic with a broad range of suggested countermeasures	Too few details to be included in meta-analysis.
(Leaf, W. A. and Preusser, D. F., "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups." DOT HS 908 021, Washington, D.C., National Highway Traffic Safety Administration, (1999))	Review of existing literature and data sets to determine the relationship between speed and resulting pedestrian injury	No AMFs. Not added to synthesis.
(*162*) (Preston, H. and Schoenecker, T., "Safety Impacts of Street Lighting at Rural Intersections." 1999, St. Paul, Minnesota Department of Transportation, (1999))	Conducted both a cross-sectional study (3,400 intersections) and a before-and-after analysis (12 intersections) of the effect of street lighting on rural intersection safety	Suggested by 17-18(4). Added to synthesis.
(*160*) (Elvik, R., "Meta-Analysis of Evaluations of Public Lighting as Accident Countermeasure." Transportation Research Record 1485, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 112-123.)	Meta-analysis of 37 studies on the safety effect of illumination; illumination of various types of roadway segments included	Suggested by 17-18(4). Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*161*) (Griffith, M. S., "Comparison of the Safety of Lighting Options on Urban Freeways." Public Roads, Vol. 58, No. 2, McLean, Va., Federal Highway Administration, (1994) pp. 8-15.)	Used crash data to compare the safety of continuously lighted urban freeways and urban freeways with interchange lighting only	Suggested by 17-18(4). Added to synthesis.
(Cirillo, J. A., "Safety Effectiveness of Highway Design Features: Volume I - Access Control." FHWA-RD-91-044, Washington, D.C., Federal Highway Administration, (1992))	A literature review and discussion on the basic findings which relate access control to the safety of a highway facility	Not relevant to this section. Not added to synthesis.
(Keck, M. E., "The Relationship of Fixed and Vehicular Lighting to Accidents." FHWA-SA-91-019, McLean, Va., Federal Highway Administration, (1991))	Synthesis of research results covering a period from 1979 to 1988	Refers to Richards (1981) included in Elvik (1995). Not added to synthesis.
(Box, P. C., "Major Road Accident Reduction by Illumination." Transportation Research Record 1247, Washington, D.C., Transportation Research Board, National Research Council, (1989) pp. 32-38.)	Before and after study on the effect on crashes of illumination at one site, 2.8 km in length	Suggested by 17-18(4). Used in Elvik (1995) meta-analysis.
(Mueller, E. A. and Rankin, W. W., "Pedestrians." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 8, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	A synthesis of research findings on the safety effects of specific traffic control measures and roadway elements	Reviewed and included in Elvik (1995). Not added to synthesis.
(Cleveland, D. E., "Illumination." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 3, Washington, D.C., Automotive Safety Foundation, (1969))	A synthesis of research findings on the safety effects of special design and control features	Reviewed and included in Elvik (1995). Not added to synthesis.

Exhibit 3-138 shows summary estimates of the effects of lighting on accidents. Effects are stated as odds ratios. Uncertainty in summary estimates of effect is stated as adjusted standard error. All estimates of effect refer to accidents in darkness only.

Two sets of summary estimates of effect are presented in Exhibit 3-138. The first is based on conventional meta-analysis. The second set has been generated from coefficients estimated in meta-regression analysis. In theory, the meta-regression estimates are superior to the conventional summary estimates, since they control for more confounding factors or imbalance in the distribution of estimates across moderator variables (a moderator variable is any variable that influences the size of the effect of a measure on accidents).

Only estimates that specify accident severity have been used. Estimates referring to “all” accidents, which is usually a mixture of fatal, injury and property-damage-only accidents have been discarded. The number of estimates underlying each summary estimate is stated in parentheses.

All summary estimates of effect, both those based on the conventional meta-analysis and those based on meta-regression, indicate that illumination reduces the number of accidents. There is a very systematic pattern in summary estimates of effect: the largest effect is found for fatal accidents, the smallest effect is found for property damage only accidents. There is little variation in effect between various types of traffic environment (e.g., rural, urban). This applies both to the conventional summary estimates and to the summary estimates based on meta-regression. It is therefore clear that illumination reduces the number of accidents in darkness, in particular fatal accidents.

Some of the conventional summary estimates are based on very few estimates of effect. These summary estimates have large standard errors. In subsets that contain few estimates of effect, the standard errors are smaller for the meta-regression summary estimates than for the conventional summary estimates. The meta-regression summary estimates indicate larger effects on accidents in nearly all cases than the conventional summary estimates. The reasons for this are not clear. It is a bit surprising, since the effects attributed to road safety measures often tend to get smaller the more confounding or contextual variables a study controls for. In this case, the opposite pattern is found (Exhibit 3-138).

Exhibit 3-138: Summary estimates of the effects on accidents of public lighting

		Summary estimate of effect and standard error	
Traffic environment	**Accident severity**	**Summary estimate**	**Standard error**
Summary estimates based on conventional meta-analysis			
All types of highway	All types, Fatal (18)	0.313	0.361
	All types, Injury (85)	0.717	0.056
	All types, PDO (19)	0.825	0.072
Rural highways	All types, Fatal (2)	0.265	0.720
	All types, Injury (19)	0.802	0.124
	All types, PDO (1)	0.696	0.426
Urban highways	All types, Fatal (13)	0.365	0.515
	All types, Injury (46)	0.685	0.073
	All types, PDO (16)	0.840	0.075
Freeways	All types, Fatal (3)	0.274	0.712
	All types, Injury (20)	0.728	0.121
	All types, PDO (2)	0.678	0.256
Summary estimates based on meta-regression analysis			
All types of highway	All types, Fatal	0.261	0.285
	All types, Injury	0.577	0.208
	All types, PDO	0.590	0.217
Rural highways	All types, Fatal	0.269	0.273
	All types, Injury	0.594	0.192
	All types, PDO	0.607	0.202

Urban highways	All types, Fatal	0.260	0.257
Summary estimates based on meta-regression analysis			
	All types, Injury	0.576	0.169
	All types, PDO	0.589	0.180
Freeways	All types, Fatal	0.253	0.269
	All types, Injury	0.559	0.187
	All types, PDO	0.572	0.197

NOTE: The number of estimates underlying each summary estimate is stated in parentheses.

The meta-regression analysis shows that the differences in effects of illumination between different types of highways are minor and far from statistically significant. Hence, differentiating estimates of effect with respect to the type of highway does not seem to be justified. Therefore the use of the same values for the safety effects of illumination on all types of highway seems reasonable.

Harkey et al. (2008) conducted an additional meta-analysis and, in conjunction with the findings of an expert panel, developed AMF values for roadway segment lighting (*168*). The meta-analysis utilized data from 38 previous studies to determine results according to crash severity and time of day. The expert panel believed that the AMFs were best presented in a combined fashion for all injury accidents. The resulting AMFs are presented in Exhibit 3-139.

Exhibit 3-139*: Summary estimates of the effects on accidents of public lighting by severity and time of day (168)*

Nighttime Crashes	**AMF**
Total Crashes	0.80
All Injury Crashes	0.77
All Crashes	**AMF**
Total Crashes	0.94
All Injury Crashes	0.94

3.4.2. Increase Pavement Friction

Increasing the road surface pavement friction is often provided along roadway segments in response to both a high proportion of wet-road accidents and low friction numbers (*168*). Treatments involving a 1.5 in resurfacing or a 0.5 in microsurfacing using non-carbonate aggregates can be used to improve the pavement skid resistance. This section discusses the safety effect of increasing the pavement friction on roadway segments.

Exhibit 3-140: Resources examined to investigate the safety effect of increased pavement friction on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(Harkey, D.L., R. Srinivasan, J. Baek, B. Persaud, C. Lyon, F.M. Council, K. Eccles, N. Lefler, F. Gross, E. Hauer, J. Bonneson, "Crash Reduction Factors for Traffic Engineering and ITS Improvements", NCHRP Project 17-25 Final Report, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2008))	Researched and/or developed AMF values for a number of roadway segment treatments including increasing pavement friction.	Added new AMFs.

Treatment: Increase pavement friction

Rural two-lane roads, rural divided multilane highways, urban arterials, and suburban arterials

Harkey et al. (2008) conducted a reanalysis of data provided from a previous study from the NYDOT involving an examination of the safety impacts of improving pavement skid resistance *(168)*. An empirical Bayes before-after analysis was conducted on the data which included 36.3 miles (118 segments) and 1242.4 miles (2108 segments) of treated and untreated locations, respectively. Sites that were treated exhibited both a high proportion of wet-road accidents and low friction numbers (i.e., below the Programmatic Design Target Friction Number, FN40R of 32). The results generally showed statistically significant reductions in crashes for all roadway and crash types. Intuitive thinking was confirmed, that the greatest benefit was found on wet weather crashes. The notable exception to these general trends was found on two-lane rural roads where no significant change was found. The resulting AMFs are found in Exhibit 3-141.

Exhibit 3-141*: AMFs on increased pavement friction for roadway segments (168)*

Accident type Severity	AMF	Std. Error
All types All severities	**0.76**	**0.03**
Wet-road All severities	**0.43**	**0.03**
Rear-end All severities	**0.83**	**0.05**
Rear-end wet-road All severities	**0.58**	**0.07**
Single vehicle All severities	**0.70**	**0.05**

3.4.3. Access Points

Within the context of the HSM, a roadway segment is defined as the road between two major intersections and may include minor intersections and driveways. As Hauer points out, the prevailing belief is that traffic flow and access are the two main determinants of the safety of a road (*163*). Control of access spacing and density is critical because ensuring that intersections/driveways are not in the areas of influence of other intersections/driveways essentially separates conflict points and makes it easier for drivers to react and respond to traffic conflicts.

This section addresses the safety effect of access density or number of access points per unit length of road on roadway segments. Consideration is given to the road class, function of the road, and traffic control method.

In future editions of the HSM, this section may contain specific driveway-related issues, such as access density, conflict points, and limiting entrances to right in-right out; sight triangles and obstructions to view; alignment of the corridor and time to view oncoming traffic; the number of lanes to cross, median treatment, etc. This section would not subtract or repeat driveway knowledge from related sections, such as Section 6.5.

The safety impact of providing turn lanes for midblock access points may also be included here, and may include discussion of both right and left-turn lanes provided for private driveways. Some elements that may be addressed are: high volumes, signage, sight lines, acceleration/deceleration lanes, traffic control (unsignalized), pavement markings, curbs, medians, pedestrian, and bicycle-related safety effects when installing the midblock turn lanes.

The reader may wish to review related material presented in Chapter 4 and Chapter 7.

Exhibit 3-142: Resources examined to investigate the safety effect of access points and roadway segments on road networks

DOCUMENT	DESCRIPTION	COMMENT
(Fitzpatrick, K., E.S. Park, W.H. Schneider, "Potential Driveway Density Accident Modification Factors for Rural Highways Using Texas Data", Transportation Research Board 87th Annual Meeting, Washington D.C., (2008))	Negative binomial regression analysis of two- and four-lane rural roads in Texas. Results of analysis were used to create models representing the effect of driveway density on crashes for roadway segments.	Added to synthesis. AMFs quantify safety effects of access point density.
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis. t and s values calculated using available information.
(*163*) (Hauer, E., "Access and Safety." (2001))	Report is a critical review of previous research studies that investigated the safety effects of intersection spacing and driveway density	Added to synthesis. AMFs to quantify safety effects of changing intersection and driveway densities found.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways through a review of previous studies.	Not added to synthesis. Only generic information on access management found.

DOCUMENT	DESCRIPTION	COMMENT
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000)).	Identified the relationship between access point density and safety. Access point density is accounted for by the density of driveways on a roadway segment. For the base model, 3 driveways per kilometer (5 driveways per mile) was the nominal condition. This can be modified with a crash reduction factor that combines driveway density and ADT. As the density increases over five driveways per mile, the crash risk increases. For segments with less than the five driveways per mile, the crash risk decreases.	Not added to synthesis. AMF for driveway density is based on research by Muskaug (1985) which has already been incorporated into synthesis as part of meta-analysis by Elvik and Vaa (2004).
(*164*) (Gluck, J., Levinson, H. S., and Stover, V., "NCHRP Report 420: Impact of Access Management Techniques." Washington, D.C., Transportation Research Board, National Research Council, (1999))	Provides the results of numerous research studies on the safety impacts of various access management techniques	Added to synthesis. Information about changes in accident rates resulting from changes in signalized and unsignalized access-point densities added.
(Papayannoulis, V., Gluck, J. S., Feeney, K., and Levinson H.S., "Access Spacing and Traffic Safety." Dallas, Tex., Transportation Research Board Urban Street Symposium, (1999))	Reviews studies that relate safety to access spacing. Conducted analyses of crash data and access spacing; data from eight states; urban and rural analyzed separately	Not added to synthesis. Results from this study already incorporated into synthesis as part of review from a more recent reference by same authors (Gluck et al., 1999)
Gattis, L. J.; and Blackwell, Mack. Comparison of Delay and Accidents on Three Roadway Access Designs in a Small City. National Conference on Access Management, 1999.	This study examined safety issues with respect to traffic delay times and access density. The study didn't estimate any safety effect for access density or travel delay.	Not added to synthesis.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	Synopsis of a number of safety topics and only includes generic (anecdotal) statements about there being higher accident rates associated with higher access point densities. These trends have already been well established and discussed at length in this synthesis.	Not added to synthesis. No quantified evidence was found.
(*38*) (Gattis, J. L., "Comparison of Delay and Accidents on Three Roadway Access Designs in a Small City." Vail, Colo., Transportation Research Board 2nd National Conference, (1996) pp. 269-275.)	Compared crash rates of three corridors with various types of access management.	Added to synthesis. Quantitative information on types of access control found. Insufficient data to determine t and s values.
(Lall, B. K., Eghtedari, A., Simons, T., Taylor, P., and Reynolds, T., "Analysis of Traffic Accidents within the Functional Area of Intersections and Driveways." TRANS-1-95, Portland, Ore., Portland State University, Department of Civil Engineering, (1995))	Analyzed 29 miles of Oregon Coast Highway; considered effect of driveways within the functional area of both urban and rural intersections. Limitations of the study with regards to the sample size (which affected the standard error values) and potential influence of confounding factors which have not been accounted for.	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(McGuirk, W. W. and Satterly, G. T., "Evaluation of Factors Influencing Driveway Accidents." Transportation Research Record 601, Washington, D.C., Transportation Research Board, National Research Council, (1976) pp. 66-72.)	Study investigated the factors that influence driveway accidents through the development of various regression equations.	Not added to synthesis. Regression equations developed cannot be used to determine t and s values. Other anecdotal findings have already been incorporated in synthesis as part of review of other references.
(Box, P. C., "Driveways." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 5, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Chapter discusses the relationship between accidents and driveways / access management.	Not added to synthesis. Insufficient data to determine t and s values. Majority of anecdotal information or discussions have already been incorporated from review of more recent references.

According to Hauer, considerations for intersection spacing are traditionally governed by considerations of delay, signal coordination, signal timing and a myriad of other operational elements. Hauer further noted that as the number of access points (i.e., signalized/unsignalized intersections and driveways) increases, so does the number of accidents (*163*). This finding is not new and many studies in the past forty years have shown that accident rates generally rise with the increased frequency of driveways and intersections. The basic premise underlying this finding is that access points introduce conflicts and friction into the traffic stream (*164*).

For example, suppose that one driveway causes (A) accidents/year. A one mile segment with (B) driveways will then have:

$$Y=A\times B \text{ accidents/year} \quad (1)$$

And a driveway spacing of:

$$X=1/B \text{ miles} \quad (2)$$

Substituting for B into (1):

$$Y=A/X$$

This shows that as driveway spacing (X) increases, the expected frequency of accidents (Y) diminishes. It follows by logic from the premise that each driveway causes some fixed number of accidents. Thus, the predominant issue is not how (Y) changes as a function of driveway density or spacing but how many accidents each driveway adds. The number of accidents caused by each driveway (A) would be a function of a number of variables including the traffic volume on the main road, the number of lanes and the amount of driveway traffic.

Treatment: Control of unsignalized intersection and driveway spacing

Rural two-lane roads

Hauer reviewed a number of studies that examined the safety impact of changing access-point density on two-lane rural roads. Hauer found that, consistent with results from many

previous research studies, the number of accidents on roadway segments generally increases as the density of access points for that roadway increases (*163*).

Using available data for two-lane rural roads from Transportation Research Circular 456, Hauer analyzed the accident rates and traffic volumes and concluded that based on the data, the AMF for access point densities can be represented by Equation 3-15. There was insufficient information to determine the corresponding standard error for the AMF equation.

Equation 3-15: Accident Modification Factor for access point (intersection and driveway) density (163)

$$AMF = \frac{(1.199 + 0.0047X_{after} + 0.0024X^2_{after})}{(1.199 + 0.0047X_{before} + 0.0024X^2_{before})}$$

where X is "Access Points/Mile".

Another more recent study cited by Hauer was conducted by Miaou (1996) who developed regression equations to estimate single-vehicle, off-the-road accidents resulting from changes to intersection or driveway densities on two-lane, undivided rural roads (*163*). Using results from the research study by Miaou, Hauer determined that a change in intersection densities from x to y intersections/mile on such roads resulted in the AMF shown in Equation 3-16. Similarly, a change in driveway densities from a to b driveways/mile on such roads resulted in the AMF shown in Equation 3-17. There was insufficient information to determine the functions to express the corresponding standard errors for both these AMF equations.

Equation 3-16: Accident Modification Factor for Single-vehicle, off-the-road accidents due to changes in intersection density (163)

$$AMF = e^{0.041(y-x)}$$

where x and y are expressed in intersections/mile

Equation 3-17: Accident Modification Factor for single-vehicle, off-the-road accidents due to changes in driveway density (163)

$$AMF = e^{0.010(b-a)}$$

where a and b are expressed in driveways/mile

In another similar study, Miaou re-analyzed data from a 1987 study by Zegeer et al., and using the results from this re-analysis, Hauer found that the AMF for total accidents following an increase in driveway densities assumes the form shown in Equation 3-18. There was insufficient information to determine the functions to express the corresponding standard errors for both these AMF equations.

Equation 3-18: Accident Modification Factor for total accidents due to changes in driveway density (163)

$$AMF = e^{0.0213(b-a)}$$

where a and b are expressed in driveways/mile

Hauer examined a study by Vogt and Bared that developed regression equations to estimate total accidents on roadway segments and remarked that an increase in driveway density from a driveways/mile to b driveways/mile resulted in an AMF values ranging from $e^{0.008}$ to $e^{0.012}$ (*163*). Using the final combined regression coefficient as reported in the original study, the AMF then assumes the form shown in Equation 3-19. The corresponding standard error value could not be calculated for this AMF as the necessary information was not available.

Equation 3-19: Accident Modification Factor for total accidents due to changes in driveway density (163)

$$AMF = e^{0.0084(b-a)}$$

where a and b are expressed in driveways/mile

Fitzpatrick et al. (2008) developed AMF values for driveway density along two-lane rural roads using data from Texas (*173*). For their study, 2,345 centerline miles were available and the baseline condition was set at 3 driveways per mile. Using negative binomial regression on three years of crash data, models were developed to represent the resulting effect of driveway density on crashes as shown in Equation 3-20.

Equation 3-20*: Accident Modification Factor for total accidents due to changes in driveway density (173)*

$$AMF = e^{0.0232(DD-base)}$$

where: DD = driveway/mile

base = base number of driveways (assumed at 3 driveways/mile)

Driveway density, lane width, shoulder width, segment length, and ADT were all variables considered in the development of this model.

Rural multi-lane highways

Fitzpatrick et al. (2008) also developed an AMF model for access density for rural four-lane highways *(173)*. The dataset used in the development included 402 centerline miles of roadway. The negative binomial regression produced the model shown in Equation 3-21.

Equation 3-21*: Accident Modification Factor for total accidents due to changes in driveway density (173)*

$$AMF = ((e^{0.0481(DD-base)})-1)*0.08+1$$

where: DD = driveway/mile

base = base number of driveways (assumed at 3 driveways/mile)

Median type, driveway density, lane width, shoulder width, segment length, and ADT were all variables considered in the development of this model.

Urban and suburban arterials

According to Gluck et al., accident rates rise with the increasing density of access points such as driveways and intersections (*164*). This trend is clearly illustrated in the accident rates derived by the authors for roadway segments with varying intersection and driveway densities as

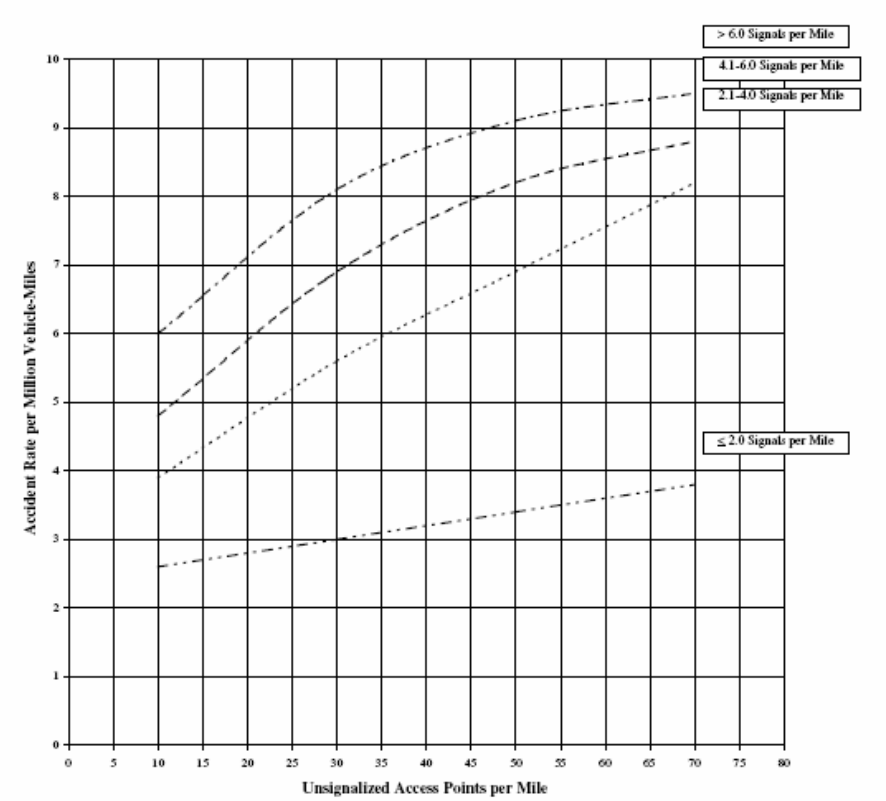
summarized in Exhibit 3-143. Although these accident rates are highly dependent on a number of other significant factors such as road geometry (e.g., lane width and presence or absence of turn lanes and physical medians), operating speeds, and driveway and intersection traffic volumes, increasing the spacing between access points and providing greater separations of conflicts will reduce the number and variety of events to which drivers must respond, thereby leading to a decrease in the potential number of overall crashes.

Exhibit 3-143: Accident rates (accidents per MVMT) by access density (164)

Unsignalized Access Points per Mile	Signalized Access Points per Mile			
	< 2.00	2.01 - 4.00	4.01 - 6.00	> 6.00
≤ 20	2.6	3.9	4.8	6.0
20.01 - 40.00	3.0	5.6	6.9	8.1
40.01 - 60.00	3.4	6.9	8.2	9.1
> 60	3.8	8.2	8.7	9.5
All	3.1	6.5	7.5	8.9

Using the results from their analysis, Gluck et al. developed functions to represent the accident rates for various access density conditions in urban and suburban areas. These functions are illustrated in Exhibit 3-144. Gluck et al. cautioned that the rates in Exhibit 3-144 may only be used to estimate the changes associated with increasing unsignalized access density at any given signal density (driveways to single-family residences should be excluded). The figure in Exhibit 3-144 cannot be used to estimate the effects of adding signals. This is because in deriving the rates, the authors used signal density as a surrogate for cross-street traffic. Following the development of the functions, Gluck et al. then devised a methodology to estimate a new accident rate for a given roadway following a change to its access density. This was achieved using Equation 3-22.

Exhibit 3-144: Estimated accident rates (Accidents per MVMT) by access density for urban/suburban areas (164)



Equation 3-22: Method to calculate accident rate (per MVMT) following changes to unsignalized access density (164)

$$\text{Projected Accident Rate} = \text{Existing Accident Rate} \times \frac{R_2}{R_1}$$

where:
R_1 is the base accident rate under prevailing access-point density conditions;
and R_2 is the base accident rate for the new access-point density conditions

As an example, assuming that a given roadway with 3 signalized intersections per mile and 18 driveways per mile has an accident rate of 7.0 accidents per MVMT. If additional driveways are added to that roadway, resulting in an increase in the unsignalized access-point density from 18 driveways per mile to 30 driveways per mile, R1 and R2 values for the base access-point density conditions are extracted from Exhibit 3-144 and the projected accident rate would be:

Projected Accident Rate	=	Existing Accident Rate	x	$\frac{R_2}{R_1}$
	=	7.0	x	$\frac{5.6}{4.5}$
	=	8.7 acc/million VMT		

In essence, the R_2/R_1 ratio is analogous to the concept of AMFs as defined in this Manual. As such, the AMF values for changes to unsignalized access point densities can be directly extracted from Exhibit 3-144. There is insufficient information to determine the corresponding standard error values.

Elvik and Vaa conducted a meta-analysis of a number of studies related to the removal of private access points and driveways on urban arterials and collectors, and found that this treatment significantly reduces the number of injury accidents, regardless of the original driveway density (pg 489, (*8*)). Traffic volumes were not provided. The results from the meta-analysis are summarized in Exhibit 3-145. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 3-145: Safety effectiveness of reducing private driveway densities on roadway segments(8)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Reducing private driveways per km road from 30 to 16-30	Urban	Arterials, volume not reported	All types, Injury	0.71	0.04
Elvik and Vaa, 2004	Reducing private driveways per km road from 16-30 to 6-15	Urban	Arterials, volume not reported	All types, Injury	0.69	0.02
Elvik and Vaa, 2004	Reducing private driveways per km road from 6-15 to under 6	Urban	Arterials, volume not reported	All types, Injury	0.75	0.03

Treatment: Reduce number of median crossings and intersections

Urban and suburban arterials

Gattis compared accident rates at three similar and adjacent urban roadway segments with differing access controls in place (*38*). The roadway segment with the least access control had a high density of driveways, intersecting streets and median openings; the roadway segment with a moderate level of access control had frontage roads running parallel with the main roadway segment and fewer cross streets; and the roadway segment with the highest level of access control had few median openings, driveways, and cross streets.

Gattis reported that the roadway segment with the highest level of access control also had the lowest non-intersection and intersection, angle and sideswipe accident rates but the highest intersection and non-intersection rear-end accident rates. According to Gattis, the roadway segment with the highest level of access control had PDO accident rates about half that of the other two roadway segments, and total and injury accident rates that were about forty percent less than those of the other two segments. The number of accidents and the accident rates were not provided in the study.

Rural two-lane roads; Rural multi-lane highways; Expressways

No studies found.

3.4.4. Transit Stop Placement [Future Edition]

As defined in Highway Capacity Manual (*1*), a midblock transit stop is a transit stop located at a point away from intersections.

In future editions of the HSM, this section may discuss the safety effect of various midblock transit stop placements on segments in relation to other design and operational elements (e.g., horizontal, vertical alignment, shoulder width, etc.). Potential resources are listed in Exhibit 3-146.

Exhibit 3-146: Potential resources on the relationship between transit stop placement and safety

DOCUMENT
Campbell, B. J, Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004)

3.4.5. Weather Issues

Although the weather cannot be controlled, measures to mitigate inclement weather and the resulting impact on the roadway are discussed in the following sections. Topics include adverse weather and low visibility warning systems, snow, slush and ice control, and wet pavement.

3.4.5.1. Adverse Weather and Low Visibility Warning Systems

Some transportation agencies employ advanced highway weather information systems that warn drivers of the occurrence of adverse weather, including icy conditions, or low visibility.

These systems may include on-road systems such as flashing lights, changeable message signs, static signs (e.g., “snow belt area”, “heavy fog area”), or in vehicle information systems.

Adverse weather and low visibility warning systems often rely on modern detection technology or advanced weather observations. Warnings may be given in the form of variable message signs, radio messages, or in extreme cases, temporary closing of the road. Systems warning of adverse weather or reduced visibility are most commonly used on freeways or on roads passing through mountains or other locations that may experience unusually severe weather. These systems tend to be less used on urban highways and on ordinary rural two-lane highways.

On certain mountain passes, for example in Norway, assisted platoon driving is used during heavy snowfall. Cars are stopped before entering the mountain pass. A snowplowing truck then drives first and all cars follow behind in a single platoon. Without the assistance given by the leading truck, it may be almost impossible even to see the road in heavy snowfall, which tends to go together with high winds. Visibility in this kind of weather is almost zero, as literally everything becomes white and no contours or contrasts are visible.

Dense fog presents similar problems. In dense fog, all reference points that are used for lane keeping and speed choice disappear. Traffic congestion in dense fog can be very hazardous, as cars that are moving slowly or have stopped due to congestion tend to come as a surprise. It is in dense fog on freeways that crashes involving 50 or 100 cars can occur. Crashes involving so many cars are less likely to occur when visibility is good.

The topic of this section is the safety effects of adverse weather and low visibility warning systems. Information was found only for fog warning systems, and this information may benefit from additional research.

In future editions of the HSM, this section may include information on the following treatments:

- Warnings of high winds, possibly combined with temporary speed limits
- Warnings of heavy snowfall, possibly combined with assisted platoon driving
- Warnings of slippery roads, caused for example by freezing rain
- Warning of roadway icing, particularly on bridges

Studies that have evaluated the effects of systems that warn drivers of adverse weather or low visibility have been identified in the Handbook of Road Safety Measures (Elvik and Vaa 2004) (*8*). A search of the TRANSPORT database was performed to identify the most recently published studies. Using “low visibility and road safety” as search terms, no studies were identified. Five studies concerning adverse weather and road safety were identified:

- Janoff, Davit and Rosenbaum 1982 (United States, fog warning signs)
- Edwards 1996 (Great Britain, weather related accidents)
- Hogema, van der Horst and van Nifterick 1996 (Netherlands, fog warning signs)
- Vaa 1998 (Norway, ice warning system)
- Carson and Mannering 2001 (United States, ice warning signs)

The reports of Janoff et al. and Hogema et al. state the effects of fog warning signs on the number of accidents in fog. The paper by Edwards does not describe the effects of warning devices, but deals with the importance of adverse weather in contributing to accidents. The report by Vaa was a technical feasibility study of an ice warning system, concluding that the system

tested was not sufficiently reliable to be used. Carson and Mannering evaluated ice warning signs, but merely state that no statistically significant effects were found, without providing more details. Thus, only the studies of Janoff et al. and Hogema et al. provide evidence on the safety effects of warning systems.

Exhibit 3-147: Resources examined to investigate the safety effect of adverse weather and low visibility warning systems on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
NCHRP Project 17-28 "Pavement Marking Materials and Markers: Safety Impact and Cost-Effectiveness" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-28	On-going project.	Results not applicable. Not added to synthesis.
(Carson, J. and Mannering, F., "The Effect of Ice Warning Signs on Ice-Accident Frequencies and Severities." Accident Analysis and Prevention, Vol. 33, No. 1, Oxford, N.Y., Pergamon Press, (2001) pp. 99-109.)	Studied the effect of ice warning signs on crash frequency and severity in WA.	Suggested by 17-18(4). Too few details to be included in meta-analysis
(Weiss, A. and Schifer, J. L., "Assessment of Variable Speed Limit Implementation Issues." NCHRP 3-59, Washington, D.C., Transportation Research Board, National Research Council, (2001))	Variable speed limits	Not relevant to this section. Not added to synthesis.
(Kyte, M., Shannon, P., and Kitchener, F., "Idaho Storm Warning System Operational Test." ITD No. IVH9316 (601), Boise, Idaho Transportation Department, (2000))	Evaluated the effect of a Storm Warning System on safety; did not analyze crashes, used speed a surrogate for safety	Suggested by 17-18(4). No accident data, not added to synthesis.
(Vaa, T. Evaluering av system for isvarsling. SINTEF rapport A98558. Trondheim, SINTEF, (1998))	Technical feasibility study of an ice warning system.	Does not describe effects of warning devices. Not added to synthesis.
(Hogema, J. H. and van der Horst, R., "Evaluation of A16 Motorway Fog-Signaling System with Respect to Driving Behavior." Washington, D.C., Transportation Research Board, National Research Council, (1997) pp. 63-67.)	Evaluated the effect of an automatic fog-signaling system on driver behavior in the Netherlands; used surrogate measures for safety	Suggested by 17-18(4). This paper uses surrogate measures for safety; 1996 paper by same authors rely on accident data and was included
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))	A literature review and survey of Canadian jurisdictions, yielded recommendations for non-enforcement speed management measures	No AMFs. Not added to synthesis.
(*166*) (Hogema, J. H., van der Horst, R., and van Nifterick, W., "Evaluation of an automatic fog-warning system." Traffic Engineering and Control, Vol. 37, No. 11, London, United Kingdom, Hemming Information Services, (1996) pp. 629-632.)	Evaluated the effect of an automatic fog-signaling system on driver behavior in the Netherlands.	Added to synthesis.
(Edwards, J., "Weather-related road accidents in England and Wales: A spacial analysis." Journal of Transport Geography 4:201-212. (1996))	Reviewed adverse weather and road safety.	Does not describe effects of warning devices. Not added to synthesis.
(Kulmala, R. and Rama, P., "Safety Evaluation in Practice: Weather Warning Systems." Smart Vehicles Lisse, Netherlands, Swets & Zeitlinger, (1995))	Studied the effect of a Road Weather Warning System in Finland on speed and headway	Suggested by 17-18(4). No accident data. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Office of Technology Applications, "Ice Detection and Highway Weather Information Systems." FHWA-SA-93-053, Washington, D.C., Federal Highway Administration, (1993))	Reports the results of evaluations conducted by 8 states of their ice detection and highway weather information systems; potential for crashes due to icy conditions was one of the aspects evaluated	Suggested by 17-18(4). Limited qualitative information. Not added to synthesis.
(*167*) (Janoff, M. S., Davit, P. S., and Rosenbaum, M. J., "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 11." Adverse Environmental Operations FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Before-and-after study, employing accidents not occurring in fog as comparison group	Added to synthesis.

Treatment: Implement fog warning signs

The findings of the studies of Janoff et al. (1982) and Hogema et al. (1996) have been synthesized. Janoff et al. is a before-and-after study, employing accidents not occurring in fog as a comparison group (*167*). Janoff et al. was rated low for quality and the standard error was adjusted by a factor of 3. Hogema et al. is also a before-and-after study, but the authors employed a comparison group in addition to using non-fog accidents as a comparison (*166*). The study was rated as high quality, and the standard error of the estimate of effect was adjusted by a factor of 1.2.

The summary estimate of effect based on both studies is a reduction in fog accidents of 77% ($t = 0.227$, $s = 1.005$). Although the number of accidents in fog went down by almost 80%, the reduction was not statistically significant and the resulting standard error is quite large. The size of the reduction makes it unlikely, however, that it is entirely attributable to chance variation.

3.4.5.2. Snow, Slush, and Ice Control

It is generally accepted that the presence of snow, slush or ice on the road surface increases the accident rate. By improving the standards of winter maintenance, it may be possible to contain, or ideally speaking, eliminate the increase in accident rate, thus making travel as safe in winter as it is in summer. A number of measures are used to control snow, slush and ice. This section reviews the effects of these measures on road safety. The review is based on an updated version of the meta-analysis reported in Elvik and Vaa's "Handbook of Road Safety Measures" (*8*).

This section discusses the safety effects of measures designed to control snow, slush or ice. First, a discussion of the safety impact of the presence of snow, slush or ice on the roadway surface is presented. Then, the following treatments have been included in the review:

- Snow clearance (plowing)
- Use of sand to improve friction
- Use of salt to prevent snow or ice from forming or from sticking to the road surface
- Use of salt as an accident blackspot measure
- Increasing maintenance preparedness (shorter response time)
- Increasing standards for winter maintenance
- Installing snow screens in areas exposed to snowdrifts

Exhibit 3-148: Resources examined to investigate the safety effect of snow, slush and ice control on roadway segments

DOCUMENT	DESCRIPTION	COMMENT
(*8*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis updated for the purposes of the HSM.	Added to synthesis.
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Synthesis of a variety of reports on the reduction of crashes on horizontal curves.	No new information. Not added to synthesis.
(Khattak, A. J. and Knapp, K. K., "Interstate Highway Crash Injuries During Winter Snow and Non-Snow Events." Washington, D.C, 80th Annual Meeting of the Transportation Research Board, (2001))	Compare crashes and occupant injuries reported on Interstate highways in Iowa during winter snow event periods to winter non-snow event periods; controlled for other factors.	Suggested by 17-18(4). Deals with snow as risk factor; not relevant for this section. Not added to synthesis.
(Friar, S. and Decker, R., "Evaluation of a Fixed Anti-Icing Spray System." Transportation Research Record, No. 1672, Washington, D.C., Transportation Research Board, National Research Council, (1999) pp. 34-41.)	Before and after study of the effect of an anti-icing system on crashes; one location in Utah	Suggested by 17-18(4). Added to meta-analysis of Elvik (2004).
(Gilfillan, G., "Road Safety Benefits Of Liquid Anti-Icing Strategies and Agents." Kamloops, British Columbia, Canada, Insurance Corporation of British Columbia, (1999))	An analysis of three years of historical collision data based on individual roadway test segments	Added to meta-analysis of Elvik (2004).
(Hanbali, R. M., "Criterion for Evaluating the Effectiveness of Winter Road Maintenance on Traffic Safety." Toronto, Ontario, Canada, International Road Federation XIII World Meeting, (1998))	Analyzes the effect of snow and icy conditions and their countermeasures on traffic safety	Suggested by 17-18(4). Not enough data to include in meta-analysis.
(Kulmala, R. and Rama, P., "Safety Evaluation in Practice: Weather Warning Systems." Smart Vehicles Lisse, Netherlands, Swets & Zeitlinger, (1995))	A report based on the implementation of an experimental design at three locations and the capture of the results	No AMFs. Not added to synthesis.
(Savenhed, H., "Relationship Between Winter Road Maintenance and Road Safety." 399A, Swedish National Road and Transport Research Institute (VTI), (1995))	Evaluated the crash risk of before and after winter road maintenance	Suggested by 17-18(4). 1994 VTI-report by same author included in synthesis.
(Sävenhed, H., "Relation between Winter Road Maintenance and Road Safety." Seefeld, Austria, IXth PIARC International Road Congress, (1994))	Evaluated the crash risk of before and after winter road maintenance	Added to meta-analysis of Elvik (2004).
(Alger, R. G., Beckwith, J. P., and Adams, E. E., "Comparison of Liquid and Solid Chemicals for Anti-Icing Applications on Pavements." Transportation Research Record 1442, Washington, D.C., (1994) pp. 162-169.)	Review and summary of the data acquired from tests designed to assess the anti-icing properties of several chemicals that are potential candidates for winter highway maintenance	Not enough data to include in meta-analysis.
(Hanbali, R. M., "Economic Impact of Winter Road Maintenance on Road Users." Transportation Research Record 1442, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 151-161.)	Evaluated the effect on safety of winter road maintenance operations	Suggested by 17-18(4). Not enough data to include in meta-analysis.

Discussion: Safety impact of the presence of snow, slush or ice on the roadway surface

In most jurisdictions, standards have been developed for the use of these measures. A standard may state, for example, that snow should be cleared from the road surface before snow depth exceeds 2 inches (5 cm). Standards for snow clearance very often depend on traffic volume and on the transport function a road serves. The strictest standards typically apply to freeways or arterial roads, whereas no standard at all may have been developed for minor access roads in residential areas. Depending on the intensity of snowfall, a certain standard for maximum snow depth implies a certain maximum response time before snow is cleared. If snow falls very intensely, the response must be quicker than if there are only scattered snowflakes.

Salt, also known as chemical de-icing, is generally used as a preventive measure, to prevent snow from sticking to the road surface. Ideally speaking, salted roads should have a bare road surface throughout the winter. In cold winter climates, this is not feasible, as salt is effective only at temperatures above about 21F (or -6°C).

It is important to distinguish between the short-term effects of snow, slush or ice control and the effects throughout an entire winter season. The difference between short-term and long-term effects can be shown by means of an example.

*Exhibit 3-149: Short term effect of snow clearance at low preparedness (*8*)*

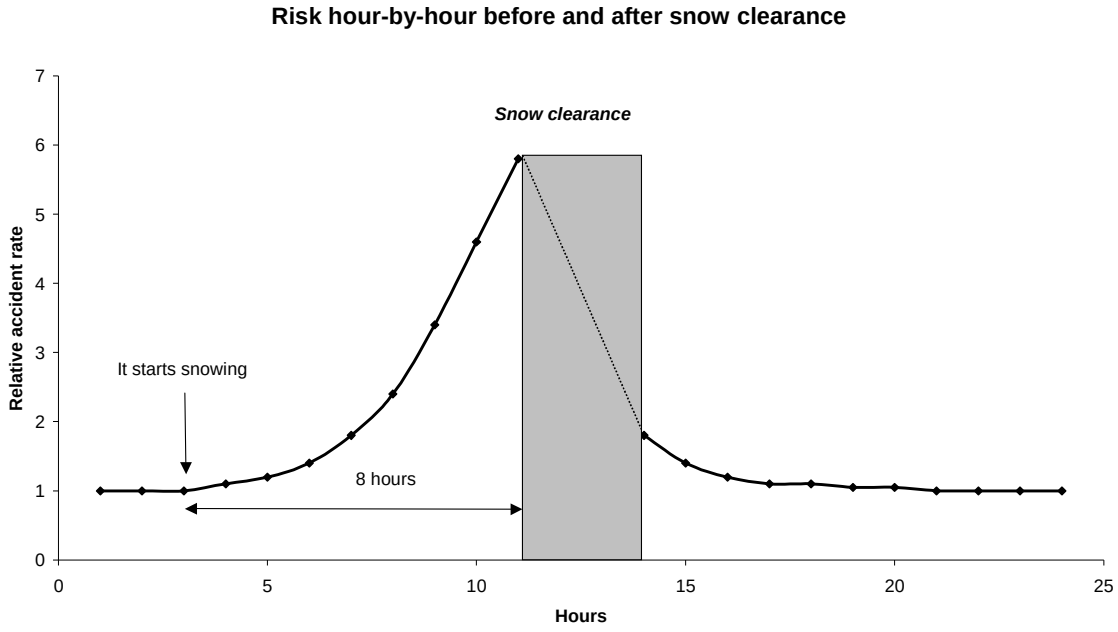
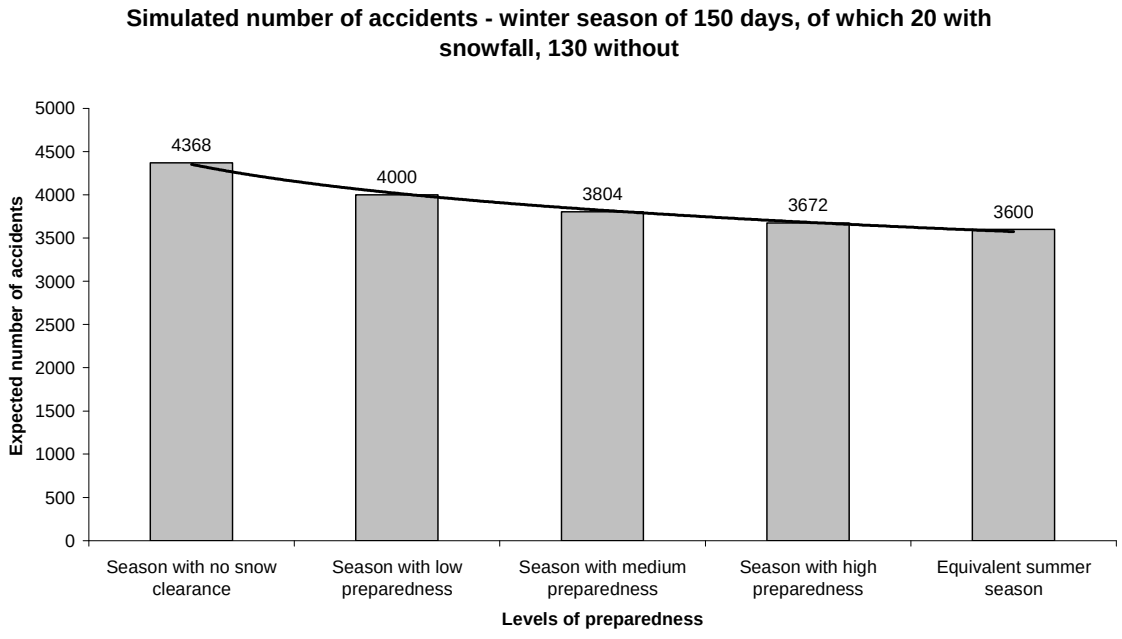


Exhibit 3-149 shows the typical development hour-by-hour in accident rate during snowy weather. As it starts to snow, road surface conditions get worse and the accident rate starts to rise. In the example given in Exhibit 3-149, snow clearance begins eight hours after it starts snowing; this would not be an abnormal delay, for example on a weekend night. Snow is then cleared and the accident rate drops drastically. Traffic wears down whatever snow might be left after clearance, thus bringing the accident rate back to the level before it started to snow. If it is assumed that all hours have the same traffic volume (which is obviously unrealistic for any given day, but perhaps not unrealistic in the long run, as it can start snowing at any time of the day), the effect of snow clearance in Exhibit 3-149 can be estimated as an accident reduction of 49%. The eleven hours before snow clearance have then been compared to the eleven hours after snow clearance. (*8*)

If maintenance crews operate at a higher state of preparedness, they may perhaps start clearing the road of snow after four hours, rather than eight. The rise in accident rate is then broken off at an earlier stage. The effect of snow clearance during the first 11 hours after it was performed, compared to the last 11 hours before, can then be estimated as an 8% accident reduction, again assuming that all hours carry the same amount of traffic. Thus, somewhat counter-intuitively, a high state of preparedness is associated with a smaller estimated short-term effect on accidents than a low state of preparedness. The explanation of this lies in the fact that conditions do not get as bad before action is taken in the state of high preparedness as they do in the state of low preparedness. (*8*)

The effects of different standards of winter maintenance on accidents during the whole winter season are much smaller than the short-term effects. Exhibit 3-150 shows simulated total numbers of accidents for a winter season based on different levels of preparedness, all based on the model presented in Exhibit 3-149.

Exhibit 3-150: Simulated effects of different levels of preparedness in winter maintenance – whole season



In this example, it has been assumed that the winter season lasts for 150 days (defined as days during which temperature drops below freezing (32F, 0°C). There is snowfall on 20 days, and no snow on 130 days. In the example given in Exhibit 3-150, maintaining a high state of preparedness compared to maintaining a low state of preparedness during the whole season is associated with an accident reduction of about 8% (from Exhibit 3-150: high preparedness = 3672 expected accidents, low preparedness = 4000 expected accidents; then 3672/4000 = 0.92). The effects will increase as a function of the duration and severity of the winter season. The longer it lasts, and the more often there is adverse weather, the more important becomes the standard of winter operations for the safety of traffic.

Treatment: Take measures to control snow, slush or ice

All road types

Exhibit 3-151 lists the studies that serve as the basis for the estimates of effect presented in this section. In total, 24 studies containing 188 estimates of effect have been retrieved. The largest number of studies refers to the use of salt. There are 14 studies that have evaluated the safety effects of salting roads. Six studies have evaluated the effects of standards for winter operations, such as the depth of snow tolerated before clearance is started. Finally four studies have evaluated the effects of several types of snow or ice control, including snow clearance, use of salt or sanding.

Some studies have employed more than one type of design. These studies are listed once for each of the designs they have employed, since different study designs embody different levels of control for confounding factors.

*Exhibit 3-151: Studies that have evaluated effects on road safety of chemical de-icing, standards for winter operations, and other winter operations (*8*)*

Study	Country	Design	Number of estimates
Studies that have evaluated use of salt (chemical de-icing)			
Väg- och vattenbyggnad 1972	Finland	Before-after with comparison group	4
Andersson 1978	Sweden	Before-after with comparison group	12
Andersson 1978	Sweden	Case-control study	9
Brüde and Larsson 1980	Sweden	Case-control study	18
Lie 1981	Norway	Matched case-control study	45
Öberg et al 1985	Sweden	Before-after with comparison group	4
Möller 1988	Sweden	Case-control study	9
Nilsson and Vaa 1991	Norway	Before-after with comparison	6
Öberg et al 1991	Sweden	Before-after with comparison	3
Kallberg 1993	Finland	Before-after with comparison	2
Öberg 1994	Sweden	Before-after with comparison	1
Sakshaug and Vaa 1995	Norway	Before-after with comparison	1
Sakshaug and Vaa 1995	Norway	Simple before-after	2

Sakshaug and Vaa 1995	Norway	Case-control study	2
Kallberg 1996	Finland	Before-after with comparison	1
Friar and Decker 1999	United States	Before-after with comparison	1
Gilfillan 2000	Canada	Simple before-after	2
Studies that have evaluated standards for winter operations			
Ragnøy 1985	Norway	Comparative study	9
Bertilsson 1987	Sweden	Simple before-after	4
Schandersson 1988	Sweden	Comparative study	36
Eriksen and Vaa 1994	Norway	Before-after, matched comparison	2
Vaa 1996	Norway	Before-after, matched comparison	2
Studies that have evaluated other winter operations			
Tabler and Furnish 1982	United States	Simple before-after (snow screens)	8
Björketun 1983	Sweden	Matched before-after (preparedness)	6
Schandersson 1986	Sweden	Simple before-after (several actions)	6
Sävenhed 1994	Sweden	Simple before-after (several actions)	1

The quality of the studies varies. No study has been rated as high quality; 86 estimates of effect have been rated as medium-high quality, 81 estimates of effect have been rated as medium-low quality and 21 estimates of effect have been rated as low quality. The standard errors of estimates of effect in each study have been adjusted by a factor of 1.8 for medium-high quality estimates based on before-and-after studies, 2.2 for medium-low quality estimates of effect, and 3 for low quality estimates of effect based on before-and-after studies. For other study designs, such as case-control studies or comparative studies, the corresponding correction factors for the standard error were 2 for medium-high quality estimates, 3 for medium-low quality estimates, and 5 for low quality estimates of effect. The adjustment factor for the standard error was 1.8 for 49 estimates of effect, 2 for 37 estimates of effect, 3 for 100 estimates of effect and 5 for 2 estimates of effect.

Few of the studies provide a detailed description of the types of road or traffic environment to which the study results apply. Many studies refer to fairly large road systems, in some cases comprising several thousand kilometres. In these cases, it is probably reasonable to assume that all types of roads are included, both urban and rural, as well as freeways. A few studies, notably those of Eriksen and Vaa (1994), Vaa (1996) and Gilfillan (2000), have evaluated programmes for improving winter operations in cities (as reviewed in Elvik and Vaa (2004) (*8*)). The cities studied were Trondheim in Norway and Kamloops in British Columbia, Canada.

Estimates of effect generally refer to all types of accidents (i.e., both single vehicle and multiple, involving all types of road users). Some studies identify accidents according to road surface condition. The most commonly made distinction is between snow or ice-covered road surfaces and bare road surfaces. No study makes a clear distinction between snow-covered road surfaces and ice-covered road surfaces.

Nearly all studies were conducted in the Scandinavian countries. The length and severity of the winter season varies substantially between regions of these countries. In the south

of Sweden, for example, there may not be any snow at all during winter, and only a few days with freezing rain or ice on the road. In the northern parts of Finland, Norway and Sweden, snow usually falls in October and remains on the ground until late April. Most roads in these areas, at least in rural areas, are fully or partly covered by snow throughout the winter.

Exhibit 3-152 reports summary estimates of effect for various measures taken to control snow, slush or ice. Effects are stated as odds ratios. The standard errors have been adjusted as explained above. The estimates are based on conventional meta-analysis. The number of estimates underlying each summary estimate is shown in parentheses. Accident severity is stated if it was specified in the studies serving as sources for the summary estimates of effect. The structure of the results was such that a meta-regression analysis was not judged to be informative in this case.

*Exhibit 3-152: Summary estimates of the effects on accidents of snow, slush and ice control (*8*)*

Measure taken	Specification of effect	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Short-term effects of all measures to control snow, slush or ice (all accidents)			
All measures	First 12 hours (1)	0.500	0.197
	First 24 hours (6)	0.707	0.240
	First 96 hours (2)	0.955	0.189
Effects during the whole winter season of raising standards for winter operations			
Raising standards	Injury accident (31)	0.891	0.022
	PDO-accidents (22)	0.734	0.020
Effects of use of salt (chemical de-icing) during the whole winter season (baseline = no salt)			
Introduction of salt	Injury accidents (42)	0.852	0.094
	PDO-accidents (6)	0.919	0.083
Termination of salt	Injury accidents (6)	1.116	0.136
	PDO-accidents (5)	0.998	0.121
Effects of snow fences and higher state of preparedness for the whole winter season			
Snow fences (6%)	All accidents	0.894	0.256
Higher preparedness	All accidents	0.922	0.068*

* NOTE: Based on a single study only; general validity is highly uncertain, even if standard error is small

The short-term effects of measures taken to control snow, slush or ice (this includes snow clearance, spread of sand, and spread of salt) are largest during the first 12 hours after the measures were taken, and then decline. Only a very small effect remains after 96 hours (Exhibit 3-152). This pattern conforms to what one would expect the effects of winter operations to be. The baseline for these estimates of effect is a before-period of equal duration to the after period (i.e., 12 hours, 24 hours or 96 hours). During the before period, there will typically have been snow storms or other adverse weather conditions. (*8*)

The road system will usually have been classified into one of a limited number of classes, maybe 4 or 5, with respect to the minimum standards for winter operations. Raising the standards for winter operations by one class is associated with a reduction of the number of injury accidents of about 10% and a reduction of the number of property-damage-only accidents of about 25% (Exhibit 3-152). It should be noted that many of the estimates serving as the basis for the summary estimate come from cross-section studies that did not adequately control for confounding factors. The accident samples were large in many studies; hence the standard error is small. (*8*)

As an example of the standards used and what it means to raise standards by one class, Exhibit 3-153 provides details of the standards for winter operations used on national highways in Norway.

Exhibit 3-153: Standards for winter maintenance on national roads in Norway

Standards	**Class 4 AADT <500**	**Class 3 AADT 501-1500**	**Class 2 AADT 1501-3000**	**Class 1 AADT >3001**
Strategy A: Snow or ice permitted to form on road surface				
Maximum snow depth before clearance (dry snow, cm)	15	12	10	7
Maximum snow depth before clearance (wet snow, cm)	12	8	7	6
Spread of sand if friction is below 0.25	Within 4 hours at critical points	Within 4 hours, whole road	Within 2 hours, whole road	Within 2 hours, whole road
Strategy B: Keep road surface bare (no snow or ice)				
Maximum snow depth before clearance (dry snow, cm)	Strategy not used	Strategy not used	10	7
Maximum snow depth before clearance (wet snow, cm)	Strategy not used	Strategy not used	7	6
Preventive salting	Not performed	Not performed	Applied if friction is expected to drop below 0.4	Applied if friction is expected to drop below 0.4
Road surface should be bare within N hours after snowfall	Snow on road surface permitted	Snow on road surface permitted	Within 6 hours after snowfall	Within 4 hours after snowfall Within 2 hours after snowfall (AADT >5000)

The introduction of preventive salting is associated with a reduction of the number of accidents. The term preventive salting refers to the spread of salt before it starts to snow, in order to prevent snow from sticking to the road surface. If salting is terminated, the number of injury accidents appears to increase, whereas the number of property-damage-only accidents remains unchanged (Exhibit 3-152). The baseline for these estimates is roads that are not salted at all in winter.

Snow fences may be installed on mountain passes that are exposed to snow drifts. If 6% of the highway length is covered by snow fences, there is a reduction of snow-related accidents of about 10% (Exhibit 3-152). This estimate refers to a mountain pass that was particularly exposed to snow drifts across the road. This estimate of safety effect cannot necessarily be extrapolated to other percent coverage of snow fences.

Raising the state of preparedness, for example by having maintenance crews on stand-by duty, or by having inspection vehicles driving around the road system, is associated with an accident reduction throughout the winter season of about 8% (Exhibit 3-152). The estimate is based on a single study only and its general validity is therefore highly uncertain, even if the standard error is small.

3.4.5.3. Wet Pavement [Future Edition]

In future editions of the HSM, this section may discuss the safety effect of drainage characteristics, hydroplaning remediation, high-friction pavements (e.g., at specific curve location), and other elements related to wet pavement. Potential resources are listed in Exhibit 3-154.

Exhibit 3-154: Potential resources on the relationship between wet pavement and safety

DOCUMENT
NCHRP 17-28: Pavement Marking Materials and Markers: Safety Impact and Cost-Effectiveness (http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-28)
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))
(Hanley, K. E., Gibby, A. R., and Ferrara, T. C., "Analysis of Accident Reduction Factors on California State Highways." Transportation Research Record, No. 1717, Washington, D.C., Transportation Research Board, National Research Council, (2000) pp. 37-45.)
(Kyte, M., Shannon, P., and Kitchener, F., "Idaho Storm Warning System Operational Test." ITD No. IVH9316 (601), Boise, Idaho Transportation Department, (2000))
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))
(Kulmala, R. and Rama, P., "Safety Evaluation in Practice: Weather Warning Systems." Smart Vehicles Lisse, Netherlands, Swets & Zeitlinger, (1995))
(Fambro, D. B., Nowlin, R. L., Warren, S. P., Lienau, K. A., Mounce, J. M., Bligh, R. P., Mak, K. K., and Ross, H. E., "Geometric Design Guidelines for Suburban High-Speed Curb and Gutter Roadways." FHWA/TX-95/1347-1F, College Station, Texas A&M University, (1995))
(Dahir, S. H. and Gramling, W. L., "NCHRP Synthesis of Highway Practice Report 158: Wet-Pavement Safety Programs." Washington, D.C., Transportation Research Board, National Research Council, (1990))
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))

3.4.6. Pavement Materials [Future Edition]

In future editions of the HSM, this section may include discussion of the safety impact of pavement surface deterioration, changes to the coefficient of surface friction, and surface rehabilitation, for different surface materials (e.g., asphalt concrete, Portland cement concrete, gravel, tar & gravel, dirt, interlock bricks, grooved pavement, textured roads, etc.). Potential resources are listed in Exhibit 3-155.

Exhibit 3-155: Potential resources on the relationship between pavement materials and safety

DOCUMENT
NCHRP 17-28: Pavement Marking Materials and Markers: Safety Impact and Cost-Effectiveness (http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-28)
NCHRP 17-26: Methodology to Predict the Safety Performance of Urban and Suburban Arterials (http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26)
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Collisions at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))
(Torbic, D. J., Harwood, D. W., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 7: A Guide for Reducing Collisions on Horizontal Curves." Washington, D.C., Transportation Research Board, National Research Council, (2004))
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Council, F. M., McGee, H., Prothe, L., and Eccles, K. A., "NCHRP Report 500 Volume 6: A Guide for Addressing Run-off-Road Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))
(Bray, JS. (2003) "Skid Accident Reduction Program (SKARP): Targeted Crash Reductions." Institute of Transportation Engineers (ITE) 2003 Technical Conference and Exhibit. Fort Lauderdale, Florida, USA)
(Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))
(Hauer, E., "Shoulder Width, Shoulder Paving and Safety." (2000))
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))
(Gharaibeth, N. G., Hicks, J. E., and Hall, J. P., "Analysis of Accidents, Traffic and Pavement Data." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 396-402.)
(Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995), Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))
(Ligon, C. M., Carter, E. C., Joost, D. B., and Wolman, W. W., "Effects of Shoulder Textured Treatment on Safety." FHWA/RD-85/027, Washington, D.C., Federal Highway Administration, (1985))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))
(Dawson, R. F. and Oppenlander, J. C., "General Design." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 11, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))

DOCUMENT
(Dearinger, J. A. and Hutchinson, J. W., "Cross Section and Pavement Surface." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 7, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))

3.4.7. Animals [Future Edition]

In future editions of the HSM, this section may address treatments to mitigate the presences of wild animals along roadway segments (e.g., deer, moose, etc.) to reduce crashes between motor vehicles and wild animals. Potential resources are listed in Exhibit 3-156.

Exhibit 3-156: Potential resources on the relationship between animals and safety

DOCUMENT
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))

References

1. Transportation Research Board, "Highway Capacity Manual 2000." Washington, D.C., Transportation Research Board, National Research Council, (2000)
2. Hauer, E., "Lane Width and Safety." (2000)
3. Hauer, E., Council, F. M., and Mohammedshah, Y., "Safety Models for Urban Four-Lane Undivided Road Segments." (2004)
4. Bauer, K. M., Harwood, D. W., Hughes, W. E., and Richard, K. R., "Safety Effects of Using Narrow Lanes and Shoulder-Use Lanes to Increase the Capacity of Urban Freeways." 83rd Transportation Research Board Annual Meeting, Washington, D.C., (2004)
5. Harwood, D. W., Rabbani, E. R., Richard, K. R., McGee, H. W., and Gittings, G. L., "NCHRP Report 486: Systemwide Impact of Safety and Traffic Operations Design Decisions for 3R Projects." Washington, D.C., Transportation Research Board, National Research Council, (2003)
6. Huang, H. F., Stewart, J. R., and Zegeer, C. V., "Evaluation of Lane Reduction "Road Diet" Measures on Crashes and Injuries." Transportation Research Record, No. 1784, Washington, D.C., Transportation Research Board, National Research Council, (2002) pp. 80-90.
7. Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000)
8. Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004)
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Chapter 4: Intersections

Chapter 4. Intersections

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4.1. Safety Effects of Intersection Design Elements

An intersection is the at-grade crossing of two highways, and can be three-, four-, or multi-leg, or take the form of a roundabout. The following sections describe the safety effects of the design and operations of intersections, including roundabouts. Pedestrian and bicyclist considerations are discussed, as well as other intersection elements, such as illumination.

4.1.1. Intersection Types

As early as 1970, Box pointed out that accident statistics clearly indicate that accidents at intersections are a national problem. However, since the area of influence of an intersection often extends far beyond the intersection itself, the issue of defining what constitutes an intersection accident is sometimes a problem in itself (*1*). According to AASHTO, an intersection is defined by both its physical and functional areas(*2*). This functional area extends both upstream and downstream from the physical intersection area and includes any auxiliary lanes and their associated channelization. For example, some agencies may define an intersection accident as one which occurs within the intersection crosswalk limits while other agencies may consider all accidents within 100 or 200 ft of an intersection as being intersectional (*1*).

The discussion in this section will also cover the implementation of roundabouts for different traffic volume ranges. When results from before-after studies are available, the "before" traffic control type is also discussed. Where possible, the safety impacts of the road safety treatments on motorcyclists will be considered. The distinction between road types and urban versus rural settings is particularly critical in this section, since the safety of a multi-lane intersection is not likely to be comparable with the safety of a single lane intersection given the different volume and capacity needs, and given the policies that are likely to govern the intersection design.

For a more detailed overview of the elements that are related to intersection design and types of intersection configurations in use, the reader is directed to AASHTO's "Green Book" (*2*), as well as a recent study by Fitzpatrick and Wooldridge (*3*). In addition to conventional intersection designs, this section also discusses the safety impacts of alternative intersection designs such as tapered offset left-turn lanes and the construction of indirect left-turn road safety treatments. These include median U-turn crossovers, super street median crossovers, quadrant roadway intersections, split intersections, and continuous flow intersections. The reader is directed to the recently available FHWA Signalized Intersection Guide for further information, available at http://www.tfhrc.gov/safety/pubs/04091/index.htm.

This section examines the safety effects of the various types of intersections, including signalized and unsignalized 3-leg, 4-leg, and multi-leg intersections and roundabouts. The discussion in this section excludes any consideration for approach roadway elements such as lanes (number, width, etc.), shoulders and sidewalks, and medians since these topics are addressed in Section 4.1.2.

FHWA's Roundabout Guide contains additional general information on design and operational issues concerning roundabouts. Given that a large number of studies, which investigate the safety impacts of various road safety treatments at intersections, are related to pedestrians and bicyclists, readers may also refer to Section 4.3 Pedestrian and Bicyclist Safety.

Exhibit 4-1: Resources examined to investigate the safety effect of intersection types

DOCUMENT	DESCRIPTION	COMMENT
(*119*) (Jagannathan, R., Gimbel, M., Bared, J.G., Hughes, W.E., Persaud, B., and Lyon, C., Safety Comparison of Jug Handle Intersections and Conventional Intersections, *Transportation Research Record* 1953, 2006, pp. 187-200.)	Study compared the safety of 44 New Jersey Jug Handle intersections with 50 conventional signalized intersections using cross-sectional regression models	Added to synthesis. Information was not sufficient to develop AMFs and standard errors.
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Report provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities	Added to synthesis. Only qualitative discussion of safety impacts presented. No quantitative evidence of quantified safety impacts found.
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Accidents Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Reference discusses potential safety impacts of reducing intersection skew and providing left-turn lanes with positive offsets for older drivers	Not added to synthesis. No AMFs or other quantified evidence of safety improvements. Some material on offset left-turn lanes may be relevant to other sections.
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results may be added if relevant when available.
(*5*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Reference suggested by NCHRP 17-18(4). Added to synthesis. Results from meta-analysis used to calculate t and s values.
(McGee, H., Taori, S., and Persaud, B. N., "NCHRP Report 491: Crash Experience Warrant for Traffic Signals." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Study investigated the safety of signalized and stop-controlled intersections using an Empirical Bayes before-after study approach.	Not added to synthesis since material is more relevant to traffic control at intersections.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Report is a detailed implementation guide that provides guidance and strategies to improve safety at unsignalized intersections	Not added to synthesis because of lack of quantitative evidence of safety effects.
(*6*) (Bared, J. G. and Kaisar, E. I., "Advantages of Offset T-Intersections with Guidelines." Moscow, Russia, Proc. Traffic Safety on Three Continents, (2001))	Study investigated the safety impact of converting three- and four-leg intersections by offsetting them and creating two offset T- intersections.	Plots showing crash reduction functions added to synthesis. There is insufficient information in reference to calculate s values.

DOCUMENT	DESCRIPTION	COMMENT
(Xu, L., "Right Turns Followed by U-Turns vs. Direct Left Turns: A Comparison of Safety Issues." No. 11, (2001) pp. 36-43.)	Cross-sectional study comparing accident rates and accident frequencies between direct left-turns and an alternative left-turn design (i.e. right-turn, followed by U-turn)	Reference suggested by NCHRP 17-18(4). Not added to synthesis. Treatment being examined is the type of left-turn configuration and not directly related to the design of the intersection itself. Reference is more relevant intersection operations.
(Bauer, K. M. and Harwood, D. W., "Statistical Models of At-Grade Intersections - Addendum." FHWA-RD-99-094, McLean, Va., Federal Highway Administration, (2000))	Used crash data to develop statistical models of the relationship between traffic crashes and highway geometric elements for at-grade intersections	Reference suggested by NCHRP 17-18(4). Not added to synthesis. Accident models for three- and four-leg urban and rural intersections were developed and the information provided is more relevant to Approach Roadway Elements section
(*7*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Study presents an algorithm for predicting the safety performance of various factors for roadway segments and for at-grade intersections on rural two-lane highways	Added to synthesis. Highly relevant reference for Approach Roadway Elements section as well.
(Vogt, A., "Crash Models for Rural Intersections: Four-Lane by Two-Lane Stop-Controlled and Two-Lane by Two-Lane Signalized." FHWA-RD-99-128, McLean, Va., Federal Highway Administration, (1999))	Crash models and crash reduction factors were developed for rural three- and four-leg rural intersections on four-lane highways, stop-controlled on the minor legs; and signalized rural intersections of two-lane roads.	Not added to synthesis. Reference is more relevant to Approach Roadway Elements section.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Reference reviewed existing research and provided guidelines on highway engineering improvements that would help older drivers and pedestrians	Not added to synthesis. No AMFs or other quantitative evidence of safety impacts found
(Kulmala, R., "Safety at Rural Three- and Four-Arm Junctions: Development and Application of Accident Prediction Models." 233, Espoo, Finland, VTT Technical Research Centre of Finland, (1995))	Before-After study of the safety effectiveness of several geometric design elements at rural three- and four-leg intersections	Not added to synthesis. More relevant to Approach Roadway Elements section.
(Kuciemba, S. R. and Cirillo, J. A., "Safety Effectiveness of Highway Design Features: Volume V - Intersections." FHWA-RD-91-048, Washington, D.C., Federal Highway Administration, (1992))	Report briefly discusses nine studies (1972 to 1988) of the relationship between intersections and safety.	Not added to synthesis. No AMFs or other quantitative evidence of safety impacts found

DOCUMENT	DESCRIPTION	COMMENT
(Corben, B. F., "Crashes at Traffic Signals: Guidelines for a Traffic Engineering Safety Program of Replacing Selected Intersection Signals with Roundabouts." 7, Victoria, Australia, VicRoads and Transport Accident Commission, (1989))	Study's objective was to develop traffic safety engineering guidelines for when and where to replace existing traffic signals with roundabouts.	Not added to synthesis. No relevant information.
(Box, P. C., "Intersections." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 4, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Reference reviews studies relating safety to elements of intersections, including geometric layout, left-turn lanes, traffic controls, signing, and turn restrictions among others	Not added to synthesis. No AMFs or other quantitative evidence of safety impacts found.

Exhibit 4-2: Resources examined to investigate the safety effect of roundabouts

DOCUMENT	DESCRIPTION	COMMENT
(*120*) (Rodegerdts, L. A., Blogg, M., Wemple, E., Myers, E., Kyte, M., Dixon, M., List, G., Flannery, A., Troutbeck, R., Brilon, W., Wu, N., Persaud, B., Lyon, C., Harkey, D., and Carter, E. C., "NCHRP Report 572: Applying Roundabouts in the United States." Washington, D.C., Transportation Research Board, National Research Council, (2007))	Before-after study of the effect of crashes at 55 intersections that were converted to roundabouts (36 were previously two-way stop controlled, 10 were all-way stop controlled, and 9 were controlled by signals); includes rural, suburban, and urban environments	Added to synthesis. t and s values included in Master summary table.
(*121*) (Nambisan, S. S. and Parimi, V. "A Comparative Evaluation of the Safety Performance of Roundabouts and Traditional Intersection Controls", *ITE Journal*, March 2007).	This study compared the crash rates of 6 roundabouts with 8 stop and signalized intersections in Las Vegas.	Not added to synthesis because other studies used more defensible methods.
(*122*) (De Brabander, B. and Vereeck, L., Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users, *Accident Analysis and Prevention*, 39 (2007), pp. 591-599.)	Before-after study of the effect of injury crashes at 95 roundabouts in the Flanders area of Belgium. The EB approach was used but traffic volume was not available and hence safety effects could not be modeled using safety performance functions.	Added to synthesis, but results from Rodegerdts et al., were used for the HSM.
(*123*) (Daniels, S., Nuyts, E., and Wets, G., The Effects of Roundabouts on Traffic Safety for Bicyclists: An Observational Study, *Accident Analysis and Prevention*, 40 (2008), pp. 518-526.)	Before-after study of the effect of injury crashes involving bicycles at 91 roundaboutns in the Flanders area of Belgium. The EB approach was used, but motor vehicle and bicycle volume were not available. Hence safety effects could not be modeled using safety performance functions.	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*124*) De Brabander, B., Nuyts, E., and Vereeck, L., Roadwy safety Effects of Roundabouts in Flanders, *Journal of Safety Research*, 36 (2005), pp. 289-296.	Before-after study of the effect of injury crashes at 95 roundabouts in the Flanders area of Belgium. The EB approach was used but traffic volume was not available and hence safety effects could not be modeled using safety performance functions.	Not added to synthesis. De Brabander and Vereeck (2007) provides updated results from the analysis of the same set of roundabouts.
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Report provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities	Added to synthesis only for exhibits of alternative intersection designs. No evidence of quantified safety impacts found.
(*8*) (Persaud, B. N., Retting, R. A., Garder, P. E., and Lord, D., "Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method." Transportation Research Record, No. 1751, Washington, D.C., Transportation Research Board, National Research Council, (2001))	Before-after study of the effect on crashes at 23 intersections following change from stop and signal control to roundabout design; seven states, both urban, suburban, and rural	Reference suggested by NCHRP 17-18(4). Added to synthesis. t and s values included in Master Summary table.
(Flannery, A., "Geometric Design and Safety Aspects of Roundabouts." Transportation Research Record, No. 1751, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 76-81.)	Used crash data to identify geometric characteristics of roundabouts that affect safety; MD, FL, and NV	Reference suggested by NCHRP 17-18(4). Briefly reviewed. Did not review in detail since results do not add to findings. Did not add to synthesis.
(Persaud, B. N., Retting, R. A., Garder, P. E., and Lord, D., "Crash Reduction Following Installation of Roundabouts in the United States." Arlington, Va, Insurance Institute for Highway Safety, (2000))	Before and after study of the effect on crashes resulting from the installation of roundabouts; 24 intersections in 8 states; used EB statistics; urban, rural, and suburban	Reference suggested NCHRP 17-18(4). Reference reviewed but not added to synthesis since there is a more recent reference by the authors (Persaud et al., 2001) that presents results from the same research
(Flannery, A. and Elefteriadou, L., "A Review of Roundabout Safety Performance in the United States." Las Vegas, Nev., Proc. 69th Annual Meeting of the Institute of Transportation Engineers , (1999))	Before and after study of the effect on crashes of roundabouts, 3 intersections in FL and 5 in MD	Reference suggested by NCHRP 17-18(4). Did not add to synthesis or review in detail since the studies cited in this reference were reviewed by Elvik and Vaa using meta-analysis and presented in their Handbook.
(Robinson, D. L., "Accidents at Roundabouts in New South Wales." Road and Transport Research, Vol. 7, No. 1, Vermont South, Australia, ARRB Transport Research Ltd., (1998) pp. 3-12.)	Report discusses roundabouts in Australia with special reference to accidents involving bicyclists	Not added to synthesis. More relevant to sections on pedestrian and bicyclist safety.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	Report summarizes a literature review of the relationship between measures of road performance, including safety, and road geometry and condition.	Not added to synthesis. Brief review shoes that the reference has nothing new to add to already substantial results for roundabouts.

DOCUMENT	DESCRIPTION	COMMENT
(Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995), Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))	Review of studies on roundabouts	Reference suggested by NCHRP 17-18(4). Not added to synthesis. Brief review shoes that the reference has nothing new to add to already substantial results for roundabouts. Studies cited already reviewed by Elvik and Vaa in their Handbook.
(Schoon, C. and van Minnen, J., "The Safety of Roundabouts in The Netherlands." Traffic Engineering & Control, Vol. 35, No. 3, London, United Kingdom, Hemming Information Services, (1994) pp. 142-148.)	Before and after study of crashes at 181 intersections in the Netherlands converted to roundabouts	Potential international resource suggested NCHRP 17-18(4). Did not add to synthesis or review in detail since the studies cited in this reference were reviewed by Elvik and Vaa using meta-analysis and presented in their Handbook.
(Corben, B. F., "Crashes at Traffic Signals: Guidelines for a Traffic Engineering Safety Program of Replacing Selected Intersection Signals with Roundabouts." 7, Victoria, Australia, VicRoads and Transport Accident Commission, (1989))	Citation from the Ministry of Transportation of British Columbia library e-catalogue. Study's objective was to develop traffic safety engineering guidelines for when and where to replace existing traffic signals with roundabouts.	Reference suggested by NCHRP 17-18(4). Not added to synthesis. It provided no relevant information for HSM.
(McCoy, P. T. and Malone, M. S., "Safety Effects of Left-Turn Lanes on Urban Four-Lane Roadways." Transportation Research Record 1239, Washington, D.C., Transportation Research Board, National Research Council, (1989) pp. 17-22.)	Study analyzed accident experience at signalized and unsignalized intersections on urban four-lane highways in Nebraska to assess the safety impacts of implementing left-turn lanes.	Not added to synthesis. More relevant to Approach Roadway Elements section.

From the critical review of references identified, quantitative empirical-based evidence of safety impacts were found for the reduction/elimination of intersection skew angles, the conversion of four-leg or cross intersections into two T-intersections, and for the conversion of intersections into roundabouts. Volume ranges are provided here when available. The safety impacts of other road safety treatments have been described using only qualitative or anecdotal information.

Treatment: Reduce/eliminate intersection skew angle

In research conducted by Harwood et al. (*7*), AMFs for at-grade intersections were estimated by an expert panel from predictive models that were developed in a previous study (*9*) using extended negative binomial regression. Using separate accident prediction models for three- and four-leg intersections the researchers found the following:

- For Total Intersection Accidents at three-leg stop-controlled intersections, AMF = exp(0.0040 SKEW)
- For Total Intersection Accidents at four-leg stop-controlled intersections, AMF = exp(0.0054 SKEW)

where SKEW = intersection skew angle (degrees), expressed as the absolute value of the difference between 90 degrees and the actual intersection angle (*7*). These AMFs are most applicable to rural two-lane and multi-lane intersections.

There was insufficient information to calculate standard error values associated with the Harwood et al. functions.

Harwood et al. added that skew angle is a much less important factor in the operation of signalized intersection than in the operation of stop-controlled intersections. According to Harwood et al., since the traffic signal separates most movements from conflicting approaches, the risk of accidents related to the skew angle between the intersecting approaches is limited at a signalized intersection. Therefore, the AMF for skew angle at four-leg signalized intersections is 1.0 for all cases (*7*). However, given that the safety effect of the skew angle at a signalized intersection is also highly dependent on the operational characteristics of the traffic signal control, logic dictates that the AMF would ultimately depend on the combined effects of the skew angle and the traffic control design elements such as the allowance of right-turns on red signals, and the use of a protected-only phasing for left-turns.

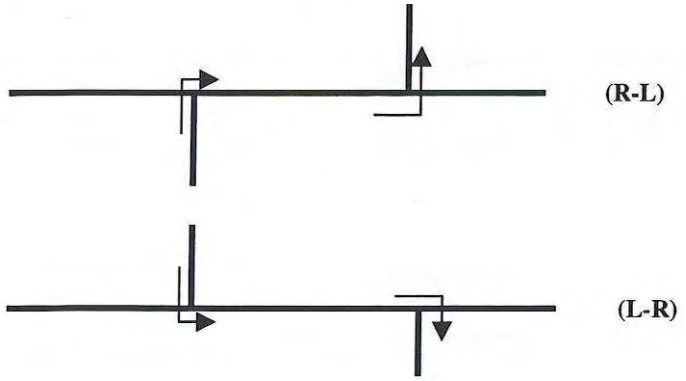
Discussion: Impact of intersection skew angle on drivers

Antonucci et al. stated that roads that intersect with each other at angles less than 90º can present sight distance and operational problems for drivers. As a result, there is likely to be high incidence of right-angle accidents, particularly involving vehicles approaching from the acute angle. Safety issues stemming from intersections with skew angles that are not 90º can be attributed to the fact that vehicles have a longer distance to travel through the intersection (increasing their exposure to conflicts), and drivers (particularly older drivers) may find it difficult to turn their head and neck to view an approach on an acute angle. Furthermore, vehicles turning right at an acute angle may encroach on the lane for vehicles approaching from the opposite direction. When RTOR are permitted, drivers may have more difficulty judging gaps when turning. Also, crossing distances for pedestrians are increased (*4*).

Treatment: Conversion of four-leg or cross intersections into two T-intersections

According to Bared and Kaisar, one of the road safety treatments used at specific sites, where the opportunity exists, to reduce accidents at intersections has been to stagger the intersection or in other words, to convert a cross intersection into a pair of T-intersections (*6*). These staggered intersections can be constructed in one of two ways: left-right staggering and right-left staggering. These two forms of staggering are shown in Exhibit 4-3.

Exhibit 4-3: Basic Forms of Staggered T-Intersections



By applying regression models developed from previous research studies by Vogt et al. (1995) to predict total and injury accidents, Bared and Kaisar calculated the sum of such accidents for two T-intersections and compared these estimates to the predicted accident frequencies for cross intersections (*6*). Using this approach, Bared and Kaisar developed accident reduction functions for rural two-lane by two-lane, and two-lane (minor road) by four-lane (major road) two-way stop-controlled (TWSC) intersections. These functions are shown in Exhibit 4-4 and Exhibit 4-5. For both cases, the authors assumed that the traffic volume on the minor road constituted 10% of the total entering ADT.

Exhibit 4-4: Accident Reduction for Rural 2x2-lane TWSC intersections (6)

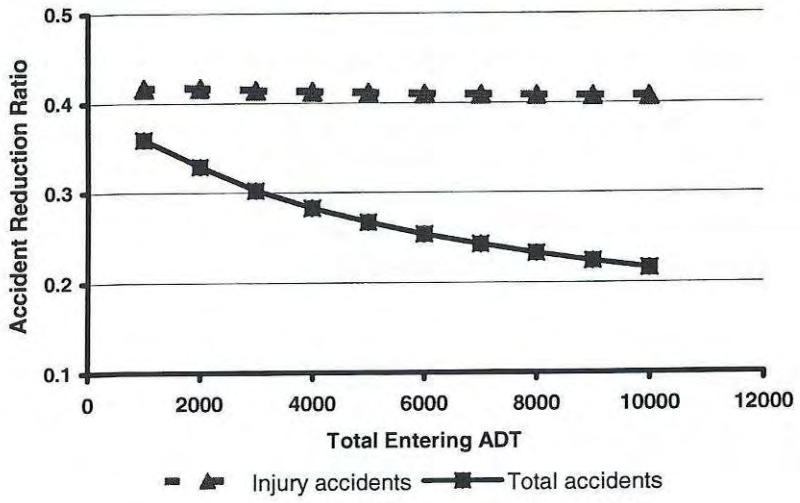
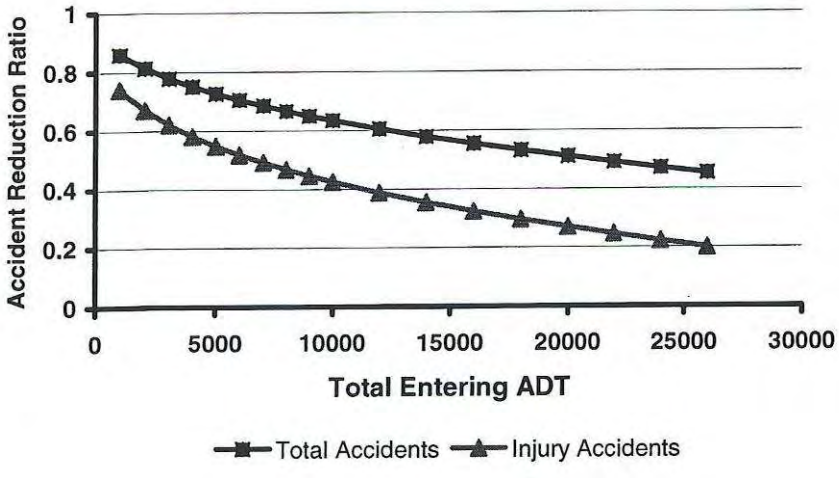


Exhibit 4-5: Accident Reduction for Rural 2x4-lane TWSC intersections (6)



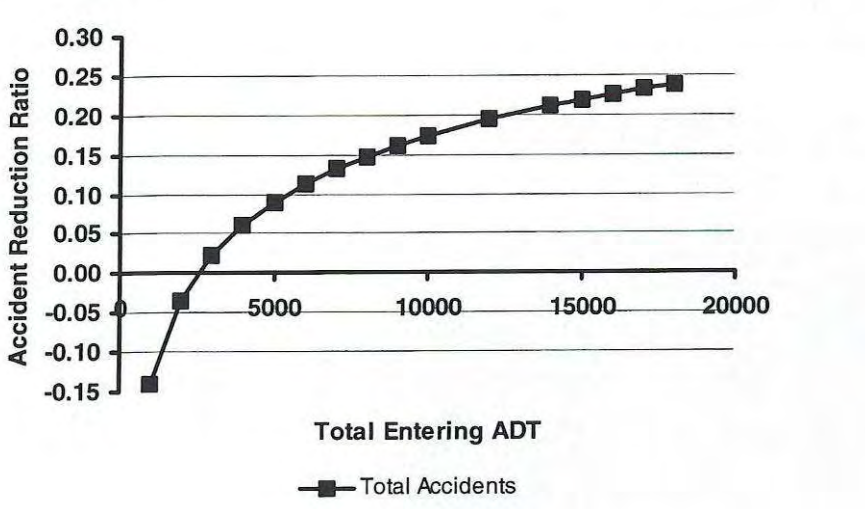
As shown in Exhibit 4-4, the reduction in injury crashes when applying this treatment at rural two-lane by two-lane TWSC intersections is higher (about 40% reduction or an AMF of 0.60) than the reduction in total crashes (between 20% to 35% or AMF value of between 0.8 and 0.65). The authors further noted that the reduction in total crashes resulting from this particular treatment decreases and levels off at approximately 20% (AMF of 0.8) when the total entering ADT flow is 10,000 veh/day.

As shown in Exhibit 4-5, the safety effects of implementing this treatment appeared to be reversed for two-lane (minor road) by four-lane (major road) two-way stop-controlled (TWSC) intersections; reduction in injury crashes is lower (between 20% to 75%, or AMF value of between 0.8 and 0.25) than the reduction in total crashes (between 40% to 85% or AMF value of between 0.6 and 0.15). The reduction in total crashes resulting from this particular treatment decreases and levels off at approximately 20% (AMF of 0.8) for injury crashes and 40% (AMF of 0.6) for total crashes when the total entering ADT flow exceeds 25,000 veh/day. In the application of the models, Bared and Kaisar assumed that four-lane state highways are divided.

There was insufficient information to calculate standard error values for the AMF values developed by Bared and Kaisar.

In addition to the crash reduction functions for unsignalized intersections, Bared and Kaisar also combined the results from regression models developed by Bauer et al. in a previous research study with their own research results to develop crash reduction functions quantifying the safety effects of this particular treatment for signalized intersections (*6*). The large majority of the intersections used in the development of the models included left-turn lanes with fully actuated signals. By assuming a 60% to 40% ratio for traffic volume on the main road versus the crossroad, Bared and Kaisar reported that accident reduction resulting from the road safety treatment increases with increasing traffic volumes and levels off at approximately 25% (AMF of 0.75) beyond total entering ADT volumes of 18,000 veh/day. The results are shown in Exhibit 4-6. Bared and Kaisar reported that the fit of the models was not strong. There was insufficient information to calculate standard error values for the AMF values.

Exhibit 4-6: Accident Reduction for Urban 2x2-lane Signalized intersections



Elvik and Vaa conducted a meta-analysis of a number of studies related to the conversion of cross intersections to two T-intersections and found that the safety effect is dependent on the proportion of minor road traffic at the cross intersection prior to conversion (p. 307) (*5*). According to the authors, it appears that there are no safety benefits when this treatment is applied to cross intersections with little minor road traffic. In fact, the results from the meta-analysis show that both injury and PDO accidents increase. Based on the results of the meta-analysis, Elvik and Vaa also found that the reduction in injury and PDO accidents following the treatment is higher when the proportion of minor road traffic is larger, and that the safety effect is more pronounced for injury accidents. The results from the meta-analysis are summarized in Exhibit 4-7. The traffic volumes at the sites examined were not reported. This study was considered to be of medium-high quality due to the rigorous meta-analysis methodology applied by Elvik and Vaa, and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 4-7: Safety Effectiveness of Converting Cross intersections into two T-intersections

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Conversion of cross intersection into two T-intersections	Urban	Intersections with little minor road traffic (<15%), traffic volumes Not specified	All types Injury	1.35	0.27
Elvik and Vaa, 2004	Conversion of cross intersection into two T-intersections	Urban	Intersections with some minor road traffic (15-30%), traffic volumes not specified	All types Injury	0.75	0.08
Elvik and Vaa, 2004	Conversion of cross intersection into two T-intersections	Urban	Intersections with heavy minor road traffic (>30%), traffic volumes not specified	All types Injury	0.67	0.10
Elvik and Vaa, 2004	Conversion of cross intersection into two T-intersections	Urban	Intersections with little minor road traffic (<15%), traffic volumes Not specified	All types PDO	1.15	0.11
Elvik and Vaa, 2004	Conversion of cross intersection into two T-intersections	Urban	Intersections with some minor road traffic (15-30%), traffic volumes not specified	All types PDO	1.00	0.09
Elvik and Vaa, 2004	Conversion of cross intersection into two T-intersections	Urban	Intersections with heavy minor road traffic (>30%), traffic volumes not specified	All types PDO	0.90	0.09

Discussion: Conversion of two T-intersections to single 4-leg intersection

None of the studies examined provided any empirically-based evidence of accident reductions resulting from the conversion of two T-intersections to 4-leg intersections. However, according to Antonucci et al., it is expected that this strategy would reduce accidents involving left-turning traffic from the major road onto the cross street at each of the two T intersections, particularly when implemented at signalized offset T-intersections with very high through volumes on the cross street (*4*).

Discussion: Type of T-intersection configuration or staggering

Bared and Kaisar, and Elvik and Vaa noted that the left-right staggering of intersections appear to be more favorable for reducing the number of accidents compared to the right-left configuration. According to Elvik and Vaa, a previous study by Brude and Larsson found that the left-right pattern reduced the number of accidents by 4% while the right-left pattern increased the number of accidents by 7% (*5*). However, the authors added that the differences were not statistically significant.

Treatment: Conversion of intersections into roundabouts

Results from recent studies appear to indicate that converting conventional intersections with stop signs or traffic signals to roundabouts can produce substantial reductions in motor vehicle crashes, particularly injury crashes. Persaud et al. suggest that the crash reductions resulting from the conversion of conventional intersections to roundabouts can be attributed primarily to two factors: reduced traffic speeds, and the elimination or reduction of specific types of motor vehicle conflicts that typically occur at angular intersections (*8*). The conflicts include left-turns against oncoming or opposing traffic, rear end accidents, and right-angle conflicts at both traffic signals and stop signs.

Persaud et al. found that in general, the installation of roundabouts resulted in substantial reductions to crashes (*8*). Using an Empirical Bayesian before-after study approach, the researchers found 40% and 80% reductions in total crashes and injury crashes, respectively, following the implementation of the treatment. The authors analyzed stop-controlled and signalized intersections (prior to conversion), as well as single and multi-lane roundabouts (following conversion) separately, summarized in Exhibit 4-8. This study was ranked medium-high, and an MCF of 1.8 was applied to the standard errors.

Elvik and Vaa conducted a meta-analysis of studies that examined the safety impacts of installing roundabouts and found that the number of property damage only accidents increased following the implementation of the treatments. The researchers found that property damage only accidents increased from 32% to 73%. However, the researchers cautioned that the results were "highly conflicting" and "uncertain" (p. 299) (*5*). These results are not added to the synthesis.

De Brabander and Vereeck used the empirical Bayes before-after study approach to study the impact of roundabouts on injury crashes in the Flanders region of Belgium (*122*). Traffic volume was not available for this evaluation and hence safety effects could not modeled using safety performance functions. Overall, the study estimated a 39% reduction in injury crashes and a 17% reduction in serious injury crashes. Intersections that were previously unsignalized experienced a larger reduction in crashes when roundabouts were introduced compared to intersections that were previously signalized. An MCF of 2.2 was applied to the standard errors from this study.

Rodegerdts et al. provide additional insight with data from 55 intersections in the United States (*120*). This study used the empirical Bayes before-after study approach, included traffic volume data, and was ranked high. An MCF of 1.2 was applied to the standard errors. Results from this study were recommended for the HSM. It is important to note here that many of the same sites that were included in Persaud et al. (*8*) were included in Rodegerdts et al. (*120*) with updated information.

Exhibit 4-8: Safety effectiveness of converting signalized or stop-controlled intersections to roundabouts

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Persaud et al., 2001	Conversion of stop-controlled intersection into single-lane roundabout	Urban	Not specified, AADT = 4,600 - 17,825	All crashes, all severities	0.28	0.108
Persaud et al., 2001	Conversion of stop-controlled intersection into single-lane roundabout	Rural	Not specified, AADT = 7,185 - 17,220	All crashes, all severities	0.42	0.126
Persaud et al., 2001	Conversion of stop-controlled intersection into multi-lane roundabout	Urban	Not specified, AADT = 13,272 - 30,418	All crashes, all severities	0.95	0.180
Persaud et al., 2001	Conversion of signalized intersection into single- or multi-lane roundabout	Urban	Not specified, AADT = 5,322 - 31,525	All crashes, all severities	0.65	0.162
Persaud et al., 2001	Conversion of stop-controlled intersection into single-lane roundabout	Urban	Not specified, AADT = 4,600 - 17,825	All crashes, Injury	0.12	0.144
Persaud et al., 2001	Conversion of stop-controlled intersection into single-lane roundabout	Rural	Not specified, AADT = 7,185 - 17,220	All crashes, Injury	0.18	0.162
Persaud et al., 2001	Conversion of signalized intersection into single- or multi-lane roundabout	Urban	Not specified, AADT = 5,322 - 31,525	All crashes, Injury	0.26	0.252
De Brabander and Vereeck (2007)	Convert to roundabout	Not specified	Not specified	All crashes, injury	0.61	0.079

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
De Brabander and Vereeck (2007)	Convert signalized intersections to roundabout	Not specified	Not specified	All crashes, injury	0.68	0.135
De Brabander and Vereeck (2007)	Convert unsignalized intersection to roundabout	Not specified	Not specified	All crashes, injury	0.56	0.101
De Brabander and Vereeck (2007)	Convert to roundabout	Not specified	Not specified	All crashes, serious injury	0.83	0.230
De Brabander and Vereeck (2007)	Convert signalized intersection to roundabout	Not specified	Not specified	All crashes, serious injury	0.87	0.387
De Brabander and Vereeck (2007)	Convert unsignalized intersection to roundabout	Not specified	Not specified	All crashes, serious injury	0.80	0.297
De Brabander and Vereeck (2007)	Convert to roundabout	Not specified	Not specified	All crashes, light injury	0.62	0.084
De Brabander and Vereeck (2007)	Convert signalized intersection to roundabout	Not specified	Not specified	All crashes, light injury	0.69	0.163
De Brabander and Vereeck (2007)	Convert unsignalized intersection to roundabout	Not specified	Not specified	All crashes, light injury	0.54	0.107
Rodegerdts et al., 2007	Convert signalized intersection to roundabout	Urban All lanes	Unspecified	All types All severities	0.99	0.14
				All types Injury	0.40	0.14
		Suburban Two lanes		All types All severities	0.33	0.05
		All settings All lanes		All types All severities	0.52	0.06
				All types Injury	0.22	0.07
	Convert two-way stop-controlled	All settings All lanes	Unspecified	All types All severities	0.56	0.05

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
	intersection to roundabout			All types Injury	0.18	0.04
		Rural Single-lane		All types All severities	0.29	0.04
				All types Injury	0.13	0.04
		Urban All lanes		All types All severities	0.71	0.11
				All types Injury	0.19	0.10
		Urban Single-lane		All types All severities	0.61	0.12
				All types Injury	0.22	0.12
		Urban Two-lane		All types All severities	0.88	0.21
		Suburban All lanes		All types All severities	0.68	0.08
				All types Injury	0.29	0.10
		Suburban Single-lane		All types All severities	0.22	0.07
				All types Injury	0.22	0.12
		Suburban Two-lane		All types All severities	0.81	0.11
				All types Injury	0.32	0.14
	Convert all-way stop-controlled intersection to roundabout	All settings All lanes		All types All severities	1.03	0.18
Daniels et al. (2008)	Convert to roundabout	Inside built-up areas (urban)	Not specified	Bicyle, injury	1.48	0.516
Daniels et al. (2008)	Convert to roundabout	Inside built-up areas (urban)	Not specified	Bicycle, fatal and serious injury	1.77	1.134
Daniels et al. (2008)	Convert to roundabout	Outside built-up areas (rural)	Not specified	Bicycle, injury	1.01	0.438

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Daniels et al. (2008)	Convert to roundabout	Outside built-up areas (rural)	Not specified	Bicycle, fatal and serious injury	1.21	0.690
Daniels et al. (2008)	Convert to roundabout	Both rural and urban	Not specified	Bicycle, injury	1.27	0.342
Daniels et al. (2008)	Convert to roundabout	Both rural and urban	Not specified	Bicycle, fatal and serious injury	1.44	0.601

Discussion: Impact of roundabouts on pedestrians and bicyclists

The results regarding the impact of roundabouts on pedestrians and bicycles is not consistent. Although there was insufficient data to develop indices of effectiveness for this specific treatment, Persaud et al. (*8*) indicated that single-lane roundabouts appear to be safe for pedestrians and bicyclists as well, on the basis of results from a previous research study in Europe[1]. None of the multi-lane roundabouts examined by the Persaud et al. experienced any pedestrian-related crashes in the "after" period. Elvik and Vaa further added that from a meta-analysis of select studies, results appear to indicate that "pedestrian accidents are reduced to the same extent as other types of accidents when roundabouts are built" and that there is also a reduction in cyclist-related crashes although to a lesser degree (10% to 20% reduction) (*5*). However, Daniels et al. in their before-after empirical Bayes study of 91 locations in Flanders, Belgium, found a 27% increase in total injury crashes involving bicyclists when roundabouts were introduced (*123*) (see Exhibit 4-8). Daniels et al. also found a 44 percent increase in fatal and serious injury crashes involving bicycles following the introduction of roundabouts. However, data on motor vehicle and bicycle traffic were not available for their evaluation. In addition, the study did not indicate the number of single lane and multi-lane roundabouts in their sample. An MCF of 2.2 was applied to the standard errors from this study. Due to the limitations from this study, their results need to be used with caution. It is also important to note that ADA requirements are an important consideration for the safety of pedestrians at roundabouts.

Discussion: Improving deflection of through vehicle travel path

Forced path changes for through-vehicles violate driver expectations and may be difficult for unfamiliar drivers to navigate (*4*). Antonucci et al. speculate that the violation of driver expectancy can often result in reduced speed of the vehicle through the intersection. The researchers further point out that crashes influenced by a deflection in travel path are likely to include rear-end, sideswipe, head-on, and angle. Acceptable deflection angles through intersections (usually ranging from 3° to 5°) vary by individual agency, but are typically related to the design and/or posted speed on an intersection approach. As a result of the high costs of

[1] Hyden, C., and A. Varhelyi. The Effects on Safety, Time Consumption and Environment of Large Scale Use of Roundabouts in an Urban Area: A Case Study. Accident Analysis and Prevention, Vol. 32, 1999, pp. 11-23.

redesigning intersection approaches, the use of pavement markings to delineate the through vehicle path is often used as a countermeasure to the safety problems associated with intersections with deflection angles. However, none of the studies examined provided any empirically-based evidence of accident reductions resulting from the improvements to the deflection on through vehicle travel path at intersections.

Discussion: Providing indirect left-turn

According to Antonucci et al., safety problems associated with left-turns at signalized intersections are magnified at intersections with high traffic volumes, especially those with high volumes of left-turns. Indirect left-turn treatments, such as jughandles before the crossroad, directional median crossovers, and loop roadways beyond the crossroad, can address both safety and operational problems related to left-turns since these treatments remove the left-turning vehicles from the traffic stream without causing them to slow down or stop in a through-traffic lane, and, in turn, reduces the potential for rear-end crashes with through vehicles. Right-angle crashes are also likely to decrease after indirect left turn treatments are implemented, since the turning movement is relocated or changed to a different maneuver (*4*).

Jagannathan et al. compared the safety of 44 New Jersey Jug handle intersections (NJJI) and 50 conventional signalized intersections in New Jersey (*119*). Negative binomial regression models were developed to relate crash frequency with site characteristics including major and minor road AADT, posted speed limit on major and minor road, number of approach lanes in major and minor road and presence/absence of a median. Models were estimated for total accidents, injury and fatal accidents, rear-end accidents, left-turn and angle accidents, and sideswipe accidents. Separate sets of models were developed for conventional and jug handle intersections. The study concluded that for a given level of traffic volume, speed limit, and number of lanes, NJJIs had lower PDO, injury plus fatal accidents, and head-on accidents compared to conventional intersections. The NJJIs also had a higher proportion of rear-end and PDO accidents and a lower proportion of left-turn accidents than conventional intersections. Despite these findings, caution should be exercised in using results from such cross-sectional regression models to infer the safety performance of different entity types. AMFs could not be developed based on the results from this study.

Discussion: Constructing interchange or grade separation

By separating the grades of intersecting roadways, volumes of crossing and turning traffic, as well as the number of vehicle-vehicle conflict points may be reduced. According to Antonucci et al., this can lower the number and severity of crashes caused by these movements and intersection conditions, specifically rear end and angle crashes (*4*). None of the studies examined provided any empirically-based evidence of accident reductions resulting from this particular treatment.

4.1.2. Approach Roadway Elements

In accordance with the Green Book published by AASHTO, an intersection is defined by both its functional and physical areas, as shown in Exhibit 4-9. This functional area not only includes the intersection proper, but also the approaches in which vehicle maneuvers related to the intersection such as lane changing and deceleration take place. As illustrated in Exhibit 4-10, the functional area on the approach to an intersection consists of three basic elements:

- Perception-reaction distance

- Maneuver distance
- Queue-storage distance

The distance traveled during the perception-reaction time will depend upon vehicle speed, driver alertness, and driver familiarity with the location. Where there is a left- or right-turn lane, the maneuver distance includes the length needed for drivers to brake and make lane changes. In the absence of turn lanes, it represents the distance needed to brake and stop comfortably (*2*).

Exhibit 4-9: Physical and Functional Intersection Area (2)

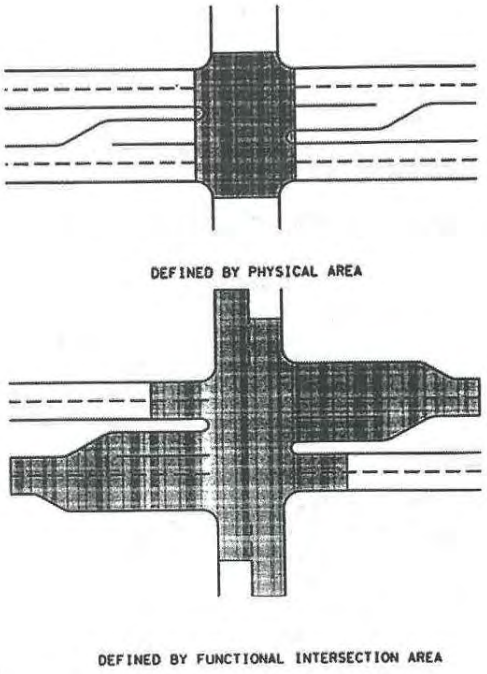
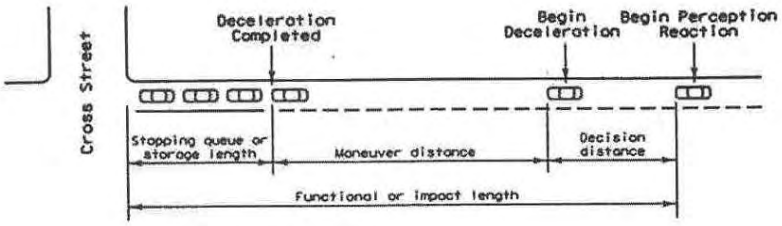


Exhibit 4-10: Elements of the Functional Area of an Intersection (2)



Approach roadway elements considered in the HSM include:

- Lanes
- Shoulders and sidewalks

- Medians

As noted by Neuman et al., reducing the frequency and severity of vehicle-vehicle conflicts can reduce the frequency and severity of intersection crashes. This can be achieved through geometric design improvements such as separating through and turning movements at the intersection, restricting or eliminating turning maneuvers, or providing acceleration lanes (*10*). Higher-cost, longer-term improvements, such as a redesign of the intersection, can also improve safety (*4*). Geometric improvements can provide both operational and safety benefits at intersections. For example, improvements to turning movements, through channelization or separating turns temporally can result in reductions in certain types of crashes. Geometric changes can also improve safety for pedestrians and bicyclists (*4*).

The following sections discuss the safety impact of lanes, shoulders and sidewalks, medians and curbs at both signalized and unsignalized intersections.

4.1.2.1. Lanes

AASHTO defines channelization as "the separation or regulation of conflicting traffic movements into definite paths of travel by traffic islands or pavement marking to facilitate the orderly movements of both vehicles and pedestrians". Channelization of intersections is typically considered for one or more of the following factors (*2*):

- The paths of vehicles are confined by channelization so that not more than two paths cross at any one point.
- The angle and location at which vehicles merge, diverge, or cross are controlled.
- The amount of paved area is reduced and thereby decreases vehicle wander and narrows the area of conflict between vehicles.
- Clearer indications are provided for the proper path in which movements are to be made.
- The predominant movements are given priority.
- Areas are provided for pedestrian refuge.
- Separate storage lanes permit turning vehicles to wait clear of through-traffic lanes.
- Space is provided for traffic control devices so that they can be more readily perceived.
- Prohibited turns are controlled.
- The speeds of vehicles are restricted to some extent.

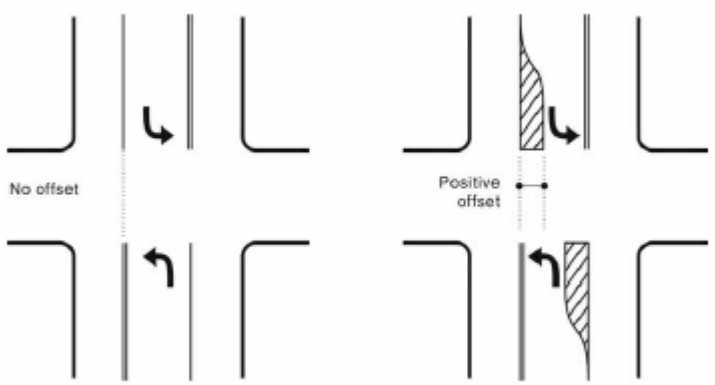
Channelization can be implemented through the use of traffic islands (physical channelization) or road markings (painted channelization) (*5*). Both physical and painted means of channelization are used to demarcate shared and exclusive lanes. As defined in the Highway Capacity Manual, an exclusive turn lane is a designated left-turn or right-turn lane (or lanes) used exclusively by vehicles making those turns (*11*).

According to Antonucci et al., exclusive left-turn lanes are a proven treatment for addressing safety problems associated with left-turning vehicles. By removing left-turning vehicles from the through-traffic stream, conflicts with through vehicles can be reduced or even eliminated depending on the signal timing and phasing scheme. The presence of a left-turn lane allows drivers to wait in the turn lane until there is a gap in opposing traffic through which they can turn safely, and this helps reduce conflicts with opposing through traffic (*4*).

Safety improvements can be made through the proper design of the various elements associated with turn lanes such as the length, width and taper (*4*). For example, the length of a left-turn or right-turn lane should allow for the removal of slow decelerating vehicles from the through traffic stream, thereby reducing the potential for rear-end accidents. This can be particularly important for higher-speed intersections such as those typically found in rural areas. A turn lane that is too short can cause turning queues (especially left-turning vehicles) to spillover into through lanes, forcing through vehicles to stop or change lanes, which can lead to rear-end and sideswipe crashes. In addition, if access to a left-turn lane is blocked, drivers of left-turning vehicles may drive into the opposing lane to reach the left-turn lane; this could result in head-on crashes (*4*).

As discussed by Harwood et al., an emerging issue in the design of left-turn channelization is the restriction in sight distance that opposing left-turn vehicles cause one another (*12*). When opposing left-turn lanes are provided, vehicles waiting to turn left may block the respective driver's view of approaching traffic in the through lanes. This problem may be more acute among older drivers, particularly given that they may experience greater difficulties at intersections as a result of diminished visual capabilities, such as depth and motion perception. These diminished visual capacity traits, often associated with older drivers, can lead to accidents between vehicles turning left from the major road and through vehicles on the opposing major-road approach. As such, an additional key design variable for consideration is the off-set of opposing left-turn lanes. Research findings indicated that an increase in sight distance through positively offsetting left-turn lanes can be beneficial to left-turning drivers, particularly older left-turning drivers (*13*). An illustration of how opposing left-turn lanes can be offset is shown in Exhibit 4-11.

Exhibit 4-11: Offset of Left-turn Lanes (4)



As a result of capacity issues and traffic congestion problems at intersections, many highway agencies use double or even triple left-turn lanes at major intersections. These left-turn configurations, particularly, double left-turn lanes, are attractive design alternatives because they generally increase the overall capacity at an intersection by reducing the required left-turn green time. While dual left-turn lanes are normally used in tandem with protected left-turn phasing, some jurisdictions have opted to employ protected-plus-permitted left-turn signal phasing to further increase intersection capacities (*14*). However, there are a number of potential problems with permissive double left-turn movements. These concerns include reduced sight distances, potential increases in sideswipe accidents, and also impaired ability for left-turning drivers to judge gaps in conflicting traffic (*15*). Signal phasing is discussed in Section 4.2.

The reader is directed to AASHTO's Policy on Geometric Design for Highways and Streets (*2*), the TRB Highway Capacity Manual (*11*), NCHRP Report 279 (*16*), the FHWA's MUTCD (*17*), and the policies of individual highway agencies for further information on the design criteria for turn lanes.

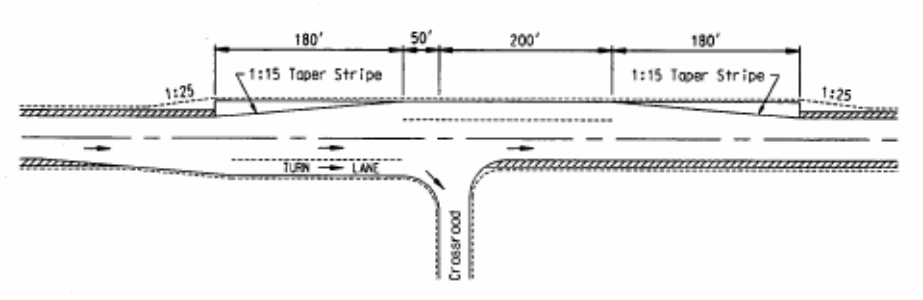
This section discusses the safety effects of the presence (or absence) of left-turn lanes and right-turn lanes as well as the different design elements associated with lanes at intersections in general. The safety effect of the number of lanes on an intersection approach is not addressed here because this is a variable that is primarily determined by traffic demand and the desired level of service. Harwood noted that with a demand-related design parameter such as the number of lanes, it is difficult to directly assess whether any observed safety effects are due to the number of lanes or due to the traffic volume on the approach (*18*).

This edition of the HSM addresses the safety effect of adding left-turn lanes, median acceleration lanes, and by-pass lanes, as well as the elements used to channelize left-turn movements such as bollards, medians, or pavement markings. The HSM will attempt to address the design parameters related to left-turn and right-turn lanes such as the length and offset, along with other related issues such as the use of dual and triple left-turn lanes, dual right-turn lanes, and by-pass lanes.

The reader is directed to the "Intersection Channelization Design Guide" for additional information on commonly-used channelization treatments and practices (*16*). Given that the safety at intersections is closely related to the type of traffic control as well, the reader is also referred to Section 4.2 of the HSM.

When a left-turn lane is not warranted, or if the construction of a left-turn lane is not practical due to a number of reasons (such as a limited right-of-way, terrain, etc.), highway designers sometimes construct left-turn bypass lanes as an alternative or short-term solution at intersections with slower-speed, lower volume traffic (*19*). By-pass lanes are more often constructed on three-leg or T-intersections than on four-leg intersections because there tends to be lower traffic volumes at the three-leg intersections and because there are no streets on the opposite side to the minor street approach, the by-pass lane can be constructed with no conflicting traffic. The objective of the by-pass lane at a three-leg or T-intersection is to allow for a vehicle on the major road to move around or pass a stopped or decelerating vehicle traveling in the same direction and making a left-turn onto the minor street (*20*). An example of a left-turn by-pass lane is illustrated in Exhibit 4-12.

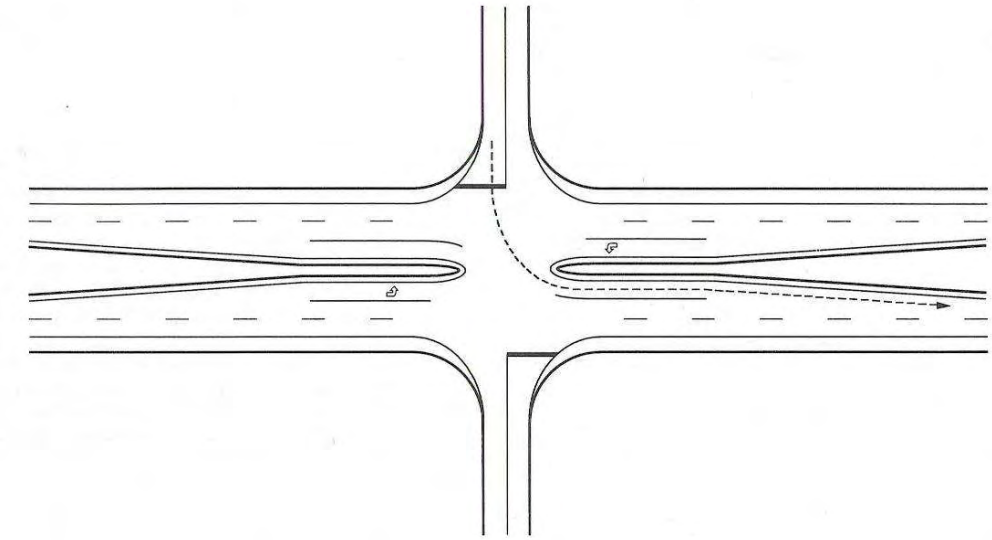
Exhibit 4-12: Left-Turn By-Pass Lanes at T-intersections (19)



Another left-turn treatment that is discussed in this section is median left-turn lanes. These lanes have been used by a number of highway agencies at divided highway intersections to

allow vehicles turning left onto a divided highway to continue through the median roadway without stopping and merge into traffic on the far side of the divided highway (*21*). An example of a median left-turn acceleration lane is shown in Exhibit 4-13.

Exhibit 4-13: Median Left-turn Acceleration Lane on Divided Highway Intersections (21)



The provision of exclusive right-turn lanes can minimize accidents between vehicles turning right and following vehicles, particularly at high-volume and high-speed intersections of major roads. However, it is possible that the installation of a right-turn lane could create other safety problems at the intersection. For example, as shown in Exhibit 4-14, a vehicle on a right-turn lane can obscure the sight of the driver of a following through vehicle who is trying to detect vehicles on the cross streets and vice versa (*5*). This can lead to accidents between vehicles turning left, turning right, or crossing from the minor road and through vehicles on the major road. According to Neuman et al., these types of accidents can potentially be reduced by offsetting right-turn lanes, as shown in Exhibit 4-15.

Exhibit 4-14: Blind spot created by right-turn lanes at intersections (5)

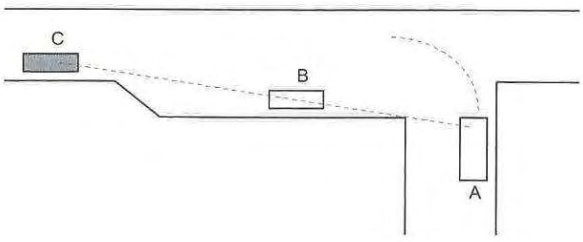
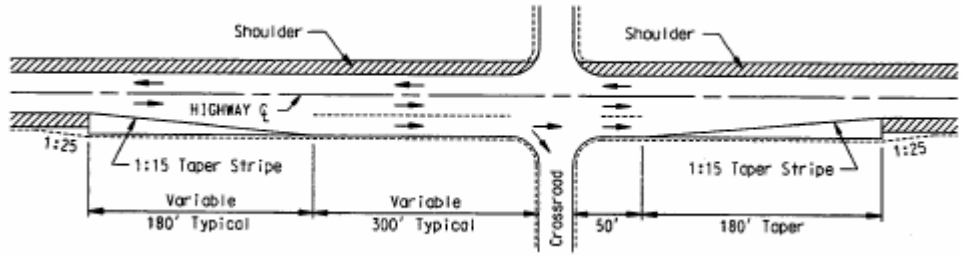


Exhibit 4-15: Offset Right-turn Lanes (16)



As noted earlier, bypass lanes at four-leg/cross intersections should are typically used only when all other solutions have been deemed impractical and where the cross street traffic volume is low. The typical configuration of by-pass lanes at four-leg intersections is usually comprised of a combined right-turn/by-pass lane on the right side of the through lane as shown in Exhibit 4-16. With the presence of the minor road approaches on both sides of a four-leg intersection, the number of conflict points are increased and there is greater concern for safety resulting from the implementation of by-pass lanes four-leg/cross intersections (*20*).

Exhibit 4-16: Combined By-Pass and Right-turn Lanes (19)



Auxiliary through lanes are typically used at intersections to increase the capacity of through traffic. The safety effect of auxiliary through lanes, as well as the different design parameters related to these types of lanes may be addressed in a future edition of the Highway Safety Manual.

Exhibit 4-17: Resources examined to investigate the safety effect of lanes at intersections

DOCUMENT	DESCRIPTION	COMMENT
(*125*) Wang, X. and Abdel-Aty, M., Right-Angle Crash Ocurrence at Signalized Intersections, *Transportation Research Record* 2019, (2007), pp. 156-168.	Negative binomial regression models were estimated relating the frequency of right angle crashes with many intersection and approach characteristics including whether there a positive left-turn offset on the crossing roadway (instead of negative offset)	Added to synthesis.
(*126*) Jonsson, T., Ivan, J.N., and Zhang, C., Crash Prediction Models for Intersections on Rural Multilane Highways: Differences by Collision Type, Transportation Research Record 2019, (2007), pp. 91-98	Negative binomial regression models were estimated relating the frequency of different types of crashes on stop controlled intersections on rural multilane roads with many intersection and approach characteristics. Independent variables include many site characteristics including whether there was left turn channelization	Added to synthesis. AMFs with t statistics are provided.
(*127*) Fitzpatrick, K., Schneider IV, W.H., and Park, E.S., Operation and Safety of Right-Turn Lane Designs, *Transportation Research Record* 1961, (2006), pp. 55-64.	This study compiled crash data from five sites in Irving and four sites from College Station, Texas. The intent was to look at the number of right-turn crashes associated with four types of right turn treatments: Right-turn lane with lane line, Right-turn lane with island, Shared through-right lane, and Shared through-right lane with island.	Not added to synthesis. There were only 16 right turn crashes that occurred in the sample of sites used in this study. Does not add much to the safety knowledge.
(*128*) Wang, X., Abdel-Aty, M., and Brady, P., Crash Estimation at Signalized Intersections: Significant Factors and Temporal Effect, *Transportation Research Record* 1953, (2006), pp. 10-20	Negative binomial regression models were estimated relating the frequency of crashes with many intersection and approach characteristics including the presence of exclusive right-turn lanes.	Not added to synthesis. Other studies of the same treatment (e.g., Harwood et al., 2002) have used a more defensible approach to determine the safety effect of right-turn lanes.
(*129*) Wang, X. and Abdel-Aty, M., Temporal and Spatial Analysis of Rear-end Crashes at Signalized Intersections, *Accident Analysis and Prevention*, 38 (2006), pp. 1137-1150.	Negative binomial regression models were estimated relating the frequency of rear-end crashes with many intersection and approach characteristics including the presence of exclusive right-turn and left-turn lanes.	Not added to synthesis. Other studies of the same treatment (e.g., Harwood et al., 2002) have used a more defensible approach to determine the safety effect of right-turn and left-turn lanes.
(*130*) Abdel-Aty, M. and Wang, X., Crash Estimation at Signalized Intersections Along Corridors: Analyzing Spatial Effect and Identifying Significant Factors, *Transportation Research Record* 1953 (2006), pp. 98-111.	Negative binomial regression models were estimated relating the frequency of crashes with many intersection and approach characteristics including the presence of exclusive right-turn lanes.	Not added to synthesis. Other studies of the same treatment (e.g., Harwood et al., 2002) have used a more defensible approach to determine the safety effect of right-turn lanes.

DOCUMENT	DESCRIPTION	COMMENT
(*131*) Kim, D. and Washington, S., The Significance of Endogeneity Problems in Crash Models: An Examination of Left-Turn Lanes in Intersection Crash Models, *Accident Analysis and Prevention*, 38 (2006), pp. 1094-1100.	Regression models were estimated to relating angle crashes to the intersection characteristics including left-turn lanes. A limited information maximum likelihood (LIML) approach was used to account for the endogeneity between left-turn lane presence and angle crashes.	Not added to synthesis. Other studies of the same treatment (e.g., Harwood et al., 2002) have used a more defensible approach to determine the safety effect of left-turn lanes.
Lee, Jae-Joon.; Hummer , E, Joseph.; Rouphail, M. Nagui. False Capacity for Lane Drops. North Carolina State University, Research and Analysis Group, Final Report: Project HWY-2003-07. 2005.	This paper developed regression models to explain lane utilization for six defined intersection types in North Carolina using 94 sites. This paper also looked at how land drop affects safety. 3 years of collision data and collision rates. The authors looked at patterns in the collision rates for a few types of lanes drops.	No safety effect estimated. Not added to synthesis.
(*5*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis. Results from meta-analysis (p. 293) used to calculate t and s values.
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Report provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities. Only presents results from select previous research studies.	Added to synthesis. Only descriptive information about lanes added. The only quantitative information found (AMFs developed by Harwood et al, 2002) not added since the study cited will be reviewed first-hand.
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Accidents Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Reference discusses potential safety impacts of reducing intersection skew and providing left-turn lanes with positive offsets for older drivers	Not added to synthesis. No AMFs or other quantified evidence of safety improvements.
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	Interim report for study designed to develop a methodology to predict the safety performance of various elements such as Lane width, Shoulder width and curbs, etc. on urban and suburban arterials.	Results not available.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Study reviews and brings together the best available evidence on the safety impact of traffic operations. All the studies reviewed report on crash occurrence, severity or proven crash surrogates.	Not added to synthesis because reference does not provide sufficient information from studies cited needed to properly assess the soundness of the approach, and the details related each of those studies. In addition, the majority of the studies cited has been or will be reviewed first-hand.

DOCUMENT	DESCRIPTION	COMMENT
(*12*) (Harwood, D. W., Bauer, K. M., Potts, I. B., Torbic, D. J., Richard, K. R., Rabbani, E. R., Hauer, E., Elefteriadou, L., and Griffith, M. S., "Safety Effectiveness of Intersection Left- and Right-Turn Lanes." Washington, D.C., 82nd Transportation Research Board Annual Meeting, (2003))	Conducted a well designed before and after with control study of adding left-turns lanes, adding right-turn lanes, or extending the length of the lanes at intersections	Suggested by NCHRP 17-18(4). Added to synthesis. AMFs were developed along with standard error values for addition of left- and right-turn lanes at T- and four-leg intersections with varying traffic controls.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Reference discusses issues associated with aggressive driving and potential strategies to mitigate the problem.	Not added to synthesis. Brief mention about possibly providing longer left-turn lanes to minimize driver frustration (therefore discouraging aggressive driving behavior). Overall, material not relevant to the HSM.
(*10*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Report is a detailed implementation guide that provides guidance and strategies to improve safety at unsignalized intersections	Added to synthesis. Only discussion on offset right-turn lanes, left-and right-turn acceleration lanes added. Reference cites two studies by Harwood et al. (2002) that have been reviewed first-hand and added to synthesis.
(*22*) (Harwood, D. W., Bauer, K. M., Potts, I. B., Torbic, D. J., Richard, K. R., Kohlman Rabbani,E.R., Hauer, E., Elefteriadou, L., "Safety Effectiveness of Intersection Left- and Right-Turn Lanes" Federal Highway Administration FHWA-RD-02-089, McLean, Va. (2002))	Same study as (*12*)	Added to synthesis.
(Strathman, J. G., Duecker, K. J., Zang, J., and Williams, T., "Analysis of Design Attributes and Crashes on Oregon Highway System." FHWA-OR-RD-02-01, Washington, D.C., Federal Highway Administration, (2001))	Study developed crash frequency models and crash reduction factors for freeway and non-freeway road segments.	Not added to synthesis due to shortcomings in study approach. Study attempted to relate changes in crashes with treatments such as the presence of turn lanes but removed intersection crashes from database. In addition, some road segments had continuous two-way left-turn lanes, which mean that the safety effects are really due to a combination of treatments and cannot just be attributed to turn lanes alone.
(Thomas, G. B. and Smith, D. J., "Effectiveness of Roadway Safety Improvements." Ames, Iowa Department of Transportation, (2001))	Analyzes seven intersection improvement categories in the State of Kansas including new signals, new signals and turn lanes, add turn phasing to existing signal, add turn phasing and turn lane to existing signals, replace pedestal mount signals with mast arm mounted signals, add turn lanes only and other geometric improvements.	Not added to synthesis. Findings from this naïve before-after study have been superseded by findings from more recent studies (Harwood et al., 2004) that have used more defensible methods (eg. EB approach).

DOCUMENT	DESCRIPTION	COMMENT
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Study presents an algorithm for predicting the safety performance of various factors for roadway segments and for at-grade intersections on rural two-lane highways	Not added to synthesis. Findings from this expert panel have been superseded with findings from a more recent study by the same principle researchers (Harwood et al., 2004)
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Study investigated low-cost safety and operational improvements for two-lane and three-lane roadways.	Not added to synthesis. Some anecdotal evidence of safety impacts resulting from left-turn channelization but insufficient information to properly assess the validity of findings or to calculate t and s values.
(Dixon, K. K., Hibbard, J. L., and Nyman, H., "Right-Turn Treatment for Signalized Intersections." Dallas, Tex., Urban Street Symposium Conference Proceedings, (1999))	Study of right-turn strategies; comparative analysis of two-years of crash history at select intersections in Atlanta	Suggested by NCHRP 17-18(4). Not added to synthesis. Study is a cross-sectional study that did not account for confounding factors. In addition, there are several stronger studies on right-turn lanes already included in synthesis [see (Harwood et al., 2003) and (Harwood et al., 2000)]
(Vogt, A., "Crash Models for Rural Intersections: Four-Lane by Two-Lane Stop-Controlled and Two-Lane by Two-Lane Signalized." FHWA-RD-99-128, McLean, Va., Federal Highway Administration, (1999))	Analyzed the relationship between crashes and intersection elements (including channelization) at 3 types of rural intersections in CA and MI	Suggested by NCHRP 17-18(4). Not added to synthesis. Finding from this study already used as part of effort by expert panel to develop AMFs in study by Harwood et al. (2000).
(*20*) (Preston, H. and Schoenecker, T., "Bypass Lane Safety, Operations, and Design Study." MN/RC - 2000-22, St.Paul, Minnesota Department of Transportation, (1999))	Naïve before and after analysis of bypass lanes affect on crashes in rural Minnesota	Suggested by NCHRP 17-18(4). Added to synthesis. Used crash data in reference (see Figure 5.23 on p. 72) to calculate t and s values.
(*14*) (Tarrall, M. B. and Dixon, K. K., "Conflict Analysis for Double Left-Turn Lanes with Protected-Plus-Permitted Signal Phases." Transportation Research Record 1635, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 1-19.)	Used traffic conflicts to assess the safety effect of three double-left-turn lanes with protected-plus-permitted phasing, metro Atlanta	Suggested by NCHRP 17-18(4). Qualitative information added to synthesis. No quantitative information on safety impacts added because study uses conflicts, not accidents. In addition, study is cross-section study but does not discuss potential effects of confounding factors and whether direct comparisons of conflict rates can be made.
(Staplin, L., Harkey, D. L., Lococo, K. H., and Tarawneh, M. S., "Intersection Geometric Design and Operational Guidelines for Older Drivers and Pedestrians Volume: I: Final Report." FHWA-RD-96-132, McLean, Va., Federal Highway Administration, (1997))	Study presents findings of changing geometric and operational characteristics and measuring the impact on older drivers through human factors measures.	Not added to synthesis. Some discussion about safety issues related to offset left-turn lanes and right-turn curb radius on older drivers. However, these discussions have already been added to synthesis using material from other studies previously reviewed. No quantitative information on safety effects of these treatments was presented.

DOCUMENT	DESCRIPTION	COMMENT
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Reference reviewed existing research and provided guidelines on highway engineering improvements that would help older drivers and pedestrians.	Not added to synthesis. No AMFs or other quantitative evidence of safety impacts found.
(*15*) (Carnahan, C. R., Fox, W. C., French, K. A., Hange, W. A., Henderson, J. L., Hook, D. J. P., Imansepahi, A., Khattak, S. S., Paulson, J. D., Resseguie, J. K., Richey, J. M., and Searls, T. D., "Permissive Double Left Turns: Are They Safe?" Washington, D.C., ITE 1995 Compendium of Technical Papers, (1995) pp. 214-218.)	Comparison of crash rates at signals with single and double left-turns operating with permissive and protect-only phasing in Denver and Colorado Springs metro areas	Suggested by NCHRP 17-18(4). Insufficient data to determine t and s values. In addition, comparison of accident rates, not frequencies but insufficient information about exposure to properly assess if comparison of accident rates is feasible. Qualitative information added to synthesis.
(Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Report is a detailed study of the operational and safety considerations of median widths.	Only figure of median acceleration lane added. No quantitative information found, only discussions and anecdotal evidence presented.
(Maze, T. H., Henderson, J. L., and Sankar, R., "Impacts on Safety of Left-Turn Treatment at High Speed Signalized Intersections." HR-347, Ames, Iowa Highway Research Board, (1994))	Study investigated the safety effects of left-turn treatment at high speed signalized intersections and developed regression models to estimate accident rates for left-turn and total approach accidents	Not added to synthesis. Results from more recent studies [(Harwood et al., 2002)] using stronger methodologies have already been incorporated into synthesis.
(Kuciemba, S. R. and Cirillo, J. A., "Safety Effectiveness of Highway Design Features: Volume V - Intersections." FHWA-RD-91-048, Washington, D.C., Federal Highway Administration, (1992))	Report briefly discusses nine studies (1972 to 1988) that examined the relationship between intersections and safety.	Not added to synthesis. Only anecdotal evidence and discussions are presented. No quantitative information found.
(Gibby, A. R., Washington, S. P., and Ferrara, T. C., "Evaluation of High-Speed Isolated Signalized Intersections in California." Transportation Research Record 1376, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 45-56.)	Analyzed the relationship between crashes and intersection elements (including channelization) at high-speed intersections in CA	Suggested by NCHRP 17-18(4). Not added to synthesis. Study correlated approach accident rates with different types of left-turn signal phasing rather than the absence or presence of left-turn lanes. More relevant to intersection operations.
(McCoy, P. T. and Malone, M. S., "Safety Effects of Left-Turn Lanes on Urban Four-Lane Roadways." Transportation Research Record 1239, Washington, D.C., Transportation Research Board, National Research Council, (1989) pp. 17-22.)	Used crash data at signalized and unsignalized intersections in NE to determine the effect of left-turn lanes on safety	Suggested by NCHRP 17-18(4). Not added to synthesis. Finding from this study already used as part of effort by expert panel to develop AMFs in study by Harwood et al. (2000).

DOCUMENT	DESCRIPTION	COMMENT
(Neuman, T. R., "NCHRP Report 279: Intersection Channelization Design Guide." Washington, D.C., Transportation Research Board, National Research Council, (1985))	Additional information on factors to consider for constructing right-turn lanes or for *design* guidelines (e.g., taper length, storage lane length, and corner radius design guidelines) for right-turn lanes. The report also addresses multiple turn lanes.	Not added to synthesis although reference is one of the studies reader is directed to for more information. Discussion and anecdotal evidence presented for many design parameters associated with left- and right-turn lanes. These discussions already added from more recent references. No quantitative information found.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Report is a synthesis of 17 safety research areas, including channelization and left-turn lanes.	Not added to synthesis. Mostly anecdotal and qualitative information provided, all of which have already been added to synthesis from more recent references.
(Box, P. C., "Intersections." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 4, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Study summarizes finds from a number of studies (prior to 1970) that investigated the various design and operational parameters of intersections.	Not added to synthesis. Study included brief discussion on findings from early studies that investigated left-turn treatments. However, these findings have since been superseded by more results from more recent studies.

The effectiveness of a number of left-turn and right-turn treatments has been quantified for two-lane and multi-lane rural highways, as well as urban and suburban arterials.

Treatment: Add left-turn lanes to major road approaches at intersections

Elvik and Vaa conducted a meta-analysis of a number of studies related to the addition of left-turn lanes through the use of physical and painted channelization treatments, and found that the use of physical means of channelization (e.g., using traffic islands) resulted in decreases in injury accidents and mixed results in PDO accidents. Conversely, the authors found that adding painted left-turn lanes produced mixed results in injury accidents and decreases in PDO accidents (p. 293) (*5*). A distinction was made in terms of the types of intersections (T-intersections versus four-leg or cross intersections).The majority of the sites examined were two-lane roads with traffic volumes ranging from 5,000 veh/day to 15,000 veh/day. The results from the meta-analysis are summarized in Exhibit 4-18 to Exhibit 4-19. This study was considered to be of medium-high quality due to the rigorous methodology applied by Elvik and Vaa, and the standard error values have been multiplied with a method correction factor of 1.8 to compensate for this.

Harwood et al. (2002) investigated the safety effectiveness of adding left-turn lanes with a before-after study using a combination of three approaches: the yoked comparison (YC) or matched-pair approach, the comparison group approach (CG), and the Empirical Bayes (EB) approach (*22*). In descending order of appropriateness, results from the EB approach were deemed to be the most credible followed by the results from the CG approach and then the YC approach. For cases where the EB result was not statistically significant but the CG or YC result was statistically significant, the result from CG or YC approach was adopted as the final result (*22*). The intersections studied were located in both urban and rural areas, and were either traffic signal controlled or two-way stop-controlled. For the sites examined, traffic volumes had a range of 1,600 veh/day to 55,100 veh/day for major road ADT, 25 veh/day to 26,000 veh/day for minor road ADT, and 1,100 veh/day to 62,300 veh/day for total entering ADT. The results from the

study quantifying the safety effect of adding a left-turn lane on a single major road approach at T-intersections are shown in Exhibit 4-18. The safety impact of adding a left-turn lane on a single major road approach is summarized in Exhibit 4-19. The safety impact of adding left-turn lanes on both major road approaches at four-leg/cross intersections is summarized in Exhibit 4-20. These results were assigned a high rating; a MCF of 1.2 was applied to the s ideal calculated using reported standard error values.

Standard error values are not available for some AMFs because those values were developed based on the judgment of an expert panel using a number of previous research studies for rural two-lane roads, reported by Harwood et al. (2000) (*7*). Despite the lack of standard error values, these results were determined to be the best available knowledge at this time and suggested by Harwood et al. (2002) (*22*).

Exhibit 4-18: Safety effectiveness of adding left-turn lanes at T-intersections

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Physical channelization of left-turn lane on major road	Mostly rural	T-intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, Injury	0.73	0.23
Elvik and Vaa, 2004	Physical channelization of left-turn lane on major road	Mostly rural	T-intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, PDO	1.20	0.42
Elvik and Vaa, 2004	Painted channelization of left-turn lane on major road	Mostly rural	T-intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, Injury	0.78	0.25
Elvik and Vaa, 2004	Painted channelization of left-turn lane on major road	Mostly rural	T-intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, PDO	0.80	0.34
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Rural	Stop-controlled T-intersections, Major road 1,600 to 32,400 vpd, Minor road 50 to 11,800 vpd	All types, all severities	0.56	0.07
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Stop-controlled T-intersections, Major road 1,520 to 40,600 vpd, Minor road 200 to 8000 vpd	All types, all severities	0.67	0.15
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Rural	Stop-controlled T-intersections, Major road 1,600 to 32,400 vpd, Minor road 50 to 11,800 vpd	All types, Fatal and Injury	0.45	0.10

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Rural	Signal controlled T-intersections, volume not reported	All types, all severities	0.85	n/a
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Signal controlled T-intersections, volume not reported	All types, all severities	0.93	n/a
Harkey et al., (2008)	Installation of left-turn lane on single major road approach	Urban	Stop-controlled T-intersections, volume not reported	All types, Fatal and Injury	0.65	n/a
Harkey et al., (2008)	Installation of left-turn lane on single major road approach	Urban	Signal controlled T-intersections, volume not reported	All types, Fatal and Injury	0.94	n/a

Exhibit 4-19: Safety effectiveness of adding left-turn lanes on single major road approach at four-leg/cross intersections

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Physical channelization of left-turn lane on major road	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	All types, Injury	0.96	0.21
Elvik and Vaa, 2004	Physical channelization of left-turn lane on major road	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	All types, PDO	0.84	0.39
Elvik and Vaa, 2004	Painted channelization of left-turn lane on major road	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, Injury	1.28	0.48
Elvik and Vaa, 2004	Painted channelization of left-turn lane on major road	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, PDO	0.74	0.22

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Rural	Stop-controlled four-leg/cross intersections, Major road 1,600 to 32,400 vpd, Minor road 50 to 11,800 vpd	All types, all severities	0.72	0.03
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Stop-controlled four-leg/cross intersections, Major road 1,520 to 40,600 vpd, Minor road 200 to 8000 vpd	All types, all severities	0.73	0.04
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Rural	Signal controlled four-leg/cross intersections, volume not reported	All types, all severities	0.82	n/a
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Signal controlled four-leg/cross intersections, Major road 7,200 to 55,100 vpd, Minor road 550 to 2,600 vpd	All types, all severities	0.90	0.10
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Newly signalized four-leg/cross intersections, Major road 4,600 to 40,300 vpd, Minor road 100 to 13,700 vpd	All types, all severities	0.76	0.03
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Rural	Stop-controlled four-leg/cross intersections, Major road 1,600 to 32,400 vpd, Minor road 50 to 11,800 vpd	All types, Fatal and Injury	0.65	0.04
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Stop-controlled four-leg/cross intersections, Major road 1,520 to 40,600 vpd, Minor road 200 to 8000 vpd	All types, Fatal and Injury	0.71	0.05
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Signal controlled four-leg/cross intersections, Major road 7,200 to 55,100 vpd, Minor road 550 to 2,600 vpd	All types, Fatal and Injury	0.91	0.02

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of left-turn lane on single major road approach	Urban	Newly signalized four-leg/cross intersections, Major road 4,600 to 40,300 vpd, Minor road 100 to 13,700 vpd	All types, Fatal and Injury	0.72	0.06

Exhibit 4-20: Safety effectiveness of adding left-turn lanes on both major road approaches at four-leg/cross intersections

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Rural	Stop-controlled four-leg/cross intersections, Major road 1,600 to 32,400 vpd, Minor road 50 to 11,800 vpd	All types, all severities	0.52	0.04
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Urban	Stop-controlled four-leg/cross intersections, Major road 1,520 to 40,600 vpd, Minor road 200 to 8000 vpd	All types, all severities	0.53	0.04
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Rural	Traffic Signal controlled four-leg/cross intersections, volume not reported	All types, all severities	0.67	n/a
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Urban	Traffic signal controlled four-leg/cross intersections, Major road 7,200 to 55,100 vpd, Minor road 550 to 2,600 vpd	All types, all severities	0.81	0.13
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Urban	Newly signalized four-leg/cross intersections, Major road 4,600 to 40,300 vpd, Minor road 100 to 13,700 vpd	All types, all severities	0.58	0.04
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Rural	Stop-controlled four-leg/cross intersections, Major road 1,600 to 32,400 vpd, Minor road 50 to 11,800 vpd	All types, Fatal and Injury	0.42	0.04

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Urban	Stop-controlled four-leg/cross intersections, Major road 1,520 to 40,600 vpd, Minor road 200 to 8000 vpd	All types, Fatal and Injury	0.50	0.06
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Urban	Traffic signal controlled four-leg/cross intersections, Major road 7,200 to 55,100 vpd, Minor road 550 to 2,600 vpd	All types, Fatal and Injury	0.83	0.02
Harwood et al., 2002	Installation of left-turn lanes on both major road approaches	Urban	Newly signalized four-leg/cross intersections, Major road 4,600 to 40,300 vpd, Minor road 100 to 13,700 vpd	All types, Fatal and Injury	0.52	0.07

Discussion: Provide positive offset for left-turn lanes

According to Antonucci et al., it is likely that providing positive offset for left-turn lanes helps to reduce the potential for left-turning crashes at signalized intersections since it provides the opportunity for longer sight distances for the benefit of left-turning drivers to spot oncoming vehicles thereby improving their ability to discern appropriate gaps in opposing through traffic (*4*). However, there is only limited empirically-based evidence of such an effect. Wang and Abdel-Aty developed regression models relating right-angle crash frequency with intersection and approach characteristics at 197 four-leg signalized intersections in Central Florida (*125*). Models were developed at the intersection level, roadway level, and approach level. In the roadway and approach level models, crashes were either assigned to the at-fault vehicle or with the roadway or approach whose stop line was closest to the crash location (defined as near-side). Some of their models indicated that the presence of zero or positive left-turn offset on the crossing roadway (compared to having negative offset) is associated with fewer right-angle crashes.

Jonsson et al. (*126*) developed regression models relating single vehicle, intersection direction (angle), opposite direction, some direction, and total crashes, with intersection characteristics at stop controlled T and cross intersections on rural multilane roads in California. Their models showed that for four-leg intersections, the presence of left-turn channelization (raised/curb or painted) seems to reduce same direction and total crashes.

AMFs and standard errors from these two studies are provided in Exhibit 4-21 (a method correction factor of 2.0 was applied to the standard errors from both these studies). As part of Phase 2 of FHWA's low cost pooled fund effort, a study is being conducting to evaluate the safety impact of positive offset for left-turn lanes at signalized intersections. This study is using the before-after empirical Bayes study design. The results of this evaluation are expected to be available in Fall 2008.

Exhibit 4-21: Safety effectiveness of introducing left-turn offset

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Wang and Abdel-Aty, 2007	Introducing zero or positive offset left-turn lane on crossing roadway	Urban	Signalized intersection (roadway-level at-fault model); Major road through AADT 30.607 to 82,774	Right angle, all severities	0.739	0.256
Wang and Abdel-Aty, 2007	Introducing zero or positive offset left-turn lane on crossing roadway	Urban	Signalized intersection (approach-level at-fault model); Major road through AADT 30.607 to 82,774	Right angle, all severities	0.801	0.275
Jonsson et al. 2007	Introduce raised/curb left-turn channelization	Rural	Four-leg stop controlled intersections on multilane roads	Same direction crashes, all severities	0.749	0.270
Jonsson et al. 2007	Introduce raised/curb left-turn channelization	Rural	Four-leg stop controlled intersections on multilane roads	Total crashes, all severities	0.872	0.281
Jonsson et al. 2007	Introduce painted left-turn channelization	Rural	Four-leg stop controlled intersections on multilane roads	Same direction crashes, all severities	0.613	0.189
Jonsson et al. 2007	Introduce painted left-turn channelization	Rural	Four-leg stop controlled intersections on multilane roads	Total crashes, all severities	0.671	0.175

Discussion: Provide left-turn acceleration lanes at divided highway intersections

By removing the slower left-turning vehicles from through lanes, this treatment is expected to reduce rear-end and sideswipe accidents resulting from conflicts between vehicles turning left onto the highway and through vehicles on the highway (*10*). However, no quantitative estimates of the safety effectiveness of this treatment are available. Neuman et al. identified three potential areas of concern with regards to the use of left-turn acceleration lanes at divided highway intersections. First, the length of the lanes is critical since excessively long acceleration lanes may be mistaken as an additional through lane, resulting in additional conflicts due to last-minute lane changes; second, the appropriate design of the median opening area is also a key design parameter in minimizing conflicts between vehicles entering the left-turn acceleration lane and other through and turning vehicles using the median opening; third, the installation of left-turn acceleration lanes increases the overall width of the intersection, and this in turn may cause potential problems for pedestrians crossing the intersection (*10*).

Treatment: Add right-turn lanes to major road approaches at intersections

Elvik and Vaa carried out a meta-analysis of a number of studies that examined the safety effects of adding right-turn lanes using physical channelization treatments (e.g. using

traffic islands), and found that the use of this particular type of treatment resulted in decreases in both injury accidents and PDO accidents (p. 293) (*5*). As with left-turn lanes, a distinction was made in terms of the types of intersections (T-intersections versus four-leg or cross intersections); the majority of the sites examined were two-lane roads with traffic volumes ranging from 5,000 veh/day to 15,000 veh/day. The results from the meta-analysis are summarized in Exhibit 4-22 and Exhibit 4-23. This study was considered to be of medium-high quality due to the rigorous methodology applied by Elvik and Vaa, and the standard error values have been multiplied with a method correction factor of 1.8 to compensate for this. The study results were not combined due to the differences in crash severity and type of intersections (T-intersection versus cross intersection).

Exhibit 4-22: Safety effectiveness of adding right-turn lanes through physical channelization at T-intersections

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Physical channelization of right-turn lane on major road	Mostly rural	T-intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	All types, Injury	0.98	0.63

Exhibit 4-23: Safety Effectiveness of Adding Right-turn Lanes through physical channelization at Four-leg/Cross intersections

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Physical channelization of right-turn lane on major road	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	All types, Injury	0.87	1.94
Elvik and Vaa, 2004	Physical channelization of right-turn lane on major road	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, PDO	0.81	0.84

Harwood et al. investigated the safety effectiveness of adding right-turn lanes with a before-after study using a combination of three approaches: the yoked comparison (YC) or matched-pair approach, the comparison group approach (CG), and the Empirical Bayes (EB) approach. In descending order of appropriateness, results from the EB approach were deemed to be the most credible followed by the results from the CG approach and then the YC approach (*22*). For cases where the EB result was not statistically significant but the CG or YC result was statistically significant, the result from CG or YC approach was adopted as the final result. The intersections studied were located in both urban and rural areas, and were either traffic signal controlled or two-way stop-controlled. For the sites examined, traffic volumes had a range of

1,600 to 55,100 veh/day for major road ADT, 25 to 26,000 veh/day for minor road ADT, and 1,100 to 62,300 veh/day for total entering ADT, respectively.

The results from the study quantifying the safety effect of adding a right-turn lane on a single major road approach at either T-intersections or four-leg/cross intersections are shown in Exhibit 4-24. The safety impact of adding a right-turn lane on both major road approaches at four-leg/cross intersections are summarized in Exhibit 4-25. These results were assigned a high rating; a MCF of 1.2 was applied to the s ideal calculated using reported standard error values.

Exhibit 4-24: Safety Effectiveness of Adding Right-turn Lanes on One Major Road Approach at T- or Four-leg/Cross Intersections

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of right-turn lane on single major road approach	Mixed urban and rural	Stop-controlled T- or Four-leg/cross intersections, major road 1,600 to 55,100 veh/day, minor road 25 to 26,000 veh/day	All types, all severities	0.86	0.06
Harwood et al., 2002	Installation of right-turn lane on single major road approach	Mixed urban and rural	Traffic signal controlled T- or Four-leg/cross intersections, major road 1,600 to 55,100 veh/day, minor road 25 to 26,000 veh/day	All types, all severities	0.96	0.02
Harwood et al., 2002	Installation of right-turn lane on single major road approach	Mixed urban and rural	Stop-controlled T- or Four-leg/cross intersections, major road 1,600 to 55,100 veh/day, minor road 25 to 26,000 veh/day	All types, Fatal and Injury	0.77	0.08
Harwood et al., 2002	Installation of right-turn lane on single major road approach	Mixed urban and rural	Traffic signal controlled T- or Four-leg/cross intersections, major road 1,600 to 55,100 veh/day, minor road 25 to 26,000 veh/day	All types, Fatal and Injury	0.91	0.04

Exhibit 4-25: Safety Effectiveness of Adding Right-turn Lanes on Both Major Road Approaches at Cross Intersections

Author, date	Treatment/ Element	Setting	Intersection Type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Installation of right-turn lane on both major road approaches	Mixed urban and rural	Stop-controlled T- or Four-leg/cross intersections, major road 1,600 to 55,100 veh/day, minor road 25 to 26,000 veh/day	All types, all severities	0.74	0.08
Harwood et al., 2002	Installation of right-turn lane on both major road approaches	Mixed urban and rural	Traffic signal controlled T- or Four-leg/cross intersections, major road 1,600 to 55,100 veh/day, minor road 25 to 26,000 veh/day	All types, all severities	0.92	0.03
Harwood et al., 2002	Installation of right-turn lane on both major road approaches	Mixed urban and rural	Stop-controlled T- or Four-leg/cross intersections	All types, fatal and injury	0.59	n/a
Harwood et al., 2002	Installation of right-turn lane on both major road approaches	Mixed urban and rural	Traffic signal controlled T- or Four-leg/cross intersections	All types, fatal and injury	0.83	n/a

Discussion: Provide positive offset for right-turn lanes

None of the studies examined provided any empirically-based evidence of accident reductions resulting from the implementation of positive offsets for right-turn lanes. However, it is likely that such a treatment helps to reduce the potential for accidents between vehicles turning left, turning right, or crossing from the minor road and through vehicles on the major road since vehicles in the right-turn lanes no longer obstruct the view of those drivers (*10*).

Discussion: Provide right-turn acceleration lanes at intersections

By removing the slower right-turning vehicles from through lanes, this treatment is expected to reduce rear-end and sideswipe accidents resulting from conflicts between vehicles turning right onto the highway and through vehicles on the highway (*10*). No quantitative estimates of the safety effectiveness of this treatment are available. Neuman et al. identified two potential areas of concern with regards to the use of right-turn acceleration lanes at intersections. First, the length of the lanes is critical since excessively long acceleration lanes may be mistaken as an additional through lane, resulting in additional conflicts due to last-minute lane changes; second, the installation of right-turn acceleration lanes increases the overall width of the

intersection, and this in turn may cause potential problems for pedestrians crossing the intersection (*10*).

Treatment: Channelization on both major and minor roads at intersections

Elvik and Vaa meta-analyzed a number of studies that investigated the combined safety effects of adding left- and right-turn lanes at intersections using both physical (e.g. using traffic islands) and painted treatments (5). Elvik and Vaa report that the use of this particular type of treatment decreased injury accidents and PDO accidents at T-intersections and four-leg/cross intersections. However, the authors noted that there appeared to be an increase in injury accidents following the implementation of physical channelization of minor and major roads at T-intersections (p. 293) (5). The majority of the sites examined were two-lane roads with traffic volumes ranging from 5,000 to 15,000 veh/day. The results from the meta-analysis are summarized in Exhibit 4-26 and Exhibit 4-27. This study was considered to be of medium-high quality and the standard error values have been multiplied with a method correction factor of 1.8 to account for this.

Exhibit 4-26: Safety effectiveness of adding channelization on both major and minor roads at T-intersections

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Physical channelization of both major and minor roads	Mostly rural	T-intersections, mostly 2-lane roads, 5,000 to 15,000 veh/day	All types, Injury	1.16	0.16

Exhibit 4-27: Safety effectiveness of adding channelization on both major and minor roads at four-leg/cross intersections

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Physical channelization of both major and minor roads	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	All types, Injury	0.73	0.10
Elvik and Vaa, 2004	Physical channelization of both major and minor roads	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	All types, PDO	0.87	0.40
Elvik and Vaa, 2004	Painted channelization of both major and minor roads	Mostly rural	Four-leg/cross intersections, mostly 2-lane roads , 5,000 to 15,000 veh/day	Injury Accidents	0.43	0.12

Treatment: Install by-pass lanes

Preston and Schoenecker conducted a naïve before-after study to investigate the safety effectiveness of by-pass lanes at stop-controlled three- and four-leg intersections on two-lane and multi-lane rural highways (*20*). Results from the study are summarized in Exhibit 4-28. Traffic volumes at the study sites were not provided in the reference. The study was assigned a low rating due to the methodology applied and lack of detail provided; the values for the indices of effectiveness were calculated using available crash data and a MCF of 2.2 was applied to the s ideal calculated based on the number of before crashes and the ratio of after/before duration. The study results were not combined due to the differences in crash severity.

Exhibit 4-28: Safety Effectiveness of Adding By-Pass Lanes at Intersections

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Preston and Schoenecker, 1999	Addition of left- or right-turn by-pass lanes	Rural	Stop-controlled T- or Four-leg/cross intersections, volumes not reported	All types, all severities	0.95	0.21
Preston and Schoenecker, 1999	Addition of left- or right-turn by-pass lanes	Rural	Stop-controlled T- or Four-leg/cross intersections	All types, Fatal and Injury	1.25	0.46
Preston and Schoenecker, 1999	Addition of left- or right-turn by-pass lanes	Rural	Stop-controlled T- or Four-leg/cross intersections	All types, PDO	0.81	0.23

Discussion: Introduce right-turn channelization

Much of the research conducted to assess the safety effectiveness of right-turn channelization is dated (i.e., 20 to 40 years old). Insufficient data were presented in the references reviewed to ascertain or calculate specific AMFs.

However, as noted by Fitzpatrick et al., "The effectiveness of various safety improvement projects was evaluated in the early 1970's by Dale. He found that channelization of intersections produced an average 32.4 percent reduction in all types of accidents. Accidents involving personal injuries decreased by more than 50 percent" (page 81,(*23*)). Further details of the projects were not reported by Fitzpatrick et al.

Similar results were noted by McCoy et al. (1995). The findings of this research are summarized by Harwood on pages 40 and 41 of the NCHRP Interim Report 17-26 - Methodology to Predict the Safety Performance of Urban and Suburban Arterials:

"In general, studies indicate that channelization improves safety in urban and suburban areas. David and Norman found that raised pavement markings tended to decrease accidents, especially at three-leg intersections. Exnicios determined that several safety measures, including channelization, resulted in a 31 percent reduction in total accidents (over two years), a 58 percent reduction in total accidents (over one year), and a 100 percent reduction in total

accidents (over 26 months) at several suburban intersections located in or near several metropolitan areas. Rowan and Williams found accident rates, personal injuries and rear-end type accidents were reduced due to the introduction of channelization at intersections in northwest Houston."

Harwood also presents findings for channelization at rural intersections. On page 40 of the same document, he notes:

"In developing guidelines for channelized right-turn lanes at unsignalized intersections on rural two-lane highways, McCoy et. al. (1995) evaluated the safety effects of channelized right-turn lanes. An analysis of the accident history at 89 rural intersections with and without channelized right-turn lanes over a five-year period found no effect of channelized right-turn lanes on the frequency, severity, or types of accidents that occur on approaches to unsignalized intersections. Thus, based upon the accident analysis it was concluded that channelized right-turns do not provide the road user with any safety benefits or disbenefits."

However, the methodologies applied to yield these results are somewhat dated and may not account for confounding factors, regression-to-mean, etc. Current research being conducted for Part III of the HSM may produce quantification of the safety effect of channelization.

4.1.2.2. Shoulders

AASHTO defines the shoulder of a roadway as "the portion of the roadway contiguous with the traveled way that accommodates stopped vehicles, emergency use, and lateral support of subbase, base, and surface courses" (*2*). In some cases, the shoulder can also accommodate bicyclists. Hauer adds that while the original intent of shoulders was to provide for vehicles that have to stop for involuntary or emergency stops, the full shoulder also induces some amount of voluntary stopping. Vehicles stopped on shoulders may have a negative effect on safety (*24*).

There is also the possibility that wider shoulders may lead to higher travel speeds. Even small increments in the mean speed have noticeable impact on accident severity (*24*). Additional discussion of shoulders is provided in Section 3.1.

Sidewalks or walkways are "pedestrian lanes" that provide people with space to travel within the public right-of-way that is separated from roadway vehicles (*25*). Sidewalks are considered to be an integral part of city streets but are rarely provided in rural areas despite there being a higher potential for accidents with pedestrians due to higher speeds and the general absence of lighting. In urban areas, when pedestrians encounter an intersection, there is a major interruption in pedestrian flow and as such, the sidewalk should provide sufficient storage area for those waiting to cross as well as an area for pedestrian cross traffic to pass (*2*).

There are several resources available for sidewalk and shoulder design elements, such as: NCHRP 254 "Shoulder Geometrics and Use Guidelines" contains further detailed information about the design elements of roadway shoulders; AASHTO's "Guide for the Development of Bicycle Facilities" provides more information on the use of shoulders to accommodate bicyclists; and AASHTO's "Guide for the Planning, Design, and Operation of Pedestrian Facilities" (*26*) contains further guidance on sidewalk design elements.

Section 3.1 contains further information on the safety impacts of shoulders on roadway segments, and Section 3.2 discusses the safety impacts of on-street parking. Section 4.3 contains more information on pedestrian and bicyclist safety at intersections.

This section examines the safety effects of the various geometric design elements related to shoulders and sidewalks at intersections. The discussion in this section excludes any consideration for these facilities at mid-block or along roadway segments since these issues are addressed Chapter 3.

Exhibit 4-29: Resources examined to investigate the safety effect of shoulders and sidewalks at intersections

DOCUMENT	DESCRIPTION	COMMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Report provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities	Not added to synthesis. No quantitative or qualitative information on safety impacts found.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing the effects of various road safety measures and treatments using a meta-analytical approach.	Not added to synthesis. Information found more relevant to sections of road segments.
(*18*) NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	Interim report for study designed to develop a methodology to predict the safety performance of various elements such as Lane width, Shoulder width and curbs, etc. on urban and suburban arterials.	Added to synthesis. Only non empirical-based and anecdotal information found based on literature review. No quantitative evidence of safety impacts found because reference is only a draft interim report—the models have not been developed at this time
(Zegeer, C. V., Seiderman, C., Lagerwey, P., Cynecki, M. J., Ronkin, M., and Schneider, R., "Pedestrian Facilities Users Guide - Providing Safety and Mobility." FHWA-RD-01-102, McLean, Va., Federal Highway Administration, (2002))	Report describes pedestrian crash trends and potential safety treatments. The report does not include accident modification factors	Added to Section 4.3
(*24*) (Hauer, E., "Shoulder Width, Shoulder Paving and Safety." (2000))	Report is an extensive review of the empirical evidence on the safety effects of shoulder width. It includes comments on paved/unpaved shoulders	Added to synthesis. Some discussion on the geometric design elements of shoulders is presented. Regression equation cited from study by Washington et al. relating shoulder width to accident rates included. S value calculated using available information from original study.
(Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Report is a detailed study of the operational and safety considerations of median widths at 40 rural and suburban divided highway intersections	Not added to synthesis. Reference is more relevant to Medians

Based on available literature on the topic, it appears that the majority of safety studies that deal with shoulders focus on the safety impacts of shoulders on road segments rather than at

intersections. A critical review of the references identified previously, along with a preliminary review of references available through TRIS, yielded limited accident modification factors for the geometric design issues related to either shoulders or sidewalks at intersections. The critical review shows that there is an abundance of empirical-based evidence of safety impacts for shoulders on road segments, particularly as they relate to shoulder widths. With regards to the transferability of findings from studies examining shoulders for road segments, it is prudent to withhold from drawing any conclusions based on studies that examined road segments rather than intersections because of the complex nature of the mechanism through which safety is affected. As Hauer points out, the study of the safety impacts of shoulders is "both complex and perhaps variable in time and place".

Hauer further adds that "one may conduct a study on straight and level road sections only to find later that the results are different on curvy roads or roads with a large grade". With results being so ambiguous and occasionally even contradictory for road segments alone, it is clearly prudent to refrain from drawing similar conclusions about shoulders at intersections, particularly given that driver behavior and expectations are very different at intersections compared to road segments.

Discussion: Widen shoulder at intersections

As it stands, few empirically-based studies focus on the safety effects of the various design elements associated with shoulders at intersections. Harwood et al. reviewed a number of previous research studies and found inconclusive evidence on the safety impacts of wide shoulders at intersections. For instance, Bauer and Harwood reported that increasing the shoulder width at rural intersections tends to decrease accidents while David and Norman did not find any evidence that incremental changes in shoulder width near intersections affected accident rates (*18*). No AMFs could be derived from these studies for rural intersections.

Hauer carried out a comprehensive review of studies examining the safety effects of shoulder widths, including a study by Washington et al. (1991) that examined the safety effects of various geometric design elements on high-speed, isolated, signalized intersections in urban or suburban environments (*24*). The traffic volumes for the sites used in the study were not reported. Hauer found that wide paved shoulders were statistically significantly associated with lower accident rates.

Based on review of a study by Washington et al., Hauer reported that the number of accidents for high-speed, isolated intersections prediction could be calculated using Equation 1 and Equation 2 (*24*). An approach was considered to be high-speed if any of the following criteria were met: (a) it had an observed mean speed of 45 mph or greater; (b) it had an observed 85th percentile speed of 50 mph or greater; (c) it was a state highway approach with no posted speed limit; (d) it had a posted speed limit of 50 mph or greater; (e) site visit by researchers showed intersection to have no traffic control within 5 miles of intersection and had high-speed traffic. Given the form of the equations, AMFs and corresponding standard error values could not be derived.

Equation 1: Regression Equation Relating Total Accidents with Shoulder Width at Isolated, High-Speed Intersections, for all approaches (24)

Total Accidents per million entering vehicles = 2.81 - 0.19×paved shoulder width [ft]

S = 0.05

Equation 2: Regression Equation Relating Total Accidents on High-Speed Approaches with Shoulder Width at Isolated, High-Speed Intersections, for high speed approaches (24)

Total Accidents for the high-speed approach per million entering vehicles for that approach = 3.24 - 0.27×paved shoulder width [ft]

S = 0.06

4.1.2.3. Medians

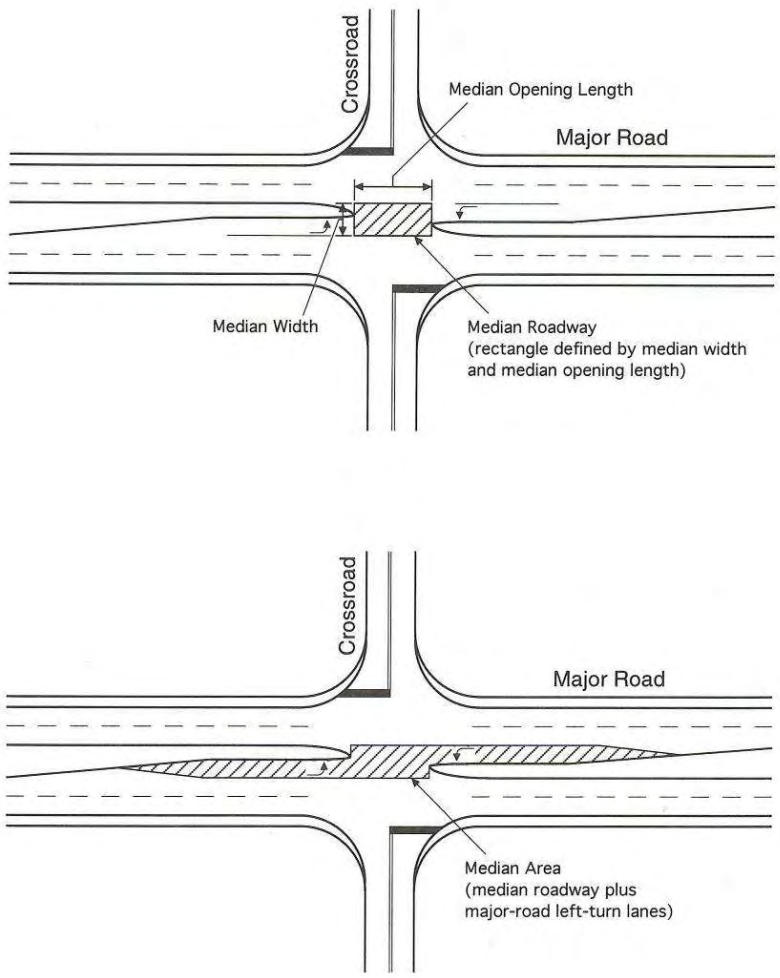
The AASHTO Green Book defines a median as "the portion of a highway separating opposing directions of the traveled way" (*2*). Further, the principle functions of a median are to separate opposing traffic, provide a recovery area for out-of-control vehicles, provide a stopping area in case of emergencies, allow space for speed changes and storage of left-turning and U-turning vehicles, minimize headlight glare, and provide width for future lanes (*2*). Additional benefits of a median include the possibility of an open green space, and providing a refuge area for pedestrians crossing the street.

Three other commonly used terms are defined in the "Median Intersection Guide" (*21*):

- Median roadway: paved area in the center of the divided highway at an intersection defined by the median width and the median opening length
- Median area: median roadway plus the major-road left-turn lanes (if any)
- Median width: total width between the edges of opposing through lanes, including the left shoulder and the left-turn lanes (if any)

The median roadway, median area and width are illustrated in Exhibit 4-30. The design of a median opening and median ends should be based on traffic volumes, urban/rural area characteristics, and type of turning vehicles (*2*).

Exhibit 4-30: Definition of Median Roadway and Median Area (21)



At intersections, special concern should be given to the median width because, as indicated in NCHRP Report 375, most types of undesirable driving behavior in the median areas of divided highway intersections are associated with competition for space by vehicles traveling through the median in the same direction. The potential for such problems is limited where crossroad and U-turn volumes are low, but may increase at higher volumes (*21*).

Medians have to be wide enough to accommodate and protect left-turning or U-turning vehicles but not so wide that drivers become confused about the correct path to follow while on the median roadway. Median widths generally range from 4 ft to 80 ft (1.2 m to 24 m) or more. On divided highways without at-grade intersections, the median may be as narrow as 4 ft to 6 ft (1.2 m to 1.8 m) under very restricted conditions but that a median width of 60 ft (20 m) or more should be provided wherever possible. Medians 12 ft to 30 ft (3.6 m to 9 m) are preferred because they provide the necessary protection for left-turning vehicles at intersections. Median widths in the 30 ft to 50 ft (9 m to 15 m) range also provide protection for left-turning vehicles but do not allocate enough storage space for larger vehicles such as buses and trucks. Median widths of 80 ft (25 m) or more may be needed to accommodate large tractor-trailer trucks without encroaching

on the through lanes of a major road. Despite this challenge, intersections on divided highways with median widths in the 30 ft to 50 ft (9 m to 15 m) range are deemed to operate well (*2*).

The AASHTO Green Book (*2*) and NCHRP Report 375 (*21*) provide information on the design criteria for medians at intersections.

This section discusses the safety effects of providing medians at intersections on rural multilane highways, different median widths at intersections on rural multi-lane highways, including freeways, and urban and suburban arterials. Section 3.1 provides additional information on the safety effects of medians on roadway segments. Section 4.3 discusses the impacts of intersection design on pedestrians and bicyclists.

Exhibit 4-31: Resources examined to investigate the safety effect of medians at intersections

DOCUMENT	DESCRIPTION	COMMENT
(*126*) (Jonsson, T., Ivan, J.N., and Zhang, C., Crash Prediction Models for Intersections on Rural Multilane Highways: Differences by Collision Type, Transportation Research Record 2019, (2007), pp. 91-98)	Negative binomial regression models were estimated relating the frequency of different types of crashes on stop controlled intersections on rural multilane roads with many intersection and approach characteristics. Independent variables include many site characteristics including whether there was a median	Added to synthesis.
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results may be added if relevant when available.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing the effects of various road safety measures and treatments using a meta-analytical approach.	Not added to synthesis. Material in reference is related to medians on roadway segments rather than intersections.
(Xu, L., "Right Turns Followed by U-Turns Versus Direct Left Turns: A Comparison of Safety Issues." ITE Journal, Vol. 71, No. 11, Washington, D.C., Institute of Transportation Engineers, (2001) pp. 36-43.)	Cross-sectional study comparing accident rates and accident frequencies between direct left turns and an alternative left-turn design (i.e. right-turn, followed by U-turn)	Not added to synthesis. Treatment being examined is the type of left-turn configuration and not directly related to the design of the median itself. Reference is more relevant to intersection types and alternative left-turn treatments.
(Dixon, K. K., Hibbard, J. L., and Nyman, H., "Right-Turn Treatment for Signalized Intersections." Dallas, Tex., Urban Street Symposium Conference Proceedings, (1999))	Paper briefly discusses various intersection treatments, but does not provide accident data. It also discusses the potential safety impacts of five common right-turn treatments.	Not added to synthesis. Reference more relevant to Lanes.

DOCUMENT	DESCRIPTION	COMMENT
(*21*) (Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Report is a detailed study of the operational and safety considerations of median widths at 40 rural and suburban divided highway intersections.	Added to synthesis. AMFs were calculated using reported percentage reductions in accidents resulting from regression equations. s values were computed using reported standard error values.
(Bowman, B. L. and Vecellio, R. L., "Effects of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety." Transportation Research Record 1445, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 169-179.)	Study compared accident rates for arterials to determine the effects of median treatments on vehicular and pedestrian accidents	Not added to synthesis. Focus of study is on safety effect of medians at midblock. While some information is presented on intersections, there is insufficient data to calculate t and s values.
(Maze, T. H., Henderson, J. L., and Sankar, R., "Impacts on Safety of Left-Turn Treatment at High Speed Signalized Intersections." HR-347, Ames, Iowa Highway Research Board, (1994))	Study investigated the safety effects of left-turn treatment at high speed signalized intersections at 63 intersections in Iowa.	Not added to synthesis. Regression models developed in study are additive in form and cannot be used to calculate AMF values, as verified by Hauer.
(Gibby, A. R., Washington, S. P., and Ferrara, T. C., "Evaluation of High-Speed Isolated Signalized Intersections in California." Transportation Research Record 1376, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 45-56.)	Study developed linear regression equations to compare different intersection treatments, including median type and width.	Not added to synthesis. Comments by reviewers were highly critical of findings, particularly with regards to the recommendation by authors of raised medians over flat medians.
(Harwood, D. W., "NCHRP Report 282: Multilane Design Alternatives for Improving Suburban Highways." Washington, D.C., Transportation Research Board, National Research Council, (1986))	Cross-sectional study that examined the safety effects of a number of design parameters on unsignalized intersection crashes	Not added to synthesis. More recent study by same author supersedes results from this reference.

The safety effectiveness of wider medians has been quantified for rural multi-lane highways and urban and suburban arterials. No studies for rural two-lane highways were found. It appears that few studies that examine the safety effects of medians focus on intersections; the large majority deals with median widths (and other median design parameters) on roadway segments. The only study from which AMFs and corresponding standard error values were derived did not report any traffic volumes but did provide information on the range of validity for median widths.

Treatment: Introduce medians at intersections

Jonsson et al. estimated regression models to relate single vehicle, angle, opposite direction, same direction, and total crashes with intersection characteristics at stop-controlled intersections on rural multilane roads in California (*126*). The sample included 378 T intersections and 264 cross intersections. Presence or absence of a median was included as an indicator variable in these models. However, since introducing a median can be correlated with the presence or absence of left-turn lanes, the results from this study were not used to develop AMFs for introducing medians at intersections.

Treatment: Widen median widths at intersections

Harwood et al. developed regression equations to represent expected changes to multiple-vehicle accidents resulting from changes to median widths at rural four-leg unsignalized intersections, urban/suburban four-leg unsignalized intersections, urban/suburban three-leg unsignalized intersections, and urban/suburban four-leg signalized intersections (*21*). While the equations themselves were not reported in the study, results were tabulated in terms of percentage changes to total multiple-vehicle accidents and fatal/injury multiple-vehicle accidents resulting from unit increases to median widths at these types of intersections. This tabulation of results is shown in Exhibit 4-32.

In summary, Harwood et al. found that as median widths increase, accidents decrease for rural, four-leg intersections. In contrast, accident frequencies increased for urban/suburban three- and four-leg unsignalized intersections and four-leg signalized intersections. AMFs and corresponding standard error values were estimated using the results from the study and are summarized in Exhibit 4-33. These values are valid over the range of median widths from 14 to 80 ft (4 to 24 m). A method correction factor of 1.5 was applied to the s ideal calculated using reported 95% confidence interval values.

Exhibit 4-32: Summary of Safety Effects Resulting from Changes to Median Width (21)

	Median width effect expressed as a percentage change in accident frequency					
	Per unit change of 1 m in median width			Per unit change of 1 ft in median width		
Intersection type	Estimate (%)	Lower 95% confidence limit	Upper 95% confidence limit	Estimate (%)	Lower 95% confidence limit	Upper 95% confidence limit
TOTAL MULTIPLE-VEHICLE ACCIDENTS						
Rural 4-leg unsignalized	-4.16	-6.30	-2.00	-1.22	-1.92	-9.61
Rural 3-leg unsignalized	-	-	-	-	-	-
Urban/suburban 4-leg unsignalized	5.67	4.23	7.08	1.73	1.29	2.16
Urban/suburban 3-leg unsignalized	2.69	1.11	4.26	0.82	0.34	1.30
Urban/suburban 4-leg signalized	3.02	1.11	4.97	0.92	0.34	1.50
FATAL AND INJURY MULTIPLE-VEHICLE ACCIDENTS						
Rural 4-leg unsignalized	-4.43	-7.15	-1.67	-1.35	-2.18	-0.51
Rural 3-leg unsignalized	-	-	-	-	-	-
Urban/suburban 4-leg unsignalized	5.25	3.21	7.31	1.60	0.98	2.23
Urban/suburban 3-leg unsignalized	-	-	-	-	-	-
Urban/suburban 4-leg signalized	2.92	1.11	4.72	0.89	0.34	1.44

Exhibit 4-33: Safety Effectiveness of Widening Medians at Intersections

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Rural	Four-leg unsignalized intersections, volume not reported	Multiple-vehicle accidents, all severities	0.958	0.016
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Urban/ suburban	Four-leg unsignalized intersections, volume not reported	Multiple-vehicle accidents, all severities	1.057	0.011

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Urban/ suburban	Three-leg unsignalized intersections, volume not reported	Multiple-vehicle accidents, all severities	1.027	0.012
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Urban/ suburban	Four-leg signalized intersections, volume not reported	Multiple-vehicle accidents, all severities	1.030	0.014
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Rural	Four-leg unsignalized intersections, volume not reported	Multiple-Vehicle Accidents, Fatal and Injury	0.9557	0.021
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Urban/ suburban	Four-leg unsignalized intersections	Multiple-Vehicle Accidents, Fatal and Injury	1.0525	0.015
Harwood et. al, 1995	Widening median by 3 ft (1 m)	Urban/ suburban	Four-leg signalized intersections	Multiple-Vehicle Accidents, Fatal and Injury	1.0292	0.014

4.1.3. Roadside Elements

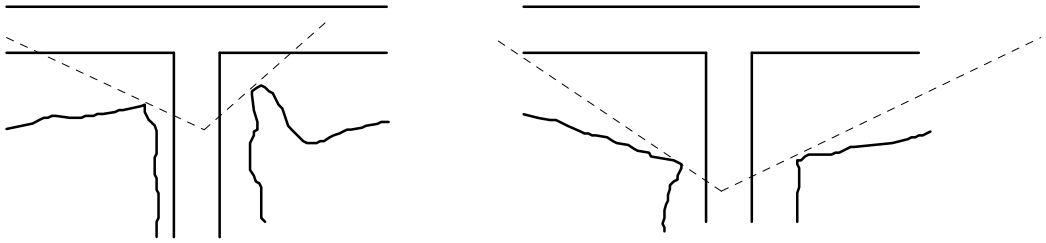
This section will provide information on the safety effect of roadside elements (e.g., geometry, features and barriers) on the approach to an intersection. This section will add to the knowledge presented for roadway segment roadside elements in Section 3.1.

4.1.3.1. Roadside Geometry

Roadside geometry is discussed in Section 3.1 for roadway segments. This section will add to that discussion with roadside geometry design specific to intersections. A key consideration at intersections is the triangle sight distance. Limited sight distance can make it difficult to detect the intersection itself or entering vehicles in time to stop safely. This section discusses approach sight triangles and departure sight triangles (as defined in AASHTO's Green Book (*2*)) at intersections.

Intersection triangle sight distance is illustrated in Exhibit 4-34. In a three-leg junction, there are two triangles. In a four-leg intersection, there are four triangles.

Exhibit 4-34: Intersection triangle sight distance



According to the AASHTO Green Book, curbs serve any or all of the following purposes: drainage control, roadway edge delineation, right-of-way reduction, aesthetics, delineation of pedestrian walkways, reduction of maintenance operations, and assistance in orderly roadside development. It adds that a curb, by definition, incorporates some raised or vertical element. A curb may be designed as a separate unit or in combination with the pavement. Vertical and sloping curb designs may include a gutter, forming a combination curb and gutter section as is typically used in urban settings (*2*). The AASHTO Green Book (*2*) provides information on the design of curbs.

This section of the HSM is intended to discuss the safety effects of different elements on the roadside of roadway segments at intersections. Chapter 3 of the HSM contains further information on roadside geometry on roadway segments.

Exhibit 4-35: Resources examined to investigate the safety effect of roadside geometry at intersections

DOCUMENT	DESCRIPTION	COMMENT
(5) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing the effects of various road safety measures and treatments using a meta-analytical approach.	Added to synthesis.
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	A synthesis of results complied from literature, contact with state and local agencies throughout the United States, and federal programs	No AMFs. Not added to synthesis.
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results not available.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	A synthesis of results complied from literature, contact with state and local agencies throughout the United States, and federal programs	Cites Harwood et al (2000). Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Compilation of data including safety, geometric, and traffic with a broad range of suggested countermeasures	Too few details to be included in meta-analysis.

DOCUMENT	DESCRIPTION	COMMENT
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Sight distance due to roadway aliment or terrain was considered for the crash prediction algorithm.	Does not contain original studies relevant for this section. Not added to synthesis.
(Harwood, D. W., Mason, J. M., Brydia, R. E., Pietrucha, M. T., and Gittings, G. L., "NCHRP Report 383: Intersection Sight Distance." Washington, D.C., Transportation Research Board, National Research Council, (1996))	Research on the current procedure employed by AASHTO ISD methodology. Conclusions and recommendations on the ISD design procedures	No AMFs. Not added to synthesis.
(Carnahan, C. R., Fox, W. C., French, K. A., Hange, W. A., Henderson, J. L., Hook, D. J. P., Imansepahi, A., Khattak, S. S., Paulson, J. D., Resseguie, J. K., Richey, J. M., and Searls, T. D., "Permissive Double Left Turns: Are They Safe?" Washington, D.C., ITE 1995 Compendium of Technical Papers, (1995) pp. 214-218.)	This study incorporated a literature review, a survey of state DOT's and some local agencies, a review of data collected at traffic signals in the Denver and Colorado Springs areas, and a delay study of a corridor in Denver	No AMFs. Not added to synthesis.
(Kulmala, R., "Safety at Rural Three- and Four-Arm Junctions: Development and Application of Accident Prediction Models." 233, Espoo, Finland, VTT Technical Research Centre of Finland, (1995))	Research based on an inventory of 2,700 junctions where a model of 915 three-arm and 847 four-arm junctions were modeled	Added to synthesis (from a 1992 report by the same author).
(Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))	Report is a detailed study of the operational and safety considerations of median widths at 40 rural and suburban divided highway intersections.	Not added to synthesis.
(Kuciemba, S. R. and Cirillo, J. A., "Safety Effectiveness of Highway Design Features: Volume V - Intersections." FHWA-RD-91-048, Washington, D.C., Federal Highway Administration, (1992))	A review incorporating a variety of studies including accident data, facility design guidelines, route designation criteria, and evaluations of facilities based on observational analysis accident data	No AMFs. Not added to synthesis.

Treatment: Increase sight triangle

Only a few studies evaluating the safety effects of increasing sight triangles in intersections have been found. These studies have been previously studied by Elvik and Vaa (2004) (*5*), and are listed in Exhibit 4-36.

Exhibit 4-36: Studies evaluating the safety effects of increasing triangle sight distance in intersections (5)

Study	Country	Design	Number of estimates
Johannessen and Heir 1974	Norway	Cross-sectional study	16
Hanna, Flynn and Tyler 1976	United States	Cross-sectional study	1
Vaa and Johannessen 1978	Norway	Cross-sectional study	6
Brüde and Larsson 1985	Sweden	Empirical Bayes before-after	1

Study	Country	Design	Number of estimates
Vodahl and Giæver 1986	Norway	Cross-sectional study	1
Kulmala 1992	Finland	Empirical Bayes before-after	4

All of these studies are fairly old and none of them employ current state-of-the art design or techniques for analysis. Most of the studies are cross-section studies that compare accident rates in intersections that differ with respect to the shortest sight distance found in any of the triangles. These studies do not control for any confounding factors. The standard error of the estimate of effect in these studies has been increased by a factor of 5. The studies cover minimum sight distances ranging from 65 ft (20 m) to 490 ft (150 m). Only two studies are before-and-after studies; both of them employed an Empirical Bayes design that controls for regression-to-the-mean. In both studies, however, this design was somewhat simpler than the current state-of-the-art Empirical Bayes design. The standard error of the estimates of effect in these studies has been increased by a factor of 1.8.

Not all studies state the increase in sight distance evaluated. In studies stating the size of the difference in sight distance being compared, the difference ranges from about 65 ft (20 m) to about 195 ft (60 metres). The estimates given in Exhibit 4-37 refer to all increases in sight distance, and not just those within a particular range. The studies do not make it clear if this is approach sight distance or departure sight distance.

Exhibit 4-37: Summary estimates of the effect of increasing triangle sight distance in intersections

Author, date	Treatment/ Element	Setting	Intersection Type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Increasing triangle sight distance	Not reported	Three leg, volume not reported	All types, Injury (7)	1.296	0.570
Elvik and Vaa, 2004	Increasing triangle sight distance	Not reported	Three leg, volume not reported	All types, PDO (1)	1.290	0.771
Elvik and Vaa, 2004	Increasing triangle sight distance	Not reported	Four-leg, volume not reported	All types, Injury (11)	0.525	0.288
Elvik and Vaa, 2004	Increasing triangle sight distance	Not reported	Four-leg, volume not reported	All types, PDO (10)	0.892	0.154

NOTE: The number in brackets beside the index of effectiveness indicates the number of estimates used to generate the result.

At three-leg intersections, there is a tendency for the number of accidents to increase, as shown in Exhibit 4-37. The standard errors are very wide, showing that the evidence of effect in three-leg intersections is highly limited. In four-leg intersections, the number of accidents is reduced. This applies both to injury accidents and to property-damage-only accidents, but the largest accident reduction is found for injury accidents. Most of the intersections studies were

rural and controlled by yield signs. The estimates are highly uncertain. There is clearly a need for more research.

4.1.3.2. Roadside Features

Roadside features may include signs, signals, luminaire supports, utility poles, trees, motorist-aid call boxes, railroad crossing warning devices, fire hydrants, mailboxes, bus shelters, and other similar roadside features. Roadside features are sometimes referred to as street furniture.

The AASHTO Roadside Design Guide contains information about the placement of these features, criteria for breakaway supports, base designs, among others (*27*).

This section provides discussion on relocating signal hardware out of the intersection clear zone, and minimizing or relocating roadside features at roundabouts. No AMFs could be developed based on available literature.

In future editions of the HSM, this section may provide quantified information on the safety effect of various roadside features on the approach to an intersection in the context of both rural and urban environments; for two-lane roads, multi-lane highways and urban and suburban arterials.

Roadside features on roadway segments are discussed in Section 3.1.

Exhibit 4-38: Resources examined to investigate the safety effect of roadside features at intersections.

DOCUMENT	DESCRIPTION	COMMENT
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Various strategies to mitigate crashes at signalized intersections.	Qualitative information only. Added to synthesis.
(Lacy, K., Srinivasan, R., Zegeer, C. V., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 8: A Guide for Addressing Accidents Involving Utility Poles." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies to mitigate accidents with utility poles.	Qualitative discussion of strategies. No AMFs. Reader referred to original document for more information. Not added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Various strategies to mitigate crashes at unsignalized intersections.	No relevant strategies. Not added to synthesis.
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Prediction models developed for two-lane rural roads.	No relevant information. Not added to synthesis.
(Vogt, A., "Crash Models for Rural Intersections: Four-Lane by Two-Lane Stop-Controlled and Two-Lane by Two-Lane Signalized." FHWA-RD-99-128, McLean, Va., Federal Highway Administration, (1999))	Models developed for stop-controlled and signalized intersections.	Presence of roadside features not included in models. Not added to synthesis.

(*58*,*28*) (Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995), Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))	Summary of roundabout designs and accommodation of various road users.	Qualitative discussion of roadside features. Added to synthesis.

Discussion: Relocate signal hardware out of clear zone

Antonucci et al. describe various strategies to mitigate crashes at signalized intersections, including relocate signal hardware out of clear zone (*4*). Antonucci et al. provide the following guidance for traffic signal hardware (pg V-78):

- "traffic signal supports and controller cabinets should be located as far from the edge of pavement as is possible, especially on high-speed facilities, as long as this does not adversely affect visibility of the signal indications"
- "where there is an existing roadside barrier, the cabinet should be located behind the barrier when feasible"
- "if practical, signal supports in medians should be located to provide more than the minimum clearance required by the agency"

Crash data or other quantitative measures of effectiveness are not provided by Antonucci et al., however the authors state that relocating signal hardware out of the clear zone "should reduce the likelihood of vehicles" colliding with the hardware (*4*). More information about the attributes of this strategy and others can be found in NCHRP Report 500 Volume 12.

Discussion: Minimize or relocate roadside features at roundabouts

Brown provides a brief discussion on the presence of roadside features (or furniture) at roundabouts based on international experience (*58*,*28*). Brown states "essential 'furniture' should be minimized on the central island (and deflection islands), and together with the lighting columns, should be located clear of over-run paths and visibility envelopes" (pg 156) (*28*). The safety effect of minimizing or relocating roadside features is not quantified.

4.1.3.3. Roadside Barriers [Future Edition]

As defined by AASHTO's Roadside Design Guide, a roadside barrier (guardrail, guiderail) is "a longitudinal barrier used to shield motorists from natural or man-made obstacles located along either side of a traveled way. It may also be used to protect bystanders, pedestrians, and cyclists from vehicular traffic under special conditions" (*27*). In future editions, this section of the HSM may discuss the safety effect of implementing roadside barriers on intersection approaches, including roundabouts. No potential resources have been identified for this section.

4.1.4. Alignment Elements [Future Edition]

The following sections will discuss the safety impact of horizontal and vertical curves on the approach to intersections and roundabouts.

4.1.4.1. Horizontal Alignment [Future Edition]

In future editions of the HSM, this section may provide information on the safety effect of the horizontal alignment of an approach to an intersection, and the safety effect of the position of an intersection within a curve. The effect that alignment has on sight distance and safety may be addressed. This section could compare crashes on intersection approaches that have horizontal

curves to crashes on similar approaches that have straight alignments. The safety effect of realigning intersections or flattening approaches may be identified. This section will add to material presented in Section 3.1 for roadway segments. Potential resources are listed in Exhibit 4-39.

Exhibit 4-39: Potential resources on the safety relationship of horizontal alignment at intersections

DOCUMENT
(*132*) (Savolainen, P.T. and Tarko, A. "Safety Impacts at Intersections on Curved Segments", Transportation Research Record 1908, (2005), pp. 130-140.
(Yuan, F; Ivan, JN; Qin, X; Garrick, NW; Davis, CF,"Safety Benefits of Intersection Approach Realignment on Rural Two-Lane Highways", Transportation Research Record 1785, (2001))
(Harwood, D. W., Mason, J. M., Brydia, R. E., Pietrucha, M. T., and Gittings, G. L., "NCHRP Report 383: Intersection Sight Distance." Washington, D.C., Transportation Research Board, National Research Council, (1996))
(Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))

4.1.4.2. Vertical Alignment [Future Edition]

In future editions of the HSM, this section may provide information on the safety effect of the vertical alignment of an approach to an intersection. The effect that vertical alignment has on sight distance and safety may be addressed, and linked to the intersection roadside geometry and roadside barriers. This section could compare crashes on intersection approaches that have vertical curves to crashes on similar approaches that have flat alignments. The safety effect of realigning intersections or flatting approaches may be identified. This section will add to material presented in Section 3.1 for roadway segments. Potential resources are listed in Exhibit 4-40.

Exhibit 4-40: Potential resources on the safety relationship of vertical alignment at intersections

DOCUMENT
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))
(Yuan, F; Ivan, JN; Qin, X; Garrick, NW; Davis, CF,"Safety Benefits of Intersection Approach Realignment on Rural Two-Lane Highways", Transportation Research Record 1785, (2001))
(Harwood, D. W., Mason, J. M., Brydia, R. E., Pietrucha, M. T., and Gittings, G. L., "NCHRP Report 383: Intersection Sight Distance." Washington, D.C., Transportation Research Board, National Research Council, (1996))
(Harwood, D. W., Pietrucha, M. T., Wooldridge, M. D., Brydia, R. E., and Fitzpatrick, K., "NCHRP Report 375: Median Intersection Design." Washington, D.C., Transportation Research Board, National Research Council, (1995))
(Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995)) and (Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))

(Kuciemba, S. R. and Cirillo, J. A., "Safety Effectiveness of Highway Design Features: Volume V - Intersections." FHWA-RD-91-048, Washington, D.C., Federal Highway Administration, (1992))

4.1.4.3. Combination Horizontal and Vertical Alignment [Future Edition]

In future editions of the HSM, this section may discuss the safety effects of combined horizontal and vertical alignment, possibly including design consistency and speed profiles. Consideration may be given to include discussion of driver preview of the road surface of the intersection, including pavement markings and other signs or signals. This section will add to material presented in Section 3.1 for roadway segments. Potential resources are listed in Exhibit 4-41.

Exhibit 4-41: Potential resources on the safety relationship of combined horizontal and vertical alignment at intersections

DOCUMENT
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))

4.2. Safety Effects of Intersection Traffic Control and Operational Elements

The following sections provide discussion of the safety effect of various traffic control and operational elements of intersections. Topics of discussion include the type of traffic control employed, traffic signal operations, warning beacons, signs, pavement markings, delineation, traffic calming, and ITS applications.

Topics for future editions of the HSM include speed limits and on-street parking near intersections.

Some important resources regarding intersection traffic control and safety are:

- "Manual on Uniform Traffic Control Devices", FHWA 2003 (*17*)
- "Traffic Control Devices Handbook", ITE 2001 (*29*)
- "Intersection Geometric Design and Operational Guidelines for Older Drivers and Pedestrians Volume: I: Final Report", Staplin et al., 1997 (*30*)
- "Safety Effectiveness of Highway Design Features: Volume V – Intersections", Kuciemba et al., 1992 (*31*)

4.2.1. Type of Traffic Control

A variety of traffic control devices may be used at the at-grade intersection of two streets or highways, including signalization, stop-control, and yield-control. Roundabouts are also being applied at intersections to increase capacity and safety. Converting the traffic control at an intersection may be prompted by safety or operational concerns.

The discussion in this section covers the relative safety effect of conversions of various intersection control types including:

- Stop-control to yield-control conversions;

- Two-way stop-controlled (TWSC) to all-way stop-controlled (AWSC);
- TWSC or AWSC to signalized;
- Signalized to stop-control.

Conversion of intersections to roundabouts and other intersection design changes are discussed in Section 4.1.1.

The impact of installation of signals by expanding the commonly known traffic signal warrant to include a safety warrant as documented in the MUTCD (*17*) will be included in this section. The suggested process was recently documented in the study "Crash Experience Warrant for Traffic Signals" by McGee et al. (*32*).

Where available, information is provided for 3-leg and 4-leg intersections and for various crash types and severities. Of particular importance are the relationships between the various methods of intersection control and their influences on rear-end and right-angle crash types.

Exhibit 4-42: Resources examined to investigate the safety effect of traffic control types at intersections

DOCUMENT	DESCRIPTION	COMMENT
(*133*) (Harkey, D., et al., Accident Modification Factors for Traffic Engineering and ITS Improvements, *NCHRP Report* 617, TRB, 2008)	Estimated the safety impacts of replacing stop control with traffic signals at rural intersections. Before-after EB method was used.	Added to synthesis. t and s values provided in an exhibit.
(*134*) (Davis, G.A. and Aul, N., "Safety Effects of Left-Turn Phasing Schemes at High-Speed Intersections", Minnesota Department of Transportation, Report No. MN/RC-2007-03, (2007))	Estimated the safety impacts of replaing signal control with traffic signals in intersections in urban areas with major road speed limit at least 40 mph. Before-after full Bayes method was used.	Added to synthesis. t and s values provided in an exhibit.
(*135*) (Hadayeghi, A., Malone, B., and De Gannes, R., Development of New Crash Experience Warrants for Traffic Signals in Ontario, *Transportation Research Record 1953*, (2006), pp. 120-127)	This paper recommends a safety analysis and evaluation tool for estimating the expected safety of the installation of traffic signals.	Not added to synthesis. The paper dees not provide AMFs.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook that summarizes the effects of a wide range of safety measures.	Not added to synthesis
(Hauer, E., "Left Turn Protection, Safety, Delay and Guidelines: A Literature Review." (2004))	A compilation of various research that analyzes safety of various left turn phasing operations	Not added to this synthesis.
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Provides a plan for an integrated, multi-disciplinary approach to addressing crashes and safety. Material not relevant for this subsection.	Not added to synthesis
(*32*) (McGee, H., Taori, S., and Persaud, B. N., "NCHRP Report 491: Crash Experience Warrant for Traffic Signals." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Establishes a safety motivated amendment to the MUTCD warrant for traffic signals using EB methodologies	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Elvik, R., "Effects on Road Safety of Converting Intersections to Roundabouts: A Review of Evidence From Non-US Studies." Washington, D.C., 82nd Transportation Research Board Annual Meeting 2003, (2003))	Paper discusses a meta-regression analysis approach for 28 studies concerned with converting intersections to roundabouts. The studies selected include both published and unpublished work from locations outside the United States.	More general (and useful) statistics provided in The Handbook of Safety Measures by the same author. Not added to synthesis
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Reference provides a synthesis of various research by topic and comments on overall quality or scope. AMF's are listed as published. Standard error generally not provided so this reference was used to identify other work for further investigation.	Used as a source of other studies. Not added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Establishes guidelines for initiatives to reduce aggressive driving. No AMFs provided. Signal coordination listed as a potential strategy. Material not relevant for this subsection.	Not added to synthesis
(Harwood, D. W., Bauer, K. M., Potts, I. B., Torbic, D. J., Richard, K. R., Kohlman Rabbani, E. R., Hauer, E., and Elefteriadou, L., "Safety Effectiveness of Intersection Left- and Right-Turn Lanes." FHWA-RD-02-089, McLean, Va., Federal Highway Administration, (2002))	Many AMFs provided for left- and right-turn lanes and design features for intersections. Some good references made to other research conducted.	Material not relevant for this section. Not added to synthesis
(Retting, R. A., Chapline, J. F., and Williams, A. F., "Changes in Crash Risk Following Re-timing of Traffic Signal Change Intervals." Accident Analysis and Prevention, Vol. 34, No. 2, Oxford, N.Y., Pergamon Press, (2002) pp. 215-220.)	Paper considers the safety effects of re-timing the yellow and red clearance intervals using ad-hoc vs. ITE methodologies.	Not added to synthesis
(Thomas, G. B. and Smith, D. J., "Effectiveness of Roadway Safety Improvements." Ames, Iowa Department of Transportation, (2001))	Analyzes seven intersection improvement categories in the State of Kansas including new signals, new signals and turn lanes, added turn phasing to existing signals, added turn phasing and turn lanes to existing signals, replace pedestal mount signals with mast arm mounted signals, added turn lanes only and other geometric improvements.	AMFs superseded by other more recent work. Not added to the synthesis
(Lyon, C. and Persaud, B. N., "A Pedestrian Crash Model for Urban 4-Leg Signalized Intersections." London, Ontario, Canada, Canadian Multidisciplinary Road Safety Conference XII, (2001) pp. 1-8.)	Presents safety performance functions for pedestrian crashes at intersections. However, AMFs cannot be derived from the information provided in the paper.	Not added to synthesis
(Bauer, K. M. and Harwood, D. W., "Statistical Models of At-Grade Intersections - Addendum." FHWA-RD-99-094, McLean, Va., Federal Highway Administration, (2000))	Used crash data to develop statistical models of the relationship between traffic crashes and highway geometric elements for at-grade intersections. Multivariate SPFs were developed, but the author concedes that, "they do not appear to be of direct use to practitioners".	Not added to synthesis. Reference suggested by NCHRP 17-18(4).

DOCUMENT	DESCRIPTION	COMMENT
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	AMFs are provided for intersection traffic control based on previous research.	Not added to synthesis. Original research studies referenced where applicable to this section.
(*33*) (Persaud, B., Hauer, E., Retting, R. A., Vallurupalli, R., and Mucsi, K., "Crash Reductions Related to Traffic Signal Removal in Philadelphia." Accident Analysis and Prevention, Vol. 29, No. 6, Oxford, N.Y., Pergamon Press, (1997) pp. 803-810.)	Considers the effects of converting one-way streets in Philadelphia from signal to multi-way stop control.	Added to synthesis.
(Kulmala, R., "Safety at Rural Three- and Four-Arm Junctions: Development and Application of Accident Prediction Models." 233, Espoo, Finland, VTT Technical Research Centre of Finland, (1995))	Before-After study of the safety effectiveness of several geometric design elements at rural three- and four-leg intersections	Not added to synthesis. More relevant to intersection design.
(*34*) (McGee, H. W. and Blankenship, M. R., "NCHRP Report 320: Guidelines for Converting Stop to Yield Control at Intersections." Washington, D.C., Transportation Research Board, National Research Council, (1989))	Study considered a before-after conversion of stop to yield control with a comparison group. Data from the study was used to generate an index of effectiveness and standard error values.	Data from study used to generate AMFs which were added to synthesis.
(Radwan, A. E. and Wing, D., "Safety Effects of Traffic Signal Installations: State of the Art." FHWA/AZ-87/809, Phoenix, Arizona Department of Transportation, (1987))	Synthesis of past research on traffic control at intersections.	Suggested by NCHRP 17-18(4). Not added to synthesis.
(*35*) (Lovell, J. and Hauer, E., "The Safety Effect of Conversion to All-Way Stop Control." Transportation Research Record 1068, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 103-107.)	Considers crash data from San Francisco, Philadelphia, Michigan and Toronto and establishes AMFs for conversion from two-way to all-way stop-control signals.	Added to synthesis.

From the review of references identified, it is apparent that there has been a significant effort over the last 30 years to establish the safety effectiveness of various methods of traffic control at intersections. Many of the studies, however, lack sufficient details to accurately assess the findings from the perspective of safety. More recent efforts report AMFs using state-of-the-art statistical methodologies and provide details on the study data. As a result, for the HSM, more emphasis was placed, where possible, on adopting the latest studies for each type of intersection traffic control.

Treatment: Convert stop control to yield control

As documented in NCHRP Report 320, McGee and Blankenship conducted a review of accidents at intersections where the traffic control was converted from stop-control to yield-control (*34*). The analysis involved a before-after study with comparison group for 141 intersections from 3 cities with a comparison group. The methodology developed for the HSM to generate an index of effectiveness and a corresponding standard error was applied using the data provided in the report. Regression-to-the-mean was a potential factor, and was corrected using an estimate of 0.1. A MCF of 1.5 was also applied. The results show that crashes sharply increase (an AMF of 2.34 with a standard error of 1.151). Unfortunately, no further breakdown by crash

type or intersection configuration was possible from the data presented in the study. Specific details are provided in Exhibit 4-43.

Exhibit 4-43: AMF for Stop Control to Yield Control (34)

Study, date	Treatment / element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
McGee and Blankenship, 1989	Stop to Yield Control	Urban/ suburban	All intersection configurations, four-leg, volume not reported	All types, all severities	2.27	1.26

Treatment: Convert two-way to all-way stop-control

The study conducted by Lovell and Hauer in 1986 provides a comprehensive analysis of data from San Francisco, Philadelphia, Michigan and Toronto (*35*). The data provided were sufficient to calculate estimates of the standard error, shown in Exhibit 4-44. The results show a reduction in accidents for all types and severities when intersections are converted from two-way to all-way stop control, but particularly for right angle crashes and crashes involving injuries. All the conversions considered in the study were warranted on the basis of traffic volume patterns, directional splits, and intersection configurations. It is essential that conversions from two-way to all-way STOP-control be used only when the established warrants are met.

The index of effectiveness values adopted for Exhibit 4-44 are as published in the study because the study considered before and after data and controlled regression to the mean effects through the use of likelihood functions.

Standard errors were not provided in the original study. The values shown were established using the adopted HSM procedures. A method correction factor of 1.8 was used to adjust the standard error values to account for the method quality (estimated as medium-high).

Exhibit 4-44: AMF for Conversion from Two-way to All-way Stop Control (35)

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lovell and Hauer, 1986	Two-way to All-way stop control	Primarily Urban intersections	MUTCD Warrants must be met, volume not reported	Right angle, All severities	0.25	0.032
Lovell and Hauer, 1986	Two-way to All-way stop control	Primarily Urban intersections	MUTCD Warrants must be met, Primarily Urban intersections, volume not reported	Rear-end, All severities	0.82	0.134
Lovell and Hauer, 1986	Two-way to All-way stop control	Primarily Urban intersections	MUTCD Warrants must be met, Primarily Urban intersections, volume not reported	Left-Turn, All severities	0.71	0.522

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lovell and Hauer, 1986	Two-way to All-way stop control	Primarily Urban intersections	MUTCD Warrants must be met, Primarily Urban intersections, volume not reported	Pedestrian, All severities	0.57	0.150
Lovell and Hauer, 1986	Two-way to All-way stop control	Primarily Urban intersections	MUTCD Warrants must be met, Primarily Urban intersections, volume not reported	All types, Injury	0.30	0.057
Harwood, Council et al (2000), based on Lovell and Hauer, 1986	Two-way to All-way stop control	Primarily Urban intersections	MUTCD Warrants must be met, Primarily Urban intersections, volume not reported	All types, all severities	0.52	0.038

Note: Conversions from two-way to all-way STOP-control should be used only when the established warrants are met.

Treatment: Convert stop-control to signal

A study published in 2003 by McGee et al. provides AMFs regarding signalization at urban intersections (*32*). The report includes a proposed amendment to the signal warrant provided in the Manual of Uniform Traffic Control Devices (MUTCD). The results show, on average, a decrease in right-angle crashes and an increase in rear-end crashes with an index of effectiveness for all crash types of fatal+injury severity of 0.860 and 0.770 for 3-leg and 4-leg intersections respectively after signalization was installed. Further details are provided below in Exhibit 4-45. The indices of effectiveness values adopted for Exhibit 4-45 are the same as those published in the study. No changes to these values are required because the authors accounted for regression to the mean and traffic volume changes (according to published traffic signal warrant thresholds). A method correction factor of 1.2 (method quality descriptor: high) was used to adjust the standard error values published in the before-after EB study. This value of 1.2 was selected because the methodology used for the study appears to account for all potential confounding factors.

More recently, Davis and Aul used the before-after full Bayes method to estimate the safety impacts of signalizing urban intersections with major road speed limits at least 40 mph (*134*). This study included 17 intersections from the Minnesota Twin Cities metro district that were signalized from 1991 to 1997. AMFs from this study are also included in Exhibit 4-44. A method correction factor of 1.2 (method quality descriptor: high) was used to adjust the standard error values published in the study. Right angle crashes decreased and rear end crashes increased following the installation of signals (the results from McGee et al. could not be combined with thre results from Davis and Aul because McGee et al dealt only with injury crashes). The results from Davis and Aul are recommended for use in the HSM for signalization or urban intersections.

Harkey et al. (*133*), used the before-after EB method to estimate the safety effect of signalizing rural intersections. The study included 6 three-leg intersections and 39 four-leg

intersections from Minnesota and California. AMFs from this study are also included in Exhibit 4-44. A method correction factor of 1.2 (method quality descriptor: high) was used to adjust the standard error values published in the study. Here again, right angle crashes decreased and rear-end crashes increased following signalization. The results from Harkey et al. are recommended for use in the HSM for signalization of rural intersections.

Exhibit 4-45: AMF for signalization of intersections

Study, date	Treatment/ element	Setting	Intersection Type, Volume (veh/day)	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
McGee et al., 2003	Convert stop-control to signal	Urban	3-Leg, Major 11,750-42,000 Minor 900-4000	All types, fatal+injury	0.86	0.379
McGee et al., 2003	Convert stop-control to signal	Urban	3-Leg, Major 11,750-42,000 Minor 900-4000	Right-angle, fatal+injury	0.66	0.537
McGee et al., 2003	Convert stop-control to signal	Urban	3-Leg, Major 11,750-42,000 Minor 900-4000	Rear-end, fatal+injury	1.50	0.612
McGee et al., 2003	Convert stop-control to signal	Urban	4-Leg, Major 12,650-22,400 Minor 2400-3625	All types, fatal+injury	0.77	0.268
McGee et al., 2003	Convert stop-control to signal	Urban	4-Leg, Major 12,650-22,400 Minor 2400-3625	Right-angle, fatal+injury	0.33	0.240
McGee et al., 2003	Convert stop-control to signal	Urban	4-Leg, Major 12,650-22,400 Minor 2400-3625	Rear-end, fatal+injury	1.38	0.465
Davis and Aul, 2007	Convert stop-control to signal	Urban, Major Speed Limit at least 40 mph	4-leg	All crashes, all severities	0.95	0.091
Davis and Aul, 2007	Convert stop-control to signal	Urban, Major Speed Limit at least 40 mph	4-leg	Right angle, all severities	0.33	0.056
Davis and Aul, 2007	Convert stop-control to signal	Urban, Major Speed Limit at least 40 mph	4-leg	Rear end, all severities	2.43	0.371
Harkey et al., 2008	Convert stop-control to signal	Rural	3-leg and 4-leg; Major AADT 3,261-29,926; Minor AADT 101-10,300	All types, all severities	0.56	0.030
Harkey et al., 2008	Convert stop-control to signal	Rural	3-leg and 4-leg; Major AADT 3,261-29,926; Minor AADT 101-10,300	Right-angle, all severities	0.23	0.020

Study, date	Treatment/ element	Setting	Intersection Type, Volume (veh/day)	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harkey et al., 2008	Convert stop-control to signal	Rural	3-leg and 4-leg; Major AADT 3,261-29,926; Minor AADT 101-10,300	Left-Turn, all severities	0.40	0.056
Harkey et al., 2008	Convert stop-control to signal	Rural	3-leg and 4-leg; Major AADT 3,261-29,926; Minor AADT 101-10,300	Rear-end, all severities	1.58	0.170

Treatment: Remove an unwarranted signal (one-way streets)

Exhibit 4-46 summarizes the results of a study, based exclusively on data from intersections in Philadelphia, studied by Persaud et al. (*33*). The data for removing signals were collected when the State of Pennsylvania changed the signal warrants and the City of Philadelphia determined that a number of locations that had met the warrants based on past warrants did not meet the warrants after the change in traffic control. Persaud et al. note that these signals are on one-way roadways that are not classified as major arterials but within urban environments. The results, as shown in Exhibit 4-46, indicate a decrease for all crash types when unwarranted signals are removed. There were 199 signals removed on one-way streets and a 71-intersection comparison group was used in the study (*33*).

The index of effectiveness values adopted for Exhibit 4-46 are as published in the study because the authors accounted for regression to the mean and traffic volume changes. A method correction factor of 1.5 was used to adjust the standard error values (confirmed by Hauer). This value of 1.5 was selected because it is a before-after study with large comparison group and several confounding factors have been accounted for using regression analysis techniques.

Exhibit 4-46: AMFs for Removal of Unwarranted Signalization at Intersections (one-way streets in urban areas) (33)

Study, date	Treatment / element	Setting	Intersection Type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Persaud, Hauer et al, 1997	Remove unwarranted signal	Not reported	Unwarranted signals, one-way streets in urban areas, volumes not reported	Right-Angle & Turning, All severities	0.76	0.14
Persaud, Hauer et al, 1997	Remove unwarranted signal	Not reported	Unwarranted signals, one-way streets in urban areas, volumes not reported	Rear-end, All severities	0.71	0.29
Persaud, Hauer et al, 1997	Remove unwarranted signal	Not reported	Unwarranted signals, one-way streets in urban areas, volumes not reported	Pedestrian, All severities	0.82	0.31

Study, date	Treatment / element	Setting	Intersection Type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Persaud, Hauer et al, 1997	Remove unwarranted signal	Not reported	Unwarranted signals, one-way streets in urban areas, volumes not reported	All types, all severities	0.76	0.11

4.2.2. Traffic Signal Operations

Signalized intersections can be controlled using a variety of signal operations, including left-turn phases, right-turn phases, phase and cycle durations, actuated control, advance warning flashers and other operational considerations.

The following sections provide information on the safety effect of each of these operational considerations, as well as the range of options within each. It is expected that the reader is familiar with intersection operations and related terms as described in the Highway Capacity Manual (*11*).

4.2.2.1. Left-Turn Operation

Much research has been conducted on the safety effectiveness of various forms of left-turn control. In recent years, a number of studies have adopted state-of-the-art statistical methodologies to assess the various left-turn options and to identify those characteristics that influence the safety of left-turning traffic.

This section identifies the safety effect of various left-turn operations at signalized intersections including permitted, protected/permitted, permitted/protected and protected left-turn phasing, leading (protected left before through phase) versus lagging (through before protected left phase), and replacing left-turns at intersections with a combined right-turn/u-turn maneuver.

Section 4.1 provides a discussion of the design of left- and right-turn lanes and treatments.

As defined in the Highway Capacity Manual (2000) (*11*):

- Permitted Turn = Left- or right-turns at a signalized intersection that is made against an opposing or conflicting vehicular or pedestrian flow.
- Protected Turn = Left- or right-turns at a signalized intersection that are made with no opposing or conflicting vehicular or pedestrian flow allowed.
- Protected / Permitted = Compound left-turn protection at a signalized intersection that displays the protected phase before the permitted phase.
- Permitted / Protected = Compound left-turn protection that displays the permitted phase before the protected phase.

Where available, information is provided for the environment, traffic volumes, number of opposing lanes, and 3- and 4-leg intersections as well as for various crash types and severities.

Discussion is provided for the following treatments:

- Protected to protected/permitted left-turn operations

- Protected/permitted to permitted/protected left-turn operations
- Leading protected to lagging protected exclusive left-turn operations
- Protected vs. protected/permitted left-turn phasing with the addition of a left-turn lane
- Replacing Direct Left-turns with Right-turn/U-Turn

Exhibit 4-47: Resources examined on the relationship between left-turn operation and safety

DOCUMENT	DESCRIPTION	COMMENT
(*133*) (Harkey, D., et al.,Accident Modification Factors for Traffic Engineering and ITS Improvements, *NCHRP Report* 617, TRB, (2008)	A before-after EB study was conducted to estimate the safety effectiveness of changing the left turn phasing	Added to synthesis
(*134*) (Davis, G.A. and Aul, N., "Safety Effects of Left-Turn Phasing Schemes at High-Speed Intersections", Minnesota Department of Transportation, Report No. MN/RC-2007-03, (2007))	A before-after full Bayes study was conducted to estimate the safety effectiveness of changing the left turn phasing	Added to synthesis
(*130*) Abdel-Aty, M. and Wang, X., Crash Estimation at Signalized Intersections Along Corridors: Analyzing Spatial Effect and Identifying Significant Factors, Transportation Research Record 1953 (2006), pp. 98-111.	Regression models were developed to relate crash frequency with intersection characteristics including left turn phasing	Not added to synthesis. Other studies have used more defensible methods to evaluate left-turn phasing
(*129*) Wang, X. and Abdel-Aty, M., Temporal and Spatial Analysis of Rear-end Crashes at Signalized Intersections, *Accident Analysis and Prevention*, 38 (2006), pp. 1137-1150.	Negative binomial regression models were estimated relating the frequency of rear-end crashes with many intersection and approach characteristics including left-turn phasing	Not added to synthesis. Other studies have used more defensible methods to evaluate left-turn phasing
(*128*) Wang, X., Abdel-Aty, M., and Brady, P., Crash Estimation at Signalized Intersections: Significant Factors and Temporal Effect, *Transportation Research Record* 1953, (2006), pp. 10-20.	Negative binomial regression models were estimated relating the frequency of crashes with many intersection and approach characteristics including left-turn phasing	Not added to synthesis. Other studies have used more defensible methods to evaluate left-turn phasing
(*36*) Lyon, C., Haq, A., Persaud, B., and Kodama, S. T., "Development of Safety Performance Functions for Signalized Intersections in a Large Urban Area and Application to Evaluation of Left Turn Priority Treatment." TRB 2005	Estimated the safety effect of priority left turn treatments at signalized intersections in Toronto.	Added to the synthesis
(*37*) (Hauer, E., "Left Turn Protection, Safety, Delay and Guidelines: A Literature Review." (2004))	Author reviews many studies undertaken between 1975 and 2003, comments on statistical approach, potential biases and findings	Added to the synthesis
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	AMFs provided are from other studies and do not provide standard error values or any information about the study data. Original studies reviewed if applicable.	Not added to the synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Accidents Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	AMFs provided are from other studies and do not provide standard error values or any information about the study data. Original studies reviewed if applicable.	Not added to the synthesis
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003)	AMFs provided are from other references and do not provide standard error values or any information about the study data. Original studies reviewed if applicable.	Not added to the synthesis
(Brehmer, C. L., Kacir, K. C., Noyce, D. A., and Manser, M. P., "NCHRP Report 493: Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Evaluates traffic signal head display alternatives for protected/permissive left-turn phasing – not relevant to left-turn phase selection alternatives.	Not added to the synthesis
(*22*) (Harwood, D. W., Bauer, K. M., Potts, I. B., Torbic, D. J., Richard, K. R., Kohlman Rabbani, E. R., Hauer, E., and Elefteriadou, L., "Safety Effectiveness of Intersection Left- and Right-Turn Lanes." FHWA-RD-02-089, McLean, Va., Federal Highway Administration, (2002))	Study focuses on the addition of turning lanes rather than phasing. Reference is made to AMF for left-turn phasing but there is insufficient information in the data presented to determine standard error.	Added to the synthesis
(Bonneson, J., Middleton, D., Zimmerman, K., Charara, H., and Abbas, M., "Intelligent Detection-Control System for Rural Signalized Intersections." FHWA/TX-03/4022-2, Austin, Texas Department of Transportation, (2002))	Surrogate measures for safety of long distance detection identified along with AMFs developed by others. Applicable to future editions.	Not relevant to this section. Not added to synthesis.
(Thomas, G. B. and Smith, D. J., "Effectiveness of Roadway Safety Improvements." Ames, Iowa Department of Transportation, (2001))	Study focuses mostly on benefit cost ratios for new construction projects, not specifically safety assessments.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(*38*) (Xu, L., "Right Turns Followed by U-Turns Versus Direct Left Turns: A Comparison of Safety Issues." ITE Journal, Vol. 71, No. 11, Washington, D.C., Institute of Transportation Engineers, (2001) pp. 36-43.)	Cross section study reviewed crash experience of 250 sites in FL; included eight-lane, six-lane, and four-lane divided arterials	Suggested by NCHRP 17-18(4). Added to the synthesis
(Sheffer, C. and Janson, B. N., "Accident and Capacity Comparisons of Leading and Lagging Left-turn Signal Phasings." Washington, D.C., 78th Transportation Research Board Annual Meeting, (1999) pp. 48-54.)	Compared crash rates between protected-only leading and lagging left-turn phases	Suggested by NCHRP 17-18(4). Included in Hauer's review (2004). Not added to synthesis.
(*39*) (Gluck, J., Levinson, H. S., and Stover, V., "NCHRP Report 420: Impact of Access Management Techniques." Washington, D.C., Transportation Research Board, National Research Council, (1999))	Discusses methods for predicting and analyzing safety and traffic operational effects of selected access management techniques.	Qualitative information added to synthesis.
(Tarrall, M. B. and Dixon, K. K., "Conflict Analysis for Double Left-Turn Lanes with Protected-Plus-Permitted Signal Phases." Transportation Research Record 1635, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 1-19.)	Before and after study evaluated the effect of converting a double left-turn lane from protected-plus-permitted to protected only phasing on conflicts, limited to one intersection in metro Atlanta	Suggested by NCHRP 17-18(4). No AMFs. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Shebeeb, O., "Safety and Efficiency for Exclusive Left-Turn Lanes at Signalized Intersections." ITE Journal, Vol. 65, No. July, Washington, D.C., Institute of Transportation Engineers, (1995) pp. 53-59.)	Study evaluated the safety of various left-turn movement phasing at signalized intersections; used crash data. Standard deviations shown in the results are larger than the mean values.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(Carnahan, C. R., Fox, W. C., French, K. A., Hange, W. A., Henderson, J. L., Hook, D. J. P., Imansepahi, A., Khattak, S. S., Paulson, J. D., Resseguie, J. K., Richey, J. M., and Searls, T. D., "Permissive Double Left Turns: Are They Safe?" Washington, D.C., ITE 1995 Compendium of Technical Papers, (1995) pp. 214-218.)	No conclusive AMFs could be determined (i.e. no breakdown of sample sizes and no specific crash rate values).	Suggested by NCHRP 17-18(4). Not added to the synthesis
(Maze, T. H., Henderson, J. L., and Sankar, R., "Impacts on Safety of Left-Turn Treatment at High Speed Signalized Intersections." HR-347, Ames, Iowa Highway Research Board, (1994))	Developed linear regression models from data from 248 intersections. Format of models not reliable.	Not added to the synthesis
(*40*) (Lee, J. C., Wortman, R. H., Hook, D. J., and Poppe, M. J., "Comparative Analysis of Leading and Lagging Left Turns." Phoenix, Arizona Department of Transportation, (1991))	Before and after study on the safety effects of conversion from leading to lagging protected left-turn operation; intersections in 3 areas in AZ	Suggested by NCHRP 17-18(4). Added to the synthesis as reviewed by Hauer

Treatment: Change to protected left-turn phasing

Harkey et al. conducted a before-after EB study based on 12 intersections in Winston-Salem, NC, where permitted or permitted-protected phasing was replaced by protected left turn phasing (*133*). Due to the limited sample of sites in this study, a method correction factor of 1.8 was applied to the standard errors (with a smaller sample there is less confidence in the preciseness of the estimates of the standard errors). Davis and Aul (*134*) conducted a before-after full Bayes study based on 4 intersections in Minnesota: 1 intersection where the minor approach phase was changed from permitted to protected, 2 intersections where the minor approach phase was changed from permitted/protected to protected, and 1 intersection where major approach phasing was changed from permitted-protected to protected. A method correction factor of 1.8 was applied to the standard errors from Davis and Aul (the s_ideal from Davis and Aul were approximate and estimated based on the 95% confidence intervals). Results are shown in Exhibit 4-48. The AMFs from Harkey et al. and Davis and Aul were combined based the procedure outline in the HSM. Overall, the results indicate that introducing left-turn protected phasing virtually eliminates all left-turn crashes on the treated roadway, but the treatment has very little effect on total intersection crashes.

Exhibit 4-48: Change to protected lef t turn phasing

Author, Title	Treatment	Setting Intersection type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harkey et al., 2008	Change from permitted or permitted-protected to protected	Urban, 3 and 4 leg signalized	Not available	Left-turn on treated roadway; all severities	0.014	0.025

Author, Title	Treatment	Setting Intersection type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harkey et al., 2008	Change from permitted or permitted-protected to protected	Urban, 3 and 4 leg signalized	Not available	Total intersection crashes; all severities	0.992	0.126
Davis and Aul, 2007	Change from permitted to protected on minor approach	Urban 4 leg signalized with major speed limit at least 40 mph	Not available	Left turn on minor approach; all severities	0.010	0.020
Davis and Aul, 2007	Change from permitted to protected on minor approach	Urban 4 leg signalized with major speed limit at least 40 mph	Not available	Total intersection crashes; all severities	0.825	0.798
Davis and Aul, 2007	Change from permitted-protected to protected on minor approach	Urban 4 leg signalized with major speed limit at least 40 mph	Not available	Left turn on minor approach; all severities	0.035	0.078
Davis and Aul, 2007	Change from permitted-protected to protected on minor approach	Urban 4 leg signalized with major speed limit at least 40 mph	Not available	Total intersection crashes; all severities	0.990	0.610
Davis and Aul, 2007	Change from permitted-protected to protected on major approach	Urban 4 leg signalized with major speed limit at least 40 mph	Not available	Left turn on major approach; all severities	0.008	0.015
Davis and Aul, 2007	Change from permitted-protected to protected on major approach	Urban 4 leg signalized with major speed limit at least 40 mph	Not available	Total intersection crashes; all severities	0.5808	0.336
Combined AMF for changing left-turn phasing to protected on urban 3 and 4 leg signalized intersections (Harkey et al., 2008, and Davis and Aul, 2007)				Left-turn crashes on treated approach; all severities	0.010	0.011
				Total intersection crashes; all severities	0.941	0.115

Treatment: Permitted to protected/permitted or permitted/protected left-turn phase

Harkey et al. critically reviewed several studies that had tried to evaluate the safety effect of converting from permitted to protected/permitted or permitted/protected phasing. The study by Lyon et al. was identified to be the most defensible. Lyon et al., estimated the safety effect of priority left turn treatments at signalized intersections in Toronto (*36*). SPFs were developed and the statistically defendable empirical Bayes methodology was used to estimate the safety effect of left turn priority treatment. A method correction factor of 1.2 was applied to the standard errors from Lyon et al. The resulting AMFs and standard errors are shown in Exhibit 4-49.(*36*)

Harkey et al. (*133*) also conducted a before-after EB study based on a limited sample of 3 intersections from Winston-Salem, NC, where permitted phasing was replaced by protected phasing. Due to the limited sample of sites in this study, a method correction factor of 1.8 was applied to the standard errors. Davis and Aul used the before-after full Bayes method to study the safety impacts of changing the left-turn phasing on the minor road in four 4-leg intersections from permitted to permitted/protected. Here again, a method correction factor of 1.8 was applied to the standard errors. For left turn injury crashes, the results from Lyon et al. are recommended for inclusion in the HSM, and for total intersection crashes, the results from Harkey et al., 2008, are recommended for inclusing in the HSM (the results from Lyon et al. could not be combined with the results from Harkey et al and Davis and Aul because Lyon et al. dealt only with injury crashes unlike the other two studies).

Exhibit 4-49: Permitted to protected/permitted or permitted/protected left-turn phase

Author, Title	Treatment	Setting Intersection type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lyon, C., et al., 2005 and Harkey et al., 2008	Change permitted to protected/permitted or permitted/protected	Urban Four-leg signalized	Major road 2,978 to 76,892 vpd Minor road 6 to 45,474 vpd	Left-turn injury	0.84	0.022
Harkey et al., 2008	Change permitted to protected/permitted or permitted/protected	Urban Four-leg signalized	Unspecified	Total intersection crashes; All severities	1.00	n/a
Harkey et al., 2008	Change permitted to protected/permitted or permitted/protected	Urban signalized	Not available	Left-turn crashes on treated roadway	0.978	0.499
Davis and Aul, 2007	Changed permitted to permitted/protected on minor approach	Urban signalized (4-leg)	Not available	Left-turn crashes on minor road	0.734	0.984

NOTE: "vpd" = vehicles per day

Treatment: Protected to protected/permitted left-turn operations

Hauer (2004) reviewed information from a study that was originally conducted by Warren et al. in 1985 (*37*). According to Hauer, Warren studies various crash types according to different options of left-turn phasing. The results of this analysis are shown in Exhibit 4-50, which show that converting protected phasing to protected/permitted results in a fairly substantial increase in left-turn crashes while slightly reducing rear-end and other types of crashes. (The definition of "other" crash types is not clearly documented.)

Standard errors in Exhibit 4-50 were calculated by Hauer (*37*). These standard error values were adjusted by a method correction factor of 2.2 (corresponding to a study quality rating of medium-low), based on the methodology applied by Warren et al.

Exhibit 4-50: AMFs for protected to protected-permitted left-turn operations (37)

Author, date	Treatment / element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Hauer, 2004	Protected to Protected-Permitted	Not reported	Not reported	Left-turns, all severities	1.65	1.562
Hauer, 2004	Protected to Protected-Permitted	Not reported	Not reported	Rear End, all severities	0.96	0.484
Hauer, 2004	Protected to Protected-Permitted	Not reported	Not reported	Other, all severities	0.96	0.440
Hauer, 2004	Protected to Protected-Permitted	Not reported	Not reported	All types, injury	1.10	0.550

Treatment: Protected/permitted to permitted/protected left-turn operations

Hauer reviewed information from a 1991 study conducted by Lee et al. (1991) (40) that studied permitted/protected phasing to reduce crashes over protected/permitted (37). The standard errors in Exhibit 4-51 were calculated by Hauer and adjusted by a method correction factor of 2.2 (corresponding to a study quality rating of medium-low), based on the methodology and lack of detail reported. Hauer points out that although the results are not statistically significant, this "does not imply that the estimates are not the most likely ones on the basis of available data" (*37*).

Exhibit 4-51: AMFs for Protected/Permitted to Permitted/Protected Left-turn Operations (37)

Author, date	Treatment/ element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lee et. al, 1991	Protected / Permitted to Permitted / Protected	Not reported	Not reported	Left-turn, all severities	0.67	0.484

Author, date	Treatment/ element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lee et. al, 1991	Protected / Permitted to Permitted / Protected	Not reported	Not reported	All types, all severities	0.87	0.418

Treatment: Leading protected to lagging protected exclusive left-turn operations

When the left-turn phase is exclusively protected (i.e., no permissive left-turn phase), Lee et al. (1991) measured an increase in crashes for lagging exclusive protected phasing over leading exclusive protected phasing (*37*). Standard errors in Exhibit 4-52 were calculated by Hauer, and adjusted by a method correction factor of 2.2 (corresponding to a study quality rating of medium-low). In Hauer's consideration of this study, he points out that although the results are not statistically significant, this "does not imply that the estimates are not the most likely ones on the basis of available data".

Exhibit 4-52: AMFs for Exclusive Leading Protected to Exclusive Lagging Protected (37)

Author, date	Treatment / element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lee et. al, 1991	Exclusive Leading Protected to Exclusive Lagging Protected	Not reported	Not reported	Left-turn, all severities	1.49	1.188
Lee et. al, 1991	Exclusive Leading Protected to Exclusive Lagging Protected	Not reported	Not reported	All types, all severities	1.15	0.418

Treatment: Protected vs. protected/permitted left-turn phasing with the addition of a left-turn lane

Exhibit 4-53 is adapted from Table 54 in the FHWA Report by Harwood et al. (*22*). Although the study focuses on the addition of turning lanes rather than exclusively on differences in phasing, AMFs were developed for different types of left-turn phasing with the addition of new left-turn lanes. However, there is insufficient information in the report to determine standard error of these estimates.

Exhibit 4-53: Comparison of safety effectiveness of added left-turn lanes with protected and protected/permitted signal phasing at urban signalized four-leg intersections (22)

Author, date	Treatment/ element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harwood et al., 2002	Protected left-turn phase with added left-turn lane	Urban	Signalized Four-leg, volumes not reported	All types, all severities	0.90[a]	Unable to calculate
Harwood et al., 2002	Protected/ permitted left-turn phase with added left-turn lane	Urban	Signalized Four-leg, volumes not reported	All types, all severities	0.91[b]	Unable to calculate

NOTE: [a] based on 5 sites
[b] based on 31 sites

Treatment: Replace direct left-turns with right-turn/U-turn

Exhibit 4-54 summarizes the findings of a study conducted by Xu (2001) (*38*). The study offers a cross-sectional comparison of the safety of two egress designs for unsignalized sidestreets and driveways onto divided arterials: direct left-turns; and right-turn followed by U-turn. Xu found that, by closing off the side-street left-turn using directional median openings (effectively forming a T-intersection with a closed median), drivers are forced to turn right and then perform a U-turn on the divided arterial at a downstream location.(*38*)

Xu used similar timeframes for the two samples (direct left-turn locations and right-turn/U-turn locations). This suggests no adjustments to the index of effectiveness are required for volume growth differences. Locations were chosen that had "high ingress and egress volumes" although the actual minor volumes were not reported. Isolated driveways were selected, to minimize interference between multiple driveways. Posted speed limits were between 40 and 55 mph on the arterial road and no parking on the arterial road, arterial road segments were 0.1 to 0.25 miles in length.

Standard error values were calculated based on the number of sites in the study and the duration of observations. Standard errors were then adjusted by a method correction factor of 5 for based on a Low rating and the cross-section study type, due to the lack of information on changes in volumes, driveway volumes, and minimal accounting for confounding factors.

Exhibit 4-54: Replacing Direct Left-turns with Right-turn/U-Turn (38)

Author, date	Treatment/ element	Setting Intersection type	Traffic Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Xu, 2001	Replace direct left-turn with right-turn/U-turn	Unsignalized intersections/ access points on 4-, 6-, and 8-lane divided	Arterial AADT > 34,000 vpd; sidestreet/ access volume unspecified	All crash types All severities	0.80	0.13
				All crash types - PDO	0.89	0.17

Author, date	Treatment/ element	Setting Intersection type	Traffic Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
		arterial		All crash types - Injury and fatality	0.64	0.18
				Rear-end, all severities	0.84	0.22
				Sideswipe, all severities	1.21	0.75
				Angle, all severities	0.64	0.21
		Unsignalized intersections/ access points on 4-lane divided arterial		All crash types - All severities	0.49	0.28
				All types, PDO	0.56	0.37
				All types, Injury+fatal	0.38	0.39
		Unsignalized intersections/ access points on 6-lane divided arterial		All crash types - All severities	0.86	0.15
				All types, PDO	0.95	0.20
				All types, Injury+fatal	0.69	0.21
				rear-end, all severities	0.91	0.25
				Sideswipe, all severities	1.33	0.92
				Angle, all severities	0.67	0.25
		Unsignalized intersections/ access points on 8-lane divided arterial		All crash types - All severities	0.89	0.67
				All types, PDO	0.97	0.86
				All types, Injury+fatal	0.73	1.04

Based on three studies summarized by Gluck et al. (pg 100) (*39*), providing u-turns as alternatives to direct left-turns, specifically the "Michigan U", may improve safety. The Michigan U-turn design has evolved since the 1970s. The first study showed directional crossovers have lower average intersection-related accident rates compared to bidirectional crossovers, for total crashes and for injury crashes. The second study of Grand River Avenue in Detroit showed a 61 percent reduction in the average number of accidents yer year on the 0.43 mile section over 5 years. Angle accidents had the greatest reduction (96%), followed by sideswipe (61%) and rear-end (17%) accidents.(*39*) The third study of 123 segments of boulevard containing 226 mi of highway stratified segments by bidirectional or directional crossovers, then by the number of signals per segment. The results indicated that on divided highway sections without traffic signals, directional U-turn median crossovers had a 14% higher accident rate than segments with bidirectional median crossovers. The method used to accident rate was accidents per 100 million vehicle miles. As the density of traffic signals increased, divided highways with directional crossovers had decreasing relative accident rates compared to divided highways with bidirectional crossovers.(*39*) Published data was insufficient to determine an AMF.

The above study findings from Xu and Gluck et al., are assumed to apply to this indirect left-turn treatment at intersections (or at least to high-volume driveways that function as intersections). Liu et al. studied a related, but somewhat different issue – closing left turns from driveways (*145*). The authors attempted to address the safety effect of the separation distance between driveway exits and downstream U-turn locations. Negative binomial regression models were estimated to relate total number of crashes and total number of target crashes (target crashes included crashes directly related to the indirect left-turn treatment) and site characteristics including traffic volume, separation distance and whether a U-turn bay was provided at a signalized intersection (where cross traffic would be present) versus a median opening (where cross traffic would not be present). The models indicated that "separation distances significantly impact the safety of the street segments between the driveways and the downstream U-turn locations". The models showed that a "10% increase in the separation distance will result in a 3.3% decrease in total crashes and a 4.5% decrease in crashes which are related with right turns followed by U-turns". The results from the regression models were also compared with the average number of crashes (involving left-turns from driveways) that occurred at 32 three-leg unsignalized intersections where direct left-turns from driveways were allowed. The comparisons indicated that if the separation distance was less than 175 feet, right turns followed by U-turns may actually produce more crashes compared to direct left-turns. However, for separation distances longer than 175 feet, the right U-turn combination will produce fewer crashes if the U turns can be made from a median opening (i.e., locations without cross traffic). For separation distances longer than 500 feet, the right-turn U combination will produce fewer crashes compared to direct left turns regardless of whether the U turn can be made from a median opening or signalized intersection. Since this study was based on a treatment of driveway left-turns, it is difficult to know whether the findings apply to the same treatment at intersections. If applicable, the implied guidance is that if the right U-turn treatment is applied to an intersection, the median opening U-turn location should be located at least 175 feet from the intersection.

4.2.2.2. Right-Turn Operation

Substantial research work has been undertaken since the early 1980s to evaluate the safety implications for right-turn-on-red. The studies of this time considered data collected during the previous decade when many eastern states adopted RTOR policies. Since then, few opportunities have emerged that would provide the necessary data to conduct similar studies.

As mentioned, this section also provides information on the safety effect of right-turn operations at signalized intersections. Crashes, especially pedestrian and bicyclist crashes, at signalized intersections where right-turns are permitted during the red signal indication are considered against "area wide right-turn-on-red" prohibitions.

This section is divided into two major components, right-turn-on-red operations at traffic signals and right-turn channelization. Other safety effects addressed in this section include free slip lanes (channelization) at a signalized intersection.

Section 4.1 provides a discussion of the design of left- and right-turn lanes and treatments. Section 4.3 discusses the impact of intersection operations on pedestrian and cyclist safety.

Exhibit 4-55: Resources examined on the relationship between right-turn-on-red and safety

DOCUMENT	DESCRIPTION	COMMENT
(*133*) (Harkey, D., et al.,Accident Modification Factors for Traffic Engineering and ITS Improvements, *NCHRP Report* 617, TRB, (2008)	Expert panel critical review of studies related to right-turn-on-red	Added to synthesis
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	The report provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities. Refers to key findings from previous research as "expected effectiveness".	Not added to the synthesis
(*5*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook that summarizes the effects of a wide range of safety measures	Added to synthesis
(*41*) (Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research on pedestrians including the effect on pedestrian safety of right-turn-on-red operation	Suggested by NCHRP 17-18(4). Added to the synthesis
(*42*) (Lord, D., "Synthesis on the Safety of Right Turn on Red in the United States and Canada." Washington, D.C., 82nd Transportation Research Board Annual Meeting, (2003))	Reviews various studies	Suggested by NCHRP 17-18(4). Added to the synthesis
(*43*) (Retting, R. A., Nitzburg, M. S., Farmer, C. M., and Knoblauch, R. L., "Field Evaluation of Two Methods for Restricting Right Turn on Red to Promote Pedestrian Safety." ITE Journal, Vol. 72, No. 1, Washington, D.C., Institute of Transportation Engineers, (2002) pp. 32-36.)	Evaluated the safety effect on pedestrians of RTOR restrictions at 15 intersections in Arlington, VA; Evaluation criteria for comparing the two methods includes drivers stopping at stop lines, drivers turning right on red, drivers turning right on red without stopping. – Any crash statistics provided were very broad based in nature.	Suggested by NCHRP 17-18(4). Added to the synthesis
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Provides a synthesis of results from many studies for rural intersections. No specific AMFs provided for RTOR.	Not added to the synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Huang, H., "The Effects of No Turn on Red/Yield to Peds Variable Message Signs on Motorist and Pedestrian Behavior." Florida Department of Transportation, (2000))	The study investigated motorist and pedestrian behavior at variable message signs that displayed NO TURN ON RED or YIELD TO PEDS No crash data presented in the study.	Not added to the synthesis
(Hunter, W. W., "Evaluation of a Combined Bicycle Lane/Right Turn Lane in Eugene, Oregon." FHWA-RD-00-151, McLean, Va., Federal Highway Administration, (2000))	The study compared conflicts and maneuvers at two intersections. Possibly related to intersection design, but no crash data provided. "No conflicts were recorded at either intersection." – page 14.	Not added to the synthesis
(Davis, G. A. and Adams, D., "Identifying High-Hazard Sites for Older Drivers." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 201-207.)	Study applies EB methodologies for 102 sites in Minnesota to identify high-hazard sites for older drivers. The breakdown of accident types does not explicitly consider RTOR or channelization	Not added to the synthesis
(Compton, R. P. and Milton, E. V., "Safety Impact of Permitting Right-Turn-On-Red: A Report to Congress by the National Highway Traffic Safety Administration." DOT HS 808, Washington, D.C., National Highway Traffic Safety Administration, (1994))	Evaluated the safety impact of permitting right-turn-on-red movements, used total crashes and fatal crashes, crashes with other motor vehicle and pedestrian crashes. No AMFs generated.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(*44*) (Zegeer, C. V. and Cynecki, M. J., "Evaluation of Countermeasures Related to RTOR Accidents that Involve Pedestrians." Transportation Research Record 1059, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 24-34.)	Field evaluation of the effect of seven RTOR countermeasures on pedestrian safety; used conflicts and violations as surrogates; 34 intersections in 6 U.S. cities	Suggested by NCHRP 17-18(4). Added to the synthesis
(*45*) (Clark, J. E., Maghsoodloo, S., and Brown, D. B., "Public Good Relative to Right-Turn-on-Red in South Carolina and Alabama." Transportation Research Record 926, Washington, D.C., Transportation Research Board, National Research Council, (1983) pp. 24-31.)	Before and after study of the effect of RTOR laws on crashes at intersections in SC and AL	Suggested by NCHRP 17-18(4). Added to the synthesis
(*46*) (Preusser, D. F., Leaf, W. A., DeBartolo, K. B., Blomberg, R. D., and Levy, M. M., "The Effect of Right-Turn-on-Red on Pedestrian and Bicyclist Accidents." Journal of Safety Research, Vol. 13, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 45-55.)	Evaluated the effect of a "Western" version of RTOR on pedestrian and bicycle crashes with motor vehicles; sites in NY, WI, OH, and LA	Suggested by NCHRP 17-18(4). Added to the synthesis
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Publication provides a synthesis of previous studies and percentages of RTOR crashes in various data samples. No AMFs or supporting data provided	Not added to the synthesis

Many of the earlier studies (i.e., 1980's) conducted to assess the safety of permitting right-turn-on-red also published the data collected in the study. In many cases and as described below, these data were used to generate more statistically defensible AMFs and the associated standard error values.

Treatment: Permit Right-Turn-On-Red (RTOR)

Exhibit 4-56 shows that permitting RTOR increases pedestrian crashes based on a study by Preusser et al. (*46*). Exhibit 4-56 displays the results of individual data sets supplied by 4 different jurisdictions (New York State (except New York City), Wisconsin, Ohio, and New Orleans) as well as the result of combining the AMFs and standard errors together. The index of effectiveness values (AMFs) were calculated from the data supplied by Preusser et al.

Preusser et al. indicate the mean values shown have been adjusted to account for seasonal differences but does not indicate if volume increases were accounted for. However, no further adjustments were made on the AMFs calculated from the data.

A method correction factor of 2.2 was used to adjust the standard error values calculated from the data, based on the use of accident frequencies and non-EB methodologies.

Exhibit 4-56: AMFs for Pedestrian Crashes for Permitting Right-Turn-On-Red (46)

Author, date	Treatment/ element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Preusser et al., 1982	Permit right-turn-on-red	Not reported (New York State)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	1.429	0.243
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Wisconsin)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	2.075	0.512
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Ohio)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	1.574	0.306
Preusser et al., 1982	Permit right-turn-on-red	Not reported (New Orleans)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	1.813	0.881
				Combined	**1.57**	**0.18**

The study by Preusser also included information that allows for the calculation of AMFs for bicycle crashes (*46*). Again, AMF values with standard errors were calculated from the data provided in the Preusser report, based on data from three different jurisdictions (New York State (except New York City), Wisconsin, and Ohio). The standard error values have been multiplied with a method correction factor of 2.2 (i.e., medium low rating) to account for the study methodology. The results are shown in Exhibit 4-57.

The results show that RTOR has a negative safety effect on bicycle crashes at signalized intersections.

Exhibit 4-57: AMFs for Bicycle Crashes for Permitting Right-Turn-On-Red (46)

Author, date	Treatment / element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Preusser et al., 1982	Permit right-turn-on-red	Not reported (New York State)	Signalized Intersections, volume not reported	Bicycle Crashes, All Severities	1.820	0.315
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Wisconsin)	Signalized Intersections, volume not reported	Bicycle Crashes, All Severities	1.726	0.524
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Ohio)	Signalized Intersections, volume not reported	Bicycle Crashes, All Severities	1.798	0.525
				Combined	**1.80**	**0.24**

Elvik and Vaa provide AMFs for RTOR based on U.S. studies in the "Handbook of Safety Measures, by the severity of right-turn crashes (pg 508) (*5*). Standard error calculated based on 95% confidence intervals provided by Elvik and Vaa were then multiplied by a method correction factor of 1.8 (medium-high rating) based on the meta-analysis approach used.

Elvik and Vaa's findings indicate that the adoption of RTOR has a negative impact on the safety of right-turns, both for injury and property damage only crashes (Exhibit 4-58).

Exhibit 4-58: AMFs for Right-turn Crashes for Permitting Right-Turn-On-Red (5)

Author, date	Treatment / element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Permit right-turn-on-red	Not reported	Signalized Intersections, volume not reported	Right-turn Crashes, Injury	1.60	0.090
Elvik and Vaa, 2004	Permit right-turn-on-red	Not reported	Signalized Intersections, volume not reported	Right-turn Crashes, PDO	1.10	0.009

Although not explicitly presented in their report, Clark et al. provide sufficient data and information for the studies conducted in South Carolina and Alabama to be able to determine AMFs and standard errors (*45*). The data, interpreted for AMFs, reflects a naïve before-after study without explicit consideration of volume changes. The calculated standard errors were adjusted by a method correction factor of 2.2 (medium low rating). The results are shown in Exhibit 4-59 and are valuable in that they reflect all crashes occurring at signalized intersections, not just right-turning conflicts or crashes. The data are listed for each state separately and then

combined. In each case, an increase in crashes after permitting RTOR was evident based on the data.

Exhibit 4-59: AMFs for All Signalized Intersection Crashes for Permitting Right-Turn-On-Red (45)

Author, date	Treatment / element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Clark et al., 1983	Permit right-turn-on-red	Not reported (South Carolina)	Signalized Intersections, volume not reported	All Crashes, All Severities	1.13	0.021
Clark et al., 1983	Permit right-turn-on-red	Not reported (Alabama)	Signalized Intersections, volume not reported	All Crashes, All Severities	1.05	0.011
				Combined	**1.067**	**0.010**

The various studies reviewed above have similar conclusions. The data from these studies consistently shows that permitting right-turn-on-red at a jurisdictional level has a negative effect on safety.

Additional information on restricting and permitting right-turn-on-red is provided in Section 4.3 on pedestrian and bicyclist safety at intersections.

Discussion: Restrict Right-Turn-On-Red (RTOR)

Very little quantitative crash data were found on the analysis of right-turn-on-red restrictions. A 2008 study examined earlier study data to develop an AMF for restricting/prohibiting RTOR. Studies in 1986 and 2002 considered the compliance of drivers to signing restrictions. In their 1986 study, Zegeer et al. investigated violation rates for NO TURN ON RED (NTOR) and the resulting pedestrian-vehicle conflicts (*44*). In a reference to this study, Campbell et al. note that Zeeger and Cynecki found that "3.7 percent of all right-turning motorists at RTOR-prohibited intersections violate the NTOR signs. However, approximately 21 percent violate the NTOR signs if given an opportunity (e.g. first in line at the intersection with no pedestrians in front of them and no vehicle coming from the left)" (*41*).

Harkey et al. (*133*) critically reviewed studies related to restricting/prohibiting right-turn-on-red and concluded that the Clark, et al., study noted in the section above was the most pertinent. That expert panel assumed that most of the intersections in the Clark study were 4-leg locations with all approaches allowing RTOR. Taking the inverse of the Clark findings, they suggest that the AMF for *prohibiting* RTOR is = $(0.984)^n$, where "n" is the number of treated approaches. This formation indicates that crashes are reduced as the number of RTOR legs are reduced.

In a study by Retting et al. (2002), two methods of restricting RTOR at urban intersections were assessed (*43*):

- Traffic signals restricting RTOR at specified times, and

- Highly visible traffic signs restricting RTOR when pedestrians are present.

The study was conducted at 15 signalized intersections in Arlington, Virginia. Evaluation criteria for comparing the two methods included drivers stopping at stop lines, drivers turning right on red, drivers turning right on red without stopping.

Retting concludes with the following remark, "At intersections with frequent pedestrian activity and where RTOR restrictions are approved to promote pedestrian safety, preference should be given to installing traffic signs prohibiting RTOR during specified hours tailored to pedestrian activity rather than signs giving drivers discretion to determine whether pedestrians are present" (*43*).

Additional information on restricting and permitting right-turn-on-red is provided in Section 4.3 on pedestrian and bicyclist safety at intersections.

4.2.2.3. Signal Timing, Clearance Intervals, and Cycle Length

This section contains information on the safety effects of timing parameters of a signalized intersection including the length of the yellow interval, the use of an all-red interval, and the use of split phases.

As defined in the Highway Capacity Manual (2000) (*11*):

- Cycle = A complete sequence of signal indications
- Cycle length = the total time for a signal to complete one cycle
- Interval = a period of time in which all traffic signal indications remain constant.
- Split Phase = temporal separation of the two approaches from the same roadway.

Related issues such as: pedestrian crossing times (lead/lag, pedestrian only phase) and "scramble" phases in Section4.3, and red light running in Section 4.2.8. Signal coordination will be discussed in Section 4.2.8 in a future edition.

Exhibit 4-60: Resources examined for the relationship between signal phases and safety.

DOCUMENT	DESCRIPTION	COMMENT
(*47*) (Souleyrette, R. R., O'Brien, M. M., McDonald, T., Preston, H., and Storm, R., "Effectiveness of All-Red Clearance Interval on Intersection Crashes." MN/RC-2004-26, St. Paul, Minnesota Department of Transportation, (2004))	Authors provide several methodologies to assess all-red clearance intervals for safety. Data from the study used to generate AMFs and standard error values.	Added to the synthesis
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Provides a strategy for implementing integrated safety programs. Some samples of "expected effectiveness" are provided. One such description adopted for split phases	Added to the synthesis
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Accidents Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	All red intervals recommended, but no specific studies sited that can assist in producing AMFs.	Not added to the synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Reference provides a synthesis of various research by topic and comments on overall quality or scope. AMFs are listed as published. Where applicable, original study reports were reviewed.	Not added to the synthesis.
(Bonneson, J. A. and Son, H. J., "Prediction of Expected Red-Light-Running Frequency at Urban Intersections." Transportation Research Record, No. 1830, Washington, D.C., Transportation Research Board, National Research Council, (2003) pp. 38-47.)	Study establishes relationships between duration of yellow intervals and occurrence of red-light running. No AMFs provided.	Not added to the synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Provides a strategy for implementing integrated safety programs. Some samples of "expected effectiveness" are provided, but none that deal with signal timing parameters.	Not added to the synthesis.
(*48*) (Retting, R. A., Chapline, J. F., and Williams, A. F., "Changes in Crash Risk Following Re-timing of Traffic Signal Change Intervals." Accident Analysis and Prevention, Vol. 34, No. 2, Oxford, N.Y., Pergamon Press, (2002) pp. 215-220.)	Evaluated the crash effects of modifying the change interval; 122 intersections with a random before and after with control; examined crashes	Suggested by NCHRP 17-18(4). Added to the synthesis
(Datta, T. K., Schattler, K., and Datta, S., "Red Light Violations and Crashes at Urban Intersections." Washington, D.C., 79th Transportation Research Board Annual Meeting, (2000))	Crude Before and after analysis to evaluate the effect of an all-red-interval on crashes; conducted in Detroit, MI for 3 intersections. Does not account for volume changes or RTM.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(Retting, R. A. and Greene, M., "Influence of Traffic Signal Timing on Red-Light Running and Potential Vehicle Conflicts at Urban Intersections." Transportation Research Record 1595, Washington, D.C., Transportation Research Board, National Research Council, (1997))	Before and after study on the effect on safety of increased change intervals; used potential conflicts as surrogates; 10 urban intersections. However, study used potential conflicts, not actual conflicts or crashes.	Suggested by NCHRP 17-18(4). Not added to the synthesis.
(Gibby, A. R., Washington, S. P., and Ferrara, T. C., "Evaluation of High-Speed Isolated Signalized Intersections in California." Transportation Research Record 1376, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 45-56.)	Linear regression models developed to establish a relationship between inter-green period and accident rates. However, models not intended to accurately predict rates.	Not added to the synthesis.
(Roper, B. A., Fricker, J. D., Montgomery, R. E., and Sinha, K. C., "The Effects of the All-Red Clearance Interval on Accident Rates in Indiana." TE 1991 Compendium of Technical Papers, Washington, D.C., ITE 1991 Compendium of Technical Papers, (1991) pp. 361-365.)	The study analyzes crashes at 25 treatment intersections and 25 comparison intersections for a period 2-year before and 5-years after the installation of all-red clearance intervals. However, no study data were provided and the findings of the study were inconclusive.	Suggested by NCHRP 17-18(4). Not added to the synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Bhesania, R. R., "Impact of Mast-Mounted Signal Heads on Accident Reduction." ITE Journal, Vol. 61, No. 10, Washington, D.C., Institute of Transportation Engineers, (1991) pp. 25-29.)	Simple before and after study of mast-mounted signal heads and 1-second of all-red at 6 signalized intersections. However, cannot separate new hardware from signal timing.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(Zador, P., Stein, H., Shapiro, S., and Tarnoff, P., "Effect of Signal Timing on Traffic Flow and Crashes at Signalized Intersections." Transportation Research Record 1010, Washington, D.C., Transportation Research Board, National Research Council, (1984) pp. 1-8.)	Comparative analysis of traffic signal change interval timing and daytime crashes at 91 intersections throughout the US	Suggested by NCHRP 17-18(4). Insufficient information to draw conclusions. Not added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Provides a synthesis of various research studies conducted prior to 1982, but does not present original data or an opportunity to calculate any new AMFs.	Not added to the synthesis.
(Dawson, R. F. and Oppenlander, J. C., "General Design." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 11, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Report provides crash statistics for various environments, states, and facilities. Also provides high level safety data by major type of facility improvement. Insufficient information provided for descriptions of treatments and on the particulars of the data (i.e. durations for before/after periods, etc.)	Not added to the synthesis.

Treatment: Update inter-green intervals to ITE Standards

Retting et al. provide the most recent information regarding signal change intervals and safety (*48*). The study examines the effect of re-timing 40 signals using the ITE Proposed Recommended Practice for Determining Vehicle Change Intervals (1985). Another 56 signals were selected as a comparison group. Random assignment of the sites to experimental and control groups reduces the possible biases due to regression to the mean.

The data presented in the study was used to determine AMFs and standard errors in accordance with the procedures documented in Table 9.8, page 125 of (*50*). Standard error values as shown were adjusted with a method correction factor of 1.2 (in accordance with HSM procedures for B/A studies with comparison groups, rated high). The results are shown below in Exhibit 4-61.

Yellow change intervals at the treatment sites ranged from 3 to 4 seconds in the before period and 2.6 to 5.4 seconds in the after period. Red clearance intervals ranged from 2 to 3 seconds in the before period and 1.1 to 6.5 seconds in the after period.

Exhibit 4-61: AMFs for Modifying Clearance Intervals at Traffic Signals

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	All types and severities	0.91	0.10

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	Rear-end, all severities	1.11	0.20
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	Right angle, all severities	0.94	0.21
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	Pedestrian / Bicyclist, all severities	0.61	0.19
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	All types, Injury	0.87	0.11
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	Rear-end, Injury	1.06	0.21
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	Right angle, Injury	1.30	0.26
Retting, Champline & Williams, 2002	Retiming signal change intervals to ITE standards	Not reported	4-Leg Signalized Intersections, volume not reported	Pedestrian / Bicyclist, Injury	0.61	0.19

Discussion: Installation of an All-Red Clearance Interval

Souleyrette et al. considers the safety implications of providing an all-red interval at traffic signals in Minneapolis (*47*). Two methodologies were described in the paper: a) a cross-section study was used for 38 sites with all-red clearance intervals and 38 sites without; b) a before-after study of 22 treatment sites with a comparison group of 47 sites. The combined results of both methodologies indicate an overall 47% increase in accidents. Data were insufficient to develop AMFs.

These findings contradict those of previous research. In the background research documented by Souleyrette et al., fewer crashes were observed in the study by Datta et al. (2000) although all red intervals were introduced along with alterations to the yellow intervals. In the study by Roper et al. (1991), no significant difference was cited (using two distinct comparisons) before and after the implementation of an all red interval (as cited in (*47*)).

In consideration of the Souleyrette et al. report in light of the inconclusive findings from previous studies, it is suggested that more research be conducted that can establish more conclusively the overall affects of an all-red interval to safety.

Discussion: Implement split phases

Although no conclusive findings were identified, Antonucci et al. provide some general information on the effectiveness of split phases in "A Guide for Addressing Accidents at Signalized Intersections", NCHRP 500 Volume 12 (*4*). Reference is made to Page V-11 which provides a general description of the effects on safety of implementing split phase operations:

"Though studies have not conclusively proven that implementation of split phases reduces fatalities and severe injuries at signalized intersections, the elimination of conflicts can logically be expected to reduce crashes. Using split phases to separate opposing traffic can be expected to greatly reduce the sideswipe, rear-end, and angle conflicts and the accidents associated with the geometric situation that contributes to the conflicts between the opposing vehicles. The effectiveness in reducing crashes involving left-turning vehicles should be similar to that of adding a protected-only left-turn phase."

4.2.2.4. Actuated Control

This section would ideally contain information on the safety effect of various types of phase operations (i.e., fully actuated, semi-actuated, and pre-timed). Currently, there is limited information available regarding the safety effect of actuated intersection control. There is a need to quantify the safety impact of various forms of signal actuation on all crash types at different intersection types and environments.

As defined in the Highway Capacity Manual (2000) (*11*):

- Fully actuated control = a signal operation in which vehicle detectors at each approach to the intersection control the occurrence and length of every phase.
- Pre-timed control = a signal control in which the cycle length, phase plan and phase times are preset to repeat continuously.
- Semi-actuated control = a signal control in which some approaches (typically on the minor street) have detectors, and some of the approaches (typically on the major street) have no detectors.

Exhibit 4-62: Resources examined on the relationship between actuated controls and safety

DOCUMENT	DESCRIPTION	COMMENT
(Mohamedshah, Y., Chen, L., and F.M.Council, "Association of Selected Intersection Factors With Red-Light-Running Crashes." FHWA-RD-00-112, McLean, Va., Federal Highway Administration, (2000))	Before/After study at 10 intersections (20 approaches) to establish red-light running trends vs. yellow intervals, back plates on signal heads, flow rates/cycle lengths.	Not added to the synthesis.
(*51*) (Bamfo, J. K. and Hauer, E., "Which is Safer in terms of Right-Angle Vehicle Accidents? Fixed-time or Vehicle-actuated Signal Control." Toronto, Ontario, Canada, Canadian Multidisciplinary Road Safety Conference X, (1997) pp. 352-360.)	Multivariate models were established to determine the relationship between right-turn crashes on approaches with vehicle actuated or pretimed control.	Added to the synthesis

Only qualitative evidence of the safety affects of various forms of phase operations where found in the various references reviewed.

Discussion: Vehicle actuated approaches

In a 1997 cross section study of data taken at 306 intersections in Hamilton-Wentworth, Bamfo et al. determined that there is a general increase in the number of right-angle crashes for approaches with fixed time (FT) control over approaches with vehicle actuated (VA) control (*51*). The database consisted of 46 three-leg intersections, 6 with VA and 40 with FT, and 260 four-leg intersections, 22 with VA and 238 with FT.

As the sample size of right-angle crashes for the vehicle actuated approaches was small, the overall precision of the findings were a noted concern by the authors… "However, inasmuch as the number of approaches and the total number of accidents at approaches with the VA control is small, sound conclusive statements may not be made of these observations. Nonetheless, it is suggestive that for similar traffic flows, the safety of a representative FT approach from the study database is about 15% higher than that of a representative VA approach" (pg 358) (*51*). Because of the limited precision, no standard error values were established.

4.2.2.5. Detector Placement and Signal Control on High Speed Approaches [Future Edition]

The onset of the change interval at a signalized intersection can be timed so as to minimize the likelihood that a motorist will be a distance from the intersection where they may be indecisive about whether to stop or proceed through the intersection, i.e., in the "dilemma zone". Traffic detectors can be placed strategically to determine the optimum onset of the change interval.

In future editions of the HSM, the safety of minimizing the occurrence of "dilemma zone" decisions will be addressed here. This section may identify the safety effect of detector placement on high-speed approaches to signalized intersections. Detector placement on approach to roundabouts with signals may also be addressed here. Potential resources are listed in Exhibit 4-63.

Exhibit 4-63: Potential resources on the relationship between detector placement and signal control and safety

DOCUMENT
(Bonneson, JA, and McCoy, PT, "Traffic Detector Designs For Isolated Intersections " ITE Journal, Vol. 66, No. 8, 1996)

4.2.2.6. Advance Warning Flashers and Warning Beacons

An advance warning flasher (AWF) is a traffic control device that provides drivers with advance information on the status of a downstream traffic signal. Advance warning flashers may be linked to the signal timing mechanism or operate continuously.

This section discusses the effect of advance warning flashers on the safety of the intersection.

Exhibit 4-64: Resources examined on the relationship between advanced warning flashers and safety

DOCUMENT	DESCRIPTION	COMMENT
(*52*) (Sayed, T., Vahidi, H., and Rodriguez, F., "Advance Warning Flashers: Do They Improve Safety?" Transportation Research Record, No. 1692, Washington, D.C., Transportation Research Board, National Research Council, (1999) pp. 30-38.)	Model parameters are provided along with Accident Reduction indications for each site. It is possible to develop AMFs and standard error values from these data; however, the standard errors are very large and were not adopted for inclusion into the synthesis.	Suggested by NCHRP 17-18(4). Added to the synthesis but not AMFs
(Farraher, B. A., Weinholzer, R., and Kowsji, M. P., "The Effect of Advanced Warning Flashers on Red Light Running - A Study Using Motion Imaging Recording System Technology at Trunk Highway 169 and Pioneer Trail in Bloomington, Minnesota." Las Vegas, Nev., Proc. 69th Institute of Transportation Enginners Annual Meeting, (1999))	Study considers red-light violations with and without AWFs by vehicle type, time of day, approaching speeds. No crash data provided.	Suggested by NCHRP 17-18(4). Not added to the synthesis.
(Gibby, A. R., Washington, S. P., and Ferrara, T. C., "Evaluation of High-Speed Isolated Signalized Intersections in California." Transportation Research Record 1376, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 45-56.)	Linear regression models developed to establish a relationship between sites with and without AWFs. However, models not intended to accurately predict rates.	Not added to the synthesis.
(Box, P. C., "Intersections." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 4, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Provides a synthesis of studies conducted for advanced warning flashers (amongst other studies). However the report is dated and has been superseded by more recent work	Not added to the synthesis.

In 1999, Sayed et al. published a study that considered the crash histories of intersections with and without Responsive Advanced Warning Flashers (AWFs) (*52*). A total of 25 sites without AWFs and 81 sites with AWFs were selected for analysis. The AWFs under consideration consisted of illuminated, rectangular signs with 200 mm yellow flashing beacons in each of the upper corners. The flashing interval commenced (one second on, one second off) prior to the onset of the yellow at the traffic signal.

Regression analysis was conducted using three different approaches:

1. Separate model approach – separate GLIM models developed for AWF and non-AWF intersections.
2. Single Model approach – a single accident prediction model to represent all of the intersections in the data sample.
3. Separate "unforced" models – the development of two separate accident prediction models for AWF and non-AWF locations (as in Method 2) without, however the "forcing" of any of the parameters.

Sayed et al. provide graphical comparisons of expected total accidents by traffic volumes for various minor road AADTs (Exhibit 4-65).

Sayed et al. note:

- "When minor street traffic volumes are low (i.e., AADT at 3,000), AWF benefits are limited if not negligible. Here it is observed that as the major street traffic volumes increase, AWF locations are correlated with increasing accident frequency relative to the non-AWF locations."

- "When minor street traffic volumes are moderate (i.e., AADT at 8,000), AWF benefits varied by the major street traffic volumes. Here it is observed that where the major street AADT is below 35,000 vehicles per day, the AWF locations have a lower accident frequency relative to the non-AWF locations."
- "When the minor street traffic volumes are high (i.e., AADT at 18,000), AWF locations are consistently associated with lower accident frequency in comparison to the non-AWF locations, and regardless of the major street traffic volumes. For the Total model, the "cross-over" point was found to be a minor road AADT of approximately 13,000 – meaning that when the minor road volume exceeded this value the AWF locations have consistent lower accident frequencies."

Exhibit 4-65: Comparison of expected total accidents by traffic volume (Figure 2 of (52))

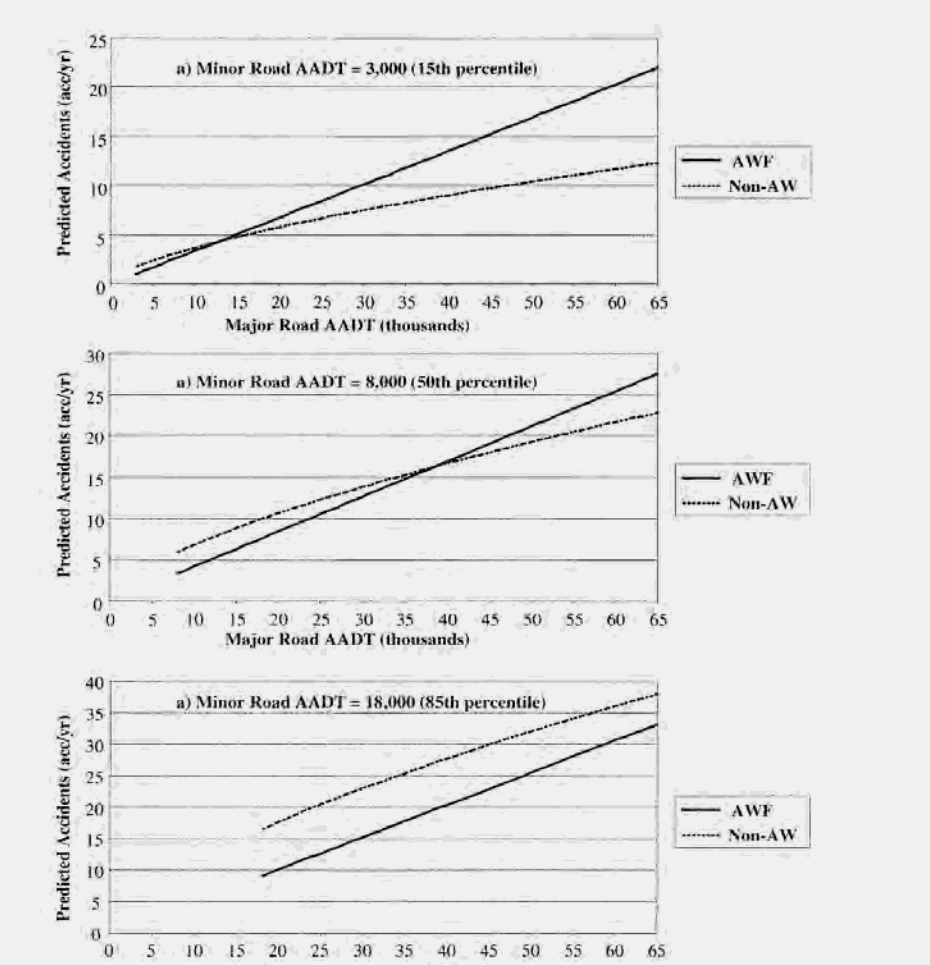


Figure 2 Comparison of Expected Total Accidents By Traffic Volume

Gibby et al. came to the same conclusion about the effectiveness of advance warning treatments for intersections when they concluded that "advance warning flashers (AWFs) seem to improve the safety" of approaches to high-speed isolated signalized intersections. Although there

was insufficient information to derive indices of effectiveness and their corresponding standard errors, based on a comparison of accident rates between sites comprised of rural, isolated signalized intersections with high speed approaches with AWFs and similar sites without AWFs, Gibby et al. suggested that "an approach may experience as much as a 50 percent reduction in approach accident rates after installation of an AWF". Using a similar approach to examine the effectiveness of advance warning signs with no flashers (AWSs), the researchers concluded that AWSs have "little effect on approach accident rates" (*53*).

4.2.2.7. Other Operational Considerations

This section contains information on the safety effect of other traffic signal operational considerations such as the use of flashing signal operation during low-volume periods, sometimes referred to as "night-flash" operations.

Flashing traffic signal operation can be used during low volume conditions to minimize delay at a signalized intersection. The section provides some discussion of the trends between crashes at intersections during flashing operation against full signal operations.

There is a need to quantify the safety impact of flashing signal operations in low volume conditions. Future editions of the HSM may contain additional traffic signal operations.

Exhibit 4-66: Resources examined on the relationship between various signal operational considerations and safety

DOCUMENT	DESCRIPTION	COMMENT
(*133*) (Harkey et al., "Accident Modification Factors for Traffic Engineering and ITS Improvements", NCHRP Report 617, (2008)	Before-after EB studies were conducted using data from Winston-Salem to evaluate the safety of different treatments including night-flash operation.	Added to synthesis.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Reference provides a synthesis of various research by topic and comments on overall quality or scope. AMFs are listed as published. Where applicable, original study reports were reviewed.	Not added to the synthesis
(Polanis, S. F., "Do 12" Signal Lenses Reduce Angle Crashes?" Washington, D.C., Institute of Transportation Engineers 68th Annual Meeting, (1998))	Describes the results of a before and after study on the effect of 12 inch signal lenses on crashes at 38 signals in Winston-Salem, NC. However, no independent results provided for night-flash operations.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(Sayed, T., Abdelwahab, W., and Nepomuceno, J., "Safety Evaluation of Alternative Signal Head Design." Transportation Research Record 1635, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 140-146.)	Empircal Bayes before and after crash analysis of the effect of increased signal head size at 10 urban intersections in British Columbia. However, this report does not consider flashing signal operations.	Suggested by NCHRP 17-18(4). Not added to the synthesis
(*54*) (Barbaresso, J. C., "Relative Accident Impacts of Traffic Control Strategies During Low-Volume Night Time Periods." ITE Journal, Vol. 57, No. 8, Washington, D.C., Institute of Transportation Engineers, (1987) pp. 41-46.)	Before and after study evaluated the effect on crashes of flashing operation at six 4-legged intersections; also conducted comparative analysis of crashes at intersections by signal operation	Suggested by NCHRP 17-18(4). Added to the synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Short, M. S., Woelfl, G. A., and Chang, C. J., "Effects of Traffic Signal Installation On Accidents." Accident Analysis and Prevention, Vol. 14, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 135-145.)	Considers 31 recently signalized intersections in Milwaukee. However, the author concludes "that the change in PDOE accidents is associated with some phenomena independent of either flash or normal operation alone."	Not added to the synthesis.

Few studies appear to have been conducted on the safety effects of operating traffic signals in a flashing condition during nighttime or low volume periods. One study that did consider the effects of flashing operations was published in the ITE Journal by Barbaresso in 1987 (*54*). The study considers 6 signalized intersections selected for available crash data for 3-years before and 3-years after flashing nighttime operations was eliminated. It also considers a cross-section study of 82 additional intersections.

Although the data provided in the study report does not allow for the generation of AMFs and standard errors, the author notes that "eliminating flashing signal operation at the four-legged arterial intersections analyzed in this study should result in a reduction of 0.13 right-angle accidents per year-hour eliminated" (pg 44) (*54*). The method of site selection is not clear; therefore regression-to-mean is a potential confounder of these results.

Barbaresso also finds "The results of this study indicate that right-angle accidents are significantly overrepresented at four-legged arterial intersections when signals are in a flashing mode during nighttime hours. T-type intersections and arterial-collector intersections, where signals flash part time, experienced significantly fewer right-angle accidents than the other intersection types analyzed" (pg 45) (*54*).

Harkey et al., 2008 (*133*), conducted a before-after EB study using data from 12 signalized intersections in Winston Salem, NC, where night time flash operation was replaced by steady operation (see Exhibit 4-67). This study was rated medium high due to limited sample and an MCF of 1.8 was used to modify the standard errors. The results indicated about a 35% reduction in nighttime angle and total nighttime crashes following the replacement of flashing operation.

Exhibit 4-67: Replacing Night-Time Flashing Operation with Steady Operation

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Harkey et al., 2008	Replace Night-Time Flash with Steady Operation	Urban	3-leg and 4-Leg Signalized Intersections, volume not reported	Nighttime angle; all severities	0.659	0.324
Harkey et al., 2008	Replace Night-Time Flash with Steady Operation	Urban	3-leg and 4-Leg Signalized Intersections, volume not reported	All Nighttime; all severities	0.651	0.261

4.2.3. Signs

Traffic signs are typically classified as one of three categories: Regulatory signs; Warning signs and Guide Signs. As defined in the Manual on Uniform Traffic Control Devices (*17*), Regulatory signs provide notice of traffic laws or regulations, warning signs give notice of a situation that might not be readily apparent, and guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational or cultural information. While MUTCD provides the standards, as well as guidance and options necessary for signing within the right-of-way of all types of highways open to public travel, many agencies supplement the information contained in this manual with their own guidelines and standards. The MUTCD does not specify the conditions (traffic, road geometry, etc.) under which the signs are to be used.

This section examines the safety effects of signage at, and in advance of signalized and unsignalized intersections and roundabouts. The discussion in this section excludes any consideration for yield and stop signs intersections and also any signs along roadway segments since these topics are addressed in Sections 4.2.1 and 3.2.

Given that a large number of studies that investigate the safety impacts of signs at intersections are related to pedestrian crosswalks, readers may also refer to Section 4.3. In terms of signage within work zones, the reader is directed to Section 6.2.

Exhibit 4-68: Resources examined to investigate the safety effect of signs at intersections or roundabouts

DOCUMENT	DESCRIPTION	COMMENT
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Study provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities.	Added to synthesis. Anecdotal evidence of signage safety effectiveness found. No quantitative information provided.
(*13*) (Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Accidents Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	The report provides engineering, planning, education, and policy guidance for accommodating the needs of older drivers in order to reduce crashes and fatalities	Added to synthesis. Anecdotal evidence of the safety effectiveness of signs found. No quantitative information provided.
(*10*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Reference is a detailed implementation guide that provides guidance and strategies to improve safety at unsignalized intersections.	Added to synthesis. Anecdotal evidence of the safety effectiveness of signs at intersections found. No quantitative information provided.
(Van Houten, R., Malenfant, J. E., and McCusker, D., "Advance Yield Markings: Reducing Motor Vehicle-Pedestrian Conflicts at Multilane Crosswalks with Uncontrolled Approach." Transportation Research Record, No. 1773, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 69-74.)	Evaluated the effect of advance yield markings and a symbol sign on pedestrian safety at intersections; used conflicts, pedestrian and motorist behavior as surrogate.	Not added to synthesis since more relevant to Sections 3.3 and 4.3 (Pedestrian and Bicycle Safety at Intersections).

DOCUMENT	DESCRIPTION	COMMENT
(*23*) (Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways through a review of previous studies.	Added to synthesis. Some anecdotal evidence of speed reductions resulting from signs at horizontal curves but no quantitative information provided about safety impacts.
(Huang, H., "The Effects of No Turn on Red/Yield to Peds Variable Message Signs on Motorist and Pedestrian Behavior." Florida Department of Transportation, (2000))	The study investigated effectiveness of variable message signs in changing motorist and pedestrian behavior at intersections. Focus on vehicle-pedestrian conflicts involving vehicles turning right on red	Not added to synthesis since more relevant to Pedestrian and Bicyclist Safety at Intersections.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Reviews existing research and attempts to provide guidelines on highway engineering improvements that would help older drivers and pedestrians.	Not added to synthesis. No discussion on safety impacts of signs.
(Retting, R. A., Van Houten, R., Malenfant, L., Van Houten, J., and Farmer, C. M., "Special Signs and Pavement Markings Improve Pedestrian Safety." ITE Journal, Vol. 66, No. 12, Washington, D.C., Institute of Transportation Engineers, (1996) pp. 28-35.)	Before-after study investigated the effectiveness of special signs and pavement markings used to prompt pedestrians to look for turning vehicles at intersections.	Not added to synthesis since more relevant to Pedestrian and Bicycle Safety at Intersections.
(Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995),Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))	The report traces the evolution of roundabout design in the UK up to 1993 and provides a brief synopsis of some previous safety research studies in Chapter 7 (page 136).	Not added to synthesis. No quantitative or qualitative evidence of crash reductions related to signs found.
(*55*) (Brich, S. C. and Cottrell Jr, B. H., "Guidelines for the Use of No U-Turn and No-Left Turn Signs." VTRC 95-R5, Richmond, Virginia Department of Transportation, (1994))	Naïve before and after study that evaluated the effect of No U-Turn and No Left-Turn signs on crash rates at 8 signalized intersections	Reference suggested by NCHRP 17-18(4). Added to synthesis. t and s values related to "No Left Turn" and "No U-Turn" signs calculated using available accident data
(Kuciemba, S. R. and Cirillo, J. A., "Safety Effectiveness of Highway Design Features: Volume V - Intersections." FHWA-RD-91-048, Washington, D.C., Federal Highway Administration, (1992))	Report briefly discusses nine studies (1972 to 1988) of the relationship between intersection design/operations and safety	Not added to synthesis. No information on signs.
(Gibby, A. R., Washington, S. P., and Ferrara, T. C., "Evaluation of High-Speed Isolated Signalized Intersections in California." Transportation Research Record 1376, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 45-56.)	Cross-sectional analysis comparing accident rates for high-speed, isolated signalized intersections.	Added to Section on Advance warning flashers.

DOCUMENT	DESCRIPTION	COMMENT
(Upchurch, J. E., "Guidelines for Use of Sign Control at Intersections to Reduce Energy Consumption." ITE Journal, Vol. 53, No. 1, Washington, D.C., Institute of Transportation Engineers, (1983) pp. 22-34.)	Discussion on warrants for traffic signals at intersections	Not added to synthesis. No information on safety effectiveness of signs
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis study reviewing 17 safety research areas	Not added to synthesis. No material on the safety effectiveness of signs at intersections or roundabouts.
(*1*) (Box, P. C., "Intersections." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 4, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Reference reviews studies relating safety to elements of intersections, including geometric layout, left turn lanes, traffic controls, signing, and turn restrictions among others.	Added to synthesis. Some quantitative data found on effectiveness of overhead and roadside directional signs, and advance warning signs with flashers but insufficient data to calculate t and s values.

From the review of studies, there appears to be few studies that have attempted to quantify the safety impacts of signs at intersections or roundabouts other than those used to draw attention to pedestrian crossings. Of those references that were reviewed, only one presented any information on the quantified safety impacts of signs at intersections. The remaining references were limited to discussions on safety using anecdotal based information.

Treatment: Install "No Left Turn" and "No U-Turn" signs

Brich and Cottrell reviewed a study by Shoaf (1967) that examined the safety effectiveness of prohibiting left-turns and U-turns through the installation of "No Left Turn" or "No U-Turn" signs at intersections on urban and suburban arterials and found that this particular treatment reduced the number of left-turn accidents by 47% to 63% (*55*). Although no other details were provided about that particular study, results from a similar analysis carried out by the researchers themselves appear to concur with these findings. Using a simple before-after approach, Brich and Cottrell reported a 59% reduction in left-turn and u-turn accidents and a 62% reduction in total accidents following the implementation of this change in traffic operations and the installation of "No U-Turn" and/or "No Left Turn" signs at intersections and median crossovers. The intersections and median crossovers studied had an entering ADT volume range of 19,435 to 42,000 veh/day. It is unclear from the reference if the intersections examined were signalized or unsignalized.

Indices of effectiveness and standard error values shown in Exhibit 4-69 were calculated using the reported number of crashes and the ratio of before-after duration. These results were assigned a medium-low rating based on the study quality, and a method correction factor of 2.2 was applied to the s ideal calculated to account for this. In addition, the AMFs have been adjusted to account for the known changes in traffic volume that occurred at the treatment sites during the study by dividing by 1.09 (increase in traffic of 9%).

Although changes in traffic volumes were provided in the study, it should be noted that the researchers did not take into account the possibility of accident migration or spillover to adjacent intersections or median crossovers that were not studied.

Exhibit 4-69: Safety effects of prohibiting left-turns and/or U-turns by installing "No Left Turn" and/or "No U-Turn" signs (55)

Author, date	Treatment / Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Brich and Cottrell (1994)	Prohibit left-turns with "No Left Turn" sign	Urban and suburban arterial	Three- and Four-leg intersections and median crossovers Entering AADT 19,435 to 42,000 vpd	Left-turn, All severities	0.36	0.2
				All intersection crashes, All severities	0.32	0.1
	Prohibit left-turns and U-turns with "No Left Turn" and "No U-Turn" signs			Left-turn and U-Turn crashes, All severities	0.23	0.2
				All intersection crashes, All severities	0.28	0.2

Discussion: Advance warning signs with beacons

The more cues there are to the presence of an intersection and the further away these cues can be seen, the more readily a driver will detect the presence of the intersection in time to perform whatever maneuver may be required there. The less expected the intersection is, the more cues are needed and the more visible the cues should be. Although there was insufficient data and evidence to reach a definitive, quantitative conclusion on its safety impacts, the general consensus among researchers in the references reviewed was that advance warning signs, particularly when used in conjunction with flashers, are effective in improving the overall safety of intersections.

Box reported that a study by Smith and Vostrez (1964) had examined the safety effectiveness of static flashing beacons in conjunction with advance warning signs, and found that the use of the treatments resulted in a 20% reduction in accidents (*1*). Antonucci et al. added that some crashes such as rear-end or angle accidents at signalized intersections may occur because drivers are unaware of the presence of an intersection or are unable to see the traffic control device in time to comply. The researchers suggested that installing advance warning signs or upgrading signs can alert drivers to the presence of an intersection (*4*). Potts et al. added that advanced warning signs can "help reduce confusion and perception/reaction time at existing or potentially hazardous conditions on or adjacent to the roadways", particularly for older drivers (*13*).

AMFs could not be developed for advance warning signs or flashers based on the available literature.

Discussion: Impact of advance warning signs on surrogate safety measures

In terms of the effects advance warning signs have on surrogate measures such as speed, Fitzpatrick et al. reported on the findings from a study by Lyles (1980) and stated that lighted warning signs were found to be more effective than more traditional unlighted warning signs in reducing vehicle speeds in the vicinity of rural intersections (*23*). The treatments were also found to be more effective in increasing driver awareness of both the signs and the conditions at the intersection. No information as to how the researchers arrived at this conclusion was provided.

Discussion: Advance guide signs

None of the studies examined provided any quantitative evidence of safety improvements resulting from the use of advance guide signs. Although intuitively, one expects that this treatment will improve safety since it enables drivers to detect the presence of an approaching intersection, findings from a previous research study appears to show mixed and inconclusive results.

For instance, Box reviewed a study by Stevens (1958) that investigated the safety effectiveness of directional signing upstream of intersections in reducing sideswipe accidents and found that overhead directional signs reduced sideswipe accident rates from 2.6 per million vehicles the year before installation, to 1.7 the first year after, and then to 0.9 for both the second and third years after. Conversely, the installation of roadside directional signs resulted in increases in sideswipe accident rates from 0.9 to 3.2 per million vehicles after the installation of the treatment. The road classes and traffic volumes for the sites examined in the study were not reported. Although it is unclear from the study whether direct comparisons can or should be made since no further information about the signs were provided (i.e. the location of the overhead and roadside signs relative to the intersection, font sizes, etc.), Box concluded by suggesting that overhead directional signs are more effective in reducing sideswipe accidents compared to roadside directional signs because they were more visible to drivers who had to make lane changes upstream of an intersection (*1*).

Neuman et al. stated that the use of advance guide signs such as lane assignment signing, in tandem with appropriate pavement markings, can reduce accidents caused by driver indecision (*10*). Potts et al. added that providing advance guide signs may also reduce crashes involving older drivers because these treatments provide older drivers with additional time to make necessary lane changes and route selection decisions (*13*).

AMFs could not be developed for advance guide signs based on the available literature.

4.2.4. Delineation

Delineation has long been considered as an essential element for providing effective guidance to drivers on highways. Delineation typically refers to any method of defining the roadway operating area for drivers and may include delineation devices such as pavement markings made from a variety of marking materials, raised pavement markers (RPMs), pavement markers, and post-mounted delineators (PMDs) (*56*). The MUTCD adds that markings on highways have important functions in providing guidance and information for the road user.

Major marking types include pavement and curb markings, object markers, delineators, colored pavements, barricades, channelizing devices and islands. In some cases, markings are used to supplement other traffic control devices such as signs, signals and other markings. In other instances, markings are used alone to effectively convey regulations, guidance, or warnings in ways not obtainable by the use of other devices (*17*).

In the case of delineation devices such as post-mounted delineators, the MUTCD states that they can be particularly beneficial at locations where the alignment might be confusing or unexpected, such as at lane reduction transitions and curves (*17*). Delineators are effective guidance devices at night and during adverse weather. An important advantage of delineators in certain locations is that they remain visible when the roadway is wet or snow covered since they are required to be retroreflective and mounted above the roadway surface and along the side of the roadway in a series to indicate the alignment. In terms of retroreflectivity requirements, the MUTCD stipulates that delineators are required to have retroreflective elements with a minimum dimension of 3 in (75 mm) and be capable of retroreflecting light under normal atmospheric conditions from a distance of 1,000 ft (300 m) when illuminated by the high beams of standard automobile lights (*17*).

The MUTCD adds that the visibility of pavement markings can be obscured by snow, debris, and water on or adjacent to the markings. The visibility can also be compromised since the durability of the pavement marking is affected by weather, its material properties, traffic volumes and location, and subsequently degrades (*17*).

The MUTCD presents standard ways of conveying information to the driver through the design, color, pattern and width of the pavement marking. For example, yellow lines separate traffic flowing in opposing directions, whereas white lines denote traffic flowing in the same direction (*56*). A double line indicates maximum or special restrictions; a solid line discourages or prohibits crossing (depending on the specific application); a broken line indicates a permitted condition; and a dotted line provides guidance (*17*). The reader is directed to the MUTCD for further detailed standards related to color, pattern, and width of pavement markings.

This section investigates the safety effects of the different delineation practices typically used to regulate, warn or provide guidance to drivers at or in close proximity to intersections, and excludes any examination of road segments.

For the safety effect of delineation treatments on road segments, refer to Chapter 3. Given that a large number of studies investigating the safety impacts of pavement markings at intersections are related to crosswalks, readers may also refer to Section 4.3.

Exhibit 4-70: Resources examined to investigate the safety effect of delineation at intersections

DOCUMENT	DESCRIPTION	COMMENT
(*136*) (Gross, F., Jagannathan, R., Lyon, C., and Eccles, K., "Safety Effectiveness of STOP AHEAD Pavement Markings", Presented at the 87th Annual Meeting of the Transportation Research Board, 2008)	Used a before-after EB approach to evaluate the safety impact of stop-ahead pavement markings.	Added to synthesis.
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "A Guide for Addressing Accidents at Signalized Intersections." NCHRP 500 Volume 12, Washington, D.C., Transportation Research Board, National Research Council, (2004))	Study provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities.	Added to synthesis. Anecdotal evidence of delineation safety effectiveness found. No quantitative information provided.
(*13*) (Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "A Guide for Addressing Accidents Involving Older Drivers." NCHRP 500 Volume 9, Washington, D.C., Transportation Research Board, National Research Council, (2004))	The report provides engineering, planning, education, and policy guidance for accommodating the needs of older drivers in order to reduce crashes and fatalities	Added to synthesis. Anecdotal evidence of delineation safety effectiveness found. No quantitative information provided.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Not added to synthesis. No relevant material found on pavement markings at intersections.
(*10*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "A Guide for Addressing Unsignalized Intersection Accidents." NCHRP Report 500 Volume 5, Washington, D.C., Transportation Research Board, National Research Council, (2003))	Reference is a detailed implementation guide that provides guidance and strategies to improve safety at unsignalized intersections.	Added to synthesis. Anecdotal evidence of pavement marking safety effectiveness found. No quantitative information provided.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "A Guide for Addressing Unsignalized Intersection Accidents." NCHRP Report 500 Volume 5, Washington, D.C., Transportation Research Board, National Research Council, (2003))	Reference is a detailed implementation guide that provides guidance and strategies to improve safety at unsignalized intersections.	Not added to synthesis. No quantitative information provided.
(Van Houten, R., Malenfant, J. E., and McCusker, D., "Advance Yield Markings: Reducing Motor Vehicle-Pedestrian Conflicts at Multilane Crosswalks with Uncontrolled Approach." No. 1773, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 69-74.)	Evaluated the effect of advance yield markings and a symbol sign on pedestrian safety at intersections; used pedestrian and motorist behavior as surrogate.	Reference suggested by NCHRP 17-18(4). Not added to synthesis since more relevant to Pedestrian and Bicycle Safety at Intersections.
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Summarizes various studies on pedestrian crossing treatments at uncontrolled intersections, signalized intersections, and mid-block signals.	Reference suggested by NCHRP 17-18(4). Not added to synthesis since more relevant to Pedestrian and Bicycle Safety at Intersections.

DOCUMENT	DESCRIPTION	COMMENT
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "Accident Mitigation Guide for Congested Rural Two-Lane Highways." 440, Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study investigated low-cost safety and operational improvements for two-lane and three-lane roadways through a review of previous studies.	Not added to synthesis. Brief mention of pavement markings at intersections but no qualitative or quantitative information provided about safety impacts.
(Storm, R., "Pavement Markings and Incident Reduction." Ames, Iowa, 2000 MTC Transportation Scholars Conference, (2000) pp. 152-162.)	Reference identifies the areas where pavement markings are most likely to reduce crashes and focuses on the application of pavement markings in three areas: horizontal curvature, turning movements, and pedestrian crosswalks.	Reference suggested by NCHRP 17-18(4). Not added to synthesis since more relevant to Pedestrian and Bicycle Safety at Intersections.
(Persaud, B. N., Parker, M., Wilde, G., and IBI Group, "Safety, Speed & Speed Management: A Canadian Review." Ottawa, Ontario, Canada, Transport Canada, (1997))	The study reviewed the relationships between safety, speed limits and the impact of various traffic control devices on speeds and crashes	Not added to synthesis since the one study identified to be relevant (Griffin and Reinhardt, 1996) was reviewed first-hand and added to the synthesis.
(Retting, R. A., Van Houten, R., Malenfant, L., Van Houten, J., and Farmer, C. M., "Special Signs and Pavement Markings Improve Pedestrian Safety." Vol. 66, No. 12, Washington, D.C., Institute of Transportation Engineers, (1996) pp. 28-35.)	Before-after study investigated the effectiveness of special signs and pavement markings used to prompt pedestrians to look for turning vehicles at intersections. Study measures changes in pedestrian behavior and conflicts not crashes.	Not reviewed since information from reference was already included in the critical review reported in (Storm, 2000).
(*57*) (Griffin, L. I. and Reinhardt, R. N., "A Review of Two Innovative Pavement Patterns that Have Been Developed to Reduce Traffic Speeds and Crashes." Washington, D.C., AAA Foundation for Traffic Safety, (1996c))	Study reviews the effectiveness of converging chevron pattern road markings and transverse bar pattern markings.	Added to synthesis. t and s values calculated using accident reduction percentages and 95% percentile confidence intervals as reported in reference (p. 39-41).
(*58,28*) (Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995), Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))	The report traces the evolution of roundabout design in the UK up to 1993 and provides a brief synopsis of some previous safety research studies in Chapter 6 (page 136).	Added to synthesis. Quantitative evidence of crash reduction found although there are insufficient data to calculate t and s values.
(Zegeer, C. V. and Cynecki, M. J., "Evaluation of Countermeasures Related to RTOR Accidents that Involve Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 24-34.)	Field evaluation of the effect of advanced stop lines (pavement marking) on pedestrian safety; used conflicts and violations as surrogates; 34 intersections in 6 U.S. cities.	Reference suggested by NCHRP 17-18(4). Not added to synthesis since more relevant to Pedestrian and Bicycle Safety at Intersections.

From the review of studies identified previously, it appears that few researchers have attempted to quantify the safety impacts of delineation treatments other than pavement markings at intersections or roundabouts. The large majority of safety studies related to delineation treatments at intersections or roundabouts typically deal with pavement markings and not the other forms of delineation such as object markers and post-mounted delineators. A number of

studies dealt with pedestrian crosswalk markings, and therefore are discussed in their relevant sections.

It is difficult to study and to quantify the safety impacts of specific types of pavement markings at intersections and roundabouts given that the use of such treatments is often regulated through the MUTCD. This subsequently minimizes the chances of finding sites with similar characteristics (i.e. traffic volumes, etc.) and yet have different pavement markings or none altogether. One study which did develop AMFs for one type of pavement marking is described in the following section.

Treatment: Stop Ahead Pavement Markings

Providing Stop Ahead pavement markings can alert drivers to the presence of an intersection. These markings can be especially useful in rural areas at unsignalized intersections with patterns of crashes related to drivers not being aware of the intersection. Gross et al. conducted a before-after EB study using data from approaches to 17 stop controlled intersections in Arkansas and Maryland (*136*). Due to the limited sample size and other study limitations, an MCF of 1.8 was applied to the standard errors (see Exhibit 4-73). The pavement markings seem to have been effective in reducing total intersection crashes, total injury crashes, and rear-end crashes. They seem to be more effective at 3-legged intersections and in all way stop controlled intersections.

Exhibit 4-71: Introducing Stop Ahead Pavement Markings

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	3 and 4 leg stop controlled intersections	Right angle; all severities	1.036	0.326
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	3 and 4 leg stop controlled intersections	Rear-end; all severities	0.710	0.324
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	3 and 4 leg stop controlled intersections	Injury crashes	0.784	0.216
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	3 and 4 leg stop controlled intersections	Total crashes; all severities	0.689	0.144
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	3 leg stop controlled	Injury crashes	0.453	0.295
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	4 leg stop controlled	Injury crashes	0.881	0.270

Study, date	Treatment/ element	Setting	Intersection type, Volume	Accident type, severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	All way stop controlled	Injury crashes	0.577	0.268
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	One-way stop control or two-way stop control	Injury crashes	0.923	0.315
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	3 leg stop controlled	Total crashes; all severities	0.399	0.202
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	4 leg stop controlled	Total crashes; all severities	0.770	0.178
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	All way stop controlled	Total crashes; all severities	0.441	0.164
Gross et al., 2008	Introduce stop ahead pavement markings	Predominantly rural (15 rural and 2 urban)	One-way stop control or two-way stop control	Total crashes; all severities	0.872	0.220

Discussion: Post-mounted delineators at intersections

Antonucci et al. investigated a number of strategies designed to improve safety at signalized intersections and through a review of an ongoing study being conducted in Winston-Salem, North Carolina, found that removing small right-turn triangular channelizing islands and using flexible delineators along the gore stripe to provide positive guidance to drivers turning right, potentially reduces right-turn rear-end crashes. This particular treatment is expected to prevent situations where right-turning drivers approaching the intersection only detect the channelizing islands at the very last minute, stop suddenly and consequently face a high risk of being rear-ended. Although the "after" study had not been completed at the time the reference was written, preliminary findings suggest that right-turn rear-end crashes are "becoming less common" (*4*).

Discussion: Delineators and older drivers

Potts et al. (*13*) discussed several strategies to accommodate the needs of older drivers in order to reduce crashes and fatalities. According to the researchers, increasing the awareness of roadway elements among older drivers through the use of pavement markings and delineation "should improve overall safety" since this heightened awareness will "quicken older drivers' reaction times when conflicts occur". However, the effectiveness of this strategy has not been quantified.

Although all these studies contain some type of anecdotal information suggesting some reduction in crashes due to the implementation of delineation treatments at intersections or roundabouts, of the studies examined, none provide the data and quantitative evidence necessary to reach a definitive, quantitative conclusion on its safety impacts.

Treatment: Transverse bar pavement marking at roundabout approaches

According to Griffin and Reinhardt, transverse bar pavement markings are most often used at approaches to roundabouts that are preceded by long stretches of highway on which drivers could habituate to higher speeds (*57*). Other applications of this particular type of pavement marking have been located at the approaches to intersections, horizontal curves, construction areas, and freeway off-ramps.

Griffin and Reinhardt reviewed a number of studies that examined the impact of such treatments on crashes and identified two studies (Havell, 1983 and Helliar-Symons, 1981, as cited by (*57*)) that provided the quantitative data necessary to calculate AMFs and standard error values. Of the these two studies, only the AMFs and corresponding standard error values derived from the Helliar-Symons study are included in this synthesis for HSM because upon reviewing the study, Griffin and Reinhardt remarked that the crash data used in the study by Havell (1983) were "often ambiguous or inexact".

In the review of the study by Helliar-Symons (1981), Griffin and Reinhardt re-analyzed data available to determine the safety effect of transverse bar markings consisting of strips of yellow thermoplastic material 0.6m (2 ft) in width, applied on the approaches to roundabouts. Only crashes on or within one kilometer (0.62 miles) of the roundabout involving vehicles that had crossed the treatment approach and had been judged to be speed-related were considered. Results from the study are summarized in Exhibit 4-72. The road classes and traffic volumes at the sites examined were not reported. This study was considered to be of medium-low quality (simple before after study with 2 years before and 2 years after data) and the standard error values have been multiplied with a method correction factor of 2.2 to account for this.

Exhibit 4-72: Safety effect of transverse bar pavement markings on roundabout approaches

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Total Speed-related, Injury Crashes	0.43	0.19
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Speed-related, Single vehicle crashes	0.53	0.30
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Speed-related Serious Injury Crashes	0.26	0.28
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Speed-related Slight Injury Crashes	0.48	0.24
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Speed-related, Daytime crashes	0.34	0.18

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Speed-related, Wet surface crashes	0.32	0.23
Griffin and Reinhardt, 1996	Transverse bar markings	Not specified	Not specified	Speed-related, Dry Surface crashes	0.55	0.33

Discussion: Pavement markings at roundabouts

Brown (*28*) reviewed a number of studies on the safety impacts of pavement markings at roundabout approaches (Green, 1973; Helliar-Symons, 1981) and within the roundabout (Yee and Bell, 1986). Although there were insufficient data to estimate the actual index of safety effectiveness of such a treatment, the study by Green (1973) reported that a change from single 8 in (200mm) by 3 ft (0.91m) wide broken white yield line markings at roundabout approaches to 18 in wide markings supplemented with yield signs resulted in 18% fewer injury accidents compared to the national average. It is unclear how this national average was derived, and caution should be exercised using the site accident reduction given the likelihood of confounding factors. Yee and Bell (1986) examined the safety impacts of concentric lane markings and found that while there was a reduction in speed, the markings did not "sufficiently reduce accidents". The degree to which the treatment reduced vehicle speeds was not reported. The study by Helliar-Symons on the safety impacts of transverse bar pavement markings was previously discussed as part of the review done by Griffin and Reinhardt. (*57*).

Discussion: Improved or more conspicuous pavement markings at unsignalized intersections

In the study by Neuman et al. (*10*), the researchers discuss various strategies to improve the safety at unsignalized intersections and state that the use of delineation (and enhanced signing) "should improve safety at the intersection" because drivers will be more alert to potential vehicles on the cross streets. However, they add that that the effectiveness of this strategy has not been quantified. Another treatment reviewed by Neuman et al. was the use of a stop bar (or a wider stop bar where one already exists) on minor-road approaches at intersections. According to the researchers, this treatment is expected to be "especially effective" when applied on approaches where conditions allow the stop bar to be seen by an approaching driver at a significant distance from the intersection. Once again, the effectiveness of such a treatment has not been quantified.

Discussion: Extended edgelines and centerlines through median openings and unsignalized intersections of divided highways

Neuman et al. also discussed the use of dashed markings (extended left edgelines) across median openings at unsignalized divided highway intersections and deemed this treatment to be particularly appropriate for intersections with patterns of rear-end, right-angle, or turning accidents (*10*). The use of this particular treatment will make it less likely for drivers of vehicles waiting in the median roadway for an appropriate gap, to stop in a position with a portion of their vehicle encroaching on the through roadway. Neuman et al. suggested that this strategy "should

assist in reducing accidents" between vehicles using the median roadway and through traffic but found that its effectiveness has not been satisfactorily quantified. In addition, the use of double yellow centerlines at the median openings of divided highways at intersections were also discussed and although the safety effectiveness of this particular strategy has also not been quantified, the researchers stated that the presence of a double yellow centerline "should" minimize side-by-side queuing of vehicles and angled stopping on the median roadway, thereby reducing driver confusion.

Discussion: Lane assignment markings

According to Neuman et al. (*10*), at complex intersections, drivers sometimes face difficulties in determining the appropriate lane from which to perform certain maneuvers and this can potentially lead to accidents. Neuman et al. suggested that the use of lane assignment markings can reduce accidents caused by driver indecision or error such as when a driver performs an unexpected maneuver from an inappropriate lane (e.g., a vehicle making a left-turn from a through lane). However, as with the other pavement markings treatments discussed in this particular reference, the effectiveness of lane assignment markings has not been quantified.

Antonucci et al. (*4*) appear to be in agreement when they stated that pavement markings can be a low-cost solution to guide through vehicles traveling within an intersection with substantial deflection. They added that dashed lines similar to those used to delineate left-turn paths are appropriate for the delineation of the through path. No quantitative analysis was conducted to verify this.

4.2.5. Speed Limits [Future Edition]

In future editions of the HSM, this section may contain discussion on the safety impact of speed limits on intersection approaches in a variety of settings. Treatments such as variable speed limits, lowering the speed limit, and the use of differential speed limits may be included. This section will build on the discussions of speed in other sections of the HSM. Potential resources are listed in Exhibit 4-73.

Exhibit 4-73: Potential resources on the relationship between speed limits and safety at intersections

DOCUMENT
(Johansson, C., Garder, P., and Leden, L., "The Effect of Change in Code on Safety and Mobility for Children and Elderly as Pedestrians at Marked Crosswalks - A Case Study Comparing Sweden to Finland." Washington, D.C., 83rd Transportation Research Board Annual Meeting, (2004))
(Persaud, B. N., Retting, R. A., Garder, P. E., and Lord, D., "Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method." Transportation Research Record, No. 1751, Washington, D.C., Transportation Research Board, National Research Council, (2001))
(Weiss, A. and Schifer, J. L., "Assessment of Variable Speed Limit Implementation Issues." NCHRP 3-59, Washington, D.C., Transportation Research Board, National Research Council, (2001))
(Vogt, A., "Crash Models for Rural Intersections: Four-Lane by Two-Lane Stop-Controlled and Two-Lane by Two-Lane Signalized." FHWA-RD-99-128, McLean, Va., Federal Highway Administration, (1999))
(Hummel, T., "Dutch Pedestrian Safety Research Review." FHWA-RD-99-092, McLean, Va., Federal Highway Administration, (1999))

(Carnahan, C. R., Fox, W. C., French, K. A., Hange, W. A., Henderson, J. L., Hook, D. J. P., Imansepahi, A., Khattak, S. S., Paulson, J. D., Resseguie, J. K., Richey, J. M., and Searls, T. D., "Permissive Double Left Turns: Are They Safe?" Washington, D.C., ITE 1995 Compendium of Technical Papers, (1995) pp. 214-218.)
(Kulmala, R., "Safety at Rural Three- and Four-Arm Junctions: Development and Application of Accident Prediction Models." 233, Espoo, Finland, VTT Technical Research Centre of Finland, (1995))

4.2.6. Traffic Calming

Intersections are places where accidents tend to cluster. This section presents current knowledge regarding the effects on highway safety of traffic calming in intersections. Traffic calming in intersections includes all measures that are designed to reduce speed in the intersection, or reduce the number of conflicts between the various traffic movements passing through an intersection.

This section will present evidence on the safety effects of the traffic calming devices at intersections. Some of the evidence presented here is also presented in other sections of the Highway Safety Manual, in particular in Chapter 3's traffic calming section for roadway segments, and Section 4.3. The following measures have been included in this section:

- Road narrowing (curb extensions, bulbouts, curb bulbs)
- Raised intersections
- Raised pedestrian crosswalks
- Raised bicycle crossings

Converting intersections to roundabouts may be considered as a traffic calming measure; for the HSM, discussion of this treatment is provided in Section 4.1.1.

The main source of evaluation studies is the "Handbook of Road Safety Measures" (*5*). The studies referred to in that book have been updated by more recent studies that are easily available. An extensive literature search has not been performed.

Exhibit 4-74: Resources examined to investigate the safety effect of traffic calming at intersections

DOCUMENT	DESCRIPTION	COMMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	A synthesis of results complied from literature, contact with state and local agencies throughout the United States, and federal programs	No AMFs. Not added to synthesis.
(Johansson, C., Garder, P., and Leden, L., "The Effect of Change in Code on Safety and Mobility for Children and Elderly as Pedestrians at Marked Crosswalks - A Case Study Comparing Sweden to Finland." Washington, D.C., 83rd Transportation Research Board Annual Meeting, (2004))	A case study comparing the results of a study from Sweden with a study from Finland	Not relevant for this section. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Accidents Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	A synthesis of results complied from literature, contact with state and local agencies throughout the United States, and federal programs	No AMFs. Not added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "A Guide for Addressing Unsignalized Intersection Accidents." NCHRP Report 500 Volume 5, Washington, D.C., Transportation Research Board, National Research Council, (2003))	A synthesis of results complied from literature, contact with state and local agencies throughout the United States, and federal programs	No AMFs. Not added to synthesis.
(*59*) (Elvik, R., "Area-wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects." Accident Analysis and Prevention, Vol. 33, No. 3, Oxford, N.Y., Pergamon Press, (2001) pp. 327-336.)	A meta-analysis of 33 studies that evaluated the effect of traffic calming on safety	Suggested by NCHRP 17-18(4). Added to synthesis.
(Huang, H. F. and Cynecki, M. J., "The Effects of Traffic Calming Measures on Pedestrian and Motorist Behavior." FHWA-RD-00-104, McLean, Va., Federal Highway Administration, (2001))	Evaluated numerous traffic calming measures using before and after studies in 3 cities, and cross-sectional studies in 5 cities; employed surrogates (e.g., speeds and compliance)	Suggested by NCHRP 17-18(4). Not reviewed. Duplicates report FHWA-RD-99-135
(Ewing, R., "Impacts of Traffic Calming." Transportation Quarterly, Vol. 55, No. 1, Washington, D.C, Eno Foundation for Transportation Inc., (2000) pp. 33-46.)	Summarizes the results of hundreds of before-and-after studies of traffic calming	Suggested by NCHRP 17-18(4). Not reviewed. Duplicates report FHWA-RD-99-135
(King, M. R., "Calming New York City Intersections." Dallas, Tex., Urban Street Symposium Conference Proceedings, (2000))	Evaluated the effect of neckdowns on crashes at six locations in New York City; focused on pedestrian crashes	Suggested by NCHRP 17-18(4). Limited data presented in paper. Not added to synthesis.
(Davies, D. G., "Research, Development and Implementation of Pedestrian Safety Facilities in the United Kingdom." FHWA-RD-99-089, McLean, Va., Federal Highway Administration, (1999))	A report from a series of pedestrian safety synthesis reports, with the majority of the data from the United Kingdom	No AMFs. Not added to synthesis.
(Ekman, L. and Hyden, C., "Pedestrian Safety in Sweden." FHWA-RD-99-091, McLean, Va., Federal Highway Administration, (1999))	A report from a series of pedestrian safety synthesis reports, with the majority of the data from Sweden	No AMFs. Not added to synthesis.
Ewing, R. H., "Traffic Calming: State of the Practice." FHWA-RD-99-135, Washington, D.C., Federal Highway Administration, (1999))	Research of traffic calming measures and their inherent impacts on the immediate environment as well as the study of legal, emergency, and public effects	No AMFs. Not added to synthesis.
(Hummel, T., "Dutch Pedestrian Safety Research Review." FHWA-RD-99-092, McLean, Va., Federal Highway Administration, (1999))	A report from a series of pedestrian safety synthesis reports, with the majority of the data from the Netherlands	No AMFs. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Garder, P., Leden, L., and Pulkkinen, U., "Measuring the Safety Effect of Raised Bicycle Crossings Using a New Research Methodology." Transportation Research Record 1636, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 64-70.)	Before and after study of raised urban bicycle crossings in Sweden	Suggested by NCHRP 17-18(4). Added to Section 4.3 for bicyclist design.
(ITE Traffic Engineering Council, "Design and Safety of Pedestrian Facilities: A Recommended Practice of the Institute of Transportation Engineers." ITE Journal, Vol. RP-026A, Washington, D.C., Institute of Transportation Engineers, (1998))	A research report on the recommended design and safety of pedestrian facilities	No AMFs. Not added to synthesis.
(Mertner, J. and Jorgensen, L., "Effects of Traffic Calming Schemes in Denmark." Transactions on the Built Environment, Vol. 33, Southampton, United Kingdom, WIT Press, (1998) pp. 213-223.)	Before and after study of traffic calming in Denmark, evaluated safety	Suggested by NCHRP 17-18(4). Uses speed as measurement. Not added to synthesis.
(Catalano, V. V. and Schoen, J. M., "Neighborhood Traffic Management in Tuscon, Arizona." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 21-27.)	Report based on a 5-year history of actual program evidence from technical studies and neighborhood input	No AMFs. Not added to synthesis.
(Zein, S. R., Geddes, E., Hemsing, S., and Johnson, M., "Safety Benefits of Traffic Calming." Transportation Research Record 1578, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 3-10.)	Research based on individual traffic calming studies; 85 case studies were reviewed fro Europe, North America, and Australia	Reviewed by Elvik 2001. Too few data to be included in meta-analysis. Not added to synthesis.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	A review incorporating a variety of studies including accident data, facility design guidelines, route designation criteria, and evaluations of facilities based on observational analysis accident data	No AMFs. Not added to synthesis.

Exhibit 4-75 lists studies that have evaluated the effects of the measures included in this section. This analysis is based on (*59*) and has been updated by Elvik for NCHRP Project 17-27.

Exhibit 4-75: Studies that have evaluated effects on road safety of traffic calming at intersections

Study	Country	Design	Number of estimates
Road narrowing (curb extensions, bulbouts, curb bulbs)			
Engel and Thomsen 1983	Denmark	Simple before-after	1
Blakstad 1993	Norway	Simple before-after	1
Raised intersections			
Schnüll et al 1992	Germany	Simple before-after	4
Raised pedestrian crosswalks			
Engel and Thomsen 1983	Denmark	Simple before-after	2
Jones and Farmer 1988	Great Britain	Simple before-after	4

Raised pedestrian crosswalks			
Downing et al 1993	Pakistan	Before-after with comparison group	2
Blakstad 1993	Norway	Simple before-after	2
Raised bicycle crossings			
Gårder et al 1998	Sweden	Empirical Bayes before-after	1

Only two studies have been found that have evaluated the effects on accidents of widening sidewalks at intersections. The studies do not state if the intersections studied had three or four legs. Both are simple before-after studies not controlling for any confounding factors and therefore both of these studies have been rated as low quality. Accordingly, the standard error has been adjusted by a factor of 3.

Only one study has been found that evaluates safety effects of raised intersections. It is a simple before-after study, not controlling for any confounding factors. It has been rated as a low quality study. The standard error has been adjusted by a factor of 3.

Four studies have been identified that evaluate raised pedestrian crosswalks. Again, the quality of these studies leaves much to be desired. Three of these studies have been rated as low quality, one (Downing et al., 1993) medium-low quality. Standard errors have been adjusted by a factor of 3 in the three low quality studies and by a factor of 2.2 in the medium-low quality study.

One study has evaluated raised bicycle crossings. It employs state-of-the-art Empirical Bayes methodology and has been rated as a high quality study. The standard error has been adjusted by a factor of 1.2.

Exhibit 4-76 summarises the findings of the studies listed in Exhibit 4-75. Uncertainty in summary estimates of effect is stated as the standard error of the summary estimate.

There are very few estimates of the effects of widening sidewalks, constructing raised intersections or constructing raised bicycle crossings. All the summary estimates are close to zero and all are highly uncertain. Current evidence is therefore inconclusive as far as the effects of these measures are concerned.

Raised pedestrian crosswalks appear to reduce accidents. The effects may be overstated, as none of the studies have controlled for regression-to-the-mean or long-term trends in accident frequency.

Exhibit 4-76: Effects on accidents of various traffic calming treatments at intersections

Studies summarised (No. of Estimates)	Treatment/ Element	Setting	Intersection type & volume	Accident Type & Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
All studies (2 estimates)	Widen sidewalks at intersections	Not reported	Not reported	All types, Injury	1.116	1.260
All studies (2 estimates)	Raised intersections	Not reported	Four legs, type of traffic control unknown	All types, Injury	1.053	0.712
All studies (2 estimates)	Raised intersections	Not reported	Four legs, type of traffic control	All types, PDO	1.134	1.401

Studies summarised (No. of Estimates)	Treatment/ Element	Setting	Intersection type & volume	Accident Type & Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
			unknown			
All studies (10 estimates)	Raised pedestrian crosswalks	Not reported	Not reported	All types, injury	0.642	0.543
All studies (5 estimates)	Raised pedestrian crosswalks	Not reported	Not reported	Pedestrian, injury	0.545	0.937
All studies (5 estimates)	Raised pedestrian crosswalks	Not reported	Not reported	Vehicle, all severities	0.697	0.667
All studies (1 estimate)	Raised bicycle crossings	Not reported	Not reported	Bicycle accidents, injury	1.088	0.527

4.2.7. On-street Parking [Future Edition]

In future editions of the HSM, this section may discuss the safety impact of on-street parking near intersections. The impact of various distances from the intersection to parked cars may be of interest. This section will relate to the discussion of on-street parking on roadway segments in Chapter 3. Potential resources are listed in Exhibit 4-77.

Exhibit 4-77: Potential resources on the relationship between on-street parking at intersections and safety

DOCUMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))
Bureau of Transport Economics, "The Black Spot Program 1996-2002: An evaluation of the First Three Years", www.dotars.gov.au/transprog/downloads/road_bs_matrix.pdf
(Humphreys, J. B., Box, P. C., Sullivan, T. D., and Wheeler, D. J., "Safety Aspects of Curb Parking- Executive Summary." FHWA-RD-79-75, Washington, D.C., Federal Highway Administration, (1978))

4.2.8. Intelligent Transportation Systems and Traffic Management

The following sections provide discussion on various Intelligent Transportation System (ITS) treatments at intersections and roundabouts. Automated intersection enforcement and red-light running is discussed.

Signal coordination, red-light hold systems, queue detection systems, and automated speed enforcement may be discussed in future editions of the HSM.

4.2.8.1. Signal Coordination [Future Edition]

Signal progression or signal coordination is generally used to increase capacity of a corridor. In a future edition of the HSM, this section will discuss the safety impacts of providing signal coordination. Potential resources are listed in Exhibit 4-78.

Exhibit 4-78: Potential resources on the relationship between signal coordination of adjacent intersections and safety.

DOCUMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))
Rakha, H., Medina, A., Sin, F., Dion, M., Van Aerde, M. and Jenq, J. (2000), "Traffic signal coordination across jurisdictional boundaries: field evaluation of efficiency, energy, environmental, and safety impacts", *Transportation Research Record* 1727.

4.2.8.2. Queue Detection System [Future Edition]

Queue detection systems are generally used to increase the operational level of service of an intersection. In future editions of the HSM, this section may discuss the safety impact of implementing queue detection systems. Various types of queue detection systems may be included in the discussion. Potential resources are listed in Exhibit 4-79.

Exhibit 4-79: Potential resources on the relationship between queue detection systems and safety.

DOCUMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))

4.2.8.3. Automated Intersection Enforcement and Red-Light Running

In an effort to mitigate accidents due to red-light running at signalized intersections, many jurisdictions have installed red-light cameras. These cameras are positioned along the approaches to intersections with traffic signals and can detect and record the occurrence of a red-light violation. Often, signing, public information programs and rotation of camera equipment will result in "spillover" effects at nearby intersections or throughout a jurisdiction.

This section contains information on the safety effect of red-light-camera systems at signalized intersections. FHWA's evaluation of the crash-related effects of RLC systems, including "spillover" effects to nearby untreated intersections will be addressed.

Exhibit 4-80: Resources examined on the relationship between automated enforcement and safety

DOCUMENT	DESCRIPTION	COMMENT
(*137*) (Shin, K. and Washington, S., "The Impact of Red Light Cameras on Safety in Arizona", *Accident Analysis and Prevention*, 39, (2007), pp. 1212-1221)	Used several approaches (including EB) to study the safety impact of red light cameras in Scottsdale and Phoenix, Arizona. EB approach was possible only in Scottsdale. The study did	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
	not examine spillover effects at non-RLC equipped intersections were not examined. In addition, it is not clear if trend effects were considered in the EB evaluation in Scottsdale.	
(*138*) (Sayed, T. and de Leur, P., "Evaluation of Intersection Safety Camera Program in Edmonton, Canada", *Transportation Research Record* 2009, (2007), pp. 37-45)	Used the EB before-after approach to study the safety effect of mobile red light cameras at 25 intersections in Edmonton, Canada. The study did not examine spillover effects at non RLC locations.	Added to synthesis
(*139*) (Miller, J.S., Khandelwal, R., and Garber, N.J., "Safety Impacts of Photo-Red Enforcement at Suburban Signalized Intersections: An Empirical Bayes Approach", Transportation Research Record 1969, (2006), pp. 27-34) (Garber, N. J., Miller, J. S., Eslambolchi, S., Khandelwal, R., Mattingly, M., Sprinkle, K. M., and Wachendorf, P. L., "An Evaluation of Red Light Camera (Photo-Red) Enforcement Programs in Virginia: A Report in Response to a Request by Virginia's Secretary of Transportation." VTRC 05-R21, Charlottesville, Va., Virginia Transportation Research Council, (2005))	A before-after study using the EB approach was conducted to evaluate the impact of red light cameras at 13 signalized intersections in Fairfax County, Virginia. The study does not indicate if spillover effects at non-camera sites and other confounding factors were accounted for in the evaluation.	Added to synthesis.
(*62*) (Persaud, B., Council, F. M., Lyon, C., Eccles, K., and Griffith, M., "A Multi-Jurisdictional Safety Evaluation of Red Light Cameras.", *Transportation Research Record* 1922, (2005) pp. 29-37.)	A highly relevant resource combining data from 7 different jurisdictions in the U.S. EB approach including consideration of RTM results in recent and statistically defensible AMFs for consideration in this subsection	Added to synthesis.
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Red light cameras are not explicitly considered in the report.	Not added to synthesis.
(*63*) (Council, F. M., Persaud, B., Lyon, C., Eccles, K., Griffith, M. S., Zaloshnja, E., and Miller, T., "Economic Analysis of the Safety Effects of Red Light Camera Programs and the Identification Factors Associated with the Greatest Benefits." Washington, D.C., Presented at 84th Transportation Research Board Annual Meeting, (2004) pp. 1-11.)	This report builds on the results of reference 3280. It presents an economic analysis to further define the safety benefits of red-light cameras and is therefore referenced in this subsection.	Added to synthesis.
(Garder, P., "Traffic Signal Safety: Analysis of Red-Light Running in Maine." Orono, Maine Department of Transportation, (2004))	Report considers crash statistics involving red-light running in the State of Maine. No specific evaluation was done of red-light cameras.	Not added to synthesis.
(Bonneson, J. A. and Son, H. J., "Prediction of Expected Red-Light-Running Frequency at Urban Intersections." Transportation Research Record, No. 1830, Washington, D.C., Transportation Research Board, National Research Council, (2003) pp. 38-47.)	The study considers factors that affect the frequency of red-light running including approach flow rate, cycle length, yellow change interval, speeds, etc. No AMF's for red light cameras were considered.	Not added to synthesis.
(McGee, H. W. and Eccles, K. A., "Impact of Red Light Camera Enforcement on Crash Experience." *NCHRP Synthesis of Highway Practice*, No. 310, Washington, D.C., Transportation Research Board, (2003))	Examines what impact red light camera enforcement has had on crashes and related crash severity at intersections. Insufficient empirical evidence to state effect conclusively.	Not added to synthesis.
(Council, F. M. and Persaud, B., "Red Light Camera Safety Evaluation - Experimental Design, Draft Final Report. Appendix A." (2002))	Proposed evaluation design for national study of crash effects of RLC systems. Includes critical reviews of past RLC studies but no new	Suggested by NCHRP 17-18(4). Not

DOCUMENT	DESCRIPTION	COMMENT
	data to supplement the findings of this subsection.	added to synthesis.
(Retting, R. A., Chapline, J. F., and Williams, A. F., "Changes in Crash Risk Following Re-timing of Traffic Signal Change Intervals." Accident Analysis and Prevention, Vol. 34, No. 2, Oxford, N.Y., Pergamon Press, (2002) pp. 215-220.)	Report considers the affects of changing the change intervals for traffic signals. No specific AMF's or crash information was provided for red light cameras.	Not added to synthesis.
(Maccubbin, R. P., Staples, B. L., and Salwin, A. E., "Automated Enforcement of Traffic Signals: A Literature Review." Washington, D.C., Federal Highway Administration, (2001))	Report provides a summary of other research. No new information was provided.	Not added to synthesis.
(Retting, R. A. and Kyrychenko, S. Y., "Crash Reductions Associated with Red Light Camera Enforcement in Oxnard, California." Arlington, Va., Insurance Institute for Highway Safety, (2001))	Reports crash reduction in three cities, unable to identify crashes related to red-light running events. Superseded by Persaud et al study.	Not added to synthesis.
(Smith, D. M., McFaden, J., and Passetti, K. A., "Automated Enforcement of Red Light Running Technology and Programs: A Review." Transportation Research Record, No. 1734, Washington, D.C., Transportation Research Board, National Research Council, (2000) pp. 29-37.)	Evaluated the effect of automated enforcement systems on crashes and violations at intersections in three cities in the U.S., conducted in NY, FL, and MD. The report considers the stages of the implementation programs and does not provide sufficient information to develop AMF's.	Suggested by NCHRP 17-18(4). Not added to synthesis.
(Datta, T. K., Schattler, K., and Datta, S., "Red Light Violations and Crashes at Urban Intersections." Washington, D.C., 79th Transportation Research Board Annual Meeting, (2000))	Paper considers the effects of all-red intervals, exclusive left turn lanes and left-turn phases on accidents. No red-light camera evaluations were considered.	Not added to synthesis.
(Mohamedshah, Y., Chen, L., and F.M.Council, "Association of Selected Intersection Factors With Red-Light-Running Crashes." FHWA-RD-00-112, McLean, Va., Federal Highway Administration, (2000))	Study considers the characteristics of intersections that are susceptible to red light running accidents. No specific AMF's or crash information was provided for red light cameras.	Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	Some discussion of speed control is mentioned, however, there is no explicit discussion of the effectiveness of red-light cameras on safety.	Not added to synthesis.
(McFadden, J. and McGee, H. W., "Synthesis and Evaluation of Red Light Running Automated Enforcement Programs in the United States." FHWA-IF-00-004, Washington, D.C., Federal Highway Administration, (1999))	Evaluated the effect of automated enforcement systems on crashes and violations at intersections in five cities in the U.S. A repeat of reference 3081.	Suggested by NCHRP 17-18(4). Not added to synthesis.

Treatment: Install red-light cameras at intersections

Since red-light camera technologies emerged over 30 years ago, applications have been assessed throughout the world in terms of the effects on safety. The most defensible and comprehensive study was completed by Persaud, Council, Lyon, Eccles, and Griffith (2005) (*62*). The results from this study are provided in Exhibit 4-77 and recommended for the HSM. This study considers data acquired from red-light camera installations in 13 jurisdictions throughout the United States. However, through a selective review of the data against the requirement of high priority data elements (e.g. crash, ADT, signal phasing changes, RLC signage) the study narrowed the data sample to 7 jurisdictions and explicitly considered the data at 132 treatment sites with 408 and 296 reference and comparison groups (*62*).

The study employed an Empirical Bayesian methodology and accounted for RTM. No further adjustments to the index of effectiveness were required, and a method correction factor of 1.2 was used to reflect a regression comparison where all potential confounding factors considered during a review of the study are accounted for. Persaud et al. found that, with the introduction of red-light cameras, a decrease in the right angle accidents is expected (25% for all severities and 16% for injury accidents) with a corresponding increase in rear-end accidents (15% for all severities and 24% for injury accidents) (Exhibit 4-81) (*62*). These findings are consistent with the findings of previous studies on the topic and suggest that red-light cameras may be best suited for locations that have a high number of angle accidents and a correspondingly lower number of rear-end accidents. A companion paper from Council et al. (2005) provides a closer examination of this assumption using economic analysis (*63*).

Shin and Washington, used several approaches (including EB) to evaluate the safety of red light cameras in Phoenix and Scottsdale, Arizona (*137*). The evaluation included 10 intersections in Phoenix and 14 intersections in Scottsdale. The EB method was not applied in evaluating the Phoenix installations because a complete reference group was not available for that city. In addition, it is not clear if (and how) the trend effects were accounted for the in the EB evaluation of the Scottsdale intersections. The authors also acknowledge that the study did not specifically account for spillover effects at non-RLC intersections. The EB evaluation of the Scottsdale sites revealed a 17% reduction in angle crashes, 40% reduction in left turn crashes, and a 45% increase in rear-end crashes. The results of the EB analysis are shown in the Exhibit. The EB analysis was rated Medium High and an MCF of 1.8 was used to adjust the standard errors from this study. The results from Persaud et al. were combined with Shin and Washington and recommended for inclusion in the HSM.

Miller et al. used several approaches (including EB) to evaluate the safety of 13 intersections with red light cameras in Fairfax, Virginia (*139*). The study paper/report does not indicate whether spillover effects to non-RLC intersections were accounted for. The results indicate a 33% reduction in red light running crashes, 34% reduction in injury red light running crashes, 59% increase in rear end crashes, 14% increase in total injury crashes, and 12% increase in total crashes. The increase in rear end crashes is much higher than the increase found in other EB studies. The authors argue that one reason for this increase is that in the Miller et al. study, only those rear-end crashes attributable to the presence of the red phase were defined as rear-end crashes unlike most other studies that included all rear-end crashes.

Unlike the three other studies discussed here, Sayed and de Luer evaluated the safety of a mobile red light camera enforcement system in Edmonton using the before-after EB method (*138*). Up to 60 locations are included with a total of 24 enforcement cameras available for

deployment. Twenty five sites were selected for evaluation – all of them were four leg intersections with a speed limit of 50 km/h. All crash types including angle, rear end, and total crashes decreased following the implementation of the cameras. Angle crashes decreased between 17 and 20% and rear-end crashes decreased between 12 and 14%. The authors acknowledge that the study did not specifically account for spillover effects at non-RLC intersections.

Exhibit 4-81: Safety effectiveness of red light cameras on accidents

Author, date	Treatment / Element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Persaud et al., 2005	Red Light Cameras	California, Maryland, North Carolina	Entering AADTs: Minor road: 12562 to 33679, Major road: 52625 to 109067	Right Angle and left turn, All Severities	0.75	0.035
Persaud et al., 2005	Red Light Cameras	California, Maryland, North Carolina	Entering AADTs: Minor road: 12562 to 33679, Major road: 52625 to 109067	Right Angle and left turn, Injuries	0.84	0.071
Persaud et al., 2005	Red Light Cameras	California, Maryland, North Carolina	Entering AADTs: Minor road: 12562 to 33679, Major road: 52625 to 109067	Rear End, All Severities	1.15	0.036
Persaud et al., 2005	Red Light Cameras	California, Maryland, North Carolina	Entering AADTs: Minor road: 12562 to 33679, Major road: 52625 to 109067	Rear End, Injuries	1.24	0.139
Shin and Washington, 2007	Red Light Cameras	Scottsdale, Arizona		Right angle and left-turn, all severities	0.665	0.076
Shin and Washington, 2007	Red Light Cameras	Scottsdale, Arizona		Rear-end, all severities	1.45	0.108
Combined Persaud et al., 2005 and Shin and Washington, 2007	Red Light Cameras	California, Maryland, North Carolina, and Arizona		Right angle and left-turn all severities	**0.735**	**0.032**
				Rear-end, all severities	**1.180**	**0.034**
				Right angle and left-turn, injuries	**0.84**	**0.071**
				Rear-end, Injuries	**1.24**	**0.139**

4.2.8.4. Automated Speed Enforcement [Future Edition]

In future editions of the HSM, this section may discuss the safety effects of photo radar enforcement at the approaches to the intersection. Drone radar may also be discussed in this section. Potential resources are listed in Exhibit 4-82.

Exhibit 4-82: Potential resources on the relationship between automated enforcement and safety

DOCUMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))
Retting and Farmer, "Evaluation Of Speed Camera Enforcement In The District Of Columbia" TRR 1830 "Highway Safety, Traffic Law Enforcement, and Truck Safety", 2003

4.3. Pedestrian and Bicyclist Safety at Intersections

Pedestrians and bicyclists are more vulnerable road users, and consideration of their needs at intersections, particularly in urban areas, may impact the overall safety performance of an intersection. Several sources are available for information on pedestrian and bicyclist accommodation including pedestrians with disabilities, such as:

- www.walkinginfo.org
- www.bicycleinfo.org
- AASHTO "Guide for the Planning, Design and Operations of Pedestrian Facilities", 2004 (*26*)
- "ADA and ABA Accessibility Guidelines for Buildings and Facilities", 2004 (*65*)
- "NCHRP Report 500 Volume 10: A Guide for Reducing Crashes Involving Pedestrians" by Zegeer et al., 2004 (*66*)
- "Pedestrian Facilities Users Guide – Providing Safety and Mobility" by Zegeer et al., 2002 (*25*)
- Parts I and II of "Designing Sidewalks and Trails for Access" by Axelson, Kirschbaum, et al., 1999 and 2001 (*67*,*68*)
- "Design and Safety of Pedestrian Facilities: A Recommended Practice of the ITE", 1998 (*69*)
- "The Effects of Bicycle Accommodations on Bicycle/Motor Vehicle Safety and Traffic Operations" by Wilkinson et al., 1994 (*70*)

The design of accessible pedestrian facilities is required and is governed by implementing regulations under the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, which reference specific design and construction standards for usability(*71*).

One of the most comprehensive guides describing a wide range of treatments to enhance pedestrian safety and mobility is the PEDSAFE Guide, sponsored by the Federal Highway Administration (*72*). This report provides details of 47 different types of engineering and roadway treatments, in addition to enforcement and educational measures. It also includes a description of 71 "case studies" (or success stories) of various pedestrian treatments which have been implemented in communities throughout the U.S.

The PEDSAFE Guide includes expert system software, which is available at http://safety.fhwa.dot.gov/pedsafe and also at www.walkinginfo.org/pedsafe. This software is a diagnostic tool which allows a user to select treatments based on the types of crash or operating problems at a site, as well as site characteristics (e.g., number of lanes, type of roadway, traffic volume, area type, traffic control devices, intersection or midblock, presence and type of median,

speed limit). The system provides information to help identify safety and operational needs. The PEDSAFE Guide and software are intended primarily for engineers, planners, safety officials, but may also be useful to citizens in determining needed pedestrian improvements on streets and highways.

The following sections discussed pedestrian and bicyclist elements at intersections, such as pedestrian crossing design, median refuge islands, bicycle operations, and pedestrian and bicyclist traffic control. Future editions of the HSM may include sections on pedestrians and bicyclists at roundabouts, and the impact of weather issues on pedestrians and bicyclists at intersections.

4.3.1. Pedestrian Crossing Design

This section provides information on the safety effects of various design elements for pedestrian crossings at signalized and unsignalized intersections, excluding roundabouts.

Additional information on addressing the needs of all pedestrians through design can be found in Parts I and II of "Designing Sidewalks and Trails for Access" (*67*,*68*).

The following discussion includes several topics related to intersection design treatments that may affect pedestrians, including:

- Road narrowing (curb extensions, bulbouts, curb bulbs, lane narrowing, visual enclosure, curb radius)
- Raised crosswalks
- Raised intersections
- Bus stop location
- Pedestrian crossing speed

Related sections of the HSM include Sections 4.2.2 Traffic Signal Operations, 4.2.6 Traffic Calming, 4.3.4 Pedestrians and Bicyclists at Roundabouts [Future Edition], and 4.4.3 Signal Heads and Hardware.

Exhibit 4-83: Resources examined on the relationship between pedestrian crossing design and safety at intersections

DOCUMENT	DESCRIPTION	COMMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Crashes at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Summaries strategies to reduce crashes at signalized intersections, with minimal information on pedestrian treatments at intersections	No new information. Not added to synthesis.
(*41*) (Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research on pedestrians, including the safety effects of treatments at intersections	Added to synthesis.
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results may be added if relevant when available.

DOCUMENT	DESCRIPTION	COMMENT
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Crashes Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Includes information and research summaries on strategies to reduce pedestrian crashes, including geometric pedestrian treatments at intersections	Added to Section 4.3.2.
(*5*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook that summarizes the effects of a wide range of safety measures.	Added to synthesis
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Synthesis of past research on a variety of treatments, but does not include intersection design treatments for pedestrians	Not added to synthesis.
(Lord, D., "Synthesis on the Safety of Right Turn on Red in the United States and Canada." Washington, D.C., 82nd Transportation Research Board Annual Meeting, (2003))	Study involved collecting observational data at 26 intersections in the province of Quebec and also analyzed pedestrian crash data involving RTOR from agencies in the U.S. and Canada	Added to Section 4.2 and 4.3.5.
Raford, Noah; and Ragland, R. David. Space Syntax: An Innovative Pedestrian Volume Modeling Tool for Pedestrian Safety. Institute of Transportation Studies, U.C. Berkeley Traffic Center, 2003.	This study focuses on estimating pedestrian exposure by using a method called Space Syntax. The purpose of this report is to help planners and engineer to have estimates of pedestrian exposure data since such information is rather scarce.	No treatments were considered and hence no safety effect was estimated. Not added to synthesis
(*75*) (Huang,H.F. , Cynecki,M.J., "The Effects of Traffic Calming Measures on Pedestrian and Motorist Behavior" FHWA-RD-00-104, McLean, Va., Federal Highway Administration (2000))	Evaluated curb extensions at a total of eight locations in Cambridge, Seattle, Greensboro (NC), and Richmond (VA), based on pedestrian wait time, vehicle speed, and motorist yielding behavior	Added to synthesis.
(*73*) (Davies, D. G., "Research, Development and Implementation of Pedestrian Safety Facilities in the United Kingdom." FHWA-RD-99-089, McLean, Va., Federal Highway Administration, (1999))	Summarizes findings from the U.K on pedestrian safety research, including "curb build-outs" (curb extensions)	Added to synthesis.
(Hummel, T., "Dutch Pedestrian Safety Research Review." FHWA-RD-99-092, McLean, Va., Federal Highway Administration, (1999))	Summarizes pedestrian safety research in the Netherlands. Minimal information is given on specific effects of geometric treatments at intersections.	Not added to synthesis.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	An article which provides a discussion of pedestrian designs and treatments. No information is given on geometric design measures at intersections	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Kulmala, R., "Safety at Rural Three- and Four-Arm Junctions: Development and Application of Accident Prediction Models." 233, Espoo, Finland, VTT Technical Research Centre of Finland, (1995))	Before-After study of the safety effectiveness of several geometric design elements at rural three- and four-leg intersections	Not added to synthesis. More relevant to intersection design.
(Compton, R. P. and Milton, E. V., "Safety Impact of Permitting Right-Turn-On-Red: A Report to Congress by the National Highway Traffic Safety Administration." DOT HS 808, Washington, D.C., National Highway Traffic Safety Administration, (1994))	Report to Congress.	Added to Section 4.3.5.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	Provides a summary of a critical review of literature on the safety effects of roadway geometric features on pedestrian and bicycle safety. No information is included on intersection geometric measures related to pedestrians	Not added to synthesis.
(Zegeer, C. V. and Cynecki, M. J., "Evaluation of Countermeasures Related to RTOR Accidents that Involve Pedestrians." Transportation Research Record 1059, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 24-34.)	Collected observational data on more than 67,000 drivers at 110 intersections in Washington, D.C., Dallas, Austin, Detroit, Lansing, and Grand Rapids. Studied motorist violations of NO TURN ON RED (NTOR) signs	Used in section for pedestrians and bicyclists and traffic control. Not added to synthesis.
(Lalani, N., "Road Safety at Pedestrian Refuges." Traffic Engineering & Control, Vol. 18, No. 9, London, United Kingdom, Hemming Information Services, (1977) pp. 429-431.)	Before and after study of the effect of pedestrian refuges on crashes; sites in London.	Added to Section 4.3.2.

Treatment: Implement road narrowing and curb extensions

Narrowing the roadway width using curb extensions (sometimes called chokers, curb bulbs, neckdowns, or nubs) extends the curb line or sidewalk out into the parking lane, and thus reduces the effective street width for crossing pedestrians. Such reduction in street width can reduce vehicle speeds, improve visibility between pedestrians and oncoming motorists, as well as reduce the crossing distance for pedestrians.

In his summary report of pedestrian research in the U.K., Davies reported in Nottingham (by Thompson and Heyden, 1991) where curb extensions were extended 2.5 meters into the street and included “substantial lengths of guardrail,” (assumed to be protective railing for pedestrians). The authors reported a reduction in average pedestrian crashes from 4.7 to 1 per year after the treatment (*73*). Insufficient information was available to determine an AMF from this study.

A 2001 study by Huang and Cynecki involved evaluating curb extensions at a total of eight locations in Cambridge, Seattle, Greensboro (NC), and Richmond (VA), based on pedestrian wait time, vehicle speed, and motorist yielding behavior. No significant improvements were found at most of the sample sites after curb extensions were installed. Huang and Cynecki

stated that some of the results may have been due to traffic conditions at the study sites. The authors also stated that such devices cannot guarantee that motorists will slow down or yield to pedestrians, or that pedestrians will choose to cross at the crosswalk (*75*).

In their 2001 report, Huang and Cynecki report several other studies that have involved the evaluation of curb extensions, as follows (*75*):

- MacBeth evaluated five raised and narrowed intersections in Ontario, Canada, as well as seven mid-block pedestrian crossing locations, where the speed limit was also lowered to 30 km/h. The proportion of motorists exceeding the 30 km/h speed limit was reduced from 86% in the before period to 20% in the after period. Several treatments were applied in conjunction at these locations; therefore the safety effect of curb extensions alone cannot be determined.
- A study in the Netherlands (as cited by Replogle) involved street narrowing projects in two towns. In Oosterhout, two bulbouts were installed which required motorists to deviate from a straight roadway path, and the 85th percentile speeds and the rate of pedestrian/motor vehicle conflicts dropped after installation of the bulbouts. Two bulbouts were installed opposite each other to narrow the travel way in De Meern, which resulted in a significant reduction in the 85th percentile speed. However, the magnitude of the reduction was not reported by Huang and Cynecki.
- A 1992 study by Lumilla in Australia reported that bulbouts had little effect on vehicle speeds in the cities of Keilor (Queensland) and Eltham (Victoria). That same study, however, reported that a street treated with bulbouts and marked parking lanes had a total crash rate that was one third of the rate of an untreated comparison street. Huang and Cynecki did not indicate the number of crashes which involved pedestrians, or the type of parking lanes provided.

Based on recent meta-analysis work by Elvik and Vaa (2004) (*5*), only two studies have been found that have evaluated the effects on accidents of road narrowing, or widening sidewalks, at intersections, one from Denmark and the other from Norway. The studies do not state if the intersections studied had three or four legs. Both were simple before-after studies not controlling for any confounding factors and therefore both of these studies have been rated as low quality. Accordingly, the standard error has been adjusted by a factor of 3. The result of a meta-analysis of these two studies is provided in Exhibit 4-84.

Exhibit 4-84: Effects on accidents of road narrowing and curb extensions at intersections (5)

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident Type & Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa (2004)	Widen sidewalks at intersections	Not reported	Not reported	All types, Injury	1.116	1.260

Treatment: Install raised pedestrian crosswalks

Elvik and Vaa (2004) (*5*) recently performed a meta-analysis of four international studies that evaluated raised pedestrian crosswalks. Three of these studies have been rated as low quality, one (Downing et al., 1993) medium-low quality. Standard errors have been adjusted by a factor of 3 in the three low quality studies and by a factor of 2.2 in the medium-low quality study. Intersection types and volumes were not reported by Elvik and Vaa. The resulting indices of

effectiveness are presented in Exhibit 4-85. Based on these values, raised pedestrian crosswalks appear to reduce accidents. The effects may be overstated, as none of the studies have controlled for regression-to-the-mean or long-term trends in accident frequency.

Exhibit 4-85: Effects on accidents of raised pedestrian crossings at intersections

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident Type & Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa (2004)	Raised pedestrian crosswalks	Not reported	Not reported	All types, injury	0.642	0.543
Elvik and Vaa (2004)	Raised pedestrian crosswalks	Not reported	Not reported	Pedestrian, injury	0.545	0.937
Elvik and Vaa (2004)	Raised pedestrian crosswalks	Not reported	Not reported	Vehicle, all severities	0.697	0.667

Treatment: Install raised intersections

Huang and Cynecki evaluated the installation of a raised intersection in Cambridge, MA in their 2001 study (*75*). There was a significant increase in the percentage of pedestrians who crossed in the crosswalk, from 11.5% to 38.3%. There was an increase in the percentage of motorists who yielded to pedestrians in the crosswalk, but this increase was not statistically significant (due to small sample sizes). No AMFs could be developed from this study.

Based on recent work by Elvik and Vaa (2004), only one study has been found that evaluates safety effects of raised intersections (*5*). It is a simple before-after study, not controlling for any confounding factors, conducted in Germany by Schull et al. (1992). It has been rated as a low quality study. The standard error has been adjusted by a factor of 3. The setting and type of traffic control used was not reported. The results of Elvik and Vaa's analysis are provided in Exhibit 4-86.

Exhibit 4-86: Effects on accidents of raised intersections

Author, date	Treatment/ Element	Setting	Intersection type & volume	Accident Type & Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa (2004)	Raised intersections	Not reported	Four legs, type of traffic control unknown	All types, Injury	1.053	0.712
Elvik and Vaa (2004)	Raised intersections	Not reported	Four legs, type of traffic control unknown	All types, PDO	1.134	1.401

Discussion: Bus stop location at intersections

Crashes at bus stops account for 2% of all pedestrian crashes in urban locations. These accidents usually occur when a pedestrian tries to cross the street in front of a stopped bus and is struck by a motorist whose vision was obstructed by the bus. In rural areas, 3% of all pedestrian accidents occur at school bus stops (*41*).

For the urban crashes, one solution is relocating a bus stop to the far side of an intersection so that pedestrians are more likely to cross the street behind the bus rather than in front of it. A before-after study by Berger in 1975 (as noted by Campbell et al.) of two intersections where bus stops were relocated in Miami, FL, and San Diego, CA, showed that the relocation to the far side of the intersection eliminated crossing in front of the bus; whereas, in the period before relocation, half the people who crossed the street after getting off the bus crossed in front of it (*41*). No AMFs could be developed for bus stop locations at intersections.

4.3.1.1. Crosswalk Markings

According to the 1992 Uniform Vehicle Code (Section 1-112) (*76*), a crosswalk is defined as:

That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalk on the opposite sides of the highway measured from the curbs, or in the absence of curbs, from the edges of the traversable roadway; and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the existing sidewalk at right angles to the centerline.

Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Legal crosswalks, therefore, exist at all intersections on public streets and highways where there is a sidewalk on at least one side of the road and/or where crosswalk markings exist, while a legal crosswalk only exists at a midblock location if it is marked. According to the MUTCD (Section 3B-18) (*17*), a crosswalk may be marked with paint, plastic tape, thermoplastic materials, or other materials. The marking of crosswalks has been quite controversial in the U.S. in recent years at uncontrolled locations (i.e., locations where no traffic signals or stop signs exist on the approach at either intersection or midblock locations). Recent safety research on crosswalks, as discussed below, has helped to resolve some of the controversy on this issue.

Marked crosswalks are typically installed at signalized intersections, as well as school zones and some unsignalized intersections. Acceptable crosswalk marking patterns are given in the MUTCD (*17*). Crosswalks may be raised (sometimes termed “speed tables”) or used in conjunction with supplemental signing, in-pavement flashing lights, overhead flashers, nighttime lighting, pedestrian refuge islands, signalization, and/or other devices.

This chapter summarizes the safety effects of marked vs. unmarked crosswalks on pedestrian crashes and also provides some discussion on pedestrian and motorist behavior at intersections related to crosswalk markings. This section also includes a review of studies of advance stop lines and signing which supplement marked crosswalks at intersections. Finally, information is summarized on studies (from the United Kingdom) that have evaluated the effects of such crossing measures as Zebra, Pelican, Puffin, and Toucan pedestrian crossings. Details on the treatment of pedestrian crossings to adequately accommodate people with disabilities are contained in Parts I and II of “Designing Sidewalks and Trails for Access” (*67,68*), and will not be repeated in this manual.

Pedestrian signal options commonly used at intersections in the U.S. are discussed in the chapter on traffic control devices (Section 4.3.5).

Based on the information found in the literature on marked crosswalks, there is a considerable amount of useful information on the crash effects of marked vs. unmarked crosswalks (from the study by Zegeer et al., 2002) and of the effects of marked crosswalks on pedestrian and motorist behavior (e.g., Knoblauch et al., 2000). However, there is a particular need for further research to better quantify the effects of crosswalk enhancements on pedestrian crashes, as well as pedestrian and motorist behaviors. Such crosswalk enhancements include advance warning signs, crosswalk flashing lights, overhead illuminated pedestrian crossing signs, crosswalk marking types and patterns, and other measures. It would also be useful to have a formal evaluation of the effect of advance stop lines on pedestrian crashes on multi-lane roads. Finally, there is a need to develop more detailed criteria of the types of pedestrian crossing treatments that would be most appropriate for installation on streets having various combinations of number of lanes, traffic ADT, area type, speed limit, and other conditions.

Exhibit 4-87: Resources examined to investigate the safety effect crosswalk markings at intersections

DOCUMENT	DESCRIPTION	COMMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Crashes at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Provides crash-related countermeasures at signalized intersections, with only a brief mention of crosswalks and enhancements	Not added to the synthesis
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Crashes Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Provides details of 16 strategies to reduce pedestrian crashes, including crosswalk enhancements	Added to Section 4.3.2.
(*41*) (Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Contains a summary of relevant research studies	Used as a source of information for this chapter. Added to synthesis.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Summarizes crosswalk evaluation study by Knoblauch and Raymond (2002)	Provides no new information - Used as a reference only. Not added to the synthesis
(*77*) (Zegeer, C. V., Stewart, R., Huang, H., and Lagerwey, P., "Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines." FHWA-RD-01-075, McLean, Va., Federal Highway Administration, (2002))	Evaluated the safety effects of marked vs. unmarked crosswalks, based on 1,000 marked and 1,000 unmarked crossing sites at uncontrolled intersections in 30 cities.	Added to synthesis. Main source of information on the safety effects of marked crosswalks for various traffic and roadway conditions
(Zegeer, C. V., Stewart, J. R., Huang, H., and Lagerwey, P., "Safety Effects of Marked Versus Unmarked Crosswalks At Uncontrolled Intersections." Transportation Research Record, No. 1773, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 56-68.)	Same study as (*77*).	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*79*) (Knoblauch, R. L., Nitzburg, M., and Seifert, R. F., "Pedestrian Crosswalk Case Studies: Richmond, Virginia; Buffalo, New York; Stillwater, Minnesota." FHWA-RD-00-103, McLean, Va., Federal Highway Administration, (2001))	Before and after study of crosswalk markings at 11 unsignalized intersections in 4 cities, evaluated indirect measures such as driver and pedestrian behavior	Suggested by NCHRP 17-18(4). Added to synthesis.
(Van Houten, R., Malenfant, J. E., and McCusker, D., "Advance Yield Markings: Reducing Motor Vehicle-Pedestrian Conflicts at Multilane Crosswalks with Uncontrolled Approach." Transportation Research Record, No. 1773, Washington, D.C., Transportation Research Board, National Research Council, (2001) pp. 69-74.)	Evaluated the effect of advance yield markings and a symbol sign on pedestrian safety at intersections; used pedestrian and motorist behavior as surrogate	Suggested by NCHRP 17-18(4). Added to synthesis as cited in (*73*)
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Summarizes various studies on pedestrian crossing treatments at uncontrolled approaches to intersections, signalized intersections, and mid-block signals	Suggested by NCHRP 17-18(4). Not added to synthesis. No additional information.
(*81*) (Knoblauch, R. L. and Raymond, P. D., "The Effect of Crosswalk Markings on Vehicle Speeds in Maryland, Virginia and Arizona." FHWA-RD-00-101, Great Falls, Va., Federal Highway Administration, (2000))	Study of crosswalks at six sites in Maryland, Virginia, and Arizona.	Added to the synthesis
(*82*) (Jones, T. L. and Tomcheck, P., "Pedestrian Accidents in Marked and Unmarked Crosswalks: A Quantitative Study." ITE Journal, Vol. 70, No. 9, Washington, D.C., Institute of Transportation Engineers, (2000) pp. 42-46.)	Evaluation of pedestrian crashes at "unprotected" crosswalks in Los Angeles.	Added to synthesis.
(Cairney, P., "Pedestrian Safety in Australia." FHWA-RD-99-093, McLean, Va., Federal Highway Administration, (1999))	The report states that: "The installation of crosswalks has not been contentious in Australia, and there is no research on their effectiveness".	Not added to the synthesis
(*83*) (Ekman, L. and Hyden, C., "Pedestrian Safety in Sweden." FHWA-RD-99-091, McLean, Va., Federal Highway Administration, (1999))	Summarizes the results from several crosswalk evaluation studies	Added to the synthesis
(*73*) (Davies, D. G., "Research, Development and Implementation of Pedestrian Safety Facilities in the United Kingdom." FHWA-RD-99-089, McLean, Va., Federal Highway Administration, (1999))	Discusses studies which evaluated the effects of zebra, pelican, and toucan crossings in the U.K.	Added to the synthesis
(*84*) (Van Houten, R. and Malenfant, J. E. L., "Canadian Research on Pedestrian Safety." FHWA-RD-99-090, McLean, Va., Federal Highway Administration, (1999))	Summarizes studies which evaluated crosswalk enhancements	Added to the synthesis
(Hunt, J., "A Review of the Comparative Safety of Uncontrolled and Signal Controlled Midblock Pedestrian Crossings in Great Britain." Cologne, Germany, 9th International Conference on Road Safety in Europe, (1998))	Review of performance of Pelican and Zebra crossings in Kent (U.K.).	No AMFs, conflicting results. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Mueller, E. A. and Rankin, W. W., "Pedestrians." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 8, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Contains a summary of pedestrian research studies conducted prior to 1970	Not added to the synthesis

Marking crosswalks at uncontrolled locations (i.e., no traffic signal or stop sign control, either midblock or on approach to intersection) is discussed first, including some findings on pedestrian crashes, motorist behavior, pedestrian behavior, and driver speed. This is followed by a discussion of the use of alternative marking patterns, such as the "zebra" or "ladder" marking. Information in this chapter primarily deals with intersections, although some studies include analysis of crosswalks at midblock locations as well as intersections.

Discussion: Mark crosswalks at uncontrolled locations (intersection and midblock)

In the most comprehensive study of marked crosswalks at uncontrolled intersection and midblock locations to date, Zegeer, Stewart, Huang, and Lagerwey (2002) analyzed data from 1,000 marked and 1,000 matching unmarked crosswalk sites in 30 U.S. cities (*77*). Zegeer et al. determined that some site factors (area type, speed limit, and crosswalk marking pattern) were not associated with pedestrian crashes. Site factors that were related to pedestrian crashes which were used as control variables in the analysis included pedestrian ADT, vehicle ADT, number of lanes, median type, and region of the United States. With these factors accounted for, Poisson and negative binomial regression models were used to determine the crash effects of marked vs. unmarked crosswalks.

At uncontrolled locations on two-lane roads and multi-lane roads with low traffic volumes (i.e., ADT below 12,000 veh/day), it was found that a marked crosswalk alone, compared with an unmarked crosswalk, made no statistically significant difference in pedestrian crash rate. On multi-lane roads with an ADT of more than 12,000 veh/day, a marked crosswalk by itself (without other substantial improvements) was associated with a statistically significant higher pedestrian crash rate compared to sites with an unmarked crosswalk.

On multi-lane roads, raised medians in marked or unmarked crosswalks provided statistically significant lower crash rates than no raised median.

The crash rates for older pedestrians were higher than for other pedestrian-age groups, considering pedestrian crashes and exposure by age. Furthermore, older pedestrians were more likely than younger pedestrians to cross at a marked crosswalk, which may partially explain the higher pedestrian crash rate at marked crosswalks. Another reason for higher pedestrian crashes at marked crosswalks were multiple threat crashes that occurred on multi-lane roads (i.e., a vehicle in the curb lane stops for a pedestrian in the crosswalk and the pedestrian crossing into the second lane and into the path of an oncoming vehicle that may not be aware of the pedestrian).

Zegeer et al. state that, "The results of this study should not be misused as justification to do nothing to help pedestrians to safely cross streets. Instead, pedestrian crossing problems and needs should be routinely identified, and appropriate solutions should be selected to improve pedestrian safety and access. Deciding where to mark or not mark crosswalks is only one consideration in meeting that objective" (*77*), page 1). Zegeer et al. suggested a number of

potential improvements at unsignalized crossing locations to enhance pedestrian safety. Some of these recommendations include: providing raised medians on multi-lane roads, installing traffic and pedestrian signals where warranted, adding curb extensions or raised islands to reduce street-crossing distance, installing adequate nighttime lighting at pedestrian crossings, constructing raised street crossings, designing safer intersection and driveways (e.g., with tighter turn radii), among others (*77*).

In conjunction with the Zegeer et al.'s research on crosswalks done for FHWA, Knoblauch performed two studies on pedestrian and motorist behavior. One of these studies was an effort to assess the effect of crosswalk markings on driver and pedestrian behavior at 11 unsignalized locations in four U.S. cities (*79*). All of the sites were two- or three-lane roads with relatively low speed limits (35 to 40 mph) and low volumes (less than 12,000 veh/day). Given these characteristics, the authors concluded that marking pedestrian crosswalks had no measurable negative effect on either pedestrian or motorist behavior. Crosswalk usage increased after markings were installed, but no evidence was found that pedestrians were less vigilant or more assertive in the marked crosswalk. Drivers were found to approach a pedestrian in the crosswalk rather slowly, but no changes in driver yielding were noted. Details on the duration of the study periods were not reported.

Knoblauch's second study was performed at six sites in Maryland, Virginia, and Arizona (*81*). All of these locations were uncontrolled intersection approaches (i.e., no traffic signals or stop control for the study approach) with a 35 mph speed limit and had been recently resurfaced. Using a staged pedestrian at sample crossing locations, speed data were taken under three conditions: no pedestrian present, pedestrian looking, pedestrian not looking. Results indicated a slight reduction in vehicle approach speeds at most, but not all, of the locations after the crosswalk markings had been installed. There was a significant reduction in overall speed under conditions of no pedestrians and where pedestrians were not looking.

Several studies prior to the studies by Zegeer et al. (2002) and Knoblauch et al. (2000) produced a wide range of results concerning the safety effects of marked vs. unmarked crosswalks. Most of these older studies discussed below, were conducted between 1972 and 1994, and concluded that pedestrian crashes were higher in marked crosswalks, compared to unmarked crosswalks. However, note that none of these earlier studies attempted to analyze the effects of marked vs. unmarked crosswalks specifically for different numbers of lanes, traffic volume, or other roadway features.

Jones and Tomcheck (2000) evaluated pedestrian crashes at "unprotected" crosswalks (i.e., at unsignalized intersections) on arterials in Los Angeles to test the validity of the city's crosswalk policies (*82*). The study attempted to determine whether removing a crosswalk marking reduces pedestrian crashes at such locations, and/or increase pedestrian crashes at adjacent unprotected sites. Jones and Tomcheck analyzed pedestrian crashes at 104 unsignalized intersections on arterials where marked (parallel-line) crosswalks had been removed due to resurfacing. Jones and Tomcheck state that the locations were not chosen for the pedestrian accident histories. The study did not include school crosswalks. At many intersections, some legs had both marked and unmarked crosswalks before and after the study. An average of approximately 7 years of pedestrian crash data was collected for each of the before and after periods for the 104 sites. Traffic and pedestrian exposure data were not collected, but untreated comparison sites were identified and used in the analysis.

When only the legs of the intersections that previously had marked crosswalks are considered, Jones and Tomcheck found that there was a 73% reduction (from 116 to 31) in pedestrian crashes after crosswalk markings were removed at the 104 sites combined (*82*). Considering both legs (previously marked and unmarked crosswalks) of the intersections, there was a statistically significant decline of 61% (from 129 to 50) in pedestrian crashes (*82*). There was no statistically significant increase in pedestrian crashes at intersections adjacent to intersections where crosswalk markings were removed. At the 15 intersections where crosswalk markings were retained (i.e., untreated "comparison sites"), pedestrian crashes did not decrease. The authors recommended supporting… "a policy of selectively installing or reinstalling marked, unprotected crosswalks only after careful consideration" (*82*). It should be noted that the study did not report the effects of removing crosswalk markings by road type (i.e., two-lane vs. multi-lane) or volumes at the study sites. Also, the study mentions that "when a street is to be resurfaced, a plan is prepared to update the roadway striping … unprotected marked crosswalks are analyzed to see whether they should be retained" (pg 43) (*82*). Jones and Tomcheck do not clearly state if the crosswalks that were removed were deemed to be unnecessary, or the criteria used to make that determination. This may influence the results of the Jones and Tomcheck study.

In the often-cited 1972 San Diego study by Herms, crashes on marked crosswalks were found to be twice as frequent per unit of pedestrian volume, compared to unmarked crosswalks (Herms, 1972 as cited in (*41*)). Herms looked at 400 intersections in the city, each of which had one marked and one unmarked crosswalk leg on the same street. In an earlier version of the same study (Herms, 1970), the author mentioned San Diego's 1962 warrants for determining where to paint crosswalks. The city's warrants required marking crosswalks when traffic gaps were inadequate, pedestrian volume was high, speed was moderate, and/or there were other relevant factors such as previous crashes. These criteria suggest that crosswalks in San Diego were painted where the conditions were already most conducive to pedestrian crashes or which already had a history of pedestrian crashes.

As documented by Campbell et al. (*41*), authors of the Zegeer et al. study (2002) attempted to compare their results with those of the 1972 Herms San Diego study. Taking all of the 2,000 sites together as one group and simply dividing the crashes by pedestrian crossing volume (as Herms did), the Zegeer group also found that marked crosswalks had a pedestrian crash rate that was slightly more than twice the rate of unmarked crosswalk sites. Only when a more sophisticated statistical analysis was applied did the researchers find that marked crosswalks are associated with higher pedestrian crash risk only on high-volume, multi-lane roads (i.e., ADT above 12,000 veh/day).

In 1994, Gibby et al. analyzed crashes at 380 unsignalized highway intersections in California from among 10,000 candidate intersections throughout the state (Gibby et al., 1994 as cited in (*41*)). Crash rates per pedestrian-vehicle volume were two or three times higher in marked than in unmarked crosswalks at these sites. As with the Herms study, this study combined all sites with marked crosswalks and unmarked crosswalks, and did not conduct a separate analysis for different cross-sections, traffic volumes, etc.

A 1985 Toronto study (Yagar) found that crashes had been increasing and continued to increase at the same rate after marked crosswalks were installed at 13 intersections within the city (as cited by (*41*)). This suggests that marking the crosswalks had little effect. However, there were more tailgating crashes after the crosswalks were painted. Yagar also explained the increasing crashes after installation of the marked crosswalks as a problem with out-of-town motorists.

Tobey et al. (1983) examined crashes at both marked and unmarked crosswalks as a function of pedestrian volume (P) multiplied by vehicle volume (V) and, unlike some of the previous studies cited here, reported fewer accidents at marked crosswalks than at unmarked ones (Tobey et al., 1983 as cited in (*41*)). However, this may be due to the fact that Tobey's study included signalized as well as uncontrolled crossings and it is likely that more marked crosswalks were at controlled locations than unmarked crosswalks were. It should be mentioned that the study methodology was designed to determine the pedestrian crash rate for a variety of human and location conditions, but was not specifically intended to quantify the isolated safety effects of marked vs. unmarked crosswalks.

In 1974, Gurnett described a project in which painted crosswalk stripes were removed from three locations because of a recent bad crash history (Gurnett, 1974 as cited in (*41*)). There were fewer crashes after removal of the stripes, but these findings might simply be due to regression-to-mean, since the only sites that were "treated" (i.e., crosswalks were removed) were those that had a recent history of pedestrian crashes.

In 1967, the Los Angeles County Road Department found that accident frequency increased from four to 15 after marked crosswalks were installed at 89 non-signalized intersections (as cited in (*41*)). All the locations that showed an increase in crashes after crosswalk installation had an ADT of greater than 10,900 vehicles; sites with fewer vehicles experienced no change in pedestrian crashes. This is consistent with the findings of the Zegeer study mentioned earlier.

As documented by Campbell et al. (*41*), a study in London (Mackie and Older, 1965) calculated crash risk as the ratio of crashes per unit time to pedestrian volume counts. The authors discovered a gradient effect, with risk lower in marked crosswalks (zebra pattern) than in the areas up to 50 yards (45.7 m) away. Crash risk increased nearer to the marked crossing, although within the crossing the crash risk was lower (*41*). In contrast, Campbell et al. cite Swedish researchers (Ekman, 1988) who found that pedestrians are exposed to a double risk of injury when using a marked (zebra) crosswalk than crossing at a location without any signs or road markings (*41*).

Despite the contradictory findings of these various studies, it is clear that marked crosswalks are generally not associated with any statistically significant difference in pedestrian crash risk (compared to unmarked crosswalk sites) on two-lane roads or on multi-lane roads with less than 12,000 veh/day. On multi-lane roads with ADT higher than 12,000 veh/day, marked crosswalks installed alone without other substantial safety devices carry significantly increased crash risk for pedestrians, unless more substantial pedestrian safety treatments are provided (*41*). The safety professional may consider such crossing treatments (e.g., raised medians on multi-lane roads, traffic and pedestrian signals, where warranted, adequate nighttime lighting at pedestrian crossings, etc.) to help pedestrians to cross streets more safely.

Discussion: Advance stop lines and other crosswalk enhancements at marked crosswalks at intersections

In an effort to determine factors that would influence motorists to yield for pedestrians in marked crosswalks, Van Houten (1992) applied a sequential series of enhancements at intersections in Dartmouth, Nova Scotia (as cited in (*73*)). First, signs were added; then a stop line; and finally amber lights activated by the pedestrians. The number of vehicles that stopped when they should increased by up to 50%; conflicts dropped from 50% to 10% at one location

and from 50% to 25% at another site. Motorists who yielded to pedestrians went up from 25% to 40% at one site and from 35% to 45% elsewhere.

Using sites in Newfoundland and New Brunswick, Canada, researchers (Malefant and Van Houten, 1989 as cited in (*73*)) looked for ways to increase the number of drivers who yield to pedestrians. Additional roadway markings, feedback to pedestrians regarding compliance, warning signs for drivers, and enforcement were all used to encourage yielding behavior. The response to these multiple interventions was successful, with increased percentages of motorists who yielded to pedestrians ranging from 50% before the interventions to 70% afterwards in one city; 10% to 60% in another locale; and 40% to 60% in the third one.

In 1993, Cynecki, Sparks, and Grote studied the effects of transverse rumble strips installed in advance of marked crosswalks at 19 uncontrolled locations (as cited in (*73*)). There was little change in vehicle speed; 85th percentile speeds showed no real change.

Discussion: Behavioral studies of marked vs. unmarked crosswalks

Due to the wide range of findings on the effects of marked vs. unmarked crosswalks from the crash-based research, it is also important to closely examine studies of pedestrian and motorist behavior at marked vs. unmarked crosswalks, particularly since some of the authors cited above offered "opinions" on such behaviors to support their findings. For example, in his 1972 study conclusions, Herms stated, "Evidence indicates that the poor crash record of marked crosswalks is not due to the crosswalk being marked as much as it is a reflection on the pedestrian's attitude and lack of caution when using the marked crosswalk". Other authors agreed with this assessment about the pedestrian's attitude and behavior in a marked crosswalk (e.g., *Public Works*, 1969; Los Angeles County Road Department, 1967). The following is a summary of some of these studies which involved evaluating pedestrian behavior on marked vs. unmarked crosswalks.

Pedestrian Behavior

Knoblauch et al. (2001) launched a study intended to observe the type of reckless pedestrian behavior to which Herms and others attributed the negative crash results reported in some of the marked crosswalk studies (as cited in (*41*)). The researchers gathered data at eleven sites before and after marked crosswalks were installed, evaluating the information in terms of three hypotheses regarding pedestrian behavior. The findings for each hypothesis were:

- Hypothesis 1 – Will pedestrians feel more protected in a marked as opposed to an unmarked crosswalk and therefore act more aggressively? The research team found no statistically significant difference in blatantly aggressive behavior.
- Hypothesis 2 – Will pedestrians stay within the marked lines of the crosswalk? Pedestrians walking alone did tend to use the marked crosswalks, especially at intersections, while pedestrian groups did not. Overall crosswalk usage did increase statistically significantly after markings were added.
- Hypothesis 3 – Because they feel more protected, will pedestrians engage in less "looking behavior" when crosswalks are marked? Looking behavior actually increased after markings were installed; no evidence of decreased vigilance was found.

For the most part, these findings were consistent with an earlier study of pedestrian behavior done by Knoblauch et al. (1987) that considered the effect of marked crosswalks on

pedestrian looking behavior and staying within the area defined by the markings (*41*). The duration of the observations were not reported.

Hauck (1979) evaluated 17 crosswalks at traffic signals that were re-painted in Peoria, IL (as cited in (*41*)). A before- after analysis found a decrease in both pedestrian and motorist violations at the sites after installation of marked crosswalks. Jaywalking was unchanged, but the number of people who stepped out in front of traffic decreased at 12 of the locations and those crossing against the DON'T WALK signal phase decreased at 13 sites.

The studies suggest that pedestrian behavior is generally improved by marking crosswalks. There is no indication of reckless behavior associated with marked crosswalks.

Motorist Behavior

Knoblauch (2000) took speed measurements at six locations before and after marked crosswalks were installed (as cited in (*41*)). Speeds were measured: 1) with no pedestrians present; 2) with a member of the research team posing as a pedestrian who was looking at traffic; and 3) when the team member approached and stood at the curb looking straight across the road rather than at oncoming traffic. Motorist behavior was not consistent, so the results were not clear-cut. At one site, drivers slowed down considerably even when no pedestrians were present. When a pedestrian was present and looking at traffic, there was a small but not statistically significant decrease in speed at all six locations. Knoblauch reasoned that drivers might assume a pedestrian looking toward oncoming traffic would not try to cross the street, so vehicles did not need to slow down. However, when the pedestrian was present and not looking for oncoming cars, drivers approaching the marked crosswalk did slow down enough to register a statistically significant change. Knoblauch's conclusion was that drivers usually respond to crosswalk markings, especially when a pedestrian is present but not watching traffic (*41*).

In 2001, Knoblauch et al. studied motorist behavior on two- and three-lane roads with 35 to 40 mph speed limits and found the following answers to these two questions (as cited in (*41*)):

1. Do crosswalk markings affect the motorist's response to pedestrians? Drivers did seem to slow down a little more as they approached pedestrians in marked crosswalks as opposed to unmarked crossings.
2. Would marked crosswalks disrupt the flow of traffic by causing drivers to stop and yield to pedestrians? There was no observable change and no real difference between the yielding behavior with regard to pedestrians in a marked vs. unmarked crosswalk.

Ekman (1988) found that Swedish drivers did not slow down when approaching zebra crossings, which is understandable in that speeds were measured when no pedestrians were present in the crosswalk or at the curb (as cited in (*41*)).

Campbell et al. (*41*) cite another Swedish study (Varhelyi, 1996) that measured speeds at non-signalized zebra crossings. Motorists maintained or even increased their speeds in 73% of what the author labeled "critical" cases and only slowed down 27% of the time when they should have. Despite this reality, a separate survey showed that 67% of the motorists responding said they "always" or "very often" slow down (*41*).

Katz et al. (1975) studied driver-pedestrian interaction when members of the research team crossed the street under a variety of conditions in 960 trials. Drivers were more likely to

stop for pedestrians when the vehicle approach speed was low, when the pedestrian was in a marked crosswalk, when the distance between the car and pedestrian was greater rather than less, when there was a group of pedestrians, and when the pedestrians did not make eye contact with the driver (as cited in (*41*)).

In summary, the presence of marked crosswalks seems to have little, if any, consistent effect on motorist speed or behavior. However, it appears that drivers at lower speeds are more likely to stop and yield to pedestrians than higher-speed motorists.

Summary

Despite the contradictory findings of these various studies, it is clear that marked crosswalks are generally not associated with any difference in pedestrian crash risk (compared to unmarked crosswalk sites) on two-lane roads or on multi-lane roads with less than 12,000 veh/day. On multi-lane roads with ADT higher than 12,000 veh/day, marked crosswalks installed alone without other substantial safety devices carry statistically significant increased crash risk for pedestrians, unless more substantial pedestrian safety treatments are provided. Based on studies of pedestrian and motorist behavior, pedestrian behavior is generally improved by marking crosswalks, and no indication of reckless behavior has been found associated with marked crosswalks. However, most of these behavioral studies were on two- or three-lane roads, where no differences were found in pedestrian crash risk between marked and unmarked crosswalks. On many roads (particularly for multi-lane roads with ADT above about 12,000 veh/day), the safety professional may consider such crossing enhancements as raised medians on multi-lane roads, advanced stop lines, traffic and pedestrian signals (where warranted), adequate nighttime lighting at pedestrian crossings, etc., to help pedestrians to cross streets more safely.

4.3.2. Median Refuge Islands

Pedestrian crossings at intersections are sometimes designed with a median refuge island; otherwise referred to as center islands, refuge islands, pedestrian islands, or median slow points. Median refuge islands are raised areas that help protect pedestrians who are crossing the road, either at an intersection or mid-block. The presence of a median refuge island in the middle of a street or intersection allows pedestrians to focus on just one direction of traffic at a time and then take refuge on the island while waiting for an adequate gap in cars coming from the other direction before continuing to walk across the road. Islands are appropriate for use at both uncontrolled (i.e., no traffic signals or stop signs) and signalized crosswalk locations. Where the road is wide enough and on-street parking exists, center islands can be combined with curb extensions to enhance pedestrian safety (*66*).

According to the new AASHTO Pedestrian Guide (*26*), medians and crossing islands should be at least 6 ft (1.8 m) wide, which allows room for more than one pedestrian to wait, as well as 2 ft (0.6 m) wide detectable warnings for the visually impaired on either side of the island. A median width of 8 ft (2.4 m) is recommended “where practical” to accommodate wheelchairs, bicycles, scooters, and groups of pedestrians. The recommended length of an island (parallel to the street) is 20 ft (6.1 m), large enough to protect potential users of the island by making it visible to approaching motorists. The AASHTO Pedestrian Guide also recommends that islands have a level landing area of at least 4 ft (1.2 m) square, to provide a resting area for wheelchairs. Criteria for maximum slope of ramps and detectable warnings are set forth in the Guide and also in ADA Accessibility Guidelines (*65*).

This section will compare the safety of pedestrian crossings at intersections with median refuge islands as opposed to those without refuge islands. The section will include crash-based studies, as well as research using pedestrian and/or motorist behavior as a measure of safety effectiveness. This section will also include some information with regard to different design elements and marking, signing, and other devices that are sometimes used to supplement median refuge islands.

Based on the available research on the topic of median refuge islands at intersections, there are clear needs for future research. First, there is a need to conduct a large-scale evaluation on the crash effects of refuge islands under a wide range of traffic and roadway conditions (e.g., for two-lane vs. multi-lane roads, varying traffic and pedestrian conditions, area types, signalized vs. unsignalized crossings, and varying speed conditions). This could be evaluated using a properly designed before-after study (with control sites) or a comparative analysis. A crash-based study must account for pedestrian volume conditions, since adding a refuge island will undoubtedly attract some pedestrians to cross where the refuge island was installed (and thus cause an increase in pedestrian crossing activity at the refuge island and a decrease at nearby sites without refuge islands).

There is also a need to determine the effects of design features (e.g., curb extensions, width of refuge island) and traffic control devices (signing, crosswalk markings, advance warning devices), which may be used to supplement intersection refuge islands. Based on the available literature, there is a need to develop general guidelines or recommendations on when and where the installation of intersection refuge islands is most appropriate and beneficial.

Exhibit 4-88: Resources examined to investigate the safety effect of median refuge islands at intersections

DOCUMENT	DESCRIPTION	COMMENT
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Crashes at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	No information on ped refuge islands	Not added to the synthesis.
(Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Contains a summary of relevant research studies	Used as reference. Not added to synthesis.
(*66*) (Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Crashes Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Includes a discussion of refuge islands and a summary of some research studies involving refuge islands	Added to the introduction.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Summarizes research results from several studies on refuge islands	Not added to the synthesis.
(*77*) (Zegeer, C. V., Stewart, R., Huang, H., and Lagerwey, P., "Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines." FHWA-RD-01-075, McLean, Va., Federal Highway Administration, (2002))	Matched comparison of 5 years of crash data at 1,000 marked crosswalks and 1,000 unmarked crosswalks	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Bacquie, R., Egan, D., and Ing, L., "Pedestrian Refuge Island Safety Audit." Monterey, Calif., Presented at 2001 ITE Spring Conference and Exhibit, (2001))	Study of midblock pedestrian crossings.	Not added to the synthesis.
(*75*) (Huang, H. F. and Cynecki, M. J., "The Effects of Traffic Calming Measures on Pedestrian and Motorist Behavior." FHWA-RD-00-104, McLean, Va., Federal Highway Administration, (2001))	Before and after evaluation of pedestrian and motorist behaviors at 4 sites	Added to the synthesis.
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Summarizes research and practice related to uncontrolled crossings	Not added to the synthesis.
(Garvey, P. M., Gates, M. T., and Pietrucha, M. T., "Engineering Improvements to Aid Older Drivers and Pedestrians." Traffic Congestion and Traffic Safety in the 21st Century Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 222-228.)	Refuge islands are only mentioned briefly	Not added to the synthesis.
(Staplin, L., Harkey, D. L., Lococo, K. H., and Tarawneh, M. S., "Intersection Geometric Design and Operational Guidelines for Older Drivers and Pedestrians Volume: I: Final Report." FHWA-RD-96-132, McLean, Va., Federal Highway Administration, (1997))	Refuge islands are only mentioned briefly	Not added to the synthesis.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	General discussion of refuge islands	Not added to the synthesis.
(*89*) Garder,P., "Pedestrian Safety at Traffic Signals" Accident Analysis and Prevention Vol.21, Oxford, N.Y. (1989)	Analyzed intersections in two Swedish cities (Stockholm and Malmo)	Added to the synthesis.
(*88*) Garder,P., Hyden,C., Linderholm,L., "Samband mellan olycksrisk och olika forklaringsvariabler" LTH Bulletin 27, Lund, Sweden (1978)	Studied effects of refuge islands on serious conflicts with pedestrians	Added to the synthesis.
(*87*) (Lalani, N., "Road Safety at Pedestrian Refuges." Traffic Engineering & Control, Vol. 18, No. 9, London, United Kingdom, Hemming Information Services, (1977) pp. 429-431.)	Before and after study of the effect of pedestrian refuges on crashes; sites in London.	Suggested by NCHRP 17-18(4). Added to the synthesis.

Discussion: Install median refuge islands at marked or unmarked crosswalks at signalized or unsignalized intersections

Zegeer et al. studied 2,000 crossing sites in 30 cities; all sites were in urban or suburban areas and included primarily arterial and collector streets (*77*). Streets covered a range of speed limits, typically 25 to 40 mph. Sites were selected within a variety of area types (i.e., residential, downtown, commercial, urban fringe, etc.). Zegeer et al. found that the presence of a raised median or refuge island was associated with a statistically significantly lower rate of pedestrian crashes on multi-lane roads (compared to no median or refuge island). This was true at marked as well as unmarked crosswalks. All sample sites used in the study were uncontrolled crossings at intersection (i.e., no traffic signals or STOP-control on intersection approach of interest) or mid-block locations. The presence of painted (not raised) medians or islands and two-way-left-turn

lanes provided no statistically significant reduction in pedestrian crash rate on multi-lane roads. The study collected and controlled for pedestrian and vehicle exposure, along with other site variables in the analysis (*77*).

The purpose of a study by Lalani in 1977 was to compare personal injury crashes before and after installation of "Double-D" shaped refuge islands at 120 sites, including intersection and mid-block, marked and unmarked locations in London, England. These islands were installed in conjunction with other roadway improvements, such as anti-skid surfacing, illuminated bollards, bus lanes, and crosshatch markings. Although the use of central refuge islands is generally considered to enhance pedestrian safety, this study found that refuges reduced vehicle crash frequency but increased pedestrian accident frequency at intersections (*87*).

Lalani also determined that (*87*):

- At intersections, vehicular accident frequency was significantly reduced only when the refuge islands were reinforced with hatch markings to channelize motor traffic;
- At midblock locations, vehicular accidents were only reduced where the islands had internally illuminated bollards; and
- Pedestrian accidents were only reduced at sites where the refuge islands were constructed on roads next to high pedestrian generators. (It is unclear if Lalani is referring to intersection or midblock or both.)

It is possible that the results of the Lalani study (i.e., the increase in pedestrian crashes after installation of refuge islands) may be a manifestation of the fact that more pedestrians are drawn to use the crossing after a refuge island is installed. A study of all of the pedestrian crashes along a road section (with corresponding pedestrian exposure) and controlling for pedestrian exposure at the crossings would allow for quantifying this effect.

A 1978 study in Sweden by Garder was conducted to determine the effects of refuge islands on serious conflicts with pedestrians (*88*). Based on studies at 115 intersections (termed "junctions") in Sweden from 1974 to 1976, serious pedestrian conflicts were reduced by approximately 20% on low-speed (less than 19 mph, or 30 km/h) intersections after the installation of "central traffic islands". On higher-speed intersections, serious pedestrian conflicts were about 60% lower after installation of the islands. The risk of pedestrian conflicts at signalized (two-phase) intersections was reduced by about 30% after central traffic islands were installed. However, the results were not statistically significant (*88*). Pedestrian volumes and other characteristics of the locations studied were not reported.

In 1989, Garder analyzed intersections in two Swedish cities (Stockholm and Malmo), concluding that the installation of a median refuge island decreased pedestrian crash risk by one third (*89*). The measurement of pedestrian crash risk is not clear from the literature. However, the percentage of pedestrians who crossed on a red light (i.e., "red-walking") was higher when a refuge island was present than not (15% as opposed to 10%) (*89*). The configuration and traffic control at the study intersections were not reported.

A study by Huang and Cynecki (2001) involved before-after analysis of a variety of traffic calming measures in several U.S. cities, using pedestrian and motorist behavior as measures of effectiveness. The study included an evaluation of four refuge islands at two unsignalized four-leg intersections in Sacramento, California, across streets that were two-way, two-lane with parking on both sides and zebra crosswalks at the refuge islands. The refuge islands constricted the width of the travel lanes and were expected to reduce vehicle speeds, increase the number of pedestrians for whom motorists yielded, and increase the percentage of pedestrians who crossed in the crosswalk (*75*).

After installation of pedestrian refuge islands at the four crosswalk locations, the percentage of motorists who yielded to pedestrians increased from 32.6% to 42.1% (*75*). This was not statistically significant (at the 90% level), due to relatively small sample sizes of crossing pedestrians. However, there was a statistically significant increase in the percentage of pedestrians who crossed in the crosswalk (from 61.5% to 71.9%) (*75*). There was no statistically significant difference in the pedestrian wait time after the refuge islands were installed. It would be expected that pedestrian wait time would more likely be improved in situations where refuge islands are installed on multi-lane roads.

There is strong evidence from crash-based studies and also from behavioral studies that raised median refuge islands provide a significant safety benefit for pedestrians at intersections. The benefits of islands are most likely pronounced on multi-lane roads, where pedestrians only have to cross half of the street at a time and can then wait on the refuge island for gaps in motor vehicle traffic before crossing the second half of the street. Median refuge islands must be properly designed and visible to motorists to prevent crashes involving vehicles striking the island.

4.3.3. Bicyclist Design Considerations

The safety of bicyclists at intersections depends on many factors related to geometric and traffic control conditions. Guidelines for the planning, design, and operation of bicycle facilities are provided in the 1999 “Guide for the Development of Bicycle Facilities” report by AASHTO (*90*). Specific design information is given in that document related to treatments for bicyclists at intersections, including sight distance, signs, signals and markings, proper design of bike lanes at intersections, transition zones, approach treatments, refuge islands, and others.

According to Hunter et al. (1996), 50% to 70% of all crashes between bicycles and motor vehicles occur at or near intersections. A number of countermeasures have been developed and tested in the U.S. and abroad to facilitate the safe passage of bicyclists through intersections. Much of the information below related to bicycles was adopted from a summary of literature compiled by Hunter et al. for “A Comparative Analysis of Bicycle Lanes versus Wide Curb Lanes: Final Report” (*91*).

This section provides information on roadway design features to accommodate bicyclists at signalized and unsignalized intersections. Specific treatments discussed include:

- Bike lanes at intersections
- Grade separation
- Offset or discontinuous bike lanes at intersections
- Raised, painted bicycle crossings

Section 3.3 provides discussion of bicycle treatments along roadway segments.

There is a need to conduct further research to better quantify the effects of bike lanes and wide curb lanes on bicycle crashes and conflicts for a variety of traffic and roadway conditions. Also, more testing is needed to better quantify the effect on behaviors, conflicts, and crashes of such treatments as raised bike lane crossings.

Exhibit 4-89: Resources examined to investigate the safety of bicyclists at intersections

DOCUMENT	DESCRIPTION	COMMENT
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results may be added if relevant when available.
(*5*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook that summarizes the effects of a wide range of safety measures.	Added to synthesis
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Brief summary of past research on a variety of treatments	No new information. Not added to synthesis
(Jensen, S. U., "Cyclist Safety at Signalised Junctions." Amsterdam, Netherlands, Velo Mondial 2000, (2000))	Danish study that evaluated the effect of advance bicycle merging treatments on bicyclist crashes at 11 intersections in Denmark	Suggested by NCHRP 17-18(4). Not added to synthesis – more relevant to bicycle traffic control.
(Hunter, W. W., "Evaluation of a Combined Bicycle Lane/Right Turn Lane in Eugene, Oregon." FHWA-RD-00-151, McLean, Va., Federal Highway Administration, (2000))	Compared conflicts at an intersection with a combined bicycle lane/right-turn lane to a similar intersection with a standard right lane and bike lane to the left in Eugene, Oregon	Suggested by NCHRP 17-18(4). Not added to synthesis
(*91*) (Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. F., and Pein, W. E., "A Comparative Analysis of Bicycle Lanes versus Wide Curb Lanes: Final Report." *FHWA-RD-99-034*, McLean, Va., Federal Highway Administration, (1999))	Comparative analysis of bicycle lanes versus wide curb lanes, sites in CA, FL, and TX, used conflicts as surrogate for safety	Suggested by NCHRP 17-18(4). Added to synthesis
(Hunter, W. W., Stewart, J. R., and Stutts, J. C., "A Study of Bicycle Lanes Versus Wide Curb Lanes." Transportation Research Record: Journal of the Transportation Research Board, No. 1667, Washington, D.C., Transportation Research Board, (1999) pp. 70-77.)	Comparative analysis of bicycle lanes versus wide curb lanes, sites in CA, FL, and TX, used conflicts as surrogate for safety	Not added to synthesis. Same information as above reference (final report of same study)
(Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. H., and Pein, W. E., "Bicycle Lanes Versus Wide Curb Lanes: Operational and Safety Findings and Countermeasure Recommendations." FHWA-RD-99-035, McLean, Va., Federal Highway Administration, (1999))	Comparative analysis of videotaped behavior of bicyclists and motorists at 16 intersections with either a bike lane or wide curb lane; sites in CA, FL, and TX; also looked at conflicts and lateral positioning of bicyclists	Not dded to synthesis. No information not provided in final report of same study.
(*93*) (Hunter, W. W., Harkey, D. L., and Stewart, J. R., "Portland's Blue Bike Lanes: Improving Safety through Enhanced Visibility." Portland, Ore., City of Portland, (1999))	Study of colored bike lanes in Portland, Oregon.	Limited qualitative information added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Brude, U. and Larsson, J., "The Safety of Cyclists at Roundabouts: A Comparison between Swedish, Danish, and Dutch Results." Nordic Road and Transport Research, No. 1, Linköping, Sweden, Johnny Dahlgren Grafisk Produktion AB, (1997) pp. 23-25.)	A summary of safety studies on cyclist safety at roundabouts from Sweden, Denmark, and the Netherlands	This article to be covered under Pedestrian and Bicyclist Safety at Roundabouts. Not added to synthesis.
(*94*) (Jensen, S. U., "Junctions and Cyclists." Barcelona, Spain, Proc. Velo City '97 - 10th International Bicycle Planning Conference, (1997))	Evaluation of raised crossings for bicycles, some of which were marked with blue pavement, at signalized intersections in Denmark	Limited information added to synthesis. No AMFs.
(*61*) (Garder, P., Leden, L., and Pulkkinen, U., "Measuring the Safety Effect of Raised Bicycle Crossings Using a New Research Methodology." *Transportation Research Record 1636*, Washington, D.C., Transportation Research Board, National Research Council, (1998) pp. 64-70.)	Before and after study of raised urban bicycle crossings in Sweden	Suggested by NCHRP 17-18(4). Added to synthesis.
(Compton, R. P. and Milton, E. V., "Safety Impact of Permitting Right-Turn-On-Red: A Report to Congress by the National Highway Traffic Safety Administration." DOT HS 808, Washington, D.C., National Highway Traffic Safety Administration, (1994))	Report to Congress	No AMFs. Not added to synthesis.
(Wilkinson, W. C., Clarke, A., Epperson, B., and Knoblauch, R., "The Effects of Bicycle Accommodations on Bicycle/Motor Vehicle Safety and Traffic Operations." FHWA-RD-92-069, Washington, D.C., Federal Highway Administration, (1994))	Conclusions are provided on bicycle planning and design based on the current state of the practice; recommendations are based on a literature review	Used as a reference. Not added to synthesis.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	Summarizes the safety effectiveness of various geometric features on pedestrian and bicycle safety, based on critical reviews of literature	Used as a reference. Not added to synthesis.
(Preusser, D. F., Leaf, W. A., DeBartolo, K. B., Blomberg, R. D., and Levy, M. M., "The Effect of Right-Turn-on-Red on Pedestrian and Bicyclist Accidents." Journal of Safety Research, Vol. 13, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 45-55.)	Examined the effects of RTOR on pedestrian safety	Not relevant to this section. Not added to synthesis.

Discussion: Provide bicycle lanes at intersections

A bicycle lane (BL) is defined as a part of the roadway designated for bicycle traffic and separated from motor vehicles in adjacent lanes by pavement markings. Most often, bicycle lanes are installed near the right edge of the road, although they are sometimes placed to the left of right-turn lanes or on-street parking. Bike lanes at intersections have been evaluated in several studies.

A Danish study (Jensen, 1997) looked at the effect of BLs on accident rates at signalized intersections and at priority intersections (at priority intersections, traffic is controlled by signage rather than signals and one road has priority over the other). Results indicated that the implementation of BLs caused no change in the number of either bicycle-motor vehicle or overall

crashes at signalized intersections. However, there was an increase in bicycle-motor vehicle crashes at priority intersections. The study also found a reduction in all crashes along the stretches of roadway between intersections (*94*). No further details regarding the study were reported.

A comparative analysis of bicycle lanes (BLs) versus wide curb lanes (WCLs) was conducted for the FHWA in 1999 (*91*). In the cities of Santa Barbara, CA, Gainesville, FL, and Austin, TX, videotapes were made of bicyclists approaching and riding through eight intersections that had BLs and eight others that had WCLs. At the BL locations, 2,700 cyclists were observed, while 1,900 cyclists were taped going through the WCL intersections. In addition, brief on-site interviews of 2,900 bicyclists were conducted; and an analysis was performed on crash data from bicycle-motor vehicle crashes (*91*).

Hunter et al. showed that 5.6% of all bicyclists on the videotapes were riding the wrong way, against traffic, with significantly more of this behavior exhibited at WCL sites (1.7%) than at BL locations (1.0%). One-third of the bicyclists at both types of facilities claimed to be experienced riders (*91*).

The Hunter et al. study also showed that more people riding bicycles approached the intersection on a sidewalk at locations that had a WCL (15%) than where a BL (3%) was present. The type of bicycle facility available (WCL or BL) had no apparent effect on whether or not cyclists obeyed traffic signals. In fact, 92% of the videotaped bicyclists at the study sites complied with the signals. Seventy-five percent of the cyclists obeyed stop signs, but a higher percentage did so at BL locations (81%) than WCL sites (55%) (*91*).

A statistically significant difference was noted by Hunter et al. in the percentage of bicyclists who shied a little to the right, away from motor vehicle traffic, as they progressed straight through BL intersections (11%) compared with WCL locations (7%) (i.e., cyclists move further away from cars when they have a delineated bike lane). For cyclists turning left at the intersection, among those who did so motor vehicle-style (i.e., from the left-turn lane), 14% at the WCL locations turned improperly as opposed to 3% at the BL sites. More pedestrian-style left turns (i.e., dismounting and walking bike in crosswalks) were seen at WCL sites (24%) than at BL intersections (12%). (It should be noted that the WCL sites usually involved higher traffic volumes, speeds, and numbers of lanes). When bicyclists made right turns, a statistically significant 19% were done in a pedestrian-style at WCL locations compared to 10% at BL sites (*91*). It is not clear at this time which maneuver for conducting left-turns is safer.

In terms of conflicts occurring at the actual intersection, 198 were recorded on tape. Of these, 79% were bicycle/motor vehicle conflicts, 10% bicycle/bicycle conflicts, and 10% bicycle/pedestrian conflicts. Again, more bicycle/bicycle conflicts occurred in the BLs than in WCLs, with a greater proportion of bicycle/pedestrian problems in the WCLs. Over 90% of all midblock and intersection conflicts noted in this study were considered minor (*91*).

In their comment section, Hunter et al. suggest the findings contradict prevailing assumptions about the differences between WCLs and BLs. Many experts think that more experienced riders tend to use the WCLs and less proficient cyclists opt for BLs; survey results in this study found no difference in cyclist experience according to type of facility. Similarly, the common belief that riding the wrong way is more common among BL users was called to question by results of this study, which found a higher proportion of people going against traffic at the WCL sites. Of course, this might be due to the fact that WCLs are often found on higher volume roadways, where cyclists seek what they think is the safest route possible. Data from both

BL and WCL locations suggest the need for educating cyclists about the safest way to make both left and right turns at intersections (*91*).

Hunter et al. state that (*91*):

"The overall conclusion of this research is that both BL and WCL facilities can and should be used to improve riding conditions for bicyclists, and this should be viewed as a positive finding for the bicycling community. The identified differences in operations and conflicts were related to the specific destination patterns of bicyclists riding through the intersection areas studied."

Hunter et al. recommend the use of BLs "…where there is adequate width, in that BLs are more likely to increase the amount of bicycling than WCLs" (*91*).

Discussion: Grade separation for cyclists

In China, a country where bicycling is a very popular mode of transportation, the city of Beijing has provided grade separation for cyclists at more than 50 interchanges (Liu, Shen, and Ren, 1993; Burden, Wallwork and Guttenplan, 1994; as summarized by Hunter et al. (*91*)). Grade separation can effectively reduce the potential for conflicts between bicycles and motor vehicles at intersections. However, it is also very costly, so a number of less expensive at-grade options have been developed to enhance bicycle safety, such as those described in this section. For obvious reasons, these lower-cost alternatives are in wider use than grade separations.

Discussion: Offset or discontinue bike lanes at intersections

It is sometimes feasible, when a bicycle path must cross a street, to offset that crossing away from the regular intersection. This allows bicyclists a better view of motor vehicle traffic. Another option is the use of a dashed bike lane pavement marking stripe to guide cyclists in the curbside bike lane to the left of right-turning cars. This was done at one location in Cupertino, California (Grigg, 1978 as cited in (*91*)). Several state DOTs, including Florida, recommend that bike lanes be discontinued or dashed on the approach to an intersection, permitting bicycles and cars to merge (*91*). It is also desirable for right-angle bicycle crossings at intersections to allow for good sight lines.

Treatment: Raised painted bicycle crossings

Raised crossings for bicycles, some of which were marked with blue pavement, at signalized intersections in Denmark led to a 36% reduction in bicycle-motor vehicle crashes and a 57% reduction in the number of cyclists killed or severely injured (*94*). Sufficient details of the study were not available to verify sample sizes or statistical validity of these results.

Raised, painted bicycle crossings installed at 44 intersections in Gothenburg, Sweden had similar safety benefits. The traffic control in place at the intersections was not reported. After installation, the speed of motor vehicles making right turns went down by 35 to 40%, while bicycle speeds increased 10 to 15%. Based on a quantitative model, the calculated safety benefit of these two changes in speed was a 10% reduction in bicycle-motor vehicle crashes. A survey showed that bicyclists attributed a perceived 20% improvement in their safety to the raised and painted crossings. Experts who were also surveyed suggested a 30% safety enhancement, but Leden pointed out that the number of crashes were likely to increase because the improved crossing facilities had led to a 50% increase in bicycle usage (Leden, 1997 as cited by (*93*)).

The following year, researchers used a Bayesian approach to reevaluate findings from the Leden study (Garder, Leden, and Pulkkinen, 1998 (*61*)). This study was reviewed by Elvik and Vaa (2004) (*5*). It employed state-of-the-art Empirical Bayes methodology and was been rated as a high quality study. The standard error has been adjusted by a factor of 1.2, and the result is presented in Exhibit 4-90. However, the result is considered inconclusive based on the large standard error.

Exhibit 4-90: Effects on accidents of providing raised painted bicycle crossings at intersections (5)

Author, Date	Treatment/ Element	Setting	Intersection type & volume	Accident Type & Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa (2004)	Raised bicycle crossings	Not reported	Not reported	Bicycle accidents, injury	1.088	0.527

Another Swedish study based on a literature review, bicyclist interviews, and expert opinions found that adding a bicycle path at signalized intersections would cause a 40% increase in crash risk (Leden, Garder, and Thedeen, 1993 as cited in (*93*)).

In short, the research literature from Europe shows mixed results on the effects of raised bicycle crossings on bicycle safety at intersections. The true safety effect is not easy to determine from available research studies and may depend on the specific manner in which the treatments are installed, the behaviors of the motorists and bicyclists at the sites, driver expectation for cyclists, the countries where the treatments are applied (i.e., the road use culture), the visibility of cyclists at intersections, vehicle approach speeds and perhaps other factors.

4.3.4. Pedestrians and Bicyclists at Roundabouts [Future Edition]

In future editions of the HSM, this section may contain discussion of pedestrian and bicyclist accommodation specific to roundabout intersections. Potential resources are listed in Exhibit 4-91.

Exhibit 4-91: Potential resources on pedestrian and bicyclist safety at roundabouts

DOCUMENT
(*123*) Daniels, S., Nuyts, E., and Wets, G., "The Effects of Roundabouts on Traffic Safety for Bicyclists: An Observational Study", *Accident Analysis and Prevention*, 40 (2008), pp. 518-526.
(*120*) Rodegerdts, et al., "Roundabouts in the United States", *NCHRP Report* 572, TRB, (2007).
Dijkstra, Ir. A. 2004: Rotondes met vrijliggende fietspaden ook veilig voor fietsers? R-2004-14 (www.SWOV.nl/rapport/R-2004-14.pdf).
Building a True Community, a report from the Public Rights-of-Way Access Advisory Committee submitted to the Board in January 2001.
Accessible Rights-of-Way: A Design Guide, a guide the Board developed in cooperation with the Federal Highway Administration to provide advisory information until guidelines for public rights-of-way are developed

DOCUMENT
Accessible Pedestrian Signals, a Board report that provides a synthesis on current technology in accessible pedestrian signals, including a listing of devices and manufacturers in the U.S. and abroad, and a matrix comparing the features of each device. Note: A more recent synthesis of accessible pedestrian signal technologies developed through the National Cooperative Highway Research Program (NCHRP) is avaialble at www.walkinginfo.org/aps/.
Detectable Warnings: Synthesis of U.S. and International Practice, a Board-sponsored study on detectable warnings that surveys the state-of-the-art in the U.S. and abroad and summarizes the installation and effectiveness of various designs.
(Persaud, B. N., Retting, R. A., Garder, P. E., and Lord, D., "Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method." Transportation Research Record, No. 1751, Washington, D.C., Transportation Research Board, National Research Council, (2001))
(Persaud, B. N., Retting, R. A., Garder, P. E., and Lord, D., "Crash Reduction Following Installation of Roundabouts in the United States." Arlington, Va, Insurance Institute for Highway Safety, (2000))
(Flannery, A. and Elefteriadou, L., "A Review of Roundabout Safety Performance in the United States." Las Vegas, Nev., Proc. 69th Annual Meeting of the Institute of Transportation Engineers , (1999))
(Ekman, L. and Hyden, C., "Pedestrian Safety in Sweden." FHWA-RD-99-091, McLean, Va., Federal Highway Administration, (1999))
(Leaf, W. A. and Preusser, D. F., "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups." DOT HS 908 021, Washington, D.C., National Highway Traffic Safety Administration, (1999))
(Robinson, D. L., "Accidents at Roundabouts in New South Wales." Road and Transport Research, Vol. 7, No. 1, Vermont South, Australia, ARRB Transport Research Ltd., (1998) pp. 3-12.)
(Brown, M., "The Design of Roundabouts - Volume 2." London, England, Transport Research Laboratory, Department of Transport, (1995),Brown, M., "The Design of Roundabouts - Volume 1." London, England, Transport Research Laboratory, Department of Transport, (1995))
(Schoon, C. and van Minnen, J., "The Safety of Roundabouts in The Netherlands." Traffic Engineering & Control, Vol. 35, No. 3, London, United Kingdom, Hemming Information Services, (1994) pp. 142-148.)
(Brude, U. and Larsson, J., "The Safety of Cyclists at Roundabouts: A Comparison between Swedish, Danish, and Dutch Results." Nordic Road and Transport Research, No. 1, Linköping, Sweden, Johnny Dahlgren Grafisk Produktion AB, (1997) pp. 23-25.)

4.3.5. Pedestrian and Bicyclist Traffic Control

At many locations, pedestrians depend on traffic signals for help in getting safely across the street. Several traffic control devices can be employed at intersections to direct pedestrians, such as crosswalk markings, pedestrian signal heads, push buttons, signs, and audible signals. Traffic controls may also be provided specifically for cyclists at popular cyclist locations.

This section will provide information available from the literature on traffic control devices related to pedestrians and cyclists at intersections. Pedestrian and bicycle treatments are discussed separately.

Pedestrian traffic control treatments and issues discussed in this section include:

- Install pedestrian signal heads at signalized intersections
- Type of pedestrian signal (solid or flashing WALK/DON'T WALK, or walking man/hand symbols)
- Install pedestrian countdown signals
- Provide audible and/or vibrotactile pedestrian signals
- Illuminated pedestrian push buttons

- Provide leading pedestrian interval (LPI)
- Automated Pedestrian Detectors
- Install innovative pedestrian traffic control devices
- Pedestrian safety at signalized intersections of different configurations
- Pedestrian-related signs
- Right-turn-on-red

Bicyclist traffic control treatments found in current literature and added to the discussion here are:

- Colored bicycle crossings
- Profiled pavement markings
- Advanced stop line (ASL) or bike box

Section 4.2 contains further details on intersection operations.

4.3.5.1. Pedestrian Traffic Control

The following discussion includes research related to signalization, signs, and markings, as they relate to pedestrian safety. Much of the information in this section related to pedestrians has been adapted from information from "A Review of Pedestrian Safety Research in the United States and Abroad" (*41*), in addition to other sources.

Exhibit 4-92: Resources examined to investigate the safety effect of pedestrian traffic control at intersections

DOCUMENT	DESCRIPTION	COMMENT
(*95*) (Eccles, K. A., Tao, R., and Mangum, B. C., "Evaluation of Pedestrian Countdown Signals in Montgomery County, Maryland." Washington, D.C., 83rd Transportation Research Board Annual Meeting, (2004))	Before-and-after study to determine the effects of pedestrian countdown signals on both pedestrian and motorist behavior in Montgomery County, MD	Added to synthesis.
(*41*) (Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research on pedestrians including the effect on pedestrian safety of traffic control.	Suggested by NCHRP 17-18(4). Much of the information in this section has been adapted from this document. Added to synthesis.
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Crashes at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies for accident mitigation at signalized intersections.	Limited discussion of pedestrian crashes. No additional information, not added to synthesis.
(Zegeer, C. V., Stutts, J., Huang, H., Cynecki, M. J., Van Houten, R., Alberson, B., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 10: A Guide for Reducing Crashes Involving Pedestrians." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies for pedestrian accident mitigation.	Not added to synthesis – similar information provided in Campbell (2004).
(*42*) Lord, D., "Synthesis on the Safety of Right Turn on Red in the United States and Canada." 82nd Transportation Research Board Annual Meeting, Washington, D.C., (2003)	Reviews various studies	Added to the synthesis

DOCUMENT	DESCRIPTION	COMMENT
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Synthesis of past research on a variety of treatments.	Not added to synthesis.
(Retting, R. A., Chapline, J. F., and Williams, A. F., "Changes in Crash Risk Following Re-timing of Traffic Signal Change Intervals." Accident Analysis and Prevention, Vol. 34, No. 2, Oxford, N.Y., Pergamon Press, (2002) pp. 215-220.)	Before/after study with control groups of crash experience at intersections with signal timing changes, particularly to change intervals.	Included in signal operations discussion. Not added to synthesis.
(Retting, R. A., Nitzburg, M. S., Farmer, C. M., and Knoblauch, R. L., "Field Evaluation of Two Methods for Restricting Right Turn on Red to Promote Pedestrian Safety." ITE Journal, Vol. 72, No. 1, Washington, D.C., Institute of Transportation Engineers, (2002) pp. 32-36.)	Evaluated two methods for restricting RTOR at urban intersections in Arlington, Virginia.	Not relevant to this section. Not added to synthesis.
(*43*) (Retting, R. A., Nitzburg, M. S., Farmer, C. M., and Knoblauch, R. L., "Field Evaluation of Two Methods for Restricting Right Turn on Red to Promote Pedestrian Safety." ITE Journal, Vol. 72, No. 1, Washington, D.C., Institute of Transportation Engineers, (2002) pp. 32-36.)	Driver behavioral data were collected and analyzed at 15 signalized intersections in Arlington, VA to evaluate time-specific RTOR-prohibition signs, and NTOR "When Peds are Present" signs	Added to synthesis.
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))	Summarizes various studies on pedestrian crossing treatments at uncontrolled intersections, signalized intersections, and mid-block signals	Suggested by NCHRP 17-18(4). No relevant information, not added to synthesis.
(*96*) (Huang, H. F. and Zegeer, C. V., "An Evaluation of Illuminated Pedestrian Push Buttons in Windsor, Ontario." FHWA-RD-00-102, McLean, Va., Federal Highway Administration, (2001))	Evaluates illuminated push buttons at four intersections in Windsor, Ontario.	Suggested by NCHRP 17-18(4). No AMFs. Added to synthesis.
(*97*) (Hughes, R., Huang, H., Zegeer, C. V., and Cynecki, M. J., "Evaluation of Automated Pedestrian Detection at Signalized Intersections." FHWA-RD-00-097, McLean, Va., Federal Highway Administration, (2001))	Before and after study, evaluated the effect of automated pedestrian detectors used in conjunction with push buttons on conflicts and inappropriate crossings in Los Angeles, CA, Phoenix, AZ, and Rochester, NY	Suggested by NCHRP 17-18(4). No AMFs. Added to synthesis.
(*109*) Nitzburg, M. and Knoblauch, R. L., "An Evaluation of High-Visibility Crosswalk Treatment - Clearwater Florida." *FHWA-RD-00-105*, McLean, Va., Federal Highway Administration, (2001)	Studied the behavioral effects of a novel overhead illuminated crosswalk sign and high-visibility ladder style crosswalk on narrow low-speed roadways in Clearwater, FL	Added to synthesis.
(*108*) Huang, H. F., Zegeer, C. V., Nassi, R., and Fairfax, B., "The Effects of Innovative Pedestrian Signs at Unsignalized Locations: A Tale of Three Treatments." *FHWA-RD-00-098*, McLean, Va., Federal Highway Administration, (2000)	Several innovative pedestrian devices used in conjunction with marked crosswalks at unsignalized locations were evaluated	Added to synthesis.
(King, M. R., "Calming New York City Intersections." Dallas, Tex., Urban Street Symposium Conference Proceedings, (2000))	Evaluated the effect of leading pedestrian intervals on crashes at 26 intersections in New York City; used a before and after study	Suggested by NCHRP 17-18(4). No AMFs. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*98*) (Van Houten, R., Retting, A. R., Farmer, C. M., and Van Houten, J., "Field Evaluation of a Leading Pedestrian Interval Signal Phase at Three Urban Intersections." Transportation Research Record, No. 1734, Washington, D.C., Transportation Research Board, National Research Council, (2000) pp. 86-92.)	Evaluated the effect on safety of using a three-second leading pedestrian interval at three urban intersections; used pedestrian behavior and conflicts	Suggested by NCHRP 17-18(4). No AMFs. Added to synthesis.
(Ekman, L. and Hyden, C., "Pedestrian Safety in Sweden." FHWA-RD-99-091, McLean, Va., Federal Highway Administration, (1999))	Synthesis of pedestrian safety practices in Sweden.	Not relevant to this section. Not added to synthesis.
(*99*) (Leonard, J., Juckes, M., and Clement, B., "Behavioural Evaluation of Pedestrians and Motorists towards Pedestrian Countdown Signals." Laval, Quebec, Canada, Dessau-Soprin Inc, (1999))	Evaluated the effect on pedestrian safety of pedestrian countdown signals at intersection using pedestrian and motorist behavior	Suggested by NCHRP 17-18(4). No AMFs. Added to synthesis.
(Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. H., and Pein, W. E., "Bicycle Lanes Versus Wide Curb Lanes: Operational and Safety Findings and Countermeasure Recommendations." FHWA-RD-99-035, McLean, Va., Federal Highway Administration, (1999))	Summary of literature on a number of countermeasures developed and tested in the U.S. and abroad to facilitate the safe passage of bicyclists through intersections	Same information as Hunter et al. (1999) below. Not added to synthesis.
(Hummel, T., "Dutch Pedestrian Safety Research Review." FHWA-RD-99-092, McLean, Va., Federal Highway Administration, (1999))	Synthesis of pedestrian safety practices in the Netherlands.	No AMFs. Not added to synthesis.
(Van Houten, R. and Malenfant, J. E. L., "Canadian Research on Pedestrian Safety." FHWA-RD-99-090, McLean, Va., Federal Highway Administration, (1999))	Synthesis of pedestrian safety practices in Canada.	No AMFs. Not added to synthesis.
(Jensen, S. U., "Junctions and Cyclists." Barcelona, Spain, Proc. Velo City '97 - 10th International Bicycle Planning Conference, (1997))	Evaluation of raised crossings for bicycles, some of which were marked with blue pavement, at signalized intersections in Denmark	Limited information added to Section 4.3.3. No AMFs.
(Retting, R. A., Van Houten, R., Malenfant, L., Van Houten, J., and Farmer, C. M., "Special Signs and Pavement Markings Improve Pedestrian Safety." ITE Journal, Vol. 66, No. 12, Washington, D.C., Institute of Transportation Engineers, (1996) pp. 28-35.)	Observed three signalized intersections before and after prompts for pedestrians to look for turning vehicles (special signs and pavement markings) were implemented	Not relevant to this section. Not added to synthesis.
(*100*) (Lord, D., "Analysis of Pedestrian Conflicts with Left Turning Traffic." Transportation Research Record 1538, Washington, D.C., Transportation Research Board, National Research Council, (1996))	Studied pedestrian conflicts with left-turning vehicles at T-intersections and four-leg intersections	Limited qualitative information added to synthesis. No AMFs.
(*101*) (Clark, K. L., Hummer, J. E., and Dutt, N., "Field Evaluation of Fluorescent Strong Yellow-green Pedestrian Warning Signs." Transportation Research Record 1538, Washington, DC, Transportation Research Board, National Research Council, (1996))	Experimented with using a fluorescent yellow-green sign to warn drivers of pedestrians	Limited qualitative information added to synthesis. No AMFs.
(*74*) (Compton, R. P. and Milton, E. V., "Safety Impact of Permitting Right-Turn-On-Red: A Report to Congress by the National Highway Traffic Safety Administration." DOT HS 808, Washington, D.C., National Highway Traffic Safety Administration, (1994))	Report to Congress	Limited qualitative information added to synthesis. No AMFs.

DOCUMENT	DESCRIPTION	COMMENT
(Herrstedt, L., Nielsen, M. A., Agustson, L., Krogsgaard, K. M. L., Jorgensen, E., and Jorgensen, N. O., "Safety of Cyclists in Urban Areas: Danish Experiences." Copenhagen, Denmark, Danish Road Directorate, (1994))	Study done in Denmark of profiled pavement markings	Not added to synthesis. No AMFs.
(Radwan, A. E. and Wing, D., "Safety Effects of Traffic Signal Installations: State of the Art." FHWA/AZ-87/809, Phoenix, Arizona Department of Transportation, (1987))	Review of signal installations and impact on accident patterns, frequency and severity, including pedestrians.	No AMFs, not added to synthesis.
(*103*) (Zaidel, D. M. and Hocherman, I., "Safety of Pedestrian Crossings at Signalized Intersections." Transportation Research Board 1141, Washington, D.C., Transportation Research Board, National Research Council, (1987))	Evaluated the safety effects of concurrent and exclusive signal timing, as opposed to no pedestrian interval or pedestrian signal head. A total of 320 signalized intersections	Added to synthesis.
(*44*) (Zegeer, C. V. and Cynecki, M. J., "Evaluation of Countermeasures Related to RTOR Accidents that Involve Pedestrians." Transportation Research Record 1059, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 24-34.)	Collected observational data on more than 67,000 drivers at 110 intersections in Washington, D.C., Dallas, Austin, Detroit, Lansing, and Grand Rapids, studied motorist violations of NO TURN ON RED (NTOR) signs and crashes with pedestrians	Added to synthesis. No AMFs.
(*104*) (Robertson, H. D. and Carter, E. C., "The Safety, Operational, and Cost Impacts of Pedestrian Indications at Signalized Intersections." Transportation Research Record 959, Washington, D.C., Transportation Research Board, National Research Council, (1984))	Literature review, an analysis of pedestrian crashes, a delay analysis, and a benefit-cost analysis of pedestrian signal indications.	Limited qualitative information added to synthesis. No AMFs.
(*105*) (Zegeer, C. V., Opiela, K. S., and Cynecki, M. J., "Pedestrian Signalization Alternatives." FHWA/RD-83/102, Washington, D.C., Federal Highway Administration, (1983))	Analyzed data from 1,297 signalized intersections involving a total of 2,081 pedestrian crashes in 15 U.S. cities (same as Zegeer et al., 1982)	Added to synthesis.
(*45*) (Clark, J. E., Maghsoodloo, S., and Brown, D. B., "Public Good Relative to Right-Turn-on-Red in South Carolina and Alabama." Transportation Research Record 926, Washington, D.C., Transportation Research Board, National Research Council, (1983) pp. 24-31.)	Evaluated the effects of the change in the RTOR laws in South Carolina and Alabama on the proportion of right turn and pedestrian crashes	Added to synthesis.
(*106*) (Zegeer, C. V., Opiela, K. S., and Cynecki, M. J., "Effect of Pedestrian Signals and Signal Timing on Pedestrian Accidents." Transportation Research Record 847, Washington, D.C., Transportation Research Board, National Research Council, (1982) pp. 62-72.)	Analyzed data from 1,297 signalized intersections involving a total of 2,081 pedestrian crashes in 15 U.S. cities	Added to synthesis.
(Short, M. S., Woelfl, G. A., and Chang, C. J., "Effects of Traffic Signal Installation On Accidents." Accident Analysis and Prevention, Vol. 14, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 135-145.)	Before/after study of 31 newly signalized intersections in Milwaukee, including analysis of pedestrian and bicycle crashes.	Not relevant to this section. Not added to this synthesis.
(*46*) (Preusser, D. F., Leaf, W. A., DeBartolo, K. B., Blomberg, R. D., and Levy, M. M., "The Effect of Right-Turn-on-Red on Pedestrian and Bicyclist Accidents." Journal of Safety Research, Vol. 13, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 45-55.)	Examined the effects of RTOR on pedestrian safety	Limited information added to synthesis. No AMFs.

DOCUMENT	DESCRIPTION	COMMENT
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))	Discusses some design features which are appropriate including pedestrian and bicycle facilities.	Not added to synthesis. No AMFs.
(Mueller, E. A. and Rankin, W. W., "Pedestrians." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 8, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Synthesis of older literature on pedestrian safety.	Not added to synthesis.

Discussion: Install pedestrian signal heads at signalized intersections

The most comprehensive study of pedestrian signal heads was performed by Zegeer et al. (1982, 1983), who analyzed data from 1,297 urban signalized intersections involving a total of 2,081 pedestrian crashes in 15 U.S. cities (*106*,*105*). The four pedestrian timing patterns used at the 1,297 signalized intersections in the study are summarized in Exhibit 4-93. Marked crosswalks existed at nearly all of the intersections. Of the 1,297 intersections, 508 did not have pedestrian signal heads (i.e., WALK – DON'T WALK).

Exhibit 4-93: Pedestrian signal timing patterns studied by Zegeer et al. (106,105)

Pedestrian timing pattern	Study intersections	Description
Concurrent (standard)	658 (50.7%)	Gives pedestrians a WALK interval at the same time that parallel traffic has a green light. During this phase, vehicles may also turn right or left across the pedestrian's path when safe to do so. Concurrent timing is the type most often used in the U.S.
None	508 (39.2%)	Pedestrians are expected to comply with the vehicular signal heads.
Exclusive	109 (8.4%)	Gives pedestrians a phase during each signal cycle where motor traffic is stopped in all directions so that pedestrians may take advantage of the interval to cross the street. A variation of this timing strategy is the "scramble" or "Barnes Dance" phase, which allows pedestrians to cross diagonally through the intersection as well as across the intersecting roadways
Early release or Late release	22 (1.7%)	Early: Gives pedestrians a head start in each cycle before allowing motorists to make right or left turns Late: Makes pedestrians wait to cross until after vehicles have turned

The Zegeer team found a statistically significant relationship between increased pedestrian crashes and factors such as higher pedestrian and vehicle volumes, two-way (vs. one-way) roads, wider streets, higher bus use, and greater percentage of turning movements. Compared with traffic signals without pedestrian signal heads, concurrent timing had no statistically significant effect on pedestrian crashes. Exclusive timing produced statistically significant fewer (about half) of the pedestrian crashes as concurrent timing or signals with no pedestrian signals. However, this was only true at locations with pedestrian volumes of more than 1,200 people per day (*106*,*105*). There was insufficient sample size (22 sites) of early release and late release signal timing to determine the safety effect of those timing schemes. The implementation of a Leading Pedestrian Interval is discussed later in this section.

Zegeer et al. controlled for the effects of pedestrian volume, traffic volume, intersection geometrics, etc. The results of the study are summarized in Exhibit 4-94.

Zegeer et al. suggest the following possible reasons that concurrent signal timing was not found to be effective in reducing pedestrian crashes (*106*,*105*):

- Many pedestrians misunderstand the meaning of signal messages such as the flashing DON'T WALK, which is intended to alert pedestrians that they should not enter the street now but should finish crossing if they've already started;
- Some pedestrians have the incorrect assumption that a WALK interval stops traffic in all directions, including turns;
- Many pedestrians do not comply with pedestrian signals (e.g., 65.9% of the pedestrians at 64 intersection approaches were observed to began crossing the street during the flashing or steady DON'T WALK phase);
- Many pedestrians seem reluctant to use the push buttons that activate pedestrian signals (only 51.3% of all pedestrians in the study used the button to activate the crossing signal).

Exhibit 4-94: Summary of effects of pedestrian signal timing on pedestrian crashes

Comparison	Dependent Variable (per year)	Adjusted Means (Sample Sizes in Parentheses)	Significant Difference (0.05 level)	Level of Significance
All Ped. Signal Alternatives	Mean Pedestrian Crashes	No Ped. Signal: 0.36 (508) Concurrent: 0.40 (658) Exclusive: 0.22 (109) Other: 0.38 (22)	Yes	0.001
	Mean Pedestrian Turning Crashes	No Ped. Signal: 0.13 (508) Concurrent: 0.17 (658) Exclusive: 0.01 (109) Other: 0.20 (22)	Yes	0.001
No. Ped. Signal Indication vs. Concurrent Ped. Signal Timing	Mean Pedestrian Crashes	No Ped. Signal: 0.36 (508) Concurrent: 0.40 (658)	No	0.130
	Mean Pedestrian Turning Crashes	No Ped. Signal: 0.12 (508) Concurrent: 0.15 (658)	Yes	0.048

Comparison	Dependent Variable (per year)	Adjusted Means (Sample Sizes in Parentheses)	Significant Difference (0.05 level)	Level of Significance
No. Ped. Signal Indication vs. Exclusive Ped. Signal Timing	Mean Pedestrian Crashes	No Ped. Signal: 0.33 (508) Exclusive: 0.15 (109)	Yes	0.001
	Mean Pedestrian Turning Crashes	No Ped. Signal: 0.11 (508) Exclusive: 0.00 (109)	Yes	0.001
Concurrent Ped. Signal Timing vs. Exclusive Ped. Signal Timing	Mean Pedestrian Crashes	Concurrent: 0.43 (658) Exclusive: 0.27 (109)	Yes	0.001
	Mean Pedestrian Turning Crashes	Concurrent: 0.17 (658) Exclusive: 0.03 (109)	Yes	0.001

For each comparison, control variables were: Pedestrian Volume (AADT), Total Traffic Volume (AADT), Street Operation (One-Way/Two-Way), Ped. Signal Alternatives

Based on their research, Zegeer et al. recommended that highway agencies should not automatically install pedestrian signals at all locations that have traffic signals. Each site should be evaluated in terms of cost versus effectiveness (*106,105*). However, the authors affirm the need for pedestrian signals at certain types of locations including school crossings, on wide streets, or places where the vehicular traffic signals are not visible to pedestrians.

Research in Israel (*103*) has evaluated the safety effects of concurrent and exclusive signal timing, as opposed to no pedestrian interval. A total of 320 signalized intersections in Tel Aviv, Jerusalem, and Haifa were included in this study, with analysis of 1,310 pedestrian accidents and 5,132 vehicle crashes. Higher rates of pedestrian crashes were found at intersections with the higher pedestrian and vehicle volumes, as well as at more complex intersections (i.e., the most legs or potential points of conflict). The type of signal timing provided for pedestrians had only a slight effect on pedestrian crashes and no effect on vehicle injury crashes, especially where vehicle volumes were low (less than 18,000 ADT). Intersections with exclusive phases for pedestrians had fewer crashes where vehicle and pedestrian volumes were higher (*103*). These results concur with the results of Zegeer et al. (1982, 1983).

Using a literature review, an analysis of pedestrian crashes, a delay analysis, and a benefit-cost analysis, a 1984 study by Robertson and Carter found that pedestrian signal indications reduce pedestrian crashes at some intersections, have little or no effect at others, and may actually increase crashes at yet other sites (*104*). The presence of pedestrian signals in itself did not have a statistically significant effect on pedestrian and vehicle delay, but the signal timing scheme had a major influence on delay. As a result of this study, the authors suggested further study to identify the types of intersections where pedestrian signals would be most effective. AMFs could not be derived from the study results.

Discussion: Provide leading pedestrian interval (LPI)

Van Houten et al. studied the introduction of a three-second leading pedestrian interval (LPI) at three signalized intersections in downtown St. Petersburg, Florida. Using WALK/DON'T WALK signal heads that were automatically coordinated with the signal timer (i.e., did not require push buttons), signal phasing at the intersections were programmed to release pedestrian traffic three seconds before vehicle traffic. A one-second all-red interval was used at all intersections (*98*). Based on observations of pedestrians older than age 12 on weekdays between 8:30 am and 5:00 pm (excluding periods of heavy rain), logistic regression models were used to estimate the effects of the LPI. The models included vehicle-pedestrian conflicts, pedestrian yielding, time, site location, and pedestrian age (senior vs. non-senior). Van Houten et al. conclude that the introduction of a three-second LPI "reduced conflicts between pedestrians and turning vehicles, reduced the incidence of pedestrians yielding the right-of-way to turning vehicles, and made it somewhat easier for pedestrians to cross the street by allowing them to occupy the crosswalk before turning vehicles were permitted to enter the intersection" (pg 88, (*98*)). Note that accessible pedestrian signals are needed for pedestrians who don't use visual cues. A crash analysis was not performed as part of the study.

Discussion: Illuminated pedestrian push buttons

When pedestrians come to an intersection where a push button is necessary to activate the WALK phase on a crossing signal, they might wonder whether the button has already been pushed and whether or not it is working. If they push the button and there is a delay before the WALK phase illuminates, they might think the system is broken and begin crossing the street too soon, while DON'T WALK is still showing. One solution to this problem is the illuminated push button, which has a light that comes on to show that the WALK phase has indeed been called and will soon be displayed.

A study by Huang and Zegeer (2000) looked at the effects of illuminated push buttons on pedestrian behavior (*96*). The authors found that illuminated push buttons made no statistically significant difference in crossing behavior, including how often the pedestrian phases were activated and how many people actually pushed the button or complied with the WALK message. The lighted buttons also had no significant influence on pedestrian behaviors such as running, aborted crossings, and hesitation prior to entering the street. Before the illuminated push buttons were installed, 17% of pedestrians pushed the button; afterwards, only 13% did so. Both before and after installation of the lighted device, the button was pushed 32% of the time by at least one person in each group. Among people who pushed the button when parallel traffic had the red light, the percentage that actually complied with the WALK phase was 67.8% with the illuminated type of push button and 72.3% without—a majority of pedestrians in either case (*96*).

Discussion: Automated pedestrian detectors

Another type of device created to assist people in crossing the street is the automated pedestrian detection system, which senses the presence of people standing at the curb (waiting to cross the street) and then mechanically activates the WALK signal without any action required from the pedestrian to push a button. Another feature of the detectors at some locations is that another sensor can be aimed to monitor slower-walking pedestrians in the street, so it will extend the clearance interval until the pedestrian is safe on the other side.

In 2000, Hughes, Huang, Zegeer, and Cynecki tried to determine whether these automated systems combined with standard pedestrian push buttons could reduce pedestrian-

vehicle conflicts and reduce the number of people entering the roadway during the DON'T WALK (or flashing DON'T WALK) display (*97*). Videos were taken before and after installation of the automated systems at intersections in Los Angeles, Phoenix, and Rochester, NY, with results showing a statistically significant reduction in pedestrian-vehicle conflicts as well as the percent of pedestrian crossings initiated during the DON'T WALK phase. Both infrared and microwave sensors were tested, with no significant differences found. However, field testing of the microwave equipment in Phoenix suggested a need for fine turning the detection zone in order to reduce false and missed calls.

Discussion: Type of pedestrian signal (solid or flashing WALK/DON'T WALK, or walking man/hand symbols)

Several behavioral studies in the U.S. have found pedestrian comprehension with signals to be a challenge. Furthermore, studies differ somewhat on the effects of pedestrian signals (i.e., WALK/ DON'T WALK) on pedestrian behavior.

Since earlier research had indicated that pedestrians often misunderstand the meaning of a flashing DON'T WALK signal (i.e., the pedestrian clearance interval), the Zegeer et al. team developed and field-tested several alternatives. One involved adding a third pedestrian signal message – a steady yellow DON'T START – to the standard WALK and flashing DON'T WALK signal. This three-message signal produced a statistically significant reduction in pedestrian violations and conflicts at three out of four test sites (urban signalized intersections with moderate to high pedestrian volumes) and was therefore recommended for additional tests. On the other hand, it was found that displaying a steady DON'T WALK message during the clearance and pedestrian prohibition intervals was no more effective than the flashing DON'T WALK, and therefore, was not recommended (*106*).

Many people appear to not understand the exact meaning of pedestrian signals and markings or the relevant legalities. Survey data taken from 48 states in 1995 resulted in the following responses related to crosswalks (Tidwell et al., 1995 as cited in (*41*)):

- 86 to 94% of the respondents said that pedestrians should cross the street at intersections or marked midblock crossings;
- 92 to 97% understood that motorists should yield to pedestrians in a marked crosswalk;
- 79 to 87% knew that RTOR vehicles must yield the right-of-way to people in a crosswalk;
- 59 to 61% were unaware that drivers are not obligated to stop when someone is waiting on the sidewalk to cross the street;
- 42 to 46% mistakenly think that a DON'T WALK message means that the pedestrian should return to the curb where the crossing began;
- 47% incorrectly believe that a WALK signal means there will be no conflicts with turning vehicles.

In an observational study (Petzold, 1977), compliance with pedestrian signals was analyzed at six intersections in Washington, D.C., San Francisco, and Oakland, CA (as summarized by Campbell et al. (*41*)). At the four intersections that had a flashing WALK signal to indicate the WALK phase, a total of 550 people were observed crossing the street. The other two intersections had a steady WALK signal to indicate the WALK phase; and 139 pedestrians were observed using these two crossings. No difference was found in how people used the

flashing versus steady WALK signals. In fact, it was noted that many of the observed pedestrians paid very little attention to the signal. The study also found that most pedestrians do not understand the meaning of the flashing WALK and flashing DON'T WALK phases. Petzold noted that symbols such as the walking person and upheld hand were more readily comprehended than word messages on pedestrian signals (*41*). Another study cited by Campbell et al. (Palamarthy et al., 1994) found that only half of the pedestrians observed pushed the button to activate the WALK signal (*41*).

Another study summarized by Campbell et al. that compared the behavior of pedestrians relative to flashing versus solid WALK signals was conducted in Massachusetts (Sterling, 1974) (*41*). At these locations, selected for their high volume of both pedestrian and motor traffic, the signals were vehicle-actuated and had a fixed length for the pedestrian phase. It was found that 29% of pedestrians at intersections with a flashing WALK signal crossed the street legally, whereas 51% of pedestrians at intersections with a steady WALK signal made legal crossings. A conflict between pedestrian and vehicle occurred in 6% of the crossings at the intersections with the steady WALK signal, as opposed to conflicts occurring in 8% of the crossings at the intersections with a flashing WALK indication, which was found by Sterling to be a statistically significant difference (*41*).

Mortimer (1973) evaluated the behavior of 3,200 pedestrians who were observed crossing the street at 24 signalized intersections in Detroit, MI (as noted in (*41*)). Half of the sites had standard pedestrian signals; the others did not have pedestrian signals, only vehicular signals. There were 4% fewer pedestrians starting to cross on the amber/DON'T WALK phase at the crossings with pedestrian signals, than at locations without pedestrian signals. There were 20% more people arriving at the far side of the crossing on the green/WALK phase at sites with pedestrian signals than at locations without pedestrian signals (*41*). In short, Mortimer found some improvement in pedestrian behavior (i.e., fewer pedestrians in the crosswalk at the end of the WALK/green phase when pedestrian signals were present).

In 1967, Fleig and Duffy observed people crossing the street at one signalized intersection in Brooklyn, NY, where pedestrian signal heads had been installed (*41*). Along with this behavioral study, the researchers did a before -after comparison of crashes at 11 other locations where pedestrian signals were installed. No statistically significant differences were found in crashes at the 11 comparison sites or behaviors at the study site before and after installation of pedestrian signal heads.

Discussion: Install pedestrian countdown signals

In an effort to determine the effects of pedestrian countdown signals on both pedestrian and motorist behavior, a before-after study was conducted at five intersections (with 4 crosswalks per intersection, or 20 crosswalks) in Montgomery County, MD, where these signals were installed (*95*). Countdown signals, which are used in conjunction with standard pedestrian signal indications, provide the pedestrian with information about how much time remains to safely cross the street. A survey conducted as part of the study done in Maryland revealed that most pedestrians were aware of the countdown signal and 62.6% understood its meaning. Observational data gathered at the five intersections showed that the countdown signals had mixed effects on pedestrian behavior. At 2 of the 20 crosswalks observed, there was a statistically significant decrease in the number of pedestrians who entered on the WALK indication (i.e., more pedestrians began walking during the flashing or solid DON'T WALK indication). However, at 6 of the 20 crosswalks, there was a statistically significant increase (i.e., more pedestrians were correctly entering on the WALK indication).

The researchers also observed the number of phases during which pedestrians were still in the intersection when conflicting traffic was released; none of the intersections experienced a statistically significant increase in this measure during the after-installation phase (i.e., there was no increase in the number of phases in which a pedestrian was still in the crosswalk when conflicting traffic was released). At 4 of the 5 intersections, there were statistically significantly fewer pedestrian-motor vehicle conflicts after the countdown signals were installed (*95*).

Vehicle approach speeds were also observed during the Eccles et al. study. The authors found that the countdown signals had no effect on approach speeds during the pedestrian clearance interval (i.e., the flashing DON'T WALK when the countdown was displayed) (*95*).

Leonard et al. evaluated pedestrian and motorist behavior after the addition of a countdown signal to conventional pedestrian signal heads (i.e., Hand/Man or Walk/Don't Walk) in Monterey, California (*99*). The study took place at two signalized urban intersections; observations were conducted over a four-day period of 760 pedestrians. Overall, it was found that 83% of pedestrians started at the beginning of the pedestrian phase and completed the crossing during the phase. Leonard et al. conclude that "pedestrian countdown signals do not represent any significant safety hazards" (pg 16, (*99*)). The study did not review conflicts or accidents.

No AMFs could be developed for pedestrian countdown signals.

Discussion: Install innovative pedestrian traffic control devices

To address identified problems related to pedestrian traffic controls, such as confusion about the meaning of signal messages, Zegeer et al. (1982) developed and tested alternative methods for warning pedestrians and/or motorists of potential conflicts between pedestrians and turning vehicles at intersections (*105*). The devices were evaluated several months after installation. Long-term effects (i.e., after several years) were not studied. These novel devices were field tested at locations in Washington, D.C., Milwaukee, Detroit, Ann Arbor, and Saginaw, MI, with the following results:

- A sign reading YIELD TO PEDESTRIAN WHEN TURNING (red and white triangle, 36 inches on each side) reduced conflicts between pedestrians and turning vehicles.

- A black-on-yellow warning sign that said PEDESTRIANS WATCH FOR TURNING VEHICLES statistically significantly decreased conflicts between turning vehicles and pedestrians.
- At two locations where pedestrian violations (such as crossing against the signal) had not been problematic, a sign explaining the pedestrian signal had no detectable effect. However, at two sites with a history of serious pedestrian violations, the signal explanation sign did increase pedestrian compliance and reduced conflicts with turning vehicles.
- Four sites in three different cities were used to test a device for warning pedestrians about vehicles that were turning and/or possibly running red lights. This device consisted of a three-section signal that displayed the message WALK WITH CARE during the crossing interval. This signal was found to statistically significantly reduce pedestrian signal violations as well as conflicts with turning vehicles.

In another study, several innovative pedestrian devices used in conjunction with marked crosswalks at unsignalized locations were evaluated in terms of improved crosswalk visibility and motorist yielding behavior (*108*). The three devices were: an overhead CROSSWALK sign (Seattle, WA); pedestrian safety cones reading STATE LAW—YIELD TO PEDESTRIANS IN CROSSWALK IN YOUR HALF OF ROAD (NY State and Portland, OR); and pedestrian-activated STOP FOR PEDESTRIAN IN CROSSWALK overhead signs (Tucson, AZ). The signs were tested in locations with a variety of traffic and roadway conditions.

Both the safety cones used in New York and the overhead CROSSWALK signs in Seattle resulted in more drivers stopping for pedestrians, and one of the pedestrian-activated signs in Tucson increased motorists' yielding behavior. The signs in Seattle and Tucson decreased the instances where people had to run, hesitate, or abort an attempt to cross the street. None of the signs seemed to influence whether or not pedestrians crossed in the crosswalk (*108*).

Based on their findings, Huang et al. concluded that these signs alone would not ensure that drivers slow down and yield to people crossing the street; instead, pedestrian safety devices need to be supplemented with education and enforcement. Ultimately, many problems could be forestalled by designing "friendlier" pedestrian environments in the first place (*108*).

Nitzburg and Knoblauch (2000) studied the behavioral effects of a novel overhead illuminated crosswalk sign and high-visibility ladder style crosswalk on narrow low-speed roadways in Clearwater, FL (*109*). With these features in place, motorist yielding to pedestrians went up a significant 30 to 40% during the daytime, with a smaller increase at night (8%). The number of pedestrians who used the crosswalk rose by 35%. There was no observable change in pedestrian overconfidence, running, or conflicts. In conclusion, it was found that pedestrian and motorist behavior was positively affected by high-visibility crosswalk treatments on narrow low-speed roadways such as those included in this study; additional research is needed to determine their effectiveness on wider streets with higher speed limits (*109*).

Discussion: Pedestrian safety at signalized intersections of different configurations

A 1996 study confirmed earlier findings that more pedestrian conflicts with left-turning vehicles occur at T-intersections than at standard four-leg intersections (*100*). This is perhaps caused by the fact that a motorist turning left at a T-intersection does not have to wait for oncoming traffic and therefore might have no reason to hesitate before turning. In this scenario, the car could strike a person who has started crossing the street at the same moment that the turn

was initiated. At four-leg intersections, on the other hand, motorists sometimes have to wait for oncoming vehicles to pass by, which gives pedestrians the equivalent of an early release timing pattern.

Discussion: Pedestrian-related signs

State and local agencies employ a variety of pedestrian-related signs, which fall into three categories:

- Regulatory signs, such as PEDESTRIANS PROHIBITED, WALK ON LEFT FACING TRAFFIC, NO HITCHHIKING;
- Warning signs like the advance pedestrian crossing sign and the school warning sign;
- Guide signs, which provide travel information or directions to walkways, trails, overpasses, or other pedestrian facilities.

Both the MUTCD (*17*) and the Traffic Control Devices Handbook (*29*) contain criteria for the design and placement of pedestrian-related signs. Using the experience of 48 state and local agencies, a study conducted in 1988 for the Transportation Research Board summarizes traffic and roadway conditions where various signs are most or least effective (*110*). The study did not quantify the safety effect of signage, and the results of the study are not repeated here.

In 1996, Clark et al. experimented with using a fluorescent yellow-green sign to warn drivers of pedestrians (*101*). The use of this new sign was associated with increased numbers of cars that slowed down or stopped for pedestrians, although there was no decrease in conflict events.

Discussion: Permit Right-Turn-On-Red (RTOR)

A study by Lord in 2003 reported that New York City and the Province of Quebec were the only places in North America that did not allow motorists to make a right turn on red (RTOR) at signalized intersections. In the year 2000, Quebec's Ministry of Transportation (MTQ) sponsored this study aimed at finally ending the quarter-century-old debate as to whether or not to permit RTOR (*42*). Elements of this study included analysis of crash statistics from Canada and the United States, a literature review, expert survey, and a two-part pilot study described below. One issue mentioned several times in Lord's paper outlining the MTQ study is the lack of adequate data related to RTOR crashes (*42*).

The two-part pilot study was initiated in the spring of 2001. Driver behavior was observed at 26 sites in the Province of Quebec where RTOR was authorized for a period of nine months. The second part of the pilot study involved collecting data from a number of U.S. and Canadian agencies concerning the effect that RTOR had on safety and on traffic operations (*42*).

Lord found that, in most cases, RTOR does not pose a danger to motorists, cyclists, or pedestrians. Lord reported that pedestrian crashes involving a RTOR maneuver make up less than 1% of all reported accidents in the U.S. and Canada, and the crashes that do occur are usually not severe. Many of the transportation experts and researchers who were surveyed for this study do not consider RTOR to be a safety problem (*42*).

Exhibit 4-94 shows that permitting RTOR increases pedestrian and bicycle crashes based on a study by Preusser et al. (*46*). Exhibit 4-94 displays the results of individual data sets supplied by 4 different jurisdictions (New York State (except New York City), Wisconsin, Ohio,

and New Orleans) as well as the result of combining the AMFs and standard errors together. The index of effectiveness values (AMFs) were calculated from the data supplied by Preusser et al.

Preusser et al. indicate the mean values shown have been adjusted to account for seasonal differences but does not indicate if volume increases were accounted for. However, no further adjustments were made on the AMFs calculated from the data.

A method correction factor of 2.2 was used to adjust the standard error values calculated from the data, based on the use of accident frequencies and non-EB methodologies. Discussion of the impact on other types of crashes is found in Section 4.2.2.2.

Exhibit 4-95: AMFs for Pedestrian and Bicycle Crashes for Permitting Right-Turn-On-Red (46)

Author, date	Treatment/ element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Preusser et al., 1982	Permit right-turn-on-red	Not reported (New York)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	1.429	0.243
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Wisconsin)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	2.075	0.512
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Ohio)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	1.574	0.306
Preusser et al., 1982	Permit right-turn-on-red	Not reported (New Orleans)	Signalized Intersections, volume not reported	Pedestrian Crashes, All Severities	1.813	0.881
				Combined	**1.567**	**0.175**

Author, date	Treatment / element	Setting	Intersection type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Preusser et al., 1982	Permit right-turn-on-red	Not reported (New York State)	Signalized Intersections, volume not reported	Bicycle Crashes, All Severities	1.820	0.315
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Wisconsin)	Signalized Intersections, volume not reported	Bicycle Crashes, All Severities	1.726	0.524
Preusser et al., 1982	Permit right-turn-on-red	Not reported (Ohio)	Signalized Intersections, volume not reported	Bicycle Crashes, All Severities	1.798	0.525
				Combined	**1.796**	**0.240**

In 1994, NHTSA (Compton and Milton) reported to Congress that 0.2% of all fatal pedestrian and bicycle accidents result from RTOR (*74*).

In 1986, Zegeer and Cynecki collected observational data on more than 67,000 drivers at 110 intersections in Washington, D.C., Dallas, Austin, Detroit, Lansing, and Grand Rapids, looking for links between motorist violations of NO TURN ON RED (NTOR) signs and the related crashes with pedestrians (*44*). Analysis of the data showed that 3.7% of all drivers making a right-turn violated the NTOR signs. When given an opportunity to violate the NTOR sign (i.e., being the first car in line at a signalized intersection with no pedestrians in front of them and no cars coming from the left), 21% of the drivers ignored the NTOR signs.

Furthermore, according to Zegeer and Cynecki, 23.4% of all RTOR violations create a conflict with a pedestrian. Where RTOR is permitted, 56.9% of drivers do not come to a complete stop before turning, compared with 68.2% who fail to do so at STOP-controlled intersections. One suggested reason for the higher violation rate at the latter is that stop-sign intersections may be more conducive to either a rolling stop or no stop at all due to lower side street volumes and pedestrian activity than most signalized locations (*44*).

In a later phase of the study, Zegeer and Cynecki developed 30 potential countermeasures to enhance pedestrian safety at intersections permitting RTOR, where seven of these countermeasures were tested at 34 intersections in six cities in the U.S. Motorist violations and pedestrian-vehicle conflicts related to both RTOR and RTOG (right turn on green) were used as measures of effectiveness (*44*). Results included the following:

- NTOR signs with a red ball were more effective than standard black-and-white ones.
- An offset stop bar increased compliance in making a full stop before turning at RTOR locations and also lessened conflicts with traffic on cross streets.
- The more costly electronic NTOR/black-out sign used only during school crossing periods or other critical times was slightly more effective than the regular NTOR sign.
- Drivers were more likely to comply with the RTOR restriction if it was limited to peak pedestrian periods rather than imposed full-time.
- In areas with moderate or low RTOR volumes, an alternative NTOR WHEN PEDESTRIANS ARE PRESENT sign was effective at intersections with low to moderate volumes of RTOR vehicles.
- In general, the likelihood of a RTOG accident was found to be greater than that of a RTOR accident, based on conflict data.

During the mid-1970's, a number of states in the eastern portion of the United States adopted the "permissive" type of RTOR that was already common out west. The "Western" approach to RTOR allows this maneuver at all locations that are not otherwise marked by a prohibitory sign. Of course, motorists are expected to stop and yield to pedestrians, bicyclists, and oncoming vehicles prior to making a Western RTOR. A study by Preusser et al. (1982) of several eastern locations revealed statistically significant increases in pedestrian and bicyclist crashes with right-turning vehicles after the Western RTOR was introduced (*46*). Comparison of computerized accident data from the periods before and after implementation of the Western RTOR rule showed the following increases in accident rates:

- 43% for pedestrian accidents and 82% for bicycles in New York State;

- 107% for pedestrians and 72% for bicycles in Wisconsin;
- 57% for pedestrians and 80% for bicycles in Ohio; and
- 82% for pedestrians in New Orleans.

It should be remembered that these percentages are increases in very small numbers, since RTOR-pedestrian crashes are very rare.

A second part of this study involved analysis of actual police crash reports. From this analysis, the authors were able to identify a common crash scenario involving RTOR. Often, a driver who is stopped prior to turning right focuses on traffic coming from the left in order to identify a gap adequate to permit his right turn. Consequently, the motorist does not see a pedestrian or bicyclist on his right and a conflict occurs when the turn is initiated. The Preusser team found that RTOR accidents account for 1% to 3% of all pedestrian and bicycle accidents (*46*).

Discussion: Restrict Right-Turn-On-Red

A study conducted in Arlington County, VA evaluated the comparative safety benefits of two methods for restricting RTOR movements: traffic signs that limit RTOR during specific time periods vs. highly visible traffic signs that disallow RTOR when pedestrians are present (*43*). The study took place at 15 signalized intersections targeted by the Department of Public Works for implementation of pedestrian safety measures, partly because of public concern over RTOR conflicts. A third of the intersections (5 sites) served as the control group, while the others were equally divided between the two treatments. At the first group of five treated sites, signs were placed that stated “NO TURN ON RED, 7 AM – 7 PM, MON – FRI”. At the second group of five treated sites fluorescent yellow-green reflective signs reading “NO TURN ON RED – WHEN PEDESTRIANS ARE PRESENT” were implemented.

Observations of pedestrian and motorist behavior were conducted at each location during the before and after phases. The researchers found a small but statistically significant increase in the percentage of drivers who actually stopped at painted stop lines prior to turning at the sites with signs related to the presence of pedestrians. Large increases were noted at the intersections where time-specific RTOR restrictions were imposed, whether pedestrians were present or not (*43*).

During the “before” period, 80% of all observed vehicles actually turned right on red at these locations. After installation of the signs, there was a small decline in the percentage of motorists who turned right on red at the sites with signs restricting right turns when pedestrians are present, and a large decrease where RTOR was not permitted during specified time periods (*43*).

Thirty-nine percent of all vehicles observed did not come to a full stop before making a RTOR during the before period. This figure decreased greatly when time-specific signs were installed, but there was little change at locations where pedestrian presence was a factor for drivers to consider (*43*).

In terms of pedestrian behavior, 14% yielded to drivers making a RTOR during the “before” period. After installation of the signs, there was a large decrease in those who yielded to vehicles turning right at time-specific locations, with little change at sites that disallowed RTOR in the presence of pedestrians (*43*).

Overall, the Retting et al. concluded that signs that made RTOR dependent on driver discretion related to the presence or absence of pedestrians were less effective. Signs that prohibit RTOR during daytime hours, when pedestrians are more numerous anyway, might be preferable (*43*).

Another study looked at the safety effects of RTOR in South Carolina and Alabama. In South Carolina, accidents at signalized intersections involving right-turning vehicles for two years before and three years after the RTOR law was implemented were compared with accidents in the same period that did not involve right-turning vehicles. A similar comparison in Alabama covered three years before and five years after RTOR was instituted (*45*).

Results showed a statistically significant increase during the after period in South Carolina for right-turning property damage accidents than for accidents not involving right turns. This was not true in Alabama. There was no statistically significant difference in the rate of change in fatality or injury accidents in either state when comparing right-turning vehicles to non-right-turning vehicles. Furthermore, there was no evidence of increased pedestrian accidents resulting from RTOR in either South Carolina or Alabama (*45*).

Additional discussion of the safety effects of right-turn-on-red is included in Section4.2.2.2.

Summary

There is a wide variety of traffic control measures that have been used and evaluated related to improving pedestrian safety. The presence of special signal timing such as exclusive or "scramble" timing has been shown to reduce pedestrian crash risk by approximately 50% for intersections which have more than 1,200 pedestrians per day, generally found in downtown areas. Such timing requires a longer cycle length thus it needs to be studied in conjunction with increased pedestrian and motorist delay. Although concurrent (or standard) timed pedestrian signals (i.e., where pedestrians get a WALK signal parallel to through traffic, which conflicts with right-turning and left-turning vehicles) showed no significant reduction in pedestrian crashes compared to no pedestrian signals, pedestrian signals are essential for many types of signalized locations (e.g., on one-way streets where pedestrians cannot see the vehicle signals, on wide streets, at complex intersections, or where there is separate left-turn phasing), and can also be important in providing information to pedestrians relative to when it is safe to begin crossing the street. In general, pedestrian signals should be considered for installation at all signalized locations. They are particularly important where pedestrians cannot see the traffic signals, at complex intersections, and where pedestrians cross wide streets. Early release timing and pedestrian countdown signals are also options to enhance pedestrian signals, although the safety effect of these treatments has not been adequately quantified. However, pedestrian countdown signals appear to improve pedestrian crossing behavior and reduce conflicts with motor-vehicles.

Pedestrian-related signing, as described in the MUTCD, is used at intersections. These include regulatory signs ("Yield to Pedestrians in Crosswalks"), warning signs (e.g., advance pedestrian crossing signs), and guide signs (e.g., signs directing pedestrians to walkways, trails, and overpasses). Florescent yellow-green signs are more noticeable by drivers and may result in increased motorist yielding to pedestrians. Allowing right-turn-on-red has shown mixed results, although RTOR crashes involving pedestrians are extremely rare. No turn on red (NTOR) signs may be appropriate at certain locations such as at intersections with poor sight distance, complex intersection design or phasing, and/or high volumes of pedestrians. Such treatments as larger NTOR signs, "red ball" NTOR signs, and electronic NTOR signs (illuminated during the red

interval) seem to be more effective than standard NTOR signs in terms of motorist compliance to RTOR regulations, however the safety effect of all these treatments has not been adequately quantified.

There are a variety of innovative signs and signal options that seem promising, based on studies of conflicts and/or pedestrian and motorist behaviors. For example, automated pedestrian detectors at signalized intersections will detect pedestrians waiting to cross the street and give a pedestrian the WALK signal (without having to push the button) and/or extend the clearance interval for a slow-walking pedestrian in the street. Such devices have shown to reduce pedestrian violations and conflicts between pedestrians and motor vehicles. Signs in the street at unsignalized pedestrian crossings (such as "Stop for Pedestrians in Crosswalk) can increase motorist yielding. Again, the safety effect of all these treatments has not been adequately quantified.

4.3.5.2. Bicyclist Traffic Control

According to Hunter et al. (1996), 50% to 70% of all crashes between bicycles and motor vehicles occur at or near intersections. A number of traffic control devices have been developed and tested in the U.S. and abroad to facilitate the safe passage of bicyclists through intersections, as discussed below. Much of the information below related to bicycles was adopted from a summary of literature compiled by Hunter et al. for "A Comparative Analysis of Bicycle Lanes versus Wide Curb Lanes: Final Report" (*91*).

This section provides information on traffic control features to accommodate bicyclists at signalized and unsignalized intersections. Specific treatments discussed include:

- Colored bicycle crossings
- Profiled pavement markings
- Advance stop line (ASL) bike box

Section 3.3 provides discussion of bicycle treatments along roadway segments. Bicyclist design elements at intersections are discussed in Section 4.3.3.

More testing is needed to better quantify the effect on behaviors, conflicts, and crashes of such treatments as colored bike lanes, advance stop lines (bike boxes) at intersections, and profiled or "slalom" lane markings at intersection approaches.

Exhibit 4-96: Resources examined to investigate the safety of bicyclists at intersections

DOCUMENT	DESCRIPTION	COMMENT
NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	On-going project.	Results may be added if relevant when available.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook that summarizes the effects of a wide range of safety measures.	Not added to synthesis
(*111*) (Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Brief summary of past research on a variety of treatments	Added to synthesis

DOCUMENT	DESCRIPTION	COMMENT
(*92*) (Jensen, S. U., "Cyclist Safety at Signalised Junctions." Amsterdam, Netherlands, Velo Mondial 2000, (2000))	Danish study that evaluated the effect of advance bicycle merging treatments on bicyclist crashes at 11 intersections in Denmark	Suggested by NCHRP 17-18(4). Added to synthesis.
(*91*) (Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. F., and Pein, W. E., "A Comparative Analysis of Bicycle Lanes versus Wide Curb Lanes: Final Report." *FHWA-RD-99-034*, McLean, Va., Federal Highway Administration, (1999))	Comparative analysis of bicycle lanes versus wide curb lanes, sites in CA, FL, and TX, used conflicts as surrogate for safety	Suggested by NCHRP 17-18(4). Added to synthesis
(Hunter, W. W., Stewart, J. R., and Stutts, J. C., "A Study of Bicycle Lanes Versus Wide Curb Lanes." Transportation Research Record: Journal of the Transportation Research Board, No. 1667, Washington, D.C., Transportation Research Board, (1999) pp. 70-77.)	Comparative analysis of bicycle lanes versus wide curb lanes, sites in CA, FL, and TX, used conflicts as surrogate for safety	Suggested by NCHRP 17-18(4). Not added to synthesis
(Hunter, W. W., Stewart, J. R., Stutts, J. C., Huang, H. H., and Pein, W. E., "Bicycle Lanes Versus Wide Curb Lanes: Operational and Safety Findings and Countermeasure Recommendations." FHWA-RD-99-035, McLean, Va., Federal Highway Administration, (1999))	Comparative analysis of videotaped behavior of bicyclists and motorists at 16 intersections with either a bike lane or wide curb lane; sites in CA, FL, and TX; also looked at conflicts and lateral positioning of bicyclists	Not added to synthesis
(*93*) (Hunter, W. W., Harkey, D. L., and Stewart, J. R., "Portland's Blue Bike Lanes: Improving Safety through Enhanced Visibility." Portland, Ore., City of Portland, (1999))	Study of colored bike lanes in Portland, Oregon.	Limited qualitative information added to synthesis.
(Brude, U. and Larsson, J., "The Safety of Cyclists at Roundabouts: A Comparison between Swedish, Danish, and Dutch Results." Nordic Road and Transport Research, No. 1, Linköping, Sweden, Johnny Dahlgren Grafisk Produktion AB, (1997) pp. 23-25.)	A summary of safety studies on cyclist safety at roundabouts from Sweden, Denmark, and the Netherlands	This article to be covered under Pedestrian and Bicyclist Safety at Roundabouts. Not added to synthesis.
(Compton, R. P. and Milton, E. V., "Safety Impact of Permitting Right-Turn-On-Red: A Report to Congress by the National Highway Traffic Safety Administration." DOT HS 808, Washington, D.C., National Highway Traffic Safety Administration, (1994))	Report to Congress	No AMFs. Not added to synthesis.
(Wilkinson, W. C., Clarke, A., Epperson, B., and Knoblauch, R., "The Effects of Bicycle Accommodations on Bicycle/Motor Vehicle Safety and Traffic Operations." FHWA-RD-92-069, Washington, D.C., Federal Highway Administration, (1994))	Conclusions are provided on bicycle planning and design based on the current state of the practice; recommendations are based on a literature review	Used as a reference. Not added to synthesis.
(Zegeer, C. V., Stutts, J. C., and Hunter, W. W., "Safety Effectiveness of Highway Design Features: Volume VI - Pedestrians and Bicyclists." FHWA-RD-91-049, Washington, D.C., Federal Highway Administration, (1992))	Summarizes the safety effectiveness of various geometric features on pedestrian and bicycle safety, based on critical reviews of literature	Used as a reference. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Preusser, D. F., Leaf, W. A., DeBartolo, K. B., Blomberg, R. D., and Levy, M. M., "The Effect of Right-Turn-on-Red on Pedestrian and Bicyclist Accidents." Journal of Safety Research, Vol. 13, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 45-55.)	Examined the effects of RTOR on pedestrian safety	Not relevant to this section. Not added to synthesis.

Discussion: Colored bicycle crossings

An interesting alternative is the use of color to designate bicycle path crossing points. After the bike crossings at five Montreal intersections were marked with blue pavement, it was found that cyclists obeyed stop signs and stayed on the designated crossing more often. This improved cyclist behavior and, in turn, reduced the level of conflict between bicyclists and drivers (*91*).

In an evaluation of blue bike lanes in Portland, Oregon, in 1999, Hunter, Harkey, and Stewart collected and examined motorist behavior, motorist and cyclist view-points, and conflicts (using videotape) at exit ramps, right-turn lanes, and entrance ramps (*93*). City officials also conducted a field survey of cyclists and a mail survey of motorists. The results showed that after the blue bike lane sections were installed, the following statistically significant results were found (*93*):

- Increase in the proportion of motorists yielding to cyclists
- Increase in the incidence of motorists slowing or stopping when they approach the conflict areas
- Decrease in motorist use of their turn signals
- Decrease in hand signaling and head turning by cyclists
- Increase in the use of the recommended path and a decrease in slowing by cyclists

In addition, Hunter et al. found a reduction in conflicts (although sample sizes were small), and an overwhelming majority of cyclists and “close to a majority of motorists” who reported that the addition of the blue bike lanes improved safety (*93*).

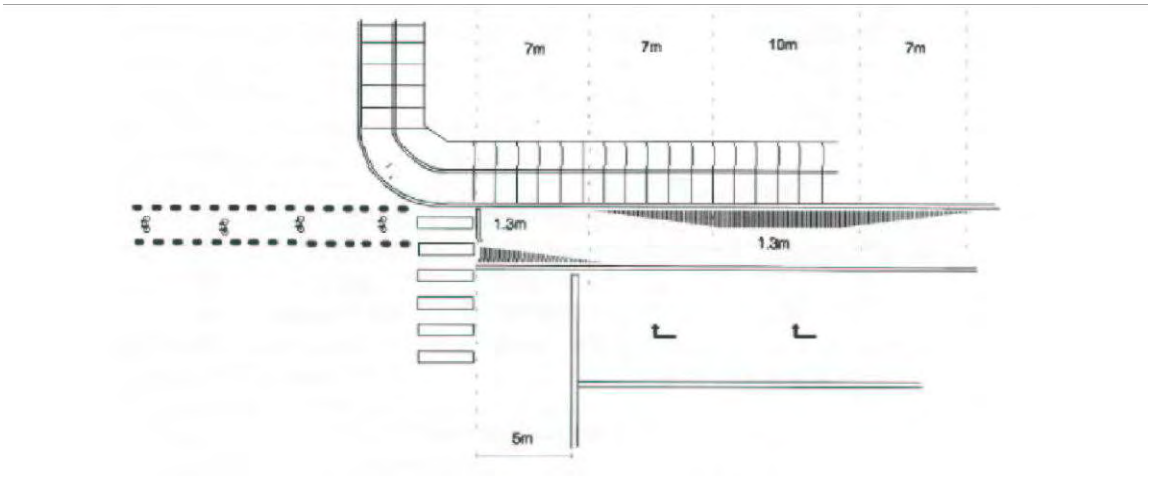
As a result of this study, the City of Portland recommended that blue coloring of bike lanes should continue to be installed to improve the visibility of conflict areas involving bicyclists and motor vehicles, and that video monitoring of such sites should continue (*93*).

Discussion: Profiled pavement markings

A 2000 study by Jensen involved evaluating new intersection configurations to better accommodate bicyclists at 11 signalized intersections in 5 municipalities in Denmark (*92*). The intersection pavement marking designs involved installing cycle tracks with narrow bicycle lanes up to the stop lines. “Slalom” bike lanes were used along with staggered stop lines, as well as cycle crossing markings and “profiled stripes”. Exhibit 4-97 illustrates the striping configuration of these treatments. A before-after study of bicycle crashes revealed that bicycle crashes were reduced at 7 out of the 11 intersections where the treatments were tested; three intersections experienced an increase in accidents. There was a 30% reduction in crashes between right-turning motor vehicles and through cyclists. On road sections where there were “entrances and exits”

(presumed to be driveways) on the intersection approach where the truncated cycle paths were used, cycle crashes increased significantly.

Exhibit 4-97: Layout of "slalom" bike lane on intersection approach with staggered stop line and marked bike crossing (92)



In a study done in Denmark, profiled pavement markings were evaluated (Herrstedt et al., 1994, as summarized in (*93*)). Such markings are installed on the pavement between bike lanes and motor vehicles lanes to increase the lateral distance between bicyclists and drivers on intersection approaches, and to increase attentiveness on the part of both these types of roadway users. Profiled pavement markings were applied at four-leg and T-intersections (traffic control not reported) to guide approaching bicyclists closer to the regular travel lanes and then divert them away from those lanes at the intersection itself. These profiled markings produced positive changes in both motorist and cyclist behavior. It was found that more drivers adapted their speeds to that of the bicyclists. More motorists stayed behind the stop line at the intersection, and fewer of them made a right turn in front of someone on a bicycle. It was also noted that cyclists became alert sooner at T-intersections with the profiled markings to guide them (*93*). Further details on the study, such as the duration of the study period, were not reported.

Discussion: Advanced stop line (ASL) or bike box

The advanced stop line (ASL) or "bike box" is a pavement marking pattern designed to give priority to bicyclists over motor vehicles, and can increase the visibility between motorists and bicyclists. This treatment can be used at signalized intersections on roads with a marked bike lane. The stop line for motor traffic is applied in advance of the intersection, which creates a clear space, or "box", where cyclists can wait in front of the cars and then proceed ahead of them into the intersection when the light turns green. This treatment reduces conflicts between bicyclists and turning motor vehicles by making the cyclists easier to see (*93*).

A single signal placed at the bike box can be used to control traffic at these locations. However, in the United Kingdom, a two-signal design is sometimes used. In this system, a red light requires motor vehicles to remain stopped while a special green light directs cyclists ahead to the box (*93*).

In the United Kingdom, bike boxes have proved helpful at intersections with traffic volumes up to 1,000 veh/hr. The safety impact of bike boxes with higher traffic volumes was not found in the literature. Two studies involving nine signalized intersections revealed that two-thirds or more of the bicyclists used the cycle lane and the bike box, while less than 20% disobeyed the signal (Wheeler, 1995 as cited in (*93*)). However, up to 16% of the motorists encroached into the bike lanes, and more than half of the lead drivers at one location violated the advanced stop line in front of the bike box. It was also found that the two-signal system was no more effective than the single signal if the roadway design included a mandatory bike lane and colored pavement in the areas designated for bicycle use (Wheeler, 1995 as cited in (*93*)).

In a review of the Wheeler study, Forbes notes that the study is a "naïve before-after crash study in which … [the] overall number of crashes is too low to draw any statistically significant conclusions" (*111*). Forbes also states that signal phasing was modified at one of the intersections five months prior to the installation of the advance stop line, a traffic signal was added at another site along with the advance stop line. At a third site, a turn prohibition was implemented shortly prior to installation of the advance stop line. Thus, Forbes implies that the changes in crashes may be in part due to these other treatments, and not from the advance stop lines alone (*111*).

Recessed, or advanced, stop lines have also been used in Denmark. In one study, it was determined that recessed (or advanced) stop lines significantly decreased crashes between cyclists passing through the intersection and motorists turning right (Herrstedt et al., 1994 as cited in (*93*)).

In conclusion, it appears that recessed/advanced stop lines increase cyclist safety at intersections, and the bike box may also be beneficial, although an ideal design and quantification of the safety effect are not known at this time.

4.3.6. Weather Issues [Future Edition]

In future editions of the HSM, the safety effect of weather issues on facilities to accommodate bicyclists and pedestrians will be addressed here. This may include the provision of shelters or canopies, and non-slippery surfaces on sidewalks and crosswalks. This section will add to the knowledge presented in other sections on weather issues. Potential resources are listed in Exhibit 4-98.

Exhibit 4-98: Potential resources on weather issues and pedestrian and bicyclist safety at intersections

DOCUMENT
(Ekman, L. and Hyden, C., "Pedestrian Safety in Sweden." FHWA-RD-99-091, McLean, Va., Federal Highway Administration, (1999))
(Jones, T. L. and Tomcheck, P., "Pedestrian Accidents in Marked and Unmarked Crosswalks: A Quantitative Study." ITE Journal, Vol. 70, No. 9, Washington, D.C., Institute of Transportation Engineers, (2000) pp. 42-46.)

4.4. Safety Effects of Other Intersection Elements

Other intersection elements include illumination, access points, signal heads and hardware, transit stops, flashing beacons, strobe-light red signals, weather, and pavement materials. The safety effect of characteristics contained in these elements will be addressed in the following sections. Readers may also wish to review material related to these elements in Section 3.4.

4.4.1. Illumination

Artificial illumination is often provided at intersections in urban and suburban areas, and also at some intersections in rural settings with higher volumes or more complex decisions for drivers.

This section presents evidence regarding the safety effect of public lighting at intersections. This refers to the introduction of lighting at intersections that did not previously have it. Effect will be stated according to accident severity.

For future editions of the HSM there is a need to quantify the safety impacts of the following elements:

- Effect of illumination on the crash risk of the intersection, including risk to pedestrians, cyclists, and other users
- Different types of illumination (i.e., high mast, low light)

Exhibit 4-99: Resources examined to investigate the safety effect of illumination at intersections

DOCUMENT	DESCRIPTION	COMMENT
(*133*) Harkey et al., "Accident Modification Factors for Traffic Engineering and ITS Improvements", *NCHRP Report* 617 (2008), TRB.	An expert panel reviewed several studies and developed an AMF.	Added to synthesis.
(*140*) (Bruneau, J.-F., and Morin, D., "Standard and Nonstandard Roadway Lighting Compared with Darkness at Rural Intersections", *Transportation Research Record* 1918, (2005), pp. 116-122)	Compared the crash rates during day and night at rural intersections with and without lighting.	Not added to synthesis. Other studies (Elvik and Vaa, 2004) used more defensible methods
NCHRP 3-72: Lane Widths, Channelized Right Turns, and Right-Turn Deceleration Lanes in Urban and Suburban Areas http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+3-72	May provide additional insight when complete.	Expected completion May 2005
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	A synthesis of results complied from literature, contact with state and local agencies throughout the United States, and federal programs	No new information. Not added to synthesis.
(Campbell, B. J, Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	A synthesis of research studies on pedestrian safety	No new information. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Accidents Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies aimed at reducing accidents involving older drivers.	No new information. Not added to synthesis.
(*5*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Meta-analysis of many treatments, including illumination. Reanalysis of Wanvik (2004).	Added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Synthesis of a variety of reports on the reduction of accidents at unsignalized intersections	No new information. Not added to synthesis.
(Sullivan, J. M. and Flannagan, M. J., "The Role of Ambient Light Level in Fatal Crashes: Inferences from Daylight Saving Time Transitions." Accident Analysis and Prevention, Vol. 34, No. 4, Oxford, N.Y., Pergamon Press, (2002) pp. 487-498.)	Three specific countermeasures were tested against each other in a single scenario that would be reasonable match to each	Does not address the effects of lighting. Not added to synthesis.
Yi, Ping.; John, L. J.; Dissanayake, S.; and Zang, Y. Impact of highway Illumination on Traffic Fatality in Various Roadway and Environmental Conditions. Transportation Research Record, TRB, National Research Council, Washington, D.C., 2002	This study compares collisions in lighted and unlighted conditions by evaluating the interaction of roadway, traffic, weather conditions and age of driver at the time of collisions. The two-way ANOVA technique was used to evaluate the interactions.	No safety effects reported. Not added to synthesis.
(Jones, T. L. and Tomcheck, P., "Pedestrian Accidents in Marked and Unmarked Crosswalks: A Quantitative Study." ITE Journal, Vol. 70, No. 9, Washington, D.C., Institute of Transportation Engineers, (2000) pp. 42-46.)	A research study including the review of current practice and before and after studies	Not relevant to this section. Not added to synthesis.
(*114*) (Preston, H. and Schoenecker, T., "Safety Impacts of Street Lighting at Rural Intersections." 1999, St. Paul, Minnesota Department of Transportation, (1999))	Conducted both a cross-sectional study (3,400 intersections) and a before-and-after analysis (12 intersections) of the effect of street lighting on rural intersection safety	Suggested by 17-18(4). Added to synthesis.
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))	A synthesis of a relationships between measures of raod performance and road asset features, primarily based on literature review and investigation	No AMFs. Not added to synthesis.
(*112*) (Elvik, R., "Meta-Analysis of Evaluations of Public Lighting as Accident Countermeasure." Transportation Research Record 1485, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 112-123.)	Meta-analysis of 37 studies on the safety effect of illumination; illumination of various types of roadway segments included	Suggested by 17-18(4). Added to synthesis.
(Compton, R. P. and Milton, E. V., "Safety Impact of Permitting Right-Turn-On-Red: A Report to Congress by the National Highway Traffic Safety Administration." DOT HS 808, Washington, D.C., National Highway Traffic Safety Administration, (1994))	A report based on data from current operations, a literature review of previous research, and results of analysis on current data	No relevant information. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Keck, M. E., "The Relationship of Fixed and Vehicular Lighting to Accidents." FHWA-SA-91-019, McLean, Va., Federal Highway Administration, (1991))	Synthesis of lighting research from 1979 to 1988	Suggested by 17-18(4). Refers to Richards (1981) included in Elvik (1995). Not added to synthesis.
(Anderson, K. A., Hoppe, W. J., McCoy, P. T., and Price, R. E., "Cost-Effectiveness Evaluation of Rural Intersections Levels of Illumination." Transportation Research Record 996, Washington, D.C., Transportation Research Board, National Research Council, (1984) pp. 44-47.)	Analyzed the effect on conflicts of various levels of illumination at one rural intersection	Suggested by 17-18(4). Did not employ accident data. Not added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	A synthesis of safety research categorized into 17 subjects and presented as individual chapters.	Included in Elvik (1995). Not added to synthesis.
(Lipinski, M. E. and Wortman, R. H., "Effect of Illumination on Rural At-Grade Intersection Accidents." Transportation Research Record 611, Washington, D.C., Transportation Research Board, National Research Council, (1978) pp. 25-27.)	Cross-sectional study, 445 rural intersections in IL	Suggested by 17-18(4). Included in Elvik (1995). Not added to synthesis.

A meta-analysis of 37 evaluation studies containing 142 estimates of effect has been reported by Elvik (1995) (*112*). This analysis serves as the main source of evidence used in this section. The analysis has been updated by adding the studies of Griffith (1994) (*113*), Preston (1999) (*114*) and Wanvik (2004), the latter subject to a re-analysis by Elvik (2004) (*5*). This brings the total number of studies to 40 and the total number of estimates of effect to 152. State-of-the-art techniques of meta-analysis have been applied to summarize evidence from these studies.

Results of studies that deal specifically with illumination in intersections have been selected. There are 32 estimates of effect that refer to intersections and 18 estimates of effect that refer to pedestrian accidents. Pedestrian accidents have been included because they often occur at, or close to, intersections.

Studies have been classified in three groups according to study quality. Studies rated as high quality include studies using both an internal and external comparison group (the distinction between external and internal comparison is explained below) and matched case-control studies. Studies rated as medium quality include studies that provide data on traffic volume in addition to accident data, and studies using an external comparison group only. Studies rated as low quality include studies that use only an internal comparison group and simple (as opposed to matched) case-control studies. Most studies, representing 74% of the estimates of effect, have been rated as low quality. Standards errors have been adjusted by a factor of 1.2 in high quality studies (all study designs), 2 in medium quality before-and-after studies, and 3 in low quality before-and-after studies. In case-control or cross-section studies, standard errors were adjusted by a factor of 3 medium quality studies and a factor of 5 in low quality studies.

An internal comparison group refers to the use of daytime accidents as comparison group when estimating the effect on lighting. As an example, suppose there were 80 accidents in daytime and 55 in darkness at an intersection before lighting was installed. Further, suppose the

number of accidents in daytime increased to 84 and the number of accidents in darkness declined to 39 after lighting was installed. The effect would then be estimated to: (39/55)/(84/80) = 0.675.

This study design does not control for two potential confounding factors: (1) Long-term trends in the proportion of accidents occurring in darkness, and (2) Regression-to-the-mean, in particular with respect to an abnormally high proportion of accidents in darkness. To some extent, both these confounding factors can be controlled for by using an external comparison group, i.e. intersections where lighting has not been installed. Suppose, for example, that for comparison intersections where lighting was not installed, the following numbers were observed during before and after periods matching the location above where lighting was installed: daytime before = 112; daytime after = 119; darkness before = 58; darkness after = 54. Then, in the comparison group, the odds ratio would be: (54/58)/(119/112) = 0.876. The adjusted estimate of effect (ratio of odds ratios) would be: 0.675/0.876 = 0.771.

Exhibit 4-100 shows summary estimates of the effects of lighting on accidents. Effects are stated as odds ratios. Uncertainty in summary estimates of effect is stated as adjusted standard error. All estimates of effect refer to accidents in darkness only.

Three sets of summary estimates of effect are presented in Exhibit 4-100. The first is based on conventional meta-analysis. The second set has been generated from coefficients estimated in meta-regression analysis. In theory, the meta-regression estimates are superior to the conventional summary estimates, since they control for more confounding factors or imbalance in the distribution of estimates across moderator variables (a moderator variable is any variable that influences the size of the effect of a measure on accidents) (*5*). The third set is based on an expert panel that was assembled as part of NCHRP Project 17-25 (*133*) that reviewed the work by Elvik and Vaa (*5*) and also used additional information on the distribution of crashes by injury severity and time of day from North Carolina and Minnesota.

Only estimates that specify accident severity have been used. Estimates referring to "all" accidents, which is usually a mixture of injury accidents and property-damage-only accidents have been discarded. The number of estimates underlying each summary estimate is stated in parentheses.

No study estimating the effect on intersection illumination on fatal accidents has been found. Both injury accidents and property-damage-only accidents appear to be reduced. The effect attributed to illumination is larger according to the meta-regression analysis than it is for the conventional meta-analysis.

Pedestrian accidents are strongly reduced when illumination is provided. Again, the meta-regression summary estimates of effect indicate somewhat larger effects than the conventional meta-analysis summary estimates do. The reasons for this are not clear. It is fairly common in road safety evaluation research to find that more well-controlled studies attribute a smaller effect to the measure evaluated than less well-controlled studies. In this case, the meta-regression approach must be considered as a more well-controlled approach than the conventional approach to meta-analysis. It is therefore a bit surprising that the effects attributed to road lighting are larger in the meta-regression approach than in the conventional approach.

Exhibit 4-100: Summary estimates of the effects on accidents of lighting in intersections (5)

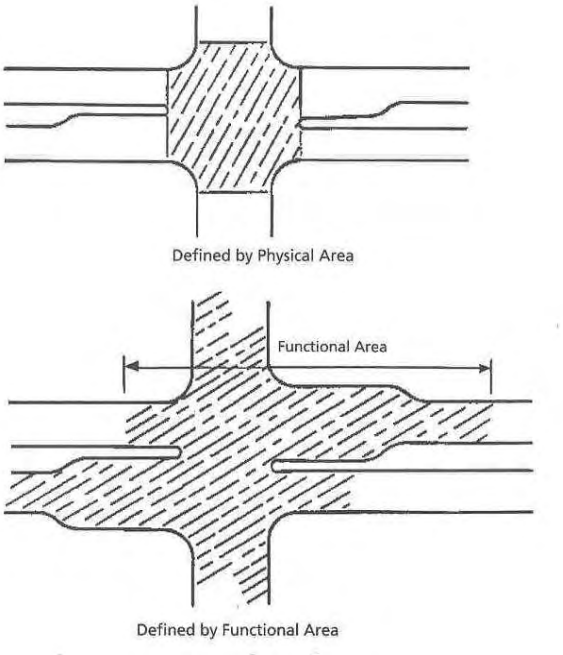
Author, date	Treatment/ Element	Setting	Intersection Type & Volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Summary estimates based on conventional meta-analysis						
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	All types Nighttime Fatal	No study	No study
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	All types Nighttime Injury (16)	0.624	0.126
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	All types Nighttime PDO (16)	0.688	0.361
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	Pedestrian Nighttime Fatal	0.216	0.865
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	Pedestrian Nighttime Injury	0.576	0.176
Summary estimates based on meta-regression analysis						
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	All types Nighttime Fatal	0.228	0.282
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	All types Nighttime Injury (16)	0.504	0.205
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	All types Nighttime PDO (16)	0.515	0.214
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	Pedestrian Nighttime Fatal	0.185	0.281
Elvik and Vaa, 2004	Lighting in intersections	Unspecified	All settings All types	Pedestrian Nighttime Injury	0.409	0.203
Estimates based on expert panel review of Elvik and Vaa, 2004, and crash statistics						
Harkey et al. (2008)	Lighting in intersections	Unspecificed	All settings All types	Nighttime crashes; all types; all severities	0.790	n/a
Harkey et al. (2008)	Lighting in intersections	Unspecificed	All settings All types	Nighttime crashes; all types; injury and fatal	0.710	n/a

4.4.2. Other Access Points within the Functional Area

The management of access, namely the location, spacing, and design of private and public intersections, has been identified as one of the most critical elements in roadway planning and design. Access management provides or manages access to land development while simultaneously preserving traffic safety, capacity, and speed on the surrounding road system, thus addressing congestion, capacity loss, and accidents on the nation's roadways (*115*). In particular, the number of access points, coupled with the speed differential between vehicles traveling along the roadway, contributes to rear-end crashes (*4*).

Driveways are, in effect, at-grade intersections and should be designed consistent with the intended use. It has been noted that the number of accidents is disproportionately higher at driveways than at other intersections; thus their design and location warrant special consideration (*115*). With regards to the proximity of driveways to intersections, the AASHTO Green Book specifically states that "driveways should not be situated within the functional boundary of at-grade intersections" (*116*). The concept of the functional area for an intersection is illustrated in Exhibit 4-101. While AASHTO does not present guidelines as to the size of the functional area of an intersection, it has been suggested that the functional boundary include all required storage lengths for exclusive turn lanes and for through traffic, plus any maneuvering distance for the exclusive turn lanes.

Exhibit 4-101: Function and physical area of an intersection (115)



ITE identified a number of factors for consideration when designing access to developments (*115*). These include (1) limiting the number of access points, (2) separating conflict areas, (3) reducing acceleration and deceleration requirements at access points, (4) removing turning vehicles from through-travel lanes, (5) spacing major intersections to facilitate progressive travel speeds along arteries, and (6) providing adequate on-site storage at major development access locations. The main focus of this subsection is on the control of access points

within the functional area of intersections. The other access design factors are addressed in the other sections of the HSM, as identified below.

Additional information is available in the Access Management Manual produced by the Transportation Research Board Committee on Access Management (ADA70) (http://www.accessmanagement.gov/manual.htm), as well as the Access Management CD Library developed by the Florida DOT (http://www.dot.state.fl.us/planning/systems/sm/accman).

This section discusses the safety effects of access points within the functional areas of at-grade intersections for all road classes.

Given that safety impacts of access management at intersections is closely related to the separate design and traffic control components that constitute those intersections, the reader may wish to review Sections 4.1 and 4.2 for additional information on approach roadway elements and intersection traffic control, respectively. Chapter 7 contains further discussion on the safety effect of access management principles.

Exhibit 4-102: Resources examined to investigate the safety effect of Access Points at Intersections

DOCUMENT	DESCRIPTION	COMMENT
(*18*) NCHRP Project 17-26 "Methodology to Predict the Safety Performance of Urban and Suburban Arterials" http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-26	Interim report for study designed to develop a methodology to predict the safety performance of various elements such as Lane width, Shoulder width and curbs, etc. on urban and suburban arterials.	Added to synthesis. Only discussion on safety impact of driveways located close to intersections have been added to synthesis. No quantitative evidence of safety impacts found because reference is only a draft interim report—the research is still ongoing.
(*4*) (Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Report provides guidance on strategies designed to improve safety at signalized intersections and especially to reduce fatalities. Only presents results from select previous research studies.	Added to synthesis. Only anecdotal evidence and discussion on potential safety effect of restricting access close to intersections provided and added to synthesis.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Not added to synthesis. Information found in Chapter 3.5 of reference is related to access on roadway segments, not intersections.
(*10*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Harwood, D. W., Potts, I. B., Torbic, D. J., and Rabbani, E. R., "NCHRP Report 500 Volume 5: A Guide for Addressing Unsignalized Intersection Accidents." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Report is a detailed implementation guide that provides guidance and strategies to improve safety at unsignalized intersections.	Added to synthesis. Only anecdotal evidence and discussion on potential safety effect of restricting access close to intersections provided and added to synthesis.
(*118*) (Hauer, E., "Access and Safety." (2001))	Reference is a critical review of studies that investigated the safety effects of intersection spacing and driveway density.	Not added to synthesis. Focus of study is the safety effect of access management elements on roadway segments, not intersections.

DOCUMENT	DESCRIPTION	COMMENT
(Xu, L., "Right Turns Followed by U-Turns Versus Direct Left Turns: A Comparison of Safety Issues." ITE Journal, Vol. 71, No. 11, Washington, D.C., Institute of Transportation Engineers, (2001) pp. 36-43.)	Cross-sectional study comparing accident rates and accident frequencies between direct left turns and an alternative left-turn design (i.e. right-turn, followed by U-turn)	Not added to synthesis. Treatment being examined is the type of left-turn configuration and not directly related to the number of access points in close proximity to the intersection. Reference is more relevant intersection types and alternative left-turn treatments.
(Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	Study presents an algorithm for predicting the safety performance of various factors for roadway segments and for at-grade intersections on rural two-lane highways	Not added to synthesis. Although base models developed by researchers for four-leg stop and signal controlled intersections take into consideration the number of driveways in the vicinity of intersections, it is based on a small data set and cannot be used to derive AMFs.
(*39*) Gluck, J., Levinson, H. S., and Stover, V., "NCHRP Report 420: Impact of Access Management Techniques." Washington, D.C., Transportation Research Board, National Research Council, (1999)	Discusses methods for predicting and analyzing safety and traffic operational effects of selected access management techniques.	Added to synthesis.
(Vogt, A., "Crash Models for Rural Intersections: Four-Lane by Two-Lane Stop-Controlled and Two-Lane by Two-Lane Signalized." FHWA-RD-99-128, McLean, Va., Federal Highway Administration, (1999))	Analyzed the relationship between crashes and intersection elements at 3 types of rural intersections in CA and MI	Not added to synthesis. Base models developed by researchers for four-leg stop and signal controlled intersections were already incorporated into a more recent study by Harwood et al. (2000) and reviewed previously.
(*117*) (Lall, B. K., Eghtedari, A., Simons, T., Taylor, P., and Reynolds, T., "Analysis of Traffic Accidents within the Functional Area of Intersections and Driveways." TRANS-1-95, Portland, Ore., Portland State University, Department of Civil Engineering, (1995))	Cross-section study comparing accident frequencies at urban and rural isolated intersections and influenced intersections.	Added to synthesis. t and s values calculated using reported crash data.
(McGuirk, W. W. and Satterly, G. T., "Evaluation of Factors Influencing Driveway Accidents." Transportation Research Record 601, Washington, D.C., Transportation Research Board, National Research Council, (1976) pp. 66-72.)	Study investigated the factors that influence driveway accidents through the development of various regression equations.	Suggested by 17-18(4). Not added to synthesis. Insufficient data to determine t and s values. Regression equations relating accidents to the spacing between driveways and adjacent intersections were deemed to be invalid by the authors themselves following results from statistical analysis.
(Box, P. C., "Driveways." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 5, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Chapter discusses the relationship between accidents and driveways / access management	Not added to synthesis. Insufficient data to determine t and s values. Material not relevant to HSM.

The effectiveness of closing or relocating driveways outside of the functional areas of intersections has been quantified for two-lane and multi-lane rural highways, and urban and suburban arterials. Traffic volume ranges and other pertinent information are provided when available. Although the safety impact of restricting turn movements at driveways located in close proximity to intersections has not been quantified, a brief discussion on this particular treatment is also included here.

Treatment: Closure or Complete Relocation of Driveways near Intersections

Lall et al. conducted a cross-section study that compared the accident frequencies at isolated intersections against those at influenced intersections, in both urban and rural areas (*117*). The intersections examined were classified as either isolated or influenced depending on the presence of driveways within the functional area of the intersection being studied. Intersections investigated in the study were unsignalized and matched in terms of the traffic volumes, type of traffic control, and posted speed limits. The authors mentioned that for the urban intersections, the traffic volume was 24,000 veh/day for the isolated intersection, and 15,000 veh/day for the influenced intersections; for the rural intersections, the traffic volume was 11,000 veh/day for both influenced and isolated sites (*117*).

Although traffic volume information for intersections is typically expressed in terms of total entering vehicles, for reasons unknown, the traffic volume measure of choice in this study was average daily traffic (ADT); it is unclear from the report if the ADT values were averaged for all approaches to the respective intersections.

Posted speed limits for the urban intersections were 35 and 30 mph for isolated and influenced intersections respectively, while the posted speed limits were 50 mph for all rural sites (*117*). The results from the study are summarized in Exhibit 4-103. A method correction factor of 5 was applied to the s ideal which was calculated based on the number of crashes for influenced intersections and the ratio of exposures (in this case, traffic volume). Note that the AMF values and the corresponding standard errors are large due to the small sample size for crash data used in the study. In addition, it is unclear from the study if the isolated and influenced sites were matched to adequately account for other potential confounding factors such as the type of land use, whether highways were divided or not, etc. There is also the potential for accident migration or spillover, especially since for isolated intersections traffic will have to access abutting land developments via alternative driveways or intersections.

Exhibit 4-103: Safety Effectiveness of Driveway Closure at Intersections (117)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lall et al., 1995	Closure or complete relocation of all driveways from functional area of intersection	Urban	Mix of two- and four-lane divided or undivided highways, ADT = 15,000 to 24,000 veh/day	Total Intersection -Accidents, all severities	0.93	2.31
Lall et al., 1995	Closure or complete relocation of all driveways from functional area of intersection	Urban	Mix of two- and four-lane divided or undivided highways, ADT = 15,000 to 24,000 veh/day	Intersection accidents, Injury	1.67	5.05

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Lall et al., 1995	Closure or complete relocation of all driveways from functional area of intersection	Rural	Mix of two- and four-lane divided or undivided highways, ADT = 11,000 veh/day	Total Intersection -Accidents, all severities	1.17	3.25
Lall et al., 1995	Closure or complete relocation of all driveways from functional area of intersection	Rural	Mix of two- and four-lane divided or undivided highways, ADT = 11,000 veh/day	Intersection accidents, Injury	1.41	4.48

Lall et al. suggested that the greater frequency of accidents at isolated intersections can be attributed to driver expectation. The authors added that for both urban and rural isolated intersections, drivers' lack of expectancy of a conflicting vehicle movement when they are driving on an open corridor can result in accidents when they suddenly encounter a vehicle maneuvering a conflicting path against their own vehicle trajectory. On the other hand, when driving in an area with more intersections and driveways, drivers expect such maneuvers and hence, are more cautious about potential accidents.

It is intuitive and generally accepted that reducing the number of access points within the functional areas of intersections is expected to improve safety (as expressed by Antonucci et al. (*4*) and Neuman et al. (*10*)). It appears that the findings of Lall et al. are counterintuitive and contrary to the conventional belief; each scenario in Exhibit 4-103 is associated with an increase in accidents (AMF>1.0). Further, Antonucci et al. indicate that restricting access to commercial properties near intersections by closing driveways on major roads or moving them to a minor road approach will help reduce conflicts between through and turning traffic, and this, in turn, may lead reductions in rear-end and angle crashes related to vehicles turning into and out of driveways and speed changes near the intersection and the driveway (*4*). In addition to the potential reduction in conflicts, it has been suggested that locating driveways away from intersections also provides more time and space for vehicles to turn or merge safely across lanes (*18*). Neuman et al., add that access points within 250 feet upstream and downstream of an intersection are generally undesirable (*10*).

Discussion: Imposing Turn Restrictions

When a driveway on a high-volume street adjacent to an unsignalized intersection cannot be closed or relocated, it may be appropriate to restrict turning maneuvers at the driveway. For example, left turns at the driveway can be restricted and driveway movements limited to right turns in and right turns out (*10*). By doing so, the number of potential conflict points is reduced, hence reducing the potential for accidents related to vehicles exiting or entering via that driveway. However, the potential for accident migration or spillover to adjacent driveways or intersections must be taken into account. No quantitative estimates of the safety effectiveness of this treatment are currently available.

Discussion: Control of signalized intersection spacing

According to Gluck et al., the spacing of traffic signals, in terms of their frequency and uniformity, governs the performance of urban and suburban highways (*39*). Gluck et al. added that spacing of traffic signals is one of the most important access management techniques and one that is commonly used in States such as Colorado, Florida and New Jersey. For instance, highway agencies in all three states require long signal spacing (e.g., ½ mi) or minimum through band widths (e.g., 50%) along principal arterial roads. Gluck et al. pointed out that several studies conducted in those States have reported that accident rates (per million vehicle miles of travel [MVMT]) generally rise as traffic signal density increases (*39*).

As an example, an increase from two to four traffic signals per mile resulted in roughly a 40% increase in accidents along highways in Georgia and roughly a 150% increase along US 41 in Lee County, Florida. However, the safety effects may be obscured in part by differing traffic volumes on intersecting roadways and by the use of MVMT for computing rates, rather than computing accidents per million entering vehicles. The difficulties that arise from comparisons using MVMT are intrinsic to the way MVMT estimates are calculated. As Hauer pointed out, by adding an intersection one adds accidents but since intersections do not add MVMT, dividing more accidents by the same MVMT is bound to increase the ratio of accidents per MVMT (*118*).

4.4.3. Signal Heads and Hardware [Future Edition]

In future editions of the HSM, this section may include discussion of signal visibility and/or conspicuity, increasing signal head size, providing additional signal heads, installing backplates, lens size, and replacing pedestal mounted signals with mast arm mounted signals. Potential resources are listed in Exhibit 4-104.

Exhibit 4-104: Potential resources on the relationship between signal heads and hardware at intersections and safety

DOCUMENT
(*133*) Harkey et al., "Accident Modification Factors for Traffic Engineering and ITS Improvements", *NCHRP Report* 617 (2008), TRB.
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Accidents at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))
(Bonneson, J.A. and Son, H.J., "Prediction of expected red-light-running frequency at urban intersections", *Transportation Research Record* 1830, pp. 30-47 (2003))
(Thomas, G. B. and Smith, D. J., "Effectiveness of Roadway Safety Improvements." Ames, Iowa Department of Transportation, (2001))
(Sayed, T., Abdelwahab, W., and Nepomuceno, J., "Safety evaluation of alternative signal head design", *Transportation Research Record* 1635, pp. 140-146 (1998))
(Hamilton Associates, "The safety benefits of additional primary signal heads", Insurance Corporation of British Columbia, (1998))
(Gibby, A. R., Washington, S. P., and Ferrara, T. C., "Evaluation of High-Speed Isolated Signalized Intersections in California." Transportation Research Record 1376, Washington, D.C., Transportation Research Board, National Research Council, (1992) pp. 45-56.)
(Bhesania, R. R., "Impact of Mast-Mounted Signal Heads on Accident Reduction." ITE Journal, Vol. 61, No. 10, Washington, D.C., Institute of Transportation Engineers, (1991) pp. 25-29.)

DOCUMENT
(Short, M. S., Woelfl, G. A., and Chang, C. J., "Effects of Traffic Signal Installation On Accidents." Accident Analysis and Prevention, Vol. 14, No. 2, Oxford, N.Y., Pergamon Press, (1982) pp. 135-145.)

In future editions of the HSM, this section may also discuss the safety impact of using a strobe light in the red signal at an intersection. Strobe lights are used as a supplement to the red lens to draw the attention of drivers to a traffic signal. Potential resources are listed in Exhibit 4-105.

Exhibit 4-105: Potential resources on the relationship between strobe light in the red signal at intersections and safety

DOCUMENT
(Cottrel, B.H. Jr., "Evaluation of the use of strobe lights in the red lens of traffic signals" VTRC 95-TAR-5, Charlottesville, Virginia, Virginia Transportation Research Council, (1994))

4.4.4. Transit Stop Placement [Future Edition]

As defined in the Highway Capacity Manual (*11*), a far-side stop is a transit stop that requires transit units to cross an intersection prior to stopping to serve passengers. The opposite, a near-side stop, is a transit stop prior to the intersection.

In future editions of the HSM, this section may address the safety impact of the positioning and location of intersection transit stops, the impact on pedestrian desire lines, as well as bicycle considerations, mode/transit transfer needs. Potential resources are listed in Exhibit 4-106.

Exhibit 4-106: Potential resources on the relationship between transit stops at intersections and safety

DOCUMENT
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))

4.4.5. Flashing Beacons at Unsignalized Intersections

Installing flashing beacons over the intersection or along the roadside can help alert drivers to the presence of unsignalized intersections that may be unexpected or may not be visible. Flashing beacons may be particularly appropriate for intersections with patterns of angel collisions related to lack of driver awareness of the intersection (*10*). Resources reviewed for this treatment are listed in Exhibit 4-107.

Exhibit 4-107: Potential resources on the relationship between flashing beacons at unsignalized intersections and safety

DOCUMENT	DESCRIPTION	COMMENT
(*141*) (Srinivasan, R., Carter, D., Persaud, B., Eccles, K., and Lyon, C., "Safety Evaluation of Flashing Beacons at Stop Controlled Intersections", Presented at the 87th Annual Meeting of the Transportation Research Board, Washington, D.C., 2008.)	An emprirical Bayes method was used to examine the safety impacts of installing flashing beacons at approaches to stop controlled intersections based on data from North and South Carolina.	Added to synthesis.
(*142*) (Murphy, B.G., and Hummer, J.E., "Development of crash reduction factors for overhead flashing beacons at rural intersections in North Carolina", Presented at the 2007 Annual Meeting of the Transportation Research Board, Washington, D.C., 2007)	Used three different methods including the empirical Bayes method to evaluate the safety impacts of overhead flashing beacons in North Carolina.	Added to synthesis.
(*143*) (Pant, P.D., Park, Y., Neti, S.V., and Hossain, A.B., "Comparative study of rural stop controlled and beacon-controlled intersections", Transportation Research Record 1692, pp. 164-172, 1999.)	Compared the crash rates at six stop controlled intersections without a beacon compared to seven stop-controlled intersections with a beacon.	Added to synthesis.
(*144*) (Cribbins, P.D. and Walton, C.M., "Traffic signals and overhead flashers at rural intersections: their effectiveness in reducing accidents", Highway Research Record 325, pp. 1-4, 1970.)	Evaluated the safety impacts of flashing beacons at rural intersections in North Carolina that were installed after 1965. This study compared the equivalent property damage only (EPDO) rate before the installation of beacons with the EPDO rate after installation.	Added to synthesis.

Cribbins and Walton (*144*) evaluated the safety impacts of flashing beacons at 14 rural intersections in North Carolina that were installed after 1965. Based on the severity level of each accident and the total entering vehicles at the intersections, an equivalent property damage only (EPDO) rate was computed before and after the installation of beacons. Following the installation of the beacons, the EPDO rate decreased by 48 percent. Based on a paired t-test, the authors concluded that the reduction was statistically significant at the 0.01 level.

Pant et al. (*143*) compared the crash rates at six stop-controlled intersections without a beacon compared to seven stop-controlled intersections with a beacon. Fatal, injury, property damage only (PDO), and right-angle crashes were included in the analysis. The mean rates for most accident types were higher at beacon-controlled intersections. A before-after analysis found statistically insignificant reductions in fatal, serious visible injury, and angle accidents following the installation of beacons at 7 sites.

More recently, Murphy and Hummer evaluated the safety impacts of flashing beacons at 34 four-leg two-way stop-controlled locations in North Carolina *(142)*. Three different methods were used to conduct the analysis: naïve before and after analysis, before and after analysis using a safety performance function, and the empirical Bayes (EB) method. The naïve before and after analysis revealed a 10 percent reduction in total crashes, 15 percent reduction in injury crashes,

66 percent reduction in severe injury crashes, 11 percent reduction in frontal impact crashes, and a 50 percent reduction in failure-to-stop crashes. A safety performance function developed by Vogt and Bared *(?)* for intersections in Minnesota was recalibrated using data from 170 reference intersections in North Carolina. This method showed a 13 percent increase in total crashes following the introduction of flashing beacons. The EB approach was applied to account for potential effects of regression-to-the-mean. The EB approach also made use of data from the reference population, but accounted for the increase in traffic volume using a linear assumption. However, considering that the safety performance function used by the authors showed that the relationship between crash frequency and major and minor average annual daily traffic (AADT) is not linear, assuming a linear change will give an incorrect result. Their EB approach revealed a 12 percent decrease in total crashes, 9 percent decrease in injury crashes, 40 percent decrease in severe injury crashes, 9 percent decrease in frontal impact crashes, and 26 percent reduction in failure-to-stop crashes.

Srinivasan et al. (*141*) supplemented the database used by Murphy and Hummer (?) with more sites from North Carolina and also included data from sites in South Carolina. An empirical Bayes analysis was conducted by developing safety performance functions using data on reference groups from North and South Carolina. The results from this study are shown in Exhibit 4-111. This study was rated High and an MCF of 1.2 was applied to the standard errors. Overall, the flashing beacons seem to be effective in reducing crashes, especially right angle crashes. The beacons were more effective in rural and suburban areas compared to urban areas. Results from this study are recommended for the HSM.

Exhibit 4-108: Safety Effectiveness of Flashing Beacons at Four-Leg Stop Controlled Intersections (141)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Srinivasan et al., 2008	Flashing beacons at four leg stop controlled intersections on two lane roads Standard and actuated beacons	Rural, Urban, and Suburban; Two way and four way stop controlled	Major road volume: 250 to 42,520 vpd Minor road volume: 90 to 13,270 vpd	All types All severities	0.949	0.043
				All types Injury	0.898	0.0576
				Rear end All severities	0.921	0.107
				Angle	0.867	0.055
		Rural		Angle	0.843	0.064
		Suburban		Angle	0.882	0.122
		Urban		Angle	1.123	0.281
		Two-way stop controlled		Angle	0.873	0.056
		Four-way stop controlled		Angle	0.722	0.246

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
	Standard overhead beacons	Rural, Urban, and Suburban; Two way and four way stop controlled		Angle	0.881	0.065
	Standard stop mounted			Angle	0.418	0.196
	Standard overhead and stop mounted			Angle	0.867	0.062
	Actuated beacons			Angle	0.860	0.118

4.4.6. Weather [Future Edition]

In future editions of the HSM, this section may discuss elements of weather similar to the information presented in Section 3.4.4. This section would contain information specific to intersections. The outline of this section is similar to Section 3.4.4: adverse weather and low visibility warning systems; snow, slush and ice control, and wet pavement. No potential resources have been identified for this section.

4.4.6.1. Adverse Weather and Low Visibility Warning Systems [Future Edition]

Some transportation agencies employ advanced highway weather information systems that warn drivers of the occurrence of adverse weather, including icy conditions, or low visibility. These systems may include on-road systems such as flashing lights, changeable message signs, static signs (e.g., “snow belt area”, “heavy fog area”), or in vehicle information systems.

In future editions of the HSM, this section may discuss the safety effect of these weather information systems at intersections. No potential resources have been identified for this section.

4.4.6.2. Snow, Slush, and Ice Control [Future Edition]

It is generally accepted that the presence of snow, slush or ice on the road surface increases the accident rate. A number of measures are used to control snow, slush and ice. In future editions of the HSM, this section may review the effects of these measures on road safety at intersections. No potential resources have been identified for this section.

4.4.6.3. Wet Pavement [Future Edition]

In future editions of the HSM, this section may discuss the safety effect of drainage characteristics, hydroplaning remediation, high-friction pavements (e.g., at specific curve location), and other elements related to wet pavement at intersections. A potential resource is listed in Exhibit 4-107.

Exhibit 4-109: Potential resource on the relationship between increased pavement friction on intersection approaches and safety

DOCUMENT
Harkey et al., "Accident Modification Factors for Traffic Engineering and ITS Improvements", *NCHRP Report* 617 (2008-in press), TRB.

4.4.6.4. Pavement Materials [Future Edition]

In future editions of the HSM, this section may include discussion of the safety impact of pavement surface deterioration, changes to the coefficient of surface friction, and surface rehabilitation, for different surface materials (e.g., asphalt concrete, Portland cement concrete, gravel, tar & gravel, dirt, interlock bricks, grooved pavement, textured roads, etc.) at intersections. No potential resources have been identified for this section.

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Chapter 5: Interchanges

Chapter 5. Interchanges

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5.1. Safety Effects of Interchange Design Elements

Interchange types range from cloverleaf to single point designs. Interchanges are comprised of a number of different elements such as: deceleration and acceleration lanes, on-off ramps, ramp terminals, freeway sections between ramps, freeway segments leading to the deceleration lane/off-ramp combination, and the freeway segments adjacent and beyond the on-ramp/acceleration lane combination.

The following sections explore the safety effects of various interchange design elements including interchange type, merge/diverge areas, ramp roadways, and ramp terminals.

This edition of the HSM does not include interchanges along urban expressways, which would benefit from separate consideration due to the distinct land use, urban traffic distribution and characteristics, and travel speeds (as part of urban and suburban arterials).

5.1.1. Interchange Type/Configuration

There are several types of interchanges, including diamond, cloverleaf, single point, partial cloverleaf, directional, and trumpet interchanges. AASHTO's Policy on Geometric Design contains details on interchange types and their characteristics (*1*).

Some interchange types are more appropriate to different applications (e.g., rural versus urban); therefore, the safety effect of various interchange types in various applications will be included in this section where possible.

There may be safety implications on the crossing road for an overpass versus an underpass design condition. The configuration of ramps and the consistency of design along a corridor (e.g., all exit ramps are found in the right side) may have key safety implications when considering driver expectation, as noted in AASHTO's Policy on Geometric Design (*1*). Information on these topics may be included here when available.

This section covers current knowledge related to interchange type and ramp type. A review of the literature reveals that it is convenient to treat these two separate topics collectively. Current studies are cross-sectional since instances of replacing a ramp or interchange type with another are too rare to facilitate the desired before-after study type for deriving AMF knowledge.

Exhibit 5-1: Resources examined to investigate the safety effect of interchange type

DOCUMENT	DESCRIPTION	COMMENT
(*16*) (Parajuli, B., Persaud, B., Lyon, C., and Munro, J., "Safety Performance Assessment of Freeway Interchanges, Ramps, and Ramp Terminals", Presented at the Road Safety Engineering Management Section of the 2006 Annual Conference of the Transportation Association of Canada, Charlottetown, Prince Edward Island, (2006))	Developed negative binomial regression models for different interchange categories	Added to synthesis
(*17*) (Bared, J., Powell, A., Kaisar, E., and Jagannathan, R., "Crash Comparison of Single Point and Tight Diamond Interchanges", Journal of Transportation Engineering, Vol. 131(5), pp. 379-381, May 2005)	Compared the safety of 27 diamond interchanges with 13 single point interchanges	Added to synthesis
(*2*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*3*) (Garber, N. J. and Fontaine, M. D., "Guidelines for Preliminary Selection of the Optimum Interchange Type for a Specific Location." VTRC 99-R15, Charlottesville, Virginia Transportation Research Council, (1999))	Studied operational and safety characteristics of various interchange types, 3 years of accident data for 10 interchanges in Virginia.	Suggested by NCHRP 17-18(4). No AMFs; rates and qualitative information added to synthesis.
(*4*) (Khorashadi, A., "Effect of Ramp Type and Geometry on Accidents." FHWA/CA/TE-98/13, Sacramento, California Department of Transportation, (1998))	Analyzed accident rates between ramps of different designs, by urban/rural, and on-ramp vs. off-ramp.	No AMFs; summary information added to synthesis.
(*5*) (Bauer, K. M. and Harwood, D. W., "Statistical Models of Accidents on Interchange Ramps and Speed-Change Lanes." FHWA-RD-97-106, McLean, Va., Federal Highway Administration, (1997))	Negative binomial regression models developed for interchange ramps and speed change lanes based on data from Washington State.	Added to synthesis.
(*6*) (Garber, N. J. and Smith, M. J., "Comparison of the Operational and Safety Characteristics of the Single Point Urban and Diamond Interchanges." FHWA-VA-97-R6, Richmond, Virginia Department of Transportation, (1996))	Compared accident rate, accident type and accident location using 3 years of accident data at 5 diamond interchanges and 8 SPUIs.	Suggested by NCHRP 17-18(4). No AMFs; qualitative information added to synthesis.
(*7*) (Twomey, J. M., Heckman, M. L., Hayward, J. C., and Zuk, R. J., "Accidents and Safety Associated with Interchanges." Transportation Research Record 1383, Washington, D.C., Transportation Research Board, National Research Council, (1993) pp. 100-105.)	Reviewed literature dealing with the safety of interchange features.	Suggested by NCHRP 17-18(4). No AMFs; accident rates by ramp type added to synthesis.
(Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume IV - Interchanges." FHWA-RD-91-047, Washington, D.C., Federal Highway Administration, (1992))	Same material as Twomey et al. (1993).	Suggested by NCHRP 17-18(4). Not added to synthesis.
(*8*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Some material from Chapter 6 provides insight into interchange treatments.	Cirillo's regression models added to synthesis.
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Summarized in Various 1982	Not added to synthesis.
(Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Same information is covered in Twomey et al. (1993).	Not added to synthesis.
(Cirillo, J. A., Beatty, R. L., Dietz, S. K., Kaufman, S. F., and Yates, J. G., "Interstate System Accident Research Study-I: Three Volumes." Washington, D.C., U.S. Department of Transportation, Federal Highway Administration, (1970))	Provides comparison of pre-interstate to post-interstate safety.	Not added to synthesis.

Treatment: Convert intersection to grade-separated interchange

Elvik and Erke reviewed additional international literature to update the "Handbook ofRoad Safety Measures". The findings of their update meta-analysis were considered medium high, and a MCF of 1.8 was assigned to the standard errors reported.

For converting a four-leg at-grade intersection to a grade-separated interchange, these updated findings show a decrease in accidents in the area of the intersection, as shown in Exhibit 5-2.(*9*) The safety effect of converting a three-leg intersection is also shown in Exhibit 5-2.(*9*)

Converting a three-leg or four-leg signalized at-grade intersection to a grade-separated interchange decreases accidents in the area of the intersection, as shown in Exhibit 5-2.(*9*)

Exhibit 5-2: Safety effects of converting at-grade intersection to grade-separated interchange(9)

Author, date	Treatment	Setting Interchange type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Erke, 2007	Convert at-grade intersection to grade-separated interchange	Four-leg intersection Traffic control unspecified	Unspecified	All accidents in the area of the intersection, All severities	0.58	0.10
Elvik and Erke, 2007				All accidents in the area of the intersection, Injury	0.43	0.05
Elvik and Erke, 2007				All accidents in the area of the intersection, Non-injury	0.64	0.14
Elvik and Erke, 2007		Three-leg intersection Traffic control unspecified		All accidents in the area of the intersection, All severities	0.84	0.17
Elvik and Erke, 2007		Three-leg or Four-leg Signalized intersection		All accidents in the area of the intersection, All severities	0.73	0.08
Elvik and Erke, 2007				All accidents in the area of the intersection, Injury	0.72	0.11

NOTE: Based on International studies: Hvoslef 1974; Statens vägverk 1983B; Tie ja vesirakennushallitus 1983; Johansen 1985; Tielaitos 2000; Pajunen 1999; Meewes 2002

Treatment: Safety effect of interchange and ramp type

Elvik and Erke reviewed additional international literature to update the "Handbook of Road Safety Measures". The findings of their update meta-analysis were considered medium high, and a MCF of 1.8 was assigned to the standard errors reported, as shown in Exhibit 5-3.

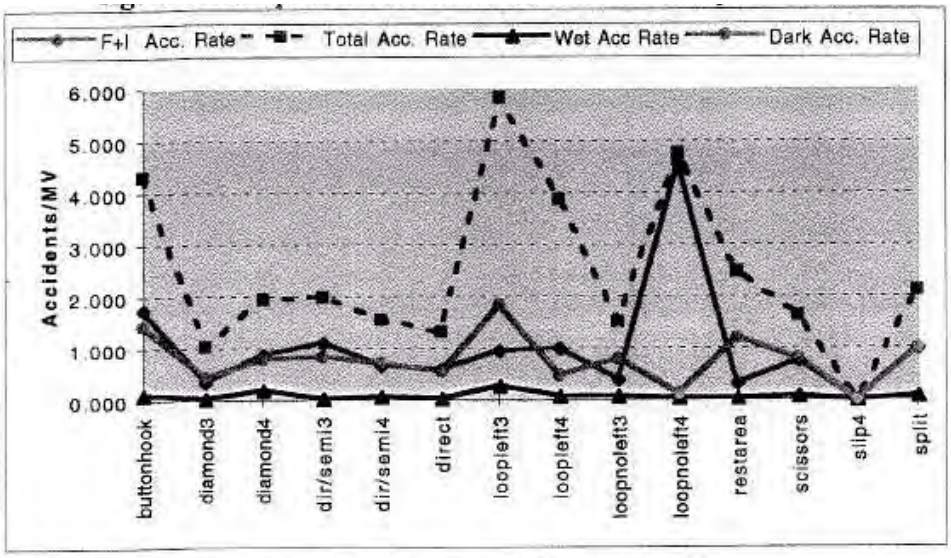
Exhibit 5-3: Safety effects of providing a different interchange type(9)

Author, date	Treatment	Setting Interchange type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Erke, 2007	Provide diamond interchange	Trumpet, direct access, cloverleaf, or directional loop	Unspecified	Truck accidents on ramps, All severities	0.89	0.1
Elvik and Erke, 2007				All accidents in the area of the interchange, All severities	0.93	0.09
Elvik and Erke, 2007		Trumpet, direct access, or cloverleaf		Truck accidents on ramps, All severities	1.43	0.09
Elvik and Erke, 2007		Trumpet interchange		All accidents in the area of the interchange, All severities	0.62	0.2
Elvik and Erke, 2007		Cloverleaf interchange			0.98	0.2
Elvik and Erke, 2007		Directional loop interchange			0.91	0.2
Elvik and Erke, 2007				Truck accidents on ramps, All severities	0.90	0.1
Elvik and Erke, 2007	Provide tight-urban-diamond interchange (TUDI)	Single-point-urban interchange (SPUI)		All accidents in the area of the interchange, All severities	1.02	0.1

NOTE: Based on U.S. studies: Lundy 1967; Cirillo 1968, 1970; Yates 1970; Bauer, Harwood 1998; Janson et al. 1998; Bared, Giering & Warren 1999; Khorashadi 1998; Golob, Recker & Alvarez 2004; McCartt et al. 2004; Lee et al. 2002 and International studies: Wold 1995; Pajunen 1999; Tielaito 2000

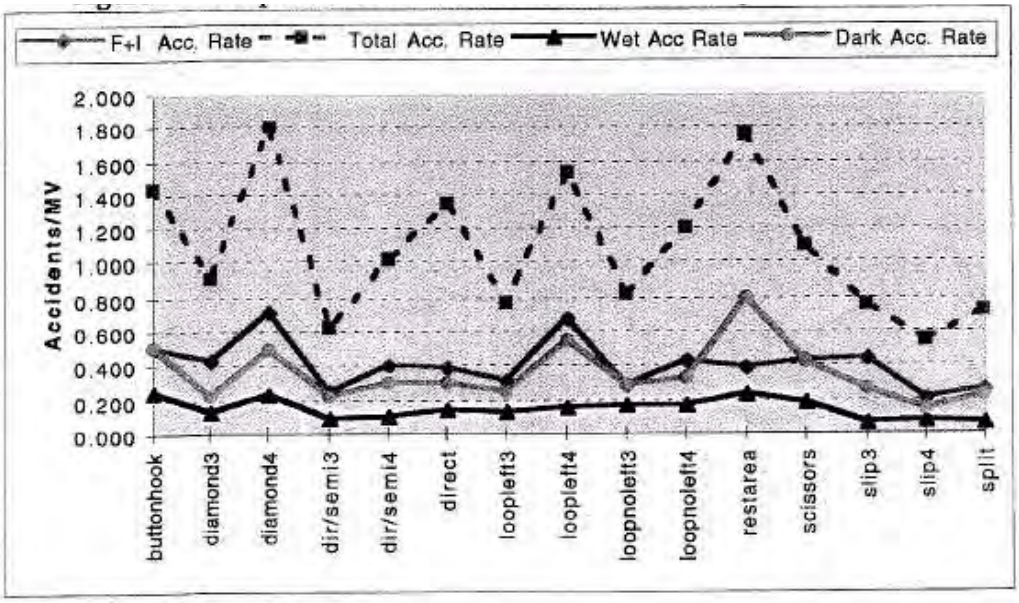
Khorashadi (1998) analyzed accident rates (accidents per million vehicles entering or exiting a ramp) between ramps of different designs and disaggregated by urban/rural area and on-ramp vs. off-ramp (*4*). Accident types studied included fatal, fatal+injury, total, wet, and dark accidents. A total of 13,325 ramps were used with 3 years of data. Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA) methods were used and the effects of traffic volumes and district location were taken into account. Exhibit 5-4 to Exhibit 5-7 show accident rates by area type and on-ramp vs. off-ramp.

Exhibit 5-4: Comparison of Accident Rates for Off-Ramps in Rural Areas (Figure 16 of (4))



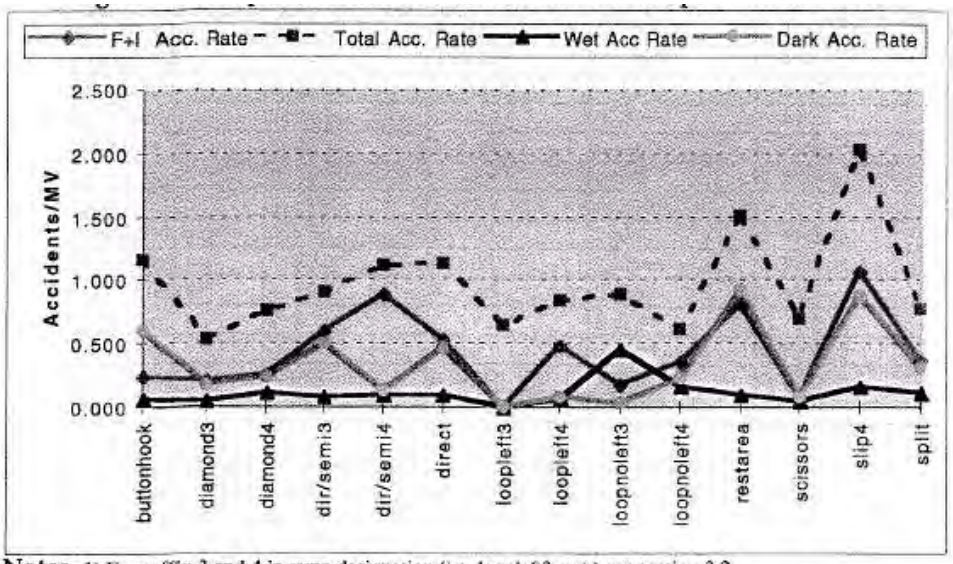
Notes: 1) For suffix 3 and 4 in ramp designation (i.e. loopleft3, ect.) see section 3.2.
2) dir/semi = Direct or Semi-direct Connector; loopnoleft = Loop with no Left Turn; loopleft = Loop with Left Turn; buttonhook= Button Hook; twoway = Two-Way Ramp; restarea= Rest Areas, Vista Points and Truck Scales

Exhibit 5-5: Comparison of Accident Rates for Off-Ramps in Urban Areas (Figure 17 of (4)



* (With Ramp Volume Adjusted)

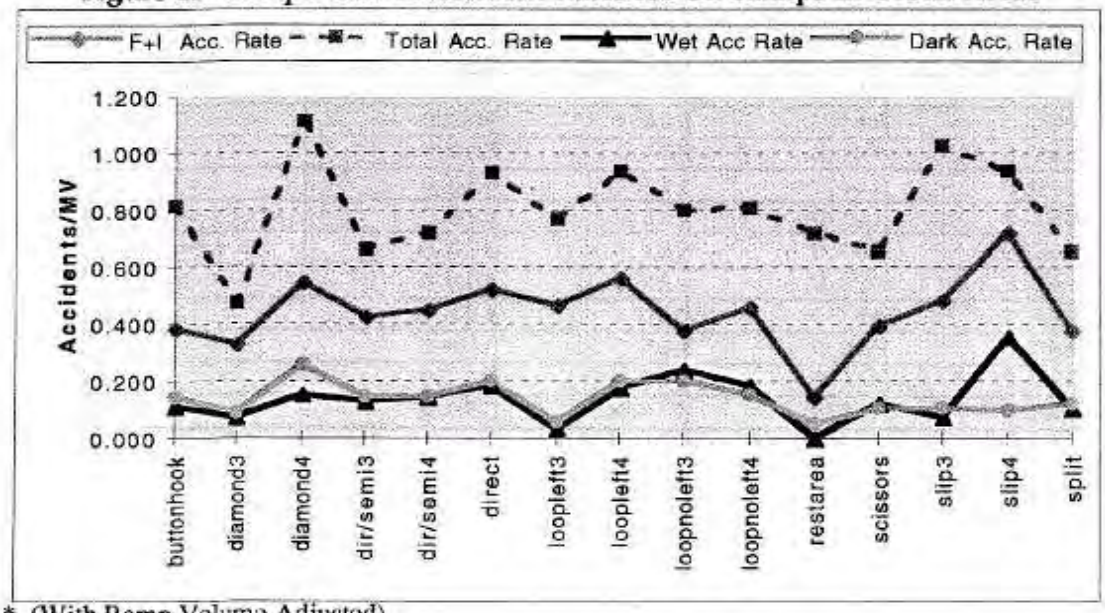
Exhibit 5-6: Comparison of Accident Rates for On-Ramps in Rural Areas (Figure 18 in (4)



Notes: 1) For suffix 3 and 4 in ramp designation (i.e. loopleft3, ect.) see section 3.2.
2) dir/semi = Direct or Semi-direct Connector; loopnoleft = Loop with no Left Turn; loopleft = Loop with Left Turn; buttonhook= Button Hook; twoway = Two-Way Ramp; restarea= Rest Areas, Vista Points and Truck Scales

Exhibit 5-7: Comparison of Accident Rates for On-Ramps in Urban Areas (Figure 19 in (4))

Figure 19 Comparison of Accident Rates for On-Ramps in Urban Areas



* (With Ramp Volume Adjusted)

Garber and Fontaine (1999) studied the operational and safety characteristics of various interchange types, including 3 years of accident data for 10 interchanges in Virginia (*3*). These 10 sites consisted of 2 diamond, 3 full cloverleaf, 3 partial cloverleaf, and 2 single point urban interchanges (SPUIs). Accident data were collected up to 150 ft from the interchange and on all ramps. Differences in accident rates (accidents/100 million entering vehicles) were compared and tested using the student's t-test methodology. Due to the small data sample size, none of the findings were deemed conclusive by Garber and Fontaine. The only statistically significant accident rate differences were for PDO and total accident rates, where partial cloverleafs exhibited a lower accident rate than SPUIs. Exhibit 5-8 shows the distribution of accident types at the four interchange types. Exhibit 5-9 shows the distributions of accident locations at the four interchange types.

Exhibit 5-8: Accident Type Distribution (Figure 21 of (3))

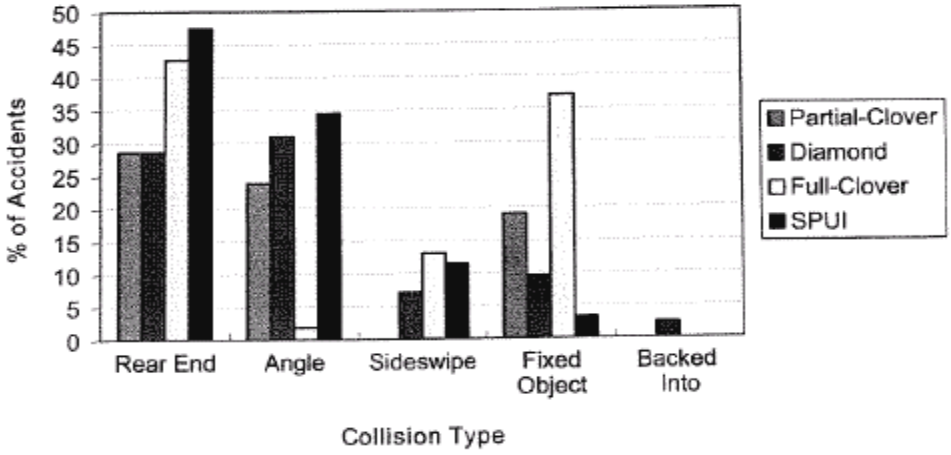


Exhibit 5-9:Accident Location Distribution (Figure 22 of (3))

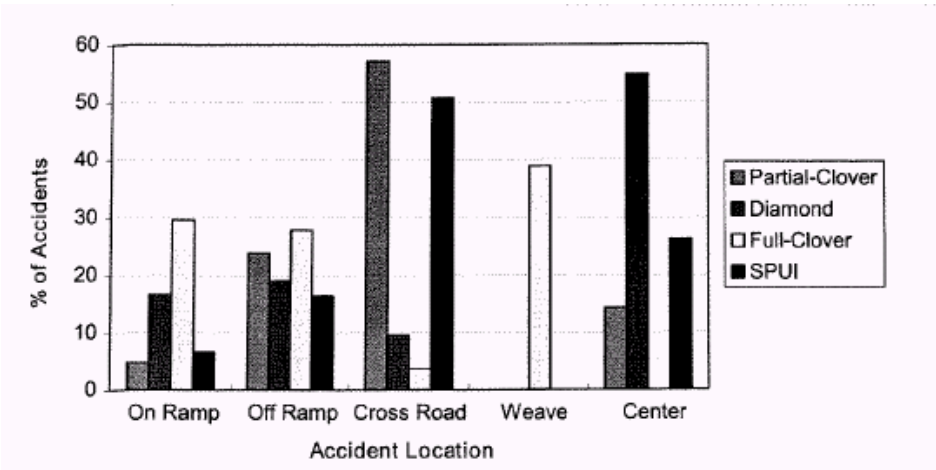


Figure 22. Accident Location Distribution

Key conclusions made by Garber and Fontaine were (*3*):

- Angle accidents are less common at full cloverleafs (2%) than at partial cloverleafs (24%) and SPUIs (34%), likely due to the absence of turning movements at full cloverleafs.
- SPUIs had a larger percentage of sideswipe accidents (12%) than diamond (7%) or partial cloverleaf interchanges.
- The full cloverleaf had a larger percentage of fixed object accidents (37%) than any other interchange type.

The most common accident locations by interchange type were:

- Diamond – center of ramp intersection (54.8%)
- SPUIs – crossroad (50.8%)
- Partial cloverleaf – crossroad (57.1%)
- Full cloverleaf – weaving area (38.9%)

Further guidance with respect to safety concerns, according mostly to the literature review, included (*3*):

- Loop ramps should be avoided where possible due to a poorer safety record than other ramp types.
- Weaving areas are a high concern for safety, especially when collector-distributor roads are not provided.
- When two roads intersect at a large skew angle, use of the SPUI is generally not recommended due to reduced sight distance.
- Interchange uniformity should be considered when selecting interchange types. Uniformity can aid drivers in where they need to enter or exit reducing confusion.

Likewise, Garber and Smith's (1996) earlier study compared the accident rate, accident type and accident location using 3 years of accident data at 5 diamond interchanges and 8 single point urban interchanges (SPUIs) (*6*). No statistically significant differences were found in accident severity between the two interchange types. In conclusion, when permitted left-turn phasing is used at diamond interchanges, the proportion of angle and center of intersection accidents is higher than at the SPUIs. Signalized intersections on the crossroad that are adjacent to interchanges have a poorer safety record when the downstream signal is not coordinated with the interchange signal and when there is inadequate clear distance to the intersection. This will be discussed further in Section 5.1.5.1 [Future Edition]. Exhibit 5-10 shows the distribution of accident locations between diamond and SPUI interchanges. Exhibit 5-11 shows the distributions of accident type. Exhibit 5-12 shows the accident rate by accident type.

Exhibit 5-10: Accident Location Distribution (Figure 18 of (6))

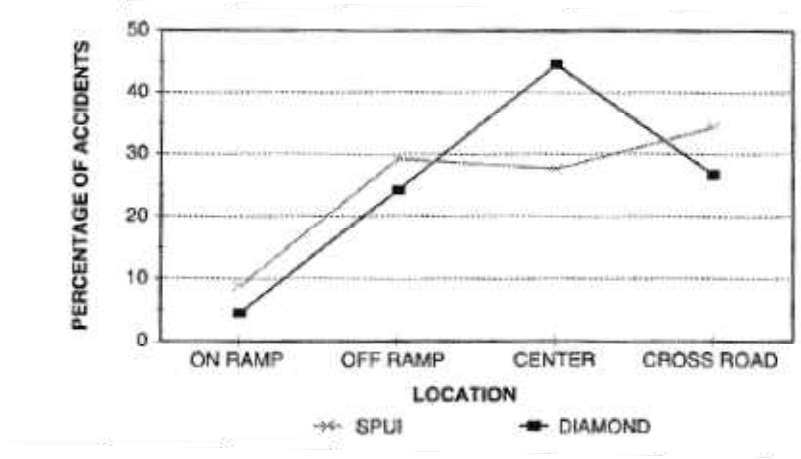


Exhibit 5-11: Accident Type Distribution (Figure 19 of (6))

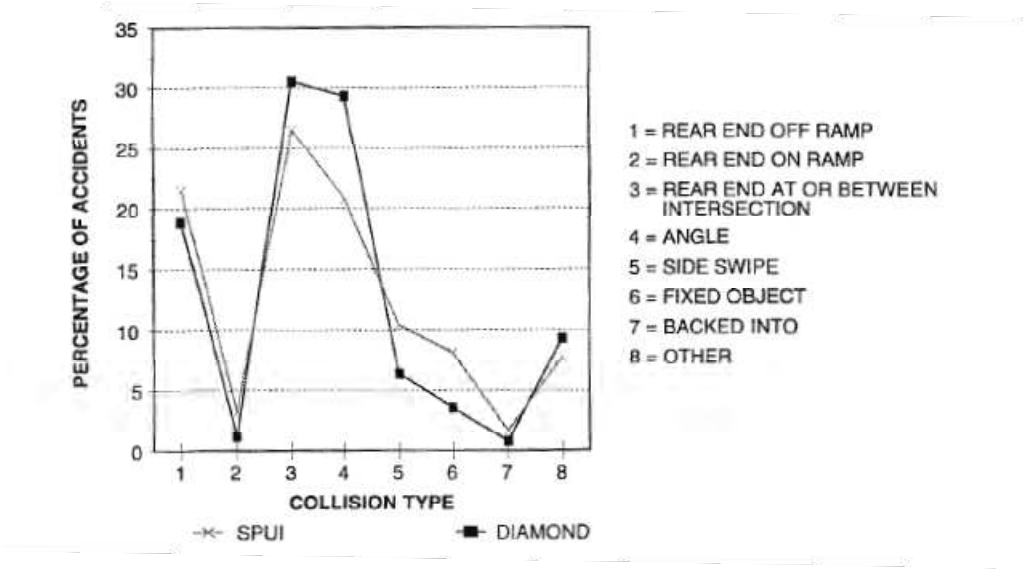
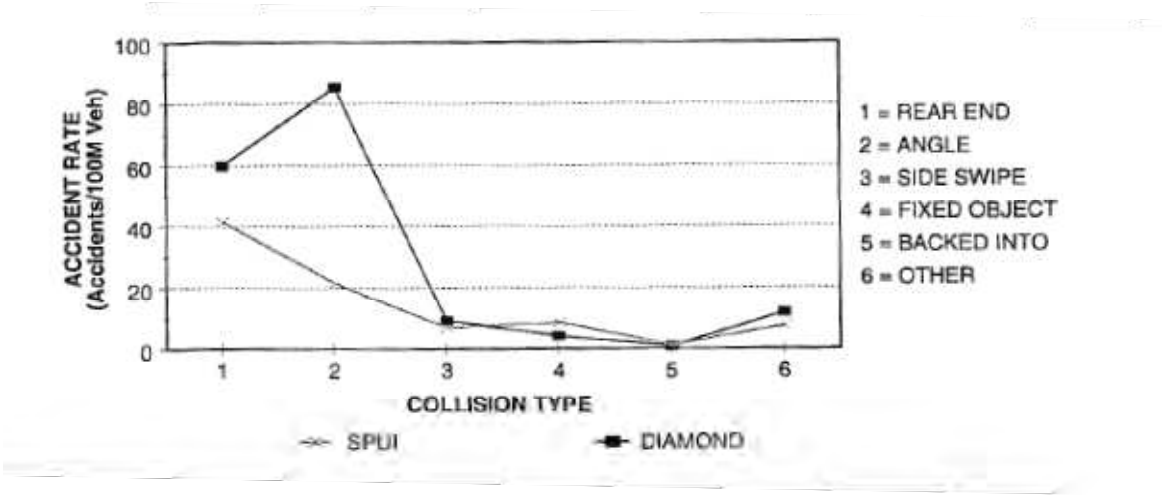


Exhibit 5-12: Accident Rates by Accident Type (Figure 20 of (6))



Tests of proportionality by Garber and Smith indicated the following statistically significant differences (*6*):

- The proportion of on-ramp accidents is greater at SPUI than diamond interchanges.
- The proportion of off-ramp accidents is greater at SPUI than diamond interchanges.
- The proportion of accidents in the center of the intersection is greater at diamond than SPUI interchanges.
- The proportion of on-ramp rear-end accidents at SPUIs is greater than at diamond interchanges.
- The proportion of sideswipe and fixed object accidents at SPUIs is greater than at diamond interchanges.
- The proportion of angle accidents at is greater at diamond interchanges than at SPUIs.

Garber and Smith note that where SPUIs are used, the signalization of on-ramp flows should be avoided as an increase in rear-end on-ramp accidents may result (*6*).

Twomey et al. (1993) reviewed literature dealing with the safety of interchange features (*7*). Taken from their paper, Exhibit 5-13 shows accident rates by type of ramp. Diamond interchange ramps have the lowest accident rate; however, the rates do not include crossroad and ramp intersection accidents. Diamond ramps, cloverleaf ramps with collector-distributors, direct connections and cloverleaf loops with collector-distributors typically have lower accident rates than scissor ramps and left-side ramps. Buttonhook ramps, loops without collector-distributors, cloverleaf ramps without collector-distributors and trumpet ramps are between these high and low groups. Exhibit 5-14 indicates that accident rates increase as interchange spacing decreases in urban areas.

Exhibit 5-13:Accident Rates by Type of Freeway Ramp (Table 6 of (7))

Ramp Type	On	Off	On & Off
Diamond Ramps	0.40	0.67	0.53
Cloverleaf Ramps with Coll-Dist Roads[a]	0.45	0.42	0.61
Direct Connections	0.50	0.91	0.67
Cloverleaf Loops with Coll-Dist Roads[a]	0.38	0.40	0.69
Buttonhook Ramps	0.64	0.96	0.80
Loops with Coll-Dist Roads	0.78	0.88	0.83
Cloverleaf Ramps w/o Coll-Dist Roads	0.72	0.95	0.84
Trumpet Ramps	0.84	0.85	0.85
Scissor Ramps[b]	0.88	1.48	1.28
Left Side Ramps	0.93	2.19	1.91
Average	0.59	0.95	0.79

NOTE: Accident rates are per million vehicles.
[a]Only the On & Off rate includes the accidents occurring on the collector-distributor roads.
[b]A ramp that has opposing traffic crossing the ramp traffic under stop sign control.

Exhibit 5-14: Accident Rates by Proximity to Interchange Ahead or Behind (Table 8 of (7))

EXIT SIDE

Dist. to exit-ramp nose ahead

Urban	No. Acc.[a]	Acc. Rate [b]
Less than .2 miles	722	131
.2-.4 miles	1,509	127
.5-.9 miles	786	119
1.0-1.9 miles	280	75
2.0-3.9 miles	106	65
4.0-7.9 miles	19	69
More than 8 miles[c]	--	--
Rural		
Less than .2 miles	160	76
.2-.4 miles	459	75
.5-.9 miles	559	69
1.0-1.9 miles	479	69
2.0-3.9 miles	272	68
4.0-7.9 miles	46	62
More than 8 miles[c]	--	--

ENTRANCE SIDE

Dist. to exit-ramp nose ahead

Urban	No. Acc.[a]	Acc. Rate [b]
Less than .2 miles	426	121
.2-.4 miles	1,156	125
.5-.9 miles	1,855	105
1.0-1.9 miles	278	84
2.0-3.9 miles	151	59
4.0-7.9 miles	280	75
More than 8 miles[c]	--	--
Rural		
Less than .2 miles	117	80
.2-.4 miles	482	82
.5-.9 miles	569	72
1.0-1.9 miles	435	64
2.0-3.9 miles	169	51
4.0-7.9 miles	52	60
More than 8 miles[c]	--	--

[a] No. of Accidents.
[b] Accidents per 100 Million Vehicle-Miles.
[c] No data available.

Bauer and Harwood (1997) developed negative binomial regression models for accidents on interchange ramps and speed change lanes (*5*). Data from the State of Washington were used to develop separate models for total and fatal+injury accidents. The database analyzed included five types of ramp configurations:

1. Diamond
2. Parco loop
3. Free-flow loop
4. Outer connection
5. Direct or semi-connection

The following combinations of elements were successfully modeled:

- Ramp proper segments (off- and on-ramps combined and off-ramps only)
- Entire ramps (off- and on-ramps combined and off-ramps only)
- Acceleration lanes
- Deceleration lanes
- Entire ramps plus adjacent speed-change lanes

Ramp proper segments are sub-segments on a ramp with a constant cross-section. These ramp proper segments were defined in an attempt to relate accident frequency to cross-section geometrics. Entire ramps include whole ramps from the entry/exit gore to the exit terminal/merge gore.

The best explanatory variable for all models was the ramp Annual Average Daily Traffic (AADT). Other significant variables in some models included mainline AADT, rural/urban location, ramp type (on/off), ramp configuration, and length of ramp plus speed-change lane. Other variables attempted included travelway width for ramps and speed-change lanes, right shoulder width for ramps and speed-change lanes, left-shoulder width for ramps, ramp grade (upgrade/downgrade), and radii of horizontal curves on ramps (*5*).

The model form used by Bauer and Harwood is shown in Equation 5-1.

Equation 5-1: Negative binomial regression model form for accidents on interchange ramps and speed change lanes (5)

$$\text{Accident frequency} = \text{alpha}(AADT)^{b0}\exp(b_1X_1+b_2X_2+\ldots+b_nX_n))$$

Where alpha and $b_0 \ldots b_n$ are the estimated parameters

The relative effects estimated by Bauer and Harwood are not intended for use as AMFs. As noted by the original authors, "The models presented here, which focus on expected values, are not intended to predict which specific ramps will have extremely high accident frequencies". Rather, these models may be calibrated by agencies for predicting the safety performance of ramps of various types. Nevertheless, based on the models, the following trends are noted (*5*):

- Results for ramp proper, entire ramps and ramps and speed change lanes indicate that off-ramps have a higher accident frequency than on-ramps.
- For AADT from 27 veh/day to 24,365 veh/day, ramps with one lane experience fewer accidents than ramps with 2 or more lanes.
- For off-ramps, the configuration from lowest to highest accident frequency for ramp proper is:
    - direct/semi-direct connectors
    - diamond
    - loop
    - outer connectors
- For on-ramps, the configuration from lowest to highest accident frequency for ramp proper is:
    - direct/semi-direct connectors
    - outer connectors
    - loop
    - diamond
- Without accounting for on- vs. off-ramp, the expected accident frequencies by ramp configuration vary although direct/semi-direct, free-flow and diamond interchanges are low to lowest in that order.

Bared et al. (2005) compared the intersection related crash frequencies between single point interchanges (SPI) and diamond interchanges (DI) (*17*). Data from 27 DIs from the state of Washington were used to estimate a negative binomial regression model relating total crash frequency and injury/fatal crash frequency with cross road AADT and off-ramp AADT. In addition, crash and traffic volume data were collected from 13 SPIs from four States: Maryland, California, Missouri, Washington, and Virginia. Regression models were not estimated for the SPI group. None of the sites had frontage roads and none of them allowed through traffic from the off ramps onto corresponding on ramps. The observed crashes of the individual SPI sites were compared with the expected crashes derived from the regression models estimated for the DI sites. The comparison was done using a nonparametric Wilcoxon signed-rank test. For total crashes, the comparison did not reveal significant differences. However, for injury and fatal crashes, the SPI was found to be safer compared to the DI.

Parajuli et al. (2006) developed negative binomial regression models for three groups of interchanges on Ontario freeways (*16*):

Group 1 (133 sites): Full diamond, Partial Cloverleaf (Parclo), Partial Loop (Loop), and Service Road

Group 2 (104 sites): Parclo (4-Quad), Loop (4-Quad), Full Cloverleaf

Group 3 (70 sites): Trumpet, Direct Link, Freeway to Freeway, Other

The influence length of each interchange was considered as 1 km on either side of the interchange. If two interchanges were closely spaced (less than 2 km), the influence length for each was taken as one half of the distance between them. Crash data from 1997 to 2002 were included in the analysis. The main objective of the regression models was to use them as predictive tools as part of network screening. Models for mainline crashes included AADT and section length in kilometers in the following form (Equation 5-3):

Equation 5-2: Negative binomial regression model form for mainline crashes (16)

$$Collisions / year = a(AADT)^{b} e^{c(length)}$$

where, a, b, and c are parameters estimated from the data.

Exhibit 5-15 shows the parameter estimates and standard errors from the models estimated along with the average AADT and number of crashes for each group.

Exhibit 5-15: Regression models for freeway mainline crashes for various interchange groups (Parajuli et al. 2006 (16))

Crash Type	Parameter	Group 1 (133 sites)		Group 2 (104 sites)		Group 3 (70 sites)	
		Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Injury and Fatal	ln(a)	-7.0564	0.7881	-10.9230	0.6720	-10.0818	0.9062
	b	0.7732	0.0578	1.1302	0.0484	0.9898	0.0685
	c	0.1407	0.1780	0.1801	0.1617	0.5680	0.2002
	φ	0.2634	0.0369	0.1632	0.0251	0.3072	0.0563
Property damage only	ln(a)	-8.4681	0.6107	-11.3698	0.6222	-10.6217	0.8347
	b	0.9949	0.0467	1.2212	0.0459	1.1301	0.0639
	c	0.2834	0.1292	0.5871	0.1409	0.7248	0.1831
	φ	0.1784	0.0233	0.1458	0.0208	0.2944	0.0500

Crash Type	Parameter	Group 1 (133 sites)		Group 2 (104 sites)		Group 3 (70 sites)	
		Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
AADT	Minimum	8,833		9,250		6,858	
	Average	82,194		135,374		85,157	
	Maximum	383,833		428,633		373,000	
Crash counts	Injury/Fatal	4,896		10,906		3,270	
	PDO	16,546		39,303		12,169	

The models in Exhibit 5-15 were used to developed graphs showing the relationship between crash frequency on the mainline and AADT. It is clear that for high AADT values (say exceeding 150,000), interchanges in Group 2 have the highest number of mainline crashes, and this is true for PDO and injury/fatal crashes. Group 3 consistently has the fewest number of crashes. This finding is not very surprising because interchanges in Group 2 are probably the most complex in terms of the number of access points with the mainline of the freeway, and interchanges in Group 3 have the least number of access points. It should be emphasized that these models are not intended to be causal, and hence, definitive conclusions regarding the safety of interchange types cannot be made from these models.

Exhibit 5-16: Relationship between mainline injury and fatal crashes and AADT for different interchange groups (derived from Parajuli et al. 2006 (16))

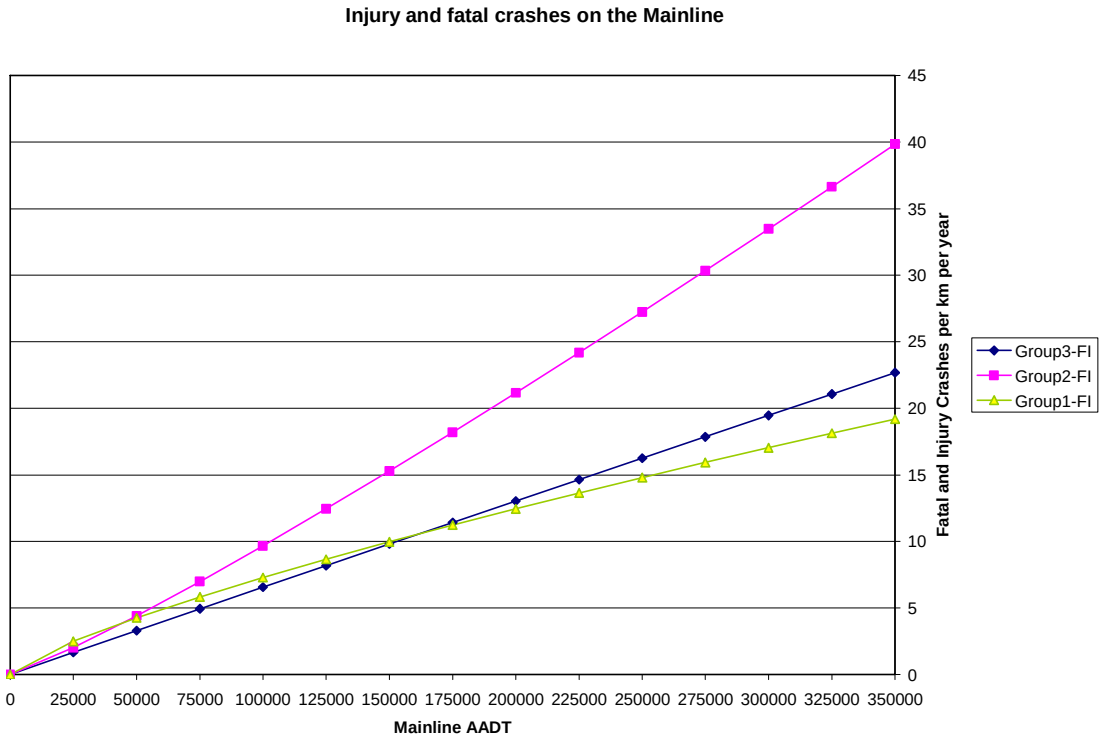
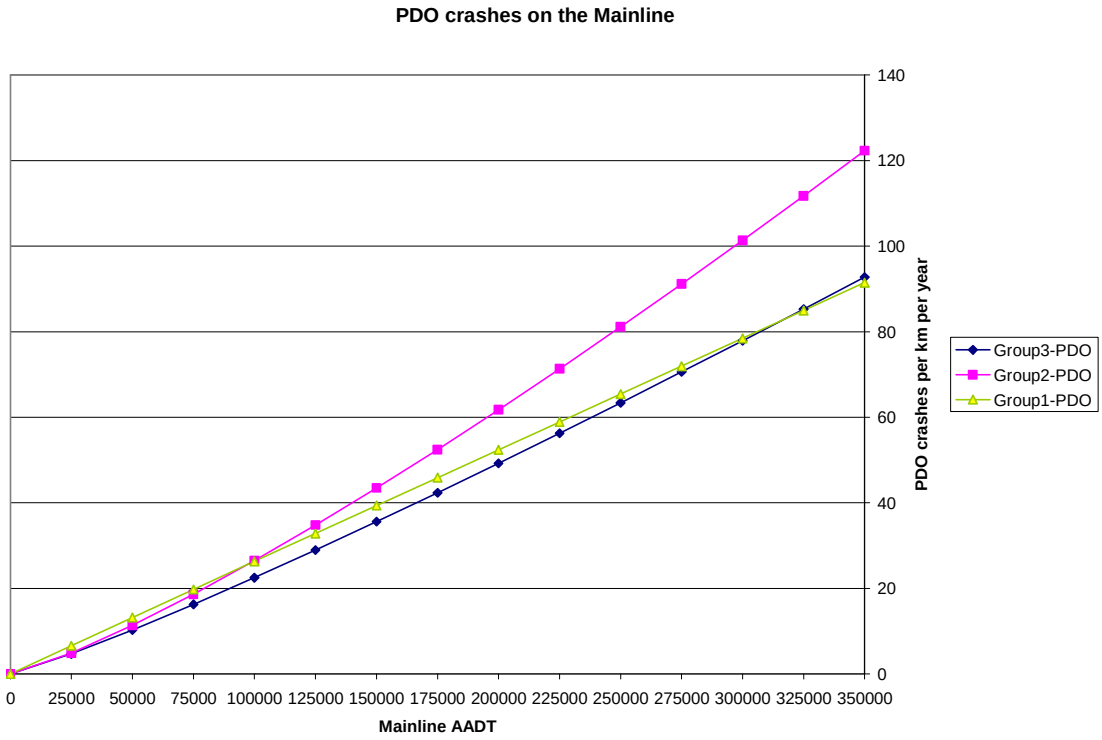


Exhibit 5-17: Relationship between mainline PDO crashes and AADT for different interchange groups (derived from Parajuli et al. 2006 (16))



Cirillo et al. (1969) developed a series of regression models from interstate accident and geometry data for various interchange types.(*8*) ADT was found to be the key predictor of accidents at interchanges. Geometric elements included in the models include: lane width, shoulder width, lighting intensity, and guardrail presence. These models are summarized in Exhibit 5-18. These models cannot be used to develop AMFs for specific treatments.

Exhibit 5-18: Regression models for various interchange types (Cirillo et al. (1969) (8))

Model	Number of Observations (N)	Square of Multiple Correlation Coefficient (R^2)
Full Cloverleaf (with no collector-distributor roadway)		
Y = -3.7 + 1.3X – 0.025C	186	0.80
Partial Cloverleaf		
Y = -1.6 + 0.24X + 2.9Z – 0.17F	191	0.69
Three-leg or Trumpet		
Y = 0.41 + 0.20X + 0.17J	160	0.53
Full Diamond		

Model	Number of Observations (N)	Square of Multiple Correlation Coefficient (R^2)
Y = -1.0 + 0.31X + 2.0Z – 1.0A + 0.14B – 0.0045D – 0.11F – 0.51G + 0.61H	681	0.89
Half Diamond		
Y = -0.64 + 0.15X + 1.27 + 0.50A + 0.14B – 0.0064D	94	0.86
Full Slip Ramp		
Y = 2.9 + 2.0X – 0.067C – 0.0013E	96	0.76

Where:

Y = Number of Accidents
X = Average daily traffic volume (thousands of vehicles)
Z = Average daily traffic volume exiting the interstate (thousands of vehicles)
A = X x Number of businesses per one hundred feet on crossroad
B = X x Area type (1 = rural, 0=urban)
C = X x Percent commercial vehicles, day
D = X x Percent commercial vehicles, night
E = X x Size of interchange (feet) ("Index" of area consumed by interchange)
F = X x Lighting intensity (foot-candles)
G = X x Type of crossroad (1=divided, 0=undivided)
H = X x Number of lanes in crossroad (1=four or more, 0=two)
J = X x Type of interchange (1=trumpet, 0=three-leg)

Other information provided in the 1982 synthesis of interchange safety include:(*8*)

- Woods et al. concluded that all freeway exists would be expected on the right in advance of the interchange structure, based on diagnostic field studies in Texas
- A study by Lundy of the relative safety of different interchange ramps using accident rates indicates that diamond and directional interchanges have the best safety performance, while loop and cloverleaf ramps without collector-distributor roads, trumpet, scissors, and left-hand ramps have the poorest safety performance. This study included accidents from on- and off-ramps, and excluded crossroad accidents and freeway mainline accidents within the interchange area.

Treatment: Crossroad over versus under the freeway

Elvik and Erke reviewed additional international literature to update the "Handbook ofRoad Safety Measures". The findings of their update meta-analysis were considered medium high, and a MCF of 1.8 was assigned to the standard errors reported, as shown in Exhibit 5-19.

Exhibit 5-19: Safety effects of designing an interchange with crossroad above freeway[9]

Author, Date	Treatment	Setting Interchange type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Erke, 2007	Design diamond, trumpet or cloverleaf interchange with crossroad above freeway	Unspecified	Unspecified	All accidents in the area of the interchange, All severities	0.96	0.1

NOTE: Based on U.S. studies: Lundy 1967; Cirillo 1968, 1970; Yates 1970; Bauer, Harwood 1998; Janson et al. 1998; Bared, Giering & Warren 1999; Khorashadi 1998; Golob, Recker & Alvarez 2004; McCartt et al. 2004; Lee et al. 2002 and International studies: Wold 1995; Pajunen 1999; Tielaito 2000

Operational studies indicate that it is more desirable to design interchanges with the crossroad over (above) the freeway.(*8*) Two key reasons are:

1. The crossroad over the freeway normally results in a longer sight distance to the exit ramp and gore area. The freeway over the crossroad (less desirable) normally results in a shorter sight distance to the exit ramp and gore area due to the freeway vertical grade and/or vertical crest.
2. The crossroad over the freeway allows gravity to assist the operation of both accelerating vehicles (the on-ramp has a down-grade) and decelerating vehicles (the off-ramp has an up-grade). In addition, the resulting grades generally provide longer sight distances.

Discussion: Modify interchange spacing

Decreasing interchange spacing appears to increase accidents.(*7*, *18*, *19*) However, the safety effect is not certain at this time.

Discussion: Provide right-hand exit and entrance ramps

Leisch et al. state that providing left-hand exits on the freeway system violates the concepts of operational uniformity and design consistency. North American drivers tend to anticipate exits on the right-hand side, and select lanes accordingly. As a result, the occasional left-hand exit ramps violates driver expectancy, which may result in evasive maneuvers, lane changes, and a mix of decelerating traffic destined for the left-hand exit with high-speed straight-through and passing traffic in the left lane.(*8*) Leisch et al. cite three studies of left-hand versus right-hand exit ramps, concluding that left-hand exits have a poorer safety performance than right-hand exits (Lundy, Northwestern University, Taylor et al.).

Similarly, Leisch et al. state that providing left-hand entrances to the freeway violates driver expectation. Drivers in the left lane of a freeway do not expect vehicles to enter the freeway and merge into their lane. Also, as traffic in the left lane is generally high-speed straight-through and passing traffic, and entering drivers must merge at a higher speed than if the merging occurred with right lane traffic.(*8*) These concerns may be increased for low speed or heavy trucks. Leisch et al. cite three studies of left-hand versus right-hand entrance ramps, concluding that left-hand entrances have a poorer safety performance than right-hand entrances (Lundy, Northwestern University, Taylor et al.).

Drivers expect exit and entrance ramps on freeways to be on the right-hand side of the freeway.(*8*) Providing left-hand exit or entrance ramps has a negative effect on safety. However, the safety effect is not certain at this time.

Conclusions

The results of the meta-analysis by Elvik and Vaa provide AMFs for modifying various interchange types to a diamond interchange.

The Khorashadi et al. study is a simple cross-sectional one in which traffic volume was accounted for using the accident rate procedure that tends to give misleading results. Thus, the conclusions are not practical in terms of providing quantitative or qualitative knowledge on the

relative safety of various ramp types. A similar difficulty exists for the Garber et al. studies as well as those reviewed by Twomey et al.

The Bauer et al. study provides regression models with correlated and omitted variables, and their use to derive AMFs is therefore questionable. These models can be used to make inferences about the relative safety of various ramp types, but these inferences cannot easily be corroborated with intuition since it is not intuitively clear how ramp types differ in safety.

The models developed by Bauer et al. were intended as predictive models of the safety performance of ramps and interchanges (rather than causal models from which AMFs could be derived) and could and should be used as such if deemed appropriate in Part 3 of the HSM. The Garber et al. study, though a modern-day one, is, by the authors' own admission, inconclusive. This is compounded by the methodology applied that is known to lead to incorrect conclusions.

The Cirillo et al. regression models cannot be used to develop AMFs for specific treatments.

In summary, there is little or no AMF information for interchange and ramp type, but there are nevertheless useful models for predicting the safety performance of ramps of various types.

5.1.2. Merge/Diverge Areas

Merge/diverge areas can be loosely defined as those portions of the highway at an interchange where vehicles entering and exiting must change lanes to continue traveling in their desired direction. The following terms, as defined in AASHTO's Policy on Geometric Design (*1*), will be used in this discussion:

- Weaving sections: "highway segments where the pattern of traffic entering and leaving at contiguous points of access results in vehicle paths crossing each other; may occur within an interchange, between entrance ramps, followed by exit ramps of successive interchanges, and on segments of overlapping roadways" (Pg 823).
- Speed change lanes: auxiliary lane that provides for vehicles to accelerate or decelerate; part of the ramp terminal area; taper or parallel (Pg 848).

In addition, as defined in the Highway Capacity Manual (2000) (*10*):

- Interchange ramp terminal = a junction with a surface street to serve vehicles entering or exiting a freeway (plural is "terminals").
- Entrance ramp = a ramp that allows traffic to enter a freeway.
- Exit ramp = a ramp for traffic to depart from a freeway.
- Acceleration lane = a paved auxiliary lane, including tapered areas, allowing vehicles to accelerate when entering the through-traffic lane of the roadway.
- Deceleration lane = a paved auxiliary lane, including tapered areas, allowing vehicles leaving the through-traffic lane of the roadway to decelerate.
- Merge = a movement in which two separate lanes of traffic combine to form a single lane without the aid of traffic signals or other right-of-way controls.
- Diverge = a movement in which a single lane of traffic separates into two lanes without the aid of traffic control devices.

Exhibit 5-20: Resources examined to investigate the safety effect of merge and diverge areas at interchanges

DOCUMENT	DESCRIPTION	COMMENT
(*20*) (Sarhan, M., Hassan, Y., and Abd El Halim, A.O., "Design of Freeway Speed Change Lanes: Safety-Explicit Approach", Presented at the 85th Annual Meeting of the Transportation Research Board, Washington, D.C., January 2006)	Developed negative binomial regression models to study the relationship between crash frequency and length of acceleration and deceleration lanes.	Added to synthesis.
(*2*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis.
(Smiley, A., "Driver Performance at Interchanges." (2004))	The paper analyses drivers' tasks at interchanges (entering, through, exiting).	Not added to synthesis.
(Janson, B., Kononov, J., Awad, W., Robles, J., and Pinkerton, B., "Effects of Geometric Characteristics of Interchanges on Truck Safety." CDOT-DTD-R-99-3, Denver, Colorado Department of Transportation, (1999))	Used crash data from WA, CO, and CA to identify relationships between truck accidents and geometric characteristics of interchanges including merge/diverge areas.	Suggested by NCHRP 17-18(4). Not added to synthesis.
(Bared, J., Giering, G. L., and Warren, D. L., "Safety Evaluation of Acceleration and Deceleration Lane Lengths." ITE Journal, Vol. 69, No. 6, Washington, D.C., Institute of Transportation Engineers, (1999) pp. 50-54.)	This reference reports same models as Bauer and Harwood (1997).	Suggested by NCHRP 17-18(4). Not added to synthesis.
(Khorashadi, A., "Effect of Ramp Type and Geometry on Accidents." FHWA/CA/TE-98/13, Sacramento, California Department of Transportation, (1998))	No analysis of merge/diverge areas.	Not added to synthesis.
(*5*) (Bauer, K. M. and Harwood, D. W., "Statistical Models of Accidents on Interchange Ramps and Speed-Change Lanes." FHWA-RD-97-106, McLean, Va., Federal Highway Administration, (1997))	Negative binomial regression models developed for interchange ramps and speed change lanes based on data from Washington State.	Suggested by NCHRP 17-18(4). Added to synthesis.
(*7*) (Twomey, J. M., Heckman, M. L., Hayward, J. C., and Zuk, R. J., "Accidents and Safety Associated with Interchanges." Transportation Research Record 1383, Washington, D.C., Transportation Research Board, National Research Council, (1993) pp. 100-105.)	Reviewed literature dealing with the safety of interchange features.	Suggested by NCHRP 17-18(4). Accident rates by interchange unit added to synthesis, with qualitative observations by authors.
(Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume IV - Interchanges." FHWA-RD-91-047, Washington, D.C., Federal Highway Administration, (1992))	Same material as Twomey et al. (1993)	Not added to synthesis.
(*8*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Reviewed literature dealing with the safety of interchange features.	Suggested by NCHRP 17-18(4). Added to synthesis.
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Summarized in Various 1982	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*11*) (Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	Reviewed available literature on merge, diverge, and weaving areas.	Discussion of findings added to synthesis.

Discussion: Accident experience of merge/diverge areas

Bauer and Harwood (1997) developed negative binomial regression models for accidents on interchange ramps and speed change lanes (*5*). Data from the State of Washington were used to develop separate models for total and fatal+injury accidents. The database analyzed included five types of ramp configurations:

1. Diamond
2. Parco loop
3. Free-flow loop
4. Outer connection
5. Direct or semi-connection

Accidents on acceleration and deceleration lanes were modeled separately from ramp accidents. Separate models were developed for accidents on acceleration and deceleration lanes including ramp accidents. Lanes associated with a weaving area, lane drops or lane additions were not considered in the models. Left-side ramps were also excluded.

The model form used is shown in Equation 5-3.

Equation 5-3: Negative binomial regression model form for accidents on interchange ramps and speed change lanes (5)

$$\text{Accident frequency} = \text{alpha}(AADT)^{b0}\exp(b_1X_1+b_2X_2+\ldots+b_nX_n))$$

where alpha and $b_0 \ldots b_n$ are the estimated parameters.

Exhibit 5-21 shows the estimated parameter values, their 90% confidence intervals, and the relative effects of each variable included in the final models. The relative effect indicates the expected change in accident frequency for a unit change in that variable. Only those variables related to the merge and diverge areas are reported here. Exhibit 5-22 shows results for the speed-change lane length variable from models for the entire ramp area and speed change lane.

As noted by the original authors, these relative effects are not intended for use as AMFs, “The models presented here, which focus on expected values, are not intended to predict which specific ramps will have extremely high accident frequencies”. Rather, these models may be calibrated by agencies for predicting the safety performance of ramps of various types. Nevertheless, based on the models, the following trends are noted (*5*):

- For every 1 ft increase in right shoulder width on deceleration lanes, the total accident frequency is predicted to increase by 10 percent.
- Total accident frequencies are less in rural areas than urban areas for both acceleration and deceleration lanes.
- As the length of acceleration lane increases, accidents are expected to increase. However, this is natural in that a longer length results in greater exposure. To fully

understand the effects of speed-change lanes, all accidents, including those on the ramp and in weaving areas, should be considered. Indeed, the models for entire ramp areas and speed-change lanes indicate decreases of 93% and 91% for total and fatal+injury accidents respectively for an increase of 1 mile in the speed-change lane (Exhibit 5-22).

Exhibit 5-21: Model Results for Speed-Change Lanes (5)

Independent variable	Ramp Area	Total Accidents		F+I Accidents	
		Estimate (90% C.I.)	Relative Effect (90% C.I.)[1]	Estimate (90% C.I.)	Relative Effect (90% C.I.)[1]
Right shoulder width (ft)	Deceleration Lane	0.09 (0.02 to 0.17)	1.094 (1.020 to 1.185)		
Area type Rural Urban	Acceleration Lane	-0.59 (-1.14 to -0.04) 0	0.55 (0.320 to 0.961) -		
	Deceleration Lane	-1.21 (-1.88 to -0.60) 0	0.298 (0.152 to 0.549) -		
Length of speed-change lane (mi)	Acceleration Lane	6.88 (4.56 to 9.29)	972.6 (95.58 to 10829)	5.32 (2.64 to 8.15) [c]	204.38 (14.01 to 3463)

[c] diamond on-ramps only

[1] Relative effect indicates the expected percentage change in accident frequency for a unit change in that variable. These values cannot be used to develop AMFs.

Exhibit 5-22: Model Results for Entire Ramps and Speed-Change Lanes (5)

Independent variable[a]	Ramp Area	Total Accidents		F+I Accidents	
		Estimate (90% C.I.)[a]	Relative Effect (90% C.I.)[1]	Estimate (90% C.I.)[a]	Relative Effect (90% C.I.)[1]
Length of speed-change lane (mi)	Entire Ramp and Speed-Change Lane	-2.59 (-4.50 to -0.69)	0.075 (0.011 to 0.50)	-4.42 (-6.49 to -2.36)	0.012 (0.002 to 0.094)

[a] variables for Entire Ramp and Speed Change Lane are significant at 20% level

[c] diamond on-ramps only

[1] Relative effect indicates the expected percentage change in accident frequency for a unit change in that variable. These values cannot be used to develop AMFs.

Bauer and Harwood (1997) also note that certain geometric design variables were not found to have a statistically significant relationship to accident frequency, and based on their study are not ultimately recommended for use, including: traveled-way width for ramps and speed change lanes, right shoulder width for ramps and speed change lanes, left shoulder width for ramps, ramp grade, radii of horizontal curves on ramps.(*5*)

Twomey et al. (1993) reviewed literature dealing with the safety of interchange features (*7*). Exhibit 5-23 shows accident rates by interchange unit, separately for rural and urban interchanges. Twomey et al. note that the safety of entrance and exit terminals improves with geometric designs providing acceleration lanes in excess of 800 ft, deceleration lanes in excess of 900 ft, and weaving areas in excess of 800 ft.

Exhibit 5-23: Accident Rates by Interchange Unit and Area Type (Table 7 of (7)

TABLE 7 Accident Rates by Interchange Unit and Area Type (*d*)

RURAL

Interchange Unit	Vehicle Miles (100 Mil.)	No. Accidents[a]	Accident Rate[b]
Deceleration lane	2.51	348	137
Exit Ramp	0.57	199	346
Area between speed change lanes	6.52	554	85
Entrance Ramp	0.59	95	161
Acceleration lane	3.68	280	76
Acceleration - deceleration lane	0.49	87	176
Total	14.36	1,563	109[c]

URBAN

Interchange Unit	Vehicle Miles (100 Mil.)	No. Accidents[a]	Accident Rate[b]
Deceleration lane	5.83	1,089	186
Exit Ramp	1.48	546	370
Area between speed change lanes	11.87	1,982	167
Entrance Ramp	1.61	1,159	719
Acceleration lane	8.40	1,461	174
Acceleration - deceleration lane	2.45	555	227
Total	31.64	6,792	214[c]

[a]No. of Accidents.
[b]Accidents per 100 Million Vehicle-Miles.
[c]Average Accident Rate.

Oppenlander and Dawson (1970) reviewed available literature and reported a number of findings for merge areas, diverge areas, and weaving areas (*11*):

Merging Area:

- 52 percent of on-ramp accidents occur in the merging area.
- A previous study of 412 on-ramps in Texas reports that 90% of merging accidents are rear-end when the merge area is short.
- As the ratio of ramp to mainline volume increases, the accident rate in the merging area increases, regardless of the length of speed change lanes. When merging traffic is less than 6 percent of the freeway traffic, longer acceleration lanes are of little benefit.
- Entrance terminals where through lanes are on downgrades have a lower accident rate than when mainline traffic is on an upgrade, the top of a crest curve, or the bottom of a sag curve.
- Acceleration lanes in excess of 800 ft improve safety (Exhibit 5-24).
- No relationship has been found between merging angle and safety.

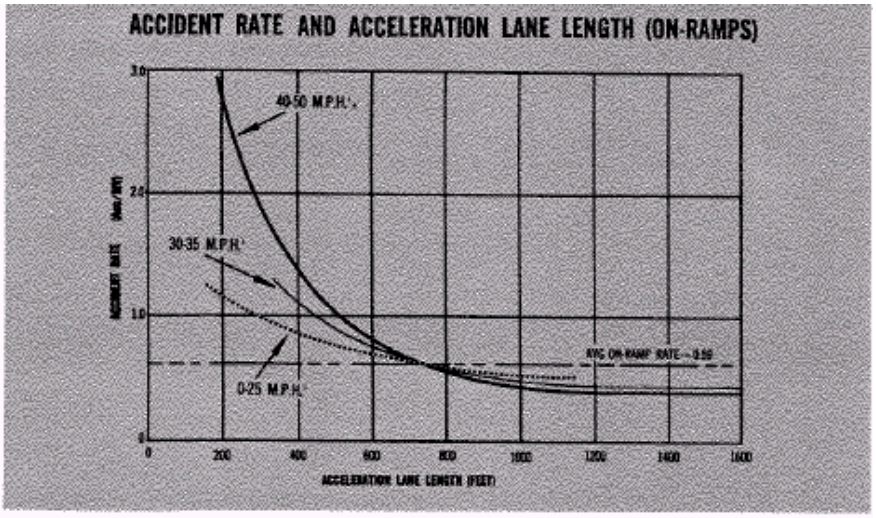
Diverging Area:

- Approximately 44 percent of accidents on off-ramps occur in the exit terminal, and of these over half are single-vehicle accidents
- Deceleration lanes in excess of 800 to 900 feet reduce accident rates by eliminating speed reductions on the through lanes (Exhibit 5-25).
- When the diverging traffic is less than 6 percent no safety benefit is seen by increasing the length of the deceleration lane.
- Geometric designs which hide the gore area from the driver's view pose a risk to drivers.

Weaving Area:

- Accident rates in weaving areas increase for weaving lengths under 700 to 800 ft (Exhibit 5-26).

Exhibit 5-24: Accident Rate and Acceleration Lane Length (on-ramps) (Figure 3 of (11)



[1] Entering Speed at the ramp nose.

Exhibit 5-25: Accident Rate and Deceleration Lane Length (off-ramps) (Figure 5 of (11))

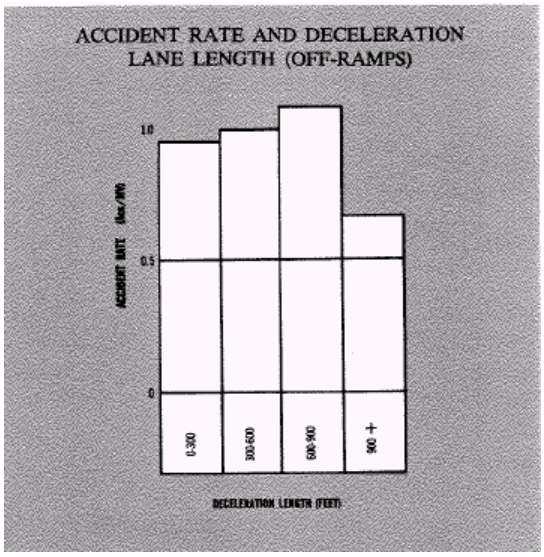
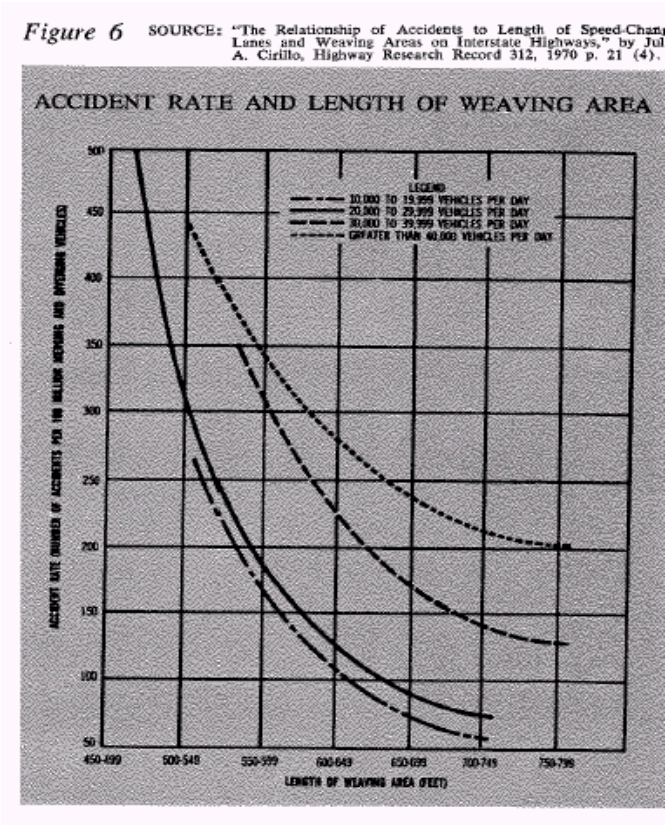


Exhibit 5-26: Accident Rate and Length of Weaving Area (Figure 6 of (11))



A meta-analysis by Elvik and Vaa of three U.S. studies (Lundy 1967; Cirillo 1968, 1970; Yates 1970) and one international study (Wold 1995), shows that increasing the length of an acceleration lane by about 98 ft (30 m) decreases accidents of all types and severities as shown in Exhibit 5-27.(2) Increasing the length of a deceleration lane by about 98 ft (30 m) could decrease accidents of all types and severities as shown in Exhibit 5-27.(2)

Exhibit 5-27: Safety effects of extending speed change lanes (2)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Extend acceleration lane by approx. 98 ft (30 m)	Unspecified	Unspecified	All types All severities	0.89	0.05
Elvik and Vaa, 2004	Extend deceleration lane by approx. 98 ft (30 m)	Unspecified	Unspecified	All types All severities	0.93	0.06

In the FHWA interchange safety analysis tool (*22*), AMF functions for acceleration lane length have been incorporated as follows:

For total accidents (all severity levels combined):

$$AMF = 1.296 * e^{(-2.59 * L_{accel})}$$

For fatal and injury accidents:

$$AMF = 1.576 * e^{(-4.55 * L_{accel})}$$

Where,

L_{accel} = Length of acceleration lane (mi)

L_{accel} is measured from the nose of the gore area to the end of the lane drop taper.

Sarhan et al. (2006) developed negative binomial regression models to relate crash frequency in the interchange area of freeways that included the speed change lanes at the two ends (*20*). Data from 26 interchange along Highway 417 within the city of Ottawa, Ontario, Canada, and between IC 145 West (intersection with Highway 7) and IC 110 East (intersection with Walkley road), were selected for the study. To distinguish between the cases where an acceleration or deceleration lane has unlimited length and is extended to the next ramp, a binary variable was included to indicate if it is an extended lane. The analysis included crash data for a five year period from 1998 to 2002. Two separate models were estimated; one that included length of acceleration lanes as an independent variable and other that included length of deceleration lanes as an independent variable. Similar to many of the negative binomial regression models estimated by other studies, the relationship between crash frequency and the independent variables was assumed to be log-linear. Equation 5-3 shows the forms that were used for the two regression models.

Equation 5-4: Negative binomial regression model form for accidents in interchange areas (20)

$$y = \exp(\beta_0 + \beta_1 EXPO + \sum \beta_i x_i)$$

where, y is the collision frequency, β_i are regression coefficients, x_i are model predictors, and EXPO represents the total traffic exposure for a specific segment in units of million vehicle-km as follows:

EXPO = (5 years)(AADT)(365)(Lseg)(10^{-6})

Equation 5-3 shows the regression model that included the length of the acceleration lane.

Equation 5-5: Negative binomial regression model that included length of acceleration lane (20)

$$y = \exp(2.5389 + 0.0168 * EXPO - 0.0020 * LAcc + 1.6269 * AccCo)$$

where, LAcc is the length of the acceleration lane in meters, and AccCo is an indicator variable that was coded as 1 if the acceleration lane was extended, and 0 otherwise.

Equation 5-3 shows the regression model that was estimated for sites with deceleration lanes.

Equation 5-6: Negative binomial regression model that included length of deceleration lane (20)

$$y = \exp(2.7238 + 0.0136 * EXPO - 0.0015 * LDec + 1.2143 * DecCo)$$

where, LDec is the length of the deceleration lane in meters, and DecCo is an indicator variable that was coded as 1 if the deceleration lane was extended, and 0 otherwise. The authors suggest that for sections with both an acceleration lane and a deceleration lane, the average of the expected values from the two models would be the best estimate for the expected number of crashes on that segment.

Based on these models, the AMF for increasing the length of the acceleration lane by 30 meters will be exp(-0.0020*30) = 0.942. Similarly, the AMF for increasing the length of the deceleration lane by 30 meters will be exp(-0.0015*30) = 0.956. These AMFs are not proposed for the HSM because they are derived from the cross sectional models. The AMFs from Elvik and Vaa (*2*) (Exhibit 5-27) based on a meta-analysis of results from several studies is more defensible and proposed for the HSM.

Increasing the right shoulder width of deceleration or acceleration lanes appears to increase accidents.(*5*) However, the safety effect is not certain at this time.

Treatment: Modify two-lane-change merge/diverge area to one-lane-change

Elvik and Erke reviewed additional international literature to update the "Handbook of Road Safety Measures". The findings of their update meta-analysis were considered medium high, and a MCF of 1.8 was assigned to the standard errors reported, as shown in Exhibit 5-28.(*9*)

Exhibit 5-28: Safety effects of modifying two-lane-change merge/diverge area to one-lane-change (9)

Author, date	Treatment	Setting Interchange type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Erke, 2007	Modify two-lane to one-lane merge/ diverge area	Unspecified	Unspecified	Accidents in the merging lane, All severities	0.68	0.04

NOTE: Based on U.S. studies: Lundy 1967; Cirillo 1968, 1970; Yates 1970; Bauer, Harwood 1998; Janson et al. 1998; Bared, Giering & Warren 1999; Khorashadi 1998; Golob, Recker & Alvarez 2004; McCartt et al. 2004; Lee et al. 2002 and International studies: Wold 1995; Pajunen 1999; Tielaito 2000.

Discussion: Angle of convergence

Leisch et al. cite several studies of the safety effects of various angles of convergence of interchange ramps. Although no AMFs or safety data are provided, the operational characteristics of lower angles of convergence appear to be more desirable than the operational characteristics of higher angles of convergence. Specifically, "smooth flow" was found at merges with an angle of convergence of 3 degrees or less. Driver gap acceptance was higher at small convergence angles, which Leisch et al. relate to smoother traffic flow, less stopping, and a reduced likelihood of rear-end collisions.(*8*)

5.1.3. Ramp Roadways

As defined in Chapter 25 of the Highway Capacity Manual "a ramp is a length of roadway providing an exclusive connection between two highway facilities. The facilities connected by a ramp may consist of freeways, multilane highways, two-lane highways, suburban streets, and urban streets. A ramp may consist of up to three geometric elements of interest: ramp-freeway junction, ramp roadway, ramp-street junction." (*10*). Note that the Highway Capacity Manual (2000) considers ramp-freeway junction and ramp roadway collectively for capacity analysis.

This section discusses the accident experience of interchange ramp roadways. Discussion of HOV lanes on entrance or exit ramps will be included in Chapter 6.

Exhibit 5-29: Resources examined to investigate the safety effect of ramp roadway elements at interchanges

DOCUMENT	DESCRIPTION	COMMENT
(*16*)(Parajuli, B., Persaud, B., Lyon, C., and Munro, J., "Safety Performance Assessment of Freeway Interchanges, Ramps, and Ramp Terminals", Presented at the Road Safety Engineering Management Section of the 2006 Annual Conference of the Transportation Association of Canada, Charlottetown, Prince Edward Island, (2006))	Negative binomial regression models were estimated for different categories of ramps.	Added to synthesis.
(*21*)(Lord, D. and Bonneson, J.A., "Calibration of Predictive Models for Estimating Safety of Ramp Design Configurations", Transportation Research Record 1908, pp. 88-95, (2005))	Recalibrated the models developed by Bauer and Harwood (1998) for 44 ramps in Texas.	Added to synthesis.
(*2*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Added to synthesis.
(*12*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Crashes." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Synthesis of strategies to reduce aggressive driving crashes.	Discussion of short ramp length and aggressive driving added to synthesis. No AMFs.

DOCUMENT	DESCRIPTION	COMMENT
(Bahar, G., DiLorenzo, T., Munro, J., and Persaud, B., "Prioritization of Interchanges and Ramps based on Potential for Safety Improvements." Monterey, Calif., Institute of Transportation Engineers Spring Conference and Exhibit, (2001))	Developed SPFs for interchanges and ramps in Ontario.	No AMFs. Not added to synthesis.
(Janson, B., Kononov, J., Awad, W., Robles, J., and Pinkerton, B., "Effects of Geometric Characteristics of Interchanges on Truck Safety." CDOT-DTD-R-99-3, Denver, Colorado Department of Transportation, (1999))	Used crash data from WA, CO, and CA to identify relationships between truck accidents and geometric characteristics of interchanges including merge/diverge areas.	Not added to synthesis.
(Khorashadi, A., "Effect of Ramp Type and Geometry on Accidents." FHWA/CA/TE-98/13, Sacramento, California Department of Transportation, (1998))	Accident rates were analyzed to assess the differences between ramps.	Suggested by NCHRP 17-18(4). This study deals with ramp configuration, not ramp design. Not added to this section.
(*5*) (Bauer, K. M. and Harwood, D. W., "Statistical Models of Accidents on Interchange Ramps and Speed-Change Lanes." FHWA-RD-97-106, McLean, Va., Federal Highway Administration, (1997))	Developed negative binomial regression models for accidents on interchange ramps and speed change lanes.	Suggested by NCHRP 17-18(4). Added to synthesis.
(*7*) (Twomey, J. M., Heckman, M. L., Hayward, J. C., and Zuk, R. J., "Accidents and Safety Associated with Interchanges." Transportation Research Record 1383, Washington, D.C., Transportation Research Board, National Research Council, (1993) pp. 100-105.)	Reviewed past research that studied the effect of interchange design and accidents including acceleration and deceleration lanes.	Suggested by NCHRP 17-18(4). Added to synthesis.
(Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume IV - Interchanges." FHWA-RD-91-047, Washington, D.C., Federal Highway Administration, (1992))	Reviewed past research that studied the effect of ramp design on safety.	Suggested by NCHRP 17-18(4). Same material as for Twomey et al. (1993), not added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Old document, any relevant material would likely have been covered in Twomey (1992).	Not added to synthesis.
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))	Old document, any relevant material would likely have been covered in Twomey (1992).	Not added to synthesis.
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Summarized in Various 1982	Not added to synthesis.
(Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	No information on ramp geometry.	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Slatterly Jr., G. T. and Cleveland, D. E., "Traffic Volume." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 2, Washington, D.C., Automotive Safety Foundation, (1969))	Old document, any relevant material would likely have been covered in Twomey (1992).	Not added to synthesis.

Discussion: Accident experience of interchange ramp roadways

Bauer and Harwood (1997) developed negative binomial regression models for accidents on interchange ramps and speed change lanes. Data from the State of Washington were used to develop separate models for total and fatal+injury accidents (*5*). The database analyzed included five types of ramp configurations:

1. Diamond
2. Parco loop
3. Free-flow loop
4. Outer connection
5. Direct or semi-connection

The following combinations of elements were successfully modeled:

- Ramp proper segments (off- and on-ramps combined and off-ramps only)
- Entire ramps (off- and on-ramps combined and off-ramps only)
- Acceleration lanes
- Deceleration lanes
- Entire ramps plus adjacent speed-change lanes

Ramp proper segments are sub-segments on a ramp with a constant cross-section. These ramp proper segments were defined in an attempt to relate accident frequency to cross-section geometrics. Entire ramps include whole ramps from the entry/exit gore to the exit terminal/merge gore.

The best explanatory variable for all models was the ramp Annual Average Daily Traffic (AADT). Other significant variables in some models included mainline AADT, rural/urban location, ramp type (on/off), ramp configuration, and length of ramp + speed-change lane. Other variables attempted included travel way width for ramps and speed-change lanes, right shoulder width for ramps and speed-change lanes, left-shoulder width for ramps, ramp grade (upgrade/downgrade), and radii of horizontal curves on ramps.

Exhibit 5-30 shows the estimated parameter values, their 90% confidence intervals, and the relative effects of each variable included in the final models. The model form used is shown in Equation 5-7.

Equation 5-7: Negative binomial regression model form for accidents on interchange ramps and speed change lanes (5)

$$\text{Accident frequency} = \text{alpha}(AADT)^{b0}\exp(b_1X_1+b_2X_2+\ldots+b_nX_n))$$

where alpha and $b_0 \ldots b_n$ are the estimated parameters.

The relative effect indicates the expected change in accident frequency for a unit change in that variable. Only those variables related to interchange type are reported in Exhibit 5-30. All models included terms for AADT so exposure has been controlled for. The estimates are not shown here for the AADT terms.

These relative effects are not intended for use as AMFs; as noted by the original authors: "The models presented here, which focus on expected values, are not intended to predict which specific ramps will have extremely high accident frequencies". Rather, these models may be calibrated by agencies for predicting the safety performance of ramps of various types. Nevertheless, based on the models, the following trends are noted (*5*):

- Results for ramp proper, entire ramps, and entire ramps and speed change lanes combined, indicate that off-ramps have a higher accident frequency than on-ramps.
- For AADT from 27 veh/day to 24,365 veh/day, ramps with one lane experience fewer accidents than ramps with 2 or more lanes.
- Increases in right shoulder width of 1 ft predict a 7 percent increase in fatal+injury accidents on acceleration lanes.
- Increases in lane width of 1 ft predict a 6 and 8 percent decrease in total and fatal+injury accidents respectively on off-ramps.
- Ramps in rural areas are expected to have a lower accident frequency than urban ramps for both total and fatal+injury accidents. When entire ramps and speed change lanes are modeled together, accidents are higher in rural areas for total accidents but lower in rural areas for fatal+injury accidents.

Exhibit 5-30: Results of Interchange Models developed by (5)

Independent variable [a]	**Ramp Area**	**Total Accidents**		**F+I Accidents**	
		Estimate (90% C.I.)[a]	**Relative Effect (90% C.I.)[1]**	**Estimate (90% C.I.)[a]**	**Relative Effect (90% C.I.)[1]**
Ramp Type Off-ramp On-ramp	Ramp Proper	0.78 (-0.04, 1.61) 0	2.18 (0.96, 5.00) -	1.45 (0.58, 2.32) 0	4.263 (1.786, 10.176) -
	Entire Ramps	0.50 (0.31, 0.70) 0	1.649 (1.363, 2.014) -	0.55 (0.33,0.76) 0	1.733 (1.391, 2.138) -
	Entire Ramp and Speed Change Lane	0.37 (0.16, 0.58) 0	1.448 (1.174, 1.786) -	0.48 (0.25, 0.71) 0	1.616 (1.284, 2.034) -
Number of lanes 1 2 or more	Ramp Proper	0.77 (0.49, 1.05) 0	2.16 (1.632, 2.858) -	0.78 (0.49, 1.06) 0	2.181 (1.632, 2.886) -
	Ramp Proper – Off Ramps Only[b]	1.03 (0.67, 1.39) 0	2.801 (1.954, 4.015) -	1.20 (0.75, 1.67) 0	3.320 (2.117, 5.312) -
Right shoulder width (ft)	Ramp Proper			0.07 (0.02, 0.11)	1.073 (1.020, 1.116)
Average lane width (ft)	Ramp Proper – Off Ramps Only[b]	-0.06 (-0.11, -0.01)	0.942 (0.896, 0.990)	-0.08 (-0.15, -0.02)	0.923 (0.861, 0.980)
Area Type Rural	Entire Ramps	-0.35 (-0.62, -0.07) 0	0.705 (0.538, 0.932) -	-0.34 (-0.66, -0.02) 0	0.712 (0.517, 0.980) -

Independent variable [a]	Ramp Area	Total Accidents		F+I Accidents	
		Estimate (90% C.I.)[a]	Relative Effect (90% C.I.)[1]	Estimate (90% C.I.)[a]	Relative Effect (90% C.I.)[1]
Urban	Entire Ramp and Speed Change Lane	0.37 (0.16, 0.58) 0	1.448 (1.174, 1.786) -	-0.26 (-0.50, -0.02) 0	0.771 (0.606, 0.980) -

NOTES:

a – variables for Entire Ramp and Speed Change Lane are significant at 20% level

b – rear-end accidents and accidents related to cross-road ramp terminal excluded

1 – Relative effect indicates the expected percentage change in accident frequency for a unit change in that variable. These values cannot be used to develop AMFs.

Lord and Bonneson (2005) recalibrated the models developed by Bauer and Harwood (1998) using data from 44 ramps in and around Austin, TX (*21*). The intent was to estimate the safety of several ramp design configurations – diagonal ramps, non-free-flow ramps, free-flow ramps, and outer connection ramps. The results of recalibration indicated that more crashes occur on exit ramps compared to entrance ramps by a ratio of about 6 to 4. In addition, non-free-flow ramps experienced twice as many crashes as other types.

Parajuli et al. (2006) (discussed earlier) estimated negative binomial regression models for 9 categories of ramps (*16*):

- Flared on-ramps (354 sites)
- Loop on-ramps (270 sites)
- Flared and loop combined on-ramps (624 sites)
- Flared off-ramps (413 sites)
- Loop off-ramps (116 sites)
- Flared and loop combined off-ramps (529 sites)
- Freeway-freeway ramps (124 sites)
- Other on-ramps (87 sites)
- Other off-ramps (134 sites)

Equation 5-8 shows the form that was used for the ramp crashes. The models included AADT and length of the ramp in kilometers.

Equation 5-8: Negative binomial regression model form for mainline crashes (16)

$$Collisions / year = a(AADT)^{b} e^{c(length)}$$

Exhibits 5-31 through 5-33 provide the parameter estimates, standard errors, and the number of crashes that were used to estimate these models. Very few crashes were available to estimate the models for other on-ramps and other off-ramps and hence these results should be used with caution. Exhibit 5-34 shows some summary statistics on the ramp volume that was used for the modeling.

Exhibit 5-31: Results of Ramp Models developed for Flared and Loop on-ramps (16)

Crash Type	Variable	Flared on-ramps (354 sites)		Loop on-ramps (270 sites)		Flared and Looped Combined On-Ramps (624 sites)	
		Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Injury and Fatal	ln(a)	-8.9013	0.7744	-8.4405	0.8568	-8.788	0.5826
	b	0.7962	0.0883	0.6741	0.0987	0.7561	0.0664
	c	0.0968	0.3422	1.2251	0.413	0.5259	0.291
	φ	0.6617	0.1508	0.2939	0.1522	0.5665	0.1116
PDO	ln(a)	-7.4134	0.5149	-6.0394	0.492	-6.8203	0.3589
	b	0.7535	0.0579	0.563	0.0573	0.6717	0.041
	c	0.9483	0.3487	1.3569	0.3201	1.1316	0.2386
	φ	0.8262	0.092	0.4623	0.075	0.6863	0.0611
Crash counts	Injury/Fatal	311		180		491	
	PDO	1,408		824		2,232	

Exhibit 5-32: Results of Ramp Models developed for Flared and Loop off-ramps (16)

Crash Type	Variable	Flared off-ramps (413 sites)		Loop off-ramps (116 sites)		Flared and Looped Combined Off-Ramps (529 sites)	
		Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Injury and Fatal	ln(a)	-9.1476	0.591	-8.3723	1.2133	-8.9626	0.5258
	b	0.851	0.0662	0.7002	0.1425	0.8148	0.0592
	c	0.3564	0.3206	1.4753	0.7227	0.6489	0.3036
	φ	0.6073	0.1034	1.2532	0.3874	0.7158	0.1058
PDO	ln(a)	-8.0417	0.3645	-8.1072	0.7905	-8.0689	0.3306
	b	0.8911	0.0415	0.8478	0.0932	0.8847	0.0037
	c	0.198	0.1877	0.9718	0.5124	0.3426	0.187
	φ	0.3796	0.043	0.6811	0.1427	0.4357	0.0431
Crash counts	Injury/Fatal	645		130		775	
	PDO	2,645		503		3,148	

Exhibit 5-33: Results of Ramp Models developed for Freeway to Freeway and Other Ramp Types (16)

Crash Type	Variable	Freeway-Freeway Ramps (124 sites)		Other on-ramps (87 sites)		Other off-ramps (134 sites)	
		Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Injury and Fatal	ln(a)	-8.3446	0.9828	-12.8018	3.5616	-10.5913	2.1429
	b	0.7742	0.1055	1.0653	0.4019	0.8505	0.2453
	c	0.4447	0.2457	0.9403	4.7567	2.5585	4.7026
	φ	0.9077	0.1872	2.6718	2.1477	1.9855	1.04

Crash Type	Variable	Freeway-Freeway Ramps (124 sites)		Other on-ramps (87 sites)		Other off-ramps (134 sites)	
PDO	ln(a)	-7.8696	0.7589	-6.5062	1.142	-8.7222	1.259
	b	0.8694	0.082	0.4832	0.1376	0.7763	0.144
	c	0.5529	0.2129	4.9637	2.4673	5.1396	2.9624
	φ	0.7466	0.111	1.489	0.5102	1.403	0.365
Crash counts	Injury/Fatal	409		15		37	
	PDO	1,725		86		169	

Exhibit 5-34: Summary of Ramp Volume Data for Modeling (16)

Ramp Type	Mean AADT	Minimum AADT	Maximum AADT
Flared	6,199	63	62,842
Loop	4,787	40	33,543
Freeway to Freeway	12,170	320	43,692
Flared and Loop	5,728	40	62,842
Othres	4,368	13	24,934

Exhibits 5-35 and 5-36 are graphs showing the relationship between AADT and crash frequency for selected ramp types. These were derived from the models shown in exhibits 5-31 through 5-33. Consistent with results from previous studies, off ramps (within a particular category) seem to experience more crashes compared to on-ramps. For fatal and injury crashes, loop off ramps have the highest frequency, while for PDO crashes, freeway to freeway ramps have the highest frequency. Again, it should be emphasized that the models estimated in Parajuli et al. are meant to be predictive rather than causal models, and hence results regarding the safety effectiveness of ramp types based on these models should not be considered definitive.

Exhibit 5-35: Relationship between frequency of injury and fatal crashes and AADT for different ramp types (derived from Parajuli et al (16))

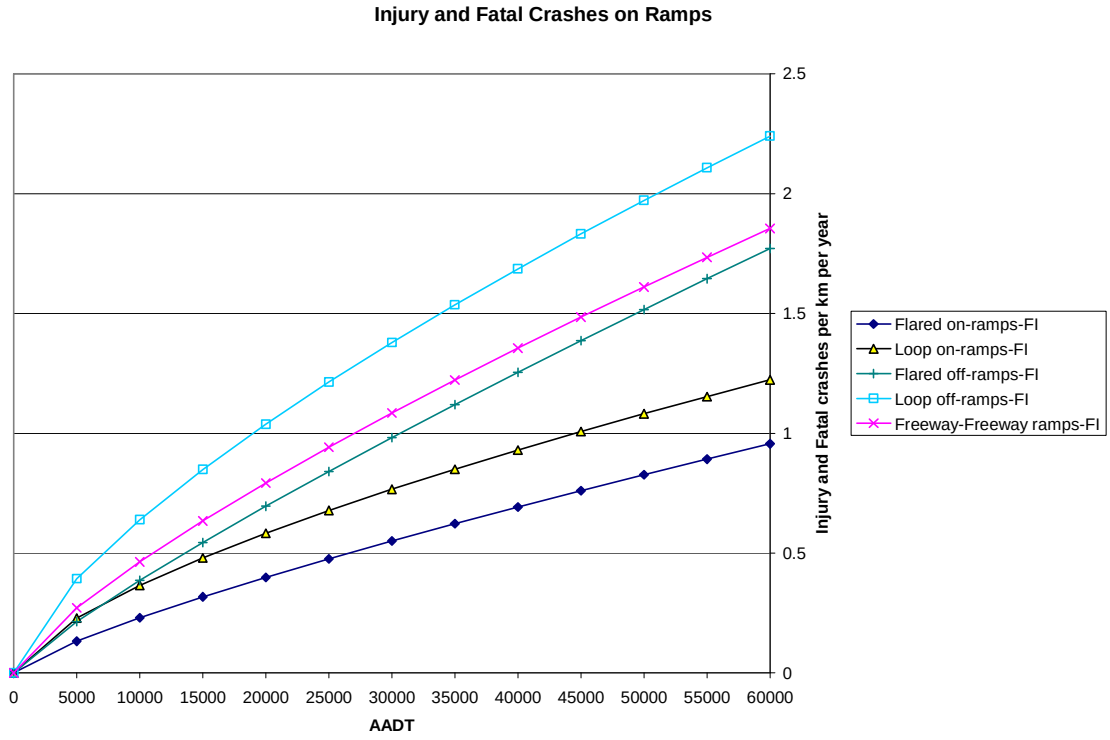
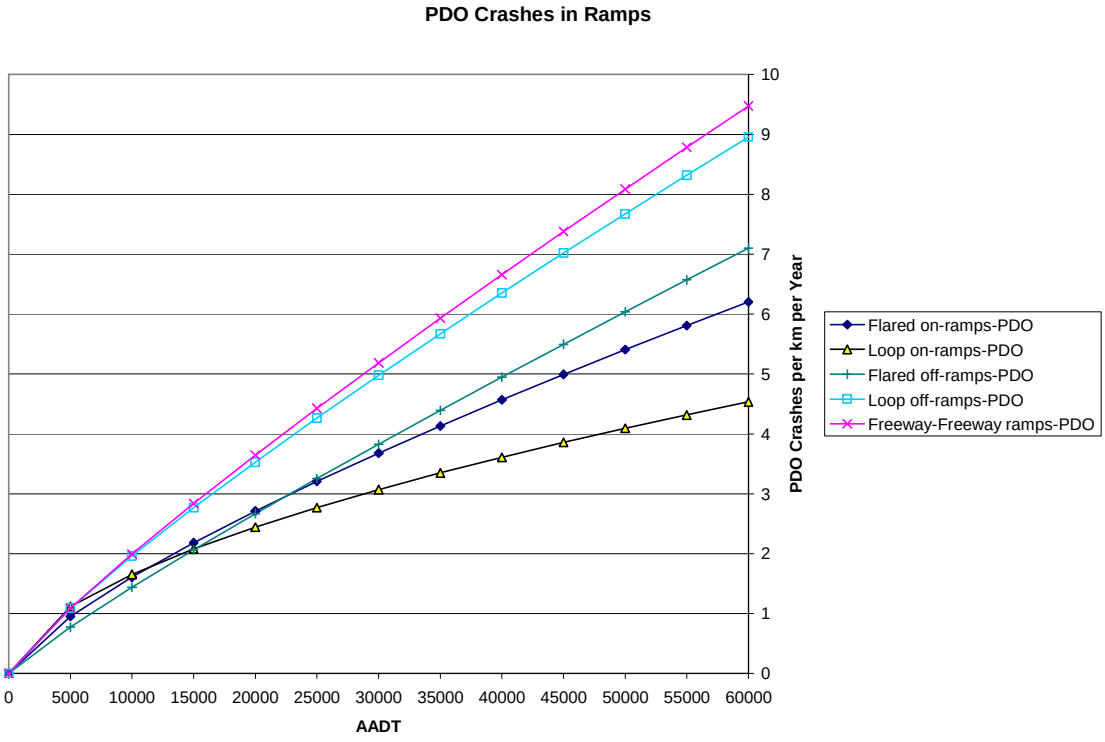


Exhibit 5-36: Relationship betweenPDO crashes and AADT for different ramp types (derived from Parajuli et al (16))



Twomey et al. (1993) reviewed literature dealing with the safety of interchange features (*7*). The findings illustrated in Exhibit 5-37 to Exhibit 5-39 are relevant to horizontal and vertical curvature on ramps; in summary:

- With the exception of loop ramps in rural areas, all right-side and outer-connection loops show an increase in accident rate with increasing maximum curvature.
- Straight outer-connections have lower accident rates than curved connections in both urban and rural areas and for all ADT levels, except 0 to 499 ADT in urban areas.
- Rural loops have higher accident rates with lower curvature, while urban loops have higher accident rates at higher curvature.
- Off-ramps have higher accident rates than on-ramps.
- Grade has no effect on on-ramp accidents but downhill off-ramps have a higher accident rate than uphill off-ramps.
- Ramps should be designed with flat horizontal curves except in rural areas.
- Sharp curves at the end of ramps and sudden changes from straight to sharp curves should be avoided.

Exhibit 5-37: Accident Rates on Outer Connections by Curvature and ADT (Table 1 from (7))

ADT	Urban[a]		Rural[a]	
	Straight <1°[b]	Curved >1°[c]	Straight <1°[b]	Curved >1°[c]
0-499	0.74	0.64	0.00	0.67
500-1000	0.34	0.72	0.13	0.49
1001-1500	0.64	0.64	0.00	0.61
1501-2000	0.15	0.93	0.00[d]	0.20
>2001	0.49	0.82	0.00[d]	0.72
all volumes	0.44	0.81	0.05	0.56

[a] Accidents per 100 million vehicles.
[b] Less than 1 degree of curvature.
[c] Greater than 1 degree of curvature.
[d] Less than 10 units.

Exhibit 5-38: Accident Rates on Loops by Curvature and ADT (Table 2 from (7))

ADT	Urban		Rural	
	Low[a] <12°[b]	High[a] >36°[c]	Low[a] <12°[b]	High[a] >36°[c]
0-499	0.000[d]	0.841	1.000	0.26
500-1000	0.000[d]	0.960	0.810	0.37
1001-1500	1.320[d]	0.890	0.000[d]	0.00
1501-2000	0.000[d]	0.720	0.000[d]	0.00
>2001	0.141	1.000	0.000[d]	0.00
all volumes	0.200	0.940	0.631	0.25

[a] Accidents per 100 million vehicles.
[b] Less than 12 degrees of curvature.
[c] Greater than 36 degrees of curvature.
[d] Less than 10 units.

Exhibit 5-39: Accident Rates by Ramp Type and Curvature (Table 3 from (7))

TABLE 3 Accident Rates by Ramp Type and Curvature

Ramp	No. Ramps	No.[a] Accidents	MV[b]	Accident Rate[c]
On-ramps				
Straight	180	282	524.5	0.54
Curved	150	229	335.2	0.68
Off-ramps				
Straight	188	420	536.0	0.78
Curved	142	258	310.1	0.81
Total on & off				
Straight	368	702	1060.5	0.66
Curved	292	487	645.3	0.75

[a] No. of Accidents
[b] Million Vehicles.
[c] Accidents per Million Vehicles.

NCHRP Report 500 Volume 1 notes that the lack of adequate exit ramp length encourages aggressive driving as manifested by shoulder or median driving (*12*). The lack of adequate entrance ramp length is cited as encouraging improper merging behavior.

Discussion: Increase horizontal curve radius of ramp roadway

Increasing the horizontal curve radius of a ramp roadway appears to decrease accidents of all types and severities. Elvik and Vaa provide an AMF of 0.77, and a 95% confidence interval of 0.72 to 0.83.(2) However, the baseline condition of the horizontal curve and the amount of change to the radius is not clear.

Discussion: Increase lane width of ramp roadway

Increasing lane width on off-ramps appears to decrease accidents. However, the baseline condition of lane width and the amount of widening is not clear.(*5*)

Discussion: Increase shoulder width of ramp roadway

Increasing shoulder width on acceleration lanes appears to increase injury accidents. However, the baseline condition of shoulder width and the amount of widening is not clear.*(5)*

Treatment: Modify ramp type or configuration

Elvik and Erke reviewed additional international literature to update the "Handbook of Road Safety Measures". The findings of their update meta-analysis were considered medium high, and a MCF of 1.8 was assigned to the standard errors reported, as shown in Exhibit 5-40.

Exhibit 5-40: Safety effects of modifying ramp type or configuration (9)

Author, date	Treatment	Setting Interchange type	Traffic Volume	Accident type Severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Erke, 2007	Provide long ramp instead of shortramp[1]	Unspecified	Unspecified	Accidents on the ramp, All severities	0.62	0.1
Elvik and Erke, 2007	Provide straight ramp instead of cloverleaf ramp				0.55	0.2
Elvik and Erke, 2007	Provide cloverleaf ramp instead of long ramp[1]				0.77	0.2
Elvik and Erke, 2007	Provide short ramp instead of directional loop ramp[1]				0.70	0.2

NOTE: Based on U.S. studies: Lundy 1967; Cirillo 1968, 1970; Yates 1970; Bauer, Harwood 1998; Janson et al. 1998; Bared, Giering & Warren 1999; Khorashadi 1998; Golob, Recker & Alvarez 2004; McCartt et al. 2004; Lee et al. 2002 and International studies: Wold 1995; Pajunen 1999; Tielaito 2000.
1) Definitions of short and long ramps were not specified

Interchange configuration includes many design elements. The following general guidance may be considered for interchange design elements:

- Direct/semi-direct connectors appear to have the best safety performance on the ramp proper compared to other configurations for both off-ramps and on-ramps.*(5)*
- Diamond configuration appears to have an adequate safety performance on the ramp proper compared to other configurations for off-ramps, but a poorer safety performance on the ramp proper for on-ramps.*(5)*

- Loop ramps appear to have a poorer safety performance on the ramp proper compared to other configurations for both off-ramps and on-ramps.*(5)*
- Outer connectors appear to have a poorer safety performance on the ramp proper compared to other configurations for off-ramps, but an adequate safety performance on the ramp proper for on-ramps.*(5)*

Summary

The Bauer et al. models are not useful for deriving AMFs. These models, while not in a counterintuitive direction, are likely to be inaccurate due to the many omitted variables and likely correlations among variables used.

These models, however, are recommended for predicting the safety performance of interchange ramps since these were done with a complete database using the latest modeling techniques. This is a very important application, given that the current edition of the HSM will not contain such models. The models will need to be calibrated in order to apply them in other jurisdictions and time periods using the recalibration procedure presented in Part III. A similar argument could be made for models from Parajuli et al. (*16*) and Sarhan et al. (*20*), which are again predictive (not causal models) and are likely to be at least a bit inaccurate due to the many omitted variables and likely correlations among variables used.

The Twomey et al. summary provides some logical insights, as does that of Neuman et al., but this is all that they provide. That many conclusions are in accord with good design practice (e.g. that long ramps with gentle curvature is good) suggests that the conclusions, though useful, add little to the inherent knowledge base of a good designer.

5.1.4. Ramp Terminals

Interchange ramp terminals are defined by the Highway Capacity Manual (2000) as "a junction with a surface street to serve vehicles entering or exiting a freeway" (plural is "terminals").

At this time, very little information is available regarding the safety and design of interchange ramp terminal intersections. Chapter 4 contains information on the design and operation of intersections and safety.

Pedestrians and cyclists are discussed in Section 5.3. Ramp terminal traffic control is discussed in Section 5.2.1.

Exhibit 5-41: Resources examined to investigate the safety effect of interchange ramp terminals

DOCUMENT	DESCRIPTION	COMMENT
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing meta-analysis results of safety studies for a variety of topics.	Not added to synthesis.
NCHRP Project 15-31 "Design Guidance for Freeway Mainline Ramp Terminals" CH2MHill	Objective: to develop improved design guidance for freeway mainline ramp terminals, should also address issues related to design of gore area and transitional area to ramp proper.	On-going. Not added to synthesis
(*13*) (Gluck, J., Levinson, H. S., and Stover, V., "NCHRP Report 420: Impact of Access Management Techniques." Washington, D.C., Transportation Research Board, National Research Council, (1999))	Limited discussion of ramp terminals	Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*8*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	No AMFs for ramp terminals. Some qualitative knowledge.	Added to synthesis.
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))	No information on ramp terminals	Not added to synthesis.
(Leisch, J. E., "Alinement." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 12, Washington, D.C., Highway Users Federation for Safety and Mobility, (1971))	Summarized in Various 1982	Not added to synthesis.
(Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))	No information on ramp terminals	Not added to synthesis.

Gluck et al. (1999) cite the AASHTO booklet, "A Policy on Design Standards – Interstate System (July 1991)" that access control on the crossing route should extend beyond the ramp terminal at least 100 ft in urban areas and 300 ft in rural areas (*13*). Gluck et al. also note that where intersections are too close to ramp terminals, heavy weaving volumes and accidents may result. They further note that the spacing between ramp terminals and cross-route access points must allow for proper merging, weaving, and diverging of ramp and arterial traffic. No analysis of accident data is reported.

These guidelines are supported by intuition and not by empirical evidence. As such, though insightful, they should be applied with the same consideration as any guideline that is not scientifically based.

Leisch et al. conclude that the arrangement of ramp terminals, including sequencing, spacing, and location of entrances and exits, is important in the operation and safety of interchanges.(*8*) For example, ramp sequences which create weaving sections, such as cloverleaf interchanges, can reduce the safety performance of an interchange. The spacing of consecutive entrances and exits can impact safety performance if adequate deceleration or acceleration lengths are not provided.(*8*)

5.1.4.1. Acceleration and Deceleration Lanes [Future Edition]

In future editions of the HSM, this section may provide information on the safety effects of acceleration and deceleration lanes to the ramp terminal intersection. Potential resources are listed in Exhibit 5-42.

Exhibit 5-42: Potential resources on the relationship between the design of acceleration and deceleration lanes at ramp terminals and safety

DOCUMENT
(American Association of State Highway and Transportation Officials, "A Policy on Geometric Design of Highways and Streets, 4th ed. Second Printing." Washington, D.C., (2001)) page 692-693
(Twomey, J. M., Heckman, M. L., Hayward, J. C., and Zuk, R. J., "Accidents and Safety Associated with Interchanges." Transportation Research Record 1383, Washington, D.C., Transportation Research Board, National Research Council, (1993) pp. 100-105.)

DOCUMENT
(Bared, J., Giering, G. L., and Warren, D. L., "Safety Evaluation of Acceleration and Deceleration Lane Lengths." ITE Journal, Vol. 69, No. 6, Washington, D.C., Institute of Transportation Engineers, (1999) pp. 50-54.)
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))
(Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))

5.1.5. Other Design Elements

Other design elements associated with interchanges are discussed in the following sections.

5.1.5.1. Closely Spaced Intersections [Future Edition]

In future editions of the HSM, this section may provide information on the effect of intersections closely spaced to interchanges on safety, including closely-spaced ramp terminal intersections, and other intersections on the crossroad. Potential resources are listed in Exhibit 5-43.

Exhibit 5-43: Potential resources on the relationship between the design of closely spaced intersections and safety

DOCUMENT
1983 Nordstrom and Stockton report, "Evaluation of Minor Freeway Modifications"

5.1.5.2. Lane Drops [Future Edition]

In future editions of the HSM, this section may provide information on the effect of lane drops at interchanges on safety, including sight distance to the lane drop, and providing an optional lane. No potential resources were identified.

5.1.5.3. Collector-Distributor Roads [Future Edition]

In future editions of the HSM, this section may provide information on the effect of collector-distributor roads on interchange safety. No potential resources were identified.

5.2. Safety Effects of Interchange Traffic Control and Operational Elements

The following sections discuss various traffic control devices and operational schemes employed at interchanges and interchange ramp terminal intersections. Such devices include intersection signalization, ramp metering, signage, delineation, pavement markings and markers.

5.2.1. Traffic Control at Ramp Terminals

Ramp terminals can be signalized, stop-controlled, free-flowing, yield-controlled, or have channelized right-turn movements.

This section is intended to address aspects of intersection traffic control that are unique to ramp terminals. Information on non-ramp terminal intersections is provided in Chapter 4.

Future editions of the HSM may benefit from research efforts underway in Ontario, Canada and the U.S. to model the safety of ramp terminals.

Exhibit 5-44: Resources examined to investigate the safety effect of traffic control at ramp terminals

DOCUMENT	DESCRIPTION	COMMENT
(*16*)(Parajuli, B., Persaud, B., Lyon, C., and Munro, J., "Safety Performance Assessment of Freeway Interchanges, Ramps, and Ramp Terminals", Presented at the Road Safety Engineering Management Section of the 2006 Annual Conference of the Transportation Association of Canada, Charlottetown, Prince Edward Island, (2006))	Developed negative binomial regression models relating crash frequency (PDO and fatal/injury) at ramp terminals as a function of AADT and presence/absence of slip lanes. Separate models developed for stop and signalized terminals.	Added to synthesis.
(Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Crashes." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Synthesis of strategies to reduce aggressive driving crashes.	No relevant information, not added to synthesis.
(*8*) (Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis of safety research including traffic control at interchanges	Suggested by NCHRP 17-18(4). No information on ramp terminal control. Information to mitigate wrong way movements added to synthesis.
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))	Comprehensive review includes information on traffic control device applications	Suggested by NCHRP 17-18(4). No relevant information, not added to synthesis.

Most of the models of ramp safety tend to exclude accidents occurring at the intersection. One explanation is that safety on the ramp is largely unrelated to the characteristics of the ramp and cross-street intersection. Another explanation is that different jurisdictions may be involved for the ramp and for the cross-street, and data on traffic volumes and accidents at the ramp terminal intersection are difficult to obtain.

Parajuli et al. developed negative binomial regression models relating the frequency of crashes at ramp terminals with traffic volume and a variable to indicate if the approach ramp is split (whether it has a slip lane for right turning traffic) (*16*). For signalized ramp terminals, the regression models took the following form:

Equation 5-9: Negative binomial regression model form for signalized ramp terminals (16)

$$Collisions / year = a(AADTramp)^{b}(AADTcross)^{c} e^{d(split)}$$

For stop controlled ramp terminals, the regression models took the following form:

Equation 5-10: Negative binomial regression model form for stop controlled ramp terminals (16)

$$Collisions / year = a(AADTtotal)^{b} e^{c(split)}$$

where AADTcross is the sum of approach volumes from two approaches of the side road, AADTramp is the sum of approach volumes from ramp and the service roads, AADTtotal is the total AADT approach the terminal from all approaches, and 'split' is an indicator variable taking the value of zero if the approach ramp is non-split and 1 if the approach ramp is split (i.e., with a slip lane for right turning traffic).

Exhibit 5-45 shows the parameter estimates and standard errors from the models including the negative binomial overdispersion parameter (φ). Exhibit 5-46 shows summary statistics on the ramp volumes used in the analysis. As expected, the models seem to indicate that crashes increase with increase in traffic volume. In addition, ramp terminals with a slip lane for right turning vehicles seems to be associated with fewer crashes – the slip lanes seems more effective in 4 leg signalized intersections compared to the other types. It should be emphasized that the models developed by Parajuli et al. were intended to be used as predictive models (safety performance functions) rather than causal models from which AMFs could be derived. Hence, findings discussed above regarding the possible benefits of slip lanes for right turning vehicles should not be considered definitive.

Exhibit 5-45: Parameter Estimates of Ramp Terminal Regression Models (16)

Collision Type	Parameter	3-leg signalized (140 sites)		4 leg signalized (23 sites)		3-leg and 4-leg stop controlled (144 sites)	
		Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Injury and Fatal	ln(a)	-12.7762	1.9129	-17.1286	3.9417	-6.9588	1.9920
	b	0.6187	0.1776	0.7150	0.2558	0.5028	0.2077
	c	0.6114	0.1946	0.9685	0.4299	-1.1066	0.3405
	d	-0.7555	0.1478	-2.4316	1.0432		
	φ	0.8132	0.1072	0.1501	0.1235	1.1730	0.4364
PDO	ln(a)	-11.5143	1.3120	-14.4269	4.1520	-6.7506	1.2659
	b	0.7360	0.1123	0.9566	0.2382	0.6087	0.1319
	c	0.5351	0.1181	0.6219	0.4321	-1.0104	0.1976
	d	-0.7636	0.1465	-1.3896	0.4710		
	φ	0.4257	0.0606	0.3328	0.1418	0.5499	0.1240
Crash Counts	Injury & Fatal	565		120		87	
	PDO	2,669		436		305	

Exhibit 5-46: Ramp Terminal Traffic Volume used in the Modeling (16)

Type of Ramp Terminal	Average Approach AADT		Minimum Approach AADT		Maximum Approach AADT	
	Ramp	Cross Road	Ramp	Cross Road	Ramp	Cross Road
3-leg signalized	13,641	39,972	1,148	7,360	57,590	116,969
4-leg	11,351	37,452	1,971	8,793	34,677	76,431

Type of Ramp Terminal	Average Approach AADT		Minimum Approach AADT		Maximum Approach AADT	
	Ramp	Cross Road	Ramp	Cross Road	Ramp	Cross Road
signalized						
3-leg stop controlled	3,261	13,171	83	283	14,552	65,801
4-leg stop controlled	4,026	10,997	1,394	4,384	11,495	31,756

Discussion: Traffic control elements to mitigate wrong way movements

Several treatments have been applied at various interchanges to mitigate wrong way movements at ramp terminals. Although AMFs are not available, the following treatments in combination appear to provide some safety improvement for various interchange types:(*8*)

- Large pavement arrows
- 24 inch stop bar
- DO NOT ENTER sign
- guide sign
- WRONG WAY sign
- NO RIGHT TURN / NO LEFT TURN signs
- KEEP RIGHT sign

5.2.2. Ramp Metering [Future Edition]

Ramp metering is primarily used for congestion management, and may reduce motor vehicle crashes by reducing sideswipes and reducing rear-end crashes caused by vehicles merging during congested periods. However, if not properly designed and operated, ramp meters may increase the crash risk on the surface crossroads.

In future editions of the HSM, this section will provide information on the safety effect of implementing ramp metering at ramp terminals. This section may address the effect of ramp metering on crash risk at an interchange, including the mainline crash risk, ramp crash risk, and the minor road crash risk. Potential resources are listed in Exhibit 5-47.

Exhibit 5-47: Potential resources on the relationship to ramp metering and safety

DOCUMENT
Abdel-Aty, M. and Gayah, V.V., "Comparison of Two Different Ramp Metering Algorithms for Real-Time Crash Risk Reduction", Presented at the 87th Annual Meeting of the Transportation Research Board", Washington, D.C., January 2008.
Lee, C., Hellinga, B., and Ozbay, K., "Quantifying Effects of Ramp Metering on Freeway Safety", Accident Analysis and Prevention, Vol. 38, pp. 279-288, 2006.
MinnDOT, "Twin Cities Ramp Meter Evaluation - Final Report", 2001
Upchurch and Cleavenger, "Freeway Ramp Metering's Effect on Accidents: Recent Arizona Experience", 1999

DOCUMENT
MinnDOT, "Trunk Highway 169 - Dynamic Ramp Metering Evaluation", 1998
(Jernigan, J. D., "Expected Safety Benefits of Implementing Intelligent Transportation Systems in Virginia: A Synthesis of the Literature." FHWA/VTRC 99-R2, Richmond, Virginia Department of Transportation, (1998))
Piotrowicz, "Ramp Metering Status in North America, 1995
Henry and Meyhan, "Six Year FLOW Evaluation", 1989
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))

5.2.3. Signs [Future Edition]

In future editions of the HSM, the safety effects of different types and locations for advance warning and information signs on the mainline for exit ramps at interchanges may be discussed in this section. Overhead signs, roadside signs, with retroreflective materials or illuminated and other guidance signs such as street names or route numbers may be of interest. It may be difficult to separate the safety effect of signing from design elements. This section will add to the information provided in other signage sections of the HSM. No potential resources were identified.

5.2.4. Delineation [Future Edition]

Future editions of the HSM may include information on the safety effects of delineated ramp roadways (e.g., chevrons, post mounted delineators), different pavement markings, and raised pavement markers. Delineation may be discussed for different interchange types and ramp types. This section will add to the information provided in other sections of the HSM on delineation. Potential resources are listed in Exhibit 5-48.

Exhibit 5-48: Potential resources on the relationship of delineation, and pavement markings of interchanges and safety

DOCUMENT
(Smiley, A., "Driver Performance at Interchanges." (2004))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))
(Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))

5.3. Pedestrian and Bicyclist Safety at Interchanges

At interchange ramp terminals, there may be a requirement for the local agency to ensure the continuity of the facilities for pedestrians and bicyclists. This continuity may not be fully considered by other jurisdictions responsible for freeways and higher level crossing roads. Pedestrians are particularly vulnerable to high speed approach vehicles turning at ramp terminals.

No specific AMFs were found in the available literature related to pedestrian and bicyclist treatments at interchanges. Discussion of bicyclists on freeways and at ramp terminals is provided based on limited literature sources. Behavioral studies of pedestrian safety at interchanges are also discussed.

In future editions of the HSM, this section may include quantitative knowledge related to pedestrian and bicyclist safety at interchanges, particularly at ramp terminals. The following treatments may be included: traffic and pedestrian signals, refuge islands, traffic control devices, and specific policies related to pedestrian and bicyclist activity within these areas.

This section will only address aspects of pedestrian and cyclist safety on segments and at intersections that are unique to ramp terminals. Chapter 3 contains related information on these road users on roadway segments. Chapter 4 contains other related information on these road users at intersections.

Exhibit 5-49: Resources examined to investigate the safety of pedestrians and bicyclists at interchanges

DOCUMENT	DESCRIPTION	COMMENT
(*14*) (Ferrara, T. C. and Gibby, A. R., "Statewide Study of Bicycles and Pedestrians on Freeways, Expressways, Toll Bridges and Tunnels." FHWA/CA/OR-01/20, Sacramento, California Department of Transportation, (2001))	Conducted an analysis of bicycle and pedestrian accident data, in part to develop procedures for allowing bicyclists to cross ramps.	Suggested by NCHRP 17-18(4). Added to synthesis.
(Staplin, L., Lococo, K., Byington, S., and Harkey, D., "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians." FHWA-RD-01-051, Washington, D.C., Federal Highway Administration, (2001))	Several strategies to reduce crashes involving older drivers and pedestrians.	Contained no information specific to pedestrians and cyclists at interchanges. Not added to synthesis.
(*15*) (Zeidan, G., Bonneson, J. A., and McCoy, P. T., "Pedestrian Facilities at Interchanges." FHWA-NE-96-P493, Lincoln, University of Nebraska, (1996))	Study to develop design guidelines for pedestrian facilities at interchanges in Nebraska	Added to synthesis.
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))	Comprehensive review includes information on accommodation of pedestrians and bicyclists at interchanges	Suggested by NCHRP 17-18(4). General discussion of pedestrian and bicyclist design features at ramps, with no research or evaluation results. Not added to synthesis.

Discussion: Bicyclists on freeways, ramps, and at junctions

A study by Ferrara and Gibby in 2001 for the California Department of Transportation (Caltrans) involved a statewide analysis of bicyclist and pedestrian use and accident data on freeway shoulders, including toll bridges and tunnels (*14*). Caltrans policy permits bicyclist travel

on these facilities in the absence of a suitable alternate route. The purpose of the study was to clarify some of the relevant issues and develop guidelines for bicyclist and pedestrian traffic on freeway shoulders, bridges, and tunnels.

In 1999, Caltrans officials met with members of bicycle advocacy groups and the California Highway Patrol to discuss the proposed study and develop a list of issues to be addressed. One of the questions was, "What special factors for bicyclist/pedestrian safety are there through interchanges and on/off-ramps?". The Caltrans study consisted of several parts(*14*):

- A survey of other DOTs;
- A literature review;
- A study of bicyclist-related crashes on freeways in Caltrans Districts 1, 2, and 3, using data from the Traffic Accident Surveillance Analysis System (TASAS) and actual traffic accident reports;
- A study of pedestrian crashes on freeways in Districts 2 and 3, also based on data from TASAS and traffic accident reports;
- An Internet survey of 1,239 bicyclists;
- Analysis of the accident history of certain bridges and tunnels; and
- A statistical analysis of all crashes on freeways, using the independent variable of Bicycle Status (permitted vs. prohibited) to predict accident rates.

From 1990 to 1998, 41 pedestrian and bicyclist crashes on freeways were included in the study, with bicycle-motor vehicle accidents accounting for 61% of the total (25 out of 41). Fourteen of the twenty-five bicycle-motor vehicle crashes occurred at a ramp terminal (10 at off-ramps and 4 at on-ramps (*14*)).

The literature review by Ferrara et al. cited another project that examined Caltrans records for bicycle-motor vehicle crashes from 1988 to 1997 (California Department of Transportation, no date). The records showed that 2,739 bicycle-motor vehicle crashes had been reported on California freeways during that time frame, and that many of them occurred near freeway ramp junctions. During the ten-year period, across a 4,100-mile freeway network, only 3 bicyclist fatalities and 15 bike crashes (0.4%) occurred at both non-ramp and non-intersection locations, and 86 bike crashes (3.1% of the total) occurred on freeway shoulders. A total of 2,556 bicycle-motor vehicle crashes (93.7%) occurred at ramps or intersections. It is evident that bicyclists are most vulnerable to motor vehicle traffic at these areas of the freeway system (*14*). Ferrara et al. note that these results are consistent with the 1995 study by Hunter et al., which concluded that intersections, driveways, and other junctions need special consideration when freeways are designed due to the sizable threat that they present for cyclists. Another report cited by Ferrara et al. (Clarke, 1995), suggests that the best option for accommodating cyclists at ramps is to encourage riders to cross at right angles to motor vehicle traffic, and at a point where they have adequate sight distance (*14*).

Ferrara et al. recommended that cyclists using these high-speed roadways should be required to wear a helmet and have a driver's license. In addition, bicyclist traffic should only be permitted on freeways that have a minimum 8 ft shoulder width. In addition, Ferrara et al. recommended that drain inlets should be modified to reduce challenges for cyclists (*14*).

A formal bicycle-counting program was recommended by Ferrara et al. to facilitate further research into issues related to bike usage of freeway shoulders, bridges, and tunnels. Bicycle traffic statistics are necessary in order to evaluate the effectiveness of various roadway treatments in enhancing bicyclist safety. One challenge mentioned by Ferrara et al. is the fact that

so few serious crashes (28% according to one survey) are ever reported (Moritz, 1996), which limits the reliability of police-reported crash data (*14*).

Returning to the issue of safety at interchanges, the authors emphasize that "the responsibility of crossing a freeway ramp safely should rest with the bicyclist" (*14*). However, the report also noted Caltrans' additional requirement to assess all ramps where bicyclists are allowed to cross on the freeway side. Since cyclists must find adequate gaps in order to safely cross a ramp, Ferrara et al. stated that cyclists should be prohibited from using ramps that have a repeated peak hour volume of 500 veh/hr or more. This recommendation is based on the assumption that a cyclist needs a 7-second gap in the ramp traffic stream in order to make a 40 ft crossing from a stopped position (*14*).

The report also recommends that to be safe, bicyclists attempting to cross a freeway ramp require a minimum sight distance of 760 ft in areas where approaching traffic has a 70 mph speed limit. A sight distance of 460 ft is sufficient when the approach speed is 45 mph. The required sight distance must be equal to, or greater than, the speed of oncoming vehicles multiplied by the 7-second gap necessary to make a ramp crossing. However, even adequate sight distance is not enough to counter traffic volumes at some locations which do not allow the 7 seconds or more required for a cyclist to proceed across the ramp (*14*).

Ferrara et al. recommend that prohibitory signs be posted and alternate routes provided for bicyclists at locations that do not meet both traffic volume levels and sight distances criteria. Furthermore, it is recommended that bicyclists should be restricted from using multilane ramp crossings and weave areas (*14*). Ferrara et al. did not evaluate any roadway treatments related to interchanges.

Discussion: Pedestrians on freeways, ramps, and at junctions

For the period between 1990 and 1998, the Caltrans study found that 327 pedestrian crashes occurred on freeways (*14*). Of these, 64.5% involved drivers who had stopped on the freeway and exited their vehicle. Snow and ice were a major factor in 26.3% of the incidents, and 53.2% of the accidents occurred while pedestrians were assisting a disabled vehicle.

Since most pedestrian crashes on freeways involve motorists who exit their cars to perform maintenance (such as installing snow chains), it was evident that drivers need enhanced education concerning the safe procedure for emergency situations on freeways (*14*).

The purpose of a study by Zeidan et al. was to develop design guidelines for pedestrian facilities at interchanges in Nebraska (*15*). The authors refer to a study conducted in 1978 (Knoblauch et al.), which determined that 42% of all pedestrian accidents on freeways occurred at interchanges. This study underscores the importance of design considerations for pedestrians. Factors such as high volumes of through traffic on cross streets, the large number of vehicles turning onto or off of ramps, wide cross sections, and high speeds are mentioned as contributing to the difficulty of negotiating interchange areas on foot. In addition, the configuration of an interchange creates many potential conflict points between pedestrians and motor vehicles (*15*).

The Zeidan study began with a literature review, which revealed only one document presenting information on pedestrian facilities at interchanges. A lack of national design standards was also noted. Supplemental to the literature review, state departments of transportation were surveyed regarding current state-of-the-art practices; 29 state DOT's responded. Roadway designers and well-known experts on pedestrian issues were also interviewed. Results of the literature review, the surveys, and the expert interviews perpetuated

field studies of pedestrian behavior with regard to sidewalks and crosswalks at several freeway interchanges in the city of Omaha (*15*).

At three locations that had existing sidewalks on the cross street, pedestrian use of those sidewalks was observed. Sidewalks were being used almost equally at all three interchange sites, which led Zeidan et al. to conclude that sidewalks will be used in developed areas that generate pedestrians. The three locations observed in this study all had development on all four sides of the interchange; if this were not the case, sidewalks would only be required on the side of the cross street that is developed and creating pedestrian traffic (*15*).

At two other interchanges, observations were made of pedestrian behavior in the crosswalks. The pedestrians at one site were mostly local residents; those at the other site were not. At the first site (with mostly local resident pedestrians), it was found that (*15*):

- 90% of the pedestrians used a proper search pattern before entering the crosswalk to cross the ramp, especially when vehicles were approaching from more than one direction;
- 40% were vigilant in continuing to search for traffic while crossing the ramps;
- 81% followed the intended crossing path, which generally had been designed to minimize exposure time to traffic; and
- 78% complied with pedestrian signals, especially when vehicles were present, which suggest higher compliance when pedestrians perceived the need to do so.

Motorist behavior was also observed in terms of whether or not they yielded to pedestrians in crosswalks at the interchanges. Only a very low percentage (10%) of motorists yielded to pedestrians crossing the ramps (*15*).

At the second location, where many non-local pedestrians were headed to a stadium event, pedestrians exhibited extremely cautious behavior. All of the pedestrians observed used a proper search pattern, and more than 90% showed vigilance while crossing the ramp. Pedestrians were more likely (58% vs. 40% when crossing with traffic) to follow the intended path across the ramp when walking in the opposite direction of cars in the adjacent travel lane (*15*).

The study also found that a high percentage of pedestrians comply with pedestrian signals (e.g., WALK/DON'T WALK) at interchange ramps, particularly when vehicle volumes were high. Overall, motorist yielding behavior, particularly on entrance ramps, was very low. The study did not quantify motorist behavior.

Zeidan et al. developed guidelines for designing pedestrian facilities at interchanges, which include the following (*15*):

- Sidewalks "should be provided between the origins and destinations of existing and future pedestrian trips within the interchange" (page 45).
- Grade separated crossings "may be warranted if a benefit-cost analysis justifies their use".
- Various types of regulatory signs are mentioned from the MUTCD as possibly appropriate to direct pedestrians to use crosswalks or sidewalks, warn pedestrians about certain hazards, provide information about traffic signal operation, or to warn drivers about pedestrians ahead.
- Traffic signals with pedestrian signals are mentioned as possible treatments within interchange areas, if warranted.

- Refuge islands may enhance traffic signal operation, and may be used to keep crosswalk lengths from exceeding 75 ft. Refuge islands must meet ADA requirements and also comply with AASHTO design guidelines.
- Pavement edge lines are suggested treatments on interchange ramps to reduce the effective lane width on the ramp, and thereby reduce vehicle speeds.
- Illumination is also mentioned as a potential treatment, if it meets appropriate warrants.

Zeidan et al. also provide specific criteria describing where marked crosswalks should and should not be provided with respect to interchange ramps (*15*).

Zeidan et al. did not formally evaluate any of the countermeasures, and therefore no AMFs were developed or reported related to interchange areas for pedestrians.

Summary

Only two studies were found which provide information on the safety of pedestrians and/or bicyclists relative to interchange areas. In summary, there is a high potential for pedestrian and bicyclist crashes at the intersection of entrance and exit ramps at interchanges due to high-speed vehicles entering and leaving the freeways. Although pedestrians and bicyclists typically use caution at such crossings, motorists have a low yield rate, particularly at entrance ramps. Furthermore, high vehicle speeds, poor sight distance, high traffic volumes, combined with vulnerable pedestrians and cyclists (e.g., children, older pedestrians) can compromise the safety of the crossing environment for both pedestrians and cyclists.

Therefore, there is often a need to provide specific roadway treatments to help enhance pedestrian and cyclist safety. Some of the possible safety enhancements include adding sidewalks, careful use of crosswalks (and crosswalk enhancements), appropriate warning and regulatory signing (for motorists and pedestrians), traffic and pedestrian signals (if warranted), refuge islands, pavement edgelines (to narrow the width of lanes on ramps), and overhead lighting. No specific AMFs were found in the literature related specifically to such treatments for pedestrians and bicyclists at interchanges.

One study also recommended developing specific policies regarding cyclist and pedestrian use of freeways. Recommendations included insuring that freeways have a shoulder width of at least 8 ft, and well-designed drain inlets to reduce potential challenges for cyclists. Improving sight distance for pedestrians and cyclists at ramp crossings was another recommendation, as well as providing safer alternative routes for pedestrians and bicyclists.

5.4. Safety Effects of Other Interchange Elements

This section of the HSM provides information on the safety effects of the various secondary design and operational elements of interchanges. Topics discussed in the following sections include interchange spacing, illumination, transit stop placement, weather issues, and pavement materials.

5.4.1. Interchange Spacing [Future Edition]

In future editions of the HSM, this section may provide information on the safety effect of spacing between interchanges. This section may be related to Section 5.1.2 with respect to the weaving, merge and diverge areas, which are affected by the distance between consecutive interchanges. Auxiliary lanes between closely spaced interchanges will be discussed in this section. Potential resources are listed in Exhibit 5-50.

Exhibit 5-50: Potential resources on the effect of interchange spacing on safety

DOCUMENT
(Pilko, P., Bared, J.G., Edara, P.K., and Kim, T., "Safety Assessment of Interchange Spacing on Urban Freeways – Enhanced Models", Presented at the 86th Annual Meeting of the Transportation Research Board, Washington, D.C., January 2007)
(Bared, J. G., Edara, P., Kim, T., "Safety Impact of Interchange Spacing on Urban Freeways", Presented at the 85th Annual Meeting of the Transportation Research Board, Washington, D.C., January 2006)
(Chiu, M., Robinson, J. B., Boychuk, R., and Smiley, A., "Evaluating the Road Safety Effects of Interchange Spacing: A Multidisciplinary Approach." Ottawa, Ontario, Canada, Transportation Association of Canada (TAC) Annual Conference 2004, (2004))
(Smiley, A., "Driver Performance at Interchanges." (2004))
(Twomey, J. M., Heckman, M. L., Hayward, J. C., and Zuk, R. J., "Accidents and Safety Associated with Interchanges." Transportation Research Record 1383, Washington, D.C., Transportation Research Board, National Research Council, (1993) pp. 100-105.)
(Twomey, J. M., Heckman, M. L., and Hayward, J. C., "Safety Effectiveness of Highway Design Features: Volume IV - Interchanges." FHWA-RD-91-047, Washington, D.C., Federal Highway Administration, (1992))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))
(Oppenlander, J. C. and Dawson, R. F., "Interchanges." Traffic Control and Roadway Elements - Their Relationship to Highway Safety No. 9, Washington, D.C., Highway Users Federation for Safety and Mobility, (1970))

5.4.2. Illumination [Future Edition]

Illumination is discussed for other sites, such as intersections and roadway segments. In future editions of the HSM, this section will add to that information and may describe the safety effect of partial and full illumination of interchanges, including illumination of the ramp terminal intersection. Various types of illumination may be discussed, including high mast. The effect of illumination along the highway may influence the effect of illumination at interchanges. Potential resources are listed in Exhibit 5-51.

Exhibit 5-51: Potential resources on the effect of illumination on interchange safety

DOCUMENT
(Monsere, C.M. and Fischer, E.L., "Safety Effects of Reducing Freeway Illumination for Energy Conservation", Presented at the 87th Annual Meeting of the Transportation Research Board, Washington, D.C., January 2008)
(Elvik, R., "Meta-Analysis of Evaluations of Public Lighting as Accident Countermeasure." Transportation Research Record 1485, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 112-123.)
(Griffith, M. S., "Comparison of the Safety of Lighting Options on Urban Freeways." Public Roads, Vol. 58, No. 2, McLean,Va., Federal Highway Administration, (1994) pp. 8-15.)
(Keck, M. E., "The Relationship of Fixed and Vehicular Lighting to Accidents." FHWA-SA-91-019, McLean, Va., Federal Highway Administration, (1991))
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))

5.4.3. Transit Stop Placement [Future Edition]

The relationship of transit stops at interchanges and safety may be discussed in this section in future editions of the HSM. Transit stops may be located on ramp roadways or at interchange ramp terminals, and may take the form of large transportation mode transfer points. Potential resources are listed in Exhibit 5-52.

Exhibit 5-52: Potential resources on the effect of transit stop placement on interchange safety

DOCUMENT
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))

5.4.4. Weather Issues [Future Edition]

In a similar manner as presented in other chapters, weather-related safety treatments and the safety impact when installed at interchanges may be discussed in the following sections.

5.4.4.1. Adverse Weather and Low Visibility Systems [Future Edition]

In future editions of the HSM, the safety effect of adverse weather and/or low visibility at or near interchanges may be discussed in this section. This section would build on similar discussions in other chapters. No potential resources were identified.

5.4.4.2. Snow, Slush, and Ice Control [Future Edition]

In future editions of the HSM, this section may address the effect that snow, slush and ice control methods have on interchange safety performance. This section would build on similar discussions in other chapters. No potential resources were identified.

5.4.4.3. Wet Pavement [Future Edition]

In future editions of the HSM, this section may discuss the safety effect of wet weather, and results conditions such as hydroplaning; and the use of high-friction pavements may be of interest here. This section would build on similar discussions in other chapters. No potential resources were identified.

5.4.5. Pavement Materials [Future Edition]

Drivers perform a great number of maneuvering at approaches to interchanges and at the entry ramp areas. The safety impact of different materials for the surface of these areas may be discussed here in future editions of the HSM. This section would build on similar discussions in other chapters. No potential resources were identified.

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Chapter 6: Special Facilities and Geometric Situations

Chapter 6. Special Facilities and Geometric Situations

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6.1. Railroad-Highway Grade Crossings

According to Tustin et al., railroad-highway grade crossings are unique in that they constitute the intersection of two transportation modes, which differ both in the physical characteristics of their rights-of-way and in their operations (*1*). A railroad-highway crossing, like any highway-highway intersection, involves either a separation of grades or a crossing at-grade (*2*). In the past, railroad companies were allowed to build their tracks across streets and roads at-grade primarily to avoid the high capital costs of grade separations (*1*). Initially, safety at railroad grade crossings was not considered to be a key problem but with the growing volumes of traffic on highways and the introduction of faster vehicles both on the road and on the track, the issue of safety has come to the forefront over the last few decades.

The components of a railroad-highway crossing are divided into two categories: the highway and the railroad. The highway component can be further classified into four elements: the driver; vehicle, roadway, and pedestrians (and other vulnerable road users). The railroad component is classified into its two primary elements: the train; and the track. Given the presence of these components, the location where these two different modes of transportation intersect is designed to incorporate the basic needs of both highway vehicles and trains. A grade separated railroad-highway crossing, by its nature, eliminates the conflict points between the two modes of transportation and consequently, can be regarded as a separate type of facility altogether from grade crossings. Through the elimination of the point of intersection between highway and railroad, a grade-separated crossing provides the highest level of crossing safety (*1*). The focus of the HSM is on railroad-highway grade crossings. Grade-separated crossings are not included.

The "Railroad-Highway Grade Crossing Handbook" (*1*) contains further information on the various components that constitute railroad-highway grade crossings.

This section of the HSM provides information on the safety impact of design elements, traffic control devices, and operational characteristics at railroad-highway grade crossings for all road users.

Safety issues related to pedestrians and bicyclists, and the safety effects of other railroad-highway grade crossing elements such as the presence of trucks and transit vehicles in the vicinity of the crossing may be included in future editions of the HSM. Future editions of the HSM may also be able to provide information for different types of railroad-highway grade crossings such as heavy rail, high speed passenger trains, light rail transit, or regional passenger trains, single and multiple tracks.

6.1.1. Safety Effects of Railroad-Highway Grade Crossing Design Elements

According to AASHTO, the geometric design of a railroad-highway grade crossing involves several elements, namely the alignment, profile, sight distance and cross section (*2*). Furthermore, the design of such crossings and the decision on the type of warning device installed there may benefit from simultaneous action, since the appropriate design may vary with the type of warning device used (*2*). For instance, the highway will ideally cross the railroad at or nearly at right-angles for both active and passive railroad-highway grade crossings. The angle of the crossing is perhaps more critical for passive crossings since passive crossings are controlled with only signs and pavement markings (*2*). Similarly, sight distance is a primary consideration particularly for railroad-highway grade crossings without train-activated warning devices because at these crossings, the driver is expected to visually detect the train and be able to determine whether to stop or continue crossing (*2*).

With regards to the horizontal alignment at railroad-highway grade crossings, AASHTO's "Policy on Geometric Design of Highways and Streets" states that wherever practical, crossings are to be avoided if possible on either highway or railroad curves (*2*). Roadway curvature inhibits a driver's view of a crossing ahead, and a driver's attention may be focused on the curve rather than the train. Likewise, railroad curvature may inhibit a driver's view down the tracks from a stopped position at the crossing and on the approach to the crossing.

In terms of the vertical alignment, it is desirable for the intersection of highway and railroad to be as level as possible for the benefit of improved sight distances and acceleration distances, better rideability, and braking (*2*).

Additional information on the various design elements pertaining to railroad-highway grade crossing is available in the "Railroad-Highway Grade Crossing Handbook" (*1*) and AASHTO's "Policy on Geometric Design of Highways and Streets"

This section of the HSM provides information on the safety effects of the various design elements of railroad-highway grade crossings. The adjacent land use and environment (i.e., urban versus rural) heavily influences the presence of pedestrians, bicyclists and familiar/unfamiliar drivers, as well as the overall level of exposure in terms of rail and vehicular traffic. As such, whenever possible, the safety impact of the design elements related to railroad-highway grade crossings are discussed in the context of these different environments. While this edition of the HSM introduces the reader to the individual design elements that play a role in the overall safety of the crossing, future editions may specifically address and quantify the safety impacts of design elements such as horizontal and vertical alignments, sight distances, and proximity of highway-highway intersections and other access points.

Private crossings will not be addressed separately. Pedestrians and bicyclists are discussed in Section 6.1.3.

6.1.1.1. Crossing Design [Future Edition]

To be addressed in future editions.

6.1.1.2. Cross-section Elements [Future Edition]

To be addressed in future editions.

6.1.1.3. Roadside Elements [Future Edition]

To be addressed in future editions.

6.1.1.4. Alignment Elements [Future Edition]

The safety impacts of different vertical and horizontal alignments and their combinations at approaches to railroad-highway grade crossings may be discussed in this section in future editions of the HSM. Potential resources are listed in Exhibit 6-1.

Exhibit 6-1: Potential resources on the alignment of railroad-highway grade crossings and safety

DOCUMENT
(Bowman, B. L., "The Effectiveness of Railroad Constant Warning Time Systems." Transportation Research Record 1114, Washington, D.C., Transportation Research Board, National Research Council, (1987) pp. 111-122.)
(Wooldridge, M. D., Fambro, D. B., Brewer, M. A., Engelbrecht, R. J., Harry, S. R., and Cho, H., "Design Guidelines for At-Grade Intersections Near Highway-Railroad Grade Crossings." FHWA/TX-01/1845-3, Austin, Texas Department of Transportation, (2000))

6.1.1.5. Sight Distance [Future Edition]

In future editions of the HSM, this section may discuss the safety impact of sight distances to the crossing, sight distance to crossing signals, different angles of intersecting tracks and roadways, sight triangles, roadside hardware, and vegetation, at different operating vehicular and train speeds. Potential resources are listed in Exhibit 6-2.

Exhibit 6-2: Potential resources on the sight distance to railroad-highway grade crossings and safety

DOCUMENT
(Bowman, B. L., "The Effectiveness of Railroad Constant Warning Time Systems." Transportation Research Record 1114, Washington, D.C., Transportation Research Board, National Research Council, (1987) pp. 111-122.)
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))
(Richards, H. A. and Bridges, G. S., "Railroad Grade Crossings." Traffic Control and Roadway Elements - Their Relationship to Highway Safety Vol. Revised, No. 1, Washington, D.C., Automotive Safety Foundation, (1968))

6.1.2. Safety Effects of Railroad-Highway Grade Crossing Traffic Control and Operational Elements

According to the MUTCD, traffic control for railroad-highway grade crossings includes signs, signals markings, other warning devices and their supports along highways approaching and at the crossings for the reasonably safe and efficient operation of both rail and highway traffic (*3*). The MUTCD recognizes that a railroad-highway grade crossing "is situated on a right-of-way available for the joint use of highway and railroad traffic" (*3*). Unlike highway-highway intersections where the right-of-way is alternately assigned to opposing traffic streams, at railroad-highway grade crossings, the right-of-way is always given to the train because of the way it operates and the difficulty in trains responding to quick stops and starts due to their sheer mass. Thus, vehicles on the highway approach are required to stop to avoid a crash, while a train approaching a highway-rail grade crossing has no such requirement unless there is a station at the site.

The Federal Uniform Vehicle Code stipulates that traffic control devices utilized at railroad-highway grade crossings may provide at least two notices of the crossing presence – one in advance to the crossing and the other in proximity to the crossing (*4*). These two classifications of traffic control devices are dealt with in this section.

While the Highway Safety Manual focuses on providing users with quantitative evidence of the safety effects of various treatments measured by accident experience, note that little evidence is available for railroad crossings. This is due to the limited data available; vehicle and pedestrian accidents at grade crossings are relatively infrequent, although usually severe in nature (due to the size and mass of the trains involved). That is, it is just as likely to have zero crashes in a given time period due to randomness as due to the traffic engineering treatment (*5*). Subsequently, many researchers have focused on crossing user movements or risky behavior that present a threat of crash with a train without an actual crash occurring.

The following sections discuss the safety impact of advance traffic control and warning alternatives on the approaches to railroad-highway grade crossings, and the traffic control at the crossings themselves.

Additional information on preemption of traffic signals is available from the ITE Recommended Practice "Preemption of Traffic Signals Near Railroad Crossings" (*6*).

6.1.2.1. Signs and Markings

Advance traffic control and warning alternatives for railroad-highway grade crossings typically consist of signs and pavement markings. Other advance control and warning alternatives include flashing light signals, vehicle activated signals, and transverse rumble strips. The MUTCD provides details on the types of advance warning signs and pavement markings for use at railroad-highway grade crossings, including the standards, guidance and options prescribing when these signs and pavement markings are to be used.(*3*) Further details regarding the use of advance warning signs and pavement markings are available in the MUTCD.

The discussion in this section excludes consideration for signals and gates. These topics are discussed in Section 6.1.2.2.

Exhibit 6-3: Resources examined to investigate the safety effect of signs and markings at railroad-highway grade crossings

DOCUMENT	DESCRIPTION	COMMENT
(*14*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing the effects of various road safety measures and treatments using a meta-analytical approach.	Added to synthesis.
(*7*) (Lerner, N. D., Llaneras, R. E., McGee, H. W., and Stephens, D. E., "NCHRP Report 470: Traffic Control Devices for Passive Railroad-Highway Grade Crossings." Washington, D.C., Transportation Research Board, National Research Council, (2002))	Includes a detailed critical review of research on the effect of traffic control devices at rail-highway grade crossings; Also evaluated traffic control devices.	Reference suggested by NCHRP 17-18(4). Added to synthesis. Provides summary statement about state of the practice. No safety evidence found.
(Korve, H. W., Ogden, B. D., Siques, J. T., Mansel, D. M., Richards, H. A., Gilbert, S., Boni, E., Butchko, M., Stutts, J. C., and Hughes, R. G., "TCRP Report 69: Light Rail Service: Pedestrian and Vehicular Safety." Washington, D.C., Transportation Research Board, National Research Council, (2001))	Presents "before and after" evaluation of the safety effect of pre-signals at highway-rail grade crossings using motorist behavior, not accidents.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Korve, H. W., "NCHRP Synthesis of Highway Practice Report 271: Traffic Signal Operations Near Highway-Rail Grade Crossings." Washington, D.C., Transportation Research Board, National Research Council, (1999))	Report presents an overview of current practices regarding the operation of traffic signals at intersections located close to highway-rail grade crossings.	Not added to synthesis.
(*8*) (Fambro, D. B., Noyce, D. A., Frieslaar, A. H., and Copeland, L. D., "Enhanced Traffic Control Devices and Railroad Operations for Highway-Railroad Grade Crossings: Third-Year Activities." FHWA/TX-98/1469-3, Austin, Texas Department of Transportation, (1997))	Research evaluated the effectiveness of a vehicle-activated strobe light and supplemental sign enhancements at passive railroad crossings using a before and after study which investigated changes in speed at the crossings, a driver survey and a driver observation study.	Reference suggested by NCHRP 17-18(4). Added to synthesis. Only evidence of improvements to speed and positive changes to driver behavior.

DOCUMENT	DESCRIPTION	COMMENT
(Richards, S. H., Heathington, K. W., and Fambro, D. B., "Evaluation of Constant Warning Times Using Train Predictors at a Grade Crossing with Flashing Light Signals." Transportation Research Record 1254, Washington, D.C., Transportation Research Board, National Research Council, (1990) pp. 60-71.)	Researchers evaluated the effects of train predictors and constant warning time (CWT) on crossing safety and driver response measures (including risky behavior) at a grade crossing with flashing light signals.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Fambro, D. B., Heathington, K. W., and Richards, S. H., "Evaluation of Two Active Traffic Control Devices for Use at Railroad-Highway Grade Crossings." Transportation Research Record 1244, Washington, D.C., Transportation Research Board, National Research Council, (1989) pp. 52-62.)	Study investigated the effectiveness of two traffic control devices in changing driver behavior using a before-after study approach. The two devices evaluated for potential safety benefits were four-quadrant flashing light signals with overhead strobes and standard highway traffic signals (pre-signals).	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Heathington, K. W., Fambro, D. B., and Richards, S. H., "Field Evaluation of a Four-Quadrant System for Use at Railroad-Highway Grade Crossings." Transportation Research Record 1244, Washington, D.C., Transportation Research Board, National Research Council, (1989) pp. 39-51.)	Research examined the safety effectiveness of four-quadrant gates through before and after study of driver behavior.	Not added to synthesis.
(Bowman, B. L., "The Effectiveness of Railroad Constant Warning Time Systems." Transportation Research Record 1114, Washington, D.C., Transportation Research Board, National Research Council, (1987) pp. 111-122.)	Study of the effectiveness of railroad constant warning time (CWT) systems in reducing motorist violations and vehicle-train accidents using 5 years of crash data.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Bowman, B. L., McCarthy, K. P., and Hughes, G., "The Safety, Economic and Environmental Consequences of Requiring Stops at Railroad-Highway Crossings." Transportation Research Record 1069, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 117-125.)	Study examined the safety, economic, operational and environmental consequences of requiring hazardous materials transporters, school buses and passenger buses to stop at railroad-highway crossings with active warning devices when the devices are not activated.	Reference suggested by NCHRP 17-18(4). Not added to synthesis, because reference does not provide necessary information to determine t and s values.
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))	The handbook provides general information on highway-rail grade crossings including overview of various traffic control devices.	Not added to synthesis. Nothing found on safety except for accident prediction models but use of those models to develop t values not valid

Based on a critical review of the references identified previously, it appears that the large majority of studies done to date are based on the use of anecdotal or qualitative evidence of improvements to safety at railroad-highway grade crossings. Some studies have focused on the modifications to driver behavior at these types of grade crossings and have concluded that some treatments are promising in terms of improving driver alertness and comprehension. However, none of the studies reviewed by the researchers were able to make conclusions based on accident experience. This view is shared by Lerner et al. who carried out a literature review of previous research studies and concluded that "one of the more striking and disappointing points is how little appears to be known definitively (or is even reasonably well supported) by empirical data on traffic control device effectiveness" (*7*).

Treatment: Install signs and crossbucks at unprotected railroad-highway grade crossings

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Elvik and Vaa conducted a meta-analysis of a number of studies that investigated the safety effect of signs and crossbucks at previously unprotected railroad-highway grade crossings and found that this particular treatment reduces total grade crossing accidents (p. 579) (*14*). The traffic volumes and environment were not provided in the report. The results from the meta-analysis are summarized in Exhibit 6-4. This study was considered to be of medium-high quality and the standard error value is based on the 95% confidence interval provided by Elvik and Vaa, and a method correction factor of 1.8 was applied to account for the study quality.

Exhibit 6-4: Safety effectiveness of signs and crossbucks at railroad-highway grade crossings

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Implementing signs and crossbucks at previously unprotected crossings.	Not specified.	Not specified.	All grade crossing accidents, severity not specified.	0.75	0.18

Discussion: Impact of vehicle-activated strobe light and supplemental signs on vehicle speeds and driver awareness

Fambro et al. (1997) found that the use of a vehicle-activated strobe light and a "LOOK FOR TRAIN AT CROSSING" supplemental sign in addition to the MUTCD W10-1 sign at passive railroad-highway grade crossings resulted in reduced average vehicle speeds in the vicinity of the crossing (*8*). In addition, the researchers concluded that the enhanced sign system appeared to increase driver awareness of the crossing and, on the basis of results from the observation of drivers, also caused some drivers to "approach the passive railroad-highway grade crossing with additional caution" by advanced braking, switching on their high-beam headlights, and crossing the railroad at lower speeds (*8*).

6.1.2.2. Signals and Gates

The "Manual on Uniform Traffic Control Devices for Streets and Highways" (MUTCD) designates two types of traffic control devices that are used to warn road users that a train is approaching a highway-rail grade crossing: 1) passive devices, and 2) active devices (*3*).

Passive traffic control systems typically consist of signs, pavement markings, and grade crossing illumination that identify and direct vehicle operators and pedestrians' attention to the location of a grade crossing. Stand-alone passive devices provide no information to motorists on whether a train is actually approaching. The devices simply notify highway users that they are about to enter an active railroad (or LRT) alignment, that users need to be aware that trains may approach at any time, and permit vehicle operators and pedestrians to take appropriate action (*9*).

On the other hand, active devices rest in an inactive state until a train approaches. When a train is detected (using some form of track circuitry), grade crossing warning devices consisting of some combination of automatic gates, bells or flashing lights activate. Active devices prompt crossing users with an auditory or visual clue that a train is actually approaching the crossing in question, and in some cases such as when gates are lowered, actually prevent crossing users from occupying or traversing the right-of-way. Nevertheless, active warning devices also have limitations in their effectiveness, particularly when there are occurrences such as drivers maneuvering around lowered gates, or attempting to beat the train to the crossing regardless of whether the grade crossing devices are activated or not. Many active grade crossings continue to use train detection technology that activate crossing control devices based on the fastest trains. This means that trains traveling slower than the design speed or stopping on the approach length result in prolonged activation of the railroad-highway warning system (*10*,*11*).

Previous research studies such as those by Hopkins (1981), Berg et al. (1982), and Wilde et al. (1975) suggest that such excessive and variable warning times may have negative impacts of crossing safety and traffic operations (*11*). Richards et al. demonstrated that there is a "clearly identifiable trend" showing that the longer the waiting time, the greater the number of vehicles that crossed while the (active) warning devices were activated (*11*). This finding has been supported by other studies (*10*,*11*,*12*).

Given the location of many railroad-highway grade crossings in urban areas, it is inevitable that many of these crossings are located in close proximity to highway-highway intersections or experience such high volumes of highway traffic that occurrences of vehicle queues extending over grade crossings are a significant concern. Guidance in the MUTCD states that "when a highway-rail grade crossing with a flashing-light signal system is located within 60 m (200 ft) of an intersection or midblock location controlled by a traffic control signal, the traffic control signal should be provided with preemption in accordance with Chapter 8D.07" (*3*). However, a recent research study has reported that there is widespread concern that during the traffic signal preemption sequence, motorists focus on the downstream intersection traffic signal indications instead of focusing on the flashing light signals located at the grade crossing (*5*). Consequently, the use of traffic signals installed on the near side of railroad-highway grade crossings located adjacent to a signalized intersection (commonly termed "pre-signals") has been touted as a possible solution to reduce motorist confusion and risky behavior at the crossing.

Users of this Manual may be familiar with commonly used terminology dealing with highway and railroad signaling issues, such as those used in Chapter 8 of the MUTCD (*3*), and provided here:

- **Clear Storage Distance** – the distance available for vehicle storage measured between 1.8 m (6 ft) from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway. At skewed highway-rail grade crossings and intersections, the 1.8 m (6 ft) distance shall be measured perpendicular to the nearest rail either along the centerline or edgeline of the highway, as appropriate, to obtain the shorter distance. Where exit gates are used, the distance available for vehicle storage is measured from the point where the rear of the vehicle would be clear of the exit gate arm. In cases where the exit gate arm is parallel to the track(s) and is not perpendicular to the highway, the distance is measured either along the centerline or edgeline of the highway, as appropriate, to obtain the shorter distance;
- **Interconnection** – the electrical connection between the railroad active warning system and the highway traffic signal controller assembly for the purpose of preemption;
- **Minimum Track Clearance Distance** – for standard two-quadrant railroad warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the highway stop line, warning device, or 3.7 m (12 ft) perpendicular to the track centerline, to 1.8 m (6 ft) beyond the track(s) measured perpendicular to the far rail, along the centerline or edgeline of the highway, as appropriate, to obtain the longer distance. For four-quadrant gate systems, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the highway stop line or entrance warning device, to the point where the rear of the vehicle would be clear of the exit gate arm. In cases where the exit gate arm is parallel to the track(s) and is not perpendicular to the highway, the distance is measured either along the centerline or edge of the highway, as appropriate, to obtain the longer distance;
- **Minimum Warning Time** – Through Train Movements – the least amount of time active warning devices shall operate prior to the arrival of a train at a highway-rail grade crossing;
- **Preemption** – the transfer of normal operation of highway traffic signals to a special control mode;
- **Pre-signal** – supplemental highway traffic signal faces operated as part of the highway intersection traffic signals, located in a position that controls traffic approaching the highway-rail grade crossing in advance of the intersection;
- **Queue Clearance Time** – the time required for the design vehicle of maximum length stopped just inside the minimum track clearance distance to start up and move through and clear the entire minimum track clearance distance. If pre-signals are present, this time shall be long enough to allow the vehicle to move through the intersection, or to clear the tracks if there is sufficient clear storage distance. If a four-quadrant gate system is present, this time shall be long enough to permit the exit gate arm to lower after the design vehicle is clear of the minimum track clearance distance;

Additional information on the preemption of traffic signals is available in the ITE Recommended Practice (*6*).

This section provides information and AMFs on the safety effect of the following active and passive traffic control devices used at or directly adjacent to railroad-highway grade crossings.

Freeways and expressways are not discussed in this section.

Exhibit 6-5: Resources examined to investigate the safety effect of signals and markings at railroad-highway grade crossings

DOCUMENT	DESCRIPTION	COMMENT
Oh, J., Washington, S.P., and Nam, D., "Accident Prediction Model for Railway-Highway Interfaces", Accident Analysis and Prevention, Vol., 38, 2006, pp. 346-356.	Models were developed to relate crashes at railroad crossings in Korea with the characteristics of the crossings.	Added to synthesis.
(Park, P. Y.-J. and Saccomanno, F.F., "Reducing Treatment Selection Bias for Estimating Treatment Effects Using Propensity Score Method", Journal of Transportation Engineering, Vol. 12 (February 2007), pp. 112-117)	This paper used the propensity score method to reduce treatment selection bias. Using this information AMFs were estimated for different treatments.	Added to synthesis.
(Saccomanno, F.F., Park, P.Y.-I., and Fu, L., "Estimating Countermeasure Effects for Reducing Collisions at Highway-Railway Grade Crossings", Accident Analysis and Prevention, Vol. 39 (2007), pp. 406-416)	This paper used a Bayesian data fusion approach to combine results from previous studies with results from Canadian studies that had examined the safety of railroad grade crossings. Estimates of AMFs were provided for elimination of whistle prohibition and upgrading flashing lights to gates.	Added to synthesis.
(Saccomanno, F.F. and Lai, X., "A Model for Evaluating Countermeasures at Highway-Railway Grade Crossings", Transportation Research Record 1918, pp. 18-25, 2005)	This study used factor analysis along with cluster analysis to divide the sample of crossings into different groups. Negative binomial models were developed for each cluster relating crash frequency with site characteristics.	Added to synthesis.
(Park, Y.-J. and Saccomanno, F.F., "Evaluating Factors Affecting Safety at Highway-Railway Grade Crossings", Transportation Research Record 1918, pp. 1-9, 2005)	This study used the tree-based recursive partitioning method (RPART) to divide the crossings in Canada to 19 classes. Negative binomial regression models were developed relating crash frequency with site characteristics – indicator variables were introduced to represent classes.	Added to synthesis.
(Park, Y.-J. and Saccomanno, F.F., "Collision Frequency Analysis Using Tree-Based Stratification", Transportation Research Record 1908, pp. 121-129, 2005)	Poisson regression models were estimated to relate crashes at crossings with site characteristics. The sample of intersections were classified based on a method called tree-based recursive partitioning method (RPART)	Added to synthesis.
(*13*) (Hauer, E., "Cause and Effect in Observational Cross-Section Studies on Road Safety." (2005))	Study discussing strengths and weaknesses of cross-section safety studies	Added to synthesis for discussion on applicability of railroad-highway grade crossing accident prediction models.
(*14*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	Handbook summarizing the effects of various road safety measures and treatments using a meta-analytical approach.	Added to synthesis. t and s values calculated using available information.
(*7*) (Lerner, N. D., Llaneras, R. E., McGee, H. W., and Stephens, D. E., "NCHRP Report 470: Traffic Control Devices for Passive Railroad-Highway Grade Crossings." Washington, D.C., Transportation Research Board, National Research Council, (2002))	Includes a detailed critical review of research on the effect of traffic control devices at rail-highway grade crossings; Also evaluated traffic control devices.	Reference suggested by NCHRP 17-18(4). Added to synthesis. Only anecdotal evidence.

DOCUMENT	DESCRIPTION	COMMENT
(*5*) (Korve, H. W., Ogden, B. D., Siques, J. T., Mansel, D. M., Richards, H. A., Gilbert, S., Boni, E., Butchko, M., Stutts, J. C., and Hughes, R. G., "TCRP Report 69: Light Rail Service: Pedestrian and Vehicular Safety." Washington, D.C., Transportation Research Board, National Research Council, (2001))	Presents "before and after" evaluation of the safety effect of pre-signals at highway-rail grade crossings using motorist behavior, not accidents.	Added to synthesis. Only anecdotal evidence.
(Wooldridge, M. D., Fambro, D. B., Brewer, M. A., Engelbrecht, R. J., Harry, S. R., and Cho, H., "Design Guidelines for At-Grade Intersections Near Highway-Railroad Grade Crossings." FHWA/TX-01/1845-3, Austin, Texas Department of Transportation, (2000))	Report provides guidelines for the design of intersections located close to highway-railroad crossings.	Not added to synthesis. No information found on safety impacts—reference only deals with traffic operations (i.e., interconnection, pre-emption) without relating the various recommendations to the safety effects.
(*9*) (Korve, H. W., "NCHRP Synthesis of Highway Practice Report 271: Traffic Signal Operations Near Highway-Rail Grade Crossings." Washington, D.C., Transportation Research Board, National Research Council, (1999))	Report presents an overview of current practices regarding the operation of traffic signals at intersections located close to highway-rail grade crossings.	Added to synthesis. Only anecdotal evidence of safety improvements found.
(Fambro, D. B., Noyce, D. A., Frieslaar, A. H., and Copeland, L. D., "Enhanced Traffic Control Devices and Railroad Operations for Highway-Railroad Grade Crossings: Third-Year Activities." FHWA/TX-98/1469-3, Austin, Texas Department of Transportation, (1997))	Research evaluated the effectiveness of a vehicle-activated strobe light and supplemental sign enhancements at passive railroad crossings using a before and after study which investigated changes in speed at the crossings, a driver survey and a driver observation study.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Applied Management & Planning Group, "Evaluation of Pedestrian Swing Gates at the Imperial Highway Station." Los Angeles, Calif., Los Angeles County Metropolitan Transportation Authority, (1995))	Before and after evaluation of pedestrian traffic control at light rail station, used frequency of dangerous pedestrian maneuvers as MOE.	Reference suggested by NCHRP 17-18(4). Not added to synthesis. More relevant to Section on Pedestrians and Bicyclists at Railroad-Highway Grade Crossings (Future Edition).
(*11*) (Richards, S. H., Heathington, K. W., and Fambro, D. B., "Evaluation of Constant Warning Times Using Train Predictors at a Grade Crossing with Flashing Light Signals." Transportation Research Record 1254, Washington, D.C., Transportation Research Board, National Research Council, (1990) pp. 60-71.)	Researchers evaluated the effects of train predictors and constant warning time (CWT) on crossing safety and driver response measures (including risky behavior) at a grade crossing with flashing light signals.	Added to synthesis. Only anecdotal evidence and improvements terms of driver behavior found.
(*12*) (Heathington, K. W., Fambro, D. B., and Richards, S. H., "Field Evaluation of a Four-Quadrant System for Use at Railroad-Highway Grade Crossings." Transportation Research Record 1244, Washington, D.C., Transportation Research Board, National Research Council, (1989) pp. 39-51.)	Research examined the safety effectiveness of four-quadrant gates through before and after study of driver behavior.	Reference suggested by NCHRP 17-18(4). Added to synthesis. Only anecdotal and improvements in terms of driver behavior found.
(*15*) (Fambro, D. B., Heathington, K. W., and Richards, S. H., "Evaluation of Two Active Traffic Control Devices for Use at Railroad-Highway Grade Crossings." Transportation Research Record 1244, Washington, D.C., Transportation Research	Study evaluated investigated the effectiveness of two traffic control devices in changing driver behavior using a before-after study approach. The two devices evaluated for potential safety benefits were four-quadrant flashing light signals with overhead	Added to synthesis. Only anecdotal and improvements in terms of driver behavior found.

DOCUMENT	DESCRIPTION	COMMENT
Board, National Research Council, (1989) pp. 52-62.)	strobes and standard highway traffic signals (pre-signals).	
(Bowman, B. L., "The Effectiveness of Railroad Constant Warning Time Systems." Transportation Research Record 1114, Washington, D.C., Transportation Research Board, National Research Council, (1987) pp. 111-122.)	Study of the effectiveness of railroad constant warning time (CWT) systems in reducing motorist violations and vehicle-train accidents using 5 years of crash data.	Not added to synthesis. Only anecdotal evidence and discussion of CWT provided.
(*16*) (Hauer, E. and Persaud, B. N., "How to Estimate the Safety of Rail-Highway Grade Crossings and the Safety Effects of Warning Devices." Transportation Research Record 1114, Washington, D.C., Transportation Research Board, National Research Council, (1987) pp. 131-140.)	Study compared results from previous cross-section and before-after studies that investigated the safety effect of various warning devices at railroad-highway grade crossings.	Some qualitative notes added to synthesis. Results from this particular study already incorporated as part of meta-analysis by Elvik and Vaa (2004).
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))	The handbook provides general information on highway-rail grade crossings including overview of various traffic control devices.	Not added to synthesis. Nothing found on safety except for accident prediction models but use of those models to develop t values not valid.

Based on a critical review of the references identified in Exhibit 6-5, it appears that the many of the studies done to date are based on the use of anecdotal or qualitative evidence of improvements to safety at both active and passive railroad-highway grade crossings. As a result of the inherent difficulty in finding sufficient crash data for railroad-highway grade crossings as described in Section 6.1.2, most studies are focused on the modifications to driver behavior at railroad-highway grade crossings and have concluded that some treatments such as pre-signals and four-quadrant gates are promising in terms of reducing or even eliminating violations and risky driver behavior. Apart from results from Hauer and Persaud (*16*) and Elvik and Vaa (*14*) and more recently by Dr. Saccomanno and his colleagues in Canada (*50*, *51*, *52*, *53*, *54*), none of the other studies reviewed were able to make conclusions based on accident reductions.

As reported by Tustin et al., there are a wide variety of accident prediction models currently in use throughout the U.S. to forecast the number of railroad-highway grade crossing accidents (*1*). These models vary in complexity but all use some combination of input parameters such as the number of tracks, highway traffic approach speeds, train speeds, number of mainline tracks, number of trains, and numerous other factors. These accident prediction models are essentially regression models based on cross-section data and based on findings from research by Hauer and Persaud (*16*).

It appears that the indices of effectiveness derived using such models may be unreliable since the models do not account for policies usually in place when agencies decide on using one type of traffic control device versus another, and other confounding factors that may influence the results of such an analysis. For example, Hauer and Persaud point out that costlier protection devices at railroad-highway grade crossings tend to be used at sites with higher demands on crossing users (such as poor sight distances, downgrades, higher approach speeds, proximity to schools, etc.) and perhaps have a history of accident occurrence (*16*). With such practices in place, it may be unrealistic or unreasonable to calculate indices of effectiveness by taking the ratio of accidents for a crossing with one type of traffic control

device over the accidents for a similar crossing with another type of traffic control device. In a more recent study, Hauer stated that, with respect to the treatments at railroad-highway grade crossings, there is "the omnipresent suspicion that entities have trait A but not B for good reason and that these reasons are not fully known and difficult to account for in a regression model" (*13*).

Saccomanno et al., (2007) also acknowledge the limitations of using regression models to determine the effectiveness of engineering treatments, including "variable colinearity, misspecification of inputs, failure to consider higher-order interaction terms, treatment selection bias, and regression-to-the-mean" (*51*). To address some of these limitations, Park and Saccomanno (*54*) use tree-based recursive partitioning method (RPART) to stratify the crossings into meaningful and homogenous classes. Separate regression models were developed for each homogenous class. Park and Saccomanno (*50*) argue that this approach does a better job of separating the effect of countermeasures from other factors such as roadway class and site characteristics, compared to traditional cross-sectional regression models. Following a similar theme, Saccamanno and Lai (*52*) first used factor and cluster analysis and then estimated regression models for each cluster. Park and Saccomanno (*50*) used propensity score method to reduce treatment selection bias in trying to estimate the safety effectiveness of selected treatments at railroad crossings.

Due to the limitations of cross sectional models, Hauer and Persaud (1987) argue that before-after studies are a reasonable approach to estimate the safety effectiveness of countermeasures since there are methods to "cleanse before-and-after comparisons of bias-by-selection" (*16*). However, crashes are relatively rare at railroad crossings and hence, any treatment that is evaluated needs to be implemented at a large number of locations in order to obtain statistically reliable results of its effectiveness. It is also important to note that the indices of effectiveness that are derived from before-after studies represent the average safety effect of the sites examined and as such, the applicability of these values depends on the specific mix of crossing characteristics of the entities being "treated" and studied. The index of effectiveness derived from a before-after study may not apply to some specific cases where the characteristics of a particular crossing are vastly different from those examined in the before-after study.

Treatment: Upgrade crossings with signs to flashing lights and sound signals

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Elvik and Vaa analyzed a number of research studies that examined the safety effect of upgrading the traffic control at crossings from signs to flashing lights and sound signals, and reported that this treatment significantly reduced total grade crossing accidents (p. 579) (*14*). The traffic volumes and environment were not provided in the report. The results from the meta-analysis are summarized in Exhibit 6-6. This study was considered to be of medium-high quality and the standard error value is based on the 95% confidence interval provided by Elvik and Vaa, and a method correction factor of 1.8 was applied to account for the study quality.

Park and Saccomanno (*54*) used RPART to classify the locations into 4 classes and developed poisson regression models to relate crash frequency with site characteristics. Models were developed for each class separately. In addition, one model was developed for all classes combined with indicator variables to represent each class. The relationship between exposure and crashes was assumed to be linear in this model. The type of warning device (flashing lights, gates, or signs) was one of the independent variables in the model. Using the coefficients of these independent variables, AMFs were derived and are shown in Exhibit 6-6. An MCF of 2.0 was applied to the standard errors.

Park and Saccomanno (*53*) also used RPART to classify locations. However, in this study, a larger set of independent variables were used including type of warning device. The RPART procedure produced 19 classes and they were represented as indicator variables in a negative binomial regression

model – the indicator variables for six of these classes were statistically significant at the 0.05 significance level. The AMF for upgrading signs to flashing lights on arterial/collector or local roads was estimated to be 0.253. On the other hand, the AMF for upgrading signs to flashing lights on 'other' roads was estimated to be much higher (0.722). Standard errors were not provided for these AMFs.

Saccamanno and Lai (*52*) first used factor and cluster analysis and then estimated regression models for each cluster. The models revealed a 58% reduction in crashes when signs were upgraded to flashing lights (i.e., AMF of 0.42). Standard errors were not provided for these AMFs.

Park and Saccomanno (*50*) used propensity score method to reduce treatment selection bias in trying to estimate the safety effectiveness of selected treatments at railroad crossings. They compared these results with those obtained through a before-after EB method. The propensity score method revealed a 31.7% reduction in crashes when signs were upgraded to flashing lights (i.e., AMF of 0.683). The before-after EB method revealed a reduction of 69.1% reduction (i.e., AMF of 0.309). Standard errors were provided for either of these AMFs.

The results from Elvik and Vaa (*14*) were recommended for the HSM. The meta-analysis results were considered more defensible compared to the cross-sectional models that were developed in several of the studies co-authored by Saccomanno. The EB before-after results from Park and Saccomanno (*50*) could not be used because standard errors were not provided.

Exhibit 6-6: Safety effectiveness of flashing lights and sound signals at railroad-highway grade crossings with only signs

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Upgrading signs to flashing lights and sound signals.	Not specified.	Not specified.	All grade crossing accidents, severity not specified.	0.50	0.045
(*54*) Park and Saccomanno (2005)	Upgrade signs to flashing lights		Arterial or collector	All grade crossing accidents	0.216	0.053
	Upgrade signs to flashing lights		Local or other roads with multiple tracks	All grade crossing accidents	0.312	0.138
	Upgrade signs to flashing lights		Local roads with single track	All grade crossing accidents	0.212	0.043
	Upgrade signs to flashing lights		Other road types with single track	All grade crossing accidents	0.260	0.230
	Upgrade signs to flashing lights		All	All grade crossing accidents	0.226	0.033

Treatment: Install gates at crossings where previously there were only signs

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Elvik and Vaa examined the safety effect of gates at railroad-highway grade crossings that previously had only signs as traffic control devices.(*14*) The authors conducted a meta-analysis of a number of studies and reported a significant reduction in grade crossing accidents following the implementation of the treatment. The environment and traffic volumes were not provided. The safety effects are summarized in Exhibit 6-7. This study was considered to be of medium-high quality and the standard error value is based on the 95% confidence interval provided by Elvik and Vaa, and a method correction factor of 1.8 was applied to account for the study quality.

Exhibit 6-7 also shows the AMFs that were developed from the poisson regression models estimated by Park and Saccomanno (*54*) (MCF of 2.0 was applied to the standard errors from this study). Saccomanno and Lai (*52*) found a 63% reduction in crashes when gates were introduced at locations with signs; as mentioned earlier, this study used factor and cluster analysis along with negative binomial regression (standard errors were not available in the paper). When propensity scores were used, Park and Saccomanno (*50*) reported a 47.6% reduction in crashes when gates were introduced; the same study also reported 84.6% reduction in crashes when a before-after EB method was utilized (standard errors were not provided in both cases).

The results from Elvik and Vaa (*14*) were recommended for the HSM. The meta-analysis results were considered more defensible compared to the cross-sectional models that were developed in several of the studies co-authored by Dr. Saccomanno. The EB before-after results from Park and Saccomanno (*50*) could not be used because standard errors were not provided.

Exhibit 6-7: Safety effectiveness of gates at railroad-highway grade crossings with only signs previously

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing gates at crossings with signs.	Not specified.	Not specified.	All grade crossing accidents, severity not specified.	0.33	0.09
(*54*) Park and Saccommanno (2005)	Installing gates at crossings with signs.		Arterial or collector	All grade crossing accidents	0.064	0.018
	Installing gates at crossings with signs.		Local or other roads with multiple tracks	All grade crossing accidents	0.132	0.050
	Installing gates at crossings with signs.		Local roads with single track	All grade crossing accidents	0.091	0.033
	Installing gates at crossings with signs.		Other road types with single track	All grade crossing accidents	0.340	0.536

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
	Installing gates at crossings with signs.		All	All grade crossing accidents	0.066	0.013

Treatment: Install gates at crossings where previously there were only flashing lights and sound signals

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Using a meta-analysis of several studies, Elvik and Vaa investigated the safety effect of installing gates at railroad-highway grade crossings that previously had only flashing lights and sound signals as traffic control devices.(*14*) The traffic volumes and environment were not provided in the report. The results from the meta-analysis are summarized in Exhibit 6-8. This study was considered to be of medium-high quality and the standard error value is based on the 95% confidence interval provided by Elvik and Vaa, and a method correction factor of 1.8 was applied to account for the study quality. The AMFs from Elvik and Vaa were recommended for inclusion in the HSM.

Saccomanno and Lai (2005) reported a 13% reduction in crashes when gates were introduced at crossings that originally had flashing lights; this study used negative binomial regression along with cluster analysis (standard errors were not provided). When the propensity score method was used, Park and Saccomanno (2007) found a 24.4% reduction in crashes; when a before-after EB method was used, the reduction was 71.3% (standard errors were not reported).

Saccomanno et al. (2007) used Bayesian data fusion approach to combine results from three previous studies conducted by Saccomanno and his colleagues in Canada with other previous studies conducted mainly using data from the United States. As an example, AMFs were derived for upgrading flashing lights to gates for a specific type of road: local roads, single track, track angle of 70 degrees, AADT of 15,000, 12 daily trains, posted speed limit of 50 km/h, and maximum train speed of 10 mph. The results were a bit different depending on whether the posterior distribution was normal or beta. The AMF was 0.669 with a normal distribution and 0.618 with a posterior distribution. Since these results are applicable to very specific conditions, they are not included in Exhibit 6-8.

Exhibit 6-8: Safety effectiveness of gates at railroad-highway grade crossings with only flashing lights and sounds signals

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Installing gates at crossings with flashing lights and sound signals.	Not specified.	Not specified.	All grade crossing accidents, severity not specified.	0.55	0.09

Discussion: Impact of STOP and Yield signs at passive railroad-highway grade crossings

Lerner et al. discussed the use of STOP and Yield signs at passive railroad-highway grade crossings and concluded that despite the selective practice of using STOP signs at some grade crossings for many years and despite several field studies, "the effectiveness of STOP signs for general use appears unresolved and controversial" (*7*). In terms of Yield signs, the researchers found that there seems to be growing support for the use of these types of treatments at passive railroad-highway grade crossings, particularly since drivers are supposed to yield the right-of-way to oncoming trains. No evidence was presented to support this treatment in terms of either positive changes in driver behavior or crash reductions.

Discussion: Impact of pre-signals on driver behavior

Korve et al. stated that pre-signals have already been recommended by the U.S. DOT's Technical Working Group (TWG) in certain locations; specifically, at highway-rail grade crossings where the clear storage distance cannot accommodate the design vehicle, typically a large truck (*9*). Pre-signals control traffic entering the highway-rail grade crossing, thereby circumventing potential vehicle-train conflicts so long as there is compliance with the pre-signals. According to the research reviewed, most agencies view traffic pre-signals as providing relatively consistent service with few malfunctions; motorists tend to understand and obey them more readily than flashing light signals, especially if traffic signals are enforced by the local police authority.

This treatment appears to be particularly effective in reducing risky driver behavior in the vicinity of railroad-highway grade crossings. For instance, Fambro et al. investigated the safety effectiveness of pre-signals using a before-after study of driver behavior and found that the treatment reduced the number of crossings per signal activation and the risky behavior per train arrival from 3.35 to 0.73 and from 0.13 to 0.05 respectively (*15*). Risky behavior was defined by Fambro et al. to be the number of vehicles crossing while the flashing light signals are activated and within 10 seconds of the train's arrival. In terms of other driver response measures, the highway traffic signal did not significantly change the approach speed profile, the perception-brake reaction time, or the maximum deceleration level. There were also no apparent negative effects such as accidents, confusion, diversions, or unnecessary delay attributed to the treatment (*15*). Based on these findings, the researchers concluded that the highway traffic signal proved to be feasible and effective as a grade crossing traffic control device that outperforms standard flashing light signals on key safety and driver response measures (*15*).

This finding appears to be substantiated with the results from a similar research study by Korve et al. As part of the research effort to improve the safety of light rail transit (LRT) in semi-exclusive rights-of-way, Korve et al. conducted a before-after study of motorist driving behavior to investigate the effectiveness of pre-signal treatments at railroad-highway grade crossings for LRT. Two urban sites were examined and the researchers found that the use of pre-signals reduced the number of motorists in the clear storage distance at one site by 93% on average and 80% on average at the second site (*5*). The authors also found that pre-signals reduced the number of vehicles in the minimum track clearance distance but the results were not statistically significant. On average, the treatment also reduced right turns on red (when prohibited) by 82% (*5*). By conducting a cross-sectional analysis, Korve et al. also concluded that the use of the Keep Clear Zone striping reduced the number of vehicles that stopped in the clear storage distance or in the minimum track clearance distance by 93% (*5*). From the information provided in the reference, it is unclear if this cross-sectional comparison is appropriate given that the traffic volume at the site with the Keep Clear Zone striping had about half the vehicular traffic volume (10,000 ADT) of the site without (20,000 ADT), with both experiencing train volumes in excess of 40 trains per day.

Discussion: Impact of constant warning time devices on driver behavior

Richards et al. investigated the effectiveness of train predictors to provide constant warning times at a single track railroad-highway grade crossing and found that this particular treatment significantly reduced the frequency of incidences of risky driver behavior (*11*). Risky driver behavior was defined in terms of the number of vehicles crossing the tracks between activation of the warning device and the train's arrival at the crossing. Based on a comparison of the frequencies of vehicle crossings after activation of the warning devices, Richards et al. found that the treatment "significantly reduced" the average number of vehicles crossing per train arrival from 10.86 to 3.35 (*11*). Although this measure of effectiveness is dependent on the traffic and train volumes at the crossing, Richards et al. concluded that the installation of train predictors (and the resulting constant warning times) led to fewer excessively long warning times at crossings. This in turn reduces incidences of risky driver behavior, improving the overall safety and enhanced driver respect for flashing light signals (*11*). The researchers also reported that approach speeds of vehicles, driver reaction times and deceleration behavior (braking) were not adversely affected (*11*).

Discussion: Impact of four-quadrant gates on violations

Heathington et al. investigated the effectiveness of a four-quadrant gate system using a before-after study approach (*12*). Heathington et al. found that the treatment did not result in any changes to driver behavior, particularly when examined from the perspective of vehicle speeds approaching the railroad-highway grade crossing, perception-brake reaction times, and deceleration levels (*12*). However, the treatment resulted in the complete elimination of vehicles driving around gates and reduced the average number of vehicles crossing while the gate arms were being lowered from 4.01 to 1.13 for vehicles crossing per train arrival, or 96.8 to 54.7% of trains (*12*). With the implementation of the treatment, no vehicles crossed within 20 seconds of the train's arrival at the crossing, suggesting that the treatment was effective in "eliminating risky and illegal behavior[1]" (*12*).

Discussion: Impact of four-quadrant flashing light signals on driver behavior

Fambro et al. investigated the safety effectiveness of four quadrant flashing light signals with overhead strobes using driver performance measures such as vehicle approach speeds, perception-brake reaction times, and violation and vehicle crossing rates (*15*). The authors found that four-quadrant flashing light signals with strobes "did not significantly affect violations, clearance times, approach speed profiles, maximum deceleration levels or perception-brake reaction times" (*15*). There were also no accidents, confusion, or motorist diversions with the implementation of the treatment. The researchers concluded that four-quadrant flashing light signals with strobes offered no apparent driver response or safety advantages over standard two-quadrant flashing signals (*15*).

[1] Heathington et al. defined four categories of driver behavior as they relate to the clearance time. The clearance time is the difference in time between the last vehicle to cross and the train's arrival at the crossing. The four categories are: Risky – less than 10 seconds; Aggressive – from 10 to 20 seconds; Normal – from 20 to 30 seconds; Cautious – greater than 30 seconds (*12*).

6.1.3. Pedestrians and Bicyclist Safety at Railroad-Highway Grade Crossings [Future Edition]

Rail agencies and others are concerned with the large volumes of trespassers into areas designated to train movements. The safety effectiveness of some measures to control expected and undesirable movements may be discussed in this section in future editions of the HSM. Treatments may include: pedestrian traffic control, signage, pedestrian and cyclist gates, crossings and sidewalk designs, accessibility, and grade separated facilities. Potential resources are listed in Exhibit 6-9.

Exhibit 6-9: Potential resources on the pedestrian and bicyclist safety considerations at railroad-highway grade crossings

DOCUMENT
(Korve, H. W., Ogden, B. D., Siques, J. T., Mansel, D. M., Richards, H. A., Gilbert, S., Boni, E., Butchko, M., Stutts, J. C., and Hughes, R. G., "TCRP Report 69: Light Rail Service: Pedestrian and Vehicular Safety." Washington, D.C., Transportation Research Board, National Research Council, (2001))
(Applied Management & Planning Group, "Evaluation of Pedestrian Swing Gates at the Imperial Highway Station." Los Angeles, Calif., Los Angeles County Metropolitan Transportation Authority, (1995))
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))
(Staplin, L., Lococo, K., Byington, S., and Harkey, D., "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians." FHWA-RD-01-051, Washington, D.C., Federal Highway Administration, (2001))
(Farran, J. I., Korve, H. W., Levinson, H. S., and Mansel, D., "The Light Rail Transit Safety Experience." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 97-103.)

6.1.4. Safety Effects of Other Railroad-Highway Grade Crossing Elements

This section of the HSM provides information on the safety effects of the various secondary design and operational elements of railroad-highway grade crossings. The following section discusses the safety impact of artificial illumination at railroad-highway grade crossings. Sections dealing with the use of different grade crossing materials, as well as the safety issues related to the presence of hazardous materials vehicles, trucks, school buses and other transit vehicles in the vicinity of grade crossings may be included in future editions of the HSM.

6.1.4.1. Illumination

Artificial illumination is occasionally provided at railroad highway grade crossings. This section presents evidence regarding the safety effect of illumination of railroad-highway grade crossings. This refers to the introduction of artificial lighting of railroad-highway grade crossings that did not have it.

Future editions of the HSM may include discussions of "tall flexible posts" and "traffic dots" at railroad (LRT) crossings.

Exhibit 6-10: Resources examined to investigate the safety effect of illumination at railroad-highway grade crossings

DOCUMENT	DESCRIPTION	COMMENT
(Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Collisions Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Several strategies aimed at reducing crashs involving older drivers.	No AMFs. Not added to synthesis.
(Wooldridge, M. D., Fambro, D. B., Brewer, M. A., Engelbrecht, R. J., Harry, S. R., and Cho, H., "Design Guidelines for At-Grade Intersections Near Highway-Railroad Grade Crossings." FHWA/TX-01/1845-3, Austin, Texas Department of Transportation, (2000))	Research performed in cooperation with the Texas DOT with respect to the deign guidelines of at-grade intersections near highway-railroad crossings.	No AMFs. Not added to synthesis.
(*17*) (Elvik, R., "Meta-Analysis of Evaluations of Public Lighting as Accident Countermeasure." Transportation Research Record 1485, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 112-123.)	A meta-analysis of 37 studies, containing a total of 142 results from 1948 to 1989.	Added to synthesis.
(Mather, R. A., "Seven Years of Illumination at Railway-Highway Crossings." Transportation Research Record 1316, Washington, D.C., Transportation Research Board, National Research Council, (1991) pp. 54-57.)	The results of 34 crossings that were installed during the first 7 years of illumination in Oregon.	Too few details to be included in meta-analysis.
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))	Handbook providing information on railroad-highway crossings, including characteristics of the crossing environment and users with physical and operational characteristics.	No AMFs. Not added to synthesis.

One before and after study (Mather ,1991) was found that evaluates safety effects of illumination of railroad-highway grade crossings, using 34 railroad-highway grade crossings in the state of Oregon (*18*). According to this study, the number of accidents in darkness was reduced from 18 before 1985 (length of period not stated) to 3 in the years 1985 to 1989, when the illumination program was conducted. Mather states that, “Because the sample is small, it is statistically invalid to draw many definite conclusions.” (p. 56) (*18*).

Evidence regarding the effect of intersection illumination is taken from a meta-analysis of 37 evaluation studies containing 142 estimates of effect (*17*). This analysis has subsequently been updated by the addition of new studies, increasing the number of studies to 40 and the number of estimates of effect to 152.

Results of studies that deal specifically with illumination in intersections have been selected. There are 32 estimates of effect that refer to intersections. State-of-the-art techniques of meta-analysis have been applied to synthesize these estimates of effect.

Studies have been classified in three groups according to study quality. Studies rated as high quality include studies using both an internal and external comparison group (the distinction between external and internal comparison is explained below) and matched case-control studies. Studies rated as medium quality include studies that provide data on traffic volume in addition to accident data, and studies using an external comparison group only. Studies rated as low quality include studies that use only an internal comparison group and simple (as opposed to matched) case-control studies. Most studies, representing 74% of the estimates of effect, have been rated as low quality. Standards errors have been adjusted by a factor of 1.2 in high quality studies (all study designs), 2 in medium quality before-after studies, and 3 in low quality before-after studies. In case-control or cross-section studies, standard errors were adjusted by a factor of 3 medium quality studies and a factor of 5 in low quality studies.

Exhibit 6-11 shows summary estimates of the effects of lighting on accidents. Uncertainty in summary estimates of effect is stated as adjusted standard error. All estimates of effect refer to accidents in darkness only. Two sets of summary estimates of effect are presented. The first set is based on conventional meta-analysis. The second set has been generated from coefficients estimated in meta-regression analysis. In theory, the meta-regression estimates are superior to the conventional summary estimates, since meta-regression controls for more confounding factors or imbalance in the distribution of estimates across moderator variables (a moderator variable is any variable that influences the size of the effect of a measure on accidents).

Exhibit 6-11: Summary estimates of the effects on accidents of public lighting in intersections

Accident type	**Accident severity**	**Index of Effectiveness, $t_{adjusted}$**	**Estimate of Std. Error, s**
Summary estimates based on conventional meta-analysis			
Intersection accidents	*Fatal accidents*	*No study*	*No study*
	Injury accidents (16)	*0.624*	*0.126*
	PDO-accidents (5)	*0.688*	*0.361*
Summary estimates based on meta-regression analysis			
Intersection accidents	Fatal accidents	0.228	0.282
	Injury accidents	0.504	0.205
	PDO-accidents	0.515	0.214

Only estimates that specify accident severity have been used. Estimates referring to "all" accidents, which is usually a mixture of injury accidents and property-damage-only accidents have been discarded. The number of estimates underlying each summary estimate is stated in parentheses.

No study estimating the effect of intersection illumination on fatal accidents has been found. Both injury accidents and property damage only accidents appear to be reduced. It is unclear why the effect attributed to illumination is larger according to the meta-regression analysis than it is for the conventional meta-analysis.

It is fairly common in road safety evaluation research to find that more well-controlled studies attribute a smaller effect to the measure evaluated than less well-controlled studies. In this case, the meta-regression approach must be considered as a more well-controlled approach to meta-analysis than the conventional approach. Unexpectedly, the effects attributed to road lighting are larger in the meta-regression approach than in the conventional approach.

6.1.4.2. Closely Spaced Intersections or Access Points [Future Edition]

The proximity of a railroad-highway grade crossing to other intersections (or access points) may be related to the safety performance of the crossing. Future editions of the HSM may discuss this relationship in this section. The distance is generally designed to provide sufficient vehicle storage based on the expected queue lengths to prevent spillover of vehicles queuing on the tracks when a train approaches. Potential resources are listed in Exhibit 6-12.

Exhibit 6-12: Potential resources on closely spaced intersections to railroad-highway grade crossings and safety

DOCUMENT
(Institute of Transportation Engineers, "Preemption of Traffic Signals Near Railroad Crossings: Version 11." Washington, D.C., Institute of Transportation Engineers, (2004))
(Antonucci, N. D., Hardy, K. K., Slack, K. L., Pfefer, R., and Neuman, T. R., "NCHRP Report 500 Volume 12: A Guide for Addressing Collisions at Signalized Intersections." Washington, D.C., Transportation Research Board, National Research Council, (2004))
(Lerner, N. D., Llaneras, R. E., McGee, H. W., and Stephens, D. E., "NCHRP Report 470: Traffic Control Devices for Passive Railroad-Highway Grade Crossings." Washington, D.C., Transportation Research Board, National Research Council, (2002))

6.1.4.3. Crossing Surface Materials [Future Edition]

In future editions of the HSM, this section may include information on the safety impact of various roadway surface materials at railroad-highway grade crossings. Potential resources are listed in Exhibit 6-13.

Exhibit 6-13: Potential resources on the safety effects of improving the crossing surface of a railroad-highway grade crossing

DOCUMENT
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))
(Lerner, N. D., Llaneras, R. E., McGee, H. W., and Stephens, D. E., "NCHRP Report 470: Traffic Control Devices for Passive Railroad-Highway Grade Crossings." Washington, D.C., Transportation Research Board, National Research Council, (2002))

6.1.4.4. Hazardous Materials and Truck Routes [Future Edition]

Future editions of the HSM may include discussion of the safety impact of routing hazardous materials and trucks on highways with railroad grade crossings. Potential resources are listed in Exhibit 6-14.

Exhibit 6-14: Potential resources on the safety effects of hazardous materials and truck routes at railroad crossings

DOCUMENT
(Bowman, B. L., McCarthy, K. P., and Hughes, G., "The Safety, Economic and Environmental Consequences of Requiring Stops at Railroad-Highway Crossings." Transportation Research Record 1069, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 117-125.)
(Tustin, B. H., Richards, H., McGee, H., and Patterson, R., "Railroad-Highway Grade Crossing Handbook - Second Edition." FHWA TS-86-215, McLean, Va., Federal Highway Administration, (1986))

6.1.4.5. Transit and School Buses [Future Edition]

Future editions of the HSM may provide discussion in this section of the safety impact of passenger and school buses at railroad-highway grade crossings, and the effects of such vehicles stopping at all crossings. Potential resources are listed in Exhibit 6-15.

Exhibit 6-15: Potential resources on the safety effects of passenger and school buses at railroad crossings

DOCUMENT
(Bowman, B. L., McCarthy, K. P., and Hughes, G., "The Safety, Economic and Environmental Consequences of Requiring Stops at Railroad-Highway Crossings." Transportation Research Record 1069, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 117-125.)

6.2. Work Zones

Work zones may present major disruptions in driving speed, driving characterisitcs and driver expectancy and it is generally accepted that there may be an increase in the number of accidents while a work zone is in place. Accidents in work zones can cause major delays and congestion, paralyzing peak hour traffic.

Rigorous work zone studies are difficult to conduct due to the great variations in work zone design and circumstances. In additon to the usual issues of ADT, type of traffic, weather, illumination, posted speed limit, accident reporting levels, etc., work zone studies must contend with a possible drop in volumes, especially in urban areas, as well as a great variation in the work zone characteristics.

Important work zone issues include:

- How can safety be addressed while keeping traffic moving through a work zone?
- What is the safety effect of closing as many lanes as possible so that the work can be completed quickly? Is it better from a safety perspective to proceed more slowly and to allow traffic to use as many lanes as possible?
- Do work crew protection devices and procedures affect the safety of the traveling public?
- Are work zone strategies that include, for example, technological improvements that can shorten work zone duration or a bonus/penalty for early/late completion of the project, justified by safety improvements?
- What is the safety effect of detours, especially through urban areas with residential traffic and pedestrians?

There are few reliable AMFs found in available literature addressing treatments used in work zones. Many studies compare the accident experience “before” and “during” the work zone. Since the presence of a work zone of any type is not a safety treatment, the use of AMFs that compare a road segment with and without a work zone differs from the use of AMFs elsewhere in the HSM. Where specific treatments are investigated, the duration of the work zone may be too short to record enough accidents to analyze. In addition, small samples, the problem of matching “before” data to the work zone’s length, duration and time of year, and the problem of comparing work zones with differing characteristics mean that some of the information on the safety effects of work zone design and treatments remain tentative. A recently completed NCHRP study entitled “Traffic Safety Evaluation of Nighttime and Daytime Work Zones” provides useful insight into the safety of conducting work with and without lane closures during day and night.

FHWA's "Work Zone Operations Best Practices Guidebook" (*19*) is a valuable resource, along with the FHWA Work Zone website (http://ops.fhwa.dot.gov/wz/index.asp), and the National Work Zone Safety Information Clearinghouse (http://wzsafety.tamu.edu/).

6.2.1. Safety Effects of Work Zone Design Elements

Many traffic, road, and work type characteristics are the basis for selecting design elements of work zones. Work zone design elements include duration, length, and time of day; lane closure design; lane closure merge design; centerline treatments; and other design elements. The safety effect of these elements is discussed in the following sections.

6.2.1.1. Duration, Length, and Time of Day

This section comprises elements of a work zone such as duration (number of days), length (in kilometers or miles) and time of the day (day or night) when the work is taking place. The aspect of driver familiarity or lack of, with the work zone is brought in the context of these elements and the overall safety performance.

The questions of whether accidents are more likely to occur during the early period of construction work compared with the later periods of construction work and whether nighttime work zones offer advantages daytime work zones are discussed.

At present, there is a lack of safety information about the following elements:

- Many short versus one longer work zone;
- Whether it is worthwhile to offer a bonus/penalty for early/late completion of the project;
- Whether it is worthwhile to concentrate on developing technological improvements that can shorten work zone duration;

Many agencies have started conducting work at night to reduce traffic disruption and delay to the driving public. Possible challenges with nighttime work zones include the changeover period each morning and evening, a longer overall work zone presence, shift work problems leading to accidents among construction workers, and noise and light problems in residential areas. Recent work has indicated that nighttime work does produce "negative impacts on the workers' sleep patterns, body rhythms, and social and family lives" (*56*).

There is a need to quantify the safety impact of the duration, construction stage, length, and time of day of work zones on rural and urban roads of all types and for all accident types and severities.

Exhibit 6-16: Resources examined to investigate the safety effect of the duration, construction stage, length, and time of day of work zones

DOCUMENT	DESCRIPTION	COMMENT
(Ullman, G.L., Finley, M.D., Bryden, J.E., Srinivasan, R., and Council, F.M., "Traffic Safety Evaluation of Nighttime and Daytime Work Zones", Draft Final Report on NCHRP Project 17-30, Submitted May 2008)	A detailed study of the safety aspects of daytime and nighttime work zones using data from 5 States. Empirical Bayes methods were used to assess the impacts of conducting work at day and night with and without lane closures.	Added to synthesis. AMFs with standard errors are provided in an exhibit.
(Li, Y., and Bai, Y., "Comparison of Characteristics between Fatal and Injury Accidents in the Highway Construction Zones", Safety Science, Vol. 46 (2008), pp. 646-660.)	This study compared the characteristics of fatal and injury crashes that occurred in Kansas work zones from 1992 to 2004.	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
Arditi, D., Lee, D.-E., and Polat, G., "Fatal Accidents in Nighttime versus Daytime Highway Construction Work Zones", Journal of Safety Research, Vol. 38 (2007), pp. 399-405.	This study used FARS data to compare fatal accidents that occurred in nighttime and daytime work zones in Illinois from 1996 to 2001.	Added to synthesis
(*14*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	The book provides a systematic overview of the effects of road safety measures (translated from 1997 Norwegian edition, partly updated).	Limited qualitative information. Added to synthesis.
Holguin-Veras, J., Ozbay, K., Baker, R., Sackey, D., Medina, A., and Hussain, S., "Toward a Comprehensive Policy of Nighttime Construction Work", Transportation Research Record 1861, 2003, pp. 117-124.	This study tried to produce a policy for nighttime construction work by considering the travel time savings, impact of workers' human factors, and impact of pay differentials.	Added to synthesis
(*20*) (Khattak, A. J., Khattak, A. J., and Council, F. M., "Effects of Work Zone Presence on Injury and Non-Injury Crashes." Accident Analysis and Prevention, Vol. 34, No. 1, Oxford, N.Y., Pergamon Press, (2002) pp. 19-29.)	The authors used regression models to investigate the number of expected crashes by work zone duration (number of days) and work zone length.	Suggested by NCHRP 17-18(4). Added to synthesis.
(*21*) (Tarko, A. P. and Venugopal, S., "Safety and Capacity Evaluation of the Indiana Lane Merge System Final Report." FHWA/IN/JTRP-2000/19, West Lafayette, Ind., Purdue University, (2001))	The study evaluated the Indiana Lane Merge System (ILMS) using procedures that combined crash-based and conflict-based crash prediction models to evaluate the safety effects of the ILMS in a real construction zone.	Added to synthesis.
(Pesti, G., Jessen, D. R., Byrd, P. S., and McCoy, P. T., "Traffic Flow Characteristics of the Late Merge Work Zone Control Strategy." Washington, D.C., 78th Transportation Research Board Annual Meeting, (1999))	The paper evaluated the operational effects of the Late Merge concept in reducing queues and road rage at work zones. The study used traffic conflicts (forced merges, lane straddles and lane blocking) as a measure of safety effectiveness.	No relevant information for this section. Not added to synthesis.
(Pal, R. and Sinha, K. C., "Analysis of Crash Rates at Interstate Work Zones in Indiana." Transportation Research Record 1529, Washington, D.C., Transportation Research Board, National Research Council, (1996) pp. 43-53.)	The authors used regression models to investigate the number of expected crashes at crossover and partial lane closure sites by work zone duration (number of days).	No relevant results for this section. Not added to synthesis.
(*22*) (Rouphail, N. M., Mousa, R., Said, K., and Jovanis, P. P., "Freeway Construction Zones in Illinois: A Follow-Up Study. Final Report." FHWA/IL/RC-004, Springfield, Illinois Department of Transportation, (1990))	The study evaluated various traffic control measures used in work zones.	Added to synthesis. Provides information on construction stage.
(*23*) (Rouphail, N. M., Yang, Z. S., and Fazio, J., "Comparative Study of Short- and Long-Term Urban Freeway Work Zones." Transportation Research Record 1163, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 4-13.)	Comparative study of crash experience at long-term and short-term freeway work zones.	Suggested by NCHRP 17-18(4). Added to synthesis. Limited information. No AMFs.
(McCoy, P. T. and Peterson, D. J., "Safety Effects of Two-Lane Two-Way Segment Length Through Work	The study's objective was to determine the safety effects of lengthening TLTW segments.	Suggested by NCHRP 17-18(4). Limited

DOCUMENT	DESCRIPTION	COMMENT
Zones on Normally Four-Lane Divided Highways." Transportation Research Record 1163, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 15-21.)	Five speed distribution parameters were used as indicators of traffic safety.	information, now out of date. Not added to synthesis. No AMFs.
(*24*) (Graham, J. L., Paulsen, R. J., and Glennon, J. C., "Accident and Speed Studies in Construction Zones." FHWA-RD-77-80, Washington, D.C., Federal Highway Administration, (1977))	The study analyzed accidents that occurred before and during construction in 79 zones in seven states in the 1970s.	Added to synthesis. Limited information. No AMFs.

Several studies have investigated work zone duration, length and time of work, but most of the information available is qualitative and could not be used to establish AMFs. One problem is that work zone length and duration cover a wide range of possibilities. Work zone duration, for example, can range from a few hours to many months. Each study had its own definition of "short" and "long" which sometimes overlap and are not always defined.

The most recent (2002) study available, by Khattak et al., used negative binomial models to investigate the number of expected crashes by work zone duration (number of days) and work zone length (distance) (*20*). The study investigated 36 construction zones at rural and urban locations in California in its sample, which, although small, is larger than the samples used in most previous studies.

For convenience, Khattak et al.'s model is introduced here, and will be referred to in the discussions of work zone duration and length in this section. The explanatory variables in the model were duration of the work zone (days), work zone length (km), ADT, an exposure term intended to capture interactive effects of work zone duration, length and ADT, and a location variable (urban/rural). As the data files used did not contain work zone traffic volumes, Khattak et al. assumed that ADT remained constant. Because ADT volumes are likely to decrease during construction, or to have a different daily distribution, the results are considered to be conservative estimates. There is probably a greater effect of traffic volumes on traffic crashes than the analysis and modeling show. The model is shown in Equation 6-1. Note that the average ADT at the 36 work zones was 101,000 veh/day, but ranged from 4,000 to 237,000 veh/day. The urban location variable and exposure term were not found to be statistically significant (*20*).

Equation 6-1: Model to predict number of expected crashes by work zone duration (number of days) and work zone length (distance) (20)

$$Y = (x_1)^{1.2659} (x_2)^{1.1149} (x_3)^{0.6718} \exp(-0.2257x_4)\exp(-0.5126x_5)\exp(0.1988x_6)\exp(-17.7748)$$

Where

Y is expected number of total crashes in a given duration on work zone segments

x_1 is average ADT of the work zone (veh/day)

x_2 is duration of observation (days)

x_3 is length of the work zones (km)

x_4 is 1 if the work zone is in an urban area, 0 otherwise

x_5 is 1 if injury producing crash, 0 otherwise

x_6 is 1 if crashes recorded during work zones, 0 otherwise

Treatment: Change duration of work zones

Rural two-lane roads; Rural multi-lane highways

No studies found.

Freeways; Expressways

Khattak et al.'s study investigated the safety effects of work zone duration at a mixture of urban and rural freeway sites (*20*). The duration of the work zones observed ranged from 16 days to 714 days. Traffic volumes varied greatly at the sites studied.

Khattak et al.'s model (Equation 6-1) showed that crash frequencies (for all crash types and severities combined, and for injury and non-injury severities separately) increased with increasing work zone duration. As Khattak et al. state, "The estimated parameter for work zone duration is slightly higher than unity, indicating a greater than one-to-one correspondence between crash frequency and duration of observation. According to the model results, a 1% increase in duration of observation will result in a 1.1149% increase in crash frequency" (page 25) (*20*). In other words, if a fictional 7-day work zone experienced 100 crashes (all types, all severities), extending that work zone to 7.5 days (a 7% increase) would result in an 8% increase in crashes (i.e., 7% increase in duration x 1.1149% increase in crashes = 8% more crashes = AMF of 1.08), or 108 crashes (all types, all severities) (Equation 6-2), when all other variables are kept constant. The standard error for this AMF may be calculated from the z-statistic for the model parameter given by Khattak et al.; a method quality descriptor of medium-low was assigned to this study due to the small number of factors that were included in the model. For a 1% increase in duration, the standard error is minimal (i.e., 0.0023). However, as the percent increase in duration becomes larger, so does the standard error, in a non-linear way. Therefore, a fixed standard error cannot be provided for this accident modification function.

Equation 6-2: AMF for percent increase in work zone duration (20)

$$AMF_{all} = 1 + (\%\ \text{increase in duration} * 1.1149)/100$$

Where:

AMF_{all} is the accident modification factor for all crash types and all severities in the work zone

% increase in duration is the change in duration (# days) of the work zone presence

Khattak et al. conclude that the crash frequency at the work zones on the freeways "increased with higher values of work zone duration" (page 29) and that by "reducing work zone duration, reductions in both injury and non-injury crashes can be achieved" (page 29) (*20*).

Tarko and Venugopal evaluated the Indiana Lane Merge System (ILMS) using procedures that combined crash-based and conflict-based crash prediction models for four-lane divided rural freeways (*21*). Tarko and Venugopal commented, "The duration of work turned out to be a significant factor in all cases. For almost all the cases, the factor was approximately one. This shows that the number of crashes increases almost linearly with the duration" (page 52) (*21*). However, AMFs were not available from this study.

Rouphail et al. compared long- and short-term (intermittent) work zones on urban freeways in a 1988 study (*23*). The 23 "short-term work zones" were intermittent zones where construction took place during six-hour closures. The three "long-term work zones" were longer than four days. All these sites might be considered short-term in other studies. Rouphail et al. were unable to obtain ADT data for the year when the study was conducted, but because all the sites were short-term or relatively short-term, the

researchers concluded that motorists were not advised of the work zones and "flow rates should not be expected to vary considerably during construction" (page 5) (*23*).

At the intermittent work zones, Rouphail et al. found that the accident rate was similar to the rate during the before construction period, but at the "long-term" work zones, Rouphail et al. found that accidents increased by 88% compared with the before period and that "rear-end accidents increased significantly" (page 6), but accident severity decreased (*23*). However, AMFs were not available from this study.

Urban and suburban arterials

No studies found.

Treatment: Change work zone length

Rural two-lane roads; Rural multi-lane highways

No studies found.

Freeways; Expressways

Khattak et al.'s study investigated the safety effects of work zone duration at a mixture of urban and rural freeways sites (*20*). The length of the work zones ranged from 0.51 mi (0.83 km) to 12.20 mi (19.53 km). The average length was 4.21 mi (6.73 km). The average ADT at the 36 work zones was 101,000 veh/day, but ranged from 4,000 to 237,000 veh/day.

Khattak et al.'s model (Equation 6-1) showed that crash frequencies increased with increasing work zone length. "According to the model results, a 1% increase in ….segment length will increase crash frequency by 0.6718%" (page 25) (*20*). In other words, if a fictional 5 km work zone experienced 100 crashes (all types, all severities), extending that work zone to 5.25 km (a 5% increase) would result in an 3% increase in crashes (i.e., 5% increase in length x 0.6718% increase in crashes = 3% more crashes = AMF of 1.03), or 103 crashes (all types, all severities) (Equation 6-3), when all other variables are kept constant. The standard error for this AMF may be calculated from the z-statistic for the model parameter given by Khattak et al.; a method quality descriptor of medium-low was assigned to this study due to the small number of factors that were included in the model. For a 1% increase in length, the standard error is minimal (i.e., 0.0013). However, as the percent increase in length becomes larger, so does the standard error, in a non-linear way. Therefore, a fixed standard error cannot be provided for this accident modification function.

Equation 6-3: AMF for % increase in work zone length (km) (20)

$AMF_{all} = 1 + (\%\ \text{increase in length} * 0.6718)/100$

Where: AMF_{all} is the accident modification factor for all crash types and all severities in the work zone

% increase in length is the change in length (km) of the work zone

Khattak et al. do not appear to draw any further conclusions regarding work zone length.

Tarko and Venugopal's evaluation of the Indiana Lane Merge System (ILMS) included the length of the work zone as a factor in the model developed (*21*). The authors did not expect the length of the work zone to affect crashes on the approaches to work zones, but found that the length of the work zone "turned out to be statistically very significant for two cases, total rear end crashes and rear end PDO crashes" (page 51) (*21*).

Tarko and Venugopal also comment that "Even more surprising and counter-intuitive was the sign of the length variable…..indicating that shorter work zones had a larger number of merging crashes than longer work zones given that other factors remained the same" (page 51). Tarko and Venugopal suggested that the explanation might be that long (distance) work zones tend to be of greater duration, more intensive traffic management would be in place compared to short work zones and this might make drivers more cautious (page 51) (*21*). No AMFs could be derived from this study.

Urban and suburban arterials

No studies found.

Discussion: Operate work zones in the daytime or nighttime

Rouphail et al. commented that Shepard and Cottrell (1985) "alluded to the potential benefit of night work zone activities but provided no information regarding their accident experience" (*23*) (page 5). Arditi et al. (2007) used data on fatal accidents in construction zones in Illinois from 1996 to 2001 to assess the safety of daytime and nighttime construction zones (*57*). In order to account for exposure, information from Wunderlich and Hardesty (*58*) were used to determine the percentage of work zones where work was done during the day and the percentage of work zones where work was done at night. Arditi et al. concluded that "nighttime construction is about five times more hazardous than daytime construction". However, it is important to note that although Arditi et al. (*57*) tried to account for the number of daytime and nighttime work zones, they did not explicitly account for the fact that more of the night time work is probably undertaken on higher volume roads that have more crashes.

Ullman et al. (2008) conducted a detailed study of safety at daytime and nighttime work zones using data from five States: New York, North Carolina, Ohio, Washington, and California (*55*). New York has a unique database of work zone crashes that provide detailed information about the work zone situation at the time of the crash (e.g., flagging, lane closure, mobile operation, etc.), type of traffic crash, and type of worker construction crash. Data from work zones crashes that occurred from 2000 to 2005 in New York State were analyzed. In the New York state data, accidents occurring between 6 am and 6 pm were coded as daytime accidents and those from 6 pm to 6 am were coded as nighttime accidents. Following is a summary of the results (*55*):

- "Worker involved crashes at nighttime work zones were significantly more severe than in daytime.
- Rear-end crashes comprise a smaller proportion of work zone traffic crashes at night work zone operations than during daytime operations (49% during day versus 36% at night).
- Crashes involving workers, construction vehicles or equipment, and construction materials and debris comprise a greater percentage of crashes at night than during the day.
- Intrusion crashes at night work operations are significantly more severe than at daytime work operations".

The results from the analysis of the other four States from this study are discussed below under 'Freeways; Expressways'.

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

Graham et al.'s 1977 study found that daytime accidents increased by about 8%, and nighttime accidents increased by about 9% compared to before construction (mixed urban and rural settings, all road

types, all accident types and severities) (page 36) (*24*). The authors pointed out that "the number of night accidents increased during construction, but the proportion of night accidents to total accidents remained the same" (page 83) (*24*). Although this study provides some insight to the accident experience of a work zone during daytime compared to nighttime, no AMFs can be derived.

Freeways; Expressways

Elvik and Vaa's overview of the effects of road safety noted that a 1985 English study of freeways "showed that accidents during road works increase on a percentage basis more with work at night than with work during the day. The increase was least where the road works site was not illuminated" (page 453) (*14*). Elvik and Vaa did not derive AMFs.

Ullman et al. (2008) used the empirical Bayes before-during method to examine the safety of daytime and nighttime construction zones with and without temporary lane closures (*55*). The analysis focused on a total of 64 construction projects on freeway sections encompassing about 465 centerline-miles of roadway and a total of over 82 years of work. The average length of a construction project was 7 miles and the average duration was 16 months. Exhibits 6-17 through 6-19 show the expected change in crashes (in the form of an index of change) that occurs when a construction zone is introduced. In these exhibits, day is defined from 6 am to 7 pm, and night is from 7 pm to 6 am. Results for three conditions are shown: active work with temporary lane closure, active work with no temporary lane closure, and no active work and no temporary lane closure. This study was rated High and a MCF of 1.2 was applied to the standard errors.

Exhibit 6-17 shows the expected changes in crashes when there was active work with temporary lane closures. Results are provided for three AADT ranges (< 50,000; 50,000-100,000; > 100,000) and also for all AADT ranges combined. Day time lane closures were more common at the lower AADT levels while night time lane closures were more common at higher AADT levels. Subtracting 1 from the index of change and expressing it as a percent will give the percentage increase in crashes that will occur. Looking at the results for all the AADT ranges combined, the index of change for day and night time crashes is quite similar. However, since the number of crashes is typically much higher during the day compared to night, daytime lane closures would lead to a much larger increase in crashes.

Exhibit 6-17: Safety impacts of daytime and nighttime work zones in freeways (active work with temporary lane closure)(55)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
Ullman et al., 2008	Active work with temporary lane closure	Night	Freeway, AADT < 50,000	Injury accidents; all types	1.318	0.272
	Active work with temporary lane closure	Day	Freeway, AADT < 50,000	Injury accidents; all types	1.596	0.179
	Active work with temporary lane closure	Night	Freeway, AADT 50,000-100,000	Injury accidents; all types	1.335	0.181
	Active work with temporary lane closure	Day	Freeway, AADT 50,000-100,000	Injury accidents; all types	1.116	0.293

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
	Active work with temporary lane closure	Night	Freeway, AADT > 100,000	Injury accidents; all types	1.491	0.139
	Active work with temporary lane closure	Day	Freeway, AADT > 100,000	Injury accidents; all types	1.261	0.269
	Active work with temporary lane closure	Night	Freeway, All AADT ranges	Injury accidents; all types	1.423	0.102
	Active work with temporary lane closure	Day	Freeway, All AADT ranges	Injury accidents; all types	1.455	0.134
	Active work with temporary lane closure	Night	Freeway, AADT < 50,000	PDO accidents; all types	1.630	0.226
	Active work with temporary lane closure	Day	Freeway, AADT < 50,000	PDO accidents; all types	1.899	0.151
	Active work with temporary lane closure	Night	Freeway, AADT 50,000-100,000	PDO accidents; all types	1.712	0.164
	Active work with temporary lane closure	Day	Freeway, AADT 50,000-100,000	PDO accidents; all types	1.338	0.256
	Active work with temporary lane closure	Night	Freeway, AADT > 100,000	PDO accidents; all types	1.798	0.124
	Active work with temporary lane closure	Day	Freeway, AADT > 100,000	PDO accidents; all types	1.870	0.239
	Active work with temporary lane closure	Night	Freeway, All AADT ranges	PDO accidents; all types	1.748	0.091
	Active work with temporary lane closure	Day	Freeway, All AADT ranges	PDO accidents; all types	1.808	0.115
	Active work with temporary lane closure	Night	Freeway, AADT < 50,000	All accidents; all types	1.527	0.176
	Active work with temporary lane closure	Day	Freeway, AADT < 50,000	All accidents; all types	1.770	0.115
	Active work with temporary lane closure	Night	Freeway, AADT 50,000-100,000	All accidents; all types	1.569	0.124

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
	Active work with temporary lane closure	Day	Freeway, AADT 50,000-100,000	All accidents; all types	1.262	0.193
	Active work with temporary lane closure	Night	Freeway, AADT > 100,000	All accidents; all types	1.649	0.091
	Active work with temporary lane closure	Day	Freeway, AADT > 100,000	All accidents; all types	1.645	0.180
	Active work with temporary lane closure	Night	Freeway, All AADT ranges	All accidents; all types	1.609	0.068
	Active work with temporary lane closure	Day	Freeway, All AADT ranges	All accidents; all types	1.663	0.088

Exhibit 6-18: Safety impacts of daytime and nighttime work zones in freeways (active work with no temporary lane closure) (55)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
Ullman et al., 2008	Active work with no temporary lane closure	Night	Freeway, AADT < 50,000	Injury accidents; all types	2.256	1.562
	Active work with no temporary lane closure	Day	Freeway, AADT < 50,000	Injury accidents; all types	1.452	0.259
	Active work with no temporary lane closure	Night	Freeway, AADT 50,000-100,000	Injury accidents; all types	1.341	0.406
	Active work with no temporary lane closure	Day	Freeway, AADT 50,000-100,000	Injury accidents; all types	1.189	0.074
	Active work with no temporary lane closure	Night	Freeway, AADT > 100,000	Injury accidents; all types	1.395	0.382
	Active work with no temporary lane closure	Day	Freeway, AADT > 100,000	Injury accidents; all types	1.132	0.068

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
	Active work with no temporary lane closure	Night	Freeway, All AADT ranges	Injury accidents; all types	1.414	0.275
	Active work with no temporary lane closure	Day	Freeway, All AADT ranges	Injury accidents; all types	1.174	0.050
	Active work with no temporary lane closure	Night	Freeway, AADT < 50,000	PDO accidents; all types	1.359	0.816
	Active work with no temporary lane closure	Day	Freeway, AADT < 50,000	PDO accidents; all types	1.371	0.176
	Active work with no temporary lane closure	Night	Freeway, AADT 50,000-100,000	PDO accidents; all types	1.227	0.304
	Active work with no temporary lane closure	Day	Freeway, AADT 50,000-100,000	PDO accidents; all types	1.410	0.067
	Active work with no temporary lane closure	Night	Freeway, AADT > 100,000	PDO accidents; all types	2.037	0.352
	Active work with no temporary lane closure	Day	Freeway, AADT > 100,000	PDO accidents; all types	1.388	0.053
	Active work with no temporary lane closure	Night	Freeway, All AADT ranges	PDO accidents; all types	1.666	0.229
	Active work with no temporary lane closure	Day	Freeway, All AADT ranges	PDO accidents; all types	1.398	0.041
	Active work with no temporary lane closure	Night	Freeway, AADT < 50,000	All accidents; all types	1.642	0.746
	Active work with no temporary lane closure	Day	Freeway, AADT < 50,000	All accidents; all types	1.386	0.145

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
	Active work with no temporary lane closure	Night	Freeway, AADT 50,000-100,000	All accidents; all types	1.285	0.246
	Active work with no temporary lane closure	Day	Freeway, AADT 50,000-100,000	All accidents; all types	1.323	0.050
	Active work with no temporary lane closure	Night	Freeway, AADT > 100,000	All accidents; all types	1.797	0.258
	Active work with no temporary lane closure	Day	Freeway, AADT > 100,000	All accidents; all types	1.299	0.042
	Active work with no temporary lane closure	Night	Freeway, All AADT ranges	All accidents; all types	1.577	0.178
	Active work with no temporary lane closure	Day	Freeway, All AADT ranges	All accidents; all types	1.314	0.032

Exhibit 6-19: Safety impacts of daytime and nighttime work zones in freeways (no active work and no temporary lane closure) (55)

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
Ullman et al., 2008	No active work and no temporary lane closure	Night	Freeway, AADT < 50,000	Injury accidents; all types	1.054	0.104
	No active work and no temporary lane closure	Day	Freeway, AADT < 50,000	Injury accidents; all types	1.106	0.073
	No active work and no temporary lane closure	Night	Freeway, AADT 50,000-100,000	Injury accidents; all types	1.141	0.085
	No active work and no temporary lane closure	Day	Freeway, AADT 50,000-100,000	Injury accidents; all types	0.936	0.046

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
	No active work and no temporary lane closure	Night	Freeway, AADT > 100,000	Injury accidents; all types	1.106	0.076
	No active work and no temporary lane closure	Day	Freeway, AADT > 100,000	Injury accidents; all types	1.051	0.036
	No active work and no temporary lane closure	Night	Freeway, All AADT ranges	Injury accidents; all types	1.114	0.050
	No active work and no temporary lane closure	Day	Freeway, All AADT ranges	Injury accidents; all types	1.020	0.026
	No active work and no temporary lane closure	Night	Freeway, AADT < 50,000	PDO accidents; all types	1.133	0.082
	No active work and no temporary lane closure	Day	Freeway, AADT < 50,000	PDO accidents; all types	1.271	0.060
	No active work and no temporary lane closure	Night	Freeway, AADT 50,000-100,000	PDO accidents; all types	1.309	0.080
	No active work and no temporary lane closure	Day	Freeway, AADT 50,000-100,000	PDO accidents; all types	1.102	0.040
	No active work and no temporary lane closure	Night	Freeway, AADT > 100,000	PDO accidents; all types	1.455	0.071
	No active work and no temporary lane closure	Day	Freeway, AADT > 100,000	PDO accidents; all types	1.234	0.030
	No active work and no temporary lane closure	Night	Freeway, All AADT ranges	PDO accidents; all types	1.330	0.047
	No active work and no temporary lane closure	Day	Freeway, All AADT ranges	PDO accidents; all types	1.196	0.022

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
	No active work and no temporary lane closure	Night	Freeway, AADT < 50,000	All accidents; all types	1.094	0.065
	No active work and no temporary lane closure	Day	Freeway, AADT < 50,000	All accidents; all types	1.208	0.047
	No active work and no temporary lane closure	Night	Freeway, AADT 50,000-100,000	All accidents; all types	1.240	0.061
	No active work and no temporary lane closure	Day	Freeway, AADT 50,000-100,000	All accidents; all types	1.042	0.030
	No active work and no temporary lane closure	Night	Freeway, AADT > 100,000	All accidents; all types	1.303	0.052
	No active work and no temporary lane closure	Day	Freeway, AADT > 100,000	All accidents; all types	1.159	0.023
	No active work and no temporary lane closure	Night	Freeway, All AADT ranges	All accidents; all types	1.237	0.035
	No active work and no temporary lane closure	Day	Freeway, All AADT ranges	All accidents; all types	1.127	0.017

A recent FHWA report provides average crash costs for twenty two different crash types (*59*). Based on information from that report, the average cost for PDO crashes on freeways = $7,800, and the average cost for injury and fatal crashes = $206,015. Using these crash costs, information from Exhibits 6-17 through 6-19, and average crashes per mile on California freeways, Exhibits 20 through 22 show graphs between increased crash costs per 100 work-hours per mile of work and AADT (similar trends will be obtained if crash frequencies from other States are used, although the absolute numbers will be different) (*55*).

It is clear from Exhibit 6-20 that working during the day when work activities require travel lanes to be temporarily closed results in higher crash costs – the difference between day and night increases at higher AADT levels. Exhibit 6-21 indicates that the differences between working at night versus working during the day on tasks that do not require lane closure are less clear. The increased crash costs are very close for night and day. In situations where work is inactive and there is no lane closure the increased crash costs are slightly higher at night (Exhibit 6-22), but increased costs are lower across the entire range of AADT when compared to situations when there is active work.

Exhibit 6-20: Relationship between increased crash costs and freeway AADT (active work with temporary lane closure) (55)

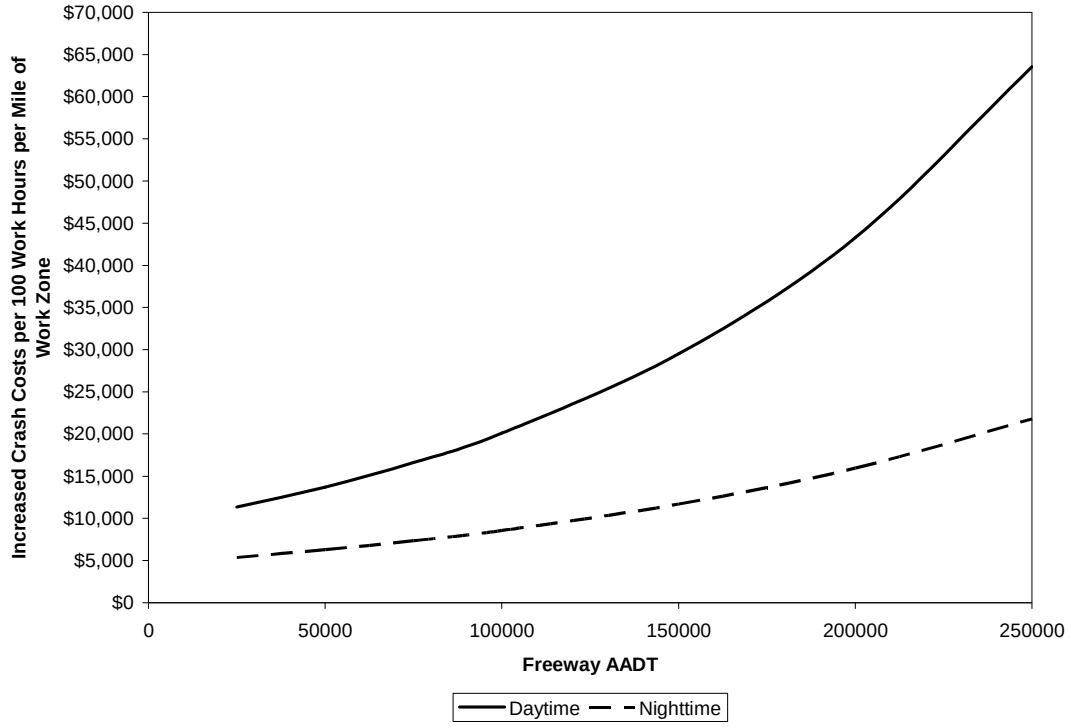


Exhibit 6-21: Relationship between increased crash costs and freeway AADT (active work without temporary lane closure) (55)

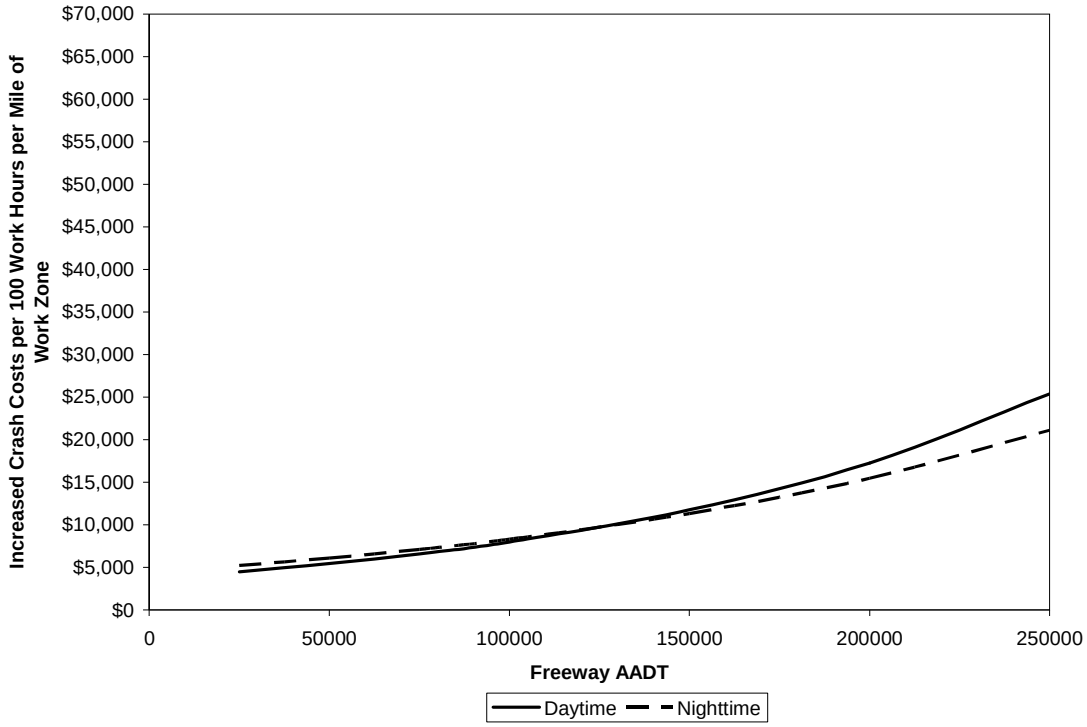
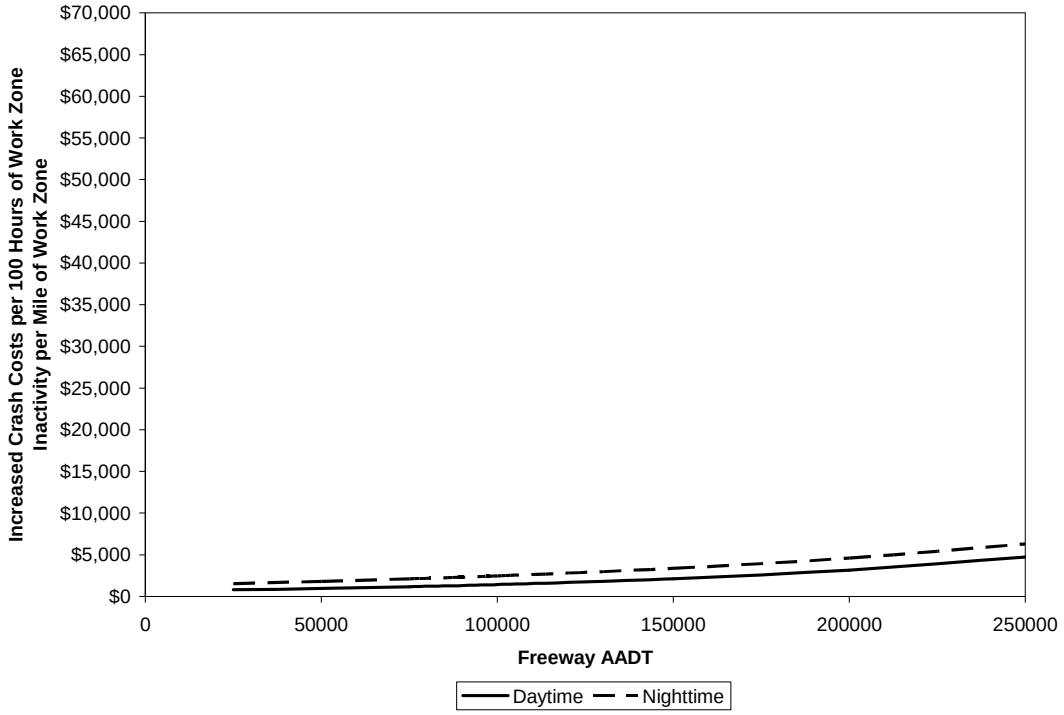


Exhibit 6-22: Relationship between increased crash costs and freeway AADT (no active work and temporary lane closure) (55)



Discussion: Construction stages

Rural two-lane roads; Rural multi-lane highways; Urban and suburban arterials

No studies found.

Freeways; Expressways

Based on a study on urban freeways in Chicago, Rouphail et al. (1990) commented that accident risk "is at its highest during the initial construction stage" (page 138) (*22*). They noted that drivers experienced many difficulties adapting to the new conditions in the very early stage of a work zone and considered this period to be particularly vulnerable. Rouphail et al. concluded that "by far the largest discriminant of accident rates" was the construction stage itself (page 139) (*22*). In the early stages ("at or shortly after the start of the construction activities" (page 139) (*22*)), the average accident rate was 9.71 accidents/million-vehicle-miles (acc/mvm) compared with 6.00 acc/mvm in the later stages. The researchers comment that these results suggest that drivers might have had challenges adapting to the new traffic control procedures and the new geometric constraints. However, AMFs could not be determined from this study.

No studies were found for rural freeways.

6.2.1.2. Lane Closure Design

There are two main alternative types of lane closure design for work zones on freeways, rural multi-lane roadways, and urban and suburban arterials:

- Crossover closure with two-lane two-way operations (TLTWO); and
- Single (or partial) lane closure in one direction.

This section examines the safety effects of crossover closures and single lane closures at a work zone.

In **crossover closures**, all the lanes in one direction of a divided or undivided multi-lane highway are closed (Exhibit 6-23). For example, if construction is taking place on the northbound lanes, all the northbound lanes are closed, but the southbound lanes remain open and are used for both directions of traffic. Traffic on the northbound lanes must "cross over" the median or centerline to travel on the southbound lanes. Once on the southbound lanes, the northbound and southbound traffic face each other without a median. This is known as two-lane two-way traffic operations (TLTWO).

The TLTWO roadway is signed and marked for two-way traffic. Temporary centerlines or other dividers may be used to separate the traffic (Section 6.2.1.3). Using this closure type, work crews are able to work without nearby traffic, however, heavy traffic volumes, loaded trucks, nighttime and bad weather can create safety concerns with respect to the two-way two-lane temporary arrangement.

Median crossover design varies for the crossover closures. The two main categories described by Graham and Migletz are flat diagonal designs and reverse curve designs (*25*). Flat diagonal designs are constructed with no superelevation or curvature in the crossover. Reverse curve designs employ two curves in the crossover and frequently have superelevation in the curves.

In **single lane closures**, full closure of all the lanes in one direction at any one time does not occur (Exhibit 6-24). Although defined as "single lane closures", one or more lanes may be closed at any one time. The number of lanes closed depends on the total number of lanes on the roadway and the construction circumstances.

A work zone using a single lane closure does not directly affect traffic on the non-construction side of the roadway. Traffic on the construction side passes close to or adjacent to the work zone and work crew.

This section discusses the safety impact of crossover closures and single lane closures at work zones on multi-lane roads.

However, available information is limited and there is a need to better quantify the safety impact of the following:

- Work zones with crossover closures on rural and urban multi-lane roads and freeways for all accident types and severities for different traffic conditions;
- Work zones with single lane closures on rural and urban multi-lane roads and freeways for all accident types and severities for different traffic conditions;
- Different median crossover designs used in crossover closures;
- Different lane closure design elements such as taper lengths and lane widths; and
- Lane closure design for two-lane roads.

The safety effects of closing the right hand lanes vs. closing the left hand lanes, and centerline treatments used to separate opposing traffic are discussed in Section 6.2.1. Lane markings and delineation (cones, markings, etc.) for lane closure design are discussed in Section 6.2.2.

Exhibit 6-23: Crossover closure with two-lane two-way operation (25)

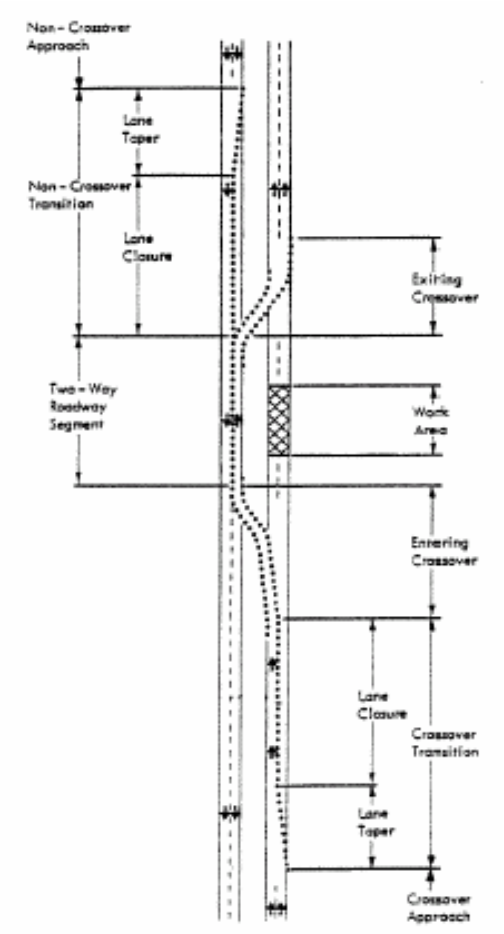


Exhibit 6-24: Single lane closure (24)

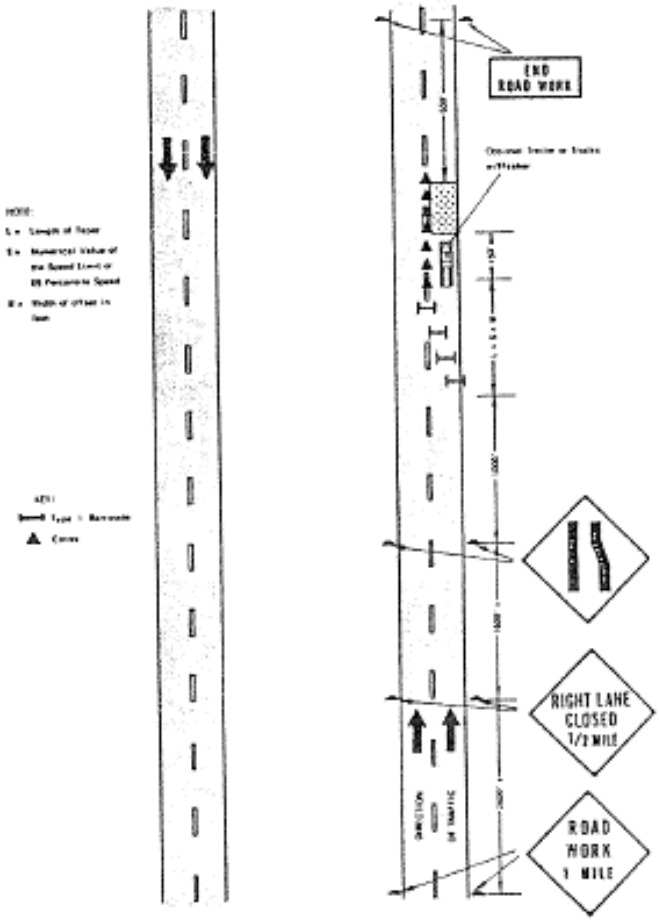


Exhibit 6-25: Resources used to investigate the safety effect of lane closure design in work zones

DOCUMENT	DESCRIPTION	COMMENT
(Tarko, A. P. and Venugopal, S., "Safety and Capacity Evaluation of the Indiana Lane Merge System Final Report." FHWA/IN/JTRP-2000/19, West Lafayette, Ind., Purdue University, (2001))	The study evaluated the Indiana Lane Merge System (ILMS) which is an advanced dynamic traffic control system designed to encourage drivers to switch lanes well in advance of the work zone entry taper.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Pesti, G., Jessen, D. R., Byrd, P. S., and McCoy, P. T., "Traffic Flow Characteristics of the Late Merge Work Zone Control Strategy." Washington, D.C., 78th Transportation Research Board Annual Meeting, (1999))	The reports evaluated a late merge system. Conflicts were used as a surrogate for safety.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(*26*) (Pal, R. and Sinha, K. C., "Analysis of Crash Rates at Interstate Work Zones in Indiana." Transportation Research Record 1529, Washington, D.C., Transportation Research Board, National Research Council, (1996) pp. 43-53.)	The authors used a before and after study with a comparison group to analyze the relative safety of crossover lane closures (two-way traffic operations) and partial lane closures.	Reference suggested by NCHRP 17-18(4). Added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Rouphail, N. M., Yang, Z. S., and Fazio, J., "Comparative Study of Short- and Long-Term Urban Freeway Work Zones." Transportation Research Record 1163, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 4-13.)	The study compared the accident experience of four long-term and 23 short-term projects before, during and after urban freeway work zones between 1981 and 1983.	Study not concerned with lane closure design. Not added to synthesis.
(*27*) (Dudek, C. L., Richards, S. H., and Buffington, J. L., "Some Effects of Traffic Control on Four-Lane Divided Highways." Transportation Research Record 1086, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 20-30.)	The study evaluated single lane closures in one direction, and crossover closures with two-lane two-way operations (TLTWO) at nine sites.	Reference suggested by NCHRP 17-18(4). Added to synthesis.
(*25*) (Graham, J. L. and Migletz, J., "Design Considerations for Two-Lane, Two-Way Work Zone Operations." FHWA/RD-83/112, Washington, D.C., Federal Highway Administration, (1983))	The study investigated the safety and operational problems of 22 TLTWO sites and compared the results with 14 lane closure sites.	Reference suggested by NCHRP 17-18(4). Added to synthesis.
(Graham, J. L., Paulsen, R. J., and Glennon, J. C., "Accident and Speed Studies in Construction Zones." FHWA-RD-77-80, Washington, D.C., Federal Highway Administration, (1977))	The study analyzed accidents that occurred before and during construction in 79 zones in seven states in the 1970s.	Reference suggested by NCHRP 17-18(4). Added to Section 6.2.1.1.

Most of the crossover closures and single lane closures study results relate to rural multi-lane divided highways and all accident types and severities, and compare the work zone conditions to the no-work zone condition. Although some studies did not clearly specify the setting, few studies appeared to investigate urban crossover or urban single lane closures. Traffic volumes were not usually specifically mentioned in the studies. All the studies except one express their findings as accident rates rather than as accident frequencies. Some studies present amalgamated results and others present results site by site.

Treatment: Use crossover closure at work zone

Rural two-lane roads

Not applicable.

Rural multi-lane highways; Freeways; Expressways

Three studies provided estimates of the effect of crossover closures on accidents in work zones on rural multi-lane highways and freeways. The results are shown in Exhibit 6-26, comparing the accident experience during construction to before construction. These results contain mixed site types, including rural combined with suburban, and multi-lane highways combined with freeways. The studies also included a variety of centerline treatments and crossover designs (location, length, curves, signing, use of temporary barriers, quality of road surface, etc.).

Accidents during a crossover closure usually increased compared with the before work zone period. As shown in Exhibit 6-26, the Dudek et al. study showed no change over three sites combined, but increases in the other two studies ranged from 7% to 61% for all accident types and all severities.

The index of effectiveness of 1.00 (s = 0.35) for the Dudek study (Exhibit 6-26) is based on three sites (*27*), and was calculated by using accident rate data supplied by Dudek et al. and by assuming that the number of accidents that occurred in the construction periods (which ranged from 1.2 to 10.6 months) was proportional to the number of accidents that would have occurred during a whole year. Only one year of before data was provided. Sufficient information was available to calculate s ideal from the Dudek et al. study, using Eqn 7.3 from Hauer (*28*). A method correction factor of 3 was applied, reflecting the limited number of sites, data used in the study, and the methodology applied, yielding an s value of 0.35.

Pal and Sinha included data accident severity in their study and found marked increases in both injury and fatal accidents during a crossover closure compared to before construction: the index of effectiveness for injury and fatal accidents was 1.84 on four-lane divided roadways and 1.66 on six-lane divided roadways (*26*). The estimate of the standard error is unknown

Pal and Sinha analyzed the safety of crossover lane closures (two-way traffic operations) at 4R projects (resurfacing, restoration, rehabilitation and reconstruction) in Indiana (*26*). Pal and Sinha's study was based on a before and during study with a comparison group and a non-Bayesian approach. They did not use the empirical Bayes approach in their study "because of the sparsity of data" (page 44). No accident frequencies were provided in the publication. The study also included regression models to evaluate the relative safety effects of any future lane closure strategy at a given site, but the authors concluded that the results were limited by the size of the data set (*26*).

Note that the Pal and Sinha's data (Exhibit 6-26) are taken from the authors' averages based on 13 crossover work zone sites. The "during work zone" accident rate was divided by the "before work zone" accident rate to produce the index of effectiveness. Pal and Sinha base the "before work zone" accident rates on similar time periods during the five years preceding the work zones (*26*).

Graham and Migletz conducted a detailed study of the safety and operational problems of TLTWO at 22 work zones sites in 1981 (*25*). The study was conducted in response to controversy regarding TLTWO due to the possibility of head-on accident problems in the two-way portion of the zone. Most of the sites were on interstate roadways. Volumes and setting were not reported.

Graham and Migletz calculated accident rates (per 100 MVM) for those sites where before and during construction data were available. Graham and Migletz found that accident rates increased by 7% at the TLTWO sites compared with the time before the work zone (Exhibit 6-26) (*25*). This increase appears to represent all accident types and severities in the work zone. A standard error for this value was unavailable.

Exhibit 6-26: Estimates of the effect of crossover closures on accident rates in work zones compared to before construction

Author, date	Treatment /element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Pal and Sinha, 1996	TLTWO	Not specified	Four-lane divided, volume not reported	All types, all severities	1.33	Not available
Dudek et al 1986	TLTWO	Not specified	Four-lane divided, 6,800 to 38,000 veh/day	All types, all severities	1.00	0.35

Author, date	Treatment /element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Pal and Sinha, 1996	TLTWO	Not specified	Six-lane divided, volume not reported	All types, all severities	1.61	Not available
Graham and Migletz 1983	TLTWO	Almost all rural (few suburban)	Multi-lane divided, volume not reported	All types, all severities	1.07	Not available
Pal and Sinha, 1996	TLTWO	Not specified	Four-lane divided, volume not reported	All types, Injury and fatal	1.84	Not available
Pal and Sinha, 1996	TLTWO	Not specified	Six-lane divided, volume not reported	All types, Injury and fatal	1.66	Not available

In summary, at crossover closures, the increase for all accident types and severities ranged from no change to about a 60% increase. When considering accident severity of injury and fatal, accidents may increase from 66 to 84% after a crossover work zone is implemented. However, standard errors could not be developed based on the available studies.

Discussion: Using a crossover closure in a work zone (Rural multi-lane highways; Freeways; Expressways

Graham and Migletz note that severe accidents (including head-on accidents) tended to occur in the TLTWO zone. “The two-way segment had the largest number of accidents of any part of the TLTWO zone and also the greatest severity” (page 66), but “There were not a great number of severe head-on accidents in the TLTWO zones” (page 66). Graham and Migletz noted that drivers who were traveling in the non-crossover direction (and who did not have to cross the median to enter the TLTWO) were most “at fault” (page 7). “Such drivers are less likely to be aware of the two-way operation because they may not have had to change lanes or change their path to enter the work zone” (page 7) (*25*).

Graham and Migletz also noted that pavement and shoulder conditions are important in the TLTWO zone, especially the two-way roadway segment (*25*).

Graham and Migletz gave detailed attention to crossover medians and crossover median design; however, no AMFs were obtainable from their publication. Compared with the two-way segment of the TLTWO design, the less severe accidents tended to occur in the crossover median areas (*25*). The Graham and Migletz study included case studies of six TLTWO sites and detailed comments on crossover design. The “entering crossover” areas experienced more accidents than did the “exiting crossovers”. “There were 60% more accidents at entering crossovers than at exiting crossovers” (page 66). Graham and Migletz report that provision for loaded trucks was the most critical aspect of crossover design; fixed object accidents were the most common and often involved portable concrete barriers where these were used. Rear-end accidents were the second most common accident type (*25*).

Flat diagonal entering and exiting crossover designs “had a much lower accident rate” than reverse curve designs (page 66). Accident rates at the entering crossovers were lower when the right approach lane was closed than when the left approach lane was closed. No AMFs could be derived.

Urban and suburban arterials

No studies were found.

Treatment: Use single lane closure at work zone

Rural two-lane roads

Not applicable.

Rural multi-lane highways; Freeways; Expressways

The same three studies used in the crossover closure summary provided estimates of the effect of single lane closures on accidents in work zones. Four estimates of the effect of single lane closures on all accident types and all severities in work zones are shown in Exhibit 6-27. The results show that accidents increased during a single lane closure from 33% to 90%.

Pal and Sinha included data accident severity in their study (*26*). They found a marked increase in both injury and fatal accidents during a crossover closure: the index of effectiveness for injury and fatal accidents was 1.85 on four-lane divided roadways and 1.20 on six-lane divided roadways (Exhibit 6-27). The estimate of the standard error is not known.

Pal and Sinha analyzed the safety of single lane closures (two-way traffic operations) at 4R projects (resurfacing, restoration, rehabilitation and reconstruction) in Indiana (*26*). Pal and Sinha's study was based on a before and during study with a comparison group and a non-Bayesian approach. Pal and Sinha did not to use the empirical Bayes approach in their study "because of the sparsity of data" (page 44). No accident frequencies were provided in the publication. The study also included regression models to evaluate the relative safety effects of any future lane closure strategy at a given site, but the authors concluded that the results were limited by the size of the data set (*26*).

Note that the Pal and Sinha data (Exhibit 6-27) are taken from the authors' averages based on 21 single lane closure projects. The "during work zone" accident rate was divided by the "before work zone" accident rate to produce the index of effectiveness. The authors based their "before work zone" accident rates on the accident rates that occurred over similar time periods during the five years preceding the work zones (*26*).

The index of effectiveness of 1.56 (s = 0.70) (Exhibit 6-27) for the Dudek et al. study is based on four sites (*27*), and was calculated by using accident rate data supplied by Dudek et al. and by assuming that the number of accidents that occurred in the construction periods (which ranged from 1.2 to 10.6 months) was proportional to the number of accidents that would have occurred during a whole year. Only one year of before data was provided. Sufficient information was available to calculate s ideal from the Dudek et al. study, using Eqn 7.3 from Hauer (28). A Method Correction Factor of 3 was applied, reflecting the limited number of sites and data used in the study and the methodology applied, yielding an s value of 0.70.

Although the Graham and Migletz study focused on TLTWO sites, they also commented on single lane closures (*25*). Accidents at the one site for which data are given increased by 190% (Exhibit 6-27) compared with the "before" period (page 46) (*25*). The estimate of the standard error is not known. Due to the lack of detailed supporting data, it is not possible to comment further on the study's quantitative findings. Graham and Migletz reviewed 14 single lane closure sites, and noted that fixed object accidents were the most common type of accident. They also noted that most of the lane closure accidents occurred in the work area, but that the severity of accidents that occurred in the lane closure zone was higher than the severity in the work area.

Exhibit 6-27: Estimates of the effect of single lane closures on accident rates in work zones

Author, date	Treatment/ element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Pal and Sinha, 1996	Single lane closure	Not specified	Four-lane divided, volume not reported	All types, all severities	1.33	Not available
Dudek et al 1986	Single lane closure	Not specified	Four-lane divided, 20,000 to 41,500 veh/day	All types, all severities	1.56	0.70
Pal and Sinha, 1996	Single lane closure	Not specified	Six-lane divided, volume not reported	All types, all severities	1.34	Not available
Graham and Migletz 1983	Single lane closure	Almost all rural (few suburban)	Multi-lane divided, volume not reported	All types, all severities	1.90	Not available
Pal and Sinha, 1996	Single lane closure	Not specified	Four-lane divided, volume not reported	All types, Injury and fatal	1.85	Not available
Pal and Sinha, 1996	Single lane closure	Not specified	Six-lane divided, volume not reported	All types, Injury and fatal	1.20	Not available

In summary, at single lane closures, the increases in crashes ranged from about 33% to about 90% for all severities, including injury and fatal crashes. It is not possible to develop standard errors from the available studies.

Urban and suburban arterials

No studies were found.

Discussion: Comparison of crossover closures and single lane closures

Accidents increased substantially at most work zones with either crossover closures or single lane closures, but it is not clear from the research available whether crossover closures or single lane closures are preferable. Pal and Sinha (*26*) tended to find that accident rates were higher at crossover closures whereas Dudek et al. (*27*) and Graham and Migletz (*25*) tended to find that accident rates were higher at single lane closures. Although Pal and Sinha concluded that crash rates were higher at crossover lane closures than at single lane closures, the difference was small and not statistically significant, "The average work zone crash rate under a crossover strategy was not found to be significantly higher than under a partial lane closure strategy", (page 52) (*26*) but "There is some evidence that there may be a greater chance of having a severe crash in a crossover than in a partial closure" (page 45) (*26*).

The results are summarized in Exhibit 6-28 (all accident types and severities) and Exhibit 6-29 (fatal and injury accidents).

Exhibit 6-28: Comparison of estimates of the effect of crossover closures vs. single lane closures on accident rates (all types and severity) in work zones

Author, date	Setting	Road type	Volume	Crossover closures Index of Effectiveness, $t_{adjusted}$	Single lane closures Index of Effectiveness, $t_{adjusted}$
Pal and Sinha, 1996	Not specified	Four- lane divided	Not specified	1.33	1.33
Dudek et al 1986	Not specified	Four- lane divided	6,800 – 41,500	1.00	1.56
Pal and Sinha, 1996	Not specified	Six- lane divided	Not specified	1.61	1.34
Graham and Migletz 1983	Almost all rural (few suburban)	Multi-lane divided	Not specified for all sites	1.07	1.90

Exhibit 6-29: Comparison of estimates of the effect of crossover closures vs. single lane closures on accident rates (all types, fatal and injury) in work zones

Author, date	Setting	Road type	Volume	Crossover closures Index of Effectiveness, $t_{adjusted}$	Single lane closures Index of Effectiveness, $t_{adjusted}$
Pal and Sinha, 1996	Not specified	Four- lane divided	Not specified	1.84	1.85
Pal and Sinha, 1996	Not specified	Six- lane divided	Not specified	1.66	1.20

6.2.1.3. Lane Closure Merge Design

At many work zones, it is necessary to close one or more lanes. Therefore, vehicles must merge into the lanes available. This section of the manual examines the safety effect of different lane merge systems used in work zones. The transition area at the beginning of a work zones requires drivers to adapt their driving behavior to the new and possibly unexpected conditions ahead. Each driver must modify his/her speed and lane positioning, interacting with the other drivers at the site. The safety of the location will depend on the success of drivers' adaptations.

The safety of lane merge systems used in work zones may be affected by the location of the work zone relative to interchange ramps and roadway intersections.

Studies of two types of lane closure merge designs were found in the literature: the Indiana Lane Merge System (ILMS) and the Late Merge. Some discussion of the safety effects of closing the right lane(s) vs. closing the left lane(s), and of interchange ramps and roadway intersections located close to work zone lane merges is included in this section.

However, currently available information is qualitative and tentative. There is a need to quantify the safety impact of the all of the elements involved in lane merge decisions.

Lane markings and delineation in work zones are discussed in Section 6.2.2.

Exhibit 6-30: Resources used to investigate the safety effect of lane closure merge design in work zones

DOCUMENT	DESCRIPTION	COMMENT
(*21*) (Tarko, A. P. and Venugopal, S., "Safety and Capacity Evaluation of the Indiana Lane Merge System Final Report." FHWA/IN/JTRP-2000/19, West Lafayette, Ind., Purdue University, (2001))	The study evaluated the Indiana Lane Merge System (ILMS) using procedures that combined crash-based and conflict-based crash prediction models to evaluate the safety effects of the ILMS in a real construction zone.	Reference suggested by NCHRP 17-18(4). Limited qualitative information. Added to the synthesis. No AMFs.
(*29*) (Pesti, G., Jessen, D. R., Byrd, P. S., and McCoy, P. T., "Traffic Flow Characteristics of the Late Merge Work Zone Control Strategy." Washington, D.C., 78th Transportation Research Board Annual Meeting, (1999))	The paper evaluated the operational effects of the Late Merge concept in reducing queues and road rage at work zones. The study used traffic conflicts as a measure of safety effectiveness.	Reference suggested by NCHRP 17-18(4). Limited qualitative information. Added to the synthesis. No AMFs.
(*22*) (Rouphail, N. M., Mousa, R., Said, K., and Jovanis, P. P., "Freeway Construction Zones in Illinois: A Follow-Up Study. Final Report." FHWA/IL/RC-004, Springfield, Illinois Department of Transportation, (1990))	The study includes a very detailed investigation of three major work zones on an urban freeway in Chicago over a four-year period before, during and after construction.	Limited qualitative information. Added to the synthesis. No AMFs.
(*23*) (Rouphail, N. M., Yang, Z. S., and Fazio, J., "Comparative Study of Short- and Long-Term Urban Freeway Work Zones." Transportation Research Record 1163, Washington, D.C., Transportation Research Board, National Research Council, (1988) pp. 4-13.)	The study compared the accident experience of three long-term (longer than four days) and 23 short-term sites before, during and after freeway construction or maintenance work undertaken between 1981 and 1983.	Added to the synthesis. No AMFs.
(*27*) (Dudek, C. L., Richards, S. H., and Buffington, J. L., "Some Effects of Traffic Control on Four-Lane Divided Highways." Transportation Research Record 1086, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 20-30.)	The study evaluated single lane closures in one direction, and crossover closures with two-lane two-way operations (TLTWO) at nine sites. The study included an investigation of conflicts at merges and right lane vs. left lane closures.	Reference suggested by NCHRP 17-18(4). Limited qualitative information. Added to the synthesis. No AMFs.
(*25*) (Graham, J. L. and Migletz, J., "Design Considerations for Two-Lane, Two-Way Work Zone Operations." FHWA/RD-83/112, Washington, D.C., Federal Highway Administration, (1983))	The study investigated the safety and operations of 22 TLTWO sites and compared the results with 14 lane closure sites.	Added to the synthesis. No AMFs.

Unfortunately, very few accident studies of lane merging at work zones were found. Studies that investigated the safety of lane merging before work zones and the relative location of ramps and intersections often used conflicts during lane merging rather than accidents as the measure. No study provided AMFs.

Discussion: Use Indiana Lane Merge System (ILMS)

Tarko et al. evaluated the Indiana Lane Merge System (ILMS) which is an advanced dynamic traffic control system designed to encourage drivers to switch lanes well in advance of the work zone lane drop and entry taper (*21*). The study used capacity models and crash prediction models to evaluate the safety and capacity effects of the ILMS on four-lane divided rural freeways. A new method that combined crash-based and conflict-based procedures was developed. A value for the relative change in the number of conflicts with and without the system was first established and then assumed by Tarko et al. to be equivalent to the relative change in the number of crashes. This value was multiplied by the number of crashes expected to occur without the system to obtain the expected crash reduction using the new system by Tarko et al. Crash prediction models without ILMS and conflict models with and without ILMS were developed. In addition, a capacity evaluation was conducted to estimate the capacity impacts of ILMS (*21*).

The model showed "positive" safety impacts such as fewer conflicts on merging, with even greater benefits in the form of reduction in trip delay. Tarko et al. note that the system "does not cause any impact until AADT values reach 42,000 veh/day" (page 137) (*21*). The authors comment that since vehicles may be re-routed to avoid the work zone, the safety impact on the surrounding roads should also be considered (*21*).

No AMFs could be derived from this study.

Discussion: Use the Late Merge concept

Pesti et al. (1999) conducted a study of the operational impact of the Late Merge concept in reducing queues and road rage at congested work zones on rural interstates and rural four-lane freeways. The study used traffic conflicts (forced merges into the single open lane, lane straddles and lane blocking) as a measure of safety effectiveness (*29*).

The researchers concluded that although the Late Merge concept would reduce queue length and driver frustration, the "merging operation of vehicles in advance of the work zone was often controlled rather by truck drivers than by the work zone control plan"…."thus the potential benefits of the Late Merge will not be realized unless drivers, particularly truck drivers, have a better understanding and acceptance of the concept' (page 7) (*29*).

No AMFs could be derived from this study.

Discussion: Right lane vs. left lane closures

Dudek et al. considered the safety effects of closing the right lane(s) vs. closing the left lane(s) on four-lane divided highways (*27*). Dudek et al. noted that where volumes are heavy, drivers try to leave the lane that is about to be closed early to avoid being trapped in the taper (*27*). The researchers included an evaluation of conflicts at work zones as an indirect measure of work zone safety. They found that there were fewer conflicts when the right side of the roadway remained open to traffic and the left lanes were closed. In other words, closing the left lane led to fewer conflicts than closing the right lane. "Conflicts occur more frequently at right lane closures [than at left lane closures] probably for two reasons: (a) right lane volumes on a four-lane freeway are usually higher than left lane volumes under light-to-moderate-flow conditions, and (b) drivers are apparently more hesitant to vacate a closed right lane, possibly because they fear missing their downstream ramp" (page 28) (*27*). "No conclusions, however, could be reached from the data regarding the relative safety of right or left lane closures" (page 29) (*27*).

No AMFs could be derived from this study. The results may be considered intuitive; however the following study by Rouphail et al. found the opposite.

Dudek et al. suggested that on rural multi-lane highways, left lane closures for work zones might be safer than right lane closures for work zones. However, Rouphail et al.'s study, which took place on urban freeways in Chicago, suggested the opposite (*22*). Rouphail et al. found that accident rates were higher when the left approach lane was closed than when the right approach lane was closed. In other words, closing the left lane led to higher accident rates than closing the right lane: "Although somewhat counterintuitive", the accident rate was higher when construction work took place over the left side of the roadway (7.93 Acc/MVM) leaving the right-lanes open than when it took place over the right side of the roadway (6.43 Acc/MVM) (page ii) (*22*). Rouphail et al. commented that the higher accident rate associated with left side construction and the closure of the left lanes "may be due to the fact that with right side construction, both ramp and mainline traffic are constrained to operate at low speeds due to capacity limitations on the mainline and the geometric limitations of the ramp side (reduced acceleration and deceleration space). With left side construction, ramp traffic (especially on ramp) is free to approach at the desired speed" (page ii) (*22*).

No AMFs could be derived from this study. These results are the opposite of the study by Dudek et al. The different findings could be due to differences in the rural and urban settings of the studies, traffic volumes, differences in driver behavior when merging from the left compared with merging from the right at the sites examined, and to differences in the sites' layouts and their relation to nearby ramps and intersections.

Discussion: Location of the work zone relative to interchange ramps and roadway intersections

As the exact location of accidents was not usually available to the researchers in any of the studies reviewed, it was not always possible for the researchers to be certain whether an accident took place on a ramp, or on the mainline within the acceleration or deceleration lane area, or just before or after the acceleration or deceleration lane. The lack of precise information on accident location and the large number of variations in circumstances and factors such as ramp type and position frustrated the researchers' analysis.

Graham and Migletz discussed intersections in the vicinity of work zones (*25*). Their study was a detailed investigation of 22 TLTWO sites in 1981, mostly on interstate roadways. In the case of three accidents that occurred at the exiting crossover part of a work zone, for example, the researchers noted that these accidents "were probably more associated with the location of the crossovers near intersections than with the actual design of the crossovers" (page 47) (*25*). At one site, a temporary off-ramp in a work zone on a two-way road segment recorded eight accidents. These accidents were attributed to the effect of the design and signing of the temporary off-ramp and also to the presence of pot-holes. No AMFs could be derived from this study.

Tarko et al.'s Indiana Lane Merge System (ILMS) study mentioned ramps (*21*). This study was conducted on four-lane divided rural freeways and included ramps in the capacity models and crash prediction models designed to evaluate the safety and capacity effects of the ILMS. Tarko et al. noted, "The effect of ramps was found to be insignificant for both the work zone segments and the work zone approaches. The exact reason for the insignificance is not known" (page 52) (*21*). No AMFs could be derived from this study.

Rouphail et al. extended their discussion of whether accident rates at work zones were higher when the left approach lane was closed or when the right approach lane was closed to point out that the location of ramps might have affected the accident experience (*22*). Their study took place on urban freeways in Chicago where they were concerned that "the accident problem on the study segments seems to be concentrated in the vicinity of ramps (particularly entrance ramps)" (page 141) (*22*). Although the increase in accidents for both "near entrance ramps" and "near exit ramps" was very pronounced, (as shown in Table 4.2 in the paper) Rouphail et al. could not further analyze their data because the precise location of the accidents was unknown. It was not possible to establish whether accidents that occurred on ramps were affected by work zone activity or whether the accidents would have occurred anyway. Rouphail et al. noted that accidents in the vicinity of ramps were especially noticeable when the two right lanes were closed and weaving problems arose, but they did not give details (*22*).

A slightly earlier study by Rouphail et al. (1988) (also of work zones on urban freeways in Chicago) noted that "The proportion of ramp accidents increased significantly during construction" (page 6) (*23*). The increase was 45% at work zones that were longer than four days, "The predominant accident types were rear-end crashes and ramp-related accidents, especially when the lane closures involved the two right lanes adjacent to the entrance and exit ramps" (page 13) (*23*). Rouphail et al. pointed out that "The effect of closing the right two lanes is dramatically evident in the occurrence of ramp-related accidents" (page 8) (*23*). This is in contrast Rouphail et al.'s conclusion (1990) (*22*) that closing the left lane led to higher accident rates than closing the right lane. Rouphail et al. suspected that traffic control problems arose as certain lanes were opened or closed to traffic. The weaving problems of merging and diverging traffic needed attention on the sites studied, especially as ADT was high (over 100,000 veh/day). In one project, the presence of the work zone meant that traffic entering or leaving the freeway had to cross two lanes of traffic with little room for acceleration or deceleration (*23*).

No AMFs could be derived from the available literature. The influence on safety of nearby ramps on lane merging at urban and rural work zones is unclear. Further examination of ramp accidents in relation to work zones appears to be warranted, but will require the exact location of the accidents and the work zones in order to understand the details of the accidents and their relationship to work zones. At this stage, no conclusion is possible.

6.2.1.4. Other Design Elements [Future Edition]

In future editions of the HSM, additional design elements and their safety impacts may be discussed in this section, such as surface type of roadway in the work zone, drop-off between new and old pavement, road surface condition for through traffic during construction and maintenance, roadside design (clear zone, barriers, protecting hardware), construction access points and truck acceleration and deceleration areas, presence vs. absence of ramps; and condition of ramp access (space for full vs. reduced acceleration / deceleration). Potential resources are listed in Exhibit 6-31.

Exhibit 6-31: Potential resources on the safety effectiveness of other design elements in work zones

DOCUMENT
(Rouphail, N. M., Mousa, R., Said, K., and Jovanis, P. P., "Freeway Construction Zones in Illinois: A Follow-Up Study. Final Report." FHWA/IL/RC-004, Springfield, Illinois Department of Transportation, (1990))

6.2.2. Safety Effects of Work Zone Traffic Control and Operational Elements

Traffic control devices are needed at work zones to inform drivers of temporary conditions, manage driver expectations, and minimize possible driver confusion. A wide range of traffic control devices may be used under a wide range of work zone circumstances. Work zone traffic control and operational elements include traffic control devices; speed control in work zones; delineation, pavement markings and markers. The safety effect of these elements is discussed in the following sections.

6.2.2.1. Signs and Signals

Since work zones often increase driver workload, appropriate and conspicuous devices are needed to convey information to drivers and to alert them to the presence of construction workers and equipment. Traffic control devices are designed to change the behavior of drivers so that drivers slow down, stop, merge or stay in lane as needed. The type of control device(s) used depends on the road class and setting, the work zone layout, the work zone duration, the cost, whether the work zone is static or moving, and institutional constraints (such as whether trained flaggers are available). Combinations of control devices are commonly used.

It is important that drivers are aware of the traffic control devices sufficiently in advance to make the required maneuver and to minimize potential driver confusion. The recent CH2M HILL study (NCHRP Report 500 Volume 19) noted that improved visibility and clarity is "expected to reduce conflicts" (page 27) (*30*).

Traffic control devices include warning and protective measures. The Manual on Uniform Traffic Control Devices (MUTCD) provides guidance on the layout of traffic control devices at work zones (*3*). Elvik (page 448) points out that traffic control at work zones is designed to (*14*):

- Protect road workers and road users;
- Direct traffic through the work zone with minimum delay and inconvenience; and
- Allow an effective progression of the work zone, where applicable.

Traffic control devices include signs used to alert drivers to conditions and speed reductions, flashing arrows used to indicate the need to change lanes, and channelization devices such as barriers, cones and barrels used to direct traffic.

Most studies evaluate the accident rate at a work zone with a given combination of traffic controls and compare the findings with the accident rates before the work zone. Studies have not compared work zones *with* traffic control devices with work zones *without* traffic control devices. This would give a clearer indication of the effect of traffic controls at work zones, but it is not a practical proposition (*14*).

This section provides information on the safety effects of some traffic control devices used in work zones.

Exhibit 6-32: Resources examined on the safety effectiveness of signs and signals in work zones

DOCUMENT	DESCRIPTION	COMMENT
(Kononov, J. and Znamenacek, Z., "Risk Analysis of Freeway Lane Closure During Peak Hour." Washington, D.C., 84th Transportation Research Board Annual Meeting, (2005))	The paper's objective was to create an expert system which would improve the quality of lane closure decisions. The study examined the increased probability of an accident occurring in a work zone.	Not added to synthesis. No AMFs.
(*30*) (CH2M HILL, "NCHRP Report 500 Volume 19: A Guide for Designing Safer Work Zones - DRAFT." Washington, D.C., Transportation Research Board, National Research Council, (2004))	The report examines safety improvements at work zones including engineering practices, enforcement and education. It discusses "expected effectiveness" in general terms. DRAFT	Limited qualitative information. Added to synthesis.
(*14*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	The book provides a systematic overview of the effects of road safety measures (translated from 1997 Norwegian edition, partly updated).	Limited qualitative information. Added to synthesis.
(*31*) (Potts, I., Stutts, J., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP Report 500 Volume 9: A Guide for Addressing Collisions Involving Older Drivers." Washington, D.C., Transportation Research Board, National Research Council, (2004))	The report provides guidance for accommodating the needs of older drivers.	Limited qualitative information. Added to synthesis.
(Fontaine, M. D. and Hawkins, G. H., "Catalog of Effective Treatments to Improve Driver and Worker Safety at Short-Term Work Zones." FHWA/TX-01/1879-3, Austin, Texas Department of Transportation, (2001))	The report catalogs devices for improving driver and worker safety at very short-term work zones. Quantitative information is limited to a few speed reduction details.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Walker, V. and Upchurch, J., "Effective Countermeasures to Reduce Accidents in Work Zones." FHWA-AZ99-467, Phoenix, Department of Civil and Environmental Engineering, Arizona State University, (1999))	The study reviewed work zone countermeasures and selected six for use in Arizona.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(Pesti, G., Jessen, D. R., Byrd, P. S., and McCoy, P. T., "Traffic Flow Characteristics of the Late Merge Work Zone Control Strategy." Washington, D.C., 78th Transportation Research Board Annual Meeting, (1999))	The paper evaluated the operational effects of the Late Merge concept in reducing queues and road rage at work zones. The study used traffic conflicts (forced merges, lane straddles and lane blocking) as a measure of safety effectiveness.	No relevant information. Not added to synthesis.
(*32*) (McCoy, P. T. and Bonneson, J. A., "Work Zone Safety Device Evaluation." SD92-10-F, Pierre, South Dakota Department of Transportation, (1993))	The research evaluated traffic control devices that could improve safety in work zones in South Dakota. The evaluation included driver recognition and comprehension of traffic control.	Limited quantitative information. Added to synthesis.
(Stout, D., Graham, J., Bryant-Fields, B., Migletz, J., Fish, J., and Hanscom, F., "Maintenance Work Zone Safety Devices Development and Evaluation." SHRP-H-371, Washington, D.C., Strategic Highway Research Program, National Research Council, (1993))	The study evaluated 25 prototype work zone safety devices designed to protect work crews at short-term (one to 12 hour duration) work zones.	Not added to synthesis. No AMFs.

DOCUMENT	DESCRIPTION	COMMENT
(*33*) (Garber, N. J. and Woo, T. H., "Effectiveness of Traffic Control Devices in Reducing Accident Rates at Urban Work Zones." Transportation Quarterly, Vol. 45, No. 2, Washington, D.C., Eno Foundation for Transportation Inc., (1991) pp. 259-270.)	The study used regression models to examine the effectiveness of various combinations of traffic control devices in reducing accidents in urban work zones in Virginia.	Reference suggested by NCHRP 17-18(4). Added to synthesis
(Graham, J. L., Paulsen, R. J., and Glennon, J. C., "Accident and Speed Studies in Construction Zones." FHWA-RD-77-80, Washington, D.C., Federal Highway Administration, (1977))	The study analyzed accidents that occurred before and during construction in 79 zones in seven states in the 1970s.	Not used in this synthesis. Does not cover topic.

The studies used in the synthesis did not provide comprehensive results and did not provide quantitative information that could be applied to derive AMFs for any treatment. The qualitative information was also limited.

CH2M HILL's recent study found little information on the safety effects of traffic control devices at work zones (*30*). The study does not provide AMFs, but discusses "expected effectiveness" in general terms. Elvik and Vaa reviewed the literature on some work zone traffic control measures, but also found that the safety effects are often unknown (*14*).

Potts et al.'s study addressed ways to reduce crashes and fatalities involving older drivers (*31*). Older drivers are at increased risk when negotiating work zones because work zones often violate driver expectancy. The study provided no data on accidents.

Discussion: Improve visibility and clarity of signs

The CH2M HILL study addressed the problem of signs failing to give drivers warning sufficiently in advance to make the required maneuver (*30*). The study recommended improving the visibility and clarity of signs and markings while avoiding creating additional confusion for drivers. Improved visibility is "expected to reduce conflicts" (page 27) (*30*). No AMFs were available.

Discussion: Use diverging lights display

McCoy and Bonneson evaluated a diverging lights display designed to give approaching drivers the illusion that they were closing in on a convoy of four maintenance and paint striping vehicles (*32*). The display was mounted on the last vehicle. The study site was a moving work zone on a four-lane interstate freeway with ADT of 8,500 veh/day. The diverging lights display was intended to improve driver recognition of a convoy of paint striping vehicles and to encourage drivers to change lanes well in advance. Traffic conflicts were used to measure effectiveness. The diverging lights display "was not effective in improving driver recognition of the paint striping convoy" (page 56) (*32*). Some erratic maneuvers suggested that the display added to driver confusion. No AMFs could be derived.

Discussion: Use various traffic controls at work zones (Traffic signals, Manual traffic control, Flaggers)

Elvik and Vaa found that "The effect on accidents of signals at road works is not known". The authors made no further comment (page 452) (*14*). Elvik and Vaa also found that the effect on accidents of manual traffic control "is not known". The authors made no further comment (page 452) (*14*).

In the case of flaggers, Elvik and Vaa reported that a 1985 study by Richards et al. found that flaggers reduced average speed by 19% (*14*). Elvik and Vaa considered that this speed reduction "implies a reduction in the expected number of injury accidents of around 40%" (page 452) (*14*). No further details regarding this study are reported by Elvik and Vaa; no AMFs can be derived from these results.

Discussion: Install ITS applications

The CH2M HILL study also investigated the use of ITS applications in work zones. The authors indicate that the complex and individual nature of work zones challenge the application and safety evaluation of specific technologies. Although "there are no studies available that conclusively prove that ITS technologies reduce work zone related crashes, anecdotal information from a variety of work zones on which ITS was used shows that the crash rates were lower than expected" (3168 page 23) (*30*).

Discussion: Implement combinations of traffic control devices

Garber and Woo (1991) developed regression models to examine the effectiveness of various combinations of traffic control devices (from two to six devices such as flaggers, cones, barricades, barriers, static signs, and flashing arrows) in reducing accidents in urban work zones, but the data were insufficient to provide AMFs (*33*). The study was conducted at 26 Virginia sites where construction was taking place for at least 30 days and AADT was at least 3,000 veh/day. The road types modeled were multi-lane urban highways (divided and undivided mixed together) and two-lane urban highways. Project duration ranged from 42 days to 1,096 days. Project length ranged from 0.21 mi to 6.35 mi. The before accident data consisted of accident data for a period just prior to and approximately equal to the duration of the work zone project. The study used accident rates (*33*). Due to the variety of combinations studies and the limited number of sites included, no AMFs can be derived.

In general, flaggers were the most successful and lane-closure barricades were the least successful: "any combination of control devices that includes flaggers will be most effective in reducing accident rates at work zones on urban two-lane highways" (page 267) (*33*). (Flaggers must be properly trained and given adequate breaks.) Lane-closure barricades used in any combination of traffic control devices appeared to result in a slight increase in accidents on multi-lane highways, but not on two-lane highways (*33*).

Garber and Woo recommend the following traffic control device combinations, depending on the road type:

- For two-lane urban highways, the three most effective combinations of traffic control devices were **cones and flaggers**, **barricades and flaggers**, or **static signs and flaggers** (there was no statistically significant difference in the effectiveness of the three combinations). Any combination of traffic control devices including flaggers was found to be more effective than combinations without flaggers.
- For multi-lane urban highways, the most effective combination of traffic control devices was **cones, flashing arrows and flaggers**. Use of barricades as part of any traffic control device combination appears to produce slightly higher accident rates than the same combination of traffic control devices excluding barricades.

AMFs could not be developed based on the Garber and Woo study. No other studies were found that quantified the safety effect of traffic control device combinations.

6.2.2.2. Delineation

Delineation can be used to guide drivers safely along a clear path through work zones. This is especially important where driver expectations are seriously violated, at night, under adverse weather conditions and when drivers may be fatigued.

This section discusses the safety effects of delineation, pavement markings and pavement markers in work zones, specifically temporary pavement markings (overlays). The information currently available is qualitative and tentative.

Exhibit 6-33: Resources examined on the safety effectiveness of delineation in work zones

DOCUMENT	DESCRIPTION	COMMENT
(Kononov, J. and Znamenacek, Z., "Risk Analysis of Freeway Lane Closure During Peak Hour." Washington, D.C., 84th Transportation Research Board Annual Meeting, (2005))	The paper's objective was to create an expert system which would improve the quality of lane closure decisions. The study examined the increased probability of an accident occurring in a work zone.	Not added to synthesis.
(Khattak, A. J., Khattak, A. J., and Council, F. M., "Effects of Work Zone Presence on Injury and Non-Injury Crashes." Accident Analysis and Prevention, Vol. 34, No. 1, Oxford, N.Y., Pergamon Press, (2002) pp. 19-29.)	The authors used regression models to investigate the number of expected crashes by work zone duration (number of days) and work zone length.	Not added to synthesis.
(Bernhardt, K. L., Virkler, M. R., and Shaik, N. M., "Evaluation of Supplementary Traffic Control Measures for Freeway Work-Zone Approaches." Washington, D.C., 80th Transportation Research Board Annual Meeting, (2001))	The study investigated whether three traffic control devices (white lane drop arrows, CB wizard alert system and orange rumble strips) could be used to reduce traffic speed, reduce speed variance and improve advance merging on approaches to freeway work zones.	Not added to synthesis.
(Fontaine, M. D. and Hawkins, G. H., "Catalog of Effective Treatments to Improve Driver and Worker Safety at Short-Term Work Zones." FHWA/TX-01/1879-3, Austin, Texas Department of Transportation, (2001))	The report catalogs devices for improving driver and worker safety at very short-term work zones. Quantitative information is limited to a few speed reduction details.	Not added to synthesis.
(Walker, V. and Upchurch, J., "Effective Countermeasures to Reduce Accidents in Work Zones." FHWA-AZ99-467, Phoenix, Department of Civil and Environmental Engineering, Arizona State University, (1999))	The study reviewed work zone countermeasures and selected six for use in Arizona.	Not added to synthesis.
(Garber, N. J. and Srinivasan, S., "Effectiveness of Changeable Message Signs in Controlling Vehicle Speeds at Work Zones: Phase II." VTRC 98-R10, Charlottesville, Virginia Transportation Research Council, (1998))	The study's investigated the effect of changeable message signs (CMS) with radar on vehicle speeds at three sites.	Not added to synthesis.
(Pal, R. and Sinha, K. C., "Analysis of Crash Rates at Interstate Work Zones in Indiana." Transportation Research Record 1529, Washington, D.C., Transportation Research Board, National Research Council, (1996) pp. 43-53.)	The authors used a before and after study with a comparison group to analyze the relative safety of crossover lane closures (two-way traffic operations) and partial lane closures. Centerline treatment not discussed.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(McCoy, P. T. and Bonneson, J. A., "Work Zone Safety Device Evaluation." SD92-10-F, Pierre, South Dakota Department of Transportation, (1993))	The research evaluated traffic control devices that could improve safety in work zones in South Dakota. The evaluation looked at speed reduction and at driver recognition and comprehension of traffic control.	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Stout, D., Graham, J., Bryant-Fields, B., Migletz, J., Fish, J., and Hanscom, F., "Maintenance Work Zone Safety Devices Development and Evaluation." SHRP-H-371, Washington, D.C., Strategic Highway Research Program, National Research Council, (1993))	The study evaluated 25 prototype work zone safety devices designed to protect work crews at short-term (one to 12 hour duration) work zones.	Not added to synthesis.
(Harwood, D. W., "NCHRP Synthesis of Highway Practice Report 191: Use of Rumble Strips to Enhance Safety." Washington, D.C., Transportation Research Board, National Research Council, (1993))	The report provides a synthesis of research into the safety effects of rumble strips.	Not added to synthesis.
(*33*) (Garber, N. J. and Woo, T. H., "Effectiveness of Traffic Control Devices in Reducing Accident Rates at Urban Work Zones." Transportation Quarterly, Vol. 45, No. 2, Washington, D.C., Eno Foundation for Transportation Inc., (1991) pp. 259-270.)	The study used regression models to examine the effectiveness of various combinations of traffic control devices in reducing accidents in urban work zones in Virginia.	Added to synthesis. No AMFs.
(Rouphail, N. M., Mousa, R., Said, K., and Jovanis, P. P., "Freeway Construction Zones in Illinois: A Follow-Up Study. Final Report." FHWA/IL/RC-004, Springfield, Illinois Department of Transportation, (1990))	The study evaluated various traffic control measures used in work zones.	Not added to synthesis.
(*41*) (Dudek, C. L., Huchingson, R. D., Creasey, F. T., and Pendleton, O., "Field Studies of Temporary Pavement Marking at Overlay Project Work Zones on Two-Lane, Two-Way Rural Highways." Transportation Research Record 1160, Washington, D.C., Transportation Research Board, National Research Concil, (1988) pp. 22-34.)	The study analyzed the relative safety of temporary broken line pavement markings (overlays) in highway work zones at seven sites at night.	Added to synthesis. No AMFs.
(27) (Dudek, C. L., Richards, S. H., and Buffington, J. L., "Some Effects of Traffic Control on Four-Lane Divided Highways." Transportation Research Record 1086, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 20-30.)	The study evaluated single lane closures in one direction, and crossover closures with two-lane two-way operations (TLTWO) at nine sites.	Added to synthesis. No AMFs.
(25) (Graham, J. L. and Migletz, J., "Design Considerations for Two-Lane, Two-Way Work Zone Operations." FHWA/RD-83/112, Washington, D.C., Federal Highway Administration, (1983))	The study investigated 22 rural TLTWO sites, which included a variety of crossover designs and centerline treatments. The study calculated accident rates (per MVM) for different centerline treatments.	Added to synthesis. No AMFs
(Graham, J. L., Paulsen, R. J., and Glennon, J. C., "Accident and Speed Studies in Construction Zones." FHWA-RD-77-80, Washington, D.C., Federal Highway Administration, (1977))	The study analyzed accidents that occurred before and during construction in 79 zones in seven states in the 1970s. Centerline treatment not discussed.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.

Limited information was found on the safety effectiveness of delineation, pavement markings and pavement markers in work zones. No recent studies were found.

Discussion: Use temporary centerline separation in work zones

Temporary centerline treatments are used to separate traffic where drivers face opposing traffic without a median along two-lane two-way operations (TLTWO) at crossover closures on divided highways. The treatments are intended to prevent accidents that tend to lead to severe injuries and fatalities (such as head-on accidents). Temporary centerline treatments may also be needed on multi-lane undivided highways while a lane is closed for a work zone.

Centerline treatments are not always applied; possibly due to equipment cost, loss of lane width, maintenance costs and related issues, or the need to allow for exceptions for short-term work or the provision of passing opportunities.

The current literature provides limited information. Two important questions that could not be answered by current literature include:

1. Do temporary centerline treatments at work zones impact safety?
2. Are some options (drums, cones, etc.) as effective in preventing head-on accidents as the more expensive options such as portable concrete barriers?

Various temporary centerline treatments are discussed in concert because the studies reviewed did not provide enough information to examine different centerline treatments individually.

The two studies that mentioned centerline separation in work zones were conducted at sites on rural multi-lane highways and freeways. No information was found for urban and suburban arterials. Discussion on centerline separation in work zones was not found for rural two-lane roads in available literature.

Dudek et al. investigated TLTWO and single lane closure designs at work zones and noted the centerline "separation" used at six sites (three of which were single lane closures and three of which were two-lane two-way operations) (*27*). The type of separation was assumed to refer to the centerline treatments at the TLTWO sites, but it is not clear whether the separation on the single lane closure sites was along a centerline or at the lane merge. The types of separation used varied among the six sites included in the Dudek et al. study: cones, pavement markings, portable concrete barriers, and tubular markers. The authors do not explain why a particular centerline treatment was used at a particular site. In addition, the short period of "before" data (one year) limited the analysis. As a result of these difficulties, it is not possible to draw any conclusions regarding the centerline treatments used in the Dudek et al. study.

Graham and Migletz's 1983 study analyzed accident rates by six centerline treatments at work zones on multi-lane divided highways (*25*). The treatments were:

3. Striping only – double solid yellow centerline (six sites).
4. Raised pavement markers and striping – double solid yellow centerline with single yellow bi-directional raised pavement markers at 50 ft intervals (one site).
5. Cones and striping - double solid yellow centerline with traffic cones at 200 ft intervals (six sites).
6. Raised pavement markers and cones – pairs of yellow bi-directional raised pavement markers at 10 ft intervals with traffic cones at 200 ft intervals (one site).
7. Tubular markers and striping – double solid yellow centerline with 2 ft tall plastic tubular markers at 200 ft intervals (two sites).
8. Portable concrete barrier – portable concrete barrier (PCB) with 3 in circular yellow delineators on top at 20 ft intervals (one site).

The authors do not explain why a particular treatment was used at a particular site and their discussion of centerline treatments was presented only in qualitative terms. In short, Graham and Migletz concluded that (*25*):

- It may be desirable to combine striping (double solid yellow centerlines) with other centerline treatments because work zones with only double yellow centerlines had the highest accident rates and the vehicle encroachment rate into opposing lanes was much higher than for any other type of centerline studied; and
- Portable concrete barriers are expensive, but may be justified at sites such as some bridge projects where the work zone length is short, traffic volume is high (10,000 or more veh/day) and approach speed is high. However, portable concrete barriers do not compensate for poor geometric design.

There was insufficient information in the Graham and Migletz paper to determine AMFs.

Discussion: Use temporary pavement markings (overlays)

In 1991, Garber and Woo modeled six traffic control devices including temporary pavement markings (*33*). One of the six traffic control devices was temporary pavement markings, and the findings concluded that markings did not feature in the most effective combinations of traffic control devices for two-lane highways.

In 1988, Dudek et al. investigated the relative safety of 1 ft, 2 ft, and 4 ft long temporary broken centerline line pavement markings (overlays) at seven work zones at night (*41*) The work zones sites were on two-lane two-way rural highways with 12 ft lanes and paved shoulders and volumes from 2,500 to 6,700 veh/day. The test conditions were carefully controlled to include dry weather conditions, sites with both curves and tangents, centerline stripes only (no edgelines), and the use of a 40 ft pavement marking cycle. The 1 ft, 2 ft, and 4 ft long broken line markings were evaluated in terms of vehicle speeds, lateral distance from the centerline, lane straddling and erratic maneuvers. The researchers also analyzed driver opinions (four drivers per site) of the broken line markings. Accident experience was not studied.

Dudek et al. concluded that all three striping patterns provided adequate delineation on rural two-lane two-way highways, but noted that the findings cannot be generalized to situations not tested (*41*). The study was criticized by a reviewer (published in the report) for using near perfect conditions for assessing retro-reflectivity (for example, roadways that were dry, very dark and had limited curvature) and for the absence of edgelines, which may have focused drivers' attention on the centerlines. There was concern that the study could have negative consequences by not establishing a need for stronger pavement markings. Nevertheless, the authors concluded that "The data failed to indicate major differences"(page 33) between the length and spacing of the temporary stripes" (*41*). The controversy created by the study indicates a clear need for additional research.

No AMFs could be determined from the available literature.

6.2.2.3. Rumble Strips

Rumble strips warn drivers by creating vibration and noise when driven over. The objective of rumble strips is to reduce crashes caused by drowsy or inattentive drivers. In general, rumble strips are used in areas where the noise generated is unlikely to disturb adjacent residents; that is, in non-residential areas.

Temporary rumble strips may be used in work zones as a traffic control device.

Exhibit 6-34: Resources examined on the safety effectiveness of rumble strips in work zones

DOCUMENT	DESCRIPTION	COMMENT
(Kononov, J. and Znamenacek, Z., "Risk Analysis of Freeway Lane Closure During Peak Hour." Washington, D.C., 84th Transportation Research Board Annual Meeting, (2005))	The paper's objective was to create an expert system which would improve the quality of lane closure decisions. The study examined the increased probability of an accident occurring in a work zone.	Not added to synthesis.
(Khattak, A. J., Khattak, A. J., and Council, F. M., "Effects of Work Zone Presence on Injury and Non-Injury Crashes." Accident Analysis and Prevention, Vol. 34, No. 1, Oxford, N.Y., Pergamon Press, (2002) pp. 19-29.)	The authors used regression models to investigate the number of expected crashes by work zone duration (number of days) and work zone length.	Not added to synthesis.
(Bernhardt, K. L., Virkler, M. R., and Shaik, N. M., "Evaluation of Supplementary Traffic Control Measures for Freeway Work-Zone Approaches." Washington, D.C., 80th Transportation Research Board Annual Meeting, (2001))	The study investigated whether three traffic control devices (white lane drop arrows, CB wizard alert system and orange rumble strips) could be used to reduce traffic speed, reduce speed variance and improve advance merging on approaches to freeway work zones.	Not added to synthesis.
(Fontaine, M. D. and Hawkins, G. H., "Catalog of Effective Treatments to Improve Driver and Worker Safety at Short-Term Work Zones." FHWA/TX-01/1879-3, Austin, Texas Department of Transportation, (2001))	The report catalogs devices for improving driver and worker safety at very short-term work zones. Quantitative information is limited to a few speed reduction details.	Not added to synthesis.
(Walker, V. and Upchurch, J., "Effective Countermeasures to Reduce Accidents in Work Zones." FHWA-AZ99-467, Phoenix, Department of Civil and Environmental Engineering, Arizona State University, (1999))	The study reviewed work zone countermeasures and selected six for use in Arizona.	Not added to synthesis.
(Garber, N. J. and Srinivasan, S., "Effectiveness of Changeable Message Signs in Controlling Vehicle Speeds at Work Zones: Phase II." VTRC 98-R10, Charlottesville, Virginia Transportation Research Council, (1998))	The study's investigated the effect of changeable message signs (CMS) with radar on vehicle speeds at three sites.	Not added to synthesis.
(Pal, R. and Sinha, K. C., "Analysis of Crash Rates at Interstate Work Zones in Indiana." Transportation Research Record 1529, Washington, D.C., Transportation Research Board, National Research Council, (1996) pp. 43-53.)	The authors used a before and after study with a comparison group to analyze the relative safety of crossover lane closures (two-way traffic operations) and partial lane closures. Centerline treatment not discussed.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.
(McCoy, P. T. and Bonneson, J. A., "Work Zone Safety Device Evaluation." SD92-10-F, Pierre, South Dakota Department of Transportation, (1993))	The research evaluated traffic control devices that could improve safety in work zones in South Dakota. The evaluation looked at speed reduction and at driver recognition and comprehension of traffic control.	Not added to synthesis.
(Stout, D., Graham, J., Bryant-Fields, B., Migletz, J., Fish, J., and Hanscom, F., "Maintenance Work Zone Safety Devices Development and Evaluation." SHRP-H-371, Washington, D.C., Strategic Highway Research Program, National Research Council, (1993))	The study evaluated 25 prototype work zone safety devices designed to protect work crews at short-term (one to 12 hour duration) work zones.	Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(Harwood, D. W., "NCHRP Synthesis of Highway Practice Report 191: Use of Rumble Strips to Enhance Safety." Washington, D.C., Transportation Research Board, National Research Council, (1993))	The report provides a synthesis of research into the safety effects of rumble strips.	Not added to synthesis.
(*32*) (McCoy, P. T. and Bonneson, J. A., "Work Zone Safety Device Evaluation." *SD92-10-F*, Pierre, South Dakota Department of Transportation, (1993))	The research evaluated traffic control devices that could improve safety in work zones in South Dakota. The evaluation looked at speed reduction and at driver recognition and comprehension of traffic control.	Limited qualitative information. Added to synthesis. No AMFs.
(*33*) (Garber, N. J. and Woo, T. H., "Effectiveness of Traffic Control Devices in Reducing Accident Rates at Urban Work Zones." Transportation Quarterly, Vol. 45, No. 2, Washington, D.C., Eno Foundation for Transportation Inc., (1991) pp. 259-270.)	The study used regression models to examine the effectiveness of various combinations of traffic control devices in reducing accidents in urban work zones in Virginia.	Added to synthesis. No AMFs.
(Rouphail, N. M., Mousa, R., Said, K., and Jovanis, P. P., "Freeway Construction Zones in Illinois: A Follow-Up Study. Final Report." FHWA/IL/RC-004, Springfield, Illinois Department of Transportation, (1990))	The study evaluated various traffic control measures used in work zones.	Not added to synthesis.
(Dudek, C. L., Huchingson, R. D., Creasey, F. T., and Pendleton, O., "Field Studies of Temporary Pavement Marking at Overlay Project Work Zones on Two-Lane, Two-Way Rural Highways." Transportation Research Record 1160, Washington, D.C., Transportation Research Board, National Research Concil, (1988) pp. 22-34.)	The study analyzed the relative safety of temporary broken line pavement markings (overlays) in highway work zones at seven sites at night.	Not added to synthesis. No AMFs.
(Dudek, C. L., Richards, S. H., and Buffington, J. L., "Some Effects of Traffic Control on Four-Lane Divided Highways." Transportation Research Record 1086, Washington, D.C., Transportation Research Board, National Research Council, (1986) pp. 20-30.)	The study evaluated single lane closures in one direction, and crossover closures with two-lane two-way operations (TLTWO) at nine sites.	Not added to synthesis. No AMFs.
(Graham, J. L. and Migletz, J., "Design Considerations for Two-Lane, Two-Way Work Zone Operations." FHWA/RD-83/112, Washington, D.C., Federal Highway Administration, (1983))	The study investigated 22 rural TLTWO sites, which included a variety of crossover designs and centerline treatments. The study calculated accident rates (per MVM) for different centerline treatments.	Not added to synthesis. No AMFs
(Graham, J. L., Paulsen, R. J., and Glennon, J. C., "Accident and Speed Studies in Construction Zones." FHWA-RD-77-80, Washington, D.C., Federal Highway Administration, (1977))	The study analyzed accidents that occurred before and during construction in 79 zones in seven states in the 1970s. Centerline treatment not discussed.	Reference suggested by NCHRP 17-18(4). Not added to synthesis.

Discussion: Install portable transverse rumble strips as additional warning in advance of a STOP sign on a work zone segment

Walker and Upchurch cited a 1996 study (by Gent and Gerken) in which portable transverse rumble strips were found to be the most effective device rated for getting the attention of motorists at work zones, but the strips tended to buckle and move as vehicles passed over them (*34*). Walker and Upchurch did not report the road type, volume, and other site characteristics.

McCoy and Bonneson evaluated portable rumble strips intended to improve driver recognition of the STOP sign on the approach to a work zone at a bridge (*32*). The study site was a two-lane road with ADT of 830 veh/day. The portable rumble strips were not effective in improving driver compliance with the STOP sign. Lack of activity at the work zone while the study took place may have confounded the results. No AMFs can be derived from this study.

6.2.2.4. Speed Limits and Speed Zones

Many traffic control devices used in work zones aim to reduce speed of the traffic. Walker and Upchurch point out that "it has been widely accepted that the primary cause for increased accidents in construction work zones is the result of vehicles traveling at excessive speeds" (page 29) (*34*). The speed of vehicles traveling through a work zone can be used as a surrogate for the safety of the work zone, if the relationship is established. Reduced speed limits may lead to lower speeds and to fewer and/or less severe accidents (*34*).

The conventional practice for regulating speeds in work zones follows the static signing procedures using regulatory or advisory speed signs found in the Manual on Uniform Traffic Devices (MUTCD) (*3*). The approach adopted to reduce vehicle speeds depends on the road type and setting, the work zone layout, the work zone duration, whether the work zone is static or moving, the cost of the speed control, and institutional constraints (such as the availability of a police presence and the availability of trained flaggers). Combinations of speed controls are commonly used.

Traffic control devices used to reduce speed include passive speed control, such as static signs intended to alert drivers to conditions or speed reductions ahead, and channelization devices used to direct traffic through or around hazards. Passive speed control may be sufficient where drivers have enough time and information to make reasonably safe speed decisions without the need for additional prompting or reinforcement.

Active speed control may be used where drivers do not drive at safe and appropriate speeds. Active speed controls display personalized real-time information or enforce compliance with the passive measures. Examples include changeable message signs, flaggers, lane width reductions, transverse rumble strips and law enforcement.

Posted speed limits and speed variance are particularly important at work zones. Motorists need a common set of rules that encourage predictable and uniform driving behavior and the safe flow of traffic.

Temporary speed limits must be set with care. Garber and Srinivasan point out that speed reduction can lead to congestion and rear-end accidents (which are particularly common at work zones) (*35*). Weiss and Schifer note that speed limits should not be dramatically reduced because the decision to adopt a "substantially different speed can contradict the perception of the safe driving speed for the majority of drivers and thus can produce disturbances in the driving stream" (page 5) (*36*).

There are no uniform guidelines and suitable engineering studies for determining appropriate guidelines for speed limits in work zones. “There are inconsistencies in the methods used to determine work zone speed limits, noncompliance with the posted speed limit by motorists, and a growing practice of establishing work zone speed limits through administrative decision without the benefit of an engineering study” (page 29) (*34*). Passive, nonspecific measures such as signs are thought to be less effective than active measures such as flaggers and changeable message signs, but how much less effective is unknown (*35*). Rigorous study designs are hard to achieve. Driver behavior in a work zone is influenced by the geometry of the roadway, the signage, the type of construction, vehicle mix, etc., making complete isolation of individual factors difficult.

This section provides information on the effectiveness of traffic control devices and operational elements that affect the operating speed of vehicles approaching work zones and passing through work zones. Limited information was found, and is discussed here, on temporary speed limits, speed zoning, flaggers, the use of innovative flagging procedures, changeable/variable message signs (CMS), speed display trailers, changeable message signs with radar/personalized messages, variable speed limit (VSL) systems, radar drones (unmanned radar), radar activated horns, cones combined with (unspecified) warnings, lane width reduction, transverse rumble strips applied to reduce speeds prior to or in work zones, white lane drop arrows, transverse rumble strips combined with CB messages, Citizens Band (CB) messages, and law enforcement.

Exhibit 6-35: Resources examined on the relationship of speed control and safety in work zones

DOCUMENT	DESCRIPTION	COMMENT
(*14*) (Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	The book provides a systematic overview of the effects of road safety measures (translated from 1997 Norwegian edition, partly updated).	Limited qualitative information. Added to synthesis.
(*37*) (Bernhardt, K. L., Virkler, M. R., and Shaik, N. M., "Evaluation of Supplementary Traffic Control Measures for Freeway Work-Zone Approaches." Washington, D.C., 80th Transportation Research Board Annual Meeting, (2001))	The study investigated whether three traffic control devices (white lane drop arrows, CB wizard alert system and orange rumble strips) could be used to reduce traffic speed, reduce speed variance and improve advance merging on approaches to freeway work zones.	Reference suggested by NCHRP 17-18(4). Limited qualitative information. Added to synthesis. No AMFs.
(*38*) (Fontaine, M. D. and Hawkins, G. H., "Catalog of Effective Treatments to Improve Driver and Worker Safety at Short-Term Work Zones." FHWA/TX-01/1879-3, Austin, Texas Department of Transportation, (2001))	The report catalogs devices for improving driver and worker safety at very short-term work zones. Quantitative information is limited to a few speed reduction details.	Limited quantitative information. Added to synthesis. No AMFs.
(*36*) (Weiss, A. and Schifer, J. L., "Assessment of Variable Speed Limit Implementation Issues." NCHRP 3-59, Washington, D.C., Transportation Research Board, National Research Council, (2001))	The study is a detailed assessment of the effectiveness of variable speed limits (VSL). Expected completion date is July 2005.	Limited qualitative information. Added to synthesis. No AMFs.
(*34*) (Walker, V. and Upchurch, J., "Effective Countermeasures to Reduce Accidents in Work Zones." FHWA-AZ99-467, Phoenix, Department of Civil and Environmental Engineering, Arizona State University, (1999))	The study reviewed work zone countermeasures and selected six for use in Arizona.	Limited quantitative information. Added to synthesis. No AMFs.

DOCUMENT	DESCRIPTION	COMMENT
(*35*) (Garber, N. J. and Srinivasan, S., "Effectiveness of Changeable Message Signs in Controlling Vehicle Speeds at Work Zones: Phase II." VTRC 98-R10, Charlottesville, Virginia Transportation Research Council, (1998))	The study investigated the effect of changeable message signs (CMS) with radar on vehicle speeds at three sites.	Reference suggested by NCHRP 17-18(4). Very limited quantitative information. Added to synthesis. No AMFs.
(*39*) (Freedman, M., Teed, N., and Migletz, J., "Effect of Radar Drone Operation on Speeds at High Crash Risk Locations." Transportation Research Record 1464, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 69-80.)	The study compared vehicle speeds at work zones and high crash locations with and without radar drones at 12 sites.	Reference suggested by NCHRP 17-18(4). Qualitative information. Added to synthesis. No AMFs.
(*32*) (McCoy, P. T. and Bonneson, J. A., "Work Zone Safety Device Evaluation." SD92-10-F, Pierre, South Dakota Department of Transportation, (1993))	The research evaluated traffic control devices that could improve safety in work zones in South Dakota. The evaluation looked at speed reduction and at driver recognition and comprehension of traffic control.	Reference suggested by NCHRP 17-18(4). Limited qualitative information. Added to synthesis. No AMFs.
(*40*) (Richards, S. H., Wunderlich, R. C., Dudek, C. L., and Brackett, R. Q., "Improvements and New Concepts for Traffic Control in Work Zones. Volume 4. Speed Control in Work Zones." FHWA/RD-85/037, College Station, Texas A&M University, (1985))	Evaluated four work zone speed reduction measures; studies conducted on an undivided multilane urban arterial, an urban freeway, and two rural freeways; reports results from 2-lane rural highway also	Reference suggested by NCHRP 17-18(4). Added to synthesis. No AMFs.
(*24*) (Graham, J. L., Paulsen, R. J., and Glennon, J. C., "Accident and Speed Studies in Construction Zones." FHWA-RD-77-80, Washington, D.C., Federal Highway Administration, (1977))	Part 2 of the study was a field test that investigated speed reduction methods at three work zones. The study used traffic conflicts.	Reference suggested by NCHRP 17-18(4). Qualitative information. Added to synthesis. No AMFs.

Numerous studies have investigated speed reduction in work zones, but there is very little detailed or quantitative information available about establishing effective speed limits or the safety effects of speed reductions. For example, the safety effects of temporary speed limit signs and speed zoning are unknown. Whether temporary speed limit signs should be advisory or regulatory, from their safety effectiveness aspect is also unknown.

Limited information was found for temporary speed limits, flaggers, changeable / variable message signs (CMS), variable speed limit (VSL) systems, radar, rumble strips, white lane drop arrows and Citizens Band (CB) messages, and most of the information was qualitative.

Discussion: Install temporary speed limit signs and speed zoning

Walker and Upchurch (1999) noted in their literature review that most studies had found that both advisory and regulatory temporary speed limit signs “have shown either only small effects or no effect of work zone speed limits on vehicle speeds” (page 29) and “work zone speed limits by themselves are relatively ineffective in influencing traffic speeds” (page 31) ((*34*)).

Graham et al. (1977) investigated speed reduction methods at three sites: an urban four-lane undivided arterial, an urban four-lane divided freeway, and a rural interstate highway. They concluded that "construction zones with reduced speed limits do not experience lower accident rates than other zones" (page 83) and that "Drivers adjust speed and position based on the environment (geometrics of zone, lateral clearance and devices) more than on signing" (page 84) (*24*). They also concluded that speed zoning "does not reduce mean vehicle speed and does increase conflicts in the transition area" (page 83) (*24*). The study did not provide AMFs for speed limits signs.

Discussion: Use flaggers

Flaggers may be used to control traffic and reduce traffic speed through work zones. Elvik and Vaa's overview of road safety mention only one study that considered flaggers (*14*). They reviewed a 1985 study by Richards et al. (*40*) where flaggers were found to reduce average speed by 19% on rural two-lane roads, rural freeways, urban freeways, and undivided urban arterials. Elvik and Vaa considered that this speed reduction "implies a reduction in the expected number of injury accidents of around 40%" (page 452) (*14*). Volumes were not stated. No AMFs can be determined.

Discussion: Use innovative flagging procedures

Walker and Upchurch's review of work zone countermeasures included flashing stop/slow paddles (*34*). The paddles featured high intensity lights that the flagger could turn on if a motorist appeared to be ignoring the flagger. Walker and Upchurch cited studies (no reference details given, page 55) that found that drivers rated the flashing stop/slow paddles as effective, especially at night. There were no AMFs. The flaggers reported that they felt better protected. The road type for this study was not stated, but the tests were conducted on urban and rural roads in several states.

McCoy and Bonneson evaluated two innovative flagging procedures in advance of a single lane closure on a freeway compared to no flaggers prior to the work zone (*32*). The objective of the flagging procedures was to reduce traffic speeds. Instead of holding a STOP/SLOW sign paddle, the flagger held a 45 mph sign paddle in one hand and used the other hand to motion the traffic to slow down. The other procedure was similar, but included a larger sign paddle and bright coveralls.

McCoy and Bonneson comment, "The innovative flagging procedures were effective in reducing the speed of traffic approaching the work zone. The average traffic speeds were lower after the flagging procedures were instituted" (page 49) (*32*). "The first procedure resulted in speed reductions of 15.2 and 11.1 mph at the beginning and end of the taper respectively" (page 49), and the second procedure "resulted in speed reductions of 12.4 and 9.2 mph at the beginning and end of the taper respectively" (page 49) (*32*). The results were not compared with speed reductions for standard flagging procedures. Difficulties with the procedures included flagger fatigue and boredom, and ensuring that flaggers followed the procedures consistently. No AMFs can be determined from this study.

A 1985 study by Richards et al. was conducted at six sites on rural two-lane roads, rural freeways, urban freeways, and undivided urban arterials (*40*). The study compared MUTCD flaggers with innovative flagging on one side of the road and on both sides of the road.

Richards et al. noted that the best flagging treatment was an innovative procedure that involved the flagger motioning traffic to slow down with one hand and then pointing to the nearby speed sign (page x) (*40*). This procedure "resulted in larger average speed reductions than MUTCD flagging at five of the six study sites, but the differences were small" (2 to 4 mph) (page xi) (*40*). Speed reductions were greater on rural two-lane roads and urban arterials than on urban or rural freeway sites. "The results also indicated that flagging effectiveness may be improved on freeways by having a flagger on both sides of the travel lanes" (page xi) (*40*). No AMFs can be determined.

Discussion: Install changeable message signs (CMS)

Walker and Upchurch summarized two studies that evaluated changeable (or variable) message signs (CMS) (*34*). The first study, a 1992 New York study by Migletz et al., found that CMS reduced speeds, but the speeds remained 10 mph above the work zone speed limit and there were concerns that increased variance in the vehicle speeds might increase safety problems. Walker and Upchurch do not report operating speeds for this study prior to the implementation of CMS. The second study, a 1992 Illinois study by Benekohal, investigated CMS under three sets of circumstances: one CMS outside the work zone; one CMS within the work zone; and two CMSs within the work zone. All the signs used the same alternating message, "WORKERS AHEAD" and "SPEED LIMIT 45 MPH". The study found that "the CMS only affected the speeds of vehicles close to the CMS" (page 48) (*34*). The road type for the two studies cited was not stated. No AMFs can be determined.

Garber and Srinivasan mention that Richards et al. found that CMS are more effective when used in combination with other treatments, such as static signs or flaggers (*35*). The road type for the study cited was not stated. No further details are noted.

Richards et al.'s 1985 study was conducted at six sites on rural two-lane roads, rural freeways, urban freeways, and undivided urban arterials (*40*). This study found a 7% speed reduction for CMS on rural freeways, urban freeways, and undivided urban arterials (CMS were not tested on rural two-lane roads).

No AMFs can be determined, but Elvik and Vaa reported that a speed reduction of 7% "implies a reduction in the expected number of injury accidents of around 15%" (page 452) (*14*).

Discussion: Install changeable message signs with radar and personalized messages (including speed display trailers)

Changeable (or variable) message signs (CMS) equipped with a radar unit are an alternative to the high costs involved in having law enforcement officers stationed at work zones. CMS with radar supply reliable and up-to-date warning messages to speeding drivers.

Garber and Srinivasan noted that a 1986 study of CMS with radar by Richards and Dudek found that CMS with automated speed and message display (ASMD) seemed to reduce speeds (*35*). The road type for the study cited was not stated, and quantification of the speed reduction was not reported.

Rural two-lane roads

Fontaine and Hawkins included portable variable message signs (changeable message signs) and speed display trailers in their catalog of devices found to be effective for improving driver and worker safety at rural, short-term (typically a single day) work zones where safety treatments must be set up easily and quickly (*38*). The road type was not specified, but the photos in the report appear to be of rural two-lane roads. All the devices were evaluated in terms of their impact on traffic speeds, conflicts, etc. AMFs could not be derived due to insufficient quantitative information. Exhibit 6-36 shows how changeable message signs and speed display trailers reduced vehicle speeds and the percentage of drivers who were speeding both before the taper and in the work zone. AMFs cannot be derived from these results.

Exhibit 6-36: Effect of portable variable message signs and speed display trailers on speed and the percentage of drivers who were speeding (38)

	Speed		% Speeding	
Treatment	**Before taper**	**Work zone**	**Before taper**	**Work zone**
Changeable message signs	-0.5 mph	-1.0 mph	No change	-3.0%
Speed display trailer	-5.0 mph	-3.5 mph	-13.0%	-6.0%

Rural multi-lane highways

Garber and Srinivasan cite a 1994 Garber and Patel study that found that personalized messages aimed at high speed drivers appeared to be useful and that CMS with radar were "more effective than static MUTCD signs in altering drivers' behavior in work zones" (page 2) (*35*). The study was conducted on interstate highways.

Garber and Srinivasan examined the effect of the duration of exposure to CMS with radar in work zones. They also examined the effectiveness of CMS with radar in reducing speeds and influencing speed profiles. The study was conducted on two interstates and one primary route. The researchers noted high-speed drivers who triggered the CMS and checked them at the beginning, middle and end of the work zone. The study found that CMS with radar reduced speeds by 8 to 10 mph at work zones, and that speeds were reduced for all vehicle types (*35*).

Garber and Srinivasan also indicate that CMS were effective in controlling vehicle speeds even at work zone projects of long duration (e.g., more than seven days and up to seven weeks). A second CMS might be useful in long work zones (e.g., longer than 1.06 km or 3,500 ft) to reduce the tendency for vehicles to speed up as they approach the end of the work zone. "CMS with radar is indeed a very effective device for controlling speeds and speed variances in short-term and long-term work zones" (page 59) (*35*).

CMS with radar appear to reduce operational speeds through work zones on rural multi-lane highways. No measure of the accident experience was noted in the literature reviewed; therefore AMFs could not be developed.

Freeways; Expressways

Walker and Upchurch cited a 1995 British study by Symonds Travers Morgan Ltd (*34*). The British study investigated CMS that displayed the license plate and speed of a speeding vehicle to drivers on a rural divided freeway. Before and after speed studies showed that the immediate feedback given to drivers led to impressive and long lasting results in reducing driver speed (page 52) (*34*). The number of PDO and injury accidents dropped. The index of effectiveness for PDO accidents was 0.52 (s = 0.39). The index of effectiveness for injury accidents was 0.25 (s = 0.81). The s ideal was calculated using the daily average number of PDO or injury accidents in the before and "during" periods (PDO: 0.26 and 0.29; Injury: 0.03 and 0.01, respectively) and the ratio of before/"during" duration (299 days and 142 days respectively) to reach an estimate of the standard error. In both cases, an MCF of 3.0 was applied to s ideal because the British study was a cited work. The volumes and other characteristics of the study are unknown.

McCoy and Bonneson investigated speed monitoring displays in advance of a single lane closure work zone on a freeway (*32*). The "speed monitoring displays were effective in reducing the speed of traffic approaching the work zone" (page 38). Speed reductions averaged only 0.6 mph at 4,000 ft in advance of the taper. The reductions were 4 mph at the beginning of the taper and 4 mph at the end of the taper. The volumes and other characteristics of the study are unknown. No accident experience was reported; therefore no AMFs could be developed.

Urban and suburban arterials

No studies found.

Discussion: Install Variable Speed Limit (VSL) systems

As defined by the FHWA, variable speed limits systems provide real-time information on the appropriate operating speed for current road conditions based on traffic volumes, traffic speed, weather, and other elements.

Weiss and Schifer found that work zones are suited to experimental and ongoing variable speed limit (VSL) applications, which are designed to reduce the speed variations that lead to reduced safety (*36*). The interim report for this project states that real time portable VSL systems may reduce rear-end accidents by reducing congestion and controlling lane merging at work zones. This study is on-going, and is expected to conclude in July 2005.

Treatment: Install radar drones (unmanned radar)

Rural two-lane roads

Fontaine and Hawkins investigated radar drones (unmanned radar) at rural, short-term (typically a single day) work zones where safety treatments must be set up easily and quickly. The road type was not specified, but the photos appear to be of rural two-lane roads.

Exhibit 6-37 shows Fontaine and Hawkins's findings regarding how radar drones reduced vehicle speeds and the percentage of drivers who were speeding before the taper and in the work zone (*38*). The effects on speed were minimal. AMFs cannot be developed from this study.

Exhibit 6-37: Effect of radar drones (unmanned radar) on speed and the percentage of drivers who were speeding (38)

Treatment	Speeds		% Speeding	
	Before taper	Work zone	Before taper	Work zone
Radar drone	-2.0 mph	-1.0 mph	-1.0%	+0.5%

Walker and Upchurch cited a 1992 study by Benekohal that found that where radar drones were used, drivers of vehicles equipped with radar detection devices reduced speed, but the drivers soon realized that no police were present (*34*).

Rural multi-lane highways

Freedman et al.'s 1994 study investigated the use of radar drones to reduce speeds in work zones (*39*). The study compared vehicle speeds with and without radar drones at 12 sites in Missouri. The 12 sites included six long- and short-term work zones sites on urban and rural interstates and on urban and rural roadways. Volumes at the 12 sites ranged from 20,000 veh/day to 70,000 veh/day.

Freedman et al. found that mean speeds at the 12 sites were "moderately lower when radar was operating" (page 69) and speed reductions at work zones were "moderate at most": 3.4 mph (5.5 km/h) (page 78) (*39*).

There were "more meaningful reductions in the number of vehicles exceeding the speed limit by more than 10 mph" (page 69) (*39*). Speeds remained well above the speed limit even when the radar was operating. The researchers concluded that "the operation of drone radar can somewhat reduce the speeds of passenger vehicles and tractor-trailer combinations at many long- and short-term construction and maintenance zones" (page 78) (*39*). Freedman et al. note that the effects on speed were also felt for up to 0.8 mi (1.3km) downstream of the work zones. No AMFs could be derived.

Freeways; Expressways; Urban and suburban arterials

No studies found.

Discussion: Install radar activated horn system

A 1992 study by Benekohal, cited by Walker and Upchurch, investigated a radar activated horn system (*34*). Vehicles traveling over a certain speed triggered the horn to produce an audible reminder that could be heard for a minimum of one mile and a maximum of three miles. The horn system "appeared to have some speed reduction effect on the motorists" (page 49), but further research was recommended into the most suitable detection distance, the human factors involved, and the noise problem created by the horn. The road type for the study cited was not stated.

Discussion: Use cones combined with warnings about the presence of work zones

Elvik and Vaa reported that a 1985 Richards et al. study found that cones combined with warnings about the presence of work zones led to an average reduction in speed of 7% (*14*). Elvik and Vaa considered that this speed reduction "implies a reduction in the expected number of injury accidents of around 15%" (page 452) (*14*). The setting and the type of warning are not reported by Elvik and Vaa.

Discussion: Reduce lane width

Richards et al.'s 1985 study was conducted at six sites on rural two-lane roads, rural freeways, urban freeways, and undivided urban arterials (*40*). This study found a 7% speed reduction when lane width was reduced.

No AMFs can be determined, but Elvik and Vaa reported that a speed reduction of 7% "implies a reduction in the expected number of injury accidents of around 15%" (page 452) (*14*).

Discussion: Install transverse rumble strips in advance of work zone

McCoy and Bonneson's 1993 study investigated portable transverse rumble strips used in advance of a single lane closure work zone on a rural two-lane highway in South Dakota (*32*). The volume at the site was 830 veh/day. The researchers concluded that portable transverse rumble strips did not reduce vehicle speeds. Speeds were higher with the rumble strips than without them. As the location used for testing may not have been suitable, the findings were considered uncertain; no AMFs could be developed.

Bernhardt et al.'s 2001 study investigated whether removable orange raised rumble strips with CB (Citizens Band) messages could be used to reduce traffic speed, reduce speed variance and improve advance merging on approaches to freeway work zones. The study took place at a long-term work zone on a rural interstate highway (14,600 veh/day) in Missouri (*37*).

The rumble strips were evaluated while the CB messages were operating. Bernhardt et al. found that "rumble strips can be expected to promote …. some decreases in mean speeds of vehicles approaching an interstate highway work zone with a lane drop" (page 1) (*37*). They also found that the use of rumble strips in conjunction with CB messages improved mean speed characteristics (the study reviewed mean speed, speed variance, 85th percentile speed, fastest 15% of vehicles, percentage of vehicles below the speed limit, and 10-mph pace). No accident information is found; no AMFs could be developed.

Discussion: Use white lane drop arrows

The 2001 Bernhardt et al. study found that removable "white lane drop arrows can be expected to promote …. some decreases in mean speeds of vehicles approaching an interstate highway work zone with a lane drop" (page 1) (*37*). The arrows were associated with a decrease in speed near the work zone, but speed increased upstream from the work zone. No accident experience is reported; no AMFs could be developed.

Discussion: Broadcast Citizens' Band (CB) messages

Bernhardt et al.'s 2001 study found that "CB messages can be expected to promote …. some decreases in mean speeds of vehicles" (page 1) at a work zone (*37*). Like white lane drop arrows, CB messages were associated with a decrease in speed near the work zone and an increase in speed upstream from the work zone (page 18) (*37*). No accident experience is reported; no AMFs could be developed.

Discussion: Police enforcement of speeds

Richards et al.'s study (1985) was conducted at six work zone sites on rural two-lane roads, rural freeways, urban freeways, and undivided urban arterials (*40*). Richards et al. investigated speed reduction using a police traffic controller (speed reductions of 9 to 13 mph), and a stationary patrol car (4 to 12 mph). They also investigated a stationary patrol car with emergency lights or radar. This performed "slightly better" (page xi) than the stationary patrol car. The fourth type of law enforcement was a circulating patrol car which was used only on the rural two-lane sites and which was the least effective (2 to 3 mph.) (*40*).

No AMFs can be determined from the Richards et al. study (*40*), but the average speed reduction for the law enforcement approaches was 18% which suggests a substantial accident reduction given that Elvik and Vaa considered that a speed reduction of 19% for flagging "implies a reduction in the expected number of injury accidents of around 40%" (page 452) (*14*).

Graham et al. (1977) investigated speed reduction methods at three sites: an urban four-lane undivided arterial, an urban four-lane divided freeway, and a rural interstate highway, and found that "Enforcement patrols … decrease vehicle speeds near where they are installed, but their speed reduction effect is only effective over a short length of highway" (page 84) (*24*). No accident experience is reported; no AMFs could be developed.

Summary

The safety effects of the various treatments for reducing speed in work zones cannot be quantified at this time, but the literature currently available suggests that the most effective treatments for reducing speeds through work zones are:

- Changeable message signs with radar and personalized messages,
- Flaggers using innovative flagging procedures, and
- Flaggers using standard flagging procedures.

The speed reductions achieved by these treatments imply injury accident reductions in the region of 40% (*14*).

The following treatments discussed in the current literature achieved speed reductions that imply injury accident reductions in the region of 15% (*14*):

- Changeable message signs,
- Cones combined with (unspecified) warnings, and
- Lane width reduction.

The following treatments discussed in the current literature produced inconclusive results or had limited success in reducing work zone speeds:

- Radar drones (unmanned radar);
- Portable variable message signs;
- Speed display trailers;
- Advisory and regulatory temporary speed limit signs;
- Reduced speed limits in work zones, speed zoning;
- White lane drop arrows;
- Transverse rumble strips combined with CB messages; and
- CB messages.

Further research is necessary for all treatments, all road types, and all crash types. In the case of changeable message signs in work zones, the results vary depending on whether radar and personalized messages were added and on other circumstances at the site. The effects ranged from large to small, raising many questions and suggesting that the results available at present may be subject to change.

6.2.3. Pedestrian and Bicyclist Safety at Work Zones [Future Edition]

The accommodation of these road users is of particular importance for long duration work zones on urban and suburban arterials. In future editions of the HSM, the safety effect of various work zone design and traffic control elements may be discussed here. Potential resources are listed in Exhibit 6-38.

Exhibit 6-38: Potential resources on the safety considerations for pedestrians and bicyclists in work zones.

DOCUMENT
(Lalani, N., "Alternative Treatments for At-Grade Pedestrian Crossings." Washington, D.C., Institute of Transportation Engineers, (2001))
(Staplin, L., Lococo, K., Byington, S., and Harkey, D., "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians." FHWA-RD-01-051, Washington, D.C., Federal Highway Administration, (2001))

6.2.4. Safety Effects of Other Work Zone Elements

Other work zone elements that may have a safety impact include illumination and weather. These elements are discussed in the following sections.

6.2.4.1. Illumination

Illumination of work zones is a critical element in particular if the zone is active during the night.

The treatment discussed in this section is the effect on safety of providing artificial lighting for the duration of a highway work zone. This refers to the use of artificial lighting in work zones for the duration of the work.

No study has been found that has evaluated the effect on safety of illumination in highway work zones. Since there are no studies, effects could be estimated by relying on studies that have evaluated the effects of roadway lighting in general, i.e., not specifically in work zones. However, due to the special operations that can occur in work zones, this may not provide the most conservative AMFs.

Evidence regarding the effect of illumination is taken from a meta-analysis (Elvik 1995) of 37 evaluation studies containing 142 estimates of effect. This analysis has subsequently been updated by the addition of new studies, increasing the number of studies to 40 and the number of estimates of effect to 152.

Studies have been classified in three groups according to study quality. Studies rated as high quality include studies using both an internal and external comparison group (the distinction between external and internal comparison is explained below) and matched case-control studies. Studies rated as medium quality include studies that provide data on traffic volume in addition to accident data, and studies using an external comparison group only. Studies rated as low quality include studies that use only an internal comparison group and simple (as opposed to matched) case-control studies. Most studies, representing 74% of the estimates of effect, have been rated as low quality. Standards errors have been adjusted by a factor of 1.2 in high quality studies (all study designs), 2 in medium quality before-and-after studies, and 3 in low quality before-and-after studies. In case-control or cross-section studies, standard errors were adjusted by a factor of 3 medium quality studies and a factor of 5 in low quality studies.

An internal comparison group refers to the use of daytime accidents as comparison group when estimating the effect on lighting. For example, assume that there were 80 accidents in daytime and 55 in darkness before lighting was installed, and that the number of accidents in daytime increased to 84 and the number of accidents in darkness declined to 39 after lighting was installed. The resulting effect would then be estimated to: (39/55)/ (84/80) = 0.675.

This design does not control for two potential confounding factors: (1) Long-term trends in the proportion of accidents occurring in darkness, and (2) Regression-to-the-mean, in particular with respect to an abnormally high proportion of accidents in darkness. To some extent, both these confounding factors can be controlled for by using an external comparison group, i.e., intersections where lighting has not been installed. Suppose, for example, that for intersections where lighting was not installed, the following numbers were observed: Daytime before = 112; daytime after = 119; darkness before = 58; darkness after = 54. Then, in the comparison group, the odds ratio would be: (54/58)/ (119/112) = 0.876. The adjusted estimate of effect (ratio of odds ratios) would be: 0.675/0.876 = 0.771.

Exhibit 6-39: Resources examined to investigate the safety effect of illumination in highway work zones

DOCUMENT	DESCRIPTION	COMMENT
(CH2M HILL, "NCHRP Report 500 Volume 19: A Guide for Designing Safer Work Zones - DRAFT." Washington, D.C., Transportation Research Board, National Research Council, (2004))	Synthesis of information including recent literature, contact with state and local agencies throughout the United States, and federal programs.	DRAFT – to be reviewed when final is published.
(Bernhardt, K. L., Virkler, M. R., and Shaik, N. M., "Evaluation of Supplementary Traffic Control Measures for Freeway Work-Zone Approaches." Washington, D.C., 80th Transportation Research Board Annual Meeting, (2001))	Report describing the results of the testing of three individual traffic control devices.	Not relevant for this section. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*17*) (Elvik, R., "Meta-Analysis of Evaluations of Public Lighting as Accident Countermeasure." Transportation Research Record 1485, Washington, D.C., Transportation Research Board, National Research Council, (1995) pp. 112-123.)	A meta-analysis of 37 studies, containing a total of 142 results from 1948 to 1989.	Added to synthesis.
(Stout, D., Graham, J., Bryant-Fields, B., Migletz, J., Fish, J., and Hanscom, F., "Maintenance Work Zone Safety Devices Development and Evaluation." SHRP-H-371, Washington, D.C., Strategic Highway Research Program, National Research Council, (1993))	Report presenting the findings of tests and evaluations of several new work safety zone devices.	No AMFs. Not added to synthesis.
(Dudek, C. L., Huchingson, R. D., Creasey, F. T., and Pendleton, O., "Field Studies of Temporary Pavement Marking at Overlay Project Work Zones on Two-Lane, Two-Way Rural Highways." Transportation Research Record 1160, Washington, D.C., Transportation Research Board, National Research Concil, (1988) pp. 22-34.)	Report based on field studies conducted to compare the safety and operational effectiveness of differently spaced broken line pavement markings in work zones.	Not relevant for this section. Not added to synthesis.

Exhibit 6-40 shows summary estimates of the effects of lighting on accidents (it is important to note that AMFs in this exhibit are for all conditions, not just work zones). This summary is based on (*17*) and was updated by Elvik for NCHRP Project 17-27. Safety effects are stated as odds ratios. Uncertainty in summary estimates of effect is stated as adjusted standard error. All estimates of effect refer to accidents in darkness only.

Two sets of summary estimates of effect are presented in Exhibit 6-40. The first set is based on conventional meta-analysis. The second set has been generated from coefficients estimated in meta-regression analysis. In theory, the meta-regression estimates are superior to the conventional summary estimates, since meta-regression controls for more confounding factors or imbalance in the distribution of estimates across moderator variables (a moderator variable is any variable that influences the size of the effect of a measure on accidents).

Only estimates that specify accident severity have been used. Estimates referring to “all” accidents, which is usually a mixture of injury accidents and property-damage-only accidents have been discarded. The number of estimates underlying each summary estimate is stated in parentheses.

All summary estimates of effect, both those based on the conventional meta-analysis and those based on meta-regression, indicate that illumination reduces the number of accidents. There is a systematic pattern in summary estimates of effect: the largest effect is found for fatal accidents, the smallest effect is found for property-damage-only accidents. There is little variation in effects between various types of traffic environment (rural, urban, freeways). This applies both to the conventional summary estimates and to the summary estimates based on meta-regression. It is therefore clear that illumination reduces the number of accidents in darkness, in particular fatal accidents.

Some of the conventional summary estimates are based on very few estimates of effect. These summary estimates have large standard errors. In subsets that contain few estimates of effect, the standard errors are smaller for the meta-regression summary estimates than for the conventional summary estimates. The meta-regression summary estimates indicate larger effects on accidents in nearly all cases than the conventional summary estimates. The reasons for this are not clearly evident. It is surprising since the effects attributed to road safety measures often tend to get smaller when at study controls for more confounding or contextual variables. In this case, the opposite pattern is found.

Exhibit 6-40: Summary estimates of the effects on accidents of public lighting

Road type & setting	Accident severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Summary estimates based on conventional meta-analysis			
All types of highway	Fatal accidents (18)	0.313	0.361
	Injury accidents (85)	0.717	0.056
	PDO-accidents (19)	0.825	0.072
Rural highways	Fatal accidents (2)	0.265	0.720
	Injury accidents (21)	0.802	0.124
	PDO-accidents (3)	0.696	0.426
Urban highways	Fatal accidents (13)	0.365	0.515
	Injury accidents (46)	0.685	0.073
	PDO-accidents (16)	0.840	0.075
Freeways	Fatal accidents (3)	0.274	0.712
	Injury accidents (20)	0.728	0.121
	PDO-accidents (2)	0.678	0.256
Summary estimates based on meta-regression analysis			
All types of highway	Fatal accidents	0.261	0.285
	Injury accidents	0.577	0.208
	PDO-accidents	0.590	0.217
Rural highways	Fatal accidents	0.269	0.273
	Injury accidents	0.594	0.192
	PDO-accidents	0.607	0.202
Urban highways	Fatal accidents	0.260	0.257
	Injury accidents	0.576	0.169
	PDO-accidents	0.589	0.180
Freeways	Fatal accidents	0.253	0.269
	Injury accidents	0.559	0.187
	PDO-accidents	0.572	0.197

6.2.4.2. Weather [Future Edition]

In future editions of the HSM, the safety effects of weather conditions on the work zone and road users may be discussed here. Weather conditions may include drainage, warning messages for mist, fog, and rain ahead, as well snow and ice-clearing policies for the work zone. No potential resources for this section have been identified.

6.3. Bridges [Future Edition]

Future editions of the HSM may provide information on the safety effect of various bridge design and operational characteristics in this section. Elements of interest may include deck length and width (number of lanes), bridge railings or shoulders, medians, horizontal and vertical alignment, approach to bridges, bridge deck material, signage, pavement markings, surface condition of bridge deck (possibly related to weather), illumination, provisions for pedestrians and cyclists, etc. Potential resources are listed in Exhibit 6-41.

Exhibit 6-41: Potential resources on the safety of bridges

DOCUMENT
(Ferrara, T. C. and Gibby, A. R., "Statewide Study of Bicycles and Pedestrians on Freeways, Expressways, Toll Bridges and Tunnels." FHWA/CA/OR-01/20, Sacramento, California Department of Transportation, (2001))
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))
(Lee, J. and Mannering, F., "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management." WA-RD 475.1, Olympia, Washington State Department of Transportation; (1999))
(Friar, S. and Decker, R., "Evaluation of a Fixed Anti-Icing Spray System." Transportation Research Record, No. 1672, Washington, D.C., Transportation Research Board, National Research Council, (1999) pp. 34-41.)
(Perrillo, K., "The Effectiveness and Use of Continuous Shoulder Rumble Strips." Albany, N.Y., Federal Highway Administration, (1998))
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))
(Miaou, S. P., "Measuring the Goodness of Fit of Accident Prediction Models." FHWA-RD-96-040, McLean, Va., Federal Highway Administration, (1996))
(Zegeer, C. V. and Council, F. M., "Safety Effectiveness of Highway Design Features: Volume III - Cross Sections." FHWA-RD-91-046, Washington, D.C., Federal Highway Administration, (1992))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))

6.4. Tunnels [Future Edition]

In future editions of the HSM, this section may discuss tunnel width (number of lanes), medians, horizontal and vertical alignment, shoulders, escape routes, shoulders for emergency pull-overs, illumination, signage, traffic control devices, restricted-width tunnels (single lane tunnel for two-way traffic), reversible lanes in tunnels, height of tunnels (vehicle type), and accommodation of cyclists and pedestrians. Potential resources are listed in Exhibit 6-42.

Exhibit 6-42: Potential resources on the safety of tunnels

DOCUMENT
(Ferrara, T. C. and Gibby, A. R., "Statewide Study of Bicycles and Pedestrians on Freeways, Expressways, Toll Bridges and Tunnels." FHWA/CA/OR-01/20, Sacramento, California Department of Transportation, (2001))
(McLean, J., "Practical Relationships for the Assessment of Road Feature Treatments - Summary Report." ARR 315, Vermont South, Australia, ARRB Transport Research Ltd, (1997))

6.5. Two-way Left-turn Lanes

A two-way left-turn lane (TWLTL) is a common access management treatment used for many years on urban and suburban arterials with commercial development. These lanes are sometimes called continuous center left-turn lanes (CCLTLs).

A TWLTL is a special lane in the center of the highway reserved for vehicles making mid-block left-turns (between intersections) into or out of driveways. A TWLTL may also be carried through intersections with minor streets that are not controlled for the major traffic flow. The lane provides a deceleration and storage area for vehicles making these left-turns and is used by drivers traveling in either direction. The use of TWLTLs in the center of an urban or suburban four-lane road is well established. Since about 1990, TWLTLs have been used in the center of two-lane roads. TWLTLs are also used on six-lane roads and in rural and urban fringe areas.

TWLTLs target left-turn accidents into and out of driveways, in particular rear-end and sideswipe accidents.

TWLTLs are intended to reduce delays and conflicts caused by turning traffic and to improve safety by protecting drivers wanting to turn left from through vehicles while waiting for a gap in the traffic. However, challenges may still arise:

- Where drivers increase their speed on the through lanes due to the left-turning traffic being removed;
- Where a through lane is an HOV lane which may carry little traffic, encouraging drivers to risk crossing it even when their view is blocked as they do not expect a vehicle to be coming;
- In urban areas where the TWLTL means that pedestrians have further to walk across the road;
- In urban areas where pedestrians may treat the TWLTL as a refuge area;
- Where traffic volumes increase so that traffic backs up in the turning lane, especially if there are many driveways and the backed up traffic impedes vehicles wanting to turn left in the opposite direction;
- Where the driveway entrance is poorly designed and cannot readily accommodate the turning traffic which may then slow down or even stop as it crosses the through lanes;
- Where driveways are not clearly marked and conspicuous so that drivers do not know well in advance whether a left-turn is feasible; and
- Where drivers use the TWLTL for passing. Fitzpatrick et al. (*42*) cite Harwood and St. John who found that 0.4% were involved in illegal passing of vehicles. A TWLTL that leads to the loss of a passing lane needs careful evaluation; and
- Several states in the southeastern United States have constructed seven-lane urban arterials where one lane is a TWLTL. On these roads, problems may arise because drivers may cross six or seven lanes to enter or exit a business.

This section examines the impact of driveway density and the safety effectiveness of TWLTLs on rural two-lane roads, rural multi-lane highways, and urban and suburban arterials.

Exhibit 6-43: Resources examined on the relationship between two-way left-turn lanes and safety on urban and suburban arterials.

DOCUMENT	DESCRIPTION	COMMENT
(Persaud, B., Lyon, C., Eccles, K., Lefler, N., Carter, D., and Amjadi, R., "Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads," Report No. FHWA-HRT-08-042, Federal Highway Administration, Washington, D.C., (2008))	The study discusses the safety effectiveness of TWLTLs in reducing total, injury, and rear-end crashes.	Added to synthesis. Includes AMF.
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	The book provides a systematic overview of the effects of road safety measures (translated from 1997 Norwegian edition, partly updated).	AMF estimates based on sources reviewed by Hauer (2000). Not added to synthesis.
(*43*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., McGee, H., Prothe, L., Eccles, K., and Council, F. M., "NCHRP Report 500 Volume 4: A Guide for Addressing Head-On Collisions ." Washington, D.C., Transportation Research Board, National Research Council, (2003))	The study discusses TWLTLs as one of many potential countermeasures for reducing the number of head-on fatal crashes	Limited qualitative and quantitative information. Added to synthesis. No AMFs.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Forbes reviewed eight studies none of which post-dated the studies reviewed by Hauer or Harwood et al. in 2000.	No additional quantitative information. Not added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study lists and briefly discusses many potential low-cost safety countermeasures for two-lane and three-lane roadways.	Limited qualitative and quantitative information. Not added to synthesis.
(*44*) (Hauer, E., "The Median and Safety." (2000))	The report provides detailed reviews of the safety effects of six major approaches to median design including TWLTLs.	Added to synthesis.
(*45*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	The study presents an algorithm for predicting the safety performance on rural two-lane highways. A panel of experts developed the AMFs used in the accident prediction algorithm.	Added to synthesis. Includes AMF.
(Gluck, J., Levinson, H. S., and Stover, V., "NCHRP Report 420: Impact of Access Management Techniques." Washington, D.C., Transportation Research Board, National Research Council, (1999))	The report discusses selected access management techniques.	Limited quantitative information. Not added to synthesis as main focus was access management and TWLTL work superseded by Harwood et al., 2000.
(Castronovo, S., Dorothy, P. W., and Maleck, T. L., "An Investigation of the Effectiveness of Boulevard Roadways." Washington, D.C., 77th Transportation Research Board Annual Meeting, (1998))	The study compared accident rates on roadways with TWLTLs with accident rates on boulevards with divided directional cross-over median designs.	Limited information. Not added to synthesis No AMFs.

DOCUMENT	DESCRIPTION	COMMENT
(Bonneson, J. A. and McCoy, P. T., "Effect of Median Treatment on Urban Arterial Safety: An Accident Prediction Model." Transportation Research Record 1581, Washington, D.C., Transportation Research Board, National Research Council, (1997) pp. 27-36.)	The study used crash data to model the relationship between crashes and median treatment including two-way left-turn lanes and raised medians on urban arterials.	Reference suggested by NCHRP 17-18(4). Included in Hauer's review in 2000. Not added to synthesis.
(*46*) (Harwood, D. W., "NCHRP Report 330: Effective Utilization of Street Width on Urban Arterials." Washington, D.C., Transportation Research Board, National Research Council, (1990))	The report reviews the literature on urban arterial street width. It includes a review of TWLTLs and safety.	Limited qualitative and quantitative information. Added to synthesis. No AMFs.
(Harwood, D. W., "NCHRP Report 282: Multilane Design Alternatives for Improving Suburban Highways." Washington, D.C., Transportation Research Board, National Research Council, (1986))	The study investigated and compared the safety (and other) characteristics of selected multi-lane road types in suburban areas.	Reference suggested by NCHRP 17-18(4).This study is reviewed in Harwood 1990 and Hauer 2000.Not added to synthesis.
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))	Synthesis of practices up to 1982.	Not added to synthesis. No AMFs.

The definition of target accidents for TWLTLs is important in studies of the safety effectiveness of TWLTLs. Hauer points out that as TWLTLs are designed to prevent accidents at access points, mainly left-turn in and out accidents, AMFs for TWLTLs should apply only to driveway-related accidents (not to all accidents on the road segment) and only to the in and out left-turn accidents at driveways (*44*). Hauer considered that as about half of all driveway-related accidents are associated with in and out left-turns, TWLTLs target about half of driveway-related accidents.

Regarding target accidents, Harwood comments that "It is likely that TWLTLs are more effective when installed at sites with a high proportion of rear-end and angle accidents (as they usually are)" (page 13) (*46*). Harwood also points out that head-on accidents are not a major concern after implementation of TWLTL. Harwood found that the literature on three- and five-lane TWLTLs "universally discounts the possibility of substantial increases in head-on accidents" (page 13) and that "head-on accidents usually decrease with TWLTL installation, although not as much as other accident types such as rear-end accidents" (page 13).

Studies are likely to provide different estimates of accident reduction depending on access density and the traffic volume of in and out left-turns at the access points. Hauer reviewed studies from 1964 to 2000, but found no studies that recognized the importance of driveway density or frequency of in and out left-turns at the access points of access-point related left-turns and the proportion of left-turn accidents (*44*). Most studies of the safety effectiveness of TWLTLs report all accidents, not just the target accidents.

Studies have investigated the safety effectiveness of TWLTLs using various approaches. These include comparing TWLTLs with other median treatments (undivided roadways or raised medians), comparing three, five and seven-lane roadways, examining various types of TWLTL installation including restriping or road widening, and for divided or undivided roadways.

Hauer points out that studies' findings on the safety effectiveness of TWLTLs vary because of methodological problems and inadequacies, and because the researchers did not include only TWLTL target accidents (*44*).

Neuman et al.'s 2003 study of TWLTLs for two- and four-lane roads found that although TWLTLs are "fairly widely used", they have "not been sufficiently evaluated to be considered 'proven' " (page V-16) (*43*). The authors concluded that, "there are no truly valid estimates of the effectiveness of such conversions [to TWLTLs] based on sound before/after studies for a two-lane road… Precise estimates of effectiveness should be developed" (page V-16) (*43*).

The safety effects of TWLTLs in relation to pedestrians are discussed in Section 3.3.

Treatment: Provide two-way left-turn lane

Rural two-lane roads

Although TWLTLs are generally associated with urban and suburban arterials, the best AMF estimates are for rural two-lane highways using Harwood et al.'s 2000 approach and a detailed consideration of driveway density on rural two-lane highways (*45*).

A panel of experts concluded that TWLTLs are inappropriate where there are less than three driveways per kilometer (five driveways per mile). If the driveway density is less than three driveways per kilometer, the AMF for TWLTL installation is 1.00.

Where driveway density is three or more driveways per km (five driveways per mi), Harwood et al.'s AMF for the installation of a TWLTL is given in Equation 6-4 (*45*) (page 40).

Equation 6-4: AMF for the installation of a TWLTL on rural two-lane highways where driveway density is three or more driveways per km (five driveways per mi) (45)

$$AMF = 1 - 0.7\ P_D\ P_{LT/D}$$

where

P_D = driveway-related accidents as a proportion of total accidents

$= (0.0047DD + 0.0024DD^2) / (1.199 + 0.0047DD + 0.0024DD^2)$; and

$P_{LT/D}$ = left-turn accidents susceptible to correction by a TWLTL as a proportion of driveway-related accidents (estimated by the expert panel to be 0.5)

The AMF applies to left-turn accidents in and out of driveways; it does not apply to non-driveway-related accidents and non-left-turn accidents at driveways.

The standard error for the function is not reported.

The function is based on Hauer's work (*44*), but has been altered to give a more conservative result than Hauer's original formulation. (For example, whereas Harwood et al.'s AMF for 10 driveways per mile is 0.93, Hauer's original AMF for 10 driveways per mile was 0.85.) Using Harwood et al.'s approach, the AMF for a TWLTL on a rural two-lane highway with 25 driveways per mile is 0.80, an accident reduction of 20% for the target accidents (left-turn in and out accidents at driveways) (*45*).

If the driveway density along a rural two-lane road is unknown, Exhibit 6-44 presents alternative AMFs that can be used to estimate the safety effects of installing a TWLTL along the roadway, Persaud et al. (2008) used the Empirical Bayes (EB) methodology for observational before-after studies to evaluate the safety effectiveness of TWLTLs on rural two-lane roads. Data were collected from

four states (*60*). A method correction factor of 1.2 was used to adjust the standard errors from this study. Persaud et al. noted that future research on the impacts of intersection and driveway density and on differentiating the effect of the two installation methods, restriping versus widening, could provide additional insights into the effectiveness of this measure.

Exhibit 6-44: AMFs for TWLTLs on rural two lane roads (60).

Treatment/ Element	Setting Road Type	Accident type & severity	Index of Change, $t_{adjusted}$	Estimate of Std. Error, s
Provide two-way left-turn lane (TWLTL)	Rural Two-lane	Total accidents; all types	0.64	0.04
		Injury accidents; all types	0.65	0.08
		Total accidents; rear-end	0.53	0.05

Rural multi-lane highways; Freeways; Expressways

No studies found.

Urban and suburban arterials

Hauer found that most studies of TWLTLs suggest an AMF for urban and suburban arterials of about 0.70. He concludes that the best AMF estimates available for all accident types range from 0.70 to 0.90 (*44*). (Although the standard error for these AMF estimates is unknown, the level of confidence is likely to be "medium-high" as this work contributed to the calculation of the AMFs for rural two-lane highways given above.)

Harwood reviewed studies of TWLTL design on urban arterials in 1990 (*46*). The target accidents in this review are unclear but probably included all accidents rather than just left-turn accidents at driveways. Based on a literature review by Harwood "the safety effectiveness of converting from the two-lane undivided to the three-lane TWLTL design alternative is expected to be in the range of 11 to 35% accident rate reduction" (page 25). In the case of five-lane cross-sections with a TWLTL, Harwood reports that the studies "generally concluded that TWLTLs reduce accident rate by from 19 to 35%" (page 27). Standard errors were not reported and could not be calculated for these AMFs.

Persaud et al. (2008) evaluated the safety effectiveness of TWLTLs installed on several urban sites (*60*). They found the safety effects to be negligible and suggested that potential sites in this environment should be carefully selected and that future research may be necessary to identify circumstances most favorable for urban installations.

Although several studies of the safety effect of TWLTLs on urban and suburban arterials indicate some safety benefit, an AMF cannot be derived. Further research is necessary in order to quantify the safety effect of TWLTLs on urban and suburban arterials.

6.6. Passing and Climbing Lanes

A passing lane is a lane provided on two-lane two-way rural roads to increase overtaking opportunities and reduce delays. Passing lanes are provided where problems arise on level or rolling terrain. (Climbing lanes are provided to overcome delays caused by slow moving vehicles on steep upgrades.) It is generally more cost-effective to improve passing opportunities than to reconstruct existing roads. There are several low-cost strategies for adding passing opportunities:

- Passing lanes;
- Short four-lane sections - passing lanes are provided in both directions of travel;
- Climbing lanes - provided to overcome delays caused by slow moving vehicles on steep upgrades;
- Turnouts - short auxiliary lanes used in winding, mountainous areas; and
- Shoulder use sections - shoulders are provided for disabled vehicles which need to stop or recover. Though driving on shoulders is usually illegal, shoulders may be used by slow moving vehicles in some areas to allow other vehicles to pass. Some shoulders are signed where shoulder use is allowed.

These strategies are shown in Exhibit 6-45.

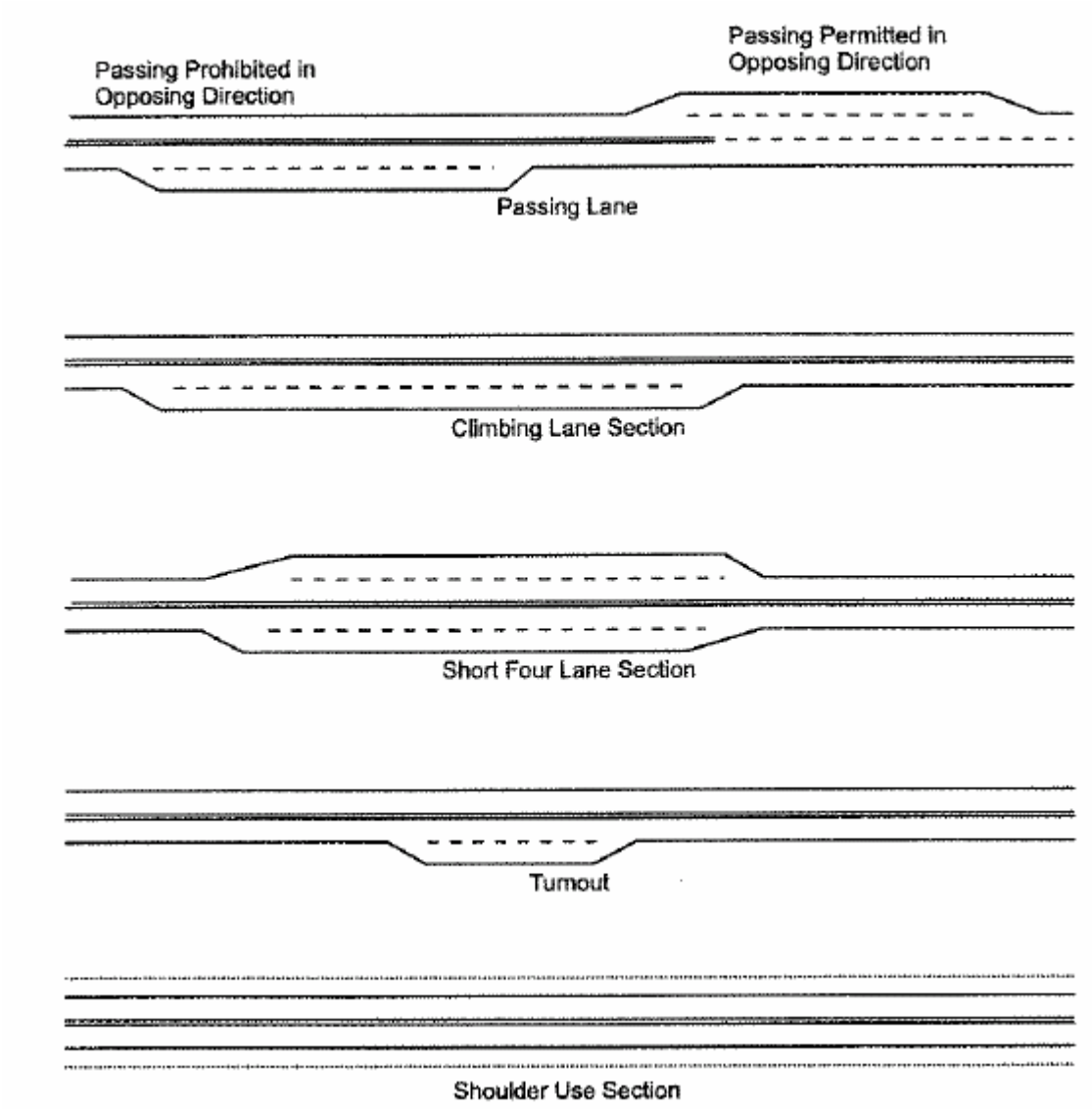
The length of a passing lane varies; the optimal length is usually 0.8 to 3.23 km (0.5 to 2.0 mi) (*2*). Passing lanes may be isolated and designed to alleviate a particular bottleneck problem or may be provided at regular intervals to improve overall traffic operations along a road segment.

Passing lanes are designed to minimize vehicle interactions and reduce hazardous situations by providing motorists with safe passing opportunities. Most rural two-lane highways carry relatively little traffic and experience few operational problems. However, safety and operational problems may arise where traffic volume becomes heavy. Additional problems include poor sight distance, lack of passing opportunities, the percentage of trucks and slow moving vehicles, the range of driving speeds, and rolling or steep terrain. Where platoons develop, delays and frustration may lead to illegal passing and passing-related accidents.

Passing lanes may also be used to preserve community character and scenic areas. Passing lanes are particularly useful in restricted corridors where only one road is available. Refer to the AASHTO Policy on Geometric Design of Highways and Streets for details on the design and placement of passing lanes (*2*).

Passing lanes target passing-related crashes such as passing-related head-on, same-direction sideswipe, and opposite-direction sideswipe crashes. Crashes that can be related to passing are a very small proportion of all crashes and the safety aspects of passing and climbing lanes have not been the subject of much research. Passing-related head-on crashes are “a relatively low percentage of all head-on crashes” (page V-21) (*43*). Passing lanes may also reduce crashes associated with vehicles traveling in platoons, but the safety benefits to the whole corridor affected by the passing lane installations are not known.

Exhibit 6-45: Typical treatments for adding passing opportunities on two-lane highways



Climbing lanes are short roadway segments that allow slow moving vehicles to “climb” grades while other vehicles pass. Climbing lanes are used where heavy vehicles such as trucks and recreational vehicles slow down due to gradient and may create potential conflicts with other vehicles.

Climbing lanes allow traffic platoons which have formed behind slower vehicles to dissipate in a safer manner than using an oncoming traffic lane to facilitate a passing maneuver. Alternatively, climbing lanes provide an improvement on highway sections which may not meet warrants for adding additional lanes, but which show a demand for overtaking that exceeds the available opportunities and deterioration of levels-of-service in terms of reduced speeds.

Climbing lanes are added to the upgrade side of a two-lane highway. The center and downgrade outer lanes operate as a conventional two-lane highway. The climbing lane should be immediately recognizable. Signs may include "SLOWER TRAFFIC KEEP RIGHT" or “TRUCKS USE RIGHT

LANE" to direct slow moving vehicles into the climbing lane. The centerline of the normal two-lane roadway is clearly marked. Climbing lanes generally continue over the vertical curve crest so that vehicles may gain speed before merging.

Justification for providing climbing lanes may be based on safety performance of the roadway, lack of sight distance, traffic volume and composition, gradient, speed, speed reduction, speed differential, delay or platooning, level-of-service and economics. For example, some jurisdictions require climbing lanes on grades steeper than 2% and longer than 500 m. The American Association of State Highway and Transportation Officials (AASHTO) states that a minimum truck speed reduction of 16 km/h (10 mph) justifies the addition of climbing lanes (*2*).

It is generally expected that climbing lanes reduce the number of accidents that arise from speed differential problems and resulting conflicts between slow moving vehicles and passing vehicles. The main target accidents are rear-end and same direction sideswipe accidents. Additional concerns include head-on and opposite direction sideswipe accidents.

A slow moving vehicle turnout is not an auxiliary lane. AASHTO describes a turnout as "a widened, unobstructed shoulder area that allows slow-moving vehicles to pull out of the through lane to give passing opportunities to following vehicles" (*2*). A turnout may be provided on roadways where opportunities to pass slow moving vehicles are limited and where the cost of providing a full auxiliary lane would be prohibitive (Exhibit 6-45).

To determine the safety effects of climbing lanes (or turnouts), it is necessary to compare the number of crashes on roadway segments with climbing lanes (or turnouts) with the number of crashes on similar roadway segments without climbing lanes (or turnouts).

This section discusses the safety effect of passing lanes and climbing lanes on rural two-lane roadways. The use of short four-lane sections and shoulder use sections as passing lanes is included here; along with climbing lanes and turnouts. Current knowledge is limited, and there is a need to confirm the AMFs available for passing lanes and short four-lane sections and to quantify the safety impact of passing lane length, passing lane spacing, ADT and traffic mix (truck percentage), grades, horizontal curvature, sight distance, tapers and merges for passing lanes.

The safety impacts of the following passing lane-related elements were not found in current literature, and may be added to future editions of the HSM: three-lane alternate passing design, design elements (such as passing lane length, passing lane spacing, grades, horizontal curvature, sight distance, tapers and merges, shoulders), traffic operational elements (such as corridor speed, signage and pavement markings), ADT and traffic mix (truck percentage), the presence of intersections and /or access points/driveways on passing lane sections, and the impact on the roadway as a whole (corridor approach).

Future HSM editions may cover the safety effect of climbing lanes and turnouts in relation to traffic volumes, traffic mix (truck percentage), different grades, corridor speed and speed differentials, horizontal curvature, signage, markings, advance signage of passing opportunity and the impact on the roadway as a whole (beyond the length of the facility itself).

Exhibit 6-46: Resources examined on the safety of passing and climbing lanes

DOCUMENT	DESCRIPTION	COMMENT
(Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004))	The book provides a systematic overview of the effects of road safety measures (translated from 1997 Norwegian edition, partly updated).	No information on passing lanes. Not added to synthesis.

DOCUMENT	DESCRIPTION	COMMENT
(*43*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., McGee, H., Prothe, L., Eccles, K., and Council, F. M., "NCHRP Report 500 Volume 4: A Guide for Addressing Head-On Collisions ." Washington, D.C., Transportation Research Board, National Research Council, (2003))	The study discusses passing lanes as one of many potential countermeasures for reducing the number of head-on fatal crashes.	Added to synthesis. Provides percent reduction in crashes based on literature review.
(*45*) (Harwood, D. W., Council, F. M., Hauer, E., Hughes, W. E., and Vogt, A., "Prediction of the Expected Safety Performance of Rural Two-Lane Highways." FHWA-RD-99-207, McLean, Va., Federal Highway Administration, (2000))	The study presents an algorithm for predicting the safety performance on rural two-lane highways. A panel of experts developed the AMFs used in the accident prediction algorithm.	Climbing lanes mixed with passing lanes. Added to synthesis.
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))	The study lists and briefly discusses many potential low-cost safety countermeasures for two-lane and three-lane roadways.	Not added to synthesis. Values reported by Neuman et al., 2003.
(Curren, J. E., "NCHRP Report 369: Use of Shoulders and Narrow Lanes to Increase Freeway Capacity." Washington, D.C., Transportation Research Board, National Research Council, (1995))	The study evaluated strategies to increase the capacity of urban freeways by using shoulders with and without narrow lanes.	No information. Not added to synthesis.
(Taylor, W. C. and Jain, M. K., "Warrants for Passing Lanes." Transportation Research Record 1303, Washington, D.C., Transportation Research Board, National Research Council, (1991) pp. 83-91.)	Used a simulation model to study the operational benefits of passing lanes. The study compared accident rates on sections with and without passing lanes, but these sections are likely to differ considerably in basic characteristics.	Not added to synthesis.
(*48*) (St.John, A. D. and Harwood, D. W., "Safety Considerations for Truck Climbing Lanes on Rural Highways." Transportation Research Record 1303, Washington, D.C., Transportation Research Board, National Research Council, (1991) pp. 74-82.)	The paper explored the problem of warrants for climbing lanes by investigating slow moving trucks and grade. Only speed related accidents were considered.	Reference suggested by NCHRP 17-18(4). No AMFs. Limited qualitative information added to synthesis.
(47) (Khan, A. M., Holtz, N. M., and Yicheng, Z., "Cost-Effectiveness of Climbing Lanes: Safety, Level of Service and Cost Factors." TDS-90-08, Downsview, Ontario, Canada, Ontario Ministry of Transportation, (1990))	The study examines the role of climbing lanes in reducing the problems created by slow vehicles. It includes a summary of safety aspects.	Reference suggested by NCHRP 17-18(4). Limited qualitative/quantitative information. Added to synthesis.
(ADI Limited, "Passing Manoeuvres and Passing Lanes: Design, Operational & Safety Evaluations." Ottawa, Ontario, Canada, Transport Canada, (1989))	The report reviews the operation and safety of passing lanes on two-lane two-way highways.	The findings were reviewed in Harwood et al., 2000 and Fitzpatrick et al., 2000. Not added to synthesis.

Treatment: Add passing lanes or short four-lane sections

Rural two-lane roads

Three groups of authors have recently reviewed and synthesized the findings of passing lane studies: Neuman et al. (2003) (*43*), Harwood et al. (2000) (*45*), and Fitzpatrick et al. (2000) (*42*).

Neuman et al.'s synthesis (*43*) summarizes the results of the studies reviewed in all three publications. The base condition for an AMF for a passing lane is the absence of the passing lane. The AMF for short four-lane sections (side by side passing lanes provided in opposite directions on the same

roadway section) does not apply to extended four-lane sections. Estimates of the standard error of the AMFs in Exhibit 6-47 are not reported and not calculable.

Exhibit 6-47: AMFs for passing lanes, short four-lane sections and shoulder use sections on rural or suburban two-lane roads (43)

Design alternative	All severities	Fatal and injury
Passing lanes	0.75	0.70
Short four-lane sections	0.65	0.60
Shoulder use sections	No known statistically significant effect	

The AMFs in Exhibit 6-47 for total crashes appear to be the same as those reported by Harwood et al. (*45*) and Fitzpatrick et al. (*42*).

Neuman et al. commented that it is possible that shoulder treatments may have been a confounding factor at some sites studied if the shoulder treatments were constructed simultaneously with passing lanes or short four-lane sections (*43*).

Neuman et al. pointed out that passing lanes or short four-lane sections have been "fairly widely used", but passing lanes have "not been sufficiently evaluated to be considered 'proven'" (V-21) (*43*). This suggests that additional studies are needed to provide methodologically and statistically sound measures of safety effectiveness.

Both Neuman et al. and Harwood et al. indicate that passing lanes are known to affect traffic 3 to 8 mi (5 to 13 km) downstream of the passing lane, but the effect has not been quantified in safety terms (*43*) (*45*).

Rural multi-lane highways; Freeways; Expressways; Urban and suburban arterials

No studies found.

Discussion: Add a climbing lane

Rural two-lane roads

Harwood et al. found that the AMF "for a conventional passing or climbing lane" in one direction on a rural two-lane road is 0.75 for total accidents (page 39); an estimate of standard error cannot be determined for this value (*45*). This is the same value noted by Neuman et al. for passing lanes (*43*). Due to the combination of passing and climbing lanes in this value, further research is needed to determine the safety impact of climbing lanes alone.

Kahn et al.'s 1990 summary of the research available also concluded that "climbing/passing lanes have been credited with a reduction in accident rates by 25% or higher as compared with untreated two-lane sections" (page 43) (*47*). The studies reviewed ranged from a reduction of 11% to a reduction of 42%. The standard error for this value could not be calculated. Further research is needed to determine the safety impact of climbing lanes.

Speed differentials in relation to climbing lanes have received some attention. St. John and Harwood's 1991 study noted that the role of slow moving trucks in creating potential for crashes was not quantified (page 74) (*48*). Khan et al. refer to Homburger's work in 1987 and Glennon's work in 1970 as examples of studies that have shown that accidents happen more frequently and are more severe as speed differentials increase (page 41) (*47*).

Information in the current literature on safety effects of the design elements of climbing lanes is limited. Kahn et al. noted that "Inadequate sight distance prior to the lane drop creates a safety hazard" (page 43) and that "Lane addition (diverge) and (merge) areas do not represent any marked safety hazards", (page 43) but gave no additional information (*47*).

Therefore, the only AMF estimate found in the current literature for adding climbing lanes (in combination with passing lanes) on a rural two-lane road is 0.75 for all accident types and severities; an estimate of standard error for this AMF could not be determined.

Rural multi-lane roads; Freeways; Expressways; Urban and suburban arterials

Not applicable.

6.7. Emergency Escape Ramps [Future Edition]

Long downgrades may cause trucks to require emergency braking and stopping by means of entering an emergency escape ramp. As defined in the AASHTO Policy on Geometric Design, emergency escape ramps "provide a location for out-of-control vehicles, particularly trucks, to slow and stop away from the main traffic stream…generally the result of a driver losing braking ability either through overheating of the brakes due to mechanical failure or failure to downshift at the appropriate time" (*2*).

Crashes resulting from a truck's loss of control and inability to stop tend to be severe. The safety effect of emergency escape ramps will be discussed in this section in future editions of the HSM. The safety impacts of different emergency escape ramp designs such as sandpile, ascending grade arrester bed, horizontal grade arrester bed, or descending grade arrester bed may be discussed. Potential resources were not found for this section.

6.8. Emergency Crossovers [Future Edition]

To be addressed in future editions.

6.9. Rest Stops [Future Edition]

Future editions of the HSM may provide discussion in this section on the safety effect of providing rest stops on long stretches of highway. Potential resources are listed in Exhibit 6-48.

Exhibit 6-48: Potential resources on the safety of rest stops

DOCUMENT
(Knipling, R. R., Waller, P., Peck, R. C., Pfefer, R., Neuman, T. R., Slack, K. L., and Hardy, K. K., "NCHRP 500 Report Volume 13: A Guide for Addressing Collisions Involving Heavy Trucks." Washington, D.C., Transportation Research Board, National Research Council, (2003))

6.10. High Occupancy Vehicle Facilities [Future Edition]

High occupancy vehicle (HOV) lanes promote the utilization of highway infrastructure in a more cost effective manner by minimizing the number of vehicles traveling and increasing the number of occupants per vehicle. The safety effects of separating this traffic from the mixed traffic lanes will be discussed in this section in future editions of the HSM.

In future editions of the HSM, this section may discuss the traffic control devices and operational elements specific to HOV lanes or other special denomination lanes (e.g., bus-only lanes), and the related safety performance. Some elements that may be of interest include: the design of diverge and

merge access points to HOV facilities, the type of separation between HOV lanes and general traffic, speed differentials, reversible HOV lanes, the mix of traffic permitted, and provision on the left or right side of the highway. Potential resources are listed in Exhibit 6-49.

Note that bicycle lanes and shared bike/bus lanes are discussed in Section 3.3.

Exhibit 6-49: Potential resources on the relationship between HOV lanes and safety

DOCUMENT
(Curren, J. E., "NCHRP Report 369: Use of Shoulders and Narrow Lanes to Increase Freeway Capacity." Washington, D.C., Transportation Research Board, National Research Council, (1995))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))

6.11. Reversible Roadways and Lanes [Future Edition]

The safety effects of using reversible roadways or lanes may be discussed in future editions of the HSM. Elements that may influence the safety performance of reversible roadways or lanes include signage, pavement markings, traffic operations, access points and access management. Potential resources are listed in Exhibit 6-50

Exhibit 6-50: Potential resources on the relationship between reversible lanes and safety

DOCUMENT
(Harwood, D. W., "NCHRP Report 330: Effective Utilization of Street Width on Urban Arterials." Washington, D.C., Transportation Research Board, National Research Council, (1990))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))

6.12. Frontage Roads [Future Edition]

In future editions of the HSM, this section may discuss the safety effect of various elements of frontage roads. Potential resources are listed in Exhibit 6-51.

Exhibit 6-51: Potential resources on the safety of frontage roads.

DOCUMENT
(Gluck, J., Levinson, H. S., and Stover, V., "NCHRP Report 420: Impact of Access Management Techniques." Washington, D.C., Transportation Research Board, National Research Council, (1999))
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))
("NCHRP Synthesis of Highway Practice Report 35: Design and Control of Freeway Off-Ramp Terminals." Washington, D.C., Transportation Research Board, National Research Council, (1976))

6.13. Transit Facilities and Related Features [Future Edition]

Future editions of the HSM may include discussion of the safety effects of transit facilities for different road classes and environments. This discussion may include intermodal links, carpool lots,

shared facilities, transit stop locations (with links to Chapters 3, 4, and 5), HOV lanes and dedicated bus lanes. The safety effect of providing park and ride and kiss and ride facilities may also be discussed here. Potential resources are listed in Exhibit 6-52.

Exhibit 6-52: Potential resources on the safety of transit facilities

DOCUMENT
(Farran, J. I., Korve, H. W., Levinson, H. S., and Mansel, D., "The Light Rail Transit Safety Experience." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 97-103.)
(Menta, V. K., Strate, H. E., and Saracena, A., "New Jersey Route 495 Exclusive Bus Lane Safety Study." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 319-325.)

6.14. Bicyclist and Pedestrian Facilities and Related Features [Future Edition]

Future editions of the HSM may include discussion of the safety effects of dedicated off-road pedestrian and bicyclist facilities, such as pedestrian over or under passes, shared-use paths, etc. Potential resources were not identified.

6.15. Toll Plazas [Future Edition]

Future editions of the HSM may provide information on the safety effect of various toll plaza designs and operational characteristics. Potential resources are listed in Exhibit 6-53.

Exhibit 6-53: Potential resources on the relationship between toll plazas and safety

DOCUMENT
(Menta, V. K., Strate, H. E., Boss, D. A., and Saracena, A., "Electronic Toll Collection and Safety at the Holland Tunnel." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 236-242.)
(Various, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1." FHWA-TS-82-232, Washington, D.C., Federal Highway Administration, (1982))

6.16. Weigh Stations [Future Edition]

To be addressed in future editions.

6.17. Special Events [Future Edition]

In future editions of the HSM, this section may provide information on the safety effect of special events that require closing roads or redirecting traffic, such as parades or festivals. Potential resources are listed in Exhibit 6-54.

Exhibit 6-54: Potential resources on the relationship between special events and safety

DOCUMENT
(Fitzpatrick, K., Balke, K., Harwood, D. W., and Anderson, I. B., "NCHRP Report 440: Accident Mitigation Guide for Congested Rural Two-Lane Highways." Washington, D.C., National Cooperative Highway Research Program, Transportation Research Board, (2000))

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Chapter 7: Road Networks

Chapter 7. Road Networks

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Chapters 3 to 6 provide information about the safety effects of specific treatments designed for road segments, intersections, interchanges and various other facilities. Chapter 7 considers how the safety of the road network as a whole is impacted by planning, design and operational decisions, and also by the road-use culture of the network's users.

National policy requires state and metropolitan authorities to develop long-range planning processes and to create long-range plans that will increase the safety of the transportation system for all users. This Chapter is concerned with the principles and philosophies that guide the processes and the policies that result.

How do long-range policy decisions impact safety at the network, corridor, and project levels? How do we ensure that we understand and maximize the safety benefits of our geometric and operational improvements in the wider context of population growth, land use issues, the transportation network and the human behavior of those who use the network, whether as motorized or non-motorized users? What is the best way to ensure that state and metropolitan authorities successfully incorporate safety into their long-range planning?

High-level policy and planning decisions affect the safety of the network at every level of the network. The decisions made affect the number of crashes expected to occur on the network by determining a whole range of issues, including, for example:

- How much travel takes place (how far people travel in the course of their daily activities);
- What mode of travel is used (whether people travel by train, subway, bus, car, bicycle or walking);
- What kind of facility is used (whether people travel on a freeway or an arterial);
- Whether road users pass through few high-volume intersections or many low-volume intersections;
- The distance between access points;
- The need for children to cross roads on their way to school; and
- The operating speeds implied by the local residential road network (e.g., straight wide roadways, crescents, or cul-de-sacs).

At the design and operational level of planning, some decisions (such as shoulder widening or the provision of a turn lane) have little effect on travel patterns over the network as a whole, but whenever a design or operational decision affects the network and the mode, route, or trip choice of users, the pattern of trips on the network and the safety effects on the network as a whole may change. One-way street systems, for example, illustrate how design and operational decisions may appear to focus on a relatively limited area, but have safety implications for the road network beyond the immediate site.

National policy expects transportation authorities to go beyond construction based strategies. Transportation authorities are expected to incorporate education and enforcement strategies into their goal for a safer transportation network. Although there is little detailed information on how driver and pedestrian behaviors vary and create a road-use culture or how that road-use culture evolves, it is clear that there are situations where the local road-use culture has an effect on safety. Examples include driver behavior where red-light cameras are installed, driver behavior at all-way stops, the attitude towards driving while impaired, the use of seatbelts, yielding to pedestrians, etc. In the case of both red-light cameras and all-way stops, there may be additional network safety effects. Drivers may anticipate the use of red-light cameras or all-way stops at other intersections and change their behavior accordingly.

7.1. Safety in Transportation Network Planning

Although a safe transportation system is desired and expected, safety has not been an explicit and pro-active part of the transportation planning process. Transportation planning has traditionally focused on capacity and congestion with some attention being given to operation and management. Safety has, however, become more prominent in the last decade.

The Transportation Equity Act for the 21st Century (TEA-21) in 1998 gave specific recognition to safety as a planning factor. For the first time, state agencies and Metropolitan Planning Organizations (MPOs) were required to incorporate safety (and security) criteria into their respective planning processes and activities in a comprehensive and multimodal way.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) became law in 2005. SAFETEA-LU has a strong focus on integrated, comprehensive safety planning and makes greatly increased funding available. The Act established the Highway Safety Improvement Program (HSIP) as a core program. The purpose of the HSIP is to reduce fatal and serious/life changing crashes. Strategic Highway Safety Plans (SHSP) are a new requirement (under the HSIP) and must be fully linked and integrated with the transportation planning process and associated plans. In addition, certain safety issues (work zones, older drivers, and pedestrians, including children walking to school) receive special emphasis in the Act. Flexibility is an important part of SAFETY-LU's approach, allowing states to examine their own circumstances and to concentrate on their most critical safety needs.

Legislation has clearly established that safety must become a quantitative, permanent and key part of the long-range and short-range planning activities conducted by the various agencies involved in the transportation planning process at every level of the network. The safety needs of each level of the network from the local to state must be assessed and related to other levels of the network to create a seamless continuity of safety planning that is fully integrated with established planning procedures. The agencies involved include departments of transportation (DOTs), MPOs, transit agencies, local governments, and special district agencies. It is also necessary for planning agencies to relate to external agencies and organizations which have programs relating to safety planning. These include service organizations, commercial organizations and non-governmental organizations (NGOs). All of these relationships must be recognized and strengthened to accommodate the consideration of safety issues.

The many agencies involved need to adopt a common safety vision with safety goals and objectives that are not only explicit and pro-active, but also quantifiable and quantified. It is the creation of clearly quantified goals and objectives that leads to a common commitment to track and achieve those goals and objectives. NCHRP Report 501, by Bahar et al., provides additional guidance to integrate all stakeholders in a systematic and proactive process (*2*).

State DOTs are responsible for establishing long-range goals and objectives for their transportation systems. MPOs develop long-range goals and objectives for the metropolitan areas.

As the introduction of explicit safety in transportation planning (safety conscious planning) is relatively new, (*3*) there is little quantitative information on its accident reduction impact and potential. Safety conscious planning is discussed in Section 7.2.2.

Exhibit 7-1: Resources examined to investigate the safety effects of incorporating safety into the transportation planning process

DOCUMENT	DESCRIPTION	COMMENT
(*1*) Washington, S., Meyer, M., van Schalkwyk, I., Dumbaugh, E., Mitra, S., and Zoll, M., "Incorporating Safety into Long-Range Transportation Planning." NCHRP Report 546, Washington, D.C., National Cooperative Highway Research Program, (2006)	The final report was reviewed when it was published in 2006.	Added to synthesis. Little or no quantitative information.
(Washington, S., Meyer, M., van Schalkwyk, I., Dumbaugh, E., Mitra, S., and Zoll, M., "Draft Guidance: Incorporating Safety into Long Range Transportation Planning." NCHRP 8-44, Washington, D.C., National Cooperative Highway Research Program, (2004) pp. 1-65, plus Appendix, Exhibits.)	The draft report is a guidebook that provides overall direction on how safety is integrated into the transportation planning process.	Superseded by NCHRP Report 542
(*4*) Lamptey, G., Labi, S., and Sinha, K. C., "Investigating the Sensitivity of Optimal Network Safety Needs to Key Safety Management Inputs." No. TRB 2005 Annual Meeting CD-ROM, Washington, DC, Transportation Research Board, (2005) pp. 1-21.	The paper combines engineering principles with economic evaluation to assess the long-term safety needs of a network and the optimal level of funding required to address the safety needs.	Added to synthesis. Little or no quantitative information.
(*2*) (Bahar, G., Masliah, M., Mollett, C., and Persaud, B., "NCHRP Report 501: Integrated Safety Management Process." Washington, D.C., Transportation Research Board, National Research Council, (2003))	Development of an Integrated Safety Management Process.	Added to synthesis. Little or no quantitative information.
(Petzold, R., "Proactive Approach to Safety Planning." Public Roads, Vol. 66, No. 6, McLean, Va., Federal Highway Administration, (2003) pp. 1-8.)	The paper discusses safety-conscious planning and the value of taking a proactive approach to improve safety.	Added to Section 7.2. Little or no quantitative information.
(*5*) (Lord, D. and Persaud, B. N., "Estimating the safety performance of urban road transportation networks." Accident Analysis and Prevention, Vol. 36, New York, N.Y., Elsevier Ltd., (2003) pp. 609-620.)	The paper describes the application of models designed to prevent unsafe situations from arising by allowing planners to estimate the number of crashes on digital or coded urban transportation networks.	Added to synthesis. Little or no quantitative information.
(U.S.Department of Transportation, "Considering Safety in the Transportation Planning Process." Washington, D.C., U.S. Department of Transportation, (2002))	The report's focus is on incorporating safety into the transportation planning process for the multimodal transportation system and on providing planners with information and techniques to better understand the role of safety within this process.	Not added to synthesis. Little or no quantitative information.
(Litman, T., "Traffic Calming: Benefits, Costs and Equity Impacts." Victoria Transport Policy Institute, (1999)	This paper describes a framework for evaluating traffic calming programs.	Added to Section 7.4. Little or no quantitative information.
(Tarko, A. P., Sinha, K. C., and Farooq, O., "Methodology for Identifying Highway Safety Problem Areas." Statistical Methods and Accident Analysis for Highway and Traffic Safety, Transportation Research Record 1542, Washington, DC, Transportation Research Board, (1996) pp. 49-53.)	The paper develops a methodology that can be used to identify locations and areas that need safety treatment.	Not added to synthesis. Little or no quantitative information.

7.1.1. Incorporating Safety into the Transportation Planning Process

Integrating safety into transportation planning affects every aspect of the transportation planning process. To reduce the number of accidents and their severity, and to increase the safety of the road network through an integrated and pro-active approach, it is necessary to consider safety at every stage of the planning process. Safety must be part of the planning, implementation and evaluation of the transportation network.

NCHRP Report 546, by Washington et al., describes current thinking and progress towards a transportation process that fully recognizes and integrates safety(*1*). They point out that it is important that the evaluation of safety implications takes place during the first steps of the transportation planning process, not when the process is already well established(*1*). Washington et al. propose using key planning steps to integrate safety into the entire transportation planning process(*1*).

The objective of Washington et al.'s research "was to develop a guidance manual for practitioners that identifies and evaluates alternative ways to more effectively incorporate and integrate safety considerations in long-range statewide and metropolitan transportation planning and decision-making processes ((*1*), pg iv). The authors envisage a seven step process for incorporating safety considerations into transportation planning in a comprehensive manner(*1*). "Safety" is defined to "include all externalities of the transportation system that result in personal harm—including both physical and emotional—such as minor and severe injuries and fatalities, and for all system users such as pedestrians, bicyclists, transit riders, motorists, and commercial vehicle operators" ((*1*), pg vii).

The creation of the vision and the identification of strategies that can increase the safety of the road network first require an understanding of the nature of the safety problems faced. This understanding needs to include both the "big picture" and the specific issues facing a particular regional or local area. Examples of specific issues include run-off-the road crashes in rural areas, pedestrians and bicyclists in some urban areas, and the elderly in retirement communities. The nature of the problem will affect the vision and the type of strategies adopted to integrate safety into the transportation planning process.

The vision is the start of the process. Whether the vision is a broad statement of the desired end-state or a well-defined scenario, it provides the foundation for incorporating safety into the goal and objectives. The goal and objectives then provide a basis for identifying system performance measures, a "relatively new concept in transportation planning" ((*1*), pg 22), and the data needed to evaluate progress towards the goal and objectives.

It is likely that as safety becomes better integrated into the transportation planning process, safety will have a greater influence on strategies and projects. As the quality of data and the sophistication of analysis improve, it will eventually be possible to create models that estimate the safety of the network. This will enable planners to make quantitative comparisons of strategies.

7.1.2. Seven Key Steps for Incorporating Safety into the Transportation Planning Process

Washington et al. discuss seven key steps that are required to incorporate safety into the transportation planning process (*1*). These steps are:

Step 1: Incorporate Safety into the Vision Statement

Step 2: Incorporate Safety into the Set of Goals and Objectives

Step 3: Incorporate Safety into System Performance Measures

Step 4: Incorporate Safety into Technical Analysis

Step 5: Evaluate Alternative Projects and Strategies

Step 6: Develop Plan and Program

Step 7: Monitor System Performance

7.1.2.1. Step 1: Incorporate safety into the vision statement

The process of planning a safe network needs a vision that is made clear and realistic. The definition of goals and objectives will "serve to direct subsequent planning activities for assessing the relative contribution of different alternatives or strategies in achieving desired outcomes" ((*1*), pg 21). Safety professionals and advocates should be involved from the outset.

The vision statement refers to the desired characteristics of future travel experiences. Washington et al. give the example of Oakland, California's vision statement: "The highest aim of the Metropolitan Transportation Commission is to plan for, deliver and manage a safe, efficient, integrated multimodal transportation system for the San Francisco Bay Area".((*1*), pg 28). Although very broad, this statement includes safety and is probably the result of an extensive consultation process that brings safety issues to the attention of many agencies and the public. The vision statement provides a reference for all future debate and decisions.

7.1.2.2. Step 2: Incorporate safety into the set of goals and objectives

The goals and objectives should explicitly address the main safety issues facing the region, including those relevant to non-motorized users. The goals and objectives should be developed with an integrated approach including the enforcement, education and emergency aspects needed to support the safety initiatives. With safety clearly built into the planners' goals and objectives, safety can play an important role in comparing and evaluating different transportation projects.

Goals have traditionally been general, but it is now recognized that goals should be measurable, and that any targets specified (such as a 20% reduction in fatal accidents) should be realistic and achievable.

Examples of traditional safety goals include:

- Increase highway safety; and
- Provide for a safe and effective circulation system that minimally impacts the area's open space, and scenic roadways.

AASHTO's Strategic Highway Safety Plan provides a good example of an explicit and quantifiable goal: "To reduce the number of fatalities from traffic crashes by 5,000 to 7,000 lives annually" (*2*). A quantifiable goal will enable the small contributions of each one of the identified objectives and strategies toward achieving this goal to be noted.

Objectives are more precise and measurable than goals can be. Examples of safety objectives include:

- Reduce fatal run off the road accidents in the region by 10 percent over the next three years;
- Reduce drug and alcohol related accidents by 25 percent within 5 years; and
- Reduce pedestrian and bicycle related injuries and fatalities by 50 percent.

7.1.2.3. Step 3: Incorporate safety into system performance measures

Safety performance measures should be designed to ensure that the planning process and its results are accountable. “Performance measures are used to monitor the characteristics of transportation system performance and to determine the extent to which desired goals and objectives are being achieved” ((*1*), pg 32). Performance measures can provide quantitative information on the safety impact of land use and transportation network planning decisions and useful information that can be used to refine the action plans should this become necessary, or alternatively modify the originally set goals and objectives. As data become available, it should be possible to “develop a state or regional strategy for monitoring the safety of the multimodal transportation system” to identify problem areas pro-actively ((*1*), pg 60). This monitoring strategy will include safety information that will raise the priority of safety-beneficial projects and increase the likelihood of such projects being incorporated into the network.

“Evaluation of system performance has traditionally relied on measures of congestion, travel delay, traffic volumes, and measurements of the condition of such things as pavements and bridges” rather than specific safety measures ((*1*), pg 32). To be successful, the safety performance measures must be valid indicators of safety based on good data and analysis. These examples are from the Minnesota Statewide Transportation Plan:

- Number of accidents per vehicle-mile traveled;
- Number of accidents between cars and trains at railroad crossings; and
- Total number of roadway fatalities ((*1*), pg 33).

Other examples might include “normalized accident rate performance measures (e.g., fatal crashes per million vehicle miles of travel), unit costs and cost-effectiveness measures (e.g., dollars invested in countermeasure), alcohol and drug involved crashes (e.g., number of intoxicated young drivers) and some other measures (e.g., restraint usage rates)” ((*1*), pg 34).

Safety performance measures should be included in the evaluation criteria used to compare projects and strategies. Washington et al. suggest discussing the safety-related performance measures with transportation modelers “to determine if the measures can be predicted in future years” and used to forecast the safety performance measures of alternative approaches and scenarios ((*1*), pg 34). Planners should prepare “Prepare a set of prototypical safety-related performance measures that reflect the goals and objectives [that have been adopted for the planning effort]. This set should be limited in number to only those measures that provide critical information on the safety performance of the transportation system and that could presumably be affected by the types of strategies that will result from the planning process” ((*1*), pg 34).

Washington et al. provide an example of the use of safety performance measures in Minnesota where trend-based projections were used to show that the number of road fatalities was likely to rise from 604 per year to 735 per year. The introduction of moderate enforcement measures was expected to reduce the number of fatalities to 550. Similarly, Bahar et al. provide detailed descriptions of examples of the application of performance measures (*2*).

7.1.2.4. Step 4: Incorporate safety into technical analysis

Technical analysis uses safety data and appropriate models and tools to identify problems within the system and to assess the strategies available for addressing the problems. Comprehensive, timely and high quality data are essential, but may not always be available. Washington et al. refer to the importance of quality data through their report.(*1*) New data collection methods, including GIS, may ease some of the problems. Bahar et al describe best practice suggestions for databases (Appendix B2) (*2*).

Many safety analysis tools are becoming available. The choice will depend on data availability, the scale of the analysis (local, corridor, regional), amount of prediction required, the degree of uncertainty, the time available, the number of modes included in the analysis, and so on. Washington et al. list the tools available in their Appendix C and summarize the purpose, level of detail and amount of expertise needed for each one(*1*). Similarly, Bahar et al. provide an appendix with examples of the application of various tools for the incorporation and evaluation of safety after the implementation of selected strategies (*2*).

As Washington et al. point out, "project and corridor-level safety tools have been available for some time and are used in many safety studies", but safety prediction models and "regional level planning tools …. are not as readily available" ((*1*), pg 43). Methods and tools are required to predict long-range safety performance and enable planners to be proactive in formulating solutions to safety problems.

Washington et al. describe the work currently taking place to develop PLANSAFE as an accident forecasting tool in Arizona ((*1*), pg 129). PLANSAFE uses population growth and various "built" scenarios to forecast the expected number of fatal, injury, pedestrian and total crashes over ten years in small traffic analysis zones (TAZ) and neighborhoods (collections of TAZ). Washington et al. provide an interesting list of the factors incorporated into PLANSAFE to capture "most of the major factors involved with crashes at the TAZ level" ((*1*), pg 149). The factors include weather (proportion of wet/icy/snow/foggy/sunny days per year), the proportion of various high risk driving populations (young, elderly, unemployed, DUI records), issues affecting high-risk non-motorized populations (number of crosswalks, number of school, sidewalk mileage, bicycle facilities), facilities' speed, design and access control (proportions of local/collector/arterial/rural highway/interstate mileage), and the number of potential conflicts on the network (signalized/unsignalized intersections, intersection density, total area). The model offers predictions to show when and where an outcome occurs.

As accident forecasting models are further developed, it should be possible to compare and predict the safety impact of major long-range transportation planning decisions that influence the safety of the transportation system. Major strategies include:

- Reducing travel exposure by using land use arrangement and density to reduce the need to travel and the distance traveled in the course of their daily activities;
- Encouraging travelers to use the safest modes; and
- Encouraging travelers to use the most appropriate and safest facility for each trip so that travelers' exposure to conflicts is reduced during their journeys.

It should also be possible to provide quantitative assessments of the way in which changes on one part of the network may lead to safety impacts elsewhere on the network so that these impacts can be evaluated and the trade offs analyzed.

Few studies have as yet successfully tackled network wide safety analysis. An exception is the work of Lord and Persaud. In 2004, Lord and Persaud published research into developing a tool that would help to prevent unsafe situations from arising by allowing planners to estimate the number of crashes on digital or coded urban transportation networks (*5*). Like PLANSAFE, Lord and Persaud's approach offers simple accident predictions rather than explanations of accident occurrence. Their paper provides many insights into the problems involved in modeling and predicting accidents at the network level.

Lord and Persaud conducted a literature review, but found very few publications on the application of safety performance functions (SPFs) to transportation networks. The research available had limitations. For example, models were often not calibrated or validated for the networks studied. Lord and Persaud focused on the macroscopic representation of physical networks and the application of SPFs (*5*).

Lord and Persaud used Toronto, Canada data from 1990 to 1995 to develop SPFs for nodes and links (mid-block and at minor intersections). The researchers pointed out that several years of data are needed to take into account year to year accident variations due to economic conditions, weather, reporting practices, etc. Their models are for all accident severities combined. The models were applied to two sample networks (*5*):

- A small street system in Toronto (six links, six nodes, one centroid); and
- A hypothetical network, 4 km wide by 2 km long (18 links, 15 nodes, 6 centroids, with 9,800 vehicle-trips assigned to the network).

The network representations were macroscopic, excluding local (residential) roads and layouts (which were considered to be microscopic networks). As Toronto is laid out on a grid, the study did not cover a radial layout or curving roads.

Lord and Persaud concluded that ((*5*) pg 615):

- The models predicted values similar to true accident counts; and
- Traffic flow explained over 50% of crash occurrences.

Lord and Persaud aimed to estimate the safety of different scenarios even before the detailed characteristics of the physical network were known. They concluded that it is feasible to estimate the safety of transportation networks at the planning stage, that SPFs can be used to estimate crashes on digital transportation networks and that the models used in their study provide a good start (*5*). Traffic flow was by far the most important variable. With further refinement of Lord and Persaud's approach, planners could use the tool to plan site specific measures and redistribute traffic on network, and optimize the occurrence of accidents on critically affected links and nodes.

Lord and Persaud also list some important issues and problems that arise in attempting to predict the safety of a network (*5*):

1. Prediction of traffic flows – transportation planning software may give inaccurate traffic flows and lead to inaccurate appraisal of network safety.
2. Applicability and accuracy of SPFs – The SPFs used in the study were developed for Toronto and would have to be recalibrated for other jurisdictions.
3. How the network is coded – The relationship between segment length and accident counts is non-linear. Where links are sub-divided into many segments, the model must be adjusted to avoid over-estimation of accidents on links.
4. Road changes – The modification of a road characteristic is likely to affect the road's safety. For example, when a road is widened, there may be changes in land use along the road and these may lead to additional minor intersections and driveways, but the models are unlikely to capture these changes. Lord and Persaud feel that it is possible to develop more detailed models, but it is difficult to obtain readily available and reliable information about the physical characteristics of the network. This is a serious constraint. As it is difficult to know the land use and physical characteristics of roads and intersections at the planning stage, it is difficult to apply detailed models. Lord and Persaud also point out that their models may not apply in the long term as factors that influence crashes (economic conditions, new laws, bye laws, etc) change over time.

5. Networks that are not yet built – Lord and Persaud's models need data on minor intersections and links, but it may not be possible to know the exact location of minor intersections and links on networks that are not yet built. A general purpose model is needed.
6. Software – The models were calculated on spreadsheets as they could not be used within existing transportation planning software. The computation requirements were very cumbersome. There is a need to develop transportation planning software that can accommodate accident prediction.

Washington et al. outline similar limitations on safety forecasting models ((*1*), pg 147).

Lord and Persaud provide a list of avenues for further research (*5*):

- Additional models for nodes (by crash type, time periods);
- Estimation of safety in the zones not included in the models (i.e. local streets) to be used to predict total crashes for the study area;
- Simplification of computation of crashes on links (Lord and Persaud used a series of three models);
- Incorporation of finalized SPFs into transportation planning software;
- Investigation of how the use of AMFs to estimate minor changes in the network fits into safety research at the network level; and
- Investigation of network-based predictive models that consider the network as one entity.

The realization of those studies will enable planners to predict safety more explicitly and more accurately than is possible at present.

7.1.2.5. Step 5: Evaluate alternative projects and strategies

Evaluation comprises the process of comparing different courses of action and selecting the most beneficial. The process must be readily accessible both to decision makers and to the public.

A suitable evaluation methodology is necessary to make valid evaluations of alternative projects and strategies. Most safety evaluations are based on listing and ranking the evaluation criteria, or assigning scores or weights, or conducting a cost-benefit analysis. The evaluation criteria should be specified early in the planning process so the necessary data and tools can be made available. The performance measures defined in Step 3 are integrated into the evaluation and selection of alternatives.

Whether the evaluation is based on simple ratings or on far more complex procedures, it must be fair, open, and based on reasonable assumptions regarding, for example, estimates of accident costs. It must also be sensitive enough to analyze trade offs and to draw worthwhile distinctions between options.

It is important that the adopted goals and objectives be compared against the expected outcome of the alternative projects and strategies, as these are some of the activities contributing toward the goal or objectives. Bahar et al. provide a description of methodologies for the determination of level of implementation and success in meeting the goal and objectives (Appendix D3 of (*2*)).

Lamptey et al. (*4*)have recently developed an approach that agencies can use to assess the long-term safety needs of a network using a comprehensive and system wide methodology . "The paper addresses the issue of optimal funding amounts to address the safety needs for physical highway infrastructure for a state highway network" ((*4*) pg 18). The study used data from Indiana's state highway network.

Lamptey et al.'s approach combines engineering principles with economic evaluation and business practices. The study finds that the projects proposed for the state of Indiana "on the average, a total of 107 crashes (36 fatal/injury and 71 PDO) are expected to be saved for every $1 million increase in average safety expenditure" ((*4*) pg 15).

The researchers investigate the impact of different levels of funding on network safety. They note that the definition of safety needs varies with the method used to identify locations requiring safety measures and the economic evaluation criteria used. They also note that the benefits of safety improvement projects are non-linear: crash reductions per dollar spent decline after a certain point. Lamptey et al. suggest that their approach can be used to determine the optimal level of funding and to compare that level of funding with current expenditure. They estimate that the optimal funding on the physical infrastructure of the Indiana state highway system they examined would imply "an average annual amount of $450 per mile from 2005 to 2015."

7.1.2.6. Step 6: Develop plan and program

The way in which safety projects are selected, prioritized and incorporated within transportation plans will critically affect how successfully safety is integrated into the transportation planning process(*1*). The plans must include clearly identified safety projects. These projects must be consistent with the goals, objectives and performance measures of any other safety plans that may be introduced in the area.

There are many possible approaches. Washington et al. found that MPOs tend to include general traffic management and pedestrian and bicyclist safety in their transportation plans. DOTs tend to include general traffic management, pedestrian and bicyclist safety, and intermodal crossings. Washington et al. offer a far wider range of safety issues that should be included ((*1*), pg 54). Examples include:

- Targeting specific groups for education efforts (elderly drivers, transit, work zones, etc);
- Enhancing traffic enforcement (safety audits, traffic management, etc);
- Improving data collection and management; and
- Maximizing personal vehicle safety (seat belts, aggressive driving, weather issues, DUI, etc.).

Many states have developed detailed strategies and actions for their safety plans.

The choice of projects for transportation improvement programs will depend on negotiations with stakeholders and also on prioritization procedures. When safety issues are explicitly recognized and safety effects are quantified, the priority given to safety projects in the selection process will increase.

7.1.2.7. Step 7: Monitor system performance

It is essential to establish whether safety goals are being achieved. The safety performance of the transportation plan must be monitored using good quality data and an effective safety management system to highlight the successes and to facilitate changes to strategies. The feedback should be used to refine the plan's goals, objectives, performance measures, problem identification, project analysis and evaluation. {Washington, 2006 3469 /id}

Bahar et al. describe nine methodologies for the monitoring of the outcomes of implementation of selected strategies (Appendix D1 (*2*)).

7.1.3. Summary

The integration of safety into transportation network planning continues to make progress towards the goal of inherently safe road networks. Milestones and important developments include recent legislation (TEA-21 in 1998 and SAFETEA-LU in 2005), and the on-going development of quantitative models and other tools that can be used to provide a quantitative assessment of the impact of safety projects and safety planning on the road network.

7.2. Safety in the Planning and Design of Residential Neighborhoods and Commercial Areas

This section discusses the safety issues involved in planning and designing residential neighborhoods and commercial areas. The safety planning of residential neighborhoods and commercial areas provide two good examples of the safety issues faced by those involved in the design of road networks at local levels of the road network. The explicit consideration of safety (in terms of the expected frequency and severity (and type) of accidents) during the planning and design stages (as discussed in Section 7.1) creates a proactive opportunity for all highway professionals to construct roadways that minimize the need for safety mitigation after construction is complete.

Two important approaches are available for ensuring safety is considered explicitly and proactively:

- Self-explaining roads; and
- Safety conscious planning.

Section 7.2.1 discusses self-explaining roads, which are especially relevant to the local level of planning. Section 7.2.2 discusses safety conscious planning in general. The principles are then related to residential neighborhoods and commercial areas (Section 0).

Exhibit 7-2: Resources examined to investigate safety in the planning and design of residential neighborhoods and commercial areas

DOCUMENT	DESCRIPTION	COMMENT
(*10*) (Arizona Department of Transportation, "Safety Conscious Planning: A New Concept." Phoenix, Ariz., Arizona Safety Conscious Planning Forum, (2002) pp. 1-14.)	The report summarizes the discussions of 40 experienced professionals regarding safety-planning for TEA-21.	Added to synthesis. Little or no quantitative information.
(Davis, G. A., Sanderson, K, and Davuluri, S., "Development and Testing of a Vehicle/Pedestrian Collision Model for Neighborhood Traffic Control." MN/RC - 2002-23, St. Paul, Minn., Minnesota Department of Transportation, (2002))	The study assessed the effect of vehicle traffic volumes and speeds on pedestrian safety in 25 residential streets.	Not added to synthesis.
(*12*) (Roberts, K., "Safety Conscious Planning - The Development of the Safer Transportation Network Planning Process." (2001))	The report addresses Safety Conscious Planning initiatives for developing inherently safe transportation networks.	Added to synthesis. Little or no quantitative information.
(*13*) (Depue, L., "Safety-Conscious Planning." E-C025, TRB Committee on Traffic Safety Management, (2001))	The report briefly discusses Safety Conscious Planning mainly in terms of administrative issues.	Added to synthesis. Limited qualitative information.

DOCUMENT	DESCRIPTION	COMMENT
(*14*) (Herrstedt, L., "A Vision for the Future - Safe Infrastructure." European Union, (2001))	The paper briefly examines self-explaining roads and forgiving roads in a European context.	Added to synthesis. Little or no quantitative information.
(*15*) (Bonneson, J. A., Parham, A. H., and Zimmerman, K., "Comprehensive Engineering Approach to Achieving Safe Neighborhoods." SWUTC/00/167707-1, College Station, Tex., Texas Transportation Institute, (2000))	The research investigated the problem of drivers diverting from busy arterials through residential areas where they create safety problems.	Added to synthesis. Little or no quantitative information.
(*16*) (Dijkstra, A., "Transforming 'Traditional' Urban Main Roads into Sustainably-Safe Roads." Washington, D.C., TRB, (2000))	The paper outlines Dutch recommendations for traffic in built-up areas and the principle of sustainable safe traffic.	Added to synthesis. Little or no quantitative information.
(*17*) (van Vliet, P. and Schermers, G., "Sustainable Safety: A New Approach for Road Safety in the Netherlands." Rotterdam, The Netherlands, Ministry of Transport, Public Works and Water Management, (2000))	The report discusses the history and principles of sustainable safety in Holland.	Added to synthesis. Little or no quantitative information.
(*18*) (Institute of Transportation Engineers, "The Traffic Safety Toolbox: A Primer on Traffic Safety." Washington, D.C., ITE, (1999))	The report is a convenient primer that provides readers with the safety personal knowledge and expertise of many authors.	Added to synthesis. Little or no quantitative information.
(West, J. and Lowe, A., "Integration of Transportation and Land Use Planning through Residential Street Design." ITE Journal, Vol. August, (1997) pp. 48-51.)	The paper examined overburdened residential street in Eugene, Oregon with the emphasis on the rigidity of development codes.	Not added to synthesis. No quantitative information.
(*19*) (Giese, J. L., Davis, G. A., and Sykes, R. D., "The Relationship Between Residential Street Design and Pedestrian Safety." Boston, Mass., Institute of Transportation Engineers, (1997))	The study investigated whether physical and/or perceptual elements of residential streets affect vehicle speeds.	Added to synthesis. Little or no quantitative information.
(*22*) (Hunter, W. W., Stutts, J. S., Pein, W. E., and Cox, C. L., "Pedestrian and Bicycle Crash Types of the Early 1990's." *FHWA-RD-95-163*, McLean, Va., Federal Highway Administration, (1995))	Review of pedestrian and bicycle crashes.	Added to synthesis. Little or no quantitative information.
(Wegman, F., "Safety Effects of Road Design in Europe." D-96-14, (1996))	The report discuses road design standards and traffic regulations in Europe.	Not added to synthesis. No quantitative information.
(*20*) (Theeuwes, J., "Self-explaining roads: An exploratory study." (1994))	The study investigated improvements for self-explaining roads based on the driver's visual search process while driving.	Added to synthesis. Little or no quantitative information.

The design and safety of residential neighborhoods require special consideration due to the presence of particularly vulnerable road users: pedestrians, children, the elderly, and bicyclists. In the past, most residential areas were relatively safe, and residential streets carried local traffic and low traffic volumes. With increasing traffic volumes, parks and community centers provided a safe alternative for children's playing and for local social activities. As traffic continued to increase, walking or cycling to parks and community centers became challenging and required special facilities for non-motorized and vulnerable users.

Fewer people nowadays rely on small local amenities (such as stores, schools or workplaces) to which they can safely walk. Schools that served the immediate community have been replaced by large schools with wide catchment areas. Many residential streets are wide and over designed for their desired function and role in modern shared-space residential neighborhoods. Residential streets can often accommodate large local and non-local volumes of traffic moving at high speeds. Higher volumes and operating speeds have led many communities to demand greater safety in their residential areas. Communities want lower traffic volumes and lower operating speeds.

In business and retail commercial areas, concern about decreasing safety on arterials and collectors has demanded attention and the introduction of traffic management measures that will sustain the vitality of the businesses. Small local shopping areas have been replaced by larger stores which are often accessible only by car and which raise the question of the safety of location and internal design of commercial areas.

One-way and turn restrictions (Section 7.3), traffic calming measures (Section 7.4), and access management policy (Section 7.5) provide some mitigation and "fix" measures to help achieve safer environments for all road users within existing residential and commercial areas.

The evidence presently available regarding the best choice of urban layout and some types of road design is mostly qualitative, anecdotal and sometimes somewhat based on personal philosophy. Very limited quantitative information was found. Research is required to quantify the safety impact of medium and local level planning decisions on a wide variety of network settings, road types, and traffic volumes.

7.2.1. Self-Explaining Roads

The concept of self-explaining roads was introduced in Holland in the 1990s. Highway professionals sought ways to promote a self-enforcing and harmonious environment for all road users. Self-explaining roads use design and appearance to provide consistent and correct information about the function and role of the road, encouraging drivers (and other road users) to adjust their speed and behavior in response to the adjacent land use and environment.

"The aim should be to create a simple and unambiguous, clear and understandable, readable and recognizable traffic situation – easy to handle for the road users – without too many distracters and information overload – and leaving no doubt about the reasonable speed level, the give-way situation, location and movement of other road users around. The aim is simplicity and clearness instead of complexity and ambiguity!" (*14*)

Self-explaining roads are intended to reduce driver errors and crashes by ensuring that safety is built into the road environment. The design of the road environment is adapted to meet the limitations of human information processing and to match driver expectations and experience. From their experience of various road environments, road users develop "prototypical representations of different road environments" ((*20*), pg 5). A self-explaining road is designed to meet these expectations. Freeways, for example, provide a clear and immediate mental image of the type of driving and driving speed to be expected. Giese et al., in their study of the relationships between street elements and vehicle speeds, investigated whether the physical and/or perceptual elements of residential streets were important (*19*). Giese et al.'s recommendations include "shorter" street lengths for new residential developments (length not specified) and designs that create a sense of spatial enclosure as this appears to be associated with slower speeds on residential streets.

In a residential setting, the design of a self-explaining road may include familiar traffic calming techniques and various other measures, such as influencing driver behavior by changing the road surface (e.g., using colored road surfaces to distinguish bicycle lanes), introducing narrow street patterns, and removing visually intrusive signs.

7.2.1.1. Classification of self-explaining roads

The move towards ensuring that roadways are "self-explaining" requires roads to be appropriately classified. Some roadways may have to be reclassified and redesigned to conform to the self-explaining approach. Each level of classification must be designed to match the desired operating speed of the road. In the Netherlands, van Vliet and Schermers distinguished three categories of roads important to sustainable safety and self-explaining roads (*17*):

- Roads with a through function (for the rapid movement of through traffic);
- Roads with a distributor function (for the distribution and collection of traffic to and from different districts and residential areas); and
- Roads with an access function (providing access to homes and shops while ensuring the safety of the street as a meeting place. Roads with an access function are residential streets.).

Each road category requires careful design that matches its function and complies with the following three safety principles (*17*):

- Functionality (preventing unintended use of the infrastructure);
- Homogeneity (preventing major variations in the speed, direction, and mass of vehicles at moderate and high driving speeds); and
- Predictability (preventing uncertainty among road users).

The van Vliet and Schermers report emphasizes the distinction between roads with a through function and roads with an access function, "roads with an access function should not offer time-saving connections to through traffic (that is: traffic traveling to or from a location outside the immediate area); and roads with a through function should not offer direct access to homes, schools, offices, factories, sports facilities, etc." (*17*).

Bonneson et al. investigated safety in residential neighborhoods, especially the problem of poor differentiation of streets according to traffic function (*15*). Bonneson et al. were concerned about motorists diverting from slow, crowded arterials to the residential street system where they add to neighborhood traffic volumes and increase crash exposure for pedestrians, bicyclists, and other vehicles. The researchers focused on various "fix" treatments implemented to achieve a more self-explaining road network including neighborhood traffic management techniques (street closures, speed humps, traffic circles, and roadway narrowing) and corridor traffic management techniques to increase arterial travel speed (signalization improvements, geometric improvements, and access management). Bonneson et al. noted that the traffic management techniques reduced both traffic volumes and crash rates (*15*).

7.2.1.2. Self-explaining roads in residential areas

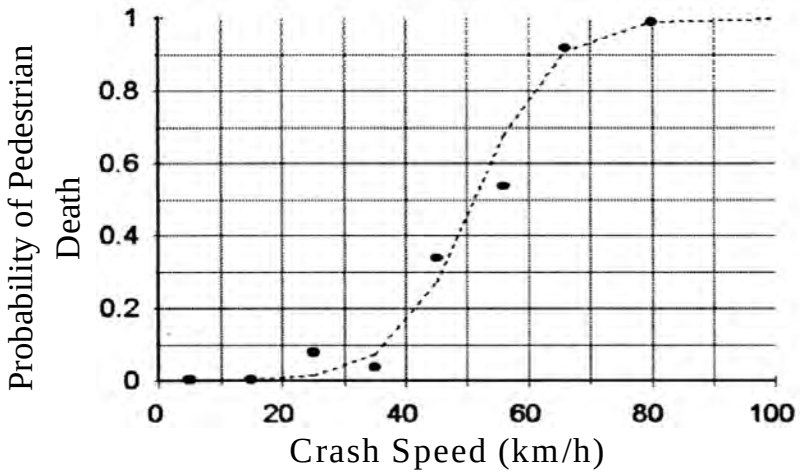
The design of self-explaining roads gives drivers a clear view of other road users. Drivers using self-explaining roads in residential areas expect to encounter children, pedestrians and bicyclists from the "look" of the road and its surroundings. According to the NHTSA report "Traffic Safety Facts 2000", fatal pedestrian crashes are most commonly due to improper crossing of the roadway or intersection (30%), followed by walking or playing in the roadway (*21*). Hunter et al. found that the main human factor problems contributing to pedestrian crashes included the limited time that drivers have to respond to unanticipated pedestrian movements, blocked vision, inadequate searching and checking by pedestrians and drivers (especially on left turns), speeding, and pedestrians assuming that they are far more visible than they actually are (*22*).

(Additional information about pedestrian safety is available in Section 3.3 Pedestrian and Bicyclist Safety on Roadway Segments, Section 4.3 Pedestrian and Bicyclist Safety at Intersections, and Section 5.3 Pedestrian and Bicyclist Safety at Interchanges. Future editions of the HSM may also include additional discussion about bicyclist and pedestrian facilities in Chapter 6.)

In 1984, Holland decided that "residential areas should be transformed into zones with a speed limit of 30 km/h"(*16*). Residential areas are designated as 18 mph (30 km/h) zones and have been found to be "relatively safe … despite considerable variation in the directions and mass of vehicles using them. Their safety [is] attributable to driving speeds and small speed differences between different road users" (*17*), pg 10). The Dutch have continued to work towards implementing appropriate measures in residential areas to support the 18 mph (30 km/h) zoning. From 1998 to 2001, there was a plan to add "at least 12,000 kilometers of infrastructurally adapted 30 km/h roads" (*17*), pg 14).

The lower vehicular speeds along self-explaining roads are particularly important for pedestrian safety and reduce the difficulties of pedestrians who are seeking appropriate crossing gaps in traffic. Pedestrians are especially at risk as vehicle speeds increase. Exhibit 7-3 shows how the relationship between speed and the probability of a pedestrian fatality rises rapidly when the crash speed exceeds about 18 mph (30 km/h) (*23*).

Exhibit 7-3: The relationship between speed and the probability of pedestrian fatality (23)



Children are highly vulnerable to speeding traffic. Research suggests that children do not have the maturity needed to cross the street safely until they are 9 to 12 years old (Sandels, 1966 as cited in (*24*)). Children are often impulsive and unpredictable with short attention spans and little understanding of danger. They may dart into traffic without thinking. Children lack the experience necessary to judge speed, vehicle approach time, and gaps in the traffic.

The Dutch have selected four demonstration projects to determine the effects of the concept of self explaining roads and sustainable safety. van Vliet and Schermers also mention 13 pilot areas where the creation of 18 mph (30 km/h) self explaining roads improved safety and the quality of life. In these pilot areas, a study found that (*17*), pg 20):

- The number of movements by motor vehicles fell by 20 to 30%;
- The number of accident casualties declined by 30% on average; and
- 80% of local residents were satisfied with the creation of an 18 mph (30 km/h) zone.

It is clear from the Dutch experience that detailed knowledge about driver perception of residential road environments can be used to influence driver behavior through changes in road design and traffic control strategies. The design of a self-explaining road can elicit safe behavior by encouraging and persuading drivers to reduce speed voluntarily and more or less automatically in response to the design itself.

There is some evidence of increased safety after the implementation of the self-explaining roads, but there are no AMFs at this time.

7.2.2. Safety Conscious Planning

Safety Conscious Planning (SCP) is a comprehensive, system wide and proactive process that integrates safety into transportation decision making for all transportation modes including walking, cycling, and transit. SCP aims to create safety planning procedures that are explicit and quantifiable. SCP is not limited to consideration of specific sites or “black spots”, but includes corridors and the entire transportation network at the local, regional, and state levels, as discussed in Section 7.1. SCP is also not limited to current safety problems, but aims to reduce the number of accidents by establishing inherently safe transportation networks by identifying opportunities to prevent future hazards and problem behaviors. On an inherently safe transportation network, it is difficult for the driver to have a crash. Road safety improvements are achieved through small changes, targeted at the whole network (*13*)

As discussed in Section 7.1, statewide and metropolitan planning agencies must consider the strategies and projects and that will increase the safety of the transportation network for motorized and non-motorized users. SCP assists transportation planners to consider safety more effectively, both in the long- and short-term transportation planning process.

“The short-term objective is to integrate safety considerations into the transportation planning process at all levels, specifically the Strategic Highway Safety Plans (SHSP), Statewide Transportation Improvement Programs (STIP) and the Transportation Improvement Programs (TIP) developed by the State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) respectively. This step should be followed by consideration of safety objectives in the longer range, 20 year plans that the state DOTs and MPOs are required to prepare and update periodically.(*13*)

Safety conscious planning is, by definition, comprehensive, network wide and multimodal. Almost every aspect of safety planning for residential and commercial areas can be considered in safety conscious planning terms.

Since safety conscious planning is a relatively new concept, definitive guidelines are not yet available and clear strategies to evaluate and determine their effectiveness are not yet developed.(*3*) There are no AMFs at this time.

Applying Safety Principles to the Planning and Design of Residential Neighborhoods and Commercial Areas

This section examines examples of residential and commercial planning issues that have received at least some safety analysis.

Discussion: Safety in the design and planning of residential areas

A list of principles has been proposed for new street patterns with a view to reducing accidents (*10*,*12*). The principles relevant to SCP for residential areas include:

- Differentiation of streets according to traffic function (clear distinction between arterial and local roads) with through traffic discouraged or eliminated, as introduced in Section 7.2.1 on self-explaining roads;
- Provision of facilities for motor vehicles, pedestrians and bicyclists including extensive pedestrian and bicycle networks and grade separated walkways to take pedestrians to bus stops on main roads;
- Consideration of the elderly road user;
- Layout designed to encourage low speed driving with driving at walking pace speed in some cases. Layouts are likely to include cul de sacs and very short streets (no longer than 100 m);
- No private driveways on arterial roads;
- Layout designed to discourage on-street parking as parked cars may increase risk of accidents;
- Small neighborhoods (about 500 houses) with no external traffic;
- Numerous playgrounds and green space areas available, traffic free;
- Separation of residential zones by car-free areas;
- Exclusive bus-ways; and
- Creating safe routes to school including connectivity with transit and other modal transfers, and appropriate site planning (for example, one ingress and one egress at school).

In the 1950s and 1960s, various British New Towns were constructed, often with many of the above principles in mind, especially extensive pedestrian and bicycle networks and/or exclusive bus-ways. The Traffic Safety Toolbox (1999) noted a greatly improved “safety index” in the New Towns compared with “old” (and larger) towns ((*18*), pg 23). Cul de sacs were found to be five to ten times safer for pedestrians, and especially for children, than other street patterns (Bennet G.T. and Markland J., “Road Accidents in Traditionally Designed Local Estates. Supplemental Report 394”, 1978 quoted by (*18*)). The Traffic Safety Toolbox also noted similar findings in Sweden.

Houten, Holland (population 32,000) was designed in 1979 using many of principles listed above. The town has twice as much bicycle and public transport use and 25% less car use than similar towns. Road traffic injuries are 70% lower than the national average in Holland and no fatalities have been reported ((*18*), pg 25, quoting: Kray J.H., “Dutch Approaches to Surviving with Traffic and Transport. Transport Review”, 1996).

Discussion: Safety in the design and planning of commercial areas

Most road users reach commercial areas using urban collectors and arterials. Dijkstra points out that although the speed recommendation of 18 mph (30 km/h) for residential streets is well established, the speed and safe design elements of "urban main/distribution roads are unknown or are at least not very clear" ((*16*), pg 61). Unknowns include network issues such as the network structure, the distance between junctions, and sight distances. Dijkstra favors the limited access type of network structure due to the decreased junction density which "will have a positive effect on the accident rate" ((*16*), pg 64).

Many factors are involved in creating overall principles for the safe design and speed recommendations for the network of urban collectors and arterials including road geometry (e.g., lane width and presence or absence of turn lanes and physical medians), operating speeds, and driveway and intersection traffic volumes.

With the increasing trend towards large stores providing a regional point of commerce attracting customers from various residential areas, it is important to have a systematic approach with early planning of the transportation network and the buildings in the commercial area. The site design may minimize the risk of conflicts both when vehicles approach the shopping area and when vehicles are within the shopping area by safely integrating the needs of vehicles, pedestrians, deliveries, parking, and buildings. Those who use the shopping area need accessibility to the shopping areas and safe and convenient circulation within the shopping area.

Although no quantitative information has been found on the design of shopping areas and their safe placement in the network, some safety conscious guidelines are presented:

- Intersections with municipal roads are provided at suitable locations that take into account the safety effects of different traffic volumes and speeds;
- Sequential decision making – as drivers reach the shopping area, the design of access points and other features follow a one-decision-at-a-time process:
    - Advance signing provides clear information allowing the driver time to select the shopping area as their destination and enter at the most appropriate access point;
    - On entering the shopping area, the driver is provided with the necessary information for reaching the specific store required. The route that provides access to a suitable parking lot near the destination is clearly distinguished. (Similarly, truck access points are clearly marked and differentiated from general public access); and
    - Once in the parking lot, the layout and choice of aisles provide customers with clear visibility of the area, avoiding confusion and frustration, and reducing driver delay.
- Driver expectations are met because the site design is similar to the design of other commercial sites;
- Roadways within the shopping area are consistent with urban roadway standards and treated like municipal roadways with respect to signs, and markings. Where possible, standard roadway geometry and lighting are used;
- Clear circulation routes provide safe, convenient and efficient circulation, minimizing conflict points and risk;
- Pedestrian routes are planned to encourage pedestrians to use sidewalks, crossings and properly designated areas to minimize conflicts with vehicles;
- Truck access and loading are separate from shoppers and their vehicles; and

- Parking provides suitable aisle width for safe maneuvering in and out of a parking stall, varied types and dimensions of parking stalls for users such as expectant mothers or family parking spaces, and the provision of handicapped parking stalls in accordance with the Americans with Disabilities Act (*25*).

Summary

The actual and perceived safety of many residential neighborhoods has deteriorated over the years as higher traffic volumes and higher operating speeds through wide residential streets have increased the number and severity of accidents. Reduced traffic volumes and lower speeds in residential areas are essential to the safety of local pedestrians, children, the elderly and bicyclists, all of whom are particularly vulnerable road users. Similarly, decreasing safety has been recorded along collectors and arterial streets used to reach major destinations such as schools and commercial areas. Two important approaches to improve the safety of the road network are self-explaining roads and safety conscious planning.

Self-explaining roads are designed to make the function, role and appropriate speed of a road immediately clear, recognizable and self-enforcing. Road design can complement and reinforce road users' perception of residential road environments in a way that encourages drivers to adjust their speed and in a way that encourages all road users to adjust their behavior appropriately. Holland has made considerable investments in self-explaining roads especially in residential areas, and designated areas are being expanded following clear procedures. The speed limit for residential self-explaining roads is 18 mph (30 km/h). Procedures for making self-explaining collectors and arterials remain less clear and are under development.

Safety conscious planning (SCP) involves the explicit, proactive and comprehensive implementation of measures known to improve safety. SCP is multimodal and concerned with the entire transportation network rather than localized problem areas only, although specific land and site planning with explicit safety in mind forms part of the comprehensive approach. The approach is intended to work towards a transportation network that is inherently safe and which avoids the need for mitigation projects to treat unsafe roadway conditions.

Self-explaining roads and safety conscious planning are relatively new and ambitious concepts intended to create broad and consistent road safety design principles for application in residential and commercial areas. Self-explaining roads in Holland have produced encouraging results with fewer vehicle movements and a 30% reduction in accident casualties in pilot areas, but there is limited quantitative information available as yet for assessing the impact of the concepts. Continuing evaluation and research are required to develop the guidelines needed to be able to correct the safety problems of existing areas, to ensure that safety problems are not built into future residential and commercial areas, and to quantify the safety impact of medium and high level planning decisions on different types of network, different road types, and various traffic volumes.

7.3. One-Way Systems and Turn Restrictions

One-way operations may include an area-system where all or most streets are affected, and may include corridor-systems where there are only a limited number of one-way streets. One-way systems may be found in both downtown and residential areas. Some one-way streets pass through both kinds of land use.

One-way operations are usually introduced to increase traffic capacity. One-way operations can improve safety under certain conditions (*18*).

One-way systems require careful thought and attention in their planning, design, and implementation to ensure that safety is maximized and that unintended consequences are avoided. Issues include the geometrics at the beginning and end of one-way segments, tapers, regulatory signs throughout, pavement markings, and suitable accommodation of turning movements at the beginning and end of one-way segments (*18*). One-way operations also require careful attention to their effect on the network surrounding them and the possibility that accidents are transferred to the neighboring area.

This section examines the safety impact of one-way operations and turn restriction in urban areas. The impact of closing streets and/or restricting traffic is also discussed.

Exhibit 7-4: Resources examined to investigate the safety effect of one-way operations

DOCUMENT	DESCRIPTION	COMMENT
(*26*) (Campbell, B. J., Zegeer, C. V., Huang, H. H., and Cynecki, M. J., "A Review of Pedestrian Safety Research in the United States and Abroad." FHWA-RD-03-042, McLean, Va., Federal Highway Administration, (2004))	Synthesis of past research, focused on pedestrian safety.	Added to synthesis.
(*27*) (Berkovitz, A., "The Marriage of Safety and Land-Use Planning: A Fresh Look at Local Roadways." Washington, D.C., FHWA, (2001))	The study examines the role that land-use planning plays in reducing traffic-related crashes, particularly for pedestrians and bicyclists.	Added to synthesis. Little or no quantitative information.
(*18*) (Institute of Transportation Engineers, "The Traffic Safety Toolbox: A Primer on Traffic Safety." Washington, D.C., ITE, (1999)).	The Institute of Transportation Engineers' Safety toolbox is a primer on many aspects of traffic safety, representing the personal knowledge, experience and expertise of members on how safety may be improved.	Added to synthesis. Little or no quantitative information.
(*28*) (Hart, J., "Converting Back to Two-Way Streets in Downtown Lubbock." Washington, D.C., ITE, (1998))	The study investigated the conversion of one set of one-way streets to two-way streets in the central business district of Lubbock, Texas	Added to synthesis. Little or no quantitative information.
(*29*) (Stemley, J. J., "One-Way Streets Provide Superior Safety and Convenience." Washington, D.C., ITE, (1998))	The study discusses the advantages and disadvantages of one-way streets and concludes that the advantages outweigh the disadvantages.	Added to synthesis. Little or no quantitative information.
(Institute of Transportation Engineers, "Traffic Engineering Handbook Fourth Edition." Vol. 4, Englewood Cliffs, N.J., Prentice-Hall, Inc., (1992))	The Institute of Transportation Engineers' Handbook brings together the state of the art in established transportation engineering practice.	Not added to synthesis.

Discussion: Conversion of two-way streets to one-way streets

Little quantitative information is available on the conversion of two-way streets to one-way streets. Both the qualitative and quantitative comments found in the literature are sometimes contradictory.

One-way systems have the following potential operational benefits:

- Elimination of two-way traffic conflicts on a street;
- Reduction in the large number of potential conflicts at intersections in a two-way system and eliminate left-turns of opposing traffic;
- Simplification of all turns;
- Possible reduction in waiting times for pedestrian at signals;

- Simplification of traffic control at intersections; and
- Facilitation of traffic signal synchronization and reduction in congestion. Platoons of traffic moving at the appropriate speed may travel the length of the street with few or no stops.

The following statements found in current literature provide some insight into the potential benefits of one-way systems in terms of general safety:

- Reduced congestion and fewer conflicts between traffic flows mean that "conversion to one-way operations can …. have a significant impact in improving safety as well as reducing congestion" (*18*);
- Reduced congestion may "bring about a reduction in rear-end accidents" (*18*). "Head-on and left-turn-from-the-street accidents between intersections will virtually disappear" (*29*);
- "Numerous studies have shown that the conversion of two-way streets to one-way operation reduces total accidents [by] 10 to 50 percent" ((*29*), pg 330-337). (This finding is taken from a 1967 study by Bruce, "One-way Major Arterial Streets. Improved Street Utilization through Traffic Engineering".);
- "A well planned and carefully designed system of one-way streets can be one of the most effective means of reducing accidents in an urban street network" ((*18*), pg 127, referring to Pignataro "Traffic Engineering Theory and Practice", 1973);
- Stemley mentions a New York City study (Karagheuzoff, 1972) that "reported an average reduction of 22 percent in intersection accidents after conversion to one-way street pairs in New York City" (*29*); and
- "The simplified operation of one-way streets is particularly helpful to elderly drivers and pedestrians [who] generally have slower perception and reaction times and reduced eye movements while searching the environment" (*29*).

One-way streets may provide potential benefits in terms of pedestrian safety, such as:

- Pedestrians deal with only one direction of traffic and may be less likely to take risks crossing the road as waiting times are reduced by simplified signal phasing at intersections ((*18*), pg 127, (*29*)); and
- Stemley mentions a New York City study (Wiley, 1959) that "found a 25 percent reduction in intersection pedestrian accidents at one-way street intersections after conversion from two-way operation" (*29*).

Potential safety concerns with one-way systems include:

- Increased vehicle speed;
- Increased sideswipe accidents due to increased weaving (from lane to lane or when finding a parking space);
- Inconvenience for drivers who must drive one or more blocks out of their way to reach their destinations;
- Possible confusion, difficulty and delay in reaching the destination, especially for drivers new to the area;
- Difficulties for pedestrians crossing fast moving traffic;
- Longer walks for bus users to reach destinations and bus stops;
- Confusion among some bus users when finding the return service; and
- Emergency vehicle operation through one-way street systems.

Discussion: Conversion of one-way streets back to two-lane, two-way streets

Stemley (1998) noted that many one-way street systems were introduced 30 or 40 years ago before many downtown city areas declined, losing retail activity and losing pedestrian and vehicular and volumes. “Even in cities where congested streets now exist during many hours of the day, critics of a one-way street system recite perceived disadvantages, believe that the disadvantages outweigh any advantages and argue a change must be made for the good of the community” (*29*). Stemley supports one-way systems and concluded that “by changing to a two-way system, a large backward step will be taken which will result in a downtown that is less inviting than it is now” (*29*).

Berkowitz, however, discusses a case of a pair of one-way streets where the problems associated with the one-way system led to the streets being rebuilt and converted back to two-lane, two-way streets (*27*). In this example, the pair of one-way streets passed through the town's business district. The streets also passed through a residential area. Each street had three 11 ft (3.4 m) wide lanes with parallel parking allowed on both sides of the street except during rush hours. The average traffic speed was almost 35 mph (56 km/h). In the business district, there were traffic signals at intersections; in the residential area, the cross streets were stop-controlled. Most accidents along this corridor were sideswipes and rear-ends at the signalized intersections, or sideswipes associated with traffic turning or crossing from the cross streets. Almost all of the accidents were property damage only crashes, and a few resulted in injury. Residents complained about high-speed traffic passing through their neighborhood and children having to cross one or both of the major thoroughfares if they walked to school (*27*).

The one-way streets were both converted to two-lane, two-way streets with a 10.5 ft (3.2 m) lane in each direction, two 5.5 ft (1.7 m) bike lanes, and parallel parking without rush-hour restrictions on both sides of the street. The sidewalks were widened, and some trees and benches were added in the business district. “Zebra” patterned crosswalk markings with pedestrian warning signs were added to the two intersections closest to the school. The average speeds came down to about 25 mph (40 km/h). Berkovitz notes that the number of accidents remained about the same, but fewer resulted in injuries. Travel times for commuters by car increased slightly, but the number of bicyclists and pedestrians increased. In addition, some vehicular traffic was diverted to alternate routes (*27*).

In Lubbock, Texas, some one-way streets were converted back to two-way streets in 1995 due to business concerns and “the inconvenience of downtown travelers [having] to go several blocks out of the way to drive in the direction of their choice” (*28*). The change back to two-way streets was popular with the business community. The City of Lubbock found that “the number of accidents has increased by a small margin, but it has been no greater than the fluctuation from year to year” (*28*).

Discussion: Traffic Restrictions and Street Closures

Town centers and residential areas sometimes close streets to traffic or implement traffic restrictions. As noted in Campbell et al. (2004), a study in Upsala, Sweden by Lovemark (1974) evaluated certain downtown streets where some streets were closed to vehicles or subject to traffic restrictions (*26*). Defining “pedestrian risk” as the probability of a personal injury crash that could be predicted from serious traffic conflicts for various types of pedestrian and motorist behaviors, it was found that pedestrian risk declined 29% in the study area. Surrounding streets that were not affected by the traffic restrictions experienced a 30% increase in vehicular volume after restrictions were imposed, and a 12% increase in pedestrian risk (*26*).

Similar street closures and traffic restrictions in 19 areas of London (Brownfield et al., 1980 as cited in (*26*)) resulted in reduced pedestrian accidents at ten of the sites. Pedestrian crash rates remained stable at two locations. Overall, pedestrian crashes declined by 24.4%, although this change was not statistically significant.

Summary

The safety effects of one-way systems are not well documented either for the streets directly affected or for the surrounding area. The balance between the safety advantages and disadvantages of one-way systems compared with two-way systems is unclear.

Although one-way systems may lead to a reduction in accidents through reduced congestion and simplified turning movements, one-way systems can also lead to increased vehicle speeds and longer trips as some drivers may have to make additional turns and drive additional distances to reach their destination. The needs of pedestrians and transit users who may experience difficulties negotiating one-way systems may be a key consideration.

It is likely that the closure of streets to motorized traffic has an effect beyond the site. The overall effect for all road users is not known.

7.4. Area Wide Traffic Calming

As described in the Traffic Engineering Handbook, "the broadest interpretation of the term "traffic calming" has now expanded to mean the various ways of reducing the motor vehicle intrusion into and effects on urban life" ((*31*), pg 259). Traffic calming under this definition comprises a "process and a desired outcome" (*31*). Making safety an explicit and integral part of the long and short-range planning of metropolitan areas (Section 7.1), and the planning and design of residential and commercial areas (Section 7.2) will lead to an urban form consistent with the broadest definition of traffic calming, and to a safe, harmonious and integrated network for all road users.

Litman states that traffic calming which significantly reduces traffic speeds typically reduces crashes by 40%.(*7*)

Three levels of traffic calming are defined in ITE's Traffic Engineering Handbook:

- Level III (Metropolitan) Traffic Calming involves a global network planning approach of setting objectives with strategies and actions designed to achieve the goal of a reduction of travel. The metropolitan level of traffic calming can only be achieved by introducing appropriate measures into long and short-range plans (Section 7.1);
- Level II Traffic Calming relates to measures that bring the explicit consideration of safety to modifications to existing cross sections and land use adjacent to the arterial road system; and
- Level I Traffic Calming refers to the traditional approach to site-specific calming techniques and traffic calming deployed to the local street system.

Most area-wide traffic calming schemes focus on the management of vehicles by means of physical devices, and are typically found in residential areas, with the purpose of reducing traffic volume and driving speed on residential access roads (Level I). Numerous measures can be used to reduce traffic volume and driving speed: systems of one-way streets, street closures, vehicle restrictions, lane narrowings, bike lanes, mini-circles, speed humps, raised crosswalks, chicanes, rumble strips, pavement treatments, etc.

This section describes the safety effects of area-wide traffic calming schemes, mostly at the Level I classification of measures, as defined above. Many studies have evaluated the safety effects of area-wide traffic calming. Some researchers have made strong claims regarding the safety of traffic calming, but the type of traffic calming and the circumstances tend to be unclear(*7*). Much of the quantitative work on Level I traffic calming is European.

Exhibit 7-5: Resources examined to investigate the safety effect of area wide traffic calming

DOCUMENT	DESCRIPTION	COMMENT
(*32*) (Bunn, F., Collier, T., Frost, C., Ker, K., Roberts, I., and Wentz, R., "Area-wide traffic calming for preventing traffic related injuries (Cochrane review)." The Cochrane Library, No. 3, Chichester, UK, John Wiley and Sons, (2004))	Re-analysis of Elvik (2001).	Added to synthesis.
(*33*) (Christensen, P., "Area wide urban traffic calming schemes: re-analysis of a meta-analysis." Working paper TØ/1676/2004, Oslo, Norway, Institute of Transport Economics, (2004))	Re-analysis of Elvik (2001).	Added to synthesis.
(Forbes, G., "Synthesis of Safety for Traffic Operations: Final Report." Ottawa, Ontario, Canada, Transport Canada, (2003))	Synthesis presenting the best available evidence respecting the safety impacts of traffic operations	No new quantitative data. Not added to synthesis.
(*34*) (Elvik, R., "Area-wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects." Accident Analysis and Prevention, Vol. 33, No. 3, Oxford, N.Y., Pergamon Press, (2001) pp. 327-336.)	Meta-analysis of 33 studies evaluating the safety effects of area-wide urban traffic calming	Added to synthesis.
(*31*) (Institute of Transportation Engineers, "Traffic Engineering Handbook Fifth Edition." Washington, D.C., Institute of Transportation Engineers, (1999))	The Institute of Transportation Engineers' Handbook brings together the state of the art in established transportation engineering practice.	Added to synthesis.
(Ewing, R., "Impacts of Traffic Calming." Transportation Quarterly, Vol. 55, No. 1, Washington, D.C, Eno Foundation for Transportation Inc., (2000) pp. 33-46.)	This paper quantifies the kinds of impacts resulting from traffic calming measures of various types	Not reviewed. Duplicates report FHWA-RD-99-135 (see below)
(Ewing, Reid, "Traffic Calming: State of the Practice." Washington, D.C., Institute of Transportation Engineers, (1999))	An extensive document about the many aspects of Traffic Calming; Pg 109-112 – safety impact of traffic calming is briefly discussed. The author notes that all studies have not controlled for RTM and other factors.	Not enough information or data offered for AMF estimates – Not added to synthesis
(Catalano, V. V. and Schoen, J. M., "Neighborhood Traffic Management in Tuscon, Arizona." Chicago, Ill., Traffic Congestion and Traffic Safety in the 21st Century: Challenges, Innovations and Opportunities, (1997) pp. 21-27.)	Report based on a 5-year history of actual program evidence from technical studies and neighborhood input	No AMFs. Not added to synthesis.
(Zein, S. R., Geddes, E., Hemsing, S., and Johnson, M., "Safety Benefits of Traffic Calming." Transportation Research Record 1578, Washington, D.C., Transportation Research Board, National Research Council, (1994) pp. 3-10.)	Conducted a study of the safety benefits of traffic calming at four sites in Vancouver; also reviewed 85 case studies from Europe, Australia and North America	Reviewed by Elvik 2001. Too few data to be included in meta-analysis. Not added to synthesis.

Rather than reviewing each of these studies, this section will rely on three meta-analyses that have been made of relevant evaluation studies. These meta-analyses include one made by Elvik (*34*), a re-analysis of Elvik's analysis by Christensen (*33*), and a meta-analysis by Bunn et al. (*32*).

For the purposes of clarifying the terminology and data used in the studies presented here, the road system in an area is re-classified with some roads designated as main roads and others as local roads. Traffic calming measures are applied on local roads, whereas main roads are often upgraded to serve larger traffic volumes without an increase in accidents. Local roads are usually residential streets with two lanes and curb parking with a traffic volume below 2,000 veh/day. Main roads are usually wider, and may be two-lane or multi-lane undivided roads with a traffic volume between 5,000 and 30,000 veh/day. Land use along main roads is usually more commercial than the land use along local roads. A common speed limit is 31 mph (50 km/h). In general, the upgrading of main roads tends to rely on inexpensive measures like parking prohibitions, restrictions on turning movements at intersections and upgrading of traffic signals. These projects can be classified as Level I traffic calming measures. ((*31*), Table 9.1, pg 261).

Exhibit 7-6 lists the main findings of the three meta-analyses of studies that have evaluated the safety effects of area-wide traffic calming schemes.

Exhibit 7-6: Estimates of the effects on accidents of area-wide traffic calming schemes according to three meta-analyses of evaluation studies

Data summarised	Area and accidents influenced	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Meta-analysis by Elvik (2001)			
Best studies (10 estimates)	Whole area, injury accidents	0.890	0.050
Best studies (9 estimates)	Local roads, injury accidents	0.820	0.119
Best studies (9 estimates)	Main roads, injury accidents	0.934	0.061
Best studies (5 estimates)	Whole area, PDO accidents	0.861	0.038
Best studies (3 estimates)	Local roads, PDO accidents	0.729	0.109
Best studies (3 estimates)	Main roads, PDO accidents	0.952	0.060
Re-analysis of Elvik (2001) by Christensen (2004)			
Estimate generated by meta-regression model	Whole area, injury accidents	0.830	0.110
Estimate generated by meta-regression model	Local roads, injury accidents	0.820	0.267
Estimate generated by meta-regression model	Main roads, injury accidents	0.750	0.194
Estimate generated by meta-regression model	Whole area, PDO accidents	0.800	0.092
Estimate generated by meta-regression model	Local roads, PDO accidents	0.700	0.240
Estimate generated by meta-regression model	Main roads, PDO accidents	0.730	0.163
Meta-analysis by Bunn et al. (2004)			
Before-after with comparison group (8 estimates)	Whole area, fatal accidents	0.625	1.340

Meta-analysis by Bunn et al. (2004)			
Before-after with comparison group (16 estimates)	Whole area, injury accidents	0.890	0.102
Meta-analysis by Bunn et al. (2004)			
Before-after with comparison group (8 estimates)	Whole area, all accidents	0.950	0.145
Before-after with comparison group (8 estimates)	Whole area, pedestrian accidents	1.000	0.156

Elvik (2001) classified studies by the study design employed. Before-and-after studies using a matched comparison group were rated as best. If adequately matched by previous accident history, these studies will control both for regression-to-the-mean and long-term trends in safety (*34*). Unfortunately, not all studies provide enough details to assess how closely the treated sites were matched to the comparison sites. In the British "Urban safety project", which was included among the meta-analyzed studies using a matched comparison group, treated sites were very carefully matched to comparison sites with respect to both the number of accidents and past accident history. Studies were rated as medium high quality and the standard errors were adjusted by a factor of 1.8. This adjustment was also applied for the analyses reported by Christensen (*33*) and Bunn et al. (*32*).

According to the meta-analysis reported by Elvik (2001), area-wide traffic calming is associated with a reduction of the number of injury accidents of slightly more than 10% (*34*). There is a larger reduction on local streets than on main streets. Accidents resulting in property damage only go down by nearly 20%; again the largest reduction is found for local streets. Somewhat surprisingly, the accident reduction appears to be larger for property-damage-only accidents than for injury accidents. This is surprising, because speed-reducing measures are an important element of area-wide traffic calming. One would normally expect a reduction in speed to have a greater impact on injury accidents than on property damage only accidents.

Christensen (2004) re-analysed Elvik's study, applying techniques for meta-regression analysis (*33*). Based on the coefficients estimated in the meta-regression analyses, Christensen generated estimates of the effects of traffic calming based on coefficients describing study design and the decade when a study was reported. The estimates presented in Exhibit 7-6 refer to before-after studies employing a matched comparison group and published after 1990. Christensen found an accident reduction in all the study design and decade groupings that were specified. The estimates are, however, somewhat inconsistent, in that the estimated effect for both local streets and main streets tends to be larger than the estimated effect for the whole area. This appears as inconsistent, because, in the conventional meta-analysis as performed by Elvik (2001), the effect for the whole area is the weighted mean (or sum) of the effect for local streets and main streets. One would expect the safety effect for the whole area to lie somewhere between the effect found for local streets and the effect found for main streets.

Bunn et al. (2004) performed a meta-analysis of area-wide traffic calming projects, including only before-and-after studies that employed a comparison group (although not necessarily a matched comparison group) (*32*). They estimated a reduction of 37% in fatal accidents, 11% in injury accidents and 5% in all accidents. Judging by the raw numbers presented in the study, the last category (all accidents) is likely to consist mostly of property damage only accidents. For pedestrian accidents, Bunn et al. did not find an effect of area-wide traffic calming.

The findings of these analyses for injury accidents are broadly consistent. For the whole area affected, one may expect traffic calming to reduce injury accidents by some 10 to 15%. The summary estimates of effect for property damage only accidents are less consistent. Elvik (*34*) and Christensen (*33*) find indications of a larger effect for property-damage-only accidents than for injury accidents; Bunn et al. find indications to the contrary. In view of the fact that speed reduction is a key element of traffic calming, the finding of Bunn et al. (*32*) is more consistent with what is otherwise known about the impacts of reducing speed than the findings of Elvik and Christensen.

7.5. Access Management Policy

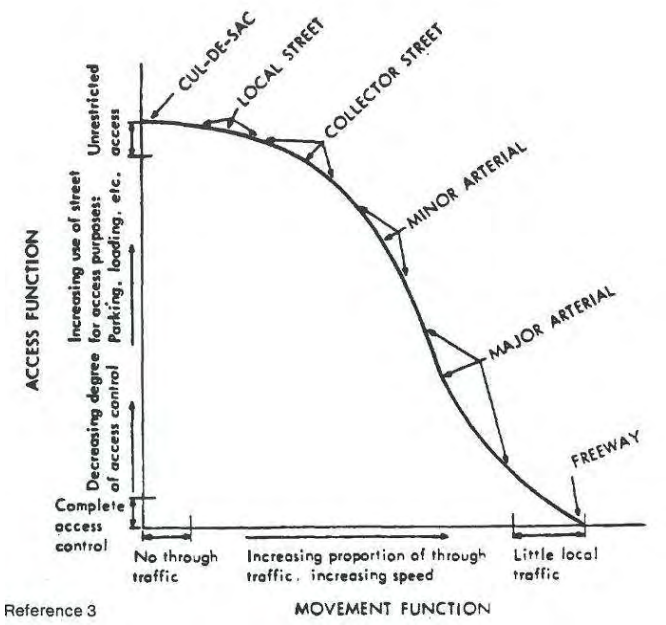
Access management is a set of techniques designed to manage the frequency and magnitude of conflict points at residential and commercial access points. The purpose of an access management program is to balance the required mobility of a roadway facility with the accessibility needs of adjacent land uses (*35*). The management of access, namely the location, spacing, and design of private and public intersections, is considered to be one of the most critical elements in roadway planning and design. Access management provides or manages access to land development while simultaneously preserving traffic safety, capacity, and speed on the surrounding road system, thus addressing congestion, capacity loss, and accidents on the nation's roadways (*31*).

As described in the AASHTO's "A Policy on Geometric Design of Highways and Streets" the two major considerations in classifying highway and street networks functionally are access and mobility. Along with the idea of traffic categorization is the dual role of the highway and street network in providing access to the surrounding properties, and travel mobility. While access is a fixed need for every area served by the highway system, mobility is provided at varying levels of service and is typically represented through the operating speed or trip travel time (*36*). Where maximum efficiency of traffic movement is achieved, direct access to the roadway is limited. Conversely, imposing minimal restraint on roadway access reduces the safe, efficient movement of through traffic (*37*).

The relationship of the two functions relative to the functional classifications of the roadway system is illustrated in Exhibit 7-7. Full access control means that preference is given to through traffic by providing access connections by means of ramps with only selected public roads and by prohibiting crossings at-grade and direct private driveway connections. With partial control of access, preference is given to through traffic to a degree and access connections, which may be at-grade or grade-separated, are provided with selected public roads, and private driveways. In general, full or partial access, control is accomplished by legally obtaining the access rights from the abutting property owners, usually at the time of purchase of the right-of-way, or by the use of frontage roads (*36*).

With freeways, where the safety and efficiency of traffic movement are highest priority, highway designers and administrators typically have had little trouble defining the need, policies and standards needed to obtain the necessary control of access. Likewise, at the other end of the scale, property access is clearly the dominant characteristic of local streets such as cul-de-sacs and the policies, design and operational characteristics are easily tailored to reflect this priority. Difficulty arises when trying to balance access and mobility for the roadway system lying between the two extremes (such as arterials and collectors), and this is reflected in the greatly varying policies and standards practiced by the various jurisdictions across the country. A balanced, comprehensive access management program which provides reasonable access while maintaining safety and efficiency in traffic movement is needed (*37*).

Exhibit 7-7: Relationship between access control and traffic movement (37)



Two definitions are particularly relevant to this section of the HSM: access point, and access-point density. The Highway Capacity Manual (2000) defines the following terms (*38*):

- Access point: "an intersection, driveway, or opening on the right-hand side of a roadway. An entry on the opposite side of a roadway or median opening also can be considered as an access point if it is expected to influence traffic flow significantly in the direction of access"
- Access-point density: "the total number of access points on a roadway divided by the length of the roadway and then averaged over a minimum length of 5 km"

As presented in NCHRP Report 420, access management combines relevant road authority policy and the particular attributes of the roadway and access to assess alternatives and select the most effective choice of access design and operations. The safety of an access point depends on the inter-relationships between the corridor characteristics, other access points along the corridor, and its specific design and operations. Access design principles should be applied and coordinated with the three components of the access system. These components include the public roadway, the access (via the driveway or public street), and the land use itself. All three components have to be treated as integral parts of an overall system because neglecting any one would merely transfer a problem to one of the others (*31*).

Although access management techniques have evolved over time, they can generally be divided into two categories: techniques that control access through changes in policies; and techniques that control access through changes in the design of the roadway or the operations. The two categories can be further subdivided into the following (*39*):

- Policy – Management:
  a. Access codes/spacing
  b. Zoning/subdivision Regulations
  c. Purchase of Access Rights
  d. Establishment of Setbacks from Interchanges and Intersections
- Design – Operations:
  a. Interchanges
  b. Frontage Roads
  c. Medians – Left turns
  d. Right turns
  e. Access/Driveway Location (Retrofit, Consolidation, Reorientation, Relocation)
  f. Traffic controls
  g. Access/Driveway Design

An extensive TRB website containing access management information is available at www.accessmanagement.gov.

Intersections, segments, and the safety effect of various design elements are discussed in great detail in Chapters 3 and 4, and there are inevitable links between those chapters and this section. Relevant links to those Chapters are identified in the following discussion.

The following sections discuss the safety impact of the various access management techniques that fall under the categories identified previously. More specifically, the safety implications of providing residential and commercial access are addressed within the context of the roadway network (policies and planning), the roadway segment or corridor (density, road class and environment, the presence of medians, alignment versus offsetting of opposite driveways, proximity to intersections, etc.), and of various design elements related to the control of access (median type, permitted entry/exit movements, left-turn entry, right-in/right-out, storage, sight clearance, etc.).

7.5.1. Access Control and Road Function

Highway and street networks are functionally classified using two key considerations: access and mobility. Highways have a dual role, providing travel mobility on the road network, and also providing access to the surrounding properties. On roads designed for high levels of service, direct access is limited or not allowed.

The relationship between access control and traffic movement can be divided into three main types:

1. Full access control is found on freeways. Preference is given to through traffic by prohibiting at-grade crossings and direct private driveway connections, and by providing access only by ramps which connect with selected public roads.
2. Partial access control is typical of collectors and arterials. Preference is given to through traffic, but connections are provided with selected public roads and private driveways. The connections may be at-grade or grade-separated.
3. Unrestricted access control is provided on local streets.

Most challenges associated with access control arise when balancing access and mobility on collectors and arterials. These challenges are reflected in the greatly varying policies and standards practiced by the various jurisdictions across the country.

The policies of road authorities, which form an extension of the planning policies (and subsequently, the explicit safety) for the road network, as discussed in Section 7.1, provide the basis for the key elements of access management. That is, for each of the road classes defined in an agency's policies, guidelines and standards may be established for limiting driveways and restricting movements, defining the spacing between driveways, and many other elements related to access management. Note that although Gluck et al. grouped access spacing together with access codes and classified the combination as one of the four policy-related access management techniques (*39*), access spacing and other policy-related access management techniques are addressed in separate sections.

Previous research studies have established that the overall safety of a roadway segment is generally thought to be dependent on the access spacing and number of driveways/intersections present (*40*). **In the context of the HSM, access points include minor intersections (e.g., three-leg unsignalized) as well as private driveways, and a roadway segment is defined as the road between two major intersections.**

7.5.2. Access Management Policies and Road Network Safety

Access management policies, such as establishing an access management code, modernizing zoning requirements, and acquiring rights-of-way, are extremely important and provide a basic framework for other access management techniques. In essence, these policies balance the rights of property owners to have reasonable access to the general system of streets and highways with the rights of road users to freedom of movement, safety, and the efficient expenditure of public funds. The policies and recommended access guidelines balance these competing rights. The goal is to manage access to land development while simultaneously preserving the flow of traffic on the public road system in terms of safety, capacity, and speed (*41*).

Flora and Keitt state that the development and adoption of an access management policy is the first essential step toward effective access management. This policy establishes the goals of the access management program and defines the mechanisms through which the goals will be accomplished (*37*). However, because of their broad nature, policies generally do not lend themselves to measurement or quantification (*39*). Gluck et al. identified four groups of access management techniques related to access management policies (*39*):

- Access codes/spacing
- Zoning/subdivision regulations
- Purchase of access rights
- Establishment of setbacks from interchanges and intersections

One important aspect of an access management policy is the legal basis which it may create. Through a realistic statement of objectives and goals, access management is tied to the transportation needs and welfare of the public at large. An access management policy also provides for more uniform application of regulatory measures, thus minimizing the argument by many opponents that they are being arbitrarily discriminated against (*37*).

According to AASHTO's "Policy on Geometric Design of Highways and Streets", policy-related access control techniques can be implemented with two basic legal powers: police power and eminent domain. The first provides the state with sufficient authority for most access control techniques associated with highway operations, driveway location, driveway design, and access denials. The second allows a state to take property for public use provided that the owner is compensated for the loss (*36*). While the owner of abutting property is entitled to a reasonable degree of access, that owner is not entitled to direct access to new limited access highways to freeways (*37*). Highway agencies usually have the power to deny access through the use of police power when reasonable access is available (*36*). A state may need to use eminent domain when building local service roads, buying abutting property, acquiring additional right-of-way, and taking access rights.

This section discusses the safety effect of policies related to the provision of access points along different road classes, and the different policies governing the planning of road networks from the perspective of policy issues such as setback distances and corner clearances.

No AMFs were found or calculated.

It is recognized that there are inherent difficulties associated with measuring the safety impact of access management policy changes to whole road networks since changes in how the network is defined (i.e., the boundary of the network itself) will directly affect the outcome of the analysis. Nevertheless, it is foreseeable that the safety effect of policy changes to roadway segments and specific corridors be quantified. Future research should aim to present quantitative information in the context of road types and volumes, road environment and accident types and severity.

As noted earlier, policy-related access management treatments or techniques are inherently difficult to quantify or measure. None of the studies reviewed provided sufficient information to develop indices of effectiveness or standard error values. Some qualitative and anecdotal evidence was found, the majority of which focused on conflicts and not accidents.

Discussion: Impact of different types of access control

Gattis compared accident rates at three similar and adjacent urban roadway segments with differing access controls in place (*42*). The roadway segment with the least access control had a high density of driveways, intersecting streets and median openings; the roadway segment with a moderate level of access control had frontage roads running parallel with the main roadway segment and fewer cross streets; and the roadway segment with the highest level of access control had few median openings, driveways, and cross streets.

Gattis reported that the roadway segment with the highest level of access control also had the lowest non-intersection and intersection, angle and sideswipe accident rates but the highest intersection and non-intersection rear-end accident rates. According to Gattis, the roadway segment with the highest level of access control had PDO accident rates about half that of the other two roadway segments, and total and injury accident rates that were about forty percent less than those of the other two segments.

Discussion: Access management policies at intersections in the vicinity of interchanges

Freeway interchanges provide the means to move traffic between freeways and arterial streets and have become focal points of activity in urban, suburban and even rural locations. As a result, interchanges draw large volumes of traffic and stimulate the development of the surrounding land. Although access is controlled on the freeway in the interchange area, there is often little or no access control along the arterial roads. Existing street intersections along the arterial are often located too close to interchanges and the problem is further compounded with curb cuts and median breaks to provide access to adjacent traffic generators (*39*).

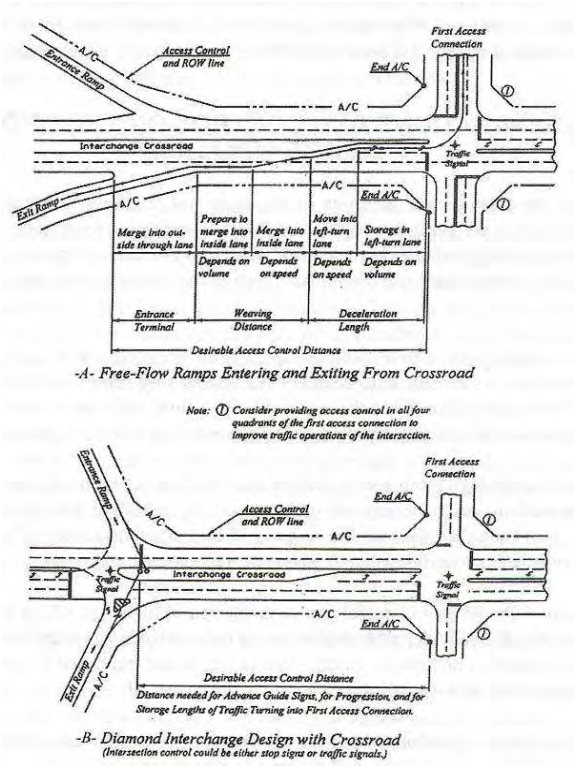
There is growing recognition that access separation distances and roadway geometry have to be better regulated from an access management perspective. According to NCHRP Synthesis Report 332, access management policies that are now typically in effect at interchanges address issues including access spacing standards, corner clearances, and also the use of medians (*35*).

With respect to access spacing for intersections in the vicinity of interchanges, there are three aspects that directly affect the management of access, namely: the appropriate spacing of the interchanges; the distance along the crossroad from an interchange ramp in which access should be restricted or eliminated; and the appropriate spacing of public and private accesses along the crossroad when close to interchange on-/off-ramps. Highway agencies currently use a wide range of factors to determine the appropriate spacing to the first access point downstream or upstream of the interchange terminal. These factors include the surrounding land use and environment, the classification of the crossroad, the interchange form, type of access point, downstream storage requirements, the design of the cross section, design speed, volume, cycle length, cost and economic impacts, functional role of the interchange and the jurisdiction of the crossroad. While it is generally recognized that controlling access at intersections in the vicinity of interchanges has the benefit of minimizing congestion, simplifying driving tasks, improving pedestrian and bicyclist safety and even reducing overall crash rates, it is unclear how each of the determining factors contributes to the overall safety of the road network adjacent to the interchange (*35*).

Although it has been established that numerous state departments of transportation rely on the 100 ft urban and 300 ft rural access spacing guidelines provided in the 1991 AASHTO publication, “A Policy on Geometric Design of Highways and Streets”, there appears to be no underlying rationale for these spacing requirements and the safety implications of adhering to or straying from these spacing requirements have not been established (*35*).

Recent research suggests a shift in state policy in response to contemporary guidance emerging recent research efforts from AASHTO and the Transportation Research Board (*43*). For example, the 2001 edition of AASHTO’s “Policy on Geometric Design of Highways and Streets” provides more extensive treatment of the subject of interchange area access control than previous editions. As illustrated in Exhibit 7-8, AASHTO not only addresses the importance of access control on interchange crossroads but also identifies elements to consider in determining appropriate access separations and access control distances in the vicinity of free-flowing ramps.

Exhibit 7-8: Access control elements along interchange crossroads (36)



The most recent update to the state of the practice in interchange area access management is found in the Transportation Research Board's Access Management Manual (TRB 2004), which expands upon previous research efforts conducted in NCHRP Report 420: Impacts of Access Management Techniques, and several other studies (*43*). As summarized in Exhibit 7-9 and Exhibit 7-10, and illustrated in Exhibit 7-11, these sources recommend access spacing standards for crossroads at freeway interchanges which are greater than the minimum provisions of AASHTO policy.

Exhibit 7-9: Suggested minimum access spacing standards [ft] for two- and four-lane roads at interchanges (39)

Two-Lane Crossroads

Access Type	Area Type		
	Full Developed Urban	Suburban	Rural
	(45 mph)	(45 mph)	(55 mph)
First Access	750	990	1,320
First Signalized Intersection	1,320	1,320	1,320

Four-Lane Crossroads

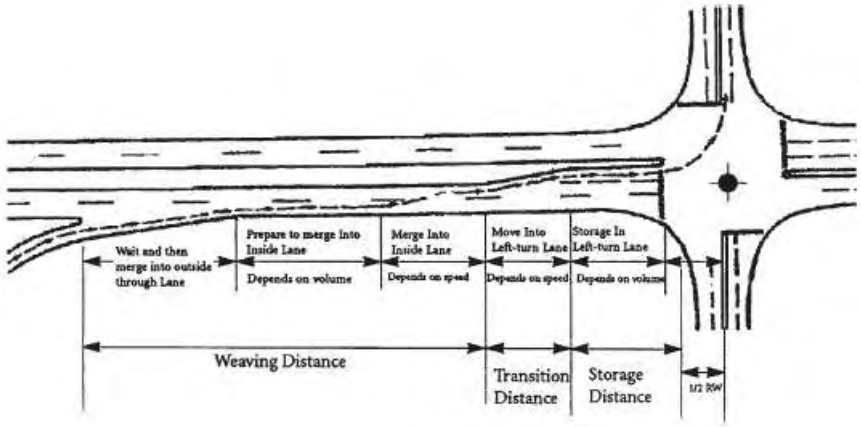
Access Type	Area Type		
	Full Developed Urban	Suburban	Rural
	(45 mph)	(45 mph)	(55 mph)
First Access from Off-Ramp	750	990	1,320
First Median Opening	990	1,320	1,320
First Access before On-Ramp	990	1,320	1,320
First Signalized Intersection	2,640	2,640	2,640

Exhibit 7-10: Suggested access spacing guidelines in the vicinity of interchanges (43)

Separation Distances from Interchange Exit Ramps

Weaving - Moving across through lanes	800 feet on two-lane arterials 1,200 on four-lane arterials 1,600 on six-lane arterials
Transition - Moving into turn lane(s)	150 to 200 feet
Perception-reaction distance	100 to 150 feet
Storage	Adequate for volume without overflow into through lane (typically 200 to 300 feet depending on demand)
Distance to centreline of intersection	40 to 50 feet

Exhibit 7-11: Factors influencing access spacing in the vicinity of interchanges (39)



One of the more critical factors identified in NCHRP Synthesis Report 332 is the design speed on roadway segments in the vicinity of the interchange. As expected, the higher the design speed, the greater the access spacing should be (*35*).

While the general relationships between design speed and required braking distance are understood, the safety impact of changing the policies related to the design speed on roadways near interchanges have not been quantified. In the absence of more definitive research results, evidence from existing studies that have evaluated the safety effects of changes to design speeds on the approaches to intersections will be used. With the prevalent presence of weaving and merging traffic, some of the risk factors for accidents are clearly different at intersections in the vicinity of interchanges compared to regular intersections. However, evidence regarding the safety effects of these treatments at regular intersections is perhaps the closest one can get to intersections in the vicinity of interchanges at this time. Additional information may be provided in future editions of the HSM. Interchanges are also discussed in Chapter 5.

Discussion: Regulate corner clearance

Corner clearances represent the minimum distances required between intersections and driveways along arterials and collector streets. Flora and Keitt defined corner clearance as the distance measured along the back of the arterial curb from the nearest edge of a driveway to the nearest edge of the intersection (*37*). As stated by AASHTO, "driveways should not be situated within the functional boundary of at-grade intersections. This boundary would include the longitudinal limits of auxiliary lanes" (*36*).

Through a review of existing policies related to corner clearances for various state, county and city agencies, Gluck et al. found that the requirements varied greatly from one jurisdiction to the next and ranged from as little as 16 ft to 350 ft. Although the safety effect of regulating corner clearance has not been quantified to date, as the authors point out, placing driveways too close to intersections correlates with higher accident frequencies and as many as one-half of all accidents involved are driveway-related (*39*).

With regards to network planning, ensuring adequate corner clearance can best be achieved before land subdivision and site development approval. Potential options to do so include (*35*):

1. Requiring property access from secondary roads;
2. Locating driveways at the farthest edge of the property line away from the intersection;
3. Consolidating driveways with adjacent properties; and
4. Installing a raised median barrier on approaches to intersections to prevent left-turn maneuvers.

Implementing these treatments can minimize driveway/intersection conflicts since they prevent the blockage of driveways upstream of an intersection by standing traffic queues.

7.6. Road-Use Culture

Road safety is affected not only by the engineering and planning decisions that create the transportation network used by travelers, but also by the road-use culture of the people using the network. Road-use culture refers to the different choices made by people as they respond to the network and to other users of the network. These choices vary with social group and geographical area. In Europe, where all EU countries apply similar countermeasures to improve road safety and all have regulations for speeding, DUI, and seat belts, the countries have very different success in reducing the number of accidents. For example, in 1996, the United Kingdom had 64 road accident fatalities per million people whereas Portugal had 274 road accident fatalities per million people (*44*).

While the choices may not be understood entirely, it is clear, for example, that the general level of patience and politeness or of impatience and aggression is likely to characterize the behavior of road users over a wide area. Familiarity will also play a role. In Holland, for example, bicyclists are fully accepted road users whereas elsewhere, bicyclists and even pedestrians may be perceived as an inconvenience on the road. Factors such as the level of enforcement and the efficiency of the supporting judicial system are also likely to have an effect in road use culture. Road-use culture affects motorists' decisions to drive above the speed limit, response to red-light cameras at intersections, behavior at all-way stops in a neighborhood, and every other aspect of driving behavior including acceptance and attitudes towards pedestrians and bicyclists. Pedestrians and bicyclists also use the transportation network in accordance with their own road-use culture and perception of how to behave and how to respond to the network and to other road users.

Zaidel has considered the role of safety interventions in relation to road-use culture and the interaction between individuals, groups and culture (*45*). Zaidel asks how an individual driver may influence the behavior of other drivers, how other drivers may affect the behavior of an individual driver, how an accepted driving practice spreads and whether there is a threshold level of adoption needed for other drivers to adopt a driving practice. Zaidel points out that visible behaviors, such as seat belt usage, speeding, stopping at stop signs, etc., whether desirable or undesirable, are more likely to diffuse quickly than invisible behaviors (for example, DUI).

Conspicuous anti-social behaviors include "cutting up" another driver, making threatening gestures and not signaling are easily copied by other drivers, and bad habits diffuse quickly. Some anti-social behaviors, such as parking on the wrong side of the street spread very quickly. Zaidel asks why it takes longer to convince motorists to roll back the illegal parking habits than it took for the habits to spread, and why illegal parking habits spread quickly, while drinking and driving campaigns need large-scale and prolonged intervention (*45*). Zaidel suggests that the modeling of epidemics and contagious diseases has analogies with traffic behavior. At a simpler level, modeling changes in traffic violations over time may illuminate citizens' views of what is fair and help to explain shifts in the culture of driving.

If these cultural shifts could be better understood, more effective interventions could be devised and aimed at driver sub-groups, for example, young drivers. General beliefs about safety belts, the influence of alcohol on driving, etc., all evolve over time through the "influence of individual driver experiences and learning, expert persuasion, media information, group interaction and collective phenomena such as imitation" (*45*), but what are the mechanisms at work? How do we start and encourage a good "snowball" effect? How do we stop or dissipate an undesirable "snowball"? How do we create a safer traffic environment by improving the "culture of driving" or by changing the "social climate"?

Zaidel believes that shifts in driver culture include changes in observable driving behaviors and changes in a driver's set of related beliefs. The 1998 SARTRE study found, for example, that young drivers' beliefs include having more confidence than older drivers in seat belts (*44*). Among drivers in general, many agreed that seat belts reduce injury, but many appeared to feel that, as they personally were careful drivers, they did not need to wear one (*44*). Zaidel regards understanding driver beliefs and modeling changes as a major challenge, but an approach that will help us to understand and the influence the course of drivers (*45*).

There is a need to understand of the nature of road-use culture and the behavioral and social factors that may influence driver behavior and affect drivers' judgments and opinions about driving and the traffic system. There are about 42,000 fatalities each year in the United States from motor vehicle accidents. About 9,500 fatalities (35%) are intersection-related, about 13,000 fatalities (31%) are speed-related and about 17,000 fatalities (40%) are due to alcohol-related crashes. What role do behavioral issues play in these accidents? How do behavioral issues affect driver responses to signal timing and phasing, channelization, speeding, persuasive messages, running red lights, laws and regulations, enforcement, safety campaigns and many other driving issues? Can we influence and change road culture? How do road-use cultures vary from place to place and over time, and how does this variation manifest itself in the number of accidents on the network?

Few studies provide a quantitative analysis of the role of road culture and behavioral issues in road accidents. The theoretical and methodological difficulties associated with measuring the safety effects of different road cultures are considerable. Researchers tend to follow either a theoretical line of enquiry or a very practical and down-to-earth "what works?" approach. Some approaches emphasize the role of factors that influence the individual in road-use culture and others emphasize the role of factors that influence the group. As research continues, new knowledge will allow future editions of the HSM to provide quantitative information on the relationship between road culture and safety.

At present, studies are available on specific issues such as young and new drivers and graduated driver licensing programs, older drivers, and drivers' responses to various engineering, enforcement, education and legislative measures designed to improve safety.

This section discusses the safety issues and implications of different road-use cultures, and the interventions that affect those cultures in the areas of engineering, enforcement, and education. Road-use culture and the various interventions need to be considered against the background of the legislation and judicial system in operation.

Local road-use culture affects every aspect of road use. Engineering treatments, enforcement, education, legislation and operational management all have to function in the context of the local road-use culture. Transportation agencies and other professionals need to know if and how road users respond to specific safety treatments and safety programs so they can design treatments and programs that are likely to be successful.

Exhibit 7-12: Resources examined to investigate the safety effect of road-use culture

DOCUMENT	DESCRIPTION	COMMENT
(*46*) (Insurance Institute for Highway Safety, "Electronic Stability Control." Status Report, Vol. 40, No. 1, Arlington, Va., Insurance Institute for Highway Safety, (2005))	The Insurance Institute for Highway Safety's press release discuses the Institute's study of states that have changed from secondary to primary laws for seat belts.	Added to synthesis. Little or no quantitative information.
(*47*) (Gains, A., Heydecker, B., Shrewsbury, J., and Robertson, S., "The National Safety Camera Programme: Three Year Evaluation Report." London, United Kingdom, PA Consulting Group, (2004))	The study analyzed the effectiveness of a speed and red lights camera program in the U.K.	Added to synthesis. Little or no quantitative information.
(*48*) (Chaudhary, N. K., Solomon, M. G., and Cosgrove, L. A., "The Relationship Between Perceived Risk of Being Ticketed and Self-Reported Seat Belt Use." Journal of Safety Research, Vol. 35, No. 4, New York, N.Y., Elsevier, (2004) pp. 383-390.)	The study investigated seat belt infraction and the perceived risk of being ticketed (PRT) in relation to laws and enforcement.	Added to synthesis. Little or no quantitative information.
(*49*) (Insurance Institute for Highway Safety, "U.S. Driver Licensing Renewal Procedures for Older Drivers." Arlington, Va., Insurance Institute for Highway Safety, (2004))	The Insurance Institute for Highway Safety tracks state laws on licensing procedures for older drivers.	Added to synthesis. Little or no quantitative information.
(*50*) (Greenberg, M. D., Morral, A. R., and Jain, A. K., "How Can Repeat Drunk Drivers Be Influenced To Change? An Analysis of the Association Between Drunk Driving and DUI Recidivists' Attitudes and Beliefs." Journal of Studies on Alcohol, Vol. 65, No. 4, New Brunswick, N.J., Rutgers Center of Alcohol Studies, (2004) pp. 460-463.)	The project studied the beliefs of people with multiple driving under the influence (DUI) offenses to improve public policy interventions designed to deter or prevent drunk driving.	Added to synthesis. Little or no quantitative information.
(*51*) (Aultman-Hall, L., and Padlo, P., "Factors Affecting Young Driver Safety." JHR 04-298, Rocky Hill, Conn., Connecticut Department of Transportation, (2004))	The study assessed young drivers' crash types and their relevance to GDL restrictions. The study used Connecticut data.	Added to synthesis. Little or no quantitative information.
(*52*) (University of California, "Bringing DUI Home: Reports from the Field on Selected Programs." Traffic Safety Center Online Newsletter, Vol. 1, No. 3, Berkeley, Calif., University of California, (2003))	The study investigated a drinking and driving prevention program in Salinas, Calif. The program used a broad variety of approaches and interventions.	Added to synthesis. Little or no quantitative information.
(*53*) (Agent, K. R., Green, E. R., and Langley, R. E., "Evaluation of Kentucky's "Buckle Up Kentucky: It's The Law & It's Enforced" Campaign." KTC-03-26/KSP1-03-11, Lexington, Ky., Kentucky Transportation Center, (2003))	The report documents the publicity efforts and results of the "Buckle-Up Kentucky" seat belt campaign of 2003.	Added to synthesis. Little or no quantitative information.
(*54*) (Mayhew, D. R. and Simpson, H. M., "Graduated Driver Licensing." TR News, Vol. 229, No. November-December 2003, Washington, D.C., TRB, (2003))	The report traces the development of graduated driver licensing (GDL) programs and discusses studies of the safety effectiveness of GDL programs.	Added to synthesis. Little or no quantitative information.
(*55*) (Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., and Wark, R., "NCHRP Report 500 Volume 1: A Guide for Addressing Aggressive-Driving Collisions." Washington, D.C., Transportation Research Board, National Research Council, (2003))	The report discusses aggressive driving and suggests several strategies for addressing the problem of aggressive drivers.	Added to synthesis. Little or no quantitative information.

DOCUMENT	DESCRIPTION	COMMENT
(*6*) (U.S.Department of Transportation, "Considering Safety in the Transportation Planning Process." Washington, D.C., U.S. Department of Transportation, (2002))	The report focuses on incorporating safety into the transportation planning process for the multi-modal transportation system. It provides planners with information and techniques to better understand the role of safety within the transportation planning process.	Added to synthesis. Little or no quantitative information.
(*56*) (Hogue and N.L., "Crash Reduction Due to the Installation of Red Light Cameras: Guidelines for Site Selection." SWUTC/02/473700-00003-4, College Station, Tex., Texas Transportation Institute, (2002))	The study assessed the use of automated enforcement to combat red light violators in the U.S. and elsewhere.	Added to synthesis. Little or no quantitative information.
(*57*) (Fuller, R., "From Theory to Practice: Implications of the Task-Capability Interface Model for Driver Training." London, United Kingdom, Department for Transport, (2000))	The study investigated the causes of crashes from a psychological perspective, especially the problem of determining the conditions under which driver capability falls short of what is required.	Added to synthesis. Little or no quantitative information.
(*58*) (Smith, D. J., "Human Factors and Traffic Crashes." Ames, Iowa, Center for Transportation Research and Education, (2000))	The paper focuses on factors that may cause driver error. Alcohol is a major factor.	Added to synthesis. Little or no quantitative information.
(*59*) (Stuster, J, Coffman, Z, and Warren, D, "Synthesis of Safety Research Related to Speed and Speed Management." FHWA-RD-98-154, Washington, D.C., FHWA, (1998))	The report is a synthesis of research findings on the safety effects of speed, speed limits, enforcement, and engineering measures to manage speed.	Added to synthesis. Little or no quantitative information.
(*60*) (Transportation Research Board, "Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits." Special Report 254, Washington, D.C., National Academy Press, (1998))	The review is a TRB special report that reviews current practice for setting and enforcing speed limits.	Added to synthesis. Little or no quantitative information.
(*44*) (The SARTRE Group, "The Attitude and Behaviour of European Car Drivers to Road Safety." SARTRE 2 Reports, Part 3, Leidschendam, Netherlands, Institute for Road Safety Research (SWOV), (1998) pp. 1-38.)	This study reports on an international survey of European car drivers designed to investigate road and driver behavior and opinions about safety issues including drinking and driving, speeding, seat belt wearing, and possible countermeasures.	Added to synthesis. Little or no quantitative information.
(*61*) (Rogers, P. N., "Specific Deterrent Impact of California's 0.08% Blood Alcohol Concentration Limit and Administrative Per Se License Suspension Laws. Volume 2 of: An Evaluation of the Effectiveness of California's 0.08% Blood Alcohol Concentration Limit and Administrative Per Se License Suspension Laws." CAL-DMV-RSS-97-167;AL9101, Sacramento, Calif., California Department of Motor Vehicles, (1997))	The project evaluated the impact of two (DUI) laws introduced in California in 1990.	Added to synthesis. Little or no quantitative information.
(*62*) (Ontario Injury Prevention Resource Centre, "Best Practice Programs for Injury Prevention." Toronto, Ontario, Canada, Ontario Injury Prevention Resource Centre, (1996))	The study investigated Ontario Ministry of Health priorities for 1992 including prevention of injuries to bicyclists and motor vehicle occupants.	Added to synthesis. Little or no quantitative information.

DOCUMENT	DESCRIPTION	COMMENT
(*45*) (Zaidel, D. M., "A Modeling Perspective on the Culture of Driving." Accident Analysis and Prevention, Vol. 24, No. 6, Great Britain, Pergamon Press Ltd., (1992) pp. 585-597.)	Zaidel discusses the possibility of traffic behavior modeling. He discusses how the individual driver and the collective of drivers interact, and how the culture of driving changes.	Added to introduction to section. Little or no quantitative information.

7.6.1. Engineering Treatments

7.6.1.1. Network-wide Consistency

The consistency of engineering measures at the network wide level as well as at each individual location is likely to affect the driving habits and road-use culture of local users who come to expect certain procedures and to act accordingly. Examples include all-red phases at traffic signals, right-turn-on-red policy, the use of left-turn arrows or flashing lights at traffic signals, and policies regarding yielding at intersections and roundabouts. When the approach adopted is not consistent across the jurisdiction, safety deterioration may take place. This effect is shown when unfamiliar drivers encounter quite different rules of the road when traveling in a foreign country. No resources that study the impact of network-wide consistency were found.

7.6.1.2. Mitigate aggressive driving

Many issues relating to aggressive driving can be linked to problems with engineering and infrastructure. Driver frustration may arise, for example from delays. This frustration may lead to aggression and an increased likelihood of accidents.

Neuman et al.'s view is that suitable engineering measures could be used to prevent aggression from occurring (*55*). The authors discuss the elements that can lead to frustration including engineering issues such as uncoordinated traffic signals and a lack of accurate information regarding causes of traffic delays, but Neuman et al. reported that "no program has been found" that includes corrective engineering actions ((*55*), pg V-17).

While there have been reports of dealing with aggressive driving and reducing the number of crashes, Neuman et al. point out that the success may be due to the use of law enforcement rather than to an understanding of aggressive driving. "No effort has addressed the treatment of engineering elements as a means of mitigating aggressive driving, even though traffic safety professionals recognize that the driving environment plays a role in driver behavior" (*55*).

Neuman et al. propose to reduce aggressive driving by improving the driving environment (*55*). The strategy is two-pronged. The first step aims to mitigate problem elements in the driving environment, but needs further research as "programs related to aggressive driving are too new to have been adequately evaluated" ((*55*), page V-4). Multi-disciplinary teams of safety experts will be needed to correct aggressive driving and to explore the frustration-aggression approach which remains experimental. The frustration that occurs, for example, on roads with inappropriate speed limits, encouraging drivers to disregard the posted limit, may continue to be a problem unless the speed limit is made more appropriate. Further examples are poorly coordinated traffic signals (which encourage red light running), inadequate exit ramps (which encourage driving on the shoulder or median), inadequate exit ramps (which encourage improper merging), inadequate left-turn lanes, and unclear traffic controls in work zones (*55*). In 2002, no programs were known to be attempting to improve the driving environment and mitigate aggressive driving by minimizing these "triggers" of aggressive driving (*55*).

The second prong of the strategy to improve the driving environment aims to reduce non-recurring delays and provide better information about these delays. Motorists want accurate and timely information. Many information systems are available, but it is necessary to know which ones work and which ones are best for managing incidents and keeping traffic moving. Neuman et al. found no research into aggressive driving and areas of non-recurring delay or regular congestion (*55*).

7.6.2. Enforcement Interventions

The discussion of enforcement is divided into:

- Speed enforcement (mobile patrol vehicles, stationary patrol vehicles, radar, etc);
- Enforcement to reduce red-light running;
- Enforcement to increase seat belt and helmet use; and
- Enforcement to reduce driving under the influence.

7.6.2.1. Enforcement to reduce speeding

Speed issues are discussed in Chapter 2. Speed is believed to contribute to 12% of all crashes and 30% of fatal crashes (Bowie and Walz, 1994 cited by (*59*)).

In a driving culture, the social environment and associated social behaviors create norms. One of the most important norms is acceptable driving speed. Aware of the norm, a driver who notices that a driver ahead is slowing down will respond in an appropriate way. Most people conform to the behavior expected, but some drivers fall short of what is required. Drivers who do not conform to society's rules and norms for driving behavior, or who are driving in unfamiliar surroundings where the prevailing road-use culture differs from their own, may be more likely to have an accident than drivers who are familiar with the local road-use culture and conform to it.

Drivers assess the road's characteristics (curvature, number of lanes, grade, length of grade, number of lanes, surface condition, sight distance, and maintenance condition, among others), the adjacent land use, the number of access points and the roadway surroundings (such as tall objects close to the road) to choose the driving speed they consider to be appropriate (*59*). The weather also influences most drivers although many drivers fail to reduce their speed on wet roads (Lamm et al. 1990, cited by (*59*)).

The speed choices ultimately made by drivers often exceed the posted limits. A 1990 study of low and moderate speed roads in four States found that 70%of drivers were exceeding the speed limit (Harkey et al. 1990, cited by (*59*). Although "there is evidence that crash risk is lowest near the average speed of traffic" ((*59*), pg 14), the human preference for exceeding the speed limit is an important safety issue because the risk "increases exponentially for motorists traveling much faster" ((*59*), pg 14), and the speed of the vehicle on impact greatly affects the severity of any crash that occurs.

Unfortunately, most drivers, when surveyed, have been found to underestimate their driving speed, especially when driving fairly fast or fast. After a high-speed period, drivers who slow down typically perceive their new speed as lower than it actually is (Schmidt and Tiffin, 1969; Mathews, 1978 cited by (*59*)). In addition, perceptual limitations lead to drivers failing to respond appropriately to curvature (Shinar, 1977 cited by (*59*)). Since drivers tend to drive at the speed that they find acceptable and safe despite posted speed limits, little or no effect on speed has been found for low and moderate speed roads where speed limits were changed (raised or lowered) (*59*). In the case of freeways, higher speeds and more injury crashes have occurred after speed limits were raised. This is important because "for every 1 mi/h change in speed, the number of injury crashes increases 5 percent" (3%for every 1 km/h) (Finch et al. 1994, cited by (*59*)). The net safety effect of speed limits and changes in speed limits across the network is not known.

It is clear that speed limits are necessary, but the system wide implications of speed limits and driver responses and the various options for enforcement interventions need research to understand their effect on the road-use culture.

Some enforcement approaches are known to have spillover effects across the network. For example, speed cameras installed at local intersections may affect behavior at intersections not equipped with the cameras. The publicity and public interest accompanying installation of the cameras may lead to a "generalized change in driver behavior at intersections with and without cameras" ((*46*), pg 6). Some enforcement approaches also have "time halo" effects in which the effect of the enforcement remains after the enforcement has been withdrawn.

Eight speed enforcement interventions are discussed below.

Discussion: Mobile patrol vehicles

A 1986 study found that the greatest compliance with speed limits occurred close to mobile patrol vehicles. Compliance decreased with distance from the patrol vehicles (Shinar and Stiebel 1986, cited by (*59*)). In Illinois, when the overhead lights were removed from patrol cars, these vehicles ticketed 25% more motorists than before, suggesting that their visible presence had been a deterrent to speeding for many drivers (Raub 1985, cited by (*59*)).

Benekohal et al. (1992) found that the presence of mobile patrol vehicles reduced the average speeds of cars and trucks in a highway construction zone. The time halo effect lasted an hour after the vehicles left the site (Benekohal et al. 1992, cited by (*59*)). Vaa's study of very intensive daily police presence found a time halo effect of vehicle speed reductions that lasted up to 8 weeks (Vaa 1997, cited by (*59*)).

Discussion: Stationary patrol vehicles

Stationary patrol vehicle enforcement led to "a pronounced decrease in average traffic speed." The vehicle had to be present for five days for vehicle speeds to be reduced even after the vehicle had gone (Hauer et al. 1982, cited by (*59*)). A 1986 study investigated the effect of a stationary patrol vehicle positioned on an urban street. The decrease in speed was "measurable" and the number of drivers exceeding the speed limit dropped by two-thirds (Armour 1986, cited by (*59*)).

Discussion: Aerial enforcement

Aerial enforcement has been found to reduce highway speeds. In Australia, vehicle crashes were reduced by 22% (Kearns and Webster 1988, cited by (*59*)). An earlier Australian study found that when aerial enforcement came to an end, the number of car drivers and truck drivers exceeding the speed limit increased by 6% (Saunders 1979, cited by (*59*)). In New York, aerial enforcement was used successfully to apprehend drivers who used radar detectors and CB radio to avoid being caught (Blackburn, Moran and Glauz 1989, cited by (*59*)).

Discussion: Radar and laser speed monitoring equipment

Laser guns have been used as an alternative to radar, successfully apprehending drivers with radar detection in their cars. Those caught with radar detectors tended to be the drivers "traveling at the most extreme speeds" (Teed and Lund 1991, cited by (*59*)).

Discussion: Automated enforcement

Automated enforcement systems use video or photographic identification in conjunction with radar or lasers to detect speeding drivers and automatically record the vehicle registrations.

In Melbourne, Australia, there was a statistically significantly reduction in injury crashes within 1 km of the speed camera during "high alcohol hours" on arterial roads. Mean speeds were not reduced, but the number of drivers who exceeded the speed limit by more than 15 km/h decreased (details not given) (Rogerson et al. 1994, cited by (*59*).

Elvik and Vaa (*64*) found that automated enforcement reduced injury crashes at sites with high accident rates by 26%. At other sites, the reduction was only 5%. Elvik and Vaa also undertook a meta analysis using data from several countries and found that automated enforcement brought about a 17% reduction in injury crashes. The study by Elvik and Vaa (*64*) was rated High and a MCF of 1.2 was used to adjust the standard errors.

The "National Safety Camera Programme" in the United Kingdom was introduced to reduce speed and red light running. Gains et al. reported on the effectiveness of the system from 2000 to 2003 (examining 24 areas operating the program for at least a year) (*47*). The program was well supported by the public. At fixed camera sites, Gains et al. found that vehicle speed dropped by about 7%. Excessive speeding (i.e. traveling at 15 mph more than the speed limit) dropped by 80% at fixed camera sites. Mobile camera sites were also effective, but the percentages were considerably lower than at fixed camera sites. The report concludes that the safety camera program to reduce road accidents "is extremely successful at reducing speed, accidents, casualties and saving lives" ((*47*), pg 62).

Chen et al., 2002, evaluated the safety impacts of mobile photo radar enforcement on a 22 km Vancouver Island segment of Highway 17 (Pat Bay Highway) in British Columbia (*65*). The empirical Bayes method was used to control for regression to the mean and time effects. The before and after periods were limited: 2 years each. Mean speed reduced by about 2 km/h (3% reduction) and standard deviation decreased by about 0.5 km/h (6% reduction). Crashes reduced by about 16% in the corridor as a whole. An MCF of 1.8 was used to adjust the standard errors from this study.

Mountain et al., 2004, examined the impact of 62 fixed speed camera sites on roads with severe speeding problems throughout the United Kingdom (*66*). Data were collected for upto 2 km centered on the camera site. The empirical Bayesian method was used for the evaluation. Considering a 500 m monitoring length, personal injury crashes decreased by about 25%, out of which 20% was attributed to the impact of cameras on speed (and possibly other aspects of speed behavior), and about 5% of the reduction attributed to diversion of traffic to other routes. Consider a 1 km monitoring length, the

reduction in injury crashes was 25%. An MCF of 1.2 was used to adjust the standard errors from this study.

Goldenbeld and van Schagen (2005) studied the impact of mobile, inconspicuous speed cameras on rural roads in the Friesland Province of Netherlands (*67*). Treatment was directed at 80 and 100 km/h single carriageway roads with high injury crashes. For evaluating the effects on safety, the experimental group included 28 speed camera enforced road sections (average length of about 4 km), and the comparison group included all other rural roads in the province of Friesland, approximately 5,200 km total length. Injury crashes reduced by 21% following the introduction of the automated enforcement. An MCF of 2.2 was used to adjust the standard errors from this study.

Christie et al., (2005), examined the safety impacts of mobile speed cameras in South Wales, United Kingdom (*68*). There were 101 mobile speed camera studies throughout the region at rural and urban locations. The majority of the sites were on 30 mph speed limit roads. Matched control sites were selected from Gwent, a neighboring police enforcement district, with only one mobile and no static cameras. Within 500 m on either side of the camera sites, there was a 51% reduction in injury crashes. An MCF of 2.2 was used to adjust the standard errors from this study.

The Australian Road Research Board (ARRB) evaluated the safety impact of 28 unattended fixed speed cameras in New South Wales, Australia (*69*). Cameras had primarily been installed in locations with high crash rates or high severity crashes that subsequently underwent speed analysis, site review, and consideration of other potential safety treatments. For the before after analysis, camera sites were matched with controls based on speed limit, number of lanes, and roadway cross section (divided/undivided). At the camera segments, there was about a 23% reduction in fatal and injury crashes. An MCF of 2.2 was used to adjust the standard errors from this study.

Exhibit 7-13 shows the AMFs and their standard errors from studies that evaluated the effect of automated enforcement on safety. Based on the results of these studies, a combined AMF and standard error was recommended for inclusion in the HSM.

Exhibit 7-13: Safety Effects of Automated Enforcement

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Automated Enforcement Mobile and Fixed Cameras	Not specified.	Not specified.	Injury Crashes	0.830	0.009
Chen et al., 2002	Automated Enforcement Mobile Cameras	Not specified.	Not specified.	Injury Crashes	0.840	0.108
Mountain et al., 2004	Automated Enforcement Fixed Cameras	Not specified.	Not specified.	Injury Crashes	0.810	0.072
Goldenbeld and Schagen, 2005	Automated Enforcement Mobile Cameras	Not specified.	Not specified.	Injury Crashes	0.790	0.163
Christie et al., 2005	Automated Enforcement Mobile Cameras	Not specified.	Not specified.	Injury Crashes	0.490	0.084

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
ARRB, 2005	Automated Enforcement Fixed Cameras	Not specified.	Not specified.	Injury Crashes	0.772	0.176
Combined	**Automated Enforcement Mobile and Fixed Cameras**	**Not specified.**	**Not specified.**	**Injury Crashes**	**0.826**	**0.009**

Discussion: Drone radar

Drone radar (unattended radar transmitters) was tested by Freedman, Teed and Migletz (1993) in a construction zone. The results showed only a slight reduction in average vehicle speed, but there was a 30 to 50% decrease in the number of drivers who exceeded the speed limit by more than ten miles per hour (Freedman, Teed and Migletz 1993, cited by (*59*)). Similar findings were documented by Streff, et al. (Streff et al. 1995, cited by (*59*)).

Discussion: Speed feedback indicators

Variable message displays can be used to display the speed of a vehicle to drivers to increase drivers' awareness of their speeds and to encourage drivers to slow down. In Casey and Lund's 1990 study, speeds were decreased while the indicator was installed, but not after it was removed (Casey and Lund 1990, cited by (*59*)). Speed reduction also ceased after speed feedback trailers were removed from residential sites in Texas. While the trailers were operating, the speed reductions were 2 to 3 mph (3 to 5 km/h) (Perrillo 1997, cited by (*59*)). A much earlier study (1976) found no significant effect on traffic speeds from variable message displays (Dart and Hunter 1976, cited by (*59*)).

Based on the work by cited in Elvik and Vaa (*64*), the AMF from Exhibit 7-14 was recommended for use in the Highway Safety Manual for the safety effect of changeable speed warning signs. An MCF of 1.8 was used to adjust the standard errors from this study.

Exhibit 7-14: Safety Effects of Changeable Speed Warning Signs

Author, date	Treatment/ Element	Setting	Road type & volume	Accident type & severity	Index of Effectiveness, $t_{adjusted}$	Estimate of Std. Error, s
Elvik and Vaa, 2004	Changeable speed warning signs	Not specified.	Not specified.	All types	0.54	0.17

Discussion: Traffic enforcement notification signs

Stuster investigated portable traffic enforcement warning signs in Huntington Beach, California. These signs warn the public that they are entering (or leaving) an area where thorough traffic enforcement is taking place. Stuster found a 17% reduction in injury crashes (Stuster 1995, cited by (*59*)). Regression-to-the-mean, however, may explain much of this effect as the warning signs and additional traffic enforcement are directed towards locations considered to be particularly hazardous.

Summary

Speed limits need to be largely self-enforcing. It is clear from the many studies reviewed that the main problem with speed enforcement is that the effectiveness of enforcement measures is usually short-term and limited to the immediate vicinity of the enforcement. Most enforcement interventions appear to have little effect in modifying road-use culture. If drivers believe that speed limits are unreasonable, inappropriate or inconsistently applied to the network, it is very unlikely that temporary enforcement measures can bring about permanent speed reductions. Even if enforcement is strictly applied to certain roads, speeding may simply migrate to other roads.

"The issue of appropriate driving speeds … will persist as long as there are individual drivers making choices about risk and time efficiency. Ultimately, decisions about appropriate speed limits depend on judgments about society's tolerance for risk, valuation of time, and willingness to police itself" ((*60*), pg 14).

7.6.2.2. Enforcement to reduce red-light running

Red-light camera (RLC) systems have been used in the United States for a few years. According to Hogue and Dudek, red light running led to 106,000 crashes, 89,000 injuries and about 1,036 deaths in the United States in the year 2000 (*56*). No studies have been found documenting whether the number of drivers running red lights is increasing or decreasing, and no comments have been found regarding the type of driver who is most likely to run red lights.

The use of automated enforcement offers considerable savings compared with the expense involved in having police surveillance at intersections followed by the police having to chase and stop vehicles that have run a red light. RLC systems are usually installed at intersections with particularly high accident rates. Chapter 4 provides some information on the safety effectiveness cameras installed at signalized intersections for target accidents.

As discussed in Section 7.6.2.1, Gains et al. reported on the effectiveness of the "National Safety Camera Programme" in the United Kingdom (*47*). The program was well supported by the public, but there are no well-documented comments on any changes in road-use culture after the installation of the cameras.

7.6.2.3. Enforcement to reduce driving under the influence

General beliefs and attitudes towards drinking and driving vary and are not well documented. The 1998 SARTRE study found that the perceived risk of being breathalyzed on a journey is low across Europe, but that attitudes in Northern European differ from those in Southern Europe (*44*). Drivers in Northern European countries tend to support strict drinking and driving laws and to reject any personal freedom in drinking and driving. Southern European drivers, however, underestimate alcohol risks for adult drivers. They have a far more lenient approach towards adult drivers who, they feel, should in most cases be able to police themselves. Southern European drivers see drinking and driving as a problem of young drivers who should be completely forbidden to drink and drive.

Greenberg et al. recently interviewed 273 people with multiple driving under the influence (DUI) offenses to establish how these offenders' beliefs were related to their impaired driving (*50*). The study was intended to help to focus public policy interventions designed to deter or prevent drunk driving. Greenberg et al. concluded that behavioral controls have the best prospects for reducing drunk driving

(*50*). Behavioral controls included internal behavior controls such as moral beliefs concerning alcohol-impaired driving, and external behavioral controls such as the offenders' perceptions of accidents and criminal punishment. Social controls (peer group pressure) appeared to be less important.

It is clear that alcohol has a major effect on driver error and that DUI is a major problem. Smith believes that "the number of alcohol related fatalities may be underestimated" and that it is likely that "some drivers become impaired well before the blood alcohol content (BAC) of 0.10 is reached" (*58*). Fuller points out that young, male drivers, alcohol, and high speed are a lethal combination: "these factors are associated with 40% of all loss-of-control fatal crashes involving young male drivers aged 18 to 21 years" (Laapotti and Keskinen cited by (*57*)).

Many approaches have been tried in the attempt to reduce DUI. The approaches include classes for juvenile DUI offenders, alcohol abuse treatment as an alternative to license suspensions, lowering the legal blood alcohol limit to 0.05, introducing random breath testing, and bar staff training. These particular approaches were assessed by the Ontario Ministry of Health in 1992, but there appeared to be no clear pattern of driver response (*62*). Some drivers were frequent violators and appeared to need special attention and policies (*62*).

Rogers' study emphasized the importance of punishment (*61*). Rogers' study evaluated two DUI laws introduced in California in 1990. One law reduced the permitted blood alcohol concentration (BAC) limit to 0.08 and the other law imposed a pre-conviction license suspension on arrested DUI offenders. These laws were "highly effective in reducing subsequent accidents and recidivism among DUI offenders" (*61*).

The University of California's Berkeley Traffic Safety Center concluded that "drinking and driving prevention seems to be most successful when it engages a broad variety of programs and interventions" (*52*). The authors investigated a program that included highly publicized sobriety checkpoints (which Smith regards as one of the most useful measures for deterring drunk driving (*58*)), responsible beverage service training, underage drinking controls, limits on alcohol availability, and media advocacy. The program was introduced in Salinas, California where it "succeeded not only in mobilizing the community, but also in reducing traffic injuries and impaired driving over a sustained period of time. Traffic crashes, injuries, and drinking and driving rates, all decreased as a result of the project" (*52*). The researchers commented that programs that concentrated only on sobriety check points succeeded in achieving a "decrease in crash numbers" and an increase in DUI arrests over the short term, but were not successful over the longer term.

These results of the studies discussed indicate that the culture of drinking and driving can be modified, but that change requires concentrated legislation and enforcement efforts and appropriate community programs to achieve long term and sustainable results.

7.6.2.4. Enforcement to increase seat belt and helmet use

In 2004, every state except New Hampshire had a seat belt use law, but most states had secondary seat belt use laws rather than primary seat belt use laws. The National Highway Traffic Safety Administration's 2004 survey found that seat belt use averaged "84 percent in primary states compared with 73 percent in secondary states" (*46*). The Insurance Institute for Highway Safety (IIHS) has recently conducted the first study of the effect of changing from secondary belt use law to primary law on accident fatalities. The IIHS examined driver fatalities in 10 jurisdictions where secondary laws were amended to primary (California, the District of Columbia, Georgia, Indiana, Louisiana, Maryland, Michigan, New Jersey, Oklahoma, and Washington). The data were from 1989 to 2003. The change in laws was usually combined with enhanced enforcement as many states participated in special 'Click It or Ticket' seat belt

enforcement campaigns. The Institute found that the enforcement campaigns and change to primary laws increased seat belt usage, and calculated that "when states strengthen their laws from secondary enforcement to primary, driver death rates decline by an estimated 7 percent" (*46*).

In the same press release, the IIHS points out that "65 percent of those killed riding on motorcycles weren't wearing helmets" and that "In states with universal helmet requirements, 80 percent of the motorcyclists were helmeted, compared with 14 percent in states without such laws" (*46*).

Chaudhary et al. examined the perceived risk of being ticketed for not wearing a seat belt (*48*). Chaudhary et al. recommended that existing laws should be strengthened "to create a higher perception of being ticketed" and that selective traffic enforcement programs to enforce of existing laws could increase safety belt use (*48*).

Agent et al. investigated Kentucky's 2003 "Buckle up Kentucky: It's the law and it's enforced" campaign (*53*). The campaign started three weeks before Memorial Day 2003. The enforcement period was one week before and one week after Memorial Day 2003. Agent et al. found that there was a drop in injuries during the two-week enforcement period. The authors recommended that the law in Kentucky should be changed from secondary to primary enforcement and that the public must be made aware that the law is being enforced (*53*).

The studies above indicate that the adoption of primary seat belt laws will increase the use of seat belts and effectively modify road-use culture. This finding is supported by the 1998 SARTRE study in Europe that found that for seat belt usage, there were few voluntary adopters (*44*). People were more likely to wear seat belts after legislation was introduced and the law was necessary to help to create the critical threshold after which adoption was widespread.

7.6.3. Education Programs

Typical education issues and initiatives include:

- Public education campaigns;
- Young drivers and graduated driver licensing programs; and
- Older drivers and retesting older drivers.

7.6.3.1. Public education campaigns

Most enforcement efforts include public information, warnings, or educational campaigns. Maekinen and Oei (1994) "stress that publicity and warning signs contribute significantly to the effectiveness of the technology" used in enforcement Maekinen and Oei (1994) (cited by (*59*)). "Traffic safety programs that include highly visible public information and education (PI&E) campaigns that accompany law enforcement efforts have proven to both increase positive public impressions toward police activities and result in safer driving habits" (*59*). Regarding positive public impressions, a program in Boise, Idaho, was able to show the police as genuine in their wish to use enforcement to promote safety rather than to stop motorists and impose fines (*59*).

Stuster et al. found that the most effective programs comprise integrated PI&E and law enforcement (*59*). None of the PI&E campaigns that they reviewed resulted in a "significant reduction in speed, speeding, crashes, or crash severity" unless the campaign was "closely tied to an enforcement or engineering program" (*59*). "General assessment of public information programs has shown them to have limited effect on actual behavior except when they are paired with enforcement" ((*55*), page V-11).

Neuman et al. emphasize the importance of using multimedia that are carefully planned, professionally produced and expensive, but "while some agencies have reported successful public

information campaigns and linked those campaigns to targeted enforcement, there is little published evidence of [the] effectiveness" of PI&E campaigns and "assessing the effectiveness of a large scale public information campaign is almost impossible". It may only be possible to test for public awareness of the problem and knowledge of the campaign's message. Testing needs to determine drivers' exposure to the message and their response to the message (*55*).

7.6.3.2. Young drivers and Graduated Driver Licensing programs

Graduated driver licensing (GDL) programs were developed because novice drivers have an increased risk of crashes. Teenagers are more likely to be involved in deadly crashes than are most other age groups (*6*). Teenage drivers are three times more likely to be in a fatal traffic crash than are other drivers (NHTSA, 1998 cited by (*51*)).

Aultman-Hall and Padlo used 1997 to 2001 crash reports for drivers aged 16 to 20 years in Connecticut. Their study investigated the relative propensity of young drivers to cause a traffic crash ((*51*), pg 22):

- At night
- On freeways vs. non-freeways
- Driving with passengers (by number and age of passengers).

The results confirmed research that has shown that "young drivers, especially young males and those who are 16 and 17 years old, are more likely to cause both single and two vehicle traffic crashes. The risk is great enough to suggest that this group of drivers should be subject to measures that minimize their exposure, especially in known risky circumstances like nighttime and on freeways." (*51*)

Young drivers' risk is increased due to their age and lack of experience as drivers. Fuller noted that over-representation of young drivers in crashes "appears to be universal" ((*57*), pg 8) despite a wide variety of driver training approaches across Europe. In particular, young male drivers may have a risky life style and they typically over-estimate their competence. They also drive more at night. These factors are transferred to driving and result in higher crash rates.

The immaturity of young drivers gives them an "optimism bias" (Dejoy, 1989 cited by (*51*)). Young teenage drivers are more likely to drink alcohol and drive (NHTSA, 2000 cited by (*51*)) and less likely to wear seat belts (NHTSA, 1998 cited by (*51*). As young drivers mature in age, however, they are less prone to risk-taking life styles and their risk of accidents is reduced.

Recent research "suggests that increased driving experience is somewhat more important than increased age in reducing collisions among young novices" (*54*). Unfortunately, young drivers are at risk while getting the experience they need.

GDL is intended to "encourage new drivers to gain driving experience under conditions that minimize exposure to risk" and to ensure that new drivers are exposed to more demanding driving situations only when they have enough experience (*54*). GDL takes lifestyle factors into account by including restrictions such as zero blood alcohol, not driving on high speed highways, not driving at night, and limitations on the number and age of passengers.

The exact restrictions and progression of GDL programs vary among jurisdictions. GDL was first introduced in New Zealand in 1987. In North America, California and Maryland were the first states to introduce some elements of GDL. Florida introduced a GDL program in 1996. By 2003, 47 states and ten Canadian province and territories had full or partial GDL programs.

Mayhew and Simpson reviewed evaluations of the safety of GDL programs and found that "Research has demonstrated that graduated licensing is an effective public safety measure – all program evaluations published to date have reported safety benefits" with "overall reductions in crashes of 4 to 60 percent" in the United States, Canada and New Zealand (Simpson 2003, cited by (*54*), pg 5). The variation in results may be due to differences in the programs (for example various restrictions applied to carrying teenage passengers or driving at night), differences in the study methodology, and to differences in the age groups studied. Long-term studies "have found sustained and significant reductions of 7 percent" (Langley et al. 1996, cited by (*54*), pg 6).

Mayhew and Simpson noted that GDL enjoys strong support from parents and teenagers (*54*). This support is necessary for GDL to be successful as parents must help by enforcing the restrictions and by ensuring that new drivers get practice.

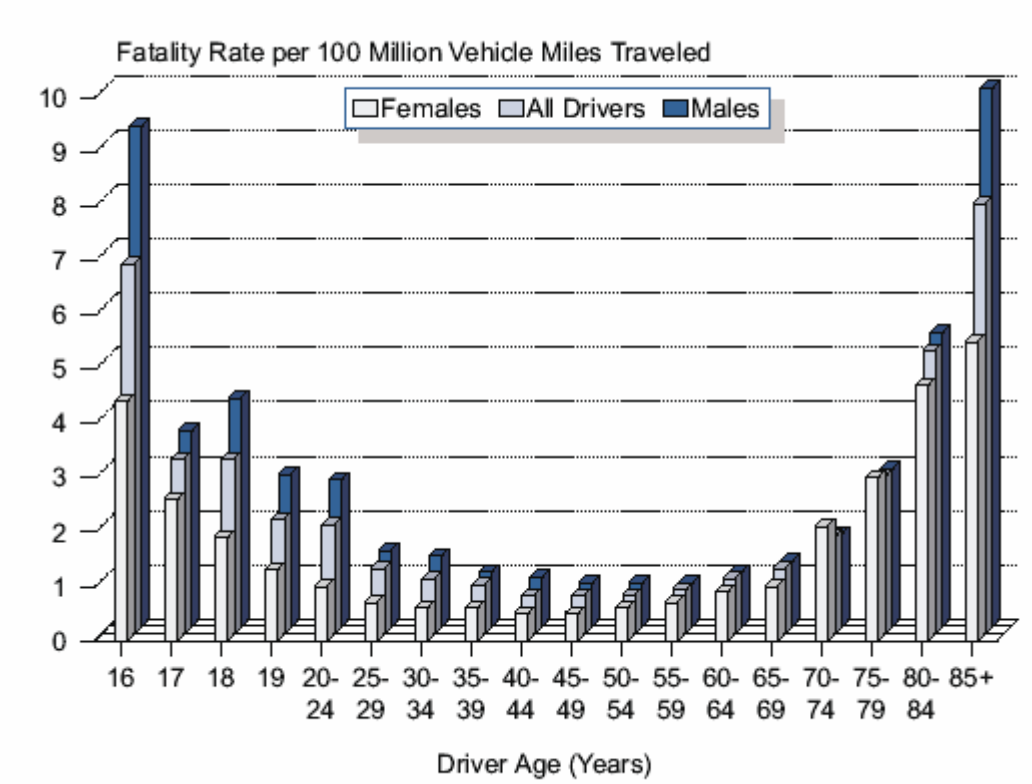
Research should be conducted into how GDL programs can be further improved and how driver education for young people can be extended to go well beyond basic knowledge and skills. Research into driver education for young people might include investigating the effectiveness of driver education programs, the role of social influences among young people, and how best to explain risky driving behaviors, driving as a dangerous activity, situations where driving task demands may exceed capability, and the problem of young drivers' actual skills versus their perceived skills.

It is believed that GDL programs will modify road-use culture and the approach of new drivers in our communities.

7.6.3.3. Older drivers and retesting older drivers

There is great variability in the way drivers' abilities decline with age and how this affects the driving skills of the elderly. "There were 18.5 million older licensed drivers in 1999, a 39 percent increase from the number in 1989. In contrast, the total number of licensed drivers increased by only 13 percent from 1989 to 1999" (*63*). By 2030, there will be approximately 70 million older adults, more than twice the number in 1997. Older drivers, along with young drivers, have more accidents per miles driven than any other age group, as shown in Exhibit 7-15.

Exhibit 7-15: Driver fatality rates by age and sex, 1996 (63)



Special renewal procedures for older drivers (in addition to normal renewal procedures) are designed to ensure that older adults meet license requirements (*49*). When drivers reach the age of 65 or 70, most states have shortened renewal cycles and the requirement that older drivers must renew their licenses in person rather than remotely. Older drivers whose capabilities are in doubt may be required to undergo physical or mental examinations. They may also have to retake the standard licensing tests (vision, written, and road tests). Certain restrictions may be applied. These restrictions might include nighttime driving or installing additional mirrors.

The road-use culture of older drivers will be a critical issue in years to come. Communities will need to revisit the infrastructure to accommodate the growing proportion of these road users.

7.6.4. Summary

Motor vehicle crashes are the leading cause of death for Americans. If crashes are to be reduced, it will be necessary to have a much better understanding of driver culture than is presently available. This understanding will help us to design treatments and interventions that are likely to be successful in changing driving behavior and increasing safety, and will also help us to create appropriate safety campaigns and enforcement procedures. Studies suggest that it is particularly difficult to change the road-use culture regarding the choice of driving speed and observation of speed limits, but various levels of progress have been made changing the road-use culture regarding, for example, DUI and seat belt usage. Graduated driver licensing programs and special consideration and testing of older drivers are helping to allow for the special problems of these two groups with the aim of reducing their accident rates.

Studies show that enforcement has a vital role in changing driver behavior, if only in the short term. It should be mentioned that if enforcement is to succeed in reducing undesirable and dangerous driving practices and if enforcement is to have a chance of bringing about a change in road-use culture, it is essential that the supporting traffic laws are sound and well enforced throughout the network. If traffic laws are not enforced, the perceived risk of being apprehended for a traffic violation will be low. If enforcement actions are few and far between, motorists will take advantage of their apparent freedom to speed, drive inconsiderately, run red lights, etc. and will not change their driving habits.

Good enforcement requires public support for what is being enforced. It also requires resources to maintain and, where necessary, increase the law enforcement presence. Automated enforcement (for speed and red-light-running enforcement) with the appropriate enabling legislation offers the potential for important savings.

Enforcement cannot succeed without a supportive administrative and court system. When a ticket is issued, there must be an efficient system that tracks and manages the process of collecting the fine or forwarding the offender to the courts. The police will not aggressively pursue traffic infringements if they know the fines will not be collected or that the courts will not prosecute offenders. There must be consistent treatment of convictions and penalties and as few loopholes as possible.

The public will not take enforcement seriously if they know that the system does not work and that there is a good chance of avoiding conviction. Where driving habits are entrenched and hard to change, it may be necessary for the courts to have the authority to impose strong penalties that convey the message that attitudes and behavior need to change and that aggressive, unsafe driving will not be tolerated.

7.7. Transitions between Highway Facility Types [Future Edition]

In future editions of the HSM, this section may discuss transitions between highway facility types and safety, from a road network perspective. Research from Chapter 5 may be of interest in this section. Potential resources were not identified for this section.

7.8. Security (against Crime) and Safety [Future Edition]

In future editions of the HSM, this section may discuss engineering treatments to increase the security of road users, particularly bicyclists and pedestrians, against crime. For example, overpasses and underpasses are often not utilized at night due to security concerns. Potential resources were not identified for this section.

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Iowa's Experience with Road Diet Measures

Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates

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A before-and-after study implemented from a Bayesian perspective to assess crash history reduction due to road diets in Iowa was conducted by the Iowa State University Department of Statistics in cooperation with the Iowa Department of Transportation's Office of Traffic and Safety. The study used both monthly crash data and estimated volumes obtained from TAS for 30 sites—15 treatment and 15 comparison—over 23 years (1982 to 2004). The sites had volumes ranging from 2,030 to 15,350 during this period and were largely located in smaller urbanized areas. The research objective was to assess whether road diets appear to result in crash reductions on Iowa roads. Crash data were analyzed at each site before and after the conversions were completed. Given the random, rare nature of crash events, a hierarchical Poisson model was fitted, such that log mean rate was expressed as a piecewise linear function of time period, seasonal effects, and a random effect corresponding to each site. Monthly traffic volumes were incorporated as exposures. Estimation of model parameters was conducted within a Bayesian framework. Results indicate a 25.2% reduction in crash frequency per mile and an 18.8% reduction in crash rate. This differs from a previously publicized study that reported a 6% reduction in crash frequency per mile and an insignificant indication for crash rate effects. The results from the Iowa study fit practitioner experience and agree with another Iowa study that used a simple before-and-after approach on the same sites.

A Bayesian before-and-after data analysis to evaluate crash history reduction due to road diets in Iowa was conducted by the Iowa State University (ISU) Department of Statistics in cooperation with the Iowa Department of Transportation (IDOT) Office of Traffic and Safety (TAS) (*1*). The study used both monthly crash data and estimated volumes obtained from TAS for 30 sites, 15 treatment (Sites 1 through 15) and 15 comparison (Sites 18 through 32), over 23 years (1982 to 2004). Site volumes ranged from 2,030 to 15,350 during that period and were largely located in smaller urbanized areas. Table 1 displays site locations and Year 2000 city populations and volumes. Further data discussion is presented later.

The main goal was to assess the before-and-after impacts of road diets in Iowa. Given the random and rare nature of crash events, the monthly nature of the data, and apparent seasonal effects on crash frequency, a hierarchical Poisson model—in which log mean rate was expressed as a piecewise linear function of time period, seasonal effects, and a random effect corresponding to each site—was fitted to the crash frequencies. A Bayesian approach was adopted for estimating model parameters and drawing inferences.

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Transportation Research Record: Journal of the Transportation Research Board, No. 1953, Transportation Research Board of the National Academies, Washington, D.C., 2006, pp. 163–171.

LITERATURE REVIEW

Road diets have been implemented for numerous years. The earliest road diet for our study was completed in 1993. Another source mentions road diets in the mid-1970s and 1980s (*2*). Despite this other information, little formal research has been conducted on safety impacts of road diets, the most notable being relatively recent (*3–5*). However, several studies have mentioned the operational impacts. A review of these can be found by referencing Knapp and Giese (*6*). The consensus of these studies is that under most average daily traffic (ADT) conditions tested, road diets have minimal effects on vehicle capacity because left-turning vehicles are moved into a common two-way left-turn lane. However, if road diets are implemented on roads with ADTs above approximately 20,000 vehicles, there is high probability that traffic congestion will increase until traffic diverts to alternate routes (*3–5*). An Iowa study for one site found that 85th percentile free-flow speed reduced 4 or 5 mph (6 or 8 kph) and the percentage of vehicles traveling more than 5 mph (8 kph) over the speed limit dropped by 30% after implementation (*7*).

Figure 1 shows a road diet implemented by reallocating existing space while leaving the overall area unchanged (*3–5*).

Road diets offer potential benefits to vehicles and pedestrians. On a four-lane street, drivers change lanes to pass slower vehicles or vehicles stopped in the left lane waiting to turn left. In contrast, drivers' speeds on two-lane streets are limited by the lead vehicle's speed. Thus, road diets may reduce vehicle speeds and vehicle interactions during lane changes, which could reduce frequency and severity of vehicle-to-vehicle crashes. Pedestrians benefit because they have fewer lanes of traffic to cross and motor vehicles are likely to be moving slower (*3–5*).

Use of Bayesian approaches in highway safety research began with the introduction of empirical Bayes (EB) by Persaud and Hauer (*8*) and Hauer (*9*). Since then, much research using EB has emerged (*10–14*), and EB has become a research mainstream, to the point where two recent syntheses (*15, 16*) have discussed the approach and two federal software efforts, the Interactive Highway Safety Design Module and the Comprehensive Highway Safety Improvement

TABLE 1 Site Locations

ID	City	Population 2000	Volume 2000	ID	City	Population 2000	Volume 2000
1	Storm Lake	10,076	7,503	18	Storm Lake	10,076	8,790
2	Clear Lake	8,161	10,403	19	Le Mars	9,237	10,880
3	Mason City	29,172	7,800	20	Cedar Falls	36,145	2,768
4	Osceola	4,659	8,172	21	Jefferson	4,626	5,685
5	Manchester	5,257	9,400	22	Harlan	5,282	6,981
6	Iowa Falls	5,193	10,609	23	Norwalk	6,884	7,679
7	Rock Rapids	2,573	4,766	24	Belmond	2,560	3,734
8	Glenwood	5,358	6,410	25	Harlan	5,282	6,981
9	Des Moines	198,682	13,695	26	Des Moines	198,682	13,953
10	Council Bluffs	58,268	11,000	27	Ames	50,731	10,711
11	Blue Grass	1,169	9,155	28	Mapleton	1,322	3,007
12	Sioux Center	6,002	8,942	29	Algona	5,741	7,263
13	Indianola	12,998	13,288	30	Oskaloosa	10,938	11,143
14	Lawton	697	9,237	31	Merrill	754	7,774
15	Sioux City	85,013	9,608	32	Sioux City	85,013	15,333

Model/Safety Analyst, are primarily based on EB principles (*13*). The current *Highway Safety Manual* development effort (*17*) uses much EB research as a basis. Hauer's 1997 book directly addressed before-and-after studies, comparing the EB approach with the classical naïve and classical comparison-group methods (*12*). EB is at the forefront for traffic safety research and will be for years.

Recently, fully Bayesian (FB) approaches have been explored by traffic safety researchers. Beginning with computer and methodological advances in the early 1990s, the feasibility of implementing fully Bayesian methods, perhaps to fit multilevel (or hierarchical) models, began to be explored for transportation-related research (*18–24*). Much like EB, FB is gaining wider acceptance; however, broad application may be years away as modeling techniques are explored and refined. On the basis of previous and ongoing FB-related work within Iowa (*21*), the FB approach serves as the analysis basis for Iowa road diet experience. The focus of this work, however, is not methodological. The work's main objective is to explore whether road diets are associated with an increase in traffic safety in Iowa.

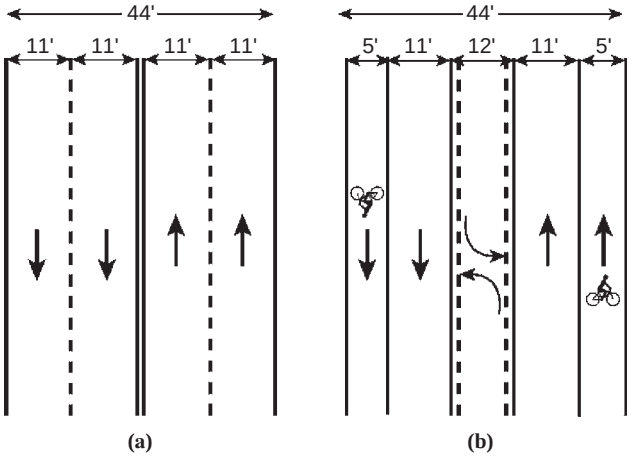


FIGURE 1 Example of road diet (*3–5*): (*a*) before conversion to road diet and (*b*) after conversion to road diet.

SITE AND DATA DESCRIPTION

Site Selection and Data Collection

Each treatment site had a different, known intervention date; the dates are shown in Table 2, in the completion year column. Monthly crash records for all sites (except Site 20) were available for the period 1982 to 1994, but because the intervention date varied across treatment sites, the number of before-and-after crash records varied by site. Monthly volume data for each site were also obtained for 1982 to 2004. Because the information available for Site 20 was not reliable, that site was omitted from the analyses.

Crash data were obtained by visual inspection within a geographic information system (GIS); data on crashes appearing along the road were exported to a file. The volume data were obtained similarly, with a beginning with visual selection within the GIS and then exporting to a file. TAS has 6 years (1998 to 2003) of roadway inventory data, which includes traffic volumes; another 7 years of solely volume data (1991 to 1997); and factors available to estimate earlier yearly volumes. Other factors exist to estimate monthly volumes by type of facility. These monthly volume data for the 23 years were estimated for each site through use of a custom SAS Institute code to apply these factors. The lengths for the sites were derived directly from the GIS-based mapping. Later, additional custom SAS code was used to parse the crash data by month, merge these data with the volume data, and develop a consolidated database for all locations.

Comparison sites were included to allow isolation of the intervention as a factor should an increase in safety be observed at treatment sites. Comparison sites are useful only if they are sufficiently similar to the treatment sites (in the relevant attributes) to play the role of the treatment sites but without the intervention. Carefully chosen comparison sites permit inference of what might have happened at the treatment sites had intervention not been implemented. In the Iowa study, comparison sites were chosen to match treatment sites in attributes

TABLE 2 Site Descriptive Information

ID	Yoked ID	Route	Number of Lanes	Length (mi)	Completion Year	ID	Yoked ID	Route	Number of Lanes	Length (mi)	Completion Year
1	18	IA 7	3	1.41	1993	18	1	IA 7	4	0.71	1993
2	19	US 18	3	1.51	2003	19	2	US 75	4	1.80	2003
3	20	IA 122	3	1.78	2001	20	3	Local	4	1.80	2001
4	21	US 34	3	2.04	2001	21	4	IA 4	4	2.40	2001
5	22	IA 13	3	0.35	2001	22	5&8	IA 44	4	1.20	2001
6	23	US 65	3	1.23	2002	23	6	IA 28	4	0.80	2002
7	24	IA 9	3	0.35	1998	24	7	US 69	4	0.90	1998
8	25	US 275	3	1.09	1998	25	5&8	IA 44	4	1.20	1998
9	26	Local	3	1.19	1999	26	9	Local	4	1.50	1999
10	27	US 6	3	0.20	2000	27	10	Local	4	0.33	2000
11	28	Local	3	0.72	1999	28	11	IA 141	4	0.70	1999
12	29	US 75	3	1.52	1999	29	12	US 169	4	2.00	1999
13	30	IA 92	3	1.57	1999	30	13	IA 92	4	1.50	1999
14	31	US 20	3	0.64	2000	31	14	US 75	4	0.50	2000
15	32	Local	3	0.77	2000	32	15	Local	4	1.20	2000

including traffic volume, geometry, and location (in terms of population size), all factors believed to be associated to safety. The pairs are shown in Table 2 as columns ID (site identification) and yoked ID (paired ID). Treatment sites are indicated as having three lanes as opposed to four lanes for comparison sites.

Exploratory Analysis of Crash Data

Figure 2 shows monthly crash density at a set of paired sites. Crash density is shown on the *y*-axis; the *x*-axis is months. The vertical line marks the intervention completion time at the treatment site and is also shown in the comparison site plot. The solid line is a smooth estimate of crash density over time. The smooth curve was obtained by fitting a nonparametric local polynomial regression with optimal bandwidth (*25*). The nonparametric regression model was fitted as an exploratory tool. The smooth mean crash curves provide some insight into the evolution of crash density at treatment and comparison sites and about the form of the Poisson regression to be fitted in later analyses.

Figure 3 explores the potential differences in monthly crash rates between treated and comparison sites in another pair of sites (Sites 9 and 26). The plot shows three curves: the monthly crash rate (crashes per hundred million vehicle miles traveled) for the treated site, the monthly crash rate at the comparison site, and the difference in monthly crash rates between the comparison and the treated sites. The difference is plotted with the solid dark curve. The difference appears to be more consistently negative after the intervention than before.

In general, as shown by example in Figure 2, the authors observed a decrease in the number of crashes at both treatment and comparison sites over the duration of the study. However, just the raw numbers suggest that the reduction in crash density and in rate at treatment sites accelerated after intervention. (See Figure 2 for density and Figure 3 for rate.) Thus, the data collected in Iowa are not consistent with those collected on the West Coast and that were analyzed by Huang et al. (*3*–*5*); the data from those studies, even before statistical analyses, indicated only a slight (if any) impact of the road diets.

METHODS

Notation and Model

Crash events are often modeled as Poisson or negative binomial random variables. The authors formulated a hierarchical Poisson regression model for monthly crash density in which the log mean rate is expressed as a function of time period, seasonal effects, and a random effect corresponding to each site. Because mean rate itself is modeled as random, this model accommodates the overdispersion often observed in crash density data. Often, the Poisson mean is modeled as a gamma random variable [e.g., Persaud and Hauer (*8*)]. The Poisson–Gamma model has been shown to fit crash data well but does not easily lend itself to accounting for potential effects of covariates such as time, season, and month of conversion on crash density.

Let (y_{it}, υ_{it}) denote number of crashes per mile (density) (y) and traffic volume (υ) at site i during month t, and let

$$y_{it} \sim \text{Poisson}(\theta_{it})$$

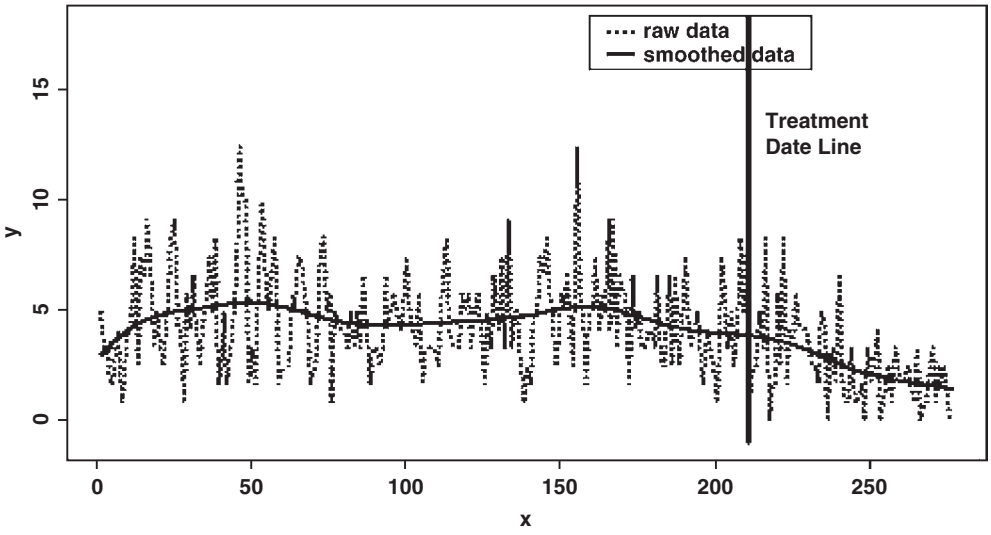
where $\theta_{it} = \lambda_{it}\upsilon_{it}/1{,}000$ is the expected number of crashes and λ_{it} is the crash rate per 1,000 vehicles.

Here, $i = 1, \ldots, 29$ and $t = 1, \ldots, 276$. At the second stage, let

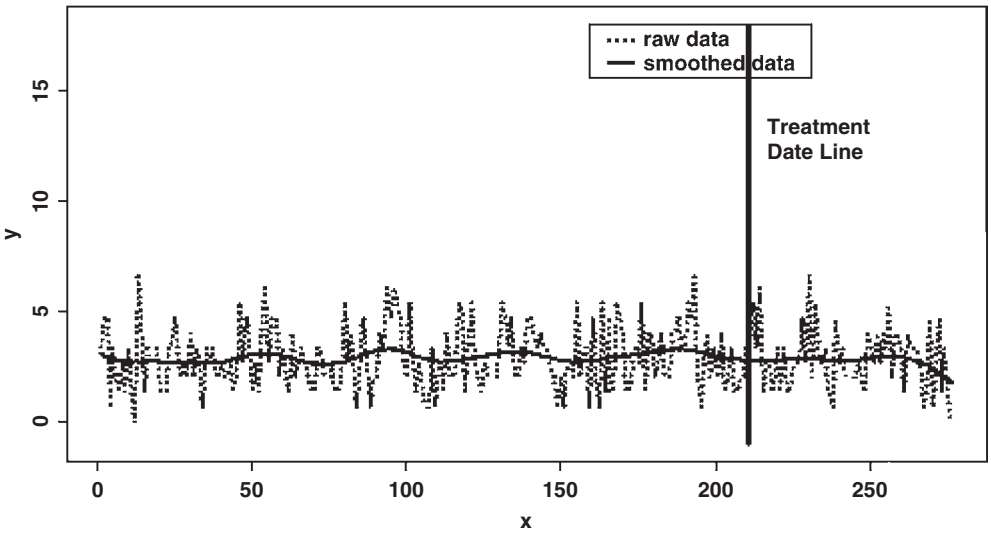
$$\log(\lambda_{it}) = \beta_1 + \beta_2 X_{1i} + \beta_3 t + \beta_4 (t - t_{0i}) I_{\{t>t0i\}} + \beta_5 X_{1i} t + \beta_6 X_{1i} (t - t_{0i}) I_{\{t>t0i\}} + \beta_7 X_{2it} + \beta_8 X_{3it} + \beta_9 X_{4it} + id_i$$

where

$id_i \sim N(0, \sigma_b^2)$ and σ_b^2 = the between-site variance in log mean rate,
X_1 = 1 if the site is a treatment site and zero otherwise,
t = month,
t_{0i} = month during which the intervention was completed in site i,



(a)



(b)

FIGURE 2 Observed and smoothed estimated monthly crash density for sample pair of sites: (*a*) Site 9 and (*b*) Site 26.

$I_{\{t>t0i\}}$ = an indicator variable that takes the value 1 if the tth month is posterior to the month during which intervention was completed at the treatment site, and

$X_{2it}, X_{3it}, X_{4it}$ = three seasonal dummy variables defined for site i during month t to account for the possible effect of the four seasons on crash density. The seasonal variables can be thought of as trigonometric dummies and are given by

$$X_{2it} = \cos\left[\left(2\pi \times S_{it}\right)/4\right]$$

$$X_{3it} = \cos\left[\left(4\pi \times S_{it}\right)/4\right]$$

$$X_{4it} = \sin\left[\left(2\pi \times S_{it}\right)/4\right]$$

where $S_{it} = 1, 2, 3$, or 4 if month t is winter, spring, summer, or fall, respectively.

The model allows estimation and accounting for time effects, conversion month, and season on log mean rate. In the second stage of the model, the log mean rate was allowed to be a piecewise linear function of time, in which the change point (or point where the linear segments join) is located at the intervention completion month in treatment sites. For comparison sites, the change point was located at the same month as for the corresponding paired treatment site. It was assumed that the effect of volume on crash density was linear, a plausible assumption because the volume at treatment and comparison sites did not change significantly after intervention implementation. Had a change in traffic volume been observed, log mean density (rather than rate) would have been modeled as a function of covariates, with volume included as an offset variable. All site volumes were well below the 20,000 threshold over which it is hypothesized that road diets may have an impact on volume (*3*–*5*).

The monthly crash data clearly showed seasonal effects, as would be expected in Iowa. The four seasons were defined as follows:

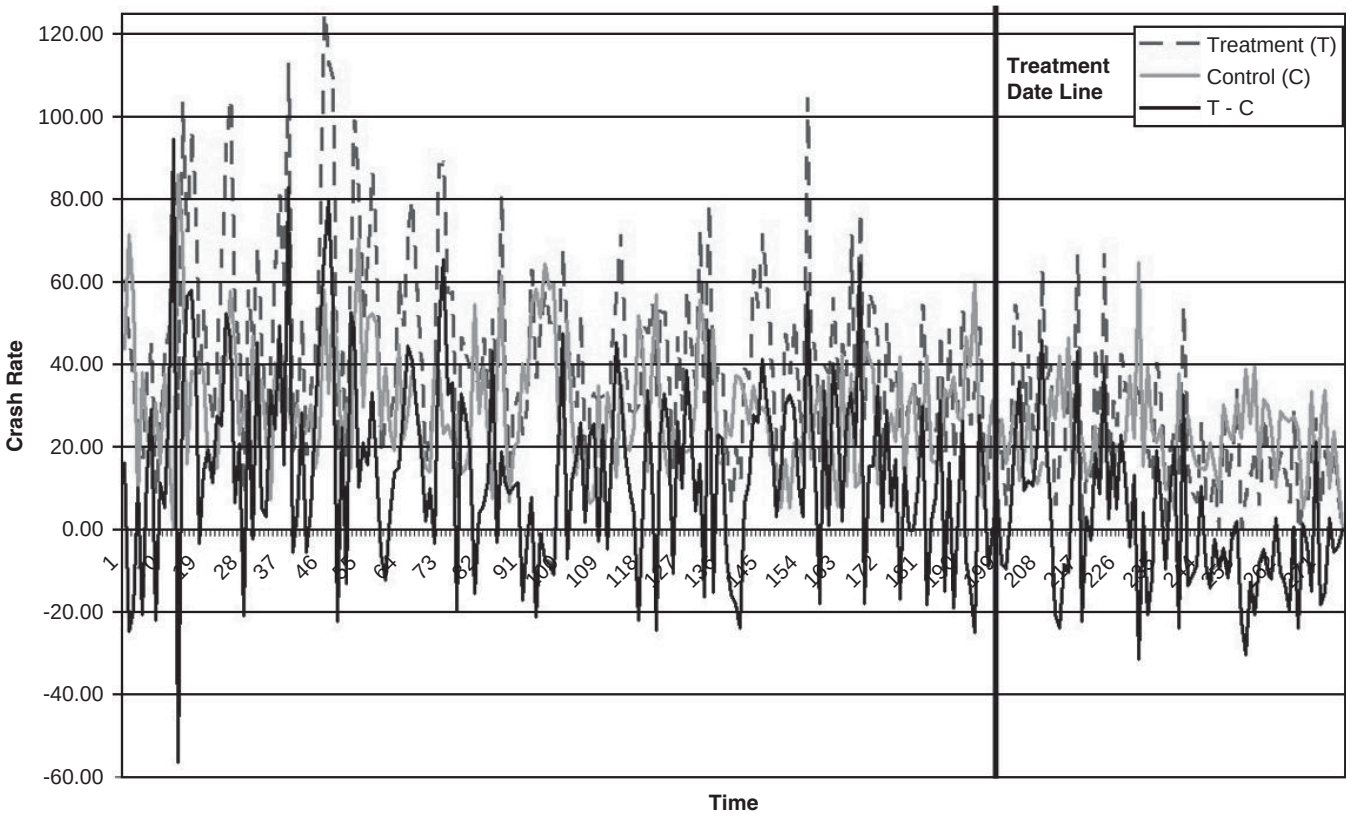


FIGURE 3 Monthly crash rate and difference in monthly crash rate for sample pair of sites.

winter (December, January, and February), spring (March, April, and May), summer (June, July, and August) and fall (September, October, and November) and were accounted for by including the three smoothly evolving cyclical functions of season with different period and frequency defined above. These seasonality covariates capture the smooth and repeating seasonal trends.

Finally, because these sites represent a random sample of similar sites in Iowa, a random effect corresponding to site was also included in the model for log crash rate. The random effect was assumed to be normally distributed with mean zero and unknown variance representing between-site variability in crash rates.

The use of a piecewise model, also known as a change-point model, to analyze before-and-after studies has not yet received much attention in the traffic safety literature. Essentially, a change-point model assumes that the evolution of crash rates over time before the intervention is different from the evolution after intervention. Inspection of observed crash frequencies suggests that crash rates have decreased at all study sites over the past several years. The change-point model allows us to quantify the differences in the slopes of log crash rate on time before and after the conversion. Because some sites were treated and some were not, different before-and-after slopes were included for treated and comparison sites.

Estimation of Model Parameters

A Bayesian approach (*21, 26*) was adopted to estimate model parameters. In the Bayesian approach, model parameters are treated as random variables and the goal is to estimate the distribution of likely values of the parameters given priors and data information. This distribution is called the posterior distribution. The approach differs from classical methods in that (*a*) distributions of likely values, rather than point estimates and standard errors of parameters, are obtained and (*b*) all results are conditional on the sample. One other fundamental difference between the classical and the Bayesian approaches is that prior information about model parameters can be combined with information contained in the sample to draw inferences. This is not possible within the classical framework. The EB approach (*12*) is a special case in the Bayesian paradigm in which prior distributions are partially based on the sample.

To conduct a Bayesian analysis, one must choose prior distributions for all parameters at the third level of the model. This work used proper, semiconjugate but diffuse priors for two reasons. First, proper priors guarantee that the joint posterior distribution will be integrable. By letting the priors be noninformative (or almost noninformative), the data are allowed to "speak for themselves." In this study, the number of observations available for each site, as well as the number of sites, was large enough to assume that the priors will have little if any influence on the posterior distribution. The normal prior distributions were chosen for all regression coefficients in the log crash-rate model, with mean zero and a large variance, reflecting the belief that a priori none of the covariates in the model may be associated with the log crash rate. The between-site variance was assumed to be independent of the regression coefficients a priori and was modeled as a scaled inverted chi-square distribution. The prior expected value of the inverse between-site variance was assumed to be 1, and its prior variance was set at 100 to reflect lack of precise knowledge.

With the use of Markov chain Monte Carlo (MCMC) methods and the freeware WinBUGS, estimates were made for the posterior distributions of the parameters in the model and of functions of model parameters (*27, 28*). For each parameter, two independent parallel chains were run over 200,000 iterations. Each chain was burned at iteration 100,001, and to avoid autocorrelation of parameter draws, the chains were thinned, with every 100th draw being kept for inference. Convergence of the chains were monitored with the Gelman–Rubin statistic (*29*) and autocorrelation functions were checked. That is, 2,000 almost independent draws were obtained from the marginal posterior distributions of each parameter in the model.

Monte Carlo estimates of quantities of interest, including means, standard deviation, and various percentiles of the marginal posterior distribution of each parameter, were obtained from the draws. For example, posterior means were estimated as the averages of parameter draws over the 2,000 iterations. Similarly, posterior standard deviations were estimated as the empirical standard deviations of draws over the 2,000 iterations.

To assess the effect of road diets, crash rates and densities were compared in periods before and after the intervention for treatment and comparison sites. To do so, draws were first obtained of monthly mean crash density for each site and each month. Then those draws over the months composing a year were added, and thus a posterior distribution of annual crash density was obtained for each site and each year. The distribution of mean crash rate for each site and each year was obtained by the posterior distribution of mean crash density being combined with the estimated annual traffic volume at each site and each year. A posterior distribution of crashes before and after the intervention for each site (both density and rate) was obtained as an average, over the appropriate years, of the annual estimates of density and rate. One advantage of implementing a Bayesian analysis through use of MCMC methods is that posterior distributions of functions of model parameters can be readily computed from the draws.

RESULTS

Posterior distributions were estimated for all model parameters as well as for site-specific and group-specific (treatment or comparison group) quantities, including mean crash rates and mean crash densities over various time periods.

As anticipated from the exploratory analyses of the data, there was a significant decrease in crash rate and density over time in all sites. However, the regression coefficient denoted β_6 in the model described earlier had a posterior distribution with almost all of its mass below zero, a situation indicating that the parameter was very likely to be negative. That parameter controls the difference in the slope of log crash rate on time between treatment and comparison sites. A negative value for β_6 suggests that the decrease in crash rate accelerated after intervention at treated sites. The slopes of log crash rate on month are significantly different for treatment and comparison sites after intervention, but they are not significantly different before intervention was implemented.

Also as anticipated, the seasonal effects on log crash rate were significant; in Iowa, crash rates increase significantly in winter, but differences in rates among spring, summer, and fall were not significant.

Overall, results indicate a 25.2% (23.2% to 27.8%) reduction in crash frequency per mile and an 18.8% (17.9% to 20.0%) reduction in crash rate over the 15 treatment sites in relation to the comparison sites. The values in parentheses are the posterior 2.5th and 97.5th percentiles of the appropriate distributions and constitute a central 95% credible set. That is, with 95% probability, the true reduction in crash frequency per mile is between 23.2% and 27.8%. These results are illustrated in Figures 4 and 5.

Figure 4 shows, for an example pair of sites, the posterior mean of the expected yearly crash density and the 2.5th and 97.5th percentiles of the posterior distribution of crash density. The solid vertical lines on each plot mark the year of completion of the intervention at the treated sites.

Figure 4 shows that there was an estimated reduction in crash density at these sites. The reduction appears to be more pronounced at the treatment site. The 95% credible sets for expected crash frequencies are in general rather narrow. Thus, the authors are confident that site-specific expected annual crash frequency per mile is estimated with a good degree of confidence.

Also computed was the posterior distribution of expected annual crash densities for all treated and all control sites over the years preceding and following the intervention. Because the number of years following the intervention varied across sites, not all sites contributed equally to the overall estimate for the after condition. The four posterior distributions are shown in Figure 5, which shows that, while the expected annual crash density has decreased at all sites, the reduction is significantly more pronounced at sites that underwent the conversion. The posterior distributions shown in Figure 5 are narrow, a situation indicating that the posterior mean is a reliable summary of the distribution of likely values of expected crash frequencies.

In the comparison group, the two posterior distributions overlap somewhat. This overlap indicates that the reduction in crash density in the after period, while noticeable, is not overwhelming. In contrast, the posterior distribution of average expected crashes per mile after intervention has shifted significantly relative to the distribution estimated for the period preceding the conversion.

The overall 25% and 19% results differ from the Huang et al. study (*3–5*); that study reported a 6% reduction in crash frequency per mile and an insignificant indication for crash-rate effects. This difference is evident when the raw data from the two studies are compared. The Iowa data, when graphed, indicate marked reductions, whereas the Huang data indicate very little difference. On the basis of these Iowa FB results and results from a simple before-and-after analysis done as part of a separate causal study (*30*), the authors are comfortable with the 25% and 19% reductions, especially as they fit practitioner expectations. The simple before-and-after analysis done by the previous causal study on the same sites used a simple before-and-after method with comparison groups and indicated a 24% reduction in crash density due to road-diet implementation (*30*). This previous study also determined that injury crashes were reduced 34% and showed reductions in crash involvement by younger and older drivers.

DISCUSSION OF RESULTS

A hierarchical Poisson regression model was fitted to the crash density observed at each site. The log monthly crash rate at each site was then modeled through the use of a piecewise linear regression model with a change point. The independent variables (or explanatory variables) in the change-point regression included the effects of the four seasons of the year, treatment, time, and interactions of treatment and time. To estimate the association between log monthly crash rates and the explanatory variables, a random effect was added to account for overdispersion and for autocorrelation among observations obtained at the same site. Proper but noninformative priors were used for all parameters in the model, and all calculations were

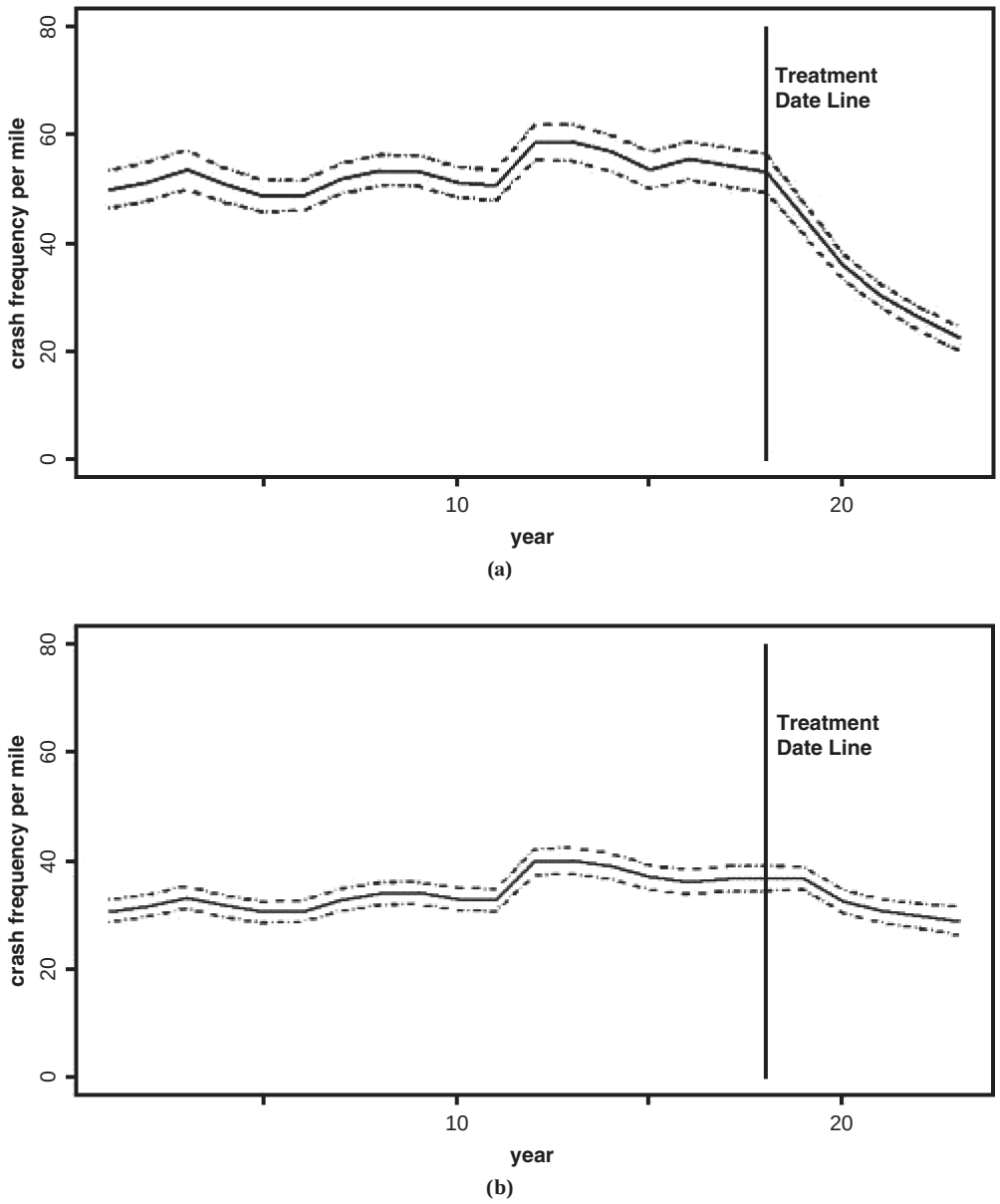


FIGURE 4 Posterior mean and 95% credible set of expected crash frequency per year and per mile for sample pair of sites: (*a*) Site 9 and (*b*) Site 26.

accomplished through use of MCMC methods implemented in WinBUGS. The model permits accounting for temporal variation in traffic volume [e.g., Hauer (*12*)] and also for the effect of season on crash density. The model explicitly recognizes that the observed number of crashes at a site during any one month is a noisy measurement of the site's true or long-run mean crash density. By focusing on estimation of the expected number of crashes at the site given observations at the site, the model addresses the regression-to-the-mean problem.

The model discussed earlier was chosen to describe the data on the basis of information gleaned from exploratory analyses. Alternative models could have also been considered. One such alternative model might have included an additional parameter to accommodate an abrupt decrease in crashes at treated sites. That is, the model could have included a discontinuity in crashes immediately following the intervention. From a traffic safety point of view, the expectation of a sudden drop in the number of crashes at a site that underwent a major modification would seem to be plausible. Thus, a second model was fitted to the data, this time including a drop parameter, but it was found that the model presented here fits the data better, in the sense of resulting in a smaller value for the deviance information criterion (DIC) (*26*). The DIC is a measure of the overall fit of the model and can be used to compare nested models, such as the two considered. In addition, the exploratory analysis and the visual inspection of the data did not suggest that in fact a sudden drop in the number of crashes had occurred at the treatment sites. The reason for this suggestion is that these sites, while located in populated areas, are not high-volume sites.

The results are strikingly different from those reported by Huang et al. (*3–5*) and the differences are most likely explained simply by differences in the data themselves. The model that was fitted by Huang et al. (*3*) is in many ways similar to the model that was adopted in this study. A major difference between the two studies appears to

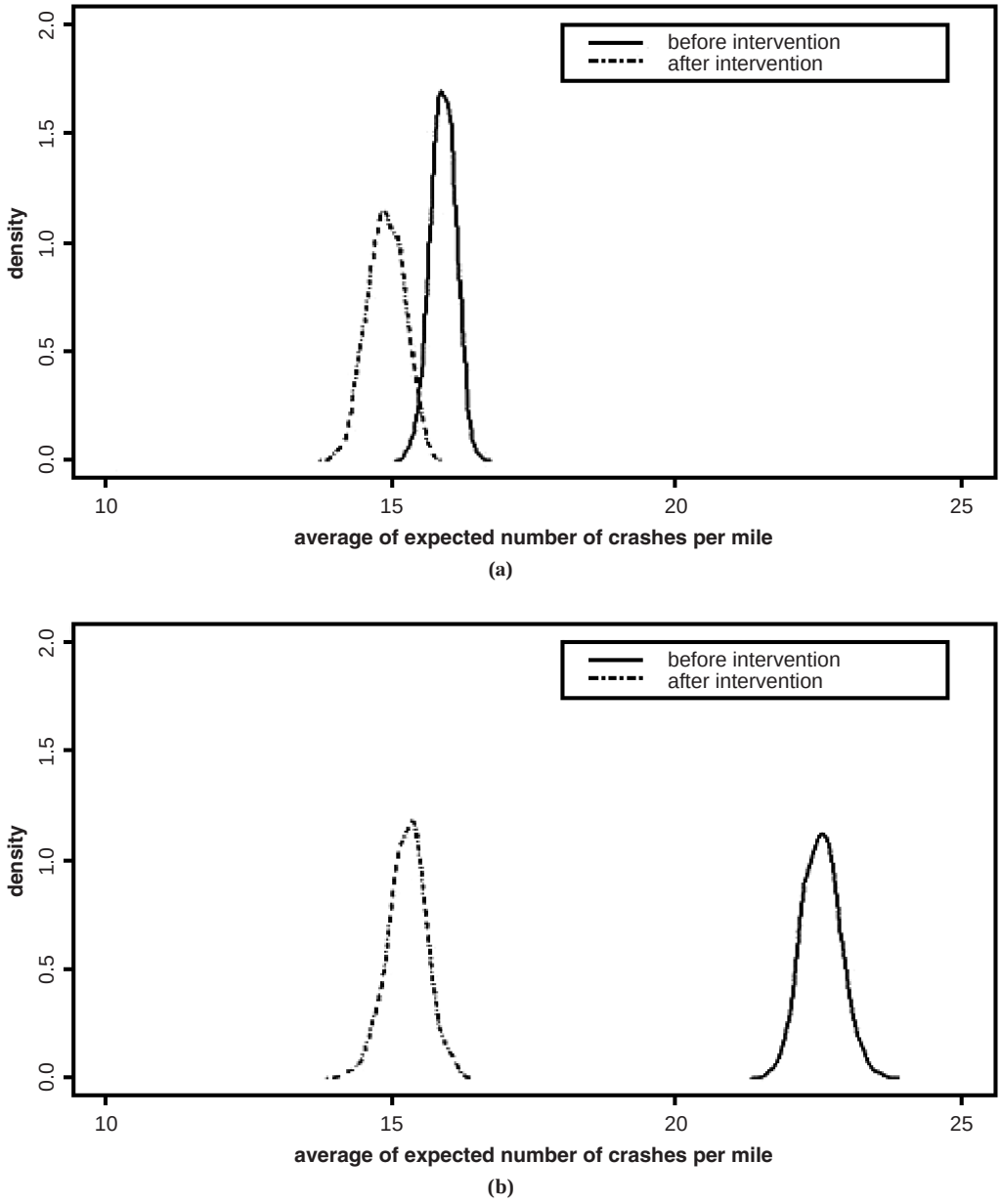


FIGURE 5 Posterior distributions of average (across treated and control sites) expected annual crash frequencies per mile during years preceding and following completion of intervention: (*a*) control group and (*b*) treatment group.

be in the sizes of the data sets themselves. The IDOT collected information at both the treatment and the comparison sites over a period of 23 years, so the number of years preceding and following the intervention at the treatment sites exceeded in all cases the number of years that Huang et al. (*3*) had available for their study. At least in Iowa, site-specific crash data suggest that the within-site variance in crash density can be quite large, a condition that in turn suggests the possible need for several years of data for each site if the objective is to make inferences about the impact of site improvements on the true crash density at the site.

It will typically make little difference whether model parameters are estimated from within a classical or a Bayesian framework when a large amount of data are available for each site; in fact, when data are plentiful, a comparison of simple averages of the crashes before the intervention to those after it might suffice and provide reliable information about the impact of the intervention as long as the study includes both a treatment group and a comparison group of sites. The modeling and estimation components of the statistical analysis become more important when either the number of sites or the years of observation available for each site are small. In that case, both the classical and the Bayesian paradigms can lead to erroneous conclusions unless the model is reasonably well specified. Because the Huang et al. (*3*) model is appropriate for this type of study, the differences found between their work and this work might be explained by sample-size issues. The crash-rate analyses carried out by Huang et al. (*3*) were based on only the 8 treatment sites and 14 comparison sites for which data were available. For this small number of sites, only 3 years of data for both the before and the after periods

were available. Of course, it may also be the case that road diets are not as effective everywhere and that other factors may explain the different results. This possibility suggests that this type of study should be undertaken at other locations.

By analyzing monthly data, the authors were able to account for seasonal variability in crash density and traffic volume; while this is a must in Iowa, where seasonal variation in driving conditions is marked, it may not be as critical in a study conducted in other regions of the country.

One potential improvement to this analysis might be the inclusion of a buffer period around the time of conversion of the site, during which drivers get used to the new layout of the road. Huang et al. (*3*–*5*) accounted for this effect by ignoring crashes that occurred around the time of conversion. The current work included all crashes in the analyses and attempted to account for the potential impact of the conversion itself with a model parameter. It may be better to proceed as in Huang et al. (*3*–*5*) and remove crash information around the conversion time from the analysis data set. The authors do not anticipate noticeable differences in the results even if the data were reanalyzed with the omission of some of the monthly crash records.

ACKNOWLEDGMENTS

The authors are grateful to the three anonymous referees, who provided valuable suggestions to improve the presentation and readability of this manuscript. Li and Carriquiry's work was partially funded through the State of Iowa Department of Transportation.

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The Safety Data, Analysis, and Evaluation Committee sponsored publication of this paper.

American Journal of Epidemiology
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Vol. 161, No. 5
Printed in U.S.A.
DOI: 10.1093/aje/kwi059

ORIGINAL CONTRIBUTIONS

Secondhand Smoke, Dietary Fruit Intake, Road Traffic Exposures, and the Prevalence of Asthma: A Cross-Sectional Study in Young Children

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Received for publication August 23, 2004; accepted for publication November 19, 2004.

The authors have investigated the independent effects of exposure to secondhand smoke, road vehicle traffic, and dietary fruit intake in a cross-sectional study of asthma in young children. They surveyed all children aged 4–6 years in 235 schools in the East Midlands and East of England regions of the United Kingdom in 2003. Data on respiratory symptoms, diagnoses and treatment, smoking in the home, and dietary fruit intake were collected by parental questionnaire. A geographic information system was used to map postcodes and determine the distance of the home from the nearest main road. Responses were obtained from 11,562 children. Wheeze in the past year and physician-diagnosed asthma were reported by 14.1% and 18.2%, respectively. Both of these outcomes were more common in children who lived with a smoker, and the prevalence of asthma increased with the number of smokers in the home. Asthma prevalence was not associated with proximity of the home to a main road or with dietary fruit intake. The authors conclude that, of the potential risk factors considered in this study, preventing secondhand smoke exposure may be the most effective way of preventing asthma.

asthma; diet; public health; tobacco smoke pollution; vehicle emissions

Exposures to secondhand tobacco smoke, road vehicle traffic, and diet are some of the most prevalent modifiable risk factors for asthma in children. The effect of parental smoking on wheezing illness and diagnosed asthma in children is well established (1, 2), but evidence that these outcomes are more common in children living close to a main road (3–5) has not been confirmed in all studies (6, 7). Several dietary factors have been linked to asthma (8), and one of the most consistent observations is of an inverse association with fruit intake (9–13).

The National Schools Fruit Scheme is a government initiative that aims to provide each child aged 4–6 years with free fruit in school every day by winter 2004. As part of an evaluation of the health benefits of this scheme, we have taken the opportunity to investigate the relative importance of fruit intake, exposure to secondhand smoke, and road vehicle traffic in determining the prevalence of asthma in over 11,000 children.

MATERIALS AND METHODS

Participants comprised all eligible children attending a sample of schools in two regions of England, the East Midlands and Eastern Region, in the summer 2003 term, before commencement of the National School Fruit Scheme. We contacted a random sample of 225 schools in each region, with the aim of recruiting 125 in each region, and distributed a short questionnaire to parents of all children aged 4–6 years. We included questions relating to wheeze and eczema, based on standard wording from the International Study of Asthma and Allergies in Childhood (14). We also asked about asthma diagnosed by a physician and whether the child had a reliever or steroid inhaler for asthma and, if so, how many puffs he or she had used in the past week. The questionnaires were scanned and entered into a database (Document Capture Company, Wembley, United

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TABLE 1. Distribution of asthma outcomes by age, sex, local education authority area, Townsend Index, and presence of eczema, United Kingdom, 2003

	Frequency (no.)	%	Wheeze in past year (%)*	Physician-diagnosed asthma (%)†	Asthma medication (%)‡
Sex					
Male	5,835	50.5	16.5	21.1	18.7
Female	5,711	49.5	11.6	15.2	13.2
p value			<0.001	<0.001	<0.001
Age (years)					
4	1,625	14.1	14.9	16.6	16.1
5	5,780	50.1	14.4	17.5	15.5
6	4,130	35.9	13.4	19.7	16.5
p_{trend}			0.1	0.002	0.4
Area					
East Midlands	5,567	48.1	13.8	17.8	15.6
Eastern Region	5,995	51.9	14.3	18.5	16.3
p value			0.5	0.3	0.3
Townsend Index					
1 (least deprived)	2,091	20	11.7	16.7	15.1
2 (–3.4637 to –2.1311)	2,083	20	14.1	17.8	16.2
3 (–2.1310 to –0.4519)	2,088	20	14.1	17.4	15.4
4 (–0.4518 to 1.7336)	2,088	20	14.0	18.3	16.1
5 (most deprived)	2,087	20	16.9	20.9	17.5
p_{trend}			<0.001	0.001	0.07
Eczema in past year§					
No	9,140	80.5	11.5	15.7	13.4
Yes	2,216	19.5	24.9	28.2	26.5
p value			<0.001	<0.001	<0.001

* Wheeze in the past year defined as a positive response to the question: "Has your child had wheezing or whistling in the chest in the last 12 months?"

† Diagnosed asthma defined as a positive response to the questions: "Has your child ever had asthma?" and "Has this been confirmed by a physician?"

‡ Asthma medication defined as a positive response to one of the following questions: "Does your child have a reliever inhaler?" or "Does your child have a preventer inhaler?" (Both were given with examples.)

§ Eczema in the past year defined as a positive response to both of the following questions: "Has your child ever had an itchy skin rash that has affected the skin creases (e.g., folds of elbows, behind knees) at some stage?" and "Has your child had this rash in the past 12 months?"

Kingdom). Ethics permission was obtained from the Eastern Multiple Regional Ethics Committee.

Exposure to secondhand smoke was elicited by asking how many people living in the child's household smoke, and exposure to fruit intake by asking how many days in a typical week the child eats fruit, excluding fruit juice, and how many pieces of fruit on average per day. These were multiplied together to estimate the number of portions of fruit per week, categorized for analysis as no fruit intake, less than 7, 7–13, 14–20, or 21 or more. The number of smokers in the household was categorized as none, 1, 2, or 3 or more. We asked specifically about the number of apples eaten per week. Parents provided their postcode, which was linked using the postcode-enumeration district directory (Manchester Information and Associated Services, University of Manchester, Manchester, United Kingdom) to census enumeration district, and in turn to the Townsend *Z* score for the 1991 census, as a marker of deprivation. The Townsend Index was analyzed in quintiles. The postcode was also used to estimate the distance of the child's home to the nearest main road, by converting the code to northing and easting grid references of 1-m resolution, using "code point" software (Ordnance Survey, Southampton, United Kingdom) in the EDINA national data center (The University of Edinburgh, Edinburgh, Scotland). We then linked this grid reference to a digitized map of Great Britain with a coordinate resolution of 1 m (Strategi database; Ordnance Survey), including all main roads, defined as motorways, A- or B-class roads,

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TABLE 2. The univariate and multivariate effects of smoking in the home, fruit intake, and distance from main road upon wheeze in the past year, United Kingdom, 2003

	Frequency (no.)	%	Wheeze in past year (%)	Age, sex, and area adjusted		Fully adjusted*	
				Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
No. of smokers in the home							
0	7,429	65.2	13.0	1		1	
1	2,606	22.9	15.2	1.21	1.07, 1.37	1.18	1.02, 1.35
2	1,188	10.4	18.6	1.54	1.31, 1.81	1.40	1.17, 1.69
≥3	164	1.4	18.3	1.52	1.04, 2.23	1.47	0.97, 2.23
p_{trend}			<0.001				
Distance of home from main road (m)							
≥150	8,461	73.2	13.8	1		1	
90–149	1,297	11.2	15.7	1.14	0.97, 1.35	1.14	0.96, 1.36
30–89	1,212	10.5	14.5	1.05	0.89, 1.23	1.02	0.87, 1.21
<30	592	5.1	13.2	0.95	0.73, 1.23	0.90	0.69, 1.18
p_{trend}			0.6				
Dietary fruit intake (portions per week)							
≥21	1,804	16.0	15.9	1		1	
14–20	2,962	26.3	14.1	0.86	0.73, 1.02	0.84	0.70, 1.01
7–13	2,625	23.3	12.8	0.77	0.65, 0.92	0.77	0.64, 0.93
1–6	3,349	29.8	13.6	0.82	0.69, 0.96	0.80	0.67, 0.95
0	507	4.5	17.0	1.02	0.79, 1.31	1.01	0.77, 1.33
p_{trend}			0.2				

*Adjusted for all the factors in the table plus the Townsend score and area.

using ArcView 3.3 geographic information system software (Environmental Systems Research Institute, Inc., Redlands, California). Individuals living within 150 m, and then in turn within 30, 60, 90, and 120 m, of a main road were identified, and categories were chosen to reflect the relation between primary pollutant exposures and distance from the road (3).

Analysis was by chi-squared tests and tests for trend, as well as by multiple logistic regression in STATA statistical software (Stata Corporation, College Station, Texas), with standard errors adjusted for cluster sampling by school. A p value of less than 0.05 (two-sided test) was considered statistically significant. We adjusted for age, sex, and area (East Midlands or East of England) as a priori confounders and then looked at the independent effects of number of smokers in the household, distance from roads, and portions of fruit in a mutually adjusted model, with additional adjustment for the Townsend Index.

RESULTS

Of the total of 450 schools (225 in each region) contacted to take part in the study, 215 (48 percent) did not respond to or refused our invitation; this was largely due to the very short time interval between award of funding for the study and the start of the fruit scheme in some schools. We therefore recruited a total of 235 schools, 113 and 122 schools in the East Midlands and Eastern Region, respectively. From an estimated 21,289 eligible children in these schools, responses were obtained from 11,562 (54 percent). Demographic data are shown in table 1; study participants were slightly more affluent than the national average (median Townsend Z score: –1.33; interquartile range: –3.16 to 1.10).

Wheeze in the past year was reported in 14.1 percent of children, ever wheezing in 25.3 percent, and a physician diagnosis of asthma in 18.2 percent; 16 percent of children were reported to have an asthma medication (15 percent a bronchodilator and 10 percent inhaled steroids), and 7.9 percent had used asthma medication in the last week. All of these outcomes were more common in boys (table 1) and in relation to greater deprivation. A total of 19 percent of children had had eczema symptoms in the past year.

Thirty-five percent of children lived in a household with at least one smoker. In univariate analysis, living with a smoker was significantly associated with the child's having wheezed in the past year and with a physician diagnosis of asthma (data not shown), and both of these outcomes were more common with increasing numbers of smokers in the home (both $p < 0.001$) (table 2). Twenty-seven percent of children lived within 150 m of a main road and 5 percent within 30 m. There was no evidence of any association between distance from a main road, analyzed as either a factor or a trend, and either wheeze in the past year or diagnosed asthma (table 2). The median number of portions of fruit eaten per week was 10 (interquartile range: 5–14 portions); 49 percent of children ate fruit less than once a day, and 4 percent never ate fruit. Wheeze in the past year was most common in those

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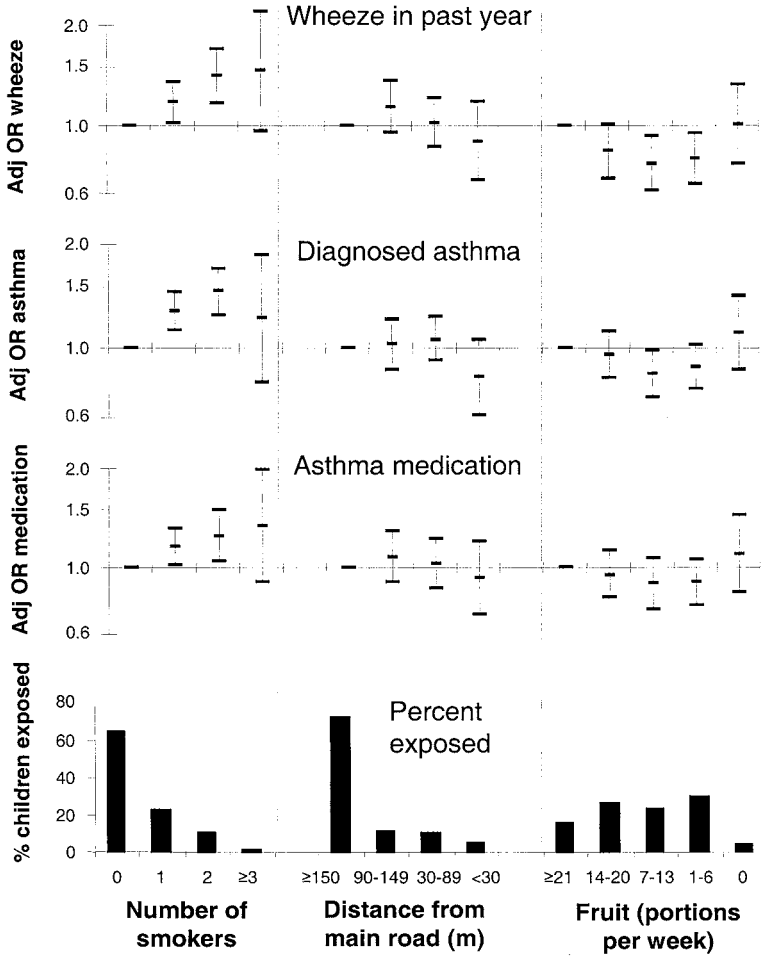

FIGURE 1. Fully adjusted odds ratios for the effect of the number of smokers in the household, distance from the main road, and number of portions of fruit per week on wheeze in the past year, diagnosed asthma, and having an asthma medication among 11,562 children, United Kingdom, 2003. Odds ratios are adjusted for all of the variables shown, plus age, sex, area (East Midlands or East of England), and Townsend score, and are plotted on a log scale, with 95% confidence intervals. Adj, adjusted; OR, odds ratio.

who seldom or never ate fruit, but it was also more common in those in the highest category of fruit intake (heterogeneity across categories of fruit intake: $p = 0.016$), and there was no significant trend in risk across the categories ($p = 0.24$) (table 2). A similar pattern was seen for physician-diagnosed asthma. Similar findings arose from analysis of data specific to apple intake; wheeze in the past year occurred in 16.5 percent of children who never ate apples and in 13.3 percent and 15.5 percent of those who ate 1–4 and five or more apples per week, respectively ($p_{trend} = 0.4$).

Adjusting for age and sex, area, or Townsend score made no substantial difference to these findings. In a multivariate logistic regression model including number of smokers in the home, distance from a main road, and either fruit or apple intake, only the number of smokers in the home had an independent effect on wheeze in the past year ($p_{trend} < 0.001$) (table 2). There were no significant interactions between the effects of these variables. The number of smokers in the home was also the only independent predictor of physician-diagnosed asthma and prescription of asthma medication (figure 1). Eczema was significantly inversely related to the number of smokers in the home and unrelated to distance from the road or to fruit intake (data not shown).

DISCUSSION

Our data confirm that over one in six young children in the United Kingdom currently has diagnosed asthma. Although asthma in this age group is likely to include more than one disease phenotype (15), most children with wheezing symptoms in our study had been given a diagnostic label of asthma and prescribed an asthma medication. Therefore, when we used these as alternative measures for asthma in this study to overcome the potential for misclassification or bias arising from any one measure, our findings were similar for all of these outcomes. Our findings are therefore pragmatically valid in relation to the clinical asthma phenotype. The consistent relation between all of these outcomes and

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smoking in the home, as well as the demonstration of an exposure-response relation between smoking and asthma, indicates that this association is likely to be causal. If so, and given the high prevalence of exposure (35 percent), secondhand smoke exposure emerges as the most important of these three risk factors for asthma in young children. In contrast, our study found little effect of distance of the home from a main road or of dietary fruit intake.

Just over 50 percent of children in schools that agreed to participate in the study returned completed questionnaires suitable for analysis. Although the prevalence of wheezing (16, 17) and the estimated fruit intake (18) in our study population were comparable with other data from the United Kingdom for young children, the proportion of children exposed to smoking at home was slightly lower than the 42 percent reported nationally (19), possibly reflecting a poorer response from smokers. However, while the generally low response and potential bias within it may have influenced our prevalence estimates, they are relatively unlikely to have affected estimates of the associations with asthma found in our data.

The effect estimates for all of our exposures may, however, have been influenced by reporting bias. A tendency for parents of asthmatic children to overreport their child's fruit intake because of increased health awareness might have led to a reduction in the apparent protective effect of fruit. By the same reasoning, the effect of smoking could have been underestimated by systematic underreporting of smoking by parents aware of the potential effects of smoking on asthma in their child. It should also be appreciated that, since the prevalence of all of our asthma outcome measures was rather more than 10 percent, the odds ratios may tend to overestimate the true prevalence ratios.

That parental smoking is detrimental to children's respiratory health is well established, and recent meta-analyses have demonstrated that parental smoking increases the risk of respiratory illness in early infancy by a ratio of 1.5 (1, 2) and of asthma in school-age children by a ratio of 1.2 (1). Though maternal smoking may have a greater impact, paternal smoking also has an independent effect (1). Our data provide further confirmation that the prevalence of asthma in children increases with the number of smokers in the home. We estimate that, assuming a causal relation, 8 percent of asthma in children of this age is attributable to secondhand smoke exposure at home.

We found no association between living close to a main road and the prevalence of asthma. The postcodes used to georeference the child's home apply to the midpoint of about 15 houses, and this will have led to some nonsystematic misclassification of the distance from the road and, thus, to an underestimate of the magnitude of any effect. In common with most other studies, we used an objective but proxy measure for exposure to exhaust emissions based on distance from the main road alone, rather than modeled estimates of ambient air pollution. Our estimate may be a poor indicator of individual exposure to specific pollutants such as diesel or ozone, which have been implicated in asthma (20) and which will additionally depend on the volume, flow, and type of traffic on the road; pattern of air dispersion of individual pollutants; and the amount of time spent at home and exposure elsewhere. The majority of previous studies in children, using various objective measures of exposure to vehicle traffic at home, report positive associations with the prevalence of asthma or respiratory symptoms (3, 4), but these effects have not always reached conventional statistical significance (5) and have sometimes been confined to girls (5). Several other studies have found no effect (6, 7). Our findings add further evidence that road traffic exposure does not have a major influence on asthma risk in young children.

Dietary fruit intake has been related to increased lung function and reduced risk of wheeze and asthma in adults (11, 12); apples in particular seem to be important (21, 22). Findings in children are generally less consistent (9, 10, 13, 22, 23). Our data suggest that the minority of children who consume no fruit, or specifically no apples, may be at a moderately increased risk of asthma, but we found no evidence of any reduction in prevalence with higher levels of fruit intake. Using a parental questionnaire to ascertain diet is an imperfect measure, but the pattern of association with the number of apples eaten per week, which is easier to measure, was remarkably similar to that for any fruit. That our study was cross-sectional is a further important limitation, and it will be important to follow up these children after the introduction of fruit in school to assess whether altering dietary consumption of fruit has any long-term influence on respiratory health.

In conclusion, we have studied three of the potentially avoidable causes of asthma in children and found that, of these, secondhand smoke exposure was the single independent determinant of disease. On this evidence, we suggest that of the three factors considered in this study the most effective means of preventing asthma in children is likely to be to reduce exposure to secondhand tobacco smoke at home.

ACKNOWLEDGMENTS

This study was funded by the Department of Health of the United Kingdom.

The authors thank the school-teaching and secretarial staffs who made the survey work possible. Grid reference data and digitized road data are held by copyright of the Crown and were made available by the Ordnance Survey, via the code point software and Strategi database. Access to the data relating to the social deprivation indices was provided by Manchester Information and Associated Services.

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- L.A. NOW

Pedestrian deaths surge in L.A., overall traffic fatalities down slightly

By LAURA J. NELSON
FEB 27, 2018 | 7:35 PM

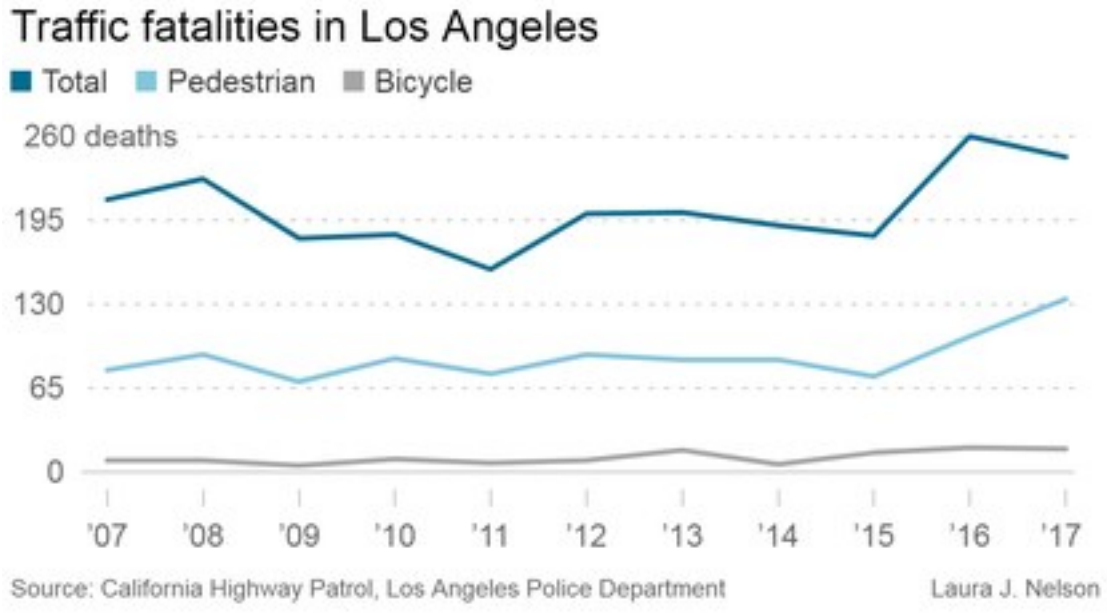


Motorists sit in traffic on Venice Boulevard in September, when outrage over traffic safety measures led to a bid to recall Los Angeles Councilman Mike Bonin, who represents the Westside. (Genaro Molina / Los Angeles Times)

Pedestrian deaths in Los Angeles have surged more than 80% in the first two years of a high-profile initiative launched by Mayor Eric Garcetti to eliminate traffic fatalities, new data show.

In 2015, 74 people on foot were killed by drivers in Los Angeles. That figure rose to 134 in 2017, the highest number in more than 15 years.

Overall, the number of bicyclists, pedestrians, motorcyclists and drivers killed in collisions on city streets fell last year by 6%, to 244, according to preliminary police data released by the city Transportation Department.



(Laura J. Nelson / Los Angeles Times)

In 2015, Garcetti signed an executiveorder creating the Vision Zero initiative, which set the ambitious goal of eliminating traffic deaths on city streets by 2025. It called for reductions of 20% by 2017 and 50% by 2020.

The 6% decline in 2017 falls well short of that goal, and the city's slow progress suggests reducing fatalities by half in the next three years will be difficult.

"Every life is important and we must keep pushing to do better," Garcetti said Tuesday in a statement to The Times, saying he was proud the city had reduced deaths overall in 2017. "Safety is our top priority, and we will continue to set bold goals."

The 2017 statistics were included in a report scheduled to be discussed Wednesday at a City Council transportation committee hearing.

The L.A. data are on par with national trends, which show that more pedestrians are dying, and drivers are more distracted, Transportation Department spokesman Oliver Hou said in an email.

Figures on traffic deaths across the country are not yet available for 2017, but in the previous year, pedestrian deaths rose 9% nationally and 42% in Los Angeles.

Los Angeles officials spent more than a year studying collision data to pinpoint the city's most dangerous streets for pedestrians and cyclists, and worked in 2017 to make changes along 40 of those corridors. Many are broad thoroughfares, including North Broadway in Chinatown, 3rd Street in Koreatown and Sepulveda Boulevard in the San Fernando Valley.

Officials have focused on those areas because pedestrians and cyclists represent an outsize number of the city's traffic fatalities. From 2012 to 2016, people on foot were involved in 8% of the traffic collisions in L.A. but represented 44% of the deaths, the Transportation Department said.

Last year, the city made 1,120 changes to streets and intersections, Hou said. Hundreds of crosswalks were modified, including four that now allow pedestrians to cross all directions at once, and 144 digital signs were installed that tell drivers their speeds.

Speed is often the determining factor in whether someone survives a car crash. When struck by a car moving at 20 mph, a pedestrian has a 90% chance of survival, but when hit by a vehicle going 40 mph, the chance of survival falls to 20%, according to a federal study of crash data.

The city also changed the timing on 67 traffic lights to give pedestrians the walk signal several seconds before drivers receive a green light. That change — known as a "leading pedestrian interval" — is designed to cut down on drivers hitting pedestrians in crosswalks.

The increase in pedestrian deaths isn't surprising for anyone who walks in Los Angeles and has had a near miss with a speeding driver, said Emilia Crotty, executive director of Los Angeles Walks, a pedestrian advocacy organization. Projects that have been shown to reduce pedestrian injuries, including so-called "scramble crosswalks" that allow people to cross in all directions, should not be delayed by concerns about commute times from local officials, Crotty said.

The most high-profile street safety project in 2017, along a handful of streets on L.A.'s Westside, sparked a wave of protests from residents and commuters, two lawsuits and an effort to recall Councilman Mike Bonin, who represents the area. Eventually, the city reversed most of the improvements.

The advocates who fought the Playa del Rey project said they were interested in helping other local groups fight street changes that would affect commute times in other parts of the city. Street safety advocates worried that the backlash could set the Vision Zero effort back by several years.

The city “learned some very hard lessons” last year, Crotty said. “We need our City Council members to champion this issue like the life-and-death situation that it is. Whatever negative pushback there is — perhaps from some drivers — this is what we need to protect the most vulnerable people in our neighborhoods.”

File No. 16-0147

TRANSPORTATION COMMITTEE REPORT relative to the relinquishment of certain portions of State Route 187 (Venice Boulevard) in the City of Los Angeles.

Recommendations for Council action, SUBJECT TO THE APPROVAL OF THE MAYOR:

1. FIND that the that the relinquishment of Venice Boulevard (State Route 187) from Lincoln Boulevard to Cadillac Avenue to the California Department of Transportation (Caltrans) is in the best interest of the City.

2. APPROVE the relinquishment as detailed in the August 22, 2016 Joint Los Angeles Department of Transportation (LADOT) and Bureau of Engineering (BOE), attached to the Council file.

3. APPROVE and AUTHORIZE the Mayor to execute District Agreement No 07-5097 with Caltrans, subject to review by the City Attorney as to form and legality, for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue.

4. AUTHORIZE the Director of the Office of Accounting, Board of Public Works (BPW), to receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue and to deposit said funds as follows:

    a. $13,000,000 into the Subventions and Grants Fund No. 305, Department No. 50, and appropriated into a new account within the Fund entitled Venice Boulevard Relinquishment.

    b. $1,500,000 into the Transportation Trust Fund No. 655, Department No. 94, and appropriated into a new account within the Fund entitled Venice Boulevard Great Streets Improvements.

5. AUTHORIZE the LADOT to issue non-participating change orders as part of ongoing transportation construction contracts in order to expedite the construction and enhance safety at five intersections along the Great Street section of Venice Boulevard.

6. AUTHORIZE the Director of the Office of Accounting, BPW, to make any technical accounting corrections or clarifications to the above instructions in order to effectuate the intent of the Mayor and City Council.

7. RECEIVE and FILE the Motion (Bonin - O'Farrell) relative to the relinquishment of certain portions of State Routes 187 (Venice Boulevard) and 1 (Lincoln Boulevard) in the City of Los Angeles.

Fiscal Impact Statement: The LADOT and BOE report that the City will receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue. A minimum estimated amount of $7,000,000 in improvements along Venice Boulevard would remain to be addressed. It is anticipated that the additional funds could be secured by pursuing outside grant funding opportunities.

Community Impact Statement: None submitted.

(Public Works and Gang Reduction Committee waived consideration of the above matter)

Summary:

On February 10, 2016, your Committee considered a Motion (Bonin - O'Farrell) to the relinquishment of certain portions of State Routes 187 (Venice Boulevard) and 1 (Lincoln Boulevard) in the City of Los Angeles. According to the Motion, on May 13, 2015, the Council approved a resolution (Council File No. 15-0002-S48) that supported legislation authorizing California Transportation Commission to relinquish to the City of Los Angeles State Route 187 (Venice Boulevard) between Lincoln Boulevard and Cadillac Avenue and State Route 1 (Lincoln Boulevard) between the Southern City Limit of the City of Santa Monica and State Route 105.

The necessary legislation was approved by the Legislature and the Governor and enacted into law on October 7, 2015. On October 29, 2015, Caltrans began the relinquishment process by requesting comments from the City. In order to expeditiously complete the necessary Relinquishment Assessment Report, it is critical that City staff provide input to substantiate the appropriateness of the relinquishments.

After consideration and having provided an opportunity for public comment, the Committee moved to continue this matter. Subsequently, this matter was considered on February 24 and after having provided another opportunity for public comment, the Committee further continued this matter pending a full report from the LADOT and BOE in regard to the relinquishment process and because Caltrans had not issued the final Relinquishment Assessment Report (RAR) for SR-1 (A copy of the RAR is included with the August 22, 2016 Joint LADOT/BOE report and is attached to the Council file).

On August 24, 2016, the Committee considered an August 22, 2016 Joint LADOT/BOE report in response to the Committee's direction of February 24, 2016. According to the LADOT/BOE, the relinquishment process transfers control of portions of the state highway system owned and operated by Caltrans to local jurisdictions when it is in the mutual interests of both parties. Caltrans policy encourages relinquishments of portions of state highways that can be characterized as conventional city streets and that do not serve regional or statewide transportation needs, as they represent opportunities to reduce ongoing maintenance costs and tort liability, among other benefits to the State. This incentive drives the State "to negotiate with local agencies a level of work or contribution to facilitate the relinquishment".

Because the proposed relinquishment would be accomplished by legislative enactment, Caltrans is not obligated to bring SR-187 to a "state of good repair", which had been the City's standard in previous negotiations. Caltrans has characterized its proposed financial contribution of $14 million for street improvements and sidewalks and ramps and an additional $500,000 for a previously programmed project for a total of $14.5 million as the "cost to relinquish". The City's estimate for rehabilitation of Venice Boulevard is $21.5 million to bring the entire 5.4-mile stretch of roadway into compliance with current City standards. Finally, subsequent to the introduction of the original Motion, the City and Caltrans agreed to defer the relinquishment of Lincoln Boulevard to a later date since Caltrans has not issued the final RAR for SR1.

After consideration and having provided an opportunity for public comment, the Committee moved to recommend approval of the recommendations as detailed above. This matter is now submitted to Council for its consideration

Respectfully Submitted,

TRANSPORTATION COMMITTEE

MEMBER	VOTE
BONIN:	YES
KORETZ:	YES
HUIZAR:	YES
MARTINEZ:	YES
RYU:	YES

ARL
8/24/16

-NOT OFFICIAL UNTIL COUNCIL ACTS-



LADOT

NEW STREET DESIGN IS IMPROVING SAFETY

- Injuries and collisions are down along Mar Vista's Venice Blvd
- Learn more about how safer street designs help neighborhoods



Improvements in Street Design Can Reduce Collisions and Injuries



OVER TIME, SMALL CHANGES IN STREET DESIGN CAN MAKE A BIG DIFFERENCE in pedestrian safety and local neighborhood vibrancy. Safety issues are not always obvious. But data-driven solutions that improve a driver's ability to see pedestrians and bicycles, reduce speeding, and improve timing at intersections can reduce the number and severity of collisions while saving lives.

IN MAR VISTA, a burgeoning downtown with six lanes of fast moving traffic, frequent speeding, and a lack of crosswalks and buffers for bikes led to a much higher than average number of serious crashes, disproportionately impacting children and seniors. Between 2003 and 2016 alone, **MAR VISTA SAW 132 INJURY COLLISIONS** involving people walking and biking, and five deaths on Venice Boulevard.

DID YOU KNOW?

Traffic collisions are the leading cause of death in LA County for children below 14 years of age.

A driver traveling at 20 mph can stop in three car lengths; a driver traveling at 40 mph takes as many as nine car lengths to stop.

A person walking hit by a car at 20 mph has an 80% chance of surviving; at 40 mph, that person only has a 10% chance of surviving.

Mar Vista's Venice Boulevard Street Safety and Neighborhood **Improvements are Here**

Changes implemented on Venice Boulevard are proven solutions that have worked across Los Angeles and America.

IMPROVEMENTS INCLUDE:

- **FOUR NEW CROSSWALKS** to increase pedestrian safety and visibility.
- **A BIKE LANE** separated from traffic by physical barriers, to move traffic away from sidewalks and people walking and biking.
- **IMPROVED** traffic light timing.
- **THE NEW FOUR LANE** configuration allows for traffic flow, but discourages speeding and enhances Mar Vista's neighborhood feel.



Initial Data Shows a Reduction in Collisions, Injuries, and Speeding

DATA ALSO SHOWS A REDUCTION in drivers speeding above the 40 mph limit, which is crucial because pedestrian collisions involving cars going over 40 mph are almost always fatal.

TRAFFIC FLOW IS ALSO NEARLY BACK TO PRE-PROJECT LEVELS, with most trips through the corridor within 30 to 90 seconds of pre-project times.

METHODOLOGY & DISCLAIMERS: 1. The data shown are the first available on the project. In analyzing collision data, we frequently observe monthly variations in the number of reported collisions. It will be important to track the data over a number of months to draw conclusions on the project's overall performance. 2. This data comes directly from LAPD, based on collision reports that are collected for each reported incident. This is the same information that is reported to the State's SWITRS database, which all agencies rely on for historical analysis. Only reported collisions can be analyzed. For a more detailed methodology and disclaimer, please visit: https://www.veniceblvdmarvista.org/evaluation/

	PRE-INSTALL May 2016- April 2017	POST-INSTALL May 21- Aug 20, 2017
COLLISIONS (monthly average)	5.5	**4.3**
INJURY COLLISIONS (monthly average)	3	**2.7**

^ Data for Venice Boulevard, Beethoven Street to Inglewood Boulevard.

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100 S Main St 9th Floor, Los Angeles, CA 90012

PRSRT STD
US POSTAGE
PAID
Pacific Print
Resources

8

********SCH 5-DIGIT 90066 FSSB
Robert & Selena Inouye
3954 Coolidge Ave
Los Angeles CA 90066-5008

LATEST DATA FROM THE VENICE BLVD IMPROVEMENT PROJECT

	PRE-INSTALL May 2016-April 2017	POST-INSTALL May 21-Aug 20, 2017
COLLISIONS (monthly average)	5.5 ▶▶▶	**4.3**
INJURY COLLISIONS (monthly average)	3 ▶▶▶	**2.7**

^ Data for Venice Boulevard, Beethoven Street to Inglewood Boulevard.

Community Voices on the Safety Improvements



YVETTE ROMAN of Mar Vista

"I am a long-time resident and business owner in Mar Vista. For years, Venice Boulevard was a place I avoided... Six lanes of loud, speeding, intimidating cars made it a most unpleasant and dangerous place to walk, to bike, and even to drive. The changes have made a world of difference in our neighborhood experience, as the Boulevard feels and acts far less like a freeway, and far more like a community."

LA FIRE DEPARTMENT

"LAFD has partnered with the LADOT to implement measures along Venice Boulevard that will support our ability to respond to 911 calls as quickly as possible. These measures include installing traffic light transponders that will trigger a green light and yield areas at each intersection that allow vehicles to pull to the right for emergency vehicles to pass."

Questions about the Improvement Project on Venice Blvd? ▶▶▶

Learn more at **VeniceBlvdMarVista.org/faq** Send your questions to **ladot.veniceblvdmarvista@lacity.org**

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LADOT

HISTORY OF THE GREAT STREETS INITIATIVE

ON MAR VISTA'S VENICE BLVD

JUNE 4, 2014

Venice Blvd is identified as a priority for improvements under the Great Streets Initiative.

JAN — MAY 2015



LADOT conducts community outreach through a neighborhood canvass, at the Mar Vista Farmers' Market, and through mobile workshops.

AUG 2015

Venice Blvd in Mar Vista identified as part of Los Angeles' High Injury Network.

AUG 2015



LADOT hosts a community open house to share the conceptual design. Conceptual design also shared during CicLAvia along Venice Blvd.

NOV 2015



Make It Mar Vista hosts a demonstration of a pop-up protected bike lane, temporary parklets, interactive mural painting, live performances, and an art exhibit.

DEC 2015 — JAN 2017

LADOT works with Caltrans to relinquish Venice Blvd (formerly State Route 187) and develop final design plans for signal construction, ADA ramps, etc.

FEB — MAY 2017



Construction occurs for the Venice Blvd pilot project.

JUNE 2017

The Venice Blvd Great Streets pilot project launches.

JULY 2017

Mar Vista community council considers the Venice Blvd pilot project and asks for report back in 6-months.

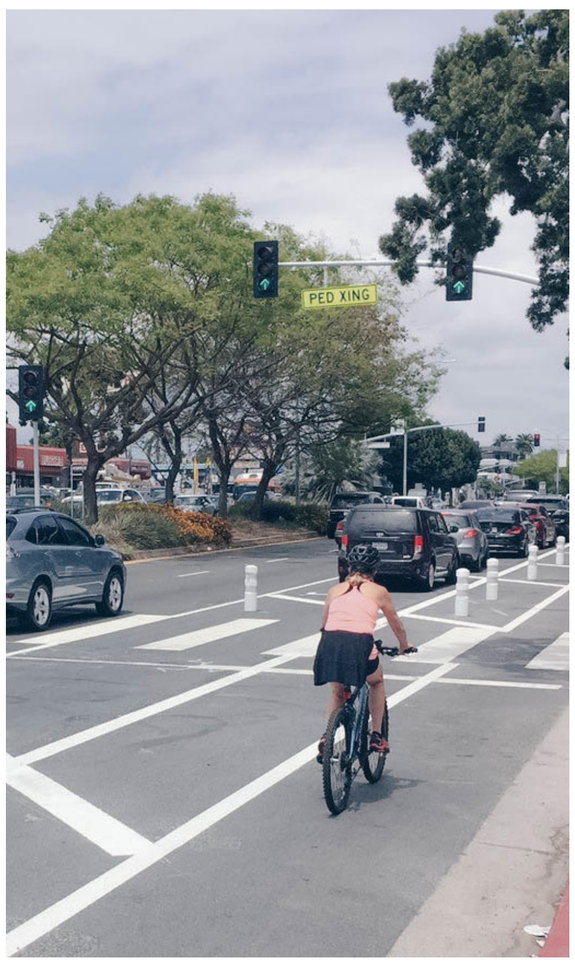
EARLY 2018

6-month review of pilot project.



UPGRADES

ON MAR VISTA'S VENICE BLVD



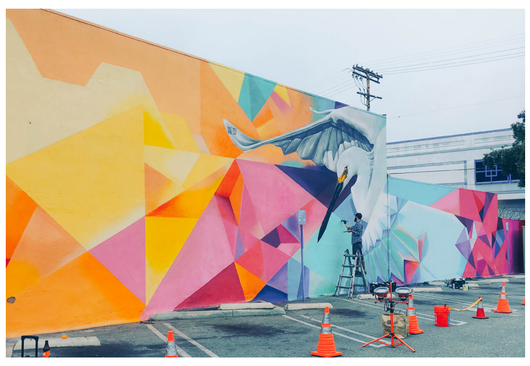
LADOT used low-cost, quick-to-install materials to create the pilot project features.

A pilot project is underway, testing new lane configurations, parking, and safer crossing points to improve safety on Venice Blvd between Beethoven St and Inglewood Blvd. These changes were designed with community input conducted throughout 2015 and 2016, including:

- 442 community surveys
- 4 public workshops
- 3 ongoing outreach displays
- 2 community walks/bike rides
- 3,500 individual inputs on project elements
- 71% of participants in process from Mar Vista Community (90066 zip)
- Regular attendance at Mar Vista Community Council

Feedback from Mar Vista community members indicated a desire for Venice Blvd to feel more like a Main Street destination and not a freeway. LADOT designed project elements that improve safety, support Mar Vista's vibrant neighborhood, and enhance the small business climate. They include:

- Four new fully signalized crosswalks
- Protected and buffered bike lanes
- Pedestrian head-starts and high-visibility crosswalks
- Community art installations





The pilot project will test the new street design, allowing LADOT engineers to collect real-time data and community feedback about the changes at one-month, three-month, and six-month intervals. After a one-year evaluation of installation, LADOT will return to the community in an open house format to discuss opportunities for any potential next phases of the project and to assess which features can be made permanent.

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LADOT

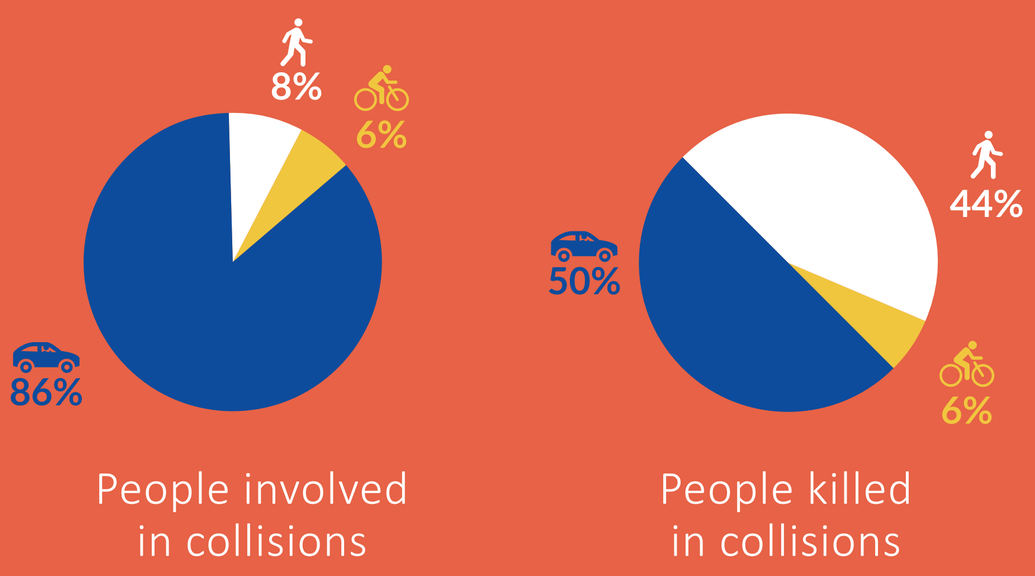
SAFETY CHALLENGES

ON MAR VISTA'S VENICE BLVD

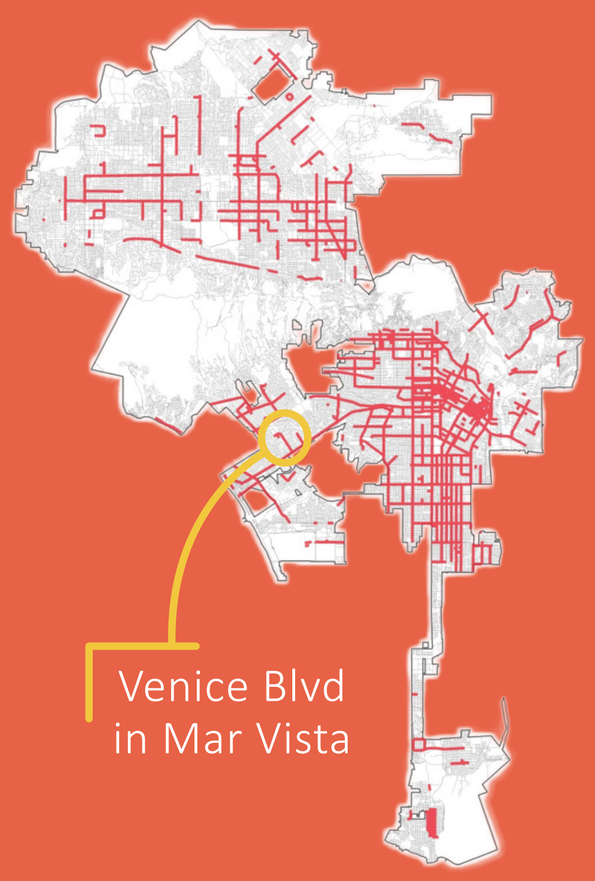


From 2003-2016, 360 collisions involving injury occurred on Venice Blvd. **Over half of the serious injuries involved people walking and biking.** Five people lost their lives.

Los Angeles Collision Landscape:



High Injury Network (HIN):



6% of our streets account for 65% of deaths and serious injuries for people walking & biking.

Vehicle Speed Death Risk:





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LADOT

SAFETY IMPROVEMENTS

ON MAR VISTA'S VENICE BLVD

LADOT made the following safety improvements after careful consideration done through engineering feasibility, technical evaluations, and a community input process:



- Four new pedestrian crossings with full traffic signals
- New left-turn arrows at Grand View
- Brighter, high visibility crosswalks
- Pedestrian head starts for safety & visibility
- Signal optimization to balance traffic flow
- Protected and buffered bike lanes
- Buffer zone and vertical element between bike lane and parked vehicles



The "Benchmarking Great Streets: Venice Boulevard" report provided important information to inform our design decisions during the pilot phase.



We also analyzed and considered other design options, which were not pursued for technical and feasibility reasons. You can learn more about the features that were considered and presented in August 2015 by reading the "Investing in Mar Vista's Venice Boulevard as a Great Street" handout, available at this station.

Key VISION ZERO Safety Principles:



SPEEDING KILLS

A pedestrian hit at 40 mph has a **10%** chance of survival. A pedestrian hit at 20 mph has an **80%** chance of survival.

STREET DESIGN MAKES A MAJOR DIFFERENCE

6% of our streets account for **65%** of deaths and serious injuries for people walking and biking.

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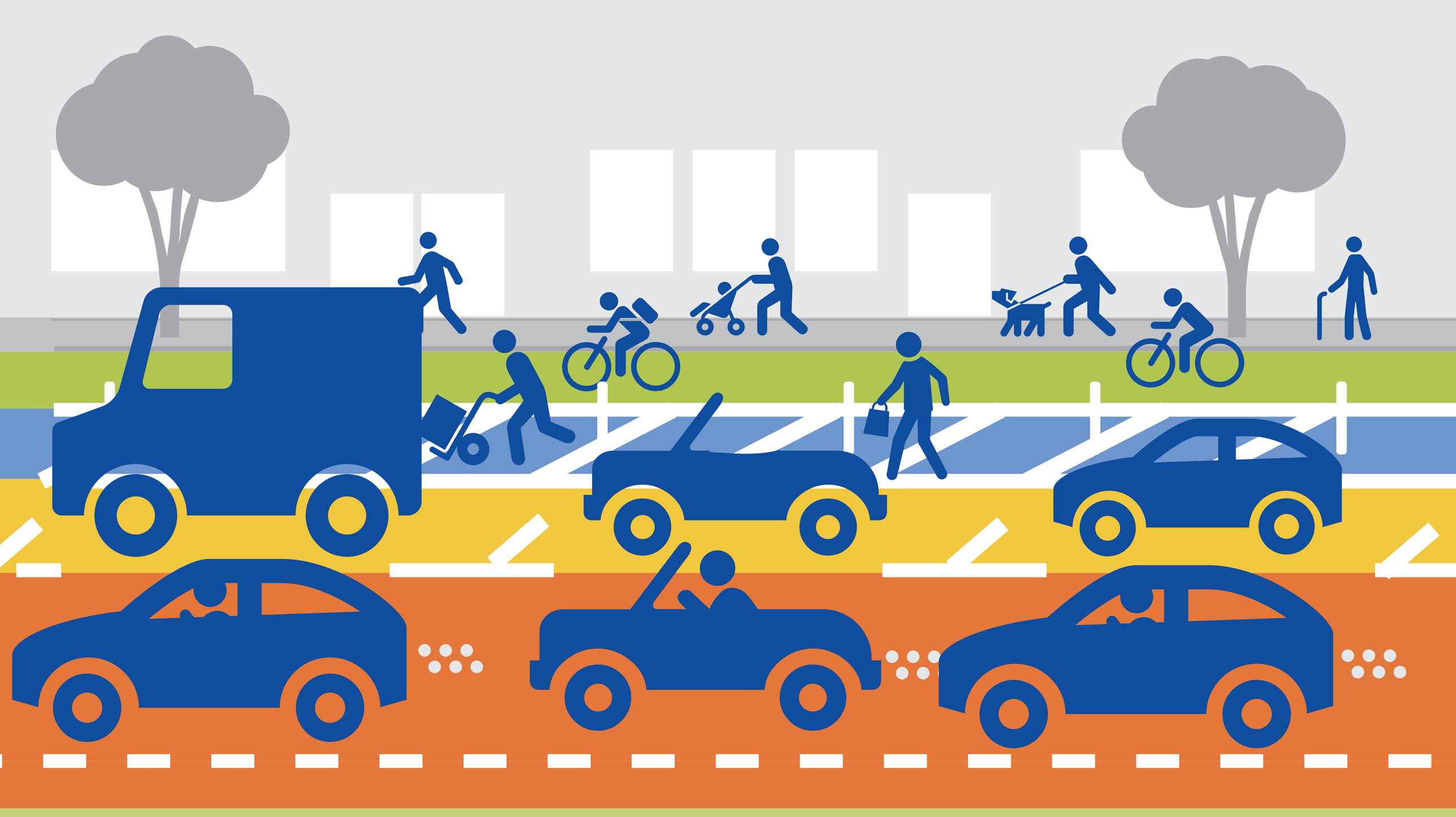
LADOT

HOW TO USE

THE NEW STREET



DRIVE
Stay in travel lane. Do not drive in parking lane or bicycle lane.

LOAD
Use buffer zone to get to your parked car. Look for passing bicycles when opening car doors and crossing the bicycle lane.

PARK
Park your car in marked parking stalls, to the left of the buffer zone and bicycle lane.

BIKE
Ride in the new bicycle lanes. Watch for crossing pedestrians.

WALK
Look for oncoming bicycles when crossing bicycle lanes.



VISION ZERO LOS ANGELES | 2015-2025

LADOT

HOW TO USE

THE NEW STREET





VISION ZERO LOS ANGELES | 2015-2025

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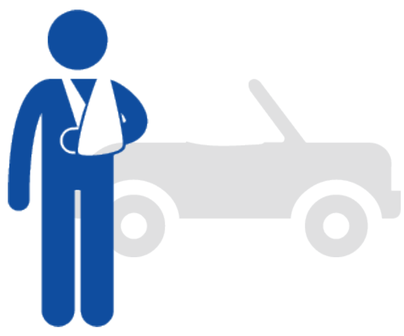
BENEFITS

FROM SIMILAR PROJECTS

In Los Angeles, CA, similar street designs reduced the risk of traffic injury and had a positive impact on businesses:

- Along similar corridors, collisions decreased 32.4% and injuries 36.7%.
- Along Rowena Ave in 2008 and 2010, there were six crashes where unsafe speed was a contributing factor. In 2013 and 2015, after street changes were made, there were zero crashes involving unsafe speeds.
- Along York Blvd corridor there was a net-positive impact to businesses after LADOT implemented a similar street design.

When similar street designs were implemented in other cities, researchers found that:



In New York, NY, the risk of traffic injury was reduced:

Crashes with injuries fell 17%
Pedestrian injuries fell 22%
Total injuries fell 20%



In New York, sales increased 49% along 9th Avenue, where the changes were made, while there was a 3% sales increase across the rest of Manhattan.





Across the country, protected bike lanes **encourage more people to travel by bike:**

In Washington, D.C., bike ridership **increased 200%** after protected bike lanes were installed.

In New York, NY, bike ridership **increased 190%** after protected bike lanes were installed.

In San Francisco, CA, bike ridership **increased 115%** after protected bike lanes were installed.





MAR VISTA COMMUNITY INPUT
ON NEIGHBORHOOD FEATURES

Following community input sessions in 2015 and 2016, **Mar Vista residents expressed interest in:**



Landscaping | Lighting | Seating | Outdoor gathering spaces | Regular special events

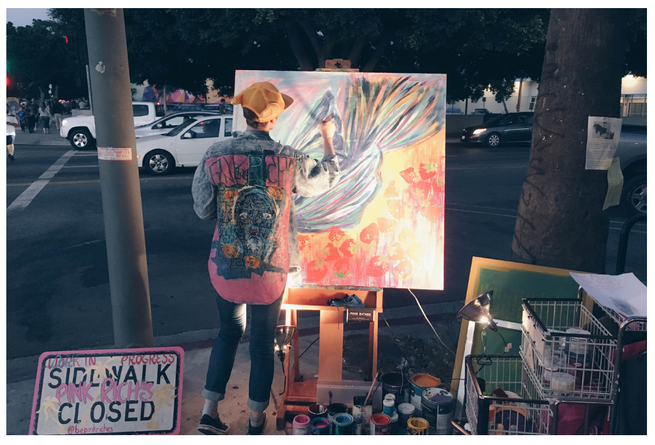
To create a vibrant main street for Mar Vista, the following features were installed and initiated:

- Mar Vista Great Street streetlight banners
- Proactive sidewalk and tree well maintenance
- A pop-up demonstration parklet at CicLAvia
- 14 new bike racks
- 13 new trash and recycling receptacles
- Weekly overnight street sweeping
- Solar powered Soofa bench and 2 signal cabinet murals

Great Streets and LADOT have partnered on the following events in Mar Vista:



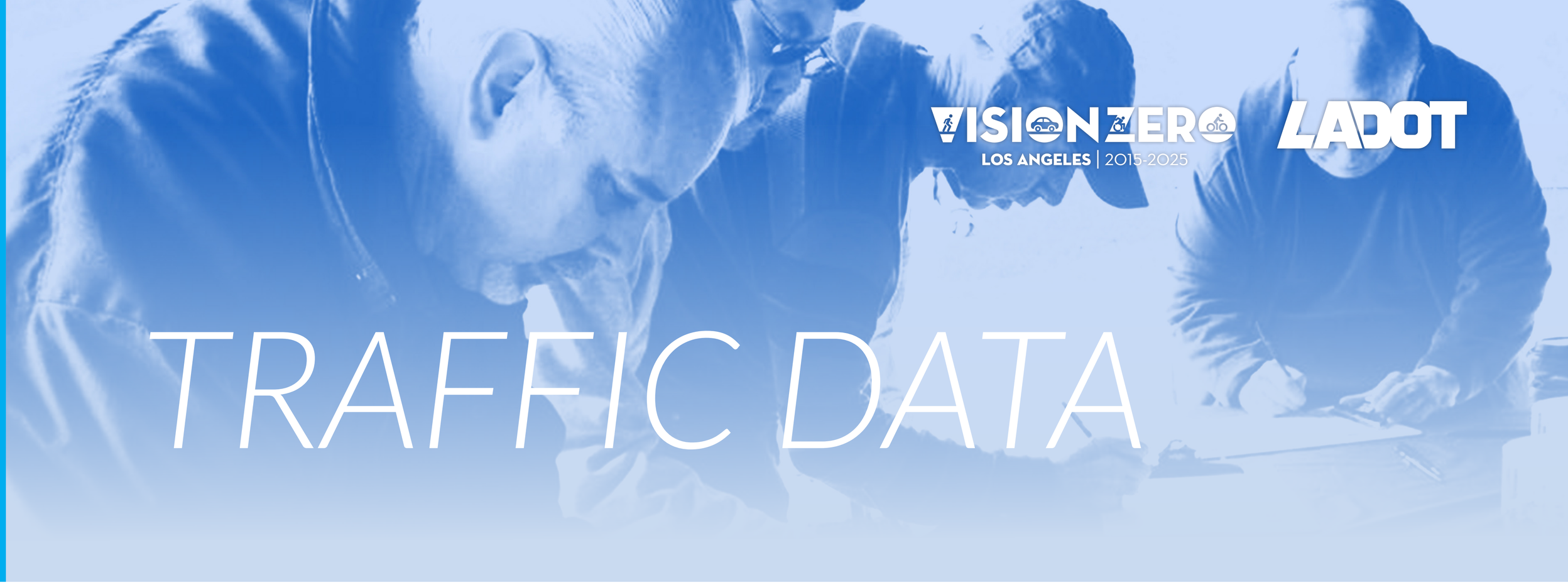
Make It Mar Vista



Mar Vista Art Walk



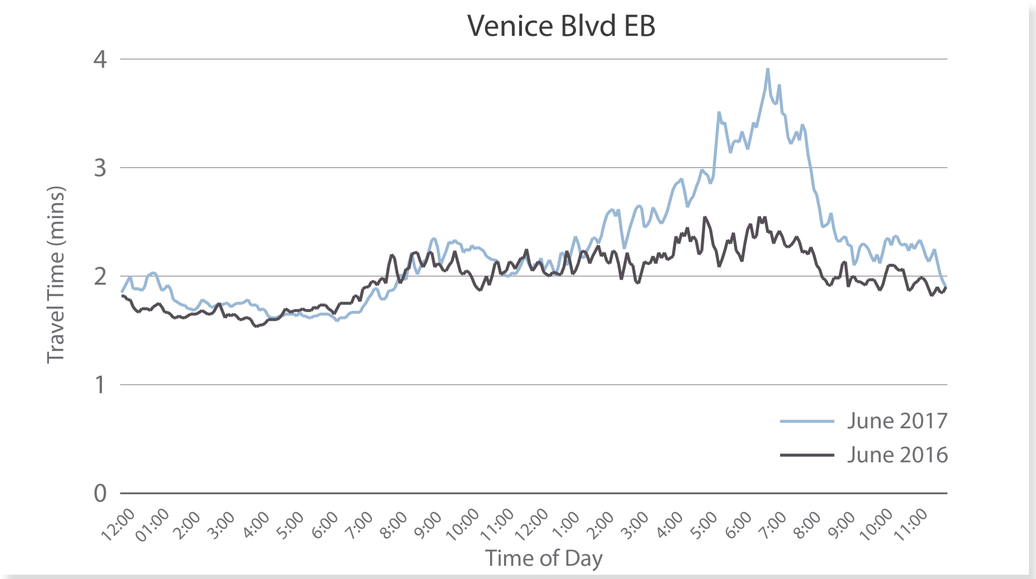
CicLAvia

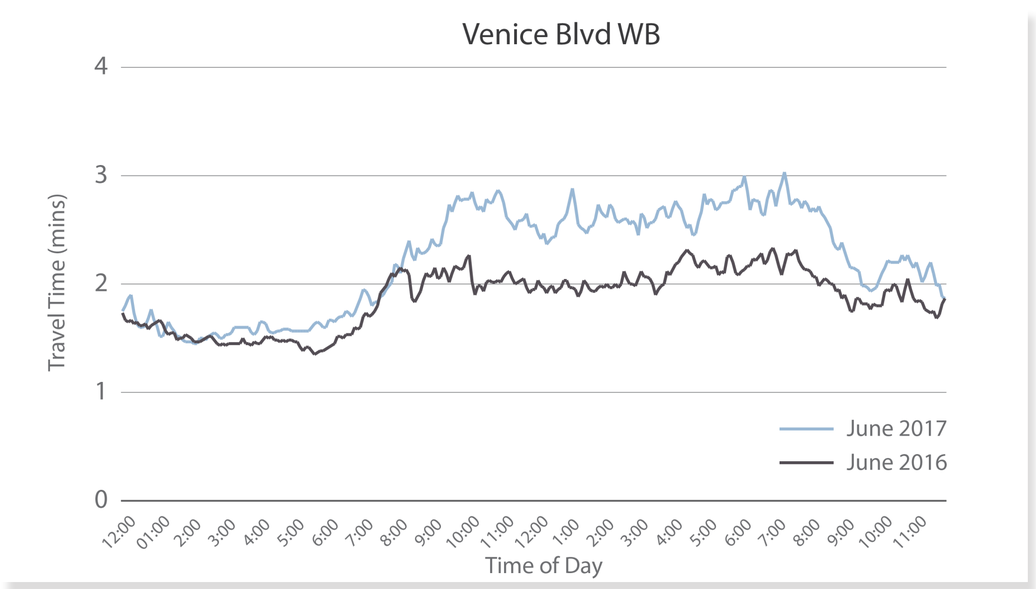


TRAFFIC DATA

LADOT is monitoring project impacts and benefits at one-month, three-month and six-month intervals. We will share updated data as it becomes available over time. At present, we have preliminary information to share.

To evaluate the project, LADOT has procured a contract with the data company INRIX. INRIX uses data from GPS-enabled devices such as smartphones and vehicle fleets to provide current and historical travel time, speed, and vehicle volume data. This cutting edge data source will allow us to measure traffic changes more quickly and accurately compared to traditional data collection methods.





TRAVEL TIMES: LADOT is studying travel times during key commuting periods. Initial studies of the corridor indicate that travel times throughout the corridor have increased by over 30 seconds during the PM peak period. Travel times during the AM peak period have increased slightly for the westbound direction, and remain relatively unchanged for the eastbound direction.

LADOT will continue to monitor travel time data. More information will be available at the three-month and six-month intervals.

CORRIDOR	7-10 AM AVERAGE TRAVEL TIME			3-6 PM AVERAGE TRAVEL TIME		
	Pre-Project	Post-Project	Change	Pre-Project	Post-Project	Change
Beethoven to Inglewood (EB)	02:04	02:05	+00:01	02:15	02:52	+00:37
Inglewood to Beethoven (WB)	02:02	02:18	+00:16	02:08	02:40	+00:32

Travel Time Data Provided by INRIX

TRAFFIC DATA

SPEED: The pilot project has reduced speeding along Venice Blvd, representing a 90% decrease in the number of drivers going more than the posted speed of 40mph. This provides safety benefits to the corridor, and if this trend continues, lower speed limits can be posted.

	VENICE WEST OF LOUELLA		VENICE WEST OF COLONIAL		VENICE WEST OF BARRY	
DIRECTION	EB	WB	EB	WB	EB	WB
PRE-PROJECT	45	44	41	41	45	43
POST-PROJECT	43	41	38	36	44	44
CHANGE	-2	-3	-3	-5	-1	+1





VOLUME AND CUT-THROUGH TRAFFIC:

Preliminary data has shown an increase in traffic on Pacific Ave and Charnock Rd.

We will be monitoring this closely and working with local communities along affected streets to determine best-fit solutions to address this issue.

WHAT WE'VE HEARD

AND HOW WE'RE RESPONDING



Mar Vista's Venice Blvd is a Pilot Project

The new lane configuration and neighborhood improvements on Mar Vista's Venice Blvd are the result of a community-driven, one-year pilot project installed with low-cost and temporary materials. Parts of the pilot may become permanent if adopted at the end of the project.

ISSUES WE'VE HEARD AND OBSERVED	HOW WE'RE RESPONDING
First Responders	*LADOT is working to ensure that key services work smoothly with the new street design. LADOT staff is communicating directly with local fire department managers to address any concern and work towards minimizing the impact to their operations.*
Accessibility	*For all LADOT parking protected bike lane projects, we have been working with the Los Angeles Department on Disability, Metro Access, and people with disabilities to identify areas with access constraints.*
Evacuation	*Evacuation operations as a result of disasters such as tsunami, fire, etc., can be safely implemented on any major roadway regardless of the configuration of lanes, e.g., utilizing the entire roadway in a single direction.*
Visibility at Intersections	*LADOT is studying and optimizing design features to ensure safety in our design. We are studying visibility at intersections in all directions and looking to install green paint at conflict areas.*
Signal Operations	*LADOT is currently optimizing signal operations and modifications as well as adjusting crosswalk crossing times.*
Cut Through Traffic	*Preliminary data has shown an increase in traffic on Pacific Ave and Charnock Rd We will be monitoring this closely and working with local communities along affected streets to determine best-fit solutions to address this issue. For more information, please visit the "Traffic" board at Station 7.*

VISION ZERO LOS ANGELES | 2015-2025

LADOT

BE HEARD

SHARE YOUR INPUT & OBSERVATIONS, AND STAY INVOLVED

LEAVE A VOICE COMMENT

LEAVE US A NOTE!

WHICH IDEA IS YOUR FAVORITE?



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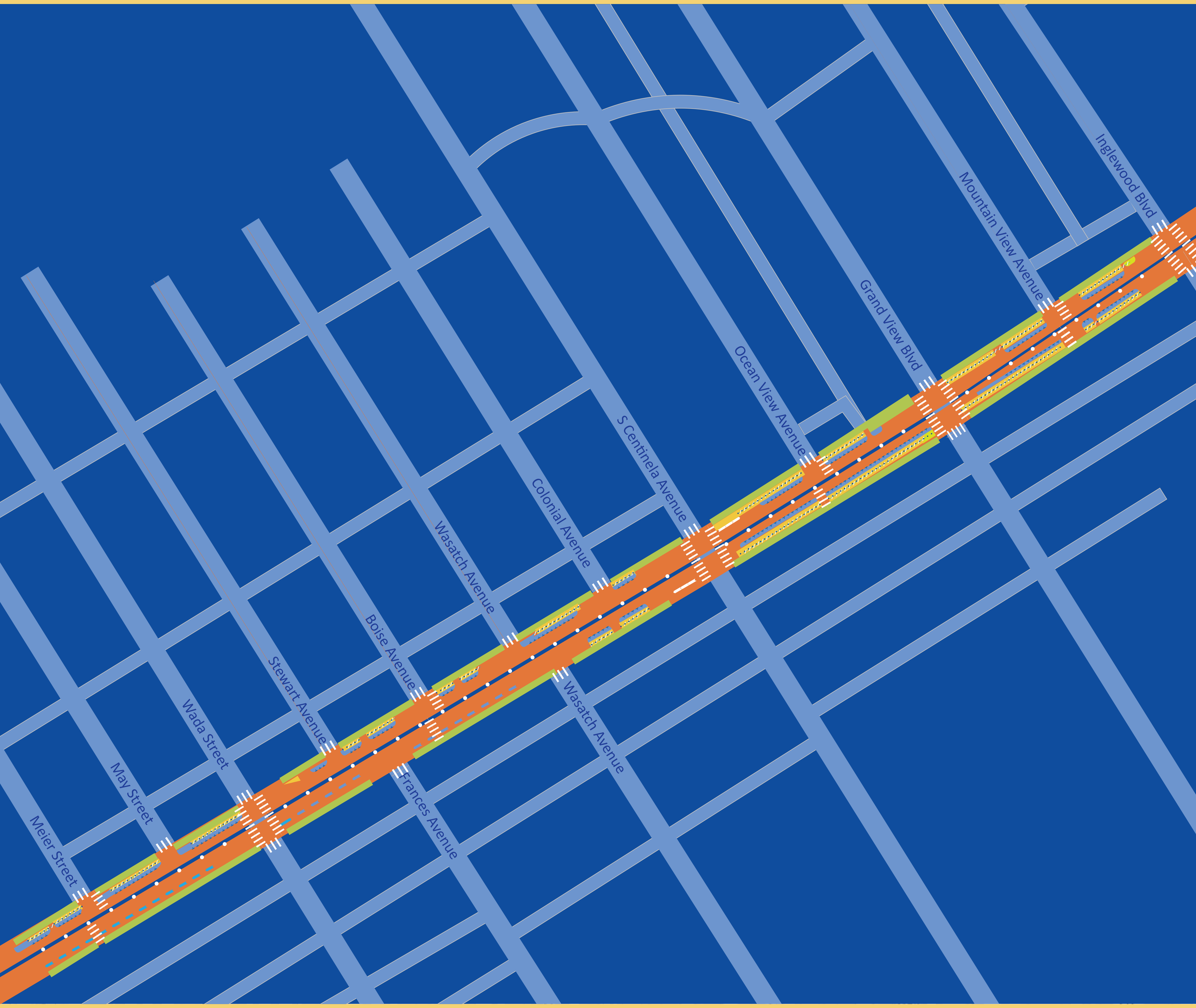
LADOT

BE HEARD

SHARE YOUR INPUT & OBSERVATIONS, AND STAY INVOLVED



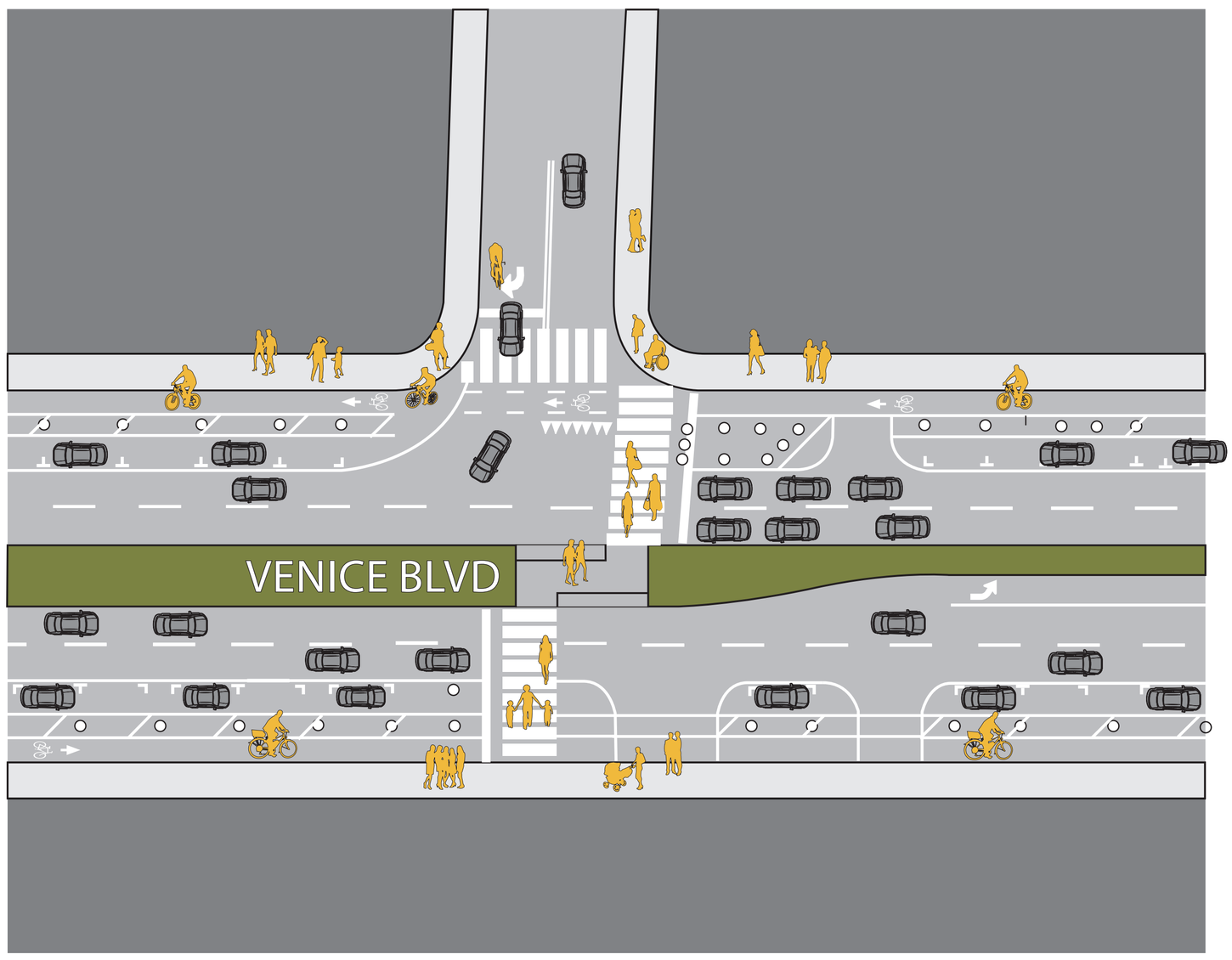
VISION ZERO LOS ANGELES | 2015-2025

LADOT

IMPROVING RIGHT TURNS AT INTERSECTIONS

Example Intersection Existing Right Turn Design

The existing design was intended to slow right turning vehicles by reducing the turning radius. Based on observatons and community feedback, this design will be modified at some intersections. *See below*

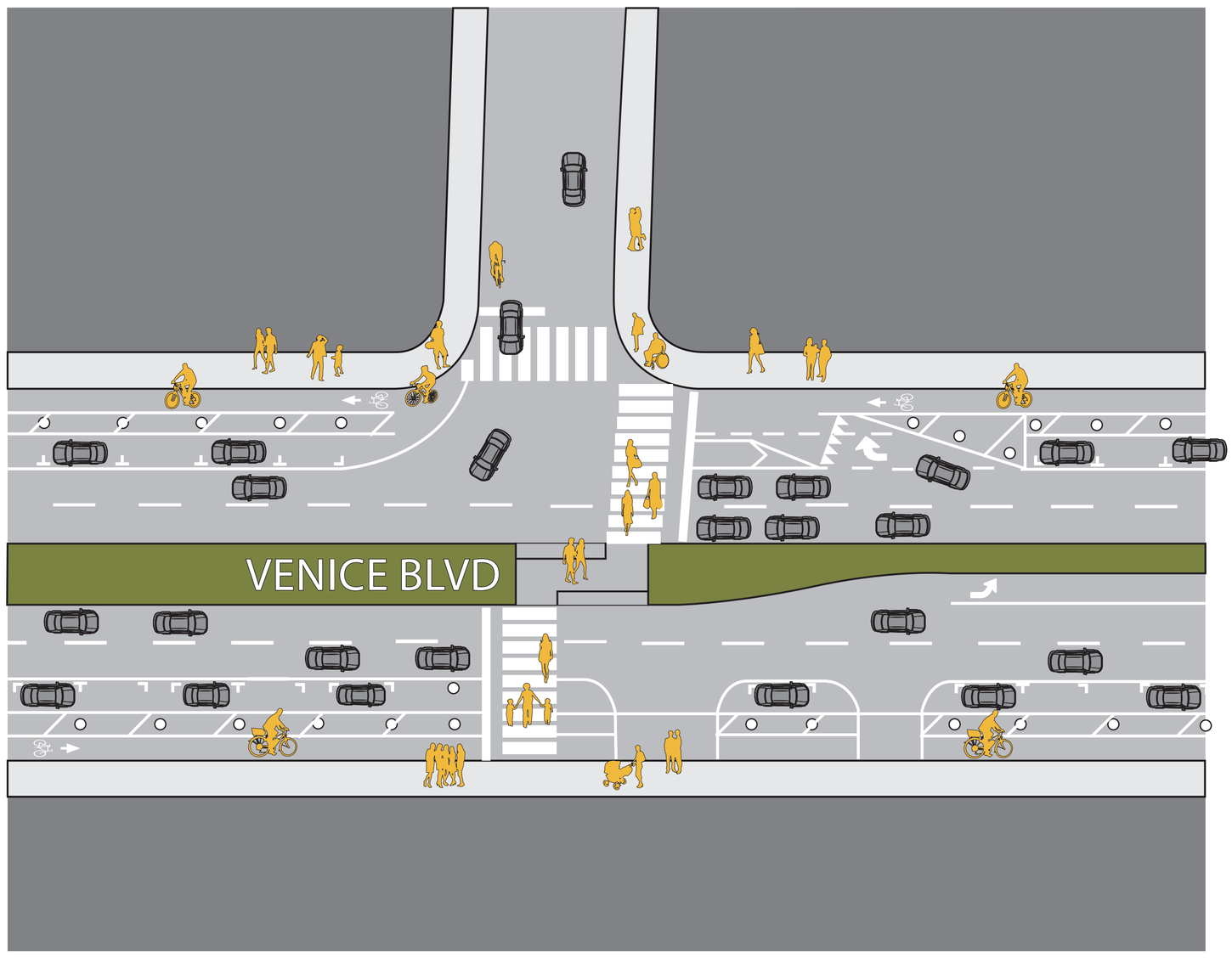


Example Intersection Proposed Right Turn Design

A new right turn configuration has been designed and is planned for installation at the following six locations:

- Meier St / Venice Blvd, westbound
- Boise Ave and Venice Blvd, westbound
- Mountain View Ave / Venice Blvd, westbound
- Ocean View Ave / Venice Blvd, westbound
- Grand View Blvd / Venice Blvd, westbound
- Grand View Blvd / Venice Blvd, eastbound

The new design will enhance visibility for people driving and bicycling at right turn intersections. There will be a loss of 1-3 parking spaces per location. However, LADOT is examining the corridor to identify locations where parking can be recaptured.



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Transportation Research and Education Center (TREC)

10-2013

Making Streets into Complete Streets: An Evidence-Based Design Manual

Marc Schlossberg
University of Oregon

John Rowell
University of Oregon

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Schlossberg, Marc, and John Rowell. Rethinking Streets: An Evidence Based Design Manual on Making Streets into Complete Streets. NITC-TT-539. Portland, OR: Transportation Research and Education Center (TREC), 2013. https://dx.doi.org/10.15760/trec.51

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OTREC

OREGON TRANSPORTATION RESEARCH AND EDUCATION CONSORTIUM

FINAL REPORT

Making Streets into Complete Streets: An Evidence-Based Design Manual

NITC-TT-539

October 2013

A National University Transportation Center sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration

MAKING STREETS INTO COMPLETE STREETS: AN EVIDENCE-BASED DESIGN MANUAL

Final Report

NITC-TT-539

by

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October 2013

Technical Report Documentation Page

1. Report No. NITC-TT-539	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle **Making Streets into Complete Streets:** An Evidence-Based Design Manual		5. Report Date October 2013 6. Performing Organization Code
7. Author(s) Marc Schlossberg, PhD John Rowell, AIA		8. Performing Organization Report No.
9. Performing Organization Name and Address University of Oregon 1209 University of Oregon Eugene, OR 97403-1209		10. Work Unit No. (TRAIS) 11. Contract or Grant No.
12. Sponsoring Agency Name and Address Oregon Transportation Research and Education Consortium (OTREC) P.O. Box 751 Portland, Oregon 97207		13. Type of Report and Period Covered 14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

The predominant approach toward street function on major roads in the United States is to emphasize mobility and throughput of vehicles. The "Complete Streets" movement challenges some of this paradigm, emphasizing that streets should accommodate multiple modes of travel and should often be considered destinations themselves. Often, efforts to transform streets into Complete Streets face resistance from both professional communities of traffic engineers and from the public that their design will reduce throughput and vehicle flow..Complete Streets advocates, in some cases, counter that while their designs often create pedestrian and cycling space from areas that were previously occupied by automobiles, that throughput is often not impacted and that flow can actually improve.

This project's aim was to document a variety of existing and implemented examples of Complete Street improvements from around the country, visually document their design and context, and compare actual outcomes in order to create an evidence-based design guide for transportation planners, traffic engineers, policymakers, and communities across the country. The goal is to make it easier for communities to use the evidence from other communities to help make decisions about retrofitting their streets to better support multimodal options and the creation of placemaking with their streets. Complete Streets policies are being adopted all across the country, but local officials have few documented guidebooks to help them think about how to retrofit streets based on best practices. This project fills this gap.

17. Key Words complete streets, urban design, multimodal, bicycle, pedestrian, place, transit	18. Distribution Statement No restrictions. Copies available from OTREC: www.otrec.us

19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages 22	22. Price

ACKNOWLEDGEMENTS

We would like to thank the National Institute for Transportation and Communities (NITC) for their support of this project and active work to help put research into action. We would also like to thank our partners in the private, public, and nonprofit sectors from around the country who have offered their input throughout this process; in particular, Andy Clarke of the League of American Cyclists, Kit Keller of the Associating of Pedestrian and Bicycle Professionals, and Sheila Lyons of the Oregon Department of Transportation. We would also like to thank Rowell Brokaw Architects for supporting the following three graduate student architecture fellows who helped tremendously with developing all of the design templates throughout this guidebook (and countless designs that did not make the cut): Briony Walker, Laura Levenberg, and Kelly Sanford. We would also like to thank Emma Newman, an undergraduate student in Environmental Studies who helped tremendously in identifying potential streets to include and developing the background database of information. Finally, we cannot say enough about two graduate research fellows who put in tremendous time on all aspects of this project, passionate about making a better world, and inspiringly professional and capable: Dave Amos (Architecture and Planning) and Kelly Sanford (Architecture).

DISCLAIMER

The contents of this report reflect the views of the authors, who are solely responsible for the facts and the accuracy of the material and information presented herein. This document is disseminated under the sponsorship of the U.S. Department of Transportation University Transportation Centers Program in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof. The contents do not necessarily reflect the official views of the U.S. Government. This report does not constitute a standard, specification, or regulation.

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EXECUTIVE SUMMARY

The predominant approach toward street function on major roads in the United States is to emphasize mobility and throughput of vehicles. The "Complete Streets" movement challenges some of this paradigm, emphasizing that streets should accommodate multiple modes of travel and should often be considered destinations themselves. Often, efforts to transform streets into complete streets (or from mobility-based to accessibility-based designs) face resistance from both professional communities of traffic engineers and from the public that their design will reduce throughput and vehicle flow. Complete Streets advocates, in some cases, counter that while their designs often create pedestrian and cycling space from areas that were previously occupied by automobiles, that throughput is often not impacted and that flow can actually improve.

One example of this conflict is in the concept of the "road diet," where a four-lane road (two lanes in each direction) with no median or bike lanes is turned into a two-lane road (one lane in each direction), a center turn median and two bike lanes. Removing two automobile travel lanes seems like it would reduce automobile throughput, but supporters of road diets believe that the increased flow achieved with left-turning vehicles using the center median actually maintains or improves upon previous throughput numbers because flow is improved on the through lanes.

This project's aim was to document a variety of existing and implemented examples of Complete Street improvements from around the country, visually document their design and context, and compare actual outcomes in order to create a design toolbox for transportation planners, traffic engineers, policymakers, and communities across the country. The goal is to make it easier for communities to use the evidence from other communities to help make decisions about retrofitting their streets to better support multimodal options and the creation of placemaking with their streets. Complete Streets policies are being adopted all across the country, but local officials have few documented guidebooks to help them think about how to retrofit streets based on best practices. This project fills this gap.

1.0 INTRODUCTION

1.1 BACKGROUND

The predominant approach toward street function on major roads in the United States is to emphasize mobility and throughput of vehicles. The Complete Streets movement challenges some of this paradigm, emphasizing that streets should accommodate multiple modes of travel and should often be considered destinations themselves (McCann, 2005; Burden and Litman, 2011; Seskin. 2011). Often, efforts to transform streets into Complete Streets (or from mobility-based to accessibility-based designs) face resistance from both professional communities of traffic engineers and from the public that their design will reduce throughput and vehicle flow. Complete Streets advocates, in some cases, counter that while their designs often create pedestrian and cycling space from areas that were previously occupied by automobiles, that throughput is often not impacted and that flow can actually improve (Seskin, 2011).

One example of this conflict is in the concept of the road diet, where a four-lane road (two lanes in each direction) with no median or bike lanes is turned into a two-lane road (one lane in each direction), a center turn median and two bike lanes. Removing two automobile travel lanes seems like it would reduce automobile throughput, but road diet supporters believe that the increased flow achieved with left-turning vehicles using the center median actually maintains or improves upon previous throughput numbers because flow is improved on the through lanes. Moreover, supporters of these types of retrofits often claim that they are catalysts for adjacent land use change and increase private investment in such land.

What is lacking in professional practice – for traffic engineers, transportation planners, public policymakers, community organizations, and citizens alike – is an evidence and performance-based guidebook that links various types of street redesigns with different types of performance. Existing studies tend to concentrate on the hypothetical, either in design or assessment (Bochner, Daisa et al., 2011; Carlson, Greenberg et al., 2011; Elias, 2011; Tiwari and Curtis, 2012), or provide individual case studies that are limited in use for communities that want to explore a range of potential retrofit options (Carlson, Greenberg et al., 2011; Dock, Greenberg et al., 2012; Sanders and Cooper. 2012). These conceptual ideas or limited case studies do provide some grounds for rethinking the design and function of streets, but are often insufficient to provide guidance for practitioners and communities that want to base decisions on actual, completed and successful projects from a range of street and land use contexts.

This evidence-based guidebook consists of the performance of actual streets from across the United States that have been retrofitted in some way to be transformed from an exclusively automobile-centered design to ones that accommodate multimodal movement. From our knowledge and extensive national outreach, such a guidebook does not exist.

2.0 INTENTION, METHODOLOGY & PROCESS

2.1 INTRODUCTION

The objectives of this project were fairly straightforward:

1. To identify *existing* examples across the United States from a variety of regions and built environment conditions of street redesigns that qualify as Complete Streets;
2. To document their existing conditions, including right-of-way, transportation and design elements, vehicle throughput, vehicular accident rates, relationship to the surrounding street network, cross sections, photos, and other post-construction outcomes;
3. To translate this information into a guidebook for professionals (in particular, traffic engineers and transportation planners), policymakers, community groups, and citizens to make evidence- and performance based decisions on street redesigns; and
4. To distribute this handbook nationally.

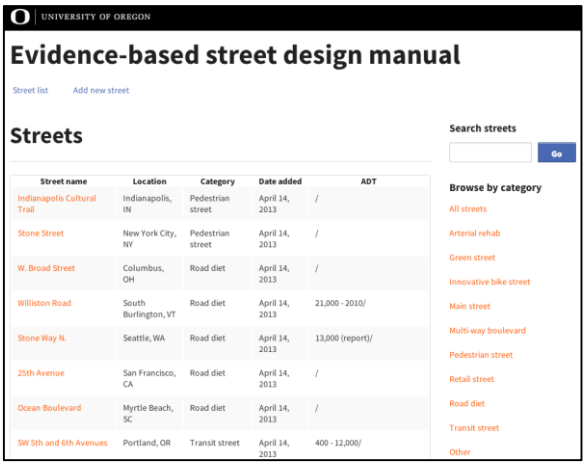
In addition, the overarching approach to communicating this range of information was to do so in a visually rich, easily accessible and understandable manner that allowed all stakeholders to engage with material of importance to them, while also giving each stakeholder access to information that other stakeholders tend to focus on in their decision-making processes. Thus, the project's intention was to create a resource that can both engage a wide variety of community stakeholders in street retrofit decision making *and* providing each stakeholder an opportunity to understand how others make decisions.

2.2 DEVELOPING GUIDEBOOK CONTENT

The research team developed the guidebook content in several ways, including engaging national partners, conducting stakeholder interviews, soliciting stakeholder and professional feedback, requesting potential street nominations from professionals, and scanning popular press and online sources for potential streets to include in the book. The primary method for collecting potential streets to include in the guidebook was through an online data entry portal that was widely advertised nationally (see Figure 1 for sample screenshots).

Figure 1: Online Solicitation of Street Case Studies





Directors of the Complete Streets Coalition (which became part of Smart Growth America during this project), the League of American Cyclists, and the Association for Pedestrian and Bike Professionals all offered guidance as to content they thought would be useful to their national constituencies of transportation professionals. They also provided feedback about ways of communicating such information they felt would be effective and helpful in assisting communities to make changes to their own streets. Each sent a letter out to their broad constituency or membership lists of professionals, soliciting participation in suggesting good streets to include in this guidebook and other feedback as relevant.

In addition, the research team engaged engineers and designers from local and state government and the private sector with a history of working on street retrofit projects similar to those envisioned to be part of the resource guide. Each key informant provided feedback throughout the project, from broad framing to specific design details (see
Table 1 for a full list of the primary contributors).

Table 1: Key Project Informants

Name	Organization	Type
Andy Clarke	President, League of American Cyclists	National membership

Name	Organization	Type
Kit Keller	Executive Director, Association for Pedestrian and Bike Professionals	National membership
Stefanie Seskin	Deputy Director of the National Complete Streets Coalition	National nonprofit
David Nelson	Project for Public Spaces	National nonprofit
Michael Ronkin	Consultant (former State Bike/Ped Coordinator)	Private sector
Sheila Lyons	Oregon DOT Bike/Ped Coordinator	Public
Gary Obery	Oregon DOT Traffic Engineer	Public
Tom Larsen	Eugene Traffic Engineer	Public
Chris Zahas	Leland Consulting Group	Private sector
Kaarin Knudson	Rowell Brokaw Architects	Private sector
Michele Reeves	CIVILIS Consultants	Private sector

Through this process, it became clear that there were many divergent directions the project could go, and the research team decided to focus and select case studies that were both "normal" and connected to placemaking and commercial activity. In terms of "normal" streets, the approach was to find examples from across the country of fairly typical streets, development patterns, concerns, and eventually, solutions. There have been many "signature" projects from around the country where very substantial street changes have taken place (e.g., turning Times Square into a pedestrian mall), but the focus of this project was to find examples that many communities of different sizes, locations, and political tendencies could learn from. Each example may not win redesign competitions, but the collection of completed projects can give readers a deep understanding and insight as to what might be possible in their own communities. The second main criteria for selecting streets to include was to focus on projects that had a placemaking quality, usually related to street-oriented commercial activity. In most cases, the street project had a partial goal of creating "place" that enhanced economic vitality of street-oriented businesses, while also addressing transportation throughput and multimodal transportation access.

Figure 2: Nationwide Collection of Streets in Guidebook



To further demonstrate the geographic and typology diversity of completed street projects in the guidebook, Table 2 organizes some of them in a “fun fact” manner.

Table 2: "Fun Facts" about Guidebook Streets

Smallest Metro Population: 15,499 Courthouse Square, Sulphur Springs, TX **Largest Metro Population**: 22,214,083 8th and 9th Avenues, New York City, NY **Narrowest Right of Way**: 50 feet Pine and Spruce Streets, Philadelphia, PA **Widest Right of Way**: 146 feet Pennsylvania Avenue, Washington, D.C. **Highest Average Daily Traffic**: 50,000 E. Washington Avenue, Madison, WI / 28th Street, Boulder, CO **Lowest Average Daily Traffic**: 3,500 Courthouse Square, Sulphur Springs, TX **Slowest Speed**: 15 mph Lancaster Boulevard, Lancaster, CA **Highest Speed**: 40 mph Aurora Avenue N., Shoreline, WA

As case studies were formatted into a near final form, the project team again reached out to our national partners and key informants for their peer review of the content, visual representation, and perceived usefulness of the information presented. All of these stakeholders were informed throughout the project process and gave periodic feedback to help steer the project; their thoughts were insightful and invaluable to help make this a nationally relevant and useful resource. Three public presentations to transportation and local planning professionals were also given, one in April 2013 (WSRO/ACT/ToGo Conference in Vancouver, WA) and two in September 2013 (the Oregon Planning Institute and the Oregon Transportation Summit). The intent was to share the work to date, solicit feedback, and ensure that the resource being developed was fulfilling a professional need. The feedback was overwhelmingly positive and many offered suggestions for future guidebooks, including focusing on rural street transformations, state highway transformation within urbanized areas, and intersection retrofits within a Complete Streets context.

2.3 DISSEMINATION OF INFORMATION

Once the resource guide is complete, multiple copies will be distributed to the stakeholders mentioned previously, including to their membership per request and contingent on supply. In addition, business cards of interested professionals throughout Oregon were collected at the conference presentations. Additional outlets for dissemination will be pursued, including the national network of federal agency staff and professionals maintained by the University of Oregon's Sustainable Cities Initiative, as well as the national network reached through NITC's communications efforts.

3.0 THE GUIDEBOOK

3.1 HOW TO USE THE GUIDEBOOK

The guidebook can be used in multiple ways. First, communities that are thinking about retrofitting some of their commercial streets to enhance bicycle, pedestrian, or transit facilities and/or to enhance the placemaking and commercial activity alongside a retrofitted street design can seek out specific examples in the book that most closely resemble their project. Street examples in the guidebook are grouped by generalized type, making it easy for users to immediately focus on street types of most relevance to their own needs. These street types include: Road Diets, Arterial Rehabs, Urban Mixed Use, Main Streets, Bike Streets, and Transit Streets. Such examples can provide direct insight into what is possible and can also provide a contact point for followup if desired.

Second, many users will wish to see the collection of case studies in their entirety to get a full range of possibilities. As mentioned earlier, the streets presented in the guidebook are fairly "normal" – the projects highlighted are typically not extraordinarily unique endeavors. Thus, users who seek out the entire collection of examples will be able to envision a whole host of opportunities within their community, given that many of the examples could be found in most communities of any size across the country.

Third, the guidebook includes some basic information about streets, some of the terminology engineers and planners use to think about streets, the purpose of streets, and some other basic relevant concepts that can provide basic education to a range of professionals, policymakers, and community stakeholders who are inevitably involved when redesigning streets is on the local agenda.

3.2 THE GUIDEBOOK SECTIONS

3.2.1 Front Matter

The guidebook begins with a series of introductory pages designed to orient users to the use of the guidebook, explain some basic transportation planning and engineering concepts, and help community stakeholders, including transportation professionals, understand multiple concepts of transportation decision making. In the end, the guidebook's purpose is to help communities use evidence from completed projects elsewhere to better inform their own street retrofit decision making, and to do so with broad community input that can understand projects using the same base knowledge and terminology. The front matter is designed to provide this common orientation to all users throughout a community, including transportation planners and engineers, policymakers, and community stakeholders at large.

Several key subsections in the front matter introduce basic concepts like average daily traffic (ADT), peak traffic, right-of-way, design vs. posted speeds, and more. As with the presentations of the street case studies, these front matter subsections are designed to be visually appealing and easily accessible by a wide variety of users. Figure 3 is an example of a page that describes the

street cross section, including how easy and/or expensive it is to manipulate or change different aspects of the street.

Figure 3: Street Cross Section Explanation

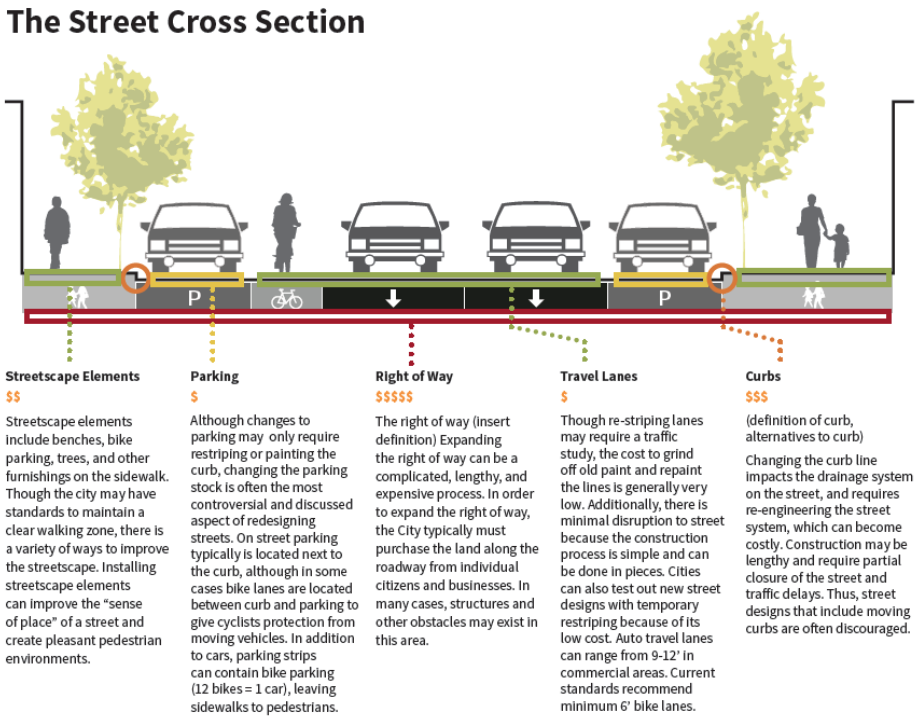


Figure 4 provides an example comparing street design and the potential speed of travel on differing streets with similar posted speed limits. The purpose of examples such as these within the front matter is to help users of the guide understand that street design influences both transportation access, comfort, safety, and the placemaking qualities of different designs. There are often tradeoffs between each of these factors, and guidebook examples such as this one offer an opportunity for community stakeholders, professionals, and policymakers to understand how to think of such tradeoffs.

Figure 4: Design vs. Posted Speed illustration



Also within the front matter is a sample four-page spread of a case study street that highlights each information element on the page to point out its purpose. Each case study street is presented in the same visual format, with some information similarly included in all cases with other information customized to the unique set of circumstances being shared. The "How to use this guide" section orients users to the different elements they will be seeing in the remainder of the guide (see Figure 5).

Figure 5: Sample Page: "How to use this guide"





3.2.2 Guidebook Streets

The core of the design guide is a collection of over 20 completed street retrofit projects from across the country, presented in a consistent, visually accessible manner available to multiple community stakeholders in communities of all sizes throughout the country. Case examples are grouped into the following general street typologies:

- Road Diet: A road diet attempts to rebalance streets by usually substituting two car lanes with a center median and bike lanes.
- Arterial Rehab: Busy, multilane streets, often referred to as arterials, crisscross the landscape of our cities and suburbs. Alongside these wide thoroughfares, fast food restaurants, strip malls, and grocery stores take advantage of the high volume of car traffic these streets were originally designed to carry. Examples here demonstrate how arterials can be rehabilitated to better accommodate other modes and improve the aesthetics of the area.
- Urban Mixed Use: Streets in this category play host to a diverse mix of uses. These uses can change along the length of the street, with each block having a different character. The uses may also be different from building to building, or within the same building. Streets in this section of the guidebook demonstrate how improvements to the public right-of-way can further grow and support that diversity and energy.
- Main Street: Main streets serve as important symbols in a community. The streets in this category have historically served as the center of town, the place people went to shop, meet friends, and attend community events. Prior to the redesigns documented in this guide, each of these streets went through periods where they no longer served as that community hub. These examples show what some communities have done to change the street to bring back some of the historic main street feel and function.
- Bike Street: Cycling, and the need for dedicated bicycle infrastructure, is on the rise in the United States. These streets demonstrate a variety of ways cyclists can be accommodated on all types of streets, from simple bicycle lanes to an eight-mile world-class urban trail.
- Transit Street: Transit streets emphasize buses and trains and employ designs that make it easy for people to use them.

Each open-faced page of the guidebook includes an aerial view of the street, a cross section of the right-of-way segmented by use and function, a figure-ground sketch of the adjacent street

network and building context, a description in text and images of specific street treatments, the actual current ADT of the design, and a report as available on vehicular accident rates within the study areas. Upon completion, a user will be able to access the information in a variety of ways, including by street design, by right-of-way, by ADT, or by other elements that may be available.

3.2.3 Guidebook Back Matter

Following the presentation of street examples, citations and resources for further investigation are clearly presented. While this guidebook is designed to orient a wide variety of community stakeholders to the range of possibilities for street redesigns, it is also intended as a resource where community stakeholders can find people or projects to follow up with as necessary. The information in the back matter portion of the guide is designed to assist in this way.

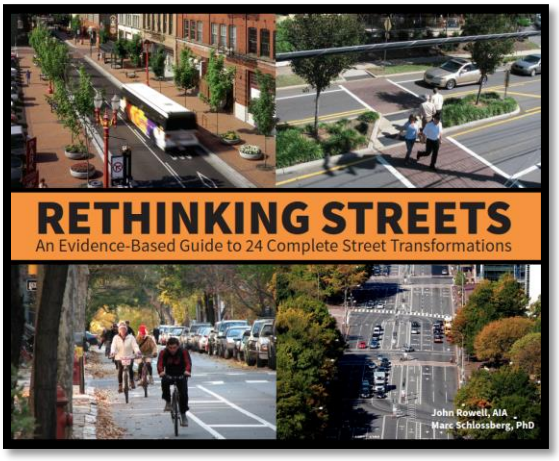
4.0 CONCLUSION

Many communities across the country are re-examining their streets, how they function, who they serve, and how they can be improved to serve more functions than throughput for motorized vehicles. While such throughput is, of course, an important function of a transportation network, for decades street design has favored that function over multinodal access or the placemaking qualities of streets. The Complete Streets movement of the last decade has helped move these issues more into the mainstream, with many local and state legislatures adopting some variation of Complete Street polices. Yet, when actual projects at the local level become considered, they often face opposition from neighbors or from commercial interests. Common fears include the belief that congestion will increase, neighborhood cut-through will occur, and businesses will be negatively impacted.

What has not existed is an evidence-based street design guide to help local professionals, policymakers, and other community stakeholders see how other communities have proceeded with similar projects and what the transportation and economic impacts have been. Thus, rather than having a guidebook of hypothetical design alternatives, this guidebook presents already completed projects that show before-and-after conditions, contexts around the project, and different transportation and economic performance metrics. The goal is to reduce some of the fear of the unknown within local transportation decision making and to provide a common language to all the stakeholders that inevitably come together when redesigning important streets in their community.

Throughout the process of developing this guidebook, it continually became clear that such a guidebook does not exist and that one is desperately desired. Moreover, it became clear that there is an interest in several additional evidence-based street guidebooks that focus on: 1) complete intersections; 2) retrofits of state roads within urban areas; 3) rural street retrofit projects; and 4) "signature" street retrofit projects.

Figure 6: Potential Guidebook Cover



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Neighborhood Traffic Intrusion

The clean, expansive beaches in Manhattan Beach attract visitors from far away to enjoy the splendid amenities of the Pacific Ocean, particularly during the summer. This attraction generates significant outside traffic and parking demands along the beach. While beneficial to the local economy, the beachgoers can impact residential neighborhoods by using local streets to avoid congested thoroughfares and parking in quiet residential areas.

Manhattan Beach lies between major employment centers to the north and South Bay residential communities and Palos Verdes Peninsula to the south. As described above, through north-south traffic significantly impacts Sepulveda and Aviation Boulevards, which carry volumes over their design capacity during morning and evening commute hours. This effect is intensified whenever I-405 experiences substantial delays.

When arterial and collector roadways become over-congested and vehicular movement is limited, motorists look for alternative routes to bypass the heavily congested streets. Regular commuters use the alternative routes regularly. Manhattan Beach's grid street pattern established in the early 1900s is conducive to cut-through traffic, which creates noise impacts and compromises pedestrian and vehicular safety in these neighborhoods. Local streets that intersect with congested arterials and collector streets experience the most cut-through problems.



2nd Street is a popular street for motorist to cut through. The uses on 2nd Street are all residential. A slight grade change is conducive to higher vehicle speeds as motorists travel downhill.

Motorists also look to avoid major intersections where excessive queuing occurs. Intersections along Sepulveda Boulevard in particular are heavily congested during peak hours, and connecting streets facilitate motorists cutting through to other north-south routes.

Neighborhood Traffic Issue Areas

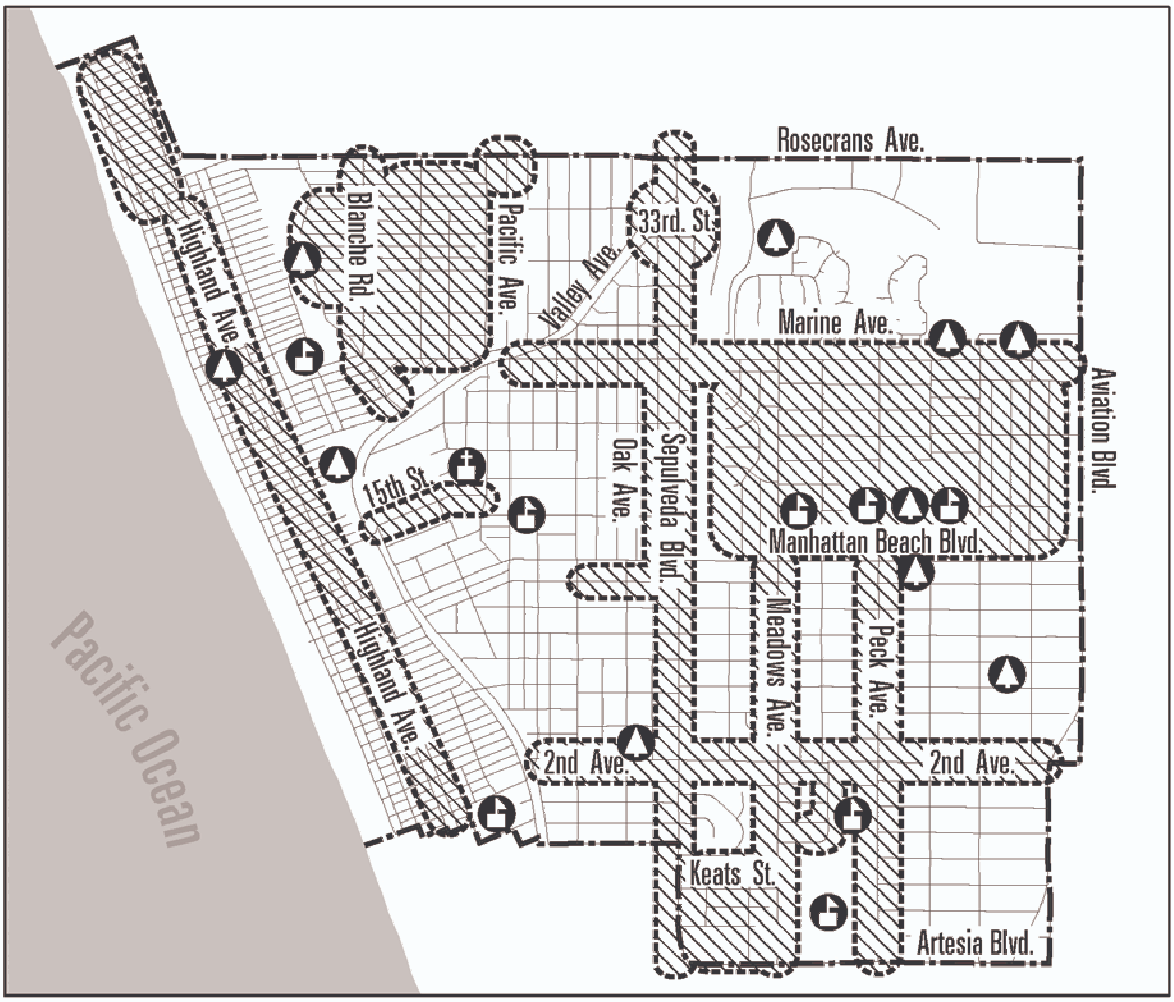
Marine Avenue (residential section west of Sepulveda Boulevard) and 2nd Street have experienced significant traffic impacts, including speeding, excessive volumes, truck traffic, and cut-through traffic during the peak hours of the day. Traffic studies have been conducted to determine the needed street measures that will help reduce traffic impacts on both streets. Marine Avenue measures included stop signs, increased enforcement, signage directing commuters to arterials, and modification to the centerline. 2nd Street has also gone through extensive street experimenting with street chokers and diverters aimed at reducing cut-through traffic.

Residents are concerned about excessive speed and volume resulting from Meadows Avenue being used as an alternative to Sepulveda Boulevard. Complaints from residents originated from persons with homes between Marine Avenue and Manhattan Beach Boulevard. The intersection is posted to only allow right or left turns onto Marine Avenue from Meadows Avenue, both directions; no through traffic is allowed. Residents surrounding Sand Dune Park have voiced their concern to the City about traffic volumes and lack of parking for park users.

Local streets directly adjacent to schools experience traffic impacts as well, such as cut-through traffic (vehicles and buses) and speeding, and pick-up and drop-off trips during morning and mid-afternoon hours. Parents shuttling children to school significantly increase traffic on local streets that surround the schools. Student parking for Mira Costa High School can encroach into surrounding residential areas, creating significant impacts.

Other areas have been identified as having traffic issues and some of these areas have been studied (see Figure 1-6). In many of these areas where traffic issues have identified, the City continues to experiment with options and has taken proactive measures to reduce impacts on the surrounding residential neighborhood.

Figure I-6:
Residential Streets/Neighborhoods with Traffic Issues



Source: Meyer, Mohaddes, Inc. and Neighborhood Traffic Committee; November 2002

Residential/Neighborhood Traffic Issue Areas

Schools

Public

Private

Parks

Neighborhood Traffic Management Program

In response to continued residents' concerns regarding traffic impacts in neighborhoods, in 2002 the City instituted a Neighborhood Traffic Management Program designed to identify specific issues at a local neighborhood level, and to allow residents to help define mitigation strategies appropriate to the identified and documented problem. The overall objective of the Neighborhood Traffic Management Program is to improve the livability of neighborhoods by mitigating the impacts of vehicular

traffic in residential areas. Specific impacts addressed by the Program include high non-local cut-through traffic volumes, excessive speeds, truck traffic intrusion, demonstrated accident history, and related problems.

The process will ensure that neighborhoods with demonstrated problems and community support for traffic improvements have equal access to neighborhood traffic management measures. The Program depends upon resident involvement and may vary from year-to-year based upon funding available for installation of neighborhood traffic improvements. The process includes the following steps:

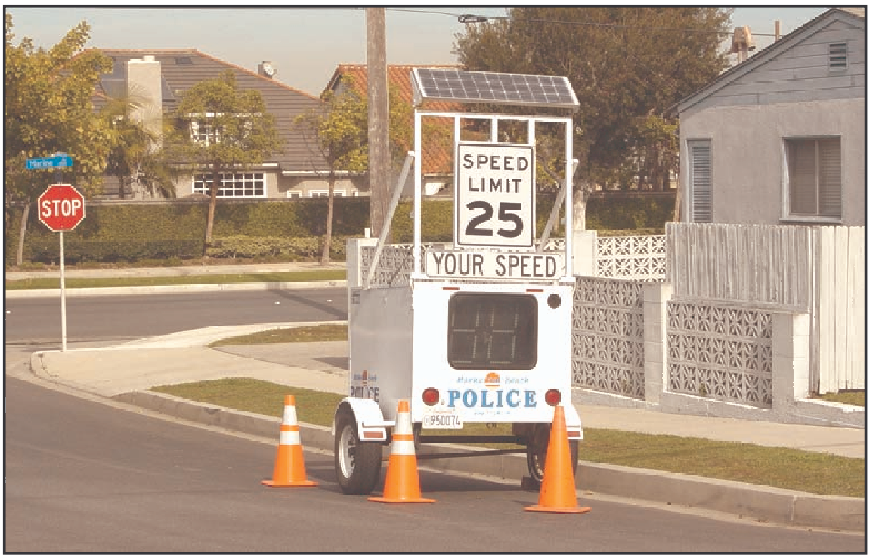
Step 1 - Identify Candidate Streets/Neighborhoods
Step 2 - Preliminary Screening and Evaluation
Step 3 - Engineering Analysis/Preliminary Recommendations
Step 4 - Neighborhood Meetings and Survey/Petitions
Step 5 - Develop, Install, and Evaluate Test Projects
Step 6 - Determination of Permanent Project
Step 7 - Monitoring

Various traffic management measures can be placed within a neighborhood street to help alleviate traffic; however, each control measure can have an impact on or divert traffic to adjacent streets. The Neighborhood Traffic Management Program requires extensive evaluation, analysis, and monitoring to prevent additional traffic problems elsewhere within a neighborhood.

Figure I-7 and Table I-1 present some of the different traffic management measures that can be used to ease traffic issues on local neighborhood streets. Efforts to apply Level 1 toolbox measures will be made first where feasible, then proceeding to Level 2 and Level 3 only when applicable Level 1 tools have been demonstrated as inadequate to solve the problems.



At Meadows Elementary School, both a speed limit sign and a temporary electronic message board warn drivers to slow down and drive safely.

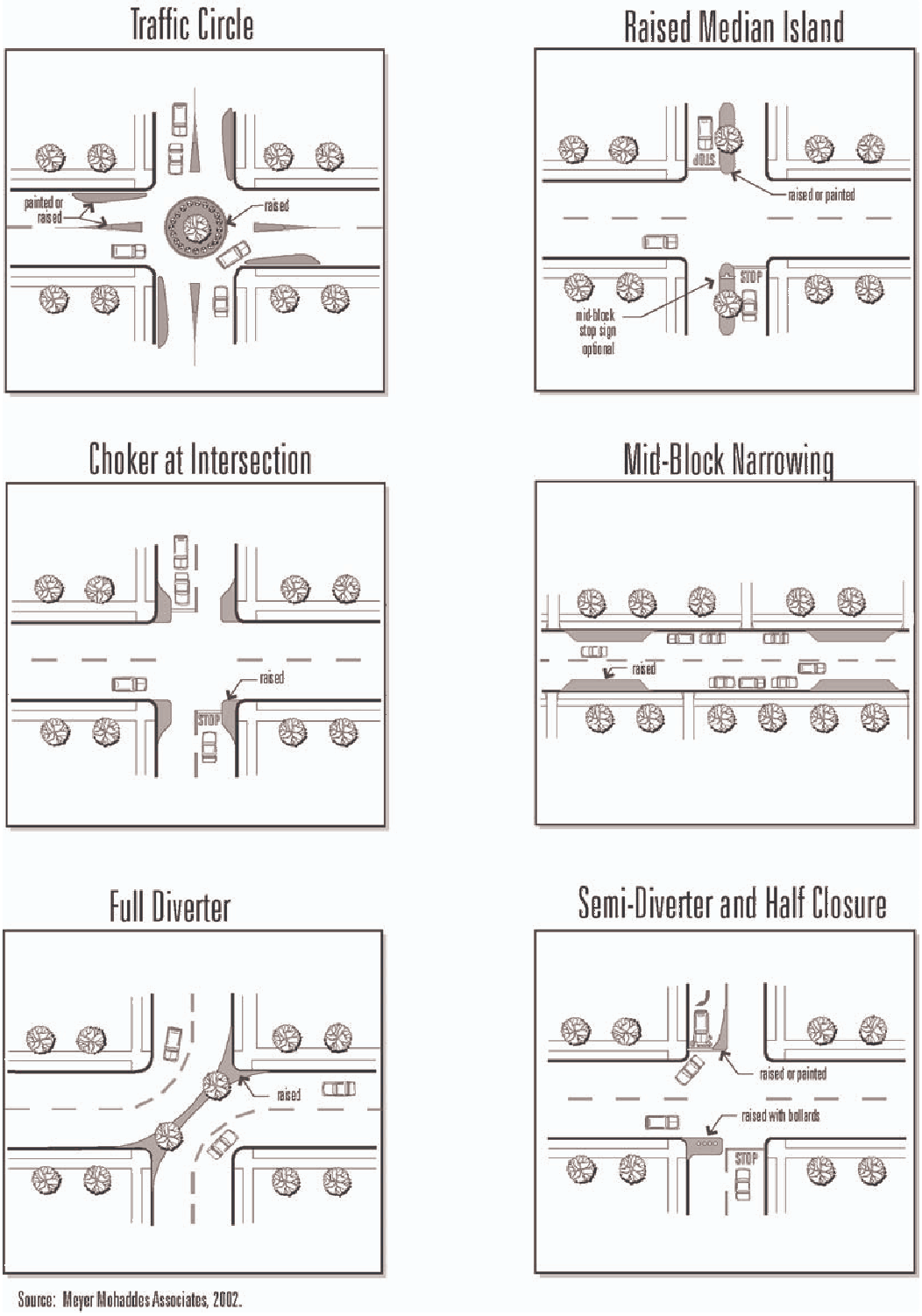


This speed monitoring trailer, provided by the Manhattan Beach Police Department, is an example of a Level 1 Toolbox measure.

Table I-1
Traffic Management Measures

Level 1	Level 2	Level 3
▪ Enhanced Police Enforcement ▪ Speed Monitoring Trailer ▪ Neighborhood Traffic Watch Program ▪ Higher Visibility Crosswalk ▪ Pedestrian Crossing Signs ▪ Electronic Speed Limit Signs/Larger Static Speed Limit Signs	▪ Traffic Signal Adjustments to Discourage Cut-Through Traffic ▪ Turn Restrictions Via Signage ▪ Rumble Strips/Dots ▪ Crosswalk Warning System ▪ Raised Median Island ▪ Entry Island (Neighborhood Identification Island) ▪ Mid-Block Narrowing ▪ Chokers at Intersections ▪ Lane Reduction/Lane Narrowing/Restriping ▪ Stop Sign as Neighborhood Traffic Control Measure ▪ Parking Restrictions	▪ Raised Crosswalk ▪ Raised Intersection ▪ Traffic Circle ▪ Restricted Movement Barrier ▪ Entrance Barrier-Half Closure ▪ Diagonal Diverter

Some traffic management measures can limit or affect access of emergency vehicles. Specific measures can negatively impact response time, such as diagonal diverter or half closure. Many of Manhattan Beach's roadways are very narrow; adding traffic measures can further limit emergency vehicle access. Public Works, Fire, Traffic Engineering, Community Development staff, and the Police Traffic Division review traffic improvement related requests and make recommendations to the to the Parking and Public Improvements Commission. The Commission members, who are appointed by the City Council, make recommendations and the City Council then takes action on the request.



Source: Meyer Mohaddes Associates, 2002.

Figure I-7

Examples of Neighborhood Traffic Management Measures

Police Department Traffic Team

In addition to the physical improvement strategies offered by the Neighborhood Traffic Management Program, the City will continue to use the Police Department's Traffic Team to patrol the streets of Manhattan Beach, investigating and resolving traffic-related concerns or complaints and enforcing traffic laws. Traffic officers are assigned to neighborhood patrol areas and solicit the support of the patrol officers, and to work as a team to address issues within their assigned area. The intent of the strategy is to have traffic officers become aware of and be more responsive to community concerns. This program also encourages officers to establish relationships with community residents and businesses, creating a heightened awareness of the people and activities in their assigned area. Contact with the community provides familiarity and allows the officers to develop a sense of ownership, thereby positively impacting traffic issues. It also provides residents a means to express traffic issues within their neighborhoods.

Goals and Policies: Preventing Neighborhood Traffic Intrusion

Goal I-2:	**Move commuter traffic through the City primarily on arterial streets, and on collector streets as appropriate, to protect other streets from the intrusion of commuter traffic.**
Policy I-2.1:	Encourage the use of the Neighborhood Traffic Management Program and utilize neighborhood traffic management tools to mitigate neighborhood intrusion by commuter traffic.
Policy I-2.2:	Establish priorities and determine funding available for implementing the Neighborhood Traffic Management Program.

Policy Discussion

Levels 2 and 3 traffic measures can be considerable in costs. With limited funding resources, planning and prioritizing the implementation of traffic measures is important, and will be established by the City Council.

Policy I-2.3:	Upgrade all major intersections and arterial streets to keep traffic moving efficiently.

Policy I-2.4: Require additional traffic lanes and/or other traffic improvements for ingress and egress for new development along arterials where necessary for traffic and safety reasons.

Policy I- 2.5: Work with neighboring cities and regional and sub-regional agencies to widen and upgrade all major intersections and associated street segments within the City and adjacent jurisdictions to optimize traffic flow.

Policy Discussion

Manhattan Beach is working with the cities of El Segundo, Hawthorne, and Redondo Beach to synchronize traffic signals using real time information and develop traffic management plans to combat congestion. Manhattan Beach consistently works with the MTA, South Bay Cities Council of Governments, Caltrans, employees associations, and neighboring jurisdictions on projects such as the Sepulveda Boulevard widening, Aviation Boulevard widening, Rosecrans Corridor Study and, the Douglas Street extension. Public Works has a number of CIP projects in the City that address subregional and regional traffic issues.

Policy I-2.6: Encourage the use of Intelligent Transportation Systems (ITS), such as advanced signalization, motorist information, advanced transit, advanced emergency vehicle access, and intelligent parking systems, as well as other appropriate communication technologies, to direct through traffic.

Policy Discussion

Intelligent Transportation Systems include the application of advanced information processing (computers), communications, technologies, and management strategies in an integrated manner to improve the safety, capacity, and efficiency of a transportation system. As mentioned in Policy I-2.5, Manhattan Beach is working with neighboring cities to coordinate traffic signals to move traffic through cities faster.

Policy I- 2.7: Monitor and minimize traffic issues associated with construction activities.

Policy Discussion

Construction activity can cause significant traffic congestion due to the need to close lanes or streets, limiting vehicle capacity or creating detours. More than one construction site on a street simultaneously can pose serious traffic impacts on surrounding streets.

2. PROJECT ALTERNATIVES

2.1 Introduction

Six alternatives are evaluated in detail in this Draft Environmental Impact Report (DEIR) for the Exposition Corridor Transit Project Phase 2 (Expo Phase 2) project: the No-Build Alternative, Transportation Systems Management (TSM) Alternative, and four Light-Rail Transit (LRT) Alternatives. This chapter describes the physical and operating characteristics of these alternatives. The chapter also includes a discussion of alternatives that were initially considered during the screening process and withdrawn from detailed consideration as a result of that screening.

The No-Build Alternative is included to allow reviewers to compare the impacts of the LRT Alternatives with the impact of doing nothing. A TSM Alternative is included as a lower-cost way to address the transportation problems in the corridor. A range of potential LRT Alternatives were developed and subjected to a two-step screening process to identify those that meet the Purpose and Need defined in Chapter 1 (Introduction), weighed against environmental and operating criteria.

2.2 No-Build Alternative

The No-Build Alternative consists of the existing transit services as well as improvements explicitly committed to be constructed by the year 2030 as defined in the Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP).[19]

The CEQA Guidelines state that the "purpose of describing and analyzing a no project alternative is to allow the public and decisionmakers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (14 *California Code of Regulations* ("CEQA Guidelines") Section 15126.6 (e)(1)). The No-Build Alternative is included in the EIR to provide a basis for comparison of what would happen if a LRT Alternative or the TSM Alternative is not approved.

The CEQA Guidelines make a distinction between the environmental "baseline" and the no-project alternative analysis. The CEQA Guidelines provide that the impacts of a project are normally determined by comparing the impacts of the project against the "physical environmental conditions in the vicinity of the project" (CEQA Guidelines Section 15125(a)). The CEQA Guidelines provide, however, that the EIR shall also examine "what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community service" (CEQA Guidelines Section 15126.6(e)(2)).

Consistent with the CEQA Guidelines, the No-Build Alternative is defined to consist of the existing transit services as well as improvements explicitly committed to be constructed by the year 2030 as defined in the SCAG RTP. Accordingly, this No-Build Alternative includes only transit service and roadway construction projects that are programmed and funded and would

[19] *2008 Regional Transportation Plan: Making the Connections*, adopted May 2008.

be expected to occur, independent of and regardless of whether one of the proposed TSM or LRT Alternatives is approved. Of the various programmed construction improvements contained in the SCAG RTP, only the I-405 Carpool Lanes northbound and southbound between the US 101 Freeway and SR-90, and southbound between Waterford and the I-10 Freeway (I-405 widening project); the I-10/Robertson Boulevard Interchange; and the Overland Avenue Bridge Widening (over I-10) are located in or near the Expo Phase 2 project area.

In accordance with the CEQA Guidelines, the EIR evaluates the impacts of the project alternatives against existing conditions. The EIR also evaluates projected future traffic and air quality conditions with and without the project. This is necessary so that the public and the decisionmakers may understand the future impacts on traffic and air quality of approving and not approving the project. In this manner, the EIR evaluates both the impact of the project alternatives against current environmental conditions as well as comparing the impacts of the project against projected future traffic and air quality conditions.

The future traffic and air quality conditions are based on the adopted official demographic and projections for the project area and region. Past experience with the adopted demographic projections indicate that it is reasonable to assume that the population of the project area and the region will continue to increase over the life of the project. The projected population increases will, in turn, result in increased traffic congestion and increased air emissions from mobile sources in the project area and in the region.

2.2.1 No-Build Fixed Guideway Service Assumptions

A “fixed guideway” refers to any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. The term includes heavy rail, commuter rail, light rail, monorail, trolleybus, aerial tramway, inclined plane, cable car, automated guideway transit, ferryboats, that portion of motor bus service operated on exclusive or controlled rights-of-way, and high-occupancy-vehicle (HOV) lanes.

Figure 2.2-1 (Metro Rail Service) and Table 2.2-1 (No-Build Alternative—Fixed Guideway Assumptions for Year 2030) detail the fixed guideway assumptions included in the No-Build Alternative. The Expo Phase 1 LRT and the Gold Line Eastside LRT Extension, which are currently under construction, are also assumed as well as the planned peak-only Wilshire Rapid Bus. The Metro Rail and BRT system connects to Metrolink commuter rail service at Union Station in Downtown Los Angeles, which provides service to six counties over 512 route miles.

2.2.2 No-Build Bus Service Assumptions

The No-Build Alternative assumes there will be connections between the applicable local bus services and Expo Phase 1 stations. It is also assumed that bus routes currently terminating at the West Los Angeles Transit Center located at Washington/Fairfax will continue to serve that location while also connecting to the Expo Phase 1 stations at either La Cienega or Culver City.

The No-Build Alternative also assumes full implementation of the Metro Rapid Bus program, which includes 28 routes across the county, as well as planned peak-only rapid bus lanes along Wilshire Boulevard between Western Avenue and Centinela Avenue. Rapid bus routes in the study area include Lincoln Boulevard, Sepulveda Boulevard, Beverly Boulevard, Santa Monica Boulevard, Wilshire Boulevard, Olympic Boulevard, and Pico Boulevard.



Source: Metro, 2008; DMJM Harris, 2008.

Figure 2.2-1
Metro Rail Service

Table 2.2-1 No-Build Alternative—Fixed Guideway Assumptions for Year 2030

Line	Endpoints	Peak Headway (minutes)	Off-Peak Headway (minutes)
Metro Rail			
Purple	Union Station to Wilshire/Western	10	10
Red	Union Station to North Hollywood	5	10
Blue*	7th/Flower to Downtown Long Beach	5	10
Expo Phase 1	7th/Flower to Venice/Robertson	5	10
Gold	Atlantic to Sierra Madre Villa	5	10
Green	105/605 to Marine	5	10
Metro Liner BRT			
Orange	North Hollywood to Warner Center	5	10

SOURCE: LACMTA Countywide Modeling, June 28, 2007 and updated June 3, 2008

* 10-minute peak headways between 7th/Metro and Willow, and between 7th/Metro and Pacific equates to combined 5-minute trunk headways between 7th/Metro and Willow.

The remainder of the bus network is based on the June 2007 service patterns of Metro, LADOT, Culver City, and Santa Monica Big Blue Bus, as well as committed enhancements to those services anticipated by 2030. Table 2.2-2 (No-Build Alternative—Study Area Routes) lists the study area routes and the corresponding headways.

Based on direction from Metro, the bus fleet is assumed to include a mix of articulated and higher-capacity 45-foot buses in 2030.

Table 2.2-2 No-Build Alternative—Study Area Routes

Line No.	Description	Existing (June 2007) peak headway, off-peak headway (min)	2030 No-Build peak headway, off-peak headway (min)
Metro Rapid (Line numbers for future routes subject to change)			
703	Lincoln Blvd (4th/Wilshire–Aviation Green Line)	15, 0	10 NB/15 SB, 0
704	Santa Monica Blvd (Ocean/Santa Monica–Hill/Pico)	NA	7, 15
706	Sepulveda (UCLA–Aviation Green Line)	NA	5 NB/10 SB, 20
707 (730)	Pico (Ocean/Colorado–Wilshire/Western)	NA	10, 10
714	Beverly (Santa Monica/Canon–Pico/Grand)	15, 0	10, 0
720	Wilshire (Ocean/Colorado–Whittier/Goodrich)	4 EB/3 WB, 6	2.5, 5
728	W. Olympic (Union Stn–Ave of the Stars/SM Blvd)	NA	6, 12

Table 2.2-2 No-Build Alternative—Study Area Routes

Line No.	Description	Existing (June 2007) peak headway, off-peak headway (min)	2030 No-Build peak headway, off-peak headway (min)
Metro Local, Limited, and Express Bus Routes			
28	Olympic Bl, Olympic/Fairfax–Temple/Spring	6, 7.5	6, 7.5
	Olympic Bl, Century City–Temple/Spring	9, 15	NA
33	Venice Bl, Main/Sunset–Union Stn	7.5, 15	7.5, 15
333	Venice Blvd Ltd, 2nd/Santa Monica–6th/Main	7.5, 15	7.5, 15
220	Robertson Bl, Santa Monica/San Vicente–Venice/Robertson	40, 40	40, 40
534	Malibu Express, Trancas Canyon–WLA TC	15 WB/30 EB, 30	15 WB/30 EB, 30
City of Los Angeles Department of Transportation (LADOT)			
431	Sepulveda/Montana–Union Station	4 EB trp AM, 4 WB trp PM	45 EB, 0 (no change)
437	Venice (Wash/Pac)–Marina del Rey–LACBD (Temple)	6 EB trp AM, 6 WB trp PM	30 EB, 0 (no change)
Culver City Municipal Bus Lines			
1	Washington Bl	12, 15	12, 15
2	Sunkist Park	60, 60	60, 60
3	Crosstown (Century City–Fox Hills)	20, 20	20, 20
4	Fox Hills Mall–Jefferson Blvd–WLA TC	60, 60	30, 30
5	Braddock Dr	1 WB AM; 2 EB PM	90, 0
6	LAX–Sepulveda Bl–UCLA	12, 15	12, 30
7	Culver Bl	40, 40	40, 40
8	Playa Vista–LAX Limited (Playa Vista, Jefferson, Lincoln, LAX)	NA	30, 30
Santa Monica Municipal Bus Lines			
1	UCLA–Santa Monica Bl–Venice	10, 10	10, 10
	UCLA–Santa Monica Bl–20th–SMC	NA	30, 30
2	UCLA–Wilshire Bl–Venice–Walgrove Ave	15, 20	15, 20
3	LAX–Lincoln Bl–UCLA	15, 30	10, 30
	LAX–4th/Santa Monica Bl	20 SB, 30	12 SB, 30
4	SM Civic Ctr–San Vicente Bl–Olympic/Westwood	30, 30	30, 30
5	6th/Wilshire–Olympic Bl–Pico/Rimpau	20, 30	20, 30
	Olympic/Sawtelle–Pico/Rimpau, WB	60, 0 WB	60, 0 WB
6	SMC–Palms–Venice/Robertson (formerly SMC)	NA	30 WB, 60

Table 2.2-2 No-Build Alternative—Study Area Routes

Line No.	Description	Existing (June 2007) peak headway, off-peak headway (min)	2030 No-Build peak headway, off-peak headway (min)
7	Pico Bl, SM to Pico/Rimpau	10, 10	7.5, 10
	Pico Bl Limited	20, 0 both directions	NA
8	4th/Wilshire–Ocean Park Bl–Westwood Bl–UCLA	15, 15	15, 15
9	SM–Temescal Canyon–Sunset Bl	30, 30	30, 30
10	Santa Monica–Union Stn	15, 30	15, 30
	Marine/Main–Union Stn	60 EB, 0	60 EB, 0
12	Pico/Robertson–Palms–UCLA	15, 15	15, 15
Super 12	Westwood & Palms Limited	15, 0 NB	12, 0 NB
13	Westside Pavilion–Pico/Rimpau	30, 0 WB	30, 0 WB
14	Culver City–Brentwood Village–Sepulveda/Moraga	12–15, 30	12, 30
Crosstown	miniBlue Crosstown: 14th/20th St Loop (formerly SM11)	15, 15 clockwise	15, 15 clockwise
Sunset	miniBlue Sunset: SMC Campus Connector–Airport/Centinela, Ocean Park, 20th–Colorado–Stewart–Pico loop	NA	15, 15

SOURCE: Connetics Transportation Group, 2008.
EB = eastbound; WB = westbound; NB = northbound; SB = southbound

2.2.3 No-Build Highway and Roadway Improvement Assumptions

The No-Build Alternative assumes that a number of highway and roadway improvements by other entities, which are currently in planning or under construction, will be in place. These include the: I-405 Freeway Carpool Lanes northbound and southbound between the I-10 Freeway and SR-90, and southbound between Waterford and the I-10 Freeway (I-405 widening project); the I-10/Robertson Boulevard Interchange; and the Overland Bridge Widening over the I-10 Freeway.

2.3 TSM Alternative

The Transportation Systems Management (TSM) Alternative identifies transit improvements above and beyond the No-Build Alternative as defined above with the goal of improving transit services as much as possible without making major capital investment in new infrastructure, and specifically without constructing the Expo Phase 2 project.

The TSM Alternative would involve three basic components: addition of a rapid bus route connecting downtown Culver City with downtown Santa Monica; associated service improvements on selected north/south routes to feed stations along the new rapid bus route;

and service improvements on selected routes connecting Westside communities to the Expo Phase 1 terminus.

2.3.1 Rapid Bus Service

The new rapid bus route would roughly parallel the routing of the LRT Alternatives between Culver City and Santa Monica. The rapid bus would operate on headways of five minutes during the peak periods and ten minutes during the midday. The route would begin at the Expo Phase 1 terminus and travel north on Robertson Boulevard, west on National Boulevard, north on Westwood Boulevard, west on Olympic Boulevard, and north on 4th Street in Santa Monica. The route would loop around Broadway, Ocean Avenue, Santa Monica Boulevard, and back to 4th Street on its return to Culver City. Stops would be at roughly half-mile intervals. Headways for weekdays, Saturdays, and Sundays are shown in Table 2.3-1 (TSM Alternative—Rapid Bus Service Headways).

Table 2.3-1 TSM Alternative—Rapid Bus Service Headways

Time Period	Hours	Service Headways (minutes)
Weekdays		
Early Morning	4:00 a.m. to 6: 00 a.m.	15–20
AM Peak	6:00 a.m. to 9:00 a.m.	5
Midday	9:00 a.m. to 3:00 p.m.	10
PM Peak	3:00 p.m. to 5:30 p.m.	5
Early Evening	5:30 p.m. to 7:00 p.m.	10
Late Evening	7:00 p.m. to 12:30 a.m.	15–20
Saturdays		
Morning	4:00 a.m. to 10:00 a.m.	15–20
Midday	10:00 a.m. to 7:00 p.m.	10–15
Late Evening	7:00 p.m. to 12:30 a.m.	15–20
Sundays/Holidays		
Morning	4:00 a.m. to 10:00 a.m.	15–20
Midday	10:00 a.m. to 7:00 p.m.	10–15
Late Evening	7:00 p.m. to 12:30 a.m.	15–20

SOURCE: Connetics Transportation Group, 2008.

2.3.2 Feeder Service and other Service Improvements

Although the study area enjoys an existing high level of service, improvements would be made on several north/south routes to feed stops along the new rapid bus route. Improvements would be made to transit services along Robertson Boulevard, Culver Boulevard, Sepulveda Boulevard, 14th Street, 20th Street, and Lincoln Boulevard.

These service improvements would improve connections between the Expo Phase 1 terminus/Expo 2 Rapid Bus and various Westside communities such as Culver City, West

Hollywood, Palms, West Los Angeles, Westwood/UCLA, Santa Monica, Mar Vista, and Marina del Rey.

Table 2.3-2 (2030 TSM Alternative [Compared to 2030 No-Build]—Study Area Routes) lists the study area routes and the corresponding headways, and highlights the changes as compared to the No-Build Alternative.

Table 2.3-2 2030 TSM Alternative (Compared to 2030 No-Build)—Study Area Routes

Line No.	Description	2030 No-Build (peak headway, off-peak headway [min])	2030 TSM (peak headway, off-peak headway [min])
Metro Rail			
EXPO	7th/Flower to Venice/Robertson	5, 10	5, 10
Metro Rapid (Line numbers for future routes subject to change)			
701	*Expo 2 (Venice/Robertson–4th/Broadway)*	*NA*	*5, 10*
703	*Lincoln Blvd (4th/Wilshire–Aviation Green Line)*	*10 NB/15 SB, 0*	*10 NB/15 SB, 30*
704	Santa Monica Blvd (Ocean/Santa Monica–Hill/Pico)	7, 15	7, 15
706	Sepulveda (UCLA–Aviation Green Line)	5 NB/10 SB, 20	5 NB/10 SB, 20
707 (730)	Pico (Ocean/Colorado–Wilshire/Western)	10, 10	10, 10
714	Beverly (Santa Monica/Canon–Pico/Grand)	10, 0	10, 0
720	Wilshire (Ocean/Colorado–Whittier/Goodrich)	2.5, 5	2.5, 5
728	W. Olympic (Union Stn–Ave of the Stars/SM Blvd)	6, 12	6, 12
Metro Local, Limited, and Express Bus Routes			
28	Olympic Bl, Olympic/Fairfax–Temple/Spring	6, 7.5	6, 7.5
33	Venice Bl, Main/Sunset–Union Stn	7.5, 15	7.5, 15
333	Venice Blvd Ltd, 2nd/Santa Monica–6th/Main	7.5, 15	7.5, 15
220	*Robertson Bl, Santa Monica/San Vicente–Venice/Robertson*	*40, 40*	*30, 30*
534	Malibu Express, Trancas Canyon–WLA TC	15 WB/30 EB, 30	15 WB/30 EB, 30
City of Los Angeles Department of Transportation (LADOT)			
431	Sepulveda/Montana–Union Station	45 EB, 0	45 EB, 0
437	Venice (Wash/Pac)–Marina del Rey–LACBD (Temple)	30 EB, 0	30 EB, 0
Culver City Municipal Bus Lines			
1	Washington Bl	12, 15	12, 15
2	Sunkist Park	60, 60	60, 60
3	Crosstown (Century City–Fox Hills)	20, 20	20, 20
4	Fox Hills Mall–Jefferson Blvd–WLA TC	30, 30	30, 30
5	Braddock Dr	90, 0	90, 0

Table 2.3-2 2030 TSM Alternative (Compared to 2030 No-Build)—Study Area Routes

Line No.	Description	2030 No-Build (peak headway, off-peak headway [min])	2030 TSM (peak headway, off-peak headway [min])
6	LAX–Sepulveda Bl–UCLA	12, 30	12, 30
7	*Culver Bl*	*40, 40*	*30, 30*
8	Playa Vista–LAX Limited (Playa Vista, Jefferson, Lincoln, LAX)	30, 30	30, 30
Santa Monica Municipal Bus Lines			
1	UCLA–Santa Monica Bl–Venice	10, 10	10, 10
	UCLA–Santa Monica Bl–20th–SMC	30, 30	30, 30
2	UCLA–Wilshire Bl–Venice–Walgrove Ave	15, 20	15, 20
3	LAX–Lincoln Bl–UCLA	10, 30	10, 30
	LAX–4th/Santa Monica Bl	12 SB, 30	12 SB, 30
4	SM Civic Ctr–San Vicente Bl–Olympic/Westwood	30, 30	30, 30
5	6th/Wilshire–Olympic Bl–Pico/Rimpau	20, 30	20, 30
	Olympic/Sawtelle–Pico/Rimpau, WB	60, 0 WB	60, 0 WB
6	SMC–Palms–Venice/Robertson (formerly SMC)	30 WB, 60	30 WB, 60
7	Pico Bl, SM to Pico/Rimpau	7.5, 10	7.5, 10
8	4th/Wilshire–Ocean Park Bl–Westwood Bl–UCLA	15, 15	15, 15
9	SM–Temescal Canyon–Sunset Bl	30, 30	30, 30
10	Santa Monica–Union Stn	15, 30	15, 30
	Marine/Main–Union Stn	60 EB, 0	60 EB, 0
12	Pico/Robertson–Palms–UCLA	15, 15	15, 15
Super 12	*Westwood & Palms Limited*	*12 NB, 0*	*12 NB/30 SB, 30*
13	Westside Pavilion–Pico/Rimpau	30, 0 WB	30, 0 WB
14	*Culver City–Brentwood Village–Sepulveda/Moraga*	*12, 30*	*10, 20*
Crosstown	*miniBlue Crosstown: 14th/20th St Loop (formerly SM11)*	*15, 15 clockwise*	*15, 15 both directions*
Sunset	miniBlue Sunset: SMC Campus Connector–Airport/Centinela, Ocean Park, 20th–Colorado–Stewart–Pico loop	15, 15	15, 15

SOURCE: Connetics Transportation Group, 2008.

Routes with differences between No-Build and TSM are italicized.

EB = eastbound; WB = westbound; NB = northbound; SB = southbound

2.3.3 Highway and Roadway Improvements

There are no highway or roadway improvements included in the TSM Alternative, beyond those identified in the No-Build Alternative.

2.3.4 Fleet Requirements

The TSM Alternative would require twenty additional Metro buses, two additional Culver City buses, and fifteen additional Santa Monica Big Blue buses over the No-Build Alternative.[20]

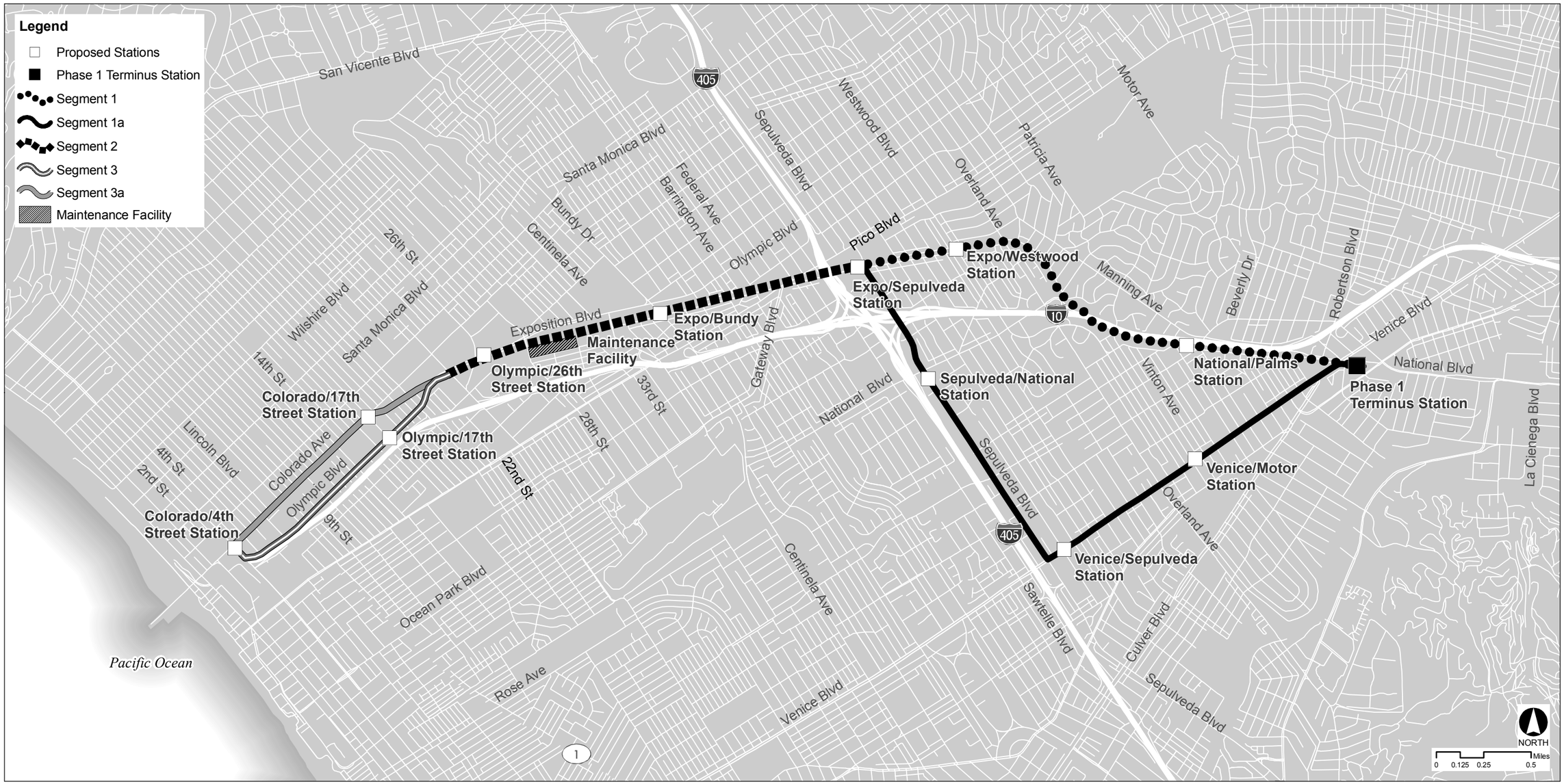
2.4 LRT Alternatives

For the Expo Phase 2 project, various LRT Alternatives were carried through screening and further defined for the DEIR. These LRT Alternatives would begin at the terminus of Expo Phase 1 in Culver City and would terminate in downtown Santa Monica in the vicinity of the intersection of 4th Street and Colorado Avenue (refer to Appendix H for a fold out exhibit). Depending upon the alternative, the alignments between these two points would vary as follows:

- LRT Alternative 1 (Expo ROW–Olympic Alternative) (LRT 1) would utilize approximately 5 miles of the existing Exposition ROW from the Expo Phase 1 terminus until reaching the intersection with Olympic Boulevard in Santa Monica. From that point, the alignment would follow Olympic Boulevard to the proposed terminus station.
- LRT Alternative 2 (Expo ROW–Colorado Alternative) (LRT 2) would also utilize the existing Exposition ROW from the Expo Phase 1 terminus until reaching the intersection with Olympic Boulevard in Santa Monica. From that point, the alignment would continue within the Exposition ROW to west of 19th Street, then diverge from the Exposition ROW and enter onto Colorado Avenue east of 17th Street and follow the center of Colorado Avenue to the proposed terminus.
- LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative) (LRT 3) would divert from the Exposition ROW at the Expo Phase 1 terminus and follow Venice and Sepulveda Boulevards until reaching the intersection with the Exposition ROW. The alignment would then continue westward along the Exposition ROW and Olympic Boulevard identical to LRT 1.
- LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative) (LRT 4) would divert from the Exposition ROW at the Expo Phase 1 terminus and follow Venice and Sepulveda Boulevards until reaching the intersection with the Exposition ROW. The alignment would then continue westward along the Exposition ROW and Colorado Avenue identical to LRT 2.

To facilitate a detailed description and comparison, the LRT Alternatives have been divided into geographic segments as described below (refer to Appendix H for a foldout exhibit). The segments correspond roughly to physical boundaries between areas of the project, or alternate street alignments that the project would follow, and each LRT Alternative comprises some combination of three segments. This approach is used, where appropriate, throughout this section and the discussion of potential impacts in Chapter 3, (Environmental Analysis),Chapter 4 (Construction Impacts), Chapter 5 (Other CEQA Considerations), Chapter 6 (Financial Considerations), Chapter 7 (Comparison of Alternatives), and Chapter 8 (Community Participation and Public Engagement). Figure 2.4-1 (Project Map—By Segment) shows the locations of each of the segments.

[20] Expo Phase 2 Operating Plans & Assumptions, October 2008, prepared by Connetics Transportation Group.



Source: Metro, 2008; DMJM Harris, 2008

Figure 2.4-1
Project Map - By Segment

- Segment 1 (Expo ROW, in LRT Alternatives 1 and 2)—Follows the Exposition ROW from the Expo Phase 1 terminus station in Culver City to the Exposition ROW/Sepulveda Boulevard intersection, approximately 2.8 miles in length
- Segment 1a (Venice/Sepulveda, in LRT Alternatives 3 and 4)—Follows westerly in the median of Venice Boulevard from the Expo Phase 1 terminus station in Culver City to the Venice and Sepulveda Boulevards intersection, then follows northerly in the center of Sepulveda Boulevard to the Exposition ROW/Sepulveda Boulevard intersection, approximately 3.7 miles in length
- Segment 2 (Sepulveda to Cloverfield, in All LRT Alternatives)—Follows the Exposition ROW from the Exposition ROW/Sepulveda Boulevard intersection to the Exposition ROW/Olympic Boulevard intersection, approximately 2.3 miles in length
- Segment 3 (Olympic, in LRT Alternatives 1 and 3)—Follows the median of Olympic Boulevard from the Exposition ROW/Olympic Boulevard intersection to the Phase 2 terminus at 4th Street and Colorado Avenue in Santa Monica, approximately 1.5 miles in length
- Segment 3a (Colorado, in LRT Alternatives 2 and 4)—Follows the Exposition ROW from the Exposition ROW/Olympic Boulevard intersection to west of 19th Street in Santa Monica. The alignment then diverges onto Colorado Avenue east of 17th Street and continues along the center of Colorado Avenue terminating between 4th Street and 5th Street, approximately 1.5 miles in length.

The segments comprising each of the LRT Alternatives are summarized in Table 2.4-1 (LRT Alternatives—Segment Summary).

Table 2.4-1 LRT Alternatives—Segment Summary

LRT Alternative	Segment 1: Expo ROW	Segment 1a: Venice/ Sepulveda	Segment 2: Sepulveda to Cloverfield	Segment 3: Olympic	Segment 3a: Colorado
LRT 1: Expo ROW–Olympic Alternative	●		●	●	
LRT 2: Expo ROW–Colorado Alternative	●		●		●
LRT 3: Venice/ Sepulveda–Olympic Alternative		●	●	●	
LRT 4: Venice/ Sepulveda–Colorado Alternative		●	●		●

SOURCE: DMJM Harris, 2008.

2.4.1 Segment 1 (Expo ROW)—Exposition ROW from Expo Phase 1 Terminus to Sepulveda Boulevard (LRT Alternatives 1 and 2)

Alignment

Drawings of the proposed LRT alignment and profile in this segment are provided in Appendix E (Plan and Profile), Drawing Nos. T-008, T-007, T-006, and T-005. Segment 1 is also shown in Figure 2.4-2 (Segment 1: Expo ROW).

As shown in Drawing T-008, this segment would start at the Venice/Robertson Station, the terminal station of Expo Phase 1. This station is an aerial station located within the Exposition ROW between Venice Boulevard and Washington Boulevard in Culver City.

From this point, the alignment would proceed via an aerial structure over Venice Boulevard. The aerial structure from the Venice/Robertson Station to the northeast side of Venice Boulevard would be approximately 500 feet long and up to 30 feet high (to top of rail). The alignment would then transition to grade within the Exposition ROW on a retained fill embankment[21] beginning on the west side of Venice Boulevard and extending approximately 900 feet west of the street. Venice Boulevard would be reconstructed from back of sidewalk to back of sidewalk in this area to provide columns to support the aerial structure in the median of Venice Boulevard. This street reconstruction would extend approximately 300 feet east and west on Venice Boulevard. The reconstruction would occur within the existing street right-of-way along with additional acquired property.

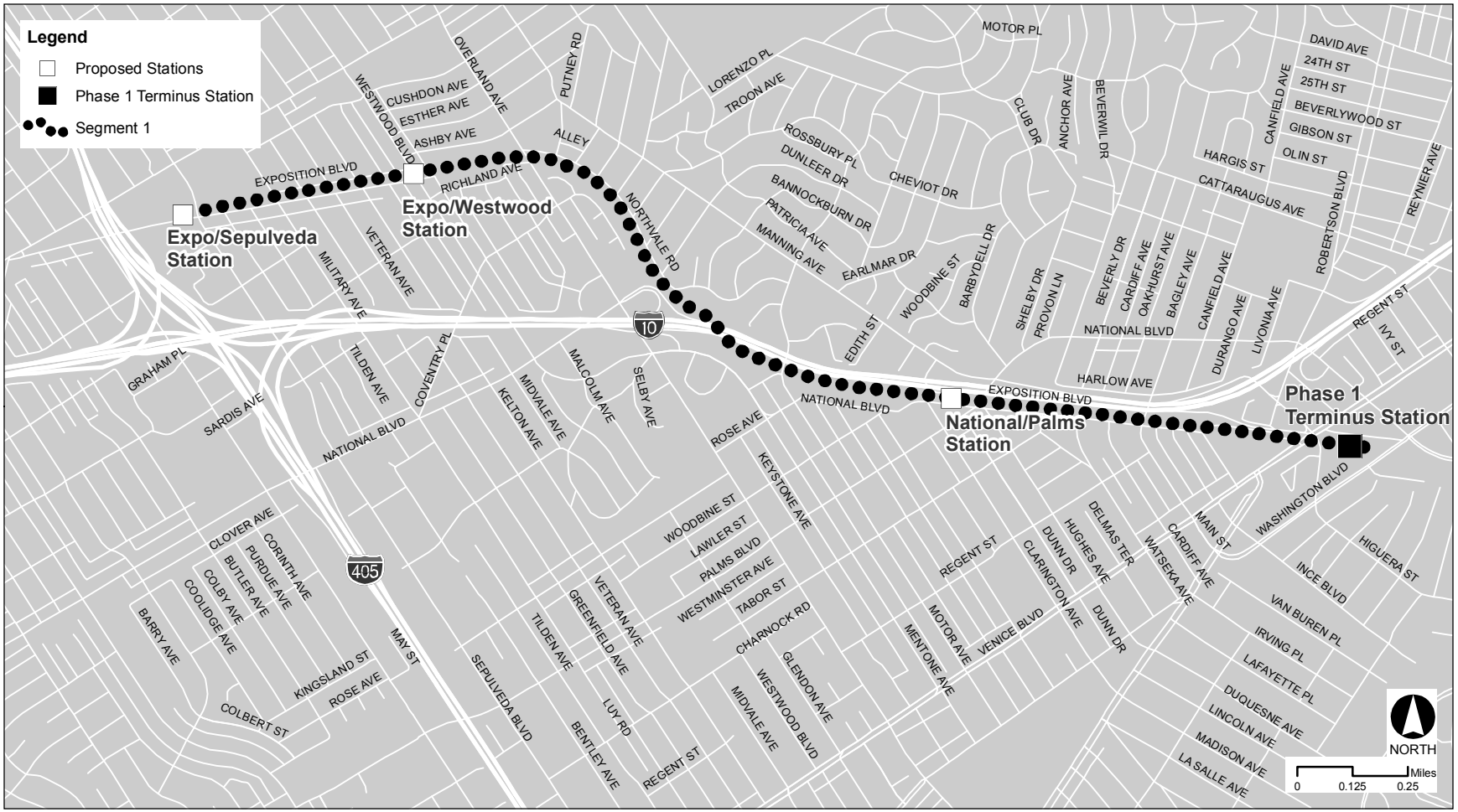
After returning to grade, the alignment would continue within the Exposition ROW and would cross Bagley Avenue at grade. Sixty parking spaces would also be constructed along the Exposition ROW north of Venice Boulevard between Bagley Avenue and Durango Avenue.

Continuing west, the Exposition ROW currently crosses over National Boulevard/Palms Boulevard on a bridge (Drawing T-007). The existing bridge would likely be replaced with a wider bridge to accommodate a two-track alignment, or, the existing bridge could potentially be retained and a parallel new bridge built to accommodate the second LRT trackway. The proposed National/Palms Station would be located upon the existing embankment at grade within the Exposition ROW immediately west of the bridge. Further west, a pocket track would be created between the two tracks to allow for short-term train or maintenance equipment storage.

The alignment would continue within the Exposition ROW and would cross over Motor Avenue on a bridge. The existing bridge would likely be replaced to accommodate a two-track alignment, or, as with the National Boulevard/Palms Boulevard crossing, it may be possible to retain the existing bridge and construct a parallel new structure to accommodate the second LRT trackway. West of Motor Avenue, the Exposition ROW narrows to 28 feet for a short distance and a partial property acquisition[22] would be required on the south side of the

[21] A retained fill embankment is usually constructed at the transition between an aerial structure and at grade alignment. Concrete retaining walls or mechanically stabilized earth (MSE) walls (or other similar materials) are constructed on the sides of the guideway and fill material is placed between the retaining walls to provide a surface for the guideway. Further information is provided in Section 7.2 (Construction Scenario).

[22] Property acquisitions are discussed in detail in Section 3.16 (Socioeconomics) and shown in Appendix G.



Source: Metro, 2008; DMJM Harris, 2008

Figure 2.4.2
Segment 1: Expo ROW

alignment. The alignment would then cross under the I-10 Freeway through the existing box structure. The width and height of the box structure is adequate to accommodate a two-track alignment. Only minor modification of the box would be needed to accommodate the LRT infrastructure.

Throughout the length of the Exposition ROW extending from east of National Boulevard/Palms Boulevard until the crossing under the I-10 Freeway, retaining walls would be constructed along both sides of the alignment. These retaining walls would be required to separate the LRT alignment from the adjacent I-10 Freeway, which is parallel to but higher than the Exposition ROW, and from the adjacent Exposition Boulevard, which is parallel to but lower than the Exposition ROW.

The alignment would continue at grade along the Exposition ROW, which lies within an existing trench parallel to and south of Northvale Road. The right-of-way width is approximately 100 feet wide in this area and varies from 30 feet deep at the deepest point before coming to existing grade near Overland Avenue. The base of the trench would need to be widened to accommodate the two-track alignment configuration extending from the box under the I-10; therefore retaining walls would be required to support the side slopes of the trench in some locations.

The alignment would continue within the Exposition ROW and would cross Overland Avenue at grade with crossing gates. Overland Avenue would be widened within the public right of way between Cushdon Avenue (north of the Exposition ROW) and Coventry Place (south of the Exposition ROW) to accommodate two additional lanes of traffic, one northbound and one southbound. In order to meet city standards, the Americans with Disabilities Act (ADA), and other requirements, reconstruction of curb returns may require minor acquisitions of property, up to 85 square feet in area, at the corners of a number of parcels on Overland Avenue.

After crossing Overland Avenue, the alignment would continue at grade and would cross Westwood Boulevard at grade with crossing gates. The Exposition ROW remains approximately 100 feet wide in this area. The proposed Expo/Westwood Station would be an at-grade center-platform station located within the Exposition ROW (on the east side of Westwood Boulevard). Westwood Boulevard would be widened by approximately 4 feet within the public ROW between Ashby Avenue (north of the Exposition ROW) and Richland Avenue (south of the Exposition ROW) to allow for two northbound lanes of traffic and bus stops on both sides of the street in close proximity to the station. Bus stops are currently located north of Exposition Boulevard on the east and west sides of Westwood Boulevard. The east side bus stop would remain in its current location while the west side bus stop would be moved south of Exposition Boulevard. A signalized pedestrian crossing of Westwood Boulevard would be provided adjacent to the LRT crossing to facilitate safe pedestrian crossings.

The Exposition Boulevard connections at Westwood Boulevard would be reconstructed within public right-of-way. On the north side of the Exposition ROW, Exposition Boulevard (west) would be reconfigured to provide a northbound turn pocket, while Exposition Boulevard (east) would be reconstructed to provide a northbound only turn lane. On the south side of the Exposition ROW, Exposition Boulevard (west) would be reconfigured to allow a southbound only turn lane, while Exposition Boulevard (east) would be reconfigured to allow only right turn in/right turn out movements.

From Westwood Boulevard, the alignment would proceed at grade within the Exposition ROW and would cross Military Avenue and Sepulveda Boulevard at grade (Drawing T-005) with crossing gates. A double-track crossover would be provided at approximately Greenfield (Station 639+00). Signalized crossings of Sepulveda Boulevard would be provided adjacent to the LRT crossing to facilitate safe pedestrian crossing.

Sepulveda Boulevard would be widened by approximately 10 feet within the public right-of-way and with a partial acquisition of one adjacent property in the vicinity of the crossing to accommodate an additional southbound through lane. The street widening would extend approximately 100 feet to the north of the Exposition ROW and would extend to Richland Avenue (south of the Exposition ROW). In addition, Exposition Boulevard would be widened by approximately 12 feet within the existing public right-of-way on the east side of Sepulveda Boulevard. In order to meet city standards, ADA, and other requirements, reconstruction of curb returns may require minor acquisitions of property, up to 85 square feet in area, at the corners of a number of parcels on Sepulveda Boulevard.

Stations

Segment 1 would have two stations as described below. All figures referred to in this section are found in Appendix F (Station Plans and Maintenance Facility). All stations would be ADA compliant.

National/Palms Station

The proposed National/Palms Station is to be located within the Exposition ROW just west of the aerial structure over National Boulevard/Palms Boulevard (Drawing A-900). The station would have a center platform, 270-foot-long and up to 30-foot-wide depending upon the width of the adjacent pocket track. Although the platform would be located at grade, the Exposition ROW is at a higher elevation than the adjacent streets in this area. No station parking would be provided.

Expo/Westwood Station

The proposed Expo/Westwood Station would be an at-grade center-platform station and would be located within the Exposition ROW on the east side of Westwood Boulevard. The platform would be 270 feet long and 16 feet wide.

Approximately 170 surface parking spaces would be provided for the station. Approximately half of the spaces would be built on both sides of the alignment, extending between Overland Avenue and Westwood Boulevard. The parking areas would be partly situated within the Exposition ROW and partly within adjacent City of Los Angeles-owned right-of-way currently not developed. Vehicles utilizing the parking area on the north side of the alignment would enter from Overland Avenue and exit onto Westwood Boulevard (i.e., one-way traffic). Vehicles utilizing the parking area on the south side of the alignment could enter and exit from either Overland Avenue or Westwood Boulevard (i.e., two-way traffic).

2.4.2 Segment 1a (Venice/Sepulveda)—Venice and Sepulveda Boulevards from Expo Phase 1 Terminus to Exposition ROW at Sepulveda (LRT Alternatives 3 and 4)

Alignment

Drawings of the proposed LRT alignment and profile in this segment are provided in Appendix E, Drawing Nos. T-012, T-011, T-010, and T-009. Segment 1a is also shown in Figure 2.4-3 (Segment 1a: Venice/Sepulveda).

As shown in Drawing T-012, this segment would start at the Venice/Robertson Station, which is the terminal station of Expo Phase 1. The Venice/Robertson Station is an aerial station located within the Exposition ROW between Venice Boulevard and Washington Boulevard in Culver City.

From this point, the alignment would proceed via an aerial structure and turn to the southwest into the median of Venice Boulevard. The aerial structure would be approximately 2,300 feet long and up to 30 feet high (to top of rail). The alignment would then transition to grade within the median of Venice Boulevard on a retained fill embankment. The embankment would be approximately 600 feet long and would begin east of Cardiff Avenue (Station 527+00 of Appendix E drawings) and would terminate just east of Delmas Terrace (Sta. 533+00). A crossover would be located west of Clarington Avenue (Sta. 545+00).

The alignment would continue at grade within the median of Venice Boulevard until west of Motor Avenue (Sta. 559+48), a distance of approximately 2,650 feet (Drawing No. T-011). The proposed Venice/Motor Station would be located at grade within the median of Venice Boulevard immediately east of Motor Avenue (Sta. 554+00).

Immediately west of Motor Avenue the alignment would transition to an aerial structure by means of a retained fill embankment. The embankment would be over 350 feet long and would gradually reach a height of up to 30 feet (to top of rail) at the point where it transitions to an aerial structure just east of Keystone Avenue (Sta. 563+00).

The alignment would continue on the aerial structure within the median of Venice Boulevard and cross Overland Avenue. The structure would be approximately 1,100 feet long and up to 30 feet high (to top of rail). The alignment would then transition to grade within the median of Venice Boulevard on a retained fill embankment. The embankment would be over 400 feet long and would begin just east of Glendon Avenue (Sta. 574+00) and terminate at approximately Westwood Boulevard (Sta. 578+26).

The alignment would proceed at grade within the median of Venice Boulevard for approximately 1,100 feet and would then transition to an aerial structure over the intersection of Venice Boulevard and Sepulveda Boulevard. The embankment leading to the aerial structure would commence just west of Veteran Avenue (Sta. 590+00). It would be approximately 400 feet long and reach a height of up to 30 feet (to top of rail) before transitioning to the aerial structure just west of Military Avenue (Sta. 594+00). The aerial structure would continue in the median of Venice Boulevard before turning northwest into the center of Sepulveda Boulevard (Drawing T-010). An aerial station—Venice/Sepulveda Station—would be located on the aerial structure at approximately Bentley Avenue (Sta. 600+00) immediately before the alignment turns north onto Sepulveda Boulevard (at approximately Sta. 605+00).



Source: Metro, 2008; DMJM Harris, 2008

Figure 2.4-3
Segment 1a: Venice/Sepulveda

Street reconstruction would be required along the entire length of the alignment along Venice Boulevard. On Venice Boulevard, the existing number of traffic lanes and the existing Class II bike lanes would be retained but street parking would be eliminated over much of the alignment.[23]

In addition, along Venice Boulevard, full and partial property acquisitions would be necessary to provide the necessary street width. Other partial acquisitions may be required to accommodate curb cuts to meet city standards, ADA, and other requirements.

After turning northwest into the center of Sepulveda Boulevard, the alignment would continue in an aerial configuration for approximately 500 feet before transitioning to a retained fill embankment (Sta. 609+00). The total length of the aerial structure from west of Military Avenue on Venice Boulevard to the transition to retained fill embankment on Sepulveda Boulevard would be approximately 1,500 feet and would be up to 30 feet above grade (to top of rail). After the transition, the alignment would then continue on retained fill embankment for approximately 900 feet until approximately Charnock Road (South) (Sta. 618+00). At this point, due to the fact that Sepulveda Boulevard slopes rapidly upwards between Venice Boulevard and Charnock Road (South), the elevation of the street and the embankment would coincide and the alignment would briefly come to grade.

Continuing north along the center of Sepulveda Boulevard, the alignment would again transition to a retained fill embankment just north of Charnock Road (South) (Sta. 619+25). After approximately 800 feet, this embankment would transition to an aerial structure just north of Westminster Avenue (Sta. 627+00). The aerial structure would continue within the center of Sepulveda Boulevard and would span the Sepulveda/National Boulevard intersection. The aerial structure would be approximately 4,400 feet long and would be up to 30 feet high (to top of rail). On the north side of National Boulevard the alignment would then transition to grade at approximately Sardis Avenue on a 300-foot-long retained fill embankment (Sta. 671+00 to Sta. 674+00). The alignment would continue at grade within the center of Sepulveda Boulevard until the intersection with the Exposition ROW (Sta. 700+07), a distance of approximately 2,600 feet. The proposed Sepulveda/National Station would be located just south of National Boulevard (Sta. 664+00) and would be an aerial station.

Two single-track crossovers would be included on the aerial structure. One would be just north of the Sepulveda Channel (Station 644+00) and the other just north of Queensland Street (Station 653+00).

Street reconstruction would also be required along the entire length of the alignment along Sepulveda Boulevard. The existing number of traffic lanes would be retained but the alignment would result in some restrictions on left-turn movements as the existing left-turn lanes would be used to accommodate the guideway within the center of the street and street parking would be eliminated over much of the alignment. There is an existing Class 3 bicycle route on Sepulveda Boulevard that would remain.

Sepulveda Boulevard would need to be widened by approximately 30 feet at the intersection with the Exposition ROW to accommodate the at-grade LRT tracks and an additional southbound through lane. The street widening would extend from approximately 100 feet to the north of the Exposition ROW to Richland Avenue (south of the Exposition ROW). In addition,

[23] Parking impacts are discussed in Section 3.2 (Transportation/Traffic).

approximately 12 feet of Exposition Boulevard would be widened within the public right-of-way and Exposition ROW on the east side of Sepulveda Boulevard.

Property acquisitions would also be required along Sepulveda Boulevard to accommodate the guideway and street improvements. Other partial acquisitions may be required to accommodate curb returns on both sides of the street to meet city standards, ADA, and other requirements.

The alignment would turn to the west in an at-grade configuration at the intersection of Sepulveda Boulevard and the Exposition ROW (Sta. 700+07).

Stations

Segment 1a would have three stations as described below. All stations would be ADA compliant. All figures referred to in this section are found in Appendix F.

Venice/Motor Station

The proposed Venice/Motor Station would be located at grade within the median of Venice Boulevard immediately east of Motor Avenue (Drawing A-1200). The station would have two 270-foot-long, 12-foot-wide side platforms. No station parking would be provided.

Venice/Sepulveda Station

This proposed station would be constructed as part of the aerial structure over the Venice/Sepulveda intersection (Drawing A-1300). The station would be located above the median of Venice Boulevard to the east of Sepulveda Boulevard. It would have a 270-foot-long, 23-foot-wide center platform. A street level transit patron plaza would be provided below the station. Signalized pedestrian crosswalks would allow access from the plaza to the north and south sides of Venice Boulevard. No station parking would be provided.

Sepulveda/National Station

This proposed station would be constructed as part of the aerial structure along Sepulveda Boulevard. It would be located just south of National Boulevard above the center of Sepulveda Boulevard and would have a 270-foot-long, 23-foot-wide center platform (Drawing A-1100). Pedestrian access would be provided from the southwest and southeast corners of the Sepulveda/National intersection. Pedestrians would utilize the crosswalk to access the median in the center of Sepulveda Boulevard and then travel down the center of the median to a point below the platform. Additional access would be provided from the west side of Sepulveda Boulevard to a point below the center of the platform via a mid-block crossing at Clover Avenue (west).

Surface station parking for approximately 250 cars would be provided in the vicinity of the station. One parking location would encompass a portion of the block of currently occupied commercial uses at the northwest corner of the Sepulveda Boulevard/National Boulevard intersection. Vehicular access to this parking area would be from National Boulevard. A second parking location would be further south, at the corner of Sepulveda Boulevard and Clover Avenue, on two parcels currently occupied by a commercial use. Vehicular access to this parking area would be from Sepulveda Boulevard and Clover Avenue. All three parcels would be acquired to accommodate the guideway, stations, and associated street reconstruction.

2.4.3 Segment 2 (Sepulveda to Cloverfield)—Exposition ROW from Sepulveda Boulevard to Olympic Boulevard (All LRT Alternatives)

Alignment

Drawings of the proposed LRT alignment and profile in this segment are provided in Appendix E (Plan and Profile), Drawing Nos. T-005, T-004, and T-003. Segment 2 is also shown in Figure 2.4-4 (Segment 2: Sepulveda to Cloverfield).

From Sepulveda Boulevard, the alignment would continue west within the Exposition ROW in an at-grade configuration. The proposed Expo/Sepulveda Station would be located immediately west of Sepulveda Boulevard (Sta. 665+00).

The alignment would transition to an aerial structure 600 feet west of Sepulveda, west of the proposed Expo/Sepulveda Station, and would cross under the elevated I-405 Freeway and over Sawtelle Boulevard in an aerial configuration.

Sawtelle Boulevard would be reconstructed from approximately 400 feet south of Exposition Boulevard to approximately 200 feet north of Pico Boulevard (Appendix E, Drawing No. CP-100). At the LRT crossing, the reconstructed street would be at a lower elevation than the existing street to maintain sufficient vertical clearance under the trackway structure for vehicles traveling along Sawtelle Boulevard. To match the proposed elevations of Sawtelle Boulevard, portions of Exposition Boulevard would be reconstructed at a lower elevation than the existing pavement. These transition zones would be approximately 400 feet west and 300 feet east of Sawtelle Boulevard.

Vehicular access would be maintained to the properties at the southwest corner of Sawtelle Boulevard and Exposition Boulevard, however, the existing driveways and sidewalk would be reconstructed. At this corner, the sidewalk would be rebuilt at the existing elevation and a low retaining wall would be built between the sidewalk and the travel lanes. The sidewalk would be replaced on all four corners adjacent to the lowered street to provide pedestrian access at those corners. On the northwest and southeast corners, retaining walls would be built behind the sidewalk, on the property line. Grading (i.e., adjusting the ground level so that it is level or sloped to a specific incline) or a small retaining wall would be required on the northeast corner of Sawtelle Boulevard and Exposition Boulevard to meet existing grade. On the southwest corner, the sidewalk would be along the curb and integrated into the adjacent building entrance.

Pico Boulevard would be reconstructed from Gateway Boulevard to 400 feet east of Sawtelle Boulevard in order to match the new elevations on Sawtelle Boulevard as well as to construct a median island and to adjust the travel lanes to accommodate structural columns for the LRT. The new back of sidewalk would be slightly lower than the existing elevations for up to 200 feet from Sawtelle Boulevard east and west on Pico Boulevard and 100 feet north of Pico Boulevard on Sawtelle Boulevard. Grading would be used where feasible to provide appropriate transitions. Other locations may require curbs or short walls (height up to 18 inches) at the back of the sidewalk to maintain existing grades. Partial and full property acquisition would be required on Sawtelle Boulevard and Pico Boulevard as a result of the profile changes.

After crossing Sawtelle Boulevard, the aerial structure would continue west within the Exposition ROW and then cross over the Pico/Exposition/Gateway Boulevards intersection. The total length of the aerial structure would be approximately 1,500 feet and, with the exception of the crossing under the elevated section of the I-405 Freeway, would be up to 30 feet high (to top of



Source: Metro, 2008; DMJM Harris, 2008

Figure 2.4-4
Segment 2: Sepulveda to Cloverfield

rail). At the crossing under the I-405, the structure would be approximately 15 feet above grade (to top of rail). The Exposition ROW width is generally 100 feet throughout this area.

West of Pico Boulevard, the alignment would transition to grade via a retained fill embankment. The embankment would begin just west of Pico Boulevard (Sta. 675+00) and extend as far as Federal Avenue (Sta. 683+50), a length of 850 feet. The alignment would cross Barrington Avenue and would continue towards Bundy Drive. Immediately south of the Exposition ROW and east of Barrington Avenue, Exposition Boulevard would be reconfigured so that vehicle movements between Barrington Avenue and Exposition Boulevard would no longer be possible due to the proximity of the future crossing grates. Some street widening would also be required in the vicinity of Barrington Avenue and Pico Boulevard (south of the Exposition ROW) on the west side of the street.

As it approaches Bundy Drive, the alignment would transition to an aerial structure via a retained fill embankment. The embankment would begin at approximately Granville Avenue (Sta. 698+00) and extend as far as the east side of Bundy Drive (Sta. 707+50), a length of 950 feet. The proposed Expo/Bundy Station would be located immediately over the street (Sta. 710+00) or 300 feet to 400 feet to either the east or west of the street. The aerial structure would be approximately 400 feet long and up to 30 feet above grade (to top of rail). Upon reaching the west side of Bundy Drive, the alignment would transition to grade within the Exposition ROW on a retained fill embankment approximately 900 feet west of Bundy Drive (Sta. 711+50 to 720+50).

Continuing west, the alignment would continue at grade within the Exposition ROW for a distance of approximately 4,500 feet and would cross Centinela Avenue, Stewart Street and 26th Street in an at-grade configuration with crossing gates (Drawings T-004 and T-003).

A maintenance facility would be built between Centinela Avenue and Stewart Street, to the south of the Exposition ROW. This facility is described below at the end of Section 2.4.6 [Other Related Facilities]).

Approximately 10 feet of street widening would be required along Centinela Avenue between the Exposition ROW and Olympic Boulevard to accommodate an additional northbound lane of traffic. This would require a partial property acquisition on the west side of the street between the Exposition ROW and Olympic Boulevard. Exposition Boulevard would be reconstructed for approximately 100 feet east of Centinela. A signalized crossing would be provided at Exposition Boulevard on Centinela Avenue to facilitate safe pedestrian crossings.

Some minor street reconfiguration would be required at Stewart Street (approximately 85 square feet) to add a southbound through lane. Existing on-street parking would need to be eliminated on the east and west sides of the street for one block south of the Exposition ROW. In association with these modifications, the median on Olympic Boulevard would need to be reconstructed to allow for the addition of an eastbound right-turn lane and a westbound left-turn lane onto Stewart Street. These modifications would all occur within the existing street right-of-way. In addition, the lead tracks to the maintenance facility would be located within the Exposition ROW west of Stewart Street, resulting in three sets of tracks crossing Stewart Street at grade.

The Exposition ROW decreases to a width of approximately 50 feet west of Stewart Street and further decreases to a minimum of approximately 30 feet just east of 26th Street. The proposed

Olympic/26th Street Station would be located at grade immediately east of 26th Street (Sta. 760+00). As such, a partial acquisition of City of Santa Monica-owned property would be required on the south side of the Exposition ROW to accommodate the LRT tracks and proposed station.

Immediately west of 26th Street, the Exposition ROW increases to approximately 65 feet in width and the alignment transitions to an aerial structure over Cloverfield Boulevard and Olympic Boulevard, with retained fill embankments leading to and from the aerial structure. The embankment on the east side of Cloverfield Boulevard would be approximately 350 feet long (Sta. 765+50 to 769+00) and would gradually reach a height of up to 30 feet (to top of rail) at the point where it transitions to the aerial structure. The aerial structure over Cloverfield Boulevard would be approximately 1,000 feet in length and would be up to 30 feet high (to top of rail).

Stations

Segment 2 would have three proposed stations as described below. Stations would be ADA compliant. All figures referred to in this section are found in Appendix F.

Expo/Sepulveda Station

The proposed Expo/Sepulveda Station would be located within the Exposition ROW just west of Sepulveda Boulevard (Drawing A-700). The station would be at grade and would have two 270-foot-long, 12-foot-wide side platforms. Access would be from Sepulveda and Exposition Boulevards. A parking structure would be constructed on the site of the existing surface parking lot of the City of LADOT property to the south of the station. The structure would have two decks above the existing surface parking. Each of the two decks would have approximately 130 spaces. The ground level would continue to accommodate existing LADOT parking requirements, while the other two levels would be for station parking. Vehicular access to this facility would be from Exposition Boulevard.

Expo/Bundy Station

This proposed station would be constructed as part of the aerial structure over Bundy Drive (Drawing A-600). The station would have a 270-foot-long, 23-foot-wide center platform and would be located either immediately over the street or a short distance to either the east or the west of the street. Access to the platform would be by stairs and elevators at one or both ends of the platform.

Up to 250 surface parking spaces would be built within the Exposition ROW between Barrington Avenue and Centinela Avenue. Vehicular access to these spaces would be from Exposition Boulevard.

Olympic/26th Street Station

The proposed Olympic/26th Street Station would be located east of 26th Street in Santa Monica (Drawing A-500). The at-grade station would lie partially within the Exposition ROW, which narrows to a minimum of approximately 30 feet at this location, and partially within City of Santa Monica-owned property to the south of the Exposition ROW. It would be an at-grade station and would have a 270-foot-long, 16-foot-wide center platform. No station parking would be provided.

2.4.4 Segment 3 (Olympic)—Olympic Boulevard from Exposition ROW to Santa Monica Terminus (LRT Alternatives 1 and 3)

Alignment

Drawings of the proposed LRT alignment and profile in this segment option, which would connect to Segment 2, are provided in Appendix E, Drawing Nos. T-003, T-002, and T-001. Segment 3 is also shown in Figure 2.4-5 (Segment 3: Olympic).

As shown in Drawing T-003, this segment would begin with an aerial structure over Cloverfield Boulevard which would enter the median of Olympic Boulevard. The aerial structure would be approximately 1,000 feet long and up to 30 feet high (to top of rail). The alignment would transition to grade within the median of Olympic Boulevard on a 275-foot-long retained fill embankment that would terminate at approximately 21st Street (Sta. 781+75).

The alignment would continue at grade within the median of Olympic Boulevard until approximately Euclid Street (Sta. 812+50), a distance of approximately 3,100 feet, and would cross the 20th Street, 17th Street, and 14th Street intersections at grade in street running mode.[24] The proposed Olympic/17th Street Station would have split platforms and would be located within the median of Olympic Boulevard on the east and west sides of 17th Street. A double-track crossover[25] would be located at approximately 19th Street (Station 789+00).

Street reconstruction would be required along Olympic Boulevard between 20th Street and 14th Street to accommodate the LRT alignment and station. Some partial property acquisitions may be required to accommodate curb reconstruction to meet city standards, ADA, and other requirements.

Immediately west of Euclid Street the alignment would transition to an aerial structure by means of a retained fill embankment. The embankment would be approximately 700 feet long extending from approximately Euclid Street (Sta. 812+50) to just east of 11th Street (Sta. 819+50) and would gradually reach a height of up to 30 feet (to top of rail) at the point where it would transition to an aerial structure (Sta. 819+50).

Continuing to the west, the alignment would be on aerial structure either above the median of Olympic Boulevard or adjacent to properties on the south side of Olympic Boulevard or adjacent to or above the embankment of the I-10 Freeway. The aerial structure would cross over the 11th Street, 10th Street, 9th Street, Lincoln Street, 7th Street and 5th Street intersections before turning north and terminating at the site of the proposed Colorado/4th Street Station at the corner of 4th Street and Colorado Avenue (Sta. 852+35). A double-track crossover would be provided on the aerial structure at approximately 6th Street (Station 841+00). Street reconstruction would be required on Olympic Boulevard between 7th Street (Sta. 836+00) and 5th Street (Sta. 845+50) to allow for column placement. Property acquisition for the proposed terminus station would be required.

[24] Street-running mode is a mode of operation where train movement is manually controlled by the Train Operator in accordance with track signals and posted speed limits. Maximum allowable speed is 35 mph. Street-running territory refers to segments of mainline tracks where trains travel adjacent to vehicular traffic and are separated only by a median or barrier, per CPUC approval.

[25] A crossover is a connection between two adjacent tracks, allowing a train on one track to cross over to the other. When two crossovers are present in opposite directions, one after the other, the configuration is called a double crossover.



Source: Metro, 2008; DMJM Harris, 2008

Figure 2.4-5
Segment 3: Olympic

The total length of the aerial structure from the east side of 11th Street to the terminus at 4th Street and Colorado Avenue would be approximately 3,300 feet and would be up to 35 feet above grade (to top of rail).

Stations

Segment 3 would have two stations as described below. Stations would be ADA compliant. All figures referred to in this section are found in Appendix F.

Olympic/17th Street Station

For the Segment 3 option, the proposed Olympic/17th Street Station would be a split-platform station located at grade within the median of Olympic Boulevard on the east and west sides of 17th Street (Drawing A-300). Each platform would be 270 feet long and 12 feet wide. No station parking would be provided.

Colorado/4th Street Station

The proposed Colorado/4th Street Station would be the western terminus of the project (Drawing A-100). It would be located on the site of an existing commercial block bounded by 4th Street, 5th Street, and Colorado Avenue. A significant portion of the station site is owned by the City of Santa Monica and was acquired for transit-related use. The station would be aerial and would have a two-platform/three-track configuration. Each platform would be 16 feet wide. The station would be 35 feet above the grade of the Colorado Avenue/4th Street intersection and would be approximately 22 feet lower than the roof of the adjacent Macy's building located at the northwest corner of the intersection. Approximately 250 surface parking spaces would be located on the same block, adjacent to the station platforms. Vehicular access to the parking area would be from 5th Street.

2.4.5 Segment 3a (Colorado)—Colorado Avenue from Exposition ROW to Santa Monica Terminus (LRT Alternatives 2 and 4)

Alignment

Drawings of the proposed LRT alignment and profile in this segment option, which would connect with Segment 2, are provided in Appendix E, Drawing Nos. T-013 and T-014. Segment 3a is also shown in Figure 2.4-6 (Segment 3a: Colorado).

As shown on Drawing T-014, this segment would begin with an aerial structure over Cloverfield and Olympic Boulevards, and would continue westerly within the Exposition ROW to the west of Olympic Boulevard. The aerial structure would be approximately 800 feet long and as high as 30 feet (to top of rail) above grade. The alignment would transition to grade within the Exposition ROW on a retained fill embankment. The embankment would begin immediately west of Olympic Boulevard (Sta. 777+00) and end just east of 20th Street (Sta. 781+98).

The alignment would continue within the Exposition ROW from 20th Street until west of 19th Street in an at-grade configuration with crossing gates, a distance of approximately 600 feet. At this point the alignment would turn into the center of Colorado Avenue via an at-grade crossing at 17th Street and operate in street running mode. The proposed Colorado/17th Street Station would be located within the center of Colorado Avenue just west of 17th Street (Sta. 800+00).



Source: Metro, 2008; DMJM Harris, 2008

Figure 2.4-6
Segment 3a: Colorado

From the proposed Colorado/17th Street Station, the alignment would continue at grade along the center of Colorado Avenue via embedded track to the terminus, a distance of approximately 5,500 feet, and would include at-grade crossings at 17th Street, 14th Street, 11th Street, Lincoln Boulevard, 7th Street, 6th Street, and 5th Street. Each of these crossings would be signalized for vehicular/pedestrian crossing. Vehicular left turns would no longer be permitted from Colorado Avenue to 16th, 15th, 14th, 12th, 11th, 10th, 9th, 7th, 6th, 5th Streets, Lincoln Boulevard and Euclid Street. Left turns from Colorado Avenue to 17th and 4th Streets would be permitted. Left turns from 17th, 14th, 11th, 7th, 6th, 5th, and 4th Streets and Lincoln Boulevard to Colorado Avenue will also be permitted.

The Colorado/4th Street Station terminus would be on the existing commercial block bounded by 4th Street, 5th Street, and Colorado Avenue, which is the same location as the Colorado/4th Street Station terminus described for the Segment 3 option.

Street reconstruction work and lane reconfiguration would be required along Colorado Avenue between approximately 18th Street and the terminus to accommodate the LRT alignment and 17th Street Station. Several commercial/industrial parcels would need to be acquired between 16th Street and 18th Street on the south side of Colorado Avenue in order to accommodate the transition from the Exposition ROW into Colorado Avenue and to accommodate an eastbound right-turn lane at Lincoln Boulevard. One lane of traffic would be retained in each direction along Colorado Avenue and on-street parking would be retained along the north side of the street only. In addition, some partial parcel acquisitions may be required to accommodate curb return reconstruction in order to meet city standards, ADA, and other requirements.

A single-track crossover would be required between 6th Street and 7th Street, and a double-track crossover would be required between 19th Street and 20th Street.

Stations

The Segment 3a option would have two stations as described below. Stations would be ADA compliant. All figures referred to in this section are found in Appendix F.

Colorado/17th Street Station

The proposed Colorado/17th Street Station would be located within the center of Colorado Avenue west of 17th Street (Drawing A-400). It would be an at-grade station and would have a 270-foot-long, 16-foot-wide center platform. Up to 70 surface station parking spaces would be provided at the southeast corner of 17th Street and Colorado Avenue.

Colorado/4th Street Station

For the Segment 3a option, the proposed Colorado/4th Street Station would be located off-street on the existing commercial block bounded by 4th Street, 5th Street, and Colorado Avenue (A-200), which is the same location as for Segment 3.

The proposed station would be at grade and would have a two-platform/three-track or a one-platform/three-track configuration that would occupy the site in a diagonal southwest-northeast configuration. A significant portion of the station site is owned by the City of Santa Monica and was acquired for transit-related use. Each platform would be 16 feet wide. Approximately 225

surface parking spaces would be located on the same block adjacent to the station platforms. Vehicular access to the parking area would be from 5th Street.

2.4.6 Other Related Facilities

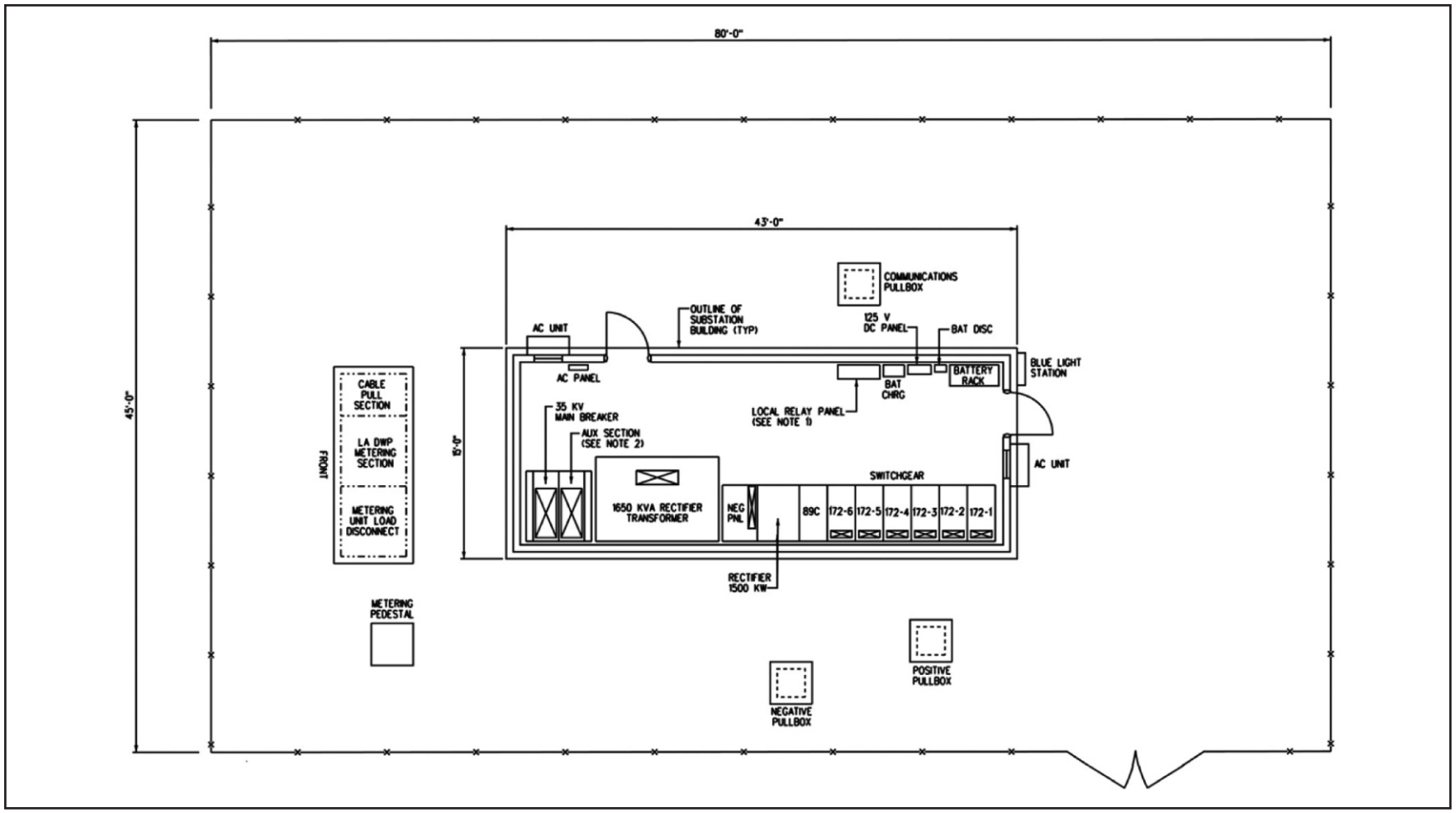
This section discusses other required facilities that support the LRT Alternative alignments.

Traction Power Substations

Traction Power Substations (TPSS) are electrical substations that receive high voltage AC (alternating current) power provided by the power utility companies and transform the power to 750 Volt DC (direct current) power for distribution to the LRT vehicles. A TPSS is typically a metal prefabricated building approximately 15 feet wide by 43 feet long by 16 feet high. The TPSS site would also include a perimeter fence, and space for utility equipment, manholes, pull boxes, and allow vehicle access. The entire TPSS requires land on the order of 80 feet by 45 feet or equivalent area in different configurations; the actual size of the site will also depend on real estate considerations. Figure 2.4-7 (Typical Traction Power Substation Layout) shows a typical TPSS layout.

Overall, there are approximately eight TPSS sites required for LRT 1 and LRT 2 (Expo ROW alternatives) and nine TPSS sites for LRT 3 and LRT 4 (Venice/Sepulveda alternatives), situated in proximity to the alignment. Although final locations will be refined during Preliminary Engineering, the following are potential locations that have been studied, which include in some instances more than one potential location for the same TPSS:

- On Segment 1:
  - In the vicinity of National/Palms Station, on one or more of four parcels to the south of Exposition Boulevard and west of Clarington Avenue or, alternatively, on a parcel to the southeast of Exposition Boulevard and Hughes Avenue (Drawing No. T-007)
  - In the vicinity of the Expo/Westwood Station, within the Exposition ROW, east or west of Overland Avenue (Drawing No. T-006)
- On Segment 1a:
  - In the vicinity of Venice/Motor Station, on a parcel at the northwest corner of Venice Boulevard and Motor Avenue (Drawing No. T-011)
  - In the vicinity of Venice/Sepulveda Station, on a parcel at the northeast corner of Venice Boulevard and Sepulveda Boulevard (Drawing No. T-010)
  - In the vicinity of Sepulveda/National Station, on a parcel at the northwest corner of Sepulveda Boulevard and Clover Avenue (Drawing No. T-009)
- On Segment 2:
  - In the vicinity of Expo/Sepulveda Station, within the Exposition ROW, east or west of Sepulveda Boulevard (Drawing No. T-009)
  - On the north side of the Exposition ROW to the east of Barrington Avenue (Drawing No. T-004)



Source: Metro, 2008; DMJM Harris, 2008.

Figure 2.4-7
Typical Traction Power Substation Layout

  - On the site of the proposed maintenance facility, south of the Exposition ROW, north of Exposition Boulevard, and east of Stewart Street (Drawing MF-100)
  - On a parcel to the west of Cloverfield Boulevard and south of the Exposition ROW (Drawing No. T-003)

- On Segment 3:
  - On one of four parcels to the south of Olympic Boulevard, west of 17th Street, and adjacent to the I-10 Freeway or, alternatively, on the I-10 Caltrans ROW near the Olympic/17th Street Station (Drawing No. T-002)
  - At the Colorado/4th Street Station site (Drawing No. T-001)
- On Segment 3a:
  - On one of two parcels at the southeast corner of Colorado Avenue and 17th Street (Drawing No. T-014)
  - At the Colorado/4th Street Station site (Drawing No. T-013)

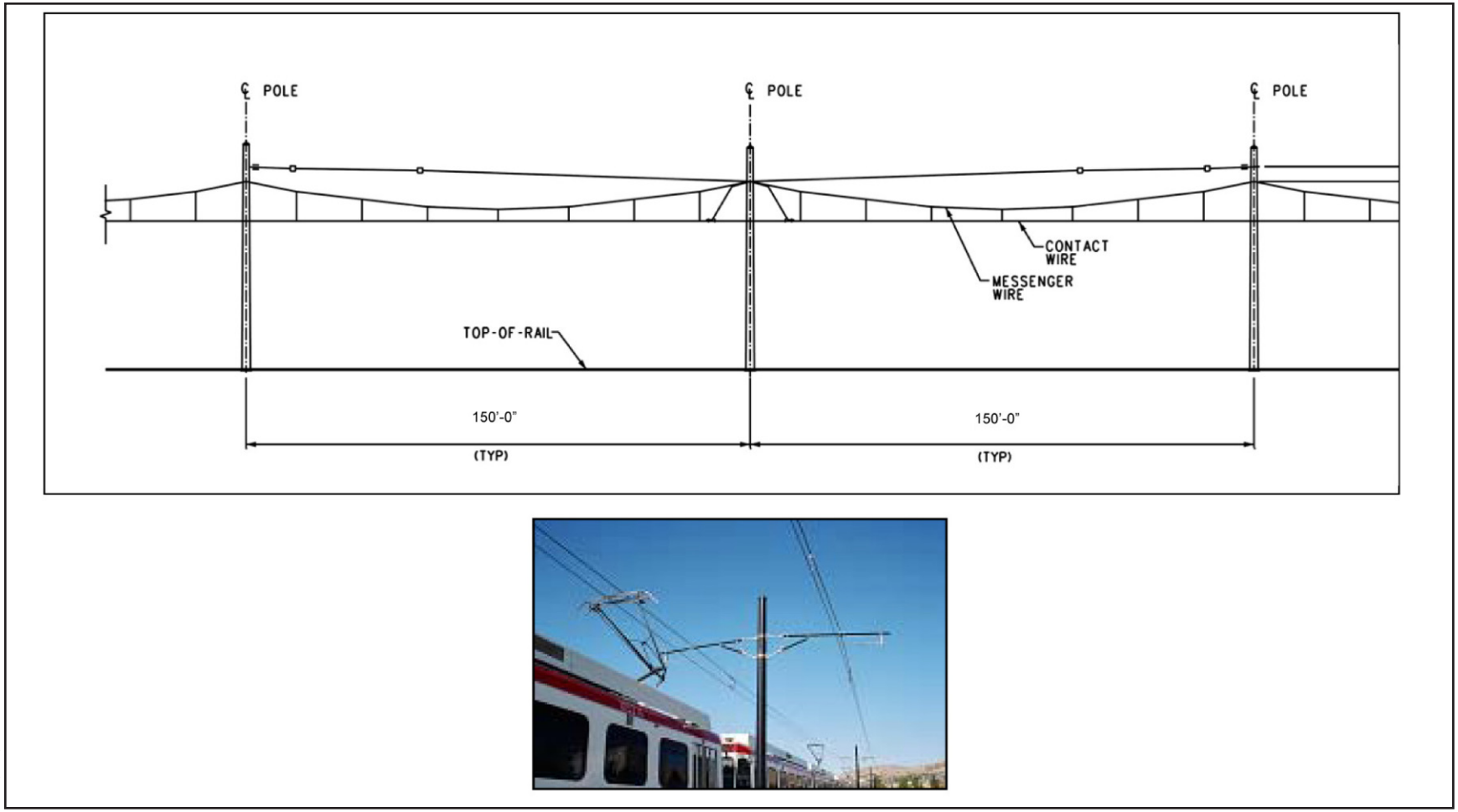
Overhead Contact System

The light-rail line would be electrically powered. The electric current would come from a copper/bronze contact wire that would be suspended above the track. A device called a pantograph on the roof of the LRT vehicle slides along the underside of the contact wire and delivers electric power to the vehicle. This contact wire and the poles and other structures that support it are collectively known as an Overhead Contact System (OCS). In a catenary system, the contact wire is supported from a parallel "messenger" wire that is directly above the contact wire. The messenger wire is then supported from cross-span wires or brackets as may be appropriate to the location. Typically, a low profile OCS system is used in urban/suburban settings to minimize the visual effect of the wires and poles. The low profile system will be used for all LRT Alternatives. The poles that support the OCS would be fabricated from steel pipe or other structural steel shapes and mounted on reinforced concrete foundations. The poles would project approximately 20 feet above the track and would be spaced at an average of 150 feet. If other infrastructure, such as street lighting is also on the pole, a taller pole would be utilized. Refer to Figure 2.4-8 (Typical Overhead Contact System) for a typical OCS.

Communication and Signal (C&S) Buildings

Communication and Signal (C&S) buildings house train controls and communications for LRT operations. C&S buildings are typically co-located with stations or TPSS sites or, ideally, adjacent to track interlockings.[26] They consist of pre-fabricated metal, concrete, or similar type of material buildings approximately 25 feet wide by 10 feet long by 12 feet high. Locations are presumed to be either on parcels to be acquired for TPSSs or within the Exposition ROW. The exact location of the C&S buildings would be determined during Preliminary Engineering.

[26] An interlocking is an arrangement of signals, switches, and control apparatus interconnected such that functions must succeed each other in a predetermined sequence. This prevents conflicting train movements at locations where tracks intersect such as at junctions or crossings.



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Source: Metro, 2008; DMJM Harris, 2008.

Figure 2.4-8
Typical Overhead Contact System

Radio Towers

Up to two radio towers would be installed along the alignment to support communications. These could be located on *(i)* the Exposition ROW to the west of the Expo/Sepulveda Station (Drawing No. T-005), and *(ii)* the Caltrans ROW outside the shoulder of the I-10 Freeway just west of Motor Avenue (Drawing No. T-007).

The radio towers would be up to 70 feet high as measured from the ground level. Each tower would consist of tapered tubular steel 2 to 3 feet in diameter at its base, with a 15-foot by 15-foot concrete foundation and multiple antennas at the top, and an adjacent cabinet for the radio equipment.

For the Expo/Sepulveda Station location, the equipment cabinet could be integrated with the station equipment; while in the case of the I-10 Freeway location, the equipment cabinet could be free-standing. The exact quantity, locations, and dimensions of the radio towers would be determined during Preliminary Engineering.

Bicycle Facilities

Stations will include bicycle racks and lockers in accordance with *Metro Design Criteria*. Additionally, a parallel bicycle facility (bike path, on street bike lane, or on street bike route) is being planned by others. To the extent possible, this facility has been considered in the development of the LRT Alternatives.

Maintenance Facility

A Maintenance Facility is proposed to be constructed as a part of the Expo Phase 2 project. The facility is to be designed and built to meet the maintenance needs of the LRT vehicles required to operate Phase 2 through the year 2030. It could operate 24 hours a day in three shifts. The following are components of the facility:

- Outdoor storage for 20 to 36 LRT vehicles and associated storage track
- Trackway to connect to the main line and allow the movement of LRT vehicles from the main line track to and within the maintenance facility area
- Maintenance and Administration building with office and vehicle repair areas
- Vehicle wash facility
- Traction power substation
- Parking for 65 to 70 employee automobiles

The Maintenance and Administration building would be approximately 300 feet long and 166 feet wide, two stories in height, and with a total area of approximately 125,000 square feet. The building could be built of concrete block or corrugated metal or a combination thereof.

The Maintenance Facility site would be located on a parcel within the City of Santa Monica immediately south of the Exposition ROW, north of Exposition Boulevard, and east of Stewart Street. The site currently functions as a surface parking lot and light-industrial dispatch facility. The plans for this facility are included in Appendix F.

2.4.7 Operating Plans

LRT Service

For the LRT Alternatives, initial revenue/non-revenue hours would be from approximately 4:00 a.m. to 2:00 a.m. daily. As noted in Table 2.4-2 (LRT Alternatives—Service Headways), service headways would average five minutes for weekday peak periods and between 10 and 20 minutes for off-peak periods.

Table 2.4-2 LRT Alternatives—Service Headways

Time Period	Hours	Service Headways (minutes)
Weekdays		
Early Morning	4:00 a.m. to 6: 00 a.m.	15
AM Peak	6:00 a.m. to 9:00 a.m.	5
Midday	9:00 a.m. to 3:00 p.m.	10
PM Peak	3:00 p.m. to 5:30 p.m.	5
Early Evening	5:30 p.m. to 7:00 p.m.	10
Late Evening	7:00 p.m. to 12:30 a.m.	20
Saturdays		
Morning	4:00 a.m. to 10:00 a.m.	15
Midday	10:00 a.m. to 7:00 p.m.	10–15
Late Evening	7:00 p.m. to 12:30 a.m.	20
Sundays/Holidays		
Morning	4:00 a.m. to 10:00 a.m.	15–20
Midday	10:00 a.m. to 7:00 p.m.	10–15
Late Evening	7:00 p.m. to 12:30 a.m.	20

For LRT 1 (Expo ROW–Olympic Alternative), the estimated one-way travel time from the Expo Phase 1 terminus at Venice/Robertson Station in Culver City to the Expo Phase 2 terminus station in Santa Monica is 18.2 minutes, which equates to a 21.8 mph average operating speed. For LRT 2 (Expo ROW–Colorado Alternative), the estimated one-way travel time is 19.5 minutes, or an average operating speed of 20.3 mph.

For LRT 3 (Venice/Sepulveda–Olympic Alternative), the estimated one-way travel time between the same beginning and end points is 22.1 minutes, which equates to a 20.4 mph average operating speed. For LRT 4 (Venice/Sepulveda–Colorado Alternative), the estimated one-way travel time is 23.4 minutes, or an average operating speed of 19.2 mph.

Bus Service

Table 2.4-3 (2030 LRT Alternatives Compared to 2030 No-Build—Study Area Routes) lists the study area routes and the corresponding headways and highlights the changes associated with the LRT Alternatives as compared to the No-Build Alternative.

Table 2.4-3 2030 LRT Alternatives Compared to 2030 No-Build—Study Area Routes

Line No.	Description	2030 No-Build Alternative peak headway, off-peak headway (min)	2030 LRT Alternatives peak headway, off-peak headway (min)
Metro Rail			
EXPO	*7th/Flower to Venice/Robertson*	*5, 10*	*5, 10*
Metro Rapid (Line numbers for future routes subject to change)			
701	Expo 2 (Venice/Robertson–4th/Broadway)	NA	NA
703	*Lincoln Blvd (4th/Wilshire–Aviation Green Line)*	*10 NB/15 SB, 0*	*10 NB/15 SB, 30*
704	*Santa Monica Blvd (Ocean/Santa Monica–Hill/Pico)*	*7, 15*	*7, 15*
706	Sepulveda (UCLA–Aviation Green Line)	5 NB/10 SB, 20	5 NB/10 SB, 20
707 (730)	Pico (Ocean/Colorado–Wilshire/Western)	10, 10	10, 10
714	Beverly (Santa Monica/Canon–Pico/Grand)	15, 0	10, 0
720	Wilshire (Ocean/Colorado–Whittier/Goodrich)	2.5, 5	2.5, 5
728	W. Olympic (Union Stn–Ave of the Stars/Santa Monica Blvd)	6, 12	6, 12
Metro Local, Limited, and Express Bus Routes			
28	Olympic Bl, Olympic/Fairfax–Temple/Spring	6, 7.5	6, 7.5
33	Venice Bl, Main/Sunset–Union Stn	7.5, 15	7.5, 15
333	Venice Blvd Ltd, 2nd/Santa Monica–6th/Main	7.5, 15	7.5, 15
220	*Robertson Bl, Santa Monica/San Vicente–Venice/Robertson*	*40, 40*	*30, 30*
534	*Malibu Express, Trancas Canyon–WLA TC*	*15 WB/30 EB, 30*	*15 WB/30 EB, 30*
City of Los Angeles Department of Transportation (LADOT)			
431	Sepulveda/Montana–Union Station	45 EB, 0	45 EB, 0
437	Venice (Wash/Pac)–Marina del Rey–LACBD (Temple)	30 EB, 0	30 EB, 0
Culver City Municipal Bus Lines			
1	Washington Bl	12, 15	12, 15
2	Sunkist Park	60, 60	60, 60

Table 2.4-3 2030 LRT Alternatives Compared to 2030 No-Build—Study Area Routes

Line No.	Description	2030 No-Build Alternative peak headway, off-peak headway (min)		2030 LRT Alternatives peak headway, off-peak headway (min)
3	Crosstown (Century City–Fox Hills)	20, 20		20, 20
4	Fox Hills Mall–Jefferson Blvd–WLA TC	30, 30		30, 30
5	Braddock Dr	90, 0		90, 0
6	LAX–Sepulveda Bl–UCLA	12, 30		12, 30
7	*Culver Bl*	*40, 40*		*30, 30*
8	Playa Vista–LAX Limited (Playa Vista, Jefferson, Lincoln, LAX)	30, 30		30, 30
Santa Monica Municipal Bus Lines				
1	UCLA–Santa Monica Bl–Venice	10, 10		10, 10
	UCLA–Santa Monica Bl–20th–SMC	30, 30		30, 30
2	UCLA–Wilshire Bl–Venice–Walgrove Ave	15, 20		15, 20
3	LAX–Lincoln Bl–UCLA	10, 30		10, 30
	LAX–4th/Santa Monica Bl	12 SB, 30		12 SB, 30
4	SM Civic Ctr–San Vicente Bl–Olympic/Westwood	30, 30		30, 30
5	6th/Wilshire–Olympic Bl–Pico/Rimpau	20, 30		20, 30
	Olympic/Sawtelle–Pico/Rimpau, WB	60, 0 WB		60, 0 WB
6	SMC–Palms–Venice/Robertson (formerly SMC)	30 WB, 60		30 WB, 60
7	Pico Bl, Santa Monica to Pico/Rimpau	7.5, 10		7.5, 10
8	4th/Wilshire–Ocean Park Bl–Westwood Bl–UCLA	15, 15		15, 15
9	Santa Monica–Temescal Canyon–Sunset Bl	30, 30		30, 30
10	Santa Monica–Union Stn	15, 30		15, 30
	Marine/Main–Union Stn	60 EB, 0		60 EB, 0
12	Pico/Robertson–Palms–UCLA	15, 15		15, 15
Super 12	*Westwood & Palms Limited*	*12 NB, 0*		*12 NB/30 SB, 30*

Table 2.4-3 2030 LRT Alternatives Compared to 2030 No-Build—Study Area Routes

Line No.	Description	2030 No-Build Alternative peak headway, off-peak headway (min)		2030 LRT Alternatives peak headway, off-peak headway (min)
13	Westside Pavilion–Pico/Rimpau	30, 0 WB		30, 0 WB
14	*Culver City–Brentwood Village–Sepulveda/Moraga*	*12, 30*		*10, 20*
Crosstown	*miniBlue Crosstown: 14th/20th St Loop (formerly SM11)*	*15, 15 clockwise*		*15, 15 both directions*
Sunset	miniBlue Sunset: SMC Campus Connector–Airport/Centinela, Ocean Park, 20th–Colorado–Stewart–Pico loop	15, 15		15, 15

SOURCE: Connetics Transportation Group, 2008

Routes in LRT Alternatives that are different than No-Build are italicized.

EB = eastbound; WB = westbound; NB = northbound; SB = southbound

Fleet Requirements

The fleet requirements associated with the LRT Alternatives when compared to the No-Build Alternative are summarized in Table 2.4-4 (LRT Alternatives—Fleet Requirements [Changes to No-Build]) below:

Table 2.4-4 LRT Alternatives—Fleet Requirements (Changes to No-Build Alternative)

LRT Alternative	LRT Vehicles	Metro Bus	Culver City Bus	Santa Monica Big Blue Bus
LRT 1: Expo ROW–Olympic Alternative	20	1	2	16
LRT 2: Expo ROW–Colorado Alternative	23	1	2	16
LRT 3: Venice/Sepulveda–Olympic Alternative	24	1	11	22
LRT 4: Venice/Sepulveda–Colorado Alternative	26	1	11	22

SOURCE: DMJM Harris, 2008.

2.5 Ridership

2.5.1 Ridership by Alternative

Weekday boardings[27] for the TSM and the LRT Alternatives were estimated for 2030 using the Metro Travel Demand Model. Section 3.2 (Transportation/Traffic) provides additional information on Model methodology and analysis. The estimated results by Alternative are shown in Table 2.5-1 (2030 Phase 2 Weekday Boardings by Alternative):

Table 2.5-1 2030 Phase 2 Weekday Boardings by Alternative

Alternative	Boarding (Phase 2 Only)
TSM Alternative	10,206
LRT 1: Expo ROW–Olympic Alternative	36,653
LRT 2: Expo ROW–Colorado Alternative	36,412
LRT 3: Venice/Sepulveda–Olympic Alternative	35,880
LRT 4: Venice/Sepulveda–Colorado Alternative	35,849

SOURCE: AECOM, 2008.

[27] Weekday boardings include all instances of a person boarding the LRT system at any time during the typical weekday.

2.5.2 Station Boardings

The Metro Travel Demand Model was also used to estimate weekday boardings at each station for the four LRT Alternatives. The estimated weekday boardings for each LRT Alternative are shown in Table 2.5-2 (2030 Weekday Station Boardings by LRT Alternative). It should be noted that the Total Boardings by LRT Alternative is higher than Station Boardings. Total Boardings includes all boardings attracted to the LRT system as the result of the extension of the system into the project area, e.g., a person boarding at 7th/Metro station heading west to a station within the Expo Phase 2 project is counted as a boarding.

Table 2.5-2 2030 Phase 2 Weekday Station Boardings by LRT Alternative

Station	LRT 1: Expo ROW–Olympic	LRT 2: Expo ROW–Colorado	LRT 3: Venice/Sepulveda–Olympic	LRT 4: Venice/Sepulveda–Colorado
National/Palms	1861	1856	n/a	n/a
Expo/Westwood	5237	5213	n/a	n/a
Venice/Motor	n/a	n/a	2045	2050
Venice/Sepulveda	n/a	n/a	3292	3310
Sepulveda/National	n/a	n/a	2367	2354
Expo/Sepulveda	5096	5097	6135	6113
Expo/Bundy	2863	2811	2489	2443
Olympic/26th Street	2113	2116	2026	2003
Olympic/17th Street	2643	n/a	2469	n/a
Colorado/17th Street	n/a	3093	n/a	2912
Colorado/4th Street	3333	2906	2853	2557

SOURCE: AECOM, 2008.

2.6 Alternatives Considered and Withdrawn

2.6.1 Alternatives Evaluated During Alternatives Screening Process

At the beginning of the Alternatives Screening process in 2007, a range of modal and alignment options were considered. These alternatives included those originally described in the Notice of Intent (NOI),[28] along with alternatives that were brought forward by local governments, the public, or other stakeholders during the environmental scoping process. These alternatives were then screened with the objective of narrowing the alternatives to those most likely to meet the project purpose and need, fully defined in Chapter 1 (Introduction) and summarized in the discussion below.[29] Thus, the data presented below is as of April 2008.

[28] The Expo Authority sent the Notice of Preparation (NOP) announcing the Expo Authority's intent to prepare a DEIS/DEIR to the California State Clearinghouse on February 22, 2007. The State Clearinghouse designated this as project no. 2007021109.

[29] Refer to *Final Alternatives Screening Report*, April 11, 2008, prepared for Exposition Metro Line Construction Authority by DMJM Harris.

Screening Alternatives Description

The alternatives considered in addition to the No-Build and TSM Alternatives are described below:

- **LRT on the Exposition ROW:** This LRT Alternative would follow the Exposition ROW from the terminus of Expo Phase 1 in Culver City all the way to Santa Monica. The alignment would divert from the Exposition ROW at the western end upon reaching Olympic Boulevard. From this point, the alignment would follow Olympic Boulevard along the edge of the I-10 Santa Monica Freeway to reach the proposed terminus station at the intersection of 4th Street and Colorado Avenue in Santa Monica.
- **LRT on Venice/Sepulveda:** This LRT Alternative would divert from the Exposition ROW at the terminus of Expo Phase 1 in Culver City and follow Venice Boulevard until reaching the intersection with Sepulveda Boulevard. The alignment would then turn north and continue along Sepulveda Boulevard before turning west along the Exposition ROW. The alignment would then continue along the Exposition ROW similar to the LRT on the Exposition ROW Alternative.
- **BRT on the Exposition ROW:** Similar to the LRT on the Exposition ROW Alternative described above, this Bus Rapid Transit (BRT) Alternative would operate exclusively within the Exposition ROW from the terminus of Expo Phase 1 in Culver City all the way to Santa Monica. At the western end, upon reaching Olympic Boulevard, the bus service would divert from the Exposition ROW and operate along Olympic Boulevard, 11th Street and Colorado Avenue in mixed-flow traffic until reaching its terminus between 4th and 5th Streets on the south side of Colorado Avenue in Santa Monica.
- **LRT on Venice/Venice:** This LRT Alternative would divert from the Exposition ROW at the terminus of Expo Phase 1 in Culver City and follow Venice Boulevard west. The alignment would continue west on Venice Boulevard towards Venice Beach to a terminus station just east of Abbot Kinney Boulevard.
- **LRT on Venice Boulevard to Lincoln Boulevard to Santa Monica:** This LRT Alternative would divert from the ROW at the terminus of Expo Phase 1 in Culver City and follow Venice Boulevard west until reaching the intersection with Lincoln Boulevard. The alignment would then turn north and continue along Lincoln Boulevard toward Santa Monica. The alignment would cross over the I-10 Santa Monica Freeway and turn west along the north side of the freeway to reach the proposed terminus station at the intersection of 4th Street and Colorado Avenue in Santa Monica.
- **Web of LRT Routes on Culver Boulevard, Washington Boulevard, Pico Boulevard, and Santa Monica Boulevard:** This LRT Alternative would consist of several LRT routes along major boulevards, referred to as a "web network."

  The Culver Boulevard Route would divert from the Exposition ROW at the terminus of Expo Phase 1 in Culver City and briefly follow Venice Boulevard before turning onto Culver Boulevard and continuing towards Marina Del Rey.

  Similarly, the Washington Boulevard Route would divert from the Exposition ROW at the terminus of Expo Phase 1 in Culver City and briefly follow Venice Boulevard before turning onto Culver Boulevard. After a short distance on Culver Boulevard, the alignment would turn onto Washington Boulevard and continue towards Venice Beach/Marina Del Ray.

The Pico Boulevard Route could follow either the Exposition ROW alignment or the Venice/Sepulveda alignment from the terminus of Expo Phase 1 in Culver City until reaching the intersection with Pico Boulevard. The alignment would then divert from the Exposition ROW and continue straight on Pico Boulevard until reaching the intersection with Lincoln Boulevard. The alignment would then turn north along Lincoln Boulevard and cross over the I-10 Santa Monica Freeway before turning west along the north side of the freeway to reach the proposed terminus station at the intersection of 4th Street and Colorado Avenue in Santa Monica.

The Santa Monica Boulevard Route could follow either the Exposition ROW alignment or the Venice/Sepulveda alignment from the terminus of Expo Phase 1 in Culver City until reaching the intersection of the Exposition ROW and Sepulveda Boulevard. The alignment would then go north along Sepulveda Boulevard until reaching the intersection with Santa Monica Boulevard. The alignment would then turn west and continue straight on Santa Monica Boulevard towards Santa Monica.

- **LRT Route on a Street other than Venice Boulevard, including Culver Boulevard, Washington Boulevard, Pico Boulevard, or Santa Monica Boulevard:** This LRT Alternative would involve an LRT alignment on one of the following streets: Culver Boulevard, Washington Boulevard, Pico Boulevard, or Santa Monica Boulevard. The details of each alignment are as described in Web of LRT Routes Alternative above.
- **Monorail on the Exposition ROW or Venice/Sepulveda:** This alternative would follow either the Exposition ROW or the Venice/Sepulveda alignments as described above. However, instead of LRT or BRT, this alternative envisions monorail technology.
- **PRT on the Exposition ROW or Venice/Sepulveda:** This alternative would follow either the Exposition ROW or the Venice/Sepulveda alignments as described above. However, instead of LRT or BRT, this alternative would use Personal Rapid Transit (PRT) vehicles.

Screening Methodology and Criteria

Screening was completed at two levels. The first screening, Level 1, was intended to narrow the nine alternatives above to those that showed the most promise to be successful in achieving some of the project objectives and purpose. The second screening, Level 2, completed a more in-depth evaluation of the remaining alternatives to determine which should be carried forth into the DEIR based on their ability to feasibly achieve the project purpose taking into account technical, environmental, and economic factors.

Level 1 Screening Criteria

The Level 1 screening was based on the following qualitative evaluation criteria:

- Effectiveness

  Effectiveness is comprised of two key elements: the ability of the alternative to address the purpose and need for the project and the compatibility of the project with the existing regional system.

  In Level 1 screening, purpose and need were evaluated particularly as it related to:

  - The compatibility of the proposed technology with those currently in use in the study area and the region;

- Connection to the regional transit network in the county; and
- The ability to serve activity and trip generating centers in the study area.

The other project objectives within purpose and need, including cost effectiveness, future growth, and transit oriented development, were evaluated under other screening Level 1 criteria and are discussed under costs and transit supportive land use, rather than purpose and need.

Regional compatibility addressed the ability of the technology to be integrated into the existing regional system. Technologies not in current use in the region and unproven in similar applications elsewhere in the country were considered incompatible and are eliminated on this criterion alone.

- Environmental Effects

  The Level 1 evaluation was based on a largely qualitative assessment of the project design issues that may lead to significant engineering and environmental issues. These issues may be insurmountable, result in high levels of environmental impact, or, when addressed, contribute significant capital or operating costs to the project.

  This involved an assessment of the magnitude of the impacts on the natural environment and on the community including:

  - Impacts on the Natural Environment (e.g., biological resources, geology and soils, hydrology and water quality, recreation and Section 4(f) resources, and cultural resources, etc.)
  - Community Impacts (e.g., aesthetics and visual quality, land acquisition and displacement/community disruption, hazards/hazardous materials, air quality, noise and vibration, and transportation, etc.)

- Costs

  This involved a qualitative assessment of the likelihood that the alternative could be achieved at a capital cost equal or less than the other alternatives. This assessment took into account potential costs that could be reasonably predicted based on similar projects in other locations including Expo Phase 1.

- Transit Supportive Land Use

  This involved a qualitative assessment of the comparative degree to which the individual alternatives would support transit usage. This included a review of projected population and employment as alternatives with higher population and employment typically experience higher transit ridership. Income, compatibility with community plans and environmental justice (e.g., disproportionate impact on minority or low income populations) considerations were also examined.

Level 2 Screening Criteria

The Level 2 screening involved a more in-depth evaluation of the alternatives remaining after the Level 1 screening and included such elements as:

- Effectiveness

  This involved an evaluation of the following measures of effectiveness as derived from the travel demand forecasting model and application of the Federal Transit

Administration (FTA) Summit methodology for analysis of user benefit. The FTA has neither reviewed nor approved the analysis.

  - Project Boardings
  - Travel Time
  - FTA User Benefit

- Environmental

  This involved a more detailed assessment of land acquisition and parking impacts associated with the alternatives carried through to Level 2 screening.

- Costs:

  Preliminary capital and operating costs were prepared for each of the alternatives remaining after the Level 1 screening. In addition, the FTA Cost Effectiveness Index (CEI)[30] was calculated for each alternative to better understand the potential for each alternative to qualify for federal funding. The following measures were developed for each alternative:

  - Capital Cost
  - Operating Cost
  - FTA Cost Effectiveness Index

The Level 1 and Level 2 screening criteria are summarized in Table 2.6-1 (Screening Criteria).

Table 2.6-1 Screening Criteria

Screening Criteria	Level 1	Level 2
Effectiveness		
Purpose and Need		
• Linking to Major Trip Generators	●	
• Project Boardings		●
• Travel Time		●
• FTA User Benefit		●
Regional Compatibility		
• Compatible Technology	●	
• Transfers	●	
Environmental Effects		
Negative Impacts on the Natural Environment	●	
Negative Community Impacts	●	●
Costs		
Qualitative Cost Comparison	●	

[30] Details on the FTA Cost Effectiveness evaluation methodology are available at www.FTA.dot.gov/documents/FY_2009_Eval_Process.doc

Table 2.6-1 Screening Criteria

Screening Criteria	Level 1	Level 2
Capital Costs		●
Operating Costs		●
FTA Cost Effectiveness Index		●
Transit Supportive Land Use		
Demographics		
• 2030 Population	●	
• 2030 Jobs	●	
• 2030 Median Household Income	●	
Compatibility with Community Plans and Policies	●	
Environmental Justice	●	

Level 1 Screening Summary

Based on the Level 1 screening, the Exposition ROW Alternatives (LRT and BRT) resulted in the lowest levels of anticipated negative natural resource and community impacts, the lowest potential for negative impacts on environmental justice communities, the greatest consistency with community plans and policies, served the highest numbers of trip generators in the study area, and demonstrated solid future population and employment levels to support a future transitway.

The **LRT on Venice/Sepulveda** Alternative had high levels of anticipated impact associated with land acquisition, and related business and residential displacement. Some of the property acquisition could be reduced by implementing an aerial structure option with a total length of approximately 5,000 feet. This alternative had the potential for high impacts on environmental justice communities and no significant existing policy and plan support for an alignment along Venice and Sepulveda Boulevards. However, the alternative was supported by solid population and employment numbers and proximity to high numbers of trip generators in the study area.

The **LRT on Venice/Venice** Alternative had high levels of anticipated impact associated with land acquisition and related business and residential displacement. Much of this impact could be eliminated by implementing an aerial option but it would add substantial costs. In addition, the alternative had the potential for high impacts on environmental justice communities, no significant existing policy and plan support, linkage to a low number of major trip generators, and was poorly supported by current or future population and employment numbers. The forcast ridership for this Alternative was less than half the forecast ridership for the ROW and Venice/Sepulveda Alternatives. Thus, the effectiveness and efficiency of this Alternative was poor. This alternative was advocated by some members of the community in the scoping process.

The **LRT on Culver Boulevard and Washington Boulevard** Alternative had high levels of anticipated impacts related to land acquisition, and related business and residential displacements, and high levels of anticipated impacts on natural and community resources.

They had low population and job numbers, and poor connectivity to trip generators in the study area. As a result, it was recommended they be eliminated from any further consideration beyond Level 1 screening.

The **LRT on Venice/Lincoln, Pico Boulevard, and Santa Monica Boulevard** Alternatives all had moderate-to-high levels of anticipated natural resource and community impacts primarily related to property acquisition and related displacement of business and residents. These high levels of property acquisition contributed to significantly higher capital costs than other reasonable alternatives. As a result, further consideration of these alternatives was not recommended beyond Level 1 screening.

The **LRT Web Network** Alternative was also not recommended for further consideration due to the very high levels of anticipated natural resource and community impacts, primarily related to property acquisition and related displacement of business and residents, and high levels of impact on environmental justice communities. As a result, further consideration of this alternative was not recommended beyond Level 1 screening.

In summary, the **LRT and BRT on Exposition ROW** Alternatives were recommended to be carried forward to second-level screening. In addition, it was recommended that the Venice/Sepulveda LRT Alternative be included in the second-level screening, due to the population and jobs projections for the alignment. The Venice/Venice LRT Alternative was also recommended for second-level screening due to the community interest in this alignment.

Level 2 Screening Summary

The Level 2 screening provided additional quantified information regarding ridership, travel time savings, cost effectiveness, potential land acquisition impacts, on-street parking impacts, capital costs and operating costs. In addition, although not seeking federal funds for the project, the Exposition Metro Line Construction Authority (Expo Authority) applied a cost-effectiveness test based upon a nationally used formula for projects seeking federal major capital investment funding in order to assist policy makers and the public in comparing the relative merits of investing the various alternatives. Table 2.6-2 (Level 2 Screening Summary [Completed in April 2008]) summarizes the data included in the second level screening analysis completed in April 2008.

Table 2.6-2 Level 2 Screening Summary (Completed in April 2008)

	LRT Exposition ROW	LRT Venice/ Sepulveda	BRT Exposition ROW	LRT Venice Blvd to Venice Beach
Effectiveness				
Purpose and Need				
Project Boardings (2030)	41,400	34,700	24,100	17,200
Travel Time (Minutes in the transit vehicle between Downtown LA and Santa Monica)	44.0	49.3	47.0	50.5
2030 Daily User Benefit (above TSM)	14,400	11,300	5,400	2,400

Table 2.6-2 Level 2 Screening Summary (Completed in April 2008)

	LRT Exposition ROW	LRT Venice/ Sepulveda	BRT Exposition ROW	LRT Venice Blvd to Venice Beach
Environmental Effects				
Property Acquisition/Relocation*	Low	High	Low	Medium–Low
Parking Impacts	Low	High	Low	High
Costs (Develop a safe high-capacity transit system cost effectively.)				
Capital Costs (2007$)	$946M to $1,067M	$1,264M to $1,361M	$382M	$861M to $1,206M
Capital Cost/Mile (2007$)	$143M to $161M	$168M to $181M	$74M	$145M to $204M
Operating Costs	$37M	$33M	$30M	$26M
Cost Effectiveness Index	$18 to $20	$28 to $29	$19	$85 to $111

*ROW only; does not include stations, parking, TPSS sites, or curb cuts.

LRT Exposition ROW

The LRT Exposition ROW Alternative was projected to generate 41,400 average weekday boardings in the Year 2030, which was the highest of all of the alternatives. These numbers reflect the significant number of trip generators existing in the corridor and the transit supportive land use projected for the corridor. This alternative would also provide the fastest travel time to Santa Monica and would be approximately 3 to 7 minutes faster than the other three alternatives. The LRT Exposition ROW Alternative would also result in the highest level of transportation user benefit[31] of 14,400 hours.

The LRT Exposition ROW Alternative was found to have a low level of community disruption in terms of property acquisition and relocation. Only one full business parcel acquisition (comprised of ten business units) would be required while no residential parcels would be impacted.

The only measurable on-street parking loss associated with the LRT Exposition ROW Alternative would be along Olympic Boulevard. The 200-space parking loss in this segment would primarily impact Memorial Park, businesses and offices (i.e., daytime uses). Some underutilized parking would potentially be available in close proximity on side streets to offset the loss, but not enough to fully compensate. As such, some parking would be lost or required to be replaced on private property acquired for replacement parking.

For the screening process, two separate capital cost estimates were developed for the LRT Exposition ROW Alternative: one that envisioned a mostly at-grade alignment and another that envisioned aerial structures over major cross streets. The capital costs were estimated to range

[31] User Benefit is a measure of the savings in travel time in 2030 for the users of the new transit improvement expressed in hours of travel time saved over the time it would take them to make their trips if the project did not exist.

from $946M to $1,067M (in 2007 dollars). This is the second highest total cost of all of the alternatives.

Annual operating costs were estimated to be $37M, which was the highest operations and maintenance costs of all of the alternatives. This was primarily because of the larger LRT vehicle fleet size required to serve the ridership demand and the vehicle maintenance costs associated with the fleet.

Based on the conceptual level capital and operating costs, the cost-effectiveness index (CEI)[32] for the LRT Exposition ROW Alternative was estimated to be $18 to $20, which falls in the midpoint of the medium rating and is similar to the BRT Exposition ROW Alternative.

In summary, the Level 2 screening concluded that the LRT Exposition ROW Alternative provided the best transit option at the lowest cost as reflected in the medium cost-effectiveness rating. This alternative also appeared likely to have the least long-term community disruption, particularly related to property acquisition and displacement and the elimination of on-street parking. It was recommended that this alternative be carried into the environmental document for more detailed evaluation.

LRT Venice/Sepulveda

The LRT Venice/Sepulveda Alternative was projected to generate 34,700 average weekday boardings in the Year 2030, which was less than the LRT Exposition ROW Alternative but higher than the other alternatives. This alternative would have a travel time of approximately 49 minutes which would be five minutes slower than the LRT Exposition ROW Alternative and is associated with the additional length and additional station stop. The LRT Venice/Sepulveda Alternative would also result in a transportation user benefit of 11,300. The reduction in user benefit over the LRT Exposition ROW Alternative reflects the longer trip time and the reduced benefits to trips for major trip generators north of the Overland/Westwood area.

The property acquisitions associated with an at-grade alignment along Venice/Sepulveda would be extensive and would result in substantive community disruption. Twenty-one full multifamily parcel acquisitions, 43 partial multifamily acquisitions, 3 full single-family acquisitions, 3 partial single-family acquisitions, 15 full business parcel acquisitions, and 41 partial business parcel acquisitions would be required.

The possibility of reducing impacts by implementing an aerial structure was evaluated. An aerial structure generally reduces the total width of ROW required and the resultant property acquisitions. However, ROW would still be required for stations and approach structures where the alignment would be required to transition from aerial to at-grade. An aerial alternative would require 16 full multifamily parcel acquisitions, 9 partial multifamily acquisitions, two full single-family acquisitions, two partial single-family acquisitions, plus three full business parcel acquisitions.

Although aerial structures would reduce the property impacts to some degree, they would contribute a dominant visual element to the neighborhood/community. The extent to which that element impacts the neighborhood/community would be different depending on the length of the

[32] The CEI is a measure used by the Federal Transit Administration that compares the capital and operating costs of each alternative with the user benefit. The result is a dollar amount of expenditure per user benefit hour generated by the project.

aerial structure and the conditions in the surrounding area. The aerial structure on Venice Boulevard for the Venice/Sepulveda Alternative would be 1.9 miles in length. An aerial structure in a very low rise neighborhood that is on flat terrain, like the conditions along Venice Boulevard, would be more notable than an aerial structure among higher rise developments, adjacent to an elevated freeway, or in hilly terrain, like in some areas adjacent to the Exposition ROW.

Evaluations were also completed to determine whether through-traffic lanes could be eliminated on Venice and Sepulveda Boulevards to decrease the amount of property acquisition. The evaluations concluded that through lanes could not be eliminated on either Venice or Sepulveda Boulevards based on current traffic volumes.[33] Future traffic volumes would be anticipated to worsen that situation.

The LRT Venice/Sepulveda Alternative would result in the loss of approximately 1,000 parking spaces along Venice and Sepulveda Boulevards. This parking is only about half-utilized during the day, but evening use may be high as the residential users on the side streets park on Venice and Sepulveda Boulevards. In addition, the utilization of side street parking in these areas is high during the daytime hours and potentially higher at night considering the residential uses on the side streets. As a result, few of the lost spaces could be compensated for on the side streets which could require the acquisition of additional private property to compensate for the parking loss.

Three separate capital cost estimates were developed for the LRT Venice/Sepulveda Alternative: one that envisioned a mostly at-grade alignment, a second that envisioned a mostly at-grade alignment but with aerial structures over the Venice/Overland intersection as well as along much of Sepulveda Boulevard, and a third estimate that envisioned aerial structures along much of both Venice and Sepulveda Boulevards. The capital costs were estimated to range from $1,264M to $1,361M (in 2007 dollars). This would be the highest cost alternative both in terms of total cost and cost per mile. The most expensive option would be the LRT Venice/Sepulveda Alternative assuming extensive use of aerial structures to minimize property displacements.

Annual operating costs were estimated to be $33M, which was the second highest operations and maintenance costs of all of the alternatives. The operating cost is less than for the LRT Exposition ROW Alternative due to the smaller LRT vehicle fleet requirements associated with the lower ridership demand.

Based on the conceptual level capital and operating costs, the CEI for the LRT Venice/Sepulveda Alternative was estimated to be $28 to $29, which falls on the high end of the medium-low cost-effectiveness rating.

In summary, the LRT Venice/Sepulveda Alternative provided good transportation user benefit but at a higher cost and potentially higher level of community disruption than the Exposition ROW Alternatives. As measured by the medium-low cost-effectiveness index, this project might not be the most efficient transit investment in the long term. As the environmental document would provide a more detailed evaluation of the full range of community impacts associated with this alternative, it was recommended that this alternative continue to be studied as an alternative to the LRT Exposition ROW option in the environmental document.

[33] Meyer, Mohaddes Associates, Technical Memorandum—Evaluation of Lane Elimination on Venice Boulevard and Sepulveda Boulevard, August 24, 2007.

BRT Exposition ROW

The BRT Exposition ROW Alternative would provide substantially fewer boardings than the LRT Exposition ROW or LRT Venice/Sepulveda Alternatives due to the slower travel time and forced transfer at the Expo Phase 1 terminus. The BRT Exposition ROW Alternative was projected to generate approximately 24,100 average weekday boardings in the Year 2030. Over 5,000 of those boardings would be transfers from the Expo Phase 1 LRT at Culver City. Further, maximum peak hour passenger loads on the BRT would range from 2,000 to 3,000 passengers. Based on the Metro BRT hourly passenger capacities, the peak hour passenger loading would dictate the need for 2.5-minute headways during the peak period and potentially 1.5- to 2-minute headways during the peak hour.

Operationally, 1.5- to 2.5-minute headways would present a significant challenge to north/south cross streets. While a detailed traffic evaluation was not conducted, based on historic precedent, the City of Los Angeles Department of Transportation will only support signal priority to the extent that it does not significantly impact north/south traffic flows. Given the very high existing traffic volumes on the north/south arterials, it is not expected that the City would support the levels of signal priority required to accommodate 1.5- to 2.5-minute headways. As a result, it is expected that with 1.5- to 2.5-minute headways, the BRT vehicles would be delayed at the crossings leading to bunching and significant degradation of service quality. By comparison, LRT would be able to meet these service demands more effectively and efficiently with 5-minute peak headways, given the more than 400 hundred person capacity of a two-car train.

With regard to transit travel times, the BRT Exposition ROW Alternative would be approximately 3 minutes slower than the LRT Exposition ROW Alternative due to the acceleration and crossing characteristics of bus operations. Given the forced transfer at the Expo Phase 1 terminus station, the BRT Exposition ROW Alternative would also result in a lower level of transportation user benefit of 5,400.

The BRT Exposition ROW Alternative was found to have a low level of community disruption in terms of property acquisition and relocation. Only four business unit acquisitions would be required, while there would be no residential impacts.

Similar to the LRT Exposition ROW Alternative, the only measurable on-street parking loss associated with the BRT Exposition ROW Alternative would be along Olympic Boulevard. The 200-space parking loss in this segment would primarily impact Memorial Park, businesses and offices (i.e., daytime uses). Some underutilized parking would potentially be available in close proximity on side streets to offset the loss, but not enough to fully compensate. As such, some parking would be lost or required to be replaced on private property acquired for replacement parking.

One capital cost estimate was developed for the BRT Exposition ROW Alternative, which envisioned an at-grade alignment. The cost estimate of $382M (2007 dollars) was significantly lower than for any of the other alternatives. However, if grade separations were required to mitigate the north/south cross street impacts, the capital cost would increase substantially.

Annual operating costs were estimated to be $30M, which would also be lower than either the LRT Exposition ROW or LRT Venice/Sepulveda Alternatives. This is attributed to lower bus maintenance costs as compared to LRT vehicle maintenance costs, and the lower ridership demand on the BRT. Operating costs, independent of maintenance, would be somewhat higher

for the BRT primarily due to the higher number of operators required for the bus service than the LRT. In addition, there would be less infrastructure maintenance required for BRT systems.

Based on the conceptual level capital and operating costs, the CEI for the BRT Exposition ROW Alternative was estimated to be $19, which falls in the midpoint of the medium rating and is similar to the LRT Exposition ROW Alternative. However, as noted previously with regard to the capital cost, if grade separations were required to mitigate the north/south cross street impacts, the cost effectiveness of this alternative would be substantially reduced.

In summary, although the BRT Exposition ROW Alternative would have significantly lower construction costs, a low level of community disruption for property acquisition and relocation, and low levels of on-street parking elimination, the project would provide service to fewer riders due to the transfer at the Expo Phase 1 terminus and would provide a lower level of transportation user benefit. In addition, the BRT Exposition ROW Alternative would result in significant traffic impacts to north/south cross streets with the very high frequency of service required to meet the demand. If grade separations were required to mitigate the north/south cross street impacts, the cost effectiveness of this alternative would be reduced. Based on the lower ridership, lower user benefit, and operational issues, this alternative was eliminated from any further consideration in the environmental document.

LRT Venice/Venice

The LRT Venice/Venice Alternative was projected to generate 17,200 average weekday boardings in the Year 2030, which was lower than all of the other alternatives. The lower projections were substantially related to fewer current and future jobs, lower population projections, and less proximity to major study area trip generators. This alternative would require a bus transfer to access the Santa Monica terminus and, therefore, has the longest travel time of approximately 50.5 minutes.[34] This alternative would also result in the lowest transportation user benefit of 2,400.

Similar to the LRT Venice/Sepulveda Alternative, the property acquisitions associated with an at-grade alignment along Venice Boulevard would be extensive and would result in substantive community disruption. Ten full multifamily parcel acquisitions, 49 partial multifamily acquisitions, 1 full single-family acquisitions, 3 partial single-family acquisitions, 38 full business parcel acquisitions, and 39 partial business parcel acquisitions would be required.

As with the LRT Venice/Sepulveda Alternative, the possibility of reducing impacts by implementing an aerial structure was also evaluated. An aerial alternative would require one partial single-family acquisition, plus six full business parcel acquisitions.

As noted previously in the case of the LRT Venice/Sepulveda Alternative, although aerial structures would reduce the property impacts to some degree, they would contribute a dominant visual element to the neighborhood/community. The aerial structure on Venice Boulevard for the LRT Venice/Venice Alternative would be 5.5 miles in length affecting more adjacent neighborhoods.

Evaluations were also completed to determine whether through-traffic lanes could be eliminated on Venice Boulevard to decrease the amount of property acquisition. The evaluations concluded

[34] 50.5 minutes would be the LRT and Bus transit time to Santa Monica; the LRT travel time to the Venice Beach terminus would be 43.1 minutes.

that through lanes could not be eliminated based on current traffic volumes.[35] Future traffic volumes would be anticipated to worsen that situation.

The LRT Venice/Sepulveda Alternative would result in the loss of up to 1,100 parking spaces along Venice Boulevard. This parking is only about half-utilized during the day, but evening use may be high as the residential users on the side streets park on Venice Boulevard. In addition, the utilization of side street parking in these areas is high during the daytime hours and potentially higher at night considering the residential uses on the side streets. As a result, few of the lost spaces could be compensated for on the side streets which could require the acquisition of additional private property to compensate for the parking loss.

Two separate capital cost estimates were developed for the LRT Venice/Venice Alternative: one that envisioned a mostly at-grade alignment and a second that envisioned an aerial structure along much of Venice Boulevard. The capital costs were estimated to range from $861M to $1,206M (in 2007 dollars). Although this would be less costly than the LRT Exposition ROW Alternative, the cost per mile, which ranges from $145M to $204M, would be higher.

Annual operating costs were estimated to be $26M, which was the lowest operations and maintenance costs of all of the alternatives. The lower cost is reflective of the smaller LRT vehicle fleet requirements.

Based on the conceptual level capital and operating costs, the CEI for the LRT Venice/Venice Alternative was estimated to be $85 to $111, which is well into the low cost-effectiveness rating.

In summary, the LRT Venice/Venice Alternative performed significantly less well than the other LRT Alternatives. The transit benefit was very limited and the capital costs were high. The cost effectiveness was not at all competitive. In addition, there would be a greater degree of disruption to the community associated with land acquisition/relocation than other alignments, on-street parking elimination would be high for the at-grade option, and there would be other community concerns for the lengthy aerial option. It was recommended that this alternative be eliminated from any further consideration in the environmental document.

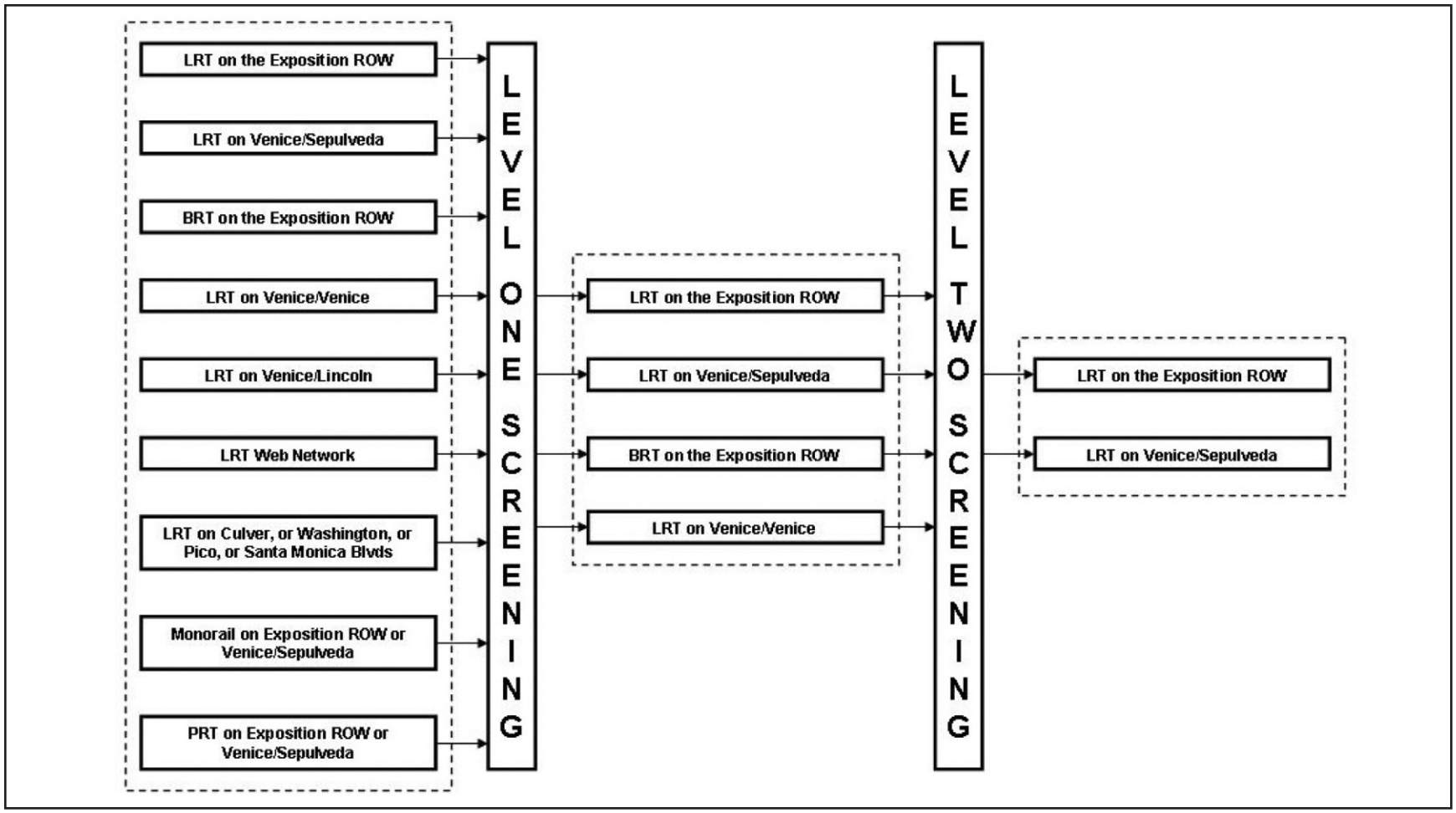
Level 2 Screening Conclusions

In conclusion, the Level 2 screening supported the elimination of the BRT Exposition ROW Alternative and the LRT Venice/Venice Alternative from any further analysis.

The LRT Exposition ROW and the LRT Venice/Sepulveda Alternatives were recommended for inclusion in the environmental document to provide for a more detailed and comprehensive evaluation, leading to a more informed decision regarding the Locally Preferred Alternative.

Level 1 and Level 2 screening summaries are depicted in Figure 2.6-1 (Level 1 and Level 2 Screening Summary).

[35] Meyer, Mohaddes Associates, Technical Memorandum—Evaluation of Lane Elimination on Venice Boulevard and Sepulveda Boulevard, August 24, 2007.



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Source: Metro, 2008; DMJM Harris, 2008.

Figure 2.6-1
Level 1 and Level 2 Screening Summary

2.6.2 Design Options Evaluated During Project Development

A number of issues and design options associated with the LRT Alternatives were evaluated during the early stages of project development in an effort to establish a more-fully defined project and set of alternatives that could be carried forward into the environmental document for further detailed analysis. The following issues and design options, briefly described below, are based upon technical evaluations that concluded dismissal of the issue or option for the stated reasons and were not carried forward within the environmental document.

Motor Station Alternative—Segment 1: Expo ROW

The proposed Motor Station in Segment 1 was initially described in the Notice of Intent (2007) and was also presented to the public during the project Scoping process (2007). The proposed station location was east of Motor Avenue and south of the I-10 Freeway within the Exposition ROW. Further evaluation of this station location revealed that it would not be feasible to construct a station at this site due to geometric constraints based upon the *Metro Design Criteria*.[36] The existing box structure under the I-10 Freeway is located immediately west of the proposed station location and the alignment would need to curve to enter the box structure. As such, there would not be a sufficient length of tangent track (i.e., straight section of track) to allow for the construction of a standard 270-foot-long station platform at this location. Because of these geometric constraints, the proposed station was moved further east to just west of the Palms/National intersection within the Exposition ROW.

Day-lighting Stone Canyon Creek or Greenway—Segment 1: Expo ROW

A "Greenway" concept was proposed by the community during the project Scoping process. This concept focused on the area between Overland and Military Avenues and essentially proposed day-lighting the existing storm drain (11 feet wide by 9.5 feet high) which is located beneath Overland Avenue and flows to the south. The system would be "day-lighted" by pumping the stormwater from the existing storm drain to a surface swale on the Exposition ROW. The water would flow in this surface swale from Overland Avenue towards Westwood Boulevard. The swale would allow percolation of stormwater through its surface and recharge the local water table. Water flows in excess of the amount that percolates would flow westward in the swales to a catch basin which would connect to another branch of the same stormwater system. The Overland storm drain currently carries the perennial-flowing Stone Canyon Creek, a tributary to the Ballona Creek, as well as substantial storm drainage collected throughout the West Los Angeles area.

Issues associated with day-lighting a major storm drain were evaluated.[37] The analysis showed the following:

The area located between Overland Avenue and Westwood Boulevard is within a Federal Emergency Management Flood Zone (FIRM Community Panel Number 060137 0071 C). The area is subject to rising water during a 100-year flood event. Bringing the Stone Canyon Creek

[36]Exposition LRT Project, *Metro Design Criteria*, Revision 2, January 2007.
[37] Exposition Light-Rail Transit Project Phase 2—Drainage Modifications Study Letter Report, Metcalf & Eddy, January 28, 2008.

to the surface would likely increase the potential for rising waters and increase the area affected by the 100-year flood elevation, such as the adjacent single-family homes.

- The Overland storm drain is designed for a 50-year flood, which has extremely high flows of 2,942 cubic foot per second (cfs). The requirement to day-light the 2,942 cfs flow from the existing storm drain structure to the surface, a distance of approximately 15 feet, would require an enormous and costly pump station.[38]
- Once day-lighted, a large swale within the Exposition ROW would be required to clean the water. The space required for this large swale would encroach upon the space required for the proposed light-rail tracks, the Expo/Westwood station platforms, and the station parking. The swale would require substantial length in order to clean the water and this would require continuing the swale under the cross streets, including Westwood Boulevard, Midvale Avenue, Kelton Avenue and beyond. Continuing the swale in this manner would require raising the existing street elevations to provide culverts[39] for the water to flow below the streets, or constructing three new vehicular bridges. The costs of these elements (swale, street reconstruction, etc.) and the neighborhood impact associated with the construction would be substantial.
- In lieu of day-lighting within the Exposition ROW, it was suggested that an inverted siphon could be used to transport the stormwater beneath a trench that could be constructed to allow the LRT to pass under Overland. While the grade crossing analysis did not recommend grade separation of this crossing, this concept was reviewed for technical feasibility and discussed with the City of Los Angeles in response to public comments. Inverted siphons are not typically used for stormwater because debris which is carried in the stormwater can interfere with the effectiveness of the siphon. In addition, the volume of water transported by this drainage system is so large that the city would not utilize an inverted siphon.

For the above reasons, the Greenway concept was determined not to be feasible.

During the next phase of the project, the Expo Authority will work with the appropriate agencies to determine if it is feasible to treat stormwater runoff within the Exposition ROW from the Westwood Boulevard and Overland Avenue area.

Venice and Sepulveda Boulevards Trench—Segment 1a: Venice/Sepulveda

An aerial structure is proposed at the intersection of Overland Avenue on Venice Boulevard. The alternative of a trench[40] could be possible at this location but would need to be covered in the vicinity of the intersection to accommodate double left-turn lanes (from Venice Boulevard onto Overland Avenue) that would bridge over the trench. This covered section would result in significant ventilation and patron exiting requirements due to the length of the covered section.

[38] At this early stage of design it would be difficult to accurately estimate the size and cost of the pump station. A project recently completed by Metcalf & Eddy in the Los Angeles area included a 133 cfs pump station with approximately 30 feet of lift at an approximate construction cost of $4.5 million and structure dimensions 42 feet wide by 86 feet long. By comparison, the pump station required in this area of Expo Phase 2 would need to pump nearly 28 times more flow.
[39] A culvert is a conduit used to enclose a flowing body of water.
[40] Trenches are generally left open on top (i.e., they are uncovered). Tunnels are completely enclosed on all sides apart from the openings at either end.

In addition, the construction impacts (e.g., noise, traffic detours, dust) associated with trench construction would be substantially greater than an aerial structure.

An aerial structure is also proposed at the corner of Venice and Sepulveda Boulevards. A trench could be possible at this location but, similar to Overland, would need to be covered in the vicinity of the intersection and would have significant ventilation and exiting requirements. In addition, the construction impacts would be substantially greater as the trench would have to be constructed under the westbound lanes of Venice Boulevard and the northbound lanes of Sepulveda Boulevard, both heavily used streets. Further, on Sepulveda Boulevard, the existing 97-inch Metropolitan Water District (MWD) water line would have to be relocated to allow for the trench. By comparison, construction of the proposed median columns associated with the aerial structure would be less complicated and would result in less construction impacts.

An aerial structure is also proposed along a large portion of the LRT alignment along Sepulveda Boulevard. Given the width of Sepulveda Boulevard and the required lanes for through and turning traffic, an open trench would not be feasible. As such, a covered trench would be required, which would have significant ventilation and patron exiting requirements as well as significant construction impacts. Further, the existing 97-inch MWD water line would have to be relocated between Venice Boulevard and the I-10 Freeway to allow for the trench. By comparison, construction of an aerial structure is less complicated and would result in less construction impacts.

Overland Station—Segment 1a: Venice/Sepulveda

A station at Overland Avenue was identified[41] as a suitable location for a station on Venice Boulevard due to the good interface with the existing bus service on Venice Boulevard, the north/south destinations along Overland Avenue, and the adjacent commercial and residential areas. The grade crossing analysis concluded that Overland Avenue would require grade separation of the light-rail guideway, meaning that Overland Station would be an aerial station. Locating a station directly at Overland Avenue would require a larger aerial structure than if there were no station in order to accommodate the platforms, elevators, and pedestrian access with stairways from street level.

As a result, an alternate at-grade station at Motor Avenue was evaluated and determined to be feasible. Motor Avenue has similar benefits to Overland Avenue: access to Venice Boulevard, bus service, north/south destinations, and adjacent commercial and residential areas. In addition, the at-grade station configuration would allow for a less extensive aerial structure at Overland Avenue. For these reasons the Overland/Venice location was not retained for evaluation in the DEIR.

Sawtelle Station West of I-405—Segment 2: Sepulveda to Cloverfield

The 2001 DEIS/DEIR for this study area considered locating an aerial station between Sawtelle and Pico Boulevards to provide access from both of these busy arterials. This DEIR reviewed the same location for a potential aerial station but was not able to develop a station design that met the *Metro Design Criteria*. This discrepancy was based upon the lack of sufficient horizontal structure length for an aerial station. An alternative station location in closer proximity to the intersection of Exposition and Sepulveda Boulevards was examined and determined to be a

[41] The Overland Station location was identified in the Draft EIS/EIR for the Mid-City/Westside Transit Corridor, dated April 6, 2001.

feasible design alternative that would meet the *Metro Design Criteria*. In addition, this station location would provide good access to the major north/south corridor of Sepulveda Boulevard, and would allow for easier circulation in and around the station via the less utilized Exposition Boulevard. For these reasons, the previously proposed station between Sawtelle and Pico Boulevards was not pursued in this project.

Sawtelle and Pico Boulevards Trench—Segment 2: Sepulveda to Cloverfield

The grade crossing analysis concluded that the light rail should be separated from Pico Boulevard; this separation could be over or under the vehicular street. The feasibility of putting the light rail under Sawtelle and Pico Boulevards within a trench was evaluated. From just west of Sepulveda Boulevard, the trench would descend at a 3.9-percent grade and go under the I-405 Freeway, Sawtelle Boulevard, and Pico Boulevard before ascending back to grade east of Barrington Avenue.

This alternative would require vehicular bridges at Sawtelle and Pico Boulevards over the trench. In addition, this alternative would also require locating the Expo/Sepulveda Station east of Sepulveda Boulevard, with associated station parking and circulation issues in closer proximity to a residential neighborhood.

This alternative does not present technical flaws at this level of design; however, construction would be more complex due to the existing utilities and particularly under the I-405 Freeway where the freeway columns may require modifications due to the additional loading of the trench. Furthermore, locating the Expo/Sepulveda Station east of Sepulveda Boulevard would be less desirable as the Expo/Westwood Station is only 2,500 feet from Sepulveda Boulevard and thus already serving this area. For these reasons, the trench concept was dropped from further consideration and the aerial structure concept was carried forward in the design.

Bundy Drive Trench—Segment 2: Sepulveda to Cloverfield

The grade crossing analysis concluded that the light rail should be separated from Bundy Drive; this separation could be over or under the vehicular streets. This study investigated a light-rail trench option under Bundy Drive. From just west of Barrington Avenue, the trench would descend at a 4.6-percent grade under Bundy Drive before ascending back to grade east of Centinela Avenue.

This alternative would require a vehicular bridge structure to allow Bundy Drive to pass over the trench. Further, an existing 48-inch reinforced concrete storm drain pipe under Bundy Drive would need to be relocated or modified to accommodate the trench profile and a pump station for the stormwater may be required as flow by gravity would be interrupted by the trench. In addition, the Expo/Bundy Station would be located within the trench which would further complicate the engineering challenges associated with this alternative. For these reasons, the trench alignment option was withdrawn from further consideration.

Cloverfield Boulevard Trench—Olympic Boulevard Alignment—Segment 2: Sepulveda to Cloverfield and Segment 3: Olympic

The grade crossing analysis concluded that the light rail should be separated from Cloverfield Boulevard; this separation could be over or under the vehicular streets. This study investigated a light-rail trench option under Cloverfield Boulevard. The trench would extend from

approximately 300 feet east of 26th Street and descend at a 4.9-percent grade under Cloverfield Boulevard before ascending back to grade east of 20th Street on Olympic Boulevard.

This alternative would require vehicular bridge structures to allow Cloverfield Boulevard and the eastbound lanes on Olympic Boulevard to pass over the trench structure. Due to vertical clearance requirements under the eastbound lanes of Olympic Boulevard, the trench structure would need to extend under 20th Street and would be longer than a comparable aerial structure. Additionally, the proposed Olympic/26th Street Station would need to be located approximately 400 feet east of 26th Street which would be further from the activity centers near Cloverfield Boulevard. The station and trench structure would also result in a greater impact to the Bergamot Station properties and buildings. Further, an existing 48-inch reinforced concrete pipe under Cloverfield Boulevard would need to be relocated to accommodate this alignment, which may not be feasible or desirable from a maintenance perspective.

Given the additional length associated with the trench structure, plus the additional real estate and utility impacts, the alternative was not retained for evaluation in the DEIR.

Cloverfield Boulevard Trench—Colorado Avenue Alignment—Segment 2: Sepulveda to Cloverfield and Segment 3a: Colorado

The grade crossing analysis concluded that the light rail should be separated from Cloverfield Boulevard; this separation could be over or under the vehicular streets. This study investigated a light-rail trench option under Cloverfield Boulevard. The trench would extend from approximately 300 feet east of 26th Street and descend at a 4.7-percent grade under Cloverfield Boulevard before ascending back to grade east of 20th Street on the Exposition ROW.

This alternative would require vehicular bridge structures to allow Cloverfield Boulevard and Olympic Boulevard to pass over the trench structure. Additionally, similar to the Olympic Boulevard Alignment, the at-grade Olympic/26th Street Station would need to be located 400 feet east of 26th Street, which would be further from the activity centers near Cloverfield Boulevard. The station and trench structure would also result in a greater impact to the Bergamot Station properties and buildings. Further, as with the Olympic Boulevard Alignment, an existing 48-inch reinforced concrete pipe under Cloverfield Boulevard would need to be relocated to accommodate this alignment, which may not be feasible or desirable from a maintenance perspective.

For the reasons noted above, this alternative was not retained for evaluation in the DEIR.

I-10 Santa Monica Freeway Option—Segment 3: Olympic

This study investigated an alignment utilizing the Caltrans ROW north of the I-10 Freeway extending from west of Cloverfield Boulevard until the Santa Monica terminus station as an alternative to the Olympic Boulevard alignment.[42]

[42] As noted previously in the description of Segment 3, the Olympic Boulevard alignment would begin with an aerial structure over Cloverfield Boulevard which would enter the median of Olympic Boulevard at approximately 21st Street. The alignment would continue at grade within the median of Olympic Boulevard until approximately Euclid Street. The alignment would then transition to an aerial structure and continue either above Olympic Boulevard or adjacent to properties on the south side, or adjacent to or above the embankment of the I-10 Freeway, before turning north and terminating at the intersection of Colorado Avenue and 4th Street.

This alternative, referred to as the freeway option, would start just west of the intersection of Olympic Boulevard and the Exposition ROW within Segment 3. At this point, the alignment would exit the Exposition ROW to the south and would run on the south/east side of Olympic Boulevard until it crosses 20th Street at grade. This portion of the alignment would either require the elimination of the Olympic Boulevard median, the acquisition of property adjacent to Olympic Boulevard, or possibly both. The alignment would run within the current eastbound traffic lanes of Olympic Boulevard while the east and westbound vehicular traffic would utilize the existing median and the existing westbound lanes.

After crossing 20th Street, the alignment would veer southwest towards the I-10 Freeway into a trench and run parallel to and within the existing slope on the north side of the freeway, next to the 20th Street on-ramp. It would then go under the 17th Street, 14th Street, and 11th Street overcrossings of the I-10 Freeway. The existing off-ramp to Lincoln Boulevard would have to be modified to go under 11th Street and over the light-rail alignment. The alignment would continue along the existing slope, pass under Lincoln Boulevard, the on-ramp from Lincoln Boulevard, and past 5th Street until turning north just east of 4th Street at the terminus station. Significant modification would be required to the on-ramp from Lincoln Boulevard or the off-ramp to 4th/5th Street and it may not be possible to maintain the ramp connection to 5th Street. As a variation to the freeway option, the light rail could be located within the median of Olympic Boulevard until 12th Street and transition to the slope on the north side of the freeway between 12th and 10th Streets, thus eliminating some portion of the trench. West of 10th Street, the alignment would continue to the terminus station as described above.

The benefit of the freeway option would be the elimination of the aerial structure proposed for the Olympic Boulevard alignment, which would start at 11th Street and continue until the station terminus at Colorado/4th Street, thus avoiding the introduction of a new visual element. However, per the project criteria, this new visual element is not considered an impact as it would be adjacent to a freeway in a mostly industrial area with uses such as the Santa Monica Big Blue Bus maintenance and layover facility. Also, the construction of the freeway option would likely cause significant disruption to freeway traffic since four bridges over the freeway would likely require full reconstruction to create sufficient horizontal and vertical clearances for the light-rail guideway. Further, the City of Santa Monica considers the 4th and 5th Street off-ramps to be vital access points to the activity centers in the area. Closing or disrupting these ramps would negatively impact the local traffic circulation and access. In summary, the substantial negative impacts of this freeway option were considered greater than those associated with the Olympic Boulevard Alternative and it was, therefore, withdrawn from further consideration.

Olympic Boulevard—14th Street Station vs. 17th Street Station—Segment 3: Olympic

This study investigated potential station locations at 14th and 17th Streets along the Olympic Boulevard alignment. Both locations would provide benefits, including facilitating access to Memorial Park and the existing Santa Monica College shuttle. These stations would also serve a large number of businesses located along Olympic Boulevard and on adjacent blocks, as well as residential areas to the south of the I-10 Freeway that are accessible via the freeway overcrossings at 14th Street or 17th Street.

The 14th Street Station would be more evenly spaced between the adjacent stations at Colorado/4th Street Station and the Olympic/26th Street Station, and would be closer to Memorial Park than 17th Street. However, 17th Street would have access to the existing bike facility along

17th Street and would be closer to Crossroads School and the Santa Monica Unified School District office, thus allowing faculty, students, and employees easy access to transit.

The light-rail alignment is proposed to ascend between 14th and 11th Streets to allow for an aerial alignment over 11th Street.[43] The need to ascend immediately west of 14th Street would preclude a standard split-platform station configuration at 14th Street. Other standard station configurations (i.e., side platform or center platform) would create real estate impacts to either Memorial Park on the northeast corner, or the business on the southeast corner, or both. By comparison, a standard split-platform station configuration could be employed at 17th Street within the existing public right-of-way by utilizing the area opposite the left-turn pockets on Olympic Boulevard at 17th Street.

Another option, which would not be standard, would be to locate the westbound station platform just east of 14th Street and the eastbound station platform just west of 17th Street. This configuration could also be constructed within the existing public right-of-way but would create a complicated passenger interface.

In summary, both locations provide similar benefits in terms of facilitating access to businesses and residences, but 17th Street would allow for a standard station configuration without requiring real estate impacts. For this reason, the 14th Street Station alternative was not retained for evaluation in the DEIR.

Colorado Avenue—14th Street Station vs. 17th Street Station—Segment 3a: Colorado

This study investigated potential station locations at 14th and 17th Streets along Colorado Avenue. A 14th Street Station could be located east of 14th Street within the center of Colorado Avenue, while a station at 17th Street could be located within the center of Colorado Avenue just west of 17th Street.

Both locations would provide benefits, including facilitating access to Memorial Park and the existing Santa Monica College shuttle. These stations would also serve a large number of businesses located along Colorado Avenue and adjacent blocks, as well as residential areas to the north of Colorado Avenue. The 17th Street station location would also provide access to the existing bike facility along 17th Street.

For either station alternative, the eastbound traffic lanes on Colorado Avenue would be reconfigured as they approach 17th Street. The lanes would bow southward to increase the angle between the eastbound traffic lanes and the LRT crossing as it transitions from the Exposition ROW onto Colorado Avenue. This would provide greater visibility at the intersection and greater clearance between the trains and the traffic lanes. This reconfiguration would result in real estate acquisitions on the south side of Colorado Avenue between 14th and 17th Streets but would also allow for the placement of a center-platform station within the center of Colorado Avenue west of 17th Street. In the case of the 14th Street station location, however, additional real estate acquisitions would be required to the west of 14th Street. These additional acquisitions would be necessary to reconfigure the traffic lanes to accommodate the station and guideway within the center of Colorado Avenue.

[43] Refer to Section 2.4.4 (Segment 3 [Olympic]—Olympic Boulevard from Exposition ROW to Santa Monica Terminus [LRT Alternatives 1 and 3]) for further description of the Olympic Boulevard alignment.

In summary, both locations provide similar benefits in terms of facilitating access to businesses and residences, but the 14th Street location would result in additional property acquisitions. For this reason, the 14th Street Station alternative was not retained for evaluation in the DEIR.

Colorado Avenue—16th Street Station—Segment 3a: Colorado

This study investigated a station at 16th Street on the Colorado Avenue alignment with the objective of possibly reducing project-related impacts, such as property acquisition. The station could be located on the south side of Colorado Avenue between 16th and 17th Streets on a privately-owned property that spans between these streets. This alternative would require that 16th Street be reconfigured to be a cul de sac in order to facilitate safe braking distance between the platform and the street crossing. A mid-block crossing at 17th Street just south of Colorado Avenue would also be required. In addition, eastbound traffic on Colorado Avenue would need to cross both light-rail tracks to the west of 16th Street. This would not be ideal as the train operator's visibility of approaching vehicles would be restricted by the angle of approach to the crossing. In addition, operation of the 14th Street signal would need to be synchronized with the light-rail crossing of the eastbound vehicular lanes of Colorado Avenue. While pedestrian access would be minimally improved as compared to the proposed station within the center of Colorado Avenue at 17th Street, real estate acquisition would still be required both east and west of 17th Street in order to accommodate the guideway.

A variation of this location would be on the south side of Colorado Avenue between 14th and 16th Streets on property owned by the City of Santa Monica, north of Memorial Park. This location would allow immediate access to Memorial Park and, given that the property is City-owned, would eliminate the need to acquire private property. Similar to the location between 16th and 17th Streets, this alternative would require the closure of 16th Street south of the light-rail alignment, would require a mid-block crossing at 17th Street just south of Colorado Avenue, and would also require that eastbound traffic on Colorado Avenue cross both light-rail tracks mid-block between 14th and 16th Streets resulting in visibility and signal synchronization concerns similar to those noted above.

In summary, although pedestrian access to the 16th Street station locations on the south side of Colorado Avenue would be somewhat better than access to the proposed station within the center of Colorado Avenue at 17th Street, the benefits would not outweigh the traffic and signalization concerns, while the magnitude of the real estate impacts would not be substantially different. For these reasons, the 16th Street Station alternatives were not retained for evaluation in the DEIR.

Colorado Avenue—Colorado/2nd Street Station—Segment 3a: Colorado

An optional terminus arrangement with an on-street station between 2nd Street and 4th Street was examined at the request of the City of Santa Monica. The proposed station would be at grade and would have a 270-foot-long, 23-foot-wide center platform stretching between just west of 4th Street to just east of 2nd Street. Approximately 225 surface parking spaces would be located on the commercial block bounded by 4th Street, 5th Street, and Colorado Avenue, and vehicular access would be from 5th Street. This block would also serve as the location of a train storage track.

This on-street station would require the closing of Main Street at Colorado Boulevard as the at-grade station platform would span the intersection. Additionally, the eastbound side of Colorado Boulevard would be permanently closed to traffic between 4th Street and 2nd Street due to the

narrow public right-of-way. The proximity of the Sears retail building to the street precludes the practical possibility of expanding the right-of-way. Additionally, the difficult rail geometry of this station would create a slow and potentially unreliable transit operating environment with 5 mph speed restrictions for the LRT. For this reason, the Colorado/2nd Street station was not retained for evaluation in this DEIR.

Station Parking—All LRT Alternatives

Station parking was considered in the context of the demand for transit parking versus the project-related impacts associated with providing parking in an already built-out environment. The Metro Travel Demand Model, which was used to estimate project ridership, also provided an estimate of the number of people who would access the system by auto, drop-off, bus, and walk modes. The 2030 parking demand for stations located along LRT 1 and LRT 2 was estimated to be approximately 1,191 spaces, while parking demand at stations along LRT 3 and LRT 4 was estimated to be 1,096 spaces.

Due to the high cost of property within the study area, the average cost per parking space is between $73,000 and $105,000 (in 2008 dollars).[44] Given this excessive cost, it was therefore assumed that parking would only be provided on public rights-of-way or on property that would be acquired for project-related features, such as stations or guideway.

Based on the above criteria, approximately 900 spaces are proposed to be incorporated into LRT 1 and LRT 2, and 990 are proposed to be incorporated into the LRT 3 and LRT 4. For those areas where parking demand was not fully realized, the Expo Authority and Metro would work with the local communities and cities to limit spillover parking within the adjacent neighborhoods.

Maintenance Facilities

In order the meet the maintenance requirements of the light-rail vehicles, a suitably located site of approximately 6 to 10 acres was determined to be necessary. Using aerial mapping, site visits, and other sources, a detailed evaluation of potential sites was undertaken. The basic desirable site characteristics included the following:

- Adjacency to the LRT Alternatives
- A regular shape conducive to storage and maintenance track layout and activities
- Location in a commercial/industrial area
- Relatively flat topography
- Good vehicular access
- Limited environmental impact potential

Approximately thirteen sites, ranging in size from 3 to 18 acres, were identified as potential candidate sites within the bounds of the study area based upon the six desirable site characteristics above. Of these, six were screened out as being too small to meet the project requirements. Each of these six sites was below 6 acres in size and could not be reasonably combined with adjoining parcels to meet the minimum size requirement.

[44] Estimate includes property and surface or structure costs.

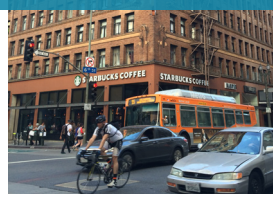
Of the remaining seven parcels, the following was concluded for each site:

- A site in Los Angeles, adjacent to Venice Boulevard and Durango Avenue, was deemed too irregularly shaped and not reasonably accessible to the light-rail system. In addition, the current usage as a shopping center with multiple tenants would have made relocation difficult and expensive.
- A site in Los Angeles, just west of the I-405 Freeway and north of Pico Boulevard, was determined to have multiple owners and leaseholders as well as being located in a manner that would not allow for reasonable connection to the light-rail tracks.
- A portion of a site in Los Angeles, also just west of the I-405 Freeway and north of Pico Boulevard, entered into the construction phase for residential housing during Expo Phase 2 project development and was, therefore, no longer a reasonable option.
- A site in Los Angeles, east of Centinela, was deemed to have a configuration that was less than ideal. In addition, the site had multiple owners which would result in a complicated and potentially costly acquisitions process.
- Two locations in Santa Monica, south of Olympic Boulevard; the first between 14th and 17th Streets and the second between 17th and 20th Streets were examined. Both sites were less than 4 acres in size and could not be expanded without significant challenges due to the I-10 Freeway to the south, Olympic Boulevard to the north, and major north/south streets constraining eastward or westward expansion. Thus, both sites were rejected as being insufficient in size to satisfy the criteria.
- A site in Santa Monica, east of Stewart Street and south of the light-rail system, was determined to be the best site with respect to the desirable site characteristics listed above. Therefore, this is the site proposed and studied within the DEIR.

Mobility Plan 2035

An Element of the General Plan

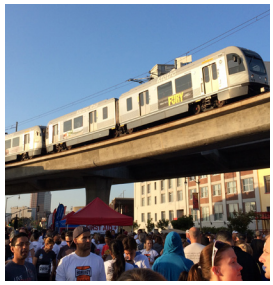























Los Angeles Department of City Planning

Approved by City Planning Commission: **June 23, 2016**
City Plan Case No. CPC-2013-0910-GPA-SPCA-MSC

Adopted by City Council: **September 7, 2016**
Council File No. 15-0719-S15

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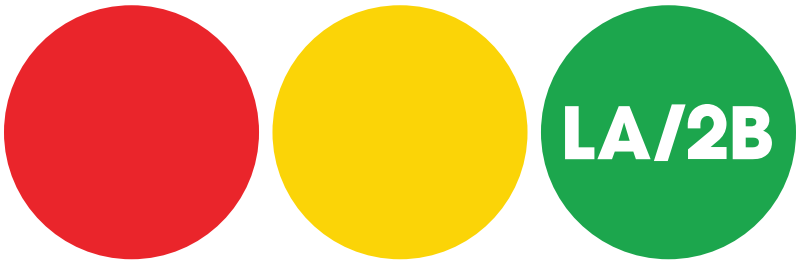

The road ahead.

Mobility Plan 2035

Activity Log

Date	Committee Amendments
August 11, 2015	Plan Adopted by City Council
November 25, 2015	Plan Amended by City Council
January 20, 2016	Plan Amended by City Council
September 7, 2016	Plan Amended by City Council

Activity Log

Date	Committee Amendments

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Task Force
American Institute of Architects, LA
Bicycle Advisory Committee
Big Blue Bus
Bikestation
Building Industry Association
Bus Riders Union
Caltrans District 7
Community Health Council
Culver City Bus
Disabled Access Commission
FilmL.A., Inc
Fixing Angelenos Stuck in Traffic
Foothill Transit
Green LA Coalition
Harbor LA
Heal the Bay
LA River Revitalization Corporation
LA County Bicycle Coalition
LA County, Department of
Public Health, PLACE
LA Department of Transportation
LAUSD - Office of Environmental
Health and Safety

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Los Angeles Business Council
Los Angeles Eco-Village
Los Angeles Chamber of Commerce
Los Angeles Walks
Metro
Multicultural Communities for Mobility
Natural Resources Defense Council
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Southern California Association
of Governments
Southern California Air Quality
Management District
Taxicab, Limousine and Paratransit Association
The Valley Economic Alliance
Transit Coalition
TRUST South LA
UCLA Luskin School
UPS
USC Transportation
Valley Industry and Commerce Association

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Alisa St

Introduction + Orientation Chapter

Introduction

Key Policy Initiatives

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Street Classifications

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Context

Key Forces, Trends, and Concepts in 21st Century Mobility Planning

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Partners

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Public Participation

Project Website

Online Town Hall

Participation Summary

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Introduction + Orientation Chapter

Introduction

Los Angeles has historically been a bustling center where people from all over the world have come to explore the possibilities this city has to offer. The 3.8 million who have made it their home have given this city its unique identity comprised of distinct neighborhoods. Numerous places to go, things to do, warm weather, and a strong economic base all contribute to making Los Angeles a great place to live and work. A city as diverse as Los Angeles requires a transportation system that offers equally varied and viable mobility choices to accommodate all.

Mobility Plan 2035 (Plan) provides the policy foundation for achieving a transportation system that balances the needs of all road users. As an update to the City's General Plan Transportation Element (last adopted in 1999), Mobility Plan 2035 incorporates "complete streets" principles and lays the policy foundation for how future generations of Angelenos interact with their streets.

In 2008, the California State Legislature adopted AB 1358, The Complete Streets Act, which requires local jurisdictions to "plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways, defined to include motorists, pedestrians, bicyclists, children, persons with disabilities, seniors, movers of commercial goods, and users of public transportation, in a manner that is suitable to the rural, suburban or urban context."

The City's transportation system will continue to evolve to fit the context of the time and situation. Today, we are faced with environmental constraints, public health issues, regional inequity, and some of the longest traffic delays in the nation. The way Mobility Plan 2035 addresses these issues though policy initiatives today will set the stage for the way we move in the future.

Mobility Plan 2035 includes goals that are equal in weight and define the City's high-level mobility priorities.

Each of the goals contains objectives (targets used to help measure the progress of the Plan) and policies (broad strategies that guide the City's achievement of the Plan's five goals):

- Safety First
- Access for All Angelenos
- World Class Infrastructure
- Collaboration, Communication and Informed Choices
- Clean Environments & Healthy Communities

These goals represent a confluence of transportation and public policy health that can create opportunities to address the historic inequities in the City that have starkly limited quality of life in low-income communities. By placing a citywide emphasis on safety, access, and health the city can begin to equalize the playing field and first address socioeconomically disadvantaged areas with the highest need to connect people to more prospects of success through mobility.



"Complete streets" take into account the many community needs that streets fulfill. Streets do not just move people from one location to another. They provide a space for people to recreate, exercise, conduct business, engage in community activities, interact with their neighbors, and beautify their surroundings. Complete streets offer safety, comfort, and convenience for all users regardless of age, ability or means of transportation. They also lead to other public benefits, including improved transportation, a cleaner environment, and healthier neighborhoods.

- Los Angeles City Council Motion, January 28, 2014

Key Policy Initiatives:

- Lay the foundation for a network of complete streets and establish new complete street standards that will provide safe and efficient transportation for pedestrians (especially for vulnerable users such as children, seniors and the disabled), bicyclists, transit riders, and car and truck drivers, and more
- Use data to priotize transportation decions that strive towards equity in safety, public health, access, social benefits, and/or economic benefits
- Consider the strong link between land use and transportation
- Embed equity and environmental justice into the transportation policy framework, project implementation, and action programs
- Target greenhouse gas reductions through a more sustainable transportation system
- Promote "first mile-last mile" connections
- Improve interdepartmental and interagency communications and coordination with respect to street design and maintenance
- Increase the use of technology (applications, real time transportation information) and wayfinding to expand awareness of and access to parking options and a host of multi-modal options (car share, bicycle share, car/van pool, bus and rail transit, shuttles, walking, bicycling, and driving)
- Expand the role of the street as a public place
- Increase the role of "green street" solutions to treat and infiltrate stormwater
- Consider community input before implementation of any Mobility Plan projects
- Consider the needs of public safety when evaluating changes that implement "Complete Streets" improvements
- Use the Health Atlas, CalEPA's CalEnviroScreen tool data, Housing and Community Investment Department's socioeconomic data utilized in determining the City's 16 Family Source Center's Service Areas, and collision history data on pedestrian and bicyclist traffic related fatalities and severe injuries to prioritize transportation decisions based upon outcomes of safety, public health, equity, environmental justice, language and physical access, social benefits, and/or economic benefits

Reader's Guide

While the Plan's narrative frames the key concepts and proposals of Mobility Plan, the essence of the Plan lies in its goals, objectives, policies, and action programs. These declarative statements set forth the City's approach to various issues. Goals, objectives, policies, and action programs are described below.

Goals: A goal is a statement that describes the future condition or "end" state. Goals are outcome-oriented and achievable over time. Each goal is represented by a chapter in the Plan.

Objectives: An objective is an aspirational measure of goal attainment. In the Mobility Plan, the objectives follow the goal and precede the policies. Meeting given objectives will depend on available funding to implement the proposed programs.

Policies: A policy is a clear statement that guides a specific course of action for decision-makers to achieve a desired goal. In the Plan, each policy is preceded by a key word or phrase alerting the reader to its main purpose. Information about the intent of the policy is described in the text following the policy.

Action Programs: The proposed action programs are located in Chapter 6 of the Plan. They comprise of proposed procedures, programs, or techniques that may be utilized to further the Mobility Plan's goals and policies. Decisions to implement specific programs are discretionary and governed by program cost, available funding, staffing, feasibility and similar considerations.

Mobility Plan 2035 is organized into six chapters. Each chapter is further organized into sections that address the specific topics described below. The 2010 Bicycle Plan goals and policies have been folded into the Mobility Plan to reflect a commitment to a balanced, multi-modal viewpoint. Bicycle Plan programs have been incorporated into Chapter 6: Action Plan.

Introduction and Orientation. This initial chapter describes the role of the Mobility Plan and provides a brief timeline of transportation. The chapter also outlines the Plan's five goals, highlights the Plan's organizational format, describes the Plan's relationship to the City's General Plan as well as plans developed by other City agencies and regional jurisdictions and includes a glossary of transportation terms. This chapter also contains the circulation system maps with street designations.

Chapter 1: Safety First focuses on topics related to crashes, speed, protection, security, safety, education, and enforcement.

Chapter 2: World Class Infrastructure focuses on topics related to the Complete Streets Network (walking, bicycling, transit, vehicles, green streets, goods movement), Great Streets, Bridges, Street Design Manual, and the smart investments needed to get there.

Chapter 3: Access for All Angelenos focuses on topics related to affordability, accessibility, land use, operations, reliability, transportation demand management and community connections .

Chapter 4: Informed Choices focuses on topics related to real-time information, open source data, transparency, monitoring, reporting, emergency response, departmental and agency cooperation and database management.

Chapter 5: Clean Environments and Healthy Communities focuses on topics related to the environment, health,

benefits of active transportation, clean air, clean fuels and fleets and open street events.

Chapter 6: Action Plan contains the nextwork concept maps for transit, bicycle, vehicle, pedestrian, and goods movement and describes the various programs that, funding and staff permitting, will be prioritized for implementation. The action programs are organized into the following 15 categories: Communication, Data & Analysis, Education, Enforcement, Engineering, Funding, Legislation, Maintenance, Management, Operations, Parking/Loading, Planning and Land Use, Public Space, Schools, and Support Features.

Purpose, Adoption, & Implementation Process of the Plan

GENERAL PLAN PURPOSE

California State Law requires that cities prepare and adopt a comprehensive, integrated, long-term General Plan to direct future growth and development. The General Plan is the fundamental policy document of a city. It defines how a city's physical and economic resources are to be managed and utilized over time. Decisions by a city regarding the use of its land, design, character of buildings and open spaces, conservation of existing and provision of new housing, provision of supporting infrastructure and public and human services, and protection of residents from natural and man-caused hazards are guided by and must be consistent with the General Plan.

The General Plan may be adopted either as a single document or as a group of related documents organized either by subject matter or by geographic section within the planning area [Government Code Section 65301 (b)]. The General Plan must be periodically updated to ensure its relevance and usefulness.

Changes to the law over the past thirty years have vastly boosted the importance of the General Plan to land use decision making. A General Plan may not be a "wish list" or a vague view of the future but rather must provide a concrete direction.

State law requires that the General Plan must contain seven mandatory elements: land use, transportation, housing, conservation, open space, noise, and safety. All of the elements must be internally consistent. The City of Los Angeles has 12 elements to better address the particular issues facing the City.

Framework Element

The City has adopted an overarching "Framework Element" that sets forth a strategy for long-range growth and development, providing a citywide context for updates to community plans and the citywide elements. The Framework is focused around seven guiding principles: grow strategically; conserve existing residential neighborhoods; balance the distribution of land uses; enhance neighborhood character through better development standards; create more small parks, pedestrian districts, and public plazas; improve mobility and access; and identify a hierarchy of commercial districts and centers.

The Framework sets forth an estimate of population and employment growth to the year 2010 that can be used to guide the planning of infrastructure and public services. This, however, does not represent a limit on growth or a mandated level of growth in the City or

its Community Plan Areas. Traditionally, such "end-state" limits have proven ineffective in guiding growth and public infrastructure/service investments and in responding to the changing needs of a city's residents and its economy. In its place, the Framework establishes a program to annually monitor growth, its impacts, and infrastructure and service needs that will be documented in a report to the City Council and pertinent service departments and agencies. This provides decision makers and planners with the information that is essential in shaping growth in a manner that seeks to mitigate its impacts, minimize development costs, conserve natural resources, and enhance the quality of life in the City.

MOBILITY PLAN PURPOSE

The purpose of this Plan is to present a guide to the further development of a citywide transportation system which provides for the efficient movement of people and goods. This Plan recognizes that primary emphasis must be placed on maximizing the efficiency of existing and proposed transportation infrastructure through advanced transportation technology, through reduction of vehicle trips, and through focusing growth in proximity to public transit. In addition, the Plan sets forth street designations and related standards. A listing of street types with descriptions and generalized cross sections for each designation is included in the Complete Street Design Guide.

The Plan recognizes the contribution of a proper juxtaposition of land uses to the reduction of vehicle trips. Locating uses that better serve the needs of the population closer to where they work and live reduces the number and distance of vehicle trips and decreases the amount of pollution from mobile sources. The Mobility Plan provides goals, objectives, policies and programs to continually meet the changing mobility, air quality and health challenges faced by the City.

ADOPTION PROCEDURES

Commission Approval

The General Plan and any amendments thereto must be approved by the City Planning Commission following a public hearing and the approved changes must be presented to the Mayor and the City Council by the Director of Planning, together with the Commission's report and recommendations.

City Council Adoption

The General Plan and any amendment to it must be adopted by majority vote of the City Council. A two-thirds vote of the Council is required if its action is contrary to the recommendations of either the City Planning Commission or of the Mayor. A three-fourths vote of the Council is required if the action of the Council is contrary to the recommendations of both the City Planning Commission and the Mayor.

IMPLEMENTATION PROCEDURES

The Plan identifies goals, objectives, policies, and action items (programs and projects) that serve as guiding tools for making sound transportation decisions as the City matures and evolves.

Like most long-term planning documents it is not expected that all of the goals and objectives will be met nor that all of the policies and action items be completed. Instead, this Plan is both a working guide and a reference document.

The Plan is intended to guide the City and other agencies In allocating often scarce resource dollars when determining future mobility improvements. The policies located throughout the Plan are interrelated and should be examined comprehensively when making planning decisions. This Plan reflects the ideas and challenges that the City foresees in the future- from its perspective today.

Street Classifications

Each of the city's arterial streets included in the General Plan Circulation System Maps (found in this chapter) have been re-designated from the 1999 Transportation Element to reflect the new arterial types included in the Street Standard Plan S-470. The updated S-470 includes five arterial road types (Boulevard I, II, Avenue I, II, III) whereas the current S-470 has only three (Major Highway Class I, II, Secondary Highway). The expanded range of dimensions more accurately reflects the range of street dimensions that exist today and acknowledges that there are many arterial streets that are, and should remain, narrower than their current designation would permit. In a majority of instances, today's arterial streets have not yet been expanded to reflect the full dimension envisioned by the current designation, as physical changes to the roadway are not made until adjacent parcels are redeveloped.

In recognition of this, and since the 1999 Transportation Element was last adopted, there has been growing interest in restricting streets from being widened to match their currently assigned designation. To align with this interest, as community and specific plans have been updated and/or introduced over the past 14 years (since 1999), footnotes have been added and street modifications have been made that would restrain a street from future widening. In most instances, the street retained its designation in name only, but the footnotes and modifications indicated that the street was not to be widened in the future. Unfortunately, this collection of footnotes and modified references has made it difficult for city engineers, consultants, property owners, developers and community members alike to have a full grasp of the city's long-term vision for its streets.

To rectify this situation, the Mobility Plan, in the majority of cases, assigns new street designations that are more closely aligned with the streets' current dimensions and thus future dedications and/or widenings will be smaller in dimension than would be required under the current designation. Streets that had been previously "modified" will retain their corresponding "modified" dimension under the new designations unless their "modified" dimensions are in alignment with one of the new street designations in which case the modified term will be eliminated. An inventory of modified street segments is included in Appendix F.

In the interest of protecting our adjacent land uses, living within our current right-of-way, and managing our streets efficiently, all of the City's arterial streets have been reclassified according to the new system. The former functional classification nomenclature will still remain for reference purposes. Any changes to these street designations would require a general plan amendment.

Street Designations and Standard Roadway Dimensions

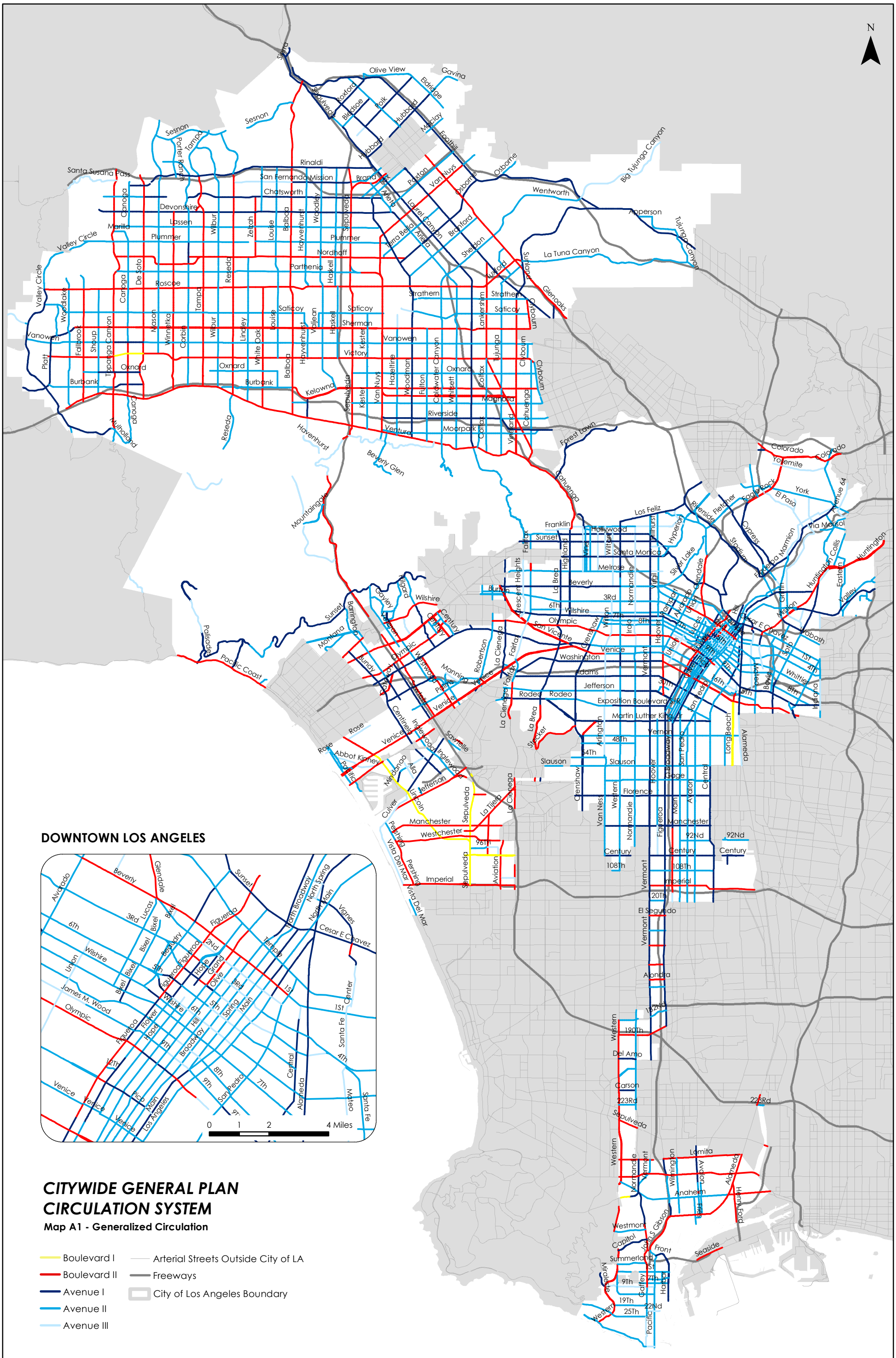
Previous Designation	Previous Designated Dimensions	Example of Previous Built Dimensions	New Designation(s)	New Designated Dimensions (right-of-way/(Right-of-Way/Roadway widths, feet) Roadway widths, feet)
Major Highway Class I	(126/102)	(126/102)	Boulevard I	(136/100)
		(110/80)	Boulevard II	(110/80)
Major Highway Class II	(104/80)	(104/80)	Boulevard II	(110/80)
		(100/70)	Avenue I	(100/70)
		(86/56)	Avenue II	(86/56)
		(72/46)	Avenue III	(72/46)
Secondary Highway (90/70)	(90/70)	(100/70)	Avenue I	(100/70)
		(86/56)	Avenue II	(86/56)
		(72/46)	Avenue III	(72/46)
		(66/40)	Collector Street	(66/40)
Collector Street	(64/44)	(64/44)	Collector Street	(66/40)
Industrial Collector Street	(64/48)	(64/48)	Industrial Collector Street	(68/48)
Local Street	(60/36)	(60/36)	Local Standard	(60/36)
		(50/30)	Local Limited	(50/30)
Industrial Local	(60/44)	(60/44)	Industrial Local	(64/44)
Standard Walkway	10	10	Pedestrian Walkway	(10–25)
(New Designation)			Shared Street	(30' / 10')
(New Designation)			Access Roadway	(20 right-of-way)
Service Road	20	Various	One-Way Service Road – Adjoining Arterial Streets	(28–35/12 or 18)
			Bi-Directional Service Road – Adjoining Arterial Streets	(33–41/20 or 28)
Hillside Collector	(50/40)	(50/40)	Hillside Collector	(50/40)
Hillside Local	(44/36)	(44/36)	Hillside Local	(44/36)
Hillside Limited Standard	(36/28)	(36/28)	Hillside Limited Standard	(36/28)

Citywide General Plan Circulation System Maps

The Citywide General Plan Circulation System maps establish the designated street classifications for arterial streets, scenic highways, divided streets, and depict modified segments as well. Any changes to these street designations would require a general plan amendment.

The first maps that displays all of the arterial streets onto a single map describes the "generalized circulation" meaning that further details such as whether a street is divided, modified, or a scenic highway are not depicted. The hollowing sub-area maps provide a more detailed description of the streets' complete designation as a divided, modified, or scenic highway in addition to its primary designation as a Boulevard or Avenue.

Scenic Highways depicted within the City of Los Angeles have special controls for protection and enhancement of scenic resources. Scenic Highway Guidelines (for those designated scenic highways for which there is no adopted scenic corridor plan) are presented in the appendices of this Plan. Proposed streets are depicted in the Community Plans, consistent with General Plan standards and criteria (see Policy 3.12 on proposed streets). Community Plans also designate collector streets.


N
Olive View
Gavina
Sesnon
Rinaldi
Santa Susana Pass
San Fernando Mission
Chatsworth
Devonshire
Lassen
Plummer
Nordhoff
Parthenia
Roscoe
Saticoy
Vanowen
Victory
Oxnard
Burbank
Kelowna
Riverside
Moorpark
Ventura
Havenhurst
Beverly Glen
Mountaingate
Cahuenga
Forest Lawn
Franklin
Sunset
Hollywood
Santa Monica
Melrose
Beverly
3Rd
6Th
Wilshire
Olympic
San Vicente
Venice
Washington
Adams
Jefferson
Rodeo
Exposition Boulevard
Martin Luther King Jr
Slauson
48Th
54Th
Manchester
Westchester
96Th
Century
108Th
Imperial
Los Feliz
Riverside
Fletcher
Eagle Rock
York
El Paso
Colorado
Yosemite
Via Marisol
Huntington
Avenue 64
Cesar E Chavez
1ST
4th
Whittier
Indiana
Alameda
Long Beach
Central
Aviation
Florence
92Nd
20Th
El Segundo
Alondra
182Nd
190Th
Del Amo
Carson
223Rd
Lomita
Anaheim
Westmont
Capitol
Summerland
Seaside
Front
9Th
19Th
22Nd
25Th
Pacific
Harbor
Gaffey
Figueroa
Hope
Flower
Broadway
Hill
Spring
Main
Grand
Olive
Temple
Beaudry
Bixel
Lucas
Union
James M. Wood
Pico
Los Angeles
Mateo
Santa Fe
Palisades
Pacific Coast
Sunset
Barrington
Montana
Bundy
Centinela
Rose
Abbot Kinney
Culver
Pershing
Vista Del Mar
Manning
Robertson
Mirabeau
Alla
Lincoln
Inglewood
Sawtelle
Westwood
Palms
Overland
Cheviot Hills
Century City
Beverly Hills
Big Tujunga Canyon
Wentworth
Apperson
Tujunga Canyon
La Tuna Canyon
Glenoaks
Osborne
Paxton
Van Nuys
Foothill
Eldridge
Olive View
Sepulveda
Roxford
Bledsoe
Polk
Hubbard
McClay
Sesnon
Porter Ranch
Tampa
Canoga
Valley Circle
Woodlake
Fallbrook
Shoup
Tampa
Reseda
Zelzah
Louise
Balboa
Woodley
Haynenhurst
Lindley
White Oak
Mason
Winnetka
Corbin
Wilbur
De Soto
Marilla
Platt
Tarzana
Topanga Canyon
Mulholland
Laurel Canyon
Terra Bella
Arleta
Branford
Sheldon
Lurline
Strathern
Lankershim
Clybourn
Tujunga
Colfax
Magnolia
Cahuenga
Vineland
Hazeltine
Woodman
Fulton
Coldwater Canyon
Whitsett
Van Nuys
Kester
Haskell
Vanjean
Sherman
Kester
Victory
Oxnard
Burbank
Balboa
Haynenhurst
Louise
Haskell
Saticoy
Strathern
Plummer
Nordhoff
Parthenia
Roscoe
Saticoy
Vanowen
Victory
Oxnard
Burbank
Kelowna
Riverside
Moorpark
Ventura
Havenhurst
Beverly Glen
Mountaingate
Cahuenga
Forest Lawn
Franklin
Sunset
Hollywood
Santa Monica
Melrose
Beverly
3Rd
6Th
Wilshire
Olympic
San Vicente
Venice
Washington
Adams
Jefferson
Rodeo
Exposition Boulevard
Martin Luther King Jr
Slauson
48Th
54Th
Manchester
Westchester
96Th
Century
108Th
Imperial
Los Feliz
Riverside
Fletcher
Eagle Rock
York
El Paso
Colorado
Yosemite
Via Marisol
Huntington
Avenue 64
Cesar E Chavez
1ST
4th
Whittier
Indiana
Alameda
Long Beach
Central
Aviation
Florence
92Nd
20Th
El Segundo
Alondra
182Nd
190Th
Del Amo
Carson
223Rd
Lomita
Anaheim
Westmont
Capitol
Summerland
Seaside
Front
9Th
19Th
22Nd
25Th
Pacific
Harbor
Gaffey
Figueroa
Hope
Flower
Broadway
Hill
Spring
Main
Grand
Olive
Temple
Beaudry
Bixel
Lucas
Union
James M. Wood
Pico
Los Angeles
Mateo
Santa Fe
Palisades
Pacific Coast
Sunset
Barrington
Montana
Bundy
Centinela
Rose
Abbot Kinney
Culver
Pershing
Vista Del Mar
Manning
Robertson
Mirabeau
Alla
Lincoln
Inglewood
Sawtelle
Westwood
Palms
Overland
Cheviot Hills
Century City
Beverly Hills
Big Tujunga Canyon
Wentworth
Apperson
Tujunga Canyon
La Tuna Canyon
Glenoaks
Osborne
Paxton
Van Nuys
Foothill
Eldridge
Olive View
Sepulveda
Roxford
Bledsoe
Polk
Hubbard
McClay
Sesnon
Porter Ranch
Tampa
Canoga
Valley Circle
Woodlake
Fallbrook
Shoup
Tampa
Reseda
Zelzah
Louise
Balboa
Woodley
Haynenhurst
Lindley
White Oak
Mason
Winnetka
Corbin
Wilbur
De Soto
Marilla
Platt
Tarzana
Topanga Canyon
Mulholland
Laurel Canyon
Terra Bella
Arleta
Branford
Sheldon
Lurline
Strathern
Lankershim
Clybourn
Tujunga
Colfax
Magnolia
Cahuenga
Vineland
Hazeltine
Woodman
Fulton
Coldwater Canyon
Whitsett
Van Nuys
Kester
Haskell
Vanjean
Sherman
Kester
Victory
Oxnard
Burbank
Balboa
Haynenhurst
Louise
Haskell
Saticoy
Strathern
Plummer
Nordhoff
Parthenia
Roscoe
Saticoy
Vanowen
DOWNTOWN LOS ANGELES
Beverly
Glendale
Sunset
Alvarado
3Rd
Lucas
Bixel
6Th
Wilshire
Union
Bixel
Figueroa
Beaudry
12Nd
Hope
Grand
Olive
8Rd
1St
Temple
North Broadway
North Main
Vignes
Cesar E Chavez
Center
1St
Santa Fe
4th
Central
Alameda
Mateo
Santa Fe
James M. Wood
Olympic
Figueroa
Hope
Flower
Broadway
Hill
Spring
Main
5th
9th
8th
7th
12Th
Venice
Pico
Los Angeles
0 1 2 4 Miles
CITYWIDE GENERAL PLAN
CIRCULATION SYSTEM
Map A1 - Generalized Circulation
Boulevard I
Boulevard II
Avenue I
Avenue II
Avenue III
Arterial Streets Outside City of LA
Freeways
City of Los Angeles Boundary
0 2.5 5 7.5 10 Miles
September 2016

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A2 - VALLEY SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- Divided Streets
- ★★ Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- City of Los Angeles Boundary
- / / Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

N

0 0.5 1 2 3 4 Miles

September 2016

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A3 - WEST SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 1 2 3 Miles

September 2016

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A4 - CENTRAL, MIDCITY SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local Streets/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 0.7 1.4 2.1 Miles

September 2016

N

CASP

DOWNTOWN LOS ANGELES

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A5 - CENTRAL, EAST AND CORNFIELD ARROYO SECCO PLAN (CASP) SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 0.65 1.3 1.95 Miles

September 2016

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A6 - CENTRAL, EAST SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 0.25 0.5 0.75 Miles

September 2016

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A7 - CENTRAL, CORNFIELD ARROYO SECCO PLAN SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 0.4 0.8 1.2 Miles

September 2016

CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

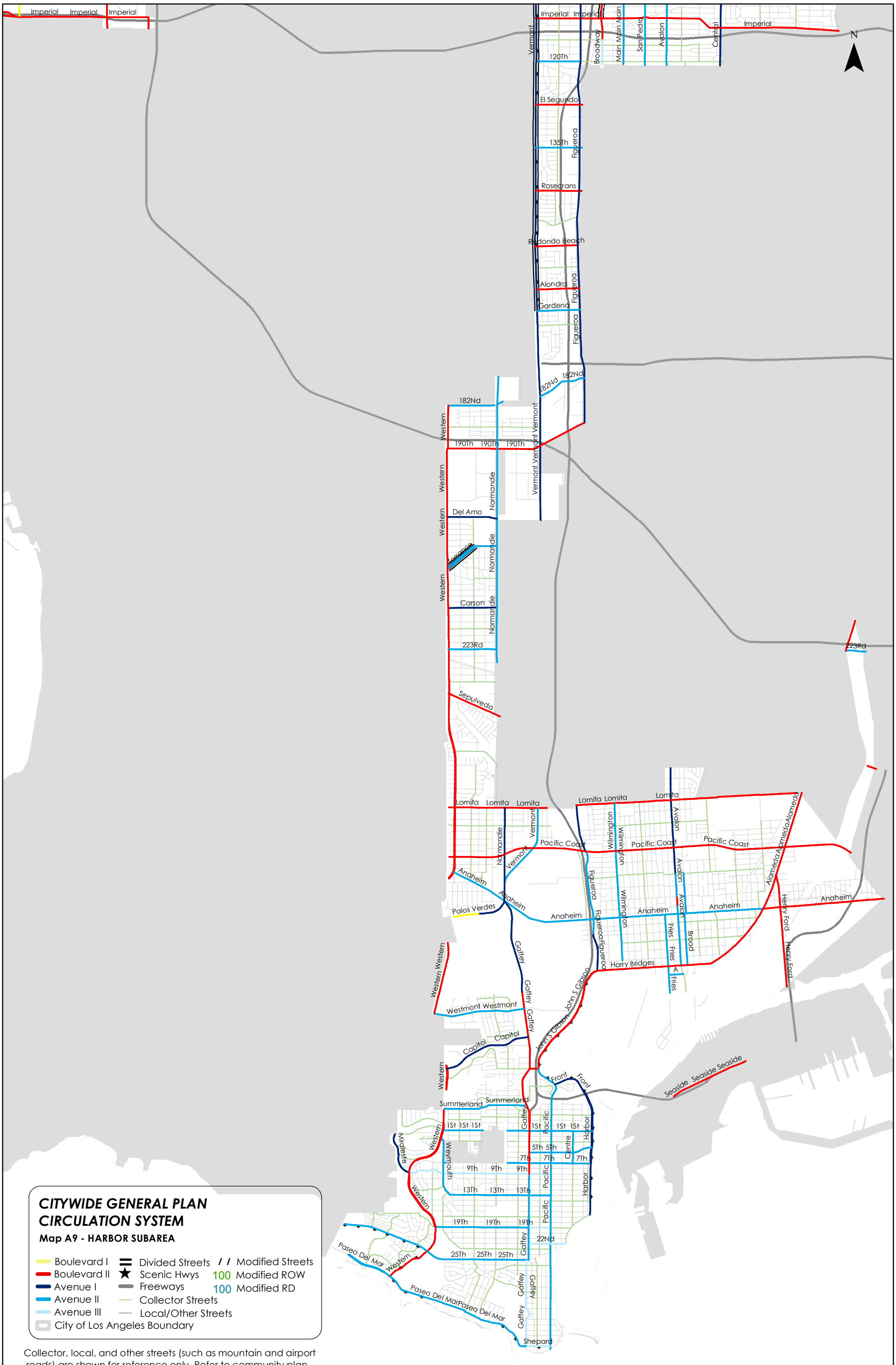
Map A8 - SOUTH SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 0.85 1.7 2.55 Miles

September 2016



CITYWIDE GENERAL PLAN CIRCULATION SYSTEM

Map A9 - HARBOR SUBAREA

- Boulevard I
- Boulevard II
- Avenue I
- Avenue II
- Avenue III
- City of Los Angeles Boundary
- Divided Streets
- Scenic Hwys
- Freeways
- Collector Streets
- Local/Other Streets
- Modified Streets
- 100 Modified ROW
- 100 Modified RD

Collector, local, and other streets (such as mountain and airport roads) are shown for reference only. Refer to community plan or NavigateLA for more detail.

0 1 2 3 Miles

September 2016

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Background

The City of Los Angeles has grown from its modest size of 50,000 people and 28 square miles in 1890, to 3.8 million people and 468 square miles today. The City's population is projected to increase to 4.3 million people by 2035, according to SCAG regional growth projections. Collectively, Los Angeles, Anaheim, and Long Beach rank as one of the nation's top metropolitan economic powerhouses[1]. A robust transportation system that offers multiple options and quality infrastructure will be crucial to achieving and maintaining economic prosperity, especially in a city and region so large and expansive. In addition to being the second largest city in the country, Los Angeles is also the most diverse. Meeting the transportation and mobility needs of such a varied, growing population requires a comprehensive package of transportation strategies.

Distance, weather, comfort, time, and costs usually dictate our mode of travel. But whether we walk, bike, board a bus/train/taxi, drive a car, or fly on an airplane, we rely on transportation to get us where we want to go. As in any other city, Los Angeles residents have a variety of reasons for using public transportation including work, school, medical & dental appointments, shopping & dining, social activities, and personal business. For those without personal transportation options, the bus or train may be their only available options. According to American Fact Finder (2013 American Community Survey 5-Year Estimates) out of the 1,743,619 people 16 years of age and older in Los Angeles, 191,769 use public transportation to travel to work. About 37% of these workers are transit dependent with no car. These numbers do not take into account the large number of non-work trips that take place in the City. Increased investment in quality mobility options for this transit dependent population may reduce travel times to and from work, and provide better accessibility for personal activities. Social equity can be increased when transit becomes a preferred option rather than the only choice.

Not only does transportation move people from one place to another, but it also moves goods and materials. Cargo ships and airplanes deliver products made in far flung places to our harbor and airport, freight rail and large semi-trailers distribute goods to warehouse distribution points, and local delivery trucks bring these goods to our homes and workplaces. The multifaceted nature of our goods movement industry keeps our economy humming by not only delivering goods to retail businesses for our consumption, but also by providing bountiful employment opportunities in the logistics sector.

While Los Angeles' reputation as a car culture is not unfounded, this legacy has often ignored the early and continued presence of pedestrians, bicyclists, trains, streetcars, and delivery trucks traveling throughout the City (see timeline on subsequent pages). The popularity of each of these other transportation modes has varied over time, as economics and lifestyle preferences continually change. However, for today (2015) and for the foreseeable future (2035), a transportation system that offers multiple modal choices (with respect to time, cost, convenience, energy, etc.) will foster a culture of smarter, better informed road users. and provide increased benefits for the large transit dependent population in the City that exist today.

For many, the car is the only viable form of transportation and this Plan acknowledges the necessary and

1 *The Los Angeles-Long Beach-Anaheim Metropolitan region ranked as #2 in GDP with $765 billion; U.S. Dept of Commerce, Bureau of Economic Analyses (2012). GDP-by-Metropolitan-Area Statistics.*

continued investments that are needed to maintain our roadways. For many others, public transportation is the only affordable form of transportation. According to LA County Metro's Spring 2015 Customer Survey results, bus users have an average household income of $14,876 dollars and train users have an average household income of $19,374 dollars. While LA County as a whole has an average household income of $55,909 dollars. Likewise, there are many who cannot, or desire not to, use a car every day. This Plan, therefore, also acknowledges the necessary and continued investments that are needed to improve the variety of safe, comfortable, and viable transportation choices.

Even a relatively minor incremental shift in mode choice can yield large rewards. Cars and trucks contribute to 40% of greenhouse gas emissions. Therefore, reductions in vehicle miles traveled (VMT) will reduce the amount of carbon emissions and improves the region's air quality. Safer and more comfortable streets that encourage the use of active transportation (biking, walking) can improve a person's overall health.

This Plan recognizes the importance of our City's streets as the lifeblood of our health and economy and seeks to prioritize resources to transform and maintain our streets as complete streets that serve all users, now and into the future.

This evolution will not happen overnight. Upgrading technology and modifying or adapting street and/or rail infrastructure is not easy or cheap. It is an aspiration that we are setting for future generations.

Key Forces Influencing Shifts in Mobility Planning

Changing Demographics

This Plan responds to changing demographics, a younger population desirous of safe and accessible active transportation options (biking, walking), a growing number of residents and employees seeking alternatives to the car, and an aging population that may need to rely more and more on transportation alternatives to the automobile. In 2030, senior citizens will make up one fifth of LA County's population. This older population (as well as children and the disabled) will benefit from longer pedestrian crossing times, shorter street crossing distances, wider, shaded sidewalks, street benches, and separated bicycle facilities. Today's teens are delaying getting their driver's licenses in droves. According to a 2012 survey, 56% of respondents did not get their license within one year of being age-eligible and only 54 percent had acquired their license before turning 18 years old[2]. When teens do get their driver's license they are driving fewer miles than previous generations did at the same age. Young people between the ages of 16 and 34 drove 23 percent fewer miles on average in 2009 than they did in 2001[3]. Fewer of today's households have two cars as more are deciding (for financial and/or environmental reasons) to get by with one car or less.

2 *http://newsroom.aaa.com/wp-content/uploads/2013/07/Teens-Delay-Licensing-FTS-Report.pdf*

3 *ttp://uspirg.org/sites/pirg/files/reports/A%20New%20Direction%20vUS.pdf*

Transportation, Health and Land Use Connection

Information is also becoming increasingly available on the relationships between the built environment, health, and the economy. Improved urban design (wider sidewalks, street trees, street lighting, parking design, less parking, and better access to transit) increases both the utilization of active transportation modes and spurs community interaction, which in turn can improve the health of an area's residents and increase economic activity.

Technology

Technology is also dramatically altering the way we think about travel and our relationship with streets. Technology permits us to attend a meeting remotely, and bypass the morning's commute thereby reducing a trip. Increasingly, new transportation network companies are using mobile technology to connect ordinary drivers with passengers needing a ride. Car sharing companies provide easy, temporary access to a rental car. Both of these new options offer a convenient and cost-effective alternative to buying and owning a car. Increasingly, technology informs us about real-time travel options so that tomorrow's trip decisions can be aided by information as to the cost, length of trip, health benefits, departure and arrival time of multiple transportation options.

Streets as Places

In today's cities, streets not only facilitate movement but provide "places" to gather, to congregate, to sit, to watch, and to interact. This expanded definition has fundamentally changed our relationship with streets and will factor into future transportation discussions. The success of CicLAvia, coupled with the desire for improved sidewalks and more public gathering spaces speaks to the community's increasing interest in using their streets for more than just transportation. Streets are the City's public face, the places that connect us to work, entertainment, shopping, recreation, and each other. Complete street policies will help carve out a new vision for how we think about streets.

Equity and Resource Distribution

According to the World Health Organization (WHO), inequity in daily living is shaped by long standing social configurations and procedures. Social norms, policies, and practices that support and encourage unequal resource distribution results in prolonged conditions negatively affecting living conditions including but not limited to health, education, housing, and employment[1]. Income inequality can result in the less wealthy being unable to purchase personal transportation and can exclude them from living in areas with a greater wealth of resources such as jobs, grocery stores, parks, and more. Expanding mobility through better quality public transit can greatly increase access to opportunity in areas of need.

The City of Los Angeles has historically demonstrated large public health disparities when comparing a geographic area of a certain socioeconomic status to another. As shown in the City's Health Atlas[2], there is a 12 year difference in life expectancy between the most affluent and poorest parts of the City. In urban settings, poor resource distribution can negatively affect health, education attainment, and employment, which makes expanding opportunities through the City's transportation system all the more important. Increased mobility can help address these issues. Equity can be increased by investing in mobility and access for communities that have few resources and opportunities to improve their quality of life.

<?> *http://newsroom.aaa.com/wp-content/uploads/2013/07/Teens-Delay-Licensing-FTS-Report.pdf*

L.A. Mobility Timeline

1850–1900

The timeline is divided into three sections: early years up to the adoption of the 1999 Transportation Element, years following adoption to the present, and future of the City/regional transportation system.

- Historical Event
- Project
- Legislation
- Plan or Study

- Active
- Multi-modal
- Rail
- Roads/vehicles
- Transit

1850

1851 1852 1853 1854 1855 1856 1857 1858 1859

1860

1861 1862 1863 1864 1865 1866 1867 1868 1869

1870

1871 1872 1873 1874 1875 1876 1877 1878 1879

1880

1881 1882 1883 1884 1885 1886 1887 1888 1889

1890

1891 1892 1893 1894 1895 1896 1897 1898 1899

1900

1850 Los Angeles incorporated as a municipality. California achieves statehood.





1869 Transcontinental Railroad completed, linking California (San Francisco) to the rest of the nation for the first time.

1869 21-mile **Los Angeles & San Pedro Railroad** completed, connecting downtown Los Angeles to the harbor for the first time and opening the door to **global trade**. The tracks ran along the same path as today's Alameda Corridor.



1874 First street car line in the city opens, consisting of two open cars **drawn by horses** along a 2.5-mile track running from Temple Street down Spring to 6th Street.

1876 Southern Pacific Railroad completed, **linking the city to the national rail network for the first time** and setting the stage for an era of **explosive urban growth**. Los Angeles successfully competed against San Diego to become the terminus of the railroad.



1880 Main Street becomes the **first paved roadway** in the city.

1887 Santa Fe Railroad completed, further spurring immigration to Southern California from the East and Midwest.

1887 The Los Angeles Electric Railway introduces the city's **first electric-powered streetcars**. The line goes out of business the following year when its power plant boiler bursts.





1895 Los Angeles Railway (Yellow Cars) inaugurates the city's **first interurban trolley** line, running between Los Angeles and Pasadena.

1896 State's **Bureau of Highways** issues its first plan, laying the foundation for the California highway system as it exists today.

1897 The **city's first dedicated bikeway** opens, an elevated wooden turnpike connecting Downtown Los Angeles to Pasadena. Only 4.5 of the planned 9 miles are built.

1900–1950

- Historical Event
- Project
- Legislation
- Plan or Study
- Active
- Multi-modal
- Rail
- Roads/vehicles
- Transit



1900
1901
1902 1902 Henry E. Huntington's **Pacific Electric** trolley line begins service from downtown Los Angeles to Long Beach, along the path of today's Metro Blue Line.





1903
1904
1905
1906
1907 1907 **Subdivision Map Act** enacted, giving the City legal authority to exact land dedications for street rights-of-way.
1907 A **100 mile-per-hour monorail** running from Pasadena to Santa Monica is proposed the idea does not get beyond the planning stage.
1908
1909
1910
1911
1912
1913
1914
1915 1907 **Port of Los Angeles** officially founded with the creation of the Los Angeles Board of Harbor Commissioners. That year, the Port handled $2 million worth of cargo. In 2012, the Port handled more than $280 billion worth of cargo.
1915 "**Jitneys**," automobiles operated by private citizens, offer customers flexible service and routes, threatening the business of fixed rail lines.



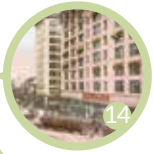


1916
1917
1918
1919
1920
1921
1922
1923 1923 State approves **first gas tax** to fund maintenance and construction of state and county roads.
1923 **First gasoline-fueled buses** in the city introduced by the People's Motor Bus Company.





1924
1924 Rapidly growing automobile ownership leads to **increasing congestion and conflicts with streetcars**. In response, a private group commissions the "Major Traffic Street Plan" by renowned city planners Frederick Law Olmsted, Jr., Charles H. Cheney, and Harland Bartholomew.
1925
1925 City adopts its **first traffic sign and signal plan.**
1925 Huntington introduces the city's **first subway,** the Hollywood Subway.



1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1925 United States Highway System establishes the **first nationwide system of standardized routes.**
1928 The city's **first airport** opens on a 640-acre bean field in Westchester. Today, LAX is the sixth busiest airport in the world and third busiest in the United States, serving 64 million passengers per year.

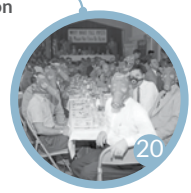




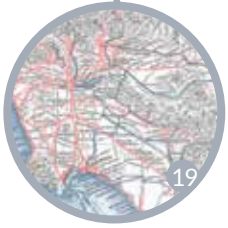


1939 **Union Station** opens.
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1940 California's **first non-toll highway, or "freeway,"** completed, the six-mile **Arroyo Seco Parkway** (later renamed the Pasadena Freeway).
1945 The Pacific Electric has its peak ridership, and is the **world's largest electric rail system**, with 1,164 miles of track serving 125 cities throughout Southern California.
1947 Following a severe "**smog attack**" in 1943, the Los Angeles County Board of Supervisors establishes the **nation's first air pollution control program.**
1947 The City enacts its **first parking requirements**, requiring residential units to provide at least one off-street parking spot.









1950–1975

- Historical Event
- Project
- Legislation
- Plan or Study

- Active
- Multi-modal
- Rail
- Roads/vehicles
- Transit

1950

1951 **1951 Los Angeles County Metropolitan Transit Authority** (LAMTA) established.

1952

1953 **1953 Four-level interchange** is completed, a marvel of civil engineering, connecting the Hollywood, Pasadena, and Harbor Freeways.


22

1954

1955

1956 **1956** President Eisenhower signs the **Federal-Aid Highway Act of 1956**, establishing the Highway Trust Fund and spurring a national wave of highway building.


23

1957

1958

1959 **1959** City adopts the **Highway and Freeways Element**, the first transportation element to be included in the City's general plan. The element focuses on expanding the transportation network through investments in highway and freeway infrastructure.

1960

1961

1962

1963 **1963** Undercut by buses and private automobiles, the **Pacific Electric discontinues service** on its last remaining line, from Los Angeles to Long Beach.


24

1964 **1964** The state legislature creates the **Southern California Rapid Transit District** (RTD), tasked with designing, building, and operating a regional transit system. Unlike the Los Angeles County Metropolitan Transit Authority (LAMTA) that preceded it, the RTD is authorized to levy taxes and use eminent domain.

1965


25

1966

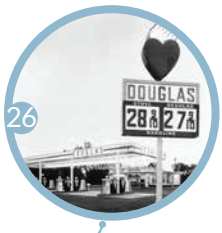
1967

1968

1969

1970 **1970** Congress enacts an expanded **Clean Air Act** and creates the **Environmental Protection Agency** to administer it.
1970 National Environmental Policy Act (NEPA) and **California Environmental Quality Act** (CEQA) enacted.

1971



26

1972 **1972** Federal **Clean Water Act** enacted.
1972 Acknowledging shifting priorities, the state legislature establishes the California Department of Transportation (aka Caltrans) to replace the Division of Highways. The new agency is charged with planning and implementing a **multi-modal transportation** system.

1973

1974 **1974** Voters approve a measure allowing gas tax revenue to be used for **non-highway projects** for the first time. The federal **Urban Mass Transit Administration** allocates funds for multimodal regional transit systems.

1975

1975–2000

Historical Event
Project
Legislation
Plan or Study

Active
Multi-modal
Rail
Roads/vehicles
Transit

1975

1976 **1976** The **first carpool (HOV) lanes** are installed on the I-10.



1977 **1977** City adopts its **first Bicycle Plan**, establishing a 600-mile citywide system of bikeways intended to serve both recreational and transportation needs. Included within the citywide system was a 300-mile backbone system.

1978



1979 **1979 Los Angeles Department Of Transportation** (LADOT) formed, consolidating most transportation-related functions into a single department.

1980 **1980** Los Angeles County voters approve **Proposition A, the first tax specifically intended to fund public transportation.**

1981



1982

1983

1984 **1984** The **Automated Traffic Surveillance and Control** (ATSAC) is initiated by the City to provide traffic congestion relief during the Olympic Games, using a combination of traffic engineering measures and traffic operation control procedures.

1985

1986

1987



1988

1989 **1989** The State establishes the **Congestion Management Program** (CMP), requiring regions to examine the impact of land use and growth on the regional transportation system.

1990 **1990** Proposition C passed sales tax for transit and alternative transportation

1990 **1990** The **Port of Los Angeles becomes the nation's busiest port**, overtaking New York City.

1990 **1990** The **Blue Line** light rail system begins service downtown Los Angeles and Long Beach, the first interurban transit service to operate since 1963.

1991



1992 **1992** The **Metrolink** regional commuter train system begins service, operated by the Southern California Regional Rail Authority.

1993 **1993** The **I-105 freeway opens**, the last new freeway to be constructed in the Los Angeles region. Other once-planned freeways including the Beverly Hills Freeway and the Laurel Canyon Freeway remain unbuilt.

1993 **1993** The state legislature establishes the **Los Angeles County Metropolitan Transportation Authority** (MTA, or Metro), consolidating the RTD and Los Angeles County Transportation Commission (LACTC).

1994

1993 **1993** Metro opens the **Red Line** subway, with service between Union Station and Westlake.

1995



1995 **1995** Metro's **Green Line** begins service between Norwalk and Redondo Beach, running largely within the median of the I-105 Freeway.

1996

1996 **1996** The City adopts a **new bicycle plan**, designating 673 miles of bikeways plus 69 miles of study corridors.

1997

1998

1999 **1999** The City adopts the **Transportation Element** of the general plan. The new Mobility Element updates and replaces this plan.

2000

2000–2010

Historical Event
Project
Legislation
Plan or Study

Active
Multi-modal
Rail
Roads/vehicles
Transit

2000

2000 Metro's **Rapid Bus Service** pilot program begins.





2001

2002

2002 The **Alameda Corridor** begins operations, linking the ports of Long Beach and Los Angeles to rail yards near downtown LA via a 20-mile-long, below-grade "rail expressway." The Corridor reduces the share of cargo moved by truck on the 710 freeway, thereby reducing congestion and emissions.



2003

2003 Metro's **Gold Line** begins operation from Union Station to Sierra Madre Villa.



2004

2005

2005 Metro's **Orange Line** bus rapid transit (BRT) service begins, connecting North Hollywood to Warner Center. The 14-mile busway is a less expensive alternative to fixed-rail transit.





2006

2006 **AB 32 (the California Global Warming Solutions Act)** enacted, setting a statewide target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

2006 Proposition 1B passed, The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act

2007

2007 **Low Carbon Fuel Standard** established, setting a target ofreducing the carbon intensity of fuels sold in California by at least 10 percent by 2020.

2008

2008 **SB 375 (Sustainable Communities Strategy)** adopted, requiring regional planning that links transportation with land use, as a strategy for meeting the state's greenhouse gas reduction goals.

2008 Los Angeles County voters pass **Measure R** with a two-thirds majority, implementing a half-cent sales tax to finance various transportation improvements in the region.

2008 **AB 1358 (Complete Streets Act)** signed into law, requiring all cities and counties to account for all roadway users when updating transportation plans.





2009

2010

2010 The City adopts its third **bicycle plan, the most ambitious to date** in its commitment to bikeways.

2010 The **first CicLAvia event** takes place, opening up streets in downtown Los Angeles to all modes of non-motorized transportation for a single day.

2010–2020

Historical Event
Project
Legislation
Plan or Study

Active
Multi-modal
Rail
Roads/vehicles
Transit

2010

2011

2011 Metro **Gold Line extension** from Union Station to Atlantic Station opens.

2012 - LA Express Park, first demand-based parking pricing program implemented

2012 The California Air Resources Board (CARB) approves the **Advanced Clean Cars** program, setting targets for adoption of zero-emission vehicles.

2012

2012 Initial phase of Metro's Expo Line opens, connecting Downtown Los Angeles to Culver City.

2012 Metro's **Orange Line is extended** to Northridge (Chatsworth Station).


41

2013 The **Greenway 2020** campaign launches, with the vision of a continuous, 51-mile greenway adjacent to the Los Angeles River.

2013

2013 The City adopts a **Bicycle Parking Ordinance**, requiring development projects to provide bike parking and allowing reductions in required vehicular parking.

2013 **ExpressLanes/High Occupancy Tolling** (HOT) begin on the I-110 and I-10.

2013 Lyft, Uber, Sidecar and other **ridesharing services** launch in Los Angeles.

2013 - Automated Traffic Surveillance & Control (ATSAC) system completed citywide


42


43

2014

2014 **Wilshire Bus Rapid Trasit:** 12.5 miles along Wilshire Blvd. from Valencia St. to Santa Monica at Centinela Ave.

2014 **I-405 Sepulveda Pass Improvements:** Add 10 miles of HOV lanes, improve ramps, bridges, sound walls on 1-405

2015 Expected completion of the City's **first protected bike lanes (cycle tracks)** along sections of the 4.5-mile **MyFigueroa** Project.

2015Expected adoption of the City's new **Mobility Element**. Expected adoption of the **Westside Mobility Plan**, a transportation blueprint for the Westside. Expected adoption of the **Transit Neighborhood Plans** for the Exposition and Crenshaw/LAX Lines.

2015

2015 Expected completion of **Phase 2 of the Expo Line**, extending from Culver City to Santa Monica.

2016 Expected completion of **Phase 2a of the Gold Line Foothill Extension**, from Pasadena to Azusa.

2017

2018

2019

2019 Expected completion of the **Crenshaw/LAX Line**, connecting the Expo and Green Lines via LAX.

2020

2020 Planned completion of the **Regional Connector**, providing a one-seat ride for travel across Los Angeles County.

Sources:

1. Los Angeles Public Library Photo Collection
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3. Los Angeles Public Library Photo Collection
4. Los Angeles Public Library Photo Collection
5. Los Angeles Public Library Photo Collection
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31. Photo by Alan Weeks
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37. Photo by Gary Leonard courtesy of Los Angeles Metro.
38. Photo by Gary Leonard courtesy of Los Angeles Metro.
39. http://commons.wikimedia.org/wiki/File:Ciclav ia_family_October_2012.jpg
40. Photo by Melissa Wall
41. Ludovic Hirlimann
42. Los Angeles River Revitalization Corp.
43. Photo by Sergio Ruiz

Projects and Future Milestones with Unknown Timelines or Completion Dates

→ **Gold Line Foothill Extension.** Will extend the existing Gold Line to Montclair. The current extension to Azusa will be completed in 2016; however a timeline has not been released for the phases to Montclair and the Ontario Airport.

→ **Bike Share.** Regional Metro Bike Share Program is being explored

→ **Sepulveda Pass Corridor.** Metro is studying various modal alternatives for the regional transportation corridor.

→ **Purple Line Extension** Metro plans to extend the purple line to the westside, phase 1 2023.

→ **California High Speed Rail** (CAHSR). The system would transport passengers between Los Angeles and San Francisco in under three hours.

Airport Metro Connector. Extension of the Green line to connect to LAX.

Mobility by the Numbers

Sources found in Appendix A

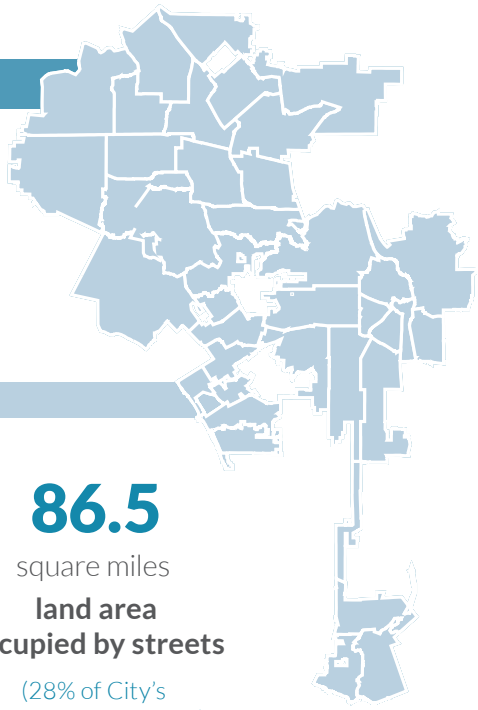
The City

POPULATION

3.8
million

LAND AREA

468
square miles



Infrastructure

STREETS

7,500
miles

60%
miles of local streets

40%
miles of "arterial" and "collector" streets

86.5
square miles
land area occupied by streets
(28% of City's total developed land)

SIDEWALKS

10,750
miles

42%
sidewalks in disrepair

800
miles of alleys

181
miles of freeways

40,000
intersections

22,000
marked crosswalks

4,398
traffic signals

38,011
parking meters

Driven in The City On An Average Day

75.2
million miles

53%
on freeways

47%
on surface streets

Goods Movement

(Port of Los Angeles & Long Beach combined)

$1.1 Billion

PER DAY

value of **cargo handled** in 2012

(more than $700,000 per minute)

39,000

PER DAY

number of **containers handled** in 2012

one, every 2.2 seconds,

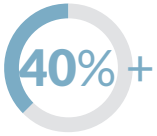
(twenty-foot equivalent units)

1st busiest in the US

(since 2000)



9th busiest port in the world

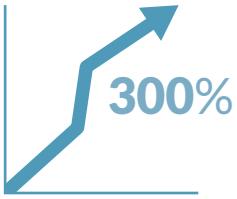


OF THE NATIONS CONTAINERIZED IMPORTS

pass through the ports

PROJECTED INCREASE

in cargo volume at ports **by 2035**



Goods Movement From The Port transforms to:



truck





truck-to-rail





rail



Air Travel

(LAX)

63.7

MILLION PASSENGERS IN 2012

175, 000 / day



1659

TAKEOFFS & LANDINGS IN 2012

one every 52 seconds

6th busiest airport in the world

(by passenger traffic)



Economic, Environmental, & Health Impacts

Obesity



INCREASE IN THE LIKELIHOOD OF OBESITY
for each additinal hour per day spent in a car

$6 Billion
ANNUAL COST OF OBESITY
in LA County
(measured in healthcare & lost productiviy)



of children are obese in the City of LA

Collisions

36,000+
angelenos injured or killed
in motor vehicle collisions per year
100 every day



of traffic fatalities are pedestrian and bicyclists

1/3
angelinos injured or killed in motor vehicle collisions per year

double
the national average
pedestrian fatality rates for children under age 4 and seniors over age 70



of pedestrians die when hit by a vehicle moving < 20 MPH



of pedestrians die when hit by a vehicle moving > 40 MPH

Cost of Living

$ 9,122
average annual cost of **vehicle ownership**





of **household income** is typically spent **on transportation**

Economic, Environmental, & Health Impacts

Air Pollution

57
UNHEALTHY AIR QUALITY DAYS
in 2012
(when air pollution levels, in LA County, exceeded federal standards)

$22
BILLION ANNUAL COST
of health impacts **from air pollution** in the South Coast Air Basin

2,000+
PREMATURE DEATHS PER YEAR
in greater Los Angeles **attributed to air pollution from vehicles**

Greenhouse Gas Emissions

160
MILLION
tons of greenhouse emissions per year
from vehicles in California

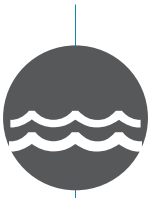




of California's greenhouse gas emissions come from transportation

Water Pollution

4 in 10
of California's most polluted beaches are in Los Angeles County





of beaches in LA County received an F grade for wet weather water quality
(2008 - 2012 average)

Signs of Change

Walking & Biking

64,000
PEOPLE WALK TO WORK
everyday in the City of Los Angeles*



16,000
PEOPLE BIKE TO WORK
everyday in the City of Los Angeles*





INCREASE IN BIKING TO WORK
2000-2010

**walk and bike commute trips only reflect a small number of total trips in the City. In the LA region it's 5% of all walking trips and 16% of all biking trips.*

Transit

1.5
MILLION PEOPLE
ride Metro rail and buses on a typical weekday

2.1
BILLION MILES
traveled by Metro rail and buses in 2013

3rd
in public transit usage of cities nationwide

80
Metro rail stations currently in service



15,967
Metro bus stops currently in service



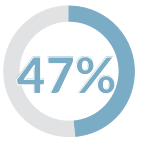


of Metro bus fleet is powered by clean-burning CNG



Signs of Change

Walking & Biking



of all trips in
greater Los Angeles
are less than 3 miles
(within walking/ biking distance)





of these trips are
currently made by car

Transit



of all roads in Los Angeles
are relatively flat
(less than 5% grade)



300

DAYS/ YEAR

with favorable weather conditions
for active transportation
(sunshine, moderate temperatures)



- new Metro rail lines currently planned or under construct
  - Expo Line Phase 2
  - Crenshaw/ LAX Line
  - Gold Line Foothill Extension
  - Purple Line Extension
  - Regional Connector
- 116 Metro rail stations planned to be in service by 2035

Transportation Partners

Managing such a sprawling and complex transportation network like Los Angeles requires coordinating between multiple State, Regional, County, and local jurisdictions, agencies, and departments. Below is a summarized list of the various players who impact the City's transportation system and who will be active partners in implementing the future changes envisioned by this Plan.

Los Angeles Department of Transportation (LADOT)

The Los Angeles Department of Transportation is the second largest provider of transit within the City, serving over 30 million passenger boardings per year. The LADOT Bureau of Transit Programs manages a fleet of nearly 400 vehicles that operate over 800,000 revenue hours and over two billion passenger miles.

Los Angeles County Metropolitan Transportation Authority (Metro)

The Los Angeles County Metropolitan Transportation Authority (Metro) serves as a transportation planner, coordinator, funder, designer, builder, and operator for the 1,433 square mile transit and track service area within Los Angeles County. It is responsible for the planning, design, and implementation of the region's Metro Rail, Metro Liner and Metro Bus systems.

Regional Transit Providers

In addition to the Metro bus and rail system, portions of the City are served by other local operators.

Santa Monica Big Blue Bus (BBB)

The Santa Monica Big Blue Bus (BBB) operates a fleet of over 200 buses. Spanning more than 51 square miles across Santa Monica and portions of the Westside (including UCLA/ Westwood, Century City, Culver City, LAX, and more), BBB serves more than 20 million people annually.

Culver City Bus

Operating a fleet of 52 buses, Culver City Bus system is comprised of 7 routes spanning nearly 26 miles on the Westside, including Venice, Culver City, Westwood, Palms, and Century City. The system serves over 5 million riders annually.

Foothill Transit

Foothill Transit, a joint powers authority of 22 cities in the San Gabriel and Pomona Valleys, serves 14 million passengers annually and currently operates 33 bus lines covering 327 square miles.

Other Agencies Serving Downtown Los Angeles

Other local agencies outside the City of LA, such as City of Santa Clarita Transit, Gardena Municipal Bus Lines, Montebello Bus Lines, and Torrance Transit outside the City of LA operate express service to Downtown Los Angeles.

Los Angeles World Airport (LAWA)

The Los Angeles World Airports (LAWA) is a proprietary department of the City of Los Angeles, under the management and control of a seven-member Board of Airport Commissioners appointed by the Mayor and confirmed by the City Council. LAWA operates three airports in the Los Angeles Air Trade Area: Los Angeles International Airport (LAX), LA/Ontario International Airport (ONT), and Van Nuys Airport (VNY). LAWA also maintains the LA/Palmdale Regional Airport (PMD).

Port of Los Angeles (POLA)

The Port of Los Angeles is the nation's premier gateway for international commerce, generating more than 3 million jobs nationally. Almost 1 million jobs are related to Port-related commerce in California alone. The Port of Los Angeles spearheads many innovative environmental initiatives and security measures, and boasts a bevy of historic and recreational facilities.

Street Design, Operations, Planning and Maintenance Partners

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) is responsible for planning, design, construction, maintenance, and operation of the state highway system. The City of Los Angeles is located within the jurisdiction of Caltrans District 7, which includes Los Angeles and Ventura counties. District 7 is responsible for 42 freeways and highways, consisting of 915 freeway and highway miles in Los Angeles County and 273 miles in Ventura County. On average, 100 million vehicle miles are traveled daily on District 7 freeways.

Los Angeles Department of City Planning (DCP)

The Department of City Planning (DCP) is responsible for preparing, maintaining, and implementing a General Plan that guides development in the City of Los Angeles. The department sets citywide and community-specific goals and policies to guide future growth and promote the social and physical health, safety, and welfare of Angelenos. DCP also helps manage ongoing residential and commercial growth along the City's corridors, in high activity centers, and around transit opportunities.

Los Angeles Department of Public Works

Bureau of Engineering (BOE)

The Bureau of Engineering is responsible for the City's vast network of infrastructure within the public right of way, including the planning, design, and construction of public facilities. BOE also manages the delivery of voter-approved public bond funds, federally funded projects, and cross-sector local government programs that serve millions of residents and businesses in diverse neighborhoods and industries.

Bureau of Street Lighting (BSL)

The Bureau of Street Lighting is responsible for the design, construction, operation, maintenance and repair of the street lighting system within the City of Los Angeles. There are currently more than 220,000 lights in the City consisting of more than 400 designs.

Bureau of Sanitation (BOS)

The primary responsibility of the Bureau of Sanitation is to collect, clean and recycle solid and liquid waste generated by residential, commercial and industrial users in the City of Los Angeles and surrounding communities.

Bureau of Street Services (BSS)

The Bureau of Street Services is responsible for maintaining repairing, resurfacing, and cleaning improved streets, alleys, bridges, tunnels, pedestrian subways, and related structures. The Bureau also maintains street trees, landscaped median islands and embankments.

Los Angeles Department of Transportation (LADOT)

The Los Angeles Department of Transportation is the leader in the planning, design, construction, and operation of the transportation system in the City of Los Angeles. The Department partners with sister agencies to improve transportation service and infrastructure in the City and the region.

Consistency with Other Plans

Land Use Element - 35 Community Plans and 2 Special Use Districts

The City's 35 Community Plans and two Special Purpose Districts (LAX and Port Master Plans) constitute the Land Use Element of the City's General Plan. While the General Plan provides a citywide approach to enhancing safe, accessible transportation options, the area plans that comprise the Land Use Element provide the opportunity for a more focused and nuanced transportation discussion at a community level. In this way, localized recommendations that address community-specific conditions can be developed in each of the Plans/ Districts that are consistent with and complementary to this citywide Plan.

Community Plans

The Community Plans implement, at a community level, the citywide goals and policies established in the overarching General Plan Framework and all other elements of the General Plan. They are intended to promote an arrangement of land uses, streets and services which will encourage and contribute to the economic, social and physical health, safety, welfare and convenience of the people who live and work in each of the communities.

Special Purpose Districts

LAX

The LAX Plan is intended to promote an arrangement of airport uses that encourages and contributes to the modernization of the airport in an orderly and flexible manner within the context of the City and region. It establishes a framework for the development of facilities that promote the movement and processing of passengers and cargo within a safe and secure environment while continuing to serve as the region's principal international gateway.

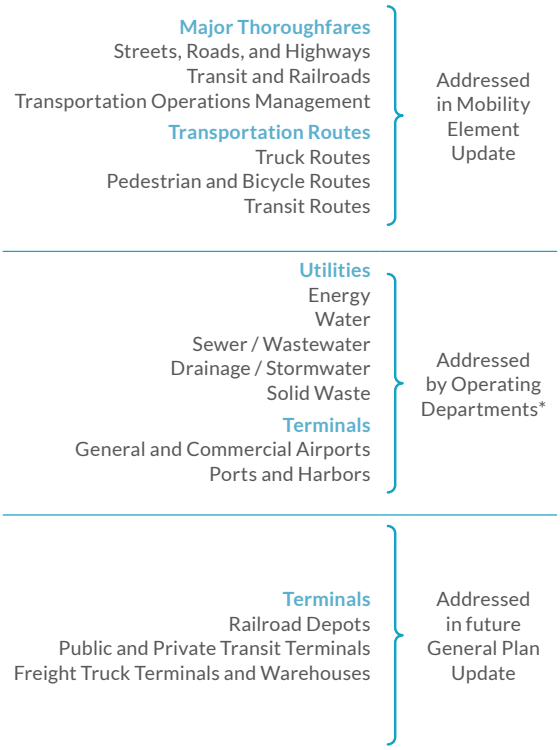
Port of Los Angeles

The Port of Los Angeles Plan is the official guide to the continued development and operation of the Port. The plan promotes an arrangement of land and water uses, circulation and services that will encourage and contribute to the economic, social and physical health, safety, welfare and convenience of the Port. The Plan also provides for additional public recreation facilities within the Port of Los Angeles consistent with sound and compatible port planning. The Plan is designed to be consistent with the Port Master Plan.

Circulation Element

Under California Government Code §65302(b), the General Plan requires the inclusion of a Circulation Element, which consists of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, any military airports and ports, and other local public utilities and facilities. Since the City of LA is so vast with specialized departments, the Mobility Element covers goals, objectives, policies and programs for major thoroughfares, transportation routes, and terminals; existing planning documents by operational departments cover goals, objectives, policies and programs for utilities, airports, ports and harbors.

Consistent with the policies of the adopted Air Quality Management Plan, the Mobility Plan 2035 promotes strong linkages between land use, transportation and air quality. The Land Use Element is intended to guide the location and intensity of the private and public use of land and to promote an arrangement of land uses, streets, and services which will encourage and contribute to the economic, social and physical health, safety, welfare, and convenience of the people who live and work in the City. The Community Plans, which comprise the Land Use Element, incorporate the Mobility Plan's Highways and Freeways system and also designate collector streets.



Sample List of Existing Infrastructure Planning Documents

LADWP Power Integrated Resources Plan 2010

LADWP Urban Water Management Plan 2010

LADWP Water Supply Action Plan 2008

Bureau of Sanitation (BOS) 5-Year Strategic Plan 2011

BOS Wastewater, Recycled Water and Stormwater Management Integrated Resources Plan 2006

BOS Water Quality Compliance Master Plan for Urban Runoff Water Quality Compliance Master Plan 2009

BOS Solid Waste Integrated Resources Plan 2009

Other Citywide Plans

In addition to the General Plan, the City occasionally adopts long-range vision plans that provide further guidance to the City in establishing priorities for funding future policy decisions and staff resources.

Los Angeles River Revitalization Master Plan (2007)

The Los Angeles River Revitalization Master Plan (LARRMP) provides a vision for the 32 miles of the Los Angeles River within the City limits. This vision balances multiple goals including flood protection, water quality, open space, habitat, recreation and non-motorized transportation opportunities. The LARRMP calls for the continued "development of non-motorized transportation and recreation elements including bicycle and pedestrian paths and multi-use trails in the River and tributary rights-of-way." The Los Angeles River plays a significant role in Los Angeles' environmental, non-motorized transportation and recreational identity.

http://boe.lacity.org/lariverrmp/CommunityOutreach/pdf/LARRMP_Final_05_03_07.pdf

Los Angeles Department of Recreation and Parks Community-Wide Needs Assessment (2009)

The Los Angeles Department of Recreation and Parks' Community-Wide Needs Assessment identifies, quantifies and prioritizes residents' needs for recreation and open space throughout the City of Los Angeles. The Needs Assessment is the first step in a citywide park master plan and a five-year capital improvement plan. The Needs Assessment underwent an extensive community outreach process that included community leaders, stakeholders and other members of the public in interviews, focus groups, community forums and surveys. When asked which parks and recreation facilities residents felt a need for, the majority of the community (63%) identified the need for walking and bicycling trails.

Community-Wide Needs Assessment (2009) http://www.laparks.org/planning/pdf/finalReport.pdf

Short Range Transit Plan 2011-12 (March 2012)

The Short Range Transit Plan provides an overview of the City of Los Angeles' transit system. It includes information about the City's transit services, areas served, ridership, and fleet and equipment inventory. The Plan also discusses budget and financial resources to support the Department's goals and objectives for fiscal years 2011-14.

The City of Los Angeles, through LADOT's Transit Bureau, provides fixed-route and demand-response (paratransit) services throughout the City.

Short Range Transit Plan http://ladot.lacity.org/pdf/PDF261.pdf

Consistency with Other Agency Plans

When preparing or revising a General Plan, cities and counties should carefully analyze the implications of regional plans for their planning area. General Plans are required to include an analysis of the extent to which the general plan's policies, standards and proposals are consistent with regional plans.

Regional plans prepared by the Southern California Association of Governments (SCAG) and other designated regional agencies (e.g. Metro) provide the legal basis for allocating state and federal funds, as in the case of transportation and water quality facilities. Other regional plans, such as air quality plans, detail measures which local governments may institute in order for the region to meet state and federal standards.

The General Plan Framework and Land Use Elements serve as subregional input to SCAG's Regional Transportation Plan (RTP) and Sustainable Community Strategy (SCS) and provide a context for cooperative planning efforts between the City, adjacent cities, and the five county region.

California Transportation Plan

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce greenhouse gas (GHG) emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California's future statewide, integrated, multimodal transportation system. The CTP is prepared in response to Federal and State requirements and is updated every five years.

Southern California Association of Governments (SCAG) Regional Transportation Plan (2012) and Non-Motorized Transportation Report (2008)

The 2012 Regional Transportation Plan (RTP) is a $524.7 billion plan that provides a regional investment framework to address the region's transportation and related challenges. SCAG's vision for the region focuses on three interrelated principles (mobility, economy, and sustainability), all of which aim to create efficient transportation systems, healthier communities, and a thriving economy. The RTP outlines a plan to meet state and federal environmental goals, implement emission-free transportation technologies, and develop investment strategies for sustainable economic growth.

The Non-Motorized Transportation Report of the RTP is a technical and policy document that guides, supports and encourages the development of county and city bicycle and pedestrian networks, facilities and other non-motorized programs for the SCAG region. Particular emphasis is placed on increasing bicycling and walking as a commute option and improving safety for all forms of non- motorized transportation.

Regional Transportation Plan http://rtpscs.scag.ca.gov/Documents/2012/final/f2012RTPSCS.pdf

Metro Complete Streets Policy (2014)

The Complete Streets Policy builds upon projects and programs already underway at Metro to increase mobility options, improve air quality and health, and strengthen the economy in Los Angeles County. It is a tool to help guide Metro to better coordinate within the various functions and departments of the agency and between partner organizations that have influence or jurisdiction over the public realm.

Complete Streets Policy Draft http://www.metro.net/projects/countywide-planning/complete-streets/

Metro Long Range Transportation Plan (2009)

Metro's 2009 Long Range Transportation Plan provides a 30-year vision for Los Angeles County's transportation system to the year 2040. The Plan identifies public transportation and highway projects, funding forecasts over a 30-year timeframe, multi-modal funding availability, sub-regional needs, and project performance measures.

Long Range Transportation Plan http://media.metro.net/projects_studies/images/final-2009-LRTP.pdf

Metro Bicycle Transportation Strategic Plan (2006)

Metro's 2006 Bicycle Transportation Strategic Plan (BTSP) aims to help municipalities and agencies in the region plan for bicycling in their jurisdictions as a viable mode of transportation. The plan contains an inventory of "bike-transit" hubs in Los Angeles County. It assists in the identification of routes that may eventually provide continuity for bicyclists, while also outlining a strategy for prioritizing regional bikeway projects. As the regional transportation planning authority for Los Angeles County, Metro is the primary local funding source for bicycle transportation.

Bicycle Transportation Strategic Plan http://media.metro.net/projects_studies/bikeway_planning/images/BTSP.pdf

Los Angeles County Bicycle Master Plan (2012)

As an update to the to the 1975 Los Angeles County Bikeway Plan, the 2012 Los Angeles County Bicycle Plan seeks to both promote greater ridership and expand the mobility options for all riders throughout the county. The plan outlines proposed network expansions, ridership strategies, funding sources, and programming and implementation. In addition, the plan also addresses issues related to gaps in the network, problematic areas, and regional connectivity.

LA County Bicycle Master Plan http://dpw.lacounty.gov/pdd/bike/masterplan.cfm

Metro Los Angeles Union Station Master Plan (2014)

Union Station is the region's primary transit hub, connecting Southern California counties whose combined population totals more than 17 million. The Union Station Master Plan will develop Metro's vision and guide future development at the station, including transit operations and new private and/or public real estate development.

Union Station Master Plan http://www.metro.net/projects/LA-union-station

Connect US Action Plan

The Connect US Action Plan (formerly known as the Linkages Study) seeks to improve connections between Los Angeles Union Station and the 1st historic neighborhoods by enhancing pedestrian and bicycle travel options. The Connect US Action Plan includes a neighborhood-level assessment of arterial and collector streets, with an emphasis on bicycle and pedestrian mobility. The final report will include a community-prioritized list of improvement projects to strengthen bicycle and pedestrian (active transportation) connectivity between communities and destinations.

Connect US Action Plan http://www.metro.net/projects/linkages

LADOT Strategic Plan (2014)

LADOT released its first strategic plan outlining the organization's goals, objectives, and benchmarks, which are consistent with the ideas set forth in this Plan.

LADOT Strategic Plan http://www.ladot.lacity.org/stellent/groups/Departments/@LADOT_Contributor/documents/Contributor_Web_Content/LACITYP_029076.pdf

First-Last Mile Strategic Plan

In 2012, the Metro Board adopted the Countywide Sustainability Planning Policy and Implementation Plan and the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Joint Work Program, both of which direct the development of a First-Last Mile Strategic Plan. The goal of this plan is to better coordinate infrastructure investments in station areas to extend the reach of transit, with the ultimate goal of increasing ridership.

These guidelines help facilitate the integration of mobility solutions in a complex, multi-modal environment. Strategies will need to be flexibly deployed to contend with widely varying environments throughout the county, yet will aim to improve the user experience by supporting intuitive, safe and recognizable routes to and from transit stations. This effort will require coordination amongst the many cities and authorities having jurisdiction over the public realm throughout the county.

http://media.metro.net/docs/sustainability_path_design_guidelines.pdf

Public Participation

Community participation and feedback have been critical to forming the direction of the Mobility Plan 2035. An open public dialogue has been integral to each step of the planning process, from visioning and analyzing to goal and policy formulation.

The Mobility Plan is a citywide document, and community outreach for a city as large and spread out as Los Angeles is no easy undertaking. A strategic approach was used to engage a cross section of citizens at the community level in order to garner broader citywide issues.

Since the inception of the Mobility Plan in the Fall of 2011, project staff have participated in over 100 community meetings throughout the city, held four "think lab" workshops, two scoping meetings, seven community forums and public hearings, maintained a project website for easy access to materials, implemented an online town hall to hear from those unable to go to traditional meetings, and worked with various agencies, nonprofits, and community groups.

Online All the Time

Project Website: LA2B.org



LA2B.org has been the main source of information for the Mobility Plan with regular updates on the status of the plan. From the website, the public has been able to download important documents released during the process and become more informed about the analysis behind each step by reading blog posts. Website visitors can read about the project, learn how to get involved, and contact planning staff online to give their comments.

Online Town Hall : Ideas.la2b.org



As a new way of expanding the number and diversity of stakeholders, the Mobility Plan introduced an online town hall through ideas.la2b.org. This online format provided an opportunity for community members to share thoughts and opinions about the streets of Los Angeles.

The virtual town hall has allowed for a wider range of citizens to participate outside of traditional workshops and focus groups. The largest participant group was in the 25-45 age range. In addition, participants represented 79 of the 108 (73%) zip codes associated with the City of Los Angeles as well as additional participants from Culver City, Long Beach, Pasadena, Santa Monica, and the South Bay. The online format also allowed staff to identify geographical areas where there was limited participation and focus additional outreach efforts in those communities.

Activated Communities

To ensure widespread distribution of information, materials were disseminated at the Council District and Neighborhood Council levels. The Mobility Plan Team worked with the Department of Neighborhood Empowerment and Council staff to reach out to the community on a citywide scale.

Task Force

The Mobility Task Force was put into place to guide this citywide effort and community-wide discussion. The Task Force played a pivotal role in assisting the City to generate significant engagement and input for the plan. Over 50 organizations were invited including: community groups, nonprofits, major

transit providers, and civic, business, and environmental transportation leaders throughout the City.

"Great Streets, Great Neighborhoods" Activity Kit

To obtain participation on an overarching citywide scale, an activity kit was sent to over 100 Neighborhood Councils and civic organizations. This pen-and-paper activity, with a one fourth response rate, was meant to supplement the dialogue of our online town hall and included a series of brief exercises to help give input toward the development of the draft goals, objectives, policies, and programs of the Mobility Plan.

Public Workshops

In early 2012, the Departments of City Planning and Transportation held citywide workshops in central locations across the City: Van Nuys, the Miracle Mile, Downtown, and Pacoima. These "Think Labs", encouraged participants to explore L.A.'s existing mobility system through a gallery of maps that conveyed key information about the City's streets and demographics. Community members also shared ideas that complemented those submitted onto LA/2B's online Town Hall.

Scoping Meetings

The environmental analysis of the plan required a scoping period to receive input from the public and other agencies on what should be studied in the Environmental Impact Report. Two scoping meetings held in the spring of 2013 focused the analysis around the potential impacts and benefits of the proposed enhanced networks.

Community Planning Forums and Staff Level Public Hearings

The Draft Plan and Draft Environmental Impact Report were released February 2014 starting a 90 day public comment period on both documents. A series of seven meetings and staff level public hearings were held citywide to take comments and answer questions on the Plan. Resources were pooled together with The Plan for A Healthy Los Angeles and re:code LA to expand the Plan's reach to a broader audience and allow participants to participate in three related long range planning efforts being led by City Planning.



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YIELD
HERE
TO
SCHOOL BUS
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Chapter 1: Safety First

Discussion

Objectives

Policies

1.1 Roadway User Vulnerability
1.2 Complete Streets
1.3 Safe Routes to Schools
1.4 Design Safe Speeds
1.5 Railroad Crossings
1.6 Multi-Modal Detour Facilities
1.7 Regularly Maintained Streets
1.8 Goods Movement Safety
1.9 Recreational Trail Separation

Safety First

Crashes, speed, protection, security, safety education, and enforcement.

Discussion

Safety is at the foundation of a Complete Streets policy – to design and operate streets in a way that enables safe access for all users, regardless of age, ability, or transportation mode choice. Safety consistently ranks as a top priority for many in the City of Los Angeles and is an important factor in creating livable neighborhoods. People want streets to be safe, stress-free places for all ages and all modes of travel. In terms of transportation, concerns for physical safety stem from traffic speeds, roadway conflict between different modes of travel, and infrastructure. Safety is a key issue when deciding whether to walk, bike, drive, or take transit.

Safety and the Built Environment

Street quality and infrastructure have a role in improving transportation safety. Street paving in disrepair poses a safety threat for pedestrians, vehicles, and bicyclists. Sidewalks that are uneven, narrow, or physically obstructed can also force pedestrians closer to vehicle traffic or on alternate routes that are not always obvious. Safer crossings at intersections and at the middle of larger blocks are an additional area of pedestrian concern. Furthermore, pedestrians can perceive areas with lower levels of street activity and lighting, and fewer trees and plants as unsafe due to physical and psychological discomfort. While these built environment issues are fundamental to improving transportation safety, they will be further addressed in the next chapter.

Transportation Safety in Los Angeles

In recent years, there has been a shift towards creating a healthier LA that allows people to make more environmentally sustainable transportation choices. To do that, other transportation options have to be seen as safe, attractive, and convenient. With active modes of transportation on the rise as people's everyday choice, safety measures must take into account the most vulnerable users - pedestrians. A city that is safe for pedestrians is safe for all.

Creating safe streets requires a multifaceted approach. Roadway engineering, education, and enforcement all play an important role in building a safe transportation system. Roadway engineering can have the greatest impact in reducing collisions. Roadway enhancements such as separated bicycle lanes protect cyclists, while more visible crosswalks and bulb-outs provide added safety for pedestrians. Roadway interventions like these are intended to make it second nature for everyone to follow the rules of the road, which can have the added benefit of making traffic flow more predictably and consistently. Educating students on how to cross the road or drivers to share the road make for a more pleasant travel experience while also reducing collisions. Enforcing traffic laws such as speed limits underpins all the pieces that work together to make streets safe for all. Safety measures strategically implemented throughout the city can dramatically reduce the number and severity of collisions in Los Angeles.

Feedback from Online Town Hall

"Safety would be a top priority for all forms of transportation."

"A livable neighborhood is one where you need not fear that your children will be hit by cars."

"Public streets would be used to safely transport people and goods."

Vehicle speed is a significant factor in traffic collisions. Higher speeds pose a two-fold problem: 1) the faster a car is moving, the smaller the field of vision the driver can process, and 2) increased speed increases the force of collision impact, increasing the likelihood of a severe injury or fatality. As a result, faster traffic poses a higher safety risk to others on the road, especially pedestrians and bicyclists because they are smaller and less visible than vehicles.

Many policies and programs are in place and in development to promote transportation safety in Los Angeles. In recent years, the Department of City Planning authored its Urban Design Guidelines and Walkability Checklist to encourage better site design that increases safety and accessibility for the general public, regardless of mode of travel.

Objectives

- Vision Zero: Decrease transportation related fatality rate to zero by 2035.
- Increase the number of adults and children who receive in-person active transportation safety education, in areas with the highest rates of collisions, by 10% annually.
- Ensure that 80% of street segments do not exceed targeted operating speeds by 2035. (Refer to Complete Streets Design Guide for targeted operating speeds).
- Establish 100 school slow zones operating within 1/2 mile of schools by 2035.
- Increase the percentage of females* who travel by bicycle to 35% of all riders by 2035. (*The presence of females riding on a bikeway is typically cited as an indicator that the bikeway provides a safe and comfortable environment for less experienced riders. Therefore, this measurement is a good proxy for understanding the degree to which a particular bikeway has succeeded in attracting the range of bicyclists between eight and 80 years of age).
- Increase pedestrian safety improvements in the design and implementation of complete streets projects within the top 25% SB565 disadvantaged communities located in the City of Los Angeles or as subsequently identified through tools utilized by the City.

Policies

1.1 Roadway User Vulnerability

1.2 Complete Streets

1.3 Safe Routes to Schools

1.4 Design Safe Speeds

1.5 Railroad Crossings

1.6 Multi-Modal Detour Facilities

1.7 Regularly Maintained Streets

1.8 Goods Movement Safety

1.9 Recreational Trail Separation





1.1 Roadway User Vulnerability:

Design, plan, and operate streets to prioritize the safety of the most vulnerable roadway user.

Our streets need to be safe for all users. By planning and designing for the most vulnerable users, we ensure our streets will be safe for all. Roadways should operate in a manner that considers the presence of people who walk and bike, children, the elderly, and the mobility-impaired. In many cases, roadways are designed to facilitate vehicle throughput first, rather than other modes. The design and operation of our streets to create a safe and livable environment for people is a priority for our City.

1.2 Complete Streets:

Implement a balanced transportation system on all streets, tunnels, and bridges using complete streets principles to ensure the safety and mobility of all users.

California's Complete Streets Act (AB 1358) was signed into law in 2008 and mandates that complete street policies and standards be incorporated into a city's general plan. The idea behind complete streets is to make streets safe, comfortable, and convenient for people of all mode types.

A transportation system that accommodates the needs and considers the safety of all users is at the foundation of a well-designed city. An effective transportation system allows for the use of multiple modes and in the end results in providing a variety of options for people to move around in ways that best suit them.

The approach to implementing complete streets in the City of Los Angeles has taken shape through a layered network concept. The Complete Street Network layers roadway systems that prioritize a certain mode (transit/bicycle/vehicle) within each layer. While each street will still accommodate all modes, layering networks serves to emphasize a particular mode on a particular street as part of a larger system. A layered network approach has the benefit of increasing connectivity between modes. Enhancing the system for one type of mode can have shared benefits for another while recognizing the need to balance a variety of modal options.

Expanding the active tranportation network increases opportunities for the transit dependant by better connecting people to work, education, and recreation. A transportation system that is more balanced is also more equitable by providing a means of cost-effective travel. Implementing complete street policies will ensure that the City of Los Angeles has more viable options for travel.



1.3 Safe Routes to Schools:

Prioritize the safety of school children on all streets regardless of highway classifications.

A singular focus on accommodating vehicular mobility has resulted in street configurations that disadvantage other users, especially pedestrians. Reduced crossing times, increased vehicle lanes, wide curb radii at intersections, and reduced visibility at crosswalks have made walking hazardous.

School-age children are a particularly vulnerable group of roadway users. In the City of LA, school-age children (ages 5-17) account for 19% of all pedestrian-related collisions and 18% of all fatally or severely injured pedestrians[4]. In order to increase the safety of school children as they are traveling to and from school, the City initiated a Safe Routes to School Strategic Plan during the Fall of 2013 that works to ensure that no child shall be injured or killed by a vehicle when walking or biking to/from school.

The Los Angeles Unified School District (LAUSD) has the second largest population of any public school system in the United States. There are 495 LAUSD schools within the City of LA that together contribute to a large amount of vehicle trips every morning. Implementing a Safe Routes to School Programs would create more opportunities for children to walk or bike to school and could have a secondary benefit of decreasing vehicle trips during peak travel times.

According to data from LADOT, many students are already using active forms of transportation during their commute to school. 33% of LA County students either walk or bike to school, which is almost 10% higher than the State average (26%). This trend becomes stronger when a student lives within a half-mile from school. Of those who live between a quarter-mile and a half-mile from their school, 50% walk or bike to school. Of those a quarter-mile or less, 73% walk or bike to school. Even of those students that live over a mile from their school, 19% still walk or bike. By focusing on increased safety measures to and from school, the percentage of students walking/biking to school has the potential to rise even higher.

4 *LADOT, Safe Routes to School Fact Sheet*

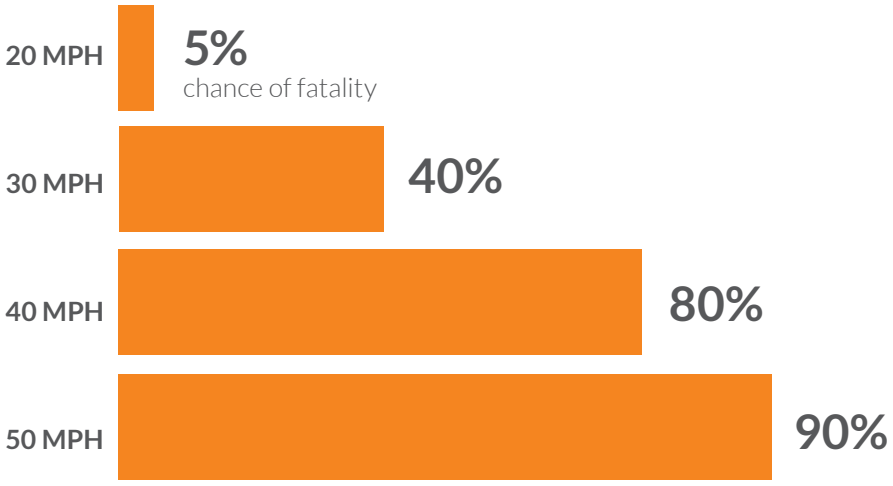
1.4 Design Safe Speeds:

Design streets to Targeted Operating Speeds as defined in the Complete Streets Design Guide.

Context-sensitive roadway design is important for the safety of all roadway users. The way a street is designed has much to do with how it functions. A completely straight road with multiple lanes on each side allows for a high capacity of fast-moving vehicles, whereas a roadway with narrow travel lanes, a winding path, greenery, and pedestrian activity calls for slower travel speeds.

Speed limits have been on the rise due to state speed limit requirements. The 85th percentile rule dictates that the speed limit be set at or below the 85th percentile operating speed, meaning that if people break the law and drive faster than the posted speed limit on a particular road, the speed limit can and will be raised. This law has grave consequences for street safety and performance since it does not take into account other factors like land use context and other modes of transportation.

Given that excessive speed is a highly cited factor in collisions, targeted reductions in speed could have a big impact on reducing the number of collisions in Los Angeles. Pedestrians and bicyclists are particularly vulnerable in collisions with cars, especially when those vehicles are traveling at increased speeds. At higher speeds bicyclists and pedestrians become less visible and more vulnerable. Since the human brain can only process a finite amount of visual information, the field of vision decreases significantly as the speed of travel increases. At faster speeds the field of vision narrows and the periphery, often where pedestrians or bicycles would be located, fades from view. Also with increased speed is the likelihood of injury and death, which jumps from a 40% chance of death when a vehicle is traveling at 30 mph to an 80% chance of death when a vehicle is traveling at 40 mph[5].



5 *(National Highway Traffic Safety Administration, DOT HS 809 021October 1999 Final Report)*

1.5 Railroad Crossings:

Reduce conflicts and improve safety at railroad crossings through design, planning, and operation.

Southern California leads the nation in fatal collisions at railroad crossings[6]. Vehicles can stack up at these crossings and sometimes cannot clear out when trains come through, leading to potentially disastrous situations. For this reason, the safety of all road users should be considered at railroad crossings in order to minimize collisions. Keeping traffic from driving across railroad tracks with a bridge or underpass minimizes the chance for conflict and is the most effective way to reduce conflicts at railroad crossings.



6 *Federal Railroad Administration, Office of Safety Analysis*

1.6 Multi-Modal Detour Facilities:

Design detour facilities to provide safe passage for all modes of travel during times of construction.

Current standards call for all users to be considered when streets are temporarily reconfigured during construction. The California Manual on Uniform Traffic Control Devices for Streets and Highways provides guidelines for temporary traffic control that provides for the safety of all when designing detour facilities.

During times of roadway construction, lane and sidewalk space are often reduced. Pedestrians can be exposed to oncoming traffic if sidewalk space is blocked off while bicyclists and vehicles are left to maneuver within the remaining roadway space. Detour facilities are needed to provide a clear route of safe passage for all modes during roadway construction. Awareness of detour facility guidelines is paramount to increasing safety in construction zones.

1.7 Regularly Maintained Streets:

Enhance roadway safety by maintaining the street, alley, tunnel, and bridge system in good to excellent condition.

At the very core of a safe street system is proper maintenance. Streets that are not regularly maintained can damage vehicles that traverse over them. In addition, inadequate streets can lead to dangerous situations for drivers and place bicyclists and pedestrians in vulnerable positions while trying to maneuver around obstacles.

Well maintained streets feel safer to travel on and attract more users. Properly maintained streetscapes that are clean and attractive are essential to making livable neighborhoods and creating streets that are welcoming to people.





1.8 Goods Movement Safety:

Ensure that the goods movement sector is integrated with the rest of the transportation system in such a way that does not endanger the health and safety of residents and other roadway users.

The concept of complete streets extends to goods movement as well. As transportation systems evolve, the economic necessity of moving goods via trucks on city streets will still be an important issue to consider in the balancing act of roadway prioritization. Truck movement should be limited to the arterial street network as much as possible since these streets have the lanes and wider turning radii to accommodate these heavy large vehicles. Land uses along heavily used truck routes should also coincide with goods movement priorities and limit interaction with residential uses.

1.9 Recreational Trail Safety:

Balance user needs on the City's public recreational trails.

The City has a limited number of recreational trails established for various mode uses such as hiking, horseback riding, and mountain biking. Given the constrained amount of trails, the first priority is keeping trail users safe and preventing conflicts between various users.



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PHOTO: LADOTBIKEBLOG, FLICKR

Chapter 2: World Class Infrastructure

Discussion

Objectives

Policies

2.1 Adaptive Reuse of Streets
2.2 Complete Streets Design Guide
2.3 Pedestrian Infrastructure
2.4 Neighborhood Enhanced Network
2.5 Transit Network
2.6 Bicycle Networks
2.7 Vehicle Network
2.8 Goods Movement
2.9 Multiple Networks
2.10 Loading Areas
2.11 Transit Right-of-Way Design
2.12 Walkway and Bikeway Accommodations
2.13 Highway Preservation and Enhancement
2.14 Street Design
2.15 Allocation of Transportation Funds
2.16 Scenic Highways
2.17 Roadway Widenings

World Class Infrastructure

Design, Complete Streets Network (walking, bicycling, transit, vehicles, goods movement), Bridges, Highways, Smart Investments

Discussion

Infrastructure is the physical underpinning of the City's transportation system. In the City of Los Angeles, streets are our largest public asset and play a large role in defining the City's character. A well-maintained and connected network of streets, paths, bikeways, trails, and more provides Angelenos with the optimum variety of mode choices. This Plan establishes a Complete Streets Network of individual roads enhanced for a particular mode (pedestrians bicycles, transit, vehicles, trucks). It also focuses attention on the benefits of flexible design standards, needed future infrastructure improvements, and funding.

Streets are a defining feature of the public realm. Beyond their function as corridors for travel, they also serve as settings for commercial activity and spaces for interaction. Pedestrian and retail activity along street corridors is vital to the economic health of neighborhoods. As the City continues to expand and invest in its infrastructure, improvements must also be made to enhance the streetscape realm, creating attractive environments for walking, biking, and transit to create a balanced transportation system.

The implementation of the Enhanced Networks would not automatically occur as a result of adoption of the Plan. Further design, development, and specific right-of-way treatments would be determined only after further study and discussion with the community and the City's leadership.

It is anticipated that both transportation infrastructure planning (as presented in the Mobility Plan) as well as future land use planning efforts (community plans, specific plans, and occasionally individual project), will be undertaken in an iterative manner. The Mobility Plan will provide the framework for future community plans and specific plans that will take a closer look at the Plan's Enhanced Networks and PEDs analysis, in specific areas of the City and may recommend more-detailed implementation strategies to realize the MP 2035. More detailed land use planning may reveal the need for changes to the networks, which will be undertaken as needed to reflect these more detailed planning efforts.

Objectives

- Establish a culturally sensitive, multilingual and neighborhood accessible public outreach approach to complete the protected bicycle lanes and Neighborhood Enhanced Network segments on Map D1 of the Bicycle Enhanced Network by 2035. Complete the Bicycle Path segments along the Los Angeles River, as depicted in Map D1 of the Bicycle Enhanced Network by 2025.

- Provide 95% on-time arrival reliability of buses traveling on the Transit Enhanced Network by 2035. Establish an off-peak 5 minute bus frequency on 25% of the Transit Enhanced Network by 2035.

- Establish an off-peak 10 minute bus frequency on 50% of the Transit Enhanced Network by 2035.

- Establish an off-peak 15 minute bus frequency on 100% of the Transit Enhanced Network by 2035.

- Achieve established performance levels on 100% of the streets within the Neighborhood Enhanced Network by 2035 (see policy 2.4 Neighborhood Enhanced Network).

- Increase vehicular travel time reliability on all segments of the Vehicle Enhanced Network by 2035.

- Bring all sidewalks to good condition by 2035. Bring all City-owned streets, tunnels, and bridges to good condition by 2035.

- Increase the number of roadway segments that have a level of B (Average Pavement Condition Index of 80) or better by 2035.

- Increase proportion of freight transportation provided by railroad and intermodal services to 50 by 2035.

- Increase share of Measure R local return funds to 20% for active transportation investments with special consideration for active transportation safety improvements.

- Dedicate 20% of road reconstruction budgets and capital improvement funds toward complete street improvements.

- Maintain the Automated Traffic Control Surveillance and Control System (ATSAC) Communications Network.

- Design and implement by 2035 Pedestrian Enhanced Districts within the City's diverse neighborhoods and regional centers around schools, parks, community and regional gathering destinations, and employment centers with a prioritization of census tracts falling within SB 535's Top 25 Disadvantaged Communities and the highest concentration of pedestrian fatalities and severe injuries.

Policies

2.1 Adaptive Reuse of Streets

2.2 Complete Streets Design Guide

2.3 Pedestrian Infrastructure

2.4 Neighborhood Enhanced Network

2.5 Transit Network

2.6 Bicycle Network

2.7 Vehicle Network

2.8 Goods Movement

2.9 Multiple Networks

210 Loading Areas

2.11 Transit Right-of-Way Design

2.12 Walkway and Bikeway Accommodations

2.13 Highway Preservation and Enhancement

2.14 Street Design

2.15 Allocation of Transportation Funds

2.16 Scenic Highways

2.17 Street Widenings

2.1 Adaptive Reuse of Streets:

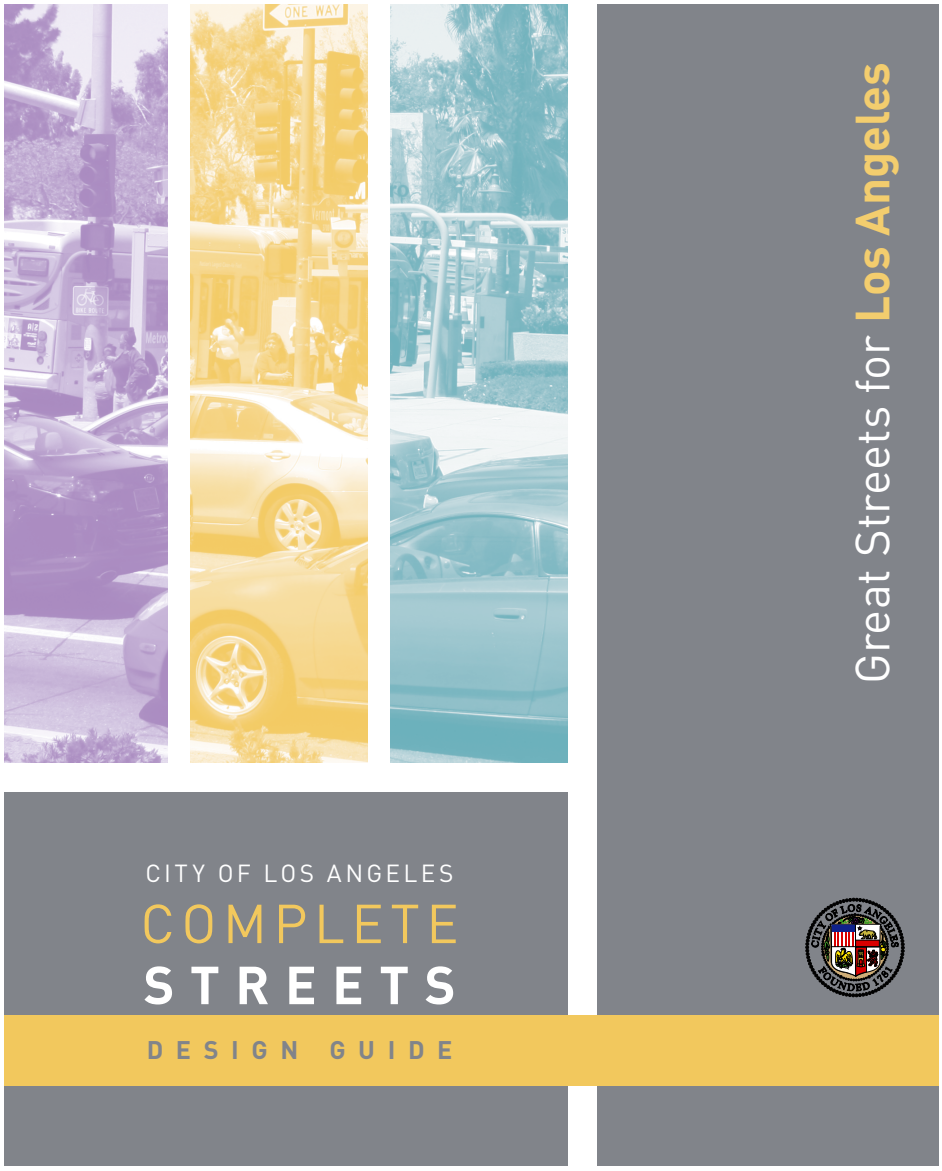
Design, plan, and operate streets to serve multiple purposes and provide flexibility in design to adapt to future demands.

Streets are often thought of as conduits for travelling from one place to another, whether it is by foot, bicycle, or motorized vehicle. While a complete streets policy is about enabling safe access for all transportation users, streets also serve many other functions beyond mobility. As public spaces, they are vibrant settings for social interaction. As retail corridors, they promote the local economy and can become great destinations. As ecological infrastructure, they offer opportunities to enhance the City's sustainability with trees and stormwater collection. The City's roadway network is more than just a transportation system – it is an urban ecosystem, a complex set of interactions among objects, people, and the environment.

Numerous city departments, each with different perspectives and objectives, have a role in shaping and managing streets. However, it is vital to keep in mind the multiple purposes and benefits streets provide, and to adopt a multi-faceted approach in the planning and design process. Ideally, designs should be flexible in their nature to accommodate a diversity of uses and adapt to future needs. This is particularly true of the Complete Street Network where it may be necessary to incorporate a variety of treatments to achieve the goal of a particular street segment. Given the often unique street configurations of the City's many diverse street types, design solutions may vary from street to street regardless if they have the same street designation and/or are on a similar network. Design solutions will need to be tailored to the particular concerns of the community while also balancing the overall modal priorities of the area.







2.2 Complete Streets Design Guide:

Establish the Complete Streets Design Guide as the City's document to guide the operations and design of streets and other public rights-of-way.

The Complete Streets Design Guide lays out a vision for designing safer, more vibrant streets that are accessible to people, no matter what their mode choice. It is a living document that will frequently get updated as City departments identify and implelement streets standards and experiment with different configurations to promote complete streets. The guide is meant to be a toolkit that provides numerous examples of what is possible in the public right of way and provide guidance on context-sensitive design.

2.3 Pedestrian Infrastructure:

Recognize walking as a component of every trip, and ensure high-quality pedestrian access in all site planning and public right-of-way modifications to provide a safe and comfortable walking environment.

Walking is a vital component to a city's circulation since most every journey starts and ends with walking. There are multiple benefits to investing in pedestrian infrastructure. Enhancing the environment can promote more walking, reduce reliance on other modes for shorter trips, promote health, increase the vitality of streets, and more. Providing more attractive and wider sidewalks, and adding pedestrian signalization, street trees, and other design features encourages people to take trips on foot instead of car. This helps to reduce cars on the road and emissions, increase economic vitality, and make the City feel like a more vibrant place.

The Pedestrian Enhanced Districts (PEDs) provided in the maps section in Chapter 6 of the Plan call out initial analysis done to find out where pedestrian improvements on arterial streets could be prioritized to provide better walking connections to and from the major destinations within communities. Further analysis and prioritization will be done as funding and projects come through based on safety, public health, equity, access, social, and/or economic benefit objectives.

The Neighborhood Network was established in the 2010 Bicycle Plan as a network of local streets comfortable for bicycling. The Mobility Plan recognizes that this network can also serve local neighborhood pedestrian activity. The Neighborhood Enhanced Network reflects the synthesis of the two ideas and serves as a system of local streets that are slow moving and safe enough to connect neighborhoods through active transportation.





2.4 Neighborhood Enhanced Network:

Provide a slow speed network of locally serving streets.

The Neighborhood Enhanced Network is a selection of streets that provide comfortable and safe routes for localized travel of slower-moving modes such as walking, bicycling, or other slow speed motorized means of travel. This network complements the Pedestrian Enhanced Districts and the Bicycle Enhanced Network by identifying non-arterial streets important to the movement of people who walk and bike. Criteria for streets on the Neighborhood Enhanced Network may include vehicular travel that does not exceed 1500 vehicles a day and streets where the 85th percentile of travel speed is equal to or less than 20 mph, in order to provide a safe and comfortable experience for people who travel by walking, bicycling, or other slower moving modes. Enhancements may not be required if streets meet targeted speeds and volumes or they can take shape in the form of a variety of traffic calming features depending on local context need. Please see the Complete Street Design Guide for more discussion on Neighborhood Enhanced Network features. The Neighborhood Enhanced Network (NEN) maps are provided in the maps section in Chapter 6 of the Plan.

2.5 Transit Network:



mprove the performance and reliability of existing and future bus service.

A robust public transit network is important to a great transportation system. As of 2014, Metro reported that the Los Angeles County region averaged 1.4 million boardings a weekday, making it one of the largest transit agencies in the nation. Performance, convenience and comfort are key factors in improving the transportation experience.

The implementation of the Transit Enhanced Network (TEN), while not only an iterative process will be done in collaboration with transit operators as thet determine service levels and hours of operation.

Working in collaboration with the transit operators, combined with street improvements of city managed enhancements, the Transit-Enhanced streets outlined in the Plan strive to: provide reliable and frequent transit service that is convenient and safe; increase transit mode share; reduce single-occupancy vehicle trips; and integrate transit infrastructure investments with the identity of the surrounding street. These corridors were selected based on a data-driven analysis of factors such as ridership, destinations, employment, and population.

Transit enhanced streets may receive a number of enhancements to improve line performance and/or the overall user experience for people who walk and take transit. Enhancements may range from streetscape improvements to make walking safer and easier, to transit shelters, or bus lanes. The Transit Enhanced Network (TEN) map is provided in the maps section in Chapter 6 of the Plan.





2.6 Bicycle Networks:

Provide safe, convenient, and comfortable local and regional bicycling facilities* for people of all types and abilities.

Bicycling is an important element to complete streets as it fulfills both long and short distance trips in the larger transportation system. The City of LA established a long term vision of improving bicycling for all types of people of varying experience with the 2010 Bicycle Plan. The Mobility Plan builds upon this idea with the vision of fully separated, protected bicycle lanes. The Bicycle Enhanced Network is comprised of protected bicycle lanes, and bicycle paths to provide bikeways for a variety of users. This low-stress network provides a higher level of comfort than just a striped bicycle lane. The Complete Streets Design Guide details various bicycling treatments and in what contexts they work best in.

There are multiple benefits to improving the bicycling network and providing fully separated bicycle lanes. Many other cities have demonstrated an increase in bicycle ridership and a decrease in traffic delay when street calming features such as protected bicycle lanes get installed. In addition, bicycling has positive benefits for public health, environmental health, and local business.

Bicycling plans and implementation strategies will continue to evolve as conditions change, but the City's long term vision will remain to provide safe, convenient, and comfortable bicycling facilities that are prioritized based on a number of factors such as public health, safety, equity and other factors consistent with the prioritization-focused policies (Policy 4.6) in this Plan. The Bicycle Enhanced Network (BEN) map and Bicycle Lane Network map is provided in the maps section in Chapter 6 of the Plan.

*bicycling facilities are ideally suited for a host of slow moving modes including but not limited to scooters, skateboards, rollerblading, rideables and other future compact personal transportation technologies.

2.7 Vehicle Network:

Provide vehicular access to the regional freeway system.

The role of vehicular movement has been significant in the development of the Los Angeles region and will continue to play a critical role in our City's circulation. The freeway infrastructure built in the 1950s helped establish vehicles as the primary mode of transportation in LA. The freeway network was designed on the heels of the 1956 Federal Highway Act that focused on designing a system emphasizing regional movement. A total of 527 miles were built countywide and 181 miles were built citywide, but the freeway system was never fully completed due to local context.

In response to the need to accommodate regional traffic to and from the freeways on city streets, the Vehicle Enhanced Network (VEN) was developed to identify corridors that will remain critical to vehicular circulation and to balance regional and local circulation needs. The Vehicle Enhanced Network (VEN) identifies 79 miles of arterials, important to vehicular movement, that carry between 30,000 and 80,000 vehicles per day, traverse 10 miles or more through the City, and provide access to freeways and critical facilities. As the Mobility Plan establishes a Complete Streets Network that provides new choices (transit use, walking, biking), the Plan also addresses maintaining access for vehicular users particularly by identifying gaps in the regional freeway system. Safety and targeted operating speeds are still key as part of the design and operation of VEN streets. The overall intent of the VEN is to provide streets that prioritize vehicular movement and offer safe, consistent travel speeds and reliable travel times.

The Vehicle Enhanced Network (VEN) map is provided in the maps section in Chapter 6 of the Plan.











2.8 Goods Movement:

mplement projects that would provide regionally significant transportation improvements for goods movement.

Goods movement is a core economic engine in Southern California, providing one of the largest employment bases in the County. In California, 76 percent of all freight is shipped by truck. Trucks also transport 98 percent of all finished goods to final destinations, according to the California Trucking Association.

The Port of Los Angeles has been the largest container port complex in the country since 2000. Combined with neighboring Port of Long Beach, they form the 9th largest container port in the world and handle 14.6 million Twenty-Foot Equivalent (TEU) containers collectively (CY 2013). The Port of Los Angeles alone is ranked fourth worldwide for volume of total cargo and second largest in the nation behind Anchorage. Most of the region's air cargo (78%) moves through LAX, making it the third busiest air cargo airport in the world. The County is also a major rail hub with both Union Pacific and BNSF operating mainlines linking the region to the national rail network. Goods movement by all these modes is projected to increase by over 80% between 1995 and 2020 (SCAG). In addition to this, the greater Los Angeles area is now the largest manufacturing center in the United States. All of this activity generates an enormous and growing volume of truck and rail trips in the City.

Goods movement is a regional issue that requires collaboration among many departments across cities in the Southern California area. As of 2014, Metro is preparing a Countywide Strategic Truck Arterial Network to identify the region's key arterials necessary for the movement of goods.

It has been demonstrated that business is attracted to and retained in areas where business-related goods deliveries, including small package delivery, are convenient and reliable. Goods movement improvements can alleviate congestion, improve mobility, remove traffic safety hazards, and promote economic health. The transportation of goods is critical to business vitality, and every effort, policy, and project that helps improve the greening and streamlining of goods movement also makes the City safer, cleaner, and economically stronger.

The Goods Movement map is provided in the maps section in Chapter 6 of the Plan.

2.9 Multiple Networks:



Consider the role of each enhanced network when designing a street that includes multiple modes.

The Mobility Plan recognizes the various modes of travel that need to be accommodated on streets (such as walking, biking, driving, goods movement, and more). The Plan proposes a number of enhanced networks that prioritize a certain mode of travel to be improved, as discussed in the prior policies. Certain streets may be included in multiple networks which may cause conflicts between modes. The Complete Street Design Guide provides a guidebook of design tools that minimize these conflicts and offers solutions that can promote multiple modes in certain circumstances. In situations where there are multiple priorities and constrained street widths, the safety of people shall be considered a priority.

Where more than one enhanced network is identified for a specific street, design modifications shall include elements of each enhanced network. For example, on a street that is identified as both a PED (Pedestrian Enhanced District) and a BEN (Bicycle Enhanced Network), there are multiple opportunities to look at treatments and designs that can be beneficial to the movement of multiple users. Additionally, on a street that is identified as both a TEN (Transit Enhanced Network) and a BEN, designs must include both dedicated transit facilities and protected bicycle facilities, if feasible. Alternatively, a parallel corridor can be identified during the implementation process that can meet the network connectivity needs of an area.

Where an enhanced network for one mode also includes design elements for a different mode (not on an enhanced network), the enhanced network design elements will take precedence, while keeping the safety of people a first priority as mentioned earlier. For example, on a street that is identified as a TEN but is also intended to receive a bicycle lane, design elements for the transit can take precedence over the provision of a bicycle lane. The design and development process will provide the opportunity refine and identify circulation needs that can provide safety and access for a variety of modes.

The Plan proposes hundreds of miles of enhanced networks that will require additional analysis and discussion before being implemented.



2.10 Loading Areas:

Facilitate the provision of adequate on and off-street loading areas.

Many businesses depend on being able to receive deliveries, often multiple times per day. When loading and unloading areas are mismanaged or poorly designed, businesses may experience delays that can lead to greater costs, operational inefficiencies, and customer dissatisfaction.

A common problem is a lack of sufficient space (either on- or off-street) to reasonably accommodate delivery trucks and allow for their unloading. Illegally parked vehicles present another problem when they prevent delivery trucks from parking in the ideal location to load and unload goods.

When considering the design of our roadways, it is important to accommodate the delivery and unloading of goods upon which businesses depend, while also seeking to minimize the impacts of large trucks in the urban environment. Loading areas should be strategically located and designed in order to best facilitate the commercial needs of the businesses they are meant to serve. In addition, these loading and unloading areas should consider all potential vehicle maneuvers that delivery trucks can make, so as to not encroach on or block the public right-of-way.

2.11 Transit Right-of-Way Design:

Set high standards in designing public transit rights-of-way that considers user experience and supports active transportation infrastructure.

Transit rights-of-way, such as the Blue Line, Orange Line, and segments of the Gold Line and Exposition lines that have separated rights-of-way provide better operation times and an overall better experience for transit users. High-quality supporting infrastructure parallel to exclusive transit rights-of-way such as fully protected bike paths and walkways are ideal for making seamless connections from walking and biking to transit.



2.12 Walkway and Bikeway Accommodations:

Design for pedestrian and bicycle travel when rehabilitating or installing a new bridge, tunnel, or exclusive transit right-of-way.

New exclusive rights-of-way along transit corridors such as the Orange Line can provide new ways to improve circulation for active transportation through previously inaccessible corridors. People who walk and bike can also benefit greatly from the connectivity that bridges and tunnels provide to facilitate access across a mobility barrier.

Bridges, tunnels, and transit rights-of-way provide vital connections between areas separated by otherwise impassable barriers such as rivers, rail lines, and freeways. They have the potential to significantly enhance the mobility experience for all modes passing through the City and should be designed to reflect a balanced transportation system.

2.13 Highway Preservation and Enhancement:

Support the preservation and enhancement of the state highways consistent with the RTP/SCS and the goals/policies of the General Plan.

The state highway system is an essential component of the City's transportation network. As such, the City has a vested interest in the network performance and maintenance of these highways. Developing a strategy for how the City and Caltrans will interact on all aspects of state highway planning, maintenance, operations, and expansion can aid in streamlining the development review process. Where possible and feasible, the City will work with Caltrans to contribute to State highway improvements that directly contribute to achieving the goals and policies of SCAG's Regional Transportation Plan/ Sustainable Communities Strategy (RTP/ SCS) as well as the City's General Plan.







2.14 Street Design:

Designate a street's functional classification based upon its current dimensions, land use context, and role.

Los Angeles has a vast roadway system of about 7,500 miles of streets. Approximately 40% of the City's streets operate as arterials that serve to move people and goods long distances from one end of the City to the other. Around 60% of streets are non-arterials intended for local circulation and to serve neighborhood travel.

Every city has a hierarchy of street classifications that defines the role of each street type and how it serves the travel needs of a larger system. The new standard plan for street classifications (S-470) lays out a new nomenclature to reflect complete street policies. Major Highways are being called Boulevards and Secondarys are now Avenues. Since the functional classification of streets is tied to federal level aid from the US Department of Transportation, the old functional classification terminology will also be kept for funding purposes.

A street's designation influences its overall design. Street widths, number of lanes, land use context, and more are influenced by the designation of a street. The Complete Streets Design Guide delves into the components of a street, and the different roadway and right-of-way widths for the hierarchy of street classifications.

Due to the variety of street types and land use contexts , many streets do not completely fit into the dimensions identeified in the S-470. In these situations, a street will receive a sub-designation as "modified" as well as an alternative dimension for either the right-of-way, roadway, or both.



2.15 Allocation of Transportation Funds:

Expand funding to improve the built environment for people who walk, bike, take transit, and for other vulnerable roadway users.

The maintenance of streets and roadways benefits all users. However, it is important to set aside funding specifically for the development of bikeways and pedestrian facilities because sidewalks and bikeways connect all users to transit, commercial centers, neighborhoods, and parks and recreational areas; they act as first mile and last mile solutions for a wide range of users (ages 8-80) for trips throughout the day.

Benefits of Investing in Complete Streets: expanding and enhancing the City's network of complete streets can result in direct and indirect benefits:

Low cost and available funding – The cost of implementing and maintaining complete streets policies are minimal compared to the cost of widening roadways.

Economic revitalization – Investing in streetscape improvements can enliven commercial corridors and boost the local economy (and increase sales tax revenue).

Improve safety – Improving the right-of-way for a wider range of modes makes safer environments and corridors for pedestrians and the most vulnerable users. Traffic calming coupled with the presence of multiple modes can help reduce vehicle speeds and the rate of collisions.

Reduce GHG - emissions and congestion – Multi-modal streets encourage the use of transit and active modes, decreasing the dependence on vehicles. The National Complete Streets Coalition reported an estimated savings from $2.3 billion (Chicago) to $19 billion (New York City) per year in transportation costs when cities provided better transit, walking, and biking facilities

2.16 Scenic Highways:

Ensure that future modifications to any scenic highway do not impact the unique identity or characteristic of that scenic highway.

Scenic Highways include many of the City's iconic streets. Preservation and enhancement of these streets and their scenic resources need to be preserved per the Scenic Highways Guidelines in Appendix B of this Plan.



2.17 Street Widenings:

Carefully consider the overall implications (costs, character, safety, travel, infrastructure, environment) of widening a street before requiring the widening, even when the existing right of way does not include a curb and gutter or the resulting roadway would be less than the standard dimension.

Due to the often unique nature of a street segment there are situations where widening the roadway width to the standard dimension could change the character of the street in an undesirable way, prove unnecessarily expensive relative to the resulting benefits, or result in other adverse changes. The Planning Director will resolve any ambiguity with respect to whether any particular street shall be widened.





PHOTO: LADOTBIKEBLOG, FLICKR

Chapter 3: Access for All Angelenos

Discussion

Objectives

Policies

3.1 Access for All
3.2 People with Disabilities
3.3 Land Use Access and Mix
3.4 Transit Services
3.5 Multi-Modal Features
3.6 Regional Transportation & Union Station
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Access for All Angelenos

Affordability, vulnerable users, land use, operations, reliability, demand management, community connections.

Discussion

A transportation system is only useful insofar as it is accessible and convenient.

There are a number of different dimensions within the concept of accessibility. One aspect of accessibility relates to the design of the built environment. The 3.8 million people who live in the City have widely varying levels of physical ability. They include large numbers of children, seniors, and people with disabilities. A fair and equitable system must be accessible to all, and must pay particularly close attention to accommodating the most vulnerable users. These issues can be addressed by standards for streets and sidewalks, as well as site planning.

Land use is another component of accessibility. One measure of this is the percentage of destinations – such as jobs, services and residences – that can be conveniently accessed via non-vehicular modes. Current planning efforts seek to increase this percentage by expanding transit service, and by aligning higher-density land uses with existing and planned transit infrastructure.

A related concept is connectivity: how comprehensive and complete each modal network is, and how well the various networks fit together. Many trips involve using more than one mode of transportation, and a well-connected mobility network facilitates transferring from one to another as seamlessly as possible.

Still another piece of accessibility is affordability. The City's population varies widely in terms of income levels. For many families, transportation is among the most significant expenditures, along with food and housing.

Objectives

- Ensure that 90% of households are have access within one mile to the Transit Enhanced Network by 2035.
- Ensure that 90% of all households have access within one-half mile to high quality bicycling* facilities by 2035. (*protected bicycle lanes, paths, and neighborhood enhanced streets)
- Increase the percentage of 0/1 car ownership (car-light) households from 50% currently to 75% by 2035.
- Reduce the average share of household income spent on transportation costs to 10 % by 2035 through the provision of more transportation options.
- Provide a shared use vehicle within a half-mile of 75% of households by 2035.
- Provide access to bicycle sharing within a quarter-mile of 50% of households by 2035.
- Install pedestrian access curb ramps at 100% of all intersections by 2035.
- Increase the combined mode split of persons who travel by walking, bicycling or transit to 50% by 2035.

Policies

3.1 Access for All

3.2 People with Disabilities

3.3 Land Use Access and Mix

3.4 Transit Services

3.5 Multi-Modal Features

3.6 Regional Transportation & Union Station

3.7 Regional Transit Connections

3.8 Bicycle Parking

3.9 Increased Network Access

3.10 Cul-de-sacs

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3.12 Proposed Streets

3.1 Access for All:

Recognize all modes of travel, including pedestrian, bicycle, transit, and vehicular modes - including goods movement - as integral components of the City's transportation system.



The outcomes of a transportation system can be dramatically different depending on the expressed goals of a city. A city that prioritizes public transit infrastructure will be built differently from a city that prioritizes single occupancy vehicle travel. The build out and evolution of a city happens slowly based on incremental decisions that work towards a larger vision. The City of LA now has a vision to make travel safe and convenient for all modes. The first step in making a balanced transportation system is a basic acknowledgment that various modes of travel are given equally important weight from a citywide standpoint. Some travel choices will work better than others in certain areas and the incremental decisions that will arise from this policy platform will need to be context-sensitive with the larger goal still in mind.

Making changes to the built environment can, in turn, bring about dramatic shifts in behavior, such as increasing the distance someone is willing or able to walk. Today, we often get in the car even for local errands, because walking would entail negotiating a narrow, broken sidewalk with no tree canopy for shade, crossing a wide intersection with four or more lanes of fast-moving vehicles, and braving the vast parking lot in front of the store's entry. But reimagine that walk now with a wider, smooth sidewalk lined with mature trees that provide shade, disabled access ramps and street calming at the intersection to moderate vehicle behavior and reduce the crossing distance while increasing the visibility of the pedestrian, and a store entrance made more accessible by including a well-marked pedestrian pathway or relocating the parking behind the store. Communities whose environment more closely resembles the second scenario have higher rates of pedestrian mobility, with all the associated benefits: lower rates of obesity, improved air quality, and more opportunities to encounter neighbors and friends.

The Americans with Disabilities Act of 1990 (ADA) defines disability as "a mental or physical impairment that substantially limits one or more major life activities." ADA protection extends to individuals who currently have a disability and those with a record of a mental or physical impairment.



3.2 People with Disabilities:

Accommodate the needs of people with disabilities when modifying or installing infrastructure in the public right-of-way.

Seemingly minor modifications such as adding curb cuts and audible signals at intersections, providing an occasional bench to rest, and ensuring that pathways are free of obstacles, can do much to increase the comfort and safety of all pedestrians, particularly those with disabilities[6].

6 *Federal Highway Administration California Division, Americans with Disabilities Act, (2013).*

3.3 Land Use Access and Mix:

Promote equitable land use decisions that result in fewer vehicle trips by providing greater proximity and access to jobs, destinations, and other neighborhood services.

While the quality of the streetscape plays a large part in someone's decision to walk or not, so too does the proximity of the most commonly frequented neighborhood destinations such as supermarkets and schools. A community with a mix of uses clustered close together makes it much easier for someone to accomplish a number of daily errands by walking or bicycling. Better still is when these uses are clustered around a transit station, offering people the opportunity to easily take care of errands on their way to work or home, without having to go out of the way.

Neighborhoods with frequent, reliable transit seven days a week are the ideal place to cluster uses and services so that area residents, students, and/or employees can complete a number of errands within a single walk or bike trip. Likewise, it makes sense for land uses situated near major transit stops to be of the intensity and type that they attract a high number of transit riders. A major transit stop adjacent to a cluster of single family homes on 5,000 square-foot lots or larger is not going to generate the same number of riders as a regional destination such as museum, university/ college, shopping, office, or apartment complex. The greatest benefits of transit accrue when the greatest number of potential riders can be located within easy access of the transit service.

TOD Corridors

Transit-oriented development (TOD) planning has been a tool used by cities to promote the development of areas that have a mix of housing, jobs, and local services . However TOD refers to more than just the properties immediately adjacent to stations; the corridors themselves can be planned as destinations and job centers that add value to the area. Investing in elements such as first-and-last mile strategies, pedestrian-friendly street infrastructure, and bicycle parking increases the appeal and walkability of transit corridors. Corridors linked to transit have the capacity to accommodate greater densities of residential and commercial uses, while increasing access to transit connections.



3.4 Transit Services:

Provide all residents, workers and visitors with affordable, efficient, convenient, and attractive transit services.

Transit services, whether buses, trains, commuter shuttles, or paratransit, offer a mobility alternative for residents, employees, students and visitors who either do not have access to, or prefer not to use, a car.

The costs of car ownership are large. In addition to the cost of the vehicle itself, one must also factor in the costs of fuel, maintenance, parking, and insurance. As a result, a number of households in the City cannot afford to own a car or choose not to. Others may feel compelled to own a car and consequently are forced to cut back on things such as housing, food, and health care.

Compared to a private vehicle, transit is more affordable. However, in order for it to be a viable alternative, it should be reasonably reliable, efficient, convenient, safe, and comfortable. The more that our regional transit system meets this description, the better it will serve its existing customer base, and the more it will succeed at attracting new riders (especially those not driven by economic necessity). When private vehicles are no longer considered to be a necessity, the cost of living decreases and quality of life improves for everyone.

3.5 Multi-Modal Features:

Support "first-mile, last-mile solutions" such as multi-modal transportation services, organizations, and activities in the areas around transit stations and major bus stops (transit stops) to maximize multi-modal connectivity and access for transit riders.

While many of our daily trips can be well served by transit, it is rare that one's origin and destination are both located directly adjacent to a transit stop. In transportation planning, the issue of how to make these connections at the beginning and end of each journey is known as the "first-mile, last-mile" problem. As a comparison, a typical vehicle trip across the City involves driving on the freeway for most of the distance, but using local streets at the beginning and end. Similarly, a trip that utilizes a train to cover the largest leg of a journey may include a bike ride to reach the train station and a walk to reach the final destination.

A wide variety of solutions have been developed to meet first-mile, last-mile needs of transit users. The options run the gamut from simply enhancing the public realm around transit stations to encourage walking (sidewalks, street trees, street lights, wayfinding), to providing racks for bicycles on buses and trains, as well as supporting bicycle share programs, taxis, car shares, and high-frequency local shuttle service. By providing a robust array of options, a variety of different needs can be accommodated, greatly increasing the number of destinations reachable by transit.









3.6 Regional Transportation & Union Station:

Continue to promote Union Station as the major regional transportation hub linking Amtrak, Metrolink, Metro Rail, and high-speed rail service.

Since 1939, Union Station has been the center of the region's transportation system. Union Station serves as the hub for Amtrak, Metrolink, and Metro Rail trains, as well as numerous local and long-distance buses and the Flyaway shuttle to LAX. In the future, high-speed rail is expected to join this list as well. Currently, Union Station handles a combined total of about 60,000 boardings per day, and once all Measure R Projects are completed it is estimated that this number will exceed 100,000.

Metro, the agency which has owned and operated Union Station since 2011, is currently developing a master plan for the area that will identify long-term strategies for improving multi-modal connections within the station, as well as enhancing the quality of its public spaces. The plan will also highlight mixed-use development opportunities on the 40-acre site, and propose ways to strengthen the station's connections to the downtown core, the LA river, and surrounding neighborhoods. The vision is for a station that serves as an impressive gateway, a destination in itself and one of the city's foremost landmarks, rather than simply a place to pass through.

3.7 Regional Transit Connections:

mprove transit access and service to major regional destinations, job centers, and inter-modal facilities.

In addition to the general principle of focusing neighborhood services and a mix of uses around transit stations – creating destinations around transit – an important parallel is improving transit service to the major regional destinations that already exist.

Currently, a number of the region's foremost attractions have only limited transit service. These include: the Getty Center, the Valley Performing Arts Center, Griffith Park, Sepulveda Basin, Venice Beach, San Pedro, LAX, major sports venues, and major employment centers such as Century City. Because of the large numbers of trips associated with these places, improvements in transit service in these key locations could lead to significant mobility benefits.

Key Connections:

Sepulveda Pass/405 Corridor: While not an actual destination, the 405 Corridor through the Sepulveda Pass represents a vital connection between the San Fernando Valley and the West side of Los Angeles. It carries 331,000 cars daily[7]. Despite the freeway widening to make room for an HOV lane, both short-term and long-term transit options are urgently needed to provide drivers with an alternative to driving.

Los Angeles International Airport: Based on a 2006 passenger survey, 55% of individuals travel to LAX by private car, 11% by rental car, 10% by on-call shuttle or van, 9% by taxi, 3% by Flyaway, and 1% by transit[8]. Increasing the amount of transit access and service to LAX would offer a viable non-vehicular option. In addition to accommodating passenger service, a new rail connection to LAX can assist a portion of the 50,000 employees that come to the airport for work.

North/South Connectivity: The continuation of the Crenshaw Light Rail line north to the Hollywood Bowl would expand the travel options for area residents, employees, and visitors. A visitor could arrive at LAX and travel directly north to Hollywood. The addition of this leg to Metro's rail network would greatly contribute to the flexibility and fluidity with which travelers could move about the region.

Harbor Subdivision: The Harbor Subdivision, which is an existing freight rail corridor, provides an opportunity to improve the non-vehicular mobility of residents in the South Bay, Harbor, and southern portions of the City. The rail corridor can fit seamlessly into the regional transportation network, connecting to other existing stations (Green, Blue, Union Station), stopping at major destinations (Downtown LA, LAX), and providing rail service where it is currently lacking (South LA, South Bay cities).

'The West Santa Ana Branch (WSAB) Transit Corridor, initially funded by Measure R, would provide a thirty-four mile corridor connecting Union Station to Downtown Los Angeles with the





7 *http://media.metro.net/images/Route%20I-405%20(107KB).pdf*

8 *http://www.lawa.org/uploadedfiles/lax/pdf/2006LAXPassengerSurveyFinal.pdf*

south/eastern cities of Huntington Park, South Gate, Paramount, Bellflower, Artesia and Cerritos. These connections could improve passenger mobility while providing opportunities for transit oriented development and economic development.

Employment Centers: Employment hubs in the city, such as Warner Center, Downtown, Century City, and Hollywood experience greater-than-average levels of congestion because of the density of employees working there. Transit not only to these hubs, but also to future sites of clustered employment in the city, requires improved transit access and service.

Educational Institutions: There are numerous universities and colleges across Los Angeles that would benefit from improved transit access. While there are current examples of those that have convenient transit access near their sites (e.g., Expo Line to USC, Blue Line to LA Trade Tech, Orange Line to Valley/ Pierce College, Metrolink to Cal State LA), there are still many institutions that could benefit from better service and access.

Parks and Recreation Centers: Iconic neighborhoods such as Venice Beach and Griffith Park represent only a few of Los Angeles' many parks. Just as important are the rest of Los Angeles' parks and recreation centers. As local places of lesiure and community, each deserves better transit access.

Hospitals: The City's many hospitals play an important role not only with regard to our health care needs, but also in terms of our economy. Nationally, hospitals create over 2 trillion dollars in economic activity[9].

Shopping Centers: Los Angeles' many retail attractions generate valuable sales tax revenue and foster social gatherings. Providing better transit access and service to these attractions would help contribute tow the economic viability of our city by providing consumers with an alternative means of travel.

Sports Venues: Special attention should be paid to large sporting events that require additional transit service before and after games. For example, Metro operates a dedicated shuttle bus service (Dodger Stadium Express) from Union Station to Dodger Stadium before and after the game. Also, rail line schedules should be tailored to absorb the additional demand for riders traveling to attend Lakers/Clippers/Kings and USC/UCLA games. These special accommodations, especially when well-publicized, can provide much-needed congestion relief when a game or event begins during the evening rush-hour.

9 *www.aha.org/content/00-10/2010econcontrib.pdf*

3.8 Bicycle Parking:

Provide bicyclists with convenient, secure and well-maintained bicycle parking facilities.

Just as the availability of vehicle parking at a destination influences one's decision about whether or not to drive there, so too does the availability of bicycle parking play a major role in making bicycling an attractive option. With the knowledge that there will be a place to safely and conveniently secure his/her bicycle for the duration of a visit, a bicyclist is much more likely to ride. Conversely, fear of theft and difficulty finding suitable parking discourage the use of bicycles for commuting and errands.

Outdoor bicycle racks are the most basic and most common parking option. These should be located as close as possible to building entrances, without obstructing pedestrian pathways, and should ideally be sheltered and well-illuminated. Educating riders on the proper ways to secure their bicycle reduces the likelihood of theft. Bicycle lockers and indoor bicycle parking offer a greater level of security, as well as protection from the elements. Regardless of the type of facility, bicycle parking should be easy to locate, with signage, when helpful.

The Los Angeles Department of Transportation (LADOT) Sidewalk Bike Parking Program installs bicycle racks in the public right-of-way at the request of local business owners or citizens[10]. Metro also provides bicycle racks and/or lockers at most transit stations, facilitating the use of bicycles for first/last mile connections. Metro is planning to open its first "Bike Hubs" in 2015 - facilities which will provide secure indoor parking along with repair stands, air pumps, and other tools and resources. Similar facilities already exist in a number of other cities in Los Angeles County[11].



Bicycle Parking Ordinance

In 2013, the City adopted a new Bicycle Parking Ordinance. The Ordinance expands bicycle parking requirements for new developments and additions, and establishes design standards. It also includes a provision allowing bicycle parking to substitute for up to 30% of required automobile parking

Bicycle Parking as Public Art

Bicycle racks can be designed so that they are not only functional, but also sculptural works of art that contribute to placemaking and add visual interest to the streetscape. "Bicycle Stops Here" was a cooperative project of the Community Redevelopment Agency (CRA), Southern California Institute of Architecture (SCI-Arc), and the Los Angeles Department of Transportation (LADOT). The project included the development of functional works of art at 10 different locations that can be used as bicycle racks.

10 *http://www.bicyclela.org/Parking.htm*

11 *http://www.metro.net/bikes/*

"Our streets are our largest public asset. They occupy 15% of Los Angeles' total land area and serve as our City's circulation system. We need them to also foster community by providing places to gather and enjoy."

-Mayor Eric Garcetti, 2014



3.9 Increased Network Access:

Discourage the vacation of public rights-of-way.

A street vacation is a term used to describe the process that turns public streets over to private property. While a vacation provides greater control and responsibility of the space to the adjacent property owner, the vacation process reduces access for all modes of travel. Streets, alleys, stairways, and other public right-of-ways play an important role in the City's mobility system by facilitating better connectivity.

Increased network access improves the mobility of travelers by breaking up long blocks and providing short-cuts that reduce the distance required to get from one point to another.

3.10 Cul-de-sacs:

Discourage the use of cul-de-sacs that do not provide access for active transportation options.

Traditional cul-de-sacs are designed with the intention of excluding through traffic and reducing street connectivity. This reduced network connectivity has greater impacts on pedestrians and bicyclists, as the increased trip distances discourage active modes of transportation.

A daylighted cul-de-sac is an alternative to the conventional closed-off design. Daylighting refers to the modification of a dead end street to allow for pedestrian and bicycle through access. In addition, there are a number of design tools available in the Complete Streets Design Guide to reduce and calm through traffic within neighborhoods.

CicLAvia

Organized by a non-profit group in collaboration with the City of Los Angeles, CicLAvia is a day-long event in which selected streets are closed to motorized traffic and opened to people. Inspired by the first "Ciclovía," which took place in Bogotá, Colombia, over thirty years ago, the event is less of a "race," as there is no designated start or finish point and movement flows in both directions. Besides riding bicycles, people participate in many different ways: running, rollerblading, walking dogs, picnicking, and socializing. A variety of impromptu events and performances take place along the route.

People St.

People St. is a program designed to facilitate partnerships between the community and the City to implement projects that transform under-used areas of street into high-quality public space. The program operates as a public-private partnership. Each project requires the active participation of neighborhood sponsors to identify a site, conduct outreach, and raise funds for implementation and maintenance.

The first People St. demonstration project, Sunset Triangle Plaza, debuted on Griffith Park Boulevard, near Sunset Boulevard, in Silver Lake in March 2012. A one-block stretch of the street has been closed to traffic and is filled with café tables and chairs, planters, a bike corral, and a basketball hoop. The plaza has hosted events including summer movie nights and a weekly farmers market. Evaluation studies on the pilot have found increased revenues for local business owners.



3.11 Open Streets:

Facilitate regular "open street" events and repurposing of the public right of way.

In many of the City's neighborhoods, open space is in short supply. Only 52% of the City's residents live within walking distance (1/2 mile) of a park, compared to 98% in San Francisco, 96% in New York, and 90% in Chicago[12]. In a city where public gathering spaces are few, creative solutions have to be employed. The flexible nature of complete streets can allow an underutilized space to be converted to other uses fitting to the situation.

Short-term repurposing of streets for non-vehicular purposes can be a highly effective means of encouraging people to get outside, promoting both physical activity and social connections.

12 *The Trust for Public Land, Center for City Park Excellence, "2012 City Park Facts"*

3.12 Proposed Streets

Plan for and accommodate future growth areas through the identification of “proposed streets” during the community planning process.

The potential future location for proposed streets are identified in the Community Plan maps to improve and/ orcomplement existing local circulation.

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STOP# 6178
LADOT
DASH
CITY WEST
LADOT
13309
Stops
1st & Los Angeles (Westboun...
As of 02:05:35PM Monday
Live Map
Static Map
Bus Arrival Times
arriving
bus 13309 at 2:05 PM
Is It Accurate?
in 21 min
bus 13311 at 2:26 PM
Is It Accurate?
in 28 min
bus 15301 at 2:33 PM
Is It Accurate?
SMS/Text Access
Text "ladot 6178" to 41411
Phone Access

Chapter 4: Collaboration, Communication & Informed Choices

Discussion

Objectives

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4.1 New Technologies
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4.4 Community Collaboration
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4.13 Parking and Land Use Management
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Collaboration, Communication & Informed Choices

Real-time information, open-source data, transparency, monitoring, reporting, departmental and agency cooperation, database management, parking options, loading and unloading, goods movement

Discussion

Whether it is providing information about the cost and availability of a public parking space, the arrival of the next bus, or the current speeds on a freeway, real-time technology is changing the way we think about our travel. In recent years, the advent of mobile phone applications has resulted in better management of travel decisions due to the predictability that real-time technology provides. The impact of new technologies on our day-to-day mobility demands will continue to become increasingly important in the future.

The amount of information made available by new technologies must be managed responsibly in the future. It is not enough to merely produce the data. It must be stored, organized, and made accessible in user-friendly formats so that it can be queried and utilized without complication. As we dive into the next 20 years, new technologies will play a major role in our communities by providing users with better information.

Improved mobility through communication is not limited to technological innovations. New signage and traditional forms of media will continue to play an important role in wayfinding and providing place-based information on things such as parking availability, bike facilities, and local destinations.

Understanding the role that technology plays in our transportation needs is crucial to building better communication channels across the City. Whether it is communication between community members and government, the private and public sector, or various government agencies, effective communication will be paramount in streamlining processes at every level. More importantly, technology will be a vital tool for collaboration, ensuring that the policies and programs guiding our region's future are closely coordinated and well-integrated.

Objectives

- Provide real-time information at all major transit stations by 2020.
- Implement coordinated wayfinding at all major transit stations by 2035.
- Implement wayfinding along all segments of the completed Bicycle Enhanced Network by 2035.
- Install street parking occupancy-detection capability at 50% of on-street parking locations by 2035.
- Coordinate communication with regional transportation agencies and neighboring jurisdictions.

Policies

4.1 New Technologies

4.2 Dynamic Transportation Information

4.3 Fair and Equitable Treatment

4.4 Community Collaboration

4.5 Improved Communication

4.6 Data-Driven Prioritization of Projects

4.7 Performance Evaluation

4.8 Transportation Demand Management Strategies

4.9 Transportation Management Organizations

4.10 Public-Private Partnerships

4.11 Cohesive Regional Mobility

4.12 Goods Movement

4.13 Parking and Land Use Management

4.14 Wayfinding

4.15 Public Hearing Process

4.1 New Technologies:

Support new technology systems and infrastructure to expand access to transportation choices.

The way we move continues to change as technology evolves. Cities need to be prepared to adapt to technological advances as they come – from the newest mobility smartphone application to transportation technology systems that cannot be fathomed in the present day. Encouraging new technology that expands our mobility options involves being open to adapting current infrastructure, whether physical or procedural, to support the new ways we will move in the future.

4.2 Dynamic Transportation Information:

Support a comprehensive, integrated transportation database and digital platform that manages existing assets and dynamically updates users with new information.

Informed users create a cleaner, smarter, and more efficient transportation system. Information regarding road closures, traffic conditions, and arrival times for public transit is important for making better, smarter travel choices. This information affords individuals more flexibility to adjust their travel choices as changes occur in real-time.

A wide variety of relevant transportation data already exists; however, it is scattered across many different sources and sometimes is not easily available. By utilizing emerging spatial and communication technologies, a dynamic, comprehensive transportation database and digital platform could seamlessly manage and share - in real-time - the many types of data gathered locally. In addition to real-time information, the system could use historical trends to predict near-future conditions.



4.3 Fair and Equitable Treatment:

Ensure the fair and equal treatment of people of all races, cultures, incomes and education levels with respect to the development and implementation of citywide transportation policies and programs.

Keeping open communication lines between the City and its residents is crucial. In order to facilitate the fair and equal treatment of its residents, the City should strive to inform and involve environmental justice groups, community-based organizations, and all concerned residents in the planning and monitoring process of new and ongoing transportation policies and programs. Soliciting and incorporating resident feedback will contribute toward citywide transportation policies and programs that emphasize the fair distribution of resources as well as equitable outcomes.

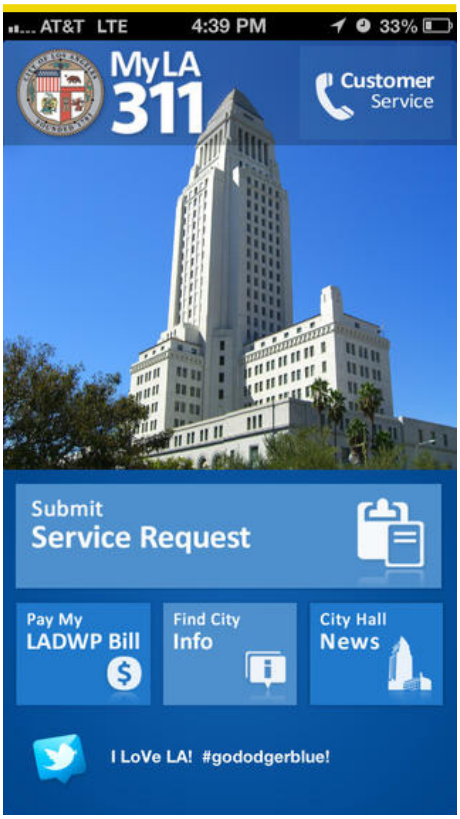
4.4 Community Collaboration:

Continue to support the role of community engagement in the design outcomes and implementation of mobility projects.

Community engagement is important to every stage of the planning phase. As projects get implemented in the City, continued engagement will be essential in finding context-sensitive solutions in various communities that may value different results.







4.5 Improved Communication:

Facilitate communication between citizens and the City in reporting on and receiving responses to non-emergency street improvements.

An open communication platform where citizens have a venue to input street improvements allows for a transparent catalogue that is easily accessible for both the front end and back end users.

In March, 2013, the City released a mobile phone application titled "MyLA311" that allowed residents to submit service requests for potholes, graffiti, broken street lights, and fallen trees in their communities.

4.6 Data-Driven Prioritization of Projects:

Make the most of limited financial resources by utilizing data to prioritize transportation projects based upon equity in safety, public health, access, social benefits, and/or economic benefits.

A data-driven process that identifies a potential list of projects that will have the most impact based on certain criteria is important to making the most of our limited transportation dollars. Because financial resources are constrained, it is important to strategically prioritize improvements to the City's transportation network. Preference can be given to integrated projects that achieve multiple objectives and benefits. Besides being a more efficient use of resources, multi-benefit projects can potentially tap into a larger number of funding sources.

This approach will require considering a wider array of data beyond vehicular throughput, which has traditionally been a primary factor guiding transportation investments. A more comprehensive set of criteria should account for the full range of benefits and impacts associated with any given investment.

4.7 Performance Evaluation:

Evaluate performance of new transportation strategies through the collection and analysis of data.

Data collection, analysis, and monitoring are instrumental to the smart investment in, and development of, programs and strategies that will improve the citywide transportation system. Information such as collision rates, traffic flows, ridership rates and roadway capacities are quantifiable factors that reflect the overall effectiveness of a program. Consistently tracking the progress and performance of new changes to a system (such as added bicycle lanes or new transit lines) allows for refinements to be made to improve the existing system.

Much of the transportation data that monitors traffic flows during peak travel times, ridership rates on various transit lines, and collision rates is collected by LADOT and Metro and is used to analyze the performance of roadway and highway improvements, new transit lines, and increased service. Such monitoring, tracking, and performance review is central to the implementation of programs that diversify the City's transportation system to include pedestrians, bicycles, transit, and vehicles - they provide hard numbers and statistics over time that can support investment in multi-modal transportation systems.

In the past, the City has focused much of its transportation funds on improving roadways for motorized vehicles. However, the growing problem of traffic congestion, air pollution, and decreasing quality of life has created an impetus for new and innovative strategies that reimagine the City's transportation future. Examples of new strategies include:

- Data collected through bicycle and pedestrian counts track the increase in non-motorized travel (citywide),[13] which can be used to improve bike and pedestrian infrastructure on heavily used streets

- LADOT's Shared Lane Marking Study measured the changes in driver and bicycle interactions, showing that sharrows improved driver behavior[14].

13 *Los Angeles County Bicycle Coalition LACBC. (2009). LA Bike Count Results. www.la-bike.org.*

14 *LADOT. (2011). Shared Lane Marking Study Final report June, 2011. Ladot.lacity.org.*



4.8 Transportation Demand Management Strategies:

Encourage greater utilization of Transportation Demand Management (TDM) strategies to reduce dependence on single-occupancy vehicles.

In the City of Los Angeles, 67% of commute trips are made by single-occupancy vehicles [15]. The percentage of commuters who carpool has been steadily declining since the 1970s, mirroring a national trend[16]. Single-occupancy vehicle travel has contributed to severe delays due to traffic congestion, among other problems.

A variety of programs and strategies, which are collectively referred to as Transportation Demand Management (TDM), can reduce the percentage of commuters who drive alone by raising awareness of available alternatives and by offering incentives to make those alternatives more attractive.

The elements of a TDM program are already in place today among major employers. The City of Los Angeles' TDM Ordinance (LAMC 12.26.J), adopted in 1993, mandates that businesses that exceed certain square footage thresholds implement certain TDM measures. Similarly, the South Coast Air Quality Management District's Rule 2202 requires that employers with more than 250 employees at a worksite implement an emission reduction program designed to reduce vehicle miles travelled (VMT) and/or increase average vehicle ridership (AVR)[17].

Transportation Demand Management (TDM) Program Elements

- Telecommuting
- Carpool/Vanpool
- Unbundled parking/ parking cash out
- Transit pass subsidy
- Bicycle facilities (parking/lockers)
- Parking for rideshare/ carshare users
- Parking for scooter/moped/ motorcycle users
- Transportation information center
- Guaranteed ride home
- Flex work hours
- Commuter club (various benefits and incentives)

15 *2007-2011 American Community Survey 5-Year Estimates, Los Angeles City*

16 *SCAG 2012 RTP-SCS, p. 23-4*

17 *http://www.aqmd.gov/trans/rideshare.html*
http://www.aqmd.gov/rules/reg/reg22/r2202.pdf

- **Telecommuting (employees):** Telecommuting programs give employees the flexibility to work from home as opposed to in an office that they would have to travel to. Individually, the benefits of working from home can yield more productive results, as it allows for work to be done within the comforts of one's own home and affords more flexibility in one's personal schedule. Moreover, employees also bypass the stress and costs (e.g. gas, car maintenance, etc.) of having to commute, especially during the rush hour.

- **Telecommuting (employers):** Employers can also benefit from telecommuting programs. By promoting flexible work schedules, they can cut down on the amount of employee absences and tardies that occur from long-distance commutes or morning traffic. Additionally, telecommuting can compensate for a company's limited office space, equipment, and resources that employees may already have at home.

- **Carpool/Vanpool:** Commuters that utilize carpool and vanpool services save money on gas and parking costs. In addition, they can reap the time benefits of a carpool lane and help improve overall air quality from fewer greenhouse gas emissions.

- **Unbundled parking/parking cash out:** A "parking cash out" program can help reduce the amount of solo drivers by requiring employers to offer their workers the option of accepting a cash payment in lieu of a subsidized parking space[18]. A 1997 study revealed that a parking cash out program implemented by eight employers resulted, on average, in a 12% reduction in vehicle emissions[19].

- **Transit pass subsidy:** An employer-subsidized transit pass program can help promote alternative modes of transportation amongst employees or residents, especially in areas with limited parking availability. At the same time, it reduces the number of cars on the road and can save the user money on car-related expenses.

- **Bicycle facilities (parking/lockers):** Adequate bicycle parking is important because it encourages more bike trips. The inability to find bike parking can discourage bicyclists from making the trip at all, or alternatively, convince them to drive instead.

- **Parking for rideshare/carshare users:** Special parking accomodations for rideshare/carshare users not only make these services more attractivee, but also diminish the need to purchase one's own car.

- **Parking for scooter/moped/motorcycle users:** Parking for scooters, mopeds, and motorcycles takes up less space than that needed to accommodate single-occupancy users.

- **Transportation information center:** A transportation information center would assist residents, employees, and visitors with information on transit schedules, commute planning, ridesharing, telecommuting, taxis, para-transit, on-site services, and bicycle and pedestrian routes and facilities.

- **Guaranteed ride home:** A Guaranteed Ride Home (GRH) plan ensures that participating employees that do not drive to work will have access to an emergency ride service when needed. For example, this service can be utilized during the day in cases of a family emergency, or at night if employees are asked to work late into the evening past the hours that their transit service operates.

- **Flex work hours:** Flexible work hours, or "flextime," allows employees to arrive and depart outside of traditional peak-time hours. Flexible work hours help promote trips (especially vehicle trips) during non-peak hours, when roads are less congested.

- **Commuter club (various benefits and incentives):** Members of commuter clubs (i.e., individuals that choose not to drive) can benefit from many transportation services, such as subsidized vanpool or transit passes, discounted daily parking permits, and carshare credits.

18 *http://www.arb.ca.gov/research/apr/past/93-308a.pdf*

19 *http://www.arb.ca.gov/research/apr/past/93-308a.pdf*

4.9 Transportation Management Organizations:

Partner with the private sector to foster the success of Transportation Management Organizations (TMOs) in the City's commercial districts.

Because our City's commercial districts serve as major employment hubs, they face many transportation challenges that warrant specific demand management and mitigation strategies.

Transportation Management Organizations (TMOs) are nonprofit organizations comprised of private employers, property owners, and developers who work together to educate local employees about the benefits of alternative commuting solutions. TMOs function in much the same way as TDM programs, but at the larger scale of a district rather than an individual workplace. By assuming responsibility for the operation of these programs, TMOs make it easier for smaller businesses to offer TDM benefits to their employees.

In the City of Los Angeles, the Warner Center and Century City TMOs effectively work toward improving the traffic conditions and mobility options for employees in their respective areas. Their efforts provide other commercial districts in the City with a blueprint on how to manage and implement the many facets of a successful TMO.

Warner Center TMO

The Warner Center TMO in the San Fernando Valley has developed successful transportation programs that have resulted in better, more efficient circulation in the area. Created in 1988, the nonprofit coalition has developed a robust corporate membership that includes over 30,000 employees. Currently, nearly 1 in 3 Warner Center employees participate in ridesharing, which is considerably more than the regional average. Over the years, the Warner Center TMO has worked to acquire and maintain bicycling-related amenities, bus transit service from multiple agencies (including the Metro Orange Line), a comprehensive vanpool fleet, and a convenient carpooling database. In addition, the TMO works closely with commercial property owners to track ridesharing statistics and travel patterns, in order to meet long-term trip reduction goals.

Century City TMO

Century City TMO's web-based platform, Commute 90067, allows companies and their employees to log trips and accumulate points based on ridesharing participation and the number of miles saved from reduced trips. Companies and individual employees can track their commute behavior and see how they rank amongst their Century City peers. The TMO's useful trip planner feature allows commuters to compare the cost, time, distance, and carbon footprint of their trips in order to help them make the best travel decision. Additionally, the TMO sets an overall "smart commute" goal for all its members to collectively strive for and displays their progress toward that goal on the TMO website.

4.10 Public-Private Partnerships:

Encourage partnerships with community groups (residents and business/property owners) to initiate and maintain enhanced public rights-of-way projects.

The successful planning and implementation of future projects will hinge on the critical partnerships forged between the City and its citizens. Through public-private partnerships, the public sector teams up with the private sector and/or community-based groups on new projects that would otherwise be difficult to undertake single-handedly. For instance, the 2012 unveiling of the Sunset Triangle Plaza in Silver Lake has proven how the City and local community groups can work collectively to bring new, exciting projects to fruition in a shorter time period. A partnership that mutually emphasizes transparent, conscientious decision-making at every step of the process will ultimately yield successful, long-standing projects.

The City can continue to build and maintain strong partnerships with local community groups in a collaborative effort to develop new projects and sustain their long-term viability. These partnerships will allow both parties to carve out a unified vision for projects from the outset. Additionally, they will also help accelerate project timelines by ensuring that the associated risks and responsibilities will not fall squarely on only one party's shoulders. For example, potential issues related to liability insurance, financing mechanisms, and facility management will be negotiated early on by both parties. Moreover, the success of these partnerships will rely on strong leadership from elected officials and community leaders that will see the development process through its entirety and ensure the long-term sustainability of these projects.



4.11 Cohesive Regional Mobility:



Communicate and partner with the Southern California Association of Governments (SCAG), Los Angeles County Metropolitan Transportation Authority (Metro), and adjacent cities and local transit operators to plan and operate a cohesive regional mobility system.

Most people's daily journeys take them across multiple jurisdictional boundaries. For a transportation system to serve their needs effectively, it must work seamlessly. This can only be accomplished through close cooperation between government agencies representing cities and counties throughout the region, along with relevant state and federal partners.

These partnerships must emphasize the importance of having clear communication lines, so as to avoid duplicative services, bureaucratic roadblocks, and conflicting visions. Regularly scheduled coordination meetings between agencies can help ensure that all parties are on the same page. Agencies would also benefit from a web-based application designed to keep all parties up-to-date on the status and timeline of ongoing projects.

Moreover, each agency and department should recognize that data and research produced internally could also be valuable to their partner agencies in accomplishing shared goals. The unobstructed sharing of expertise across jurisdictions will benefit the region as a whole and allow transportation projects to avoid unnecessary delays.





4.12 Goods Movement:

ncrease public awareness about the importance and economic value of goods movement in the Los Angeles region.

Goods movement represents a vital component of our regional economy. Industries directly and indirectly dependent on goods movement (e.g., manufacturing, wholesale trade, retail trade, construction, and warehousing) account for over a third of Southern California's jobs and a third of our region's gross domestic product[20]. These industries are expected to grow substantially in the next 20 years, as greater consumer demand is expected to follow increases in population and employment[21].

The Ports of Los Angeles and Long Beach make up the nation's largest container port complex, moving 43% of the nation's containerized cargo[22]. In 2012, the ports collectively handled nearly $384 billion worth of cargo, or more than $1 billion per day. In addition, both ports generate billions of dollars in local and state tax revenue annually[23].

20 *http://rtpscs.scag.ca.gov/Documents/2012/final/f2012RTPSCS.pdf*

21 *http://rtpscs.scag.ca.gov/Documents/2012/final/f2012RTPSCS.pdf*

22 *http://www.octa.net/pdf/goods_facts.pdf*

23 *http://portoflosangeles.org/pdf/POLA_Facts_and_Figures_Card.pdf*

4.13 Parking and Land Use Management:

Balance on-street and off-street parking supply with other transportation and land use objectives.

Parking in Los Angeles is a crucial but often overlooked element of the larger mobility system in the City and region at large, with significant implications for travel behavior as well as urban form.

An oversupply of parking can undermine broader regional goals of creating vibrant public spaces and a robust multi-modal mobility system.

An abundance of free parking has the effect of incentivizing automobile trips and making alternative modes of transportation less attractive.

Moreover, parking consumes a vast amount of space in the urban environment, land which could otherwise be put to any number of valuable alternative uses. Large parking lots create significant environmental impacts, detract from neighborhoods' visual quality, and discourage walking by increasing the distances between services and facilities.

When planning for parking-related needs, it is important to consider ways of effectively managing parking demand. By appropriately pricing short-term on-street and off-street parking, mobility needs can be accommodated while reducing adverse impacts.



4.14 Wayfinding:

Provide widespread, user-friendly information about mobility options and local destinations, delivered through a variety of channels including traditional signage and digital platforms.

First-time visitors and long-time residents alike depend on wayfinding signage to navigate through the City. The essential function of wayfinding is to facilitate reaching one's destination by indicating directions and distances. The most effective wayfinding also provides information on alternative ways of getting there, and highlights additional points of interest along the way. When designed well, wayfinding can enhance one's surroundings and contribute to a neighborhood's civic pride and unique sense of place, in addition to providing information.

Wayfinding should be a ubiquitous element of the cityscape so as to always be readily accessible. It is particularly important in and around key destinations, along major corridors and at intersections, and at multi-modal mobility hubs such as transit stations.

In addition to traditional signage, technology serves an increasingly valuable role in wayfinding, enabling directions to be individually customized, and delivering a wealth of place-based information.

4.15 Public Hearing Process:

Require a public hearing for the proposed removal of an existing Class II or Class IV bicycle facility.

Open communication in changes to a still nascent network of bikeways benefits stakeholders and maintains the integrity of the long range vision of our transportation system.

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Los Angeles
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Chapter 5: Clean Environments & Healthy Communities

Discussion

Objectives

Policies

5.1 Sustainable Transportation
5.2 Vehicle Miles Traveled (VMT)
5.3 Alternative Metrics
5.4 Clean Fuels and Vehicles
5.5 Green Streets

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Clean Environments and Healthy Communities

Environment, public health, clean air, clean fuels and fleets

Discussion

Transportation is deeply implicated in the health of both human beings and natural systems. Mobility directly impacts human health and wellness, both physical and mental. Active transportation modes such as bicycling and walking can significantly improve personal fitness and create new opportunities for social interaction, while lessening impacts on the environment.



The transportation sector is by far the largest source of greenhouse gas (GHG) emissions and the largest consumer of energy. Transportation is also among the most significant sources of air, water, and noise pollution in the urban environment.

Air Pollution

Despite significant improvements in the last several decades, the Los Angeles region continues to suffer from the worst air quality in the United States[25]. Los Angeles residents are at greater risk for asthma attacks, heart attacks and premature deaths due to air pollution. The Los Angeles Basin is uniquely predisposed to poor air quality, as atmospheric inversions and the surrounding mountain ranges trap air pollutants.

Researchers estimate that air pollution is responsible for more than 7,500 premature deaths per year in the Los Angeles metro area, of which more than 2,000 can be attributed to vehicle emissions alone[26]. Statewide, vehicle emissions result in more than twice as many premature deaths as car crashes[27]. The economic impact of this public health burden is estimated at $22 billion per year in the South Coast Air Basin (in lost days at work, lost days at school, health care, and premature death)[28].

Increases in both the regional population and the stringency of federal air quality standards will pose a significant challenge to cities throughout Southern California. As of August 2013, the South Coast Air Basin is in non-attainment of federal standards for three of the six criteria pollutants: ozone, lead, and fine particulate matter (PM2.5). Under the Clean Air Act, non-attainment areas are required to develop implementation plans outlining specific measures they will take to reduce pollution levels sufficiently to meet the standards. Additionally, all federally supported highway and transit project activities in non-attainment areas are required to demonstrate that they will not cause new air quality violations, worsen existing violations, or delay timely attainment of the standards[29]. The AQMD's 2012 Air Quality Management Plan focuses on bringing the Basin into attainment with the 24-hour PM2.5 standard[30].

In addition to the National Ambient Air Quality Standards (NAAQS)

14 *http://www.stateoftheair.org/2013/city-rankings/most-polluted-cities.html*

26 *Caiazzo, Fabio, et al. "Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005." Atmospheric Environment (2013).*

27 *http://www-fars.nhtsa.dot.gov/States/StatesCrashesAndAllVictims.aspx*

28 *Vision LA, 3*

29 *2012 Air Quality Management Plan (AQMP), 4-14*

30 *South Coast AQMD, 2012 Air Quality Management Plan (AQMP), ES-5*

established by the U.S. EPA, the state of California has set standards for certain pollutants (such as particulate matter and ozone) which are more stringent than the corresponding federal standards. California has also set standards for some pollutants that are not addressed by federal standards.

In 2010, transportation accounted for more than 34% of California's greenhouse gas emissions, the largest by far of any sector[31]. 80% of the transportation-related emissions come from passenger vehicles, equivalent to 160 million tons of carbon dioxide per year[32].

Water Pollution

Urbanization and community development patterns have degraded Los Angeles' local water resources over time in two ways. One is the physical alteration of creeks and streams when they were channelized or buried underground so that development could occur on top of them. This prevents natural ecological and water purification processes from occurring. The second is the runoff from impermeable surfaces, such as streets and parking lots. This increases the volume of water in the creeks and streams during storm events, which makes restoring a natural condition in those waterways difficult. It is also the most significant source of water pollution in local rivers and beaches.

When rain falls on paved surfaces, it picks up an array of pollutants, including pesticides and fertilizers, oil and automotive fluids, heavy metals, animal waste, and litter, before entering the storm drain system. This water is not treated before being released into the ocean, and as a result, Los Angeles County is home to 7 of the 10 most polluted beaches in California[33]. These pollutants endanger the health of plants and animals that inhabit local ecosystems, as well as humans who engage in recreational water-based activities.

"Green infrastructure" and "low impact development" rethink how streets and parking lots are designed. These approaches have the potential to address many problems in the urban environment simultaneously: reducing water pollution levels, flooding problems, and the urban heat island effect; increasing local groundwater supplies; and improving habitat quality and aesthetics[34].

Noise Pollution

Automobile and truck traffic is a leading source of noise in the urban environment, increasing stress levels and reducing quality of life. In contrast, non-motorized modes of transportation such as walking and bicycling generate little or no noise.

Human Health

A 2004 analysis found that each additional hour spent in a car per day was associated with a six percent increase in the likelihood of obesity[35]. Walking to transit or biking adds a fitness element to an everyday routine.

Long commutes can also take a toll on mental health – each hour spent alone in a car is an hour not spent with friends or family. Commuters ensconced in their own cars are deprived of opportunities for serendipitous encounters with neighbors - of the sort that happen on

31 *http://www.arb.ca.gov/cc/inventory/data/graph/graph.htm*

32 *http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-10_2013-02-19.pdf*

33 *http://www.nytimes.com/2013/04/08/us/los-angeles-plan-to-turn-pollution-into-drinking-water.html?_r=0*

34 *TreePeople, Second Nature: Adapting L.A.'s Landscape for Sustainable Living, http://www.treepeople.org/sites/default/files/images/learn/Second%20Nature%20.pdf*

35 *SCAG 2012 RTP-SCS, 30*

a sidewalk. The stresses associated with commuting can occasionally manifest in episodes of "road rage."

Objectives

- Decrease VMT per capita by 5% every five years, to 20% by 2035.
- Meet a 9% per capita GHG reduction for 2020 and a 16% per capita reduction for 2035 (SCAG RTP).
- Convert 100% of City General Services Division vehicle fleet to alternative fuels and/or zero emission vehicles by 2035.
- Convert 100% of City refuse collection trucks and street sweepers to alternative fuels by 2020.
- Reduce transportation-related energy use by 95% and reduce maintenance requirements of City vehicle fleet.
- Reduce port-related diesel particulate matter emissions by 77%, NOx by 59%, and SOx by 93% by 2023, relative to 2005.
- Reduce the number of unhealthy air quality days to zero by 2025.
- Reduce the pollutant load of stormwater runoff to meet Total Maximum Daily Load standards.
- Install more than 1,000 new publicly available EV charging stations throughout the City.

Policies

5.1 Sustainable Transportation

5.2 Vehichle Miles Traveled (VMT)

5.3 Alternative Metrics

5.4 Clean Fuels and Vehicles

5.5 Green Streets

5.1 Sustainable Transportation:

Encourage the development of a sustainable transportation system that promotes environmental and public health.

A healthy transportation system complements a healthy city by allowing people to make choices that are more environmentally sustainable and physically beneficial transportation choices. To do that, other options like walking, biking, and transit have to be seen as a safe, attractive, and convenient mode choice. Giving people options to make healthy choices by putting the same thought and investment into making walking, biking, and transit viable options is key to improving the health of the City and the people who live here. Sustainable transportation also extends to the circulation of goods movement. Goods movement is important to the City's economic health and a goods movement system that considers local context and integrates clean truck corridors can promote healthy and environmentally safe communities. See Policy 1.8 on goods movement safety.

5.2 Vehicle Miles Traveled (VMT):

Support ways to reduce vehicle miles traveled (VMT) per capita.

Greenhouse gas (GHG) emissions are closely correlated with Vehicle Miles Traveled (VMT)[36]. Reducing VMT is therefore an important component of the overall strategy to reduce GHG emissions. Efficient fuels and alternative vehicle technologies, which produce fewer GHG emissions per mile traveled, are another component.

Reducing VMT requires a combination of sustainable approaches working together:

- Land use policies aimed at shortening the distance between housing, jobs, and services that reduce the need to travel long distances on a daily basis
- Increasing the availability of affordable housing options with proximity to transit stations and major bus stops.
- Offering more attractive non-vehicle alternatives, including transit, walking, and bicycling
- Transportation Demand Management (TDM) programs that encourage ride-sharing
- Pricing mechanisms that encourage commuters to consider alternatives to driving alone, including:
  - Congestion or cordon pricing, which would charge vehicles entering into a congested area (such as downtown during rush hour)

36 *SCAG 2012 RTP-SCS, p. 106*

5.3 Alternative Metrics:

Support a range of transportation metrics to evaluate the multiple purposes that streets serve.

Many jurisdictions have traditionally used the "level of service" (LOS) metric to evaluate potential transportation impacts from development projects. LOS measures vehicle delay at intersections and on roadways, and is represented as a letter grade A through F, with F representing congested conditions.

Because the LOS metric only considers impacts on vehicular movement, it often has the effect of discouraging projects that support alternatives to driving such as public transit, bicycle lanes, pedestrian safety features, and urban infill development. Roadway widening is the typical mitigation measure required for projects that exceed LOS standards. However, wider roads can result in adverse environmental, public health, and fiscal impacts. Wider roads are more expensive to maintain and enable driving at faster speeds in the short term, leading to more pollution, noise, and higher risks to bicyclists and pedestrians in the long term.

SB 743

Senate Bill (SB) 743, enacted in September 2013, creates a process to change the way that transportation impacts are analyzed. The bill tasks the Governor's Office of Planning and Research with proposing an alternative to LOS for evaluating transportation impacts from development projects, particularly in areas served by transit. The new criteria "shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Potential metrics may include vehicle miles traveled (VMT) and automobile trips generated (both overall and per capita). Once developed, the new metrics will be implemented through an amendment to CEQA (California Environmental Quality Act) Guidelines and Thresholds of Significance[37].

37 *http://www.opr.ca.gov/s_sb743.php*

5.4 Clean Fuels and Vehicles:

Continue to encourage the adoption of low and zero emission fuel sources, new mobility technologies, and supporting infrastructure.

Low and zero emission fuel source vehicles are a way of reducing greenhouse gas emissions and air pollution. Reducing vehicle miles traveled is another approach to meeting these outcomes (Policy 5.2). Since vehicles will continue to be a common mode of transportation for the foreseeable future, improving their efficiency is an important complementary policy.

5.5 Green Streets:



Maximize opportunities to capture and infiltrate stormwater within the City's public right-of-ways.

Impervious surfaces such as streets and alleys disrupt the natural hydrological cycle, with numerous consequences. Rain that falls on these surfaces picks up an array of pollutants and carries them into local bodies of water. This stormwater cannot soak into the ground, meaning that local groundwater supplies are not replenished. It also increases the volume of runoff entering storm drains and streams during storm events, which creates the need for engineered flood control channels.

The City's Green Streets Initiative is a program that seeks to address these interrelated problems through the use of stormwater Best Management Practices (BMPs) that mimic natural hydrological functions. Goals of the program include:

- Reducing pollutant levels in stormwater through natural filtration, to improve local water quality and meet regulatory requirements
- Increasing local water supplies by recharging groundwater basins, thereby decreasing dependence on imported water
- Improving air quality and reducing the heat island effect
- Enhancing aesthetics, which can increase pedestrian use of sidewalks and encourage the use of bicycles
- Reducing stormwater runoff to restore the natural stormwater runoff hydrograph of the land mobility pathways occupy.
- Reducing flooding.

Best Management Practices (BMP) include canopy trees, planters, bioswales, pervious paving, infiltration trenches, curb extensions., designing mobility pathways that daylight and restore creeks and streams where they have been buried underground, and focusing on "parkway" areas between the roadway and sidewalk, where stormwater can be easily directed from streets and sidewalks

These BMPs vary in terms of their cost, effectiveness, and the applications for which they are best suited.


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Chapter 6: Action Plan

Introduction

Network Concept Maps

Program Categories

Communication
Data + Analysis
Education
Enforcement
Engineering
Funding
Legislation
Maintenance
Management
Operations
Parking/Loading Zones
Planning + Land use
Public Space
Schools
Support Features

Action Plan

Discussion

An implementation program is a coordinated series of actions the City hopes to take in the future that are broadly intended to advance, over the long term, the General Plan's goals, policies, and objectives. An implementation program is thus a follow-up measure and Chapter 6 is a menu of such programs the City will consider pursuing. Taken as a whole, these programs represent the City's best thinking today on what actions should be taken to make sure that the Plan's aspirations are achieved. Many of these programs can be pursued through initiatives already underway, such as the current effort to rewrite the City's zoning code and LADOT's Strategic Plan. Other programs will require the securing of additional resources. As such, the precise programs the City may pursue, in which order, and when, will in part be opportunity-driven, dependent on the availability of funding, staffing, and other necessary resources.

Program implementation is in large part contingent upon the availability of adequate funding. Funding is likely to change over time due to economic conditions and to fluctuations in the priorities of federal, state and regional funding agencies. None of the projects included here can be implemented unless specific funding is made available.

The Mobility Plan 2035 is implemented by a broad range of programs which encompass amendments to existing plans, ordinances, development standards and design guidelines; capital investments/projects; coordination of economic development/development review processes; and interagency/interjurisdictional coordination. The Action Plan describes each of the implementation programs and identifies the City agencies responsible for implementation. The programs are organized into 15 categories and each program includes reference to the pertinent policies that it implements.

The implementation of programs should prioritize the use of diverse culturally-tailored, multilingual, and neighborhood-based public outreach formats, and include data performance collection protocols that are inclusive of the City's diverse ethnic, disabled, and low income populations. Programs prioritized for implementation should include (as funding and staff is made available) pedestrian safety education, multimodal access and transportation informational campaigns.

The Action Plan also includes the programs that were originally included as part of the 2010 Bicycle Plan and those programs have subsequently been integrated into this plan.

Network Concept Maps

The following maps depict the modal priorities established by the Mobility Plan today. The Plan also recognizes that cities are dynamic and transportation systems may need to be modified over time. Therefore the networks described herein are identified as aspirational network concepts that do not require a plan amendment in order to be modified. While the network concepts are not part of a street's official designation any future changes would still need to comply with State planning law consistency requirements and therefore, meet the goals, objectives and policies of the Mobility Plan. Future projects to improve City right of ways for the enhanced networks, including selecting alternative streets, would be required to be reviewed under CEQA, including under CEQA Guidelines 15162 to determine if a subsequent or supplemental EIR would be required, or whether a completely new CEQA review and clearance would be required.

The Plan also recognizes that flexibility is needed in implementing all or portions of a street segment that may be on one or more of the networks. Given the many street types found throughout the City and the process by which cities evolve it is anticipated that future street improvements may not always fully realize the full design changes that have been conceived and/or articulated here. For example, a street on the Transit Enhanced Network that was identified as being "comprehensive" - meaning that it might ultimately receive a full-time bus lane - might initially receive only a bus lane in the peak period. Or, a street identified as a Tier 1 Protected Bicycle Lane on the Bicycle Lane Network might ultimately be comprised of successive segments that could include a bicycle lane, a protected bicycle lane and even perhaps a short segment that includes a sharrow. The Plan is not intended as a recipe book that must be followed to the letter but simply a preliminary roadmap to guide the City in making future multi-modal improvements that improve the overall safety of the City's streets while increasing Angelenos' access to multiple modal choices.

The street segments indicated on the Networks represent potential opportunities to connect major destinations, but they are not intended to represent the full range of street options that may be considered during the implementation phase. For example, while Westwood Boulevard is identified on the BEN as a plausible north-south means of connecting UCLA with designations to the south, parallel north-south corridors may be substituted to implement Westwood bicycle enhancements and provide an alternative connection to the citywide network, based upon more detailed operational studies and community engagement.

Map B – Transit Enhanced Network: The following map depicts a network of streets prioritized for transit. The Transit Enhanced Network is described in Policy 2.5 of this Plan and sample treatments are presented in the Complete Streets Design Guide. The Transit Enhanced Network covers approximately 300 miles throughout the City of Los Angeles.

Map C1-C5 – Neighborhood Enhanced Network: The following maps depict a network of approximately 800 miles of collector, local, and some arterial streets identified to provide a calm and safe environment for walking, biking, and circulation of slower moving modes. The Neighborhood Enhanced Network is described in Policy 2.4 of this Plan. Examples of treatments for Neighborhood Enhanced Network components are presented in the Complete Streets Design Guide.

Map D1 – D2 – Bicycle Enhanced Network and Bicycle Lane Network: The following maps depict a network of arterial streets and other rights-of-way prioritized for bicycle movement.

The Bicycle Enhanced Network is described in Policy 2.6 of this Plan. Segments of the Neighborhood Enhanced Network have been identified to provide gap closures to the protected bicycle lane system within the Bicycle Enhanced Network. Sample treatments are presented in the Complete Streets Design Guide. The Bicycle Enhanced Network consists of:

Bicycle Paths - Bicycle facilities outside of the roadway, such as the LA River bicycle path. Bicycle Paths cover approximately 150 miles.

Tier 1/ Protected Bicycle Lanes - Bicycle facilities on arterial roadways with physical separation. Protected Bicycle Lanes cover approximately 300 miles.

Neighborhood Enhanced Network - Bicycle facilities on neighborhood serving streets that provide connections within the protected bicycle lane system. Covers approximately 50 miles.

The Bicycle Lane Network consists of: Tier 2 and Tier 3 Bicycle Lanes - Bicycle facilities on arterial roadways with striped separation Tier 2 bicycle lanes consist of approximately 400 miles. Tier 3 bicycle lanes consist of approximately 200 miles of bikeways. Tier 2 bicycle lanes are more likely than Tier 3 bicycle lanes to be built by 2035.

Map E – Vehicle Enhanced Network: The following map depicts a network of streets prioritized for vehicular movement. The Vehicle Network is described in Policy 2.7 of this Plan. The

Vehicle Enhanced Network covers approximately 80 miles of arterials throughout the City of Los Angeles.

Map F – Pedestrian Analysis: The following map depicts targeted areas on arterial streets prioritized for pedestrian safety enhancements. Pedestrian infrastructure is described in Chapter 2.3 of this Plan and sample treatments are presented in the Complete Streets Design Guidelines. This analysis is a snapshot in time and will require update as implementation occurs.

Map G – Goods Movement: The following map depicts the existing freight movement facilities (including the major intermodal terminals: LAX, Van Nuys Airport, Port of Los Angeles). Goods Movement is discussed in Policies 1.8, 2.8, and 4.12 of this Plan. Goods movement is further discussed on a regional level in Metro's Countywide Strategic Truck Arterial Network.

Program Categories

Communication

Data + Analysis

Education

Enforcement

Engineering

Funding

Legislation

Maintenance

Management

Operations

Parking/Loading Zones

Planning + Land use

Public Space

Schools

Support Features

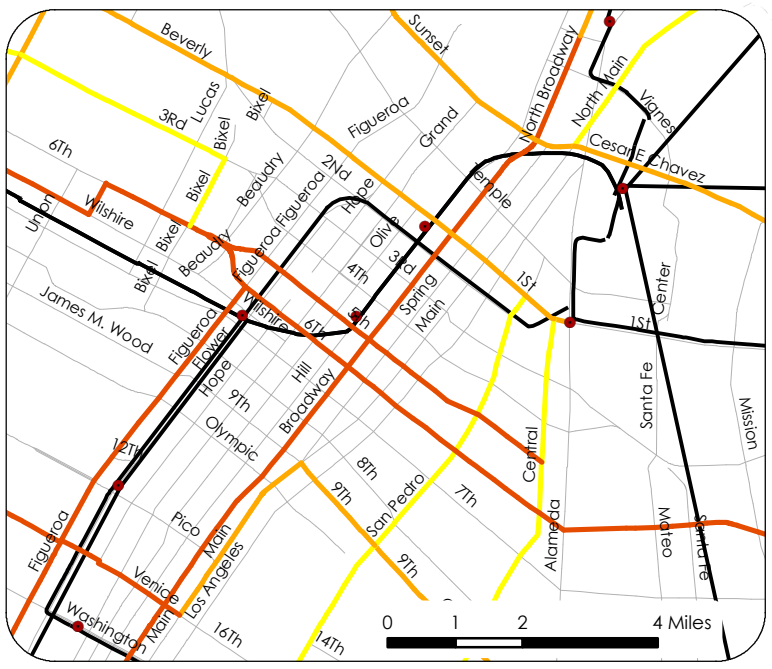
It is important to emphasize that none of the programs described in Chapter 7 represent a mandatory duty or other official obligation on the part of the City. On the contrary, priorities and perspectives continually evolve. New techniques and superior methods to achieve the Plan's aspirations may be identified. Conversely, what worked at one time may no longer work. As such, the program strategies the City may pursue are subject to change. The City thus retains the flexibility to make adjustments and mid-course corrections as deemed advisable, and may do so without formally amending the Mobility Plan, including changes to the Network Concept Maps.

Implementation of the Plan depends on four factors:

1. Significant and sustained funding for projects and staff, particularly by prioritizing projects in federal, state, and local transportation programs
2. A commitment by key city agencies to implement the recommended strategies
3. A strong partnership with the community
4. Political support

N

DOWNTOWN LOS ANGELES



TRANSIT ENHANCED NETWORK

Map B

- Moderate Transit Enhanced Streets
- Moderate Plus Transit Enhanced Streets
- Comprehensive Transit Enhanced Streets
- Future Valley/ West Transit Study Corridor
- Existing & Planned Rail/Busway
- Transit Stations
- Arterials
- Freeways
- City of Los Angeles Boundary

0 2.5 5 7.5 10 Miles

September 2016

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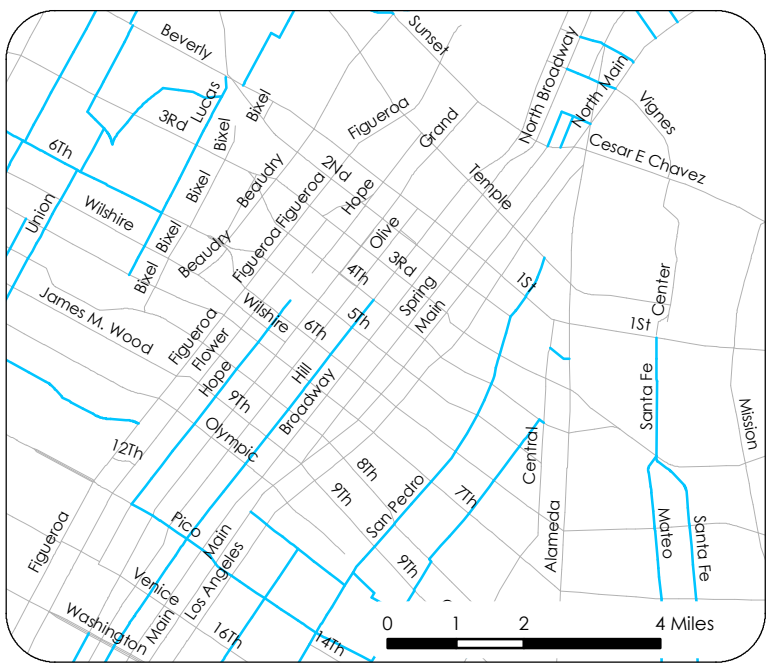
DOWNTOWN LOS ANGELES



Consider incorporating NEN type improvements to any street that serves a school, park, community gathering place or major employment destination within Cal EPA's SB 535 list of Disadvantaged Communities to ensure a safe and pleasant active transportation option. This map may further be amended, as described in program PL 4, as a result of future analysis during a community plan update.

NEIGHBORHOOD ENHANCED NETWORK

Map C1

- Neighborhood Network
- Arterials
- City of Los Angeles Boundary

0 2.5 5 7.5 10 Miles

September 2016

NEIGHBORHOOD ENHANCED NETWORK - VALLEY SUBAREA

Map C2

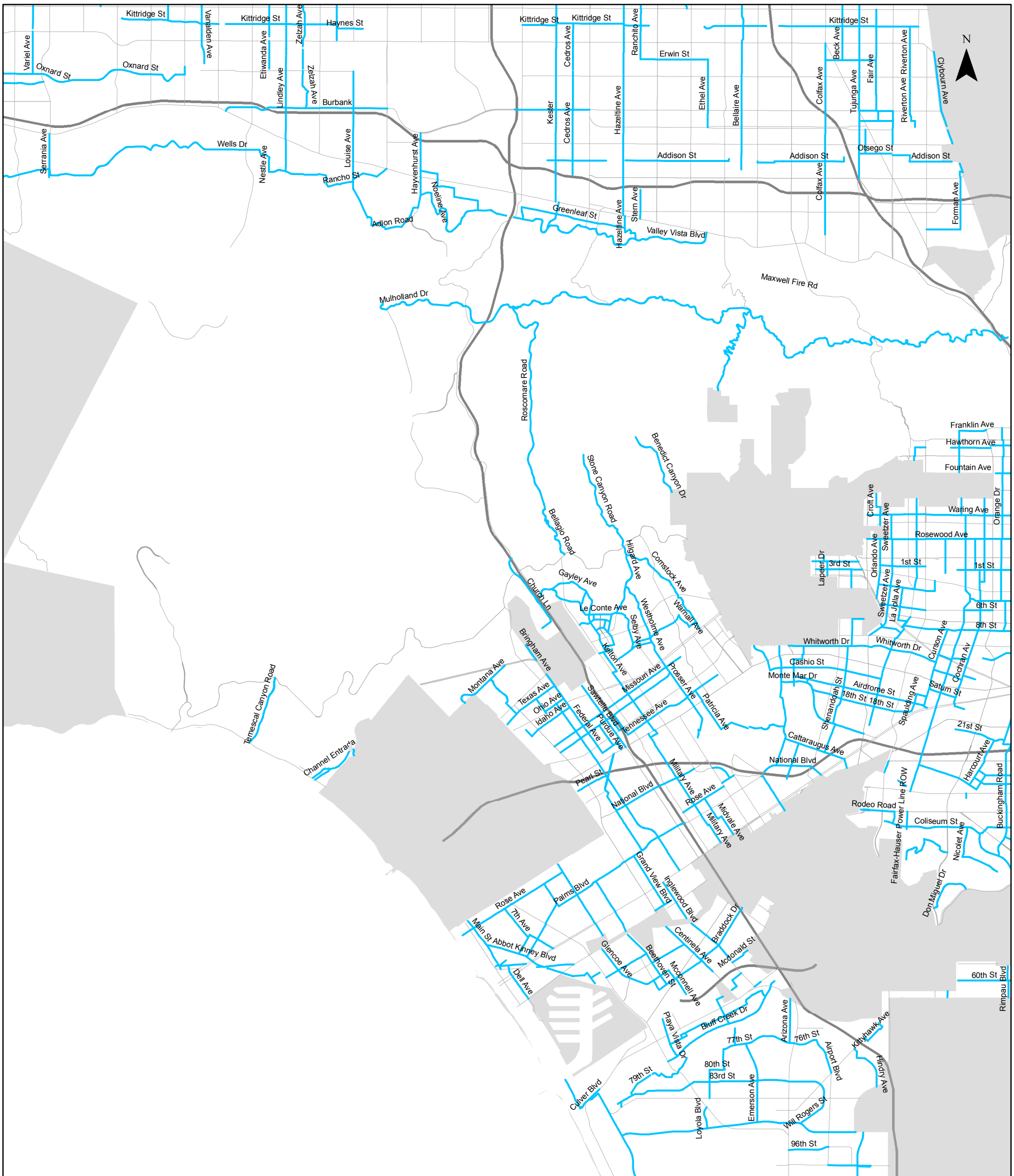
- Neighborhood Network
- Arterials
- City of Los Angeles Boundary

Consider incorporating NEN type improvements to any street that serves a school, park, community gathering place or major employment destination within Cal EPA's SB 535 list of Disadvantaged Communities to ensure a safe and pleasant active transportation option. This map may further be amended, as described in program PL 4, as a result of future analysis during a community plan update.

N

0 2 4 6 Miles

September 2016



NEIGHBORHOOD ENHANCED NETWORK-WEST SUBAREA

Map C3

- Neighborhood Network
- Arterials
- City of Los Angeles Boundary

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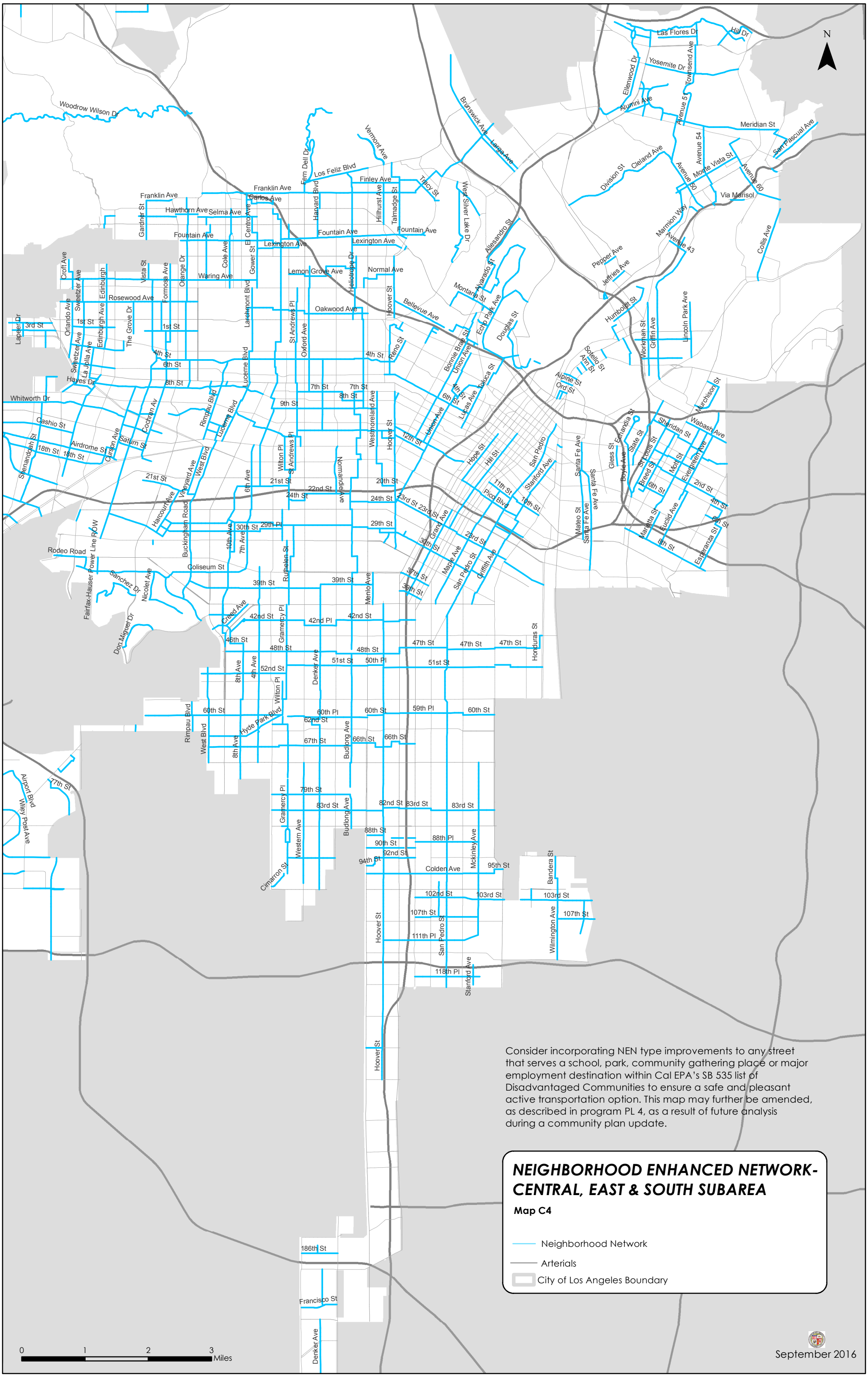
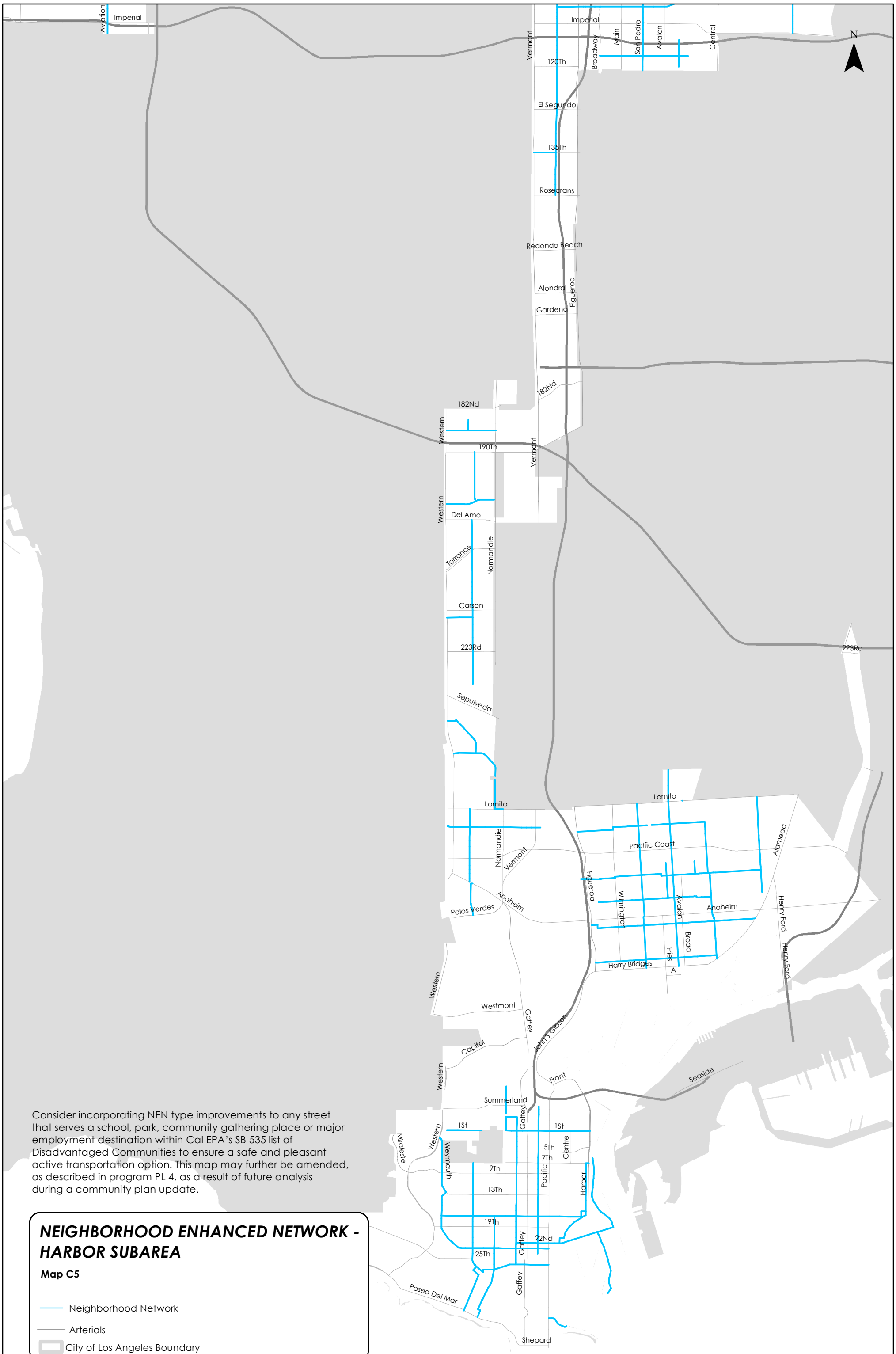
0 1 2 3 4 Miles

September 2016


N
Woodrow Wilson Dr
Las Flores Dr
Hill Dr
Yosemite Dr
Townsend Ave
Ellenwood Dr
Alumni Ave
Avenue 51
Meridian St
San Pascual Ave
Brunswick Ave
Larga Ave
Vermont Ave
Fern Dell Dr
Los Feliz Blvd
Finley Ave
Franklin Ave
Carlos Ave
Harvard Blvd
Hillhurst Ave
Talmadge St
Tracy St
West Silver Lake Dr
Allesandro St
Division St
Cleland Ave
Avenue 54
Monte Vista St
Avenue 60
Via Marisol
Marmion Way
Avenue 43
Collis Ave
Gardner St
Hawthorn Ave
Selma Ave
Centro Ave
Fountain Ave
Lexington Ave
Cole Ave
Gower St
Waring Ave
Lemon Grove Ave
Heliotrope Dr
Normal Ave
Hoover St
Bellevue Ave
Montana St
Alvarado St
Echo Park Ave
Douglas St
Pepper Ave
Jeffries Ave
Humboldt St
Workman St
Griffin Ave
Lincoln Park Ave
Sotello St
Alm St
Alpine St
Ord St
Croft Ave
Sweetzer Ave
Edinburgh
Vista St
Formosa Ave
Orange Dr
Rosewood Ave
Orlando Ave
Edinburgh Ave
The Grove Dr
Laurel Dr
3rd St
1st St
La Jolla Ave
Hayes Dr
Lucerne Blvd
Larchmont Blvd
St Andrews Pl
Oxford Ave
Oakwood Ave
4th St
6th St
8th St
7th St
9th St
Reno St
Bonnie Brae St
Union Ave
Lucas Ave
Toluca St
Whitworth Dr
Cashio St
Shenandoah St
Curson Ave
Cochran Av
Saturn St
Airdrome St
18th St
Rimpau Blvd
Vineyard Ave
West Blvd
Wilton Pl
Normandie Ave
Westmoreland Ave
Hoover St
12th St
Hope St
Hill St
San Pedro
Stanford Ave
Santa Fe Ave
Gless St
Echandia St
Boyle Ave
State St
St Louis St
Breed St
Mott St
Evergreen Ave
Sheridan St
Wabash Ave
Murchison St
2nd St
4th St
6th St
8th St
Marietta St
Euclid Ave
Esperanza St
21st St
22nd St
24th St
20th St
11th St
Pico Blvd
10th St
23rd St
Harcourt Ave
Buckingham Road
6th Ave
10th Ave
7th Ave
30th St
29th Pl
29th St
Grand Ave
Maple Ave
San Pedro St
Griffith Ave
Mateo St
Santa Fe Ave
Rodeo Road
Fairfax-Hauser Power Line ROW
Coliseum St
Sanchez Dr
Nicolet Ave
Ruthelen St
39th St
37th St
Menlo Ave
Don Miguel Dr
Creed Ave
42nd St
42nd Pl
Gramercy Pl
46th St
48th St
47th St
Honduras St
8th Ave
4th Ave
52nd St
51st St
50th Pl
Denker Ave
Wilton Pl
60th St
60th Pl
62nd St
59th Pl
Rimpau Blvd
West Blvd
Hyde Park Blvd
67th St
66th St
Budlong Ave
77th St
Airport Blvd
Wiley Post Ave
79th St
83rd St
82nd St
88th St
88th Pl
90th St
92nd St
94th St
Western Ave
Cimarron St
Mckinley Ave
Colden Ave
95th St
Bandera St
102nd St
103rd St
107th St
111th Pl
118th Pl
Stanford Ave
Wilmington Ave
Hoover St
186th St
Francisco St
Denker Ave
Consider incorporating NEN type improvements to any street that serves a school, park, community gathering place or major employment destination within Cal EPA's SB 535 list of Disadvantaged Communities to ensure a safe and pleasant active transportation option. This map may further be amended, as described in program PL 4, as a result of future analysis during a community plan update.
NEIGHBORHOOD ENHANCED NETWORK-CENTRAL, EAST & SOUTH SUBAREA
Map C4
Neighborhood Network
Arterials
City of Los Angeles Boundary
0
1
2
3
Miles
September 2016



Consider incorporating NEN type improvements to any street that serves a school, park, community gathering place or major employment destination within Cal EPA's SB 535 list of Disadvantaged Communities to ensure a safe and pleasant active transportation option. This map may further be amended, as described in program PL 4, as a result of future analysis during a community plan update.

NEIGHBORHOOD ENHANCED NETWORK - HARBOR SUBAREA

Map C5

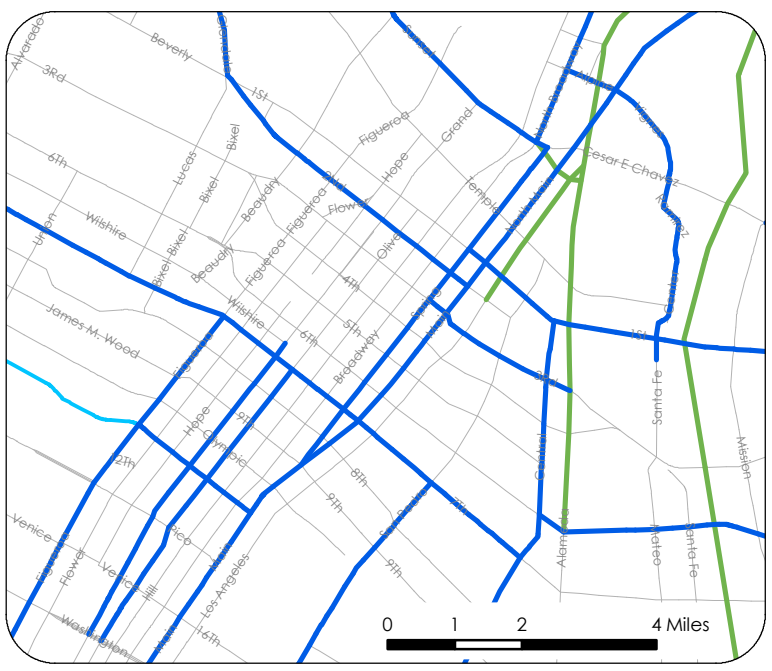
- Neighborhood Network
- Arterials
- City of Los Angeles Boundary

0 1 2 3 Miles

September 2016

N

DOWNTOWN LOS ANGELES



BICYCLE ENHANCED NETWORK (LOW STRESS NETWORK)

Map D1

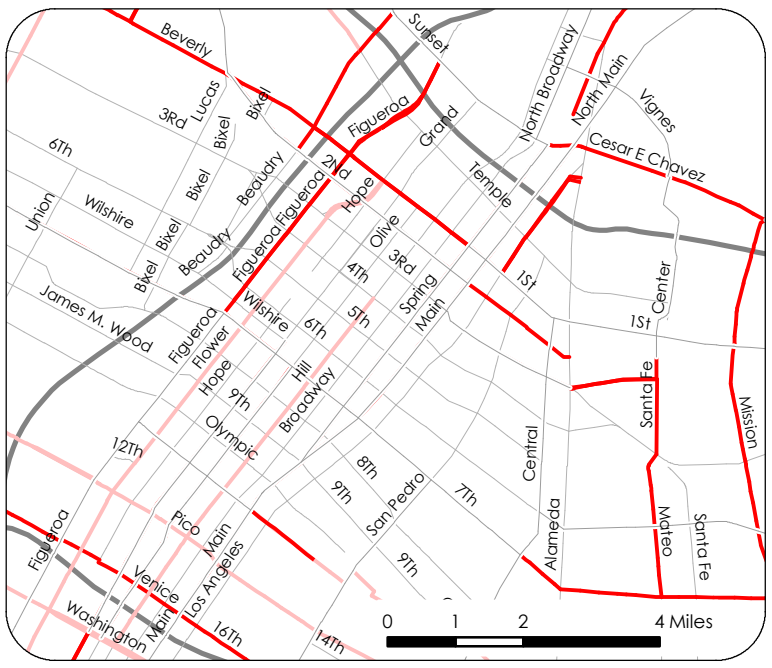
- Bicycle Paths
- Tier 1 Protected Bicycle Lanes
- BEN Segments from the Neighborhood Enhanced Network
- Arterials
- Freeways
- City of Los Angeles Boundary

0 3 6 9 Miles

September 2016

N

DOWNTOWN LOS ANGELES



BICYCLE LANE NETWORK

Map D2

- Tier 2 Bicycle Lane
- Tier 3 Bicycle Lane
- Arterials
- Freeways
- City of Los Angeles Boundary

0 2.5 5 7.5 10 Miles

September 2016

VEHICLE ENHANCED NETWORK

Map E

- Vehicle Enhanced Network
- Arterials
- Freeways
- City of Los Angeles Boundary

0 2.5 5 7.5 10 Miles

September 2016

N

DOWNTOWN LOS ANGELES



PEDESTRIAN ENHANCED DISTRICTS

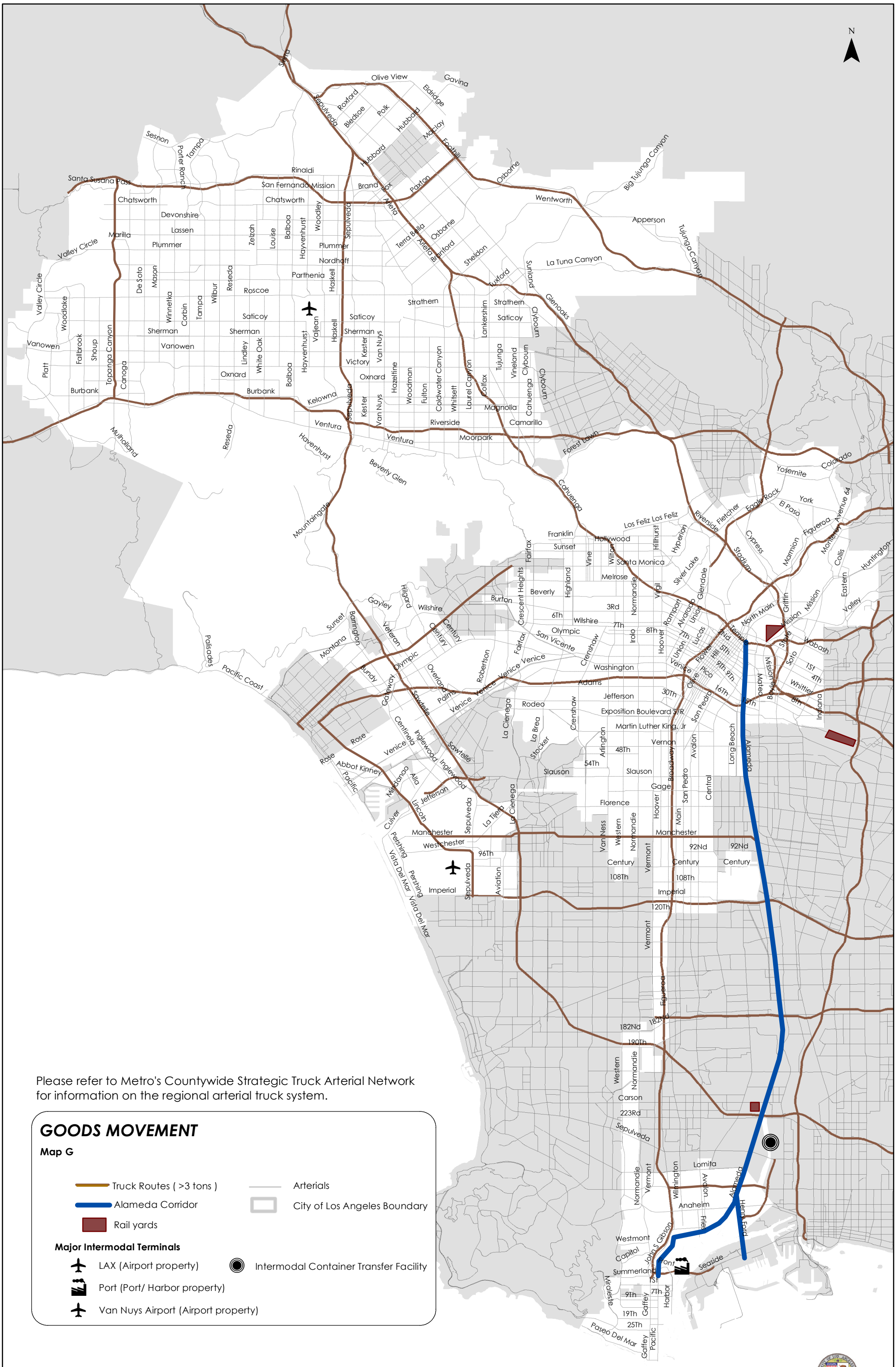
An Analysis of Walkability and Safety Factors
Map F

- Pedestrian Segments
- Arterials
- Freeways
- City of Los Angeles Boundary

Consider incorporating pedestrian type improvements to any street that serves a school, park, community gathering place or major employment destination within Cal EPA's SB 535 list of Disadvantaged Communities to ensure a safe and pleasant active transportation option. This map may further be amended, as described in program PL 4, as a result of future analysis during a community plan update

0 2 4 6 8 Miles

September 2016


N
Olive View
Gavina
Roxford
Bledsoe
Polk
Hubbard
Eldridge
Sepulveda
Foothill
Sesnon
Porter Ranch
Tampa
Rinaldi
Santa Susana Pass
San Fernando Mission
Brand
Paxton
Osborne
Big Tujunga Canyon
Wentworth
Apperson
Tujunga Canyon
Chatsworth
Devonshire
Lassen
Marilla
Plummer
Valley Circle
Zelzah
Louise
Balboa
Hayvenhurst
Woodley
Nordhoff
Parthenia
Haskell
Arleta
Terra Bella
Osborne
Branford
Sheldon
Tuxford
La Tuna Canyon
Sunland
Glenoaks
Clybourn
De Soto
Mason
Winnetka
Corbin
Tampa
Wilbur
Reseda
Roscoe
Woodlake
Fallbrook
Shoup
Topanga Canyon
Canoga
Platt
Saticoy
Sherman
Vanowen
Lindley
White Oak
Oxnard
Burbank
Valjean
Kester
Van Nuys
Victory
Hazeltine
Woodman
Fulton
Coldwater Canyon
Whitsett
Laurel Canyon
Colfax
Tujunga
Vineland
Clybourn
Cahuenga
Magnolia
Lankershim
Strathern
Kelowna
Ventura
Riverside
Camarillo
Moorpark
Forest Lawn
Mulholland
Haverhurst
Beverly Glen
Reseda
Cahuenga
Colorado
Yosemite
Eagle Rock
El Paso
York
Avenue 64
Figueroa
Riverside
Fletcher
Cypress
Stadium
Mammion
Monterey
Collis
Huntington
Eastern
Valley
Mountaingate
Los Feliz Los Feliz
Franklin
Hollywood
Sunset
Fairfax
Vine
Wilton
Hillhurst
Hyperion
Silver Lake
Glendale
Santa Monica
Melrose
Highland
Normandie
Virgil
Rampart
Alvarado
Union
Lucas
Beverly
Burton
Crescent Heights
Hilgard
Gayley
Wilshire
3Rd
6Th
7Th
8Th
Olympic
San Vicente
Irolo
Hoover
Crenshaw
Fairfax
Veteran
Century
Sunset
Barrington
Montana
Palisades
Pacific Coast
Bundy
Gateway
Overland
Robertson
Venice
Washington
Adams
Jefferson
Rodeo
Exposition Boulevard S/R
Martin Luther King, Jr
Vernon
48Th
54Th
Slauson
Gage
Florence
Manchester
Westchester
96Th
Century
108Th
Imperial
120Th
182Nd
190Th
Carson
223Rd
Lomita
Anaheim
Westmont
Capitol
Summerland
Seaside
Long Beach
Alameda
Henry Ford
Avalon
Broadway
San Pedro
Main
Central
Griffin
Mission
North Main
Temple
Hill
Flower
Figueroa
Olive
Pico
9th
7th
5th
2Nd
16th
15th
30Th
Soto
Mission
Boyle
Mateo
1St
4th
Whittier
8th
Indiana
Wabash
Sepulveda
Aviation
Pershing
Vista Del Mar
Culver
Jefferson
Lincoln
Alla
Milbrae
Abbot Kinney
Pacific
Rose
Venice
Inglewood
Centinela
Sawtelle
La Cienega
La Brea
Stocker
Crenshaw
Arlington
Van Ness
Western
Normandie
Vermont
Wilmington
Avalon
Figueroa
Harbor
Gaffey
Miraleste
Paseo Del Mar
Pacific
Please refer to Metro's Countywide Strategic Truck Arterial Network for information on the regional arterial truck system.
GOODS MOVEMENT
Map G
Truck Routes (>3 tons)
Alameda Corridor
Rail yards
Arterials
City of Los Angeles Boundary
Major Intermodal Terminals
LAX (Airport property)
Port (Port/ Harbor property)
Van Nuys Airport (Airport property)
Intermodal Container Transfer Facility
0
2.5
5
7.5
10
Miles
September 2016

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Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
C.1	Bicycle Ambassador Program. Develop a Bicycle Ambassador program to attend public events including health fairs and communitiy bike rodeos to broaden awareness of bicycling and provide safety information.	DOT, bicycle nonprofits	3.5, 2.6, 4.4,	Communication
C.2	Bike to Work Week. Expand the regional efforts of Bike-to-Work Week by providing City sponsored events and pit stops in every council district and supporting bicycling to school for students. Provide information, support services and incentives for bicyclists to bicycle to work and school. Distribute materials and post information on Bicycle Program Websites.	Mayor, Council Offices, LAUSD, DOT, SCAG, Metro	5.1, 2.6, 1.3	Communication
C.3	Bus Arrival Information. Work with Metro, municipal transit providers, and local businesses and organizations to provide bus arrival information near station and stop areas.	Metro, DOT, Mayor's Office, BSS, Council Offices	4.2, 4.11	Communication
C.4	Car Free Days. Coordinate a Car-Free Day on a regular basis each month. Provide information and incentives for drivers to leave the car behind for a day. Work with Metro and City Council offices to provide incentives and disseminate materials to event participants.	DOT, DPW, Council Offices, Mayor, SCAG, Metro	5.2, 4.8	Communication
C.5	Citywide Active Transportation Map. Provide and distribute physical and electronic copies of the City's existing bikeway facilities, neighborhood greenways and safe routes to school along with information about public bicycle parking facilities and mobility hub facilities.	DOT Systems, Planning, DOT Bikeways, Metro, Council Offices	4.14	Communication
C.6	Citywide Bicycle Transportation Website. Continue to maintain the BicycleLA.org website to provide bicyclists with current information about safety, future improvements, events, network maps, route information and suggestions, maintenance and other relevant information.	DOT	4.14, 1.6	Communication
C.7	Multi-Modal Access Campaign. Develop a Multi-Modal Access Campaign, in collaboration with Metro, SCAG and other transportation providers, to highlight the availability (all day, every day) of multiple transportation options (transit, vanpool, car share, bikeshare, bicycling, walking, etc.) across the region.	Metro, SCAG, DOT, BBB, Culver City Bus, Metrolink, Foothill Transit, Orange Transit, Gardena Transit	3.5, 4.11	Communication
C.8	Neighborhood Network and Business District Maps. Work with local Business Improvement Districts, Neighborhood Councils, Homeowner Associations and Chambers of Commerce to develop, fund, and distribute physical and electronic maps of localized portions of the existing bikeways, neighborhood network streets, and bicycling supportive businesses.	DOT, Council Offices	4.14	Communication
C.9	Poster Campaigns. Promote awareness of the various networks, streetscape, and green or "great street" improvements through the installation of posters and/or banners. Installation could be either temporary or permanent and could be used to inform the community about the Networks as well as focus on a variety of topics including safe driving practices and/or bicycling encouragement.	DOT, Mayor's Office, Council Offices	4.14	Communication
C.10	Roadway Safety Campaigns. Conduct outreach citywide to advance vision zero goal.	DOT, LAPD, Caltrans, OHS, LAUSD, LASPD, Council Offices	1.2	Communication
C.11	Timely Information. Provide timely information on current roadway work, including scheduled maintenance, work in progress and completed projects. Use temporary signage, social media, and web banners to warn users and provide detour strategies for vehicles, pedestrians and bicyclists. Promote the State-wide 511 Real Time Travel Information System.	DOT, BOE, BSS, Council	4.2, 1.6, 4.14	Communication

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
C.12	Wayfinding. Develop and install a comprehensive way-finding program throughout the City to provide information about transportation routes, schedules, bikeways urban trails, and area amenities including schools, parks, cultural and retail activities.	DOT, DCP, Mayor's Office, BSS, Council Offices	4.14	Communication
C.13	CSTAN. In collaboration with Metro support efforts to promote goods movement traffic to the CSTAN and identify funding to maintain corridors.	DOT	4.14	Communication
D.1	Analysis of Existing Paths. Identify and map paved paths within City parks suitable for bicycling. Emphasize opportunities for gap closures in the active transportation network.	RAP, Council Offices	2.6	Data & Analysis
D.2	Annual Counts of Bicyclists and Pedestrians (Active Transportation). Initiate a long term strategy to count the number and type (by sex, age, disability, income and geography) of bicyclists and pedestrians traveling for all trips on the Networks and other City streets each year . Identify a specific date and locations for the annual count. The number of locations that are included each year should increase as funding increases. Utilize the locations, date, and time of the count conducted by the Los Angeles County Bicycle Coaliton (LACBC) in 2009 as the baseline; implement a methodology that is consistent with SCAG and Metro/UCLA Luskin Center.	DOT, DCP, Mayor's Office of Technology, LAPD, Council Offices	4.11, 3.1, 1.4, 2.3, 2.6, 2.15	Data & Analysis
D.3	Semi-Annual Survey. Conduct in-person and on-line interviews annually about active transportation implementation. In particular, identify on-going concerns and listen to suggested improvements. Collect data on problem areas (not just where collisions have occurred but where "near-misses" frequently occur) and identify solutions.	DOT, DCP, Council Offices	4.11, 4.10	Data & Analysis
D.4	Collision Monitoring and Analysis. Annually identify locations with high levels of auto, pedestrian, and bicycle collisions and develop and implement strategies to improve the safety of these areas and reduce overall collision rates. Analyze bicycle crash data from the Statewide Integrated Traffic Records System (SWITRS) and other sources to evaluate the impacts of prior improvements. Use collision data to produce hot zone maps (GIS maps that reflect crash data citywide) and to conduct case studies of potential improvments to reduce collisions. Coordinate engineering and enforcement reporting systems to avoid duplication and/or overlooked emergency room data; with support and data from LAPD, LAFD and LAUSD.	DCP, DOT, LAPD, LAFD, Council Offices	1.1, 4.11	Data & Analysis
D.5	Data Collection Protocols. Establish before and afer data collection protocols for all projects.	DOT, DCP	4.6, 4.7	Data & Analysis
D.6	Goods Movement Information. Compile goods movement data from the Port of Los Angeles, Los Angeles World Airport and regional goods movement providers to monitor and assess economic fluctuations.	Port, LAWA	4.12, 4.6	Data & Analysis
D.7	Greenhouse Gas Emission Tracking Program. Quantify total reduction in GHG from vehicle miles traveled reductions. Include data in the Citywide Climate Action Plan and the Climate Action Registry. Maintain a database of completed infrastructure projects; track and apply offset credits (resulting from GHG and VMT reductions) towards the city's compliance with SB 375, AB 32 and the region's Sustainable Community Strategy.	Mayor's Office on Environment and Sustainability, DCP, Council, SCAQMD	5.1, 5.4, 4.11	Data & Analysis

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
D.8	Mountain Trail Spillover and Conflict Resolution Analysis. Conduct a spillover analysis to determine the extent to which mountain biking use spills over onto trails where biking is prohibited. Examine other jurisdictions to understand how they accommodate mountain biking and how they have managed conflicts.	RAP, DPW, Council Offices	1.9	Data & Analysis
D.9	Off-Road and Park Trail Bicycle Database. Develop a database and create maps of mountain and park bicycling trails within and adjacent to the City of Los Angeles.	RAP, DCP, DOT, LAPD, Council Offices	1.9	Data & Analysis
D.10	Revised Traffic Analysis Methodology. Establish a revised Traffic Analysis Methodology (TAM) that takes into consideration a project's location, design and density, based on CEQA revisions, OPR guidelines, and other state/regional authorities	DOT, DCP	5.3	Data & Analysis
D.11	Unimproved/Off-Road Database. Inventory all unimproved roads and determine their suitability for mountain biking and off-road facilities.	RAP, DCP, DOT, LAFD, Council Offices	1.9	Data & Analysis
D.12	Strategic Capital Planning Group. Establish an inter-departmental Group to determine , using data and prioritization criteria,a list of priority projects and match to funding sources.	CAO, DCP. BPE. BSS. BSL, BOE, Council Offices	4.6, 4.11, 4.7, 2.15	Data & Analysis
ED.1	Bicycle Parking Training. Develop a Bicycle Parking Requirement Training Presentation and Handbook and post on the Bicycle website. Provide training sessions to the Departments of Building and Safety, Planning, Engineering, and all other public counter staff on the LAMC bicycle parking requirements.	DBS, DOT, DCP	2.6, 3.8	Education
ED.2	Design Workshops. Host/participate in workshops on active transportation facility design.	DOT, DCP, Council Offices	1.4, 2.2, 4.4, 4.10	Education
ED.3	Goods Movement Awareness. Develop and implement strategies to increase coordination of issues relating to goods movement and increase awareness of economic role of goods movement.	POLA	1.8, 2.8, 4.12, 2.10	Education
ED.4	LAPD Officer Training. Train officers on the rights and responsibilities of all roadway users and improve their ability to evaluate conflicts and collisions between different modal users.	LAPD	1.2	Education
ED.5	Rail Crossing Safety. Work with local and regional passenger and freight services to educate all users about safe at-grade crossing practices.	DOT, Mayor's Office, Council Offices	1.5	Education
ED.6	Roadway Safety Education. Educate law enforcement, heavy duty bus and truck operators, taxis, motorists, all City employees, and roadway users on the rights of, and need for safe motoring skills, around non-motorized active transportation uses. Develop educational/ promotional materials to inform roadway users about the benefits of active transportation facilities.	DOT, POLA, LAUSD, GSD, LAPD, Council Offices	1.1, 1.2, 1.4	Education
ED.7.	Roadway Safety Public Service Announcements. Continue to produce a series of Roadway Safety Public Service Announcements (PSA's) for distribution on television, radio, and outdoor signage.	DOT, LAPD, ITA	1.1, 1.2, 1.5	Education
ENF.1	Commercial Loading Zones. Target enforcement efforts against parking by vehicles not in the act of loading/unloading in Commercial Loading Zones.	DOT	2.10	Enforcement

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
ENF.2	Enforcement Stings. Target enforcement efforts against unsafe behavior by roadway users, especially in school and commercial loading zones. Publicize the stings to encourage healthy interaction among all roadway users.	LAPD, Council Offices	1.1	Enforcement
ENF.3	Local Truck Use. Target enforcement efforts against truck use on local streets where cut-through traffic has been expressly forbidden.	DOT, LAPD, Council Offices	1.8	Enforcement
ENF.4	Speed Limit Enforcement. Execute speed limit enforcement checks 48 hours prior to calculating prevailing speeds in Engineering and Traffic Surveys used for adjusting speed limits.	LAPD, DOT	1.4	Enforcement
ENF.5	Truck Inspection Areas. Develop a Truck Inspection Program in coordination with Highway Patrol and Port of Los Angeles.	DOT, POLA, LAPD	2.8, 4.12	Enforcement
ENF.6	Enforcement Program. Utilize LAPD and LADOT Traffic Officers to identify bicycle lane parking violations and issue citations.	LAPD, DOT, DPW	1.1	Enforcement
ENG.1	ATSAC. Continue to implement and update as needed the City's signal management program (ATSAC) to monitor and manage the traffic flows.	DOT	4.11, 4.2	Engineering
ENG.2	Bicycle-Sensitive Detectors. Continue to install bicycle sensitive detectors at all actuated signal controlled intersections, including pavement markings for bicyclists.	DOT	2.6, 1.2	Engineering
ENG.3	Transit Enhanced Network. Collaborate with transit providers to implement the TEN, an approximately 300 mile network ofroadway improvements to provide a frequent and reliable bus system that interfaces and supports the fixed-transit lines.	DOT, DCP, Metro, Mayor's Office, Council Offices	2.5	Engineering
ENG.4	Bridge Design Program. Incorporate bicycle and pedestrian facilities when designing new or retrofitting bridges. Particular attention to bridge underpasses that cross existing or future bicycle/walking paths to ensure design integration.	DOT, BOE	2.12	Engineering
ENG.5	Caltrans Design. Work with Caltrans to develop and implement design improvements to freeway entrances and exit ramps to transition motorists from freeways speeds to an urban environment that includes vulnerable roadway users.	DOT, Caltrans	1.1, 1.4, 2.2	Engineering
ENG.6	Bicycle Enhanced Network. Create and maintain an interconnected bicycle network of 150 miles of bicycle paths and 300 miles of protected bicycle lanes to provide a regional low-stress bicycle system.	DOT, DCP, Council Offices	1.4, 2.6, 4.14	Engineering
ENG.7	Flexible Installation Standards. Use engineering judgement and the approval of the City transportation engineer or designee, in lieu of warrants, to install facilities that will improve safety and comfort for bicyclists and pedestrians.	DOT, City Attorney, Caltrans, BOE, BSS, BSL	1.4, 2.1, 2.2	Engineering
ENG.8	Grade Crossing Elimination. Work with Southern California Regional Railroad Association (Metrolink) as well as with freight rail operators to eliminate rail/ street at-grade crossings on regional passenger rail and freight lines.	BOE, Port of LA, DOT, FRA, FTA, FHWA, CPUC, Metro, Expo Authority, City Attorney, Railroad Owners and Operators.	1.5	Engineering

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
ENG.9	Green Alleys Program. Continue the Green Alleys program to introduce low-impact development stormwater features and improve the overall quality and safety of neighborhood alleys.	BOS, DOT, LASAN, Council Offices	5.5, 2.3, 1.2, 1.7	Engineering
ENG.10	Industrial Street Infrastructure. Provide adequate street infrastructure in established industrial areas; revise geometric design standards for intersections in/around industrial areas with high truck volumes.	DOT, DCP, BOE	1.7, 1.8, 2.8	Engineering
ENG.11	Manual of Policies and Procedures. Update LADOT Manual of Policies and Procedures to incorporate innovative engineering standards and traffic control devices (for all modes of transportation) included in the City's Complete Street Design Guide. Regularly update both manuals as new standards and devices are adopted by the California Traffic Control Devices Committee in the MUTCD and/or the CA Highway Esign Manual and/or Federal Highway Administration.	BOE, DOT, DCP, LASAN	2.2, 1.4, 1.2	Engineering
ENG.12	Complete Street Design Guide (CSDG). Utilize the CSDG to guide decisions about specific complete street enhancements and potential cross-section designs of streets on the BEN, Bicycle Lane, TEN, PED, and VEN networks.	DCP, BOE, DOT, LASAN, LAPD, LAFD	2.2	Engineering
ENG.13.	Neighborhood Traffic Calming and Slow Zones. Establish a procactive neighborhood traffic management program and institute "slow zones" in targeted areas. Support and advocate for 20 new zones.	DOT, DCP, CLA, LAPD, Council Offices	1.4, 2.4, 3.1, 3.2	Engineering
ENG.14	Neighborhood Enhanced Network. Implement the NEN, an approximately 800 mile system of collector and local streets designed to facilitate pedestrian and bicycle activity. A subset of this network has been priortized to fill gaps in the protected bicycle lane system defined by the Bicycle Enhanced Network.	DOT, DCP, LASAN, Council Offices	2.4, 3.1, 3.2	Engineering
ENG.15	Vehicle Enhanced Network (VEN). Implement the VEN, an 80 mile roadway system of existing city streets that have been prioritized for vehicular movement due to their ability to improve vehicular access to the regional freeway system.	DOT, DCP, BOE, BSS, Council Offices	2.7	Engineering
ENG.16	Los Angeles River. Implement Greenway 2020 (a locally led effort to complete the bicycle path along the entire 32 mile stretch of the Los Angeles River by 2020.) and Los Angeles River Greenway Trail to provide a multi-generational trail and provide active transportation options to disadvantaged communities.	RiverWorks Team and local non-profit partners, Council Offices	2.3, 2.4, 2.6, 3.1	Engineering
ENG.17	Bicycle Lane Network. Implement and maintain an interconnected 700 mile bicycle lane system 300 of which are intended to be upgraded to protected bicycle lanes. See above BEN.	DOT, DCP, Council Offices	1.4, 2.6, 4.14	Engineering
ENG.18	Pedestrian Enhanced Districts. Implement pedestrian improvements on targeted intersections and arterial street segments based on a set of criteria.	DOT, DCP, LASAN, Council Offices	2.3, 3.1, 3.2	Engineering

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
ENG.19	First Mile/Last Mile Transit Connectivity Program. Install pedestrian and bicycle connectivity improvements at every major Metro transit station by providing enhanced sidewalk amenities such as landscaping, shading, lighting, directional signage, shelters, curb extensions and mid-block crosswalks where feasible, ADA rampos, lead pedestrian interval signal phases, secure bike parking, etc.	DOT, Council Offices	3.5	Engineering
F.1	Commercial Vehicle Related Revenue: Dedicate revenues generated by commercial vehicle fees to roadway-related purposes	DOT	1.7, 4.6	Funding
F.2	Congestion and Cordon Pricing. Evaluate potential revenues and performance improvements in congestion relief from the implementation of congestion or cordon pricing. Identify the boundaries of, and access points in and out of cordon pricing districts on which to implement congestion pricing.	DOT, DCP, Mayor's Office, CLA, SCAG, Council Offices	4.6, 4.8	Funding
F.3	Coordinated Grant Application. Establish a coordinated effort to apply for and administer federal, state, and local transportation grants to provide additional funding to support transportation and streetscape efforts.	Mayor's Office, Council Offices, LADOT, DCP, Public Works	1.2, 4.6, 4.11	Funding
F.4	Funding Reports. Identify the total amount of funding needed to design, construct and maintain transportation related priority projects on an on-going basis. Identify existing sources of funds and evaluate funding gaps.	CAO, DOT, BOE, BSS, BOS	1.7, 4.6	Funding
F.5	Maintenance Options. Establish procedures and protocols to facilitate partnerships with community groups and the private sector to provide maintenance of street investments; encourage the utilization of assessment districts by local non-profits or businesses to fund and maintain specific infrastructure improvements	DOT, BOE, BSS, LASAN Council Offices	4.10, 4.6	Funding
F.6	Priority Grading System (PGS). Pursue funding for projects based upon the criteria established by the PGS as defined by the Strategic Capital Planning Group.	DOT, DCP, BOE, BSS, BSL, LASAN	1.7, 4.6	Funding
F.7	State Highway Control. Identify funding, and initiate process with Caltrans to transfer oversight of, and improve State Highways within the City limits including Lincoln, Santa Monica, Venice and Topanga Canyon Boulevards.	Mayor's Office, DOT, DCP Council Offices	2.13, 4.6,	Funding
F.8	State Highway Funding. Coordinate with Caltrans, other local, regional, state and federal agencies, and the private sector to identify and implement funding alternatives for the City's transportation network including the State highway system.	Mayor's Office, DOT, DCP Council Offices	2.13, 4.11, 4.6	Funding
F.9	Active Transportation Funding. Update Mobility Plan every five years to stay competitive for state funding of active transportation grants.	DCP, DOT	1.2, 2.15, 4.6	Funding
L.1	Advocacy for Funding Multi-Modal Infrastructure Projects. Aggressively advocate for continued and expanded Federal, State, Regional, and Local funding for multi-modal transportation programs and infrastructure projects in transportation legislation. Ensure representation of issues with City's lobbyists in Sacramento and Washington DC.	Mayor's Office, City Council, CLA	1.2, 3.5, 4.6	Legislation

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
L.2	Legislation Monitoring. Continually monitor and develop state and federal legislation to support or oppose legislation that could impact plan/project implementation.	DOT, DCP, Mayor's Office, CLA	4.11, 4.6	Legislation
L.3	Posted Speed Limit Reductions. Develop and advocate for state legislation to support reducing posted traffic speeds. Revised methodology should account for all roadway users (including pedestrians and bicyclists), adjacent land uses, and street user demand.	Mayor's Office, CLA	1.4, 1.2, 3.2	Legislation
L.4	Resetting Speed Limits. Evaluate the effectiveness of the State's speed limit requirements on street safety and performance.	DOT, City Attorney	1.4	Legislation
L.5	Tailpipe Emission Legislation. Support legislation to reduce tailpipe emissions from cars and trucks.	Mayor's Office, CLA, SCAQMD	5.3, 5.4	Legislation
L.6	Vehicular Travel Safety Training. Work with the Los Angeles County Superior Court to develop a program that offers training on driving behavior around other users of the roadway to motorists receiving citations and/or involved in collisions with non-auto modes.	DOT, City Attorney, Council Offices	1.1	Legislation
L.7	Local Street Speed Limit. Advocate for and support for a 20 mph speed limit on all local streets within California.	DOT, City Attorney	1.4	Legislation
MT.1	Bicycle Path Maintenance Program. Regulary inspect and maintain Class I bicycle paths.	DOT, BOE, Council Offices	1.7	Maintenance
MT.2	Crosswalk Maintenance. Implement a crosswalk upgrade and maintenance program to ensure all crosswalks are kept to City standards. See Street Design Manual.	DOT, Council Offices	3.2, 1.7	Maintenance
MT.3	Mandeville Canyon Park. Maintain off-road bicycle trails in Mandeville Canyon.	RAP	1.9	Maintenance
MT.4	Notification System. Develop a coordinated interdepartmental maintenance and response program for the City's network of roads and bikeways; continue to utilize DPW service request forms and the 311 System for the public to directly inform the City.	Mayor's Office, BSS, BOE, Council Offices	4.1, 4.2	Maintenance
MT.5	Pavement Preservation Program. Annually fund a baseline pavement preservation program that provides for major rehabilitation (resurface and reconstruction) and preventive maintenance (crack and slurry seal). Make annual schedule public and easily accessible on the BSS website. Prioritize bikeways and other areas of high need. BSS to Coordinate non-emergency resurfacing with other departments one year in advance.	BSS, Council Offices	1.7, 4.6	Maintenance
MT.6	Sidewalk Cleaning. Work with local businesses and community organizations to maintain sidewalks, along arterials, free of debris	Mayor's Office, BSS, Council Offices	1.7, 4.10	Maintenance
MT.7	Sidewalk Repair. Implement a sidewalk improvement program to bring up all existing degraded sidewalk sections to City standards and implement a program to ensure that future degraded sidewalk sections are promptly identified and repaired in a timely manner.	BSS, Council Offices	1.7	Maintenance
MT.8	Street Services Budget Allocation Formula. Continue to utilize the Bureau of Street Services' Budget Allocation Formula that allows for the equalization of pavement conditions citywide.	BSS	1.7	Maintenance

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
MT.9	Street Trees. Implement a tree trimming cycle for all street trees within the public ROW. Use Priority Grading System to prioritize streets.	BSS	1.7, 2.3	Maintenance
MG.1	Five Year Mobility Plan Implementation Report. Develop and submit a report every five years detailing accomplishments of prior five years and prepare a proposed work plan for the next five year cycle.	DCP, DOT, BOE, BSS, BSL, BOS, Council Offices	4.7	Management
MG.2	Green Streets Committee. Continue the Green Streets Committee to identify and evaluate the effectiveness of existing green street features and to continue to identify funding and location options in which to upgrade with green street features.	DOT, DCP, BOE, BSS, LASAN	5.5, 4.6, 4.7	Management
MG.3	Off-Peak Deliveries. Identify and Implement incentives to encourage off-peak hour delivery operations.	DOT, DCP, Mayor's Office	2.10	Management
MG.4	Regional Cooperation. Work cooperatively with adjoining jurisdictions and agencies to coordinate transportation related planing and implementation activities to ensure regional connectivity.	DOT, DCP, Metro, Mayor's Office, SCAG	3.7, 4.11	Management
MG.5	State Highway Management. Collaborate with Caltrans on any modifications to the State highway system necessary to accommodate new development or on any modifications to City's transportation network.	DOT, DCP, Caltrans, Council Offices	2.13	Management
MG.6	State Highway Management continued. Cooperate with Caltrans to identify State highway deficiencies and associated improvement plans, to be used in the City's long range planning and individual project review.	DOT, DCP, Caltrans, Council Offices	2.13, 4.11	Management
MG.7	Transportation Management Organizations. Continue to work with businesses and future development projects to establish geographically and/or industry based Transportation Management Organizations throughout the City for the purposes of implementing a coordinated transportation demand management program.	DCP, DOT , Council Offices	4.9	Management
MG.8	Non-Ownership Models for Vehicle Mobility. Support existing and future innovations that support access to vehicle mobility without the cost and responsibility of ownership.	DOT, Metro, BIDS, Chambers of Commerce, Departments of Aging and Disability, User Groups, Council Offices	4.1, 4.2, 4.10, 5.2, 5.4	Management
O.1	City Fleet. Convert the City's, including proprietary departments, fleets into alternative fuel, very- low and zero-emission vehicles.	GSD, LAWA, POLA, DPW	5.3, 5.4	Operations
O.2	City Work-related Trips. Instruct departments to establish protocols to facilitate the use of transit for short trips (< 5 miles during work hours when the employee does not need to transport materials). Facilitate non-vehicular alternatives to City employees for work-related trips.	Mayor's Office, GSD, Council Offices	4.8, 4.9	Operations
O.3	Construction Zone Standards. Implement and expand upon standard procedures as defined in the MUTCD to ensure safe bicycle and pedestrian travel through construction zones and detours.	DOT, BSS, BOE, DWP, POLA, Utilities, Council Offices	1.6	Operations

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Program No.	PROGRAM	Department.	Policy	Topic
O.4	Feeder Network/Transit Circulator (DASH System and Commuter Express). Coordinate local bus transit services so as to provide neighborhoods with local feeder buses where the roadway system permits.	DOT	3.4	Operations
O.5	Flyaway Shuttle. Continue the Flyaway Shuttle service from Westwood, Van Nuys, Expo, La Brea and Union Station locations, and evaluate other regional locations, such as San Pedro, for expanded service.	LAWA	3.4, 3.6, 3.7	Operations
O.6	Operational Efficiencies. Establish and strengthen public/private partnerships (with the goods movement industry) to coordinate and improve operational efficiencies for the movement of goods. Work could include the implementation of incentives to encourage off-peak and extended hour Port operations, an appointment system, the consideration of short-haul intermodal rail operations, and the establishment of an Advanced Transportation Management and Information System (ATMIS) which would include changeable message signs and video surveillance.	DOT, POLA, Mayor's Office, Council Offices	2.8, 4.10	Operations
O.7	Region-Wide Traffic Control Center. Link all of the traffic control centers in region on a 24 hour basis.	Mayor's Office, ITA, DOT, Metro, Caltrans.	4.1, 4.2	Operations
O.8	Shuttle Bus. Work with special event providers, employers and community-based organizations to identify and implement shuttle bus programs to serve as a first-mile, last-mile solution between transit stations and special events and/or specific populations. Continue programs like Cityride, to provide transportation assistance for senior citizens and individuals with disabilities.	DOT, Mayor's Office, DOA, Council Offices	3.2, 3.4, 3.5	Operations
O.9	Signal Timing. Identify opportunities to re-time street signals to provide safer speeds, improve safety for all, and create smoother traffic throughput. Identify opportunities to re-time street signals to allow longer crossing times for bicyclists and pedestrians in large intersections.	DOT, Council Offices	1.4, 2.3, 2.5, 2.6	Operations
O.10	Transit Coordination. Actively collaborate with regional transit partners to achieve seamless transfers between systems, including scheduling, ticketing, shared fare systems, and stops and loading areas.	DOT, IT, and other transit providers, Mayor's Office	3.4, 4.11	Operations
O.11	Transit/Event Coordination. Facilitate collaboration between regional transit partners and event providers to provide and promote awareness of additional and timely transit service before and after large events.	DOT, Council Offices	4.2, 3.4	Operations
O.12	Improve the Flow of Freight Traffic. Identify and implement strateigies to facilitate the flow of freight traffic.	DOT, Council Offices	2.8	Operations
O.13	Truck Inspections and Service Patrol. Identify locations for temporary and long-term truck inspection stations and Implement a Truck Service Patrol Program to remove disabled commercial trucks from freeway lanes.	DCP	2.8	Operations
O.14	Improve the Flow of Passenger Traffic. Identify and implement strategies to provide reliable travel times during peak hours and during special events.	DCP, DOT, Council Offices	2.5, 3.4	Operations

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Program No.	PROGRAM	Department.	Policy	Topic
O.15	Zero Emission Truck Collaborative (ZETC). Promote consistency among public agencies in working to catalyze the development and deployment of zero emission trucks in the region.	POLA, Metro, AQMD, POLB, Caltrans, SCAG and Gateway Cities COG.	5.4, 5.1	Operations
PK.1	Creative Parking Solutions. Work with communities, businesses, and organizations to identify and implement creative strategies to resolve parking conflicts in areas with high-parking demand.	DCP, DOT, Council Offices	4.13, 4.10	Parking/ Loading Zones
PK.2	Curb Parking Conversion. Standardize processes to facilitate the conversion of curb parking spaces for other uses such as parklets, plazas, bike corrals and docking stations for bicycle sharing, especially in high volume areas of pedestrians and bicyclists.	DOT, BOE, DCP, LASAN, Council Offices	2.1, 3.8, 3.11	Parking/ Loading Zones
PK.3	Individualized Parking Requirements. Permit businesses to identify their respective parking demand and establish criteria whereby projects can reduce on-site parking through the inclusion of a package of transportation demand management strategies.	DCP, DOT	4.8, , 4.9	Parking/ Loading Zones
PK.4	LA Express Park. Continue LA Express Park system using reak-time technology to increase awareness of the availability of parking spaces.	DOT, BIDS, Chambers of Commerce, Council Offices	4.13	Parking/ Loading Zones
PK.5	Meter Pricing. Establish demand based meter pricing to maximize efficient use of on-street meters.	DOT	4.13	Parking/ Loading Zones
PK.6	Neighborhood Parking Districts. Explore modifying some Neighborhood Parking Districts to permit the utilization of residential streets for metered commercial parking and direct revenue to specific neighborhood improvements.	DOT, DCP, City Attorney, Council Offices	4.13	Parking/ Loading Zones
PK.7	Off-Street Loading. In non-industrial areas, require off-street dock and/or loading facilities for all new non-residential buildings and for existing non-residential buildings and undergoing extensive renovations and/or expansion, whenever practical.	DCP	2.10	Parking/ Loading Zones
PK.8	On-Street Loading. Encourage the designation of on-street loading areas, through removal of curb parking, in established industrial areas where off-street loading facilities are lacking. Update the Commercial Loading Zone Ordinance (see B-2, page 6, 2-14 of Mayor's Task Force-Mar 2004)	DOT, DCP, City Attorney, Council Offices	2.10	Parking/ Loading Zones
PK.9	Pedestrian Design Features in Parking Areas. Update zoning code to require the inclusion of pedestrian design features into all parking lots and provide safe, clear paths of travel from parking lots and/or structures to the associated buildings and/or uses. Ensure that all features are ADA compliant.	DCP	2.3, 3.1	Parking/ Loading Zones
PK.10	Pedestrian Improvement Incentives. Establish an incentive program to encourage projects to retrofit parking lots, structures and driveways to include pedestrian design features.	DCP	2.3, 3.1, 4.13,	Parking/ Loading Zones
PK.11	Reduced Size Parking. Develop parking, design, and replacement parking standards for reduced size vehicles (e.g. sub-compact cars, scooters, motorcycles, bike corrals) in residential and non-residential developments as well as public parking facilities and public rights-of-way.	DCP	4.13	Parking/ Loading Zones
PK.12	Shared Off-Street Parking. Facilitate the shared utilization of privately owned off-street parking facilities.	DOT, City Attorney, BIDS, DCP, Council Offices	4.13	Parking/ Loading Zones

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Program No.	PROGRAM	Department.	Policy	Topic
PK.13	Transit Area Parking Reductions. Reduce parking requirements for developments that locate near transit (e.g. within a half-mile of a transit stop)or a major bus stop and provide facilities to enable pedestrian, bicycle and disabled access. Parking requirement reductions are being reviewed as a potential component of the Central City and Central City North Community Plans.	DCP	4.13	Parking/ Loading Zones
PK.14	Unbundled Parking Options. Evaluate potential for the unbundling of parking from rental or purchase options for all new multi-family development.	DCP	4.13	Parking/ Loading Zones
PK.15.	Accessible Parking in Residential Areas. Update policies and guidelines for accessible parking in residential areas.	DOT, DCP, City Attorney, Council Offices	3.2, 3.3, 4.13	Parking/ Loading Zones
PK.16.	Park and Ride. Expand the park and ride network.	Dot, Caltrans, Metro	3.4, 3.5, 4.13	Parking/ Loading Zones
PL.1	Driveway Access. Require driveway access to buildings from non-arterial streets or alleys (where feasible) in order to minimize interference with pedestrian access and vehicular movement.	DCP	3.9, 4.3	Planning & Land Use
PL.2	Local Access. Explore opportunities to incorporate community assets (food, retail) in locations immediately adjacent to residential areas to promote local walking and biking trips and reduce VMT.	DCP, Council Offices	3.3, 1.2, 5.2	Planning & Land Use
PL.3	Mixed-Use. Encourage mixed-use residential, employment and commercial serving uses where appropriate to facilitate increased utilization of walking, bicycling, and transit use.	DCP, Council Offices	3.3, 1.2, 5.1	Planning & Land Use
PL.4	Network Additions. Identify bicycle, neighborhood, and transit enhanced streets and pedestrian enhanced areas in Community Plan updates to provide local complements to the Citywide Transit Neighborhood, and Bicycle Enhanced Networks, and Pedestrian Enhanced Destinations and increase access to area amenities including medical, schools, parks, major employment centers, and community facilities through continuous, predictable and safe sidewalks, intersections, bikeways, and transit support facilities.	DOT, DCP, Council Offices	3.3, 2.3, 2.4, 2.5, 2.6, 1.2	Planning & Land Use
PL.5	Pedestrian Safety Action Plan. Develop a Pedestrian Safety Action Plan for that enhances mobility and accessibility for pedestrians.	DOT, Mayor	3.1, 2.3	Planning & Land Use
PL.6	Regional Transportation Plan. Coordinate with Metro and SCAG on the development of the Regional Transportation Plan, Sustainable Communities Strategy, and the Long Range Transportation Plan.	DCP, DOT,LASAN, Metro, SCAG	4.11	Planning & Land Use
PL.7	Transit Coordination. Continue to work with Metro and various Construction Authorities on station location, portal siting, station access, support features and parking strategies that maximize ridership and transit revenue.	DCP, DOT, Metro, other bus providers	4.11, 3.7	Planning & Land Use
PL.8	Transit Neighborhood Plans. Adopt and implement Transit Neighborhood Plans that enhance access to transit stations and set new zoning regulations to effectuate appropriate mixes and scales of uses as well as site design.	DCP	3.3	Planning & Land Use

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Program No.	PROGRAM	Department.	Policy	Topic
PL.9	Transportation Demand Management Ordinance Revision (TDM). Update the TDM ordinance (LA Municipal Code 12.26.J) to expand the number and type of projects required to incorporate TDM strategies and expand the number and variety of available TDM strategies. Include bicycle parking and other bicycle use incentives as a TDM measure to mitigate traffic/ vehicle trips for purposes of CEQA compliance for commercial, residential and mixed-use development projects. Continue to require eligibile projects to provide work-trip reduction plans and parking cash-out programs in compliances with ACMD's Regulation XV.	DCP, DOT	4.8	Planning & Land Use
PL.10	Truck Staging Facilities. Identify locations within the City where regional truck staging and service facilities are permitted and address solutions to illegal freight staging practices.	DOT, DCP, Council Offices	1.8, 2.10	Planning & Land Use
PL.11	Union Station Master Plan. Continue to work with Metro to complete the Union Station Master Plan and implement Connect US. Connect US is a strategy to improve active transportation options to and from Union Station.	DCP, DOT, Mayor's Office, Council Offices	3.6	Planning & Land Use
PL.12	Greenways to Rivers Arterial Stormwater System (GRASS). Establish a stormwater greewnay planning network and an intergrative planning tool for Los Angeles' One Water Plan.	DCP, DOT, Mayor's Office, Council Offices	5.1, 5.5	Planning & Land Use
PL.13	Special Street/Alley Treatments. Explore the use of special materials used within public right of ways.	DCP, DOT, DPW	2.1, 2.2	Planning & Land Use
PL.14	Community Engagement - Conduct extensive community engagement, develop detailed operational studies and design options and undertake additional environmental analysis for the following network segments within the Council District Four boundaries before implementing any street modifications: Melrose Avenue between Highland and Western Avenues; Lankershim between 134 Freeway and Cahuenga Boulevard, 4th Street between Highland and Western and segments of the BEN and/or TEN within the boundaries of the Sherman Oaks Neighborhood Council. The Council office and community stakeholders would play a critical role in finalizing any plans or projects for these corridors. Alternative parallel corridors, in lieu of the ones identified here, may be considered as potential network substitutes during this process.	DCP, DOT, Community Stakeholders, Council Office	4.4	Planning & Land Use
PS.1	Plazas/Paseos. Identify temporary and/or permanent opportunities to establish car free zones and/or plazas/paseos/play streets in select locations around the City. Play streets provide an opportunity to open public spaces to families and residents in park-poor communities without fear of conflicts with motor vehicles.	DCP, DOT, Council Offices	3.11	Public Space
PS.2	Great Streets. Continue to support the Mayor's Great Streets Initiative by creating a comprehensive matrix of project elements and associated costs, outlining an implementation timeline, tracking project impacts, evaluating funding strategy, and strategizing the coordination of city services to Great Streets.	DOT, BOE, BSS, LASAN, RAP, DCP, DCA, DPW, BSL, EDD, Council Offices	2.15, 3.11	Public Space
PS.3	Pedestrian Loops. Explore the development of a connected network of walking passageways utilizing both public and private spaces, local streets and alleyways to facilitate circulation.	DOT, BOE, BSS, RAP, DCP, DPW, Council Offices	3.9, 3.10, 3.11	Public Space

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
PS.4	People Street. Continue the People Street program for community partners to repurpose underused portions of streets (below the curb) using cost effective materials into temporary plazas, parklets, bike parking, and other public spaces.	DOT, BOE, LASAN, BOS, RAP, Council Offices	4.10, 3.11	Public Space
PS.5	Recreational Rides. Organize and lead local and citywide recreational rides ranging from 5-30 miles. Prioritize routes that include the Green, Bicycle Enhanced or Neighborhood Networks.	RAP, LAPD, Mayor's Office, Council Offices, DOT, BOE, Bicycle non-profits	2.6	Public Space
PS.6	Open Streets. Establish procedures and protocols to support and expand non-profit efforts to coordinate and plan frequent and predictable events.	Mayor's Office, Council Offices, RAP, DOT, DPW, LAPD, LAFD	3.11	Public Space
S.1	Active Transportation Education. Coordinate with LAUSD to incorporate mobility education (for children ages 4-18) into regular physical education curriculum.	DOT, LAUSD, Council Offices	1.3, 1.2	Schools
S.2	Bike, Walk, and Roll Weeks. Support Metro's Bike, Walk, and Roll Week by providing City sponsored events and pit stops in every council district and supporting bicycling to school for students. Provide information, support services and incentives for bicyclists to bicycle to work and school. Distribute materials, post information, and evaluate the progress of the program.	DOT, LAPD, Council, Mayor, LAUSD, Metro, SCAG	1.3, 1.4, 3.1, 4.10, 5.1, 5.2	Schools
S.3	Safe Routes to School. Continue to work/partner with LAUSD, (with support from PTAs and traffic officers) to develop an education program, develop and implement a safe routes to school program and maps and a Comprehensive SRTS Strategic Plan to calm traffic in communities surrounding all elementary, middle and high schools to maximize pedestrian and bicycle convenience and safety. Refer to the Citywide Safe Routes to School Strategic Plan	DOT, DPW, LASAN, support from LAPD, and LAUSD, Council Offices	1.3	Schools
S.4	School Locations. Work with LAUSD and other school providers to site new schools in appropriate locations that can be easily accessed and integrated into the surrounding community.	DCP, LAUSD, Council Offices	1.3, 3.3	Schools
SF.1	Artist Designed Bicycle Parking Standards. Support and develop creative bicycle parking solutions in the public rights-of-way and adopt as city standard guidelines.	DOT, BOE	3.8, 3.11	Support Features
SF.2	Bicycle Parking at Existing Major Destinations. Work with special event facilities' managers to provide convenient, secure, good quality and well-lit bicycle parking facilities at special event venues such as Dodger Stadium, the Staples Center/LA Convention Center, and the LA Memorial Coliseum/Sports Arena.	DOT, Council Offices	3.8	Support Features
SF.3	Bicycle Path Landscaping. Incorporate drought tolerant and low maintainence plant materials along bicycle paths.	DOT, DPW, MRCA, Council Offices	2.6,5.5	Support Features
SF.4	Bicycle Path Lighting. Adopt and install standard lighting designs for bicycle paths and grade separated bikeways.	DOT, BSL, Council Offices	2.6	Support Features
SF.5	Bicycle Path Mile Markers. Continue to install and retrofit mile markers along bike paths; work with LAPD and LAFD to facilitate emergency response on paths.	DOT, LAPD, LAFD, BOE	2.6	Support Features
SF.6	Bicycle Racks on Taxis. Investigate the integration of bicycles with taxi service by adding bicycle racks on to all of the taxi cabs that are permitted through DOT.	DOT	3.5, 3.8	Support Features

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
SF.7	Bicycle Sharing Network. Work with Metro and other area jurisdictions to launch a Bicycle Share Program. Identify a strategy to enable city staff to access the bicycle share system as a "fleet" option for work related tasks.	Metro, DOT, DCP, Council Offices, Office of the Mayor	2.6, 4.11	Support Features
SF.8	Bicycle Valet. Work with special event providers, employers and community-based organizations to provide bicycle valet services at large public and private special events.	DOT, bicycle non-profits, Council Offices	3.8	Support Features
SF.9	Bus Bike Racks (on/off-board). Work with transit providers to provide solutions for additional bike storage, such as bike rack systems to accommodate at least three bicycles on-board the bus, or permitting bicyclists to board with their bicycles at the rear of the bus.	DOT Transit, Metro, regional transit providers	3.8, 3.5, 4.11	Support Features
SF.10	Essential Transit Components. Include short-term and long-term bicycle parking and way-finding as essential components of all stations.	Metro, DOT	3.8	Support Features
SF.11	Increase Publicly Available Bicycle Parking. Review all City-owned, operated, and leased facilities for compliance with the City's bicycle parking standards. Increase bicycle parking to meet LAMC requirements where deficiencies are present.Continue to implement bicycle parking and corrals at major destinations, especially where demand is already high. Encourage the Los Angeles Unified School District (LAUSD), local four-year universities, and the Los Angeles Community College District (LACCD) to install quality bicycle parking at public schools within the City of Los Angeles.	All	3.8, 1.3, 2.6	Support Features
SF.12	LED Street Lighting. Continue to retrofit existing street lighting infrastructure with energy-efficient LEDs.	BSL	1.7, 2.3, 3.2	Support Features
SF.13	Mobility Hubs/Multi-Modal Transit Plaza. Facilitate the implementation of multi-modal transportation support activities and services in proximity to transit stations and major bus stops, including but not limited to: adequate bus stop and layover space, transit shelters with real-time bus arrival information, bike share docking stations, car share facilities, taxi-waiting/call areas, Wi-Fi service, public showers/toilets, bicycle storage and repair facilities, and food and beverage providers.Develop a coordinated permitting proceess for the installation of the support features identified above.	DOT/Metro, Council Offices, DCP, Office of the Mayor, DPW	3.5, 4.1, 4.2	Support Features
SF.14	Off-Street Alternative Energy Charging. Continue to support off-street alternative energy charging and fueling stations within privately and city-owned parking and/or fueling facilities.	DOT, DCP, Mayor's Office, DWP	5.3, 5.4	Support Features
SF.15	On-Board Storage. Work with transit providers to provide an on-board location for the storage of shopping bags and/or luggage.	Metro, DOT	3.4, 4.11	Support Features
SF.16	On-Street Bicycle Corrals.Develop bicycle parking corrals in on-street parking spaces as a public-private partnership. Continue implemention of a pilot program and evaluate the feasibility and criteria for widespread use.	DOT, BSS, BOE, Council Offices	3.8, 3.11	Support Features
SF.17	Operator Judgement of Bicycles on Buses. Work with Metro and local transit operators in the City of Los Angeles to allow operators to make decisions regarding allowing bicycles on buses when space on bus allows, racks are full, service is last of the day or in inclement weather	DOT, City Council, Mayor's Office, BAC, Metro	3.5, 3.8, 4.11	Support Features

Mobility Plan 2035 Programs

Program No.	PROGRAM	Department.	Policy	Topic
SF.18	Parking Meter Posts. Develop pilot project to install bicycle parking mechanism on parking meter posts.	DOT Parking	3.8	Support Features
SF.19	Sidewalk Bicycle Parking Program. Continue to install and maintain City-standard bicycle racks on sidewalks. Identify areas with demand for bicycle racks and implement an installation schedule. Prioritize the installation of racks on streets.	DOT, Council Offices	3.8	Support Features
SF.20	Street Furniture Definition. Include bicycle racks in the definition of street furniture to utilize streetscape funding opportunities	City Attorney, BSS	1.7, 2.2, 3.8, 2.15	Support Features
SF.21	Street Lighting. Support equitable distribution of funds for appropriate street and/or pedestrian lighting, especially in areas of high crime rate and high volume of pedestrian activities.	BSL, DCP, DOT, Council Offices	1.7, 2.3, 3.2	Support Features
SF.22	Transit District Curbside Management. Manage curb areas adjacent to transit stops to facilitate the loading and unloading of buses, para transit, smart shuttles, van/car pools and taxi queuing. Include curb areas for bicycle parking and car share facilities where space warrants.	DCP, DPW, DOT, Metro & other transit providers	3.5, 3.8, 3.2	Support Features
SF.23	Transit Furniture. Transit furniture shall be prioritized on corridors with the highest rates of public transit ridership; design features shall incorporate aesthetic, comfort, and protection from the elements (sun and rain) considerations. Target the equitable provision of transit furniture throughout the City. Evaluate and pursue all possible alternatives to increase transit furniture in underserved corridors.	DPW, Council Offices	1.7, 2.5, 4.3, 4.6	Support Features
SF.24	Transit Pass. Collaborate with Metro to encourage schools, employers, and residential developers to provide monthly or annual transit passes for their respective students, employees, and residents.	DOT, DCP, LAUSD, Metro	4.8, 4.9, 4.11	Support Features
SF.25	Trash Facilities. Increase the number of trashcans on sidewalks. Work with local business and community organizations to develop an adopt-a-trash can program.	DPW, BOS, Council Offices	1.7, 4.10	Support Features
SF.26	Tree Canopy. Continue to expand the City's tree canopy using tree species that are appropriate for the location, climate, water supply, planting conditions and existing street infrastructure.	LASAN, BSS, BOE, DWP, Tree People, Council Offices	1.7, 3.2, 2.3, 2.4, 3.1	Support Features
SF.27	Turnstile Design. Work with Metro and local transit agencies to ensure that all turnstiles can accommodate a bicycle.	DOT, City Council, Mayor's Office, BAC	3.5, 4.11	Support Features
SF.28	Bicycle Friendly Businesses. Continue to support Bicycle Friendly Business Program	DOT, Council Offices	2.6	Support Features

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Appendices

Appendix A: References

Introduction

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Appendix B: Inventory of Designated Scenic Highways and Guidelines

Scenic Highways Guidelines

Corridor Plans for each designated Scenic Highway should be prepared in accordance with each corridor's individual character or concept. These Corridor Plans may be incorporated into specific plan or district plan ordinances. In the absence of such adopted Scenic Corridor Plans, the following interim guidelines are established as part of this Plan:

1. Roadway

a. Design and alignment of a Scenic Highway roadway must include considerations of safety and capacity as well as preservation and enhancement of scenic resources. However, where a standard roadway design or roadway realignment would destroy a scenic feature or preclude visual access to a scenic feature cited in Appendix B of this Plan, design alternatives must be considered through preparation of an environmental impact report.

b. Design characteristics such as curves, changes of direction and topography which provide identity to individual Scenic Highways shall be preserved to the maximum extent feasible.

2. Earthwork / Grading

a. Grading for new cuts or fills shall be minimized. Angular cuts and fills shall be avoided to the maximum extent feasible.

b. All grading shall be contoured to match with the surrounding terrain.

c. In order to negate the environmental impacts of grading in designated Hillside Areas (as depicted on Bureau of Engineering Basic Grid Map No. A-13372), maximum effort shall be made to balance cut and fill on-site.

3. Planting / Landscaping

a. Fire-resistant native plants and trees shall be utilized in any parkway landscaping along Scenic Highways located within designated Hillside Areas.

b. In designated Hillside Areas, where previous plant material has been washed away or destroyed (due to excessive rainfall, fire, grading, etc.) erosion-controlling plants shall be planted to prevent erosion and mud/land slides. Such Hillside parkways and slope easements shall either be hydro-seeded, or terraced and then planted, with native fire-resistant plants.

c. Outstanding specimens of existing trees and plants located within the public right-of-way of a Scenic Highway shall be retained to the maximum extent feasible within the same public right-of-way.

d. Low-growing ground cover and/or shrubs shall be utilized as parkway planting along Scenic Highways in order to avoid blocking a desirable view of a scenic feature listed in Appendix E of this Element. Plant material size at maturity as well as overall scale of plants within the landscaped area must be carefully studied in the site analysis and design stages.

e. Landscaped medians of Scenic Highways shall not be removed. Such medians may be reduced in width (1) to accommodate left turn channelization within one hundred feet of a signalized intersection; or (2) to accommodate a designated Class II bikeway provided that there is compliance with Guideline 3c above, and that the resulting median width is not less than eight (8) feet.

4. Signs / Outdoor Advertising

a. Only traffic, informational, and identification signs shall be permitted within the public right-of-way of a Scenic Highway.

b. Off-site outdoor advertising is prohibited in the public right-of-way of, and on publicly-owned land within five hundred feet of the center line of, a Scenic Highway.

c. A standard condition for discretionary land use approvals involving parcels zoned for non-residential use located within five hundred feet of the center line of a Scenic Highway shall be compliance with the sign requirements of the CR zone.

d. Designated Scenic Highways shall have first priority for removal of nonconforming billboards or signs. Such priority extends to properties located along, or within five hundred feet of the center line of, designated Scenic Highways.

5. Utilities

a. To the maximum extent feasible, all new or relocated electric, communication, and other public utility distribution facilities within five hundred feet of the center line of a Scenic Highway shall be placed underground.

b. Where undergrounding of such utilities is not feasible, all such new or relocated tilities shall be screened to reduce their visibility from a Scenic Highway.

Scenic Byways Guidelines

Guidelines for Scenic Byways designated in the Community Plans should be established as part of the Community Plan Update or Revision process, with guidelines tailored to local considerations. Such guidelines may be incorporated into the Community Plan text or into a Community Design Overlay (CDO). Guidelines for scenic byway protection and/or enhancement should consider the following aspects:

1. Roadway Design and Alignment
2. Parkway Planting / Landscaping
3. Signs / Outdoor Advertising Restrictions
4. Utilities (e.g. undergrounding of new or relocated utility facilities)
5. Opportunity for Enhanced Non-motorized Circulation

Selection Criteria for Scenic Highways and Byways

1. Scenic Highways

Any proposed Scenic Highway should correspond to one of the following basic types:

- (1) An arterial street or state highway which traverses area(s) of natural scenic quality in undeveloped or sparsely developed areas of the City; OR
- (2) An arterial street which traverses urban area(s) of cultural, historical or aesthetic value which merit protection and enhancement.
- Specific criteria to be considered in the evaluation of proposed scenic highways include:
- 3) Visual impact of scenic features or area,
- (4) Type/angle/duration of view + location of viewer,
- (5) Vegetation (type and extent), and/or
- (6) Scenic characteristics

2. Scenic Byways

Any proposed Scenic Byway to be designated by a Community Plan shall correspond to one of the following basic types:

- (1) A non-arterial street which traverses an area of natural scenic quality in an undeveloped or sparsely developed area of the City;
- OR (2) A non-arterial street which traverses or borders significant Open Space (as depicted in Figure 6-1 of the Citywide General Plan Framework).

Inventory of Designated Scenic Highways

Street Name	Alignment	Scenic Features or Resources/Comment
Adams Blvd	Figueroa to Crenshaw	
Avenue of the Stars	Santa Monica to Pico	Wide landscaped median, fountains
Balboa Blvd	1.Fwy. 5 to Sesnon; 2.Victory to Burbank Blvd	Streets should be designed so as to least disrupt the scenic qualities of the area it traverses. Sepulveda Basin, park access
Barham Blvd	Fwy. 101 to Forest Lawn Dr.	Dramatic pass with northerly Valley views
Beverly Glen Blvd.	Ventura Blvd. to Sunset Blvd.	Winding cross mountain road; valley views
Big Tujunga Canyon Blvd.	Fwy. 210 to northerly City boundary	Canyon road with impressive views of rugged mountains
Brand Blvd	Sepulveda to City boundary	Landscaped median
Broadway	98th St. to 112th St.	Wide landscaped median
Burbank Blvd	Balboa to Fwy. 405	Sepulveda Basin, park access
Burton Way	Le Doux Rd to City boundary with Beverly Hills	Wide landscaped median
Coldwater Canyon Dr	Ventura Blvd to City boundary with Beverly Hills	Winding cross mountain road providing access to the Mulholland Scenic Parkway
Colorado Blvd	Eagledale to Monte Bonito	(Specific Plan Ord. No. 168,046)
Crenshaw Blvd	Fwy. 10 to Slauson	
Culver Blvd	Vista Del Mar to Ballona Creek	Ocean and Marina views, Ballona wetlands
Eagle Rock Blvd	NE'ly Verdugo Rd to Colorado Blvd	Landscaped median
Forest Lawn Dr	Barham to Griffith Park Dr.	Winding road past Hollywood Hills; gateway to Griffith Park
Fwy. 5	Fwy. 210 to N'ly City limit	State Scenic Highway
Fwy. 101	Topanga Canyon Blvd to W'ly City limit	State Scenic Highway
Fwy, 118	DeSoto Ave to W'ly City limit	State Scenic Highway
Fwy. 210	Fwy. 5 to E'ly City limit	State Scenic Highway
Glendale Blvd	LA River Bridge to City Boundary with Glendale	Wide landscaped median
Harbor Blvd	Vincent Thomas Bridge to Crescent Ave + future alignment to Shepard St	Views of historic San Pedro and the Port
Highland Ave	Wilshire to Melrose	Landscaped median, significant palm trees
Huntington Dr N	Monterey Rd to E'ly City limit	Wide landscaped median
John S. Gibson Blvd	Harry Bridges Blvd to Pacific Ave	Views of harbor activities, Vincent Thomas Bridge
La Tuna Canyon Blvd	Sunland Blvd to Fwy. 210	Views of ranches in Verdugo Hills
Laurel Canyon Blvd	Ventura Blvd to Hollywood Blvd	Winding cross mountain road through rustic area

Inventory of Designated Scenic Highways

Street Name	Alignment	Scenic Features or Resources/Comment
Leimert Blvd	MLK to 43rd Place	Landscaped median
Lincoln Blvd (Highway Route 1)	Venice Blvd to City boundary with Santa Monica	State Scenic Highway
Los Feliz Blvd	Riverside Dr to Western Ave	Hillside and city views
Monterey Rd	Hardison Way to Huntington Dr	
Mountaingate Dr	Canyonback Sepulveda	Landscaped median
Mullholland Dr	1.Fwy. 101 westerly to Mulholland Hwy; 2.Mulholland Hwy to Valley Circle Blvd	(Specific Plan Ord. No. 167,943) Panoramic views, "ribbon of park"
Pacific Avenue/Front St	John S. Gibson Blvd to Harbor Blvd	Views of Vincent Thomas Bridge; views of historic San Pedro and Port
Pacific Coast Highway (Highway Rte. 1)	Entire alignment N. of Fwy. 10 (City portion)	State Scenic Highway
Palisades Dr	Sunset Blvd to N'ly terminus	Wide mountain road; good landscaping and ocean views
Paseo del Mar	Western Ave to Gaffey St	Hillside bluff route with ocean views, park access
Plummer St	Valley Circle to Topanga Canyon	(LAMC 17.05-T)
Porter Ranch Streets Corbin Ave Mason Ave Rinaldi St Sesnon Blvd Winnetka Ave	(future streets)	(Specific Ord. No. 166,-068)
Reseda Blvd	1.Portion N. of Rinaldi; 2.Ventura Blvd. to S'ly terminus	Street should be designed so as to least disrupt scenic qualities of the hillside area it traverses
Rinaldi St *	Fwy. 405 to Corbin Ave	Hillside street with good mountain, Valley Views
Riverside Dr	Los Feliz Blvd to Stadium Way	Essential link in "chain of parks" concept
Santa Monica Blvd	Sepulveda to City Boundary with Beverly Hills	
Santa Susana Pass Rd	Entire alignment within City	Dramatic pass; hillside and Valley views
San Vicente Blvd	1.Pico Blvd to Colgate Ave; 2.Goshen Ave to 26th St	Wide street with landscaped median [Specific Plan Ord. No. 161,766]; wide landscaped median
Sepulveda Blvd	1.Fwy 405 to Sunset Blvd; 2.Rayen St. to Devonshire St	Old cross mountain road with tunnel, views of mountains and Valley Wide street with landscaped median

Inventory of Designated Scenic Highways

Street Name	Alignment	Scenic Features or Resources/Comment
Sesnon Blvd *	Winnetka Ave to Balboa Blvd	Street should be designed so as to least disrupt the scenic qualities of the hillside area it traverses
Sherman Way	Variel to Kester	Wide street, landscaped median
Shepard Street	Pacific Ave to Gaffey St	Views of harbor, ocean
Silver Lake Blvd	Duane St to Armstrong Ave	Views to and from Reservoir; landscaped setbacks
Stadium Way	Fwy. 5 to Fwy. 110	Winding drive through Elysian Park
Sunland Blvd	Chivers Ave. to Fwy. 210	Hillside views
Sunset Blvd	PCH to City Boundary with Beverly Hills	Views of mountains, estates, UCLA campus
Tampa Ave	Portion N. of Devonshire St	Street should be designed so as to least disrupt the scenic qualities of the hillside area it traverses
Temescal Canyon Rd	PCH to Sunset Blvd	Broad avenue lined with parks and amenities
Topanga Canyon Blvd (Highway Rte. 27)	PCH to Mulholland Dr (City portion)	State Scenic Highway
Valley Circle Blvd	Mulholland Dr. to Plummer St.	"country road" winding past Chatsworth Reservoir with views of "Twelve Apostles" rock formations (LAMC 17.05-T.)
Venice Blvd	Longwood to Abbot Kinney	Wide street, landscaped median
Ventura Blvd	Valley Circle to Fwy. 405	(Specific Plan Ord. No. 166,650)
Vermont Ave	Gage to Gardena Blvd	Wide street, landscaped median
Vineland Ave	Ventura Blvd to Magnolia	Landscaped median
Vista del Mar	Culver Blvd to Imperial Highway	Sand dunes and ocean views
Wentworth St	Sheldon St to Fwy. 210	Views of hills, Hansen Dam and Tujunga Wash
Western Ave	1.25th St to Paseo del Mar; 2. Franklin Ave to Los Feliz	Hillside and ocean views Hillside and city views
White Oak Ave	Rinaldi to Devonshire	Deodar trees cultural-historic monument
Wilshire Blvd	1.Beverly Hills boundary to Malcom Ave; 2.Sycamore to Fairfax	(Specific Plan Ord. No. 155,044) Miracle Mile; landscaped median
Woodley Ave	Victory to Burbank Blvd	Park access; Sepulveda Basin
25th St	Western Ave to W'ly City boundary	Hillside and ocean views
Avenue 64	York Blvd to N'ly City boundary	

City of Los Angeles Transportation Element 1999 - Appendix E

Appendix C: Funding Resources

Funding Resources and Opportunities

Transportation improvements are funded through multiple departments and are subject to prioritized project lists. As part of the discussion about smart investments, it is necessary to identify a diverse cross section of revenue sources that can feasibly implement the improvements proposed in the Plan. This section outlines potential funding opportunities at the federal, state, regional, and local level and discusses various options that are currently being explored or studied by regional and City agencies. The following also includes revenue sources that are currently used to fund Transportation related projects.

Federal Funding Sources

Many of the enhancements proposed in the Mobility Element qualify for Federal Aid.

National Highway System (NHS)

These funds are typically restricted to projects located on the National Highway System.

Surface Transportation Program (STP)

STP funds can be used on any public roads that are not classified as local roads or minor collectors. Such roads are referred to as federal-aid roads or highways. However projects or improvements to bridges, safety, carpool related, and bicycle/pedestrian infrastructure care exempt from the highway restriction.[1]

Congestion Mitigation and Air Quality (CMAQ) Improvement

The CMAQ program funds transportation projects and programs that help meet the requirements of the Clean Air Act. Eligible projects include: transit improvements, travel demand strategies, traffic flow improvements, and fleet conversions to cleaner fuel[2].

Transportation Investment Generating Economic Recovery (TIGER)

The United States Department of Transportation invests in road, rail, transit, and port projects that will have a significant impact on the Nation, region, or a metropolitan area. To date, Congress has dedicated $1.5 billion for TIGER I, $600 million for TIGER II, $526.944 million in 2011, and $500 million in 2012. The TIGER Discretionary Grants have awarded projects that are multi-modal, multi-jurisdictional, or are difficult to fund through existing programs.[3]

Fixed Guideway Capital Investment Grants Program (New Starts and Small Starts)

The New Starts program provides funds for the construction of fixed guideway systems or extensions to existing guideway systems. The Small Starts program provides funds to capital projects that either (a) meet the definition of a fixed guideway for at least 50 percent of the project length in the peak period or (b) are corridor-based bus projects with 10 minute peak/15 minute off-peak headways or better while operating at least 14 hours per weekday. New Starts projects must cost more than $75 million and have a total capital cost of more than $250 million, while Small Starts projects must cost less than $75 million and have a total capital cost of less than $250 million.

The New Starts and Small Starts programs were funded through the Safe, Accountale, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), and was reauthorized through the Moving Ahead for Progress in the 21st Century Act (MAP-21). Map-21 authorized $1.9 billion for 2013 and $1.9 billion for 2014. Funds are available for five years (the fiscal year in which the amount is made plus four additional years.[4]

Land & Water Conservation Fund (LWCF)

The LWCF program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities. The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources. The LWCF could fund the development of river-adjacent bicycle facilities.

Petroleum Violation Escrow Account (PVEA)

PVEA funds come from fines paid by oil companies in the 1970's for violating oil price caps set by the federal government. The Department of Energy's State Energy and Weatherization Assistance Program distribute the money at the state level through grants. PVEA funds projects with an emphasis on energy saving including public transportation and bridge construction or maintenance.

State Funding Sources

California's principal source of state revenue for transportation is the state excise tax on motor vehicle fuels; this includes motor vehicle fuel, diesel fuel, and alternative fuels on a per-gallon basis. Approximately 49.7% of the State's transportation funding was attributed to the State Fuel Excise Tax, 20.8% to the sales tax on Motor Vehicle Fuel

Much of the money available at the State level is funded through the State Transportation Improvement Program (STIP), which includes revenue from the State Highway Account (SHA) and

1 *State of California Department of Transportation, Division of Local Assistance. Local Assistance Program Guidelines: Processing Procedures for Implementing Federal and/or State Funded Local Public Transportation Projects. December 2008*

2 *Ibid*

3 *United States Department of Transportation. TIGER Grants. www.dot.gov/tiger*

4 *U.S. Department of Transportation Federal Transit Administration. Notice of FTA Transit Program Changes, Authorized Funding Levels and Implementation of the Moving Ahead for Progress in the 21st Century Act (MAP-21) and FTA Fiscal Year 2013 Apportionments, Allocations, Program Information and Interim Guidance. http://www.fta.dot.gov/documents/2012-10-10_MAP-21_FINAL.pdf*

TEA-21 fund allocated to the State.

Active Transportation Program (ATP)

As of September 26, 2013, the ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single program with a focus to make California a national leader in active transportation. The ATP administered by the Division of Local Assistance, Office of Active Transportation and Special Programs.

The purpose of ATP is to encourage increased use of active modes of transportation by achieving the following goals:

- Increase the proportion of trips accomplished by biking and walking
- Increase safety and mobility for non-motorized users,
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas (GHG) reduction goals,
- Enhance public health,
- Ensure that disadvantaged communities fully share in the benefits of the program, and
- Provide a broad spectrum of projects to benefit many types of active transportation users.

Environmental Enhancement and Mitigation Program (EEMP)

The Environmental Enhancement and Mitigation (EEM) Program has a total of $10 million each year to local, state, and federal governmental agencies and to nonprofit organizations. Projects must be directly or indirectly related to the environmental impact of the modification of an existing transportation facility or construction of a new transportation facility. The four categories of the grant are:

- Highway landscaping and urban forestry projects
- Resource lands projects
- Roadside recreation projects
- Mitigation projects beyond the scope of the lead agency

All projects are funded on a reimbursement basis of the state's proportionate share of actual costs. No matching funds, cost shares, or other funding sources are required to apply from the EEM grant. However, projects that include the greatest proportion of other moentary sources of funding are rated highest. Grants are limited to $350,000.

Office of Traffic Safety (OTS) Grant

Office of Traffic Safety Grants (OTS) fund safety programs and equipment. Bicycle and Pedestrian Safety is a specifically identified priority. This category of grants includes enforcement and education programs, which can encompass a wide range of activities, including bicycle helmet distribution, design and printing of billboards and bus posters, other public information materials, development of safety components as part of physical education curriculum, or police safety demonstrations through school visitations. The grant cycle typically begins with a request for proposals in October, which are due the following January. In 2009, OTS awarded $82 million to 203 agencies.[5]

Recreational Trails Program (RTP)

The Recreational Trails Program provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized as well as motorized uses. Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails;
- Development and rehabilitation of trailside and trailhead facilities and trail linkages;
- Purchase and lease of trail construction and maintenance equipment;
- Construction of new trails (with restrictions for new trails on federal lands);
- Acquisition of easements or property for trails;
- State administrative costs related to this program (limited to seven percent of a State's funds); and
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds).

Safe Routes to Schools (SR2S)

The Safe Routes to Schools (SR2S) program provides funds to local governments to improve safety and efforts that promote walking and bicycling within communities. The main objective of the SR2S grant is to increase the number of children walking and bicycling to school by removing barriers such as lack of infrastructure, unsafe infrastructure, and lack of programs to educate children, parents, and members of the community. The program rates proposals on the following factors:

- Demonstrated need of the applicant.
- Potential of the proposal for reducing child injuries and fatalities.
- Potential of the proposal for encouraging increased walking and bicycling among students.
- Identification of safety hazards.
- Identification of current and potential walking and bicycling routes to school.

Consultation and support for projects by school-based associations, local traffic engineers, local elected officials, law enforcement agencies, and school officials.

The State's SR2S program is authorized through Streets & Highways Code Section 2330-2334 and was extended indefinitely through AB 57. In 2012, SR2S awarded $48.5 million in funds to 139 projects; about $24.45 million is available annually.[6]

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5 *Caltrans. EEM Program Information. http://dot.ca.gov/hq/LocalPrograms/EEM/program-info2.htm*

6 *Caltrans. Safe Routes to School program information. http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/sr2s.htm*

Regional Funding Sources

A major portion of state funding from the State Transportation Improvement Program (STIP) is allocated to Regional Transportation Planning Agencies (RTPAs). In California, 75 percent of STIP funds are sent to the Regional Transportation Improvement Programs (RTIP). The City of Los Angeles falls under the jurisdiction of the Los Angeles County Metropolitan Transportation Authority (Metro). Metro works with the Southern California of Governments (SCAG), the Metropolitan Planning Organization (MPO), to develop a Regional Transportation Plan (RTP) every four years. The RTP is critical to the region's transportation projects because without it, proposed projects would not qualify for Federal and State funding. [7]

Metro: Call for Projects Program

Much of the funds available for local transportation programs are funded through Metro's Call for Projects program. Metro accepts project applications every other year in eight modal categories.[8]

- Regional Surface Transportation Improvements
- Goods Movement Improvements
- Signal Synchronization & Bus Speed Improvements
- Transportation Demand Management
- Bicycle Improvements
- Pedestrian Improvements
- Transit Capital
- Transportation Enhancement Activities

Approved projects are ranked, prioritized, and integrated into the Los Angeles County Transportation Improvement Program (TIP) as part of the five-year program of scheduled projects.[9]

Transportation Development Act (TDA), Article 3

The Transportation Development Act (TDA), Article 3 funds are administered by Metro, to local jurisdictions annually. 15 percent of the TDA funds are allocated to the City and County; 30 percent going to the City and 70 percent to the County. TDA Article 3 funds may be used for the following activities related to the planning and construction of bicycle and pedestrian facilities:

- Engineering expenses leading to construction.
- Right-of-way acquisition.
- Construction and reconstruction.
- Retrofitting existing bicycle and pedestrian facilities, including installation of signage to comply with the Americans with Disabilities Act (ADA).
- Route improvements such as signal controls for cyclists, bicycle loop detectors, rubberized rail crossings and bicycle-friendly drainage grates.
- Purchase and installation of bicycle facilities such as secure bicycle parking, benches, drinking fountains, changing rooms, restrooms and showers which are adjacent to bicycle trails, employment centers, park-and-ride lots, and/or transit terminals and are accessible to the general public

Congestion Mitigation Fee Program

The Congestion Mitigation Fee Program was proposed by Metro (through a joint study effort with local jurisdictions and agencies) to meet the state mandated Congestion Management Program (CMP) Deficiency Plan requirements. The one-time fee would be applied to all types of new development projects to help mitigate the impact of growth on the regional transportation network through transportation improvements. A feasibility study was completed in 2008, yet the program has not yet been adopted [10]

Local Funding Sources

While the availability of Federal and State grants are adequate sources to fill the gap in necessary funds, they only provide a temporary fix to the ongoing deficit in funding. Regional and local sources can provide a more stable, reliable, and long-term solution to the shortage in transportation improvement funds. However, the limited supply of funds available for transportation improvements and programs are already stretched thin and will require additional sources of revenue to supplement new projects and programs. The following are City's major sources of revenue that fund transportation related projects and programs:

Proposition A Local Transit Assistance Fund

The Proposition A Local Transit Assistance Fund consists of money allocated by the County, based on population. Revenue generated from the ½ cent sales tax is used for the planning administration, and operation of citywide public transportation programs.

Proposition C Transit Improvement Fund

The Proposition C Transit Improvement Fund receives funds from the ½ cent sales tax increase approved in Los Angeles County in 1990. The funds are allocated on a per capita basis and may be used for public transit, paratransit, and the repair and maintenance of streets used by public transit.

Measure R Local Traffic Relief and Rail Expansion Fund

Measure R is a countywide, ½ cent sales tax that funds local and countywide transportation projects and programs. Passed in 2008, this 30-year tax is expected to generate $40 billion, create 210,000 construction jobs, fund vital county and local transportation projects, and accelerate the timeline of projects in development. Measure R local return funds are a key source of revenue used to fund street maintenance and improvement projects, traffic relief, transit programs and upgrades, and bicycle and pedestrian programs.

7 *Caltrans. Global Gateways Program. http://www.dot.ca.gov/hq/tpp/offices/ogm/products_files/GGDP_Final_Report.pdf*

8 *Los Angeles County Metropolitan Transportation Authority (METRO). Call for Projects Overview. http://www.metro.net/projects/call_projects/.*

9 *Los Angeles County Metropolitan Transit Authority (Metro). Call for Projects Overview. http://www.metro.net/projects/call_projects/*

10 *LACMTA Congestion Management Program. (2013). Metro – Congestion Management Program. http://www.metro.net/projects/congestion_mgmt_pgm/*

Measure J and Extension of Measure R

Measure J was an effort to extend the Measure R Transit Sales Tax by another 30 years. The Measure was put on the ballot in June 2012, but failed to receive the necessary 2/3s vote to pass. Revenue from the 30-year period was expected to be approximately $90 billion from 2039-2069. While Measure R will not expire until 2039, there is still a need to plan for a funding mechanism or tax that will replace it.

Additional Funding and Leveraging Opportunities

In addition to sources of transportation funding that it has not traditionally relied upon, the City may be able to secure transportation dollars in the future through several existing, but as yet untapped or underutilized, sources of funds. Moreover, the City could potentially benefit from entirely new sources-sources that do not yet exist but are being considered by transportation policymakers and stakeholders.

Special Revenue Funds

According to the City Controller's Office, as of June 30, 2012 there are over 500 Special Revenue Funds in the City of Los Angeles. These funds consist of fees and monies collected for specific purposes and have specific expenditure provisions. While many accounts are actively being used, there is a possibility that the balances of many inactive funds can be used for transportation improvements.

Bicycle Plan Trust Fund

Following the adoption of the Citywide Bicycle Plan in 2010, the City created the Bicycle Trust Fund in 2011 to collect developer mitigation fees. These fees are used to fund the implementation of bicycle projects and programs of the Bicycle Plan. The City requires conditions of approvals or development agreements, for land use projects, that include the contribution of funds to implement improvements that benefit surrounding communities.

Developer Trust Funds

The City has created 10 trust funds (funded primarily with the Transportation Impact Assessment Fee) that are dedicated for specific transportation projects.

High Priority Projects

There may be an opportunity for the City to obtain 80% of the funding for its unfunded capital projects from Congressional earmarks for "High Priority Projects." The process for obtaining High Priority Project funding is highly discretionary and may not be dependent on well-defined funding criteria. The City would benefit by seeking support for projects through a congressional representative.

Congestion Pricing (Currently being studied by SCAG)

Utilizing a fee or charge to make the best use of existing/future investments in highway, roadway, and/or parking infrastructure. Fees would depend on congestion at the time of use; users would pay more during peak periods of travel or high demand. Different types of congestion pricing include:

- **Facility Pricing.** Charges a toll for the use of all lanes of a road, a bridge, or a short road segment
- **Express Lanes.** HOT lanes; separate lanes of freeway
- **Cordon Pricing.** Fee is charged every time a vehicle crosses a boundary in/out of a congested area
- **Express Parking.** Pricing of parking varies by weekday, weekend, and availability
- **Area Wide Pricing.** Charge is applied to vehicle driving anywhere in a larger area)county or region)
- **VMT.** Fee is applied based on the number of miles traveled (used instead of the gas tax, see below)
- **Emissions Fees.** Variable fees based on the level and type of emissions/pollutants a classification of vehicles produce (encourage a shift to cleaner burner engines..)

Congestion Mitigation Fee

Metro proposed a countywide Congestion Mitigation Fee Programs to meet the State-mandated requirements of the Congestion management Program (CMP) Deficiency Plan to mitigate the impact of new development (2003). The Congestion Mitigation Fee would be applied to new development projects seeking a building permit. This one-time fee would be used to fund transportation projects in each jurisdiction's project list. Each jurisdiction determines the specific fee-per-trip by developing a transportation list that takes into account expected growth in the city and would also generate a fee schedule by land use type.[11]

Although Metro is the Congestion Management Agency, revenue collected by each jurisdiction would stay in the City; control over projects and spending would stay in the local government.

Rental Car Fees

Many states and cities across the country assess a rental car tax to offset the impact of those cars on streets and highways- the State of California and the City of Los Angeles do not. If the City were to levy a 2% tax on all car rentals in the City it could generate $7 million annually.[12]

Developer Mitigations

Funding through mitigation fees or development agreements can be used strictly for street improvement in the area, rather than beautification projects.

Trash Franchise Fees

The fees collected through a Franchise Fee could be used to repair roads used by private and/or public haulers. There would be a logical nexus between the fee and the use of revenue because a truck carrying 10 times the weight of a car does 1,000 times more damage to a road than a car.

11 *Southern California Association of Governments SCAG. (2011). Express travel choices Study. http://www.expresstravelchoices.org/docManager/1000000066/FAQ_110113.pdf*

12 *Metro. Congestion Management Program: Congestion Mitigation Fee Study. http://media.metro.net/board/Items/2013/05_may/20130515p&pitem15.pdf*

General Obligation Bond (Street/Infrastructure Bond)

Is backed by revenue from property taxes and requires a two-thirds voter approval.

Incremental Sales Tax Assessment

In July 2011, the State Tax dropped 1 percent, reducing Los Angeles County's Sales Tax to 8.75. A voter-approved increase of 1/4th of 1 percent by the City would result in $100 million annually. *However, it is significant to note that in 2012 voters failed to approve (Measure J) an extension of the current half-cent tax (Measure R). Measure R will expire in 2039.

Special Tax Assessment

An assessment district can be created, at the request of a majority of property owners, to finance improvements in the defined area. All property owners that benefit from improvements would be subject to an assessment (based on how much the property is expected to benefit from the improvement).

Mello-Roos District

The City can form a special, community facilities district (subject to two-thirds approval of property owners in the area) that can finance public infrastructure through the sale of bonds.

Infrastructure Financing District (IFD)

The City or County can create IFDs to pay for regional scale public works projects. IFDs divert property tax increment revenue for up to 30 years. These funds cannot be used for maintenance, repairs, operating costs, and services. The City must first develop an infrastructure plan, send copies to all landowners, consult with local governments, hold a public hearing, and gain approval from all local agencies that will contribute its property tax increment to IFD. In addition two-thirds voter approval is required to form an IFD and issue bonds.

Mark Roos District

Local government facilities can be financed by bank bond pools, funded by bond proceeds. The pool (formed under a Joint Powers Authority) can buy any legally issued debt instrument within or without its geographic area.

General Road User Fees

Similar to tolls implemented on highways, user fees can be applied to City streets.

Transportation Utility Fees

Legal difference between fee and tax, using the "rational nexus test"

- Service needs must be directly relatable to those bearing the cost
- The cost must be allocated proportionally to benefits
- The facilities funded must be part of a comprehensive plan; the fee must account for taxes paid toward transportation so property owners are not double-billed
- The fee revenues must be used for their intended purposes in a timely manner

*proposes a direct fee on those using road/ similar to toll roads

America Fast Forward

In response to the growing need for federal financing to improve transportation infrastructure, Metro, the City of Los Angeles, and a number of municipalities in the US proposed legislation to provide more flexible federal bond and loan programs. America Fast Forward proposes a new federal financing approach to leverage transportation projects by using tax code incentive s and credit assistance through two pieces of legislation: Qualified Transportation Improvement Bonds (QTIB) and the Enhanced Transportation Infrastructure Finance and Innovation Act Program (TIFIA). While TIFIA was adopted in 2012, QTIB has yet to be approved. However, QTIB has the support of mayors across the US and provides an opportunity for state and local governments to maximize infrastructure investment through public-private financing mechanisms.[13]

Qualified Transportation Improvement Bonds (QTIB)

Qualified Transportation Improvement Bonds (QTIB) would create a new class of qualified tax credit bonds, similar to those created for forestry, conservation, renewable energy projects, energy conservation, qualified zone academics, and new school construction. The qualified tax credit bonds would be issued by state, local, or other eligible issuers where the federal government subsidizes most or all the interest cost through granting investors annual tax credits in lieu of interest payments. Annual bond authorizations would be $4.5 billion annually; unissued amounts could be carried forward to a future year The QTIB proposal has not been adopted by Congress, but it reflects the growing demand for more flexible transportation financing.

Enhanced Transportation Infrastructure Finance and Innovation Act Program (TIFIA)

The Transportation Infrastructure Finance and Innovation Act (TIFIA) authorizes the federal government to make conditional credit commitments to large projects or programs that meet national infrastructure investment goals. The U.S. Department of Transportation (USDOT) can provide: secured/direct loans, loan guarantees, and lines of credit. Reauthorization of the Transportation Bill (MAP-21) increased the maximum federal share on projects from 33 percent to 49 percent.This guarantees lower interest rates for transportation agencies and decreases the overall cost of projects. Eligible projects must have costs that equal or exceed at least one of the following:

- $50 million;
- $25 million for a rural project;
- $15 million for an intelligent transportation system (ITS) project; or
- 1/3 of the most recently-completed fiscal year's formula apportionments for the States in which the project is located.[14]

13 *Metro. America Fast Fordward. http://americafastforward.net/*

14 *Metro. America Fast Forward: The TIFIA Provision. http://americafastforward.net/wp-content/uploads/2013/03/AFF_TIFA.pdf*

Appendix D: Glossary of Transportation Terms

Accessibility: Accessibility is the ability to reach destinations. While mobility focuses on ***how*** you are getting somewhere, accessibility emphasizes ***where*** you are going and incorporates land use aspects within transportation planning. Accessibility is the goal of a good transportation system with the end result of increasing the ease of traveling to desired destinations such as jobs, recreation, and other resources.

Active Transportation: consists of pedestrians and bicyclists. Active transportation refers to an interconnected system of pedestrians and bicyclists that are better integrated with and more likely to use public transit.

Alignment: identifies the general location of a current or future roadway.

At-grade crossing: A junction where bicycle path or sidewalk users cross a roadway at the same level as motor vehicle traffic, as opposed to a grade-separated crossing where users cross over or under the roadway using a bridge or tunnel.

ATSAC: Automatics Traffic Surveillance and Control. Developed during the 1984 Olympics, the System monitors and adjusts the traffic signal system based on real-time data to help alleviate traffic congestions.

Bicycle-Enhanced Network (BEN): The BEN is a network of streets that will receive treatments that prioritize bicyclists. This network is a subset of the 2010 Bicycle Plan and will supplement the system.

Bicycle facilities: A general term used to describe all types of bicycle-related infrastructure including linear bikeways and other provisions to accommodate or encourage bicycling, including bicycle racks and lockers, bikeways, and showers at employment destinations.

Bicycle Lane: A striped lane for one-way bicycle travel on a street or highway. Caltrans refers to this facility as a Class II bikeway.

Bicycle Path: A paved pathway separated from motorized vehicular traffic by an open space or barrier and either within the highway rights-of-way or within an independent alignment. Bicycle paths may be used by bicyclists, skaters, wheelchair users, joggers, and other non-motorized users. Caltrans refers to this facility as a Class I Bikeway which "Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow of motorists minimized."

Bicycle Route: A shared roadway specifically identified for use by bicyclists, providing a superior route based on traffic volumes and speeds, street width, directness, and/or cross-street priority, denoted by signs only. Caltrans refers to this facility as a Class III Bikeway – "Provides for shared use with pedestrian or motor vehicle traffic."

Bike Boulevard: A roadway that motorists may use, but that prioritizes bicycle traffic through the use of various treatments to slow motorists and enhance the bicycle level of service. Directional signage, bicycle amenities, and other enhancements are most often used together.

Bikeway: A generic term for any road, street, path or way that in some manner is specifically designed for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

California Department of Transportation (Caltrans): State agency responsible for the design, construction, operation, and maintenance of the State highway system (includes interstate and state highways)

California Environmental Quality Act (CEQA): CEQA was enacted in 1970 to protect the environment by requiring public agencies to analyze and disclose the potential environmental impacts of proposed land use decisions. Any public or private project with potential adverse effects upon the environment is subject to CEQA and must be reviewed by decision makers and the public. For more information, visit the California Natural Resources Agency page on CEQA Guidelines.

CA MUTCD: The CALTRANS Manual on Uniform Traffic Control Devices, which designates standards for signage and pavement markings.

Capacity: Capacity is the measure of a transportation facility's ability to accommodate a moving stream of people or vehicles in a given period of time.

Class I Bikeway: CALTRANS HDM designation. See "bicycle path".

Class II Bikeway: CALTRANS HDM designation. See "bicycle lane".

Class III Bikeway: CALTRANS HDM designation. See "bicycle route".

Class IV Bikeway: CALTRANS HDM designation. See "protected bicyle lane".

Clearance, lateral: Width required for safe passage of bicycle path users as measured on a horizontal plane.

Clearance, vertical: Height required for safe passage of bicycle path users as measured on a vertical plane.

Complete streets: Also known as living streets, complete streets are designed to be safe and comfortable for road users of all modes, ages, and abilities. This includes: pedestrians, public transit vehicles and riders, bicyclists, and motorists.

Complete Streets Networks: A layering of different street networks based on mode of transportation, with each layer incorporating complete streets principles. The concept of Complete Streets Networks is being utilized in this update of the Mobility Element.

CTCDC: The California Traffic Control Devices Committee establishes standards and designs for the signs, stripping, pavement markings and signalization included in CA MUTCD.

CROW Manual: Bicycle facility and design manual from the Netherlands.

Enhanced Complete Street System: Is a network of major streets that facilitate multi-modal mobility within the citywide transportation system. This system consists of four networks: Pedestrian-Enhanced Districts (PEDs), Bicycle-Enhanced Network (BEN), Transit-Enhanced Network (TEN), and the Vehicle-Enhanced Network (VEN). The four proposed networks work together as a layered network of complete streets.

Environmental Impact Report (EIR): An environmental impact report is a document that describes and analyzes the

significant environmental effects of a project and discusses ways to mitigate or avoid these effects (California Code of Regulations §15362). An EIR is required under CEQA if an initial study indicates that a proposed project may cause one or more significant effects on the environment.

"First-mile, last-mile" solutions: A term used in transportation planning to illustrate the hurdle of getting people to and from a transportation hub and their final destination. An example of a first/last-mile solution in the city of Los Angeles is the DASH system in Downtown. It connects people from Union Station to their workplace and vice versa on their commutes home. Another solution could be compact, foldable bikes that can easily be brought onto buses, rail, or trains. First and last mile solutions encourage the use of public transport by offering easy ways to connect people to and from their final destinations. See the City's 2009 "Maximizing Mobility in Los Angeles" for more information about first-mile, last-mile solutions in LA.

Gaps

Connection Gaps: Connection gaps are missing segments (1/4 mile long or less) on a clearly defined and otherwise well-connected bikeway. Major barriers standing between bicycle destinations and clearly defined routes also represent connection gaps.

Linear Gaps: Similar to connection gaps, linear gaps are 1/2-to one-mile long missing link segments on a clearly defined and otherwise well-connected bikeway.

Corridor Gaps: On clearly defined and otherwise well-connected bikeway, corridor gaps are missing links longer than one mile. These gaps will sometimes encompass an entire street corridor where bicycle facilities are desired but do not currently exist.

System Gaps: Larger geographic areas (e.g., a neighborhood or business district) where few or no bikeways exist would be are identified as system gaps. A geographic gap is identified where the density of bikeways in one part of the City is less than the density of bikeways in another part of the City.

General Plan: The policy foundation for all growth and land development in a jurisdiction. The City of Los Angeles General Plan consists of the Framework Element, eight additional elements, and 35 Community Plans forming the Land Use Element. The Mobility Element will replace the City's 1999 Transportation Element.

Geographic Information System (GIS): A collection of computer hardware, software, and geographic data for capturing, storing, manipulating, analyzing, and displaying all forms of geographically referenced information.

Geometry: The vertical and horizontal characteristics of a transportation facility, typically defined in terms of gradient, degrees, and super elevation.

Goods movement: The transport of for-sale products from their manufacturing origin to their final destination where they will be sold. Moving goods can involve many different types of transport such as airplanes, cargo ships, trains, and trucks.

Grade-separated crossing: A bridge or tunnel allowing pedestrians and bicyclists to cross a major roadway without conflict.

Green streets: Streets that incorporate environmentally-friendly design or infrastructure. Examples of green street measures are permeable paving and native plant landscaping, which can both help conserve water and reduce urban runoff without sacrificing aesthetic quality.

Highway Design Manual (HDM): Caltrans Highway Design Manual for the design of transportation facilities including streets and bikeways.

Lead Agency: The primary public agency responsible for managing and carrying out a project. (The City of Los Angeles Department of City Planning is the Lead Agency in the Mobility Element Update project)

Level of service (LOS): Term for the measurement of how well automobile traffic "flows" on a roadway system or how well an intersection functions.

Livable neighborhood: The concept that a neighborhood that meets the needs and desires of its residents, businesses, and visitors. Factors impacting livability include safety, affordability, health, access, sustainability, diversity, or businesses. A livable neighborhood is often described as a neighborhood that kids can play safely in or where people enjoy spending time in their local community.

Loop detector: A device placed in the pavement at intersections to detect a vehicle or bicycle and trigger a signal or provide green time.

Medians: Area in the center of the roadway that separates directional traffic. Medians may be painted and leveled with the surrounding roadway or "raised" using curb and gutter. Medians may include landscaping, concrete, striping or any combination thereof.

Mitigation Measure: If a proposed project is subject to CEQA, mitigation measures are proposed to eliminate, avoid, rectify, compensate for, or reduce that effect on the environment.

Mobility: Mobility is the ability to move around. It takes into consideration how people are getting from place to place (i.e. walking, biking, bus, auto, etc) and how fast. In general, improving mobility improves accessibility.

Mode share: Also called mode split, refers to the number or percentage of travelers using a certain mode of transportation.

MPP LADOT: Manual of Policies and Procedures used by the City's Department of Transportation

Multi-modal transportation: Refers to a transportation system that considers various modes or ways of getting around (public transit, walking, biking, car, etc.)

MUTCD: Federal Manual on Uniform Traffic Control Devices, which designates standards for signage and pavement markings. CA MUTCD has jurisdiction in California.

Neighborhood Enhanced Network: Slow-moving, locally serving streets that promote the safety of all roadway users.

Non-Motorized Transportation: Refers to modes of travel such as walking and biking. (also includes equestrians)

Notice of Preparation (NOP): A Notice of Preparation is a document stating that an EIR will be prepared for a particular project. It is the first step in the EIR process (14 California Code of Regulations §15082). The NOP includes a description of the project, location indicated on an attached map, probable environmental effects of the project.

Paved shoulder: The outer edge of the roadway beyond the outer stripe edge that provides a place for bicyclists when it is

wide enough (3 ft. minimum), free of debris, and does not contain rumble strips or other obstructions.

Pavement marking: Any marking on the surface of the pavement that gives directions to motorists and other road users in the proper use of the road. The MUTCD determines the standard marking in California for state and local use.

Pedestrian-Enhanced Districts (PEDs): The PEDs are an analysis of a snapshot in time of areas where pedestrian improvements are prioritized relative to other modes. These areas may be located near schools, transit stations, areas of high pedestrian activity, areas with high collision frequency, or other placemaking opportunity areas.

Performance metrics: Standards and measurements for performance results. In transportation planning, the most commonly used performance metrics measure vehicle throughput and delay (congestion).

Protected Bicycle Lanes/ Cycle Tracks: Bicycle lanes that provide further protection from other travel lanes by the use of a physical roadway intervention.

Refuge islands: Raised medians which may be used by pedestrians or bicyclists at intersections or mid-block for assistance with crossing wide streets or signalized intersections.

Regional Transportation Plan (RTP): A plan to meet the region's long-term mobility needs by connecting transportation and land use policy decisions. The RTP is prepared by the Southern California Association of Governments (SCAG), which is the Metropolitan Planning Organization (MPO) of this region.

Right of way (ROW): The legally granted access that a roadway or other transportation facility can use. It is important to note that the right of way can extend beyond the asphalt in a street and can also include non-street land such as former railroad lines.

Sensitive receptors: A term from the Environmental Protection Agency that refers to areas with occupants more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants. Sensitive receptors include (but are not limited to) hospitals, schools, daycare facilities, elderly housing and convalescent facilities.

Shared pathway: A path that permits more than one type of user, such as a path designated for use by both pedestrians and bicyclists.

Shared roadway: A roadway where bicyclists and motor vehicles share the same space with no striped bicycle lane. Any roadway where bicycles are not prohibited by law (i.e. interstate highways or freeways) is a shared roadway.

Sight distance: The distance a person can see along an unobstructed line of sight.

Single-occupancy vehicle: A private car that is being used to transport only one person, the driver.

Southern California Association of Governments (SCAG): SCAG is a Joint Powers Authority and the Metropolitan Planning Organization (MPO) for this region. Their main task is to develop a Regional Transportation Plan (RTP) and Federal Transportation Improvement Program (FTIP) every four years. These documents identify transportation priorities for the region.

Street classifications: Arterial – Major streets that are very wide with multiple lanes; Non Arterial – Local streets that are not very wide. These are the type of streets that usually run through neighborhoods. Learn more about street classifications here.

Streetscape: The visual appearance, physical forms, and character of a street. Examples of streetscape elements include roadways, medians, sidewalks, street furniture, crosswalks, signs, open space, and landscaping, among many other factors. View common street features in our Street Features Glossary.

Traffic calming: Changes in street alignment, installation of barriers, and other physical measures employed to reduce traffic speeds and/or cut-through traffic volumes in the interest of street safety, livability, and other public purposes.

Traffic control devices: Signs, signals, or pavement markings whether permanent or temporary, placed on or adjacent to a travel way by authority of a public body having jurisdiction to regulate, warn, or guide traffic. CA MUTCD/MUTCD designates standards.

Traffic volume: The number of vehicles that pass a specific point for a specific amount of time (hour, day, year).

Transit-Enhanced Network (TEN): The proposed TEN will improve existing and future bus service on arterial streets by prioritizing improvements for transit riders.

Transportation Demand Management (TDM): Strategies that influence long-term travel behavior. The aim of TDM is to improve mobility and decrease negative impacts such as traffic congestion and air pollution. TDM strategies can include: ride-sharing, providing commuter subsidies, promoting walking and biking, and encouraging flexible work schedules.

Transportation System Management (TSM): Strategies that make better use of the existing transportation system by improving signalization, re-striping lanes for turning vehicles, or providing real-time traffic information. TSM strategies aim to increase efficiency and capacity in the short-term.

Utilitarian trips: Trips that are not for recreational purposes, such as running errands.

Vehicle Enhanced Network (VEN): The proposed VEN consists of enhancements, on a select group of streets, to prioritize the efficient movement of motor vehicles.

Wayfinding signs: Signs typically placed at road and bicycle path junctions (decision points) to guide bikeway users toward a destination or experience.

Walkable neighborhood: A neighborhood in which people can safely and easily walk to a variety of local destinations and resources.

Wide curb lane: A 14 foot (or greater) wide outside lane adjacent to the curb of a roadway, that provides space for bicyclists to ride next to (to the right of) motor vehicles. Also referred to as a "wide outside lane". If adjacent to parking, 22 feet in width may also be considered a wide curb lane.

Appendix E: Glossary of Acronyms

AASHTO - American Association of State Highway and Transportation Officials

AB - Assembly Bill

APC - Area Planning Commission

BAC - Bicycle Advisory Committee (City of Los Angeles)

BFS - Bicycle Friendly Street

BLOS - Bicycle Level of Service

BoE - Bureau of Engineering (Department of Public Works)

BoS - Bureau of Sanitation (Department of Public Works)

BP - Bicycle Plan

BPIT - Bicycle Plan Implementation Team

BRT - Bus Rapid Transit

BSL - Bureau of Street Lighting (Department of Public Works) BSS - Bureau of Street Services (Department of Public Works) BTA - Bicycle Transportation Account (Caltrans)

BTSP - Bicycle Transportation Strategic Plan (Metro)

CA DMV - California Department of Motor Vehicles

CA MUTCD - California Manual on Uniform Traffic Control Devices Caltrans - California Department of Transportation

CDL - Commercial Driver License

CEQA - California Environmental Quality Act

CFP - Call for Projects (Metro)

CMAQ - Congestion Mitigation and Air Quality

CRA - Community Redevelopment Agency

CSHTS - California Statewide Household Travel Survey

CTCDC - California Traffic Control Device Committee

DBS - Department of Building and Safety

DCP - Department of City Planning

DEIR - Draft Environmental Impact Report

DOT - Department of Transportation

DPW - Department of Public Works

DUI - Driving Under the Influence (of alcohol or drugs) EAD - Environmental Affairs Department

EIR - Environmental Impact Report

GHG - Greenhouse Gas

GIS - Geographic Information System

GSD - General Services Department

HDM - Highway Design Manual (Caltrans) HSIP - Highway Safety Improvement Program ITA - Information Technology Agency

LACMTA - Los Angeles County Metropolitan Transportation Authority (also Metro)

LAMC - Los Angeles Municipal Code

LAPD - Los Angeles Police Department

LAUSD - Los Angeles Unified School District

LAWA - Los Angeles World Airports

LOS - Level of Service

Metro - Los Angeles County Metropolitan Transportation Authority (also LACMTA or MTA)

MUTCD - Manual on Uniform Traffic Control Devices (Federal) NHTS - National Household Travel Survey

OTS - Office of Traffic Safety (State of California)

PBCAT - Pedestrian and Bicycle Crash Analysis Tool

PMS - Pavement Management System POLA - Port of Los Angeles

PSA - Public Service Announcement RAP - Recreation and Parks

ROW - Right-of-Way

RTP - Recreational Trails Program

RTPA - Regional Transportation Planning Agency

RUS - Recreational Use Statute

SAFTEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

SB - Senate Bill

SCAG - Southern California Association of Governments

SCS - Sustainable Community Strategy

SLM - Shared Lane Marking (also “sharrow”)

SLPP - State Local Partnership Program

SR2S - Safe Routes to School (CA State Program) SRTS - Safe Routes to School (Federal Program) SWITRS - Statewide Integrated Traffic Records System TDA - Transportation Development Act

TEA-21 - Transportation Equity Act of the 21st Century TIMP - Traffic Impact and Mitigation Studies

VMT - Vehicle Miles Traveled

Appendix F: Inventory of Modified Street Designations

INVENTORY OF MODIFIED STREET DESIGNATIONS			
Street	**Alignment**	**Standard Street Designation**	**Comment on Modified Street Designation**
3rd St	Doheny Dr to City of Beverly Hills boundary	Collector	No future dedication required.
Alcazar St	Eastlake Ave to Soto St	Collector	Modified standards set forth in USC HSC, Council File #14-0267-81
Abbot Kinney	Main St to Plams Blvd	Avenue III	Venice Plan calls for a 70' R.O.W. w/ 50' roadway.
Beverly Blvd	Western Ave to La Cienega Blvd	Avenue I	No widening in excess of the existing roadway (Wilshire Plan)
Beverly Glen Blvd	Mulholland Dr to Sunset Blvd	Scenic Arterial Mountain	No widening, realigning or improvement to increase traffic capacity (Bel Air - Beverly Crest Plan)
Biggy St	Zonal Ave to Eastlake Ave	Local	Modified standards set forth in USC HSC, Council File #14-0267-81
Bixel St	Miramar St to Wilshire Blvd	Avenue II	Modified standards are set forth in the Central City West Specific Plan.
Boyle Ave	Pleasant Ave to Whittier Blvd	Ave II	Modified standards set forth in Boyle Heights Community Plan
Califa St	Topanga Canyon Blvd to Canoga Av	Collector	Modified standards are set forth in the Warner Center Specific Plan.
Centinela Ave	Culver City Boundary to 90 Freeway	Ave I	See navigateLA for specific segment modifications
Century Blvd	Sepulveda Blvd to Aviation	Blvd I	Modified Standards are set forth in the Century Corridor Streetscape Plan
Century Blvd	Aviation to La Cienega	Blvd I	Modified Standards are set forth in the Century Corridor Streetscape Plan
Century Blvd	Grape St to Laurel Pl	Collector	Modified standards set forth in Jordan Downs Specific Plan
Cesar Chavez Ave	Cummings St to Mott St	Ave II	Modified standards set forth in Boyle Heights Community Plan
Coldwater Canyon Dr	Mulholland Dr to Beverly Hills City boundary	Scenic Arterial Mountain	No widening, realigning or improvement to increase traffic capacity (Bel Air - Beverly Crest Plan)
Crenshaw Blvd	Pico Blvd to 79th St	Avenue I	Modified standards are set forth in the West Adams - Baldwin Hills - Leimert Plan

INVENTORY OF MODIFIED STREET DESIGNATIONS			
Crescent Heights Blvd	Wilshire Blvd to Rosewood Av	Avenue III	Roadway restricted to current width along single family, low and low medium density residential areas. Permit flaring or other types of improvements at the commercial intersections of Wilshire, Third Street, and Beverly Boulevard. The City may acquire dedication, 100 feet beyond the alley behind these intersections for improvements only if the adjacent lots are ever developed with commercial, commercial parking or high or medium density multiple family residential uses.
Culver Blvd	City Boundary near Lincoln Blvd to Vista Del Mar	Ave III	No further dedication required
DeSoto Ave	Fwy 101 bridge to Victory Blvd	Boulevard II	Modified standards set forth in Warner Center Specific Plan
Eastlake Ave/Norfolk St	Alcazar St to Soto St	Collector	Modified standards set forth in USC HSC, Council File #14-0267-81
Enchandia St	Cesar Chavez Ave to Pleasant Ave	Ave II	Modified standards set forth in Boyle Heights Community Plan
Glencoe St	Washington Bl to Maxella Av	Avenue II	Modified standards set forth in Glencoe - Maxella Specific Plan
Glendale Blvd	1st Street to Fwy 101 viaduct	Boulevard II	Modified standards are set forth in the Central City West Specific Plan
Grand Ave	Temple St to 4th St	Boulevard II	Modified standards will conform to the Conceptual Rendering of Pedestrian Amenities and Linkages [Exhibt A, attached to Council file No. 02-1238] relating to the Grand Avenue Promenade project.
Grand Ave	4th St to 5th Street	Avenue II	Modified standards will conform to the Conceptual Rendering of Pedestrian Amenities and Linkages [Exhibt A, attached to Council file No. 02-1238] relating to the Grand Avenue Promenade project.
Highland Ave	Melrose Av to Rosewood	Divided Avenue I	Retain medians; trees to be preserved; no improvements beyond the existing right-of-way (Wilshire Plan)
Highland Ave	Rosewood to Wilshire	Divided Avenue I	Retain medians; trees to be preserved; no improvements beyond the existing right-of-way (Wilshire Plan)
Hope St	6th St to Olympic	Avenue II	Modified standards set forth in the Downtown Street Standards.
Laurel Canyon Blvd	Lookout Mountain to Mulholland Dr	Avenue II	No widening, realigning or improvement to increase traffic capacity (Bel Air - Beverly Crest Plan)
Motor Ave	10 Freeway to Venice Blvd	Ave II	See navigateLA for specific segment modifications
Mulholland Dr	Mulholland Hwy to Lakeridge Rd	Scenic Parkway	No changes or improvement may be made to the alignment or design of Mulholland Drive without the prior approval of the City Council. Mulholland Drive must remain at its existing alignment and the width of the right-of-way must remain as is. Mulholland Drive shall consist of two travel lanes, one in each direction, with a maximum width of 15 feet per lane. The shoulder shall be five feet wide.(Ord. 167,943)

INVENTORY OF MODIFIED STREET DESIGNATIONS			
Overland Ave	Pico Blvd to La Grange Av	Collector	No street widening shall be permitted, except for any currently scheduled realignment project at Pico Blvd. This restriction is in effect as long as fronting properties remain in the Low Density Housing Category. (West Los Angeles Plan)
Oxnard St	Lindley Ave to Louise Ave	Ave II	No further dedication required
Playground St	Alcazar St to Norfolk St	Local	Modified standards set forth in USC HSC, Council File #14-0267-81
Pleasant Ave	Enchandia St to Boyle Ave	Ave II	Modified standards set forth in Boyle Heights Community Plan
Redondo Blvd	Venice Blvd to La Brea	Collector	Wilshire Plan calls for 70' R.O.W./50' roadway to accommodate Class II bikeway.
Robertson Blvd	Whitworth to 18th St	Avenue II	Wilshire Plan calls for 80' R.O.W./60' Roadway
Santa Fe Ave	1st St to 4th St	Ave III	See Metro Connect US plan for detailed cross sections.
San Vicente Blvd	Santa Monica City Limits to Goshen Av	Boulevard II	No roadway alignment changes shall be made on the San Vicente Scenic Corridor (except for safety improvements) without a public hearing, to be held by the Board of Public Works, notification of which shall be posted along the right-of-way and published in a newspaper of local circulation at least 16 days prior to the hearing date. (Ord. 161,766)
Sunset Blvd	City of Beverly Hills boundary to 405 fwy	Avenue I	Per Bel Air – Beverly Crest Plan text, Sunset is not to be widened for the purpose of increasing capacity.
Sunset Blvd	405 fwy to PCH	Avenue I - Avenue II (from Swarthmore to Rustic Lane)	Per Brentwood – Pacific Palisades Plan Footnote No.14, Sunset is not to be widened for the purpose of increasing capacity during the Plan's 20-year life. [thru June, 2018]
Victory Blvd	De Soto Av to Topanga Canyon Blvd	Boulevard I	Modified standards are set forth in the Warner Center Specific Plan.
Vista Del Mar	Culver Blvd to Imperial Hwy	Ave III	No further dedication required
Wilshire Blvd	San Vicente Blvd to Sweetzer	Boulevard II	No widening in excess of existing roadway (Wilshire Plan)
Wilshire Blvd	Sweetzer to Lafayette Park Pl	Avenue I	No widening in excess of existing roadway (Wilshire Plan)
White Oak Ave	Rinaldi St to Devonshire St	Avenue II	Any additional improvement shall be limited to 54 feet in width between curbs to protect the historic and cultural deodar trees. (Granada Community Plan)
Modified Street Standards for Specific Area Geographies			
For modified street standards in the Sylmar Community Plan, West Adams Community Plan, Hollywood Community Plan, Cornfield Arroyo Specific Plan (CASP), Downtown area, and Warner Center Specific Plan areas, please see the related community plans, CASP document, Downtown Street Standards document, and Warner Center Specific Plan for detailed cross sections on modified street segments.			




LA/2B
The road ahead.

TRANSPORTATION

MOTION

On May 13, 2015, the Council approved a resolution (C.F. 15-0002-S48) that supported legislation authorizing California Transportation Commission to relinquish to the City of Los Angeles State Route 187 (Venice Boulevard) between Lincoln Boulevard and Cadillac Avenue and State Route 1 (Lincoln Boulevard) between the Southern City Limit of the City of Santa Monica and Route 105. The legislation was approved by the Legislature and the Governor and chaptered into law on October 7, 2015.

On October 29, 2015, the California Department of Transportation (Caltrans) began the relinquishment process by requesting comments from the City. In order to expeditiously complete the necessary Relinquishment Assessment Report, it is critical that City staff provide input to substantiate the appropriateness of the relinquishments.

I THEREFORE MOVE that the Council direct the Department of Transportation, in coordination with the Bureau of Engineering and any other appropriate City agency, to prepare and present the information required by Caltrans relative to the relinquishment to the City of Los Angeles of State Route 187 (Venice Boulevard) between Lincoln Boulevard and Cadillac Avenue, and State Route 1 (Lincoln Boulevard) between the Southern City Limit of the City of Santa Monica and Route 105.

PRESENTED BY: _____
MIKE BONIN
Councilmember, 11th District

FEB 5 2016

SECONDED BY: _____

ORIGINAL

msr

Mar Vista Community Council

Special Meeting of the Board of Directors

Wednesday, September 21, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
4. **Presentation: Neighborhood Conservation (Mansionization) Ordinance**
5. **Policy Motion: R1 Variation Zone** (Directors motion submitted by Rob Kadota)

   The Mar Vista Community Council recommends that the Los Angeles Department of City Planning adopt the R1V2 zone for Mar Vista.

   Public Comment (max 1 min each unless waived by the Chair)

   Board Comment
6. **Policy Motion: Venice Blvd Relinquishment** (submitted by Great Streets and Tranportation Infrastructure committees)

   Whereas the LA City Council is due to vote on Council File 16-0147 in October 2016,

   Whereas the Mar Vista Community Council supports the relinquishment of Venice Blvd between Lincoln and Cadillac from Caltrans to the City of Los Angeles,

   Therefore be it resolved that the Mar Vista Community Council supports Council File 16-0147 and encourages the City of Los Angeles to work with the Mar Vista Community Council on utilizing a portion of the $14,500,000 payment from Caltrans to the City for the relinquishment for improvements along Venice Blvd between Walgrove and Sawtelle.
7. **Public Comment**
8. **Adjournment**

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Mar Vista Community Council

Special Meeting of the Board of Directors

Wednesday, September 21, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:06 P.M.

   Quorum present: Rob Kadota, Melissa Stoller, Robin Doyno, Sherri Akers, Michelle Krupkin, Holly Tilson, Susan Klos, Paola Cervantes, Ken Alpern, Sarah Auerswald, Damien Newton, Greg Tedesco , Joseph Gallowway

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Sherri Akers: Community lost treasured community leader this week: Susan Kiern.

   Melissa Stoller: We're transitioning to MailChimp; encouraging email signups

   Sarah Auerswald: Can sign you up tonight.

   Rob Kadota: Acknowledged using time to honor someone who has passed away.

4. **Presentation: Neighborhood Conservation (Mansionization) Ordinance**

   Presentation by Patricia Keane, Director of Land Use & Planning for Bonin

   Two separate programs. 1:-amend city code (BMO Baseline Mansionization Ordinance; and BHO Baseline Mansionization Ordinance); 2: Interim Control Ordinance (ICO)

   Concern that existing BMO ordinance is not controlling building size.

   For Mar Vista, ICO is a little more restrictive than current city code; for other areas, a lot more restrictive. ICOs expire in March, 2017. Neighborhood can default to citywide rules or can select a new R1 Variation Zone. R1V/R/F—major difference is where you can put massing on second story.

   City code changes apply regardless of zone selected. Garage & patio components are part of definition of floor area; applies regardless of zone. Floor area currently excludes 1st 400 sq. ft. proposed amendments to citywide BMO includes the following exemptions: 400 sq. ft. if rear garage or entry, 200 sq ft if at front, excluded. Justification is to be less auto-centric. Patios (front or back) are excluded if uncovered; if covered and enclosed on three sides, no exemption. Exemption for accessory structures: 200 sq. ft. per structure, up to 400 sq. ft.Other bonuses are gone. ICO: .5 without bonuses; current BMO: .5 with bonuses. Overhangs don't count as floor area. Lot coverage determines if need to build 2nd story. Height limit is from the grade.

   How does this fit in to general & community Plan? Community plans don't tend to get into size, more characteristics of neighborhood. Mar Vista community plan is 20 years old.

   New zones will rollover into recodeLA.

   Planning Department staff did analysis. Zoning consultants (professional planners) did zones. Believes they reached R1V2 recommendation by analysis of floor area ranges in Mar Vista. Recommend something a little large than current average. Existing BMO is like R1V1. ICO is closest to R1V2.

   Zoning code defines what is front, what is back. What if impossible to put garage in back? New rules will apply to new development. Threshold for what is changed applies for remodel.

   Land use decisions are not based on property values. Planning Commission will consider planning recommendation and community input. If there are areas that have different concerns within Mar Vista, can

have different codes. If no community consensus, may need to determine if need to rezone, or perhaps lean more on professionals.

5. **Policy Motion: R1 Variation Zone** (Directors motion submitted by Rob Kadota)

The Mar Vista Community Council recommends that the Los Angeles Department of City Planning adopt the R1V2New zone for Mar Vista.

Motion to approve by Sarah, 2nd by Melissa.

Public Comment (max 1 min each unless waived by the Chair)

Susan Klos: See Attachment A. Note: Susan left room after reading comment.

Karen Sandler: Lives on Stuart Ave. (Mar Vista flats); 1650 sq. ft. home. Huge amount of remolding and development. Neighborhood character is changing, not for better. Recommends V2.

Ken Hayton: Supports V1 or New. V2 will restrain growth. New provides some compromise but prefers V1

Mike Marans:: 1500 sq. ft. home. Prefers R1VNew. How do they get away with small lot subdivision.\ at 3660 Beethoven?

Bob Elliott: Home on Ashwood near Mark Twain; 4900 sq. ft. lot. Supports R1VNew; V2 is too restrictive for area. If have crawl space, it takes up 21 inches of height.

Kent Alvis: Lives across from Little League field. Does't think we are ready to vote, make statement. V2 is too restrictive.

Ameen Aminat: Redeveloping at Grandview & Victoria. For people new to neighborhood, paying more per sq. ft., so have less money to work with as developer. This is reason for ugly new developments.

Brian Selem: Mar Vista is too broad an area. Favors V1. Big loss of value.

Harriet Natsuyama: Not in favor of mansionization. Leaning toward V2. Prevent mansionization.

Joseph Treves: Loves Mar Vista. Concerned we're over reacting to new large homes. Different needs than in past: offices, parents, grown children.

David Altemus: In Mar Vista since 1948, bought house in 1972. Home prices are based solely on sq. ft. Likes R1V1.

Jeff Rapport: Lived in Mar Vista since 1948. Is very eclectic neighborhood..Some people have built boxes. This is crazy. Penalizes people for putting more garages in. Supports V1.

Saeed Ali: R1V2. Need to consider height with crawl space. Decision is being made much to fast, without enough community involvement.

Patti Oblath: Wade St. No longer has southern exposure or privacy in back yard. R1V2 or R1New.

Neil Kritzinger: Why creating another alphabet soup? If legislating slopped roof, would need to build 3rd floor.

Andrew Galambos: Born in Mar Vista. Architect. Encroachment will deal with massing. R1V2 or New. It's hard to look at the zones in isolation from new BMO.

Additional Comments: see Attachment B.

Board Comment

Sarah Auerswald: Comments deadline is Sept. 24. Patricia Keane: Influence declines after deadline; may be possible to extend deadline for Mar Vista. If have comments after date, submit directly to Planning Commission; it votes on recommendation for City Council.

Damien Newton: Comments at last BOD meeting addressed character of community, 12224 Venice development. Community character is within neighborhoods, not what's on Venice. Has heard "I like V1, but could go with New; I like V2, but could go with New." Would be comfortable with R1VNew.

Holly Tilson: wanted to ask a friend who is an expert in the field, if motion is written properly but didn't have the opportunity because it was not presented at a T&I meeting. For her, whole thing started with mansionization. Feels that residents need to write their own letters.

Michelle Krupkin: City planning had meetings over the summer; everyone wanted V2, it wasn't small enough. Don't know if VNew is good compromise

Melissa Stoller: Mar Vista is too large an area to be covered by one zone. Doesn't want more boxes.

Robin Doyno: Very concerned about mansionization. Probably VNew is best way to go; needs more time. Could have several plans if done cogently.

Greg Tedesco: Leaning toward VNew, good compromise, need to get things under control.

Sherri Akers (via email): 'm not qualified to evaluate the specifics of this ordinance. But my concern is that most of us have a high likelihood of needing to expand the typical Mar Vista home. Many may need to accommodate up to 3 generations. For many, if not most, long term care is unaffordable. To bring parents into our homes and maintain quality of life may be best achieved by adding another master suite. Many of us will need a live in caregiver. Again, we want to accommodate that while still having some privacy. Many adult children can't afford to live in LA and are moving back with their parents - often with their own children. My primary concern is that we not be prohibited from improving our homes so that we can care for our families and ourselves.

Friendly Amendment by Paola Cervantes: R1VNew, 2nd by Robin Doyno. Rob Kadota accepts amendment.

Friendly Amendment by Damien Newton: Urge Planning to take 2nd look. Are they looking at too large an area. Sarah Auerswald: how would we vote on it we break Mar Vista into smaller areas? Rob Kadota: suggests we take stand now, community can keep commenting. Damien: Motion withdrawn.

Motion carried as amended: 6 ayes, 2 nays, 0 abstentions, 1 recusal (Susan Klos), 1 absent (Sherri Akers).

Note: Susan Klos returned to room following vote.

6. **Policy Motion: Venice Blvd Relinquishment** (submitted by Great Streets and Tranportation Infrastructure committees)

   Whereas the LA City Council is ~~due to vote on~~ approved Council File 16-0147 ~~in October 2016~~ on August 31, 2016,

   Whereas the Mar Vista Community Council supports the relinquishment of Venice Blvd between Lincoln and Cadillac from Caltrans to the City of Los Angeles,

   Therefore be it resolved that the Mar Vista Community Council supports Council File 16-0147 and encourages the City of Los Angeles to work with the Mar Vista Community Council on utilizing a portion of the $14,500,000 payment from Caltrans to the City for the relinquishment for improvements along Venice Blvd between Walgrove and Sawtelle.

   Motion to approve by Michelle Krupkin, 2nd by Damien Newton.

   Board Comment

   Michelle Krupkin: Friendly amendment: Council voted August 31.

   Damien Newton: Lots of people have done great job on our Great Street, main roadblock has been CalTrans.

   Motion carried as amended: 9 ayes, 0 nays, abstentions, 0 recusals,, 1 absent (Sherri Aker).s

7. **Public Comment**
8. **Adjournment**

   Meeting adjourned at 8:53 P.M.

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ATTACHMENT A: Susan Klos Public Comment and Recusal

I have conferred with the Office of the City Attorney and since this issue impacts my primary residence there is an exception under the law found at California Code of Regulations section 18702.4(b)(1)(A) that allows me to speak as a member of the public.

I request that the committee's minutes reflect that I am being disqualifying myself as a committee member, but speaking as a member of the public under California Code of Regulations section 18702.4(b)(1)(A).

(I sat in the audience at this point)

Public comment - I'm an At-Large Director of the MVCC speaking not as a committee member of the MVCC, but as a member of the public under California Code of Regulations section 18702.4(b)(1)(A). I have obtained advice from the Office of the City Attorney regarding my ability to speak as a member of the public on this matter.

(I left the room for the vote)

ATTACHMENT B: Public Comments submitted to PLUM Committee

a. John and Jill Skinner

Like many in our community, we are tired of builders who have been able to take advantage of loopholes and erect glorified boxes that have rooftop decks, etc. We are fine with eliminating loopholes that would cut down on this trend and would support the R1V1 or R1V New proposals.

However, the proposed R1V2 zone for Mar Vista is a complete over-reaction to the overzealous builders and will not only hurt the regular homeowner but it also fails to take into account the future of families in Los Angeles. Frankly, we are shocked such strong restrictions are even being proposed and we would NOT have bought our current home in Mar Vista if something like R1V2 was in place.

A few points we would like to make:

**Based on talking with neighbors, many people in Mar Vista still think the area would fall under the R1V1 proposal. They don't understand that R1V2 is what has been recommended for Mar Vista. Most people seem to be fine with 50% FAR with no bonuses but further restrictions are getting a big thumbs down. Many of these people might be silent because they don't understand the restrictions of R1V2 compared to R1V1.

Caring for elderly parents/grandparents/children living at home: People are living much longer. Even though society is having less kids then they did 20+ years ago, the size of families living together is INCREASING. Due to medical and health advancements, some households will have four living generations in them. "By 2025, as many as 25% of the U.S. population will be in multi-generational households and the demand for a different kind of residential property will accelerate over the next decade to meet this demand" (Strategic Advantage Real Estate newsletter). When you combine this with astronomically high rents forcing children to live at home longer than ever, does it really make sense to further restrict a homeowner in regards to what they can do with their property?

More people are working from home: More people are working at home and need dedicated work space in the house. Reducing the options to have a work space at home doesn't make much sense as we move into the future.

Discriminatory toward larger families: As a father and someone who grew up with five siblings, I have a serious problem with many of the proponents for the new proposal arbitrarily telling people they can make due in smaller houses. They don't know the specific needs of a certain families that might require more space, etc. We all have different needs and that needs to be respected. What about families with special needs children?

Why make the ugly boxes even more valuable?: By passing the proposed ordinance, it will have the unfortunate impact of making those unsightly/over-built shoe boxes even more valuable. They will never be torn down since the homeowner would have to build a significantly smaller house. Since these homes will not have any competition, their value will end up trading at premium prices…so the people with the homes that everyone loves to hate will be in an even better financial position.

Attached Garages: Since when would an area in which you park your car be counted against the livable square footage? It is NOT fair to assume that everyone uses an attached garage as extra living space. Attached garages are essential for safety, especially when a spouse is a frequent business traveler. Attached garages allow for people to build a home that creates a larger backyard which is an essential component for maximizing California living and one's own land value. I have yet to hear a rationale argument as to why an attached garage should be counted against the allowable floor area of a lot especially when non-attached garage square footage is considered exempt.

Thank you for your time and we appreciate all that you do to make Mar Vista such a great place to live. We sincerely hope a recommendation more along the lines of the R1V1 is made to the City Council.

We are happy to speak with anyone about this topic if needed.

All the Best,

John and Jill Skinner
12624 Indianapolis Street

b. Tod Jerry

I am writing to comment on the proposal of the Rl Variation Zone (Rl V2) for the Mar Vista Neighborhood.

I believe that the proposed further reduction of Floor Area Ratio ("FAR") under the R1V2

Variation zone is overly restrictive and unnecessary in combination with the new massing rules under the updated Baseline Mansionization Ordinance ("BMO"). RlVNew should be considered as an option as massing guidelines are much more important than FAR.

I am the Chief Operating Officer of Marmol Radziner. Marmol Radziner is a leading architect and contractor that has been in business for over 27 years in Los Angeles. The company has designed and built hundreds of homes throughout Los Angeles over the last several decades, and has been widely recognized as a leader in residential architectural design.

I have also been a resident of Mar Vista since 2002. While growing our family, my wife and I

have remodeled two homes and I am in the process of building a third ha.use in Mar Vista.

Mar Vista has seen significant growth over the last 20 years for a number of reasons. Most importantly, the real estate has been relatively affordable in comparison to Venice, Santa Monica, Pacific Palisades, and other Westside neighborhoods. Additionally, the environment to remodel or build new homes has been generally less restrictive and easier to manage compared to the neighboring communities. This has attracted a diverse group of residents and driven tremendous growth and property value appreciation.

The sense of community is wonderful and has grown stronger as new residents have come to our neighborhood. Schools have improved, restaurants and retail have thrived, and the Farmers' Market has become a Westside destination.

Many residents and neighbors react negatively to new development when the architecture appears out of scale or character to the neighborhood, which is understandable. The main problem with many new homes is a lack of sensitivity to the massing of the new building in relation to the neighborhood and surrounding streetscape, often without considering the relationship between interior living space of the home and the exterior garden and lighting.

It is difficult to build "good architecture" into a city zoning code, so the common reaction is to restrict size, and thus reduce FAR. This is the incorrect approach. **The focus should be on the massing of the new building.**

The newly proposed BMO does address massing in several important ways. While FAR is reduced and bonuses are removed, a complex set of new rules is introduced to guide setbacks, building articulation and shape (encroachment plane, front facade, side wall articulation). The new massing rules will start to address the most critical concern with new construction. However, also reducing FAR at the same time is effectively a "double whammy". FAR has rio context without having rules on shape. A large house that is well proportioned can have a more attractive presence than a smaller house that is poorly designed.

The City of Santa Monica utilizes many of the same concepts as proposed in the new BMO. However, **Santa Monica also allows a 61% FAR** in most neighborhoods. The rules in Santa Monica have historically been viewed as restrictive in comparison to Los Angeles.

Interestingly, Pacific Palisades is recommending the adoption ofRIVI, which has a less restrictive allowable FAR (55-65%) than the new BMO. The Palisades neighborhood has historically been subject to various local CCR's (such as Tract 9300), which have similar massing rules (encroachment plane for example) as the new BMO.

From a planning perspective, the restrictive massing rules in Santa Monica and in Tract 9300 could be viewed as historically effective despite relatively large allowable FAR.

If Mar Vista adopts the RIV2 zoning variation, it will be significantly more restrictive to build in Mar Vista as compared to Santa Monica or Pacific Palisades.

I would encourage the Mar Vista Community Council, local leaders, and residents to further evaluate the potential variation zones as compared to the new BMO and consider other options,

including the proposed R1 VNew. The new massing rules under the BMO are significantly more restrictive than current code and will be very effective in addressing the most critical concerns of newly constructed homes. There is no need to also significantly decrease FAR at the same time.

c. Michael Poloukhine

Based on the newly published proposed code revisions, in addition to my previous recommendations, I recommend the following additional revisions to better assure the intent of the changes is met without the potential for negative effects on design excellence in our community.

Section 1: Floor Area, Residential definition, Section 12.03

Covered porches and over-in-height ceilings are useful design tools used create indoor/outdoor transitions and shape spaces in creative and interesting ways. Excluding only some of their floor area may be rational where there is no direct massing control, however, in the R1 zone's encroachment plane their discouragement is not only no longer necessary but actually detrimental to design excellence and variety in home designs. In the R1 zone, with the encroachment plane introduced, open porches and double-counting of over-in-height areas can, and in the interest of better design should be excluded entirely from RFA.

Section 12: Subdivision 1 of Subsection C of Section 12.08:

The added language for front facade modulation is the same language from the current code already shown to be ineffective as interpreted by LADBS Staff to preclude variations in the setback across stories. Greater design flexibility can be introduced while still providing for massing control by relying on a home's cumulative facade area rather than building width: "The cumulative aggregate area of the exterior walls facing the front lot line, equal to a minimum of 25 percent of the front facade area, shall be stepped back . . ."

Additionally, tying the degree of setback to building depth unnecessarily penalizes narrow lots that require longer buildings to achieve the same building area, while also ignoring the overall neighborhood street façade context which may be negatively affected by too deep a building facade setback. There is no rational reason a building on a 40' wide lot should have a deeper faced setback than the same area building on a 50' or 60' wide lot directly adjacent to it, and to require this by code will only encourage disjointed and oddly proportioned street facades. A more contextual and rational determinant of front facade setback would be the front yard depth: ". . . shall be stepped back a distance of at least 20 percent of the required front yard setback, (up to 20 percent of the building depth) from a plane parallel to the lot width . . ."

I believe the above recommendations would help encourage design excellence without detrimental impact to the intent of the revisions and urge you to consider their incorporation into the ordinance.

Mar Vista Community Council

Regular Meeting of the Board of Directors

Wednesday, September 14, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of August 9th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by scott.malsin@assembly.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Open
   c. LANCC: Joseph Galloway
   d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
    a. Chair - Rob Kadota
    b. First Vice Chair – Sarah Auerswald
    c. Second Vice Chair – Joseph Galloway
    d. Secretary – Melissa Stoller
    e. Treasurer – Holly Tilson
        i. Report on current financial status
        ii. **APPROVAL** of August Monthly Expense Report (MER)
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Website Ad Hoc Committee** – Chair TBD
        i. **MVCC Website Presentation** – Sarah Auerswald (15 min)
    b. **Safety and Security Committee** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
    b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
    c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
    e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
    g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    h. **Planning and Land Use Management Committee** - Mitchell Rishe, Co-chairs; Michael Millman & Latrice Williams, Vice-chairs
    i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    j. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
    m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: *Directors may request removal of any item from the consent calendar*

    MVCC approves Items 11.a-11.m on consent.

    a. ADMINISTRATIVE MOTION: Nomination and Approval of Website Ad Hoc Committees chair (submitted by Rob Kadota, MVCC Chair)

    MVCC approves the appointment of Sarah Auerswald as Website Ad Hoc Committee Chair.

    b. **ADMINISTRATIVE MOTION: Santa Monica Airport Committee Name Change** (submitted by Santa Monica Airport Committee)

Whereas: Prior to October, 2015 complaints were received by MVCC Chair Bill Koontz regarding greatly increased noise impacts from LAX traffic. The complaints were forwarded to MVCC Santa Monica Airport committee Co-Chair Martin Rubin;

And whereas: the October, and November 2015 Santa Monica Airport Committee meetings included discussion regarding the topic of SoCal Metroplex noise impacts to Mar Vista;

And whereas: the topic of SoCal Metroplex noise impacts to Mar Vista will continue to be an issue of concern to the Mar Vista community;

Be it resolved: that LAX issues along with Santa Monica Airport (SMO) issues be reflected in the name of this committee;

And be it further resolved: that the names this committee recommends to the MVCC Board of Directors be either: the MVCC Airport Committee, or the MVCC Airport Committee - SMO and LAX.

c. **ADMINISTRATIVE MOTION: Safety and Security Committee Name Change** (submitted by Safety and Security Committee)

Whereas at its July 28, 2016 meeting, the Safety and Security Committee agreed that a name change would better reflect the mission of the committee, the Mar Vista Community council hereby affirms the committee's decision to change its name to the "Committee on Public Safety."

d. **ADMINISTRATIVE MOTION: Safety and Security Committee Mission Change** (submitted by Safety and Security Committee)

Whereas at its July 28, 2016 meeting, the Safety and Security Committee agreed that a change to its mission statement would better reflect the objectives of the committee, the Mar Vista Community council hereby affirms the committee's decision to change its mission statement to:

"The mission of the Mar Vista Community Council's Committee on Public Safety is to assist stakeholders in elevating the quality of life, enhancing safety, and improving emergency preparedness within the community. The committee does this by encouraging personal responsibility and through cooperation with public and private-sector agencies having jurisdiction over the community."

e. **FUNDING MOTION: Budget Adjustment** (director motion submitted by Holly Tilson)

MVCC approves the allocation of $282 that is currently unallocated to the Operations budget category.

f. **FUNDING MOTION: Fall Festival** (submitted by Community Outreach Committee)

Whereas the Mar Vista fall Festival is an annual event that benefits the whole community, and whereas the MVCC has supported the event in the past, Therefore MVCC will support the 2016 Fall Festival in the amount of $4000.

g. **FUNDING MOTION: Hilltop Neighbors Association Picnic** (submitted by Community Outreach Committee)

Whereas the Hilltop HNA has their Picnic on September 10th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $300 to the Hilltop Neighbors Association Picnic.

h. **FUNDING MOTION: Facebook Ad Campaign** (submitted by Community Outreach Committee)

Whereas Facebook is a useful tool to increase engagement and outreach, Therefore MVCC will spend $100 for ads in September and October.

i. **FUNDING MOTION: MailChimp** (submitted by Community Outreach Committee)

Whereas the email system in the current website is not working correctly, and it is therefore imperative to use a new system to email stakeholders, therefore the MVCC will spend $50/month for Mailchimp subscription, beginning September.

j. **FUNDING MOTION: Fall Newsletter** (director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of up to $7000 to layout, print and distribute a fall newsletter.

k. **POLICY MOTION: AB-1930 In-home supportive services: family caregivers: advisory committee** (submitted by Aging In Place Committee)

AB-1930 would, until January 1, 2019, establish the In-Home Supportive Services Family Caregiver Benefits Advisory Committee within the State Department of Social Services, as specified, for the purpose of describing the availability of, and barriers to accessing, employment-based supports and protections, as specified, and studying the impact of the lack of access to these supports and protections on individuals who provide supportive services a spouse or as the parent of a recipient child. The bill would require the advisory committee to submit a peer-reviewed report to the Legislature, as specified, on or before January 1, 2018.

WHEREAS, by 2030, 20% of our community will be 65 or older.

WHEREAS, 1 in 3 will have dementia or Alzheimer's.

WHEREAS, Medicare does not cover any of the essential services needed to care for those with dementia – forcing family caregivers out of the work force.

WHEREAS, 25% of Boomers care for an aging parent resulting in an average loss of income of over $300K. When forced to leave the workplace they face further hardship if taking social security early with a reduction of benefits of almost 30%.

The Mar Vista Community Council respectfully urges Assembly members Sebastian Ridley Thomas and Autumn Burke to request that AB-1930 In-home supportive services: family caregivers: advisory committee include caring for senior parents and requests their support.

l. **POLICY MOTION: Local Oil/Gas Facility Inspection** (submitted by Green Committee)

The natural gas storage facility for SoCalGas - Sempra Energy in Playa del Rey area are the oldest repurposed oil wells in the entire Gas Company system. If there are recent safety inspection and tests for methane and other gas leaks in the air above and surrounding these storage facilities, we request that they be made available to the Mar Vista Community Council and the general public and be easily searchable online, simple to read, chartable and interpreted for the lay person to see and understand the baseline and any increases and decreases in methane levels over time. We also request searchable online access to the status of safety valves for effective shut down on all storage facilities.

If no recent safety inspections or ongoing tests for methane and other gas leaks have been made, we request that they be scheduled as soon as possible and the results be released to this Council and the general public in the manner described above. Further we request these safety inspections be frequent and air quality tests be monitored and completed and made public daily.

Also, Air Quality Notifications must be available online and a method be made available for Playa del Rey and surrounding area stakeholders to sign up and be notified of Reportable Releases, as they are now being done for the Aliso Canyon Storage Facility neighbors.

m. **POLICY MOTION: EV Chargers in Multi-Family Dwelling Units** (submitted by Green Committee)

WHEREAS, the negative impacts of climate change are worsening more quickly than anyone expected, including extreme storm events, such as powerful storms, winds, floods, wildfires and drought; and

WHEREAS, the planet has now topped 400 parts per million (ppm) in the concentration of global carbon dioxide in the atmosphere and 350 ppm is considered the maximum threshold above which irreversible climate impacts begin to occur; and

WHEREAS, according to the US Environmental Protection Agency, fossil fuel production and usage is the largest emitter of greenhouse gases worldwide; and

WHEREAS, reducing the use of fossil fuel-powered vehicles is an effective way to reduce greenhouse gas emissions and particulate matter; and

WHEREAS, the spread of the use electric vehicles charged by renewable power like solar, wind and geothermal has begun in earnest; and

WHEREAS, wealthy communities have received by far the largest shares of state rebates to purchase electric cars; and

WHEREAS, low-income communities are disproportionally affected by pollution and climate change; and

WHEREAS, newly constructed or renovated multi-family buildings are currently required to be wired for electric vehicle chargers, but are not required to have actual chargers installed; and

WHEREAS, persons living in multi-family buildings find it difficult to charge their vehicles and therefore have little incentive to purchase and use electric vehicles; and

WHEREAS, according to the National Multifamily Housing Council in 2015, apartments in the City are 41% of all housing. Since multifamily housing is much more population dense than single family homes, an enormous percentage of the City's population does not have reliable access to electric vehicle chargers; and

WHEREAS, to reach a goal of 100% of multifamily parking spaces having access to electric vehicle chargers by 2025, setting annual benchmarks would be an effective approach – for example 20% by 2017, 30% by 2018, 40% by 2019, 50% by 2020, 60% by 2021, 70% by 2022, 80% by 2023, 90% by 2024 and 100% by 2025; and

WHEREAS, the Mar Vista Community Council has been a strong leader in promoting Citywide sustainability policies and aims to continues its tradition into the future;

NOW, THEREFORE, BE IT RESOLVED, **that by the adoption of this Resolution, the Mar Vista Community Council hereby supports and encourages any legislation promoting a fair plan that provides EV charging capability to existing and new multi-family housing parking for electric vehicle by 2025.**

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS*** *– The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS*** *– In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors

Wednesday, September 14, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:02 P.M.

   Quorum present: Rob Kadota, Melissa Stoller, Robin Doyno, Sherri Akers, Michelle Krupkin, Holly Tilson, Susan Klos, Paola Cervantes, Ken Alpern, Sarah Auerswald, Damien Newton, Greg Tedesco

2. **Pledge of Alligence**

   Led by Bill Scheding.

3. **Approval of August 9th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)

   Motion to approve by Sarah Auerswald, 2nd by Sherri Akers.

   Change "Gymnasium" (in heading) to "Auditorium.

   Damien Newton: Kudos to Secretary for recording of public comments.

   Motion as amended carried unanimously.

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Robin Doyno: Supervisor Ed Edelman recently died. Responsible for ignificant changes Board of supervisors: children's healthcare, Aides crisis, etc. Board took a moment to remember him.

   Bill Scheding: Hasn't received eblasts for last two meetings.

5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

   a. Mar Vista Recreation Center – Director tracie.field@lacity.org

      Soccer field will be done. Using artificial turf but fill isn't rubber crumbs.

      Tracie is being transferred to Sylmar November 25.

   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Big meeting yesterday RE: proposed revision to R1 zoning code. September 25 is deadline for submitting comments to influence staff report. Should have tentative dates for MVCC community meeting tomorrow. Comments by Mar Vista residents at Department of Planning September 13 meeting: 14 want bigger house (R1-V1 or R1New), 3 want smaller house as proposed for Mar Vista (R1-V2).

      Tentative MVCC Community meeting next Wednesday, September 21. Perhaps it will be a special meeting.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by scott.malsin@assembly.ca.gov

   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Next meeting is Wednesday, September 21, 10:00 a.m. Agenda will close Saturday, September 17, 1:00 p.m.

Melissa Stoller: Why is meeting closed to public. Answer: This is liaison committee – not infrastructure or traffic. Strictly addresses neighborhood traffic problems – speeding, signals, stop signs. LADOT requested that meeting be closed because of budget cuts. Open meetings would require more staff time. If public comes to meeting and starts requesting things, LADOT will not come to meetings.

Bill Scheding: Committee dates back to Cindy Mitzokowski. Never intended to be public meeting.

b. DWP MOU: Open

c. LANCC: Joseph Galloway

d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

One Water has taken over group; doing stakeholder outreach for waste/recycled/drinking water. New 20 year plan should be out in January.

e. WRAC: Rob Kadota/Joseph Galloway

Meets 3rd Wednesday of month at Lenny's Deli. Will elect officers at next meeting.

f. WRAC LUPC: Sharon Commins

Report via email: No meeting in September due to the Congress of Neighborhood Councils.

Rob Kadota: Sharon has moved out of county, will appoint new liaison in near future.

g. City Budget Advocates: Holly Tilson, Joseph Galloway

h. Recode LA: Sharon Commins

Report via email: Meeting changed to Thursday Oct 6th, 6-9 pm at the Bradbury Building; check website to confirm details.

i. Animal Services: Tom Ponton

j Fall Festival: Albert Olson

Report by Tom Ponton: Stuff is coming in at furious pace. Three booths left as of a few days ago. Repair Café iwill be n big gym; staffed mostly by retired people with expertise. Silent auction. Animal services: pet adoption, micro-chipping.

Sarah Auerswald: Need to get word out that Repair Café wants people to let them know ahead of time what they're bringing. Link to form is posted.

k Friends of Historic FS 62: Albert Olson

Rob Kadota is now serving on 501c Board. It submitted worksheet listing community organizations that will use facility; dedicated 7-9 almost every night for MVCC to use for meetings. Once approved, has 3 years to pull it off.

Sherri Akers: Felicia Mahood Community Center interested in using facility.

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Next Coffee Time is September 15; speaker is Jean Roth: important things your website must have.

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota

Thank you to those who helped at recent community events. Grease screening at Venice High School is Saturday, September 17; will have actual Greased Lightening car. Always ongoing need for volunteers.

At last BOD meeting there was an incident involving an MVCC committee vice-chair. Rob has talked to people who saw the inappropriate behavior. Motion to remove this person didn't make it on agenda; Rob is in discussion perpetrator about other options.

Next BOD meetings rescheduled to October 14 and November 1.

b. First Vice Chair – Sarah Auerswald

c. Second Vice Chair – Joseph Galloway

d. Secretary – Melissa Stoller

Is sending a weekly eblast from MailChimp. It includes information about meetings scheduled for the following week if they're on the calendar; it's okay to add meetings to the calendar before having an agenda. If there's something you feel should be highlighted about an upcoming meeting, please send that information to Melissa by 5:00 Friday. Please also let her know about any upcoming events of general interest to the community.

BOD: Nov. 1, Oct. 14.

e. Treasurer – Holly Tilson

i. Report on current financial status

MER Section A: bills paid & cleared during August.

MER Section B: Lines 1-2 are checks written but not yet cleared. Other outstanding committements are approved but checks are not yet written.

Beginning checking account balance was $9,066.14; $380.91 cleared, leaving a balance of $,685.18.

Our allocation for the current fiscal year is $37,000, paid quarterly.

ii. **APPROVAL** of August Monthly Expense Report (MER)

Motion to approve by Melissa Stoller, 2nd by Susan Klos. Motion carried unanimously.

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Website Ad Hoc Committee** – Chair TBD

Westdale Homeowners Association block party is October 9.

Emails: getting 1000's of spam attacks with ENS mail system. Moving to MailChimp; in transition.

Next meeting is Monday, September 19, 6:30 p.m., at Mar Vista Library. Agenda closes September 15.

i. **MVCC Website Presentation** – Sarah Auerswald (15 min)

Presentation: see http://marvistacc.org/files/New-Website-Presentation-MVCCBOD-14Sept.pdf

Public Comment:

Latrice Williams: what other NCs use this vendor? Sarah Auerswald: West Hills, Tarzana, Studio City; can get names of others.

Bill Scheding: Will I get notice when I do new subscription? (Yes.) Can I unsubscribe on form? (No, but there's an unsubscribe at bottom of email). Thanks for presentation.

Christopher: Drupal? (Yes)

Tom Ponton: What outreach are you using to get word out about email?

Board Comment:

Ken Alpern: why should we need to pay for as part of City of Los Angeles? Sarah: during election, NCs had free use of NationBuilder. Functionality wasn't much better and they couldn't promise what ongoing costs would be.

Sherri Akers: Biggest problem with current website is signup is not intuitive. Aren't prompted to sign up for committee newsletters.

Michelle Krupkin: Hope in future will alleviate problems of Great Streets not being able to post description of meeting.

b. **Safety and Security Committee** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

Report by Elliot Hanna via email:

1. The special meeting on mail and package theft was held on August 25, 2016. We had a great turnout of somewhere between 60 and 70 people. The major takeaway is to report all mail theft to both L.A.P.D. and the United States Postal Inspection Service at

http://www.postalinspectors.uspis.gov. This is extremely important. Also, since the meeting, I learned from Capt. Long that Det. Gomez and Inspectors Ramirez and Versoza are talking regularly regarding ways to cooperate on mail theft issues.

2. The next regularly scheduled meeting of the Committee on Public Safety will be held on Thursday, September 22, 2016 at 7:00 p.m. at the Coffee Connection at 3838 Centinela Blvd., Los Angeles, CA 90066.

c. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Guest presenter September 15 is California Highway Patrol. Ways to drive less rather than give up license completely.

Doing workshop at Congress of Neighborhoods.

e. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Next meeting is September 28.

f. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

g. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Joint meeting with T&I; on Septermber 15 on 1st floor of Coffee Connection.

h. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Street services doing potholes repair Septermber 15.

i. **Planning and Land Use Management Committee** - Mitchell Rishe, Co-chairs; Michael Millman & Latrice Williams, Vice-chairs

PLUM meeting on September 20, 7:30 p.m., at WindwardSchool.

j. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Not meeting this month. Changing meeting to 1st Tuesday of month.

k. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

l. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

m. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

n. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

b. Zone 2 – Damien Newton

c. Zone 3 – Melissa Stoller

Hilltop held its annual picnic on Saturday, September 10.

There have been a lot of tagging incidents recently (with Anarchy symbol) in Zone 2 & 3, including garages, fences, a car and the Mar Vista stairs. Police have been notified; I don't believe there are any suspects yet.

d. Zone 4 – Greg Tedesco

e. Zone 5 – Michelle Krupkin

f. Zone 6 – Holly Tilson

11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: *Directors may request removal of any item from the consent calendar*

MVCC approves Items 11.a-11.m on consent.

Melissa Stoller requested removal of 11.f & 11.j, and suggest that we combine the discussion of these items.

Motion to approve 11.a-e, 11.g-k, & 11.k on consent by Sarah Auerswald, 2nd by Sherri Akers.

Bill Scheding: Thanks Board for support of Hilltop picnic.

Motion carried unanimously.

a. ADMINISTRATIVE MOTION: Nomination and Approval of Website Ad Hoc Committees chair (submitted by Rob Kadota, MVCC Chair)

MVCC approves the appointment of Sarah Auerswald as Website Ad Hoc Committee Chair.

b. **ADMINISTRATIVE MOTION: Santa Monica Airport Committee Name Change** (submitted by Santa Monica Airport Committee)

Whereas: Prior to October, 2015 complaints were received by MVCC Chair Bill Koontz regarding greatly increased noise impacts from LAX traffic. The complaints were forwarded to MVCC Santa Monica Airport committee Co-Chair Martin Rubin;

And whereas: the October, and November 2015 Santa Monica Airport Committee meetings included discussion regarding the topic of SoCal Metroplex noise impacts to Mar Vista;

And whereas: the topic of SoCal Metroplex noise impacts to Mar Vista will continue to be an issue of concern to the Mar Vista community;

Be it resolved: that LAX issues along with Santa Monica Airport (SMO) issues be reflected in the name of this committee;

And be it further resolved: that the names this committee recommends to the MVCC Board of Directors be either: the MVCC Airport Committee, or the MVCC Airport Committee - SMO and LAX.

c. **ADMINISTRATIVE MOTION: Safety and Security Committee Name Change** (submitted by Safety and Security Committee)

Whereas at its July 28, 2016 meeting, the Safety and Security Committee agreed that a name change would better reflect the mission of the committee, the Mar Vista Community council hereby affirms the committee's decision to change its name to the "Committee on Public Safety."

d. **ADMINISTRATIVE MOTION: Safety and Security Committee Mission Change** (submitted by Safety and Security Committee)

Whereas at its July 28, 2016 meeting, the Safety and Security Committee agreed that a change to its mission statement would better reflect the objectives of the committee, the Mar Vista Community council hereby affirms the committee's decision to change its mission statement to:

"The mission of the Mar Vista Community Council's Committee on Public Safety is to assist stakeholders in elevating the quality of life, enhancing safety, and improving emergency preparedness within the community. The committee does this by encouraging personal responsibility and through cooperation with public and private-sector agencies having jurisdiction over the community."

e. **FUNDING MOTION: Budget Adjustment** (director motion submitted by Holly Tilson)

MVCC approves the allocation of $282 that is currently unallocated to the Operations budget category.

f. **FUNDING MOTION: Fall Festival** (submitted by Community Outreach Committee)

Whereas the Mar Vista fall Festival is an annual event that benefits the whole community, and whereas the MVCC has supported the event in the past, Therefore MVCC will support the 2016 Fall Festival in the amount of $4000.

Motion to approve by Sarah Auerswald, 2nd by Michelle Krupkin.

Discussion:

Bill Scheding: should pay directly, not to Landkeepers

Melissa Stoller: What is money used for? Tom Ponton: Usually for permits—need up-front money. Festival is fundraiser for park (if there is a profit).

Jay Handel: What's ROI as board/Neighborhood Council? Tom Ponton: 3,000-4000 stakeholders attend. Sarah Auerswald: Outreach Committee discussed, will use festival to really do outreach.

Sherri Akers: For Green & AIP committees, festival has been terrific outreach opportunity.

Melissa Stoller: Now that we no longer have Green Garden Showcase, this is the big event

Motion carried unamimously.

g. **FUNDING MOTION: Hilltop Neighbors Association Picnic** (submitted by Community Outreach Committee)

Whereas the Hilltop HNA has their Picnic on September 10th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $300 to the Hilltop Neighbors Association Picnic.

h. **FUNDING MOTION: Facebook Ad Campaign** (submitted by Community Outreach Committee)

Whereas Facebook is a useful tool to increase engagement and outreach, Therefore MVCC will spend $100 for ads in September and October.

i. **FUNDING MOTION: MailChimp** (submitted by Community Outreach Committee)

Whereas the email system in the current website is not working correctly, and it is therefore imperative to use a new system to email stakeholders, therefore the MVCC will spend $50/month for Mailchimp subscription, beginning September.

j. **FUNDING MOTION: Fall Newsletter** (director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of up to $7000 to layout, print and distribute a fall newsletter.

Motion to approve by Sarah, 2nd by Michelle.

Discussion:

Tom Ponton: Total cost reduced to $3,697.42.

Jean Roth: Newsletter reminds her to look at website.

Bill Scheding: Newsletter has been part and parcel of MVCC outreach since Day 1. Most of the people on Hilltop are not Facebook/email people. Lots of people are not internet savvy. Should come up with a strategy to get the Newsletter into apartments.

Sara Roos: Redundancy of communication modes is useful. People expect it.

Sherri Akers: Would love to create a permanent poster to go in public area of apartments. Have talked about creating a resource book—tell what committees do, why the matter. Thinks we can use lawn signs very effectively—they worked for election (we didn't have a newsletter for the election, just for recruiting candidates). We need to allocate our resources, consider whether we are we reaching entire demographic fairly. Did survey on her block: a lot said they throw them away, never look at, never receive.

Holly Tilson: Likes newsletters. Always reads George Chung's, he comes to door. Candidates generated a lot of people coming to election from knocking on doors.

Ken Alpern: Tom has interesting idea in his statement: it's generational. Sad that apartment owners don't help get info to tenants.

Damien Newton: We read the newsletter, but that's abnormal. Awareness of difference between MVCC and NWNA is not high. Should announce end of newsletter in next newsletter.

Michelle Krupkin: If we keep the Newsletter, should look in to doing in Spanish.

Melissa Stoller: I like newsletters, but we have limited funds and need to make choices. A good newsletter requires more lead-time. Worked on Green Garden Showcase newsletter; people would say they never received it when we knew it had been delivered to their doorstep. Fall Festival is not an MVCC event and, with 3000-4000 attendees, is already well known in the community. If we're going to do a newsletter this year, we should save it for an MVCC event that really needs publicity. I've never read the newsletter.

Sarah Auerswald: Excited about how many people want to talk about Outreach. Newsletter is not in budget passed by board. Outreach goal was to get new people. Put aside $8,000 for other ways to get

word out. Didn't rule out putting out one Newsletter. Paid Distribution is expensive and can't get into apartments. Worries that don't have time to put out good newsletter now. Would you [Fall Festival] support this so strongly if did Spring newsletter instead?

Tom Ponton: There's time to do two-pages for Festival, two for MVCC; put something about each committee. Apartments get ½ of all distributed (leave near mail boxes).

Jay Handel: If were in business, would we still be in business doing what we're doing? Mail to routes with lots of apartments.

Sara Roos: Biggest issue: are Neighborhood Ass0ciaitons organized to distribute?

Sarah Auerswald: We did every door direct for election cycle. Would want to spend time building brand, targeting.

Paola Cervantes: Thanks everyone for their suggestions. If phase out newsletter, need to find another way to reach out to people.

Sherri Akers: friendly amendment to amend motion to spend $800 on lawn signs. Sarah Auerswald: not accepted.

Sarah Auerswald: Distribution by Neighborhood Association is wonderful suggestion, but need to already be organized to do.

Damien Newton: Friendly amendment to change to $4000. Sarah Auerswald: accepted.

Christopher McKinnon: Have we ever had an accounting of Fall Festival expenses? Ans: No.

Sarah Auerswald: We have finite amount of money.

Greg Tedesco: He's more of a print guy than web guy; don't want to waste the money.

Motion carried: 6 ayes, 4 nays, 0 abstain, 0 absent.

k. **POLICY MOTION: AB-1930 In-home supportive services: family caregivers: advisory committee** (submitted by Aging In Place Committee)

AB-1930 would, until January 1, 2019, establish the In-Home Supportive Services Family Caregiver Benefits Advisory Committee within the State Department of Social Services, as specified, for the purpose of describing the availability of, and barriers to accessing, employment-based supports and protections, as specified, and studying the impact of the lack of access to these supports and protections on individuals who provide supportive services a spouse or as the parent of a recipient child. The bill would require the advisory committee to submit a peer-reviewed report to the Legislature, as specified, on or before January 1, 2018.

WHEREAS, by 2030, 20% of our community will be 65 or older.

WHEREAS, 1 in 3 will have dementia or Alzheimer's.

WHEREAS, Medicare does not cover any of the essential services needed to care for those with dementia – forcing family caregivers out of the work force.

WHEREAS, 25% of Boomers care for an aging parent resulting in an average loss of income of over $300K. When forced to leave the workplace they face further hardship if taking social security early with a reduction of benefits of almost 30%.

The Mar Vista Community Council respectfully urges Assembly members Sebastian Ridley Thomas and Autumn Burke to request that AB-1930 In-home supportive services: family caregivers: advisory committee include caring for senior parents and requests their support.

l. **POLICY MOTION: Local Oil/Gas Facility Inspection** (submitted by Green Committee)

~~The natural gas storage facility for SoCalGas - Sempra Energy in Playa del Rey area are the oldest repurposed oil wells in the entire Gas Company system. If there are recent safety inspection and tests for methane and other gas leaks in the air above and surrounding these storage facilities, we request that they be made available to the Mar Vista Community Council and the general public and be easily searchable online, simple to read, chartable and interpreted for the lay person to see and understand the baseline and any increases and decreases in methane levels over time. We also request searchable online access to the status of safety valves for effective shut down on all storage facilities.~~

~~If no recent safety inspections or ongoing tests for methane and other gas leaks have been made, we request that they be scheduled as soon as possible and the results be released to this Council and the general public in the manner described above. Further we request these~~

~~safety inspections be frequent and air quality tests be monitored and completed and made public daily.~~

~~Also, Air Quality Notifications must be available online and a method be made available for Playa del Rey and surrounding area stakeholders to sign up and be notified of Reportable Releases, as they are now being done for the Aliso Canyon Storage Facility neighbors.~~

Whereas, the natural gas storage facility for SoCalGas - Sempra Energy in Playa del Rey area is the oldest repurposed oil wells in the entire Gas Company system, and

Whereas, the immediate and regional vicinity of the Playa Del Rey natural gas storage facility is at significant environmental risk should any negligence and/or mishaps in monitoring or storage of the natural gas occur, as recently occurred in the Aliso Canyon Storage Facility,

Therefore, the Mar Vista Community Council (MVCC) requests that:

1. If there are recent safety inspection and tests for methane and other gas leaks in the air above and surrounding these storage facilities, we request that they be made available to the MVCC and the general public, and
2. The safety inspection tests be easily searchable online, simple to read, chartable and interpreted for the lay person to see and understand the baseline, and any increases and decreases, of methane levels over time.
3. Searchable online access to the status of safety valves for effective shut down on all storage facilities be available to the general public.
4. If no recent safety inspections or ongoing tests for methane and other gas leaks have been made, that they be scheduled as soon as possible, and that the results be released to the MVCC, the City of Los Angeles, and the general public in the manner described above.
5. These safety inspections be frequent and air quality tests be monitored and completed and made public daily, or as frequently and as expeditiously as possible.
6. Air Quality Notifications be available online and a method be made available for Playa del Rey and surrounding area stakeholders to sign up and be notified of Reportable Releases, as they are now being done for the neighbors of the Aliso Canyon Storage Facility.

Friendly amendment by Ken Alpern.

Motion to approve as amended by Sherri Akers, 2nd by Sarah Auerswald.

Discussion:

Rob Kadota: Should it go to T&I Commitee?

Sherri Akers: Approached Ken, he submitted friendly amendment, decided it didn't need to put on the T&I agenda. Motion is not time-sensitive

Rob Kadota: Should get positive things to committees, not just negative.

Holly Tilson: wanted to ask a friend if motion is written properly but didn't have the opportunity because it was not presented at a T&I meeting.

Motion carried unanimously.

m. **POLICY MOTION: EV Chargers in Multi-Family Dwelling Units** (submitted by Green Committee)

WHEREAS, the negative impacts of climate change are worsening more quickly than anyone expected, including extreme storm events, such as powerful storms, winds, floods, wildfires and drought; and

WHEREAS, the planet has now topped 400 parts per million (ppm) in the concentration of global carbon dioxide in the atmosphere and 350 ppm is considered the maximum threshold above which irreversible climate impacts begin to occur; and

WHEREAS, according to the US Environmental Protection Agency, fossil fuel production and usage is the largest emitter of greenhouse gases worldwide; and

WHEREAS, reducing the use of fossil fuel-powered vehicles is an effective way to reduce greenhouse gas emissions and particulate matter; and

WHEREAS, the spread of the use electric vehicles charged by renewable power like solar, wind and geothermal has begun in earnest; and

WHEREAS, wealthy communities have received by far the largest shares of state rebates to purchase electric cars; and

WHEREAS, low-income communities are disproportionally affected by pollution and climate change; and

WHEREAS, newly constructed or renovated multi-family buildings are currently required to be wired for electric vehicle chargers, but are not required to have actual chargers installed; and

WHEREAS, persons living in multi-family buildings find it difficult to charge their vehicles and therefore have little incentive to purchase and use electric vehicles; and

WHEREAS, according to the National Multifamily Housing Council in 2015, apartments in the City are 41% of all housing. Since multifamily housing is much more population dense than single family homes, an enormous percentage of the City's population does not have reliable access to electric vehicle chargers; and

WHEREAS, to reach a goal of 100% of multifamily parking spaces having access to electric vehicle chargers by 2025, setting annual benchmarks would be an effective approach – for example 20% by 2017, 30% by 2018, 40% by 2019, 50% by 2020, 60% by 2021, 70% by 2022, 80% by 2023, 90% by 2024 and 100% by 2025; and

WHEREAS, the Mar Vista Community Council has been a strong leader in promoting Citywide sustainability policies and aims to continues its tradition into the future;

NOW, THEREFORE, BE IT RESOLVED, **that by the adoption of this Resolution, the Mar Vista Community Council hereby supports and encourages any legislation promoting a fair plan that provides EV charging capability to existing and new multi-family housing parking for electric vehicle by 2025.**

Motion to approve by Sherri Akers, 2nd by Sarah Auerswald.

Presentation by Sherri Akers: Real hardship to charge if no charger at home. Believes electric vehicles are future. Wants people to be able to live in apartment and drive electric vehicle. There are lots of ways for existing apartments to do; could, for example, give credit to use local charging stations.

Discussion:

Holly Tilson: Wanted to pull so have opportunity to vote "No." Huge expense for existing building

Michelle: In condos, expense is passed on to condo owner

Motion carried: 10 ayes, 1 nay, abstain, absent.

12. **Grievances**, if any, received

13. **Future agenda items**

Damien Newton: Westwood neighborhood council had speaker on Neighborhood Integrity ballot measure. Arrange for MVCC? Do in PLUM Committee?

Rob Kadota: Potentially meeting next Wednesday, September 21. Plum would need to reschedule.

Ken Alpern: Stakeholder meeting early next year for Neighborhood Integrity measure.

14. **Public Comment**

Jay Handel: Neighborhood Council Budget Advocates website is up: ncbala.com. Meets 1st Monday of month at DONE, 3rd Saturday at West Los Angeles Municipal Building. Meetings are open.

Bill Scheding:

15. **Adjournment**

Meeting adjourned at 9:16 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS*** *– The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board*

meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

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* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, August 9, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

PLEASE NOTE We hope to complete ITEMS 1 through 11.k no later than 8:05 P.M. so sufficient time can be given to Item 11.l, Proposed Development for 12444 Venice Blvd. MVCC Directors, elected officials, representatives and liaisons are encouraged to submit written reports where practical and keep verbal comments focused and short.

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of July 12th, 2015 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Lizka Mendoza, Director
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.gallowy@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by scott.malsin@assembly.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Open
   c. LANCC: Joseph Galloway
   d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson

k. Friends of Historic FS 62: Albert Olson

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
      i. Nomination/approval of Zone 2 Director
         Names of those submitting statements: Damien Newton & Martin Rubin
      ii. Nomination/approval of Second Signatory for funding functions
      iii. Board retreat
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly TIlson
      i. Report on current financial status
      ii. **APPROVAL** of July Monthly Expense Report (MER)
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   b. **Homeless Issues Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   c. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
   d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   g. **Planning and Land Use Management Committee** - Mitchell Rishe, Co-chairs; Michael Millman & Latrice Williams, Vice-chairs
   h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   i. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   j. **Safety and Security Committee** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
   m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – TBD
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR:– Directors may request removal of any item from the consent calendar.

    MVCC approves Items 11.a-11.k on consent.

a. **ADMINISTRATIVE MOTION: Ad-Hoc Website Committee** (submitted by Executive & Finance Committee)

MVCC approves the creation of an Ad-Hoc Website Committee.

b. **ADMINISTRATIVE MOTION: Community Champions Program** (submitted by Education, Arts & Culture Committee)

MVCC establishes community recognition "Community Champions" program that recognizes community members who go above and beyond in working to make Mar Vista a more vibrant, caring, welcoming community. Honorees will be recognized each month at the MVCC BOD meeting and be given a certificate of appreciation. Their efforts could be highlighted on the MVCC web page and on social media outlets. The program will rely on nominations from the board and community. All nominees will be listed and recognized. The EAC Committee can choose to highlight a particular nominee if they so choose

c. **FUNDING MOTION: Board Retreat Funding** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $250 for refreshments and supplies for the board retreat.

d. **FUNDING MOTION: Westdale Homeowners' Association Annual Picnic October 9th** (submitted by Community Outreach Committee)

Whereas MVCC wants to offer support to local resident associations to help them gather for their annual events, and Whereas the Westdale Homeowners' Association has their Picnic on October 9th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $300 to the Westdale Homeowners' Association Picnic.

e. **FUNDING MOTION: North Westdale Neighborhood Association Annual Block Party and Talent Show September 10th** (submitted by Community Outreach Committee)

Whereas MVCC wants to offer support to local resident associations to help them gather for their annual events, and Whereas the North Westdale Neighborhood Association has their Block Party and Talent Show on September 10th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $300 to the North Westdale Neighborhood Association Block Party & Talent Show.

f. **FUNDING MOTION: Mar Vista Art Walk** (submitted by Community Outreach Committee)

Whereas the quarterly MV Art Walk is a signature event of the community now, and Whereas it attracts many people, both those who are new to the area and locals, and Whereas it presents a wonderful opportunity for the MVCC to do marketing and outreach at the event, Therefore, be it resolved that the MVCC should support the next 4 quarterly events with printing costs at $300 each for a total of $1200 over the 2016-2017 fiscal year.

g. **FUNDING MOTION: MVCC Outreach Booth Rental** (submitted by Community Outreach Committee)

Whereas the Mar Vista Farmers' Market is a weekly community gathering event, and Whereas it attracts many people, both those who are new to the area and locals, and Whereas it presents an ongoing opportunity for the MVCC to do marketing and outreach, Therefore, be it resolved that the MVCC should pay the annual fee of $1000 to the Market for the storage of materials, set up, tear down and two booth spaces.

h. **FUNDING MOTION: New MVCC Tablecloths** (submitted by Community Outreach Committee)

Whereas the Mar Vista Farmers' Market Booth Tables need tablecloths with our logo on them, and Whereas the Monthly Board meeting also requires tablecloths with our logo on them, and Whereas the current tablecloths are 7 years old and showing their age, Therefore, be it resolved that the MVCC will buy new tablecloths for both events, three Blue and one Green, for an amount not to exceed $600.

i. **FUNDING MOTION: Mar Vista Farmers Market Outreach Tent – equipment, supply and printing needs to improve MVCC visibility** (submitted by Community Outreach Committee)

Whereas it's important to use the Farmers' Market Tent for Outreach, and Whereas we have a goal of improving the visibility and reach of the MVCC, Therefore, be it resolved that the MVCC will spend up to $300 for seed money to determine Outreach Materials for the Outreach tent.

j. **FUNDING MOTION: VHS screening of Grease** (submitted by Education, Arts & Culture Committee

Whereas MVCC wants to offer support to the VHS Alumni Association for the annual screening of Grease at VHS and whereas MVCC EACC can attend and use the occasion to do marketing and community outreach for MVCC, Therefore be it resolved that MVCC approves a Neighborhood Purpose Grant for a maximum of $500 to help offset operational costs associated with the VHS Alumni Association Grease Screening.

k. **POLICY MOTION**: **Support for Santa Monica Airport Letter** (submitted by Santa Monica Airport Committee)

Whereas: The MVCC has already taken the position in support of closing Santa Monica Airport as soon as possible (see: http://marvista.org/files/MVCC-120911-POLICY%20MOTION-SMO%20RESOLUTION%206296.pdf);

And whereas: the Santa Monica City Council will revisit this topic at their August 23, 2016 meeting;

And whereas: the following letter (see Addendum A), drafted by a variety of local Santa Monica and Los Angeles community activists, establishes, arguably, the most risk-free, quick, and direct path to help Santa Monica achieve its Strategic Priority of local control at the Airport;

Be it resolved: that the Mar Vista Community Council will add its signature in strong support of this letter;

And be it further resolved: that the MVCC will submit for the record at, councilmtgitems@smgov.net, with the agenda item, (yet to be determined) for the August 23, 2016 SM City Council meeting, in the subject line.

l. **POLICY MOTION**: **Proposed development for 12444 Venice Blvd**

Alternative 1 (submitted by PLUM Committee)

Executive Summary: The MVCC strongly opposes the proposed development as is, but will strive to work with both the developer and the City of L.A. to create a development more in character with the neighborhood, and which best meets the City goals of affordable housing, transit-oriented development, and Great Streets Initiative. A Site Plan Review and a public hearing called by the Director of Planning is called for by the MVCC.

Whereas, the Mar Vista Community Council (MVCC) has been a leader in promoting affordable housing, transit-oriented development, environmental law, the Great Streets Initiative, and appropriate mitigation with respect to all Planning decisions in the City of Los Angeles; and

Whereas, the proposed mixed-use development for 12444 Venice Blvd. (DIR-2016-304-DB-SPR) calls for a seven-story, 85-foot-height, 77-unit project with over 2000 square feet of ground floor retail but providing only 75 parking spaces; and

Whereas, this proposed development for 12444 Venice Blvd. ("the Development") has a height entirely out of character for the surrounding neighborhood, and sets an alarming if not dangerous precedent with respect to overdevelopment on Venice Blvd. (one of the City of Los Angeles' designated Great Streets) in that it almost guarantees parking spillover and inappropriate impacts on both the residential and commercial neighbors both immediately and regionally adjacent to the proposed development; and

Whereas, the Development has no safeguards for the residential and commercial neighbors with respect to environmental impacts, height impacts, inappropriate misinterpretation and precedent for affordable housing laws, and appropriate mitigation with respect to transit benefits in lieu of sufficient parking, and threatens both legal and political efforts of the City to promote consensus and political will to create more affordable housing, mass transit initiatives, and sustainable urban infill; and

Whereas, the Development's planners and promoters have resisted calls for a public hearing on the Development's negative impacts on pedestrian, traffic, bicycle and bus

commuters, as well as the Development's negative impacts on promoting Venice Blvd. as a City of Los Angeles Great Streets, and have resisted calls by the CD11 Councilmember's office for meeting with the Mar Vista Community Council;

The Mar Vista Community Council must therefore, in fulfilling its proper and appropriate role as a duly-elected Neighborhood Council to protect the rights, environment, and quality of life of all its stakeholders, STRONGLY OPPOSE the Development as currently planned BUT WILL STRIVE TO WORK WITH both its developers and the City of Los Angeles to, at this site:

1) Support a project that is more consistent with the intent and implementation of City and State environmental, CEQA, affordable housing, and transit-promoting laws and ordinances; and
2) Establish, with a Site Plan Review, the proper environmental review so as to determine the full environmental impacts of the currently-proposed Development; and
3) Support a project that is planned and implemented after appropriate meetings with, and input from, the Mar Vista Community Council and any relevant neighbors and neighborhood associations, as well as the CD11 Councilmember and his staff, including a public hearing to be called by the Director of Planning (and which has also been requested by Councilmember Mike Bonin, because the proposed Development may have a significant effect in changing the character of this neighborhood; and
4) Support a project that has sufficient subterranean parking, and can therefore both minimize or eliminate overflow parking impacts on its neighbors, and has appropriate height/transportation mitigations consistent with the region; and
5) Support a project that is consistent with, and not a distraction or distortion from, the intent of affordable housing, alternative and multimodal transportation initiatives, the Great Streets Initiative (particularly that which the MVCC has for years and is still working on for Venice Blvd.), and environmental laws promoted by the City of Los Angeles; and
6) Support a project that, with the use of subterranean parking, can be of lower/appropriate height and with sustainable environmental and infrastructural impacts, and can enhance both the profitability of the Development yet be also consistent with the economic/environmental health of its residential and commercial neighbors.

Minority Report Opposing Alternative 1 (See Addendum B)

Alternative 2 (Directors' motion submitted by Sarah Auerswald & Sherri Akers)

Whereas the July 20th PLUM meeting was attended by close to 100 people with 12 comment cards to support the project and 14 to oppose it and a vote of 56% opposing and 44% supporting the project.

Whereas the community concerns were primarily focused on the building height and 85 feet and limited parking which the developer has agreed to mitigate.

Whereas creating additional housing is a key priority with the City Comprehensive Homeless Strategy reporting that "Los Angeles is last in a list of major cities to build housing supply to keep up with population demand. Los Angeles is also first nationally for the least affordable housing market when considering local income to local housing cost ratios."

Whereas this is a 'By Right' project and was planned within the current zoning laws with no variances requested.

Whereas we have an aging community that urgently needs our support and creating more multi-unit residences is a key component of that with the senior friendly features that new building codes require. By January 3, 2017, the General Manager of the Department of City Planning has been instructed to report on how to prioritize zoning matters that affect older adults, including encouraging multiple-unit developments.

Whereas sustainability is a signature characteristic of Mar Vista and current code requires green features generally lacking in our existing multi residential and commercial buildings.

The MVCC supports the proposed development with the following compromises:

1. Increase parking spaces to 87 or more
2. Clarification on height which is currently is 60' tall at the roof deck with lofts of a few fifth floor units up to 71' at the tallest. Explore the elimination of 5th floor lofts or of retail space if there is a community urgency to further height reduction.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: Santa Monica Airport Letter

Santa Monica City Council
1685 Main Street, Room 209
Santa Monica, California 90401

E-mail: council@smgov.net;
councilmtgitems@smgov.net

RE: The Community's Request Regarding Interim Actions Prior to Closure of Santa Monica Airport

Dear Santa Monica Mayor and City Council Members:

We thank you for your efforts to close Santa Monica Airport when legally cleared. While the closure process proceeds, gaining "local control" of the Airport is one of the 5 Strategic Priorities of the City of Santa Monica. Today, multiple fixed base operators (FBOs) provide aeronautical services and have significant control of operations at the Airport. These FBO operations include services, such as aircraft fueling and maintenance, as well as many extra services, such as limousine service, aircraft washing, baggage handling, catering, concierge services, rental cars, and hotel arrangements.

However, beginning July 2015, these FBO tenants have had no right to continued leases at the Airport. Although their leases are expired, the FBOs remain and continue to perpetuate the harmful impacts of the Airport on the community. Yet, there are no agreements, laws, or regulations that prohibit the City from evicting these specific FBOs. In fact, the 1984 Settlement Agreement that obligated the City to "provide sufficient space for the location and operation of 3 full service fixed base operators" expired on July 1, 2015. Furthermore, the FAA Director's Determination dated November 22, 2000 which was then affirmed by the FAA Final Decision dated February 2, 2003 confirmed (a) that FBO leases were not 30-year leases, but were actually 29-year leases timed to expire on July 1, 2015, (b) that it would be unreasonable for the City to be required to enter into FBO lease agreements beyond July 1, 2015, and (c) that beyond July 1, 2015, the Airport is "a local land use matter".

The City, as the owner and proprietor of the Airport, should legally and immediately remove the FBOs and assert the City's "proprietary exclusive right" to be the only exclusive service provider at the Airport. As the sole service provider, the City would achieve de facto "local control" of these Airport services and be able to directly manage them in line with the interests of the local community.

The Proprietary Exclusive Right

The FAA Airport Compliance Manual, which provides guidance on an airport sponsor's commitments when they accept federal grants, explains the Proprietary Exclusive Right as follows:

"The owner of a public-use airport (public or private owner) may elect to provide any or all of the aeronautical services needed by the public at the airport. In fact, the statutory prohibition against exclusive rights does not apply to these owners. However, while they may exercise the exclusive right to provide aeronautical services, they may not grant or convey this exclusive right to another party. The airport sponsor that elects to engage in a proprietary exclusive must use its own employees and resources to carry out its venture. An independent commercial enterprise that has been designated as an agent of the airport sponsor may not exercise nor be granted such an exclusive right."

"Aircraft fueling is a prime example of an aeronautical service an airport sponsor may choose to provide itself. While the airport sponsor may exercise its proprietary exclusive to provide fueling services, aircraft owners may still assert the right to obtain their own fuel and bring it onto the airport to service their own aircraft, but only with their own employees and equipment and in conformance with reasonable airport rules, regulations, and minimum standards."

Even if we assume the 1994 grant commitments extend to 2023 (which is actively being disputed), the "proprietary exclusive right" is still in complete compliance with all obligations of the City.

We strongly but respectfully request you take the following actions:

1. Give Notice to Vacate to all FBOs at the Airport, including Atlantic Aviation and American Flyers, before September 1, 2016.

2. Authorize the City to assert its "proprietary exclusive right" and provide minimal levels of service while

continuing to evaluate and periodically adjust service levels until Airport closure is legally cleared.

3. Rent or buy equipment and employ staff that may be required to operate fuel services and to park aircraft.

These steps are the most risk-free, quick, and direct path to help the City achieve its Strategic Priority of local control at the Airport. Meanwhile, the remaining legal issues with the FAA related to the 1994 Grant and the 1948 Instrument of Transfer should continue to be aggressively pursued in a timely manner.

Santa Monica is an extremely capable city that maintains and operates many services efficiently and effectively, including fire, police, Big Blue Bus, waste collection, recycling, cemetery, CityTV, and parks and recreation, among others. With the addition of FBO services we can also safely operate and maintain the Airport with the local control necessary to reduce the Airport's impact on our surrounding communities.

ADDENDUM B: 1244 Venice Blvd. Alternative 1 Minority Report

The July 20th PLUM meeting was attended by close to 100 people. There were 30 comment cards with 12 in support the project and 14 opposing it. Supporters urged the committee to look forward rather than back, and to recognize the changes taking place in our community. Some spoke to their concern that their children would not be able to live in the community that they were raised in. As there were so many in attendance, the meeting started late and ran late. Many people had to leave and were unable to speak or vote.

Renters represent 60% or more of our community and there was a strong renter turn out. 68 people stayed to vote and 44% voted to support the project – 38 to 30. It was moving to hear the testimony of so many who want a place in our community and look forward to the creation of more multi-unit residences to make that possible. There are numerous points that we hope the Board will consider.

The City Comprehensive Homeless Strategy reports that "Los Angeles is last in a list of major cities to build housing supply to keep up with population demand. Los Angeles is also first nationally for the least affordable housing market when considering local income to local housing cost ratios." We have to change that and change is difficult.

How can we change the rules midstream?

This is an 'By Right' project and was planned within the current zoning laws. There are no variances requested. The community concerns with height and parking need to be addressed with our elected officials to change the rules. Once a stakeholder has invested in our community it does not seem ethical to stop a project that conforms to all of the existing laws and regulations. If someone proposed that we sell our single family homes for under market price 'for the good of the community' it is unlikely that many of us would volunteer.

We have an aging community that urgently needs our support and creating more multi-unit residences is a key component of that. The Mayor issued the Purposeful Aging LA initiative to make Los Angeles the #1 friendliest city for aging in the US. That includes the following mandate –

- By January 3, 2017, the General Manager of the Department of City Planning shall report on **how to prioritize zoning matters that affect older adults, including encouraging multiple-unit developments,** updating regulations to support affordable senior housing and care facilities, and promoting accessory dwelling units
- New projects provide enhancements for aging that are lacking in Mar Vista for ADA compliance. Elevators provide easy street access for those with limited mobility. A pedestrian entrance from Venice but car entry only from ally – no driveways or cars turning in from Wasatch or Venice – provide safe access for residents and pedestrians. LADOT calculates a reduction on traffic impact

Sustainability is a signature characteristic of Mar Vista – this project embraces those values with a high commitment to sustainability. Current code requires green features generally lacking in our multi residential buildings such as -

- The current plan calls for 220v plug ins at every parking stall. This hopes to be the 1st building in Mar Vista to boast full EV charging.
- The project plans include a large amount of green space and an exterior green wall
- There will be 89 bicycle parking spaces and every unit gets a long term bike locker

- One to two Zip car spaces – the first in the community – are planned to reduce the need for car ownership.
- SUSMP is done via biofiltration planters along the sides of the building and inside the core of the building, in the green sitting areas.

Pets – Los Angeles is 60% renters and apartments that don't accept pets contribute to our high kill rate in shelters.

- As a policy, all of this developer's buildings are pet friendly, regardless of breed. That is managed via their property management company, Crimson Property Management. The plans include a dog run.

Mar Vista has a strong artist community which is becoming a signature of the community. This project supports that community.

- The developer has proposed that her affordable housing units (subsidized units) in the complex be made available for artist preference using the federal housing regulation H.R. 3221.
- The project will include an exterior mural wall created by a prominent member of our Mar Vista artist community.

Respectfully submitted by Sarah Auerswald and Sherri Akers, MVCC At Large Directors

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, August 9, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:15 P.M.

   Quorum present: Rob Kadota, Joseph Galloway, Melissa Stoller, Robin Doyno, Sherri Akers, Michelle Krupkin, Holly Tilson, Susan Klos, Paola Cervantes, Ken Alpern, Sarah Auerswald, Damien Newton (following election)

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Approval of July 12th, 2015 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)

   Motion to approve by Sarah Auerswald, 2nd by Joseph Galloway. Motion carried unanimously

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   None

5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

   a. Mar Vista Recreation Center –Director tracie.field@lacity.org

   b. CD 5 – Councilmember Paul Koretz, rep by joseph.gallowy@lacity.org

      Baseline Masionization passed by city planning commission with some amendments. Will go to City Council PLUM Committee.

      Wed, Aug 10 –Free Go Green/Save Green Event at Westwood Recreation Center.

      LADWP Customer Service Saturday, August 13, 1394 S Sepulveda.

      Clean Streets Challenge Workshop, August 30, 6:00 p.m., at Iman Center, 3376 Motor Ave.

      LAPD is working with Cedars-Sinai to collect blood; Call Sgt. Low at 310-482-06307.

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Councilmember Bonin wants us to form right regulation, not let revenue frame the regulations. Waiting for scheduling from PLUM.

      Potential affordable housing opportunities: Council completed survey of city-owned vacant lots. Wants public input – what public wants to see at various locations.

      Sarah Auerswald question RE: Airbnb number of days restriction. Originally was set at 90 days based on average host days of 76; increased to 180.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by scott.malsin@assembly.ca.gov

   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Next meeting is September 21. Most complaints are about speeding and ignoring stop signs near schools. LAPD will be more intensive once school starts.

b. DWP MOU: Open

c. LANCC: Joseph Galloway

Vision Zero: Mayor Garcetti using Great Streets to better address speeding in neighborhoods.

Motions to address homeless issue. Won't support proposition on November ballot, asking Governor to declare emergency.

Looking for NCs to support motions they've passed.

d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

Now called One Water. Will have report form 9/13 meeting.

e. WRAC: Rob Kadota/Joseph Galloway

Karen Bass attended last meeting.

f. WRAC LUPC: Sharon Commins

g. City Budget Advocates: Holly Tilson, Joseph Galloway

Discussed $1.2m bond measure, doesn't support. Believes city and county have enough resources.

h. Recode LA: Sharon Commins

i. Animal Services: Tom Ponton

Fall Festival – 50-60 booths. Repair Café in big gym; bring stuff & get fixed. Small gym: silent auction. Animal services fair, will license dogs, microchips,

j Fall Festival: Albert Olson

k Friends of Historic FS 62: Albert Olson

Meets 1st Thursday of September.

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Monthly coffee time third Thursday, August 11. Topic: digital tools for small business.

August mixer August 22 at Rustic Kitchen.

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota

i. Nomination/approval of Zone 2 Director

Names of those submitting statements: Damien Newton & Martin Rubin

Damien Newton nominated by Rob Kadota, 2nd by Sherri Akers.

Damien intro: moved to Mar Vista in January, , because of neighborhood, Richland Ave Elem; volunteers at school a lot, on Rosendahl's bicycle advisory committee for Expo Phase II.

Motion carried unanimously.

ii. Nomination/approval of Second Signatory for funding functions

Nomination of Rob Kadota by,Sarah Auerswald, 2nd by Melissa Stoller. Motion carried unanimously.

iii. Board retreat

Saturday, August 12. Encourages committee chairs to attend. Open to public. Think about committee work as it relates to calendar year.

b. First Vice Chair – Sarah Auerswald

c. Second Vice Chair – Joseph Galloway
d. Secretary – Melissa Stoller
e. Treasurer – Holly TIlson
    i. Report on current financial status
    i. **APPROVAL** of July Monthly Expense Report (MER)

    Motion to approve by Sherri Akers, 2nd by Sarah Auerswald. Motion carried unanimously.

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

    EmpowerLA approved workshop at Congress of Neighborhood Councils

    b. **Homeless Issues Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

    Update on Billie: seeing his mom in Florida tomorrow (she's very ill).

    c. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

    Meets 3rd Tuesday of month at Mar Vista Library, 5:30.

    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

    Meets August 10 at Mar Vista Library (3rd Wednesday of month).

    f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    g. **Planning and Land Use Management Committee** - Mitchell Rishe, Co-chairs; Michael Millman & Latrice Williams, Vice-chairs
    h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    i. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

    Met yesterday. Wants to add LAX into committee name

    j. **Safety and Security Committee** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

    Changing name to Committee on Public Safety, and changing mission statement. Discussed illegal fireworks and mail theft.

    Special meeting August 25 to address mal theft.

    k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
    m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin

    Mail theft is issue.

    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR:– Directors may request removal of any item from the consent calendar.

MVCC approves Items 11.a-11.k on consent.

Motion to approve consent calendar by Sherri Akers, 2nd by Paola Cervantes. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION: Ad-Hoc Website Committee** (submitted by Executive & Finance Committee)

MVCC approves the creation of an Ad-Hoc Website Committee.

Approved on consent.

b. **ADMINISTRATIVE MOTION: Community Champions Program** (submitted by Education, Arts & Culture Committee)

MVCC establishes community recognition "Community Champions" program that recognizes community members who go above and beyond in working to make Mar Vista a more vibrant, caring, welcoming community. Honorees will be recognized each month at the MVCC BOD meeting and be given a certificate of appreciation. Their efforts could be highlighted on the MVCC web page and on social media outlets. The program will rely on nominations from the board and community. All nominees will be listed and recognized. The EAC Committee can choose to highlight a particular nominee if they so choose

Approved on consent.

c. **FUNDING MOTION: Board Retreat Funding** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $250 for refreshments and supplies for the board retreat.

Approved on consent.

d. **FUNDING MOTION: Westdale Homeowners' Association Annual Picnic October 9th** (submitted by Community Outreach Committee)

Whereas MVCC wants to offer support to local resident associations to help them gather for their annual events, and Whereas the Westdale Homeowners' Association has their Picnic on October 9th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $300 to the Westdale Homeowners' Association Picnic.

Approved on consent.

e. **FUNDING MOTION: North Westdale Neighborhood Association Annual Block Party and Talent Show September 10th** (submitted by Community Outreach Committee)

Whereas MVCC wants to offer support to local resident associations to help them gather for their annual events, and Whereas the North Westdale Neighborhood Association has their Block Party and Talent Show on September 10th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $300 to the North Westdale Neighborhood Association Block Party & Talent Show.

Approved on consent.

f. **FUNDING MOTION: Mar Vista Art Walk** (submitted by Community Outreach Committee)

Whereas the quarterly MV Art Walk is a signature event of the community now, and Whereas it attracts many people, both those who are new to the area and locals, and Whereas it presents a wonderful opportunity for the MVCC to do marketing and outreach at the event, Therefore, be it resolved that the MVCC should support the next 4 quarterly events with printing costs at $300 each for a total of $1200 over the 2016-2017 fiscal year.

Approved on consent.

g. **FUNDING MOTION: MVCC Outreach Booth Rental** (submitted by Community Outreach Committee)

Whereas the Mar Vista Farmers' Market is a weekly community gathering event, and Whereas it attracts many people, both those who are new to the area and locals, and Whereas it presents an ongoing opportunity for the MVCC to do marketing and outreach, Therefore, be it resolved that the MVCC should pay the annual fee of $1000 to the Market for the storage of materials, set up, tear down and two booth spaces.

Approved on consent.

h. **FUNDING MOTION: New MVCC Tablecloths** (submitted by Community Outreach Committee)

Whereas the Mar Vista Farmers' Market Booth Tables need tablecloths with our logo on them, and Whereas the Monthly Board meeting also requires tablecloths with our logo on them, and Whereas the current tablecloths are 7 years old and showing their age, Therefore, be it resolved that the MVCC will buy new tablecloths for both events, three Blue and one Green, for an amount not to exceed $600.

Approved on consent.

i. **FUNDING MOTION: Mar Vista Farmers Market Outreach Tent – equipment, supply and printing needs to improve MVCC visibility** (submitted by Community Outreach Committee)

Whereas it's important to use the Farmers' Market Tent for Outreach, and Whereas we have a goal of improving the visibility and reach of the MVCC, Therefore, be it resolved that the MVCC will spend up to $300 for seed money to determine Outreach Materials for the Outreach tent.

Approved on consent.

j. **FUNDING MOTION: VHS screening of Grease** (submitted by Education, Arts & Culture Committee

Whereas MVCC wants to offer support to the VHS Alumni Association for the annual screening of Grease at VHS and whereas MVCC EACC can attend and use the occasion to do marketing and community outreach for MVCC, Therefore be it resolved that MVCC approves a Neighborhood Purpose Grant for a maximum of $500 to help offset operational costs associated with the VHS Alumni Association Grease Screening.

Approved on consent.

k. **POLICY MOTION**: **Support for Santa Monica Airport Letter** (submitted by Santa Monica Airport Committee)

Whereas: The MVCC has already taken the position in support of closing Santa Monica Airport as soon as possible (see: http://marvista.org/files/MVCC-120911-POLICY%20MOTION-SMO%20RESOLUTION%206296.pdf);

And whereas: the Santa Monica City Council will revisit this topic at their August 23, 2016 meeting;

And whereas: the following letter (see Addendum A), drafted by a variety of local Santa Monica and Los Angeles community activists, establishes, arguably, the most risk-free, quick, and direct path to help Santa Monica achieve its Strategic Priority of local control at the Airport;

Be it resolved: that the Mar Vista Community Council will add its signature in strong support of this letter;

And be it further resolved: that the MVCC will submit for the record at, councilmtgitems@smgov.net, with the agenda item, (yet to be determined) for the August 23, 2016 SM City Council meeting, in the subject line.

Approved on consent.

l. **POLICY MOTION**: **Proposed development for 12444 Venice Blvd**

Alternative 1 (submitted by PLUM Committee)

Executive Summary: The MVCC ~~strongly~~ opposes the proposed development as is, but will strive to work with both the developer and the City of L.A. to create a development more in character with the neighborhood, and which best meets the City goals of affordable housing, transit-oriented development, and Great Streets Initiative. A Site Plan Review and a public hearing called by the Director of Planning is called for by the MVCC.

Whereas, the Mar Vista Community Council (MVCC) has been a leader in promoting affordable housing, transit-oriented development, environmental law, the Great Streets Initiative, and appropriate mitigation with respect to all Planning decisions in the City of Los Angeles; and

Whereas, the proposed mixed-use development for 12444 Venice Blvd. (DIR-2016-304-DB-SPR) calls for a seven-story, ~~85~~ *88*-foot-height (*to be confirmed by city)*, 77-unit project with over 2000 square feet of ground floor retail but providing only 75 parking spaces; and

Whereas, this proposed development for 12444 Venice Blvd. ("the Development") has a height entirely out of character for the surrounding neighborhood, and sets an alarming if not dangerous precedent with respect to overdevelopment on Venice Blvd. (one of the City of Los Angeles' designated Great Streets) in that it almost guarantees parking spillover and inappropriate impacts on both the residential and commercial neighbors both immediately and regionally adjacent to the proposed development; and

Whereas, the Development has no safeguards for the residential and commercial neighbors with respect to environmental impacts, height impacts, inappropriate misinterpretation and precedent for affordable housing laws, and appropriate mitigation with respect to transit benefits in lieu of sufficient parking, and threatens both legal and political efforts of the City to promote consensus and political will to create more affordable housing, mass transit initiatives, and sustainable urban infill; and

~~Whereas, the Development's planners and promoters have resisted calls for a public hearing on the Development's negative impacts on pedestrian, traffic, bicycle and bus commuters, as well as the Development's negative impacts on promoting Venice Blvd. as a City of Los Angeles Great Streets, and have resisted calls by the CD11 Councilmember's office for meeting with the Mar Vista Community Council;~~

The Mar Vista Community Council must therefore, in fulfilling its proper and appropriate role as a duly-elected Neighborhood Council to protect the rights, environment, and quality of life of all its stakeholders, ~~STRONGLY~~ OPPOSE the Development as currently planned BUT WILL STRIVE TO WORK WITH both its developers and the City of Los Angeles to, at this site:

1) Support a project that is more consistent with the intent and implementation of City and State environmental, CEQA, affordable housing, and transit-promoting laws and ordinances; and
2) Establish, with a Site Plan Review, the proper environmental review so as to determine the full environmental impacts of the currently-proposed Development; and
3) Support a project that is planned and implemented after appropriate meetings with, and input from, the Mar Vista Community Council and any relevant neighbors and neighborhood associations, as well as the CD11 Councilmember and his staff, including a public hearing to be called by the Director of Planning (and which has also been requested by Councilmember Mike Bonin, because the proposed Development may have a significant effect in changing the character of this neighborhood; and
4) Support a project that has sufficient subterranean parking, and can therefore both minimize or eliminate overflow parking impacts on its neighbors, and has appropriate height/transportation mitigations consistent with the region; and
5) Support a project that is consistent with, and not a distraction or distortion from, the intent of affordable housing, alternative and multimodal transportation initiatives, the Great Streets Initiative (particularly that which the MVCC has for years and is still working on for Venice Blvd.), and environmental laws promoted by the City of Los Angeles; and
6) Support a project that, with the use of subterranean parking, can be of lower/appropriate height and with sustainable environmental and infrastructural impacts, and can enhance both the profitability of the Development yet be also consistent with the economic/environmental health of its residential and commercial neighbors.

Presentation by Pamela Day, Developer: Seven affordable units; they will be artist preference. Portion of roof deck is community garden, donating to Food Forward. A living wall blocks view of nearby properties.

Presentation by Cole Garrison, GMPA Architects: Working with Pamela about 2 years on project. Doesn't often have developers so focused on quality. Cole's role is to take intent given and create the content.

Studied nature of pedestrian experience on Venice; lots of pedestrian activity east of project, want to draw over. Lots of glass;; ried to break up mass of large building and take advantage of SoCal outdoors. Garage elements will be masked by retail and mural. Closing off two driveways, allowing city to provide up to 5 more parking spaces.

Mitchell Rishe (presented Alternative 1 motion): Some things need clarification. Mike Bonin has weighed in, can request public hearing. Nothing in project right now that guarantees artist preference.

Motion to approve Alternative 1by Mitchell Rishe, 2nd by Ken Alpern.

Latrice Williams (minority report.): Impressed with Ms. Day in finding a way to increase parking by 60% more than what is required by law. Feels Ms. Day is trying to accommodate the needs of the community in which she also lives and works. We don't live in a bubble and are affected by the larger issues of living in LA, lack of housing (for which the city has a mandate), lack of affordable housing, pedestrian friendly streets and transportation issues. This project fits perfectly into the Great Streets Initiative that we as a community embraced. It's a block away from farmers market, post office, library and if we turn the old fire station into a community center, this project is a block north further providing a central corridor. The high density building will serve as an anchor in a location of Mar Vista with a higher ratio of apartments, to single family homes. Since change is enviable as a community we should embrace and "focus on a vision" as to how we plan to allow Mar Vista to grow, to meet the ever-changing needs of living in a big city.

Public Comment (at meeting)

Joseph Treves: Beautiful project, but not right for Mar Vista. Agrees we need more housing. Number less than 77 would still increase housing. Need to provide ample parking. Height and parking are issues.

Randy Freeman: Lives near project. Nothing but increases in traffic. We were told Playa Vista wouldn't increase traffic. Parking is way under what we need.

Joe Santana: 36 years in Mar Vista. Used to be laid-back neighborhood, now road-rage, cut-thru neighborhood.

Wayne Gunther: Project is all about foreign venture capitalism money. $200 million a year.

Melissa Stirling: 10-year resident. Rides bike to work. Supports project: need more housing, it's green & beautiful, is enough parking. As young person, really loves.

Lorena Monarnez: 10-year resident. Rides bike to work, without a car for about 5 years. This type of new community is definitely for younger generation. Here for the future.

Marcus Gladney: 3-years in area. People are coming to LA. Totally for the project. Leads Venice Electric Light Parade (bikes). Nobody wants to come thru Mar Vista – nothing to see. Change is happening.

Amy Oswick: 12-years in area. Got rid of car 2 years ago. 10,000 new employees are coming in to Mar Vista. If they can't live here, will drive to work.

Susanne Hines: Homeowner here for 26 years. Development is ncongruous with neighborhood. People do still use cars. Rents will require 1-bedroom, 2 people, 2-bedroom, 4 people. Artist rendering doesn't show width of Venice (makes it look narrower).

Roy Persinko: Voted for 4-house small lot subdivision behind his house. This is out of scale, ridiculous.

Bernie Eisenberg: 36-year resident. Against. Inevitability: Both sides of Venice Blvd will be lined with tall apartments. Who can afford $3000 rent?

Jay Duerr: In Mare Vista since 1994. Had bike accident on Venice Blvd. Son was run over by bike. Will be a lot more bike injuries.

Brad Kraus. Lives around the corner from project. One car family, has one parking space. Moved here because loves neighborhood, takes bus to EXPO line. People now live with one car, they figure it out.

Ram RaFee: Grew up in neighborhood, thinks project is amazing.

Jim LeFever: In Mar Vista since 1984. Architect. Looked at drawings, visited site. Conforms to code and is well-sited. Can't see any significant impact on community. 1/2/3 story housing is unsustainable. This needs to be our future. This project is part of the solution..

Wen-Chia Parker. Architect. 12 years. Worked on HUD, low-income housing. Sad: Now there's a divide in community. One parking space is not enough. Scale of building is not right for community.

Kristin Duerr: Educator, long time resident. Lives three houses away from multi-unit apartment building: parking is issue, bike issues have impacted family. Design has issues. Supports Bonin request for hearing.

Michael Millman: 6-years on MVCC board and vice-chair of PLUM. Mar Vista passed resolution setting 3-story precedent. Michaels family provides housing for 200 families, has apartment. buildings. Why was it essential to circulate letters to neighbors telling them not to come tonight or they'd be sued?

Bill Koontz: Loves artists of Mar Vista, but if preference for them is not in covenant, artist housing won't happen. It's up to us to make sure it happens. Would like to see 2-layers of underground parking, make retail pay for it; would pay for itself in 10 years. Young people will grow up, have kids, need a minivan.

Darian B.: Pamela employees 200 people. Mar Vista has car problem, get over it. 1465 people will be employed for this in neighborhood.

Mark Beasly: Local artist. Made it, need to give opportunity to local artists.

Lenore French: Mar Vista Art Walk organizer. Approached Pamela about artist preference. Trying to extend the law.

Gina Levy. 26-year resident. Doesn't believe we have a housing crisis. High vacancy rates downtown (LA Times). Has traffic flow concerns: egress in and out on alley. No left turn into from Venice. Building is too tall.

Yvette Davis: 3rd generation Mar Vista. Not against progress or change. Husband rides bike; so many near misses surprised he's still alive. Wants clear idea of how artists will be chosen, clear commitment. Playa Vista will have 6000 units.

Michael Ernstoff: Can't stop the project – developer has right. Need to address the state law that says can only require ½ parking space per unit. Are monetizing street parking, which developer doesn't own.

Saeed Ali: Live on 3600 block of Maplewood. Should supports Alternative 1 because it's consistent with past BOD positions and states six concerns that should be addressed.

Robert Schaffer: 30-year resident, a few blocks from development. We are a community of 2-story buildings, with occasional 3-story building. Could see 5-story building, not seven.

Christopher McKinnon: Opposed because it's out of character with neighborhood. Has divided community; is hoping we can bring back together.

Don Rossmore: 39-years in Mar VIsta. Concerned at some point will need to move to apartment and won't be one he can afford.

Martin Rubin: 23-years in Mar Vista. BOD role: stated unanimously 4-yreas ago to limit height. If MVCC is deliberative body, need to stick with that. More and more young people are moving into neighborhood to raise family. Need to maintain Mar Vista as family-oriented community.

Nancy Moarret: Lived in Mar Vista since 1982, bought house in Jefferson Park, sold it and moved back to Mar Vista. More people, more families, need place to live, and Mar Vista is nice place to live.

Margot Griswold: Over 20 years in Mar VIsta. Project just too big. Shouldn't allow McBuildings. Not against change. Mar Vista doesn't have 10000 jobs coming in, Playa Vista does. Residents will need to get to work, not all will ride bikes. Building is too tall, not enough parking spaces.

Rose Marie Durocher: 40-years in Mar Vista. Concerned about parking. Where will people going to retail businesses park? Why artists – gardeners need apartments. We need low/moderate income housing. Limit to 3-4 stories.

Marilyn Zweifach: In area since 1979. Wants to be able to stay in community as senior. Seniors do better when have vibrant world around, are part of community.

Ezra Gale (Mike Bonin' Senior Planner): Works on projects that are not 100% by-right. Building will two major areas of impact: parking and height. Pleased to see increase in parking. LA is on way to public housing, not there yet. Concern whether commercial component will be able to attract tenant

that will enliven street. Would be tallest building on Venice Blvd.; 13-15 feet of project are architectural features, don't provide housing. The two anti-growth initiatives coming up won't have impact on this type of project.

Mitchell Rishe: PLUM was very divided meeting, very close vote

Public Comment (via email)

Susan Keirn: Supports project. Need for affordable housing cannot be denied and she applauds the developer for considering the need for housing for artists. I would also like to see consideration given to those who work in Mar Vista but cannot afford it, like teachers, retail workers, police, etc. While the height does exceed what we have been accustomed to in Mar Vista (over 40 years for my family), it is within the law and is keeping with the block that it sits on. The 'all age appropriate' design is especially of interest as ad,ressing the needs of seniors would allow for more of us to 'age in place' while close to commercial stores.

Jeanne Kuntz: This structure appears to be an opportunity for a multi-use development that will ultimately enhance our community. providing much-needed housing in Mar Vista and doing so in a manner that improves our environment and has minimal negative consequences. Whether or not we like it, our city is changing and we must take advantage of every opportunity to make the transition with grace and intelligence.

Andrew Basmajian: Project fits with thinking about what would be the most sustainable way to add necessary housing to our busy metropolis, meets existing land use planning criteria and should not be evaluated by criteria that does not yet exist. That is only fair to the developer and how the system should work. Beyond that, the density the project delivers will improve the foot traffic to local businesses, including dozens of small businesses, and the Mar Vista Farmer's Market, etc., which is exactly what a "Great Street" deserves.

David & Susan Feinstein: Totally in favor of the development of multi-use commercial and residential. Please accept my favorable view of this project.

Board Comment

Ken Alpern: hasn't this BOD always fought for more housing, affordability, more bike lanes, EXPO.? Is this not a Trojan horse.

Holly Tilson: Accommodating some with promises to artists. How do we know won't flip? Want written agreement. Majority of those opposed want accommodations for height and parking: 3-4 stories, 1.5 parking spaces per unit.

Damien Newton: There is market for this type of building. Hard to make decision when so many questions. Does this count as public hearing? Bonin wants public hearing for Planning Commission.

Michelle Krupkin: Oliver building (next to Payless) has 37 units, 3 stories, more parking, Retail is overwhelming neighborhood.

Melissa Stoller: Torn. Single-family homeowner, but hears the renter in our neighborhood. Wants to age-in-place; if I had to move to an apartment, this is the type of building I would like. Concerned about height and parking. Would like more opportunity to review.

Joseph Galloway: Lots of promises, as artist he wants to see affordable housing. City needs opportunity to sit down with developers, need to clarify details about project.

Sarah Auerswald: Pleased so many are taking time to express themselves--small d democracy. Is in favor of more housing.

Robin Doyno: Recusal because of proximity to project.

Susan Klos: Need more affordable housing and need to start somewhere. Will create more green space where now is parking and cinderblock building.

Sherri Akers: Excitement in seeing so many people and so many opinions expressed. Venice is due for renaissance. Wish height wasn't' such an issue. Is the city I'd like us to be. We need more mixed-use residential to support our seniors. If have problem with height, need to work with city to change code.

Paola: Cervantes: Have mixed feelings about project. Need more time, more clarity.

Sherri Akers: Some of wording in #1 is incorrect, would like to amend:

- Verify and correct height
- Delete 6th paragraph
- Delete "STRONGLY" from 1st and 7th paragraphs.

Ken Apern (motion author): accept friendly amendment.

Motion as amended carried: 7 ayes, 0 nays, 3 abstentions (Melissa Stoller, Joseph Galloway, Paola Cervantes), 1 recusal (Robin Doyno).

Minority Report Opposing Alternative 1 (See Addendum B)

Alternative 2 (Directors' motion submitted by Sarah Auerswald & Sherri Akers)

Whereas the July 20th PLUM meeting was attended by close to 100 people with 12 comment cards to support the project and 14 to oppose it and a vote of 56% opposing and 44% supporting the project.

Whereas the community concerns were primarily focused on the building height and 85 feet and limited parking which the developer has agreed to mitigate.

Whereas creating additional housing is a key priority with the City Comprehensive Homeless Strategy reporting that "Los Angeles is last in a list of major cities to build housing supply to keep up with population demand. Los Angeles is also first nationally for the least affordable housing market when considering local income to local housing cost ratios."

Whereas this is a 'By Right' project and was planned within the current zoning laws with no variances requested.

Whereas we have an aging community that urgently needs our support and creating more multi-unit residences is a key component of that with the senior friendly features that new building codes require. By January 3, 2017, the General Manager of the Department of City Planning has been instructed to report on how to prioritize zoning matters that affect older adults, including encouraging multiple-unit developments.

Whereas sustainability is a signature characteristic of Mar Vista and current code requires green features generally lacking in our existing multi residential and commercial buildings.

The MVCC supports the proposed development with the following compromises:

1. Increase parking spaces to 87 or more
2. Clarification on height which is currently is 60' tall at the roof deck with lofts of a few fifth floor units up to 71' at the tallest. Explore the elimination of 5th floor lofts or of retail space if there is a community urgency to further height reduction.

Motion not considered due to passage of Alternative 1.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

Meeting adjourned at 9:30 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS*** *– The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: Santa Monica Airport Letter

Residents of Santa Monica,
West Los Angeles, Venice, and Mar Vista

August 8, 2016

Santa Monica City Council
1685 Main Street, Room 209
Santa Monica, California 90401
E-mail: council@smgov.net

RE: The Community's Request for Interim Actions Prior to Closure of Santa Monica Airport

Dear Santa Monica Mayor and City Council Members:

We thank you for your efforts to close Santa Monica Airport. While the closure process proceeds, gaining "local control" of the Airport is one of the 5 Strategic Priorities of the City. Today, multiple fixed base operators (FBOs) provide aeronautical services and have significant control of the Airport. These FBO operations include fueling and maintenance, as well as many extra services, such as limousine service, aircraft washing, baggage handling, catering, concierge services, rental cars, and hotel arrangements.

Beginning July 2015, these FBOs have had no right to continued leases at the Airport. Their leases are expired, but they remain at the Airport and continue to perpetuate harmful impacts on the community. There are no agreements, laws, or regulations that prohibit the City from evicting the FBOs. In fact, the 1984 Settlement Agreement that obligated the City to "provide sufficient space for the location and operation of 3 full service fixed base operators" expired on July 1, 2015. Furthermore, the FAA Director's Determination dated November 22, 2000 which was affirmed by the FAA Final Decision dated February 2, 2003 confirmed (a) that FBO leases were not 30-year leases, but were actually 29-year leases timed to expire on July 1, 2015, (b) that it would be unreasonable for the City to be required to enter into FBO lease agreements beyond July 1, 2015, and (c) that beyond July 1, 2015, the Airport is "a local land use matter".

The City, as the owner and proprietor of the Airport, should legally and immediately remove the FBOs and assert the City's "proprietary exclusive right" to be the only exclusive service provider at the Airport. As the sole service provider, the City would achieve *de facto* "local control" of these Airport services and be able to directly manage them in line with the interests of the local community.

The Proprietary Exclusive Right

The FAA Airport Compliance Manual, which provides guidance on an airport sponsor's commitments when they accept federal grants, explains the Proprietary Exclusive Right as follows:

> *"The owner of a public-use airport (public or private owner) may elect to provide any or all of the aeronautical services needed by the public at the airport. In fact, the statutory prohibition against exclusive rights does not apply to these owners. However, while they may exercise the exclusive right to provide aeronautical services, they may not grant or convey this exclusive right to another party. The*

airport sponsor that elects to engage in a proprietary exclusive must use its own employees and resources to carry out its venture. An independent commercial enterprise that has been designated as an agent of the airport sponsor may not exercise nor be granted such an exclusive right."

"Aircraft fueling is a prime example of an aeronautical service an airport sponsor may choose to provide itself. While the airport sponsor may exercise its proprietary exclusive to provide fueling services, aircraft owners may still assert the right to obtain their own fuel and bring it onto the airport to service their own aircraft, but only with their own employees and equipment and in conformance with reasonable airport rules, regulations, and minimum standards."

Even if we assume the 1994 grant commitments extend to 2023 (which is actively being disputed), the "proprietary exclusive right" is still in complete compliance with all obligations of the City.

We strongly but respectfully request you take the following actions:

1. Give Notice to Vacate to all FBOs at the Airport, including Atlantic Aviation and American Flyers, before September 1, 2016.
2. Authorize the City to assert its "proprietary exclusive right" and provide minimal levels of service while continuing to evaluate and periodically adjust service levels until Airport closure is legally cleared.
3. Rent or buy equipment and employ staff that may be required to operate fuel services and to park aircraft.

These steps are the most direct path to help the City achieve its Strategic Priority of local control at the Airport. Meanwhile, the remaining legal issues with the FAA related to the 1994 Grant and the 1948 Instrument of Transfer should continue to be aggressively pursued.

Santa Monica is an extremely capable city that maintains and operates many services efficiently and effectively, including fire, police, Big Blue Bus, waste collection, recycling, cemetery, CityTV, and parks and recreation. With the addition of FBO services we can also safely operate the Airport with the local control necessary to reduce the Airport's impact on our surrounding communities.

Sincerely,

Residents and Representatives of the
Santa Monica, West Los Angeles, Venice, and Mar Vista Communities

ADDENDUM B: 1244 Venice Blvd. Alternative 1 Minority Report

The July 20th PLUM meeting was attended by close to 100 people. There were 30 comment cards with 12 in support the project and 14 opposing it. Supporters urged the committee to look forward rather than back, and to recognize the changes taking place in our community. Some spoke to their concern that their children would not be able to live in the community that they were raised in. As there were so many in attendance, the meeting started late and ran late. Many people had to leave and were unable to speak or vote.

Renters represent 60% or more of our community and there was a strong renter turn out. 68 people stayed to vote and 44% voted to support the project – 38 to 30. It was moving to hear the testimony of so many who want a place in our community and look forward to the creation of more multi-unit residences to make that possible. There are numerous points that we hope the Board will consider.

The City Comprehensive Homeless Strategy reports that "Los Angeles is last in a list of major cities to build housing supply to keep up with population demand. Los Angeles is also first nationally for the least affordable housing market when considering local income to local housing cost ratios." We have to change that and change is difficult.

How can we change the rules midstream?

This is an 'By Right' project and was planned within the current zoning laws. There are no variances requested. The community concerns with height and parking need to be addressed with our elected officials to change the rules. Once a stakeholder has invested in our community it does not seem ethical to stop a project that conforms to all of the existing laws and regulations. If someone proposed that we sell our single family homes for under market price 'for the good of the community' it is unlikely that many of us would volunteer.

We have an aging community that urgently needs our support and creating more multi-unit residences is a key component of that. The Mayor issued the Purposeful Aging LA initiative to make Los Angeles the #1 friendliest city for aging in the US. That includes the following mandate –

- By January 3, 2017, the General Manager of the Department of City Planning shall report on **how to prioritize zoning matters that affect older adults, including encouraging multiple-unit developments,** updating regulations to support affordable senior housing and care facilities, and promoting accessory dwelling units
- New projects provide enhancements for aging that are lacking in Mar Vista for ADA compliance. Elevators provide easy street access for those with limited mobility. A pedestrian entrance from Venice but car entry only from ally – no driveways or cars turning in from Wasatch or Venice – provide safe access for residents and pedestrians. LADOT calculates a reduction on traffic impact

Sustainability is a signature characteristic of Mar Vista – this project embraces those values with a high commitment to sustainability. Current code requires green features generally lacking in our multi residential buildings such as -

- The current plan calls for 220v plug ins at every parking stall. This hopes to be the 1st building in Mar Vista to boast full EV charging.
- The project plans include a large amount of green space and an exterior green wall
- There will be 89 bicycle parking spaces and every unit gets a long term bike locker
- One to two Zip car spaces – the first in the community – are planned to reduce the need for car ownership.
- SUSMP is done via biofiltration planters along the sides of the building and inside the core of the building, in the green sitting areas.

Pets – Los Angeles is 60% renters and apartments that don't accept pets contribute to our high kill rate in shelters.

- As a policy, all of this developer's buildings are pet friendly, regardless of breed. That is managed via their property management company, Crimson Property Management. The plans include a dog run.

Mar Vista has a strong artist community which is becoming a signature of the community. This project supports that community.

- The developer has proposed that her affordable housing units (subsidized units) in the complex be made available for artist preference using the federal housing regulation H.R. 3221.
- The project will include an exterior mural wall created by a prominent member of our Mar Vista artist community.

Respectfully submitted by Sarah Auerswald and Sherri Akers, MVCC At Large Directors

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, July 12, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:05 P.M.

   Quorum present: Rob Kadota, Joseph Galloway, Melissa Stoller, Robin Doyno, Sherri Akers, Michelle Krupkin, Greg Tedesco, Holly Tilson, Susan Klos, Paola Cervantes, Ken Alpern, Sarah Auerswald

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Approval of June 14th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)

   Motion to approve as amended (change "AGENDA" to "MINUTES"). Motion carried: 8 ayes, 0 nays, 1 abstention (Sarah Auerswald).

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Sharon Commins (via email) RE illegal fireworks in Mar Vista flats:

   > Two extremely large starburst types were detonated directly over my house the night of July 4th. My daughter, who still has PTSD from our house fire in 2010 thought our house had blown up. These huge fireworks belong in a professionally managed pyrotechnics show with proper clearances from buildings/landscaping as well as fire suppression support, NOT on our streets above our homes.
   >
   > The Next Door comment thread I started has reached 71 replies. Only a handful of respondents believe this situation is OK and we all should either put up with it—with earmuffs—'to celebrate America' or 'leave town with our pets if we don't like it'.
   >
   > There were at least 3 instances of blocking the public right of way for impromptu 'shows' near where I live. Whether LAPD had presence anywhere in Mar Vista while all this was going on is unclear.
   >
   > A couple of things need to happen going forward, in my opinion, and MVCC can help facilitate them:
   >
   > - • Greater LAPD basic car presence on July 4th and New Year's Eve to protect residents
   > - • Encouraging stakeholders to call 311 every single time they hear/see fireworks detonated… and email the CD11, CD5 and City Attorney offices simultaneously
   >
   > Bottom line: people should not have to beg their city government to enforce fireworks laws.

   Selena Inouye via email (selenalcsw@aol.com) RE: illegal fireworks

   > I want to bring to your attention to an escalating situation in the Mar Vista, Culver City and Del Rey communities regarding the use of illegal fireworks. Over the past several years, I have noticed that the use of illegal fireworks during 4th of July and New Year's Eve has steadily increased, creating excessive noise in our neighborhoods.
   >
   > Much to my frustration, no government agency or official appears to be stepping up to the plate to address the complaints of neighbors living here about the use of illegal fireworks. Specifically, I'm disappointed the LAPD Pacific station and the LAFD fire inspectors aren't doing more to enforce the LA City and County laws banning fireworks.
   >
   > One of the largest illegal fireworks displays in our area is near the Mar Vista Gardens Housing Projects in Del Rey. It is common knowledge that the bike path next to and bridges over La Ballona Creek are places where illegal fireworks are being set off. @BruinMichael on Twitter posted a video on Twitter this year at 11:58 PM on July 4 showing aerial fireworks exploding over La Ballona Creek with the caption "Mar Vista

projects fireworks. Always putting out a good show:" (sic) That "good show" began Friday July 1st and lasted the entire weekend. On the 4th of July, it started at 6 PM and ended around 2 am on the 5th.

Neighbors flocked to Nextdoor.com this year with numerous complaints on 4 different threads about how the noise is impacting their lives, their children, their pets and veterans living with PTSD. We all agreed that this needs to stop before someone loses their home to fire or someone gets seriously injured. In addition, we need to be concerned about the environmental impact illegal fireworks are having on La Ballona creek. Trash and chemicals are traveling down the creek, to the wetlands and eventually out to sea.

I'd like to suggest that a working group be established to address the issue of illegal fireworks. Ideally, it would bring together neighbors from Mar Vista, Del Rey and Culver City and include representatives from Councilman Bonin's office, the Culver City Council, the LAPD and LAFD, the Housing Authority of the City of Los Angeles, the Community Councils of Mar Vista and Del Rey, as well as non-profit organization like La Ballona Renaissance and Ballona friends. I would be interested in volunteering and being a member of any group or committee established to address this issue.

Marsha Miller: 7 bedroom mansion being built next door to her tiny home; concerned will become group home.

Kalani Whittington: Limited street parking in zone 2, influx of vans & business vehicles with advertising on their sides parked for long periods of time. Neighborhood bordered by 2 recycling facilities (Ralphs & Cheviot Hills mall); people steal out of blue bins to recycle.

Martin Rubin: North Westdale Neighborhood Association meeting July 27 at St. Andrews; high ranking Frontier rep will speak, address billing issues (on spot if WiFi). NWNA fall block party/talent show on Sept. 10.

Lorena Alvarado: current resident of Del Rey, moving to Mar Vista at end of year. Grease screening at Venice High for 5th year in a row: Saturday, Sept 17. Del Rey NC has sponsored in past, would like MVCC to sponsor as well (would have table).

5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Tracie Field, Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by Joseph Galloway joseph.gallowy@lacity.org 323-966-1820

      Working on mitigating homeless encampments on Palms & Sepulveda.

      Manages clean street days – gets notification when encampment location will be cleaned up.

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org

      City Council considering a $1.2B bond measure to tackle homeless problems Also discussing a tax assessed on property parcel value: $17.50 per each $100,000 of assessed value.

      Pushing to increase level of affordable housing. For Martin Cadillac project, increased to 20%: 5% very low income, 15% workforce housing.

      City Planning Commission considering revisions to Baseline Masionization Ordinance.

      Ron Kato appointed to Health & Wellness position.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel Jacinto joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

      Clean Streets Initiative – mayor's directive issued last April. As we are coming out of recession, can bring back more services that were cut. In anticipation of a Clean Streets Challenge Grant. Clean Streets teams formed July 1. NCs can apply for a grant.

      $138M for building new housing & supportive services took effect July 1. Will be long time before see results, but effort has begun.

      Mayor strongly supports move by City Council for ballot measure to provide stable stream of funding. Finally there is political will to take action.

      Mayor launched Welcome Home project. It's about citizens of LA taking ownership of homelessness issue; have real discussions about realities of homelessness & bring items to fill laundry basket. MVCC is in planning stage for Saturday, July 23. Will also do collection at MVCC Farmers' Market tent. Items given to people recently moved in to supportive housing.

6:00 next Thursday: Daniel speaking at Aging In Place committee meeting.

f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly Katona Karly.Katona@bos.lacounty.gov

g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov

Sebastian Ridley-Thomas represented self (video: https://www.facebook.com/AssemblymemberRidleyThomas/videos/1760335020917475/)

Representative is bringing focus on homelessness. Trying to get Sacramento to understand difference between "sticks & bricks" and the expensive services needed. In LA, 70% of homeless do not have chronic mental illness, but still need services. LA County: 47,000 homeless, including 9000 children; schools have special homeless division. LAHSA (Los Angeles Homeless Services Athority) formed to absorb planning & liability associated with homelessness solutions. County is the safety net for indigent services. CA Senate President pushed sticks & bricks solution; issue debt to pay over 4 years. Governor resistant to any action on services; doesn't realize that skid row isn't what it was when he lived here in 80's. 7000 on City of LA skid row, 7000 in Lancaster/Palmdale. 2500 homeless in CA Assembly District 54. Should declare emergency at state level – could then prioritize for action, move money from any non-federal account, ignore some rules; trying to get governor to do this for ½ billion. It would help if MVCC took a position and encouraged moving the money quickly. MVCC has helped change pubic consciousness.

LAPD is holding community relations dialog on Wednesday, July 13, in Exposition Park. See http://futureofpolicing.org/events/ for additional dates/locations.

Governor's by right proposal would change authority of local governments to approve affordable housing regulations, removing authority from local officials; goal is to build more housing. One-time $400,000 included in budget for local needs.

Question: can't affordable units be required in developments? Answer: Yes, but would be a covenant that expires at some time.

Sherri Akers: 10% tax on medical and recreational marijuana? Answer: Will be on November ballot. Probably will raise no more than $50-70 million if passed.

h. CA Assembly 62 - Assembly Member Autumn Burke, rep by Sr. Field Rep Odyssesus Bostick

i. US 33– Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov

j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by Jasmine Elbarbary jasmine.elbarbary@lacity.org 213-978-1551

Delivered oath of office to Sarah Auerswald & Ken Alpern; presented board members with certificates of election.

Ethics Training: July 20, 6-8 pm, Westchester Municipal Building.

DONE requests appointment of Homeless Services, Animal Services, Legal, and Public Works liaisons.

7. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Next meeting is July 20; agenda closes July 16.

b. DWP MOU: Myra Boime

c. LANCC: Open

d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

e Fall Festival: Albert Olson

f. City Budget Advocates: John Kuchta

g. Recode LA: Sharon Commins

h. Mar Vista Chamber of Commerce: Sarah Auerswald

Minimum wage increased July 1; employers need to be aware.

Status Kuo reopened with full bar & new menu. New yoga studio is coming.

Next monthly Coffee Time is Thursday, July 21; will have speaker form VEDC, a non-profit agency that helps small business get started.

Monthly mixers, 5-7 P.M.: July 25, Status Kuo; August 22, Rustic Kitchen

i. Animal Services: Steve Boskin

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota

i. Presentation of Certificates of Election and Oath of Office to Board of Directors

See 6.k above.

ii. Treasurer vacancy – nomination/election to follow under new business

See 10.a below.

iii. Update on process of filling Zone 2 Director vacancy

Town Hall scheduled on Wednesday, July 13, 7:00 P.M. at St. Andrews Lutheran Church to discuss.

iv. MVCC Committees and Liaisons

Would like to develop feedback forms (what's working, what's not) for committee attendees–seeking input for construction of form.

v. EmpowerLA required Strategic Budget Package for Fiscal Year 2016-17 documents: Strategic Plan, Outreach Survey, Budget and Self-assessment tool

Will address at upcoming Board. Past chair Bill Koontz is doing prior year evaluation.

vi. MVCC BOD Strategic Planning Retreat

August 13, 9:00 A.M.–1:00 P.M. Lunch will be served.

vii. MVCC MV Farmers Market Outreach and Green Tent

Trying out different things at MVCC outreach tent. Big Chalkboard for input. Encourages committees to provide info graphics.

viii. BOD Required trainings and certifications

Required trainings and certifications are completed.

ix. Mar Vista Celebrates 90!

2017: celebration of Mar Vista's annexation to Los Angeles. Landkeepers Preservation Group has some funds.

b. First Vice Chair – Sarah Auerswald

Handling internal issues: how to write a motion, etc.

MVCC is eligible to apply for Clean Streets Challenge Grant as NC; possible T&I Committee participation.

c. Second Vice Chair – Joseph Galloway

Handling external issues. Notify Joseph if issues need attention City Council or Dept. of Public Works.

d. Secretary – Melissa Stoller

e. Treasurer – open/Robin Doyno, transitional Treasurer

NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2016-17 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports areavailable online at http://done.lacity.org/onlinefunding/ncfunding.aspx.

i. Report on current financial status

ii. **APPROVAL** of June Monthly Expense Report (MER)

Motion to approve by Melissa Stoller, 2nd by Sherri Akers. Motion carried unanimously.

a. **POLICY MOTION: MVCC Call for Funding and Initiatives to Further Expedite Repairing our City Sidewalks Near Rail Transit Stations** (submitted by Transportation & Infrastructure Committee)

Whereas, our City Council has agreed to a thirty (30) year plan to replace and repair our City sidewalks, and

Whereas, both the Mar Vista Community Council and other Neighborhood Councils throughout the City find this thirty year plan to be entirely insufficient to meet the needs of Angelenos, and

Whereas, the poor and dangerous condition of our sidewalks particularly affects the health, wellbeing and transit access of City residents,

Therefore Mar Vista Community Council calls for a major budgetary reprioritization in our City Budget, as well as from any new tax/revenue-raising efforts, to establish a new goal of a two-year plan for all sidewalks on major thoroughfares (such as Centinela, Sepulveda, and Westwood Blvds.) within a 1/2 mile radius of all rail transit stations to better meet the true needs of Los Angeles City residents in a timely fashion.

Motion to approve by Michelle Krupkin, 2nd by Sherri Akers.

Discussion

> Ken Alpern: This is supplement to last T&I motion that passed (asking for sidewalk repairs to be completed in 7-10 years); recommends expediting to 2 years

Motion carried: 10 ayes, 0 nays, 1 abstentions (Joseph Galloway).

b. **POLICY MOTION: Residents to Access Westwood/Rancho Park, Expo/Sepulveda, Expo/Bundy, and 26th/Bergamot Stations** (submitted by Transportation & Infrastructure Committee)

Whereas, bicycle paths and share rows are either not approved, and/or not possible, on major thoroughfares to the Westside Expo Rail Line stations, and

Whereas, safe and effective bicycle routes to Westside Expo Rail Line stations are needed for easy and convenient access of Mar Vista and Westside Village residents to the Expo Line,

Therefore MVCC requests that the appropriate departments with the governments of the City 2 and County of Los Angeles promote the availability of maps, apps, and billboards to best publicize the most convenient and safe routes to Westside Expo Line stations

Motion to approve by Michelle Krupkin, 2nd by Ken Apern.

Motion carried: 10 ayes, 0 nays, 1 abstentions (Joseph Galloway).

c. **POLICY MOTION: MVCC Call for a Handicap Sidewalk Ramp at the southwest corner of Palms Blvd/Sawtelle Blvd** (submitted by Transportation & Infrastructure Committee)

Whereas there is a need for a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds,

Therefore MVCC requests that the Department of Public Works expedite the planning, funding, and construction of a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Motion carried: 10 ayes, 0 nays, 1 abstentions (Joseph Galloway).

d. **POLICY MOTION: MVCC Call for Modern Bus Shelters at Intersections of National/Sawtelle, National/Sepulveda, National/Westwood, and Palms/Sepulveda** (submitted by Transportation & Infrastructure Committee)

Whereas, National/Sawtelle, National/Sepulveda, National/Westwood, *Centinela/Venice, Barrington/National* and Palms/Sepulveda are key bus access points to north/south buses along Sepulveda Blvd. and Westwood Blvd., and

Whereas bus access and ridership are particularly critical to accessing the new Expo Light Rail Line at the Exposition/Sepulveda and Westwood/Rancho Park stations,

Therefore MVCC calls upon the City of Los Angeles, in cooperation with the MVCC, gather data, to plan, *investigate* fund*ing*, and construct modern bus shelters, with benches, canopies, USB ports for phone charging, and signage/lighting to identify arrival of north/south buses at National/Sepulveda, ~~and~~ Palms/Sepulveda *and other key access points to be identifi*ed.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Discussion

Sarah Auerswald: MVCC funding? Ken: Yes, possibly $5000 per shelter.

Sarah Auerswald & Rob Kadota: Then seems like should have funding motion. This is policy motion, doesn't have numbers. Ken Alpern: Change to "investigate funding."

Sherri Akers: What about Centinella? SE corner of Centinela & Venice.

Melissa Stoller: Add Barrington & National.

Rob Kadota: Ask Metro for ridership information to help determine locations.

Bill Koontz: Make partnerships with companies that do advertising on benches. Sarah: J.C. Decaux (outdoor advertising firm) is already planning benches in some areas.

Motion carried: 10 ayes, 0 nays, 1 abstentions (Joseph Galloway).

10. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable. Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    a. **ADMINISTRATIVE MOTION: Nomination and Election of an MVCC Treasurer** – Bill Koontz, Chair Election Committee

    Nominination of Holly Tilson by Rob Kadota. Nomination accepted by Holly. Election unanimously approved.

    b. **ADMINISTRATIVE MOTION(s): Nominations by MVCC Chair to Committees and Liaisons** and review/approval by MVCC Board of Directors

    Nominations by Rob Kadota, 2nd by Sherri Akers.

    Standing Committees

Committee	Nominee(s)	Position	Exec Support
Aging in Place	Sherri Akers, Tajana Luethi, Birgitta Kastenbaum	Co-chairs	Rob Kadota
Community Outreach	Sarah Auerswald	Chair	Sarah Auerswald
	Joseph Galloway	Vice-chair	
	Sherri Akers	Social Media Maven	
Education, Arts and Culture	Robin Doyno, Paola Cervantes	Co-chairs	Rob Kadota/ Sarah Auerswald
	Lenore French	Vice-chair	
Elections and By-laws	Rob Kadota	Chair	Rob Kadota
	Holly Tilson	Vice-chair	
Green	Melissa Stoller Jeanne Kunta Sherri Akers	Co-chairs	TBD
Planning and Land Use Management	Mitchell Rishe	Chair	Rotating support
	Michael Millman, Latrice Williams	Vice-chairs	
Recreation and Open Space Enhancement	Jerry Hornoff, Tom Ponton	Vice-chairs	TBD
Safety and Security	Bill Koontz	Chair	Rob Kadota
	Elliot Hanna	Vice-chair	
Santa Monica Airport	Holly Tilson, Martin Rubin	Co-chairs	Joseph Galloway
Transportation and Infrastructure	Ken Alpern, Michelle Krupkin	Co-chairs	TBD

    Ad-hoc Committees

Ad-hoc Committees

Committee	Nominee(s)	Position	Exec Support
Historic FS 62	Rachel Swager, Roy Persinko	Co-chairs	Rob Kadota
Homeless Solutions	Robin Doyno, Susan Klos	Co-chairs	Rob Kadota
	Joe Cuanan	Vice chair	
Great Streets	Michelle Krupkin, Greg Castelnuovo-Tedesco	Co-chairs	Sarah Auerwsald

Liaisons

Position	Nominee	Exec Support
DWP MOU	Open	
LANC	Joseph Galloway	Rob Kadota
DWP Recycled Water	Christopher McKinnon	
Mar Vista Fall Festival	Albert Olsen	
City Budget	Holly Tilson	Joseph Galloway
Recode LA	Sharon Cummins	
WRAC	Rob Kadota/ Joseph Galloway	Rob Kadota/ Joseph Galloway
WRAC LUPC	Sharon Commins	Mitchell Rishe
MV Chamber of Commerce	Sarah Auerswald	
Animal Services Liaison	Tom Ponton	
LADOT/CD11/LAPD Traffic Committee	Linda Guagliano	
Historic FS 62 Non Profit	Albert Olsen	Rob Kadota
Mar Vista Celebrates 90	Open	

Motion amended to consider Michael Millman's appointment separately. Appointments as amended carried unanimously.

Motion by Rob Kadota to approve appointment of Michael Millman as PLUM vice-chair, 2nd by Sherri Akers.

Rob Kadota: Recommends having as Vice Chair, comported self well at last PLUM meeting.

Michelle Krupkin: Requires monitoring for Brown Act.

Ken Alpern: Won't deny shortcomings, but also his dedication. Wide support in community

Robin Doyno: Would not support because of numerous ethics violations. Continues to roil water in this community.

Sherri Akers: Shares concern. Problem isn't what happens in meetings, but inflaming communication. Everyone should take ethics training.

Melissa Stoller: Michael has taken ethics training.

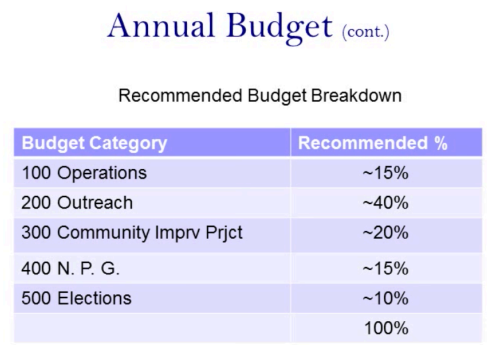
Holly Tilson: Unaware of what went on, but have attended several PLUM meetings. Steve Williams & Michael MIllman do good job..

Jasmine Elbarbary: focus on what we do want, not what we don't want.

Motion carries: 5 ayes, 4 nays, 2 abstentions (Greg Castlenuoso-Tedesco & Joseph Galloway)

c. **ADMINISTRATIVE MOTION**: **Proposed Outreach Budget** (submitted by Outreach Committee)

Whereas in 1999, the Los Angeles City Charter established the Neighborhood Council System and the Department of Neighborhood Empowerment "to promote more citizen participation in government and make government more responsive to local needs…" (Charter Section 900). The Mar Vista Community Council recognizes that we must prioritize community outreach and approves the attached budget of $20,400 to create a more effective website, a Facebook ad campaign, continued use of printed newsletter, continued support of neighborhood block parties, creation of zone specific and multi-unit residential outreach tools, adoption of electronic email service, banners and flyers to promote MVCC events, supplies for in-person outreach events "coffee time with the board members" and printed material for committee and BOD meetings. (See slide below from Empower Budget Training - audio states: "keep in mind that the NC is not a foundation for granting public funds".)



	200 Outreach	
ADV	Advertising	
	Banners, signs & biz cards	3,000
	Facebook Ads ($100/month)	1,200
	Community give aways (ex:bags, cups etc)	1,000
EVE	Event Expense / Food & Refreshments	
	NA Block Parties ($300 X 7)	2,100
	Coffee Time events within each Zone ($100/month)	1,200
	Eco Car Expo	600
MEE	Meeting Expense - moved to operations	
	photocopies (agendas, minutes, etc.)	
NEW	Newsletter Expense	
	2 newsletters ($4k each)	
	(Printing, design & distro)	8,800
	New email service (like constant contact) Annual	1,500
WEB	Website Maintenance/Enhancement/Creation	
	New website design	5,000
	Monthly retainer for maintenance - TBD	
	Sub Total	$24,400

Motion to approve by Sarah Auerswald, 2nd by Sherri Akers.

Motion to consider budget (10.d) first by Rob Kadota..Motion carried unanimously.

Discussion

Sarah: Meant to reflect a priority to do much more outreach.

d. **ADMINISTRATIVE MOTION: Review and finalization of MVCC 2016-2017 Budget Worksheet**

Motion to approve by , 2nd by .

Discussion

Jasmine Elbarary: Everything should provide outreach.

Melissa Stoller: Note that budget doesn't specifically include Newsletter (costs about $4400 each). Perhaps should not put school NPG in budget, will set expectation that might not be met.

Motion carried unanimously.

e. **ADMINISTRATIVE MOTION: Treasurer's Report** (submitted by Outreach Committee)

MVCC approves a motion amending the Treasurer's report at MVCC Board of Directors meeting. Treasurer will provide

- Current bank account statement that includes the account balance
- A recap of pending approved expenses and the amount in ongoing operating expenses
- Report on available funds currently available
- Show that the account reconciles with what has been reported to DONE in the MER's motion

Motion to approve by Sarah, 2nd by Sherri Akers

Motion carried unanimously,

f. **ADMINISTRATIVE MOTION: On-line Voting** (submitted by Community Outreach Committee)

Whereas 40% of the LA Neighborhood Councils have already implemented on line voting; Whereas the 2016 election provided will have provided the opportunity for Empower to identify and improve any procedural problems; Whereas many stakeholder felt they were denied an opportunity to vote due to the narrow four hour window and in person requirement; The Mar Vista Community Council hereby moves to adopt the Empower system of On Line Voting starting with the 2018 election.

Motion to approve by Sarah Auerswald, 2nd by Sherri Akers.

Discussion

Martin Rubin: Loves idea, need to ensure have security.

Jasmine Elbarbary: 35 NCs did on-line voting last election.

Sherri Akers & Sarah Auerswad: Lack of on-line voting for MVCC was huge issue.

Melissa Stoller: Don't judge online voting just by this year; DONE has two years to improve the process.

Motion by Rob Kadota to table for up to 4 months and let Election & By-laws Committee study, 2nd by Sherri Akers.

Motion to table carried unanimously.

g. **FUNDING MOTION**: Reimbursement for Green Tent supplies (Directors motion submitted by Melissa Stoller)

MVCC approves reimbursing $18.50 Melissa Stoller for the purchase of the following Green Tent supplies: push pins, white board markers.

Motion to approve by Greg Castelnouvo-Tedesco, 2nd by Michelle Krupkin.

Motion carried: 11 ayes, 0 nays, 1 abstentions (Melissa Stoller).

11. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **FEATURED COMMITTEE: Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs

Purposeful Aging Los Angeles: As of 2018, mayor has asked all NCs to do something like MVCC.

Having 3 co-chairs works well for AIP. Have branded AIP with logo. Early on, committee meeting turned in to speakers series—starting when Laura Trejo from Department of Aging came in and had robust Q&A. Usually have about 20 attendees, composition rotates depending on topic: some seniors, a lot of adult children of seniors, professionals in field . Presentations become part of reference library. Booked with presenters thru January. See http://marvistacc.org/files/AIP-Board-presentation.pdf for more info.

WLA NC is hoping to start similar committee; will start distributing MVCC's AIP speaker announcements.

Rob Kadota: Would like video. SherriAkers: Have thought about; is privacy issue.

Time Bank will do Repair Café during Fall Festival.

Developing relationships with elected officials.

Part of goal: everything that comes before board, consider implications for seniors.

b. **Homeless Solutions Ad Hoc Committee** – Robin Doyno, Chair

Approved idea of joining support of 1% tax for homeless.

Published Homelessness Resource Pamphlet

Welcome Home Project event on Saturday, July 23, 4-6 P.M.

Next meeting.is Wednesday, July 28.

c. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

MVCC Tent: Making available to committees to let everyone know about you. Standing dates with fire station and Chamber of Commeiree.

d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs

e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

Met with Ezra Gayle,

12444 Venice, 2 blocks west of Centinela – 85' tall, 75 parking spaces, 7 stories, 77 residential units, 2000 sq. ft. of retail, applicant has no intention to have public hearing. Another property owned by same developer on other side of street (55 ft high) got approved without PLUM even knowing about Technically doesn't require hearing because offering low income housing. Requesting community engagement and transparency. PLUM will propose motion at next meeting asking city planner to set pubic hearing.

Marsha Miller: Heard on NPR that developers are changing whole character of neighborhoods with mansionization.

Sarah Auerswald: Have been pubic hearings, perhaps not recently; not legally required. People who moved because of it made a profit and values went up.

Holly Tilson: issue for people living around there (12444 Venice Blvd) is height & parking. Cars will spill over into surrounding neighborhood.

Sherri Akers: developer presented other project at PLUM. Was on PLUM agenda and then taken off at last minute because we had not done our work.

Ken Alpern: Developer's negative reputation in community is well earned.

Michelle Krupkin: Oliver Building next to Pay Less; has more ample, subterranean parking, and neighbors still very upset.

h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs

i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

j. **Safety and Security Committee** – Rob Kadota, Chair

k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

m. **Elections and By-laws**- Bill Koontz, chair

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Westside Village Homeowners Association board: wants to do more with earthquake preparedness. Wants to meet with Jeseph Galloway.

Karen Matthews: wants to meet with Joseph Galloway re: Co-op apartments on Sepulveda.

b. Zone 2 – open

Rob: drove every section of Zone 2 to get familiar.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

Proposal on Victoria: trying to set up meeting with developer, see if can work out compromise

e. Zone 5 – Michelle Krupkin

Great Streets: Discussion of draft sidewalk condition document.

f. Zone 6 – Holly Tilson

Traffic issues, RV issues, dog poo, trash in alleys. Talking with Len Nguyen & Officer Acosta.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**

Martin Rubin: NWNA doing great job looking at cut-thru traffic issues; will share ideas.

Joseph Galloway: City Planning Commission will address Baseline Masionization Ordinance at July 14 meeting. 5-step plan for emergency management – will introduce in next BOD.

Ken Alpern: LAX Green Line Metro Connector pubic hearing on July 13.

15. **Adjournment**

Meeting adjourned at 9:39 P.M.

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Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, July 12, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of June 14th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Lizka Mendoza, Director
   b. CD 5 – Councilmember Paul Koretz, rep by Joseph Galloway joseph.gallowy@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel Jacinto joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly Katona Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by Sr. Field Rep Odyssesus Bostick
   i. US 33– Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by Jasmine Elbarbary jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Myra Boime
   c. LANCC: Open
   d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
   e Fall Festival: Albert Olson
   f. City Budget Advocates: John Kuchta
   g. Recode LA: Sharon Commins
   h. Mar Vista Chamber of Commerce: Sarah Auerswald
   i. Animal Services: Steve Boskin
8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
      i. Presentation of Certificates of Election and Oath of Office to Board of Directors
      ii. Treasurer vacancy – nomination/election to follow under new business

iii. Update on process of filling Zone 2 Director vacancy

iv. MVCC Committees and Liaisons

v. EmpowerLA required Strategic Budget Package for Fiscal Year 2016-17 documents: Strategic Plan, Outreach Survey, Budget and Self-assessment tool

vi. MVCC BOD Strategic Planning Retreat

vii. MVCC MV Farmers Market Outreach and Green Tent

viii. BOD Required trainings and certifications

ix. Mar Vista Celebrates 90!

b. First Vice Chair – Sarah Auerswald

c. Second Vice Chair – Joseph Galloway

d. Secretary – Melissa Stoller

e. Treasurer – open/Robin Doyno, transitional Treasurer

NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2016-17 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports areavailable online at http://done.lacity.org/onlinefunding/ncfunding.aspx.

i. Report on current financial status

ii. **APPROVAL** of June Monthly Expense Report (MER)

9. **Old Business** - Action items held over from previous meeting (Public comment permitted)

a. **POLICY MOTION: MVCC Call for Funding and Initiatives to Further Expedite Repairing our City Sidewalks Near Rail Transit Stations** (submitted by Transportation & Infrastructure Committee)

Whereas, our City Council has agreed to a thirty (30) year plan to replace and repair our City sidewalks, and

Whereas, both the Mar Vista Community Council and other Neighborhood Councils throughout the City find this thirty year plan to be entirely insufficient to meet the needs of Angelenos, and

Whereas, the poor and dangerous condition of our sidewalks particularly affects the health, wellbeing and transit access of City residents,

Therefore Mar Vista Community Council calls for a major budgetary reprioritization in our City Budget, as well as from any new tax/revenue-raising efforts, to establish a new goal of a two-year plan for all sidewalks on major thoroughfares (such as Centinela, Sepulveda, and Westwood Blvds.) within a 1/2 mile radius of all rail transit stations to better meet the true needs of Los Angeles City residents in a timely fashion.

b. **POLICY MOTION: Residents to Access Westwood/Rancho Park, Expo/Sepulveda, Expo/Bundy, and 26th/Bergamot Stations** (submitted by Transportation & Infrastructure Committee)

Whereas, bicycle paths and share rows are either not approved, and/or not possible, on major thoroughfares to the Westside Expo Rail Line stations, and

Whereas, safe and effective bicycle routes to Westside Expo Rail Line stations are needed for easy and convenient access of Mar Vista and Westside Village residents to the Expo Line,

Therefore MVCC requests that the appropriate departments with the governments of the City 2 and County of Los Angeles promote the availability of maps, apps, and billboards to best publicize the most convenient and safe routes to Westside Expo Line stations

c. **POLICY MOTION: MVCC Call for a Handicap Sidewalk Ramp at the southwest corner of Palms Blvd/Sawtelle Blvd** (submitted by Transportation & Infrastructure Committee)

Whereas there is a need for a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds,

Therefore MVCC requests that the Department of Public Works expedite the planning, funding, and construction of a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds.

d. **POLICY MOTION: MVCC Call for Modern Bus Shelters at Intersections of National/Sawtelle, National/Sepulveda, National/Westwood, and Palms/Sepulveda** (submitted by Transportation & Infrastructure Committee)

Whereas, National/Sawtelle, National/Sepulveda, National/Westwood, and Palms/Sepulveda are key bus access points to north/south buses along Sepulveda Blvd. and Westwood Blvd., and

Whereas bus access and ridership are particularly critical to accessing the new Expo Light Rail Line at the Exposition/Sepulveda and Westwood/Rancho Park stations,

Therefore MVCC calls upon the City of Los Angeles, in cooperation with the MVCC, to plan, fund, and construct modern bus shelters, with benches, canopies, USB ports for phone charging, and signage/lighting to identify arrival of north/south buses at National/Sepulveda and Palms/Sepulveda.

10. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable. Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Nomination and Election of an MVCC Treasurer** – Bill Koontz, Chair Election Committee

b. **ADMINISTRATIVE MOTION(s): Nominations by MVCC Chair to Committees and Liaisons** and review/approval by MVCC Board of Directors

c. **ADMINISTRATIVE MOTION**: **Proposed Outreach Budget** (submitted by Outreach Committee)

Whereas in 1999, the Los Angeles City Charter established the Neighborhood Council System and the Department of Neighborhood Empowerment "to promote more citizen participation in government and make government more responsive to local needs…" (Charter Section 900). The Mar Vista Community Council recognizes that we must prioritize community outreach and approves the attached budget of $20,400 to create a more effective website, a Facebook ad campaign, continued use of printed newsletter, continued support of neighborhood block parties, creation of zone specific and multi-unit residential outreach tools, adoption of electronic email service, banners and flyers to promote MVCC events, supplies for in-person outreach events "coffee time with the board members" and printed material for committee and BOD meetings. (See slide below from Empower Budget Training - audio states: "keep in mind that the NC is not a foundation for granting public funds".)

Annual Budget (cont.)

Recommended Budget Breakdown

Budget Category	Recommended %
100 Operations	~15%
200 Outreach	~40%
300 Community Imprv Prjct	~20%
400 N. P. G.	~15%
500 Elections	~10%
	100%

	200 Outreach	
ADV	Advertising	
	Banners, signs & biz cards	3,000
	Facebook Ads ($100/month)	1,200
	Community give aways (ex:bags, cups etc)	1,000
EVE	Event Expense / Food & Refreshments	
	NA Block Parties ($300 X 7)	2,100
	Coffee Time events within each Zone ($100/month)	1,200
	Eco Car Expo	600
MEE	Meeting Expense - moved to operations	
	photocopies (agendas, minutes, etc.)	

NEW	Newsletter Expense	
	2 newsletters ($4k each)	
	(Printing, design & distro)	8,800
	New email service (like constant contact) Annual	1,500
WEB	Website Maintenance/Enhancement/Creation	
	New website design	5,000
	Monthly retainer for maintenance - TBD	
	Sub Total	$24,400

d. **ADMINISTRATIVE MOTION: Review and finalization of MVCC 2016-2017 Budget Worksheet**

e. **ADMINISTRATIVE MOTION: Treasurer's Report** (submitted by Outreach Committee)

MVCC approves a motion amending the Treasurer's report at MVCC Board of Directors meeting. Treasurer will provide

- Current bank account statement that includes the account balance
- A recap of pending approved expenses and the amount in ongoing operating expenses
- Report on available funds currently available
- Show that the account reconciles with what has been reported to DONE in the MER's motion

f. **ADMINISTRATIVE MOTION: On-line Voting** (submitted by Community Outreach Committee)

Whereas 40% of the LA Neighborhood Councils have already implemented on line voting; Whereas the 2016 election provided will have provided the opportunity for Empower to identify and improve any procedural problems; Whereas many stakeholder felt they were denied an opportunity to vote due to the narrow four hour window and in person requirement; The Mar Vista Community Council hereby moves to adopt the Empower system of On Line Voting starting with the 2018 election.

g. **FUNDING MOTION**: Reimbursement for Green Tent supplies (Directors motion submitted by Melissa Stoller)

MVCC approves reimbursing $18.50 Melissa Stoller for the purchase of the following Green Tent supplies: push pins, white board markers.

11. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **FEATURED COMMITTEE: Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs

b. **Homeless Issues Ad Hoc Committee** – Robin Doyno, Chair

c. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs

e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs

i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

j. **Safety and Security Committee** – Rob Kadota, Chair

k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

m. **Elections and By-laws**- Bill Koontz, chair

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – open
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, June 14th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:10 P.M.
   Quorum present (pre-installation): Bill Koontz, Mitchell Rishe, Melissa Stoller, Bill Scheding, Robin Doyno, Sherri Akers, Brad Wilhite,, Michelle Krupkin, Valerie Davidson, Michael Millman, Yvette Molinaro,
   Quorum present (Post-installation): Rob Kadota, Joseph Galloway, Melissa Stoller, Robin Doyno, Sherri Akers, Michelle Krupkin, Greg Tedesco, Holly Tilson, Susan Klos, Paola Cervantes
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of May 10th, 2016 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)
   Motion to approve by Bill Scheding, 2nd by Valerie Davidson. Motion carried: 10 ayes, 0 nays, 1 abstention (Yvette Molinaro).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Debbie Rochlin: Thank you for donation to MVNA block party.
   Bill Scheding: Brown Act still in effect. No MVCC property can remain in your house; must be stored.
   Motion by Bill Scheding to move LADOT/CD11/LAPD Traffic Committee Liaison report up on agenda (see 9.f), 2nd by Michelle Krupkin. Motion passed unanimously.
5. **Financial Report and Funding Motions**
   a. Report on current financial status
      Robin Doyno: Have approximately $2400 that didn't plan on.
      Bill Koontz: Funding moving from DONE to City Clerk. Account moving from Union Bank to Wells Fargo.
   b. **APPROVAL** of May Monthly Expense Report (MER)
      Motion to approve by Robin Doyno, 2nd by Melissa Stoller.
      Discussion:
      Melissa Stoller: The remaining balance ($6246.38) shown on Page 2 is our bank account balance as of the end of May. It includes prior fiscal year funds that we cannot spend.
      Valeriie Davidson: Have we reveived thank you's from schools? Bill Koontz: They might not have installed/used items yet.
      Motion carried unanimously.
   c. **FUNDING MOTION: Display Supplies** (Director's motion submitted by Melissa Stoller)
      MVCC approves the expenditure of up to $445 for the purchase of supplies to be used for creating display materials for the MVCC Outreach and Green Tents at the Mar Vista Farmers' Market as well as other events in which MVCC participates.

Qty	Item	Amount
3	HP564XL High Capacity Ink Cartridges (3 colors + photo black)	$275
1	HP564 XL High Capacity Ink Cartridges (3 Pack Black)	$90
3	Staples Photo Plus Paper, 8 1/2" x 11", Gloss, 50/Pack	$80

Motion to approve by Melissa Stoller, 2nd by .Mitchell Rishe.

Motion carried unanimously.

d. **FUNDING MOTION: Homeless Solutions Pamphlet** (director's motion submitted by ~~Homeless Solutions Committee~~ Robin Doyno)

MVCC approves the expenditure of up to $600 for printing of a Homeless Solutions Resource Guide.

Correction: Pamphlet was discussed and supported at committee meeting but, because funding motion was not agendized, it could not be voted on.

Motion to approve by Robin Doyno, 2nd by Bill Scheding. Motion carried: 10 ayes, 1 nays, 0 abstentions

Discussion:

Michael Millman: Wants to know if vetted by DONE and Homeless Committee. How will it be distributed? Why doesn't City pay for it, instead of us spending our precious money?

Bill Koontz: Motion was discussed (positive response) but not agendized as a motion.

Robin Doyno: LAPD and some Mar Vista residents would like to have it to distribute.

Melissa: Would rather see money spent on something that will benefit our community, rather then going to General Fund or to Congress of Neighborhood Councils. Front page should be changed to make MVCC more prominent; as it is currently formatted, it looks like an LAPD publication.

Motion carried: 10 ayes, 1 nay, 0 abstentions

e. **FUNDING MOTION: Fire Station 62/CD11 Improvement Fund**

MVCC allocates up to $2000 to the FS62/CD11 Improvement Fund as reimbursement for services such as inspections and drawings already rendered and paid for by CD11.

Motion to approve by Robin Doyno, 2nd by Bill Scheding.

Discussion:

Bill Koontz: CD11 has already spent a lot of money on this. Still trying to work out how/if we can do this. It's a way of banking money. Len Nguyen is working on it.

?: Is the soil polluted with oil, requiring a clean-up.

Tom Ponton: Who will own it? Bill Koontz: Still TBD, but everyone at the table agrees it should be a community center.

Bill Scheding: Highly irregular to have money go back to CD11. Don't think wecan pull off.

Valerie Davidson: Is this unusual? Bill Koontz: have done interdepartmental transfers before.

Motion carried: 10 ayes, 0 nays, 1 abstention (Bill Scheding)

f. **FUNDING MOTION:** Allocation of Unspent Funds

MVCC allocates any funds remaining in its 2015-16 Fiscal Year account, not to exceed $2000, to the 2016 Congress of Neighborhood Councils.

Motion to approve by Melissa Stoller, 2nd by Bill Scheding.

Discussion:

Standard – we do this every year. Wonderful event.

Michael Millman: This is the gang that can't shoot straight. If you want to see true incompetence, go to this. Would rather see money go to something in Mar Vista—neighborhood associations, etc.

Bill Koontz: Would rather spend the money in Mar Vista but that isn't on the agenda.

Melissa Stoller: Found it helpful as a new board member, made good contacts, got to interact with other NCs.

Sherri Akers: Was helpful for Green Committee to use it to share best practices, make contacts.

Motion carried: 8 ayes, 3 nays, 0 abstentions

6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org

Report delivered by Mike Bonin.

Speed Humps: Maker of motion. First step is to hire people to work on program. Two sets of speed bumps per Council District this year. Can put conditions on development, can have self-assessment to get more.

Millionaires tax: Mike lobbied in Sacramento. Biggest roadblock is Governor. Mayor has started study on putting fees on developers; hopes to have approved by March of next year. If County allocates money proportionately, everyone city has skin in the game.

b. Mar Vista Recreation Center – Tracie Field, Director tracie.field@lacity.org

Tom Ponton: Off and running on this year's festival (mid-October). Already have forms for booths & donations. Focus on animals this year: rescue groups and so forth. Not advertising this—don't want 100 dogs at the festival.

Mitchell Rishe: Who should Mar Vista Roller Hockey league contact to have tie-in event with Festival?

Tom Ponton: Would like to have tie-in event.

c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com

Paul thanks Mar Vista for inviting him to Festival; sorry that wasn't able to make it.

Budget approved last month. Speed bump program being discussed again, set number per council district. Also includes funding for new tree trimming crew. Graffiti abatement program getting more money. Cool Blocks pilot program: helps designate block captains for sustainability/environmental issues.

Lots of construction vehicles on Venice Blvd., obstructing bike lanes.

RE: homeless encampments under 405 (Venice & National). Will try to get cleaned up June 22.

Valerie Davidson: how high will speed bumps be? What material? Joseph: probably high, will be asphalt.

d. US 36 – Janice Hahn

e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov

Consider agendizing a resolution in support of Homeless Initiative by July meeting. 47,000 people in LA County are sleeping on street or vehicles—big increase. Polling shows initiative is likely to pass.

Would be funded by ½% personal income tax on people earning over $1million per year and go long way toward addressing issues. State Legislature must pass bill allowing the city to impose the tax in order to implement.

Sherri Akers: Homeless Solutions Forum on June 23 at Loyola Marymont. See http://eepurl.com/b4i8nv for more information.

Mitchell Rishe: People living in the park, lighting fires every night for warmth/cooking.

g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov

h. CA Assembly 47

i. CA Assembly 62

j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov

k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel TammDaniel.tamm@lacity.org

l. Joel Jacinto, Department of Public Works

7. **Installation of New Board/transfer of powers**

a. Swearing in of the New Board: Councilmember Mike Bonin

To old board: Thank you for the time you put in. Hope you stay engaged.

- Bill Koontz: amazing demeanor, that has shaped board
- Mitchell: thank you for all the time you put in on PLUM, even-handed and fair
- John: great job on website.
- Brad: phenomenal work on schools in North Westdale
- Yvette: Farmers' Market and Fall Festival
- Val: SM airport committee
- Bill Scheding: MVCC wouldn't exist if not for your hard work

- Michael Millman: Passionate advocate for Mar Vista

Presentation of certificates.

b. Election of New Board Officers: Bill Koontz

i. Chair

Nominations: Rob Kadota, nominated by Robin Doyno

Vote: 10 ayes, 0 nays, 0 abstentions.

ii. 1st Vice Chair

Nominations: Sarah Auerswald, nominated by Melissa Stoller

Vote: 10 ayes, 0 nays, 0 abstentions.

iii. 2nd Vice Chair

Nominations: Joseph Galloway, nominated by Rob Kadota

Vote: 10 ayes, 0 nays, 0 abstentions.

iv. Secretary

Nominations: Melissa Stoller, nominated by Rob Kadota

Vote: 10 ayes, 0 nays, 0 abstentions.

v. Treasurer

Nominations: Greg Tedesco nominated by Rob Kadota

Gret tentatively accepts (financial advisor, might have conflict of interest)

Vote: 9 ayes, 0 nays, 1 abstention (Greg Tedesco)

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); itemsmay be received and filed by consent if no discussion or public comment.
9. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair

      Secretary will contact for business card information.

      Will look at standing times for committee meetings, may need to change some of them. Will also look at appointments for liaisons.

   b. 1st Vice Chair
   c. 2nd Vice Chair
   d. Secretary

      Agendas must be posted and eblasted at least 72 hours before a meeting. BOD Agenda Process: Board and committee chairs receive an email request for agenda items the day after the ExFin meeting; agenda is closed the Friday before the BOD meeting.

   e. Treasurer
   f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

      Next meeting is July 20; agenda closes July 16.

      Bill Koontz: Would Linda Guagliano be point person for speed bumps if they are allowed again?
      Linda: doesn't know, not yet approved.

   g. DWP MOU Liaison: Myra Boime
   h. LANCC Liaison: Open (Bill Koontz reporting)
   i. DWP Recycled Water Liaison: Christopher McKinnonwww.ladwp.com/recycledwater

      Becoming part of One Water LA, which has a wider scope. Now would be a perfect time to replace Christopher as liaison. Resigning, can reappoint.

   j Fall Festival Liaison: Albert Olson
   k. City Budget: John Kuchta
   l. Recode LA: Sharon Commins
   m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/
   n. Animal Services Liaison: Steve Boskin
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Homeless Solutions Ad Hoc Committee** – Robin Doyno, Chair
b. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
   Report by Sherri Akers.
   Meeting June 21, focus on Outreach budget.
c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
   Report by Sherri Akers.
   Has a speaker program. Next meeting is Thursday, June 16; Molly Davies, Vice President of Wise and Healthy Aging, will speak on their Elder Abuse Prevention and Ombudsman Services.
d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
   Report by Melissa Stoller.
   Committee runs the Green Tent, does sustainability/environment outreach.
e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
   Relinquishment of Venice Blvd will occur soon.
f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
   Report by Michelle Krupkin.
   See Item 15, Future Agenda Items, for motions to be considered at the next Board of Directors meeting.
g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
   Report by Michael Millman.
   On Victoria & Grand View, high probability that property owner will try to do lot split into 3 lots. Michael will make sure we get mitigation. On agenda for next PLUM meeting on Tuesday, June 21.
h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
   Report by Robin Doyno.
   Meets 3rd Monday of every month. High priority item: more community involvement with utility boxes painting.
i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
   Report by Martin Rubin.
   Issue is at critical stage. Interests of Mar Vista need strong representation; we need to formulate strong position to represent our interests. Santa Monica would throw us under the bus in a heartbeat. Have committed to putting name in as Zone 2 Director.
   On Saturday, June 18, 11am-2pm, the City of Santa Monica will hold the first public planning workshop for the upcoming expansion of Airport Park. See http://airport2park.org/come-help-design-santa-monicas-newest-park-airport/ for more information.
j. **Safety and Security Committee** – Rob Kadota, Chair
k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
m. **Elections and By-laws**- Bill Koontz, chair
   Moratorium on changing by-laws is over. Perhaps should incorporate some of the Standing Rules.

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1
    b. Zone 2
    c. Zone 3
       Received complaint about sidewalks (and lack of sidewalk in some sections) on Palms between Grand View and Meier.
    d. Zone 4
       Big issue is lot on Victoria. Sidewalks in front of St. Bedes and along Centinela in poor condition.
    e. Zone 5
       Paving of oval proceeding very slowly. Art Walk went very well. Discussions about permit parking.

f. Zone 6

Issues: shots fired in one of the alleys, explosion of graffiti, lot splitting & larger houses.

Rob: Use 311 mobile app when reporting problems.

g. At-Large Directors

- Robin Doyno: Need to do outreach
- Rob: Would like to have gathering of board (agendized Brown Act meeting open to public) within 30-60 days, find out more about each other.

12. **Discussion Calendar**
13. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
14. **Grievances**, if any, received
15. **Future agenda items**

a. **POLICY MOTION: MVCC Call for Funding and Initiatives to Further Expedite Repairing our City Sidewalks Near Rail Transit Stations** (submitted by Transportation & Infrastructure Committee)

Whereas, our City Council has agreed to a thirty (30) year plan to replace and repair our City sidewalks, and

Whereas, both the Mar Vista Community Council and other Neighborhood Councils throughout the City find this thirty year plan to be entirely insufficient to meet the needs of Angelenos, and

Whereas, the poor and dangerous condition of our sidewalks particularly affects the health, wellbeing and transit access of City residents,

Therefore Mar Vista Community Council calls for a major budgetary reprioritization in our City Budget, as well as from any new tax/revenue-raising efforts, to establish a new goal of a two-year plan for all sidewalks on major thoroughfares (such as Centinela, Sepulveda, and Westwood Blvds.) within a 1/2 mile radius of all rail transit stations to better meet the true needs of Los Angeles City residents in a timely fashion.

b. **POLICY MOTION: Residents to Access Westwood/Rancho Park, Expo/Sepulveda, Expo/Bundy, and 26th/Bergamot Stations** (submitted by Transportation & Infrastructure Committee)

Whereas, bicycle paths and sharrows are either not approved, and/or not possible, on major thoroughfares to the Westside Expo Rail Line stations, and

Whereas, safe and effective bicycle routes to Westside Expo Rail Line stations are needed for easy and convenient access of Mar Vista and Westside Village residents to the Expo Line,

Therefore MVCC requests that the appropriate departments with the governments of the City 2 and County of Los Angeles promote the availability of maps, apps, and billboards to best publicize the most convenient and safe routes to Westside Expo Line stations

c. **POLICY MOTION: MVCC Call for a Handicap Sidewalk Ramp at the southwest corner of Palms Blvd/Sawtelle Blvd** (submitted by Transportation & Infrastructure Committee)

Whereas there is a need for a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds,

Therefore MVCC requests that the Department of Public Works expedite the planning, funding, and construction of a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds.

d. **POLICY MOTION: MVCC Call for Modern Bus Shelters at Intersections of National/Sawtelle, National/Sepulveda, National/Westwood, and Palms/Sepulveda** (submitted by Transportation & Infrastructure Committee)

Whereas, National/Sawtelle, National/Sepulveda, National/Westwood, and Palms/Sepulveda are key bus access points to north/south buses along Sepulveda Blvd. and Westwood Blvd., and

Whereas bus access and ridership are particularly critical to accessing the new Expo Light Rail Line at the Exposition/Sepulveda and Westwood/Rancho Park stations,

Therefore MVCC calls upon the City of Los Angeles, in cooperation with the MVCC, to plan, fund, and construct modern bus shelters, with benches, canopies, USB ports for phone charging, and signage/lighting to identify arrival of north/south buses at National/Sepulveda and Palms/Sepulveda.

e. **2016-17 Budget**
   Due in September.
f. **Appointment of Zone 2 Director**
   Rob will initiate process.
g. **Committee Assignments**
   Will address at next meeting. Need to do outreach about committee chairs.

16. **Public Comment**
    Debbie Rochlin: Amazing board!
    Bill Koontz: Boy Scout saying: "Leave nature better than the way you found it." Believes has left MVCC better than the way he found it.
17. **Adjournment**
    Meeting adjourned at 8:56: P.M.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, June 14th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of May 10th, 2016 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Financial Report and Funding Motions**
    a. Report on current financial status
    b. **APPROVAL** of May Monthly Expense Report (MER)
    c. **FUNDING MOTION: Display Supplies** (Director's motion submitted by Melissa Stoller)
    MVCC approves the expenditure of up to $445 for the purchase of supplies to be used for creating display materials for the MVCC Outreach and Green Tents at the Mar Vista Farmers' Market as well as other events in which MVCC participates.

Qty	Item	Amount
3	HP564XL High Capacity Ink Cartridges (3 colors + photo black)	$275
1	HP564 XL High Capacity Ink Cartridges (3 Pack Black)	$90
3	Staples Photo Plus Paper, 8 1/2" x 11", Gloss, 50/Pack	$80

    d. **FUNDING MOTION: Homeless Solutions Pamphlet** (submitted by Homeless Solutions Committee)
    MVCC approves the expenditure of up to $600 for printing of a Homeless Solutions Resource Guide.
    e. **FUNDING MOTION: Fire Station 62/CD11 Improvement Fund**
    MVCC allocates up to $2000 to the FS62/CD11 Improvement Fund as reimbursement for services such as inspections and drawings already rendered and paid for by CD11.
    f. **FUNDING MOTION:** Allocation of Unspent Funds
    MVCC allocates any funds remaining in its 2015-16 Fiscal Year account, not to exceed $2000, to the 2016 Congress of Neighborhood Councils.
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Tracie Field, Director tracie.field@lacity.org
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62

j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel TammDaniel.tamm@lacity.org
l. Joel Jacinto, Department of Public Works

7. **Installation of New Board/transfer of powers**
   a. Swearing in of the New Board: Councilmember Mike Bonin
   b. Election of New Board Officers: Bill Koontz
      i. Chair
      ii. 1st Vice Chair
      iii. 2nd Vice Chair
      iv. Secretary
      v. Treasurer
8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); itemsmay be received and filed by consent if no discussion or public comment.
9. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair
   b. 1st Vice Chair
   c. 2nd Vice Chair
   d. Secretary
   e. Treasurer
   f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
   g. DWP MOU Liaison: Myra Boime
   h. LANCC Liaison: Open (Bill Koontz reporting)
   i. DWP Recycled Water Liaison: Christopher McKinnonwww.ladwp.com/recycledwater
   j Fall Festival Liaison: Albert Olson
   k. City Budget: John Kuchta
   l. Recode LA: Sharon Commins
   m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/
   n. Animal Services Liaison: Steve Boskin
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Homeless Issues Ad Hoc Committee** – Robin Doyno, Chair
    b. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    j. **Safety and Security Committee** – Rob Kadota, Chair
    k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    m. **Elections and By-laws**- Bill Koontz, chair
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1
b. Zone 2
c. Zone 3
d. Zone 4
e. Zone 5
f. Zone 6

12. **Discussion Calendar**
13. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
14. **Grievances**, if any, received
15. **Future agenda items**
    a. **POLICY MOTION: MVCC Call for Funding and Initiatives to Further Expedite Repairing our City Sidewalks Near Rail Transit Stations** (submitted by Transportation & Infrastructure Committee)

    Whereas, our City Council has agreed to a thirty (30) year plan to replace and repair our City sidewalks, and

    Whereas, both the Mar Vista Community Council and other Neighborhood Councils throughout the City find this thirty year plan to be entirely insufficient to meet the needs of Angelenos, and

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    Whereas, bicycle paths and sharrows are either not approved, and/or not possible, on major thoroughfares to the Westside Expo Rail Line stations, and

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    Whereas there is a need for a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds,

    Therefore MVCC requests that the Department of Public Works expedite the planning, funding, and construction of a Handicap Sidewalk Ramp at the southwest corner of Palms and Sawtelle Blvds.

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    Whereas bus access and ridership are particularly critical to accessing the new Expo Light Rail Line at the Exposition/Sepulveda and Westwood/Rancho Park stations,

    Therefore MVCC calls upon the City of Los Angeles, in cooperation with the MVCC, to plan, fund, and construct modern bus shelters, with benches, canopies, USB ports for phone charging, and signage/lighting to identify arrival of north/south buses at National/Sepulveda and Palms/Sepulveda.

    e. **2016-17 Budget**
    f. **Appointment of Zone 2 Director**

g. **Committee Assignments**

16. **Public Comment**
17. **Adjournment**

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Addendum A: 2016 Stakeholder Survey Questions

1. What are you doing or do you plan to do for your senior years if your self-sufficiency is compromised? (check all that apply)
   - ☐ Continue to live alone where I live now
   - ☐ Continue to live alone with a private caregiver for assistance
   - ☐ Continue to live alone with assistance from a 'village'
   - ☐ Move in with family
   - ☐ Share my home with roommates
   - ☐ Rent a room in my home as a short term rental
   - ☐ Move into an assisted living complex
   - ☐ Move to an elevator building with access to local businesses
   - ☐ Relocate to somewhere with a lower cost of living
   - ☐ Other: _____

2 MVCC Aging in Place Committee feedback

What services for seniors should AIP focus on?

How can we make Mar Vista more senior friendly?

What services do you believe to be important to support aging in place?

The Aging in Place Committee has a monthly guest speaker. What topics you would like presented?

Are you interested in aging in place? Please give us your email address if you would like information from the committee.

3 Please tell us if you have visited these MVCC Green Committee venues and then give us your idea for new events! (Check all that apply)
   - ☐ MVCC Green Tent at the Mar Vista Farmers Market
   - ☐ Mar Vista Eco Car Expo
   - ☐ Mar Vista Wise Water Expo
   - ☐ Mar Vista Green Garden Showcase
   - ☐ Mar Vista Green Living Workshops with Sustainable Works
   - ☐ Event I would like you to host: _____

4. Which steps have you taken to address climate change? (Check all that apply)
   - ☐ Removed lawn and replaced with drought tolerant landscaping
   - ☐ Installed solar panels
   - ☐ Reduced dependence on gasoline auto by using
     - ☐ EV or Plug in Hybrid
     - ☐ Hybrid
     - ☐ Bike or walk more
     - ☐ Public transportation
     - ☐ Ride share aps
   - ☐ Use reusable bags, bottles and utensils
   - ☐ Buy only what is needed, loan or borrow items when possible
   - ☐ Other steps:

5 Los Angeles City and County transportation agencies spend:

- ☐ Too much spending on roads and not enough on bus/rail transit
- ☐ Too much spending on bus/rail transit and not enough on roads
- ☐ Just about right balance of spending on roads and bus/rail transit
- ☐ Too little spending on both roads and on bus/rail transit

6. We need new and/or more facilities for parking and for alternative transportation (bus, rail, bicycle):

- ☐ In a manner that favors more vehicular parking, but less for alternative transportation
- ☐ In a manner that favors more alternative transportation, but less for vehicular parking
- ☐ In a manner that favors both more vehicular parking and more alternative transportation
- ☐ This is not an important priority to me

7. How do you usually hear about MVCC meetings/events? (check all that apply)

- ☐ MVCC website
- ☐ MVCC email
- ☐ MVCC newsletter
- ☐ MVCC Facebook page
- ☐ Nextdoor
- ☐ Other social media: _____
- ☐ Word of mouth

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, May 10th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of April 12th, 2016 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Tracie Field, Director tracie.field@lacity.org
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel TammDaniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **MVCC Candidate Introductions** (max 1 min each)
7. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); itemsmay be received and filed by consent if no discussion or public comment.
    a. **ADMINISTRATIVE MOTION: Homeless Solutions Committee mission statement** (Director's motion submitted by Michael Millman)
    MVCC remands the Homeless Solutions Ad-Hoc Committee mission statement to the Committee for consideration and vote.
    b. **POLICY MOTION: Resolution In Support Of Mayor Garcetti's Sustainable City Plan Goal For Local Solar Power** (submitted by Green Committee)
    WHEREAS, Los Angeles receives more than 250 days of sunshine per year and has enough rooftop space to hold 5,500 MW of solar power; and
    WHEREAS, fossil fuel-burning power plants release toxic pollutants, including mercury, acid gases, and particulates, that damage the health of local residents, as well as greenhouse gases; and
    WHEREAS, A severe earthquake could cause LA to be without power for two weeks or more, making distributed energy generation and storage especially important; and

WHEREAS, solar job growth was up 38 percent statewide in 2015, providing 20,000 new jobs for Californians in 2015 alone; and

WHEREAS, SB 32, signed into law on October 11, 2009, requires LADWP to make a tariff available to eligible renewable electric generation facilities within its service territory, until LADWP meets its 75 MW share of the statewide target;

BE IT RESOLVED that the Mar Vista Community Council supports the pro-solar principles espoused in Mayor Garcetti's Sustainable City pLAn and urges the Mayor to stand behind and take whatever actions needed to support the goal of 1,500 MW of local solar PV by 2025 as a *baseline* target, with a strong effort to surpass this goal, in accordance with the current Sustainable City pLAn or any subsequent revisions.

c. **POLICY MOTION: 3629/3635 Grandview Blvd. (Susan Klos), case no. ZA-2016-1048** (submitted by PLUM Committee)

Project Description: Construction of an 18'x18' carport on the front portion of the property without the substantial attachment to the house.

MVCC approves the application as submitted.

d. **POLICY MOTION: 12249 Venice Blvd. (The Mar Vista), case no. ZA-2016-1004-CUB**

Project Description: Conditional use permit to allow the sale and dispensing of a full line of alcoholic beverages for on site consumption. A conditional use to allow hours of operation 7am – 1am.

MVCC approves the application as submitted.

e. **POLICY MOTION: Call For LADWP Governance and Bylaws to Include Neighborhood Council Representation** (submitted by T&I Committee)

The Mar Vista Community Council supports the requirement of at least one (or more) Neighborhood Council Representative(s) elected by duly-authorized Neighborhood Councils of the City of Los Angeles to ensure Neighborhood Council representation in LADWP in both its revised Bylaws and Governance

f. **POLICY MOTION: Recommendations for future MetroRail projects to enhance Westside/regional/countywide mobility** (submitted by T&I Committee)

The Mar Vista Community Council supports the following two large rail projects for inclusion in the Metro Long Range Transportation Plan:

a) Metro Rail line from West LA / LAX to Valley, and
b) Direct Metro Rail (or Metrolink) line from LAX to Union Station via the Harbor Subdivision Rail Right of Way.

g. **POLICY MOTION: Request for CD11 "Alley Update"** (submitted by T&I Committee)

The Mar Vista Community Council requests the CD11 office provide an Itemization and Recommendations for Repairs, Paving, Major Reconstructions and Enhancements of MVCC Alleys that serve our Commercial Corridors on Venice, Centinela, National and any other major Boulevards within the MVCC boundaries.

h. **POLICY MOTION: Funding and Initiatives to Further Expedite Repair of our City Sidewalks** (submitted by T&I Committee)

Whereas, our City Council has agreed to a thirty (30) year plan to replace and repair our City sidewalks, and

Whereas, both the Mar Vista Community Council and other Neighborhood Councils throughout the City find this thirty year plan to be entirely insufficient to meet the needs of Angelenos, and

Whereas, the poor and dangerous condition of our sidewalks affects the health, wellbeing and legal conditions of City residents,

Therefore, the Mar Vista Community Council calls for a major budgetary reprioritization in our City Budget, as well as from any new tax/revenue-raising efforts, to establish a new goal of 7- 10 years to better meet the true needs of City residents in a timely fashion.

8. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)

a. Chair-Bill Koontz

i. Resignation of Bill Scheding as MVCC Treasurer
ii. **ELECTION** of new Treasurer
iii. **ADMINISTRATIVE MOTION: Stakeholder Survey**

MVCC approves the 2016 Stakeholder Survey (Addendum A).

b. First Vice Chair – Mitchell Rishe
c. Second Vice Chair – John Kuchta
d. Secretary –Melissa Stoller
e. Treasurer-TBD: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports areavailable online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
    i. Report on current financial status
    ii. **APPROVAL** of March Monthly Expense Report (MER)
    iii. **APPROVAL** of April Monthly Expense Report (MER)
    iv. **FUNDING MOTION: Budget Reconciliation** (Directors motion by John Kutcha)

    MVCC approves the following changes to better reconcile the budget with to-date and pending expenses:

Budget Category	Current Budget	Adjustment	New Budget
Operations	$11,000	-$6,000	$5,000
Outreach	$15,500	+$4,000	$19,500
NPG	$5,000	+$7,900	$12,900
Elections	$10,500	-$5,900	$4,600
Total	$42,000	$0	$42,000

    v. **FUNDING MOTION:** MVNA Block Party (submitted by Community Outreach Committee)

    MVCC allocates up to $500 for MVNA Block Party contingent on the availability of funds.

    vi **FUNDING MOTION: Mar Vista Art Walk** (director's motion submitted by Melissa Stoller)

    Whereas a goal of Mar Vista's Great Street project is to enhance its reputation as a walkable, attractive destination; and

    Whereas art walks attract local foot traffic and increase economic viability of communities; and

    Whereas during the inaugural Mar Vista Art Walk, held December 3, 2015 some local businesses reported more than double their normal sales and even their best sales night ever; and

    Whereas approximately 1,000 visitors walked along Venice Boulevard and participated in the evening's program of events; and

    Whereas many art walk events transpired outdoors on sidewalks, thus encouraging the majority of visitors to walk the entire length of our Venice Boulevard Great Street due to this organizational emphasis on sidewalk engagement;

    The Mar Vista Community Council approves a Neighborhood Purpose Grant of $500 for printing of fliers, posters, maps, programs, handouts for a second Mar Vista ark walk—Steppin' Into the Art of Mar Vista, to be organized and run by non-profit Green Communications Initiative, Inc., and held June 2, 2016, 6-9p.m. along the Venice Blvd CD- 11 "Great Street" between Inglewood Blvd and Beethoven Street.
f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnonwww.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/

n. Animal Services Liaison: Steve Boskin

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Homeless Issues Ad Hoc Committee** – Robin Doyno, Chair
    b. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    j. **Safety and Security Committee** – Rob Kadota, Chair
    k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    m. **Elections and By-laws**- Bill Koontz, chair
        - Candidate Forum
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Addendum A: 2016 Stakeholder Survey Questions

1. What are you doing or do you plan to do for your senior years if your self-sufficiency is compromised? (check all that apply)
   - ☐ Continue to live alone where I live now
   - ☐ Continue to live alone with a private caregiver for assistance
   - ☐ Continue to live alone with assistance from a 'village'
   - ☐ Move in with family
   - ☐ Share my home with roommates
   - ☐ Rent a room in my home as a short term rental
   - ☐ Move into an assisted living complex
   - ☐ Move to an elevator building with access to local businesses
   - ☐ Relocate to somewhere with a lower cost of living
   - ☐ Other: _____

2 MVCC Aging in Place Committee feedback

What services for seniors should AIP focus on?

How can we make Mar Vista more senior friendly?

What services do you believe to be important to support aging in place?

The Aging in Place Committee has a monthly guest speaker. What topics you would like presented?

Are you interested in aging in place? Please give us your email address if you would like information from the committee.

3 Please tell us if you have visited these MVCC Green Committee venues and then give us your idea for new events! (Check all that apply)
   - ☐ MVCC Green Tent at the Mar Vista Farmers Market
   - ☐ Mar Vista Eco Car Expo
   - ☐ Mar Vista Wise Water Expo
   - ☐ Mar Vista Green Garden Showcase
   - ☐ Mar Vista Green Living Workshops with Sustainable Works
   - ☐ Event I would like you to host: _____

4. Which steps have you taken to address climate change? (Check all that apply)
   - ☐ Removed lawn and replaced with drought tolerant landscaping
   - ☐ Installed solar panels
   - ☐ Reduced dependence on gasoline auto by using
     - ☐ EV or Plug in Hybrid
     - ☐ Hybrid
     - ☐ Bike or walk more
     - ☐ Public transportation
     - ☐ Ride share aps
   - ☐ Use reusable bags, bottles and utensils
   - ☐ Buy only what is needed, loan or borrow items when possible
   - ☐ Other steps:

5 Los Angeles City and County transportation agencies spend:

- ☐ Too much spending on roads and not enough on bus/rail transit
- ☐ Too much spending on bus/rail transit and not enough on roads
- ☐ Just about right balance of spending on roads and bus/rail transit
- ☐ Too little spending on both roads and on bus/rail transit

6. We need new and/or more facilities for parking and for alternative transportation (bus, rail, bicycle):

- ☐ In a manner that favors more vehicular parking, but less for alternative transportation
- ☐ In a manner that favors more alternative transportation, but less for vehicular parking
- ☐ In a manner that favors both more vehicular parking and more alternative transportation
- ☐ This is not an important priority to me

7. How do you usually hear about MVCC meetings/events? (check all that apply)

- ☐ MVCC website
- ☐ MVCC email
- ☐ MVCC newsletter
- ☐ MVCC Facebook page
- ☐ Nextdoor
- ☐ Other social media: _____
- ☐ Word of mouth

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday May 9th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:01. P.M.

   Quorum present: Rob Kadota, Susan Klos, Robin Doyno, Sarah Auerswald, Holly Tilson, Greg Tedesco, Sherri Akers, Melissa Stoller, Michelle Krupkin, Ken Alpern, Damien Newton, Paola Cervantes

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Approval of April 11th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.

   Motion to approve by Melissa Stoller, 2nd by Sarah Auerswald. Motion carried: 8 ayes, 0 nays, 0 abstentions, 3 absent (Ken Alpern, Michelle Krupkin, Damien Newton)

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Sheila Ginsberg: Concerned about bikes on Venice Blvd. – not following rules, not stopping at corners. Went to Police, they're concerned also. On Palms, two lanes merge into one and middle not used; dangerous.

   Robin Doyno: Has brought school board race lawn signs.

   Ileana Whachtel: Post Measure S, group is forming organization to keep city hall transparenent. City said it's forming task force around transit, but is only holding one public meeting. Want to let community know what they say they're going to do and what they do.

5. **Community Memorial Observations**

   Hope that businesses on Centinela recover soon from fire.

6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org

   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Work on Venice Great Streets. Timeline: continuing to do outreach along corridor and 1 block north and Ssouth. Work (mid-block crossings & protected bike lanes) should be complete by end of May.

      Bike with Mike Saturday May 20. Starts at Westchester Municipal Building.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep not assigned.

   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams brian@trustedmessengermarketing.com.

      Brian Ross Edwards is newly assigned rep. Doing Crenshaw Health Fest in June. Also recognizing 40 emerging civic leaders under 40.

   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

Will be coming to every meeting.

7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

      Next meeting is May 17; Agenda closes May 10. Next meeting after that is July 19.

   b. DWP MOU: Chuck Ray

      Meeting is 1st Saturday of every month.

      January meeting. Community Solar Plan: program addresses problem of people who want solar but can't afford it. DWP would install and rent use of. Funded with $20,000. Will cost DWP 50-75 cents per kilowatt hour.

      February meeting. DWP presentation about how they set rates. Thanks to Rate Payer Advocate Dr. Pickle, they now have logical way of setting rates based on cost. More rational than has been in last few decades but rates will still go up.

      March meeting. EV charger program: Goal is 145000 electric vehicles on road in next 5 years. City would own 1600. Public use charger goal is 10,000 available in 5 years.

   c. LANCC: Joseph Galloway

   d. One Water LA: Christopher McKinnon

      Meeting May 11, discussing mostly sanitation. End of May meeting will go over list of projects (DWP & Sanitation). Next big problem: how to fund the projects.

   e. WRAC: Rob Kadota/Joseph Galloway

   f. WRAC LUPC: Sharon Commins

   g. City Budget Advocates: Holly Tilson, Joseph Galloway

   h. Recode LA: Sharon Commins

   i. Animal Services: Tom Ponton

   j Fall Festival: Albert Olson

      Meets next week.

   k Friends of Historic FS 62: Albert Olson

      Roy Persinko reported. Have submitted numbers (about $800,000), ball is rolling. May go to vote in a little while. Was some vandalism – thowing paint on walls, other stupid stuff. Windows are now boarded up. Got pictures of some boys who were checking it out, trying to ID them.

   l. Mar Vista Celebrates 90: Open

   m. Mar Vista Chamber of Commerce: Sarah Auerswald

      Meets 3rd Thursday of month at Coffee Connection. Partnered with Venice Chamber for Merchants of Venice.

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota

      Term will end in June. Elections of officers at June meeting; opportunity to do reset.

      Has laminated signs to use at Windward to direct people to the conference room – can borrow.

   b. First Vice Chair – Sarah Auerswald

      Let her know if you want a marvista.com email address.

   c. Second Vice Chair – Joseph Galloway

   d. Secretary – Melissa Stoller

      Remember to send information for the Mar Vista news eblast that goes out each Friday.

      Will not be at the June meeting. Would be happy to answer questions about job of Secretary if anyone is interested.

   e. Treasurer – Holly Tilson

      i. Report on current financial status

1. February bank statement
2. Pending/approved expenditures and anticipated budget surpluses
3. Funding deadlines:
    - June 1, 2017 - Last day to submit a Funding Request Form (FRF) to Funding Program
    - June 7, 2017 - Last day to issue a Union Bank Account online check payment
    - June 11, 2017 - Last day to use the NC Bank Card

Trying to quickly spend all our money. A lot of pending expenses aren't going to happen or aren't going to use all the funding allocated.

ii. **APPROVAL** of April Monthly Expense Report (MER)

Motion to approve by Sarah Auerswald, 2nd by Michelle Krupkin. Motion carried unanimously.

9. Committee Reports: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

Submitted by-laws proposals before the May deadline. City Clerk is taking over of elections; need to change date so doesn't conflict with other elections.

b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

Mar Vista meeting – both Council members will have tables.

c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

Elliot has developed speaker series.

d. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Meeting May 10 will discuss the installation of the CD11 Pilot Program for Great Street Venice Blvd. including the mid block crossings, the protected bike lane and other projects.

e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Meets 3rd Thursday. May 18 speaker topic is "Cannabis for Medical Use," focused on seniors. Rob Kadota: Working on live streaming, looking on MyFi.

f. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Meets 3rd Wednesday. Next meeting: Strategy, implementing what community needs.

g. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Next meeting May 24: 2 housing projects in Zone 6. Will also discuss possible motion RE: ADUs (won't vote until July).

i. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Meets 4th Thursday. In discussion about bus shelters with LED lights, making Mar Vista pilot project.

j. **Bicycle Committee** - Mitchell Rishe, Chair

Farmers' Market hired Phil Fox to run repair stand: no parts tune-up. Walk or bike to school day is May 10. Bike to work day, May 18; Bikeowave running repair stand.

At Farmers' Market this Sunday, talking about safe cycling.

k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Collaborating with South Robertson for their Eco Car Expo – put in contact with cars we have.

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Marshall Wong – presentation on hate crimes.

Need volunteers for Art Walk. Lenore is tabling at Meetup Mar Vista.

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Meets 4th Saturday, 6-7 P.M.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

EXPO line crossing delays. Linda Guagliano: will bring up at Traffic Committee meeting.

b. Zone 2 – Damien Newton

NWNA is having Adrian Acosta & presentation on RING doorbell.

Repaving streets, negative feedback – seems to be in areas that get cut thru traffic, would like beatup streets to slow down traffic.

Charter school taking up part of Webster Middle School next year.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

MVNA block party is June 25.

e. Zone 5 – Michelle Krupkin

Took street services 2 weeks to pick up palm fronds that were blocking an ADA site.

Marcasel petition – attempting to close street at Washington Place.

f. Zone 6 – Holly Tilson

Fire in 3500 block commercial buildings;

Brouhaha: too tall buildings with inadequate parking; Venice HS modernization.

11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 12.a-u on consent.

Removal of items from consent calendar:

11.a by Melissa Stoller

11.j by Sarah Auerswald

11.k by Ken Alpern

11.n by Sarah Auerswald

11.o by Damien Newton

11.s by Ken Alpern

11.u by Holly Tilson

Motion to approve Items 11.b-i, 11.l-m, 11.p-r, and 11.t on consent by Greg Tedesco, 2nd by Sarah Auerswald. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION:** MVCC Election Timing Resolution (submitted by Election and By-laws Committee)

As the Los Angeles City Clerk's Office assumes control of elections for neighborhood councils and needs to adjust the timing of elections so they don't conflict with other elections, The Mar Vista Community Council supports proposed option 2 which extends the term of current board members by one year and conduct elections in 2019 thereby establishing a once every two year schedule. (2019, 2021, 2023...).

The options not supported include: Option 1) Conduct 2018 NC elections as scheduled; Option 3) Conduct 2018 Neighborhood Council elections as scheduled and then conduct elections again in 2019 with all board members up for election at which time the entire board would be up and would have to re-stagger with 2 and 4 year terms; Option 4) OTHER

Motion to approve by Sarah Auerswald, 2nd by Holly. Tilson

Public comment:

Jasmine Elbarbary: will be blanket decision, not separate decisions for different NCs.

Discussion:

Damien Newton: Doesn't believe in elected officials extending their terms.

Rob Kadota: Idea behind motion was to have less turmoil.

Robin Doyno: Supports spirit of Damien's comment, but this is for efficiency.

Sherri Akers: Financially, responsible thing to do is extend term. Need to be realistic: not everyone will be willing to extend their term.

Melissa: People ran for a two year term, not a three year term. Instead of extending term of current board to 2019, supports having election in 2018 for a three year term.

Greg Tedesco: Doesn't like to vote to extend term.

Michelle Krupkin: Echos Greg.

Ken Alpern: Would rather have extended term imposed on him than vote for it.

Motion carried: 7 ayes, 3 nays, 1 abstention (Greg Tedesco).

b. **FUNDING MOTION:** Parking Permit Replacement Fee (Director's motion submitted by Rob Kadota)

MVCC approves the payment of a $40 replacement fee for a lost City Hall parking permit.

Motion carried on consent.

c. **FUNDING MOTION:** CERT Training (submitted by Executive and Finance Committee)

MVCC approves the allocation of $1500 previously approved for securing a venue for CERT training to include refreshments and supplies as well.

Motion carried on consent.

d. **FUNDING MOTION:** MVNA Block Party (submitted by Executive and Finance Committee)

MVCC approves the reimbursement of $300 of Mar Vista Neighborhood Association's block party expenses.

Motion carried on consent.

e. **FUNDING MOTION:** T&I Committee March Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $25 to Coffee Connection for the Transportation and Infrastructure Committee's March meeting.

Motion carried on consent.

f. **FUNDING MOTION:** T&I Committee May-June Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $75 to Coffee Connection for the Transportation and Infrastructure Committee's April, May and June meetings.

Motion carried on consent.

g. **FUNDING MOTION:** ExFin/Elections and By-laws Committee April-June Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $75 to Coffee Connection for the Executive and Finance and Elections and By-laws Committees' April, May and June meetings.

Motion carried on consent.

h. **FUNDING MOTION:** Farmers' Market Storage (Directors motion submitted by Sarah Auerswald)

MVCC approves the payment of $1000 for the annual storage fee for the Blue & Green Tents at the Mar Vista Farmers' Market.

Motion carried on consent.

i. **FUNDING MOTION:** Website Data Entry (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $1500 to The Web Corner for website data entry.

Motion carried on consent.

j. **FUNDING MOTION:** MVCC Promotional Outreach Materials (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $~~2500~~*2000* for promotional outreach materials.

Motion to approve by Sarah Auerswald, 2nd by Melissa Stoller.

Friendly amendment by Sarah Auerswald changing amount to $2000 accepted.

Motion as amended carried unanimously.

k. **FUNDING MOTION:** Mar Vista Turns 90 Promotional Materials (submitted by Executive and Finance Committee)

MVCC approves the allocation of up to $~~2500~~*2000* to Mar Vista Landkeepers for creation of a keepsake and a community directory in celebration and honor of Mar Vista Turns 90.

Motion to approve by Melissa Stoller, 2nd by Damien Newton.

Friendly amendment by Sarah Auerswald changing amount to $2000 accepted.

Public Comment

> Christopher McKinnon: $4,100 left over from Mar Vista turns 80. No consensus on spending the money. Opposes motion until the $4100 is spent.

Motion as amended carried: 10 ayes, 0 nays, 1 abstentions (Greg Tedesco).

l. **FUNDING MOTION:** Safe Cycling/Vision Zero Outreach Materials (submitted by Bike Mar Vista Committee)

Purchase of safe cycling/vision zero outreach materials not to exceed $1500 for items like flat tire patch kits, reflective pant leg straps, front and rear cycling lights, safe cycling bandana, reflective bike mar vista sharing the road stickers.

Motion carried on consent.

m. **FUNDING MOTION:** Neighborhood Congress (submitted by Executive and Finance Committee)

MVCC approves the allocation of up to $2000 to support the 2017 Congress of Neighborhoods.

Motion carried on consent.

n. **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

Motion tabled.

o. **POLICY MOTION**: 3246 Barrington Small Lot Subdivision (submitted by Planning and Land Use Management Committee)

Whereas a small lot subdivision is proposed for 3246 Barrington Ave; and

Whereas the proposed subdivision has 5 units and the Mar Vista Community Council has supported four units per lot along the same corridor; and

Whereas the current proposal has only one parking space for guests and two per unit, for eleven spaces total;

The Mar Vista Community Council opposes the small lot subdivision as it is currently proposed because we believe the project has too many units and that there is not sufficient parking for guests.

Motion to approve by Damien Newton, 2nd by Sarah Auerswald.

Developer: Christine Lan?

Presented at PLUM, also talked to neighbors. Project goal: from street, maintain same view as single family homes in neighborhood.

2 car garages, 1 guest parking spot.

Concern expressed by neighbor behind about roof deck. Moved roof deck further from edge and put up higher solid wall.

5 unit small lot subdivision; could get 11 apartment units on site.

Public comment:

Have you considered adding more guest parking? Ans: Not able to find way to do.

David Altemus: Lives on Barry Ave. Favors project. Concerned about parking. Wouldn't want to buy something with one guest parking spot for 5 homes. Alley is in very poor condition. Students passing from east must cross alley; alley has S turn, is blind. Developer: will repave full width of alley behind the property (only required to do half).

Where does garbage go? Ans: Individual behind homes.

Traffic on Barrington is already relentless. We approved 4 units, 5 sets new precedent. Need more parking.

Board Discussion:

Melissa: Complements developer on the design and the way it blends in; hopes it will inspire other developers. Wishes could support this development but can't. Issues are parking and number of units.

Ken Alpern: Thank you for neighborhood preservation. What income range do you plan to promote? Ans: Market rate. Ken: If only 4 units can sell each for more (more sq. ft.).

Michelle Krupkin: echos Ken's concerns about parking, school accessibility.

Greg Tedesco: Thank you for keeping height down. Whether 4 units or 5, people will have to park in garage or take a long walk.

Holly Tilson: Thanks developer for speaking with neighbors. Why not put in green screening in back? Ans: not a lot of room.

Sherri Akers: Struggles with this development. Appreciates concessions. Worries about too much of community converting to Small Lot Subdivisions; they're not well suited to seniors or families with small children. Need to become better at using our garages for parking.

Motion carried: 6 ayes, 4 nays, 1 abstention (Damien Newton). See Attachment A: Minority Report.

p. **POLICY MOTION**: Alley in 3200 block of Barrington Ave. (submitted by Planning and Land Use Management Committee)

Whereas there are multiple small lot subdivisions proposed for the 3200 block of Barrington avenue on the east side; and

Whereas access to these units will be from the alley that runs behind the properties; and

Whereas currently the alley is unevenly paved with several large potholes; and

Whereas the developers for these projects are committing to improving portions of the alley but there is no plan to fix the entire length; and

Whereas the entrance to the alley on the south end is regularly used by students and families walking to and from Mar Vista Elementary; and

Whereas there is no plan to calm traffic through design or signage for the alley;

The Mar Vista Community Council asks the City of Los Angeles to prepare a comprehensive plan for the alley to improve the experience for people using the alley to get to/from their residences and creates a safe environment for people crossing the alley entrance on foot, bike, or car.

Motion carried on consent.

q. **POLICY MOTION**: Planning Bulletins (submitted by WRAC via Planning and Land Use Management Committee)

The Mar Vista Community Council requests that City Council Districts 5 and 11 prepare regular email planning bulletins that compile current land use issues, including citywide policy issues, current hearing dates, and details about Westside developments being considered by the City

Motion carried on consent.

r. **POLICY MOTION:** Cell Towers (submitted by Transportation and Infrastructure Committee)

Whereas T-Mobile proposing to install 1) above ground facility at each of the following two locations: 1) West o9. **Election of New Board Officers** – Rob Kadota – move to end of new business

a. Chair

b. 1st Vice Chair

c. 2nd Vice Chair

d. Secretary

e. Treasurer

f S. Grand View Blvd, North of Dewey Street and 2) 1220 Palms Blvd. (South of Palms West of Grand View Blvd.), and

Whereas the proposed above ground facilities will consist of (1) 48" tall x 12" wide x 9.5" deep power meter pedestal to be located in the public right of way, not on private property, and

Whereas T-Mobile has statewide franchise rights under California Public Utilities Code Sections 7901 and 7901.1, which allow placement of equipment in the public right-of-way by a utility company,

Therefore, the MVCC supports the installation of the above mentioned above ground facilities provided it fits the character of the adjacent neighborhoods.

Motion carried on consent.

s. **POLICY MOTION:** Preservation of the LAX-Union Station Rail Right of Way for Passenger Rail (submitted by Transportation and Infrastructure Committee)

WHEREAS, the MVCC supports a countywide approach to rail, bicycle, and pedestrian transportation networks, and

WHEREAS, the MVCC supports preservation and optimized land use of rail right of ways for long-term rail projects (such as that which allowed the Expo, Green, and Crenshaw/LAX light rail lines to expand Metro Rail to the Westside, Mid-City, and South Bay regions of Los Angeles County), and

WHEREAS, the Harbor Subdivision Rail Right of Way connects LAX to the Crenshaw/LAX Light Rail Line, the Blue Line, the Gold Line, and Union Station, and

WHEREAS, the regions of South Los Angeles, Southeast Downtown Los Angeles (including the Arts District), and the Eastside have insufficient to no direct rail connectivity with each other and both Union Station and LAX, and

WHEREAS, a rail line connecting LAX directly to Union Station with a one-seat trip has fundamental and vital importance to the economic well-being of Los Angeles, and could serve as a Second Downtown Light Rail Connector with relevant benefits to the entirety of Los Angeles County, and

WHEREAS, the Expo Line has already shown that a rail right of way could both establish a light rail line and an adjacent bikeway to serve multimodal commuting needs,

THEREFORE, the MVCC strongly opposes ANY Rail to River Corridor Project that precludes a light rail line, and

THEREFORE, the MVCC strongly supports the "Expo Line Model" of BOTH a light rail line and accompanying Bikeway to connect Inglewood to the Los Angeles River, and

THEREFORE, the MVCC strongly supports any purchase of land by Metro to allow for a widened right of way to enable such a combined light rail and bikeway project, and

THEREFORE, the MVCC strongly supports a Major Investment Study by Metro to create a direct LAX to Union Station light rail project that is not prevented by the current Rail to River walk/bikeway project.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Motion carried: 10 ayes, 0 nays, 1 abstention (Damien Newton).

t. **POLICY MOTION:** Support for Landside Access Modernization (LAMP) Program (submitted by Airport Committee – pending committee approval)

WHEREAS, Los Angeles International Airport (LAX) is the second busiest airport in the United States and the largest in California; and

WHEREAS, our community depends on LAX for the trade, travel and tourism that it brings to our area and the larger Southern California region; and

WHEREAS, since the start of the economic recovery in 2009, air service demand at LAX has increased from 56 million annual passengers to 80 million annual passengers in 2016, and Los Angeles is seeking to host the 2024 Olympics; and

WHEREAS due to the increase in air services, LAX is experiencing heavy traffic congestion in and around the airport; and

WHEREAS, on regular days up to 95,000 vehicles enter Los Angeles International Airport's Central Terminal Area increasing to 120,000 during the peak Thanksgiving Holiday period; and

WHEREAS, almost half of the vehicles are buses, shuttles and vans from rental car companies, hotels and shared-ride companies along with taxis who are also competing for the limited space on the streets and curbs in the CTA; and

WHEREAS, 23 different rental car lots scattered around the airport area add to this problem; and WHEREAS, to resolve this problem Los Angeles is proposing to spend $5.5 billion on the Landside Access Modernization Program, or "LAMP," and

WHEREAS, LAMP will consist of 6-million square foot Consolidated Rental Car Facility (CONRAC), two 3-million square foot Intermodal Transportation Facilities (IFTs) or transit hubs, a 2 . mile Automated People Mover (APM) connecting the CONRAC, ITFS and a new light rail station to the airport, and related roadway improvements and property development; and

WHEREAS, LAMP will relieve traffic congestion within the Central Terminal Area (CTA) and the surrounding street network, improve the LAX passenger experience and keep LAX as the international gateway for the West Coast;

NOW THEREFORE BE IT RESOLVED, that the MVCC Airport Committee and the MVCC Planning and Land Use Management Committee jointly recommend that the MVCC send a letter of support for the Landside Access Modernization Program at Los Angeles International Airport as presented to us be sent to the operator of the airport, Los Angeles World Airports with the addition of the four following recommendations:

1. Improve automated people mover service convenience to drop people closer to check in and gates;
2. Implement traffic mitigations promptly, including improved flyaway service and employee bus services for the LAX 50,000 employees;
3. Support regional network of airport solutions to make travel at other airports desirable for those living and working far from LAX in other parts of the Southern CA region
4. Arrange for increased police and fire support for the area as more people are concentrated in and around LAX.

Motion carried on consent.

u. **POLICY MOTION:** Santa Monica Airport Runway Shortening Options (submitted by Airport Committee – pending committee approval)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, as immediate neighbors of the Santa Monica Airport, Mar Vista residents are impacted daily by the nuisances and serious health hazards created by the airport: air pollution; noise pollution; safety risks, among others. For this reason, years ago the Mar Vista

Community Council ('MVCC") formed a committee to address the concerns of its residents and to monitor activities at and about the airport;

WHEREAS, Los Angeles City Council District 11 borders Santa Monica Airport (SMO) to the south and to the east, including an almost sixteen acre portion of the east end of SMO within the City of Los Angeles CD 11;and

WHEREAS, the CD 11 neighborhoods of Mar Vista, Venice, and other West Los Angeles neighborhoods, as well as Council District 5 (CD 5) neighborhoods of Rancho Park, Cheviot Hills, and other West Los Angeles neighborhoods within CD5 are all uniquely impacted by nuisances, and serious safety/public health concerns created by SMO operations;

WHEREAS, the City of Santa Monica is now considering various design concepts to shorten the runway to 3,500 feet of operational length from the current 4,937 feet.

WHEREAS, several peer reviewed scientific monitoring air quality studies (*Aircraft Emission Impacts in a Neighborhood Adjacent to a General Aviation Airport in Southern California* September, 2009; *Neighborhood-scale air quality impacts of emissions from motor vehicles and aircraft*, July, 2013; *A Supplemental Monitoring Campaign at the Santa Monica Airport, April, 2011*) have all measured highly elevated air pollutant levels in MVCC's Zone 2 created by Santa Monica Airport's aircraft operations;

WHEREAS, the studies all give cause for concern for the public health of the downwind of SMO residents;

BE IT RESOLVED THAT the MVCC requests and supports efforts by the Los Angeles City Council to require SMO's eastern end of the runway be shortened by at least 1,000 feet to help offset years of exposure to toxic air emissions from aircraft idle and blast.

BE IT FURTHER RESOLVED THAT the MVCC requests the Los Angeles City Council to request that the FAA alter SMO's and LAX's conflicted flight paths to eliminate unnecessary idle/hold times by aircraft at both SMO and LAX.

BE IT FURTHER RESOLVED THAT the MVCC notify Councilmember Mike Bonin and Councilmember Paul Koretz of the urgency and timeliness to lead a strong effort along with the City of Los Angeles Mayor and the Los Angeles City Attorney on behalf of Los Angeles District 11 and District 5 constituents in order to assure that SMO impacts are *not* unjustly burdensome to the City of Los Angeles.

Motion to approve by Holly Tilson, 2nd by Sarah Auerswald. Friendly amendment accepted.

Public Comment

Typo: add “not” to last sentence.

Motion carried unanimously.

12. **Grievances**, if any received
13. **Future agenda items**
14. **Public Comment**

    Rob Kadota: please consider volunteering for Art Walk

    Jasmine Elbarbary: Does Bike Mar Vista teach adults who never rode a bike how to ride? Rob: not now, but yes in future.

15. **Adjournment**

    Meeting adjourned at 8:58 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a “Speaker Card” to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board’s jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ATTACHMENT A: Minority Report - Small Lot Subdivision 3246 Barrington Ave (Agenda Item 11.o)

The minority Board members that opposed this motion and voted to support the Small Lot Subdivision at 3246 Barrington would like to recognize the great care that was taken by the developer to design this project to remain in character with the surrounding community. This design is compatible with other single-family homes when viewed from the street. The landscape is aesthetically pleasing and drought resistant. We appreciate that they did not build to the full amount that is allowable. The height is much lower than the maximum allowed. We also appreciate their efforts to mitigate the concerns of nearby neighbors and gathering data directly from them by canvassing. After meeting with a concerned neighbor, the developer took steps to preserve the privacy of adjacent property owners.

New developments face the same challenges as existing single family homes. It is unusual for existing single-family homes to have parking for more than two cars and they rarely have guest parking on the property. We feel a concern that we are holding new buildings to a higher standard than we currently maintain as homeowners. We hope that the limited guest parking access would encourage more sustainable transportation.

We feel that this project is preferential to the community when compared to the multi-unit residential that would be allowed to be built on the property. Objections to reasonable projects could have the unintended consequence of discouraging Small Lot developments and we could be faced with multi-unit projects in their place.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, April 12th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of March 8th, 2015 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel TammDaniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.
    a. **ADMINISTRATIVE MOTION: EACC Co-chair**
    MVCC approves the appointment of Elias Segali as co-chair of the Education, Arts and Culture Committee, replacing co-chair Brad Wilhite.
    b. **ADMINISTRATIVE MOTION: Ad-hoc Homeless Issues Committee name change**
    MVCC approves changing the name of the ad-hoc Homeless Issues Committee to ad-hoc Homeless Solutions Committee.
    c. **ADMINISTRATIVE MOTION: Ad-hoc Homeless Solutions Committee mission**
    MVCC approves the following mission statement for the Ad-Hoc Homeless Solutions Committee:
    The Mar Vista Community Council's Homeless Solutions Committee seeks to protect the community from the impacts of homelessness by working with homeless individuals who wish to receive social services; which will hopefully lead to permanent housing and a future for them off the streets.

ASAP

We will advocate, educate, reach out to, work with, and find and implement viable solutions to better the lives of our homeless neighbors while working with stakeholders to address their community concerns.

d. **POLICY MOTION: Support for Credit for Caring Act** (submitted by Aging in Place Committee)

Whereas by 2030, 20% of our community will be 65 or older; and

Whereas 1 in 3 will have dementia or Alzheimer's – almost 2/3 of them women; and

Whereas Medicare does not cover any of the essential services needed to care for those with dementia, forcing family caregivers out of the work force; and

Whereas 25% of Boomers care for an aging parent resulting in an average loss of income of over $300K, yet when forced to leave the workplace they face further hardship if taking social security early with a reduction of benefits of almost 30%.

The Mar Vista Community Council respectfully urges Congressmember Karen Bass to support our senior community by:

- Introducing a proposal thatearly retirement taken to provide family caregiving be an exception to the reduction for early benefits, as done with disabilities.
- Supporting the proposal by Congressmember David Jolly that will change how the cost of living increase is calculated on social security
- Supporting the Credit for Caring Act, which provides a tax credit to working family members equal to 30 percent of a caregiver's expenses greater than $2,000. The bill aims to reward working taxpayers and encourage continued participation in the workforce while providing care to a loved one. It was introduced by Rep. Linda Sánchez, D-California, who chairs the Congressional Hispanic Caucus, and Rep. Tom Reed, R-N.Y.

e. **POLICY MOTION: VA Master Plan #1** (submitted by WRAC via PLUM Committee)

The Mar Vista Community Council supports the Los Angeles Homeless Veterans Leasing Act of 2015 (Feinstein / S. 2013 and Lieu / H.R. 3484), to place permanent supportive housing, and parking for dwelling in vehicles, on the Department of Veterans Affairs Greater Los Angeles Campus in West Los Angeles.

f. **POLICY MOTION: VA Master Plan #2** (submitted by WRAC via PLUM Committee)

The Mar Vista Community Council supports the draft master plan for the Department of Veterans Affairs West Los Angeles campus.

g. **POLICY MOTION: Small Lot Subdivision Ordinance** (submitted by WRAC via PLUM Committee)

The Mar Vista Community Council supports amending the Small Lot Subdivision Ordinance such that all Small Lot Subdivision projects shall comply with the land's underlying zone, including setbacks, and further amending to prohibit cantilevered construction over required open space, including driveways and required setbacks.

7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
      i. Report on current financial status
      ii. **APPROVAL** of March Monthly Expense Report (MER)
      iii. **Funding Motion** (submitted by Community Outreach Committee)

      MVCC allocates up to $500 for MVNA Block Party contingent on the availability of funds.

AGENDA

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnonwww.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/
n. Animal Services Liaison: Steve Boskin

8. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Homeless Issues Ad Hoc Committee** – Robin Doyno, Chair
   b. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
   c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
   d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
   e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
   f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
   g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
   h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
   i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
   j. **Safety and Security Committee** – Rob Kadota, Chair
   k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
   l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
   m. **Elections and By-laws**- Bill Koontz, chair
      - Candidate Forum
9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite
   c. Zone 3 – Bill Scheding
   d. Zone 4 - Michael Millman
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Valerie Davidson
10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, April 12th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:11 P.M.
   Quorum present: Bill Koontz, Mitchell Rishe, John Kuchta, Melissa Stoller, Bill Scheding, Yvette Molinaro, Robin Doyno, Sherri Akers, Ken Alpern, Brad Wilhite,, Michelle Krupkin, Valerie Davidson
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of March 8th, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve by Sherri Akers, 2nd by Melissa Stoller. Motion carried: 9 ayes, 0 nays ,3 abstentions (Michelle Krupkin, Valerie Davidson, Yvette Molinaro).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Sarah Auerswald: Mega Garage Sale sponsored by a local realtor, MV Chamber of Commerce, Learning Zone
   Sharon Cummins: Should appoint a 3rd co-chair to Homeless Committee, particularly on Globe who's impacted.
   Sarah Auerswald: Candidate orientation for all of West region on Wednesday, April 20, at Iman Center, 7:00 P.M.
   Sherri Akers: May 12, 9:30 a.m.: Senior Fraud Awareness Forum; Sherri is being honored. Stop Senior Scam troup is performing at Mar Vista Recreation Center Friday, April 15.
   Jennie Simonson (Bicycle Coalition): Bike to Work Day is May 19.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      Come to Celebration of Life memorial for Bill Rosendahl on Saturday, April 16, 2:00-6:00. Tons of food. Still need 34 volunteers.
   b. Mar Vista Recreation Center – Tracie Field, Director tracie.field@lacity.org
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn
   e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
      Representative is now head of taxation committee. More funding per capita stays in Northern California but center of population is in LA.
      Head of Los Angeles caucus – deals with situations where LA gets short end of stick
      Michelle Krupkin: Penny Lane Development? No info.
   g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
   h. CA Assembly 47
   i. CA Assembly 62
   j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
   k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel TammDaniel.tamm@lacity.org

l. Joel Jacinto, Department of Public Works

6. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

Motion to take 6.b-g on consent by Bill Scheding, 2nd by Sherri Akers. Motion carried: 10 ayes, 0 nays, 1 abstention (Michelle Krupkin).

Moved to approve consent calendar by Bill Scheding, 2nd by Valerie Davidson. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION: EACC Co-chair**

MVCC approves the appointment of Elias Segali as co-chair of the Education, Arts and Culture Committee, replacing co-chair Brad Wilhite.

Motion to hold over by Bill Scheding, 2nd by Melissa Stoller. Motion carried unanimously.

b. **ADMINISTRATIVE MOTION: Ad-hoc Homeless Issues Committee name change**

MVCC approves changing the name of the ad-hoc Homeless Issues Committee to ad-hoc Homeless Solutions Committee.

Michelle Krupkin: Negative reaction to use of word "Solutions" because of the Holocaust.

Robin Doyno: Understands Michelle's reaction and will discuss other names with the committee.

c. **ADMINISTRATIVE MOTION: Ad-hoc Homeless Solutions Committee mission**

MVCC approves the following mission statement for the Ad-Hoc Homeless Solutions Committee:

> The Mar Vista Community Council's Homeless Solutions Committee seeks to protect the community from the impacts of homelessness by working with homeless individuals who wish to receive social services; which will hopefully lead to permanent housing and a future for them off the streets.
>
> We will advocate, educate, reach out to, work with, and find and implement viable solutions to better the lives of our homeless neighbors while working with stakeholders to address their community concerns.

d. **POLICY MOTION: Support for Credit for Caring Act** (submitted by Aging in Place Committee)

Whereas by 2030, 20% of our community will be 65 or older; and

Whereas 1 in 3 will have dementia or Alzheimer's – almost 2/3 of them women; and

Whereas Medicare does not cover any of the essential services needed to care for those with dementia, forcing family caregivers out of the work force; and

Whereas 25% of Boomers care for an aging parent resulting in an average loss of income of over $300K, yet when forced to leave the workplace they face further hardship if taking social security early with a reduction of benefits of almost 30%.

The Mar Vista Community Council respectfully urges Congressmember Karen Bass to support our senior community by:

- Introducing a proposal thatearly retirement taken to provide family caregiving be an exception to the reduction for early benefits, as done with disabilities.
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e. **POLICY MOTION: VA Master Plan #1** (submitted by WRAC via PLUM Committee)

The Mar Vista Community Council supports the Los Angeles Homeless Veterans Leasing Act of 2015 (Feinstein / S. 2013 and Lieu / H.R. 3484), to place permanent supportive housing, and parking for dwelling in vehicles, on the Department of Veterans Affairs Greater Los Angeles Campus in West Los Angeles.

f. **POLICY MOTION: VA Master Plan #2** (submitted by WRAC via PLUM Committee)

The Mar Vista Community Council supports the draft master plan for the Department of Veterans Affairs West Los Angeles campus.

g. **POLICY MOTION: Small Lot Subdivision Ordinance** (submitted by WRAC via PLUM Committee)

The Mar Vista Community Council supports amending the Small Lot Subdivision Ordinance such that all Small Lot Subdivision projects shall comply with the land's underlying zone, including setbacks, and further amending to prohibit cantilevered construction over required open space, including driveways and required setbacks.

7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz

      MVCC funds are frozen (see Attachment A). Downtown hasn't returned calls, answered questions about MERs.

      Bill Scheding: Letter doesn't say what process is to get unfrozen. Will drive them downtown tomorrow.

      Bill Koontz: A few months ago, you didn't know where $11,000 was.

      Bill Scheding: Will be happy to resign after he drives MERs downtown. Will send letter of resignation. He needs to sign MER paperwork now.

      Bill Koontz: Will have special meeting next week. Melissa has required training to be Treasurer; need candidate for Secretary.

      Ken Alpern: Doesn't blame anyone for feeling upset or angry, but doesn't think two months of being angry helps anyone. Thinks this will make things worse. Shouldn't treat Bill Scheding this way after years and years of service. Ultimately, Ken blames the City.

   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
      i. Report on current financial status

         Bill Scheding: We have $13,018.02 in Bank.

         Sharon Commins: Someone should go downtown & talk to them.

         Bill Scheding: Can run forms downtown tomorrow, will make appointment.

         Bill Koontz: Should also scan signed version & email.

         Sarah Auerswald: Cares how much money there is because we have an election to run, and have request for funding.

         Elliot Hanna: Agrees with Ken. First thing to ask when something goes awry, is what is the process problem. Need to address from that standpoint.

         Sherri Akers: Was asked to use her credit card for Eco Car Expo. Sent three emails with receipt to Bill Scheding and didn't get response. Then Bill paid the printer as per the MER. Sherri will contact printer and ask if can credit her credit card.

         Melissa Stoller: MER budget amounts are incorrect—doesn't' show amounts as revised a couple of month's ago. And it books prior fiscal year expenses against this year's budget, which will result in our showing that we've spent more than the $42,000 alloted this year.

         Bill Scheding: If we overspend account, no big deal—just comes out of next year. $42,000 is just a number.

      ii. **APPROVAL** of March Monthly Expense Report (MER)

         Motion to approve by Bill Scheding, 2nd by Ken Alpern.

         Discussion

            MER shows $32,363.04 that we've spent.

            Bill Koontz: Not filing in all the info—outstanding checks or other outstanding commitments.

Bill Koontz: Friendly amendment to add $5 bank service charge (due to balance falling below $1000); Bill Scheding accepts.

Bill Scheding: MER doesn't need to balance to Bank Statement; can't balance.

Vote: 2 ayes, 5 nays, 3 abstentions. MER is not approved.

Bill Koontz: Maybe talk to people downtown, deal with MER at next week's meeting.

iii. **Funding Motion** (submitted by Community Outreach Committee)

MVCC allocates up to $500 for MVNA Block Party contingent on the availability of funds.

Motion to approve by Bill Scheding, 2nd by Melissa Stoller.

Discussion

Sarah Auerswald: When will we know if we have funds?

Bill Scheding: Doesn't know about the NPGs; doesn't know when we'll know.

Sarah Auerswald: There are constituents who want to know, we should know if there is money available.

Elliot Hanna: Wife made the request for $500. Doesn't think should appropriate phantom money. Party is June 12.

Bill Koontz: Should put over till next month.

Lenore French: What happened to Art Walk motion? Melissa Stoller: Was withdrawn due to lack of funds.

Ken Alpern: We don't have information from city to go by, they've been horrid at providing it.

Sarah Auerswald: BOD voted on how to spend the money.

Bill Koontz: Is very simple to add the numbers up and know how much we've allocated.

Motion to put over to next month by Melissa Stoller, 2nd by John Kutcha. Motion carries unanimously.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

Short meeting. Cleared up 3 of the 5 oldest items. Continuing problem at National/Overland on-ramp to I10. Backup prevents people from turning left. They took away one right turn lane years ago, backing traffic up to south side of bridge.

Next meeting is May 18; agenda closes May 12.

Bill Koontz: Problem with cut thru traffic on Stoner. Where on that block would it be best to put speed trailer?

Mitchell Rishe: Gravel storage area south of Palms (DWP site?). There's constant dumping & picking up of gravel and surrounding homes getting dust. BillK: Len looking into.

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnonwww.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

In the works—discussing theme.

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

Event at Iman Center had more attendees that other 3 forums combined.

ICL ordinance is coming up in May or June. Crucial: Neighborhoods will choose where they want their single family neighborhoods.

In the fall, will roll out downtown plan.

We should have a Community Design Overlay for Great Streets.

Ken Alpern: Much of this is political; we're lucky to have Mike Bonin.

m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/

Monthly meeting on April 21: discussing best way to use Linked-in.

Mixer on April 25, 5:00-7:00.

Sponsoring Bike to Work Day with Bicycle Coalition–several stands, giving out coffee.

Hulu bikes are coming! We're part of the zone; can leave them tied up to any bike rack.

n. Animal Services Liaison: Steve Boskin

8. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Homeless Solutions Ad Hoc Committee** – Robin Doyno, Chairobe.

Robin Doyno: Michelle's comments were heard; may come back with another name change. Will also consider including a homeowner on Globe.

concerned Mar Vistans. The second, possibly 10 providers and 16-17 Mar Vistans. Both meeting were excellent; idea sharing, open mindedness, very little "move-them-out attitude," networking between providers as well as between providers and Mar Vistans. Was considerable disruption from one person at 2nd meeting. Topics discussed:

- Lava Mae: a bus-like hygiene station travelling around town providing showers. The idea is working in San Francisco; it's about to happen here.
- Parks and schools for showers.
- Developing a handy resource guide for people on the street to access services.
- Observers for the encampment clean-ups.
- District 11 idea of using Metro Lot on Main Street I Venice for affordable housing.

Actions:

- Actual casework done unofficially by people associated with Committee.
- Attendance at Westside Homeless and Housing Coalition, LA City Council's Homelessness and Poverty Committee, Mark Ridley Thomas' Empowerment on Mental Health Committee.
- Witnessed several "sweeps" beneath our bridges.
- Investigated vigilantism against the homeless. Advised and discussed with Council District 11.
- Met with LAPF Captain Alberca.
- One person housed by way of SHARE program.
- Stephen (10 FWY & Mational) relocated with Michael Millman's help.
- Investigated and supported Safe Park program.

Sharon Cummins: Watch underlying zoning at Parks; need conditional use permit) to change use of space.

Ken: Alpern: synonym for "solutions" is "answers"

Brad WIlhite: Walkway between Ceilhunt & Colby near I10—opening cut in fence

b. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

Lots of outreach, huge slate of candidates.

Website:

- Can't upgraded for security without breaking the website. Developer used old version of Perl.
- Solution: hire 3rd party consultant with Perl & Drupal experience.
- Should we spend money to make current website secure or save for redesign later? Redesign will take longer than we think. Recommendation: hire a city-approved consultant to handle small number of updates.
- "Website has been compromised" emails –probably phishing. Marvistacc websiteis still up.

Melissa Stoller: Would crowd-sourcing of website coding (using local volunteers) work if interfaces were defined? John: problem – hired consultant before; intentionally designed so is difficult to manage so they could get maintenance contract. Is built of modules, no cohesion. Need to have positive relationship with consultant vetted by city; will need long-term relationship.

c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs

d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs

Great 1st Annual Eco Car Expo!

e. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

CalTrans still owns Venice Blvd.

f. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

g. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

Poor turnout at meeting on Martin Cadillac. See redesign on their website (http://www.martinexpotowncenter.com). Mar Vista's community plan is outdated; need more comprehensive plan.

PLUM meeting April 19 at Windward.

h. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs

i. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

Planes cleared off of parcel of land north of dog park; it will be parking lot. Leases canceled; planes moved elsewhere.

j. **Safety and Security Committee** – Rob Kadota, Chair

k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

Close to having a meeting. Mike has some big news.

m. **Elections and By-laws**- Bill Koontz, chair

Candidate Forum: perhaps at St. Bedes May 16.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Expo line opening May 20; will be big hoopla.

b. Zone 2 – Brad Wilhite

Zone 2 doing transportation survey about. Cut-thru traffic. Will share results.

c. Zone 3 – Bill Scheding

d. Zone 4 - Michael Millman

e. Zone 5 – Michelle Krupkin

Status Kuo closed for conversion; will reopen selling liquor

f. Zone 6 – Valerie Davidson

Quiet except for loud jets.

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**

John Kutcha: when budget problem came up, every member who voted to approve the MERs shares some responsibility.

15. **Adjournment**

Meeting adjourned at 9:11 P.M.

* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Attachment A: Funding Freeze Notice

work with you to pay your ongoing operational expenses in a timely manner please contact the Funding Unit to provide this information to us.

To further assist you in complying with these requirements, the Department will now be appointing temporary staff to assist you in completing these reports. These individuals are fully trained in the Department's funding processes, policies, and requirements. Danielle Sandoval will be contacting your Treasurer, 2nd Signer, and cardholder shortly to help in completing the forms and compiling the supporting documentation.

The Department will be billed by the temporary staffing agency for these services at a rate of $31.68 per hour, and we will pay these bills from your Neighborhood Council's appropriated funds. We estimate that the length of time to complete one (1) MER (including filling out the form, phone calls, emails, meetings with NC officers) will range from 2-5 hours per MER, assuming all of your supporting documentation, e.g. receipts, invoices, flyers, etc., are available.

We will work quickly to unfreeze your funds once we receive the outstanding Monthly Expenditure Reports. If you have any other questions, please contact the Funding Group at (213) 978-1551 or via email at EmpowerLA.Funding@LACity.org. Thank you for your assistance in this matter.

Sincerely,

Grayce Liu
General Manager
Department of Neighborhood Empowerment

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, March 8th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

Minutes

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:11 P.M.
   Quorum present: Bill Koontz, John Kuchta, Melissa Stoller, Bill Scheding, Robin Doyno, Sherri Akers, Ken Alpern, Michael Millman, Michelle Krupkin
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 16th, 2016 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker)
   Motion to approve by Bill Scheding, 2nd by Melissa Stoller. Minutes approved: 6 ayes, 0 nays, 1 abstention (John Kuchta).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair).
   Andrew Adams, National & Federal: running for Democratic Central Committee, the governing board for the Democratic Party, for Assembly District 54. Wants to make sure it's making smart decisions when endorsing, and has reps that look & talk like us and represent our community. Website is http://www.andrewfadams.com
   Lenore French: The next Art Walk is June 2.
   Christopher McKinnon: Times spreading a rumor that drug-resistant bacteria are growing Hyperion recycled water.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      Bill Rosendahl isdoing better, more alert.
      Will present 10 additional art box designs at Great Streets ad-hoc; funding glitch fixed.
      City Council approved hiring a Petroleum Administrator; moving forward with fracking moratorium and wants to bring in someone fully focus.
      Sherri Akers: Will this person also take responsibility of methane leak inventory?
      Len: hopefully we'll be able to use the person's expertise for this.
      Bill Koontz: Is there a way to bring in someone who isn't an ex-lobbyist?
      Len: open to someone with expertise but not someone working for an oil company.
   b. Mar Vista Recreation Center – Tracie Field, Director tracie.field@lacity.org
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
      - Expo Phase 2 opening May 20.
      - Brought motion to support homeless strategy plan, emphasizing homeless seniors.
      - With Mike Bonin & Mike O'Farrell, helping restore honors to vets dismissed under don't ask/don't tell.
        Robin Doyno: Does Councilman support homeless plan section 6.B which addresses temporary shelter sites?
        Joseph: Not familiar with this.
      - Send post office complaints to Claudia Ergon, 323-9651422.

- Job fair in Baldwin Hills on Saturday, March 12.
- Temple Isaiah's annual Purim carnival is Sunday, March 13.
- Trying to get parking guards for Clover Elementary; in 2011, was told it wasn't feasible; -asking them to take another look
- April 6, 6-9 P.M., mansionizaiton forum at the Iman Foundation, 3376 Motor Ave.
- Development uestions:

  Michael Millman: Palms & Sepulveda (NW corner) developers want 300 unit mixed use development, park, restaurants, grocery store; in initial planning stage

  Ken Alpren: Sepulveda & National: Big Lots development? Area needs upgrading, approved stoplight for left turns. Need discussion.

d. US 36 – Janice Hahn
e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
   - Art Walk: mayor formed partnership with Department of Public Affairs.
   - Thrilled about Expo Line opening; mayor spent time in DC getting funding.
   - Mayor advocated for raising minimum wage which is taking effect July 1. To ensure a smooth transition, is launching extensive public education initiative on how to best educate constituencies.
   - 1st of 3 infomercials encouraging people to run for Neighborhood Council; one oriented to youth, 1 in Spanish
   - Mayor ran on reforming DWP; measures are coming up on November ballot. Progress: billing system fixed; call wait time slashed, new leadership. Principles for next phase.
   - Melissa Stoller: Recent firing of AQMD & Coastal Commission heads impacts Los Angeles; what actions can/will mayor take? Daniel: Will find out; this is definitely LA issue.
   - Question regarding Safe Parking areas for homeless residents: if City Council means forward, that will be included in homeless initiative.
l. Joel Jacinto, Department of Public Works

6. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.
   a. **ADMINISTRATIVE MOTION: Ad-hoc Homeless Issues Committee Co-chair**

      MVCC approves the appointment of Susan Klos as co-chair of the ad-hoc Homeless Issues Committee.

      Motion to approve by Bill Scheding, 2nd by Bill Scheding. Motion unanimously approved.

   b. **POLICY MOTION: Small Lot Subdivision For The Barrington Corridor North Of The Intersection Of Federal And Indianapolis Avenues** (submitted by PLUM Committee)

      The MVCC values the unique history, character and residential scale of the Westdale neighborhood. The existing two story apartment buildings and single-family homes along Barrington Avenue were designed to blend with the surrounding neighborhood. We support the desires of the owners in the fourteen houses that are zoned R-3 to be able to live along-side developments that are appropriate in scale. Our first preference is that these fourteen properties remain single-family homes. However if any of these properties are to be developed for other uses, the MVCC supports the small lot subdivision model over the larger apartment building model. The reasons included reduced density, better conforming to neighborhood character, and ownership model. We support in concept the plan proposed for 3277 Barrington Avenue with the following conforming stipulations as agreed to by the developer:

- That the design and materials conform to the character of the existing neighborhood structures.
- That the existing setback (green space) along Barrington Avenue be preserved.
- That the first structure facing Barrington Avenue has a lower profile (<= 34' 6" railing height) than the structures set further back on the lot resulting in less massing as viewed from the street. (NOTE: the railing is 42" in height by code).
- That the height the remaining structures from ground to the railing height to be <= 36'6".
- That the development adheres to a 9'1", 10'1", 9'1" ceiling height model.
- That the roof decks be stepped back from the outside perimeter to retain privacy for the neighbors and utilize the frosted glass laminate to ensure privacy and a light and pleasing roofline.
- That landscaping is designed to enhance the appearance and includes trees and hedges along the structures facing the alley to mitigate the view of the building from the single-family homes adjacent to the alley.
- That every effort be made to reduce the height (massing) of the structure. Possible considerations would include eliminating the rooftop stairwell enclosures resulting in the screened upper level stairs and handrails being the highest building element on the project. This request is an effort to find common ground with the developer and neighborhood on the project's overall height and is based on the understanding this will allow the developer to continue to provide each of their buyer's a roof deck with no change in the deck's finish floor railing height elevation, currently shown as < 34'6" and its' code required 42" tall frosted glass laminate guard rail.

The MVCC appreciates the time spent and willingness of the developer to adjust plans in a manner that helps to mitigate the concerns of the community and we support this model as the only acceptable approach to the other properties on the street.

Motion to approve by Michael Millman, 2nd by Ken Alpern.

Discussion

Michael Millman: should approve, lots of hard work reaching best deal possible; vetted several times in PLUM and other meetings.

Barbara Algaze: speaking for Tom Knaechtel: traffic will be unbearable, minimum of 168 additional car trips, 56 additional cars parking on streets. School safety risk. 3 units can be rented out by owner. Units are out of proportion to neighborhood. Developer fraudulently represented intentions to purchase–why trust promises now.

John Evans: Entire project conducted in deception. Westdale HOA bullied by "by-rights" development.

Lori Gilder: Grew up in neighborhood. When bought home behind the development was vaguely aware of R3 zoning; we should have changed zoning. Also angry with developer–threatened with apartment, then brought down a few feet; let neighbors know, if you don't support Small Lot Subdivision plan, you'll have 45-50 ft. building.

Marilyn Smart, home just north of development: doesn't support.

David Altemis (speaking for Jerry Hornoff): See Atttachment A.

Lou Roth, 3270 Stoner Ave: Doesn't support, Council has been punked. doesn't understand why builder is not required to conform to neighborhood.

Aaron Belliston, project rep: Held numerous meetings with council, presented at March, 2015, PLUM meeting. Provided mitigations where possible. Seeking support for small lot model for lots on Barrington; thinks can hold up this model for the other 14 lots. Conformed with community as best possible; height & density voluntarily reduced. Goal is to get community support, not because we need it. Attempting to get additional crosswalk.

John Kutcha: Property has been R3 forever. It's difficult to oppose development based on "I don't want it there." We do need to increase housing/density. Is a renter, very aware of traffic problems. Opposing all developments seems like a battle already lost. Can't preserve community forever; communities need to grow. Should think about how people who live in these units will be integrated into our community.

Sherri Akers: Needs to agree with points that John made. Loves Small Lot Subdivision aesthetically, but it excludes our growing senior population and families with young children. Concern about marketability over time.

Ken Alpern: Is central figure in Expo Line & Casden development. City is anti-mansionization, but allows something like this that transforms neighborhoods. City claims to be pro-Neighborhood Council and wants participation, but DWP reform has no rep elected by NC –must have. City raises minimum wage while treating 1% as royalty above us. This development is within single-family neighborhood–different; if have height this tall, it doesn't add to neighborhood, but transforms. There should be some densification, but not to this degree, with this height; this is transformation. Can only fight with lawsuit.

Michael Millman: Stood with neighborhood to knock down Bundy village; knocked down Casden; stopped Bikini Bar, pot shop; supported granny flats. Conflicted: shouldn't reward bad conduct; no evidence that there was, but there's a certain aroma about that. Threats to build apartments looks like extortion. No guarantee that this will be model for remaining properties. Has respect for Jerry Hornoff; talked to lawyers. Respects fact that developer came to PLUM a year ago. Would like to see a lot of mitigation, but pictures little kids walking across street to Mar Vista school. Trust is very important.

Melissa Stoller: I hate this development: it's ugly and doesn't fit neighborhood; concerned about Airbnb renters in first floor unit. Will hold my nose and vote for it because the alternative could be worse.

Aaron Belliston: Developer has 3 other lots, 2 are side-by-side. Is trying to purchase one sold to apartment developer (making another side-by-side), but no luck so far.

Bill Koontz: Developer has gone to PLUM several times, Mike Bonin has given thumbs up. Lawsuits always fail. We are simply an advisory body–have no power, it's not up to us.

Bill Scheding: We need to remember Stakeholders we represent.

Motion carried: 7 ayes, 1 nay, 0 abstentions.

c. **POLICY MOTION: Traffic Study to Address Impending Densification of the Barrington Corridor North of the Intersection of Federal and Indianapolis Avenues** (submitted by PLUM Committee)

A recent trend is underway whereby many as 14 historically single family homes on Barrington, just north of the intersection of Federal and Indianapolis Avenues, are likely to be redeveloped as multifamily homes or apartments due to their underlying R3 zoning designation. The City of Los Angeles is also embarking on the Mobility Plan 2035 to address transportation challenges in Los Angeles. Given that the resulting densification will significantly increase cumulative trips generated in the corridor, the MVCC hereby requests that the 11th District Council Office (Councilmember Mike Bonin) coordinate with the City of Los Angeles Department of Transportation to conduct an expedited comprehensive traffic circulation study of the Barrington Corridor area to address impacts and develop potential mitigations, including but not limited to:

- Assess the potential for a signal crossing at Navy Avenue across Barrington Avenue to facilitate pedestrian crossings and vehicular turning movements onto Barrington Avenue;
- Assess the impact at ingress and egress of the alleys on Federal and Indianapolis Avenues, just east and west of Barrington, that are likely to provide access for all the additional off-street parking required to serve the developments. Safety issues that need to be addressed include conflicts in turning movements at the alleys so close to the intersection of Barrington Avenue, and the blind curve on Federal Avenue approaching the alley access;
- Assess the impact and effectiveness of the timing of lights and turn signals at the intersections of Barrington & National, Barrington & Federal, and McLaughlin & Palms;
- Assess the impact and effectiveness of a 4-way stop at the intersection of Federal & Barry/Colbert.
- Installation of a continental crosswalk on the East side of the Barrington & Federal intersection;

- Assess the impact of potential cut-through traffic, speeding and safety on the parallel streets, Stoner, Stanwood, Barry, Clover, Colbert and Federal Avenues, and develop proposed mitigations; and
- Assess the potential impacts on the path of travel of students walking or biking to Mar Vista Elementary School and on drop-off and pick-up at Mar Vista Elementary.
- *All existing & new signals be adapted as head-start signals.*

Motion to approve by Michael Millman, 2nd by Ken Alpern.

Discussion

Aaron Belliston, developer rep: Motion came out of meetings with Dept. of Transportation. Asking Mike Bonin to request traffic study on expedited basis. Most important thing is to do traffic counts, this will tell DOT what needs to be done.

John Evans, 3221 Barry: We don't know what impact of Expo line will be. Looks like it's starting to back up at Gateway & Barrington. Playa Vista screwed the pooch for north/south traffic.

Friendly amendment: Head start signals–they allow 4 second delay. Amendment accepted.

Mark Levy: Hope's that traffic on cut-thru streets considered. Lives on Stoner.

Bill Scheding: If street does its own speed bump, make sure it's up to spec.

Ken Alpern: Can't do speed bumps; safety issues.

Sarah Auerswald: Speed trailer has worked on her street.

Ken Alpern: Bill Pope said Playa Vista was built on assumption that there would be cut-thru streets; only way we can be sure people don't speed is to have police presence. Developer should pay for studies, not us the taxpayers. City is ultimately to blame: it's pro-Neighborhood Councils, but DWP reform has no rep for taxpayers; anti-mansionization, but allows this; minimum wage but 1% are higher life forms. Oppose the city and you're an elitist, selfish, probably racist NIMBY. We need density at major transit nodes like Sepulveda Blvd., not within single-family residence tracts; small lot subdivisions but not neighborhood transformation. This is 1st time Ken has been against a small lot subdivision. If we had Community Plans, this would have been prevented.

Michael Millman: Will be standing firm on next one for developer to conduct traffic study.

Motion as amended carried unanimously.

d. **POLICY MOTION: Bay Delta Conservation Plan** (submitted by Green Committee)

Whereas the analysis done by the LADWP Ratepayer Advocate per the MVCC Motion of October 8th, 2013 (see Attachment A) evaluated this project at a significantly lower cost, it does not accurately reflect the cost to Mar Vista Stakeholders. At the current projected cost of $67 billion, this will impose an estimated average cost of $5,000-$10,000 to each Mar Vista household over the life of the project.

Whereas the tunnels won't deliver any new water to Los Angeles, are estimated to cost between $25 and $67 billion (approximately $1.6 to 10 billion Los Angeles share), and would actually undermine Los Angeles' water security, the creation of thousands of local jobs, and would benefit special interests at the expense of Los Angeles ratepayers. Already MWD has taken from LA taxpayers upwards of 300 million intended for tunnels construction, and Mayor Garcetti appointees have voted in support of these motions.

Whereas the twin tunnels would siphon billions we need to support Mayor Garcetti's goals for a more self-sufficient and reliable water system in LA. Mayor Garcetti's Emergency Drought Directive calls for reducing our dependence on imported water, and increasing local water supply sources such as storm water, replenishing groundwater aquifers, and recycled water. As Garcetti's directive states, imported water is not only exponentially more expensive then local water sources, but is at immediate and long term risk because of impacts from climate change and the drought. As these necessary investments are estimated to be over $2 billion, ratepayer money should not be wasted on constructing new tunnels that would primarily benefit special interests.

Be it resolved, that the Mar Vista Community Council opposes the Bay-Delta Conservation Plan (BDCP), "Twin Tunnels," or "California Water Fix" and any effort to divert the Sacramento River.

Be it further resolved that we urge Mayor Eric Garcetti to take action to ensure that ratepayers aren't harmed, specifically by directing his appointees at the Metropolitan

Water District (MWD) to vote no on any measure that would spend ratepayer or taxpayer money on the tunnels.

BACKGROUND INFORMATION

Attachment A: October, 2013, MVCC Policy Motion

Attachment B: Los Angeles Los Angeles Groups Opposed to the Bay Delta Tunnels & California Water Fix

Separate documents:

- DWP Ratepayer Advocate Analysis (separate document)
- Food and Water Watch Analysis of Ratepayer Impact of Bay Delta Conservation Plan (separate document)
- Mayor Eric Garcetti Executive Directive No. 5: Emergency Drought Response-Creating a Water Wise City

Motion to approve by Sherri Ajers, 2nd by Bill Scheding.

Discussion:

Conner Everts: Represents environmental water caucus. Cost of tunnels has gone up, amountt of water gone down over last 40 years. Santa Monica is planning to be off all imported water by2017. If we distract from this, we'll loose focus and take resources away. There's no clear path for financing project, major share will fall on ratepayers of Los Angeles. Will take 20-30 years to complete. Santa Monica has ample ground water, but doesn't have LA's recycled water.

Brenna Norton, Food and Water Watch: Boils down to special interests enriching themselves at our expense. Potentially will be largest public works project ever in California. Passed in 1982 as twin tunnels & was then overturned. We don't get a vote. Metropolitan Water District will pass through bond cost (9 billion from LA) on our water bills. MWD sells imported water to Los Angeles and other SoCal cities;. business model is failing because cities want local water. Mayor Garcetti plan to reduce imported water by 20% by 2017. Bay Delta Plan would take away money needed to fix LA water supply. We need to fix LA, have safe & secure water supply. Should ask Garcetti to cut off funding for project.

Sherri Akers: Attended Resilience by Design. Convinced that we must get off imported water. Wood boxes will collapse in earthquake.

Ken Alpern: When say we won't get any of the water and they say "yes you will," what is response? What are you promoting instead. There are already existing tunnels; two more are intended to suck Sacramento River dry.

Brenna Norton: Garcetti just broke ground on largest groundwater reservoir. Tools are there, but we're not investing in them. Spend the money, but spend it smart.

Motion carried: 7 ayes, 1 nay, 0 abstentions.

e. **POLICY MOTION: Special NPG Rule Resolution** (submitted by ExFin Committee)

WHEREAS neighborhoods are composed inherently of stakeholders with interleaved allegiances and agendas; and

WHEREAS managing conflicts of interest is very much the business of any neighborhood council board member; and

WHEREAS all board members sign a code of conduct and attend ethics training; and

WHEREAS Neighborhood Councils are mandated to reflect the diverse interests within their area (Charter Sec. 906(a)(3); Plan Art. II Sec.1); and

WHEREAS MVCC is currently conducting outreach to encourage diverse Stakeholders, *including parents,* to run for seats on their Council; and

WHEREAS parents of school-age children are a significant and important segment of MVCC's district; and

WHEREAS knowing that their membership on the MVCC Board would block any Neighborhood Purpose Grants to their children's schools is a disincentive to run; and

WHEREAS invoking guidance disqualifying NPGs for an individual local school if any Neighborhood Council Board Member has a child at the school is discriminatory and antithetical to the NC charter;

BE IT RESOLVED that the Mar Vista Community Council Board requires an opinion from the City Attorney confirming that this guidance is valid.

Motion to approve by Melissa Stoller, 2nd by John Kuchta.

Discussion

Bill Koontz: DONE discovered rule that we can't give money to schools under certain circumstances. NPG form says can give money to school so long as we have a letter from principal on letterhead. Need to ask DONE for clarification, and what is basis for this.

Melissa Stoller: How would DONE know? There's nothing in the process to report/check whether a board member has a child at the school. Board might not even be aware.

Sara Roos: Issue is lack of confidence in board members to manage conflict of interest.

Michael Millman: If someone is elected to board and has conflict of interest, person should recuse themselve.

Bill Koontz will follow up with City Attorney.

Motion carried unanimously.

f. **POLICY MOTION: Resolution supporting animal rights** (directors' motion submitted by Sherri Akers)

The Mar Vista Community Council supports Council File 15- 0843 (see Attachment C) by Councilmember Paul Koretz and Mitch O'Farrell and urges the City to -

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include.
    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.
    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have
2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

98 percent of Denver properties accept cats and 93 percent accept small dogs. Yet 62 percent of Los Angeles rental properties refuse animals completely. This is considered to be a major obstacle to achieving no kill shelters. With a critical shortage of housing in Los Angeles, having to find housing that accepts pets makes it even more challenging. The MVCC applauds and thanks the Councilmembers for taking action on this issue.

Motion to approve by, Sherri Akers 2nd by Bill Scheding. Michael Millman recusing himself.

Discussion

Sherri Akers: Asking for study, not directing a conclusion.

Motion carried unanimousy.

g. **POLICY MOTION: Utility Box Painting** (directors' motion submitted by Robin Doyno)

WHEREAS Mar Vista benefits from beautification projects, and

WHEREAS The Utility Box Painting Projects in other areas of our fair city have enriched, enlivened and civilized the public area, and

WHEREAS the Senior, Artist, and Youth Communities can all share in the creation of The Mar Vista Utility Box Project, and

WHEREAS the Venice Boulevard and Grandview pilot utility box painting enriched the inaugural Mar Vista Art Walk and currently stands as an aesthetic plus to our de facto town square, and

WHEREAS the Los Angeles District Council Office 11 has supported and continues to support the previous iteration as well as the current effort to advance our cultural profile, and

WHEREAS Mar Vista will benefit from the inclusion of the visual history of our community in the Utility Box Painting Project, and

WHEREAS the community will benefit from a juried decision to select 15 to 20 artists to render their submissions on utility boxes by a jury composed of 2 MVCC EACC members, 2 city council staff members and 2 at large community members, and

WHEREAS MVCC EACC shall produce, distribute and post a call for submissions and time line, conduct a selecting jury, post results and execute a letter of understanding, therefore BE IT RESOLVED that the Mar Vista Community Council shall ask Los Angeles District Council Office 11 to embrace and sponsor the above listed project.

Motion to approve by Robin Doynbo, 2nd by Bill Scheding.

Motion carried unanimously (Michael Millman absent).

7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta

    Website: lots going on. Working on back-end stuff, Screen Shot documentation on how to do things.

    d. Secretary –Melissa Stoller

    Please send me your events for eblast.

    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.

        i. Report on current financial status

        None.

    Motion to approve 7.e.ii-iv on consent by Bill Scheding, 2nd by Ken Alpern.

    Discussion

        Michael Millman: How much is left for rest of year?

        Bill Scheding: Probably maybe about $500 left for rest of year.

        Melissa Stoller: These MERs are incorrect. They book all of the prior year expenses paid this year against our current year budget. The budget is supposed to mean something. What are we going to do when the expenditures exceed our $42,000 budget? The remaining prior year roll-over amount is incorrect; I'm not comfortable with just spending it on current year expenses—how do we show it in our budget? I don't understand why Bill redid all the MERs on the old form instead of using the correct MERs I did on the new forms that don't book prior year expenses against this year's budget. I don't understand why there isn't a motion to unwind the damage done by the budget motion passed at the last meeting.

        Michael Millman: Mar Vista Neighborhood Association counted on getting $300; disappointed that money wasn't set aside. Wish we could reshuffle some of this and support block parties.

        Bill Koontz: Maybe later there'll be some left over money. Important to reach out to people we never reach out to.

        Bill Scheding: Have over-committed to projects.

    Motion to approve on consent not carried.

        ii. **APPROVAL** of December Monthly Expense Report (MER)

        Motion to approve by Bill Scheding, 2nd by Ken Alpern.

        Motion carried: 6 ayes, 1 nay, 1 abstention (Bill Koontz).

        iii. **APPROVAL** of January Monthly Expense Report (MER)

        Motion to approve 7.e.ii-iv on consent by , 2nd by .

        Discussion

        Motion carried: 6 ayes, 1 nay, 1 abstention (Bill Koontz).

        iii. **APPROVAL** of February Monthly Expense Report (MER)

        Motion to approve by Bill Scheding, 2nd by Ken Alpern.

        Motion carried: 5 ayes, 2 nays, 1 abstention (Bill Koontz).

        iV. **Funding Motion**: PO BOX (submitted by ExFin Committee)

The Mar Vista Community Council approves reimbursing Bill Koontz $132 for renewal of our PO Box.

Motion to approve by Bill Scheding, 2nd by Ken Alpern.

Motion carried: 7 ayes, 0 nays, 1 abstention (Bill Koontz).

v **Funding Motion: Mar Vista Eco Car Expo publicity** (submitted by Green Committee)

The Mar Vista Community Council approves the allocation of up to $275 for the printing of Eco Car Expo publicity materials including flyers, banners and signage for the A Frames.

Motion to approve by Melissa Stoller, 2nd by Bill Koontz.

Friendly amendment by Melissa Stoller:

The Mar Vista Community Council approves the allocation of up to $700 for the printing of the following Eco Car Expo publicity materials:

• 2'x5' banner	$35.00
• 75 8 ½" x 11" flyers	$44.00
• 25 8 ½" x 11" 2-up flyers	$24.00
• 12 20"x24" (for a-frames) @ 11.75 each	$141.00
Sub-total	$244.00
Estimated tax	23.79
Total	267.79

Discussion

Michael Millman: Copyland would match price. Bait & switch from other printer. Copyland people are from Mar Vista

Sherri Akers: We've used the printer before.

Motion carried: 7 ayes, 1 nay, 0 abstentions.

v **Funding Motion: Mark Twain CIP to NPG reallocation** (Directors motion submitted by Bill Scheding)

The Mar Vista Community Council approves funding the Mark Twain MS Community Improvement Program grant approved at the February 16, 2016, Board of Directors meeting as a Neighborhood Purpose Grant.

Motion to approve by Bill Koontz, 2nd by Bill Scheding.

Discussion

Bill Scheding: Budget can be moved around.

Melissa Stoller: Reason for motion is that NPG paperwork already done.

Motion carried unanimously.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/

March 17 meeting, talking about sales.

Outreach: please do your part at committee meetings, neighborhood meetings, wherever you go: ask people to run for MVCC board.

n. Animal Services Liaison: Steve Boskin

8. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite

c. Zone 3 – Bill Scheding
d. Zone 4 - Michael Millman
e. Zone 5 – Michelle Krupkin
f. Zone 6 – Valerie Davidson

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
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    b. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    c. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    d. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
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    f. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
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    h. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    i. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    j. **Elections and By-laws**- Bill Koontz, chair
    k. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    l. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    m. **Homeless Issues Committee** – Robin Doyno, Chair
10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

    Meeting adjourned at 9:45 P.M.

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Attachment A: Jerry Hornoff Statement re: Barrington Development Motion (6.b)

I am sorry I cannot attend and thank David for presenting this on my behalf.

As you know we have had a series of meeting over the last few months with the Mar Vista Community Council (MVCC), Councilmember Mike Bonin's office, Westdale Homeowners, and the developer of the property at 3277 Barrington Avenue. Although the preferred outcome would be to retain single family homes on the R3 (multi-family) zoned section of Barrington Avenue (between National Boulevard and the Indianapolis /Federal Avenue intersection) the reality is that at least four properties and perhaps other in the future have been sold to parties interested in multi-family development.

By right in an R3 zone a developer can construct a 45' apartment building housing 9-12 units depending on the design and lot size. There is also a California State Bill (SB1818) that allows for a height increase to 54' (12-15 units) along with an allowed parking space reduction (1 space per unit) if the developer will set aside a small number of units (2-3) as low income. In the first case (45' apartment) there is no variance or hearings required. In the case of SB1818 there is review but in other similar situations the developer has prevailed in spite of Los Angeles City opposition. Based upon research and consultation, my opinion is that our ability to stop a 45' apartment building structure is not possible. Our pressure might be able to slowdown the timeline by a few months but the structure would be built. I have similar concerns regarding an SB1818 project. Unfortunately, individual projects of this size do not result in either a safety or traffic consideration by the Los Angeles City planning or traffic office.

In this reality, the approach taken has been to work with the developer. In the case of 3277 Barrington Avenue the developer has been available and engaged with the MVCC and the Westdale Homeowners Association. They have proposed a small lot subdivision model. At the 3277 Barrington Avenue location this would result in a division into four lots, one unit per lot, and each unit individually owned. Each unit would have two parking spaces. The project would retain the parkway setback. The project will have a maximum height of 42’, the stairway enclosure height, and a predominant height of 36’6”, well below the 45’ by right option. The developer has used windows and a frosted glass deck railing to reduce the impact. They have reduced and setback the rooftop decks to provide more privacy for the units and the neighbors. They have landscaping to also reduce the impact. This is not an ideal solution but I believe it represents a workable outcome. Looking at future development along Barrington Avenue, rather than 9-15 rental units in a 45-54' apartment building per lot we are favoring 4-5 individually owned small lot homes per lot. This would result in significantly reduced densification and provide ownership. It would establish a multi-family development model we can encourage other developers to follow.

I therefore strongly recommend that you support this motion.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, March 8th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 16th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.
    a. **POLICY MOTION: Small Lot Subdivision For The Barrington Corridor North Of The Intersection Of Federal And Indianapolis Avenues** (submitted by PLUM Committee)

    The MVCC values the unique history, character and residential scale of the Westdale neighborhood. The existing two story apartment buildings and single-family homes along Barrington Avenue were designed to blend with the surrounding neighborhood. We support the desires of the owners in the fourteen houses that are zoned R-3 to be able to live along-side developments that are appropriate in scale. Our first preference is that these fourteen properties remain single-family homes. However if any of these properties are to be developed for other uses, the MVCC supports the small lot subdivision model over the larger apartment building model. The reasons included reduced density, better conforming to neighborhood character, and ownership model. We support in concept the plan proposed for 3277 Barrington Avenue with the following conforming stipulations as agreed to by the developer:

    - That the design and materials conform to the character of the existing neighborhood structures.
    - That the existing setback (green space) along Barrington Avenue be preserved.

- That the first structure facing Barrington Avenue has a lower profile (<= 34' 6" railing height) than the structures set further back on the lot resulting in less massing as viewed from the street. (NOTE: the railing is 42" in height by code).
- That the height the remaining structures from ground to the railing height to be <= 36'6".
- That the development adheres to a 9'1", 10'1", 9'1" ceiling height model.
- That the roof decks be stepped back from the outside perimeter to retain privacy for the neighbors and utilize the frosted glass laminate to ensure privacy and a light and pleasing roofline.
- That landscaping is designed to enhance the appearance and includes trees and hedges along the structures facing the alley to mitigate the view of the building from the single-family homes adjacent to the alley.
- That every effort be made to reduce the height (massing) of the structure. Possible considerations would include eliminating the rooftop stairwell enclosures resulting in the screened upper level stairs and handrails being the highest building element on the project. This request is an effort to find common ground with the developer and neighborhood on the project's overall height and is based on the understanding this will allow the developer to continue to provide each of their buyer's a roof deck with no change in the deck's finish floor railing height elevation, currently shown as < 34'6" and its' code required 42" tall frosted glass laminate guard rail.

The MVCC appreciates the time spent and willingness of the developer to adjust plans in a manner that helps to mitigate the concerns of the community and we support this model as the only acceptable approach to the other properties on the street.

b. **POLICY MOTION: Traffic Study to Address Impending Densification of the Barrington Corridor North of the Intersection of Federal and Indianapolis Avenues** (submitted by PLUM Committee)

A recent trend is underway whereby many as 14 historically single family homes on Barrington, just north of the intersection of Federal and Indianapolis Avenues, are likely to be redeveloped as multifamily homes or apartments due to their underlying R3 zoning designation. The City of Los Angeles is also embarking on the Mobility Plan 2035 to address transportation challenges in Los Angeles. Given that the resulting densification will significantly increase cumulative trips generated in the corridor, the MVCC hereby requests that the 11th District Council Office (Councilmember Mike Bonin) coordinate with the City of Los Angeles Department of Transportation to conduct an expedited comprehensive traffic circulation study of the Barrington Corridor area to address impacts and develop potential mitigations, including but not limited to:

- Assess the potential for a signal crossing at Navy Avenue across Barrington Avenue to facilitate pedestrian crossings and vehicular turning movements onto Barrington Avenue;
- Assess the impact at ingress and egress of the alleys on Federal and Indianapolis Avenues, just east and west of Barrington, that are likely to provide access for all the additional off-street parking required to serve the developments. Safety issues that need to be addressed include conflicts in turning movements at the alleys so close to the intersection of Barrington Avenue, and the blind curve on Federal Avenue approaching the alley access;
- Assess the impact and effectiveness of the timing of lights and turn signals at the intersections of Barrington & National, Barrington & Federal, and McLaughlin & Palms;
- Assess the impact and effectiveness of a 4-way stop at the intersection of Federal & Barry/Colbert.
- Installation of a continental crosswalk on the East side of the Barrington & Federal intersection;
- Assess the impact of potential cut-through traffic, speeding and safety on the parallel streets, Stoner, Stanwood, Barry, Clover, Colbert and Federal Avenues, and develop proposed mitigations; and
- Assess the potential impacts on the path of travel of students walking or biking to Mar Vista Elementary School and on drop-off and pick-up at Mar Vista Elementary.

c. **POLICY MOTION: Bay Delta Conservation Plan** (submitted by Green Committee)

Whereas the analysis done by the LADWP Ratepayer Advocate per the MVCC Motion of October 8th, 2013 (see Attachment A) evaluated this project at a significantly lower cost, it does not accurately reflect the cost to Mar Vista Stakeholders. At the current projected cost of $67 billion, this will impose an estimated average cost of $5,000-$10,000 to each Mar Vista household over the life of the project.

Whereas the tunnels won't deliver any new water to Los Angeles, are estimated to cost between $25 and $67 billion (approximately $1.6 to 10 billion Los Angeles share), and would actually undermine Los Angeles' water security, the creation of thousands of local jobs, and would benefit special interests at the expense of Los Angeles ratepayers. Already MWD has taken from LA taxpayers upwards of 300 million intended for tunnels construction, and Mayor Garcetti appointees have voted in support of these motions.

Whereas the twin tunnels would siphon billions we need to support Mayor Garcetti's goals for a more self-sufficient and reliable water system in LA. Mayor Garcetti's Emergency Drought Directive calls for reducing our dependence on imported water, and increasing local water supply sources such as storm water, replenishing groundwater aquifers, and recycled water. As Garcetti's directive states, imported water is not only exponentially more expensive then local water sources, but is at immediate and long term risk because of impacts from climate change and the drought. As these necessary investments are estimated to be over $2 billion, ratepayer money should not be wasted on constructing new tunnels that would primarily benefit special interests.

Be it resolved, that the Mar Vista Community Council opposes the Bay-Delta Conservation Plan (BDCP), "Twin Tunnels," or "California Water Fix" and any effort to divert the Sacramento River.

Be it further resolved that we urge Mayor Eric Garcetti to take action to ensure that ratepayers aren't harmed, specifically by directing his appointees at the Metropolitan Water District (MWD) to vote no on any measure that would spend ratepayer or taxpayer money on the tunnels.

<u>BACKGROUND INFORMATION</u>

Attachment A: October, 2013, MVCC Policy Motion

Attachment B: Los Angeles Los Angeles Groups Opposed to the Bay Delta Tunnels & California Water Fix

Separate documents:

- DWP Ratepayer Advocate Analysis (separate document)
- Food and Water Watch Analysis of Ratepayer Impact of Bay Delta Conservation Plan (separate document)
- Mayor Eric Garcetti Executive Directive No. 5: Emergency Drought Response-Creating a Water Wise City

d. **POLICY MOTION: Special NPG Rule Resolution** (submitted by ExFin Committee)

WHEREAS neighborhoods are composed inherently of stakeholders with interleaved allegiances and agendas; and

WHEREAS managing conflicts of interest is very much the business of any neighborhood council board member; and

WHEREAS all board members sign a code of conduct and attend ethics training; and

WHEREAS Neighborhood Councils are mandated to reflect the diverse interests within their area (Charter Sec. 906(a)(3); Plan Art. II Sec.1); and

WHEREAS MVCC is currently conducting outreach to encourage diverse Stakeholders, *including parents,* to run for seats on their Council; and

WHEREAS parents of school-age children are a significant and important segment of MVCC's district; and

WHEREAS knowing that their membership on the MVCC Board would block any Neighborhood Purpose Grants to their children's schools is a disincentive to run; and

WHEREAS invoking guidance disqualifying NPGs for an individual local school if any Neighborhood Council Board Member has a child at the school is discriminatory and antithetical to the NC charter;

BE IT RESOLVED that the Mar Vista Community Council Board requires an opinion from the City Attorney confirming that this guidance is valid.

e. **POLICY MOTION: Resolution supporting animal rights** (directors' motion submitted by Sherri Akers)

The Mar Vista Community Council supports Council File 15- 0843 (see Attachment C) by Councilmember Paul Koretz and Mitch O'Farrell and urges the City to -

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include.
    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.
    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have
2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

98 percent of Denver properties accept cats and 93 percent accept small dogs. Yet 62 percent of Los Angeles rental properties refuse animals completely. This is considered to be a major obstacle to achieving no kill shelters. With a critical shortage of housing in Los Angeles, having to find housing that accepts pets makes it even more challenging. The MVCC applauds and thanks the Councilmembers for taking action on this issue.

f. **POLICY MOTION: Utility Box Painting** (directors' motion submitted by Robin Doyno)

WHEREAS Mar Vista benefits from beautification projects, and

WHEREAS The Utility Box Painting Projects in other areas of our fair city have enriched, enlivened and civilized the public area, and

WHEREAS the Senior, Artist, and Youth Communities can all share in the creation of The Mar Vista Utility Box Project, and

WHEREAS the Venice Boulevard and Grandview pilot utility box painting enriched the inaugural Mar Vista Art Walk and currently stands as an aesthetic plus to our de facto town square, and

WHEREAS the Los Angeles District Council Office 11 has supported and continues to support the previous iteration as well as the current effort to advance our cultural profile, and

WHEREAS Mar Vista will benefit from the inclusion of the visual history of our community in the Utility Box Painting Project, and

WHEREAS the community will benefit from a juried decision to select 15 to 20 artists to render their submissions on utility boxes by a jury composed of 2 MVCC EACC members, 2 city council staff members and 2 at large community members, and

WHEREAS MVCC EACC shall produce, distribute and post a call for submissions and time line, conduct a selecting jury, post results and execute a letter of understanding, therefore

BE IT RESOLVED that the Mar Vista Community Council shall ask Los Angeles District Council Office 11 to embrace and sponsor the above listed project.

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    a. Chair-Bill Koontz
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    d. Secretary –Melissa Stoller
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n. Animal Services Liaison: Steve Boskin

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ATTACHMENT A: October, 2013, MVCC Policy Motion

Mar Vista Community Council
Web: www.MarVista.org
P.O. Box 66871
Mar Vista, CA 90066
info@marvista.org

Officers 2012-2013
Chair
Sharon Commins
smcommins@marvista.org

1st Vice Chair
Bill Koontz
billk@marvista.org

2nd Vice Chair
Yvette Molinaro
yvette.molinaro@marvista.org

Secretary
Bill Duckett
bduckett@marvista.org

Treasurer
Bill Scheding
wls@MarVista.org

Board of Directors 2012-2013

Zone Directors
Zone 1
Ken Alpern
Zone 2
Bill Koontz
Zone 3
Kate Anderson
Zone 4
Michael Millman
Zone 5
Michelle Krupkin
Zone 6
Valerie Davidson
At-Large Directors
Sharon Commins
Bill Duckett
Yvette Molinaro
Mitchell Rishe
Melissa Stoller
Bill Scheding
Community Director
John Kuchta

Certified Neighborhood Council
August 13, 2002

OCTOBER 14, 2013
VIA EMAIL

To: The Honorable Mike Bonin, Councilmember, 11th District City of Los Angeles mike.bonin@lacity.org
The Honorable Paul Koretz, Councilmember, 5th District, City of Los Angeles paul.koretz@lacity.org

Cc: Len Nguyen, Field Deputy, CD11 len.nguyen@lacity.org
Andy Schrader, Deputy of Environmental Affairs and Sustainability CD 5 andy.shrader@lacity.org

Re: **BAY DELTA CONSERVATION PLAN/RATEPAYER ADVOCATE**

Dear Councilmembers:

At the regularly scheduled meeting held October 8, 2013, The Mar Vista Community Council approved the following policy motion by a unanimous vote:

WHEREAS, the Office of Public Accountability (OPA) is a Los Angeles City department established by voter-approved Charter Amendment I (adopted March 8, 2011) in order to shed greater light on the Department of Water & Power's (DWP) operations and finances and to serve as an independent watchdog, charged with analyzing proposed increases in water and power rates on a timely and continuous basis; and
WHEREAS, the Sacramento-San Joaquin River Delta (Delta), the hub of California's water supply, is facing major challenges, including aging levees, seismic instability, increased urbanization, ecosystem degradation, a lack of fresh water, and a reduced and inconsistent annual snowpack and potential sea-level rise and flooding resulting from the climate crisis; and
WHEREAS, the City of Los Angeles purchases, on average, 50% of its water supply from the Metropolitan Water District of Southern California (MWD); 90% of the City's MWD water is from the Delta via the State Water Project (SWP); and
WHEREAS, the proposed Bay Delta Conservation Plan (BDCP) includes building at a cost of tens of billions of dollars, two 35-mile tunnels to divert a portion of the Sacramento River in a stated attempt to achieve a reliable water supply for California and a healthy Delta ecosystem. The City's ratepayers would be expected to contribute substantially to pay for the BDCP; and
WHEREAS, the DWP has previously announced a policy of purchasing less imported water and pursuing lower cost options of increasing the City's local water supply – its Urban Water Management Plan includes taking the local water supply from 10% to 37% by 2035. These options include greater conservation, wastewater recycling, stormwater capture, grey water systems, new building and fixture standards, aquifer cleanup and infrastructure repair and maintenance. As the production of "local water" by the City will benefit the entire state, the costs should not fall exclusively upon the Los Angeles ratepayers; and
WHEREAS, in early August, 2013, the Brown Administration released a draft statewide economic report of costs and benefits of the BDCP. The Public Draft Plan of the BDCP is scheduled to be released in October. As of August 25, 2013, the City's Ratepayer Advocate has not yet released a report detailing the BDCP's impact upon the City's ratepayers;
NOW, THEREFORE, BE IT RESOLVED that by adoption of this resolution, the Mar Vista Community Council respectfully requests that the Ratepayer Advocate provide an independent, peer-reviewed, cost-benefit analysis of the impact of the BDCP to Mar Vista ratepayers, including an analysis of the externalities – environmental or otherwise, including the expansion of the local job market when building a local water supply – involved in the BDCP, contrast these costs per acre foot with other sources of water, including efficiency-demand management, recycled water, stormwater capture and desalination; and publicly submit this analysis to the Mar Vista Community Council, the other Neighborhood Councils and the Los Angeles City Council for their consideration and comment before the BDCP moves forward.

Thank you for your thoughtful consideration of the matter,

Sharon Commins, Chair
Mar Vista Community Council
smcommins@marvista.org

ATTACHMENT B: Los Angeles Groups Opposed to the Bay Delta Tunnels & California Water

Alliance of Californians for Community Empowerment (ACCE)
Angeles Sierra Club
Center for Human Rights & Constitutional Law
Downtown Neighborhood Council
East Los Angeles Community Corporation
Food & Water Watch
Historic Highland Park Neighborhood Council
Lincoln Heights Neighborhood Council
Los Angeles WaterKeeper
Mar Vista Neighborhood Council - independent cost benefit analysis
Midtown North Hollywood Neighborhood Council
North Hollywood North East Neighborhood Council
Northridge East Neighborhood Council
Northridge South Neighborhood Council
Palms Neighborhood Council
Pico Neighborhood Council
Progressive Democrats of Santa Monica Mountains
Rampart Village Neighborhood Council
Studio City Neighborhood Council – Final EIR
The River Project
Westside Neighborhood Council
Westwood Neighborhood Council
Union de Vecinos
Winetka Neighborhood Council

Other Statewide

Concerned Citizens Water Coalition
Dean Democratic Club of Silicon Valley
AquAlliance
California Save our Streams Council
California Water Impact Network
Center for Biological Diversity
Environmental Protection Information Center
Environmental Water Caucus
POWER, Public Officials for Water and Environmental Reform
Restore the Delta
Southern California Watershed Alliance
Trinity Lake Revitalization Alliance
Marin Water Coalition
San Mateo County Democracy for America

Fishing

California Sportfishing Protection Alliance
California Striped Bass Association – Isleton-Delta Chapter
Fish Sniffer Magazine
Northern California Council Federation of Fly Fishers

Farming and Agricultural

Agricola Flora and Fauna Ranch
California State Grange

Business

BPF Investments
Cole Law Firm
Dave Hieb Surveying

ATTACHMENT C: Animal Rights

File No. 15-0843

PERSONNEL AND ANIMAL WELFARE COMMITTEE REPORT relative to soliciting input in regard to programs and regulations that could facilitate the expansion of animal adoptions by tenants in residential rental properties.

Recommendations for Council action, as initiated by Motion (Koretz - O'Farrell):

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community Investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include:

    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.

    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have.

2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

Fiscal Impact Statement: Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

Community Impact Statement: Yes

For, if amended: Greater Valley Glen Neighborhood Council

(Housing Committee waived consideration of the above matter)

Summary:

On November 18, 2015, your Committee considered a Motion (Koretz - O'Farrell) relative to soliciting input in regard to programs and regulations that could facilitate the expansion of animal adoptions by tenants in residential rental properties. According to the Motion, more than 2 million City residents (approximately 62 percent) are tenants and estimates are that more than half the housing stock consists of rental units that do not accept companion animals. In Denver, by contrast, 98 percent of apartment communities accept cats, 93 percent accept small dogs and 66 percent accept large dogs, all without negatively impacting the perception that the city provides a high quality of life for its residents.

With the City striving to achieve "no kill" status relative to adoptable animals, reaching the goal will require encouraging and, when possible, facilitating adoptions in rental units. Doing so requires seeking and fostering cooperation and understanding between tenants and landlords with regard to companion animals. An American Humane Association survey of shelters in 93 U.S. cities has reported that "moving" is the most common reason given for pet guardians relinquishing their animals to shelters, and "landlord restrictions" ranks fourth. Data collected by the Santa Clara, CA Humane Society indicates that about 26 percent of relinquishments are due to such restrictions.

City shelters report that, since 2011, at least 22.6 percent of relinquished dogs and 18.6 percent of relinquished cats were turned in due to issues relating to tenancy restrictions. Pet guardians who have lost their homes due to economic circumstances often find themselves unable to find rental housing in which they could continue to keep their animals. In other cases landlords have, upon occasion, insisted that existing tenants get rid of their animals or face eviction. In many such cases the City's Rent Stabilization Ordinance protects the tenants, but unfortunately those tenants are not aware of their rights under the law.

After consideration and having provided an opportunity for public comment, the Committee moved to approve the Motion, as amended. This matter is now submitted to Council for its consideration.

Respectfully Submitted,

PERSONNEL AND ANIMAL WELFARE COMMITTEE

MEMBER	VOTE
KORETZ:	YES
RYU:	YES
HARRIS-DAWSON:	YES

ARL
1/19/16

-NOT OFFICIAL UNTIL COUNCIL ACTS-

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, February 16th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:08 P.M.
   Quorum present: Bill Koontz, Mitchell Rishe, Melissa Stoller, Bill Scheding, Yvette Molinaro, Robin Doyno, Sherri Akers, Ken Alpern, Michael Millman, Michelle Krupkin
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 9th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve by Bill Scheding, 2nd by Sherri Akers.
   Corections: Change heading from "AGENDA" to "MINUTES," add "motion tabled" to each tabled motion.
   Minutes as amended unanimously approved.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Michael Millman: Bill Rosendahl not doing well. Asking for contributions to get card/flowers; made $10 donation.
   Sherri: Bill not very cognizant; Visits mean a lot. Family caregivers might appreciate something.
   Bill Koontz: Perhaps send food from a local restaurant.
   Sarah Auerswald: MVCC now on Instagram: marvistacc.
5. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
      i. Report on current financial status
      ii. **APPROVAL** of December Monthly Expense Report (MER)
      Motion to approve by Bill Scheding, 2nd by Bill Koontz.
      Discussion:
      Sara Roos: Submitted several questions; never received response. Some items put to incorrect budget. It matters: Budget is a political document; shows priorities.
      Melissa Stoller: Found errors in every MER to date.
      Mitchell: Line C1 (Outstanding Checks) isn't filled in. Important for determining how much we can still spend.

Bill Scheding: Hasn't been filling it in—it's hard to know what it is. To his knowledge, there's no carry forward of funds from last year. DONE said we should start year with zero balance.

Melissa Stoller: So we know what expenditures have cleared and we know what total we want, and we just put in line items to reach that total? What are we trying to balance to?

Michael Millman: How much money do we have left?

Sarah Auerswald: All the MERs should be corrected. We all need to know how much money there is.

Bill Scheding: February MER will match the money in the bank.

Melissa Stoller: Knowing how much money is in the bank doesn't tell us how much we have to spend.

Friendly amendment: change dates on lines A1 & A2.

Motion to place all three MER motions on consent calendar by Sherri Akers, 2nd by Yvette Molinaro. Motion carried unanimously.

Discussion:

Melissa Stoller: Question to Bill Scheding: are MERs supposed to reflect bank balance? Bill: MERs are so we don't overspend accounts and spend according to budget. Melissa Stoller: But we have money allocated to incorrect budget items, and the MERs only include cleared items.

Mitchell Rishe: We're looking at funding motion of $23,000. As of end of February, we have $14,000 left according to MER.

Sherri Akers: Do we know, with ongoing commitments and outstanding checks, how much we have available? Suggest we table MERs.

Bill Scheding: Don't see any reason to change the MERs.

Michael Millman: Is there a limit on what we can spend at Copyland? Melissa Stoller: I believe limit is $500 a month. Bill Koontz: Limit wouldn't include special printing such as posters.

Motion to table MERs until next meeting by Sherri Akers, 2nd by Mitchell Rishe.

Bill Scheding: Won't redo all the MERs. Can put number in February.

Motion to table carries: 8 ayes, 0 nays, 1 abstention (Bill Scheding).

iii. **APPROVAL** of January Monthly Expense Report (MER)

Motion tabled.

iv. **APPROVAL** of February Monthly Expense Report (MER)

Motion tabled.

v. **Funding Motion: MVCC Election** (submitted by Outreach & Elections Committees)

~~MVCC approves the reallocation of funds in the MVCC budget to the Outreach and Elections/Bylaws Committees not to exceed $23,400 as needed for the following expenses for the 2016 MVCC election as mandated by the City of Los Angeles to ensure maximum community outreach to recruit candidates and maximize voter turnout.~~

- ~~City is requesting 3 direct mailers. Cost to reach 30,000 plus households is $8,465 plus tax. We are proposing two mailers at a total cost of $18,600~~
- ~~100 yard signs – $600~~
- ~~Banners – 6 to be placed at park (2), Farmers Market (at tent), Venice High Learning Garden, Old Fire Station, Walgrove School - $50 each, $300 total~~
- ~~Flyers $200~~
- ~~4-page newsletter (previously allocated in budget) printing, layout and distribution – est. $3,500~~
- ~~Postcards or bookmarks for handout (quote of $32 for $2,500) - $200~~

Whereas the MVCC is mandated to hold elections for a new Board of Directors in 2016,

And whereas compliance with the mandate that Neighborhood Councils reflect the diverse interests within their area (Charter Sec. 906(a)(3); Plan Art. II Sec.1) and the Standards and Best Practices for following this rule states that "NCs should focus their external communication efforts to reach all of the groups (neighborhoods, ethnicities, race, gender, age, homeowners and renters and Sexual orientation) for elections and participation at Board meetings and special events;

And whereas MVCC wishes to improve upon past outreach efforts to abet a diverse makeup of the Board of Directors and to ensure maximum community outreach to recruit candidates and maximize engaged voter turnout;

And whereas MVCC will make use of all methods of outreach available to them, including and especially, methods that incur no cost at all, such as email blasts, Facebook posts, Nextdoor posts, the weekly booth at the Mar Vista Farmers' Market, and in-person discussions, such as at every MVCC Committee meeting and BOD meeting between now and June 4th;

And whereas doorstep distribution of MVCC newsletters excludes the large number of Stakeholders who reside in Multiple Dwelling Units with restricted access;

And whereas there are still important items that must be funded, such as postcards, lawn signs, banners, newsletters and Every Door Direct Mail (EDDM) postage

Be it therefore resolved that MVCC approves the allocation of funds in the MVCC Budget to the Outreach budget for the following expenses for the 2016 election:

- *10,000 postcards to hand out: $750*
- *EDDM delivery to select postal routes within Mar Vista (1 mailer): $1500*
- *50 yard signs: $600*
- *Banners—9 to be placed at park (2), Farmers Market (at tent), Venice High Learning Garden, Old Fire Station, Walgrove School, and Zone 1, 2 and 3 locations to be determined: $450*
- *Flyers: $200*
- *Day-of election expenses—ballot printing, tent rentals, chairs, volunteer t-shirts, etc.: $1500*
- *4-page newsletter (of the $8500 previously allocated in budget, $2,518.57 remains) printing, layout and distribution: $5000*
- *Total funding request: $10,000*

Motion to approve by Melissa Stoller, 2nd by Ken Alpern.

Friendly amendment by Bill Koontz accepted.

Discussion:

Sarah Auerswald: Elections outreach includes lots of things that are free.

Yvette Molinaro: Who will hand out 10,000 postcards, the flyers, etc.? Will put postcards, signs at her Farmers' Market booth.

Sarah Auerswald: Will give out at Farmers' Market, EDDM to apartments, give to lead officers and others to pass out, etc. Yard signs are just like those used for block parties. Flyers will go into kid's backpacks.

Sherri Akers: Newsletter doesn't reach 60% of our community.

Michelle Krupkin: When are we going to get website that we can update?

Bill Scheding: Wants to be sure there's fair distribution of multi-lingual. EDDM must be multi-lingual.

Melissa Stoller: $4500 was initially budgeted for election; newsletter was separately budgeted. So we're only asking for an increase of $500 in the elections budget.

Mitchell Rishe: Is fine with motion. Wants to make sure there are no complaints of newsletters littered all over. It severely impacts Mar Vista's green cred.

Bill Koontz: CBS (current distribution vendor) is the cheapest. He can write letter to them statin that, if they don't do a better job, we will take our business elsewhere.

Michael Millman: Not convinced that if you are a property owner, you don't have the heart to consider diverse issues. A lot of people who reside in apartments tend to be apathetic. Having run MVNA, he would use yard signs, dump the newsletter. In favor of $4500 in budget, think it can be done for $3000.

Melissa Stoller: The Newsletter will be delivered in March and will not include candidate statements. It will tell about MVCC, encourage Stakeholders to run and describe board member responsibilities. It will also publicize the Eco Car Expo.

Ken Alpern: Has wanted renters so bad, he's approached all apartments in Zone 1, but most renters don't care what we do.

Sarah Auerswald: It's our mandate to try.

Bill Scheding: Attended a couple of election administration meetings downtown. It's a one size fits all elections solution; Mar Vista is being hammered same as NCs that get 5 people.

Bill Koontz: Board has storied history of renters on board; he was on the board for 5 years while a renter. Has problem with candidates having to do own flyers—past experience of candidate asking people only to vote for him to increase his chance of winning. Doesn't want candidates to be main source of outreach, wants MVCC to be. At community meetings he attends, he asks "How did you hear about MVCC?": everyone gets newsletters, many saw signs, got emails from neighborhood association.

Bill Scheding: Anyone running for office shouldn't hand out general purpose election stuff.

Sherri Akers: Budget not just to get voters out, also to recruit candidates.

Bill Koontz: …and going forward, get more people involved.

Motion carried unanimously as amended..

vi. **Funding Motion: Webster Middle School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Webster MS** is a community school strongly and increasingly appreciated by our local northern Mar Vista residents.

WHEREAS support of its resurging reputation among the community is very important to Mar Vista's reputation as a residence with strong educational opportunities.

WHEREAS the current highly popular robotics offerings are insufficient to serve more than a single classroom despite great demand for more equipment to teach more, and eager, students.

BE IT RESOLVED that MVCC eagerly grants $2419.70 toward Webster MS's request to partially fund more robotics equipment for a second classroom to reach avid STEAM students.

Motion to place school funding motions on consent by Bill Scheding, 2nd by Ken Alpern. Bill Scheding accepts pulling out 5.e.ix (Venice), 5.e.x (Walgrove), and 5.e.xi (Richland).
Discussion:

Motion to place 5.e.ix-xi on consent calendar unanimously approved.

Discussion:

Melissa Stoller: Passage of all of the funding requests would not leave MVCC with a sufficient cushion to unanticipated expenses. Would like to amend one or more to make funding contingent upon available funds.

Sara Roos: In EAC committee would like first four requests (5.e.vi-ix) funded at level requested. If need to cut down, slice from Richland and Grand View. Some of the grants are discrete—can't do if funding is reduced.

Ken Alpern: Agrees with many of the concerns pro and con, doesn't want to loose a well functioning education committee. We should put our faith in education committee.

Michael Millman: We're just talking about consent motion.

Sherri Akers: We asked EACC to take another look at their requests; they did everything we asked.

Motion to approve consent calendar by Bill Scheding, 2nd by Ken Akern. Motion carried unanimously.

vii. **Funding Motion: Mark Twain Middle School CIG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Mark Twain ES** has attracted considerable attention of late concerning its public properties and community aesthetics, and

WHEREAS social injustice in the relative public spending among local primary school campuses is of local public concern, and

WHEREAS the outdoor play equipment and public spaces at Mark Twain are long in need of enrichment and beautification, it would address the public's focus to

BE IT RESOLVED that MVCC would support Twain's outdoor spaces through a Community Improvement Grant for $1719 matching the cost of Outdoor PE Equipment ($969) with the local West Mar Vista Neighborhood Association that organized local activism in this regard.

Approved on consent.

viii. **Funding Motion: Grand View Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Grand View Elementary School** serves over 500 children a packet of processed food daily.

WHEREAS despite being a school of high poverty concentration, still appreciable amounts of this biodegradable meal head for a landfill every day.

WHEREAS this school has an active gardening program with instruction on high quality, home-grown foodstuffs and earth sciences that would benefit pedagogically from the component that shows the ecology of waste.

WHEREAS salvaging the food waste and transforming its nutrients into a form compatible with growth, learning and the school's learning garden will benefit all available parties and constructs.

BE IT RESOLVED that MVCC recommends applying $1300 toward a Neighborhood Purpose Grant that will facilitate closing the knowledge circle on food, food waste, decomposition and regrowth.

Approved on consent.

ix. **Funding Motion: Venice High School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Venice High School** (VHS) is Mar Vista's local westside secondary school, enrolling more than 2000 children of whom approximately two-thirds are "socioeconomically disadvantaged", and distributed ethnically with a population that is two-thirds Hispanic and equal measures among one quarter its students that is Caucasian and African-American.

WHEREAS VHS students and community alumni are integrally connected with a history and culture of both beach and conservation honoring its "Dogtown" and "green" roots.

WHEREAS hundreds of students commute daily in a self-propelled mode that fosters traffic mitigation and clean, green, healthy community values that merit support from the community at large.

WHEREAS publicly and monetarily supporting the values reflected by our community confers encouragement of beneficial community values that itself attracts families and community-spirited individuals.

BE IT RESOLVED that MVCC will contribute $1949.90 toward funding purchase of securable wheelbase lockers that encourage studious behavior, sustainable commuting and healthful living among our community's young scholars.

Motion to approve by Bill Scheding, 2nd by Mitchell Rishe.

Discussion:

> Michelle Krupkin: Has neighbor on administrative staff, is sympathetic to his desire to get the skateboards out of his office. If students had bought smaller skateboards, they would fit in their lockers.

Ken Alpern: 1st response was I'd rather spend on books. I realize that there are alternative forms of transportation. But this is way to keep people out of cars, kids exercising.

Michael Rishe: Will support motion out of friendship and belief in the committee system. Questions statement that it will "encourage studious behavior."

Mitchell Rishe: It's not for us to tell a school what they need. They asked for lockers.

Melissa Stoller: Requests friendly amendment to make conditional on funding available. Bill Scheding rejects the amendment.

Sar Rooa: This motion addresses what the school says is their problem. Venice High is a community of 2200 kids. Students are riding skateboards on campus. New principal says, his is what she needs to get things under control—do what kids need to get them to work with us. This is a movement toward huge community that feels disenfranchised.

Bill Scheding: He's hearing that there are board members who don't want to tell the community we're spending money on skateboard lockers, and he understands.

Bill Koontz (to Sara Roos): We asked you to look for other funding, maybe go halves with Venice NC.

Ken Alpern: Skateboards are cheaper overall than bicycles. This will make the students play by the rules, not act as hooligans. Wants to have MVCC logo on this.

Michael Millman: Has his vote, but there are students with skateboards who were out of control. Principal asked "what will it take to get you to store your skateboards." Now we're going to reward them with lockers.

Motion carried: 7 ayes, 1 nay, 0 abstentions.

x. **Funding Motion: Walgrove Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Walgrove Elementary School** is situated in the increasingly popular westernmost edge of Mar Vista.

WHEREAS private fundraising at Walgrove has become critical in supplementing operating funds lost as a result of district-wide austerity measures.

WHEREAS Walgrove's popularity has been growing though less steadily recently so that anchoring enrollment is imperative not only for this school but for the integrity of the whole community as well.

WHEREAS community outreach is not only fun and good but crucial toward sustaining the school, its community and what makes the community so attractive.

BE IT RESOLVED that MVCC will contribute $1250 toward supporting this community interaction which showcases current student's beloved Studio Lab learning and conveys its appeal to neighbors and their prospective students.

Motion to approve by Bill Scheding, 2nd by Melissa Stoller.

Friendly amendment offered by Melissa Stoller: to the extent funds are available. Withdrawn.

Discussion:

Sara Roos: Event is in Spring. Is something they will go ahead with or without MVCC funding. A teacher has been paying for this out-of=pocket.

Motion carried unanimously.

xi. **Funding Motion: Richland Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Richland Elementary School** has initiated a dual language French instructional program.

WHEREAS materials at the school formerly devoted to conventional English-only instruction are wanting in French resources.

WHEREAS the MVCC has explicitly supported instigation of this popular program, commending it as an important aspect of local living that recommends Mar Vista to young families.

WHEREAS fundraising potential and discretionary budgeting among the school and its community are scarce.

BE IT RESOLVED that MVCC allocates up to $1K for the purchase of dual language resources to the school as most befits its dual language learners.

Motion to approve by Bill Scheding, 2nd by Sherri Akers.

Michael Millman recused himself—wife volunteers and teaches in French program.

Motion carried: 6 ayes, 1 nays, 0 abstentions, 1 recused.

xii. **Funding Motion: Budget Balancing** (directors motion submitted by Bill Scheding)

Whereas the MVCC budgets need an adjustment,

Therefore be it resolved to move $5000 from acct 300 (CIG) to acct 100 (Operations) and

Therefore be it resolved to move $6000 from acct 400 (NPG) to acct 500 (Elections).

Motion to approve by Bill Scheding, 2nd by Ken Alpern.

Discussion:

Melissa Stoller: All expenditures should be booked to the correct budget category before we adjust the budget.

Motion carried: 6 ayes, 1 nay, 1 abstention (Mitchell Rishe).

6. **Public Comment**

Sarah Auerswald: How do I request an audit?

Sara Roos: Now there isn't funding for motions just passed.

Sherri: Akers Would like us to find out what other NCs do. Agrees that MER is just a report, not an accounting system.

7. **Adjournment**

Meeting adjourned at 9:15 P.M.

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, February 9th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 12th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Special presentation to Lizka Mendoza
        ii. Executive & Finance Committee
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
        i. Report on current financial status
        ii. **APPROVAL** of December Monthly Expense Report (MER)
        iii. **APPROVAL** of January Monthly Expense Report (MER)

iv **Funding Motion: Mar Vista Eco Car Expo publicity** (submitted by Green Committee)

The Mar Vista Community Council approves the allocation of up to $700 for the printing of Eco Car Expo publicity materials including flyers, banners and signage for the A Frames.

v **Funding Motion: Mar Vista Art Walk** (director's motion submitted by Robin Doyno)

Whereas a goal of Mar Vista's Great Street project is to enhance its reputation as a walkable, attractive destination; and

Whereas art walks attract local foot traffic and increase economic viability of communities; and

Whereas during the inaugural Mar Vista Art Walk, held December 3, 2015 some local businesses reported more than double their normal sales and even their best sales night ever; and

Whereas approximately 1,000 visitors walked along Venice Boulevard and participated in the evening's program of events; and

Whereas many art walk events transpired outdoors on sidewalks, thus encouraging the majority of visitors to walk the entire length of our Venice Boulevard Great Street due to this organizational emphasis on sidewalk engagement;

The Mar Vista Community Council approves a Neighborhood Purpose Grant of $500 for printing of fliers, posters, maps, programs, handouts for a second Mar Vista ark walk—Steppin' Into the Art of Mar Vista, to be organized and run by non-profit Green Communications Initiative, Inc., and held March 3, 2015, 6-9p.m. along the Venice Blvd CD- 11 "Great Street" between Inglewood Blvd—Beethoven Street.

vi. **Funding Motion: MVCC Election** (submitted by Outreach & Elections Committees)

MVCC approves the reallocation of funds in the MVCC budget to the Outreach and Elections/Bylaws Committees not to exceed $23,400 as needed for the following expenses for the 2016 MVCC election as mandated by the City of Los Angeles to ensure maximum community outreach to recruit candidates and maximize voter turnout.

- City is requesting 3 direct mailers. Cost to reach 30,000 plus households is $8,465 plus tax. We are proposing two mailers at a total cost of $18,600
- 100 yard signs - $600
- Banners – 6 to be placed at park (2), Farmers Market (at tent), Venice High Learning Garden, Old Fire Station, Walgrove School - $50 each, $300 total
- Flyers $200
- 4-page newsletter (previously allocated in budget) printing, layout and distribution – est. $3,500
- Postcards or bookmarks for handout (quote of $32 for $2,500) - $200

vii. **Funding Motion: Webster Middle School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Webster MS** is a community school strongly and increasingly appreciated by our local northern Mar Vista residents.

WHEREAS support of its resurging reputation among the community is very important to Mar Vista's reputation as a residence with strong educational opportunities.

WHEREAS the current highly popular robotics offerings are insufficient to serve more than a single classroom despite great demand for more equipment to teach more, and eager, students.

BE IT RESOLVED that MVCC eagerly grants $2419.70 toward Webster MS's request to partially fund more robotics equipment for a second classroom to reach avid STEAM students.

viii. **Funding Motion: Mark Twain Middle School CIG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Mark Twain ES** has attracted considerable attention of late concerning its public properties and community aesthetics, and

WHEREAS social injustice in the relative public spending among local primary school campuses is of local public concern, and

WHEREAS the outdoor play equipment and public spaces at Mark Twain are long in need of enrichment and beautification, it would address the public's focus to

BE IT RESOLVED that MVCC would support Twain's outdoor spaces through a Community Improvement Grant for $1719 matching the cost of Outdoor PE Equipment ($969) with the local West Mar Vista Neighborhood Association that organized local activism in this regard.

ix. **Funding Motion: Grand View Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Grand View Elementary School** serves over 500 children a packet of processed food daily.

WHEREAS despite being a school of high poverty concentration, still appreciable amounts of this biodegradable meal head for a landfill every day.

WHEREAS this school has an active gardening program with instruction on high quality, home-grown foodstuffs and earth sciences that would benefit pedagogically from the component that shows the ecology of waste.

WHEREAS salvaging the food waste and transforming its nutrients into a form compatible with growth, learning and the school's learning garden will benefit all available parties and constructs.

BE IT RESOLVED that MVCC recommends applying $1300 toward a Neighborhood Purpose Grant that will facilitate closing the knowledge circle on food, food waste, decomposition and regrowth.

x. **Funding Motion: Venice High School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Venice High School** (VHS) is Mar Vista's local westside secondary school, enrolling more than 2000 children of whom approximately two-thirds are "socioeconomically disadvantaged", and distributed ethnically with a population that is two-thirds Hispanic and equal measures among one quarter its students that is Caucasian and African-American.

WHEREAS VHS students and community alumni are integrally connected with a history and culture of both beach and conservation honoring its "Dogtown" and "green" roots.

WHEREAS hundreds of students commute daily in a self-propelled mode that fosters traffic mitigation and clean, green, healthy community values that merit support from the community at large.

WHEREAS publicly and monetarily supporting the values reflected by our community confers encouragement of beneficial community values that itself attracts families and community-spirited individuals.

BE IT RESOLVED that MVCC will contribute $1949.90 toward funding purchase of securable wheelbase lockers that encourage studious behavior, sustainable commuting and healthful living among our community's young scholars.

xi. **Funding Walgrove Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Walgrove Elementary School** is situated in the increasingly popular westernmost edge of Mar Vista.

WHEREAS private fundraising at Walgrove has become critical in supplementing operating funds lost as a result of district-wide austerity measures.

WHEREAS Walgrove's popularity has been growing though less steadily recently so that anchoring enrollment is imperative not only for this school but for the integrity of the whole community as well.

WHEREAS community outreach is not only fun and good but crucial toward sustaining the school, its community and what makes the community so attractive.

BE IT RESOLVED that MVCC will contribute $1250 toward supporting this community interaction which showcases current student's beloved Studio Lab learning and conveys its appeal to neighbors and their prospective students.

ix. **Funding Richland Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Richland Elementary School** has initiated a dual language French instructional program.

WHEREAS materials at the school formerly devoted to conventional English-only instruction are wanting in French resources.

WHEREAS the MVCC has explicitly supported instigation of this popular program, commending it as an important aspect of local living that recommends Mar Vista to young families.

WHEREAS fundraising potential and discretionary budgeting among the school and its community are scarce.

BE IT RESOLVED that MVCC recommends contributing $1K worth of dual language resources to the school as most befits its dual language learners.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/
n. Animal Services Liaison: Steve Boskin

7. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **POLICY MOTION: Resolution supporting Mar Vista Schools** (directors' motion submitted by Melissa Stoller)

Whereas our schools are an integral part of our community, and

Whereas the Mar Vista Community Council, and the community it serves, strongly values our neighborhood schools and supports their efforts to enhance their students educational experience and attract students from our neighborhood to our schools; and

Whereas, as a result of district-wide austerity measures, LAUSD budgets do not adequately support many community-supported enhancements to our children's educational experience—and even some basic needs—such as:

- A composting program to transform the compulsory "Breakfast in the Classroom" mandate from a classroom refuse problem into a composting program that teaches nutrition and ecology and supports the thriving learning garden program at Grand View Elementary;
- Dual language resources to support and grow a French dual language immersion program initiated by Richland Elementary School;
- Outdoor play equipment, such as functional basketball nets and refurbished backboards, as expressly addresses neighbors' concerns from the community surrounding Mark Twain Middle School;
- Robotics equipment to enable Webster Middle School to expand its popular robotics programs beyond a single classroom and reach more of the students eager to learn;
- Walgrove Elementary School's annual Game Day that reaches out to the community to showcase its exciting Studio Lab program;
- Wheel-locking skateboard lockers at Venice High School that would provide safe storage for student's boards and allowing them to focus on their studies, encourage "green" transportation mode that reduces vehicular congestion, and improve student attendance; and

Whereas, despite high poverty rates at many of our schools, parents have made significant contributions toward educational enhancements at their schools; and

Whereas identifying the most critical needs to present as a Neighborhood Purpose Grant or Community Improvement Project to MVCC requires an enormous time investment by school staff and community volunteers; and

Whereas MVCC needs to reserve funds for operational and outreach expenses as well as for unforeseen community needs and priorities, making it difficult to support NPG requests until near the end of its fiscal year; and

Whereas holding its mandated council election at the end of its fiscal year exacerbates this problem; and

Whereas schools need to receive NPG funding early in the school year in order to spend the grant money as intended by MVCC; and

Whereas community council funds do not carry over to the next fiscal year;

Let it be resolved that the Mar Vista Community Council requests a rule change to allow Neighborhood Purpose Grant and Community Improvement Project funding approved by a neighborhood council before the end of its fiscal year to be spent by schools in the next fiscal year.

Additionally, let it be resolved that MVCC encourages board, committee and community members to assist in finding alternative funding sources for these worthy projects.

b. **POLICY MOTION: Resolution supporting animal rights** (directors' motion submitted by Sherri Akers)

The Mar Vista Community Council supports Council File 15- 0843 (see Attachment A) by Councilmember Paul Koretz and Mitch O'Farrell and urges the City to -

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include.
    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.
    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have
2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

98 percent of Denver properties accept cats and 93 percent accept small dogs. Yet 62 percent of Los Angeles rental properties refuse animals completely. This is considered to be a major obstacle to achieving no kill shelters. With a critical shortage of housing in Los Angeles, having to find housing that accepts pets makes it even more challenging. The MVCC applauds and thanks the Councilmembers for taking action on this issue.

c. **POLICY MOTION: Martin Expo Town Center Project**, 12101 W. Olympic Blvd., Case Nos. TT-72298-MU; ENV-2012-3063-EIR; CPC-2013-2567-GPA-VZC-HD- CU-MCUB-CUX-ZV-ZAD-SPR; CPC-2015-4455-DA (submitted by PLUM & T&I Committees)

WHEREAS, traffic in West Los Angeles surrounding the Martin Expo Town Center Project is in gridlock at every major nearby intersection, especially during "rush hours"; and

WHEREAS, it is unknown but anticipated that traffic will become even more impacted once Phase 2 of the Metro Expo Line begins operation, especially as a result of a number of "at grade" crossings, including the nearby crossing on Barrington Ave.; and

WHEREAS, it is unknown but anticipated that, in order to avoid "at grade" crossings, commuters will divert their traffic patters to "above grade" crossing streets, including Bundy Dr. where the Martin Town Center Project is located; and

WHEREAS, it is unknown but anticipated that, once Phase 2 of the Metro Expo Line begins operation, streets surrounding the Project, including side and residential streets, will be impacted as riders commute by car and bike to and from the adjacent Expo/Bundy station:

NOW, THEREFORE, the Mar Vista Community Council strongly recommends that the City Planning Department put any approvals relating to the Martin Expo Town Center Project

on hold, pending a new traffic study after Phase 2 of the Metro Expo Line starts operation, as this will allow the City to better determine the Project's full impact on traffic.

d. **POLICY MOTION: WRAC Motion RE: Conditional Use Beverage (CUB) Permits** for Alcohol Authority of City Zoning Administrators to Impose Conditions of Approval to Mitigate Potential Land Use Impacts Arising from the Sale or Service of Alcoholic Beverages That Are Adverse to Public Health, Safety and Welfare (submitted by PLUM & T&I Committees)

WHEREAS, the City of Los Angeles has imposed land use conditions in

Conditional Use Beverage (CUB) permits for decades to protect public health, safety and welfare by mitigating potential impacts due to the sale or service of alcohol, as recommended by the LAPD, Council Offices, neighborhood councils, community councils, and local residents; and

WHEREAS, the Department of City Planning suddenly reversed this decades-long practice in 2012, on the advice of the City Attorney's Office, with no public notice, no public process, no public hearings, and no direction from the City Council, which is charged with policy-making authority; and

WHEREAS, Zoning Administrators now unilaterally and without notice use the Plan Approval Process to remove previously-imposed conditions designed to avoid or mitigate actual or potential land use impacts adverse to public health, safety and welfare; and

WHEREAS, municipalities throughout the State of California have and continue to impose land use conditions to mitigate adverse impacts that may otherwise arise from the sale or service of alcohol, including the Cities of Santa Monica, West Hollywood, Palmdale, Lancaster, Huntington Park, Montebello, Orange, San Bernardino, Pinole, Ventura, San Buenaventura, Santa Cruz, Hayward, Walnut Creek, Watsonville, and the County of Los Angeles, among others; and

WHEREAS, the City's current practice undermines the ability of the City and local communities to protect against potential land use impacts that are adverse to public health, safety and welfare, including but not limited to potential nuisances, by restricting the imposition of conditions on, among other things, hours of sale of alcohol, happy hours, container sizes, types of alcohol sold, and other similar rules and regulations, despite the efficacy of such conditions in avoiding or mitigating potential adverse impacts arising from the sale or service of alcohol; and

WHEREAS, California courts have repeatedly affirmed that municipalities have broad police powers to impose land use conditions that protect against potentially adverse impacts on public health, safety and welfare arising from the sale or service of alcohol; and

WHEREAS, the California Department of Alcoholic Beverage Control (ABC) has not advised the City that the imposition of such land use conditions interferes with ABC's enforcement of State law; and

WHEREAS, implementation of this new policy not only impairs the ability of the LAPD, Council Offices, and communities to protect public health, safety and welfare, but also interferes with the ability of CUB applicants to garner support for their projects by negotiating for the imposition of mutually agreed-upon conditions, as had been done for decades before the current practice was imposed, which forces communities to oppose projects they could otherwise support with proper conditions:

NOW, THEREFORE, be it Resolved that the Mar Vista Community Council calls upon the City Council to adopt a policy to: (1) Authorize the imposition of land use conditions that protect public health, safety and welfare by mitigating potential adverse impacts from the sale or service of alcohol, consistent with the practice of other jurisdictions statewide as well as the City's decades-long practice prior to 2012; (2) Maintain and enforce previously-imposed CUB conditions on the sale or service of alcohol; and (3) Prohibit the removal of previously-imposed conditions outside the public processes mandated under the City Charter and Zoning Code.

e. **POLICY MOTION: Utility Box Painting** (directors' motion submitted by Robin Doyno)

WHEREAS Mar Vista benefits from beautification projects, and

WHEREAS The Utility Box Painting Projects in other areas of our fair city have enriched, enlivened and civilized the public area, and

WHEREAS the Senior, Artist, and Youth Communities can all share in the creation of The Mar Vista Utility Box Project, and

WHEREAS the Venice Boulevard and Grandview pilot utility box painting enriched the inaugural Mar Vista Art Walk and currently stands as an aesthetic plus to our de facto town square, and

WHEREAS the Los Angeles District Council Office 11 has supported and continues to support the previous iteration as well as the current effort to advance our cultural profile, and

WHEREAS Mar Vista will benefit from the inclusion of the visual history of our community in the Utility Box Painting Project, and

WHEREAS the community will benefit from a juried decision to select 15 to 20 artists to render their submissions on utility boxes by a jury composed of 2 MVCC EACC members, 2 city council staff members and 2 at large community members, and

WHEREAS MVCC EACC shall produce, distribute and post a call for submissions and time line, conduct a selecting jury, post results and execute a letter of understanding, therefore

BE IT RESOLVED that the Mar Vista Community Council shall ask Los Angeles District Council Office 11 to embrace and sponsor the above listed project.

8. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    b. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    c. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    d. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    e. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    f. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    g. **Safety and Security Committee** – Rob Kadota, Chair
    h. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    i. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    j. **Elections and By-laws**- Bill Koontz, chair
    k. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    l. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    m. **Homeless Issues Committee** – Robin Doyno, Chair
10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

ATTACHMENT A: Council File 15-0843

File No. 15-0843

PERSONNEL AND ANIMAL WELFARE COMMITTEE REPORT relative to soliciting input in regard to programs and regulations that could facilitate the expansion of animal adoptions by tenants in residential rental properties.

Recommendations for Council action, as initiated by Motion (Koretz - O'Farrell):

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community Investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include:

    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.

    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have.

2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

Fiscal Impact Statement: Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

Community Impact Statement: Yes

For, if amended: Greater Valley Glen Neighborhood Council

(Housing Committee waived consideration of the above matter)

Summary:

On November 18, 2015, your Committee considered a Motion (Koretz - O'Farrell) relative to soliciting input in regard to programs and regulations that could facilitate the expansion of animal adoptions by tenants in residential rental properties. According to the Motion, more than 2 million City residents (approximately 62 percent) are tenants and estimates are that more than half the housing stock consists of rental units that do not accept companion animals. In Denver, by contrast, 98 percent of apartment communities accept cats, 93 percent accept small dogs and 66 percent accept large dogs, all without negatively impacting the perception that the city provides a high quality of life for its residents.

With the City striving to achieve "no kill" status relative to adoptable animals, reaching the goal will require encouraging and, when possible, facilitating adoptions in rental units. Doing so requires seeking and fostering cooperation and understanding between tenants and landlords with regard to companion animals. An American Humane Association survey of shelters in 93 U.S. cities has reported that "moving" is the most common reason given for pet guardians relinquishing their animals to shelters, and "landlord restrictions" ranks fourth. Data collected by the Santa Clara, CA Humane Society indicates that about 26 percent of relinquishments are due to such restrictions.

City shelters report that, since 2011, at least 22.6 percent of relinquished dogs and 18.6 percent of relinquished cats were turned in due to issues relating to tenancy restrictions. Pet guardians who have lost their homes due to economic circumstances often find themselves unable to find rental housing in which they could continue to keep their animals. In other cases landlords have, upon occasion, insisted that existing tenants get rid of their animals or face eviction. In many such cases the City's Rent Stabilization Ordinance protects the tenants, but unfortunately those tenants are not aware of their rights under the law.

After consideration and having provided an opportunity for public comment, the Committee moved to approve the Motion, as amended. This matter is now submitted to Council for its consideration.

Respectfully Submitted,

PERSONNEL AND ANIMAL WELFARE COMMITTEE

MEMBER	VOTE
KORETZ:	YES
RYU:	YES
HARRIS-DAWSON:	YES

ARL
1/19/16

-NOT OFFICIAL UNTIL COUNCIL ACTS-

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, February 9th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:08 P.M.
   Quorum present: Bill Koontz, Mitchell Rishe, Melissa Stoller, Bill Scheding, Yvette Molinaro, Robin Doyno, Sherri Akers, Ken Alpern, Brad Wilhite, Michael Millman, Michelle Krupkin, Valerie Davidson
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 12th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve by Bill Scheding 2nd by Sherri Akers. Friendly amendment to correct date in item 7.e. Minutes unanimously approved as amended.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Martin Rubin: North Westdale Neighborhood Association meeting on February 24 at St. Andrews Church. Guest speaker is Nelson Hernandez, senior advisor to Santa Monica on airport affairs.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      City approved a coordinated strategy to address homeless situation in cooperation with County. Immediate strategy's to address encampments. Options for dealing with people living in cars were presented to Council in closed session. The Safe Park Program allows churches and businesses to have a few cars parked overnight.
      Bill Scheding: Cars are parking again on Centinela north of National, south of Gateway on east side. Should be no parking—cars change lanes, could hit bicyclsts.
      Mike will talk to board soon about turnover of Historic Fire Station 62.
      Presentation of certificate of appreciation to Lizka Mendoza.
   b. Mar Vista Recreation Center – Lizka Mendoza, Director
      Lizka's next assignment is in Winnetka. New Mar Vista Recreation Center director, Tracy Fields, will start last week of February; 25 year veteran of department.
      Brad WIlhite: is there one thing we should keep eye on?
      Lizka: two major things:
      - Soccer field—is in beginning stages of getting three quotes
      - Acoustic tiling in gym

      Also, quality of life, homeless situation: acknowledge that they are people and need help. Has been working with LAPD, park rangers, District Attorney, County. Balancing of situation (humanity vs. safety) is important; living in the pool is safety issue.
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn
   e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
      Congresswoman Karen Bass is hosting a meeting at Mar Vista Recreation Center on Monday, March 7, 6:30 P.M. LAWA will be there to talk about: Santa Monica airport, metroplex, and flight paths.

Issues suggested by board members: homeless vets, economy, postal service, car pool lanes double line (Maral: county jurisdiction but has relationship),

f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
l. Joel Jacinto, Department of Public Works

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
      i. Special presentation to Lizka Mendoza
      ii. Executive & Finance Committee

      ExFin Committee members are the MVCC officers. Only two fo the five officers were at the last meeting (no quorum) so ExFin couldn't meet.
   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
      i. Report on current financial status

      [Spreadsheets created by Melissa Stoller and by Sara Roos distributed]

      Bill Scheding: Cash/expenditures carried over from previous year plus checks not yet cleared makes balancing budget difficult. Wrote $5000 in checks last night and now is only about $11,000 in bank.

      Sherri Akers: Why is there only $11,000 in back account when MER shows $22,744.53 balance?

      Bill Scheding: Doesn't wish to vote more than $11,000 today of funding today.

      Ken Alpern: Pass funding requests as "if funding available."

      Yvette Molinaro: What if we pass nine funding motions and run out of money at motion 4?

      Bill Koontz: Is one week enough to get to bottom of funding?

      Bill Scheding: Thinks budget amounts are accurate, not sure about the rest.

      Sherri Akers: Is the $5000 in extra funding in bank account yet? We need an audit, concerned we're at risk.

      Steve Wallace: Need to account for money in and out; need something to show, maybe should have audit.

      Bill Koontz: Uncomfortable with making decisions now; we have three spreadsheets, three amounts.

      Ken Alpern: This is an NC that gets things done. Recommend to chair: if can fix by Sunday, can we call emergency meeting, have tentative pathway.

      Bill Koontz: Emergency meeting can only address one item; wouldn't be able to consider budget motions.

      Ken Alpern: Then set reasonable date for a BOD meeting; seems like can do in a week.

      Meeting is February 16. Bill Koontz will send out Doodle

      Bill Scheding: Motions should go back to originating committees We are subverting committee process by just using friendly amendments.

Sarah Auerswald: How can we know the amount available so we can rework requests.

Need statement of what's been spent.

Michael Mellman: Putting cart before horse: can do world class election with no money. Do we really need all this outreach? We won't get more people. All of us can reach out to 150 friends to vote.

Paula: What can we do in future to make sure this doesn't happen again?

Motion by Bill Scheding to refer all funding motions back to committee; no 2nd and motion is dropped.

Motion by Ken Alpern to table all funding motions until next meeting, 2nd by Sherri Akers. Motion carries: 7 ayes, 2 nays, 0 abstentions.

ii. **APPROVAL** of December Monthly Expense Report (MER)

iii. **APPROVAL** of January Monthly Expense Report (MER)

iv **Funding Motion: Mar Vista Eco Car Expo publicity** (submitted by Green Committee)

The Mar Vista Community Council approves the allocation of up to $700 for the printing of Eco Car Expo publicity materials including flyers, banners and signage for the A Frames.

v **Funding Motion: Mar Vista Art Walk** (director's motion submitted by Robin Doyno)

Whereas a goal of Mar Vista's Great Street project is to enhance its reputation as a walkable, attractive destination; and

Whereas art walks attract local foot traffic and increase economic viability of communities; and

Whereas during the inaugural Mar Vista Art Walk, held December 3, 2015 some local businesses reported more than double their normal sales and even their best sales night ever; and

Whereas approximately 1,000 visitors walked along Venice Boulevard and participated in the evening's program of events; and

Whereas many art walk events transpired outdoors on sidewalks, thus encouraging the majority of visitors to walk the entire length of our Venice Boulevard Great Street due to this organizational emphasis on sidewalk engagement;

The Mar Vista Community Council approves a Neighborhood Purpose Grant of $500 for printing of fliers, posters, maps, programs, handouts for a second Mar Vista ark walk—Steppin' Into the Art of Mar Vista, to be organized and run by non-profit Green Communications Initiative, Inc., and held March 3, 2015, 6-9p.m. along the Venice Blvd CD- 11 "Great Street" between Inglewood Blvd—

Motion tabled.

vi. **Funding Motion: MVCC Election** (submitted by Outreach & Elections Committees)

MVCC approves the reallocation of funds in the MVCC budget to the Outreach and Elections/Bylaws Committees not to exceed $23,400 as needed for the following expenses for the 2016 MVCC election as mandated by the City of Los Angeles to ensure maximum community outreach to recruit candidates and maximize voter turnout.

- City is requesting 3 direct mailers. Cost to reach 30,000 plus households is $8,465 plus tax. We are proposing two mailers at a total cost of $18,600
- 100 yard signs - $600
- Banners – 6 to be placed at park (2), Farmers Market (at tent), Venice High Learning Garden, Old Fire Station, Walgrove School - $50 each, $300 total
- Flyers $200
- 4-page newsletter (previously allocated in budget) printing, layout and distribution – est. $3,500
- Postcards or bookmarks for handout (quote of $32 for $2,500) - $200

Motion tabled.

vii. **Funding Motion: Webster Middle School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Webster MS** is a community school strongly and increasingly appreciated by our local northern Mar Vista residents.

WHEREAS support of its resurging reputation among the community is very important to Mar Vista's reputation as a residence with strong educational opportunities.

WHEREAS the current highly popular robotics offerings are insufficient to serve more than a single classroom despite great demand for more equipment to teach more, and eager, students.

BE IT RESOLVED that MVCC eagerly grants $2419.70 toward Webster MS's request to partially fund more robotics equipment for a second classroom to reach avid STEAM students.

Motion tabled.

viii. **Funding Motion: Mark Twain Middle School CIG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Mark Twain ES** has attracted considerable attention of late concerning its public properties and community aesthetics, and

WHEREAS social injustice in the relative public spending among local primary school campuses is of local public concern, and

WHEREAS the outdoor play equipment and public spaces at Mark Twain are long in need of enrichment and beautification, it would address the public's focus to

BE IT RESOLVED that MVCC would support Twain's outdoor spaces through a Community Improvement Grant for $1719 matching the cost of Outdoor PE Equipment ($969) with the local West Mar Vista Neighborhood Association that organized local activism in this regard.

Motion tabled .

ix. **Funding Motion: Grand View Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Grand View Elementary School** serves over 500 children a packet of processed food daily.

WHEREAS despite being a school of high poverty concentration, still appreciable amounts of this biodegradable meal head for a landfill every day.

WHEREAS this school has an active gardening program with instruction on high quality, home-grown foodstuffs and earth sciences that would benefit pedagogically from the component that shows the ecology of waste.

WHEREAS salvaging the food waste and transforming its nutrients into a form compatible with growth, learning and the school's learning garden will benefit all available parties and constructs.

BE IT RESOLVED that MVCC recommends applying $1300 toward a Neighborhood Purpose Grant that will facilitate closing the knowledge circle on food, food waste, decomposition and regrowth.

Motion tabled.

x. **Funding Motion: Venice High School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Venice High School** (VHS) is Mar Vista's local westside secondary school, enrolling more than 2000 children of whom approximately two-thirds are "socioeconomically disadvantaged", and distributed ethnically with a population that is two-thirds Hispanic and equal measures among one quarter its students that is Caucasian and African-American.

WHEREAS VHS students and community alumni are integrally connected with a history and culture of both beach and conservation honoring its "Dogtown" and "green" roots.

WHEREAS hundreds of students commute daily in a self-propelled mode that fosters traffic mitigation and clean, green, healthy community values that merit support from the community at large.

WHEREAS publicly and monetarily supporting the values reflected by our community confers encouragement of beneficial community values that itself attracts families and community-spirited individuals.

BE IT RESOLVED that MVCC will contribute $1949.90 toward funding purchase of securable wheelbase lockers that encourage studious behavior, sustainable commuting and healthful living among our community's young scholars.

Motion tabled.

xi. **Funding Walgrove Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Walgrove Elementary School** is situated in the increasingly popular westernmost edge of Mar Vista.

WHEREAS private fundraising at Walgrove has become critical in supplementing operating funds lost as a result of district-wide austerity measures.

WHEREAS Walgrove's popularity has been growing though less steadily recently so that anchoring enrollment is imperative not only for this school but for the integrity of the whole community as well.

WHEREAS community outreach is not only fun and good but crucial toward sustaining the school, its community and what makes the community so attractive.

BE IT RESOLVED that MVCC will contribute $1250 toward supporting this community interaction which showcases current student's beloved Studio Lab learning and conveys its appeal to neighbors and their prospective students.

Motion tabled.

xii. **Funding Richland Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Richland Elementary School** has initiated a dual language French instructional program.

WHEREAS materials at the school formerly devoted to conventional English-only instruction are wanting in French resources.

WHEREAS the MVCC has explicitly supported instigation of this popular program, commending it as an important aspect of local living that recommends Mar Vista to young families.

WHEREAS fundraising potential and discretionary budgeting among the school and its community are scarce.

BE IT RESOLVED that MVCC recommends contributing $1K worth of dual language resources to the school as most befits its dual language learners.

Motion tabled.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

Post Office signs: working on getting painting on alley pavement erased

All of signs around Farmer's Market completed.

Next meeting is March 16. New LAPD rep is showing up at meetings.

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

Next meeting is Wednesday, February 24: downtown plan

m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/

Thursday, February 18 Coffee Time: Tax Tips.

n. Animal Services Liaison: Steve Boskin

7. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **POLICY MOTION: Resolution supporting Mar Vista Schools** (directors' motion submitted by Melissa Stoller)

Whereas our schools are an integral part of our community, and

Whereas the Mar Vista Community Council, and the community it serves, strongly values our neighborhood schools and supports their efforts to enhance their students educational experience and attract students from our neighborhood to our schools; and

Whereas, as a result of district-wide austerity measures, LAUSD budgets do not adequately support many community-supported enhancements to our children's educational experience—and even some basic needs—such as:

- A composting program to transform the compulsory "Breakfast in the Classroom" mandate from a classroom refuse problem into a composting program that teaches nutrition and ecology and supports the thriving learning garden program at Grand View Elementary;
- Dual language resources to support and grow a French dual language immersion program initiated by Richland Elementary School;
- Outdoor play equipment, such as functional basketball nets and refurbished backboards, as expressly addresses neighbors' concerns from the community surrounding Mark Twain Middle School;
- Robotics equipment to enable Webster Middle School to expand its popular robotics programs beyond a single classroom and reach more of the students eager to learn;
- Walgrove Elementary School's annual Game Day that reaches out to the community to showcase its exciting Studio Lab program;
- Wheel-locking skateboard lockers at Venice High School that would provide safe storage for student's boards and allowing them to focus on their studies, encourage "green" transportation mode that reduces vehicular congestion, and improve student attendance; and

Whereas, despite high poverty rates at many of our schools, parents have made significant contributions toward educational enhancements at their schools; and

Whereas identifying the most critical needs to present as a Neighborhood Purpose Grant or Community Improvement Project to MVCC requires an enormous time investment by school staff and community volunteers; and

Whereas MVCC needs to reserve funds for operational and outreach expenses as well as for unforeseen community needs and priorities, making it difficult to support NPG requests until near the end of its fiscal year; and

Whereas holding its mandated council election at the end of its fiscal year exacerbates this problem; and

Whereas schools need to receive NPG funding early in the school year in order to spend the grant money as intended by MVCC; and

Whereas community council funds do not carry over to the next fiscal year;

Let it be resolved that the Mar Vista Community Council requests a rule change to allow Neighborhood Purpose Grant and Community Improvement Project funding approved by a neighborhood council before the end of its fiscal year to be spent by schools in the next fiscal year.

Additionally, let it be resolved that MVCC encourages board, committee and community members to assist in finding alternative funding sources for these worthy projects.

Motion to approve by Melissa Stoller, 2nd by Mitchell Rishe.

Motion to waive reading by Bill Scheding, second by Sherri Akers. Motion carried unamimously.

Discussion

Georgia McCreery: huge renaissance happening in Mar Vista schools, success happening as result of huge parent push to keep kids in neighborhood schools. When mix students of all econ levels all students improve. Zimmer has provided outstanding principals. Massive push by corps and big money pushing for charter schools that send kids outside of local neighborhoods. Grants are designed to keep student at local schools. Twain of special interest because of what went on with traffic armegneda. If have empty rooms, district is required to give space to charters. Schools have giant databases, emails.

Sara Roos: Was understood that we have many contacts to reach out to and find funding; maybe could help as a body to look elsewhere.

Noah Derby: thanks letting me attend meetings, has been gigantic learning experience.

Sherri Akers: Thanks to Sara for info you compiled.

Bill Scheding: true people that can make difference at schools are parents. Rule change request: city doesn't allow.

Mitchell Rishe: disappointed that school funding motions not being considered. Requests that school motions put first on agenda after election.

Michael: applauds efforts of parents to support our schools; suggests when make presentations tell how parents have made contributions

Ken Alpern: has never seen this sort of thing, huge embarrassment. Would like to make friendly amendment to restore NC funding to $50,000.

Bill Scheding: should address education stuff, but are required to have election.

Motion carried unanimously. Bill Scheding & Michelle Krupkin abstain.

b. **POLICY MOTION: Resolution supporting animal rights** (directors' motion submitted by Sherri Akers)

The Mar Vista Community Council supports Council File 15- 0843 (see Attachment A) by Councilmember Paul Koretz and Mitch O'Farrell and urges the City to -

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include.
    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.
    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have
2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

98 percent of Denver properties accept cats and 93 percent accept small dogs. Yet 62 percent of Los Angeles rental properties refuse animals completely. This is considered to be a major obstacle to achieving no kill shelters. With a critical shortage of housing in Los Angeles, having to find housing that accepts pets makes it even more challenging. The MVCC applauds and thanks the Councilmembers for taking action on this issue.

Motion to carry over by Sherri, 2nd by Michelle.

Motion carried unanimously.

c. **POLICY MOTION: Martin Expo Town Center Project**, 12101 W. Olympic Blvd., Case Nos. TT-72298-MU; ENV-2012-3063-EIR; CPC-2013-2567-GPA-VZC-HD- CU-MCUB-CUX-ZV-ZAD-SPR; CPC-2015-4455-DA (submitted by PLUM & T&I Committees)

WHEREAS, traffic in West Los Angeles surrounding the Martin Expo Town Center Project is in gridlock at every major nearby intersection, especially during "rush hours"; and

WHEREAS, it is unknown but anticipated that traffic will become even more impacted once Phase 2 of the Metro Expo Line begins operation, especially as a result of a number of "at grade" crossings, including the nearby crossing on Barrington Ave.; and

WHEREAS, it is unknown but anticipated that, in order to avoid "at grade" crossings, commuters will divert their traffic patters to "above grade" crossing streets, including Bundy Dr. where the Martin Town Center Project is located; and

WHEREAS, it is unknown but anticipated that, once Phase 2 of the Metro Expo Line begins operation, streets surrounding the Project, including side and residential streets, will be impacted as riders commute by car and bike to and from the adjacent Expo/Bundy station:

NOW, THEREFORE, the Mar Vista Community Council strongly recommends that the City Planning Department put any approvals relating to the Martin Expo Town Center Project on hold, pending a new traffic study after Phase 2 of the Metro Expo Line starts operation, as this will allow the City to better determine the Project's full impact on traffic.

Motion to approve by Michelle Krupkin, 2nd by Ken Alpern.

Motion to waive reading by Michelle, 2nd by Bill Scheding

Discussion

Steve Wallace: wait till Expo in operation and gates come down at at-grade crossings and we see impact on traffic, then look at development. Need to evaluate before gets out of hand.

Ken Alpern: meeting with Mike on Thursday, would like to say motion was passed.

Motion carried unanimously.

d. **POLICY MOTION: WRAC Motion RE: Conditional Use Beverage (CUB) Permits** for Alcohol Authority of City Zoning Administrators to Impose Conditions of Approval to Mitigate Potential Land Use Impacts Arising from the Sale or Service of Alcoholic Beverages That Are Adverse to Public Health, Safety and Welfare (submitted by PLUM & T&I Committees)

WHEREAS, the City of Los Angeles has imposed land use conditions in

Conditional Use Beverage (CUB) permits for decades to protect public health, safety and welfare by mitigating potential impacts due to the sale or service of alcohol, as recommended by the LAPD, Council Offices, neighborhood councils, community councils, and local residents; and

WHEREAS, the Department of City Planning suddenly reversed this decades-long practice in 2012, on the advice of the City Attorney's Office, with no public notice, no public process, no public hearings, and no direction from the City Council, which is charged with policy-making authority; and

WHEREAS, Zoning Administrators now unilaterally and without notice use the Plan Approval Process to remove previously-imposed conditions designed to avoid or mitigate actual or potential land use impacts adverse to public health, safety and welfare; and

WHEREAS, municipalities throughout the State of California have and continue to impose land use conditions to mitigate adverse impacts that may otherwise arise from the sale or service of alcohol, including the Cities of Santa Monica, West Hollywood, Palmdale, Lancaster, Huntington Park, Montebello, Orange, San Bernardino, Pinole, Ventura, San Buenaventura, Santa Cruz, Hayward, Walnut Creek, Watsonville, and the County of Los Angeles, among others; and

WHEREAS, the City's current practice undermines the ability of the City and local communities to protect against potential land use impacts that are adverse to public health, safety and welfare, including but not limited to potential nuisances, by restricting the imposition of conditions on, among other things, hours of sale of alcohol, happy hours, container sizes, types of alcohol sold, and other similar rules and regulations, despite the efficacy of such conditions in avoiding or mitigating potential adverse impacts arising from the sale or service of alcohol; and

WHEREAS, California courts have repeatedly affirmed that municipalities have broad police powers to impose land use conditions that protect against potentially adverse impacts on public health, safety and welfare arising from the sale or service of alcohol; and

WHEREAS, the California Department of Alcoholic Beverage Control (ABC) has not advised the City that the imposition of such land use conditions interferes with ABC's enforcement of State law; and

WHEREAS, implementation of this new policy not only impairs the ability of the LAPD, Council Offices, and communities to protect public health, safety and welfare, but also interferes with the ability of CUB applicants to garner support for their projects by negotiating for the imposition of mutually agreed-upon conditions, as had been done for decades before the current practice was imposed, which forces communities to oppose projects they could otherwise support with proper conditions:

NOW, THEREFORE, be it Resolved that the Mar Vista Community Council calls upon the City Council to ~~adopt~~ evaluate a policy to: (1) Authorize the imposition of land use conditions that protect public health, safety and welfare by mitigating potential adverse impacts from the sale or service of alcohol, consistent with the practice of other jurisdictions statewide as well as the City's decades-long practice prior to 2012; (2) Maintain and enforce previously-imposed CUB conditions on the sale or service of alcohol; and (3) Prohibit the removal of previously-imposed conditions outside the public processes mandated under the City Charter and Zoning Code.

Motion by Bill Scheding to move up in agenda, 2nd by Ken Alpern. Motion carries unanimously.

Motion to approve by Michelle Krupkin, 2nd by Ken Alpern

Motion to waive reading by Michelle Krupkin, 2nd by Ken Alpern. Motion carries unanimously.

Discussion

Sharon Cummins: City Attorney changed rules allowing neighborhoods to negotiate conditions.

Wendy Rosen: Has negotiated successfully with applicants. Old process worked well for neighborhoods and projects. Council office doesn't understand the new rule. Now we're appealing every decision, dragging out approval process.

Steve Sann: Thinks there's real misinformation. This motion is to restore process that allows negotiation of reasonable conditions to address impact of alcohol sales. Ability of community to place reasonable conditions allows them to get to "yes." Doesn't add a penny to cost; avoids additional cost. Restores regime that existed for 40 years.

Sarah Auerswald (speaking as Mar Vista Chamber of Commerce representative):

Louie's (see Attachment A): It's hard to open a business already and this will make it much harder. Chain restaurants can afford, small businesses can't.

Venice Grind (see Attachment A): Doesn't support. We don't need another layer of conditions piled on existing conditions.

Steve Wallace: We can either allow someone in an office somewhere look on a computer and make decision or allow a local process. We need as many local decisions as possible to bring in the businesses we want.

Sara Roos: Requests clarification of why Chamber is opposing

Steve Sann: Change wasn't done through City Council. No public notice or hearing. Sweeping change done completely administratively by someone in zoning department. CUB is still required, but zoning hearings don't permit discussion of anything related to alcohol. City Attorney points to Zoning Administration, Zoning points to City Attorney. No other city in California takes this position.

Ken Apern: The change is dreadful, we need to pass this motion and possibly ask City Attorney to investigate how/why change happened.

Michael Mellman: Supports motion. No one has supported Brentwood as well as Wendy. We need to keep local control over facilities that offer alcohol.

Mitchell Rishe: Doesn't want to discourage local business. Concerned about Sarah Blanch's organization (Westside Impact Project) possibly being temperance-type organization.

Wendy Rosen: Motion 1st presented to WRAC by Sarah Blanch--Council office reached out and said WRAC should work with her. Westside Impact Project conducts education about responsible drinking and works on problems created by abuse; receives County funding. Council office supports this motion. Steve Sann has case where applicant agreed to conditions and city won't put them on; now appealing to ABC.

Sherri Akers: Friendly amendment: final paragraph change "adopt" to "Evaluate." Michelle accepts.

Melissa: "Evaluate" isn't strong enough. We want them to restore previously imposed conditions. We're making a request, not passing a law.

Michael: What we know is that we have local activists supporting and they have

Motion as amended carried: 11 ayes. 1 nay, 0 abstentions.

e. **POLICY MOTION: Utility Box Painting** (directors' motion submitted by Robin Doyno)

WHEREAS Mar Vista benefits from beautification projects, and

WHEREAS The Utility Box Painting Projects in other areas of our fair city have enriched, enlivened and civilized the public area, and

WHEREAS the Senior, Artist, and Youth Communities can all share in the creation of The Mar Vista Utility Box Project, and

WHEREAS the Venice Boulevard and Grandview pilot utility box painting enriched the inaugural Mar Vista Art Walk and currently stands as an aesthetic plus to our de facto town square, and

WHEREAS the Los Angeles District Council Office 11 has supported and continues to support the previous iteration as well as the current effort to advance our cultural profile, and

WHEREAS Mar Vista will benefit from the inclusion of the visual history of our community in the Utility Box Painting Project, and

WHEREAS the community will benefit from a juried decision to select 15 to 20 artists to render their submissions on utility boxes by a jury composed of 2 MVCC EACC members, 2 city council staff members and 2 at large community members, and

WHEREAS MVCC EACC shall produce, distribute and post a call for submissions and time line, conduct a selecting jury, post results and execute a letter of understanding, therefore

BE IT RESOLVED that the Mar Vista Community Council shall ask Los Angeles District Council Office 11 to embrace and sponsor the above listed project.

Motion to carry over by Robin Doyno, 2nd by Michelle Krupkin. Motion carried unanimously.

8. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern

    b. Zone 2 – Brad Wilhite

       Status of community-wide Spring yard sale? Bill Koontz: working on setting date.
    c. Zone 3 – Bill Scheding

       Hilltop Neighbors Association meeting on Thursday, February 11.
    d. Zone 4 - Michael Millman

       Mega party on June 12, lots of politicians.
    e. Zone 5 – Michelle Krupkin

       Great Streets installed smart bench in front of Mar Vista Library.
    f. Zone 6 – Valerie Davidson

       All is good.
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    b. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs

       Eco Car Expo looking great, has as many cars as can accommodate.
    c. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    d. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

       Meeting February 22.
    e. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    f. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

       Continuing issues with FAA.
    g. **Safety and Security Committee** – Rob Kadota, Chair
    h. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    i. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    j. **Elections and By-laws**- Bill Koontz, chair
    k. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

       Meeting February 10.
    l. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs

       Meeting February 18. LA Metro presentation about specific program for seniors.

       Went to strategy meeting.at Archstone Foundation.
    m. **Homeless Issues Committee** – Robin Doyno, Chair

       First meeting February 24.

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**

    Melissa Stoller: Remember to send information to me about events of general community interest for MVCC eblast.
15. **Adjournment**

    Meeting adjourned at 9:35 P.M.

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

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ATTACHMENT A: Emailed comments RE: Item 7.d (CUB motion)

From Demetrios Mavromichalis:

My name is Demetrios Mavromichalis. I am the owner of Venice Grind, The Wood, Founding member and former President of the Mar Vista Farmers Market of which I hold a seat on the board and all around driving force behind all things positive in our community.

I am a life long resident of the Mar Vista and Del Rey communities. I attended elementary school on Grandview and Washington Place and even live on the same street my whole life where my wife and I raise our two children.

I am vested in my community 100%.

I am not in support of the WRAC motion re: CUB permits on the table tonight. We do not need another layer of conditions piled on top of existing conditions that make it even harder to obtain an ABC license. The ABC, Los Angeles City planning and zoning as well as local community councils have the power to support and approve new applications and licenses based he applicant, the location and the type of operation. If the community is not in support of a proposed use then it becomes difficult to obtain the permit from the city therefor making it and almost impossible to apply and get approved for an ABC license.

I have been through the process personally and currently going through it again with CUB on a former "grandfathered" 21 and over night club which my partners and I our downgrading the use to a family restaurant that will serve wine and beer to accompany the food being served. This isn't a "slam dunk'. we still have to adhere to requirements, rules and regulations and adhere to conditions that will be set forth by the ABC like hours of operation, noise and non disturbance conditions and so on just to name a few.

Mar Vista business community is becoming vibrant and starting to thrive and become known as a destination for foodies and and families. Locals are happy that they have choices in their community. We do not have the same problem as Venice or Santa Monica with over saturation of alcohol establishments, house parties and marijuna dispensaries.

From John Atkinson (Louie's of Mar Vista)

As a small business owner in I can attest to the incredible amount of government obstacles in operating a restaurant or bar. This city makes the smallest things very difficult and very costly. It's not easy being an owner operator in Los Angeles I promise you. Any additional requirements will only serve to dissuade small business from opening. If Cheesecake Factory and Denny's are the type of businesses Mar Vista wants then this organization will help ensure that. Those type of chain restaurants can afford time and money to deal with excessive bureaucracy. If however Louie's and Venice Grind is more of what we want please help small owner operators by rejecting further hurdles to independent operations. I love Mar Vista & so did my grandfather when he opened Louie's meat market in 1954. Lets keep our neighborhood cool and local. Furthermore if Mar Vista doesn't want a type of business the citizens will not patronize it. Free market makes the ultimate call does it not? Thank you for your consideration.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, February 9th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 12th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Special presentation to Lizka Mendoza
        ii. Executive & Finance Committee
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
        i. Report on current financial status
        ii. **APPROVAL** of December Monthly Expense Report (MER)
        iii. **APPROVAL** of January Monthly Expense Report (MER)

iv **Funding Motion: Mar Vista Eco Car Expo publicity** (submitted by Green Committee)

The Mar Vista Community Council approves the allocation of up to $700 for the printing of Eco Car Expo publicity materials including flyers, banners and signage for the A Frames.

v **Funding Motion: Mar Vista Art Walk** (director's motion submitted by Robin Doyno)

Whereas a goal of Mar Vista's Great Street project is to enhance its reputation as a walkable, attractive destination; and

Whereas art walks attract local foot traffic and increase economic viability of communities; and

Whereas during the inaugural Mar Vista Art Walk, held December 3, 2015 some local businesses reported more than double their normal sales and even their best sales night ever; and

Whereas approximately 1,000 visitors walked along Venice Boulevard and participated in the evening's program of events; and

Whereas many art walk events transpired outdoors on sidewalks, thus encouraging the majority of visitors to walk the entire length of our Venice Boulevard Great Street due to this organizational emphasis on sidewalk engagement;

The Mar Vista Community Council approves a Neighborhood Purpose Grant of $500 for printing of fliers, posters, maps, programs, handouts for a second Mar Vista ark walk—Steppin' Into the Art of Mar Vista, to be organized and run by non-profit Green Communications Initiative, Inc., and held March 3, 2015, 6-9p.m. along the Venice Blvd CD- 11 "Great Street" between Inglewood Blvd—Beethoven Street.

vi. **Funding Motion: MVCC Election** (submitted by Outreach & Elections Committees)

MVCC approves the reallocation of funds in the MVCC budget to the Outreach and Elections/Bylaws Committees not to exceed $23,400 as needed for the following expenses for the 2016 MVCC election as mandated by the City of Los Angeles to ensure maximum community outreach to recruit candidates and maximize voter turnout.

- City is requesting 3 direct mailers. Cost to reach 30,000 plus households is $8,465 plus tax. We are proposing two mailers at a total cost of $18,600
- 100 yard signs - $600
- Banners – 6 to be placed at park (2), Farmers Market (at tent), Venice High Learning Garden, Old Fire Station, Walgrove School - $50 each, $300 total
- Flyers $200
- 4-page newsletter (previously allocated in budget) printing, layout and distribution – est. $3,500
- Postcards or bookmarks for handout (quote of $32 for $2,500) - $200

vii. **Funding Motion: Webster Middle School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Webster MS** is a community school strongly and increasingly appreciated by our local northern Mar Vista residents.

WHEREAS support of its resurging reputation among the community is very important to Mar Vista's reputation as a residence with strong educational opportunities.

WHEREAS the current highly popular robotics offerings are insufficient to serve more than a single classroom despite great demand for more equipment to teach more, and eager, students.

BE IT RESOLVED that MVCC eagerly grants $2419.70 toward Webster MS's request to partially fund more robotics equipment for a second classroom to reach avid STEAM students.

viii. **Funding Motion: Mark Twain Middle School CIG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Mark Twain ES** has attracted considerable attention of late concerning its public properties and community aesthetics, and

WHEREAS social injustice in the relative public spending among local primary school campuses is of local public concern, and

WHEREAS the outdoor play equipment and public spaces at Mark Twain are long in need of enrichment and beautification, it would address the public's focus to

BE IT RESOLVED that MVCC would support Twain's outdoor spaces through a Community Improvement Grant for $1719 matching the cost of Outdoor PE Equipment ($969) with the local West Mar Vista Neighborhood Association that organized local activism in this regard.

ix. **Funding Motion: Grand View Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Grand View Elementary School** serves over 500 children a packet of processed food daily.

WHEREAS despite being a school of high poverty concentration, still appreciable amounts of this biodegradable meal head for a landfill every day.

WHEREAS this school has an active gardening program with instruction on high quality, home-grown foodstuffs and earth sciences that would benefit pedagogically from the component that shows the ecology of waste.

WHEREAS salvaging the food waste and transforming its nutrients into a form compatible with growth, learning and the school's learning garden will benefit all available parties and constructs.

BE IT RESOLVED that MVCC recommends applying $1300 toward a Neighborhood Purpose Grant that will facilitate closing the knowledge circle on food, food waste, decomposition and regrowth.

x. **Funding Motion: Venice High School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Venice High School** (VHS) is Mar Vista's local westside secondary school, enrolling more than 2000 children of whom approximately two-thirds are "socioeconomically disadvantaged", and distributed ethnically with a population that is two-thirds Hispanic and equal measures among one quarter its students that is Caucasian and African-American.

WHEREAS VHS students and community alumni are integrally connected with a history and culture of both beach and conservation honoring its "Dogtown" and "green" roots.

WHEREAS hundreds of students commute daily in a self-propelled mode that fosters traffic mitigation and clean, green, healthy community values that merit support from the community at large.

WHEREAS publicly and monetarily supporting the values reflected by our community confers encouragement of beneficial community values that itself attracts families and community-spirited individuals.

BE IT RESOLVED that MVCC will contribute $1949.90 toward funding purchase of securable wheelbase lockers that encourage studious behavior, sustainable commuting and healthful living among our community's young scholars.

xi. **Funding Walgrove Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Walgrove Elementary School** is situated in the increasingly popular westernmost edge of Mar Vista.

WHEREAS private fundraising at Walgrove has become critical in supplementing operating funds lost as a result of district-wide austerity measures.

WHEREAS Walgrove's popularity has been growing though less steadily recently so that anchoring enrollment is imperative not only for this school but for the integrity of the whole community as well.

WHEREAS community outreach is not only fun and good but crucial toward sustaining the school, its community and what makes the community so attractive.

BE IT RESOLVED that MVCC will contribute $1250 toward supporting this community interaction which showcases current student's beloved Studio Lab learning and conveys its appeal to neighbors and their prospective students.

ix. **Funding Richland Elementary School NPG** (submitted by Education, Arts & Culture Committee)

WHEREAS **Richland Elementary School** has initiated a dual language French instructional program.

WHEREAS materials at the school formerly devoted to conventional English-only instruction are wanting in French resources.

WHEREAS the MVCC has explicitly supported instigation of this popular program, commending it as an important aspect of local living that recommends Mar Vista to young families.

WHEREAS fundraising potential and discretionary budgeting among the school and its community are scarce.

BE IT RESOLVED that MVCC recommends contributing $1K worth of dual language resources to the school as most befits its dual language learners.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/
n. Animal Services Liaison: Steve Boskin

7. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **POLICY MOTION: Resolution supporting Mar Vista Schools** (directors' motion submitted by Melissa Stoller)

Whereas our schools are an integral part of our community, and

Whereas the Mar Vista Community Council, and the community it serves, strongly values our neighborhood schools and supports their efforts to enhance their students educational experience and attract students from our neighborhood to our schools; and

Whereas, as a result of district-wide austerity measures, LAUSD budgets do not adequately support many community-supported enhancements to our children's educational experience—and even some basic needs—such as:

- A composting program to transform the compulsory "Breakfast in the Classroom" mandate from a classroom refuse problem into a composting program that teaches nutrition and ecology and supports the thriving learning garden program at Grand View Elementary;
- Dual language resources to support and grow a French dual language immersion program initiated by Richland Elementary School;
- Outdoor play equipment, such as functional basketball nets and refurbished backboards, as expressly addresses neighbors' concerns from the community surrounding Mark Twain Middle School;
- Robotics equipment to enable Webster Middle School to expand its popular robotics programs beyond a single classroom and reach more of the students eager to learn;
- Walgrove Elementary School's annual Game Day that reaches out to the community to showcase its exciting Studio Lab program;
- Wheel-locking skateboard lockers at Venice High School that would provide safe storage for student's boards and allowing them to focus on their studies, encourage "green" transportation mode that reduces vehicular congestion, and improve student attendance; and

Whereas, despite high poverty rates at many of our schools, parents have made significant contributions toward educational enhancements at their schools; and

Whereas identifying the most critical needs to present as a Neighborhood Purpose Grant or Community Improvement Project to MVCC requires an enormous time investment by school staff and community volunteers; and

Whereas MVCC needs to reserve funds for operational and outreach expenses as well as for unforeseen community needs and priorities, making it difficult to support NPG requests until near the end of its fiscal year; and

Whereas holding its mandated council election at the end of its fiscal year exacerbates this problem; and

Whereas schools need to receive NPG funding early in the school year in order to spend the grant money as intended by MVCC; and

Whereas community council funds do not carry over to the next fiscal year;

Let it be resolved that the Mar Vista Community Council requests a rule change to allow Neighborhood Purpose Grant and Community Improvement Project funding approved by a neighborhood council before the end of its fiscal year to be spent by schools in the next fiscal year.

Additionally, let it be resolved that MVCC encourages board, committee and community members to assist in finding alternative funding sources for these worthy projects.

b. **POLICY MOTION: Resolution supporting animal rights** (directors' motion submitted by Sherri Akers)

The Mar Vista Community Council supports Council File 15- 0843 (see Attachment A) by Councilmember Paul Koretz and Mitch O'Farrell and urges the City to -

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include.
    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.
    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have
2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

98 percent of Denver properties accept cats and 93 percent accept small dogs. Yet 62 percent of Los Angeles rental properties refuse animals completely. This is considered to be a major obstacle to achieving no kill shelters. With a critical shortage of housing in Los Angeles, having to find housing that accepts pets makes it even more challenging. The MVCC applauds and thanks the Councilmembers for taking action on this issue.

c. **POLICY MOTION: Martin Expo Town Center Project**, 12101 W. Olympic Blvd., Case Nos. TT-72298-MU; ENV-2012-3063-EIR; CPC-2013-2567-GPA-VZC-HD- CU-MCUB-CUX-ZV-ZAD-SPR; CPC-2015-4455-DA (submitted by PLUM & T&I Committees)

WHEREAS, traffic in West Los Angeles surrounding the Martin Expo Town Center Project is in gridlock at every major nearby intersection, especially during "rush hours"; and

WHEREAS, it is unknown but anticipated that traffic will become even more impacted once Phase 2 of the Metro Expo Line begins operation, especially as a result of a number of "at grade" crossings, including the nearby crossing on Barrington Ave.; and

WHEREAS, it is unknown but anticipated that, in order to avoid "at grade" crossings, commuters will divert their traffic patters to "above grade" crossing streets, including Bundy Dr. where the Martin Town Center Project is located; and

WHEREAS, it is unknown but anticipated that, once Phase 2 of the Metro Expo Line begins operation, streets surrounding the Project, including side and residential streets, will be impacted as riders commute by car and bike to and from the adjacent Expo/Bundy station:

NOW, THEREFORE, the Mar Vista Community Council strongly recommends that the City Planning Department put any approvals relating to the Martin Expo Town Center Project

on hold, pending a new traffic study after Phase 2 of the Metro Expo Line starts operation, as this will allow the City to better determine the Project's full impact on traffic.

d. **POLICY MOTION: WRAC Motion RE: Conditional Use Beverage (CUB) Permits** for Alcohol Authority of City Zoning Administrators to Impose Conditions of Approval to Mitigate Potential Land Use Impacts Arising from the Sale or Service of Alcoholic Beverages That Are Adverse to Public Health, Safety and Welfare (submitted by PLUM & T&I Committees)

WHEREAS, the City of Los Angeles has imposed land use conditions in

Conditional Use Beverage (CUB) permits for decades to protect public health, safety and welfare by mitigating potential impacts due to the sale or service of alcohol, as recommended by the LAPD, Council Offices, neighborhood councils, community councils, and local residents; and

WHEREAS, the Department of City Planning suddenly reversed this decades-long practice in 2012, on the advice of the City Attorney's Office, with no public notice, no public process, no public hearings, and no direction from the City Council, which is charged with policy-making authority; and

WHEREAS, Zoning Administrators now unilaterally and without notice use the Plan Approval Process to remove previously-imposed conditions designed to avoid or mitigate actual or potential land use impacts adverse to public health, safety and welfare; and

WHEREAS, municipalities throughout the State of California have and continue to impose land use conditions to mitigate adverse impacts that may otherwise arise from the sale or service of alcohol, including the Cities of Santa Monica, West Hollywood, Palmdale, Lancaster, Huntington Park, Montebello, Orange, San Bernardino, Pinole, Ventura, San Buenaventura, Santa Cruz, Hayward, Walnut Creek, Watsonville, and the County of Los Angeles, among others; and

WHEREAS, the City's current practice undermines the ability of the City and local communities to protect against potential land use impacts that are adverse to public health, safety and welfare, including but not limited to potential nuisances, by restricting the imposition of conditions on, among other things, hours of sale of alcohol, happy hours, container sizes, types of alcohol sold, and other similar rules and regulations, despite the efficacy of such conditions in avoiding or mitigating potential adverse impacts arising from the sale or service of alcohol; and

WHEREAS, California courts have repeatedly affirmed that municipalities have broad police powers to impose land use conditions that protect against potentially adverse impacts on public health, safety and welfare arising from the sale or service of alcohol; and

WHEREAS, the California Department of Alcoholic Beverage Control (ABC) has not advised the City that the imposition of such land use conditions interferes with ABC's enforcement of State law; and

WHEREAS, implementation of this new policy not only impairs the ability of the LAPD, Council Offices, and communities to protect public health, safety and welfare, but also interferes with the ability of CUB applicants to garner support for their projects by negotiating for the imposition of mutually agreed-upon conditions, as had been done for decades before the current practice was imposed, which forces communities to oppose projects they could otherwise support with proper conditions:

NOW, THEREFORE, be it Resolved that the Mar Vista Community Council calls upon the City Council to adopt a policy to: (1) Authorize the imposition of land use conditions that protect public health, safety and welfare by mitigating potential adverse impacts from the sale or service of alcohol, consistent with the practice of other jurisdictions statewide as well as the City's decades-long practice prior to 2012; (2) Maintain and enforce previously-imposed CUB conditions on the sale or service of alcohol; and (3) Prohibit the removal of previously-imposed conditions outside the public processes mandated under the City Charter and Zoning Code.

e. **POLICY MOTION: Utility Box Painting** (directors' motion submitted by Robin Doyno)

WHEREAS Mar Vista benefits from beautification projects, and

WHEREAS The Utility Box Painting Projects in other areas of our fair city have enriched, enlivened and civilized the public area, and

WHEREAS the Senior, Artist, and Youth Communities can all share in the creation of The Mar Vista Utility Box Project, and

WHEREAS the Venice Boulevard and Grandview pilot utility box painting enriched the inaugural Mar Vista Art Walk and currently stands as an aesthetic plus to our de facto town square, and

WHEREAS the Los Angeles District Council Office 11 has supported and continues to support the previous iteration as well as the current effort to advance our cultural profile, and

WHEREAS Mar Vista will benefit from the inclusion of the visual history of our community in the Utility Box Painting Project, and

WHEREAS the community will benefit from a juried decision to select 15 to 20 artists to render their submissions on utility boxes by a jury composed of 2 MVCC EACC members, 2 city council staff members and 2 at large community members, and

WHEREAS MVCC EACC shall produce, distribute and post a call for submissions and time line, conduct a selecting jury, post results and execute a letter of understanding, therefore

BE IT RESOLVED that the Mar Vista Community Council shall ask Los Angeles District Council Office 11 to embrace and sponsor the above listed project.

8. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    b. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    c. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    d. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    e. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    f. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    g. **Safety and Security Committee** – Rob Kadota, Chair
    h. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    i. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    j. **Elections and By-laws**- Bill Koontz, chair
    k. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    l. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    m. **Homeless Issues Committee** – Robin Doyno, Chair
10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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ATTACHMENT A: Council File 15-0843

File No. 15-0843

PERSONNEL AND ANIMAL WELFARE COMMITTEE REPORT relative to soliciting input in regard to programs and regulations that could facilitate the expansion of animal adoptions by tenants in residential rental properties.

Recommendations for Council action, as initiated by Motion (Koretz - O'Farrell):

1. INSTRUCT the Department of Animal Services (DAS) and the Housing and Community Investment Department (HCID) to solicit input from stakeholders in the Los Angeles rental housing market in regard to approaches that could facilitate the expansion of animal adoptions by tenants in residential rental properties to include:

    a. Programs to better inform tenants of their rights in regard to animal ownership while taking into consideration the welfare of the animals.

    b. Concerns, in regard to both financial issues and physical property, that landlords and other tenants may have.

2. INSTRUCT the DAS and HCID to review programs and concepts in other cities to determine if their provisions should be considered as a basis for developing approaches applicable in the City of Los Angeles.

Fiscal Impact Statement: Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

Community Impact Statement: Yes

For, if amended: Greater Valley Glen Neighborhood Council

(Housing Committee waived consideration of the above matter)

Summary:

On November 18, 2015, your Committee considered a Motion (Koretz - O'Farrell) relative to soliciting input in regard to programs and regulations that could facilitate the expansion of animal adoptions by tenants in residential rental properties. According to the Motion, more than 2 million City residents (approximately 62 percent) are tenants and estimates are that more than half the housing stock consists of rental units that do not accept companion animals. In Denver, by contrast, 98 percent of apartment communities accept cats, 93 percent accept small dogs and 66 percent accept large dogs, all without negatively impacting the perception that the city provides a high quality of life for its residents.

With the City striving to achieve "no kill" status relative to adoptable animals, reaching the goal will require encouraging and, when possible, facilitating adoptions in rental units. Doing so requires seeking and fostering cooperation and understanding between tenants and landlords with regard to companion animals. An American Humane Association survey of shelters in 93 U.S. cities has reported that "moving" is the most common reason given for pet guardians relinquishing their animals to shelters, and "landlord restrictions" ranks fourth. Data collected by the Santa Clara, CA Humane Society indicates that about 26 percent of relinquishments are due to such restrictions.

City shelters report that, since 2011, at least 22.6 percent of relinquished dogs and 18.6 percent of relinquished cats were turned in due to issues relating to tenancy restrictions. Pet guardians who have lost their homes due to economic circumstances often find themselves unable to find rental housing in which they could continue to keep their animals. In other cases landlords have, upon occasion, insisted that existing tenants get rid of their animals or face eviction. In many such cases the City's Rent Stabilization Ordinance protects the tenants, but unfortunately those tenants are not aware of their rights under the law.

After consideration and having provided an opportunity for public comment, the Committee moved to approve the Motion, as amended. This matter is now submitted to Council for its consideration.

Respectfully Submitted,

PERSONNEL AND ANIMAL WELFARE COMMITTEE

MEMBER	VOTE
KORETZ:	YES
RYU:	YES
HARRIS-DAWSON:	YES

ARL
1/19/16

-NOT OFFICIAL UNTIL COUNCIL ACTS-

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, January 12th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of December 8th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **Presentation by Sara Roos:** Role Of Mar Vista's Community Schools In The Quality Of Our Community's Life (15 min)
7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
        i. **APPROVAL** of December Monthly Expense Report (MER)
        ii **Funding Motion: Mar Vista Eco Car Expo artwork** (director's motion submitted by Melissa Stoller)

The Mar Vista Community Council approves the expenditure of up to $300 for the creation of publicity artwork for a Mar Vista Eco Car Expo to be held at the Mar Vista Farmers' Market on April 10, 2016.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/
n. Animal Services Liaison: Steve Boskin

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

NOTE: the 3277 Barrington small lot subdivision developer is expected to present at the February Board of Directors; it is not on this January agenda.

a. **POLICY MOTION: LAX flight approaches** (submitted by Santa Monica Airport Committee)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, beginning no later than October 2015, residents of Mar Vista have observed and experienced significant overhead changes to arrival patterns of commercial passenger airplanes into Los Angeles International Airport (LAX);

WHEREAS these airplanes fly over Mar Vista every 1-2 minutes, beginning before dawn and continuing through the day into the evening, at altitudes lower than they did prior to October 2015, emitting noise at higher levels than they did prior to October 2015;

WHEREAS, residents of the Pacific Palisades, Santa Monica, West Los Angeles, Culver City, and other parts of the City of Los Angeles have reported similar observations regarding changes to approach paths to LAX since at least October 2015;

WHEREAS, the Federal Aviation Administration (FAA) is responsible for flight approaches and departures relating to LAX;

WHEREAS, the FAA is in the process of implementing the Next Generation Air Transportation System (NextGen), with the goal of transforming the country's air traffic control system from a ground-based system to a satellite-based system in order to increase efficiency, safety, and predictability to flights throughout the United States;

WHEREAS, on October 8, 2015, the FAA concluded a public comment period relating to its implementation of NextGen technology for LAX and other Southern California airports;

WHEREAS, representatives of the FAA have not explained the reason for the observed changes to flight approaches into LAX over Mar Vista but have denied that they are associated with NextGen implementation;

BE IT RESOLVED THAT the MVCC requests and supports efforts by the Los Angeles City Council to request information from the FAA regarding the reason for the observed changes to flight approaches into LAX over Mar Vista.

BE IT FURTHER RESOLVED THAT the MVCC supports flight approaches into LAX over the neighborhoods noted above that would offer a reduction of noise impacts.

b. **POLICY MOTION: Utility Box Beautification** (submitted by Education, Arts and Culture Committee)

MVCC supports incorporating "Cooperative Values" and "Character Counts" campaign of LAUSD to synergize and support the MV box initiative.

c. **POLICY MOTION: Webster Middle School STEAM magnet** (submitted by Education, Arts and Culture Committee)

MVCC supports establishment of Webster Middle School STEAM magnet as championed and requested by principal Peter Benefiel.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Koontz, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    n. **Homeless Issues Committee** – Robin Doyno, Chair
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, January 12th, 2016, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:09 P.M.
   Quorum present: Bill Koontz, Mitchell Rishe, John Kuchta, Melissa Stoller, Yvette Molinaro, Robin Doyno, Ken Alpern, Michael Millman, Michelle Krupkin, Valerie Davidson
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of December 8th, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to put over by Melissa Stoller 2nd by Michelle Krupkin. Motion carried unanimously.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Sarah Auerswald
   Sarah attended elections and outreach training. Core mission of NCs is outreach; getting 200 at an election is not outreach. MVCC needs to spend more than is currently budgeted to increase awareness for potential candidates as well as voters. Need to reach all 23,000 households. Every committee needs to get the word out with everything we do need. Sarah will provide talking points.
   Window for declaring candidacy is February 21-April 6.
   Lisa DeBlois, Westchester Playa Village
   Name changed to Westside Pacific Villages. Now includes entire MVCC area
   Using MVCC NPG money to do outreach in Mar Vista. Holding two informational meetings at MV Library for volunteer & member outreach.
   - Saturday January 30th 11:00 AM to 1:00 PM
   - Wednesday February 3rd 6:00 PM to 7:30 PM

   John Wax 3227 Barry Ave.
   Since some other Barrington R3 properties are in escrow, wants to know if developers must come to MVCC.
   Mitchell Rishe: PLUM Committee is very aware of domino effect. Apartment building is by right, they don't need to present or get city planning approval
   John: If developers ask for density bonus exemption, does that trigger requirement to present?
   Len Nguyen: depends on what types of incentives developer asks for: 9 units with setbacks don't need a hearing; requests for "off-menu" incentives need to meet more difficult findings.
   Susan Klos, Grand View Blvd. in Mar Vista
   Concerned about the homeless sweep conduction on December 29 on Venice Blvd. under the 405 Fwy. Belongings that should have been put in storage were discarded and the LAVAN protocol was not followed. See Attachment A for Susan's full report.
   Michael Millman: encourages Susan to go to Homeless Committee and give evidence.
   Lenore French
   — Thanks MVCC for supporting the Art Walk on December 3rd; it was huge success. Printed 500 maps and schedules (they were key to helping visitors) and ran out. About 1000 people attended.

Trying to institutionalize—first Monday of each quarter. Adding live theater next time.

John Evans, 3271 Barry Ave.

House demolition on Barry removed sidewalk as well. Sidewalk is still not repaired, have a lot of elderly people.

Response: May be temporary—required to remove old sidewalk and replace with new.; perhaps was trying to save money by doing it during house demolition.

Bill Koontz

Dept. of Building & Safety has new app: LADBSGo.

Robin Doyno

Close to 100% on volunteers for homeliess count.

Utility box at Venice and Grandwiew is painted. Can get another 1 or 2 for next art walk. Thanks Mike Bonin.

5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org

      El Nino town hall on Wednesday, Jan 13 at Oakwood Recreation Center

      Mike honored Sara Auerswald as Mar Vista 2015 neighborhood hero.

      Mike is excited about release of city & council reports on homelessness; give us strategy for moving forward: rapid rehousing, free storage, safe parking

      Len has been talking to Susan about the cleanup that occurred Dec. 29. Sanitation claims they abided by rules. LAPD said didn't put limits on how much people could carry away and they were allowed to come back for more. Homeless services outreach was out there a week before (prior to notice of sweep); Mike wants them to come out after the notice is out. Sanitation claims they didn't see medical records or medication. Nothing was taken to lockers.

      Mike will send eblast about NC elections.

      Valerie Davidson: Appeal of FAA decision to keep Santa Monica Airport open until 2023 will be heard by 9th Circuit Court of Appeals I Pasadena on March 11 at 9:00 A.M.

   b. Mar Vista Recreation Center – Lizka Mendoza, Director

      Just finished winter camp. 36 campers.

      A Mar Vista Recreation Center team was one of the winners in the Fall citywide soccer tournament. Will have banner

      Getting bids for soccer field redo.

      Looking at acoustic paneling for gym; work would need to wait till end of winter season.

      Robin Doyno was instrumental in getting speaker system and mikes for winter recital. Thank you.

      Bill Koontz: Water in upper corner of gym? Litzka: due to the way AC was done (leaves holes). Need to patch up holes before redo ceiling.

   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn
   e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
   g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
   h. CA Assembly 47
   i. CA Assembly 62
   j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
   k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
   l. Joel Jacinto, Department of Public Works
6. **Presentation by Sara Roos:** Role Of Mar Vista's Community Schools In The Quality Of Our Community's Life (15 min)

   Zillow shows that Mar Vista community has become very attractive. Our public schools are part of the reason people want to live here. Sara felt that people were surprised last month that schools were requesting/needing money. Issue: why doesn't LAUSD provide playground equip? Response: sometimes city departments that should take care of something don't. Schools have a budget, should be doing these things. But this is our

community and when we see something that will improve our community, we should do it. Function as a council is to distribute money as NPG (Neighborhood Purpose Grant) or CIG (Community Improvement Grant).

Sara wants to be available for people to ask questions.

EACC has school reps from each of the public schools. Sara makes special outreach to the public schools. Ability of schools to raise money correlates with wealth of student body (# in Free Lunch program – see Attachment B).

Sara was dismayed at not being allowed to speak to this at last meeting. (Bill Koontz: Roberts Rules of Order didn't allow discussion of NPG requests because motion being discussed was about putting NPG motions over). At least 1000 people affected by BOD decision not to address. It is getting too late in year to utilize the money.

Michelle Krupkin: Appreciates the work that was done, but this is an NC election year and the money requested was large portion of our budget.

Melissa Stoller: Mismatch of NC fiscal year and school schedule must be a problem for other NCs as well. Suggests pushing DONE to allow funds to be spent after close of fiscal year

Bill Koontz: MVCC must do elections. Not mandated to give money to schools.

Sarah Auerswald: Should set aside $15,000 for election.

Michael Millman: Everybody appreciates Sara's efforts, respects her opinions. System with DONE is really the impediment.

Ken Alpern: Is disappointed can't vote on tonight. Thinks DONE will have problems with some of the projects.

Mitchell Rishe: Was shocked at hostility of BOD toward Sara last month; need to defer to our education committee and be more respectful to needs of our schools and show more deference to our school's needs.

7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller

    Noted that the wording of motions submitted for inclusion on the BOD agenda should be exactly the same as the wording of the motion passed by a committee, except should reference MVCC, not the committee ("The Mar Vista Community Council…").

    Reminded members that committees are required to post meeting minutes.

    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2015-16 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.

        i. **APPROVAL** of December Monthly Expense Report (MER)

        Motion to table by Bill Koontz, 2nd by Melissa Stoller.

        Discussion

        Bill Koontz: MER is missing expenses, including $4000 for the Fall Festival.

        Motion carried unanimously.

        ii **Funding Motion: Mar Vista Eco Car Expo artwork** (director's motion submitted by Melissa Stoller)

        The Mar Vista Community Council approves the expenditure of up to $300 for the creation of publicity artwork for a Mar Vista Eco Car Expo to be held at the Mar Vista Farmers' Market on April 10, 2016.

        Motion to approve by Melissa Stoller 2nd by Valerie Davidson.

        Discussion:

        Melissa: We needed to move ahead on this before the Green Committee meeting in order to get going on publicity. The logo and a flyer are completed. The Green Committee will have follow-on funding requests for printing.

        Valerie: Will there be a car that runs on cooking oil?

        Melissa: We do not currently have one.

Motion carried unanimously.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

Next meeting is January 20. Agenda closes January 16.

About 12 items left from November meeting.

Request for all-way stop at Stonervand Navy: Study was conducted. Engineering review failed to justify. Review of traffic incidents didn't reveal a problem.

Post Office parking lot, signs are illegal. Boll Koontz reports no right turn is still posted. Linda does't have answer, signs were supposed to be removed.

Mitchell Rishe: sent email about Palms & Sawtelle.

g. DWP MOU Liaison: Myra Boime

Meeting discussed increased water rates. Minimum of $10 to be connected to grid is fair.

h. LANCC Liaison: Open (Bill Koontz reporting)

Didn't meet.

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

Christopher was unable to attend the BOD meeting. An October 2015 article in Los Angeles Magazine spells out most of what water and Recycled Water means to Los Angeles.
http://www.lamag.com/longform/the-dry-years-to-come/

j Fall Festival Liaison: Albert Olson

Made about $4000, will be put toward acoustic ceiling tiles.

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

Meets Jan 27; urban ag &

Recode meets on January 27, 2016, 6-8 P.M. at City Hall. Topics are urban agriculture and San Francisco *vs* Los Angeles urban economics history

Downtown plan resumes in February, 2016

Appointment of new Director of Planning expected by end of month.

m. Mar Vista Chamber of Commerce: Sarah Auerswald http://marvistachamber.com/

Monthly meeting 3rd thurs of month 9am coffee connection. Facebook marketing.

Jan 20 – all westside chambers. Digital economy. Doubletree Hotel, $60 tickets

Getty House program on Jan 29. Will be there representing Great Streets grant project.

n. Animal Services Liaison: Steve Boskin

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

NOTE: the 3277 Barrington small lot subdivision developer is expected to present at the February PLUM, March BOD; it is not on this January agenda.

a. **POLICY MOTION: LAX flight approaches** (submitted by Santa Monica Airport Committee)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, beginning no later than October 2015, residents of Mar Vista have observed and experienced significant overhead changes to arrival patterns of commercial passenger airplanes into Los Angeles International Airport (LAX);

WHEREAS these airplanes fly over Mar Vista every 1-2 minutes, beginning before dawn and continuing through the day into the evening, at altitudes lower than they did prior to October 2015, emitting noise at higher levels than they did prior to October 2015;

WHEREAS, residents of the Pacific Palisades, Santa Monica, West Los Angeles, Culver City, and other parts of the City of Los Angeles have reported similar observations regarding changes to approach paths to LAX since at least October 2015;

WHEREAS, the Federal Aviation Administration (FAA) is responsible for flight approaches and departures relating to LAX;

WHEREAS, the FAA is in the process of implementing the Next Generation Air Transportation System (NextGen), with the goal of transforming the country's air traffic control system from a ground-based system to a satellite-based system in order to increase efficiency, safety, and predictability to flights throughout the United States;

WHEREAS, on October 8, 2015, the FAA concluded a public comment period relating to its implementation of NextGen technology for LAX and other Southern California airports;

WHEREAS, representatives of the FAA have not explained the reason for the observed changes to flight approaches into LAX over Mar Vista but have denied that they are associated with NextGen implementation;

BE IT RESOLVED THAT the MVCC requests and supports efforts by the Los Angeles City Council to request information from the FAA regarding the reason for the observed changes to flight approaches into LAX over Mar Vista.

BE IT FURTHER RESOLVED THAT the MVCC supports flight approaches into LAX over the neighborhoods noted above that would offer a reduction of noise impacts.

Motion to approve by Valerie Davidson, 2nd by Melissa Stoller.

Discussion:

FAA denies that changes are related to NextGen.

Peter Altman: Drafted the motion. FAA has been "less than communicative".

Bill Koontz: Very well written motion, a model of how motions should be written.

Motion carried unanimously (Yvette Molinaro absent).

b. **POLICY MOTION: Utility Box Beautification** (submitted by Education, Arts and Culture Committee)

MVCC supports incorporating "Cooperative Values" and "Character Counts" campaign of LAUSD to synergize and support the MV box initiative.

Motion to approve by Robin Doyno, 2nd by Ken Alpern.

Motion to send back for clarification by Bill Koontz, 2nd by Melissa Stoller. Motion carried unam

Discussion

Michelle Krupkin: Would like to see Art reflect Mar Vista character.

Melissa Stoller: Need to describe what "Cooperative Values" and "Character Counts" campaigns are and how they would be implemented into the utility box beautification process.

Motion carried unanimously (Yvette Molinaro absent).

c. **POLICY MOTION: Webster Middle School STEAM magnet** (submitted by Education, Arts and Culture Committee)

MVCC supports establishment of Webster Middle School STEAM *(Science, Technology, Engineering and Arts Magnet)* magnet as championed and requested by principal Peter Benefiel.

Motion to approve by Robin Doyno, 2nd by Ken Alpern.

Friendly amendment by Ken Alpern: state what STEAM stands for.

Motion carried unanimously (Yvette Molinaro absent).

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite
   c. Zone 3 – Bill Scheding
   d. Zone 4 - Michael Millman

Gets lots of inquiries about encampment under 405 freeway. Neighbors applaud immediate removal and believe encampments are illegal.

There are still lots of RVs parked on Palms. Not getting help from police, Department of Transportation, Mike Bonin's office.

Annual meeting is January 21 at St. Bedes. Annual block party will be June 12.

Possible expansion of Windward School.

   e. Zone 5 – Michelle Krupkin

All quiet. Keeshen being paved.

f. Zone 6 – Valerie Davidson

Pretty quiet. Rain coming down gutter, 6 feet out into street, blocked at end. Rustic Kitchen opened

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

       Likely November ballot measures:

       - Increase sales tax for mass transit: Metro and Santa Monica bus lines don't have enough available buses to connect with Expo line.
       - Neighborhood Integrity Initiative: 2 year moratorium on very large developments to get problems worked out.

       Michael Mioman: supports workshops where get opinions from all sides.

       Sarah Auerswald: do joint with the Chambers.

       Ken Alpern: We are already reasonable. Problem is, what do you do when downtown is tone deaf?

    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

       Lots of big matters coming up: 3277 Barrington development leading to others; corner at Gateway & Pico (Tacomiendo property); Martin Cadillac development is back (10 story residential over 500 units, 7 story office building.); 52 units on Venice by Crimson Holdings; proposed small lot subdivision ordinance amendment; Westside mobility plan EIR. Westside is densifying.

       Ken Alpern: need to meet soon, hold joint T&I meeting.

       Bowling Alley sign pole approved.

    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs

       Meeting January 25.

    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

       Need to do outreach for election, reach all 23000 households. Need to do everything possible. Must demonstrate we've done everything possible.

    k. **Elections and By-laws**- Bill Koontz, chair

       Will meet and come up with budget and outreach plans

    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

       Meeting January 13.

    m. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    n. **Homeless Issues Committee** – Robin Doyno, Chair
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**

16. **Adjournment**

    Meeting adjourned at 9: P.M.

* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, December 8th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of November 10, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
        i. **APPROVAL** of November Monthly Expense Report (MER)
        ii **FUNDING MOTION: Winter Wonderland** (submitted by ExFin Committee)
        The Mar Vista Community Council approves a Neighborhood Purpose Grant of up to $1000 to the LAPD Booster Club for reimbursement of Winter Wonderland tent and chair rentals.

iii **FUNDING MOTION: Webster MS, Venice HS, Mark Twain MS & Grand View ES NPGs** (Submitted by Education, Arts & Culture Committee)

The Mar Vista Community Council approves the following Neighborhood Purpose Grants:

- $2925 to Webster Middle School to expand its successful robotics pilot.
- $2350 to Venice High School to pilot secure wheelbase-locking storage of skateboards used for commuting.
- $2688 to Mark Twain Middle School to beautify its playgrounds and support its vigorous PE program with essential equipment.
- $1300 to Grand View Elementary School for establishing a classroom food waste recycling and composting program.

iv. **FUNDING MOTION: Walgrove ES NPG** (Submitted by Education, Arts & Culture Committee)

The Mar Vista Community Council approves a Neighborhood Purpose Grant of up to $2500 to Walgrove Elementary School to support its 2nd annual Studio Lab Community Game Day.

v. **FUNDING MOTION: Richland ES NPG** (Submitted by Education, Arts & Culture Committee)

The Mar Vista Community Council approves a Neighborhood Purpose Grant of up to $2500 to Richland Elementary School for books and learning tools supportive of its new Dual Language Immersion Program.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

n. Animal Services Liaison: Steve Boskin

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Standing Rules Revision** (submitted by Elections & Bylaws committee)

MVCC approves replacement of the Standing Rules approved May 13, 2008 and last amended on June 9, 2015 with a new version dated December 8, 2015.

b. **ADMINISTRATIVE MOTION: Elections & Bylaws Committee Chair** (submitted by Executive and Finance Committee)

MVCC approves the appointment of Bill Koontz as chair of the Elections & Bylaws Committee.

c. **POLICY MOTION: Homeless Count MOU** (submitted by Executive and Finance Committee)

MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See Addendum A) and will participate in the 2016 Greater Los Angeles Homeless Count. Further, MVCC approves the creation of an ad hoc 2016 Homeless Count committee and appoints Liberty Bradford and Robin Doyno as co-chairs.

d. **POLICY MOTION: 3277 S Barrington Small Lot Subdivision** (submitted by PLUM committee)

MVCC oppose the project as proposed, with the following requests for any development on the site:

- Height no greater than 30 feet
- Increased setbacks
- Mitigation of traffic and other impacts to MV Elementary
- Mitigation of safety concerns in the alley (mainly due to increased traffic)
- Provide for guest parking

- Architectural re-design more consistent with the character of neighborhood
- Reduce to 2-3 units
- Removal of "kitchenette" in plans.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
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11. **Discussion Calendar**
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Addendem A: Homeless Count MOU

NEIGHBORHOOD COUNCIL
MEMORANDUM OF UNDERSTANDING
OPT-IN PROGRAM
FOR THE
2016 GREATER LOS ANGELES HOMELESS COUNT
January 26, 27, and 28, 2016

This Opt-In Program Memorandum of Understanding (MOU) sets forth partnership roles and responsibilities between LAHSA and Neighborhood Councils in the City of Los Angeles during the 2016 Greater Los Angeles Homeless Count. This MOU shall be executed by LAHSA and the Department of Neighborhood Empowerment on behalf of the Neighborhood Councils that desire to participate in the 2016 Homeless Count.

BACKGROUND

The Los Angeles Homeless Services Authority (LAHSA) is a joint powers authority formed by the City and County of Los Angeles in 1993, to address the problems of homelessness in Los Angeles. LAHSA is the lead agency of the Los Angeles Continuum of Care (LA CoC). The LA CoC includes 85 cities and the unincorporated areas of Los Angeles County, excluding only the cities of Glendale, Long Beach and Pasadena, as each of those three cities operate their own independent Continuums.

"Homeless Count" refers to the process of counting homeless persons residing in shelters or living on the street, in parks, cars or other places not meant for human habitation, as well as conducting the Housing Inventory Chart (HIC), an enumeration of the number of shelters, beds and units dedicated to housing homeless persons. Since 2005, LAHSA has coordinated six biennial Greater Los Angeles Homeless Counts. Beginning in 2016, the Point-In-Time Count ("Count") will occur annually. The Count consists of four components: 1) the street count; 2) the shelter count; 3) the youth count; and, 4) the demographic survey.

The 2015 Homeless Count was the largest census in the country, benefitting from the support of more than 5,500 volunteers. In 2015 the Count discovered that on any given point-in-time approximately 41,174 residents are homeless in the LA CoC, and 44,359 people experience homelessness in Los Angeles County. The data gathered from the Homeless Count is extremely valuable to our mission of ending homelessness. It supplies government agencies, service providers and housing providers with a reliable estimate of the homeless population in the City and County of Los Angeles, including sub-regions such as Service Planning Areas (SPAs), Supervisorial Districts (SDs) and Council Districts (CDs) within the City of Los Angeles. It also provides an array of demographic information.

In 2009, the study methodology was enhanced to enable Opt-In City/Community Areas to coordinate a homeless count within their borders, using locally recruited volunteers from public and private agencies. In 2015, 248 cities and communities enumerated all of their census tracts. Using the results from the LAHSA shelter and youth counts, cities are able to estimate a Point-in-Time number of the homeless families and individuals who are sheltered and unsheltered in their jurisdictions.

The Opt-In Program gives cities, communities and other jurisdictions the opportunity to obtain locally-specific data at a high confidence level. Full enumeration of every agreed-upon census tract within each City/Community Area will

provide more granular data and can substantially aid efforts to evaluate existing homeless services and plan for future measures to address local homelessness in your community.

I. NEIGHBORHOOD COUNCIL RESPONSIBILITIES

Neighborhood Councils serve as advisory bodies to the City of Los Angeles. (Los Angeles City Charter Art. IX § 900.) Any Neighborhood Council that desires to participate in this program shall agendize and discuss at a public meeting that they agree to the terms in this MOU and to participate in the 2016 Homeless Count. Any Neighborhood Council that desires to participate in this program shall then forward its minutes or a resolution to the Department of Neighborhood Empowerment requesting that the Department enter this MOU on behalf of the Neighborhood Council. During the 2016 Homeless Count, Neighborhood Council participating in the program will obtain volunteers to conduct a full enumeration (complete counting) of all unsheltered homeless persons in the agreed-upon census tracts within the Neighborhood Council's boundary. (Exhibit A.) In addition, the Neighborhood Council will:

A. Obtain volunteers in order to achieve continuous, reliable counts of unsheltered homeless persons.

B. Provide the name, address, telephone number, capacity and picture of each Deployment Site. A Deployment Site is a location within your area from which volunteers will be deployed to perform the 2016 Homeless Count that meets the following requirements (Deployment Site Worksheet - Exhibit B):

- Is NOT currently a site where services are provided to homeless people at night;
- Has capacity and sufficient space to hold, and contains tables and chairs for, the specified number of volunteers for your area;
- Is able to maintain sufficient cellular phone service coverage and/or has Wi-Fi access points, landline telephone lines, or another comparable means of communication in the absence of sufficient mobile service signal;
- Contains accessible restroom facilities;
- Includes, or is adjacent to, ample free parking;
- Is located within the Neighborhood Council's boundaries approved by LAHSA;
- Has a confirmed Deployment Site Coordinator, who sets-up the site and directs operations during the 2016 Homeless Count (further duties are listed in paragraph C, below); and
- Has a confirmed Deployment Site Access Provider to assist with logistics and coordinating access during the 2016 Homeless Count, either by providing all necessary keys or being present to grant access during the Count. A Deployment Site Access Provider is the contact person or persons who will be responsible for providing access to each of the designated Deployment Sites in your area on the day/evening of the training and date of the Count. (Exhibit B)

C. Designate and provide the name, office number, cellular number and email address of the Deployment Site coordinator, who has the following responsibilities/duties:

- Direct the operations at a volunteer Deployment Site for the date of the count, including but not limited to the set-up of the site and ensuring volunteers receive a light meal;
- Ensure that volunteers are deployed in teams to the proper locations;
- Track all volunteer teams to ensure that they return in a timely manner;
- Assist volunteers by answering any questions;
- Review all incoming tally sheets for accuracy;
- Communicate and coordinate with the Homeless Count Regional Coordinator, SPA Leadership and LAHSA headquarters on the status of the Count at their site;
- Coordinate the pick-up and drop-off of all 2016 Homeless Count materials with LAHSA; and

- Participate in training.

D. Provide the name, office number, cellular number and email address for each Deployment Site Access Provider.

E. Provide a volunteer that will coordinate with the Homeless Count Regional Coordinator and provide regular communication of the status of progress, issues and volunteer recruitment including providing volunteer lists from the volunteer management system. Depending upon deployment needs on the date of the Count, your volunteers may be deployed to conduct 2016 Homeless Count activities outside of or adjacent to your City/Community Area.

F. Provide confirmation of geographic boundaries for your Neighborhood Council from which the actual number of census tracts to be counted will be determined by LAHSA. (EXHIBIT A)

G. Ensure there is an unarmed security guard or police officer at each Deployment Site on the date of the Count. LAHSA will provide support for this requirement on a case by case basis.

H.) Provide a volunteer that ensures that each adult participating in the count signs a release and waiver (EXHIBIT D), and a parent or legal guardian of each minor volunteer (under 18 years of age) completes and signs a release and waiver (EXHIBIT E), indemnifying LAHSA and your Neighborhood Council/City of Los Angeles from any liability during their participation on the date of the Count. Minors must be as least 14 years of age.

I. Ensure Site Coordinators and other appropriate volunteer staff attend trainings to support the successful implementation of the Count.

J. Provide a light meal to volunteers on the date of the Count. Remember, volunteers arrive around meal time.

K. Any and all data regarding the 2016 Homeless Count MUST give recognition to LAHSA.

II. LAHSA RESPONSBILITIES

In order to ensure a successful enumeration of homeless persons across the LA CoC, LAHSA will be responsible for providing the following:

A. Hire a Regional Homeless Count Manager who shall be responsible for interfacing with LAHSA, managing the Homeless Count Regional Coordinators (RCs), and overseeing their execution of 2016 Homeless Count activities within each Service Planning Area (SPA).. The RC will be the designated lead within the SPA who is responsible for managing, directing and overseeing the planning, logistics, coordination and execution of 2016 Homeless Count activities;

B. Hire a consultant to analyze the data and provide the Point-In-Time Count results for the LA CoC, including homeless subpopulation and totals by geography, as well as the production of a 2016 Homeless Count report.

C. Train the Deployment Site Coordinators and 2016 Homeless Count and volunteers. Deployment Site Coordinators will receive training on Count preparation, data collection, safety procedures and other relevant training, as needed. Volunteers will receive training on standard enumeration and safety procedures;

D. Provide materials necessary for a successful Count, including, but not limited to, scanned copies (PDFs) of all the documentation needed to conduct the unsheltered and sheltered Count, as well as the demographic surveys;

E. Provide a determination of the specific census tracts that need to be counted in order to achieve a full enumeration of unsheltered homeless persons in your area. LAHSA and the Neighborhood Council must be in agreement regarding the census tracts to be counted (EXHIBIT A) prior to the execution of this MOU.

F. Based upon the number of census tracts to be enumerated in your area, LAHSA will provide Neighborhood Councils with an estimate of the minimum number of volunteers needed to successfully complete your Count (EXHIBIT A);

G. Based upon the number of census tracts to be counted and the geographic characteristics of your area, LAHSA will provide Neighborhood Councils with a determination of the specific number of Deployment Sites that will be needed for a successful Count (see EXHIBIT A);

H. Provide Neighborhood Councils with a Summary Report produced by the 2016 Homeless Count, based on the successful enumeration of 100% of all census tracts.

III. HOMELESS COUNT REGIONAL COORDINATOR RESPONSBILITIES

In order to ensure a successful enumeration of homeless persons within each participating City/Community Area, your designated Homeless Count Regional Coordinator is responsible for assisting with the following:

A. Maintain general oversight and management support in conducting the Count, youth count, shelter count and demographic survey.

B. Outreach and recruiting of Opt-In Participants.

C. Collaborate with SPA stakeholders to leverage resources and coordinate logistical support prior to and during the 2016 Homeless Count, including, but not limited to, identifying potential Deployment Sites, obtaining security personnel and other relevant Count duties.

D. Provide support with volunteer outreach, recruitment and tracking.

E. Provide support by obtaining SPA level sponsorships.

F. Supply materials necessary for a successful Count.

G. Provide ongoing guidance, tools, and assistance to Site Coordinators and other relevant volunteers.

IV. OPT-IN COMMITMENT

The execution of this MOU by the Department of Neighborhood Empowerment on behalf of those Neighborhood Councils agreeing to participate in the 2016 Homeless Count signifies a commitment to fulfill all of the responsibilities in this MOU. Attached as Exhibit "C" is a list of Neighborhood Councils participating in the 2016 Greater Los Angeles Homeless Count.

V. RIGHT TO WITHHOLD DATA

In the event that a Neighborhood Council opts out fails to fulfill its responsibilities under this MOU, LAHSA reserves the right to withhold any and all data from your Community/City Area produced by the 2016 Homeless Count.

IN WITNESS WHEREOF, the Opt-In Participant and the Los Angeles Homeless Services Authority have caused this MOU to be executed by their duly authorized representatives.

For: DEPARTMENT OF NEIGHBORHOOD EMPOWERMENT

By: _____
Grayce Liu, General Manager

Date: _____

For: LOS ANGELES HOMELESS SERVICES AUTHORITY (LAHSA)

By: _____
Peter Lynn, Executive Director

Date: _____

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, December 8th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:07 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Melissa Stoller (Secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Brad Wilhite, Ken Alpern, Mitchell Rishe, Michael Millman
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of November 10, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve as corrected by Bill Scheding, 2nd by Michelle Krupkin. Motion carried unanimously
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   3277 S. Barrington development:
   - Hayashi Bara, 3361 McLaughlin: upset the MVCC agreed to postpone discussion; people in neighborhood are ready, shouldn't postpone because developer isn't.
   - John Evans, 3300 block Barry: another home on Barrington is up for sale; realtor Sherri Noyes distributed flyer that is actively seeking creative developer for apartment building
   - Elaine Stumpis: People moved here because they want to be in neighborhood of single-family homes. 10 years ago developer tried to increase size of apartments and the neighborhood pushed back; we can't allow developers to destroy our neighborhood for money. There are times on McLaughlin when traffic is stopped all the way to Palms.
   - Jerry Hornoff, Lawler St. & president of Westdale Homeowners Association: need to recognize that the property is zoned R3 and try to work with the developer. Perhaps we can then use, along with council office to leverage other development.
   - Steve Wallace: Best developments in Mar Vista are where neighborhood worked with developers. Developer can put 12-unit apartment there and if they do, other developers will follow. Think about what you would accept in that area. If we can protect the parkway, that will limit development (size must go down if can't do curb cuts for entry/egress). Gateway & Barrington: application for 125 unit apartment building where tire business is.
   - Debby Almo Bazquez, 3264 Stoner: Lots of traffic down Stoner 4-7 P.M.; people speeding, no regard for pedestrians. Very dangerous situation.
   - ?: Will impinge on solar rights; water system overtaxed. Allowing overdevelopment ruins scale & charm of neighborhood & devalues property. Need moratorium & realistic.
   - Len Nguyen: Mike Bonin has received lots of emails. Asked staff to review underlying zoning, what's legal and what steps can be taken. If it meets zoning, there's not a lot we can do to stop.

   Sherri Akers: RE: methane leak. Green Committee passed a methane leak motion, has asked other NCs to pass a motion. NASA study shows Methane leaks are rampant.
   Ken Axten: People squatting in park (structures, using picnic table, cooking on BBQ)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
   - El Nino is coming, City is planning series of town halls.
   - Introduced 7 motions re: parking recommendations.
   - Bill Scheding: Notices lots of people using Centinela between Gateway & National to bike to commute; should restripe right turn lanes as bike lanes.
   - Valerie Davidson: Overnight parking on Centinela where it's posted no parking.
   - Myra Boime: Wants "keep clear" sign at Palms & Beethoven.
   - Ken Alpern: Will there be some efforts to provide more/alternative parking? Fan of bicycle network but need to consider safety; use riverbeds to go long distances–safer, avoids bike vs. car.

b. Mar Vista Recreation Center – Lizka Mendoza, Director
c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
   - Venice Blvd: Rep. Ridley-Thomas authored successful bill to allow State to relinquish to city of Los Angeles from Lincoln to Cadillac.

     Michelle Krupkin, RE: Venice: Poor condition of parts of street; issues with Make It Mar Vista due to CalTrans; issue with smart bus bench–can't put it on street.

     Scott: call him directly if need help.

     Ken Alpern: can we eyeball before any agreement is signed for Venice Blvd? Local input would help process.
   - Homeless encampments along rights of way; working on one near Cotner & Olympic; will displace homeless and they'll go elsewhere–complex issue.
   - Bill Scheding: Should allow cars to go in & out of car pool lanes freely

g. US 33 – Ted Lieu, rep. by Joey Apodaca joey.apodaca@mail.house.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
l. Joel Jacinto, Department of Public Works

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
      i. **APPROVAL** of November Monthly Expense Report (MER)

         Motion to approve by Bill Scheding, 2nd by Valerie Davidson.

         Motion to table by Melissa Stoller, no 2nd.

         Discussion:

         Bill Scheding: Need to maintain our paperwork on monthly basis; DONE can freeze funds.

         Steve Wallace: Do we loss $29,000 if not spent?

Bill Scheding: Money is allocated, not yet spent; we'll spend any left over funds at end of year.

Bill Koontz: Yes, would lose if not spent; allocated $4500 for election

Motion carried: 9 ayes, nays, 1 abstentions (Melissa Stoller).

ii **FUNDING MOTION: Winter Wonderland** (submitted by ExFin Committee)

The Mar Vista Community Council approves a Neighborhood Purpose Grant of up to $1000 to the LAPD Booster Club for reimbursement of Winter Wonderland tent and chair rentals.

Motion to approve by Bill Scheding, 2nd by Sherri Akers.

Discussion:

Bill Scheding: MVCC has been supporting for years.

Michelle Krupkin: Need volunteers day before (Dec. 11)–sorting toys in Pacific Division parking lot; starts at noon

Motion carried: 9 ayes, 0 nays, 1 abstention (Robin Doyno).

iii **FUNDING MOTION: Webster MS, Venice HS, Mark Twain MS & Grand View ES NPGs** (Submitted by Education, Arts & Culture Committee)

The Mar Vista Community Council approves the following Neighborhood Purpose Grants:

- $2925 to Webster Middle School to expand its successful robotics pilot.
- $2350 to Venice High School to pilot secure wheelbase-locking storage of skateboards used for commuting.
- $2688 to Mark Twain Middle School to beautify its playgrounds and support its vigorous PE program with essential equipment.
- $1300 to Grand View Elementary School for establishing a classroom food waste recycling and composting program.

Motion to consider 6.e.iii-v together by Bill Scheding, 2nd by Melissa Stoller. Motion carried unanimously.

Motion to refer back to committee with comments by Bill Scheding, 2nd by Sherri Akers.

Discussion:

Sara Roos: EACC is here to support Mar Vista. Work of committee is what Mar Vista is about. Put out requests to small projects to schools. Ability of school booster clubs to raise money is dependent in part on relative wealth of population. Moved NPG timeline forward because it'sdifficult for schools to do the projects near end of school year. Projects help raise the profile of Mar Vista. EACC requests that 1st 4 requests be funded 100%.

Sherri Akers: Together grants are 1/3rd of total MVCC budget, first 4 are 25% of budget. Committees are careful to not spend money. Need to consider total picture, not just individual motions.

Ken Alpern: Long history of supporting these types of projects. Was taken aback by amounts and some of the projects. Board usually prefers "things" over programs. People in community may look at and say "isn't this what LAUSD is supposed to be doing?"

Michelle Krupkin: Echoes Ken & Sherri's feelings. This is huge portion of budget. Perhaps there are some matching grants.

Michael Millman: What is relationship of size of these grants to other NPG grants in community? How do skateboard lockers enhance profile of Mar Vista?

Robin Doyno: EACC thinking was $4000 in NPG pile, $5000 in Community Improvement Grant. Last June, talked about branding Mar Vista as Education Capital.

Sherri Akers: Currently $16000 allocated for grants, EACC asking for $14,000.

Steve Wallace: Two of the schools aren't all Mar Vista kids. Are other NCs putting in money to these schools? Why can't skate board pallets be rolled in to Venice High work? Shouldn't our taxes be paying for things like stop watches for coaches?

Christopher McKennon: Does money go to the school, or individual vendors? Bill Scheding: goes to school in lump sum.

Brad Wilhite: thanks to Sara Roos for hard work on committee. Feels like number presented tonight is about same as last year. Items submitted by schools are well thought out; if follow back to source, they make sense and are important.

Bill Koontz: Last year had gift of one newsletter and no election to fund.

Bill Scheding: Should give EACC a dollar amount to target.

Bill Koontz: Requests board members to attend EACC meeting, give Sara private feedback/questions.

Ken Alpern: We owe it to Sara to delve in.

Motion carried: 8 ayes, 3 nays, 0 abstentions.

iv. **FUNDING MOTION: Walgrove ES NPG** (Submitted by Education, Arts & Culture Committee)

The Mar Vista Community Council approves a Neighborhood Purpose Grant of up to $2500 to Walgrove Elementary School to support its 2nd annual Studio Lab Community Game Day.

v. **FUNDING MOTION: Richland ES NPG** (Submitted by Education, Arts & Culture Committee)

The Mar Vista Community Council approves a Neighborhood Purpose Grant of up to $2500 to Richland Elementary School for books and learning tools supportive of its new Dual Language Immersion Program.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

- Met Nov. 18. Long list of new business. LAPD officer previously assigned skipped last two meetings; the newly assigned officer was in accident a few days before meeting. Sgt. Christopher Kunz attended meeting.
- Newly installed signs for Farmers' Market: 85% done, expect to finish in next few weeks.
- MV Post Office: Complaints about not being able to exit onto Grand View. Public alley and Post Office has no say in traffic control. Will sandblast signs saying "No Exit".
- Valerie Davidson: Need handicap curbs at intersection at Rose at all four corners
- Mitchell Rishe: Lineup of cars trying to get on 10 FWY; response (put up no blocking signs) doesn't address root of problem.
- Bill Scheding: Put "No Right Turn" sign on Stoner to prevent cut-thru's.

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

- Hasn't meet since last BOD. Part of water rate increase is for water recycling.
- Bill Koontz: Should inject water back in to ground–more expensive short term that spreading fields, but long term saves money. Is there any discussion of this?
- Christopher: Injection done now to prevent seawater incursion. Injection involves spending money, pumping.
- Valerie Davidson: Rain barrel program? Sherri Akers: Focus is more on cisterns; just had demonstration program.

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald –add website

- Thanks for Make it Mar Vista support. Head of Small Business Association spent whole day there with her family: bowled, bought gifts for Obama's at Soaptopia.
- Meeting Monday, Dec 14 at 5:30 P.M.
- Rustic Kitchen opening on Dec. 16.
- Michelle Krupkin: Thanks Sarah for efforts with Cal Trans.

n. Animal Services Liaison: Steve Boskin

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

   a. **ADMINISTRATIVE MOTION: Standing Rules Revision** (submitted by Elections & Bylaws committee)

   MVCC approves replacement of the Standing Rules approved May 13, 2008 and last amended on June 9, 2015 with a new version dated December 8, 2015.

   Motion to approve by Bill Scheding, 2nd by.Mitchell Rishe.

   Discussion:

   Sherri Akers: Appreciates work that went in to.

   Mitchell Rishe: Friendly amendment II.6.d:

   The minutes should contain enough information for stakeholders to understand how~~/why~~ the committee came to its decision.

   Michael Millman: Are there consequences for violating Standing Rules? Are they designed to be guidelines?

   Bill Koontz: Recollection is that there's something in by-laws: are rules, not guideline.

   Motion carried as amended: 9 ayes, 0 nays, 1 abstention (Michael Millman).

   b. **ADMINISTRATIVE MOTION: Elections & Bylaws Committee Chair** (submitted by Executive and Finance Committee)

   MVCC approves the appointment of Bill Koontz as chair of the Elections & Bylaws Committee.

   Motion to approve by Melissa Stoller, 2nd by Ken Apern. Motion carried unanimously.

   Discussion:

   Jay Handal, Neighborhood Council Elections Administrator: Lots of help available this time: templates, poll banners, Chiat Day publicity. Has 19 employees. Committed to making great election. Frontloading all registered voters into NationBuilder. Paying for poll workers. NCs need to reach out to stakeholders. To do really good job, allow $8000-10,000.

   Sarah Auerswald: Elections Committee needs to sign MVCC up for NationBuilder.

   Robin: Wants to be included on Outreach Committee.

   c. **POLICY MOTION: Homeless Count MOU** (submitted by Executive and Finance Committee)

   MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See Addendum A) and will participate in the 2016 Greater Los Angeles Homeless Count. Further, MVCC approves the creation of an ad hoc 2016 Homeless Count committee and appoints Liberty Bradford and Robin Doyno as co-chairs.

   Motion to approve by Robin Doyno, 2nd by Valerie Davidson.

   Discussion:

   24 volunteers already signed up; need 60.

   Motion carried unanimously.

   d. **POLICY MOTION: 3277 S Barrington Small Lot Subdivision** (submitted by PLUM committee)

   MVCC oppose the project as proposed, with the following requests for any development on the site:

   - Height no greater than 30 feet
   - Increased setbacks
   - Mitigation of traffic and other impacts to MV Elementary
   - Mitigation of safety concerns in the alley (mainly due to increased traffic)
   - Provide for guest parking
   - Architectural re-design more consistent with the character of neighborhood
   - Reduce to 2-3 units
   - Removal of "kitchenette" in plans.

   Motion to put over by Michael Millman, 2nd by Bill Scheding.

   Discussion:

   Michael Millman: Be cautious about putting over, consult with zone director

   Motion carried unanimously.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
        - January 21: MVNA annual meeting at St. Bede's 7:00 P.M.
    e. Zone 5 – Michelle Krupkin
        - Earls Gourmet closed.
    f. Zone 6 – Valerie Davidson
        - Usual concern with mansionization & traffic; great holiday lights on Rose Ave.
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

       Might have joint meeting with PLUM Tuesday, December 15, to discuss bike lanes.
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs

       Please ask questions.
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

       Great meeting. LA Weekly & Argonaut reporters attended.

       FAA says lease extended to 2023 because Santa Monica received some funding.

       Dec. 9 NWNA informational meeting addressing airport issues
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

       Lots of traction on Facebook.
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-Chairs
    n. **Homeless Issues Committee** – Robin Doyno, Chair

       Need volunteers for January 27 homeless count, 2 to 2 ½ hrs.

       Need board members at Farmers' Market to promote count.
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**

    Georgia McQuerry: Daughters attend Mark Twain & Walgrove. Schools in Mar Vista are loosing kids to charters. Grants are about trying to keep the kids local and making schools flagships of our community. If keep kids there, less traffic. LAUSD expects schools to raise funds; it's really hard.
16. **Adjournment**

    Meeting adjourned at 9:36 P.M.

* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, November 10th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of October 13, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
    l. Joel Jacinto, Department of Public Works
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
        i. **APPROVAL** of October Monthly Expense Report (MER)
        ii **FUNDING MOTION: Farmers' Market tents** (submitted by ExFin Committee)
        The Mar Vista Community Council approves the expenditure of up to $999 to purchase new MVCC and Green Tent canopies and, if available, patch and repair kits for the existing canopies.

iii **FUNDING MOTION: Mar Vista Art Walk** (Director's motion submitted by Bill Koontz)

The Mar Vista Community Council approves the expenditure of up to $300 for the printing of flyers to publicize the December 3rd Mar Vista Art Walk.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Elections & Bylaws Committee Chair**

MVCC approves the appointment of Bill Koontz as chair of the Elections & Bylaws Committee.

b. **ADMINISTRATIVE MOTION: Aging in Place Committee**

MVCC approves changing Aging in Place from an ad-hoc to a standing committee.

c. **ADMINISTRATIVE MOTION: Animal Services Liaison**

MVCC approves the appointment of Sherri Akers as Animal Services Liaison.

d **ADMINISTRATIVE MOTION: NCSA Liaison**

MVCC eliminates the position of Neighborhood Council Sustainability Alliance Liaison.

e **ADMINISTRATIVE MOTION: Standing Rules Revision**

MVCC approves replacement of the Standing Rules approved May 13, 2008 and last amended on June 9, 2015 with a new version dated November 10, 2015.

f. **POLICY MOTION: Homeless Count MOU** (submitted by Executive and Finance Committee)

MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See Addendum B) and will participate in the 2016 Greater Los Angeles Homeless Count.

g. **POLICY MOTION: Short term rentals** (submitted by Aging in Place Committee)

The Mar Vista Community Council supports the motion by Councilmember Mike Bonin (Council File 14-1635-S2 – see Addendum A) to create a new ordinance addressing short term rentals.

Whereas seniors are currently 10% of the Air BnB hosts, with 56% of those being retired and 25% being empty nesters, with 49% doing this for financial reasons. (http://blog.airbnb.com/celebrating-airbnbs-60-host-community/).

Whereas the following statistics project that our senior community will face significant financial challenges for aging in place:

- About 22% of Americans 65 years and older are in danger of becoming elder orphans - single or widowed; they have no children, at least in the area, and no support system. Based on 2012 U.S. Census data, about one third of Americans age 45 to 63 are single, and in a position to become orphans as they age.
- People age 65 and older now make up 13 percent of the total population and will jump to 16% by 2020 and 19% by 2030
- 33% of Boomers have put aside less than $50,000 for retirement
- Baby Boomers have saved an average of $262,541, about a third of the $805,398 they predict they'll need at retirement.
- Among the first wave of baby boomers to hit retirement age, more than half (54 percent) quit working before they planned. A majority of those polled say it was job loss or health-related issues.
- The average annual cost of a nursing home is $91,000 per year
- Home caregiver 24/7 costs are $125 a day and up and will further increase with the Dept. of Labor decision that home caregivers must be paid at least minimum wage and overtime.

- Assisted Living facilities average $3,351 per month for a one bedroom but are as high as $12,000 with costs increasing as the level of care increases.
- Short term rentals are often the only viable means for seniors to bring in extra income to cover their increased cost of living expenses due to the need for additional services as seniors age in place and maintain independence.
- 80% of women live longer than their spouses, often by many years, on average 14. Widowhood creates economic hardship as Social Security benefits and pensions plans benefits have a reduced pay out after a spouse dies.

The Mar Vista Community Council believes that short term rentals will be a key component in our fight to help seniors stay in their home as they age. Therefore, as proposed by Councilmember Mike Bonin, the MVCC urges the LA City Council to authorize a host to rent all or part of their primary residence to short-term visitors, permitting someone to rent a spare room, or a back house. This would include renting their whole house while they are out of town.

h. **POLICY MOTION: 12400 W. Pacific Ave Small Lot Subdivision** (submitted by PLUM Committee)

MVCC approves the application (Case Nos. VTT-73598-SL, ENV-2015-2499-EAF) to build a small lot subdivision with 5 single-family dwelling, each 3 stories and 45 feet in height at 12400 W. Pacific Ave, with request that developer: (1) provide more realistic renderings for board to better evaluate the aesthetics of the project, and (2) consult with the MVCC Green Committee on green building elements and landscaping.

i. **POLICY MOTION: MVCC Recommendations for future MetroRail projects to enhance Westside/regional/countywide mobility** (submitted by T&I Committee)

MVCC Recommendations for future MetroRail projects to enhance Westside/regional/countywide mobility

The Mar Vista Community Council, supports the following two large rail projects for inclusion in the Metro Long Range Transportation Plan:

a) Metro Rail line from West LA / LAX to Valley, and

b) Direct Metro Rail (or Metrolink) line from LAX to Union Station via the Harbor Subdivision Rail Right of Way.

j. **POLICY MOTION: Great Street** (submitted by T&I Committee)

Whereas LA City currently owns but a small portion of Great Street Venice Blvd. and

Whereas, the rest of Great Street Venice Blvd. is owned by Caltrans, and

Whereas, LA City owns Venice/Inglewood adjacent to the Mar Vista Library and the side streets off of Venice Blvd. just outside of the Venice Blvd. Caltrans right-of-way,

Therefore, Mar Vista Community Council supports a Smart Bench for Venice at Inglewood near the Mar Vista Library.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
        i. **Green Garden Showcase** – Sherri Akers & Melissa Stoller
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
h. **Safety and Security Committee** – Rob Kadota, Chair
i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
k. **Elections and By-laws**- Bill Scheding, chair
l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
m. **Aging in Place** - Sherri Akers, Chair

11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Addendem B: Council File 14-1635-S2

PLANNING & LAND USE MANAGEMENT

MOTION

In the past few years, technology and innovation have expanded and fundamentally changed the way people travel and vacation. Visitors to Los Angeles and cities around the world routinely use "short-term rentals" in lieu of hotels to stay in and experience a community. The impacts of the short-term rental industry have been dramatic – in both positive and negative ways.

Tourists who stay in short-term (less than 30 days) rentals relish the opportunity to stay in Los Angeles' many and diverse neighborhoods, and experience our City as "a local." Many short-term rental hosts speak glowingly of a "sharing economy" and their ability to make ends meet by renting out a room or their back house. Tourists and hosts alike speak of new friendships and the positive benefits of this new form of vacation experience.

At the same time, critics have decried unfavorable consequences, such as the impact on some residential neighborhoods, which are changed by a revolving cast of visitors and their impacts. Significantly, in some popular tourist communities such as Venice, speculators have subverted the "sharing economy" business model, converting regular rental housing into short-term rentals, significantly reducing rental stock and contributing to increased rents and decreased affordable housing. In some cases, large numbers of units in the same building, or entire buildings, have been converted to short-term rentals, operated by off-site management companies.

The City's current zoning regulations do not anticipate or effectively govern short-term rentals, and need to be revised so that the City can effectively preserve rental housing, protect the character of residential neighborhoods, and collect transient occupancy tax that pays for crucial City services. Neighboring cities, such as Santa Monica and West Hollywood, have already crafted local ordinances.

Last month, the City Administrative Officer released two reports regarding short-term rentals (*CAO File No. 0220-0513-0000, Council File 14-0593 Relative to a Comprehensive Study on the Sharing Economy and Its Impacts on the City of Los Angeles*, and *CAO File No. 0220-05153-000,0 Council File No. 14-0600-S89 Application of Transient Occupancy Tax for Short-Term Rentals*). Those reports framed the issues facing City policy makers.

I THEREFORE MOVE that the City Council direct the City Planning Department, with the assistance of the City Attorney, in consultation with the Office of Finance and other relevant City departments, to prepare and present an ordinance governing short-term rentals in Los Angeles in the following manner:

- Authorizes a host to rent all or part of their primary residence to short-term visitors, permitting someone to rent a spare room, a back house, or even their own home while they are out of town.
- Prohibits hosts from renting units or buildings that are not their primary residence or are units covered by the Rent Stabilization Ordinance (RSO), forbidding speculators from creating a syndicate of short-term rental properties, and prohibiting the loss of valuable rental housing stock.
- Captures Transient Occupancy Tax (TOT) from all hosts.

JUN 3 2015

PRESENTED BY:

MIKE BONIN
Councilmember, 11th District

HERB J. WESSON, JR.
Councilmember, 10th District

SECONDED BY:

ORIGINAL

Addendem B: Homeless Count MOU

NEIGHBORHOOD COUNCIL
MEMORANDUM OF UNDERSTANDING
OPT-IN PROGRAM
FOR THE
2016 GREATER LOS ANGELES HOMELESS COUNT
January 26, 27, and 28, 2016

This Opt-In Program Memorandum of Understanding (MOU) sets forth partnership roles and responsibilities between LAHSA and Neighborhood Councils in the City of Los Angeles during the 2016 Greater Los Angeles Homeless Count. This MOU shall be executed by LAHSA and the Department of Neighborhood Empowerment on behalf of the Neighborhood Councils that desire to participate in the 2016 Homeless Count.

BACKGROUND

The Los Angeles Homeless Services Authority (LAHSA) is a joint powers authority formed by the City and County of Los Angeles in 1993, to address the problems of homelessness in Los Angeles. LAHSA is the lead agency of the Los Angeles Continuum of Care (LA CoC). The LA CoC includes 85 cities and the unincorporated areas of Los Angeles County, excluding only the cities of Glendale, Long Beach and Pasadena, as each of those three cities operate their own independent Continuums.

"Homeless Count" refers to the process of counting homeless persons residing in shelters or living on the street, in parks, cars or other places not meant for human habitation, as well as conducting the Housing Inventory Chart (HIC), an enumeration of the number of shelters, beds and units dedicated to housing homeless persons. Since 2005, LAHSA has coordinated six biennial Greater Los Angeles Homeless Counts. Beginning in 2016, the Point-In-Time Count ("Count") will occur annually. The Count consists of four components: 1) the street count; 2) the shelter count; 3) the youth count; and, 4) the demographic survey.

The 2015 Homeless Count was the largest census in the country, benefitting from the support of more than 5,500 volunteers. In 2015 the Count discovered that on any given point-in-time approximately 41,174 residents are homeless in the LA CoC, and 44,359 people experience homelessness in Los Angeles County. The data gathered from the Homeless Count is extremely valuable to our mission of ending homelessness. It supplies government agencies, service providers and housing providers with a reliable estimate of the homeless population in the City and County of Los Angeles, including sub-regions such as Service Planning Areas (SPAs), Supervisorial Districts (SDs) and Council Districts (CDs) within the City of Los Angeles. It also provides an array of demographic information.

In 2009, the study methodology was enhanced to enable Opt-In City/Community Areas to coordinate a homeless count within their borders, using locally recruited volunteers from public and private agencies. In 2015, 248 cities and communities enumerated all of their census tracts. Using the results from the LAHSA shelter and youth counts, cities are able to estimate a Point-in-Time number of the homeless families and individuals who are sheltered and unsheltered in their jurisdictions.

The Opt-In Program gives cities, communities and other jurisdictions the opportunity to obtain locally-specific data at a high confidence level. Full enumeration of every agreed-upon census tract within each City/Community Area will

provide more granular data and can substantially aid efforts to evaluate existing homeless services and plan for future measures to address local homelessness in your community.

I. NEIGHBORHOOD COUNCIL RESPONSIBILITIES

Neighborhood Councils serve as advisory bodies to the City of Los Angeles. (Los Angeles City Charter Art. IX § 900.) Any Neighborhood Council that desires to participate in this program shall agendize and discuss at a public meeting that they agree to the terms in this MOU and to participate in the 2016 Homeless Count. Any Neighborhood Council that desires to participate in this program shall then forward its minutes or a resolution to the Department of Neighborhood Empowerment requesting that the Department enter this MOU on behalf of the Neighborhood Council. During the 2016 Homeless Count, Neighborhood Council participating in the program will obtain volunteers to conduct a full enumeration (complete counting) of all unsheltered homeless persons in the agreed-upon census tracts within the Neighborhood Council's boundary. (Exhibit A.) In addition, the Neighborhood Council will:

A. Obtain volunteers in order to achieve continuous, reliable counts of unsheltered homeless persons.

B. Provide the name, address, telephone number, capacity and picture of each Deployment Site. A Deployment Site is a location within your area from which volunteers will be deployed to perform the 2016 Homeless Count that meets the following requirements (Deployment Site Worksheet - Exhibit B):

- Is NOT currently a site where services are provided to homeless people at night;
- Has capacity and sufficient space to hold, and contains tables and chairs for, the specified number of volunteers for your area;
- Is able to maintain sufficient cellular phone service coverage and/or has Wi-Fi access points, landline telephone lines, or another comparable means of communication in the absence of sufficient mobile service signal;
- Contains accessible restroom facilities;
- Includes, or is adjacent to, ample free parking;
- Is located within the Neighborhood Council's boundaries approved by LAHSA;
- Has a confirmed Deployment Site Coordinator, who sets-up the site and directs operations during the 2016 Homeless Count (further duties are listed in paragraph C, below); and
- Has a confirmed Deployment Site Access Provider to assist with logistics and coordinating access during the 2016 Homeless Count, either by providing all necessary keys or being present to grant access during the Count. A Deployment Site Access Provider is the contact person or persons who will be responsible for providing access to each of the designated Deployment Sites in your area on the day/evening of the training and date of the Count. (Exhibit B)

C. Designate and provide the name, office number, cellular number and email address of the Deployment Site coordinator, who has the following responsibilities/duties:

- Direct the operations at a volunteer Deployment Site for the date of the count, including but not limited to the set-up of the site and ensuring volunteers receive a light meal;
- Ensure that volunteers are deployed in teams to the proper locations;
- Track all volunteer teams to ensure that they return in a timely manner;
- Assist volunteers by answering any questions;
- Review all incoming tally sheets for accuracy;
- Communicate and coordinate with the Homeless Count Regional Coordinator, SPA Leadership and LAHSA headquarters on the status of the Count at their site;
- Coordinate the pick-up and drop-off of all 2016 Homeless Count materials with LAHSA; and

- Participate in training.

D. Provide the name, office number, cellular number and email address for each Deployment Site Access Provider.

E. Provide a volunteer that will coordinate with the Homeless Count Regional Coordinator and provide regular communication of the status of progress, issues and volunteer recruitment including providing volunteer lists from the volunteer management system. Depending upon deployment needs on the date of the Count, your volunteers may be deployed to conduct 2016 Homeless Count activities outside of or adjacent to your City/Community Area.

F. Provide confirmation of geographic boundaries for your Neighborhood Council from which the actual number of census tracts to be counted will be determined by LAHSA. (EXHIBIT A)

G. Ensure there is an unarmed security guard or police officer at each Deployment Site on the date of the Count. LAHSA will provide support for this requirement on a case by case basis.

H.) Provide a volunteer that ensures that each adult participating in the count signs a release and waiver (EXHIBIT D), and a parent or legal guardian of each minor volunteer (under 18 years of age) completes and signs a release and waiver (EXHIBIT E), indemnifying LAHSA and your Neighborhood Council/City of Los Angeles from any liability during their participation on the date of the Count. Minors must be as least 14 years of age.

I. Ensure Site Coordinators and other appropriate volunteer staff attend trainings to support the successful implementation of the Count.

J. Provide a light meal to volunteers on the date of the Count. Remember, volunteers arrive around meal time.

K. Any and all data regarding the 2016 Homeless Count MUST give recognition to LAHSA.

II. LAHSA RESPONSBILITIES

In order to ensure a successful enumeration of homeless persons across the LA CoC, LAHSA will be responsible for providing the following:

A. Hire a Regional Homeless Count Manager who shall be responsible for interfacing with LAHSA, managing the Homeless Count Regional Coordinators (RCs), and overseeing their execution of 2016 Homeless Count activities within each Service Planning Area (SPA).. The RC will be the designated lead within the SPA who is responsible for managing, directing and overseeing the planning, logistics, coordination and execution of 2016 Homeless Count activities;

B. Hire a consultant to analyze the data and provide the Point-In-Time Count results for the LA CoC, including homeless subpopulation and totals by geography, as well as the production of a 2016 Homeless Count report.

C. Train the Deployment Site Coordinators and 2016 Homeless Count and volunteers. Deployment Site Coordinators will receive training on Count preparation, data collection, safety procedures and other relevant training, as needed. Volunteers will receive training on standard enumeration and safety procedures;

D. Provide materials necessary for a successful Count, including, but not limited to, scanned copies (PDFs) of all the documentation needed to conduct the unsheltered and sheltered Count, as well as the demographic surveys;

E. Provide a determination of the specific census tracts that need to be counted in order to achieve a full enumeration of unsheltered homeless persons in your area. LAHSA and the Neighborhood Council must be in agreement regarding the census tracts to be counted (EXHIBIT A) prior to the execution of this MOU.

F. Based upon the number of census tracts to be enumerated in your area, LAHSA will provide Neighborhood Councils with an estimate of the minimum number of volunteers needed to successfully complete your Count (EXHIBIT A);

G. Based upon the number of census tracts to be counted and the geographic characteristics of your area, LAHSA will provide Neighborhood Councils with a determination of the specific number of Deployment Sites that will be needed for a successful Count (see EXHIBIT A);

H. Provide Neighborhood Councils with a Summary Report produced by the 2016 Homeless Count, based on the successful enumeration of 100% of all census tracts.

III. HOMELESS COUNT REGIONAL COORDINATOR RESPONSBILITIES

In order to ensure a successful enumeration of homeless persons within each participating City/Community Area, your designated Homeless Count Regional Coordinator is responsible for assisting with the following:

A. Maintain general oversight and management support in conducting the Count, youth count, shelter count and demographic survey.

B. Outreach and recruiting of Opt-In Participants.

C. Collaborate with SPA stakeholders to leverage resources and coordinate logistical support prior to and during the 2016 Homeless Count, including, but not limited to, identifying potential Deployment Sites, obtaining security personnel and other relevant Count duties.

D. Provide support with volunteer outreach, recruitment and tracking.

E. Provide support by obtaining SPA level sponsorships.

F. Supply materials necessary for a successful Count.

G. Provide ongoing guidance, tools, and assistance to Site Coordinators and other relevant volunteers.

IV. OPT-IN COMMITMENT

The execution of this MOU by the Department of Neighborhood Empowerment on behalf of those Neighborhood Councils agreeing to participate in the 2016 Homeless Count signifies a commitment to fulfill all of the responsibilities in this MOU. Attached as Exhibit "C" is a list of Neighborhood Councils participating in the 2016 Greater Los Angeles Homeless Count.

V. RIGHT TO WITHHOLD DATA

In the event that a Neighborhood Council opts out fails to fulfill its responsibilities under this MOU, LAHSA reserves the right to withhold any and all data from your Community/City Area produced by the 2016 Homeless Count.

IN WITNESS WHEREOF, the Opt-In Participant and the Los Angeles Homeless Services Authority have caused this MOU to be executed by their duly authorized representatives.

For: DEPARTMENT OF NEIGHBORHOOD EMPOWERMENT

By: _____
Grayce Liu, General Manager

Date: _____

For: LOS ANGELES HOMELESS SERVICES AUTHORITY (LAHSA)

By: _____
Peter Lynn, Executive Director

Date: _____

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, November 10th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:08 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Melissa Stoller (Secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Brad Wilhite, Ken Alpern, Yvette Molinaro, Mitchell Rishe
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of October 13, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve as corrected by Bill Scheding, 2nd by Sherri Akers. Motion carried: 5 ayes, 0 nays, 2 abstentions (Mitchell Rishe & Yvette Molinaro).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   None.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Starting winter shelter donation drive – collecting items through December 18th, especially toiletries, clothing items such as socks & underwear, backpacks & reading glasses. Collecting through December 18.
        Sherri Akers: Perhaps approach retailer and order what really need at a discount, then request donations. Len will look in this.
      - Draft master plan for WLA VA released: www.helphouselavets.com. It's in comment period.
      - Application window for next round of Parklet grants is now open. Contact Jessie Howzer: Jessie.howzer@lacity.org, 213-473-7011.
      - Utility box art project: Daniel Osztreicher is at new job; Len is trying to get submitted applications from him. If there are three or less, will just go ahead; if more, we'll need a review committee.
   b. Mar Vista Recreation Center – Lizka Mendoza, Director
      - Thank you for wonderful fall Festival.
      - Halloween carnival went well – about 300 people participated.
      - Fall programming went well. Soccer & girls basketball are completed.
      - Will renovate soccer field Spring, 2016. Approved and funded; in talks with contracted vendors. Will complete by summer (either before or after spring soccer).
        Mitchell Rishe: was contacted by parent concerned about cancer risk of crumb rubber. Lizka: trying to find out exactly what new field will be made of.
        Sherri Akers: believes Park Dept. is no longer using crumb rubber.
      - Lizka as put in request for new stage & floor in rec room. Trying to get new acoustic tiles.
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn

e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
l. Joel Jacinto, Department of Public Works

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.
      i. **APPROVAL** of October Monthly Expense Report (MER)
      Motion to approve by Bill Scheding, 2nd by Melissa Stoller. Motion carried unanimously.
      ii **FUNDING MOTION: Farmers' Market tents** (submitted by ExFin Committee)
      The Mar Vista Community Council approves the expenditure of up to $999 to purchase new MVCC and Green Tent canopies and, if available, patch and repair kits for the existing canopies.
      Motion to approve by Bill Scheding, 2nd by Sherri Akers. Motion carried unanimously.
      iii **FUNDING MOTION: Mar Vista Art Walk** (Director's motion submitted by Bill Koontz)
      The Mar Vista Community Council approves the expenditure of up to $300 for the printing of flyers to publicize the December 3rd Mar Vista Art Walk.
      Motion to approve by Melissa Stoller, 2nd by Sherri Akers. Motion carried unanimously.
      Green Communications Initiative, a local non-profit (applying for 501c), is running the Art Walk. Will be on Venice between Inglewood & Beethoven. Money is not going to GCI.
   f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net
      Next meeting is November 18; agenda closes November 14, early afternoon.
      Sgt. Christopher Koontz, now in charge of assigning officer; new officer, Davis, will attend meeting.
   g. DWP MOU Liaison: Myra Boime
      Referenced articles about utilities trying to kill rooftop solar. Storage technology is available. How do we get DWP to embrace it?
      Robin Doyno: getting DWP to move ahead is big project. Myra & Robin will continue to monitor.
      Bill Koontz: need to keep focus on proposed rate increase. Myra: if go to locally generated power, don't need the transmission lines.
      Ken Alpern: Seems like if we save energy, rates go up, if we use more power, rates go up. As long as City gets money from DWP, won't keep rates down.
   h. LANCC Liaison: Open (Bill Koontz reporting)
   i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
      Recycled water is joint effort of DWP & Waste Management. Project to clean Tillman plant water and use it in Valley. Budweiser is going to clean up its water and infiltrate into aquifer.
   j Fall Festival Liaison: Albert Olson
   k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

Not meeting in November. December 9, big meeting at City Hall.

Interim mansionization ordinance, which includes Mar Vista, extended into 2017.

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Monthly meeting is November 19 at Coffee Connection.

Make It Mar Vista is November 28, 10:00–4:00. Kickoff bike ride at 10:00 A.M. There might be ribbon cutting on Venice Blvd at 11:00 A.M opening ceremony. Will have artisan booths, live entertainment, interactive art project, bike lane, etc.

Nick Gervey: with wife, is working to bring more money into area – playing up local businesses to their short term renters. Having real impact in Mar Vista.

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

Motion to approve moving up 8.e by Bill Scheding, 2nd by Ken Alpern . Motion carried unanimously.

a. **ADMINISTRATIVE MOTION: Elections & Bylaws Committee Chair**

MVCC approves the appointment of Bill Koontz as chair of the Elections & Bylaws Committee.

Put over to next meeting.

b. **ADMINISTRATIVE MOTION: Aging in Place Committee**

MVCC approves changing Aging in Place from an ad-hoc to a standing committee.

Motion to approve by Sherri Akers, 2nd by Mitchel Rishe. Motion carried unanimously.

Ken Alpren: Consider renaming the committee "Senior Issues."

c. **ADMINISTRATIVE MOTION: Animal Services Liaison**

MVCC approves the appointment of ~~Sherri Akers~~ Steven Boskin as Animal Services Liaison.

Motion to approve as amended by Bill Scheding, 2nd. By Sherri Akers. Motion carried unanimously.

d **ADMINISTRATIVE MOTION: NCSA Liaison**

MVCC eliminates the position of Neighborhood Council Sustainability Alliance Liaison.

Motion to approve by Sherri Akers, 2nd by Melissa Stoller.

Discussion:

Sherri: NCSA is functioning more like a non-profit. Green Committee doesn't want to be member of an organization competing for funding with other non-profits we work with, but will attend events.

Motion carried unanimously.

e **ADMINISTRATIVE MOTION: Standing Rules Revision**

MVCC approves replacement of the Standing Rules approved May 13, 2008 and last amended on June 9, 2015 with a new version dated November 10, 2015.

Motion to approve by Bill Scheding, 2nd by Melissa Stoller.

Motion to refer back to committee for consideration of unincorporated friendly amendments by Bill Scheding, 2nd by Michelle Krupkin. Motion carried unanimously.

f. **POLICY MOTION: Homeless Count MOU** (submitted by Executive and Finance Committee)

MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See Addendum B) and will participate in the 2016 Greater Los Angeles Homeless Count.

Motion to approve by Robin Doyno, 2nd by Bill Scheding.

Discussion:

Melissa Stoller: if we sign, we are committing to finding a chair, andcarrying it out.

Sherri Akers: thinks we should first find a chair (Robin Doynowon't chair).

Michelle Krupkin: Why do we do in winter? Answer: because want to find homeless where they are sheltering.

Motion put over.

g. **POLICY MOTION: Short term rentals** (submitted by Aging in Place Committee)

The Mar Vista Community Council supports the motion by Councilmember Mike Bonin (Council File 14-1635-S2 – see Addendum A) to create a new ordinance addressing short term rentals.

Whereas seniors are currently 10% of the Air BnB hosts, with 56% of those being retired and 25% being empty nesters, with 49% doing this for financial reasons. (http://blog.airbnb.com/celebrating-airbnbs-60-host-community/).

Whereas the following statistics project that our senior community will face significant financial challenges for aging in place:

- About 22% of Americans 65 years and older are in danger of becoming elder orphans - single or widowed; they have no children, at least in the area, and no support system. Based on 2012 U.S. Census data, about one third of Americans age 45 to 63 are single, and in a position to become orphans as they age.
- People age 65 and older now make up 13 percent of the total population and will jump to 16% by 2020 and 19% by 2030
- 33% of Boomers have put aside less than $50,000 for retirement
- Baby Boomers have saved an average of $262,541, about a third of the $805,398 they predict they'll need at retirement.
- Among the first wave of baby boomers to hit retirement age, more than half (54 percent) quit working before they planned. A majority of those polled say it was job loss or health-related issues.
- The average annual cost of a nursing home is $91,000 per year
- Home caregiver 24/7 costs are $125 a day and up and will further increase with the Dept. of Labor decision that home caregivers must be paid at least minimum wage and overtime.
- Assisted Living facilities average $3,351 per month for a one bedroom but are as high as $12,000 with costs increasing as the level of care increases.
- Short term rentals are often the only viable means for seniors to bring in extra income to cover their increased cost of living expenses due to the need for additional services as seniors age in place and maintain independence.
- 80% of women live longer than their spouses, often by many years, on average 14. Widowhood creates economic hardship as Social Security benefits and pensions plans benefits have a reduced pay out after a spouse dies.

The Mar Vista Community Council believes that short term rentals will be a key component in our fight to help seniors stay in their home as they age. Therefore, as proposed by Councilmember Mike Bonin, the MVCC urges the LA City Council to authorize a host to rent all or part of their primary residence to short-term visitors, permitting someone to rent a spare room, or a back house. This would include renting their whole house while they are out of town.

Motion to approve by Bill Scheding, 2nd by Sherri Akers.

Discussion:

Sherri Akers: Many seniors are house poor; short-term rentals are great source of extra income. Mike Bonin has made sound motion that addresses the problems with short term rentals when they're de facto hotels or party sites.

Rachel Caraviello: Works with local non-profit that pairs seniors to share homes. Thinks this could be slippery slope about controlling what people can do in their homes.

Sharon Commins: [See mini-presentation, Attachment A] Recommends striking the last paragraph and adding the following:

> The MVCC additionally recommends that said draft ordinance based upon Council Motion 14-1635-S2 and aimed at authorization of Short Term Rentals in residential neighborhoods [wherein they are presently prohibited except by Conditional Use Permit] include the following two baseline provisions:
>
> 1. A unique, permanent ID number assigned each individual host to aid in facilitating collection of Transient Occupancy taxes 'TOT'
> 2. Short term rental of RSO units to be strictly prohibited.

Mariza Mendoza: Has financial hardship; only thing that saved her was short term rental of one room in house.

Marilyn Zweifach: We need to make space in our community, open ourselves to change and allow members of our community who need financial support stay in community.

Nick Gervey: It's not Airbnb that's pushing people out, but developers building 2-bedroom $3000 month rentals. Loud parties happen in apartments that aren't short term rentals. Should be able to do anything want with your 3-4 unit property, just like the big developers.

Michael Ernstoff: Owns property in Mar Vista. It's not role of zoning regulations to solve problems of aging population, or role of Council to promote this. Not up to Council to take away property rights; when bought house, expected that certain conditions would be continued; now being threatened by group home. Need constraints and enforcement. If operating as hotel or motel, should be subject to same regulations.

Christopher McKinnon: Is a senior aging in place. Need limit to number of short term rental days; Bonin's motion is too loose.

Sherri Akers: Motion is just asking the city to consider needs of seniors aging in place.

Tatiana Luethi: Many single women rely on being able to rent out a room.

J. J. Lichauco: Is Airbnb host, rents room in house and acts as host. If it's your own private property, why would government step in and tell what can do with it?

Sharon Cummins: 37% of Airbnb coming from large scale short term rentals.

Valerie Davidson: Thinks motion needs to have stronger wording – number of days can stay.

Mitchell Rishe: Motion is just trying to support what Mike Bonin has set in motion. We shouldn't be micro-managing, we'll have chance to weigh in on final ordinance. Short term rentals should be for owner-occupied units. Motion is sufficiently empowering to City Council to craft an ordinance.

Ken Alpern: This has been going on for decades. Problem isn't Airbmb, but abuse of it. Many people are doing this just to survive. Great motion overall, worries that last sentence will give people wrong impression.

Bill Scheding: Should have license/permit.

Sherri Akers: Bonin's motion is fast tracked.

Michelle Krupkin: Likes some of Sharon's motion, but doesn't think people want to have ID number. Have heard complaints that short term rentals are taking up parking.

Friendly amendment to strike last sentence by Sherri Akers, 2nd by Ken Alpern.

Motion to approve as amended carried: 9 ayes, 0 nays, 1 abstentions (Michelle Krupkin).

h. **POLICY MOTION: 12400 W. Pacific Ave Small Lot Subdivision** (submitted by PLUM Committee)

MVCC approves the application (Case Nos. VTT-73598-SL, ENV-2015-2499-EAF) to build a small lot subdivision with 5 single-family dwelling, each 3 stories and 45 feet in height at 12400 W. Pacific Ave, with request that developer: (1) provide more realistic renderings for board to better evaluate the aesthetics of the project, and (2) consult with the MVCC Green Committee on green building elements and landscaping.

Motion to approve by Mitchell Rishe, 2nd by Bill Scheding.

Presentation by developer

Development is at Pacific & Centinela; currently vacant lot. Driveway will be on Pacific. No guest parking. Will be five individual properties–separate homes–each with 5 levels. Will have balconies on roof and front façade.

Discussion:

Valerie Davidson: About same height as buildings behind and across street.

Mitchell Rishe: Doesn't love this project–it maxes out setbacks and height–but it's better than what is next to and across from it.

Sherri Akers: Consider including universal design elements.

Motion to approve carried: 8 ayes, 2 nays.

i. **POLICY MOTION: MVCC Recommendations for future MetroRail projects to enhance Westside/regional/countywide mobility** (submitted by T&I Committee)

MVCC Recommendations for future MetroRail projects to
enhance Westside/regional/countywide mobility

The Mar Vista Community Council, supports the following two large rail projects for inclusion in the Metro Long Range Transportation Plan:

a) Metro Rail line from West LA / LAX to Valley, and

b) Direct Metro Rail (or Metrolink) line from LAX to Union Station via the Harbor Subdivision Rail Right of Way.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin. Motion carried unanimously.

j. **POLICY MOTION: Great Street** (submitted by T&I Committee)

Whereas LA City currently owns but a small portion of Great Street Venice Blvd. and

Whereas, the rest of Great Street Venice Blvd. is owned by Caltrans, and

Whereas, LA City owns Venice/Inglewood adjacent to the Mar Vista Library and the side streets off of Venice Blvd. just outside of the Venice Blvd. Caltrans right-of-way,

Therefore, Mar Vista Community Council supports a Smart Bench for Venice at Inglewood near the Mar Vista Library.

Motion to approve by Michelle Krupkin, 2nd by Ken Alpern.

Presentation:

Michelle Krupkin: Mayor wants to place smart benches ASAP. Smart bench will have wifi hot spot, charging stations, up to the minute bus arrival info. This one won't be placed on street – behind circle in front of library; CalTrans still owns Venice Blvd–hasn't yet relinquished to city.

Discussion:

Bill Scheding: concerned about being magnet for homeless.

Sarah Auerswald: it's a pilot program.

Valerie Davidson: great idea, don't care if homeless use.

Motion to approve carried: 7 ayes,1 nay.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern

      Westside Pavillon not interested in Target to take space being vacated by Nordstrom. In next few years will redesign interior, probably Whole Foods Market as anchor.
   b. Zone 2 – Brad Wilhite
   c. Zone 3 – Bill Scheding

      Saw occupant of blue & white van dumping urine in street. LAPD says can't do anything about it.
   d. Zone 4 - Michael Millman

      Murder on Halloween.
   e. Zone 5 – Michelle Krupkin

      Rutts is replacing Don Choi.
   f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Executive & Finance Committee** - Bill Koontz, Chair
   b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
   c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
   d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
   e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

      Project at Barrington & Indianapolis.

      Mitchell Rishe: Group Homes: City constrained by Federal Law on what can do about restricting who can live in R1 neighborhood.

      Ken Alpern: Complaints tend to go away when there's code enforcement.
   f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs

About 500 people attended the Westside public school education event MVCC co-hosted with Westchester/Playa Vista.

Bill Scheding: need receipts from last year's grants..

g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

FAA has delayed ruling on land use. Metroplex is still tallying up public input on flight paths.

h. **Safety and Security Committee** – Rob Kadota, Chair
i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
k. **Elections and By-laws**- Bill Scheding, chair
l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

Michelle Krupkin: People from Silverlake are coming to next meeting to complain about road diet; their pilot was made permanent.

m. **Aging in Place** - Sherri Akers, Chair
n. **Homeless Issues** – Robin Doyno

11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

Meeting adjourned at 9: P.M.

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Attachment A: Short Term Rental presentation by Sharon Cummins

EXECUTIVE OFFICE

City Hall • 200 N. Spring Street, Room 525 • Los Angeles, CA 90012

March 19, 2014

To: Council Offices
Other Interested Parties

From: Alan Bell, AICP
Deputy Director of Planning

Subject: **Short-Term Rentals**

This memorandum answers frequently asked questions about how the zoning laws in effect today regulate short-term rentals in the City of Los Angeles.

1. **What is a short-term rental?**

In Los Angeles, short-term rentals include all or any portion of residential buildings that are designed or used for occupancy for a period of 30 consecutive calendar days or less, counting portions of calendar days as full days. While this definition typically applies to hotels or motels, it also applies to any other residential buildings (including one-family dwellings) that are designed or used for occupancy of 30 or fewer days.

2. **Where are short-term rentals allowed?**

Short-term rentals may be allowed in commercial zones; the RAS4 residential accessory services zone; and the R4 and R5 higher-density multi-family residential zones. The rules governing short-term rentals in these zones are complex. In some cases, short-term rentals are allowed with a Conditional Use Permit. In other cases, no Conditional Use Permit is required. Areas governed by specific plans, overlay zones or other specially zoned areas may have different rules.

3. **Where are short-term rentals prohibited?**

Short-term rentals are prohibited in agricultural zones; the R1 and other single-family residential zones; the R2, RD and R3 lower-density multi-family residential zones; and the RAS3 residential accessory services zone. Areas governed by specific plans, overlay zones or other specially zoned areas may have different rules.

WRAC LUPC SHORT TERM RENTAL MOTION OCT 2015

Whereas under the City of Los Angeles present zoning code, short term rentals [defined per the attached Alan Bell memo dated 4-19-2014 as "all or any portions of residential buildings that are designed or used for occupancy for a period of 30 calendar days or less"] are in fact prohibited in the following zones:

- Agricultural zones
- R1 and other single family zones
- R2, RD, lower multiple residential zones R3 and RAS3 [accessory services zone]

Whereas short term rentals have proliferated in zones where they are not allowed thereby creating a "passive permissions" environment to the detriment of neighborhoods' zoning code enforcement, and

Whereas failure to enforce conditional use permit requirements and collect all taxes owed on this activity significantly damages the City budget by encouraging tax cheating and other scofflaw behaviors, and

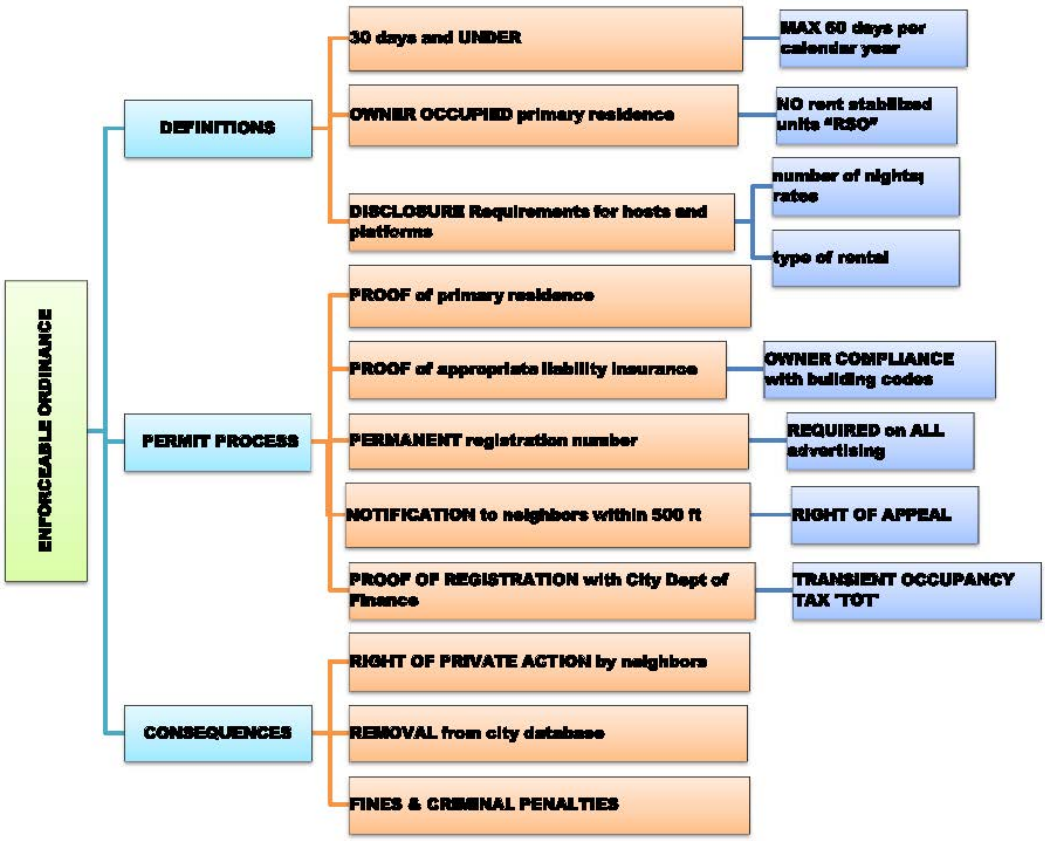
Whereas the City has a clearly defined legal duty and responsibility to apply all existing laws, and to further create a reasonable regulatory framework for short term rentals in order to:

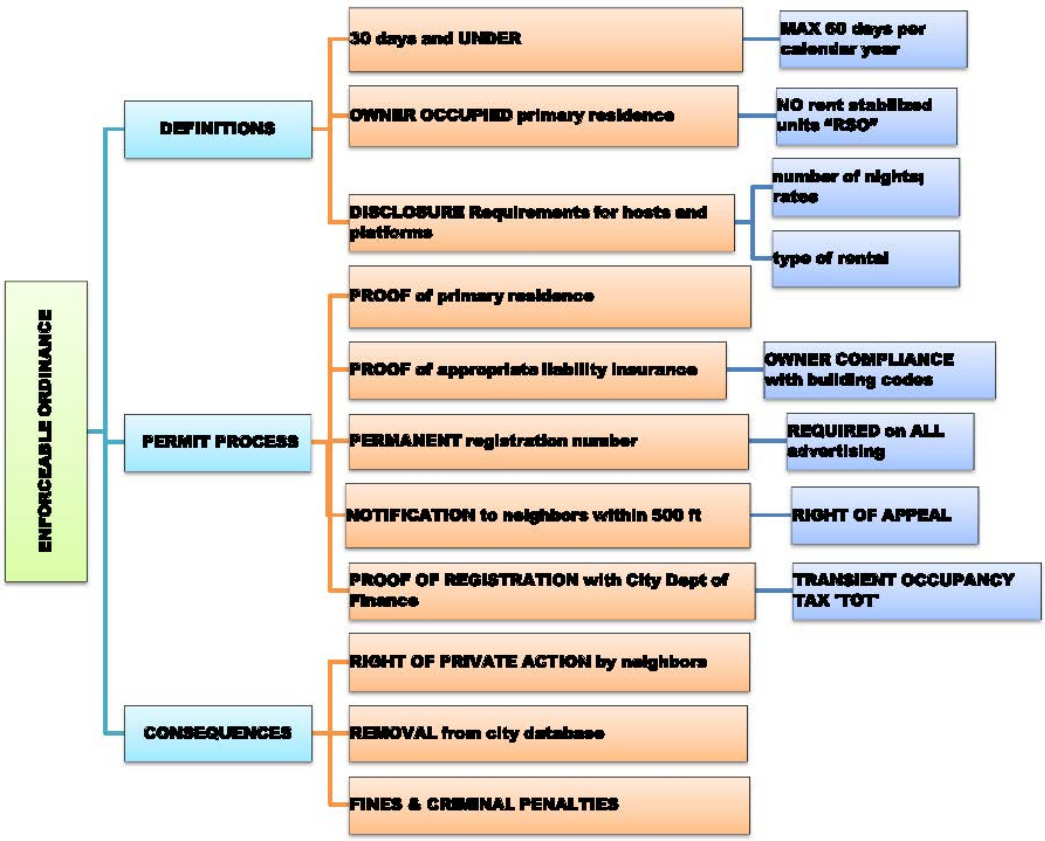
- Preserve rent stabilized housing in the marketplace, particularly for families and seniors aging in place
- Collect the required transient occupancy taxes
- Preserve neighborhood stability and eliminate the operation of so called 'rogue hotels' which remove permanent residences from the City's critically short housing supply

Whereas the City additionally has a clearly defined interest in protecting the public welfare, health, and safety through said reasonable regulatory framework,

Therefore any proposed City ordinance allowing short term rentals in presently prohibited zones must include the following essential provisions:

- No rent stabilized units "RSO" shall be allowed to rent short term
- Only owner occupied primary residences shall be permitted to host for short term rentals, and only one unit shall be permitted per host.
- There shall be a cap of 60 nights per calendar year per host for short term rentals
- Prior to listing, hosts shall be responsible for verifying their properties comply with the Los Angeles Building and Safety code at their own expense and shall make all necessary repairs
- All hosts shall obtain a City permit and a permanent registration number. The condition of receiving a City permit and permanent registration number shall be the following: proof of primary residence plus liability insurance for this specific use including any rider that may be necessary for a non-conforming use on the property. Examples of proof of primary residence shall include utility bill, drivers' license and the like
- Upon filing for a short term rentals permit, hosts shall notify property owners within 500 ft.
- All hosts shall include their permanent City registration number on all advertised listings in all media
- All hosts shall register with the City Department of Finance and remit transient occupancy taxes "TOT" including any and all back taxes owed. Short term rental TOT receipts shall not go into general fund but shall be used to create a special enforcement/compliance unit specific to enforcing regulation of short term rentals. An example of this compliance unit is the LAHD inspection program for multifamily units
- Hosts shall be required to pay the City's legal minimum wage, abide by hotel employee protections and register with the State Employment Development Department
- Hosts shall disclose such information as the City deems required for enforcement. Examples of this information shall include the type of rental whether one room or whole house, how many nights per year, how many guests and the like
- Hosts which refuse to register or disclose information necessary for enforcement shall be prohibited from operating in the City and face such penalties and fines as may be deemed appropriate by the City under the new ordinance
- Platforms shall only list City registered units and display registration number in each listing.
- Platforms shall disclose information deemed necessary by the City for enforcement and for collection of back taxes and shall be held accountable, including fines and other penalties as may be deemed appropriate by the City, for any unregistered online listings appearing upon the platforms' website
- The ordinance shall establish a right of appeal of the issuance of a short term rental permit
- The ordinance shall establish a private right of action by individuals in the community


ENFORCEABLE ORDINANCE
DEFINITIONS
30 days and UNDER
MAX 60 days per calendar year
OWNER OCCUPIED primary residence
NO rent stabilized units "RSO"
DISCLOSURE Requirements for hosts and platforms
number of nights; rates
type of rental
PERMIT PROCESS
PROOF of primary residence
PROOF of appropriate liability insurance
OWNER COMPLIANCE with building codes
PERMANENT registration number
REQUIRED on ALL advertising
NOTIFICATION to neighbors within 500 ft
RIGHT OF APPEAL
PROOF OF REGISTRATION with City Dept of Finance
TRANSIENT OCCUPANCY TAX "TOT"
CONSEQUENCES
RIGHT OF PRIVATE ACTION by neighbors
REMOVAL from city database
FINES & CRIMINAL PENALTIES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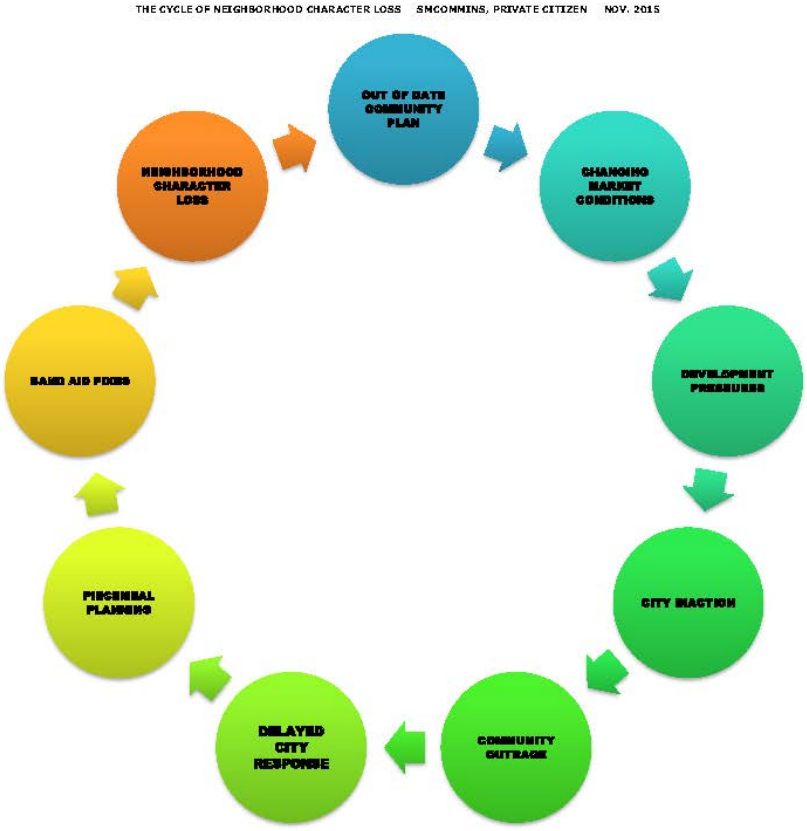

With more than 20 plus major sites for the short-term rental market, Airbnb has shaken up the hospitality industry since it began operating in 2008, and reports are that it could soon be valued at over $20 billion. That's nearly as much as Marriot International. With that much capital behind the Airbnb platform, it stands to reason that Airbnb hosts are cashing in as well. On the other hand, many of the most popular Airbnb destinations are also among the least affordable cities in the U.S. like Los Angeles.

The Transient Occupancy Tax (TOT) is a tax of 14% of the rent charged to transient guests in hotels/motels located in the City of Los Angeles. The TOT is commonly known as a "bed tax".

- 17, 044 STR units total in the city
- Average rate for a private room is $80.00 per night
- Average occupancy rate is 72%
- Based on a 30 day calendar

17044x.72=12272 units rented per night based on 72% occupancy
12272x$80.00=$981760.00 per night in rental fees
$981760.00x.14=$137,446.40 TOT per night
$137446.40x30=$4123392.00 TOT per month
$4123392.00x12=$49480704.00 TOT per year
$49,480,704.00 in TOT not collected each year from STRs in the City of Los Angeles.

TOTs need to be collected at the point of reservation and submitted monthly to the City of Los Angeles along with a monthly audit paid for by the reservation company.

Mike Masnick@mmasnick
Apparently my @airbnb reservation involves an extra degree of difficulty in the form of role playing.

> To enter building, touch gray key fob to the gray plastic square on the metal stand outside the door. When it beeps, you may enter. You will see a doorman to your left (8:30am - 12:00am, M-Sat). Please do not ask the doorman for anything or tell them you are checking in/AirBNB etc. I would really appreciate it if you could keep a low profile with the doormen, especially the one that is there in the morning (8:30AM - 5:30PM). If he asks you any questions, please just tell him you live there or try to avoid him. Past the doorman, the elevators will be on your right. There is only one resident elevator.

Airbnb Help @AirbnbHelp Oct 12 @mmasnick If you're not up for the dramatic arts, DM us and we'll take care of you.
4 retweets15 favorites

1. **Mike Masnick** @mmasnick Oct 12
@AirbnbHelp appreciated, but figure i'll give this a go and see. if i get tossed out for bad acting, i'll ping you. :)
0 retweets4 favorites

2. **Airbnb Help** @AirbnbHelp Oct 12
@mmasnick Is this the time to say, "break a leg?" Anyways we're here 24/7--ping us anytime.
1 retweet6 favorites

2.

1. **Barry Rabkin** @Impactoftech Oct 12Hopkinton, MA
@mmasnick @kimmaicutler @Airbnb But obviously nothing illegal or inappropriate is going on...

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, October 13th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of September 8, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
        i. Presentation: Traffic Box Painting Initiative - Daniel Osztreicher (Daniel.Osztreicher@LACity.Org, 310-575-8461) (5 min)
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Update on training/ethics/committee assignments. (possible motions to follow)
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.

        Funding Update:

        The next quarterly replenishment is being processed for October 1st. NCs will receive an additional $9,250.00 deposited into their checking account so long as they have funds available. Pursuant to Council File 15-0974, City Council

authorized an additional $5,000 for each NC to be used for discretionary purposes as a supplement to their existing operating budget. The Department will account for this additional $5,000 by disbursing it throughout the next 3 quarterly replenishments as additional funds in increments of ($2,000 - 2nd quarter), ($2,000 - 3rd quarter), and ($1,000 - 4th quarter). As such the final amount to be processed for NCs will be $11,250 on October 1st. The funds should become available by October 5, allowing for transfer and deposit times. As always, if additional funds are required for particular events, operation costs, or NPG's, you may complete a Cash Request Form at any time.

i. **APPROVAL** of September Monthly Expense Report (MER)

ii **FUNDING MOTION: MVCC budget addition** (submitted by ExFin Committee)

Whereas, the City has approved an additional $5,000 for each neighborhood council, and

Whereas, MVCC has chosen to add this new allocation to the Neighborhood Purpose Grant portion of its 2015-2016 annual budget,

Therefore, be it resolved, to add $5,000 to the MVCC Budget and allocate it to the Neighborhood Purpose Grant portion of the MVCC 2015-2016 Budget, with other adjustments to be approved by the Council as necessary.

iii. **FUNDING MOTION: Newsletter layout and editing** (submitted by ExFin Committee)

MVCC approves the payment of $350 to Laura Bodensteiner for newsletter layout and editing.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Committee on Homelessness**

MVCC establishes a new Homeless Issues Committee and appoints Robin Doyno as the chair.

b. **POLICY MOTION: 12249 Venice Blvd** (submitted by ExFin Committee)

MVCC will co-host, with the Westchester/Playa Neighborhood Council, a meeting "Westside Public School Education Event featuring Elected Officials and Education Representatives."

c. **POLICY MOTION: 12249 Venice Blvd** (submitted by PLUM Committee)

Motion to approve application for a liquor license as proposed

d. **POLICY MOTION: Access to Grading Documents** (submitted by PLUM Committee)

Whereas, increasing number of grading operations in commercial, residential and hillside areas have the potential of undercutting and damaging adjacent properties.

Whereas, the owners of these adjacent properties, and the general public, have the right to have access to grading plans, geology reports and soils engineering reports that are submitted to the City for the purpose of development.

Whereas, access to these public records must occur before grading plans are approved to give the public the ability to review the plans and/or allow an independent expert to examine the plans to assure themselves that the proposed grading and development will not have an adverse affect on his or her own property or the environment.

Whereas, currently, adjacent property owners are not given timely notification that would allow them to inspect the plans submitted to the City.

Whereas, access to public records is a fundamental right of every California resident.

Whereas, "[i]nterim grading documents, including geology reports, compaction reports, and soils reports, submitted by a property owner to a city's building department in conjunction with an application for a building permit are subject to public inspection and copying under the California Public Records Act at the time the documents are first received by the building department," per the published opinion of the California Office of the Attorney General No. 05-1004 dated February 28, 2006 (See Attachment A).

Therefore, the Mar Vista Community Council supports all efforts to increase public access to submitted plans and requests that the Department of Building and Safety devise a protocol that would give timely access for public inspection, and provides notice to adjacent property owners, Neighborhood Councils, [and Community Councils] as soon as such plans are submitted to the City.

e. **POLICY MOTION: Verizon Wireless, 3590 Grand View Boulevard (St. Bede's Church** (submitted by PLUM Committee)

Whereas, Verizon Wireless proposes to construct a new stealth unmanned wireless telecommunications facility ("Facility") at 3590 Grand View Boulevard, commonly known as St. Bede's Episcopal Church. The Facility is described as a "40-foot tall RF transparent tower with stucco finish and painted to match the existing subject building [and] will contain twelve panel antennas, one microwave dish and twelve remote radio units" (See Attachment B).

Be it resolved, that the Mar Vista Community Council opposes location of the proposed Facility at St. Bede's Episcopal Church.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
        i. **Green Garden Showcase** – Sherri Akers & Melissa Stoller
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**

15. **Public Comment**
16. **Adjournment**

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, October 13th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:07 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Melissa Stoller (Secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Brad Wilhite, Ken Alpern,
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of September 8, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve by Bill Scheding, 2nd by Melissa Stoller. Minutes approved as amended (change to members present): 7 ayes, 1 abstention (Melissa Stoller).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Lenore French: Art Walk.
   Will be 1st Thursday of month beginning December 3rd. 6 – 9 pm. Spearheaded as means to encourage walkability of our community. Walk will include all of the arts, not just visual. There are already 4-5 galleries west of Centinela and music venues east of Centinela. Many businesses with artistic bent will stay open late. Businesses will be allowed to put their wares out on sidewalk. Mike Bonin planning to attend.
   Bill Koontz: Discuss providing some Art Walk funding in EACC.
   Robin Doyno: This is FABULOUS.
   Martin Rubin: North Westdale Neighborhood Association talent show was very successful. Two guest speakers at NWNA meeting on October 28 at St. Andrew Church: SoCal Gas Public Affairs Manager will address meter upgrades; Terra Bella about drought.
   Bill Scheding: Beekeeping is now legal in Los Angeles
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   Joel Jacinto, Dept. of Public Works.
   Council District 11, 5 & 2 representative to board. Oversees department of Engineering. Does above-ground hearings. Interested in arts & culture. Wants to partner with us to make our city more beautiful. Lives in Council District 11 at Braddock & Purdue.
   Bill Scheding: pile of junk near canal; Len Nguyen: it's in 2 week window for clean-up by County.
   Sherri Akers: cell tower concerns. Need major campaign to give public balanced view of them.
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
   Assembly Bill 810 by Sebastian Ridley Thomas passed & governor signed it. Relinquishes sections of Venice Blvd. to city of LA.
   Mike will be at Fall Festival 1:00-3:00.
   Public Art: 3 boxes ID'd for first phase. Can divvy up however want (1, 2 or 3 artists). Each artist can get $1000 (not $1000 per box).
   Daniel Osztreicher is leaving soon; not new head as yet for Great Street Art Committee.

i. Presentation: Traffic Box Painting Initiative - Daniel Osztreicher (Daniel.Osztreicher@LACity.Org, 310-575-8461) (5 min)

b. Mar Vista Recreation Center – Lizka Mendoza, Director
c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)

a. Chair-Bill Koontz

Robin Doyno and Sherri Akers need to send course completion info to Empower.

i. Update on training/ethics/committee assignments. (possible motions to follow)

b. First Vice Chair – Mitchell Rishe
c. Second Vice Chair – John Kuchta
d. Secretary –Melissa Stoller
e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx.

Funding Update:

The next quarterly replenishment is being processed for October 1st. NCs will receive an additional $9,250.00 deposited into their checking account so long as they have funds available. Pursuant to Council File 15-0974, City Council authorized an additional $5,000 for each NC to be used for discretionary purposes as a supplement to their existing operating budget. The Department will account for this additional $5,000 by disbursing it throughout the next 3 quarterly replenishments as additional funds in increments of ($2,000 - 2nd quarter), ($2,000 - 3rd quarter), and ($1,000 - 4th quarter). As such the final amount to be processed for NCs will be $11,250 on October 1st. The funds should become available by October 5, allowing for transfer and deposit times. As always, if additional funds are required for particular events, operation costs, or NPG's, you may complete a Cash Request Form at any time.

Motion to take all on consent by Bill Scheding, 2nd by Michelle Krupkin. Motion carried unanimously.

i. **APPROVAL** of September Monthly Expense Report (MER)

ii **FUNDING MOTION: MVCC budget addition** (submitted by ExFin Committee)

Whereas, the City has approved an additional $5,000 for each neighborhood council, and

Whereas, MVCC has chosen to add this new allocation to the Neighborhood Purpose Grant portion of its 2015-2016 annual budget,

Therefore, be it resolved, to add $5,000 to the MVCC Budget and allocate it to the Neighborhood Purpose Grant portion of the MVCC 2015-2016 Budget, with other adjustments to be approved by the Council as necessary.

iii. **FUNDING MOTION: Newsletter layout and editing** (submitted by ExFin Committee)

MVCC approves the payment of $350 to Laura Bodensteiner for newsletter layout and editing.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

Next meeting is November 18. Farmers' Market signs are all up.

Valerie Davidson: Officer Martin Baracio missed two meetings in a row.

Linda Guagliano: Martin assigned to special detail in July, needed to be in traffic court for September meeting. Linda sent email requesting better support.

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

Sherri Akers: Heroes theme successful 55+ heroes. 53 booths–largest since Albert Olsen became involved. Need volunteers throughout day.

LAPD color guard opens Festival at 10:15 A.M.

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

Next meeting is October 28.

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Officially one year old. 67 members.

Next Coffee Time meeting is Thursday, October 14, 9:00 A.M. at Coffee Connection. Jean Roth will speak about the importance of branding a business.

Small Business Saturday: 36 stores signed up for Make It Mar Vista. CalTrans agreed to 1-day takeover by City. Will have 1-lane closed, 2 lanes open between Centinela & Grandview; there'll be parklets and some parking between bikes & street.

n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Committee on Homelessness**

MVCC establishes a new Homeless Issues Committee and appoints Robin Doyno as the chair.

Motion to approve by Bill Scheding, 2nd by Michelle Krupkin. Motion carried with one abstention (Robin Doyno).

Request for November BOD: Transition AIP from ad hoc to standing committee.

b. **POLICY MOTION: Co-host Public School Education Event** (submitted by ExFin Committee)

MVCC will co-host, with the Westchester/Playa Neighborhood Council, a meeting "Westside Public School Education Event featuring Elected Officials and Education Representatives."

Motion to approve by Brad Wilhite, 2nd by Michelle Krupkin.

Discussion:

- Sara Roos: Event is October 26. Communities involved are significantly different; Westchester is very charter friendly. No funding request; MVCC will do outreach

Motion carried unanimously.

c. **POLICY MOTION: 12249 Venice Blvd** (submitted by PLUM Committee)

Motion to approve application for a liquor license as proposed

Motion to approve by Michael, Millman 2nd by Sherri Akers.

Discussion:

- Michael Millman: upscale restaurant with liquor (full spirits—old license just beer & wine). Space used to be Good Hurt. They have only 9 parking spaces and no commitment for valet. Grandfathered in under old business permit; otherwise would need more parking.
- Bill Koontz: they say they plan to have valet; asking for hours until 12:00 A.M., could change to be open until 2:00.
- Robin Doyno: Owner apparently has good reputation.

- Sara Roos: Bowlero said "we're not a nightclub, but just wait – one will be opening down the street."
- Sarah Auerswald: we're just commenting; state approves liquor license.
- Michael Millman: willing to have owner do BOD presentation.
- Ken Apern: pass on to Demetrious concerns about parking.

Motion carried: 6 ayes, 3 nays.

d. **POLICY MOTION: Access to Grading Documents** (submitted by PLUM Committee)

Whereas, increasing number of grading operations in commercial, residential and hillside areas have the potential of undercutting and damaging adjacent properties.

Whereas, the owners of these adjacent properties, and the general public, have the right to have access to grading plans, geology reports and soils engineering reports that are submitted to the City for the purpose of development.

Whereas, access to these public records must occur before grading plans are approved to give the public the ability to review the plans and/or allow an independent expert to examine the plans to assure themselves that the proposed grading and development will not have an adverse affect on his or her own property or the environment.

Whereas, currently, adjacent property owners are not given timely notification that would allow them to inspect the plans submitted to the City.

Whereas, access to public records is a fundamental right of every California resident.

Whereas, "[i]nterim grading documents, including geology reports, compaction reports, and soils reports, submitted by a property owner to a city's building department in conjunction with an application for a building permit are subject to public inspection and copying under the California Public Records Act at the time the documents are first received by the building department," per the published opinion of the California Office of the Attorney General No. 05-1004 dated February 28, 2006 (See Attachment A).

Therefore, the Mar Vista Community Council supports all efforts to increase public access to submitted plans and requests that the Department of Building and Safety devise a protocol that would give timely access for public inspection, and provides notice to adjacent property owners, Neighborhood Councils, [and Community Councils] as soon as such plans are submitted to the City.

Motion to approve by Michael Millman, 2nd by Sherri Akers.

Discussion:

- Michael Millman: example of MVCC being hijacked; Michael didn't thoroughly vet the motion.
- Bill Koontz: WRAC motion. Bill knows that Sharon Cummins did her homework.

Motion carried: 9 ayes, 1 nay.

e. **POLICY MOTION: Verizon Wireless, 3590 Grand View Boulevard (St. Bede's Church** (submitted by PLUM Committee)

Whereas, Verizon Wireless proposes to construct a new stealth unmanned wireless telecommunications facility ("Facility") at 3590 Grand View Boulevard, commonly known as St. Bede's Episcopal Church. The Facility is described as a "40-foot tall RF transparent tower with stucco finish and painted to match the existing subject building [and] will contain twelve panel antennas, one microwave dish and twelve remote radio units" (See Attachment B).

Be it resolved, that the Mar Vista Community Council opposes location of the proposed Facility at St. Bede's Episcopal Church.

Motion to approve by Michael Millman, 2nd by.Ken Alpern.

Discussion:

- Michael Millman: St. Bede's reverend supported community view that this is not appropriate location.
- Already been decided by Zoning Administration: tower not going up there.

Motion carried: 10 ayes, 1 nay.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern
   Emergency Preparedness meeting was very successful & well done.
b. Zone 2 – Brad Wilhite
   All quiet. Mega garage sale on October 24.
c. Zone 3 – Bill Scheding
   Hilltop & Westdale block parties were big success.
d. Zone 4 - Michael Millman
   Hosting October 20 workshop with Pacific division LAPD.
   Getting rid of transient encampment on Palms; will put up fence if necessary.
   Zoning Administration knows how neighbors feel, frustrations with Bow.lero
e. Zone 5 – Michelle Krupkin
   Rumor that Robinson Beautilities might leave Mar Vista.
f. Zone 6 – Valerie Davidson
   Pretty quiet. West Mar Vista Neighborhood Association meeting this weekend.

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
        i. **Green Garden Showcase** – Sherri Akers & Melissa Stoller
           Sherri Akers: See statement (Attachment A).
           Melissa: It would be great to have spring event that involves community; be creative, don't limit ideas to gardens.
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
       Michae Millman: gets asks about MVCC position on care facilities, short term rentals, apartment earthquake upgrades. Need a sign at library informing people that PLUM meeting isn't there.
       Property owner has applied for permit for five 3-story buildings (small lot subdivision) at 3277 Barrington Ave. (NW corner of Barrington & Indianapolis).
    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
       Received thank you (Attachment B) from Mar Vista Elementary School.
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
       Next meeting is October 15, 7:00–8:00 P.M. behind Laundromat on National at Bundy (enter via back door).
    h. **Safety and Security Committee** – Rob Kadota, Chair
       Collaborating with Mar Vista Chamber of Commerce on Safety & Security Expo January 17 at Farmers' Market.
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
       Library needs to borrow projector to show a movie.
    k. **Elections and By-laws**- Bill Scheding, chair
       Chair needs to be someone not running for reelection. Bill Koontz volunteeres; need to put on next month's BOD agenda.
       Valerie Davidson: wants to change by-laws to split Zone 6 into two zones.
       Bill Scheding: DONE not allowing any by-laws changes until after election.
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
       Other Great Streets are getting smart bus benches; working to facilitate best bench location for our Great Street.

m. **Aging in Place Ad Hoc**- Sherri Akers ~~& Robin Doyno~~, Co-Chairs

11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received

    Potential grievance by Rick Selan is being handled.

    MVCC received subpoena in mail requesting documentation about a PLUM committee action. Subpoena not delivered correctly.
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

    Meeting adjourned at 9:03 P.M.

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ATTACHMENT A: Mar Vista Green Garden Showcase Statement

Mar Vista Green Garden Showcase

It's exciting to see what we've achieved – sustainable gardens are now plentiful and most Mar Vistans have quite a few on their own street. The irony is that this makes garden selection for the tour even more demanding – for the tour to be meaningful, the gardens need to stand out beyond what we all see around us. This makes the workload to organize the tour even more demanding – hugely dependent on the very labor intensive aspect of searching out, recruiting and curating gardens with the balance of the work crammed into a very short time frame.

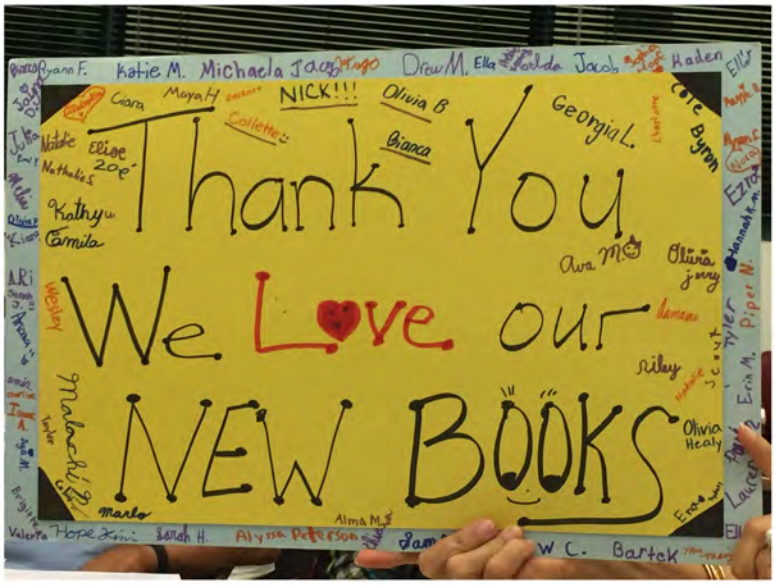
Jeanne, Melissa and Sherri are each dealing with caregiving needs that make it impossible for us to be the organizers. After Christy and Shelley became involved, they both found it to be far more demanding than they expected and are not able to continue recruiting and curating. In order to continue the tour in the current format, we would need to recruit new organizers. We've all 5 tried to find more partners to work on organizing the tour, but without success.

If new leadership can't be found, perhaps we could explore partnering with the Mar Vista Chamber of Commerce or the Mar Vista Farmers' Market on a spring event? If not, we may need to take a sabbatical on the tour this year, allowing time to explore a spring event that celebrates our community and involves a collaboration by more than our small group of tired Garden Showcase organizers.

We think it is accurate to say that the Garden Showcase is the equivalent of a part time job for at least 4 months – easily demanding 20 hours a week or more each from several people. Here is an of what it takes to produce the tour as a stand-alone event.

- We should already be looking for gardens. To get any media coverage in print, October is the due date to submit. For the last two years, it has been challenging to find 'wow' gardens. Last year, Lisa Boone of the LA Times promoted our tour in a piece she wrote about a garden elsewhere.
- Sadly, people seldom submit gardens – we have to go out and look for them. This means walking, driving or biking every street in Mar Vista. Once identified, it's a huge task to vet the gardens, identify and connect with the owner, convince them to be on the tour, get them to complete the paper work in a timely manner, and take photos. Cutoff date for garden submissions for consideration -- if we're to have any sanity in the posting and mapping process – is February 1st.
- After the cutoff date, the mad scramble begins to ensure that we have walkable clusters as well as a diverse cross section of gardens that minimizes duplication of styles while showcasing all important sustainability issues. We must check and recheck the Google map before turning it over by March 13th -- along with the newsletter articles we've been busy writing – for graphics and layout. The Garden Showcase issue of the newsletter needs to be at the printer by April 1st for distribution the weekend of April 11th.
- Publicity is an on going effort and includes meeting media representatives at selected gardens, which requires coordinating with the garden owners. We also have to recruit and place organizations to guest at appropriate gardens and Showcase Central.
- The weeks before and day of includes flag distribution and collection, placing and picking up A frame signs, drafting volunteers and organizing day-of activities for Showcase Central. This is the one area where we've been able to get other volunteers to help.

ATTACHMENT B: Mar Vista Elementary School Thank You





Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, September 8th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of August 11, 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
        i. Presentation: Traffic Box Painting Initiative - Daniel Osztreicher (Daniel.Osztreicher@LACity.Org, 310-575-8461) (5 min)
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Committee assignments (possible motions to follow)
        ii. Copyland process
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of August Monthly Expense Report (MER)
        ii **FUNDING MOTION: neighborhood purpose grant** (submitted by Aging in Place Committee)

The Mar Vista Community Council approves a neighborhood purpose grant of $1500 to Westchester Playa Village for a multifaceted outreach to the Mar Vista community.

iii. **FUNDING MOTION: Hilltop annual picnic** (submitted by Outreach Committee)

The Mar Vista Community Council approves an amount not to exceed $500 for food at the Hilltop Neighbors Annual Picnic to be held at North Venice Little League field on September 12, 2015, 4 to 7 P.M. and the Newsletter.

iv. **FUNDING MOTION: Westdale annual block party** (submitted by Outreach Committee)

The Mar Vista Community Council approves an amount not to exceed $300 for food, beverages and paper goods at the Westdale Homeowners Association annual block.

v. **FUNDING MOTION: MVCC shirts** (submitted by ExFin Committee)

The Mar Vista Community Council approves an amount not to exceed $500 for shirts for board members and committee chairs.

vi. **FUNDING MOTION: MVCC business cards** (submitted by ExFin Committee)

The Mar Vista Community Council approves an amount not to exceed $500 for updated business cards for board members and committee chairs.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Revised By-laws** (second reading)

The Mar Vista Community Council approves the By-laws as revised and approved by the Department of Neighborhood Empowerment on September 1, 2015.

b. **POLICY MOTION: MVCC Recommendations for Transit Neighborhood Plans** (submitted by T&I Committee)

The Mar Vista Community Council makes the following recommendations for Transit Neighborhood Plans that allow for increased mobility, enhanced transit access and usage, and for adjacent neighborhood protection:

a) Focus scale-appropriate new housing around transit stations. There shall be no "upzoning" of adjacent low-density residential areas in order to protect community character and to reduce congestion.

b) Workforce housing should be among the highest of priorities, and the City shall enact Inclusionary Ordinances for Affordable Housing of at least 10%.

c) Limit transit zones to 1/4 mile around rail/transit stations and limit the definition of commercial zones only to those streets that line the corridors.

d) Transit-Oriented Developments (TODs) and corridor projects shall have appropriate transitional height and step-backs to reduce impact on adjacent residential. "Buffer zones" may also be indicated and necessary to preserve residential/neighborhood character.

e) Restricted parking permits shall be required of TOD developers to fund in perpetuity, in order to prevent residents of TOD projects from parking cars and impacting adjacent residential neighborhoods.

f) Most TOD projects will be mixed-use and contain office/retail space to maintain a job base in Los Angeles.

g) Redefine, enforce and update parking, mobility, and transit-dependent requirements to include the needs of seniors; construct or rebuild housing implementing Universal Design standards suitable for seniors; create housing that will establish quality car-free living for those physically unable to use automobiles.

h) Landscape using California native plants and designs that address water capture and protect the watershed.

i) Work with UCLA, USC, Santa Monica College and all other Westside, Mid-City and Downtown universities to create affordable (and potentially subsidized) Student Housing projects.

c. **POLICY MOTION: 11900 W Washington Place** (submitted by PLUM Committee)

Motion to approve, without prejudice to the immediate neighbors or others, the proposed small lot sub division at 11900 W Washington Place, case no. AA-2015-2263-PMLA. However the Mar Vista Community Council strongly encourages: (1) that the Zoning Administrator allow for gates at the front and rear of the property driveway; (2) that the developer work with the neighbor to the south with regards to a noise buffer, which could include plants and trees such as a Portacarpus-style plant on the southern neighbor's side of the property if the Planning Department and Zoning Administrator does not allow sufficient space for a plant buffer on the developer's side of the property; (3) for the developer to consider a reduction in the height on the south side roof deck as the current height would allow for no privacy for any home on that block; and (4) to consider a grey water system for the development.

d. **POLICY MOTION: Maintaining Stability In Residential Zones And Neighborhood Conservation Under The Los Angeles General Plan Framework Element** (submitted by PLUM Committee)

Whereas, with regard to building densities, The Mar Vista Community Council affirms and upholds its single family and multifamily residential zones as key components of The Framework Element of the Los Angeles General Plan as stated in Chapter 3 - Land Use Goals, Objectives And Policies Issue Two: Uses, Density, And Character (http://planning.lacity.org/cwd/framwk/chapters/03/03.htm); and

Whereas, the Department of City Planning Website states: "The Citywide General Plan Framework is based on a directed growth strategy which targets residential and commercial growth along boulevards, corridors and clustered development around high activity centers and around transit opportunities";

Now therefore, the Mar Vista Community Council recognizes the vital correlation between the transportation, parking, sewage, water and other infrastructure needed for densities consistent with the General Plan Framework's residential zones, and supports the General Plan Framework's directed growth strategies, which appropriately place growth along major corridors and adjacent to true transit-oriented development.

Background: *The Framework Element recognizes the importance of existing single-family residential neighborhoods and the need to conserve them. Traditionally, they have formed the fabric that has distinguished the City from other urban areas. Even with substantial growth, the single-family dwelling is still considered to be a major objective of most income and ethnic groups. These areas also afford added opportunities to take advantage of the variety of lifestyles such as wateroriented, rural/agricultural and equestrian-keeping special use neighborhoods.*

AND

It is the intent of the Framework Element to maintain existing stable multi-family residential neighborhoods. In those stable neighborhoods characterized by a mix of densities and dwelling types, permitted densities may be reduced to levels consistent with the character of the entire area in order to minimize impacts on infrastructure, services, and/or maintain or enhance the residents' quality of life. The loss of potential units in these locations can be offset by the provision of new housing opportunities in mixed-use districts, centers, and boulevards. The determination of the locations in which such modifications may occur would normally occur as amendments to the community plans or other initiatives as provided for by the Los Angeles Municipal Code. The Framework Element establishes guidelines to achieve higher quality multi-family dwellings, such as design character, amenity, and open space.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, September 8th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:04 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Mitchell Rishe (1st vice chair), John Kuchta (2nd vice chair), Sherri Akers, Robin Doyno, Michelle Krupkin, Michael Millman, Brad Wilhite, Ken Alpern
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of August 11, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
   Motion to approve by Bill Scheding, 2nd by Robin Doyno. Motion carried unanimously.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Chris Crosman – Opposes cell phone tower
   Wayne Burklund – Supports cell phone tower and dispelled "myths"
   Sarah Auerswald – Thinks that board has treated church unfairly
   John Jones – Opposes cell phone tower
   Fran Rossi – Wants lights at soccer field until 8:15 to support organized sports
   Mike Melon – Opposes cell phone tower; church has been rented out to detriment of community
   Kate Wafer – Opposes cell phone tower; not consistent with R1 zone
   Dave Gautreaux – Opposes cell phone tower
   Rich Wafer – Opposes cell phone tower; inconsistent with R1 zone
   Marny Maslon – Opposes cell phone tower; will impact property values
   David Powell – Opposes cell phone tower; concerned about health
   Rick Page – Opposes cell phone tower; concerned about property values
   George Nazzal – Opposes cell phone tower; tower will look into his children's rooms
   Cathy Coon – Opposes cell phone tower; church is not neighborly
   Kathy Winkelman – Opposes cell phone tower; concerned about health affects
   Therese Lee – Opposes cell phone tower; very upset
   Tracy Bear – Opposes cell phone tower; wants to know what the alternatives are
   Connie Collin – Opposes cell phone tower; first she heard of it was today
   Motion for 5 minute recess by Bill Scheding; 2nd by Michelle Krupkin. Motion carried unanimously.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Curb and gutter project (North Oval) moving forward
      - Bill Koontz asked about sober living ad hoc committee renewal; will likely be renewed
      - Michelle Krupkin asked about traffic monitoring in Culver City
        i. Presentation: Traffic Box Painting Initiative - Daniel Osztreicher (Daniel.Osztreicher@LACity.Org, 310-575-8461) (5 min)

- Spoke about bringing art to Great Streets Initiative

b. Mar Vista Recreation Center – Lizka Mendoza, Director
   - Fall sports schedule starting this weekend, flag football September 26
   - Halloween festival Saturday, Oct. 31, 1-5p.m., in partnership with Palms Recreation Center
   - Approved for new soccer field within next 1-2 years, pending funding

c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
      i. Committee assignments (possible motions to follow)
      ii. Copyland process

      Only Bill Koontz, Melissa Stoller, or Bill Scheding can send a printing request to be charged to our MVCC Account. All MVCC committees must go through Bill Koontz, who will forward any requested documents from his email account; include the purpose, date and authorization (agenda item number) on your request.

   b. First Vice Chair – Mitchell Rishe

      Spoke to PLUM Committee August meeting; discussion about sober-living facilities.

   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
      i. **APPROVAL** of August Monthly Expense Report (MER)

      Motion to approve by Bill Scheding, 2nd by Sherri Akers. Motion carries unanimously.

      ii **FUNDING MOTION: neighborhood purpose grant** (submitted by Aging in Place Committee)

      The Mar Vista Community Council approves a neighborhood purpose grant of $1500 to Westchester Playa Village for a multifaceted outreach to the Mar Vista community.

      Motion to approve by Bill Scheding, 2nd by Ken Alpern.

      Discussion:

      - Carol Kitabayashi – Executive Director of Westchester Playa Village, a nonprofit, grassroots organization to help older adults age in place: goal is to expand into the Mar Vista
      - Marilyn Zweifach – Supports Neighborhood Purpose Grand; thinks the "Village" model is a wonderful model.
      - Rachel Caraviello – Has worked with WPV, thinks they do wonderful work.
      - Abigel Benitez – Is a geriatric social worker and volunteers for WPV; they provide a wonderful service.
      - Lori Gilder – Supports expansion of WPV into Mar Vista.

Board Comment:

- Robin Doyno – has volunteered for WPV and supports it
- Michelle Krupkin – asked for budgeting; where money goes. Per Ms. Kitabayashi: copy printing, hosting educational events for Village model
- Sherri Akers - Noted that Ms. Kitabayshi has volunteered at Green Tent
- Ken Alpern – supports but wants to make sure organization is sustainable
- Brad Wilhite – Asked about total membership and membership within Mar Vista
- Bill Scheding – Thinks we can't approve because WPV is not located in Mar Vista
- Bill Koontz – Disagreed with Bill S. They are already here, and we have supported organizations that may provide support for non-Mar Vistans (i.e., Toys for Tots)

Motion carried: 9 ayes, 1 abstention (Bill Scheding)

iii. **FUNDING MOTION: Hilltop annual picnic** (submitted by Outreach Committee)

The Mar Vista Community Council approves an amount not to exceed $500 for food at the Hilltop Neighbors Annual Picnic to be held at North Venice Little League field on September 12, 2015, 4 to 7 P.M. and the Newsletter.

iv. **FUNDING MOTION: Westdale annual block party** (submitted by Outreach Committee)

The Mar Vista Community Council approves an amount not to exceed $300 for food, beverages and paper goods at the Westdale Homeowners Association annual block.

Approved on Consent

v. **FUNDING MOTION: MVCC shirts** (submitted by ExFin Committee)

The Mar Vista Community Council approves an amount not to exceed $500 for shirts for board members and committee chairs.

Approved on Consent

vi. **FUNDING MOTION: MVCC business cards** (submitted by ExFin Committee)

The Mar Vista Community Council approves an amount not to exceed $500 for updated business cards for board members and committee chairs.

Motion to approve by, 2nd by.

Motion carries unanimously.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano lindaguag@netzero.net

Get agenda items to Linda by Saturday.

g. DWP MOU Liaison: Myra Boime

Motion to Raise Rates. Want ratepayer advocate to be able to review.

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

Sherri Akers – Appealed to Board for "Heroes"

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

Meets downtown (City Hall), 6-8 p.m., September 30

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Next meeting September 17, 9 A.M. at Coffee Connection.

November 28 – Make it Mar Vista event

Status Kuo is expanding

School of Rock, opening in October

Bill Koontz – Suggested adding outreach to agenda

n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

Motion by Mitchell Rishe to advance 8.c. to top of New Business agenda; 2nd by Sheri Akers. Motion carries unanimously.

a. **ADMINISTRATIVE MOTION: Revised By-laws** (second reading)

The Mar Vista Community Council approves the By-laws as revised and approved by the Department of Neighborhood Empowerment on September 1, 2015.

Motion to approve by Bill Scheding, 2nd by Sheri Akers.

Motion carries: unanimously.

b. **POLICY MOTION: MVCC Recommendations for Transit Neighborhood Plans** (submitted by T&I Committee);

The Mar Vista Community Council makes the following recommendations for Transit Neighborhood Plans that allow for increased mobility, enhanced transit access and usage, and for adjacent neighborhood protection:

a) Focus scale-appropriate new housing around transit stations. There shall be no "upzoning" of adjacent low-density residential areas in order to protect community character and to reduce congestion.

b) Workforce housing should be among the highest of priorities, and the City shall enact Inclusionary Ordinances for Affordable Housing of at least 10%.

c) Limit transit zones to 1/4 mile around rail/transit stations and limit the definition of commercial zones only to those streets that line the corridors.

d) Transit-Oriented Developments (TODs) and corridor projects shall have appropriate transitional height and step-backs to reduce impact on adjacent residential. "Buffer zones" may also be indicated and necessary to preserve residential/neighborhood character.

e) Restricted parking permits shall be required of TOD developers to fund in perpetuity, in order to prevent residents of projects from parking cars and impacting adjacent residential neighborhoods.

f) Most TOD projects will be mixed-use and contain office/retail space to maintain a job base in Los Angeles.

g) Redefine, enforce and update parking, mobility, and transit-dependent requirements to include the needs of seniors; construct or rebuild housing implementing Universal Design standards suitable for seniors; create housing that will establish quality car-free living for those physically unable to use automobiles.

h) Landscape using California native plants and designs that address water capture and protect the watershed.

i) Work with UCLA, USC, Santa Monica College and all other Westside, Mid-City and Downtown universities to create affordable (and potentially subsidized) Student Housing projects.

Motion to approve by Ken Alpern, 2nd by Sheri Akers. Motion to waive reading carried unanimously.

Board Comment

Sheri Akers – this was a great collaborative process.

Motion carries unanimously.

c. **POLICY MOTION: 11900 W Washington Place** (submitted by PLUM Committee)

Motion to approve, without prejudice to the immediate neighbors or others, the proposed small lot sub division at 11900 W Washington Place, case no. AA-2015-2263-PMLA. However the Mar Vista Community Council strongly encourages: (1) that the Zoning Administrator allow for gates at the front and rear of the property driveway; (2) that the developer work with the neighbor to the south with regards to a noise buffer, which could include plants and trees such as a Portacarpus-style plant on the southern neighbor's side of the property if the Planning Department and Zoning Administrator does not allow sufficient space for a plant buffer on the developer's side of the property; (3) for the developer to consider a reduction in the height on the south side roof deck as the current height would allow for no privacy for any home on that block; and (4) to consider a grey water system for the development.

Motion to approve by Mitchell Rishe, 2nd by Bill Schedding.

Discussion:

- Applicant: Have started to work through proposed design modifications.

Board Comment

- Mitchell Rishe and Sheri Akers spoke in support.

Motion carries: 8 ayes, 0 nays, 2 abstentions (Michelle Krupkin, and Robin Doyno).

d. **POLICY MOTION: Maintaining Stability In Residential Zones And Neighborhood Conservation Under The Los Angeles General Plan Framework Element** (submitted by PLUM Committee)

Whereas, with regard to building densities, The Mar Vista Community Council affirms and upholds its single family and multifamily residential zones as key components of The Framework Element of the Los Angeles General Plan as stated in Chapter 3 - Land Use Goals, Objectives And Policies Issue Two: Uses, Density, And Character (http://planning.lacity.org/cwd/framwk/chapters/03/03.htm); and

Whereas, the Department of City Planning Website states: "The Citywide General Plan Framework is based on a directed growth strategy which targets residential and commercial growth along boulevards, corridors and clustered development around high activity centers and around transit opportunities";

Now therefore, the Mar Vista Community Council recognizes the vital correlation between the transportation, parking, sewage, water and other infrastructure needed for densities consistent with the General Plan Framework's residential zones, and supports the General Plan Framework's directed growth strategies, which appropriately place growth along major corridors and adjacent to true transit-oriented development.

Background: *The Framework Element recognizes the importance of existing single-family residential neighborhoods and the need to conserve them. Traditionally, they have formed the fabric that has distinguished the City from other urban areas. Even with substantial growth, the single-family dwelling is still considered to be a major objective of most income and ethnic groups. These areas also afford added opportunities to take advantage of the variety of lifestyles such as water-oriented, rural/agricultural and equestrian-keeping special use neighborhoods.*

AND

It is the intent of the Framework Element to maintain existing stable multi-family residential neighborhoods. In those stable neighborhoods characterized by a mix of densities and dwelling types, permitted densities may be reduced to levels consistent with the character of the entire area in order to minimize impacts on infrastructure, services, and/or maintain or enhance the residents' quality of life. The loss of potential units in these locations can be offset by the provision of new housing opportunities in mixed-use districts, centers, and boulevards. The determination of the locations in which such modifications may occur would normally occur as amendments to the community plans or other initiatives as provided for by the Los Angeles Municipal Code. The Framework Element establishes guidelines to achieve higher quality multi-family dwellings, such as design character, amenity, and open space.

Motion to approve by Ken Alpern, 2nd by Mitchell Rishe. Motion to waive reading carried unanimously.

Discussion:

- Michael Ernstoff – Asked about laws regarding sober living facilities
- Michael Millman – Opposed because it relates to another statute (General Framework)
- Ken Alpern – Spoke in support of motion
- Mitchell Rishe – Spoke in support; yes it is wonkish, but sometimes it needs to be
- Sheri Akers – This was great collaboration

Motion carries unanimously.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern

   Rumor is that Nordstrom is leaving Westside Pavilion; Target is coming in.

b. Zone 2 – Brad Wilhite

Block Party - Sep. 18, 4-7 p.m. at St. Andrews Church

c. Zone 3 – Bill Scheding

Hilltop Block Party – Sept. 12, 4-7

HERO Saturday morning at North Venice Little League park

d. Zone 4 - Michael Millman

Encampments along Palms; people upset with sober living facilities; people upset with Bowling Alley; people don't like Great Streets and reduction of lane.

e. Zone 5 – Michelle Krupkin

Wants to know who put in counting mechanism at Washington Place in Culver City.

f. Zone 6 – Valerie Davidson

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

       T&I may bring forth motion to ensure that Olympics infrastructure doesn't take away from ordinary street services.

    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

       Sober living will not be a quick fix; cell phone tower will be on agenda next month.

    f. **Education, Arts and Culture Committee** – Brad Wilhite, Robin Doyno & Sara Roos, Co-Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair

       Per Bill Scheding – living in cars is a safety issue with respect to illegal dumping of human waste.

    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

       Will be painting; looking for a gathering toward the beginning of the year.

    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair

       Bill Scheding - will rewrite standing rules.

    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

       The lane closure is an experiment; if it doesn't work, it won't go forward.

    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted),
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

    Meeting adjourned at ?? p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, August 11th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of July 14, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
    f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    h. CA Assembly 47
    i. CA Assembly 62
    j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Committee assignments (possible motions to follow)
            - Motion to approve appointment of Robin Doyno as additional co-chair of Education, Arts and Culture Committee.
            - Possible motion to change Aging in Place co-chairs.
        ii. Board retreat
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of June Monthly Expense Report (MER)

ii. Funding motion: MVCC approves payment of $12 to North Westdale Neighborhood Association as reimbursement for a bounced check.

iii **FUNDING MOTION: ink cartridges** (submitted by Green Committee)

The Mar Vista Community Council approves the expenditure of up to $300 for the purchase of ink cartridges (2 HP 564XL Color/Photo Black Combo packs; 1 HP 564XL Black 3-pack) to be used for printing display materials.

iv. **FUNDING MOTION: Save Our Watershed printing** (submitted by Green Committee)

The Mar Vista Community Council approves the expenditure of up to $400 for the printing of flyers or door hangers for Mar Vista Save Our Watershed.

v. **FUNDING MOTION: Great Streets Challenge Grant Support** (submitted by T&I Committee)

Whereas, the Mar Vista Chamber of Commerce requests support from the Mar Vista Community Council Board of Directors for the Make It Mar Vista Small Business Saturday Community Event taking place on Saturday, November 28th, 2015, and

Whereas, the Mar Vista Chamber, along with several partner organizations, is honored to have been awarded one of the first-ever Great Streets Challenge Grants, and the Chamber feels a natural partnership with the MVCC as we work together to help realize the full potential of the Venice Blvd Great Street in Mar Vista, and

Whereas, there will be many aspects of the Make It Mar Vista event, and we are asking for this Board of Directors' support specifically for the Protected Bike Lane Pop-Up along Venice Blvd from Grand View to Wasatch, and

Whereas, this temporary switch of the Bike Lane and the Parking Lane along this stretch of the Great Street will require coordination with City and CalTrans officials and engineers, and will also require funding for (temporary) lane markers, barricades and signage, construction of planter boxes for use as lane barriers.

Therefore, the Mar Vista Community Council will authorize a Neighborhood Purpose Grant of $1000.00 to help make this project a reality, with the understanding that this amount will not fund this project in full, and that the Mar Vista Chamber of Commerce is also reaching out to other sources for contributions.

vi. **FUNDING MOTION: NWNA Ad** (director's motion submitted by Bill Koontz)

The Mar Vista Community Council approves the expenditure of $300 for ads in six editions of this year's North Westdale Neighborhood Association Newsletter.

vii. **FUNDING MOTION: NWNA Fall Block Party/Talent Show** (director's motion submitted by Bill Koontz)

The Mar Vista Community Council approves the expenditure of $300 for Westdale Neighborhood Association's Fall Block Party/Talent Show to be held Friday, September 18, 4-7:30 P.M. The funding will be earmarked to pay for the use of Saint Andrew's Lutheran Church's Parking lot to hold the event and be paid to the church.

viii. **FUNDING MOTION: BOD agenda printing** (director's motion submitted by Bill Scheding)

The Mar Vista Community Council approves reimbursing Bill Koontz up to $130 for printing of BOD meeting agendas.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald

n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **POLICY MOTION: Preserving City Trees** (submitted by Green Committee)

The many mature tress that line Mar Vista's streets provide shade, beauty and habitat, making our sidewalks more inviting and pedestrian friendly. They decrease pollution and heat, while increasing our property values. But many are struggling during the current drought, and may be further threatened by sidewalk construction and repair. Ensuring the health of our existing trees and increasing the number of trees that provide urban shade canopies is crucial to our wellbeing.

The Mar Vista Community Council therefore supports the following motions brought by Councilmembers Paul Koretz and Jose Huizer:

- Health of Trees in Los Angeles/Urban Forest Management Plan (Council File #15-047— see Attachment A)
- Accommodation of Trees in Sidewalk Repair and Construction (Council File #15-047-S1 — see Attachment B)

These motions mandate a study of the health of our city's trees and development of an urban forestry management plan to protect our existing trees and increase our shade tree canopy, and specifically address preservation of as many trees as possible when repairing sidewalks.

With regard to sidewalk repairs, we especially support engineering strategies such as enlarging sidewalk cutouts and tree wells, meandering sidewalks that curve around existing trees, sidewalk ramping, underground root guards that deter sidewalk lift, permeable sidewalk materials, reverse parkways, curb bump-outs and the removal of portions of lifted sidewalk to allow for a larger tree well where replacement of concrete is not necessary for access.

b. **POLICY MOTION TO OPPOSE AB 57: Limiting Local Government Authority Over Cell Towers** (submitted by T&I Committee)

Whereas cell towers have been an issue within the community, therefore the MVCC supports the City of Los Angeles resolution CF 15-0002-S62 (see Attachment C) opposing AB 57 (http://www.leginfo.ca.gov/pub/15-16/bill/asm/ab_0051-0100/ab_57_bill_20150406_amended_asm_v97.htm) which proposes to remove substantial local control over wireless facilities, and further commends Councilmembers Mike Bonin, Mitch O'Farrell and Paul Koretz for their support on this matter.

c. **POLICY MOTION TO OPPOSE AB 744: Limiting Local Government Authority Over Parking For SB 1818 Density Bonus Projects** (submitted by T&I Committee)

Whereas AB 744 (http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB744) removes local control of parking requirements for certain types of SB 1818 projects, the MVCC recommends the City of Los Angeles oppose AB 744 and therefore requests Councilmembers Mike Bonin and Paul Koretz introduce a resolution opposing AB 744.

d. **POLICY MOTION TO OPPOSE AB 1373: Exempting 40 Square Blocks Of Downtown La From The California Outdoor Advertising Act** (submitted by T&I Committee)

Whereas AB 1373 (http://www.leginfo.ca.gov/pub/15-16/bill/asm/ab_1351-1400/ab_1373_bill_20150227_introduced.htm) seeks to exempt 40 square blocks of downtown Los Angeles from the California Outdoor Advertising Act, MVCC recommends the City of Los Angeles oppose AB 1373 and requests Councilmembers Mike Bonin and Paul Koretz introduce a resolution opposing AB 1373.

e. **POLICY MOTION: MVCC Community Impact Statement to the L.A. City Council RE: LA City Mobiilty Plan 2035** (submitted by T&I Committee)

Whereas, the LA City Mobility Plan 2035 is going to the full LA City Council PLUM and Transportation Committees in September, AND

Whereas, the LA City Mobility Plan 2035 impacts the Mar Vista area and the Mar Vista Community Council, AND

Whereas, WRAC (Westside Regional Alliance of Councils) recommends a vote of no-confidence

Therefore, the Mar Vista Community Council will submit the following Community Impact statement to the LA City Council by August 27:

The Mar Vista Community Council opposes, but recommends working with those drafting, the City of Los Angeles Mobility Plan 2035 in that it:

1) Does not ensure emergency response time when approving/allowing for new development
2) Establishes insufficient infrastructure (water, sewage, electricity, roads, multimodal commuter infrastructure, and parking
3) Creates significant negative impacts on public health, safety and welfare
4) 4) Does not sufficiently encourage telecommuting and staggered commuting hours
5) Does not require sufficient traffic studies for all projects, and use a correct L.A.-based traffic generation ratio
6) Does not ensure sufficient and appropriate transportation and mitigation fees from residential and commercial developers.

f. **POLICY MOTION: Maintaining Stability In Residential Zones And Neighborhood Conservation Under The Los Angeles General Plan Framework Element** (submitted by T&I Committee)

With regard to building densities, The Mar Vista Community Council affirms and upholds its single family and multifamily residential zones as key components of The Framework Element of the Los Angeles General Plan as stated in Chapter 3 - Land Use Goals, Objectives And Policies Issue Two: Uses, Density, And Character (http://planning.lacity.org/cwd/framwk/chapters/03/03.htm):

AND

The Mar Vista Community Council recognizes the vital correlation between the transportation, parking, sewage, water and other infrastructure that has been built for densities consistent with those residential zones, and not for the more dense multifamily and mixed-use zoning now being built and being promoted for construction within those residential zones:

The Framework Element recognizes the importance of existing single-family residential neighborhoods and the need to conserve them. Traditionally, they have formed the fabric that has distinguished the City from other urban areas. Even with substantial growth, the single-family dwelling is still considered to be a major objective of most income and ethnic groups. These areas also afford added opportunities to take advantage of the variety of lifestyles such as water-oriented, rural/agricultural and equestrian-keeping special use neighborhoods.

AND:

It is the intent of the Framework Element to maintain existing stable multi-family residential neighborhoods. In those stable neighborhoods characterized by a mix of densities and dwelling types, permitted densities may be reduced to levels consistent with the character of the entire area in order to minimize impacts on infrastructure, services, and/or maintain or enhance the residents' quality of life. The loss of potential units in these locations can be offset by the provision of new housing opportunities in mixed-use districts, centers, and boulevards. The determination of the locations in which such modifications may occur would normally occur as amendments to the community plans or other initiatives as provided for by the Los Angeles Municipal Code. The Framework Element establishes guidelines to achieve higher quality multi-family dwellings, such as design character, amenity, and open space.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin

f. Zone 6 – Valerie Davidson

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

       d
    f. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Attachment A

ENERGY & ENVIRONMENT

MOTION

Urban forests have long been proven to provide multiple and essential socio-ecological benefits. We know that trees use CO_2 and produce oxygen. Lesser know is that they also capture harmful diesel particulates and smog-producing gases like nitrogen oxides, sulfur and ozone. Trees capture rain and slowly release it, reducing soil erosion, slowing storm water and protecting us from floods. Shade trees reduce heat-island effect and protect our skin from harmful UV exposure. Properly placed, shade trees can cool our homes, allowing us to reduce our energy use by up to 50%.

Urban forests create mulch that allows rain to percolate into groundwater supplies, fostering living soils. Tree roots also uptake nutrients and other pollutants keeping them out of our storm drains, rivers and oceans and reducing MS4 compliance costs. Fruit and nut producing trees in our urban forest produce needed sustenance for the people and the native wildlife that call our diverse region home.

Research has shown that the more trees there are in a community the more reduced violence, improved civic engagement, increased property values, better overall resident health and general well-being. Additionally, trees increase the life span of city infrastructure. On streets that are shaded, the asphalt deteriorates less quickly, requiring them to be paved less often.

The City is entering its fourth year of a record-breaking drought – made worse by a decades-long warming trend associated with global climate warming – and is asking its residents to reduce outdoor water use. In some cases, tree health is being unintentionally impacted by these essential reductions.

Mature shade trees are being removed in an effort to fix sidewalks. Tree species that produce significant shade could take years to grow large enough to do so. Small tree species, mostly grown for spring floral displays, are replacing shade trees, providing significant benefit reductions. Trees are also being topped and damaged by unskilled or hurried contractors hired by homeowners and City Departments.

Drought-stressed trees are more susceptible to the spread of disease and invading pathogens like bacterial leaf scorch, *Xylella fastidiosa*, a widespread disease now common in Liquidambar and other common trees in Los Angeles. Another increasingly widespread pest is the polyphagous shot hole borer, which has defied all conventional and chemical methods of control. A fungus spread by the polyphagous shot hole borer is now killing thirty-five species of trees throughout the region.

Temperatures in the City have increased by 7°F, climate change-related heat waves will increase the stress on trees as well as increase the potential for major public health impacts.

Yet, cities can have a purposeful, positive impact on tree health. In 2009, the State of Victoria, Australia, suffered an extreme heatwave that contributed to the deaths of 374 people. The City of Melbourne has since implemented a plan to double tree canopy cover by 2040. A denser tree canopy can reportedly reduce heat in neighborhoods by up to 9 °F, which may be enough to save lives.

As the City moves to implement measures aimed at resiliency and sustainability, it must prioritize the tree health and maximize the beneficial impact of its urban forest. A robust, healthy and climate-resilient tree canopy must be at the heart of its plans.

I THEREFORE MOVE that the Bureau of Street Services' Urban Forestry Division, in consultation with plant pathologists and entomologists, and other local tree-focused organizations, be directed to report to the City Council regarding the health of the trees in Los Angeles. The report should include an assessment of the City's ability to enforce current regulations, the need for new regulations and guidelines, the benefits of trees to our local watersheds and to climate resilience, reducing heat-island effect by increasing tree canopy cover, strategies to support trees without over-taxing local water resources, plans to address existing and emerging health problems of the urban forest. Given the recent agreement to commit to an extensive sidewalk repair plan, the report should also include strategies that consider potential impacts on canopy, needed resources, and the overall future outlook of our urban forest.

I FURTHER MOVE that the Urban Forestry Division be directed to collaborate to develop an urban forest management plan that will highlight new strategies to protect and enhance our urban forest without imported water supplies, provide tree health care during drought, reduce heat-island effect by increasing shade tree canopy, diversify street tree species by increasing native and low-water use trees and address new pests and diseases.

PRESENTED BY: _____
PAUL KORETZ
Councilmember, 5th District

SECONDED BY: _____

ORIGINAL

Attachment B

PUBLIC WORKS & GANG REDUCTIC

MOTION

A healthy urban forest offers multiple benefits to city residents, aesthetic, economic, and environmental. Street trees are a cornerstone of the urban forest. However, they are frequently in conflict with sidewalk infrastructure, the cause of sidewalk damage in all parts of the City.

The City is embarking on an ambitious 30-year program to repair sidewalks. It is important that this program properly consider the value of our urban forest when addressing existing trees and planning for new ones.

"Restoring LA's Urban Forest" is a recent UCLA Master of Urban and Regional Planning student analysis and report, which offers numerous recommendations for improvements in practice and policy related to the City's urban forest. It states "Restricted growing space is reported to be the single most important cause of conflicts between tree roots and hardscape."

The report also cites successes of Los Angeles's efforts in a period before the economic recession led to dramatic cutbacks in the City's tree program: it limited tree removal to 7% of the 6,500 trees that were involved in the repair of 74 miles of sidewalk. It did so "by utilizing root pruning in conjunction with multiple engineering strategies to address sidewalk repair." These and other strategies cited include: enlarging sidewalk cutouts and tree wells, meandering sidewalks that curve around existing trees, sidewalk ramping, underground root guards that deter sidewalk lift, permeable sidewalk materials, reverse parkways, curb bump-outs, sidewalk grinding, and the removal of portions of lifted sidewalk to allow for a larger tree well where replacement of concrete is not necessary for access.

It is in the City's interest to preserve and plant trees, as they foster pedestrian activity, improve aesthetics and property values, reduce pollution and heat, and provide habitat.

I THEREFORE MOVE that the Urban Forestry Division of the Bureau of Street Services, in collaboration with the Community Forest Advisory Committee and other experts as necessary, report on its guidelines for tree removal and also on its guidelines for tree wells and the accommodation of trees in the practice of sidewalk repair and construction. The report should also provide recommendations for how the sidewalk repair program can anticipate and enable tree plantings and future growth of the urban forest that lessens conflict with sidewalk infrastructure.

PRESENTED BY:

JOSE HUIZAR
Councilmember, 14th District

PAUL KORETZ
Councilmember, 5th District

SECONDED BY:

ORIGINAL

MAY 2 2 2015

Attachment C

RULES, ELECTIONS & INTERGOVERNMENTAL RELATIONS

RESOLUTION

WHEREAS, any official position of the City of Los Angeles with respect to legislation, rules, regulations or policies proposed to or pending before a local, state, or federal governmental body or agency must have first been adopted in the form of a Resolution by the City Council with the concurrence of the Mayor; and

WHEREAS, on December 2, 2014, AB 57 (Quirk), was introduced, and was subsequently amended on March 26, 2015 and April 6, 2015, which would provide that a collocation or siting application for a new wireless telecommunications facility is 'deemed approved ' if the city or county fails to approve or disapprove the application within the time periods established by the Federal Communications Commission (FCC) and all required public notices have been provided regarding the application; and

WHEREAS, AB 57 notes that in 2009 the FCC adopted rules that require local governments to review and act on applications for the establishment of wireless communications facilities in *In re Petition for Declaratory Ruling , 24 FCC Rcd. 13994 (2009)*, and under the ruling cities have 90 days to review collocation applications and 150 days for other siting applications for new wireless telecommunication facilities, however, the FCC in its rules specifically declined to make these applications 'deemed approved' if a city fails to meet the 90 or 150 day deadlines; and

WHEREAS, AB 57 does not distinguish between a wireless telecommunications facility in the public right of way or on private property, and community members have long advocated for the local adoption of regulations to govern the placement of cellular installations on the public right of way; and

WHEREAS, AB 57 notes that wireless communication facilities is 'not a municipal affair' and rather a 'matter of statewide concern,' and thereby, undermining local control inasmuch as the legislation includes 'charter cities;' and

WHEREAS, enactment into law of AB 57 would undermine local land use control, inasmuch as the city processes thousand of land use entitlement requests, and the 90 day limitation is not appropriate/realistic given the caseload and processing times necessary to meet other statutory requirements (e.g. public hearings, environmental clearance, public notification); and

WHEREAS, AB 57 is opposed by the League of California Cities, the California State Association of Counties, and the California Chapter of the American Planning Association;

NOW, THEREFORE, BE IT RESOLVED, with the concurrence of the Mayor, that by the adoption of this Resolution, the City of Los Angeles hereby includes in its 2015-16 State Legislative Program OPPOSITION to AB 57 (Quirk), which would unnecessarily and detrimentally impact the city's authority to regulate the placement of wireless telecommunications facilities, inasmuch as it would 'deemed approved' wireless facilities not approved by the city within 90 days for collocation, and 150 days for new wireless facilities, and thereby undermine the principle of home rule, and ultimately land use control.

COUNCILMEMBER MIKE BONIN

PRESENTED BY: PAUL KORETZ
Councilmember, 5th District

SECONDED BY:

ORIGINAL

cm

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, August 11th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:09 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), John Kuchta (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Brad Wilhite, Ken Alpren
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of July 14, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
   Motion to approve by Bill Scheding, 2nd by John Kuchta. Motion carried unanimously
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Stephanie Koehler: Concerned about a community care facility planned for 11957 Victoria (8 bedrooms, 32 beds, protected as community care facility). Wants added to PLUM committee; iis with size, not fact that it's a CCF.
   Sharon Commins: City Council has ad hoc CCF committee. Didn't take action on CCF recommendations. Hasn't and won't meet. Stephanie should talk to Mike Bonin.
   Ann Porter: member of LA Leadership Team for Move to Amend; working to pass constitutional amendment that corporations are not people. Video on utube: "A question of personhood".
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - 65-70 people at Street Vendor meeting tonight.
      - Great Streets & CicLAvia: are making the city more multi-mod. Used CicLAvia to see what Great Streets would be like. Feedback: want safer Venice Blvd, closer to neighborhood instead of dividing.
      - Comments RE: Great Streets plan & lane removal:
        - Michelle Krup,in: Great Streets Ad Hoc Committee meeting August 12; Jesse Holder will present
        - Michael Millman: has MVCC ever passed policy on Venice blvd? No.
        - Sharon Commins: How will city deal with cut-thru traffic that lane removal will create? Was lane removal ever discussed?
        - Valerie Davidson: need another outreach community meeting
        - Michael Millman: need to get it on MVCC's agenda at some point.
        - Melissa Stoller: cover in Fall newsletter;
        - Bill Koontz: survey at Fall Festival
        - Ken Alpren: give flyers to kids
   b. Mar Vista Recreation Center – Lizka Mendoza, Director
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn
   e. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

- Would love to table at Fall Festival.
- Airport

  Metroplex: Rep. Bass signed on to Maxine Waters letter; advocated for (and got) 90 day comment period. Metorplex is new technology; flight patterns higher, descend at greater angle.

  Bill Scheding: Military-style formation landings; they need approval from Control Tower--shouldn't be allowed.

  Martin Rubin: is Bass going to join Congressional Flight Paths Caucus? Formation approvals are from FAA.

Michael: Millman: position on Iranian treaty? Answer: Rep Bass had private meeting, hasn't yet taken position

f. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
g. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
h. CA Assembly 47
i. CA Assembly 62
j. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
k. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
      i. Committee assignments (possible motions to follow)
         - Motion to approve appointment of Robin Doyno as additional co-chair of Education, Arts and Culture Committee.

           Motion to approve by Bill Scheding, 2nd by Melissa Stoller. Motion carries: 10 ayes, 1 abstention (Robin Doyno).
         - Possible motion to change Aging in Place co-chairs.

           Motion for Aging in Place Committee to be chaired by Sherri Akers, Birgitta Kastenbaum and Tatjana Luethi, 2nd by Michelle Krupkin.

           Discussion:

           Bill Scheding would like to have one chair (no co-chairs) with vice-chairs.

           Linda Guagliano: co-chair can fill in when one chair is away; Bill Scheding: that's what vice chairs are for.

           Sherri Akers: good way to get people involved.

           Motion carries unanimously.

      ii. Board retreat

          Maybe on Saturday, August 15. Will include web training.

   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta

      Kickoff at Board retreat for feedback on how to improve website. Phrase suggestions as: "As this type of person, I want this result"

   d. Secretary –Melissa Stoller

      Get motions in on time! Include them in an email—don't just send meeting minutes.

   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

      Bill Scheding: will not include any motions without paperwork at ExFin Committee meeting; committees that meet same week as ExFin need to plan ahead.

      Melissa: objects to cutting off that much in advance of Board meeting.

i. **APPROVAL** of July Monthly Expense Report (MER)

Motion by Bill Scheding, 2nd by John Kutcha. Motion passed unanimously.

ii. **FUNDING MOTION:** MVCC approves payment of $12 to North Westdale Neighborhood Association as reimbursement for a bounced check.

Motion by Bill Scheding, 2nd by John Kutcha. Motion passed unanimously.

iii **FUNDING MOTION: ink cartridges** (submitted by Green Committee)

The Mar Vista Community Council approves the expenditure of up to $300 for the purchase of ink cartridges (2 HP 564XL Color/Photo Black Combo packs; 1 HP 564XL Black 3-pack) to be used for printing display materials.

Motion by Bill Scheding, 2nd by Sherri Akers. Motion passed unanimously.

iv. **FUNDING MOTION: Save Our Watershed printing** (submitted by Green Committee)

The Mar Vista Community Council approves the expenditure of up to $400 for the printing of flyers or door hangers for Mar Vista Save Our Watershed.

Motion by Bill Schedin, 2nd by Robin Doyno. Motion passed unanimously.

Note: If get logo, need paperwork so MVCC owns.

v. **FUNDING MOTION: Great Streets Challenge Grant Support** (submitted by T&I Committee)

Whereas, the Mar Vista Chamber of Commerce requests support from the Mar Vista Community Council Board of Directors for the Make It Mar Vista Small Business Saturday Community Event taking place on Saturday, November 28th, 2015, and

Whereas, the Mar Vista Chamber, along with several partner organizations, is honored to have been awarded one of the first-ever Great Streets Challenge Grants, and the Chamber feels a natural partnership with the MVCC as we work together to help realize the full potential of the Venice Blvd Great Street in Mar Vista, and

Whereas, there will be many aspects of the Make It Mar Vista event, and we are asking for this Board of Directors' support specifically for the Protected Bike Lane Pop-Up along Venice Blvd from Grand View to Wasatch, and

Whereas, this temporary switch of the Bike Lane and the Parking Lane along this stretch of the Great Street will require coordination with City and CalTrans officials and engineers, and will also require funding for (temporary) lane markers, barricades and signage, construction of planter boxes for use as lane barriers.

Therefore, the Mar Vista Community Council will authorize a Neighborhood Purpose Grant of $1000.00 to help make this project a reality, with the understanding that this amount will not fund this project in full, and that the Mar Vista Chamber of Commerce is also reaching out to other sources for contributions.

Motion by Bill Scheding, 2nd by Ken Alpren.

Sarah Auerswald: will be first test of what Great Streets will look/feel like. May require a lane closing.

Michelle Krupkin: extends support.

Melissa Stoller: at end, will have planter boxes to beautify street.

Motion carries unanimously. (John Kutcha absent)

vi. **FUNDING MOTION: NWNA Ad** (director's motion submitted by Bill Koontz)

The Mar Vista Community Council approves the expenditure of $300 for ads in six editions of this year's North Westdale Neighborhood Association Newsletter.

Motion by Bill Scheding, 2nd by Brad Wilhite.

Marty Rubin: discount from usual $450.

Motion carries unanimously.

vii. **FUNDING MOTION: NWNA Fall Block Party/Talent Show** (director's motion submitted by Bill Koontz)

The Mar Vista Community Council approves the expenditure of $300 for North Westdale Neighborhood Association's Fall Block Party/Talent Show to be held Friday, September 18, 4-7:30 P.M. The funding will be earmarked to pay for the use of Saint Andrew's Lutheran Church's Parking lot to hold the event and be paid to the church.

Motion by Bill Scheding, 2nd by Brad Wilhite.

Marty: Worked beautifully last year; contact Marty if want to get involved.

Motion carries unanimously.

viii. **FUNDING MOTION: BOD agenda printing** (director's motion submitted by Bill Scheding)

The Mar Vista Community Council approves reimbursing Bill Koontz up to ~~$130~~ $400 for printing of BOD meeting agendas.

Motion by Bill Scheding, 2nd by Brad Wilhite.

Melissa: why can't it be part of budget without motion each time; Bill K will look into

Motion carries – 10 ayes, 1 abstetion (Bill Koontz).

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano

North Westdale: 3-way stop at Stoner facing Gateway & Radio completed. 2-way stop at Wasatch & Westminster is now all-way. Stop signs on Francis Ave installed between Pacific & Washington

Next meeting is September 16; agenda closes Sept 12.

g. DWP MOU Liaison: Myra Boime

DWP claims it has cleaned up faulty billing system. Benchmarking coming out soon.

Rates are going up 5% per year for next 5 years to fund new/replaced infrastructure. Tier 1 water going down, other tiers going up.

Reconfigured pensions for future employees, city will kick in less.

h. LANCC Liaison: Open (Bill Koontz reporting)

Voted on motion to allocate additional $5000 with no restrictions (Empower wants to designate for elections).

Motion to ask city controller to followup on cell phone overcharges.

Free websites pitch for NC that don't have

New video for NC candidates, must watch.

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

Theme: Heroes Among Us. Want lots of nominees; submit names with statement of why (75 words) at MarVistaFestival@marvista.org and incoude a photo if possible. Will select Festival honoree from the submissions. No art show–instead, there'll be posters of the heroes.

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

September meeting: Downtown Plan

October meeting: baseline mansionization

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Received a Great Streets Challenge grant (only 8 granted); need to get crowd funding, suggested amount is $11.28 (would need 900 donations at this amount).

CicLAvia: great feedback about neighborhood from attendees.

Michael Krupkin: how is Chamber getting along with Bowlero. Sarah: Great! Having mixer there, bowling tournament with Culver City, 5:00-7:00 P.M. on August 26

n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

Motion to wave reading by Bill Scheding, 2nd by Ken Alpren. Motion carries unanimously.

a. **POLICY MOTION: Preserving City Trees** (submitted by Green Committee)

The many mature tress that line Mar Vista's streets provide shade, beauty and habitat, making our sidewalks more inviting and pedestrian friendly. They decrease pollution and

heat, while increasing our property values. But many are struggling during the current drought, and may be further threatened by sidewalk construction and repair. Ensuring the health of our existing trees and increasing the number of trees that provide urban shade canopies is crucial to our wellbeing.

The Mar Vista Community Council therefore supports the following motions brought by Councilmembers Paul Koretz and Jose Huizer:

- Health of Trees in Los Angeles/Urban Forest Management Plan (Council File #15-0467—see Attachment A)
- Accommodation of Trees in Sidewalk Repair and Construction (Council File #15-0467-S1 — see Attachment B)

These motions mandate a study of the health of our city's trees and development of an urban forestry management plan to protect our existing trees and increase our shade tree canopy, and specifically address preservation of as many trees as possible when repairing sidewalks.

With regard to sidewalk repairs, we especially support engineering strategies such as enlarging sidewalk cutouts and tree wells, meandering sidewalks that curve around existing trees, sidewalk ramping, underground root guards that deter sidewalk lift, permeable sidewalk materials, reverse parkways, curb bump-outs and the removal of portions of lifted sidewalk to allow for a larger tree well where replacement of concrete is not necessary for access.

Motion to approve by Melissa Stoller, 2nd by Michelle.Krupkin

Discussion: Ken Alpren & Michael Millman: shouldn't allow Ficus trees; City has already said won't use anymore.

Motion carries unanimously.

b. **POLICY MOTION TO OPPOSE AB 57: Limiting Local Government Authority Over Cell Towers** (submitted by T&I Committee)

Whereas cell towers have been an issue within the community, therefore the MVCC supports the City of Los Angeles resolution CF 15-0002-S62 (see Attachment C) opposing AB 57 (http://www.leginfo.ca.gov/pub/15-16/bill/asm/ab_0051-0100/ab_57_bill_20150406_amended_asm_v97.htm) which proposes to remove substantial local control over wireless facilities, and further commends Councilmembers Mike Bonin, Mitch O'Farrell and Paul Koretz for their support on this matter.

Motion to approve by Ken Alpren, 2nd by Michelle Krupkin.

Sharon Commins: Westside Regional Alliance motion.

Motion carries unanimously.

c. **POLICY MOTION TO OPPOSE AB 744: Limiting Local Government Authority Over Parking For SB 1818 Density Bonus Projects** (submitted by T&I Committee)

Whereas AB 744 (http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB744) removes local control of parking requirements for certain types of SB 1818 projects, the MVCC recommends the City of Los Angeles oppose AB 744 and therefore requests Councilmembers Mike Bonin and Paul Koretz introduce a resolution opposing AB 744.

Motion to approve by Michelle Krupkin, 2nd by Ken Alpren.

Sharon Commins: Westside Regional Alliance motion. If applicant agrees to build certain % affordable housing, will knock off some of parking requirements. This is already covered by very generous local ordinance.

Motion carries unanimously.

d. **POLICY MOTION TO OPPOSE AB 1373: Exempting 40 Square Blocks Of Downtown La From The California Outdoor Advertising Act** (submitted by T&I Committee)

Whereas AB 1373 (http://www.leginfo.ca.gov/pub/15-16/bill/asm/ab_1351-1400/ab_1373_bill_20150227_introduced.htm) seeks to exempt 40 square blocks of downtown Los Angeles from the California Outdoor Advertising Act, MVCC recommends the City of Los Angeles oppose AB 1373 and requests Councilmembers Mike Bonin and Paul Koretz introduce a resolution opposing AB 1373.

Motion to approve by Michelle Krupkin, 2nd by Ken Alpren.

Sharon: Westside Regional Alliance motion.

Michelle Krupkin: Could set precedent.

Michael Millman: until see evidence that digital signs are bad for health, represent blight, if community can profit from digital signs for good things, will support. them

Marty Rubin: strongly supports motion.

Motion carries. Vote: 9 ayes, 1 nay, 0 abstain.

e. **POLICY MOTION: MVCC Community Impact Statement to the L.A. City Council RE: LA City Mobiilty Plan 2035** (submitted by T&I Committee)

Whereas, the LA City Mobility Plan 2035 is going to the full LA City Council PLUM and Transportation Committees in September, AND

Whereas, the LA City Mobility Plan 2035 impacts the Mar Vista area and the Mar Vista Community Council, AND

Whereas, WRAC (Westside Regional Alliance of Councils) recommends a vote of no-confidence

Therefore, the Mar Vista Community Council will submit the following Community Impact statement to the LA City Council by August 27:

> The Mar Vista Community Council opposes, but recommends working with those drafting, the City of Los Angeles Mobility Plan 2035 in that it:
>
> 1) Does not ensure emergency response time when approving/allowing for new development
> 2) Establishes insufficient infrastructure (water, sewage, electricity, roads, multimodal commuter infrastructure, and parking
> 3) Creates significant negative impacts on public health, safety and welfare
> 4) 4) Does not sufficiently encourage telecommuting and staggered commuting hours
> 5) Does not require sufficient traffic studies for all projects, and use a correct L.A.-based traffic generation ratio
> 6) Does not ensure sufficient and appropriate transportation and mitigation fees from residential and commercial developers.

Motion to approve by Ken Alpren, no 2nd . Can't bring motion forward.

City Council already passed. Sherri Akers: suggests friendlier tone.

f. **POLICY MOTION: Maintaining Stability In Residential Zones And Neighborhood Conservation Under The Los Angeles General Plan Framework Element** (submitted by T&I Committee)

With regard to building densities, The Mar Vista Community Council affirms and upholds its single family and multifamily residential zones as key components of The Framework Element of the Los Angeles General Plan as stated in Chapter 3 - Land Use Goals, Objectives And Policies Issue Two: Uses, Density, And Character (http://planning.lacity.org/cwd/framwk/chapters/03/03.htm):

And,

~~The Mar Vista Community Council recognizes the vital correlation between the transportation, parking, sewage, water and other infrastructure that has been built for densities consistent with those residential zones, and not for the more dense multifamily and mixed-use zoning now being built and being promoted for construction within those residential zones:~~

Whereas, the Department of City Planning Website states: "The Citywide General Plan Framework is based on a directed growth strategy which targets residential and commercial growth along boulevards, corridors and clustered development around high activity centers and around transit opportunities",

The Mar Vista Community Council recognizes the vital correlation between the transportation, parking, sewage, water and other infrastructure needed for densities consistent with the General Plan Frameworks residential zones, and supports the General Plan Frameworks directed growth strategies which appropriately place growth along major corridors:

> The Framework Element recognizes the importance of existing single-family residential neighborhoods and the need to conserve them. Traditionally, they

have formed the fabric that has distinguished the City from other urban areas. Even with substantial growth, the single-family dwelling is still considered to be a major objective of most income and ethnic groups. These areas also afford added opportunities to take advantage of the variety of lifestyles such as water oriented, rural/agricultural and equestrian-keeping special use neighborhoods.

AND:

It is the intent of the Framework Element to maintain existing stable multi-family residential neighborhoods. In those stable neighborhoods characterized by a mix of densities and dwelling types, permitted densities may be reduced to levels consistent with the character of the entire area in order to minimize impacts on infrastructure, services, and/or maintain or enhance the residents' quality of life. The loss of potential units in these locations can be offset by the provision of new housing opportunities in mixed-use districts, centers, and boulevards. The determination of the locations in which such modifications may occur would normally occur as amendments to the community plans or other initiatives as provided for by the Los Angeles Municipal Code. The Framework Element establishes guidelines to achieve higher quality multi-family dwellings, such as design character, amenity, and open space.

Motion to approve motion as amended by Ken Alpren, 2nd by Michelle Krupkin.

Bill Scheding: motion to send back to committee (PLUM & T&I), 2nd by Melissa Stoller.

Discussion:

Melissa Stoller: if bring amended motion, should have strike-out.

Michael: need to focus on single dwelling community; PLUM will rework.

Motion to send to PLUM carries unanimously.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern

    Increasing concern about Pico neighborhood plan. Nordstrom is leaving Westside mall.

    b. Zone 2 – Brad Wilhite

    Virginia Ernst at meeting with FAA, spoke out about airport issues.

    c. Zone 3 – Bill Scheding

    Reached out to Westdale HOA, no response.

    d. Zone 4 - Michael Millman

    Thanks chair of MVCC for leadership to get CCFs on PLUM agenda.

    e. Zone 5 – Michelle Krupkin

    CicLAvia was huge success.

    S. Del Rey border: new businesses on Washington

    New development (Greek Restaurant) opposite Wood on SE corner will exit into right turn lane, there will be accidents.

    f. Zone 6 – Valerie Davidson

    Concern about airport, more heliocopter flyer-overs.

    Walgrove traffic from SM seems to be worse

    Rose & Walgrove: side swipe accident, got into fight, police called

    Wants to get broken sidewalk on Rose fixed – lots of bikes, pedestrians

    Discussion:

    Call 310-458-8692 with time of airport incident (such as formation flyovers), they will get back to you.

    Sidewalk repairs: need to come up with a list for sidewalk repairs

    Pothole repair: send in pothole list to Ken Alpren & Michelle Krupkin

    Making Ontario Airport successful will help us with LAX – press for airlines to offer attractive flights.

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Executive & Finance Committee** - Bill Koontz, Chair
b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
f. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
h. **Safety and Security Committee** – Rob Kadota, Chair

   Emergency Preparedness Expo at Farmers Market September 27.
i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

   Had a meeting. Going to start toxic materials removal. Don't yet have right of access for Friends to make alterations of building.
j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

   Website – needs to be fixed – bring list of fixes needed.
k. **Elections and By-laws**- Bill Scheding, chair
l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs

11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received

    Valerie Davidson: is there any limit on number of motions on agenda?

    Sharon Commins: should take as many motions as people want to submit, stay here as long as it takes and do our job.
14. **Future agenda items**
15. **Public Comment**

    Great things are happening with our Great Street; getting cleaned.
16. **Adjournment**

    Meeting adjourned at 9:34 P.M.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, July 14th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:13 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), John Kuchta (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Brad Wilhite, Yvette Molinaro, Ken Alpren
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of June 9, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
   Motion to approve June 9 and June 17 minutes by Bill Scheding, 2nd by Sherri Akers. Motion carried: 11 ayes, 1 abstention (John Kuchta).
4. **Approval of June 17, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
5. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Malia Schilling (CicLAvia):
   - Sunday, August 9, 9:00 A.M.–4:00 P.M.; cars must be removed from streets on route by 8:00 A.M.
   - Mar Vista Farmers' Market is hub of activity, will highlight Great Street
   - Community meeting on July 16, 7:00 P.M., at Beyond Baroque to present CicLAvia activities, business opportunities, street closures and volunteer positions. CicLAvia will also be at the Farmers' Market on July 26 in the MVCC tent.
   - CicLAvia is trying to acquire additional parking lot for Farmers' Market; talking to Bowlero

   Christopher McKennon
   - Work is in progress on North Oval curbs; tried to make it a Green Street, but it will have conventional curbs. City Council found sufficient funds to make up gap between assessment district collection and actual cost..

   Jack Nordhouse
   - Leads "What's New This Week" current events discussion group every Thursday, 1:00 P.M., at Mar Vista Public Library.

   Sherri Akers
   - 2nd Annual Relay for Life Mar Vista/WLA is Saturday, July 18, at Mar Vista Recreation Center.
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Bonin & O'Farrel introduced motion to reform small lot subdivision regulation to make more compatible with neighborhoods
      - Budget & Finance and Public Works committees holding joint meeting at Mar Vista Recreation Center on July 28, 6:00 P.M.; want public feedback on how to prioritize sidewalk repairs. A tree surgeon will determine whether a tree is removed.

- Great Streets Workshop on August 6, 6:00 P.M. will have various stations showing feedback received and reveal some streetscape design information.
- Public meeting at WLA Municipal Building, Hearing Room 200, on August 10, 6:00 P.M.–8:00 P.M., to address sidewalk vending.

b. Mar Vista Recreation Center – Lizka Mendoza, Director
c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
d2. US 37 – Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
- FAA meeting in D.C.: most attendees opposed Santa Monica Airport; FAA not listening—believes will go into litigation.
- FAA Metroplex plan that changes Southern California flight paths is in 90 day comment period.
- Mike Bonin started change.org petition to stop SMO noise and pollution.

e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
g. CA Assembly 47
h. CA Assembly 62
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
      i. Committee assignments (possible motions to follow)

         Motion by Bill Scheding, 2nd by Ken Alpren to reappoint all committee chairs, co-chairs, representatives..

         Bill talked to everyone; they're all happy with current assignments, so no moves.

         Motion carried unanimously.

      ii. Board retreat

         Still in works, looking for date in August; Bill Koontz will send Doodle.

   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   - Asked committee chairs to send motions for agenda in an email; include a Council File #.
   - Agenda will close at 8:00 P.M. the Thursday before the next BOD meeting.

   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

      Motion to consider 7.e.i–ii and 7.e.v–vii on consent by Bill Scheding, 2nd by John Kucha. Motion carried unanimously.

      i. **APPROVAL** of June Monthly Expense Report (MER)
      ii. **FUNDING MOTION:** MVCC approves a Neighborhood Purpose Grant of $4000 to the Fall Festival.
      iii. **FUNDING MOTION:** MVCC approves the expenditure of up to $300 per month, payable to StorQuest, for storage of MVCC property.
      iv. **FUNDING MOTION:** MVCC approves the expenditure of up to ~~$100~~500 per month, payable to RIMU, for web hosting.

         Bill Scheding amended to allocate up to $500. Motion to approve as amended by Bill Scheding, 2nd by John Kucha. Motion carried unanimously.

v. **FUNDING MOTION:** MVCC approves the expenditure of up to $4000 per newsletter, payable to Pacific Rim Printers, for newsletter printing.

vi. **FUNDING MOTION:** MVCC approves the expenditure of up to $2000 per newsletter, payable to CBS Advertising, for newsletter distribution.

vii. **FUNDING MOTION:** MVCC approves the expenditure of $1000, payable to the Mar Vista Farmers' Market, for tent rental.

viii. **FUNDING MOTION:** MVCC approves the establishment of an account at Copy Land, with billing not to exceed $500 per month and all print orders to be place via email by the MVCC chair.

Motion to approve by Melissa Stoller, 2nd by.Michael Millman.

Discussion:

Copyland is located at Barrington and Pico. .MVCC previously had an account there. Can't establish similar account at Staples.

Bill Scheding: can't support because it's outside of Mar Vista.

Michelle Krupkin: Suggests looking at Marty Popkin Printing on Washington Plaee in Mar Vista.

Motion carried with 12 ayes, 1 nay.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano
   - Next meeting is Wed. Jul 15, 10:00 A.M.; LAPD officer won't be there.

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
   - Met June 24. Committee members questioning why taking so long to get water to spreading grounds
   - Local business in Playa Vista won award for recycled water use. DWP is getting new customers for recycled water.
   - Bill Koontz: city has giant cistern at Mar Vista Recreation Center; and one at another park, but most of our water goes to the ocean. Wants to know: is city doing anything to prepare for El Nino? Christopher: City is thinking about.
   - New building requirements are in pipeline; include lots of greywater capture.

j Fall Festival Liaison: Albert Olson
   - Theme: Heroes Among Us. Looking for unsung neighborhood heroes, such as a neighbor who helps a neighbor.

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins
   - Next meeting is July 22, 6:00-8:00 P.M ; call for parking.
   - June Mtg (check website)
   - Seattle, Washington zoning changes: reported that at a secret meeting triplex was made base unit for zoning, eliminating single family home zone.
   - Michael Millman: requests stand up motion that MVCC can support: R1 is the fabric of Los Angeles.

m. Mar Vista Chamber of Commerce: Sarah Auerswald
   - Excited aboutt CicLAvia.
   - Sweet Lucie's opened July 14.
   - Neighborhood Night Out is August 4, 6:00–8:00 P.M, at Venice High School.
   - Ken Alpren: asks Chamber to identify alleys to tackle next as well as high priority sidewalks.

n. Neighborhood Council Sustainability Alliance: Sherri Akers
   - Water Committee meeting: Melanie Winter or the Los Angeles River Project presented; new parkway guidelines don't address curb cuts or bioswales.
   - Steering committee still more concerned with process

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

Motion to approve 8.b–f and 8.h on consent. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION: Standing Rules Amendment** (submitted by Chair)

All board members, both elected and non-elected co-chairs and anyone that may hold a position in which they represent the MVCC on another board, panel, committee or to the general public at large *shall adhere to the Code of Conduct policy #2014-12 by either signing* ~~must sign~~ the Code of Conduct *or participating in training approved the Department of Neighborhood* ~~*Empowerment* set forth by the DONE and/or the BONC~~.

Bill accepts friendly amendment offered by Sharon Cummins. Motion to approve as amended by Bill Scheding, 2nd by John Kuchta. Motion carried unanimously.

b. **POLICY MOTION: Watershed Approach** (submitted by Green Committee)

Currently, LADWP's turf replacement rebate encourages the use of "California Friendly© plants, mulch, and permeable pathways. While this popular program is a good step in the right direction, it misses opportunities to realize the Department of Sanitation's comprehensive "Capture, Conserve, Reuse" motto through a more integrative, multi-benefit approach.

The Mar Vista Community Council supports the Watershed Approach Motion (CF 15-0768 - see Attachment A) introduced by Councilmember Paul Koretz which directs the Department of Water and Power and the Bureau of Sanitation, in consultation with stakeholders, to evaluate and present to the City Council within 60 days options to incentivize applicants to meet a multi-benefit "watershed approach".

c. **POLICY MOTION: Aging in Place Logo** (submitted by Aging in Place Committee)

The Mar Vista Community Council approves the Aging in Place logo (see Attachment B) and its use to identify the Aging in Place Committee.

d. **POLICY MOTION: Santa Monica Airport Path Impacts Resolution** (submitted by Santa Monica Airport Committee)

The Mar Vista Community Council supports the Santa Monica Airport Path Impacts Resolution (see Attachment C) introduced by Councilmembers Mike Bonin and Paul Koretz.

e. **POLICY MOTION: Santa Monica Airport Proposed Ordinance** (submitted by Santa Monica Airport Committee)

The Mar Vista Community Council supports the draft Proposed Ordinance Concerning the Proprietary Management of the Santa Monica Airport.

f. **POLICY MOTION: Status Kuo (3809-3811 Grand View Blvd.)** (submitted by PLUM Committee)

The Mar Vista Community Council approves a new conditional use permit (Case No. ZA-2015-1646-CUB-ZV) for on-site sale and dispensing of alcoholic beverages; expand seating to sidewalk; expand hours of operation from 8:00 A.M. to 2:00 A.M. daily; permit take-out restaurant food; and approve the 12 mandated parking spaces at an off-site location.

g. **POLICY MOTION: 3658 and 3660 S. Beethoven St.** (submitted by PLUM Committee)

The Mar Vista Community Council approves a small lot subdivision and construction of two adjacent townhouses (three stories, not to exceed approximately ~~33~~ *34 feet 4 inches*) at 3658/3660 S. Beethoven Street, Los Angeles, CA 90066 (Case No. AA-2015-642-PMLA) subject to suggested modifications and mitigations as follows:

A. ~~Ceiling heights not to exceed 9 feet;~~
B. Installation of neighbor-friendly landscaping to enhance privacy;
C. Removal of small decorative/cosmetic balconies;
D. Reconfigure windows so as to enhance privacy;
E. Work with school officials and others to develop a mitigation plan during construction so as to protect and preserve the safety of the children.

Motion to approve by Michael Millman, 2nd by Ken Alpren.

Friendly amendment by Bill Scheding, 2nd by Michael Millman

Great PLUM meeting;

Presentation by Karig McCloskey

- Able to achieve all but height of 33, wants 34ft 4in to make space for ducting; strike ceiling limit
- Landscaping will comply with all city regulations;

- Footprint is approximately 51% of lot
- 2 car garage on site; 3000 sq. ft. per home, 4 bedrooms; lot is approx. 5600 sq. ft.

Motion carried with 9 ayes, 2 nays, 1 abstention (Michelle Krupkin).

h. **POLICY MOTION: Starbucks Coffee (3006 S. Sepulveda Blvd.)**.

The Mar Vista Community Council approves Case No. ZA 2015-1370-CU, extended hours of operation for Starbuck Coffee on-site at Supeveda/Naional shopping center, next to CVS Pharmacy.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern

      EXPO line opening April 2016.
   b. Zone 2 – Brad Wilhite

      New gas valves, new meters.
   c. Zone 3 – Bill Scheding
   d. Zone 4 - Michael Millman
   e. Zone 5 – Michelle Krupkin

      Big auto accident at Washington Place & Inglewood; need better traffic control on Inglewood.

      Extremely excessive fireworks; working on motion. Sharon Cummins: need code enforcement, ability to write citations, website to report.
   f. Zone 6 – Valerie Davidson

      Break-in with knife; found suspect barefoot in tree.

      People concerned about toxic chemicals sprayed on grass (Turf Terminators).

      Lots of McMansions, people don't like.
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

       Meeting 4th Thursday.
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

       Santa Monica City Council voting tonight on what to allow: short term leases, month to month? Land reverted July 15.
    h. **Safety and Security Committee** – Rob Kadota, Chair

       National Night Out is Tuesday, August 4 at Venice High School.
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

       Ladies Auxiliary wants to take over for training; committee beat them back.
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair

       Haven't heard back on bylaw changes.
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs

       Meeting are a speaker series; Mike Bonin is August speaker.
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)

13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

    Meeting adjourned at 9:05 P.M.

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Attachment A

ENERGY & ENVIRONMENT

MOTION

An historic and worsening drought has prompted a shift away from thirsty lawns to climate appropriate landscapes in the City of Los Angeles. This process of landscape transformation offers residents opportunities to help meet state and City mandates for conserving water (Governor's and Mayor's directives), preventing polluted runoff (MS4 Permit), mitigating climate change (AB 32) and reducing "heat island" impacts, recharging groundwater basins for local supply, supporting biodiversity (Sustainability City pLAn), reducing green waste going to landfill (AB 1826, AB 1594), and increasing healthy soil as a tool for groundwater restoration, drought resistance and carbon sequestration (Healthy Soil Initiative, SB 367).

According to the Bureau of Sanitation, one-half-inch of rain generates 3.8 billion gallons of polluted runoff in the City. According to the USDA, healthy soil sequesters carbon, holds 20 times its weight in water, reduces landscape irrigation needs, and promotes groundwater recharge. According to the Department of Water and Power (LADWP), an accelerated effort to recharge our groundwater basins and expand water reuse could increase our local water supply yield from 11% to 50% over the next two decades.

As the studies and models developed through these Departments' *Stormwater Capture Master Plan* and *Enhanced Watershed Management Plans* show, managing and harvesting rainwater on a property-by-property basis can significantly reduce stormwater pollution, mitigate local flooding, recharge local groundwater supplies, and offset the use of potable water for landscape irrigation. Simple retrofits designed to accomplish these complementary goals can save property owners money on their water bills and help the City implement more cost-effective green infrastructure projects.

Currently, LADWP's $3.75/square-foot turf replacement rebate encourages the use of "California Friendly© plants, mulch, and permeable pathways." While this popular program is a good step in the right direction, it misses opportunities to realize the Department's comprehensive "Capture, Conserve, Reuse" motto through a more integrative, multi-benefit approach.

Removing lawn provides ideal opportunities to build healthy soils, expand habitat for pollinators, and to re-contour sites through grading techniques such as berms, swales, and basins that detain, cleanse, and infiltrate stormwater. These simple measures, utilized in concert with strategies such as rain tanks, reduced hardscapes, infiltration trenches and greywater systems, can simultaneously help residential property owners maximize available water resources, support the ongoing health of our urban forest, and assist the city in meeting its water supply, water quality, biodiversity, climate resilience and sustainability goals.

There is growing consensus around the value of parcel-based stormwater management, a "watershed approach" that synergistically treats each site as a mini-watershed where water is Captured, Conserved, and Reused, as follows:

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- Capturing at least the first 1" of rainwater with rain tanks, permeable surfaces, and grading strategies like bioswales, berms and basins to help manage stormwater onsite, improve water quality, reduce local flooding, and recharge local groundwater.
- Conserving outdoor water use by installing landscaping with at least 60% SoCal native, climate-appropriate plants and trees that support wildlife habitat and preserve our region's biodiversity, and with the use of mulch and organic ground covers that mitigate heat island impacts, build healthy soils, and help sequester carbon.
- Minimize use of water and utilize more water reuse to help maintain our urban forest and support landscape and ecosystem needs without additional potable supplies.

I THEREFORE MOVE that the Department of Water and Power and the Bureau of Sanitation, and consultation with stakeholders, be requested/directed to evaluate and present the City Council within 60 days options to incentivize applicants to meet this multi-benefit "watershed approach." Such options should include tiered rebate levels, on-bill financing, and measures to ensure fair geographic and economic distribution of rebate funds. Additionally, the options should describe their potential to accelerate or diminish expected water savings from turf removals and encourage direct groundwater recharge and infiltration where applicable.

I FURTHER MOVE that the Department of Water and Power and the Bureau of Sanitation be directed to report back in 60 days on potential funding sources to help incentivize residents to adopt the "watershed approach."

PRESENTED BY:

PAUL KORETZ
Councilmember, 5th District

PAUL KREKORIAN
Councilmember, 2nd District

SECONDED BY:

Attachment B



Attachment C

RULES, ELECTIONS & INTERGOVERNMENTAL RELATIONS

RESOLUTION

Santa Monica Airport Flight Path Impacts

WHEREAS, any official position of the City of Los Angeles with respect to legislation, rules, regulations or policies proposed to or pending before a local, state or federal government body or agency must have first been adopted in the form of a Resolution by the City Council with the concurrence of the Mayor; and

WHEREAS, Santa Monica Airport's so-called "Fly Neighborly Program" currently directs departing aircraft to avoid Santa Monica neighborhoods by overflying Venice, shifting the burden of noise impacts from Santa Monica's airport on to Venice residents; and

WHEREAS, the primary departure flight tracks from Los Angeles International Airport (LAX) and Santa Monica Airport (SMO) (Runway 21 at heading 210) therefore converge and conflict just west of the airports, making necessary the sequencing of LAX and SMO takeoffs, thereby causing delays at both LAX and SMO, and causing jets to hold and idle on the SMO runway; and

WHEREAS, ultra fine particles and black carbon from jet fuel, particularly from idling jets, are thus spewing toxic jet fumes on a daily basis into West Los Angeles residential homes 250 feet from the east end of the runway at Santa Monica Airport (SMO); and

WHEREAS, a 1989 inter-departmental memo between the U.S. Department of Transportation (DOT) and the Federal Aviation Administration (FAA) regarding SMO warned that sensitive equipment and personnel should not be within 300 feet of jet fumes due to deleterious and dangerous health effects, and yet homes exist 250 feet from where jets blast fumes and Los Angeles residents experience these deleterious health effects on a daily basis; and

WHEREAS, the Federal Aviation Administration (FAA) is in the process of implementing the Next Generation Air Transportation System, or NextGen, with the goal of transforming the country's air traffic control system from a ground-based system to a satellite-based system in order to increase efficiency and capacity, while saving time and fuel, and improving aviation safety; and

WHEREAS, as part of NextGen the FAA has developed a Metroplex program with proposals to optimize the crowded airspace for the Southern California region, which is made up of airports from Los Angeles to San Diego, LAX and SMO; and

WHEREAS, the FAA has prepared a Draft Environmental Assessment (EA) to document the potential environmental effects associated with the optimization of aircraft routes and the supporting airspace management structure while departing from or arriving to the Southern California Metroplex area; and

WHEREAS, in June 2008, the FAA Flight Standards Division changed the criteria used for evaluating obstructions and terrain, and in March 2009 the FAA clarified rules pertaining to Minimum Vectoring Altitudes (MVA) to provide for safer terrain and obstruction clearance for aircraft operations; and

WHEREAS, these two FAA actions changed the initial departure procedures for SMO Instrument Flight Rule (IFR) departures, thus increasing the contingent nature of departure operations at LAX and SMO and requiring that SMO departures at heading 210 must be sequenced with LAX departures, which produce significant departure delays and cause aircraft to emit tons of pollutants and emissions; and

WHEREAS, the FAA devised a test procedure for SMO departures to reduce the length of delays at SMO and LAX resulting from sequencing the traffic from both airports that required propeller driven IRF departures from SMO to turn to heading 250 immediately after takeoff, thereby providing the appropriate degrees of lateral separation from LAX jet departures and eliminating the need to sequence departures and the resulting delays impacting jets at LAX and IFR propeller aircraft at SMO; and

WHEREAS, the FAA issued an "Interim Review of Santa Monica IFR Departure Heading Test" on March 18, 2010 that reported departure delays had been drastically reduced; prior to the test the average number of delay minutes per month was 594; and

WHEREAS, the Santa Monica IFR Departure Heading Test reduced the 594 delay minutes per month to 87 minutes - an 85% decrease, and the runway idling and wait time was significantly reduced at both SMO and LAX, resulting in a positive contribution to air quality by reducing emissions; and

WHEREAS, the Metroplex project should design routes that increase efficiency and capacity, while saving time and fuel, and improving aviation safety;

NOW, THEREFORE, BE IT RESOLVED, with the concurrence of the Mayor, that by adoption of this resolution, the City of Los Angeles hereby includes in its 2015-16 Federal Legislative Program SUPPORT for the FAA to adopt Metroplex procedures that seek to eliminate takeoff convergence and conflicts of primary departures flight tracks at LAX and SMO, thereby reducing or making unnecessary the sequencing of LAX and SMO takeoffs, and eliminating the cause for delays at both LAX and SMO; and that if noise and air pollution impacts are to be taken into consideration in the design of air traffic corridors and flight path operations, that such impacts be fairly allocated so as not to shift the full or disproportionate burden of the impacts from Santa Monica's airport on to the residents of City of Los Angeles.

PRESENTED BY: _____
MIKE BONIN
Councilmember, 11th District

SECONDED BY: _____

JUN 1 - 2015

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, July 14th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of June 9, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
4. **Approval of June 17, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
5. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
7. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Committee assignments (possible motions to follow)
        ii. Board retreat
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of June Monthly Expense Report (MER)
        ii. **FUNDING MOTION:** MVCC approves a Neighborhood Purpose Grant of $4000 to the Fall Festival.

iii. **FUNDING MOTION:** MVCC approves the expenditure of up to $300 per month, payable to StorQuest, for storage of MVCC property.
iv. **FUNDING MOTION:** MVCC approves the expenditure of up to $100 per month, payable to RIMU, for web hosting.
v. **FUNDING MOTION:** MVCC approves the expenditure of up to $4000 per newsletter, payable to Pacific Rim Printers, for newsletter printing.
vi. **FUNDING MOTION:** MVCC approves the expenditure of up to $2000 per newsletter, payable to CBS Advertising, for newsletter distribution.
vii. **FUNDING MOTION:** MVCC approves the expenditure of $1000, payable to the Mar Vista Farmers' Market, for tent rental.
viii. **FUNDING MOTION:** MVCC approves the establishment of an account at Copy Land, with billing not to exceed $500 per month and all print orders to be place via email by the MVCC chair.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano
g. DWP MOU Liaison: Myra Boime
h. LANCC Liaison: Open (Bill Koontz reporting)
i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
j Fall Festival Liaison: Albert Olson
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald
n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION: Standing Rules Amendment** (submitted by Chair)

All board members, both elected and non-elected co-chairs and anyone that may hold a position in which they represent the MVCC on another board, panel, committee or to the general public at large must sign the Code of Conduct set forth by the DONE and/or the BONC.

b. **POLICY MOTION: Watershed Approach** (submitted by Green Committee)

Currently, LADWP's turf replacement rebate encourages the use of "California Friendly© plants, mulch, and permeable pathways. While this popular program is a good step in the right direction, it misses opportunities to realize the Department of Sanitation's comprehensive "Capture, Conserve, Reuse" motto through a more integrative, multi-benefit approach.

The Mar Vista Community Council supports the Watershed Approach Motion (CF 15-0768 - see Attachment A) introduced by Councilmember Paul Koretz which directs the Department of Water and Power and the Bureau of Sanitation, in consultation with stakeholders, to evaluate and present to the City Council within 60 days options to incentivize applicants to meet a multi-benefit "watershed approach".

c. **POLICY MOTION: Aging in Place Logo** (submitted by Aging in Place Committee)

The Mar Vista Community Council approves the Aging in Place logo (see Attachment B) and its use to identify the Aging in Place Committee.

d. **POLICY MOTION: Santa Monica Airport Path Impacts Resolution** (submitted by Santa Monica Airport Committee)

The Mar Vista Community Council supports the Santa Monica Airport Path Impacts Resolution (see Attachment C) introduced by Councilmembers Mike Bonin and Paul Koretz.

e. **POLICY MOTION: Santa Monica Airport Proposed Ordinance** (submitted by Santa Monica Airport Committee)

The Mar Vista Community Council supports the draft Proposed Ordinance Concerning the Proprietary Management of the Santa Monica Airport.

f. **POLICY MOTION: Status Kuo (3809-3811 Grand View Blvd.)** (submitted by PLUM Committee)

The Mar Vista Community Council approves a new conditional use permit (Case No. ZA-2015-1646-CUB-ZV) for on-site sale and dispensing of alcoholic beverages; expand seating to sidewalk; expand hours of operation from 8:00 A.M. to 2:00 A.M. daily; permit

take-out restaurant food; and approve the 12 mandated parking spaces at an off-site location.

g. **POLICY MOTION: 3658 and 3660 S. Beethoven St.** (submitted by PLUM Committee)

The Mar Vista Community Council approves a small lot subdivision and construction of two adjacent townhouses (three stories, not to exceed approximately 33 feet) at 3658/3660 S. Beethoven Street, Los Angeles, CA 90066 (Case No. AA-2015-642-PMLA) subject to suggested modifications and mitigations as follows:

A. Ceiling heights not to exceed 9 feet;
B. Installation of neighbor-friendly landscaping to enhance privacy;
C. Removal of small decorative/cosmetic balconies;
D. Reconfigure windows so as to enhance privacy;
E. Work with school officials and others to develop a mitigation plan during construction so as to protect and preserve the safety of the children.

h. **POLICY MOTION: Starbucks Coffee (3006 S. Sepulveda Blvd.)**.

The Mar Vista Community Council approves Case No. ZA 2015-1370-CU, extended hours of operation for Starbuck Coffee on-site at Supeveda/Naional shopping center, next to CVS Pharmacy.

9. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair

    d
    f. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs
11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Attachment A

ENERGY & ENVIRONMENT

MOTION

An historic and worsening drought has prompted a shift away from thirsty lawns to climate appropriate landscapes in the City of Los Angeles. This process of landscape transformation offers residents opportunities to help meet state and City mandates for conserving water (Governor's and Mayor's directives), preventing polluted runoff (MS4 Permit), mitigating climate change (AB 32) and reducing "heat island" impacts, recharging groundwater basins for local supply, supporting biodiversity (Sustainability City pLAn), reducing green waste going to landfill (AB 1826, AB 1594), and increasing healthy soil as a tool for groundwater restoration, drought resistance and carbon sequestration (Healthy Soil Initiative, SB 367).

According to the Bureau of Sanitation, one-half-inch of rain generates 3.8 billion gallons of polluted runoff in the City. According to the USDA, healthy soil sequesters carbon, holds 20 times its weight in water, reduces landscape irrigation needs, and promotes groundwater recharge. According to the Department of Water and Power (LADWP), an accelerated effort to recharge our groundwater basins and expand water reuse could increase our local water supply yield from 11% to 50% over the next two decades.

As the studies and models developed through these Departments' *Stormwater Capture Master Plan* and *Enhanced Watershed Management Plans* show, managing and harvesting rainwater on a property-by-property basis can significantly reduce stormwater pollution, mitigate local flooding, recharge local groundwater supplies, and offset the use of potable water for landscape irrigation. Simple retrofits designed to accomplish these complementary goals can save property owners money on their water bills and help the City implement more cost-effective green infrastructure projects.

Currently, LADWP's $3.75/square-foot turf replacement rebate encourages the use of "California Friendly© plants, mulch, and permeable pathways." While this popular program is a good step in the right direction, it misses opportunities to realize the Department's comprehensive "Capture, Conserve, Reuse" motto through a more integrative, multi-benefit approach.

Removing lawn provides ideal opportunities to build healthy soils, expand habitat for pollinators, and to re-contour sites through grading techniques such as berms, swales, and basins that detain, cleanse, and infiltrate stormwater. These simple measures, utilized in concert with strategies such as rain tanks, reduced hardscapes, infiltration trenches and greywater systems, can simultaneously help residential property owners maximize available water resources, support the ongoing health of our urban forest, and assist the city in meeting its water supply, water quality, biodiversity, climate resilience and sustainability goals.

There is growing consensus around the value of parcel-based stormwater management, a "watershed approach" that synergistically treats each site as a mini-watershed where water is Captured, Conserved, and Reused, as follows:

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- Capturing at least the first 1" of rainwater with rain tanks, permeable surfaces, and grading strategies like bioswales, berms and basins to help manage stormwater onsite, improve water quality, reduce local flooding, and recharge local groundwater.
- Conserving outdoor water use by installing landscaping with at least 60% SoCal native, climate-appropriate plants and trees that support wildlife habitat and preserve our region's biodiversity, and with the use of mulch and organic ground covers that mitigate heat island impacts, build healthy soils, and help sequester carbon.
- Minimize use of water and utilize more water reuse to help maintain our urban forest and support landscape and ecosystem needs without additional potable supplies.

I THEREFORE MOVE that the Department of Water and Power and the Bureau of Sanitation, and consultation with stakeholders, be requested/directed to evaluate and present the City Council within 60 days options to incentivize applicants to meet this multi-benefit "watershed approach." Such options should include tiered rebate levels, on-bill financing, and measures to ensure fair geographic and economic distribution of rebate funds. Additionally, the options should describe their potential to accelerate or diminish expected water savings from turf removals and encourage direct groundwater recharge and infiltration where applicable.

I FURTHER MOVE that the Department of Water and Power and the Bureau of Sanitation be directed to report back in 60 days on potential funding sources to help incentivize residents to adopt the "watershed approach."

PRESENTED BY:

PAUL KORETZ
Councilmember, 5th District

PAUL KREKORIAN
Councilmember, 2nd District

SECONDED BY:

Attachment B



Attachment C

RULES, ELECTIONS & INTERGOVERNMENTAL RELATIONS

RESOLUTION

Santa Monica Airport Flight Path Impacts

WHEREAS, any official position of the City of Los Angeles with respect to legislation, rules, regulations or policies proposed to or pending before a local, state or federal government body or agency must have first been adopted in the form of a Resolution by the City Council with the concurrence of the Mayor; and

WHEREAS, Santa Monica Airport's so-called "Fly Neighborly Program" currently directs departing aircraft to avoid Santa Monica neighborhoods by overflying Venice, shifting the burden of noise impacts from Santa Monica's airport on to Venice residents; and

WHEREAS, the primary departure flight tracks from Los Angeles International Airport (LAX) and Santa Monica Airport (SMO) (Runway 21 at heading 210) therefore converge and conflict just west of the airports, making necessary the sequencing of LAX and SMO takeoffs, thereby causing delays at both LAX and SMO, and causing jets to hold and idle on the SMO runway; and

WHEREAS, ultra fine particles and black carbon from jet fuel, particularly from idling jets, are thus spewing toxic jet fumes on a daily basis into West Los Angeles residential homes 250 feet from the east end of the runway at Santa Monica Airport (SMO); and

WHEREAS, a 1989 inter-departmental memo between the U.S. Department of Transportation (DOT) and the Federal Aviation Administration (FAA) regarding SMO warned that sensitive equipment and personnel should not be within 300 feet of jet fumes due to deleterious and dangerous health effects, and yet homes exist 250 feet from where jets blast fumes and Los Angeles residents experience these deleterious health effects on a daily basis; and

WHEREAS, the Federal Aviation Administration (FAA) is in the process of implementing the Next Generation Air Transportation System, or NextGen, with the goal of transforming the country's air traffic control system from a ground-based system to a satellite-based system in order to increase efficiency and capacity, while saving time and fuel, and improving aviation safety; and

WHEREAS, as part of NextGen the FAA has developed a Metroplex program with proposals to optimize the crowded airspace for the Southern California region, which is made up of airports from Los Angeles to San Diego, LAX and SMO; and

WHEREAS, the FAA has prepared a Draft Environmental Assessment (EA) to document the potential environmental effects associated with the optimization of aircraft routes and the supporting airspace management structure while departing from or arriving to the Southern California Metroplex area; and

WHEREAS, in June 2008, the FAA Flight Standards Division changed the criteria used for evaluating obstructions and terrain, and in March 2009 the FAA clarified rules pertaining to Minimum Vectoring Altitudes (MVA) to provide for safer terrain and obstruction clearance for aircraft operations; and

WHEREAS, these two FAA actions changed the initial departure procedures for SMO Instrument Flight Rule (IFR) departures, thus increasing the contingent nature of departure operations at LAX and SMO and requiring that SMO departures at heading 210 must be sequenced with LAX departures, which produce significant departure delays and cause aircraft to emit tons of pollutants and emissions; and

WHEREAS, the FAA devised a test procedure for SMO departures to reduce the length of delays at SMO and LAX resulting from sequencing the traffic from both airports that required propeller driven IRF departures from SMO to turn to heading 250 immediately after takeoff, thereby providing the appropriate degrees of lateral separation from LAX jet departures and eliminating the need to sequence departures and the resulting delays impacting jets at LAX and IFR propeller aircraft at SMO; and

WHEREAS, the FAA issued an "Interim Review of Santa Monica IFR Departure Heading Test" on March 18, 2010 that reported departure delays had been drastically reduced; prior to the test the average number of delay minutes per month was 594; and

WHEREAS, the Santa Monica IFR Departure Heading Test reduced the 594 delay minutes per month to 87 minutes - an 85% decrease, and the runway idling and wait time was significantly reduced at both SMO and LAX, resulting in a positive contribution to air quality by reducing emissions; and

WHEREAS, the Metroplex project should design routes that increase efficiency and capacity, while saving time and fuel, and improving aviation safety;

NOW, THEREFORE, BE IT RESOLVED, with the concurrence of the Mayor, that by adoption of this resolution, the City of Los Angeles hereby includes in its 2015-16 Federal Legislative Program SUPPORT for the FAA to adopt Metroplex procedures that seek to eliminate takeoff convergence and conflicts of primary departures flight tracks at LAX and SMO, thereby reducing or making unnecessary the sequencing of LAX and SMO takeoffs, and eliminating the cause for delays at both LAX and SMO; and that if noise and air pollution impacts are to be taken into consideration in the design of air traffic corridors and flight path operations, that such impacts be fairly allocated so as not to shift the full or disproportionate burden of the impacts from Santa Monica's airport on to the residents of City of Los Angeles.

PRESENTED BY: _____
MIKE BONIN
Councilmember, 11th District

SECONDED BY: _____

JUN 1 - 2015

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
June 17, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:04 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Melissa Stoller (secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman,
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of June 9, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
   Motion to put over to July meeting by Robin Doyno, 2nd by Michael Millman. Motion carried unanimously.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   None.
5. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
   a. **APPROVAL** of provisional June Monthly Expense Report (MER).
      Motion to approve by Bill Scheding, 2nd by Sherri Akers. Vote: 6 aye, 1 nay
      Bill Scheding: Very fluid at this point; goal is to balance out.
      Vote: 6 ayes, 1 nay; motion carried.
   b. **FUNDING MOTION:** MVCC approves reimbursement of $19.95 for the purchase of a toner cartridge used for MVCC Treasurer business.
      Motion to approve by Bill Scheding, 2nd by Sherri Akers. Vote: 6 ayes, 1 nay, 1 abstention (Bill Scheding); motion carried.
   c. **FUNDING MOTION:** MVCC approves reimbursement $58.82 for printing of June 9 materials.
      Motion to approve by Bill Scheding, 2nd by Robin Doyno. Vote: 6 ayes, 1 nay, 1 abstention (Bill Koontz); motion carried.
   d. **FUNDING MOTION:** MVCC approves reimbursement mot to exceed $100 for printing of June 17 materials.
      Motion pulled.
   e. **FUNDING MOTION:** MVCC approves a Neighborhood Purpose Grant to Richland Elementary School for the purchase of books *French Immersion Program for not to exceed $750*.
      Friendly amendment by Bill Koontz (*in italics*). Motion to approve by Bill Scheding, 2nd by Robin Doyno. Vote: 7 ayes, 1 nay; motion carried.
   f. **FUNDING MOTION:** MVCC approves the expenditure of $1000 from the Operations budget for Farmers' Market tent rental.
      Motion to approve by Bill Scheding, 2nd by Michelle Krupkin. Motion carried unanimously.
   g. **FUNDING MOTION:** (Directors motion by Bill Scheding). Whereas the Independent Shakespeare Company provides free Shakespeare all summer long and is raising funds for its summer show program,

and many NCs support this summer event with donations, and ISC serves the whole city and many Mar Vista Stakeholders attend this event,

Therefore be it resolved that MVCC approves the expenditure of up to $1500, to purchase an MVCC ad in their summer program.

Motion to approve by Bill Scheding, 2nd by Michelle Krupkin. Vote: 3 ayes, 3 nays, 2 abstentions (Michelle Krupkin & Bill Koontz); motion not approved.

h. **FUNDING MOTION:** MVCC allocates any funds remaining in its 2014-15 Fiscal Year account, not to exceed $5000, to 2015 Congress of Neighborhoods/Budget Advocates.

Friendly amendment to set "not to exceed" lower offered by Sherri Akers (concerned about optics of $5000) not accepted .

Motion to approve as written by Bill Scheding, 2nd by Melissa Stoller 7 ayes, 1 nay. Motion carried unanimously.

6. **Grievances**, if any, received
7. **Future agenda items**

Melissa Stoller: Proactive motion of support for NC funding carryover to next fiscal year.

Valerie Davidson: Request acknowledgement of donations.

8. **Public Comment**

Bill Scheding: Wants someone to join EACC committee to do outreach to charter schools.

Bill Koontz: That is Brad Wilhite's job.

Michael: ExFin Committee should consider framing a motion stating MVCC supports education—public, private & charter—and instruct EACC to look at all schools plus arts and culture.

Valerie Davidson: Someone should compile list of all schools in area and send a note to each telling them how to obtain a neighborhood purpose grant.

Robin Doyno: LAUSD schools in our affluent area need more support than our Charter schools.

Sherri Akers: Relay for Life Mar Vista/West LA is July 18.

9. **Adjournment**

Meeting adjourned at 7:57 P.M.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
June 17, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of May 9, 2015 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
    a. **APPROVAL** of provisional June Monthly Expense Report (MER).
    b. **FUNDING MOTION:** MVCC approves reimbursement of $19.95 for the purchase of a toner cartridge used for MVCC Treasurer business.
    c. **FUNDING MOTION:** MVCC approves reimbursement $58.82 for printing of June 9 materials.
    d. **FUNDING MOTION:** MVCC approves reimbursement mot to exceed $100 for printing of June 17 materials.
    e. **FUNDING MOTION:** MVCC approves a Neighborhood Purpose Grant to Richland Elementary School for the purchase of books.
    f. **FUNDING MOTION:** MVCC approves the expenditure of $1000 from the Operations budget for Farmers' Market tent rental.
    g. **FUNDING MOTION:** Whereas the Independent Shakespeare Company provides free Shakespeare all summer long and is raising funds for its summer show program, and many NCs support this summer event with donations, and ISC serves the whole city and many Mar Vista Stakeholders attend this event, Therefore be it resolved that MVCC approves the expenditure of up to $1500, to purchase an MVCC ad in their summer program.
    h. **FUNDING MOTION:** MVCC allocates any funds remaining in its 2014-15 Fiscal Year account, not to exceed $5000, to 2015 Congress of Neighborhoods/Budget Advocates.
6. **Grievances**, if any, received
7. **Future agenda items**
8. **Public Comment**
9. **Adjournment**

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, June 9th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:09 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Mitchell Rishe (1st vice chair), Melissa Stoller (secretary), Sherri Akers, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Brad Wilhite
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of May 2015 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker)
   Motion to approve by Bill Scheding, 2nd by Sherri Akers. Motion carried unanimously.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Christopher Lawrence:
   - 16 year resident of Mar Vista with 2 children in Mandarin Immersion Program.
   - Program has brought families back to public schools but now LAUSD is cutting enrollment in MI kindergarten in half in the 2016-17 academic year; this is fatal blow to program. They're also adding two more portables to the Broadway campus, thus taking away additional green space on a small, already cramped campus.
   - 70 Mar Vista kids are currently enrolled in program.

   Valerie Davidson:
   - Asking neighbors to submit Congressional Casework Form (http://www.smofuture.com/faa.html) for Ted Lieu & Karen Bass to take to DC; goal is 1000 forms.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Short term rentals: Mike supports sharing economy, but wants to collect transient occupancy tax for people operating a defacto hotel and don't live in the short-term rental house or apartment building. With Councilmember Herb Wessin, brought forth motion supporting Senate Bill 593 which bans eviction of tenants in order to have short term rentals. Sara Roos asked how residency law would be enforced.
      - Sponsoring Mar Vista movie night
      - Mike has asked DOT to review classification of Rose & Beethoven as collector street.
      - Council voted to include all of Mar Vista in the mansionization Interim Control Ordinance.

   b. Mar Vista Recreation Center – Lizka Mendoza, Director
      - Summer camp started June 8. Pool opens June 13. Movie night is June 20—there'll be moon bounces; Whole Foods is sponsoring a kid biking from here to Santa Barbara to benefit Firefighters.
      - Concerns with homeless situation: illegal activities (smoking) at west end of park; handling overnight sleeping in humane & safe manner. Will bring up issue to Park Advisory Board; working with Senior Lead Officer.

- Bill Scheding: resolved a problem with Event Approval Form and $4000 for the 2014 Fall Festival is on its way to the park.

c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
g. CA Assembly 47
h. CA Assembly 62
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
   a. Chair-Bill Koontz
      i. Update on Code of Conduct with possible motion

         DONE has updated website; everyone is now up-to-date on ethics training; Robin & Sherri are not up-to-date on funding training.

      ii. Board retreat

         Team building event (include committee co-chairs who are not on Board) at Rob Kadota's; will send Doodle to find a date.

      iii. Election of board officers

         Motion to move election to after Treasurer report by Bill Sscheding, 2nd by Brad Wilhite. Motion carried unanimously.

         Sarah Auerswald presided over election.

Office	Nominee	Motion by	2nd by	Vote
Chair	Bill Koontz	Melissa Stoller	Bill Scheding	Unanimous
1st Vice Chair	Mitchell Rishe	Bill Koontz	Valerie Davidson	Unanimous
2nd Vice Chair	John Kutcha	Bill Koontz	Mitchell Rishe	Unanimous
Secretary	Melissa Stoller	Bill Koontz	Valerie Davidson	Unanimous
Treasurer	Bill Scheding	Bill Koontz	Mitchell Rishe	Unanimous

   b. First Vice Chair – Mitchell Rishe
      - Mandarin Immersion downsizing: people should take good hard look at their behavior and what it's wrought.

   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
      - Reminder: Committee chairs are responsible for writing policy motion letters; Melissa will help with formatting and post them on the website

   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

      Motion to approve funding motions 6.e.iv – vii on consent.

      Melissa questioned why we are approving funding requests for CBS and Tickled Plum for the third time in 2015.

      Motion carried unanimously (NOTE: Michael Millman recused himself).

      i. **APPROVAL** of May Monthly Expense Report (MER)

         Explanation of overdraft provided by Bill Scheding; overdrafts happened to other NCs as well.

         Motion to approve by Bill Scheding, 2nd by Bill Koontz. Motion carried unanimously.

ii. **APPROVAL** of MVCC Budget Worksheet for 2015–2016 fiscal year (see Attachment A)

Motion to approve by Bill Scheding, 2nd by Bill Koontz. Motion carried unanimously.

iii. **APPROVAL** of MVCC 2014-2015 Budget Cleanup (Director's motion by Bill Scheding)

Move to consider at end by BillS, Sherri, unam

Motion to consider this funding request last by Bill Scheding, 2nd by Sherri Akers. Motion carried unanimously.

Motion to approve by BillS, 2nd by Sherri; motion carried unamimously.

Motion to approve 1st 4 bulleted items by Bill Scheding, 2nd by Michelle Krupkin; Motion carried unanimously.

Motion to approve 5th bulleted item as amended by Bill Sscheding.

Discussion:

Sara Roos: new "shovel ready" NPG requests

- $1308 for archival computer (library has software) to document a 100 year old house donated to Venice High School
- Venice HS – sports medicine team grant, funded thru Gondolier Boosters, $1000
- $1500 for camera equip; use for Venice HS PR – document for what school is doing; SLR camera

Christopher McKinnon: can't vote on funding motions without informing public; Sherri Akers agrees. Michael Millman also agrees—vet the items, and have another meeting before disbursing.

Debbie Rochlin: What day do we say to those with uncashed checks we're allocate the money to others NPG requests(last date to submit paperwork to DONE is 6/22 and checks must be cashed by 6/30)?

Valerie Davidson: we're rushing at last minutes to spend all the money; why not plan ahead more? Response: tried to do that, but it has taken long time for DONE to cut checks.

Motion to put over to another BOD meeting before June 21st by Bill Scheding, 2nd by Michael Millman. Vote: 8 ayes, 1 nay (Mitchell Rishe), 1 abstention (Sherri Akers).

Whereas the MVCC 2014-2015 Fiscal Year budget allocates monies for projects that have not materialized, therefore let it be resolved to

- Reduce the Outreach budget item and move up to $6000 to NPG
- Reduce the Outreach budget item and move up to $1000 to Operations, with the combined movement to to exceed $9000
- Close the Election budget item and move up to $500 to operations
- Close the CIG budget item and move up to $5900 to NPG and up to $5900 to outreach, with the combined movement not to exceed $5900
- Close the MVCC Account by appropriating any remaining funds as follows:
  - ~~$2000~~ $750 from NPG budget to Richland for books,
  - $1000 from Operations budget to Farmers' Market for tent rental
  - Allocate any additional funds, not to exceed $6000, to other last minute NPG Funding Requests submitted with completed Funding Request Forms and approved by the Board at its June meeting
  - Remainder not to exceed $5000 to 2015 Congress of Neighborhoods/Budget Advocates

iv. **FUNDING MOTION:** MVCC approves the expenditure of up to $33 for RIMU, web hosting.

v. **FUNDING MOTION:** MVCC approves the expenditure of up to $259 for StorQuest.

vi. **FUNDING MOTION:** MVCC approves the expenditure of up to $350 for Tickled Plum for graphic layout of the newsletter.

vii. **FUNDING MOTION:** MVCC approves the expenditure of up to $1725 for CBS Adv. for distribution of the newsletter.

viii. **FUNDING MOTION:** Reimburse Up to Speed for Mar Vista Neighborhood Association event planning services, not to exceed $300.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano

Last meeting was May 20

- Mitigation measures in North Westdale; study completed, work orders sent out, may take 2-3 months to complete
- Farmers' Market signs: work orders still in process
- 4-way stop at Westminster & Wasatch: work order backed up
- Speed trailer on Palms between McLaughlin & Sawtelle for 2 days found average speed of 34 MPH. Speed survey is expired and drivers can't be ticketed for speeding until there's an up-to-date speed survey. Mitchell Rishe: average speed is meaningless—need to break down by time of da.y
- Brad: Richland street cleaning is during school drop-off time and lots of parents get tickets. Sara Roos: need to talk to LAUSD board, they will expedite time change with DOT.

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open (Bill Koontz reporting)

- Asking DONE to staff all positions, and city to fund
- Approved eliminating short term rentals
- Asking mayor to declare a state of emergency for homeless
- City should delay decision on sidewalk vending; different areas have different needs

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

- June 10, 8:00 P.M., Mayor will be on KCET discussing drought
- Bill Scheding: any consideration to use salt water to flush toilets?
- Valerie Davidson: noticed fire hydrants dripping water, has reported

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

- Mixer in August: bowl at Bowlero—challenging Culver City CC to contest
- Small business shopping event November 28, 2015; submitting Great Streets Challenge Grant

n. Neighborhood Council Sustainability Alliance: Sherri Akers

7. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

Motion by Michael Millman, 2nd by Michelle Krupkin, to consider 7.e and 7.f after elections.

Motion to approve all policy motions 7.a – d on consent by Bill Scheding, 2nd by Brad Wilhite. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION:** Amendment to Standing Rules (Submitted by ExFin Committee)

All Mar Vista Community Council communications and web postings to the general public or the full MVCC Stakeholder list must be approved by at least three directors of the MVCC Board. All such communications shall be from the Board of Directors, and not any one individual. ~~The only exceptions to this rule are the posting of agendas, minutes, and E-calendars.~~ *There are two exceptions to this rule:*

a. *The posting of agendas, minutes, and E-calendars;*

b. Communications sent by the Chair, the Secretary or the Chair's designee, not to exceed one communication per calendar week.

b. **POLICY MOTION: Utilizing Recycled Water from Hyperion Treatment Plant** (submitted by Green Committee)

The Mar Vista Community Council supports the motion presented by Councilmembers Mike Bonin and Paul Koretz (Attachment A: Council File 14-00078-S5) directing the Department of Sanitation report on possibilities to utilize recycled water from Hyperion Treatment Plant as a local and regional resource.

The Donald C. Tillman Water Reclamation Plant in the San Fernando Valley furnishes reclaimed water to many users. The Hyperion Plant treats the water to a high standard and then pumps it into Santa Monica Bay. In this time of long-term drought, when some are talking about desalinization, this is inexplicable.

Motion to approve by ,2nd by; motion carried unamimously.

c. **POLICY MOTION: Graywater Systems/Recycle Water** (submitted by Green Committee)

The Mar Vista Community Council supports the motion presented by Councilmembers Mike Bonin and Paul Krekorian (Attachment B: Council File 15-0458-S1) to encourage the installation of more graywater systems by eliminating the permit fees for simple systems and also instructs the Department of Water and Power to determine what other hurdles or issues could be streamlined to further encourage people to recycle water at their homes with graywater systems. We recommend that the motion be amended to include the development of an education and outreach component.

d. **POLICY MOTION: Protecting Biodiversity City Practices/Working Group** (submitted by Green Committee)

MVCC supports the motion presented by Councilmember Paul Koretz (Attachment C: Council File 15-0499) which:

- Directs the Chief Legislative Analyst's office, in partnership with the Mayor's Sustainability Team, to convene a working group with relevant City departments to report back on their current and future strategies and matrices for protecting biodiversity in all City practices;
- Mandates the formation of a Technical Advisory Committee (TAC) to report back with recommendations for strategies to protect and improve biodiversity in the City and on the feasibility of implementing the City Biodiversity Index;
- Directs the TAC to develop and implement best practice strategies for community engagement and outreach on biodiversity including implementation of equity-minded citizen science projects that serve the full range of City neighborhoods.

The City of Los Angeles is recognized as one of 35 global biodiversity hot spots—and the only one within the continental United States. The Mar Vista Community Council recognizes the importance of protecting this biodiversity and the educational, scientific and quality of life benefits that derive from access to natural landscapes that support local biodiversity.

e. **POLICY MOTION: Approval of 7-Eleven (12403 W. Venice Blvd.) Conditional Use Permit Application** (submitted by PLUM Committee)

MVCC approves as presented the application (Case No. ZA 2009-3132-CUB-CU-PA1) for a conditional use permit to allow the continued sale of beer and wine for off-site consumption only, in conjunction with an existing 7-Eleven convenience market; hours of operation: 24 hours daily with alcohol sales from 6am - 2am daily.

Motion to approve by Mitchell Rishe, 2nd by Michael Millman.

Discussion:

- Brad Wilhite: is 7-Eleven doing anything to mitigate drunks?
- 7-Eleven Rep: Yes: using cameras; 7-Eleven is remodeling lots of locations to this standard
- Michael Millman: Facility has sophisticated camera system monitoring intersection; it's used by police. No evidence of call for service for this facility, it has been good neighbor.
- Mitchell Rishe: Who would be served by this additional hour?
- 7-Eleven Rep: People have different work schedules; store is open 24 hours, can lock corridors; employees walk perimeter every hour.

Motion carried unanimously.

f. **POLICY MOTION: Approval of Rustic Kitchen (3523 S. Centinela Ave.) Conditional Use Permit Application** (submitted by PLUM Committee)

MVCC approves as presented the application (Case No. ZA-2015-1818-CUB) to obtain a conditional use permit to allow the sale and dispensing of beer and wine beverages for consumption on and off premises, in conjunction with a new gourmet market and cafe that provides catering.

Motion to approve by Mitchell Rishe, 2nd by Melissa Stoller.

Discussion:

- Rep: Gourmet market, sit down café, picnic baskets. Initially open 10:00 A.M.–8:00 P.M., will extend in future. Has held meeting to reach out to neighbors, they were very supportive.
- Michael Millman: Requests that employees car pool or use bus, as there's no on site parking in plan.

Motion carried unanimously.

g. **POLICY MOTION: Staples boycott** (submitted by Director Robin Doyno)
Be it resolved that because of the Staples' (stationary stores) policies that are part of the plan to privatize the U.S. Post Office the MVCC shall not patronize Staples. Whenever possible, those serving the MVCC shall choose other vendors.
Motion to approve by Robin Doyno, 2nd by Michelle Krupkin.
Discussion:

- Concern about singling out Staples; UPS & FedEx are also leaders in lobbying against USPS
- Mitchell Rishe: Staples is beneficiary, but not the cause of USPS privatizing.
- Michael Millman: QUestionned vetting of motion by a committee, whether Staples and USPS representatives has an opportunity to present. Pointed out that a lot of neighborhood children go there for supplies. Wants evidence to support moiton.
- Bill Scheding: Shouldn't address this in MVCC. No other convenient places in area.

Vote: 2 ayes, 3 nays, 3 abstentions (Melissa Stoller, Michelle Krupkin and Mitchell RIshe). Motion does not carry.

8. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite
   c. Zone 3 – Bill Scheding
      Wants to be proactive, not reactive on development at McLaughlin/Barrington–Federal/Indianapolis.
   d. Zone 4 - Michael Millman
   e. Zone 5 – Michelle Krupkin
      Caulder-Blake opened at 11708 Washington Place—high-end clothing
      The Oliver at Marcasel and Washington was able to build into city property because Marcasel is on part of their property
   f. Zone 6 – Valerie Davidson
      Doing outreach to neighbors on Beethoveen.
      On Rose, two lots were put together, building mansion.
      Also on Rose put 2 lots together, building mansion
      Gathering signatures for Santa Monica Airport petition.
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Executive & Finance Committee** - Bill Koontz, Chair
   b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
      At last meeting, the Watershed Protection Division of Los Angeles Sanitation Department of Public Works presented a possible stormwater reuse pilot project at NW corner of McLaughlin and Venice. The Mar Vista Public Library or Fire Station may be better locations.
   c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
      Green Garden Showcase celebration, debrief and planning on June 10.
   d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
      Put off June meeting; Ken Alpern is on vacation.
   e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
      Small lot subdivision project on Beethoven is on next agenda; planning hearing was put off because of procedural errors with notification.

Board retreat should include workshop at retreat for Zone Director to be aware of things impacting zone, help with outreach.

Valerie Davidson: Zone 6 is very large; can't commit to doing outreach for everything.

Bill Scheding: All zones have approximately the same number of people.

Robin Doyno: WMVNA can help with notification.

f. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs

Sara Roos: CD11 is trying to find money to paint utility boxes; Robin Doyno wants to be part of, anyone else is welcome.

Difficulty keeping committee non-political

Michael Millman: Requests report back next BOD meeting about what happened with Neighborhood Purpose Grants.

Bill Ssheding inquired about outreach to non-LAUSD schools; Sara Roos: No time to do and philosophically doesn't support it; if someone else wants to do it, they are welcome.

g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs

h. **Safety and Security Committee** – Rob Kadota, Chair

Participated in conference call with Deputy Chief Girmala before BOD meeting about finding by Police Commission that one officer acted out of policy in Ezell Ford case, the other within.

Three areas in West Bureau are receiving special attention: Hollywood & Vine area, Mayor's residence, Ocean Front Walk.

Emergency preparedness event at Farmers' Market in September.

i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs

$11,000 in unclaimed property identified at Senior Scam Stopper Seminar: unclaimed property website, found that night. Unclaimed property website: http://www.sco.ca.gov/upd_msg.html.

Redesigned MVCC website will support outreach to individual zones.

k. **Elections and By-laws**- Bill Scheding, chair

l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

Challenge grant applications are due June 30. Each team should have minimum of 3 people. Only one application will be selected.

m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**

    Bill Scheding: reminder—shouldn't be pushing our personal agenda.
15. **Adjournment**

    Meeting adjourned at 9:42 P.M.

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Mar Vista Community Council

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2. **Presentation of flag and Pledge of Allegiance** (1 min)
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    b. Mar Vista Recreation Center – Lizka Mendoza, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison Reports** (Action items included with public comment permitted;1min per speaker)
    a. Chair-Bill Koontz
        i. Update on Code of Conduct with possible motion
        ii. Board retreat
        iii. Election of board officers
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of May Monthly Expense Report (MER)
        ii. **APPROVAL** of MVCC Budget Worksheet for 2015–2016 fiscal year (see Attachment A)
        iii. **APPROVAL** of MVCC 2014-2015 Budget Cleanup (Director's motion by Bill Scheding)

Whereas the MVCC 2014-2015 Fiscal Year budget allocates monies for projects that have not materialized, therefore let it be resolved to

- Reduce the Outreach budget item and move up to $6000 to NPG
- Reduce the Outreach budget item and move up to $1000 to Operations, with the combined movement to to exceed $9000
- Close the Election budget item and move up to $500 to operations
- Close the CIG budget item and move up to $5900 to NPG and up to $5900 to outreach, with the combined movement not to exceed $5900
- Close the MVCC Account by appropriating any remaining funds as follows:
    - $2000 from NPG budget to Richland for books,
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    - Allocate any additional funds, not to exceed $6000, to other last minute NPG Funding Requests submitted with completed Funding Request Forms and approved by the Board at its June meeting
    - Remainder not to exceed $5000 to 2015 Congress of Neighborhoods/Budget Advocates

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viii. **FUNDING MOTION:** Reimburse Up to Speed for Mar Vista Neighborhood Association event planning services, not to exceed $300.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison: Linda Guagliano

g. DWP MOU Liaison: Myra Boime

h. LANCC Liaison: Open

i. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater

j Fall Festival Liaison: Albert Olson

k. City Budget: John Kuchta

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

n. Neighborhood Council Sustainability Alliance: Sherri Akers

7. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment.

a. **ADMINISTRATIVE MOTION:** Amendment to Standing Rules (Submitted by ExFin Committee)

All Mar Vista Community Council communications and web postings to the general public or the full MVCC Stakeholder list must be approved by at least three directors of the MVCC Board. All such communications shall be from the Board of Directors, and not any one individual. ~~The only exceptions to this rule are the posting of agendas, minutes, and E-calendars.~~ *There are two exceptions to this rule:*

a. *The posting of agendas, minutes, and E-calendars;*

b. Communications sent by the Chair, the Secretary or the Chair's designee, not to exceed one communication per calendar week.

b. **POLICY MOTION: Utilizing Recycled Water from Hyperion Treatment Plant** (submitted by Green Committee)

The Mar Vista Community Council supports the motion presented by Councilmembers Mike Bonin and Paul Koretz (Attachment A: Council File 14-00078-S5) directing the Department of Sanitation report on possibilities to utilize recycled water from Hyperion Treatment Plant as a local and regional resource.

The Donald C. Tillman Water Reclamation Plant in the San Fernando Valley furnishes reclaimed water to many users. The Hyperion Plant treats the water to a high standard and then pumps it into Santa Monica Bay. In this time of long-term drought, when some are talking about desalinization, this is inexplicable.

c. **POLICY MOTION: Graywater Systems/Recycle Water** (submitted by Green Committee)

The Mar Vista Community Council supports the motion presented by Councilmembers Mike Bonin and Paul Krekorian (Attachment B: Council File 15-0458-S1) to encourage the installation of more graywater systems by eliminating the permit fees for simple systems and also instructs the Department of Water and Power to determine what other hurdles or issues could be streamlined to further encourage people to recycle water at their homes with graywater systems. We recommend that the motion be amended to include the development of an education and outreach component.

d. **POLICY MOTION: Protecting Biodiversity City Practices/Working Group** (submitted by Green Committee)

MVCC supports the motion presented by Councilmember Paul Koretz (Attachment C: Council File 15-0499) which:

- Directs the Chief Legislative Analyst's office, in partnership with the Mayor's Sustainability Team, to convene a working group with relevant City departments to report back on their current and future strategies and matrices for protecting biodiversity in all City practices;
- Mandates the formation of a Technical Advisory Committee (TAC) to report back with recommendations for strategies to protect and improve biodiversity in the City and on the feasibility of implementing the City Biodiversity Index;
- Directs the TAC to develop and implement best practice strategies for community engagement and outreach on biodiversity including implementation of equity-minded citizen science projects that serve the full range of City neighborhoods.

The City of Los Angeles is recognized as one of 35 global biodiversity hot spots—and the only one within the continental United States. The Mar Vista Community Council recognizes the importance of protecting this biodiversity and the educational, scientific and quality of life benefits that derive from access to natural landscapes that support local biodiversity.

e. **POLICY MOTION: Approval of 7-Eleven (12403 W. Venice Blvd.) Conditional Use Permit Application** (submitted by PLUM Committee)

MVCC approves as presented the application (Case No. ZA 2009-3132-CUB-CU-PA1) for a conditional use permit to allow the continued sale of beer and wine for off-site consumption only, in conjunction with an existing 7-Eleven convenience market; hours of operation: 24 hours daily with alcohol sales from 6am - 2am daily.

f. **POLICY MOTION: Approval of Rustic Kitchen (3523 S. Centinela Ave.) Conditional Use Permit Application** (submitted by PLUM Committee)

MVCC approves as presented the application (Case No. ZA-2015-1818-CUB) to obtain a conditional use permit to allow the sale and dispensing of beer and wine beverages for consumption on and off premises, in conjunction with a new gourmet market and cafe that provides catering.

g. **POLICY MOTION: Staples boycott** (submitted by Director Robin Doyno)

Be it resolved that because of the Staples' (stationary stores) policies that are part of the plan to privatize the U.S. Post Office the MVCC shall not patronize Staples. Whenever possible, those serving the MVCC shall choose other vendors.

8. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Brad Wilhite
    c. Zone 3 – Bill Scheding
    d. Zone 4 - Michael Millman
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Valerie Davidson

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    c. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
    d. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    e. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
    f. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
    g. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
    h. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    j. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
    k. **Elections and By-laws**- Bill Scheding, chair
    l. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    m. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs
10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Attachment A

Neighborhood Council Name
Budget for Fiscal Year 2015-2016
APPROVED on 6/9/2015 (Committeee approval on June 1, 2015)

Funds				
Total Annual Allocation			**$**	**37,000.00**
Budget				
Code	Category			
	100 Operations	%		Total
AUD	Audio and Visual Services			
EDU	Training and Board Retreat			
FAC	Facilities Related and Space Rental			5,000
MIS	Miscellaneous Expense			
OFF	Office Equipment and Supplies			1,000
POS	Postage			
TAC	Temporary Staff			
TRL	Translation and Transcription			
	Sub Total	16.22%	**$**	**6,000**
	200 Outreach			
ADV	Advertising			3,000
EVE	Event Expense / Food & Refreshments			3,000
MEE	Meeting Expense			1,000
NEW	Newsletter Expense			8,500
WEB	Website Maintenance/Enhancement/Creation			
	Sub Total	41.89%	**$**	**15,500**
	300 Community Improvement			
CIP	Community Improvement Project			5,000
	Fall Festival			
	Green Garden Showcase			
	Sub Total	13.51%	**$**	**5,000**
	400 Neighborhood Purpose Grants			
GRT	Neighborhood Purpose Grant			6,000
	Sub Total	16.22%	**$**	**6,000**
	500 Elections			
ELE	Election Outreach Expense			4,500
	Sub Total	12.16%	**$**	**4,500**
	Grand Total		**$**	**37,000**

Budget Narrative:

Projected Monthly Operational Expenses		Monthly
	Vendor - Item/Service Description	Amount*
1	RIMU -- Web hosting	$ 100.00
2	StorQuest -- storage	$ 300.00
3		
4		
5		
	Total Monthly Operational Expenses	$ 400.00

Attachment B

ENERGY & ENVIRONMENT

MOTION

California is facing the worst drought in its history. On April 1, 2015, the snowpack statewide was only 5 percent of normal, the lowest in recorded history. This extreme situation is expected to potentially worsen through the remainder of this year and into 2016.The snowmelt from the Sierra Nevada Mountains is the supply source for the State Water Project (SWP) and the Los Angeles Aqueduct. These two aqueducts, along with the Colorado River Aqueduct (CRA), currently make up nearly 90 percent of the City of Los Angeles' water supply.

The Metropolitan Water District of Southern California (MWD) owns and operates the CRA and has contractual rights to SWP supplies. The City's purchases of water from MWD through these two aqueduct systems makes up 75 percent of the City's supply. They Mayor has directed the City to reduce its dependence on purchased imported water from MWD by 50 percent by 2025.

In order to reduce the City's reliance on purchased imported water and improve water supply reliability, the City is working to increase its local water supplies. One local water supply resource is recycled water. Recycled water is a safe, reliable, and drought-proof source of water.

Every day, the City treats over 340 million gallons of wastewater at its four wastewater treatment plants. The Hyperion Treatment Plant, the City's largest wastewater treatment facility, treats close to 280 million gallons per day alone. The large majority of this water is then discharged into the Pacific Ocean.

The treated wastewater from the Hyperion Treatment Plant is a very valuable resource and has the potential to offset potable demands within the City as well as the adjacent region.

I THEREFORE MOVE that the Bureau of Sanitation be directed to work with the Department of Water and Power and report back on current projects, plans, and future possibilities to utilize recycled water from the Hyperion Treatment Plant as both a local and regional resource.

PRESENTED BY: Paul Koretz
PAUL KORETZ
Councilmember, 5th District

MIKE BONIN
Councilmember, 11th District

SECONDED BY:

ORIGINAL

Attachment C

ENERGY & ENVIRONMENT

MOTION

With the State of California in the midst of a historic drought and water suppliers proposing to cut water deliveries to cities by 15%, any and every program the City of Los Angeles can undertake to help residents conserve water will have tremendous environmental and economic benefits for our City.

Graywater is untreated wastewater from showers, laundry machines, and bathtubs which has not come into contact with toilet waste. It does not include wastewater from kitchen sinks, photo lab sinks, dishwashers, or laundry water from soiled diapers. There are a variety of types of graywater systems, ranging from "clothes washer" systems (which do not require permits), to "simple" systems (which discharge up to 250 gallons per day and require permits), to "complex" systems (which discharge more than 250-gallons per day) and "treatment" systems (which are not currently allowed in Los Angeles).

Graywater reuse is legal in Los Angeles for subsurface irrigation systems at low-rise residential homes, provided that the system recycling the graywater follows the 2010 California Plumbing Code, Chapter 16A Part 1. Permits for graywater systems are issued by the City of Los Angeles Department of Building and Safety (LADBS), though further approval may be needed by the Los Angeles County Department of Public Health. The average cost of a permit is $507, which includes up to two inspections and plancheck ($396 for plancheck and $111 for permit).

LADWP has the responsibility to protect the public water system from contamination caused by the backflow of contaminants or pollutants through the water service connection. The protection of the City's water supply is governed under LADWP Rule 16-D and enforced by LADWP or by LADBS, acting as its authorized representative.

Though the Department of Water and Power offers an exceptional amount of information and resources for residents considering graywater systems on its website, only 13 permits were issued by LADBS in the past year. The City would benefit from more homeowners installing graywater systems and should do everything possible to encourage broader use of the water-saving installation.

I THEREFORE MOVE that the City Attorney, with the cooperation and assistance of the Department of Building and Safety and the Department of Water and Power, prepare and present an ordinance amending the Los Angeles Municipal Code to eliminate any fees associated with the installation of approved "simple" graywater systems (as defined by LADWP) by homeowners in Los Angeles.

I FURTHER MOVE that the Department of Water and Power conduct a review of both completed graywater system applications and applications that were started but not finished, and to report to the Council regarding what hurdles or other issues could be streamlined to further encourage people to recycle water at their homes with graywater systems.

PRESENTED BY:

MIKE BONIN
Councilmember, 11th District

PAUL KREKORIAN
Councilmember, 2nd District

SECONDED BY:

APR 15 2015

ORIGINAL

Attachment D

MOTION

The City of Los Angeles lies within the California Floristic Province, which is globally recognized as one of thirty-five biodiversity hotspots on the planet and the only hotspot in the Continental United States. The City is home to a number of threatened and rare species and provides habitat for a wide range of native vegetation and wildlife.

The survival and well-being of the City's residents depends directly on ecosystem services, including food production, oxygen generation, water purification, topsoil creation, biodegradation, and waste removal. These and many other services are built directly from an integrated community of natural biodiversity.

Access to natural landscapes which support local biodiversity contributes to quality of life, educational opportunities, restorative recreational activities, economic growth, and City character. Biodiverse landscapes provide benefits to residents such as increased productivity, fewer sick days, greater sense of place and community, and a shared sense of history.

Unfortunately, opportunities to access biodiversity are not equitably distributed across the City's neighborhoods. Underserved communities, in addition to disproportionately bearing the burden of environmental pollution, also lack opportunities to connect with nature and biodiversity. Additionally, inner-city biodiversity is often not studied, entire wildlife communities are ignored and human communities remain unengaged in the work.

The City does not currently have a cross-cutting, equitable, and integrated program to protect, manage, restore and enhance the unique biodiversity within the larger urban ecosystem in the City and region. Recognizing this, Mayor Garcetti's Sustainable City pLAn of 2015 specifically calls for development of a "no-net-loss" biodiversity strategy.

The City Biodiversity Index (also known as the Singapore Index) has been developed by international experts in urban biodiversity planning and management under the Convention on Biological Diversity and provides a self-assessment tool for cities. It is a voluntary, transparent, and objective framework to document and enumerate a city's existing native biodiversity and the ecosystem services such as climate regulation provided by that biodiversity. The Index also provides frameworks for setting conservation targets and developing biodiversity management and education programs.

The City, recognizing the importance of native biodiversity for its intrinsic, educational, scientific, and socio-ecological values, should commit to implementing the City Biodiversity Index.

The City should also develop habitat-based geospatial strategies for incorporating the conservation and equity of biodiversity in specific plans, development permitting, connectivity, planning, urban forestry, and the design and maintenance of parks and streets.

I THEREFORE MOVE that the Chief Legislative Analyst's office, in partnership with the Mayor's Sustainability Team, be directed to convene a working group of City departments, including LA Sanitation, the Planning Department, the Bureau of Street Services and its Urban Forestry Division, the Department of Recreation and Parks, the Port of Los Angeles, the Department of Water and Power, the Zoo and other relevant departments, to report back on their current and future strategies and matrices for protecting biodiversity in all City practices.

I FURTHER MOVE that LA Sanitation with the assistance of the Planning Department, the Bureau of Street Services (Urban Forestry Division), the Department of Recreation and Parks, the Port of Los Angeles, the Zoo and other relevant departments, be directed to convene a Technical Advisory Committee (TAC) comprised of local universities, NGOs, and relevant governmental agencies including the LA County Natural History Museum, to report back with recommendations for strategies to protect and improve biodiversity in the City and on the feasibility of implementing the City Biodiversity Index.

I FURTHER MOVE that the TAC should develop and implement best practice strategies for community engagement and outreach on biodiversity including implementation of equity-minded citizen science projects that serve the full range of City neighborhoods.

PRESENTED BY: _____
PAUL KORETZ
Councilmember, 5th District

SECONDED BY: _____

APR 22 2015

ORIGINAL

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, May 12th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of April 2015 Board of Directors Meeting Minutes** (public comment permitted) (1 min)
4. **Approval of April 2015 Stakeholder Meeting Minutes** (public comment permitted) (1 min)
5. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
7. **Presentations**
    a. **Education Awards** (Sara Roos, 10 min)
    b. **Green Corners** (Michael Mansour, 5 min)
8. **Officers and Liaison Reports** (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Update on Code of Conduct
        ii. Committee Assignment Motion: Remove Steve Wallace as PLUM Committee co-chair and appoint Mitchell Rishe as chair.
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **FUNDING MOTION:** Approval of May Monthly Expense Report (MER).

ii. **FUNDING MOTION:** Reimburse Bill Koontz $98.34 for refreshments purchased for the Mayor's Resilience by Design forum.

iii. **FUNDING MOTION:** Reimburse CBS Distribution for up to 6 newsletters per year, not to exceed $3500 per issue. This is an annual funding request.

iv. **FUNDING MOTION:** Reimburse Pacific Rim Printers for up to 6 newsletters per year, not to exceed $4500 per issue. This is an annual funding request.

v. **FUNDING MOTION:** Reimburse Tickled Plum for newsletter artwork for up to 6 newsletters per year, not to exceed $500 per issue. This is an annual funding request.

vi. **FUNDING MOTION:** Reimburse Debbie Rochlin for Mar Vista Neighborhood Association block party supplies, not to exceed $300.

vii. **FUNDING MOTION:** Reimburse Mar Vista Chamber of Commerce for ads and printing of their newsletter, not to exceed $1000.

viii. **FUNDING MOTION:** Reimburse North Westdale Neighborhood Association for talent show, not to exceed $500, pending submission of paperwork.

ix. **REIMBURSEMENT MOTION:** Great Streets printing

Mar Vista Community Council approves reimbursing Michelle Krupkin $31.17 for the photocopying of materials for a MVCC Great Streets survey authorized at the 11/12/2014 Board of Directors meeting.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano

g. DWP MOU/LANCC Liaison-Open

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro

j. City Budget: John Kuchta

k. Recode LA: Sharon Commins

l. Mar Vista Chamber of Commerce: Sarah Auerswald

j. Neighborhood Council Sustainability Alliance: Sherri Akers

9. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

a. Zone 1 – Ken Alpern

b. Zone 2 – Brad Wilhite

c. Zone 3 – Bill Scheding

d. Zone 4 - Michael Millman

e. Zone 5 – Michelle Krupkin

f. Zone 6 – Valerie Davidson

10. **Committee Reports** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

a. **Executive & Finance Committee** - Bill Koontz, Chair

b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair

c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs

i. **Policy motion: MVCC Methane Resolution**

WHEREAS, Los Angeles has one of the most substantial greenhouse gas footprints in the world. NASA has found that we also have one of the worst methane footprints around: 61% higher than previous estimates, which is a serious problem since methane is even more effective at trapping heat in the atmosphere than carbon dioxide; and

WHEREAS, Los Angeles is suffering on the front lines of global warming. the City is into year four of the worst drought in recorded history, which scientists are now saying has been exacerbated by climate change, and, as of the March, 2015, Metropolitan Water District board meeting the Sierra Nevada snowpack has

nearly vanished and the State and the City are likely headed for serious water rationing; and

WHEREAS, NASA's Jet Propulsion Laboratory has launched their Megacities Carbon Project to measure multi-year emission trends of carbon dioxide, methane and carbon monoxide attributed to Los Angeles and other megacities;

NOW, THEREFORE, BE IT RESOLVED, that, by the adoption of this Resolution, THE MAR VISTA COMMUNITY COUNCIL HEREBY SUPPORTS Los Angeles City Councilmember Paul Koretz's motion calling on our City departments to come up with a specific and detailed plan to address our methane problem.

THE MAR VISTA COMMUNITY COUNCIL ALSO URGES the City Council of Los Angeles to take a global leadership role as we inventory our methane leaks, eliminate them where appropriate and capture methane where possible to create a renewable energy source.

ii. **Policy Motion: Animal product greenhouse gas**

WHEREAS the livestock industry has an enormous greenhouse gas footprint and approximately 51% of global greenhouse gas emissions can be attributed to raising livestock and their natural byproducts, including an inordinate amount of methane; and

WHEREAS A recent study at Oxford University found that if we cut our meat intake by half, we can cut our carbon footprint by more than 35%; stick to sustainably raised fish and we can cut it by nearer to 50%; go vegan and the difference can be 60%; and

WHEREAS, these numbers inspired our country's foremost nutrition advisory panel, the U.S. Dietary Guidelines Advisory Committee, to take a stand and recommend that Americans eat more plant-based foods and fewer animal-based foods; and

WHEREAS, we could reduce greenhouse gas emissions significantly by reducing the consumption of animal products which would also have enormous benefits in water use reduction as well.

NOW, THEREFORE, BE IT RESOLVED, that by the adoption of this Resolution, the Mar Vista Community Council hereby urges the City of Los Angeles to embark on a public service education campaign to educate residents on the potential to reduce greenhouse gas emissions by reducing the consumption of animal food products and utilize Mar Vista to develop the program and pilot the campaign.

iii. **Policy motion: Resolution opposing Phillips 66 Santa Maria Refinery crude by rail operation**

The proposed Phillips 66 oil train offloading facility in San Luis Obispo County would bring nearly 3 million gallons of toxic crude oil per day into California. These mile-and-a-half long oil trains carry oil in unsafe tank cars through communities and over precious watersheds.

WHEREAS, the US and Canadian rail companies are common carriers, meaning they are required to carry whatever product shippers wish to put on the rail lines resulting in a 4,000% increase in crude by rail being carried on the rail lines in the past 3 years,

WHEREAS, this increase in Crude By Rail transportation has resulted in several disasters in the US and Canada (Lac Megantic, Quebec, Casselton, North Dakota, Hammond, Indiana, Aliceville, Alabama, Lynchburg, Virginia as well as four in the last weeks) which have resulted in the loss of human life and billions of dollars of damages to communities and their surrounding environment,

WHEREAS, the people of Los Angeles are concerned with the increase in oil-train traffic through many densely populated areas and the risk it poses to our city of almost four million people due to the Phillips 66 oil train off-loading facility expansion in San Luis Obispo County,

WHEREAS, the Revised Draft Environmental Impact Report (RDEIR) concludes that the proposed Phillips 66 rail spur would cause significant and unavoidable rail accident hazard risks along the main rail line that could result in oil spills, fires, and explosions near populated areas,

WHEREAS, the transport of crude oil by 100-car 1.4-mile long unit trains to the Santa Maria Refinery would occur on the Union Pacific railroad tracks through the City of Los Angeles from the Port of LA or Colton toward San Luis Obispo County, creating even more diesel pollution in already disproportionately impacted communities,

WHEREAS, our current rail system is designed to connect residents to their destinations throughout Southern California, not to move large quantities of hazardous materials like crude oil,

WHEREAS, an analysis of potential blast zone radii of rail lines carrying toxic and volatile crude from the San Fernando Valley all the way through South LA and the Harbor Area would impact homes, schools, parks, and businesses located adjacent to the tracks,

WHEREAS, the same blast zone map indicates the risk to a significant stretch of the Los Angeles River destined to receive $1 billion in local, state and federal investment over several years to overhaul much of an 11-mile soft-bottomed stretch of the river between Griffith Park and downtown,

WHEREAS, previous rail car derailment explosions in North America have demonstrated most emergency responders, including those in the City of Los Angeles, do not have sufficient equipment and supplies, such as fire suppression foam, to adequately respond to a catastrophic explosion of a rail car derailment explosion,

WHEREAS, the RDEIR does not evaluate the relative air quality or greenhouse gas emissions for the Los Angeles region,

WHEREAS, the Mar Vista Community Council sees impacts to our local and regional community from trans-shipment of tar sands crude through our communities as vital to our interests, taxing emergency responders and harming regional air, land and water quality resources,

THEREFORE BE IT RESOLVED, the Mar Vista Community Council asserts the only San Luis Obispo County Planning Commission action that would avoid this public safety risk to Los Angeles County and beyond is denial of the project,

THEREFORE BE IT ALSO RESOLVED, the Mar Vista Community Council requests the City of Los Angeles City Council write a letter of opposition to the San Luis Obispo County Planning Commission to deny this project a permit until such time as it can be proven to be safe.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

i. **Policy motion: Expo Line development**

Whereas, the Expo Transit Neighborhood Plans (TNP) are moving forward, and

Whereas, the Expo/Sepulveda TNP will include the Pico Corridor,

Whereas, the Expo Line has limited passenger capacity because it shares tracks with the Blue Line and runs substantially at-grade,

The Mar Vista Community Council supports reasonable and controlled development consistent with the limited passenger capacity with the Expo Line, as supported by the adjacent neighborhoods.

ii. **Policy motion: Right to Rest Act**

Whereas: There are already laws in place to ensure the rights of all individuals, including the homeless, to perform all legal activities in daily life, and

Whereas: There is considerable risk to public health, mobility, and rights of all citizens if local city laws are not allowed to be enforced with respect to illegal parking, illegal occupancy, and waste dumping,

Therefore, the Mar Vista Community Council opposes SB 608 (The Right to Rest Act), which would prohibit the enforcement of any local laws that violate the rights of anyone to move freely, rest, sleep, pray, and be protected in public spaces without discrimination, as well as the right to occupy a legally parked vehicle and the right to share food and eat in public).

iii. **Policy motion: Venice Blvd Alleys**

The Mar Vista Community Council recommends, and will work with, the CD11 office to study and evaluate all alleys affecting the Venice Blvd. commercial corridor, to determine what repairs and renovations are needed to benefit the businesses and resident of that corridor and the greater Mar Vista region.

f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
g. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
h. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
l. **Elections and By-laws**- Bill Scheding, chair
    i. Motion to approve 2016 Election Stipulation Sheet for DONE.
    ii. Motion to remove Rosenberg's Rules as the parliamentary authority for MVCC and to return to Robert's Rules of Order, as revised, as the parliamentary authority for MVCC and present at the MVCC Board Meeting for first reading. (See Proposed By-Laws, Article XII)
    iii. Motion to change the voting age from 18 to 16. (See Proposed By-Laws, Article X, Section 3)
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs

11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **New Business** (Public comment permitted)
    a. **Director's motion** (submitted by Sherri Akers)
    The Mar Vista Community Council supports Mayor Garcetti's SaveTheDrop campaign and wishes to partner on this effort by providing information about water conservation resources and honoring Mar Vista residents who qualify for a SaveTheDrop lawn sign.
    a. **Director's motion** (submitted by Robin Doyno)
    Be it resolved that because of the Staples' (stationary stores) policies that are part of the plan to privatize the U.S. Post Office the MVCC shall not patronize Staples. Whenever possible, those serving the MVCC shall choose other vendors.
14. **Grievances**, if any, received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, May 12th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:12 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Mitchell Rishe (1st vice chair), John Kutcha (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Ken Alpern, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Yvette Molinaro
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of April 2015 Board of Directors Meeting Minutes** (public comment permitted) (1 min)
   Motion to approve by Bill Scheding, 2nd by Melissa Stoller. Motion carried with 10 ayes; Sherri Akers abstained.
4. **Approval of April 2015 Stakeholder Meeting Minutes** (public comment permitted) (1 min)
   John Kutcha's name misspelled.
   Motion to approve as amended by Bill Scheding, 2nd by John Kutcha. Motion carried unanimously.
5. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   Joe Santana: Steve Wallace instrumental in fighting Bikini Bar, brought new business to Mar Vista, on vigil for pot shops.
   Ed Holmen: Supports Steve Wallace for all reasons mentioned by Joe; more people will come if BOD doesn't table motion to remove him for good.
   Carrie Elkins: Supports Steve Wallace for all he has done in the community and with MIP DEIR.
   Holly Tilson: Supports Steve Wallace. In group opposing MIP. Traffic is ridiculous, no reason to build brand new school when schools are crumbling. Steve came to meetings, gave information. It's underhanded to do something like this.
   Barry O'Brien: Kids in school together: better community, school for it. If we start opposing for political reasons, that's not who we are.
   Roy Persinko: Steve Wallace is always at PLUM, thankless job.
   Craig Barrett: Need Steve Wallace to get things under control, make things happen.
   Sherri Akers: Next Thursday is Senior Scam Stopper Seminar here at Mar Vista Recreation Center; it's for adult children of seniors as well.
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Daniel Osztreicher (Daniel.Osztreicher@LACity.Org, 310-575-8461): program to turn ugly grey LADOT traffic signal boxes into artistically, well thought out works of art on Great Streets. Bonin's goal is to connect all the main streets. Each box takes at least $1000. Working on funding, businesses can sponsor; happy to work with anyone. Preference given to who live/work in Mar Vista. Goal: do as many as can in next 3 years; then retouch or let artists redo.
        Graffiti: Taggers tend not to put graffiti on really good art. Can put graffiti prevention coating over art.

Give Daniel your art ideas--art in intersections, anything. Wants to get things in a couple weeks, hopes to have funding by July. Would like local schools to adopt box closest to them

b. Mar Vista Recreation Center – Lizka Mendoza, Director
   - Spring session halfway thru and programs are doing well: 630 kids in soccer, 82 in girls sports, 93 in baseball
   - Summer camp starts in June.
   - Gearing up for fall & spring activities
   - Wants to have movie night

c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
g. CA Assembly 47
h. CA Assembly 62
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

7. **Presentations**
   a. **Education Awards** (Sara Roos, 10 min)
      - Put over to next month
   b. **Green Corners** (Michael Mansour, 5 min) https://www.facebook.com/VeniceMcLaughlin
      - Slowly cleaning up NE corner of Venice & McLaughlin; wants to install native plants, green up.. Starting with parkway, which falls on state highway. Hopes to eventually get behind the fence and make a pocket park. County owns the property and city is supposed to take care of it. Trying to secure funding, have gotten some generous donations.
      - Green Committee can eblast to get volunteers for work group; ROSE Committee will get involved.

8. **Officers and Liaison Reports** (Action items included with public comment permitted, 1 min per speaker)
   a. Chair-Bill Koontz
      i. Update on Code of Conduct
         - Asking all non-board member committee co-chairs to sign. Not required by DONE; City looking in to so all NCs have same rules.
         - Only Bill Koontz can speak for MVCC. Board members can identify themselves as on BOD but can only speak for themselves.
      ii. Committee Assignment Motion: Remove Steve Wallace as PLUM Committee co-chair and appoint Mitchell Rishe as chair.

      Motion to withdraw by Bill Koontz, 2nd by Bill Scheding. Motion carried unanimously.
   b. First Vice Chair – Mitchell Rishe
   c. Second Vice Chair – John Kuchta
   d. Secretary –Melissa Stoller
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

      Friendly amendment by Bill Koontz: change "reimburse" to "allocate."

      Motion to approve all funding motions on consent by Michelle Krupkin, 2nd by Bill Scheding. Motion carried with 8 ayes; Bill Koontz, Michelle Krupkin, Michael Millman abstained.
      i. **FUNDING MOTION:** Approval of May Monthly Expense Report (MER).
      ii. **FUNDING MOTION:** ~~Reimburse~~ Allocate Bill Koontz $98.34 for refreshments purchased for the Mayor's Resilience by Design forum.

iii. **FUNDING MOTION:** ~~Reimburse~~ Allocate CBS Distribution for up to 6 newsletters per year, not to exceed $3500 per issue. This is an annual funding request.

iv. **FUNDING MOTION:** ~~Reimburse~~ Allocate Pacific Rim Printers for up to 6 newsletters per year, not to exceed $4500 per issue. This is an annual funding request.

v. **FUNDING MOTION:** ~~Reimburse~~ Allocate Tickled Plum for newsletter artwork for up to 6 newsletters per year, not to exceed $500 per issue. This is an annual funding request.

vi. **FUNDING MOTION:** ~~Reimburse~~ Allocate Debbie Rochlin for Mar Vista Neighborhood Association block party supplies, not to exceed $300.

vii. **FUNDING MOTION:** ~~Reimburse~~ Allocate Mar Vista Chamber of Commerce for ads and printing of their newsletter, not to exceed $1000.

viii. **FUNDING MOTION:** ~~Reimburse~~ Allocate North Westdale Neighborhood Association for talent show, not to exceed $500, pending submission of paperwork.

ix. ~~**REIMBURSEMENT**~~ **ALLOCATION MOTION:** Great Streets printing
Mar Vista Community Council approves ~~reimbursing~~ allocating Michelle Krupkin $31.17 for the photocopying of materials for a MVCC Great Streets survey authorized at the 11/12/2014 Board of Directors meeting.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
- Written report submitted, wants input for agenda. Clarification: this isn't an MVCC committee.

g. DWP MOU/LANCC Liaison
DWP MOU: Myra Boime –
- DWP serves 7 million, but only 2 customers are at meeting; need to get more people coming to meetings, get plan of what we want to pursue. All NCs were invited to send rep; Myra talked to San Fernando NC about sending rep.
- DWP not supporting people putting solar panels on roof—no program for building infrastructure to support.

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
- New program proposal by Mayor in about 6 months greywater capture, hot water heaters, separate meters for apartments on new construction. 6400 old units can't be retrofitted.

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
- Tom Ponton: festival committee met, discussed theme (probably Neighborhood Heroes: recognize those helping youth, elderly people. Festival is October 17th. Planning iswell ahead of schedule.

j. City Budget: John Kuchta
- Mayor & City Admin officer: provided solid, detailed responses to NC White Paper on where we should be spending money.
- Need to nominate additional representative for Budget Day

k. Recode LA: Sharon Commins
- Next meeting, May 27 at City Hall, will focus on mansionization.

l. Mar Vista Chamber of Commerce: Sarah Auerswald

j. Neighborhood Council Sustainability Alliance: Sherri Akers
- Workshop at Tree People on May 16: Save the Drop. Mayor's Sustainability representative will attend; open to public.

9. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

a. Zone 1 – Ken Alpern
- Zone is Awesome; some drop in burglaries.
- Expo Phase II testing train passed through, making progress. Passengers in April 2016 (need train cars)
- People happy about campers: thanks Michael & Steve—great tag team. Where will campers show up next?

b. Zone 2 – Brad Wilhite
c. Zone 3 – Bill Scheding
   - Hilltop had election
d. Zone 4 - Michael Millman
   - Block party/pot luck on June 7 in front of 3600 Barry (Tom Ponton's house). Will have local band. Good opportunity to talk to elected officials.
e. Zone 5 – Michelle Krupkin
   - Curious Palate gone, replaced by Atmosphere Café,
   - Sunny Blue & Asian Potato recently opened; Asian fusion
   - Burglaries plateauing; burglaries by distraction
f. Zone 6 – Valerie Davidson
   - Rose Ave slurried, no lines yet. Sunday, May 17: mega yard sale—Rose to Palms up Beethoven.
   - Military flyby (fundraiser for Woman in Armed Forces); airport apologized afterwards for not alerting public.
   - Bill Koontz: Talking to Len & Mike about Walgrove. Walgrove designated as collector; DOT says Walgrove fits their template to be designated as collector street; template doesn't factor in schools, pedestirians. If redesignated residential, can do more traffic calming things.
   - Ken Alpren: Walgrove is collector street because of Playa Vista; need to force into residential, or make Playa Vista pay.
   - Bill Scheding: changing designation won't make Santa Monica commuters stop using it.

10. **Committee Reports** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

    Motion to consider all motions on consent by Melissa Stoller, 2nd by John Kutcha. Ken Alpren requested removal of T&I motion from consent.

    Discussion

    - Felicia Bender RE Oil by Rail motion: company wants to expand facility to accommodate bomb trains that would go along LA River, through the Valley; unconscionable to have the trains in Los Angeles.
    - Bill Scheding: would like us to stick to issues that affect Mar Vista directly.
    - Sharon Cummins: wants to know who drafted motions—should name if not Green Committee. Sherri Akers: 10.d.i is from Paul Koretz's press release; Sherri drafted 10.d.ii; Felicia Bender and Sherri cooperated on 10.d.iii.
    - Sharon Cummins: shouldn't spend money on 10.d.ii.
    - Michael Millman: should focus on Mar Vista.
    - Bill Koontz – Green Committee spends so much time on Mar Vista with Green Garden Showcase.

    Green Committee motions carried with 11 ayes; Mitchell Rishe abstained.

    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-Chairs
        i. **Policy motion: MVCC Methane Resolution**

        WHEREAS, Los Angeles has one of the most substantial greenhouse gas footprints in the world. NASA has found that we also have one of the worst methane footprints around: 61% higher than previous estimates, which is a serious problem since methane is even more effective at trapping heat in the atmosphere than carbon dioxide; and

        WHEREAS, Los Angeles is suffering on the front lines of global warming. the City is into year four of the worst drought in recorded history, which scientists are now saying has been exacerbated by climate change, and, as of the March, 2015,

Metropolitan Water District board meeting the Sierra Nevada snowpack has nearly vanished and the State and the City are likely headed for serious water rationing; and

WHEREAS, NASA's Jet Propulsion Laboratory has launched their Megacities Carbon Project to measure multi-year emission trends of carbon dioxide, methane and carbon monoxide attributed to Los Angeles and other megacities;

NOW, THEREFORE, BE IT RESOLVED, that, by the adoption of this Resolution, THE MAR VISTA COMMUNITY COUNCIL HEREBY SUPPORTS Los Angeles City Councilmember Paul Koretz's motion calling on our City departments to come up with a specific and detailed plan to address our methane problem.

THE MAR VISTA COMMUNITY COUNCIL ALSO URGES the City Council of Los Angeles to take a global leadership role as we inventory our methane leaks, eliminate them where appropriate and capture methane where possible to create a renewable energy source.

ii. **Policy Motion: Animal product greenhouse gas**

WHEREAS the livestock industry has an enormous greenhouse gas footprint and approximately 51% of global greenhouse gas emissions can be attributed to raising livestock and their natural byproducts, including an inordinate amount of methane; and

WHEREAS A recent study at Oxford University found that if we cut our meat intake by half, we can cut our carbon footprint by more than 35%; stick to sustainably raised fish and we can cut it by nearer to 50%; go vegan and the difference can be 60%; and

WHEREAS, these numbers inspired our country's foremost nutrition advisory panel, the U.S. Dietary Guidelines Advisory Committee, to take a stand and recommend that Americans eat more plant-based foods and fewer animal-based foods; and

WHEREAS, we could reduce greenhouse gas emissions significantly by reducing the consumption of animal products which would also have enormous benefits in water use reduction as well.

NOW, THEREFORE, BE IT RESOLVED, that by the adoption of this Resolution, the Mar Vista Community Council hereby urges the City of Los Angeles to embark on a public service education campaign to educate residents on the potential to reduce greenhouse gas emissions by reducing the consumption of animal food products and utilize Mar Vista to develop the program and pilot the campaign.

iii. **Policy motion: Resolution opposing Phillips 66 Santa Maria Refinery crude by rail operation**

The proposed Phillips 66 oil train offloading facility in San Luis Obispo County would bring nearly 3 million gallons of toxic crude oil per day into California. These mile-and-a-half long oil trains carry oil in unsafe tank cars through communities and over precious watersheds.

WHEREAS, the US and Canadian rail companies are common carriers, meaning they are required to carry whatever product shippers wish to put on the rail lines resulting in a 4,000% increase in crude by rail being carried on the rail lines in the past 3 years,

WHEREAS, this increase in Crude By Rail transportation has resulted in several disasters in the US and Canada (Lac Megantic, Quebec, Casselton, North Dakota, Hammond, Indiana, Aliceville, Alabama, Lynchburg, Virginia as well as four in the last weeks) which have resulted in the loss of human life and billions of dollars of damages to communities and their surrounding environment,

WHEREAS, the people of Los Angeles are concerned with the increase in oil-train traffic through many densely populated areas and the risk it poses to our city of almost four million people due to the Phillips 66 oil train off-loading facility expansion in San Luis Obispo County,

WHEREAS, the Revised Draft Environmental Impact Report (RDEIR) concludes that the proposed Phillips 66 rail spur would cause significant and unavoidable rail accident hazard risks along the main rail line that could result in oil spills, fires, and explosions near populated areas,

WHEREAS, the transport of crude oil by 100-car 1.4-mile long unit trains to the Santa Maria Refinery would occur on the Union Pacific railroad tracks through the City of Los Angeles from the Port of LA or Colton toward San Luis Obispo County, creating even more diesel pollution in already disproportionately impacted communities,

WHEREAS, our current rail system is designed to connect residents to their destinations throughout Southern California, not to move large quantities of hazardous materials like crude oil,

WHEREAS, an analysis of potential blast zone radii of rail lines carrying toxic and volatile crude from the San Fernando Valley all the way through South LA and the Harbor Area would impact homes, schools, parks, and businesses located adjacent to the tracks,

WHEREAS, the same blast zone map indicates the risk to a significant stretch of the Los Angeles River destined to receive $1 billion in local, state and federal investment over several years to overhaul much of an 11-mile soft-bottomed stretch of the river between Griffith Park and downtown,

WHEREAS, previous rail car derailment explosions in North America have demonstrated most emergency responders, including those in the City of Los Angeles, do not have sufficient equipment and supplies, such as fire suppression foam, to adequately respond to a catastrophic explosion of a rail car derailment explosion,

WHEREAS, the RDEIR does not evaluate the relative air quality or greenhouse gas emissions for the Los Angeles region,

WHEREAS, the Mar Vista Community Council sees impacts to our local and regional community from trans-shipment of tar sands crude through our communities as vital to our interests, taxing emergency responders and harming regional air, land and water quality resources,

THEREFORE BE IT RESOLVED, the Mar Vista Community Council asserts the only San Luis Obispo County Planning Commission action that would avoid this public safety risk to Los Angeles County and beyond is denial of the project,

THEREFORE BE IT ALSO RESOLVED, the Mar Vista Community Council requests the City of Los Angeles City Council write a letter of opposition to the San Luis Obispo County Planning Commission to deny this project a permit until such time as it can be proven to be safe.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

i. **Policy motion: Expo Line development**

Whereas, the Expo Transit Neighborhood Plans (TNP) are moving forward, and

Whereas, the Expo/Sepulveda TNP will include the Pico Corridor,

Whereas, the Expo Line has limited passenger capacity because it shares tracks with the Blue Line and runs substantially at-grade,

The Mar Vista Community Council supports reasonable and controlled development consistent with the limited passenger capacity with the Expo Line, as supported by the adjacent neighborhoods.

Motion to approve by Ken Alpern, 2nd by Bill Scheding.

Discussion:

- John Kutcha: supports the motion, likes how it is worded.
- Mitchell Rishe: What is definition of Pico corridor? Ken Apren: Includes part of Zone 2 (Webster Middle School).
- Ken Alpern: Issue: is a cap as to how many can ride train (90-100,000 per day); it shares track with Blue Line
- Amend motion to specify height? Melissa Stoller: might be taken as an okay to build to height anywhere in corridor. John Kutcha: language is good, defers to adjacent neighborhoods; MVCC doesn't have authority to specify height.

Motion carried unanimously.

ii. **Policy motion: Right to Rest Act**

Whereas: There are already laws in place to ensure the rights of all individuals, including the homeless, to perform all legal activities in daily life, and

Whereas: There is considerable risk to public health, mobility, and rights of all citizens if local city laws are not allowed to be enforced with respect to illegal parking, illegal occupancy, and waste dumping,

Therefore, the Mar Vista Community Council opposes SB 608 (The Right to Rest Act), which would prohibit the enforcement of any local laws that violate the rights of anyone to move freely, rest, sleep, pray, and be protected in public spaces without discrimination, as well as the right to occupy a legally parked vehicle and the right to share food and eat in public.

Motion to approve by Ken Alpern, 2nd by Bill Scheding.

Discussion:

- Ken Alpern: SB 608 withdrawn, supposed to come back next January.
- Sherri Akers: homeless population in Los Angeles is up 16%, families up 12%.
- Robin Doyno: can't support something that would prohibit feeding the poor and acts of generosity; right to rest act must be rethought.
- Mitchell Rishe: doesn't see much in Right to Rest act that helps homeless.
- Michael Millman: SB608 couldn't be enforced, not finely drafted; preempts all local ordinances.
- Sharon Cummins: issue: are we going to have some measure of public health on our streets? There are better ways of tackling the problem; badly written bill.
- Bill Koontz: maybe committee should rewrite, focus more on local action by City Council.
- Michael Millman: we don't know why it was pulled and it could come back. Essential that we get message out to local elected officials; important that Mar Vista stand for something.
- Ken Alpern: not trying to target homeless

Ken Alpern moved to refer motion back to committee, 2nd by John Kutcha. Motion carried unanimously.

iii. **Policy motion: Venice Blvd Alleys**

The Mar Vista Community Council recommends, and will work with, the CD11 office to study and evaluate all alleys affecting the Venice Blvd. commercial corridor, to determine what repairs and renovations are needed to benefit the businesses and resident of that corridor and the greater Mar Vista region.

Motion to approve by Ken Alpern, 2nd by John Kutcha.

Ken Alpern: will address paving, repair, renovation, potholes.

Motion carried unanimously.

f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs; Michael Millman, Vice-Chair
g. **Education, Arts and Culture Committee** – Brad Wilhite & Sara Roos, Co- Chairs
h. **Santa Monica Airport Committee** – Valerie Davidson & Martin Rubin, Co-Chairs
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Sarah Auerswald & John Kuchta, Co-Chairs
l. **Elections and By-laws**- Bill Scheding, chair
    i. Motion to approve 2016 Election Stipulation Sheet for DONE.

    Motion to approve by Bill Scheding, 2nd by Sherri Akers.

    Discussion:

    - Melissa Stoller: election turnout dismal, wants to consider online voting.
    - Sherri Akers: online voting would provide opportunity for more people to vote.
    - Bill Koontz: DONE hasn't responded to request for presentation on online voting.
    - Sherri Akers: if we check we want online voting, must we do it?

- Bill Scheding: has reservations about online/vote by mail. Dog elected in Venice, busload came in Westchester.
- Ken Alpern: we are forced to be this restrictive?
- Robin Doyno: want to look at the safeguards, force them to make presentation.
- Mar Vista voters don't need to show ID.
- John Kutcha: difficult to choose any option—not all seats have same requirements for voters
- Michael Millman: supports trudging out to polls; need provision for handicapped, disabled.

Motion carried with 9 ayes; Robin Doyno abstained.

ii. Motion to remove Rosenberg's Rules as the parliamentary authority for MVCC and to return to Robert's Rules of Order, as revised, as the parliamentary authority for MVCC and present at the MVCC Board Meeting for first reading. (See Proposed By-Laws, Article XII)

Motion to approve by Bill Scheding, 2nd by John Kutcha.

Discussion:

- Bill Scheding: Rosenberg's Rules not robust enough given all the requirements we must meet.
- Bill Koontz: has no problem with Rosenberg's, we have Robert's for backup as needed; requirement extends to committee meetings and Robert's is easier.

Vote: 7 aye, 3 opposed, Sherri Akers abstained. Motion carried.

iii. Motion to change the voting age from 18 to 16. (See Proposed By-Laws, Article X, Section 3)

Motion to approve by Bill Scheding, 2nd by John Kutcha.

Discussion:

- Maybe get more kids show up and vote;
- Gurse: Teaches HS, no idea of consequences
- Ken: 14 yr old son thinks this is stupid idea; Ken would like a student rep (maybe non-voting)
- Michael: exciting suggestion; Windward would stand up candidates, take over board
- Mitchell: likes idea of getting youth involved
- Gurse: most schools have community service hours, Srs need to take econ/civics class; reach out to teachers to bring students here
-
- Might get more kids show up and vote.
- Gurse (public comment): teaches High School; board has no idea of consequences.
- Ken Alpern: 14 year old son thinks this is stupid idea; Ken would like a student rep (maybe non-voting).
- Michael Millman: exciting suggestion; Windward School would stand up candidates, take over Board.
- Mitchell Rishe: likes idea of getting youth involved.
- Gurse: most schools have community service hours and seniors need to take economic/civics class; reach out to teachers to bring students to meetings.

Vote: 2 ayes, 9 nays, motion not carried.

m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

n. **Aging in Place Ad Hoc**- Sherri Akers & Robin Doyno, Co-Chairs

11. **Discussion Calendar**
12. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
13. **New Business** (Public comment permitted)

a. **Director's motion** (submitted by Sherri Akers)

The Mar Vista Community Council supports Mayor Garcetti's SaveTheDrop campaign and wishes to partner on this effort by providing information about water conservation resources and honoring Mar Vista residents who qualify for a SaveTheDrop lawn sign.

Motion to approve by Bill Scheding, 2nd by Sherri Akers.

Sherri Akers: Mayor's office has reached out to NCs for support; will post on blog.

Motion carried unanimously.

b. **Director's motion** (submitted by Robin Doyno)

Be it resolved that because of the Staples' (stationary stores) policies that are part of the plan to privatize the U.S. Post Office the MVCC shall not patronize Staples. Whenever possible, those serving the MVCC shall choose other vendors.

- Robin Doyno: Put off to next meeting.

14. **Grievances**, if any, received
15. **Future agenda items**
16. **Public Comment**

    Gurse: traffic is nightmare; as teacher likes dual language programs.
17. **Adjournment**

    Meeting adjourned at 9:34 P.M.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Stakeholder Meeting
Monday, April 27th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:07 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Mitchell Rishe (2nd vice chair), John Kutcha (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Ken Alpern, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Brad Wilhite
2. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   - Fred Moss: trying to create Farmers' Market event for emergency preparadness modeled after WaterWise Expo
   - Robin Doyno: West Mar Vista Neighborhood Association
   - Sherri Akers: May 21 – Senior Scam Alert Seminar at park
3. **Funding Motions** (Public comment permitted, 1 min per speaker)
   a. **FUNDING MOTION:** Ink for Venice High School printer
      The Mar Vista Community Council authorizes the expenditure of up to $350 for the purchase of ink for Venice High School's color printer.
      Motion by Bill Scheding, 2nd by Ken Alpern; motion carried unanimously.
   b. **FUNDING MOTION:** Venice High School Spirit Campaign
      The Mar Vista Community Council authorizes a $250 neighborhood purpose grant in support of a Venice High School Spirit Campaign that seeks to raise the profile of pride and awareness in the community support following the unwanted international attention at VHS in March.
      Motion by Bill Scheding, 2nd by Melissa Stoller.
      Comment:
      - Ken Alpern: would like to be matching fund
      - Sara Roos: Lots of groups have stood up and supported the school; "I support Venice High" buttons going fast; MVCC is among last to support

      Motion carried unanimously.
   c. **FUNDING MOTION:** Grand View/McBride Elementary School
      The Mar Vista Community Council authorizes a neighborhood purpose grant not to exceed $510 for the purchase of playground equipment.
      Motion by Bill Scheding, 2nd by John Kutcha.
      Comment:
      - Sara Roos: McBride & Grand View merged; needs dual available equipment

      Motion carried unanimously.
4. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair
   a. **Motion to recognize student achievement**
      The Mar Vista Community Council will present appreciation certificates to selected middle and high school students at the May 12 Board of Directors meeting.

Motion by Bill Scheding, 2nd by John Kutcha; motion carried unanimously.

5. **Mandarin Immersion Program** – Discussion and action items (public comment permitted, 1 min per speaker unless waived by the Chair

   a. **Motion in support** (submitted by Mitchell Rishe, Ken Alpren and Sara Roos)

   Whereas, educational excellence is a right of and a benefit to all residents of Mar Vista. By supporting strong educational and financial opportunities for our stakeholders, Mar Vista becomes increasingly attractive, raising property values and increasing the flow of amenities and services catering to this ever more thriving community;

   Whereas, the Los Angeles Unified School District ("LAUSD") owns land in Mar Vista bordered by Walgrove Ave, Victoria Ave, Beethoven Ave and Lucille Ave., commonly known as the Mark Twain Middle School ("Mark Twain") campus;

   Whereas, LAUSD proposes to create a Mandarin and English Dual-Language Immersion Elementary School at the MTMS campus (the "Project"), and has released a Draft Environmental Impact Report ("DEIR") for the Project;

   Whereas, the Project is part of an articulated instructional pathway among the Venice and Mar Vista family of schools including immersion programs at Grand View Boulevard Elementary School, Broadway Elementary School, Richland Avenue Elementary School, and the language magnets at Mark Twain and Venice High School. This initiative, and specifically the Project, will benefit all residents of Mar Vista by invigorating enthusiasm for the high quality educational programs within our own boundaries;

   Whereas, the DEIR recognizes that the Project will result in significant and unavoidable impacts to traffic, especially along the severely overloaded "F"-rated north-south streets of Walgrove and Beethoven Avenues;

   Whereas, the DEIR estimates that the Project will cost at least $30 million in construction bond money and will result in the loss of up to 4 acres of open playing-field space from the Mark Twain campus;

   Now Therefore, Be It Resolved, that the Mar Vista Community Council supports the Project at the Mark Twain campus, but requests that LAUSD and the City of Los Angeles join efforts to mitigate impacts not only caused by the Project but traffic impacts that have long preceded it in the extended community as follows:

   A. That the Project mitigate traffic impacts to the greatest possible extent feasible, which must include: (i) extending the transportation radius significantly in order to encourage virtually all campus arrivals to be via foot, bicycle or bus, rather than private passenger car transportation; (ii) improvements to sidewalks, bike lanes and street crossings to facilitate walking, boarding and biking to school; (iii) roundabouts at the four corners of the campus; and (iv) dedication of school property to the City for street widening and creation of a drop-off zone.

   B. That the Project mitigate the loss of open space caused by the Project through improvements to the remaining recreational facilities at the MTMS campus, as well as improvements to other parks and schools in Mar Vista.

   Be It Further Resolved, that the Project should utilize existing buildings at the Mark Twain campus to the greatest extent feasible, and that LAUSD utilize a portion of the cost savings to improve and upgrade existing educational and recreational facilities at Mark Twain, so that the Project benefits the community as a whole, not just the Mandarin and English Dual-Language Immersion school students.

   Be it Further Resolved, that the Mar Vista Community Council requests that LAUSD upgrade and improve all existing schools within the Mar Vista community, including Beethoven Street Elementary School, Walgrove Avenue Elementary School, Venice High School, Phoenix High School, Grand View Boulevard Elementary School, Mar Vista Elementary School, Richland Avenue Elementary School, and Webster Middle School, as well as our sister Mar Vista schools east of the San Diego freeway, so that Mar Vista stakeholders are provided the educational opportunities they deserve.

   Motion by Mitchell Rishe, 2nd by Ken Alpern.

   Mitchell Rishe: motion is based on DEIR; intended to prevent possibility that MI school locates at Mark Twain and Mar Vista community is not on record with what we want. Wants to make sure community has a voice

   Mitchell accepts friendly amendments. Amended motion:

Whereas, the Mar Vista Community Council seeks educational excellence and improved quality of life for our stakeholders,

Whereas, the Los Angeles Unified School District ("LAUSD") owns land in Mar Vista bordered by Walgrove Ave, Victoria Ave, Beethoven Ave and Lucille Ave., commonly known as the Mark Twain Middle School ("Mark Twain") campus;

Whereas, LAUSD proposes to create a Mandarin and English Dual-Language Immersion Elementary School at the Mark Twain campus (the "Project"), and has released a Draft Environmental Impact Report ("DEIR") for the Project;

Whereas, the Project is part of an articulated instructional pathway among the Venice and Mar Vista family of schools including immersion programs at Grand View Boulevard Elementary School, Broadway Elementary School, Richland Avenue Elementary School, and the language magnets at Mark Twain and Venice High School. This initiative, and specifically the Project, will benefit all residents of Mar Vista by invigorating enthusiasm for the high quality educational programs within our own boundaries;

Whereas, the DEIR states that the Project will result in significant and unavoidable impacts to traffic, especially along the severely overloaded "F"-rated north-south streets of Walgrove and Beethoven Avenues;

Whereas, the DEIR estimates that the Project will cost at least $30 million in construction bond money and will result in the loss of up to 4 acres of open playing-field space from the Mark Twain campus;

Now Therefore, Be It Resolved, that the Mar Vista Community Council will only support (and otherwise opposes) the Project at the Mark Twain campus if LAUSD and the City of Los Angeles mitigate not only impacts caused by the Project, but impacts and systematic shortcomings that have long persisted in the extended community. The Final EIR must therefore consider the following:

1. Mitigation of traffic impacts to less than significant by, among other things:: (i) extending the transportation radius significantly in order to require virtually all campus arrivals to be via foot, bicycle or bus, rather than private passenger car transportation; (ii) improvements to sidewalks, bike lanes and street crossings to facilitate walking, boarding and biking to school; (iii) roundabouts at the four corners of the campus; and (iv) dedication of school property to the City for street widening and creation of a drop-off zone; (v) on campus bus ports and across campus auto drive.
2. Giving admission preference to Mar Vista and Venice residents, to both minimize traffic impacts and to ensure that residents most impacted by the Project also most benefit from it.
3. Mitigation of the loss of open space caused by the Project through improvements to the remaining recreational facilities at the Mark Twain campus (in particular, the establishment of new recreational facilities and the final design of the project that ensures the preservation of the existing open lawn/soccer field as an essential part of the Project), as well as improvements to other parks and schools in Mar Vista.
4. Utilization of existing buildings at the Mark Twain campus to the greatest extent feasible, and consideration of any and all cost reduction initiatives to this Project, and that LAUSD utilize the cost savings to improve and upgrade existing educational and recreational facilities at Mark Twain and other underserved Mar Vista public schools, so that the Project benefits the community as a whole, not just the Mandarin and English Dual-Language Immersion school students, and converts the potential loss of open space as set forth in the DEIR into a net expansion of open space to the benefit of the greater Mar Vista Community.
5. That LAUSD upgrade and improve all existing schools within the Mar Vista community, including Beethoven Street Elementary School, Walgrove Avenue Elementary School, Venice High School, Phoenix High School, Grand View Boulevard Elementary School, Mar Vista Elementary School, Richland Avenue Elementary School, and Webster Middle School, as well as our sister Mar Vista schools east of the San Diego freeway in Westside Village, so that Mar Vista Community Council stakeholders are provided the educational opportunities they deserve.

Be it Further Resolved, that the Mar Vista Community Council seeks a Memorandum of Understanding ("MOU") between the LAUSD and affected stakeholders with regards to all mitigation measures enumerated and elaborated upon above.

b. **Motion Against** (submitted by West Mar Vista Neighborhood Association)

Whereas the Mar Vista Community and the parents of the Mandarin Immersion Program at Broadway Elementary School agree with Board Member Zimmer's statement, and as quoted: "To find a balance for educational needs and the protection of the quality of life of the Mar Vista Stakeholders", and

Whereas the Draft Environmental Impact Report "Mandarin and English Dual-Language Immersion Elementary School Project" prepared for the Los Angeles Unified School District 'LAUSD' by Sapphos Environmental, Inc. for the LAUSD Office of Environmental Health and Safety was released for review March 26, 2015, and

Whereas that Draft EIR clearly states the alternative of least impact is the 'Redistricting Alternative',

Therefore, the Mar Vista Community Council asks that LAUSD and Board Member Zimmer implement "The Redistricting Alternative", and the MVCC also requests the support of Councilmember Bonin going forward, as it offers the least impacts to the community; preserves valuable open space; enhances community equity by promoting use of existing local underutilized campus facilities--thereby improving neighborhood schools; and saves the public $30 million on a new campus that is not needed.

Motion by Bill Scheding, 2nd by Michael Mellman.

Marcus Wagner: Vice President, West Mar Vista Resident Association, spoke in support of motion.

Comments (motions 5.a and 5.b)

Public Comment (speakers)

- Sharon Cummins: Not much soccer field space on Westside; people should email state legislators.
- Mary Bonnie Bray (Maplewood Ave): Polycyclic aromatic hydrocarbons in car emissions is carcinogenic, affects brain.
- Cecelia Boskin (Federal): $30mil comes at expense of preschool SRLDP program
- Lucy Dixon (Walgrove Ave): Trapped in house by traffic. Where would property to widen street come from?
- Shellie Estrin? (Beethoven St): Shouldn't build; should close 1-2 schools. Emissions in her room from cars, too many schools in that small area.
- Steve Wallace (Coolidge): PLUM Committee co-chair..Egregious for two BOD members to put motion on agenda without attending any meetings. Steve has petition opposing the new school. It's about another stupid Zimmer idea, not MIP. MIP principal & parents don't want to move. Ray Cortines thinks it's a crazy idea. Broadway will close its doors in 6 months if the move out 300 students and keep 67 at Broadway. There'll be1000 more car trips; mitigations will not work. Will remove half of the green space on site;
- Sara Roos (Mountain View Blvd): ECA Committee Co-Chair. Everyone is in agreement that the problem is traffic. Traffic component is addressed by including mitigation promise in DEIR. Hard to see how addition of cars to situation already untenable has big impact; should embrace situation to get what we want. Dismayed by ongoing incorrect "facts" that get repeated; actual: 70 +48 in Spanish immersion next year + English program at Broadway.
- Steve Hunt (Walgrove Ave): "Will probably do anyway" comment is wrong headed. Council needs to give 100% statement that we don't want this in the neighborhood. Should add protected left turn at Venice & Walgrove to DEIR.
- Nancy Williams Hankocy (Rosewood Ave): need space to get out, more recreation space for community's mental & physical health
- Sean Collins (Beethoven St): Cars speed through. Speaking as architect who builds school: can't fit this into neighborhood, need to oppose completely.
- Dr. Marsha Epstein (Buler Ave): Retired from LA County Dept. of Public Health. School is contrary to goals of the department; need to increase recreational facilities, not cut in half

- Nikki Hariton (Wavecrest Ave, Venice): Taught at Mark Twain for 4 years, other schools as well. It makes no sense for magnet to only offer 1 target language. If you grow up speaking Spanish & English , you'll be very employable. The edible & flower growing on campus is beneficial.
- Roy Morgan (Walgrove Ave): Traffic is horrible. MIP at Mark Twain is really bad idea
- Steve Morris (24th St, Santa Monica): FC LA soccer club has 300+ players. It took over maintenance of Mark Twain field, providing a quality, cared for field. Eleven soccer fields for population of 200,000 is inadequate.
- Lynette Halverson (Redwood Ave): Grew up on Redwood and has been there 66 years. Sweet Mar Vista is rapidly turning sour. Ridiculous school idea needs to move to Playa Vista—it is still being built, can accommodate.
- Lawrence Tolhurt (Greenwood Ave): Has been soccer coach. Use existing schools, no new building.
- Tom Ponton: We forgot lessons from fighting Playa Vista: can't beat back EIR without legal action. Motion doesn't belong on table, not vetted by committees. Drop motions and say what the communities want.
- Alicia Reyes (Armacost): Uses sports facilities. Webster is loosing students and teachers. We need STEM program—that would really benefit our children.
- Jeff Loo (McCune Ave): Chinese American. Disheartened by comments coming from community. DEIR is garbage, has divided the community. We need to be prepared, think about other alternatives.
- Fred Moss (Minerva Ave): 10 year Mar Vista resident. MVCC has no legal or advisory power, just deciding how will complain up the chain. People should contact assemblyman, those with power.
- Patricia McPherson (Greenwood Ave): LAUSD need to mitigate problems they've already created; buses are causing problems, wants mitigation now. MVCC & press have power to make our voices heard. New school is taxpayer waste. DEIR doesn't address traffic in MV, is wacked.
- Zak Danielson (Moore St): Part of MI program. DEIR is a fraud, has blatant errors. Team was asked to go after Zimmer's objectives in gathering facts. There will be more traffic.
- James Garrett (Greenwood Ave): Traffic is crazy, getting rid of green space is crazy. Kids will end up playing in street and someone will get hurt. Bill Koontz response: Mike Bonin is working behind scenes to have Walgrove designated "Residential" street.
- Steve Alpers: Tried to slog thru DEIR; it didn't mention classrooms available as alternative. MIP sounds great, can easily find space with vacant rooms.
- Stephanie Tokar (Rosewood Ave): CEQA is supposed to enhance community involvement, but DEIR didn't involve the community: residents didn't receive DEIR, weren't notified of scoping meetings. 500 residents came to April meeting; most don't like idea of loud construction, dust and pollution. Why this location?
- Marcus Wagner (Meier St): They tried to sneak this by; when people found out, 500 people showed up at a meeting last week.
- Riva Goldman (Barry Ave): Ditto to Dr. Epstein. Is currently a school nurse and worked at MDR Middle school when they thought program would go there. Issues: recreation space, shared space. Programs over time take over; any classroom that doesn't have class is considered empty space even though may be in use.
- Rick Selen (Glyndon Ave): Was teacher at Mark Twain for 25 years, Mark Twain teachers don't want the school and are disturbed about plan to bring 3rd-5th grade kids there next year to Twain—concerned about their safety. School should never be built.
- Lyndon Pham (Rosewood Ave): MVCC mission statement: have power to advocate. It's very clear what the community wants; MVCC has enough information.
- Julie Olds (Rosewood Ave): DEIR is faulty. A strong school with involvement needs parking and there's no mention of how parents will park. It's not reasonable for residential streets to be parking lot. Plan is not well thought out.
- John Stern (Rosewood Ave): DEIR talks about building a new school as objective, which makes scoring options faulty. Classrooms are available at Mark Twain
- Bob Elliott (Ashwood Ave): DEIR undercounts Mark Twain car trips and over counts Broadway car trips. Roundabouts are suicide circles. There will be out of area/district students.
- Sylva Saunders (Glencoe): What is really behind this is deals by electeds with construction people.

- Lisa Zwarych (Walgrove Ave): Daughter is at Beethoven. DEIR is false on air quality; students eat outside and construction will release silica particles (carcinogen) into air. How can young children focus with constant jackhammering, trucks?
- Lanina Sipivy (Walgrove Ave): If it looks like corruption, it is.
- Claire Burns (Ashwood Ave): Community is enraged: too many schools, building another is bad.
- Azadeh Hawkins Beethoven St): Supports MI program, but need to utilize existing underutilized schools.
- Margaret Turner (Greenwood Ave): Taught at Broadway for 30 years, now retired. Broadway has 52 students in English program, total of 72 in Spanish immersion program. Concerned about traffic.
- Cindy Mattson (Walgrove Ave): Lived on Walgrove over 30 years. Endorsing MI at Mark Twain is misguided. MVCC voice says a lot, needs to speak on community's behalf.
- Tim Brown (Beethoven St): Come spend a night at his house—smell the smells, hear the traffic. We can't stand another car on Beethoven
- Laurie Laythen (Maplewood Ave): Supports MIP, faults LAUSD for pitting us against each other. Shouldn't build $30m school next to one that is underfunded and neglected. Can't allow 13 year old to walk the dog because of traffic danger.
- Kathy King: Teaches at Mar Vista. Traffic has increased horribly since was a little girl. Need to say no to traffic, no to building school. MIP is a wonderful program; if its having problems at Broadway, why move to another location where there are problems. ADHD is handled with exercise in addition to medication. We need more green space and can't afford to lose 1 inch of exercise space.
- Emma Ramey (Walgrove Ave): Wasn't aware of project. MVCC has power, is our voice. She can't park in front of own house.
- StopCommuterSchool.com: Has letters, tells how to make comments. Community has raised $12,000.
- Wen-Chia Parker (Maplewood Ave): Beethoven parent, architect and master gardener. Point of LAUSD is to provide safe & good learning environment. Zimmer is moving grades 3-5 into Mark Twain this summer whether or not project is approved. What he's doing to the children and community isn't right.
- Joyce Keeler (Maplewood Ave): Got meeting notice—faulty notification, but they made some measly attempt. Is against project.
- Silva Flores (Walgrove Ave): Will they widen the street? Response: Yes, on Mark Twain side.
- Barry O'Brien: Echos Marcus Wagner: will take legal action. Please communicate that community is organized and will not go away.
- Andrew Welch (Walgrove Ave): Scared to think that one person could push this through without consent of residents in area. Scared of potential of air pollution, noise pollution and traffic. Cars & dogs have been hit, it's not safe.
- Danica Mello (Walgrove Ave): Can't raise children because of traffic. Need to think of value of field.

Written Public Comment (submitted at meeting)

- Against MI at Mark Twain: CarmenLandau (Moore St); Pat Karasick (N. Park Ave); James & Molly Melt? (Walgrove); Silver Saundors-Friedman (Glencoe Ave, Venice); Maggie Tanored (Walgrove); Paul Mattson (Walgrove Ave); Elizabeth (Beethoven St); Geetika Lizardi (Rosewood Ave); Keith Walker (Maplewood Ave), Christopher McKinnon (N. Park Ave).
- Steve Albers (Greenwood Ave): With all the unused classrooms and unmaintained school facilities in this area, it seems imprudent to spend $30M on another facility that won't be maintained. The Mandarin Immersion program is wonderful, but let's integrate it into existing facilities (i.e. MDR).
- Katherine Leighnor (Rosewood Ave): Traffic is horrendous! Do not waste precious fiscal funds when there are schools with under enrollment. And do not destroy the open space that the entire community uses!

Written Public Comment (submitted via email; summarized)

Note: names omitted due to concerns about animosity expressed toward MI supporters.

- MI parent, 1st & 3rd grade: Research shows that language proficiency requires continued study and practice, ideally through middle school. Therefore, partnership with Mark Twain's World Languages Magnet will be boon for both programs. Now is the moment to support this impressive program and to show that Los Angeles can be a model of public education and bilingual learning. The MI community is committed to helping with the transition, from fundraising to campus beautification to walking and biking to school for traffic mitigation.
- MI parent: This initiative is a golden opportunity to lay the foundation and strengthen our public education system in our local communities. Investing to improve public education benefits all homeowners in a community. If we can improve the school ratings and attract families back to Mark Twain and Venice, family funds that would have been spent on private education can not be reinvested in our neighborhood public schools, booster clubs and the local economy. Traffic and safety is a top concern with our without this new school. We are environmentally conscious citizens that will strive to mitigate traffic in a meaningful way. We already have many sibling in the program and many families already live or plan to live in Mar Vista.
- MI parent: Educational excellence is a right of and benefit to all residents of Mar Vista. The presence of the MI program on the Mark Twain campus will increase enrollment and lay the foundation necessary for a strong K-12 dual immersion pathway. Families have moved from all over the city and, in some cases, from other places in the state and country for the opportunity to have their child attend this school. A strong public education correlates to increased property values.
- Mar Vista resident, MI parent: The "motion in support" is well informed and a constructive step that seizes the opportunity to address long-standing issues that seem to be feeding the animosity. The "motion against" does not, and is misleading as well: it falsely asserts that the current MI parents support redistricting. Nobody at the DEIR meeting wanted to close their neighborhood school, just somebody else's; that was tried to the dismay of the Broadway neighborhood.
- MVCC Zone 6 residentt and 1st grade MI parent: Wholeheartedly in support of the MI school, wherever it is located. Supports the measure that supports building a new school and implementing mitigating traffic measures. Traffic and parking affects can be mitigated. Currently carpools with a MI family on Stewart and would love to ride bikes to the new school location. Buses are another option wince over 60 MI families live in the Mark Twain footprint. Believes this stellar program will be a gem of Mar Vista schools. Many MI families have already purchased homes in Mar Vista based on the current and projected school location.
- Mar Vista resident and 3rd grade MI parent: These are responses to 10 misleading comments by the group opposing MI at Mark Twain: sufficient legal notice has been provided (she received all the notices); there is no evidence that home prices have decreased due to increased traffic and much evidence that having great schools in your neighborhood increases home values; if the MI program doesn't take over the space on Mark Twain's very large campus, it is very likely that a charter school will come in; development in Playa Vista and other places is likely the underlying cause of increasing traffic and not building the MI program will not address these traffic concerns; the DEIR states redistricting is an "environmentally superior," not *the* superior option and that traffic could be worse with redistricting; residents who purchase homes witin block of a school should not complain about parents dropping their kids off at school; the only way to stop cuts to public school budgets is to get more families back to our neighborhood schools; increased enrollment will mean more federal funding for Mark Twain revitalization and more parental involvement and fundraising; MI parents have already started collaborating with LAUSD and Mark Twain on creating an MI curriculum and are excited that the MI students will be integrated with other students for English, science and math; wonders what the social implications of the Mar Vista community asking the English-only and SI families leave Broadway so that Mar Vista community can have their green space and more parking.
- Mar Vista resident and 3rd grade MI parent: Currently no options on Westside for Mandarin language instruction in middle/high school. Mandarin will be offered as elective in the overall middle school curriculum. Allocating bond money for a new school demonstrates that if parents demand better specialized programs and commit to enroll in local public schools, LAUSD will work with them; Mandarin program is so popular that application far exceed spaces available. Political reality is that LAUSD won't redistrict Broadway and move lower income disadvantaged Latino families. The impact on traffic of the new school is being overblown and can be mitigated.

Board comment

- Michael Millman: MVCC board has power. Opposes MI program at Mark Twain. Believes in neighborhood first. Let Mike Bonin know, Michael will let Mayor Garcetti know Mar Vista won't be run over. No surrender, no retreat.
- Valerie Davidson: Against school being built at Mark Twain. Use funds to rebuild existing schools. We will fight & win, get school closed down. Traffic is major problem with or without school. Lets all get together, get mitigation.
- Robin Doyno:

  Friendly amendment to 5a: LAUSD consider on campus bus ports and across campus auto drive

  Amendment accepted.

  Motion: MVCC finds the DEIR to be somewhere between fraudulent and flawed.

  2nd by Ken Alpern. 5 aye, 5 nay, 2 abstentions (Michelle Krupkin and Sherri Akers); motion not passed.
- Ken Alpern: Fought other projects. Motion 5a is about not just what were against, but also what we're for. It's our obligation to respond to DEIR. Wants more immersion programs in Mar Vista. Okay to change 7th paragraph of motion.
- Mitchell Rishe: Don't support redistricting—it pushes off problem to another community. If MI program can't stay at Broadway and we can bring in to our community, it is tremendous asset. Redistricting alternative doesn't address open space problems. Tried to address what we want, not just what we don't want in the motion. This is opportunity to get the mitigation.
- Melissa Stoller: Hears the community: we need traffic mitigation. However, finds it difficult to support redistricting another community's school and also creating more traffic for them. Think we should say what we support. If the MI program must move, would love to have it in the Mar Vista area.
- Bill Scheding: Can't imagine why we'd support motion 5a; Steve Zimmer won't enforce the conditions. Prefers 5b, but has problems with that also.
- John Kutcha: Motion 5a is in good faith, but Steve Zimmer is not operating in good faith. Reusing existing empty space is the thrifty, right thing to do. It's critical to contact state rep on this issue; stopcommuuterschool.com is place to throw money at this. It's a reminder how important it is to vote in LAUSD elections.
- Brad Wilhite: Stands with the community, will represent this voice to the board.
- Michelle Krupkin: Your vote in LAUSD elections really matters. Contact assembly member—we need mass emails. Make your voice heard at stopcommuuterschool.com—good resource. Concerned about traffic.
- Sherri Akers: Its illogical to add more students to schools that are not supported. Supports MIP, but proposal hasn't been vetted. Has anyone polled MIP students? Would like to remove term "redistricting" from motion 5b.
- Bill Koontz: Biggest issue with DEIR is inaccurate numbers and lack of outreach. We don't have more time to comment—if we did, would abstain.

Vote

Motion 5a:

Aye: Mitchell Rishe, Melissa Stoller, Robin Doyno, Ken Alpern, Valerie Davidson

Nay: Bill Koontz, John Kutcha, Bill Scheding, Brad Wilhite, Michael Millman, Micelle Krupkin

Abstain: Sherri Akers

Absent: Yvette Molinaro

Motion defeated.

Motion 5b:

Aye: John Kuchta, Bill Scheding, Sherri Akers, Ken Alpern, Brad Wilhite, Michael Millman, Micelle Krupkin, Valerie Davidson

Nay: Mitchell Rishe, Melissa Stoller

Abstain: Robin Doyno

Absent: Yvette Molinaro

Motion carried.

6. **Public Comment**
7. **Adjournment**
   Meeting adjourned at 9:34 P.M.

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* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Stakeholder Meeting
Monday, April 27th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
3. **Funding Motions** (Public comment permitted, 1 min per speaker)
    a. **FUNDING MOTION:** Ink for Venice High School printer
    The Mar Vista Community Council authorizes the expenditure of up to $350 for the purchase of ink for Venice High School's color printer.
    b. **FUNDING MOTION:** Venice High School Spirit Campaign
    The Mar Vista Community Council authorizes a $250 neighborhood purpose grant in support of a Venice High School Spirit Campaign that seeks to raise the profile of pride and awareness in the community support following the unwanted international attention at VHS in March.
    c. **FUNDING MOTION:** Grand View/McBride Elementary School
    The Mar Vista Community Council authorizes a neighborhood purpose grant not to exceed $510 for the purchase of playground equipment.
4. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair
    a. **Motion to recognize student achievement**
    The Mar Vista Community Council will present appreciation certificates to selected middle and high school students at the May 12 Board of Directors meeting.
5. **Mandarin Immersion Program** – Discussion and action items (public comment permitted, 1 min per speaker unless waived by the Chair
    a. **Motion in support** (submitted by Mitchell Rishe, Ken Alpren and Sara Roos)
    Whereas, educational excellence is a right of and a benefit to all residents of Mar Vista. By supporting strong educational and financial opportunities for our stakeholders, Mar Vista becomes increasingly attractive, raising property values and increasing the flow of amenities and services catering to this ever more thriving community;
    Whereas, the Los Angeles Unified School District ("LAUSD") owns land in Mar Vista bordered by Walgrove Ave, Victoria Ave, Beethoven Ave and Lucille Ave., commonly known as the Mark Twain Middle School ("Mark Twain") campus;
    Whereas, LAUSD proposes to create a Mandarin and English Dual-Language Immersion Elementary School at the MTMS campus (the "Project"), and has released a Draft Environmental Impact Report ("DEIR") for the Project;
    Whereas, the Project is part of an articulated instructional pathway among the Venice and Mar Vista family of schools including immersion programs at Grand View Boulevard Elementary School, Broadway Elementary School, Richland Avenue Elementary School, and the language magnets at Mark Twain and Venice High School. This initiative, and specifically the Project, will benefit all residents of Mar Vista by invigorating enthusiasm for the high quality educational programs within our own boundaries;

Whereas, the DEIR recognizes that the Project will result in significant and unavoidable impacts to traffic, especially along the severely overloaded "F"-rated north-south streets of Walgrove and Beethoven Avenues;

Whereas, the DEIR estimates that the Project will cost at least $30 million in construction bond money and will result in the loss of up to 4 acres of open playing-field space from the Mark Twain campus;

Now Therefore, Be It Resolved, that the Mar Vista Community Council supports the Project at the Mark Twain campus, but requests that LAUSD and the City of Los Angeles join efforts to mitigate impacts not only caused by the Project but traffic impacts that have long preceded it in the extended community as follows:

A. That the Project mitigate traffic impacts to the greatest possible extent feasible, which must include: (i) extending the transportation radius significantly in order to encourage virtually all campus arrivals to be via foot, bicycle or bus, rather than private passenger car transportation; (ii) improvements to sidewalks, bike lanes and street crossings to facilitate walking, boarding and biking to school; (iii) roundabouts at the four corners of the campus; and (iv) dedication of school property to the City for street widening and creation of a drop-off zone.

B. That the Project mitigate the loss of open space caused by the Project through improvements to the remaining recreational facilities at the MTMS campus, as well as improvements to other parks and schools in Mar Vista.

Be It Further Resolved, that the Project should utilize existing buildings at the Mark Twain campus to the greatest extent feasible, and that LAUSD utilize a portion of the cost savings to improve and upgrade existing educational and recreational facilities at Mark Twain, so that the Project benefits the community as a whole, not just the Mandarin and English Dual-Language Immersion school students.

Be it Further Resolved, that the Mar Vista Community Council requests that LAUSD upgrade and improve all existing schools within the Mar Vista community, including Beethoven Street Elementary School, Walgrove Avenue Elementary School, Venice High School, Phoenix High School, Grand View Boulevard Elementary School, Mar Vista Elementary School, Richland Avenue Elementary School, and Webster Middle School, as well as our sister Mar Vista schools east of the San Diego freeway, so that Mar Vista stakeholders are provided the educational opportunities they deserve.

b. **Motion Against** (submitted by West Mar Vista Neighborhood Association)

Whereas the Mar Vista Community and the parents of the Mandarin Immersion Program at Broadway Elementary School agree with Board Member Zimmer's statement, and as quoted: "To find a balance for educational needs and the protection of the quality of life of the Mar Vista Stakeholders", and

Whereas the Draft Environmental Impact Report "Mandarin and English Dual-Language Immersion Elementary School Project" prepared for the Los Angeles Unified School District 'LAUSD' by Sapphos Environmental, Inc. for the LAUSD Office of Environmental Health and Safety was released for review March 26, 2015, and

Whereas that Draft EIR clearly states the alternative of least impact is the 'Redistricting Alternative',

Therefore, the Mar Vista Community Council asks that LAUSD and Board Member Zimmer implement "The Redistricting Alternative", and the MVCC also requests the support of Councilmember Bonin going forward, as it offers the least impacts to the community; preserves valuable open space; enhances community equity by promoting use of existing local underutilized campus facilities--thereby improving neighborhood schools; and saves the public $30 million on a new campus that is not needed.

6. **Public Comment**
7. **Adjournment**

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** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, April 14th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Presentations**
    a. California Common Cause presentation on campaign finance reform (10 min)
7. **Officers and Liaison Reports** (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Appointment of Safety & Security Committee co-chair: Jeremy Pollack
        ii. Update on ethics and funding training with possible motion to follow.
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of March MER
        ii. **REIMBURSEMENT MOTION:** MER postage
        Mar Vista Community Council approves reimbursing Bill Scheding (not to exceed $30) for the purchase of postage to mail MERs.
        iii. **REIMBURSEMENT MOTION:** BOD meeting printing

Mar Vista Community Council approves reimbursing Michelle Krupkin $31.17 for the photocopying of materials for a MVCC Great Streets survey authorized at the 11/12/2014 Board of Directors meeting.

iv. **REIMBURSEMENT MOTION:** BOD meeting printing

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v. **FUNDING MOTION:** MVNA Block Party

Motion to approve up to $300 for the Mar Vista Neighborhood Association Annual block party on June 7, 2015. The money will be used for the rental of tables/chairs from Triple A Rentals.

vi. **FUNDING MOTION:** Green Committee printing & supplies

The Mar Vista Community Council authorizes the expenditure of up to $500 for Green Committee supplies and printing, budgeted as follows:

- Heavy duty display easel $60
- 100 sheets 8 ½ x 11 glossy photo paper $50
- 100 sheets 5 x 7 glossy photo paper $20
- Printing $300
- Misc. supplies $70

vii. **Funding Motion: Spring GGS Newsletter, creation of Green Garden Showcase map**

Tickled Plum, not to exceed $500 (20 hours at $25 per hour).

viii. **FUNDING MOTION:** CFLP class

Mar Vista Community Council agrees to co-sponsor the LADWP's California Friendly Landscape Planning scheduled for Saturday, May 9, 10:30 A.M.-1:30 P.M., at Mar Vista Public Library and approves the expenditure of up to $200 for the purchase of food, beverages and serving supplies.

ix **FUNDING MOTION:** Resilience by Design community meeting

The Mar Vista Community Council agrees to co-sponsor with the Mayor's office and provide refreshments for a Resiliency by Design community meeting on April 23 with Dr. Lucy Jones and approves the expenditure of up to $200 for refreshments for a projected attendance of 100.

x. **FUNDING MOTION:** File of Life

File of Life (http://www.folife.org/) provides first responders with a more complete profile of a person in an emergency. It ensures that pets are not overlooked and left to starve when a patient is taken to the hospital. It gives responders complete and up to date information on meds, doctors, pharmacy and emergency contacts and is readily recognized. MVCC approves the purchase of approximately 1000 MVCC-sponsored File of Life refrigerator magnet card sets @ $.76 each (not to exceed $1,000 with shipping and tax).

xi. **FUNDING MOTION:** National Night Out at Venice High School

MVCC grants $1,000 for equipment rental, publication printing, movie rights, and emergency kit equipment.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU Liaison- Myra Boime
h. DWP MOU/LANCC Liaison-Open
i. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
j. Fall Festival Liaison-Albert Olson/Yvette Molinaro
k. City Budget: John Kuchta
l. Recode LA: Sharon Commins
m. Mar Vista Chamber of Commerce: Sarah Auerswald
n. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite

c. Zone 3 – Bill Scheding
d. Zone 4 - Michael Millman
e. Zone 5 – Michelle Krupkin
f. Zone 6 – Valerie Davidson

9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs
        i. **Policy motion: MVCC Methane Resolution**

        WHEREAS, Los Angeles has one of the most substantial greenhouse gas footprints in the world. NASA has found that we also have one of the worst methane footprints around: 61% higher than previous estimates, which is a serious problem since methane is even more effective at trapping heat in the atmosphere than carbon dioxide; and

        WHEREAS, Los Angeles is suffering on the front lines of global warming. the City is into year four of the worst drought in recorded history, which scientists are now saying has been exacerbated by climate change, and, as of the March, 2015, Metropolitan Water District board meeting the Sierra Nevada snowpack has nearly vanished and the State and the City are likely headed for serious water rationing; and

        WHEREAS, NASA's Jet Propulsion Laboratory has launched their Megacities Carbon Project to measure multi-year emission trends of carbon dioxide, methane and carbon monoxide attributed to Los Angeles and other megacities;

        NOW, THEREFORE, BE IT RESOLVED, that, by the adoption of this Resolution, THE MAR VISTA COMMUNITY COUNCIL HEREBY SUPPORTS Los Angeles City Councilmember Paul Koretz's motion calling on our City departments to come up with a specific and detailed plan to address our methane problem.

        THE MAR VISTA COMMUNITY COUNCIL ALSO URGES the City Council of Los Angeles to take a global leadership role as we inventory our methane leaks, eliminate them where appropriate and capture methane where possible to create a renewable energy source.

        ii. **Policy Motion: Animal product greenhouse gas**

        WHEREAS, the livestock industry has an enormous the greenhouse gas footprint. Approximately 51% of global greenhouse gas emissions can be attributed to raising livestock and their natural byproducts, including an inordinate amount of methane. A recent study at Oxford University found that if we cut our meat intake by half, we can cut our carbon footprint by more than 35%; stick to sustainably raised fish and we can cut it by nearer to 50%; go vegan and the difference can be 60%; and

        WHEREAS, these numbers inspired our country's foremost nutrition advisory panel, the U.S. Dietary Guidelines Advisory Committee, to take a stand and recommend that Americans eat more plant-based foods and fewer animal-based foods; and

        WHEREAS, we could all reduce greenhouse gas emissions immediately, today, if we simply, completely, stopped eating meat which would also have enormous benefits in water use reduction.

        NOW, THEREFORE, BE IT RESOLVED, that by the adoption of this Resolution, the Mar Vista Community Council hereby urges the City of Los Angeles to embark on a public service education campaign to encourage residents to reduce the consumption of animal products to reduce greenhouse gas emissions and utilize Mar Vista to develop the program and pilot the campaign.

iii. **Policy motion: Resolution opposing Phillips 66 Santa Maria Refinery crude by rail operation**

The proposed Phillips 66 oil train offloading facility in San Luis Obispo County would bring nearly 3 million gallons of toxic crude oil per day into California. These mile-and-a-half long oil trains carry oil in unsafe tank cars through communities and over precious watersheds.

WHEREAS, the US and Canadian rail companies are common carriers, meaning they are required to carry whatever product shippers wish to put on the rail lines resulting in a 4,000% increase in crude by rail being carried on the rail lines in the past 3 years,

WHEREAS, this increase in Crude By Rail transportation has resulted in several disasters in the US and Canada (Lac Megantic, Quebec, Casselton, North Dakota, Hammond, Indiana, Aliceville, Alabama, Lynchburg, Virginia as well as four in the last weeks) which have resulted in the loss of human life and billions of dollars of damages to communities and their surrounding environment,

WHEREAS, the people of Los Angeles are concerned with the increase in oil-train traffic through many densely populated areas and the risk it poses to our city of almost four million people due to the Phillips 66 oil train off-loading facility expansion in San Luis Obispo County,

WHEREAS, the Revised Draft Environmental Impact Report (RDEIR) concludes that the proposed Phillips 66 rail spur would cause significant and unavoidable rail accident hazard risks along the main rail line that could result in oil spills, fires, and explosions near populated areas,

WHEREAS, the transport of crude oil by 100-car 1.4-mile long unit trains to the Santa Maria Refinery would occur on the Union Pacific railroad tracks through the City of Los Angeles from the Port of LA or Colton toward San Luis Obispo County, creating even more diesel pollution in already disproportionately impacted communities,

WHEREAS, our current rail system is designed to connect residents to their destinations throughout Southern California, not to move large quantities of hazardous materials like crude oil,

WHEREAS, an analysis of potential blast zone radii of rail lines carrying toxic and volatile crude from the San Fernando Valley all the way through South LA and the Harbor Area would impact homes, schools, parks, and businesses located adjacent to the tracks,

WHEREAS, the same blast zone map indicates the risk to a significant stretch of the Los Angeles River destined to receive $1 billion in local, state and federal investment over several years to overhaul much of an 11-mile soft-bottomed stretch of the river between Griffith Park and downtown,

WHEREAS, previous rail car derailment explosions in North America have demonstrated most emergency responders, including those in the City of Los Angeles, do not have sufficient equipment and supplies, such as fire suppression foam, to adequately respond to a catastrophic explosion of a rail car derailment explosion,

WHEREAS, the RDEIR does not evaluate the relative air quality or greenhouse gas emissions for the Los Angeles region,

WHEREAS, the Mar Vista Community Council sees impacts to our local and regional community from trans-shipment of tar sands crude through our communities as vital to our interests, taxing emergency responders and harming regional air, land and water quality resources,

THEREFORE BE IT RESOLVED, the Mar Vista Community Council asserts the only San Luis Obispo County Planning Commission action that would avoid this public safety risk to Los Angeles County and beyond is denial of the project,

THEREFORE BE IT ALSO RESOLVED, the Mar Vista Community Council requests the City of Los Angeles City Council write a letter of opposition to the San Luis Obispo County Planning Commission to deny this project a permit until such time as it can be proven to be safe.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair
    i. **Policy motion: Cost of building permit appeals**

    City shall revise appeals process for Building Permits. Appeals of DBS determinations shall be done via the same simple process as appeals of Planning Dept. and Planning Commission determinations with similar fees. DBS "appeals" shall not be treated as a new case with public notification and CEQA requirements, because it is an appeal. An appeal is not a new proposed development project; it is an appeal of an already filed development project.
    ii. **Policy motion: Support for Council Files 15-0020 [Collecting Fees Related to Condition Compliance] and 15-0135 [Planning's CCU Fee Ordinance to support MViP Monitoring, Verification & Inspection Program]**

    MVCC supports Council Files 15-0020 and 15-0135 (http://cityclerk.lacity.org/lacityclerkconnect/) asking that the Planning Department report back in 45 days on the best practices of other jurisdictions, including the County of Los Angeles, to ensure proper resource allocation for condition inspections and enforcement AND further asks that the Council instruct the Planning Department, in consultation with the City Attorney and any other appropriate City department, bureau, or agency, to work cooperatively to propose a method by which inspection fees related to condition compliance are required and collected by the City prior to the release of any final approval of a projects.
    iii. **Policy motion: Streamlining community improvement projects (Council File 14-1624)**

    MVCC requests the Department of Public Works, with the assistance and cooperation of the Department of Transportation, City Planning, City Attorney, Department of Neighborhood Empowerment, City Administrative Officer and the Chief Legislative Analyst, be instructed to prepare and present a report setting forth ways and means by which the City of Los Angeles may best serve community organizations seeking to undertake community improvement projects. The report should include but not be limited to a discussion of the following key elements: establishing a single point of contact for inquires and technical assistance; identifying efficiencies and streamlining of all existing processes and permits; resolution of liability responsibilities which can hinder volunteer efforts; and outreach strategy for stakeholder input.
g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair
h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair
i. **Safety and Security Committee** – Rob Kadota, Chair
    i. **Administrative motion: Zone Safety Director Program**

    Establish a Safety Zone Director program to strengthen and build a public safety network of volunteers that works with local organizations to support neighborhood watch programs, disaster preparedness, risk reduction and safety initiatives.
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair
l. **Elections and By-laws**- Bill Scheding, chair
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair
    i. **Policy motion: Support of Senate Bill 128**

    The Mar Vista Community Council supports the passage of SB128. Specifically, this bill will allow terminally ill patients the right to obtain a prescription from his or her physician for medication to be self-administered. It requires two physicians to confirm a prognosis of six months or less to live, a written request and two oral requests to be made a minimum of 15 days apart, and two witnesses to attest to the request. The two physicians must also ensure that the

patient has the mental competency to make health care decisions for him or herself.

The Mar Vista Community Council also urges the Los Angeles County District Attorney to deprioritize prosecution of physicians and family members supporting death with dignity decisions of terminally ill, mentally competent individuals. Currently five states — New Mexico, Vermont, Montana, Oregon and Washington — have passed Death with Dignity policies to expand end-of-life options for competent, terminally ill patients.

If the L.A. County District Attorney were to deprioritize the prosecution of physicians and family members supporting Death with Dignity options, it would ensure terminally ill individuals the right to preserve their dignity and manage their medications as they see fit through end of life. The L.A. County District Attorney's recognition of the medical practice of aid in dying would also grant physicians medical legitimacy in honoring the wishes of their patients to have a dignified end of life.

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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Mar Vista Community Council

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Regular Meeting of the Board of Directors
Tuesday, April 14th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
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MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7: 09 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Mitchell Rishe (2nd vice chair), John Kutcha (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Ken Alpern, Valerie Davidson, Robin Doyno, Michelle Krupkin, Yvette Molinaro, Brad Wilhite
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of March 2015 Minutes** (public comment permitted) (1 min)
   Corrections: change date to "March"; correct spelling of Ken Alpern's name.
   Motion to approve as amended by John Kutcha, 2nd Sherri Akers. Motion carried unanimously.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   - Mike Harriel, Southern California Gas Public Affairs Manager, response to MVCC's 02/03/15 Methane Emissions letter:
     - Recent study (3/31/15 Environmental Science & Technology updated data released in 1990 and found 36-70% lower emissions than the federal study: 0.1 & 0.2%; this is among the lowest emission rates in country. See methane.wsu.edu for information about the study.
     - A voluntary emissions reduction program has yielded an 800,000 metric tons reduction over the last two decades
     - SoCal Gas regularly monitors emissions and investing $6 billion to maintain and improve service over the next 5 years.
     - 87% of emissions are from agriculture and waste; 6% from gas lines.

   Sherri Akers concurs that SoCal Gas is at forefront of efforts to reduce emissions
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Repaving of alley from Inglewood to Centinela is completed; no cement channel
      - Great Streets outreach: boards at Venice Grind are down; talking to Venice High School this week; will be at Farmers' Market on Sunday, April 18; open house at Mar Vista Library on April 20, 6–8 P.M.
      - Re-landscaping at LADWP Distribution Station 59 completed.
      - Bike with Mike event on May 2, 9 A.M
   b. Mar Vista Recreation Center – Lizka Mendoza, Director
      - Kids sports signups: Soccer, 563 kids; girls basketball, 81; baseball, 123, hockey still enrolling
      - Spring egg hunt attended by approximately 500 kids
      - Summer camp is June 9–August 4; parent night is May 20
      - Resilience by Design community meeting at the park with Mayor Garcetti on April 23
      - Young autistic teen abducted from the park was found in Culver City; older man arrested

- Park security was switched from park police to LAPD; Lizka has been in touch with Senior Lead officer

c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
d. US 36 – Janice Hahn
e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
g. CA Assembly 47
h. CA Assembly 62
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

6. **Presentations**
   a. California Common Cause presentation on campaign finance reform (10 min)

      Put over to next meeting

7. **Officers and Liaison Reports** (Action items included with public comment permitted, 1 min per speaker)

   Motion to move DWP Recycled Water Liaison report, followed by EAC report up in agenda by Bill Scheding, 2nd by John Kutcha; motion carried unamimously.

   a. Chair-Bill Koontz
      i. Appointment of Safety & Security Committee co-chair: Jeremy Pollack
         - Motion to approve by Bill Scheding, 2nd by Melissa Stoller; motion carried unanimously.
      ii. Update on ethics and funding training with possible motion to follow.
         - Should be up to date; DONE records haven't caught up

   b. First Vice Chair – Mitchell Rishe
      - City Council considered resolution to put up no parking signs on Sepulveda; it passed on consent
      - Last week Jeremy Green organized a meeting with developer Crimson Holding regarding proposed condo at Boise & Venice: 5 stories, 50 units, 1.1 parking spaces per unit. Neighbors are asking for commercial on ground floor; developer's research finds this would not attract desirable tenants. Developer is not willing to negotiate or scale down.

        Comment by Sherri Akers: if she was a business, she would not like to be asked to cut back 20% on an investment she made

   c. Second Vice Chair – John Kuchta

      Fixes to website are completed

   d. Secretary –Melissa Stoller

      Will send Funding Request Form and Policy Motion templates to John for website

   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
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         Motion to approve by John Kuchta, 2nd by Melissa Stoller; motion carried unanimously.
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         Put over to May BOD meeting

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Motion to approve up to $300 for the Mar Vista Neighborhood Association Annual block party on June 7, 2015. The money will be used for the rental of tables/chairs from Triple A Rentals.

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Motion to approve by Bill Scheding, 2nd by John Kuchta; motion carried unanimously.

Bill Koontz will send eblast.

x. **FUNDING MOTION:** File of Life

File of Life (http://www.folife.org/) provides first responders with a more complete profile of a person in an emergency. It ensures that pets are not overlooked and left to starve when a patient is taken to the hospital. It gives responders complete and up to date information on meds, doctors, pharmacy and emergency contacts and is readily recognized. MVCC approves the purchase of approximately 1000 MVCC-sponsored File of Life refrigerator magnet card sets @ $.76 each (not to exceed $1,000 with shipping and tax).

Discussion:

- Other Neighborhood Associations are going in on the order. They're part of Department of Aging focused program to help seniors. MVCC can use as outreach material.
- Sherri Akers: would like to get for scam seminar

Motion to approve by Bill Scheding, 2nd by John Kuchta; motion carried unanimously.

xi. **FUNDING MOTION:** National Night Out at Venice High School

MVCC grants $1,000 for equipment rental, publication printing, movie rights, and emergency kit equipment.

Discussion:

- Will be 1st Tuesday in August. Is community/police outreach; location moves all around Pacific Division from year to year. It brings the community toether, promotes community/police partnerships.
- Don't yet have final approval from school.
- Bill Koontz: attracts people we don't usually see
- Sarah Auerswald: outreach opportunity—school starts a week later

Motion to approve by Bill Scheding, 2nd by John Kuchta; motion carried unanimously.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano

Last meeting was March 18' LAPD representative Martin Boccacio attended. North Westdale traffic mitigation : 3 way stop at Stoner & Gateway to be installed. Next meeting is May 20; agenda closes the Saturday before

Farmers' Market signs are not yet changed to 5:00 P.M.

Martin Boccacio put speed trailer on Palms between McLaughlin & Sawtelle; recorded average speed of 34 MPH

Discussion: Questions about one-way sign at post office exit; who put it up? Linda doesn't have information; Ken Alpern will put on agenda for T&I meeting.

g. DWP MOU Liaison- Myra Boime

Bill Koontz attended meeting. Discussion of feasibility of desalinization feasibility. Rate Payer Advocate spoke about goals and achievements, is working on better outreach, sitting in on OneWater meetings, reviewing DWP activities.

h. DWP LANCC Liaison-Open

Bill Koontz attended meeting. Herb Wesson spoke: new chair of Education & Neighborhoods committee; promised many things, rollover funding; took questions

Overlay on top of bylaws is coming out in May

i. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater

Investigation of toilet to tap progressing

j. Fall Festival Liaison-Albert Olson/Yvette Molinaro

Yvette can't help this year. Looking for volunteers—reach out to Albert Olsen if interested.

Meeting April 15 at Albert Olsen's

k. City Budget: John Kuchta

Jay Handel's podcast for City Budget Advocates has lots of numbers

l. Recode LA: Sharon Commins

m. Mar Vista Chamber of Commerce: Sarah Auerswald

State of City address called out Mar Vista; Status Quo provided food

Bowlero is open. Sweet Lucie's ice cream might open by May 1. Curious Palate sold to another restaurant owner who's extending patio, adding more seating; French menu

Tax Day mixer at Louie's. Regular Chamber meeting is Thursday morning.

n. Neighborhood Council Sustainability Alliance: Sherri Akers

Attended mayor's press conference and got a shout-out about the Green Garden Showcase. Supposed to partner with mayor on outreach.

Community outreach meeting on May 16; topic not announced

Rapidly got information about Distribution Station 59 out to other NCs

8. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

a. Zone 1 – Ken Alpern

Received the usual reports of robberies. 1st Expo train went west; tentative opening April, 2016; they're scrambling to get more cars

b. Zone 2 – Brad Wilhite

North Westdale Neighborhood Association: Karen Bass and Mike Bonin attended special meeting on April 8. Association elections are May 22.

French Immersion Program starting in fall at Richland.

c. Zone 3 – Bill Scheding

HERO--Hilltop Emergency Response Organization formed. Hilltop Neighbors Association annual election of officer is April 16.

Westdale (Melissa Stoller): uptick in burglaries; two pit bulls on leash attacked a small dog and the dog's owner.

d. Zone 4 - Michael Millman

e. Zone 5 – Michelle Krupkin

Burglaries.

f. Zone 6 – Valerie Davidson

Burglaries; residents are taking photos of suspicious looking cars parked on streets.

A lady tripped on broken sidewalk and broke her hip

Sprinklers are watering sidewalk.

9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

Green Committee Agenda didn't get posted on website. Motion by Bill Scheding to take off consent and refer back to Green Committee, 2nd by Ken Alpren; motion carried with one abstention (Melissa Stoller).

Ken Alpern pulled AIP motion from Consent Calendar. Remaining motions passed unanimously on consent.

a. **Executive & Finance Committee** - Bill Koontz, Chair

b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair

Melissa Stoller asked for Garden Showcase volunteers.

c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs

i. **Policy motion: MVCC Methane Resolution**

WHEREAS, Los Angeles has one of the most substantial greenhouse gas footprints in the world. NASA has found that we also have one of the worst methane footprints around: 61% higher than previous estimates, which is a serious problem since methane is even more effective at trapping heat in the atmosphere than carbon dioxide; and

WHEREAS, Los Angeles is suffering on the front lines of global warming. the City is into year four of the worst drought in recorded history, which scientists are now saying has been exacerbated by climate change, and, as of the March, 2015, Metropolitan Water District board meeting the Sierra Nevada snowpack has nearly vanished and the State and the City are likely headed for serious water rationing; and

WHEREAS, NASA's Jet Propulsion Laboratory has launched their Megacities Carbon Project to measure multi-year emission trends of carbon dioxide, methane and carbon monoxide attributed to Los Angeles and other megacities;

NOW, THEREFORE, BE IT RESOLVED, that, by the adoption of this Resolution, THE MAR VISTA COMMUNITY COUNCIL HEREBY SUPPORTS Los Angeles City Councilmember Paul Koretz's motion calling on our City departments to come up with a specific and detailed plan to address our methane problem.

THE MAR VISTA COMMUNITY COUNCIL ALSO URGES the City Council of Los Angeles to take a global leadership role as we inventory our methane leaks, eliminate them where appropriate and capture methane where possible to create a renewable energy source.

Referred back to committee.

ii. **Policy Motion: Animal product greenhouse gas**

WHEREAS, the livestock industry has an enormous the greenhouse gas footprint. Approximately 51% of global greenhouse gas emissions can be attributed to raising livestock and their natural byproducts, including an inordinate amount of methane. A recent study at Oxford University found that if we cut our meat intake by half, we can cut our carbon footprint by more than 35%; stick to

sustainably raised fish and we can cut it by nearer to 50%; go vegan and the difference can be 60%; and

WHEREAS, these numbers inspired our country's foremost nutrition advisory panel, the U.S. Dietary Guidelines Advisory Committee, to take a stand and recommend that Americans eat more plant-based foods and fewer animal-based foods; and

WHEREAS, we could all reduce greenhouse gas emissions immediately, today, if we simply, completely, stopped eating meat which would also have enormous benefits in water use reduction.

NOW, THEREFORE, BE IT RESOLVED, that by the adoption of this Resolution, the Mar Vista Community Council hereby urges the City of Los Angeles to embark on a public service education campaign to encourage residents to reduce the consumption of animal products to reduce greenhouse gas emissions and utilize Mar Vista to develop the program and pilot the campaign.

Referred back to committee.

iii. **Policy motion: Resolution opposing Phillips 66 Santa Maria Refinery crude by rail operation**

The proposed Phillips 66 oil train offloading facility in San Luis Obispo County would bring nearly 3 million gallons of toxic crude oil per day into California. These mile-and-a-half long oil trains carry oil in unsafe tank cars through communities and over precious watersheds.

WHEREAS, the US and Canadian rail companies are common carriers, meaning they are required to carry whatever product shippers wish to put on the rail lines resulting in a 4,000% increase in crude by rail being carried on the rail lines in the past 3 years,

WHEREAS, this increase in Crude By Rail transportation has resulted in several disasters in the US and Canada (Lac Megantic, Quebec, Casselton, North Dakota, Hammond, Indiana, Aliceville, Alabama, Lynchburg, Virginia as well as four in the last weeks) which have resulted in the loss of human life and billions of dollars of damages to communities and their surrounding environment,

WHEREAS, the people of Los Angeles are concerned with the increase in oil-train traffic through many densely populated areas and the risk it poses to our city of almost four million people due to the Phillips 66 oil train off-loading facility expansion in San Luis Obispo County,

WHEREAS, the Revised Draft Environmental Impact Report (RDEIR) concludes that the proposed Phillips 66 rail spur would cause significant and unavoidable rail accident hazard risks along the main rail line that could result in oil spills, fires, and explosions near populated areas,

WHEREAS, the transport of crude oil by 100-car 1.4-mile long unit trains to the Santa Maria Refinery would occur on the Union Pacific railroad tracks through the City of Los Angeles from the Port of LA or Colton toward San Luis Obispo County, creating even more diesel pollution in already disproportionately impacted communities,

WHEREAS, our current rail system is designed to connect residents to their destinations throughout Southern California, not to move large quantities of hazardous materials like crude oil,

WHEREAS, an analysis of potential blast zone radii of rail lines carrying toxic and volatile crude from the San Fernando Valley all the way through South LA and the Harbor Area would impact homes, schools, parks, and businesses located adjacent to the tracks,

WHEREAS, the same blast zone map indicates the risk to a significant stretch of the Los Angeles River destined to receive $1 billion in local, state and federal investment over several years to overhaul much of an 11-mile soft-bottomed stretch of the river between Griffith Park and downtown,

WHEREAS, previous rail car derailment explosions in North America have demonstrated most emergency responders, including those in the City of Los Angeles, do not have sufficient equipment and supplies, such as fire suppression

foam, to adequately respond to a catastrophic explosion of a rail car derailment explosion,

WHEREAS, the RDEIR does not evaluate the relative air quality or greenhouse gas emissions for the Los Angeles region,

WHEREAS, the Mar Vista Community Council sees impacts to our local and regional community from trans-shipment of tar sands crude through our communities as vital to our interests, taxing emergency responders and harming regional air, land and water quality resources,

THEREFORE BE IT RESOLVED, the Mar Vista Community Council asserts the only San Luis Obispo County Planning Commission action that would avoid this public safety risk to Los Angeles County and beyond is denial of the project,

THEREFORE BE IT ALSO RESOLVED, the Mar Vista Community Council requests the City of Los Angeles City Council write a letter of opposition to the San Luis Obispo County Planning Commission to deny this project a permit until such time as it can be proven to be safe.

Referred back to committee.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair & T&I

i. **Policy motion: Cost of building permit appeals**

City shall revise appeals process for Building Permits. Appeals of DBS determinations shall be done via the same simple process as appeals of Planning Dept. and Planning Commission determinations with similar fees. DBS "appeals" shall not be treated as a new case with public notification and CEQA requirements, because it is an appeal. An appeal is not a new proposed development project; it is an appeal of an already filed development project.

Passed unanimously on consent.

ii. **Policy motion: Support for Council Files 15-0020 [Collecting Fees Related to Condition Compliance] and 15-0135 [Planning's CCU Fee Ordinance to support MViP Monitoring, Verification & Inspection Program]**

MVCC supports Council Files 15-0020 and 15-0135 (http://cityclerk.lacity.org/lacityclerkconnect/) asking that the Planning Department report back in 45 days on the best practices of other jurisdictions, including the County of Los Angeles, to ensure proper resource allocation for condition inspections and enforcement AND further asks that the Council instruct the Planning Department, in consultation with the City Attorney and any other appropriate City department, bureau, or agency, to work cooperatively to propose a method by which inspection fees related to condition compliance are required and collected by the City prior to the release of any final approval of a projects.

Passed unanimously on consent.

iii. **Policy motion: Streamlining community improvement projects (Council File 14-1624)**

MVCC requests the Department of Public Works, with the assistance and cooperation of the Department of Transportation, City Planning, City Attorney, Department of Neighborhood Empowerment, City Administrative Officer and the Chief Legislative Analyst, be instructed to prepare and present a report setting forth ways and means by which the City of Los Angeles may best serve community organizations seeking to undertake community improvement projects. The report should include but not be limited to a discussion of the following key elements: establishing a single point of contact for inquires and technical assistance; identifying efficiencies and streamlining of all existing processes and permits; resolution of liability responsibilities which can hinder volunteer efforts; and outreach strategy for stakeholder input.

Passed unanimously on consent.

g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair

Two motions didn't make it on to agenda:

- Grandview and McBride (special ed) merged; needs playground equipment.
- Venice High School requested ink for their new wireless printer.

Mandarin Immersion Program meeting will be loud

Venice High School students arrested for sexual misconduct. Spirit campaign: all community groups are asked to show explicit support and funding to recognize kids that have conducted themselves well. Hoping to bring in kids to BOD meeting, present certificates.

- Rob Kadota suggestions: Youth Service Luncheon – will send invite to Sara; participate in National Night Out; YMCA Youth in Government
- Bill Scheding: Neighborhood Council voting age is 16; should reach out to kids
- Ken Alpren: would like non-voting student representative on BOD
- MVCC: other NCs don't allow anyone who shows up to vote, have specific membership

h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair

i. **Safety and Security Committee** – Rob Kadota, Chair

i. **Administrative motion: Zone Safety Director Program**

Establish a Safety Zone Director program to strengthen and build a public safety network of volunteers that works with local organizations to support neighborhood watch programs, disaster preparedness, risk reduction and safety initiatives.

Passed unanimously on consent.

j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair

- Meeting April 22; looking at website vendors is on the agenda

l. **Elections and By-laws**- Bill Scheding, chair

m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair

AIP is cohosting Senior Scam Stopper Seminar with L. A. County Board Supervisor Mark Ridley Thomas on May 21.

i. **Policy motion: Support of Senate Bill 128**

The Mar Vista Community Council supports the passage of SB128. Specifically, this bill will allow terminally ill patients the right to obtain a prescription from his or her physician for medication to be self-administered. It requires two physicians to confirm a prognosis of six months or less to live, a written request and two oral requests to be made a minimum of 15 days apart, and two witnesses to attest to the request. The two physicians must also ensure that the patient has the mental competency to make health care decisions for him or herself.

The Mar Vista Community Council also urges the Los Angeles County District Attorney to deprioritize prosecution of physicians and family members supporting death with dignity decisions of terminally ill, mentally competent individuals. Currently five states — New Mexico, Vermont, Montana, Oregon and Washington — have passed Death with Dignity policies to expand end-of-life options for competent, terminally ill patients.

If the L.A. County District Attorney were to deprioritize the prosecution of physicians and family members supporting Death with Dignity options, it would ensure terminally ill individuals the right to preserve their dignity and manage their medications as they see fit through end of life. The L.A. County District Attorney's recognition of the medical practice of aid in dying would also grant physicians medical legitimacy in honoring the wishes of their patients to have a dignified end of life.

Discussion

Joe Barnes, Compassionate Choices

- Modeled on Oregon law--no evidence of abuse
- Cause of death: will be listed as the illness, not suicide

- Councilmember Koretz publically supported, has introduced language in support but hasn't reached floor
- Opposition: some in Catholic Church are against (some support), some in disability community are against (and a lot support)

Sherri: Akers: 23 at AIP meeting voted unanimously in favor; it is difficult to quality a prescription.

Motion to approve by Sherri Akers, 2nd by Ken Alpren; motion carried with two abstentions (Ken ALpren and Bill Scheding).

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**

    Series of meetings for Mandarin Immersion Program; it will be coming to BOD with a motion.

    CEQA meeting coming up; after that meeting, need BOD special meeting (comment period ends 5/11—day before next regular BOD meeting)
15. **Public Comment**
16. **Adjournment 9:27**

    Meeting adjourned at 9:27 P.M.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, March 10th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Presentations**
    a. The Hub on Venice – Spencer Gross (3 min)
    b. Big Blue Bus – Tim McCormack (15 min)
7. **Officers and Liaison Reports** (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Appointment of Sherri Akers as Neighborhood Council Sustainability Alliance Liaison
        ii. Appointment of Myra Boime as DWP MOU Liaison
        iii. Search for LANCC Liaison
        iv. Follow-up on ethics/funding training, possible motion to follow
        v. **Director's motion RE: City Hall Parking Permits**
        Mar Vista Community Council approves of obtaining City Hall parking permits for the MVCC Chair and Treasurer.
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds

according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

i. **APPROVAL** of February MER

ii. **Funding Motion: Spring GGS Newsletter, creation of Green Garden Showcase map**

Tickled Plum, not to exceed $500 (20 hours at $25 per hour)

i. **Funding Motion: MVCC Speed Trailer battery replacement**

DEKA model 8A27M, Sealed maintenance free deep cycle battery, not to exceed $350.00 (see Addendum A).

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta
k. Recode LA: Sharon Commins
l. Mar Vista Chamber of Commerce: Sarah Auerswald
j. Neighborhood Council Sustainability Alliance: Sherri Akers

8. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite
   c. Zone 3 – Bill Scheding
   d. Zone 4 - Michael Millman
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Valerie Davidson
9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
   a. **Executive & Finance Committee** - Bill Koontz, Chair
   b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
   c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
   d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs
      i. **Motion to ban leaf blowers at City and DWP facilities**

      All leaf blowers—whether powered by gas, electricity or battery—blow a mixture of fine particles into the air, particles that can go deep into the lungs. This mixture includes dust, fecal matter, pesticides, fungi, chemicals, fertilizers, spores, street dirt which can contain lead and gasoline, and anything else that happens to be in the vicinity of their use. Gas-fueled leaf blowers spew out additional air pollution in the form of unburned fossil fuel; one hour of use can create as much air pollution as a car driven for 100 miles.

      Los Angeles currently bans the use of gas leaf blowers within 500 feet of a residence due to noise—and not air—pollution. Many other cities have enacted leaf blower bans. Like Los Angeles, they have found the bans difficult to enforce.

      The Mar Vista Community Council requests enactment of a ban on the use of all types of leaf blowers at all City and Department of Water and Power controlled properties. In addition to being enforceable, this ban will

      - Reduce noise and air pollution.
      - Eliminate a health risk for anyone at or near the property—especially for those performing the landscape maintenance.
      - Allow the City and DWP to illustrate best practices and, thus, lead by example.

MVCC further points out that grass clippings and fallen leaves are a source of soil-building organic matter and also help retain moisture, reducing the landscape's watering requirements.

ii. **Motion supporting Green Streets Initiative** (see Addendum B)

The Mar Vista Community Council supports the Green Sustainable Streets Motion (Council File 14-0748) by council members Filipe Fuentes and Mike Bonin requiring all new street projects in the public right of way to incorporate storm water management elements. By adding green street elements, we can remove pollutants from water —and keep them out of the LA River, Ballona Creek and Santa Monica Bay—and capture water for groundwater recharge.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

i. **Director's request policy motion (has not been passed by T&I Committee) RE: MetroRail station for the Crenshaw/LAX Light Rail Line** (**to be forwarded to, if approved by the MVCC Board, to Metro and the offices of Councilmember Mike Bonin and Mayor Eric Garcetti):**

The Mar Vista Community Council supports:

a) Naming the recently-approved and planned MetroRail station for the Crenshaw/LAX Light Rail Line at 96th/Aviation as "LAX Transit Center"

b) Exploring any artistic/station design efforts to include pylons, consistent with the iconic pylons already located at LAX, at the future 96th/Aviation MetroRail station to establish this center as the rail/transit "Gateway to LAX" for commuters, visitors and tourists travelling to/from LAX.

c) Any efforts to facilitate bus and rail access to the future station at 96th and Aviation, and to facilitate transfer to the future LAX People Mover Line.

d) C onstruction of moving sidewalks with sufficient capacity (or sufficient for two passenger lanes on each walkway for both standing and walking pedestrians, on conveniently-designed, properly-located, and covered pedestrian bridges) from People Mover stations to each and every terminal, with a configuration to best encourage usage of the People Mover to access LAX airline terminals

e) Whenever possible, construction of moving sidewalks whenever possible and with sufficient capacity on conveniently-designed, properly-located, and covered pedestrian bridges) between airline terminals on opposite sides of the Central Terminal Area.

f) C onsistent with Mayor Garcetti's vision of City-wide free wi-fi and commercial development favorable to business and tourism, construction and implementation of more cell-phone and laptop plug-in stations, free wi-fi, and commercial development within LAX, as well as on those regions adjacent to the LAX People Mover and on Century Blvd.

g) Consideration and, if possible, implementation of ramps at all vertical circulation and connections between levels, in addition to escalators and elevators at the future Metro station at 96th/Aviation and at the LAX People Mover stations

f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair

i. **Motion approving planned development at 3351-3361 Overland Ave** (see Addendum C)

WHEREAS, the owner of the property located at 3351-3361 S. Overland Avenue has submitted plans to the City Planning Department (Case No. DIR 2014-4846) to construct 38-unit apartment building including a 32.5% Density Bonus, including 10% Very Low Income Housing Units with 2 on-menu incentives,

NOW THEREFORE, the Mar Vista Community Council recommends that the City approve the plans as submitted to the City, with the request that the developer consult with the Mar Vista Community Council on a landscape plan.

g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair

h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair

i. **Safety and Security Committee** – Rob Kadota, Chair

j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

i. **Policy motion RE: Historic Fire Station 62**

Whereas, the Mar Vista Community Council fully supports and affirms the preservation and repurposing of Historic Fire Station 62 [3631 Centinela Avenue, Mar Vista, CA 90066) for public use as a multipurpose community center as witnessed by numerous resolutions and stakeholder polls [see Addendum D]

Whereas, the opportunity for CD 11 to establish a constituent services center onsite is consistent with the goals and objectives for public uses of the property to benefit all stakeholders in Mar Vista

Therefore, be it resolved, that the Mar Vista Community Council offers its full support for including a CD 11 constituent services center as part of the community uses for the site.

k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair

l. **Elections and By-laws**- Bill Scheding, chair

m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, March 10th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:10 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), John Kutcha (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Ken Alpern, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Millman, Yvette Molinaro, Brad Wilhite
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 2015 Minutes** (public comment permitted) (1 min)
   - Motion to approve as amended by Bill Scheding, 2nd by Brad Wilhite. Motion carried with 9 ayes, 1 abstention (Yvette Molinaro)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   - Rob Kadota, chair, Safety & Security committee:
     - Introduced Jeremy Pollack; he plans to develop a safety director for each MVCC Zone.
     - Senior Lead Summit on March 24 at Manchester Recruitment Center
   - Bob Gould, WLA Chamber of Commerce (westlachamber.org):
     - WLA Chamber is reaching out to all NCs in area, doing survey on important issues to pass along result to government
     - Free mixers 3rd Thursday of every month; Governor Dukakis is March guest
     - Breakfast 1st Wednesday of each month
   - Sara Auerswald: notice on library that alley paving is April 11-12 *(see 5.a., CD 11 report)*
   - Robin Doyno: bike safety information available on back table; free membership in West Mar Vista Neighborhood Association
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Alley paving: 2 phases over weekends; looking at doing Friday-Saturday near the Farmers' Market (April 10-11); 2nd date not yet scheduled
      - Hike with Mike on March 28, 9:00 A.M. – noon in Temescal Canyon (http://www.11thdistrict.com/hike_with_mike_mar28).
   b. Mar Vista Recreation Center – Lizka Mendoza, Director
      - Winter programs completed; Mar Vista has 5 teams in All Star Tournament next week; 463 enrolled in youth soccer; Flashlight Egg Hunt March 28, 6:30 P.M.; Spring Eggstravaganza, April 4
      - Soccer Field redo is top on priority list—should have some movement within year; Lizka will make sure new surface doesn't raise health concerns
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
      - RVs on Sepulveda: Transportation Committee meeting on March 11; will soon put up signs for No RV Parking; looking for longer term solution
        - Brad Whilit: lots of RVs in neighborhood

- Will get list of allowed RV parking places to give to RVs
- ACE Program (Administrative Citation Enforcement): alternative method of enforcement for minor violations (such as noise) of LA Municipal Code; police & animal services can cite with fine

d. US 36 – Janice Hahn
e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
g. CA Assembly 47
h. CA Assembly 62
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
k. Dept of Neighborhood Empowerment – rep by Tom Soong
   - April 3rd: Code of Conduct deadline
   - May 3rd: bylaw amendments deadline
   - West area Ethics & Funding training: Thursday, March 26, at WLA Municipal Building
   - Civic University: partnership between Pat Brown Institute for Public Affairs at Cal State LA and the Office of Los Angeles Mayor Garcetti; program will be conducted over course of three evenings (April 2nd, 8th & 16th, 6–9 P.M.) downtown; would like 1 male, 1 female from each NC to attend.
   - Online voting: don't have to do, but NCs have the option for 2016 NC elections; using Every Vote Counts—supposed to be very secure
   - Congress of Neighborhoods is September 26

6. **Presentations**
   a. The Hub on Venice – Spencer Gross (3 min)
      - Presentation cancelled
   b. Big Blue Bus – Tim McCormack (15 min)
      - EXPO Integration Plan (more information at http://bigbluebus.com)
         - Want to be very aggressive, maximize use of stations
         - Public Hearing March 24; going to with final plan in June, have done lots of community outreach, held Marina Del Rey rationalization meeting
         - Goals: denser grid of North-South service; remove service duplication; improve speed and reliability; increase service on major ridership corridors; inclusion of last mile service to all regional destinations
         - Plan has new/changed routes, enhanced rapid corridors; Metro line form Valley will go to EXPO Sepulveda station
         - Problem: EXPO stations don't provide for drop off/pick up
         - Soft boundaries with Culver City Municipal Bus and LA MTA; coordinating routes; regional funding for all three agencies; Santa Monica City Council is governing body for Big Blue Bus
         - Bus Stop installation August–December, 2015
         - EXPO line will run later than bus; looking at Uber-type app for a few routes
      - Jay Greenstein (Chief Field and Transportation Deputy for Council Member Paul Koretz): held lots of meetings with EXPO & Big Blue Bus; Sepulveda Station will be major connection point

7. **Officers and Liaison Reports** (Action items included with public comment permitted, 1 min per speaker)
   a. Chair-Bill Koontz
      i. Appointment of Sherri Akers as Neighborhood Council Sustainability Alliance Liaison
         - Motion to approve by Bill Koontz, 2nd by Ken Apern; motion carried unanimously
      ii. Appointment of Myra Boime as DWP MOU Liaison
         - Motion to approve by Bill Koontz, 2nd by Valerie Davidson, motion carried unanimously
         - Note to Secretary: Need to send new board roster downtown

iii. Search for LANCC Liaison
- No one has stepped up; Bill has begged and pleaded

iv. Follow-up on ethics/funding training, possible motion to follow

v. **Director's motion RE: City Hall Parking Permits**
Mar Vista Community Council approves of obtaining City Hall parking permits for the MVCC Chair and Treasurer.
- Allowed 2 per NC
- Motion to approve by Bill Scheding, 2nd by Ken Aprin; motion carried unanimously

b. First Vice Chair – Mitchell Rishe

c. Second Vice Chair – John Kuchta
- Web support vendor list not yet approved

d. Secretary –Melissa Stoller

e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

i. **APPROVAL** of February MER
- Motion to approve by Bill Koontz, 2nd by John Kutcha; motion carried unanimously
- Trying to claw back $5000 allocated for alley paving; not likely

ii. **Funding Motion: Spring GGS Newsletter, creation of Green Garden Showcase map**
Tickled Plum, not to exceed $500 (20 hours at $25 per hour)
- Motion to table by Bill Scheding, 2nd by John Kutcha; motion carried unanimously
- Need Funding Request form

i. **Funding Motion: MVCC Speed Trailer battery replacement**
DEKA model 8A27M, Sealed maintenance free deep cycle battery, not to exceed $350.00 (see Addendum A).
- Will first try car battery before purchasing; BillS, John 2nd; requests to use: ask T&I
- Motion to approve by Bill Scheding, 2nd by John Kutcha; motion carried unanimously
- No list of potential placement as yet
- Information is not shared with DOT so it won't lead to speed limit increase

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
- LADOT states "cars appear to be going faster than they really are"
- Next meeting is March 18; agenda closes March 14, 1:00 pm
- Getting complaints about new stop signs at Wade & Venice; will be on agenda
- Farmers' Market signs still say 4:00 P.M.
- Valerie: wants to know when they'll work on cut thru traffic

g. DWP MOU/LANCC Liaison-Open
- LANCC discussed voting on-line, wants city to reach out to every neighborhood council

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
- Reservoirs are down

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
- Held Lessons Learned meeting
- Trying to get money due; will use to pay permit fees

j. City Budget: John Kuchta
- Jay Handel is starting podcast for City Budget Advocates

k. Recode LA: Sharon Commins

- Recode LA is working on downtown code because that's what's funded; flattening the code, not looking at ordinances. Last meeting dealt with downtown code, what happens to nonconforming uses
- Meeting on 4th Wed of March will have baseline mationization presentation; City Council has added mationization to the recode process
- Decision in lawsuit over Hollywood Community Plan blew up all plans; need money to re-do and non is allocated

l. Mar Vista Chamber of Commerce: Sarah Auerswald
- Launched membership drive
- March 19th meeting: SEO for small business, tips on going mobile
- Bowlero Mar Vista ribbon cutting April 9th

m. Neighborhood Council Sustainability Alliance: Sherri Akers
- Launch event February 21, lots of enthusiasm
- Emphasis is on outreach to get representation in all council districts

8. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

a. Zone 1 – Ken Alpern
- Westside Village Homeowners Association meeting; Paul Koretz plans to put no RV parking signs between National & Pico on Sepulveda
- Palms Neighborhood Council meeting on March 11: vision for Overland
- Military Ave. will be shut down week of March 16 for Expo resurfacing
- SV608, Right to Rest Act: T&I committee should look at

b. Zone 2 – Brad Wilhite
- All quiet except RVs

c. Zone 3 – Bill Scheding

d. Zone 4 - Michael Millman
- MV Neighborhood Association pot luck is June 7

e. Zone 5 – Michelle Krupkin
- Compiling list for potholes; allowed 3 per zone
- Playa Vista movie theater is opening
- Mar Vista Library needs projector, getting quotes to repair or buy

f. Zone 6 – Valerie Davidson
- Lots of burglaries, suspicious people casing houses;
- Meeting March 11 at 3212 Maplewood Ave. to form neighborhood watch group; thinking of hiring private security

9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

Motion to approve all item 9 motions on consent by John Kutcha, 2nd by ?; motion carries unanimously

a. **Executive & Finance Committee** - Bill Koontz, Chair

b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
- Green Garden Showcase is Saturday, March 25; 54 gardens; would like all board members to volunteer at Showcase Central

c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs

i. **Motion to ban leaf blowers at City and DWP facilities**

All leaf blowers—whether powered by gas, electricity or battery—blow a mixture of fine particles into the air, particles that can go deep into the lungs. This mixture includes dust, fecal matter, pesticides, fungi, chemicals, fertilizers,

spores, street dirt which can contain lead and gasoline, and anything else that happens to be in the vicinity of their use. Gas-fueled leaf blowers spew out additional air pollution in the form of unburned fossil fuel; one hour of use can create as much air pollution as a car driven for 100 miles.

Los Angeles currently bans the use of gas leaf blowers within 500 feet of a residence due to noise—and not air—pollution. Many other cities have enacted leaf blower bans. Like Los Angeles, they have found the bans difficult to enforce.

The Mar Vista Community Council requests enactment of a ban on the use of all types of leaf blowers at all City and Department of Water and Power controlled properties. In addition to being enforceable, this ban will

- Reduce noise and air pollution.
- Eliminate a health risk for anyone at or near the property—especially for those performing the landscape maintenance.
- Allow the City and DWP to illustrate best practices and, thus, lead by example.

MVCC further points out that grass clippings and fallen leaves are a source of soil-building organic matter and also help retain moisture, reducing the landscape's watering requirements.

ii. **Motion supporting Green Streets Initiative** (see Addendum B)

The Mar Vista Community Council supports the Green Sustainable Streets Motion (Council File 14-0748) by council members Filipe Fuentes and Mike Bonin requiring all new street projects in the public right of way to incorporate storm water management elements. By adding green street elements, we can remove pollutants from water —and keep them out of the LA River, Ballona Creek and Santa Monica Bay—and capture water for groundwater recharge.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

i. **Director's request policy motion (has not been passed by T&I Committee) RE: MetroRail station for the Crenshaw/LAX Light Rail Line** (**to be forwarded to, if approved by the MVCC Board, to Metro and the offices of Councilmember Mike Bonin and Mayor Eric Garcetti):**

The Mar Vista Community Council supports:

a) Naming the recently-approved and planned MetroRail station for the Crenshaw/LAX Light Rail Line at 96th/Aviation as "LAX Transit Center"

b) Exploring any artistic/station design efforts to include pylons, consistent with the iconic pylons already located at LAX, at the future 96th/Aviation MetroRail station to establish this center as the rail/transit "Gateway to LAX" for commuters, visitors and tourists travelling to/from LAX.

c) Any efforts to facilitate bus and rail access to the future station at 96th and Aviation, and to facilitate transfer to the future LAX People Mover Line.

d) Construction of moving sidewalks with sufficient capacity (or sufficient for two passenger lanes on each walkway for both standing and walking pedestrians, on conveniently-designed, properly-located, and covered pedestrian bridges) from People Mover stations to each and every terminal, with a configuration to best encourage usage of the People Mover to access LAX airline terminals

e) Whenever possible, construction of moving sidewalks whenever possible and with sufficient capacity on conveniently-designed, properly-located, and covered pedestrian bridges) between airline terminals on opposite sides of the Central Terminal Area.

f) Consistent with Mayor Garcetti's vision of City-wide free wi-fi and commercial development favorable to business and tourism, construction and implementation of more cell-phone and laptop plug-in stations, free wi-fi, and commercial development within LAX, as well as on those regions adjacent to the LAX People Mover and on Century Blvd.

g) Consideration and, if possible, implementation of ramps at all vertical circulation and connections between levels, in addition to escalators and elevators at the future Metro station at 96th/Aviation and at the LAX People Mover stations

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f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair

i. **Motion approving planned development at 3351-3361 Overland Ave** (see Addendum C)

WHEREAS, the owner of the property located at 3351-3361 S. Overland Avenue has submitted plans to the City Planning Department (Case No. DIR 2014-4846) to construct 38-unit apartment building including a 32.5% Density Bonus, including 10% Very Low Income Housing Units with 2 on-menu incentives,

NOW THEREFORE, the Mar Vista Community Council recommends that the City approve the plans as submitted to the City, with the request that the developer consult with the Mar Vista Community Council on a landscape plan.

g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair

h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair

i. **Safety and Security Committee** – Rob Kadota, Chair

j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

i. **Policy motion RE: Historic Fire Station 62**

Whereas, the Mar Vista Community Council fully supports and affirms the preservation and repurposing of Historic Fire Station 62 [3631 Centinela Avenue, Mar Vista, CA 90066) for public use as a multipurpose community center as witnessed by numerous resolutions and stakeholder polls [see Addendum D]

Whereas, the opportunity for CD 11 to establish a constituent services center onsite is consistent with the goals and objectives for public uses of the property to benefit all stakeholders in Mar Vista

Therefore, be it resolved, that the Mar Vista Community Council offers its full support for including a CD 11 constituent services center as part of the community uses for the site.

k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair

l. **Elections and By-laws**- Bill Scheding, chair

m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair

- AIP is getting lots of elected's attention; Assemblyman Sebastian Ridley-Thomas is holding a senior seminar, tentatively on May 21
- Jewish Family Services is collaborating with AIP on a series of classes

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**

- Sherri Akers: Water Wise Expo is March 29 at the Farmers' Market
- Bill Koontz: "Mar Vista against illegal parking" signs available on the back table are not from MVCC; the RVs are not parked illegally
- Ken Alpern: Tuesday, April 4th is PLUM and T&I joint meeting
-

16. **Adjournment**

Meeting adjourned at 8:59 P.M.

* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, February 10th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:11 P.M.
   Quorum present: Bill Koontz (chair), Bill Scheding (treasurer), Mitchell Rishe (1st vice chair), John Kutcha (2nd vice chair), Melissa Stoller (secretary), Sherri Akers, Ken Alprin, Valerie Davidson, Robin Doyno, Michelle Krupkin, Michael Mellman, Brad Wilhite
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 2014 Minutes** (public comment permitted) (1 min)
   Minutes approved with one abstention (John Kutcha)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   - Bob Gould, WLA Chamber of Commerce (westlachamber.org): doing outreach to get more involved with Westside Neighborhood Councils. Interested in having NCs come to events and join the WLA Chamber. Upcoming events:
     - February 19: mixer at Lenny's Deli, 5:00-7:00 P.M.
     - March 19: mixer at Delphi Greek Restaurant, 5:30-7:30 P.M. with special guest former governor Michael Dukakis
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - Great Street Open House was very well attended, lots of good feedback (350 surveys)
      - New stop signs installed at Pacific and Wade
      - Working with DWP to address concerns about landscaping at substation on Venice at McLaughlin
      - Volunteers are cleaning up NE corner of Venice and McLaughlin; Office of Community Beautification is providing tools. Carter Rubin (mayor's office) might be able to fast track action.
      - Ken Alprin (when do we look at northern alleyway?): need to be sure southern alleyway is properly done
      - Val Davidson (status of changing Venice Blvd. from state to city?): being hashed out downtown; state has to either make improvements or give the city a chunk of money.
   b. Mar Vista Recreation Center – Lizka Mendoza, Director
      - Lizka Mendoza (Lizka.mendoza@lacity.org) introduced herself; she was previously at Oakwood Recreation Center
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn
   e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
   f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
   g. CA Assembly 47
   h. CA Assembly 62

i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov

j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm, Daniel.tamm@lacity.org

- Mayor Garcetti has made transportation funding a priority; Federal budget allocates $330 million for LA transit projects
- LHASA homeless count: every Westside neighborhood participated
- Settlement for VA facility: WLA VA campus will provide housing and supportive resources. Mayor Garcetti pledged to end veteran homelessness by end of 2015; he's pushing "housing first," and then substance abuse recovery. There will be a briefing on veteran's homelessness on February 23, 10:00–11:30 A.M., in council chambers; contact Daniel for free parking pass at least 48 hours before.
- Reinvigorated LA Youth Council is accepting applications through Sunday, February 7 at mayor.youthcouncil@lacity.org. Daniel will vet applicants, find about 25 students—ideally 10th graders who yearn for civic engagement & community service projects.
- Mayor proposed raising minimum wage to $13.25 by 2017, and then tying it to CPI; City Council is considering proposal, wants higher wage. Daniel can meet with small groups (house parties) to discuss.

6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)

a. Chair-Bill Koontz

i. Follow up on ethics training and code of conduct policy signatures

- Robin, Brad & Sherri need to complete funding training
- Most have completed ethics training; Empower website not yet updated the website

ii. Process for policy motion letters (see Addendum A)

- Much discussion about proposed process—timing of actions, role of the committee; referred to Elections & Bylaws Committee to tweak.
- Bill will request permission for Melissa (BOD Secretary) to post to council files on city's website

b. First Vice Chair – Mitchell Rishe

c. Second Vice Chair – John Kuchta

- MVCC website
  - John is getting list of approved contractors from Empower; then will put changes to make it easier to use out to bid. Those wanting changes should write them out and submit to John; include screen shots.
  - Bill Scheding: BOD should vet list of changes before it goes out to bid

d. Secretary –Melissa Stoller

e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

- There are all new paperwork requirements for MER.
- Motion to take all funding motions on consent by Bill Scheding, John Kutcha 2nd; Bill Koontz asked to pull out item 6.e.ii. Motion to pull January MER from consent calendar carried unanimously.
- Discussion of education funding measures:
  - Ken Aprin commended Education Committee and asked if there's anything else Sara Roos feels we should be funding—anything she will have regrets about later. Response: "No, they will come back later."
  - Valerie Davidson wants to know if we've received photos/acknowledgement of prior education funds spent; expressed that it's nice to have something from schools after funded project is completed and know it has a plaque on it—kids at BOD meeting, photos. Sara Roos pledges to bring back news & evidence

- Sara Roos sent invitation to all 16 public schools in Mar Vista; 9 submitted funding requests and gave presentations. The committee discussed and prioritized the requests at its following meeting.
- Mitch Rishe wants to know if we are making sure that, over time, funding is equal.

- CONSENT: Motion to approve all funding requests except 6.e.ii by Bill Scheding, 2nd by John Kutcha. Motion carried unanimously.

i. **APPROVAL** of December MER

ii **APPROVAL** of January MER

- Motion to approve by Bill Scheding, 2nd John Kutcha
- Discussion:
  - Overdraft explanation: we were dinged for going over Empower limit, then un-dinged
  - MVCC has $30,000 to spend by June
  - Valerie Davidson requested inclusion of more descriptions on funding sheet
- Motion carries unanimously

iii. **Funding Motion: Spring GGS Newsletter, Layout Of Camera Ready Copy**

Tickled Plum, not to exceed $375 (15 hours at $25 per hour)

iv. **Funding Motion: Spring GGS Newsletter, Printing**

Pacific Rim, $4000

Next year: ask Pacific Rim if they're doing printing, or farming it out

v. **Funding Motion: Spring GGS Newsletter, Distribution**

CBS Adv. Distributors, $1700

vi. **Funding Motion (Green): Green Garden Showcase**

The Mar Vista Community Council authorizes $300 in support of the Mar Vista Green Garden Showcase for the following expenditures -

$50 -	Bamboo poles (for flags)
$150	Food, paper goods and utensils for Garden Hosts Welcome Event
$100	Marketing materials

vii. **Funding Motion (Green): portable laptop battery charger**

The Mar Vista Community Council authorizes the expenditure of up to $350 to purchase 17W Solar Charger Kit (http://www.voltaicsystems.com/17-watt-kit) and a 10' extension cord from Voltaic. The kit includes a solar panel and battery capable of charging laptops and tablets. It will be used for presentations/displays at the Green Tent as well as at Showcase Central. And be available for use by other MVCC events.

viii. **Funding Motion (EXFIN): Budget Fund Transfer**

Transfer $3000 from the Community Improvement Grant budget to Neighborhood Purpose Grants

ix. **Funding Motion (EAC): Venice High School Neighborhood Purpose Grant**

Wireless printer and ink for mobile language lab, $360.69

x. **Funding Motion (EAC): Beethoven Elementary School Neighborhood Purpose Grant**

$2000 to encourage STEM:

- Storage unit for specialized science program, "Trash for Teaching," materials: $1250
- Professional development materials, $750

xi. **Funding Motion (EAC): Walgrove Elementary School Neighborhood Purpose Grant**

"Seussical" production costs: $1,640

xii. **Funding Motion (EAC): Mar Vista Elementary School Neighborhood Purpose Grant**

Purchase and processing of 55 library-bound books for school library, $980.20

xiii. **Funding Motion (EAC): Palms Middle School Neighborhood Purpose Grant**
Irrigation installation and repairs for large garden project, $2,000

xiv. **Funding Motion (EAC): Mark Twain Middle School Neighborhood Purpose Grant**
Portable PA system for use at school and community events, $1,000

xv. **Funding Motion (EAC): Richland Elementary School Neighborhood Purpose Grant**
Six thermoplastic benches, $3000

xvi. **Funding Motion (Outreach):**
Four ads in the Mar Vista Neighborhood Association newsletter over the course of 2015, $120

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
- New LAPD representative officer Martin Barocio attended 1st meeting of year. The meeting mostly handled leftovers from November meeting.
- New signs at Farmers' Market are slowly being put up.
- Next meeting is March 18; agenda closes Saturday before.

g. DWP MOU/LANCC Liaison-Open

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro

j. City Budget: John Kuchta
- Budget Forum 2.0 is coming soon; press release will be on website shortly

k. Recode LA: Sharon Commins
- Presentation on mansionization ordinance at January meeting (Council File 14-0656): Mansioization linked with recode effort; planners want more flavors of residential zones; 17 neighborhoods being studied for possible changes (Mar Vista is one)
- Transit neighborhood plans are not part of recode; they will be approved first,and folded in later/ The are concerns about size and density (over-densification); MVCC Zone 2 is in Sepulveda Expo station zone.

l. Mar Vista Chamber of Commerce: Sarah Auerswald
- February monthly coffee is 3rd Thursday, 9:30 A.M., at Coffee Connection. Debbie Rocklin will give presentation about tax preparation
- Evening meeting on March 2nd, 6:00–8:00 P.M.: Great Streets presentation
- Membership drive starts March 1.
- Rustic Kitchen is opening on Centinela near Palms.
- Several new restaurants are opening on Washington Blvd near Wade.
- Carving Board is opening on Gateway, west of Barrington.

7. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

a. Zone 1 – Ken Alpern
- Palms Emergency Preparedness Committee, meets 2nd Tuesday of month, Rob Kadota is attending
- Expo Phase II will have pre-operational trains running toward end of this year.
- There are concerns about Pico overdevelopment.
- Paul Koretz is speaking to the Westside Village Homeowners Association

b. Zone 2 – Brad Wilhite
- Meeting on Wednesday, February 11, 7:00 P.M., at St. Andrews Church to discuss traffic in our area.

c. Zone 3 – Bill Scheding
- Hilltop is putting $60,000 into North Venice trailer that holds emergency supplies.
- Reports of people walking around and trying door handles on cars.

d. Zone 4 - Michael Millman
- Debbie Rochlin is chairing MVNA block party, June 7, on Barry.

- Taking on 43 fractured/collapsed sidewalks, will get that resolved.
- Looking at parking configuration at/near Mar Vista Lanes.
- PLUM: was lied to about Mar Vista Lanes sign; sign may come up for approval again.

e. Zone 5 – Michelle Krupkin
- Grandview Market is getting stock from now closed Venice Ranch.
- At least 3 crime reports on North Park: people knocking on door with folded paper (no clipboard).
- Oliver complex next to Payless on Marcasel is nearing completion; retail on bottom, residential above.

f. Zone 6 – Valerie Davidson
- Some burglaries; "knock-knockers" are coming around.
- airline pilots association is suing 11 people to recover attorney fees.
- Lots of traffic accidents, people upset about not getting help on Walgrove-Rose corridor.

8. **Committee Reports & Consent Calendar** - Actx where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
- Motion to take all Green Committee motions (8.d) on consent by Bill Koontz; consent motion carried unanimously.
- Motion to approve Green Committee motions by Bill Scheding carried unanimously.

a. **Executive & Finance Committee** - Bill Koontz, Chair
b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs

i. **Motion supporting Urban Agriculture Incentive Zones**

The Mar Vista Community Council supports Councilmember Filipe Fuentes and Curren Price's Urban Agriculture Incentive Zones motion (Addendum B). In addition to encouraging productive uses for vacant land, the implementation of Urban Agriculture Incentive Zones in the city would also increase access to fruits and vegetables in areas that currently lack fresh foods. ***The Mar Vista Community Council requests that the motion be amended to strongly encourage the use of organic and sustainable growing practices and that it require that GMO seeds and plants be banned.***

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ii. **Motion regarding Sustainable Landscaping at LADWP and LA City facilities**

The Mar Vista Community Council notes that the lawn at the Los Angeles Department of Water and Power (LADWP) facility at the intersection of Venice and McLaughlin has been replaced with artificial turf, non-native plants and without any grading for rainwater capture. As recent news coverage of L.A. rains showed, one inch of rain generates 8 billion gallons of runoff in the City. This urban runoff is the #1 source of ocean pollution, and could be a valuable source of irrigation, groundwater recharge, and enhancing stream flows. Also, landscapes with living soil can help sequester carbon (http://e360.yale.edu/feature/soil_as_carbon_storehouse_new_weapon_in_climate_fight/2744/). Artificial turf compacts and kills soil microbiology, generating runoff and providing no carbon sequestering benefit. It also creates rather than mitigates the heat island effect caused by the changing climate. LADWP's own turf replacement rebate (https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-conservation/a-w-c-landscap?_adf.ctrl-state=qhcmd28t2_4&_afrLoop=1033234959869636) "encourages" use of "California Friendly© plants, mulch, and permeable pathways," though does not require grading for rainwater capture as well as use of climate-appropriate plants, mulch and efficient irrigation. Native plants provide a much needed habitat for local birds, polinators and wildlife which should be encouraged.

The Mar Vista Community Council requests that as lawns are replaced at LADWP facilities, and all other LA City facilities, they be required to retrofit following the watershed approach. The watershed approach:

- Uses rainwater as a source of irrigation;
- Creates permeable, living soil using natural woodchip mulch or leaf litter, and permeable hardscaping;
- Utilizes climate-appropriate plants and drip irrigation.

While the City is urging homeowners and businesses to replace turf lawn with sustainable alternatives, it is imperative that the LADWP and the City of Los Angeles utilize this opportunity to set an example by re-landscaping to conserve and capture water while creating a habitat that fosters the pollinators needed to support our ecosystem. Such landscaping will serve to promote environmental awareness and responsible landscaping choices by others in a highly visible setting and will ultimately save the city money in water usage, maintenance, and prevention of storm water runoff fines.

We stand ready to provide contacts and resource information as needed for assistance.

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e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs

f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair

g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair

i. **Motion Supporting a French Immersion Program at Richland**

In order to cultivate political support for Mar Vista's reputation among young families as a community with excellent public education, the Education, Arts and Culture Committee, working with Richland Avenue Elementary School principal Gerard Granade, shall draft a letter to Steve Zimmer, LAUSD Board of Education member for District 4, and Mike Bonin, Los Angeles City Council District 11 councilmember, articulating a public interest in supporting a French Immersion program at Richland.

- The following revised motion was submitted:

  Send the following letter of support to Zimmer and others on LAUSD Board when the French Immersion Program at Richland comes on agenda (probably March):

  Dear Board Member Zimmer,

  The Mar Vista Community Council (MVCC) appreciates recent efforts to articulate coherent instructional pathways throughout our "VenMar Family of Schools". We support your initiative to sustain our strong climate of multiculturalism and language learning in the community. Spanish, Mandarin and German dual-language immersion programs on the westside are enormously popular, and we are excited about the way these excellent learning models enhance the quality of life in Mar Vista.

  Consequently we are eager to see the French Immersion program proposed for Richland Avenue Elementary find favor with LAUSD. Already more than fifty families have expressed a firm interest in the program; there is little question it would be popular. We consider the prospect of attracting young families by these pedagogically superior programs, as well as the presence of these families in our midst to be so beneficial for life in Mar Vista as to outweigh whatever logistical impediments might challenge the program's implementation.

  Thank you for doing whatever it takes to initiate Richland ES' proposed French Immersion program.

- Motion to approve motion as revised by Bill Koontz, Bill Scheding 2nd. Motion carried unanimously.

h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair

i. **Safety and Security Committee** – Rob Kadota, Chair

j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair
l. **Elections and By-laws**- Bill Scheding, chair
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair

- -Next meeting is February 19. Guest speaker: affordable housing for seniors.

9. **Discussion Calender**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
    - Sherri Akers: The Neighborhood Council Sustainability Alliance has representatives from 6 of the 12 regions; representatives from 9 Neighborhood Councils are on the steering committee. It looks like NCSA will have a strong launch. NCSA will replicate citywide what MVCC Green Committee has accomplished.
    - Robin Doyno requests volunteers to email him to sign up for 1st or 2nd shift at MVCC table; Doodle will be up soon
15. **Adjournment**

    Meeting adjourned at 8:59 P.M.

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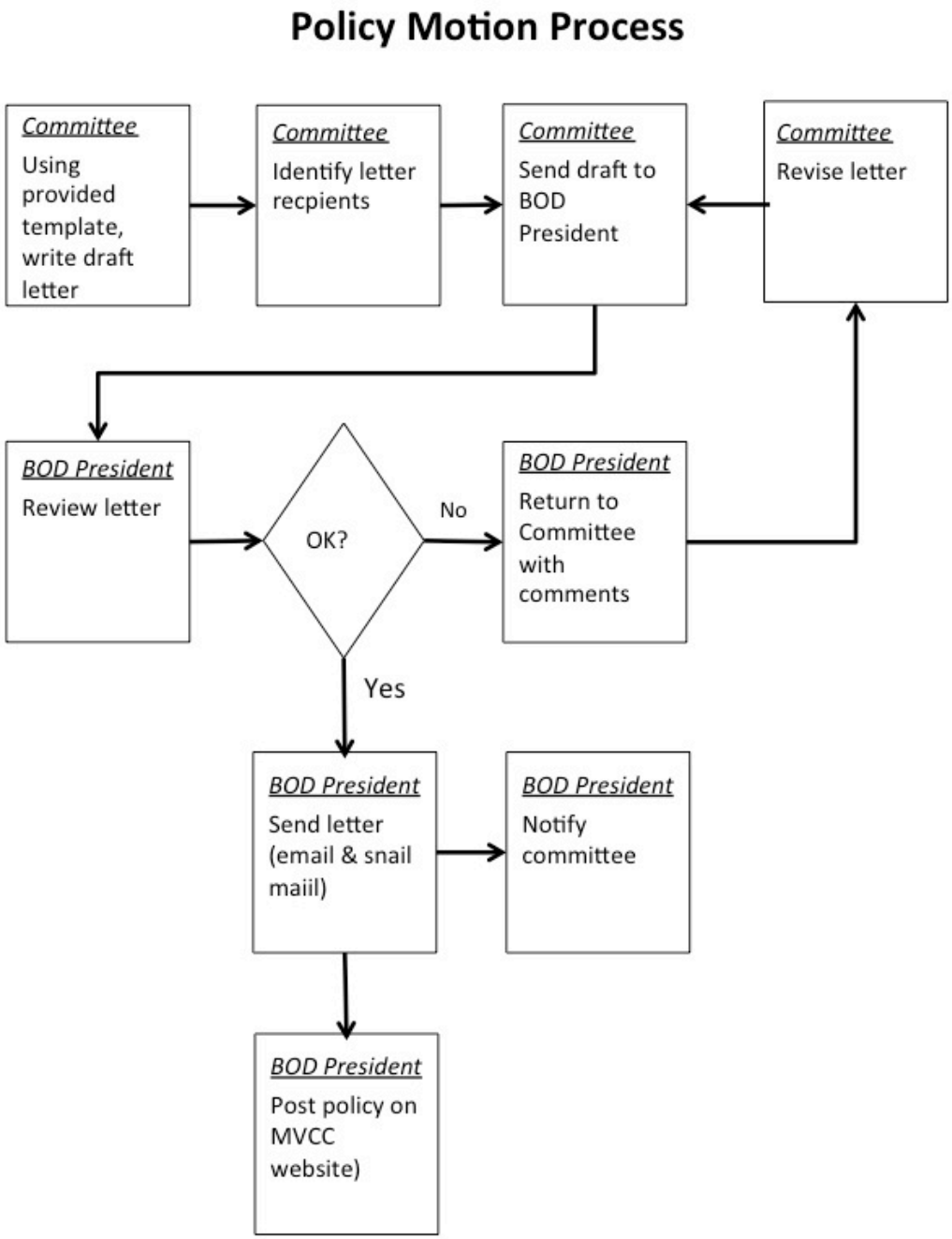
* *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

** *As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days pior to the meeting you wish to attend by contacting chair@marvista.org.*

Addendum A


Policy Motion Process
Committee
Using provided template, write draft letter
Committee
Identify letter recpients
Committee
Send draft to BOD President
Committee
Revise letter
BOD President
Review letter
OK?
No
BOD President
Return to Committee with comments
Yes
BOD President
Send letter (email & snail maiil)
BOD President
Notify committee
BOD President
Post policy on MVCC website)

Addendum B

14-1378

Motion

PLANNING & LAND USE MANAGEMENT

The *Urban Agriculture Incentive Zones Act*, AB 551 (Ting), encourages the development of vacant, unproductive land for growing food.

AB 551 allows cities, with approval from the county board of supervisors, to designate Urban Agriculture Incentive Zones. Within these zones, property owners who allow their land to be used for agriculture purposes for a minimum of five years can receive a property tax adjustment; their land would be reassessed at the average statewide irrigated agriculture lands rate.

The property tax adjustment is intended to incentivize landowners who are not utilizing their property to make it available for urban agriculture. Parcels would be eligible for the incentive if they are between 0.10 and 3 acres in size, dedicated to agriculture or animal husbandry, free of dwellings not intended for agriculture or educational purposes, and located within a zone that allows for agricultural use.

In addition to encouraging productive uses for vacant land, the implementation of Urban Agriculture Incentive Zones in the city would also increase access to fruits and vegetables in areas that currently lack fresh foods. More than 40% of low-income adults in Los Angeles County are food insecure and more than 60% of adults are obese or overweight, according to the Los Angeles Food Policy Council's October 2013 Los Angeles Food System Snapshot.

I THEREFORE MOVE that Council instruct the Department of City Planning and the Department of Building and Safety, in consultation with the City Attorney, to prepare and present an ordinance establishing Urban Agriculture Incentive Zones, and which includes the following:

1. Designate the boundaries of one or more Urban Agriculture Incentive Zones within the city and clarify zoning where food growing operations are allowed.
2. Develop a process by which the City can determine property owners' eligibility and by which property owners can apply for the incentive.
3. Develop an enforcement mechanism to ensure property owners are following local, county, and state regulations for Urban Agriculture Incentive Zones.
4. Coordinate with the County of Los Angeles the approval, establishment, and implementation of Urban Agriculture Incentive Zones as required by AB 551 (Ting), the *Urban Agriculture Incentive Zones Act.*

PRESENTED BY: _____
FELIPE FUENTES
Councilmember, 7th District

_____
CURREN PRICE
Councilmember, 9th District

SECONDED BY: _____

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OCT - 8 2014

ORIGINAL

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, February 10th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Follow up on ethics training and code of conduct policy signatures
        ii. Process for policy motion letters (see Addendum A)
    b. First Vice Chair – Mitchell Rishe
    c. Second Vice Chair – John Kuchta
    d. Secretary –Melissa Stoller
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of December MER
        ii **APPROVAL** of January MER
        iii. **Funding Motion: Spring GGS Newsletter, Layout Of Camera Ready Copy** Tickled Plum, not to exceed $375 (15 hours at $25 per hour)
        iv. **Funding Motion: Spring GGS Newsletter, Printing** Pacific Rim, $4000

v. **Funding Motion: Spring GGS Newsletter, Distribution**
CBS Adv. Distributors, $1700

vi. **Funding Motion (Green): Green Garden Showcase**
The Mar Vista Community Council authorizes $300 in support of the Mar Vista Green Garden Showcase for the following expenditures -

$50 -	Bamboo poles (for flags)
$150	Food, paper goods and utensils for Garden Hosts Welcome Event
$100	Marketing materials

vii. **Funding Motion (Green): portable laptop battery charger**
The Mar Vista Community Council authorizes the expenditure of up to $350 to purchase 17W Solar Charger Kit (http://www.voltaicsystems.com/17-watt-kit) and a 10' extension cord from Voltaic. The kit includes a solar panel and battery capable of charging laptops and tablets. It will be used for presentations/displays at the Green Tent as well as at Showcase Central. And be available for use by other MVCC events.

viii. **Funding Motion (EXFIN): Budget Fund Transfer**
Transfer $3000 from the Community Improvement budget to Community Purpose Grants

ix. **Funding Motion (EAC): Venice High School Community Purpose Grant**
Wireless printer and ink for mobile language lab, $360.69

x. **Funding Motion (EAC): Beethoven Elementary School Community Purpose Grant**
$2000 to encourage STEM:
- Storage unit for specialized science program, "Trash for Teaching," materials: $1250
- Professional development materials, $750

xi. **Funding Motion (EAC): Walgrove Elementary School Community Purpose Grant**
"Seussical" production costs: $1,640

xii. **Funding Motion (EAC): Mar Vista Elementary School Community Purpose Grant**
Purchase and processing of 55 library-bound books for school library, $980.20

xiii. **Funding Motion (EAC): Palms Middle School Community Purpose Grant**
Irrigation installation and repairs for large garden project, $2,000

xiv. **Funding Motion (EAC): Mark Twain Middle School Community Purpose Grant**
Portable PA system for use at school and community events, $1,000

xv. **Funding Motion (EAC): Richland Elementary School Community Purpose Grant**
Six thermoplastic benches, $3000

xvi. **Funding Motion (Outreach):**
Four ads in the Mar Vista Neighborhood Association newsletter over the course of 2015, $120

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta
k. Recode LA: Sharon Commins
l. Mar Vista Chamber of Commerce: Sarah Auerswald

7. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Brad Wilhite

c. Zone 3 – Bill Scheding
d. Zone 4 - Michael Millman
e. Zone 5 – Michelle Krupkin
f. Zone 6 – Valerie Davidson

8. **Committee Reports & Consent Calendar** - Actx where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs
        i. **Motion supporting Urban Agriculture Incentive Zones**

        The Mar Vista Community Council supports Councilmember Filipe Fuentes and Curren Price's Urban Agriculture Incentive Zones motion (Addendum B). In addition to encouraging productive uses for vacant land, the implementation of Urban Agriculture Incentive Zones in the city would also increase access to fruits and vegetables in areas that currently lack fresh foods. ***The Mar Vista Community Council requests that the motion be amended to strongly encourage the use of organic and sustainable growing practices and that it require that GMO seeds and plants be banned.***

        ii. **Motion regarding Sustainable Landscaping at LADWP and LA City facilities**

        The Mar Vista Community Council notes that the lawn at the Los Angeles Department of Water and Power (LADWP) facility at the intersection of Venice and McLaughlin has been replaced with artificial turf, non-native plants and without any grading for rainwater capture. As recent news coverage of L.A. rains showed, one inch of rain generates 8 billion gallons of runoff in the City. This urban runoff is the #1 source of ocean pollution, and could be a valuable source of irrigation, groundwater recharge, and enhancing stream flows. Also, landscapes with living soil can help sequester carbon (http://e360.yale.edu/feature/soil_as_carbon_storehouse_new_weapon_in_climate_fight/2744/). Artificial turf compacts and kills soil microbiology, generating runoff and providing no carbon sequestering benefit. It also creates rather than mitigates the heat island effect caused by the changing climate. LADWP's own turf replacement rebate (https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-conservation/a-w-c-landscap?_adf.ctrl-state=qhcmd28t2_4&_afrLoop=1033234959869636) "encourages" use of "California Friendly© plants, mulch, and permeable pathways," though does not require grading for rainwater capture as well as use of climate-appropriate plants, mulch and efficient irrigation. Native plants provide a much needed habitat for local birds, polinators and wildlife which should be encouraged.

        The Mar Vista Community Council requests that as lawns are replaced at LADWP facilities, and all other LA City facilities, they be required to retrofit following the watershed approach. The watershed approach:

        - Uses rainwater as a source of irrigation;
        - Creates permeable, living soil using natural woodchip mulch or leaf litter, and permeable hardscaping;
        - Utilizes climate-appropriate plants and drip irrigation.

        While the City is urging homeowners and businesses to replace turf lawn with sustainable alternatives, it is imperative that the LADWP and the City of Los Angeles utilize this opportunity to set an example by re-landscaping to conserve and capture water while creating a habitat that fosters the pollinators needed to support our ecosystem. Such landscaping will serve to promote environmental awareness and responsible landscaping choices by others in a highly visible setting and will ultimately save the city money in water usage, maintenance, and prevention of storm water runoff fines.

        We stand ready to provide contacts and resource information as needed for assistance.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair
g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair
    i. **Motion Supporting a French Immersion Program at Richland**

    In order to cultivate political support for Mar Vista's reputation among young families as a community with excellent public education, the Education, Arts and Culture Committee, working with Richland Avenue Elementary School principal Gerard Granade, shall draft a letter to Steve Zimmer, LAUSD Board of Education member for District 4, and Mike Bonin, Los Angeles City Council District 11 councilmember, articulating a public interest in supporting a French Immersion program at Richland.
h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair
l. **Elections and By-laws**- Bill Scheding, chair
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair

9. **Discussion Calender**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
14. **Adjournment**

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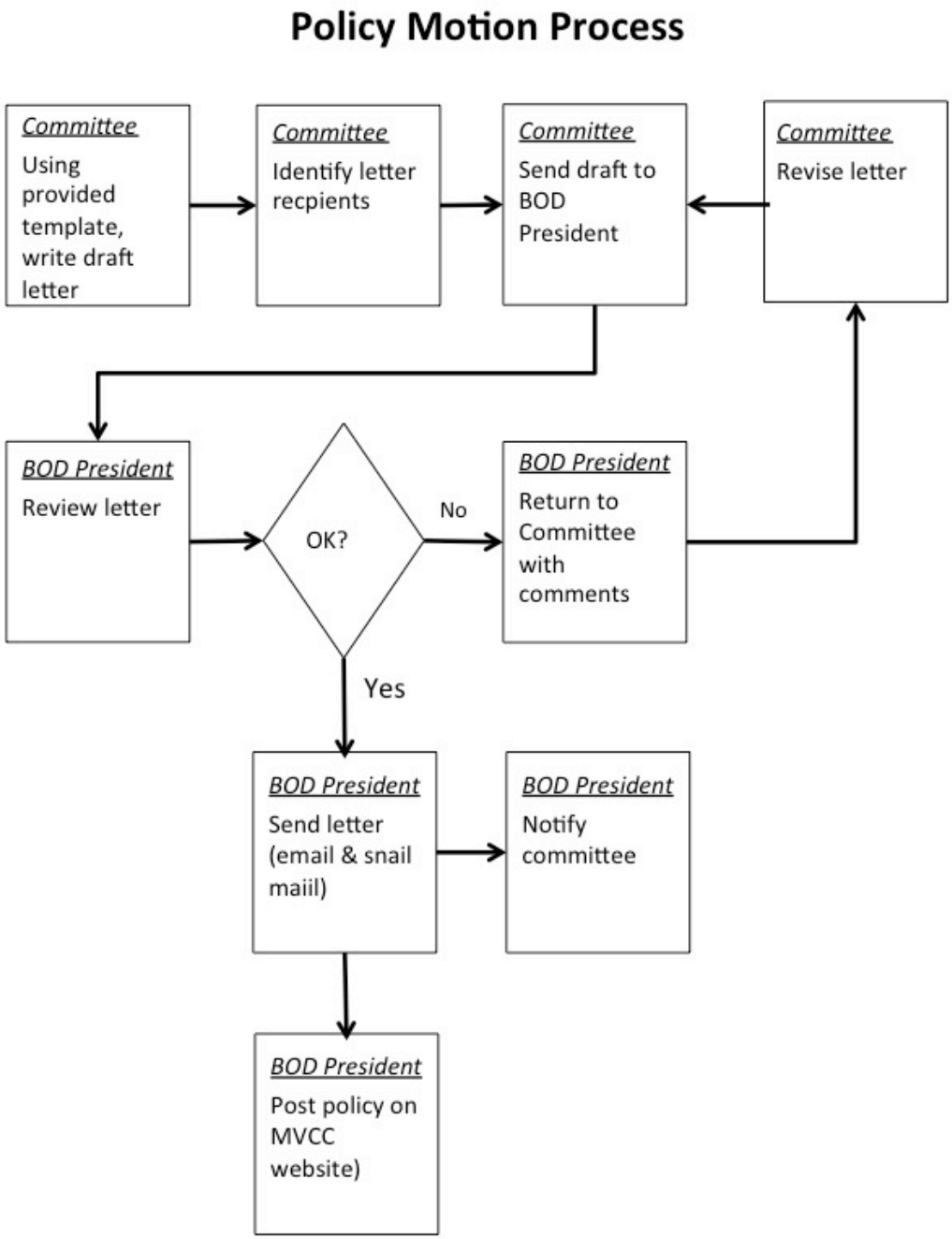
Addendum A


Policy Motion Process
Committee
Using provided template, write draft letter
Committee
Identify letter recpients
Committee
Send draft to BOD President
Committee
Revise letter
BOD President
Review letter
OK?
No
BOD President
Return to Committee with comments
Yes
BOD President
Send letter (email & snail maiil)
BOD President
Notify committee
BOD President
Post policy on MVCC website)

Addendum B

14-1378

Motion

PLANNING & LAND USE MANAGEMENT

The *Urban Agriculture Incentive Zones Act*, AB 551 (Ting), encourages the development of vacant, unproductive land for growing food.

AB 551 allows cities, with approval from the county board of supervisors, to designate Urban Agriculture Incentive Zones. Within these zones, property owners who allow their land to be used for agriculture purposes for a minimum of five years can receive a property tax adjustment; their land would be reassessed at the average statewide irrigated agriculture lands rate.

The property tax adjustment is intended to incentivize landowners who are not utilizing their property to make it available for urban agriculture. Parcels would be eligible for the incentive if they are between 0.10 and 3 acres in size, dedicated to agriculture or animal husbandry, free of dwellings not intended for agriculture or educational purposes, and located within a zone that allows for agricultural use.

In addition to encouraging productive uses for vacant land, the implementation of Urban Agriculture Incentive Zones in the city would also increase access to fruits and vegetables in areas that currently lack fresh foods. More than 40% of low-income adults in Los Angeles County are food insecure and more than 60% of adults are obese or overweight, according to the Los Angeles Food Policy Council's October 2013 Los Angeles Food System Snapshot.

I THEREFORE MOVE that Council instruct the Department of City Planning and the Department of Building and Safety, in consultation with the City Attorney, to prepare and present an ordinance establishing Urban Agriculture Incentive Zones, and which includes the following:

1. Designate the boundaries of one or more Urban Agriculture Incentive Zones within the city and clarify zoning where food growing operations are allowed.
2. Develop a process by which the City can determine property owners' eligibility and by which property owners can apply for the incentive.
3. Develop an enforcement mechanism to ensure property owners are following local, county, and state regulations for Urban Agriculture Incentive Zones.
4. Coordinate with the County of Los Angeles the approval, establishment, and implementation of Urban Agriculture Incentive Zones as required by AB 551 (Ting), the *Urban Agriculture Incentive Zones Act.*

PRESENTED BY: _____
FELIPE FUENTES
Councilmember, 7th District

_____
CURREN PRICE
Councilmember, 9th District

SECONDED BY: _____

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OCT - 8 2014

ORIGINAL

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, January 13th, 2015, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA
90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)
   Meeting called to order at 7:15 P.M.
   Quorum present: Bill Koontz (Chair), Mitchell Rishe (1st Vice Chair), Valerie Davidson, Michael Millman, Melissa Stoller, Ken Alpern, Michelle Krupkin
   Later arrivals: Yvette Molinaro, Robin Doyno, Brad Wilhite
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of December 2014 Minutes** (public comment permitted) (1 min)
   Motion for approval by Mitchelle Rishe, 2nd by Valerie Davidson. Motion carried with 6 ayes, 1 abstention (Yvette Molinaro).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
   - Sarah Auerswald: LA School Board approved a motion regarding the Mandarin Immersion Program at Mark Twain Middle School at its January 13, 2014, meeting.
   - Martin Rubin: Matthew Berkeley (North Westdale Neighborhood Association Treasurer) will take care of necessary paperwork for payment of the funding approved by MVCC in October for NWMA block party/talent show and MVCC ad in the NWNA newsletter.
   - Brandon: Four members of Boy Scout Troop 110 are attending the meeting to learn about the Council.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      - The Great Streets kickoff on Saturday, January 10, was wonderful despite rain; about 150 people attended. Afterwards, some attendees walked neighborhoods north and south of Venice Blvd. between Centinela & Inglewood to let people know about Great Streets and get their feedback.
        Ken Alpren: it is clear that the alley is a neighborhood priority; he asked that water diversion be added on to the project. Len: will investigate cost and methods.
      - A Great Streets Open House is scheduled for January 25, starting at 9:00 A.M; location is TBD
      - The Greater LA Homeless Count is Wednesday, Jan 28 in West Los Angeles.
   b. Mar Vista Recreation Center – Jason Kitahara, Director
      - Monica Gonzales (monica.t.gonzales@lacity.org), acting director, reported. Jason was promoted to the analyst division and is no longer at the park. The Department will eventually send a senior director.
      - Winter basketball starts on Saturday. There are 8 teams.
      - February 13 is a Valentine's Day Movie Night.
      - A successful winter camp just concluded.
   c. CD 5 – Paul Koretz, rep by Joseph Galloway joejdg92@gmail.com
   d. US 36 – Janice Hahn
   e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov

- The budget process is starting. Rep. Ridley-Thomas is hosting a Budget Priorities Forum on Saturday, January 24, at Dorsey High School. It begins at 9:00 A.M. and includes lunch. Six 1 ½ breakout work sessions—led by Assembly and Senate members and other senior state officials—to discuss Governor Brown's proposed budget and its impact on us in Los Angeles are planned. MVCC is invited to send a representative.

  Ken Alpren: concerned about lack of immunization, especially among the better educated, more affluent. Scott: will include as topic in one of the breakout groups at the Forum.

  Valerie: what are breakout groups? Scott: Pubic Safety, Labor & Consumer Protection, Education, Recreation, Transportation & Housing, Health & Human Services.

f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
g. CA Assembly 47
h. CA Assembly 62
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by KarlyKatona, Karly.Katona@bos.lacounty.gov
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org

6. **Officers and Liaison** Reports (Action items included with public comment permitted,1 min per speaker)
   a. Chair-Bill Koontz
      i. Re-appointment of committee chairs
         - Jeanne Kuntz, Co-Chair of Green Committee

           Motion to approve by Bill Koontz, 2nd by Melissa Stoller. Motion carried unanimously.
         - Michael Mansour, Co-Chair Great Streets Ad Hoc

           Michael is a property owner along the Great Streets area. Motion to approve by Bill Koontz, 2nd by Mitchell Rishe. Motion carried with one abstention (Michelle Krupkin).
      ii. Election of new secretary

          Bill Koontz nominated Melissa Stoller, 2nd by Michelle Krupkin. Motion carried unanimously.

          Robin Doyno will continue handling Farmers' Market table scheduling (previously done by the secretary).
      iii. Appointment of new at large director from the list of three candidates that responded
         - Sherri Akers
           - Motion to approve by Bill Koontz, 2nd by Melissa Stoller. Motion carried unanimously.
         - Michael Mansour
         - Roy Persinko
      iv. Follow up on ethics training and code of conduct policy signatures
         - Some board member's ethics training is termed out.
         - Everyone needs to sign Code of Conduct ASAP; deadline is passed.
   b. First Vice Chair – Mitchell Rishe
      - Mitchell attended the Coastal Commission meeting on January 9 in Santa Monica. Older Venice residents expressed concern about gentrification, getting priced out.
   c. Second Vice Chair – John Kuchta
   d. Secretary –To Be Determined
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

   Bill S on vacation in Cambodia for a month, so no funding motions this month
      i. **APPROVAL** of November MER

Pushed to next month due to Bill Scheding's excused absence.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
   - The LAPD officer representative died a few days before the last meeting so there was no LAPD representation. Martin Boccacio , an officer from West District is now appointed.
   - Most of the obnoxious signs at Farmers' Market are removed, including the no left turn signs at the Vineyard parking lot. New signs will say "No Parking 7:00 A.M.–5:00 P.M." (instead of until 4:00 P.M.); they are not yet ready.
   - Next meeting is January 21; agenda closes January 17.

g. DWP MOU/LANCC Liaison-Open

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
   - Certificate of Recognition presented to Christopher for participation in city's Recycled Water Advisory Group
   - Charnock well is cleaned up and Mar Vista has water. Santa Monica is pumping it.
   - Bureau of Sanitation/DWP representative attended Great Street meeting and is aware of our situation
   - Recycled Water Advisory Group focuses on San Fernando Valley where aerospace polluted the ground water. Tillman plant recycled water is purple pipe clean—ok to water golf course.

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
   - Will meet soon.

j. City Budget: John Kuchta

k. Recode LA: Sharon Commins
   - Starting to get into the nitty-gritty of downtown plan. Downtown has 4 plan zones, no standard for open space. New code will allow more unusual building envelops (such as round). Discussing how to preserve industrial zones and jobs-generating industries.
   - LA Conservancy: got over 700 responses to Instagram poll; presented community design overlays, need to include historic preservation in code.
   - Ran computer simulation for South Park. Will experiment with eliminating requirements regarding the number of parking space there.
   - Consultant talks about neighborhood based, content based zoning.

l. Mar Vista Chamber of Commerce: Sarah Auerswald
   - Glad to support Great Streets walk. Mayor Garcetti stopped at a lot of businesses.
   - Next meeting is January 14 at the Coffee Connection. A city planner will present a concept plan based upon a landscape plan developed by the South Mar Vista Neighborhood Association with Katherine Spitz. Chamber wants to see we can use plan for Great Streets.
   - Chamber has 275 on its mailing list.
   - Chamber can take on a bigger role at Farmers' Market.
   - Mayor Garcetti is negotiating with the State over status of Venice Blvd. It is currently a state route.

m. Special presentation by SurviVault Earthquake prep (20 min)
   - Roy Forbes of SurviVault gave a presentation on earthquake preparation. SurviVault sells earthquake survival kits.
   - San Andreas fault is way over due and there's a 99.7% chance of a 6.7 or greater earthquake in the next 25 years. The probability of that quake being in Southern California is 67%.
   - Everyone needs enough emergency supplies for 1 week: food, shelter, first aid, sanitation. The most important supply is water: 7 gallons per person. Pool water is not safe to drink. Do not store plastic water containers directly on concrete.
   - Replace the supplies every 6-12 months.
   - First aid kit should include QuikClot—it works even on an artery.

7. **Zone Director Reports** - may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

   Zone 1 – Ken Alpern
   - Receiving more reports of crime in area.

- Expo Line construction should be done this year, then there'll be testing. The line will be operational for public in 2016. There are lane closures on Pico Blvd. for construction.

Zone 2 – Brad Wilhite

- Crime is declining. Most crime occurs between 10 A.M & 2 P.M.
- Neighborhood association hasn't received money allocated by MVCC.
- Richland is having a school walkthrough soon. Also putting together a packet for French immersion program.

Zone 3 – Bill Scheding (reported by Mitchell Rishe)

- Fresh off the Boat, a new TV series, premiers in February. Rose Avenue was a filming location.

Zone 4 - Michael Millman

- Fractured sidewalks, missing signs.
- Annual meeting is January 29 at 7:00 P.M.

Zone 5 – Michelle Krupkin

- New mural at Farmers' Market.
- Reports of property crime.
- ` Christopher McKinnon: losing Senior Lead Officer Marci Garcia (promoted); MVCC should thank her.

Zone 6 – Valerie Davidson

- Police called for apparent break-in near her house; turned out to be resident locked out of house.
- Getting complaints about speeding cars on Rose Ave. from Palms to the beach. Waze directs motorists to use it. Speed humps are not helping. Have requested, but not received, signs. Asked to be re-designated as a residential.
- Airport issue is back in Santa Monica City Council.

8. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable(public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee** - Bill Koontz, Chair
    b. **GGS 2015 AD HOC Committee** - Shelley Wiseman, Chair
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs
    e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
    f. **Planning and Land Use Management Committee** - Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair
        i. **Policy Motion:** Whereas the Mar Vista Bowling Lanes wishes to install a new sign above their premises, which is approximately 45ft tall and backlit, and said sign is merely a replacement of an older sign which was 50 ft. high, Therefore be it resolved that the MVCC approve the proposed signage, without prejudice to neighbors and others appearing at the MVCC to offer comment or protest.
            - Motion to move item up in the agenda by Mitchell Rishe, 2nd Michelle Krupkin. Motion carried unanimously.
            - Motion to open discussion, 2nd by Brad Wilhite.
            - Discussion:
                - Michael Mellman: illumination is neighborhood friendly; motion passed unanimously in PLUM.
                - Nina Ray, representing BowlMor: LED sign, located near the street; similar in design to old sign; conditional use permit is required.
                - Tony Wilbanks, Signage Solutions: responsible for design & engineering.
                - Mitchell Rishe: questioned why again no BowlMor employee is present (they did not sent a representative to the meeting addressing Pepy's ouster).
            - Motion carried with 9 ayes, one nay and one abstention (Mitchell Rishe).

g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair Sara Roos, Co- Chair
h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair
   - Sarah: people at meetings are asking what can we do about crime; they seem to want big meeting.
   - Bill Koontz: let Adrian (Senior Lead Officer) know.
   - Sherri Akers: Aging in Place Committee would like to team up on the meeting.
l. **Elections and By-laws**- Bill Scheding, chair
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair

9. **Discussion Calender**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
    Bill Koontz: add public comment to end of agenda.
14. **Adjournment 9:04**
    Meeting adjourned at 9:04 P.M.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, January 13th, 2014, at 7:00 PM Mar Vista Recreation Center Auditorium 11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
2. **Presentation of flag and Pledge of Allegiance** (1 min.)
3. **Approval of December 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway, joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. Congressman – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Re-appointment of committee chairs
            Jeanne Kuntz Co-Chair Green Committee
            Michael Mansour Co-Chair Great Streets Ad Hoc
        ii. Election of new secretary
        iii. Appointment of new at large director from the list of three candidates that responded
            - Sherri Akers
            - Michael Mansour
            - Roy Persinko
        iv. Follow up on ethics training and code of conduct policy signatures
    b. First Vice Chair-Mitchell Rische
    c. Second Vice Chair-John Kuchta
    d. Secretary-To be determined

i. **Farmer's Market Update:** Robin Doyno will be taking over the table scheduling

e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
   i. **APPROVAL** of November MER

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano

g. DWP MOU/LANCC Liaison-Open

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro

j. City Budget: John Kuchta

k. Recode LA: Sharon Commins

l. Mar Vista Chamber of Commerce: Sarah Auerswald

m. Special Presentation by SurviVault Earthquake prep (20 mins)

7. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
8. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
   a. **Executive & Finance Committee**-Bill Koontz, Chair
   b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman, Chair
   c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
   d. **Green Committee** – Melissa Stoller, Jeanne Kuntz and Sherri Akers, Co-Chairs
   e. **Transportation & Infrastructure Committee** – Ken Alpern & Michelle Krupkin, Co-Chairs
   f. **Planning and Land Use Management Committee**-Steve Wallace & Mitchell Rishe, Co-Chairs, Michael Millman Vice-Chair
      i. **Policy Motion**: Whereas the Mar Vista Bowling Lanes wishes to install a new sign above their premises, which is approximately 45ft tall and backlit, and said sign is merely a replacement of an older sign which was 50 ft. high, Therefore be it resolved that the MVCC approve the proposed signage, without prejudice to neighbors and others appearing at the MVCC to offer comment or protest
   g. **Education, Arts and Culture Committee** – Brad Wilhite, Co-chair SaraRoos, Co- Chair
   h. **Santa Monica Airport Committee** – Valerie Davidson, co-chair Martin Rubin, Co-Chair
   i. **Safety and Security Committee** – Rob Kadota, Chair
   j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
   k. **Community Outreach Committee** – Sarah Auerswald, Co-Chair, John Kuchta, Co-Chair
   l. **Elections and By-laws**- Bill Scheding, chair
   m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
   n. **Aging in Place Ad Hoc**- Sherri Akers, Co-chair, Robin Doyno Co-Chair
9. **Discussion Calendar**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Thursday, December 9th, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

141209-BOD-AGENDA

1) **Call to Order and Welcome** – Chair (1 min.)
2) **Presentation of flag and Pledge of Allegiance** (1 min.)
3) **Approval of November 2014 Minutes** (public comment permitted) (1 min)
4) **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
5) **Special Presentation by Len Nguyen**: Mar Vista Marker Sign Design with feedback session and possible motion to follow
6) **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a) CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
   b) Mar Vista Recreation Center – Jason Kitahara, Director
   c) CD 5 – Paul Koretz, rep by Joseph Galloway, joejdg92@gmail.com
   d) US 36 – Janice Hahn
   e) CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
   f) CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
   g) CA Assembly 47
   h) CA Assembly 62
   i) 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
   j) Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
7) **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
   a) Chair-Bill Koontz
      i) Re-appointment of committee chairs
      ii) Appoint interim secretary until new elections can be held
      iii) Open the 25 day candidacy period for the appointment of the vacant at-large director's seat
   b) First Vice Chair-Mitchell Rische
   c) Second Vice Chair-John Kuchta
   d) Secretary-To be determined

i) **Farmer's Market Update**

e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

i. **APPROVAL** of October MER

ii. **APPROVAL** of funding request by Michelle Krupkin for reimbursement for out of pocket expenses related to printing costs for Great Streets Surveys. (Documentation to be provided by Michelle)

1. **FUNDING MOTION:** The Mar Vista Community Council authorizes the expenditure of up to $155 to purchase the following items for Green Tent/Green Garden Showcase displays: Heavy Duty Display Easel $100, 100 sheets 8 1/2x11 glossy photo paper $40, 100 sheets 5x7 glossy photo paper $15

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano

g. DWP MOU/LANCC Liaison-Open

h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro

j. City Budget: John Kuchta

k. Recode LA: Sharon Commins

l. Mar Vista Chamber of Commerce: Sarah Auerswald

8) **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

9) **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

a) **Executive & Finance Committee**-Bill Koontz, Chair

b) **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman, Chair

c) **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

d) **Green Committee** – Melissa Stoller, Chair; Jeanne Kuntz and Sherri Akers, Vice-Chairs

1. **Policy Motion:** Motion supporting Councilman Paul Koretz's methane gas motion:
The Mar Vista Community Council supports Councilman Paul Koretz's motion (Attachment A) addressing methane gas operations and methane gas plumes in the City as well as methane gas leaks.

2. Policy Motion: Motion regarding SoCal Gas franchise renewal
Whereas the 20-year SoCal Gas Company franchise agreement will be soon coming before City Council for approval and recent studies (http://www.scientificamerican.com/article/solving-the-case-of-californias-extra-machine/) find that finds that the main sources of methane in LA air are attributable to:
-Leaks from pipeline distribution systems (aka, So Cal Gas Company); and
- Emissions from oil and gas drilling operations
The Mar Vista Community Council (MVCC) recommends that any natural gas pipeline distribution franchise agreement include strong and required leak mitigation measures and strong short- and long-term benchmarks for moving away from natural gas to renewable energy alternatives.
The MVCC further recommends that before any 20-year SoCal Gas franchise negotiation comes before the City Council, it would be prudent to check in with and possibly work with Bart Croes from the California Air Resources Board, the California Energy Commission, Jeff Peischl from the National Oceanic and Atmospheric Administration, and Paul Wennberg from the California Institute of Technology, in order to put together a full report on the problem and possible solutions.

e) **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs

a. **Policy Motion: Director's Request:** In a joint meeting with the West LA Neighborhood Council a motion was made by the committee to oppose the project as presented.

The MVCC would also like to oppose the project as presented and will work with the developers, the CD11 office and the City Dept. of Planning to create a more environmentally sustainable, transit-oriented and neighborhood-friendly project to serve the Bundy/Olympic region that offers affordable housing units to residents that already live/work in the community.

f) **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs

g) **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair

h) **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair

i) **Safety and Security Committee** – Rob Kadota, Chair

j) **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

k) **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair

l) **Elections and By-laws**- Bill Scheding, chair

m) **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

Policy Motion:

WHEREAS the Great Streets Venice Blvd. project affects the stakeholders of Mar Vista,

WHEREAS the MVCC Great Streets Ad Hoc Committee wants to get input from said Mar Vista Stakeholders,

THEREFORE, MVCC Great Streets Ad Hoc Committee will develop and administer a survey.

n) **Aging in Place Ad Hoc**- Bill Duckett, chair

10) **Discussion Calendar**

11) **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)

12) **New Business** -(Public comment permitted)

13) **Grievances**, if any, received

13. Future agenda items

14. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL

Regular Meeting of the Board of Directors
Thursday, December 9th, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

141209-BOD-Minutes

1. **Call to Order and Welcome** – Chair (1 min.)
   Meeting called to order at 7:10 P.M.
   QUORUM PRESENT: Bill Koontz (chair), Mitchell Rishe (1st Vice Chair), Bill Scheding (Treasurer), Melissa Stoller (Acting Secretary), Brad Wilhite, Val Davidson, Michelle Krupkin and Robin Doyno
2. **Presentation of flag and Pledge of Allegiance** (1 min.)
   January 28, 2015, MVCC is helping with a homeless count. Volunteers are needed.
3. **Approval of November 2014 Minutes** (public comment permitted) (1 min)
   Motion by Bill Koontz to approve (changing heading from "Agenda" to "Minutes"). Motion carried with 7 ayes, 1 abstention (Melissa).
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
   Bill Koontz: Bill Duckett has resigned from the board. Will address filling his many positions later in the meeting.
   Robin Doyno:
   - MVCC is helping with the homeless count.
   - There will be an Aging In Place Workshop on January 8, 3:00 P.M., at the Mar Vista Public Library.
5. **Special Presentation by Len Nguyen**: Mar Vista Marker Sign Design with feedback session and possible motion to follow
   PRESENTATION: The Executive Committee provided feedback that the Welcome to Mar Vista sign should be "Larchmount-esque." The Department of Public Works needs input as to the type of stone, main artwork graphic and wording in order to proceed.
   DISCUSSION: The conceptual design (see Attachment A) closest to what MVCC wants is Concept 4. Michelle (?) expressed concern that the wooden structure above the stone would not hold up well to the elements; Len noted that using stone instead would raise the cost such that the budget would no longer allow for two signs.
   MOTION by Bill Koontz (?): The Mar Vista Community Council wants round stone for the Welcome to Mar Vista sign base with "Mar Vista" (and not "Downtown Mar Vista") set into cement. The sign graphic should be a Morton Bay Fig Tree that is less cartoony than the conceptual designs provided, without surfer. Motion carried with 7 ayes, 1 nay.
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen
      Len.Nguyen@lacity.org
      - On December 9, Mike Bonin introduced motion addressing short-term rentals that are a key element of a technology-fueled sharing economy not anticipated by the city's zoning codes or tax structure.
      - There'll be a Great Streets Kickoff on January 25, 2015, around 10:00 A.M.–noon; would like MVCC volunteers to help with planned canvassing of adjoining streets preceding this public event.
      - Donation Drive for Westside Food Bank continues through December 19; donations of non-perishable food items can be dropped of at CD11 West LA and Westchester field offices and at the Mar Vista Farmers' Market.
   b. Mar Vista Recreation Center – Jason Kitahara, Director

Monica Gonzalez reported for Jason.
- The fall program is finishing. There was a children's play and a 3-on-3 basketball tournament.
- Currently getting ready for winter basketball.
- Will be looking for acting, performing arts teachers.
- Park team is in soccer all-stars tournament and has won all games so far.

c. CD 5 – Paul Koretz, rep by Joseph Galloway, joejdg92@gmail.com
- Councilmember Koretz is not supporting legislation to legalize street vendors until the impact on brick and mortar businesses is assessed
- Councilmember Koretz supports the XL pipeline.
- Andy Shrader, Director of Environmental Affairs, Water Policy & Sustainability for the councilman, is working with officials regarding drought relief.
- A public meeting to discuss mansionization is scheduled for December 10, 7:30 P.M., at Poinsettia Park.
- Ken: requested reinstituting two right turn lanes for the 10 Freeway on National at Overland. Joseph: will do a manual traffic count, probably in early 2015; can then reevaluate what can be done.
- RV parking on Sepulveda:
  Ken: Response to complaints about RV parking on Bundy was quick and effective, but nothing has been done about the problem on Sepulveda.
  Joseph: Statutes only require moving wheels every 72 hours. Working on height and length restrictions.
- Joseph will follow-up on assistance to Vista Del Mar to establish recycling program.

d. US 36 – Janice Hahn

e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov

f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov

g. CA Assembly 47

h. CA Assembly 62

i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov

j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
- Resiliency by Design report, developed by Lucy Jones in partnership with the US Geological Survey over the past year addresses our greatest vulnerabilities: building safety, water system (including availability for firefight fighting, and pipes), telecommunication networks. The plan is available at http://www.lamayor.org/earthquake.
- The purpose of the Mayor's trip to Asia was to leverage Los Angeles' assets to form partnerships and create business and jobs. Example: LA has a great green tech sector and record of dealing with pollution.
  Christopher McKennon: how will results in business and jobs be measured?
- Package to increase street paving.
  - Found enough cuts in other areas to fund paving of an additional 400 miles.
  - Los Angeles makes its own asphalt, but has been contracting out because the plants are dilapidated. Plant #1 will be refurbished, saving $5M/year when completed. Developing another, 50% cheaper means of making asphalt.
- Mayor's minimum wage proposal will go to City Council in January; it calls for increase to $13.25 over three years and ties it to the consumer price index. Mayor Garcetti feels this is the fairest proposal for everyone involved. If desired, MVCC can host an informal get-together to discuss.

7. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)

a. Chair-Bill Koontz

i. Re-appointment of committee chairs

PLUM: Mitchell Rische & Steve Wallace, co-chairs
- Motion by Bill Koontz approved unanimously

T&I: Ken Alpern & John Kuchta, co-chairs
- Motion by Bill Koontz approved unanimously

Outreach: John Kuchta & Sarah Auerswald, co-chairs

- Motion by Bill Koontz approved unanimously

Green: Melissa Stoller & Sherri Akers, co-chairs; Jeanne Koontz, vice chair

- Motion by Bill Koontz approved unanimously

Aging in Place: Robin Doyno & Sherri Akers, co-chairs

- Motion by Bill Koontz carried with 7 ayes, 1 abstention (Robin)

SM Airport: Val Davidson & Marty Rubin, co-chairs

- Motion by Bill Koontz carried with 7 ayes, 1 nay

ii. Appoint interim secretary until new elections can be held

Put off to next meeting. Looking for candidates.

iii. Open the 25 day candidacy period for the appointment of the vacant at-large director's seat

The 25-day period for submitting a statement of candidacy to fill the vacant seat is now open and will be advertised via minutes and eblast. Candidates will have an opportunity to speak at the next board meeting and then Bill Koontz will announce his nominee. Process: if the 1st nominee is not approved, the chair nominates a 2nd; if the 2nd nominee is not approved, the chair appoints a 3rd candidate.

iv. Farmer's Market Update

Bill Koontz will handle staffing for MVCC table.

b. First Vice Chair-Mitchell Rische
c. Second Vice Chair-John Kuchta
d. Secretary-To be determined
e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

i. **APPROVAL** of October MER

Motion by Bill Scheding, 2nd by ?, carried unanimously.

ii. **APPROVAL** of funding request by Michelle Krupkin for reimbursement for out of pocket expenses related to printing costs for Great Streets Surveys. (Documentation to be provided by Michelle)

Motion by Bill Scheding, 2nd by ?, carried unanimously

iii. **FUNDING MOTION:** The Mar Vista Community Council authorizes the expenditure of up to $155 to purchase the following items for Green Tent/Green Garden Showcase displays: Heavy Duty Display Easel $100, 100 sheets 8 1/2x11 glossy photo paper $40, 100 sheets 5x7 glossy photo paper $1

Motion by Bill Melissa Stoller carried unanimously.

Bill Koontz and Bill Scheding will try to set up a Staples account for supply purchases.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano

- Will make sure that no turn signs for Farmers' Market are taken down if they are supposed to be.
- Next meeting is January 21, 2015.

g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater

DWP chief Marcie Edwards stated that Los Angeles is prepared to compete for funds from the water bond (Prop 1) passed last month.

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta
k. Recode LA: Sharon Commins
l. Mar Vista Chamber of Commerce: Sarah Auerswald

- Pop-up event was successful—businesses were happy, people went in to businesses they hadn't been in before
- Holiday Mixer is December 15, 6:00-9:00 P.M., at Louies.

8. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)

ZONE 1
- At CD 11 meeting, Jay Handal reported that occupants of 60% of RVs parked on streets are vets; they should have a place to go.
- EXPO extension will open early March, 2016, following 5 months of testing.

ZONE 2
- North Westdale meeting is December 10, 7:00 P.M., at St. Andrews Church.

ZONE 3 – no report

ZONE 4 – no report

ZONE 5
- Status Quo (new restaurant on Grand View) is open.
- Santa's Sleigh will visit 5 locations on December 10; the last stop is at Keeshen and North Park at 7:30 P.M.
- A development at 4025 Grand View with 36 3-bedroom units (3 affordable) and 85 parking spaces (entrance and exit on Grand View) is in pre-application stage with Culver City Planning Department; EIR is not required.

ZONE 6
- Getting calls about the Mandarin Immersion Program.
- Lots of concern about Walgrove traffic—more cut-thrus and accidents.
  Bill Koontz: talked to Mike Bonin about changing street designation from transition to residential.
  Len: would need to direct Planning and DOT to amend transportation plan and have Planning study it.
- 1 Break-in
- Santa Monica Airport motion passed

9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
   a. **Executive & Finance Committee**-Bill Koontz, Chair
   b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman, Chair
   c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
   d. **Green Committee** – Melissa Stoller, Chair; Jeanne Kuntz and Sherri Akers, Vice-Chairs

   Rain Barrel Truckload Sale was very successful; 166 barrels were distributed. The next Truckload Sale at the Farmers' Market is January 11. There will also be one at the Wise Water Expo on March 29.

   1. **Policy Motion:** Motion supporting Councilman Paul Koretz's methane gas motion:
      The Mar Vista Community Council supports Councilman Paul Koretz's motion (Attachment A) addressing methane gas operations and methane gas plumes in the City as well as methane gas leaks.
      Motion approved unanimously on consent.
   2. **Policy Motion:** Motion regarding SoCal Gas franchise renewal
      Whereas the 20-year SoCal Gas Company franchise agreement will be soon coming before City Council for approval and recent studies (http://www.scientificamerican.com/article/solving-the-case-of-californias-extra-machine/) find that finds that the main sources of methane in LA air are attributable to:
      - Leaks from pipeline distribution systems (aka, So Cal Gas Company); and
      - Emissions from oil and gas drilling operations

      The Mar Vista Community Council (MVCC) recommends that any natural gas pipeline distribution franchise agreement include strong and required leak mitigation measures and strong short- and long-term benchmarks for moving away from natural gas to renewable energy alternatives.
      The MVCC further recommends that before any 20-year SoCal Gas franchise negotiation comes before the City Council, it would be prudent to check in with and possibly work with Bart Croes from the California Air Resources Board, the California Energy Commission, Jeff Peischl from the National Oceanic and Atmospheric Administration, and Paul

Wennberg from the California Institute of Technology, in order to put together a full report on the problem and possible solutions.
Motion approved unanimously on consent.

e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs

Policy Motion: Director's Request: In a joint meeting with the West LA Neighborhood Council a motion was made by the committee to oppose the project as presented. The MVCC ~~would also like to~~ oppose*s* the *Martin Cadillac Town Center* project as presented*, and will work with the developers, the CD11 office and the City Dept. of Planning to create a more environmentally-sustainable, transit-oriented, and neighborhood-friendly project to serve the Bundy/Olympic region, and which will provide a model of Westside workforce housing that offers workforce housing units to residents who already live/work in the immediate surrounding area of Bundy/Olympic.*

- Steve Wallace: Neighborhoods kept asking at scoping meetings to reduce size; developed has ignored. Project could become a massive destination to drive to: 516 apartments, 200,000 sq. ft. office space, 67,000 sq. ft. retail & fast food. The Olympic/Bundy intersection already has a grade of "F" for traffic congestion.

Amended motion by Ken Alpern approved unanimously.

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs

g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair

- Neighborhood Purpose grant requests are coming in.
- Bill Koontz: Richland School has staffing to offer a French Immersion Program but doesn't have LAUSD support for it.

Bill Koontz To date, MVCC has spent very little of its $37,000 funding. Bill would like MVCC to use leftover funds to enhance Mar Vista schools, supporting a French Immersion Program as well as other programs at schools within Mar Vista.

h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair

i. **Safety and Security Committee** – Rob Kadota, Chair

j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair

l. **Elections and By-laws**- Bill Scheding, chair

- Bill will review and clean up the by-laws.

m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

- Ken: What's the next big initiative after Alley paving?

n. **Aging in Place Ad Hoc**- Bill Duckett, chair

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

Motion to adjourn at 9:03 P.M. approved unanimously.

**in compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

***As a covered entity under Title II of the Americans with Disabilities Act, the City of*

Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days prior to the meeting you wish to attend by contacting chair@marvista.org.

Attachment A

VENICE BOULEVARD - DOWNTOWN MAR VISTA
GATEWAY SIGNAGE

DESIGN INSPIRATION



SIGNAGE ARCHITECTURE
THE SIGNAGE ARCHITECTURE IS INSPIRED BY THE HISTORIC HOMES ON GRAND VIEW BOULEVARD. THE TURN OF THE CENTURY CLASSIC ARCHITECTURAL LINES, MIX OF NATURAL MATERIALS AND DETAILED CRAFTMANSHIP IS REFLECTED IN THE PROPOSED SIGN.



SIGNAGE GRAPHICS AND SYMBOLS
THE MORETON BAY FIG TREE HAS GROWN IN MAR VISTA FOR OVER 140 YEARS. JUST LIKE THE FOUNDERS OF MAR VISTA AND THE COMMUNITY TODAY, THE TREES IS A SYMBOL OF THEIR IMMENSE AND ENDURING STRENGTH.



SIGNAGE GRAPHICS AND SYMBOLS
THE COMMUNITY OF MAR VISTA WAS ORIGINALLY CALLED OCEAN PARK HEIGHTS. IN OCTOBER 1924, PIONEER RESIDENT JUANITA ROMERO PROPOSED THE NAME MAR VISTA OR 'SEA VIEW'. IMAGES OF WATER, SURFING AND THE FAMOUS SOUTHERN CALIFORNIA SUNSET HAVE BEEN INCORPORATED INTO THE SIGN CONCEPT.



CONCEPT 1
VIEW ENTERING MAR VISTA
EASTBOUND AT REDWOOD AVENUE



CONCEPT 2
VIEW ENTERING MAR VISTA
EASTBOUND AT REDWOOD AVENUE



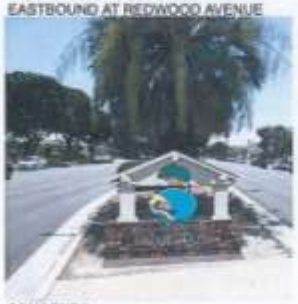
CONCEPT 3
VIEW ENTERING MAR VISTA
EASTBOUND AT REDWOOD AVENUE



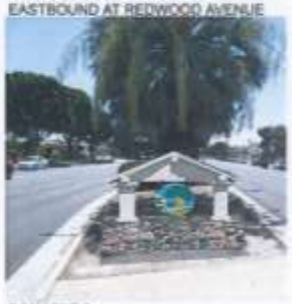
CONCEPT 4
VIEW ENTERING MAR VISTA
EASTBOUND AT REDWOOD AVENUE



CONCEPT 1
VIEW ENTERING MAR VISTA
WESTBOUND AT BLEDSOE AVENUE



CONCEPT 2
VIEW ENTERING MAR VISTA
WESTBOUND AT BLEDSOE AVENUE



CONCEPT 3
VIEW ENTERING MAR VISTA
WESTBOUND AT BLEDSOE AVENUE



CONCEPT 4
VIEW ENTERING MAR VISTA
WESTBOUND AT BLEDSOE AVENUE



VICINITY MAP

DEPARTMENT OF PUBLIC WORKS
BUREAU OF STREET SERVICES
JUNE 2014

NOTE: CONCEPTUAL DESIGN SUBJECT TO CHANGE

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Thursday, November 13th, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

141113-BOD-AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of October 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Special Presentation** – VHS report and presentation: Kids and events of Merit (10 min)
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway, joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
7. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. **MOTION-Director's request, Robin Doyno:** Be it resolved that the MVCC shall aid the Los Angeles Homeless ServicesAuthority in the approaching count of the homeless in Los Angeles.

        This aid (to be determined) and resolution shall recognize the importance ofan accurate measure of our homeless community for a variety of reasons.
        ii. **Special Presentation**

    b. First Vice Chair-Mitchell Rische
    c. Second Vice Chair-John Kuchta
    d. Secretary-Bill Duckett
        i. **Farmer's Market Update**
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of

Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx

i. **APPROVAL** of October MER

ii. **APPROVAL** of funding request by William Scheding for reimbursement of postage in the amount of $29.95 (see supporting documents, APPENDIX)

iii. **FUNDING MOTION:**

Whereas the Mar Vista Chamber of Commerce will be hosting a Pop-Up Mar Vista event on November 29th, 2014.

Therefore, the MVCC grants approval for funding in the amount of $250 to provide promotional support. Promotional materials such as banners and maps will be printed and the Mar Vista Community Council logo will be displayed along with all other sponsors' logos. In addition, the Chamber asks for support in the form of a website post and e-blast to promote the event prior to the date. (See supporting documents Appendix B).

iv. **FUNDING MOTION:** Purchase and update Santa Sleigh Stop Signs and materials-not to exceed $200.

v. **FUNDING MOTION:** Support Pacific LAPD's Winter Wonderland Toy Drive and Give-Away Program-not to exceed $2000 for supplies, toys, food and rental of equipment.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta
k. Recode LA: Sharon Commins
l. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee**-Bill Koontz, Chair
    b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman & Christy Wilhelmi, Co-Chairs
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, & Jeanne Kuntz, Co-Chairs
    e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs

POLICY MOTION: Amendment to Outdoor Dining "R" Permit

MVCC, a member of the Westside Regional Alliance of Councils, supports the following WRAC motion: Request the LA City Council amend the outdoor dining "R" permit ordinance to include requiring a window sticker advising the public that the establishment has a proper permit.

[NOTE: The purpose of this motion is to allow NC members, street inspectors, or the public, to be able to identify illegal outdoor dining].

POLICY MOTION: Investigation of Code Circumvention by Offsite Parking 'Leasing'

MVCC, a member of the Westside Regional Alliance of Councils, supports the following WRAC motion: Request the City Council investigate the Planning Department circumventing code by allowing off site parking with only a lease agreement and not a covenant agreement or variance.

[NOTE: The purpose of this motion is to ensure that the Planning Department and the CPC are not violating code and/or law by allowing uses to "Lease" required parking spaces off site, when code requires them to have a covenant agreement, or file for a variance].

POLICY MOTION: BMO Adjustments to Close Loopholes in the Law
MVCC, a member of the Westside Regional Alliance of Councils, supports the following WRAC motion: The WRAC supports CM Paul Koretz's proposed amendments to the Baseline Mansionization Ordinance (CF 14-0656). Amendments shall be approved and executed in 4 months, and other areas/districts may be added during the approval process as the city did for the Sign Ordinance

[Note: An ICO may be implemented concurrently with this approval process. The goal is a revised citywide policy, instead of a patchwork of HPOZs and RFA Overlays, which take up much time].

POLICY MOTION: Mandarin and English Dual-Language Immersion Elementary School Project at Mark Twain Middle School: The MVCC, on behalf of our neighboring stakeholders, requests the following items be studied as part of the Mark Twain DEIR and further requests that any significant impacts be mitigated back to zero:
• traffic increase
• safe routes to school [to help mitigate traffic impacts]
• circulation pattern/ingress and egress [where will the buses load/unload/idling and fumes adjacent to residences]
• construction impacts;
• proposed buildings [location of, size, mass, scale, height]
• any loss of playground or open space
• any other proposed uses besides classrooms

POLICY MOTION: Mandarin and English Dual-Language Immersion Elementary School Project at Mark Twain Middle School: With the existing traffic congestion running North & South on both Walgrove and Beethoven between the Culver City Border to Santa Monica and beyond, causing gridlock traffic at every signal light, an increase in traffic generated by a minimum of 500 new students to Mark Twain School Campus from the Mandarin Immersion program at Broadway would severely impact this and surrounding neighborhoods, bring the traffic that runs through Mar Vista on the North & South Streets and the Venice Neighborhood streets to a standstill with unbearable traffic congestion. Because the Mandarin Immersion Program is an important program, we recommend that LAUSD ensure 90% of students in this program and any future program that will increase student enrollment, use school bus transportation only.

POLICY MOTION: Mandarin and English Dual-Language Immersion Elementary School Project at Mark Twain Middle School: Serious consideration be given to adopt Dr. Patton's proposal for this facility as it utilizes existing classrooms that are currently not being used at the Mark Twain Campus, brings much needed refurbishments to the entire school, reduces the amount of Bond Money used on the project by millions of dollars, while allowing some of the open space that may have been removed and used to construct 15 new Classrooms, to allow for a substantial pick up and drop of area for the increased use of the School Bus Service and private car drop off and pick up, taking this traffic off local neighborhood streets.

POLICY MOTION: Mandarin and English Dual-Language Immersion Elementary School Project at Mark Twain Middle School: Serious consideration be given to adopt Dr. Patton's proposal for this facility as it utilizes existing classrooms that are currently not being used at the Mark Twain Campus, brings much needed refurbishments to the entire school, reduces the amount of Bond Money used on the project by millions of dollars, while allowing some of the open space that may have been removed and used to construct 15 new Classrooms, to allow for a substantial pick up and drop of area for the increased use of the School Bus Service and private car drop off and pick

up, taking this traffic off local neighborhood streets.

POLICY MOTION: Mandarin and English Dual-Language Immersion Elementary School Project at Mark Twain Middle School: A staggered start and end to the school day be enforced for the Mandarin Immersion Program and the Middle School Program, to help minimize traffic impacts to the local neighborhood caused by drop off and pick up traffic.

POLICY MOTION: Restoring Both Northbound Overland Avenue to Westbound I-10:
In the interest of public safety, the Mar Vista Community Council opposes the reduction from two northbound Overland Avenue lanes that can access the I-10 westbound freeway to only one lane, and calls upon the LADOT to increase the number of westbound I-10 accessible lanes on northbound Overland Avenue back to two lanes.

MOTION: LADOT Study Of Overland Bridge Over the I-10 Freeway and Pedestrian Safety:
In the interest of public safety, the MVCC calls upon the LADOT to complete a study on the intersection of northbound Overland Avenue and the Westbound I-10 on-ramp, as well as a study to consider limiting pedestrian flow to the western side of the Overland Bridge over the I-10 freeway, within the next three months.

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs
g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair
h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair
l. **Elections and By-laws**- Bill Scheding, chair
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Bill Duckett, chair

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

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and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days prior to the meeting you wish to attend by contacting chair@marvista.org.

Appendix A

Scheding Postal Expenditures:

USPS June 20, 2012:	$7.40
USPS July 10, 2012:	$7.40
USPS Aug. 18, 2012:	$5.05
USPS Sept. 15, 2012:	$5.05
USPS Oct. 25, 2012:	$5.05
total:	$29.95

NEIGHBORHOOD COUNCIL FUNDING PROGRAM

FUNDING REQUEST FORM

Please complete in full to request funding from a Neighborhood Council.

REQUEST DATE: 11/1/14 ***Funding Amount*** $29.95

NEIGHBORHOOD COUNCIL: Mar Vista

Please complete the information below for the Requester/Payee:

Name of Requester: **Wm.L.Scheding**

Are you a board member of this Neighborhood Council? Yes ☑

Is this a request for a recurring payment? No x *If yes, enter term:*

Is this request a payment for services requiring a 1099? No x

Is this a request for an out of state vendor? No x

Payable to: William Scheding

Remittance Address: 12301 Clover Ave,

City: Los Angeles **State:** CA **Zip Code:** 90066

Email Address: wls@marvista.org **Number:** 310-502-5402

Motion to approve up to $30 for postage rembursement to Treasurer, Scheding for forms sent to DONE.

DECLARATION

I, the Requester, understand that I am requesting public funds from the Neighborhood Council and that such funds are restricted under the guidelines set forth by the Department of Neighborhood Empowerment. I further agree to provide any documentation requested by the Department to authorize payment or review the appropriateness of the request.

W. Scheding

REQUESTER'S SIGNATURE DATE

NEIGHBORHOOD COUNCIL USE ONLY

William L. Schedung Budget Category: outreach

TREASURER'S NAME AND SIGNATURE Amended :

Bill Koontz # Approved:

SIGNER'S NAME AND SIGNATURE DATE Denied :

DEPARTMENT USE ONLY

AUTHORIZATION CATEGORY: Authorization Code:

☐ NPG ☐ CIP ☐ > $2,500

☐ LEASE ☐ SPONSORED EVENT ☐ ADVANCED PAYMENT ☐ DEPARTMENT APPROVAL SIGNATURE

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Thursday, November 13th, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

141113-BOD-AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
   -**Meeting called to order at 7:11 p.m.**
   -Quorum present – Bill Koontz (Chair), Bill Duckett (Secretary), Bill Scheding (Treasurer), Michael Millman, Brad Wilhite, Yvette Molinaro, Val Davidson, Michelle Krupkin, Ken Alpern, and Robin Doyno
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of October 2014 Minutes** (public comment permitted) (1 min)
   -Motion by Bill Scheding to approve. 2nd by Michelle Krupkin. Motion carries unanimously.
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
   -Albert Olson: Thanks to all who made Fall Festival a huge success. The $5,400 raised in the silent auction is a record. Committee members who performed above and beyond were Tom Ponton, Yvette Molinaro, Jerry Hornof, Jeanne Kuntz, Susan Melly, Sara Roos, Bill Duckett, Lorraine Wells, Sharon Commins, Pat Petereson, Sherri Akers, and Albert Olson.
5. **Special Presentation** – VHS report and presentation: Kids and events of Merit (10 min)
   -Sara Roos: Initiative is about paying attention to the 13 schools in CD 11, and especially recognizing students who go above and beyond. For individual commendations please see the attached file (Appendix B)
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen
      Len.Nguyen@lacity.org
      -Len: Event to introduce new Neighborhood Prosecutor, Veronica de la Cruz-Robles on December 4th. Westside Winter Shelter Donation Drive December 19th.
   b. Mar Vista Recreation Center – Jason Kitahara, Director
      -Jason:
   c. CD 5 – Paul Koretz, rep by Joseph Galloway,
      joejdg92@gmail.com
      -Joseph:
   d. US 36 – Janice Hahn
      -No report
   e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin
      scott.malsin@assembly.ca.gov
      -No report
   f. CA Senate 28
      -No report

g. CA Assembly 47
-No report
h. CA Assembly 62
-No report
i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
-No report
j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
-No report

7. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
   a. Chair-Bill Koontz
      i. **MOTION-Director's request, Robin Doyno:** Be it resolved that the MVCC shall aid the Los Angeles Homeless ServicesAuthority in the approaching count of the homeless in Los Angeles.
      ii. **Grace Wellmen from Communities in Motion, spoke on the motion. This is required by HUD to ID homeless persons which in turn influences funds coming to the community. Needs coordinator to find volunteers and gather them for the count. This will take place on Wednesday, January 28th.**

      Motion by Robin Doyno and 2nd by Bill Scheding. Motion passed unanimously.

      This aid (to be determined) and resolution shall recognize the importance ofan accurate measure of our homeless community for a variety of reasons.
      iii. **Special Presentation**
      Certification of appreciation given to Albert Olson and Yvette Molinaro for the incredible work they did to make the 2014 Fall Festival an overwhelming success.

   b. First Vice Chair-Mitchell Rische
   c. Second Vice Chair-John Kuchta
   d. Secretary-Bill Duckett
      i. **Farmer's Market Update**
      ii. **Sending Secretary motions**
      Motions need to be sent to the Secretary in a timely manner that the agenda can be posted 72 hours in advance of the meeting. It is very difficult to try to find them via emails, posted agendas, and posted draft minutes as many times all or none of the above happens.

   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
      i. **APPROVAL** of October MER
      Motion by Bill Scheding and 2nd by Robin Doyno carries unanimously.
      ii. **APPROVAL** of funding request by William Scheding for reimbursement of postage in the amount of $29.95 (see supporting documents, APPENDIX)
      Motion by Bill Scheding and 2nd by Robin Doyno carries unanimously.

iii. **FUNDING MOTION:**
Whereas the Mar Vista Chamber of Commerce will be hosting a Pop-Up Mar Vista event on November 29th, 2014.

Therefore, the MVCC grants approval for funding in the amount of $250 to provide promotional support. Promotional materials such as banners and maps will be printed and the Mar Vista Community Council logo will be displayed along with all other sponsors' logos. In addition, the Chamber asks for support in the form of a website post and e-blast to promote the event prior to the date. (See supporting documents Appendix B).

Friendly amendment by Michelle Krupkin to increase the dollar amount to $350 accepted.
Friendly amendment by Bill Duckett to add the following wording: *In addition and in as the event will encourage walking and biking to local businesses, MVCC grants approval for the Green Committee to provide promotional support. The Green Committee's logo will be displayed along with all other sponsors' logos.*

Motion by Bill Scheding and 2nd by Bill Duckett carries unanimously.

iv. **FUNDING MOTION:** Purchase and update Santa Sleigh Stop Signs and materials-not to exceed $200.
Motion by Bill Scheding and 2nd by Michelle Krupkin carries with 7 Ayes, 1 Nay, and one Abstention (Val Davidson)

v. **FUNDING MOTION:** Support Pacific LAPD's Winter Wonderland Toy Drive and Give-Away Program-not to exceed $2000 for supplies, toys, food and rental of equipment.
-Bill Koontz: This means a lot to underprivileged children who line up many hours beforehand.
-Bill Scheding: Need to be specific about who receives the funds. Funds will be given to the Boosters.
Motion by Bill Scheding and 2nd by Michelle Krupkin carries with 8 Ayes and 1 Nay.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
Linda: Next meeting is November 19th. Agenda closes Saturday, November 15th. Road Closed sign South of Grand View Elementary School has still not been removed (Sunday Farmers' Market)
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon
www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta
k. Recode LA: Sharon Commins
Sharon: Board should visit website and read everything.
l. Mar Vista Chamber of Commerce: Sarah Auerswald
Sarah: Pop-up Mar Vista on November 29th. Shop locally and ride your bike. Great Streets update: Council office has entered into talks with Caltrans regarding Venice Blvd.

8. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
Zone 1 – No report
Zone 2 – No report
Zone 3 – No report
Zone 4 – No report
Zone 5 – No report

Zone 6 – No report

9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee**-Bill Koontz, Chair
    b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman, Chair
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, Chair; Jeanne Kuntz and Sherri Akers, Vice-Chairs
    e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs

-Motion to move all item e policy motions to the beginning or 7 made by Bill Scheding and 2nd by Michelle Krupkin. Motion carries unanimously.

POLICY MOTION: Amendment to Outdoor Dining "R" Permit

MVCC, a member of the Westside Regional Alliance of Councils, supports the following WRAC motion: Request the LA City Council amend the outdoor dining "R" permit ordinance to include requiring a window sticker advising the public that the establishment has a proper permit.

[NOTE: The purpose of this motion is to allow NC members, street inspectors, or the public, to be able to identify illegal outdoor dining].

POLICY MOTION: Investigation of Code Circumvention by Offsite Parking 'Leasing'

MVCC, a member of the Westside Regional Alliance of Councils, supports the following WRAC motion: Request the City Council investigate the Planning Department circumventing code by allowing off site parking with only a lease agreement and not a covenant agreement or variance.

[NOTE: The purpose of this motion is to ensure that the Planning Department and the CPC are not violating code and/or law by allowing uses to "Lease" required parking spaces off site, when code requires them to have a covenant agreement, or file for a variance].

Motion to take both on consent made by Ken Alpern and 2nd by Michelle Krupkin. Motion carries unanimously.

POLICY MOTION: BMO Adjustments to Close Loopholes in the Law

~~MVCC, a member of the Westside Regional Alliance of Councils, supports the following WRAC motion: The WRAC supports CM Paul Koretz's proposed amendments to the Baseline Mansionization Ordinance (CF 14-0656). Amendments shall be approved and executed in 4 months, and other areas/districts may be added during the approval process as the city did for the Sign Ordinance~~

~~*[Note: An ICO may be implemented concurrently with this approval process. The goal is a revised citywide policy, instead of a patchwork of HPOZs and RFA Overlays, which take up much time].*~~

Motion to move this up the agenda made by Bill Scheding and 2nd by Brad Wilhite carries unanimously.

Public Comment

Shelly Wagers: Been working for 10 years on Mansionization issue. Planning Department does not share a sense of urgency. Builders are front-running the change in the ordinance.

Friendly amendment to request Mar Vista be added to the queue accepted.

Motion by Ken Alpern and 2nd by Bill Scheding. Motion carries unanimously.

Substitute Motion made by Bill Scheding and 2nd by Bill Koontz carries unanimously:

The Board of the Mar Vista Neighborhood Council supports the motion from Councilmember Paul Koretz dated May 16, 2014 with respect to amending the cityh's Baseline Mansionization Ordinance number 179883.

The Board supports adoption of an ICO (Interim Control Ordinance) modeled on the Beverly Grove RFA (Residential Floor Area) Ordinance number 182754.

The Board urges that the ICO be applied as quickly and broadly as practicable and that the proposed BMO amendments be implemented with all possible speed.

The Board further requests Mar Vista be added to the queue.

This motion should be submitted to Council File 14-0656 as a Community Impact Statement.

POLICY MOTION: Mandarin and English Dual-Language Immersion Elementary School Project at Mark Twain Middle School: The MVCC, on behalf of our neighboring stakeholders, requests the following items be studied as part of the Mark Twain DEIR and further requests that any significant impacts be mitigated back to zero:

- traffic increase
- traffic management plan utilizing remote and all potential dropoff and pickup sites, such as on or near Venice Blvd.
- tangible traffic solutions, such as one-way streets, off-street busports and cross-campus drives
- safe routes to school [to help mitigate traffic impacts]
- a staggered start and end to the school day be enforced for the Mandarin Immersion Program and the Middle School Program, to help minimize traffic impacts to the local neighborhood caused by drop off and pick up traffic
- circulation pattern/ingress and egress [where will the buses load/unload/idling and fumes adjacent to residences]
- construction impacts
- serious consideration be given to adopt Dr. Patton's proposal for this facility
- proposed buildings [location of, size, mass, scale, height]
- any loss of playground, sports field, or open space from the construction of the new school
- any loss of playground or open space from the establishment of parking, and to consider underground or remote parking alternatives
- The use of existing local alternative elementary school campuses for the current elementary English and Spanish programs:
    - to allow the Mandarin Program to continue to grow at its existing location --to explore better utilization of other Westside schools that are currently under-enrolled
    - to address the concerns of Mar Vista parents that this campus will best achieve the right balance of accommodating the needs of local families with the needs of the LAUSD in general
- water-preservation, energy-efficient and LEED-certified buildings to be used in construction
- any other proposed uses besides classrooms
- LAUSD ensures 90% of the students in this program, and any future program that will increase student enrollment, use school bus transportation only to access the school

-Motion by Ken Alpern and 2nd by Bill Scheding

-Presentation by LAUSD: Claudia Vizcarra introduced Pamela Marton who talked about why they need a new site for the program and why this site was chosen. Program began at Broadway Elementary which was experiencing enrollment decline. Mark Twain enrollment has declined from a high of 1,393 to less than 700. Grandview has had a dual immersion Spanish and Venice has a Language Magnet program so has taken on the Spanish Immersion students. The need now is a middle school that would take on the Mandarin Immersion students. Mark Twain is experienced with taking the Spanish Immersion students. Room at Mark Twain to take on the Mandarin Immersion students. Scott Singleterry: Facilities development manager gave a project overview. Comments can be emailed to cequa-comments@lausd.net. Draft EIR due in January 2015. Final should be out in April or May 2015.

PUBLIC COMMENT

-Mary Ann Hereford: Sees this as very important to parents who want their children to continue the dual language program.
-Vincent Chan: Puts children's needs above his own. This is a good program and wants to do what he can to make this as easy on the neighborhood as possible.
-John Stern: Addressed underutilization of the schools in the area and wants to see a recommendation that the funds be freed and that all empty classrooms be used instead. This goes beyond Dr. Patton's proposal.
-Kadi Sibi: Parent at MI school and coordinates car pool and would be willing to offer same help with this school.
-Charlene Dekker: Walgrove cannot absorb traffic for a whole new school the size of Mark Twain.
-Spencer Rosenheck: Kindergartner at Broadway. Opted out of Coer d'Alene and a private school to be in this program. Mark Twain would be his home Middle School. Anxious for a path forward beyond elementary school.
-Staci Boggeri: Just wants to be able to move around on the roads in neighborhood.
-Chaka Forman:
-Kerry Olinger: Gone through two dual emersion programs. Concerned with credentialing issues. Concerned about traffic. Worried about construction.
-Sharon Commins: Need to see site plan and elevations. Cequa needs everything you want studied in it. Pack it! Wants to know what will happen to the sports field because there is so little in the neighborhood as is.
-Christopher Lawrence: Co-President of parent council of MI and also a resident of Mar Vista. Deals with traffic every day but considers this more important.
-Darren Hereford: Echoed Christopher's sentiments. Parents would be dropping
-Crystal Kaza: No second choice
-Lily Chan: Co President of MI Parent Association wants to ba a good neighbor. Traffic in this area is bad anyway and this association is willing to bend over backwards to mitigate.
-Robert Liu: Parent w/child @ Broadway and looking forward to this change.
-Jushal Kapadia: Has a 1st grader @ Broadway and a son who will start in two years. People in close proximity will walk. There is too much value to this project to not try to mitigate the traffic ussues.
-Keily Graham-Lawrence: Lives by the forum so familiar with traffic moving through her neighborhood. Parents are motivated to make this work.
-Ken March: Purchased home in neighborhood because he loves this program.
-Eric Kostello: Son goes to Broadway and lives in a cut-through neighborhood so understands the concern. Supports mitigation.

-Pat Hachiya: Parents are motivated to do anything to make this work.
-Chaka Forman: Has children at local elementary school and will go to Mark Twain. Program is great.
-Douglas Weston: Has 3rd grade daughter @ Broadway. He is resident of Venice. Most of the traffic problems stem from much bigger developments than this program.

Substitute motion made by Ken Alperin with 2nd by Bill Scheding to take the major points from all the policy motions regarding Mandarin Immersion Elementary School Project at Mark Twain Middle School and fold them into this motion passed with 9 Ayes and one Nay.

~~**POLICY MOTION: Mandarin and English Dual Language Immersion Elementary School Project at Mark Twain Middle School:** With the existing traffic congestion running North & South on both Walgrove and Beethoven between the Culver City Border to Santa Monica and beyond, causing gridlock traffic at every signal light, an increase in traffic generated by a minimum of 500 new students to Mark Twain School Campus from the Mandarin Immersion program at Broadway would severely impact this and surrounding neighborhoods, bring the traffic that runs through Mar Vista on the North & South Streets and the Venice Neighborhood streets to a standstill with unbearable traffic congestion. Because the Mandarin Immersion Program is an important program, we recommend that LAUSD ensure 90% of students in this program and any future program that will increase student enrollment, use school bus transportation only.~~

~~**POLICY MOTION: Mandarin and English Dual Language Immersion Elementary School Project at Mark Twain Middle School:** Serious consideration be given to adopt Dr. Patton's proposal for this facility as it utilizes existing classrooms that are currently not being used at the Mark Twain Campus, brings much needed refurbishments to the entire school, reduces the amount of Bond Money used on the project by millions of dollars, while allowing some of the open space that may have been removed and used to construct 15 new Classrooms, to allow for a substantial pick up and drop of area for the increased use of the School Bus Service and private car drop off and pick up, taking this traffic off local neighborhood streets.~~

~~**POLICY MOTION: Mandarin and English Dual Language Immersion Elementary School Project at Mark Twain Middle School:** A staggered start and end to the school day be enforced for the Mandarin Immersion Program and the Middle School Program, to help minimize traffic impacts to the local neighborhood caused by drop off and pick up traffic.~~

POLICY MOTION: Restoring Both Northbound Overland Avenue to Westbound I-10:
In the interest of public safety, the Mar Vista Community Council opposes the reduction from two northbound Overland Avenue lanes that can access the I-10 westbound freeway to only one lane, and calls upon the LADOT to increase the number of westbound I-10 accessible lanes on northbound Overland Avenue back to two lanes.

MOTION: LADOT Study Of Overland Bridge Over the I-10 Freeway and Pedestrian Safety:
In the interest of public safety, the MVCC calls upon the LADOT to complete a study on the intersection of northbound Overland Avenue and the Westbound I-10 on-ramp, as well as a study to consider limiting pedestrian flow to the western side of the Overland Bridge over the I-10 freeway, within the next three months.

Motion to put over the above two motions by Ken Alpern and 2nd by Bill Duckett carries unanimously.

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs
g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair
h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair
l. **Elections and By-laws**- Bill Scheding, chair
m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
n. **Aging in Place Ad Hoc**- Bill Duckett, chair

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

Motion to adjourn at 9:56 p.m. by Michelle Krupkin and 2nd by Brad Wilhite.

**in compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

***As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days prior to the meeting you wish to attend by contacting chair@marvista.org.*

Appendix A

Scheding Postal Expenditures:

USPS June 20, 2012:	$7.40
USPS July 10, 2012:	$7.40
USPS Aug. 18, 2012:	$5.05
USPS Sept. 15, 2012:	$5.05
USPS Oct. 25, 2012:	$5.05
total:	$29.95

NEIGHBORHOOD COUNCIL FUNDING PROGRAM

FUNDING REQUEST FORM

Please complete in full to request funding from a Neighborhood Council.

REQUEST DATE: 11/1/14 ***Funding Amount*** $29.95

NEIGHBORHOOD COUNCIL: Mar Vista

Please complete the information below for the Requester/Payee:

Name of Requester: **Wm.L.Scheding**

Are you a board member of this Neighborhood Council? Yes ☑

Is this a request for a recurring payment? No x *If yes, enter term:*

Is this request a payment for services requiring a 1099? No x

Is this a request for an out of state vendor? No x

Payable to: William Scheding

Remittance Address: 12301 Clover Ave,

City: Los Angeles **State:** CA **Zip Code:** 90066

Email Address: wls@marvista.org **Number:** 310-502-5402

Motion to approve up to $30 for postage rembursement to Treasurer, Scheding for forms sent to DONE.

DECLARATION

I, the Requester, understand that I am requesting public funds from the Neighborhood Council and that such funds are restricted under the guidelines set forth by the Department of Neighborhood Empowerment. I further agree to provide any documentation requested by the Department to authorize payment or review the appropriateness of the request.

W. Scheding

REQUESTER'S SIGNATURE DATE

NEIGHBORHOOD COUNCIL USE ONLY

William L. Schedung Budget Category: outreach

TREASURER'S NAME AND SIGNATURE Amended :

Bill Koontz # Approved:

SIGNER'S NAME AND SIGNATURE DATE Denied :

DEPARTMENT USE ONLY

AUTHORIZATION CATEGORY: Authorization Code:

☐ NPG ☐ CIP ☐ > $2,500

☐ LEASE ☐ SPONSORED EVENT ☐ ADVANCED PAYMENT ☐ DEPARTMENT APPROVAL SIGNATURE

Appendix B

School	Student	Grade	Achievement
Mar Vista	Keira B	1	
	Audrey M	1	The Mar Vista School PTA Summer Reading Challenge was a huge success! Over 80 students each read more than 1,000 pages during the Summer and received a certificate of achievement. Two students in each grade with the highest number of pages read during Summer were announced at assembly, and invited to enjoy a special lunch in the Library with Principal Choe and our wonderful Librarian, Mrs. Marino. These 10 winners read a combined 112,036 pages over the summer:
	Dominic S	2	Page totals ranged from 3,335 pp t0 35,917 pp
	Sharon C	2	
	Josh H	3	
	Ryan S	3	
	Peyton W	4	
	Eliot R	4	
	Katie L	5	
	Amalea B	5	35,917 pp!!
PalmsMS	Ian L	7	Ian is a 7th grade violinist in the Palms Advanced Orchestra. He is an outstanding violinist and violist and goes above and beyond by volunteering to perform at many events. This Fall he played at the Westside Middle School Magnet Fair outside the Palms Magnet room at LACES, in a duet and solo during the Palms M.S. Band concert at the Mar Vista Fall Festival at Mar Vista Park as well as performing many Friday Lunch Recitals at school. When we have an opportunity and need a performer, Ian is always there and well prepared.
	Alex L	7	Alex is a 7th grade flutist in the Palms Gold Band and a tenor sax player in our Jazz Band. Alex is an outstanding musician and has volunteered to play at the Westside Middle School Magnet Fair outside the Palms Magnet room at LACES, in a duet and solo during the Palms M.S. concert at the Mar Vista Fall Festival at Mar Vista Park and a Friday Lunch Recital at school. He is always well prepared and willing to help when we need a performer.
	Logan S	8	Logan is an 8th grade violinist in the Palms Advanced Orchestra. He has been in Orchestra all three years at Palms M.S. He goes above and beyond by performing at the Westside Middle School Magnet Fair outside the Palms Magnet room at LACES and has performed at the previous two Magnet Fairs at Johnny Cochran M.S. and he performs in Friday Lunch Recitals at school. Logan is very dedicated to the violin and practices every day. He always volunteers to play for every outside opportunity he can.

	Imari S	8	Imari is an 8th grade student at Palms Middle School. She has volunteered to speak to an auditorium filled with visiting parents and students. She is poised and clear on why she is here at Palms, to learn and share ideas with others. Imari was also a participant in a workshop on Bullying. This was held in our library on behalf of the International Visitors Council of Los Angeles. The visitors were from Uganda here to study Minority Rights in the U.S. Imari was singled out to receive a gift from one representative because he recognized her ability to speak on this issue and offer ideas to the United States Department of State's International Visitor Leadership Program.
	Layla A	8	Layla (8th grade) submitted a letter to Letters about Literature, a competition sponsored by the Center for the Book in the Library of Congress, in which a student writes to an author describing how that author's work affected the student's life. Judges selected her letter as the California winner out of roughly 1,000 letters in Level 2, Grade 7 and 8. Layla's letter was compiled with the state winners from the rest of the country into a volume that is now in the Library of Congress. Layla is an 'A' student at Palms Middle School.
	Caitlin C	8	Caitlin's letter in the competition sponsored by the Center for the Book in the Library of Congress, "Letters about Literature" was selected as one the ten California Level 2 finalists, (7th and 8th grade students). In addition to being an accomplished writer, Caitlin's artwork submission to the PTA Reflections competition last year made it to the final round of judging in Sacramento. She is "an accomplished, wonderful violist and pianist", according to her music teacher, Ms. J West. She has been an 'A' student at Palms Middle School.
	Julian L	8	Julian is an 8th grade student who is achieving in his studies at Palms Middle School. According to his counselor, Ms. A Perez he had some difficulties in the 6th and 7th grade. Both he and his counselor are proud of his accomplishments and see him as eligible for culmination at this time.
VHS	Lisa S	12	Nordstrom scholarship, $10K; 1 of 80 selected from 13K applications. Award recognizes outstanding students nationally for exceptional scholastic achievement and community involvement.
	Lisa S	12	ABC News Cool Kid; Recognizing community leadership and service
	Njeri G	12	National Black Scholar (based on PSAT)
	Nora B	12	National Hispanic Scholar (based on PSAT)
	Alex S	12	National Hispanic Scholar (based on PSAT)

Jordan L	12	Only student selected from LAUSD to join the National Choir in Tennessee.
Robotics Club		Honored as tournament host for 1/24/15

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, October 14th, 2014, at 7:00 PM Mar Vista Recreation Center Auditorium 11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

141014-BOD-AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of September 2014 Minutes (Regular Meeting and Special Meeting)** (public comment permitted) (1 min)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Special Presentation** – Project Facilities Staff, Mark Twain School, concerning the future Mandarin Language School (15 min)
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Joseph Galloway, joejdg92@gmail.com
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
7. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Appoint representative for DWP MOU/LANCC
    b. First Vice Chair-Mitchell Rische
    c. Second Vice Chair-John Kuchta
    d. Secretary-Bill Duckett
        i. **Farmer's Market Update**
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of September Funding Spreadsheet Form
        ii. **FUNDING MOTION: EXEC-FIN:** Motion to approve payment to CBS Advertising Distributors, LLC for distribution of newsletters in the amount of $1679.00

iii. **FUNDING MOTION: EXEC-FIN**: Motion to revise the HNA funding to use funds for tables and chairs from ABY Rentals and not the petting zoo.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta
k. Recode LA: Sharon Commins

8. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee**-Bill Koontz, Chair
        i. **ADMINISTRATIVE MOTION**: Appoint Bill Koontz, Mitchell Rishe, John Kuchta, Bill Duckett, and Bill Scheding to have access to the City Clerk's website to upload community impact statements.
    b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman & Christy Wilhelmi, Co-Chairs
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, & Jeanne Kuntz, Co-Chairs
    e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs
    f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs
        i. **POLICY MOTION**: **PLUM:** Motion to recommend dividing the lot at 3629 Grand View Blvd., the home of Susan Klos.
    g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair
        i. **POLICY MOTION: EAC:** Motion to approve letter (Appendix A attached) to LAUSD District 4 Board Member, Steve Zimmer, supporting efforts to create a committee to address the needs of, and provide a voice for Title I families in LAUSD District 4.
    h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair
    i. **Safety and Security Committee** – Rob Kadota, Chair
    j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
    k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair
    l. **Elections and By-laws**- Bill Scheding, chair
    m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair
    n. **Aging in Place Ad Hoc**- Bill Duckett, chair
        i. **POLICY MOTION: AIP AD HOC:** Motion to accept the mission statement crafted by the committee: The Mar Vista Community Council Aging in Place Ad Hoc Committee aims to provide an empowering voice and a network of resources to our diverse community of Seniors.
        ii. **POLICY MOTION: AIP AD HOC:** Whereas the Harvard Joint Center for Housing Studies with support from AARP just released a study on Housing America's Older Adults showing that:

- By 2030 the number of adults aged 65 to 74 will nearly double from 21.7 million in 2010 to 38.6 million

- The typical homeowner over 65 can only afford in-home assistance for about 9 years – or 6.5 years in an assisted living residence. For renters it is much worse.
- In 2010, there were more than 7 potential caregivers for every person in the high-risk years of 80-plus. By 2030, the projected ratio will fall to 4 people for every person 80-plus. By 2050, it is expected to further fall to less than 3 to 1.

Therefore, the Mar Vista Community Council urges Mayor Garcetti to sign the Milken Institute Best Cities for Successful Aging Pledge and make the issue of aging in place a focal point of his administration.

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

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APPENDIX A

[MVCC Letterhead]

Steve Zimmer
Board Member
LAUSD District 4
steve.zimmer@lausd.net

[Date]

Dear Board Member Zimmer,

The Mar Vista Community Council, on the advice of its Education, Arts and Culture Committee, supports your efforts to create a committee to address the needs of, and provide a voice for, Title I families in LAUSD District 4.

The boundaries of the Mar Vista Community Council include schools within District 4, and also some schools in District 1, including Clover Elementary School, Charnock Elementary School, and Palms Middle School.

We encourage you to reach out to and include the communities and families of these District 1 schools as part of your efforts to engage and better serve Title I families. These schools serve as feeders to Venice High School, serve the same community (and sometimes the same families) as do the District 4 schools, and should be considered part of the Venice "family" of schools.

We appreciate your consideration of this request, and we appreciate your efforts on behalf of Title I families.

Best regards,

Board of Directors, Mar Vista Community Council

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, October 14th, 2014, at 7:00 PM Mar Vista Recreation Center Auditorium 11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

141014-BOD-MINUTES

1. **Call to Order and Welcome** – Chair (1 min.)
   -Meeting called to order at 7:11 p.m.
   -Quorum present – Bill Koontz (Chair), Bill Duckett (Secretary), Bill Scheding (Treasurer), Michael Millman, Brad Wilhite, Melissa Stoller, Michelle Krupkin, Yvette Molinaro, John Kuchta, Mitchell Rishe, Ken Alpern, and Robin Doyno
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of September 2014 Minutes (Regular Meeting and Special Meeting)** (public comment permitted) (1 min)
   -Motion by Bill Scheding to approve. 2nd by John Kuchta. Motion carries with 10 Ayes and 1 abstentions (Melissa Stoller)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
   Sarah Auerswald-Mar Vista Business Association is now a chamber. On 11/29 there will be a popup (small business Saturday) encouraging shoppers to shop locally for what they did not find at the malls(concentrating on the Great Street corridor).
   Albert Olson-Reminding us that the Fall Festival is this Saturday and need able-bodied to help setup on Saturday morning. The honoring of the honoree will be at 12:30 p.m.
5. **Special Presentation** – Project Facilities Staff, Mark Twain School, concerning the future Mandarin Language School (15 min)
   -Tabled until next month because feedback is still being sought
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      -Len: Offending signs for the Farmer's Market are down and they are working on the 2nd phase for signs that go to 5 p.m. Bonin will be at Fall Festival from 11 a.m.-1 p.m. Feedback is sought about the new sidewalk ordinance on October 27th @ 7pm at the rec center. Solar workshop MV Park Gym on 11/4 8-10 a.m.
   b. Mar Vista Recreation Center – Jason Kitahara, Director
      -Jason: Thanks to Fall Festival and the Hornoff family the park now has an inflatable movie screen. Golf activities have started up at the rec center. Classes on Tuesday late afternoon. Friday Halloween event on October 31st
   c. CD 5 – Paul Koretz, rep by Joseph Galloway, joseph.galloway@lacity.org
      -Joseph: Working on getting RVs off Sepulveda and street cleaning signs. Fire Department is setting up

a program to get smoke detectors in households. Westside Village Homeowners Association hosted an event on disaster preparedness.

d. US 36 – Janice Hahn
-No report

e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
-Scott: Promoting Prop 1 and 2. 4th year of balanced budget. 8 bills sponsored by Ridley-Thomas were passed. Proposed health form about highly infectious diseases. Encouraged to talk to Assemblyman regarding mandatory immunization and entrance and egress of carpool lanes.

f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
-No report:

g. CA Assembly 47
-No report

h. CA Assembly 62
-No report

i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
-No report

j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
-No report

7. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
   a. Chair-Bill Koontz
      i. Appoint representative for DWP MOU/LANCC
      -Bill Koontz will do this until he can find a representative.
   b. First Vice Chair-Mitchell Rische
      -No report
   c. Second Vice Chair-John Kuchta
      -No report
   d. Secretary-Bill Duckett
      i. **Farmer's Market Update**
      Mar Vista stakeholders are getting to know their council through the staffing of the table and Directors are becoming quite knowledgeable on the feeling of the stakeholders.
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
      i. **APPROVAL** of July, August, and September MER
      No money in July, $602 in August, and $28.72 in September. They need to be re-filed.
      Motion to approve by Bill Scheding and 2nd by Bill Duckett. Motion carries unanimously.
      ii. **FUNDING MOTION: EXEC-FIN:** Motion to approve payment to CBS Advertising Distributors, LLC for distribution of newsletters in the amount of $1679.00.
      Motion to approve by Bill Scheding and 2nd by Ken Alpern. Motion passed unanimously.

iii. **FUNDING MOTION: EXEC-FIN**: Motion to revise the HNA funding to use funds for tables and chairs from ABY Rentals and not the petting zoo.
Friendly amendment to use the money for food and beverage accepted.
Motion to approve by Bill Scheding and 2nd by John Kuchta.
Motion carries unanimously.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
-Linda: Next meeting is November 19th and agenda closes November 15th. Repeated what Len said about Farmers' Market signs.

g. DWP MOU/LANCC Liaison-Open
-No report

h. DWP Recycled Water Liaison-Christopher McKinnon
www.ladwp.com/recycledwater
-No report

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
-Yvette: Lots and lots of auction items, great deals to be had by all.

j. City Budget: John Kuchta
-John: Heavy lifting done by those on the regional level. Jay Handal is once again representing us at the regional level. Jay Handal was elected co-chair.

k. Recode LA: Sharon Commins
-No report

8. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
Zone 1 – Alternating between Westwood and Overland between getting the work done on the streets in lieu of the EXPO. Take precautions against auto theft which are happening quite frequently.
Zone 2 – Brad Wilhite: Scarefare on Octover 17th at Richmond Elementary (2:30 to 8:30p.m.). Mega Garage Sale on the 25th from 8 a.m. to 3 p.m.
Zone 3 – Bill Scheding: Hilltop Family Picnic happened on October 11th. HNA ahs dumped a great deal of money into CERT trailer.
Zone 4 – Michael Millman: Illegally parked vehicles by those parking there and going to work. Some are parking there then taking limos to LAX.
Zone 5 – Michelle Krupkin: Thinking of implementing Traffic Calming on Herbert between Grandview and Inglewood. Dead crows and will contact Vector Control. Status Quo trying to get open on Grandview.
Zone 6 – Valerie Davidson: No report.

9. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

a. **Executive & Finance Committee**-Bill Koontz, Chair
i. **ADMINISTRATIVE MOTION**: Appoint Bill Koontz, Mitchell Rishe, John Kuchta, Bill Duckett, and Bill Scheding to have access to the City Clerk's website to upload community impact statements.
Motion by Ken Alpern and 2nd Michelle Krupta. Motion carries unanimously.

b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman, chair
-No report

c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
-No report

d. **Green Committee** – Melissa Stoller, chair & Jeanne Kuntz and Sherri Akers, Co-Chairs
-No report

e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs
-No report

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs

i. **POLICY MOTION**: **PLUM:** Motion to recommend dividing the lot at 3629 Grand View Blvd., the home of Susan Klos.

-Motion by John Kuchta and 2nd Michelle Krupkin. Motion carries unanimously.

g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair

i. **POLICY MOTION: EAC:** Motion to approve letter (Appendix A attached) to LAUSD District 4 Board Member, Steve Zimmer, supporting efforts to create a committee to address the needs of, and provide a voice for Title I families in LAUSD District 4.

Sara Roos read the letter (attached to minutes).
The schools serve as feeders to Venice High per a question by Melissa Stoller.
Motion to move this up on agenda made by Bill Koontz and 2nd by John Kuchta. Motion carries unanimously.
Motion to approve made by Brad Wilhite and 2nd by Ken Alpern. Motion carries unanimously.

h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair

-No meeting this month as committee is concentrating on recruitment of people to walk precincts in Santa Monica

i. **Safety and Security Committee** – Rob Kadota, Chair

-No report

j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs

k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair

-If you load full email to see the link to unsubscribe.

l. **Elections and By-laws**- Bill Scheding, chair

m. **Great Streets Ad Hoc Committee** – Michelle Krupkin, chair

1st meeting was October 8th. Read minutes online.

n. **Aging in Place Ad Hoc**- Bill Duckett, chair

i. **POLICY MOTION: AIP AD HOC:** Motion to accept the mission statement crafted by the committee: The Mar Vista Community Council Aging in Place Ad Hoc Committee aims to provide an empowering voice and a network of resources to our diverse community of Seniors.

Motion by Bill Duckett and 2nd by John Kuchta. All

ii. **POLICY MOTION: AIP AD HOC:** Whereas the Harvard Joint Center for Housing Studies with support from AARP just released a study on Housing America's Older Adults showing that:

- By 2030 the number of adults aged 65 to 74 will nearly double from 21.7 million in 2010 to 38.6 million
- The typical homeowner over 65 can only afford in-home assistance for about 9 years – or 6.5 years in an assisted living residence. For renters it is much worse.
- In 2010, there were more than 7 potential caregivers for every person in the high-risk years of 80-plus. By 2030, the projected ratio will fall to 4 people for every person 80-plus. By 2050, it is expected to further fall to less than 3 to 1.

Therefore, the Mar Vista Community Council urges Mayor Garcetti to sign the Milken Institute Best Cities for Successful Aging Pledge and make the issue of aging in place a focal point of his administration.

-Bill Duckett offered substitute motion since the mayor has already

signed the pledge
MOTION: AIP: Mar Vista Community Council would like to thank the mayor for signing the Milken Institute Best Cities for Successful Aging pledge and ask that MVCC via the Aging In Place Ad Hoc Committee become part of the process for carrying out the pledge. Motion to approve by Bill Duckett and 2nd by John Kuchta. Motion carries unanimously.

10. **Discussion Calendar**
11. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
12. **New Business** -(Public comment permitted)
13. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**

    Rose Boulos -Across the street from Palms next to the wash, trees have not been trimmed and they need it badly. It is cover for much mischief under the cover of dark.
15. **Adjournment**

    Motion to adjourn at 8:56 p.m. by Michelle Krupkin and 2nd by John Kuchta.

**in compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

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APPENDIX A

[MVCC Letterhead]

Steve Zimmer
Board Member
LAUSD District 4
steve.zimmer@lausd.net

[Date]

Dear Board Member Zimmer,

The Mar Vista Community Council, on the advice of its Education, Arts and Culture Committee, supports your efforts to create a committee to address the needs of, and provide a voice for, Title I families in LAUSD District 4.

The boundaries of the Mar Vista Community Council include schools within District 4, and also some schools in District 1, including Clover Elementary School, Charnock Elementary School, and Palms Middle School.

We encourage you to reach out to and include the communities and families of these District 1 schools as part of your efforts to engage and better serve Title I families. These schools serve as feeders to Venice High School, serve the same community (and sometimes the same families) as do the District 4 schools, and should be considered part of the Venice "family" of schools.

We appreciate your consideration of this request, and we appreciate your efforts on behalf of Title I families.

Best regards,

Board of Directors, Mar Vista Community Council

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Board of Directors (Special Meeting)
Wednesday September 24th, 2014 7pm
The Venice Grind 12224 Venice Blvd, Los Angeles, CA 90066
(the back patio)

AGENDA

1. CALL TO ORDER
2. Introductions and public comment

Discussion of Policy Motion and submission of Community Impact Statement concerning sidewalk repairs:

The Mar Vista Community Council will support transparent, and exploration of all, cost effective strategies for repairing damaged sidewalks.

The City should prioritize public safety and tree replacement with natives, and develop incentivized, voluntary property owner participation plans with a streamlined permitting process.

The City should employ the same tactic as the 'Pothole Blitz' program, and work with Neighborhood Councils to accurately document and to rank the most urgent sidewalk repairs.

Both the PLUM Committee and the Aging in Place Committee discussed this motion and will possibly have some amendments or substitute motions to consider.

3. Public Comment
4. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Board of Directors (Special Meeting)
Wednesday September 24th, 2014 7pm
The Venice Grind 12224 Venice Blvd, Los Angeles, CA 90066
(the back patio)

MINUTES

1. CALL TO ORDER
   Called to order at 7:05 p.m.
   Quorum present: Bill Koontz (Chair), Mitchell Rishe (1st Vice Chair), Bill Duckett (Secretary), Brad Wilhite, Robin Doyno, Melissa Stoller, Val Davidson, and Michelle Krupkin
2. Introductions and public comment

Discussion of Policy Motion and submission of Community Impact Statement concerning sidewalk repairs:

The Mar Vista Community Council will support transparent, and exploration of all, cost effective strategies for repairing/replacement of damaged sidewalks including permeable materials such as modular rubberized systems.

ADA requirements pertaining to sidewalks shall be met, ensuring accessibility for stakeholders of all ages.

The City should prioritize public safety and tree replacement with natives, and develop incentivized, voluntary property owner participation plans with a streamlined permitting process.

The City should employ the same tactic as the 'Pothole Blitz' program, and work with Neighborhood Councils to accurately document and to rank the most urgent sidewalk repairs.

Sharon Commins: offers a rewording to avoid pitfalls.
Tom Ponton: interested in language that would include modular rubberized systems.
Melissa Stoller: suggests the word "replacement" be added
Mitchell Rishe: suggests the word "new" be replaced with permeable
All friendly amendments (in green above) accepted by Bill Koontz
Motion by Bill Koontz and 2nd by Val Davidson. Motion as amended carries unanimously.

Both the PLUM Committee and the Aging in Place Committee discussed this motion and will possibly have some amendments or substitute motions to consider.

3. Public Comment
4. Adjournment
   Motion to adjourn at 7:20 p.m. made by Bill Koontz and 2nd by Bill Duckett

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, September 9th, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

140909-BOD-AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of August 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Field Deputy Jeffrey Ebenstein, jeffrey.ebenstein@lacity.org
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Update on Ethics Training and compliance on by-laws
        ii. Appoint representative for DWP MOU/LANCC
    b. First Vice Chair-Mitchell Rische
    c. Second Vice Chair-John Kuchta
    d. Secretary-Bill Duckett
        i. **Report** on Empower training and Board Retreat
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of August Funding Spreadsheet Form
        ii. **FUNDING MOTION: EXEC-FIN:** Motion to approve up to $200 for the Hilltop Neighbors Association Annual Picnic/Potluck on October 11, 2014. The money will be used for the rental of tables/chairs

from Abby Rents. Any funds left over will be used to purchase food, paper goods, condiments, and other supplies from Smart & Final or Von's.

iii. **FUNDING MOTION: EXEC-FIN**: Motion to approve up to $300 for Westdale Homeowners Association Block Party on October 12, 2014. The money will be used for food, beverage, and paper goods.

iv. **FUNDING MOTION: EXEC-FIN**: Motion to approve up to $300 for shirts for MVCC Board members.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
j. City Budget: John Kuchta

7. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
8. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
    a. **Executive & Finance Committee**-Bill Koontz, Chair
    b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman & Christy Wilhelmi, Co-Chairs
    c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
    d. **Green Committee** – Melissa Stoller, & Jeanne Kuntz, Co-Chairs
    e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs
    f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs
        i. **Motion:** The Whole Foods Market at Barrington and National will be applying for a conditional use approval to permit an instructional wine tasting protocol. It is approved by the PLUM Committee, without prejudice to any neighbors being given the opportunity at the board meeting to evaluate and contest the approval.
        ii. **Motion:** Be it resolved that the Triangle Center parking lot on Meier Street in Mar Vista that accommodates the 99 Cent Store be approved for a conditional use permit, and without prejudice to neighbors thereafter challenging or otherwise contesting the approval at the MVCC board meeting, September 2014
    g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Sara Roos, Vice- Chair
    h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair
        i. **MOTION-LA Support For SM Ballot Measure LC and Opposition to Measure D:**

        WHEREAS the Santa Monica Municipal Airport is bounded on three sides by LA City residents who suffer from air and noise pollution daily and are placed at great risk of having property damage, injury, and loss of life resulting from aircraft accidents; and

        WHEREAS Santa Monica ballot Measure D provides for a vote of the people to decide the fate of the Santa Monica City Council, but does not address any of the detrimental issues aforementioned; and

        Whereas Santa Monica ballot measure LC does address the aforementioned issues and places the power to decide how the land would be used should the Santa Monica Municipal Airport be closed into the hands of the voters;

        THEREFORE the MVCC urges the City Council of the City of Los Angeles to publicly come out against the Santa Monica City ballot Measure D and in favor of Santa Monica City ballot Measure LC.

i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair
    i. See above funding motions
l. **Elections and By-laws**- Bill Scheding, chair

9. **Discussion Calendar**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

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a.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, September 9th, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

140909-BOD-MINUTES

1. **Call to Order and Welcome** – Chair (1 min.)
   -Meeting called to order at 7:11 p.m.
   -Quorum present – Bill Koontz (Chair), Bill Duckett (Secretary), Bill Scheding (Treasurer), Michael Millman, Brad Wilhite, Valerie Davidson, Melissa Stoller, Michelle Krupkin, Ken Alpern, Yvette Molinaro, and Robin Doyno
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of August 2014 Minutes** (public comment permitted) (1 min)
   -Amended to show Yvette Molinaro was present
   -Motion by Bill Scheding to approve. 2nd by Brad Whilhite. Motion as amended carries with 10 Ayes and 1 abstentions (John Kuchta)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
   -Rob Kadota: Santa's Sleigh
   -Albert Olsen: Historic 62 has started the abatement procedures, the first step in remodeling
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      -Len: Councilmember Bonin is starting a newsletter and would like for us to forward events to Len to be included. Friday, September 19th at MV Rec Center talking to Mar Vista Seniors about scams.
   b. Mar Vista Recreation Center – Jason Kitahara, Director
      -Jason: Adding some activities like golf, foodies, etc.
   c. CD 5 – Paul Koretz, rep by Field Deputy (Jeffrey Ebenstein, jeffrey.ebenstein@lacity.org)
      -Jesus Orozco: New sound ordinance for better quality of life. 5 steps to disaster preparedness. Metro fares set to rise in next few weeks. Low income people can apply for low fares. Jeff is on medical leave. Joseph will be the field deputy in Jeffrey's absence. Contact: joejdg92@gmail.com.
   d. US 36 – Janice Hahn
      -No report
   e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
   f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
      -Scott:
   g. CA Assembly 47
      -No report
   h. CA Assembly 62
      -No report
   i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
      -No report:

j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
-No report:

6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
   a. Chair-Bill Koontz
      i. Update on Ethics Training and compliance on by-laws
      -Ethics training last Thursday in Westchester and we are now up to date. Improvements still needed for treasurer procedures.
      i. Appoint representative for DWP MOU/LANCC
      -Person the Chair wants to appoint not present
   b. First Vice Chair-Mitchell Rische
      -No report
   c. Second Vice Chair-John Kuchta
      -No report
   d. Secretary-Bill Duckett
      i. **Farmer's Market Update**
      -Will be posting online who will open, close, and staff the table
      -Will be sending around another Doodle for signups
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2014-15 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
      i. **APPROVAL** of August Funding Spreadsheet Form
      Motion to approve July funding sheet (blank) by Bill Scheding and 2nd by Yvette Molinaro. Motion passed unanimously.
      Motion to approve August funding sheet by Bill Scheding and 2nd by John Kuchta. Motion carries unanimously.
      ii. **FUNDING MOTION: EXEC-FIN:** Motion to approve up to $200 for the Hilltop Neighbors Association Annual Picnic/Potluck on October 11, 2014. The money will be used for the rental of tables/chairs from Abby Rents. Any funds left over will be used to purchase food, paper goods, condiments, and other supplies from Smart & Final or Von's.
      Friendly amendment to increase this to $550 accepted.
      Motion by Bill Scheding. 2nd by Yvette Molinaro. Motion as amended approved unanimously.
      iii. **FUNDING MOTION: EXEC-FIN**: Motion to approve up to $300 for Westdale Homeowners Association Block Party on October 12, 2014. The money will be used for food, beverage, and paper goods.
      Motion by Bill Scheding. 2nd by John Kuchta. Motion approved unanimously.
      iv. **FUNDING MOTION: EXEC-FIN**: Motion to approve up to $300 for shirts for MVCC Board members.
      -Bill Koontz would like to have polo shirts. Ken Alpern spoke out against shirts. Mitchell thinks we should make t-shirts. Yvette feels board should buy their own.
      Motion by Bill Scheding to table the discussion. 2nd by John Kuchta. Motion approved unanimously.
   f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
      -Linda: No report
   g. DWP MOU/LANCC Liaison-Open
      -Still open
   h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
      -Christopher: No report
   i. Fall Festival Liaison-Albert Olson/Yvette Molinaro

-Albert: 5 weeks to festival! Still have booth space available. Will come to board next month to ask individual board members for help. Len is the honoree this year.

j. City Budget: John Kuchta
-John: No report

k. Recode LA: Sharon Commins
Three committees working on this project. Next meeting in 3 weeks at city hall, but must call ahead for parking.

7. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
Zone 1 – Ken Alpern: Emails will be going out about closures on Westwood and Overland, expo line, and repaving. Marie Wallace just passed away. She was instrumental in getting MVCC started.
Zone 2 – Brad Wilhite: Fall block party coming up on September 12th Mega garage sale October 25th.
Zone 3 – Bill Scheding: Hilltop Family Picnic October 11th 3-6 pm at Little League Field.
Zone 4 – Michael Millman: No report
Zone 5 – Michelle Krupkin: New restaurant called Status Kuo. The Korean Church was recently tented.
Zone 6 – Valerie Davidson: Concerned with Lincoln Place as residents move in. Concerns with Santa Monica ballot measures.

8. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

a. **Executive & Finance Committee**-Bill Koontz, Chair
-No Report

b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman & Christy Wilhelmi, Co-Chairs
-No meeting

c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
-No repot

d. **Green Committee** – Melissa Stoller, & Jeanne Kuntz, Co-Chairs
-No Report

e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs
-No Report

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs

i. **MOTION**: The Whole Foods Market at Barrington and National will be applying for a conditional use approval to permit an instructional wine tasting protocol. It is approved by the PLUM Committee, without prejudice to any neighbors being given the opportunity at the board meeting to evaluate and contest the approval.

-Opportunity to have a sample of a wine or beer product. The area for this will be controlled for
Motion made by Michael Millman and 2nd by John Kuchta. Motion carries unanimously.

ii. **MOTION**: Be it resolved that the Triangle Center parking lot on Meier Street in Mar Vista that accommodates the 99 Cent Store be approved for a conditional use permit, and without prejudice to neighbors thereafter challenging or otherwise contesting the approval at the MVCC board meeting, September 2014

-John Henning, lawyer for owners of property affected by this parking lot. It appears the lot is illegal. People are sleeping in the lot. Trash blows everywhere from the lot. Contends the council has power as the council listens to the recommendations of the MVCC. The permit as presented is bare bones that does not comply with any of the normal standards for permits and CUPs. The Leslies are financially harmed by the parking lot. Suggests some changes to the parking lot that would diminish the financial harm done to the Leslies.

-Kristen Lonner: Speaking on behalf of 99 cent store. Propose a landscaping buffer to satisfy the neighborhood. Feel a wall would be an attractive nuisance for homeless. Other security measures are also being taken to address the issues.
-Elizabeth Leslie: Long history in Mar Vista. Gave a history of the 99 cent store property. Problem began in the 90s with vagrancy.
-Bob Leslie: 99 cent store has been a nightmare. Read a letter from a neighbor who concurs. Trash and lights are an annoyance.
-Marta Mackavoy: Nothing to say.
-Jack Mackavoy: Nothing to say.
-Michael King: An architect who has been working for 20 years with the Leslies. 20 foot hedge proposed will do nothing for the problem. This would set a bad precedent. Conditions need to be enforceable and reasonable. Should the store even have a liquor license? Also these requests of the board: 1.) require that their proposed CUP require the LID Low Impact Development requirements for parking lots including permeable paving; 2.) require that their proposed CUP require walls surrounding the parking lot; and 3.) require their proposed CUP require the parking lot meet the City Guidelines K for parking lots including walls and landscaping.
-Peter Lee: Read a letter from a tenant. Likes the house but does not like the nuisance brought about by the 99 cent store.
-Petra Schafer: Read a tenant letter. Fears for health and safety.
-Rosemary Corcoran: 99 cent store customer who doesn't want the store to close. Supports the continued use of the store.
-Carl Schafer: Has property in the neighborhood and wishes to move back, but cannot with the blight created by the parking lot. Supports bringing the parking lot up to acceptable standards.
-Gregory Mortimer: Has 3 businesses in the triangle area. He claims the liquor is bought at a nearby liquor store. Since the city changed the parking to no overnight there has been less of a problem.
-Aminta Mortimer: feels that compromise is in order.
-Sharon Commins: wall will do the job, but feels also that it might be an attractive nuisance…spoke on some conditions that are not enforceable.
-Phil Bant: has been in this neighborhood for decades. Spoke on behalf of the landlord of the 99 cent store. He feels that there has been much effort put into keeping the lot clean and they have hired security guards.
-Angela Barba: Supports the continued use of the parking lot for the 99 cent store. Need clean streets and a plan for the homeless everywhere.
-Bess Hochman: Part of the triangle center. Supports the continued use of the parking lot.
-Berry Behrsich: Respect for the Leslies and appreciate their concerns. Feels that the problems can be mitigated.
-Sarah Roos: Feels this should go back to committee and differences can be hammered out.
-Michael Hochman: One of the owners of the property. He feels that there has been much hyperbole but his family goal is to work within the needs of the neighbors.
-Steve Wallace: feels that neighborhood should be careful what they wish for, parking in the neighborhood instead of parking lot.
Board
-Ken Alpern: Pro-parking and anti-crime. This is not a safe neighborhood. Does not want the business to go away, but also wants the people to be safe.
-Bill Scheding: competition between two businesses…take it offline and work it out
-Bill Duckett: take it back to committee and hammer out proposed conditions in terms of what is reasonable and enforceable
-John Kuchta: Feels that much of what the property owners have done amounts to bullying. Takes issue with the loss of income of property owners which he feels is overblown. Understands the nuisances but feels that much can be mitigated as long as people remain reasonable. Both parties need to spend some time working out differences.
-Mitchell Rishe: Concerns with how the opposition has presented themselves with bullying and threats. Takes issue with much of the oppositions case.
-Valerie Davidson: Always comes out on the side of public vs. private.
-Michelle Krupkin: Feels that the differences need to be discussed.

-Yvette Molinaro: Disturbed that enough notice and effective notice may not have been given for the PLUM hearing. Agrees to send it back to PLUM for a better and more fair hearing.
-Michael Millman: Feels that sending it back to PLUM will only delay inevitable. Feels that another hearing will just be more of the same lack of concession. Feels it needs to move forward to planning.
-Bill Koontz: the fight is not going to be decided here. We also need to trust the committee chairs.

8 Aye 2 Nay and 1 abstention (Bill Duckett)
Motion made by Michael Millman and 2nd by John Kuchta.

g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Amy Lawrence and Sara Roos, Vice- Chairs
No report

h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair
    i. **MOTION-LA Support For SM Ballot Measure LC and Opposition to Measure D:**

WHEREAS the Santa Monica Municipal Airport is bounded on three sides by LA City residents who suffer from air and noise pollution daily and are placed at great risk of having property damage, injury, and loss of life resulting from aircraft accidents; and

WHEREAS Santa Monica ballot Measure D provides for a vote of the people to decid~~ed~~ the fate of the Santa Monica City Council, but does not address any of the detrimental issues aforementioned; and

Whereas Santa Monica ballot measure LC does address the aforementioned issues and places the power to decide how the land would be used should the Santa Monica Municipal Airport be closed into the hands of the voters;

MVCC strongly supports SantaMonica City ballot Measure LC and strongly opposes ballot Measure D and be it further resolved that the MVCC urges the City Council of the City of Los Angeles to publicly come out against Santa Monica City ballot Measure D and in favor of Santa Monica City ballot Measure LC.

Friendly amendments accepted
Motion by Bill Duckett. 2nd by Valerie Davidson. Motion approved unanimously.

i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair
    i. See above funding motions
l. **Elections and By-laws**- Bill Scheding, chair

9. **Discussion Calendar**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
    None
13. **Future agenda items**
14. **Adjournment**
    Motion to adjourn at 9:43 by John Kuchta and 2nd by Bill Duckett

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Mar Vista Community Council Board of Directors

Planning Retreat

Saturday August 23, 2014 9am-2pm

3759 Barry Ave, LA CA 90066

(Rob Kadota's Backyard)

Casual outdoor attire encouraged

Ice-Breaker - (15min) 9:00 - 9:15am

Coffee and Pastries w/community leaders (45min) 9:15 - 9:45

LAPD SLO Adrian Acosta - confirmed

Sarah A. - Mar Vista Business Assoc - confirmed

Len Nguyen- Mike Bonin's Deputy is confirmed

Brainstorm a list for a future Mar Vista Leadership Summit….

· *Viva Krasinski – Neighborhood Youth Assoc – Rob can ask if we're interested – they host a meeting of community youth service agencies.* Possible

· *Religious Representative? Fr Newman (St Bedes?)* None confirmed

· *Leaders/Presidents from local neighborhood associations?* None confirmed

EMPOWER and website training (60 min) 9:45 -10:45am

Empower training - Thomas Soong

What do we want to accomplish with the MVCC web site and other social media?

How to create web page content, events and newsletter issues. John Kuchta will provide the website training with help from Bill Koontz. Rob will provide wifi access. Encourage people to bring their own laptops or tablets.

Break 10:45 – 11am

Appointment game - icebreaker/team builder (30min) 11:00 - 11:30

- Why are people here?
- What do you want to get out of two year term?
- Talk about your family.
- Why is this home?

Overview of Mar Vista and MVCC 11:30 - 12:15pm

Mar Vista Population (demographic profile) (Rob)

What does the calendar look like (A year in the Life) – Group Activity lead by rob

BOD expectations (know the issues) – Bill K

Life of a resolution from conception to life – TBD/Crowd Source

What's in our inventory?

Lunch 12:15-1pm

Work Group Session: 1:00 - 1:45pm

Zone Directors-associations in zone; unique to zones; stay on top of proposed developments, crime concerns or quality of life issues as well as connecting with local community organizations, schools and religious institutions…;

Expectations of zone directors At-large directors-business association (invite Sarah A.); expectations of at-large directors

1:45 - 2:00 de-brief

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
Regular Meeting of the Board of Directors
Tuesday, August 12, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

140812-BOD-AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of June 2014 Minutes** (public comment permitted) (1 min)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
    a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
    b. Mar Vista Recreation Center – Jason Kitahara, Director
    c. CD 5 – Paul Koretz, rep by Field Deputy Jeffrey Ebenstein, jeffrey.ebenstein@lacity.org
    d. US 36 – Janice Hahn
    e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
    f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
    g. CA Assembly 47
    h. CA Assembly 62
    i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
    j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
    a. Chair-Bill Koontz
        i. Update on Ethics Training and compliance on by-laws
        ii. Appoint representative for the annual budget day
        iii. Special presentation
    b. First Vice Chair-Mitchell Rische
    c. Second Vice Chair-John Kuchta
    d. Secretary-Bill Duckett
        i. Update on Empower training and Board Retreat
    e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2013-14 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
        i. **APPROVAL** of July 2014 US Bank statement
        ii. **APPROVAL** of July Funding Spreadsheet Form

iii. **FUNDING MOTION: EXEC-FIN:** Motion to approve up to $300 for MVCC ad in the NWNA newsletter.
iv. **FUNDING MOTION: EXEC-FIN**: Motion to approve funding for September 12, 2014 NWNA Talent Show.

f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano
g. DWP MOU/LANCC Liaison-Open
h. DWP Recycled Water Liaison-Christopher McKinnon www.ladwp.com/recycledwater
i. Fall Festival Liaison-Albert Olson/Yvette Molinaro
   i. MOTION-Director's request, Yvette Molinaro: "The Mar Vista Community Council would like to continue its support and sponsorship of the Mar Vista Community Fall Festival & Silent Auction by approving the allocation of up to and including the amount of $4,000 to assist in funding the 2014 Mar Vista Community Fall Festival & Silent Auction. These funds will be used in their entirety to pay the City of Los Angeles Department of Recreation & Parks for permit fees that the City charges to use the Park on the day of the Festival, October 18, 2014, and printing costs for outreach materials."
j. City Budget: John Kuchta

7. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
8. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment
   a. **Executive & Finance Committee**-Bill Koontz, Chair
      i. Appointment of Sharon Commins as the ReCode LA Liaison
   b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman & Christy Wilhelmi, Co-Chairs
   c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs
   d. **Green Committee** – Melissa Stoller, & Jeanne Kuntz, Co-Chairs
      i. **MOTION-Greenhouse Gas Emissions:** The Mar Vista Community Council supports Councilmember Paul Koretz' climate crisis motion 14-0906 *(see Addendum 1)* to the LA City Council requesting that the City should pursue a Citywide greenhouse gas emissions reduction target of 80% below 1990 levels by 2050 and a Department of Water & Power greenhouse gas emissions reduction target of 80% below 1990 levels by 2030.
      ii. **MOTION- Wildlife Corridor:** The Mar Vista Community Council supports CF 14-0518 *(see Addendum 2)*, which instructs the Planning Department to prepare and present an ordinance to create a Wildlife Corridor in the eastern area of the Santa Monica Mountains (Hillside Ordinance zone).
   e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs
      i. **MOTION—Overnight Parking Enforcement:** The MVCC strongly favors the following actions to be taken by the City of Los Angeles:
         1) Changing the wording of L.A. Municipal Code 85.2 to the following:

         "…No person shall use a vehicle parked or standing upon any City street, or on any parking lot, owned by the City of Los Angeles and under the control of the City of Los Angeles or under the control of a Los Angeles County Department of Beaches and Harbors…as living quarters…either ~~overnight,~~ day to day or otherwise…<<*add: to remain in a single location, or*

within 500 yards of that same location, for a period greater than 36 hours.>>"

ii. **MOTION—Support of Century/Aviation and 96th/Aviation Station Alternative**

The MVCC supports the Metro Board-approved plan to have two airport-adjacent rail stations at both Century/Aviation and 96th/Aviation Street:

1) To fulfill the transportation, mobility and economic needs of the Century Blvd. corridor, and

2) To provide optimal future access via a LA World Airports People Mover rail line to both the Consolidated Rental Car Facility and the Central Airport Terminals

iii. **MOTION—Support of a Comprehensive Transit/Transportation Link to LAX:**

The MVCC supports a remote access plan to best connect LAX to the greater county and Southern California region which:

1) Relocates an upgraded LAX City Bus Center to either the future Intermodal Transit Facility at 96th/Airport or the future Metro Rail station at 96th/Aviation to best accommodate Westside and San Fernando Valley commuters

2) Explores, prioritizes and funds a South Bay Green Line Extension

3) Funds two Major Investment Studies for Green Line Extensions to both the Westside and the Norwalk Metrolink Station

iv. **MOTION—Support of a Pedestrian-Friendly People Mover/Central Airport Terminal Link**

The MVCC supports any comprehensive, pedestrian-friendly LAX plan that includes People Mover station location and design, as well as moving walkways, to best encourage convenient and rapid access from the future People Mover rail line for both pedestrians and the disabled

v. **MOTION—Venice Blvd. Refurbishment**

Whereas, Venice Boulevard was recently repaved by the California Department of Transportation (CalTrans) from Lincoln Boulevard to the 1-405 Freeway; AND

Whereas, other portions of Venice Boulevard in the Venice, Mar Vista, Palms, and SoRo communities is in a terrible state of disrepair, exacerbated by the Expo Line construction; AND

Whereas, the plants on the median have died due to a broken irrigation system;

Therefore, the MVCC strongly demands that the Los Angeles City Council and California Department of Transportation should take action to see that East-Bound and West-Bound Venice Boulevard be repaved from Lincoln Boulevard to Pacific Avenue and from the I-405 Freeway to Fairfax Avenue, and that the median be planted with California native plants and supported by an initial watering schedule or an installed low-flow irrigation system.

vi. **MOTION—Expo Line Parking and Connections:**

Whereas, the MVCC recognizes a need to provide parking at light rail and subway stations to maximize ridership; AND

Whereas, parking at the Culver City Station already exceeds capacity on most weekdays; AND

Whereas the impending opening of phase two of the Expo Line offers a unique opportunity to increase the use of public transportation;

Therefore, the MVCC strongly demands that the City of Los Angeles and Metro should work together to provide or create incentives leading to the provision of parking at or adjacent to all light rail stations.

vii. **MOTION—Park-and-Ride Options and Public Transportation:**

Whereas, MVCC recognizes that Park-and-Ride options with

convenient public transportation connection to light rail will only increase ridership and its benefits to the urban environment; Therefore, the MVCC strongly demands that the City of L.A. and Metro work together to provide or create incentives leading to the provision of off-site Park-and-Ride lots in the communities of Venice, Mar Vista, Palms, and SoRo, designed to geographically expand ridership reach for light rail and subway lines.

viii. **MOTION—LAFD Hiring – WRAC:**
The Mar Vista Community Council urges the City of Los Angeles to continue to adequately fund the recruitment, hiring, and training of new firefighters to bring the Los Angeles Fire Department back to full strength by FY 2019.

Supportive Facts and Findings: The strength of the LAFD is reduced by over 100 firefighters per year due to retirement, injury, or death. The Los Angeles Fire Department has not hired new firefighters since 2008, and the current force is stretched to a point that places both the health and the safety of Angelenos at risk. Furthermore, the reduced strength of the force contributes substantially to the LAFD's overtime budget to adequately staff each shift, especially on "red flag" days. The current evaluation and reconfiguration of LAFD recruitment and hiring practices should be completed without delay. The structural deficit in personnel cannot be easily overcome without a substantial effort placed on accelerated hiring to address the foreseeable and increasing shortfall in staffing. Hiring must occur at a faster rate than attrition to overcome the force's structural personnel deficit.

ix. **MOTION—Truck Activities – WRAC:**
Resolved: The Mar Vista Community Council supports the establishment of emergency measures to control excessive truck activities in the hillsides and surrounding areas, including the enforcement and monitoring of permits, haul routes, and truck staging areas on the Westside.

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs

i. **MOTION-SB1818 / RENT STABILIZATION ORDINANCE HOUSING INVENTORY - WRAC:** MVCC requests the City Controller, The Department Of Housing, and the City Council to inventory all income restricted units built under SB 1818 and all Rent Stabilization Ordinance units and buildings that replace pre 1978 buildings and that said list of such income restricted and rent stabilization ordinance units be sorted by City Council District and by Neighborhood Council with separate reports provided for Rent Stabilization / SB1818 units.

ii. **MOTION- REQUIRE EARTHQUAKE FAULT ANALYSIS BY APPLICANT: WRAC:** Whereas the 1972 Alquist-Priolo Earthquake Fault Zoning Act [California Public Resources Code §§2622 et. seq.] mandated faults to be mapped and state legislators banned construction across active earthquake faults after the Sylmar Quake

Whereas said State mapping has not been completed due to budget cuts and some 2,000 of California's 7,000 miles of faults have not yet been zoned

Whereas the building ban has not been enforced in unmapped areas

Whereas the failure to finish said fault mapping and enforce the ban constitutes a significant public health and safety hazard

Now therefore the WRAC calls upon the City to require a fault study by the project applicant/developer as a condition of submission of an entitlement application when the proposed project is within 1000 feet of a known fault line as mapped by the California Geological Survey's existing map of all 7,000 miles of faults, published in 2010, and to fully enforce the ban on construction in active earthquake zones.

iii. **MOTION- MASTER PLANNED DEVELOPMENT ZONE 'MPD', CPC-2010-3315-CA:** Whereas the Master Planned Development Zone 'MPD', CPC-2010-3315-CA CEQA and ENV-2014-0361-CE, would permit various combinations of intense development, including 500 dwelling units and/or 500,000 sq ft of nonresidential floor area upon a 3 acre or greater area of properties assembled under one ownership, anywhere in the city,

whereas MPD SEC.12.04.10 E.1. Residential Uses and Density Bonus states the MPD would override underlying zoning densities in the A, R, and C zones by allowing density bonuses greater than 35%,

whereas the public hearing for the MPD zone was held at 1 PM downtown on Wednesday May 7, 2014,
whereas only four members of the public were in attendance to give testimony.
Therefore the Mar Vista Community Council wishes to express deep concern that the suggested MPD zone has not received adequate public input, scrutiny and discussion for a proposal which will have significant impacts upon the City's infrastructure and public services.

iv. **MOTION- SIDEWALK VENDING-WRAC:** MVCC wishes to express deep concerns regarding the Chief Legislative Analyst report 14-05-0361, dated May 13, 2014, relative to various recommendations relating to the City's Street Vending Policy. MVCC believes the following issues must be resolved before any ordinance moves forward:
    - Overlapping regulatory responsibility and possible gaps in enforcement requirements,
    - Liability
    - Trash Locations and /or zones where permitted
    - Resources for permit compliance given the mobility aspects of these carts
    - Allocation of scarce sidewalk space-other uses must be permitted to use the public right of way
    - ADA compliance/obstruction of the public right of way
    - noise
    - odors
    - hours of operation
    - Sanitary conditions for food vendors-restrooms; hot water, etc.
    - Impacts upon brick and mortar stores and JOBS—Business Improvement Districts s have to pay for services, and sidewalk vendors pay nothing. Sales Taxes are not necessarily collected

    The MVCC further requests that neighborhoods be allowed to opt in to any proposed sidewalk vending ordinance as in the precedent set by the murals ordinance.

v. **MOTION- STARBUCKS COFFEE AT 12404 VENICE BLVD. CASE # ZA-2014-1977-CU** – MVCC supports the Starbucks at Venice/Centinela application for extended opening hours 5am until midnight.

vi. **MOTION-_MOTION FOR LETTER OF SUPPORT FOR EXTENDED HOURS (UNTIL 2AM) FOR LOUIE'S OF MAR VISTA:** Whereas Louie's of Mar Vista has been in operation for over 1 year in the heart of Mar Vista without complaint of noise violation. Whereas the management has self-imposed the closing of the back exterior patio in the evenings as it abuts apartment buildings. Whereas the only noise emanating from the building in the evenings is from the front sidewalk seating area. Whereas the only neighbors in the neighboring blocks are businesses closed in the evenings.

Whereas Louie's has gone above and beyond in their efforts to be a good neighbor in the Mar Vista community.

Therefore be it resolved that the MVCC fully supports the efforts of Louie's of Mar Vista to have their hours of operation extended until 2am every night of the week.

g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Amy Lawrence and Sara Roos, Vice- Chairs
h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair
i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair
l. **Elections and By-laws**- Bill Scheding, chair

9. **Discussion Calendar**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
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13. **Future agenda items**
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Addendum 1

MOTION

Severe weather events, including drought, likely caused by a heating global climate, have afflicted people and cities around the world – costing hundreds of thousands of human lives and hundreds of billions of dollars annually. The Obama administration recently released the Third National Climate Assessment, which states that the warming of the planet, with human consumption of fossil fuels, will have severe consequences for every region of the United States.

“Risky Business,” a report on the climate change threats to the U.S. economy released by former U.S. Treasury Secretary Henry Paulson, ex-New York Mayor Michael Bloomberg and hedge-fund billionaire Tom Steyer, states that climate impacts could cost businesses billions of dollars.

The United Nations’ Intergovernmental Panel on Climate Change (IPCC) released its Fifth Assessment Report (2014) which addressed worldwide impacts of and vulnerabilities to climate change. According to *The New York Times,* the IPCC found that “decades of foot-dragging by political leaders had propelled humanity into a critical situation, with greenhouse emissions rising faster than ever,” and that, “Though it remains technically possible to keep planetary warming to a tolerable level, only an intensive push over the next 15 years to bring those emissions under control can achieve the goal.”

The U.S. Environmental Protection Agency states that “in low income communities, [climate] impacts have already been distressing, including heat-related illness and death; respiratory ailments; increases in the proliferation of infectious diseases; unaffordable rises in energy costs; loss of farm land, and crushing natural disasters.” Disproportionately, the burden of dirty energy is born by low-income communities and communities of color. Yet, an equitable expansion of clean energy presents the potential for an unprecedented investment in these same communities.

UCLA and the City’s climate change report series, “Mid-Century Warming” and “Mid- and End-of-Century Snowfall in the Los Angeles Region,” shows a tripling and quadrupling of extreme heat days in the City and that the region’s mountains may see a reduction in snowfall of up to 42% below annual averages, if greenhouse gas emissions continue to increase. If immediate efforts are made to substantially reduce emissions, mid-century loss of snow will be limited to 31%. If emissions are not curbed, the mountains will lose 66% of their snowfall by the end of the century, compared with present day. In response, UCLA has enacted a university-wide Grand Challenge target of 100% renewable energy in the Los Angeles region by 2050.

A target for reducing all greenhouse gases 80% below a 1990 baseline by the year 2050 is the scientifically-accepted minimum necessary to avoid the most dangerous climate change scenarios. Unfortunately, most countries are off track from meeting the intermediate 2020 goals, which stresses a need for immediate and decisive action. A number of States, including California and New York, and Cities, including New York, Boston, Chicago, San Francisco, Portland and Minneapolis, have pledged to cut their emissions 80% below 1990 levels by 2050.
In 2007, the City established an outline for initial reductions of greenhouse gas emissions 35% below 1990 levels by 2030. City departments have taken steps accordingly, including concerted efforts by two proprietary departments whose operations make up the largest shares of emissions.

In 2010, the City's Department of Water & Power (DWP) met its Renewable Portfolio Standard (RPS) goal of 20% and is on its way to reaching 33% by 2020. With its announced exit from coal power, DWP is well on track to reduce its emissions by at least 58% below 1990 levels by 2030.

The Port of Los Angeles adopted a Clean Air Action Plan which cut its diesel and smog forming pollution by half. A commensurate effort on greenhouse gases is desirable and appropriate.

The City is a worldwide leader, with a network of 25 Sister Cities and 3 friendship cities on 6 continents, and its policies can substantially influence policy-making elsewhere. Adoption of an aggressive policy addressing climate change could significantly and positively shift the world's current status on climate policy and deliver tangible improvements to the lives of Angelenos.

Reductions in fossil fuel burning will have a measurable impact on the nearly 47,000 asthma-induced emergency room visits across Los Angeles County every year, while the transition to clean energy across California has already spurred 47,000 jobs in the solar industry. DWP's 150 MW feed-in-tariff is on track to create 4,500 green jobs and generate $500 million in economic development, while its energy efficiency programs are expected to create 11,000 jobs by 2020. Additionally, due to its large numbers of at-risk climate communities, the City could be eligible to receive elevated levels of support from the State's Greenhouse Gas Reduction Fund, Proposition 39, and other state and federal funding sources. Climate adaptation and resiliency can stimulate new technologies and industries, attract capital, produce jobs, and generally forge a cleaner, more sustainable future for our children.

Many organizations throughout the region are already engaged in climate mitigation activities which the City has or could adopt, including, energy efficiency retrofits and educational campaigns; deployment of rooftop solar PV and solar water heating; transportation fuel conservation and switching to cleaner renewable fuels; reduction of wastes, especially organic materials, to landfills;

waste conversion technologies; “cool roof” technologies; increasing plant and tree coverage; conversion of hardscapes that create “heat island” effects to permeable materials or plant-based surfaces; and, as the import of water uses great amounts of energy, water conservation, capture and reuse.

Given the above, the City should pursue a Citywide greenhouse gas emissions reduction target of 80% below 1990 levels by 2050 and a Department of Water & Power greenhouse gas emissions reduction target of 80% below 1990 levels by 2030.

I THEREFORE MOVE that the Council direct the Los Angeles World Airports, L.A. Sanitation, Port of Los Angeles, Bureau of Street Services, Department of Transportation and General Services Department to report back to the Council in 90 days on actions they can take to reduce the City’s carbon dioxide and other greenhouse gas emissions, both stationary and mobile, to at least 80% below 1990 levels by 2050; including the implementation of a greenhouse gas emissions reduction target of 80% below 1990 levels by 2050 as a Citywide objective and ways to incentivize City departments to meet and exceed these targets.

I FURTHER MOVE that the Council direct the Department of Water and Power to report back to the Council in 90 days on actions they can take to reduce their carbon dioxide and other greenhouse gas emissions to at least 80% below 1990 levels by 2030.

I FURTHER MOVE that the Council direct DWP, L.A. Sanitation and the Department of Transportation to work with all City departments as well as coordinating with UCLA’s Grand Challenge, its Institute of the Environment and Sustainability, its Luskin Center for Innovation, and other relevant business, environmental and environmental justice organizations, to do a carbon risk assessment of currently-anticipated climate change, a greenhouse gas inventory of the City, and produce a Climate Action Plan for the City as a whole in order to identify affordable pathways and highest priority near-term and long-term actions needed to actively reduce the City’s carbon dioxide and other greenhouse gas emissions, by the end of 2014.

I FURTHER MOVE that, in the spirit of worldwide cooperation, the Council request that the Sister Cities of Los Angeles ask its member cities who have not already done so to adopt equally-aggressive or stronger greenhouse gas emission reduction policies and targets.

I FURTHER MOVE that the Council direct the Department of Neighborhood Empowerment to engage the 96 neighborhood councils of Los Angeles to assist in outreach for this effort.

I FURTHER MOVE that the Council direct the City Administrative Officer to report back to Council in 90 days on potential financial impacts to the City from possible worst case climate change scenarios: including, continued business-as-usual scenarios where global average temperature rises to 3 degrees C, 4.5 degrees C and 6 degrees C; and mitigated climate change scenarios where global emissions are held at 1990 levels, or reduced 80% below 1990 levels.

PRESENTED BY:

_____

PAUL KORETZ
Councilmember, 5th District

SECONDED BY:

_____

Addendum 2

City Council Motion 14-0518

There are various communities throughout the city that are the location of natural lands and low density residential neighborhoods where wildlife exist under the jurisdiction of the hillside ordinance. Unfortunately in these and other communities in the city, development activities often involve actions that detrimentally impact wildlife movements. Without doubt private property interests and environmental considerations benefit by definite and consistent guidance on the environmental regulatory controls needed in any proposed land use development project.

The Santa Monica Mountains Conservancy have begun looking into wildlife corridors within its territories, which will prevent further injuries and deaths to wildlife, and protect the open spaces and wildlife linkages that exist. Incursions into the habitat of wildlife in the city is counter to the intent and protections offered under the California Environmental Quality Act (CEQA).

The city needs to preserve the wildlife corridors in the eastern area of the Santa Monica Mountains(Hillside Ordinance zone), and to designate this area as a Regional Wildlife Habitat Linkage Zone, and to develop the necessary land use guidelines and measurable metrics to protect this region and dwindling habitat areas citywide.

I THEREFOREMOVE that the Council instruct the Planning Department, with the assistance of the City Attorney, and in consultation with the Santa Monica Mountains Conservancy, and citizen advocates such as, but not limited to Citizens for Los Angeles Wildlife (CLAW) and the Mulholland Design Review Board (MDRB), to prepare and present an ordinance to create a Wildlife Corridor in the eastern area of the Santa Monica Mountains (Hillside Ordinance zone) that requires the following:

1. Do not issue any building or grading permits until project applicants ensure that they will permanently accommodate wildlife habitat connectivity as part of their development projects.

2. Require easements and deed restrictions in perpetuity to protect wildlife habitat connectivity.
3. Formally designate the area as a Regional Wildlife Habitat Linkage Zone in the Municipal
Code, in as much as just one single family residential project can cause adverse impacts to the existing and threatened wildlife populations.
4. Require a Biological Constraints Checklist as part of every new building project will undergo a 'habitat connectivity and wildlife permeability review' within areas of concern .

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL

Regular Meeting of the Board of Directors
Tuesday, August 12, 2014, at 7:00 PM
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

140812-BOD-AGENDA

1. **Call to Order and Welcome** – Chair (1 min.)
   -Meeting called to order at 7:11 p.m.
   -Quorum present – Bill Koontz (Chair), Bill Duckett (Secretary), Bill Scheding (Treasurer), Michael Millman, Brad Wilhite, Valerie Davidson, Melissa Stoller, Michelle Krupkin, Ken Alpern, and Robin Doyno
2. **Presentation of the Flag and Pledge of Allegiance** (1 min)
3. **Approval of July 2014 Minutes** (public comment permitted) (1 min)
   -Motion by Bill Scheding to approve. 2nd by Val Davidson. Motion carries with 6 Ayes and 2 abstentions (Melissa Stoller and Yvette Molinaro)
4. **Public Comment & Announcements**--for items not on the agenda (max 1 min each unless waived by the Chair)
   -Yvette Molinaro has a sponsor who will print the Fall Newletter
   -Lisa Sandbank: volunteered to print a new batch of No Jet signs; 400 sings have been placed; signs are here tonight; signs will be distributed to anyone who gives her address
   -Steve Wallace: Charter School going in on Beethoven impacting traffic created by 500 students' families
   -Tom Ponton updated the Board on the island project on Charnock.
   -Tom Ponton spoke about the Relay for Life this Saturday.
5. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. CD 11 – CM Mike Bonin, rep. by Field Deputy Len Nguyen Len.Nguyen@lacity.org
      -Len: great streets initiative and Mar Vista Marker Signs project; great streets will be moving fast to get input on what people want for the great streets; concepts are being developed for Mar Vista signage; working with LADOT to take signs down at Farmers' Market…there has been no enforcement and there will not be; Bill Koontz brought up the flurry of complaints about potholes in the alleyway behind the Library and wants to keep tabs on the $5000 given by the MVCC
   b. Mar Vista Recreation Center – Jason Kitahara, Director
      -Jason: Relay for Life will be here at the park this Saturday, August 16th 10 a.m. to 10 p.m.; Mayor Garcettie and Mike Bonin will be at the event; showing ET in the park as soon as it's dark on the 16th;
      -Bill Koontz thanked Jason for the use of the Recreation Center for National Night Out. He also noticed some equipment that may be useful for events such as the Fall Festival. Jason suggested someone apply for the use.
   c. CD 5 – Paul Koretz, rep by Field Deputy Jeffrey Ebenstein, jeffrey.ebenstein@lacity.org
      -Jeffrey: No report
   d. US 36 – Janice Hahn
      -No report
   e. CA Assembly 54-Sebastian Ridley-Thomas, rep by Scott Malsin scott.malsin@assembly.ca.gov
      -No report

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f. CA Senate 28 – Ted Lieu, rep. by Robert Pullen-Miles Robert.Pullen-Miles@sen.ca.gov
-Robert: No report

g. CA Assembly 47
-No report

h. CA Assembly 62
-No report

i. 2nd Dist. L. A. County Board Supervisor Mark Ridley Thomas, rep. by Karly Katona, Karly.Katona@bos.lacounty.gov
-Scott Malsin: No report

j. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel Tamm Daniel.tamm@lacity.org
-Daniel: Asked Bill to speak in support of the Relay for Life event on August 16th

6. **Officers and Liaison** Reports (Action items included with public comment permitted, 1 min per speaker)
   a. Chair-Bill Koontz
      i. Update on Ethics Training and compliance on by-law
      -
      ii. Appoint representative for the annual budget day\
      -
      iii. Special presentation
      - Presentation of certificate of appreciation honoring Sharon Commins, Immediate Past Chair of the MVCC
   b. First Vice Chair-Mitchell Rische
   -No Report
   c. Second Vice Chair-John Kuchta
   -No Report
   d. Secretary-Bill Duckett
      i. Update on Empower training and Board Retreat
      -Board Retreat will take place August 23rd from 9 a.m. to 2 p.m.
      -Election Significant Issues and Opinions survey available upon request
      -If anyone here has never registered as an MVCC Stakeholder, please do so if you would like to receive email blasts. You can even pick and choose what you would like to receive.
      -Farmers' Market
   e. Treasurer-William Scheding: NOTE: All funding motions must conform to all Empower funding guidelines and must be funded and paid in fiscal year 2013-14 or they will expire. All NPG and CIG grants approved by the Mar Vista Community Council are restricted funds according to Department of Neighborhood Empowerment regulations and must be used for the exact purpose approved by the MVCC. All Neighborhood Council Funding reports are available online at http://done.lacity.org/onlinefunding/ncfunding.aspx
      i. **APPROVAL** of July 2014 US Bank statement
      -Can take this off agenda as this is not part of the new system
      ii. **APPROVAL** of July Funding Spreadsheet Form
      -Haven't spent any money yet so nothing to approve
      iii. **FUNDING MOTION: EXEC-FIN:** Motion to approve up to $300 for MVCC ad in the NWNA newsletter.
      -President of NWNA, Marty Ruben, spoke on behalf of motion
      -newsletter printed on recycleable paper
      Motion by Bill Scheding. 2nd by Michelle Krupkin. Motion approved unanimously.
      iv. **FUNDING MOTION: EXEC-FIN**: Motion to approve funding for September 12, 2014 NWNA Talent Show.
      -Bill Koontz spoke and asked a friendly amendment to provide funding not to exceed $300. Friendly amendment accepted by Bill Scheding
      - President of NWNA, Marty Ruben, spoke on behalf of motion
      Motion by Bill Duckett. 2nd by Melissa Stoller. Motion approved unanimously.
   f. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee Liaison - Linda Guagliano

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-Linda: Complaints about all the signs at Farmers' Market especially the no parking signs which were ordered by Bureau of Street Services; this was done to protect the Market (safety issue) and required by the permit; in process of amending this stipulation of the permit; next meeting September 17th and agenda closes the Wednesday before

g. DWP MOU/LANCC Liaison-Open
-Still open

h. DWP Recycled Water Liaison-Christopher McKinnon
www.ladwp.com/recycledwater
-Christopher: Nothing new to report. Draught continues

i. Fall Festival Liaison-Albert Olson/Yvette Molinaro

i. **MOTION-Director's request, Yvette Molinaro:**
"The Mar Vista Community Council would like to continue its support and sponsorship of the Mar Vista Community Fall Festival & Silent Auction by approving the allocation of up to and including the amount of $4,000 to assist in funding the 2014 Mar Vista Community Fall Festival & Silent Auction. These funds will be used in their entirety to pay the City of Los Angeles Department of Recreation & Parks for permit fees that the City charges to use the Park on the day of the Festival, October 18, 2014, and printing costs for outreach materials."
Yvette spoke on this motion. Goal is to raise enough money for a new projection system for the Rec Center.
Motion by Yvette Moliaro. 2nd by Bill Duckett. Motion approved unanimously.

j. City Budget: John Kuchta

7. **Zone Director Reports**--may include motions to refer action items to the appropriate MVCC committee where desirable; Public comment permitted)
Zone 1 – Ken Alpern: Westside Village sponsoring an Emergency Preparedness Forum on August 21st at 7 p.m.
Zone 2 – Brad Wilhite: No report
Zone 3 – Bill Scheding: Hilltop Family Picnic September 12th
Zone 4 – Michael Millman: No report
Zone 5 – Michelle Krupkin: Del Rey Streetscape meeting which comes right up to our border. Ideas that can be used by Great Streets Committee.
Zone 6 – Valerie Davidson: Issues with dumpsters in the road at constructions sites. Want Neighborhood Watch signs on Rose.

8. **Committee Reports & Consent Calendar** - Action items included, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted, 1 min per speaker unless waived by the Chair); items may be received and filed by consent if no discussion or public comment

a. **Executive & Finance Committee**-Bill Koontz, Chair

i. Appointment of Sharon Commins as the ReCode LA Liaison
Taken on consent with the Green, T&I, and PLUM Motions except PLUM Motion V.
Motion to approve all on Consent Bill Koontz. 2nd by Blll Scheding. Motion carries with 10 Ayes and 1 Abstention (Val Davidson)

b. **GGS 2015 AD HOC COMMITTEE-** Shelley Wiseman & Christy Wilhelmi, Co-Chairs

c. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-Chairs

d. **Green Committee** – Melissa Stoller, & Jeanne Kuntz, Co-Chairs

i. **MOTION-Greenhouse Gas Emissions:** The Mar Vista Community Council supports Councilmember Paul Koretz' climate crisis motion 14-0906 *(see Addendum 1)* to the LA City Council requesting that the City should pursue a Citywide greenhouse gas emissions reduction target of 80% below 1990 levels by 2050 and a Department of Water & Power greenhouse gas emissions reduction target of 80% below 1990 levels by 2030.

ii. **MOTION- Wildlife Corridor:** The Mar Vista Community Council supports CF 14-0518 *(see Addendum 2)*, which instructs the Planning Department to prepare and present an ordinance to create

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a Wildlife Corridor in the eastern area of the Santa Monica Mountains (Hillside Ordinance zone).

e. **Transportation & Infrastructure Committee** – Ken Alpern & Mitchell Rishe, Co-Chairs

i. **MOTION—Overnight Parking Enforcement:** The MVCC strongly favors the following actions to be taken by the City of Los Angeles:

1) Changing the wording of L.A. Municipal Code 85.2 to the following:

"…No person shall use a vehicle parked or standing upon any City street, or on any parking lot, owned by the City of Los Angeles and under the control of the City of Los Angeles or under the control of a Los Angeles County Department of Beaches and Harbors…as living quarters…either ~~overnight,~~ day to day or otherwise…<<*add: to remain in a single location, or within 500 yards of that same location, for a period greater than 36 hours.*>>"

ii. **MOTION—Support of Century/Aviation and 96th/Aviation Station Alternative**

The MVCC supports the Metro Board-approved plan to have two airport-adjacent rail stations at both Century/Aviation and 96th/Aviation Street:

1) To fulfill the transportation, mobility and economic needs of the Century Blvd. corridor, and

2) To provide optimal future access via a LA World Airports People Mover rail line to both the Consolidated Rental Car Facility and the Central Airport Terminals

iii. **MOTION—Support of a Comprehensive Transit/Transportation Link to LAX:**

The MVCC supports a remote access plan to best connect LAX to the greater county and Southern California region which:

1) Relocates an upgraded LAX City Bus Center to either the future Intermodal Transit Facility at 96th/Airport or the future Metro Rail station at 96th/Aviation to best accommodate Westside and San Fernando Valley commuters

2) Explores, prioritizes and funds a South Bay Green Line Extension

3) Funds two Major Investment Studies for Green Line Extensions to both the Westside and the Norwalk Metrolink Station

iv. **MOTION—Support of a Pedestrian-Friendly People Mover/Central Airport Terminal Link**

The MVCC supports any comprehensive, pedestrian-friendly LAX plan that includes People Mover station location and design, as well as moving walkways, to best encourage convenient and rapid access from the future People Mover rail line for both pedestrians and the disabled

v. **MOTION—Venice Blvd. Refurbishment**

Whereas, Venice Boulevard was recently repaved by the California Department of Transportation (CalTrans) from Lincoln Boulevard to the 1-405 Freeway; AND

Whereas, other portions of Venice Boulevard in the Venice, Mar Vista, Palms, and SoRo communities is in a terrible state of disrepair, exacerbated by the Expo Line construction; AND

Whereas, the plants on the median have died due to a broken irrigation system;

Therefore, the MVCC strongly demands that the Los Angeles City Council and California Department of Transportation should take action to see that East-Bound and West-Bound Venice Boulevard be repaved from Lincoln Boulevard to Pacific Avenue and from the I-405 Freeway to Fairfax Avenue, and that the median be planted with

California native plants and supported by an initial watering schedule or an installed low-flow irrigation system.

vi. **MOTION—Expo Line Parking and Connections:**
Whereas, the MVCC recognizes a need to provide parking at light rail and subway stations to maximize ridership; AND
Whereas, parking at the Culver City Station already exceeds capacity on most weekdays; AND
Whereas the impending opening of phase two of the Expo Line offers a unique opportunity to increase the use of public transportation;
Therefore, the MVCC strongly demands that the City of Los Angeles and Metro should work together to provide or create incentives leading to the provision of parking at or adjacent to all light rail stations.

vii. **MOTION—Park-and-Ride Options and Public Transportation:**
Whereas, MVCC recognizes that Park-and-Ride options with convenient public transportation connection to light rail will only increase ridership and its benefits to the urban environment;
Therefore, the MVCC strongly demands that the City of L.A. and Metro work together to provide or create incentives leading to the provision of off-site Park-and-Ride lots in the communities of Venice, Mar Vista, Palms, and SoRo, designed to geographically expand ridership reach for light rail and subway lines.

viii. **MOTION—LAFD Hiring – WRAC:**
The Mar Vista Community Council urges the City of Los Angeles to continue to adequately fund the recruitment, hiring, and training of new firefighters to bring the Los Angeles Fire Department back to full strength by FY 2019.

Supportive Facts and Findings: The strength of the LAFD is reduced by over 100 firefighters per year due to retirement, injury, or death. The Los Angeles Fire Department has not hired new firefighters since 2008, and the current force is stretched to a point that places both the health and the safety of Angelenos at risk. Furthermore, the reduced strength of the force contributes substantially to the LAFD's overtime budget to adequately staff each shift, especially on "red flag" days. The current evaluation and reconfiguration of LAFD recruitment and hiring practices should be completed without delay. The structural deficit in personnel cannot be easily overcome without a substantial effort placed on accelerated hiring to address the foreseeable and increasing shortfall in staffing. Hiring must occur at a faster rate than attrition to overcome the force's structural personnel deficit.

ix. **MOTION—Truck Activities – WRAC:**
Resolved: The Mar Vista Community Council supports the establishment of emergency measures to control excessive truck activities in the hillsides and surrounding areas, including the enforcement and monitoring of permits, haul routes, and truck staging areas on the Westside.

f. **Planning and Land Use Management Committee**-Steve Wallace & Michael Millman, Co-Chairs

i. **MOTION-SB1818 / RENT STABILIZATION ORDINANCE HOUSING INVENTORY - WRAC:** MVCC requests the City Controller, The Department Of Housing, and the City Council to inventory all income restricted units built under SB 1818 and all Rent Stabilization Ordinance units and buildings that replace pre 1978 buildings and that said list of such income restricted and rent stabilization ordinance units be sorted by City Council District and by

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Neighborhood Council with separate reports provided for Rent Stabilization / SB1818 units.

ii. **MOTION- REQUIRE EARTHQUAKE FAULT ANALYSIS BY APPLICANT: WRAC:** Whereas the 1972 Alquist-Priolo Earthquake Fault Zoning Act [California Public Resources Code §§2622 et. seq.] mandated faults to be mapped and state legislators banned construction across active earthquake faults after the Sylmar Quake

Whereas said State mapping has not been completed due to budget cuts and some 2,000 of California's 7,000 miles of faults have not yet been zoned

Whereas the building ban has not been enforced in unmapped areas

Whereas the failure to finish said fault mapping and enforce the ban constitutes a significant public health and safety hazard

Now therefore the WRAC calls upon the City to require a fault study by the project applicant/developer as a condition of submission of an entitlement application when the proposed project is within 1000 feet of a known fault line as mapped by the California Geological Survey's existing map of all 7,000 miles of faults, published in 2010, and to fully enforce the ban on construction in active earthquake zones.

iii. **MOTION- MASTER PLANNED DEVELOPMENT ZONE 'MPD', CPC-2010-3315-CA:** Whereas the Master Planned Development Zone 'MPD', CPC-2010-3315-CA CEQA and ENV-2014-0361-CE, would permit various combinations of intense development, including 500 dwelling units and/or 500,000 sq ft of nonresidential floor area upon a 3 acre or greater area of properties assembled under one ownership, anywhere in the city,

whereas MPD SEC.12.04.10 E.1. Residential Uses and Density Bonus states the MPD would override underlying zoning densities in the A, R, and C zones by allowing density bonuses greater than 35%,

whereas the public hearing for the MPD zone was held at 1 PM downtown on Wednesday May 7, 2014,
whereas only four members of the public were in attendance to give testimony.
Therefore the Mar Vista Community Council wishes to express deep concern that the suggested MPD zone has not received adequate public input, scrutiny and discussion for a proposal which will have significant impacts upon the City's infrastructure and public services.

iv. **MOTION- SIDEWALK VENDING-WRAC:** MVCC wishes to express deep concerns regarding the Chief Legislative Analyst report 14-05-0361, dated May 13, 2014, relative to various recommendations relating to the City's Street Vending Policy. MVCC believes the following issues must be resolved before any ordinance moves forward:

- ∞ Overlapping regulatory responsibility and possible gaps in enforcement requirements,
- ∞ Liability
- ∞ Trash Locations and /or zones where permitted
- ∞ Resources for permit compliance given the mobility aspects of these carts
- ∞ Allocation of scarce sidewalk space-other uses must be permitted to use the public right of way
- ∞ ADA compliance/obstruction of the public right of way

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- ∞ noise
- ∞ odors
- ∞ hours of operation
- ∞ Sanitary conditions for food vendors-restrooms; hot water, etc.
- ∞ Impacts upon brick and mortar stores and JOBS—Business Improvement Districts s have to pay for services, and sidewalk vendors pay nothing. Sales Taxes are not necessarily collected

The MVCC further requests that neighborhoods be allowed to opt in to any proposed sidewalk vending ordinance as in the precedent set by the murals ordinance.

v. **MOTION-_STARBUCKS COFFEE AT 12404 VENICE BLVD. CASE # ZA-2014-1977-CU** – MVCC supports the Starbucks at Venice/Centinela application for extended opening hours 5am until midnight.

Elizabeth Valerio of Valerio Inc. spoke on behalf of the motion
Val Davidson asked if residents have been asked. The area has been posted for public hearing.
Robin Doyno is worried because of the heavy traffic at that corner and attractive nuisance. Asked about packet which went to PLUM. Neighbors will receive notice.
Ken Alpern mentioned that credibility goes up when neighbors are polled. Feels this is a win/win for community.
Bill Scheding made comparison with parking at National and Barrington to this space.
Bill Koontz highlighted the fact that all due diligence has been done.
Michael Millman spoke of how much outreach the PLUM Committee did to get the word out of the hearing at PLUM.
Motion by Michael Millman to approve. 2nd by Blll Scheding. Motion carries with 11 Ayes and 2 abstentions (Mitchell Rishe and Robin Doyno)

vi. **MOTION-_MOTION FOR LETTER OF SUPPORT FOR EXTENDED HOURS (UNTIL 2AM) FOR LOUIE'S OF MAR VISTA:** Whereas Louie's of Mar Vista has been in operation for over 1 year in the heart of Mar Vista without complaint of noise violation. Whereas the management has self-imposed the closing of the back exterior patio in the evenings as it abuts apartment buildings. Whereas the only noise emanating from the building in the evenings is from the front sidewalk seating area. Whereas the only neighbors in the neighboring blocks are businesses closed in the evenings.

Whereas Louie's has gone above and beyond in their efforts to be a good neighbor in the Mar Vista community.

Therefore be it resolved that the MVCC fully supports the efforts of Louie's of Mar Vista to have their hours of operation extended until 2am every night of the week.

g. **Education, Arts and Culture Committee** – Brad Wilhite, chair Amy Lawrence and Sara Roos, Vice- Chairs
h. **Santa Monica Airport Committee** – Bill Duckett, chair Martin Rubin, Vice-Chair

-Airport is critical issue as the lease is up next year
-NO Jets yard signs here tonight
-Committee looking at resolution to urge LA City Council to publicly support the SM City Charter Amendment in the Fall Election

i. **Safety and Security Committee** – Rob Kadota, Chair
j. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-Chairs
k. **Community Outreach Committee** – Bill Duckett, Chair John Kuchta, Vice-Chair

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l. **Elections and By-laws**- Bill Scheding, chair

9. **Discussion Calendar**
10. **Unfinished Business** - Action items held over from previous meeting (Public comment permitted)
11. **New Business** -(Public comment permitted)
12. **Grievances**, if any, received
13. **Future agenda items**
14. **Adjournment**

Motion to adjourn made by Bill Scheding. 2nd by Michelle Krupkin. Adjourned at 8:39 a.m.

**in compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

***As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days prior to the meeting you wish to attend by contacting chair@marvista.org.*

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Addendum 1

MOTION

Severe weather events, including drought, likely caused by a heating global climate, have afflicted people and cities around the world – costing hundreds of thousands of human lives and hundreds of billions of dollars annually. The Obama administration recently released the Third National Climate Assessment, which states that the warming of the planet, with human consumption of fossil fuels, will have severe consequences for every region of the United States.

"Risky Business," a report on the climate change threats to the U.S. economy released by former U.S. Treasury Secretary Henry Paulson, ex-New York Mayor Michael Bloomberg and hedge-fund billionaire Tom Steyer, states that climate impacts could cost businesses billions of dollars.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) released its Fifth Assessment Report (2014) which addressed worldwide impacts of and vulnerabilities to climate change. According to *The New York Times,* the IPCC found that "decades of foot-dragging by political leaders had propelled humanity into a critical situation, with greenhouse emissions rising faster than ever," and that, "Though it remains technically possible to keep planetary warming to a tolerable level, only an intensive push over the next 15 years to bring those emissions under control can achieve the goal."

The U.S. Environmental Protection Agency states that "in low income communities, [climate] impacts have already been distressing, including heat-related illness and death; respiratory ailments; increases in the proliferation of infectious diseases; unaffordable rises in energy costs; loss of farm land, and crushing natural disasters." Disproportionately, the burden of dirty energy is born by low-income communities and communities of color. Yet, an equitable expansion of clean energy presents the potential for an unprecedented investment in these same communities.

UCLA and the City's climate change report series, "Mid-Century Warming" and "Mid- and End-of-Century Snowfall in the Los Angeles Region," shows a tripling and quadrupling of extreme heat days in the City and that the region's mountains may see a reduction in snowfall of up to 42% below annual averages, if greenhouse gas emissions continue to increase. If immediate efforts are made to substantially reduce emissions, mid-century loss of snow will be limited to 31%. If emissions are not curbed, the mountains will lose 66% of their snowfall by the end of the century, compared with present day. In response, UCLA has enacted a university-wide Grand Challenge target of 100% renewable energy in the Los Angeles region by 2050.

A target for reducing all greenhouse gases 80% below a 1990 baseline by the year 2050 is the scientifically-accepted minimum necessary to avoid the most dangerous climate change scenarios. Unfortunately, most countries are off track from meeting the intermediate 2020 goals, which stresses a need for immediate and decisive action. A number of States, including California and New York, and Cities, including New York, Boston, Chicago, San Francisco, Portland and Minneapolis, have pledged to cut their emissions 80% below 1990 levels by 2050.
In 2007, the City established an outline for initial reductions of greenhouse gas emissions 35% below 1990 levels by 2030. City departments have taken steps accordingly, including concerted efforts by two proprietary departments whose operations make up the largest shares of emissions.

In 2010, the City's Department of Water & Power (DWP) met its Renewable Portfolio Standard (RPS) goal of 20% and is on its way to reaching 33% by 2020. With its announced exit from coal power, DWP is well on track to reduce its emissions by at least 58% below 1990 levels by 2030.

The Port of Los Angeles adopted a Clean Air Action Plan which cut its diesel and smog forming pollution by half. A commensurate effort on greenhouse gases is desirable and appropriate.

The City is a worldwide leader, with a network of 25 Sister Cities and 3 friendship cities on 6 continents, and its policies can substantially influence policy-making elsewhere. Adoption of an aggressive policy addressing climate change could significantly and positively shift the world's current status on climate policy and deliver tangible improvements to the lives of Angelenos.

Reductions in fossil fuel burning will have a measurable impact on the nearly 47,000 asthma-induced emergency room visits across Los Angeles County every year, while the transition to clean energy across California has already spurred 47,000 jobs in the solar industry. DWP's 150 MW feed-in-tariff is on track to create 4,500 green jobs and generate $500 million in economic development, while its energy efficiency programs are expected to create 11,000 jobs by 2020. Additionally, due to its large numbers of at-risk climate communities, the City could be eligible to receive elevated levels of support from the State's Greenhouse Gas Reduction Fund, Proposition 39, and other state and federal funding sources. Climate adaptation and resiliency can stimulate new technologies and industries, attract capital, produce jobs, and generally forge a cleaner, more sustainable future for our children.

Many organizations throughout the region are already engaged in climate mitigation activities which the City has or could adopt, including, energy efficiency retrofits and educational campaigns; deployment of rooftop solar PV and solar water heating; transportation fuel conservation and switching to cleaner renewable fuels; reduction of wastes, especially organic materials, to landfills;

waste conversion technologies; “cool roof” technologies; increasing plant and tree coverage; conversion of hardscapes that create “heat island” effects to permeable materials or plant-based surfaces; and, as the import of water uses great amounts of energy, water conservation, capture and reuse.

Given the above, the City should pursue a Citywide greenhouse gas emissions reduction target of 80% below 1990 levels by 2050 and a Department of Water & Power greenhouse gas emissions reduction target of 80% below 1990 levels by 2030.

I THEREFORE MOVE that the Council direct the Los Angeles World Airports, L.A. Sanitation, Port of Los Angeles, Bureau of Street Services, Department of Transportation and General Services Department to report back to the Council in 90 days on actions they can take to reduce the City’s carbon dioxide and other greenhouse gas emissions, both stationary and mobile, to at least 80% below 1990 levels by 2050; including the implementation of a greenhouse gas emissions reduction target of 80% below 1990 levels by 2050 as a Citywide objective and ways to incentivize City departments to meet and exceed these targets.

I FURTHER MOVE that the Council direct the Department of Water and Power to report back to the Council in 90 days on actions they can take to reduce their carbon dioxide and other greenhouse gas emissions to at least 80% below 1990 levels by 2030.

I FURTHER MOVE that the Council direct DWP, L.A. Sanitation and the Department of Transportation to work with all City departments as well as coordinating with UCLA’s Grand Challenge, its Institute of the Environment and Sustainability, its Luskin Center for Innovation, and other relevant business, environmental and environmental justice organizations, to do a carbon risk assessment of currently-anticipated climate change, a greenhouse gas inventory of the City, and produce a Climate Action Plan for the City as a whole in order to identify affordable pathways and highest priority near-term and long-term actions needed to actively reduce the City’s carbon dioxide and other greenhouse gas emissions, by the end of 2014.

I FURTHER MOVE that, in the spirit of worldwide cooperation, the Council request that the Sister Cities of Los Angeles ask its member cities who have not already done so to adopt equally-aggressive or stronger greenhouse gas emission reduction policies and targets.

I FURTHER MOVE that the Council direct the Department of Neighborhood Empowerment to engage the 96 neighborhood councils of Los Angeles to assist in outreach for this effort.

I FURTHER MOVE that the Council direct the City Administrative Officer to report back to Council in 90 days on potential financial impacts to the City from possible worst case climate change scenarios: including, continued business-as-usual scenarios where global average temperature rises to 3 degrees C, 4.5 degrees C and 6 degrees C; and mitigated climate change scenarios where global emissions are held at 1990 levels, or reduced 80% below 1990 levels.

PRESENTED BY:

_____

PAUL KORETZ
Councilmember, 5th District

SECONDED BY:

_____

Addendum 2

City Council Motion 14-0518

There are various communities throughout the city that are the location of natural lands and low density residential neighborhoods where wildlife exist under the jurisdiction of the hillside ordinance. Unfortunately in these and other communities in the city, development activities often involve actions that detrimentally impact wildlife movements. Without doubt private property interests and environmental considerations benefit by definite and consistent guidance on the environmental regulatory controls needed in any proposed land use development project.

The Santa Monica Mountains Conservancy have begun looking into wildlife corridors within its territories, which will prevent further injuries and deaths to wildlife, and protect the open spaces and wildlife linkages that exist. Incursions into the habitat of wildlife in the city is counter to the intent and protections offered under the California Environmental Quality Act (CEQA).

The city needs to preserve the wildlife corridors in the eastern area of the Santa Monica Mountains(Hillside Ordinance zone), and to designate this area as a Regional Wildlife Habitat Linkage Zone, and to develop the necessary land use guidelines and measurable metrics to protect this region and dwindling habitat areas citywide.

I THEREFOREMOVE that the Council instruct the Planning Department, with the assistance of the City Attorney, and in consultation with the Santa Monica Mountains Conservancy, and citizen advocates such as, but not limited to Citizens for Los Angeles Wildlife (CLAW) and the Mulholland Design Review Board (MDRB), to prepare and present an ordinance to create a Wildlife Corridor in the eastern area of the Santa Monica Mountains (Hillside Ordinance zone) that requires the following:

1. Do not issue any building or grading permits until project applicants ensure that they will permanently accommodate wildlife habitat connectivity as part of their development projects.

DRAFT

2. Require easements and deed restrictions in perpetuity to protect wildlife habitat connectivity.
3. Formally designate the area as a Regional Wildlife Habitat Linkage Zone in the Municipal
Code, in as much as just one single family residential project can cause adverse impacts to the existing and threatened wildlife populations.
4. Require a Biological Constraints Checklist as part of every new building project will undergo a 'habitat connectivity and wildlife permeability review' within areas of concern .

DRAFT

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, December 13, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of November 1st, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/1611-01-draftBOD-MINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
         - November bank statement
      ii. **APPROVAL** of November Monthly Expense Report (MER)
      iii. Review of 2016-17 budget pending/approved expenditures (https://lacity.quickbase.com/db/bk6c27ec8?a=dr&rid=46&rl=qst)
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
   b. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
   c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   j. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
   m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items a-f on consent.

    a. **FUNDING MOTION: Storage Unit Rental** (Directors motion submitted by Rob Kadota)

    MVCC approves the rental of a storage (Unit #21) at Storquest Storage, 2531 Sawtelle Blvd, LA CA 90064, for $189 a month: $177 plus $12 insurance ($3000 coverage).

b. **FUNDING MOTION: Storage Unit Rental Reimbursement** (Directors motion submitted by Holly Tilson)

MVCC approves reimbursing Rob Kadota $189 for payment of the December storage unit rental.

c. **FUNDING MOTION: Eco Car Expo** (submitted by Green Committee)

Whereas the Mar Vista Community Council will hold the Eco Car Expo on 4/30/17 at the Mar Vista Farmers Market, and

Whereas the Mar Vista Farmers Market provides the space to hold the event free of charge, and

Whereas this event provides a community service to educate our stakeholders on the climate change impact of our transportation choices, supporting the Mayors Sustainable pLAn while also providing outreach for the Mar Vista Community Council to our stakeholders,

The Mar Vista Community Council approves an amount not to exceed $1,000 to cover lawn signs flyers and banners and other materials to promote the event.

d. **FUNDING MOTION: Dog Waste Stations** (submitted by Green Committee)

Whereas unattended pet waste is a large source of stormwater pollution, pet waste left on grassy areas, sidewalks and streets is flushed into our storm drain system and the toxic mix of bacteria from dog waste flows untreated into our local waterways and ocean, and this pollution is harmful to pets, aquatic life and beachgoers, and

Whereas the general public is unaware of the environmental and health risks associated with unattended dog waster, and

Whereas the MVCC can provide a community service that would also promote the role of MVCC in the community,

The Mar Vista Community Council moves to fund an amount not to exceed $1,000 for the purchase and installation of 3 dog waste stations in Mar Vista, locations to be determined. Stations would include educational signage and MVCC recognition.

e. **POLICY MOTION: LA Bees Project** (submitted by Green Committee)

Whereas the Mar Vista Community Council launched the initial feasibility study and first motion of support that ultimately led to the legalization of urban beekeeping in LA Angeles: and

Whereas the USDA reports that the loss of bees continues in devastating numbers with a loss of 44% last year: and

Whereas there is an urgent need to educate the community about the role of pesticides and neonicotinoids in the loss of bees and the importance of pollinator gardens.

The Mar Vista Community Council votes to support the LA Bees Project, a collaboration between LA Beekeepers Association and Honeylove, in their campaign for education and outreach on the urgent need to create and protect pollinator habitats and locating potential locations for demonstration gardens in Mar Vista.

f. **POLICY MOTION: 2017 Homeless Count MOU** (submitted by Executive & Finance Committee)

MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See https://form.jotform.com/62975488974177) and will participate in the 2017 Greater Los Angeles Homeless Count.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS*** *– The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's*

jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, December 13, 2016 at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 6.58 P.M.

   Quorum present: Susan Klos, Sherri Akers, Robin Doyno, Rob Kadota, Sarah Auerswald, Holly Tilson and Greg Tedesco.

   Late Arrivals: Melissa Stoller (7:02 P.M.), Damien Newton (7:08 P.M.), Michelle Krupkin (7:14 P.M.), Ken Alpern (7:33 P.M.),

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of November 1st, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/1611-01-draftBOD-MINUTES.pdf.

   Motion to approve by Sherri Akers, 2nd by Holly Tilson. Motion carried with 4 ayes and 2 abstentions (Sherri Akers & Greg Tedesco); Melissa Stoller, Damien Newton, Michelle Krupkin & Ken Aperns absent.

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Kevin Brockway: Lives on a local street where there's a locked alley. Recently the lock was changed and he can't access his garage. Looking for assistance on finding out who controls the locks. Some neighbors in attendance know who might be in charge, and Len Nguyen took his information to assist from the City side.

   Lorena Alvarado: Huge tree on Butler Ave has pushed up sidewalk; an elderly resident has tripped and fallen. Other neighbors have also had problems with trees. Lorena's called them in; city says has lots all records.

   Mark Herd (candidate for City Council): Homeless: shelters closed 6 months a year, people kicked out at 5 A.M. Four years on Westwood Neighborhood Council. Fighter.

   Zuma Dog: Political activist, candidate for Mayor. Against making illegal street vending legal.

5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Donation drive until end of week.

      Last week council approved changes to baseline mansionization ordinance: R1 limited to 45% regardless of lot size, prioritized garages.

      Issue in oval area: intersection of East & South Park – vacate part of parkway, increasing size of lot from 7000 sq ft to 17000 sq ft. Owner agreed to condition prohibiting lot split. Lingering concern about house size.

      Two Preferential parking (permit only) districts approved: Zanja &Tivoli. One on Tabor (Zone 1) will likely get approved. Clearing out backlog, then will clear out overnight parking limit requests.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray

      Two committees:

      - Official (liaison) committee: MOU just reapproved, mainly one way communication down from DWP.
      - Aadvocacy committee: anyone can join.

      Rate Payer Advocate goes to both meetings and has authority to ask for info from DWP. Issues:

      - Ballot measure RRR defeated, would have funded office of accountability
      - Producing Equity Measures: City Charter says focus on providing water at low price. Retirement fund has shortfall of 2.5 Billion.

   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon

      Meeting today, discussed draft policy ideas.

   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson

      Discussion about Fall Festival turns 90

   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald

      Newest restaurant: The Mar Vista – starting dinner service this week.

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
         - November bank statement

      ii. **APPROVAL** of November Monthly Expense Report (MER)

      Motion to approve by Susan Klos, 2nd by Michelle Krupkin. Motion carried unanimously

      iii. Review of 2016-17 budget pending/approved expenditures (https://lacity.quickbase.com/db/bk6c27ec8?a=dr&rid=46&rl=qst)

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

      New website is built. Will go live beginning of year. Committee chairs need to write content for their pages, board members need to provide profiles.

      Mail Chimp: need to start using.

      Request from Stakeholder: don't assume everyone knows everything.

   b. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

   b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

   c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

      Meeting Thursday.

      Had 1st meeting of working group on Purposefull Aging LA. First step is survey. Listening sessions – 1st is scheduled in Mar Vista, 3rd Thursday of February (at AIP). Talking to Windward about starting senior tech support program. Great listening session with Mike Bonin.

      Eviction attempt at Westside Horizons; 150+ residents. Vintage (owner) had plan to phase in evictions; new owner gave eviction notice to all residents, 120 days; not enough housing available to accommodate everyone.

   d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

      Consider being part of the count Jan. 25.

      Committee has been helpful getting people connected with services, getting them into housing. Count helps allocate budget to where it will do the most good.

   e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

   f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

      Four mid-block crosswalks require removing 6 trees (3 are short palms, not shade trees) – mid to late January, maybe February. Forestry will put notices on the trees 30 days before. Inviting Tree People to next Great Streets meeting, balance business owner & residents needs. Sherri Akers: need to give people awareness, posted on Facebook; include in eblast. New trees will be within Great Street.

      Sherri Akers request: have Tree People talk to business that have trees in front of them; businesses are pruning them, awful job.

   g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

      Disruption & false starts in when can meet. Would like to meet next Tuesday: cutouts on sidewalk, places for bus bench shelters.

   h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

      Meeting is tomorrow because of holidays (usually 3rd Wednesday of month); two presentations: Chipolte developer (where Juice was) and a Small lot subdivision. Street Vending Ordinance advanced. Passed resolution opposing small lot subdivision on Barrington.

      January PLUM meeting will be mini-forum on Neighborhood Integrity Initiative. January 18, pro & con speakers.

   i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

      Considering youth participation: middle schooler & high- schooler on committee. Going to ask youth what they recommend.

   j. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

      FAA issues cease & desist order on taking over Altantic Aviation and one other lease; power they used to do it is a blank page.

   k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

Looking at getting cost estimates to rehab building. Then will move in to fundraising mode.

m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair

Met. Looking at youth seat concept.

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Norms restaurant closing; raises issues about seeing family oriented business with parking be replaced by developments.

b. Zone 2 – Damien Newton

Trying to promote Webster events more.

c. Zone 3 – Melissa Stoller

Anarchy suspect in custody.

d. Zone 4 – Greg Tedesco

Move to get permitted parking near Swedish Motors; borderline case

e. Zone 5 – Michelle Krupkin

4211 East.

Trying to get Culver City police to enforce stop at Grandview & Herbert; NW corner has lots of Waze traffic. Half of people on Sherri's block didn't receive Property tax bills; they were sent. Sherri contacted Mark Ridley Thomas, Karen Bass.

f. Zone 6 – Holly Tilson

Venice High is in process of being renovated; dividing property into sports complex & education complex. Pool is not part of renovation; Parks & Rec offered to pay 50% of pool rehab.

11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

Item 11.c & d pulled from consent calendar for discussion.

Motion to approves Items a-b & e-f on consent by ?, 2nd by ?. Motion carried unanimously.

a. **FUNDING MOTION: Storage Unit Rental** (Directors motion submitted by Rob Kadota)

MVCC approves the rental of a storage (Unit #21) at Storquest Storage, 2531 Sawtelle Blvd, LA CA 90064, for $189 a month: $177 plus $12 insurance ($3000 coverage).

Motion passed on consent.

b. **FUNDING MOTION: Storage Unit Rental Reimbursement** (Directors motion submitted by Holly Tilson)

MVCC approves reimbursing Rob Kadota $189 for payment of the December storage unit rental.

Motion passed on consent.

c. **FUNDING MOTION: Eco Car Expo** (submitted by Green Committee)

Whereas the Mar Vista Community Council will hold the Eco Car Expo on 4/30/17 at the Mar Vista Farmers Market, and

Whereas the Mar Vista Farmers Market provides the space to hold the event free of charge, and

Whereas this event provides a community service to educate our stakeholders on the climate change impact of our transportation choices, supporting the Mayors Sustainable pLAn while also providing outreach for the Mar Vista Community Council to our stakeholders,

The Mar Vista Community Council approves an amount not to exceed $1,000 to cover lawn signs flyers and banners and other materials to promote the event.

Last year's Expo was very successful. Secured April 30 date with Farmers' Market; they get the tent, provide the space free. Had a Spring Newsletter last year. Funding comes out of Outreach.

Motion to approve by Melissa Stoller, 2nd by Robin Doyno. Motion carried unanimously (Ken Alpern absent)

d. **FUNDING MOTION: Dog Waste Stations** (submitted by Green Committee)

Whereas unattended pet waste is a large source of stormwater pollution, pet waste left on grassy areas, sidewalks and streets is flushed into our storm drain system and the toxic mix of bacteria from dog waste flows untreated into our local waterways and ocean, and this pollution is harmful to pets, aquatic life and beachgoers, and

Whereas the general public is unaware of the environmental and health risks associated with unattended dog waster, and

Whereas the MVCC can provide a community service that would also promote the role of MVCC in the community,

The Mar Vista Community Council moves to fund an amount not to exceed $1,000 for the purchase and installation of 3 dog waste stations in Mar Vista, locations to be determined. Stations would include educational signage and MVCC recognition.

Discussion:

Sarah Auerswald: Wouldn't spend a dime on without doing more research.

Rob Kadota: would like to see as cost share.

Holly Tilson: how picking sites?

Green Committee requests to table and send back to committee.

e. **POLICY MOTION: LA Bees Project** (submitted by Green Committee)

Whereas the Mar Vista Community Council launched the initial feasibility study and first motion of support that ultimately led to the legalization of urban beekeeping in LA Angeles: and

Whereas the USDA reports that the loss of bees continues in devastating numbers with a loss of 44% last year: and

Whereas there is an urgent need to educate the community about the role of pesticides and neonicotinoids in the loss of bees and the importance of pollinator gardens.

The Mar Vista Community Council votes to support the LA Bees Project, a collaboration between LA Beekeepers Association and Honeylove, in their campaign for education and outreach on the urgent need to create and protect pollinator habitats and locating potential locations for demonstration gardens in Mar Vista.

Motion passed on consent.

f. **POLICY MOTION: 2017 Homeless Count MOU** (submitted by Executive & Finance Committee)

MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See https://form.jotform.com/62975488974177) and will participate in the 2017 Greater Los Angeles Homeless Count.

Motion passed on consent.

12. **Grievances**, if any, received

13. **Future agenda items**

Damien Newton: Bringing item from PLUM opposing Small Lot Subdivision. If we're an NC that says "no" to everything, will be just white noise. Think about what would approve. What is the kind of housing you would approve?

Sarah Auerswald: Sherri Akers brought to council: Is there a discussion at council level about where housing belongs.

14. **Public Comment**

Ken Alpern: There's rail right of way between Crenshaw & Union Station; want eventually to be light rail. Accused of being against bicycles.

Rob Kadota: Christmas Eve – open house, starts at 5:00.

15. **Adjournment**

Meeting adjourned at 8:35 P.M.

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* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, February 14, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 10th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Presentation:** CycLAvia (15 minutes)
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
         1. November bank statement
         2. Pending/approved expenditures
      ii. **APPROVAL** of January Monthly Expense Report (MER)
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   b. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
   c. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   d. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   f. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   g. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
   h. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   j. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   k. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   l. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
   m. **Bicycle Committee** - Mitchell Rishe, Chair
   n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Damien Newton
   c. Zone 3 – Melissa Stoller
   d. Zone 4 – Greg Tedesco
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Holly Tilson
12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-j on consent.

   a. **FUNDING MOTION: MVCC Domain Names** (Director motion submitted by Sarah Auerswald)

In order to assume ownership of the domain names MarVista.org and MarVistaCC.org and launch the new website, MVCC agrees to pay $120 to past Director and Treasurer Bill Scheding to cover the cost of the domain renewals for the past few years in which he bore the cost personally.

b. **FUNDING MOTION: Website data entry** (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of up to $500 to hire someone to do data entry to add past policy, funding and administrative motions from the old websites to the new one.

c. **FUNDING MOTION: ExFin Meeting Room Rental** (Director motion submitted by Holly Tilson)

MVCC agrees to pay Westside Vineyard Church $25 for room rental for the January ExFin Meeting and approves the monthly expenditure of $25 a month for ExFin Meeting room rental.

d. **FUNDING MOTION: MVCC Giveaway Items** (submitted by Community Outreach Committee)

MVCC approves the expenditure of up to $1000 to design and create giveaway items to help boost our email list and outreach.

e. **FUNDING MOTION: MDU Outreach Items** (submitted by Community Outreach Committee)

MVCC approves the expenditure of up to $1000 to design and create outreach materials for multi-family dwelling units.

f. **FUNDING MOTION: Mar Vista Meetup Event** (submitted by Community Outreach Committee)

MVCC approves a budget of $1500, to include materials, advertising, room rental and refreshments, for a Mar Vista Meetup event on a date to be determined by the full committee.

g. **FUNDING MOTION: Safe Cycling Classes** (Director motion submitted by Rob Kadota)

MVCC approve the expenditure of up to $500 for Safe Cycling Classes materials and promotion.

h. **FUNDING MOTION: Neighborhood Purpose Grants to Schools** (Submitted by Education, Arts & Culture Committee)

Where as MVCC has a budget of $2,500 for NPGs; and

Where as this will provide an opportunity for the youth of the Mar Vista to engage in community building experiences;

The MVCC Education, Arts & Culture Committee will ask Mar Vista public schools via e-flyer to submit applications of proposals, created by their students, with a focus on: Public Safety, such as intolerance, sexual harassment/assault, bullying (emphasizing healthy relationships), etc., or Community Bridge Building, such as youth/seniors, immigration issues, LGBTQ issues, cultural diversity, inclusion, homelessness, etc. Proposals will be submitted no later than March 6 with a suggested budget range between $100-$800. Each school may submit multiple applications. E-flyer will include a link to the criteria to meet NPG requirements.

i. **ADMINISTRATIVE MOTION**: **Meetup Group** (submitted by Community Outreach Committee)

MVCC, following all procedures in the MVCC Standlng Rules, will start a Meetup Group and use it to announce our meetings and events.

j. **POLICY MOTION**: **Chipotle Conditional Use Permit** (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council supports the Conditional Use Permit application for new Chipotle restaurant to sell beer and wine to customers for on-site consumption at 11711 National Boulevard.

k. **POLICY MOTION**: **Request for Change of Venue Letter** (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council strongly supports the "Request for change of venue, 12444 Venice Boulevard — Planning Department No. DIR-2016-304-DB-SPR – HEARING OF APPEAL, CURRENTLY SCHEDULED FOR MARCH 23, 2017, 8:30A AT CITY HALL" to a location in Mar Vista as requested by the Mar Vista Residents Association in their letter (see Attachment A) to Mr. Vince Bertoni, Director of Planning, dated February 5, 2017. The MVCC also requests this change of venue and time to allow full participation of our stakeholders.

A copy of our letter support will be sent to Bertoni, Council Member Mike Bonin (Attn.: Len Nguyen, Ezra Gale), Mayor Eric Garcetti, Board of Directors, West Mar Vista Residents Association, and the Los Angeles City Planning Commission.

l. **POLICY MOTION: Atmosphere Cafe, 12034 Venice Blvd., case No. ZA-2016-3511-CUB; ENV-2016-3512-CE** (submitted by Planning & Land Use Management Committee)

WHEREAS: The hours of operation for Atmosphere Cafe have changed since the Board Meeting where we supported the Atmosphere Cafe 's application for

WHEREAS: The change in hours would not have impacted our endorsement of their Conditional Use Permit as it allows them service at breakfast

The Mar Vista Community Council reaffirms its support for the CPUC permit by Atmosphere Cafe and urges the city to expedite approval of this permit so that Atmosphere can begin evening service before the holiday season.

A copy of this resolution will be sent to all appropriate city agencies, including but not limited to, the Mayor's Office of Great Streets, the Department of City Planning, and the Office of Councilmember Mike Bonin as well as the applicant.

j. **POLICY MOTION: Venice High School swimming pool** (submitted by Education, Arts & Culture Committee)

Where as the VHS pool has the support of the community at large, and

Where as the pool is deteriorating but there are no plans currently to close it, and

Where as the VHS pool is a SHARED RESOURCE between LAUSD and CoLA. The pool's future should be incorporated in the planning process of the school's renovation, but that project is constrained by dedicated funds.

The Mar Vista Community Council leadership votes to respectfully ask District 11, Recs and Park, and LAUSD to immediately share a plan concerning the issues of renovation, title of Venice pool, agreements, and estimates for repairs of the VHS pool.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
16. **Adjournment**

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MIKE BONIN

City of Los Angeles
Councilmember, Eleventh District

December 16, 2016

Kevin C. Willis, Director
Office of Airport Compliance and Management Analysis
Federal Aviation Administration
800 Independence Ave SW
Washington DC 20591

RE: FAA Cease and Desist Order to the City of Santa Monica

Dear Mr. Willis:

I'd like to invite you down to Los Angeles, to take a stroll with me through what I'm convinced is one of the most beautiful neighborhoods in America. It's called North Westdale, and it's beautiful not because everything there is perfect rather because it's a vibrant community of families, young couples, senior citizens and others that care for each other and work hard to make this a great place to live. It might be perfect, in fact, if not for the idling jet that sits on the runway at Santa Monica Airport (SMO) a hundred feet away, spewing its toxic emissions directly into these homes.

When I first took that stroll down these neighborhood blocks surrounding SMO, I was struck by two things. The first is how incredibly close these jets are to homes. Being the Los Angeles City Councilmember that also represents Los Angeles International Airport (LAX), I am well aware of the FAA's close watch over unwarranted incursions into the areas immediately east and west of those runways that should be kept clear for safety reasons. I not only respect it, but I've also supported the efforts of airport officials to keep that area clear. So it boggles my mind that, even as it guards the Runway Protection Zone at LAX, FAA continues to allow Santa Monica Airport to operate outside of even this most basic of safety requirements, literally allowing jet operations a hundred feet away from residential buildings.

The second thing that struck me on my walk through the neighborhood is how much this airport impacts the daily lives of the residents there. When children play outside, it can only be for a short period of time, and not during the hot summer months when the choking pollution makes it impossible to enjoy more than a few minutes of our amazing California sun. It's common practice in this neighborhood to close all your windows, and completely shut yourself off from the outside on the worst pollution days. We often talk of airport impacts in terms of numbers and cold, hard facts, but you won't understand what any of that means until you take this walk with me down what will look to you like an empty and abandoned neighborhood until you realize that the families are very much there, it's just that they've retreated into their homes to seek shelter from the jet fumes.

Westchester Office
7166 W. Manchester Boulevard
Los Angeles, CA 90045
(310) 568-8772
(310) 410-3946 Fax

City Hall
200 N. Spring Street, Room 475
Los Angeles, CA 90012
(213) 473-7011
(213) 473-6926 Fax

West Los Angeles Office
1645 Corinth Avenue, Room 201
Los Angeles, CA 90025
(310) 575-8461
(310) 575-8305 Fax

I began writing this letter to communicate my outrage and condemn FAA's recent interim cease and desist order to the City of Santa Monica, and to express my anger and disappointment over what seems to be your agency's relentless effort to disenfranchise the voters of Santa Monica and bring pollution and noise as close as you can to the people I represent in Venice and West Los Angeles. But it occurred to me that you may just not know what you're doing.

It occurred to me that you may not understand how many lives you're impacting here around SMO. How many families change their daily routine to accommodate the idling jet, which in turn is changing it's own routine and holding on the tarmac to accommodate an even larger jet taking off miles away at LAX. It occurred to me that you, actually, may not know that there are homes a hundred feet away from the end of this runway, directly in the path of any jet that might be coming in for an emergency landing. Your job is to keep people safe, and you may not realize that you're not doing your job well here at SMO.

So I invite you down to Los Angeles to see for yourself why the voters of Santa Monica saw fit to issue their elected representatives clear direction to manage and limit airport uses at SMO, and why those of us that represent the residents surrounding this airport in Congress, at the state legislature, city councils, and every level of government are speaking with one voice to urge you to allow this City to determine its own future for its airport. I invite you to come hear why we so strongly support Santa Monica's efforts to implement the will of its voters under Measure LC, including the recently adopted Airport Leasing and Licensing Policy, action to evict the existing Fixed Based Operators (FBO), and exercise of its right right to establish its own City operated FBO service.

Come see for yourself. Understand the consequences of the orders you issue from Washington, D.C. Listen to the stories of those that live with this airport every day, and then rescind your cease and desist order.

Regards,

MIKE BONIN
Councilmember, 11th District

cc: Congressman Ted W. Lieu, United States House of Representatives, 33rd District of California
Joey Apodaca, Congressman Ted W. Lieu's Office, United States House of Representatives
Glen A. Martin, Western-Pacific Regional Administrator, Federal Aviation Administration

MB:op

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, February 14, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7.03 P.M.

   Quorum present: Susan Klos, Robin Doyno, Rob Kadota, Sarah Auerswald, Holly Tilson, Greg Tedesco, Melissa Stoller, Damien Newton, Paola Cervantes

   Late Arrivals: Ken Alpern (7:42 P.M.), Michelle Krupkin (7:50 p.m.),

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 10th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.

   Motion to approve by Sarah Auerswald, 2nd by. Motion carried unanimously. Robin absent

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   CD11 Candidate Robin Rudisill

   Sarah Auerswald: Preliminary amounts from Federal government to Los Angeles $502.5M, recurring grants $250-300M

5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Revised law against vehicular dwelling has taken effect. Doesn't impact existing signs. Pushing for enforcement. Can't tow if someone's in vehicle. Yellow: can sleep in car during day; not allowed to live there

      Motion to optimize LAPD officer deployment by hiring civilians to fill jobs that require sworn officers, freeing them up to patrol.

      Mid-block crossings on Venice in work.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Presentation:** CycLAvia Rachel Burke (15 minutes)

Sunday, March 26; is 20th CicLAvia event. Funded by Metro. Culver City awarded the grant; CIcLAvia & LA city also put in money. Will flyer cars so they know can't park on route. Route is 6 miles, 4 hubs – Mar Vista is largest hub. Asking people to get off bikes at Centinela & walk to hub. Will reach out to Atmosphere Café (not in pedestrian zone). Trying to rent Bowler parking\ lot; expensive. Cars can gosouthS on Grand View then east on Venice.

Rob Kadota: Bike Mar Vista (renamed from Bycicle Committee) at Farmers' Market every Sunday in March. Wants to get glider bikes to use for bike safety classes at Kids Place. Negotiating with Bike Valet to bring back mechanic. Wants to put up signs on Venice: "Inflate your tires. Stop here."

SarahAuerswald: will look for sponsors to pay for Bowlero lot.

Cars can go S on Grand View then East on Venice.

8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray

      The bimonthly meeting of the NC-DWP MOU Committee was held on Saturday, February 4th. Three topics were discussed:

      1. Renewal of the Memorandum of Understanding between the Neighborhood Councils and the DWP. Current MOU expires in April; negotiating for a 3rd MOU.

         The following request was made to update the Neighborhood Council's application for the MOU:

         "Neighborhood Councils should send all notices and the names of their DWP MOU Representatives to the head of the NC Outreach team, Stephanie Spicer (213-367-1314, stephanie.spicer@ladwp.com) with a copy to Tony Wilkinson (lawilkinson@acm.org) and Jack Humphreyville (JackH@targetmediapartners.com)"

      2. Report by the Office of Public Accountability (Dr. Pickle) on a study of DWP labor costs. Most of the data is suspect due to sources (utilities). Most employees classified as low level are in top quartile of pay for similar jobs. Mid-range in 2nd-3rd quartile. Upper mgmt. in 4th quartile.
      3. Update on DWP's water infrastructure and current issues. 90% of LA water comes from outside area. 10% local ground water, needs treatment. SoCal reservoirs about 60% full, so still need to conserve water.

   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson

      Theme: Mar Vista Celebrates 90.

   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald

      Monthly coffee time Thursday, February 16, 9:00 A.M. Speaker is goal-setting expert.

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota

      Venice Great Street mid-block crossing had ground breaking.

   b. First Vice Chair – Sarah Auerswald

      New website is live. Board members can update their profiles.

   c. Second Vice Chair – Joseph Galloway

d. Secretary – Melissa Stoller

Put meetings/events on calendar so they will be included in weekly eblast. You needn't wait until you have an agenda

e. Treasurer – Holly Tilson

i. Report on current financial status

Still have a lot of money to spend. Asked committees to turn in must-have & wish list.

City has deposited additional $5000.

1. November bank statement
2. Pending/approved expenditures

ii. **APPROVAL** of January Monthly Expense Report (MER)

Motion to approve by Melissa Stoller, 2nd by Sarah Auerswald. Motion carried unanimously.

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Monthly meeting is Wednesday, February 15. Scarf project and new parking regulations.

b. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

c. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Next meeting will discuss development at Gateway & Sawtelle.

d. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Wants aggressive approach about enhanced bus shelters. Getting out list of sidewalks;. Needs to know who send to, how get out.

Will lead March l pothole repair.

e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

f. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

g. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

We'll post anything you send.

h. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Eco Car Expo postponed.

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Next meeting March 8.

j. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

MVCC co-sponsored Education Forum.

k. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Protest rally at SM Airport. Mike Bonin attended. Santa Monica signed consent decree to postpone closing airport another 12 years; ending up in courts. Jet Suite X hasn't been given permit (didn't submit proper paperwork), says is starting anyway; changing from 30 to 15 seat planes due to runway shortening.

l. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

Revising bylaws: change rules of order to Rosenberg, clarification of length of service/number of terms. Likely to suggest a Zone 7; would take one at-large seat away. Need to look at Zone 6 population.

m. **Bicycle Committee** - Mitchell Rishe, Chair

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern

       Hearing cars have had to wait 10 or more minutes to cross Expo Tracks; Len Nguyen had to wait 30 minutes. CD5 candidate forum.

    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco

       Trying to interest neighbors in speed trailer in Rob's driveway (needs fixing)

    e. Zone 5 – Michelle Krupkin

       Vehicles being keyed and egged on Washington. Vehicle thefts from locked parking.

    f. Zone 6 – Holly Tilson

       Traffic. West Mar Vista Residents Association coordinating appeal for 12444 Venice Blvd. Started Go Fund Me site; developer put up site that looked similar. Next meeting is February 23, 6:30 pm at PenMar Park.

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-j on consent.

    Requests to remove from consent calendar: Items j, k & m.

    Motion to approve Items 12.a-j on consent by Robin, 2nd by Holly. Motion carried unanimously.

    a. **FUNDING MOTION: MVCC Domain Names** (Director motion submitted by Sarah Auerswald)

       In order to assume ownership of the domain names MarVista.org and MarVistaCC.org and launch the new website, MVCC agrees to pay $120 to past Director and Treasurer Bill Scheding to cover the cost of the domain renewals for the past few years in which he bore the cost personally.

       Approved on consent.

    b. **FUNDING MOTION: Website data entry** (Director motion submitted by Sarah Auerswald)

       MVCC approves the expenditure of up to $500 to hire someone to do data entry to add past policy, funding and administrative motions from the old websites to the new one.

       Approved on consent.

    c. **FUNDING MOTION: ExFin Meeting Room Rental** (Director motion submitted by Holly Tilson)

       MVCC agrees to pay Westside Vineyard Church $25 for room rental for the January ExFin Meeting and approves the monthly expenditure of $25 a month for ExFin Meeting room rental.

       Approved on consent.

    d. **FUNDING MOTION: MVCC Giveaway Items** (submitted by Community Outreach Committee)

       MVCC approves the expenditure of up to $1000 to design and create giveaway items to help boost our email list and outreach.

       Approved on consent.

    e. **FUNDING MOTION: MDU Outreach Items** (submitted by Community Outreach Committee)

       MVCC approves the expenditure of up to $1000 to design and create outreach materials for multi-family dwelling units.

       Approved on consent.

    f. **FUNDING MOTION: Mar Vista Meetup Event** (submitted by Community Outreach Committee)

MVCC approves a budget of $1500, to include materials, advertising, room rental and refreshments, for a Mar Vista Meetup event on a date to be determined by the full committee.

Approved on consent.

g. **FUNDING MOTION: Safe Cycling Classes** (Director motion submitted by Rob Kadota)

MVCC approve the expenditure of up to $500 for Safe Cycling Classes materials and promotion.

Approved on consent.

h. **FUNDING MOTION: Neighborhood Purpose Grants to Schools** (Submitted by Education, Arts & Culture Committee)

Where as MVCC has a budget of $2,500 for NPGs; and

Where as this will provide an opportunity for the youth of the Mar Vista to engage in community building experiences;

The MVCC Education, Arts & Culture Committee will ask Mar Vista public schools via e-flyer to submit applications of proposals, created by their students, with a focus on: Public Safety, such as intolerance, sexual harassment/assault, bullying (emphasizing healthy relationships), etc., or Community Bridge Building, such as youth/seniors, immigration issues, LGBTQ issues, cultural diversity, inclusion, homelessness, etc. Proposals will be submitted no later than March 6 with a suggested budget range between $100-$800. Each school may submit multiple applications. E-flyer will include a link to the criteria to meet NPG requirements.

Approved on consent.

i. **ADMINISTRATIVE MOTION**: **Meetup Group** (submitted by Community Outreach Committee)

MVCC, following all procedures in the MVCC Standlng Rules, will start a Meetup Group and use it to announce our meetings and events.

Approved on consent.

j. **POLICY MOTION**: **Chipotle Conditional Use Permit** (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council supports the Conditional Use Permit application for new Chipotle restaurant to sell beer and wine *and other alcohol* to customers for on-site consumption at 11711 National Boulevard.

Motion to approve by Damien, 2nd by Sarah Auerswald. Permit doesn't limit to wine and beer. Robin abstained.

Brett Engstrom (representing Chipotle): Hours of operation 9am-11pm (actually 11:00 am opeing now). No bar, no open shots, everything pre-packaged. Company promotes use of bicycles. Looking to hire from neighborhood.

k. **POLICY MOTION**: **Request for Change of Venue Letter** (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council strongly supports the "Request for change of venue, 12444 Venice Boulevard — Planning Department No. DIR-2016-304-DB-SPR – HEARING OF APPEAL, CURRENTLY SCHEDULED FOR MARCH 23, 2017, 8:30A AT CITY HALL" to a location in Mar Vista as requested by the Mar Vista Residents Association in their letter (see Attachment A) to Mr. Vince Bertoni, Director of Planning, dated February 5, 2017. The MVCC also requests this change of venue and time to allow full participation of our stakeholders.

A copy of our letter support will be sent to Bertoni, Council Member Mike Bonin (Attn.: Len Nguyen, Ezra Gale), Mayor Eric Garcetti, Board of Directors, West Mar Vista Residents Association, and the Los Angeles City Planning Commission.

Motion to approve by Damien Newton, 2nd by HollyTillson. Motion carried unanimously.

Discussion:

Howard Wiesberg. Supports motion. Owns apartment. buildings that are 500 ft. away (12415, 12421 Pacific). Parking is already non-existent. AB 744 – only need ½ parking space; allows cities tso do parking survey: how many cars do units usually need. Taking away local control from our communities.

Holly Tilson: Would like to explore using MVCC money to help fund traffic/parking survey.

Motion carried unanimously.

l. **POLICY MOTION: Atmosphere Cafe, 12034 Venice Blvd., case No. ZA-2016-3511-CUB; ENV-2016-3512-CE** (submitted by Planning & Land Use Management Committee)

WHEREAS: The hours of operation for Atmosphere Cafe have changed since the Board Meeting where we supported the Atmosphere Cafe 's application for

WHEREAS: The change in hours would not have impacted our endorsement of their Conditional Use Permit as it allows them service at breakfast

The Mar Vista Community Council reaffirms its support for the CPUC permit by Atmosphere Cafe and urges the city to expedite approval of this permit so that Atmosphere can begin evening service before the holiday season.

A copy of this resolution will be sent to all appropriate city agencies, including but not limited to, the Mayor's Office of Great Streets, the Department of City Planning, and the Office of Councilmember Mike Bonin as well as the applicant.

Approved on consent.

m. **POLICY MOTION: Venice High School swimming pool** (submitted by Education, Arts & Culture Committee)

Where as the VHS pool has the support of the community at large, and

Where as the pool is deteriorating but there are no plans currently to close it, and

Where as the VHS pool is a SHARED RESOURCE between LAUSD and CoLA. The pool's future should be incorporated in the planning process of the school's renovation, but that project is constrained by dedicated funds.

The Mar Vista Community Council leadership votes to respectfully ask District 11, Recs and Parks, and LAUSD to immediately share a plan concerning the issues of renovation, title of Venice pool, agreements, and estimates for repairs of the VHS pool.

Motion to approve by Sarah Auerswald, 2nd by Michelle Krupkin.

Introduction:

Motion came from many stakeholders in surrounding area because this is one of few indoor pools in area;.pool often breaks down. At meetings wasn't' straight answer as to who's taking ownership of pol (LAUSD or Parks).

Discussion:

Debby Diner Harris: Have been talks from LAUSD & Parks & Rec. Might be some funding. Making progress, but no solutions.

Ken Alpren: LAUSD and City of LA are separate entitles, but same taxpayers. Hopes they will work together.

Holly Tilson: Venice High development team says pool not in their scope; supposed to look at schools and see what needs are—weren't told to exclude pool. Parks & Rec says has the money to pay 50%, LAUSD non-responsive.

Greg Tedesco: Wants to see budget breakdown so can understand where the money's going.

Sarah Auerswald: Doesn't have budget because soliciting feedback from community.

Motion carried unanimously.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**

Holly Tilson: look into parking survey or anything that MVCC can help fund. Need to see if allowed to fund.

Damien Newton: Amazed at level of advocacy of BOD, impressed by level of activity.

16. **Adjournment**

Meeting adjourned at 8:39 P.M.

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* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

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ADDENDUM A: Proposed development at 12333 Venice Blvd. 08/09/17Policy Motion

West Mar Vista Residents Association

3629 Maplewood Avenue• Los Angeles, CA 90066-3021• Phone: 310.493.0959 •
E-Mail: marvistaneighbors@gmail.com Web: www.stopcommuterschool.com Facebook: Stop LAUSD commuter school in Mar Vista

February 5, 2017

Mr. Vince Bertoni
Director of Planning
City of Los Angeles
200 North Spring Street
Los Angeles CA 90012

Re: Request for change of venue, 12444 Venice Boulevard— Planning Department No. DIR-2016-304-DB-SPR – HEARING OF APPEAL, CURRENTLY SCHEDULED FOR MARCH 23, 2017, 8:30A AT CITY HALL

Dear Mr. Bertoni:

The West Mar Vista Residents Association is a community-benefit organization whose members reside and/or own property in our neighborhood, mostly within the attendance boundaries of Mark Twain Middle School. Many live near the proposed development and adjacent to the 5-story 12575 project that you approved in 2016 from the same developer.

On behalf of the association, we would respectfully request your assistance in holding the March 23 hearing in Mar Vista or at the WLA CD11 office after 6PM to allow residents to effectively participate in the process. Providing residents with the opportunity to express their views to your department will allow for a fuller and more comprehensive public record of the community's opinions. This is important as the project may set an important new standard for any new buildings in Area 46 and beyond. Your own Letter of Determination stated we could expect similar or larger buildings in Mar Vista in the future. It is therefore critical that the community have full opportunity to inform you of its views on this matter.

Please contact me if you have any questions. We look forward to your response. Thank you for your attention.

Sincerely,

Saeed Ali
President

Copy:
Council Member Mike Bonin (Attn.: Len Nguyen, Ezra Gale)
Mayor Eric Garcetti
Board of Directors, West Mar Vista Residents Association
Members, Planning and Land Use Management Committee, Mar Vista Community (Neighborhood) Council

IRS No.: 47-381297

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday January 9th, 2018, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of December 12th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   Ex Parte Communication is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

   Conflicts of interest include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.
5. **Community Memorial Observations**
6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   h. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   i. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   j. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota

f. WRAC LUPC: open
g. City Budget Advocates: Holly Tilson
h. Recode LA: Sharon Commins
i. Animal Services: Tom Ponton
j Friends of Historic FS 62: Albert Olson
k. Mar Vista Chamber of Commerce: Sarah Auerswald
l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair – Rob Kadota
      i. Announcement of Board of Directors vacancy
   b. First Vice Chair – Chuck Ray
   c. Second Vice Chair – Paola Cervantes
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
      ii. **APPROVAL** of December Monthly Expense Report (MER)
      iii. Review of draft budget revisions (see Attachment A)
10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
   a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
   b. **Community Outreach Committee** – Rob Kadota, Acting Chair
   c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   g. **Bike Mar Vista** - Mitchell Rishe, Chair
   h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   i. **Great Streets Ad Hoc Committee** – Michelle Krupkin,Chair
   j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Green Committee** –Jeanne Kuntz, Chair
   l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Damien Newton
   c. Zone 3 – Melissa Stoller
   d. Zone 4 – open
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Holly Tilson
12. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

a. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

WHEREAS, The main concerns that the MVCC has heard from the business community are:

- Bullying tactics by sales representatives to sign contracts.
- Charging fees that do not correspond to the City's agreed fee schedule.
- Missed pick-ups that are charged for.
- Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

b. **Policy Motion**: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated and comprehensive data that includes September 2017 data addressing the impacts of Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

c. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and disregard the map.

d. **Administrative Motion**: Hearing" Mar Vista Stakeholders Regarding Roadway Improvements To Venice Boulevard (Director motion submitted by Sara Roos)

Whereas the Mar Vista Community Council (MVCC) is an advisory board with no authority to legislate, and

Whereas MVCC board members are mandated to represent their constituents, yet as volunteer board members without staff or resources to faithfully survey all constituents under controversial, complicated conditions, it is unreasonable to imagine that any given board member could become well-enough prepared to generate a singular, representative position with a high likelihood of validity, even

Whereas were it possible to generate such a valid singular position, this would thereby silence the important perspectives of minority groups composed of important proportions of stakeholders, representing many and valid constituent observations on the project to be considered, therefore be it

Resolved that instead of opining summarily on the fate of the Great Streets project in Mar Vista, MVCC shall solicit and edit into one document, a compilation of stakeholder-groups' opinions to be presented to the city council office as collectively representative of the various perspectives of several discrete community groups regarding the merit and potential fate of Mar Vista's Great Streets project along Venice Boulevard.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Consent Calendar: Motion to approve items 13a-e on consent.

a. **Administrative Motion**: Authorization to submit Community Impact Statements (Directors motion submitted by Chuck Ray)

Whereas, Neighborhood Councils were created in 1999 by amending the City Charter to provide for an effective **two-way** communication between City Stakeholders and the elected and appointed city officials, and

Whereas, the City Clerk maintains a procedure for adding Community Impact Statements to council files as an official statement adopted by a Neighborhood Council on issues pending before the City Council, its committees, or City commissions.

Therefore, the Mar Vista Community Council authorizes the following board member(s) to SUBMIT Community Impact Statements which have been passed by a vote of the full board:

Rob Kadota, Chair
Chuck Ray, 1st Vice Chair
Paolo Cervantes, 2nd Vice Chair
Melissa Stoller, Secretary

Be it further resolved, in cases where an issue is moving quickly through the legislative process and a promptly issued statement is beneficial, the aforementioned board members are authorized to also WRITE and SUBMIT Community Impact Statements which express positions previously voted upon by the full board.

By this motion, the Chair and the Secretary are authorized to submit a formal request to the Department of Neighborhood Empowerment to authorize the board members listed above to

submit Community Impact Statements to the City Clerk on behalf of the Mar Vista Community Council.

b. **Administrative Motion**: **Nominations by MVCC Chair to Committees** and review/approval by MVCC Board of Directors

c. **Funding Motion**: Live streaming equipment (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $1500 for live-streaming equipment.

Streaming Video Equipment/Hardware

Mevo Plus Bundle*	$799.96 (includes camera, tripod, case and extra 10nhr battery boost) plus tax
iPad Mini (128GB)	$399 plus tax (could get a different tablet if we wanted but this is what Venice NC uses)
iPad Mini Smart Cover	$39.00 plus tax
Movo Lavalier Microphone	$39.95 plus tax
Movo Microphone Extension Cables	$12.95 x 2 ($25.90) plus tax
Total	$1303.81 plus tax

d. **Funding Motion** MiFi plan (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $140/month for AT&T device and data MiFi plan.

Wireless Mobile Internet Service and Router

ATT MiFi - Velocity	$0.99 + $45 activation fee plus data plan $60/10GB, $90/Unlimited plan (govt. contract details TBD)
Or	
ATT MiFi – Nighthawk LTE Mobile Hotspot Router	$89.99 +$45 activation fee plus data plan $60/10GB, $90/Unlimited plan (govt. contract details TBD)

e. **Funding Motion**: Board retreats (Directors motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $400 for semi-annual board retreats.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

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ADDENDUM A: 01/08/18 Draft Amended Budget

Budget Category: General/Operational	Current Budget	Proposed Budget
Subcategory: Office		
Storage		
Storquest	$2,496.00	$2,496.00
Meeting rooms rental		
The Vineyard	$600.00	$600.00
St Andrew's Lutheran Church	$300.00	$300.00
St Bede's	$75.00	$75.00
Windward School	$5.00	$5.00
PO Box rental	$132.00	$132.00
Farmer's Market rental	$1,200.00	$1,200.00
Equip & supplies (misc)		
Live streaming equipment		$1,500.00
Misc.	$1,100.00	$1,100.00
Mtg supplies & printing		
Printing	$1,000.00	$700.00
Board Training & Support		
Business cards/name badges	$250.00	$350.00
Board Retreat	$37.68	$400.00
Office subtotal:	$7,195.68	$9,158.00
Subcategory: Outreach		
Website		
The Web Corner: website maintenance	$1,650.00	$1,650.00
The Web Corner: emails	$385.00	$385.00
The Web Corner: Extra Data Entry	$500.00	$500.00
RIMU Hosting	$96.27	$96.27
Email Service		
Mail chimp email service	$480.00	$700.00
MiFi Service		
AT&T MiFi service		$840.00
Advertising		
Banners/sign/event promotion	$500.00	$500.00
Facebook ads	$250.00	$250.00
Promotional items		$2,000.00
Emergency Prep signs & brochures	$1,500.00	$1,500.00
Neighborhood Watch signs		$1,500.00
Community Events		
Block parties (~~5~~ 4 X $300)	$1,500.00	$1,200.00
Westside Senior Health & Wellness Fair	$500.00	$500.00
Winter Wonderland	$1,000.00	$1,000.00
Art Walk	$2,000.00	$2,000.00

Venice High Grease Night	$300.00	$300.00
MVCC events/outreach items/mailings/newsletter		
Mar Vista Turns 90 Celebration	$4,000.00	$4,000.00
Great Street Tree Planting	$300.00	$300.00
Green Garden Showcase	$4,000.00	$4,000.00
Misc	$7,843.05	$7,843.05
Outreach subtotal:	$26,804.32	$31,064.32
Subcategory: Elections		
Election expenses	$1,000.00	$0.00
Elections subtotal:	$1,000.00	$0.00
General/Operational Total:	$35,000.00	$39,922.32
Budget Category: Community Improvement Grants		
Alley repair/seed money	$5,000.00	$0.00
Budget Category: Neighborhood Purpose Grants	$2,000.00	$2,000.00
Budget Total	**$42,000.00**	**$41,922.32**

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday, March 14, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 10th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Presentation:** Airport Expansion (Los Angeles World Airports External Affairs Division - 15 minutes)
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
         1. February bank statement
         2. Pending/approved expenditures
      ii. **APPROVAL** of February Monthly Expense Report (MER)
10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   b. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
   c. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   d. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   f. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   g. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
   h. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   j. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   k. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   l. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

      Proposed By-laws changes: First Reading

      i. Motion to adopt and amend bylaws, election procedures and standing rules to allow for on line voting as stipulated by the City of LA and the Department of Neighborhood Empowerment.

      ii. Motion to amend MVCC Bylaws Article III (BOUNDARIES) Section 2 (INTERNAL BOUNDARIES) to amend Zone 6 by dividing it into two zones; One North of Venice Blvd and the other South of Venice Blvd.

         Zone 6: South of the Santa Monica Airport, North of Venice Blvd., East of Walgrove Ave., West of Centinela Ave.

         Zone 7: South of Venice Blvd., North of Washington Blvd., East of Walgrove Ave., West of Centinela Ave.

      iii. Motion to amend Article V (GOVERNING BOARD) Section 1 (COMPOSITION) to reflect the creation of a Zone 7 director and retain the same number of seats on the board of directors by reducing the number of At Large Directors from six to five.

         Current: "Number of Directors: The Board shall be comprised of thirteen (13) Directors, including the five (5) officers described in Article V. Of the thirteen (13) Directors, one (1) shall be elected "Community" Director, **six (6)** shall be elected "At-large" Directors and **six (6)** shall be elected "Zone" Directors."

         Proposed: "Number of Directors: The Board shall be comprised of thirteen (13) Directors, including the five (5) officers described in Article V. Of the thirteen (13)

Directors, one (1) shall be elected "Community" Director, five (5) shall be elected "At-large" Directors and seven (7) shall be elected "Zone" Directors."

iv. Motion to amend Article V (GOVERNING BOARD) Section 4 (TERMS AND TERM LIMITS) so as to clarify in both number of terms and total years how long a board member can serve before being termed out for one term.

Current: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms. After being out of office for one full term, a former Director is again eligible to run for office.

Proposed: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms or a maximum of eight (8) years. After being out of office for one full term, a former Director is again eligible to run for office.

v. Motion to amend Article V (GOVERNING BOARD) Section 7 (ABSENCES) from three consecutive absences to two consecutive absences.

Current: Absence from **three (3**) consecutive meetings without notification may subject a Director to removal.

Proposed: Absence from two (2) consecutive meetings without notification may subject a Director to removal.

vi. Motion to amend Article V (GOVERNING BOARD) Section 9 (REMOVAL) so it would reflect the same number of allowed absences in Section 7.

Current: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
B. Absence from **three (3)** consecutive meetings without notification;
C. Failure to disclose a financial conflict of interest in a matter before the Board.
D. Violation of MVCC bylaws or rules.
E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

Proposed: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
B. Absence from **two (2)** consecutive meetings without notification;
C. Failure to disclose a financial conflict of interest in a matter before the Board.
D. Violation of MVCC bylaws or rules.
E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

vii. Motion to amend Article Viii (MEETINGS) Section 1 (MEETING TIME AND PLACE) Item C – rather than requiring Board Meetings happen on the 2nd Tuesday change it to a more generic monthly term for greater scheduling flexibility.

Current: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held **on the second Tuesday of every month**.

Proposed: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held monthly.

viii. Motion to correct misspelling of "funding" in Article IX (FINANCES).

Current: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum **finding** allocation requirements.

Proposed: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with

Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum funding allocation requirements.

ix. Motion to amend Article X (ELECTIONS) Section 3 (MINIMUM VOTING AGE) to comply with DONE mandate.

Current: Only Stakeholders **eighteen (18)** years or older may vote for the election of Director

Proposed: Only Stakeholders sixteen (16) years or older may vote for the election of Director

x. Motion to amend Article X (ELECTIONS) Section 3 (OTHER ELECTION RELATED LANGUAGE) Item D to permit all eligible voters to be candidates.

Current: D. Candidates must eighteen (18) years of age or older.

Proposed:. Candidates must sixteen (16) years of age or older.

xi. Motion to change Article XII (PARLIAMENTARY AUTHORITY) from Roberts Rules of Order to Rosenberg's Rules of Order.

Current: Board Meetings are open to the public and shall be conducted in accordance with the provisions of the California Brown Act. The MVCC shall use Robert's Rules of Order, as revised. Additional rules and/or policies and procedures regarding the conduct of the meetings may be developed and adopted by the Board and those would be found in MVCC Standing Rules.

Proposed: Board Meetings are open to the public and shall be conducted in accordance with the provisions of the California Brown Act. The MVCC shall use Rosenberg's Rules of Order. Additional rules and/or policies and procedures regarding the conduct of the meetings may be developed and adopted by the Board and those would be found in MVCC Standing Rules.

https://www.cacities.org/Resources/Open-Government/RosenbergText_2011.aspx

xii. Motion to amend Attachment A (GOVERNING BOARD STRUCTURE AND VOTING) to conform to items iii, ix and x above.

BOARD POSITION	# OF SEATS	ELECTED OR APPOINTED?	ELIGIBILITY TO RUN FOR THE SEAT	ELIGIBILITY TO VOTE FOR THE SEAT
Zone Directors (Zones 1- **6** 7) Term: 2 Years	**6** 7	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone and w h o obtain signatures in support of his/her candidacy from 20 MVCC Stakeholders eligible to vote for the candidate.	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone.
At-Large Directors Term: 2 Years	**6** 5	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC and obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC.
Community Director Term: 2 Years	1	Elected	Stakeholders **18** 16 years or older who live, work or own property in the neighborhood and also community interest stakeholders who obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older.

m. **Bicycle Committee** - Mitchell Rishe, Chair

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

b. Zone 2 – Damien Newton

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

e. Zone 5 – Michelle Krupkin

f. Zone 6 – Holly Tilson

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-g on consent.

    a. **FUNDING MOTION:** Speed Trailer Radar Gun (submitted by Committee on Public Safety)

       The Committee on Public Safety hereby requests that the Mar Vista Community council appropriate $700.00 for the purchase of a new speed trailer radar gun, its installation, and miscellaneous minor upgrades.

    b. **FUNDING MOTION:** Community Tree Planting (submitted by Great Streets Ad-hoc Committee)

       Whereas the Mar Vista Community Council in coordination with Tree People will hold a Community Tree Planting Day TBD on Great Street Venice Blvd. and,

       Whereas this event will provide a community service as well as adding environmental and beautification benefits and supports the Mayor's Sustainable Plan while providing outreach for the Mar Vista Community Council to our stakeholders,

       Therefore the Mar Vista Community Council approves an amount not to exceed $300.00 to cover expenses.

    c. **FUNDING MOTION:** @marvista.com Email (directors motions submitted by Sarah Auerswald)

       Motion to spend up to $105/month to pay for email addresses for all Board members and committee chairs to be able to send and receive emails from the @marvista.org address. Up to 30 email addresses at a cost of $3.50/month to be hosted and administered by The Web Corner web hosting.

    d. **FUNDING MOTION:** Website data entry (Director motion submitted by Sarah Auerswald)

       MVCC approves the expenditure of up to an additional $500 to hire someone to do data entry to add past policy, funding and administrative motions and other data from the old websites to the new one.

    e. **FUNDING MOTION:** Bike Mar Vista (Director motion submitted by Sarah Rob Kadota)

       MVCC approve the expenditure of up to an additional $750 for safe cycling programs outreach materials and for equipment (basic bike repair tools, bike pump, repair stand) to operate a weekly bike repair stand and bike valet service in partnership with the Mar Vista Farmers Market.

    f. **POLICY MOTION**: Community Disaster Preparedness (submitted by Committee on Public Safety)

       WHEREAS the City of Los Angeles has been making great progress in disaster preparedness at the level of city departments and agencies and it is now time to begin the process of training large numbers of city residents so as to have a city capable of effectively responding to any disaster that may befall us. THEREFORE, the Mar Vista Community Council supports the inclusion of $192,000.00 as a multi-departmental budget item in the 2017-2018 city budget to cover the cost of four staff and related expenses for the preparation of a city-wide disaster preparedness plan.

    g. **POLICY MOTION:** Vision Zero (submitted by Great Streets Ad-hoc Committee)

       WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

       WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

       WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation

engineers, police officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and

WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short), to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday, March 14, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:03. P.M.

   Quorum present: Susan Klos, Robin Doyno, Rob Kadota, Sarah Auerswald, Holly Tilson, Greg Tedesco, Sherri Akers

   Late Arrivals: Melissa Stoller (7:0 P.M.), Joseph Galloway, Michelle Krupkin. Ken Alpern (7:42 P.M.)

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 14th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvista.org/docs/34485246-8618.pdf.

   Motion to approve by Sarah Auerswald, 2nd by Susan Klos. Motion carried 5 ayes, 0 nays, 1 abstention (Sherri Akers), 4 absent (Melissa Stoller, Joseph Galloway, Michelle Krupkin, Ken Alpern)

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Lenore French: Extending outreach to neighborhood associations. Zone Director's asked to help Lenore connect.

   Melissa Stoller: IMAN Cultural Center Neighborhood Potluck, March 19.

5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

      Baseline masionization ordinance passed; Mar Vista is R1V2 (previously called R1 V New). New development standards for single-family zones.

      Introduced two motions:

      1) Asked City Attorney to address best practices for developers.
      2) Rancho Park drill site was granted permits without any notification to city. Asked for investigation and report back within 90 days.

      Bringing back accessible parking spots (blue curb); there is application process (http://marvista.org/readpost.php?news_id=463).

      WRAC discussing Solar Rooftops program at March 15 meeting. Program installs solar for free for low income homeowners; DWP obligated to fix if any programs.

      Sherri Akers inquired about status of potential methane leaks survey requested by MVCC.

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Send list of alleys that need fixing to the Councilmember.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Presentation:** Airport Expansion (Los Angeles World Airports External Affairs Division - 15 minutes) Daniel Osztreicher

Over 80 million passengers passed through LAX in 2016. LAMP (Landside Access Modernization Program) will help alleviate traffic, provide new locations for passenger dropoff/pickup and create positive passenger experience. $5.5 billion project.

Components (see Addendum A, LAMP Diagram)

- CONRAC (Consolidated Car Rental Facility) – largest rental car facility in the world. Can be converted to other uses if rental car use declines. Not giving a space to car share companies like Maven or Zipcar now, but will accommodate new technologies as necessary.
- ITF (Intermobile Transportation Facility) – large parking structures. Vision is one closer to airport for local traffic, another east of aviation for international.
- Roadway expansions
- ATM (Automated People Mover – like at DFW, other large airports) connects 3 terminals, goes along 96th. Same height as theme building. Too tight to have loop in terminal area. Looking at making connections between terminal the North terminals and South terminals thru Tom Bradly; would be able to check in at any terminal and walk to gate.
- Train: 12-15 minutes from end to end
- Metro Stop

Questions:

- How much labor will be union? Do you expect labor shortages because of current situation? Answer: Large percentage will be union. Has only heard of potential shortages because of other major construction projects. Perhaps will have apprentice programs to have ready labor source.
- CONRAC will eliminate AVIS shuttle buses, but not others? Answer: Will reduce traffic by 40% – some private, some buses/shuttles. Need to individually renegotiate 1000's of licenses.
- What are community complaints. Answer: Different communities have different concerns.

See www.connectinglax.com for more information.

8. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

January meeting was short. Next meetings: March 15, May 17.

b. DWP MOU: Chuck Ray

Meeting was routine. Chuck provided the following documents:

- DWP MOU Meeting Minutes: http://marvista.org/docs/34485246-8661.docx
- LADWP Rates: http://marvista.org/docs/34485246-8659.pdf
- Rooftop Solar: http://marvista.org/docs/34485246-8660.pdf

c. LANCC: Joseph Galloway

d. One Water LA: Christopher McKinnon

Storm water went out to ocean. OneWaterLA is assembling huge list of potential projects.

e. WRAC: Rob Kadota/Joseph Galloway

f. WRAC LUPC: Sharon Commins

g. City Budget Advocates: Holly Tilson, Joseph Galloway

h. Recode LA: Sharon Commins

i. Animal Services: Tom Ponton

j Fall Festival: Albert Olson

k Friends of Historic FS 62: Albert Olson

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Meeting Thursday, March 16, 9:00 A.M. Local contractor David Kent talking about emergency preparedness in business environment.

May 20 event at Venice High.

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota

If directors/committee chairs/liaisons want to be able to send emails from marvista.org, MVCC will pay for service.

b. First Vice Chair – Sarah Auerswald

CicLAvia on March 26, want volunteers for MVCC Tent.

c. Second Vice Chair – Joseph Galloway

d. Secretary – Melissa Stoller

Eblast goes out Friday or Saturday each week. Please send input.

e. Treasurer – Holly Tilson

i. Report on current financial status

1. February bank statement
2. Pending/approved expenditures

ii. **APPROVAL** of February Monthly Expense Report (MER)

Motion to approve by Sarah Auerswald, 2nd by Joseph Galloway. Motion carried unanimously.

Budget Discussion

Ken Alpern: possibly consider $ for more asphalt.

Used to give money to Pacific Solutions for graffiti removal.

Michelle Krupkin: consider power-washing FM. Sarah Auerswald: Already done quarterly

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Presentation by Scott Sale at April meeting on Safe Park.

b. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

c. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

d. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Helped get alley behind fire station started with $5000. Will look at helping get other alleys fixed. Will look at worst alleys, help the most people first.

Sidewalk blitz: zone directors – ID sidewalks that need fixing most.

Experiencing long waits to cross EXPO line.

Rob Kadota: Do sidewalk Kickoff —Stakeholder meeting

Melissa Stoller: Please explore how Neighborhood Associations could be involved in sidewalk repair –for example, providing some funding to do entire block at same time.

e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

LAFD speaking at next AIP meeting.

Rob Kadota: Would be interesting to look at Map my Neighborhood Program

f. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

g. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

Planning a big tent event at Farmers" Market (Mar Vista Meetup). Will invite community partners to table. Especially want Zone Directors to attend.

h. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Meetings are hiatus. Want new membership.

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Discussed artist submissions.

No specific date for Community Tree Planting. Target date: April 8, 9-noon or Fall 2017.

Vision Zero (http://visionzero.lacity.org/) presentation: action plan.

LA hired Artist in residence. Looking at transforming back of street signs.

Work started at Mountain View crossing. Hoping to be done in 2 months. Next step is protected bike path.

j. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

k. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Will probably move meeting to St. Andrews Church.

City of Santa Monica is promoting what a wonderful community asset SM Airport is. Offering commercial flights to Vegas. Martin wants to see how LA will step up to protect interests of its citizens; Mike Bonin attending next meeting.

Rob Kadota: Have community meeting about NextGen? Invite people to talk about.

Ken Alpern: thanks Marty for his efforts.

l. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

Proposed By-laws changes: First Reading

i. Motion to adopt and amend bylaws, election procedures and standing rules to allow for on line voting as stipulated by the City of LA and the Department of Neighborhood Empowerment.

Discussion

Sherri Akers: Trepidation about loosing an at large position – could loose good candidates because there aren't enough spots.

Robin Doyno: West Mar Vista Neighborhood Association has gone on record for splitting Zone 6.

Holly Tilson: Concerns about splitting; there are 2 other zones that have high density. Still leaves Zone 6 as bigger than other zones. Could split into 3 at Beethoven.

Ken Alpern: Concerned about not having enough at-large directors and getting a Zone 7 Director. Consider extending Zone 5 west.

ii. Motion to amend MVCC Bylaws Article III (BOUNDARIES) Section 2 (INTERNAL BOUNDARIES) to amend Zone 6 by dividing it into two zones; One North of Venice Blvd and the other South of Venice Blvd.

Zone 6: South of the Santa Monica Airport, North of Venice Blvd., East of Walgrove Ave., West of Centinela Ave.

Zone 7: South of Venice Blvd., North of Washington Blvd., East of Walgrove Ave., West of Centinela Ave.

Discussion

iii. Motion to amend Article V (GOVERNING BOARD) Section 1 (COMPOSITION) to reflect the creation of a Zone 7 director and retain the same number of seats on the board of directors by reducing the number of At Large Directors from six to five.

Current: "Number of Directors: The Board shall be comprised of thirteen (13) Directors, including the five (5) officers described in Article V. Of the thirteen (13) Directors, one (1) shall be elected "Community" Director, **six (6)** shall be elected "At-large" Directors and **six (6)** shall be elected "Zone" Directors."

Proposed: "Number of Directors: The Board shall be comprised of thirteen (13) Directors, including the five (5) officers described in Article V. Of the thirteen (13) Directors, one (1) shall be elected "Community" Director, five (5) shall be elected "At-large" Directors and seven (7) shall be elected "Zone" Directors."

iv. Motion to amend Article V (GOVERNING BOARD) Section 4 (TERMS AND TERM LIMITS) so as to clarify in both number of terms and total years how long a board member can serve before being termed out for one term.

Current: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms. After being out of office for one full term, a former Director is again eligible to run for office.

Proposed: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms or a maximum of eight (8) years. After being out of office for one full term, a former Director is again eligible to run for office.

v. Motion to amend Article V (GOVERNING BOARD) Section 7 (ABSENCES) from three consecutive absences to two consecutive absences.

Current: Absence from **three (3**) consecutive meetings without notification may subject a Director to removal.

Proposed: Absence from two (2) consecutive meetings without notification may subject a Director to removal.

vi. Motion to amend Article V (GOVERNING BOARD) Section 9 (REMOVAL) so it would reflect the same number of allowed absences in Section 7.

Current: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
B. Absence from **three (3)** consecutive meetings without notification;
C. Failure to disclose a financial conflict of interest in a matter before the Board.
D. Violation of MVCC bylaws or rules.
E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

Proposed: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
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C. Failure to disclose a financial conflict of interest in a matter before the Board.
D. Violation of MVCC bylaws or rules.
E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

vii. Motion to amend Article Viii (MEETINGS) Section 1 (MEETING TIME AND PLACE) Item C – rather than requiring Board Meetings happen on the 2nd Tuesday change it to a more generic monthly term for greater scheduling flexibility.

Current: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held **on the second Tuesday of every month**.

Proposed: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held monthly.

viii. Motion to correct misspelling of "funding" in Article IX (FINANCES).

Current: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum **finding** allocation requirements.

Proposed: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum funding allocation requirements.

ix. Motion to amend Article X (ELECTIONS) Section 3 (MINIMUM VOTING AGE) to comply with DONE mandate.

Current: Only Stakeholders **eighteen (18)** years or older may vote for the election of Director

Proposed: Only Stakeholders sixteen (16) years or older may vote for the election of Director

x. Motion to amend Article X (ELECTIONS) Section 3 (OTHER ELECTION RELATED LANGUAGE) Item D to permit all eligible voters to be candidates.

Current: D. Candidates must eighteen (18) years of age or older.

Proposed:. Candidates must sixteen (16)) years of age or older.

xi. Motion to change Article XII (PARLIAMENTARY AUTHORITY) from Roberts Rules of Order to Rosenberg's Rules of Order.

Current: Board Meetings are open to the public and shall be conducted in accordance with the provisions of the California Brown Act. The MVCC shall use Robert's Rules of Order, as revised. Additional rules and/or policies and procedures regarding the conduct of the meetings may be developed and adopted by the Board and those would be found in MVCC Standing Rules.

Proposed: Board Meetings are open to the public and shall be conducted in accordance with the provisions of the California Brown Act. The MVCC shall use Rosenberg's Rules of Order. Additional rules and/or policies and procedures regarding the conduct of the meetings may be developed and adopted by the Board and those would be found in MVCC Standing Rules.

https://www.cacities.org/Resources/Open-Government/RosenbergText_2011.aspx

xii. Motion to amend Attachment A (GOVERNING BOARD STRUCTURE AND VOTING) to conform to items iii, ix and x above.

BOARD POSITION	# OF SEATS	ELECTED OR APPOINTED?	ELIGIBILITY TO RUN FOR THE SEAT	ELIGIBILITY TO VOTE FOR THE SEAT
Zone Directors (Zones 1- **6** 7) Term: 2 Years	**6** 7	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone and w h o obtain signatures in support of his/her candidacy from 20 MVCC Stakeholders eligible to vote for the candidate.	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone.
At-Large Directors Term: 2 Years	**6** 5	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC and obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC.
Community Director Term: 2 Years	1	Elected	Stakeholders **18** 16 years or older who live, work or own property in the neighborhood and also community interest stakeholders who obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older.

m. **Bicycle Committee** - Mitchell Rishe, Chair

At Farmers' Market for past 3 weeks. Did 8 bike repair slast week. Showed people how to change gears, inflate tires. One more time at Farmers' Market.

Has volunteer to be bike mechanic at BikeLA.

Next meeting (April 6) will have1 hour presentation on safe cycling.

Farmers' Market paid for bike stands at Market.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

Working on cost estimate of repairs.

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Be careful of people posing as salesmen.

b. Zone 2 – Damien Newton

c. Zone 3 – Melissa Stoller

There was a robbery on March 13th at about 8 pm, 3300 Block of Colbert. The victim was getting out of his car with a backpack, another car pulled up. A man got out with a gun; the victim dropped the backpack and ran away. The man/suspect ran to the waiting car with the backpack. Police are looking for images on any residential cameras. There were no injuries, or shots fired.

During the overnight hours of March 6th at home on the 3300 Block of Coolidge home that is currently under remodel had the house, shed and storage container burglarized. The alarm was not on, nor was there a dog. The back motion light was on. Construction sites and workers' trucks are very common targets—tools are tempting.

3246 Barrington Small Lot Subdivision (5 homes roof decks; 38'10" high to top of stairwell; one guest parking spot) will be on PLUM agenda for Wednesday, March 22.

d. Zone 4 – Greg Tedesco

Garbage at Taco Bell

Elliot Hanna did ride-along with police on Sunday.

e. Zone 5 – Michelle Krupkin

Rutts opened on Washington Pl.

Graffiti is way up.

f. Zone 6 – Holly Tilson

West Mar Vista Residents Association is pushing forward on appeal. For 12444 Venice Blvd.

Recreation & Parks put 2.5mill into Venice High School pool renovations.

There's one block on Moore with really bad tree roots in street.

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

Motion to approve Item 12.b-g on consent carried unanimously

a. **FUNDING MOTION:** Speed Trailer Radar Gun (submitted by Committee on Public Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community council appropriate $700.00 for the purchase of a new speed trailer radar gun, its installation, and miscellaneous minor upgrades.

Tabled.

b. **FUNDING MOTION:** Community Tree Planting (submitted by Great Streets Ad-hoc Committee)

Whereas the Mar Vista Community Council in coordination with Tree People will hold a Community Tree Planting Day TBD on Great Street Venice Blvd. and,

Whereas this event will provide a community service as well as adding environmental and beautification benefits and supports the Mayor's Sustainable Plan while providing outreach for the Mar Vista Community Council to our stakeholders,

Therefore the Mar Vista Community Council approves an amount not to exceed $300.00 to cover expenses.

Carried on consent.

c. **FUNDING MOTION:** @marvista.org Email (directors motions submitted by Sarah Auerswald)

Motion to spend up to $105/month to pay for email addresses for all Board members and committee chairs to be able to send and receive emails from the @marvista.org address. Up to 30 email addresses at a cost of $3.50/month to be hosted and administered by The Web Corner web hosting.

Carried on consent.

d. **FUNDING MOTION:** Website data entry (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of up to an additional $500 to hire someone to do data entry to add past policy, funding and administrative motions and other data from the old websites to the new one.

Carried on consent.

e. **FUNDING MOTION:** Bike Mar Vista (Director motion submitted by Sarah Rob Kadota)

MVCC approve the expenditure of up to an additional $750 for safe cycling programs outreach materials and for equipment (basic bike repair tools, bike pump, repair stand) to operate a weekly bike repair stand and bike valet service in partnership with the Mar Vista Farmers Market.

Carried on consent.

f. **POLICY MOTION**: Community Disaster Preparedness (submitted by Committee on Public Safety)

WHEREAS the City of Los Angeles has been making great progress in disaster preparedness at the level of city departments and agencies and it is now time to begin the process of training large numbers of city residents so as to have a city capable of effectively responding to any disaster that may befall us. THEREFORE, the Mar Vista Community Council supports the inclusion of $192,000.00 as a multi-departmental budget item in the 2017-2018 city budget to cover the cost of four staff and related expenses for the preparation of a city-wide disaster preparedness plan.

Carried on consent.

g. **POLICY MOTION:** Vision Zero (submitted by Great Streets Ad-hoc Committee)

WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation engineers, police officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and

WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short), to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

Carried on consent.

13. **Grievances**, if any, received
14. **Future agenda items**

Carried on consent.

15. **Public Comment**

Next month Rob Kadota is visiting wife in DC. Sarah Auerswald will chair the BOD meeting.

16. **Adjournment**

Meeting adjourned at 8:50 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

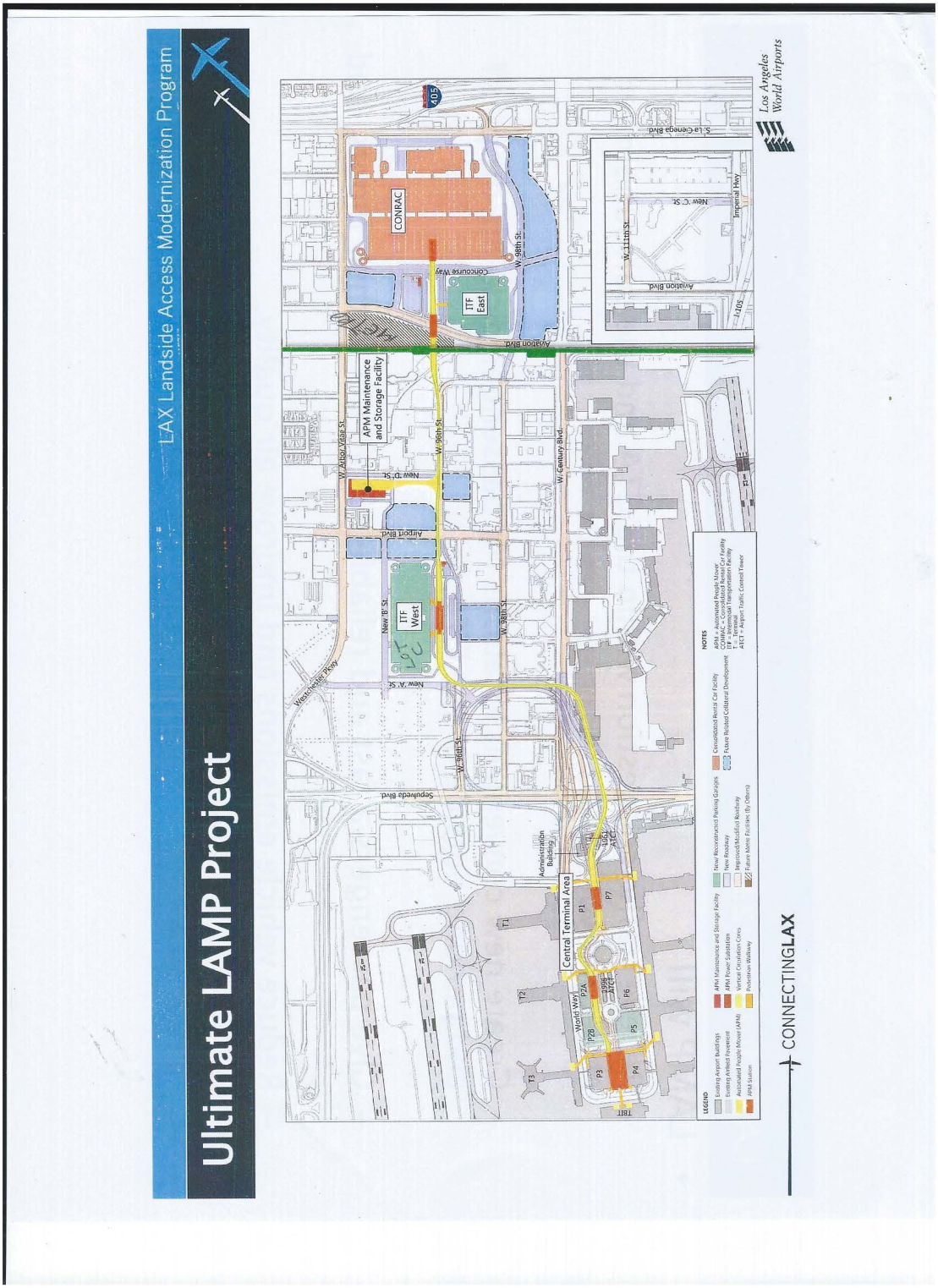
  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Attachment A: LAMP Diagram



Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday, April 11, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of March 14th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald
8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota
b. First Vice Chair – Sarah Auerswald
c. Second Vice Chair – Joseph Galloway
d. Secretary – Melissa Stoller
e. Treasurer – Holly Tilson
    i. Report on current financial status
        1. February bank statement
        2. Pending/approved expenditures
    ii. **APPROVAL** of March Monthly Expense Report (MER)
    iii. **APPROVAL** of 2016-17 Budget Revisions

10. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    l. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

    Proposed By-laws changes: First Reading

    i. Motion to adopt and amend bylaws, election procedures and standing rules to allow for on line voting as stipulated by the City of LA and the Department of Neighborhood Empowerment.

    ii. Motion to amend Article V(GOVERNING BOARD) Section 3 (Official Actions) to use the same termininololgy as Rosenberg's Rules of Order

    Current: Voting: Subject to the presence of a quorum, a majority vote of the Directors present, not including abstentions shall prevail, except that a two-thirds (2/3) vote of the Directors currently serving on the Board (Full Board) shall be required to remove a Director or an officer of the Board of Directors

    Proposed: Voting: Subject to the presence of a quorum, a majority vote of the Directors present and voting shall prevail, except that a two-thirds (2/3) vote of the Directors currently serving on the Board (Full Board) shall be required to remove a Director or an officer of the Board of Directors

    iii. Motion to amend Article V (GOVERNING BOARD) Section 4 (TERMS AND TERM LIMITS) so as to clarify in both number of terms and total years how long a board member can serve before being termed out for one term.

    Current: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms. After being out of office for one full term, a former Director is again eligible to run for office.

    Proposed: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms or a maximum of eight (8) years, whichever is greatest. After being out of office for one full term, a former Director is again eligible to run for office.

    iv. Motion to amend Article V (GOVERNING BOARD) Section 7 (ABSENCES) from three consecutive absences to two consecutive absences.

    Current: Absence from **three (3**) consecutive meetings without notification may subject a Director to removal.

    Proposed: Absence from two (2) consecutive meetings without notification may subject a Director to removal.

    v. Motion to amend Article V (GOVERNING BOARD) Section 9 (REMOVAL) so it would reflect the same number of allowed absences in Section 7.

    Current: Removal of a Director: Reasons for Removal of a Director may include:

        A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
        B. Absence from **three (3)** consecutive meetings without notification;
        C. Failure to disclose a financial conflict of interest in a matter before the Board.

D. Violation of MVCC bylaws or rules.

E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

Proposed: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;

B. Absence from **two (2)** consecutive meetings without notification;

C. Failure to disclose a financial conflict of interest in a matter before the Board.

D. Violation of MVCC bylaws or rules.

E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

vi. Motion to amend Article Viii (MEETINGS) Section 1 (MEETING TIME AND PLACE) Item C – rather than requiring Board Meetings happen on the 2nd Tuesday change it to a more generic monthly term for greater scheduling flexibility.

Current: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held **on the second Tuesday of every month**.

Proposed: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held monthly.

vii. Motion to correct misspelling of "funding" in Article IX (FINANCES).

Current: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum **finding** allocation requirements.

Proposed: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum funding allocation requirements.

viii. Motion to amend Article X (ELECTIONS) Section 3 (MINIMUM VOTING AGE) to comply with DONE mandate.

Current: Only Stakeholders **eighteen (18)** years or older may vote for the election of Director

Proposed: Only Stakeholders sixteen (16) years or older may vote for the election of Director

ix. Motion to amend Article X (ELECTIONS) Section 3 (OTHER ELECTION RELATED LANGUAGE) Item D to permit all eligible voters to be candidates.

Current: D. Candidates must eighteen (18) years of age or older.

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x. Motion to change Article XII (PARLIAMENTARY AUTHORITY) from Roberts Rules of Order to Rosenberg's Rules of Order.

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xi. Motion to amend Attachment A (GOVERNING BOARD STRUCTURE AND VOTING) to conform to items iii, ix and x above.

BOARD POSITION	# OF SEATS	ELECTED OR APPOINTED?	ELIGIBILITY TO RUN FOR THE SEAT	ELIGIBILITY TO VOTE FOR THE SEAT
Zone Directors (Zones 1- **6** 7) Term: 2 Years	**6** 7	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone and w h o obtain signatures in support of his/her candidacy from 20 MVCC Stakeholders eligible to vote for the candidate.	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone.
At-Large Directors Term: 2 Years	**6** 5	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC and obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC.
Community Director Term: 2 Years	1	Elected	Stakeholders **18** 16 years or older who live, work or own property in the neighborhood and also community interest stakeholders who obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older.

b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
d. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
f. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
g. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
i. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
j. **Bicycle Committee** - Mitchell Rishe, Chair
k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-w on consent.

    a. **FUNDING MOTION:** Meeting Equipment (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $1500 for meeting equipment, including a public address and time-keeping systems

b. **FUNDING MOTION:** Name Badges (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $200 for name badges for board members and committee chairs.

c. **FUNDING MOTION:** Planning Retreat (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $500 for a planning retreat room rental, food and materials.

d. **FUNDING MOTION:** Community Giveaways (submitted by Executive and Finance Committee)

MVCC approves the expenditure of an additional $1000 for community giveaways, for a total of up to $2000.

e. **FUNDING MOTION:** Mar Vista Meetup (submitted by Executive and Finance Committee)

MVCC approves the expenditure of an additional $1000 for Mar Vista Meetup to purchases lunch for presenters/volunteers, for a total of up to $2500.

f. **FUNDING MOTION:** Outreach for Community Partners (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $2000 for promotional outreach materials for critical community partners.

g. **FUNDING MOTION:** Domain Name (submitted by Executive and Finance Committee)

MVCC approves the expenditure $200 to renew marvista.org domain name for 10 years.

h. **FUNDING MOTION:** Website Data Entry (submitted by Executive and Finance Committee)

Expenditure of an additional $2500 for website data entry, for a total of $3500.

i. **FUNDING MOTION:** Mar Vista Turns 90 outreach materials (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $1000 for Mar Vista turns 90 Celebration/Fire Station 62 outreach materials.

j. **FUNDING MOTION:** Bike Repair Stand (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $1700 for community bike repair stand replacement.

k. **FUNDING MOTION:** Treasurer Supplies (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $150 for printer ink and paper used in performance of MVCC treasurer tasks.

l. **FUNDING MOTION:** MVCC Banners (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $500 for MVCC banners for Mar Vista Recreation Center and Fire Station 62.

m. **FUNDING MOTION:** AIP Banner (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $150 for Aging In Place Committee banner.

m. **FUNDING MOTION:** Meeting Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of an additional $45 for Elections & Bylaws/Executive & Finance committees meeting room rental at Coffee Connection to cover increase from $25 to $40.

n. **FUNDING MOTION:** Alley Paving (submitted by Transportation & Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd.,

Whereas, the MVCC supports a Matching Budgetary Motion of up to $2500 for repairing the alleys on the northern side of Venice to best serve that commercial corridor,

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

o. **FUNDING MOTION**: CERT Training (submitted by Committee on Public Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1500.00 for the purpose of securing venue(s) to conduct C.E.R.T. training for members of the community.

p. **FUNDING MOTION**: Neighborhood Watch Signs (submitted by Committee on Public Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1500.00 for the purchase of neighborhood watch signs for the community.

q. **FUNDING MOTION**: Meeting Room Rental (submitted by Airport Committee)

Request that the MVCC approves the expenditure of $25 a month to Saint Andrew's Lutheran Church for room rental for the monthly MVCC Airport Committee Meetings; first Saturday of each month, 6-7 PM. Three meetings this fiscal year: Saturday, April 01, 2017 - Saturday, May 06, 2017 - Saturday, June 03, 2017.

r. **FUNDING MOTION**: Meeting Room Rental (submitted by Transportation & Infrastructure Committee)

Whereas the MVCC Transportation & Infrastructure Committee needs to meet, and

Whereas the Coffee Connection provides a meeting place at the cost of $1.00 per person for a meeting room,

Therefore the MVCC Transportation & Infrastructure Committee supports the payment of the $4.00 meeting room fee to Coffee Connection.

s. **POLICY MOTION**: Alley Repair (submitted by Transportation & Infrastructure Committee)

Whereas, the alleys serving entire blocks of Mar Vista residents are in need of repair, and,

Whereas, the rainstorms of this current winter 2016-2017 have exacerbated the breakdown of these alleys, and

Whereas, the recent asphalt blitz is unlikely to make a significant impact on the number of significant and dangerous potholes and navigable portions of these alleys,

Whereas the MVCC therefore requests that the alleys within the neighborhoods of Mar Vista and Westside Village receive a particular focus and fast-tracking to repair and/or replace the portions in need of such service over the next 3-6 months,

Therefore the MVCC requests a monthly update from the CD11 and CD5 offices on alley repairs to that end.

t. **POLICY MOTION**: Speed Trailer (submitted by Transportation & Infrastructure Committee)

Whereas the MVCC Speed Trailer is in need of repair or placement, Therefore the MVCC Supports the Cost-Effective Budgeting of the replacement and purchase of a new MVCC Speed Trailer.

u. **POLICY MOTION**: Mobility and Safety of Expo Hub intersections (submitted by Transportation & Infrastructure Committee)

Whereas the MVCC supports all CD11, CD5 and LADOT efforts to promote mobility and safety for Expo Line intersections,

Therefore, the MVCC calls on the LADOT and Metro to report on actual rush-hour wait times for cars to cross the at-grade Expo Line intersections on Overland, Westwood, and Barrington Blvds.

v. **POLICY MOTION**: LAMP Support (submitted by Transportation & Infrastructure and Airport Committees)

WHEREAS, Los Angeles International Airport (LAX) is the second busiest airport in the United States and the largest in California; and

WHEREAS, our community depends on LAX for the trade, travel and tourism that it brings to our area and the larger Southern California region.

WHEREAS, since the start of the economic recovery in 2009, air service demand at LAX has increased from 56 million annual passengers to 80 million annual passengers in 2016, and Los Angeles is seeking to host the 2024 Olympics, and

WHEREAS due to the increase in air services, LAX is experiencing heavy traffic congestion in and around the airport; and

WHEREAS, on regular days up to 95,000 vehicles enter Los Angeles International Airport's 3 Central Terminal Area increasing to 120,000 during the peak Thanksgiving Holiday period; and

WHEREAS, almost half of the vehicles are buses, shuttles and vans from rental car companies, hotels and shared-ride companies along with taxis who are also competing for the limited space on the streets and curbs in the CTA; and

WHEREAS, 23 different rental car lots scattered around the airport area add to this problem; and

WHEREAS, to resolve this problem Los Angeles is proposing to spend $5.5 billion on the Landside Access Modernization Program, or "LAMP," and

WHEREAS, LAMP will consist of 6-million square foot Consolidated Rental Car Facility (CONRAC), two 3-million square foot Intermodal Transportation Facilities (IFTs) or transit hubs, a 2 ¼ mile Automated People Mover (APM) connecting the CONRAC, ITFS and a new light rail station to the airport, and related roadway improvements and property development; and

WHEREAS, LAMP will relieve traffic congestion within the Central Terminal Area (CTA) and the surrounding street network, improve the LAX passenger experience and keep LAX as the international gateway for the West Coast;

THEREFORE BE IT RESOLVED THAT the MVCC states its support for the Landside Access Modernization Program at Los Angeles International Airport and directs that a letter of support be sent to the operator of the airport, Los Angeles World Airports urging that the Los Angeles City Planning Commission, Los Angeles County Airport Land Use Commission and the Los Angeles City Council approve this project.

w. **POLICY MOTION**: Vision Zero Support (submitted by Great Streets Ad Hoc Committee)

WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation engineers, police officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and

WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short) to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday, April 11, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:03. P.M.

   Quorum present: Susan Klos, Robin Doyno, Sarah Auerswald, Holly Tilson, Greg Tedesco, Sherri Akers, Melissa Stoller, Joseph Galloway, Michelle Krupkin, Ken Alpern, Damien Newton, Paola Cervantes

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of March 14th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.

   Motion to approve by Melissa Stoller, 2nd by Joseph Galloway. Motion carried: 9 ayes, 0 nays, 2 abstentions (Paola Cervantes & Damien Newton), 1 absent (Ken Alpern)

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Jessica Cabot (Nick Melvoin campaign): No for-profit charter schools in LA. Sees charters as parents solotion to public schools. Wants charters to co-locate, pay rent to public schools.

   Faith Myhra (Antioch University faculty): Largest gas blowout in US history in North San Fernando Valley: equivalent of ½ million cars being on road for a year; 8000 people relocated; continuous leaks twice a day; unusually rare forms of cancer popping up, other health concerns. Economic loss as well. Storage facility in La Ballona is already leaking, people already feeling effects. Meeting

   Robin Doyno: Homeless Committee will have speaker on Safe Park

   Sherri Akers: Has applications for permanent Vote by Mail status.

5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

      Introduced motion to divest from Wells Fargo.

      Working on resurfacing Venice Blvd. End game: negotiate with CicLAvia, to bring event back to Venice Blvd, resurface street. Sherri Akers: please partner with Farmers' Market manager Diane Rogers, let her be a part of planning.

      Homeless encampments under 405 (National, Pico, Venice): Bureau of Sanitation has been going out and cleaning up, homeless come back – have right to be there.

      Ken Alpern: do we have plan for when there is housing? Joseph: thinks will provide mental health services along with housing. Susan Klos: housing will not be successful without supportive services; need to remove requirement to forcibly make them be sober, and instead support them in process.

      Greg Tedesco: any plan to have trash receptacles? Joseph: Problem is that what's being trashed is considered personal property. Running out of city land for storage facilities. Robin Doyno: trash receptacles are too often used as toilets.

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Two streets scheduled for resurfacing this month.

      May: Resurfacing Mtn View between Stanwood & Clover

      Moore: tree roots breakingvup street; Len: will submit

Stakeholder: trailer parked in front of apt. building; Len send to him.

Alleys N or Venice; Len: will talk to street services

Potholes westbound venice McLaughlin to Centinela slow lane; patches keep falling apart; Len: done by CalTrans, LA will do better.

d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

      Last meeting was March 14. Next meeting is Wednesday, May 17. Agenda closes May 10.
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway

      Discussing encouraging local council office to reevaluate over $500mil sitting in city bank account to settle law suites.

      Bill Koontz: "after meeting motions?" Joseph: doesn't know what this is, perhaps refers to motion passed in past.
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald
8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
   b. First Vice Chair – Sarah Auerswald

      Still fixing website. Can give everyone a marvista.org email address; need to tell Sarah if you want one.
   c. Second Vice Chair – Joseph Galloway

      Application process for People Streets now opens on Thursday, April 14. If you know of unused alley, this is a great use. Can provide bike racks.
   d. Secretary – Melissa Stoller

      Need to send your eblast from Mail Chimp because list has grown. If you send your private list to Sarah Auerswald or Melissa, we'll add them to mail list.
   e. Treasurer – Holly Tilson
      i. Report on current financial status

Current balance is $15,498.27. Final DONE payment was reduced by $2166 (funds left in account at end of prior fiscal year).

1. February bank statement
2. Pending/approved expenditures

Can't write checks after 7th of June, no credit card after June 11th.

ii. **APPROVAL** of March Monthly Expense Report (MER)

Motion to approve by Robin Doyno, 2nd by Ken Alpern. Motion carried unanimously.

iii. **APPROVAL** of 2016-17 Budget Revisions

Discussion:

Bill Koontz: deficit balance?

Sherri Akers: Do we need to balance the budget? Ans: lots of requests are "up to."

Ken Alpern: Perhaps should instead push for $5000 for alley repair in next fiscal year?

Holly Tilson: Wait till next month, we can have motion saying any money left over goes to alley repair.

Sherri Akers: There are four budget areas that are discretionary; could identify and cut back.

Ken Alpern: Suggest cut out $2500 for alley repair.

Sherri Akers: Friendly amendment to remove Alley Repair; 2nd by Ken Alpern. Amendment passed unanimously.

Motion to approve budget as amended by Ken Alpern, 2nd by Melissa.Stoller. Motion carried unanimously.

10. Committee Reports: (may include motions to refer committee where desirable; public comment permitted)

I. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

Proposed By-laws changes: First Reading

Motion to approve i-x on consent by Robin Doyno, 2nd by Sherri Akers. Robin withdraws motion.

Public Comment:

Bill Koontz: LANC saying put breaks on changing age to 16. Pull viii, ix & xi.

New motion: approve on consent except for viii, ix, and xi. Motion carried unanimously.

Motion to consider Items viii & ix together by Damien Newton, 2nd by Joseph. Galloway.

Discussion:

Bill Koontz: Have discussed lowering age in past, felt were too many wild card aspects out there. Would like to be more like the city council.

Greg Tedesco: Agrees with Bill about age, keep at 18.

Damien Newtn: Absolutely should change to 16.

Michelle: Krupkin Leans both ways, head spinning.

Holly Tilson: agrees with Bill, can have other programs to involve 16 year olds.

Joseph Galloway: Points made are valid. South Robertson decided to have school rep. Under 16, participates, has been very mature. Supports lowering age to 16.

Ken Apern: Has wanted to have student representative for long time. Would support more if it said 17 or high school senior would feel better about.

Robin Doyno: Very in favor of motion. Need to have respect for all our citizens, honor our youth.

Sherri Akers: Very conflicted. Would love to have HS Senior on board. Concern is the parents: "go to school and get me 40 votes."

Paola Cervantes: Doesn't think person who wants to attend meetings, prepare would do something to screw up. Not fair to throw everyone out because of possible bad apples. Have more time as 16 year old to devote to council than 17 year old applying for college.

Motion to approve Items viii & xi not carried: 6 ayes, 5 nays (requires 2/3 vote).

i. Motion to adopt and amend bylaws, election procedures and standing rules to allow for on line voting as stipulated by the City of LA and the Department of Neighborhood Empowerment.

Approved on consent.

ii. Motion to amend Article V (GOVERNING BOARD) Section 3 (Official Actions) to use the same termininololgy as Rosenberg's Rules of Order

Current: Voting: Subject to the presence of a quorum, a majority vote of the Directors present, not including abstentions shall prevail, except that a two-thirds (2/3) vote of the Directors currently serving on the Board (Full Board) shall be required to remove a Director or an officer of the Board of Directors

Proposed: Voting: Subject to the presence of a quorum, a majority vote of the Directors present and voting shall prevail, except that a two-thirds (2/3) vote of the Directors currently serving on the Board (Full Board) shall be required to remove a Director or an officer of the Board of Directors

Approved on consent.

iii. Motion to amend Article V (GOVERNING BOARD) Section 4 (TERMS AND TERM LIMITS) so as to clarify in both number of terms and total years how long a board member can serve before being termed out for one term.

Current: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms. After being out of office for one full term, a former Director is again eligible to run for office.

Proposed: Term of the Directors: The term of office for Directors shall be two (2) years or until a new Director is Installed. A Director may serve for no more than four (4) consecutive terms or a maximum of eight (8) years, whichever is greatest. After being out of office for one full term, a former Director is again eligible to run for office.

Approved on consent.

iv. Motion to amend Article V (GOVERNING BOARD) Section 7 (ABSENCES) from three consecutive absences to two consecutive absences.

Current: Absence from **three (3**) consecutive meetings without notification may subject a Director to removal.

Proposed: Absence from two (2) consecutive meetings without notification may subject a Director to removal.

Approved on consent.

v. Motion to amend Article V (GOVERNING BOARD) Section 9 (REMOVAL) so it would reflect the same number of allowed absences in Section 7.

Current: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
B. Absence from **three (3)** consecutive meetings without notification;
C. Failure to disclose a financial conflict of interest in a matter before the Board.
D. Violation of MVCC bylaws or rules.
E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

Proposed: Removal of a Director: Reasons for Removal of a Director may include:

A. Inability to carry out his/her duties and responsibilities due to time limitations, illness and/or other personal obligations;
B. Absence from **two (2)** consecutive meetings without notification;
C. Failure to disclose a financial conflict of interest in a matter before the Board.
D. Violation of MVCC bylaws or rules.

E. The MVCC will consult with its legal counsel, the Office of the City Attorney, throughout this removal process.

Approved on consent.

vi. Motion to amend Article Viii (MEETINGS) Section 1 (MEETING TIME AND PLACE) Item C – rather than requiring Board Meetings happen on the 2nd Tuesday change it to a more generic monthly term for greater scheduling flexibility.

Current: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held **on the second Tuesday of every month**.

Proposed: C. Board Meetings. The purpose of the Board Meeting is to conduct the business of the MVCC and to plan future meetings. Board meetings shall be held monthly.

Approved on consent.

vii. Motion to correct misspelling of "funding" in Article IX (FINANCES).

Current: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum **finding** allocation requirements.

Proposed: A. The Board shall review its fiscal budget and make adjustments as needed to comply with City laws and City administrative rules, and to keep in compliance with Generally Accepted Accounting Principles and the City's mandate for the use of standardized budget and minimum funding allocation requirements.

Approved on consent.

viii. Motion to amend Article X (ELECTIONS) Section 3 (MINIMUM VOTING AGE) to comply with DONE mandate.

Current: Only Stakeholders **eighteen (18)** years or older may vote for the election of Director

Proposed: Only Stakeholders sixteen (16) years or older may vote for the election of Director

Not approved.

ix. Motion to amend Article X (ELECTIONS) Section 3 (OTHER ELECTION RELATED LANGUAGE) Item D to permit all eligible voters to be candidates.

Current: D. Candidates must eighteen (18) years of age or older.

Proposed:. Candidates must sixteen (16) years of age or older.

Not approved.

x. Motion to change Article XII (PARLIAMENTARY AUTHORITY) from Roberts Rules of Order to Rosenberg's Rules of Order.

Current: Board Meetings are open to the public and shall be conducted in accordance with the provisions of the California Brown Act. The MVCC shall use Robert's Rules of Order, as revised. Additional rules and/or policies and procedures regarding the conduct of the meetings may be developed and adopted by the Board and those would be found in MVCC Standing Rules.

Proposed: Board Meetings are open to the public and shall be conducted in accordance with the provisions of the California Brown Act. The MVCC shall use Rosenberg's Rules of Order. Additional rules and/or policies and procedures regarding the conduct of the meetings may be developed and adopted by the Board and those would be found in MVCC Standing Rules.

https://www.cacities.org/Resources/Open-Government/RosenbergText_2011.aspx

Approved on consent.

xi. Motion to amend Attachment A (GOVERNING BOARD STRUCTURE AND VOTING) to conform to items iii, ix and x above.

Motion to amend: remove changes to number of directors. Motion approved as amended: 9 ayes, 3 nays.

Motion to approve as amended carried:

BOARD POSITION	# OF SEATS	ELECTED OR APPOINTED?	ELIGIBILITY TO RUN FOR THE SEAT	ELIGIBILITY TO VOTE FOR THE SEAT
Zone Directors (Zones 1- **6** 7) Term: 2 Years	**6** 7	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone and w h o obtain signatures in support of his/her candidacy from 20 MVCC Stakeholders eligible to vote for the candidate.	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone.
At-Large Directors Term: 2 Years	**6** 5	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC and obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC.
Community Director Term: 2 Years	1	Elected	Stakeholders **18** 16 years or older who live, work or own property in the neighborhood and also community interest stakeholders who obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older.

As amended:

BOARD POSITION	# OF SEATS	ELECTED OR APPOINTED?	ELIGIBILITY TO RUN FOR THE SEAT	ELIGIBILITY TO VOTE FOR THE SEAT
Zone Directors (Zones 1- **6**) Term: 2 Years	**6**	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone and w h o obtain signatures in support of his/her candidacy from 20 MVCC Stakeholders eligible to vote for the candidate.	Stakeholders **18** 16 years or older who live, work or own property within the stated geographic boundaries of a Zone.
At-Large Directors Term: 2 Years	**6**	Elected	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC and obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older who live, work or own property within the stated boundaries of the MVCC.
Community Director Term: 2 Years	1	Elected	Stakeholders **18** 16 years or older who live, work or own property in the neighborhood and also community interest stakeholders who obtain 20 signatures of MVCC Stakeholders to support his/her candidacy.	Stakeholders **18** 16 years or older.

b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

Mar Vista Meetup May 21, 10-1:00. Hoping all committees, board member will come. Will have Neighborhood Asssociations, community organizations.

c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

d. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Department of Transportation artist coming to next meeting.

e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Meeting night for next meeting changed to Monday, April 17.

f. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Growing opportunities to serve our community.

g. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

April 26 is hearing on 3246 Barrington small lot subdivision.

3230/38 Barrington: Planning didn't' approve, needs more info about sanitation access.

12444 Venice hearing April 26, 11:30 a.m.

Granny Flat forum on May 4.

Palms & Centinela property: Owner told Bill Koontz he has plans all made up.

i. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Idea: Zone directors need to adopt a street, note any major sidewalk repairs.

Sarah Auerswald: need to come up with framework.

j. **Bicycle Committee** - Mitchell Rishe, Chair

k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Possibility can reinvent and activate Green Garden Showcase in 2018. Maggie Begley inspired by it, redid her garden.

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Next meeting May 2. Beginning stages of looking at Mar Vista Art Walks on Saturday to increase participation.

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Regular meeting date and time: 1st Saturday at 6:00 p.m.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

Slowly making progress on knowing cost of refurbishment.

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Thanks for sidewalk fix.

b. Zone 2 – Damien Newton

Concerns about airport & homelessness. Working with council office on providing Bike Rodeos for schools.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

Pedestrian crossways work has started.

e. Zone 5 – Michelle Krupkin

DWP may replace a power pole at McLaughlin & Venice that's leaning.

Grab & Go opening in old Earl's Gourmet Grub.

f. Zone 6 – Holly Tilson

RV emptied waste on Stewart Ave.

Sherri Akers: Seeing a lot more RVs parked throughout neighborhood; need places within neighborhood to dump. Joseph Galloway: City hasn't come up with plan.

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 12.a-w on consent.

Sherri Akers: pull n

Sarah Auerswald: pull d

Damien Newton: pull r & w

Ken Alpern: pull u

Holly Tilson: pull k & v

Melissa Stoller: pull t

Motion to approve Items 12.a-c, e-j, l-m, o-q and s on consent by Sherri Akers, 2nd by Ken Alpern. Motion carried unanimously (Susan Klos absent).

a. **FUNDING MOTION:** Meeting Equipment (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $1500 for meeting equipment, including a public adderss and time-keeping systems

   Approved on consent.

b. **FUNDING MOTION:** Name Badges (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $200 for name badges for board members and committee chairs.

   Approved on consent.

c. **FUNDING MOTION:** Planning Retreat (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $500 for a planning retreat room rental, food and materials.

   Approved on consent.

d. **FUNDING MOTION:** Community Giveaways (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of an additional $1000 for community giveaways, for a total of up to $2000.

   Friendly amendment by Sarah Auerswald to change "community giveaways" to "outreach material", 2nd by Ken Alpern.

   Motion as amended carried unanimously.

e. **FUNDING MOTION:** Mar Vista Meetup (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of an additional $1000 for Mar Vista Meetup to purchases lunch for presenters/volunteers, for a total of up to $2500.

   Approved on consent.

f. **FUNDING MOTION:** Outreach for Community Partners (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $2000 for promotional outreach materials for critical community partners.

   Approved on consent.

g. **FUNDING MOTION:** Domain Name (submitted by Executive and Finance Committee)

   MVCC approves the expenditure $200 to renew marvista.org domain name for 10 years.

   Approved on consent.

h. **FUNDING MOTION:** Website Data Entry (submitted by Executive and Finance Committee)

   Expenditure of an additional $2500 for website data entry, for a total of $3500.

   Approved on consent.

i. **FUNDING MOTION:** Mar Vista Turns 90 outreach materials (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $1000 for Mar Vista turns 90 Celebration/Fire Station 62 outreach materials.

   Approved on consent.

j. **FUNDING MOTION:** Bike Repair Stand (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $1700 for community bike repair stand replacement.

   Approved on consent.

k. **FUNDING MOTION:** Treasurer Supplies (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $150 for printer ink and paper used in performance of MVCC treasurer tasks.

   Motion to approve by Ken, 2nd by Sherri.

Motion carried: 1 abstention (Holly)

l. **FUNDING MOTION:** MVCC Banners (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $500 for MVCC banners for Mar Vista Recreation Center and Fire Station 62.

Approved on consent.

M1. **FUNDING MOTION:** AIP Banner (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $150 for Aging In Place Committee banner.

Approved on consent.

M2. **FUNDING MOTION:** Meeting Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of an additional $45 for Elections & Bylaws/Executive & Finance committees meeting room rental at Coffee Connection to cover increase from $25 to $40.

Approved on consent.

n. **FUNDING MOTION:** Alley Paving (submitted by Transportation & Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd.,

Whereas, the MVCC supports a Matching Budgetary Motion of up to $2500 for repairing the alleys on the northern side of Venice to best serve that commercial corridor,

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

Ken: motion to table, 2nd by Joseph. Unaniously

o. **FUNDING MOTION**: CERT Training (submitted by Committee on Public Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1500.00 for the purpose of securing venue(s) to conduct C.E.R.T. training for members of the community.

Approved on consent.

p. **FUNDING MOTION**: Neighborhood Watch Signs (submitted by Committee on Public Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1500.00 for the purchase of neighborhood watch signs for the community.

Approved on consent.

q. **FUNDING MOTION**: Meeting Room Rental (submitted by Airport Committee)

Request that the MVCC approves the expenditure of $25 a month to Saint Andrew's Lutheran Church for room rental for the monthly MVCC Airport Committee Meetings; first Saturday of each month, 6-7 PM. Three meetings this fiscal year: Saturday, April 01, 2017 - Saturday, May 06, 2017 - Saturday, June 03, 2017.

Approved on consent.

r. **FUNDING MOTION**: Meeting Room Rental (submitted by Transportation & Infrastructure Committee)

Whereas the MVCC Transportation & Infrastructure Committee needs to meet, and

Whereas the Coffee Connection provides a meeting place at the cost of $1.00 per person for a meeting room,

Therefore the MVCC Transportation & Infrastructure Committee supports the payment of the $4.00 meeting room fee to Coffee Connection.

Motion carried unanimously (Susan Klos absent).

s. **POLICY MOTION**: Alley Repair (submitted by Transportation & Infrastructure Committee)

Whereas, the alleys serving entire blocks of Mar Vista residents are in need of repair, and,

Whereas, the rainstorms of this current winter 2016-2017 have exacerbated the breakdown of these alleys, and

Whereas, the recent asphalt blitz is unlikely to make a significant impact on the number of significant and dangerous potholes and navigable portions of these alleys,

Whereas the MVCC therefore requests that the alleys within the neighborhoods of Mar Vista and Westside Village receive a particular focus and fast-tracking to repair and/or replace the portions in need of such service over the next 3-6 months,

Therefore the MVCC requests a monthly update from the CD11 and CD5 offices on alley repairs to that end.

Approved on consent.

t. **POLICY MOTION**: Speed Trailer (submitted by Transportation & Infrastructure Committee)

Whereas the MVCC Speed Trailer is in need of repair or placement, Therefore the MVCC Supports the Cost-Effective Budgeting of the replacement and purchase of a new MVCC Speed Trailer.

Motion to table by Joseph Galloway, 2nd by Greg Tedesco.

Motion to table carried: 5 ayes, 3 nays, 1 abstention (Michelle Krupkin), 1 absent (Susan Klos)

u. **POLICY MOTION**: Mobility and Safety of Expo Hub intersections (submitted by Transportation & Infrastructure Committee)

Whereas the MVCC supports all CD11, CD5 and LADOT efforts to promote mobility and safety for Expo Line intersections,

Therefore, the MVCC calls on the LADOT and Metro to report on actual rush-hour wait times for cars to cross the at-grade Expo Line intersections on Overland, Westwood, and Barrington Blvds.

Motion to approve by Ken Alpern, 2nd by Sherri Akers.

Bill Koontz: Likes.

Robin Doyno: A grade crossing is a civic failure.

Motion to carried: 8 ayes, 1 abstention (Joseph Galloway), 1 absent (Susan Klos)

v. **POLICY MOTION**: LAMP Support (submitted by Transportation & Infrastructure and Airport Committees)

WHEREAS, Los Angeles International Airport (LAX) is the second busiest airport in the United States and the largest in California; and

WHEREAS, our community depends on LAX for the trade, travel and tourism that it brings to our area and the larger Southern California region.

WHEREAS, since the start of the economic recovery in 2009, air service demand at LAX has increased from 56 million annual passengers to 80 million annual passengers in 2016, and Los Angeles is seeking to host the 2024 Olympics, and

WHEREAS due to the increase in air services, LAX is experiencing heavy traffic congestion in and around the airport; and

WHEREAS, on regular days up to 95,000 vehicles enter Los Angeles International Airport's 3 Central Terminal Area increasing to 120,000 during the peak Thanksgiving Holiday period; and

WHEREAS, almost half of the vehicles are buses, shuttles and vans from rental car companies, hotels and shared-ride companies along with taxis who are also competing for the limited space on the streets and curbs in the CTA; and

WHEREAS, 23 different rental car lots scattered around the airport area add to this problem; and

WHEREAS, to resolve this problem Los Angeles is proposing to spend $5.5 billion on the Landside Access Modernization Program, or "LAMP," and

WHEREAS, LAMP will consist of 6-million square foot Consolidated Rental Car Facility (CONRAC), two 3-million square foot Intermodal Transportation Facilities (IFTs) or transit hubs, a 2 ¼ mile Automated People Mover (APM) connecting the CONRAC, ITFS and a new light rail station to the airport, and related roadway improvements and property development; and

WHEREAS, LAMP will relieve traffic congestion within the Central Terminal Area (CTA) and the surrounding street network, improve the LAX passenger experience and keep LAX as the international gateway for the West Coast;

THEREFORE BE IT RESOLVED THAT the MVCC states its support for the Landside Access Modernization Program at Los Angeles International Airport and directs that a letter of support be sent to the operator of the airport, Los Angeles World Airports urging that the Los Angeles City Planning Commission, Los Angeles County Airport Land Use Commission and the Los Angeles City Council approve this project.

Motion tabled. Send

Motion to table and send back to Airport and T&I committees by Sarah Auerswald, 2nd by Ken Alpern.

Motion carried unanimously.

w. **POLICY MOTION**: Vision Zero Support (submitted by Great Streets Ad Hoc Committee)

WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation engineers, police officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and

WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short) to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

Motion to approve by Michelle Krupkin, 2nd by Sherri Akers.

Motion to carried: 8 ayes, 1 abstention (Damien Newton), 1 absent (Susan Klos)

13. **Grievances**, if any, received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

Meeting adjourned at 9:20 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

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upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

***** ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday May 9th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of April 11th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald
8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota
b. First Vice Chair – Sarah Auerswald
c. Second Vice Chair – Joseph Galloway
d. Secretary – Melissa Stoller
e. Treasurer – Holly Tilson
    i. Report on current financial status
        1. February bank statement
        2. Pending/approved expenditures and anticipated budget surpluses
        3. Funding deadlines:
            - June 1, 2017 - Last day to submit a Funding Request Form (FRF) to Funding Program
            - June 7, 2017 - Last day to issue a Union Bank Account online check payment
            - June 11, 2017 - Last day to use the NC Bank Card
    ii. **APPROVAL** of April Monthly Expense Report (MER)

9. Committee Reports: (may include motions to refer committee where desirable; public comment permitted)

l. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
d. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
f. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
g. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
i. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
j. **Bicycle Committee** - Mitchell Rishe, Chair
k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-w on consent.

a. **ADMINISTRATIVE MOTION:** MVCC Election Timing Resolution (submitted by Election and By-laws Committee)

   As the Los Angeles City Clerk's Office assumes control of elections for neighborhood councils and needs to adjust the timing of elections so they don't conflict with other elections, The Mar Vista Community Council supports proposed option 2 which extends the term of current board members by one year and conduct elections in 2019 thereby establishing a once every two year schedule. (2019, 2021, 2023...).

   The options not supported include: Option 1) Conduct 2018 NC elections as scheduled; Option 3) Conduct 2018 Neighborhood Council elections as scheduled and then conduct elections again in 2019 with all board members up for election at which time the entire board would be up and would have to re-stagger with 2 and 4 year terms; Option 4) OTHER

b. **FUNDING MOTION:** Parking Permit Replacement Fee (Director's motion submitted by Rob Kadota)

   MVCC approves the payment of a $40 replacement fee for a lost City Hall parking permit.

c. **FUNDING MOTION:** CERT Training (submitted by Executive and Finance Committee)

   MVCC approves the allocation of $1500 previously approved for securing a venue for CERT training to include refreshments and supplies as well.

d. **FUNDING MOTION:** MVNA Block Party (submitted by Executive and Finance Committee)

   MVCC approves the reimbursement of $300 of Mar Vista Neighborhood Association's block party expenses.

e. **FUNDING MOTION:** T&I Committee March Room Rental (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of $25 to Coffee Connection for the Transportation and Infrastructure Committee's March meeting.

f. **FUNDING MOTION:** T&I Committee May-June Room Rental (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of $75 to Coffee Connection for the Transportation and Infrastructure Committee's April, May and June meetings.

g. **FUNDING MOTION:** ExFin/Elections and By-laws Committee April-June Room Rental (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of $75 to Coffee Connection for the Executive and Finance and Elections and By-laws Committees' April, May and June meetings.

h. **FUNDING MOTION:** Farmers' Market Storage (Directors motion submitted by Sarah Auerswald)

   MVCC approves the payment of $1000 for the annual storage fee for the Blue & Green Tents at the Mar Vista Farmers' Market.

i. **FUNDING MOTION:** Website Data Entry (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of $1500 to The Web Corner for website data entry.

j. **FUNDING MOTION:** MVCC Promotional Outreach Materials (submitted by Executive and Finance Committee)

   MVCC approves the expenditure of up to $2500 for promotional outreach materials.

k. **FUNDING MOTION:** Mar Vista Turns 90 Promotional Materials (submitted by Executive and Finance Committee)

   MVCC approves the allocation of up to $2500 to Mar Vista Landkeepers for creation of a keepsake and a community directory in celebration and honor of Mar Vista Turns 90.

l. **FUNDING MOTION:** Safe Cycling/Vision Zero Outreach Materials (submitted by Bike Mar Vista Committee)

   Purchase of safe cycling/vision zero outreach materials not to exceed $1500 for items like flat tire patch kits, reflective pant leg straps, front and rear cycling lights, safe cycling bandana, reflective bike mar vista sharing the road stickers.

m. **FUNDING MOTION:** Neighborhood Congress (submitted by Executive and Finance Committee)

MVCC approves the allocation of up to $2000 to support the 2017 Congress of Neighborhoods.

n. **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

o. **POLICY MOTION**: 3246 Barrington Small Lot Subdivision (submitted by Planning and Land Use Management Committee)

Whereas Whereas a small lot subdivision is proposed for 3246 Barrington Ave; and

Whereas the proposed subdivision has 5 units and the Mar Vista Community Council has supported four units per lot along the same corridor; and

Whereas the current proposal has only one parking space for guests and two per unit, for eleven spaces total;

The Mar Vista Community Council opposes the small lot subdivision as it is currently proposed because we believe the project has too many units and that there is not sufficient parking for guests.

p. **POLICY MOTION**: Alley in 3200 block of Barrington Ave. (submitted by Planning and Land Use Management Committee)

Whereas there are multiple small lot subdivisions proposed for the 3200 block of Barrington avenue on the east side; and

Whereas access to these units will be from the alley that runs behind the properties; and

Whereas currently the alley is unevenly paved with several large potholes; and

Whereas the developers for these projects are committing to improving portions of the alley but there is no plan to fix the entire length; and

Whereas the entrance to the alley on the south end is regularly used by students and families walking to and from Mar Vista Elementary; and

Whereas there is no plan to calm traffic through design or signage for the alley;

The Mar Vista Community Council asks the City of Los Angeles to prepare a comprehensive plan for the alley to improve the experience for people using the alley to get to/from their residences and creates a safe environment for people crossing the alley entrance on foot, bike, or car.

q. **POLICY MOTION**: Planning Bulletins (submitted by WRAC via Planning and Land Use Management Committee)

The Mar Vista Community Council requests that City Council Districts 5 and 11 prepare regular email planning bulletins that compile current land use issues, including citywide policy issues, current hearing dates, and details about Westside developments being considered by the City

r. **POLICY MOTION:** Cell Towers (submitted by Transportation and Infrastructure Committee)

Whereas T-Mobile proposing to install 1) above ground facility at each of the following two locations: 1) West of S. Grand View Blvd, North of Dewey Street and 2) 1220 Palms Blvd. (South of Palms West of Grand View Blvd.), and

Whereas the proposed above ground facilities will consist of (1) 48” tall x 12” wide x 9.5” deep power meter pedestal to be located in the public right of way, not on private property, and

Whereas T-Mobile has statewide franchise rights under California Public Utilities Code Sections 7901 and 7901.1, which allow placement of equipment in the public right-of-way by a utility company,

Therefore, the MVCC supports the installation of the above mentioned above ground facilities provided it fits the character of the adjacent neighborhoods.

s. **POLICY MOTION:** Preservation of the LAX-Union Station Rail Right of Way for Passenger Rail (submitted by Transportation and Infrastructure Committee)

WHEREAS, the MVCC supports a countywide approach to rail, bicycle, and pedestrian transportation networks, and

WHEREAS, the MVCC supports preservation and optimized land use of rail right of ways for long-term rail projects (such as that which allowed the Expo, Green, and Crenshaw/LAX light rail lines to expand Metro Rail to the Westside, Mid-City, and South Bay regions of Los Angeles County), and

WHEREAS, the Harbor Subdivision Rail Right of Way connects LAX to the Crenshaw/LAX Light Rail Line, the Blue Line, the Gold Line, and Union Station, and

WHEREAS, the regions of South Los Angeles, Southeast Downtown Los Angeles (including the Arts District), and the Eastside have insufficient to no direct rail connectivity with each other and both Union Station and LAX, and

WHEREAS, a rail line connecting LAX directly to Union Station with a one-seat trip has fundamental and vital importance to the economic well-being of Los Angeles, and could serve as a Second Downtown Light Rail Connector with relevant benefits to the entirety of Los Angeles County, and

WHEREAS, the Expo Line has already shown that a rail right of way could both establish a light rail line and an adjacent bikeway to serve multimodal commuting needs,

THEREFORE, the MVCC strongly opposes ANY Rail to River Corridor Project that precludes a light rail line, and

THEREFORE, the MVCC strongly supports the "Expo Line Model" of BOTH a light rail line and accompanying Bikeway to connect Inglewood to the Los Angeles River, and

THEREFORE, the MVCC strongly supports any purchase of land by Metro to allow for a widened right of way to enable such a combined light rail and bikeway project, and

THEREFORE, the MVCC strongly supports a Major Investment Study by Metro to create a direct LAX to Union Station light rail project that is not prevented by the current Rail to River walk/bikeway project.

t. **POLICY MOTION:** Support for Landside Access Modernization (LAMP) Program (submitted by Airport Committee – pending committee approval)

WHEREAS, Los Angeles International Airport (LAX) is the second busiest airport in the United States and the largest in California; and

WHEREAS, our community depends on LAX for the trade, travel and tourism that it brings to our area and the larger Southern California region; and

WHEREAS, since the start of the economic recovery in 2009, air service demand at LAX has increased from 56 million annual passengers to 80 million annual passengers in 2016, and Los Angeles is seeking to host the 2024 Olympics; and

WHEREAS due to the increase in air services, LAX is experiencing heavy traffic congestion in and around the airport; and

WHEREAS, on regular days up to 95,000 vehicles enter Los Angeles International Airport's Central Terminal Area increasing to 120,000 during the peak Thanksgiving Holiday period; and

WHEREAS, almost half of the vehicles are buses, shuttles and vans from rental car companies, hotels and shared-ride companies along with taxis who are also competing for the limited space on the streets and curbs in the CTA; and

WHEREAS, 23 different rental car lots scattered around the airport area add to this problem; and WHEREAS, to resolve this problem Los Angeles is proposing to spend $5.5 billion on the Landside Access Modernization Program, or "LAMP," and

WHEREAS, LAMP will consist of 6-million square foot Consolidated Rental Car Facility (CONRAC), two 3-million square foot Intermodal Transportation Facilities (IFTs) or transit hubs, a 2 . mile Automated People Mover (APM) connecting the CONRAC, ITFS and a new light rail station to the airport, and related roadway improvements and property development; and

WHEREAS, LAMP will relieve traffic congestion within the Central Terminal Area (CTA) and the surrounding street network, improve the LAX passenger experience and keep LAX as the international gateway for the West Coast;

NOW THEREFORE BE IT RESOLVED, that the MVCC Airport Committee and the MVCC Planning and Land Use Management Committee jointly recommend that the MVCC send a letter of support for the Landside Access Modernization Program at Los Angeles International Airport as presented to us be sent to the operator of the airport, Los Angeles World Airports with the addition of the four following recommendations:

1. Improve automated people mover service convenience to drop people closer to check in and gates;
2. Implement traffic mitigations promptly, including improved flyaway service and employee bus services for the LAX 50,000 employees;
3. Support regional network of airport solutions to make travel at other airports desirable for those living and working far from LAX in other parts of the Southern CA region
4. Arrange for increased police and fire support for the area as more people are concentrated in and around LAX.

u. **POLICY MOTION:** Santa Monica Airport Runway Shortening Options (submitted by Airport Committee – pending committee approval)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, as immediate neighbors of the Santa Monica Airport, Mar Vista residents are impacted daily by the nuisances and serious health hazards created by the airport: air pollution; noise pollution; safety risks, among others. For this reason, years ago the Mar Vista Community Council ('MVCC") formed a committee to address the concerns of its residents and to monitor activities at and about the airport;

WHEREAS, Los Angeles City Council District 11 borders Santa Monica Airport (SMO) to the south and to the east, including an almost sixteen acre portion of the east end of SMO within the City of Los Angeles CD 11;and

WHEREAS, the CD 11 neighborhoods of Mar Vista, Venice, and other West Los Angeles neighborhoods, as well as Council District 5 (CD 5) neighborhoods of Rancho Park, Cheviot Hills, and other West Los Angeles neighborhoods within CD5 are all uniquely impacted by nuisances, and serious safety/public health concerns created by SMO operations;

WHEREAS, the City of Santa Monica is now considering various design concepts to shorten the runway to 3,500 feet of operational length from the current 4,937 feet.

WHEREAS, several peer reviewed scientific monitoring air quality studies (*Aircraft Emission Impacts in a Neighborhood Adjacent to a General Aviation Airport in Southern California* September, 2009; *Neighborhood-scale air quality impacts of emissions from motor vehicles and aircraft*, July, 2013; *A Supplemental Monitoring Campaign at the Santa Monica Airport, April, 2011*) have all measured highly elevated air pollutant levels in MVCC's Zone 2 created by Santa Monica Airport's aircraft operations;

WHEREAS, the studies all give cause for concern for the public health of the downwind of SMO residents;

BE IT RESOLVED THAT the MVCC requests and supports efforts by the Los Angeles City Council to require SMO's eastern end of the runway be shortened by at least 1,000 feet to help offset years of exposure to toxic air emissions from aircraft idle and blast.

BE IT FURTHER RESOLVED THAT the MVCC requests the Los Angeles City Council to request that the FAA alter SMO's and LAX's conflicted flight paths to eliminate unnecessary idle/hold times by aircraft at both SMO and LAX.

BE IT FURTHER RESOLVED THAT the MVCC notify Councilmember Mike Bonin and Councilmember Paul Koretz of the urgency and timeliness to lead a strong effort along with the City of Los Angeles Mayor and the Los Angeles City Attorney on behalf of Los Angeles District 11 and District 5 constituents in order to assure that SMO impacts are unjustly burdensome to the City of Los Angeles.

12. **Grievances**, if any received

13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

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* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday May 9th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:01. P.M.

   Quorum present: Rob Kadota, Susan Klos, Robin Doyno, Sarah Auerswald, Holly Tilson, Greg Tedesco, Sherri Akers, Melissa Stoller, Michelle Krupkin, Ken Alpern, Damien Newton, Paola Cervantes

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Approval of April 11th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.

   Motion to approve by Melissa Stoller, 2nd by Sarah Auerswald. Motion carried: 8 ayes, 0 nays, 0 abstentions, 3 absent (Ken Alpern, Michelle Krupkin, Damien Newton)

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Sheila Ginsberg: Concerned about bikes on Venice Blvd. – not following rules, not stopping at corners. Went to Police, they're concerned also. On Palms, two lanes merge into one and middle not used; dangerous.

   Robin Doyno: Has brought school board race lawn signs.

   Ileana Whachtel: Post Measure S, group is forming organization to keep city hall transparenent. City said it's forming task force around transit, but is only holding one public meeting. Want to let community know what they say they're going to do and what they do.

5. **Community Memorial Observations**

   Hope that businesses on Centinela recover soon from fire.

6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org

   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Work on Venice Great Streets. Timeline: continuing to do outreach along corridor and 1 block north and Ssouth. Work (mid-block crossings & protected bike lanes) should be complete by end of May.

      Bike with Mike Saturday May 20. Starts at Westchester Municipal Building.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep not assigned.

   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams brian@trustedmessengermarketing.com.

      Brian Ross Edwards is newly assigned rep. Doing Crenshaw Health Fest in June. Also recognizing 40 emerging civic leaders under 40.

   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

Will be coming to every meeting.

7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

      Next meeting is May 17; Agenda closes May 10. Next meeting after that is July 19.

   b. DWP MOU: Chuck Ray

      Meeting is 1st Saturday of every month.

      January meeting. Community Solar Plan: program addresses problem of people who want solar but can't afford it. DWP would install and rent use of. Funded with $20,000. Will cost DWP 50-75 cents per kilowatt hour.

      February meeting. DWP presentation about how they set rates. Thanks to Rate Payer Advocate Dr. Pickle, they now have logical way of setting rates based on cost. More rational than has been in last few decades but rates will still go up.

      March meeting. EV charger program: Goal is 145000 electric vehicles on road in next 5 years. City would own 1600. Public use charger goal is 10,000 available in 5 years.

   c. LANCC: Joseph Galloway

   d. One Water LA: Christopher McKinnon

      Meeting May 11, discussing mostly sanitation. End of May meeting will go over list of projects (DWP & Sanitation). Next big problem: how to fund the projects.

   e. WRAC: Rob Kadota/Joseph Galloway

   f. WRAC LUPC: Sharon Commins

   g. City Budget Advocates: Holly Tilson, Joseph Galloway

   h. Recode LA: Sharon Commins

   i. Animal Services: Tom Ponton

   j Fall Festival: Albert Olson

      Meets next week.

   k Friends of Historic FS 62: Albert Olson

      Roy Persinko reported. Have submitted numbers (about $800,000), ball is rolling. May go to vote in a little while. Was some vandalism – thowing paint on walls, other stupid stuff. Windows are now boarded up. Got pictures of some boys who were checking it out, trying to ID them.

   l. Mar Vista Celebrates 90: Open

   m. Mar Vista Chamber of Commerce: Sarah Auerswald

      Meets 3rd Thursday of month at Coffee Connection. Partnered with Venice Chamber for Merchants of Venice.

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota

      Term will end in June. Elections of officers at June meeting; opportunity to do reset.

      Has laminated signs to use at Windward to direct people to the conference room – can borrow.

   b. First Vice Chair – Sarah Auerswald

      Let her know if you want a marvista.com email address.

   c. Second Vice Chair – Joseph Galloway

   d. Secretary – Melissa Stoller

      Remember to send information for the Mar Vista news eblast that goes out each Friday.

      Will not be at the June meeting. Would be happy to answer questions about job of Secretary if anyone is interested.

   e. Treasurer – Holly Tilson

      i. Report on current financial status

1. February bank statement
2. Pending/approved expenditures and anticipated budget surpluses
3. Funding deadlines:
    - June 1, 2017 - Last day to submit a Funding Request Form (FRF) to Funding Program
    - June 7, 2017 - Last day to issue a Union Bank Account online check payment
    - June 11, 2017 - Last day to use the NC Bank Card

Trying to quickly spend all our money. A lot of pending expenses aren't going to happen or aren't going to use all the funding allocated.

ii. **APPROVAL** of April Monthly Expense Report (MER)

Motion to approve by Sarah Auerswald, 2nd by Michelle Krupkin. Motion carried unanimously.

9. Committee Reports: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

Submitted by-laws proposals before the May deadline. City Clerk is taking over of elections; need to change date so doesn't conflict with other elections.

b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

Mar Vista meeting – both Council members will have tables.

c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

Elliot has developed speaker series.

d. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Meeting May 10 will discuss the installation of the CD11 Pilot Program for Great Street Venice Blvd. including the mid block crossings, the protected bike lane and other projects.

e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Meets 3rd Thursday. May 18 speaker topic is "Cannabis for Medical Use," focused on seniors. Rob Kadota: Working on live streaming, looking on MyFi.

f. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Meets 3rd Wednesday. Next meeting: Strategy, implementing what community needs.

g. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Next meeting May 24: 2 housing projects in Zone 6. Will also discuss possible motion RE: ADUs (won't vote until July).

i. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Meets 4th Thursday. In discussion about bus shelters with LED lights, making Mar Vista pilot project.

j. **Bicycle Committee** - Mitchell Rishe, Chair

Farmers' Market hired Phil Fox to run repair stand: no parts tune-up. Walk or bike to school day is May 10. Bike to work day, May 18; Bikeowave running repair stand.

At Farmers' Market this Sunday, talking about safe cycling.

k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Collaborating with South Robertson for their Eco Car Expo – put in contact with cars we have.

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Marshall Wong – presentation on hate crimes.

Need volunteers for Art Walk. Lenore is tabling at Meetup Mar Vista.

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Meets 4th Saturday, 6-7 P.M.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

EXPO line crossing delays. Linda Guagliano: will bring up at Traffic Committee meeting.

b. Zone 2 – Damien Newton

NWNA is having Adrian Acosta & presentation on RING doorbell.

Repaving streets, negative feedback – seems to be in areas that get cut thru traffic, would like beatup streets to slow down traffic.

Charter school taking up part of Webster Middle School next year.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

MVNA block party is June 25.

e. Zone 5 – Michelle Krupkin

Took street services 2 weeks to pick up palm fronds that were blocking an ADA site.

Marcasel petition – attempting to close street at Washington Place.

f. Zone 6 – Holly Tilson

Fire in 3500 block commercial buildings;

Brouhaha: too tall buildings with inadequate parking; Venice HS modernization.

11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 12.a-u on consent.

Removal of items from consent calendar:

11.a by Melissa Stoller

11.j by Sarah Auerswald

11.k by Ken Alpern

11.n by Sarah Auerswald

11.o by Damien Newton

11.s by Ken Alpern

11.u by Holly Tilson

Motion to approve Items 11.b-i, 11.l-m, 11.p-r, and 11.t on consent by Greg Tedesco, 2nd by Sarah Auerswald. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION:** MVCC Election Timing Resolution (submitted by Election and By-laws Committee)

As the Los Angeles City Clerk's Office assumes control of elections for neighborhood councils and needs to adjust the timing of elections so they don't conflict with other elections, The Mar Vista Community Council supports proposed option 2 which extends the term of current board members by one year and conduct elections in 2019 thereby establishing a once every two year schedule. (2019, 2021, 2023...).

The options not supported include: Option 1) Conduct 2018 NC elections as scheduled; Option 3) Conduct 2018 Neighborhood Council elections as scheduled and then conduct elections again in 2019 with all board members up for election at which time the entire board would be up and would have to re-stagger with 2 and 4 year terms; Option 4) OTHER

Motion to approve by Sarah Auerswald, 2nd by Holly. Tilson

Public comment:

Jasmine Elbarbary: will be blanket decision, not separate decisions for different NCs.

Discussion:

Damien Newton: Doesn't believe in elected officials extending their terms.

Rob Kadota: Idea behind motion was to have less turmoil.

Robin Doyno: Supports spirit of Damien's comment, but this is for efficiency.

Sherri Akers: Financially, responsible thing to do is extend term. Need to be realistic: not everyone will be willing to extend their term.

Melissa: People ran for a two year term, not a three year term. Instead of extending term of current board to 2019, supports having election in 2018 for a three year term.

Greg Tedesco: Doesn't like to vote to extend term.

Michelle Krupkin: Echos Greg.

Ken Alpern: Would rather have extended term imposed on him than vote for it.

Motion carried: 7 ayes, 3 nays, 1 abstention (Greg Tedesco).

b. **FUNDING MOTION:** Parking Permit Replacement Fee (Director's motion submitted by Rob Kadota)

MVCC approves the payment of a $40 replacement fee for a lost City Hall parking permit.

Motion carried on consent.

c. **FUNDING MOTION:** CERT Training (submitted by Executive and Finance Committee)

MVCC approves the allocation of $1500 previously approved for securing a venue for CERT training to include refreshments and supplies as well.

Motion carried on consent.

d. **FUNDING MOTION:** MVNA Block Party (submitted by Executive and Finance Committee)

MVCC approves the reimbursement of $300 of Mar Vista Neighborhood Association's block party expenses.

Motion carried on consent.

e. **FUNDING MOTION:** T&I Committee March Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $25 to Coffee Connection for the Transportation and Infrastructure Committee's March meeting.

Motion carried on consent.

f. **FUNDING MOTION:** T&I Committee May-June Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $75 to Coffee Connection for the Transportation and Infrastructure Committee's April, May and June meetings.

Motion carried on consent.

g. **FUNDING MOTION:** ExFin/Elections and By-laws Committee April-June Room Rental (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $75 to Coffee Connection for the Executive and Finance and Elections and By-laws Committees' April, May and June meetings.

Motion carried on consent.

h. **FUNDING MOTION:** Farmers' Market Storage (Directors motion submitted by Sarah Auerswald)

MVCC approves the payment of $1000 for the annual storage fee for the Blue & Green Tents at the Mar Vista Farmers' Market.

Motion carried on consent.

i. **FUNDING MOTION:** Website Data Entry (submitted by Executive and Finance Committee)

MVCC approves the expenditure of $1500 to The Web Corner for website data entry.

Motion carried on consent.

j. **FUNDING MOTION:** MVCC Promotional Outreach Materials (submitted by Executive and Finance Committee)

MVCC approves the expenditure of up to $~~2500~~*2000* for promotional outreach materials.

Motion to approve by Sarah Auerswald, 2nd by Melissa Stoller.

Friendly amendment by Sarah Auerswald changing amount to $2000 accepted.

Motion as amended carried unanimously.

k. **FUNDING MOTION:** Mar Vista Turns 90 Promotional Materials (submitted by Executive and Finance Committee)

MVCC approves the allocation of up to $~~2500~~*2000* to Mar Vista Landkeepers for creation of a keepsake and a community directory in celebration and honor of Mar Vista Turns 90.

Motion to approve by Melissa Stoller, 2nd by Damien Newton.

Friendly amendment by Sarah Auerswald changing amount to $2000 accepted.

Public Comment

> Christopher McKinnon: $4,100 left over from Mar Vista turns 80. No consensus on spending the money. Opposes motion until the $4100 is spent.

Motion as amended carried: 10 ayes, 0 nays, 1 abstentions (Greg Tedesco).

l. **FUNDING MOTION:** Safe Cycling/Vision Zero Outreach Materials (submitted by Bike Mar Vista Committee)

Purchase of safe cycling/vision zero outreach materials not to exceed $1500 for items like flat tire patch kits, reflective pant leg straps, front and rear cycling lights, safe cycling bandana, reflective bike mar vista sharing the road stickers.

Motion carried on consent.

m. **FUNDING MOTION:** Neighborhood Congress (submitted by Executive and Finance Committee)

MVCC approves the allocation of up to $2000 to support the 2017 Congress of Neighborhoods.

Motion carried on consent.

n. **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

Motion tabled.

o. **POLICY MOTION**: 3246 Barrington Small Lot Subdivision (submitted by Planning and Land Use Management Committee)

Whereas a small lot subdivision is proposed for 3246 Barrington Ave; and

Whereas the proposed subdivision has 5 units and the Mar Vista Community Council has supported four units per lot along the same corridor; and

Whereas the current proposal has only one parking space for guests and two per unit, for eleven spaces total;

The Mar Vista Community Council opposes the small lot subdivision as it is currently proposed because we believe the project has too many units and that there is not sufficient parking for guests.

Motion to approve by Damien Newton, 2nd by Sarah Auerswald.

Developer: Christine Lan?

Presented at PLUM, also talked to neighbors. Project goal: from street, maintain same view as single family homes in neighborhood.

2 car garages, 1 guest parking spot.

Concern expressed by neighbor behind about roof deck. Moved roof deck further from edge and put up higher solid wall.

5 unit small lot subdivision; could get 11 apartment units on site.

Public comment:

Have you considered adding more guest parking? Ans: Not able to find way to do.

David Altemus: Lives on Barry Ave. Favors project. Concerned about parking. Wouldn't want to buy something with one guest parking spot for 5 homes. Alley is in very poor condition. Students passing from east must cross alley; alley has S turn, is blind. Developer: will repave full width of alley behind the property (only required to do half).

Where does garbage go? Ans: Individual behind homes.

Traffic on Barrington is already relentless. We approved 4 units, 5 sets new precedent. Need more parking.

Board Discussion:

Melissa: Complements developer on the design and the way it blends in; hopes it will inspire other developers. Wishes could support this development but can't. Issues are parking and number of units.

Ken Alpern: Thank you for neighborhood preservation. What income range do you plan to promote? Ans: Market rate. Ken: If only 4 units can sell each for more (more sq. ft.).

Michelle Krupkin: echos Ken's concerns about parking, school accessibility.

Greg Tedesco: Thank you for keeping height down. Whether 4 units or 5, people will have to park in garage or take a long walk.

Holly Tilson: Thanks developer for speaking with neighbors. Why not put in green screening in back? Ans: not a lot of room.

Sherri Akers: Struggles with this development. Appreciates concessions. Worries about too much of community converting to Small Lot Subdivisions; they're not well suited to seniors or families with small children. Need to become better at using our garages for parking.

Motion carried: 6 ayes, 4 nays, 1 abstention (Damien Newton). See Attachment A: Minority Report.

p. **POLICY MOTION**: Alley in 3200 block of Barrington Ave. (submitted by Planning and Land Use Management Committee)

Whereas there are multiple small lot subdivisions proposed for the 3200 block of Barrington avenue on the east side; and

Whereas access to these units will be from the alley that runs behind the properties; and

Whereas currently the alley is unevenly paved with several large potholes; and

Whereas the developers for these projects are committing to improving portions of the alley but there is no plan to fix the entire length; and

Whereas the entrance to the alley on the south end is regularly used by students and families walking to and from Mar Vista Elementary; and

Whereas there is no plan to calm traffic through design or signage for the alley;

The Mar Vista Community Council asks the City of Los Angeles to prepare a comprehensive plan for the alley to improve the experience for people using the alley to get to/from their residences and creates a safe environment for people crossing the alley entrance on foot, bike, or car.

Motion carried on consent.

q. **POLICY MOTION**: Planning Bulletins (submitted by WRAC via Planning and Land Use Management Committee)

The Mar Vista Community Council requests that City Council Districts 5 and 11 prepare regular email planning bulletins that compile current land use issues, including citywide policy issues, current hearing dates, and details about Westside developments being considered by the City

Motion carried on consent.

r. **POLICY MOTION:** Cell Towers (submitted by Transportation and Infrastructure Committee)

Whereas T-Mobile proposing to install 1) above ground facility at each of the following two locations: 1) West o9. **Election of New Board Officers** – Rob Kadota – move to end of new business

a. Chair

b. 1st Vice Chair

c. 2nd Vice Chair

d. Secretary

e. Treasurer

f S. Grand View Blvd, North of Dewey Street and 2) 1220 Palms Blvd. (South of Palms West of Grand View Blvd.), and

Whereas the proposed above ground facilities will consist of (1) 48" tall x 12" wide x 9.5" deep power meter pedestal to be located in the public right of way, not on private property, and

Whereas T-Mobile has statewide franchise rights under California Public Utilities Code Sections 7901 and 7901.1, which allow placement of equipment in the public right-of-way by a utility company,

Therefore, the MVCC supports the installation of the above mentioned above ground facilities provided it fits the character of the adjacent neighborhoods.

Motion carried on consent.

s. **POLICY MOTION:** Preservation of the LAX-Union Station Rail Right of Way for Passenger Rail (submitted by Transportation and Infrastructure Committee)

WHEREAS, the MVCC supports a countywide approach to rail, bicycle, and pedestrian transportation networks, and

WHEREAS, the MVCC supports preservation and optimized land use of rail right of ways for long-term rail projects (such as that which allowed the Expo, Green, and Crenshaw/LAX light rail lines to expand Metro Rail to the Westside, Mid-City, and South Bay regions of Los Angeles County), and

WHEREAS, the Harbor Subdivision Rail Right of Way connects LAX to the Crenshaw/LAX Light Rail Line, the Blue Line, the Gold Line, and Union Station, and

WHEREAS, the regions of South Los Angeles, Southeast Downtown Los Angeles (including the Arts District), and the Eastside have insufficient to no direct rail connectivity with each other and both Union Station and LAX, and

WHEREAS, a rail line connecting LAX directly to Union Station with a one-seat trip has fundamental and vital importance to the economic well-being of Los Angeles, and could serve as a Second Downtown Light Rail Connector with relevant benefits to the entirety of Los Angeles County, and

WHEREAS, the Expo Line has already shown that a rail right of way could both establish a light rail line and an adjacent bikeway to serve multimodal commuting needs,

THEREFORE, the MVCC strongly opposes ANY Rail to River Corridor Project that precludes a light rail line, and

THEREFORE, the MVCC strongly supports the "Expo Line Model" of BOTH a light rail line and accompanying Bikeway to connect Inglewood to the Los Angeles River, and

THEREFORE, the MVCC strongly supports any purchase of land by Metro to allow for a widened right of way to enable such a combined light rail and bikeway project, and

THEREFORE, the MVCC strongly supports a Major Investment Study by Metro to create a direct LAX to Union Station light rail project that is not prevented by the current Rail to River walk/bikeway project.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Motion carried: 10 ayes, 0 nays, 1 abstention (Damien Newton).

t. **POLICY MOTION:** Support for Landside Access Modernization (LAMP) Program (submitted by Airport Committee – pending committee approval)

WHEREAS, Los Angeles International Airport (LAX) is the second busiest airport in the United States and the largest in California; and

WHEREAS, our community depends on LAX for the trade, travel and tourism that it brings to our area and the larger Southern California region; and

WHEREAS, since the start of the economic recovery in 2009, air service demand at LAX has increased from 56 million annual passengers to 80 million annual passengers in 2016, and Los Angeles is seeking to host the 2024 Olympics; and

WHEREAS due to the increase in air services, LAX is experiencing heavy traffic congestion in and around the airport; and

WHEREAS, on regular days up to 95,000 vehicles enter Los Angeles International Airport's Central Terminal Area increasing to 120,000 during the peak Thanksgiving Holiday period; and

WHEREAS, almost half of the vehicles are buses, shuttles and vans from rental car companies, hotels and shared-ride companies along with taxis who are also competing for the limited space on the streets and curbs in the CTA; and

WHEREAS, 23 different rental car lots scattered around the airport area add to this problem; and WHEREAS, to resolve this problem Los Angeles is proposing to spend $5.5 billion on the Landside Access Modernization Program, or "LAMP," and

WHEREAS, LAMP will consist of 6-million square foot Consolidated Rental Car Facility (CONRAC), two 3-million square foot Intermodal Transportation Facilities (IFTs) or transit hubs, a 2 . mile Automated People Mover (APM) connecting the CONRAC, ITFS and a new light rail station to the airport, and related roadway improvements and property development; and

WHEREAS, LAMP will relieve traffic congestion within the Central Terminal Area (CTA) and the surrounding street network, improve the LAX passenger experience and keep LAX as the international gateway for the West Coast;

NOW THEREFORE BE IT RESOLVED, that the MVCC Airport Committee and the MVCC Planning and Land Use Management Committee jointly recommend that the MVCC send a letter of support for the Landside Access Modernization Program at Los Angeles International Airport as presented to us be sent to the operator of the airport, Los Angeles World Airports with the addition of the four following recommendations:

1. Improve automated people mover service convenience to drop people closer to check in and gates;
2. Implement traffic mitigations promptly, including improved flyaway service and employee bus services for the LAX 50,000 employees;
3. Support regional network of airport solutions to make travel at other airports desirable for those living and working far from LAX in other parts of the Southern CA region
4. Arrange for increased police and fire support for the area as more people are concentrated in and around LAX.

Motion carried on consent.

u. **POLICY MOTION:** Santa Monica Airport Runway Shortening Options (submitted by Airport Committee – pending committee approval)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, as immediate neighbors of the Santa Monica Airport, Mar Vista residents are impacted daily by the nuisances and serious health hazards created by the airport: air pollution; noise pollution; safety risks, among others. For this reason, years ago the Mar Vista

Community Council ('MVCC") formed a committee to address the concerns of its residents and to monitor activities at and about the airport;

WHEREAS, Los Angeles City Council District 11 borders Santa Monica Airport (SMO) to the south and to the east, including an almost sixteen acre portion of the east end of SMO within the City of Los Angeles CD 11;and

WHEREAS, the CD 11 neighborhoods of Mar Vista, Venice, and other West Los Angeles neighborhoods, as well as Council District 5 (CD 5) neighborhoods of Rancho Park, Cheviot Hills, and other West Los Angeles neighborhoods within CD5 are all uniquely impacted by nuisances, and serious safety/public health concerns created by SMO operations;

WHEREAS, the City of Santa Monica is now considering various design concepts to shorten the runway to 3,500 feet of operational length from the current 4,937 feet.

WHEREAS, several peer reviewed scientific monitoring air quality studies (*Aircraft Emission Impacts in a Neighborhood Adjacent to a General Aviation Airport in Southern California* September, 2009; *Neighborhood-scale air quality impacts of emissions from motor vehicles and aircraft*, July, 2013; *A Supplemental Monitoring Campaign at the Santa Monica Airport, April, 2011*) have all measured highly elevated air pollutant levels in MVCC's Zone 2 created by Santa Monica Airport's aircraft operations;

WHEREAS, the studies all give cause for concern for the public health of the downwind of SMO residents;

BE IT RESOLVED THAT the MVCC requests and supports efforts by the Los Angeles City Council to require SMO's eastern end of the runway be shortened by at least 1,000 feet to help offset years of exposure to toxic air emissions from aircraft idle and blast.

BE IT FURTHER RESOLVED THAT the MVCC requests the Los Angeles City Council to request that the FAA alter SMO's and LAX's conflicted flight paths to eliminate unnecessary idle/hold times by aircraft at both SMO and LAX.

BE IT FURTHER RESOLVED THAT the MVCC notify Councilmember Mike Bonin and Councilmember Paul Koretz of the urgency and timeliness to lead a strong effort along with the City of Los Angeles Mayor and the Los Angeles City Attorney on behalf of Los Angeles District 11 and District 5 constituents in order to assure that SMO impacts are *not* unjustly burdensome to the City of Los Angeles.

Motion to approve by Holly Tilson, 2nd by Sarah Auerswald. Friendly amendment accepted.

Public Comment

Typo: add “not” to last sentence.

Motion carried unanimously.

12. **Grievances**, if any received
13. **Future agenda items**
14. **Public Comment**

    Rob Kadota: please consider volunteering for Art Walk

    Jasmine Elbarbary: Does Bike Mar Vista teach adults who never rode a bike how to ride? Rob: not now, but yes in future.

15. **Adjournment**

    Meeting adjourned at 8:58 P.M.

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ATTACHMENT A: Minority Report - Small Lot Subdivision 3246 Barrington Ave (Agenda Item 11.o)

The minority Board members that opposed this motion and voted to support the Small Lot Subdivision at 3246 Barrington would like to recognize the great care that was taken by the developer to design this project to remain in character with the surrounding community. This design is compatible with other single-family homes when viewed from the street. The landscape is aesthetically pleasing and drought resistant. We appreciate that they did not build to the full amount that is allowable. The height is much lower than the maximum allowed. We also appreciate their efforts to mitigate the concerns of nearby neighbors and gathering data directly from them by canvassing. After meeting with a concerned neighbor, the developer took steps to preserve the privacy of adjacent property owners.

New developments face the same challenges as existing single family homes. It is unusual for existing single-family homes to have parking for more than two cars and they rarely have guest parking on the property. We feel a concern that we are holding new buildings to a higher standard than we currently maintain as homeowners. We hope that the limited guest parking access would encourage more sustainable transportation.

We feel that this project is preferential to the community when compared to the multi-unit residential that would be allowed to be built on the property. Objections to reasonable projects could have the unintended consequence of discouraging Small Lot developments and we could be faced with multi-unit projects in their place.

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday June 13th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of May 9th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald
8. **Great Street Venice Blvd. Presentation**

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
    a. Chair - Rob Kadota
    b. First Vice Chair – Sarah Auerswald
    c. Second Vice Chair – Joseph Galloway
    d. Secretary – Melissa Stoller
    e. Treasurer – Holly Tilson
        i. Report on current financial status
            1. February bank statement
            2. Pending payments
        ii. **APPROVAL** of April Monthly Expense Report (MER)
10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
    c. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
    d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
    e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
    f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
    h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
    i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
    j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    k. **Bike Mar Vista** - Mitchell Rishe, Chair
    l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-h on consent.

    a. **FUNDING MOTION**: MailChimp (submitted by Executive & Finance Committee)

        MVCC approves the expenditure of up to $25 a month to lift the MailChimp free account limit of 2000 emails in a 24-hour period.

b. **FUNDING MOTION:** Melissa Stoller reimbursement (submitted by Executive & Finance Committee)

MVCC approves the reimbursement of $22.50 paid by Melissa Stoller to lift the MailChimp free account limit of 2000 emails in a 24-hour period.

c. **FUNDING MOTION:** Domain Name (submitted by Executive & Finance Committee)

MVCC approves the payment of an additional $1.70 for the marvista.org domain name, bringing the total to $201.70.

d. **FUNDING MOTION:** Farmers' Market space rental (submitted by Executive & Finance Committee)

MVCC approves the payment of an additional $200 for Farmers' Market space rental, bringing the total to $1200.

e. **FUNDING MOTION:** Facebook ads (submitted by Executive & Finance Committee)

MVCC approves the payment of a total of $364.33 for Facebook ads.

f. **FUNDING MOTION:** Meeting Equipment (submitted by Executive & Finance Committee)

MVCC approves the purchase of meeting equipment up to $1200.

g. **FUNDING MOTION:** Printing (submitted by Executive & Finance Committee)

MVCC approves the payment of $57.76 to Copyland for printing of meeting materials.

h. **POLICY MOTION:** Proposed Condominium Small Lot Subdivision at 3981 Moore Street (submitted by PLUM Committee)

Whereas - the proposed project does not require a variance, and

Whereas - the proposed project would increase housing near transit corridors and walkable communities and amenities,

Therefore the Mar Vista Community Council supports the condominium subdivision proposed at 3981 Moore St.

9. **Election of New Board Officers** – Rob Kadota
   a. Chair
   b. 1st Vice Chair
   c. 2nd Vice Chair
   d. Secretary
   e. Treasurer
13. **Grievances**, if any received
14. **Future agenda items**
   a. **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

   Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

   Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

   Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

   b. **FUNDING MOTION:** Green Garden Showcase (submitted by Green Committee)

   MVCC approves the expenditure of up to $4000 for 2018 Mar Vista Green Garden Showcase supplies, marketing and education.
15. **Public Comment**
16. **Adjournment**

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Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday June 13th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min) Meeting was called to order at 7:04pm

In attendance: Rob Kadota, Sherri Akers, Holly Tilson, Damien Newton, Greg Tedesco, Robin Doyno, Susan Klos Michelle Kruplkin, and Sarah Auerswald.

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of May 9th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1 min per speaker) http://marvistacc.org/files/161213-BOD-draftMINUTES.pdf.

Moved by Michelle Krupkin, 2nd by Susan Klos, approved unanimously

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

Michael Millman – MVNA Pot Luck Block Party announcement – June 25th

Gary Gamboni – pay it forward band – interested in NPG grant application

Marty Rubin – expressing gratitude for Board's support of Airport Committee

5. **Community Memorial Observations**

Dorothy Garvin – founding member of MVCC – has passed away

6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org

   No report

   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

   No report

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

   Len made a short report, thanking Rob Kadota for his service as MVCC Chair.

   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

   No report

   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

   No report

   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

   No report

   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams: Brian.Adams@asm.ca.gov

   Event – Family Health Fest www.srtevent.com - June 24th https://a54.asmdc.org/photo/2017-crenshaw-healthfest

   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

   No report

   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

   No report

   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

No report

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

There will be workshops to help reach out to underserved communities to run for Neighborhood Councils

l. LAPD Senior Lead Officer Adrian Acosta 37285@lapd.online

Pacific Carnival July 22, 23, 24 on Culver Blvd.

7. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

July 19th is next meeting, agenda closes on July 12th

b. DWP MOU: Chuck Ray

Meeting report – recently re-approved the 5-year MOU

c. LANCC: Joseph Galloway

No report

d. One Water LA: Christopher McKinnon

The issue of How to recycle storm water – new plan 2040 – new projects – issues include how to pay for these projects – OC has drinkable water they are bottling – Chris will bring us a sample – Tillman plant will be one of the first projects

e. WRAC: Rob Kadota/Joseph Galloway

WRAC has begun initial discussions to become a non-profit entity that can engage in fund-raising.

f. WRAC LUPC: Sharon Commins

No report

g. City Budget Advocates: Holly Tilson

No report

h. Recode LA: Sharon Commins

No report

i. Animal Services: Tom Ponton

No report

j Fall Festival: Albert Olson

No report, but the date is October 21st. Save the Date.

k Friends of Historic FS 62: Albert Olson

Next hurdle overcome – the committee passed the motion on consent – now it goes before the Full City Council

l. Mar Vista Celebrates 90: Open

No report

m. Mar Vista Chamber of Commerce: Sarah Auerswald

No report

8. **Great Street Venice Blvd. Presentation**

Carter Rubin from the Great Streets Initiative, Jessie Holzer Mobility Director for CD11, and Nat Gale from DOT Vision Zero. Carter Rubin narrated the slides and led the presentation. Jessie Holzer spoke about the outreach effort. Nat Gale spoke about the goals of Vision Zero, mentioning that Venice Blvd is one of the most dangerous stretches of street in Los Angeles.

FAQs and SURVEY: http://www.11thdistrict.com/mar_vista_great_street

Questions:

Morgan Peats – wanted to know about data collected – Vision Zero data collected over 6 years

Vickie Perlsom – who decides what success metrics are it

John – How long is pilot project? Are there predefined metrics?

Ben Martin – why was traffic increased in other Great Streets – York and other example – thing move more swiftly when collisions are reduced

Sarah Guzman – outreach questions – feels she did not receive info prior to implementation – how can they do more

April Peterson – how quickly can the lanes be returned? 1-year pilot

Tamara Kaiser – how are you measuring collisions + what are the metrics of success?

Susan – lives in Westchester owns property in Mar Vista – mentioned Playa del Rey problems

Laura – asked the price of the project? Where can we vote and express our opinions

Dell – wanted to know if they used the registrar of voters?

Morgan Peats – are you measuring traffic data on Palms? Yes – and on dozens of side streets + wants to know

Chris – do you accept that Venice Blvd does not or end in Mar Vista? How many people were surveyed?

Evan Ortega – why is Mike Bonin not here?

Mia Garafis – owner of Sunny Grill – says she was never notified and doesn't like it.

Jordana – what kind of outreach did you do to the disabled community? How are you measuring travel time data? Says her travel time is longer now

Anna – owns a business on Venice – asks people to give it a chance – asks for civil discourse

Trish – do you live in our community – do you experience our pain? Carter lives west of the 405 his whole life and drives Venice often.

Tina Segler – are you familaiar with Head in th sand?

Public Comment –

Morgan Keats – thanked for the council and the cookies + thinks it's bad to create more gridlock recall@gridlockmikebonin.com He's formed a PAC

Sara Guzman – MV resident for 51 years – created a nightmare for her – causing detours into neighborhood – slows down firefighters

Ben Martin – he had a positive reaction – drove it 4 times today and felt they're trying to make things BETTER. Let's give it a shot.

Steven Cohen – East Venice resident – wishes it would work and doesn't imagine it will work

Alix Gcossky – feels we should look at bigger picture and feels it is unmitigated greed and development

Lenore French – wants to improve the walkability of the community and that's why she started the Art Walk – and she gets the comments every time from longtime residents that they didn't know about businesses by the fact they are walking

Eric Bress – feels like we're invisible and no one will listen to us – no mater how much we cry out against it. He sees like there is a lot of confusion.

Jordana Thigpen – Vision Zero is appropriate because it looks like zero vision went into it. already won't trust the data. Wants Venice Blvd to remain a highway – demands a Town Hall

Dave Davis – people are rising up – South Bay has people mad, too – wants people to work together to fight it all over LA

Yvette Roman – wants people to give it a try – the way people drive is horrifying – people are distracted – wants to see traffic reduced

Ken Marek – wishes he could see people happier – wants Board to ask for a motion to change it back and figure out a way to do it right.

Richard Macmillan – lived here for 15 years – needs to drive for work – has never seen so much gridlock on Venice – takes him a long time to even get out his driveway –

Alex Schub – likens this to a missile being fired and then asking if it worked

Joe Fontana – seconds matter – says the emergency responders make this an unsafer places – ask the Board to reverse this bad idea

Jeff Khoury – Venice is now failing as a blvd – we all rely on it – I get cut off on my motorcycle – doesn't understand how it's safer – feels no one reached out to him –

Sheri Odere – 30-year resident of Mar Vista – she feels they've made it into a disaster – she's had trouble when ambulances have come through – she thinks its garbage

Selena Inouye – got attention by taking away a lane of traffic – seeing gridlock – says she filled out the survey years ago but thought it was about beautifying the blvd – what does Pilot Project mean? Want more transparency.

Sandra Stewart – was a surprise to her – concerned about the data – thinks this is about development – and thinks the data will be skewed because there is development coming

Tamara Kaiser – loves the crosswalks – on a positive note – says she is glad both Carter and Jessie are there but wishes their bosses were here. Feels the outreach was not done to people of color, or low –income people –

Laura Bachelder – accidents along Vista del Mar are due to drunken drivers – mentioned that traffic is very bad and offered other ways to make driving safer besides taking out a lane

Mike Albanese – is from Venice – wants to compare car traffic to bike traffic – and then see the effects from Waze in Venice

John Russo – Playa del Rey – thanks the council and Jessie and Nat and Carter for listening to the anger – says mobility plan is bad

Rita Goldman – heard about the meeting from Change.org – saw bad traffic backup on the weekend – hopes they are looking at effects on Venice past the edge of the Great Streets – worried about emergency vehicles getting through

Brook Eaton – Playa Vista resident – heard about Vision Zero via Westways Magazine – felt the reduction in lanes was not anything

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota

   2nd Vice Chair Joseph Galloway has stepped down, so we have an opening – we'll be doing outreach over the next month

   b. First Vice Chair – Sarah Auerswald

   Website and meeting update requests

   c. Second Vice Chair – Joseph Galloway

   Not present

   d. Secretary – Melissa Stoller

   Not present – no report

   e. Treasurer – Holly Tilson
      i. Report on current financial status
         1. February bank statement
         2. Pending payments
      ii. **APPROVAL** of May Monthly Expense Report (MER)

      Motion to approve by Rob, 2nd by Michelle, approved unanimously

10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

    Green Garden Showcase will happen again in 2018. Details to come

    b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

    No report

    c. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

    No report

    d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

No report

e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

No report (see above for Great Streets update)

f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

No report

g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

No report

h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

No report

i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

No report

j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

No report

k. **Bike Mar Vista** - Mitchell Rishe, Chair

No report

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

No report

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

No report

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

No report

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

No report

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-h on consent.

    h. was pulled from consent calendar by request of Damien Newton

    a-g moved to take on consent by Damien, 2nd by Holly – approved unanimously

    a. **FUNDING MOTION**: MailChimp (submitted by Executive & Finance Committee)

       MVCC approves the expenditure of up to $25 a month to lift the MailChimp free account limit of 2000 emails in a 24-hour period.

       Approved on consent

b. **FUNDING MOTION:** Melissa Stoller reimbursement (submitted by Executive & Finance Committee)

MVCC approves the reimbursement of $22.50 paid by Melissa Stoller to lift the MailChimp free account limit of 2000 emails in a 24-hour period.

Approved on consent

c. **FUNDING MOTION:** Domain Name (submitted by Executive & Finance Committee)

MVCC approves the payment of an additional $1.70 for the marvista.org domain name, bringing the total to $201.70.

Approved on consent

d. **FUNDING MOTION:** Farmers' Market space rental (submitted by Executive & Finance Committee)

MVCC approves the payment of an additional $200 for Farmers' Market space rental, bringing the total to $1200.

Approved on consent

e. **FUNDING MOTION:** Facebook ads (submitted by Executive & Finance Committee)

MVCC approves the payment of a total of $364.33 for Facebook ads.

Approved on consent

f. **FUNDING MOTION:** Meeting Equipment (submitted by Executive & Finance Committee)

MVCC approves the purchase of meeting equipment up to $1200.

Approved on consent

g. **FUNDING MOTION:** Printing (submitted by Executive & Finance Committee)

MVCC approves the payment of $57.76 to Copyland for printing of meeting materials.

Approved on consent

h. **POLICY MOTION:** Proposed Condominium Small Lot Subdivision at 3981 Moore Street (submitted by PLUM Committee)

Whereas - the proposed project does not require a variance, and

Whereas - the proposed project would increase housing near transit corridors and walkable communities and amenities,

Therefore the Mar Vista Community Council supports the condominium subdivision proposed at 3981 Moore St.

Damien made the motion, 2nd by Michelle, passed unanimously.

Larry spoke representing the developers of the project – single family home stands there now, but will be replaced with 7 condos – zoned R3 – conforms to code – developer will allow for Mobility 2035 compliance – no rooftop deck – 45 feet tall – total square footage of lot 6000 sft –

Sherri spoke about the building being ADA compliant, good for Seniors – elevator building –

Rob spoke about praising the developer for coming through channels and presenting to MVCC committee and BOD

9. **Election of New Board Officers** – Rob Kadota

Run by Jasmine Elbarbary from DONE

a. Chair

Sarah Auerswald was nominated by Rob – 2nd by Sherri Akers - unanimously approved

b. 1st Vice Chair

Rob Kadota was nominated by Sarah Auerswald - 2nd by Greg Tedesco - unanimously approved

c. 2nd Vice Chair

Sherri Akers was nominated by Sarah Auerswald - 2nd by Robin Doyno - unanimously approved

d. Secretary

Melissa Stoller was nominated by Sarah Auerswald - 2nd by Damien Newton - unanimously approved

e. Treasurer

Holly Tilson was nominated by Sarah Auerswald - 2nd by Rob Kadota - unanimously Approved

13. **Grievances**, if any received
14. **Future agenda items**
    a. **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

    Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

    Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

    Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

    b. **FUNDING MOTION:** Green Garden Showcase (submitted by Green Committee)

    MVCC approves the expenditure of up to $4000 for 2018 Mar Vista Green Garden Showcase supplies, marketing and education.
15. **Public Comment**
16. **Adjournment** meeting adjourned at 9:20pm

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Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday July 11th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of June 13th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Venice Boulevard Great Street**
   a. Vision Zero presentation (15 minutes)
   b. Mike Bonin presentation (10 minutes)
   c. **Policy Motions** Public comment permitted, 1 min per speaker unless waived by the Chair).
      i. **Restoration of 3rd Lane on Venice Boulevard** (submitted by stakeholder petition)

      WHEREAS, the Venice Boulevard "Great Street" program has recently been implemented, including several changes to the roadway between Beethoven Avenue and Inglewood Boulevard, and

      WHEREAS, the changes include removing one traffic lane in each direction to accommodate a buffer zone for on-street passenger loading of parked vehicles (rather than from the sidewalk) and widening of the bicycle lane, and

      WHEREAS, Council District 11 circulated surveys to a very small minority of the community (approximately 450 total surveys, many to students who don't drive) and extrapolated "community-driven" support for many elements of the "Great Street", yet the surveys did not specifically ask the community about the lane reduction element of the program or obtain feedback from the vast majority of those who use Venice Boulevard on a daily basis, and

      WHEREAS, the lane reductions have caused significant daily traffic jams, increased cut-through traffic on surrounding residential streets, increased traffic jams on alternate streets throughout the greater Mar Vista area, and increased pollution from idling vehicles, and

      WHEREAS, the increased traffic on Mar Vista roadways has had an adverse impact on emergency response times of Fire and Police Department, and

      WHEREAS, a grassroots movement of community members has emerged in recent weeks, and have obtained over 1900 electronic signatures asking for the return of the old three traffic lane in each direction configuration, and

      WHEREAS, Council District 11 has communicated that the roadway changes consist of a pilot program, using inexpensive temporary materials, and that the City would keep what the community loves and remove what the community does not want,

      THEREFORE, Mar Vista Community Council moves to advise Council District 11 to: 1) immediately reverse the lane reduction and return Venice Boulevard to the long established six lane configuration, and 2) further urges the City of Los Angeles Department of Transportation and Council District 11 to provide online access to any and all traffic studies done in advance of the commencement of the lane closures, as well as

online access to any and all traffic studies performed after implementation of the Great Street program.

ii. **Continuation of Venice Boulevard Pilot Project** (directors motion submitted by Ken Alpern and Sherri Akers)

WHEREAS, the Venice Boulevard "Great Street" pilot project has recently been implemented, including several changes to the roadway between Beethoven Avenue and Inglewood Boulevard, and including the removal of one traffic lane in each direction to accommodate a buffer zone for on-street passenger loading of parked vehicles (rather than from the sidewalk) and the creation of a buffered bicycle lane

WHEREAS, Members of the community have expressed concern about traffic jams, increased cut-through traffic on surrounding residential streets, increased traffic jams on alternate streets throughout the greater Mar Vista area, and increased pollution from idling vehicles, and

WHEREAS, community members have expressed concern about adverse impact on emergency response times of Fire and Police Department,

WHEREAS, community members have expressed concern that the new on-street loading area does not provide convenient sidewalk access for disabled persons and may expose the City to the risk of litigation based upon the American's With Disabilities (ADA) Act,

WHEREAS, MVCC has previously passed this motion in support of Vision Zero and is committed to making any needed changes to support this commitment -

WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation engineers, police officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short), to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

WHEREAS, a grassroots movement of community members has obtained over 1450 electronic signatures asking for the return of the old three traffic lane in each direction configuration, the Mar Vista Community Council hereby additionally requests the following –

- The MVCC requests that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month. MVCC also requests the same data on streets in LA where this same configuration was implemented.
- The MVCC requests an evaluation be done by an ADA consultant
- The MVCC requests that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike) or other organizations similar in focus and expertise.
- That the City of Los Angeles posts all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented
- That the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze.

- That MVCC be provided with a breakdown of all petitions showing a breakdown of signatures indicating the number of signatures by zip code or community of residence.
- That MVCC be provided with the data to date on the survey created by CD11 and updated on a regular basis.
- That MVCC be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented.

NOW, THEREFORE, BE IT RESOLVED that by the adoption of this Resolution, the Mar Vista Community Council hereby urges the City of Los Angeles and grass roots community organizations to provide the needed information promptly with a planned reassessment six months from this date.

7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: open
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald
9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Sarah Auerswald
   b. First Vice Chair – Rob Kadota
   c. Second Vice Chair – Sherri Akers
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status

- June bank statement
- Fiscal Year 2016-17 close-out

ii. **APPROVAL** of June Monthly Expense Report (MER)

10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
    c. **Community Outreach Committee** – Sarah Auerswald, Chair
    d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
    e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
    f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
    h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
    i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
    j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    k. **Bike Mar Vista** - Mitchell Rishe, Chair
    l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 12.a-n on consent.

    a. **ADMINISTRATIVE MOTION:** LANCC Liaison

       MVCC approves the appointment of Chuck Ray as LANCC Liaison.

    b. **FUNDING MOTION:** 2017-18 Budget (submitted by Executive & Finance Committee)

       MVCC approves the Fiscal Year 2017-18 budget (Addendum A).

    c. **FUNDING MOTION:** Melissa Stoller reimbursement (submitted by Executive & Finance Committee)

       MVCC approves the reimbursement of Director Melissa Stoller for Mailchimp fees not to exceed $100.

    d. **FUNDING MOTION:** Windward School Meeting Space (submitted by Executive & Finance Committee)

MVCC authorizes the payment of $5 for annual use of Windward school facilities for meeting space.

e. **FUNDING MOTION:** T&I Meeting Materials Printing (submitted by Executive & Finance Committee)

MVCC approves the payment to Copyland for printing of extra copies of agendas and minutes for the June Transportation & Infrastructure Committee meeting, up to $100.

f. **FUNDING MOTION:** Board Retreat (submitted by Executive & Finance Committee)

MVCC authorizes the expenditure of up to $150 for the July 15th Board Retreat: $75 to St. Bede's for room rental and up to $75 for refreshments.

g. **FUNDING MOTION:** MailChimp (submitted by Executive & Finance Committee)

MVCC authorizes MailChimp to charge the MVCC credit card for monthly charges for email service (up to $50/month for 2017-18) and set up the credit card on the account.

h, **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

i. **FUNDING MOTION:** Green Garden Showcase (submitted by Green Committee)

MVCC approves the expenditure of up to $4000 for 2018 Mar Vista Green Garden Showcase supplies, marketing and education.

j. **POLICY MOTION:** Installation of Modern Bus Shelters at Venice/Centinela and National/Sepulveda (submitted by Transportation & Infrastructure Committee)

WHEREAS, the MVCC has always been in favor of enhancing commuter mobility and quality of life for commuters utilizing all modes of transportation, and

WHEREAS, the MVCC has always supported the rights of bus and other transit commuters to access mass/rapid transit in shelters providing shelter, comfort, and--ideally--LED signage and other amenities to serve the needs of commuters to know when upcoming buses are arriving utilizing the best of modern technologies,

Therefore, the MVCC supports installation of a modern bus shelter at the northwest corner of Venice/Centinela, with protection from the elements and all installable modern amenities, such as LED signage of future bus arrivals powered by solar paneling, to be included if at all possible, and to be supported logistically and financially the Outfront/JCDecaux Street Furniture, the Los Angeles CD11 office, and the MVCC, and

Therefore, the MVCC supports installation of a modern bus shelter at the southwest and southeast corners of National/Sepulveda, with protection from the elements and all installable modern amenities, such as LED signage of future bus arrivals powered by solar paneling, to be included if at all possible, and to be supported logistically and financially the Outfront/JCDecaux Street Furniture, the Los Angeles CD11 office, and the MVCC.

k. **POLICY MOTION:** Update on Stormwater Treatment System at Mar Vista Park (submitted by Transportation & Infrastructure Committee)

Whereas, the Mar Vista Community Council (MVCC) has always supported infrastructure and environmental efforts to promote clean and reclaimed storm and other water runoff both locally and regionally, and

Whereas, the MVCC was, and still is, strongly in support of the water reclamation project adjacent to Mar Vista Park to be used to disinfect stormwater for park landscape irrigation, and which was paid for by $4.5 million in City and State funds

Whereas, the MVCC has learned that some significant questions remain unanswered as to the functionality of the water reclamation system for Mar Vista Park,

Therefore, the MVCC expresses strong concerns as to the functionality of the water reclamation system, as well as to the appropriate use of City and State funds and other resources, and when any necessary repairs or improvements will occur, and

Therefore, the MVCC calls for immediate updates and presentations by the L.A. Department of Water and Power, L.A. City Bureau of Sanitation and the L.A. Department of Public Works to the address these questions and concerns, as well as the functional status of the water reclamation project/system, to the MVCC Board of Directors, and to the greater stakeholder constituency of the Mar Vista Community Council.

l. **POLICY MOTION:** Traffic/Transit Studies to Improve Venice Great Streets Project (submitted by Transportation & Infrastructure Committee)

Whereas, the Mar Vista Community Council (MVCC) has always supported efforts to enhance mobility and smooth traffic flow for all modes of transportation in and adjacent to its boundaries, and

Whereas, the MVCC understands that a Great Streets Project on Venice Blvd. seeks to serve the needs of all of its constituents, and

Whereas, the MVCC strongly supports accurate and guiding data, independently-verified, to best serve the needs of commuters on or adjacent to Venice Blvd,

Therefore, the MVCC calls upon the LA Department of Transportation and Metro, working in conjunction with the CD11 office, to supply all appropriate data and/or traffic studies on both Venice Blvd. and adjacent/connecting major thoroughfares like Palms, Centinela, Washington Place, and Washington Blvd for both the morning and the afternoon/evening portions of the day, including rush hour and weekends, particularly before and after implementation of, and in prior years before, the CD 11 Pilot Program on Great Street Venice Blvd., and

Therefore, the MVCC calls upon Metro to work with CD11 to provide bus ridership numbers for Metro regular and Rapid Bus lines on Venice Blvd, particularly before and after the implementation of the CD 11 Pilot Program on Great Street Venice Blvd., and in prior years before, the Great Street Venice Blvd. Project, and

Therefore, the MVCC calls upon the CD11 Office, the L.A. Department of Transportation, and all appropriate City and Metro entities to establish MVCC Board of Directors-approved metrics and quarterly data updates on an ongoing basis.

m. **POLICY MOTION:** Art Walk Support (Director motion submitted by Sarah Auerswald)

Whereas the Mar Vista Community Council has supported the Mar Vista Art Walk since March of 2016, and

Whereas Green Communications Initiative, Inc. is the organizer of the Mar Vista Art Walk, and

Whereas the Mar Vista Art Walk and Green Communications Initiative, Inc. continue to provide beneficial events and services around local Arts, Artists and Environmentally-friendly pedestrian inducements to the community, and

Whereas the Mar Vista Art Walk continues to provide additional benefits to the local economy and small businesses, and

Whereas the Mar Vista Art Walk and Green Communications Initiative, Inc. seek to procure funds through appropriate arts grants and other sources of financial support to sustain them in perpetuity as an ongoing benefit to the community,

Therefore, the Mar Vista Community Council agrees to support the Mar Vista Art Walk and Green Communications Initiative, Inc. in their efforts to procure these funds.

n. **POLICY MOTION:** City Sponsored Parking Study (Director motion submitted by Holly Tilson & Ken Alpern)

Whereas-AB744 offers any City the opportunity to use an arbitrary 0.5 parking spaces per bedroom for building projects, it also allows the use of an area-wide or jurisdiction-wide parking study to impose a higher vehicular parking ratio, and

Whereas, the City is using the arbitrary 0.5 parking space per bedroom requirement without any analysis of its impact on parking in the area, and

Whereas-Mar Vista is expecting future density and volume of multifamily housing,

Therefore, be it resolved-The Mar Vista Community Council strongly encourages and requests CD11 and the LA Mayor to authorize and preform a parking study, in cooperation with the

MVCC and Mar Vista residents' organizations, as allowed under AB744 and exercise the city's due right to impose an objective standard for vehicular parking in any new development in Mar Vista.

Background Information

While researching various land use codes for an appeal of the 12444 Venice Blvd. project, we discovered that the City was using an arbitrary standard of 0.5 parking space per bedroom, citing a state law. Research showed that the same law allowed the city to do parking studies of an area to provide a more objective, locally-driven assessment of area parking before using the arbitrary 0.5 parking space per bedroom standard.

As this issue is of great interest due to potential land development in the area, we recommend the MVCC be proactive on the broad issue rather than reactive on a project by project basis.

Under Government Code, Section 65915(p)(7), chaptering AB 744:

(7) Notwithstanding paragraphs (2) and (3), if a city, county, city and county, or an independent consultant has conducted an area-wide or jurisdiction-wide parking study in the last seven years, then the city, county, or city and county may impose a higher vehicular parking ratio not to exceed the ratio described in paragraph (1), based upon substantial evidence found in the parking study, that includes, but is not limited to, an analysis of parking availability, differing levels of transit access, walkability access to transit services, the potential for shared parking, the effect of parking requirements on the cost of market-rate and subsidized developments, and the lower rates of car ownership for low- and very low income individuals, including seniors and special needs individuals. The city, county, or city and county shall pay the costs of any new study. The city, county, or city and county shall make findings, based on a parking study completed in conformity with this paragraph, supporting the need for the higher parking ratio.

Clearly, the intent of the state law is to permit local, independent parking studies to drive parking requirements and to impose an arbitrary standard (0.5 spaces per bedroom) when jurisdictions did not have such a study.

Dr. Howard Weisberg, PhD, conducted a limited but scientific study of parking near the 12444 Venice Blvd. project which projected that the 0.5 parking space per bedroom requirement would result in a spillover of 44 on-street parking spaces. That would exacerbate the already intolerable parking gridlock in the area (in this study on-street parking was already at 99.6%). The small sample study can provide a prototype for a larger, city-sponsored survey that could implement the locally driven requirements of AB 744, rather than the arbitrary standard.

The Planning Department has stated that we can expect more projects like 12444 Venice Blvd.. Therefore, a study of the facts, as permitted by the cited law, should be done and applied to other proposed and future development projects as it would help provide an opportunity for more amicable and reasoned discourse and decisions.

13. **Grievances**, if any received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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ADDENDUM A: 2017-18 MVCC Budget

Budget Category	Amount	Detail	TOTALS
100 Operations			
Facilities and Space Rental			
Farmers Market Space	1,200.00		
Storage	2,280.00	190 X 12	
PO Box	132.00		
Meeting space rental			
(Coffee Connection)	600.00	$25 X 2 X 12	
(Windward)	5.00		
(St. Andrew's)	300.00	$25 X 12	
Equipment and Supplies			
Meeting equipment	500.00	misc	
Meeting supplies and printing			
Printing	1,000.00	$83 X 12	
Board training and support			
Business cards/name badges	250.00		
Board retreat	300.00		
Website Hosting	1,900.00	$150 X 12 + $33 x 3	
Extra Data Entry (as needed)	500.00		
Mailchimp Email Service	500.00	$40 X 12	
		OPERATIONS TOTAL	**9,467**
200 Outreach			
Advertising			
Banners, signs, MVCC/event promotion	500.00		
Facebook ads	250.00		
Newsletter			
(Fall Festival)	4,000.00		
MVCC Event expense			
Block, parties ($300 x 7)	1,500.00	$300 X 5	
Community Events			
Fall Festival	10,000.00		
Winter Wonderland	1,000.00		
Art Walk	1,200.00	$300 x 4	

Budget Category	Amount	Detail	TOTALS
Green Garden Showcase	4,000.00		
		OUTREACH TOTAL	**22,450**
300 Community Improvement			
Alley Repair seed money	5,000.00		
		COMMUNITY IMPROVEMENT TOTAL	**5,000**
400 Neighborhood Purpose Grants			
500 Election	5,000.00		
		ELECTION TOTAL	**5,000**
		TOTAL TOTAL	**41,917**

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday July 11th, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:01. P.M.

   Quorum present*:* Rob Kadota, Susan Klos, Robin Doyno, Sarah Auerswald, Holly Tilson, Greg Tedesco, Sherri Akers, Melissa Stoller, Michelle Krupkin, Ken Alpern

   Late arrival: , Ken Alpern 7:30

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of June 13th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).

   Motion carried: 9 ayes, 0 nays, 1 abstention (Melissa Stoller), 1 absent (Ken Alpern)

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Kalani Whitington: Logged ticket with 311 regarding Venice median brush. Lines haven't been painted on Venice, Washington & Culver – don't know what lane are driving in.

   Noam Karl: Should have zoning changes allowing higher density in some areas. Allow a few strategically chosen blocks.

   Brent: Lives at Sawtelle and Tabor; now parking not allowed for anyone not living on Tabor.

   Terry: Lives on Inglewood Blvd; wants to know what's being done about all the people living on the sidewalk in his neighborhood.

5. **Community Memorial Observations**

   Remembrance by Sherri Akers

   > Paul Herzog passed away this week after a brief illness. Paul was a tremendous influence for our Green Committee, the Mar Vista Green Garden Showcase and our overall focus on sustainability. He was a frequent presence on the tour and at the Green Tent and a much treasured resource on questions related to best practices for an ocean friendly garden.

6. **Venice Boulevard Great Street**
   a. ~~Vision Zero~~ Department of Transportation (DOT) presentation (15 minutes) – Matt Gale

      Venice was identified as a Great Street in June, 2014. Mayor Garcetti and CD11 Councilmember Mike Bonin did door-to-door neighborhood canvas in Mar Vista to over 400 homes. There were workshops at the Farmers' Market to identify what Great Street could look like; visioning ideas were brought up. Took outreach on the road to six different locations, different dates; some posters were up for weeks at a time. Results: 8 priorities, including protected bike lanes and community gathering place.

      Vision Zero: everybody should be able to move through our streets safely. Speed kills – at 40 MPH, 10% survival rate for collisions. Half of people killed in collisions are people walking or biking. 6% of city streets account for 65% of severe and fatal traffic collisions involving people who are walking; Venice Blvd. is one of these streets. This plus community input led to design principle of improving safety for all: Bulk of funding went to crosswalks.

      Design based on data. Brought design concepts to community in April 2015. Demonstrated what design could physically look like at Make It Mar Vista 2015. Collected data, benchmarking of before statisitics. Has data to demonstrate safety improvement,

DOT is committed to 1, 3 & 6 month data gathering and analysis. Holding open house July 22 at Windward School. Coordinating closely with Fire Dept. and Dept. on Disability. Considering adjustments on daily/hourly basis. Design doesn't have any negative effect on evacuation.

b. Mike Bonin presentation (10 minutes)

Thank you to those who came, the board, a special thank you to Damien for his plea for civility. Before Great Streets, heard from parents who didn't feel safe for children crossing the street, seniors don't feel safe. Began several months of extensive outreach; it gave us a roadmap. Installed series of murals, upgraded bus shelters, smoothed some of sidewalks. #1 request: Wanted to be safe and feel safe so could be vital center for their neighborhood. There was clear intent to slow speeds going through neighborhood.

Evaluating pilot program using data as well as the way people experience the boulevard, getting feedback, and listening. Has heard conflicting things. Has heard all the voices. Uses the street – walking, biking driving – multiple times every week. People he encounters on the street – walking, in restaurants – say they love it. Need to think of what is in the interest of Mar Vista tomorrow, five years from now, 10 years from now. Are many more young families. Must ask, "What investments and choices do we need to make for next generations?"

c. **Policy Motions** Public comment permitted, 1 min per speaker unless waived by the Chair).

Public Comment

Bill Pope: In favor of having downtown but not at expense of commuters. Real problem is giving our streets away to developers.

Kurt Gary: MV resident. Pro reconfiguration: too many cars.

Greg Beytin: Bike commuter, hit twice. Thank you DOT. Need to reduce number of cars, future is going to be different.

Patricia Byvoet: Bikes 6 time week from Metro station to Beethoven. Encourages sticking to pilot for a year. Is an urban planner from Amsterdam.

Gina Sommo: Venice Blvd Stakeholder. Purpose of Board is to be advocate for community. There's broad community agreement that lanes must be restored immediately.

Nick Burns: Advocates for more housing in Mar Vista. Excited about Great Streets project – it's about creating spaces that facilitate community interaction.

Laura Minzenberg: Increased commute times are not trivial. There's impact on air quality, particulate matter.

Glen: Whitney: Every trip that you decide to bike instead of drive is one less car trip. Everything that increases bike safety increases biking. Bikers have a right to use the roads in a safe environment.

Audrey Stimson: Uses Venice Blvd to commute. Sees pilot as future. This is progress. Slowdown is good thing.

Rachael Horn. Biker. Thank you for considering bikers and pedestrians as well as motorized vehicles. Will continue the conversation July 29 at Bikerowave.

Madelaine Kolisnyk: With the changes, bikers getting hit more, business hurting, people can't get to work on time.

Sheri Odere: Lane reduction has infuriated drivers, not calmed traffic. People using cut through neighborhood streets not meant for this traffic.

Glen Berkovitz: Likes protected bike lane, but not lane reduction. Don't need to eliminate lane for Mar Vista to blossom

Dennis Mogermah: Would be in favor if bike lane went somewhere – would be nice if it went to beach. It's a dozen short blocks of inconvenience. Not in favor.

Garrett O'Neal: There was existing bike lane. Idea that this doesn't impact tsunami evacuation is preposterous.

Ken Marek: Encourages board to vote for lane restoration. If lanes not quickly restored, will lead to recall election.

Ingrid Boon: Lane reductionas really impacts local traffic. Ironic that project name is Vision Zero.

Azad Autrgh??: Need to start somewhere, think about future.

LaurenTeplin: Bike commuter. Was hit by car on Venice. Finally feel it's safe enough to return to street. It's necessary to take action when people are getting hurt.

Tia Tuenge: Likes the change. Her kids feel safer. Likes hanging out at the coffee shop more now -- quieter. Have had cut-thru traffic forever.

Aaron Elster: Doesn't understand why project took place – there was a bike lane before. Rides bike all the time, this seems more dangerous.

Marilyn Zweifach. As senior citizen is excited to see community gathering place in her neighborhood as she ages in place. Traffic is toxic, need to make change. Auto culture is unsustainable.

Andrew Parks. Is senior citizen and a bike rider. Against the lane closure. Problem is public transportation. At the 450, things even out.

Laura Smith: 82% of business on Venice are opposed to lane reduction., 9% neutral, 9% in favor. Please restore traffic lanes.

Robi Abonoor: Venice was such an uninviting place before the protected bike lanes.

Chantal de Renesse: Mixed feeings. It's much less safe for bicyclists when turn right from Wade. Loves the crosswalks.

Anastsia Bacigalupo: Works at Venice and Beethoven. Feels safer now riding bike to work, Work is with/for people with disabilities; everyone feels more comfortable walking around Mar Vista. Great step forward for community.

Tatjana Luethi: In favor of protected lanes. Advocate for seniors, important to make safer for walkers.

Miquel Femmings: Cyclist – has had close calls on this stretch of Venice. Strongly encourages allowing pilot program to do its job.

Eames Demetrios: In favor of improvement. It's a fantasy that going back to Venice as was is the solution. Need to engage in process of making city better. Need new solutions.

Jean Knotts: Need compromise. Get rid of medians and give back lane. 3rd lane is evacuation route, lane reduction creating safety hazard on surrounding streets.

Vincent Hartung: Works closely with Public Safety (police & fire). Huge bottleneck – can't get thru. Has seen police use bike lane.

Gila Standring. Avoids Venice now, no longer goes to businesses. Doesn't understand the logic behind this.

Scott Sing: On my bike I am traffic too, one less car taking up streets. Works in bike shop – people say they're afraid to ride on streets.

Christine Nichols: Has gallery on Venice, foot traffic has dropped. Come up with more workable solution for businesses.

MJ Grogan: Not feasible for everyone to bike to work.

Lyndsay Nolan: sSrongly supports project. Allow DOT to complete full evaluation.

Gary Kavanagh: 20th century Auto Action pPan, is failure. Hopes this project is start of things to come.

Anna Martin. Owns bike shop on Venice. Business has gone down but is in favor of project. Safer. Let project stay course for at least a year.

Ray Ramos: In old days politician would talk about relieving traffic. Now we need to figure out how to avoid area. It's a weird parking configuration.

Don Ward: This project is a safety project; reduces traffic deaths, but makes commutes take longer. Supports.

?: Thankful for project. Will take time to adjust.

Carrie Creighton: Commutes to Mar Vista from Manhattan Beach. DOT data points don't take into consideration that schools are closed now. Auto culture won't change unless we have alternatives.

Eric Bruins: Need to give chance to work, get the data.

Madeline Brozen: Was too scary to travel on Venice before this project. Street is safer, quieter.

Damian Kevitt: Lost right leg while cycling. Would still have it if there was protected bike lane. Give it time to get data and evaluate.

Dave Sumptlon: Doesn't trust DOT's data.

Chris Cerbo: Not against Great Streets or Vison Zero: against solutions that don't take into account all users. Against this project, not safe.

Tamara Kaiser: Very little ability to give feedback to our elected people. How are people with kids supposed to get around on bikes? Against project.

Amanda Meza: Excellent project. These types of projects are necessary for every to enjoy our great city. Let pilot continue.

Dorie Leo: Against project. Many bikers don't stop at stop lights/signs.

Jennifer Rafeedre: Places where did samples aren't places those against the project would go. Bad data

Selena Inouye: 2305 stakeholders have gone to Change.com and given a big thumbs down.

Jordanna Thigpen: Opposed – not safe. Was once hit by car and in comma but still opposed.

Katie Lemmon: Supports changes.

Terrence Housten: Had no idea Mar Vista had downtown before this project.

?: Reduce speed limit on Venice Blvd.

Kent Strumpell: Only asking for minority part of boulevard to improve mobility for everybody.

Rett Bryson: Bonin is twisting facts, this is overreach. Need to restore lanes.

Steve Cohen: Can't use bike to commute. This plan is unsafe – only safe if look at al of Venice Bvd. – idea is good, execution is wrong.

Sheila Ginsberg: Has ruined her neighborhood. Feels unsafe to drive car.

Kim Cheselka: Feels safer. Just need to give time to get used to.

Emilia Crotty: Evaluation is important - critical component of any project.

Erik Sharlow: Great idea. Feels so much safer when on Venice. People are in much better mood at Art Walk.

Gerhard Mayer: Best looking boulevard in all of Venice. This has worked out everywhere, will work out here.

Robin Olson: Soaptopia will not renew lease, business down.

Alexander Hirsch: EMT, has seen first hand injuries that happen.

Amy Schoenbaum: Rides bike, hates new configuration.

Lenore French: Happy all agree that safety is most important thing.

Karam Whittington: In 2015, people weren't paying attention to wider bike lane.

Spencer Sims: Thank you for doing this.

Monique Lopez: At least 5 families would like their loved ones back. Can potentially save 16 people from being injured each year.

Mark Mallore: Commuter. Need solution for 8-10, 4-7. Supports project.

Roy Persinko: When did Venice & Centinela ever move well?

Sima Sherman: Not enough preliminary research was done. Need to have reliable alternative transit in place before take away lanes.

Raymond Massa: Bike commutes 20 miles. Gave up car in 2010. This has improved his daily life.

Melody Wu: Lowering speed limit will not improve safety. Against restoring lanes.

?: Concern is all the other streets. Bad data in, bad data out.

Marcia Hanscom: Supports pilot project.

Gayle Woods: Saw ambulance blocked. Took 7 minutes to go one block.

Terry Rango: LA lives on 4 tires.

Lee Sugich: Not safe.

Samantha West: Optimistic to see what will happen when data come in.

Joe Connolly: Has stopped 5 people from getting hit since pilot put in.

Margot Griswold: Wasn't aware of outreach. Thinks project is great.

Megan Viro: Not a driver. The city is changing, you all need to figure it out.

Lily Brown: Walk, drives, bikes – lane reduction is only adding a minute or two Supports letting pilot run through.

Andrew Pasillas: Strong support. Must be time for thorough evaluation.

Michael Brodsky: Grandfather was hit and killed in crosswalk. Supports anything that will stop people from speeding.

?: Encouraging density while taking away lanes. Against lane reduction.

Justin Levine. If banned all cars, pedestrian deaths would go to zero. Against lane reduction.

Gina Peterman: Less safe.

Brooke Eaton: Concerned about 1st responders. Doesn't believe DOT is considering this.

Nate Wine: Never felt safe for self and for kids to bike. Feels safer now.

Cary Gordon: Supports program with reservations. If want to get to Vision Zero need traffic enforcement.

Yolanda Martinez: Bicyclists should be taking test like drivers. Against lane reduction..

?: Doesn't trust data. Takes 30-40 minutes longer. Messed up parking situation.

Joni Yung: All for anything that can make streets safer.

Dave Peterson: Proper process not followed.

Eva Green: Venice being impacted. Should all be good neighbors, don't just consider Mar Vista.

Jeff Mee: Stick to pilot, project has been great for him and child.

April Peterson: Did the survey. Didn't think would take lane away.

Pat Smith: Has hurt True Value Hardware, business, down 4%.

John Russo: Experiment gone wrong -- need to stop and reconsider.

Jeanne Kuntz: In any city that doesn't plan for real future, streets will become parking lot.

Jordan Fraade: Pro Vision Zero. Urge vote against turning Venice back into speedway. It's a pilot project, let's try something different for a little while.

Sara Guzman: We all want safety but this is mistake.

Demetrios M: Businesses are struggling. Must be better way to get to solution that works for everybody.

Tristan Graves: Traffic needs to be slowed down. Practice mindfulness and you'll be good.

Natalie Farnham: Supports. This has worked in other communities.

Gabriel Hill :Supports project. What side of history do you want to be on? Keep project.

Anna : Great Streets is bringing community together. Takes time to get it right, don't take away.

?: Cars shouldn't have to go into neighborhoods. Parking system is insane.

John Green: Wife has been hit twice by car while biking. Please see this thru.

Martin Rubin: would like to know how response time of emergency vehicles could be improved

Nancy Brown: Venice has always been busy, now diverts traffic to everywhere else.

Wayne: Venice Blvd. has always been this way.

Board Discussion

Greg Tedesco: Would like to see project go forward and get data. Begs our patience, let's go forward for year and see if can make work.

Damien Newton: Supports director motion. Need to address emergency vehicles. Explore if can use Metro fund to help local businesses

Ken Alpern: See Addendum B.

Michelle Krupkin: Most concerned about emergency vehicle and ADA access. Won't be Great Street with empty businesses.

Melissa Stoller: I've heard safety concerns from those who support restoring lanes immediately and those who supportletting project run course. Can't have Great Street and 6-lane high-speed highway. I support letting pilot continue – need data. Our community – and others -- need a place gather.

Rob Kadota: Has great hope for Great Street. Has enormous potential.

Holly Tilson: Zone 6 has been severely impacted. Idea is great but creating a bottleneck isn't going to fix anything.

Robin Doyno: Don't stop in middle, wait and see.

Sherri Akers: Not voting on whether lanes should be restored, but whether should be restored now. Need data.

Susan Klos: Project needs more time.

Paola Cervantes: We need to collect more data. Look at possibly of narrowing median, reducing speed limit. Stopping pilot now now is not solution,

i. **Restoration of 3rd Lane on Venice Boulevard** (submitted by stakeholder petition)

WHEREAS, the Venice Boulevard "Great Street" program has recently been implemented, including several changes to the roadway between Beethoven Avenue and Inglewood Boulevard, and

WHEREAS, the changes include removing one traffic lane in each direction to accommodate a buffer zone for on-street passenger loading of parked vehicles (rather than from the sidewalk) and widening of the bicycle lane, and

WHEREAS, Council District 11 circulated surveys to a very small minority of the community (approximately 450 total surveys, many to students who don't drive) and extrapolated "community-driven" support for many elements of the "Great Street", yet the surveys did not specifically ask the community about the lane reduction element of the program or obtain feedback from the vast majority of those who use Venice Boulevard on a daily basis, and

WHEREAS, the lane reductions have caused significant daily traffic jams, increased cut-through traffic on surrounding residential streets, increased traffic jams on alternate streets throughout the greater Mar Vista area, and increased pollution from idling vehicles, and

WHEREAS, the increased traffic on Mar Vista roadways has had an adverse impact on emergency response times of Fire and Police Department, and

WHEREAS, a grassroots movement of community members has emerged in recent weeks, and have obtained over 1900 electronic signatures asking for the return of the old three traffic lane in each direction configuration, and

WHEREAS, Council District 11 has communicated that the roadway changes consist of a pilot program, using inexpensive temporary materials, and that the City would keep what the community loves and remove what the community does not want,

THEREFORE, Mar Vista Community Council moves to advise Council District 11 to: 1) immediately reverse the lane reduction and return Venice Boulevard to the long established six lane configuration, and 2) further urges the City of Los Angeles Department of Transportation and Council District 11 to provide online access to any and all traffic studies done in advance of the commencement of the lane closures, as well as online access to any and all traffic studies performed after implementation of the Great Street program.

Motion presentation by Ken Merek: Bringing same motion as passed by large margin at Great Streets Ad Hoc Committee meeting; was some question as to whether committee could vote on the motion,

Motion not carried: 3 ayes, 8 nays, 0 abstentions.

ii. **Continuation of Venice Boulevard Pilot Project** (directors motion submitted by Ken Alpern and Sherri Akers)

WHEREAS, the Venice Boulevard "Great Street" pilot project has recently been implemented, including several changes to the roadway between Beethoven Avenue and Inglewood Boulevard, and including the removal of one traffic lane in each direction to accommodate a buffer zone for on-street passenger loading of parked vehicles (rather than from the sidewalk) and the creation of a buffered bicycle lane

WHEREAS, Members of the community have expressed concern about traffic jams, increased cut-through traffic on surrounding residential streets, increased traffic jams on alternate streets throughout the greater Mar Vista area, and increased pollution from idling vehicles, and

WHEREAS, community members have expressed concern about adverse impact on emergency response times of Fire and Police Department,

WHEREAS, community members have expressed concern that the new on-street loading area does not provide convenient sidewalk access for disabled persons and may expose the City to the risk of litigation based upon the American's With Disabilities (ADA) Act,

WHEREAS, MVCC has previously passed this motion in support of Vision Zero and is committed to making any needed changes to support this commitment -

WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation engineers, police officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short), to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

WHEREAS, a grassroots movement of community members has obtained over 1450 electronic signatures asking for the return of the old three traffic lane in each direction configuration, the Mar Vista Community Council hereby additionally requests the following –

- The MVCC requests that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month. MVCC also requests the same data on streets in LA where this same configuration was implemented.
- The MVCC requests an evaluation be done by an ADA consultant
- The MVCC requests that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike) or other organizations similar in focus and expertise.
- That the City of Los Angeles posts all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented
- That the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze.
- That MVCC be provided with a breakdown of all petitions showing a breakdown of signatures indicating the number of signatures by zip code or community of residence.

- That MVCC be provided with the data to date on the survey created by CD11 and updated on a regular basis.
- That MVCC be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented.

NOW, THEREFORE, BE IT RESOLVED that by the adoption of this Resolution, the Mar Vista Community Council hereby urges the City of Los Angeles and grass roots community organizations to provide the needed information promptly with a planned reassessment six months from this date.

Motion presentation

Ken Alpern: Need to focus on Vision Zero. Recommending take stakeholder conerns and assess situration rather than take immediate action without information.

Sherri Akers: This is not a vote to retain the lane reduction, but a vote to gather and analyze data.

Motion to approve by Sherri Akers, 2nd by Ken Alpern. Motion carried: 10 ayes, 1 nay, 0 abstentions.

7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: open
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald
9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Sarah Auerswald
   b. First Vice Chair – Rob Kadota
   c. Second Vice Chair – Sherri Akers

d. Secretary – Melissa Stoller

e. Treasurer – Holly Tilson

i. Report on current financial status

- June bank statement
- Fiscal Year 2016-17 close-out

City books are closed. Must approve a budget in order to use our bank account.

ii. **APPROVAL** of June Monthly Expense Report (MER)

Motion to approve by Holly Tilson, 2nd by Sherri. Akers Motion carried unanimously.

10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

c. **Community Outreach Committee** – Sarah Auerswald, Chair

d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

k. **Bike Mar Vista** - Mitchell Rishe, Chair

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

b. Zone 2 – Damien Newton

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

e. Zone 5 – Michelle Krupkin

f. Zone 6 – Holly Tilson

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 12.a-n on consent.

Removal of items from consent calendar:

12.j-l by Ken Alpern

12.i by Holly Tilson

12.n by Damien Newton

Motion to approve-12..a-I, 12.m on consent by Sarah Auerswald, 2nd by Michelle Krupkin. Motion carried unanimously.

a. **ADMINISTRATIVE MOTION:** LANCC Liaison

MVCC approves the appointment of Chuck Ray as LANCC Liaison.

Approved on consent.

b. **FUNDING MOTION:** 2017-18 Budget (submitted by Executive & Finance Committee)

MVCC approves the Fiscal Year 2017-18 budget (Addendum A).

Approved on consent.

c. **FUNDING MOTION:** Melissa Stoller reimbursement (submitted by Executive & Finance Committee)

MVCC approves the reimbursement of Director Melissa Stoller for Mailchimp fees not to exceed $100.

Approved on consent.

d. **FUNDING MOTION:** Windward School Meeting Space (submitted by Executive & Finance Committee)

MVCC authorizes the payment of $5 for annual use of Windward school facilities for meeting space.

Approved on consent.

e. **FUNDING MOTION:** T&I Meeting Materials Printing (submitted by Executive & Finance Committee)

MVCC approves the payment to Copyland for printing of extra copies of agendas and minutes for the June Transportation & Infrastructure Committee meeting, up to $100.

Approved on consent.

f. **FUNDING MOTION:** Board Retreat (submitted by Executive & Finance Committee)

MVCC authorizes the expenditure of up to $150 for the July 15th Board Retreat: $75 to St. Bede's for room rental and up to $75 for refreshments.

Approved on consent.

g. **FUNDING MOTION:** MailChimp (submitted by Executive & Finance Committee)

MVCC authorizes MailChimp to charge the MVCC credit card for monthly charges for email service (up to $50/month for 2017-18) and set up the credit card on the account.

Approved on consent.

h, **FUNDING MOTION:** Venice Alley Paving (submitted by Transportation and Infrastructure Committee)

Whereas, the MVCC Supports a vibrant and safe commercial corridor for the businesses and customers of Venice Blvd., and

Whereas, the MVCC supports a Matching Budgetary Motion of up to $5000 in the 2017-8 MVCC budget for repairing the alleys on the northern side of Venice Blvd. to best serve that commercial corridor, and $2500 for repairing alleys on the southern side of Venice Blvd.

Therefore MVCC requests that the CD11 allot any available funding towards a contractor to replace and/or repair any significant portions of the alleys immediately paralleling the northern side of Venice Blvd.

Approved on consent.

i. **FUNDING MOTION:** Green Garden Showcase (submitted by Green Committee)

MVCC approves the expenditure of up to $4000 for 2018 Mar Vista Green Garden Showcase supplies, marketing and education.

Motion to approve by Sherri, 2nd by Melissa. Unanimously.

Approved on consent.

j. **POLICY MOTION:** Installation of Modern Bus Shelters at Venice/Centinela and National/Sepulveda (submitted by Transportation & Infrastructure Committee)

WHEREAS, the MVCC has always been in favor of enhancing commuter mobility and quality of life for commuters utilizing all modes of transportation, and

WHEREAS, the MVCC has always supported the rights of bus and other transit commuters to access mass/rapid transit in shelters providing shelter, comfort, and--ideally--LED signage and other amenities to serve the needs of commuters to know when upcoming buses are arriving utilizing the best of modern technologies,

Therefore, the MVCC supports installation of a modern bus shelter at the northwest corner of Venice/Centinela, with protection from the elements and all installable modern amenities, such as LED signage of future bus arrivals powered by solar paneling, to be included if at all possible, and to be supported logistically and financially the Outfront/JCDecaux Street Furniture, the Los Angeles CD11 office, and the MVCC, and

Therefore, the MVCC supports installation of a modern bus shelter at the southwest and southeast corners of National/Sepulveda, with protection from the elements and all installable modern amenities, such as LED signage of future bus arrivals powered by solar paneling, to be included if at all possible, and to be supported logistically and financially the Outfront/JCDecaux Street Furniture, the Los Angeles CD11 office, and the MVCC.

Motion to approve by Ken Apern, 2nd by Michelle Krupkin.

Discussion:

> Ken Alpern: No budgetary impact, paid for by advertising. Outfront/JCDecaux are ready to go forward.

Motion carried unanimously.

k. **POLICY MOTION:** Update on Stormwater Treatment System at Mar Vista Park (submitted by Transportation & Infrastructure Committee)

Whereas, the Mar Vista Community Council (MVCC) has always supported infrastructure and environmental efforts to promote clean and reclaimed storm and other water runoff both locally and regionally, and

Whereas, the MVCC was, and still is, strongly in support of the water reclamation project adjacent to Mar Vista Park to be used to disinfect stormwater for park landscape irrigation, and which was paid for by $4.5 million in City and State funds

Whereas, the MVCC has learned that some significant questions remain unanswered as to the functionality of the water reclamation system for Mar Vista Park,

Therefore, the MVCC expresses strong concerns as to the functionality of the water reclamation system, as well as to the appropriate use of City and State funds and other resources, and when any necessary repairs or improvements will occur, and

Therefore, the MVCC calls for immediate updates and presentations by the L.A. Department of Water and Power, L.A. City Bureau of Sanitation and the L.A. Department of Public Works to the address these questions and concerns, as well as the functional status of the water reclamation project/system, to the MVCC Board of Directors, and to the greater stakeholder constituency of the Mar Vista Community Council.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin. Unanimously.

Discussion:

> Ken Alpern: A lot of the water reclamation project is not working. State trying to grab 4-5 million back from city

Motion carried unanimously.

l. **POLICY MOTION:** Traffic/Transit Studies to Improve Venice Great Streets Project (submitted by Transportation & Infrastructure Committee)

Whereas, the Mar Vista Community Council (MVCC) has always supported efforts to enhance mobility and smooth traffic flow for all modes of transportation in and adjacent to its boundaries, and

Whereas, the MVCC understands that a Great Streets Project on Venice Blvd. seeks to serve the needs of all of its constituents, and

Whereas, the MVCC strongly supports accurate and guiding data, independently-verified, to best serve the needs of commuters on or adjacent to Venice Blvd,

Therefore, the MVCC calls upon the LA Department of Transportation and Metro, working in conjunction with the CD11 office, to supply all appropriate data and/or traffic studies on both Venice Blvd. and adjacent/connecting major thoroughfares like Palms, Centinela, Washington Place, and Washington Blvd for both the morning and the afternoon/evening portions of the day, including rush hour and weekends, particularly before and after implementation of, and in prior years before, the CD 11 Pilot Program on Great Street Venice Blvd., and

Therefore, the MVCC calls upon Metro to work with CD11 to provide bus ridership numbers for Metro regular and Rapid Bus lines on Venice Blvd, particularly before and after the implementation of the CD 11 Pilot Program on Great Street Venice Blvd., and in prior years before, the Great Street Venice Blvd. Project, and

Therefore, the MVCC calls upon the CD11 Office, the L.A. Department of Transportation, and all appropriate City and Metro entities to establish MVCC Board of Directors-approved metrics and quarterly data updates on an ongoing basis.

Motion to approve by Michelle Krupkin, 2nd by Ken Alpern.

Motion carried unanimously.

m. **POLICY MOTION:** Art Walk Support (Director motion submitted by Sarah Auerswald)

Whereas the Mar Vista Community Council has supported the Mar Vista Art Walk since March of 2016, and

Whereas Green Communications Initiative, Inc. is the organizer of the Mar Vista Art Walk, and

Whereas the Mar Vista Art Walk and Green Communications Initiative, Inc. continue to provide beneficial events and services around local Arts, Artists and Environmentally-friendly pedestrian inducements to the community, and

Whereas the Mar Vista Art Walk continues to provide additional benefits to the local economy and small businesses, and

Whereas the Mar Vista Art Walk and Green Communications Initiative, Inc. seek to procure funds through appropriate arts grants and other sources of financial support to sustain them in perpetuity as an ongoing benefit to the community,

Therefore, the Mar Vista Community Council agrees to support the Mar Vista Art Walk and Green Communications Initiative, Inc. in their efforts to procure these funds.

Approved on consent.

n. **POLICY MOTION:** City Sponsored Parking Study (Director motion submitted by Holly Tilson & Ken Alpern)

Whereas-AB744 offers any City the opportunity to use an arbitrary 0.5 parking spaces per bedroom for building projects, it also allows the use of an area-wide or jurisdiction-wide parking study to impose a higher vehicular parking ratio, and

Whereas, the City is using the arbitrary 0.5 parking space per bedroom requirement without any analysis of its impact on parking in the area, and

Whereas-Mar Vista is expecting future density and volume of multifamily housing,

Therefore, be it resolved-The Mar Vista Community Council strongly encourages and requests CD11 and the LA Mayor to authorize and perform a parking study, in cooperation with the MVCC and Mar Vista residents' organizations, as allowed under AB744 and exercise the city's due right to impose an objective standard for vehicular parking in any new development in Mar Vista.

<u>Background Information</u>

While researching various land use codes for an appeal of the 12444 Venice Blvd. project, we discovered that the City was using an arbitrary standard of 0.5 parking space per bedroom, citing a state law. Research showed that the same law allowed the city to do parking studies of an area to provide a more objective, locally-driven assessment of area parking before using the arbitrary 0.5 parking space per bedroom standard.

As this issue is of great interest due to potential land development in the area, we recommend the MVCC be proactive on the broad issue rather than reactive on a project by project basis.

Under Government Code, Section 65915(p)(7), chaptering AB 744:

(7) Notwithstanding paragraphs (2) and (3), if a city, county, city and county, or an independent consultant has conducted an area-wide or jurisdiction-wide parking study in the last seven years, then the city, county, or city and county may impose a higher vehicular parking ratio not to exceed the ratio described in paragraph (1), based upon substantial evidence found in the parking study, that includes, but is not limited to, an analysis of parking availability, differing levels of transit access, walkability access to transit services, the potential for shared parking, the effect of parking requirements on the cost of market-rate and subsidized developments, and the lower rates of car ownership for low- and very low income individuals, including seniors and special needs individuals. The city, county, or city and county shall pay the costs of any new study. The city, county, or city and county shall make findings, based on a parking study completed in conformity with this paragraph, supporting the need for the higher parking ratio.

Clearly, the intent of the state law is to permit local, independent parking studies to drive parking requirements and to impose an arbitrary standard (0.5 spaces per bedroom) when jurisdictions did not have such a study.

Dr. Howard Weisberg, PhD, conducted a limited but scientific study of parking near the 12444 Venice Blvd. project which projected that the 0.5 parking space per bedroom requirement would result in a spillover of 44 on-street parking spaces. That would exacerbate the already intolerable parking gridlock in the area (in this study on-street parking was already at 99.6%). The small sample study can provide a prototype for a larger, city-sponsored survey that could implement the locally driven requirements of AB 744, rather than the arbitrary standard.

The Planning Department has stated that we can expect more projects like 12444 Venice Blvd.. Therefore, a study of the facts, as permitted by the cited law, should be done and applied to other proposed and future development projects as it would help provide an opportunity for more amicable and reasoned discourse and decisions.

Motion to approve by Holly Tilson, 2nd by Ken Alpern.

Public Comment:

Howard Weisberg: State provides for this type of study. City planning shouldn't be done by people yelling at each other without facts.

Board discussion:

KenAlpern: Parking is very expensive for developers. People want to build up. There is money that's supposed to go to more parking every year and it's sucked into general fund.

Holly Tilson: LA City lobbied against this. All cities have option of doing parking study, Los Angeles opted not to.

Motion carried unanimously.

13. **Grievances**, if any received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

Meeting adjourned at 9:58 P.M.

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ADDENDUM A: 2017-18 MVCC Budget

Budget Category	Amount	Detail	TOTALS
100 Operations			
Facilities and Space Rental			
Farmers Market Space	1,200.00		
Storage	2,280.00	190 X 12	
PO Box	132.00		
Meeting space rental			
(Coffee Connection)	600.00	$25 X 2 X 12	
(Windward)	5.00		
(St. Andrew's)	300.00	$25 X 12	
Equipment and Supplies			
Meeting equipment	500.00	misc	
Meeting supplies and printing			
Printing	1,000.00	$83 X 12	
Board training and support			
Business cards/name badges	250.00		
Board retreat	300.00		
Website Hosting	1,900.00	$150 X 12 + $33 x 3	
Extra Data Entry (as needed)	500.00		
Mailchimp Email Service	500.00	$40 X 12	
		OPERATIONS TOTAL	**9,467**
200 Outreach			
Advertising			
Banners, signs, MVCC/event promotion	500.00		
Facebook ads	250.00		
Newsletter			
(Fall Festival)	4,000.00		
MVCC Event expense			
Block, parties ($300 x 7)	1,500.00	$300 X 5	
Community Events			
Fall Festival	10,000.00		
Winter Wonderland	1,000.00		
Art Walk	1,200.00	$300 x 4	

Budget Category	Amount	Detail	TOTALS
Green Garden Showcase	4,000.00		
		OUTREACH TOTAL	**22,450**
300 Community Improvement			
Alley Repair seed money	5,000.00		
		COMMUNITY IMPROVEMENT TOTAL	**5,000**
400 Neighborhood Purpose Grants			
500 Election	5,000.00		
		ELECTION TOTAL	**5,000**
		TOTAL TOTAL	**41,917**

ADDENDUM B: Ken Alpern Comments

We Need To Do Our Jobs

(by Ken Alpern, MVCC Transportation/infrastructure Committee Co-Chair)

The Venice Blvd. issue will not go away, and neither will other related issues, such as intrastructure, mobility the environment, traffic, and planning. The MVCC, its committees, and its Board of Directors has fought for the Expo Line and for traffic impacts from overdevelopment for many years. We've had a history of doing our jobs rather well, and we need to continue them:

1) If we don't realize that Venice Blvd. has always been a secondary highway, akin to a freeway, then we're not doing our jobs.
2) If we don't realize that Venice Blvd. is very different from National Blvd. in its traffic capacity and purposing for car/bike/bus flow, then we're not doing our jobs.
3) If we don't adhere to the original "Downtown Mar Vista" concept of the MVCC, with Mar Vista being a place to go to and not just go through, then we're not doing our jobs.
4) If we don't protect the safety of bicyclists, then we're not doing our jobs.
5) If we don't value the mobility of car motorists, and their safety as well, on this major highway, then we're not doing our jobs.
6) If we don't create sufficient parking to access Mar Vista, then we're not doing our jobs.
7) If we don't propose already-dedicated City funds (currently being diverted to the General Fund) for parking structures to serve our commercial corridor, then we're not doing our jobs.
8) If we don't partner with a developer to create a development with a large parking structure to potentially eliminate the need for a parking lane, and enhance access to Downtown Mar Vista, then we're not doing our jobs.
9) If we don't recognize that traffic flow during the morning and evening rush hours, versus mid-day and late evening portions of the day, creates two entirely different mobility scenarios on Venice Blvd., then we're not doing our jobs.
10) If we're not considering alternative (and safe) routes for bicyclists during rush hour, and to further the intent of a Backbone Bikeway Network, then we're not doing our jobs.
11) If we're not distinguishing and recognizing the value and necessity of Type I and II Bikeways, then we're not doing our jobs.
12) If we ignore the financial and/or environmental and/or quality of life impacts of the greater Westside by significantly impacting car mobility on a major highway, then we're not doing our jobs.
13) If we don't encourage Rapid Bus access to and through Mar Vista for an "Expo Line to the Beach" bus route, then we're not doing our jobs.
14) If we don't establish a safe pedestrian/bicycle access to local restaurants, and search for new ways to encourage both short-term and long-term bicycle routes, then we're not doing our jobs.
15) If we let ANYONE, including ourselves, forget that Venice Blvd. is wide enough for restriping and median narrowing to create three car lanes AND a separated bicycle lane, then we're not doing our jobs.

Let's Just Do Our Jobs!

Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, December 13, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of November 1st, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/1611-01-draftBOD-MINUTES.pdf.
4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Joseph Galloway
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open
   m. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
         - November bank statement
      ii. **APPROVAL** of November Monthly Expense Report (MER)
      iii. Review of 2016-17 budget pending/approved expenditures (https://lacity.quickbase.com/db/bk6c27ec8?a=dr&rid=46&rl=qst)
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
   b. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
   c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   j. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
   m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items a-f on consent.

    a. **FUNDING MOTION: Storage Unit Rental** (Directors motion submitted by Rob Kadota)

    MVCC approves the rental of a storage (Unit #21) at Storquest Storage, 2531 Sawtelle Blvd, LA CA 90064, for $189 a month: $177 plus $12 insurance ($3000 coverage).

b. **FUNDING MOTION: Storage Unit Rental Reimbursement** (Directors motion submitted by Holly Tilson)

MVCC approves reimbursing Rob Kadota $189 for payment of the December storage unit rental.

c. **FUNDING MOTION: Eco Car Expo** (submitted by Green Committee)

Whereas the Mar Vista Community Council will hold the Eco Car Expo on 4/30/17 at the Mar Vista Farmers Market, and

Whereas the Mar Vista Farmers Market provides the space to hold the event free of charge, and

Whereas this event provides a community service to educate our stakeholders on the climate change impact of our transportation choices, supporting the Mayors Sustainable pLAn while also providing outreach for the Mar Vista Community Council to our stakeholders,

The Mar Vista Community Council approves an amount not to exceed $1,000 to cover lawn signs flyers and banners and other materials to promote the event.

d. **FUNDING MOTION: Dog Waste Stations** (submitted by Green Committee)

Whereas unattended pet waste is a large source of stormwater pollution, pet waste left on grassy areas, sidewalks and streets is flushed into our storm drain system and the toxic mix of bacteria from dog waste flows untreated into our local waterways and ocean, and this pollution is harmful to pets, aquatic life and beachgoers, and

Whereas the general public is unaware of the environmental and health risks associated with unattended dog waster, and

Whereas the MVCC can provide a community service that would also promote the role of MVCC in the community,

The Mar Vista Community Council moves to fund an amount not to exceed $1,000 for the purchase and installation of 3 dog waste stations in Mar Vista, locations to be determined. Stations would include educational signage and MVCC recognition.

e. **POLICY MOTION: LA Bees Project** (submitted by Green Committee)

Whereas the Mar Vista Community Council launched the initial feasibility study and first motion of support that ultimately led to the legalization of urban beekeeping in LA Angeles: and

Whereas the USDA reports that the loss of bees continues in devastating numbers with a loss of 44% last year: and

Whereas there is an urgent need to educate the community about the role of pesticides and neonicotinoids in the loss of bees and the importance of pollinator gardens.

The Mar Vista Community Council votes to support the LA Bees Project, a collaboration between LA Beekeepers Association and Honeylove, in their campaign for education and outreach on the urgent need to create and protect pollinator habitats and locating potential locations for demonstration gardens in Mar Vista.

f. **POLICY MOTION: 2017 Homeless Count MOU** (submitted by Executive & Finance Committee)

MVCC agrees to the terms of the Neighborhood Council Opt-In Program MOU (See https://form.jotform.com/62975488974177) and will participate in the 2017 Greater Los Angeles Homeless Count.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.

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Mar Vista Community Council

Regular Meeting of the Board of Directors

Tuesday, November 1, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting call to order at 7:06 P.M

   In attendance: Robin Doyno, Paola Cervantes, Rob Kadota, Sarah Auerswald, Holly Tilson, Michelle Krupkin and Damien Newton. Ken Alpern arrived 7:39 P.M.

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of October 13th, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://marvista.org/files/161013-BOD-MINUTES-DRAFT.pdf

   Motion by Damien Newton, 2nd by Paola Cervantes. Motion approved with 1 abstention by Michelle Krupkin.

4. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Question from the public about Historic Fire Station 62. Question from the public about whether the Green Committee policy motion letter has gone out; chair will double check.

5. **Community Memorial Observations:** Tom Hayden, Others

   Robin Doyno had a nice tribute to Tom Hayden. Christopher McKinnon mentioned Mar Vista neighbor Janet Brown, who just passed away.

6. **PRESENTATION: LA 2024 Olympics Bid**

   Joslyn Treece, Community Manager of LA 2024, gave the presentation. It's amazing and we should win (opinion).

7. **PRESENTATION: The Mayor's Office of Public Engagement** (15 min.)

   Daniel Tamm gave a presentation meant to refresh our understanding of what his office does. Overview of the initiatives they are working on:

   - Mayor's Youth Council
   - Sustainability plan – is on the website (LAMayor.org/sustainability)
   - Great Streets Challenge Grant – applications now being accepted for 2nd round. Now open to all streets.
   - Welcome Home project – delivery date December 10th – volunteers are welcome.

   Mr. Tamm is also the Interfaith liaison.

8. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas rep not assigned.
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

9. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Next meeting is Wednesday, November 16th. Agenda closes Saturday, November 12th. ADA Curb Cuts have been mentioned as an issue in the neighborhood. Mid-block cross walk on Washington Place? Still doing a study. Holly will re-send Greenwood & Palms issues.

b. DWP MOU: Open

c. LANCC: Joseph Galloway

d. One Water LA: Christopher McKinnon

Met October 26. Joint venture of Sanitation & DWP. Mission is to make a new water plan for 2020. There are many projects in the pipeline.

e. WRAC: Rob Kadota/Joseph Galloway

f. WRAC LUPC: Sharon Commins

g. City Budget Advocates: Holly Tilson, Joseph Galloway

h. Recode LA: Sharon Commins

i. Animal Services: Tom Ponton

j Fall Festival: Albert Olson

k Friends of Historic FS 62: Albert Olson

l. Mar Vista Celebrates 90: Open

Chair will appoint a committee chair and committee will begin to meet in 2017.

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Make It Mar Vista happening November26.

10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota

Creation of bicycle sub-committee.

Sidewalk repair update at big joint meeting in January: AIP, T&I and Safety & Security.

Chair would like the Board to reflect on where we are and where we can be. Plus Chair will gather feedback from each Board member. Pleased with involvement level so far. Has asked for each Committee to submit sign-in sheets so he can solicit feedback from meeting attendees with the goal of improving our efforts overall.

b. First Vice Chair – Sarah Auerswald

Handbook overview: funding procedure policies + Copyland policies.

All Committee Chairs who need copies made for their meetings should send their packets to Rob Kadota, who will handle sending them out for printing. The goal is to contain costs and to be sure the Board knows how much we are spending on copies.

c. Second Vice Chair – Joseph Galloway

d. Secretary – Melissa Stoller

e. Treasurer – Holly Tilson

i. Report on current financial status

- October bank statement:

ii. **APPROVAL** of October Monthly Expense Report (MER)

Motion to approve by Michelle Krupkin, 2nd by Ken Alpern.

DONE is saying we won't get out quarterly disbursement because we owe them the budget package. No questions on our current MER. March-June 2016 MERs have been submitted to DONE.

Motion carried unanimously.

iii. Review of 2016-17 budget pending/approved expenditures (https://lacity.quickbase.com/db/bk6c27ec8?a=dr&rid=46&rl=qst)

Revised Budget Proposal presented to the Board. Motion to approve.

Motion by Robin Doyno, 2nd by Michelle Krupkin. Motion carried unanimously.

11. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

       Website underway.

    b. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
    b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
    c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

       Homeless Count is in January. Report on SORO Town Hall; Robin has videotape of the event.

    e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

       Venice Blvd. relinquishment has finally taken place and work has begun to fix the street. Sidewalks will be repaired. Councilmember Bonin was on site helping on October 31.

    g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

       Grand View water regulator repair work by DWP will commence mid-November and is planned to continue until June 2017.

    h. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

       Next meeting is November 16th. Agenda items include Gateway and Barrington projects

    i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    j. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
    m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin

       Rutts may open soon. Light on Lotus (new yoga studio) has opened and is thriving.

    f. Zone 6 – Holly Tilson

       Concern about knock-knock burglaries, plus RVs. Venice High is asking for comments on campus modernization plans; next informational meeting November 29th at 6pm at Venice High.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: *Directors may request removal of any item from the consent calendar*

MVCC approves Items a-h on consent.

Motion to pull 13.b. & 13.f by Holly Tilson, 2nd by Paola Cervantes. Motion carried unanimously.

Motion to approve 13.a, c-e, g and h on consent by Robin Doyno, 2nd by Ken Alpern. Motion carried unanimously..

Public comment from Mitchell Rishe: happy to do work on subcommittee.

a. **FUNDING MOTION: Tablecloths** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of an additional $100, in addition to $600 already approved, for the purchase of three blue tablecloths with the MVCC logo and one green tablecloth with the Green Committee logo for use at the Farmers' Market tents, meetings and other MVCC events.

Carried on consent.

b. **FUNDING MOTION: Winter Wonderland** (submitted by Executive & Finance Committee)

MVCC approves the payment of $1000 to LAPD Pacific Boosters for their Annual Winter Wonderland Event.

Motion to approve by Holly Tilson, 2nd by Michelle Krupkin, Motion carried unanimously

c. **FUNDING MOTION: AIP Neighborhood Congress materials printing** (submitted by Executive & Finance Committee)

MVCC approves the payment of $35.37 to Copyland for printing of AIP Neighborhood Congress materials.

Carried on consent.

d. **FUNDING MOTION: Meeting materials printing** (submitted by Executive & Finance Committee)

MVCC approves the payment of $100.27 to Copyland for printing of MVCC special 9/14 meeting materials.

Carried on consent.

e. **FUNDING MOTION: Board Support (100 - Operations) materials printing** (submitted by Executive & Finance Committee)

MVCC approves the payment of $588.10 to Copyland for printing of MVCC business cards

Carried on consent.

f. **POLICY MOTION: Atmosphere Cafe, 12034 Venice Blvd., case No. ZA-2016-3511-CUB; ENV-2016-3512-CE** (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council supports the CPUC permit by Atmosphere Cafe, 12034 Venice Blvd., case No. ZA-2016-3511-CUB; ENV-2016-3512-CE and urges the city to expedite approval of this permit so that Atmosphere can begin evening service before the holiday season.

A copy of this resolution will be sent to all appropriate city agencies, including but not limited to, the Mayor's Office of Great Streets, the Department of City Planning, and the Office of Councilmember Mike Bonin as well as the applicant.

Motion to approve by Damien Newton, 2nd by Michelle Krupkin. Discussion of the project. Motion carried unanimously.

g. **ADMINISTRATIVE MOTION: Bicycling Subcommittee Chair** (submitted by Rob Kadota, MVCC Chair)

MVCC appoints Mitch Rishe to chair a sub-committee on Bicycling under the auspices of our Transportation and Infrastructure committee.

Carried on consent.

h. **ADMINISTRATIVE MOTION: DWP MOU** (submitted by Rob Kadota, MVCC Chair)

MVCC appoints Chuck Ray to represent MVCC as our designated DWP MOU liaison.

Carried on consent.

14. **Grievances**, if any, received
15. **Future agenda items**
16. **Public Comment**

    Comment about improvements wanted for Mar Vista Park. Suggested that maybe they should meet with Park Advisory Board.
17. **Adjournment**

    Motion to adjourn at 8:53 by Sarah Auerswald, 2nd by Holly Tilson. Approved unanimously.

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Mar Vista Community Council

Regular Meeting of the Board of Directors

Thursday, October 13, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of September 14th, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/160914-BOD-draftMINUTES_0.pdf
4. **Approval of October 21st, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/160921-BOD-draftMINUTES.docx
5. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director tracie.field@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by scott.malsin@assembly.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Open
   c. LANCC: Joseph Galloway
   d. DWP Recycled Water Liaison: Christopher McKinnon www.ladwp.com/recycledwater
   e. WRAC: Rob Kadota/Joseph Galloway
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson, Joseph Galloway
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson
   k Friends of Historic FS 62: Albert Olson
   l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Rob Kadota
      i. Need to identify replacement for Sharon Cummins on WRAC LUPC (Land Use and Planning Committee).
   b. First Vice Chair – Sarah Auerswald
   c. Second Vice Chair – Joseph Galloway
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
         - September bank statement: http://marvistacc.org/files/09-2016-Bank-Statement.pdf
      ii. **APPROVAL** of August Monthly Expense Report (MER)
9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Website Ad Hoc Committee** – Chair TBD
   b. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair
   c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   h. **Planning and Land Use Management Committee** - Mitchell Rishe, Co-chairs; Michael Millman & Latrice Williams, Vice-chairs
   i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   j. **Santa Monica Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
   m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair
10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: *Directors may request removal of any item from the consent calendar*

    MVCC approves Items 11.a-11.m on consent.

    a. ADMINISTRATIVE MOTION: PLUM Committee Chair (submitted by Rob Kadota, MVCC Chair)

MVCC appoints Damien Newton to be chair of the Planning and Land Use Management Committee, replacing Mitchell Rishe and thanking him for his service.

b. ADMINISTRATIVE MOTION: PLUM Committee Vice-Chair (submitted by Rob Kadota, MVCC Chair)

MVCC removes Michael Millman as vice-chair of the Planning and Land Use Management Committee, thanking him for his many years of service and leaving in place Latrice Williams as vice-chair.

c. **FUNDING MOTION: Tablecloths** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of an additional $100, in addition to $600 already approved, for the purchase of three blue tablecloths with the MVCC logo and one green tablecloth with the Green Committee logo for use at the Farmers' Market tents, meetings and other MVCC events.

d. **FUNDING MOTION: Election Signs and Banners** (submitted by Executive & Finance Committee)

MVCC approves the payment of $60 to Tickled Plum for the design of MVCC election signs and banners.

e. **FUNDING MOTION: Election advertising** (submitted by Executive & Finance Committee)

MVCC approves the following payments for MVCC election advertising:

- $10 to Facebook for page boost
- $110 to the Argonaut for ad

f. **FUNDING MOTION: Meeting materials printing** (submitted by Executive & Finance Committee)

MVCC approves the payment of $73.86 to Copyland for printing of MVCC meeting materials.

g. **FUNDING MOTION: Website hosting** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of $32.09 monthly for website hosting by RIMU.

h. **FUNDING MOTION: September Website hosting** (submitted by Executive & Finance Committee)

MVCC approves reimbursing $32.09 to Holly Tilson for payment of the September website hosting invoice.

i. **FUNDING MOTION: October Website hosting** (submitted by Executive & Finance Committee)

MVCC approves reimbursing $32.09 to Holly Tilson for payment of the October website hosting invoice.

j. **FUNDING MOTION: August meeting materials printing** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of $$153.09 for printing of August meeting materials.

k. **FUNDING MOTION: Board retreat room rental** (submitted by Executive & Finance Committee)

MVCC approves the payment of $75 to St. Bede's Church for room rental for MVCC's BOD retreat held on August 13, 2016.

l. **FUNDING MOTION: Website** (submitted by Community Outreach Committee)

Whereas the website ad hoc committee has met and decided on The Web Corner for the redesigned MVCC website, therefore, be it resolved that the MVCC will hire The Web Corner to create a new website for MVCC and migrate over all the existing files for a fee of $2000, plus an ongoing monthly maintenance fee of $150/month once the new site is live.

m. **POLICY MOTION: Grandview Market, 12210 Venice Blvd., case No. ZA-2016-3148** (submitted by Planning & Land Use Management Committee)

Grandview Market, 12210 Venice Blvd., case No. ZA-2016-3148: MVCC approves a Conditional Use Permit to continue the sale of beer and wine for on-site consumption and the sale of beer for off-site consumption in conjunction with an existing 4,794 square foot restaurant/market including a 183 square foot patio.

12. **Grievances**, if any, received
13. **Future agenda items**
14. **Public Comment**
15. **Adjournment**

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Mar Vista Community Council

Regular Meeting of the Board of Directors

Thursday, October 13, at 7:00 P.M.
Mar Vista Recreation Center Gymnasium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:00 P.M.

   Quorum present: Rob Kadota, Melissa Stoller, Robin Doyno, Sherri Akers, Holly Tilson, Susan Klos, Paola Cervantes, Sarah Auerswald, Damien Newton, Greg Tedesco, Joseph Galloway

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Approval of September 14th, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/160914-BOD-draftMINUTES_0.pdf

   Motion to approve by, 2nd by.

   Motion carried unanimously.

4. **Approval of October 21st, 2016 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker) http://www.marvista.org/files/160921-BOD-draftMINUTES.docx

   Motion to approve by, 2nd by.

   Motion carried unanimously.

5. **Public Comment & Announcements** - for items not on the agenda (max 1 min each unless waived by the Chair)

   Albert Toubia: Centinela Ave. – sidewalks & big trees – terrible condition.

   Rene Abrey: Renter. Has problem with smoking. Culver City has no smoking ordinance in MDU. LA doesn't have – does Mar Vista? Would like ordinance that specific to this community. Wasn't able to open door because of smoke from neighbor. Contact Claudia.Martin@lacity.org - deals with quality of life situations; bring to Safety & security committee. Could also take up at WRAC.

   Rob Kadota: City is looking at sidewalk repair project. Also part of long lawsuit for ADA issues; fixing pathways that are most used by people with disabilities; use myLA311 to report.

6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)

   a. Mar Vista Recreation Center – Director tracie.field@lacity.org caroline.la

   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

      Addressing emergency preparedness issues. Working with Traffic Division re: speeding in Westside Village residential area. Speed hump program starting; only two projects per City Council district.

      S. Robertson NC hosting Homeless Solutions Town Hall on THrusday, Oct. 27, 7:00 pm, at Museum of Toleranceto build compassionate empathy and get good ideas.

      Pilot flyer for myLA311 application. Highly encourage using. Within last 9 months, MVCC is 2nd of 10 to upload requests.

   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Mike hosting booth at fall festival 10:30 – 12:30 office hours.

      Public hearing on 12444 Venice Blvd. (S side of Venice at Wasatch) is Thursday, Nov. 3 , 6:00 pm, WLA Municipal Building. Staff contact is lakisha.hull@lacity.org; copy Len & Mike.

Met with DWP – they're planning work on regulator station (makes sure water pressure isn't too high). On east side of Grand View, just N of Venice Blvd. Project will take a few months. Will need to close a lane.

Getting complaints about traffic impact on Centinela from Scattergood Project. Conduit is in; pulling high voltage cable. Will be complete in February. Holiday moratorium.

Coordination on road work? Len: do try to coordinate.

d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by scott.malsin@assembly.ca.gov

h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j.– US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Next meeting Nov. 16; agenda closes Nov. 12.

Sherri: curb cuts? Linda: can ask for.

Joseph: Bureau of Engineering does curb cuts; would need to do study.

b. DWP MOU: Open

c. LANCC: Joseph Galloway

d. One Water LA Liaison: Christopher McKinnon

e. WRAC: Rob Kadota/Joseph Galloway

f. WRAC LUPC: Sharon Commins

g. City Budget Advocates: Holly Tilson, Joseph Galloway

h. Recode LA: Sharon Commins

Downtown LA 2040: Proposed Downtown Code has been released. Week long open studio event was held at the historic Bradbury Building, 304 S. Broadway St from Monday, October 3rd - Saturday, October 8th, 2016. Additional information available at http://www.dtla2040.org/about.html.

Next ZAC meeting: October 26, 2016, 6-8pm in the Robert Janovici Conference Room [Room 525 City Hall]--200 North Spring Street, Los Angeles CA 90012. As always, call ahead for parking OR take Metro.

i. Animal Services: Tom Ponton

Establishing relationship with Animal Services department.

Sherri: dog way stations in front of MDU – have some in S. Mar Vista, really successful.Would like to put on next Green Committee meeting – do outreach to MDUs.

Tom: need to put where they won't bother anyone from smell. Need donor – about $200 – and someone to empty container. Will have 2 at Festival.

j Fall Festival: Albert Olson

Oct. 22. 55 booths, including 15 festival partners/sponsors. Need volunteers at festival as well as for setup (8-10).

Will have free samples for dogs at festival.

Sarah: suggests have band members also do 1 hour of volunteer time.

Sherri: put appeal for volunteers on committee agendas.

k Friends of Historic FS 62: Albert Olson

Waiting to hear back analysis of package submitted.

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Monthly coffee time Oct. 30. Make It Mar Vista in November.

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Rob Kadota

i. Need to identify replacement for Sharon Cummins on WRAC LUPC (Land Use and Planning Committee).

Looking for replacement for Sharon in near future; she's no longer living in Los Angeles.

b. First Vice Chair – Sarah Auerswald

Working on handbook for leadership.

c. Second Vice Chair – Joseph Galloway

d. Secretary – Melissa Stoller

Will be out of the country October 14-November 2; internet access will be limited.

e. Treasurer – Holly Tilson

i. Report on current financial status

- September bank statement: http://marvistacc.org/files/09-2016-Bank-Statement.pdf

ii. **APPROVAL** of September Monthly Expense Report (MER)

Motion to approve by Meliossa, 2nd by Sherri.

Discussion:

Sarah: Election funding items on agenda – are they things that should have been paid last fiscal year?

Holly: thinks DONE let $2300 carry over.

Motion carried unanimously.

9. **Committee Reports** - (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. **Website Ad Hoc Committee** – Chair TBD

Committee met, answered remaining questions.

b. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

b. **Community Outreach Committee** – Sarah Auerswald, Chair; Joseph Galloway, Vice-chair

Mostly dealing with website. Also looking at promotional materials.

Newsletter didn't get to everyone; let us know so we can follow up with delivery company. Hope for more time next time so can proofread.

Rob: thanks Sarah, Melissa & Sherri for their hard work on Newsletter.

c. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Meeting Monday, 6:00: speaker on Tools for dealing with dementia.

Purposeful Aging Los Angeles: Sherri is rep for CD 11

d. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

   Looking at scarf project, Laudry Love, Little Free Pantry.(similar to Little Free Library)

e. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

   Eco Car Expo is April 30.

f. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

h. **Planning and Land Use Management Committee** - Mitchell Rishe, Co-chairs; Michael Millman & Latrice Williams, Vice-chairs

i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

   Nov. meeting moved to Nov. 3.

j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

k. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

l. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

m. **Elections and By-laws**- Rob Kadota, Chair; Holly Tilson, Vice-chair

   Will meet before end of year.

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

    a. Zone 1 – Ken Alpern

       Concern about RVs on Sepulveda building up.

       Just recently had some burglaries. Caught

    b. Zone 2 – Damien Newton

       Burglary issues. Neighborhood Watch starting up.

       St. Andrew: decorate car in parking lot, get treats.

       Richland bike & walk to school – talking about expanding to other schools.

    c. Zone 3 – Melissa Stoller

       Need street cleaning on Centinela north of Palms.

    d. Zone 4 – Greg Tedesco

       Parking issues with car repair (2 Guys from Sweden). On Barrington, street filling up with long term parking.

    e. Zone 5 – Michelle Krupkin

    f. Zone 6 – Holly Tilson

       Most houses broken into with open windows; don't put trash barrels against house – burglars will use to climb up.

11. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: *Directors may request removal of any item from the consent calendar*

MVCC approves Items 11.a-11.m on consent.

Request to remove the following items from consent calendar.

Sarah: pull C

Joseph: Pull A

Rob: B

Damien: Pull A

Motion to approve on consent by Ken , 2nd by Sherri.

Motion carried unanimously.

a. ADMINISTRATIVE MOTION: PLUM Committee Chair (submitted by Rob Kadota, MVCC Chair)

MVCC appoints Damien Newton to be chair of the Planning and Land Use Management Committee, replacing Mitchell Rishe and thanking him for his service.

Motion to approve by Sherri, 2nd by Robin.

Discussion:

Damien: has been writing about planning, land us for over 9 years; something that is interested in.

Motion carried: 10 ayes, 0 nays, I abstension (Damien).

b. ADMINISTRATIVE MOTION: PLUM Committee Vice-Chair (submitted by Rob Kadota, MVCC Chair)

MVCC removes Michael Millman as vice-chair of the Planning and Land Use Management Committee, thanking him for his many years of service and leaving in place Latrice Williams as vice-chair.

Motion to approve by Sherri, 2nd by Sarah.

Discussion:

Rob: Michael has offered to suspend himself for 90 days, backed up with letter of resignation. Not within our procedures; would be self-imposed.

Damien: has no idea what we're talking about.

Sherri: We had really difficult year last year with a number of contentious issues, Michael was largely instigator in getting community inflamed before BOD was able to engage with members of community. Constant violations of Brown Act.

Holly: What were the issues Michael inflamed community about?

Paola: Has heard many versions of people Michael has offended.

Melissa: No process for suspension, could be reappointed in three months.

Ken: A lot of people not being represented here. Well aware of how Michael does things. Has also held meeting together. If pass in this way, will offend a lot of people.

Robin: Brought long list of grievances when brought to committee, one still before California Fair Political Practices. We've been dealing with real ethical problem for more than a year.

Motion carried unanimously: 0 ayes, 8 nays, 3 abstentions.

c. **FUNDING MOTION: Tablecloths** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of an additional $100, in addition to $600 already approved, for the purchase of three blue tablecloths with the MVCC logo and one green tablecloth with the Green Committee logo for use at the Farmers' Market tents, meetings and other MVCC events.

Motion to approve by , 2nd by .

Discussion:

Sarah: motion to table, take back to committee.

Motion carried unanimously.

d. **FUNDING MOTION: Election Signs and Banners** (submitted by Executive & Finance Committee)

MVCC approves the payment of $60 to Tickled Plum for the design of MVCC election signs and banners.

e. **FUNDING MOTION: Election advertising** (submitted by Executive & Finance Committee)

MVCC approves the following payments for MVCC election advertising:

- $10 to Facebook for page boost
- $110 to the Argonaut for ad
-

f. **FUNDING MOTION: Meeting materials printing** (submitted by Executive & Finance Committee)

MVCC approves the payment of $73.86 to Copyland for printing of MVCC meeting materials.

g. **FUNDING MOTION: Website hosting** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of $32.09 monthly for website hosting by RIMU.

h. **FUNDING MOTION: September Website hosting** (submitted by Executive & Finance Committee)

MVCC approves reimbursing $32.09 to Holly Tilson for payment of the September website hosting invoice.

i. **FUNDING MOTION: October Website hosting** (submitted by Executive & Finance Committee)

MVCC approves reimbursing $32.09 to Holly Tilson for payment of the October website hosting invoice.

j. **FUNDING MOTION: August meeting materials printing** (submitted by Executive & Finance Committee)

MVCC approves the expenditure of $$153.09 for printing of August meeting materials.

k. **FUNDING MOTION: Board retreat room rental** (submitted by Executive & Finance Committee)

MVCC approves the payment of $75 to St. Bede's Church for room rental for MVCC's BOD retreat held on August 13, 2016.

l. **FUNDING MOTION: Website** (submitted by Community Outreach Committee)

Whereas the website ad hoc committee has met and decided on The Web Corner for the redesigned MVCC website, therefore, be it resolved that the MVCC will hire The Web Corner to create a new website for MVCC and migrate over all the existing files for a fee of $2000, plus an ongoing monthly maintenance fee of $150/month once the new site is live.

Motion to approve by , 2nd by .

Discussion:

Motion carried unanimously.

m. **POLICY MOTION: Grandview Market, 12210 Venice Blvd., case No. ZA-2016-3148** (submitted by Planning & Land Use Management Committee)

Grandview Market, 12210 Venice Blvd., case No. ZA-2016-3148: MVCC approves a Conditional Use Permit to continue the sale of beer and wine for on-site consumption and the sale of beer for off-site consumption in conjunction with an existing 4,794 square foot restaurant/market including a 183 square foot patio.

Motion to approve by , 2nd by .

Discussion:

Eric Newman: Renewing beer & wine license. Would allow on consumption at sidewalk tables. Will respect neighbors, getting goo feedback.

Tom Ponton: Louies's – lost battle to have outdoor seating. Eric: Louie's is on property line; Grandview Market has space inside property line.

Angela Heckland: Market add a lot to neighbor.

Motion carried unanimously.

12. **Grievances**, if any, received
13. **Future agenda items**

Next BOD: will have 2024 Olympics presentation.

14. **Public Comment**

Ken Alpern (speaking as member of public): Measure M: main complaint that hears is "it doesn't do enough". Makes sure we have some funds in pipeline to give us some mobility.

Paola: moment of silence for Nora Fine. Recently lost battle with breast cancer.

Santa Monica voted on plan for 20 acres of airport not use (parking, FAA can't block).

15. **Adjournment**

Meeting adjourned at 9:35 P.M.

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Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday August 8th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of July 11th, 2017 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker).
4. **Public Comment & Announcements** - for items not on the agenda (max 30 seconds each, 30 minutes total, unless waived by the Chair)
5. **Community Memorial Observations**
6. **Appointment of Community Director**

   All Candidates who have submitted a statement of candidacy will have the option to make a short statement. The Chair will then make the appointment, subject to approval by the Board.
7. **Discussion of Fall Festival Sponsorship** – possible administrative motion to follow
8. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
9. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Fall Festival: Albert Olson

k. Friends of Historic FS 62: Albert Olson

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
    a. Chair - Sarah Auerswald
    b. First Vice Chair – Rob Kadota
    c. Second Vice Chair – Sherri Akers
    d. Secretary – Melissa Stoller
    e. Treasurer – Holly Tilson
        i. Report on current financial status
            - July bank statement
        ii. **APPROVAL** of July Monthly Expense Report (MER)
11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
    c. **Community Outreach Committee** – Sarah Auerswald, Chair
    d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
    e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
    f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
    h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
    i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
    j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    k. **Bike Mar Vista** - Mitchell Rishe, Chair
    l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 13.a-ae on consent.

    a. **Administrative Motion**: 2nd Signer (director motion submitted by Melissa Stoller)

MVCC approves making Sarah Auerswald the 2nd signer on the MVCC account.

b. **Administrative Motion**: Budget Package (submitted by Executive & Finance Committee)

MVCC approves the 2017/18 budget package and strategic plan (see http://marvista.org/docs/34485418-9077.pdf).

c. **Funding Motion:** Storage Unit (submitted by Executive & Finance Committee)

MVCC approves expenditure of $2280 for Storquest Storage Unit, to be paid at $190/month.

d. **Funding Motion:** Website Hosting & Maintenance (submitted by Executive & Finance Committee)

MVCC approves expenditure of $1650 for website hosting and maintenance, to be paid to The Web Corner at $150/month.

e. **Funding Motion:** Dedicated Emails (submitted by Executive & Finance Committee)

MVCC approves expenditure of $385 for dedicated emails, to be paid to The Web Corner at $35/month.

f. **Funding Motion:** Old Website Hosting (submitted by Executive & Finance Committee)

MVCC approves expenditure of $32.09 for hosting old website for 1 month, to be paid to RIMU.

g. **Funding Motion:** Email Service (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $480 for email service, to be paid to Mailchimp at $40/month.

h. **Funding Motion:** Coffee Connection Meeting Room (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $600 for meeting location fees, to be paid to The Vineyard Church at $50/month.

i. **Funding Motion:** St. Andrews Church Meeting Room (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $300 for meeting location fees, to be paid to St. Andrew's Church at $25/month.

j **Funding Motion:** Printing (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $1000 for printing costs, to be paid to Copyland at $83/month.

k. **Funding Motion:** MailChimp Reimbursement (submitted by Executive & Finance Committee)

MVCC approves up to $100 to reimburse Melissa Stoller for paying the MVCC MailChimp expenses until the new MVCC credit card is set up.

l. **Funding Motion:** RIMU Hosting Reimbursement (submitted by Executive & Finance Committee)

MVCC approves $64.58 to reimburse Sarah Auerswald for paying the RIMU hosting expenses until the new MVCC credit card is set up.

m. **Funding Motion:** Board Retreat Refreshments Reimbursement (submitted by Executive & Finance Committee)

MVCC approves $37.68 to reimburse Sarah Auerswald for purchase refreshments for the July 15, 2017, Board Retreat as the the new MVCC credit card was not set up.

n. **Funding Motion:** Budget Revision (submitted by Executive & Finance Committee)

MVCC approves the revised 2017/18 budget (Addendum A). NOTE: possible motions to amend based on funding requests.

o. **Funding Motion:** Emergency Preparation Signs (submitted by Committee on Pubic Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1,500 for emergency preparation signs, promotional material, and for other related purposes.

p. **Funding Motion:** Art Walk (Director motion submitted by Sarah Auerswald)

MVCC approves $500 per quarter (for a total of $2000) to support outreach efforts during Mar Vista Art Walk in 2017-18 and cover printing costs

q. **Funding Motion:** NWNA Block Party (Director motion submitted by Damien Newton)

Whereas MVCC wants to offer support to local resident associations to help them gather for their annual events, and Whereas the North Westdale Neighborhood Association has their Block Party and Talent Show on September 9th, and Whereas the MVCC leadership can attend and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $500 to the North Westdale Neighborhood Association Block Party & Talent Show

r. **Funding Motion:** Hilltop Neighbors Block Party (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure $300 for the Hilltop Neighbors annual block party.

s. **Funding Motion:** Outreach Materials Storage (Director motion submitted by Sarah Auerswald)

MVCC approves the payment of $1200 to the Mar Vista Farmers Market for 2017-18 fiscal year storage of outreach materials.

t. **Funding Motion:** Fall Festival (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of $4000 for the Mar Vista Fall Festival.

u. **Funding Motion:** Fall Newsletter (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of up to $4000 for layout, printing and distribution of a Fall Newsletter.

v. **Funding Motion:** Replacement tablecloth (Director motion submitted by Sarah Auerswald)

MVCC approve up to $350 to purchase a replacement tablecloth for meetings - amount to come from the "equipment" category in the budget.

w. **Funding Motion:** Storage payment reimbursement (Director motion submitted by Holly Tilson)

MVCC approves reimbursing Rob Kadota for the following payments he made to StorQUest for MVCC's storage space: June 2017 rental $178 + insurance $12 + late fee $26.70 for total of $216.70; July rental $196 + insurance $12 for a total of $208

x. **Funding Motion:** Program to challenge racism, sexism, homophobia & islamaphobia (submitted by Education, Arts & Culture Committee)

The Education Arts and Culture Committee of the Mar Vista Community Council moves to approve a request for $500 in funding for developing and staging a program challenging racism, sexism, homophobia and islamaphobia for Mar Vista schools. Based on research of the Southern Poverty Law Center, L.A. County Commission on Human Relations, etc., we would present to interested classrooms and/ or student clubs with discussion, study, information and response to each of the challenges of racism, sexism, homophobia and islamaphobia.

y. **Funding Motion:** NPG Proposals (submitted by Education, Arts & Culture Committee)

Where as MVCC has a budget of $1,500 for NPGs; and Where as this will provide an opportunity for the youth of the Mar Vista to engage in community building experiences; The MVCC Education, Arts & Culture Committee will ask Mar Vista public schools via e-flyer to submit applications of proposals, created by their students, with a focus on: Public Safety, such as intolerance, sexual harassment/ assault, bullying (emphasizing healthy relationships), etc., or Community Bridge Building, such as youth/seniors, immigration issues, LGBTQ issues, cultural diversity, inclusion, homelessness, etc. Proposals will be submitted no later than November 6 with a suggested budget range between $100-$500. Each school may submit multiple applications. E-flyer will include a link to the criteria to meet NPG requirements.

z. **Policy Motion:** Cell Phone Tower (submitted by Planning & Land Use Management Committee)

WHEREAS preliminary construction of a cell phone tower has begun on city-owned property adjacent to 3815 McLaughlin Avenue in West Los Angeles;

WHEREAS there is no notice of construction posted anywhere in the immediate area near the construction cite;

WHEREAS no notice was given to neighbors surrounding the construction area and;

WHEREAS no notice was given to the Mar Vista Community Council and;

WHEREAS proper permitting has not been completed for this project, no permits are found on searches of city websites ZIMAS and LADBS and;

WHEREAS no hearings were held on the addition of a cell phone tower to the neighborhood where neighbors could voice their concerns and;

WHEREAS the community protested the existing cell tower on the 3815 McLaughlin property in 2008

WHEREAS a similar tower was proposed several years ago in the same area and was widely opposed by the community;

Therefore let it be resolved that the Mar Vista Community Council asks the city do everything in its power to immediately stop the construction of the cell phone tower.

Let it further be resolved that the company building the tower brings renderings of the proposed tower to MVCC so that the community can see what the towers will look like if they are built;

Let it further be resolved that the relevant city departments explain how this project was permitted, if it was, without public notice and explain how they will make sure this doesn't happen in the future.

aa. **Policy Motion:** Los Angeles General Plan (submitted by Planning & Land Use Management Committee)

Whereas the city has for months been working on a plan behind closed doors for the overall vision and dreams for Los Angeles, the **General Plan**, which is to be presented to the public and Neighborhood Councils sometime this fall;

And whereas Mayor Garcetti has said, residents must have "a sense of ownership over the development of our communities," and City Councilman Jose Huizar, chair of the powerful PLUM committee, pledged to bring "accountability and transparency back into our General Plan and Community Plan processes";

And whereas Los Angeles is several years behind other Western U.S. cities in involving its citizens in a General Plan update process that starts from the ground up;

And whereas public money and public interest are major factors in the earliest decision-making on our General Plan Update process, strategies, and dreams;

And whereas it is widely agreed the public cannot fully participate in General Plan Updating meetings, hearings and debates that unfold during the day downtown;

And whereas closed-door meetings on the fundamental debates and decisions about our dreams and goals for updating of the General Plan can only create more distrust and dismay over the city's broken planning system;

We request that the Planning Department Work Group meeting now underway be about our shared ideas and ideals for the Los Angeles general plan and its many elements. This process should be transparent and set in the evenings, and perhaps on weekends wherein the venues may be in different neighborhoods, including Mar Vista. Naturally, the meetings will be open to the public, and representatives from each neighborhoods alliance will be invited. The meeting schedule shall be expanded beyond the four meetings contemplated, and of course they will not be closed-door sessions. In connection with the neighborhood meetings, there shall be appropriate outreach at least two weeks in advance of the meeting, and written agendas and other promotional materials, and written agendas and other promotional material shall be available and offered at the meetings.

We further request, in the same vein, that the Mayor's Planning Task Force and Transportation Infrastructure Steering Committee for the General Plan both be made fully transparent, be set at evening and weekend hours; be open to the public as of now; and expand their closed-door meetings to several additional meetings that follow the prescription in this paragraph.

ab. **Policy Motion:** Senate Bill 649 (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council opposes SB 649, which removes from cities the discretionary regulation of "small cell" cell phone towers in the public right-of-way and on city property. Exceptions for historic zones and Coastal Zone are included, but scenic highways and R zones are not included. Local control should be maintained. Cities have capability to properly analyze applications within existing laws and balance protection of neighborhoods with the need for increased wireless capacity.

Should the legislation be passed by both the Senate and Assembly, we urge Governor Jerry Brown to veto the legislation.

Background Information: See Addendum B

ac. **Policy Motion:** Gateway Project (submitted by Planning & Land Use Management Committee)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, The mission of the Mar Vista Community Council (MVCC) is to provide a forum for discussion of issues that affect the quality of life of MVCC Stakeholders, and to facilitate stakeholder communication and serve as the advocate for the MVCC area with officials of the City of Los Angeles and other governmental and non-governmental entities.

WHEREAS, the Gateway Project is located within the boundaries of the West Los Angeles Sawtelle Neighborhood Council (WLASNC) just 1/4 mile from Zone 2 of the MVCC;

WHEREAS, gridlock traffic throughout Mar Vista and West Los Angeles has continued to become increasingly problematic;

WHEREAS, the Gateway Project would increase traffic and increase the burden to find local parking;

WHEREAS, the Gateway Project calls for 129 units that will replace "mom and pop" businesses that have been serving the community for years and that these businesses will be missed;

WHEREAS, the WLASNC has voted not to support each of two separate versions of the Gateway Project;

BE IT RESOLVED THAT the MVCC supports the decision of the West L.A. Neighborhood Council to not support the Gateway Project.

ad. **Policy Motion:** NPG guidelines (submitted by Education, Arts & Culture Committee)

MVCC approves EACC guidelines for 2017-2018 fiscal year that any NPG applicant partner with an interested Mar Vista school prior to requesting money MVCC through EACC.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

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ADDENDUM A: Revised 2017-18 MVCC Budget

Budget Category: General Operational	**Total Amount**
Storage	
Storquest	$2,280.00
Website	
The Web Corner: website maintenance	$1,650.00
The Web Corner: emails	$385.00
The Web Corner: Extra Data Entry	$500.00
RIMU Hosting	$96.27
Email Service	
Mail chimp email service	$480.00
Meeting rooms rental	
The Vineyard	$600.00
St Andrew's Lutheran Church	$300.00
St Bede's	$75.00
Windward School	$5.00
PO Box rental	$132.00
Farmer's Market rental	$1,200.00
Equip & supplies (misc)	
misc	$1,100.00
Mtg supplies & printing	
printing	$1,000.00
Board Training & Support	
Business cards/name badges	$250.00
Board Retreat	$37.68
Operations total	**$10,090.95**
Budget Category: Outreach	
Advertising	
Banners/sign/event promotion	$500.00
Facebook ads	$250.00
Emergency Prep public safety outreach	$1,500.00
Newsletter	
(Fall Festival)	$4,000.00
MVCC Events	
Block parties (5 X $300)	$1,500.00
Westside Senior Health & Wellness Fair	$500.00
Venice High Grease Night	$300.00
Community Events	
Fall Festival	$4,000.00
Winter Wonderland	$1,000.00
Art Walk	$2,000.00
Green Garden Showcase	$4,000.00
Outreach Total	**$19,550.00**

Budget Category: Elections	
Election expenses	$5,000.00
Budget Category: Community Improvement Grants	
Alley repair/seed money	$5,000.00
Budget Category: Neighborhood Purpose Grants	$2,000.00
Budget Total	**$42,440.95**

ADDENDUM B: Motions Opposing SB 649 Background Information (Provided by WRAC)

SB 649 Status Update – as of July 24, 2017

SB 649 – the bill eliminating local control over large cell towers – recently passed unanimously in the Assembly Communications & Conveyance Committee. Assuming passage in the Appropriations Committee, it will then go to the full Assembly for a vote, likely in late August or early September.

Some Assembly committee members claimed to be concerned with local control – and the bill's author promised to somehow strengthen local governments' ability to regulate for design and location – yet SB 649 passed with no such amendments. In fact, amendments further expanding the restrictions on local control (now broadly covering all "communications" facilities) have been proposed by committees and accepted by the bill's author (Hueso, SD 40/Imperial Co.).

Committee members were clearly more swayed by the telecom lobby than by the extensive opposition, which includes major newspapers (e.g., LA Times editorial and article by venerable columnist George Skelton); respected statewide organizations such as the League of CA Cities and the American Planning Association; the County of Los Angeles and 27 other CA counties; LA Mayor Garcetti, Councilmembers Bonin (http://pacpalicc.org/wp-content/uploads/2017/06/SB2064920Letter.pdf) and Koretz; numerous other public officials statewide; and over 220 CA cities and towns. The Westside Regional Alliance of Councils (WRAC) has also submitted opposition based on members' prior unanimous support for local control over such facilities (http://pacpalicc.org/wpcontent/uploads/2017/06/WRACPosition_SB649CellTower_062117-2.pdf). WRAC leadership has also recommended to member councils a motion opposing SB 649: http://westsidecouncils.com/pending/.

Voices in opposition are increasing, with local media outlets now weighing in (e.g., the Argonaut, http://argonautnews.com/cell-tower-bill-gets-bad-reception/, and the UCLA Daily Bruin, http://dailybruin.com/2017/07/16/editorial-sb-649-needs-to-be-vetoed-to-preserve-local-governmentpower/). However, it is widely-acknowledged (see Skelton/LAT) that *many more opposition voices will be required in order to defeat the bill*[1]

SB 649 is an unprecedented, unnecessary attempt to strip local governments of control; they will be forced to allow the telecom industry to install large towers on public property (including parks and arguably even schools) for a minimal fee (market rate leasing is prohibited); and local discretionary authority will be eliminated (including in residential zones), resulting in thousands of new poles with refrigerator-sized equipment installed next to homes and in other sensitive areas with no public input.

It appears that only a huge public outcry or a Governor's veto can now stop this bad bill. Simply put: "People should not be forced to stare at ugly refrigerators dangling outside their homes." (Skelton/ http://www.latimes.com/politics/la-pol-sac-skelton-telecom-att-verizon-california-bill-20170710-story.html).

By: Christina Spitz
For ID purposes: Chair/President Emeritus,
Pacific Palisades Community Council (PPCC)
Current Board Member, PPCC
Member, WRAC Leadership (alt. PPCC rep)
Member, WRAC-LUPC (alt. PPCC rep)
Email: ppfriends3@hotmail.com

[1] Los Angeles-area members' positions are mixed. ASM Dababneh (the west Valley) is a co-sponsor of the bill and voted Yes in committee, as did ASM Santiago (downtown LA). ASM Ridley-Thomas voted No and ASM Bloom was a "No Vote Recorded" in the Local Government Committee; staff for both ASMs have indicated they will be No's in a floor vote on the bill. ASM Burke has not indicated a position. All three ASMs whose districts encompass parts of CD11 (Ridley-Thomas, Bloom, Burke) should be urged to vote No on SB 649 in the expected floor vote of the full Assembly; Gov. Brown should also be urged to veto the bill should that become necessary.

Talking Points re SB 649 ("Small Cell" Cell Tower Regulation)

By Chris Spitz, PPCC Chair/President Emeritus - June 2017

- SB 649 (Hueso) passed in the Senate in May 2017 and is now being considered by the Assembly (expected to be assigned soon to relevant committees—Communications & Conveyance, Local Government—with a floor vote in the full Assembly possible this summer if passed in committees).
- SB 649 would eliminate local government discretionary authority (i.e., require "by right" permits only, without notice, hearing, review of location/design/aesthetics) over so-called "small cell" (actually not so- small) cell towers in the public right of way and on public property statewide, with few exceptions. The League of California Cities (League) warns that the bill "unnecessarily and unconstitutionally strips local authority over public property and shuts out public input and local discretion by eliminating consideration of the aesthetic and environmental impacts of 'small cells.'"
- What are "small cells" under SB 649? Short answer: cell towers with antennas up to 6 cu. ft. in volume and related equipment up to 21 cu. ft. (roughly the size of an old phone booth), with no single piece of equipment exceeding 9 cu. ft.; other ancillary equipment, such as power pedestals, are not counted in the calculation of equipment volume. Commentators have noted that this definition actually encompasses very large structures, that the label "small cell" is a misnomer, and that the bill would effectively remove local control over most cell towers.
- SB 649 excludes "small cells" only on fire stations, in historic zones and in the coastal zone (i.e., local government discretionary authority would remain in those areas), but not in other sensitive areas such as in residential zones (in front of homes), in areas protected by duly enacted Specific Plans, in or adjacent to parkland, open space, scenic highways, public parks and recreational facilities, schools and in otherwise protected mountain areas. Critics have questioned why only the three limited areas are deemed sensitive enough to require discretionary review.
- SB 649 is backed by the telecom industry, which seeks rapid deployment of 5G infrastructure (requiring thousands more poles/antennas). The industry argues that local government regulatory regulation unreasonably impedes deployment and should be streamlined.[2] Cities and counties deny that local regulation unreasonably impedes deployment and stress that local authority (police power) is protected by the state Constitution ("Home Rule"). The League and other opposing organizations acknowledge that Californians should have access to telecommunications facilities, but explain that this goal is "not inherently in conflict with appropriate local planning."
- SB 649 is opposed by over 110 cities, counties and organizations statewide, including the County of Los Angeles, the City and County of San Francisco, Santa Monica, Culver City, West Hollywood, Beverly Hills, the League of California Cities, the League of California Counties, the American now pending in City Council (CF 17-000 S69). CMs Bonin and Koretz oppose the bill.
- PPCC and BCC oppose SB 649. The author requests that all WRAC member-councils ASAP take up and pass the recommended SB 649 motion and urge their respective Assemblymembers (Bloom, Ridley-Thomas, Burke) to oppose the bill. Contact Chris at ppfriends3@hotmail.com for more information (she has been working on cell regulation matters since 2009).

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[1] Contrast the more reasonable definition of "small cell" in proposed revisions to the City's Above Ground Facilities (AGF) Ordinance, supported by WRAC and long-stalled in the Council Public Works Committee (CF 09-2645) – up to 3 cu. ft. of antennas, not counting related equipment. In 2010, the then-WRAC membership unanimously passed a Motion calling for comprehensive revision of the City's cell tower regulations to provide for protection for communities and local neighborhoods "to the fullest extent of the law." SB 649 directly contradicts this goal and will make the much-needed AGF Ordinance revisions (as well as existing local regulations) largely moot.

[2] A parallel legislative effort is underway in numerous states nationwide and also at the federal level (Notice of Proposed Rulemaking regarding streamlining small cell deployment currently pending in the FCC).

WRAC-Recommended Motion and Background Information re SB 649

See: http://westsidecouncils.com/motion/cell-towers-aka-wireless-facilities-public-right-way-city-property/.

Cell towers aka wireless facilities in public right-of-way and on city property

Proposed by WRAC LUPC on June 21, 2017

Passage deadline: September 2017

- Passed by Pacific Palisades Community Council and Westwood Community Council *[update: Brentwood Community Council and South Robertson Neighborhood Council have also passed the motion to date]*

Motion

WRAC recommends opposing SB 649, which removes from cities the discretionary regulation of "small cell" cell phone towers in the public right-of-way and on city property. Exceptions for historic zones and Coastal Zone are included, but scenic highways and R zones are not included. Local control should be maintained. Cities have capability to properly analyze applications within existing laws and balance protection of neighborhoods with the need for increased wireless capacity

Background

More information in the talking points attachment. WRAC previously weighed in on the issue in 2010, 2011, and 2013.

On June 21, 2017, WRAC authorized sending a letter stating its long advocacy for local control of cell towers (attached below).

Bill text:
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB649*Status:* Senate approved bill, which is similar to a bill from last year. Assembly will consider it next. Telecom companies need more pole space and facilities for 5G capacity.

- Sizes of cell panels are big (6 cu. ft.) and sizes of equipment panels are big (21 cu.ft.), and can be reduced. *[note: sizes have been increased; 35 cu.ft. additional equipment; excluded ancillary equipment unlimited size]*
- Telecom companies can spend more money to rent space on existing public poles (streetlights, etc.).
- Opponents to bill include 100 *[now over 220]* cities, League of California Cities, League of California Counties, American Planning Institute.

Download additional background

Talking Points re SB-649
WRAC Cell Tower Letter 12.2.11
WRAC Cell Tower Letter 12.16.13
WRACPosition_SB649CellTower_062117

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday August 8th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:02. P.M.

   Quorum present: Rob Kadota, Robin Doyno, Sarah Auerswald, Holly Tilson, Sherri Akers, Melissa Stoller, Michelle Krupkin, Paola Cervantes, Ken Alpern

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of July 11th, 2017 Board of Directors Meeting Minutes** (public comment permitted; 1min per speaker).

   Motion to approve by Melissa Stoller, 2nd by Rob Kadota. Correction: pg. 6, Michelle Krupkin's comments. Motion as amended carried unanimously (Ken Alpern absent).

4. **Public Comment & Announcements** - for items not on the agenda (max 30 seconds each, 30 minutes total, unless waived by the Chair)

   Venice Blvd.

   Mitchell Rishe: This (bike lane) is how it's done all over the world.

   Waymon Wade: Bike lane unsafe, people need to walk across to get to sidewalk.

   Steven Odere: Bad for business, bad for people who live in area. Concerned about lack of community input.

   Sara Guzman: Objects to bike lane and to cutting speaker time;

   Jason Fineia: As pedestrian, Venice is much more dangerous with bike lanes.

   Suzanne Hines: Mar Vista resident. Appalled at July BOD meeting. Clearly 70-30 split for restoring l is against bike lanes.

   Selena Inouye: Representing change.org petition against lane change. Will get own data and share with community.

   Art Fielder: Venice configuration is confusing and ugly.

   Dave Davis: Commuter who uses Venice Blvd. Is against lane reduction.

   Sheri Odere: Worried about emergency response. Restore lanes, why won't you listen to us?

   Kennard Ramsey: Wants start date of Venice Blvd. data gathering. ANS: May 20.

   Sarah Furlong: Traffic spilling into her neighborhood - more cars than before, not slowing down.

   Martha Santana, Mitchell Ave: Speaking as pedestrian – dangerous, cars not slowing down.

   Roni Dressel: Venice Great Street is disaster for businesses.

   Amy Schoenbaum, Venice & Victoria: Has had several close calls with cars turning right. No longer uses bike lane.

   Dennis Mozerman: Thanks for 4-way stop at Palms & Greenwood. Opposed to lane reconfiguration.

   Richard Hall: Venice Blvd. Is nuisance, public safety issue.

   Stoplight at Sawtelle & Charnock

   Ana Fernandez: Against traffic light at Sawtelle & Charnock. Should just have stop sign.

   Mary Ann Martinez: Lives in Mar Vista. Opposes traffic light at Sawtelle & Charnock. It's unfair to person who lives at corner.

   Guillermo Rebagliati: Against traffic light, it's not necessary, won't prevent accidents.

Leslie Neal, Globe Ave: Has long thought need stoplight at Sawtelle & Charnock

Donna Welker: Has problem getting out of driveway, stoplight would make it worse.

Jose Fernandez. Opposed to traffic light. Traffic will be starting and stopping, lives next to.

Other.

Marty Rubin: President North Westdale Neighbors Association. 4th annual block party and talent show on September 9. Putting call out for talent.

Robin Doyno: Minnesota governor declared terrorist act when mosque was bombed last Saturday.

Steve Donwoody: Invites everyone to come to Dem Club meeting at Culver City Community Center,

5. **Community Memorial Observations**

None

6. **Appointment of Community Director**

All Candidates who have submitted a statement of candidacy will have the option to make a short statement. The Chair will then make the appointment, subject to approval by the Board.

Candidates:

Sara Roos (out of town)

Vanessa Diaz: Looks forward to getting more involved in MV community

Elliott Hanna: Co-Chair of Committee on Public Safety, working with LAPD, Postal Service, Fire Station. Started monthly speaker series. Wants to get community more involved.

Discussion

Damien: three great candidates to choose from

Motion to approve appointment of Elliott Hanna as Community Director by Sarah Auerswald. Motion carried unanimously.

7. **Discussion of Fall Festival Sponsorship** – possible administrative motion to follow

Presentation by Sarah & Rob

Fall Festival is in flux. May or may not take place this year, may look different this year. Depends on how structured, who sponsors, who runs it. Concerns about liability; examining to see if prudent to continue.

Festival was to be vehicle for celebrating Mar Vista Turns 90. If no festival, will celebrate at Farmers' Market.

a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

Jessie Holzer – Great Street:

July 22 held Great Streets Open House, received 120 written comments. Reviewing options for right turns. Reviewing green paint comments. Fire Department is getting transponders to turn lights green. Next report-back is at 90 days.

Median Landscaping between Lincoln & Sepulveda is underway

Access speaker will be at Great Streets meeting.

Comments/Questions:

Sarah Auerswald: Venice High School wants to adopt median in front of VHS (unless city is planting).

Sherri Akers: Thanks for saving 5 of the 15 trees slated for removal. Assuming will be 25 new trees, wants to know what trees were selected.

Sarah Auerswald: Coordinate with Michelle Krupkin on future DOT meetings RE: Great Streets.

Michelle Krupkin: when will trees be planted on Venice to replace those removed? Need specific date.

Question: Does DOT data take into account people no longer taking Venice Blvd? ANS: looks at traffic diversion.

Question: Was strip to measure traffic for 26 hours, then it was removed. ANS: might be gathering cell phone data 24/7.

Question: City-wide, millions spent on median landscaping, then not watered or maintained. Sarah Auerswald: Venice was Cal Trans state highway until about a year ago.

Lives on corner of Charnock & Sawtelle, against signal. Sarah Auerswald: T&I will address, Those interested in this should sign up to receive MVCC email.

d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov

h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

Neighborhood Council elections scheduled now for 2018, City Council committee meeting postponed till August 22. Can reach out via council file.

Melissa Stoller: Is committee aware NCs need to reserve large amount of funding just in case election is 2018. If put off decision to move elections to 2019, reserved funds become difficult to spend, might pass up other opportunities.

9. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Last meeting was July 19, minutes are posted on MVCC website. Next meeting is September 22 at 10:00 a.m., not open to public. Agenda closes one week before (9/13 at noon).

Five of 7 items on last agenda tabled till September.

LADOT is doing study for Sawtelle//Charnock stoplight; big backlog for studies. People can email comments to T&I and to DOT. Would be left turn signal. Was request for turn signal at Westminster; DOT engineer decided it would be better to put at Charnock.

Ken Alpern: T&I will meet 1st Wednesday of September.

Sherri Akers: Rather than waiting till DOT does study, they should get community input. Give Melissa DOT contact info to include in Friday eblast.

Ken Alpern: Ask CD 11 office to put temporary hold on light.

b. DWP MOU: Chuck Ray

DWP material is on MVCC website.

Three presentations at last meeting; will be on website soon.

- David Wright presentation on labor agreement.
- DWP PRESENTATION on Cadiz proposal to generate power using underground aquifer and pipeline to another reservoir. Federal government previously turned down – bad for environment – but more receptive now.
- Dr. Pickle prepared material about what is being paid for similar jobs outside DWP; raises will be pretty modest and data-based.

Dr. Pickle's 5 year appointment expired, now month-to-month appointment. Should be reappointed or replaced as soon as possible.

Ken Alpern: What is your opinion about Dr. Pickle serving another term? Chuck Ray: Last time there was 8-month nationwide search. Dr. Pickle had difficulty getting started because the City made it difficult; he couldn't hire staff for 18 months. Dr. Pickle is well-qualified, has found ways to get his word out, is willing to serve another term.

c. LANCC: Chuck Ray

Up to $10,000 in rebate money for repairs that bring sidewalk up to ADA standards. Then property owner is responsible for sidewalk. SEQA clearly states that sidewalks are responsibility of city.

Issue of commissioner non-attendance at meetings—preventing quorum.

LANCC believes city has broken spirit of Neighborhood Councils.

d. One Water LA: Christopher McKinnon

One Water's report on storm water & sewage (what to do with it, how to collect/reuse) might be finalized soon.

e. WRAC: Sarah Auerswald

Next meeting 3rd Wednesday of August.

f. WRAC LUPC: Sharon Commins

g. City Budget Advocates: Holly Tilson

h. Recode LA: Sharon Commins

i. Animal Services: Tom Ponton

j Fall Festival: Albert Olson

k Friends of Historic FS 62: Albert Olson

Working on mission statement and building out board. Need to raise $2M

About 75 people attended BBQ.

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

Next coffee time is Tursday, August 16, 8:00 A.M. the Coffee Cnnection

10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair - Sarah Auerswald

Regarding letters recently mailed to board members and others: take photo of return address, police are now involved.

b. First Vice Chair – Rob Kadota

Trying posting agenda instead of making lots of copies. Let Rob know if you have other ideas

c. Second Vice Chair – Sherri Akers

d. Secretary – Melissa Stoller

Signup to receive weekly Mar Vista newsletter email.

e. Treasurer – Holly Tilson

i. Report on current financial status

This is 1st MER produced by city using new system.

- July bank statement

ii. **APPROVAL** of July Monthly Expense Report (MER)

Motion to accept July MER by Holly Tilson, 2nd by Sherri. Akers. Motion carried unanimously.

11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Working on documents required to authorize Green Garden Showcase.

b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

At moment planning that election will be next June.

c. **Community Outreach Committee** – Sarah Auerswald, Chair

Meeting Thursday, August 10, 6:30 P.M. at Mar Vista Library. Any ideas are welcome, need volunteers

d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

Meeting Wednesday, August 10: speakers, Q&A session. update on murals

e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Purposeful Aging is launching survey to public August 14. Don't want just to go to older adults, want to plan city for those who are aging.

g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Homeless resource guide is available on table.

h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Talking about moving meeting dates, looking at first Thursday of month.

Rob Kadota: Would conflict with Art Walk & Bike Mar Vista.

Ken Alpern: Works well for PLUM to meet before T&I.

Planning 101, August 16, open to public.

j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Will meet 1st Wednesday of month, beginning September 6.

k. **Bike Mar Vista** - Mitchell Rishe, Chair

Hosting ride on Sunday, 10:00 A.M. from FM to Ballona Creek. Ciclavia this Sunday.

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Arranging meeting with Allison Holdorff Polhill (rep for school board member Nick Melvoin) .

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Meets 1st Saturday of month, 6:00 P.M. 4 people at last meeting (increase).

Santa Monica is writing off LA, doesn't mind pushing impacts over LA.

Guest speaker in December—airport environmental activist.

Damien Newton: Increase in helicopter traffic? Martin: No longer coming in the suggested way, now coming in over LA.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Valerie Fontaine requesting use of MVCC sound system October 12, 6:30-9:00, at St. Johns for preparedness fair.

b. Zone 2 – Damien Newton

Block party is September 9.

c. Zone 3 – Melissa Stoller

Westdale not having its annual block party.

Hilltop party is September 9. all afternoon.

d. Zone 4 – Greg Tedesco

e. Zone 5 – Michelle Krupkin

Cell tower issue.

SLO is officer coming back from shoulder injury.

Kids are doing donuts in South Park oval in cars.

Wall St. Pizza started construction.

All day parking on Washington, no parking enforcement.

f. Zone 6 – Holly Tilson

Traffic impacts of Venice lane reconfiguration, lots of cut-thru traffic.

Addressing cell towers, very large ones have gone up on Palms

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 13.a-ae on consent.

Removal of items from consent calendar:

13. c, l , q, s by Holly

13.z, aa by Damien

13.x,y, ad. by Rob

13.ac by Melissa

Motion to approve-12..a-b, d-k, m-p, r, t-w, ab on consent by Ken Alpern, 2nd by Sherri.Akers. Motion carried unanimously.

a. **Administrative Motion**: 2nd Signer (director motion submitted by Melissa Stoller)

MVCC approves making Sarah Auerswald the 2nd signer on the MVCC account.

Approved on consent.

b. **Administrative Motion**: Budget Package (submitted by Executive & Finance Committee)

MVCC approves the 2017/18 budget package and strategic plan (see http://marvista.org/docs/34485418-9077.pdf).

Approved on consent.

c. **Funding Motion:** Storage Unit (submitted by Executive & Finance Committee)

MVCC approves expenditure of ~~$2280~~*2496* for Storquest Storage Unit, to be paid at ~~$190~~*208*/month.

Friendly amendment by Holly Tilson: new monthly charge is $196 + $12.. Motion to approve as amended by Holly Tilson, 2nd by Damien Newton. Motion carried unanimously.

d. **Funding Motion:** Website Hosting & Maintenance (submitted by Executive & Finance Committee)

MVCC approves expenditure of $1650 for website hosting and maintenance, to be paid to The Web Corner at $150/month.

Approved on consent.

e. **Funding Motion:** Dedicated Emails (submitted by Executive & Finance Committee)

MVCC approves expenditure of $385 for dedicated emails, to be paid to The Web Corner at $35/month.

Approved on consent.

f. **Funding Motion:** Old Website Hosting (submitted by Executive & Finance Committee)

MVCC approves expenditure of $32.09 for hosting old website for 1 month, to be paid to RIMU.

Approved on consent.

g. **Funding Motion:** Email Service (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $480 for email service, to be paid to Mailchimp at $40/month.

Approved on consent.

h. **Funding Motion:** Coffee Connection Meeting Room (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $600 for meeting location fees, to be paid to The Vineyard Church at $50/month.

Approved on consent.

i. **Funding Motion:** St. Andrews Church Meeting Room (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $300 for meeting location fees, to be paid to St. Andrew's Church at $25/month.

Approved on consent.

j **Funding Motion:** Printing (submitted by Executive & Finance Committee)

MVCC approves expenditure of up to $1000 for printing costs, to be paid to Copyland at $83/month.

Approved on consent.

k. **Funding Motion:** MailChimp Reimbursement (submitted by Executive & Finance Committee)

MVCC approves up to $100 to reimburse Melissa Stoller for paying the MVCC MailChimp expenses until the new MVCC credit card is set up.

Approved on consent.

l. **Funding Motion:** RIMU Hosting Reimbursement (submitted by Executive & Finance Committee)

MVCC approves $~~64.58~~*64.18* to reimburse Sarah Auerswald for paying the RIMU hosting expenses until the new MVCC credit card is set up.

Friendly amendment by Holly Tilson: amount should be $64.18. Motion to approve as amended by Holly Tilson, 2nd by Michelle Krupkin. Motion carried unanimously.

m. **Funding Motion:** Board Retreat Refreshments Reimbursement (submitted by Executive & Finance Committee)

MVCC approves $37.68 to reimburse Sarah Auerswald for purchase refreshments for the July 15, 2017, Board Retreat as the the new MVCC credit card was not set up.

Approved on consent.

n. **Funding Motion:** Budget Revision (submitted by Executive & Finance Committee)

MVCC approves the revised 2017/18 budget (Addendum A). NOTE: possible motions to amend based on funding requests.

Approved on consent.

o. **Funding Motion:** Emergency Preparation Signs (submitted by Committee on Pubic Safety)

The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1,500 for emergency preparation signs, promotional material, and for other related purposes.

Approved on consent.

p. **Funding Motion:** Art Walk (Director motion submitted by Sarah Auerswald)

MVCC approves $500 per quarter (for a total of $2000) to support outreach efforts during Mar Vista Art Walk in 2017-18 and cover printing costs

Approved on consent.

q. **Funding Motion:** NWNA Block Party (Director motion submitted by Damien Newton)

Whereas MVCC wants to offer support to local resident associations to help them gather for their annual events, and Whereas the North Westdale Neighborhood Association has their Block Party and Talent Show on September 9th, and Whereas the MVCC leadership can attend

and use the occasion as a chance to do Outreach for the MVCC, Therefore, be it resolved, that the MVCC will pay $~~500~~300 to the North Westdale Neighborhood Association Block Party & Talent Show

Friendly amendment by Holly Tilson to change amount to $300. Damien Newton accepts, 2nd by Sherri Akers.. Motion carried Unanimously.

r. **Funding Motion:** Hilltop Neighbors Block Party (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure $300 for the Hilltop Neighbors annual block party.

Approved on consent.

s. **Funding Motion:** Outreach Materials Storage (Director motion submitted by Sarah Auerswald)

MVCC approves the payment of $1200 to the Mar Vista Farmers Market for 2017-18 fiscal year storage of outreach materials.

Paid 2017-18 storage fee in June. Sarah Auerswald accepts tabling.

t. **Funding Motion:** Fall Festival (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of $4000 for the Mar Vista Fall Festival.

Approved on consent.

u. **Funding Motion:** Fall Newsletter (Director motion submitted by Sarah Auerswald)

MVCC approves the expenditure of up to $4000 for layout, printing and distribution of a Fall Newsletter.

Approved on consent.

v. **Funding Motion:** Replacement tablecloth (Director motion submitted by Sarah Auerswald)

MVCC approve up to $350 to purchase a replacement tablecloth for meetings - amount to come from the "equipment" category in the budget.

Approved on consent.

w. **Funding Motion:** Storage payment reimbursement (Director motion submitted by Holly Tilson)

MVCC approves reimbursing Rob Kadota for the following payments he made to StorQUest for MVCC's storage space: June 2017 rental $178 + insurance $12 + late fee $26.70 for total of $216.70; July rental $196 + insurance $12 for a total of $208

Approved on consent.

x. **Funding Motion:** Program to challenge racism, sexism, homophobia & islamaphobia (submitted by Education, Arts & Culture Committee)

The Education Arts and Culture Committee of the Mar Vista Community Council moves to approve a request for $500 in funding for developing and staging a program challenging racism, sexism, homophobia and islamaphobia for Mar Vista schools. Based on research of the Southern Poverty Law Center, L.A. County Commission on Human Relations, etc., we would present to interested classrooms and/ or student clubs with discussion, study, information and response to each of the challenges of racism, sexism, homophobia and islamaphobia.

Discussion:

Robin Doyno: Motion embraces incredibly pertinent situation in our community. Looking into getting speaker on hate crimes at EACC meeting. This is seed money.

Sherri Akers: Ncomfortable with paying speaker.

Ken Alpern: When talking about schools, need to be sure they would accept. Perhaps do materials for Farmers' Market.

Rob Kadota: Is there commitment from schools? Maybe do discussion at Library. Broaden to whole community, not just students/young adults. Loves the vision, perhaps other wording (ism's).

Sarah Auerswald: Need to put through event process.

Melissa Stoller: Suggests tabling until get more clarity.

Michelle Krupkin: Knows people who would be thrilled to come and talk about this.

Robin Doyno: Felt it lwould be easier to mold young minds, don't yet have cooperation of schools.

EACC willing to table.

y. **Funding Motion:** NPG Proposals (submitted by Education, Arts & Culture Committee)

Where as MVCC has a budget of $1,500 for NPGs; and Where as this will provide an opportunity for the youth of the Mar Vista to engage in community building experiences; The MVCC Education, Arts & Culture Committee will ask Mar Vista public school and *Mar Vista-based youth oriented non-profits* via e-flyer to submit applications of proposals, created by their students, with a focus on: Public Safety, such as intolerance, sexual harassment/ assault, bullying (emphasizing healthy relationships), etc., or Community Bridge Building, such as youth/seniors, immigration issues, LGBTQ issues, cultural diversity, inclusion, homelessness, etc. Proposals will be submitted no later than November 6 with a suggested budget range between $100-$500. Each school may submit multiple applications. E-flyer will include a link to the criteria to meet NPG requirements.

Motion to approve by Robin Doyno, 2nd by Damien Newton.

Paola Cervantes: Wants approval to send out requests for proposals to schools

Rob Kadota: Friendly amendment to include A26 and other 501c youth-oriented organizations

Motion as amended carried unanimously.

z. **Policy Motion:** Cell Phone Tower (submitted by Planning & Land Use Management Committee)

WHEREAS preliminary construction of a cell phone tower has begun on city-owned property adjacent to 3815 McLaughlin Avenue in West Los Angeles;

WHEREAS there is no notice of construction posted anywhere in the immediate area near the construction cite;

WHEREAS ~~no~~ notice was given *two years ago* to neighbors surrounding the construction area and;

WHEREAS no notice was given to the Mar Vista Community Council and;

WHEREAS proper permitting has not been completed for this project, no permits are found on searches of city websites ZIMAS and LADBS and;

WHEREAS no hearings were held on the addition of a cell phone tower to the neighborhood where neighbors could voice their concerns and;

WHEREAS the community protested the existing cell tower on the 3815 McLaughlin property in 2008

WHEREAS a similar tower was proposed several years ago in the same area and was widely opposed by the community;

Therefore let it be resolved that the Mar Vista Community Council asks the city do everything in its power to immediately stop the construction of the cell phone tower.

Let it further be resolved that the company building the tower brings renderings of the proposed tower to MVCC so that the community can see what the towers will look like if they are built;

Let it further be resolved that the relevant city departments explain how this project was permitted, if it was, without public notice and explain how they will make sure this doesn't happen in the future.

Motion to approve by Damien Newton, 2nd by Michelle Krupkin.

Damien Newton: Permit was attached on to another permit (now expired) 2 years ago. Never did any public outreach. Wasn't a good public process, city needs to do better.

Ken Alpern: Has seen towers done very well, understands city is constrained by state.

Sherri Akers: Limited amount of public outreach 2 years ago.

Motion carried unanimously

aa. **Policy Motion:** Los Angeles General Plan (submitted by Planning & Land Use Management Committee)

Whereas the city has for months been working on a plan behind closed doors for the overall vision and dreams for Los Angeles, the **General Plan**, which is to be presented to the public and Neighborhood Councils sometime this fall;

And whereas Mayor Garcetti has said, residents must have "a sense of ownership over the development of our communities," and City Councilman Jose Huizar, chair of the powerful PLUM committee, pledged to bring "accountability and transparency back into our General Plan and Community Plan processes";

And whereas Los Angeles is several years behind other Western U.S. cities in involving its citizens in a General Plan update process that starts from the ground up;

And whereas public money and public interest are major factors in the earliest decision-making on our General Plan Update process, strategies, and dreams;

And whereas it is widely agreed the public cannot fully participate in General Plan Updating meetings, hearings and debates that unfold during the day downtown;

And whereas closed-door meetings on the fundamental debates and decisions about our dreams and goals for updating of the General Plan can only create more distrust and dismay over the city's broken planning system;

We request that the Planning Department Work Group meeting now underway be about our shared ideas and ideals for the Los Angeles general plan and its many elements. This process should be transparent and set in the evenings, and perhaps on weekends wherein the venues may be in different neighborhoods, including Mar Vista. Naturally, the meetings will be open to the public, and representatives from each neighborhoods alliance will be invited. The meeting schedule shall be expanded beyond the four meetings contemplated, and of course they will not be closed-door sessions. In connection with the neighborhood meetings, there shall be appropriate outreach at least two weeks in advance of the meeting, and written agendas and other promotional materials, and written agendas and other promotional material shall be available and offered at the meetings.

We further request, in the same vein, that the Mayor's Planning Task Force and Transportation Infrastructure Steering Committee for the General Plan both be made fully transparent, be set at evening and weekend hours; be open to the public as of now; and expand their closed-door meetings to several additional meetings that follow the prescription in this paragraph.

Motion to approve by Damien Newton, 2nd by Rob Kadota.

Public Comment:

Elana speaking in support. Can amend. Asks that it be sent to Bonin, and Garcetti. Losing tree canopy, drafting motion to address.

Discussion:

Sherri Akers: Reluctant to specify evening & weekend meetings unless asking for public input because of overtime hours.

Ken Alpern: agrees with Sherri. Would like to specify 7:00 pm for evening meetings plus weekends.

Sarah Auerswald: Getting too specific with time.

Melissa Stollerl: getting too specific, no time that works for all.

Damien: overthinking, pass as is.

Motion carried unanimously

ab. **Policy Motion:** Senate Bill 649 (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council opposes SB 649, which removes from cities the discretionary regulation of "small cell" cell phone towers in the public right-of-way and on city property. Exceptions for historic zones and Coastal Zone are included, but scenic highways and R zones are not included. Local control should be maintained. Cities have capability to properly analyze applications within existing laws and balance protection of neighborhoods with the need for increased wireless capacity.

Should the legislation be passed by both the Senate and Assembly, we urge Governor Jerry Brown to veto the legislation.

Background Information: See Addendum B

Approved on consent.

ac. **Policy Motion:** Gateway Project (submitted by Planning & Land Use Management Committee)

WHEREAS, the Mar Vista Community Council (MVCC) is an official neighborhood organization of the City of Los Angeles;

WHEREAS, The mission of the Mar Vista Community Council (MVCC) is to provide a forum for discussion of issues that affect the quality of life of MVCC Stakeholders, and to facilitate stakeholder communication and serve as the advocate for the MVCC area with officials of the City of Los Angeles and other governmental and non-governmental entities.

WHEREAS, the Gateway Project is located within the boundaries of the West Los Angeles Sawtelle Neighborhood Council (WLASNC) just 1/4 mile from Zone 2 of the MVCC;

WHEREAS, gridlock traffic throughout Mar Vista and West Los Angeles has continued to become increasingly problematic;

WHEREAS, the Gateway Project would increase traffic and increase the burden to find local parking;

WHEREAS, the Gateway Project calls for 129 units that will replace "mom and pop" businesses that have been serving the community for years and that these businesses will be missed;

WHEREAS, the WLASNC has voted not to support each of two separate versions of the Gateway Project;

BE IT RESOLVED THAT the MVCC supports the decision of the West L.A. Neighborhood Council to not support the Gateway Project.

Motion to approve by Melissa Stoller, 2nd by Damien Newton.

Martin Rubin: Traffic is getting worse. Cart before horse development. Zone 2 directly affected. Jay Handel (WLA neighborhood council Treasurer) says not supporting is same as opposing.

Ken Alpern: Friendly amendment to say oppose, instead of support.

Damien Newton: WLANC – motion brought to approve project, voted to support, motion not passed. Never motion made to oppose project. Officially has no position.

Rob Kadota: This is about as close as can get to Expo station. Why is it a bad development.

Damien Newton: PLUM – bad intersection. Feeling that won't use EXPO – can't cross street there. Issues about driveway. Developer good at working with WLA stakeholders. Concerns about traffic spilling into neighborhood.

Melissa: Seems appropriate for the location, should be able to work out intersection problems. Should have presentation from developer.

Ken: all he's heard is negative about this.

Melissa: need something that can be for.

Holly: This is just supporting a neighboring NC.

Paola: low income units? Yes. Did they consider having businesses at bottom? Original proposal yes, but not auto services; WLA/Sawtelle requested removal.

Vote: 4 ayes, 1 nays, 4 abstain (Damien, Sherri, Paola, Robin). Motion carried.

ad. **Policy Motion:** NPG guidelines (submitted by Education, Arts & Culture Committee)

MVCC approves EACC guidelines for 2017-2018 fiscal year that any NPG applicant partner with an interested Mar Vista school prior to requesting money MVCC through EACC.

Motion to approve by Paola Cervantes, 2nd by Michelle Krupkin.

Paola Cervantes: Outreach by many organizations, but they haven't reached out to schools.

Motion carried unanimously.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

Meeting adjourned at 9:49 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: Revised 2017-18 MVCC Budget

Budget Category: General Operational	**Total Amount**
Storage	
Storquest	$2,280.00
Website	
The Web Corner: website maintenance	$1,650.00
The Web Corner: emails	$385.00
The Web Corner: Extra Data Entry	$500.00
RIMU Hosting	$96.27
Email Service	
Mail chimp email service	$480.00
Meeting rooms rental	
The Vineyard	$600.00
St Andrew's Lutheran Church	$300.00
St Bede's	$75.00
Windward School	$5.00
PO Box rental	$132.00
Farmer's Market rental	$1,200.00
Equip & supplies (misc)	
misc	$1,100.00
Mtg supplies & printing	
printing	$1,000.00
Board Training & Support	
Business cards/name badges	$250.00
Board Retreat	$37.68
Operations total	**$10,090.95**
Budget Category: Outreach	
Advertising	
Banners/sign/event promotion	$500.00
Facebook ads	$250.00
Emergency Prep public safety outreach	$1,500.00
Newsletter	
(Fall Festival)	$4,000.00
MVCC Events	
Block parties (5 X $300)	$1,500.00
Westside Senior Health & Wellness Fair	$500.00
Venice High Grease Night	$300.00
Community Events	
Fall Festival	$4,000.00
Winter Wonderland	$1,000.00
Art Walk	$2,000.00
Green Garden Showcase	$4,000.00
Outreach Total	**$19,550.00**

Budget Category: Elections	
Election expenses	$5,000.00
Budget Category: Community Improvement Grants	
Alley repair/seed money	$5,000.00
Budget Category: Neighborhood Purpose Grants	$2,000.00
Budget Total	**$42,440.95**

ADDENDUM B: Motions Opposing SB 649 Background Information (Provided by WRAC)

SB 649 Status Update – as of July 24, 2017

SB 649 – the bill eliminating local control over large cell towers – recently passed unanimously in the Assembly Communications & Conveyance Committee. Assuming passage in the Appropriations Committee, it will then go to the full Assembly for a vote, likely in late August or early September.

Some Assembly committee members claimed to be concerned with local control – and the bill's author promised to somehow strengthen local governments' ability to regulate for design and location – yet SB 649 passed with no such amendments. In fact, amendments further expanding the restrictions on local control (now broadly covering all "communications" facilities) have been proposed by committees and accepted by the bill's author (Hueso, SD 40/Imperial Co.).

Committee members were clearly more swayed by the telecom lobby than by the extensive opposition, which includes major newspapers (e.g., LA Times editorial and article by venerable columnist George Skelton); respected statewide organizations such as the League of CA Cities and the American Planning Association; the County of Los Angeles and 27 other CA counties; LA Mayor Garcetti, Councilmembers Bonin (http://pacpalicc.org/wp-content/uploads/2017/06/SB2064920Letter.pdf) and Koretz; numerous other public officials statewide; and over 220 CA cities and towns. The Westside Regional Alliance of Councils (WRAC) has also submitted opposition based on members' prior unanimous support for local control over such facilities (http://pacpalicc.org/wpcontent/uploads/2017/06/WRACPosition_SB649CellTower_062117-2.pdf). WRAC leadership has also recommended to member councils a motion opposing SB 649: http://westsidecouncils.com/pending/.

Voices in opposition are increasing, with local media outlets now weighing in (e.g., the Argonaut, http://argonautnews.com/cell-tower-bill-gets-bad-reception/, and the UCLA Daily Bruin, http://dailybruin.com/2017/07/16/editorial-sb-649-needs-to-be-vetoed-to-preserve-local-governmentpower/). However, it is widely-acknowledged (see Skelton/LAT) that *many more opposition voices will be required in order to defeat the bill*[1]

SB 649 is an unprecedented, unnecessary attempt to strip local governments of control; they will be forced to allow the telecom industry to install large towers on public property (including parks and arguably even schools) for a minimal fee (market rate leasing is prohibited); and local discretionary authority will be eliminated (including in residential zones), resulting in thousands of new poles with refrigerator-sized equipment installed next to homes and in other sensitive areas with no public input.

It appears that only a huge public outcry or a Governor's veto can now stop this bad bill. Simply put: "People should not be forced to stare at ugly refrigerators dangling outside their homes." (Skelton/ http://www.latimes.com/politics/la-pol-sac-skelton-telecom-att-verizon-california-bill-20170710-story.html).

By: Christina Spitz
For ID purposes: Chair/President Emeritus,
Pacific Palisades Community Council (PPCC)
Current Board Member, PPCC
Member, WRAC Leadership (alt. PPCC rep)
Member, WRAC-LUPC (alt. PPCC rep)
Email: ppfriends3@hotmail.com

[1] Los Angeles-area members' positions are mixed. ASM Dababneh (the west Valley) is a co-sponsor of the bill and voted Yes in committee, as did ASM Santiago (downtown LA). ASM Ridley-Thomas voted No and ASM Bloom was a "No Vote Recorded" in the Local Government Committee; staff for both ASMs have indicated they will be No's in a floor vote on the bill. ASM Burke has not indicated a position. All three ASMs whose districts encompass parts of CD11 (Ridley-Thomas, Bloom, Burke) should be urged to vote No on SB 649 in the expected floor vote of the full Assembly; Gov. Brown should also be urged to veto the bill should that become necessary.

Talking Points re SB 649 ("Small Cell" Cell Tower Regulation)

By Chris Spitz, PPCC Chair/President Emeritus - June 2017

- SB 649 (Hueso) passed in the Senate in May 2017 and is now being considered by the Assembly (expected to be assigned soon to relevant committees—Communications & Conveyance, Local Government—with a floor vote in the full Assembly possible this summer if passed in committees).
- SB 649 would eliminate local government discretionary authority (i.e., require "by right" permits only, without notice, hearing, review of location/design/aesthetics) over so-called "small cell" (actually not so- small) cell towers in the public right of way and on public property statewide, with few exceptions. The League of California Cities (League) warns that the bill "unnecessarily and unconstitutionally strips local authority over public property and shuts out public input and local discretion by eliminating consideration of the aesthetic and environmental impacts of 'small cells.'"
- What are "small cells" under SB 649? Short answer: cell towers with antennas up to 6 cu. ft. in volume and related equipment up to 21 cu. ft. (roughly the size of an old phone booth), with no single piece of equipment exceeding 9 cu. ft.; other ancillary equipment, such as power pedestals, are not counted in the calculation of equipment volume. Commentators have noted that this definition actually encompasses very large structures, that the label "small cell" is a misnomer, and that the bill would effectively remove local control over most cell towers.
- SB 649 excludes "small cells" only on fire stations, in historic zones and in the coastal zone (i.e., local government discretionary authority would remain in those areas), but not in other sensitive areas such as in residential zones (in front of homes), in areas protected by duly enacted Specific Plans, in or adjacent to parkland, open space, scenic highways, public parks and recreational facilities, schools and in otherwise protected mountain areas. Critics have questioned why only the three limited areas are deemed sensitive enough to require discretionary review.
- SB 649 is backed by the telecom industry, which seeks rapid deployment of 5G infrastructure (requiring thousands more poles/antennas). The industry argues that local government regulatory regulation unreasonably impedes deployment and should be streamlined.[2] Cities and counties deny that local regulation unreasonably impedes deployment and stress that local authority (police power) is protected by the state Constitution ("Home Rule"). The League and other opposing organizations acknowledge that Californians should have access to telecommunications facilities, but explain that this goal is "not inherently in conflict with appropriate local planning."
- SB 649 is opposed by over 110 cities, counties and organizations statewide, including the County of Los Angeles, the City and County of San Francisco, Santa Monica, Culver City, West Hollywood, Beverly Hills, the League of California Cities, the League of California Counties, the American now pending in City Council (CF 17-000 S69). CMs Bonin and Koretz oppose the bill.
- PPCC and BCC oppose SB 649. The author requests that all WRAC member-councils ASAP take up and pass the recommended SB 649 motion and urge their respective Assemblymembers (Bloom, Ridley-Thomas, Burke) to oppose the bill. Contact Chris at ppfriends3@hotmail.com for more information (she has been working on cell regulation matters since 2009).

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[1] Contrast the more reasonable definition of "small cell" in proposed revisions to the City's Above Ground Facilities (AGF) Ordinance, supported by WRAC and long-stalled in the Council Public Works Committee (CF 09-2645) – up to 3 cu. ft. of antennas, not counting related equipment. In 2010, the then-WRAC membership unanimously passed a Motion calling for comprehensive revision of the City's cell tower regulations to provide for protection for communities and local neighborhoods "to the fullest extent of the law." SB 649 directly contradicts this goal and will make the much-needed AGF Ordinance revisions (as well as existing local regulations) largely moot.

[2] A parallel legislative effort is underway in numerous states nationwide and also at the federal level (Notice of Proposed Rulemaking regarding streamlining small cell deployment currently pending in the FCC).

WRAC-Recommended Motion and Background Information re SB 649

See: http://westsidecouncils.com/motion/cell-towers-aka-wireless-facilities-public-right-way-city-property/.

Cell towers aka wireless facilities in public right-of-way and on city property

Proposed by WRAC LUPC on June 21, 2017

Passage deadline: September 2017

- Passed by Pacific Palisades Community Council and Westwood Community Council *[update: Brentwood Community Council and South Robertson Neighborhood Council have also passed the motion to date]*

Motion

WRAC recommends opposing SB 649, which removes from cities the discretionary regulation of "small cell" cell phone towers in the public right-of-way and on city property. Exceptions for historic zones and Coastal Zone are included, but scenic highways and R zones are not included. Local control should be maintained. Cities have capability to properly analyze applications within existing laws and balance protection of neighborhoods with the need for increased wireless capacity

Background

More information in the talking points attachment. WRAC previously weighed in on the issue in 2010, 2011, and 2013.

On June 21, 2017, WRAC authorized sending a letter stating its long advocacy for local control of cell towers (attached below).

Bill text:
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB649*Status:* Senate approved bill, which is similar to a bill from last year. Assembly will consider it next. Telecom companies need more pole space and facilities for 5G capacity.

- Sizes of cell panels are big (6 cu. ft.) and sizes of equipment panels are big (21 cu.ft.), and can be reduced. *[note: sizes have been increased; 35 cu.ft. additional equipment; excluded ancillary equipment unlimited size]*
- Telecom companies can spend more money to rent space on existing public poles (streetlights, etc.).
- Opponents to bill include 100 *[now over 220]* cities, League of California Cities, League of California Counties, American Planning Institute.

Download additional background

Talking Points re SB-649
WRAC Cell Tower Letter 12.2.11
WRAC Cell Tower Letter 12.16.13
WRACPosition_SB649CellTower_062117

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday September 12th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of August 8th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
5. **Community Memorial Observations**
6. **Appointment of At-Large Director**

   All Candidates who have submitted a statement of candidacy will have the option to make a short statement in the order their applications were submitted: Jeff Khoury, Laura Minzenberg, Jake Yocham, Chuck Ray, Anastasia Bacigalupo, Selena Inouye. The Chair will then make the appointment, subject to approval by the Board.
7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton

j Fall Festival: Albert Olson

k Friends of Historic FS 62: Albert Olson

l. Mar Vista Celebrates 90: Open

m. Mar Vista Chamber of Commerce: Sarah Auerswald

9. Presentations
   a. "LADOT Transit's Micro Transit Pilot Proposal" by Luz Echavarria of DOT (10 minutes)
   b. "Stormwater Treatment System at Mar Vista Park" by Wing Tam of Bureau of Sanitation (10 minutes)
10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Sarah Auerswald
      i. Nomination & election of 2nd Vice Chair
   b. First Vice Chair – Rob Kadota
   c. Second Vice Chair – open
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
      ii. **APPROVAL** of August Monthly Expense Report (MER) (https://cityclerk.lacity.org/NCFundPortal/display.cfm?id=164&type=5)
11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
   a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
   c. **Community Outreach Committee** – Sarah Auerswald, Chair
   d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair
   i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   k. **Bike Mar Vista** - Mitchell Rishe, Chair
   l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Damien Newton
   c. Zone 3 – Melissa Stoller
   d. Zone 4 – Greg Tedesco
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Holly Tilson

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 13.a-n on consent.

    a. **Funding Motion**: Business cards (submitted by Executive & Finance Committee)

       MVCC approves the expenditure of up to $250 for printing of business cards.

    b. **Funding Motion**: Mar Vista Turns 90 (submitted by Executive & Finance Committee)

       MVCC approves the expenditure of up to $4000 for a Mar Vista Turns 90 Celebration to be held at the Mar Vista Farmers' Market.

    c. **Funding Motion:** Senior Health & Wellness Fair (submitted by Executive & Finance Committee)

       MVCC approves the expenditure of $500 for Senior Health and Wellness Fair outreach opportunity.

    d. **Funding Motion:** Emergency Preparation Signs (submitted by Committee on Public Safety)

       The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1,500 for emergency preparation signs, promotional material, and for other related purposes.

    e. **Funding Motion:** Budget Revision (submitted by Executive & Finance Committee)

       MVCC approves the revised budget, as presented in Addendum A.

    f. **Policy Motion:** Resolution in support of establishing a 2500-foot human health and safety buffer around oil drilling operations in the City of Los Angeles (submitted by Green Committee)

       Whereas Los Angeles is one of the only places in the United States where oil drilling occurs right in the middle of a densly-populated urban metropolis. Over 620,000 Angelenos live within a mile of an active oil well;

       Whereas the City of Los Angeles contains over 1,000 active oil wells and 80% are located within 2,500 feet of a sensitive land use, impacting residents, students, and workers;

       Whereas neighborhood drilling threatens the health and safety of those living along the fence line of these oil wells;

       Whereas oil and gas extraction sites routinely use and emit as byproducts toxic chemicals that are known carcinogens, endocrine disruptors, and are harmful to multiple organ systems. These include but are not limited to formaldehyde, hydrochloric acid, hydrofluoric acid, naphthalene, xylene, benzene and volatile organic compounds;

       Whereas the primary health risk factor associated with oil and gas development within urban areas is proximity to active sites, because any toxic emission will be at its highest and most dangerous concentration at the source of pollution;

       Whereas the closer you live, work, and play to an active oil well, the more severely your health and safety are threatened. Whereas living next door to neighborhood drilling means chronic headaches and migraines, frequent nosebleeds, exacerbated asthma and other respiratory illness, reproductive harm and an increased risk of cancer;

       Whereas the transport, onsite storage and use of toxic and flammable chemicals in industrial facilities in close proximity to homes and other sensitive land uses also raises the risk of catastrophic accidents;

       Whereas neighborhood drilling is incompatible with public health and has no place near sensitive land uses such as homes, schools, churches or daycare facilities; and studies show that a buffer of at least 2,500 feet between active oil wells and these sensitive land uses is necessary to protect community health from oil extraction;

       Whereas the City of Los Angeles is a leader at the forefront of enacting policies to protect the environment and address global climate change, including the Sustainability City pLAn requiring dramatic reductions in GHG emissions with an 80% GHG reduction target by 2050;

Whereas the City of Los Angeles has a duty to protect the health and safety of its residents and can use its power over land use and oil operations to protect those residents in this instance;

1. The Mar Vista Community Council resolves to support the introduction of an ordinance establishing a human health and safety buffer that prohibits oil drilling within 2,500 feet of sensitive land uses including homes, schools, early childhood centers, senior centers, hospitals and medical clinics, parks, etc.

   The Mar Vista Community Council authorizes the submission of a community impact statement if such an ordinance does get introduced into the Los Angeles City Council.

2. The Mar Vista Community Council resolves to support Land Use and Legal Study to determine the feasibility of such an ordinance.

   The Mar Vista Community Council authorizes the submission of a community impact statement if such a study takes place.

g. **Policy Motion:** Support for reappointment of Dr. Frederick Pickel (submitted by Transportation & Infrastructure Committee)

   Whereas Dr. Frederick Pickel has served well as the Executive Director of the Office of Public Accountability/Ratepayer Advocate for a five-year term as specified in the City Charter;

   Whereas the City Council has continued Dr. Pickel as the interim Executive Director of the Office of Public Accountability/Ratepayer Advocate until another five-year appointment occurs as specified by the City Charter;

   Whereas the City Council is overdue on selecting someone for the next five-year appointment as specified in the City Charter;

   Therefore, the Mar Vista Community Council endorses Dr. Frederick Pickel to be reappointed as the Executive Director of the Office of Public Accountability/Ratepayer Advocate for another five year term

   Note: Dr. Pickel is currently operating on a temporary contract. The City Council has not taken the necessary action to select the next Executive Director for the Office of Public Accountability/Ratepayer Advocate. This greatly weakens Dr. Pickel's effectiveness. The DWP Committee suggested in April that all Neighborhood Council pass resolutions in support of giving Dr. Pickel another five year contract.

h. **Policy Motion**: Opposition to Proposed Stop Light at Sawtelle and Charnock (submitted by Transportation & Infrastructure Committee)

   Whereas, the LADOT is recommending the implementation of a stop light at Sawtelle and Charnock; and

   Whereas, the neighbors living next to the stop light will be significantly impacted in that they will be restricted from easily and reliably accessing their homes;

   Therefore, The Mar Vista Community Council calls for a presentation by LADOT of any proposed stoplight or traffic treatment which includes the options of a stop sign or crosswalk, and not a stop light, and which takes into consideration any and all needs and impacts of these neighbors.

i. **Policy Motion**: Telecommunications permitting (submitted by Planning & Land Use Management Committee)

   Recognizing: That there are various state and federal laws that restrict what cities can and cannot do when it comes to the permitting of the construction of telecommunications facilities;

   Recognizing: That the process preceding and during construction of a cell phone vault and tower on East Blvd between Venice & Pacific left nearby residents angry, confused, and disenfranchised

   Recognizing: That the behavior of the company installing the vault infuriated an already bad situation by blocking driveways for days on end, damaging existing infrastructure, and harassing neighbors

   Recognizing: That the city issued a U permit for this process in 2015, and that notices for the AGF portion were mailed to as few as two houses near the site according to receipts provided by the construction firm

Recognizing: That while this U permit expired, when the 2017 U permit was issued, the AGF portion was allowed to be attached to the new 2017 U-Permit

Recognizing: That many long-term residents were unaware of the project and that newer residents would have had no chance to appeal the project

Therefor, let it be resolved that:

1. The City of Los Angeles review its automatic extension process for cell phone towers and vaults and make any changes allowed under state and federal law to allow residents more opportunities to learn about projects in their neighborhoods.
2. That if the city cannot substantially change its automatic extension process, that it require that notices on extended permits be mailed to all impacted residents
3. That the AGF portion of expired U permits not be automatically be renewed for new U Permits submitted for the same site
4. That the pool of impacted residents be included to include any residents who will be impacted by construction or installation of the vault, i.e. that people who have their driveways blocked get proper notice
5. That the appeal fee for appealing a permit granted for cell phone tower construction be reduced from $100 to $1
6. That a code of behavior for companies installing towers be created that includes notification and behavior of construction employees
7. That the city require "proof of deliver" for permit applications notifications.

j. **Policy Motion**: Planning Appeals Fees (submitted by Planning & Land Use Management Committee)

Recognizing: That some City Councilmembers, City Planning Commissioners, and staff at various levels of city government feel there is a problem with "nuisance appeals" of approved permits and projects granted by the City of Los Angeles;

Recognizing: That oftentimes the appeals process provides the best chance for resident and neighborhood associations to appeal projects and permits when errors are made by city staff and planning commissioners;

Recognizing: That some of the fees being discussed to file an appeal of a project by a resident or Neighborhood Association;

Therefor Let It Be Resolved : That the Mar Vista Community Council opposes any proposal to raise fees on appeals for any project or permit that comes from City Planning or the Planning Commission or any other city department or board without first conducting a lengthy public review process that includes a presentation with opportunity to provide feedback to any and all neighborhood councils.

k. **Policy Motion:** Public Comment form (submitted by Stakeholder petition)

WHEREAS, the mission of the Mar Vista Community Council (MVCC) is to provide a forum for discussion of issues that affect the quality of life of MVCC Stakeholders, to facilitate stakeholder input and feedback and to serve as advocates for Mar Vista stakeholders with officials of the City of Los Angeles and other governmental and non-governmental entities, and,

WHEREAS, many Mar Vista stakeholders in attendance at the July 11, 2017 Board of Directors meeting felt the MVCC was not fulfilling their mission to accurately collect stakeholder input and feedback as well as serve as advocates for Mar Vista stakeholders with officials of the City of Los Angeles, and,

WHEREAS, many Mar Vista stakeholders were expecting to be asked for their opinions on the motions in front of the Board of Directors at the July 11th meeting prior to the Board casting their own vote, and,

WHEREAS, many Mar Vista stakeholders felt the Public Comment form provided at the July 11th meeting did not accurately capture the demographics of the people giving Public Comment, in particular the number of people who were not Mar Vista stakeholders, and/or people who were representing non-profit groups receiving grants from LADOT Vision Zero,

THEREFORE, the Mar Vista Community Council moves to update its Public Comment form to better capture Mar Vista stakeholder input and feedback by including the following:

1) An entry to record a stakeholder's opinion on a particular agenda item in lieu of speaking, as well as the following statement: All in-lieu opinions will be tallied and announced before the Board vote on this item;

2) An entry to record a speaker's affiliation: Mar Vista stakeholder, City employee, lobbyist, business organization, neighborhood association, etc.;

3) A check box for speakers to indicate if they are a paid speaker and instructions to provide their client's information on the back of the form, as well as the following advisory: If you are receiving compensation to make this appearance, the City of Los Angeles' Municipal Lobby Ordinance (LAMC Section 48.01 et. seq., as amended) may require you to register and report your lobbying activity. For more information, contact the City Ethics Commission at (213) 978-1960 or http://www.lacity.org/ethics.

l. **Policy Motion:** Great Street Venice Blvd. Point Person (submitted by Stakeholder petition)

WHEREAS, the Mar Vista Community Council passed on July 11th the Continuation of Venice Boulevard

Pilot Project motion, a directors' motion submitted by Ken Alpern and Sherri Akers, and, WHEREAS, said motion requested the following:

- The MVCC requests that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month. MVCC also requests the same data on streets in LA where this same configuration was implemented.
- The MVCC requests an evaluation be done by an ADA consultant
- The MVCC requests that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike) or other organizations similar in focus and expertise.
- That the City of Los Angeles posts all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented
- That the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze.
- That MVCC be provided with the data to date on the survey created by CD11 and updated on a regular basis.
- That MVCC be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented.

and,

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista's problems and requests for assistance, and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community, as well as the accuracy of forms and sources of data,

THEREFORE, the Mar Vista Community Council moves to follow through on its promises to the Mar Vista stakeholders and:

1) Immediately designate point person(s) to be responsible for writing up these requests for information and evaluations to Councilperson Mike Bonin's office, Mayor Eric Garcetti's office, the Los Angeles Department of Transportation, the Los Angeles Fire Department and the Los Angeles Police Department;

2) Instruct said point person(s) to submit the written requests to the Board Chair Sara Auserwald by September 19th so they can be speedily forwarded to Councilperson Mike Bonin's office, Mayor Eric Garcetti's office, the Los Angeles Department of Transportation, the Los Angeles Fire Department and the Los Angeles Police Department;

3) Empower said point person(s) to follow up with Councilperson Mike Bonin's office, Mayor Eric Garcetti's office, the Los Angeles Department of Transportation, the Los Angeles Fire Department and the Los Angeles Police Department to ensure a timely response;

4) Instruct said point person(s) to report back to the Mar Vista stakeholders at every Board of Directors meeting as to the status of these requests for information and evaluations; and

5) Make available to all Mar Vista stakeholders the information received by publicly posting it in electronic format on the Mar Vista Community Council website http://www.marvista.org.

m. **Policy Motion:** Venice Blvd Great Street Lane Restoration #1 (submitted by Transportation & Infrastructure Committee)

The Mar Vista Community Council asks that Councilmember Mike Bonin immediately reverse the lane reductions on Venice Blvd. and implement other strategies to improve the safety, efficiency, and accessibility of our roads for pedestrians, cyclists, and vehicles. As representatives of your constituents and your elected advisory body, we believe strongly that this is the only remedy that addresses the constant, voluminous, community outcry on this issue.

n. **Policy Motion:** Venice Blvd Great Street Lane Restoration #2 (Director motion submitted by Elliot Hanna)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were recently implemented on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, The Mar Vista Community Council supports the stated goals of reducing traffic fatalities and serious injuries throughout the City of Los Angeles, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the Venice Blvd. lane reductions have caused significant daily increases in traffic, increased commuter traffic on surrounding residential streets, increased average commuting times, and increased pollution from idling vehicles, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and

WHEREAS, on August 18, 2017, Councilmember Mike Bonin named a 20-member community panel - comprised of a broad range of Playa Del Rey stakeholders with differing views and perspectives - to "analyze data, community feedback and available financial resources to make short-term and long-term recommendations to reduce speeding and improve safety on Playa del Rey streets."

THEREFORE, Mar Vista Community Council moves (1) to advise the City of Los Angeles Department of Transportation and Council District 11 to reverse the lane reduction component on Venice Boulevard and restore the six-lane configuration, and (2) to urge the City of Los Angeles Department of Transportation to study, and present to the community, alternate implementations on Venice Blvd., that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors and to provide a monthly update of changes made and data collected, and (3) to urge Councilmember Bonin – as a vital part of this study - to appoint a community panel, similar to the one appointed for the projects in Playa Del Rey, to commission a scientific survey, to conduct focus groups comprised of random stakeholders from all sides of the issue in the proper proportion, and to study and make recommendations regarding changes to Venice Blvd.

o. **Policy Motion:** Regional Safe Bike Routes (Director motion submitted by Ken Alpern)

WHEREAS, Mar Vista Community Council, Councilmember Bonin and Mayor Garcetti are ccommitted to the successful implementation of the Vision Zero Action Plan January 2017, which states, "all Angelenos have a right to safe mobility"; and

WHEREAS, the Venice Boulevard "Great Street" pilot program was implemented on May 19, 2017, including several changes to the roadway between Beethoven Street and Inglewood Boulevard to adhere to the intentions of Vision Zero; and

WHEREAS, during the 11-week period from May 20, 2017 through August 6, 2017 at least 17 accidents have been reported on the Venice Boulevard "Great Street", including 9 involving cyclists. Total accidents increased by 325%, from 4 reported during the same period in 2016, which implies that the current roadway configuration is failing to meet the objectives of Vision Zero; and

WHEREAS, the "Great Street" roadway configuration on Venice Boulevard has had unintended consequences of reducing safety by causing substantial gridlock on Venice Boulevard and many alternate routes, increasing cut-through traffic on nearby residential streets, causing greater pollution from idling motor vehicles, and slowing fire/police emergency response times; and

WHEREAS, a diverse grassroots group of community members have coalesced since May 19, 2017, resulting in over 3,000 electronic signatures asking Councilmember Bonin to restore the old three traffic lane per direction Venice Boulevard configuration in the "Great Street" roadway segment; and

WHEREAS, a recent survey of 45 businesses on Venice Boulevard found that 82% oppose the lane reduction element of the "Great Street" pilot program and that many business owners have witnessed accidents and close calls that are caused by the current unsafe roadway configuration; and

WHEREAS, Council District 11 has communicated that the "Great Streets" roadway changes on Venice Boulevard consist of a pilot program, using inexpensive temporary materials, and that the City would keep what the community loves and remove what the community does not want; and

WHEREAS, extensive segments of government owned land exist in and around Mar Vista that could be used for protected bike paths and bike lanes that would be substantially safer than the currently unsafe "Great Street" configuration on Venice Boulevard;

THEREFORE, Mar Vista Community Council moves to advise Council District 11 to immediately remove the lane reduction element of the "Great Street" pilot program and return Venice Boulevard to an improved version of the previously established six motor vehicle lane configuration, with improvements including a resurfaced roadway, bike lanes that are clearly designated with green paint, and a reduced speed limit, as allowed by State law upon completion of the roadway re-striping and any required speed study; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the State of California, County of Los Angeles, City of Culver City, and City of Santa Monica to expeditiously study, design and pave a regional network of safe bicycle paths and routes, possibly to include:

- Playa Del Rey to Playa Vista
- Marina del Rey to Playa Vista
- Del Rey to West Los Angeles
- Venice to Mar Vista
- Del Rey to Santa Monica (East)
- Del Rey to Santa Monica (West)
- Venice Beach to Downtown Los Angeles
- Bike Path Safety: initiate safety precautions including installation of lights, posting/enforcement of "no loitering" signs, and frequent daily police patrols on all bike paths;
- Bike Path Maintenance: expand ongoing and one-time bike path maintenance, including frequent sweeping and weed removal, repaving of worn-out pavement, and underground channeling of storm drain runoff.

THEREFORE, Mar Vista Community Council further moves to designate the MVCC Transportation and Infrastructure Committee to promote and advocate for implementation of this regional network of safe bicycle paths and routes as described herein, to include a Proposed Regional Network of Safe Bicycle Paths and Routes:

- **Playa Del Rey to Playa Vista:** paving City easement parallel to Culver, Jefferson and Lincoln Blvds. from Nicholson St. to Bluff Creek Dr.;
- **Marina del Rey to Playa Vista:** connecting the Marvin Braude Costal Path to McConnell Ave. in Playa Vista, following abandoned railroad, including a connection to the Culver Blvd. Median and Ballona Creek Paths, and re-topping of existing bridge pylons across Ballona Creek;
- **Del Rey to West Los Angeles:** connecting the Ballona Creek, Culver Blvd. Median, and Exposition Corridor Paths through a combination of paved paths along the Sepulveda

Channel and across Mar Vista Park, combined with greenways on residential streets including: East Blvd., Butler Ave., and Purdue Ave.;

- **Venice to Mar Vista:** connecting the Marvin Braude Costal Path to the proposed Sepulveda Channel Path via greenways on residential streets including: Zanja St. and Van Buren, Garfield, Caswell, Francis, and Pacific Avenues;
- **Del Rey to Santa Monica (East):** connecting Ballona Creek and Culver Blvd. Paths to Santa Monica College Bundy Campus via greenways on residential streets including: McConnell Blvd., Wade St., Cabrillo Blvd., and Stewart Ave.;
- **Del Rey to Santa Monica (West):** connecting the Culver Blvd. Median Path and proposed Marina del Rey to Playa Vista Path to 16th St. in Santa Monica via greenways on residential streets including: Alla Rd., Glencoe, Glyndon and Glenavon Avenues, combined with paved paths across the east edge of Penmar Park and Golf Course and adjacent to Dewey St.;
- **Venice Beach to Downtown Los Angeles:** initiate a feasibility study to explore future removal or replacement of the abandoned median railroad with a protected bikeway, while retaining three motor vehicle lanes in each direction;

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: Revised 2017-18 MVCC Budget

Budget Category: General/Operational	**Total Amount**
Subcategory: Office	
Storage	
Storquest	$2,496.00
Meeting rooms rental	
The Vineyard	$600.00
St Andrew's Lutheran Church	$300.00
St Bede's	$75.00
Windward School	$5.00
PO Box rental	$132.00
Farmer's Market rental	$1,200.00
Equip & supplies (misc)	
misc	$1,100.00
Mtg supplies & printing	
printing	$1,000.00
Board Training & Support	
Business cards/name badges	$250.00
Board Retreat	$37.68
Office subtotal:	**$7,195.68**
Subcategory: Outreach	
Website	
The Web Corner: website maintenance	$1,650.00
The Web Corner: emails	$385.00
The Web Corner: Extra Data Entry	$500.00
RIMU Hosting	$96.27
Email Service	
Mail chimp email service	$480.00
Advertising	
Banners/sign/event promotion	$500.00
Facebook ads	$250.00
Emergency Prep signs & brochures	$1,500.00
Community Events	
Block parties (5 X $300)	$1,500.00
Westside Senior Health & Wellness Fair	$500.00
Winter Wonderland	$1,000.00
Art Walk	$2,000.00
Venice High Grease Night	$300.00
MVCC Events	
Mar Vista Turns 90 Celebration	$4,000.00
Great Street Tree Planting	$300.00
Green Garden Showcase	$4,000.00
misc events	$7,843.05
Outreach subtotal:	**$26,804.32**
Subcategory: Elections	
Election expenses	$1,000.00
Elections subtotal:	**$1,000.00**
General/Operational Total:	$35,000.00
Budget Category: Community Improvement Grants	
Alley repair/seed money	$5,000.00
Budget Category: Neighborhood Purpose Grants	$2,000.00
Budget Total	**$42,000.00**

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday September 12th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:.04 P.M.

   Quorum present: Rob Kadota, Robin Doyno, Sarah Auerswald, Holly Tilson, Melissa Stoller, Paola Cervantes, Susan Klos, Greg Tedesco, Ken Alpern, Michelle Krupkin, Damien Newton, Elliot Hanna

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of August 8th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).

   Motion to approve by Melissa Stoller, 2nd by.Damien Newton. Motion carried: 7 ayes, 0 nays, 1 abstain (Elliot Hanna), 2 absent (Ken Alpern and Michelle Krupkin).

4. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)

   Christopher McKinnon: Pledge of Allegiance created in 1892 to commemorate the 400th anniversary of Christopher Columbus' voyage to America

   Rich Hirschkoff: Service request was assessed, approved and funded, but left turn signal at Palms & Sawtelle was never installed. Mike Bonin says it's not funded this year, trying to get public/private funding (Windward School).

   Michelle Pritchard: Mar Vista resident. Continued reliance on fossil fuel is contributing to global warming.

   Selena Inouye: Asks for roll call vote, poll the audience. Please post emails on MVCC website. Please explain what consent calendar is, how it works.

   Damien Newton: Tai Kwon Do having annual picnic Saturday, September 16, 10:30 A.M., at Mar Vista Recreation Center.

   Robin Doyno: Senior Wellness Fair at Senior Center on Saturday, September 16.

   Martin Rubin: Thanks MVCC for sponsorship of NWNA fall block party.

5. **Community Memorial Observations**
6. **Appointment of At-Large Director**

   All Candidates who have submitted a statement of candidacy will have the option to make a short statement in the order their applications were submitted: Jeff Khoury, Laura Minzenberg, Jake Yocham, Chuck Ray, Anastasia Bacigalupo, Selena Inouye. The Chair will then make the appointment, subject to approval by the Board.

   Nomination by chair: Chuck Ray

   Appointment approved: 10 ayes, 1 nay.

7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Mike is sponsoring Senior Health & Wellness Fair this Saturday, September 16. Free screenings and food.

      Trees on 3600-3700 blocks of Centinela: Identified 4 trees that could remain. Sidewalks will be completed soon. Will get 2 for 1 replacement for removed trees.

draft

Venice median will be trimmed, as well as the Palm tree outside old fire station.

Work on water regulator on Grandview? They reported it will be completed 2nd week in September.

d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org

e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org

f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov

g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov

h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov

i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov

j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov

k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

Check out monthly profile – includes info about how to use census data and Navigate LA – can use to do targeted mailers. Training onSeptember 20, 1000-12:00.

New Board of Commissioners president.

8. **Liaison Reports** (Public comment permitted;1min per speaker)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

Next meeting is Sept 20. Agenda closes Sept 13 at noon.

b. DWP MOU: Chuck Ray

Primary topic: California Waterfix Project (tunnels under bay delta). The monthly cost per household: $ .87. Dr. Pickle/s conclusion: is affordable.

c. LANCC: Chuck Ray

d. One Water LA: Christopher McKinnon

e. WRAC: Rob Kadota

f. WRAC LUPC: Sharon Commins

g. City Budget Advocates: Holly Tilson

h. Recode LA: Sharon Commins

Today, the re:code LA team of City Planning unveiled a proposal that will cut the number of project review processes in half. This new set of processes & procedures will maintain long-standing opportunities for public participation, and make it easier for both applicants and the public to clearly understand how the Department considers use and development proposals and how to navigate the decision-making process.

ReCode ZAC will meet on September 27, 2017, same time and place as always.

i. Animal Services: Tom Ponton

All city animal shelters are full. Rescue groups trying to help, pull animals out. Last week's adoption fair, reduced cost $25. Hurricanes causes a lot of animals to be separated from owners; Best Friends is there helping unite.

Strut your Mutt, October 21, 2:00-6:00 at Exposition Park. See https://www.facebook.com/MarVistaMutts/.

j Fall Festival: Albert Olson

Cancelled for this year.

k Friends of Historic FS 62: Albert Olson

Annual meeting is Thursday, September 14.

l. Mar Vista Celebrates 90: Open

Nov. 5 at Farmers' Market. Putting call out for Mar Vista performers, Will have 3 stages.

m. Mar Vista Chamber of Commerce: Sarah Auerswald

draft

9. Presentations
   a. "LADOT Transit's Micro Transit Pilot Proposal" by Luz Echavarria of DOT (10 minutes)

      LADOT is proposing new program that will serve Mar Vista, Palms, Marina Del Rey and Venice. People will be able to go on-line, have bus pick them up and take to EXPO line Palms station. Hours of operations will be 6-9 A.M., 4-7 P.M. Max wait time: 15 minutes. Will use 8-12 passenger buses, wheel chair accessible. Looking at $2 fare. Expect to start at beginning of year; pilot program at first. Funded thru Prop 8 funds.

      Sheila: suggests go other way as well, take people from EXPO station to their place of work. ANS: Will transport to and from Palms station.

   b. "Stormwater Treatment System at Mar Vista Park" by Wing Tam of Bureau of Sanitation (10 minutes)

      Captures and treats storm water for use in park irrigation; located under tennis courts. Finishing phase 2 in November; delayed because waiting for LA County to ok reuse component.

      Ken Alpern: Mismanagement, threat by state to take money back? ANS: Passed State audit this year, passed. Problem was inability to complete because waiting for County approval.

10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair - Sarah Auerswald
      i. Nomination & election of 2nd Vice Chair

         Chair nominates Paola Cervantes.

         Motion to approve by , 2nd by Rob Kadota. Motion carries unanimously.

   b. First Vice Chair – Rob Kadota

      Starting to help Sarah coord meetings and locations. 2nd VP will do.

   c. Second Vice Chair – open
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status

         Have $42,000 for year. Spent $1127. Committed about $25000 for future projects. Cash balance is $40,872.

      ii. **APPROVAL** of August Monthly Expense Report (MER) (https://cityclerk.lacity.org/NCFundPortal/display.cfm?id=164&type=5)

         Motion to approve by Michelle Krupkin, 2nd by Paola Cervantes. Motion carried unanimously.

11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
   a. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

      Melissa Stoller and Sherri Akers are stepping down as co-chairs. Jeanne Kuntz will continue as chair. Committee focus will be Green Tent.

   b. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

      Waiting for approval os proposed by-laws. Neighborhood Council election will be in 2019.

   c. **Community Outreach Committee** – Sarah Auerswald, Chair
   d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

      Resuming meeting on Oct.24

   e. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

      Meets tomorrow, Spetember 13: updates on Great Streets, overview of MV Art Walk

   f. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

      Paola is guest speaker.

   g. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   h. **Website Ad Hoc Committee** – Sarah Auerswald, Chair

draft

i. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Presentation on cell phone towers at next meeting.

Appeal made against Gateway project.

j. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Pothole repair completed with amazing precision and speed.

Meeting October 5 at St. Bede's, Church

k. **Bike Mar Vista** - Mitchell Rishe, Chair

Free bike repair station at MV FM every Sunday. Servicing 10-20 bikes a week. In final stages of getting a public bike repair station installed at Bikerowave.

Sponsoring a ride from FM to Ballona Creek twice a month.

Offering Ride with Rob. Sign up at Farmers' Market MVCC tent on 2nd Sunday.

Pedestrian & bike count training on Tuesday, September 19, at Mar Vista Library.

Free Cycling Savvy intro class on Tuesday, September 26, 630-7:30.

l. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Palms Middle School 16' chain link fence being replaced by 8' cinder block–will discuss at meeting.

m. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Discussing ways LA can be proactive to protect LA stakeholders because Santa Monica is not concerned about our safety, noise pollution, air pollution. It is critical that we fight back.

Rep. Karen Bass & Ted Lieu have put in some amendments.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

o. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Having Emergency Preparedness meeting Oct. 12 at St. Johns Presbyterian Church. All are welcome.

b. Zone 2 – Damien Newton

Very successful Block Party.

Working with St. Andrews to create Sunday where people can donate homegrown fruit.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

Rustic Kitchen is open again.

e. Zone 5 – Michelle Krupkin

Small Batch Ice Cream Store opened where Sweet Lucies was.

f. Zone 6 – Holly Tilson

Major concerns: crime, cut-thru traffic.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 13.~~a–n~~ *a-e, j* on consent..

13.g removed by Melissa Stoller.

13.f, n, o removed by Sarah Auerswald

13.h removed by Paola Cervantes

draft

13.k, l, n removed.

13.i removed by Damien Newton.

Motion to approve consent calendar by Ken Alpern, 2nd by Rob Kadota.

a. **Funding Motion**: Business cards (submitted by Executive & Finance Committee)

   MVCC approves the expenditure of up to $250 for printing of business cards.

   Approved on consent.

b. **Funding Motion**: Mar Vista Turns 90 (submitted by Executive & Finance Committee)

   MVCC approves the expenditure of up to $4000 for a Mar Vista Turns 90 Celebration to be held at the Mar Vista Farmers' Market.

   Approved on consent.

c. **Funding Motion:** Senior Health & Wellness Fair (submitted by Executive & Finance Committee)

   MVCC approves the expenditure of $500 for Senior Health and Wellness Fair outreach opportunity.

   Approved on consent.

d. **Funding Motion:** Emergency Preparation Signs (submitted by Committee on Public Safety)

   The Committee on Public Safety hereby requests that the Mar Vista Community Council appropriate $1,500 for emergency preparation signs, promotional material, and for other related purposes.

   Approved on consent.

e. **Funding Motion:** Budget Revision (submitted by Executive & Finance Committee)

   MVCC approves the revised budget, as presented in Addendum A.

   Approved on consent.

f. **Policy Motion:** Resolution in support of establishing a 2500-foot human health and safety buffer around oil drilling operations in the City of Los Angeles (submitted by Green Committee)

   Whereas Los Angeles is one of the only places in the United States where oil drilling occurs right in the middle of a densly-populated urban metropolis. Over 620,000 Angelenos live within a mile of an active oil well;

   Whereas the City of Los Angeles contains over 1,000 active oil wells and 80% are located within 2,500 feet of a sensitive land use, impacting residents, students, and workers;

   Whereas neighborhood drilling threatens the health and safety of those living along the fence line of these oil wells;

   Whereas oil and gas extraction sites routinely use and emit as byproducts toxic chemicals that are known carcinogens, endocrine disruptors, and are harmful to multiple organ systems. These include but are not limited to formaldehyde, hydrochloric acid, hydrofluoric acid, naphthalene, xylene, benzene and volatile organic compounds;

   Whereas the primary health risk factor associated with oil and gas development within urban areas is proximity to active sites, because any toxic emission will be at its highest and most dangerous concentration at the source of pollution;

   Whereas the closer you live, work, and play to an active oil well, the more severely your health and safety are threatened. Whereas living next door to neighborhood drilling means chronic headaches and migraines, frequent nosebleeds, exacerbated asthma and other respiratory illness, reproductive harm and an increased risk of cancer;

   Whereas the transport, onsite storage and use of toxic and flammable chemicals in industrial facilities in close proximity to homes and other sensitive land uses also raises the risk of catastrophic accidents;

   Whereas neighborhood drilling is incompatible with public health and has no place near sensitive land uses such as homes, schools, churches or daycare facilities; and studies show that a buffer of at least 2,500 feet between active oil wells and these sensitive land uses is necessary to protect community health from oil extraction;

draft

Whereas the City of Los Angeles is a leader at the forefront of enacting policies to protect the environment and address global climate change, including the Sustainability City pLAn requiring dramatic reductions in GHG emissions with an 80% GHG reduction target by 2050;

Whereas the City of Los Angeles has a duty to protect the health and safety of its residents and can use its power over land use and oil operations to protect those residents in this instance;

1. The Mar Vista Community Council resolves to support the introduction of an ordinance establishing a human health and safety buffer that prohibits oil drilling within 2,500 feet of sensitive land uses including homes, schools, early childhood centers, senior centers, hospitals and medical clinics, parks, etc.

   The Mar Vista Community Council authorizes the submission of a community impact statement if such an ordinance does get introduced into the Los Angeles City Council.

2. The Mar Vista Community Council resolves to support Land Use and Legal Study to determine the feasibility of such an ordinance.

   The Mar Vista Community Council authorizes the submission of a community impact statement if such a study takes place.

Presentation by Leah Garland

Speaking on behalf of Stand LA. Concerned about effects of oil & gas drilling so close to where people live. Los Angeles sits on top of world's largest urban oil field. Drilling releases toxic chemicals. People who live close tend to be low income, people of color. There are 1000 active oil wells in City of Los Angeles.

Holly Tilson: Use of eminent domain? ANS: Was to close the oil wells.

Public Comment

Christopher: Downside. If oil wells win and remain, would need to use eminent domain and eliminate housing near wells.

Chuck Ray: Should send to motions toT&I for technical considerations, spend more time on.

Discussion

Damien Newton: Understanding is that there's no eminent domain threat—it taken into account when ordinance written.

Ken Alpern: We have a need for industrially-zoned land.

Elliot Hanna: Problem is that the oil wells are there. Options: long, drawn out court battles, or use eminent domain to condemn homes.

Motion carried: 10 ayes, 1 nay.

g. **Policy Motion:** Support for reappointment of Dr. Frederick Pickel (submitted by Transportation & Infrastructure Committee)

Whereas Dr. Frederick Pickel has served well as the Executive Director of the Office of Public Accountability/Ratepayer Advocate for a five-year term as specified in the City Charter;

Whereas the City Council has continued Dr. Pickel as the interim Executive Director of the Office of Public Accountability/Ratepayer Advocate until another five-year appointment occurs as specified by the City Charter;

Whereas the City Council is overdue on selecting someone for the next five-year appointment as specified in the City Charter;

Therefore, the Mar Vista Community Council endorses Dr. Frederick Pickel to be reappointed as the Executive Director of the Office of Public Accountability/Ratepayer Advocate for another five year term

Note: Dr. Pickel is currently operating on a temporary contract. The City Council has not taken the necessary action to select the next Executive Director for the Office of Public Accountability/Ratepayer Advocate. This greatly weakens Dr. Pickel's effectiveness. The DWP Committee suggested in April that all Neighborhood Council pass resolutions in support of giving Dr. Pickel another five year contract.

Presentation by Chuck Ray

draft

Motion sent from DWP MOU committee. Dr. Pickle was selected in 2012. Current selection committee has 2 Neighborhood Council members. Dr. Pickle was slow in getting starting but has been very effective.

Motion to approve by Melissa Stoller, 2nd by Ken Alpern. Motion carried unanimously.

h. **Policy Motion**: Presentation of ~~Opposition to~~ Proposed Stop Light at Sawtelle and Charnock (submitted by Transportation & Infrastructure Committee)

Whereas, the LADOT is recommending the implementation of a stop light at Sawtelle and Charnock; and

Whereas, the neighbors living next to the stop light will be significantly impacted in that they will be restricted from easily and reliably accessing their homes;

Therefore, The Mar Vista Community Council calls for a presentation by LADOT of any proposed stoplight or traffic treatment ~~which includes the options of a stop sign or crosswalk, and not a stop light, and which takes into consideration any and all needs and impacts of these neighbors~~.

Public Comment

Linda Gugliano: Was originally stakeholder request for stoplight on Sawtelle at Westminister. West District Engineer looked in to, wanted signal at Charnock because it's a main traffic street. Waiting for traffic counts.

Rich Hirschkoff: He put in service request for signal at Charnock and Sawtelle to make it safer to get in and out of neighborhood. City did all studies and approved it. City said codes don't allow stop signs. Light would only go on when people need to get in and out of neighborhood.

Discussion

Sarah Auerswald: Would like motion to go back to committee.

Melissa Stoller: The original last paragraph of this motion was "Therefore, The Mar Vista Community Council calls for a re-evaluation by LA DOT of any proposed stoplight that does not take into consideration any and all needs and impacts of these neighbors." It was changed because T&I wasn't sure whether a stoplight is approved or just under study – something we should know before we pass a motion. The paragraph as rewritten makes no sense.

Ken Alpern: Amending motion to just call for a presentation.

Motion to approve as amended by Ken Alpern, 2nd by Paola Cervantes. Motion carried: 10 ayes, 1 nay.

i. **Policy Motion**: Telecommunications permitting (submitted by Planning & Land Use Management Committee)

Recognizing: That there are various state and federal laws that restrict what cities can and cannot do when it comes to the permitting of the construction of telecommunications facilities;

Recognizing: That the process preceding and during construction of a cell phone vault and tower on East Blvd between Venice & Pacific left nearby residents angry, confused, and disenfranchised

Recognizing: That the behavior of the company installing the vault infuriated an already bad situation by blocking driveways for days on end, damaging existing infrastructure, and harassing neighbors

Recognizing: That the city issued a U permit for this process in 2015, and that notices for the AGF portion were mailed to as few as two houses near the site according to receipts provided by the construction firm

Recognizing: That while this U permit expired, when the 2017 U permit was issued, the AGF portion was allowed to be attached to the new 2017 U-Permit

Recognizing: That many long-term residents were unaware of the project and that newer residents would have had no chance to appeal the project

Therefor, let it be resolved that:

1. The City of Los Angeles review its automatic extension process for cell phone towers and vaults and make any changes allowed under state and federal law to allow residents more opportunities to learn about projects in their neighborhoods.

draft

2. That if the city cannot substantially change its automatic extension process, that it require that notices on extended permits be mailed to all impacted residents
3. That the AGF portion of expired U permits not be automatically be renewed for new U Permits submitted for the same site
4. That the pool of impacted residents be included to include any residents who will be impacted by construction or installation of the vault, i.e. that people who have their driveways blocked get proper notice Min 250, max 500 '
5. That the appeal fee for appealing a permit granted for cell phone tower construction be reduced from $100 to $1
6. That a code of behavior for companies installing towers be created that includes notification and behavior of construction employees
7. That the city require "proof of deliver" for permit applications notifications.

Motion to approve by Damien Newton, 2nd by Ken Alpern. Motion carried unanimously.

j. **Policy Motion**: Planning Appeals Fees (submitted by Planning & Land Use Management Committee)

Recognizing: That some City Councilmembers, City Planning Commissioners, and staff at various levels of city government feel there is a problem with "nuisance appeals" of approved permits and projects granted by the City of Los Angeles;

Recognizing: That oftentimes the appeals process provides the best chance for resident and neighborhood associations to appeal projects and permits when errors are made by city staff and planning commissioners;

Recognizing: That some of the fees being discussed to file an appeal of a project by a resident or Neighborhood Association;

Therefor Let It Be Resolved : That the Mar Vista Community Council opposes any proposal to raise fees on appeals for any project or permit that comes from City Planning or the Planning Commission or any other city department or board without first conducting a lengthy public review process that includes a presentation with opportunity to provide feedback to any and all neighborhood councils.

Approved on consent.

k. **Policy Motion:** Public Comment form (submitted by Stakeholder petition)

WHEREAS, the mission of the Mar Vista Community Council (MVCC) is to provide a forum for discussion of issues that affect the quality of life of MVCC Stakeholders, to facilitate stakeholder input and feedback and to serve as advocates for Mar Vista stakeholders with officials of the City of Los Angeles and other governmental and non-governmental entities, and,

WHEREAS, many Mar Vista stakeholders in attendance at the July 11, 2017 Board of Directors meeting felt the MVCC was not fulfilling their mission to accurately collect stakeholder input and feedback as well as serve as advocates for Mar Vista stakeholders with officials of the City of Los Angeles, and,

WHEREAS, many Mar Vista stakeholders were expecting to be asked for their opinions on the motions in front of the Board of Directors at the July 11th meeting prior to the Board casting their own vote, and,

WHEREAS, many Mar Vista stakeholders felt the Public Comment form provided at the July 11th meeting did not accurately capture the demographics of the people giving Public Comment, in particular the number of people who were not Mar Vista stakeholders, and/or people who were representing non-profit groups receiving grants from LADOT Vision Zero,

THEREFORE, the Mar Vista Community Council moves to update its Public Comment form to better capture Mar Vista stakeholder input and feedback by including the following:

1) An entry to record a stakeholder's opinion on a particular agenda item in lieu of speaking, as well as the following statement: All in-lieu opinions will be tallied and announced before the Board vote on this item;

2) An entry to record a speaker's affiliation: Mar Vista stakeholder, City employee, lobbyist, business organization, neighborhood association, etc.;

3) A check box for speakers to indicate if they are a paid speaker and instructions to provide their client's information on the back of the form, as well as the following

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advisory: If you are receiving compensation to make this appearance, the City of Los Angeles' Municipal Lobby Ordinance (LAMC Section 48.01 et. seq., as amended) may require you to register and report your lobbying activity. For more information, contact the City Ethics Commission at (213) 978-1960 or http://www.lacity.org/ethics.

Presentation

Selena Inouye: Need better speaker card, especially if inviting people who are not stakeholders.

Public Comment

Should ID paid speakers. If organization is taking grant money, should also identify.

Discussion

Ken Alpern: Under Brown Act limited as to how much info can ask from people.

Rob Kadota: Suggests motion go to Election & By-laws Committee.

Elliot Hanna: Has problem with Item 1.

Holly Tilson: OK with sending to Election & By-laws Committee.

Motion to send to committee by Rob Kadota, 2nd by Sarah Auerswald. Motion carried unanimously.

l. **Policy Motion:** Great Street Venice Blvd. Point Person (submitted by Stakeholder petition)

WHEREAS, the Mar Vista Community Council passed on July 11th the Continuation of Venice Boulevard Pilot Project motion, a directors' motion submitted by Ken Alpern and Sherri Akers, and, WHEREAS, said motion requested the following:

- The MVCC requests that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month. MVCC also requests the same data on streets in LA where this same configuration was implemented.
- The MVCC requests an evaluation be done by an ADA consultant
- The MVCC requests that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike) or other organizations similar in focus and expertise.
- That the City of Los Angeles posts all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented
- That the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze.
- That MVCC be provided with the data to date on the survey created by CD11 and updated on a regular basis.
- That MVCC be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented.

and,

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista's problems and requests for assistance, and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community, as well as the accuracy of forms and sources of data,

THEREFORE, the Mar Vista Community Council moves to follow through on its promises to the Mar Vista stakeholders and:

1) Immediately designate point person(s) to be responsible for writing up these requests for information and evaluations to Councilperson Mike Bonin's office, Mayor Eric Garcetti's office, the Los Angeles Department of Transportation, the Los Angeles Fire Department and the Los Angeles Police Department;

2) Instruct said point person(s) to submit the written requests to the Board Chair Sara Auserwald by September 19th so they can be speedily forwarded to Councilperson Mike Bonin's office, Mayor Eric Garcetti's office, the Los Angeles Department of Transportation, the Los Angeles Fire Department and the Los Angeles Police Department;

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3) Empower said point person(s) to follow up with Councilperson Mike Bonin's office, Mayor Eric Garcetti's office, the Los Angeles Department of Transportation, the Los Angeles Fire Department and the Los Angeles Police Department to ensure a timely response;

4) Instruct said point person(s) to report back to the Mar Vista stakeholders at every Board of Directors meeting as to the status of these requests for information and evaluations; and

5) Make available to all Mar Vista stakeholders the information received by publicly posting it in electronic format on the Mar Vista Community Council website http://www.marvista.org.

Presentation

Submitted because July 11 BOD motion asked for a lot of data, haven't been getting it. Group filed California Public Records request, didn't get data on time. LADOT hasn't given date when records will be received. Stakeholders need board to follow through.

Public Comment

Martin Rubin: DOT representative said would provide data and info about how data was collected.

Where's the data? Data at public meeting was nonsense.

Discussion

Damien Newton: Strong accusation. What kind of follow-up did we do after July meeting? Sarah Auerswald: We sent out motion.

Elliot Hanna: understands frustration with follow-up. Wants to see raw data. Don't know how passing motion that says we're going to get the data we already asked for helps.

Ken Alpern: Understands, people are screaming for help. Agrees with Elliot, but we need to poke CD 11 to do their job.

Holly Tilson: Stakeholders have asked for this information because this is the MVCC's project.

Motion to approve by Sarah, 2nd by Paola Cervantes. Motion carried: 6 ayes, 3 nays, 1 abstention (Greg Tedesco).

m. **Policy Motion:** Venice Blvd Great Street Lane Restoration #1 (submitted by Transportation & Infrastructure Committee)

The Mar Vista Community Council asks that Councilmember Mike Bonin immediately reverse the lane reductions on Venice Blvd. and implement other strategies to improve the safety, efficiency, and accessibility of our roads for pedestrians, cyclists, and vehicles. As representatives of your constituents and your elected advisory body, we believe strongly that this is the only remedy that addresses the constant, voluminous, community outcry on this issue.

Discussion

Rob Kadota: Point of Order: Motion is not permitted under Roberts Rules or Rosenbergs. Cannot revisit failed motions. Rosenbergs Motion to Reconsider:

> "…a motion to reconsider may be made only by a member who voted in the majority on the original motion. If such a member has a change of heart, he or she may make the motion to reconsider (any other member of the body—including a member who voted in the minority on the original. If a member who voted in the minority seeks to make the motion to reconsider, it must be ruled out of order. The purpose of this rule is finality. If a member of minority could make a motion to reconsider, then the item could be brought back to the body again and again, which would defeat the purpose of finality."

Sarah Auerswald: We have a serious disagreement of understanding of rules. Need to table motion until it's resolved.

Motion to table m until we figure out our rules by Sarah Auerswald, 2nd by Melissa Stoller. Motion carried: 7 ayes, 4 nays.

DONE: We need to figure this out together. Might not come up with decision right away,

n. **Policy Motion:** Venice Blvd Great Street Lane Restoration #2 (Director motion submitted by Elliot Hanna)

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WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were recently implemented on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, The Mar Vista Community Council supports the stated goals of reducing traffic fatalities and serious injuries throughout the City of Los Angeles, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the Venice Blvd. lane reductions have caused significant daily increases in traffic, increased commuter traffic on surrounding residential streets, increased average commuting times, and increased pollution from idling vehicles, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and

WHEREAS, on August 18, 2017, Councilmember Mike Bonin named a 20-member community panel - comprised of a broad range of Playa Del Rey stakeholders with differing views and perspectives - to "analyze data, community feedback and available financial resources to make short-term and long-term recommendations to reduce speeding and improve safety on Playa del Rey streets."

THEREFORE, Mar Vista Community Council moves (1) to advise the City of Los Angeles Department of Transportation and Council District 11 to reverse the lane reduction component on Venice Boulevard and restore the six-lane configuration, and (2) to urge the City of Los Angeles Department of Transportation to study, and present to the community, alternate implementations on Venice Blvd., that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors and to provide a monthly update of changes made and data collected, and (3) to urge Councilmember Bonin – as a vital part of this study - to appoint a community panel, similar to the one appointed for the projects in Playa Del Rey, to commission a scientific survey, to conduct focus groups comprised of random stakeholders from all sides of the issue in the proper proportion, and to study and make recommendations regarding changes to Venice Blvd.

Motion to send to Transportation & Infrastructure Committee by Sarah Auerswald, 2nd by Melissa Stoller.

Discussion

Elliot Hanna: Thinks board has public relations problem. We need to address this. This board has done bad job of addressing this.

Ken Alpern: We can't be recalled, but if we could be we would.

Rob Kadota: This is important topic. Needs to go to committee where it can be discussed.

Damien Newton: A lot of people here want to talk about this.

Motion carried: 6 ayes, 5 nays.

o. **Policy Motion:** Regional Safe Bike Routes (Director motion submitted by Ken Alpern)

WHEREAS, Mar Vista Community Council, Councilmember Bonin and Mayor Garcetti are ccommitted to the successful implementation of the Vision Zero Action Plan January 2017, which states, "all Angelenos have a right to safe mobility"; and

WHEREAS, the Venice Boulevard "Great Street" pilot program was implemented on May 19, 2017, including several changes to the roadway between Beethoven Street and Inglewood Boulevard to adhere to the intentions of Vision Zero; and

WHEREAS, during the 11-week period from May 20, 2017 through August 6, 2017 at least 17 accidents have been reported on the Venice Boulevard "Great Street", including 9 involving cyclists. Total accidents increased by 325%, from 4 reported during the same period in 2016, which implies that the current roadway configuration is failing to meet the objectives of Vision Zero; and

WHEREAS, the "Great Street" roadway configuration on Venice Boulevard has had unintended consequences of reducing safety by causing substantial gridlock on Venice Boulevard and many alternate routes, increasing cut-through traffic on nearby residential streets, causing

draft

greater pollution from idling motor vehicles, and slowing fire/police emergency response times; and

WHEREAS, a diverse grassroots group of community members have coalesced since May 19, 2017, resulting in over 3,000 electronic signatures asking Councilmember Bonin to restore the old three traffic lane per direction Venice Boulevard configuration in the "Great Street" roadway segment; and

WHEREAS, a recent survey of 45 businesses on Venice Boulevard found that 82% oppose the lane reduction element of the "Great Street" pilot program and that many business owners have witnessed accidents and close calls that are caused by the current unsafe roadway configuration; and

WHEREAS, Council District 11 has communicated that the "Great Streets" roadway changes on Venice Boulevard consist of a pilot program, using inexpensive temporary materials, and that the City would keep what the community loves and remove what the community does not want; and

WHEREAS, extensive segments of government owned land exist in and around Mar Vista that could be used for protected bike paths and bike lanes that would be substantially safer than the currently unsafe "Great Street" configuration on Venice Boulevard;

THEREFORE, Mar Vista Community Council moves to advise Council District 11 to immediately remove the lane reduction element of the "Great Street" pilot program and return Venice Boulevard to an improved version of the previously established six motor vehicle lane configuration, with improvements including a resurfaced roadway, bike lanes that are clearly designated with green paint, and a reduced speed limit, as allowed by State law upon completion of the roadway re-striping and any required speed study; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the State of California, County of Los Angeles, City of Culver City, and City of Santa Monica to expeditiously study, design and pave a regional network of safe bicycle paths and routes, possibly to include:

- Playa Del Rey to Playa Vista
- Marina del Rey to Playa Vista
- Del Rey to West Los Angeles
- Venice to Mar Vista
- Del Rey to Santa Monica (East)
- Del Rey to Santa Monica (West)
- Venice Beach to Downtown Los Angeles
- Bike Path Safety: initiate safety precautions including installation of lights, posting/enforcement of "no loitering" signs, and frequent daily police patrols on all bike paths;
- Bike Path Maintenance: expand ongoing and one-time bike path maintenance, including frequent sweeping and weed removal, repaving of worn-out pavement, and underground channeling of storm drain runoff.

THEREFORE, Mar Vista Community Council further moves to designate the MVCC Transportation and Infrastructure Committee to promote and advocate for implementation of this regional network of safe bicycle paths and routes as described herein, to include a Proposed Regional Network of Safe Bicycle Paths and Routes:

- **Playa Del Rey to Playa Vista:** paving City easement parallel to Culver, Jefferson and Lincoln Blvds. from Nicholson St. to Bluff Creek Dr.;
- **Marina del Rey to Playa Vista:** connecting the Marvin Braude Costal Path to McConnell Ave. in Playa Vista, following abandoned railroad, including a connection to the Culver Blvd. Median and Ballona Creek Paths, and re-topping of existing bridge pylons across Ballona Creek;
- **Del Rey to West Los Angeles:** connecting the Ballona Creek, Culver Blvd. Median, and Exposition Corridor Paths through a combination of paved paths along the Sepulveda Channel and across Mar Vista Park, combined with greenways on residential streets including: East Blvd., Butler Ave., and Purdue Ave.;

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- **Venice to Mar Vista:** connecting the Marvin Braude Costal Path to the proposed Sepulveda Channel Path via greenways on residential streets including: Zanja St. and Van Buren, Garfield, Caswell, Francis, and Pacific Avenues;
- **Del Rey to Santa Monica (East):** connecting Ballona Creek and Culver Blvd. Paths to Santa Monica College Bundy Campus via greenways on residential streets including: McConnell Blvd., Wade St., Cabrillo Blvd., and Stewart Ave.;
- **Del Rey to Santa Monica (West):** connecting the Culver Blvd. Median Path and proposed Marina del Rey to Playa Vista Path to 16th St. in Santa Monica via greenways on residential streets including: Alla Rd., Glencoe, Glyndon and Glenavon Avenues, combined with paved paths across the east edge of Penmar Park and Golf Course and adjacent to Dewey St.;
- **Venice Beach to Downtown Los Angeles:** initiate a feasibility study to explore future removal or replacement of the abandoned median railroad with a protected bikeway, while retaining three motor vehicle lanes in each direction;

Rob Kadota: Motion should go to Bike Committee.

Motion to send to Transportation & Infrastructure and to Bike Mar Vista Committees by Sarah Auerswald, 2nd by Melissa Stoller. Motion carried: 6 ayes, 5 nays.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

Meeting adjourned at 9:36 P.M.

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* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Draft

ADDENDUM A: Revised 2017-18 MVCC Budget

Budget Category: General/Operational	**Total Amount**
Subcategory: Office	
Storage	
Storquest	$2,496.00
Meeting rooms rental	
The Vineyard	$600.00
St Andrew's Lutheran Church	$300.00
St Bede's	$75.00
Windward School	$5.00
PO Box rental	$132.00
Farmer's Market rental	$1,200.00
Equip & supplies (misc)	
misc	$1,100.00
Mtg supplies & printing	
printing	$1,000.00
Board Training & Support	
Business cards/name badges	$250.00
Board Retreat	$37.68
Office subtotal:	**$7,195.68**
Subcategory: Outreach	
Website	
The Web Corner: website maintenance	$1,650.00
The Web Corner: emails	$385.00
The Web Corner: Extra Data Entry	$500.00
RIMU Hosting	$96.27
Email Service	
Mail chimp email service	$480.00
Advertising	
Banners/sign/event promotion	$500.00
Facebook ads	$250.00
Emergency Prep signs & brochures	$1,500.00
Community Events	
Block parties (5 X $300)	$1,500.00
Westside Senior Health & Wellness Fair	$500.00
Winter Wonderland	$1,000.00
Art Walk	$2,000.00
Venice High Grease Night	$300.00
MVCC Events	
Mar Vista Turns 90 Celebration	$4,000.00
Great Street Tree Planting	$300.00
Green Garden Showcase	$4,000.00
misc events	$7,843.05
Outreach subtotal:	**$26,804.32**
Subcategory: Elections	
Election expenses	$1,000.00
Elections subtotal:	**$1,000.00**
General/Operational Total:	$35,000.00
Budget Category: Community Improvement Grants	
Alley repair/seed money	$5,000.00
Budget Category: Neighborhood Purpose Grants	$2,000.00
Budget Total	**$42,000.00**

draft

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday October 10th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of August 8th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Friends of Historic FS 62: Albert Olson
   k. Mar Vista Celebrates 90: Open
   l. Mar Vista Chamber of Commerce: Sarah Auerswald
8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Acting Chair – Rob Kadota

i. Announcement of board vacancy

b. First Vice Chair – open

c. Second Vice Chair – Paola Cervantes

d. Secretary – Melissa Stoller

e. Treasurer – Holly Tilson

i. Report on current financial status

ii. **APPROVAL** of September Monthly Expense Report (MER) (https://cityclerk.lacity.org/NCFundPortal/display.cfm?id=164&type=5)

9. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

b. **Community Outreach Committee** – Sarah Auerswald, Chair

d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

g. **Bike Mar Vista** - Mitchell Rishe, Chair

h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

m. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

n. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

b. Zone 2 – Damien Newton

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

e. Zone 5 – Michelle Krupkin

f. Zone 6 – Holly Tilson

11. **Old Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

a. **Policy Motion:** Venice Blvd Great Street Lane Restoration #1 (submitted by Transportation & Infrastructure Committee)

NOTE: This motion was sent back to T&I at the September 12, 2017 BOD.

The Mar Vista Community Council asks that Councilmember Mike Bonin immediately reverse the lane reductions on Venice Blvd. and implement other strategies to improve the safety, efficiency, and accessibility of our roads for pedestrians, cyclists, and vehicles. As representatives of your constituents and your elected advisory body, we believe strongly that this is the only remedy that addresses the constant, voluminous, community outcry on this issue.

b. **Policy Motion:** Venice Blvd Great Street Lane Restoration #2 (submitted by Transportation & Infrastructure Committee)

NOTE: This motion, initially submitted by a director, was sent to T&I at the September 12, 2017 BOD. Changes from the original are in red.

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were recently implemented on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, The Mar Vista Community Council supports the stated goals of reducing traffic fatalities and serious injuries throughout the City of Los Angeles, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the Venice Blvd. lane reductions have caused significant daily increases in traffic, increased commuter traffic on surrounding residential streets, increased average commuting times, and increased pollution from idling vehicles, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and

WHEREAS, on August 18, 2017, Councilmember Mike Bonin named a 20-member community panel - comprised of a broad range of Playa Del Rey stakeholders with differing views and perspectives - to "analyze data, community feedback and available financial resources to make short-term and long-term recommendations to reduce speeding and improve safety on Playa del Rey streets."

THEREFORE, Mar Vista Community Council moves (1) to advise the City of Los Angeles Department of Transportation and Council District 11 to *immediately* reverse the lane reduction component on Venice Boulevard and restore the six-lane configuration, and (2) to urge the City of Los Angeles Department of Transportation to study, and present to the community, alternate implementations on Venice Blvd., that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors and to provide a monthly update of changes made and data collected, and (3) to urge Councilmember Bonin – as a vital part of this study - to appoint a community panel *whose membership is selected by the MVCC Board of Directors*, similar to the one appointed for the projects in Playa Del Rey, to commission a scientific survey, to conduct focus groups comprised of ~~random~~ *representative* stakeholders from all sides of the issue in the proper proportion, and to study and make recommendations regarding changes to Venice Blvd.

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

MVCC approves Items 13.a-g on consent.

a. **Administrative Motion**: 2nd signer (submitted by Executive & Finance Committee)

MVCC approves the appointment of Rob Kadota as 2nd signer and credit card holder.

b. **Funding Motion**: Rob Kadota reimbursement (submitted by Executive & Finance Committee)

MVCC approves the expenditure of $6.66 to reimburse Rob Kadota for equipment and supplies.

c. **Funding Motion**: MVCC banners (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $500 for banners/signs/event promotion. Budget category: General & Operational/Outreach/advertising.

d. **Funding Motion**: Equipment and supplies (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $1000 for miscellaneous equipment and supplies. Budget category: General & Operational/Outreach/advertising.

e. **Funding Motion**: Winter Wonderland (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of $1000 to support Winter Wonderland. Budget category: General & Operational,/Outreach/community events.

f. **Funding Motion**: Great Streets tree planting (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $300 for Great Streets tree planting. Budget category: General & Operational/Outreach/ community events.

g. **Policy Motion**: Council File No 09-2645 Hearing (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council asks that Councilmember Bob Blumenfeld, Chair of the Public Works and Gang Reduction Committee hold a hearing on Council File No 09-2645, "Revised Draft Ordinance Amending Sections 62.00, 62.08, 62.09 and 62.10 of the Los Angele Municipal Code to revise specifications and procedures for the installation of above ground facilities in the public right-of-way.

13. **Grievances**, if any received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment**

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ADDENDUM A: MVCC Budget, revised September 12, 2017

Budget Category: General/Operational	**Total Amount**
Subcategory: Office	
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Meeting rooms rental	
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Windward School	$5.00
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Subcategory: Elections	
Election expenses	$1,000.00
Elections subtotal:	**$1,000.00**
General/Operational Total:	$35,000.00
Budget Category: Community Improvement Grants	
Alley repair/seed money	$5,000.00
Budget Category: Neighborhood Purpose Grants	$2,000.00
Budget Total	**$42,000.00**

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday October 10th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:04. P.M.

   Quorum present: Rob Kadota, Robin Doyno, Holly Tilson, Melissa Stoller, Paola Cervantes, Susan Klos, Greg Tedesco, Ken Alpern, Michelle Krupkin, Damien Newton, Elliot Hanna, Chuck Ray

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of September 12th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).

   Motion to approve by Melissa Stoller, 2nd by Holly Tilson. Motion carried: 9 ayes, nays, 2 absent (Ken Alpern and Michelle Krupkin).

4. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)

   Lee Sugich: Traffic access control arrows are needed on McLaughlin: Left turn lane eastbound onto Palms. Can't get out of driveway.

   Jay Handel, Budget Advocate: Budget Advocate's Theme is Take our City Back. Budget Advocates will start monitoring city services. WLA is new home of county sobering center. Construction was started on Santa Monica Blvd. in old Ethan Allen building; city kept it secret. Lease is now terminated.

   Carol Hyle: Did MVCC get promised data? Wants to know how much mailers about Great Street cost. Wants full audit and budget of how much road diet has cost.

   Selena Inouye: Point person was supposed to be giving report. Why isn't it t on today's agenda? Didn't get the asked for documents from Bonin's office or DOT. Parliamentary procedure: no prohibition against identically worded motion back to agenda.

   Pat Smith: Where is 90-day report?

   Joe Santana: ADA violation on Venice. Difficulty unloading wheelchair-bound mother on reconfigured Venice Blvd.. Consider elderly and do something about it,

   Sam Woolsey: Members of board are actively working for/against issues in Social Media.

   Jason Finis: Can bring similarly worded motions to board again.

   Sharon Odere: Why was Bonin sending volunteers out to people's homes and then not talking to them? Why is MVCC not representing us?

   Dimitrius Mavromichalis: I brought neighbors together to bring good things to neighborhood. I will expose everyone whose going against the neighborhood.

   Anan Deborwatchi:? What's happened with road diet will eventually lead to amazing neighborhood.

   Christian?: Why is nothing ever said about Garcetti's pre-inauguration press release? No mention of road diet

   Ken Marek: Article II of bylaws: purpose,is to advocate. Two online polls asking if want to keep lanes or remove them; 89% want reversal. 82% of businesses are for restoring lanes.

   Rich Hirschkoff. Left turn arrow is in works for Sawtelle & Palms; privately funded.

5. **Community Memorial Observations**
6. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org

b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

7. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray

      Jill Stewart, Coalition to Protect LA: Planning Dept is staffed by inexperienced people. Councilmember David Ryu is now chair of Health, Education & Neighborhood Councils Committee: concerned that BONC is not doing its job, wants mayor to appoint better people; DONE is service group, should not be policy group.

   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton

      Strut your Mutt, charity dog walk is October 21 at Exposition Park. Money goes to save pets in pounds. Sign up at https://www.facebook.com/MarVistaMutts/.

   j Friends of Historic FS 62: Albert Olson

      Making slow progress, working with city attorneys to move forward. Will need to raise $2M to refurbish and furnish,

   k. Mar Vista Celebrates 90: Open

      November 12 at Mar Vista Farmers' Market. Soliciting Mar Vista musicians & entertainers. Will have stage for sharing stories about past.

   l. Mar Vista Chamber of Commerce: Sarah Auerswald

8. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Acting Chair – Rob Kadota

      i. Announcement of board vacancy

      At-large Director position open, soliciting application. Applications due November 7.

      Went to EngageLA program on homelessness at mayor's residence. Money is there.

      Will fill open officer positions at November meeting.

      New bylaws shift us to Rosenberg's Rules.

   b. First Vice Chair – open
   c. Second Vice Chair – Paola Cervantes
   d. Secretary – Melissa Stoller

Meeting agendas need to be posted on the bulletin board at Mar Vista Recreation Center 72 hours before the meeting. They must be readable, which means the pages need to be spread out. The board holds 8 full pages and 2 cut in half. If there's no space left, you can try taping your agenda to the bulletin board frame. Please don't try to make your agenda smaller by using a super small font size; it needs to be reasonably readable.

Jasmine Elbarbary: If no room, can just write on agenda "remaineder will be available at the meeting."

Our standing rules require the taking and posting of meeting minutes. There are a lot missing

e. Treasurer – Holly Tilson

i. Report on current financial status

About $10,000 not yet committed. There's still extra money need to think about spending.

ii. **APPROVAL** of September Monthly Expense Report (MER) (https://cityclerk.lacity.org/NCFundPortal/display.cfm?id=164&type=5)

Motion to approve by Michelle Krupkin, 2nd by Susan Klos. Motion carried: unanimously.

9. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

b. **Community Outreach Committee** – Sarah Auerswald, Chair

Rob will chair on interim basis.

d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Trying to see what to do about Measure JJJ which grants some flexibility. Reaching out to other NCs.

Development planned for NE corner of National & Barrington. By-right development, 4 stories, 44 units. Trying to get developer to PLUM.

Moving PLUM meetings to 1st Thursday of month.

f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

Normal meeting time will be 1st Wednesday of every month at Windward. Next meeting Nov. 1.

g. **Bike Mar Vista** - Mitchell Rishe, Chair

At Farmers' Market last Sunday with bike repair stand. Oct. 22 will show mix of bicycles for people to try.

h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Meeting November, 11 at 6:30 p.m. in library. Will go in to more detail about MicroTransit project and report on Great Streets.

j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Karen Bass sent letters asking FAA to follow their rules regarding altitude; 60% are going below. Santa Monica Airport about to begin shortening runway; injunction against should be resolved in next few weeks.

k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

Green Garden Showcase event paperwork was submitted to DONE.

l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

m. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

n. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

10. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Earthquake Preparedness Fair in one week. Valerie Fountaine runs it.

b. Zone 2 – Damien Newton

Back to school day was big success. 400 students participated in bike rodeo.

St. Andrews Church will have table set up in parking lot to collect home-grown fresh fruits every Sunday; produce will go to Grace Church. Planning Veterans Green Project – electronics recycling.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

Will help anyone interested in putting together earthquake kit.

e. Zone 5 – Michelle Krupkin

Construction on Inglewood near Washington Blvd. Complaints about new lane configuration .

f. Zone 6 – Holly Tilson

Stakeholders want lane restored.

11. **Old Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Motion to move 11.b forward. Motion carried: 10 ayes, 0 nays, 1 abstention (Holly Tilson).

a. **Policy Motion:** Venice Blvd Great Street Lane Restoration #1 (submitted by Transportation & Infrastructure Committee)

NOTE: This motion was sent back to T&I at the September 12, 2017 BOD.

The Mar Vista Community Council asks that Councilmember Mike Bonin immediately reverse the lane reductions on Venice Blvd. and implement other strategies to improve the safety, efficiency, and accessibility of our roads for pedestrians, cyclists, and vehicles. As representatives of your constituents and your elected advisory body, we believe strongly that this is the only remedy that addresses the constant, voluminous, community outcry on this issue.

Public Comment

Martin Rubin: Deep disappointment in how MVCC has been operating.

Chris Servo: 11.b was bait & switch. Maybe someday you will support the community.

Jason: This was snuck in. Need to go back to drawing board.

Mary Hruska: There are other options. This version is not only choice. Need to reverse

Selena Inouye: Boggles my mind that you can't hear what community says. The minute we can vote you out of office we will.

Richard McMillan: This is worse I've ever seen MVCC behave.

?: Other Communities are watching, viewing Mar Vista as community to drive around, not true.

Susan Hirschkoff: Next time, can bring 50 people who support pilot.

?: Many are unhappy. It's really frustrating not to be heard. Many on board won't even listen.

?: Very frustrating; very one-sided on board. Lets those for the streets talk as long as they want and shuts us up.

Roy Persinko: In case this is voted down, want to make sure we can do again next month. Ridiculous. Voted on this already. Why are we here?

Ken Marek: Have to vote for this one now that other one's been modified.

Richard Hirschkoff: 41,500 residents of Mar Vista. Bylaws need to be changed eliminated declared stakeholders.

Ana: Great Streets intends to slow traffic and unite community along commercial corridor. Public engagement is the answer.

Eric Sharlow: Keep lanes the way they are, with less lights and crosswalks

Lisa Zulo: As Civics teacher, doesn't know what to tell students. Not listening to constituents.

Dimitrius: Not working for fire department, transponders not working. Reverse and come up with solution that works for everyone

Anthony: Homeowner on Wade. Feels MVCC is listening to community. Appreciates.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Board Discussion

Chuck Ray: Bylaws say must be clear consensus of community. We haven't done that.

Elliot Hanna: In committee, voted against. There's division within community, but not 50/50. Need scientific survey.

Robin Doyno: Has been listening. Forum is essential part.

Holly Tilson: All for community offering suggestions, but have paid DOT to do this. This is Mike's road he needs to fix it.

Michelle Krupkin: Safety is most important thing, There is no ADA person from city involved in design.

Ken Alpern: Had options for Scattergood. Is safety concern. Why is this being forced without a variety of options?

Damien Newton: Grant 5 years ago was from someone not then part of Vison Zero.

Motion not carried: 4 ayes, 5 nays, 1 abstention (Damien Newton), I absent (Susan Klos).

b. **Policy Motion:** Venice Blvd Great Street Lane Restoration #2 (submitted by Transportation & Infrastructure Committee)

NOTE: This motion, initially submitted by a director, was sent to T&I at the September 12, 2017 BOD. Changes from the original are in red.

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were recently implemented on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, The Mar Vista Community Council supports the stated goals of reducing traffic fatalities and serious injuries throughout the City of Los Angeles, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the Venice Blvd. lane reductions have caused significant daily increases in traffic, increased commuter traffic on surrounding residential streets, increased average commuting times, and increased pollution from idling vehicles, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and

WHEREAS, on August 18, 2017, Councilmember Mike Bonin named a 20-member community panel - comprised of a broad range of Playa Del Rey stakeholders with differing views and perspectives - to "analyze data, community feedback and available financial resources to make short-term and long-term recommendations to reduce speeding and improve safety on Playa del Rey streets."

THEREFORE, Mar Vista Community Council moves (1) to advise the City of Los Angeles Department of Transportation and Council District 11 to *immediately* reverse the lane reduction component on Venice Boulevard and restore the six-lane configuration, and (2) to urge the City of Los Angeles Department of Transportation to study, and present to the community, alternate implementations on Venice Blvd., that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors and to provide a monthly update of changes made and data collected, and (3) to urge Councilmember Bonin – as a vital part of this study - to appoint a community panel *whose membership is selected by the MVCC Board of Directors*, similar to the one appointed for the projects in Playa Del Rey, to commission a scientific survey, to conduct focus groups comprised of ~~random~~ *representative* stakeholders from all sides of the issue in the proper proportion, and to study and make recommendations regarding changes to Venice Blvd.

Public Comment

Martin Rubin: MVCC should get back on track representing the community.

Selena Inouye: Concerned about conflict of interest. Damien's company received grant from organization that supports Vision Zero, Greg received grant for pop-up bike lane. Rob: are you paid by bicycle coalition?

Anthony Dukes: MV resident. Council members just need to decide whether want to collect more data to make informed decision, not whether this is good or bad project. Encourages collection of more data.

Jeff Khourk: Board should keep in mind that they were elected to represent people of Mar Vista to City Council, not other way around. Nothing wrong with admitting it was wrong and change position

Carol: Can no longer drive due to health reasons. Has been hit while on bike on Venice. Give project more time.

Lee: Sugich: Not many bikes. Ridiculous to lose a lane for so few bikes.

Mary Rose Patejar: Lives on Palms; 16% increase in traffic. At restaurant on Venice, valet couldn't get out of car because of traffic.

Gina Sommo: Concerned with 1st responders sitting in traffic. Cut-thru traffic getting worse.

David Frank: For Great Streets - great improvement, has brought a lot of like to Mar Vista. Owns two businesses

Tamara Kaiser: Not in favor of lane reduction. Urges that regular people be on the committee, transparency in process.

Sheri Odere: Supports restoring Venice Blvd because of cut-thru traffic. Fire trucks now running through area. Created mess on Venice Blvd and now it's in the neighborhood.

Lisa Zullo: In favor of restoring lane. Come together as community and come up with alternative ways to make safe for everyone.

Sherri Akers: Went through emails received while she was on board that support continuing the pilot project; 90 letters excluding form letters and those from non-stakeholders. Board unanimously supported Vision Zero in March.

Joan Ling: MV homeowner. Supports continuing 1-year pilot. Fiees much safer walking down Venice Blvd. Takes about 1 minute longer to drive during rush hour.

Kerry Cowden: Supports restoring. No longer goes to businesses. Not many bikers

Sam Woolsey: In favor of motion 11.b, taking more community involvement,

Richard McMillan: Have never seen an issue that has divided Mar Vista like this. Are board members here to support their wishes, or those of majority of community.

Pat Smith: Opened up cell phone cuz of sitting in traffic.

Demetrios:Mavromichalis Will soon lose 5 more parking spaces, business being negatively impacted.

Steve Loiaicano: Restore lanes. Has seen cyclists avoid bike lane because too many people are getting in & out of cars.

Jason Fineis: Has documented 27 accidents on Venice, 5 last week. It's not safe for motorists, cyclists or pedestrians. Increased traffic on residential streets.

?: Cut-thru traffic terrible. No one told us about Great Streets. Restore lanes.

Josh Hamilton: Lives nearby in Palms. Was hit by opening car door (not on Great Street); broke wrist. Feels much safer in protected bike lane. Supports.

Sarah Furlong: MV homeowner. Cut-thru traffic getting really bad. LADOT needs to go street by street and put in stop signs, paint crosswalk lines. People using Waze don't know where they're going.

Nannette Pastor: Would like lanes restored. Need enforcement, streets are under policed. Sees violation on Great Street daily.

Michael Dworsky: Fan of Great Street improvements. There are lots of anticdotes & opinions on both sides. LADOT is collecting the only systematically collected before & after data.

Mary Hruska: MV Resident. There are flaws in implementation, metrics and safety. Residents want to choose their own traffic mitigation, not have plan imposed by City Hall.

Tom Ponton: Thanks the board for putting up with this. Traffic for past 40 years has been getting worse and worse and worse. Need to give pilot project a little time, analyze data.

Glen Hruska: Was impressed with LADOT data, but no data was collected on gridlocked North-South streets.

Ron Kato: Supports Great Streets. Grew up in area. Traffic's been increasing over decades. Need to look at slowing things down, bringing safety. Continue and see result at end of pilot.

Sean Collins: Not enough study before implementation, There are visibility issues and cut-thru traffic. LADOT is not measuring traffic on his parallel street.

Ken Marek: Thanks Elliot for bringing forward a compromise motion. It's not safe for cyclists.

Gordon Gardner: Supports restoring lanes. Is cutting-thru mostly so won't hit a bicyclist – blind corners. Lives off of Grandview.

Charyl Danberg: Against motion. We need to slow down traffic in city. This is experiment that needs to be continued to collect more information and think about challenges in front of us. Lack of North-South arteries that bicyclists can use limits bike traffic on Venice.

Chris Cerbo: Supports restoring lanes. There are new circumstances. Venice Blvd.is evacuation route. There's gridlock. L Now need to load cars next to traffic.

Gayle Woods: Venice needs to work for the community. LADOT & Vision Zero are sponsored by City. We're not. Something's wrong

Joseph Treves: Supports continuing pilot. There's more development, more traffic. We must adapt and so must city – address immediate & long-term issues.

Laura Smith: MV resident. Supports restoring lanes. Lane reduction rolled out in misleading and devious way. More air pollution. Emergency vehicles stuck in traffic.

Alexis Edelstein: With Recall Bonin; join at recallbonin,com. Bonin only cares about advancing his own career.

Erik Charlot: MV resident. His commute to Manhattan Beach increased by 8 minutes. Feels much safer when biking– fewer dangers to worry about. More people taking bike lanes than before.

Maria Carvelli: Rides bike down Venice to beach. Thinks configuration is dangerous.

Anna Martin: Venice Blvd business owner. Business has increased. Loves the change. Lots of kids live along Venice Blvd. and need safety. If restore lane will be kotowing to the bullies.

Christine Halberd: Resistance to change is alarming. LADOT is working to plan for future. Hearng a tremendous amount of entitlement in this room. Children live on Venice also. Hopes we look further than ourselves and city of the future.

Dick Kenna: Rides bike to work. Need to consider most vulnerable (less experienced) populations that now say they can get out and bike.

Rich Hirschkoff: Has watched neighborhood become more crowded over last 60 years. Making streets narrower is giving vision of what future will look like.

Carolyn: Wants lanes restored. Are you listening? Wants to know that we're not wasting our time.

Motion to approve by Elliot Hanna, 2nd by Ken Alpern.

Board Discussion

Elliot Hanna: Initially wrote this motion; it was amended at Transportation & Infrastructure Committee meeting. Motion is about restoring community. Wants scientific data. Need professionally facilitated focus groups.

Ken Alpern: Data and data givers are not transparent or trustworthy. LADOT data is flawed, partial & non-transparent. Hasn't considered emergency vehicles. Impacts Venice bus, Micro Transit project. Must go back to Great Street project as originally presented.

Damien Newton: Surprised when people say they didn't know there would be lane reduction. Since July motion, felt MVCC should be working on collecting data but it keeps being sidelined. Would support the friendly amendment.

Motion to amend by Melissa Stoller, 2nd by Paola Cervantes.

Motion as amended:

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were recently implemented on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, The Mar Vista Community Council supports the stated goals of reducing traffic fatalities and serious injuries throughout the City of Los Angeles, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction and creation of a protected bike lane on Venice Blvd, has caused significant tension and division within the community, and

WHEREAS, on August 18, 2017, Councilmember Mike Bonin named a 20-member community panel - comprised of a broad range of Playa Del Rey stakeholders with differing views and perspectives - to "analyze data, community feedback and available financial resources to make short-term and long-term recommendations to reduce speeding and improve safety on Playa del Rey streets."

THEREFORE, Mar Vista Community Council moves

(1) To urge the City of Los Angeles Department of Transportation to study, and present to the community, alternate implementations on Venice Blvd., that will achieve the programs' goals of reducing speed and thus injuries and deaths and contribute to the goals of Venice Great Street, while minimalizing adverse impact to the community and surrounding neighbors, and to provide a monthly update of changes made and data collected, and

(2) To urge Councilmember Bonin – as a vital part of this study - to appoint a community panel whose membership is selected by the MVCC Board of Directors, similar to the one appointed for the projects in Playa Del Rey and provide a professional facilitator, and

(3) To task the community panel to act with due diligence to study and make recommendations regarding changes to Venice Blvd. by assessing and analyzing collected data, holding an informational meeting to obtain an overview of results in other communities, conducting focus groups comprised of a broad range of Mar Vista stakeholders with differing views and perspectives.

Motion by Elliot Hanna to amend amended motion as follows:

(3) ~~To task the community panel to act with due diligence to study and make recommendations regarding changes to Venice Blvd. by assessing and analyzing collected data, holding an informational meeting to obtain an overview of results in other communities, conducting focus groups comprised of a broad range of Mar Vista stakeholders with differing views and perspectives.~~ To urge Councilmember Bonin – as a vital part of this study - to appoint a community panel whose membership is selected by the MVCC Board of Directors, similar to the one appointed for the projects in Playa Del Rey, to commission a scientific survey, to conduct focus groups comprised of representative stakeholders from all sides of the issue in the proper proportion, and to study and make recommendations regarding changes to Venice Blvd.

Discussion of Elliot's motion:

Elliot Hanna: The key thing for him is a scientific study.

Robin Doyno: Prefers Melissa's version.

Melissa Stoller: Left out "scientific survey" because I wasn't clear what that meant. Doesn't want people with hardened opinions– would set panel up for failure. Panel members can be for or against the lane reduction; it doesn't matter so long as they have an open mind.

Damien Newton: Why was Playa Vista panel set up?

Michelle Krupkin: Make-it Mar Vista called it pop-up bike lane; it didn't take away lane of traffic.

Amendment of amended motion (Elliot's motion) not carried: 4 ayes, 6 nays.

Discussion of amended motion (Melissa's amendment):

Rob Kadota: Purpose of MVCC as stated in bylaws.:

> The mission of the Mar Vista Community Council (MVCC) is to provide a forum for discussion of issues that affect the quality of life of MVCC Stakeholders, and to facilitate stakeholder communication and serve as the advocate for the MVCC area with officials of the City of Los Angeles and other governmental and non-governmental entities.

We have not had broad community collaboration and communication, haven't invited experts to make presentations. Have failed to provide adequate opportunities to discuss what we like and dislike.

Holly Tilson: Haven't had proper stakeholder input. Mike Bonin should have done this before lane was removed. Only fair way is to return 3rd lane and start from scratch. Road will be redone since dedicated bus lanes are in pipeline. Must be better ways to set street up than what LADOT did.

Michelle Krupkin: In 2008 three was a plan worked on for years by MVCC and other community members—Greening the Boulevard—that kept 3 lanes and a protected bike lane. Money was budgeted for it during Councilman Rosendahl's term. After Councilman Bonin was elected, the "Greening the Boulevard" Plan seemed to vanish along with the money allocated which also included the Venice Blvd. median "Welcome to Mar Vista" signage.

Chuck Ray: This isn't first time Mar Vista has had a contentious issue; previously, our councilman got involved. Missing involvement by Council office. We should direct Councilman to get involved. Normal functioning of community council has been cut-off.

Paola Cervantes: Amended motion gives community ability to put panel together and have deeper conversation. Could find some middle ground.

Greg Tedesco: Supports the amendment. Was involved in the pop-up. He didn't receive a grant (grant went to Chamber), did volunteer work for free. Is sympathetic about traffic. Wants pilot project to succeed, wants to get data.

Ken Alpern: Is unfriendly amendment. Reverses the original motion. We were promised an inclusive process. We were promised data, aren't being given data.

Holly Tilson: Didn't know about lane reduction ahead of time. No pre-data on side streets. City snuck this in.

Elliot Hanna: Thought this amendment was step in right direction. Removing scientific survey is deal-breaker.

Motion to accept amendment carried: 6 ayes, 4 nays, 1 abstention (Damien Newton).

Motion to approve amended motion carried: 7 ayes, 4 nays

12. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    CONSENT CALENDAR: Directors may request removal of any item from the consent calendar.

    MVCC approves Items 13.a-g on consent.

    Motion to approve consent calendar by Ken Alpern, 2nd by Elliot Hanna. Motion carried unanimously.

    a. **Administrative Motion**: 2nd signer (submitted by Executive & Finance Committee)

       MVCC approves the appointment of Rob Kadota as 2nd signer and credit card holder.

       Approved on consent.

    b. **Funding Motion**: Rob Kadota reimbursement (submitted by Executive & Finance Committee)

       MVCC approves the expenditure of $6.66 to reimburse Rob Kadota for equipment and supplies.

       Approved on consent.

    c. **Funding Motion**: MVCC banners (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $500 for banners/signs/event promotion. Budget category: General & Operational/Outreach/advertising.

Approved on consent.

d. **Funding Motion**: Equipment and supplies (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $1000 for miscellaneous equipment and supplies. Budget category: General & Operational/Outreach/advertising.

Approved on consent.

e. **Funding Motion**: Winter Wonderland (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of $1000 to support Winter Wonderland. Budget category: General & Operational,/Outreach/community events.

Approved on consent.

f. **Funding Motion**: Great Streets tree planting (Director motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $300 for Great Streets tree planting. Budget category: General & Operational/Outreach/ community events.

Approved on consent.

g. **Policy Motion**: Council File No 09-2645 Hearing (submitted by Planning & Land Use Management Committee)

The Mar Vista Community Council asks that Councilmember Bob Blumenfeld, Chair of the Public Works and Gang Reduction Committee hold a hearing on Council File No 09-2645, "Revised Draft Ordinance Amending Sections 62.00, 62.08, 62.09 and 62.10 of the Los Angele Municipal Code to revise specifications and procedures for the installation of above ground facilities in the public right-of-way.

Approved on consent.

13. **Grievances**, if any received
14. **Future agenda items**
15. **Public Comment**
16. **Adjournment 10:01.**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if*

you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: MVCC Budget, revised September 12, 2017

Budget Category: General/Operational	**Total Amount**
Subcategory: Office	
Storage	
Storquest	$2,496.00
Meeting rooms rental	
The Vineyard	$600.00
St Andrew's Lutheran Church	$300.00
St Bede's	$75.00
Windward School	$5.00
PO Box rental	$132.00
Farmer's Market rental	$1,200.00
Equip & supplies (misc)	
misc	$1,100.00
Mtg supplies & printing	
printing	$1,000.00
Board Training & Support	
Business cards/name badges	$250.00
Board Retreat	$37.68
Office subtotal:	**$7,195.68**
Subcategory: Outreach	
Website	
The Web Corner: website maintenance	$1,650.00
The Web Corner: emails	$385.00
The Web Corner: Extra Data Entry	$500.00
RIMU Hosting	$96.27
Email Service	
Mail chimp email service	$480.00
Advertising	
Banners/sign/event promotion	$500.00
Facebook ads	$250.00
Emergency Prep signs & brochures	$1,500.00
Community Events	
Block parties (5 X $300)	$1,500.00
Westside Senior Health & Wellness Fair	$500.00
Winter Wonderland	$1,000.00
Art Walk	$2,000.00
Venice High Grease Night	$300.00
MVCC Events	
Mar Vista Turns 90 Celebration	$4,000.00
Great Street Tree Planting	$300.00
Green Garden Showcase	$4,000.00
misc events	$7,843.05
Outreach subtotal:	**$26,804.32**
Subcategory: Elections	
Election expenses	$1,000.00
Elections subtotal:	**$1,000.00**
General/Operational Total:	$35,000.00
Budget Category: Community Improvement Grants	
Alley repair/seed money	$5,000.00
Budget Category: Neighborhood Purpose Grants	$2,000.00
Budget Total	**$42,000.00**

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday November 14th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

CORRECTED AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Election to fill vacant officer position(s)** – Jasmine Elbarbary
4. **Approval of August 8th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
5. **Appointment of At-Large Director**

   All Candidates who have submitted a statement of candidacy will have the option to make a short statement in the order their applications were submitted. The Chair will then make the appointment, subject to approval by the Board.
6. **Community Memorial Observations**
7. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
8. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
9. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton

j Friends of Historic FS 62: Albert Olson

k. Mar Vista Chamber of Commerce: Sarah Auerswald

10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
    a. Chair
    b. First Vice Chair
    c. Second Vice Chair – Paola Cervantes
    d. Secretary – Melissa Stoller
    e. Treasurer – Holly Tilson
        i. Report on current financial status
        ii. **APPROVAL** of October Monthly Expense Report (MER)
11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
    b. **Community Outreach Committee** – Sarah Auerswald, Chair
    d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
    d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
    f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    g. **Bike Mar Vista** - Mitchell Rishe, Chair
    h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
    i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
    j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
    l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
    m. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
    n. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – Melissa Stoller
    d. Zone 4 – Greg Tedesco
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.
    a. **Administrative Motion**: City Hall Parking Passes (director motion submitted by Rob Kadota)

       MVCC approves adding the Chair and Treasurer to the list of people who can use the City Hall parking passes.
    b. **Administrative Motion**: Conflict of Interest Disclosure (director motion submitted by Elliot Hanna)

       WHEREAS, public trust and transparency is essential to the effective function of a neighborhood council, and

WHEREAS, allegations of conflicts-of-interest have been publicly levied against sitting board members by both stakeholders and other sitting board members.

THEREFORE, Mar Vista Community Council moves that a standing item shall appear on each Board of Director's Agenda – immediately following the approval of the previous meeting's minutes and prior to the first public comment period – whereby each director shall disclose any actual or perceived conflicts-of-interest and ex-parte communications concerning items on the agenda. These shall include - but not be limited to – employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.

c. **Administrative Motion**: Record of actions (director motion submitted by Elliot Hanna)

WHEREAS, public trust and transparency is essential to the effective function of a neighborhood council, and

WHEREAS, stakeholders have expressed concern that no status is provided regarding actions taken in response to motions passed by the board.

THEREFORE, the Mar Vista Community Council moves that the Secretary shall compile a list of all actions taken in response to motions passed including, but not limited to, the actions taken, the motion to which the actions relate, the date the action was taken, the person who took the action, and the responses received. This list shall be maintained as a perpetual record on the Mar Vista Community Council website.

d. **Policy Motion**: Natural Gas Storage Facility Operations/Compliance Regulations (submitted by Planning & Land Use Management Committee)

MVCC supports motion by Councilmember Bonin (Council File NO: 17-0756) to require city departments to investigate proposal to insure that the facility is safe for the people and environment.

NOTE: Advocacy organization Protect Playa Now proposed this motion, Venice Neighborhood Council passed a similar motion.

e. **Policy Motion**: Proposed development at 11671-11677 W. National Blvd. (submitted by Planning & Land Use Management Committee)

Whereas - A large, four story, mixed use development is planned for National Boulevard between Federal and Barrington Avenues

Whereas - The development would have 46 housing units, two levels of parking, a mezzanine, a roof deck and two subterranean levels of parking

Whereas - The developer has done no outreach to the surrounding community, North Westdale Neighborhood Association, Westdale Homeowners Association, or Mar Vista Community Council other than construction permit notices to neighbors who border the property.

Whereas - The development team is planning to demolish the existing structure as soon as final permitting is completed, perhaps as soon as December.

Therefor let it be resolved: The Mar Vista Community Council opposes this project and urges a halt to all permitting until a public process that includes the Community Council and North Westdale Neighborhood Association can be completed

Therefor let it be resolved: That the Mar Vista Community Council asks Councilmember Mike Bonin to work with the developer to encourage a voluntary public process with the community.

f. **Policy Motion**: Regional Safe Bike Routes (submitted by Transportation & Infrastructure Committee)

WHEREAS, extensive segments of government owned land exist in and around Mar Vista that could be used for protected bike paths and bike lanes

THEREFORE, Mar Vista Community Council moves to advise Council District 11 to immediately remove the lane reduction element of the "Great Street" pilot program and return Venice Boulevard to an improved version of the previously established six motor vehicle lane configuration, with improvements including a resurfaced roadway, bike lanes that are clearly designated with green paint, and a reduced speed limit, as allowed by State law upon completion of the roadway re-striping and any required speed study; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study exploring the following alternative long-term protected bike

lane solutions along the entire length of Venice Boulevard, from Venice Beach to Downtown Los Angeles:

1. Removing the center median, which is a former Red Car Rail right of way ("ROW"), to increase usable roadway and provide at least 3 motor vehicle lanes, expanded turning lanes, an extra wide bike lane, and a standard parking lane on each direction of the 2-way roadway, or
2. Replacing the center median Red Car ROW with a signalized protected bikeway, while retaining at least 3 motor vehicle lanes, expanded turning lanes, and a standard parking lane on each direction of the 2-way roadway, or
3. Create signage, and repaint adjacent residential streets, as safe thoroughfares for rapid, bicycle-friendly, and safe routes for bicyclists that enhance the mobility, ease of use, and safety for bicyclists as an alternative to Venice Blvd., while still allowing a safer bicycle lane, with better visibility and access for both bicyclists and motorists, on Venice Blvd. associated with a restoration of the three-lane configuration for motorists, or
4. Constructing at least one off-street public parking facility per 3 city block segment, to enable removal of the current parking lanes to create a roadway that includes at least 3 motor vehicle lanes, expanded turning lanes, and an extra wide curb adjacent protected bike lane on each direction of the 2-way roadway; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to pave new regional connector bike paths on an expedited basis, especially including:

1. A path along the former rail ROW adjacent to the southwest side of the California 90 Expressway/Freeway from the Marvin Braude Costal Bike Trail in Marina del Rey and connecting to both the Culver Boulevard Median and Ballona Creek Bike Paths in Del Rey; and
2. Reinstallation of the former rail bridge top, potentially via fast-track City approval of 5000 Beethoven "Del Rey Pointe" apartment development plans, to connect existing and potential new bike paths in Del Rey across Ballona Creek and into Playa Vista via either McConnell Avenue and/or following the ROW to Jefferson Boulevard; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the Cities of Culver City and Santa Monica to designate a north/south onstreet bikeway through Del Rey / Mar Vista to follow a likely route from the Ballona Creek Path along McConnell Avenue, past the Culver Boulevard Median Bike Path, continuing along McConnell Boulevard, connecting to Wade Street after crossing Washington Boulevard and Washington Place, and continuing through Mar Vista on May Street, Cabrillo Boulevard, and Stewart Avenue before connecting to Airport Avenue and into current and proposed parks on the Santa Monica Airport site, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study to explore installation of bike lanes along the entire length of Walgrove Avenue, accomplished through removal of the existing parkway, widening of the street without removing any existing parking spaces, and roadway restriping, including green paint to designate the bike lanes. Such changes should include attempted coordination between the Cities of Los Angeles, Culver City, and Santa Monica to potentially include installation of a traffic signal at Washington Boulevard and Walgrove Avenue, and to seamlessly connect to the 23rd Street bike lane in Santa Monica, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to restore existing bike paths, including resurfacing uneven sections and redirecting flood drain outlets to clear excess sewage runoff, specifically including Marvin Braude Coastal Bike Path in Marina del Rey, Ballona Creek Bike Path, and Culver Boulevard Median Bike Path, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to expand the frequency of police patrols, sweeping of sand, glass and other debris and removal of weed overgrowth from all area bike paths, bike lanes and bikeways.

g. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

WHEREAS, The main concerns that the MVCC has heard from the business community are:

- Bullying tactics by sales representatives to sign contracts.
- Charging fees that do not correspond to the City's agreed fee schedule.
- Missed pick-ups that are charged for.
- ·Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

h. **Policy Motion**: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated and comprehensive data that includes September 2017 data addressing the impacts of Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

i. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and disregard the map.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday November 14th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:02. P.M.

   Quorum present: Rob Kadota, Robin Doyno, Holly Tilson, Melissa Stoller, Paola Cervantes, Ken Alpern (late), Michelle Krupkin, Damien Newton, Elliot Hanna, Chuck Ray

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Election to fill vacant officer position(s)** – Jasmine Elbarbary

   Chair

   Nominations: Rob Kadota nominted by Melissa Stoller, 2nd by Chuck Ray.

   Rob Kadota elected: 7 ayes (Chuck Ray, Robin Doyno, Paola Cervantes, Melissa Stoller, Holly Tilson, Damien Newton), 0 nays, 2 abstentions (Elliot Hanna, Michelle Krupkin), 3 absent (Ken Alpern, Susan Klos, Greg Tedesco).

   1st Vice Chair

   Nominations: Chuck Ray nominated by Melissa Stoller, 2nd by Paola Cervantes

   Chuck Ray elected: 8 ayes, 0 nays, 1 abstention (Rob Kadota), 3 absent (Ken Alpern, Susan Klos, Greg Tedesco).

4. **Approval of August 8th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).

   Motion to approve by Melissa Stoller , 2nd by Damien Newton.

   Michelle Krupkin: Add following to 11.b: Money was budgeted for it during Councilman Rosendahl's term. After Councilman Bonin was elected, the "Greening the Boulevard" Plan seemed to vanish along with the money allocated which also included the Venice Blvd. median "Welcome to Mar Vista" signage.

   Motion as amended carried: 7 ayes, nays, 2 abstentions (Holly Tilson, Rob Kadota), 3 absent (Ken Alpern, Susan Klos, Greg Tedesco).

5. **Appointment of At-Large Director**

   All Candidates who have submitted a statement of candidacy will have the option to make a short statement in the order their applications were submitted. The Chair will then make the appointment, subject to approval by the Board.

   Candidates:

   - Anastasia Bacigalupo
   - Sara Roose
   - Selena Inouye
   - Joseph Kieffer
   - Jake Yocham

   Nomination of Anastasia Bacigalupo by Chair, 2nd by Melissa Stoller.

   Board Discussion

   Michelle Krupkin: concerned that Anastasia doesn't have time, hasn't come to any Great Streets meetings as she has work conflicts; doesn't seem to be up on any ADA issues regarding the CD11 Pilot Program on Venice Blvd.

Melissa Stoller: As a renter and disabled person, Anastasia would add diversity to the board. Also excited about her experience as a parliamentarian.

Nomination of Anastasia Bacigalupo not approved: 3 ayes (Chuck Ray, Robin Doyo, Melissa Stoller), 3 nays (Elliot Hanna, Holly Tilson, Michelle Krupkin), 3 abstentions (Damien Newton, Paola Cervantes, Rob Kadota), 3 absent (Susan Klos, Greg Tedesco, Ken Alpern)

Nomination of Sara Roos by Chair, 2nd by Damien Newton.

Board Discussion

Melissa Stoller: Sara effectively chaired the Education, Arts & Culture Committee for many years.

Nomination of Sara Roos not approved: 8 ayes (Paola Cervantes, Melissa Stoller, Holly Tilson, Damien Newton, Michelle Krupkin, Robin Doyno, Chuck Ray, Elliot Hanna), 0 nays, 1 abstention (Rob Kadota), 3 absent (Susan Klos, Greg Tedesco, Ken Alpern).

6. **Community Memorial Observations**

Steven Boskin was board member for many years and the go-to photographer for many events.

7. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)

Selena Inouye: Group ran two different polls, 1730 voted, 74% want lanes on Venice Blvd want lanes restored. Looks like broad community agreement to her.

Michael Millman: No good reason why any advocacy group shouldn't be invited into MVCC booth at Farmers' Market. Otherwise should remove Green and Bonin's booths. Have forgotten about US Constitution.

Alan Sege: Participated in demonstration at Farmers' Market. Concurs with Michael Millman. Government officials from market came repeatedly to move us and tell us not to speak, we were asked to remove t-shirts or leave market. Inquired about Venice at Green booth, director said not comfortable talking about it there. Should have place every week at the Green booth.

Carol Hyle: Police were called on Sunday.

Maggie Begley: Please get involved with Green Garden Showcase: April 28, 2018. Will be smaller, more curated, educational component. Need volunteers and everyone's good will.

Jeffrey Keirns: Proposed traffic light on Charnock and Sawtelle was supposed to be on agenda. Ken Alpern: Sorry, failed to submit.

Robin Doyno: Venice High School forum on changes on Thursday, November 16. Mar Vista Library is bringing homeless program to Mar Vista 3rd Thursday of each month.

Yvonne: Street lights – is anything being done to get them in Mar Vista Dell (Walgrove & Palms)?

8. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

Fire Station 62: Draft option to lease is drafted, awaiting comments from city staff.

Hosting Westside Thanksgiving celebration: community dinner; also will provide haircuts, clothes, food. Can bring donations to WLA civic center. More info: https://www.westsidethanksgiving.org/info.html.

Community forum/open house. Tentative date is Saturday, December 2 in afternoon. Will be similar to last one, but with a presentation component.

Ken Alpern: Please invite Nat Gale.

Elliot Hanna: Will there be presentation of raw data and will Ms. Reynolds (LADOT head) be there? Very disappointed that Bonin not interested in community panel.

Paola Cervantes: Will stakeholders be able to submit questions?

Sara Roos: Can there be close communication with planning of forum? Len: Forward requests to Len.

Holly Tilson: Can we include component on cut-thru traffic. Len: yes

Michelle Krupkin: Representation from LAPD & LAFD on response time?

Selena Inouye: Comply with request for data before the meeting; allow Restore Venice Blvd. be allowed to present their data.

Ken Alpern: DONE not happy about $5000 for alley paving; how can we partner with CD11 to repair? Len: Street paving and small patches are funded but large asphalt patches haven't been funded by City Council.

Rob Kadota: Will recommend Chuck Ray as Point Person.

d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

Please send updated roster.

Civic University starting again; want two attendees from each NC (1 man, 1 woman). 4 classes, held downtown.

Inventory: need list ASAP.

Board Action Certification forms – no longer used.

Mural process is now smoother.

Board members can apply to be on Funding Equity Working Group.

Stakeholder definition: send comments to commissioner.

By-laws are open for changes until April 15.

9. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

   Next meeting is tomorrow. Follow-up report from Len Nguyen on streetlights.

   Ken Alpern: Request for traffic light at Walgrove and Palms. When will Sawtelle & Charnock be addressed? Linda: It's on agenda.

   Melissa Stoller: Left turn light on Ocean Park Blvd at Centinela/Bundy won't be installed until late 2018, early 2019. Can't this be done sooner? Linda: It's on agenda.

   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Friends of Historic FS 62: Albert Olson
   k. Mar Vista Chamber of Commerce: Sarah Auerswald
10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair – Rob Kadota

MVCC recognized at last Board of Neighborhood Commissioners meeting for 15 years of existence. City Council recognized Mar Vista 90th. Tom Ponton provided sign used at Farmers' Market celebration.

Board retreat on Saturday, January 6th.

b. First Vice Chair

c. Second Vice Chair – Paola Cervantes

d. Secretary – Melissa Stoller

Please get committee meeting minutes up on website.

e. Treasurer – Holly Tilson

i. Report on current financial status

City allocated $42,000. Revised budget doesn't allocate full amount, have unallocated $8000; think about funding ideas for next year.

ii. **APPROVAL** of October Monthly Expense Report (MER)

Motion to approve by Holly Tilson, 2nd by Elliot Hanna. Motion carried unanimously: 9 ayes, 0 nays, 1 abstention (Rob Kadota), 2 absent (Greg Tedesco, Susan Klos).

11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

b. **Community Outreach Committee** – open

Looking for chair. Outreach opportunities with Santas Sleigh, Winter Wonderland. Will put up signs at stops, looking at outreach materials.

Meeting next Thursday, November 16, to talk about Green Garden Showcase.

d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

Next meeting Nov. 28 at Windward 6:00. Officer Eliot Hernandez from LAPD Major Crimes Unit will give presentation. Will look at pubic health aspects of homeless encampments.

e. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

f. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

g. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-i

h. **Bike Mar Vista** - Mitchell Rishe, Chair

i. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Mar Vista Art Walk is Saturday after Thanksgiving. Morning will be more kid-friendly. Kids zone in parking lot on Wasatch,

Setting up meeting with Nick Melvoin regarding tolerance curriculum.

Gloria Prado presenting at next meeting.

j. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Susie Leonard from Kids Place addressed concerns about Great Street lane reduction including difficulty of parents and staff with getting children in and out of cars and parking issues. Next meeting December 13. Hopes to get someone from Mar Vista Chamber since haven't had a report from the MV Chamber at the Great Streets meeting since February 2017. Concerned that the MV Chamber does not care about the MV Council since outreach to MV Chamber has not resulted in any positive response.

k. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Held private meeting with Karen Bass, made her aware of specific impacts on SMO. Next meeting is December 2; Debbie Wagner is guest: lives near SEATAC airport, activist against pollution, wrote book, experience working with agencies. Karen Bass suggested we get PETA (People for Ethical Treatment of Animals) involved.

Will bring motions next year. There's inadequate noise monitoring.

l. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs

m. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Received kudos on pamphlet from Venice NC.

n. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

no **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Thank you for help with preparedness fair. Angry homeowners in SE corner w/ cars parking in front of private homes. may have preferential parking zone.

b. Zone 2 – Damien Newton

North Westdale Neighborhood Association meeting January 25, 2018.

Electronics recycling drive 1st week in January.

c. Zone 3 – Melissa Stoller

d. Zone 4 – Greg Tedesco

e. Zone 5 – Michelle Krupkin

Tuts Grill opened on Washington Blvd.

Sanitation work on Inglewood.

f. Zone 6 – Holly Tilson

Gas leak, a lot of Walgrove evacuated. People didn't know where to go, when they could come back.

New proposed project for Zone 6, using density bonus of Centinela & Venice (not a major transit stop).

Venice High School modernization budget $138M. Possible Olympic-sized pool.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

a. **Administrative Motion**: City Hall Parking Passes (director motion submitted by Rob Kadota)

MVCC approves adding the Chair and Treasurer to the list of people who can use the City Hall parking passes.

Motion to approve by Damien Newton, 2nd by Michelle Krupkin. Motion carried: 9 ayes, 0 nays, 1 abstention (Rob Kadota), 2 absent (Susan Klos, Greg Tadesco).

b. **Administrative Motion**: Conflict of Interest Disclosure (director motion submitted by Elliot Hanna)

WHEREAS, public trust and transparency is essential to the effective function of a neighborhood council, and

WHEREAS, allegations of conflicts-of-interest have been publicly levied against sitting board members by both stakeholders and other sitting board members.

THEREFORE, Mar Vista Community Council moves that a standing item shall appear on each Board of Director's Agenda – immediately following the approval of the previous meeting's minutes and prior to the first public comment period – whereby each director shall disclose any actual or perceived conflicts-of-interest and ex-parte communications concerning items on the agenda. These shall include - but not be limited to – employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.

Presentation by Elliot Hanna: Require that we on BOD present, designed to build public trust.

Motion to approve by , 2nd by.

Public Comment

Martin Rubin: Supports

Selena Inouye: Supports

Amy Shoenhom: Supports. Should recuse when have conflict. Street Blogs (Damien Newton) has conflict, as does Rob Kadota – received Vision Zero $

Alan Sege: Board vote is irrelevant, must disclose.

Kalani Wittington: All members of council should be required to make known if work for city council or any other city department that would be impacted by business before board.

Jasmine Elbarabary: All BOD members must take trainings and sign Code of Conduct. Conflict of interest matters are determined by conferring with City Attorney; advice is protected by attorney-client privilege.

Motion to table by Chuck Ray, 2nd by Melissa Stoller.

Board Discussion of Tabling

Ken Alpern: Perception is important.

Damien Newton: Should it be looked at by Elections & By-laws Committee? Rob Kadota: Yes, makes sense.

Holly Tilson: Affirmation

Melissa Stoller: Our By-laws establish a process for actual conflict of interest. Should table and amend by-laws. Our Standing Rules state "All Board and Committee agendas must include a standing agenda item entitled "*Ex Parte* Declaration." I will include that in the next BOD agenda and notify all committee chairs. I do not see a need for this motion.

Robin Doyno: Board doesn't enforce the ethics we've already agreed to. To have more written that we don't observe is poison pill.

Elliot Hanna: Motion intended to address fact that public doesn't trust us.

Public Comment on Tabling

Alan Sege: Could make motion to amend bylaws now.

Selena Inouye: Found Robin's comments disturbing. Who enforces?

Colume Whittington: Are we to trust our government officials to decide what is wrong and bring it to us. We need to rely on your integrity.

Michael Millman: Should just vote up or down.

Motion on tabling not carried: 3 ayes (Melissa Stoller, Robin Doyno, Chuck Ray), 6 nays (Paola Cervante, Holly Tilson, Ken Alpern, Damien Newton, Michelle Krupkin, Elliot Hanna), 1 abstention (Rob Kadota), 2 absent (Greg Tedesco, Susan Klos).

Board Comment on motion:

Damien Newton: Good idea to check with city attorney, even if don't believe have conflict of interest but there is perception.

Rob Kadota: Board members encouraged to check with city attorney if might have conflict of interest.

Motion carried: 6 ayes (Paola Cervante, Holly Tilson, Ken Alpern, Damien Newton, Michelle Krupkin, Elliot Hanna), 1 nay (Melissa Stoller), 2 abstentions (Rob Kadota, Robin, Chuck), 2 absent (Greg Tedesco, Susan Klos)

c. **Administrative Motion**: Record of actions (director motion submitted by Elliot Hanna)

WHEREAS, public trust and transparency is essential to the effective function of a neighborhood council, and

WHEREAS, stakeholders have expressed concern that no status is provided regarding actions taken in response to motions passed by the board.

THEREFORE, the Mar Vista Community Council moves that the ~~Secretary~~ Board shall compile a list of all actions taken in response to motions passed including, but not limited to, the actions taken, the motion to which the actions relate, the date the action was taken, the person who took the action, and the responses received. This list shall be maintained as a perpetual record on the Mar Vista Community Council website.

Presentation by Elliot Hanna

Public Comment

Ken: Marek: Supports.

Martin Rubin: Supports

Selena Inouye: Supports

Jasmine Elbarbary: some NCs resend motion in letter form.

Board Discussion

Ken Alpern: City Council has people to come up with letters, etc. We are all volunteers. If DONE is really serious about empowering Stakeholders, should realize we need staff.

Holly Tilson: Supports doing. Bylaws committee needs to detail how to do.

Michelle Krupkin: Likes suggestion of having a clerk provided by city.

Melissa Stoller: I've requested changes to the website to provide better access to motions passed; they are not yet implemented. Perhaps a way to record status could be incorporated into this change. The Secretary does not wish to do this work; people taking the actions or receiving the responses would need to provide the information.

Paola Cervantes: Should be responsibility of those making the motion.

Motion amended.

Motion as amended carried: 9 ayes, 0 nays, 1 abstention (Rob Kadota), 2 absent (Greg Tedesco, Susan Klos)

d. **Policy Motion**: Natural Gas Storage Facility Operations/Compliance Regulations (submitted by Planning & Land Use Management Committee)

MVCC supports motion by Councilmember Bonin (Council File NO: 17-0756) to require city departments to ~~investigate~~ ~~proposal~~ to insure that the facility is safe for the people and environment.

NOTE: Advocacy organization Protect Playa Now proposed this motion, Venice Neighborhood Council passed a similar motion.

Presentation by Damien Newton.

Public Comment

Faith Myra: Supports. Works with Food & Water Watch. Are already leaks on Westside. Is 33% well failure in Aliso Canyon after declaring safe and reopening.

Tom McHenry: Do they know difference between getting sick from natural gas vs. methane? Faith Myra: natural gas is methane.

Kalani Wittington: Opportunity to question whether development should occur in any and all areas. Well was there before the development.

Board Discussion

Holly Tilson: Need to ask for disaster plan. Faith Myra: That is next step.

Motion as amended carried: 9 ayes, 0 nays, 1 abstention (Rob Kadota), 2 absent (Greg Tedesco, Susan Klos).

e. **Policy Motion**: Proposed development at 11671-11677 W. National Blvd. (submitted by Planning & Land Use Management Committee)

Whereas - A large, four story, mixed use development is planned for National Boulevard between Federal and Barrington Avenues

Whereas - The development would have 46 housing units, two levels of parking, a mezzanine, a roof deck and two subterranean levels of parking

Whereas - The developer has done no outreach to the surrounding community, North Westdale Neighborhood Association, Westdale Homeowners Association, or Mar Vista Community Council other than construction permit notices to neighbors who border the property.

Whereas - The development team is planning to demolish the existing structure as soon as final permitting is completed, perhaps as soon as December.

Therefor let it be resolved: The Mar Vista Community Council opposes this project and urges a halt to all permitting until a public process that includes the Community Council and North Westdale Neighborhood Association can be completed

Therefor let it be resolved: That the Mar Vista Community Council asks Councilmember Mike Bonin to work with the developer to encourage a voluntary public process with the community.

Presentation by Damien Newton: Developer hasn't shared any plans with community.

Public Comment

Martin Rubin: Supports motion. Don't even know what is planned. Out of character with neighborhood.

Joan Winters: Supports motion. Want to see plans.

Mary Hersko: Should look in to development of form-based codes to control development with area.

Gian Carlo: Doesn't understand how developer can do without public hearing. Going to cast shadow on neighbor's gardens.

Colona Whittington: How many affordable housing units?

Motion to approve by Damien Newton, 2nd by Michelle Krupkin.

Board Discussion

Ken Alpern: Project as-is is something where we pay as community,

Elliot Hanna: Development is just exploding. Until we as State think about Prop 13, will continue.

Damien Newton: All the motion says is we need to be involved.

Melissa Stoller: Concerned about parking ingress/egress. Tenant on Barrington expresses concerned about workers taking all the available parking; would like developer to provide off-site parking and shuttle workers.

Motion carried: 9 ayes, 0 nays, 1 abstention (Rob Kadota), 2 absent (Greg Tedesco, Susan Klos).

f. **Policy Motion**: Regional Safe Bike Routes (submitted by Transportation & Infrastructure Committee)

WHEREAS, extensive segments of government owned land exist in and around Mar Vista that could be used for protected bike paths and bike lanes

THEREFORE, Mar Vista Community Council moves to advise Council District 11 to immediately remove the lane reduction element of the "Great Street" pilot program and return Venice Boulevard to an improved version of the previously established six motor vehicle lane configuration, with improvements including a resurfaced roadway, bike lanes that are clearly designated with green paint, and a reduced speed limit, as allowed by State law upon completion of the roadway re-striping and any required speed study; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study exploring the following alternative long-term protected bike lane solutions along the entire length of Venice Boulevard, from Venice Beach to Downtown Los Angeles:

1. Removing the center median, which is a former Red Car Rail right of way ("ROW"), to increase usable roadway and provide at least 3 motor vehicle lanes, expanded turning lanes, an extra wide bike lane, and a standard parking lane on each direction of the 2-way roadway, or
2. Replacing the center median Red Car ROW with a signalized protected bikeway, while retaining at least 3 motor vehicle lanes, expanded turning lanes, and a standard parking lane on each direction of the 2-way roadway, or
3. Create signage, and repaint adjacent residential streets, as safe thoroughfares for rapid, bicycle-friendly, and safe routes for bicyclists that enhance the mobility, ease of use, and safety for bicyclists as an alternative to Venice Blvd., while still allowing a safer bicycle lane, with better visibility and access for both bicyclists and motorists, on Venice Blvd. associated with a restoration of the three-lane configuration for motorists, or
4. Constructing at least one off-street public parking facility per 3 city block segment, to enable removal of the current parking lanes to create a roadway that includes at least 3

motor vehicle lanes, expanded turning lanes, and an extra wide curb adjacent protected bike lane on each direction of the 2-way roadway; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to pave new regional connector bike paths on an expedited basis, especially including:

1. A path along the former rail ROW adjacent to the southwest side of the California 90 Expressway/Freeway from the Marvin Braude Costal Bike Trail in Marina del Rey and connecting to both the Culver Boulevard Median and Ballona Creek Bike Paths in Del Rey; and
2. Reinstallation of the former rail bridge top, potentially via fast-track City approval of 5000 Beethoven "Del Rey Pointe" apartment development plans, to connect existing and potential new bike paths in Del Rey across Ballona Creek and into Playa Vista via either McConnell Avenue and/or following the ROW to Jefferson Boulevard; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the Cities of Culver City and Santa Monica to designate a north/south onstreet bikeway through Del Rey / Mar Vista to follow a likely route from the Ballona Creek Path along McConnell Avenue, past the Culver Boulevard Median Bike Path, continuing along McConnell Boulevard, connecting to Wade Street after crossing Washington Boulevard and Washington Place, and continuing through Mar Vista on May Street, Cabrillo Boulevard, and Stewart Avenue before connecting to Airport Avenue and into current and proposed parks on the Santa Monica Airport site, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study to explore installation of bike lanes along the entire length of Walgrove Avenue, accomplished through removal of the existing parkway, widening of the street without removing any existing parking spaces, and roadway restriping, including green paint to designate the bike lanes. Such changes should include attempted coordination between the Cities of Los Angeles, Culver City, and Santa Monica to potentially include installation of a traffic signal at Washington Boulevard and Walgrove Avenue, and to seamlessly connect to the 23rd Street bike lane in Santa Monica, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to restore existing bike paths, including resurfacing uneven sections and redirecting flood drain outlets to clear excess sewage runoff, specifically including Marvin Braude Coastal Bike Path in Marina del Rey, Ballona Creek Bike Path, and Culver Boulevard Median Bike Path, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to expand the frequency of police patrols, sweeping of sand, glass and other debris and removal of weed overgrowth from all area bike paths, bike lanes and bikeways.

Public Comment

Ken Marek: Worked tirelessly for 6 months to support community. NextDoor poll is best one. As cyclist, wants better bike infrastructure.

Michael Millman: People want bike safety. Need to pay attention to NextDoor survey. Restore integrity to board.

Selena Inouye: Motion is about real bike safety. Restore the lanes and do something positive.

?: Motion is well thought out and provides for interest of everyone in our community.

Glen Hruska: Argument supports community and gives bike safety.

Board Discussion

Damien Newton: Checked with city attorney, not under conflict. Concern with removing bike lanes while we do study.

Michelle Krupkin: Appreciates work Ken Marek has done

Holly Tilson: Implemented without informing community, Wouldn't ride bike on Venice Blvd before or after.

Melissa Stoller: I heard speakers who want immediate restoration of the traffic lanes complain that the current configuration is not ADA compliant; on what planet is a parking lot every three blocks

handicapped friendly? We can certainly be involved in the process, but I don't think it is this council's job to design regional bike paths; I don't have the knowledge or expertise. How can we advocate for removing parkways on Walgrove without any outreach to Walgrove residents?

Motion to table and consider 1st next month by Elliot Hanna, 2nd by Chuck Ray.

Motion to table carried: 6 ayes (Paola Cervantes, Melissa Stoller, Damien Newton, Robin Doyno, Chuck ray, Elliot Hanna), 2 nays (Ken Alpern, Holly Tilson), 2 abstentions (Rob Kadota, Michelle Krupkin), 2 absent (Susan Klos, Greg Tedesco).

g. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

WHEREAS, The main concerns that the MVCC has heard from the business community are:

- Bullying tactics by sales representatives to sign contracts.
- Charging fees that do not correspond to the City's agreed fee schedule.
- Missed pick-ups that are charged for.
- Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

Not taken up due to lack of time.

h. **Policy Motion**: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated and comprehensive data that includes September 2017 data addressing the impacts of

Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

Not taken up due to lack of time.

i. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and disregard the map.

Not taken up due to lack of time.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

Meeting adjourned at 9:50 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if*

you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday December 12th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

CORRECTED AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of November 14th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   Ex Parte Communication is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

   Conflicts of interest include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.
5. **Community Memorial Observations**
6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
   l. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray

d. One Water LA: Christopher McKinnon
e. WRAC: Rob Kadota
f. WRAC LUPC: Sharon Commins
g. City Budget Advocates: Holly Tilson
h. Recode LA: Sharon Commins
i. Animal Services: Tom Ponton
j Friends of Historic FS 62: Albert Olson
k. Mar Vista Chamber of Commerce: Sarah Auerswald
l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair – Rob Kadota
   b. First Vice Chair – Chuck Ray
   c. Second Vice Chair – Paola Cervantes
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
      ii. **APPROVAL** of November Monthly Expense Report (MER)
      iii. Review of draft budget revisions (see Attachment A)
10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
   a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair
   b. **Community Outreach Committee** – Rob Kadota, Acting Chair
   d. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   g. **Bike Mar Vista** - Mitchell Rishe, Chair
   h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs
   i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs
   j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Green Committee** – Melissa Stoller, Jeanne Kuntz & Sherri Akers, Co-chairs
   l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
   m. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs
   n. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Damien Newton
   c. Zone 3 – Melissa Stoller
   d. Zone 4 – Greg Tedesco
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Holly Tilson

12. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    a. **Policy Motion**: Regional Safe Bike Routes (submitted by Transportation & Infrastructure Committee)

    WHEREAS, extensive segments of government owned land exist in and around Mar Vista that could be used for protected bike paths and bike lanes

    THEREFORE, Mar Vista Community Council moves to advise Council District 11 to immediately remove the lane reduction element of the "Great Street" pilot program and return Venice Boulevard to an improved version of the previously established six motor vehicle lane configuration, with improvements including a resurfaced roadway, bike lanes that are clearly designated with green paint, and a reduced speed limit, as allowed by State law upon completion of the roadway re-striping and any required speed study; and

    THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study exploring the following alternative long-term protected bike lane solutions along the entire length of Venice Boulevard, from Venice Beach to Downtown Los Angeles:

    1. Removing the center median, which is a former Red Car Rail right of way ("ROW"), to increase usable roadway and provide at least 3 motor vehicle lanes, expanded turning lanes, an extra wide bike lane, and a standard parking lane on each direction of the 2-way roadway, or
    2. Replacing the center median Red Car ROW with a signalized protected bikeway, while retaining at least 3 motor vehicle lanes, expanded turning lanes, and a standard parking lane on each direction of the 2-way roadway, or
    3. Create signage, and repaint adjacent residential streets, as safe thoroughfares for rapid, bicycle-friendly, and safe routes for bicyclists that enhance the mobility, ease of use, and safety for bicyclists as an alternative to Venice Blvd., while still allowing a safer bicycle lane, with better visibility and access for both bicyclists and motorists, on Venice Blvd. associated with a restoration of the three-lane configuration for motorists, or
    4. Constructing at least one off-street public parking facility per 3 city block segment, to enable removal of the current parking lanes to create a roadway that includes at least 3 motor vehicle lanes, expanded turning lanes, and an extra wide curb adjacent protected bike lane on each direction of the 2-way roadway; and

    THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to pave new regional connector bike paths on an expedited basis, especially including:

    1. A path along the former rail ROW adjacent to the southwest side of the California 90 Expressway/Freeway from the Marvin Braude Costal Bike Trail in Marina del Rey and connecting to both the Culver Boulevard Median and Ballona Creek Bike Paths in Del Rey; and
    2. Reinstallation of the former rail bridge top, potentially via fast-track City approval of 5000 Beethoven "Del Rey Pointe" apartment development plans, to connect existing and potential new bike paths in Del Rey across Ballona Creek and into Playa Vista via either McConnell Avenue and/or following the ROW to Jefferson Boulevard; and

    THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the Cities of Culver City and Santa Monica to designate a north/south onstreet bikeway through Del Rey / Mar Vista to follow a likely route from the Ballona Creek Path along McConnell Avenue, past the Culver Boulevard Median Bike Path, continuing along McConnell Boulevard, connecting to Wade Street after crossing Washington Boulevard and Washington Place, and continuing through Mar Vista on May Street, Cabrillo Boulevard, and Stewart Avenue before connecting to Airport Avenue and into current and proposed parks on the Santa Monica Airport site, and

    THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study to explore installation of bike lanes along the entire length of Walgrove Avenue, accomplished through removal of the existing parkway, widening of the street without removing any existing parking spaces, and roadway restriping, including green paint to designate the bike lanes. Such changes should include attempted coordination

between the Cities of Los Angeles, Culver City, and Santa Monica to potentially include installation of a traffic signal at Washington Boulevard and Walgrove Avenue, and to seamlessly connect to the 23rd Street bike lane in Santa Monica, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to restore existing bike paths, including resurfacing uneven sections and redirecting flood drain outlets to clear excess sewage runoff, specifically including Marvin Braude Coastal Bike Path in Marina del Rey, Ballona Creek Bike Path, and Culver Boulevard Median Bike Path, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to expand the frequency of police patrols, sweeping of sand, glass and other debris and removal of weed overgrowth from all area bike paths, bike lanes and bikeways.

b. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

WHEREAS, The main concerns that the MVCC has heard from the business community are:

- Bullying tactics by sales representatives to sign contracts.
- Charging fees that do not correspond to the City's agreed fee schedule.
- Missed pick-ups that are charged for.
- Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

c.. Policy Motion: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated and

comprehensive data that includes September 2017 data addressing the impacts of Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

d. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and disregard the map.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Consent Calendar: Motion to approve items 13a-g on consent.

a. **Funding Motion**: Promotional Community Outreach Items (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $2000 for promotional community outreach items.

b. **Funding Motion**: Business Cards (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $100, in addition to $250 previously approved, for board and committee chair business cards.

c. **Funding Motion** PO Box (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $140 for Post Office Box rental.

d. **Funding Motion**: Winter Wonderland (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $1000 for the purchase of food and drinks for Winter Wonderland.

e. **Administrative Motion**: Hearing" Mar Vista Stakeholders Regarding Roadway Improvements To Venice Boulevard (Director motion submitted by Sara Roos)

Whereas the Mar Vista Community Council (MVCC) is an advisory board with no authority to legislate, and

Whereas MVCC board members are mandated to represent their constituents, yet as volunteer board members without staff or resources to faithfully survey all constituents under controversial, complicated conditions, it is unreasonable to imagine that any given board member could become well-enough prepared to generate a singular, representative position with a high likelihood of validity, even

Whereas were it possible to generate such a valid singular position, this would thereby silence the important perspectives of minority groups composed of important proportions of stakeholders, representing many and valid constituent observations on the project to be considered, therefore be it

Resolved that instead of opining summarily on the fate of the Great Streets project in Mar Vista, MVCC shall solicit and edit into one document, a compilation of stakeholder-groups'

opinions to be presented to the city council office as collectively representative of the various perspectives of several discrete community groups regarding the merit and potential fate of Mar Vista's Great Streets project along Venice Boulevard.

f. **Policy Motion**: Rancho Park Odorant Leak of 11/29/17 (Director motion submitted by Sara Roos, Melissa Stoller & Ken Alpern)

WHEREAS Mar Vista stakeholders began reporting the smell of "gas" to emergency and utility services at approximately 9 p.m. on Wednesday, November 29, 2017 and continuing into Thursday; and

WHEREAS reports from the time of the event and afterward reflect widespread confusion and alarm among stakeholders regarding insufficiently directive, inconsistent and unreliable official communications, and fear in the wake of reports of various adverse health effects experienced; and

WHEREAS the City of LA's Petroleum Administrator reported to City Council on 12/5/17 that the airborne toxin was not gas but likely a mixture of chemicals including the odorant mercaptan, commonly used to label the methane byproduct of oil extracted from a drilling operation on the City's Rancho Park golf course located in the densely residential district south of Pico Blvd between Motor and Patricia; and

WHEREAS the spilled odorant originated from operations that the City's lessee, Hillcrest Beverly Oil Corporation (HBOC *aka* E&B Natural Resources), contracted to Southern California Gas Corporation, it is nevertheless HBOC that is the drilling company with which the City sustains a contractual (leasing) relationship; and

WHEREAS in April of 2007 a multiagency report (http://clkrep.lacity.org/onlinedocs/2017/17-0149_misc_04-26-2017.pdf) referred to the City Council Planning and Land Use Management Committee meeting of June 20, 2017, found numerous violations from over twenty-plus years outstanding on the Rancho Park Drilling Site; and

WHEREAS no further report from Planning was submitted to the PLUM Committee hearing to substantiate or refute HBOC's own review of its violations (http://clkrep.lacity.org/onlinedocs/2017/17-0149_pc_6-20-17.pdf); and

WHEREAS the matter was continued by PLUM without any date set for further review (https://cityclerk.lacity.org/lacityclerkconnect/index.cfm?fa=ccfi.viewrecord&cfnumber=17-0149); and

WHEREAS these violations persist on public land, where it is public stakeholders who assume the risk for industry operations in violation of code, and public, elected officials who direct the means to request further review of these operations by City Planning (for example through the Citywide Nuisance Abatement Program mandated by LAMC 12.27.1);

THEREFORE the Mar Vista Community Council requests that City Council immediately instruct City Planning to

Formally review its 4/24/17 report of violations, and

Include the public by scheduling public hearings as part of the process to understand public risk from close proximity to extraction operations.

FURTHERMORE, MVCC requests that the city

Study its emergency procedures and communications plans for clarifying chain-of-command on reporting and reporting back to stakeholders, government managers and elected officials, and thus

Work toward the goal of centralized reporting and information exchange directly with the public to ensure timely and informative incident updates and emergency or evacuation procedures.

Encourage fence-line and other onsite monitoring systems to forewarn of problems that effect public safety.

_____

Motion to be sent to Honorable Mike Bonin, CD11; Honorable Paul Koretz, CD5; co-presenters of Motion 17-0149 (Harris-Dawson, Buscaino); members of PLUM;. Copies sent to: remaining LA City Council members; PLUM Committee administrator; CD5 & CD11 deputies.

g. **Policy Motion**: Charnock Stoplight (submitted by Transportation & Infrastructure Committee)

Mar Vista Community Council opposes the installation of a stoplight at the intersection of Charnock and Sawtelle.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: Draft Amended Budget

Budget Category: General/Operational	Current Budget	Proposed Budget
Subcategory: Office		
Storage		
Storquest	$2,496.00	$2,496.00
Meeting rooms rental		
The Vineyard	$600.00	$600.00
St Andrew's Lutheran Church	$300.00	$300.00
St Bede's	$75.00	$75.00
Windward School	$5.00	$5.00
PO Box rental	$132.00	$132.00
Farmer's Market rental	$1,200.00	$1,200.00
Equip & supplies (misc)		
misc	$1,100.00	$1,100.00
Mtg supplies & printing		
printing	$1,000.00	$1,000.00
Board Training & Support		
Business cards/name badges	$250.00	$350.00
Board Retreat	$37.68	$100.00
Office subtotal:	$7,195.68	$7,358.00
Subcategory: Outreach		
Website		
The Web Corner: website maintenance	$1,650.00	$1,650.00
The Web Corner: emails	$385.00	$385.00
The Web Corner: Extra Data Entry	$500.00	$500.00
RIMU Hosting	$96.27	$96.27
Email Service		
Mail chimp email service	$480.00	$700.00
Advertising		
Banners/sign/event promotion	$500.00	$500.00
Facebook ads	$250.00	$250.00
Promotional items		$2,000.00
Emergency Prep signs & brochures	$1,500.00	$1,500.00
Neighborhood Watch signs		$1,500.00
Community Events		
Block parties (~~5~~ 4 X $300)	$1,500.00	$1,200.00
Westside Senior Health & Wellness Fair	$500.00	$500.00
Winter Wonderland	$1,000.00	$1,000.00
Art Walk	$2,000.00	$2,000.00
Venice High Grease Night	$300.00	$300.00
MVCC Events		
Mar Vista Turns 90 Celebration	$4,000.00	$4,000.00
Great Street Tree Planting	$300.00	$300.00

Green Garden Showcase	$4,000.00	$4,000.00
Budget Category: General/Operational	Current	Proposed
misc events	$7,843.05	$7,843.05
Outreach subtotal:	$26,804.32	$30,224.32
Subcategory: Elections		
Election expenses	$1,000.00	$0.00
Elections subtotal:	$1,000.00	$0.00
General/Operational Total:	$35,000.00	$37,582.32
Budget Category: Community Improvement Grants		
Alley repair/seed money	$5,000.00	$0.00
Budget Category: Neighborhood Purpose Grants	$2,000.00	$2,000.00
Budget Total	**$42,000.00**	**$39,582.32**

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday December 12th, 2017, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

MINUTES

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:00 P.M.

   Quorum present: Rob Kadota, Robin Doyno, Holly Tilson, Melissa Stoller, Paola Cervantes, Ken Alpern (7:17), Michelle Krupkin, Damien Newton, Elliot Hanna, Chuck Ray, Sara Roos, Greg Tedesco, Susan Klos

2. **Presentation of flag and Pledge of Allegiance** (1 min)

3. **Approval of November 14th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).

   Motion to approve by Melissa Stoller, 2nd by Michelle Krupkin.

   Corrections offered by Elliot Hanna.

   Motion as amended carried: 10 ayes, nays, 2 abstentions (Rob Kadota, Sara Roos), 1 absent (Ken Alpern).

4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   > *Ex Parte Communication* is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.
   >
   > *Conflicts of interest* include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.

   Damien: Executive director of non-profit that has contracts with Vision Zero. In 2007 was vice-chair of Let's Walk. Has sent complaints to RecycLA.

   Elliot Hanna: Discussed 12 a with other board members, r received several emails concerning other motions.

   Holly Tilson: Has talked to many constituents and board members.

   Greg Tedesco: City Attorney said work on pop-up is not a conflict of interest.

   Michelle Krupkin: Participated in 2015 pop-up. Received several emails about some of the motions.

   Rob: Kadota: City Attorney said activities with LA County Bike Association; are not a conflict of interest. Has received emails around board motions, didn't respond.

   Melissa Stoller: None to declare.

   Chuck Ray: None to declare.

   Paola Cervantes: Received email about motions, no conflict of interest.

   Robin Doyno Not: aware of any conflicts

   Susan Klos: Received emails, no conflicts.

   Sara Roos: Had conversations about motions on agenda, kept below Brown Act imlimitt.

   Ken Alpern: Email communication with board members regarding motions.

5. **Community Memorial Observations**

   Ed Lee, Mayor of San Francisco.

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6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)

   Jason Fineis: Invites community to see Restore Venice Blvd. YouTube page: Venice Blvd Businesses Speak Out.

7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 54 - Assembly Member Sebastian Ridley-Thomas, rep by Brian Ross Adams Brian.adams@asm.ca.gov
   h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.

      If issues come up, feel free to reach out. Rehabilitation work on Regulating Station on Overland at Charnock will last4-6 months.

   l. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

      By-law amendments are open. Starting Girls' Leadership program called Spark, for young women ages 14-24 starts this spring. Deadline to apply is January 16. For more information seehttp://empowerla.org/ignitela/http://empowerla.org/ignitela/.

8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray

      Main issue is relationship to Aliso Canyon and gas lines.

      City Attorney wanted to discuss his volunteer work with homeless; many staff members also volunteering.

   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: Sharon Commins
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Friends of Historic FS 62: Albert Olson
   k. Mar Vista Chamber of Commerce: Sarah Auerswald
   l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

      Ad Hoc committee up and running, Will likely affiliate with Green Communications Initiative.

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair – Rob Kadota

      Planning retreat on January 6, 9:00-1:00.

   b. First Vice Chair – Chuck Ray

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c. Second Vice Chair – Paola Cervantes

d. Secretary – Melissa Stoller

Please add meetings to the calendar when they're scheduled (can add agenda later). Send information about community events for the eNewsletter to Melissa by Wednesday (preferred) or Thursday of each week.

e. Treasurer – Holly Tilson

i. Report on current financial status

Spent about $1000 this month, YTD about $5000. Motions for about $29000 already passed. Need to decide how to spend about $8000+.

ii. **APPROVAL** of November Monthly Expense Report (MER)

Motion to approve by Chuck Ray, 2nd by Susan Klos. Motion carried: 12 ayes, 0 nays, 1 abstention (Rob Kadota), 0 absent.

iii. Review of draft budget revisions (see Attachment A)

Will discuss further at board retreat.

10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** - Rob Kadota, Chair; Holly Tilson, Vice-chair

b. **Community Outreach Committee** – Rob Kadota, Acting Chair

c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair

Motion pending regarding homeless encampments, will revisit it at January 23, 2018 meeting. Had really good terrorism awareness presentation at last meeting.

Community hosted an Officer Appreciation Dinner the week before Thanksgiving. Christmas and New Years Day – community members drop off grab n' go food at police station.

d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

Will continue to operate as part of MVCC but will take less copious notes on Speakers.

e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

At January 4, 2018, meeting will have presentation by the development team on 12607 Pacific Ave and a chance for the community to propose a motion to support or oppose the project.

3981 Moore St. small lot subdivision is already approved; received plans.

3291 Sawtelle Blvd. currently has 16 units; owner wants to add 17th unit.

?? Venice Blvd is requesting density bonus based on transit stop; this was already denied to 12444 Venice Blvd. project because bus is not frequent enough.

f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair

May move next meeting to January 17.

g. **Bike Mar Vista** - Mitchell Rishe, Chair

Interested in more than just biking. Planning to combine with Recreation & Open Space.

h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chairs

Make It Mar Vista and Art Walk happened – new format.

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Greg Tedesco, Co-chairs

Meeting Wednesday, December 13 at Mar Vista Library. Lenore French will give Art Walk overview, Len Nguyen and Jessie Holzer giving updates. Has invited LADOT, not attending.

j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Guest speaker from Seattle, Debi Wagner, at last meeting; her main focus is airplane pollution. Malibu city manager, Culver City people attended – interested because of new flight pattern. Seattle fought FAA, sued. FAA is not following own rules.

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k. **Green Committee** –Jeanne Kuntz, Chairs

l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair

Venice Community Council homeless committee claims 10 successes in finding housing for people; will investigate.

m. **Recreation Open Space Enhancement Committee** – Jerry Hornof & Tom Ponton, Co-chairs

n. **Historic FS 62 Ad Hoc Committee** – Rachel Swanger & Roy Persinko, Co-chairs

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Sent letter to Paul Koretz regarding how people were informed about leak. A lot of people were terrified.

b. Zone 2 – Damien Newton

Collecting fruit (fresh & canned) at St. Andrews every Sunday.

Will start open office hours once a week in January.

Possibly Mardi Gras event in February.

c. Zone 3 – Melissa Stoller

Trash fires—possible arson—on Grand View at Palms.

d. Zone 4 – Greg Tedesco

Sunny Grill is building another building next door.

Leak odor was very strong in Zone 4.

e. Zone 5 – Michelle Krupkin

Santa Sleigh stops in Mar Vista Tuesday, Wednesday & Thursday.

MV Chamber holiday mixer – nice event.

Louie's restaurant closed. Some incident of vandalism committed by people let go.

f. Zone 6 – Holly Tilson

Zone quiet except for complaints about road diet and traffic on Palms.

Strong gas odor.

12. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Motion to consider New Business Consent Calendar before Old Business by Melissa Stoller, 2nd by Holly Tilson.

Motion carried: 8 ayes, 2 nays, 1 abstention (Rob Kadota), 0 absent. Holly – need correct vote count

a. **Policy Motion**: Regional Safe Bike Routes (submitted by Transportation & Infrastructure Committee)

WHEREAS, extensive segments of ~~government~~ *publically* owned land exist in and around Mar Vista that could be used for protected bike paths and bike lanes

~~THEREFORE, Mar Vista Community Council moves to advise Council District 11 to immediately remove the lane reduction element of the "Great Street" pilot program and return Venice Boulevard to an improved version of the previously established six motor vehicle lane configuration, with improvements including a resurfaced roadway, bike lanes that are clearly designated with green paint, and a reduced speed limit, as allowed by State law upon completion of the roadway re-striping and any required speed study; and~~

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study exploring the following alternative long-term protected bike lane solutions along the entire length of Venice Boulevard, from Venice Beach to Downtown Los Angeles:

1. Removing the center median, which is a former Red Car Rail right of way ("ROW"), to increase usable roadway and provide at least 3 motor vehicle lanes, expanded turning

draft

lanes, an extra wide bike lane, and a standard parking lane on each direction of the 2-way roadway, or

2. Replacing the center median Red Car ROW with a signalized protected bikeway, while retaining at least 3 motor vehicle lanes, expanded turning lanes, and a standard parking lane on each direction of the 2-way roadway, or

3. Create signage, and repaint adjacent residential streets, as safe thoroughfares for rapid, bicycle-friendly, and safe routes for bicyclists that enhance the mobility, ease of use, and safety for bicyclists as an alternative to Venice Blvd., while still allowing a safer bicycle lane, with better visibility and access for both bicyclists and motorists, on Venice Blvd. associated with a restoration of the three-lane configuration for motorists, or

4. Constructing at least one off-street public parking facility per 3 city block segment, to enable removal of the current parking lanes to create a roadway that includes at least 3 motor vehicle lanes, expanded turning lanes, and an extra wide curb adjacent protected bike lane on each direction of the 2-way roadway; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to pave new regional connector bike paths on an expedited basis, especially including:

1. A path along the former rail ROW adjacent to the southwest side of the California 90 Expressway/Freeway from the Marvin Braude Costal Bike Trail in Marina del Rey and connecting to both the Culver Boulevard Median and Ballona Creek Bike Paths in Del Rey; and

2. Reinstallation of the former rail bridge top, potentially via fast-track City approval of 5000 Beethoven "Del Rey Pointe" apartment development plans, to connect existing and potential new bike paths in Del Rey across Ballona Creek and into Playa Vista via either McConnell Avenue and/or following the ROW to Jefferson Boulevard; and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the Cities of Culver City and Santa Monica to designate a north/south onstreet bikeway through Del Rey / Mar Vista to follow a likely route from the Ballona Creek Path along McConnell Avenue, past the Culver Boulevard Median Bike Path, continuing along McConnell Boulevard, connecting to Wade Street after crossing Washington Boulevard and Washington Place, and continuing through Mar Vista on May Street, Cabrillo Boulevard, and Stewart Avenue before connecting to Airport Avenue and into current and proposed parks on the Santa Monica Airport site, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to conduct a feasibility study to explore installation of bike lanes along the entire length of Walgrove Avenue, accomplished through removal of the existing parkway, widening of the street without removing any existing parking spaces, and roadway restriping, including green paint to designate the bike lanes. Such changes should include attempted coordination between the Cities of Los Angeles, Culver City, and Santa Monica to potentially include installation of a traffic signal at Washington Boulevard and Walgrove Avenue, and to seamlessly connect to the 23rd Street bike lane in Santa Monica, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to restore existing bike paths, including resurfacing uneven sections and redirecting flood drain outlets to clear excess sewage runoff, specifically including Marvin Braude Coastal Bike Path in Marina del Rey, Ballona Creek Bike Path, and Culver Boulevard Median Bike Path, and

THEREFORE, Mar Vista Community Council further moves to advise Council District 11 to initiate a collaborative effort with the County of Los Angeles and City of Culver City to expand the frequency of police patrols, sweeping of sand, glass and other debris and removal of weed overgrowth from all area bike paths, bike lanes and bikeways.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Public Comment:

Ken Marek: Two cyclists in bad accident at Charnock & McLaughlin tonight. Accident at Venice & Beethoven. Don't know why can't want to improve safety and businesses.

Amy Shoenbaum: Supports motion, big advocate of Green Streets. LADOT says traffic increased by 50% on side streets. Not a lot of community support for project. Supports bike lane on Pershing but it

Draft

was taken away – whole project scrapped, even the great parts. Good things that happened with Great Streets will all be scrapped.

Kalani Wittington: Supports plan as proposed. Need to encourage people to use bike paths, not sidewalks. Don't have enough enforcement to keep wheeled vehicles off of sidewalks.

Mary Hruska: Can dispute, polls, neighborhood safety data. Great Streets has created feud in community.

Jason Fineis: Increased traffic on Charnock and Pacific 50%. Supports bike lanes on Pacific.

Dennis Logerman: Lives on Beethoven. Goes to UPS store at Venice & Centinela to get mail. Someone left car in bike lane, police went by and didn't do anything. How many businesses have to close, how many accidents happen before you do something?

Glen Hruska: Supports motion. North/South streets are affected by this because cars can't turn onto Venice.

Board Discussion

Elliot Hanna: Motion tells those at top what we want.

Chuck Ray: Very long motion, concerned about what is the plan to get it implemented. Also concerned about closing Venice Blvd. – having both in this motion is oranges & apple situation.

Melissa Stoller: Like some of the bike path ideas, others are impractical. Can't evaluate some – need visuals. I don't see a path to implement.

Holly Tilson: Supports – it's a step in right direction. All motion is doing is suggesting to CD11 all possibilities to construct something else. Palms Blvd. is impossible.

Michelle Krupkin: Supports. It's a step just to start advising CD11. Why aren't grants being used to connect all bike routes in city and create viable network. There's more traffic on Inglewood, people are angry--trying to get places, driving poorly. Maybe each council district should have a bike deputy.

Ken Alpern: Once we published maps of transit system, people said it would never happen. Concerned that Venice is leading to more accidents. Motion is step n right direction to show we're for something. Average bicyclist not represented. Want bicycle paths all over, Mar Vista at center of real bike network.

Damien Newton: Is really two motions: study bike paths; restore Venice. Reality is we're years away from getting bike network. Would be taking out bike lane project that exists now with idea that eventually will have better solution.

Greg Tedesco: Agrees with Damien. It's like "will get sky in the pie when you die". Cost of things proposed is substantial. Beautiful vision, but don't have the support we need to realize. Wants to see project through 1 year pilot program. Knows there's more cut-through traffic.

Paola Cervantes: Agrees with Damien and Greg. Issue with removing lane now is it wasn't safe before.

Sara Roos: Agree with this being essentially two motions. Community needs to be heard but doesn't think this is the way. Believes she has motion (later in agenda) to let community be heard. Moves to amend motion: to remove 2nd paragraph..

Amendment offered by Sara Roos:

- Change "govermently" to "publically" in 1st paragraph.
- Delect 2nd paragraph.

Public Comment on amendment

Ken Marek: Are you going to wait for someone to be killed.

Amy Shoenbaum: Old bike lane was very wide – wide enough to not get doored. People working on this, lots of community buy-in. 100% support in public comment this month and last.

Jacob Fneis: 7 people spoke in favor of motion, none against. Not in favor of amendment.

Kalani Wittington: In favor of motion as currently proposed (not amended). Are problems with people exiting from cars. Proposal is well thought out. We've discussed all these issues, is step in right direction. All looking to make community better cycling, transportation community,

draft

Dennis Logerman.: Had protected bike lane before, called sidewalk. See lots of confusion about bike lane, lots of people using bike lane. Some think bike lane is two-way. In favor of green paint.

Rich Hirshkoff. Hears a lot of people for, a lot against. Does 't hear how to make safe on both sides of parked cars. Simple: Slant parking on Venice; make bike lane a little narrower. Safe to get in and out of car. Lots of parking helps businesses.

Jill: Putting back the lanes is only thing that makes sense. Delayed response time for emergency vehicles. Creating danger on cut-thru streets. More pollution because of traffic jams.

Mary Hruska: Alternate solution exists now: Greening the Boulevard. Expands sidewalks & sidewalk protected bike lane, reduces lane width. Would be beautiful.

Tom: Slant parking takes up twice the space. Old bike lane would be 100% safer by putting down reflectors. Knurl bike lane so if car goes in get warning.

Board Discussion of amendment

Elliot Hanna: At T&I advised against including restore, but people at meeting made clear this is what they want. Opposes amendment.

Rob Kadota: There's a left-buffered protected bike lane on south side of Venice west of Centinela– bike lane is outside of car door range, thinks it offers lots for bike lanes. Protected lanes with bollards hide bicyclists, not as safe. Bicyclists are part of traffic. Need to do more education of bicyclists. Would like solution that integrates bikes with cars, rather than segregating bicyclists.

Michelle Krupkin: Bring to attention of board: Venice is one of 40 streets in LA to which this configuration will be applied. Venice has low kill incidents – only 3 before this. Ridiculous to put road diet on Venice when not Blvd. that needs a road diet. Should represent stakeholders.

Ken Alpern: You (Rob) are guilty of partisanship. Will pull motion if this amendment passes. Why do you want to stay on the Board. You're taking motion away from him.

Melissa Stoller: Received emails against restore; supporters of pilot project felt was already settled.

Holly Tilson: City just fixed Centinela & Venice intersection, protected bike lanes removed. Recently watched fire truck trying to move on Centinela for 2 ½ minutes, light stayed red. Can't support amendment.

Sara Roos: Agree personally 100% with complaints. Not well implemented. Filled with anger & frustration. Don't want to lose work on bike lanes. Continuing to beat head against wall when wall says it's not going to submit is not effective. Council continuing to take side in this matter increases hostility in community. People using Venice have interest in community, are stakeholders.

Elliot Hanna: Amendment to amendment – restore 2nd paragraph.

Amendment to amendment not carried: 5 ayes, 6 nays, 2 abstentions (Damien Newton, Rob Kadota).

Motion to table by Michelle Krupkin. Not carried: 4 ayes, 7 nays, 2 abstentions (Damien Newton, Rob Kadota).

Amendment carried: 6 ayes, 5 nays, 2 abstentions (Damien Newton, Rob Kadota)

Motion as amended carried: 6 ayes, 5 nays, 2 abstentions (Melissa, Rob Kadota),

b. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

WHEREAS, The main concerns that the MVCC has heard from the business community are:

- Bullying tactics by sales representatives to sign contracts.
- Charging fees that do not correspond to the City's agreed fee schedule.
- Missed pick-ups that are charged for.

draft

- Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

Tabled until next meeting.

c. Policy Motion: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated and comprehensive data that includes September 2017 data addressing the impacts of Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

Tabled until next meeting.

d. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

draft

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and disregard the map.

Tabled until next meeting.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Consent Calendar: Motion to approve items 13a-c, f on consent.

13. d, e & g removed from Consent Calendar by Melissa Stoller.

Motion to approve items 13a-c, f on consent by , 2nd by . Motion carried: 11 ayes, nays, 1 abstentions (Rob Kadota), absent ().

a. **Funding Motion**: Promotional Community Outreach Items (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $2000 for promotional community outreach items.

Passed on consent.

b. **Funding Motion**: Business Cards (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $100, in addition to $250 previously approved, for board and committee chair business cards.

Passed on consent.

c. **Funding Motion** PO Box (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $140 for Post Office Box rental.

Passed on consent.

d. **Funding Motion**: Winter Wonderland (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $1000 for the purchase of food and drinks for Winter Wonderland.

Motion withdrawn.

e. **Administrative Motion**: Hearing" Mar Vista Stakeholders Regarding Roadway Improvements To Venice Boulevard (Director motion submitted by Sara Roos)

Whereas the Mar Vista Community Council (MVCC) is an advisory board with no authority to legislate, and

Whereas MVCC board members are mandated to represent their constituents, yet as volunteer board members without staff or resources to faithfully survey all constituents under controversial, complicated conditions, it is unreasonable to imagine that any given board member could become well-enough prepared to generate a singular, representative position with a high likelihood of validity, even

Whereas were it possible to generate such a valid singular position, this would thereby silence the important perspectives of minority groups composed of important proportions of stakeholders, representing many and valid constituent observations on the project to be considered, therefore be it

Resolved that instead of opining summarily on the fate of the Great Streets project in Mar Vista, MVCC shall solicit and edit into one document, a compilation of stakeholder-groups' opinions to be presented to the city council office as collectively representative of the various perspectives of several discrete community groups regarding the merit and potential fate of Mar Vista's Great Streets project along Venice Boulevard.

Motion tabled.

f. **Policy Motion**: Rancho Park Odorant Leak of 11/29/17 (Director motion submitted by Sara Roos, Melissa Stoller & Ken Alpern)

WHEREAS Mar Vista stakeholders began reporting the smell of "gas" to emergency and utility services at approximately 9 p.m. on Wednesday, November 29, 2017 and continuing into Thursday; and

draft

WHEREAS reports from the time of the event and afterward reflect widespread confusion and alarm among stakeholders regarding insufficiently directive, inconsistent and unreliable official communications, and fear in the wake of reports of various adverse health effects experienced; and

WHEREAS the City of LA's Petroleum Administrator reported to City Council on 12/5/17 that the airborne toxin was not gas but likely a mixture of chemicals including the odorant mercaptan, commonly used to label the methane byproduct of oil extracted from a drilling operation on the City's Rancho Park golf course located in the densely residential district south of Pico Blvd between Motor and Patricia; and

WHEREAS the spilled odorant originated from operations that the City's lessee, Hillcrest Beverly Oil Corporation (HBOC *aka* E&B Natural Resources), contracted to Southern California Gas Corporation, it is nevertheless HBOC that is the drilling company with which the City sustains a contractual (leasing) relationship; and

WHEREAS in April of 2007 a multiagency report (http://clkrep.lacity.org/onlinedocs/2017/17-0149_misc_04-26-2017.pdf) referred to the City Council Planning and Land Use Management Committee meeting of June 20, 2017, found numerous violations from over twenty-plus years outstanding on the Rancho Park Drilling Site; and

WHEREAS no further report from Planning was submitted to the PLUM Committee hearing to substantiate or refute HBOC's own review of its violations (http://clkrep.lacity.org/onlinedocs/2017/17-0149_pc_6-20-17.pdf); and

WHEREAS the matter was continued by PLUM without any date set for further review (https://cityclerk.lacity.org/lacityclerkconnect/index.cfm?fa=ccfi.viewrecord&cfnumber=17-0149); and

WHEREAS these violations persist on public land, where it is public stakeholders who assume the risk for industry operations in violation of code, and public, elected officials who direct the means to request further review of these operations by City Planning (for example through the Citywide Nuisance Abatement Program mandated by LAMC 12.27.1);

THEREFORE the Mar Vista Community Council requests that City Council immediately instruct City Planning to

Formally review its 4/24/17 report of violations, and

Include the public by scheduling public hearings as part of the process to understand public risk from close proximity to extraction operations.

FURTHERMORE, MVCC requests that the city

Study its emergency procedures and communications plans for clarifying chain-of-command on reporting and reporting back to stakeholders, government managers and elected officials, and thus

Work toward the goal of centralized reporting and information exchange directly with the public to ensure timely and informative incident updates and emergency or evacuation procedures.

Encourage fence-line and other onsite monitoring systems to forewarn of problems that effect public safety.

Motion to be sent to Honorable Mike Bonin, CD11; Honorable Paul Koretz, CD5; co-presenters of Motion 17-0149 (Harris-Dawson, Buscaino); members of PLUM;. Copies sent to: remaining LA City Council members; PLUM Committee administrator; CD5 & CD11 deputies.

Passed on consent.

g. **Policy Motion**: Charnock Stoplight (submitted by Transportation & Infrastructure Committee)

Mar Vista Community Council opposes the installation of a stoplight at the intersection of Charnock and Sawtelle *and requests that the Los Angeles Department of Transportation expedite funding and installation of a critically needed left turn signal at the intersection of Sawtelle Blvd. with Palms Blvd.*

Public Comment

draft

Miriam DeLasa: Wants update on what's happening with stoplight. Once again, here at meeting with no update.

Jeff Kearns: 2nd time coming, we have opposition to stoplight.

Len Nguyen: Has discussed with Bonin and LADOT. No safety case for light there. If was approved, would get added to unfunded projects list. Concern would cause more traffic on Charnock.

Rich Hirskoff: Hears concerns. Wants to hear what those opposed to light suggest for improving safety of those trying to get out onto Sawtelle.

Motion to approve by Ken Alpern, 2nd by Melissa Stoller

Friendly amendment by Melissa Stoller: add "*and requests that the Los Angeles Department of Transportation expedite funding and installation of a critically needed left turn signal at the intersection of Sawtelle Blvd. with Palms Blvd.*"

Public Comment:

Rich HirshkoffWindward might fund ($135,000) left turn signal.

Board Discussion

Rob Kadota: Questions about how amendment relates to Charnock light.

Melissa Stoller: Impacts traffic on Sawtelle, not far from Charnock.

Amendment carried: 10 ayes, 0 nays, 1 absention (Rob Kadota), 1 absent (Susan Klos).

Motion as amended carried: 10 ayes, 0 nays, 1 absention (Rob Kadota), 1 absent (Susan Klos).

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

Meeting adjourned at 9:40 P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters*

draft

related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.

draft

ADDENDUM A: Draft Amended Budget

Budget Category: General/Operational	Current Budget	Proposed Budget
Subcategory: Office		
Storage		
Storquest	$2,496.00	$2,496.00
Meeting rooms rental		
The Vineyard	$600.00	$600.00
St Andrew's Lutheran Church	$300.00	$300.00
St Bede's	$75.00	$75.00
Windward School	$5.00	$5.00
PO Box rental	$132.00	$132.00
Farmer's Market rental	$1,200.00	$1,200.00
Equip & supplies (misc)		
misc	$1,100.00	$1,100.00
Mtg supplies & printing		
printing	$1,000.00	$1,000.00
Board Training & Support		
Business cards/name badges	$250.00	$350.00
Board Retreat	$37.68	$100.00
Office subtotal:	$7,195.68	$7,358.00
Subcategory: Outreach		
Website		
The Web Corner: website maintenance	$1,650.00	$1,650.00
The Web Corner: emails	$385.00	$385.00
The Web Corner: Extra Data Entry	$500.00	$500.00
RIMU Hosting	$96.27	$96.27
Email Service		
Mail chimp email service	$480.00	$700.00
Advertising		
Banners/sign/event promotion	$500.00	$500.00
Facebook ads	$250.00	$250.00
Promotional items		$2,000.00
Emergency Prep signs & brochures	$1,500.00	$1,500.00
Neighborhood Watch signs		$1,500.00
Community Events		
Block parties (~~5~~ 4 X $300)	$1,500.00	$1,200.00
Westside Senior Health & Wellness Fair	$500.00	$500.00
Winter Wonderland	$1,000.00	$1,000.00
Art Walk	$2,000.00	$2,000.00
Venice High Grease Night	$300.00	$300.00
MVCC Events		
Mar Vista Turns 90 Celebration	$4,000.00	$4,000.00
Great Street Tree Planting	$300.00	$300.00

draft

Green Garden Showcase	$4,000.00	$4,000.00
Budget Category: General/Operational	Current	Proposed
misc events	$7,843.05	$7,843.05
Outreach subtotal:	$26,804.32	$30,224.32
Subcategory: Elections		
Election expenses	$1,000.00	$0.00
Elections subtotal:	$1,000.00	$0.00
General/Operational Total:	$35,000.00	$37,582.32
Budget Category: Community Improvement Grants		
Alley repair/seed money	$5,000.00	$0.00
Budget Category: Neighborhood Purpose Grants	$2,000.00	$2,000.00
Budget Total	**$42,000.00**	**$39,582.32**

draft

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday February 13th, 2018, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 17th, 2018 Special Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   Ex Parte Communication is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

   Conflicts of interest include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.
5. **Community Memorial Observations**
6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   h. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   i. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   j. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: Chuck Ray
   c. LANCC: Chuck Ray
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota

f. WRAC LUPC: open
g. City Budget Advocates: Holly Tilson
h. Recode LA: Sharon Commins
i. Animal Services: Tom Ponton
j Friends of Historic FS 62: Albert Olson
k. Mar Vista Chamber of Commerce: Sarah Auerswald
l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair – Rob Kadota
      i. Announcement of Board of Directors vacancy
   b. First Vice Chair – Chuck Ray
   c. Second Vice Chair – Paola Cervantes
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
      ii. **APPROVAL** of January Monthly Expense Report (MER)
10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
   a. **Elections and By-laws Committee** – Chuck Ray and Melissa Stoller, Co-chairs
   b. **Community Outreach Committee** – Sara Roos, Chair
   c. **Committee on Public Safety** – Bill Koontz, Chair; Elliot Hanna, Vice-chair
   d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   f. **Transportation & Infrastructure Committee** – Chuck Ray & Ken Alpern, Co-chairs; Michelle Krupkin, Vice-chair
   g. **Bike Mar Vista** - Mitchell Rishe, Chair
   h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chair
   i. **Great Streets Ad Hoc Committee** – Michelle Krupkin,Chair
   j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Green Committee** –Jeanne Kuntz, Chair
   l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs, Joe Cuanan, Vice-chair
11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. Zone 1 – Ken Alpern
   b. Zone 2 – Damien Newton
   c. Zone 3 – Melissa Stoller
   d. Zone 4 – open
   e. Zone 5 – Michelle Krupkin
   f. Zone 6 – Holly Tilson
12. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    Consent Calendar: Motion to approve items 12a-c on consent.

a. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

WHEREAS, The main concerns that the MVCC has heard from the business community are:

- Bullying tactics by sales representatives to sign contracts.
- Charging fees that do not correspond to the City's agreed fee schedule.
- Missed pick-ups that are charged for.
- Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

NOTE: (If passed, this motion shall be entered as a Community Impact Statement in Council File 17-0878-S1. It shall be sent to the Mayor, all City Council members and their Chief of Staffs, and the General Manager of the LA Department of Sanitation, Enrique C. Zaldivar Enrique.Zaldivar@lacity.org.)

b. **Policy Motion**: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated and comprehensive data that includes September 2017 data addressing the impacts of Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors

that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

c. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and disregard the map.

d. **Administrative Motion**: Hearing" Mar Vista Stakeholders Regarding Roadway Improvements To Venice Boulevard (Director motion submitted by Sara Roos)

Whereas the Mar Vista Community Council (MVCC) is an advisory board with no authority to legislate, and

Whereas MVCC board members are mandated to represent their constituents, yet as volunteer board members without staff or resources to faithfully survey all constituents under controversial, complicated conditions, it is unreasonable to imagine that any given board member could become well-enough prepared to generate a singular, representative position with a high likelihood of validity, even

Whereas were it possible to generate such a valid singular position, this would thereby silence the important perspectives of minority groups composed of important proportions of stakeholders, representing many and valid constituent observations on the project to be considered, therefore be it

Resolved that instead of opining summarily on the fate of the Great Streets project in Mar Vista, MVCC shall solicit and edit into one document, a compilation of stakeholder-groups' opinions to be presented to the city council office as collectively representative of the various perspectives of several discrete community groups regarding the merit and potential fate of Mar Vista's Great Streets project along Venice Boulevard.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Consent Calendar: Motion to approve items 13a-m on consent.

a. **Funding Motion**: MVCC storage (submitted by Executive and Finance Committee)

Motion to rent a larger storage unit for MVCC equipment and supplies, not to exceed $350 a month.

b. **Funding Motion**: Projector screen & stand (submitted by Executive and Finance Committee)

Motion to purchase a portable projector screen and projector stand for use at MVCC related events and meetings, cost not to exceed $750.00.

c. **Funding Motion**: Bike repair stand (submitted by Executive and Finance Committee)

Motion to purchase a bike repair stand and pump for use in a publicly accessible location not to exceed $2,000.

d. **Funding Motion**: Office supply costs (submitted by Executive and Finance Committee)

Motion to fund up to $500 worth of related office supply costs associated with Executive Committee positions and Committee Chair responsibilities.

e. **Funding Motion**: Santa Sleigh storage (submitted by Executive and Finance Committee)

Motion to contribute up to $1000 in an NPG for the purchase of a storage unit for the Pacific LAPD Santa Sleigh.

f. **Funding Motion**: Promotional items (submitted by Executive and Finance Committee)

Motion to purchase up to $7,500 promotional items to increase awareness of MVCC.

g. **Administrative Motion**: Revised budget (submitted by Executive and Finance Committee)

MVCC approves the budget revisions presented in Addendum A.

h. **Policy Motion:** 12607 Pacific Boulevard proposed development (submitted by Planning and Land Use Management Committee)

The Mar Vista Community Council supports the on-menu density bonus and categorical exclusion of the proposed property at 12607 Pacific Boulevard provided that the city certifies the affordable housing plan and provides a plan for checking that the apartment building is following its commitment to affordable housing in future years.

i. **Policy Motion**: 3966 Grand View Boulevard proposed development (submitted by Planning and Land Use Management Committee)

The Mar Vista Community Council supports concept of the proposal for 50 units and 50 parking spaces at 3966 Grand View Blvd by the Santa Monica Community Corporation (SMCC). MVCC looks forward to working with SMCC during the design phase to insure the project is one that works for future residents and the existing community, including making certain that the project is as environmentally friendly as possible.

We understand that the project does not include "project based" Section 8 Housing.

j. **Policy Motion:** Tree Stump Removal (Submitted by Transportation & Infrastructure Committee)

WHEREAS, the MVCC recognizes there is a long waiting list and lack of stump removal teams and/or services to serve the MVCC, and

WHEREAS, the MVCC recognizes that tree stump removal has impacts on transportation/infrastructure and related safety issues, and

WHEREAS the MVCC recognizes that cities are required by CEQA law to maintain streets, curbs, parkways, and sidewalks within their borders,

THEREFORE, the MVCC calls upon the City and any related departments (LA Bureau of Street Services, LADOT, LADWP, etc.) to fund and implement tree stump removal programs so that tree stumps will be removed in a prompt and cost-effective manner.

k. **Policy Motion:** Six Month Follow-up request for promised data (Submitted by Transportation & Infrastructure Committee)

WHEREAS, on July 11, 2017, the Mar Vista Community Council passed a motion entitled "Continuation of Venice Boulevard Pilot Project" by a near-unanimous vote of ten ayes and one no, and

WHEREAS on September 12, 2017, the Mar Vista Community Council passed a motion entitled "Great Streets Venice Blvd. Point Person" by a vote of 6-3-1

WHEREAS, in those motions, the Mar Vista Community Council requested that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month, and

WHEREAS, in those motions, the Mar Vista Community Council requested the same data on streets in Los Angeles where this same configuration was implemented, and

WHEREAS, in those motions, the Mar Vista Community Council requested an evaluation be done by an ADA consultant, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike), and

WHEREAS, in those motions, the Mar Vista Community Council requested that the City of Los Angeles post all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with a breakdown of all petitions showing a breakdown of signatures indicating the number of signatures by zip code or community of residence, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the data to date on the survey created by CD11 and updated on a regular basis, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council urged "the City of Los Angeles and grass roots community organizations to provide the needed information promptly with a planned reassessment six months from this date," and

WHEREAS, that six-month reassessment date was January 11, 2018, and

WHEREAS, to date LADOT, CD11, LAPD, LAFD, nor any other city agency has provided anything requested in that July 11, 2017 motion.

THEREFORE, the Mar Vista Community Council moves to instruct the Chair to invite Councilman Bonin, Nat Gale, and Seleta Reynolds to either the March 13, 2018 Board of Directors' meeting or to a special MVCC meeting to be held not later than March 30, 2018 for the purpose of answering questions from the board and the community regarding these items.

l. **Policy Motion**: Follow-up Request for Parking Demand Survey (Submitted by Transportation & Infrastructure Committee)

WHEREAS, in June and July of last year (2017), both the West Mar Vista Residents Association and the Mar Vista Community Council sent resolutions to Councilman Bonin asking him to obtain city funding for a parking demand survey as provided for by AB 744, and

WHEREAS, the MVCC and all neighborhood associations have heard no feedback or other helpful input from either the CD11 or any appropriate City offices,

THEREFORE, the MVCC respectfully requests funding for this parking demand survey for Venice Blvd. and other major thoroughfares west of the 405 freeway from the CD11 office, and

THEREFORE, the MVCC respectfully requests on a funding for a parking demand survey for Sepulveda Blvd. and Overland Ave. from the CD5 office, both to be assigned and authorized by 4/1/2018.

m. **Policy Motion:** Correct status of Centinela Ave. and Venice Blvd. Bus Service with the LA City Planning Department (Submitted by Transportation & Infrastructure Committee)

WHEREAS, current SCAG information states that the junction of Centinela Ave. and Venice Blvd. does not have the required Bus Service to be eligible as "a major transit stop," and

WHEREAS, in the past, the mistaken categorization has allowed out of character developments to be approved inappropriately due to the City of Los Angeles Planning Department and Planning Commission using incorrect information, and

THEREFORE, the Centinela Ave. and Venice Blvd. junction should not continue to be categorized as a Major Transit Stop by the City of Los Angeles and the City of Los Angeles Planning Department, and

The MVCC respectfully requests that Councilmember Bonin officially notify the City of Los Angeles Planning Department and Planning Commission of these facts and receive confirmation that this junction will not be categorized as a Major Transit Stop for any future developments.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: 02/13/18 Draft Amended Budget

Budget Category: General/Operational	Current	Proposed
Subcategory: Office		
Storage		
Storquest	$2,496.00	$2,704.00
Meeting rooms rental		
The Vineyard	$600.00	$600.00
St Andrew's Lutheran Church	$300.00	$300.00
St Bede's	$75.00	$150.00
Windward School	$5.00	$5.00
PO Box rental	$132.00	$132.00
Farmer's Market rental	$1,200.00	$1,200.00
Equip & supplies (misc)		
Live streaming equipment		$1,600.00
Projector screen & stand		$750.00
misc	$1,100.00	$350.00
Mtg supplies & printing		
printing	$1,000.00	$500.00
Board Training & Support		
Business cards/name badges	$250.00	$400.00
Board Retreat	$37.68	$100.00
Office subtotal	$7,195.68	$8,791.00
Subcategory: Outreach		
Website		
The Web Corner: website maintenance	$1,650.00	$1,650.00
The Web Corner: emails	$385.00	$385.00
The Web Corner: Extra Data Entry	$500.00	$500.00
RIMU Hosting	$96.27	$96.27
Email Service		
Mail chimp email service	$480.00	$700.00
MiFi Service		
AT&T MiFi service		$100.00
Advertising		
Banners/sign/event promotion	$500.00	$500.00
Facebook ads	$250.00	$250.00
Promotional items		$7,500.00
Emergency Prep signs & brochures	$1,500.00	$1,500.00
Neighborhood Watch signs		$3,000.00
Community Events		
Block parties (4 X $300)	$1,500.00	$1,200.00
Westside Senior Health & Wellness Fair	$500.00	$500.00
Winter Wonderland	$1,000.00	$1,000.00
Art Walk	$2,000.00	$1,600.00
Venice High Grease Night	$300.0	$300.

Green Garden Showcase	$4,000.00	$4,000.00
MVCC events/outreach		
Mar Vista Turns 90 Celebration	$4,000.00	$1,250.00
Great Street Tree Planting	$300.00	$300.00
misc	$7,843.05	$2,877.73
Community Improvement		
Alley repair/seed money	$5,000.00	$0.00
Bike repair stand		$2,000.00
Outreach subtotal:	$31,804.32	$31,209.00
Subcategory: Elections		
Election expenses	$1,000.00	$0.00
Elections subtotal:	$1,000.00	$0.00
General/Operational Total:	$40,000.00	$40,000.00
Budget Category: Neighborhood Purpose Grants		
Santa Sleigh shed		$1000.00
School grants	$2,000	$2,000.00
Neighborhood Purpose Grants subtotal:	$2,000	$3,000
Budget Total:	$42,000.00	$42,000.00

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday February 13th, 2018, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)

   Meeting called to order at 7:05 P.M.

   Quorum present: Rob Kadota, Robin Doyno, Holly Tilson, Melissa Stoller, Ken Alpern, Michelle Krupkin, Damien Newton, Elliot Hanna, Chuck Ray, Sara Roos, Susan Klos

2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of January 17th, 2018 Special Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).

   Minutes not available.

4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   > *Ex Parte Communication* is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.
   >
   > *Conflicts of interest* include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.

   Elliot Hanna: Spoke with Sara Roos about 12.d

   Sara Roos: None

   Susan Klos: None

   Robin Doyno: None

   Chuck Ray: None

   Melissa Stoller: None.

   Holly Tilson: None

   Michelle Krupkin: None

   Damien Newton: Talked to Sara Roos about her Great Streets motion. Went to Mike Bonin's Christmas Party, No conflicts.

   Ken Alpern: Many discussions with board members and stakeholders. CItyWatch articles,

5. **Community Memorial Observations**

   None.

6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)

   Kennard Ramsey: Cut thru traffic still real problem. Lives on narrow street; are school buses.

   Carol Hile: When this all began, Bonin came with his video and gave data. Audit of how much has been spent? Has heard it's over $4M.

   Suzanne Hines: Doesn't feel that MVCC responds to needs and desires of Stakeholders. What's happening on Venice Blvd is very dangerous. Hopes Board starts to consider those who live here.

Selena Inouye: Emails received by board members today came from real live people; senders took the time to send them and could have edited the form letters. Perhaps board members could respond better.

Mary Hruska: Believes new configuration increases risks, particularly for handicapped. Believes it violates ADA requirements. Wants Bonin to address in March when he speaks to us.

Robin Doyno: Homeless Solutions Committee is grateful for quilts & blankets donated by St. Andrews Church.

7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Len.Nguyen@lacity.org

      Len: Will miss working with MVCC; will be attending PLUM meetings. Replacement: Hannah Levien (Hannah.levien@lacity.org).

      Hannah: Will be as accessible as possible. Great Streets Open House is March 10, 11:00-1:00 at the Disability Community Resource Center (12901 Venice Blvd. at Beethoven). Drop in format – no presentation; will release requested data.
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   h. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   i. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   j. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
   k. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

      NC boundaries: reconciling discrepancies (orphaned areas). Need to negotiate with Palms NC. Changes will need to go before Board of Neighborhood Commissioners.

8. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

      Report is on website. DOT has agreed to not put stoplight at Sawtelle & Charnock.
   b. DWP MOU: Chuck Ray

      Was presentation on proposal to eliminate water contamination in San Fernando Valley. Spending about $500M; some will come from water rates.
   c. LANCC: Chuck Ray

      Was presentation on procedures for subdivisions of neighborhood council. Lower limit for NC residents is 20,000. Residents of UCLA-owned properties can be counted as residents (reverses prior rule).

      City Clerk is not ready for NC elections, wants to gather information from NCs. No election budget yet; it won't include any money for election awareness. By-law revisions to address election are required by July 18, 2018, but don't have any data about elections.
   d. One Water LA: Christopher McKinnon

      Final meeting is March 5.

      NRDC is suing federal government to keep clean water rules in place.
   e. WRAC: Rob Kadota

      No report.
   f. WRAC LUPC: open
   g. City Budget Advocates: Holly Tilson

No report.

h. Recode LA: Sharon Commins

i. Animal Services: Tom Ponton

No report.

j Friends of Historic FS 62: Albert Olson

No report.

k. Mar Vista Chamber of Commerce: Sarah Auerswald

No report.

l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

No report.

9. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)

a. Chair – Rob Kadota

Attended North Westdale Neighborhood Association & Westdale Home Owners Aassociation annual meetings.

i. Announcement of Board of Directors vacancy

Zone 4 Director position is open. Applications are due within 25 days (March 9). Submit to Rob Kadota. Applicants will have opportunity to present at March 13 Board meeting and then Chair will nominate an applicant.

b. First Vice Chair – Chuck Ray

Completed DONE audit of MVCC property. Will be annual audit going forward.

c. Second Vice Chair – Paola Cervantes

Not present.

d. Secretary – Melissa Stoller

There are some errors in committee chairs on the agenda. Please send me your corrections.

There still seems to be a problem with posting meetings on the website in time to be included on the weekly eNewsletter. They can be added to the calendar before an agenda is available.

e. Treasurer – Holly Tilson

i. Report on current financial status

City doesn't provide a month-end MER – shows all expenses to date. Holly's Treasurer report shows the monthly expenditures. End of month net available ($42,000 less spending through January 31 and commitments) is $21,311.12; cash on hand $31,991.12.

Garden tour event approval status is still pending. Hasn't be able to contact DONE regarding it.

Have about $20,000 need to spend before end of year.

Ken: Several years ago, had joint MVCC/CD11 venture to repair alleys. Would like to explore possibility of another.

ii. **APPROVAL** of January Monthly Expense Report (MER)

Motion to approve by Melissa Stoller, 2nd by Michelle Krupkin. Motion carried unanimously.

10. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)

a. **Elections and By-laws Committee** – Chuck Ray and Melissa Stoller, Co-chairs

Hasn't yet met.

b. **Community Outreach Committee** – Sara Roos, Chair

Nice turnout at last week's meeting. Encourages people to join committee.

c. **Committee on Public Safety** – ~~Bill Koontz, Chair;~~ Elliot Hanna, ~~Vice-~~chair

March 27: Capt Gary Walters & CHP officer speaking at meeting.

d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs

No report.

e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs

Two PLUM motions are on Board agenda. Trying to put together panel on SB827 (Planning and zoning: transit-rich housing bonus); is having trouble finding people willing to speak in support.

f. **Transportation & Infrastructure Committee** – Chuck Ray & Ken Alpern, Co-chairs; Michelle Krupkin, Vice-chair

Having joint meeting with Committee on Public Safety on March 27. Topics are traffic considerations, speed trailer.

Asphalt repair day apparently includes sidewalks and curbs. Please send locations to zone director, Sara Roos or Ken Alpern. Deadline is February 28. Immediate fix is truck with asphalt; will take note of other problems. Ken will turn over unedited list and leave it to repair crew to determine what they can do.

g. **Bike Mar Vista** - ~~Mitchell Rishe~~ Rob Kadota, Chair

Hasn't met.

h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chair

No report.

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Rob Kadota, Co-chairs

Next meeting is Wednesday, February 14, 6:30 p.m. at Mar Vista Library.

j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs

Speaker at last meeting provides units to filer air, is trying to reach out all around state, especially schools.

Looks like some transition is taking place at SMO with 3500" runway.

k. **Green Committee** –Jeanne Kuntz, Chair

Melissa Stoller reporting: Committee is now primarily the Green Tent. Green Garden Showcase is not a Green Committee project.

l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs~~, Joe Cuanan, Vice-chair~~

Will meet sometime near end of month.

11. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

a. Zone 1 – Ken Alpern

Same concerns about break-ins, RVs. Last Thursday of month – next NA meeting.

b. Zone 2 – Damien Newton

Demolition of building on National completed. Don't yet have permits.

Electronics recycling day successful; will do again. St. Andrews Church paid fees to take recycling.

Meeting at Florence? & Barry.

c. Zone 3 – Melissa Stoller

Westdale is going to have a security walk with our senior lead officer to pint out vulnerabilities and how they could be corrected; I believe there's also going to be one in Zone 2. Feb. 25.

d. Zone 4 – open

MVNA had annual meeting. Windward held community outreach meeting.

e. Zone 5 – Michelle Krupkin

Burglary in apartment building between East Blvd. & McLaughlin on January 25. Will work with South Mar Vista Neighborhood Association on pothole list.

LandKeepers is doing beatification at Post Office; volunteer opportunities.

f. Zone 6 – Holly Tilson

Major issues are traffic: running thru stop signs, cut-through, backups.

West Mar Vista-Resident-Association meeting February 22.

12. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    Motions to consider New Business motions 13.a-g before Old Business by Chuck Ray, 2nd by Melissa Stoller.

    Motion carried.

    Consent Calendar: Motion to approve items 12a-c on consent.

    All items removed from Consent Calendar.

    Motion carried: ayes, nays, 1 abstention (Rob Kadota), absent ()

    a. **Policy Motion**: RecycLA trash franchise system (submitted by Transportation & Infrastructure Committee)

    WHEREAS, The Mar Vista Community Council (MVCC) has received many complaints and concerns from property owners and business owners who are or will be affected by the trash franchise system called RecycLA, and

    WHEREAS, The Mar Vista Community Council supports the City's efforts to have cleaner air, more recycling, and less trucks on our streets, but not at the cost to property owners and business owners, and

    WHEREAS, The main concerns that the MVCC has heard from the business community are:

    - Bullying tactics by sales representatives to sign contracts.
    - Charging fees that do not correspond to the City's agreed fee schedule.
    - Missed pick-ups that are charged for.
    - Phone calls to the waste hauler franchisee and to the City's 800 number are rarely returned.

    Therefore, the Mar Vista Community Council demands that the City investigates and resolves these issues and, if necessary, cancels the current contracts until the City can create a program that is fair and meets the needs of our community's businesses and property owners.

    NOTE: (If passed, this motion shall be entered as a Community Impact Statement in Council File 17-0878-S1. It shall be sent to the Mayor, all City Council members and their Chief of Staffs, and the General Manager of the LA Department of Sanitation, Enrique C. Zaldivar Enrique.Zaldivar@lacity.org.)

    Presentation by Chuck

    This is citywide motion from LANCC. All NCs have been asked to consider it.

    Public Comment

    Megan Browning, Athens Services: Here to address concerns, will stick around.

    Howard Weisberg: Another concern to add to motion: much higher prices

    Michael Millman: Athens bought our City Council, getting paid back by jacking up prices. RecycLA smells.

    Kalani Whittington: Lives in apartment building. Four recycling bins were placed outside of emergency exit: two large, three smaller. They just recently removed the three smaller bins. Received nasty messages from management that must separate trash correctly. Program sasn't launched properly, implementation problems.

    ?: Health issues. Missed pickups

    George Frem: Has auto repair business. Hauler did inspection but didn't know what's recyclable, what's not; how is public supposed to know? Was told there was contamination inside a bin;: just a tiny bit of dirt in huge bin. People throw their trash in one bag, aren't going to separate it. Paying three times more, threatened about opening door.

    Megan Browning: Athens really wants to help its customers.

    Board Discussion

    Ken Alpern: Green in sense of money, not environment.

Damien Newton: Businesses can also be charged fee if access to trash isn't open (not just unlocked). Probem for St. Andrews Church.

Michelle Krupkin: Has heard from apartment dwellers that hasn't picked up for weeks, creating vermin problem.

Chuck Ray: If contracts are canceled, will be liquidation costs. Most apartment owners will pass on increased costs to renters.

Elliot Hanna: Has concerns about some of the bullet points. But motion only asks city to investigate and resolve.

Rob: Hasn't heard comments about bullying tactics; would feel better with striking or rewording that bullet.

Chuck Ray/Michelle Krupkin: Bullying has been reported in LA Times

Damien Newton: Would like to work toward passing unanimously.

Elliot Hanna: If bullying was documented in LA Times, he trusts.

Motion carried: 11 ayes, 1 absent.

b. **Policy Motion**: Request for LADOT/LAPD/LAFD presentation of current and comprehensive data on Venice Blvd. Great Streets project (submitted by Transportation & Infrastructure Committee)

WHEREAS, "Vision Zero" and the "Great Streets" pilot programs were implemented approximately six months ago on both the east-bound and west-bound sides of Venice Blvd. between Beethoven Avenue and Inglewood Blvd., and

WHEREAS, the feedback by neutral LAPD and LAFD officials suggested an inability to electronically access information and data as discussed in the recent annual Hilltop Neighborhood Association meeting held on Thursday, October 26th at St. Bede's Church, and

WHEREAS, The Mar Vista Community Council supports making the stretch of Venice Blvd. between Beethoven Avenue and Inglewood Blvd. a "Great Street" with well-maintained medians and parkways, thriving businesses, and friendly to bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, The Mar Vista Community Council similarly supports safe, accessible, and livable residential streets adjacent to Venice Blvd. that are also free of inappropriate and unnecessary cut-through traffic for bicyclists, pedestrians, motorists, the aging population, and the disabled, and

WHEREAS, the lane-reduction on Venice Blvd, has caused significant tension within the community, and has led to concerns of cut-through traffic and safety/mobility issues on residential streets adjacent to Venice Blvd. in Mar Vista, while also raising interest in establishing bicycle paths/routes on Venice Blvd. residential streets to create safe and efficient bicycle mobility throughout Mar Vista,

THEREFORE, The Mar Vista Community Council moves:

(1) To advise the City of Los Angeles Department of Transportation and Council District 11, in conjunction with the Los Angeles Police and Fire Departments, as well as any appropriate LAUSD officials, to present to the MVCC and to the community, updated*, prnted* and comprehensive data that includes September 2017 data addressing the impacts of Venice Blvd. reconfiguration to the community and including access to public schools, and

(2) Address the potential of alternate implementations on Venice Blvd., as well as adjacent residential streets, that will achieve the programs' goals of reducing speed and thus injuries and deaths without adverse impact to the community and surrounding neighbors that includes the summer and fall of 2017, and which includes the comprehensive data requested by the MVCC to include all stakeholders (including businesses and schools) of the Mar Vista Community Council.

Public Comment

?: Great Streets meeting tomorrow night.

Martin Rubin: How data is collected is as critical as the data.

Michael Millman: Contacted West Bureau Traffic and asked for data for year preceding road diet; there were 11 accidents. No data on rate of speed, injuries. They don't have data, just slick p romotional material.

Selena Inouye: Has concern about how old motion is, how long it has taken to bring to vote. How long are we going to support the project without data?

Mary Hruska: Seconds what Selena said. Public outreach seems to be about how we'll sell to it to the community.

Jason Fines: Thinks they do have the data, just won't share.

Chris Truvo: Have been lots of motions regarding the data. Has observed many misuses of bike lanes by autos. Venice Blvd. is a disaster.

?: Venice Blvd was a great street, could see bikes in side view mirror, traffic flowed.

?: Supports bikers. But is this street, with cars going 40 MPH, best one to put biker on?

Kalani Whittington: Concerned that data is already irrelevant. There's a big increase in electric bikes, scooters, skateboards; they're whizzing by. There's a lack of lights, bikers not paying attention. Need to talk about taxing and registering bikes, requiring insurance.

?: Auto drivers are also causing issues. This is supposed to be place to be for cyclists, should encourage them to do well.

Motion to approve by Ken Alpern, 2nd by Michelle Krupkin.

Board Discussion

Elliot Hanna: In July, MVCC voted to continue program with reassessment in 6 months. Has contacted Council office, no response. Will take at face value that March meeting will happen.

Sara Roos: We should have this information available. Only issue is isn't clear that data is available. Should be there publicly, updated weekly. Should have transparency.

Melissa Stoller: We should have the data. But would like motion amend to simply state we want our promised 6-month reassessment.

Holly Tilson: Supports motion.

Michelle: Supports motion.

Damien Newton: Amendment: add another bullet: bring printed data to the open house.

Ken Alpern: EXPO line has its own bikeway. Reason they didn't go on Venice Blvd. because too many intersections. We

Motion as amended carried: 9 ayes, 1 nays, 1 abstention (Melissa Stoller), 1 absent (Paola Cervantes)

c. **Policy Motion**: Proliferation of Recreational Vehicles and Homeless Encampments in Mar Vista (submitted by Transportation & Infrastructure Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, and including both major commercial thoroughfares and residential streets, and

WHEREAS, it has been noted that there is an increase in homeless encampments throughout Mar Vista, including under freeway overpasses and in residential neighborhoods, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking and Homeless encampments, and what the roles and responsibilities for the LADOT and LAPD to enforce laws related to Recreational Vehicle and Homeless living spaces and locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and ~~disregard~~ correct by Ken Alpern, 2nd by Michelle Krupkin.

Public Comment

Hanna Levien: In process of putting oversize parking restriction signs on Venice Blvd.

Chris Turbo: Only way to enforce signs is to stay up and make the phone call.

Christopher McKinnon: Why is Venice green line on the map? Should remove the green line. It's not just Venice Blvd. RVs will move in to neighborhoods.

Martin Rubin: Parking restrictions have worked very well on Pearl west of Barrington.

Michael Millman: Don't bet the farm on CD11 ever standing up for community to eradicate illegal vehicles. Signs are not the answer. Need to keep pressure on CD11 to do enforcement.

Roman: Lives on Globe Ave. Supports motion. Should also enforce laws against homeless encampments. Need balance between rights of homeless and rights of community.

Kalani Whittington: Participated in WLA homeless count; almost 40 RVs between Sawtelle & Inglewood. RV holding tanks don't last more than 3-4 days; where are they dumping? If dumping raw sewage into sewers, will have major health issues, epidemics. Parking enforcement is afraid to approach vehicles.

?: Who came up with law that allows car to move just two inches forward, back?

Board Discussion

Elliot Hanna: Amendment: change to "correct" the map.

Robin Doyno: Tone of motion is harassment, without comprehensive plan.

Melissa Stoller: This just rearranges the homeless. Where are these people going to go? Would support motion that talked about solutions such as Safe Parking. ()

Holly Tilson: Supports motion.

Michelle Krupkin: Supports motion.

Damien Newton: Supports idea behind the motion. It should go through Homeless Solutions Committee.

Ken Alpern: We all have rights and responsibilities.

Motion not carried: 4 ayes, 5 nays, 1 abstention (Damien Newton), 1 2 2 absent (Paola Cervantes, Susan Klos)).

d. **Administrative Motion**: Hearing" Mar Vista Stakeholders Regarding Roadway Improvements To Venice Boulevard (Director motion submitted by Sara Roos)

Whereas the Mar Vista Community Council (MVCC) is an advisory board with no authority to legislate, and

Whereas MVCC board members are mandated to represent their constituents, yet as volunteer board members without staff or resources to faithfully survey all constituents under controversial, complicated conditions, it is unreasonable to imagine that any given board member could become well-enough prepared to generate a singular, representative position with a high likelihood of validity, even

Whereas were it possible to generate such a valid singular position, this would thereby silence the important perspectives of minority groups composed of important proportions of stakeholders, representing many and valid constituent observations on the project to be considered, therefore be it

Resolved that instead of opining summarily on the fate of the Great Streets project in Mar Vista, MVCC shall solicit and edit into one document, a compilation of stakeholder-groups' opinions to be presented to the city council office as collectively representative of the various perspectives of several discrete community groups regarding the merit and potential fate of Mar Vista's Great Streets project along Venice Boulevard.

Motion withdrawn by maker.

13. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Consent Calendar: Motion to approve items 13a-m on consent.

Items removed from Consent Calendar: 13.a, c, e, f, g, k.

Motion to approve 13.b & d on consent carried.

a. **Funding Motion**: MVCC storage (submitted by Executive and Finance Committee)

Motion to rent a larger storage unit for MVCC equipment and supplies, not to exceed $350 a month.

Pulled. Rob Kadota cleaned our storage unit and there's now enough space.

b. **Funding Motion**: Projector screen & stand (submitted by Executive and Finance Committee)

Motion to purchase a portable projector screen and projector stand for use at MVCC related events and meetings, cost not to exceed $750.00.

Passed on consent

c. **Funding Motion**: Bike repair stand (submitted by Executive and Finance Committee)

Motion to purchase a bike repair stand and pump for use in a publicly accessible location not to exceed $2,000.

Pulled from consent.

Public Comment

Selena Inouye: Shouldn't there be a discussion in a committee before spending the money?

Michael Millman: Should come up before a committee; hasn't been any stakeholder input.

Marty Rubin: Should go through committee process.

Tom McHenry: Feels it's waste of money. Why should city provide bike repair tools and stands?

?: If we want to encourage people to use public transit or bikes, this is wonderful way.

Board Discussion

Rob Kadota: Would put in front of Bikerowave (3 years left on lease) or at Mar Vista Park.

Holly Tilson: Would prefer that funding go toward street repair.

Rob: Kadota Could fund but not act on.

Michelle Krupkin: Supports Mar Vista Park location; reservations about Bikerowave location: what if they move before lease is up?

Rob Kadota: Mar Vista Park location not confirmed.

Damien Newton: Finds that stands like this are great educational tools.

Rob Kadoa: Heavy duty stand, pump; tools are cabled to stand. Motion was discussed at Bike Mar Vista a while ago.

Motion to send back to Bike Mar Vista committee by Chuck Ray, 2nd by Elliot Hanna. Motion carried: 9 ayes, 2 nays, 1 absent (Paola Cervantes).

d. **Funding Motion**: Office supply costs (submitted by Executive and Finance Committee)

Motion to fund up to $500 worth of related office supply costs associated with Executive Committee positions and Committee Chair responsibilities.

Passed on consent

e. **Funding Motion**: Santa Sleigh storage (submitted by Executive and Finance Committee)

Motion to contribute up to $1000 in an NPG for the purchase of a storage unit for the Pacific LAPD Santa Sleigh.

Board Discussion

Elliot Hanna: Are we the only NC funding it?

Rob Kadota: They're asking for $4000. We don't know where other $3000 is coming from; there are 7 NCs within Pacific PD area.

Holly Tilson: In past, Winter Wonderland funded by NCs.

Damien Newton: Has kids that still believe in Santa; probably over 1000 MV kids view the sleigh.

Ken Alpern: Concurs with Damien. His kids love it.

Elliot Hanna: Agrees with Ken, but concern is process: will we cut check and have money sitting there even if other $3000 is not raised.

Sara Roos: Would be helpful if it went through a committee.

Motion carried. 11 Yes 1 Absent - Paola Cervantes

f. **Funding Motion**: Promotional items (submitted by Executive and Finance Committee)

Motion to purchase up to $7,500 promotional items to increase awareness of MVCC.

Public Comment

Christopher McKinnon: One time funding? Rob Kadota: yes.

Christopher McKinnon: Agrees that should be well itemized. Should go through Outreach Committee. Why not take $3000 out of this and buy whole shed for LAPD.

Board Discussion

Melissa Stoller: Supports but wants more specifics,

Michelle Krupkin: Agrees with Melissa

Elliot Hanna: Agrees with Melissa

Move to table and send to Outreach Committee by Chuck Ray, 2nd by Ken Alpern.

Motion carried unanimously 11- Yes 1 – Absent Paola Cervantes

g. **Administrative Motion**: Revised budget (submitted by Executive and Finance Committee)

MVCC approves the budget revisions presented in Addendum A.

Board Discussion

Elliot Hanna: Where did Green Garden Showcase amount come from? Would like to see budget.

Melissa Stoller: Green Committee presented detailed budget months ago. A lot has changed since then, likely to have less printed material. Will likely need to purchase liability insurance.

Motion carried: 9 ayes, 1 nay, 1 abstension (Michelle Krupkin), 1 absent (Paola Cervantes).

h. **Policy Motion:** 12607 Pacific Boulevard proposed development (submitted by Planning and Land Use Management Committee)

The Mar Vista Community Council supports the on-menu density bonus and categorical exclusion of the proposed property at 12607 Pacific Boulevard provided that the city certifies the affordable housing plan and provides a plan for checking that the apartment building is following its commitment to affordable housing in future years.

Public Comment

Howard Weisberg: Owns property on Pacific. Commends developer for providing 1.3 parking spaces per bedroom; had they taken the bonus there would only have been 15 parking spaces, overflow of 24 parking spaces. Still overflow of 9 parking spaces.

Motions 13.h & 13.i carried: 8 ayes, 0 nays, 2 abstentions (Damien Newton, Michelle Krupkin) 2-Absent Susan Klos, Paola Cervantes

i. **Policy Motion**: 3966 Grand View Boulevard proposed development (submitted by Planning and Land Use Management Committee)

The Mar Vista Community Council supports concept of the proposal for 50 units and 50 parking spaces at 3966 Grand View Blvd by the Santa Monica Community Corporation (SMCC). MVCC looks forward to working with SMCC during the design phase to insure the project is one that works for future residents and the existing community, including making certain that the project is as environmentally friendly as possible.

We understand that the project does not include "project based" Section 8 Housing.

Motion carried. 8 ayes, 0 nays, 2 abstentions, 2 absent

j. **Policy Motion:** Tree Stump Removal (Submitted by Transportation & Infrastructure Committee)

WHEREAS, the MVCC recognizes there is a long waiting list and lack of stump removal teams and/or services to serve the MVCC, and

WHEREAS, the MVCC recognizes that tree stump removal has impacts on transportation/infrastructure and related safety issues, and

WHEREAS the MVCC recognizes that cities are required by CEQA law to maintain streets, curbs, parkways, and sidewalks within their borders,

THEREFORE, the MVCC calls upon the City and any related departments (LA Bureau of Street Services, LADOT, LADWP, etc.) to fund and implement tree stump removal programs so that tree stumps will be removed in a prompt and cost-effective manner.

Motion not addressed.

k. **Policy Motion:** Six Month Follow-up request for promised data (Submitted by Transportation & Infrastructure Committee)

WHEREAS, on July 11, 2017, the Mar Vista Community Council passed a motion entitled "Continuation of Venice Boulevard Pilot Project" by a near-unanimous vote of ten ayes and one no, and

WHEREAS on September 12, 2017, the Mar Vista Community Council passed a motion entitled "Great Streets Venice Blvd. Point Person" by a vote of 6-3-1

WHEREAS, in those motions, the Mar Vista Community Council requested that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month, and

WHEREAS, in those motions, the Mar Vista Community Council requested the same data on streets in Los Angeles where this same configuration was implemented, and

WHEREAS, in those motions, the Mar Vista Community Council requested an evaluation be done by an ADA consultant, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike), and

WHEREAS, in those motions, the Mar Vista Community Council requested that the City of Los Angeles post all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with a breakdown of all petitions showing a breakdown of signatures indicating the number of signatures by zip code or community of residence, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the data to date on the survey created by CD11 and updated on a regular basis, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council urged "the City of Los Angeles and grass roots community organizations to provide the needed information promptly with a planned reassessment six months from this date," and

WHEREAS, that six-month reassessment date was January 11, 2018, and

WHEREAS, to date LADOT, CD11, LAPD, LAFD, nor any other city agency has provided anything requested in that July 11, 2017 motion.

THEREFORE, the Mar Vista Community Council moves to instruct the Chair to invite Councilman Bonin, Nat Gale, and Seleta Reynolds to either the March 13, 2018 Board of Directors' meeting or to a special MVCC meeting to be held not later than March 30, 2018 for the purpose of answering questions from the board and the community regarding these items.

Motion not addressed.

l. **Policy Motion**: Follow-up Request for Parking Demand Survey (Submitted by Transportation & Infrastructure Committee)

WHEREAS, in June and July of last year (2017), both the West Mar Vista Residents Association and the Mar Vista Community Council sent resolutions to Councilman Bonin asking him to obtain city funding for a parking demand survey as provided for by AB 744, and

WHEREAS, the MVCC and all neighborhood associations have heard no feedback or other helpful input from either the CD11 or any appropriate City offices,

THEREFORE, the MVCC respectfully requests funding for this parking demand survey for Venice Blvd. and other major thoroughfares west of the 405 freeway from the CD11 office, and

THEREFORE, the MVCC respectfully requests on a funding for a parking demand survey for Sepulveda Blvd. and Overland Ave. from the CD5 office, both to be assigned and authorized by 4/1/2018.

Motion not addressed.

m. **Policy Motion:** Correct status of Centinela Ave. and Venice Blvd. Bus Service with the LA City Planning Department (Submitted by Transportation & Infrastructure Committee)

WHEREAS, current SCAG information states that the junction of Centinela Ave. and Venice Blvd. does not have the required Bus Service to be eligible as "a major transit stop," and

WHEREAS, in the past, the mistaken categorization has allowed out of character developments to be approved inappropriately due to the City of Los Angeles Planning Department and Planning Commission using incorrect information, and

THEREFORE, the Centinela Ave. and Venice Blvd. junction should not continue to be categorized as a Major Transit Stop by the City of Los Angeles and the City of Los Angeles Planning Department, and

The MVCC respectfully requests that Councilmember Bonin officially notify the City of Los Angeles Planning Department and Planning Commission of these facts and receive confirmation that this junction will not be categorized as a Major Transit Stop for any future developments.

Motion not addressed.

14. **Grievances**, if any received
15. **Future agenda items**
16. **Public Comment**
17. **Adjournment**

Meeting adjourned at 9: P.M.

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

***** ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A: 02/13/18 Draft Amended Budget

Budget Category: General/Operational	Current	Proposed
Subcategory: Office		
Storage		
Storquest	$2,496.00	$2,704.00
Meeting rooms rental		
The Vineyard	$600.00	$600.00
St Andrew's Lutheran Church	$300.00	$300.00
St Bede's	$75.00	$150.00
Windward School	$5.00	$5.00
PO Box rental	$132.00	$132.00
Farmer's Market rental	$1,200.00	$1,200.00
Equip & supplies (misc)		
Live streaming equipment		$1,600.00
Projector screen & stand		$750.00
misc	$1,100.00	$350.00
Mtg supplies & printing		
printing	$1,000.00	$500.00
Board Training & Support		
Business cards/name badges	$250.00	$400.00
Board Retreat	$37.68	$100.00
Office subtotal	$7,195.68	$8,791.00
Subcategory: Outreach		
Website		
The Web Corner: website maintenance	$1,650.00	$1,650.00
The Web Corner: emails	$385.00	$385.00
The Web Corner: Extra Data Entry	$500.00	$500.00
RIMU Hosting	$96.27	$96.27
Email Service		
Mail chimp email service	$480.00	$700.00
MiFi Service		
AT&T MiFi service		$100.00
Advertising		
Banners/sign/event promotion	$500.00	$500.00
Facebook ads	$250.00	$250.00
Promotional items		$7,500.00
Emergency Prep signs & brochures	$1,500.00	$1,500.00
Neighborhood Watch signs		$3,000.00
Community Events		
Block parties (4 X $300)	$1,500.00	$1,200.00
Westside Senior Health & Wellness Fair	$500.00	$500.00
Winter Wonderland	$1,000.00	$1,000.00
Art Walk	$2,000.00	$1,600.00
Venice High Grease Night	$300.0	$300.

Green Garden Showcase	$4,000.00	$4,000.00
MVCC events/outreach		
Mar Vista Turns 90 Celebration	$4,000.00	$1,250.00
Great Street Tree Planting	$300.00	$300.00
misc	$7,843.05	$2,877.73
Community Improvement		
Alley repair/seed money	$5,000.00	$0.00
Bike repair stand		$2,000.00
Outreach subtotal:	$31,804.32	$31,209.00
Subcategory: Elections		
Election expenses	$1,000.00	$0.00
Elections subtotal:	$1,000.00	$0.00
General/Operational Total:	$40,000.00	$40,000.00
Budget Category: Neighborhood Purpose Grants		
Santa Sleigh shed		$1000.00
School grants	$2,000	$2,000.00
Neighborhood Purpose Grants subtotal:	$2,000	$3,000
Budget Total:	$42,000.00	$42,000.00

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday March 13th, 2018, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 13th, 2018 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   Ex Parte Communication is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

   Conflicts of interest include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.
5. **Community Memorial Observations**
6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Hannah.Levien@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   h. CA Senate 30 – Senator Holly J. Mitchell, rep. by Hannah.Cho@sen.ca.gov (213) 745-6656.
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
   l. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
8. **Special Presentation State of the Street Related Infrastructure** – Laila Alequresh, Executive Advisor, Office of the CAO, City of Los Angeles (http://clkrep.lacity.org/onlinedocs/2017/17-1311_rpt_CAO_11-21-17.pdf)
9. **Liaison Reports** (Public comment permitted;1min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net

b. DWP MOU: open
c. LANCC: open
d. One Water LA: Christopher McKinnon
e. WRAC: Rob Kadota
f. WRAC LUPC: open
g. City Budget Advocates: Holly Tilson
h. Recode LA: Sharon Commins
i. Animal Services: Tom Ponton
j Friends of Historic FS 62: Albert Olson
k. Mar Vista Chamber of Commerce: Sarah Auerswald
l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

10. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
    a. Chair – Rob Kadota
        i. - Selection of Zone 4 Director
           - Candidates: Judy Deutsch, Alexys Buckner and Aaron Elster
        ii. Announcement of Board of Directors vacancies: At Large Director, Zone 3 Director
        iii. Open Executive Committee positions
        iv. LA City and County Census 2020focusing on low response areas – http://rpgis.isd.lacounty.gov/lrs/
        v. www.lamayor.org/resilience -
    b. First Vice Chair – open
    c. Second Vice Chair – Paola Cervantes
    d. Secretary – open
    e. Treasurer – Holly Tilson
        i. Report on current financial status
        ii. **APPROVAL** of Febuary Monthly Expense Report (MER)
11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Elections and By-laws Committee** – open
    b. **Community Outreach Committee** – Sara Roos, Chair
    c. **Committee on Public Safety** – Elliot Hanna, Chair
    d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
    e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
    f. **Transportation & Infrastructure Committee** –Ken Alpern, Chair; Michelle Krupkin, Vice-chair
    g. **Bike Mar Vista** – Rob Kadota, Chair; Mitchel Rishe, Vice Chair
    h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chair
    i. **Great Streets Ad Hoc Committee** – Michelle Krupkin and Rob Kadota, Co-Chairs
    j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
    k. **Green Committee** –Jeanne Kuntz, Chair
    l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs
12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern

b. Zone 2 – Damien Newton

c. Zone 3 – open

d. Zone 4 – open

e. Zone 5 – Michelle Krupkin

f. Zone 6 – Holly Tilson

13. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    Consent Calendar: Motion to approve items 12a-d on consent.

    a. **Policy Motion:** Tree Stump Removal (Submitted by Transportation & Infrastructure Committee)

       WHEREAS, the MVCC recognizes there is a long waiting list and lack of stump removal teams and/or services to serve the MVCC, and

       WHEREAS, the MVCC recognizes that tree stump removal has impacts on transportation/infrastructure and related safety issues, and

       WHEREAS the MVCC recognizes that cities are required by CEQA law to maintain streets, curbs, parkways, and sidewalks within their borders,

       THEREFORE, the MVCC calls upon the City and any related departments (LA Bureau of Street Services, LADOT, LADWP, etc.) to fund and implement tree stump removal programs so that tree stumps will be removed in a prompt and cost-effective manner.

    b. **Policy Motion:** Six Month Follow-up request for promised data (Submitted by Transportation & Infrastructure Committee)

       WHEREAS, on July 11, 2017, the Mar Vista Community Council passed a motion entitled “Continuation of Venice Boulevard Pilot Project” by a near-unanimous vote of ten ayes and one no, and

       WHEREAS on September 12, 2017, the Mar Vista Community Council passed a motion entitled “Great Streets Venice Blvd. Point Person” by a vote of 6-3-1

       WHEREAS, in those motions, the Mar Vista Community Council requested that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month, and

       WHEREAS, in those motions, the Mar Vista Community Council requested the same data on streets in Los Angeles where this same configuration was implemented, and

       WHEREAS, in those motions, the Mar Vista Community Council requested an evaluation be done by an ADA consultant, and

       WHEREAS, in those motions, the Mar Vista Community Council requested that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike), and

       WHEREAS, in those motions, the Mar Vista Community Council requested that the City of Los Angeles post all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented, and

       WHEREAS, in those motions, the Mar Vista Community Council requested that the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze, and

       WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with a breakdown of all petitions showing a breakdown of signatures indicating the number of signatures by zip code or community of residence, and

       WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the data to date on the survey created by CD11 and updated on a regular basis, and

       WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council urged "the City of Los Angeles and grass roots community organizations to provide the needed information promptly with a planned reassessment six months from this date," and

WHEREAS, that six-month reassessment date was January 11, 2018, and

WHEREAS, to date LADOT, CD11, LAPD, LAFD, nor any other city agency has provided anything requested in that July 11, 2017 motion.

THEREFORE, the Mar Vista Community Council moves to instruct the Chair to invite Councilman Bonin, Nat Gale, and Seleta Reynolds to either the March 13, 2018 Board of Directors' meeting or to a special MVCC meeting to be held not later than March 30, 2018 for the purpose of answering questions from the board and the community regarding these items.

c. **Policy Motion**: Follow-up Request for Parking Demand Survey (Submitted by Transportation & Infrastructure Committee)

WHEREAS, in June and July of last year (2017), both the West Mar Vista Residents Association and the Mar Vista Community Council sent resolutions to Councilman Bonin asking him to obtain city funding for a parking demand survey as provided for by AB 744, and

WHEREAS, the MVCC and all neighborhood associations have heard no feedback or other helpful input from either the CD11 or any appropriate City offices,

THEREFORE, the MVCC respectfully requests funding for this parking demand survey for Venice Blvd. and other major thoroughfares west of the 405 freeway from the CD11 office, and

THEREFORE, the MVCC respectfully requests on a funding for a parking demand survey for Sepulveda Blvd. and Overland Ave. from the CD5 office, both to be assigned and authorized by 4/1/2018.

Motion not addressed.

d. **Policy Motion:** Correct status of Centinela Ave. and Venice Blvd. Bus Service with the LA City Planning Department (Submitted by Transportation & Infrastructure Committee)

WHEREAS, current SCAG information states that the junction of Centinela Ave. and Venice Blvd. does not have the required Bus Service to be eligible as "a major transit stop," and

WHEREAS, in the past, the mistaken categorization has allowed out of character developments to be approved inappropriately due to the City of Los Angeles Planning Department and Planning Commission using incorrect information, and

THEREFORE, the Centinela Ave. and Venice Blvd. junction should not continue to be categorized as a Major Transit Stop by the City of Los Angeles and the City of Los Angeles Planning Department, and

The MVCC respectfully requests that Councilmember Bonin officially notify the City of Los Angeles Planning Department and Planning Commission of these facts and receive confirmation that this junction will not be categorized as a Major Transit Stop for any future developments.

14. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

Consent Calendar: Motion to approve items 13a-k on consent.

a. **Funding Motion:** MVCC Administrative Support (submitted by Executive & Finance Committee)

MVCC approves the employment of a BOD minutes writer at a cost not to exceed $800 for the remaining 2017-18 fiscal year.

b. **Funding Motion:** Green Garden Showcase publicity (submitted by Community Outreach Committee)

MVCC approves the expenditure of up to $1000 for Mar Vista Green Garden Showcase promotional banners, signs and flyers.

c. **Funding Motion:** General MVCC Promotional Item – Trash Bags to Go - $730.00 plus art set up, tax and shipping. (submitted by Community Outreach Committee)

d. **Funding Motion**: General MVCC Promotional Item – MVCC mugs, total cost not to exceed $300.00. (submitted by Community Outreach Committee)

e. **Funding Motion**: Safe Driving lawn signs safety outreach $2500 plus art set up, tax and shipping. (Submitted by Community Outreach Committee)

f. **Funding Motion**: MVCC promotional outreach items – Post It Notes with Map of Mar Vista total cost not to exceed $1500.00 (Submitted by Community Outreach Committee)

g. **Funding Motion**: MVCC promotional outreach items – seat cushions $488.40 plus art set up, tax and shipping. (Submitted by Community Outreach Committee)

h. **Funding Motion**: MVCC Blue and Green outreach awning replacements cost not to exceed $1000 total. (Submitted by Community Outreach Committee)

i. **Funding Motion:** general MVCC tr-fold brochure design and printing costs not to exceed $500.00. (Submitted by Community Outreach Committee)

j. **Funding Motion**: Funding for Community Projects for Joint MVCC/CD11/LADOT Safety and Mobility Enhancement.

Whereas, the MVCC has a strong interest in enhancing the safety and mobility of pedestrians, bicyclists, bus riders and car commuters for the benefit of all parties, and
Whereas, the Joint CoPS and T/I Committee meeting held with both LAPD and CHP members derived a preliminary consensus of how to spend these funds as potential "seed money" for the CD11 and LADOT to fund and prioritize for several such projects,
Therefore, the MVCC appropriates $10,000 towards:

a) High Visibility Crosswalks at McLaughlin Avenue and Charnock Road, and/or McLaughlin Ave. and Victoria Ave., and/or Grand View Blvd. and Pacific Avenue and/or Colonial Ave. and Victoria Ave., and/or Colonial Ave. and McCune Ave., and/or Beethoven St., Zanja St. and Caswell Ave., and/or Moore St. and Pacific Ave. and/or Grand View Blvd. and Victoria Ave., or

b) Reconstruction and restoration of the Venice Blvd-adjacent alleys (which serve a vital function to that thoroughfare's commercial corridor) north of Venice Blvd. and east of Centinela Blvd, as well as any repairs to the alley south of Venice Blvd. due to last winter's storm damage.

c) Repair of Pacific Avenue adjacent to the Farmer's Market, between Inglewood Blvd. and Centinela Ave.

k. **Administrative Motion:** MVCC Boundary (submitted by Elections & Bylaws Committee)

MVCC amends Bylaws Article III, Section 1 (Boundary Description) as follows:

The MVCC represents Stakeholders within the following geographic boundaries

- South of the Santa Monica Freeway between Centinela Ave. and the San Diego Freeway,
- West of the San Diego Freeway between the Santa Monica Freeway and National Blvd.,
- South side of National Blvd. between the San Diego Freeway and Overland Ave.,
- West side of Overland Ave. between National Blvd. and Charnock Rd.,
- *West side of Sepulveda Blvd between Charnock Rd. and Regent St.*
- *North side of Regent St. between Sepulveda Blvd. and Tuller Ave.*
- *West side of Tuller Ave. between Regent St. and Venice Blvd.*
- *North of Culver City Border between Tuller Ave. and the intersection of Zanja St. and Walgrove Ave.*
- ~~North side of Charnock Rd. between Overland Ave. and the San Diego Freeway ,~~
- ~~North of the Culver City border between the San Diego Freeway and Zanja St./Walgrove Ave.,~~
- East side of Walgrove Ave. between Zanja St. and Santa Monica City border,
- South of the Santa Monica City border between Walgrove Ave. and Centinela Ave.
- East side of Centinela Ave. between Airport Ave. and the Santa Monica Freeway. (Further details to be provided by LA City Department of Neighborhood Empowerment)

Note: Venice High, Mark Twain ~~Junior High~~ *Middle School*, Walgrove Elementary and Beethoven Elementary, shall be considered an overlap area with the neighborhood

council established by the Venice Neighborhood Council. *Palms Middle School shall be considered an overlap area with the Palms Neighborhood Council.*

Additional Information:

- Addendum A: Current MVCC map and Map highlighting issue area
- Addendum B: Boundary adjustments proposed by Palms NC

l. **Administrative Motion:** MVCC Geographic Zones Adjustment (submitted by Elections & Bylaws Committee)

MVCC amends Bylaws Article III, Section 2 (Internal Boundaries) as follows:

Geographic Zones: The Zones shall be defined as:

- Zone 1. South of National Blvd., North of Charnock Rd., East of the 405 freeway, West of Overland Ave., *West side of Sepulveda Blvd between Charnock Rd. and Regent St., North side of Regent St. between Sepulveda Blvd. and Tuller Ave., West side of Tuller Ave. between Regent St. and Venice Blvd.*;
- Zone 2: South of the 10 freeway, North of National Blvd., East of Centinela Ave., West of 405 freeway; 4 MVCC BYLAWS APPROVED 7.01.2017
- Zone 3: South of National Blvd., North of Palms Blvd., East of Centinela Ave., West of 405 freeway;
- Zone 4: South of Palms Blvd., North of Venice Blvd., East of Centinela Ave., West of 405 freeway;
- Zone 5: South of Venice Blvd., North of Culver City, East of Centinela Ave., West of Sawtelle Blvd., *North of Culver City Border*; and
- Zone 6: South of Santa Monica Airport, North of Washington Blvd., East of Walgrove Ave., West of Centinela Ave., *North of Culver City Border between Sawtelle Blvd. and the intersection of Zanja St. and Walgrove Ave*

m. **Administrative Motion:** Code of Conduct (submitted by Elections & Bylaws Committee)

MVCC adds the following statement to Article V (Governing Board) Section 8 (Censure) of the Bylaws: Violation of the Code of Conduct by a Director or Committee Chair/Co-Chair/Vice Chair may result in Censure or Removal.

n. **Administrative Motion:** Sponsorship of Great Street Town Hall (Directors motion submitted by Rob Kadota) A community conversation tentatively scheduled for Saturday April 14 1-3pm at Windward School Gymnasium.

o. **Policy Motion:** EV Chargers (submitted by Planning & Land Use Management Committee)

The AQMD says plug-in cars are essential if clean air standards are to be realized. Plug-ins now make up 5% of new vehicle sales in California, and are increasingly popular in Mar Vista, but adoption is hindered by lack of easy home and workplace charging.

Several California cities have already adopted sensible building code changes to make adding electric vehicle chargers much less expensive.

For instance, the study in the City of Oakland's Council File 16-0359 says preparing for EV chargers ahead of time adds about $140per parking space, and makes later EV charger installation $500 to $5000 cheaper.

Therefore, the Mar Vista Community Council requests that the Los Angeles City Council follow the example of these cities, and pass sensible, cost-effective building code changes to require most new parking spaces in the city to be ready for future installation of EV chargers.

p. **Policy Motion:** Proliferation of Recreational Vehicles in Mar Vista (submitted by Homeless Issues Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, on both major commercial thoroughfares and residential streets, and

WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking, and what the roles and responsibilities for the LADOT and LAPD are to enforce laws related to Recreational Vehicle locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and correct the map.

THEREFORE, the Mar Vista Community Council supports the work of Councilmember Mike Bonin to increase the amount of parking made available to vehicle dwellers with the Safe Park program in private parking lots including those of faith-based organizations. THEREFORE, the Mar Vista Community Council asks Councilmember Mike Bonin's office to explore expanding the Safe Park program to include city owned parking lots that are currently empty in the evening.

q. **Policy Motion**: Support of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act request
WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and
WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and
WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and
WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and
WHEREAS to date, this request has not been fulfilled by LADOT; and
WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;
NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

r. **Policy Motion:** LADOT/CD 11 Great Streets - Venice Blvd Town hall meeting
WHEREAS, the Venice Blvd. “Great Street” pilot project was implemented on May 20, 2017; and
WHEREAS, the pilot project included removing one traffic lane in each direction to install a curbside protected bike lane, a buffer/loading zone and reconfigured on-street parking; and
WHEREAS, Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about perceived negative impacts of pilot project, including:
1) Gridlock on Venice Blvd.,
2) Cut through traffic onto residential streets adjacent to Venice Blvd,
3) A negative increase in emergency response times for LAFD and LAPD because of the gridlock,
4) An increase accidents on Venice Blvd and adjacent streets due to gridlock and cut through traffic,
5) Safety concerns about the protected bike lane, including reduced visibility and an increase in points of conflict between cars and bicycles,
6) An increase in bicycle vs. car accidents,
7) A lack of sidewalk improvements,
8) A lack of involvement of persons with disabilities in the planning and implementation phases of the project,
9) An ongoing lack of transparency in the planning, implementation and evaluation of this pilot project,
10) A lack of pre- and post-implementation data provided to the community from LADOT and Council District 11; and
WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community; and
WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to the community's requests for assistance and information; and
THEREFORE, be it resolved that the Mar Vista Community Council will sent a letter forthwith to LADOT and Councilman Mike Bonin's office demanding a Town Hall meeting be held post haste

on this issue, to present information, gather feedback, and address the concerns of Mar Vista and Venice Blvd stakeholders about the Great Streets - Venice Blvd pilot project.

15. **Grievances**, if any received
16. **Future agenda items**
17. **Public Comment**
18. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

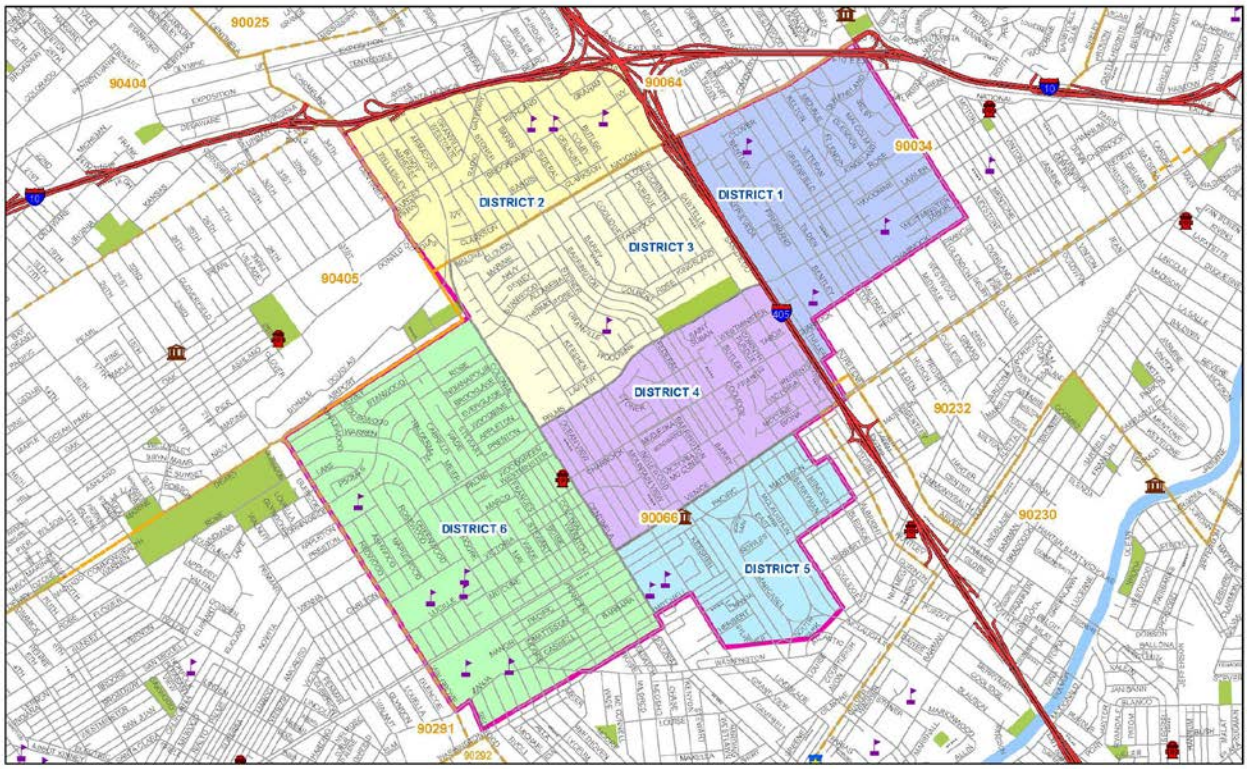
  You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

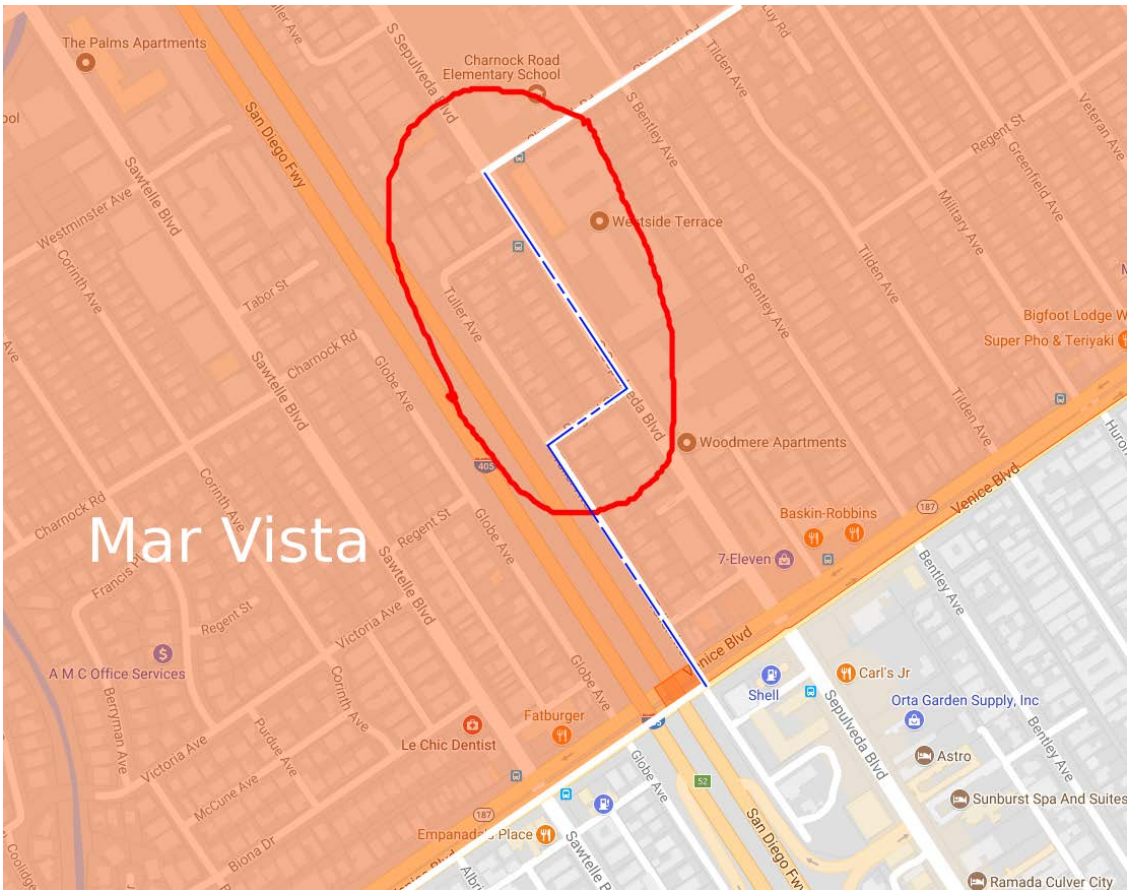
* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

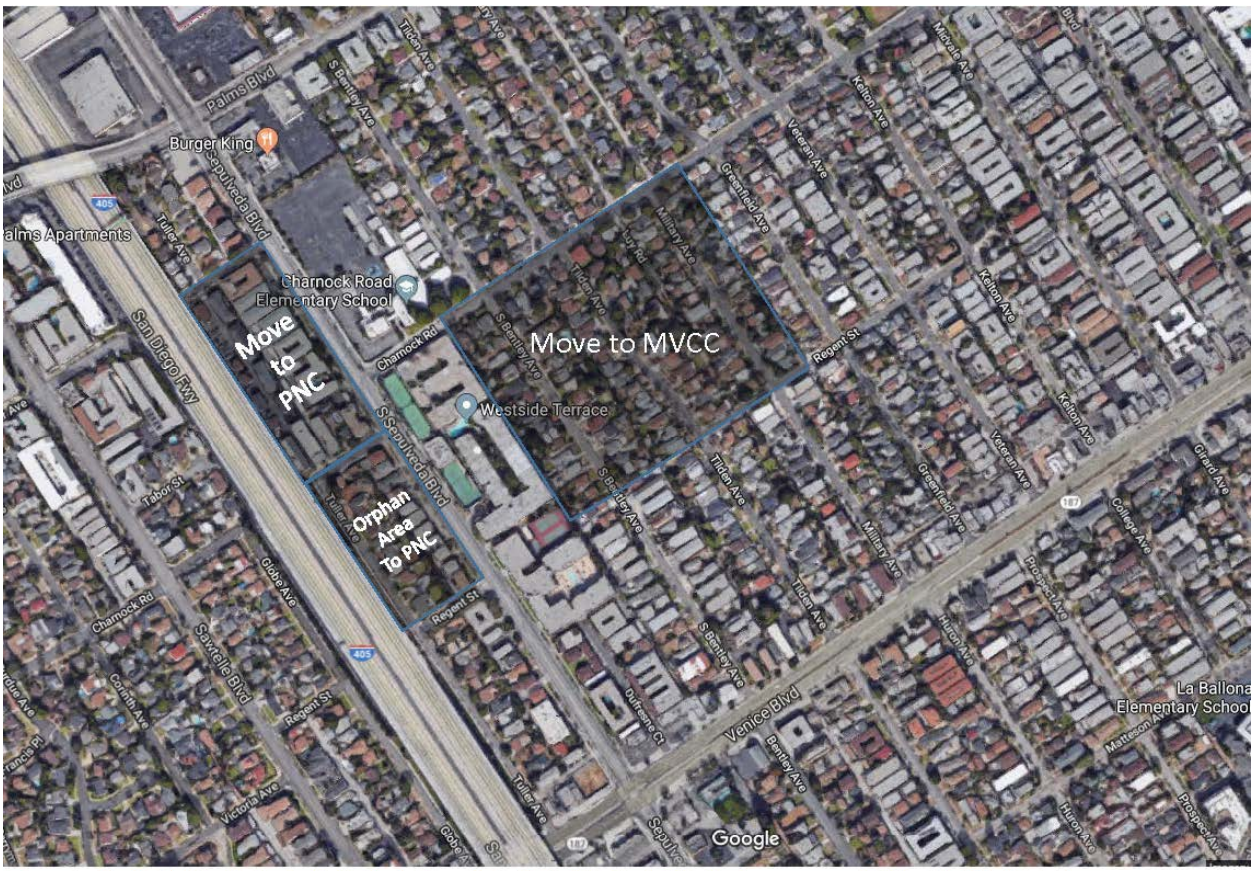
* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

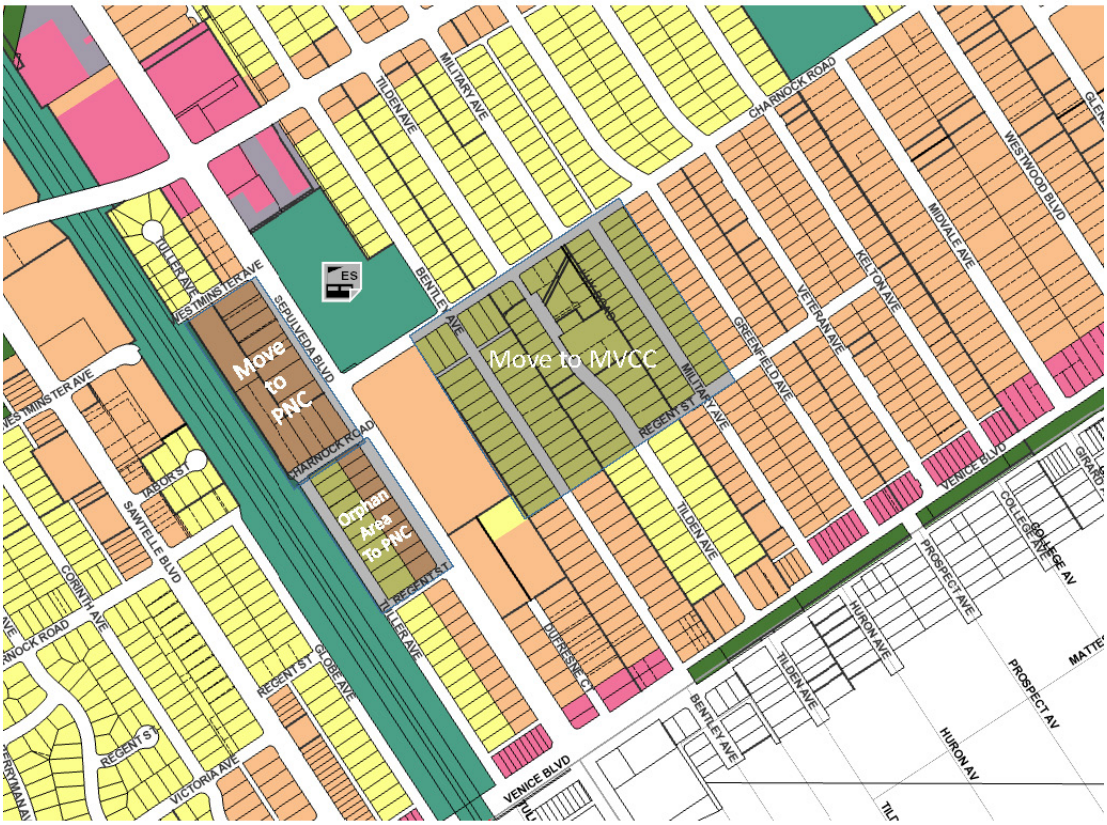
ADDENDUM A: Current MVCC Map and Issue Area

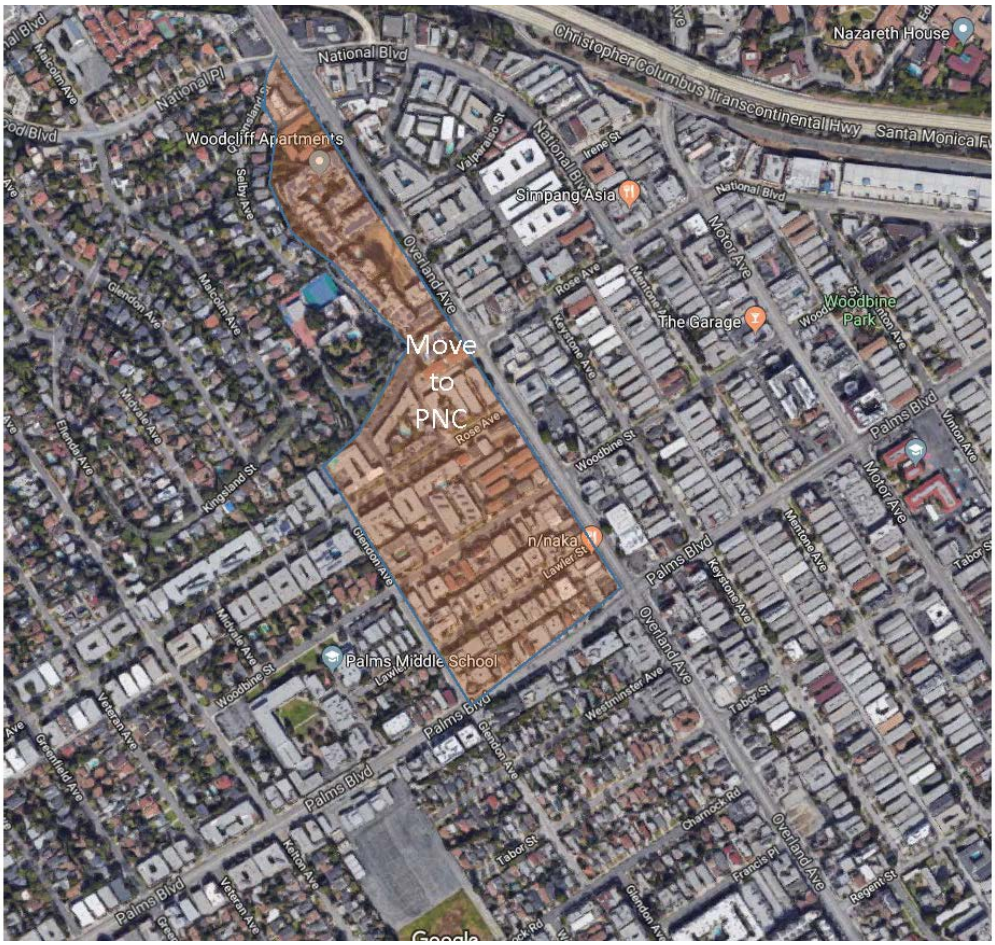




ADDENDUM B: Boundary Adjustment Maps


Move to PNC
Move to MVCC
Orphan Area To PNC
Charnock Road Elementary School
Westside Terrace
Burger King
Palms Blvd
Sepulveda Blvd
San Diego Fwy
Charnock Rd
Regent St
Venice Blvd
Tilden Ave
Bentley Ave
Military Ave
Greenfield Ave
Veteran Ave
Keiton Ave
Midvale Ave
Huron Ave
Prospect Ave
College Ave
Girard Ave
Tabor St
Globe Ave
Sawtelle Blvd
Corinth Ave
Victoria Ave
Turner Ave
Dufresne Ct
La Ballona Elementary School
Google


Move to PNC
Move to MVCC
Orphan Area To PNC
CHARNOCK ROAD
MILITARY AVE
TILDEN AVE
BENTLEY AVE
REGENT ST
VENICE BLVD
SEPULVEDA BLVD
TULLER AVE
WESTMINSTER AVE
TABOR ST
SAWTELLE BLVD
CORINTH AVE
GLOBE AVE
VICTORIA AVE
GREENFIELD AVE
VETERAN AVE
KELTON AVE
MIDVALE AVE
WESTWOOD BLVD
COLLEGE AVE
PROSPECT AVE
HURON AVE
DUFRESNE PL
ES


Nazareth House
Christopher Columbus Transcontinental Hwy
National Blvd
National Pl
Woodcliff Apartments
Simpang Asia
Overland Ave
Motor Ave
The Garage
Woodbine Park
Move to PNC
Palms Blvd
n/naka
Palms Middle School
Glendon Ave
Westminster Ave
Tabor St
Kingsland St
Woodbine St
Rose Ave
Keystone Ave
Mentone Ave
Vinton Ave
Chamock Rd
Francis Pl
Regent St
Veteran Ave
Greenfield Ave
Midvale Ave
Ellenda Ave
Malcolm Ave
Selby Ave
Valparaiso St
Irene St
Lawler St
Kelton Ave
Google


Move to PNC
NATIONAL PL
SELBY AVE
MALCOLM AVE
GLENDON AVE
IRENE ST
ROSE AVE
WOODBINE ST
KEYSTONE AVE
MENTONE AVE
WESTMINSTER AVE
MIDVALE AVE
PALMS BLVD
MS

Mar Vista Community Council

Regular Meeting of the Board of Directors
Tuesday March 13th, 2018, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of February 13th, 2018 Board of Directors Meeting Minutes** (public comment permitted; 1 min per speaker).
4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   Ex Parte Communication is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

   Conflicts of interest include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.
5. **Community Memorial Observations**
6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)

   Ms Whittington: Mar Vista should match Culver City's underpass rock garden at Sepulveda. It would be a friendly greeting.

   Mr. Doyno: Civility please!

7. **Elected Officials and City Department Reports** (max 1 min. each unless waived by the Chair)
   a. Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
   b. CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
   c. CD 11 – Councilmember Mike Bonin, rep. by Field Deputy Hannah.Levien@lacity.org
   d. LA City Board of Public Works - Liaison to CD 2, 5, 11, Commissioner joel.jacinto@lacity.org
   e. Mayor of Los Angeles – Eric Garcetti, rep. by Daniel.tamm@lacity.org
   f. 2nd Dist. L. A. County Board of Supervisors - Supervisor Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
   g. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
   h. CA Senate 30 – Senator Holly J. Mitchell, rep. by Hannah.Cho@sen.ca.gov (213) 745-6656.
   i. US 33– Ted Lieu, rep. by joey.apodaca@mail.house.gov
   j. US 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
   k. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
   l. Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

8. **Special Presentation State of the Street Related Infrastructure** – Laila Alequresh, Executive Advisor, Office of the CAO, City of Los Angeles (http://clkrep.lacity.org/onlinedocs/2017/17-1311_rpt_CAO_11-21-17.pdf)

   Whittington: Olympics event should not be only imperative to better communications.

   Rubin: City's development plans should coordinate with this initiative to improve internal CoLA communications.

   Hanna: Complex project management problem, analogous to homelessness issues.

   Roos: Implemention? Would take months at least.

   Krupkin: Council vote? Is an extensive process

   Alpern: Hope these recommendations are adopted.

   Odere: Overlap of services indicates waste …. But implementation of recommendations could save money and jobs.

9. **Liaison Reports** (Public comment permitted; 1 min per speaker)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano lindaguag@netzero.net
   b. DWP MOU: open
   c. LANCC: open
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: open
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j Friends of Historic FS 62: Albert Olson
   k. Mar Vista Chamber of Commerce: Sarah Auerswald
   l. 2018 Mar Vista Green Garden Showcase: Maggie Begley
10. **Officer Reports** (Action items included with public comment permitted; 1 min per speaker)
    a. Chair – Rob Kadota
       i. - Selection of Zone 4 Director
          - Candidates: Judy Deutsch, Alexys Buckner and Aaron Elster
       ii. Announcement of Board of Directors vacancies: At Large Director, Zone 3 Director
       iii. Open Executive Committee positions
       iv. LA City and County Census 2020focusing on low response areas – http://rpgis.isd.lacounty.gov/lrs/
       v. www.lamayor.org/resilience -
    b. First Vice Chair – open
    c. Second Vice Chair – Paola Cervantes
    d. Secretary – open
    e. Treasurer – Holly Tilson
       i. Report on current financial status
       ii. **APPROVAL** of Febuary Monthly Expense Report (MER)
11. **Committee Reports**: (may include motions to refer committee where desirable; public comment permitted)
    a. **Elections and By-laws Committee** – open

b. **Community Outreach Committee** – Sara Roos, Chair
c. **Committee on Public Safety** – Elliot Hanna, Chair
d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
f. **Transportation & Infrastructure Committee** –Ken Alpern, Chair; Michelle Krupkin, Vice-chair
g. **Bike Mar Vista** – Rob Kadota, Chair; Mitchel Rishe, Vice Chair
h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co- chairs; Lenore French, Vice-chair
i. **Great Streets Ad Hoc Committee** – Michelle Krupkin and Rob Kadota, Co-Chairs
j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
k. **Green Committee** –Jeanne Kuntz, Chair
l. **Homeless Solutions Ad Hoc Committee** – Robin Doyno & Susan Klos, Co-chairs

12. **Zone Director Reports** – (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
    a. Zone 1 – Ken Alpern
    b. Zone 2 – Damien Newton
    c. Zone 3 – open
    d. Zone 4 – open
    e. Zone 5 – Michelle Krupkin
    f. Zone 6 – Holly Tilson
13. **Old Business** - Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

    Consent Calendar: Motion to approve items 12a-d on consent.

    Consent items are (a) and (d), moved by Krupkin, seconded by Alpern: Passed 8/0/1 (Roos)

    a. **Policy Motion: "**Tree Stump Removal" (Submitted by Transportation & Infrastructure Committee)

    WHEREAS, the MVCC recognizes there is a long waiting list and lack of stump removal teams and/or services to serve the MVCC, and

    WHEREAS, the MVCC recognizes that tree stump removal has impacts on transportation/infrastructure and related safety issues, and

    WHEREAS the MVCC recognizes that cities are required by CEQA law to maintain streets, curbs, parkways, and sidewalks within their borders,

    THEREFORE, the MVCC calls upon the City and any related departments (LA Bureau of Street Services, LADOT, LADWP, etc.) to fund and implement tree stump removal programs so that tree stumps will be removed in a prompt and cost-effective manner.

    Passed on consent

    b. **Policy Motion: "**Six Month Follow-Up Request For Promised Venice Boulevard Pilot Project Data" (Submitted by Transportation & Infrastructure Committee)

    WHEREAS, on July 11, 2017, the Mar Vista Community Council passed a motion entitled "Continuation of Venice Boulevard Pilot Project" by a near-unanimous vote of ten ayes and one no, and

    WHEREAS on September 12, 2017, the Mar Vista Community Council passed a motion entitled "Great Streets Venice Blvd. Point Person" by a vote of 6-3-1, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the LAPD and LAFD submit data on response times and incident rates for before and after the changes and track same by month, and

WHEREAS, in those motions, the Mar Vista Community Council requested the same data on streets in Los Angeles where this same configuration was implemented, and

WHEREAS, in those motions, the Mar Vista Community Council requested an evaluation be done by an ADA consultant, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the buffered bike lane be evaluated for safety by established bicycle safety advocacy groups like League of American Bicyclists (www.bikeleague.org), American Bicycling Education Association (https://abea.bike), and

WHEREAS, in those motions, the Mar Vista Community Council requested that the City of Los Angeles post all related survey results, traffic studies, and community impact reports online for this pilot project and others previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council requested that the city of Los Angeles provide data available on cut through traffic on neighborhood streets that is available through the agreement with Waze, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with a breakdown of all petitions showing a breakdown of signatures indicating the number of signatures by zip code or community of residence, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the data to date on the survey created by CD11 and updated on a regular basis, and

WHEREAS, in those motions, the Mar Vista Community Council requested that it be provided with the LADOT data collected on the Los Angeles City streets where this configuration has been previously implemented, and

WHEREAS, in those motions, the Mar Vista Community Council urged "the City of Los Angeles and grass roots community organizations to provide the needed information promptly with a planned reassessment six months from this date," and

WHEREAS, that six-month reassessment date was January 11, 2018, and

WHEREAS, to date LADOT, CD11, LAPD, LAFD, nor any other city agency has provided anything requested in that July 11, 2017 motion.

THEREFORE, the Mar Vista Community Council moves to instruct the Chair to invite Councilman Bonin, Nat Gale, and Seleta Reynolds to ~~either the March 13, 2018 Board of Directors' meeting or to~~ a special MVCC meeting to be held not later than May 15 ~~March 30~~, 2018 for the purpose of answering questions from the board and the community regarding these items.

Public Comment: Supported by Inouye, Fineis, Odere, Hruska.
Board Comment: Dates and "and" amendment by Hanna.
Passed as amended above: 8/0/1 (Kadota)

c. **Policy Motion**: "Follow-Up Request For Parking Demand Survey" (Submitted by Transportation & Infrastructure Committee)

WHEREAS, in June and July of last year (2017), both the West Mar Vista Residents Association and the Mar Vista Community Council sent resolutions to Councilman Bonin asking him to obtain city funding for a parking demand survey as provided for by AB 744, and

WHEREAS, the MVCC and all neighborhood associations have heard no feedback or other helpful input from either the CD11 or any appropriate City offices,

THEREFORE, the MVCC respectfully requests funding for this parking demand survey for Venice Blvd. and other major thoroughfares west of the 405 freeway from the CD11 office, and

THEREFORE, the MVCC respectfully requests on a funding for a parking demand survey for Sepulveda Blvd. and Overland Ave. from the CD5 office, both to be assigned and authorized by 4/1/2018.

Weisberg request, acceded to by council member and staff but no action; stakeholders should be involved in planning but no subsequent response.
Board Comment: Mr. Newton: motion did not go through PLUM; request for clarification from CD11 was equivocal. Ms. Krupkin: stakeholders should be listened to.
Passed as amended below: 8/0/1 (Kadota)

Amended motion in entirety:

***Policy Motion**: "Follow-up Request for Parking Demand Survey" (submitted by Transportation & Infrastructure Committee)*

WHEREAS, in June and July of 2017, both the West Mar Vista Residents Association and the Mar Vista Community Council (MVCC) sent resolutions to Councilman Bonin requesting that he obtain city funding for a parking demand survey as provided for by AB 744, and

WHEREAS, the MVCC and all neighborhood associations have heard no feedback or other helpful input from either the CD11 or any appropriate city offices, and

WHEREAS, effective stakeholder input is essential to the success of the study and the acceptance of its findings by the community.

THEREFORE, the MVCC requests funding for a parking demand survey for Venice Boulevard. and other major thoroughfares west of the 405 freeway from the CD11 office, and for Sepulveda Boulevard and Overland Avenue from the CD5 office, and

THEREFORE, the MVCC asks the CD11 office to set up, prior to project definition, a two-way line of communication – with a task force to be set up by the MVCC Transportation and Infrastructure Committee – regarding the proposed study, and

THEREFORE, the MVCC requests details on how the study will comply with AB744.

d. **Policy Motion: "**Correct Status Of Centinela Avenue And Venice Boulevard Bus Service With The LA City Planning Department" (Submitted by Transportation & Infrastructure Committee)
WHEREAS, current SCAG information states that the junction of Centinela Ave. and Venice Blvd. does not have the required Bus Service to be eligible as "a major transit stop," and
WHEREAS, in the past, the mistaken categorization has allowed out of character developments to be approved inappropriately due to the City of Los Angeles Planning Department and Planning Commission using incorrect information, and
THEREFORE, the Centinela Ave. and Venice Blvd. junction should not continue to be categorized as a Major Transit Stop by the City of Los Angeles and the City of Los Angeles Planning Department, and
The MVCC respectfully requests that Councilmember Bonin officially notify the City of Los Angeles Planning Department and Planning Commission of these facts and receive confirmation that this junction will not be categorized as a Major Transit Stop for any future developments.

Passed on consent

14. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.
Consent Calendar: Motion to approve items 13a-k on consent.

a. **Funding Motion: "**MVCC Administrative Support" (submitted by Executive & Finance Committee)
MVCC approves the employment of a BOD minutes writer at a cost not to exceed $800 for the remaining 2017-18 fiscal year.

David Levien, note taker for NC's for a long time, including PNC. Also taken minutes for many other organizations. This appropriation would just be through June 30. The cost is an approximation, dependent on time needed for the minutes' construction. Mr Levien is not a NC employee, rather is employed by a city-approved agency, OK for any NC to use.
Public comments: Ms. Whittington – money well-spent; formerly the Secretary may have been distracted while taking notes, from the business at hand; this solution enables more attention from board members. Mr. Rubin (former board member) – skilled note-taker would be an asset to the council.
Board comment: Mr. Alpern: tricky subject for implied criticism which would be unintentional. Responsibilities of the secretary are many and hard to juggle with busy private lives. City council utilizes professional staff, NCs should too. Mr. Hanna: initially skeptical of monetary outlay but public comments have changed his perspective; feels cost is appropriate. Might mitigate unintentional bias/conflict-of-interest in the notes. An example would be useful to peruse (Rob will furnish and examples are publicly available online).
Passed: 8/0/1 (Roos)

b. **Funding Motion: "**Green Garden Showcase Publicity" (submitted by Community Outreach Committee)
MVCC approves the expenditure of up to $1000 for Mar Vista Green Garden Showcase promotional banners, signs and flyers.

Not the same request as the $4K previously appropriated. Per new spending guidelines from DONE, monies must be appropriated and spent within short time-frame. This motion complies with new rules but the monies are those already budgeted.
Passed: 7/1 (Hanna)/1 (Roos)

c. **Funding Motion: "**General MVCC Promotional Item – Trash Bags to Go" - $730.00 plus art set up, tax and shipping. (submitted by Community Outreach Committee)

Passed on consent

d. **Funding Motion**: "General MVCC Promotional Item – MVCC mugs", total cost not to exceed $300.00. (submitted by Community Outreach Committee)

Passed on consent

e. **Funding Motion**: "Safe Driving Lawn Signs" safety outreach $2500 plus art set up, tax and shipping. (Submitted by Community Outreach Committee)

Board comment: Mr. Newton: visible tactic from other NCs though with no study, it's hard to know whether and how much impact such signs make. But there is a call for these in the community; it's a good way to show support. Mr. Hanna – CHP Ofr. Lewin suggested the means is effective; it's worth a shot. Mr. Kadota: A multi-modal reference to walking, cycling would be a healthy way to include everyone's contribution to community safety, broader than centering concern on driving alone. Mr. Alpern: avoid urban blight by using high quality signs that won't disintegrate. It's just a pilot program, experimental, worth trying. Mr. Hanna – concerned with amending a simple project (Mr. Kadota's broadening of message suggestion) with complexity, losing focus which should be on excessive speed in residential neighborhoods. Drivers and their speed, not cyclists, is the source of danger. If the sign campaign becomes too complicated the effect will be diminished: speed=danger, not behavior (which is what is referenced "multi-modally")
Passed: 8/0/1 (Kadota)

f. **Funding Motion**: "MVCC Promotional Outreach Items – Post It Notes" with Map of Mar Vista total cost not to exceed $1500.00 (Submitted by Community Outreach Committee)

Board comment: Mr. Kadota: likes map design. Ms. Tilson: inexpensive, good promotion with referencing map, easy for pointing us out. Mr. Hanna – loves maps, skeptical of visibility.
Passed: 5/2 (Cervantes, Hanna)/2 (Alpern, Kadota) ---NB: Kadota or Krupkin abstained??

g. **Funding Motion**: "MVCC Promotional Outreach Items – Seat Cushions" $488.40 plus art set up, tax and shipping. (Submitted by Community Outreach Committee)

Passed on consent

h. **Funding Motion**: "MVCC Blue And Green Outreach Awning Replacements" cost not to exceed $1000 total. (Submitted by Community Outreach Committee)

Passed on consent

i. **Funding Motion: "**General MVCC Tri-Fold Brochure Design And Printing" costs not to exceed $500.00. (Submitted by Community Outreach Committee)

Passed on consent

j. **Funding Motion**: "Funding For Community Projects For Joint MVCC/CD11/LADOT Safety And Mobility Enhancement".

Whereas, the MVCC has a strong interest in enhancing the safety and mobility of pedestrians, bicyclists, bus riders and car commuters for the benefit of all parties, and
Whereas, the Joint CoPS and T/I Committee meeting held with both LAPD and CHP members derived a preliminary consensus of how to spend these funds as potential "seed money" for the CD11 and LADOT to fund and prioritize for several such projects,
Therefore, the MVCC appropriates $10,000 towards:

a) High Visibility Crosswalks at McLaughlin Avenue and Charnock Road, and/or McLaughlin Ave. and Victoria Ave., and/or Grand View Blvd. and Pacific Avenue and/or Colonial Ave. and Victoria Ave., and/or Colonial Ave. and McCune Ave., and/or Beethoven St., Zanja St. and Caswell Ave., and/or Moore St. and Pacific Ave. and/or Grand View Blvd. and Victoria Ave., or
b) Reconstruction and restoration of the Venice Blvd-adjacent alleys (which serve a vital function to that thoroughfare's commercial corridor) north of Venice Blvd. and east of Centinela Blvd, as well as any repairs to the alley south of Venice Blvd. due to last winter's storm damage.
c) Repair of Pacific Avenue adjacent to the Farmer's Market, between Inglewood Blvd. and Centinela Ave.

Safety and mobility enhancement project, the sort of Public Works project common in an earlier time. Ought to be from tax-payer funds, but this suggestion via motion amounts to guidance/] and prioritization from our community.
Public comment: Mr. Fineis: it's important to find some way to manage cut-thru traffic; this is high visibility, cost-effective. Suggestion is for hashes made with paint, not flashing lights. Slows traffic, delineates crossing-space for pedestrians distinct from motorist's space (their stop-line). Two fatalities indicates extreme need for these measures at Charnock and Victoria (& McLaughlin). Ms. Inouye: As a pedestrian, supports this motion. Venice Boulevard (VB) road diet has caused cut-through traffic; better to restore VB, but high visibility crosswalks are necessary regardless.
Board comment: Mr. Newton: Loves proposal and design, this advocacy could be a test-case for attention at many intersections, appropriate expression of MVCC's safety-concerns. Mr. Hanna – appreciates the project's tangible expression of MVCC involvement and concern – addresses safety and public relations simultaneously. Ms. Tilson – logistical problems between fiscal years can be accommodated. Mr. Kadota – there may be a serious implementation problem with new fiscal guidelines, but if properly agendized and passed, CD11 office will move forward with and

review the proposal.
Passed: 9/0/0

k. **Administrative Motion: "**MVCC Boundary" (submitted by Elections & Bylaws Committee) MVCC amends Bylaws Article III, Section 1 (Boundary Description) as follows:

The MVCC represents Stakeholders within the following geographic boundaries

- South of the Santa Monica Freeway between Centinela Ave. and the San Diego Freeway,
- West of the San Diego Freeway between the Santa Monica Freeway and National Blvd.,
- South side of National Blvd. between the San Diego Freeway and Overland Ave.,
- West side of Overland Ave. between National Blvd. and Charnock Rd.,
- *West side of Sepulveda Blvd between Charnock Rd. and Regent St.*
- *North side of Regent St. between Sepulveda Blvd. and Tuller Ave.*
- *West side of Tuller Ave. between Regent St. and Venice Blvd.*
- *North of Culver City Border between Tuller Ave. and the intersection of Zanja St. and Walgrove Ave.*
- ~~North side of Charnock Rd. between Overland Ave. and the San Diego Freeway ,~~
- ~~North of the Culver City border between the San Diego Freeway and Zanja St./Walgrove Ave.,~~
- East side of Walgrove Ave. between Zanja St. and Santa Monica City border,
- South of the Santa Monica City border between Walgrove Ave. and Centinela Ave.
- East side of Centinela Ave. between Airport Ave. and the Santa Monica Freeway. (Further details to be provided by LA City Department of Neighborhood Empowerment)

Note: Venice High, Mark Twain ~~Junior High~~ *Middle School*, Walgrove Elementary and Beethoven Elementary, shall be considered an overlap area with the neighborhood council established by the Venice Neighborhood Council. *Palms Middle School shall be considered an overlap area with the Palms Neighborhood Council.*

Additional Information:

- Addendum A: Current MVCC map and Map highlighting issue area
- Addendum B: Boundary adjustments proposed by Palms NC

Orphaned spaces necessitated boundary adjustments per CoLA. PNC suggestion shunted single family homes to MVCC and apartments to PNC. Gerrymandering was awkward so cmte defaulted to simplest form with unclaimed territory going to PNC and foregoing further changes (i.e., Addendum B was not adopted).
Ms. Krupkin amended motion (second by Ms. Roos) to clarify all schools' shared resource status.
Amendment passed unanimously, as shown in red
Board comment: Mr. Alpern: This is his zone, his concern. Shared resource concept maximizes attention to worthy and needy public schools. Bordering NCs historically appeal to different group demographic-types.
Passed as amended: 9/0/0

l. **Administrative Motion: "**MVCC Geographic Zones Adjustment" (submitted by Elections & Bylaws Committee)

MVCC amends Bylaws Article III, Section 2 (Internal Boundaries) as follows:

Geographic Zones: The Zones shall be defined as:

- Zone 1. South of National Blvd., North of Charnock Rd., East of the 405 freeway, West of Overland Ave., *West side of Sepulveda Blvd between Charnock Rd. and Regent St., North side of Regent St. between Sepulveda Blvd. and Tuller Ave., West side of Tuller Ave. between Regent St. and Venice Blvd.*;
- Zone 2: South of the 10 freeway, North of National Blvd., East of Centinela Ave., West of 405 freeway; 4 MVCC BYLAWS APPROVED 7.01.2017

- Zone 3: South of National Blvd., North of Palms Blvd., East of Centinela Ave., West of 405 freeway;
- Zone 4: South of Palms Blvd., North of Venice Blvd., East of Centinela Ave., West of 405 freeway;
- Zone 5: South of Venice Blvd., North of Culver City, East of Centinela Ave., West of Sawtelle Blvd., *North of Culver City Border*; and
- Zone 6: South of Santa Monica Airport, North of Washington Blvd., East of Walgrove Ave., West of Centinela Ave., *North of Culver City Border between Sawtelle Blvd. and the intersection of Zanja St. and Walgrove Ave*

Passed as amended: 9/0/0

m. **Administrative Motion: "**Code of Conduct" (submitted by Elections & Bylaws Committee)

MVCC adds the following statement to Article V (Governing Board) Section 8 (Censure) of the Bylaws: Violation of the Code of Conduct by a Director or Committee Chair/Co-Chair/Vice Chair may result in Censure or Removal.

Tabled

n. **Administrative Motion: "**Sponsorship of Great Street Town Hall" (Directors motion submitted by Rob Kadota) A community conversation tentatively scheduled for Saturday April 14 1-3pm at Windward School Gymnasium.

Public Comment: Ms. Inouye: supports community discussion of pros and cons. Ms. Whittington: concern with venue logistics. Mr. Fineis: concerned meeting will devolve into "Jerry Springer"-like situation. Ms. Inouye – meetings with Krupkin/Kadota/Cervantes are without decision-makers or guarantees, so pointless.
Board Comment: Mr. Hanna – Motion is absent process: format, rules, time restrictions, goals. Without these there is potential to exacerbate rather than alleviate community tensions. Thus, motion to table, seconded by Tilson:
Tabled by amendment: 5/3 (Newton, Cervantes, Doyno)1 (Kadota)

o. **Policy Motion: "**EV Chargers" (submitted by Planning & Land Use Management Committee)

The AQMD says plug-in cars are essential if clean air standards are to be realized. Plug-ins now make up 5% of new vehicle sales in California, and are increasingly popular in Mar Vista, but adoption is hindered by lack of easy home and workplace charging.

Several California cities have already adopted sensible building code changes to make adding electric vehicle chargers much less expensive.

For instance, the study in the City of Oakland's Council File 16-0359 says preparing for EV chargers ahead of time adds about $140per parking space, and makes later EV charger installation $500 to $5000 cheaper.

Therefore, the Mar Vista Community Council requests that the Los Angeles City Council follow the example of these cities, and pass sensible, cost-effective building code changes to require most new parking spaces in the city to be ready for future installation of EV chargers.

Tabled

p. **Policy Motion: "**Proliferation of Recreational Vehicles in Mar Vista" (submitted by Homeless Issues Committee)

WHEREAS, It has been noted that there is an increase in long-term Recreational Vehicle proliferation throughout Mar Vista, on both major commercial thoroughfares and residential streets, and
WHEREAS, there is some confusion as to where updated LADOT maps allow for Recreational Vehicle parking, and what the roles and responsibilities for the LADOT and LAPD are to enforce laws related to Recreational Vehicle locations,

THEREFORE, the Mar Vista Community Council strongly encourages Council office 11 and Council office 5 and other LA city agencies to enforce LAMC Ordinance 85.02 and correct the map.

THEREFORE, the Mar Vista Community Council supports the work of Councilmember Mike Bonin to increase the amount of parking made available to vehicle dwellers with the Safe Park program in private parking lots including those of faith-based organizations. THEREFORE, the Mar Vista Community Council asks Councilmember Mike Bonin's office to explore expanding the Safe Park program to include city owned parking lots that are currently empty in the evening.

Negotiated improvement on last month's motion by addressing need to remove RVs somewhere specific, adding city's program information, requests expansion of interest.
Board Comment: Mr. Hanna – redesigned motion unites the formerly-opposed. Ms Tilson: Has CoLA implemented a "safe park" program? Say, at Dockweiler? (per Alpern – Dockweiler closed for rehab).
Passed: 9/0/0

q. **Policy Motion**: "Support Of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act Request"
WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and
WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and
WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and
WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and
WHEREAS to date, this request has not been fulfilled by LADOT; and
WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;
NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

Tabled

r. **Policy Motion: "**LADOT/CD 11 Great Streets - Venice Blvd Town Hall Meeting"
WHEREAS, the Venice Blvd. "Great Street" pilot project was implemented on May 20, 2017; and
WHEREAS, the pilot project included removing one traffic lane in each direction to install a curbside protected bike lane, a buffer/loading zone and reconfigured on-street parking; and
WHEREAS, Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about perceived negative impacts of pilot project, including:
1) Gridlock on Venice Blvd.,
2) Cut through traffic onto residential streets adjacent to Venice Blvd,
3) A negative increase in emergency response times for LAFD and LAPD because of the gridlock,
4) An increase accidents on Venice Blvd and adjacent streets due to gridlock and cut through traffic,
5) Safety concerns about the protected bike lane, including reduced visibility and an increase in points of conflict between cars and bicycles,
6) An increase in bicycle vs. car accidents,
7) A lack of sidewalk improvements,
8) A lack of involvement of persons with disabilities in the planning and implementation phases of the project,

9) An ongoing lack of transparency in the planning, implementation and evaluation of this pilot project,

10) A lack of pre- and post-implementation data provided to the community from LADOT and Council District 11; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to the community's requests for assistance and information; and

THEREFORE, be it resolved that the Mar Vista Community Council will sent a letter forthwith to LADOT and Councilman Mike Bonin's office demanding a Town Hall meeting be held post hasteon this issue, to present information, gather feedback, and address the concerns of Mar Vista and Venice Blvd stakeholders about the Great Streets - Venice Blvd pilot project.

Tabled

15. **Grievances, if any received**
16. **Future agenda items**
17. **Public Comment**
18. **Adjournment**

at 9:51pm

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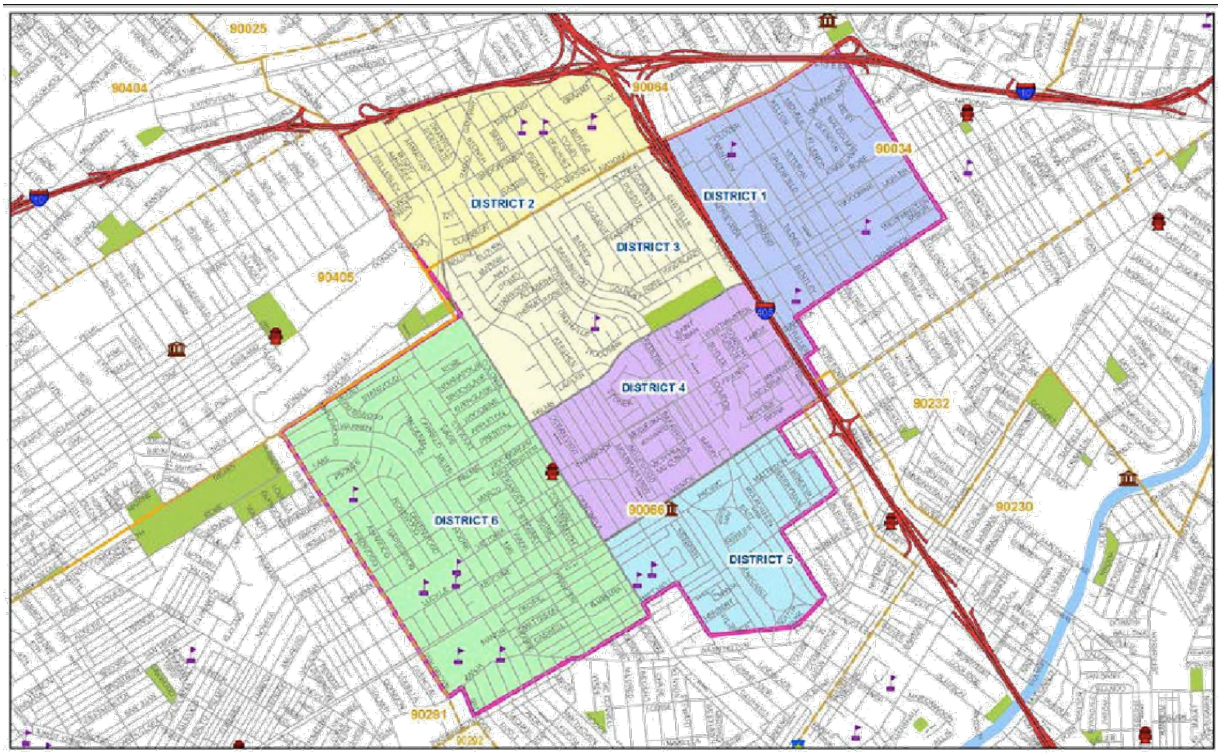
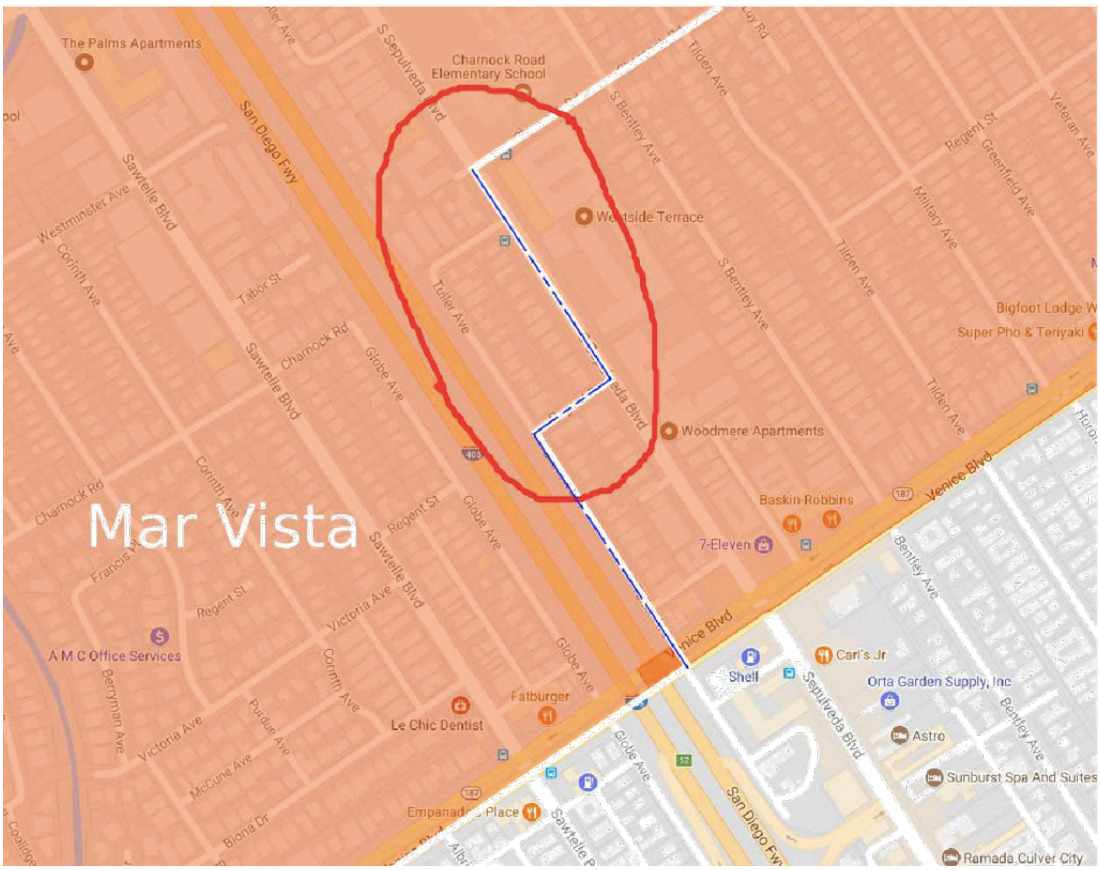
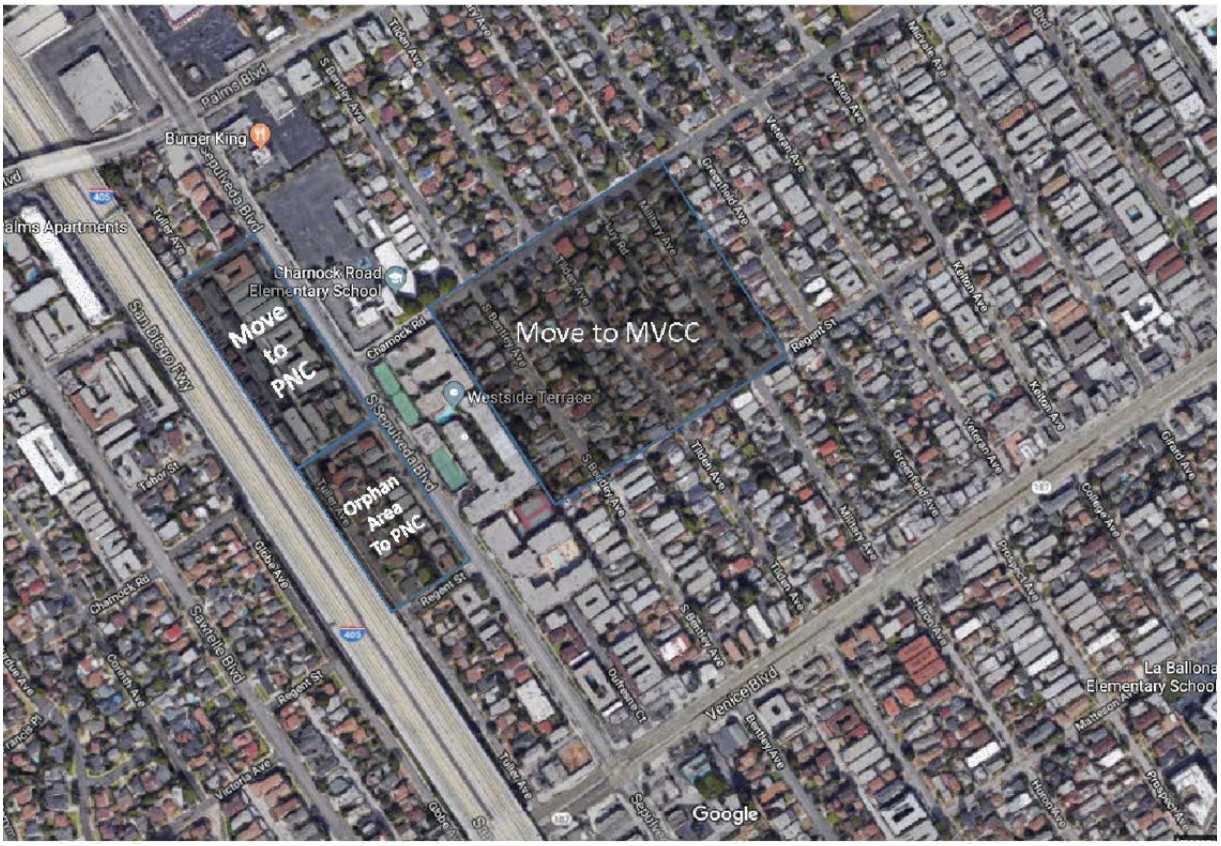
ADDENDUM A: Current MVCC Map and Issue Area

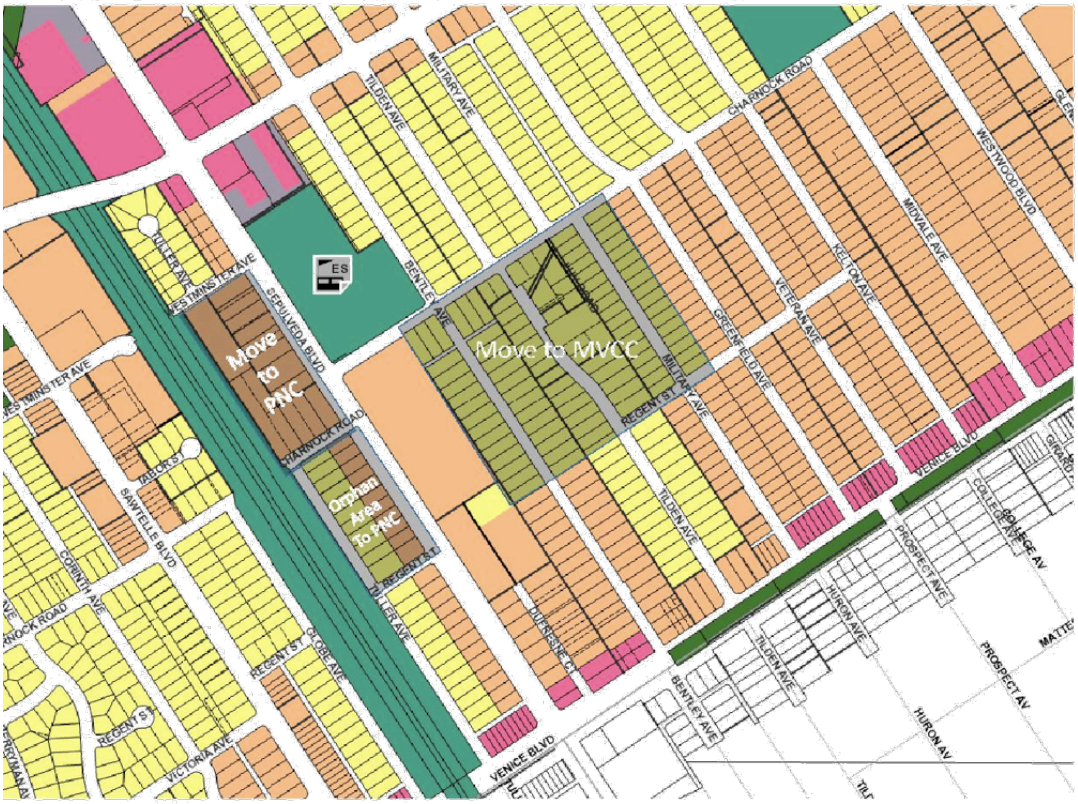


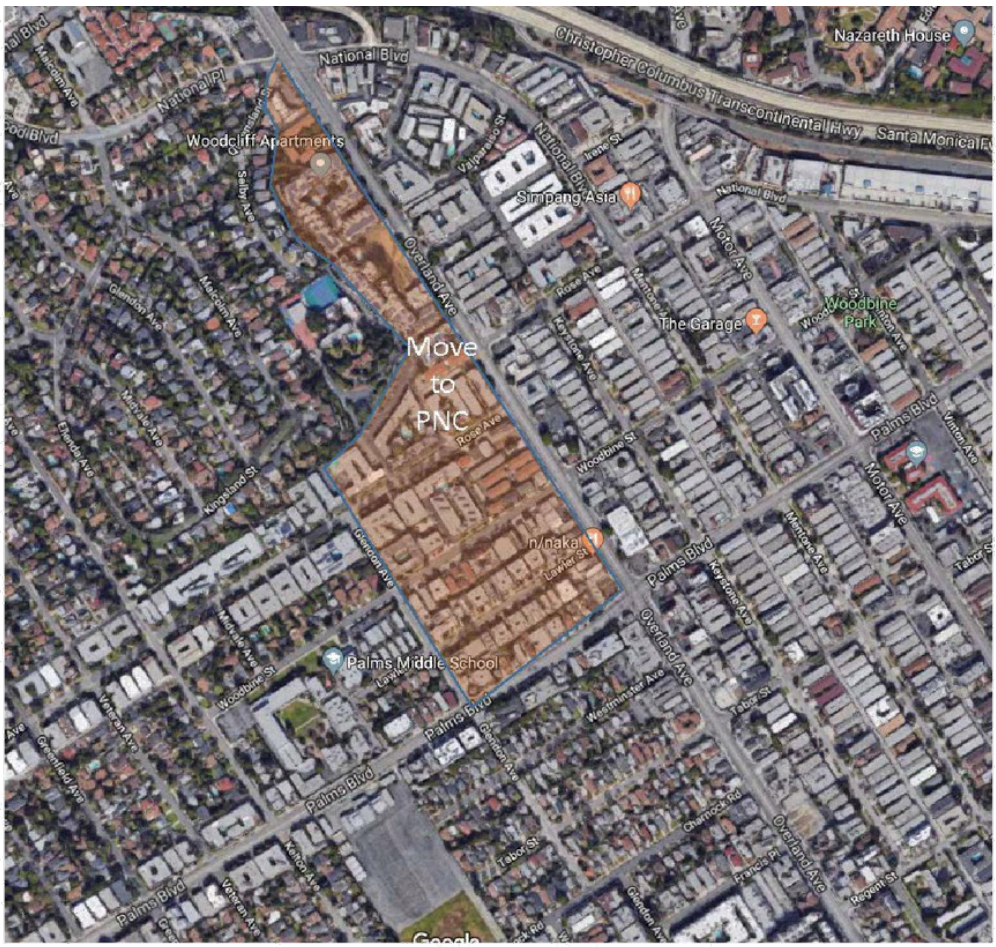


ADDENDUM B: Boundary Adjustment Maps

Not adopted






Nazareth House
Christopher Columbus Transcontinental Hwy
Santa Monica Fw
National Blvd
National Pl
Woodcliff Apartments
Simpang Asia
Overland Ave
Motor Ave
The Garage
Woodbine Park
Move to PNC
Palms Blvd
n/naka
Palms Middle School
Westminster Ave
Tabor St
Glendon Ave
Kingsland St
Woodbine St
Rose Ave
Keystone Ave
Mentone Ave
Vinton Ave
Vateran Ave
Greenfield Ave
Kelton Ave
Charnock Rd
Francis Pl
Regent St
Google


NATIONAL PL
SELBY AVE
GLENDON AVE
Move to PNC
ROSE AVE
WOODBINE ST
KEYSTONE AVE
MENTONE AVE
WESTMINSTER AVE
MS
PALMS BLVD

Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Rescheduled: Tuesday, April 17th, 2018, at 7:00pm

St. Bede's Episcopal Church Meeting Room (downstairs ground level)
3590 Grand View Boulevard, Mar Vista, CA 90066

1. **Call To Order And Welcome** – Chair (1 min)
2. **Presentation Of Flag And Pledge Of Allegiance** (1 min)
3. **Community Memorial Observations**
4. **Public Comment & Announcements** - for items not on the agenda (30 minutes total, unless waived by the Chair)
5. **Board Administration**
   A. **Ex Parte[§] Communication & Conflict of Interest[‡] Declarations**
      All Board members shall declare any ex parte communications or conflicts of interest relating to items on this meeting's agenda.
   B. **Approval of March 8th, 2018, Board of Directors Meeting Minutes** (public comment permitted)
   C. **Appointment of Board Directors**
      All qualified candidates may present a short personal statement and address questions. The Chair will move to fill the position, subject to Board approval.
6. **Reports**
   A. **Elected Officials and City Department Reports**
      All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.
   B. **Liaison Reports** (public comment permitted)
   C. **Officer Reports** (action items included, with public comment permitted)
   D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)
   E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
7. **Monthly Business** - action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted)
   Items may be received and filed by consent if there is no discussion or public comment.
   A. **Old Business** - Administrative, Funding and Policy motions previously agendized and not addressed.
      ** *Time-sensitive motions*
   B. **New Business** - Administrative, Funding and Policy motions
      ** *Time-sensitive motions*
10. **Grievances**, if any received
11. **Future Agenda Items**

[§] *Ex Parte Communication* is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

[‡] *Conflicts of Interest* include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.

12. **Public Comment**
13. **Adjournment**

AGENDA DETAIL, 4/17/18 Regular Meeting of the MVCC Board of Directors

5. **Board Administration**

   C. **Appointment of Board Directors**

   All qualified candidates may present a short personal statement and address questions. The Chair will move to fill the position, subject to Board approval.

   a. **Candidates for Zone 3 Director**

      i. Christen Hebrard

      ii. Mary Hruska

   b. **Candidates for At-Large Director**

      i. Selena Inouye

      ii. Nanxi Liu

      iii. Zeina Mehdi

6. **Reports**

   A. **Elected Officials and City Department Reports**

   All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.

   a. CoLA Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org

   b. CoLA CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org

   c. CoLA CD 11 – Councilmember Mike Bonin, rep by Field Deputy Hannah.Levien@lacity.org

   d. CoLA Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel.Jacinto@lacity.org

   e. CoLA Mayor – Eric Garcetti, rep. by Daniel.Tamm@lacity.org

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AGENDA DETAIL (Continued)

f. LA County Supervisor, Second District - Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
g. CA Assembly 54 – Assembly Member Sydney Kamlager
h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
i. CA Senate 30 – Holly J. Mitchell, rep by Field Rep Joy.Masha@sen.ca.gov
j. US Representative 33 – Ted Lieu, rep by joey.apodaca@mail.house.gov
k. US Representative 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
l. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
m. CoLA Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

B. **Liaison Reports** (public comment permitted)
   a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano at lindaguag@netzero.net
   b. DWP MOU: *open*
   c. LANCC: *open*
   d. One Water LA: Christopher McKinnon
   e. WRAC: Rob Kadota
   f. WRAC LUPC: *open*
   g. City Budget Advocates: Holly Tilson
   h. Recode LA: Sharon Commins
   i. Animal Services: Tom Ponton
   j. Friends of Historic FS 62: Albert Olson
   k. Mar Vista Chamber of Commerce: *open*
   l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

C. **Officer Reports** (action items included, with public comment permitted)
   a. **Chair** – Rob Kadota
   b. **First Vice Chair** – Elliot Hanna
   c. **Second Vice Chair** – Paola Cervantes
   d. **Secretary** – Sara Roos
   e. **Treasurer** – Holly Tilson
      i. Report on current financial status (Addendum)
      ii. **APPROVAL** of March Monthly Expense Report (MER)
      iii. Review and **APPROVAL** of draft revised budget

D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)
   a. **Elections and By-laws Committee** - Elliot Hanna & Robin Doyno, Co-chairs
   b. **Community Outreach Committee** – Sara Roos, Chair
   c. **Committee on Public Safety** – Elliot Hanna, Chair
   d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   g. **Bike Mar Vista** - Rob Kadota, Chair
   h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co-chairs; Lenore French, Vice-chair

i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Rob Kadota, Co-chairs
j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
k. **Green Committee** –Jeanne Kuntz, Chair
l. **Homeless Issues Committee** – Robin Doyno & Susan Klos, Co-chairs

E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Zone 1** – Ken Alpern
   b. **Zone 2** – Damien Newton
   c. **Zone 3** – *vacant*
   d. **Zone 4** – Aaron Elster
   e. **Zone 5** – Michelle Krupkin
   f. **Zone 6** – Holly Tilson

7. **Monthly Business** - action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted)

   Items may be received and filed by consent if there is no discussion or public comment.

   A. **Old Business** - Administrative, Funding and Policy motions previously agendized and not addressed.

      ****** *Time-sensitive motions marked by asterisk*

      a. ***Administrative Motion***

         i. "**Code Of Conduct**" (submitted by Elections & Bylaws Committee)

            MVCC adds the following statement to Article V (Governing Board) Section 8 (Censure) of the Bylaws:

            "Violation of the Code of Conduct by a Director or Committee Chair/Co-Chair/Vice Chair may result in Censure or Removal."

      b. ***Funding Motions***

         **** i.**** "**NPG Grant To Green Communications Initiative, Inc. For 2018's Mar Vista Green Garden Showcase**" (submitted by ExFin Committee)

         MVCC approves a NPG up to $1850 to Green Communications Initiative, Inc. to sponsor the 2018 Mar Vista Green Garden Showcase.

      c. ***Policy Motions***

         i. **"EV Chargers"** (submitted by Planning & Land Use Management Committee)

            WHEREAS the AQMD says plug-in cars are essential if clean air standards are to be realized. Plug-ins now make up 5% of new vehicle sales in California, and are increasingly popular in Mar Vista, but adoption is hindered by lack of easy home and workplace charging. And

            WHEREAS several California cities have already adopted sensible building code changes to make adding electric vehicle chargers much less expensive.

            WHEREAS, for instance, the study in the City of Oakland's Council File 16-0359 says preparing for EV chargers ahead of time adds about $140per parking space, and makes later EV charger installation $500 to $5000 cheaper.

            THEREFORE, the Mar Vista Community Council requests that the Los Angeles City Council follow the example of these cities, and pass sensible, cost-effective building code changes to require most new parking spaces in the city to be ready for future installation of EV chargers.

         ii. **"Support Of Mar Vista Stakeholder's Great Streets Venice Boulevard California Public Records Act Request"** (submitted by Great Streets *ad hoc* Committee)

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed ~~on behalf of the community~~ by a Mar Vista stakeholder on August 8, 2017 on behalf of the community, requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; ~~and~~

~~WHEREAS to date, this request has not been fulfilled by LADOT; and~~

~~WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders' requests for assistance and information;~~

NOW, THEREFORE, be it resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017, California Public Records Act request for pilot project data, to be furnished, ~~demanding that LADOT provide for inspection all of the information requested~~ immediately and without further delay.

B. **New Business** - Administrative, Funding and Policy motions

****** *Time-sensitive motions marked by asterisk*

a. ***Administrative Motion***

i. "**Authorization To Submit Community Impact Statement**" (Directors motion submitted by Sara Roos)

WHEREAS the City Clerk maintains a procedure for Neighborhood Councils to addend Community Impact Statements (CIS) to council files as an official statement adopted by a Neighborhood Council on issues pending before the City Council, its committees, or City commissions.

THEREFORE, the Mar Vista Community Council authorizes its ExFin Committee:

Rob Kadota, Chair
Elliot Hanna, 1st Vice Chair
Paolo Cervantes, 2nd Vice Chair
Sara Roos, Secretary
Holly Tilson, Treasurer,

to SUBMIT Community Impact Statements that have been passed by a vote of the full board.

BE IT FURTHER RESOLVED, that in cases where an issue is moving quickly through the legislative process and a promptly issued statement is beneficial, any aforementioned board member is authorized to WRITE and SUBMIT a Community Impact Statement in consultation with the chair, provided that it expresses the position of a motion previously passed by the full board.

By this motion, the Chair and the Secretary are authorized to submit a formal request to the Department of Neighborhood Empowerment to authorize the board members listed above to submit Community Impact Statements to the City Clerk on behalf of the Mar Vista Community Council.

ii. "**Credit Card Limit Increase**" (Treasurer's motion submitted by Holly Tilson)

MVCC approves increasing the MVCC credit card limit to $10-15K/mo.

- Rationale: Funding Guidelines allow $5K/month. The MVCC will not be able to purchase items approved and/or in our budget without increasing our limits.

iii. "**Censure Proposal**" (Directors motion submitted by Robin Doyno)

Because of blatant dishonesty in a letter to a community newspaper, I request that the MVCC censure Michael Millman for the false statement in his letter appearing in the March 29, 2018, Argonaut. LAMC 85.02 does not say that vehicle dwelling is illegal but just the opposite. 85.02 delineates the conditions under which vehicle dwelling is legal. To state the opposite is a dishonest way of promoting Michael's preference. I respectfully ask that the MVCC make a statement of its displeasure and/or remove him from any MVCC position.

b. ***Funding Motions***

i. "**Outreach At MVNA Block Party**" (submitted by Outreach Committee)

MVCC approves Outreach funds up to $300 to support the Mar Vista Neighborhood Association's June block party.

ii. "**Business Cards, Office Expenses**" (submitted by Treasurer)

MVCC approves funds up to $400 for the printing of business cards and additional office expenses.

iii. "**Room Rental Fee For St. Bede's" (**submitted by Treasurer)

MVCC approves room rental fee of up to $75 to St Bede's for MVCC BOD mtg.

iv. "**NPG Grant For Clover Elementary School's International Festival**" (submitted by Education, Arts and Culture Committee)

WHEREAS, Clover Elementary School's International Festival promotes community building and celebrates the diverse population of Clover Elementary. And

WHEREAS Clover ES achieves its eminent status in both LAUSD and State of California ratings even while it depends significantly on the Booster Club for funding items not covered by LAUSD'S budget and essential to this neighborhood school's mission of exceling academically, including computer labs, basic materials, arts and music programs, and much more.

THEREFORE the Education, Arts and Culture Committee recommends the Mar Vista Community Council grant $1,000 to provide essential seed money for the efforts of the Booster Club of Clover Elementary School for their International Festival.

v. "**NPG Grant For PESA's Teen Court Program And Tolerance Assembly Program**" (submitted by Education, Arts and Culture Committee)

WHEREAS in supporting the essential work of PESA (Parents, Educators/Teachers and Students in Action) we will be helping to interrupt the school-to-prison-pipeline, foster a value in public service, and give positive guidance to youthful, nonviolent offenders,

THEREFORE the Education, Arts and Culture Committee recommends that MVCC grant PESA $1,000 to continue their Teen Court Program at Venice High School and begin introducing tolerance based assemblies at Mar Vista Middle and High Schools.

c. ***Policy Motions***

i. "**Short-Term Rentals Ordinance"** (submitted by the PLUM Committee)

The Mar Vista Community Council supports inclusion of any City of Los Angeles Short-Term Rentals Ordinances that include the following:

- Tax funds generated by short-term rentals that go toward paying for enforcement officers to address community safety concerns without placing undue burden on homeowners.
- Earmarking remaining funds for the city's Affordable Housing Trust Fund.

The Mar Vista Community Council opposes any ordinance that would:

- Place new burdens on homeowners who simultaneously rent out property on which they live.
- Include a limit on the number of days that can be rented without cause inside a homeowner's primary property.
- Impose new taxes or fees that only impact short-term rentals.

ii. "**Development at 11700 Charnock Boulevard"** (submitted by the PLUM Committee)

The Mar Vista Community Council supports the application to build a new six-unit, two story, development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the city.

iii. "**Mitigating The Impact Of Group Homes On Surrounding Neighborhoods"** (submitted by the PLUM Committee)

The Mar Vista Community Council supports CIS #17-1426, a review of the legislative and regulatory opportunities the City may have for mitigating the impacts of all kinds of group homes on surrounding neighborhoods

iv. "**Opposing SB 827 [Weiner]"** (submitted by the PLUM Committee)

WHEREAS the City Charter-mandated Neighborhood Council system of Los Angeles, and the Community Councils of the City of Los Angeles, represent grass roots democracy,

WHEREAS the newly introduced California State Senate Bill 827 [Scott Weiner] as written constitutes a top down pen stroke Planning measure which completely removes land use and planning authority within one half mile of high quality transit from jurisdictions and charter cities,

WHEREAS removal of said authority clearly abolishes local input into land use planning and therefore constitutes an attack upon local democracy, upon neighborhoods, and upon the Neighborhood Councils and Community Councils in the City of Los Angeles,

WHEREAS SB 827 as written trashes the density bonus and wage provisions of the JJJ TOC ordinance which were recently enacted by the people of Los Angeles—in good faith—in order to guarantee transit close housing opportunities would actually be available to working and low- income persons and families in the City of Los Angeles,

WHEREAS the lack of analysis of infrastructure and other costs associated with this pen stroke planning creates grave uncertainty that a local agency would be able to "levy enough service charges, fees or assessments sufficient to pay for the program or level of service mandated by this act within the meaning of Section 17556 of the Government Code",

WHEREAS, given the aforementioned lack of fiscal analysis, Section 6 of Article XIII B of the California Constitution "No reimbursement" clause is cited inappropriately in this legislation,

THEREFORE, the Mar Vista Community Council opposes SB 827 in its present form.

v. "**Reform and Enhance City Process and Program Efficiencies"** (submitted by the Transportation and Infrastructure Committee)

AGENDA DETAIL (Continued)

WHEREAS, the City of Los Angeles is the only one of the top ten cities (by population) in the United States that has separate oversight between Public Works and Transportation Programs, and

WHEREAS, the City of LA has a dysfunctional and cost-ineffective organization of multiple, overlapping departments for Transportation and Infrastructure, and

WHEREAS, reforming transportation and infrastructure is consistent with Mayor Garcetti's "Back to Basics" initiatives,

THEREFORE, the Mar Vista Community Council (MVCC) strongly supports the recommendations described in CF17-1311 for Systems Improvements (Tier 1), Tools/Activities to Support System Improvements (Tier 2), and Process and Program Efficiencies (Tier 3) as recommended by the Office of the City Administrative Officer (CAO) of Los Angeles.

ADDENDA: TREASURER'S REPORT – MER, Budget

Monthly Expenditure Report

Reporting Month: March 2018 **Budget Fiscal Year: 2017-2018**

NC Name: Mar Vista Neighborhood Council

Monthly Cash Reconciliation					
Beginning Balance	**Total Spent**	**Remaining Balance**	**Outstanding**	**Commitments**	**Net Available**
$31424.05	$1208.53	$30215.52	$2950.00	$10050.00	$17215.52

Monthly Cash Flow Analysis					
Budget Category	**Adopted Budget**	**Total Spent this Month**	**Unspent Budget Balance**	**Outstanding**	**Net Available**
Office	$37000.00	$920.72	$25215.52	$100.00	$25115.52
Outreach		$287.81		$0.00	
Elections		$0.00		$0.00	
Community Improvement Project	$2000.00	$0.00	$2000.00	$0.00	$2000.00
Neighborhood Purpose Grants	$3000.00	$0.00	$3000.00	$2850.00	$150.00
Funding Requests Under Review: $0.00		Encumbrances: $10050.00		Previous Expenditures: $10575.95	

Expenditures						
#	**Vendor**	**Date**	**Description**	**Budget Category**	**Sub-category**	**Total**
1	STORQUEST-WLA/SAWTELLE	03/01/2018	(Credit card transaction)	General Operations Expenditure	Office	$208.00
2	AMAZON MKTPLACE PMTS	03/07/2018	(Credit card transaction)	General Operations Expenditure	Office	$119.99
3	AMAZON MKTPLACE PMTS	03/08/2018	(Credit card transaction)	General Operations Expenditure	Office	$212.78
4	STAPLES 00114272	03/10/2018	(Credit card transaction)	General Operations Expenditure	Office	$32.05
5	STAPLES 00114272	03/11/2018	(Credit card transaction)	General Operations Expenditure	Office	$49.24
6	STAPLES 00114272	03/17/2018	(Credit card transaction)	General Operations Expenditure	Office	$65.66
7	STORQUEST-WLA/SAWTELLE	03/31/2018	(Credit card transaction)	General Operations Expenditure	Office	$208.00
8	THE WEB CORNER	03/01/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$171.00

ADDENDA (From Treasurer)

9	AT&T BILL PAYMENT	03/18/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$94.31
10	MAILCHIMP MONTHLY	03/21/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$22.50
11	St. Andrew's Lutheran Church	03/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
	Subtotal:					**$1208.53**

Outstanding Expenditures						
#	**Vendor**	**Date**	**Description**	**Budget Category**	**Sub-category**	**Total**
1	St. Andrew's Lutheran Church	04/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
2	St. Andrew's Lutheran Church	05/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
3	St. Andrew's Lutheran Church	06/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
4	St. Andrew's Lutheran Church	03/08/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETI...	General Operations Expenditure	Office	$25.00
5	Pacific Area Boosters Association, Inc.	03/30/2018	Motion to contribute up to $1000 in an NPG for the...	Neighborhood Purpose Grants		$1000.00
6	Green Communications Initiative Inc.	04/12/2018	MVCC approved up to $4000 for the Green Garde...	Neighborhood Purpose Grants		$1850.00
	Subtotal: Outstanding					**$2950.00**

DRAFT BUDGET AND ADJUSTMENTS

Category	Subcategory	Description	Expense	Original Budget	Adjusted Budget	YTD	Available
General/ Operational Budget	Office	Storage	Storquest	$ 2,496.00	$ 2,713.00	$ 1,880.30	$ 832.70
		Meeting rooms rental	The Vineyard	$ 600.00	$ 400.00	$ 130.00	$ 270.00
			St Andrew's Lutheran Church	$ 300.00	$ 300.00	$ 200.00	$ 100.00
			St Bede's	$ 75.00	$ 150.00	$ 75.00	$ 75.00
			Windward School	$ 5.00	$ 5.00	$ 5.00	$ -
			PO Box rental	$ 132.00	$ 134.00	$ 134.00	$ -
			Farmer's Market rental	$ 1,200.00	$ 1,200.00	$ -	$ 1,200.00
		Equip & supplies (misc)	Live streaming equipment	$ -	$ 1,547.00	$ 1,546.61	$ 0.39
			Projector screen & stand	$ -	$ 333.00	$ 332.77	$ 0.23
			Misc	$ 1,100.00	$ 350.00	$ 153.62	$ 196.38
			Paid secretary	$ -	$ 800.00	$ -	$ 800.00
			Office/ExFin supplies	$ -	$ 500.00	$ -	$ 500.00
		Mtg supplies & printing	Printing	$ 1,000.00	$ 500.00	$ 69.53	$ 430.47
		Board Training & Support	Business cards/name badges	$ 250.00	$ 669.30	$ 269.30	$ 400.00
			Board Retreat	$ 37.68	$ 100.00	$ 37.68	$ 62.32
			Office Subtotal:	***$7,195.68***	***$9,701.30***	***$4,833.81***	***$4,867.49***
	Outreach	Website	The Web Corner: website maintenance	$ 1,650.00	$ 1,650.00	$ 1,200.00	$ 450.00
			The Web Corner: emails	$ 385.00	$ 336.00	$ 251.00	$ 85.00
			The Web Corner: Extra Data Entry	$ 500.00	$ 500.00	$ -	$ 500.00
			RIMU Hosting	$ 96.27	$ 97.00	$ 97.00	$ -
		Email Service	Mail chimp email service	$ 480.00	$ 292.50	$ 202.50	$ 90.00
		MiFi Service	AT&T MiFi service	$ -	$ 500.00	$ 194.80	$ 305.20
		Advertising	Banners/sign/event promotion	$ 500.00	$ 500.00	$ -	$ 500.00
			Facebook ads	$ 250.00	$ 250.00	$ -	$ 250.00
			Promotional items	$ -	$ 6,500.00	$ -	$ 6,500.00
			Emergency Prep signs & brochures	$ 1,500.00	$ 1,500.00	$ -	$ 1,500.00
			Neighborhood Watch signs	$ -	$ 3,000.00	$ -	$ 3,000.00
		Community Events	Block parties (5 4 X $300)	$ 1,500.00	$ 1,200.00	$ 618.70	$ 581.30
			Westside Senior Health & Wellness Fair	$ 500.00	$ 500.04	$ 500.04	$ -
			Winter Wonderland	$ 1,000.00	$ 978.75	$ 978.75	$ -
			Art Walk	$ 2,000.00	$ 1,800.00	$ 912.75	$ 887.25
			Venice High Grease Night	$ 300.00	$ 296.72	$ 296.72	$ -
			Green Garden Showcase	$ 4,000.00	$ -	$ -	$ -
		MVCC events/outreach items/mailings/newsletter	Mar Vista Turns 90 Celebration	$ 4,000.00	$ 1,271.00	$ 1,271.00	$ -
			Great Street Tree Planting	$ 300.00	$ 300.00	$ -	$ 300.00
			Misc + awning repair/replace (up to $1000)	$ 7,843.05	$ 1,176.69	$ 80.98	$ 1,095.71
		Community Improvement	Safety and Mobility Enhancements	$ 5,000.00	$ 4,800.00	$ -	$ 4,800.00
			Bike repair stand	$ -	$ -	$ -	$ -
			Outreach Subtotal:	***$31,804.32***	***$27,448.70***	***$6,604.24***	***$20,844.46***
	Elections	Election expenses	Election expenses	$ -	$ 1,000.00	$ -	$ -
			Elections Subtotal:	***$1,000.00***	***$0.00***	***$0.00***	***$0.00***
			General/Operational Subtotal:	***$40,000.00***	***$37,150.00***	***$11,438.05***	***$25,711.95***
Neighborhood Purpose Grants			Green Garden Showcase	$ -	$ 1,850.00	$ 1,850.00	$ -
			AE&C Committee	$ 2,000.00	$ 2,000.00	$ -	$ 2,000.00
			Santa Sleigh Shed	$ -	$ 1,000.00	$ 1,000.00	$ -
		Neighborhood Purpose Grants Subtotal:		***$2,000.00***	***$4,850.00***	***$2,850.00***	***$2,000.00***
GRAND TOTAL				**$42,000.00**	**$42,000.00**	**$14,288.05**	**$27,711.95**
			Safety and Mobility Enhancements up to $10,000 if funds available				

Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Rescheduled: Tuesday, April 17th, 2018, at 7:00pm

St. Bede's Episcopal Church Meeting Room (downstairs ground level)
3590 Grand View Boulevard, Mar Vista, CA 90066

1. **Call To Order And Welcome** – Chair (1 min)
   7:02pm called to order.
   Tuesday replacement day was chosen as it is consistent with our regular schedule.
   Present: Doyno, Elster, Kadota, Tilson, Cervantes, Roos, Newton, Krupkin; Alpern at 7:07pm
   Excused: Hanna, Klos? (not present, status unclear)
   Two vacancies; quorum established.
2. **Presentation Of Flag And Pledge Of Allegiance** (1 min)
   Tom Nichols led the presentation.
3. **Community Memorial Observations**
   Justice Stephen Breyer, Barbara Bush recognized.
4. **Public Comment & Announcements** - for items not on the agenda (30 minutes total, unless waived by the Chair)
   Tom Nichols, resident of over 50 years on the corner of Centinela; attended MT, VHS – Speaking early tonight because wife's condition (Multiple myeloma), relevant to agendized item on home sharing below, requires his rapid return. Medical bills devastated the family, the costs are staggering. They have been able to keep their house only because they are permitted year-round home sharing. Though difficult this has worked, and without negative impact on the neighborhood (their 3 kids were arguably more impactful). Please consider PLUM's recommendation below in a positive light. They are praying the hard cap under consideration by City Council doesn't happen, though there's reasonable procedure to appeal if it does.
5. **Board Administration**
   A. **Ex Parte§ Communication & Conflict of Interest‡ Declarations**
   All Board members shall declare any ex parte communications or conflicts of interest relating to items on this meeting's agenda.

Alpern – queries about process, BOD nominations, censure motion, T/I motion on agenda, CW editorials	Cervantes – Item B.5 would benefit son's HS and is therefore a potential conflict of interest.	Newton - discussions regarding BOD nominations. Challenged by the administrative censure motion below since it regards his co-Chair: what would be an appropriate position therefore?
Doyno – spoke with CD11 aide to council member Bonin regarding Homeless issues	Kadota - met with candidates about open positions. Talked with all BOD members, constituents, all candidates, except one; no conflicts	Hanna - *absent*
Elster - none	Klos - *absent*	Krupkin - none
Roos - none	Tilson – somewhere above….	

   B. **Approval of March 8th, 2018, Board of Directors Meeting Minutes** (public comment permitted)
   8 Ayes/ 0 Nays/ 1 Abstention (Roos) @ 7:11pm

Alpern	Cervantes	Doyno	Elster	Hanna
Kadota	Klos	Krupkin	Newton	Roos
Tilson				

Tilson: "**Move to suspend the rules and consider four critical funding motions before further board business: 6.C.e, 7.A.b.i, 7.B.a.ii, 7.B.b.iii".** Krupkin seconds.

Funding motions considered marked by yellow highlight:

6.C.e.i, ii, iii , review and approval of financial status, draft revised budget, MER;

7.A.b.i NPG for Green Garden Showcase;

7.B.a.ii "Credit Card Limit Increase";

7.B.b.iii Room Rental Fee for St. Bede's" (this meeting).

Motion passes: 9/0/0

All but budget to be considered on consent per Newton's suggestion.

Newton: **"Move items 7.A.b.i, 7.B.a.ii, 7.B.b.iii on consent; examine Budget items, 6.C.e"**

Consent items pass: 9/0/0

C. **Appointment of Board Directors**

All qualified candidates may present a short personal statement and address questions. The Chair will move to fill the position, subject to Board approval.

Alpern - **Motion to table Director appointments until all board members are present**. Seconded by Krupkin

Public comment:

Marty Rubin: Favors tabling to allow new paid secretary's involvement which would allow all board members to digest materials better. Given so much Board turnover, MVCC should consider approaching appointments more carefully.

Board comment:

Newton – 9 members present is comparatively good; why isn't it good enough? The appointment was not delayed last month due to Board member's absence. In the meantime, missing a BOD meeting is a problem for its consequence. For example, Zone 4 constituents didn't know about a matter in Z4, so an active Zone Director is important. Today, with 9 of 11 present, that's a good-enough showing.

Elster: Agrees, we've moved the meeting once, so it would not be right to postpone it further.

Alpern: If this were a regularly scheduled meeting the need to vote would be more important. As a special meeting, lots of issues are raised. E.g., secretary not present; the need to choose another date is important. Board should table this item.

Tilson: Supports a special meeting-forum for just the candidates, in order that all may be present. The regular meeting was shifted due to Brown Act, not by anyone's fault, so it's important to enable this. Only 4 of 6 candidates now qualified were presented at ExFin Committee, so all candidate's statements were not presented. Because we're in such transition – the community is very angry, hatred over the road diet – and this is BOD 6th replacement, it's important that all Board Members who want to, be here

Kadota – Hanna knew of his absence from the regular meeting, and was comfortable with the known candidate's statements. Following the additional candidate's interest, suddenly concern was raised. There's bias there, and that's a problem. The candidate pool has changed. There have been changes, different decisions have been made, but as a board we must move forward; it's a disservice to push this off. Seems not professional

Doyno: Support the chair's position.

Krupkin: Supports tabling the one item.

Roos: The request was articulated personally by the first VC, involves tabling one item only; what is compelling reason to deny the request?

Motion fails: 4 to table/ 5 opposed/ 0 abstentions.

Krupkin, Tilson, Alpern leave and **quorum is lost**.

Doyno requests 5 min recess to reach quorum.

Klos joins meeting, **quorum reestablished**.

Roos leaves meeting, **quorum is lost**

Meeting adjourned (8:45pm?)

a. **Candidates for Zone 3 Director**
   i. Christen Hebrard
   ii. Mary Hruska

b. **Candidates for At-Large Director**
   i. Selena Inouye
   ii. Nanxi Liu
   iii. Zeina Mehdi

6. **Reports**

A. **Elected Officials and City Department Reports**

All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.

a. CoLA Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
b. CoLA CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
c. CoLA CD 11 – Councilmember Mike Bonin, rep by Field Deputy Hannah.Levien@lacity.org
d. CoLA Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel.Jacinto@lacity.org
e. CoLA Mayor – Eric Garcetti, rep. by Daniel.Tamm@lacity.org
f. LA County Supervisor, Second District - Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
g. CA Assembly 54 – Assembly Member Sydney Kamlager
h. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
i. CA Senate 30 – Holly J. Mitchell, rep by Field Rep Joy.Masha@sen.ca.gov
j. US Representative 33 – Ted Lieu, rep by joey.apodaca@mail.house.gov
k. US Representative 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
l. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
m. CoLA Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

B. **Liaison Reports** (public comment permitted)

a. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano at lindaguag@netzero.net
b. DWP MOU: *open*
c. LANCC: *open*
d. One Water LA: Christopher McKinnon
e. WRAC: Rob Kadota
f. WRAC LUPC: *open*
g. City Budget Advocates: Holly Tilson
h. Recode LA: Sharon Commins
i. Animal Services: Tom Ponton
j. Friends of Historic FS 62: Albert Olson
k. Mar Vista Chamber of Commerce: *open*
l. 2018 Mar Vista Green Garden Showcase: Maggie Begley

C. **Officer Reports** (action items included, with public comment permitted)

a. **Chair** – Rob Kadota
b. **First Vice Chair** – Elliot Hanna
c. **Second Vice Chair** – Paola Cervantes
d. **Secretary** – Sara Roos
e. **Treasurer** – Holly Tilson

i. Report on current financial status (Addendum)

As per emailed information, $10K was approved for safety, mobility, but insufficient funds currently budgeted; shifted $4800 and there may be additional unspent funds to complete this appropriation.

Working with CD11 field deputy on the return of unspent funds…

$4K budgeted for Green Garden Showcase (GGS) no longer considered as "Outreach" but rather as an NPG to accommodate liability. Costs have dropped to $1850.

Additional events have also incurred fewer costs, necessitating adjustments.

No public comment on revisions.

ii. **APPROVAL** of March Monthly Expense Report (MER)

Tabled (by oversight); must be revisited

Ayes/ Nays/ Abstentions

Alpern	Cervantes	Doyno	Elster	Hanna
Kadota	Klos	Krupkin	Newton	Roos
Tilson				

iii. Review and **APPROVAL** of draft revised budget

Newton: Budget has changed a lot, acknowledge a lot of work: *THANK YOU* to Holly!!!
Newton **Move to approve**, seconded by Roos

9 Ayes/ 0 Nays/ 0 Abstentions for Budget

Alpern	Cervantes	Doyno	Elster	Hanna
Kadota	Klos	Krupkin	Newton	Roos
Tilson				

D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)
   a. **Elections and By-laws Committee** - Elliot Hanna & Robin Doyno, Co-chairs
   b. **Community Outreach Committee** – Sara Roos, Chair
   c. **Committee on Public Safety** – Elliot Hanna, Chair
   d. **Aging in Place** - Sherri Akers, Tatjana Luethi & Birgitta Kastenbaum, Co-chairs
   e. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
   f. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
   g. **Bike Mar Vista** - Rob Kadota, Chair
   h. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co-chairs; Lenore French, Vice-chair
   i. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Rob Kadota, Co-chairs
   j. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
   k. **Green Committee** –Jeanne Kuntz, Chair
   l. **Homeless Issues Committee** – Robin Doyno & Susan Klos, Co-chairs

E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
   a. **Zone 1** – Ken Alpern
   b. **Zone 2** – Damien Newton

c. **Zone 3** – *vacant*
d. **Zone 4** – Aaron Elster
e. **Zone 5** – Michelle Krupkin
f. **Zone 6** – Holly Tilson

7. Monthly Business **- action items, which may include motions to refer items to the appropriate MVCC committee where desirable (public comment permitted)**

Items may be received and filed by consent if there is no discussion or public comment.

****** *Time-sensitive motions* may receive special consideration.

A. **Old Business** - Administrative, Funding and Policy motions previously agendized and not addressed.

a. ***Administrative Motion***

i. "**Code Of Conduct**" (submitted by Elections & Bylaws Committee)

MVCC adds the following statement to Article V (Governing Board) Section 8 (Censure) of the Bylaws:

"Violation of the Code of Conduct by a Director or Committee Chair/Co-Chair/Vice Chair may result in Censure or Removal."

b. ***Funding Motions***

**** i.**** "**NPG Grant To Green Communications Initiative, Inc. For 2018's Mar Vista Green Garden Showcase**" (submitted by ExFin Committee)

MVCC approves a NPG up to $1850 to Green Communications Initiative, Inc. to sponsor the 2018 Mar Vista Green Garden Showcase.

***Passed on consent above* 9 Ayes/ 0 Nays/ 0 Abstentions**

Alpern	Cervantes	Doyno	Elster	Hanna
Kadota	Klos	Krupkin	Newton	Roos
Tilson				

c. ***Policy Motions***

i. **"EV Chargers"** (submitted by Planning & Land Use Management Committee)

WHEREAS the AQMD says plug-in cars are essential if clean air standards are to be realized. Plug-ins now make up 5% of new vehicle sales in California, and are increasingly popular in Mar Vista, but adoption is hindered by lack of easy home and workplace charging. And

WHEREAS several California cities have already adopted sensible building code changes to make adding electric vehicle chargers much less expensive.

WHEREAS, for instance, the study in the City of Oakland's Council File 16-0359 says preparing for EV chargers ahead of time adds about $140per parking space, and makes later EV charger installation $500 to $5000 cheaper.

THEREFORE, the Mar Vista Community Council requests that the Los Angeles City Council follow the example of these cities, and pass sensible, cost-effective building code changes to require most new parking spaces in the city to be ready for future installation of EV chargers.

ii. **"Support Of Mar Vista Stakeholder's Great Streets Venice Boulevard California Public Records Act Request"** (submitted by Great Streets *ad hoc* Committee)

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed ~~on behalf of the community~~ by a Mar Vista stakeholder on August 8, 2017 on behalf of the community, requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; ~~and~~

~~WHEREAS to date, this request has not been fulfilled by LADOT; and~~

~~WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders' requests for assistance and information;~~

NOW, THEREFORE, be it resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017, California Public Records Act request for pilot project data, to be furnished, ~~demanding that LADOT provide for inspection all of the information requested~~ immediately and without further delay.

B. **New Business** - Administrative, Funding and Policy motions

a. ***Administrative Motion***

i. "**Authorization To Submit Community Impact Statement**" (Directors motion submitted by Sara Roos)

WHEREAS the City Clerk maintains a procedure for Neighborhood Councils to addend Community Impact Statements (CIS) to council files as an official statement adopted by a Neighborhood Council on issues pending before the City Council, its committees, or City commissions.

THEREFORE, the Mar Vista Community Council authorizes its ExFin Committee:

Rob Kadota, Chair
Elliot Hanna, 1st Vice Chair
Paolo Cervantes, 2nd Vice Chair
Sara Roos, Secretary
Holly Tilson, Treasurer,

to SUBMIT Community Impact Statements that have been passed by a vote of the full board.

BE IT FURTHER RESOLVED, that in cases where an issue is moving quickly through the legislative process and a promptly issued statement is beneficial, any aforementioned board member is authorized to WRITE and SUBMIT a Community Impact Statement in consultation with the chair, provided that it expresses the position of a motion previously passed by the full board.

By this motion, the Chair and the Secretary are authorized to submit a formal request to the Department of Neighborhood Empowerment to authorize the board members listed above to submit Community Impact Statements to the City Clerk on behalf of the Mar Vista Community Council.

ii. "**Credit Card Limit Increase**" (Treasurer's motion submitted by Holly Tilson)

MVCC approves increasing the MVCC credit card limit to $10-15K/mo.

- Rationale: Funding Guidelines allow $5K/month. The MVCC will not be able to purchase items approved and/or in our budget without increasing our limits.

***Passed on consent above* 9 Ayes/ 0 Nays/ 0 Abstentions**

Alpern	Cervantes	Doyno	Elster	Hanna
Kadota	Klos	Krupkin	Newton	Roos
Tilson				

iii. "**Censure Proposal**" (Directors motion submitted by Robin Doyno)

Because of blatant dishonesty in a letter to a community newspaper, I request that the MVCC censure Michael Millman for the false statement in his letter appearing in the March 29, 2018, Argonaut. LAMC 85.02 does not say that vehicle dwelling is illegal but just the opposite. 85.02 delineates the conditions under which vehicle dwelling is legal. To state the opposite is a dishonest way of promoting Michael's preference. I respectfully ask that the MVCC make a statement of its displeasure and/or remove him from any MVCC position.

b. ***Funding Motions***

i. "**Outreach At MVNA Block Party**" (submitted by Outreach Committee)

MVCC approves Outreach funds up to $300 to support the Mar Vista Neighborhood Association's June block party.

ii. "**Business Cards, Office Expenses**" (submitted by Treasurer)

MVCC approves funds up to $400 for the printing of business cards and additional office expenses.

iii. "**Room Rental Fee for St. Bede's" (**submitted by Treasurer)

MVCC approves room rental fee of up to $75 to St Bede's for MVCC BOD mtg.

***Passed on consent above* 9 Ayes/ 0 Nays/ 0 Abstentions**

Alpern	Cervantes	Doyno	Elster	Hanna
Kadota	Klos	Krupkin	Newton	Roos
Tilson				

iv. "**NPG Grant For Clover Elementary School's International Festival**" (submitted by Education, Arts and Culture Committee)

WHEREAS, Clover Elementary School's International Festival promotes community building and celebrates the diverse population of Clover Elementary. And

WHEREAS Clover ES achieves its eminent status in both LAUSD and State of California ratings even while it depends significantly on the Booster Club for funding items not covered by LAUSD'S budget and essential to this neighborhood school's mission of exceling academically, including computer labs, basic materials, arts and music programs, and much more.

THEREFORE the Education, Arts and Culture Committee recommends the Mar Vista Community Council grant $1,000 to provide essential seed money for the efforts of the Booster Club of Clover Elementary School for their International Festival.

v. "**NPG Grant For PESA's Teen Court Program And Tolerance Assembly Program**" (submitted by Education, Arts and Culture Committee)

WHEREAS in supporting the essential work of PESA (Parents, Educators/Teachers and Students in Action) we will be helping to interrupt the school-to-prison-pipeline, foster a value in public service, and give positive guidance to youthful, nonviolent offenders,

THEREFORE the Education, Arts and Culture Committee recommends that MVCC grant PESA $1,000 to continue their Teen Court Program at Venice High School and begin introducing tolerance based assemblies at Mar Vista Middle and High Schools.

c. ***Policy Motions***

i. "**Short-Term Rentals Ordinance"** (submitted by the PLUM Committee)

The Mar Vista Community Council supports inclusion of any City of Los Angeles Short-Term Rentals Ordinances that include the following:

- Tax funds generated by short-term rentals that go toward paying for enforcement officers to address community safety concerns without placing undue burden on homeowners.
- Earmarking remaining funds for the city's Affordable Housing Trust Fund.

The Mar Vista Community Council opposes any ordinance that would:

- Place new burdens on homeowners who simultaneously rent out property on which they live.
- Include a limit on the number of days that can be rented without cause inside a homeowner's primary property.
- Impose new taxes or fees that only impact short-term rentals.

ii. "**Development at 11700 Charnock Boulevard"** (submitted by the PLUM Committee)

The Mar Vista Community Council supports the application to build a new six-unit, two story, development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the city.

iii. "**Mitigating The Impact Of Group Homes On Surrounding Neighborhoods"** (submitted by the PLUM Committee)

The Mar Vista Community Council supports CIS #17-1426, a review of the legislative and regulatory opportunities the City may have for mitigating the impacts of all kinds of group homes on surrounding neighborhoods

iv. "**Opposing SB 827 [Weiner]"** (submitted by the PLUM Committee)

WHEREAS the City Charter-mandated Neighborhood Council system of Los Angeles, and the Community Councils of the City of Los Angeles, represent grass roots democracy,

WHEREAS the newly introduced California State Senate Bill 827 [Scott Weiner] as written constitutes a top down pen stroke Planning measure which completely removes land use and planning authority within one half mile of high quality transit from jurisdictions and charter cities,

WHEREAS removal of said authority clearly abolishes local input into land use planning and therefore constitutes an attack upon local democracy, upon neighborhoods, and upon the Neighborhood Councils and Community Councils in the City of Los Angeles,

WHEREAS SB 827 as written trashes the density bonus and wage provisions of the JJJ TOC ordinance which were recently enacted by the people of Los Angeles—in good faith—in order to guarantee transit close housing opportunities would actually be available to working and low-income persons and families in the City of Los Angeles,

WHEREAS the lack of analysis of infrastructure and other costs associated with this pen stroke planning creates grave uncertainty that a local agency would be able to "levy enough service charges, fees or assessments sufficient to pay for the program or level of service mandated by this act within the meaning of Section 17556 of the Government Code",

WHEREAS, given the aforementioned lack of fiscal analysis, Section 6 of Article XIII B of the California Constitution "No reimbursement" clause is cited inappropriately in this legislation,

THEREFORE, the Mar Vista Community Council opposes SB 827 in its present form.

v. "**Reform and Enhance City Process and Program Efficiencies"** (submitted by the Transportation and Infrastructure Committee)

WHEREAS, the City of Los Angeles is the only one of the top ten cities (by population) in the United States that has separate oversight between Public Works and Transportation Programs, and

WHEREAS, the City of LA has a dysfunctional and cost-ineffective organization of multiple, overlapping departments for Transportation and Infrastructure, and

WHEREAS, reforming transportation and infrastructure is consistent with Mayor Garcetti's "Back to Basics" initiatives,

THEREFORE, the Mar Vista Community Council (MVCC) strongly supports the recommendations described in CF17-1311 for Systems Improvements (Tier 1), Tools/Activities to Support System Improvements (Tier 2), and Process and Program Efficiencies (Tier 3) as recommended by the Office of the City Administrative Officer (CAO) of Los Angeles.

10. Grievances**, if any received**

11. Future Agenda Items

12. Public Comment

13. Adjournment

ADDENDA: TREASURER'S REPORT – MER, Budget

Monthly Expenditure Report

Reporting Month: March 2018 **Budget Fiscal Year: 2017-2018**

NC Name: Mar Vista Neighborhood Council

Monthly Cash Reconciliation					
Beginning Balance	**Total Spent**	**Remaining Balance**	**Outstanding**	**Commitments**	**Net Available**
$31424.05	$1208.53	$30215.52	$2950.00	$10050.00	$17215.52

Monthly Cash Flow Analysis					
Budget Category	**Adopted Budget**	**Total Spent this Month**	**Unspent Budget Balance**	**Outstanding**	**Net Available**
Office	$37000.00	$920.72	$25215.52	$100.00	$25115.52
Outreach		$287.81		$0.00	
Elections		$0.00		$0.00	
Community Improvement Project	$2000.00	$0.00	$2000.00	$0.00	$2000.00
Neighborhood Purpose Grants	$3000.00	$0.00	$3000.00	$2850.00	$150.00
Funding Requests Under Review: $0.00		Encumbrances: $10050.00		Previous Expenditures: $10575.95	

Expenditures						
#	**Vendor**	**Date**	**Description**	**Budget Category**	**Sub-category**	**Total**
1	STORQUEST-WLA/SAWTELLE	03/01/2018	(Credit card transaction)	General Operations Expenditure	Office	$208.00
2	AMAZON MKTPLACE PMTS	03/07/2018	(Credit card transaction)	General Operations Expenditure	Office	$119.99
3	AMAZON MKTPLACE PMTS	03/08/2018	(Credit card transaction)	General Operations Expenditure	Office	$212.78
4	STAPLES 00114272	03/10/2018	(Credit card transaction)	General Operations Expenditure	Office	$32.05
5	STAPLES 00114272	03/11/2018	(Credit card transaction)	General Operations Expenditure	Office	$49.24
6	STAPLES 00114272	03/17/2018	(Credit card transaction)	General Operations Expenditure	Office	$65.66
7	STORQUEST-WLA/SAWTELLE	03/31/2018	(Credit card transaction)	General Operations Expenditure	Office	$208.00
8	THE WEB CORNER	03/01/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$171.00
9	AT&T BILL PAYMENT	03/18/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$94.31
10	MAILCHIMP MONTHLY	03/21/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$22.50
11	St. Andrew's Lutheran Church	03/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
	Subtotal:					**$1208.53**

Outstanding Expenditures						
#	**Vendor**	**Date**	**Description**	**Budget Category**	**Sub-category**	**Total**
1	St. Andrew's Lutheran Church	04/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
2	St. Andrew's Lutheran Church	05/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
3	St. Andrew's Lutheran Church	06/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
4	St. Andrew's Lutheran Church	03/08/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETI...	General Operations Expenditure	Office	$25.00
5	Pacific Area Boosters Association, Inc.	03/30/2018	Motion to contribute up to $1000 in an NPG for the...	Neighborhood Purpose Grants		$1000.00
6	Green Communications Initiative Inc.	04/12/2018	MVCC approved up to $4000 for the Green Garde...	Neighborhood Purpose Grants		$1850.00
	Subtotal: Outstanding					**$2950.00**

DRAFT BUDGET AND ADJUSTMENTS

Category	Subcategory	Description	Expense	Original Budget	Adjusted Budget	YTD	Available
General/ Operational Budget	Office	Storage	Storquest	$ 2,496.00	$ 2,713.00	$ 1,880.30	$ 832.70
		Meeting rooms rental	The Vineyard	$ 600.00	$ 400.00	$ 130.00	$ 270.00
			St Andrew's Lutheran Church	$ 300.00	$ 300.00	$ 200.00	$ 100.00
			St Bede's	$ 75.00	$ 150.00	$ 75.00	$ 75.00
			Windward School	$ 5.00	$ 5.00	$ 5.00	$ -
			PO Box rental	$ 132.00	$ 134.00	$ 134.00	$ -
			Farmer's Market rental	$ 1,200.00	$ 1,200.00	$ -	$ 1,200.00
		Equip & supplies (misc)	Live streaming equipment	$ -	$ 1,547.00	$ 1,546.61	$ 0.39
			Projector screen & stand	$ -	$ 333.00	$ 332.77	$ 0.23
			Misc	$ 1,100.00	$ 350.00	$ 153.62	$ 196.38
			Paid secretary	$ -	$ 800.00	$ -	$ 800.00
			Office/ExFin supplies	$ -	$ 500.00	$ -	$ 500.00
		Mtg supplies & printing	Printing	$ 1,000.00	$ 500.00	$ 69.53	$ 430.47
		Board Training & Support	Business cards/name badges	$ 250.00	$ 669.30	$ 269.30	$ 400.00
			Board Retreat	$ 37.68	$ 100.00	$ 37.68	$ 62.32
		Office Subtotal:		***$7,195.68***	***$9,701.30***	***$4,833.81***	***$4,867.49***
	Outreach	Website	The Web Corner: website maintenance	$ 1,650.00	$ 1,650.00	$ 1,200.00	$ 450.00
			The Web Corner: emails	$ 385.00	$ 336.00	$ 251.00	$ 85.00
			The Web Corner: Extra Data Entry	$ 500.00	$ 500.00	$ -	$ 500.00
			RIMU Hosting	$ 96.27	$ 97.00	$ 97.00	$ -
		Email Service	Mail chimp email service	$ 480.00	$ 292.50	$ 202.50	$ 90.00
		MiFi Service	AT&T MiFi service	$ -	$ 500.00	$ 194.80	$ 305.20
		Advertising	Banners/sign/event promotion	$ 500.00	$ 500.00	$ -	$ 500.00
			Facebook ads	$ 250.00	$ 250.00	$ -	$ 250.00
			Promotional items	$ -	$ 6,500.00	$ -	$ 6,500.00
			Emergency Prep signs & brochures	$ 1,500.00	$ 1,500.00	$ -	$ 1,500.00
			Neighborhood Watch signs	$ -	$ 3,000.00	$ -	$ 3,000.00
		Community Events	Block parties (~~5~~ 4 X $300)	$ 1,500.00	$ 1,200.00	$ 618.70	$ 581.30
			Westside Senior Health & Wellness Fair	$ 500.00	$ 500.04	$ 500.04	$ -
			Winter Wonderland	$ 1,000.00	$ 978.75	$ 978.75	$ -
			Art Walk	$ 2,000.00	$ 1,800.00	$ 912.75	$ 887.25
			Venice High Grease Night	$ 300.00	$ 296.72	$ 296.72	$ -
			Green Garden Showcase	$ 4,000.00	$ -	$ -	$ -
		MVCC events/outreach items/mailings/newsletter	Mar Vista Turns 90 Celebration	$ 4,000.00	$ 1,271.00	$ 1,271.00	$ -
			Great Street Tree Planting	$ 300.00	$ 300.00	$ -	$ 300.00
			Misc + awning repair/replace (up to $1000)	$ 7,843.05	$ 1,176.69	$ 80.98	$ 1,095.71
		Community Improvement	Safety and Mobility Enhancements	$ 5,000.00	$ 4,800.00	$ -	$ 4,800.00
			Bike repair stand	$ -	$ -	$ -	$ -
		Outreach Subtotal:		***$31,804.32***	***$27,448.70***	***$6,604.24***	***$20,844.46***
	Elections	Election expenses	Election expenses	$ -	$ 1,000.00	$ -	$ -
		Elections Subtotal:		***$1,000.00***	***$0.00***	***$0.00***	***$0.00***
		General/Operational Subtotal:		***$40,000.00***	***$37,150.00***	***$11,438.05***	***$25,711.95***
Neighborhood Purpose Grants			Green Garden Showcase	$ -	$ 1,850.00	$ 1,850.00	$ -
			AE&C Committee	$ 2,000.00	$ 2,000.00	$ -	$ 2,000.00
			Santa Sleigh Shed	$ -	$ 1,000.00	$ 1,000.00	$ -
		Neighborhood Purpose Grants Subtotal:		***$2,000.00***	***$4,850.00***	***$2,850.00***	***$2,000.00***
GRAND TOTAL				**$42,000.00**	**$42,000.00**	**$14,288.05**	**$27,711.95**
			Safety and Mobility Enhancements up to $10,000 if funds available				

Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, May 8th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call To Order And Welcome** – Chair (1 min)
2. **Presentation Of Flag And Pledge Of Allegiance** (1 min)
3. **Community Memorial Observations**
4. **Public Comment & Announcements** - for items not on the agenda (30 minutes total, unless waived by the Chair)
5. **Board Administration**
   - A. **Ex Parte§ Communication & Conflict of Interest‡ Declarations**

     All Board members shall declare any ex parte communications or conflicts of interest relating to items on this meeting's agenda.
   - B. **Approval of April 17th, 2018, Board of Directors Meeting Minutes** (public comment permitted)
   - C. **Appointment of Board Directors**

     All qualified candidates may present a short personal statement and address questions. Appointment is moved by the Chair for board approval.
     - i. **Candidates for Zone 3 Director**
       - a. Christen Hebrard
       - b. Mary Hruska
     - ii. **Candidates for At-Large Director**
       - a. Selena Inouye
       - b. Nanxi Liu
       - c. Zeina Mehdi
6. **Reports** (See Attachment C)
   - A. **Elected Officials and City Department Reports**

     All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.
   - B. **Liaison Reports** (public comment permitted)
   - C. **Officer Reports** (action items included, with public comment permitted)
   - D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)
   - E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
7. **Discussion Of Policy, Administrative and Funding Motions** (public comment permitted)

   Items may be received and filed by consent if there is no discussion or public comment.

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§ *Ex Parte Communication* is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

‡ *Conflicts of Interest* include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.

** *Time-sensitive motions marked by asterisk*

A. **Unfinished Business** - Policy, Administrative and Funding motions previously agendized and not addressed (See Attachment D).
   i. **EV Chargers** – changes to the city building code to require new parking spaces to be EV-charger-ready.
   ii. **Short-Term Rentals** – support for CoLA ordinance regulating short-term rentals, with conditions for opposition.
   iii. **Regulation of Group Homes** – CIS supporting LA Council consideration of mitigation opportunities for group homes.
   iv. **Opposing Development Ordinance SB 827 (Weiner)** – objections to the removal of local control in Planning.
   v. **Development at 11700 Charnock Boulevard** – supports the application
   vi. **Venice Boulevard Public Records Act Request** – supports a stakeholder's previous public records request for data regarding the Venice Blvd. public project.
   vii. **Improve Efficiency At City Hall** – support of CAO recommendations in CF17-1311
   viii. **Authorization to Submit Community Impact Statements** – enables current members of the ExFin Committee to submit community impact statements.
   ix. **Code of Conduct** – empowers censure or removal as punishment for violation of the Code of Conduct.
   x. **Censure Proposal** – censures Michael Millman over a letter to the editor of the Argonaut, dated March 29, 2018.
   xi. **Funding Motions**
      a. **International Festival at Clover ES** (NPG) - $1,000
      b. **PESA Teen Court & Tolerance Program** (NPG) - $1,000
      c. **Business Cards & Office Expenses** - $400
      d. **Outreach at MVNA** Block Party - $300

B. **New Business** - Administrative, Funding and Policy motions (See Attachment E)
   i. **Fall Festival Leadership** – exploratory committee to investigate whether a new Leader can overcome obstacles to stage the Fall Festival this year.
   ii. **Enhanced Safety at Oil Drillsites** – prescribes denial of a gas burner at Rancho Park Drillsite and proscribes ZA conditions for enhancing public safety surrounding drillsites.
   iii. **Opposing Development Ordinance SB 828** – objections to conditions overriding local planning of zoning capacity.
   iv. **Opposing Development Ordinance SB 813** – objects to eliminating FAR consideration for ADUs.
   v. **LAMC 85.02 extension** – supports updating its associated map and permanently extending the ordinance.
   vi. **Westside Mobility's Livable Boulevards Streetscape Plan** – transparency in planning and implementing Westside Mobility's Livable Boulevards Streetscape Plan.
   vii. **Zone 2 Continental Crosswalks and Curb Cuts** – identification of roadway safety enhancements.
   viii. **Classification of Director Absence** – redefine premature meeting departure as absence from the meeting.
   ix. **Funding Motions**
      a. **Farmer's Market Annual Rental Fee** – up to $1,200
      b. **Storage Locker Upgrade** - <$500/mo.
      c. **Replacement Plexiglass for Posting Display Case** - < $200
      d. **Office Supply Reimbursement, Treasurer** - < $140
      e. **Office Supply Reimbursement, Secretary** - < $70
      f. **Updated Promo Trash Bags To-Go** - < $750
      g. **Updated Promo Mugs** - < $450
      h. **Updated Promo Post-it Notes** - < $1,600
      i. **Updated Promo Safe-Driving Lawn Signs** - < $2,800
      j. **Updated Promo Seat Cushions** - < $790
      k. **MVCC Sponsorship Banner** - < $500

l. **Contingency Promo Safety Keychain** - < $400

8. **Grievances**, if any received
9. **Future Agenda Items**
10. **Public Comment**
11. **Adjournment** (by 9:45pm)

ATTACHMENT A, Financial Information

EXFIN 5/2/2018-Treasurer's Report

(Totals are from funding page 5/1, MER reflects day of printing totals.)

City allocation to MVCC		$42,000.00
YTD spending (per funding page)		$15353.20
This month	$2568.72 (cks + cc exps)	
4/1 Web Corner	$178	
4/10 GCI	$1850 (Green Garden Showcase)	
4/13 Copyland	$398.91 (Art Walk)	
4/18 AT&T	$94.31 (Wi-Fi monthly)	
4/21 Mail chimp	$22.50	
4/26 St Andrew's	$25	
Commitments (per funding page)		$10150.00
Net Available (per funding page-5/1)		$16496.80
Cash on hand (per funding page-5/1)		$26648.80

Last day to write a check 6/1 last day to use credit card 6/20

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 3 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

Subscribe to our agendas via email through L.A. City's Early Notification System at http://www.lacity.org/subscriptions

* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities, including sign language interpreters, assistive listening devices and other auxiliary aids and/or services. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

MVCC ADOPTED BUDGET

Category	Subcategory	Description	Expense	Original Budget	Adjusted Budget	YTD	Available
General/ Operational Budget	Office	Storage	Storquest	$ 2,496.00	$ 2,713.00	$ 1,880.30	$ 832.70
		Meeting rooms rental	The Vineyard	$ 600.00	$ 400.00	$ 130.00	$ 270.00
			St Andrew's Lutheran Church	$ 300.00	$ 300.00	$ 200.00	$ 100.00
			St Bede's	$ 75.00	$ 150.00	$ 75.00	$ 75.00
			Windward School	$ 5.00	$ 5.00	$ 5.00	$ -
			PO Box rental	$ 132.00	$ 134.00	$ 134.00	$ -
			Farmer's Market rental	$ 1,200.00	$ 1,200.00	$ -	$ 1,200.00
		Equip & supplies (misc)	Live streaming equipment	$ -	$ 1,547.00	$ 1,546.61	$ 0.39
			Projector screen & stand	$ -	$ 333.00	$ 332.77	$ 0.23
			Misc	$ 1,100.00	$ 350.00	$ 153.62	$ 196.38
			Paid secretary	$ -	$ 800.00	$ -	$ 800.00
			Office/ExFin supplies	$ -	$ 500.00	$ -	$ 500.00
		Mtg supplies & printing	Printing	$ 1,000.00	$ 500.00	$ 69.53	$ 430.47
		Board Training & Support	Business cards/name badges	$ 250.00	$ 669.30	$ 269.30	$ 400.00
			Board Retreat	$ 37.68	$ 100.00	$ 37.68	$ 62.32
			Office Subtotal:	***$7,195.68***	***$9,701.30***	***$4,833.81***	***$4,867.49***
	Outreach	Website	The Web Corner: website maintenance	$ 1,650.00	$ 1,650.00	$ 1,200.00	$ 450.00
			The Web Corner: emails	$ 385.00	$ 336.00	$ 251.00	$ 85.00
			The Web Corner: Extra Data Entry	$ 500.00	$ 500.00	$ -	$ 500.00
			RIMU Hosting	$ 96.27	$ 97.00	$ 97.00	$ -
		Email Service	Mail chimp email service	$ 480.00	$ 292.50	$ 202.50	$ 90.00
		MiFi Service	AT&T MiFi service	$ -	$ 500.00	$ 194.80	$ 305.20
		Advertising	Banners/sign/event promotion	$ 500.00	$ 500.00	$ -	$ 500.00
			Facebook ads	$ 250.00	$ 250.00	$ -	$ 250.00
			Promotional items	$ -	$ 6,500.00	$ -	$ 6,500.00
			Emergency Prep signs & brochures	$ 1,500.00	$ 1,500.00	$ -	$ 1,500.00
			Neighborhood Watch signs	$ -	$ 3,000.00	$ -	$ 3,000.00
		Community Events	Block parties (5 4 X $300)	$ 1,500.00	$ 1,200.00	$ 618.70	$ 581.30
			Westside Senior Health & Wellness Fair	$ 500.00	$ 500.04	$ 500.04	$ -
			Winter Wonderland	$ 1,000.00	$ 978.75	$ 978.75	$ -
			Art Walk	$ 2,000.00	$ 1,800.00	$ 912.75	$ 887.25
			Venice High Grease Night	$ 300.00	$ 296.72	$ 296.72	$ -
			Green Garden Showcase	$ 4,000.00	$ -	$ -	$ -
		MVCC events/outreach items/mailings/newsletter	Mar Vista Turns 90 Celebration	$ 4,000.00	$ 1,271.00	$ 1,271.00	$ -
			Great Street Tree Planting	$ 300.00	$ 300.00	$ -	$ 300.00
			Misc + awning repair/replace (up to $1000)	$ 7,843.05	$ 1,176.69	$ 80.98	$ 1,095.71
		Community Improvement	Safety and Mobility Enhancements	$ 5,000.00	$ 4,800.00	$ -	$ 4,800.00
			Bike repair stand	$ -	$ -	$ -	$ -
			Outreach Subtotal:	***$31,804.32***	***$27,448.70***	***$6,604.24***	***$20,844.46***
	Elections	Election expenses	Election expenses	$ 1,000.00	$ -	$ -	$ -
			Elections Subtotal:	***$1,000.00***	***$0.00***	***$0.00***	***$0.00***
			General/Operational Subtotal:	***$40,000.00***	***$37,150.00***	***$11,438.05***	***$25,711.95***
Neighborhood Purpose Grants			Green Garden Showcase	$ -	$ 1,850.00	$ 1,850.00	$ -
			AE&C Committee	$ 2,000.00	$ 2,000.00	$ -	$ 2,000.00
			Santa Sleigh Shed	$ -	$ 1,000.00	$ 1,000.00	$ -
			Neighborhood Purpose Grants Subtotal:	***$2,000.00***	***$4,850.00***	***$2,850.00***	***$2,000.00***
GRAND TOTAL				**$42,000.00**	**$42,000.00**	**$14,288.05**	**$27,711.95**

Safety and Mobility Enhancements up to $10,000 if funds available

ATTACHMENT B, Outreach Committee Financials (Updates and Revisions)

Outreach appropriations (Promo and info), 4/13/18	Passage	Expenditure not to exceed…	Dollar amount, excluding tax, shipping and setup charge	Amended maximum request including tax, shipping, setup ("STS")	Difference	Explanation	**Reapprove for expenditure not to exceed:**
14.c Promotional Item – "Trash Bags To Go"	*Consent*		$730.00	$729.49	$ (0.51)	Diminish count by #42 from #320 to #278	**750**
14.d Promotional Item – "MVCC Mugs"	Consent	$300.00		$421.17	$ 121.17	STS considerably higher, also loved cobalt-interior mug. Cheaper can be had at $317.10	**450**
14.e "Safe Driving Lawn Signs"	*8/0/1**		$2,500.00	$2,728.18	$ 228.18		**2800**
14.f Promotional item – "Post It Notes"	*5/2 (Cervantes, Hanna)/2 (Alpern, Krupkin)*	$1,500.00		$1,571.96	$71.96	Shipping crazy, charged for each run - still arguing differently but they're giving half-off as is so may be best we can get	**1600**
14.g Promotional item – "Seat Cushions"	*Consent*		$488.40	$773.85	$ 285.45	Two manufacturers, shipping is double	**790**
14.h "Blue and Green outreach awning replacements"	*Consent*	$1,000.00		$600.00	$ (400.00)	Repairs only lowered this cost	
14.i "Tri-Fold Brochure Design And Printing"	*Consent*	$500.00		-			
	subtotal	$3,300.00	$3,718.40				
Total appropriated (less tents)		$ 6,018.40		$ 6,724.64			**6390**
Total Budgeted		$ 6,500.00		$ 6,500.00		*So under original budgeted amount of &7500 but not recalculated one;*	
Budget-difference		$ 481.60		$ (224.64)		*anticipated savings in budget from advertising, delayed printing if necessary etc*	

ATTACHMENT C, Reports

6. **Reports**

A. **Elected Officials and City Department Reports**

All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.

i. CoLA Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
ii. CoLA CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
iii. CoLA CD 11 – Councilmember Mike Bonin, rep by Field Deputy Hannah.Levien@lacity.org
iv. CoLA Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel.Jacinto@lacity.org
v. CoLA Mayor – Eric Garcetti, rep. by Daniel.Tamm@lacity.org
vi. LA County Supervisor, Second District - Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
vii. CA Assembly 54 – Assembly Member Sydney Kamlager
viii. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
ix. CA Senate 30 – Holly J. Mitchell, rep by Field Rep Joy.Masha@sen.ca.gov
x. US Representative 33 – Ted Lieu, rep by joey.apodaca@mail.house.gov
xi. US Representative 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
xii. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
xiii. CoLA Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

B. **Liaison Reports** (public comment permitted)

i. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano at lindaguag@netzero.net
ii. DWP MOU: *open*
iii. LANCC: *open*
iv. One Water LA: Christopher McKinnon
v. WRAC: Rob Kadota
vi. WRAC LUPC: *open*
vii. City Budget Advocates: Holly Tilson
viii. Recode LA: Sharon Commins
ix. Animal Services: Tom Ponton
x. Friends of Historic FS 62: Albert Olson
xi. Mar Vista Chamber of Commerce: *open*
xii. 2018 Mar Vista Green Garden Showcase: Maggie Begley

C. **Officer Reports** (action items included, with public comment permitted)

i. **Chair** – Rob Kadota
ii. **First Vice Chair** – Elliot Hanna
iii. **Second Vice Chair** – Paola Cervantes
iv. **Secretary** – Sara Roos
v. **Treasurer** – Holly Tilson (See Attachment A)
   a. Report on current financial status
   b. **APPROVAL** of April Monthly Expense Report (MER)

D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)

i. **Elections and By-laws Committee** - Elliot Hanna & Robin Doyno, Co-chairs
ii. **Community Outreach Committee** – Sara Roos, Chair
iii. **Committee on Public Safety** – Elliot Hanna, Chair
iv. **Aging in Place** - Sherri Akers, Tatjana Luethi and Birgitta Kastenbaum, Co-chairs

v. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
vi. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
vii. **Bike Mar Vista** - Rob Kadota, Chair
viii. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co-chairs; Lenore French, Vice-chair
ix. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Rob Kadota, Co-chairs
x. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
xi. **Green Committee** –Jeanne Kuntz, Chair
xii. **Homeless Issues Committee** – Robin Doyno & Susan Klos, Co-chairs

E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
i. **Zone 1** – Ken Alpern
ii. **Zone 2** – Damien Newton
iii. **Zone 3** – *vacant*
iv. **Zone 4** – Aaron Elster
v. **Zone 5** – Michelle Krupkin
vi. **Zone 6** – Holly Tilson

ATTACHMENT D, Discussion of Motions (Unfinished Business)

7. **Discussion of Policy, Administrative and Funding Motions** -

A. **Unfinished Business**

POLICY MOTIONS, PLANNING AND LAND USE MANAGEMENT COMMITTEE

i. **EV Chargers**

WHEREAS the AQMD says plug-in cars are essential if clean air standards are to be realized. Plug-ins now make up 5% of new vehicle sales in California, and are increasingly popular in Mar Vista, but adoption is hindered by lack of easy home and workplace charging. And

WHEREAS several California cities have already adopted sensible building code changes to make adding electric vehicle chargers much less expensive.

WHEREAS, for instance, the study in the City of Oakland's Council File 16-0359 says preparing for EV chargers ahead of time adds about $140per parking space, and makes later EV charger installation $500 to $5000 cheaper.

THEREFORE, the Mar Vista Community Council requests that the Los Angeles City Council follow the example of these cities, and pass sensible, cost-effective building code changes to require most new parking spaces in the city to be ready for future installation of EV chargers.

ii. **Short-Term Rentals Ordinance**

The Mar Vista Community Council supports inclusion of any City of Los Angeles Short-Term Rentals Ordinances that include the following:

- *Tax funds generated by short-term rentals that go toward paying for enforcement officers to address community safety concerns without placing undue burden on homeowners.*
- *Earmarking remaining funds for the city's Affordable Housing Trust Fund.*

The Mar Vista Community Council opposes any ordinance that would:

- *Place new burdens on homeowners who simultaneously rent out property on which they live.*
- *Include a limit on the number of days that can be rented without cause inside a homeowner's primary property.*

- *Impose new taxes or fees that only impact short-term rentals.*

iii. **Mitigating The Impact Of Group Homes On Surrounding Neighborhoods**

The Mar Vista Community Council supports CF #17-1426, a review of the legislative and regulatory opportunities the City may have for mitigating the impacts of all kinds of group homes on surrounding neighborhoods

iv. **Opposing SB 827 [Weiner]** – See Addendum: Edits, revisions or amendments

WHEREAS the City Charter-mandated Neighborhood Council system of Los Angeles, and the Community Councils of the City of Los Angeles, represent grass roots democracy,

WHEREAS the newly introduced California State Senate Bill 827 [Scott Weiner] as written constitutes a top down pen stroke Planning measure which completely removes land use and planning authority within one half mile of high quality transit from jurisdictions and charter cities,

WHEREAS removal of said authority clearly abolishes local input into land use planning and therefore constitutes an attack upon local democracy, upon neighborhoods, and upon the Neighborhood Councils and Community Councils in the City of Los Angeles,

WHEREAS SB 827 as written trashes the density bonus and wage provisions of the JJJ TOC ordinance which were recently enacted by the people of Los Angeles—in good faith—in order to guarantee transit close housing opportunities would actually be available to working and low- income persons and families in the City of Los Angeles,

WHEREAS the lack of analysis of infrastructure and other costs associated with this pen stroke planning creates grave uncertainty that a local agency would be able to "levy enough service charges, fees or assessments sufficient to pay for the program or level of service mandated by this act within the meaning of Section 17556 of the Government Code",

WHEREAS, given the aforementioned lack of fiscal analysis, Section 6 of Article XIII B of the California Constitution "No reimbursement" clause is cited inappropriately in this legislation,

THEREFORE, the Mar Vista Community Council opposes SB 827 in its present form.

v. **Development at 11700 Charnock Boulevard**

The Mar Vista Community Council supports the application to build a new six-unit, two story, development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the city.

POLICY MOTIONS, GREAT STREETS COMMITTEE

vi. **Support of Mar Vista Stakeholder's Great Streets Venice Boulevard California Public Records Act Request** – See Addendum: Edits, revisions or amendments

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017, requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders' requests for assistance and information;

NOW, THEREFORE, be it resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017, California Public Records Act

request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

POLICY MOTIONS, TRANSPORTATION AND INFRASTRUCTURE COMMITTEE

vii. **Reform and Enhance City Process and Program Efficiencies**

WHEREAS, the City of Los Angeles is the only one of the top ten cities (by population) in the United States that has separate oversight between Public Works and Transportation Programs, and

WHEREAS, the City of LA has a dysfunctional and cost-ineffective organization of multiple, overlapping departments for Transportation and Infrastructure, and

WHEREAS, reforming transportation and infrastructure is consistent with Mayor Garcetti's "Back to Basics" initiatives,

THEREFORE, the Mar Vista Community Council (MVCC) strongly supports the recommendations described in CF17-1311 for Systems Improvements (Tier 1), Tools/Activities to Support System Improvements (Tier 2), and Process and Program Efficiencies (Tier 3) as recommended by the Office of the City Administrative Officer (CAO) of Los Angeles.

ADMINISTRATIVE MOTIONS

viii. **Authorization to Submit Community Impact Statement** (Director's motion submitted by Sara Roos)

WHEREAS the City Clerk maintains a procedure for Neighborhood Councils to addend Community Impact Statements (CIS) to council files as an official statement adopted by a Neighborhood Council on issues pending before the City Council, its committees, or City commissions.

THEREFORE, the Mar Vista Community Council authorizes its ExFin Committee:

Rob Kadota, Chair
Elliot Hanna, 1st Vice Chair
Paolo Cervantes, 2nd Vice Chair
Sara Roos, Secretary
Holly Tilson, Treasurer,

to SUBMIT Community Impact Statements that have been passed by a vote of the full board.

BE IT FURTHER RESOLVED, that in cases where an issue is moving quickly through the legislative process and a promptly issued statement is beneficial, any aforementioned board member is authorized to WRITE and SUBMIT a Community Impact Statement in consultation with the chair, provided that it expresses the position of a motion previously passed by the full board.

By this motion, the Chair and the Secretary are authorized to submit a formal request to the Department of Neighborhood Empowerment to authorize the board members listed above to submit Community Impact Statements to the City Clerk on behalf of the Mar Vista Community Council.

ix. **Code of Conduct** (Director's motion submitted by Robin Doyno)

MVCC adds the following statement to Article V (Governing Board) Section 8 (Censure) of the Bylaws:

> *"Violation of the Code of Conduct by a Director or Committee Chair/Co-Chair/Vice Chair may result in Censure or Removal."*

x. **Censure Proposal** (Directors motion submitted by Robin Doyno)

Because of blatant dishonesty in a letter to a community newspaper, I request that the MVCC censure Michael Millman for the false statement in his letter appearing in the March 29, 2018, Argonaut. LAMC 85.02 does not say that vehicle dwelling is illegal but just the opposite. 85.02 delineates the conditions under which vehicle dwelling is legal. To state the opposite is a dishonest way of promoting Michael's preference. I respectfully ask that

the MVCC make a statement of its displeasure and/or remove him from any MVCC position.

***** ***FUNDING MOTIONS*** *****

xi. **Funding Motions**

a. **NPG Grant for Clover Elementary School's International Festival** (submitted by Education, Arts and Culture Committee)

WHEREAS, Clover Elementary School's International Festival promotes community building and celebrates the diverse population of Clover Elementary. And

WHEREAS Clover ES achieves its eminent status in both LAUSD and State of California ratings even while it depends significantly on the Booster Club for funding items not covered by LAUSD'S budget and essential to this neighborhood school's mission of exceling academically, including computer labs, basic materials, arts and music programs, and much more.

THEREFORE the Education, Arts and Culture Committee recommends the Mar Vista Community Council grant $1,000 to provide essential seed money for the efforts of the Booster Club of Clover Elementary School for their International Festival.

b. **NPG Grant for PESA's Teen Court Program and Tolerance Assembly Program** (submitted by Education, Arts and Culture Committee)

WHEREAS in supporting the essential work of PESA (Parents, Educators/Teachers and Students in Action) we will be helping to interrupt the school-to-prison-pipeline, foster a value in public service, and give positive guidance to youthful, nonviolent offenders,

THEREFORE the Education, Arts and Culture Committee recommends that MVCC grant PESA $1,000 to continue their Teen Court Program at Venice High School and begin introducing tolerance based assemblies at Mar Vista Middle and High Schools.

c. **Business Cards, Office Expenses** (submitted by ExFin Committee)

MVCC approves funds up to $400 for the printing of business cards and additional office expenses.

d. ** **Outreach at MVNA Block Party** (submitted by Outreach Committee) **

MVCC approves Outreach funds up to $300 to support the Mar Vista Neighborhood Association's June block party.

ATTACHMENT E, Discussion of Motions (New Business)

7. **Discussion Of Policy, Administrative And Funding Motions** -

B. **New Business**

** *Time-sensitive motions marked by asterisk*

***** ***POLICY MOTION, OUTREACH COMMITTEE*** *****

i. ** **Fall Festival Leadership** **

MVCC approves an exploratory committee subsumed under the Outreach Committee for the purpose of investigating whether obstacles to hosting the Mar Vista Fall Festival can be resolved in time for Fall, 2018

***** ***POLICY MOTION, DIRECTOR'S MOTION*** *****

ii. ** **Enhance Safety At Oil Drill Sites Including The Residential Neighborhood Surrounding Rancho Park Public Golf Course ****** (Directors motion submitted by Sara Roos)

WHEREAS industrial oil drilling operations at Rancho Park Public Golf Course are ongoing and in close proximity to thousands of residents, and

WHEREAS there is an extensive history at this Drillsite of City Code violations, Conditions-of-Use violations, and repeated industrial accidents, and

WHEREAS considerable and widespread concern regarding potential jeopardy to human health and safety from extractive oil and gas operations in close proximity to dense residential areas is demonstrable from the widely reported physical symptoms and complaints about communications following the odorant spill of November 29, 2017, reminiscent of the 2015 natural gas leak further north at Aliso Canyon.

THEREFORE be it resolved to exhort that the Zoning Administrator (ZA) follow precedent and deny Drillsite approval of CEB industrial equipment within the residentially zoned Rancho Park Public Golf Course, and

FURTHER mandate all the following safety conditions:

(i) 24/7 emissions monitoring using up-to-date laser-based equipment,

(ii) Annual compliance inspections by the ZA's office and Petroleum Administrator,

(iii) Mandatory periodic Reviews of Conditions by the ZA on a 5 year cycle to allow for updating of ZA assigned Conditions of Use,

(iv) A clear emergency and accident reporting planning by which the oil company must notify LAFD, LAPD and all affected Council Districts' offices.

POLICY MOTIONS, PLUM COMMITTEE

iii. **Resolution to Oppose SB828**

The Mar Vista Community Council of the Westside Regional Alliance of Councils opposes SB828, which would allow the state to require cities to approve zoning capacity for 200% of state assigned RHNA goals, and trigger a by-right process for approvals overriding all local plans IF cities fail to meet all assigned RHNA goals. WRAC notes this bill is based on arbitrary numbers, and by-right approvals with no affordable housing requirements would be a disincentive for developers to use city density bonus ordinances that produce affordable housing—and an unintended consequence of the legislation.

iv. **Resolution to Oppose SB813**

The Mar Vista Community Council of the Westside Regional Alliance of Councils opposes SB813, which would eliminate the FAR, floor area square footage, of Accessory Dwelling Units from a site's total floor area. No compelling reason, and no planning justification, has been presented that demonstrates how the physical conditioned, livable space of an ADU is different from the physical conditioned, livable space of the primary residence on the property.

POLICY MOTIONS, TRANSPORTATION AND INFRASTRUCTURE COMMITTEE

v. **Extension of L.A.M.C. 85.02**

WHEREAS, Los Angeles Municipal Code (L.A.M.C.) Section 85.02, "Use of Vehicles as Living Quarters," went into effect on July 7, 2017, and

WHEREAS L.A.M.C. Section 85.02 shall expire on July 1, 2018 unless extended by ordinance, and

WHEREAS the Mar Vista Community Council supports extending LAMC 85.02 without a sunset provision with inclusion of "map" updates/adjustments before July 1, 2018 which is the current sunset provision, and

WHEREAS the sunset provision should be removed for permanent implementation, and

WHEREAS the City of Los Angeles and all relevant departments should make adjustments and updates with public input to address residential areas which have to deal with conditions of litter, unsanitary conditions, noise and crime, sometimes resulting in altercations, when persons dwell in their vehicles in residential areas,

THEREFORE, the Mar Vista Community Council moves to advise Council member Bonin and Council member Koretz to immediately update the map and introduce an ordinance making the provisions of L.A.M.C. 85.02 permanent.

vi. **Opposition to Westside Mobility's Livable Boulevards Streetscape Plan**

WHEREAS, Venice Boulevard changes within the boundaries of the Mar Vista Community Council have been created that have had profound impacts on traffic, and potentially with profound economic and quality of life impacts, on the adjacent community and throughout the greater Westside region, and

WHEREAS, there are plans in the Westside Mobility Livable Boulevards Streetscape Plan for Pico, Overland, Sepulveda and Centinela Boulevards, and Motor Avenue, that will have a direct impact on traffic, and potentially with profound economic and quality of life impacts, on the adjacent community and throughout the greater Westside region, and

WHEREAS, there are many who are directly affiliated with the Mar Vista Community Council, and who live in and commute through a transformed Venice Blvd., and who are both impacted by the Venice Blvd. changes and concerned about the lack of transparency, opportunity to provide relevant feedback, and other routine legal obligations on the part of the City, and

WHEREAS, commuters of all modalities (including buses, carpools, and others accessing the Expo Line) have been negatively impacted with respect to their mobility,

THEREFORE, the Mar Vista Community Council advises Councilmembers Bonin and Koretz, the Los Angeles City Department of Planning, and Westside Mobility Plan that:

a) To transparently share the source of, and the amount of, public funding for past and present changes and operations associated with Venice Blvd. transformation and reconfiguration and

b) To transparently share the source of, and the amount of, public funding for any future changes associated with the Westside Mobility's Livable Boulevards Streetscape Plan for Venice Boulevard, and

c) The City of Los Angeles is to cease and desist any future changes to Venice Boulevard until proper accounting can be established for the financial and transportation/infrastructure impacts to both Mar Vista and the greater Westside region, and

d) The City of Los Angeles Planning Department is to hold appropriately noticed public hearings to seek public comments and input regarding the totality of the Westside Mobility's Livable Boulevards Streetscape Plan before any final determinations of what parts of the Plan shall be instituted or adopted.

vii. **Recommendation for Continental Crosswalks and Curb Cuts in Zone 2, b**

WHEREAS: Cut through traffic is a significant and growing danger in Zone 2 of Mar Vista, aka North Westdale, and in Zone 1, aka Westside Village, and

WHEREAS: Richland Elementary School does not have and ADA Compliant intersection at the corner of Federal and Brookhaven, the most popular intersection for students to access the school on foot, bicycle and automobile, and

WHEREAS, Clover Avenue Elementary School students have a water obstruction at the intersection of Sepulveda and Queensland, and

WHEREAS: Modern designed crosswalks installed by the city known as Continental or Zebra Crosswalks have been shown to reduce vehicle speed and improve pedestrian safety, and

WHEREAS, removal of water obstructions will improve pedestrian safety at Sepulveda and Queensland,

THEREFORE, LET IT BE RESOLVED: That the MVCC encourages the city to paint Continental Crosswalks at the intersection of Brookhaven and Federal Avenue, Richland and Federal Avenue, Barrington and Sardis, and Sawtelle and Graham Place.

THEREFORE, LET IT ALSO BE RESOLVED: That the MVCC encourages the city to install curb cuts at the intersection of Federal and Brookhaven Avenues.

THEREFORE, LET IT ALSO BE RESOLVED: That the MVCC encourages the City to remove the standing water obstacles at Sepulveda and Queensland.

ADMINISTRATIVE MOTIONS

viii. ***Classification of Director Attendance*** *(Director's motion submitted by Robin Doyno)*

Be it resolved that a departure of a board member from the meeting after a quorum has been established shall be considered an absence. This shall be inserted into the Bylaws in Article V, Section 2.i.

ix. **Funding Motions**

a. **Farmer's Market Annual Rental Fee**

MVCC approves up to $1,200.00 for the Farmer's Market annual rental fee.

b. **Storage Locker Upgrade**

MVCC approves up to $400-$500/mo. for rental of larger storage unit.

c. **Replacement Plexiglass for Posting Display Case**

MVCC approves up to $200.00 for labor and materials to replace broken plexiglass in the wall-mounted postings display case at the MV Recreation Center (if necessary).

d. **Office Supply Reimbursement, Treasurer**

MVCC approves reimbursement of up to $140.00 to Treasurer Holly Tilson for office supplies.

e. **Office Supply Reimbursement, Secretary**

MVCC approves reimbursement of up to $70.00 to Secretary Sara Roos for office supplies.

REVISITED FUNDING MOTIONS, OUTREACH **-** Motions passed previously are updated† or rewritten§ to reflect closer estimate of total final cost including setup charge, tax and shipping (See Attachment B)

f. **Trash Bags To-Go†**

MVCC approves up to $750.00 for Outreach promotional item "Trash Bags To-Go".

g. **Mugs§**

MVCC approves up to $450.00 for Outreach promotional item "MVCC Mugs".

h. **Safe-Driving Lawn Signs†**

MVCC approves up to $2,800.00 for Outreach promotional item "Safe-Driving Lawn Signs".

i. **Post-it Notes§**

MVCC approves up to $1,600.00 for Outreach promotional item "Post-it Notes".

j. **Seat Cushions†**

MVCC approves up to $790.00 for Outreach promotional item "Seat Cushions".

k. **MVCC Meeting Banners**

MVCC approves up to $500.00 for MVCC Meeting Outreach banners.

l. **Keychain-light-whistle (Contingency)**

MVCC approves Outreach promotional item to enhance pedestrian safety for a noise-making flashlight keychain of up to $400.00 including setup charge, tax and shipping contingent on the availability of end-of-year funds.

Minutes of the
Mar Vista Community Council (MVCC)
GENERAL BOARD MEETING
Tuesday, May 8, 2018
at Mar Vista Recreation Center, 11430 Woodbine St., Mar Vista, CA 90066

MVCC (and all other) Meeting Minutes are a summary; Minutes were not, are not and are never meant to be an exact, verbatim, word-for-word transcript or comprehensive record of what was said at a Meeting. Exceptions: Motions/Resolutions (as stated at the Meeting, which take precedence over versions written on the Agenda, if different); quotes (words that have quotation marks ("") at the beginning and ending of a word or words); and other wording from the Agenda such as the first paragraph(s) of some Items. Items are listed in and match the same order as on the Agenda.

1. **Call To Order And Welcome** – Chair
   Chair Rob Kadota introduced himself and called the Meeting to order at 7:00 p.m.

2. **Presentation of flag and Pledge of Allegiance**
   The Pledge of Allegiance was said.

   Nine of the 11 Board Members were present: Paola Cervantes (2nd Vice-Chair), Robin Doyno, Aaron Elster, Elliot Hanna (1st Vice-Chair), Rob Kadota (Chair), Susan Klos, Damien Newton, Sara Roos (Secretary) and Holly Tilson (Treasurer). Kenneth Alpern and Michelle Krupkin arrived later. All Board Members were eligible to vote due to having current Ethics Training and Funding Training. New Board Members Mary Hruska and Nanxi Liu were appointed to the Board during below Item #5. C. The MVCC quorum (the minimum number of Board Members needing to be present to take binding votes on Agendized Items) was seven (see the Bylaws at https://lacity.quickbase.com/db/bj3apxsp3?a=q&qid=32&qskip=0&qrppg=1000&dlta=su46~), so the Board could take such votes. Eleven of the 13 Seats were filled (by election or appointment). Two Board Seats were vacant. Also attended: approximately 35 Stakeholders and Guests.

3. **Community Memorial Observations**
   [*This Agenda Item was addressed after Item #4.*] Mr. Newton announced that Fred [***DN (Damien)/RK/EH CLARIFY: __***] __ passed away.

Board Member Kenneth Alpern arrived at this time (7:02), making 10 Board Members present (the MVCC quorum was seven).

4. **Public Comment & Announcements** - for items not on the agenda
   Lenore French, Director, Green Communications Initiative, announced the next quarterly Mar Vista Art Walk will be June 7th, 6-10 p.m. on Venice Blvd. between Inglewood and Beethoven. A new community art gallery opened at 12804 Venice Blvd. just east of Beethoven, Thursdays-Saturdays noon-6:00 and Sundays noon-5:00.

Board Member Michelle Krupkin arrived at this time (7:04), making 11 Board Members present (the MVCC quorum was seven).

Also, there is free music every Friday night at the Grandview Market on Venice Blvd. between Centinela and Grandview. Property owner Howard Weisberg wanted to know the procedure following MVCC motions, letters sent, responses conveyed, etc. He is interested particularly in the parking study. Stakeholder Karin Ingeverson was concerned about "polystyrene products littering the streets . . . taking 500 years to biodegrade"; she asked for a support letter.

5. Board Administration

A. *Ex Parte*§ Communication & Conflict of Interest‡ Declarations.
Alpern: transportation and land use issues; Newton: Zoning Director emails; Krupkin: Zoning and At Large Director position-related emails with Stakeholders; Tilson: Board Members and Stakeholders regarding the Agenda; Cervantes: Board Members and Stakeholders regarding the Zoning Director position, and a potential conflict of interest regarding [***PC CLARIFY:*** **__**] __; Doyno: [***RD (Robin) CLARIFY:*** **__**] __; and Klos: Zoning Director position-related emails.

B. Approval of April 17th, 2018, Board of Directors Meeting Minutes.

MOTION (by Ms. Tilson, seconded by Ms. Klos): The Mar Vista Community Council approves the Minutes of its April 17, 2018 General Board Meeting as written.

DISCUSSION: There was a request for increased printed copy text visibility.

MOTION PASSED unanimously by a voice vote; zero opposed; zero abstained.

C. Appointment of Board Directors

i. Candidates for Zone 3 Director

a. Christen Hebrard
Mr. Kadota reported that Ms. Hebrard withdrew her name from consideration.

b. Mary Hruska
During Public Comment, Bill Pope endorsed Ms. Hruska. A long-time resident, she introduced herself and described her goals.

MOTION to NOMINATE (by Mr. Kadota, seconded by Mr. Alpern): The Mar Vista Community Council nominates Mary Hruska as its Zone 3 Director.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

New Board Member Mary Hruska was Seated at this time, making 12 Board Members present (the MVCC quorum is seven).

ii. Candidates for At-Large Director

a. Selena Inouye
Ms. Inouye introduced herself and described her background. She is "100% a volunteer" with Restore Venice Boulevard and "one of [her] passions is

outreach." She will consult with the City Attorney about possible conflicts of interest.

b. Nanxi Liu
Homeowner Ms. Liu introduced herself and described her background, experience and "passion for community service," including the Outreach Committee. She would like to establish a "speaker series," make website improvements and plant trees. She had attended Neighborhood Watch meetings.

c. Zeina Mehdi
Mr. Kadota reported that Ms. Mehdi withdrew her name from consideration.

MOTION to NOMINATE (by Mr. Kadota, seconded by Ms. Cervantes): The Mar Vista Community Council nominates Nanxi Liu as an At-Large Director.

MOTION PASSED by a hand vote with seven in favor; five opposed.

New Board Member Nanxi Liu was Seated at this time, making 13 Board Members present (the MVCC quorum is seven).

6. Reports (See Attachment C)

A. Elected Officials and City Department Reports
Hannah Levien, Field Deputy for L.A. City District 11 Councilman Mike Bonin (310-575-8461; Hannah.Levien@LACity.org), reported that "13 new trees will be planted" on Venice Blvd., possibly on June 14th; she or Planning Deputy Len Nguyen will advise about it. Community Plan [https://planning.lacity.org/complan/pdf/plmcptxt.pdf] "outreach is starting in July."

Lianna Mecano, Representative for State 26th District Senator Ben Allen (310-318-6994; http://sd26.senate.ca.gov), described recent legislation sponsored by the Senator.

B. Liaison Reports
Linda Guagliano (lindaguag@netzero.net) reported that the next Mar Vista Bi-monthly LADOT/CD11/LAPD Traffic Committee meeting will be Wednesday, May 16th. Mr. Kadota indicated that more reports will be given at the MVCC June [12th] Board Meeting. Christopher McKinnon described the One Water LA program.

C. Officer Reports
Ms. Tilson reported "on [the] current financial status."

FUNDING MOTION (by Ms. Tilson, seconded by Ms. Roos): The Mar Vista Community Council approves its April 2018 Monthly Expenditure Report.

FUNDING MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

FUNDING MOTION (by Mr. Hannah, seconded by Mr. Elster): The Mar Vista Community Council [***EH/AE/RK CLARIFY: __ WHAT?***] __

FUNDING MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

D. Committee Reports
It was agreed to TABLE this Item.

E. Zone Director Reports
It was agreed to TABLE this Item.

7. Discussion of Policy, Administrative and Funding Motions

A. Unfinished Business - Policy, Administrative and Funding motions previously agendized and not addressed (See Attachment D).

i. EV Chargers – changes to the city building code to require new parking spaces be EVcharger-ready.
[*This Agenda Item was addressed after the Consent Motion at the end of Item #7. A. xi.*] It was agreed to replace the phrase "most new" with "greater convertibility of."

MOTION (by Mr. Newton, seconded by Ms. Roos): The Mar Vista Community Council resolves that:

WHEREAS the AQMD says plug-in cars are essential if clean air standards are to be realized. Plug-ins now make up 5% of new vehicle sales in California, and are increasingly popular in Mar Vista, but adoption is hindered by lack of easy home and workplace charging. And

WHEREAS several California cities have already adopted sensible building code changes to make adding electric vehicle chargers much less expensive.

WHEREAS, for instance, the study in the City of Oakland's Council File 16-0359 says preparing for EV chargers ahead of time adds about $140 per parking space, and makes later EV charger installation $500 to $5000 cheaper.

THEREFORE, the Mar Vista Community Council requests that the Los Angeles City Council follow the example of these cities, and pass sensible, cost-effective building code changes to require greater convertibility of parking spaces in the city to be ready for future installation of EV chargers.

DISCUSSION: Mr. Elster reported that business customers have complained that there were no charging spaces; however, he believed that $140 is too much.

AMENDMENT to the MOTION (by Mr. Alpern, seconded by Ms. Krupkin): The Mar Vista Community Council [***DN/SR/RK CLARIFY: __ WORDING***] resolves that there should be changes to the City building code to require new parking spaces to be electric vehicle charger-ready.

AMENDMENT to the MOTION PASSED by a hand vote with seven in favor; two opposed; three abstained ([***RK/EH/PC CONFIRM: __***] the MVCC counts abstentions as neither "yes" votes nor "no" votes). [***Page four, Article Five***

Section three of the Bylaws says "Official Actions Voting: Subject to the presence of a quorum, a majority vote of the Directors present, not including abstentions shall prevail."].

MOTION to REFER this Item to the Planning and Land Use Management COMMITTEE (by Mr. Hanna, seconded by Ms. Krupkin).

MOTION PASSED by a hand vote with nine in favor; one opposed; two abstained.

ii. Short-Term Rentals – support for CoLA ordinance regulating short-term rentals, with conditions for opposition.
Mr. Newton described Committee considerations.

MOTION (by Mr. Newton, seconded by Ms. Cervantes): The Mar Vista Community Council supports inclusion of any City of Los Angeles Short-Term Rentals Ordinances that include the following:
- Tax funds generated by short-term rentals that go toward paying for enforcement officers to address community safety concerns without placing undue burden on homeowners.
- Earmarking remaining funds for the City's Affordable Housing Trust Fund.

The Mar Vista Community Council opposes any ordinance that would:
- Place new burdens on homeowners who simultaneously rent out property on which they live.
- Include a limit on the number of days that can be rented without cause inside a homeowner's primary property.
- Impose new taxes or fees that only impact short-term rentals.

DISCUSSION: Stakeholders spoke for and against short-term rentals.

AMENDMENT to the MOTION (by Mr. Elster): The Mar Vista Community Council [***RK/EH/AE CLARIFY: __ SOMETHING ABOUT***] __ earmarking __

AMENDMENT to the MOTION FAILED for lack of a second.

DISCUSSION: Board Members commented.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

MOTION (by Ms. Cervantes, seconded by Mr. Elster): The Mar Vista Community Council [***PC/AE/RK CONFIRM: __ MOTION WORDING.]*** will address Item #7. A. xi. b.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

iii. Regulation of Group Homes – CIS supporting LA Council consideration of mitigation opportunities for group homes.
See the below Consent Motion.

iv. Opposing Development Ordinance SB 827 (Weiner) – objections to the removal of local control in Planning.

[*This Agenda Item was addressed after Item #7. A. xi. b.*] Mr. Kadota requested and it was agreed to TABLE this Item to the June [12th] Board Meeting.

v. Development at 11700 Charnock Boulevard – supports the application.
It was agreed to TABLE this Item to the June [12th] Board Meeting.

vi. Venice Boulevard Public Records Act Request – supports a stakeholder's previous public records request for data regarding the Venice Blvd. roadway reconfiguration pilot project.
Ms. Krupkin reported that the Motion was passed by the Great Streets Commission in February.

M**OTION** (by Ms. Krupkin, seconded by Mr. Alpern): The Mar Vista Community Council supports a Stakeholder's previous public records request for data regarding the Venice Blvd. public project and resolves that:

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017, requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders' requests for assistance and information;

NOW, THEREFORE, be it resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017, California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

DISCUSSION: Stakeholder Donna Speckman indicated that legal action is being pursued regarding government taking too long (273 days as of this date) to comply with a Public Records Act (PRA) request. Stakeholders Jason Fineis, Kalani Whittington and another agreed on that and that the data was incorrectly interpreted.

AMENDMENT to the MOTION (by Ms. Roos): The Mar Vista Community Council strikes paragraphs three through six of the above Resolution.

AMENDMENT to the MOTION FAILED for lack of a second.

ORIGINAL MOTION PASSED by a hand vote with 11 in favor; zero opposed; one abstained.

MOTION (by Mr. Newton, seconded by Mr. Elster): The Mar Vista Community Council [***PC/AE/RK CONFIRM: __ MOTION WORDING.]*** will address Item #7. B.

MOTION PASSED unanimously; zero opposed; zero abstained.

vii. Reform and Enhance City Process and Program Efficiencies.
See the below Consent Motion.

viii. Authorization to Submit Community Impact Statements – enables current members of the ExFin Committee to submit community impact statements.

MOTION (by Ms. Roos, seconded by Mr. Newton):

WHEREAS the City Clerk maintains a procedure for Neighborhood Councils to addend Community Impact Statements (CIS) to council files as an official statement adopted by a Neighborhood Council on issues pending before the City Council, its committees, or City commissions.

THEREFORE, the Mar Vista Community Council authorizes its ExFin Committee:

Rob Kadota, Chair
Elliot Hanna, 1st Vice Chair
Paolo Cervantes, 2nd Vice Chair
Sara Roos, Secretary
Holly Tilson, Treasurer,

to SUBMIT Community Impact Statements that have been passed by a vote of the full board.

BE IT FURTHER RESOLVED, that in cases where an issue is moving quickly through the legislative process and a promptly issued statement is beneficial, any aforementioned board member is authorized to WRITE and SUBMIT a Community Impact Statement in consultation with the chair, provided that it expresses the position of a motion previously passed by the full board.

By this motion, the Chair and the Secretary are authorized to submit a formal request to the Department of Neighborhood Empowerment to authorize the board members listed above to submit Community Impact Statements to the City Clerk on behalf of the Mar Vista Community Council.

AMENDMENT to the MOTION (by Mr. Kadota, seconded by Mr. Hanna): The Mar Vista Community Council strikes Board Members' names from the Motion.

AMENDMENT to the MOTION PASSED by a hand vote; zero opposed; zero abstained.

AMENDED MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

ix. Code of Conduct – empowers censure or removal as punishment for violation of the Code of Conduct.
It was agreed to REFER this Item to the Bylaws Committee.

x. Censure Proposal – censures Michael Millman over a letter to the editor of the Argonaut, dated March 29, 2018.
Mr. Hanna referred to Bylaws Article Eight and said "this is a grievance"; he believed that the Motion would usurp the Bylaws. He made a Point of Order regarding this Agenda Item; Mr. Kadota agreed with Mr. Hanna and ruled this Agenda Item to be Out of Order. Mr. Kadota believed the Bylaws Committee should consider "development of a censure process."

xi. Funding Motions

a. International Festival at Clover ES (NPG) - $1,000
This Agenda Item was said to have been "voided" because the event was already held.

b. PESA Teen Court & Tolerance Program (NPG) - $1,000
Ms. Cervantes explained the program and that "they meet once a month." PESA representatives spoke, saying "it is a diversionary program"; teens are judged "by a jury of their peers"; a real judge presides. Mr. Doyno reported that the "Education, Arts and Culture [Committee] had a very deep discussion" about this.

MOTION (by M_. __, seconded by M_. __): The Mar Vista Community Council allocates $1,000 to the PESA Teen Court and Tolerance Program.

AMENDMENT to the MOTION (by Ms. Tilson, seconded by Mr. Hanna): The Mar Vista Community Council will increase the allocation amount to $2,000.

AMENDMENT to the MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

DISCUSSION: There was discussion of the funding level.

AMENDED MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

c. Business Cards & Office Expenses - $400
See the below Consent Motion.

d. Outreach at MVNA Block Party - $300
See the below Consent Motion.

[*The below Consent Motion was made after Item #7. A. x.*]

CONSENT MOTION (by Mr. Newton, seconded by Ms. Cervantes): The Mar Vista Community Council approves the Motions in Agenda Item #s 7. A. iii and vii, and xi. c and d.

CONSENT MOTION PASSED by a voice vote; zero opposed; zero abstained.

B. New Business - Administrative, Funding and Policy motions (See Attachment E)

i. Fall Festival Leadership – exploratory committee to investigate whether a new Leader can overcome obstacles to stage the Fall Festival this year.
See the below Consent Motion.

ii. Enhanced Safety at Oil Drillsites – prescribes denial of a gas burner at Rancho Park Drillsite and proscribes ZA conditions for enhancing public safety surrounding drillsites.
Copies were distributed of "Policy Motion Information." See the below Consent Motion.

iii. Opposing Development Ordinance SB 828 – objections to conditions overriding local planning of zoning capacity.
See the below Consent Motion.

iv. Opposing Development Ordinance SB 813 – objects to eliminating FAR consideration for ADUs.
See the below Consent Motion.

v. LAMC 85.02 extension – supports updating its associated map and permanently extending the ordinance.
See the below Consent Motion.

vi. Westside Mobility's Livable Boulevards Streetscape Plan – transparency in planning and implementing Westside Mobility's Livable Boulevards Streetscape Plan.
It was agreed to POSTPONE this Item to the June [12th] Meeting.

vii. Zone 2 Continental Crosswalks and Curb Cuts – identification of roadway safety enhancements.
[*This Agenda Item was addressed after Item #7. B. ix.*]

MOTION (by Ms. Tilson, seconded by Ms. Krupkin): The Mar Vista Community Council resolves that:

WHEREAS: Cut through traffic is a significant and growing danger in Zone 2 of Mar Vista, aka North Westdale, and in Zone 1, aka Westside Village, and

WHEREAS: Richland Elementary School does not have and ADA Compliant intersection at the corner of Federal and Brookhaven, the most popular intersection for students to access the school on foot, bicycle and automobile, and

WHEREAS, Clover Avenue Elementary School students have a water obstruction at the intersection of Sepulveda and Queensland, and

WHEREAS: Modern designed crosswalks installed by the city known as Continental or Zebra Crosswalks have been shown to reduce vehicle speed and improve pedestrian safety, and

WHEREAS, removal of water obstructions will improve pedestrian safety at Sepulveda and Queensland,

THEREFORE, LET IT BE RESOLVED: That the MVCC encourages the city to paint Continental Crosswalks at the intersection of Brookhaven and Federal Avenue, Richland and Federal Avenue, Barrington and Sardis, and Sawtelle and Graham Place.

THEREFORE, LET IT ALSO BE RESOLVED: That the MVCC encourages the city to install curb cuts at the intersection of Federal and Brookhaven Avenues.

THEREFORE, LET IT ALSO BE RESOLVED: That the MVCC encourages the City to remove the standing water obstacles at Sepulveda and Queensland.

DISCUSSION: Mr. Newton explained the Motion. Ms. Hruska said "anything we can do to make it safer" at schools.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

viii. Classification of Director Absence – redefine premature meeting departure as absence from the meeting.
It was agreed to POSTPONE this Item to the June [12th] Meeting.

ix. Funding Motions

a. Farmer's Market Annual Rental Fee – up to $1,200
See the below Consent Motion.

b. Storage Locker Upgrade - < $500/mo.
[*This Agenda Item was addressed after Item #7. B. ix. c.*]

MOTION (by Ms. Tilson, seconded by Ms. Krupkin): The Mar Vista Community Council will allocate up to $500 to upgrade the storage locker, to be used exclusively for MVCC property.

DISCUSSION: There was discussion of the locker's uses and what to store.

MOTION PASSED by a hand vote with seven in favor; one opposed; three abstained.

c. Replacement Plexiglass for Posting Display Case - < $200
Ms. Tilson explained that the case was broken.

MOTION (by Ms. Tilson, seconded by Ms. Krupkin): The Mar Vista Community Council will allocate $200 to purchase replacement Plexiglass for the posting display case.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

Board Member Susan Klos left by this time, making 10 Board Members present (the MVCC quorum was seven).

[*RK/PC/SR CLARIFY: AT THIS TIME A MOTION WAS MADE TO, APPARENTLY, MOVE AN AGENDA ITEM UP (ADDRESS IT SOONER); IT'S NOT CLEAR WHAT ITEM WAS BEING REFERRED TO*) MOTION (by Mr. Kadota, seconded by Ms. Cervantes): The Mar Vista Community Council [***RK/PC/SR CONFIRM: __ MOTION WORDING.]*** will address Item #__

MOTION FAILED by a hand vote with four in favor; seven opposed; one abstained.

d. Office Supply Reimbursement, Treasurer - < $140
See the below Consent Motion.

e. Office Supply Reimbursement, Secretary - < $70
See the below Consent Motion.

f. Updated Promo Trash Bags To-Go - < $750
See the below Consent Motion.

g. Updated Promo Mugs - < $450
[*This Agenda Item was addressed after the below Consent Motion.*]

MOTION (by Mr. Newton, seconded by Ms. Cervantes): The Mar Vista Community Council will allocate $500 to purchase updated promotional mugs.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

h. Updated Promo Post-it Notes - < $1,600
See the below Consent Motion.

i. Updated Promo Safe-Driving Lawn Signs - < $2,800
See the below Consent Motion.

j. Updated Promo Seat Cushions - < $790
See the below Consent Motion.

k. MVCC Sponsorship Banner - < $500
See the below Consent Motion.

l. Contingency Promo Safety Keychain - < $400
See the below Consent Motion.

CONSENT MOTION (by Mr. Alpern, seconded by Mr. Hanna): The Mar Vista Community Council approves the Motions in Agenda Item #s 7. B. i, ii, iii, iv and v; and ix. a, d, e, f, h, i, j, k and l.

CONSENT MOTION PASSED unanimously by a voice vote; zero opposed; zero abstained.

MOTION (by Ms. Cervantes, seconded by Mr. Elster): The Mar Vista Community Council [***PC/AE/RK CONFIRM: __ MOTION WORDING.]*** will address Item #7. B. ix. g.

MOTION PASSED unanimously by a hand vote; zero opposed; zero abstained.

8. Grievances, if any received
No Grievances were received.

9. Future Agenda Items
No future Agenda Items were requested at this time.

10. Public Comment
Mr. Newton and Mr. Alpern announced that they will not be able to attend the June [12th] Board Meeting.

11. Adjournment

MOTION to **ADJOURN** (by Mr. Kadota, seconded by Ms. Krupkin).

MOTION to ADJOURN PASSED; zero opposed; zero abstained.

The Meeting was **ADJOURNED** at 9:43 p.m.

Respectfully submitted,

The first paragraph of some Items, Motions/Resolutions and other wording may have been copied from the Agenda. Possibly edited by MVCC. Minutes written by DL, possibly edited by MVCC. The MVCC Minutes page is http://www.marvista.org/minutes-and-agendas.php.

Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday June 12th, 2018, at 7:00 pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call To Order And Welcome** – Chair (1 min)
2. **Presentation Of Flag And Pledge Of Allegiance** (1 min)
3. **Community Memorial Observations**
4. **Public Comment And Announcements** – for items not on the agenda (30 minutes total, unless waived by the Chair)
5. **Board Administration**
   A. ***Ex Parte*[§] Communication and Conflict Of Interest[‡] Declarations** from each Board Member
   B. **Approval of May 8th, 2018, Board of Directors Meeting Minutes** (public comment permitted)
   C. **Election of MVCC Executive Committee, 2018-19**
6. **Reports** – See Addendum A, Reports
   A. **Elected Officials and City Department Reports**
   All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.
   B. **Liaison Reports** (public comment permitted)
   C. **Officer Reports** (action items may be included, with public comment permitted)
   Treasurer's report regularly includes approval of Monthly Expense Report (MER) (See Attachments).
   D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)
   E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
7. **Discussion Of Policy, Administrative And Funding Motions** – See Addendum B, Motions Disposition (public comment permitted)
   A. **Unfinished business**
   Items may be received and filed by consent if there is no discussion or public comment.
   B. **New business**
   Items may be received and filed by consent if there is no discussion or public comment.
8. **Future Agenda Items**
9. **Public Comment**
10. **Adjournment**

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* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 3 minutes per speaker, unless adjusted by the presiding officer of the Board.*

* ***PUBLIC POSTING OF AGENDAS*** *- MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, Mar Vista, CA 90066*

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ADDENDUM A, Reports

Comprising a record of Representatives, Deputies and Liaisons with MVCC stakeholders

6. Reports

A. **Elected Officials and City Department Reports**

All elected officials or their representatives are invited to present issues of immediate interest. To expedite meetings, advance notice is appreciated.

i. CoLA Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
ii. CoLA CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
iii. CoLA CD 11 – Councilmember Mike Bonin, rep by Field Deputy Hannah.Levien@lacity.org
iv. CoLA Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel.Jacinto@lacity.org
v. CoLA Mayor – Eric Garcetti, rep. by Daniel.Tamm@lacity.org
vi. LA County Supervisor, Second District - Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
vii. CA Assembly 54 – Assembly Member Sydney Kamlager
viii. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
ix. CA Senate 26- Assembly Member Ben Allen, rep by District Director Lianna.Mecano@sen.ca.gov
x. CA Senate 30 – Holly J. Mitchell, rep by Field Rep Joy.Masha@sen.ca.gov
xi. US Representative 33 – Ted Lieu, rep by joey.apodaca@mail.house.gov
xii. US Representative 37 - Karen Bass, rep by District Director Maral V. Karaccusian maral@mail.house.gov
xiii. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
xiv. CoLA Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org

B. **Liaison Reports** (public comment permitted)

i. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano at lindaguag@netzero.net
ii. DWP MOU: *open*
iii. LANCC: *open*
iv. One Water LA: Christopher McKinnon
v. WRAC: Rob Kadota
vi. WRAC LUPC: *open*
vii. City Budget Advocates: Holly Tilson
viii. Recode LA: Sharon Commins
ix. Animal Services: Tom Ponton
x. Friends of Historic FS 62: Albert Olson
xi. Mar Vista Chamber of Commerce: *open*
xii. 2018 Mar Vista Green Garden Showcase: Maggie Begley

C. **Officer Reports** (action items included, with public comment permitted)

i. **Chair** – Rob Kadota
ii. **First Vice Chair** – Elliot Hanna
iii. **Second Vice Chair** – Paola Cervantes

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* ***THE AMERICAN WITH DISABILITIES ACT*** *- As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities, including sign language interpreters, assistive listening devices and other auxiliary aids and/or services. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org.*

* ***PUBLIC ACCESS OF RECORDS –*** *In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org.*

* ***RECONSIDERATION AND GRIEVANCE PROCESS -*** *For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

ADDENDUM A, Reports (Continued)

iv. **Secretary** – Sara Roos
v. **Treasurer** – Holly Tilson (See Attachment 1, Finances)
   a. Report on current month's financial status
   b. **APPROVAL** of previous months' Monthly Expense Report (MER)

D. **Committee Reports** (may include motions to refer to committee where desirable; public comment permitted)

i. **Elections and By-laws Committee** - Elliot Hanna & Robin Doyno, Co-chairs
ii. **Community Outreach Committee** – Sara Roos, Chair
iii. **Committee on Public Safety** – Elliot Hanna, Chair
iv. **Aging in Place** - Sherri Akers, Tatjana Luethi and Birgitta Kastenbaum, Co-chairs
v. **Planning and Land Use Management Committee** – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
vi. **Transportation & Infrastructure Committee** – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
vii. **Bike Mar Vista** - Rob Kadota, Chair
viii. **Education, Arts and Culture Committee** –Robin Doyno & Paola Cervantes, Co-chairs; Lenore French, Vice-chair
ix. **Great Streets Ad Hoc Committee** – Michelle Krupkin & Rob Kadota, Co-chairs
x. **Airport Committee** – Holly Tilson & Martin Rubin, Co-chairs
xi. **Green Committee** –Jeanne Kuntz, Chair
xii. **Homeless Issues Committee** – Robin Doyno & Susan Klos, Co-chairs

E. **Zone Director Reports** (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)

i. **Zone 1** – Ken Alpern
ii. **Zone 2** – Damien Newton
iii. **Zone 3** – Mary Hruska
iv. **Zone 4** – Aaron Elster
v. **Zone 5** – Michelle Krupkin
vi. **Zone 6** – Holly Tilson

ADDENDUM B, Motions

7. **Discussion Of Policy, Administrative And Funding Motions** – (public comment permitted)

   A. **Unfinished business**

   Items may be received and filed by consent if there is no discussion or public comment.

Source	Motion Number, Title	Disposition
PLUM	A.i) **Opposing SB 827 [Weiner]** *WHEREAS the City Charter-mandated Neighborhood Council system of Los Angeles, and the Community Councils of the City of Los Angeles, represent grass roots democracy,* *Therefore Let It Be Resolved, that in the absence of a formal statement to the controversy on specific legislation, it should be assumed that the Mar Vista Community Council opposes any legislation proposed by the state that would infringe on the rights of cities and other municipalities to plan their neighborhoods or create development plans that have the power of law.*	**Policy** __/__/__
PLUM	A.ii) **Development at 11700 Charnock Boulevard (Charnock/McLaughlin)** *The Mar Vista Community Council **supports** the application to build a new six-unit, two story, development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the city.*	**Policy** __/__/__
T/I	A.iii) ***Extension of L.A.M.C. 85.02*** *WHEREAS, Los Angeles Municipal Code (L.A.M.C.) Section 85.02, "Use of Vehicles as Living Quarters," went into effect on November 22, 2016, and* *WHEREAS L.A.M.C. Section 85.02 shall expire on July 1, 2018 unless extended by ordinance, and* *WHEREAS the Mar Vista Community Council supports extending LAMC 85.02 beyond July 1, 2018 without any sunset provision, and* *WHEREAS the City of Los Angeles and all relevant departments should solicit public input for updated revisions to the associated 85.02 map accommodating the impact of vehicular residency on permanent residents – including unsanitary conditions, litter, noise, crime and sporadic violence,* *THEREFORE, the Mar Vista Community Council advises the City Council of Los Angeles, including our local Council members Bonin and Koretz, to update the associated 85.02 map immediately with accommodations, and pass an ordinance retaining L.A.M.C. 85.02 permanently.*	**Policy** __/__/__
T/I	A.iv) **Opposition to Westside Mobility's Livable Boulevards Streetscape Plan** *WHEREAS, Venice Boulevard changes within the boundaries of the Mar Vista Community Council have been created that have had profound impacts on traffic, and potentially with profound economic and quality of life impacts, on the adjacent community and throughout the greater Westside region, and* *WHEREAS, there are plans in the Westside Mobility Livable Boulevards Streetscape Plan for Pico, Overland, Sepulveda and Centinela Boulevards, and Motor Avenue, that will have a direct impact on traffic, and potentially with profound economic and quality of life impacts, on the adjacent community and throughout the greater Westside region, and* *WHEREAS, there are many who are directly affiliated with the Mar Vista Community Council, and who live in and commute through a transformed Venice Blvd., and who are both impacted by the Venice Blvd. changes and concerned about the lack of transparency, opportunity to provide relevant feedback, and other routine legal obligations on the part of the City, and* *WHEREAS, commuters of all modalities (including buses, carpools, and others accessing the Expo Line) have been negatively impacted with respect to their mobility,* *THEREFORE, the Mar Vista Community Council advises Councilmembers Bonin and Koretz, the Los Angeles City Department of Planning, and Westside*	**Policy** __/__/__

ADDENDUM B, Motions (Continued)

	Mobility Plan that: *a)To transparently share the source of, and the amount of, public funding for past and present changes and operations associated with Venice Blvd. transformation and reconfiguration and* *b)To transparently share the source of, and the amount of, public funding for any future changes associated with the Westside Mobility's Livable Boulevards Streetscape Plan for Venice Boulevard, and* *c) The City of Los Angeles is to cease and desist any future changes to Venice Boulevard until proper accounting can be established for the financial and transportation/infrastructure impacts to both Mar Vista and the greater Westside region, and* *d) The City of Los Angeles Planning Department is to hold appropriately noticed public hearings to seek public comments and input regarding the totality of the Westside Mobility's Livable Boulevards Streetscape Plan before any final determinations of what parts of the Plan shall be instituted or adopted.*	
At-large Director Doyno	A.v) **Classification of Director Attendance** *Be it resolved that a departure of a board member from the meeting after a quorum has been established shall be considered an absence. This shall be inserted into the Bylaws in Article V, Section 2.i.*	**Policy** __/__/__

7. **Discussion Of Policy, Administrative And Funding Motions, Continued** – (public comment permitted)

B. **New business**

Items may be received and filed by consent if there is no discussion or public comment.

Source	Motion Number, Title	Disposition
PLUM	B.i) **Development at 12331 W. Palms Boulevard (Palms/Centinela)** *The Mar Vista Community Council **opposes** the proposed mixed use development at 12331 W. Palms Boulevard.* *The community believes the 32 unit apartment complex with 3000 feet of retail is too large for the neighborhood and will have significant impact on traffic circulation and parking.*	**Policy** __/__/__
PLUM	B.ii) **Development at 11671-11677 National Boulevard (Barrington/National)** *WHEREAS: In November of 2017 the Mar Vista Community Council (MVCC) opposed a mixed-use project proposed at 11671-11677 National Boulevard ("the Project"), noting specifically the Developer's complete lack of community involvement or indeed even community outreach;* *WHEREAS: The City permitted the Project without any public hearing, determining it "by-right" with construction already begun and;* *WHEREAS: The owners of the adjacent property located at 11685-11695 West National Boulevard, Pelton Properties, LLC (the "appellants"), are appealing to the Los Angeles City Council the LADOT's May 3, 2018 decision upholding LADOT's review and approval of the Project under the Specific Plan on the grounds that:* • *the Project causes significant transportation impacts that have not been adequately evaluated or mitigated as required under the Specific Plan, and* • *LADOT failed to perform an environmental review of the project under CEQA and;* *WHEREAS: The larger North Westdale Community (Zone 2 of the MVCC) agrees with the appellant that directing all traffic for the Project through the 120 foot long/20 foot wide alley located between National Boulevard and Sardis Avenue*	**Policy** __/__/__

	will cause numerous detrimental effects, including: *1) confusion and backup by sharing the turning lane intended for southbound Barrington traffic turning left onto eastbound National Blvd., with the Project's alley-bound traffic;* *2) traffic backing up onto Barrington and further onto National Boulevard when insufficient parking for the Project impedes movement through the narrow alley;* *3) traffic back-ups when DWP/trash/utility trucks further constrict the alley;* *4) elevated accident risk at the intersection of the Project's two-level parking garage with the Pelton property's loading and parking area;* *5) increased reckless cut-through traffic using eastbound Sardis through the residential neighborhood;* *6) impaired emergency vehicle access. Therefore;* *LET IT BE RESOLVED THAT: MVCC strongly **supports the Pelton's appeal** and asks that the City Council:* *(i) reverse LADOT's approval of the Project under the Specific Plan, and* *(ii) direct LADOT to evaluate the Project's potential traffic, circulation, and public safety impacts, and* *(iii) require that the proper environmental review be performed, and* *(iv) require that the necessary mitigation measures be implemented, with particular attention to maintaining a separate vehicular access point on West National Boulevard.*	
T/I	B.iii) **Street-Sweeping Route and Services For Centinela Blvd. Between Palms Blvd. and National Blvd., And For All MVCC Major Thoroughfares** *WHEREAS: The Mar Vista Community Council (MVCC) supports maintenance and repairs on all of its major infrastructure assets, including vital thoroughfares such as Centinela Blvd., and* *WHEREAS: It has come to the attention of the MVCC that there is no street sweeping route on Centinela Blvd. between Palms Blvd. and National Blvd., and that there are no resources allotted to correcting this current lack of street maintenance,* *THEREFORE, LET IT BE RESOLVED: That the CD11 office, L.A. Bureau of Street Services (BSS), and LADOT will work with any and all City budgeting and resources to initiate and implement regular and ongoing street sweeping to the aforementioned segment of Centinela Blvd.* *THEREFORE, LET IT ALSO BE RESOLVED: That the CD11 office, the CD5 office, BSS, and LADOT will perform an analysis of all major thoroughfares within the confines of the MVCC to determine if regular and ongoing street sweeping, as well as other vital services and maintenance, is in order.*	**Policy** __/__/__
Treasurer Tilson, Zone 6 Director	B.iv) **Second Signer** *MVCC approves _____ as second signer for the MVCC credit card.*	**Administrative** __/__/__
Treasurer Tilson, Zone 6 Director	B.v) **Approval of March MER** *MVCC approves the Monthly Expenditure Report (MER) for March, as presented by Treasurer Tilson at the April MVCC BoD meeting.*	**Administrative** __/__/__
Chair Kadota, At-large Director	B.vi) **Certification of MVCC's Inventory** *MVCC approves and certifies the MVCC Inventory list (see addendum D) is correct and complete, containing all items in the possession of MVCC as reported to the Department of Neighborhood Empowerment during Fiscal Year 2017-2018.*	**Administrative** __/__/__
Treasurer Tilson, Zone 6 Director	B.vii) **Administrative Summary** *MVCC approves the 2018-2019 Administrative Summary Packet.*	**Administrative** __/__/__

ADDENDUM B, Motions (Continued)

At-Large Director Roos	B.viii) **LADWP Aqueduct-Owens Valley Tour** (See Addendum C) *MVCC approves _____ and _____ as MVCC representatives for LADWP's Aqueduct-Owens Valley Tour.*	**Admin-istrative** __/__/__
Trea-surer Tilson, Zone 6 Director	B.ix) **Neighborhood Watch Signs** *MVCC approves up to $3000 to purchase Neighborhood Watch signs and mounting equipment as discussed throughout 2017.*	**Funding** __/__/__
Trea-surer Tilson, Zone 6 Director	B.x) **Grease Night At VHS** *MVCC approves $300 as Outreach for Grease Night at VHS.*	**Funding** __/__/__

ATTACHMENTS

Attachment 1: Finances
Year-end accounting, Last Financial Budget

Category	Subcategory	Description	Expense	Original Budget	Adjusted Budget	YTD available as of March 31	Available as of April 1	April Spending	May Spending	June, spent	June, anticipated	Cash remaining (6/9/18), FY 2017-18
General/ Operational Budget	Office	Storage	Storquest	$ 2,496.00	$ 2,713.00	$ 1,880.30	$ 832.70		$ 761.83		$ 461.00	$ (390.13)
		Meeting rooms rental	The Vineyard	$ 600.00	$ 400.00	$ 130.00	$ 270.00				$ 100.00	$ 170.00
			St Andrew's Lutheran Church	$ 300.00	$ 300.00	$ 200.00	$ 100.00		$ 25.00	$ 25.00		$ 50.00
			St Bede's	$ 75.00	$ 150.00	$ 75.00	$ 75.00				$ 150.00	$ (75.00)
			Windward School	$ 5.00	$ 5.00	$ 5.00	$ -					$ -
			PO Box rental	$ 132.00	$ 134.00	$ 134.00	$ -					$ -
			Farmer's Market rental	$ 1,200.00	$ 1,200.00	$ -	$ -				$ 1,200.00	$ (1,200.00)
		Equip & supplies (misc)	Live streaming equipment	$ -	$ 1,547.00	$ 1,546.61	-					-
			Projector screen & stand	$ -	$ 333.00	$ 332.77	-					-
			Misc	$ 1,100.00	$ 350.00	$ 6.66	$ 343.34		$ 65.67		$ 100.00	$ 177.67
			Paid secretary	$ -	$ 800.00	$ -	$ 800.00				$ 500.00	$ 300.00
			Office/ExFin supplies	$ -	$ 500.00	$ -	$ 500.00		$ 200.30		$ 299.70	$ -
		Mtg supplies & printing	Printing	$ 1,000.00	$ 500.00	$ 69.53	$ 430.47				$ 80.00	$ 350.47
		Board Training & Support	Business cards/name badges	$ 250.00	$ 669.30	$ 269.30	$ 400.00				$ 400.00	$ -
			Board Retreat	$ 37.68	$ 100.00	$ 37.68	$ 62.32					$ 62.32
			Office Subtotal:	***$7,195.68***	***$9,701.30***	***$4,686.85***	***$3,813.83***		***$ 1,052.80***	***$ 25.00***	***$ 3,290.70***	***$ (554.67)***
	Outreach	Website	The Web Corner: website maintenance	$ 1,650.00	$ 1,650.00	$ 1,200.00	$ 450.00	$ 150.00	$ 150.00	$ 150.00		$ -
			The Web Corner: emails	$ 385.00	$ 336.00	$ 251.00	$ 85.00	$ 28.00	$ 31.50	$ 31.50		$ (6.00)
			The Web Corner: Extra Data Entry	$ 500.00	$ 500.00	$ -	$ 500.00					$ 500.00
			RIMU Hosting	$ 96.27	$ 97.00	$ 97.00	$ -					$ -
		Email Service	Mail chimp email service	$ 480.00	$ 292.50	$ 202.50	$ 90.00	$ 22.50	$ 22.50		$ 22.50	$ 22.50
		MiFi Service	AT&T MiFi service	$ -	$ 500.00	$ 194.80	$ 645.20	$ 94.81	$ 94.81		$ 94.81	$ 360.77
		Advertising	Banners/sign/event promotion	$ 500.00	$ 500.00	$ -	$ 500.00				$ 500.00	$ -
			Facebook ads	$ 250.00	$ 250.00	$ -	$ 250.00					$ 250.00
			Promotional items	$ -	$ 6,500.00	$ -	$ 6,500.00		$ 6,224.84			$ 275.16
			Emergency Prep signs & brochures	$ 1,500.00	$ 1,500.00	$ -	$ 1,500.00					$ 1,500.00
			Neighborhood Watch signs	$ -	$ 3,000.00	$ -	$ 3,000.00				$ 3,000.00	$ -
		Community Events	Block parties (5 4 X $300)	$ 1,500.00	$ 1,200.00	$ 618.70	$ 581.30				$ 300.00	$ 281.30
			Westside Senior Health & Wellness Fair	$ 500.00	$ 500.04	$ 500.04	$ -					$ -
			Winter Wonderland	$ 1,000.00	$ 978.75	$ 978.75	$ -					$ -
			Art Walk	$ 2,000.00	$ 1,800.00	$ 912.75	$ 887.25	$ 398.91			$ 400.00	$ 88.34
			Venice High Grease Night	$ 300.00	$ 296.72	$ 296.72	$ -					$ -
			Green Garden Showcase	$ 4,000.00	$ -	$ -	$ -					$ -
		MVCC events/outreach items/mailings/newsletter	Mar Vista Turns 90 Celebration	$ 4,000.00	$ 1,271.00	$ 1,271.00	$ -					$ -
			Great Street Tree Planting	$ 300.00	$ 300.00	$ -	$ 300.00				$ 300.00	$ -
			Misc + awning repair/replace (up to $1000)	$ 7,843.05	$ 1,176.69	$ 80.98	$ 1,095.71		$ 9.63		$ 500.00	$ 586.08
		Community Improvement	Safety and Mobility Enhancements	$ 5,000.00	$ 4,800.00	$ -	$ 4,800.00				$ 4,800.00	$ -
			Bike repair stand	$ -	$ -	$ -	$ -					$ -
			Outreach Subtotal:	***$31,804.32***	***$27,448.70***	***$6,604.24***	***$21,184.46***	***$ 694.22***	***$ 6,533.28***	***$ 181.50***	***$ 9,917.31***	***$ 3,858.15***
	Elections	Election expenses	Election expenses	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
			Elections Subtotal:	***$1,000.00***	***$0.00***	***$0.00***	***$0.00***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***
			General/Operational Subtotal:	***$40,000.00***	***$37,150.00***	***$11,291.09***	***$24,998.29***	***$ 694.22***	***$ 7,586.08***	***$ 206.50***	***$ 13,208.01***	***$ 3,303.48***
Neighborhood Purpose Grants			Green Garden Showcase	$ -	$ 1,850.00	$ 1,850.00	$ -	$ 1,850.00				
			AE&C Committee	$ 2,000.00	$ 2,000.00	$ -	$ 2,000.00		$ 2,000.00			
			Santa Sleigh Shed	$ -	$ 1,000.00	$ 1,000.00	$ -					
			Neighborhood Purpose Grants Subtotal:	***$2,000.00***	***$4,850.00***	***$2,850.00***	***$2,000.00***	***$ 1,850.00***	***$ 2,000.00***	***$ -***	***$ -***	***$ -***
			GRAND TOTAL	**$42,000.00**	**$42,000.00**	**$14,141.09**	**$26,998.29**	**$ 2,544.22**	**$ 9,586.08**	**$ 206.50**	**$ 13,208.01**	**$ 3,303.48**

Safety and Mobility Enhancements up to $10,000 if funds available

What's outstanding after June spending – (S&M Enhancements $?)

BOD 6/12/2018-Treasurer's Report

(Totals are from funding page 6/2, MER reflects day of printing totals.)

City allocation to MVCC $42,000.00

YTD spending (per funding page) $24,738.99

This month	$ 9,585.58 (cks* + cc exps)
5/1 Web Corner	$181.50
5/1 Storquest	$208
5/13 PTE&S*	$2000.00 (NPG teen court)
5/15 Holly Tilson*	$131.33 (office supplies)
5/15 Sara Roos*	$68.97 (office supplies)
5/15 Brown & Bigelow	$734.09 (swag trash bags to go)
5/15 Brown & Bigelow	$492.57 (swag mugs)
5/18 AT&T	$94.31 (Wi-Fi monthly)
5/20 Smart & Final	$9.63 (claim tickets for bike stand/valet)
5/20 Storquest	$92.83 (adjustment for larger unit)
5/21 Mail chimp	$22.50
5/22 Brown & Bigelow	$2728.18 (swag lawn signs)
5/23 Brown & Bigelow	$1404.18 (swag post-its notes)
5/23 Brown & Bigelow	$865.82 (swag stadium seats)
5/23 St Andrew's*	$25 (airport committee)
5/27 Home Depo	$65.67 (shelving for storage unit)
5/31 Storquest	$461.00 (new cost for larger storage unit)

Commitments (per funding page) $10,075.00

Net Available (per funding page-6/2) $ 6,960.71

Cash on hand (per funding page-6/2) $17,261.01

Last day to write a check 6/1 last day to use credit card 6/20

To Be Completed:

- Minute taker – haven't seen a bill yet
- NW signs, motion on BOD agenda, Rob to purchase Awning repair and bill, FM rental bill
- Business cards
- Vineyard room rental (last day to pay 6/20), St Bede's room rental
- Great street tree planting??
- MVCC brochure
- Safety and Mobility enhancements (up to $10K) budget $4800 + any extra up to $10K, need city council motion to transfer money from MVCC to CD11 to LADOT – 6/8
- Landkeepers $2K
- Follow up on NPGs
- Web corner---extra data entry
- Facebook ads
- Banners/sign/event promotion
- MVNA – block party before 6/20
- Yearly contract review/city
  1. St Andrew's (new)
  2. Windward
  3. Coffee connection do we have one?
  4. library/MV park do we need one?
  5. Storquest, new unit #34
- Election information worksheet
- Credit card holder/second signer/preliminary budget for 2018--2019

***Attachment 2*: Sidewalk Mosaic Triptych Informatives For Great Streets Committee Report**

INFORMATIVE: Proposed sidewalk mosaics in Mar Vista

Previously:
In July 13 2016 at the Great Streets (GS) Ad Hoc Committee meeting, Tracey Corinne brought up the possibility of art installations in sidewalks including mosaics. On October 25 2016 at the GS Ad Hoc meeting, there was a discussion of a possible mosaic placement in the sidewalk near the Mar Vista Library with Tracey Corinne and CD11 Senior Field Deputy Len Nguyen planning to follow up on this item. The hopscotch, which would be anywhere from seven-ten (7-10) mosaic tiles, was intended for placement at the Mar Vista Library. Another installation of a two to three (2-3) tile mosaic was planned for a location further west end of Venice Blvd. CD11 Mobility Deputy Jessie Holzer gave a few possible locations for this site, including near Beethoven, near the Moving Joint, or between Colonial and Wasatch, near 826LA.

Tracey Corinne, the mosaic artist, has been in discussion with CD11 Mobility Deputy Jessie Holzer and Public Works Bureau Supervisor Larry Hrezo to determine materials, location and installation methods. The western Venice Blvd. location with two-three mosaic tiles was supposed to be installed first, with a tentative October 2017 install date with the larger installation at the Mar Vista library to follow in March 2018. For unknown reasons, those dates did not happen.

Currently:
The sidewalk repaving on Venice between Colonial and Wasatch that began on Tuesday May 29, 2018 is being done by Bureau of Street Services (BoSS) as part of Great Streets. Each one of the 15 Great Streets in LA City gets a 3-week sidewalk-paving blitz - once per fiscal year from the Bureau of Street Services. According to BoSS Supervisor James Hawkins, this current sidewalk paving on Venice Blvd. between Colonial and Wasatch has been planned/on the books for at least 10 mos. to one (1) year. Mr. Hawkins scouted the location in 2017 and identified it as a sidewalk in need of repair.

The installation (and the cost of materials/labor) of the mosaics most likely come out of a Great Streets fund or if necessary a fund from CD11.
The 826LA project of two-three (2-3) mosaic tiles by Tracey Corinne was always intended as a first installation, to be followed in three months time or so by the seven to ten (7-10) hopscotch tile mosaic installation by Tracey Corinne at the Mar Vista Library. Currently there is no date on the books for the installation of the hopscotch, with planning for that still in the works with Great Streets and BoSS.

Please reference the 7.13.16 minutes http://www.marvista.org/docs/34484913-8990.pdf

Also reference the 10.25.16 minutes: http://www.marvista.org/docs/34484908-8986.pdf

INFORMATIVE: Proposed sidewalk mosaics in Mar Vista

Previously:

The former CD11 Transportation Deputy shepherded a project via MVCC's Great Streets Committee for a sidewalk mosaic by artist Tracey Corrine, of a hopscotch design ("Hopscotch project") to be placed in the sidewalk in front of the MV Library.

This project remains on the table. It is difficult to implement but Tracey's been talking with the Bureau of Street Services (BSS) for some time now about the logistical details. Mosaics are very labor intensive projects, so coordinating the artist's lead time with the BSS' schedule is tricky. This project is half-completed and while an approximate date of installation cannot be promised, its completion remains a priority.

Currently:

The Bureau of Street Services is fixing the sidewalk in front of 826LA within the next month. This will result in wet concrete, a necessary condition for installing a sidewalk mosaic.

For the 826LA site, the proposed mosaic ("826LA project") would be smaller: three 20"x20" tiles. Physical conditions would not have to be arranged, they are happening anyway, and some of the labour difficulties with the Hopscotch project are obviated with this different, smaller design.

The proposed 826LA project would be different from the Hopscotch project. It would be more general to Mar Vista, and less kid-centric. It is intended to be a design that is welcoming of and to Mar Vista as a community.

The Hopscotch project would not be tabled if the 826LA project is implemented. But its completion cannot be promised, only prioritized.

Here are proposal sketches for the 826LA Project:







Bee and California Poppy square



This tile speaks to the Mar Vista Green Garden Showcase and the community's commitment to conservation and the health of the planet. The bee is on a California Poppy so it speaks as well to the state flower and its growth here in our neighborhood.

Here is the Hopscotch Project sketch:



…and here are photos of the in-process tiles for the proposed 826LA Project:





Sunflower or coastal flower square

This square is a more generic representation of nature found in Mar Vista - from sunflowers, to daisies, to coastal California *encelia*. This could be any of these and it's a bright and happy design in a sea green background.

…and a note from the Artist about process:

The colored tile is a solid color porcelain tile which is slip tested for outdoor wet areas like pools and indoor areas like bathrooms and kitchens. It will be adhered to a solid porcelain floor tile using mortar and another adhesive which allows tile to be installed over tile. These layers would be installed in the sidewalk in 20 3/8"x 20 3/8" squares framed out by BoSS. I hope for a nice artistic arrangement of the three squares somewhere around and in front of Alana's coffee roasters and 826 LA.

May 30, 2018

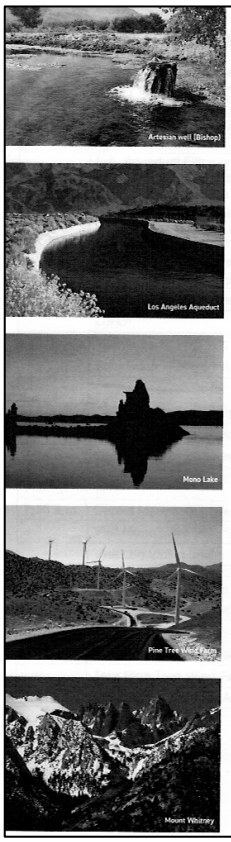
ATTACHMENTS (Continued)

***Attachment 3*: LADWP Aqueduct-Owens Valley Tours**

Los Angeles Aqueduct-Owens Valley Tour 2018

The weather may be hot during the day and cold in the early morning and evening. Bring both light and warm clothing to layer for comfort. Sunscreen and hats are a must at high altitude and comfortable, closed-toed shoes are required for outdoor locations and within LADWP facilities.

Day 1: Friday	
7:30 a.m.	L.A. Aqueduct Filtration Plant, 13101 Sepulveda Blvd., Sylmar • Continental breakfast • Welcome & Los Angeles Aqueduct Filtration Plant overview • View of Los Angeles Reservoir and shade balls
	Stop at Coso Junction Rest Area
	View from bus: • Haiwee Power Plant and S. Haiwee Reservoir • Owens Lake Dust Mitigation Project via Hwy 190
	Visit Eastern Sierra Interagency Visitor Center in Lone Pine
	Lunch
	Visit Artesian Well and Owens River
	Tour Control Gorge Power Plant
	View from bus: • Pleasant Valley Reservoir and Lake Crowley
	Arrive at accommodations in Mammoth Lakes
7:00 p.m.	Hosted dinner in Mammoth Lakes
Day 2: Saturday	
7:30 a.m.	Depart Mammoth Lakes
	Visit Mono Lake Tufa State Natural Reserve
	Visit Lee Vining Intake
	View from bus: • June Lake Loop
	Bishop Office Rest Stop
	Lunch
	Visit L.A. Aqueduct Intake
	Tour Pine Tree Wind Farm
7:00 p.m.	Arrive at Los Angeles Aqueduct Filtration Plant – Tour Ends



Los Angeles Department of Water & Power

LA Aqueduct-Owens Valley Tours

Journey with LADWP to the starting point of the Los Angeles Aqueduct and explore the 233-mile route that the city's water travels to arrive at the tap. This unique and memorable two-day tour provides LADWP stakeholders an opportunity to learn about the vast and complex operations involved in delivering water and power safely and reliably to the City of Los Angeles.

2018 Tour Dates

Fri., Jun. 22 – Sat., Jun. 23
Fri., Sep. 21 – Sat., Sep. 22
Fri., Oct. 19 – Sat., Oct. 20
Fri., Nov. 2 – Sat., Nov. 3

LADWP provides complimentary bus transportation, meals and single-occupancy sleeping accommodations for all tour guests.

To RSVP, review the attached itinerary and submit your completed Reservation Form to owensvalleytour@ladwp.com.

Early reservations are recommended as availability is limited.

As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, service and activities. To ensure availability, such requests should be made 72 hours in advance by calling (213) 367-5206, TDD: 1 (800) 432-7397.

***Attachment 4*: MVCC Inventory**

Neighborhood Council	Current Status	Was a Police Report Filed	Product Type	Brand	Model	Serial Number	Purchase Price	Receipt of purchase	Date of Approval	Date of Purchase	Item Description/Comments	Salvage Date
Mar Vista	Current		Digital/Video	Mevo	12482	AA00212482	0				Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Digital/Video	Canon	Vixia HV30	7.2269E+11	0				Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Computer Ha	Netgear	322-10170-0	31174448P1	0				Hotspot Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Computer Ha	Apple	A1822	GCGW30AFH	0				iPad Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Misc	0	0	300				Box of tools Estimated Total Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Yamaha	Stagepas 400	UEXH01394	0				Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	DeWalt	28" Toolbox	DWST28100	0				Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Sennheiser	e825s		0	0			Qty: 4 Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Shure	SM58		0	0			Qty: 1 Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Audio Techni	ST90 MkII		0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Unknown	0	0	0	0			Qty: 5 Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Alesis	Multimix 12F	A405070737	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Honda	EU Inverter 2	EAAJ-171843	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Emergency P	Misc	Earthquake K	Misc		0			Qty: 2 Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Park Tool	PCS-9		0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Turbo Charge	0	0	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Unknown	0	0	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Unknown	0	0	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Other	Unknown	0	0	0	0			Qty: 11 Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Outreach Ite	EZ-Up	0	0	0	0			10'x10' Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Unknown	0	0	218.49	0			Large Mic Stands Qty: 4 Unknown Date of Purchase No Receipt	
Mar Vista	Current		Outreach Ite	Unknown	0	0	0	0			Pull-Up Banner Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Digital/Video	Bogen	3063		0	0			Tripod Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Outreach Ite	Unknown	0	0	400	0			5 Outreach Banners Unknown Date of Purchase No Receipt	
Mar Vista	Current		Furniture (Fil	Unknown	0	0	0	0			2 Foldable Tables Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Computer Ha	LG	W1952TQ	802NDTCA53	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Computer Ha	Sony	VPL-CX70	16051	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Unknown	0	0	0	0			Qty: 2 Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Audio Techni	ATW-T341		0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Sound Equip	Audio Techni	ATW-R310	S2 4322809	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Electronics	Passport	069-9002-00	N0097091P	0	0			Unknown Price Unknown Date of Purchase No Receipt	
Mar Vista	Current		Outreach Ite	Unknown	0	0	700	0			3 Table Cloths Price Estimated Unknown Date of Purchase No Receipt No Picture	

ATTACHMENTS (Continued)

***Attachment 5*: March Monthly Expense Report**

Monthly Expenditure Report

Reporting Month: March 2018 **Budget Fiscal Year: 2017-2018**

NC Name: Mar Vista Neighborhood Council

Monthly Cash Reconciliation					
Beginning Balance	**Total Spent**	**Remaining Balance**	**Outstanding**	**Commitments**	**Net Available**
$31424.05	$1208.53	$30215.52	$2950.00	$10050.00	$17215.52

Monthly Cash Flow Analysis					
Budget Category	**Adopted Budget**	**Total Spent this Month**	**Unspent Budget Balance**	**Outstanding**	**Net Available**
Office	$37000.00	$920.72	$25215.52	$100.00	$25115.52
Outreach		$287.81		$0.00	
Elections		$0.00		$0.00	
Community Improvement Project	$2000.00	$0.00	$2000.00	$0.00	$2000.00
Neighborhood Purpose Grants	$3000.00	$0.00	$3000.00	$2850.00	$150.00
Funding Requests Under Review: $0.00		Encumbrances: $10050.00		Previous Expenditures: $10575.95	

Expenditures						
#	**Vendor**	**Date**	**Description**	**Budget Category**	**Sub-category**	**Total**
1	STORQUEST-WLA/SAWTELLE	03/01/2018	(Credit card transaction)	General Operations Expenditure	Office	$208.00
2	AMAZON MKTPLACE PMTS	03/07/2018	(Credit card transaction)	General Operations Expenditure	Office	$119.99
3	AMAZON MKTPLACE PMTS	03/08/2018	(Credit card transaction)	General Operations Expenditure	Office	$212.78
4	STAPLES 00114272	03/10/2018	(Credit card transaction)	General Operations Expenditure	Office	$32.05
5	STAPLES 00114272	03/11/2018	(Credit card transaction)	General Operations Expenditure	Office	$49.24
6	STAPLES 00114272	03/17/2018	(Credit card transaction)	General Operations Expenditure	Office	$65.66
7	STORQUEST-WLA/SAWTELLE	03/31/2018	(Credit card transaction)	General Operations Expenditure	Office	$208.00
8	THE WEB CORNER	03/01/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$171.00
9	AT&T BILL PAYMENT	03/18/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$94.31
10	MAILCHIMP MONTHLY	03/21/2018	(Credit card transaction)	General Operations Expenditure	Outreach	$22.50
11	St. Andrew's Lutheran Church	03/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
	Subtotal:					**$1208.53**

Outstanding Expenditures						
#	**Vendor**	**Date**	**Description**	**Budget Category**	**Sub-category**	**Total**
1	St. Andrew's Lutheran Church	04/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
2	St. Andrew's Lutheran Church	05/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
3	St. Andrew's Lutheran Church	06/13/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETING ROOM - ...	General Operations Expenditure	Office	$25.00
4	St. Andrew's Lutheran Church	03/08/2018	FUNDING MOTION: ST ANDREW'S CHURCH MEETI...	General Operations Expenditure	Office	$25.00
5	Pacific Area Boosters Association, Inc.	03/30/2018	Motion to contribute up to $1000 in an NPG for the...	Neighborhood Purpose Grants		$1000.00
6	Green Communications Initiative Inc.	04/12/2018	MVCC approved up to $4000 for the Green Garde...	Neighborhood Purpose Grants		$1850.00
	Subtotal: Outstanding					**$2950.00**

Minutes of the
Mar Vista Community Council (MVCC)
GENERAL BOARD MEETING
Tuesday, June 12, 2018
at Mar Vista Recreation Center, 11430 Woodbine St., Mar Vista, CA 90066

MVCC (and all other) Meeting Minutes are a summary; Minutes were not, are not and are never meant to be an exact, verbatim, word-for-word transcript or comprehensive record of what was said at a Meeting. Exceptions: Motions/Resolutions (as stated at the Meeting, which take precedence over versions written on the Agenda, if different); quotes (words that have quotation marks ("") at the beginning and ending of a word or words); and other wording from the Agenda such as the first paragraph(s) of some Items. Items are listed in and match the same order as on the Agenda.

1. **Call To Order And Welcome** – Chair
   Chair Rob Kadota introduced himself and called the Meeting to order at 7:01 p.m. Ten of the 13 Board Members were present at the Roll Call: Paola Cervantes (2nd Vice-Chair), Robin Doyno, Aaron Elster, Elliot Hanna (1st Vice-Chair), Mary Hruska, Rob Kadota (Chair), Susan Klos, Nanxi Liu, Sara Roos (Secretary) and Holly Tilson (Treasurer). Michelle Krupkin arrived later. One Board Member was not eligible to vote for funding items only, due to untimely Ethics Training. Kenneth Alpern and Damien Newton were absent (both excused). The MVCC quorum (the minimum number of Board Members needing to be present to take binding votes on Agendized Items) was seven (see the Bylaws at https://lacity.quickbase.com/db/bj3apxsp3?a=q&qid=32&qskip=0&qrppg=1000&dlta=su46~), so the Board could take such votes. All 13 of the 13 Seats were filled (by election or appointment). No Board Seat(s) were vacant. Also attended: 35 Stakeholders and Guests.

2. **Presentation of flag and Pledge of Allegiance**
   The Pledge of Allegiance was said.

3. **Community Memorial Observations**
   Mr. Elster announced that his grandmother Rae Elster passed; a moment of silence was observed.

4. **Public Comment & Announcements**
   Chelsea Byers, Field Organizer for EveryoneInLA, offered social services including affordable housing. Property owner Howard Weisberg reported on the progress of a parking study regarding a seven-story building with ½ parking space per bedroom. Stakeholder Selena Inouye requested that meetings being livestreamed.

5. **Board Administration**
   A. Ex Parte§ Communication and Conflict Of Interest‡ Declarations from each Board Member.
   Hanna: discussion regarding several Agenda Items; and Liu, about the road diet.
   All other Board Members indicated that they had no such discussions.

B. Approval of May 8th, 2018, Board of Directors Meeting Minutes.

MOTION (by Ms. Tilson, seconded by Ms. Cervantes): The Mar Vista Community Council approves the Minutes of its May 8, 2018 General Board Meeting.

DISCUSSION: Mr. Hanna noted that clarifications still are needed, therefore, the Minutes are not ready for approval.

MOTION to TABLE (by Mr. Hanna, seconded by Ms. Tilson): The Mar Vista Community Council TABLES approval of the Minutes of its May 8, 2018 General Board Meeting.

MOTION to TABLE PASSED by a hand vote with nine in favor; zero opposed; one abstained (the MVCC counts abstentions as neither "yes" votes or "no" votes).

Board Member Michelle Krupkin arrived at this time (7:14), making 11 Board Members present (the MVCC quorum was seven).

C. Election of MVCC Executive Committee, 2018-19
Jasmine Elbarbary, Neighborhood Council Advocate, L.A. Dept. of Neighborhood Empowerment (DONE) (213-978-1551; Jasmine.Elbarbary@LACity.org; www.EmpowerLA.org), conducted the election.

For Chair: Mr. Doyno nominated Mr. Kadota; Ms. Krupkin nominated Mr. Hanna, who made a statement. Mr. Hanna received six votes; Mr. Kadota received five votes. Mr. Hanna was declared the Chair.

Board Member Elliot Hanna became the Chair at this time and conducted the remainder of the election.

For 1st Vice-Chair: Ms. Cervantes nominated Mr. Kadota; Ms. Krupkin nominated herself and made a statement. Mr. Kadota received seven votes; Ms. Krupkin received four votes. Mr. Kadota was declared the 1st Vice-Chair.

For 2nd Vice-Chair: Mr. Kadota nominated Ms. Cervantes; Ms. Klos nominated Ms. Krupkin; Ms. Roos nominated Ms. Hruska. Ms. Cervantes received five votes; Ms. Krupkin received four votes; Ms. Hruska received two votes. Ms. Cervantes was declared the 2nd Vice-Chair [continuing].

For Secretary: Mr. Hanna nominated Ms. Roos, who received 11 votes. Ms. Roos was declared the Secretary [continuing].

For Treasurer: Ms. Krupkin nominated Ms. Tilson, who received 11 votes. Ms. Tilson was declared the Treasurer [continuing].

6. <u>Reports</u> (See Attachment C)

A. Elected Officials and City Department Reports.

i. CoLA Mar Vista Recreation Center – Director Caroline.Lammers@lacity.org
No representative was present and there was no report.

ii. CoLA CD 5 – Councilmember Paul Koretz, rep by joseph.galloway@lacity.org
No representative was present and there was no report.

iii. CoLA CD 11 – Councilmember Mike Bonin, rep by Field Deputy Hannah.Levien@lacity.org
Ms. Levien (310-575-8461; http://CD11.LACity.org), introduced CD11 Mobility Deputy Alek Bartrosous (Alek.Bartrosous@LACity.org). Ms. Levien reported that the mosaic is in front of 826LA on Venice Blvd. Mr. Bartrosous offered help and is working on a parking and pedestrian improvements study.

iv. CoLA Board of Public Works - Liaison to CD 2, 5, 11, Commissioner Joel.Jacinto@lacity.org
No representative was present and there was no report.

v. CoLA Mayor – Eric Garcetti, rep. by Daniel.Tamm@lacity.org
No representative was present and there was no report.

vi. LA County Supervisor, Second District - Mark Ridley Thomas, rep. by Karly.Katona@bos.lacounty.gov
No representative was present and there was no report.

vii. CA Assembly 54 – Assembly Member Sydney Kamlager
No representative was present and there was no report.

viii. CA Assembly 62 - Assembly Member Autumn Burke, rep by District Director Robert.Pullen-Miles@asm.ca.gov
No representative was present and there was no report.

ix. CA Senate 26- Assembly Member Ben Allen, rep by District Director Lianna.Mecano@sen.ca.gov
No representative was present and there was no report.

x. CA Senate 30 – Holly J. Mitchell, rep by Field Rep Joy.Masha@sen.ca.gov
No representative was present and there was no report.

xi. US Representative 33 – Ted Lieu, rep by joey.apodaca@mail.house.gov
No representative was present and there was no report.

xii. US Representative 37 - Karen Bass, rep by District Director Maral V. Karaccusian, maral@mail.house.gov
No representative was present and there was no report.

xiii. LADWP – rep by Deborah Hong, public relations specialist and NC representative for the West Side Deborah.Hong@LADWP.com, (213) 367-1076.
No representative was present and there was no report.

xiv. CoLA Department of Neighborhood Empowerment (DONE), rep by jasmine.elbarbary@lacity.org
Ms. Elbarbary reported that the 2019 NC election schedule was released; the Election Stipulation Worksheet is due by August 1st. An updated Board

Members Roster is needed. NCs are requested to each issue a Community Impact Statement regarding City Councilman David Ryu's City Council File #18-0467 about rollover funding, donations acceptance and more.

B. Liaison Reports

i. Mar Vista Bi Monthly LADOT/CD11/LAPD Traffic Committee: Linda Guagliano at lindaguag@netzero.net
Ms. Guagliano reported.

ii. DWP MOU: open
This position is open and there was no report.

iii. LANCC: open
This position is open and there was no report.

iv. One Water LA: Christopher McKinnon
No representative was present and there was no report.

v. WRAC: Rob Kadota
Ms. Roos reported that the gas flare issue and State Assembly bills were considered.

vi. WRAC LUPC: open
This position is open and there was no report.

vii. City Budget Advocates: Holly Tilson
Ms. Tilson reported that "a lot of useful information" is given at Neighborhood Council Budget Advocates Meetings and Los Angeles Neighborhood Councils Coalition (LANCC). LANCC meets on first Saturdays, 10:00 a.m. – 1pm downtown at LADWP offices, 111 North Hope St, 90012; (www.LANCC.org). Budget Advocates meet third Saturdays, 10am – 12Noon at WLA offices. We need help sharing the responsibility of attending these meetings.

viii. Recode LA: Sharon Commins
No representative was present and there was no report.

ix. Animal Services: Tom Ponton
No representative was present and there was no report.

x. Friends of Historic FS 62: Albert Olson
No representative was present and there was no report.

xi. Mar Vista Chamber of Commerce: open
This position is open and there was no report.

xii. 2018 Mar Vista Green Garden Showcase: Maggie Begley
No representative was present and there was no report.

C. Officer Reports (action items may be included, with public comment permitted). Treasurer's report regularly includes approval of Monthly Expense Report (MER) (See Attachments).

i. Chair – Rob Kadota
Mr. Hanna met with City Councilman Bonin; they discussed Venice Blvd. issues and neighbors on Globe and Tuller Aves. There will be a Board retreat.

ii. First Vice Chair – Elliot Hanna
Mr. Kadota reported that help is needed with new bike repair stand equipment and that the Farmers Market will have a speaker.

iii. Second Vice Chair – Paola Cervantes
Ms. Cervantes indicated that there was no report.

iv. Secretary – Sara Roos
Ms. Roos indicated that there was no report.

v. Treasurer – Holly Tilson (See Attachment 1, Finances)
a. Report on current month's financial status
Ms. Tilson reported that sidewalk enhancement funding is available.

b. APPROVAL of previous months' Monthly Expense Report (MER).
Ms. Tilson noted that the MER, "about 50 pages long," was emailed to the Board.

FUNDING MOTION (by Ms. Tilson, seconded by Ms. Krupkin): The Mar Vista Community Council approves its May 2018 Monthly Expenditure Report.

FUNDING MOTION PASSED unanimously by a roll call vote of the 11 eligible voters present with all 11 in favor ("Yes" or "Aye") (Cervantes, Doyno, Elster, Hanna, Hruska, Kadota, Klos, Krupkin, Liu, Roos and Tilson); zero opposed; zero abstained.

D. Committee Reports (may include motions to refer to committee where desirable; public comment permitted)
i. Elections and By-laws Committee - Elliot Hanna & Robin Doyno, Co-chairs
Mr. Hanna reported that the Committee is making progress.

ii. Community Outreach Committee – Sara Roos, Chair
Ms. Roos reported that the Committee will meet June 14th. Sticky notes with the MVCC zones imprinted are available.

iii. Committee on Public Safety – Elliot Hanna, Chair
Mr. Hanna reported that the Committee may meet on the fourth Tuesday, next with the Neighborhood Prosecutor.

iv. Aging in Place - Sherri Akers, Tatjana Luethi and Birgitta Kastenbaum, Co-chairs
No representative was present and there was no report.

v. Planning and Land Use Management Committee – Damien Newton, Chair; Michael Millman & Latrice Williams, Vice-chairs
No representative was present and there was no report.

vi. Transportation & Infrastructure Committee – Ken Alpern, Chair; Michelle Krupkin, Vice-chair
Ms. Krupkin reported that the Committee meets first Wednesdays; they discussed this Meeting's Motions and more.

vii. Bike Mar Vista - Rob Kadota, Chair
Mr. Kadota reported that the Committee is outreaching at the Farmers Market.

viii. Education, Arts and Culture Committee –Robin Doyno & Paola Cervantes, Co-chairs; Lenore French, Vice-chair
Ms. Cervantes reported that the Committee had a joint Meeting with the Great Streets ad hoc Committee. They partnered on the 826LA mosaic. The Committee will work with the PESA Teen Court & Tolerance Program on having tolerance and anti-bullying assemblies.

ix. Great Streets Ad Hoc Committee – Michelle Krupkin & Rob Kadota, Co-chairs
Ms. Krupkin reported that the Committee will meet June 13th about the Art Walk, CD11 issues and more.

x. Airport Committee – Holly Tilson & Martin Rubin, Co-chairs
Mr. Rubin reported that the Committee meets first Saturdays, next on July 7th at 6:00 p.m. at St. Andrews Church Library.

xi. Green Committee –Jeanne Kuntz, Chair
No representative was present and there was no report.

xii. Homeless Issues Committee – Robin Doyno & Susan Klos, Co-chairs
Mr. Doyno reported that the next Committee meeting will be June 20th, the third Wednesday, at 6:30 p.m. at the Library; all are welcomed. A resource guide is available.

E. Zone Director Reports (may include motions to refer action items to the appropriate MVCC committee where desirable; public comment permitted)
i. Zone 1 – Ken Alpern
Mr. Hanna noted that Mr. Alpern was not present; there was no report.

ii. Zone 2 – Damien Newton
Mr. Hanna noted that Mr. Newton was not present; there was no report.

iii. Zone 3 – Mary Hruska
Ms. Hruska reported that she will meet with Stakeholders. She is interested n a Mar Vista Community Plan [see https://planning.lacity.org/complan/pdf/plmcptxt.pdf].

iv. Zone 4 – Aaron Elster
Mr. Elster reported.

v. Zone 5 – Michelle Krupkin
Ms. Krupkin reported that the new Café 310 "seems to be doing well."

vi. Zone 6 – Holly Tilson

Ms. Tilson reported that there has been "a lot of police activity . . . north of Palms there's been . . . burglaries . . . [also] a lot of RVs parking on streets."

MOTION to BRING to the FLOOR (by Ms. Hruska, seconded by Mr. Doyno): The Mar Vista Community Council will bring Item #7. B. i. to the floor.

MOTION to BRING to the FLOOR PASSED by a hand vote with nine in favor; zero opposed; zero abstained.

7. **Discussion Of Policy, Administrative And Funding Motions** – See Addendum B, Motions Disposition.

A. Unfinished business. Items may be received and filed by consent if there is no discussion or public comment.

i) Opposing SB 827 [Weiner].

WHEREAS the City Charter-mandated Neighborhood Council system of Los Angeles, and the Community Councils of the City of Los Angeles, represent grass roots democracy,

Therefore Let It Be Resolved, that in the absence of a formal statement to the controversy on specific legislation, it should be assumed that the Mar Vista Community Council opposes any legislation proposed by the state that would infringe on the rights of cities and other municipalities to plan their neighborhoods or create development plans that have the power of law.

[*This Agenda Item was addressed after Item #7. A. iv.*] Ms. Roos explained the Motion and read aloud Mr. Newton's, the PLUM Committee Chair's, email. Mr. Hanna believed and Ms. Liu agreed that this consideration was premature.

MOTION to POSTPONE INDEFINATELY (by Mr. Elster, seconded by Ms. Roos): The Mar Vista Community Council POSTPONES INDEFINATELY Item #7. A. i.

MOTION to POSTPONE INDEFINATELY PASSED by a hand vote with ten in favor; zero opposed; one abstained (the MVCC counts abstentions as neither "yes" votes or "no" votes).

MOTION to BRING to the FLOOR (by Mr. Kadota, seconded by Mr. Elster): The Mar Vista Community Council will bring Item #7. A. ii. to the floor.

MOTION to BRING to the FLOOR PASSED; zero opposed; zero abstained.

ii) Development at 11700 Charnock Boulevard (Charnock/McLaughlin). The Mar Vista Community Council supports the application to build a new sixunit, two story, development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the city.

[*This Agenda Item was addressed after Item #7. B. Consent Motion.*]

MOTION (by Mr. Kadota, seconded by Ms. Roos): The Mar Vista Community Council supports the application to build a new six-unit, two-story development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the City.

DISCUSSION: Developer Lew Futterman, partner Stark Caldwell and Architect Robert Thibedeau displayed a rendering and presented. Mr. Futterman acknowledged that the project is three-story, not two-story. The project would replace four small one-bedroom homes with six three-bedroom homes. Each would have "their own private garage" and roof terraces; it's "distinctly family style." He said "we provided more guest parking than is required by law." Mr. Futterman and Mr. Caldwell live in Venice.

AMENDMENT to the MOTION (by Mr. Elster, seconded by Ms. Krupkin): The Mar Vista Community Council amends the Motion phrase "two-story" to "three-story."

AMENDMENT to the MOTION PASSED by a hand vote with nine in favor; zero opposed; two abstained (the MVCC counts abstentions as neither "yes" votes or "no" votes).

DISCUSSION: Mr. Thibedeau indicated that there is as yet no Hearing date.

MOTION to POSTPONE to the next Meeting (by Mr. Kadota, seconded by Ms. Tilson).

MOTION to POSTPONE to the next Meeting PASSED by a hand vote with six in favor; three opposed; two abstained (the MVCC counts abstentions as neither "yes" votes or "no" votes).

iii) Extension of L.A.M.C. 85.02.
WHEREAS, Los Angeles Municipal Code (L.A.M.C.) Section 85.02, "Use of Vehicles as Living Quarters," went into effect on November 22, 2016, and
WHEREAS L.A.M.C. Section 85.02 shall expire on July 1, 2018 unless extended by ordinance, and
WHEREAS the Mar Vista Community Council supports extending LAMC 85.02 beyond July 1, 2018 without any sunset provision, and
WHEREAS the City of Los Angeles and all relevant departments should solicit public input for updated revisions to the associated 85.02 map accommodating the impact of vehicular residency on permanent residents – including unsanitary conditions, litter, noise, crime and sporadic violence,
THEREFORE, the Mar Vista Community Council advises the City Council of Los Angeles, including our local Council members Bonin and Koretz, to update the associated 85.02 map immediately with accommodations, and pass an ordinance retaining L.A.M.C. 85.02 permanently.

This Item was POSTPONED until the next Board Meeting.

iv) Opposition to Westside Mobility's Livable Boulevards Streetscape Plan.
[*This Agenda Item was addressed after Item #7. B. ii.*] Ms. Inouye believed that more input should be given and more outreach done about this. Ms. Hruska

explained that there are various community-related Plans, including the Mobility Plan. She encouraged searching the Internet for the phrase “livable boulevards.” Ms. Roos was concerned about “private entities doing what public departments used to do . . . there seems to be a privatization,” limiting information access. Ms. Krupkin said that “there have been no public hearings on this”; she described extensive changes to streets being considered by the LA Dept. of Transportation (LADOT). Mr. Bartrosous indicated that he will get information as soon as possible. Mr. Kadota noted that “the public outreach was three to four years ago.”

MOTION (by Ms. Hruska, seconded by Ms. Krupkin): The Mar Vista Community Council resolves that:
WHEREAS, Venice Boulevard changes within the boundaries of the Mar Vista Community Council have been created that have had profound impacts on traffic, and potentially with profound economic and quality of life impacts, on the adjacent community and throughout the greater Westside region, and
WHEREAS, there are plans in the Westside Mobility Livable Boulevards Streetscape Plan for Pico, Overland, Sepulveda and Centinela Boulevards, and Motor Avenue, that will have a direct impact on traffic, and potentially with profound economic and quality of life impacts, on the adjacent community and throughout the greater Westside region, and
WHEREAS, there are many who are directly affiliated with the Mar Vista Community Council, and who live in and commute through a transformed Venice Blvd., and who are both impacted by the Venice Blvd. changes and concerned about the lack of transparency, opportunity to provide relevant feedback, and other routine legal obligations on the part of the City, and
WHEREAS, commuters of all modalities (including buses, carpools, and others accessing the Expo Line) have been negatively impacted with respect to their mobility,
THEREFORE, the Mar Vista Community Council advises Councilmembers Bonin and Koretz, the Los Angeles City Department of Planning, and Westside Mobility Plan that:

a) To transparently share the source of, and the amount of, public funding for past and present changes and operations associated with Venice Blvd. transformation and reconfiguration and
b) To transparently share the source of, and the amount of, public funding for any future changes associated with the Westside Mobility’s Livable Boulevards Streetscape Plan for Venice Boulevard, and
c) The City of Los Angeles is to cease and desist any future changes to Venice Boulevard until proper accounting can be established for the financial and transportation/infrastructure impacts to both Mar Vista and the greater Westside region, and
d) The City of Los Angeles Planning Department is to hold appropriately noticed public hearings to seek public comments and input regarding the totality of the Westside Mobility's Livable Boulevards Streetscape Plan before any final determinations of what parts of the Plan shall be instituted or adopted.

MOTION PASSED by a hand vote with six in favor; zero opposed; five abstained (the MVCC counts abstentions as neither “yes” votes or “no” votes).

v) Classification of Director Attendance
Be it resolved that a departure of a board member from the meeting after a quorum has been established shall be considered an absence. This shall be inserted into the Bylaws in Article V, Section 2.i.

This Item was POSTPONED until the next Board Meeting.

B. New business. Items may be received and filed by consent if there is no discussion or public comment.

i) Development at 12331 W. Palms Boulevard (Palms/Centinela)
The Mar Vista Community Council opposes the proposed mixed use development at 12331 W. Palms Boulevard. The community believes the 32 unit apartment complex with 3000 feet of retail is too large for the neighborhood and will have significant impact on traffic circulation and parking.

Developer representative Kristen Louner displayed and copies were distributed of renderings, site plans and elevations which the PLUM Committee also saw. The first presentation was one year ago. The site currently has a 7,000 square foot furniture store. This would be two stories; an adjacent condo has five stories. The developer is requesting shorter setbacks. They will landscape. There would be 10 two-bedroom, 14 one-bedroom and eight studio apartments, including three very-low-income; the rents "will be market rate." They would keep the "Q" condition height and are doing a traffic study. She described traffic flow changes made, saying "we've tried to address the [Committee's] concerns." Copies were distributed of a support letter from adjacent homeowners Willy and Cathy Bietak. Corienne Weber, owner of a nearby store, believed that new development is needed. Stacy Shure, of the Westside Homeowners Association (WHOA), for Mr. Alpern, was concerned about cut-through traffic and reported that the WHOA opposed the project. Eli Khan, Kacey Tavares and Anthony Dedouois, of Abundant Housing LA, supported the project, Mr. Khan saying the Westside has "500,000 jobs and 250,000 employed residents."

Homeowner Virginia Postrel supported it. Resident Sherry Adair believed that "there's too much development going on in this area" and was concerned about pedestrian safety. Ms. Inouye agreed and was concerned about infrastructure issues. Ms. Whittington said "this developer has bent over backwards to accommodate the community" and this intersection "is going to be developed . . . this building has been tiered down to fit in"; she cautioned that another developer may be less accommodating. Anders Engnell, speaking personally, supported that project, noting that the average Angelino spends 1 ½ hours per day traveling to and from work. Resident April Peterson said "the developer has been very responsive to the community . . . there will continue to be traffic problems." Resident Richard Schwab said "this is by far the best iteration" on this property. Resident Greg Tedesco believed the housing is needed. Tom McHenry was concerned that there were no sidewalks from Centinela to Grandview.

Mr. Hanna said that "each side has good points . . . it requires a top-down plan for implementation." Mr. Elster noted that "what they're building is by right."

Ms. Hruska wanted “more low-income units.” Ms. Roos reported that the Stakeholders “vote at PLUM was 29 opposed and five in favor.”

MOTION (by Mr. Kadota, seconded by Mr. Elster): The Mar Vista Community Council opposes the proposed mixed use development at 12331 W. Palms Boulevard.
The community believes the 32 unit apartment complex with 3000 feet of retail is too large for the neighborhood and will have significant impact on traffic circulation and parking.

AMENDMENT to the MOTION (by Ms. Liu, seconded by Mr. Kadota): The Mar Vista Community Council strikes paragraph two from the Motion and replaces the word “opposes” with “supports.”

AMENDMENT to the MOTION PASSED by a hand vote with seven in favor; two opposed; two abstained (the MVCC counts abstentions as neither “yes” votes or “no” votes).

AMENDED MOTION PASSED by a hand vote with seven in favor; two opposed; two abstained (the MVCC counts abstentions as neither “yes” votes or “no” votes).

ii) Development at 11671-11677 National Boulevard (Barrington/National). [See the below Motion.]
Mr. Rubin, President, North Westdale Neighborhood Association (NWNA; http://northwestdale.com), was concerned about ingress/egress from Barrington into the alley for deliveries and trash pickups. He stated that “this would cause an increase in the cut-through traffic; it’s already very problematic.” Joan Winters, NWNA Secretary, said she is “in full support of the Pelton Appeal . . . I have witnessed enormous traffic changes . . . by the Barrington alley . . . it will only increase the spilling over onto existing North Westdale streets.” She said she spoke for two other Stakeholders “on Clarkson immediately behind this project” and described already intensive use of the alley. Lisa Pelton, the Appellant, said she “own[s] the property right next door . . . [the] DWP did not properly mitigate the traffic . . . it’s a very dangerous situation.” Resident Kalani Whittington was concerned that smartphone applications “are generating traffic all over the westside.” Ms. Roos urged that rules “are there to be followed.” Ms. Hruska reported that “this Appeal will have a Hearing”; she encouraged attending “to advocate for this Motion.” She read aloud “the purpose of the Motion” from Mr. Alpern. Ms. Liu expressed that more housing is needed. Ms. Krupkin believed that the transportation study and transparency have been inadequate. Ms. Tilson indicated that the Appeal is to get certain issues addressed. Ms. Hruska clarified that the Motion is “to get the developer to do a traffic study . . . it’s not designed to stop the project.”

MOTION to CALL FOR THE QUESTION (by Mr. Doyno, seconded by Ms. Krupkin).

MOTION to CALL FOR THE QUESTION PASSED by a hand vote; zero opposed; zero abstained.

MOTION (by Ms. Hruska, seconded by Mr. Doyno): The Mar Vista Community Council resolves that:
WHEREAS: In November of 2017 the Mar Vista Community Council (MVCC) opposed a mixed-use project proposed at 11671-11677 National Boulevard ("the Project"), noting specifically the Developer's complete lack of community involvement or indeed even community outreach;
WHEREAS: The City permitted the Project without any public hearing, determining it "by-right" with construction already begun and;
WHEREAS: The owners of the adjacent property located at 11685-11695 West National Boulevard, Pelton Properties, LLC (the "appellants"), are appealing to the Los Angeles City Council the LADOT's May 3, 2018 decision upholding LADOT's review and approval of the Project under the Specific Plan on the grounds that:

- the Project causes significant transportation impacts that have not been adequately evaluated or mitigated as required under the Specific Plan, and
- LADOT failed to perform an environmental review of the project under CEQA

and;
WHEREAS: The larger North Westdale Community (Zone 2 of the MVCC) agrees with the appellant that directing all traffic for the Project through the 120 foot long/20 foot wide alley located between National Boulevard and Sardis Avenue will cause numerous detrimental effects, including:

1) confusion and backup by sharing the turning lane intended for southbound Barrington traffic turning left onto eastbound National Blvd., with the Project's alley-bound traffic;
2) traffic backing up onto Barrington and further onto National Boulevard when insufficient parking for the Project impedes movement through the narrow alley;
3) traffic back-ups when DWP/trash/utility trucks further constrict the alley;
4) elevated accident risk at the intersection of the Project's two-level parking garage with the Pelton property's loading and parking area;
5) increased reckless cut-through traffic using eastbound Sardis through the residential neighborhood;
6) impaired emergency vehicle access. Therefore;

LET IT BE RESOLVED THAT: MVCC strongly supports the Pelton's appeal and asks that the City Council:

(i) reverse LADOT's approval of the Project under the Specific Plan, and
(ii) direct LADOT to evaluate the Project's potential traffic, circulation, and public safety impacts, and
(iii) require that the proper environmental review be performed, and
(iv) require that the necessary mitigation measures be implemented, with particular attention to maintaining a separate vehicular access point on West National Boulevard.

MOTION PASSED by a hand vote with eight in favor; zero opposed; three abstained (the MVCC counts abstentions as neither "yes" votes or "no" votes).

MOTION to BRING to the FLOOR (by Ms. Krupkin, seconded by Ms. Hruska): The Mar Vista Community Council will bring Item #7. A. iv. to the floor.

MOTION to BRING to the FLOOR PASSED; zero opposed; zero abstained.

iii) Street-Sweeping Route and Services For Centinela Blvd. Between Palms Blvd. and National Blvd., And For All MVCC Major Thoroughfares
WHEREAS: The Mar Vista Community Council (MVCC) supports maintenance and repairs on all of its major infrastructure assets, including vital thoroughfares such as Centinela Blvd., and
WHEREAS: It has come to the attention of the MVCC that there is no street sweeping route on Centinela Blvd. between Palms Blvd. and National Blvd., and that there are no resources allotted to correcting this current lack of street maintenance,
THEREFORE, LET IT BE RESOLVED: That the CD11 office, L.A. Bureau of Street Services (BSS), and LADOT will work with any and all City budgeting and resources to initiate and implement regular and ongoing street sweeping to the aforementioned segment of Centinela Blvd.
THEREFORE, LET IT ALSO BE RESOLVED: That the CD11 office, the CD5 office, BSS, and LADOT will perform an analysis of all major thoroughfares within the confines of the MVCC to determine if regular and ongoing street sweeping, as well as other vital services and maintenance, is in order.

This Item was POSTPONED until the next Board Meeting.

CONSENT MOTION (by Ms. Tilson, seconded by Ms. Krupkin): The Mar Vista Community Council approves the Motions in Consent Agenda Item #s 7. B. iv., v., vii., viii., ix. and x.

CONSENT MOTION PASSED by a roll call vote of the 11 eligible voters present with 10 in favor (“Yes” or “Aye”) (Cervantes, Doyno, Elster, Hruska, Kadota, Klos, Krupkin, Liu, Roos and Tilson); zero opposed; one abstained (Hanna) (the MVCC counts abstentions as neither “yes” votes or “no” votes).

iv) Second Signer
MVCC approves President Elliot Hanna as second signer for the MVCC credit card.
This Item was approved by the above Consent Motion.

v) Approval of March MER
MVCC approves the Monthly Expenditure Report (MER) for March, as presented by Treasurer Tilson at the April MVCC BoD meeting.
This Item was approved by the above Consent Motion.

vi) Certification of MVCC’s Inventory
MVCC approves and certifies the MVCC Inventory list (see addendum D) is correct and complete, containing all items in the possession of MVCC as reported to the Department of Neighborhood Empowerment during Fiscal Year 2017-2018.

This Item was POSTPONED until the next Board Meeting.

vii) Administrative Summary
MVCC approves the 2018-2019 Administrative Summary Packet.

This Item was POSTPONED until the next Board Meeting.

viii) LADWP Aqueduct-Owens Valley Tour (See Addendum C)
MVCC approves Sara Roos as an MVCC representative for LADWP's Aqueduct-Owens Valley Tour.
This Item was approved by the above Consent Motion.

ix) Neighborhood Watch Signs
MVCC approves up to $3000 to purchase Neighborhood Watch signs and mounting equipment as discussed throughout 2017.
This Item was approved by the above Consent Motion, by a vote of 9/0/1 because one board member was not eligible to vote for funding issues.

x) Grease Night At VHS
MVCC approves $300 as Outreach for Grease Night at VHS.
This Item was approved by the above Consent Motion, by a vote of 9/0/1 because one board member was not eligible to vote for funding issues.

8. Future Agenda Items
There were no Items at this time.

9. Public Comment
There was no comment at this time.

10. Adjournment

MOTION to **ADJOURN** (by Mr. Kadota, seconded by Ms. Cervantes).

MOTION to ADJOURN PASSED; zero opposed; zero abstained.

The Meeting was **ADJOURNED** at 9:47 p.m.

Respectfully submitted,

The first paragraph of some Items, Motions/Resolutions and other wording may have been copied from the Agenda. Possibly edited by MVCC. Minutes written by DL, possibly edited by MVCC. The MVCC Minutes page is http://www.marvista.org/minutes-and-agendas.php.

Mar Vista Community Council Board of Directors

Leadership Retreat Agenda

St Bede's Church, 3590 Grand View Boulevard, Los Angeles, CA 90066

January 6, 2018 from 9am-1pm

Continental Breakfast – Coffee, Juice, Fruit, Pastries

Ice Breaker

Video Think Piece Break: http://www.gse.harvard.edu/news/16/05/good-questions

Rules of the Road – Drivers Handbook

MVCC Bylaws and Standing Rules, Brown Act, MERS, Best Practices, Basic Parliamentary Procedures for All, Directors Motions vs Committee Motions

User's Manual

Email options, Use of Social Media, Committee Chair expectations and opportunities, MVCC Equipment and tools at your disposal

Mapping Priorities and Opportunities

Committee Priorities and Issues – Room Walk with Committee Leadership in attendance if possible
Planning Calendar – 12 month look ahead by Month

Video Think Piece Break: https://www.ted.com/talks/derek_sivers_how_to_start_a_movement?language=en

Genius Labs – Pick the topic of your choice (time permitting)

MVCC Web training 101 - www.marvista.org
Social Media 101 – Twitter, Facebook, Nextdoor
Web apps/Cloud Computing – Google Apps/Dropbox/Box

Adjournment/Clean Up

Equipment and Supplies required/desired:
Computer, wifi internet access, data projector, MVCC Equipment Inventory Show and Tell, butcher paper, markers, newsprint, blue tape, camera to record work

**** PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

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** **PUBLIC ACCESS OF RECORDS –** In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at our website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

**** RECONSIDERATION AND GRIEVANCE PROCESS -** For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and our website, http://www.marvista.org.*

Mar Vista Community Council

Special Meeting of the Board of Directors
Wednesday January 17th, 2018, at 7:00 P.M.
Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

AGENDA

1. **Call to order and Welcome** – Chair (1 min)
2. **Presentation of flag and Pledge of Allegiance** (1 min)
3. **Approval of December 12th, 2017 Board of Directors Meeting Minutes** (public comment permitted;1min per speaker).
4. **Ex Parte Communication & Conflict of Interest Declarations**

   All Board members shall declare any ex parte communications or conflicts-of interest relating to items on this meeting's agenda.

   Ex Parte Communication is any material oral or written communication between a member of the board and an interested person outside the board that is relevant to the merits of a matter before the board and that was neither on the record nor on reasonable prior notice to all parties.

   Conflicts of interest include, but are not limited to employment relationships, financial relationships, and things of value given to or received from any individual, organization, or entity with any interest in any business before the council.
5. **Community Memorial Observations**
6. **Public Comment & Announcements** - for items not on the agenda (max 1 minute each, 30 minutes total, unless waived by the Chair)
7. **Officer Reports** (Action items included with public comment permitted; 1min per speaker)
   a. Chair – Rob Kadota
      i. Announcement of Board of Directors vacancy
   b. First Vice Chair – Chuck Ray
   c. Second Vice Chair – Paola Cervantes
   d. Secretary – Melissa Stoller
   e. Treasurer – Holly Tilson
      i. Report on current financial status
      ii. **APPROVAL** of December Monthly Expense Report (MER)
      iii. Review of draft budget revisions (see Attachment A)
8. **New Business -** Action items, which may include motions to refer items to the appropriate MVCC committee where desirable; Public comment permitted, 1 min per speaker unless waived by the Chair). Items may be received and filed by consent if no discussion or public comment.

   Consent Calendar: Motion to approve items 13a-e on consent.

   a. **Administrative Motion**: Authorization to submit Community Impact Statements (Directors motion submitted by Chuck Ray)

      Whereas, Neighborhood Councils were created in 1999 by amending the City Charter to provide for an effective **two-way** communication between City Stakeholders and the elected and appointed city officials, and

      Whereas, the City Clerk maintains a procedure for adding Community Impact Statements to council files as an official statement adopted by a Neighborhood Council on issues pending before the City Council, its committees, or City commissions.

Therefore, the Mar Vista Community Council authorizes the following board member(s) to SUBMIT Community Impact Statements which have been passed by a vote of the full board:

Rob Kadota, Chair
Chuck Ray, 1st Vice Chair
Paolo Cervantes, 2nd Vice Chair
Melissa Stoller, Secretary

Be it further resolved, in cases where an issue is moving quickly through the legislative process and a promptly issued statement is beneficial, the aforementioned board members are authorized to also WRITE and SUBMIT Community Impact Statements which express positions previously voted upon by the full board.

By this motion, the Chair and the Secretary are authorized to submit a formal request to the Department of Neighborhood Empowerment to authorize the board members listed above to submit Community Impact Statements to the City Clerk on behalf of the Mar Vista Community Council.

b. **Administrative Motion**: **Nominations by MVCC Chair to Committees** and review/approval by MVCC Board of Directors

c. **Funding Motion**: Live streaming equipment (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $1500 for live-streaming equipment.

Streaming Video Equipment/Hardware

Mevo Plus Bundle*	$799.96 (includes camera, tripod, case and extra 10nhr battery boost) plus tax
iPad Mini (128GB)	$399 plus tax (could get a different tablet if we wanted but this is what Venice NC uses)
iPad Mini Smart Cover	$39.00 plus tax
Movo Lavalier Microphone	$39.95 plus tax
Movo Microphone Extension Cables	$12.95 x 2 ($25.90) plus tax
	Total $1303.81 plus tax

d. **Funding Motion** MiFi plan (submitted by Executive & Finance Committee)

MVCC approves the expenditure of up to $140/month for AT&T device and data MiFi plan.

Wireless Mobile Internet Service and Router

ATT MiFi - Velocity	$0.99 + $45 activation fee plus data plan $60/10GB, $90/Unlimited plan (govt. contract details TBD)
Or	
ATT MiFi – Nighthawk LTE Mobile Hotspot Router	$89.99 +$45 activation fee plus data plan $60/10GB, $90/Unlimited plan (govt. contract details TBD)

e. **Funding Motion**: Board retreats (Directors motion submitted by Holly Tilson)

MVCC approves the expenditure of up to $400 for semi-annual board retreats.

9. **Grievances**, if any received
10. **Future agenda items**
11. **Public Comment**
12. **Adjournment**

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are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.

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ADDENDUM A: 01/08/18 Draft Amended Budget

Budget Category: General/Operational	Current Budget	Proposed Budget
Subcategory: Office		
Storage		
Storquest	$2,496.00	$2,496.00
Meeting rooms rental		
The Vineyard	$600.00	$600.00
St Andrew's Lutheran Church	$300.00	$300.00
St Bede's	$75.00	$75.00
Windward School	$5.00	$5.00
PO Box rental	$132.00	$132.00
Farmer's Market rental	$1,200.00	$1,200.00
Equip & supplies (misc)		
Live streaming equipment		$1,500.00
Misc.	$1,100.00	$1,100.00
Mtg supplies & printing		
Printing	$1,000.00	$700.00
Board Training & Support		
Business cards/name badges	$250.00	$350.00
Board Retreat	$37.68	$400.00
Office subtotal:	$7,195.68	$9,158.00
Subcategory: Outreach		
Website		
The Web Corner: website maintenance	$1,650.00	$1,650.00
The Web Corner: emails	$385.00	$385.00
The Web Corner: Extra Data Entry	$500.00	$500.00
RIMU Hosting	$96.27	$96.27
Email Service		
Mail chimp email service	$480.00	$700.00
MiFi Service		
AT&T MiFi service		$840.00
Advertising		
Banners/sign/event promotion	$500.00	$500.00
Facebook ads	$250.00	$250.00
Promotional items		$2,000.00
Emergency Prep signs & brochures	$1,500.00	$1,500.00
Neighborhood Watch signs		$1,500.00
Community Events		
Block parties (~~5~~ 4 X $300)	$1,500.00	$1,200.00
Westside Senior Health & Wellness Fair	$500.00	$500.00
Winter Wonderland	$1,000.00	$1,000.00
Art Walk	$2,000.00	$2,000.00

Venice High Grease Night	$300.00	$300.00
MVCC events / outreach items / mailings / newsletter		
Mar Vista Turns 90 Celebration	$4,000.00	$4,000.00
Great Street Tree Planting	$300.00	$300.00
Green Garden Showcase	$4,000.00	$4,000.00
Misc	$7,843.05	$7,843.05
Outreach subtotal:	$26,804.32	$31,064.32
Subcategory: Elections		
Election expenses	$1,000.00	$0.00
Elections subtotal:	$1,000.00	$0.00
General / Operational Total:	$35,000.00	$39,922.32
Budget Category: Community Improvement Grants		
Alley repair/seed money	$5,000.00	$0.00
Budget Category: Neighborhood Purpose Grants	$2,000.00	$2,000.00
Budget Total	**$42,000.00**	**$41,922.32**

Mar Vista Community Council

Agenda
Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, July 10, 2018 at 7:00 p.m. at
Mar Vista Recreation Center Auditorium
11430 Woodbine St.
Los Angeles, CA 90066

Chair: Elliot Hanna (elliot.hanna@marvista.org)
First Vice-Chair: Rob Kadota (rob.kadota@marvista.org)
Second Vice-Chair: Paola Cervantes (paola.cervates@marvista.org)
Treasurer: Holly Tilson (holly.tilson@marvista.org)
Secretary: Sara Roos (sara.roos@marvista.org)

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest -** Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes –** Reading and approval of the minutes from the June 12, 2018 meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
        - **10.2.1. Chair** – Elliot Hanna
        - **10.2.2. 1st Vice-Chair** – Rob Kadota
        - **10.2.3. 2nd Vice-Chair** – Paola Cervantes
        - **10.2.4. Secretary** – Sara Roos
        - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
        - **10.3.1. Zone 1** – Ken Alpern
        - **10.3.2. Zone 2** – Damien Newton
        - **10.3.3. Zone 3** – Mary Hruska
        - **10.3.4. Zone 4** – Aaron Elster
        - **10.3.5. Zone 5** – Michelle Krupkin
        - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
11. **Special Orders –**
    - **11.1. Adoption of Revised Standing Rules**– Discussion and possible action regarding revisions to standing rules dated September 8, 2015.
    - **11.2. Adoption of Tent and Social Media Policies –** Discussion and possible adoption of proposed standalone Tent and Social Media Policies.

11.3. **Adoption of Committee Structure and Appointments –** Discussion and adoption of revised committee structure and appointments of committee leadership.

12. **Consent Calendar** – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.
    - 12.1. **Approval of Administrative Summary Packet** – Review and approval of the Administrative Summary Packet for FY2018-2019.
    - 12.2. **Review and Approval of Monthly Expense Report** – Review and approval of the Monthly Expense Report for June, 2018.
    - 12.3. **Review and Approval of Budget** – Review and approval of the budget for FY2018-2019.
    - 12.4. **Certification of Inventory List** – Certification of council inventory for the prior fiscal year (2017 – 2018).
    - 12.5. **Approval of 2018 Election Worksheet** – Review and approval of hours, location, etc. for the 2018 election for directors of the Mar Vista Community Council.
13. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.
14. **Unfinished Business and General Orders**
    - 14.1. **Extension of L.A.M.C. 85.02** – Discussion and possible action regarding a motion from the Transportation & Infrastructure Committee requesting extension of L.A.M.C. 85.02.
    - 14.2. **Discussion of Development at 11700 Charnock Blvd.** – Discussion and possible action regarding support of an application to build a new three-story, six-unit development at 11700 Charnock Blvd.
    - 14.3. **Classification of Director Attendance** – Discussion and possible action on a proposal that departure of a board member from a meeting after the establishment of a quorum be considered an absence.
    - 14.4. **Discussion of Centinela Blvd. Street-Sweeping Services** – Discussion and possible action regarding street-sweeping route and Services for Centinela Blvd. between Palms Blvd. and National Blvd., and for all major thoroughfares within the Mar Vista Community Council's geographic area.
15. **New Business –**
    - 15.1. **Funding Items** – Approval of funding items for FY2018-2019 totaling $15,291 for meeting rooms, property storage, clerical services, and other purposes.
    - 15.2. **Discussion of Development at 12331 Palms Blvd.** – Discussion and possible action regarding the resolution passed at the June 12, 2018 meeting of the Board of Directors regarding the proposed development at 12331 Palms Blvd.
    - 15.3. **Support of Alcohol Permit for Little Fatty** – Discussion and possible action regarding support for the alcohol permit for Little Fatty, located at 3809 Grand View Blvd., as recommended by the Planning and Land Use Committee.
16. **Adjournment** (not later than 9:00 p.m.)

In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org. **As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days prior to the meeting you wish to at tend by contacting chair@marvista.org.

Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday July 10th, 2018, at 7:00 pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

Approved

1. **Call to order**

Meeting called to order at 7:02pm with approximately 25 members of the public present; 45 members estimated present by meeting's end.

2. **Presentation of Flag and Pledge of Allegiance**

Led by Hanna

3. **Roll Call** – Call of the roll and certification of a quorum

Quorum present at 7[02] pm; delayed arrival time noted in parentheses: Ken Alpern (7[10]p), Paola Cervantes, Robin Doyno, Aaron Elster, Elliot Hanna, Rob Kadota*, Susan Klos*, Michelle Krupkin (7[12]p), Nanxi Liu (7[08]p), Damien Newton, Sara Roos, Holly Tilson*

Absent: Mary Hruska

***NB: After the meeting 3 members, noted throughout with asterisks, were discovered out-of-compliance with ethics trainings. Their votes are notated as follows in these Minutes: first, in parentheses as understood during the meeting, and second, in square brackets according to strict eligibility: (ayes/nays/abstentions/absences); [ayes/nays/abstentions/absences+ineligible]. Quorum of fully qualified members was established at 7:08pm and sustained until adjournment; no business was transacted between the Call to order and the establishment of a quorum comprised exclusively of training-compliant members.*

4. **Community Memorial Observations**

None.

5. **Announcements**

Board retreat on Sunday, July 15 – public and Brown-Acted, but intended as internal "trust-building" exercise.

6. **Public Comment for Items NOT on This Agenda**

Robin Doyno – Congressional Representative Karen Bass is looking to nominate candidates for armed services academies. Contact her office if interested. Public street trash barrels need emptying; there is opportunity to work monitoring these. Contact Mr. Doyno for details.

Marty Rubin – Despite MVCC's support of the adjacent property owner's request for a traffic study regarding the development project on the corner of Barrington and National (11671-11677 National Boulevard), the developer continues to move "full speed ahead" on this project. It should be considered by CoLA Transportation Cmte, yet it is not agendized. Efforts to contact CD11 staff have been frustrated. Assistance from MVCC in urging Boardmember Bonin to agendize the matter at his CoLA Transportation Cmte would be appreciated.

Selena Inouye – (1) Requesting a copy of, or clarification of the MVCC distribution process for passed motions. Of particular interest is the May 2018 PRA-support motion.

(2) Livable Boulevards motion and CIS passed at MVCC's June meeting were not heeded at CoLA because downtown meeting was moved earlier by one day, but without sufficient notice. As a result, MVCC's protected 5 minute comment (per CIS submission) was 'disenfranchised'.

(3) MV Stakeholders filed a lawsuit against CoLA regarding the CEQA exemption for the Venice Blvd road reconfiguration. Steering Cmte members for this lawsuit are sought.

7. **Ex-Parte Communications and Conflicts-of-Interest -** Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

Alpern – discussions with many boardmembers, how to proceed regarding numerous issues, e.g., Venice Blvd, Council District matters (5 & 11), updating stakeholdersn, Citywatch articles	*Cervantes* – spoke with a few boardmembers re cmte reconfigurations*	*Doyno – Conversations with Liu, emails, re civility/badgering at MVCC meetings. Discussed HIC cochair and agendas issues, resource guide. Consulted with atty on unilateral action against NC chair. Mtg re safe parking locations. Met with Tuller residents (homeless issues). Phone msg with westside homeless poverty cmte concerning participation.*
Elster - nothing	*Kadota* – met to talk about future direction of cmtes*	*Klos* – spoken with several re changes to cmtes, chairmanship, exchanged emails re missing item on this month's BOD agenda.*
Krupkin –spoke about 72pp agenda. Spoke to city employees re unadvertised construction in Z5. Emailed CD11 to get to bottom of tree planting which had insufficient communications. No conversations generated personal profit	*Liu – conversations with stakeholders. Met w/ Roos re website*	*Newton – Streetsblog editor wrote piece critical on Livable Blvds appeal. During editor's absence (per vacation), Newton attempted to address the article w/o access to reporter's notes. Believes his own objectivity is unaffected. Discussion re 12331 Palms, AHLA, PLUM; because absent from June BOD mtg, tried to explain happenings despite absence; also does not impact personal objectivity. Procedural discussion with Charnock developers.*

Hanna – spoke with several BoD members regarding committee appointments and structure but keept the number below a majority	*Roos - discussion of Minutes with Alpern, Hanna, Tilson, Krupkin, Newton; Discussion of 85.02*	*Tilson – conversations with stakeholders and board members re items on the agenda, council members and conflicts.*	*Hruska - absent*

8. **Adoption of the Agenda**

Newton: moved to suspend the rules for the purpose of voting on Charnock Blvd, item 14.2 and item 15.2, 12331 W. Palms Blvd., to be considered first, before item #9

*Motion seconded by Alpern, **PASSES** (12/0/0/1);]; [9/0/0/4] @ 7:19pm.*

*Agenda **ADOPTED** with indicated changes by voice vote (11/0/1$_{(Roos)}$/1) [8/0/1/4]*

9. **Reading and Approval of Minutes –** Reading and approval of the minutes from the June 12, 2018 meeting of the Board of Directors.

Hanna: May Minutes are inadvertently omitted from the item.

*Krupkin: moved to waive reading of the Minutes, seconded by Alpern. **PASSED** by acclamation.*

Krupkin: moved to postpone approval of minutes to next month, as Secretary would like to update them. Suggestion and discussion of alternatively approving the Minutes at public, Brown-acted, Sunday, 7/15/18, Board retreat.

*Motion to postpone approval **PASSED** by acclamation.*

>>Agenda proceeds according to amended order<<

10. **(Agenda item 14.2) Discussion of Development at 11700 Charnock Boulevard –** Discussion and possible action regarding support of an application to build a new three-story, six-unit development at 11700 Charnock Blvd.

Approved

Motion introduced by PLUM Chair Newton: "The Mar Vista Community Council supports the application to build a new six unit, three story, development at 11700 Charnock Boulevard. The developer has met twice with the Planning and Land Use Committee and is requesting no exemptions from the city."

Community concerns included height, over-development. The project's Developers appeared at PLUM three times, (and the BoD twice) which is unusually (uniquely?) forthcoming among recent experience with developers. Location is the SW corner of McLaughlin/Charnock

Alpern applauds the Developer's outreach and honesty; inquires after parking affordable housing.

Lewis Futterman (Developer) – clarifies there are no affordable housing units; the Project is small. Parking exceeds requirements by one additional guest space (2 for the complex which is "double" the requirement) for a total of 14 spaces in the Development (2 spaces/6 units + 2 spaces/Development = 14 total). States that being receptive to suggestions, reaching out to and being supportive of the surrounding community is their ordinary, standard procedure.

Motion read and moved by Hanna; seconded by Alpern

PUBLIC COMMENT:

Inquiry and clarification that this is a small lot subdivision; there will be no rentals, it is "commodious", family housing - six units, all 3 bdrm/3 bath. Independent, separate family homes, approximately 2300 sf each.

Greg Tedesco – two concerns, not "objections" but issues to note. (1) The Project is larger than "three stories" would suggest; it is dishonest to omit mention of the additional raised garage level and roof decks. (2) with 3 bedrooms and 6 units, there are a total of 18 bedrooms being developed, with the potential to become a different sort of project in the future, and change the character of the neighborhood.

This project changes residential communities because it supports neighbors living above others on these roof decks, light lost to the height of these projects; this could impose a deterioration of the current Quality of Life in residential communities. Tedesco reiterates the necessity for more housing, but suggests locating this scale project on the Boulevards would avoid betrayal of the nature of residential communities with their some-time promise of light and air and fewer residents.

BOARD COMMENT:

Krupkin: suggests striking "three" and replacing with "four" floors. Futterman: the garage needs showing, and is not a "floor".

Kadota: we're approving the Project, not the description of the Project.*

Krupkin: requests clarification of egress, creation of an alley Futterman: the development is primarily on McLaughlin, the most easterly spaces will exit via a singular exit onto Charnock. The overall height is 43'; 45' is the limit so no variance is requested.

The Project is not started, the partners come to the community first, then make formal application. The current property houses 4 1-bdrm units with separate parking for each. An ally dedication will come later in the Project (giving back land to the City)

Discussion about amending the motion to characterize its true height and scale; rather than specifying its specific properties, it was agreed to express support of the project itself:

Without objection the amended motion PASSES: "The Mar Vista Community Council supports the proposed project at 11700 Charnock Boulevard".

*Amendment **PASSES** (8/0/4(Newton, Krupkin, Tilson, Hanna)/1) [5/0/4/4]*

11. **(Agenda item 15.2) Discussion of Development at 12331 W. Palms Boulevard** – Discussion and possible action regarding the resolution passed at the June 12, 2018 meeting of the Board of Directors regarding the proposed development at 12331 Palms Blvd.

Motion introduced by At-large Director Roos: "The Mar Vista Community Council opposes the proposed mixed-use development at 12331 W. Palms Boulevard. The community believes the 32 unit apartment complex with 3000 feet of retail is too large for the neighborhood and will have significant impact on traffic circulation and parking.

Approved

"True mitigation of (i) garaging bottlenecks and (ii) parking pressure on the surrounding neighborhood, and (iii) improved community "walkability" via installation of a sidewalk eastward from Centinela along Palms Boulevard, would transform this Project into the community enhancement its Developers promise."

Because PLUM Committee leadership was absent at last month's discussion, the 35 stakeholders who utilized the Committee process codified for the purpose of vetting and discussing policy carefully, were effectively (if inadvertently) disenfranchised. It is important to hear fully supported – and not to break trust with – our stakeholders who actively engage MVCC's full process.

The Project's representatives felt there was no secret about the PLUM Committee's opposition or their efforts to further mitigate anticipated traffic issues by altering the driveway circulation as presented formerly. The Project tries to be respectful of its neighbors by by stepping back its mass, adding additional landscaping, securing immediate neighbor's support.

Motion moved by Alpern seconded by Krupkin

PUBLIC COMMENT:

Maryrose Petayach – Surprised it is possible to fit 32 units on a 17,850 sf lot. The rental units range from 500 sf to 1000 sf – for rental. 29 will be market rate, 3 very low income units.

Stacy Shure - (representing Westside Village Homeowner's Association (Z1)) – thanks for empowering the role of our Committees. Traffic congestion generated in western Mar Vista is felt in eastern Mar Vista; this Project inadequately mitigates traffic problems. The Project plans for very high density without incorporating a sufficiency of affordable housing units.

Michael Millman - (stakeholder, former PLUM co-chair). Traffic mitigations presented at the BoD meeting should have been vetted through Committee. The modifications presented in June were inappropriate and illegitimate without prior presentation to the community, in particular the residents of Z3 and Z4.

Traffic, traffic, traffic, traffic and parking is the problem impacting Ocean View, with inadequate mitigation.

Greg Tedesco – We don't need to send the Project back to Committee, it's been agendized at PLUM, no variance is requested and we need the housing. It's absurd to hear it again. We need to move forward. This is a legal, good project, which could be higher which would not be good, and could be uglier. We need the units desperately.

Marty Rubin - (representing NWDNA) – considers the urgent call for housing illogical without better infrastructure. Further taxing infrastructure demands with more traffic and unmitigated parking issues will necessarily make traffic and air quality, safety in the community, stress levels, water shortages all worse.

Mar Vistans should consider what we want. The City makes money off these big, box-like, ugly, profit-maximizing developments. But most residents are mad and don't want to take it anymore: When are we going to wake up?

Rich Hirschkoff – 65 year resident of Corinth. There have been many iterations of redevelopment at this corner; this one is designed to mitigate traffic. June's meeting reflected a different board presence.

Selena Inouye – where does this leave the stakeholders?

BOARD COMMENT:

Doyno: requests the Chair honor Mr Hirschkoff's request to read the June roll call of this vote. The Chair rules this inappropriate.

Alpern: affirms the importance of for-profit, deliberative, transit-oriented, traffic mitigating development. Experience shows that promises quickly made are easily ignored. Mixed-use development is not sensible and doesn't work well. Why build when spillover development problems are anticipated from the start?

Krupkin: observes that abundant housing is not necessarily affordable housing. Density is favored at the expense of affordability, yet economic homelessness is sizeable. Infrastructure and mobility concerns dictate barriers and bollards; restrictions on retailers – e.g. yoga, which attracts traffic.

Elster: Was present at the PLUM meeting in question. Considers that the BoD should not rubber-stamp Committee decisions. In this case the Development is by-right and therefore the BoD is simply interfering with the Developer's entitlement. ¿Should we be a thorn in their side or let them build and live?

Approved

Roos: Asks for clarification of "by-right" status. Newton: Project is governed by SB1818 so there is no discretionary action the City can pursue.

Newton: Presents the following Committee timeline: May, 2017 the Project was presented to a small group of approximately 8, including the Z4 Director. Traffic issues were of concern. Nine months later there was a formal hearing and larger turnout. The Committee was overwhelmingly opposed to the Project at this time. At the June BoD meeting where all PLUM leadership was unavoidably absent, the motion was reversed in intent following an organized turnout by the advocacy group Abundant Housing LA. AHLA considers this consideration of an amendment to the motion to disenfranchise their organized advocacy.

The reversals of public opinion have been so strong and surprising that there is little to do but vote your own conscience.

Cervantes: motivated in June to favor the Project because of the presented changes that suggested these Developers, in contrast with many, were thoughtful and "listened". The need to move with changing times that acknowledge neighbors need more housing and want to work closer to where they live is greater than traffic concerns.*

Tilson: considers the concessions the community makes in consideration of low income housing are unfair because the costs in traffic and increased density are not mitigated while the means-test for income is transient (doesn't depend on income after initial qualification) and inadequate in scale anyway (3 units is not enough). Developer states they submit an annual income report through the 55 covenanted years, however tenants may not be evicted if income rises.

Kadota: felt the advocacy in front of the board was not "stacked", and the design process reflected growth and development in response to concerns. The Committee process and the role of engagement was met with such force that the board acknowledged this good faith by reversing the Committee motion, a good decision made in good conscience.*

Alpern: The design process should come through Committee not be presented as an outcome at the BoD meeting. The Committee reflected voting constituents of Mar Vista while the board advocacy was from a special interest group not composed of MV voting stakeholders. Closure is important, but from within the community.

Roos: inquired whether presented mitigations would satisfy PLUM Committee objections. Newton: was uncomfortable speaking for the Committee; traffic may have been mitigated but density and height were not addressed.

Doyno: clarifies that voting "yes" to amend substitutes this motion for June's, tantamount to opposing the development, while "no" supports it.

*Motion **FAILS** on vote as understood during the meeting; **PASSES** under reconsideration of transient voting ineligibility (4/6(Kadota*, Klos*, Cervantes*, Liu, Doyno, Elster)/2(Hanna, Newton)/1) [4/3(Liu, Doyno, Elster)/2(Hanna, Newton)/4].*

12. **(Agenda item 10) Reports**

12.1. Elected Official and City Department Reports

Hannah Levien (represents CD11 Bonin) – Bird scooter regulations (CF17-1125) were approved in the Transportation Committee on the 27th(principally mandating street, not sidewalk use); now onto Public Works Committee. Council is currently in recess.

The Community Plan, spearheaded by Z3 Director Hruska in an MVCC Sub-committee of PLUM, is a Big Deal.

Vanessa Serrano, new DONE representative for MVCC, replacing Jasmine. Save the date – Saturday, 9/22/18: Congress of Neighborhoods. It's a great event, registration opens in a couple weeks, dood opportunity to network with other NC board members.

Outreach gathering at the Imam Center, Tuesday July 24, 6-8pm. Open to all board members, especially

12.2. Officer Reports

Officer Reports deferred in the interest of time with no objection heard.

12.2.1. Chair – Elliot Hanna
12.2.2. 1st Vice-Chair – Rob Kadota*
12.2.3. 2nd Vice-Chair – Paola Cervantes*
12.2.4. Secretary – Sara Roos

Approved

12.2.5. Treasurer – Holly Tilson

12.3. Zone Director Reports

Zone Director Reports deferred in the interest of time with no objection heard.

12.3.1. Zone 1 – Ken Alpern
12.3.2. Zone 2 – Damien Newton
12.3.3. Zone 3 – Mary Hruska
12.3.4. Zone 4 – Aaron Elster
12.3.5. Zone 5 – Michelle Krupkin
12.3.6. Zone 6 – Holly Tilson

12.4. Committee Reports

Committee Reports deferred in the interest of time with no objection heard.

13. **Special Orders –**

13.1. (Agenda item 11.1) Adoption of Revised Standing Rules – Discussion and possible action regarding revisions to standing rules dated September 8, 2015.

*In the interests of time following questions from Doyno regarding further explanation of the proposed Standing Rules, the motion to **Commit item 11.1 to the Bylaws Committee** is moved by Kadota*, seconded by Tilson and **PASSED** hearing no objections.*

13.2. (Agenda item 11.2) Adoption of Tent and Social Media Policies – Discussion and possible adoption of proposed standalone Tent and Social Media Policies.

*In the interests of conserving BOD meeting time, the motion to **Commit item 11.2 to the Bylaws Committee** is moved by Kadota*, seconded by Tilson and **PASSED** hearing no objections.*

13.3. (Agenda item 11.3) Adoption of Committee Structure and Appointments – Discussion and adoption of revised committee structure and appointments of committee leadership.

Introduced by Hanna: Exactly seven Committees are mandated in the Bylaws. A sub-committee structure is also proposed, attached here as addenda DIR 2018-001 and DIR 2018-002.

With this Co-chair model, Committee leadership will decide internally who will "Preside".

Leadership opportunities are intentionally designed to attract new stakeholders, to be inclusive and incorporate diverse viewpoints and opinions.

PUBLIC COMMENT:

BOARD COMMENT:

Klos: requests contact information for new individuals. Questions the omission of Doyno from Homeless Issues Committee (HIC) which he founded. Concerned with imbalance of leadership numbers between Cmtes.*

Kadota: inquired whether nominations are entertained; Hanna: suggestions only, no nominations.

Hanna: contact should be contingent on confirmation, the reverse is premature.

Klos: without the opportunity to explore qualifications, there is no basis for affirming the nomination. Rather this becomes simply a statement of trust in the judgment leading to these nominations.

Hanna introduces select nominees, e.g. for HIC Dr. Samiley is a nurse at the Veteran's Administration Hospital whose family resides on Globe; Dr. Sabshin is a psychiatrist with LAC DPH. The intent is to bring "balance" to the Cmte.

Kadota: suggests amending the proposed Cmte structure in accordance with some proposals from Roos: Redefine Safety more broadly as Public Safety; put Aging In Place (AIP) under its umbrella. Subsume Mobility under Public Health and Safety rather than Transportation as this more accurately reflects its historical perspective.*

Cervantes: requests resumption of Education-Arts-Culture Cmte leadership as presented already at the ExFin Committee.*

Alpern: approves the direction of these proposals.

Approved

Klos: questions curious absences and omissions and the selection process. Hanna: there was general solicitation via mail chimp and social media (NextDoor, FB, etc). Each individual was spoken with prior to any nomination.*

Hanna introduces select Transportation/Infrastructure nominees: Mr. Hill is an 11-year resident of the relatively heavily-represented Zone 4, interested in affordable housing, homelessness, innovation, community awareness, supporter of the bike lane project; Mr Graham is a 4-year resident of Zone 4, as an "avid cyclist, reluctant driver" is an adherent of walking, cycling, birding.

Klos: concerned that present Cmte chairs were not consulted in selecting nominees. Hanna opted instead to explicitly prioritize 'change', 'diversity', 'difference'. The nominations can be rejected but not the process.*

Newton: inquires whether vice chair appointments are Cmte leadership prerogative; former PLUM Co-chair Williams would bring diversity, youth, a renter's perspective. Hanna: that appointment remains the Chair's prerogative.

Doyno: suggests this process is "Dictatorial" and the Cmte shuffling without reason. Nevertheless he shares Newton's spirit of supporting the Chair, yet decries this new spirit on the Council.

Klos: similar to Newton's, consideration is being requested to retain the former Co-chair of HIC.*

Alpern: observes that while Cmte reassignments can be unpleasant, such re-configurations do not preclude making a big difference, an important objective in serving on an NC Committee. And titled positions can be horrible, even while the most valuable person is sometimes without title. Someone's decision has to be the final one, that someone is the Chair, because that is who puts down the agenda.

Hanna: this approach addresses concerns of the board "not talking"; this proposal will move the Board in a new direction. "Business as usual" is an option, or enlisting these new people is an alternative.

Klos regrets more new faces are not present; the nominees are largely unknown. Objects that the new spirit feels more like working 'for' than 'with' the new Chair.*

Cervantes: **moves to Table** Committee approvals until Sunday's Board retreat designed to foster camaraderie; that might be an appropriate venue, and allow more time for discussion. Hanna explains its facilitator is not a mediator, and the meeting is not intended for conducting business. The Board's responsibility is to vote up or down on the Chair's nominees at Board meetings.*

Alpern: verifies that Sunday is Brown acted and public, but intended to work through a variety of important issues that are different from regular business.

*Tabling motion **FAILS**: (5(Cervantes*, Krupkin, Alpern, Tilson, Doyno)/6(Roos, Hanna, Elster, Kadota*, Newton, Liu)/1(Klos*)/1); [4/5/0/4]*

*Motion to approve Chair's nominees **PASSES** (7/1(Doyno)/4(Kadota*, Roos, Cervantes*, Klos*)/1); [7/1(Doyno)/1(Roos)/4]*

14. **(Agenda item 12) Consent Calendar** – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.
    - **14.1. (Agenda item 12.1) Approval of Administrative Summary Packet** – Review and approval of the Administrative Summary Packet for FY2018-19.
    - **14.2. (Agenda item 12.2) Review and Approval of Monthly Expense Report** – Review and approval of the Monthly Expense Report for June, 2018.
    - **14.3. (Agenda item 12.3) Review and Approval of Budget** – Review and approval of the budget for FY2018-19.
    - **14.4. (Agenda item 12.4) Certification of Inventory List** Certification of Council inventory for the prior fiscal year (FY2017-18)

Brief introduction and review by Treasurer Tilson of materials already distributed in the meeting packet.

BOARD COMMENT:

Roos requested clarification of Budget and Funding items agendized separately; Hanna: Budget Is Not Appropriations. General categories are approved as a budget; specific expenditures are appropriated.

Consent calendar moved by Cervantes, seconded by Newton; **PASSES** (12/0/0/1); [9/0/0/4]*

15. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.
    - **15.1. (Agenda item 12.5) Approval of 2018 Election Worksheet** – Review and approval of hours, location, etc. governing the 2018 election of Directors for the Mar Vista Community Council.

Approved

Kadota amends start time of 10am-2pm rather than 9am-1pm; notes one contact, primary or secondary, should be a board member, Doyno is the board member on the Elections Committee substituted for Olson.*

Date is TBD – June.

Additional issues: online voting, and potential expenditure of $5K to support it.

Liu: next working generation is looking to participate more politically; these newer forms of voting and engagement are key adoptions. $5K important strategy in engaging more, and younger, people.

Newton: agrees with Liu; Zone 2 looks more commonly North or West to Brentwood or SM; MV Farmer's Market is not so important "up there" but online voting could double engagement.

Hanna cautions there is no guarantee of its affect, but sees no downside.

Roos considers online voting vital to the NC process, but we cannot afford this additional requested expense, which the City is exploring in considering the option, not requiring for implementation.

Tilson questions the integrity of the process.

Kadota notes all polling in LAC will change in 2020; all voting is destined for significant change.*

Cervantes considers online voting one of the many new opportunities provided by a new board; online voting can go beyond walking to the FM and enable more, and broader involvement.*

Alpern's distant Zone 1 could benefit most from online voting but worries about the potential for corruption.

Doyno notes the potential for problems is different from recording our community's need. Roos circumscribes our task as articulating the need; the potential problems are not ours at this point.

Vote-by-mail (VBM) and On-line options are mutually exclusive; or neither can be adopted.

Straw-poll on which option to select: 10 favor On-line, 1 favors VBM

*Motion to adopt amendments {Timing, Contact, No funding, Online option} **PASSES** (10/1$_{(Tilson)}$/1$_{(Hanna)}$/1); [7/1/1/4]*

16. **Unfinished Business and General Orders**
    - **16.1. (Agenda item 14.1) Extension of L.A.M.C. 85.02** – Discussion and possible action regarding a motion from the Transportation & Infrastructure Committee requesting extension of L.A.M.C. 85.02.
    - **16.2. (Agenda item 14.3) Classification of Director Attendance** – Discussion and possible action on a proposal that departure of a board member from a meeting after the establishment of a quorum be considered an absence.
    - **16.3. (Agenda item 14.4) Discussion of Centinela Blvd. Street-Sweeping Services** – Discussion and possible action regarding street-sweeping route and Services for Centinela Blvd. between Palms Blvd. and National Blvd., and for all major thoroughfares within the Mar Vista Community Council's geographic area.

*In the interest of time, agenda items 14.1, 14.3, 14.4 are **POSTPONED** to the next meeting by voice acclamation.*

17. **New Business** –
    - **17.1. (Agenda item 15.1) Funding Items** – Approval of funding items for FY2018-2019 totaling $15,291 for meeting rooms, property storage, clerical services, and other purposes.

After some clarification these are projections in some cases of regular monthly expenses, clerical expenditures in other cases, the motion moved by Kadota and seconded by Newton **PASSED** (9:36pm) to approve funding items 13.2.1 – 13.2.16 (see Funding Motions addendum): (11/0/1$_{(Hanna)}$/1); [8/0/1/4]*

    - **17.2. (Agenda item 15.3) Support of Alcohol Permit for Little Fatty's** – Discussion and possible action regarding support for the alcohol permit for Little Fatty's as recommended by the Planning and Land Use Committee.

Introduced by PLUM Co-chair Newton:

"MVCC supports the application of Little Fatty for expansion of its existing restaurant/bar into the adjacent 98 Cent Discount retail tenant space, including (i) the continued/expanded sale of a full line of alcoholic beverages, (ii) the providing of six additional required car parking spaces through leased parking at 3839 Grand View Boulevard, and (iii) one additional bicycle rack at its business locale.

Approved

The MVCC also requests that Little Fatty provide additional signage informing the community of its parking at 3839 Grand View."

Motion by Kadota, seconded by Alpern* ***PASSES*** *to suspend the rules and approve the motion without discussion (2/3 vote (8 of 12); [6 of 9] is required under suspension): (10/0/2(Hanna, Newton)/1); [7/0/2/4]*

18. **Adjournment** (not later than 9:00 p.m.)

Adjourned at 9:38pm

ADDENDA – Committee Structure and Composition Directives; Funding motions; MVCC Budget, FY2018-19

Approved

Mar Vista Community Council

DIR-2018-001 – Committee Structure

July 10, 2018

1. Purpose

The purpose of this directive is to establish the committee structure for the Mar Vista Community Council for FY2019 (July, 2018 – June, 2019). This structure shall remain in effect until altered by action of the Board.

2. Standing Committees

Standing committees are mandated by ARTICLE VII, Section 1 of the "Bylaws of the Mar Vista Community Council" and are as follows:

a. Executive Budget and Finance
b. Elections and Bylaws
c. Outreach
d. Transportation and Infrastructure
e. Planning and Land Use Management
f. Public Safety (formerly Safety and Security)
g. Education, Arts, and Culture

3. Committee Structure

The Board disbands all other standing committees and establishes the following subcommittees in accordance with ARTICLE VII, Section 3 of the "Bylaws of the Mar Vista Community Council":

a. Parks and Open Space ("Parks and Open Space Enhancement" (ROSE);Planning and Land Use Management)
b. Homeless Issues (Public Safety/'Public Health and Safety')
c. Emergency Preparation (Public Safety/'Public Health and Safety')
d. Aging-in-Place (Public Safety/'Public Health and Safety')
e. Mobility (Public Safety/'Public Health and Safety')
f. CD11/LADOT Transportation (Transportation and Infrastructure)
g. Airports (Transportation and Infrastructure)
h. Great Streets (Transportation and Infrastructure)
i. Green (Outreach)

The Board disbands all existing ad hoc committees and establishes the following ad hoc committee in accordance with ARTICLE VII, Section 2 of the "Bylaws of the Mar Vista Community Council":

a. Community Plan (Planning and Land Use Management)

The overall committee structure is depicted below and listed in Table 1.



Draft

DIR-2018-001 – Committee Structure

July 10, 2018

Committee Structure	
Designator	**Title**
01.01	Elections and Bylaws
01.02	Planning and Land Use Management
01.02.01	Community Plan (Ad Hoc)
01.02.02	Recreation and Open Space ("ROSE")
01.03	Public Health and Safety
01.03.01	Homeless Issues
01.03.02	Emergency Preparation
01.03.03	Mobility
01.03.04	Aging-in-Place ("AIP")
01.04	Education, Arts, and Culture
01.05	Executive and Finance
01.06	Transportation and Infrastructure
01.06.01	CD-11/LADOT Transportation
01.06.02	Airports
01.06.03	Great Streets
01.07	Outreach
01.07.01	Green

Table 1 - Committee Structure

X

Elliot Hanna
Chairman, MVCC Board of Directors

Mar Vista Community Council

DIR-2018-002 – Committee Appointments

July 10, 2018

4. Purpose

The purpose of this directive is to establish the committee appointments for the Mar Vista Community Council for FY2018-2019 (July, 2018 – June, 2019). These appointments shall remain in effect until altered by action of the Board.

5. Appointments

The Board appoints the following individuals to chair/co-chair the indicated committees.

Mar Vista Community Council Committee Structure **Indicates a sitting Board member*		
Designator	**Title**	**Chair(s)**
01.01	**Elections and Bylaws**	Doyno, Robin* Olson, Albert Rubin, Marty
01.02	**Planning and Land Use Management**	Elster, Aaron* Newton, Damien*
01.02.01	Community Plan (Ad Hoc)	Graham, Galen Hruska, Mary* Shure, Stacy
01.02.02	Parks and Open Space	Roos, Sara* Silverman, Scott
01.03	**Public Health and Safety**	Frese, Ken Kadota, Rob*
01.03.01	Homeless Issues	Klos, Susan* Sabshin, Renee Samiley, Roman
01.03.02	Emergency Preparation	Frese, Ken Green, Cassidy
01.03.03	Mobility	Graham, Galen Kadota, Rob*
01.03.04	Aging-in-Place	Akers, Sherri Kastenbaum, Birgitta Liu, Nanxi* Luethi, Tatiana
01.04	**Education, Arts, and Culture**	Akbay, Cigdem Cervantes, Paola* Doyno, Robin*

DIR-2018-002 – Committee Appointments

July 10, 2018

Mar Vista Community Council Committee Structure **Indicates a sitting Board member*		
Designator	**Title**	**Chair(s)**
01.05	**Executive and Finance**	Cervantes, Paola* Tilson, Holly*
01.06	**Transportation and Infrastructure**	Alpern, Ken* Hill, Gabriel Krupkin, Michelle*
01.06.01	CD-11/LADOT Transportation	Guagliano, Linda
01.06.02	Airports	Rubin, Marty Tilson, Holly*
01.06.03	Great Streets	Hill, Gabriel Krupkin, Michelle*
01.07	**Outreach**	Liu, Nanxi* Seretti, Armond Sheaffer, Ali
01.07.01	Green	Kuntz, Jeanne Stoller, Melissa

6. Instructions

The Board directs all committees to select a presiding co-chair within twenty-one (21) days of the date of this directive and to report that selection to the Secretary. The presiding co-chair shall be responsible for the conduct of committee meetings, preparing committee agendas, preparing committee minutes, and ensuring that the committee adheres to all requirements specified in the bylaws and standing rules

The Board further directs all committees to produce a mission statement within twenty-one (21) days of the date of this directive and to forward that statement to the Secretary for approval by the Board at its next scheduled meeting.

X

Elliot Hanna

Chairman, MVCC Board of Directors

Funding Motions

July 10, 2018 Meeting of the Board of Directors

13.1.1 The Mar Vista Community Council approves the expenditure of up to $5,532 for FY2018-2019 for rental of a storage unit at StorQuest Self Storage, located in Los Angeles, CA.

13.2.2 The Mar Vista Community Council approves the expenditure of $1,800 for website maintenance to The Webcorner located in Los Angeles, CA 91356.

13.2.3 The Mar Vista Community Council approves the expenditure of up to $378 ($31.50 monthly) for FY2018-2019 for email addresses to The Webcorner, 19509 Ventura Blvd., Los Angeles, CA 91356.

13.2.4 The Mar Vista Community Council approves the expenditure of up to $360 for FY2018-2019 for email service to Mail Chimp located in Atlanta, GA.

13.2.5 The Mar Vista Community Council approves the expenditure of up to $1,200 for FY2018-2019 for MiFi service to AT&T, located in Dallas, TX.

13.2.6 The Mar Vista Community Council approves the expenditure of up to $300 for meeting room rental at St. Andrew's Lutheran Church, located in Los Angeles, CA.

13.2.7 The Mar Vista Community Council approves the expenditure of up to $10 for FY2018-2019 for meeting room rental at The Windward School., located in Los Angeles, CA.

13.2.8 The Mar Vista Community Council approves the expenditure of up to $450 for FY2018-2019 for meeting room rental to St. Bede's Episcopal Church, located in Los Angeles, CA.

13.2.9 The Mar Vista Community Council approves the expenditure of up to $600 for FY2018-2019 for meeting room rental to the Westside Vineyard, located in Los Angeles, CA.

13.2.10 The Mar Vista Community Council approves the expenditure of up to $1,200 for FY2018-2019 for printing and copying of meeting materials.

13.2.11 The Mar Vista Community Council approves the expenditure of up to $1,000 for FY2018-2019 for miscellaneous office expenses.

13.2.12 The Mar Vista Community Council approves the expenditure of $461 Board Reimbursement for the purpose of reimbursing to Rob Kadota for payment of the Mar Vista Community Council's monthly rental storage fee due to no access to the neighborhood council's credit card or checking account.

13.2.13 The Mar Vista Community Council approves the expenditure of up to $150 for FY2018-2019 for outstanding FY2018 meeting room rental fees to St Bede's Episcopal Church, located in Los Angeles, CA.

13.2.14 The Mar Vista Community Council approves the expenditure of up to $150 for FY2018-2019 for outstanding FY2017-2018 meeting room rental fees to the Westside Vineyard, located in Los Angeles, CA.

13.2.15 The Mar Vista Community Council approves the expenditure of up to $500 for FY2018-2019 to the Mar Vista Farmers' Market for outstanding FY2017-2018 fees for a replacement awning and associated repairs.

13.2.16 The Mar Vista Community Council approves the expenditure of up to $1,200 for FY2018-2019 for clerical services.

Mar Vista Community Council

MVCC Budget

FY2018-19

Draft Budget Revisions

2018-2019 MVCC Budget Proposal				Total grant from CoLA	Regular Monthy charge
Budget Category	**Budget Subcategory**	**Subcategory type**	**Vendor**	**$42,000.00**	
General/Operational	***General/Operational Subtotal $37,900.00***				
	Office		*Office subtotal:*	$12,762.00	$761.00
		Storage			
			Storquest	$5,532.00	$461.00
		Meeting rooms rental			
			The Vineyard	$600.00	$50.00
			St Andrew's Lutheran Church	$300.00	$25.00
			St Bede's	$75.00	
			Windward School	$5.00	$5.00
			PO Box rental	$134.00	
			Farmer's Market rental	$1,200.00	
req/treasurer			(outstanding) rental fees	$250.00	
		Equip & supplies (misc)			
incr'd 176 to 326			misc	$326.00	
		Mtg supplies & printing			
			printing	$1,000.00	
decr'd 500 to 300			ExFin/board reimbursements	$350.00	
			Business cards/name badges	$200.00	
			Board Retreat	$150.00	
		Minute taker		$2,640.00	$220.00
	Outreach		*Outreach subtotal:*	$13,038.00	$299.00
		Website			
			The Web Corner: website maintenance	$1,800.00	$150.00
			The Web Corner: emails	$378.00	$31.50
			The Web Corner: Extra Data Entry	$500.00	
		Email Service			
			Mail chimp email service	$270.00	$22.50
		MiFi Service			
			AT&T MiFi service	$1,140.00	$95.00
		Advertising			
			Banners/sign/event promotion	$500.00	
			Facebook ads	$250.00	
		Community Events			
req/Hilltop/NWNA			Block parties (5 4 X $300)	$1,200.00	
req/plum			Town halls	$600.00	
NPG?			Art Walk	$1,600.00	
NPG?			Venice High Grease Night	$300.00	
		MVCC events/outreach items/mailings/newsletter			
req/outreach			Fall newsletter	$4,000.00	
req/treasurer			(outstanding) FM awning/repair	$500.00	
		Community Improvement			
			City services		
	Elections		*Elections subtotal:*	$12,100.00	$0.00
		Election expenses		$8,100.00	
req/outreach			Spring newsletter	$4,000.00	
Block Grants	***Block Grants Subtotal $4,100.00***				
Neighborhood Purpose Grants			*NPGs subtotal:*	$4,100.00	$0.00
req/AC&E		Arts/Culture and Education Committee		$2,000.00	
req/homeless com		Homeless Issues		$600.00	
chnged from Outreach to NPG		Winter Wonderland		$1,000.00	
		Green Garden Showcase		$500.00	
Community Improvement Grants			*CIPs subtotal:*	$0.00	$0.00
				$0.00	
Grand Total, MVCC 2018-19 Budget				**$42,000.00**	

Mar Vista Community Council

Agenda
Special Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Sunday, July 15, 2018 at 1:00 p.m. at

St. Bede's Episcopal Church

3590 Grand View Blvd.

Los Angeles, CA 90066

Chair: Elliot Hanna (elliot.hanna@marvista.org)
First Vice-Chair: Rob Kadota (rob.kadota@marvista.org)
Second Vice-Chair: Paola Cervantes (paola.cervates@marvista.org)
Treasurer: Holly Tilson (holly.tilson@marvista.org)
Secretary: Sara Roos (sara.roos@marvista.org)

1. **Call to order**
2. **Roll Call** – Call of the roll and certification of a quorum
3. **Public Comment for Items NOT on This Agenda**
4. **Ex-Parte Communications and Conflicts-of-Interest -** Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
5. **Adoption of the Agenda**
6. **Reading and Approval of Minutes –** Reading and approval of the minutes from the May 8, 2018 and June 12, 2018 meetings of the Board of Directors.
7. **Special Orders** – None
8. **Unfinished Business and General Orders** - None
9. **New Business –** Board retreat, facilitated by Mr. Dave Jensen, for the purpose of working through outstanding issues and facilitating better cooperation between members of the Mar Vista Community Council and stakeholders.
10. **Adjournment** (not later than 5:00 p.m.)

In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting, may be viewed at http://www.marvista.org or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, please contact secretary@marvista.org. **As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities. Sign language interpreters, assistive listening devices, or any auxiliary aids and/or services may be provided upon request. To ensure availability of services, please make your request at least 3 business days prior to the meeting you wish to at tend by contacting chair@marvista.org.

Mar Vista Community Council

Special Meeting of the Board of Directors

Sunday, July 15, 2018, 1:00 p.m.

St. Bede's Episcopal Church
3590 Grand View Boulevard, Mar Vista 90066

1. Call to order & Roll Call

1:18pm, Choir practice room

Board Members (12; quorum met): Robin Doyno, Rob Kadota, Damien Newton, Aaron Elster, Susan Klos, Michelle Krupkin, Holly Tilson, Paola Cervantes, Mary Hruska, Nanxi Liu, Elliot Hanna, Sara Roos

Community Members/Committee Co-chairs (4): Sharon Commins, Renee Shabshin, Martin Rubin, Dave Jensen, Stacy Shure

3. Public Comment for Items NOT on This Agenda; Adoption of the Agenda

None; No objection so agenda adopted as written.

4. Ex-Parte Communications and Conflicts-of-Interest - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

None

5. Reading and Approval of Minutes – Reading and approval of the minutes from the May 8, 2018 and June 12, 2018 meetings of the Board of Directors.

*Reading is waived. Motion by Newton, seconded by Krupkin **PASSED** with amendments: 11/1 (Roos)/0*

6. Special Orders, Unfinished Business and General Orders

None

7. New Business – Board retreat, facilitated by Mr. Dave Jensen, for the purpose of working through outstanding issues and facilitating better cooperation between members of the Mar Vista Community Council and stakeholders.

"Stretching is the essence of growth". Handout addended.

It all begins with the mission, but in the meantime, these "rules of the road": (1) Play full tilt, (2) Respect diversity, (3) Focus on solutions, (4) Choose how to be here. Tools to increase effectiveness depend on: You

Team break-outs to Define Critical Norms:

Mary-Marty-Michell-Nanxi

- *Identify goal, set deadline for accomplishment*
- *Division of labor – delegation depends on skills of the team – e.g., getting the facts, info (e.g. for issue voting on…)*
- *Remember we represent a community: INPUT is important, needs to be reflective.*
- *Communicating regularly with those defining tasks*
- *Communicate goal delivery*

Sharon-Susan-Renee-Stacy

- *All teams to separate personality from policy*
- *Consistency and fairness*

Elliot-Damien-Aaron-Holly

- *Smaller, more intimate groups – openness; more is accomplished.*
- *Long agendas are too hard to research and look into*
- *Answer: communication*

Paola-Robin-Rob-Sara

- *Look to solution-oriented, fact-based, non-ego-driven methods.*
- *Need strategies for speaking freely about issues individually and as a community.*

In this way we generate solutions – within Committees, sustaining openness beyond Committees as well.

Imperative is to improve communications – via ExFin? Outreach?

Decision-making should be an 'evidence-based approach'; otherwise cost is high and success is low.

Consider: ME ←→ WE

Turn the "pain of the past into a powerful present".

Recommended book, seconded by Nanxi: "Thinking Fast And Slow", David Kahneman. Liu: How to communicate and "stay above the line".

Avoid "Decision-making traps": Confirmation bias,

Definition of leadership: "Process of unleashing the energy of others toward worthy goals".

Susan: Leader needs to trust the judgment of others: 'work with one another, not for them'.

It's hard to establish trust with so many new faces. Trust is a willingness to be vulnerable that others will meet your expectations.

Adjournment (not later than 5:00 p.m.)

Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, September 11th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the July 10, 2018 meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
        - **10.2.1. Chair** – Elliot Hanna
        - **10.2.2. 1st Vice-Chair** – Rob Kadota
        - **10.2.3. 2nd Vice-Chair** – Paola Cervantes
        - **10.2.4. Secretary** – Sara Roos
        - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
        - **10.3.1. Zone 1** – Ken Alpern
        - **10.3.2. Zone 2** – Damien Newton
        - **10.3.3. Zone 3** – Mary Hruska
        - **10.3.4. Zone 4** – Aaron Elster
        - **10.3.5. Zone 5** – Michelle Krupkin
        - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
        - **10.4.1. Elections and Bylaws**
        - **10.4.2. Community Outreach**

10.4.3. Transportation and Infrastructure

10.4.4. Planning and Land Use Management

10.4.5. Public Health and Safety

10.4.6. Education, Arts, and Culture

11. Special Orders –

11.1. Presentation of Certificate of Appreciation – Presentation from Hannah Levien of CD11 of a certificate of appreciation to Linda Guagliano for her years of service as chairperson of the MVCC/CD11/LADAOT liaison committee

11.2. Presentation from LADWP (15 minutes) – Presentation from Annette Flores, Louis Rubacalva, and Deborah Hong of LADWP regarding the Venice-Sepulveda Water Pipeline Project.

11.3. Presentation regarding Mark Twain Tennis Courts Project (15 minutes) – Presentation from Mark Hovatter of the Los Angeles Unified School District regarding the Mark Twain Tennis Courts Project.

11.4. Presentation from the Vista Area Representative, Los Angeles County Assessor's Office (10 minutes) – Short presentation from Matthew Lyons, the Mar Vista area representative of the Los Angeles County Assessor's Office. Mr. Lyons will discuss the Office of the Assessor's proactive approach to addressing taxpayer issues.

11.5. Presentation from Uber/JUMP Bikes (10 minutes) – Short presentation from Andrew Magaña, Senior Operations Manager for Uber/JUMP Bikes in Southern California.

11.6. Resignations of board member and committee chairs/co-chairs – Discussion and possible action regarding resignations received, including appointments of replacements.

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. Review and approval of Monthly Expense Report – Review and approval of the Monthly Expense Report for August, 2018.

12.2. Appropriation for Venice High School's "Grease Night" (Executive and Finance Committee [funding]) – The Mar Vista Community Council approves an OUTREACH EXPENDITURE, not to exceed $300, for the purpose of conducting outreach activities at Venice High School's "Grease Night."

12.3. Appropriation for fall newsletter (Director Tilson [funding]) – The Mar Vista Community Council approves the OUTREACH EXPENDITURE of up to $4,000 for printing costs and distribution for a fall newsletter.

12.4. Appropriation for safe-cycling events (Mobility Subcommittee [funding]) – The Mar Vista Community Council approves the OUTREACH EXPENDITURE of up to $400 for printing costs and light refreshments for safe-cycling and bike-swap/bike-tune-up events at two local elementary schools.

12.5. Subcommittee name change (Mobility Subcommittee [administrative]) – The Mar Vista Community Council renames the "Mobility" Subcommittee to the "Bike Mar Vista" Subcommittee.

12.6. **Reimbursement of office expenses (Director Tilson [funding])** – The Mar Vista Community Council approves an $86.49 OFFICE EXPENDITURE to reimburse Holly Tilson for office supplies used in the treasurer's duties.

12.7. **Support for construction of an eldercare facility (Planning and Land Use Management [policy])** – The Mar Vista Community council supports the construction of an eldercare facility with 67 assisted-care units and 20 memory-care units, with subterranean parking, at 11405 West Venice Blvd.

12.8. **Trader Joe's Conditional Use Permit (Planning and Land Use Management [policy])** – The Mar Vista Community Council supports the conditional-use permit application for Trader Joe's, located at 3546 South Sepulveda Blvd., to sell bottled alcohol.

13. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.

14. **Unfinished Business and General Orders** - None

15. **New Business –**

15.1. **Opposition to dockless scooter permits (Transportation & Infrastructure [policy])** – Discussion and possible action regarding a motion passed by the Transportation and Infrastructure Committee regarding dockless scooters in Mar Vista.

15.2. **Support for notification of tree removals (Planning and Land Use Management [policy**]) – Discussion and possible action regarding support for a 45-day public-comment period prior to the removal of any city-owned trees.

15.3. **Discussion of improvements to MVCC website (administrative)** – Discussion and possible action regarding improvements to the MVCC website.

15.4. **Discussion of constituting a town hall subcommittee (administrative)** – Discussion and possible action regarding constituting a town hall subcommittee to arrange meetings regarding issues of interest in Mar Vista.

16. **Adjournment**

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Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, September 11th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

Approved

1. **Call to order**

Order called at 7:03pm

2. **Presentation of Flag and Pledge of Allegiance**

Approximately 20 in the audience for the presentation.

3. **Roll Call** – Call of the roll and certification of a quorum

Quorum met during roll call with {Robin Doyno, Elliot Hanna, Mary Hruska, Rob Kadota, Susan Klos, Nanxi Liu, Damien Newton, Sara Roos, Holly Tilson} nine present; Aaron Elster entered at 7:09pm and Michelle Krupkin at 7:10pm;. Ken Alpern, Paola Cervantes absent

4. **Community Memorial Observations**

Hruska: 9/11/2000 remembered with a moment of silence for all who perished on Sept 11, and the families still reeling from the impact.

5. **Announcements**

Damien Newton: Angel City Chorus, which practices at St. Andrews with many Mar Vistans among its choir, competed on America's Got Talent two hours ago and they need our vote (online or via app)! It's cool to see some from our community get this recognition.

6. **Public Comment for Items NOT on This Agenda**

Selena Inouye: (1) While WLA network announced its filing of a lawsuit against the City, this is not a pass for MVCC – the Venice road diet is not over yet and the community is asking for a Town Hall on the subject in December. There will be more motions for MVCC to consider on the subject. (2) "Action Network" letters is advocacy, not harassment. (3) Inappropriate Board behavior including side conversations, rolling eyes, dirty looks, should be addressed by the Chair.

Sheri Odere: received an email reply about how her email is harassing, but she doesn't understand why and does not believe she should be accused of this.

Robin Doyno: LAUSD has behaved rudely by failing to update the community on construction changes?

7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

<table>
<tr><td>Alpern –absent</td><td>Cervantes – absent</td><td>Doyno - none</td><td>Elster - none</td></tr>
<tr><td colspan="3">Hanna – discussions of 11.1, 11.6, 12.5 with one or two other board members .</td><td>Hruska -none</td></tr>
<tr><td>Kadota - none</td><td>Klos – none</td><td colspan="2">Krupkin – Discussion of many items on the agenda, but none of which involve personal financial benefit.</td></tr>
<tr><td>Liu – none</td><td>Newton – ordinary PLUM conversations.</td><td>Roos – none</td><td>Tilson – many conversations, none involving conflicts of interest</td></tr>
</table>

8. Adoption of the Agenda

Adopted without objection at 7:13pm.

9. Reading and Approval of Minutes – Reading and approval of the minutes from the July 10, 2018 meeting of the Board of Directors.

Incorrect Minutes referenced requires approval of August 31, 2018 Minutes to be postponed to October 9, 2018 meeting.

10. Reports

10.1. Elected Official and City Department Reports

Vanessa Serrano (DONE): PowerLA podcast available through DONE website – interviews with local individuals of interest, politicians, commissioners, staff, NC board members, etc.

Annual Congress Of Neighborhoods, September 22, 2018, 8am-4pm – myriad sessions from Planning to NC-related issues. Includes parking, breakfast, lunch.

Board Member David Ryu's CF 18-0467 has extended the public comment period.

Hannah Levien (CD11): Thanks to MVCC BoD for the $10,685 via council motion for traffic improvements along McLaughlin; special thanks to Holly Tilson for treasury logistics. Arrival boards are confirmed for Centinela/Venice (per Krupkin).

10.2. Officer Reports

10.2.1. Chair – Elliot Hanna

Cmte/subcmte system is new, Mission Statements and designation of presiding or rotating Co-chairs need filing with Secretary. Minutes should be posted within ten days of meeting. Help is available – please ask!

10.2.2. 1st Vice-Chair – Rob Kadota

Rosenberg's Rules are copied, available for new Chairs – please familiarize yourself with the system and ask for help if needed.

10.2.3. 2nd Vice-Chair – Paola Cervantes

10.2.4. Secretary – Sara Roos

Filed letters and their recipients, responses, CIS available from the website. Newsletter is in process.

10.2.5. Treasurer – Holly Tilson

MER is in the packet. NCs received $42K this year. The budget we set and approve governs spending; funding motions come via cmte, and are subsequently agendized through Exfin or sometimes straight to the BoD as funding motions. This month we spent $790 on routine expenses, meeting room, etc mifi, mailchimp, The Web Corner; $39,400K remains.

10.3. Zone Director Reports

***MOTION**(Kadota/Hruska) to suspend rules and move forward the Zone Director and Committee Reports (agenda items 10.3 & 10.4) **PASSED** 10/0/1 (Hanna); [Alpern, Cervantes absent] at 7:25pm*

11. Special Orders –

11.1. Presentation of Certificate of Appreciation – Presentation from Hannah Levien of CD11 of a certificate of appreciation to Linda Guagliano for her years of service as chairperson of the MVCC/CD11/LADAOT liaison committee

Hannah Levien: Linda Guagliano has worked tirelessly with the CD11/LADOT Traffic Committee established by Bill Rosendahl. She is a great diplomat, takes reports and works carefully, holding everyone accountable; she will be hard to replace. She is recognized by the City and Council member Bonin for her decade of service.

Linda Guagliano: Expresses thanks for the beautiful award. The bimonthly committee she took over when its Chair left in 2008 is neither MVCC Committee nor Subcommittee nor liaison Committee either; it is a distinct entity. Closed to the public several years ago, the LADOT limits public input because they are unprepared to address general questions there.

Approved

11.2. Presentation from LADWP (15 minutes) – Presentation from Annette Flores, Louis Rubacalva, and Deborah Hong of LADWP regarding the Venice-Sepulveda Water Pipeline Project.

http://www.ladwp.com/SepulvedaVenice

On-site Construction Manager: Carlos Perez | 213-798-5715 | carlos.perez@ladwp.com
Project Manager: Annette Flores | 213-367-0827 | annette.flores @ladwp.com
Associate Project Manager: Mary Olmos | 213-367-4475 | mary.olmos@ladwp.com
Community Affairs: Deborah Hong | 213-367-5204 | deborah.hong@ladwp.com

Construction will start soon on the Sepulveda-Venice water pipeline increasing reliability of LADWP's water distribution system to the West Los Angeles area. The project will provide an emergency connection to the Metropolitan Water District of Southern California (MWD) water supply by constructing a new trunk line that will be connected to an existing pipeline. The new steel trunk line will be between 20-inches and 54-inches in diameter and extend approximately 1,700 feet under Sepulveda Boulevard and Venice Boulevard within the City of Los Angeles and Culver City.

The project will be staged in six sections to limit impact to the Community. The first two stages will last 6 weeks each, finished before the Holiday moratorium beginning at Thanksgiving. Travel will be intermittently impacted along Sepulveda Blvd. The entire project is anticipated to be completed by January 2020.

As part of the project, eventually a new regulator station will be constructed on Bentley Avenue south of Venice Boulevard to control and reduce water pressure coming from the MWD system. In addition, a pressure relief station will be installed on Bentley Avenue, north of Venice Boulevard to support the emergency connection. No disruption in water service is anticipated.

11.3. Presentation regarding Mark Twain Tennis Courts Project (15 minutes) – Presentation from Mark Hovatter of the Los Angeles Unified School District regarding the Mark Twain Tennis Courts Project.

Community Relations: Fortunato Tapia, fortunato.tapia@lausd.net
Chief of Facilities, LAUSD: Mark Hovatter, mark.hovatter@lausd.net

Upon the completion of 131 new school construction projects three years past, LAUSD refocused to modernization of older campuses, of which Venice HS (VHS) is one. The project is large, lasting four years, encompassing upgrading infrastructure, new sports facilities, 29 classrooms, $138m dollars.

To make room for construction and temporary housing of classrooms, VHS' existing 4 tennis courts needed to be removed, without any capacity for replacement prior to the end of construction.

To avoid displacing the HS tennis program, the contractor offered to build new courts at nearby Mark Twain MS at no cost, expanding service to a second campus and avoiding interrupted access for the High Schoolers. It seemed a benefit overall but the two sites were not treated separately, disturbing the immediate community surrounding MTMS. Accordingly LAUSD did not act as good neighbors. LAUSD regrets the disruption and lack of courtesy in explaining what was happening and why.

Community concerns have been addressed directly with stakeholders by modifying the original court design which abutted a fence, and incorporating a setback to baffle the noise along with landscaping.

Dedicated offsite parking should allay concerns about pressures on street parking. Nighttime activity on the courts is extremely unlikely: any surplus funds would likely first go to playing fields but any such addition would trigger a public comment process first.

The VHS project is a source of pride, including a state-of-the-art gym, sports fields open to the public, and sorely needed renovations to student's learning environment. Project staff is available to answer questions (contact above).

Liu: Clarifies that the time frame for courts construction is two months; entire project is 4 years.

Selena Inouye: Feels community and staff input was solicited but not heeded. Hovatter: The community was consulted and involved, but at $20m over-budget already [due to unanticipated infrastructure needs], cost:benefit design decisions limit options available for the project.

Doyno: Will the pool be modernized? Hovatter: LAUSD owns the land on which the present pool rests and supports replacement discussions with CoLA regarding indoor vs. outdoor pool. Along with the open gym this marks $32m invested in sports facilities.

Approved

Tilson: Thanks for meeting with the community; the pool remains of concern and its renovation ought to utilize LA84 (Olympic) money.

Margaret Hosier: Reiterates appreciation.

Allison Holdorff (LAUSD4): acknowledges LAUSD Facilities and WMVRA involvement.

Roos: References the community petition signed by 700 stakeholders demonstrating the pool's centrality to this community and the imperative for its renovation.

11.4. Presentation from the Vista Area Representative, Los Angeles County Assessor's Office (10 minutes) – Short presentation from Matthew Lyons, the Mar Vista area representative of the Los Angeles County Assessor's Office. Mr. Lyons will discuss the Office of the Assessor's proactive approach to addressing taxpayer issues.

The assessor's office appraises all taxable property, equipment, machinery in the City. Six agencies are involved in taxation, so because of the complex, Jeffrey Prang's office is trying to be more proactive in helping homeowners find savings. Assessor's website portal has information about property, taxes and how to claim exemptions and discover other such savings and tax relief.

Selena Inouye – concerned about the effect of a neighboring residence converted from triplex to duplex. Ans: This could be a recording issue, or a permit office problem for the registrar-recorder; Prang's office can commit to helping identify responsibility.

Tilson: A rumor suggests 40% of housing in LA is owned by one corporation; are tax bills sent in such concentration as to suggest truth to this rumor? Ans: There are corporations with significant amounts of property, but has not heard such a number.

Marty Rubin: Tax assessment will be affected by proposition 5 on the November 2018 ballot that would amend proposition 13, involving the one-time transfer of tax assessment to a newly purchased house anywhere within CA.

Regarding sales tax, its administration has recently been switched from the State Board of Equalization to the California Department of Finances and Tax Administration, perhaps reflecting changing departmental responsibilities.

11.5. Presentation from Uber/JUMP Bikes (10 minutes) – Short presentation from Andrew Magaña, Senior Operations Manager for Uber/JUMP Bikes in Southern California.

Andrew Magana <andrewm@uber.com>

CoLA has permitted a pilot program to evaluate dockless, motorized bicycles, branded a bright orange color and called "JUMP", these are owned by Uber and utilize the same app. They launched 9/17/18 in Santa Monica and soon thereafter in LA.

The green "Hulu" branded bicycles in Santa Monica, Westwood and WeHo are run by the same company ("Breeze") but are "docked", utilizing hubs and a different payment system that will eventually be integrated.

Dockless bikes are being piloted as a more convenient, controllable system; the permitting process in CoLA requires feedback from NCs. Feedback from the community will help prevent bad experiences. The collaboration with Uber is designed to reduce short car trips.

Price is competitive with scooters – tap card can be filled with cash or credit card; equitable access is subsidized.

Newton: How are adjoining municipalities integrated? Ans: out-of-service locations (say, Mar Vista) can't be activated but bicycles can be dropped there for charging-collection.

Kalani Whittington: Safety is a concern; who is liable for an underage child illegally operating a motorized vehicle? Ans: CoLA requires that JUMP carry $5m insurance, so the City is not in financial risk, but liability is determined by the courts.

Hannah Levien: Policy questions about the Council's pilot and recent mobility legislation may be directed toward her.

11.6. Resignations of board member and committee chairs/co-chairs – Discussion and possible action regarding resignations received, including appointments of replacements.

Approved

Paola Cervantes, MVCC's Second Vice-Chair, resigned her At-Large board and Committee positions for personal reasons, effective September 4, 2018. Ms. Cervantes brought decency and civility to the board. She is a wonderful, lovely person and a calming influence; her resignation is accepted with regret. The MVCC board extends best wishes for her continued well-being and happiness.

The board vacancy shall be filled pursuant to MVCC's bylaws. Letters of candidacy should be addressed to the Chair@marvista.org by 9pm on October 6, 2018, 25 days from this announcement. Following candidate's statements and a question-answer period at its regularly monthly board meeting on October 9, 2018, a replacement will be appointed by the Chair subject to board confirmation.

ExFin is filled upon election of a new second Vice-Chair. The BoD Chair will temporarily Co-chair ExFin.

The resignation of Ms. Guagliano is effective August 14, 2018 but she will temporarily Chair the September 19, 2018 meeting. To fill her giant shoes, former MVCC Chair and dedicated pot-hole investigator Albert Olson has distinguished himself as fair-minded and knowledgeable about transportation issues. His appointment effective September 20, 2018 is ***CONFIRMED by a vote of 9/0/2*** *(Doyno, Newton).*

Agenda item 10.3 Zone Director Reports

Rules (agenda order) resumed

Agenda item 10.3.1. Zone 1 – Ken Alpern

Agenda item 10.3.2 Zone 2 – Damien Newton

NWNA newsletter is out. NWNA party is coming September 29. Awesome, come hang out. Party there all day, Noon-7. Enjoy the talent show.

Pelton appeal of the project at 11671-11677 National(/Barrington). This is a big mixed use development going in by right, with interesting ingress/egress issues. Its driveway is felt to be on the "wrong" street, but the Developers didn't listen. Adjacent property owners filed an appeal of the LADOT ruling in favor of the contested driveway, which was upheld at the CoLA Transportation Cmte, but subsequently overruled by the City Attorney in a confidential letter. The appeal was deemed impermissible for liability reasons. The original single ingress/egress off Barrington remains. The Developer reached many agreements with CD11, even while unresponsive to the community. Therefore the appeal filed by the Peltons enabled interaction with the recalcitrant Developer so the community owes them a debt of gratitude.

Agenda item 10.3.3. Zone 3 – Mary Hruska

First Community Plan Subcommittee will meet September 25, 2018 at 7:30, in St. Andrews Church, Narbeth Room. All are invited. There will be outreach from DCP specifically on our Community Plan at the Felicia Mahood Center on SM Boulevard from 9-11am.

Westdale HOA block party will be held between 1p – 5p on September 30th, 2018.

Agenda item 10.3.4. Zone 4 – Aaron Elster

The shiny new zebra-crosswalks were installed at Charnock/Mclaughlin & Charnock/Victoria. Congrats to everyone who made this happen.

Agenda item 10.3.5. Zone 5 – Michelle Krupkin

Canela Restaurant closed along the Great Street on August 31, 2018. This brings the count to 14 businesses closed since the inception of the pilot program installed along Venice Boulevard on May 20, 2017.

There was a shooting in the alley between Inglewood and Marcasel. A new hair salon called The Hive Beauty Collection opened between Inglewood and Marcasel.

Agenda item 10.3.6. Zone 6 – Holly Tilson

The LAUSD presentation constituted much of Zone 6's report. Five houses have been burglarized in the last month by first knocking on the front door to determine occupancy, entering through the back door and exiting the front.

Approved

Agenda item 10.4 Committee Reports

Agenda item 10.4.1 Elections and Bylaws

Everyone's invited; Three CoChairs will rotate. Standing Rules and Bylaws are on the website; tent policy has been reviewed already.

Agenda item 10.4.2 Community Outreach

Posting deadline was missed but new one will be posted in mext couple days.

Agenda item 10.4.3 Transportation and Infrastructure

T/I is first Wednesdays; Great Streets second Wednesdays. Scooter motion discussed, overview of the Artwalk.

Agenda item 10.4.4 Planning and Land Use Management

PLUM meetings are first-Thursdays. 75 unit project at 4343 Gateway/Barrington is in the offing (with a bookstore). Very large (400+) unit project at Sepulveda/Palms is in the offing with a special meeting to be scheduled dedicated to it; it is the largest project ever built here in MV. Interactions with the developer have been challenging.

Agenda item 10.4.5 Public Health and Safety

SubCommittee reports: Aging In Place is a speaker series not meeting now; October is the next scheduled.

Mobility/Bike MV is working on outreach and education among youth and schools; Back To School is a priority. Piloting a 'Bike Rodeo' that will hopefully spread beyond its first events to many schools in rotation. Encouraging "Ride To School" and "Walk To School" days shifting traffic patterns. Partnering with Culver City "Walk N Rollers", looking for funding that can be matched as is theirs. Weekly bike stand at the Farmer's Market continues and will help prepare bikes for September 30, 2018 CicLAvia: LAPhil 100-year celebration between Disney Hall and the Hollywood Bowl.

Emergency Preparedess: Great shakeout on October 14, 2018. Valley Preparedness fair along with Resilience LA have good ways to prepare your neighborhood, and the block captain program too.

Homeless Issues: has been meeting actively around the situation at Globe/Tuller, investigating solutions.

Agenda item 10.4.6 Education, Arts, and Culture

none

12. **Consent Calendar** – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

NOTE THAT FUNDING ITEMS NEED ROLE CALL SO CONSENT CALENDAR MUST BE CALLED

- 12.1. **Review and approval of Monthly Expense Report** – Review and approval of the Monthly Expense Report for August, 2018.
- 12.2. **Appropriation for Venice High School's "Grease Night" (Executive and Finance Committee [funding]) –** The Mar Vista Community Council approves an OUTREACH EXPENDITURE, not to exceed $300, for the purpose of conducting outreach activities at Venice High School's "Grease Night."
- 12.3. **Appropriation for fall newsletter (Director Tilson [funding])** – The Mar Vista Community Council approves the OUTREACH EXPENDITURE of up to $4,000 for printing costs and distribution for a fall newsletter.
- 12.4. **Appropriation for safe-cycling events (Mobility Subcommittee [funding])** – The Mar Vista Community Council approves the OUTREACH EXPENDITURE of up to $400 for printing costs and light refreshments for safe-cycling and bike-swap/bike-tune-up events at two local elementary schools.

Pulled by Krupkin

Approved

12.5. **Subcommittee name change (Mobility Subcommittee [administrative])** – The Mar Vista Community Council renames the "Mobility" Subcommittee to the "Bike Mar Vista" Subcommittee.

Pulled by Roos

12.6. **Reimbursement of office expenses (Director Tilson [funding])** – The Mar Vista Community Council approves an $86.49 OFFICE EXPENDITURE to reimburse Holly Tilson for office supplies used in the treasurer's duties.

12.7. **Support for construction of an eldercare facility (Planning and Land Use Management [policy])** – The Mar Vista Community council supports the construction of an eldercare facility with 67 assisted-care units and 20 memory-care units, with subterranean parking, at 11405 West Venice Blvd.

12.8. **Trader Joe's Conditional Use Permit (Planning and Land Use Management [policy])** – The Mar Vista Community Council supports the conditional-use permit application for Trader Joe's, located at 3546 South Sepulveda Blvd., to sell bottled alcohol.

PUBLIC COMMENT ON CONSENT CALENDAR, EXCLUDING 12.4 & 12.5 – none.

*Consent calendar is **APPROVED** unanimously: 11/0/0*

13. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.

13.1. **(Agenda item 12.4) Appropriation for safe-cycling events (Mobility Subcommittee [funding])** – The Mar Vista Community Council approves the OUTREACH EXPENDITURE of up to $400 for printing costs and light refreshments for safe-cycling and bike-swap/bike-tune-up events at two local elementary schools.

***PROPOSED AMENDMENT:** to include costs up to $1000 ~ "The Mar Vista Community Council approves the OUTREACH EXPENDITURE of up to $1000 for printing costs and light refreshments for safe-cycling and bike-swap/bike-tune-up events at two local elementary schools".*

PUBLIC COMMENT – none on amendment

BOARD COMMENT ON AMENDMENT

Tilson: From where in the budget is this money to come? Kadota: Traditionally the end of the years sees a lot of unspent funds, e.g., $10K plus in 2017-18; expects this will happen again. Tilson: So from elections? We haven't yet discussed Committees' budget and funding priorities comprehensively as a Board. It would be prudent to discuss our funds in the context of overall re-allocations. Kadota: This is a worthwhile investment in and of itself, and the source isn't part of the motion.

Newton: Has run the program at Richland without funding and is excited about what could be done with a little money. These NC funds would be utilized after school hours.

Kadota: This is an experimental trial program for us in the school where we have the most solid parent engagement and volunteer help. The hope is to expand the program to be annual, rotating through different schools, zone to zone.

Krupkin: Supports the concept, two bike rodeos and LAPD and LAFD involvement; but is skeptical of the funding source. CoLA money may not be as appropriate as LAUSD funding or grant monies from LA County Bike Coalition or Vision Zero. Using City dollars to fund one form of transportation over another may be inappropriate.

Kadota: The rodeos are a new idea, and an opportunity to partner with City and County entities; it's a worthwhile commitment and investment. The program has $1500 grant from Walk N Rollers, which has corporate sponsors and is looking to support education.

Krupkin: Could no other sponsors be found; where is the other money sponsoring this event coming from? The possibility of NACTO money (National Association of City Transportation Officials) is concerning for its association with Vision Zero. As well, extending the request from $400 to $1000 is a large change, and without notice. More, if it's a school event why not reach out to LAUSD?

Doyno: Bicycle safety is essential.

Roos: LAUSD wouldn't be a source for this small, local event. Individual schools wouldn't have the prerogative to devote their budget to this sort of outside program.

Approved

Tilson: We haven't set priorities at the start of the year, so as motions appear precipitously, already budgeted money must be shifted around, without a guiding vision. When projects don't get completed, money goes unclaimed at the end of the year, but in election years where money is scheduled for year's end, unbudgeted motions will come from those late-scheduled election monies.

Kadota: Sensitive to prioritization and budgeting issues, wants a budget that expresses our priorities.

The goal is for Bike Rodeos to alternate between schools, and develop a system for managing LAUSD hurdles and fees. Future endeavors will be easier..

***AMENDMENT** to raise appropriation from $400 to $1000 **PASSES** 9/0/2 (Hanna, Krupkin) at 8:57pm*

PUBLIC COMMENT ON AMENDED MOTION

Selena Inouye: Shares concerns about funding one mobility form at the expense of another. The emphasis of the "Mobility Cmte" should not be preferentially for "Bikes". Will spending $1,000 on a "bike rodeo" limit the committee's capacity to consider pedestrian issues? Disability issues? Is there a pre-existing relationship with the LAC Bike Coalition that biases the committee's focus? Would such a focus be more appropriately supported by the other entity?

Stacy Shure: Six years ago Clover ES in Zone 1 hosted such a Rodeo, supported by Westside Village HOA. Engaging LAUSD was a challenge but the event was very successful, demonstrating broad community need for it. 220 families were expected; over 400 showed up, many from outside the Zone. General safety issues were addressed, both children and families were reached and it proved a good outreach tool. Neighborhood Associations, even across Zones, are good potential funding and volunteering partners.

BOARD COMMENT ON AMENDED MOTION

Hanna: Pedestrian issues haven't been ignored by the Board; last fiscal year over $10,000 went toward pedestrian traffic improvements along McLaughlin Boulevard, a significant increase over this proposed $1,000 appropriation.

Newton: Agrees with the importance of spending more on pedestrian improvements. Here, the focus is on reaching out to Elementary School students so bicycle safety makes a lot of sense. Driver safety at High Schools could work as an alternate age-specific focus.

Krupkin: Isn't "anti-safety" but is concerned instead with the program's funding sources even while acknowledging its popularity and need, and the equity concerns surrounding implementation.

Hanna: Concern with expanding scope of the proposal, which originally included solely: bike swap, safe cycling and tuneup. With subsequent Culver City Walk N Roller interaction, the scope apparently expanded to be more of an emergency prep and safety fair, which brings more people and is more interesting especially to non-kids, but is changed from the original motion passed in the SubCommittee, and which was not heard in Committee. Kadota: The money could be spent just on safe cycling, but this opportunity to expand the scope seems beneficial.

Krupkin: If the event expands and becomes annual, printing and other costs can be planned and coordinated with SubCommittees moving forward, but also with school parent and community groups.

Safety provisions are the proud scope of other MVCC Committees, as for example the recent installation of continental crosswalks at the site of a fatal pedestrian crash. Recent opening celebrations of that initiative should have included contributors to the committee project.

Tilson: What is the process for such a motion? We have available funds, but no budget line-item for this appropriation.

Hanna: The motion could be sent to ExFin for budget adjustment. Tilson: For re-approval of a new budget that includes this line item, with the motion appropriated next meeting? Kadota: Alternatively approve the motion now and rewrite the budget to accommodate the appropriation after. Tilson: and if the budget is not approved, the appropriation cannot be spent?

***MOTION CALLED** (Elster/Liu) and **APPROVED** by 2/3 vote,*

***MOTION** to approve the Outreach expenditure of $1,000 **PASSES** 10/0/1 (Hanna) at 9:11pm*

Approved

13.2. (Agenda item 12.4) Subcommittee name change (Mobility Subcommittee [administrative]) – The Mar Vista Community Council renames the "Mobility" Subcommittee to the "Bike Mar Vista" Subcommittee.

Previously the Committee was named "Bike MV". During July's Committee restructuring the committee was re-designated "Mobility" but also placed under 'Public Health And Safety' rather than 'Transportation and Infrastructure' (T/I) because this better reflected its focus on health and safety. However therefore the name "Bike MV" more accurately captured this committee's goals and aspirations; it's catchier and more reflective of what the CoChairs are trying to do.

PUBLIC COMMENT

Sheri Odere: Concerned that the MVCC Mobility Committee will be simply a bike club, leaving no stakeholder representation for other forms of "mobility" – walking, scooting, driving.

Selena Inouye: At best it would be a bike club; worse would be a lobbying group. If the purpose were to promote businesses, bicycling classes, a bicycle-agenda, that would constitute a conflict of interest and potential financial gain. A mobility committee is fine with a safety focus, but should include all forms of transportation in order to sustain a more balanced view on the issue.

BOARD COMMENT

Hanna: Breaking tradition in speaking first in order to clarify the intention in renaming the committee. It was deliberate, and intended to suggest addressing all forms of transportation. It is important to avoid even an appearance of bias; focusing on bikes alone can give the impression there is a "special interest" to the committee rather than a general one. Therefore he opposes the name change.

Kadota: welcomes T/I taking up the matter of mobility, sidewalks, pedestrian crossings, alternative transportation modalities – these are critical issues, the heart and soul of T/I. However they are beyond a narrow scope of charge, which is the goal. They are open to other issues – e.g., rides sponsored by other folks, such as MVNA.

Hanna: Moving the committee to Public Health and Safety was to emphasize safety concerns, not road trips.

Newton: Apologizes for losing composure at the term "bike lobby" since there exist more insulting conspiracy concerns.

Krupkin: Welcomes a Mobility SubCommittee under T/I, which has addressed the noted issues. Mobility issues are also of concern to the Great Streets SubCommittee, where sidewalk repair concerns pedestrian mobility.

Hruska: Suggests a Mobility SubCommittee under T/I is not incompatible with Bike MV as a SubCommittee under Public Health/Safety; both could be valuable. Great Streets could retain its interest in scooters, for example; issues of disability mobility could be addressed. A bimonthly meeting could be considered if staffing is problematic.

Tilson: moves to create two committees, Mobility under T/I and Bike MV under Public Health/Safety, both Chaired by Kadota.

Newton: Argues the motion is out of order; sustained by the Chair.

*Newton: **MOVES** (Newton/Alpern) to postpone the motion definitely until the October 9, 2018 meeting. This could allow the motion to be considered carefully and withdrawn if desired. Kadota: prefers a vote now.*

***MOTION** to postpone the Committee name change til the October BoD meeting **PASSES** 6 (Newton, Liu, Elster, Doyno, Tilson, Hanna)/5 (Roos, Klos, Kadota, Krupkin, Alpern)/0 at 9:25pm*

14. Unfinished Business and General Orders - None

Do trees.

Newton from PLUM.came through subcmte – city is redoing urban forestry plan and at wracpum was discussion that city only needs 3 days notice to removing trees in non-eergency – says 3 days Is not enough time under our own bylaws. Doesn't impact emergency situations; this is non-eergency to change 3d to 45d. len was at our meeting and saw no reason to oppose this. Thought was fine.

Hanna reads it.

Approved

15. New Business –

15.1. Opposition to dockless scooter permits (Transportation & Infrastructure [policy]) – Discussion and possible action regarding a motion passed by the Transportation and Infrastructure Committee regarding dockless scooters in Mar Vista.

WHEREAS, the Mar Vista Community Council supports dockless scooters as an affordable mode of transportation that integrates well with existing public transit options; and

WHEREAS, MVCC recognizes the primacy of public safety of ALL residents and visitors over other worthy neighborhood goals like improved transportation, accommodating new technology, or equal access to multimodal transportation for low income neighborhoods; and

WHEREAS, the majority of dockless scooter riders in Mar Vista and Venice violate traffic laws such as avoiding sidewalks and Class I bike paths or riding with a valid driver's license, and scooter companies have not taken necessary steps to mitigate illegal behavior; and

WHEREAS, the City Council and LADOT developed a regulatory framework and pilot program for shareable dockless vehicles; and

WHEREAS, the pilot regulations drew from a traffic study limited to one council district and did not include usage patterns or accident rates in areas where dockless scooter usage is highest; and

WHEREAS, the regulations emphasized equity and sidewalk safety of parked vehicles, but ignored safety of vehicles in operation; and

WHEREAS, the regulations do not provide LAPD with specific guidance on enforcement, allocate resources from fees to mitigate the costs of enforcement, or require dockless scooter operators to self-enforce by geofencing prohibited areas;

THEREFORE, MVCC censures the approval of the LADOT regulations and opposes issuing permits to companies to operate scooters at this time. MVCC will support these actions once the city council and LADOT immediately take the following steps to improve the regulations:

- *require permitted companies to disable scooter usage or parking via geofencing on all Class I bike paths, city parks (excluding roads and bicycle lanes, and including the Venice Beach Boardwalk), and LAUSD primary and secondary schools; and*
- *provide LAPD with adequate resources to deploy two extra officers for fulltime traffic enforcement, to focus on scooter usage in high-impact areas; and*
- *develop, in consultation with LAPD, signage informing scooter users of relevant traffic laws, and deploy signage in areas with the highest illegal usage (as determined by LAPD) including on the Braude Bike Path.*

Additionally, MVCC requests that LA City Council and LADOT act during the pilot program to:

- *study scooter traffic patterns, law violations, and injury rates in areas of the city with the highest scooter usage, and*
- *use the results of that study to determine, with LAPD, the extra long-term resources needed to enforce traffic laws for scooters and cover the cost of these resources with changes to the permitting fee structure, and*
- *approve enforcement mechanisms to accept reports of illegal scooter usage and disable accounts of identify users that illegally operate scooters, using ride data provided by the scooter companies.*

Agenda item 15.1 postponed until October 9, 2018 meeting for want of time.

15.2. Support for notification of tree removals (Planning and Land Use Management [policy]) – Discussion and possible action regarding support for a 45-day public-comment period prior to the removal of any city-owned trees.

WHEREAS the City of Los Angeles (CoLA) is developing a new Urban Forestry Management Plan (UFMP) following years of City budget-related cutbacks, and

WHEREAS subsequent class-action litigation settled in 2015 prioritizes and funds reparation of ADA compliant sidewalks, putting pressure on the mature trees comprising our urban canopy since these are more likely to have lifted sidewalks due to the dearth of preventive maintenance, and

WHEREAS the Urban Forestry Division (UFD) has adopted policy to notify EmpowerLA of pending tree removal permits in the City, and

WHEREAS EmpowerLA shall alert the relevant Neighborhood Council (NC) as to tree/s within its boundaries at risk for removal, triggering either a 3-day review period in the case of 1-2 at-risk trees, or a 30-day review period in the case of 3+ at-risk trees,

Approved

THEREFORE, let it be understood that while the Mar Vista Community Council (MVCC, a certified NC) appreciates the partnership that would empower cooperation in these important assessments, enabling sustenance of our vital urban canopy, yet it

REQUESTS the timeline for evaluating tree removal permits be extended to accommodate NC citizen advisory capabilities and limitations, as a Brown-Acted Council restricted by monthly committee and board meetings. Three days is insufficient time to manage and publicly evaluate such consequential – and technical – decisions with good faith and accuracy. And legal constraints can make even a 30-day notice period infeasible.

THEREFORE the MVCC requests a timeline that would empower NCs meaningfully, by restructuring UFD's process in conjunction with whatever City Departments, Offices or Councils are necessary, to mandate a 45-day period for public comment on the proposed removal of trees.

Motion presented by Newton: This is about City-owned trees. Developers frequently remove trees in the process of construction and we learn of it after permits are issued or the trees are gone. The Department of Urban Forestry is trying to involve community stakeholders better through NCs and Council District offices. But given Brown Act constraints, NCs cannot cooperate effectively in three days; this proposal could not engage us. This is feedback concerning the proposed process.

Unusual opportunity to be the first of fellow westside NCs to pass a motion; neighboring NCs are excited to follow MVCC's lead on this.

Krupkin: Witnessed the disappearance of a hundred year old historic Canary Palm without notice: supports this attempt to better engage the community in tree removal notification.

Motion regarding tree removal notification ***PASSES*** *10/0/1 (Hanna).*

15.3. Discussion of improvements to MVCC website (administrative) – Discussion and possible action regarding improvements to the MVCC website.

Agenda item 15.3 postponed until October 9, 2018 meeting for want of time.

15.4. Discussion of constituting a town hall subcommittee (administrative) – Discussion and possible action regarding constituting a town hall subcommittee to arrange meetings regarding issues of interest in Mar Vista.

Agenda item 15.4 postponed until October 9, 2018 meeting for want of time.

16. Adjournment

Meeting adjourned at 9:38pm

Approved

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Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, October 9th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the August 31, 2018 special meeting and the September 11, 2018 regular meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
        - **10.2.1. Chair** – Elliot Hanna
        - **10.2.2. 1st Vice-Chair** – Rob Kadota
        - **10.2.3. 2nd Vice-Chair** – Damien Newton
        - **10.2.4. Secretary** – Sara Roos
        - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
        - **10.3.1. Zone 1** – Ken Alpern
        - **10.3.2. Zone 2** – Vacant
        - **10.3.3. Zone 3** – Mary Hruska
        - **10.3.4. Zone 4** – Aaron Elster
        - **10.3.5. Zone 5** – Michelle Krupkin
        - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
        - **10.4.1. Elections and Bylaws**
        - **10.4.2. Community Outreach**
        - **10.4.3. Transportation and Infrastructure**
        - **10.4.4. Planning and Land Use Management**
        - **10.4.5. Public Health and Safety**
        - **10.4.6. Education, Arts, and Culture**
11. **Special Orders –**
    - **11.1. Short Presentation from Bird Scooters** – Morgan Roth, Community Relations Manager for Bird in Los Angeles will address any questions or concerns regarding Bird scooters in Mar Vista.
    - **11.2. Short Presentation from Lime Scooters** – Nima Daivari, Operations and Community Affairs Manager for Lime in Los Angeles will address any questions or concerns regarding Lime scooters in Mar Vista.

11.3. **Appointment of At-Large Director** – Appointment and confirmation of an at-large director to fill the vacancy left by the resignation of Paola Cervantes. In accordance with Article V, Section 6, Subsection C of the Bylaws of the Mar Vista Community Council, the candidates are:

- Armond Seretti
- Stacy Shure

11.4. **Resignations of Board Member and Committee Chairs/Co-Chairs** – Discussion and possible action regarding resignations received, including appointments of replacements.

11.5. **Election of Second Vice-Chair** – Election of a Second Vice-Chair to fill the vacancy left by the resignation of Paola Cervantes.

11.6. **Appointment to Resilient Los Angeles** – Appointment of a Mar Vista Community Council representative to Resilient Los Angeles (https://www.lamayor.org/sites/g/files/wph446/f/page/file/Resilient%20Los%20Angeles.pdf) as recommended by the Public Health & Safety Committee.

12. **Consent Calendar** – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. **Approval of Revised Budget** - Review and possible approval of a revised budget for FY2018-2019.

12.2. **Approval of Monthly Expense Report** - Review and possible approval of the Monthly Expense report from the prior month.

12.3. **Approval of Mission Statements** – Approval of mission statements submitted by committees and subcommittees to-date.

12.4. **Approval of Funding Requests** – Approval of routine funding requests

12.4.1. Requests from Director Tilson

12.4.1.1. **Fall Newsletter (OUTREACH)** - The Mar Vista Community Council appropriates $294.00 (above the $4K previously approved) as an OUTREACH expenditure for the Fall newsletter and distribution.

12.4.1.2. **Meeting Room Rental (St. Andrews)(OFFICE)** - The Mar Vista Community Council appropriates $600.00 for FY 2018-19 for meeting room rental at St. Andrew's Lutheran Church, located in Los Angeles, CA.

12.4.1.3. **Meeting Room Rental (The Vineyard)(OFFICE)** - The Mar Vista Community Council appropriates $600.00 for FY 2018-19 for meeting room rental at The Vineyard, located in Los Angeles, CA.

12.4.2. Requests from Executive & Finance Committee

12.4.2.1. **Board Reimbursement (OFFICE)** – The Mar Vista Community Council approves a reimbursement of $22.12 for OFFICE expenses to Elliot Hanna.

12.4.2.2. **June Art Walk (outstanding from FY 2017-18)(OUTREACH)** – The Mar Vista Community Council appropriates $73.74 in OUTREACH expenditures for June, 2018 Art Walk printing expenses.

12.4.3. Requests from Public Health & Safety Committee

12.4.3.1. **Winter Wonderland 2018 (NPG)** - The Mar Vista Community Council appropriates $1,000.00 for a Neighborhood Purpose Grant for Pacific L.A.P.D. Winter Wonderland 2018 Toy Giveaway event.

12.4.3.2. **Basic First-Aid Supplies (OUTREACH)** - The Mar Vista Community Council appropriates $500.00 for the purchase of basic first-aid supplies to encourage stakeholders their own grab-and-go disaster kits.

12.4.3.3. **High-Visibility Vests (OUTREACH)** - The Mar Vista Community Council appropriates $1,500.00 for the purchase of high-visibility vests that can be used by kids and adults while walking, running, scooting, or cycling.

12.4.3.4. **Coffee-with-a-Cop (OUTREACH)** - The Mar Vista Community Council allocates $600.00 ($100.00 for each zone) to host Coffee-with-a-Cop events. Funding is conditional upon support of local neighborhood associations (this provision may be waived if there is no viable neighborhood partner). Local, California-based coffee vendors are preferred and no styrofoam is to be used.

13. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.
14. **Unfinished Business and General Orders** – Discussion and possible action regarding items from prior meetings
    - 14.1. **Subcommittee Name Change (Mobility Subcommittee (ADMINISTRATIVE))** – The Mar Vista Community Council renames the "Mobility" Subcommittee to the "Bike Mar Vista" Subcommittee (postponed from 9/11/2018).
    - 14.2. **Opposition to Dockless Scooter Permits (Transportation & Infrastructure (POLICY))** – Discussion and possible action regarding a motion passed by the Transportation and Infrastructure Committee regarding dockless scooters in Mar Vista.
    - 14.3. **Discussion of Improvements to MVCC Website (ADMINISTRATIVE)** – Discussion and possible action regarding improvements to the MVCC website including changes to its administration.
    - 14.4. **Discussion of Constituting a Town-Hall Subcommittee (ADMINISTRATIVE)** – Discussion and possible action regarding constituting a town-hall subcommittee to arrange meetings regarding issues of interest in Mar Vista.
15. **New Business –**

    Report Regarding Permanent Supportive Housing in Mar Vista (Public Health and Safety [POLICY]) – Discussion and possible action regarding a report from the Homeless Issues Subcommittee regarding Permanent Supportive Housing in Mar Vista.

16. **Adjournment**

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Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, October 9th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

Approved

1. Call to order

Order called at 7:05pm.

2. Presentation of Flag and Pledge of Allegiance

Fewer than one dozen in attendance for the Pledge at 7:06pm. Approximately 40 members of the public were eventually in attendance.

3. Roll Call – Call of the roll and certification of a quorum

Quorum of seven met during roll-call at 7:07pm by: Robin Doyno, Elliot Hanna, Mary Hruska, Rob Kadota, Susan Klos, Sara Roos, Holly Tilson. Subsequent presence established for: Michelle Krupkin (7:10pm), Ken Alpern (7:43pm)

Aaron Elster, Nanxi Liu, absent; {Zone 2 vacant}

4. Community Memorial Observations

none

5. Announcements

Marty Rubin: NWNA meeting will host County Assessor's office on October 7 at St Andrews Church, 7pm. The annual block party was enjoyable and well-attended; MVCC sponsorship was appreciated. Thanks to Rob for purchasing and Armond for grilling.

Robin Doyno: Voter registration forms are available at the sign-in table.

Mary Hruska: Calls attention to the issue of our Urban Canopy, presented at WRAC-PLUM by Encino NC's Lee Rosenthal. The matter is particularly important for MVCC while it addresses the Community Plan and suggests future community discussion and potential support of the matter.

Armond Seretti: MVES is hosting the annual Big Boo on Oct 27. To prepare in advance for the event, meet on Thursday evenings at 6:30pm in the cafeteria to assist in building the haunted house.

Ivan Guerrero: Representing Cedars Sinai MDR Hospital, Mr. Guerrero seeks to establish a link between the Hospital, and communities it serves. Guerrero, Ivan <Ivan.Guerrero@cshs.org>

6. Public Comment for Items NOT on This Agenda

Selena Inouye: appreciates PRA letter from MVCC; LADOT's (disappointing) response will be posted via google drive on Restore Venice Boulevard's website. http://www.restorevenicebl vd.com Concerned that last-

minute NACTO-cancellation is bad form and disenfranchises ('slams an open window down on the fingers of…') stakeholders.

7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

Alpern – absent	*Doyno – Discussions with HIC CoChair re HIC issues. EACC issues in cmte.*		
Elster - absent	*Hanna – Hour-long discussion with each board candidate.*		*Hruska -none*
Kadota - none	*Klos – Clarifies that her daughter's remuneration for the Art Walk has long been declared and does not constitute a conflict-of-interest for Susan in her duties as MVCC BOD member, as do not myriad other community involvements; these are all free of financial conflict.*		*Krupkin – Discussions concern agenda-construction, Board member departures; nothing resulting in financial gain.*
Liu – none	*Roos – none*	*Tilson – Conversations about funding issues, with Armond about Outreach.*	

8. **Adoption of the Agenda**

Adopted without objection at 7:14pm (after correction of agenda item 10.2.3 that should reflect a vacancy).

9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the August 31, 2018 special meeting and the September 11, 2018 regular meeting of the Board of Directors.

*Both sets **approved** unanimously at 7:15pm. 8/0/0 (Alpern not yet arrived, Elster/Liu absent, 2 vacancies)*

10. **Reports**

10.1. Elected Official and City Department Reports

Hannah Levien: The Disability Resources Community Center, www.dcrc.co, (Venice Boulevard/Beethoven) was introduced in council by Mr. Bonin as a possible Mar Vista site for permanent supportive housing. The facility is a public-private partnership; 89% is owned by the city. It would become a "shared-use" site, with no displacement of present use or capacity, of a currently-unknown number of units, pending feasibility studies. The request will be considered by the homeless-poverty committee.

10.2. Officer Reports

10.2.1. Chair – Elliot Hanna

10.2.2. 1st Vice-Chair – Rob Kadota

A big month for Community Outreach events: Westside Village Civic Association Resilience project, where Chief Hogan presented; Block parties for North Westdale, Westdale on beautiful, tree-lined Colby Ave; Mar Vista Farmer's Market with staffing by Doyno (HIC, Library), Roos (Community Plan, Outreach with lawn signs and newsletter), Kadota (Bike valet & repair); Voter registration announced with large 3x4 poster at the Farmer's Market.

10.2.3. 2nd Vice-Chair – *vacant*

10.2.4. Secretary – Sara Roos

Working with The Web Corner to update and modernize the website; these have been difficult interactions. The Fall Festival (FF) is immanent, and 23K copies of the Fall 2018 newsletter have been printed, with 21K copies distributed featuring MVCC's nine Neighborhood Associations, in part to help with Fall Festival

Approved

advertising. Reports of non-delivery to stakeholders (both reported in Zone 6) will be addressed in a separate letter. Welbrook development letter has been sent; tracking of MVCC letters is at http://tinyurl.com/MVCCdoctracking. Brochure remains in process; lawn signs are designed, printers are posing difficulties that the wholesaler is handling. WRAC and WRAC-PLUM will be discussed elsewhere.

10.2.5. Treasurer – Holly Tilson

Newsletter attracted at least one new stakeholder. Lawn sign has been very successful; comment by Doyno and Tilson.

10.3. Zone Director Reports

10.3.1. Zone 1 – Ken Alpern

~ present after completion of Director reports, so none was given.

10.3.2. Zone 2 – *vacant*

10.3.3. Zone 3 – Mary Hruska

~ Community Plan comments moved to PLUM Reports ~

10.3.4. Zone 4 – Aaron Elster

10.3.5. Zone 5 – Michelle Krupkin

Sunny Grill owner (Zone 4) was physically assaulted in her place of business. 911 took 15 min to answer, LAPD was unable to locate the assailant.

Zone 5 – Venice Boulevard businesses continue to be affected by Venice Boulevard reconfiguration. Some businesses display signs reporting diminished trade, conflict was reported between CD11 Field Deputy Levien and businesses regarding the signage and its sentiment.

Increasing crime rates are of concern.

10.3.6. Zone 6 – Holly Tilson

Community Plan events in Westchester and Mar Vista sponsored by Department of City Planning reflect a high participation by Mar Vistans, in particular from Zone 6.

10.4. Committee Reports

10.4.1. Elections and Bylaws

Addressing the rewriting of bylaws and standing rules in that order. There has been discussion, as yet unresolved, about meeting at its currently scheduled location. Meetings are scheduled fourth-Wednesdays, at Windward.

10.4.2. Community Outreach

Seretti and Shaeffer (Liu has been out of the country) have been gathering information door-to-door. Of concern is effectively staffing and coordinating neighborhood events. Informal coffee-with-cochairs meeting will be on the 27th to sit and chat; monthly formal meetings at the library are on the second-Thursdays at 6pm.

10.4.3. Transportation and Infrastructure

Approved

Scooter motion with amendments as noted below. Great Streets subcommittee will be requesting an independent traffic study; updates on gateway signage.

10.4.4. Planning and Land Use Management

Community Plan Subcommittee was busy at its first meeting, settling on a Mission Statement, deciding on how to approach and exchange information with the City.

Open space and tree canopy are important considerations for the Community Plan. Late September meetings are important for networking with other groups, communicating with DCP.

PLUM was a short meeting as there were no new developments under consideration.

10.4.5. Public Health and Safety

This month's funding motions appear among new business below. Donors and sponsors are contributing to MV's Bike and Safety Fair. Hopefully the event's success will encourage it as an annual or maybe semi-annual event.

Homeless Issues SubCommittee: has been working with CD11 identifying potential supportive housing sites and will convey information about what is sought there to Zone Directors. News or concern with homeless-related issues in the community, especially regarding safety, is welcomed.

10.4.6. Education, Arts, and Culture

EACC is planning a town hall forum to address 'Diversity and the MV Art Walk' mid-November, during a Friday night open mike at the MV Market. A letter is being drafted to all schools soliciting a School Representative from each to the EACC.

11. Special Orders –

11.1. Short Presentation from Bird Scooters – Morgan Roth, Community Relations Manager for Bird in Los Angeles will address any questions or concerns regarding Bird scooters in Mar Vista.

Community Relations: Morgan Roth, mroth@bird.co

Headquartered in Venice, Bird has conducted operations in MV for some time. Their operations are sizable, with a lot of staff and a "bird watcher program", operating 5am – 9pm searching out improperly situated scooters. Call 1 866-205-2442 to report problems. NCs report improvements with increased communications. Mr. Roth offers his political experience as a resource to MVCC in developing an advisory position regarding the City Council's pilot program for scooters.

11.2. Short Presentation from Lime Scooters – Nima Daivari, Operations and Community Affairs Manager for Lime in Los Angeles will address any questions or concerns regarding Lime scooters in Mar Vista.

Operations and Community Affairs: Nima Daivari, nima.daivari@li.me

The Lime network has topped 6 million rides across its international network in their 15 months of operations. Rides are activated via smart phone and the regular cost is mitigated by a program for those of low income. Speed is capped at 15 mph, each scooter's charge lasts approximately 30 miles. Data tracks where the vehicles are parked, when mis-parked, enables geofencing of sidewalks. Engaging the community with incentives and fines can reduce improper usage; crowd-source behavior modification. Maintenance and operations are staffed 24/7 with charging by independent contractors. Anonymized data is free for Cities to use.

PUBLIC AND BOARD QUESTIONS:

Approved

Armond Seretti: Concerned that improper usage does not affect revenue, so there is no incentive for companies to enforce regulations – e.g, age and number-of-rider restrictions, out-of-range drops. These are safety, as well as law-enforcement issues, but also should be a part of the service.

Lime: The industry is just 14 months old, and using technology to shape behavior is a new endeavor. Mobility is not without risk; there are 35,000 deaths from drunk drivers annually.

Bird: Bird watcher program and physical, ground-observations are employed; community engagement will start soon. Helmet giveaways are common to both programs; community outreach takes time to build.

Kadota: Signaling turns with one hand off the steering mechanism feels more "sketchy" on a scooter than a bike. How do signaling conventions differ for scooters?

Bird: Rules and road operations will be communicated through the app; these are motorized vehicles.

Lime: we're working on best method of turn signaling.

Kalani Whittington: this is a motorized vehicle, that has not been regulated as, for example, Segways which were immediately blocked from sidewalks and City streets upon their appearance. Bird flooded the market so quickly the City Council could not regulate such popular devices, leaving politicians to scramble instituting safety regulations. The scooters are insufficiently lit for nighttime use with just one LED. Speeding tweens are of concern: who is liable for an accident caused by an underage scooter driver?

Krupkin:. Scooters are being ridden where they're not allowed; when will geofencing be employed?

Bird: The technology is still under development. For example, how to safely implement off-limit boundaries – slowdown or complete stop? There was successful implementation at a Santa Monica event called "Coast" that shut off all Oceanside use.

Selena Inouye: Considers these first mile-last mile solutions potentially "ablest" if more stable tricycles could be implemented to the benefit of the disabled and elderly

Lime: recumbent tricycles are in use in Chicago and NYC, and are awaiting LA regulations.

*• Extension of discussion for five minutes moved (Alpern) and **approved** without objection.*

Hruska: How long do batteries last and what happens to them after their lifetime? How will they be disposed?

Lime: Products are too new to know. No dead batteries have happened yet. Environmental concerns have yet to be characterized by newly hired staff. The company is carbon-neutral, buying carbon offsets across all products – pedal bikes, ebikes, scooters.

Russ Howes: Inquired after the contractor for app's gaming capabilities, online already for Lime, soon to be for Bird. Clarified 4 month scooter lifespan indicated by City Council; batteries are interchangeable between machines.

Alpern: invites cooperation devising and implementing policy via T/I first Wednesday Committee meeting to discuss Safety measures facilitated by knowledge, communications, data: rules, helmet status, sidewalk use, etc. Like Expo, another transportation modality, scooters fulfill a need but must be implemented "right": managing not so much corporate risk as safety.

11.3. Appointment of At-Large Director – Appointment and confirmation of an at-large director to fill the vacancy left by the resignation of Paola Cervantes. In accordance with Article V, Section 6, Subsection C of the Bylaws of the Mar Vista Community Council, the candidates are:

- Armond Seretti
- Stacy Shure

Both Mr. Seretti and Ms. Shure declined to make a statement.

*Hanna: Choosing between such good and strong candidates is hard because there is little contrast between them. The decision comes to the uncontrollable factor of the board's current overrepresentation of Zone 4. In order to balance representation, Stacy Shure from Zone 1 is **nominated** (Hanna).*

PUBLIC COMMENT:

Approved

Armond Seretti: with Stacy Shure each mutually supports the other and both agrees to stick around and annoy everyone to the maximum extent possible.

Hruska/Alpern/Doyno: We need to hear more from them both (any ties to Zone 2)?

***Appointment** of **Stacy Shure, At-Large Director** is **ratified** 7/0/2 (Klos, Doyno).*

11.4. Resignations of Board Member and Committee Chairs/Co-Chairs – Discussion and possible action regarding resignations received, including appointments of replacements.

Sherri Akers: Has not been involved with the Green Committee for awhile, so her official resignation is accepted.

Damien Newton: Has resigned as Zone 2 representative and the position will be filled according to MVCC's Bylaws. All qualified stakeholder's Letter Of Interest is due by November 3, 2018 at 9pm. The PLUM vacancy will be filled at November's Board meeting.

11.5. Election of Second Vice-Chair – Election of a Second Vice-Chair to fill the vacancy left by the resignation of Paola Cervantes.

*Mary Hruska is **nominated** (Krupkin/Alpern).*

PUBLIC COMMENT:

Kalani Whittington: Ms. Hruska's work on the Community Plan is impressive and underlies confidence in her capability.

Shure: Has shown she will make a great Vice Chair, through her diligent preparation and hard work as Cochair of MVCC's Community Plan Subcommittee.

*Motion **passes** 8/0/1 (Doyno)*

11.6. Appointment to Resilient Los Angeles – Appointment of a Mar Vista Community Council representative to Resilient Los Angeles (https://www.lamayor.org/sites/g/files/wph446/f/page/file/Resilient%20Los%20Angeles.pdf) as recommended by the Public Health & Safety Committee.

*Ken Frese is **nominated** (Hanna).*

Mr. Frese is quite an advocate for emergency preparation in the Community; he indicated a desire to represent MVCC in this way; who could match what he's able to do, who could match his enthusiasm – none could be better.

*Motion **passes** 7/1 (Doyno)/1 (Roos)*

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. Treasurer's Reports

12.1.1. Approval of Revised Budget - Review and possible approval of a revised budget for FY2018-2019.

12.1.2. Approval of Monthly Expense Report - Review and possible approval of the Monthly Expense report from the prior month.

12.2. Administrative Approvals

12.2.1. Mission Statements – Approval of mission statements submitted by Committees and Subcommittees to-date.

12.3. Funding Requests – Approval of routine funding requests

Approved

12.3.1. Requests from Director Tilson

12.3.1.1. **Fall Newsletter (OUTREACH)** - The Mar Vista Community Council appropriates $294.00 (above the $4K previously approved) as an OUTREACH expenditure for the Fall newsletter and distribution.

12.3.1.2. **Meeting Room Rental (St. Andrews)(OFFICE)** - The Mar Vista Community Council appropriates $600.00 for FY 2018-19 for meeting room rental at St. Andrew's Lutheran Church, located in Los Angeles, CA.

12.3.1.3. **Meeting Room Rental (The Vineyard)(OFFICE)** - The Mar Vista Community Council appropriates $600.00 for FY 2018-19 for meeting room rental at The Vineyard, located in Los Angeles, CA.

12.3.2. Requests from Executive & Finance Committee

12.3.2.1. **Board Reimbursement (OFFICE)** – The Mar Vista Community Council approves a reimbursement of $22.12 for OFFICE expenses to Elliot Hanna.

12.3.3. Requests from Public Health & Safety Committee

12.3.3.1. **Winter Wonderland 2018 (NPG)** - The Mar Vista Community Council appropriates $1,000.00 for a Neighborhood Purpose Grant for Pacific L.A.P.D. Winter Wonderland 2018 Toy Giveaway event.

*Consent calendar **moved** (Alpern/Krupkin) and **passes** 7/0/2 (Robin, Hanna).*

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

13.1.1.1. **(Agenda item 12.3.2.2) Art Walk (outstanding from FY 2017-18)(OUTREACH)** – The Mar Vista Community Council appropriates $73.74 in OUTREACH expenditures for June, 2018 Art Walk printing expenses.

Pulled by Roos from ExFin requests.

Expense is from last year's fiscal year, showed up on recently paid Copyland bill for June Art Walk so it's noted as last year's expense. Not part of this year's $2K

Doyno: We're obligated to pay it.

No public comment

*Motion (Doyno/Alpern) **passes** 8/0/2 (Krupkin, Hanna)*

13.1.1.2. **(Agenda item 12.3.3.2) Basic First-Aid Supplies (OUTREACH)** - The Mar Vista Community Council appropriates $500.00 for the purchase of basic first-aid supplies to encourage stakeholders to assemble their own grab-and-go disaster kits.

13.1.1.3. **(Agenda item 12.3.3.3) High-Visibility Vests (OUTREACH)** - The Mar Vista Community Council appropriates $1,500.00 for the purchase of high-visibility vests that can be used by kids and adults while walking, running, scooting, or cycling.

13.1.1.4. **(Agenda item 12.3.3.4) Coffee-with-a-Cop (OUTREACH)** - The Mar Vista Community Council allocates $600.00 ($100.00 for each zone) to host Coffee-with-a-Cop events. Funding is conditional upon support of local neighborhood associations (this provision may be waived if there is no viable neighborhood partner). Local, California-based coffee vendors are preferred and no styrofoam is to be used.

Pulled by Roos from Public Health And Safety Committee requests. Considered as a bloc.

Basic First Aid Supply is to create an interactive table-top attendance exercise where people will assemble their own small ziploc bag of basic first aid information and supplies. Starter kit will be motivational, a fun way to engage stakeholders in getting prepared.

Approved

High Visibility Vests are practical for walking, running or cycling; branded in a variety of sizes. It is a promotional item for those attending public safety events.

Coffee With A Cop is an opportunity to prioritize our support by providing local funds to encourage neighbors interacting with neighbors, inviting their senior lead officer or others, to small conversational gatherings, places of business, etc.

BOARD COMMENT:

Tilson: What is the price? A: Costs start at $2 and adding printing, range from $5-$10.

Doyno: Correct the motion with insertion of "to assemble".

Kadota: Never once has MVCC been able to spend down all our money (annually); we are chastised for not spending adequately. There should be a thoughtful discussion about prioritizing funding in the future.

Tilson: Even in the prior election-year of 2015-16 with a $4500 elections budget there was no overage and much last-minute spending – though no newsletters were sent. Agrees that prioritizing and planning expenditures long-term should be a Council priority. In this instance money was budgeted and set-aside for safety enhancements for 2018-19 already, so the expenditure is not anticipated to impact availability of funds even come the (summertime) end of the fiscal year.

Alpern: If money is assigned to Committees across-the-board, that can encourage more, and not necessarily "good" spending. This tradition of spending as requests come along is part of why money was available for last year's crosswalks initiative. The method may be unorganized but the year-end rush can be expedient.

Krupkin: Appreciates fiscal conservatism, but remarks the Coffee initiative is timely because there is interest in promoting more block captains at the moment; availability of these funds is supportive of meeting and talking.

Kadota: The Coffee initiative encourages neighborhood-MVCC Zone partnership, sustainability by specifying no styrofoam, encourages local vendor purchases.

Tilson: Coffee initiative replicates current interaction between SLO and Neighborhood Associations. Some direction or instructions about purchases (vendor, price) should be part of the motion.

Kadota: Trying to avoid micromanagement; if someone prefers Folgers that's fine, just don't brew it into styrofoam.

Shure: Clarifies the Coffee initiative's end date for spending is the fiscal year, June 30, 2019. If there is no cop in the Zone, the money simply won't be spent.

PUBLIC COMMENT:

Kalani Whittington: Better-specification of the ask is important for comfort: How many grab/go bags is $500 estimated to provide? How many vests? How many cups of coffee? As this is public money the Public deserves more information.

Selena Inouye: In particular, expenditures typically follow an event's needs, rather than planning an event around the expenditure: is there a list of events for which these expenditures are needed?

Kadota: The MV Bike Safety Fair was originally planned to be bigger, at two locations and dates. Borrowing tools, for example, would have been required but with funding, specific events can be "targeted" enabling the event to grow.

Selena Inouye: It would be nice to have more information about such events.

Tom McHenry: $500 for Bandaids and Neosporin seems a lot considering that two years later, these items can't be found and meanwhile the remaining money will wind up in the Bike Fair Safety funds. Another $1500 is going to that. Coffee is slated for $100 – that's 20 cups at Starbucks and it seems like a waste of money.

Motion (Alpern/Krupkin) ***passes*** *6/0/3 (Hanna, Roos, Hruska).*

14. Unfinished Business and General Orders – Discussion and possible action regarding items from prior meetings

14.1. Subcommittee Name Change (Mobility Subcommittee (ADMINISTRATIVE)) – The Mar Vista Community Council renames the "Mobility" Subcommittee to the "Bike Mar Vista" Subcommittee (postponed from 9/11/2018).

Approved

Kadota: The SubCommittee would like to achieve greater consensus on the proposed name-change, and the meaning of such terms as "mobility" and "bike"; the motion is requested postponed until November.

*Item is **postponed** without objection at 8:41pm*

14.2. Opposition to Dockless Scooter Permits (Transportation & Infrastructure (POLICY)) – Discussion and possible action regarding a motion passed by the Transportation and Infrastructure Committee regarding dockless scooters in Mar Vista.

Krupkin: Thanks to Zone 6 stakeholder, Russ Howes, for bringing this initiative, and working extensively to discuss and amend it through the Transportation and Infrastructure Committee.

PUBLIC COMMENT:

Russ Howes: The motion is intended to acknowledge (and commend) CD11's (in particular Eric Bruins and also Alek Bartrosouf) and the City Council's regulations on the issue, while urging additional public safety considerations.

*The advancements from Bird and Lime are promising; enforcing current regulations through involuntary inactivation via geofencing is important. When this is implemented there will be a big improvement in community conditions; the City should be encouraged to require geofencing as an enforcement mode, **in writing**.*

The City's newly adopted regulations will start October 15 with a preliminary evaluation January 31, 2019. At this time non-compliant mobility companies will be announced. It is during this period when we can urge safety considerations be explicitly addressed by our elected representatives in writing, keeping political officials (e.g., LADOT) and commercial concerns honest.

Kalani Whittington: agrees that Safety is of primary concern, and for all users, not just those on the scooters. Motorists have legal (and moral) jeopardy from non-compliant scooter-drivers too. Both compliance and enforcement are problems but these do not change the companies' responsibilities; a mutually beneficial solution must be devised. For example, scooters must be more visible for nighttime use, even if nighttime use is out-of-compliance, because it happens anyway; even if additional safety measures (e.g. more LEDs, licensing, testing) affect the companies' bottom line, planning and enforcing to this reality would be mutually beneficial.

Bird: motorized vehicles are governed by state law that classifies by vehicle-type. E.g., motorcycles differ from Big Rigs. Presently, scooter operators are required already to demonstrate ability to operate a motorized vehicle via their Driver's License. Bike laws also apply to scooters but this is not currently demonstrable.

Lime:– suggests MVCC delay their resolution for one month in order to incorporate companies' suggestions.

Russ Howes: prefers not to delay the motion because the Council pilot starts on October 15. We're not making law, but we should weigh in on what ought to be set to paper.

BOARD COMMENT:

Rob –strike "premature" from last "whereas" clause. Correct the word "data".

*Changes (Krupkin/Alpern) **moved** and **approved** unanimously 9/0/0*

*Motion (Kadota/Alpern) **approved** as amended 8/0/1 (Hanna).*

14.3. Discussion of Improvements to MVCC Website (ADMINISTRATIVE) – Discussion and possible action regarding improvements to the MVCC website including changes to its administration.

*~ Motion (Kadota/Alern) is **committed** without objection to the Outreach Committee for further action.*

14.4. Discussion of Constituting a Town-Hall Subcommittee (ADMINISTRATIVE) – Discussion and possible action regarding constituting a town-hall subcommittee to arrange meetings regarding issues of interest in Mar Vista.

*~ Motion (Kadota/Alern) is **committed** 8/0/1 (Hanna) to the Outreach Committee for further action.*

Approved

15. New Business –

15.1. Report Regarding Permanent Supportive Housing in Mar Vista (Public Health and Safety [POLICY]) – Discussion and possible action regarding a report from the Homeless Issues Subcommittee regarding Permanent Supportive Housing in Mar Vista.

Hanna: Letter from CD11 received six weeks ago requested help identifying appropriate Bridge Home sites within MVCC's area boundaries. MVCC remanded the task to HIC (Homeless Issues Cmte) to oversee Zone Director's input. An interim report (an "excellent piece of writing") from HIC is reproduced in the meeting packet.

Susan Klos: Four categories of housing types should be distinguished. Permanent Supportive Housing *(e.g., Step Up on Second, Multiple apartment units, converted hotels), defined by HUD, consists of leasing or rental for an indefinite period, paired with supportive services. Many locations are appropriate for this facility type.*

Transitional Housing *moves families or individuals within a reasonable amount of time to* Permanent Supportive Housing*. This accommodates individuals with mental and physical difficulties who have been homeless for a short period, homeless youth. A large, 5B home in a community could work with on-site caregiver.*

Bridge Housing *is temporary and designed for chronically homeless individuals and families while connecting them with a range of supportive services. The goal is to place individuals in permanent housing within six months; bed turnover could be as many as 4x per year. Currently there is Bridge Housing on Alameda Street and Pueblo Street. Proposed is for the Metro bus terminal site in Venice, and the VA.*

Safe Parking *is a fourth, nighttime only temporary housing type for those looking for permanent housing. It provides vehicle dwellers a safe and legal parking place off of streets, in centralized, small groupings of 5-10 dwellers, with sanitation, and full-time onsite security. Background check, insurance and registration must all be current. The program has been successful in SB and SD. Appropriate parking lots within each Zone could belong to faith based organizations or private parking lots, and qualify for a small stipend.*

Tilson: has the City identified all public buildings in MV? It is surprising that the Disability Community Resource Center on Beethoven/Venice, for example, is 80% CoLA. A: The Fire Station and Library are the only other ones; there are not many public properties in MV. CD11 can access this information. DWP is a possibility for safe parking, though current state standards won't allow the necessary access.

LAUSD is another possibility though there are many impediments: hours, facilities, appropriateness. With over 15K homeless LAUSD students, housing their families through Safe Park could be helpful.

Klos: Safe Parking was only implemented in April; it will increase in service rapidly.

Hannah Levien: a Safe Park paradigm is the narrow parking lot behind WLA City offices at Corinth/Santa Monica. A blanket contract from General Services provides the template.

Klos: 12 straight free hours is an impediment for most businesses though.

Hannah Levien: Some operator-specific adjustments are possible; Safe Park doesn't operate identically in every location.

Tilson: Some stakeholders fear the City's inadequate record of interaction with homeless populations underneath the 405 and elsewhere predicts replicating such inadequacy, just in a new location.

Hannah Levien: Safe Park clients are vetted heavily, often requiring a job or steady income.

Tilson: Concerns aren't with the program, but with specific locations and operations.

Hanna: concerns can be addressed moving forward through open communications with Zone Directors.

Motion (Kadota/Doyno) ***passed*** *to accept the submitted HIC report with appreciation and archive it on MVCC letterhead 8/0/1 (Hanna).*

Approved

16. Adjournment

*Meeting **adjorned** (Alpern/Krupkin) at 9:22pm.*

Approved

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Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, November 13th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the October 9, 2018 regular meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
        - **10.2.1. Chair** – Elliot Hanna
        - **10.2.2. 1st Vice-Chair** – Rob Kadota
        - **10.2.3. 2nd Vice-Chair** – Mary Hruska
        - **10.2.4. Secretary** – Sara Roos
        - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
        - **10.3.1. Zone 1** – Ken Alpern
        - **10.3.2. Zone 2** – Vacant
        - **10.3.3. Zone 3** – Mary Hruska
        - **10.3.4. Zone 4** – Aaron Elster
        - **10.3.5. Zone 5** – Michelle Krupkin
        - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
        - **10.4.1.** Elections and Bylaws
        - **10.4.2.** Community Outreach
        - **10.4.3.** Transportation and Infrastructure
        - **10.4.4.** Planning and Land Use Management (PLUM)
        - **10.4.5.** Public Health and Safety
        - **10.4.6.** Education, Arts, and Culture
11. **Special Orders –**
    - **11.1. Committee Resignations –** Discussion and possible action regarding the resignations of Sherri Akers, Birgetta Kastenbaum, and Tatiana Leuthi as Co-Chairs of the Aging-in-Place Subcommittee and Martin Rubin as Co-Chair of the Elections and Bylaws Committee.
    - **11.2. Committee Appointment -** Discussion and possible action regarding the appointment of Co-Chairs of the Planning and Land Use Committee to fill the vacancy created by the resignation of Damien Newton.

11.3. Second Announcement of Zone 2 Vacancy – In accordance with Article V, Section 6, Subsection C of the Bylaws of the Mar Vista Community Council - of a Zone 2 vacancy created by the resignation of Damien Newton.

11.4. Approval of Treasurer's Report – Discussion and possible action regarding the Treasurer's report for the prior month.

11.5. Presentation from Skip Scooters – Brief presentation from Lauren Urhausen, Western Regional Director of External Affairs for Skip Scooters

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. Appointment of Primary Cardholder – The Mar Vista Community Council appoints Elliot Hanna as the Primary Cardholder for the Mar Vista Community Council's credit card.

12.2. Appointment of Second Signer - The Mar Vista Community Council appoints Rob Kadota as the Second Signer for the Mar Vista Community Council's credit card.

12.3. Supplemental Appropriation for Grease Night at Venice High School (Executive and Finance Committee) – The Mar Vista Community Council appropriates $16.86 to cover overruns for Grease Night at Venice High School.

12.4. Appropriation for Business Cards (Executive and Finance Committee) – The Mar Vista Community Council appropriates $124.76 for business cards for board members.

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

14. Unfinished Business and General Orders -

Discussion of the City of Los Angeles' sidewalk vending program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program (postponed from 8/31/2018 special BoD meeting).

15. New Business –

15.1. Support of WRAC Motions Regarding the Community Plan Process (PLUM) - Discussion and possible action regarding motions from WRAC requesting information from the city regarding the community plan process.

15.2. Great Streets Venice Blvd. Data – Discussion and possible action regarding a stakeholder petition requesting a town-hall meeting to present the one-year pilot project data for the Venice Blvd. Great Streets Pilot Project and for other related purposes.

15.3. Great Streets Town Hall (Great Streets) – Discussion and possible action regarding constituting a community panel and conducting an independent traffic study of the Venice Blvd. Great Street project.

16. Adjournment

Bold, underlined text indicates further details available in supplemental materials at meeting.

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Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, November 13th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium

11430 Woodbine Street, Mar Vista, CA 90066

Approved

1. Call to order

Meeting called to order at 7:05pm with approximately 12 non-board members in attendance.

2. Presentation of Flag and Pledge of Allegiance

Led by Chair Hanna.

3. Roll Call – Call of the roll and certification of a quorum

Quorum established with Robin Doyno, Aaron Elster, Stacy Shure, Mary Hruska, Rob Kadota, Elliot Hanna, Sara Roos, Nanxi Liu, Holly Tilson; Michelle Krupkin (7:12pm), Ken Alpern (7:14pm)

4. Community Memorial Observations

~ none

5. Announcements

Patrick Winters: Urges careful attention to the Planning application for a large health care facility (5 combined parcels) at 11405 Venice Boulevard. The Developers of Welbrook are from Utah. They are requesting numerous deviations including a tremendous setback, reduction [of what - alley?] in the rear, height increase, 60% density bonus increase from 40 units to 87, parking increase.

The R3 Zone application is "tremendously overreaching" and will have tremendous impact on the community in general and the adjacent residential community specifically. There is a public hearing on December 5 at the WLA Municipal Building, 1645 Corinth Ave, 90025, second floor. Please turn your attention to this important matter and attend the public hearing.

> *Shure: The Developer presented this project at MVCC's Planning and Land Use Committee (PLUM) meeting twice, most recently on September 11. The second meeting included their response to requested modifications. Because Mr. Winters became aware of the project only through the ZA public notification, it appears Welbrook did not reach all immediate neighbors.*

Debbie Almo-Vazquez: Enjoys the neighborhood and in particular visits the Farmer's Market every Sunday but is troubled by ever more and increasingly regular requests for money, handouts. How can the market be made more comfortable for all Farmer's Market patrons?

Notes as well that Developers are heavily present and some have hundreds of projects going at once, resulting in project delays and little care for the community, encouraging attractive nuisance and safety hazards such as trashed job sites, graffiti and broken fences and sidewalks, with difficult project communications.

> *Online LA311 app and communications with DBS (LA Department of Building And Safety) and CD11's Ms. Levien were suggested.*

Mary Hruska: extremely concerned about a proposed City ordinance [online hyperlinked text follows], Council File CF 12-0460-S4; Case No. CPC-2016-3182-CA; ENV-2016-3183-CE. Known as the "Processes And

Procedures Ordinance", a proposed amendment to the Los Angeles Municipal Code (LAMC) that would "systematically reorganize the administrative provisions of the Zoning Code". The matter will be heard soon before CoLA PLUM. Many citizens' letters appear in the Council File linked above; it will be hard to compose a MVCC position quickly enough with the holiday and complexity of the matter (Alpern). It could be that MVCC should meet in special session to consider the matter specifically; MVCC PLUM will consider it in December.

Concern is that City Council members will not attend sufficiently to the 900+ page document given its presentation as perfunctory and inconsequential, a simple stream-lining of zoning code processes; it is anything but. The ordinance would affect City law and fundamentally restructure power in favor of the Mayor and the unelected Director of City Planning, while dis-empowering community stakeholders. For example if passed as proposed we would have no community say in the redesigned Community Plan; MVCC's PLUM Committee would have no value.

WRAC is aware of the proposed ordinance but has no position on it.

An informative from this stakeholder is posted with the meeting supplemental information.

6. Public Comment for Items NOT on This Agenda

~ none

7. Ex-Parte Communications and Conflicts-of-Interest - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

Alpern – CityWatch articles, discussions concerning the board vacancy and committee leadership.		*Doyno – HIC discussions with its CoChairs*	
Elster – PLUM leadership vacancies, discussions with Bowlero regarding their chained parking lot.		*Hanna – Discussions of committee vacancies and resignations.*	*Hruska -none*
Kadota - none	*Krupkin – discussions concerning the board vacancy and committee leadership; outreach to Zone 2 stakeholders*		*Liu – none*
Roos – conversations with Zone 2 stakeholders about the board vacancy		*Shure – none*	*Tilson – none*

8. Adoption of the Agenda

~ New Business items were mis-titled and mis-labeled in the agenda; corrected in the Minutes (Krupkin).
~ The Traffic Study motion should be considered first, and as a companion to the Town Hall motion; WRAC motions later (Hruska).
~ Catch-and-Release motion from POSy was not agendized though passed through two committees and submitted for consideration (Roos).
~ A Special Meeting to consider the "Processes and Procedures Ordinance" may be necessary (Alpern).

***Adopted** as corrected without objection at 7:31pm*

9. Reading and Approval of Minutes – Reading and approval of the minutes from the October 9, 2018 regular meeting of the Board of Directors.

*Reading waived; Minutes **approved** (Alpern/Hruska) with corrections from Krupkin, Tilson, Shure at 7:35pm.*

10. Reports

10.1 Elected Official and City Department Reports

Hannah Levien (CD11): Requests a moment of silence for those who died recently at the Borderline Grill in Thousand Oaks; and the Woolsey [Malibu] and Camp [Paradise] Fires.

~ Regarding the Street Vending motion, SB946 passed at the state-level, so LA City Council wanted to take immediate action to pass a local program, which would be grandfathered, thus establishing some level of local control over the issue. Therefore BSS, Rec/Parks were asked for input prior to the 15th; more details are available on request: Hannah.levien@lacity.org

~ Responsibility for graffiti removal is slated to shift from LAPD to BSS, per a motion introduced by CD11.

Approved

~ Great Streets final report will be released 11/19/18 as promised.

~ Catch/Release motion can be pursued even though accidentally not agendized tonight.

~ Thanks for supporting the potential of incorporating short-term housing into the Disability Community Resource Center mandate; the recommendation is under investigation.

Vanessa Serrano (DONE): DONE is co-hosting a Town Hall for NCs on Thursday, November 29, 2018, with the Purposeful Aging Los Angeles (PALA) initiative of the County and City of Los Angeles. Presentations will be on age-friendly action plans, addressing questions such as: What are the pressing issues for our aging population?, What are you doing or would you like to see addressed? Please bring ideas about how to enhance and improve different regions and the neighborhoods specific to these; how to help make them age-friendly.

> *Krupkin: The Pilot Program along Venice Boulevard is not designed for aging seniors; it is not ADA-compliant. PALA should work closely with the LA Department on Disability.*

~ ASL interpretation is available now on request via DONE.

10.2 Officer Reports

10.2.1 Chair – Elliot Hanna

Reminds committee CoChairs, that Minutes need timely posting; please get caught up.

10.2.2 1st Vice-Chair – Rob Kadota

Notes there was no MVCC booth on Sunday due to a problem accessing the storage locker, since corrected.

10.2.3 2nd Vice-Chair – Mary Hruska

Thanks for the CD11 Street Vending update from Ms. Levien. An update on the analyst's information from the 15th will be appreciated too.

10.2.4 Secretary – Sara Roos

Missed deliveries of the MVCC Fall Newsletter were investigated, solicited, replaced and conveyed to the distributor. Council letters, CIS and other business can be followed via the website link; please do not hesitate to ask about business disposition or missing information.

10.2.5 Treasurer – Holly Tilson

~ none

10.3 Zone Director Reports

10.3.1 Zone 1 – Ken Alpern

Waiting and wondering when the Palms/Sepulveda parcel Developers will speak with the Zone 1 community (the silence is deafening). CD5 is actively communicating with stakeholders about the matter; Ms. Shure is on the case.

Commercial space in the zone presently is insufficient and shrinking as well. The matter has important, MVCC- (and City-)wide relevance that should be addressed through the Community Plan update.

10.3.2 Zone 2 – Vacant

10.3.3 Zone 3 – Mary Hruska

No specific news about Zone 3, but everyone is encouraged to pay attention to the Community Plan update process!

10.3.4 Zone 4 – Aaron Elster

~ none (see Zone 5 below).

10.3.5 Zone 5 – Michelle Krupkin

Approved

Time Warp music store – north side of VB in MVCC Zone 4 – is closing (not the record store). This marks the 21st business to close on Venice Boulevard since the road reconfiguration.

~ LAPD news includes the Officers Thanksgiving that will be held on Wednesday the 21st, sign up for food serving, cleanup. The LAPD Winter Wonderland and sleigh stops is fast approaching, with opportunity to volunteer at Pacific Station (Culver/Centinela) on the day before sorting toys. Pacific Division Cadets are collecting shoe box donations. Contact michelle.krupkin@marvista.org or rob.kadota@marvista.org for information or to consider saying "thank you" by donating your time.

10.3.6 Zone 6 – Holly Tilson

Zone 6 stakeholders are concerned with petty crime, that isn't so petty. Bike chop shops, homelessness. WMVRA is interested in hearing more from CD11 about proposed supportive housing in the DCRC at Beethoven/Venice.

10.4 Committee Reports

10.4.1 Elections And By-laws

Last meeting's small group dealt with expenditures, and a discussion of how to simplify the scheduling and posting of meetings.

10.4.2 Community Outreach

~ none

10.4.3 Transportation and Infrastructure

Safety issues with scooters continue to be reported; the matter is not going away. BIG Wow and Thank You to CD11's Alek Bartrosouf and Hannah Levien for attending to issues of curb ramps and stop walks. Everyone looks forward to "Ken having nothing to complain about". Until then the parking study agendized under "New Business" below is important for CD11 to address and in conjunction with CD5. There is concern that the hopscotch mosaic project in front of the library is on hold because the "repair blitz" at Centinela/Venice may have displaced work at Inglewood/Venice?; Ms. Corinne's first installation has yet to be remunerated.

CD11's Ms. Levien clarifies that the "repair blitz" will be doubled, with a second episode scheduled near the fiscal year's end; it would have been too soon to accomplish a second tile installation now.

10.4.4 Planning and Land Use Management (PLUM)

PLUM discussion of a 70 unit project at Gateway/Barrington. Three motions were passed but the development team will return.

Community Plan – group is being shepherded and guided by a former MVCC Chair and long-time resident who encourages involvement from all stakeholders. December meeting will be rescheduled to avoid the holidays. Agendized motions from WRAC (below) do relate to the SubCommittee's work.

POSy – considered council member Englander's reconsideration of a Catch/Release program for coyotes. The program already has been tried and was found wanting; POSy opposes reinstating the already-failed initiative, but proposes a public education safety campaign that could be useful at mitigating public risk.

10.4.5 Public Health and Safety

86 kids registered for MVCC's Bike Safety Fair. It was a great success with much great support from Walk N Rollers and many local businesses [list them?]. Special thanks to Zone 1's Westside Village HOA for a cash contribution. Jump [Bikeshare] handed out helmets to all participants. There were First Aid kits and reflective vests for kids and adults at the Farmer's Market.

10.4.6 Education, Arts, and Culture

~ none

11. Special Orders –

Approved

11.1 Committee Resignations – Discussion and possible action regarding the resignations of Sherri Akers, Birgetta Kastenbaum, and Tatiana Leuthi as Co-Chairs of the Aging-in-Place Subcommittee and Martin Rubin as Co-Chair of the Elections and Bylaws Committee.

Aging In Place is a committee of long-standing, founded and run for many years by three ladies (above) who've done a spectacular job, and feel it's time now to step aside. They tried a quarterly cycle, but found the schedule didn't work, so have chosen simply to move on. The committee is integrally connected with its founders and would be hard to recreate without the original CoChairs. In the absence of a different workable suggestion, the committee's work will be archived and preserved for future reference.

Mr Rubin has chosen to step aside as Cochair of the Elections and By-laws Committee.

PUBLIC COMMENT

Selena Inouye: Regrets that Mr. Rubin has resigned. He was a big part of the committee, suggesting committee leadership issues could have been handled better. With lots of new people chairing committees the board should spend some money for training to prevent such problems.

BOARD COMMENT

Krupkin: AIP was an amazing asset to community. It is sad to see its Cochairs go, but hopes the committee can continue on; sorry Mr. Rubin is stepping down too.

*Resignations **accepted** at 8:05pm 10/0/1 (Hanna).*

11.2 Committee Appointment - Discussion and possible action regarding the appointment of Co-Chairs of the Planning and Land Use Committee to fill the vacancy created by the resignation of Damien Newton.

The resignation of Mr. Newton leaves Mr. Elster a one-man army. Mr. Alpern and Ms. Shure are appointed to join Mr. Elster as Planning and Land Use Meeting (PLUM) CoChairs

*Seeing no opposition the **appointment** (Krupkin/Roos) is ratified 10/0/1 (Hanna).*

11.3 Second Announcement of Zone 2 Vacancy – In accordance with Article V, Section 6, Subsection C of the Bylaws of the Mar Vista Community Council - of a Zone 2 vacancy created by the resignation of Damien Newton.

The Zone 2 Director vacancy remains as no Letters of Interest from a Zone 2 stakeholder were submitted. The position remains yet to be filled; qualified stakeholder's Letter Of Interest are due by Saturday, December 8th, 2018 at 9pm.

11.4 Approval of Treasurer's Report – Discussion and possible action regarding the Treasurer's report for the prior month.

MER could not be generated because a few receipts need straightening out. In its stead is a "Treasurer's Report" in the packet. We have spent approximately $11,860 and have approximately $30K remaining; included in the budget already. Winter Wonderland has a $1K NPG (Neighborhood Purpose Grant). Everything else is regular monthly costs – storage, printing, wifi, etc.

*Motion (Alpern/Krupkin) to **approve** the Treasurer's Report **passes** 10/0/1 (Hanna).*

11.5 Presentation from Skip Scooters – Brief presentation from Lauren Urhausen, Western Regional Director of External Affairs for Skip Scooters

Lauren Urhausen, lauren@skipscooters.com
Rafi, General Manager for the LA area [rafi@skipscooters.com?]

Skip Scooters distinguishes itself from competitors by working hard to have a good relationship with Community and the regulators. Never having been served a cease-and-desist order, they play by the rules, are in this together, and want to work with us. They maintain a relationship with responsible writers, use in-app tutorials. They have an internal locking device to prevent stranding and falling and are dedicated to Safety, employing a helmet program (one is earned by Ms. Petersen for correctly answering where scooters are permitted to be ridden).

Please do not hesitate to contact them so they may become part of the Community.

Approved

Krupkin: MVCC has articulated its concerns regarding scooters in a CIS filed with the City. We favor geofencing, funding for enforcement and other points enumerated there. We welcome collaborative solutions.

Hruska: Curious the motivation of scooter-users: does it substitute for walking, the bus, driving? Funds to study this formally would yield valuable data.

Skip: Data from Portland, OR DOT finds scooters used for first/last mile transit. That is, the modality competes with driving or Uber, or the bus if its stop changes. Approximately 50:50 eliminating walking and driving. Cautions that this is Portland, not LA where traffic is very different (fierce today).

Alpern: There's no shortage of accidents: Safety is important. State-level governance doesn't have to be undertaken the same way at the local level. We would like to know the degree scooters are a public health problem; will the cost of their risk be assumed by everyone??

Selena Inouye: Notes the product is "able-ist"; it does not accommodate disabilities. Two-wheel scooters are not stable, a third wheel is necessary.

Skip: Recumbent bicycles are available already in some markets.

Kadota: Signaling is sketchy on a scooter but it is just as important for a scooter operator as a cyclist or motorist to signal intention. How can this be addressed in future products?

Roos: Beyond mobility and utility studies, an on-going, funded study of current safety metrics such as ER visits, accidents and injuries would be important. These reports should be mandated in-app.

Skip: We're lacking infrastructure in LA to studies these issues yet.

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1 Appointment of Primary Cardholder – The Mar Vista Community Council appoints Elliot Hanna as the Primary Cardholder for the Mar Vista Community Council's credit card.

12.3 Supplemental Appropriation for Grease Night at Venice High School (Executive and Finance Committee) – The Mar Vista Community Council appropriates $16.86 to cover overruns for Grease Night at Venice High School.

12.4 Appropriation for Business Cards (Executive and Finance Committee) – The Mar Vista Community Council appropriates $124.76 for business cards for board members.

Item 12.2 considered separately because of improper wording.

*Motion(Liu/Hruska) **approved** at 8:28pm 10/0/1 (Hanna)*

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

13.1 [listed as agenda item 12.2] Appointment of Second Signer - The Mar Vista Community Council appoints Rob Kadota as the Second Signer for the Mar Vista Community Council's credit card.

Tilson: "Rob would be second signer if there were a second signer for a credit card, but there is no second signer on the credit card". Amended as follows:

"The Mar Vista Community Council appoints Rob Kadota as ~~the~~ Second Signer ~~for the Mar Vista Community Council's credit card~~."

*Motion(Roos/Krupkin) **approved** at 8:30pm 10/0/1 (Hanna)*

14. Unfinished Business and General Orders -

Discussion of the City of Los Angeles' sidewalk vending program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program (postponed from 8/31/2018 special BoD meeting).

Introduction by Hruska: CD11's report (above) noted this motion must be acted on in City Council shortly and its particulars have changed.

***Motion** (Hruska/Krupkin), to **postpone item 14 discussion** to December 11, 2018 regular BOD meeting (with time-certain) so the file can be discussed in its entirety then. **Passed** 10/0/1 (Hanna) at 8:31pm.*

Approved

15. New Business –

15.1 [listed as agenda item 15.3, renumbered] Independent Traffic Study (Great Streets) – Discussion and possible action regarding constituting a community panel and conducting an independent traffic study of the Venice Boulevard Great Street project.

Introduction by Alpern (8:33pm). This call for a traffic study of the Venice Boulevard Great Streets Pilot Project ("the Project") mirrors a successful collaboration between Silverlake NC and CD4.

WHEREAS, the Great Streets - Venice Boulevard Pilot Project has caused conflict and controversy in Mar Vista and the surrounding communities; and

WHEREAS, numerous requests for pre- and post-project data to the Great Streets Initiative in Mayor Garcetti's office, the Active Transportation and Vision Zero offices in the Los Angeles Department of Transportation (LADOT), and Councilmember Mike Bonin's office have been non-responsive; and

WHEREAS, the limited data and analysis that has been released from LADOT and Councilmember Bonin's office is contradictory to the experiences of the community members living near, conducting business on and otherwise using Venice Boulevard; and

WHEREAS, numerous requests for Town Hall meetings with question and answer sessions have been denied by LADOT and Councilmember Bonin's office; and

WHEREAS, the Silver Lake community, when faced with a similar situation, asked for and were granted funds to hire a transportation contractor to conduct an independent traffic study regarding the Rowena Avenue road diet by their Councilmember David Ryu; and

WHEREAS, Mar Vista stakeholders, on behalf of the businesses and residents, commuters, emergency responders and others impacted by the Great Streets Venice Boulevard Pilot Project, would like to seek the same remedy in order to receive answers to their questions and concerns that have heretofore been unaddressed by the Great Streets Initiative, LADOT and Councilmember Bonin.

THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel under the auspices of the Great Streets Ad Hoc Subcommittee, and

THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets Venice Boulevard Pilot Project, to be done within two months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.

Liu: How much funding was supplied by CM Ryu? Ans: 88K – 90K

PUBLIC COMMENT

Selena Inouye: The Community hasn't gotten straight answers out of LADOT; an independent traffic study might be the only way to get some questions answered that the Community needs.

Sheri Odere: it's about time we have an independent study to get the truth out about how this Project has impacted our neighborhood.

April Petersen: Supports the motion; accurate data would give the Community some foundational knowledge and bring people together with shared understanding. Information is necessary about the impact on side streets as well as on Venice Boulevard. Centinela Boulevard is also impacted with increased traffic and its bus stops too feed into the issues on Venice Boulevard. The absence of sidewalk improvements is troubling.

Jason Fineis: notes this data will bring transparency to the Project. More information about cut through traffic – which residents feel palpably – is necessary.

BOARD COMMENT

Alpern: The Project has safety issues that we need to understand. The optics suggest initially the Project was rammed through without any data, and now after well over a year still without data the Project's inertia simply carries it forward. The optics of non-transparency are brutal; we have no choice but to insist on this independent study.

Approved

Tilson: agrees we need the traffic study. The previous mobility chair promised in 2016 that if there were lots of cut-through traffic, a study would be done. Palms, Charnock, Victoria are all streets that in Zone 6 aren't meant to hold the current tremendous amounts of cut-through traffic; the telephone app 'Waze' directs traffic onto streets so narrow that parked cars are side-swiped: a study should be done.

Hruska: the Project shows glaring lack of transparency and incompetence. The Community that has paid for the Project also bears the brunt of its effect and is owed some real explanations.

Roos: how to convene a group that can effectively interact with the Council Office on this matter and accomplish such an open-ended request?

Krupkin: The request is to assembly a community panel under the auspices of the Great Streets SubCommittee, of unspecified size; interested parties can attend the Great Streets SubCommittee and apply to be part of the panel.

Hanna: clarifies that discussion can suggest an amendment to the motion, or to postpone the matter indefinitely but not argue points of it.

Kadota: objecting to oversight by the Great Streets ad hoc SubCommittee on the grounds that it is not a neutral or balanced group, suggests an amendment to strike the SubCommittee's auspices and substitute Board or Chair accountability: "MVCC will assemble a community panel".

Krupkin: does not accept the amendment.

Hanna: Objection is registered via voting on the amendment.

*~ **Motion (i)** (Kadota/Roos) **to AMEND** as follows:*

> *…THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a Community Panel ~~under the auspices of the Great Streets Ad Hoc Subcommittee~~, and …*
>
> *COMMUNITY COMMENT*
>
> *BOARD COMMENT*
>
> *Shure: we're all worried about conflicts in this Era Of Conflicts; convening this panel under the auspices of the full MVCC could remove the perception of conflict long perceived by some Community members.*
>
> *Krupkin: Objects to any amendment of the motion.*
>
> *Motion To Amend (i) **passes** 6/3 (Krupkin, Alpern, Hruska)/2 (Tilson, Hanna) at 8:52pm*

Liu: The study is specified to be completed "within two months", … of what moment – passage of the motion? Agreement of the contract?

Krupkin: Silverlake NC's agreement operated under this restriction.

Kadota: perhaps the timeframe could be specified more helpfully as a "goal"; or to be accomplished in a "speedy manner"?

Tilson: a small traffic study in Zone 6 was accomplished in two days.

Roos: what is to be studied? The question/s sought should dictate the study's length, goals, scope.

Alpern: The Project originally was rammed through without any studies altogether; to be specifying a timeframe now is simply raising the bar – whether two days, weeks or months does not matter. Should the motion be substituted to specify "four months"?

Hanna: to rewrite the motion it must go back to Committee; the Board can send it back. It is inefficient to construct a motion from the ground up.

Selena Inouye: The purpose of the motion is simply to get the ball rolling on this request.

Kadota: a clear charge is needed regarding what data we're asking for.

***~ Motion (ii)** (Kadota/Doyno) to **send the Independent Traffic Study motion back to SubCommittee** in order to articulate the specific data set in question.*

> *PUBLIC COMMENT*

Approved

Selena Inouye: why make the SubCommittee do all this work absent any commitment from CD11 for funding? The order should be to form a panel in principle, obtain commitment from CD11, then move forward to articulate MOU/scope of the study jointly.

Sheri Odere: this [proposal to remand the motion back to committee] is why we don't trust you [MVCC] guys; we're so frustrated our heads are exploding. We have this mess [on Venice Boulevard], we're waiting for data, we can't get you guys to agree to this proposal, which is frustrating.

Kalani Whittington: More than half [the MVCC Board] are new to the council or are in new leadership positions on it, so this [Project?] is turning out to be a bait-and-switch. For example Mr. Kadota was Chair when the Project was determined, and he is no longer; Ms. Liu is new; it all feels determined. There were community actions and presentations yet now we have scooters as a new example of a project shoved past us with no discussion of Safety. If Safety were really an issue, why are scooters not included (for example tonight I was hit by an individual wearing no helmet, dressed all in black on a scooter without a single reflector). Instead, it seems Safety is not an issue of concern, rather this is a personal political project for the Mayor and local council member, that has divided our community like national Trumpian politics does. We [should be] better than that.

April Petersen: would like this motion voted on tonight. If necessary create a special committee but move it forward tonight.

BOARD COMMENT

Kadota: some level of detail, scope of the study, is important: what are to be its basic six or seven questions? This shouldn't be an exhaustive contract, but more detail would be helpful to guide the discussion forward.

Hanna: the "quickest way to accomplish nothing is to try to do too much". We have to be realistic. The most beautifully funded motion might never see a dime. So rather than squabbling about every word, let's get the general gist and move forward.

Liu: we should request the study, and sooner rather than later. But considering the concern, if we want a study which is expressly what the city did not do – a transparent one – then we must be more specific. For example two months is inadequate – if the City completed a study in two months, we would say that's not enough. The proposal should be extended to four months at least.

Hanna: we're talking about whether to commit the motion back to Great Streets or not. Krupkin: since an amendment was just adopted removing Great Streets from assembling the community panel, it is the Board of Directors who will have to compose these two questions, and right now. Sending this back to Great Streets would be sending it back without teeth as its right to assemble a panel is gone.

Alpern: The Community's anger [re safety issues? remanding the amendment to committee? Debating the motion?] is warranted, this hypocrisy of double standards [re absence of transparent data while demanding unspecified transparency of data collection now?] is appropriate: there is a lack of transparency [in data collected]. We could amend collection to happen within four months, but no one cares. That would be missing the forest for the trees.

Shure: feels a Community Panel [first amendment] is the best way to review the data but the (amended) motion should be amended to specify it is the Community Panel that shall prepare a list of required data once funds have been obtained from CD11, rather than requesting that data list be prepared by Great Streets – i.e., sending the motion back to the SubCommittee [that is, the proposed motion on the floor].

~ ***Motion (iii)*** *(Shure/Hruska)* ***to AMEND*** *as follows:*

> *…~~THEREFORE, the MVCC~~ requests that Councilmember Bonin ~~provide the~~ fund~~ing for~~ an independent traffic study of data (or questions) identified by the assembled ad hoc Community Panel regarding the Great Streets Venice Boulevard Pilot Project, to be ~~done~~ completed within ~~two~~ four months of ~~the~~ contract ~~by~~ with an independent firm of the ~~c~~Community ~~p~~Panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.*
>
> *Liu: clarifies this is not another motion, but we are amending the motion.*
>
> *Selena Inouye: The Community Panel, rather than the Great Streets SubCommittee, should be compiling the list of data or questions, and interacting with the contractor. We would want to have experts advising us.*

Approved

Elster: Is this another amendment being offered?

Tilson: The amendment [on the floor] micromanages the initial request. "Traffic study" probably has 18 different meanings, yet the community states there is a need for a traffic study (the cut-through traffic is killing us). Which details, are to be determined later by the contractor, and not the committee. If we stipulate a time line, it should start once these details are worked out, otherwise we're facing another whole year.

~ ***Call (iv)*** *(Liu/Kadota)* ***the previous amendment for a vote*** *[2/3]:*

Shure: requests to withdraw her amendment (denied by Chair Hanna).

Call to end debate and vote (iv) *on the previous amendment* ***passes*** *8/1 (Roos)/2 (?)*

Amendment (iii) *to remand details to the Community Panel and amend the timeline* ***(iii)*** *[as above]* ***passes*** *9/1 (Roos)/1 (Hanna)*

15.2 [listed as agenda item 15.1, renumbered] Support of WRAC Motions Regarding the Community Plan Process (PLUM) - Discussion and possible action regarding motions from WRAC requesting information from the city regarding the community plan process.

(i) The Mar Vista Community Council finds the Community Plans Update Outreach Plan timeline of 3 years to be ambitious (consider that the West Adams-Baldwin Hills-Leimert and Granada Hills Plans required 7 years, and the Expo Station Neighborhood Transit Plan required 4.5 years), potentially limiting adequate public input and feedback.

Therefore, we request that the Planning Department be funded to extend the timeline if and as needed to accommodate achievement-anchored benchmarks.

(ii) The Mar Vista Community Council requests the Planning Department provide all information (below), prior to commencing any work on the Community Plan Update process.

These data are prerequisite for meaningful asset-based grassroots planning input to any Community Plan, whether it is for the Westside's first cycle (Palms-Mar Vista-Del Rey, Westchester-Playa del Rey, West Los Angeles Venice) or the second cycle (Westwood, Bel Air-Beverly Crest, Brentwood-Pacific Palisades):

1. *What is the current aggregate population in the Community Plan area?*
2. *What is the projected population in the build-out year? How is it calculated? Who calculates it? Is the U.S. Census used?*
3. *What is the population capacity in the current zoning, including R Zones and C Zones with density bonuses (Transit Oriented Communities (TOC), Expo Station Transit Neighborhood Plan (TNP)) and Accessory Dwelling Units (ADU)?*
4. *What is the population capacity in the proposed zoning, including R Zones and C Zones with density bonuses (TOC, ExpoStation TNP) and ADUs?*
5. *Capacity of jobs or count of jobs currently.*
6. *Change in jobs as a result of proposed zoning, either by increase in C or M Zones or reduction in jobs if C or M Zones are decreased.*

Approved

These two motions relate to the Community Plan update process, and are suggested by WRAC. The first simply requests the timeline be extended. The three years currently proposed is very ambitious; there is concern it cannot be accomplished effectively.

The second requests data. Where will the data be coming from that will be used in their calculations, including housing capacity, population and employment projections? The Community needs to see this data in order that we may follow and properly contribute to the process.

***Motion** (Hruska/Alpern) passes without public or board comment at 9:25pm 10/0/1 (Hanna).*

15.3 [listed as agenda item 15.3, renumbered] Town Hall and Data (Great Streets) – Discussion and possible action regarding a stakeholder petition requesting a town-hall meeting to present the one-year pilot project data for the Venice Blvd. Great Streets Pilot Project and for other related purposes.

Postponed to December 11, 2018 meeting.

16. Adjournment

Meeting adjourned at 9:27pm.

Approved

* ***PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS –*** *The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 3 minutes per speaker, unless adjusted by the presiding officer of the Board.*

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Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, December 11th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the most recent regular meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
        - **10.2.1. Chair** – Elliot Hanna
        - **10.2.2. 1st Vice-Chair** – Rob Kadota
        - **10.2.3. 2nd Vice-Chair** – Mary Hruska
        - **10.2.4. Secretary** – Sara Roos
        - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
        - **10.3.1. Zone 1** – Ken Alpern
        - **10.3.2. Zone 2** – Vacant
        - **10.3.3. Zone 3** – Mary Hruska
        - **10.3.4. Zone 4** – Aaron Elster
        - **10.3.5. Zone 5** – Michelle Krupkin
        - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
        - **10.4.1.** Elections and Bylaws
        - **10.4.2.** Community Outreach
        - **10.4.3.** Transportation and Infrastructure
        - **10.4.4.** Planning and Land Use Management (PLUM)
        - **10.4.5.** Public Health and Safety
        - **10.4.6.** Education, Arts, and Culture
11. **Special Orders –**
    - **11.1. Appointment of Zone 2 Director** – Appointment of a Zone 2 Director in accordance with Article V, Section 6, Subsection C of the Bylaws of the Mar Vista Community Council. The candidates are:
        - Martin Rubin
        - Heather Kamins
    - **11.2. Appointment of Education, Arts, and Culture Committee (EACC) Co-Chair** – Discussion and possible action regarding the appointment of an EACC Co-Chair to fill the vacancy left by the earlier resignation of Paola Cervantes.

11.3. **Approval of Monthly Expense Report (MER)** – Discussion and possible action regarding the MER for October, 2018 and November, 2018.

11.4. **Presentation regarding the Metro Bike Share Program –** Presentation from L.A. Metro regarding its bike share program.

12. **Consent Calendar** – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.
    - 12.1. **P.O. Box Rental -** The Mar Vista Community Council approves an expenditure not to exceed $140.00 for P.O. Box rental at the Mar Vista Post Office.
    - 12.2. **First Aid Supplies** - The Mar Vista Community Council approves a reimbursement of $447.07 to Rob Kadota, for first aid supplies for a scavenger hunt at the Bike Rodeo/Safety Fair held at Richland Elementary School.
    - 12.3. **Farmers' Market Tent Replacement** - The Mar Vista Community Council approves an expenditure not to exceed $400.00 for Farmers' Market Tent replacement.
13. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.
14. **Unfinished Business and General Orders –**
    - 14.1. **City of Los Angeles' Sidewalk Vending Program** – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program (*postponed from 11/13/2018 BoD meeting).*
    - 14.2. **Great Streets Town Hall** – Discussion and possible action regarding a stakeholder petition requesting a town-hall meeting to present the one-year pilot project data for the Venice Blvd. Great Streets Pilot Project and for other related purposes.
15. **New Business –**
    - 15.1. **Coyote Catch-and-Release Proposal** – Discussion and possible action regarding a proposed Coyote Catch-and-Release proposal (CF 16-0585-S2).
    - 15.2. **Zone Director Input for Community Plan** – Discussion and possible action regarding engaging Zone Directors in the process of growing stakeholder participation in updating the City of L.A.'s Community Plan for Palms-Mar Vista-Del Rey.
    - 15.3. **Starbuck's at Palms and Sepulveda Blvds.** - Discussion and possible action regarding a motion passed by Plum in support of the Starbuck's development at Palms and Sepulveda Blvds.
    - 15.4. **Community Impact Statement regarding Recode L.A.** - Discussion and possible action regarding adopting a position regarding the City Planning Department's Policies and Procedures Ordinance being considered as part of the Recode L.A. Plan.
16. **Adjournment**

Bold, underlined text indicates further details available in supplemental materials at meeting.

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Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, December 11th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street | Mar Vista, CA 90066

Approved

1. Call to order

Meeting called to order at 7:08pm

2. Presentation of Flag and Pledge of Allegiance

Ms. Hruska volunteered to lead the Pledge, which was not observed because the flag was absent.

3. Roll Call – Call of the roll and certification of a quorum

Ten members present: Robin Doyno, Aaron Elster, Stacy Shure, Mary Hruska, Elliot Hanna, Sara Roos, Nanxi Liu, Michelle Krupkin, Ken Alpern, Holly Tilson

Absent: Susan Klos (medical emergency); Rob Kadota.

One seat unfilled.

4. Community Memorial Observations

Elster: LA County buried nearly 1500 unclaimed persons on 12/5/18, many from Mar Vista. Janice Hahn commented on the day's pageantry surrounding the death of George H.W. Bush; these people are no less worthy of our recognition.

5. Announcements

Hanna: Notes board members' comments are intended to be a statement and not to open discussion. Time limits will be enforced and multiple statements limited. Public comment will be limited to two minutes.

The limits are an experiment and may be tweaked depending on how this works.

Kathryn Wheeler: Requests MVCC please talk to neighbors before approving a Development such as that for the Eldercare Facility at 11405 West Venice Boulevard. Living in close proximity to the project herself, she and her neighbors were all unaware of the project prior to Thanksgiving. In three hours over 50 signatures collected attest to neighborhood opposition. The Developers claim due-diligence in noticing the neighborhood, and reference MVCC's approval, in their quest to obtain project permits from the City. Yet [Ms. Wheeler states] MVCC's approval was obtained without due neighborhood-diligence; there is considerable opposition.

A petition can be signed online at BionaDrive.org requesting denial of the variance/s. By-right includes 30-35 units; 85 are being requested. Parking will be removed from Venice Boulevard. Dangerous walls are proposed and a loading zone. The window to comment has been extended to 12/21/18. [Response by PLUM Co-chair Shure notes the project was heard at MVCC's PLUM twice and approved on consent at PLUM's recommendation by the full board 9/11/18].

6. Public Comment for Items NOT on This Agenda

None

7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

Alpern – Committee meeting dates, Rubin candidacy.		*Doyno – Homeless Issues Committee issues, Discussion with CD11 about Municipal Code administration.*	
Elster –Zone 2 directorship	*Hanna – Conversations with Rubin, Commins about Zone 2 directorship, EACC appointment*	*Hruska – Zone 2 directorship, Policies/procedures*	
Kadota - absent	*Klos - absent*	*Krupkin – Zone 2 directorship, agenda motions*	*Liu – Zone 2 directorship*
Roos – Zone 2 directorship, neighborhood issues with CD11, stakeholders	*Shure – Zone 2 directorship, Policies/procedures discussion at PLUM and neighborhood meetings. Emails with DCP. Discussion about refreshing the Great Streets meeting.*	*Tilson – Zone 2 directorship, financial information, fall festival monies discussions*	

8. **Adoption of the Agenda**

Two-thirds vote is required here to change the agenda's order of discussion.

Shure: Advance New Business agenda item 15.3 as a courtesy to those present.

Roos: Address New Business agenda item 15.1 sooner than later (as if it were "Old") in consideration of its accidental oversight last meeting.

Krupkin: Reverse the order of Old Business agenda items 14.2 and 14.1 for reasons of timeliness.

***Motion** (Shure/Krupkin) to adopt agenda as amended **passes** without objection 9/0/1 (Hanna) at 7:25pm*

9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the most recent regular meeting of the Board of Directors.

Minutes' reading is waived. Their brevity is noted in the context of being better-termed "hours".

***Motion** (Tilson/Hruska) to adopt the 11/13/18 minutes **passes** without objection 9/0/1 (Hanna) at 7:26pm*

10. **Reports**

10.1. Elected Official and City Department Reports

Hannah Levien (CD11): Mar Vista field representative for Council District 11 member Mike Bonin.

(1) CD11 is looking for ideas and NFP community partners and businesses within Mar Vista to take advantage of a fantastic (citywide) opportunity for partnering with LADOT to obtain some "neat amenities" on our streets. Examples from throughout the City include grants for: plaza parklet (e.g., Silverlake, Sunset Junction), street furniture, decorative crosswalks, pavement mural, intersection murals, bike corrals. CD11 could approach these entities; MVCC board members need not do so directly. It is the ideas for amenities and potential partners that are solicited.

Krupkin: At the Great Streets SubCommittee two years ago, the concept of a "people street" was presented, but it was not a viable option for Venice Boulevard, which was still a State Highway at that time. Since its re-designation some projects might be newly possible, e.g. street furniture, bike corrals if they do not interfere with parking, but still not being a "people street".

Hruska: The proposal is to install amenities in public space that are co-supported by private entities: a "public-private partnership".

Liu: Thinks it's super cool; interesting. What would the financial commitment look like for a business? For a NFP? What would be the benefits? More foot traffic, what else?

Levien: Private entities commit to maintenance, while startup funds and project costs are covered by LADOT. Formerly costs would have been split but this is an outright grant. Benefits include creating gathering space, opportunities for citywide programming, community-building, reimagining the urban landscape as interwoven with the world. Recognition is unclear.

Krupkin: What is the potential "cost" to parking spaces of a bike corral? Parklet?

Levien: 1-2 parking spots.

Approved

(2) Update on the Street Vending Ordinance (State senate bill) that passed with draft regulations at the end of October, 2018. The Board of Public Works couldn't yet take action prior to approval of the draft regulations, which now have passed. Of relevance expressly to Mar Vista is Farmer's Markets (FM), and the concern for competition between vendors within and outside of the market. Street vending will be allowed only beyond 500 ft of the FM.

Opt out clause is not relevant to Mar Vista.

(3) Data on the Great Streets Pilot Project will become available before the New Year. The median between Centinela and Grand View has been landscaped.

10.2. Officer Reports

10.2.1. Chair – Elliot Hanna

Election season is fast approaching. There is discussion from DONE about preparing for elections. Stakeholder-involvement is important; people are themselves encouraged to run, to encourage others and to get behind them. To get out and vote: get involved. All MV stakeholders should be here, but are not.

A stakeholder's letter about the Globe/Tuller encampment was handed to Ms. Levien for written response at the earliest convenience of CD11.

Meeting discussion should be limited to "necessary" points; amendments should be brief, and stated one at a time. There is to be no "point-counterpoint" discussion; statements only and then the meeting "moves on".

10.2.2. 1st Vice-Chair – Rob Kadota

Absent

10.2.3. 2nd Vice-Chair – Mary Hruska

Seeking meeting venues generally, and in particular to merge PLUM with Great Streets in the New Year.

EACC is looking for a new, permanent location.

10.2.4. Secretary – Sara Roos

Two CIS's were filed, and can be tracked online via a google doc linked at the website. It is unclear what happened at November's meeting regarding the request for an independent traffic study. The meeting minutes show confusion that remains unresolved.

10.2.5. Treasurer – Holly Tilson

There is an open slot for outreach at the Farmer's Market this Sunday for any interested Committee or board member who might wish to staff MVCC's booth.

10.3. Zone Director Reports

10.3.1. Zone 1 – Ken Alpern

There is concern among Westside Villagers for the NW corner of Palms/Sepulveda. In conjunction with CD5's guidance, development must mitigate parking, traffic and housing issues, grocery availability. Starbucks' development plans on the SW corner have been responding well to neighborhood concerns of safety and security.

10.3.2. Zone 2 – Vacant

10.3.3. Zone 3 – Mary Hruska

Discussed ameliorating the affect of a resident's activities on their surroundings with Ms. Levien (CD11) and Grand View Boulevard stakeholders. Attended very helpful meetings with Mr. Bartrousef (CD11) planning a parking study which will produce valuable data along a stretch of Venice Boulevard.

Approved

10.3.4. Zone 4 – Aaron Elster

Many stakeholders are reaching out about the eldercare development along Venice Boulevard. The developers did present plans before PLUM twice, and were responsive to PLUM Committee suggestions prior to approval of the development. However now that the project is more visible folks are remarking they are surprised by it. When next there is a big development, what kind of outreach can we do? Currently we're an "opt in" for communications.

We missed reaching a significant portion of the community.

Hanna: This is a recognized problem for Mr. Seretti and the rest of the Outreach Committee; it appears to be systematic.

10.3.5. Zone 5 – Michelle Krupkin

New restaurant Quiadaiyn is now where Canela was. A terrible road accident on the SW corner of Washington Place and Mclaughlin damaged Martin Liquor; the driver was rescued by EMTs. There have been car break-ins, possibly encouraged by valuables left in the car: don't.

10.3.6. Zone 6 – Holly Tilson

Ms. Levien updated the West MV Residents Association (WMVRA) on potential transitional housing at Beethoven/Venice Boulevard. Zone 6's second neighborhood association, WMVNA maintains a Facebook page; WMVRA meets every fourth-Tuesday at Penmar Recreation Center. Zone 6 stakeholders are welcomed at both groups.

10.4. Committee Reports

10.4.1. Elections and Bylaws

The Cmte will meet the fourth Wednesday in January. The upcoming election will take place on June 2, 2019 at the Farmer's Market. There will be no online voting. This election is important and the budget reflects as much. Its administration should be the Outreach Cmte's responsibility, but as well someone not running in the election. Online venues will be setup by DONE – NextDoor, ??. MVCC funds may be used to promote the election but not specific candidates.

Vanessa Serano (DONE): An online link for board members will clarify the election timeline. Candidates' statements will be presentable during a window of time.

10.4.2. Community Outreach

No report

10.4.3. Transportation and Infrastructure

Alek Bartrosousf has been tremendously helpful in the neighborhood facilitating requests and getting many things done – crosswalks, sidewalk improvements; there's nothing to complain about now! It's a good dilemma to have…. Next to consider might be the alleyways, which are being used now as regular thoroughfares.

10.4.4. Planning and Land Use Management (PLUM)

Report is encompassed by tonight's motions.

10.4.5. Public Health and Safety

None

10.4.6. Education, Arts, and Culture

Next meeting at the Coffee Connection

Approved

11. Special Orders –

11.1. <u>Appointment of Zone 2 Director</u> – Appointment of a Zone 2 Director in accordance with Article V, Section 6, Subsection C of the Bylaws of the Mar Vista Community Council. The candidates are:

- Martin Rubin
- Heather Kamins

MVCC's Zone 2 has been vacant since Damien Newton stepped down. The two eligible candidates will speak in the order their candidacy was submitted. The Chair makes an appointment for Board ratification; see MVCC Bylaws.

<u>Marty Rubin</u>: Thanks everyone for their volunteer service. His own application was submitted because there was a shortage of volunteers; with Ms. Kamins' interest he is happy and pleased to throw his support behind Heather and withdraw his application from consideration. Marty is confidant she will perform very well as representative.

<u>Heather Kamins</u>: Was inspired by Marty's newsletter and calls for volunteers. She has lived in Mar Vista for three and a half years, LA for ten. She is a practicing attorney of 15 years, 10+ at Creative Artists. Previously she reported on crime and City administration in Boston, Ann Arbor. She looks forward to exploring prudent, humane solutions to homelessness, crime. She is here to listen and make fair decisions.

<u>Alpern</u>: Observes that one person can make a difference starting by addressing issues right in the neighborhood. Fresh, new perspectives are valuable.

<u>Krupkin</u>: Wonders about disposable time for attorney's on a partner track? Ans: As in-house attorney and VP with a staff and equity, partnership is not an issue and the hours are reasonable. The timing is good and her commitment is intentional. Her personal interest is in the Arts.

<u>Hruska</u>: notes the time commitment requires time-budgeting. Ans: evenings are free, so there is time for committees, writing and multi-tasking.

<u>Shure</u>: Notes the potential for conflicts-of-interest through professional engagement with CoLA. Ans: Any business with CoLA was through a separate, creative division.

<u>Hanna</u>: Ascertains commitment is for the remainder of the term.

*Chair **nominates** Ms. Kamins at 8:14pm*

<u>Alpern</u>: Notes Marty's long-standing and ongoing service to the neighborhood for which we owe a debt of respect and appreciation.

*Motion (Alpern/Roos) **passes** 9/0/2 (Shure, Hanna).*

11.2. <u>Appointment of Education, Arts, and Culture Committee (EACC) Co-Chair</u> – Discussion and possible action regarding the appointment of an EACC Co-Chair to fill the vacancy left by the earlier resignation of Paola Cervantes.

The Chair appoints Mr. Runson Willis. He is a guitarist, with a big following on Facebook. He plays regularly at the Grand View Market. A vibrant Arts Committee can bring the community together, so this appointment is happily anticipated.

<u>Krupkin</u>: Knows his work with Lenore and the Art Walk, as well as events outside this community. She attests to his interest in putting the time forth to support Mar Vista. He will help build more community attention to the Arts here.

<u>Liu</u>: Loves his fantastic local performances.

<u>Roos</u>: notes the importance of retaining interest in Education, without detracting any interest from the Arts.

***Motion** (Shure/Roos) **passes** to ratify the appointment 9/0/2 (Krupkin, Hanna) [Kamins votes on non-fiscal matters] at 8:21pm*

11.3. <u>Approval of Monthly Expense Report (MER)</u> – Discussion and possible action regarding the MER for October, 2018 and November, 2018.

Approved

Tilson: $1797 was spent this month. All were routine monthly expenditures except for children's high visibility vests from Brown/Bigelow. $28,294 remains to be spent. All this is allocated; projects should be competed. Allocations for elections outreach, mailings, door to door deliveries are hard to predict.

Currently funds are not permitted to rollover year to year, but following councilmember Ryu's motion regarding changes to DONE, it is possible up to $10K can be rolled over in the future.

***Motion** (Hruska/Krupkin) **passes** to accept the MER for November 2018 9/0/1 (Hanna)/1 (Kamins) at 8:26pm*

***Motion** (Tilson/Hruska) **passes** to accept the MER for October 2018 9/0/1 (Hanna)/1 (Kamins) at 8:28pm*

11.4. Presentation regarding the Metro Bike Share Program – Presentation from L.A. Metro regarding its bike share program.

Brett Thomas, ThomasBJ@metro.net
Carolyn Mamaradlo, MamaradloC@metro.net

BikeShare is a fleet of bikes available to the public for shared use. They are targeted for shorter trips of 30 minutes or less. This target is based on the willingness of an average person to trade in a car trip for a bike if the trip is under 3 miles. The fleet is intended as an extension of the transit system, to make that first/last mile connection.

Metro is the program's administrators, but it is a public-private partnership (B-cycle), worked via Council offices, LADOT. The program is County-wide, so its bikes can be accessed county-wise, as well as on the westside, all via TAP cards. Passes good for, say, DTLA work on bikes, with the same access as at Venice stations. All service areas are environmentally cleared and analysed for equity.

The bikes were first launched in DTLA with 68 stations, 13 were added throughout LA (NoHo) and now 15 stations are being added in Venice during Spring 2019.

This is a docked system, consolidated in Venice. The system will remain station-based but new technology will enable trips to end at external bike racks.

Alpern: Is a Tap card required? Ans: No, credit/debit will be available on the kiosk.

Pricing is based on mileage $1.75/30 minutes, day-pass is $5.

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. P.O. Box Rental - The Mar Vista Community Council approves an expenditure not to exceed $140.00 for P.O. Box rental at the Mar Vista Post Office.

12.2. First Aid Supplies - The Mar Vista Community Council approves a reimbursement of $447.07 to Rob Kadota, for first aid supplies for a scavenger hunt at the Bike Rodeo/Safety Fair held at Richland Elementary School.

Pulled by Krupkin.

12.3. Farmers' Market Tent Replacement - The Mar Vista Community Council approves an expenditure not to exceed $400.00 for Farmers' Market Tent replacement.

Pulled by Doyno.

***Motion** (Hruska/Roos) to approve consent calendar [item 12.1 only] **passes** 9/0/1 (Hanna)/1 (Kamins) at 8:41pm*

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

13.1. (Agenda item 12.2) First Aid Supplies - The Mar Vista Community Council approves a reimbursement of $447.07 to Rob Kadota, for first aid supplies for a scavenger hunt at the Bike Rodeo/Safety Fair held at Richland Elementary School.

Approved

"Reimbursement" is required because the City credit card did not work; this is not a double-charge. It is unknown whether all supplies were used but turnout at the event was large.

***Motion** (Hruska/Liu) to approve reimbursement **passes** 8/0/2 (Hanna, Alpern)/1 (Kamins) at 8:41pm*

13.2. (Agenda item 12.3) Farmers' Market Tent Replacement - The Mar Vista Community Council approves an expenditure not to exceed $400.00 for Farmers' Market Tent replacement.

Blue tent frame is bent, and cannot be repaired. MVCC bought a new ("white") tent in July, but this is not it; that was for the bike repair stand. The green tent is fine; it is the blue, Council tent that needs repair – as we were warned at the time of the white tent's replacement.

***Motion** (Hruska/Krupkin) to approve tent repair expenditure **passes** 9/0/1 (Hanna)/1 (Kamins) at 8:45pm*

14. Unfinished Business and General Orders –

14.1. City of Los Angeles' Sidewalk Vending Program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program (*postponed from 11/13/2018 BoD meeting).*

***Motion** (Hruska/Roos) **passes** to postpone discussion of this "opt out" clause to the January meeting given the updates from Ms. Levien regarding this State-controlled measure 10/0/1 (Hanna) at 9:18pm*

14.2. Great Streets Town Hall – Discussion and possible action regarding a stakeholder petition requesting a town-hall meeting to present the one-year pilot project data for the Venice Blvd. Great Streets Pilot Project and for other related purposes.

Selena Inouye (introduction): Initially the motion was introduced when there would have been opportunity to meet with LADOT in December, as promised last March.

The motion for a town hall presentation with accountable policy makers (LADOT, Great Streets, Council member) presenting from one, centralized stage, reflects the sentiments of many of the stakeholders who come before MVCC ("majority" sentiment is claimed). The example of VNC's townhall on the controversial Bridge Housing shows policy makers can and should appear for this sort of forum.

Date should be changed to Jan-Feb.

PUBLIC COMMENT

Sheri Odere: Supports the motion because collecting information about the mess at Venice Boulevard will reveal how its problems have spilled over onto surrounding streets (e.g., Centinela). Supporting the motion represents your areas and zones.

***Motion** (Krupkin/Tilson) is made to approve the petition's request for a Town Hall to present Great Streets-Venice Boulevard Pilot Project data.*

BOARD COMMENT

***Motion** (Liu/Alpern) to amend the date to approximately January 26, 2019 **passes** 10/0/1 (Hanna)*

Liu: Agrees there should be a town hall meeting, but suggests enumerated items 1-10 are not facts. They are negative impacts, but causality is speculative.

***Motion** (Liu/Roos) to strike enumerated items #1-10 **fails** 2/8/1 (Hanna)*

PUBLIC COMMENT

Inouye: The motion simply brings attention to the issue; eliminating the enumerated items guts this stakeholder-initiated motion and is inappropriate. But if it is necessary to pass the motion, then OK.

Hanna: The motion has not yet passed so nothing has yet been struck.

Odere: Is "done".

BOARD COMMENT

Approved

Alpern: Is similarly concerned a stakeholder motion cannot be thus-amended, and doing so would be a "slap in the face".

Hanna: Defeating this amendment is important to counter public perception that MVCC does not serve its stakeholders. Approving an amended motion would not be attending to what was asked.

Kamins: agrees that considering an amended stakeholder motion would be inappropriate. Negotiate language that would be more generally acceptable, such as "#1-10 claim to have been experienced" or "have been reported", etc.

Roos: disagrees that amending the language which comes formally from MVCC is disrespectful to stakeholders. Finding an acceptable common denominator for assertions is important.

Krupkin: the itemized list accurately reflects long-expressed ongoing concerns. To strike the list is disingenuous of the Council in claiming they "listen" to stakeholders.

Elster: agrees with Krupkin

Tilson: leaving this language validates the community experience and we must do that.

Hruska: Supports Tilson.

Doyno: amend typo "sent" to "send".

15. New Business –

15.1. Coyote Catch-and-Release Proposal – Discussion and possible action regarding a proposed Coyote Catch-and-Release proposal (CF 16-0585-S2).

Introduction by Roos. Information attached to meeting packet. Retiring council member Englander has reintroduced a resolution to investigate discredited catch-release techniques that were just extensively investigated by City departments resulting in 30+ pages of analysis and suggestions. These should be first implemented, though money is required budgeted for the purpose from City Council. In the meantime, in conjunction with the MVCC's Public Safety Committee, we can raise public consciousness of City recommendations, which include "hazing" and human behavior-modification.

Tilson: Catch-release is popular among some stakeholders; even shooting the coyotes. What about these measures? Ans: Catch-release just displaces the problem temporarily, and to another populace. Shooting coyotes is illegal. There is extensive documentation of this referenced in the informational.

Doyno: – Agree previous CoLA research and recommendations should be respected.

***Motion** (Roos/Tilson) **passes** to oppose catch-release CoLA resolution 11/0/0 at 8:26pm*

15.2. Zone Director Input for Community Plan – Discussion and possible action regarding engaging Zone Directors in the process of growing stakeholder participation in updating the City of L.A.'s Community Plan for Palms-Mar Vista-Del Rey.

Hruska: Requests to postpone this item to January BOD meeting (9:19pm)

15.3. Starbuck's at Palms and Sepulveda Blvds. - Discussion and possible action regarding a motion passed by Plum in support of the Starbuck's development at Palms and Sepulveda Blvds.

Introduction by Shure. Doug Kipper presented the project at PLUM and twice before at Zone 1 HOA. States the project is "beautifully landscaped", doesn't infringe on the neighborhood, intentionally places signage so as not to block traffic. Hours will be the same as Coffee-Bean (early morning to midnight) on the NE corner although permit is for 24/7 operations. Deliveries after closure to avoid traffic. The neighborhood is happy to see this amenity developed.

Kathryn Wheeler: Outreach may have been similarly inadequate as for the Venice Boulevard eldercare project. Some stakeholders did not hear of this project and the presentations are from only the builders' perspective. Neighbors feel out of the loop.

Shure: The presentation was before the annual HOA meeting, there were public signs, emails, notices; two presentations. Noone present objected and there was much footwork in advance of the presentations.

Approved

Alpern: The issue of ingress and egress at this corner has been very sensitive; Ms. Shure will have been very skeptical in her questions. Still it is bad to be the "last to know". There is a lot of information being passed in fliers, etc; it's easy to miss things.

Roos: agrees that while HOA may have been involved, yet this is a select group and still many immediate neighbors are demonstrably disenfranchised.

***Motion** (Shure/Alpern) **passes** to support the {Palms/Sepulveda} Starbucks project 9/0/2 (Hanna, Tilson)*

15.4. Community Impact Statement regarding Recode L.A. - Discussion and possible action regarding adopting a position regarding the City Planning Department's Policies and Procedures Ordinance being considered as part of the Recode L.A. Plan.

Introduction by Hruska. Policies and procedures ordinance CF 12-0564 ("P/P"), is part of re:CODE LA, currently before CoLA LUPC; it is not currently slated for a full City Council vote. Its impact is potentially significant to our Planning and decision process, yet it is not being conveyed to the public adequately or properly.

In contrast CF 12-0460-s4 is part of a comprehensive effort to amend city laws and regulations governing future land use for CoLA. But this P/P document is over 940 pp and cannot be comprehended by laymen, around the holidays, in so little time. The request is to delay public consideration for at least 90 days from January 1, 2019 to allow stakeholders and the MVCC adequate time to analyze the important ordinance.

PUBLIC COMMENT

Kathryn Wheeler: Indeed this huge; thanks for the effort to postpone its consideration.

BOARD COMMENT

Roos: This is a "total go" – a job for the CIS under the circumstances.

***Motion** (Shure/Alpern) **passes** to approve a CIS and letter requesting extension of the comment period for the P/P 10/0/1 (Hanna).*

16. Adjournment

Meeting adjourned at 9:23pm

Approved

Bold, underlined text indicates further details available in supplemental materials at meeting.

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Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, January 8th, 2019, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the most recent regular meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
        - **10.2.1. Chair** – Elliot Hanna
        - **10.2.2. 1st Vice-Chair** – Rob Kadota
        - **10.2.3. 2nd Vice-Chair** – Mary Hruska
        - **10.2.4. Secretary** – Sara Roos
        - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
        - **10.3.1. Zone 1** – Ken Alpern
        - **10.3.2. Zone 2** – Heather Kamins
        - **10.3.3. Zone 3** – Mary Hruska
        - **10.3.4. Zone 4** – Aaron Elster
        - **10.3.5. Zone 5** – Michelle Krupkin
        - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
        - **10.4.1.** Elections and Bylaws
        - **10.4.2.** Community Outreach
        - **10.4.3.** Transportation and Infrastructure
        - **10.4.4.** Planning and Land Use Management (PLUM)
        - **10.4.5.** Public Health and Safety
        - **10.4.6.** Education, Arts, and Culture
11. **Special Orders –**
    - **11.1. Approval of Monthly Expense Report (MER)** – Discussion and possible action regarding the MER for November, 2018.
    - **11.2. Approval of Monthly Expense Report (MER)** – Discussion and possible action regarding the MER for December, 2018.
    - **11.3. Presentation from Bryce Fluellen from LADOT** - Presentation regarding the City of Los Angeles Department of Transportation's Microtransit Program.

11.4. Presentation from Ami Fields-Meyer, Office of Mayor Eric Garcetti – Mr. Ami Fields-Meyer serves as Mayor Garcetti's representative in West Los Angeles. Prior to joining the Mayor's office, Ami served as Communications Director for Assemblyman Jesse Gabriel and completed the Coro Fellowship in Public Affairs. He has written about issues of public policy, religion, and civil rights for The Atlantic, Talking Points Memo, and The Forward.

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

14. Unfinished Business and General Orders –

14.1. City of Los Angeles' Sidewalk Vending Program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program (*postponed from 12/11/2018 BoD meeting).*

14.2. Zone Director Input for Community Plan – Discussion and possible action regarding engaging Zone Directors in the process of growing stakeholder participation in updating the City of L.A.'s Community Plan for Palms-Mar Vista-Del Rey (*postponed from 12/11/2018 BoD meeting*).

15. New Business –

15.1. Stakeholder Petition Regarding Venice Blvd. – Discussion and possible action regarding a stakeholder petition pertaining to the "Venice Blvd. Great Street."

15.2. Storage Unit Burglary – Discussion and possible action regarding the January 2, 2019 burglary at the MVCC storage unit located at Storquest on Sawtelle Blvd. in Mar Vista.

15.3. Independent Traffic Study (Great Streets) – Discussion and possible action regarding an item - requesting a community panel and an independent traffic study of the Venice Boulevard Great Street project - amended at the 11/13/2018 BoD meeting and committed to the Great Streets Subcommittee.

16. Adjournment

Bold, underlined text indicates further details available in supplemental materials at meeting.

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Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, January 8th, 2019, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. Call to order

Meeting called to order at 7:08pm.

2. Presentation of Flag and Pledge of Allegiance

Mary Hruska led the Pledge.

3. Roll Call – Call of the roll and certification of a quorum

Present: Holly Tilson, Nanxi Liu, Sara Roos, Elliot Hanna, Mary Hruska, Rob Kadota, Stacy Shure, Heather Kamins, Susan Klos, Robin Doyno (Quorum met)

Absent: Ken Alpern (arrived at 7:27pm), Michelle Krupkin (arrived at 7:11pm), Aaron Elster

4. Community Memorial Observations

~ none

5. Announcements

~ none

6. Public Comment for Items NOT on This Agenda

Damien Newton: Here to talk about Thursday/Monday; there will be a teacher's strike. The most obvious way to support it is to go to a picket line. Call the school office to request the contact information of the Union rep; or go to the picket line directly. Teachers will be denied access to school facilities, which is typical of any strike; call and offer your help – there's a lot that folks can do. For example there will be a self-run coop for Richland families, and others north of National. These plans are replicable; ask.

Hard to get attention but if anyone wishes to know more he'll help. He has information for waivers, and other ways to support public education school teachers.

Eliander Gonzalez: Launched a NFP in Elysian Valley. Concerned with the impact of high end luxury developments; he proposes building ADUs (Accessory Dwelling Units) through this NFP in conjunction with Genesis LA (another NFP). General contractor will be Restore Neighborhood LA. Also teaming up with St. Joseph, and LA County housing in Sacramento Valley. They offer landlord training and information on tenants' rights. They offer low-cost design services and access to financing, though the pilot for financing closes January 15, 2019. Those with their own financing are welcome at any time.

LAC is (was) giving out $75K. This initiative is conducted through CoLA's innovation team in the Housing Office; it is the first project coming out of this Office. In conjunction with Great Streets LA.

Krupkin: What other Great Streets are involved?. Ans: Reseda, Northridge (half-half between Lowers and Third), Wilmington (small business support program), Avalon.

Created were: Bus shelters with shading; Dining table with shade. A District was created through plantings and Palm Trees.

Draft

¿How was this funded? Ans: Through Great Streets; half-half via CD4 and CD10. Others initiatives are temporary; Northridge, for example, was temporary only.

Kalani Whittington: Calls for more common sense in approaching social problems. Tells of older shopper whose offer of change to a "gang" of older people was refused because it was insufficient to purchase a hamburger. A former PNC member out walking a dog was attacked by a homeless person. The proliferation of homeless encampments is overwhelming; people have boo'd Mayor Garcetti showing they have had enough. Common sense has been replaced by too much empathy.

Mar Vista is bearing the burden of too many homeless encampments; Koretz' CD5 has fewer. Too much money is being spent on appealing housing rather than minimal shelter. Not everyone can afford the City; land is ample in Palmdale.

Selena Inouye: Concerned about Committees not meeting, in particular: Elections/bylaws, Outreach. Monthly committee attendance, posted agendas, minutes are all Board responsibilities. And community participation is hard to encourage without regular scheduling.

> *Hanna: shares these concerns and notes the Chairs of the mentioned committees have now scheduled meetings.*

Robin Doyno: Homeless Count will start in Mar Vista on Wednesday, Jan 23. 20 more people than last year (80 for 2019) are being requested to help. There will be phenomenal snacks. Sign up through lahsa.com.

Marty Rubin: Agrees with the concerns regarding MVCC functionality. Considers homelessness a local problem that should be addressed nationally by the Federal Government.

7. Ex-Parte Communications and Conflicts-of-Interest - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

Hanna: Please indicate any communications that have occurred outside of the public view.

<table>
<tr><td colspan="2">Alpern –preparations for T/I Cmte Mtg</td><td colspan="2">Doyno –communications re board members opting out of paper handouts.</td><td>Elster –absent</td></tr>
<tr><td colspan="3">Hanna – Discussed items 14.1, 14.2 and all under 15 with a couple board members only for the purpose of ascertaining intent of items to be agendized</td><td>Hruska – Conversations with board members around the Community Plan</td><td>Kadota - none</td></tr>
<tr><td>Kamins - none</td><td>Klos - none</td><td colspan="2">Krupkin – Discussion of agenda items; Venice Blvd at VNC parking/ transportation cmte mtg. Conversation regarding storage unit burglary.</td><td>Liu – none</td></tr>
<tr><td>Roos – none</td><td colspan="2">Shure – Communications with Kroger Corporate Office, Ralph's shopping center's landlord about being an "angel lot". Kroger's enthusiastic. Attended WRAC-PLUM, meetings with Planning Department personnel.</td><td colspan="2">Tilson – board member communications about agendized items.</td></tr>
</table>

8. Adoption of the Agenda

Adopted without objection at 7:34pm

9. Reading and Approval of Minutes – Reading and approval of the minutes from the most recent regular meeting of the Board of Directors.

***Motion** (Hanna/Krupkin) to move to end of the meeting the reading and adoption of the 12/11/18 minutes **passes** with 2/3 vote of 8/4 (unkn)/1 (Hanna) at 7:38pm*

10. Reports

10.1. Elected Official and City Department Reports

CD11 Field Deputy Hannah Levien: City Council returns to session on January 15, 2019; legislative updates will resume at that time.

Draft

Update on 405 encampment: Plice are there now, and will be on a weekly basis. Sanitation will drop off orange bins in the summer. Many conversations with HIC have resulted in this system which will be more effective than is happening currently.

Traffic control. Turn signal at Sawtelle/Palms is funded, with the help of Windward. Turn signal at Venice/Wade is completed. More stop signs at Charnock/Victoria [? These are parallel streets]. Speed hump program starts next month. Continental crosswalks to be installed on Centinela south of Venice.

Street applications for improvements are due at the end of January. Not just bike corrals, but artist's murals, street furniture, LA-MAS (Gonzalez' public comment above) – type propositions.

Krupkin: Why is the left signal at Venice/Wade unusual; it's a stick, not on a pole. Ans: will be asked of Alek.

What is the funding source for the string of lights between Centinela and Grand View; are they permanent? Ans: Great Streets, installation length TBD.

Tilson: Left-turn signal on wade should mitigate safety but what will relieve the traffic along Wade? Cars are side-swiped; the street is too narrow for two lanes. Ans: First the intersection is being addressed, next steps next.

Hanna: Traffic concerns can be addressed to Albert.Olson@marvista.org, Chair of Traffic Liaison committee.

Alpern: Attention and clean up efforts are transient; what is the long-term plan, what to tell constituents? Ans: CoLA model is "Housing First". This is the only way out from under lawsuits, and the venue for reaching those in need of services. But the City cannot force people to go somewhere; folks have been unhoused a long while and there are many reasons and different motivations and types of people underlying the problem. Cleanups simply force ADA compliance; supportive housing and services provision is harder. The City is trying.

Shure: Will a lane be designated for dedicated right turns from Palms northbound on Sawtelle? Will traffic signals at Palms/Sawtelle be coordinated with Palms/Sepulveda? Ans:will check with Mo/Rudy at LADOT.

Ami Fields-Meyer: See below agenda item 11.4

DONE representative Vanessa Serrano: DONE fliers are available for distribution among local organizations interested in the NC system. It is helpful to identify locations to recruit the interested (e.g. library). Empowerment 2.0 for young women seeks to empower youth through the NC system. For West Region 11 these workshops are held successive Saturdays, starting February 16, 2019, 1-3pm.

Election Date is June 2 2019. Filing period lasts 30 days from February 17 - March 19, 2019. There is time yet for a "NC 101" presentation through Faith-based organizations, schools, NFP to interest people and recruit them to apply.

10.2. Officer Reports

10.2.1. Chair – Elliot Hanna

Committees behind with minutes will not have motions heard at the full Council.

10.2.2. 1st Vice-Chair – Rob Kadota

Cataloguing the storage unit burglary; more items have turned up missing. Communications are between City, DONE, insurance, LAPD, Chair.

10.2.3. 2nd Vice-Chair – Mary Hruska

Working with Committees on permanent meeting venues.

Draft

10.2.4. Secretary – Sara Roos

Read statement (disallowed by Chair) concerning lack of Council communications, cooperation, cohesion, respect; desire to step away from position if there is no accountability or improvement.

10.2.5. Treasurer – Holly Tilson

Still working on the funding of neighborhood watch signs.

10.3. Zone Director Reports

10.3.1. Zone 1 – Ken Alpern

Big projects: It's unknown what will go in at Palms/Sepulveda. Google will take over Westside Pavillion.

10.3.2. Zone 2 – Heather Kamins

Learning the new Zone, meeting with stakeholders.

10.3.3. Zone 3 – Mary Hruska

Nothing new to report.

10.3.4. Zone 4 – Aaron Elster

~ absent

10.3.5. Zone 5 – Michelle Krupkin

The former 99-cent store is being taken over by Little Fatty and Accomplice. Louie's will be occupied by a German gastro pub soon [per Levien]. Some business owners inquired about the light string along Venice Blvd's median. Crime and carport burglaries are of ongoing concern.

10.3.6. Zone 6 – Holly Tilson

Issues of concern remain: crime, tire slashings, cars "keyed", break-ins, traffic. SLO Acosta is scheduling a meeting with WMVRA. The proposed supportive housing at Venice/Beethoven is of concern – will the building become four stories? When will the community learn more of the process?

10.4. Committee Reports

10.4.1. Elections and Bylaws

~ none

10.4.2. Community Outreach

Meetings will resume this month.

10.4.3. Transportation and Infrastructure

February's T/I and Community Plan meeting will be combined; hopefully with enough time for both on the same evening.

Great Streets may shift February's schedule to accommodate the Bird rep. Item 15.3 below is a report-back of requested data.

Draft

10.4.4. Planning and Land Use Management (PLUM)

January's meeting was cancelled because downtown PLUM cancelled their last three meetings and there is no new news on the Policies/Procedures resolution.

Considering the process and format for submitting Community Plan "input".

10.4.5. Public Health and Safety

December's were abbreviated meetings. Ciclavia will return Sunday, March 3, 2109: CC meets MV and Palms – get your bike to the Farmer's Market where Mike will tune it up.

Emergency and Public Safety committee meetings will merge; MV Mobility will remain separate. More can be accomplished with fewer meetings and resulting concentrated participation.

10.4.6. Education, Arts, and Culture

Friday's informational meeting is cancelled.

Krupkin: one painted utility box sports a curse word. Akbay will coordinate with Great Streets in rebranding the boxes to say "MVCC".

Levien: Augmentation of the utility boxes by their designated original artist are permitted. The conversation about art and utility boxes will continue with EACC, Great Streets and also Art Walk. The public art is exciting but issues of "standards" are not being ignored.

11. Special Orders –

11.1. Approval of Monthly Expense Report (MER) – Discussion and possible action regarding the MER for November, 2018.

November's MER was approved via Treasurer's report as the official MER was not available in time. The numbers are hand-transcribed from DONE's dashboard and are not automatically populated, but differ only in a slight lag period which is inconsequential.

***Motion** (Roos/Krupkin) to approve the Treasurer's excellent bookkeeping for both November, 2018 and December, 2018 **passes** 11/0/1 (Hanna)*

11.2. Approval of Monthly Expense Report (MER) – Discussion and possible action regarding the MER for December, 2018.

See above.

11.3. Presentation from Bryce Fluellen from LADOT - Presentation regarding the City of Los Angeles Department of Transportation's Microtransit Program.

Fluellen is replaced by Ms Echeverria with DOT.

"LA Now" is a new "microtransit" service for Palms-MV-Venice-Del Rey. Partnering with NFP "Motive", it will launch March 4, 2019 with free rides until March 31 to create ridership and get awareness out. 6 buses will operate M-F during peak hours, 6am-7pm. Buses are ADA compliant with 2 wheelchair accessible seats of 14 total. Fare will be $1.50 for adults $0.75 for students/children and seniors.

Rides are reserved online like ride sharing services Uber/Lyft, or also via phone using a debit or credit card. A debit card will be available for those without any banking service. There are three permanent stops within the operational footprint: Expo-Palms, Abbot Kinney, MV Gardens. There are 37 "virtual" stops. A rider is directed to the nearest of these for pickup.

Hanna: Disabled persons may find the pickup points too inaccessible or distant. The hours are limited.

Paratransit service is still offered for the population unable to use pickup spots.

Draft

This pilot will determine popularity and ridership needs. Also safety of pickup spot.

Krupkin: Given the mixture of permanent stops and also virtual ones, how can rider judge timing?

App will manage and limit things, with estimate of exact dropoff time calculated.

Krupkin: Additional Expo stops are encouraged – Bundy and/or Sepulveda.

The stops must be in LA, not CC or SM – Sepulveda could therefore work.

Alpern: Better connectivity to Expo has been a problem for the last ten years. The map of virtual stops seems to exclude MV.

Virtual stops were generated from trip and pedestrian patterns. These potential stops are temporary; they can be altered as needs become clearer in reality. There is no fixed route.

Tilson: Grand View and Inglewood stops along Venice Boulevard would reflect common destinations of the Post Office and Library.

The app will record popularity and generate feedback to inform better decisions regarding stop locations.

Alpern: Zone Directors must help get the work out about this service and its app.

Shure: What about folks adjacent to service area?

They will be directed to a virtual stop within the service boundary.

Tilson: Where are drop off points? Ans: anywhere.

Kalani Whitington: Not sure this cost is enticing enough to "leave the tank at home".

11.4. Presentation from Ami Fields-Meyer, Office of Mayor Eric Garcetti – Mr. Ami Fields-Meyer serves as Mayor Garcetti's representative in West Los Angeles. Prior to joining the Mayor's office, Ami served as Communications Director for Assemblyman Jesse Gabriel and completed the Coro Fellowship in Public Affairs. He has written about issues of public policy, religion, and civil rights for The Atlantic, Talking Points Memo, and The Forward.

Presented as past of agenda item 10.1 at 7:57pm

Daniel Tam has moved to LADWP; Mr. Fields-Meyer is now in the second month as Mayor Garcettis' West representative. This area incorporates all of CD11 and the non-Valley portion of CD5. Traffic is an issue of foremost importance everywhere.

Mayor and CoLA have launched the "Shake Alert" app for notification of EQs after-the-fact. This is NOT an early-warning, prediction utility.

There is a new office within the Mayor's called "MOCHA", a City initiative for homelessness run by the new Deputy Mayor, Kristina Miller.

Happy to meet with anyone individually about matters of concern.

Krupkin: Looking forward to communication with Great Streets.

Alpern: The Mayor is Far Away, so better communications is appreciated.

Tilson: It would be helpful to hear the Mayor's plan on homelessness perhaps via a Town Hall.

Happy to present to neighbors.

Kadota: WRAC has considered such an event for all WLA

Hruska: Welcome, and please attend as many BoD meetings as possible!

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

Draft

14. Unfinished Business and General Orders –

14.1. City of Los Angeles' Sidewalk Vending Program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program (*postponed from 12/11/2018 BoD meeting).*

Introduction: Hruska. This motion was postponed from the November, 11, 2018 meeting. In April, 2018 CoLA approved a sidewalk vending program that removed the criminality associated with vending and regulated the practice. The original motion included an "opt out" clause but was changed to incorporate an "alert" and petition/appeal system. The motion requests restoration of the original "opt out" concept, but locality isn't specified.

Kamins: requests the original language.

PUBLIC COMMENT:

Kalani Whitington: Recognizes the good work of westside councilmen Bonin and Koretz, and acknowledges the override by eastside council members. Currently a company is encouraging illegal street vending on Sawtelle and Sepulveda by trucking in supplies, creating miniature restaurants. We would support our brick/mortar businesses by prohibiting this activity.

BOARD COMMENT:

***Motion**(Hruska/Alpern) to approve.*

Liu: Are specific streets involved? Ans: The "opt out" would potentially apply only to areas where street vending was not otherwise specifically excluded.

Levien: The opt out clause did not pass. Currently there are no plans to reintroduce it. The measure will be reconsidered in a year. If it does come back it will likely look something like a signed petition that shows available frontage.

Shure: This is moot?

***Motion** (Shure/Roos) to postpone indefinitely **passes** without objection at 9:04pm*

14.2. Zone Director Input for Community Plan – Discussion and possible action regarding engaging Zone Directors in the process of growing stakeholder participation in updating the City of L.A.'s Community Plan for Palms-Mar Vista-Del Rey (*postponed from 12/11/2018 BoD meeting*).

Co-chairs Shure and Hruska are setting up meetings with Zone Directors to address two fliers in meeting packet. Please email availability to assist in scheduling.

Community input must be submitted to DCP by early March.

Kadota: a variety of voices, not just those of Zone Directors, is optimal – attendance at these meetings from one and all is encouraged! Neighborhood associations, for example, block captains.

15. New Business –

15.1. Stakeholder Petition Regarding Venice Blvd. – Discussion and possible action regarding a stakeholder petition pertaining to the "Venice Blvd. Great Street."

Introduction: See Meeting Packet, Selena Inouye. MVCC bylaws require just 10 signatures in order to submit a motion. The last such petition was submitted in November, 2018, heard in December 2018. There is no requirement for "different" people to sign [from former petitions?]. Objections to this policy must be addressed via changing the bylaws.

This motion is about process at its core. The process that initially was laid out is not what's happening today; the collaboration proposed in 2014 has fallen apart. The Mayor's representative has not attended Great Streets ad hoc Cmte meetings. When cm Bonin released a video on Sept 20, that shouldn't have been the first notice Mar Vista had of what he was going to say; there should have been advance discussion.

Draft

This motion is very similar to what passed at LANC last Saturday [1/5/19]. If there are going to be road diets (RDs) in pace, NC need to be part of a planning and implementation process. We do not know how decisions were made regarding the Venice Boulevard pilot project.

It might be sensible to agendize this motion together with discussions at the upcoming scheduled meeting between CD11 representatives and Hanna and Kadota.

Hanna: Would it be acceptable to agendize this motion for February instead? Note that special meetings are hard to schedule.

Innoye: There's a difference between reporting and discussion; a working group can bring expertise to the discussion. So this motion requests something different….

PUBLIC COMMENT:

Kalani Whittington: The lines are still visible on Highland Avenue in Manhattan Beach/Marina from the removed Great Streets Project there. Residents of these affluent communities were able to quickly reverse the road reconfiguration, though at great cost. Mar Vista continues to endure the devisiveness which was supposed to have been just one year in duration.

Krupkin: Clarifies that the Marina Del Rey project was not a Great Streets project.

Sheri Odere: Expresses frustration with the video release date right before the holidays when people are busy. It feels like a deliberate attempt to avoid attention. But neighbors are discontented, fighting, trapped by immobile traffic, increased crime, multiple accidents; it feels like the council member is shoving through this project without listening to the people who live with it.

BOARD COMMENT:

Hanna: approves of "accountability" and yet notes that a letter was just sent from MVCC to the council office. It's not productive to inundate anyone without an opportunity to respond to the first letter. The frustration is understandable but the Council should behave as it would have others treat us. Another such motion in the future might be reasonable but first, time should be reserved for a proper response.

Kamins: A Town Hall would be a good solution and provide facts and data and allow expression of actual concerns. There is sympathy for the feelings but considers it sensible to hold off awaiting a response.

Kadota: agendizing for the following month makes sense.

Hruska: Thinks this request needs to be sent as well but is willing to wait until after the meeting with CD11

Roos: It seems expedient to fold together these discussions.

Krupkin: CD11 released this video five days before Christmas, without raw data, no analysis, no outreach for feedback; just an "everything-is-wonderful" video. The upcoming meeting is encouraging, but this request is for a direct comparative analysis and the community's request for this has not been acknowledged.

Alpern: Timing rather than the content of the motion is what is of concern, apparently. But the release of this video appeared to be in response to MVCC's previous motion. A two-way discussion has not occurred.

Tilson: What's the likelihood of a Town Hall still? When will we know? Is this impending scheduled meeting a substitution? Stakeholders would respect a delay in this motion, however, under the circumstances.

Hanna: The meeting is to advocate the Council's position, but what will be offered is unknown.

***Motion** (Hruska/Kamins): call a special meeting to address the outcome of the imminent CD11 meeting and this motion exclusively.*

> *PUBLIC COMMENT:*
>
> *Inouye: The proposed independent traffic study should be included in discussion as well.*
>
> *Hanna: A weeknight would be preferable but perhaps approximately Saturday, 1/26/19 – dependent on venue.*
>
> *Motion **passes** (10/1 (Kadota) /1(Hanna) [**Klos departed at 9:10**, absent from this vote]*

Draft

15.2. Storage Unit Burglary – Discussion and possible action regarding the January 2, 2019 burglary at the MVCC storage unit located at Storquest on Sawtelle Blvd. in Mar Vista.

The MVCC storage unit on Sepulveda beneath the freeway interchanged was burgled from a passageway inside the unit's building. Audio equipment was stolen; see meeting packet. Initial police report estimated $1500 in loss but a more thorough inventory is forthcoming. Replacement costs are estimated at over $3,000

Kadota: large ticket items include Honda generator, Apple ipad, Mevo. We are short on microphones – large ticket items, Honda generator. Apple ipad and mevo. They are lost. We can scrape by but we're short microphones, they took our large roller box of eqpt which they used to carry stuff out. We can buy low cost alternatives, might be easier … so there are replacement options.

Elliot to Serrano – from insurance, city is beneficiary of the insurance. Is the city going to give us the money? Will replacement have to come from regular budget?

15.3. Independent Traffic Study (Great Streets) – Discussion and possible action regarding an item - requesting a community panel and an independent traffic study of the Venice Boulevard Great Street project - amended at the 11/13/2018 BoD meeting and committed to the Great Streets Subcommittee.

Postponed by adjournment to 2/12/19

16. Adjournment

Meeting adjourned at 9:33pm

Bold, underlined text indicates further details available in supplemental materials at meeting.

Draft

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Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, February 12th, 2019, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the most recent regular meeting(s) of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
      - **10.2.1. Chair** – Elliot Hanna
      - **10.2.2. 1st Vice-Chair** – Rob Kadota
      - **10.2.3. 2nd Vice-Chair** – Mary Hruska
      - **10.2.4. Secretary** – Sara Roos
      - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
      - **10.3.1. Zone 1** – Ken Alpern
      - **10.3.2. Zone 2** – Heather Kamins
      - **10.3.3. Zone 3** – Mary Hruska
      - **10.3.4. Zone 4** – Aaron Elster
      - **10.3.5. Zone 5** – Michelle Krupkin
      - **10.3.6. Zone 6** – Holly Tilson
    - **10.4. Committee Reports**
      - **10.4.1.** Elections and Bylaws
      - **10.4.2.** Community Outreach
      - **10.4.3.** Transportation and Infrastructure
      - **10.4.4.** Planning and Land Use Management (PLUM)
      - **10.4.5.** Public Health and Safety
      - **10.4.6.** Education, Arts, and Culture
11. **Special Orders**
    - **11.1.** **Discussion of the Venice Blvd. Reconfiguration** – Eric Bruins, CD11 Transportation Deputy, will discuss and entertain questions regarding LADOT's recent recommendation to make permanent the Venice Blvd. reconfiguration.
      - **11.1.1.** Presentation from Mr. Bruins
      - **11.1.2.** Public Comment with regard to Mr. Bruins' presentation.
      - **11.1.3.** Board discussion and possible action regarding Mr. Bruins' presentation.
    - **11.2.** **Presentation from Community Art Machine** – Short presentation from Kimberly Karukoh regarding the Community Art Machine's ongoing projects.

11.3. **Preparations for MVCC Election** – Discussion and possible action regarding preparations for the 2019 MVCC election including a change of venue to the Mar Vista Recreation Center.

12. **Consent Calendar** – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. **[ADMINISTRATIVE] Monthly Expenditure Report –** Approval of the Monthly Expenditure Report for January, 2019

12.2. **[FUNDING] [ExFin] Board Member Reimbursement** - The Mar Vista Community Council approves a reimbursement in the amount of $53.73 to Elliot Hanna for copies made for the December 11, 2018 Board of Directors' meeting.

12.3. **[FUNDING] [ExFin] Board Member Reimbursement** - The Mar Vista Community Council approves a reimbursement in the amount of $3.22 to Elliot Hanna for copies made for the December 11, 2018 Board of Directors' meeting.

12.4. **[FUNDING] [ExFin] Minutes Writer** – The Mar Vista Community Council approves an expenditure not to exceed $500.00 for the services of a minutes writer for Board of Directors' meetings.

13. **Excluded Consent Items** – Discussion and further action on items excluded from the Consent Calendar.

14. **Unfinished Business and General Orders –**

14.1. **[POLICY] Stakeholder Petition Regarding Venice Blvd.** – Discussion and possible action regarding a stakeholder petition pertaining to the "Venice Blvd. Great Street."

14.2. **[POLICY] [Great Streets] Independent Traffic Study** – Discussion and possible action regarding an item - requesting a community panel and an independent traffic study of the Venice Boulevard Great Street project - amended at the 11/13/2018 BoD meeting and committed to the Great Streets Subcommittee.

15. **New Business**

15.1. **[POLICY] [Roos] Community Impact Statement regarding public education funding** - Discussion and possible action regarding a community impact statement supporting funding California public schools at a level at or above the national average.

15.2. **[POLICY] [Great Streets] ADA Evaluation of Venice Blvd. -** The Mar Vista Community Council (MVCC) supports an independent Americans with Disabilities Act (ADA) evaluation of the Great Street Venice Boulevard Pilot Project.

16. **Adjournment**

Bold, underlined text indicates further details can be found in supplemental materials available at the meeting.

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Mar Vista Community Council

AGENDA

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, August 14th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

1. **Call to order**
2. **Presentation of Flag and Pledge of Allegiance**
3. **Roll Call** – Call of the roll and certification of a quorum
4. **Community Memorial Observations**
5. **Announcements**
6. **Public Comment for Items NOT on This Agenda**
7. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
8. **Adoption of the Agenda**
9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the July 10, 2018 meeting of the Board of Directors.
10. **Reports**
    - **10.1. Elected Official and City Department Reports**
    - **10.2. Officer Reports**
      - **10.2.1. Chair** – Elliot Hanna
        - **10.2.1.1. Disclosure regarding board member training expirations**
        - **10.2.1.2. Disclosure regarding a complaint of alleged discrimination**
      - **10.2.2. 1st Vice-Chair** – Rob Kadota
      - **10.2.3. 2nd Vice-Chair** – Paola Cervantes
      - **10.2.4. Secretary** – Sara Roos
      - **10.2.5. Treasurer** – Holly Tilson
    - **10.3. Zone Director Reports**
      - **10.3.1. Zone 1** – Ken Alpern
      - **10.3.2. Zone 2** – Damien Newton
      - **10.3.3. Zone 3** – Mary Hruska
      - **10.3.4. Zone 4** – Aaron Elster
      - **10.3.5. Zone 5** – Michelle Krupkin
      - **10.3.6. Zone 6** – Holly Tilson

10.4. Committee Reports

10.4.1. Elections and Bylaws

10.4.2. Outreach

10.4.3. Transportation and Infrastructure

10.4.4. Planning and Land Use Management

10.4.5. Public Health and Safety

10.4.6. Education, Arts, and Culture

11. Special Orders –

11.1. Presentation from Emily Gable, Los Angeles Department of City Planning – Introduction of the Westside Community Plan Update team and discussion regarding the city's overall three-year work program and outreach strategy.

11.2. Liaison appointments – Discussion and possible action regarding appointments to liaison committees.

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. Re-approval of the June, 2018 Monthly Expense Report - Review and re-approval of the Monthly Expense Report for June, 2018.

12.2. Re-approval of the Budget for FY2018-2019 – Review and re-approval of the budget adopted at the July, 2018 meeting due to mover ineligibility.

12.3. Review and approval of Monthly Expense Report – Review and approval of the Monthly Expense Report for July, 2018.

12.4. Re-approval of June, 2018 funding items – Review and re-approval of funding items for FY2018-2019 totaling $15,291 for meeting rooms, property storage, clerical services, and other purposes.

12.5. Review and approval funding items – Review and approval of August, 2018 funding items including

12.5.1. Outstanding invoices - Payment of outstanding invoices (details available at meeting).

12.5.2. North Westdale Neighborhood Association Block Party – The Mar Vista Community Council appropriates $300 for the purpose of conducting outreach at the North Westdale Neighborhood Association's Fall, 2018 Block Party

12.5.3. Westdale Neighborhood Association Block Party – The Mar Vista Community Council appropriates $300 for the purpose of conducting outreach at the Westdale Neighborhood Association's Fall, 2018 Block Party

12.5.4. Printing expenses for the Mar Vista Art Walk – The Mar Vista Community Council appropriates up to $500 per quarter ($2,000 total) for printing expenses for the Mar Vista Art Walk, including the all-day Small Business Saturday/Art Walk event and the Joint Art Crawl with Venice and Palms.

12.5.5. Appropriation for Homeless Issues Brochures – Appropriation of $750 for printing expenses for homeless issues informational brochures.

12.5.6. Appropriation for Hilltops Neighborhood Association's Fall, 2018 Block Party - The Mar Vista Community Council appropriates $300 for the purpose of conducting outreach at the Hilltops Neighborhood Association's Fall, 2018 Block Party.

12.5.7. Appropriation for Road Safety Signs – The Mar Vista Community Council appropriates up to $1,200 for the purpose of purchasing additional road safety signs.

12.5.8. Board Member Reimbursement - The Mar Vista Community Council approves Board Reimbursement of $7.23 to Sara Roos for storage locker key as a miscellaneous office expense.

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

14. Unfinished Business and General Orders

14.1. Extension of L.A.M.C. 85.02 – Discussion and possible action regarding a motion from the Transportation & Infrastructure Committee requesting extension of L.A.M.C. 85.02.

14.2. Classification of Director Attendance – Discussion and possible action on a proposal that departure of a board member from a meeting after the establishment of a quorum be considered an absence.

14.3. Discussion of Centinela Blvd. Street-Sweeping Services – Discussion and possible action regarding street-sweeping route and Services for Centinela Blvd. between Palms Blvd. and National Blvd., and for all major thoroughfares within the Mar Vista Community Council's geographic area.

15. New Business –

15.1. Discussion of the City of Los Angeles' sidewalk vending program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program.

15.2. Discussion of beach curfews – Discussion and possible action regarding opposition to the lifting of beach curfews currently in force.

15.3. Discussion of potential locations for permanent supportive housing – Discussion and possible action regarding a letter received from Councilman Bonin requesting MVCC's assistance in identifying locations within Mar Vista for permanent supportive housing.

16. Adjournment

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Mar Vista Community Council

AGENDA & MINUTES

Regular Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Tuesday, August 14th, 2018, at 7:00pm

Mar Vista Recreation Center Auditorium
11430 Woodbine Street, Mar Vista, CA 90066

Approved

1. **Call to order**

At 7:11pm the meeting was called to order.

2. **Presentation of Flag and Pledge of Allegiance**

With no veterans present, the Pledge of Allegiance was led by Mr. Hanna.

3. **Roll Call** – Call of the roll and certification of a quorum

Quorum met at 7:12pm (unless otherwise noted): Ken Alpern (7:13pm), Robin Doyno, Aaron Elster, Elliot Hanna, Mary Hruska, Rob Kadota, Susan Klos, Michelle Krupkin, Nanxi Liu, Damien Newton, Sara Roos, Holly Tilson

Not present: Paola Cervantes

Approximately 40 stakeholders present.

4. **Community Memorial Observations**

Ron Jay – Ms. Klos honors her next door neighbor Ron Jay, one of the original, legendary Z Boy surfers featured in the documentary, Dogtown. Owner of Bonded Electric, he passed as a result of early Alzheimer's. Locals did a paddle out a few weeks back in his memory; he will be deeply missed, always in heart and mind while out paddling.

5. **Announcements**

None

6. **Public Comment for Items NOT on This Agenda**

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Marty Rubin – NWNA Block Party on Sept 29, 2018 – St Andrews 5th annual – Lots of local talent will be present; please be in touch and pick up a newsletter. Featuring Emma, a local kid who has performed Annie at the Hollywood Bowl - she'll be present for the third year running.

Damien Newton – Angel City Choral will perform on America's Got Talent at 8:15 tonight. Comprised of many local Mar Vistans, the choir rehearses locally at St Andrew, "repping" not only Los Angeles but Mar Vista itself. Voting is online immediately after their performance; they can be heard in person performing locally.

Selena Inouye – today marks the one-year anniversary of her submission via the CA Public Records Act for project data relating to the Great Streets initiative.

Howard Weisberg- update regarding the parking demand study supported by MVCC. CD11 is actively working on this matter in conjunction with LADOT, which is also requesting DCP involvement. Acknowledged as important, and slated to be included though not yet not incorporated in the process will and should be MVCC stakeholders.

Robin Doyno – Post Office (Grand View/Venice Blvd) has voter registration forms – millennials in particular are encouraged to vote.

Elly Fry – a friend involved with MVCC heard distressing news that two highly qualified women were summarily removed from leadership positions on two important committees, which was disturbing news. Ms. Fry wants to know why both were removed, since both were well qualified.

Linda Guagliano –Chair of the LADOT external CoLA Cmte regarding traffic in CD11-(noted particularly as being not actually an MVCC cmte). She has been the chair for 5 years, since its former chair took sick while visiting family. The job is difficult and has become a burden with her own poor health; she requests a new appointment be made. Ms. Guagliano will stay as needed to train her replacement but requests replacement.

Chair Hanna presented Ms Gaugliano with an MVCC mug, expressing thanks for her years of service and hopes for the return of her own good health.

Ms Guagliano stresses that her position is as liaison to MVCC of an external City Cmte; that this is not an MVCC Cmte or Subcmte.

Dr. Alpern expresses gratitude as a friend and fellow volunteer, for Ms. Guagliano's tough assignment given the constraints imposed by LADOT. Roads and transportation are a vital component of every community that all neighborhoods should be enabled to address as her Cmte has. Dr. Alpern led a chorus of agreement from other board members all urging best wishes and good health upon Ms. Guagliano.

7. Ex-Parte Communications and Conflicts-of-Interest - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

<table>
<tr><td colspan="2">Alpern – lots of discussions inspired by his writing about planning, transportation, addressing affordable housing; personal opinions are carefully distinguished from MVCC policy.</td><td colspan="2">Cervantes – absent</td><td>Doyno - none</td></tr>
<tr><td>Elster - none</td><td colspan="3">Hanna – discussions relating to complaint disclosed later in agenda item 10.2.1</td><td>Hruska -none</td></tr>
<tr><td colspan="2">Kadota - nothing</td><td colspan="2">Klos – none</td><td>Krupkin – discussions relevant to Zone 5, none of which involve financial gain.</td></tr>
<tr><td>Liu – none</td><td colspan="2">Newton – the publication he started but no longer leads, Streetsblog, has a team that has spent a lot of time covering permitting of sidewalk vendors; he has not personally been involved with the issue.</td><td>Roos – discussion with Ms. Williams and several others about Cmte assignments.</td><td>Tilson – talked to stakeholders about treasury duties and other agenda matters, but none of these involved any conflict-of-interest.</td></tr>
</table>

8. Adoption of the Agenda

7:25pm adopted

9. **Reading and Approval of Minutes** – Reading and approval of the minutes from the July 10, 2018 meeting of the Board of Directors.

***Motion** (Alpern/Hruska) to **dispense with reading PASSED** without objection at 7:26pm.*

***Motion** (Hanna/Elster) to **approve Minutes as-is PASSED 12/0/0**.*

Approved

10. Reports

10.1. Elected Official and City Department Reports

Hannah Levien – CD11 deputy for MV. In 2016 former MV deputy Nguyen championed gateway signs at McLaughlin, Sawtelle, and just east of Walgrove for which (per question from Krupkin) funding still remains budgeted, so the project will be resumed.

The Community Plan process is critically important. Special thanks to Linda Guagliano for her great service.

Ari Ruiz – representative for Autumn Burke, who represents WLA coastal communities in the State Assembly. A small part of Mar Vista is hers; she attended a MV block party recently. Sept 13 she will host a small business forum; please contact her office for more information about small business, access to government services, ari.ruiz@asm.ca.gov.

Vanessa Serrano – DONE – Ignite LA program is accepting young women aged 16-21yo interested in government and public policy; deadline is Sept. 12.

Outreach gathering on August 20, at City Hall 5pm; 6-8:30pm for local businesses and organizations to learn about the NC system, DONE, other City departments.

10.2. Officer Reports

10.2.1. Chair – Elliot Hanna

10.2.1.1. Disclosure regarding board member training expirations

Ethics training is required by DONE to be renewed every two years; three board members' certification had lapsed at the last BoD meeting. Consequently they were ineligible to vote on funding measures. All funding measures passed even with their exclusion, but following updated training this month, as a formality and with apologies to the public, the Board will re-vote last month's funding measures.

10.2.1.2. Disclosure regarding a complaint of alleged racial discrimination

DONE is investigating a complaint against the Chair; the City Attorney will review the complaint after the investigation is completed. In accordance with this process, the Chair requests no further discussion of the matter.

Doyno: Requests that while awaiting a determination, the Chair consider stepping aside. Wonders whether other board members see a conflict as he does?

Hanna: The City has told him to proceed with business in the interim; how long the process will take is unknown (confirmed by Vanessa Serrano).

Doyno: Concerned about these serious allegations of racism and unanswered questions.

Hanna: "I will not be commenting", as per instructions.

Alpern: Notes new Transportation/Infrastructure Co-chair and refutes any charge of racism; requests to drop the matter for the sake of civility as the Chair requests.

*Krupkin: City Attorney advises no discussion on the matter, so **moves discussion stop** (there is no second in deference to the Chair's comments following):*

Hanna: Observes the doctrine of innocence until proven otherwise; he'll not obstruct the investigation and will cooperate fully and recusing himself, turns the meeting over to the Vice-Chair at 7:41pm and steps outside.

Kadota: does not call for second to stop discussion, rules instead to finish with board comment, then open the matter to public discussion.

BOARD COMMENT

Alpern: It is improper to proceed against City Attorney advice. Accusations in advance of the proposed investigation would be therefore without grounding and should not be permitted in order to avoid slander.

PUBLIC COMMENT

Marty Rubin – Upset with interference in his constitutional right to point directly at a person. Objects to inflammatory names asserted without hearing allegations; this simply obstructs the request of the Chair to move on. Wants a second to the motion to move on.

Approved

Elly Fry – supports the important question raised. Didn't hear a complete answer to the demand for the Chairs recusal pending the City Attorney's determination; doesn't know the accusation.

***BOARD COMMENT** (7.46pm)*

Newton: Confirms the Chair is waiting outside, observes there is public concern about verification of information, motives. Confirmation with the City Attorney could help perhaps.

Kadota: the City Attorney advises individual board members but won't make public disclosure. The DONE rep would have corrected an inaccurate record. Consultation with the City Attorney was to the Chair alone, but there's no reason to question either sense or motives of board Directors; he requests to move on.

Elster: confidentiality could be waived by the "client"; Kadota clarifies this may not be that straight-forward a relationship as we are a Council, the attorney is the City's, etc.

Tilson: clarifies earlier DONE training where it was explained the City Attorney talks to individual board members, not the board collectively. Grievances are filed against individuals, specifics are worked out there then moved forward. There is nothing to tell or discuss here. The grievance is public record.

Alpern: concerned this occurs in the shadow of lapsed ethics training [NB from Secretary: all board members are currently up-to-date]; wants to resume meeting with its Chair.

***Motion** (Alpern/Roos) **to resume meeting PASSES 9/1(Doyno)/1(Kadota)/1(Hanna)/1(Cervantes)** (1 recusal, 1 absent) at 7:51pm*

10.2.2. 1st Vice-Chair – Rob Kadota

Starting up some new committees, talking with them about mission statements.

10.2.3. 2nd Vice-Chair – Paola Cervantes

10.2.4. Secretary – Sara Roos

Communications are key. Send info for the website and beyond.

10.2.5. Treasurer – Holly Tilson

*Monthly MER in packet, **MOTION** (Tilson/Klos) **to accept the MER PASSES** with no comment **11/0/1** at 7:54pm*

10.3. Zone Director Reports

10.3.1. Zone 1 – Ken Alpern

Stacy Shure has ably replaced Dr. Alpern in his absence, working with CD5 on Large development at Palms/Sepulveda. That corner's left turn signal (westbound onto Palms) will be paid by the developer. Inadequate or no parking is not acceptable; 40% low-income housing is desired.

Notes are encouraged between CD5 and CD11 on parking demands and studies: it is concerning the City Planning is seemingly out of the parking business.

LADWP presented information to the Westside Village HOA about the 14-month Sepulveda-Venice Water Pipeline Connection Project: ladwp.com/SepulvedaVenice. A steel trunkline between 20"-54" will connect to the MWD line, extending 1700 feet below Venice Blvd. Two new stations will be constructed at Bentley, project managers will be onsite, phone numbers will catalog delays, and there will be landscaping at the end.

10.3.2. Zone 2 – Damien Newton

NWDNA block party set for Sept 29 at St. Andrew's – it is the biggest event in the area; Angel City Chorale continues their televised success; a development on National Blvd continues, but its transportation permit may come under review as a result of community-team activism [continued at the City Council].

Another large project to be considered at PLUM (same day as the art walk) for 11701-09, Gateway/Barrington, would replace a 2 story shopping center with a 5 story mixed use, 73 residential units (6 units low income), 69 bicycle stalls development.

10.3.3. Zone 3 – Mary Hruska

North Venice Little League would add three new batting cages on the hill. They're doing a great job working closely with the community on design, placement.

Approved

Another enormous project in the works would connect the Valley with the westside and LAX: Sepulveda Blvd Transportation Project. Aim is for completion by the 2028 Olympics.

It is critical to be aware and involved with rewriting the Palms-MV-Del Rey Community Plan which will govern development, mobility, density – how we grow here in Mar Vista. Saturday, September 29 DCP will present the effort at IMAN on Motor just south of National; 9-11am in Spanish, 11-12:30 in English.

10.3.4. Zone 4 – Aaron Elster

Windward has filed applications for permits for a substantial renovation of their campus.

10.3.5. Zone 5 – Michelle Krupkin

Burglaries, attempted car theft, crime issues are problematic particularly on the oval. Thanks to CD11 for installation of parking restriction signs on Venice Boulevard preventing oversized vehicle parking.

Birds continue to obstruct passageways so ongoing talks with the City are appreciated.

10.3.6. Zone 6 – Holly Tilson

Venice HS has started it's 4 year modernization project. VHS tennis courts were to be temporarily relocated on VHS campus until their permanent location on the VHS campus was available. A decision was made instead to relocate the "temporary tennis courts" as a permanent installation on Mark Twain's campus without proper notification to the community, causing safety concerns which are being actively remediated by the community, community groups, LAUSD and its Board District 4 offices.

10.4. Committee Reports

*Without objection, a **MOTION** (Kadota/Alpern) was **PASSED to dispense with Committee Reports** in the interest of time.*

[NB: having dispensed with committee reports, an abbreviated version was entertained anyway:]

10.4.1. Elections and Bylaws

This committee will resume on August 22 at Windward, if interested join us to better the MVCC system.

10.4.2. Outreach

Armond Seretti was introduced by Doyno as one of two new Outreach Co-chairs.

Zone Directors are encouraged to craft newsletters through mailchimp to update stakeholders and help engage the community. This new committee is excited and energized to increase MVCC participation by 50% in the coming year.

10.4.3. Transportation and Infrastructure

Note revised motions in the second meeting packet.

10.4.4. Planning and Land Use Management

Hearing senior citizen development, large mixed use. From July meeting met us previously

10.4.5. Public Health and Safety

Crafting back-to-school events with Safe Cycling targeting Richland Ave and MV ES. Bike swap, bike repair stand at the Farmer's Market. CicLAvia in September celebrating LA Philharmonic's anniversary downtown.

Homeless Issues Committee focused on a special meeting with Globe/Tuller residents.

10.4.6. Education, Arts, and Culture

11. Special Orders –

11.1. **Presentation from the Los Angeles Department of City Planning** – Introduction of the Westside Community Plan Update team and discussion regarding the city's overall three-year work program and outreach strategy.

Introduction by Jonathan Hershey, Senior City Planner for WLA. The Community Plan (CP) update while vital, is a long term plan so it is engaged infrequently, the current one was implemented in 1997.

Approved

Typically its shelf-life is 20-25 years and is updated in a 5-10 year process. This iteration will be different: (i) time for review is anticipated as 3 years; 2021 is delivery target date to City Planning commissions (ii) new zones will be implemented across the entire Community Plan (re:Code LA).

This expedited review (at the behest of the Mayor's office, but only budgeted by CoLA for six years) will address issues that have grown important at the local and state level: Planning, land use, affordability, homelessness, with emphasis on development and design, and being responsive to community concerns.

There are four parts to the plan: (1) Plan text (overarching goals), (2) Land use map, (3) site-specific zoning regulations (tool for implementing plan policy, how land is used – maximum height, allowed uses, what may be built there) (4) environmental review (one conjoined EIR for four westside CPs considering cumulative impacts).

The compressed timeline started in July, 2018 and will include a series of "Planning 101" seminars; the schedule of multiple events including a webinar are listed at http://www.marvista.org/index.php, (http://www.marvista.org/readpost.php?news_id=574) and ***http://www.planningthewestside.org/***

RSVP at planning.thewestside@lacity.org

The media outreach plan includes participation in community events, festivals, walking tours. And assistance from NCs in reaching various constituencies, and voices not traditionally heard from.

Hruska: How to convey information from MVCC's Community Plan Cmte? Ans: kinikia.gardner@lacity.org

How is our input used? Ans: On a policy level, in the preparation of the overarching "Plan text" document (1) above. Policy goals of Mar Vista will be distilled from various public sources, groups and meetings. Further along in the process there will be talk of zoning and how development will fit into the community.

Stacy Shure – Need materials for planning, preparatory to first events and webinar as listed at planningthewestside.org

[Klos departs, 8:40pm]

How does re:Code LA fit into all this? Its codes supersede the old; it is city-wide.

The new Community Plans and Codes will be made consistent, and new projects will have to be in compliance – conform – with it. Nine NCs are involved on the Westside and will be convened by DCP for a collective discussion downstream in the process. [NB: NCs will be meeting jointly on their own as well] The new policy will guide future decision makers about how to view projects proposed in the future that are discretionary. It will guide requests for variances and adjustments of zones and permissions

The Plan map will lay out land use patterns in the Community. For example the distribution of single family zones, which are associated with "sub-zones" of differing associated regulations. It requires community input to be successful.

Marty Rubin – are existing traffic conditions incorporated in this planning? Ans: Yes, as part of the environmental review.

Roos: requests that Community input beyond its solicitation is actively incorporated into DCP's Plan. Wonders how one single EIR can adequately address the diverse cultural and geophysical conditions across the westside. Ans: recursive loops will catch revisions and updates; the process is not linear. The timeline is admittedly ambitious as is the proposal to conduct a single EIR. If it becomes demonstrably impossible, as responsible Planners they will opt to devote more time to it. Example of SF Valley may be instructive for avoiding mistakes, but currently money is not budgeted for longer review.

Krupkin: Does the Community Plan dovetail with other City Plans, existing and projected – e.g. Mobility 2025, West Los Angeles Transportation Improvement and Mitigation Specific Plan (WLA TIMP), Liveable Boulevards, Transportation Impact Assessment (TIA) Fee Program, Coastal Transportation Corridor Specific Plan (CTCSP), etc? Will CEQA exemptions be granted likewise for these too? How can programs exempt from CEQA be implemented? Ans: all Plans should be consistent with each other, and with policy decisions of earlier. That is the responsibility of the process, to align them. And new policies should be able to ensure consistency with incoming policies. CEQA exemptions are set by the State; the City has no control over "categorical exemptions".

Alpern: reCode LA (and MV's Sharon Commins) updates the old code established with now-invalid data, without changing the questions, which remain valid. Parent groups are an important constituency, under-represented in NCs due to time constraints of families. Joint use of public property should be negotiated –

Approved

school playing fields. Everyone needs open space and it is used broadly. Commercial space should have affordable housing nearby. Joint outreach meetings with neighboring NCs might help.

Newton: Is there a draft or an existing starting-plan from which zoning is imagined for this Community? Ans: No. Start with non-specific ideas, and they'll develop a Plan with increasing detail iteratively from notes, underlying zoning, layman's-ideals.

Kadota: this is an opportunity for Zone Directors to organize, map, envision. Reach out with social media, etc. Grow our public presence.

Liu: how is the Plan implemented? Ans: It is a scaffold of rules for developers, what individual property owners can and cannot do. Implementation is by developers, permissions by the City.

11.2. Liaison appointments – Discussion and possible action regarding appointments to liaison committees.

Postponed until next meeting because of accidental omission.

12. Consent Calendar – The Consent Calendar is reserved for items deemed to be routine and non-controversial. Any board member may pull an item or items for further discussion.

12.1. **Re-approval of the June, 2018 Monthly Expense Report** - Review and re-approval of the Monthly Expense Report for June, 2018.

12.2. **Re-approval of the Budget for FY2018-2019** – Review and re-approval of the budget adopted at the July, 2018 meeting due to mover ineligibility.

Reapprovals necessitated by expired board member ethics training as explained in Item 10.2.1.1 above.

12.3. **Review and approval of Monthly Expense Report** – Review and approval of the Monthly Expense Report for July, 2018.

[NB: Moved and approved during Treasurer's report above]

12.4. Re-approval of June, 2018 funding items – Review and re-approval of funding items for FY2018-2019 totaling $15,291 for meeting rooms, property storage, clerical services, and other purposes.

12.5. Review and approval funding items – Review and approval of August, 2018 funding items including

12.5.1. **Payment of outstanding invoices** (details available at meeting).

12.5.2. **Appropriation of $300 toward** the North Westdale Neighborhood Association's Fall, 2018 **Block Party**

12.5.3. **Appropriation of $300 toward** the Westdale Homeowners' Association's Fall, 2018 **Block Party**.

12.5.4. **Appropriation not to exceed $500 per quarter ($2,000 total) for printing expenses for the Mar Vista Art Walk**, including the all-day Small Business Saturday/Art Walk event and the Joint Art Crawl with Venice and Palms.

$500 per quarter has not always been fully spent. However a longer, full-day art crawl, in conjunction with small business event necessitates request of full amount from previously. EACC has been in recess so the request was delayed.

12.5.5. *Moved to excluded items.*

12.5.6. **Appropriation for Hilltop Neighborhood Association's Fall, 2018 Block Party** - Appropriation of $300 toward the Hilltops Neighborhood Association's Fall, 2018 Block Party.

12.5.7. **Appropriation for Road Safety Signs –** The Mar Vista Community Council appropriates up to $1,200 for the purpose of purchasing additional road safety signs.

2 new designs, 100 signs each to total 200 new signs, $5.50 per each including setup, tax, shipping, 2 colors; 1 run of 100 will be replaced by the company per printing error.

12.5.8. **Board Member Reimbursement -** The Mar Vista Community Council approves Board Reimbursement of $7.23 to Sara Roos for storage locker key as a miscellaneous office expense.

MOTION** (Kadota/Alpern) **to approve consent calendar PASSED 10/0/1

13. Excluded Consent Items – Discussion and further action on items excluded from the Consent Calendar.

Approved

13.1.1. **Agenda item 12.5.5 Appropriation for Homeless Issues Brochures** – Appropriation of $750 for printing expenses for homeless issues informational brochures.

Brochures distributed currently through libraries, Police Department, Westside Coalition, one is meant as printed resource for those who are currently homeless, it's a service piece.

Three publications total are included here; some resources could be incorporated from "McKenna-Edwards

MOTION** (Kadota/Roos) **to approve brochure appropriation PASSED 10/0/1

14. Unfinished Business and General Orders

14.1. Extension of L.A.M.C. 85.02 – Discussion and possible action regarding a motion from the Transportation & Infrastructure Committee requesting extension of L.A.M.C. 85.02.

Policy Motion: "Extension of LAMC 85.02"

Introduced by Alpern:

WHEREAS, Los Angeles Municipal Code (LAMC) Section 85.02, "Use of Vehicles as Living Quarters," went into effect on November 22, 2016, and

WHEREAS LAMC Section 85.02 shall expire on July 1, 2018 unless extended by ordinance, and

WHEREAS the Mar Vista Community Council supports extending LAMC 85.02 beyond July 1, 2018 without any sunset provision, and

WHEREAS the City of Los Angeles and all relevant departments should solicit public input for updated revisions to the associated 85.02 map accommodating the impact of vehicular residency on permanent residents – including unsanitary conditions, litter, noise, crime and sporadic violence,

THEREFORE, the Mar Vista Community Council advises the City Council of Los Angeles, including our local Council members Bonin and Koretz, to update the associated 85.02 map immediately with accommodations, and pass an ordinance retaining LAMC 85.02 permanently.

LAMC 85.02 has been extended already to January 2019, therefore this motion is not time sensitive.

*Therefore, **MOTION** (Newton/Alpern) **to commit** the "Extension of LAMC 85.02" Policy Motion **back to T/I Committee** for revision **PASSED 10/0/1***

14.2. Classification of Director Attendance – Discussion and possible action on a proposal that departure of a board member from a meeting after the establishment of a quorum be considered an absence.

Introduced by Doyno. Spirit of the motion is to count any Director whose departure breaks quorum, as being absent from the entire meeting should they leave.

*Roos: **Moves** (Roos/Tilson) to commit the motion to the Bylaws Committee*

Kadota: Changing the bylaws is a process requiring two readings, filing with DONE; all such changes should be considered comprehensively as a group.

Newton: Remanding this to Committee when everyone knows how they would vote already just makes for more work. Pass it or don't now.

Ms. Serrano (DONE) – Confirms Kadota's explanation; bylaws won't be evaluated or come into effect until after May 2019, following City Attorney review.

Hanna: the specific bylaws process does not allow a motion to direct the Bylaws Committee in its deliberations. Therefore the Chair rules this motion Out Of Order. It is observed that nothing prohibits the Bylaws Committee from considering the motion on its own.

14.3. Discussion of Centinela Blvd. Street-Sweeping Services – Discussion and possible action regarding street-sweeping route and Services for Centinela Blvd. between Palms Blvd. and National Blvd., and for all major thoroughfares within the Mar Vista Community Council's geographic area.

Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Boulevard Between Palms and National Boulevards. "Centinela Street Sweeping"

Read by Krupkin:

Approved

WHEREAS: The Mar Vista Community Council (MVCC) supports maintenance and repairs on all of its major infrastructure assets, including vital thoroughfares such as Centinela Boulevard, and

WHEREAS: It has come to the attention of the MVCC that there is no street sweeping route on Centinela Boulevard between Palms and National Boulevards,

WHEREAS It is suggest that there are no resources currently allotted towards this essential street maintenance,

THEREFORE, LET IT BE RESOLVED: That the CD11 office will work with L.A. Bureau of Street Services (BSS), and LADOT to implement regular and ongoing street sweeping along Centinela Boulevard between Palms and National Boulevards,

THEREFORE, LET IT ALSO BE RESOLVED: That the CD11 office, the CD5 office, BSS, and LADOT will review the status of street sweeping and other vital maintenance along all major thoroughfares within MVCC's confines.

PUBLIC COMMENT

Marty Rubin – attests that street sweeping makes a difference, visible in the attention to the south side of National Boulevard. Important to survey other neglected areas in MV.

Stacy Shure – Meetings with CD5 and Transportation Department indicate there is a shortage of funds and no CoLA appropriations proposed for regular route sweeping, signs. Council office will facilitate two sweeps per year.

BOARD COMMENT

Hruska: Confirms same story from BSS.

Roos: Confirms same story from +/- 2012

Alpern: At least CoLA shorts the same services consistently.

MOTION** (Krupkin/Alpern) **to support Centinela Street-Sweeping PASSED 10/0/1

15. New Business –

Postponed until next meeting for want of time.

15.1. Discussion of the City of Los Angeles' sidewalk vending program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program.

15.2. **Discussion of beach curfews –** Discussion and possible action regarding opposition to the lifting of beach curfews currently in force.

15.3. **Discussion of potential locations for permanent supportive housing** – Discussion and possible action regarding a letter received from Councilman Bonin requesting MVCC's assistance in identifying locations within Mar Vista for permanent supportive housing.

16. Adjournment

Motion to adjourn at 9:35pm.

Approved

Mar Vista Community Council

AGENDA

Special Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Friday, August 31st, 2018, at 7:00pm

Coffee Connection, Station Room
3838 S. Centinela Blvd., Mar Vista, CA 90066

1. **Call to order**
2. **Roll Call** – Call of the roll and certification of a quorum
3. **Community Memorial Observations**
4. **Announcements**
5. **Public Comment for Items NOT on This Agenda**
6. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
7. **Adoption of the Agenda**
8. **Reading and Approval of Minutes** – Reading and approval of the minutes from the August 14, 2018 meeting of the Board of Directors.
9. **Special Orders** – None
10. **Unfinished Business and General Orders**
    - 10.1. **Discussion of the City of Los Angeles' sidewalk vending program** – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program.
    - 10.2. **Discussion of beach curfews** – Discussion and possible action regarding opposition to the lifting of beach curfews currently in force.
    - 10.3. **Discussion of potential locations for permanent supportive housing** – Discussion and possible action regarding a letter received from Councilman Bonin requesting MVCC's assistance in identifying locations within Mar Vista for permanent supportive housing.
11. **New Business** – None
12. **Adjournment**

Mar Vista Community Council

AGENDA & MINUTES

Special Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Friday, August 31st, 2018, at 7:00pm

Coffee Connection, Station Room
3838 S. Centinela Blvd., Mar Vista, CA 90066

Approved

1. **Call to order**

Order called at 7:06 pm

2. **Roll Call** – Call of the roll and certification of a quorum

Quorum met during roll call with {Paola Cervantes, Robin Doyno, Aaron Elster, Elliot Hanna, Mary Hruska, Rob Kadota, Michelle Krupkin, Damien Newton, Sara Roos, Holly Tilson} ten present; Nanxi Liu entered at 7:08pm and Ken Alpern at 7:16pm; Klos absent.

3. **Community Memorial Observations**

Rick Selan was recognized by Kadota, Roos and Tilson. A retired math teacher of many long years at Mark Twain, he was very politically active advocating for gifted students and especially keenly for special education students. Upon his retirement he tutored and advocated on behalf of many young Mar Vista stakeholders, and attended countless MVCC EACC meetings. He was very dedicated, very intense and an icon around town. He will be missed by many; his was a special soul.

Ernesto Campana – A neighbor of Zone 5 and Paola Cervantes. He was a "sweetheart, with a big laugh", wonderfully sharing his home with four generations – mother, wife, kids and grandkids.

4. **Announcements**

Krupkin (/Zone 5): Canela Restaurant is closing today, marking the thirteenth business closure since inception of the Venice Boulevard reconfiguration.

Kadota (/Bike MV): absent for Market drop off, assistance secured from Cervantes. BikeMV created a calendar of events around cycling and outreach opportunities for September, including MV events and beyond (Elenda popup bike lane/street closure event in CC, cicLAvia downtown – Hollywood Bowl). Met with Culver City WalkNRollers. Cycling education may turn into a public safety fair at MVES – starting at school with identified participating parents, hope is to vary location and grow the event frequency and size. Funding may be requested for this fair and for reflective vests.

Roos (/Secretary/Fall Festival): website expanding to include community issues of interest so Board members' notifications should be forwarded. Janet Morgan is volunteering to coordinate calendaring. Julie Miller is advertising, arranging booths.

Tilson (/Treasurer): Reflective vests would be a good idea, but funding requests should be considered comprehensively. "First come-first served" may not be the best funding strategy.

5. **Public Comment for Items NOT on This Agenda**

Newton (/PLUM): PLUM focusing on Senior Center proposed for Venice Boulevard.

Krupkin – Notes the mockup presented recently for MV monument sign not that which was presented by Deputy Nguyen previously.

Alpern: inquiry about the pending 300 lawn signs, clarification that these are on order and being designed.

6. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.

Alpern – Questions about scooters, Planning; asphalt repairs.	*Cervantes – none*	*Doyno - none*	*Elster - none*
Hanna – short chat with CD11 about the Bridge Housing letter.		*Hruska -none*	*Kadota - none*
Klos – absent	*Krupkin – discussion of sidewalk vending program with Tilson and of unfinished motions with other board members.*	*Liu – meeting with Bonin about permanent supportive housing.*	
Newton – Has not personally covered the Sidewalk Vending Motion although StreetsblogLA has. Will interview Safeguard organization about safe parking in early October.	*Roos – none*	*Tilson – discussion of sidewalk vending program, and all three motions, with Krupkin. No financial conflict represented in any discussions.*	

7. Adoption of the Agenda

Adopted without objection (8:12pm)

8. Reading and Approval of Minutes – Reading and approval of the minutes from the August 14, 2018 meeting of the Board of Directors.

***Motion** (Kadota/Hruska) to **dispense with reading of Minutes and approve as-is PASSED 10/0/2** (Hanna, Cervantes).*

9. Special Orders – None

10. Unfinished Business and General Orders

10.1. Discussion of the City of Los Angeles' sidewalk vending program – Discussion and possible action regarding the restoration of the "opt-out" clause in the City of Los Angeles' sidewalk vending program.

WHEREAS, the City Council, on April 18, 2018, adopted an Ordinance creating a Sidewalk Street Vending Program and,

WHEREAS, in the final draft of said ordinance, the "opt out" provision was removed, at the last minute, prior to approval, and

WHEREAS, local brick and mortar enterprises along Venice Blvd in Mar Vista, have spent years establishing their businesses based on a set of assumptions and rules, such as where they can be located, the taxes they are required to pay, and the best ways to attract customers, and

WHEREAS, sidewalk vendors in the proposed ordinance will probably sell similar types of goods and services as nearby brick and mortar businesses, but not be required to adhere to the same elaborate state and local permitting and land-use regulations, and

WHEREAS, the local brick and mortar businesses on Venice Blvd in Mar Vista, have contributed to the "main street" atmosphere that local residents value, and

WHEREAS, the local brick and mortar businesses along Venice Blvd in Mar Vista are mostly small ones, with small profit margins, and

WHEREAS the presence of sidewalk vendors along Venice Blvd in Mar Vista, for the reasons specified above, would constitute unfair competition for the local brick and mortar businesses on the same stretch.

THEREFORE, the MVCC urges restoration of the "opt-out" clause of the Los Angeles Sidewalk Vending Ordinance.

T/I motion presented by Hruska. City Council (CoLA) approved this motion already. Originally an "opt out" clause included facility to petition out of the regulatory area; this clause was removed at the last minute. However a way to opt out remains – it is just more difficult.

Newton: What would happen if MV opted out? Hruska: The petition wouldn't apply to the whole of MV; if someone's vending in the area, can someone be arrested in that area? Hruska: No, non-compliance is no longer criminalized.

Roos: Are we eliding with anyone? Hruska: 23 CIS were filed [correction: filings were prior to 2015, for a different supplement to the CoLA motion under recent consideration, now passed].

Approved

PUBLIC DISCUSSION – none.

Motion** (Alpern/Krupkin) to **approve ~

BOARD DISCUSSION –

Hruska: MVCC filed a CIS in 2014 expressing concerns with Chief Analyst Report. We should now record objections to the passage.

Roos: (i) Opting out remains a viable possibility for individual vendors via petition; the opt out clause always only ever was to apply to special commercial districts, of which MV is not one. (ii) There are no->few public sidewalks in MV capable of supporting sidewalk vending per this regulation (they're all too constricted). (iii) this is a supplement to that earlier ordinance and relates to matters of criminality and vending, not commercial restraint of trade, (iv) we do not know the tenor of MV stakeholders and have not the facility to survey it; this being a matter of political polarization and new vs old urbanism our asserting a stance risks alienating a specific demographic, selectively and gratuitously: since the matter is moot in every conceivable way, why generate strident partisan controversy when none was even present before?

Doyno: What are Bonin's objections? Hruska: Don't know.

Hruska: Concurs it is unwise to weigh in on complicated matters about which we are not clear

Cervantes: What is the opt out process? Hruska – A protracted, onerous appeals process is now required for individuals in contrast with the specific clause which would have provided for a petition that enabled council district advocacy for the group, rather than by individual vendors. Harder the present way. Centinela does not qualify (confirmed by Newton). Details are "Still being worked out".

Doyno: Moves to table indefinitely. Kadota requests more discussion.

Hruska: This is voted on, it's a "done deal" and purpose is to show support for local businesses. The matter is moot legislatively, no one is advocating for this modification.

Kadota: Has there been consultation with Bonin or CD11 staff regarding the motion and where it stands? Hruska: No. Kadota: Pending this it's worth tabling; it's been noted there does exist provision for opting out – staff could help us to focus on the matter.

Krupkin: Great Streets Cmte has heard complaints about the street vendor located on the SW corner of Centinela/VB regarding public health and safety issues. Kadota: Counters with anecdote of locals calling for street food.

Alpern: The conversation is not being heard the right way: no suggestion that street vendors are a "bunch of felons" but rather are enjoying unfair advantage . No infrastructure costs, personal savings at the expense of the Commons. But some vendors can augment the atmosphere, and are beneficial to the community.

Hanna: Clarifies 'table' sets motion aside during this meeting; 'postpone indefinitely' sets motion aside until unspecified future date; 'postpone with set date' assures future agendizing for specified date.

Cervantes: postpone until we have more details.

***Motion** (Kadota/Liu) to **postpone until no later than January, 2019 PASSED 11/0/1** (Hanna).*

10.2. Discussion of beach curfews – Discussion and possible action regarding opposition to the lifting of beach curfews currently in force.

The Mar Vista Community Council opposes the lifting of the beach curfew currently in place, restricting beach access from midnight to 5am, daily. This is in consideration of public health and safety concerns and in keeping with long standing practice, supported by LAPD and LA County Beaches and Harbors, the agencies tasked with maintaining the safety and integrity of the beach and the shoreline, respectively."

Presented by Newton as forwarded via WRAC. Two thirds of WRAC's Westside NCs have voted already to formally oppose lifting the beach curfew. The matter is as much about campfire parties as about CoLA not having resources to police homelessness; to reduce liability CoLA wants to retain the curfew hours. Venice NC has opined policing resources should be strengthened rather than retreating. Limiting beach access is a concerning precedent. POSEy Subcmte voted to not pass the motion. However because it is controversial and the demographics of POSEy (younger) are distinct from PLUM's (older), the motion was considered at PLUM out of fairness. PLUM Cmte voted to oppose lifting the beach curfew (pass the motion).

Approved

Roos: This is a historical turf war between the CA Coastal Commission and CoLA. It is in active, current political play involving parameters of types and numbers of beach access, and where.

Kadota: Is the boardwalk considered "City" or "beach"? Ans: Don't know. VNC is opposed to lifting the curfew.

***Motion** (Kadota/Hruska) to **approve motion** already on the table*

BOARD DISCUSSION –

Newton: Coming from WRAC it's relevant to wonder whether this is an issue that affects our stakeholders. We have community members that use the beach, and this claim is more important than simply being nice to our neighbors, VNC. Still, reversing their opinion is expressly not friendly. A thorough process is needed: either vote to support, or vote to send it back to Committee, not to reverse it.

Kadota: this is an issue of police priority and resources. Venice beach is not distant; we share a border and the police department. Our priorities are relevant.

Krupkin: LAC lifeguards are additional enforcement agency, with thin resources. Safety is of concern.

Kadota: Curfew allows the police to maintain the capacity to take action and also sustain a level of safety. If the beach were open 24/7 that would drain resources; the brief closure enables the resource to be sustained.

Alpern: Precedent of clearance and "reset" is useful; it gives legitimacy to taking action. The public health hazard must not be overlooked and while curfews are repugnant, the first priority must be safety.

Hruska: Curfew exerts some deterrence of criminal activity, which helps with tourism as well as community integrity.

Newton: Unenforced curfew could encourage more brazen criminality.

Cervantes: Regardless of curfew, law enforcement is required.

Roos: Therefore it's not a question of safety but of resources to maintain it.

***Motion** (Kadota/Alpern) to **call the question passes** by 2/3 vote,*

***Motion** to **approve passes** 7/4 (Newton, Roos, Cervantes, Doyno)/1 (Hanna)*

10.3. Discussion of potential locations for permanent supportive housing – Discussion and possible action regarding a letter received from Councilman Bonin requesting MVCC's assistance in identifying locations within Mar Vista for permanent supportive housing.

Hanna: introduces attached letter (below) and proposes to task the Homeless Issues Committee (HIC) with identifying locations.

Hruska: ¿Is the permanent housing location search for parcels or empty buildings?

Kadota: These are the questions we should address as a Neighborhood Council (NC): ¿What can we bring to the table to identify this housing? Consider safe parking, perhaps as temporary-transitional, or permanent. Zone Directors (ZD) should have hard discussions with Neighborhood Associations (NAs), looking at geography and maps to see what if anything can be possible. HIC has been looking, but doesn't identify many opportunities; we need a public process.

Hruska: So land is a reasonable suggestion. Hanna: Anything that enables the City to gets folks off the street. Hruska: WLA Courthouse? Kadota: not "ours".

Liu: Excited by the prospect of an impactful, group activity utilizing a database of available properties. ¿Budget? Timeline?

Newton: Approves of HIC involvement and ZD involvement. HIC could guide ZDs search – e.g., safepark (LAUSD parking lots not eligible because they are open); report to BoD with ZD guidelines by October BoD meeting.

Alpern: Important not to blend distinct populations: working poor living in their vehicle vs. those with chronic issues. There are resources for those who will work with LAPD, City services; those who won't play by the rules should not be catered to.

Approved

Cervantes: ¿How does bridge housing relate to "safe park"? Distinction is self-contained housing vs. temporary vehicle-based housing.

Kadota: HIC Co-chairs have been active but the public must contribute creativity and process to due diligence in pursuing the requested space-identifications.

Cervantes: the old firehouse (FS62) could incorporate Bridge Housing incentivizing City support for its funding. Kadota: From the FS62 board perspective myriad reasons would preclude the suggestion but it should be considered all the same.

Hruska: empty land is virtually impossible to obtain on the westside; empty buildings, safepark locations are key per Klos.

Tilson: concerned with logistics, contracts, liability of Safepark option. MVCC would trade away its reputation in the absence of such details – CD11 must advise both MVCC and HIC.

Newton: A NFP (Not-for-Profit) organization manages Safepark contracts with organization (e.g., NA, group, congregation), permits through local police, rules concerning lot size, space availability, 24/7 security, bathrooms, site access, meals-coordination.

Doyno: logistics vary between sites so a single answer cannot cover all logistics; costs average $100K/lot.

Hanna: Community cooperation is important, part of an expectation for reciprocal CD11 attention to the 405 encampment. Hruska: Strategically this attention is key to retaining community cooperation [positive feedback loop]. Alpern: Credibility is contingent on enforcing rules for law-breakers; important piece to engaging community cooperation too.

Liu: displacing the homeless simply shifts problems from one neighborhood to another; linking community cooperation to encampment removal is uncooperative. Roos: coordination with CD11 aids cooperativity rather than quid-pro-quo or favoritism. Newton: CD11 contact is needed.

Kadota: Klos-Sabshin-Levien work closely. This is a long-term problem. Hanna/Roos: Agreed, years-old. Krupkin: CD and CoLA have resources for discovery; NC and community have fewer. Alpern: Still the community should participate and partner in the conversation. Cervantes: solutions come from building relationships, coaxing use of services specific to individual's challenges.

Cervantes: Reviewing possibilities is the least we can do. Hanna: Expectations are different from quid-pro-quo; supports cooperation but wants reciprocity.

Elster: latest research from HUD (Federal) shows building free housing is the cheapest, most viable path to a solution.

Hruska: concerned the situation is complicated by multiple needs of target population; as a Federal problem should the problem qualify for FEMA support? Cervantes: invoke multiple services. Krupkin: Efficient spending would focus on the issue directly rather than bureaucratic training. Roos: the complexity is compounded by solutions being an unfunded mandate.

Tilson: Money for free housing is not infinite; must be spent efficiently. Reopening state hospitals for chronic issues would be efficient, multi-leveled solution, that would free up subsidized housing for those with short-term housing needs. Agrees HIC + ZDs is proper group to task with identifying space.

Kadota: Issues and dynamics are vast and deep – public education and presentations are necessary. MVCC should support a Speaker series, ask serious questions, discover hidden knowledge base or resources.

Newton: just identifying space is a large task; safepark is a separate, large issue. HHH provides a means to spend and share housing for the needy. Hospitals serve a different function.

Alpern: closing federally-supported facilities dates to the Reagan administration – payment responsibility was at issue. Now three subpopulations need different treatment – down-on-luck and chronic-issues population need some monitoring in housing; the third population needs law enforcement and removal. LAC and CoLA may be unreliable for enforcement but could adopt effective affordable housing policy if empowering foundations is not the goal.

Elster: Identifying units to give away would help first two categories; building may be cheaper in the County where there is no shortage of land.

Liu: Confirms research, characterization of homeless subpopulations.

Approved

Doyno: Problems are varied; a single solution is not possible; the Lanterman Act is an issue inhibiting reopening of facilities. MVCC should support CoLA without and strings attached; we can afford to address the problems of homelessness.

***Motion** (Newton/Doyno) **passed** 11/0/1 (Hanna) as amended to provide a path forward – not solutions but a strategy: "The MVCC BoD instructs the Homeless Issues Committee to:*

(1) Report back to the Board, not later than its regular October 9, 2018 meeting, with guidelines for what Zone Directors should be seeking in partnering with CD11 to assist with the task articulated in Councilmember Bonin's letter of August 3, 2018: solving homelessness in our neighborhoods, and identifying potential locations in Mar Vista for supportive housing, bridge housing or safe parking.

(2) In cooperation with the six Zone Directors, work to identify possible locations for permanent supportive housing as requested in the letter. These joint-findings, plans, and progress shall be reported to the board at its November 13, 2018 meeting - and monthly thereafter, as necessary. "

11. **New Business** – None
12. **Adjournment**

***Motion** to adjourn (Alpern/Liu) **passed** at 9:16pm*

***Attachment** (following page) ~ Letter discussed in agenda item 10.3:*

Approved

MIKE BONIN

City of Los Angeles
Councilmember, Eleventh District

August 3, 2018

Elliot Hanna
Chair, Mar Vista Community Council
P.O. Box 66871
Mar Vista, CA 90066
elliot.hanna@marvista.org

Dear Mr. ~~Hanna~~ Elliot

At the end of March, I wrote to the Mar Vista Community Council, asking for the council's partnership in solving homelessness in our neighborhoods, and asking for suggestions on potential locations in Mar Vista for supportive housing, bridge housing, or safe parking. As this crisis in our neighborhoods continues, I am writing to renew that request.

As a director of the MVCC and now as chair of the organization, you have been vocal in drawing attention to the problem of homelessness in Mar Vista. I invite your vocal engagement in identifying constructive solutions, and in joining other 11th District neighborhoods in helping to solve this region-wide crisis. My staff and I are eager to partner with you and the MVCC on those efforts.

I have asked every neighborhood and neighborhood council to become actively engaged in creating solutions, and the response from neighborhoods around our council district has been encouraging and inspiring:

- In the past few years, *Del Rey,* which shares a zip code with Mar Vista, has earned a reputation as one of the most active and solution-oriented neighborhoods in the City. With the support of the Del Rey Neighborhood Council, supportive housing has opened on both Courtleigh Avenue and on Beach Avenue. Last year, a home for homeless youth opened in Del Rey. The Del Rey Square Apartments, a building providing low income housing for seniors, includes a significant number of formerly homeless people. In the past few weeks, the Del Rey Neighborhood Council has begun an aggressive and focused effort to find potential locations for safe parking or bridge housing.

- In *Venice,* with the support of most residents, the City is proposing bridge housing on a former bus lot, while several proposals for supportive housing are in the pipeline, on both city-owned property and on private property. The Homelessness Committee of the Venice Neighborhood Council has unanimously endorsed bridge housing, and has spearheaded a program to reunify homeless people with their families. Venice is also home to St. Joseph Center and Safe Place for Youth, which provide homeless services and help find jobs and or housing for people living on the street.

Westchester Office
7166 W. Manchester Boulevard
Los Angeles, CA 90045
(310) 568-8772
(310) 410-3946 Fax

City Hall
200 N. Spring Street, Room 475
Los Angeles, CA 90012
(213) 473-7011
(213) 473-6926 Fax

West Los Angeles Office
1645 Corinth Avenue, Room 201
Los Angeles, CA 90025
(310) 575-8461
(310) 575-8305 Fax

- In *Brentwood*, the campus of the Department of Veterans Affairs is moving forward with plans to build more than 1000 units of supportive housing for homeless veterans. The VA campus is home to the first Safe Parking program on the Westside, and in partnership with the City, bridge housing is in the works there as well.

- In *West LA*, the City and County operate the Emergency Winter Shelter program. The Neighborhood Council of West LA/Sawtelle, by an 11-1 vote, approved supportive housing for the homeless at the former WLA Animal Shelter. The neighborhood council is now considering potential Safe Parking locations. Additionally, with community support, a recently approved project at Olympic and Bundy will include homeless housing.

- In *Pacific Palisades*, the Pacific Palisades Community Council helped form the Pacific Palisades Task Force on Homelessness, which has raised money, hired its own social service agency, and successfully housed dozens of people. The PPCC recently formed a new task force to identify potential locations for bridge or crisis housing for homeless women in the community.

This response from neighborhoods has been exciting, and is showing Los Angeles that residents of the Westside are eager to lead and be part of the solution. I hope that the Mar Vista Community Council will show similar leadership. I know that the Homeless Issues Committee has been engaged in this issue for some time, and I have been grateful to work with Susan Klos, Robin Doyno and members of that committee, and understand you have named new members as well. I am eager for suggested solutions from the Mar Vista Community Council and believe that with your support, the MVCC can join and complement these other 11th District efforts, actively participating in the solution. As you have noted, the situation is dire, and demands urgent action.

I have attached a copy of my previous correspondence to MVCC, as well as a list of types of programs and projects the City and County are investing in.

Regards,

MIKE BONIN
Councilmember, 11th District

Cc: MVCC Board of Directors

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Mar Vista Community Council

AGENDA

Emergency Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Sunday, February 24th, 2019, at 6:30pm

The Coffee Connection
3636 S. Centinela Blvd., Los Angeles, CA 90066

1. **Call to order**
2. **Roll Call** – Call of the roll and certification of a quorum
3. **Public Comment for Items NOT on This Agenda**
4. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda.
5. **Adoption of the Agenda**
6. **Special Orders** –

   Venice Blvd. Resolution of Disapproval - Discussion and possible action regarding the process used in the recent decision to make permanent the Venice Blvd. reconfiguration.

7. **Adjournment**

Bold, underlined text indicates further details can be found in supplemental materials available at the meeting.

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Mar Vista Community Council

MINUTES

Special Meeting of the Board of Directors

http://www.marvista.org/minutes-and-agendas.php

Sunday, February 24th, 2019, at 6:30pm

The Coffee Connection
3636 S. Centinela Blvd., Los Angeles, CA 90066

DRAFT

1. **Call to order** – Meeting called to order at 6:38 p.m.
2. **Roll Call** – Call of the roll and certification of a quorum - Present were Mr. Hanna, Ms. Hruska, Ms. Liu, Mr. Doyno, Dr. Alpern, Ms. Krupkin, Ms. Shure, Mr. Elster, and Ms. Tilson.
3. **Public Comment for Items NOT on This Agenda** – Mr. Wayne Wheeler wondered why a statement opposing Great Streets is not being made.
4. **Ex-Parte Communications and Conflicts-of-Interest** - Each board member shall declare any ex-parte communications or conflicts-of-interest pertaining to items on or related to this agenda. – Mr. Hanna discussed the mechanics of the resolution with Ms. Hruska.
5. **Adoption of the Agenda** – Agenda adopted with no changes
6. **Special Orders** –

   Venice Blvd. Resolution of Disapproval - Discussion and possible action regarding the process used in the recent decision to make permanent the Venice Blvd. reconfiguration. – The item was moved by Dr. Alpern and seconded by Ms. Shure. A brief discussion ensued. The motion was adopted by a vote of six ayes (Alpern, Elster, Hruska, Krupkin, Shure, and Tilson) one no (Doyno), and two abstentions (Hanna and Liu).

7. **Adjournment** – Meeting adjourned at 6:49 p.m.

Bold, underlined text indicates further details can be found in supplemental materials available at the meeting.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday November 9, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October 2016 Great Streets minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Preview of upcoming Saturday Nov. 26 Make It Mar Vista/Small Business Saturday event.

5. New Business (30-65 minutes)

   a. Jessie Holzer, CD11 Mobility Deputy. Overview of Caltrans relinquishment of Venice Blvd. and review of ideas from Great Streets Projects components.

   b. Lenore French, GCI Communications, will give a preview of plans for upcoming Thursday December 1 event Mar Vista Steppin' into Art Walk & One year anniversary.

   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday November 9, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:35 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October 2016 Great Streets minutes (2 minutes) Tabled until next meeting.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald gave a preview of the upcoming Saturday Nov. 26 Make It Mar Vista/Small Business Saturday event. The day will include live entertainment including music and dance at the Venice Vineyard location, a kid zone including a bouncy house, a craft marketplace at the Venice Vineyard location and a photo booth. The event will run from 11 am to 4 pm, weather permitting. Make It Mar Vista/Small Business Saturday Street banners are up already. The popular passport scavenger game is back. Twenty-two stores and restaurants are participating. The area covered includes Inglewood to Beethoven as well as Centinela, including the Hanger (furniture store) and the Rustic Kitchen restaurant. There is a call for volunteers, who should show up at 8 am for the event. There is also an upcoming Chamber of Commerce meeting about ID Theft Prevention Thursday 11/07/16 starting at 9 am at the Coffee Connection. Sarah also shared that new restaurant Canella Cuchina is open and delicious.

5. New Business (30-65 minutes)

   a. Jessie Holzer, CD11 Mobility Deputy gave an overview of the Caltrans relinquishment of Venice Blvd. and review of ideas from Great Streets Projects components. The tree well updates have begun. Street Services is cutting tree wells wider for root expansion, removing the existing asphalt and placing decomposed granite at each site.

   JCDecaux is working on the next street shelter placement/installation in front of the Starbucks store on the SW corner of Venice and Centinela. This should be installed within 30 days to one month.

   Jessie let us know that CD11 is looking into the mosaic hopscotch placement in the sidewalk near the Mar Vista Library. CD1 is doing an installation through the LA Neighborhood Initiative and CD11 is looking at how it will work and getting assistance/tips from CD1. Tracey Corinne is involved in planning/designing 10 squares, each 10” x 12”, for this project.

   Jessie shared that the Grandview/Pacific pavement murals and Post Office alley area are moving forward. Lenore French is making a presentation next week to Dept. of Cultural Affairs. Jessie said that Mar Vista/CD11 would be the pilot program for the LA City pavement mural project.

Jessie also discussed that CD11 Street light pole banners go up will be installed on 11/07/16 and the MV Chamber of Commerce Streetlight banners will be installed on 11/28/16.

Lastly, Jessie told the group that the relinquishment process is at this stage: Caltrans came to an agreement with LA City on a dollar amount to bring the section of Venice Blvd. to a state of good repair. LA City Council voted to accept the relinquishment. Caltrans commission voted to accept the relinquishment. The official relinquishment was around 11/01/16 or 11/02/16.

b. Lenore French, GCI Communications gave a preview of plans for upcoming Thursday December 1 event - with the official title: "Mar Vista Art Walk." This will be the One-year anniversary celebration! The theme for the December 1 event will be Light. For example: the New School West and Voyages Preschool are featuring an "Out Of the Shadows" exhibition. There will be somewhere around 40-45 participating venues. Mike Temple will have a one-man show at Trunk Gallery. There will be live music at the Venice Vineyard location at the SE corner of Venice and Centinela as well as at Timewarp Music and Grandview Market. There might be Holiday Carolers also. There will be an ArtMart - a holiday mart with 15 spaces for vendors at the Promenade Car Wash as well as a movie screen featuring light installations. The Do Good Bus will be participating again. There will be lighted Cluster signs for the three Cluster areas of the Mar Vista Art Walk as well as a Best Holiday Lights contest for all businesses and restaurants. Cluster 2 will have food truck on the North Side of Venice between Centinela and Wade. The VCA will have Yappy Hour with A. Michelle Page's Danger Dogs from Nepal Art. There will also be an after party at the Grand View Art Studios with fire dancers and other celebrations. Lenore shared that there is a call for volunteers, especially for the passport scavenger hunt, with Eric Charlot serving as volunteer coordinator. Finally, Lenore shared that Mar Vista Art Walk is again a finalist for the Art Activation Grant from the LA City Department of Cultural Affairs.

c. Public Comment
d. Future Agenda Items There was a discussion of whether to hold a December 2016 meeting. The overwhelming consensus was to have a holiday break and meet again on January 11 2017.
e. Adjournment at 7:36 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Tuesday October 25, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve September 2016 Great Streets/T&I joint meeting minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy. Overview of Caltrans relinquishment and review of ideas from Great Streets Projects components.
   b. Public Comment
   c. Future Agenda Items
   d. Adjournment

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MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Tuesday October 25, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:34 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Greg Castelnuovo-Tedesco announces the League of Women Voter's meeting (Ballot Overview) 10/27/16 at Temple Isaiah. Sarah Auerswald announced Ballotopia at City Hall 10/29/16, Michelle K announced a Proposition HHH info meeting 10/29/16,

3. Motion to approve September 2016 Great Streets/T&I joint meeting minutes (2 minutes) Sarah Auerswald made the motion, Greg Castelnuovo-Tedesco seconded it. Minutes passed.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council. Michelle mentioned the possibility of moving older trees to the Santa Monica Airport2Park area.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah discussed safety, infrastructure on Great Street Venice. She also gave a brief update on the upcoming 11/26/16 Make It Mar Vista/Small Business Saturday event.

5. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, gave an overview of the upcoming Caltrans relinquishment of Venice Blvd. and review of ideas from Great Streets Projects components. Jessie stated that has Caltrans voted to relinquish and that the final documents would take approximately 1-3 weeks. She also shared that there would be a photo op with Councilman Mike Bonin on Monday, October 31 2016 at 8:30 am on Great Street Venice Blvd. in front of the Dog Bakery at 12112 Venice Blvd. that would include sidewalk grinding and tree well discussion. There will be whole block re-faces coming eventually starting sometime in 2017 with an approximate one (1) year rollout that will include replacing/improving sidewalks on Great Street Venice Blvd., one block at a time. There was a discussion of possible mosaic placement in the sidewalk near the Mar Vista Library with Tracey Corinne and Len Nguyen planning to follow up on this item.

      Jessie stated that the next steps in relinquishment include Caltrans and LA City going through the documentation process, identifying funds and distributing them (from Caltrans to LA City), hiring contractors etc. There will be a public notification of the upcoming rollout of the CD11 Pilot Program that could include a possible re-presentation of the CD11 Pilot Program at the MVCC Board of Directors meeting either in January or February 2017. The DOT signal design group engineer is still designing the mid-block crosswalks and identifying any subterranean structures at the planned intersections.

Greg Castelnuovo-Tedesco asked questions about the protected bike lane. Jessie responded that it would resemble the Reseda Blvd. bike lane, with K71 bollards.

Jessie shared that the new Streetlight banners from CD11 will be installed on 11/07/16 and the MV Chamber of Commerce Streetlight banners will be installed on 11/28/16.
She also stated that there is progress on the pavement murals planned for Grand View Blvd. as a MOU is still circulating to move this project forward. She noted that the Mar Vista pavement murals project will be the first on in LA City to be planned and installed.

Jessie informed us about the Vision Zero Grant deadline for a request for qualification of 11/04/16. They are looking for applications.

b. Public Comment. Francois from JCDecaux gave an overview of the installation of the Smart Bus Bench/Shelter planned for Great Street Venice Blvd., to be located in front of the Starbucks store on the SW corner of Venice and Centinela. The other 14 Great Streets have had these bus shelters installed, but JCDecaux had to wait for the Caltrans relinquishment for the installation in Mar Vista to take place. JCDecaux will handle the upkeep of this item.

   Jessie Holzer shares that there might be a second Soofa Smart Bench installed by BSS on or around Great Street Venice Blvd.

   Tracey Corinne brings up the Clean Streets program and the dirty SE corner of Venice and Centinela near the Santa Monica Big Blue Bus stop. Michelle Krupkin gives an overview of what the Clean Streets program is at this point, which is more about outreach for the LA311 program and bulky items pick up.

   Sarah Auerswald also gave a further update on the upcoming 11/26/16 Make It Mar Vista/Small Business Saturday event. There will be a stage with performers at the Venice Vineyard location at the SE corner of Venice and Centinela as well as the popular passport scavenger game, a bake sale from A Kid's Place, doggie treats at the VCA and a bouncy house. Twenty businesses have signed up so far, including new restaurants like Canella Cuchina.

c. Future Agenda Items

d. Adjournment at 7:45 pm.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, October 8th, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin michelle.krupkin@marvista.org

AGENDA

1. Call To Order
2. Introductions and Public Comments for items not on the agenda (2 minutes)
3. New Business
    a. Great Streets Program brief definition –Michelle Krupkin
    b. Report from the Mar Vista Business Association on the progress of mapping all the stakeholders along the route – Sarah Auerswald
    c. October 19th Walking Tour report – Sarah Auerswald
4. Public Comment
5. Future Agenda Items
6. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, October 8th, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Minutes

1. Called To Order at 6.35pm

2. Introductions and Public Comments for items not on the agenda (2 minutes)

3. New Business

   a. Great Streets Program brief definition –Michelle Krupkin

      Project Site – Venice Boulevard from Beethoven to Inglewood
      3-5 year project to complete
      Venice Blvd. is the first of 5 projects to be completed
      CD11 want to focus on nodes, or clusters where there are businesses.

   b. Report from the Mar Vista Business Association on the progress of mapping all the stakeholders along the route – Sarah Auerswald

MVBA is waiting to be signed off as an Official Chamber of Commerce by the IRS. MVBA are tabulating a MAP – Data gathering of Businesses within Mar Vista in conjunction with Scout Idea Ranch. The businesses on Venice are thrilled at the potential improvements to come.

MVBA will have their monthly meeting 10/18/14. They will look to see if they can come up with an initial listing of small low cost improvements that will make an impact.

MVBA will also review the current Master Beautification Plan Outline and see what parts of that are still suitable and acceptable to incorporate into the Great Streets Project, which can save thousands of dollars in design fees.

On November 29th, in coordination with American Express's Small Business Saturday there will be a Sidewalk type POP UP Sale on Venice.

c. October 19th Walking Tour report – Sarah Auerswald
On Sunday October 19th there will be a Walking Tour of Mar Vista businesses in conjunction with Scout Idea Ranch. The tour starts at 11 am at Vintage on Venice (12218 Venice Blvd, Los Angeles, CA 90066) and ending at Louie's.

4. Public Comment

Chris McKinnon asked that the rest of the businesses on Venice outside the project area also be notified of the potential improvements and project.

One thing that has come to light and is a major important factor moving forward is that Venice Blvd. is still a State Highway, controlled by Cal Trans. Other beautification projects have never been able to be completed because it's a State Highway. It is our understanding that again, regardless of the Mayors Plans for this project, there will be limitations to what can be done, if anything at all on Venice.

5. Future Agenda Items
Great Streets (Mayor's Office) to attend and give an update
Daniel Tamm, West LA Mayors Representative, to come give an update
Sarah will bring slideshow of potential items that can be used in the project

6. Adjournment 7:45 pm

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, November 12, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October minutes (2 minutes)
4. Reports (10 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald
5. New Business (20 minutes)
   a. Great Streets Program Manager Carter Rubin – overview
   b. USC Graduate Urban Planning Program – discussion of their CD11 Great Streets Venice Blvd. project
   c. Policy Motion:
      WHEREAS the Great Streets Venice Blvd. project affects the stakeholders of Mar Vista,
      WHEREAS the MVCC Great Streets Ad Hoc Committee wants to get input from said Mar Vista Stakeholders,
      THEREFORE, MVCC Great Streets Ad Hoc Committee will develop and administer a survey.
   d. Public Comment
   e. Future Agenda Items
   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, November 12th, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Minutes

1. Called To Order at 6.35pm

2. Introductions and Public Comments for items not on the agenda (2 minutes) Sharon Commins spoke about the recent Urban Land Institute LA Chapter meeting.

3. Motion to approve October minutes (2 minutes) – passed.

4. Reports
   a. Great Streets Program brief definition –Michelle Krupkin
      Project Site – Venice Boulevard from Beethoven to Inglewood
      3-5 year project to complete
      Venice Blvd. is the first of 5 projects to be completed
      CD11 want to focus on nodes, or clusters where there are businesses.

   b. Report from Sarah Auerswald: the Mar Vista Business Association became an Official Chamber of Commerce and is now the Mar Vista Chamber of Commerce. They are continuing to map all the stakeholders along the route. On Saturday November 29th, in coordination with American Express's Small Business Saturday there will be a Sidewalk type POP UP Sale on Venice. October 19th Walking Tour report – Sarah Auerswald reported that the Walking Tour was a great success.

5. New Business
   a. Great Streets Program Manager Carter Rubin provided an overview of the program. He shared that Venice Blvd. is a huge canvas and that CD11 is a partner with the Great Street Department to remake Venice Blvd. in order to support the community. The LA City Planning Department is working on a plan for Venice that is part of the Westside Mobility Plan. He looks forward to continue to engage in all the opportunities for Venice Blvd. as the Initiative moves forward. The Great Streets budget will be proposed in the new fiscal year -July 2015

b. USC Graduate Urban Planning Program – discussion of their CD11 Great Streets Venice Blvd. project.
Kimmy Nguyen, John Tomilson and Arianna Martino of USC came today to discuss their project. Their goal is to deal with possible phase of the project, and give options. They shared that there is no one answer that will solve everything. They will be presenting their project at a future meeting.

c. Policy Motion for MVCC Great Streets Ad Hoc Committee survey – passed. After the motion passed, there was discussion and formulation of question material for the MVCC Great Streets Ad Hoc Committee survey. The survey was finalized for its first edition.

6. Public Comment

7. Future Agenda Items

8. Adjournment 7:58 pm

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, January 14, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve November 2014 minutes (2 minutes)
4. Reports (10 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald
5. New Business (35-50 minutes)
   a. Steven Katigbak, LA Department of City Planning - short presentation on the Westside Mobility Plan and discussion about LA Dept. City Of Planning role in the Great Streets Initiative as it relates to Venice Blvd. And then perhaps what types of outreach efforts our team can conduct moving forward. (15 minutes)
   b. USC Urban Planning Program – presentation of their CD11 Great Streets Venice Blvd. project.
   c. Discussion of on-going MVCC Great Streets survey results.
   d. Public Comment
   e. Future Agenda Items
      Great Streets Open House: January 25 9 am- 2 pm Venice & Grandview (across Venice Blvd. from the Mar Vista Farmer's Market.) Contact do@lacity.org or 310-575-8461 with questions.
   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, January 14th, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Minutes

1. Called To Order at 6:40pm

2. Introductions and Public Comments for items not on the agenda (2 minutes)

3. Motion to approve November 2014 minutes (2 minutes) – passed.

4. Reports
   a. Great Streets Program brief definition –Michelle Krupkin
      Project Site – Venice Boulevard from Beethoven to Inglewood
      3-5 year project to complete
      Venice Blvd. is the first of 5 projects to be completed
      CD11 want to focus on nodes, or clusters where there are businesses.

   b. Report from Sarah Auerswald: the Mar Vista Chamber of Commerce: Businesses on Venice should have input. One big idea: Mid-Block Cross walk between Grand View and Centinela Blvds.
      Larchmont Ave. as a possible Model.

5. New Business
   a. Steven Katigbak, along with Renata Ooms and Conni Pallini-Tipton of the LA Department of City Planning, discussed the Westside Mobility Plan (WMP) as it relates to Great Streets in West LA and Venice Blvd. in Mar Vista. Handouts on the WMP with FAQs and overviews were given out. There was discussion of the 6 study areas including: Transportation Demand Model, Mobility & Rail Connectivity Study, Parking Study, Costal Transportation Corridor, West LA Transportation and Livable Boulevards. There was also discussion of the Urban Design and Streetscapes report of the 5 West LA street sections. There will be a formal outreach for Venice Blvd. similar to the Del Rey Centinela section, possibly as part of the CD11 Jan 25 event. Streetscapes functions to document planning and vision so other city departments can implement community needs.

b. MOVED TO February 11 2015 Meeting: USC Graduate Urban Planning Program – discussion of their CD11 Great Streets Venice Blvd. project.

c. MOVED TO February 11 2015 Meeting: Discussion of MVCC Great Streets Ad Hoc Committee survey results.

d. Public Comment: Sherri Akers discussed the MILK Institute Silver Tsunami agreement – must make LA good for aging and keep in forefront for Great Streets. She also discussed the idea of the city offering possible rebates for removing sidewalk and placing with hardscape for storm water capture.

   Len Nguyen from CD 11 discussed and promoted the upcoming January 25 CD 11 event and corresponding survey. Good results from the Jan 17 event already, hoping for more from Jan. 25.

   Tracey Corrine, mosaics artist, discusses possible art projects for GS Venice Blvd. including the possibility of using streetlights and utility boxes as targets for art grants. Discussion of art projects throughout city, such as WeHo Neon Art Project, Beverly Hills High Mural Project.

   There was discussion of way station signs similar to those from the Nov. 29 2014 American Express's Small Business Saturday event, designed by Lenore French.

e. Future Agenda Items- discussion of the upcoming CD11 Great Streets open House on January 25 and survey.

f. Adjournment 7:57 p.m.

Mar Vista Community Council

Green Committee

Sunday, January 25, 2015 - 9:30 A.M.

Mar Vista Farmers Market
Grand View at Venice Blvd.
Tables Adjacent to the Post Office

Agenda

1. Call meeting to order
2. Public comment
3. Motion to approve November
4. Reports
   a. MVCC Green Tent
   b. 2015 Green Garden Showcase
   c. Neighborhood Council Sustainability Alliance
   d. Water Wise Expo
      - Presenters: G3 Green Gardens Group; Greywater Corps; LA Waterkeepers; Los Angeles Department of Water & Power; Mar Vista Green Garden Showcase; Rain Barrels International; Surfrider Ocean Friendly Gardens; TreePeople
      - Suggestions for others, or is this sufficient?
   e. Interim Stormwater Management Master Plan
5. Discussion
   a. Green Committee's role in climate change activism
   b. Car wash water recycling
6. Old business
   a. Motion to purchase a portable laptop battery charger (amended

      The Mar Vista Community Council authorizes the expenditure of up to $350 to purchase 17W Solar Charger Kit (http://www.voltaicsystems.com/17-watt-kit) and a 10' extension cord from Voltaic. The kit includes a solar panel and battery capable of charging laptops and tablets. It will be used for presentations/displays at the Green Tent as well as at Showcase Central. And be available for use by other MVCC events.

   b. Motion supporting divestment (tabled until January meeting for possible amendment)

      The climate crisis is a serious threat to current and future generations in Los Angeles and around the world. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report found that global warming is already causing costly disruption of human and natural systems throughout the world including the melting of Arctic ice, the ocean's rise in acidity, flooding and drought. Almost every government in the world has agreed through the 2009 Copenhagen Accord that any warming above a 2°C (3.6°F) rise would be unsafe, and that humans can only pour about 565 more gigatons of carbon dioxide into the atmosphere to maintain this limit. In its "Unburnable Carbon" report, the Carbon

Tracker Initiative found that of the two hundred publicly-traded fossil fuel companies with the largest coal, oil, and gas reserves companies possess proven reserves that would release approximately 2,795 gigatons of CO2 if they are burned, which is five times the amount that can be released without exceeding 2°C of warming.

The City of Los Angeles has a responsibility to protect the lives and livelihoods of its inhabitants from the threat of climate change and support a future where all citizens can live healthy lives without the negative impacts of a warming environment. To furthers these goals, the Mar Vista Community Council urges the City to:

- Review the investment portfolios of all city departments and agencies to identify any holdings that include direct or indirect investments in fossil fuel companies
- Immediately cease any new investments in fossil fuel companies or in commingled assets that include holdings in fossil fuel companies;
- For any investments in commingled funds that are found to include fossil fuel companies, contact the fund managers and request that the fossil fuel companies be removed from the funds
- Ensure that none of its directly held or commingled assets include holdings in fossil fuel public equities and corporate bonds within 1 year
- Seek out investments in opportunities to limit the effects of burning fossil fuels or help to mitigate its effects including, but not limited to, clean technology and renewable energy, sustainable companies or projects, and sustainable communities

7. New business

a. Motion to fund the Green Garden Showcase

The Mar Vista Community Council authorizes the following expenditures in support of the Mar Vista Green Garden Showcase..

Bamboo poles (for flags)	$25
Food, paper goods and utensils for Garden Hosts Welcome Event	$100

b. Motion supporting Urban Agriculture Incentive Zones motion:

The Mar Vista Community Council supports Councilmember Filipe Fuentes and Curren Price's Urban Agriculture Incentive Zones motion (Attachment A). In addition to encouraging productive uses for vacant land, the implementation of Urban Agriculture Incentive Zones in the city would also increase access to fruits and vegetables in areas that currently lack fresh foods

c. Motion regarding Sustainable Landscaping at LADWP and LA City facilities

The Mar Vista Community Council notes that the lawn at the Los Angeles Department of Water and Power (LADWP) facility at the intersection of Venice and McLaughlin has been replaced with artificial turf, non-native plants and without any grading for rainwater capture. As recent news coverage of L.A. rains showed, one inch of rain generates 8 billion gallons of runoff in the City. This urban runoff is the #1 source of ocean pollution, and could be a valuable source of irrigation, groundwater recharge, and enhancing stream flows. Also, landscapes with living soil can help sequester carbon (http://e360.yale.edu/feature/soil_as_carbon_storehouse_new_weapon_in_climate_fight/2744/). Artificial turf compacts and kills soil, generating runoff and providing no carbon sequestering benefit. LADWP's own turf replacement rebate (https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-conservation/a-w-c-landscap?_adf.ctrl-state=qhcmd28t2_4&_afr

Loop=1033234959869636) "encourages" use of "California Friendly© plants, mulch, and permeable pathways," though does not require grading for rainwater capture as well as use of climate-appropriate plants, mulch and efficient irrigation.

The Mar Vista Community Council requests that as lawns are replaced at LADWP facilities, and all other LA City facilities, they be required to retrofit following the watershed approach. The watershed approach:

- Uses rainwater as a source of irrigation;
- Creates permeable, living soil using natural woodchip mulch or leaf litter, and permeable hardscaping;
- Utilizes climate-appropriate plants and drip irrigation.

While the City is urging homeowners and businesses to replace turf lawn with sustainable alternatives, it is imperative that the LADWP and the City of Los Angeles utilize this opportunity to set an example by re-landscaping to conserve and capture water while creating a habitat that fosters the pollinators needed to support our ecosystem. Such landscaping will serve to promote environmental awareness and responsible landscaping choices by others in a highly visible setting and will ultimately save the city money in water usage, maintenance, and prevention of storm water runoff fines.

We stand ready to provide contacts and resource information as needed for assistance.

8. Public comment
9. Motion to adjourn

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Attachment A

14-1378

Motion

PLANNING & LAND USE MANAGEMENT

The *Urban Agriculture Incentive Zones Act*, AB 551 (Ting), encourages the development of vacant, unproductive land for growing food.

AB 551 allows cities, with approval from the county board of supervisors, to designate Urban Agriculture Incentive Zones. Within these zones, property owners who allow their land to be used for agriculture purposes for a minimum of five years can receive a property tax adjustment; their land would be reassessed at the average statewide irrigated agriculture lands rate.

The property tax adjustment is intended to incentivize landowners who are not utilizing their property to make it available for urban agriculture. Parcels would be eligible for the incentive if they are between 0.10 and 3 acres in size, dedicated to agriculture or animal husbandry, free of dwellings not intended for agriculture or educational purposes, and located within a zone that allows for agricultural use.

In addition to encouraging productive uses for vacant land, the implementation of Urban Agriculture Incentive Zones in the city would also increase access to fruits and vegetables in areas that currently lack fresh foods. More than 40% of low-income adults in Los Angeles County are food insecure and more than 60% of adults are obese or overweight, according to the Los Angeles Food Policy Council's October 2013 Los Angeles Food System Snapshot.

I THEREFORE MOVE that Council instruct the Department of City Planning and the Department of Building and Safety, in consultation with the City Attorney, to prepare and present an ordinance establishing Urban Agriculture Incentive Zones, and which includes the following:

1. Designate the boundaries of one or more Urban Agriculture Incentive Zones within the city and clarify zoning where food growing operations are allowed.
2. Develop a process by which the City can determine property owners' eligibility and by which property owners can apply for the incentive.
3. Develop an enforcement mechanism to ensure property owners are following local, county, and state regulations for Urban Agriculture Incentive Zones.
4. Coordinate with the County of Los Angeles the approval, establishment, and implementation of Urban Agriculture Incentive Zones as required by AB 551 (Ting), the *Urban Agriculture Incentive Zones Act.*

PRESENTED BY: _____
FELIPE FUENTES
Councilmember, 7th District

_____
CURREN PRICE
Councilmember, 9th District

SECONDED BY: _____

OCT - 8 2014

ORIGINAL

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, February 11 2015, 6:30 to 8:00 p.m.
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Minutes

1. Called To Order at 6:38 p.m.

2. Introductions and Public Comments (for items not on the agenda) (2 minutes)

3. Motion to approve January 2015 minutes (2 minutes) – passed

4. Reports (30 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin gave an overview of the Great Streets Program and some possible goals that have been discussed since the inaugural October 2014 meeting.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah discussed the possibility of a mid-block crosswalk between Centinela Ave. and Grand View Blvd., perhaps located at Mountain View Ave. This is something many Venice Blvd. merchants are interested in.
   There was a discussion of the need for parking in the area. Possibilities were discussed, such as the Grand View BowlMor lot, the USPS lot (privately owned and possibly problematic due to current federal usage) and other options such as the CVS Centinela parking lot. Sarah mentioned the next meeting of the MV Chamber of Commerce: March 2nd, 6 pm at Coffee Connection, Great Streets slideshows to be shown.
   -Slideshow of MV Chamber possible Great Streets ideas -POSTPONED until March 11 meeting

5. New Business (35-50 minutes)
   a. USC Price Urban Planning Program - presentation of their CD11 Great Streets Venice Blvd. project. (30 minutes)
   John Tomlinson and Ariana Martino gave a wonderful overview of their Great Streets Initiative Final project. Some of the goals they identified were:
   -Sidewalk repair and beautification
   -Pedestrian crosswalk opportunity & visibility
   -Clean & engage alleyway use
   - Repurpose left turn pocket

-Green Existing Surface parking lots & reroute access to side street
-Narrow traffic lanes to reduce width to 10 ft and speed limit to 30 mph
-Extend Curb to narrow pedestrian crossing distance and enhance parking
-Protect Bike Lane with Green Buffer & parked cars
-Widen and Engage Median for recreation and gathering spots
Their group also set policy goals to: increase street wall consistency & vertical density at major intersections for future development.
John and Arians had a Q&A session after the presentation.
Topics discussed included:
-Parking options such as multi-modal choices, mechanical stacked parking.
-Planning for a bus to Exposition and Bundy EXPO line from Venice Blvd.
-Bike Hub parking with long-term bike parking and bike parklets
-Sidewalk right of ways. Venice Blvd. has the widest ROWs of all the 15 Great Streets.

b. Discussion of on-going MVCC Great Streets survey results, including CD11 surveys if possible. More distribution of the MVCC Great Streets survey needs to take place, with surveys being more regularly being placed and completed at the MV Farmer's Market. More promotion of the on-line survey is needed.

Len Nguyen, Field Deputy of CD 11 shared that CD11 has gathered approximately 350 surveys and are working on putting the data into a readable form. CD11 is also working on a demo version of the January 25th CD11 info session for more outreach.

c. Public Comment -none

d. Future Agenda Items -none

e. Adjournment 7:50 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, March 11 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve December 2014 minutes (2 minutes)
4. Reports (30 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Presentation of Slideshow of possible Great Streets ideas from the MV Chamber of Commerce.
5. New Business (30-45 minutes)
   a. Emily Hope from Katherine Spitz Associates. Presentation of Greening the Boulevard Slideshow (Venice Blvd. project) (30 minutes)
   b. Beacon Miodovsky of LA Walks, a pedestrian advocacy group (15 minutes). Presentation of ideas for a campaign of wayfaring signs for Great Streets Venice Blvd.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday, March 11 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

Minutes

1. Call To Order and Welcome – Chair (1 min.) 6:40 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)-
3. Motion to approve February 2015 minutes (2 minutes)

4. Reports (30 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Presentation of Slideshow of possible Great Streets ideas from the MV Chamber of Commerce. Sarah's presentation was a highlight and focused on the following possibilities:
   -Mid-Block Crosswalk to cross Venice Blvd. at Ocean View Blvd.
   -The Use of Junction Boxes for Street Art
   -Creative Use of Streetlights/light poles
   -Possible Mural – on the Billboard base in front of Vintage on Venice
   -Bike Lane – protected from traffic
   -Sidewalk Ideas
   Examples: Tarzana, Bend OR, Pop up Broadway, Existing Bike Corral on Abbot Kinney, Parklets (Silver Lake)

5. New Business (30-45 minutes)
   a. Emily Hope from Katherine Spitz Associates. Presentation of Greening the Boulevard Slideshow (Venice Blvd. project) (30 minutes) Emily gave a lovely overview of the KSA 2008 Greening the Boulevard Design Plan that included:
   Previous and current KSA work: -Hermosa Beach Streetscape
   -San Gabriel Blvd., -Whittier Blvd. -Catalina Gateway
   -Pico Blvd. – Santa Monica (from Centinela to the Ocean)
   Overview of Greening the Boulevard:
   -Concept Master Plan
   -Goals – green the Boulevard and create a vibrant people-friendly street
   -Process: -Sidewalk, -Stormwater capture – Curb Extensions –Bike Lanes
   -Identifying Features (plants, street furniture, bike racks)

b. Beacon Miodovsky of LA Walks, a pedestrian advocacy group (15 minutes). Presentation of ideas for a campaign of wayfaring signs for Great Streets Venice Blvd. Beacon's presentation included:
   - Info about Los Angeles Walks
   - Developing a system of pedestrian way finding signage.
   -The concept of using minutes vs. Mileage
   - Current Budget and Needed Funding
   There was a discussion of possible signage for Mar Vista.

c. Public Comment -There was a short discussion of possible projects such as:
   -Possible themes for painted crosswalks for the Venice/Grandview intersections
   -Drinking fountain(s) that run off could empty into swale to water plants (LA San. Watershed may be involved)

d. Future Agenda Items
   -Jessie Holzer, Mobility Deputy of CD11, relates that they are planning more CD11 Great Streets Outreach during April to May. Please also check their website for an updated Great Streets survey.
   -Steve Kat

e. Adjournment at 7:58 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Thursday April 9, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve March 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Hyeran Lee and Justin Pascone from LA County Bicycle Coalition (LACBC). Presentation: About LACBC - what we do, past campaigns and events, different types of bicycle infrastructures. Info about funding sources and planning process (30-40 minutes).
   b. Carmen Zella, Executive Director of Do ArT Foundation, an arts organization focused on the promotion and creation of work visible in the public landscape (20 minutes). Presentation of ideas for Great Streets Venice Blvd.
   c. Steven Katigbak, LA Dept. of City Planning. Streetscape Outreach Boards presentation (10-15 minutes)
   d. Public Comment
   e. Future Agenda Items
   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Thursday April 9, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

Minutes

1. Call To Order and Welcome – Chair (1 min.) 6:30 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve March 2015 minutes (2 minutes) Passed
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
   -Tabled – Sarah Auerswald not in attendance.

5. New Business (30-65 minutes)
   a. Hyeran Lee and Justin Pascone from LA County Bicycle Coalition (LACBC). Presentation: About LACBC - what we do, past campaigns and events, different types of bicycle infrastructures. Info about funding sources and planning process (30-40 minutes). Very informative presentation that covered:
   -LACBC's history,
   -The LACBC goals to Activate, Educate and Calculate – including their past and future events,
   -Bicycle infrastructure and Bicycle Lane Hierarchy,
   -The 2015 upgrade to Reseda Blvd. in Northridge,
   -Buffered Bicycle lanes and 14 different types of barriers to protect a bicycle lane,
   -Bicycle parking examples (standard, corrals, boxes, etc.)
   -Bicycle repair stations aka Fixit
   -Deal with traffic signals and Bicycling
   -There was a short discussion about how to plan protected bicycle lanes for Venice Blvd.

   b. Carmen Zella, Executive Director of Do ArT Foundation, an arts organization focused on the promotion and creation of work visible in the public landscape (20 minutes). Her presentation included:
   -DoArt Foundation history: Creating cultural exchange is at the heart of Do Art's vision for enriching our communities.

-Examples of past projects including: Marfa, Texas, Wynwood (walls) Miami, NYC Financial District, Glendale CA (Video Art), Little Tokyo Rec. Center (mural project)
-Identify type of event: Community Gathering, Pop-up Art, Downtown Artwalks
-Revitalization examples: Worchester MA, Chicago IL, Detroit MI,
-Urban Beautification (& Identify area) -Utility Box Art example: Pasadena CA
-Function -Light installation -Little Toyko, San Pedro near Blue Whale Club
-Art on Construction Fences -Mural, Fabric Art
-Urban Beautification –Favela Paintings (Brazil), Hill Young installation, Westchester – String Art on Roof, Ned Khan – Installation: Playa Runway
Civic Protocols and Art Programming: ex: Baltimore MD Public Art, Oakland CA Public Art
-State Percent for Public Art. Classic 1 percent: Los Angeles's policy since 1989 has been to allocate 1% of all capital improvement costs to commission public artwork, whether undertaken by the City or by private developers, and the "Downtown Art in Public Places" program requires that 1% of private development costs for new commercial and market-rate residential developments be committed to involving artists in the project and enriching the Downtown Cultural Trust Fund.
- Civic Art Planning – ex. Pasadena (South Park BID: Public Art Initiatives), Santa Monica, City Initiatives such as Garden Grove (GGopenstreets.com)
-Temporary art -10 years, permanent -100 years. -CD14 project (Councilman Jose Huizar) –Photography on Bus benches through MTA Arts.
-There was also a discussion of possible art projects for Mar Vista, such as Sustainable Public Art.

c. Public Comment
d. Future Agenda Items
e. Adjournment 7:59 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 13, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve April 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Steven Katigbak, LA Dept. of City Planning. Streetscape Outreach Boards presentation (30-35 minutes)
   b. A Kid's Place – preschool. Presenter: Beacon Miodovsky. Presentation of priorities and ideas for Great Streets Venice Blvd. (15-20 minutes).
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 13, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

Minutes

1. Call To Order and Welcome – Chair (1 min.) 6:38 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve April 2015 minutes (2 minutes) – waived until June 2015
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah reported that there is still strong interest in a mid-block crosswalk. Connie Pallini-Tipton from LA Dept. of City Planning mentioned that DOT requires a full pedestrian signal at a midblock crosswalk. Sarah said that the MV Chamber would like to use the November 2015 Small Business Saturday Platform to unveil their first project for Great Streets CD 11 Venice Blvd.
5. New Business (30-65 minutes)
   a. Steven Katigbak, LA Dept. of City Planning. Streetscape Outreach Boards presentation (30-35 minutes). Steven gave a very comprehensive presentation, which included Outreach Boards from the upcoming 5/31/15 LA City Dept. of Planning's Westside Mobility Plan charette that took place at the Mar Vista Farmer's Market.
   Topics included:
   -Difference between Great Streets (short-term) vs. Westside Mobility Plan (long-term) plans for Venice Blvd.
   -General Character of Venice Blvd.
   -Sidewalk Safety
   -Trash Receptacles
   -Street Furniture (and Color Options)
   -Pedestrian Lighting
   -Street Trees
   -Sidewalk Landscaping
   -Stormwater Treatments
   -Crossing Improvements
   Steven will look to share results in the near future.

b. A Kid's Place – preschool. Presenter: Beacon Miodovsky. Presentation of priorities and ideas for Great Streets Venice Blvd. (15-20 minutes).
Beacon and Naomi Shadis from A Kid's Place presented background of their organization and results from their survey:
-Background – AKP is a preschool located on Venice Blvd. between Grand View and Centinela (comprising 9000 sq. ft. inside/1000 sq. ft outside) serving 125 students ages 5 mos. to 5 years old from approximately 100 families.
Survey results; there is interest in the following:
-Trashcans on Venice Blvd. -potentially possible through a BID
-Midblock Crosswalk or Crosswalk Median designs (ex Washington & Wade)
-Interactive Art for Children –tile mosaic, inlaid hopscotch, art, stone sculptures, wall art
-Survey results for six questions:
-1. How often do you visit downtown Mar Vista between Centinela and Inglewood?
2. How long/how often do you stay in the area?
3. What would entice you to stay longer? –better parking, more businesses
4. What/Where do you visit?
5. Please rank potential improvement ideas:
-50% wanted more parking in the area as an improvement
-40% wanted more beautification – plants/artwork
-additional survey takers wanted more crosswalk safety, set backs, bicycle lane improvements
6. Additional Comments by Survey takers
Overall, there were many great ideas that were brought up as a result of the survey. Beacon will gladly share the survey with any interested parties.

c. Public Comment
d. Future Agenda Items
e. Adjournment 7:57 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 10, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve April and May 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Brainstorming session for Great Streets Challenge Grant Application (40 minutes).
   b. Public Comment
   c. Future Agenda Items
   d. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 10, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

Minutes

1. Call To Order and Welcome – Chair (1 min.) 6:33 pm.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)

   Jessie Holzer, CD11 Mobility Deputy, shared that CD11 has identified funds in the amount of $5000 for the purpose of placing artwork on DOT utility boxes in Mar Vista. Daniel Osztreicher of CD11 will be working to identify five (5) boxes that will be selected for this project. There are three (3) DOT utility boxes that are located on the Great Streets section of Venice Blvd. that will be part of the five (5) to be selected.

3. Motion to approve June 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Mar Vista Chamber of Commerce's possible partners for the Great Streets Challenge Grant will be Green Communications Initiative, CD11, Mar Vista Community Council, Vineyard Church, Venice High School and Grand View Elementary School. Additional partners are also possible.
5. New Business (30-65 minutes)
   a. Brainstorming session for Great Streets Challenge Grant Application (40 minutes). Discussion centered on possible aspects of the Mar Vista Chamber of Commerce Nov. 28 Event – Small Business Saturday. Sarah Auerswald spoke about possible activities for the day: a map game -a game with retail/stores giving out stamps to collect and enter in a final game, live music and other entertainment on a stage, food vendors giving out samples, Ecocab/pedicabs (possibly sponsored by local businesses) shuttling between businesses, a temporary community mural, booths for home-based businesses, way finding signs (each possibly to be assigned to a different

artist), collection of data from shoppers through social media posts and business surveys.
Beacon Miodovsky gave an overview of ideas for her separate event, Artify Mar Vista. She discussed five (5) possible art projects for Great Streets Venice Blvd. including 3D street artists, possible painting of crosswalks, a hopscotch art project, a fence decorating art project using recyclable materials and a set of alphabet letters hidden for kids to discover.
Hyeran Lee of the LA County Bicycle Coalition discussed possible ideas such as temporary bike lanes during the Nov. 28 event, giving out extra stamps for the map game if participants bike/walk on Small Business Saturday. Hyeran discussed how a protected bike lane could be complicated but still feasible. It might include reflectors, rolling planter boxes, and other elements. Jessie Holzer of CD11 said that there might be DOT money for a temporary bike lane.
Tom Sipalia of the Watershed Protection Division of LA Sanitation discussed growing gardens on pallets and options for capturing storm water. He also mentioned that it is possible to cut asphalt to put planters in as a storm water treatment.
Greg Tedesco of the Mar Vista Chamber discussed the possibility to customize planter boxes; for example schools could each take a planter to decorate, texture could be created with leaves, recycled products such as plastic could be used.
Michelle Krupkin suggested that Sarah Auerswald and Beacon Miodovsky might want to consider combining their efforts as one team going forward.

b. Public Comment -Tiffany Robinson from Alta Planning + Design gave a presentation of projects that her company has done. These included Revitalization Projects, Pop-up projects/events and Edible parkways. She gave a lovely power-point presentation that gave an overview of projects such as Sweet Auburn in Atlanta GA, Yonkers NY Lawrence Street Festival, Rochester NY, Troy NY events that included edible gardening. Many of these projects included installing temporary bicycle lanes and Blvd.'s using tape and other markings and temporary street closures.

c. Future Agenda Items

d. Adjournment 7:53 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday July 8, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Justin Pascone, Great Streets Studio (prev. LACBC) and Jessie Holzer, Mobility Deputy, CD11. Discussion of a Great Streets event in the pedestrian zone for the August 9 (Culver City meets Venice) CicLAvia event and thoughts for activating this space.
   b. Lisa Cahill, Director of Sustainable Solutions, Treepeople. Discussion of possible planting solutions along Venice Blvd., including drought-tolerant, low-water native plant options.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday July 8, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:35 p.m.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2015 minutes (2 minutes). Passed.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah reported that the Mar Vista Chamber of Commerce partnered with several groups to submit a Great Streets Challenge Grant application for GS Venice in CD11. Sarah described the project and spoke about the various aspects of the event, including the pop-up bike lane. Another team that submitted a Great Streets Challenge Grant application was the homage to bee keeping. Sarah also discussed with Malia Schilling of CicLAvia about coordinating efforts for the August 9th CicLAvia event.

5. New Business (30-65 minutes)
   a. Justin Pascone, Great Streets Studio (prev. LACBC), Malia Schilling of CicLAvia and Jessie Holzer, Mobility Deputy, CD11. Discussion of a Great Streets event in the pedestrian zone for the August 9 (Culver City meets Venice) CicLAvia event and thoughts for activating this space. Jessie and Justin discussed the various aspects of the August 9th CicLAvia event, including the block long pedestrian zone to be located in Mar Vista from Centinela to Grand View on Venice Blvd. There was also discussion of parklets for the event. There was a discussion of Great Streets ideas for CicLAvia such as possible parklet activities; Games such as Big Tic Tac Toe, Chess and Bocci ball are all options. There will be spray-chalked icons celebrating the parklets. Malia Schilling discussed the various water features that will be present, such as the water fountain from water hydrants and bottle fill stations. Justin spoke about DWP's sustainable hub that will feature low water fountains, solar panels, and EV chargers. Justin said that there will be a LA Public Library booth featuring Mar Vista Library and a mobile library. Michelle offered to email Justin info on the outreach bilingual contact person for LAPL.

Malia mentioned the outreach for CicLAvia in Mar Vista and other areas. There were two rounds of door-to-door outreach and CicLAvia briefings at various community meetings in Venice, Mar Vista and Culver City.

Jessie also discussed the August 6th CD11 Great Streets Community Meeting that will feature the unveiling of the Venice Blvd. Great Streets Plan. It will be a reflection of the input received from all the CD11 Stakeholders.

b. Lisa Cahill, Director of Sustainable Solutions, Treepeople. Discussion of possible planting solutions along Venice Blvd., including drought-tolerant, low-water native plant options. Lisa was unable to attend, but luckily Linda Eremita, Forestry Education Manager at Treepeople was able to attend and gave a wonderful presentation.
Linda shared two highly informative handouts: 1. City of Los Angeles Approved Street Tree list and 2. CA Native Plants – A Starter List. Linda also gave a presentation that covered many relevant aspects such as existing landscape, appropriate size – choosing the largest canopy that is appropriate for the site. Linda also went over storm water capture options and curb cuts.
Next she discussed the five different criteria for choosing appropriate plants: 1. Climate 2. Planting width 3. Soil texture 4. Soil permeability 5. Possible obstructions.
Linda shared that it is critical to choose plants the fit the site, such as plants that won't outgrow the panting space. As far as climate type, the Southern California climate is Sunset Climate Zone 22, a Mediterranean climate with mostly long dry warm to hot summer and cool to moist winters.
Linda stressed how important it is to choose plants with the same water needs in one area; i.e. put low water plants with other low water plants.
She discussed a helpful website called WUCOLS IV: Water use Classification of Landscape Species. The website for searches is:
http://ucanr.edu/sites/WUCOLS/Plant_Search/
Linda next considered parkways and medians and how they can fit into proper landscape planning. It is best to avoid monoculture and instead plant for diversity with a mix of annuals and perennials.
Linda also mentioned how to plan for a business district. A taller tree with a canopy above a building is best to avoid canopy-blocking signage.
Lastly, Linda shared info about a mobile phone application called TreemapLA that would be useful to help with a Venice Blvd. inventory of current plantings.
https://www.opentreemap.org/latreemap/map/

c. Public Comment
d. Future Agenda Items
e. Adjournment at 7:53 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 12 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve July 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, Mobility Deputy, CD11. Discussion of pilot programs for Great Streets Venice and update on feedback from the concept plan and parklet.
   b. Public Comment
   c. Future Agenda Items
   d. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 12, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:40 p.m.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Sharon Commins commented that there should be better tree spacing the MV business district. Trees should be planted where two (2) buildings meet.

3. Motion to approve July 2015 minutes (2 minutes). Passed. 11-0-0
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin

   b. Report from Mar Vista Chamber of Commerce member Lenore French.
      Lenore reported that the Team Make It Mar Vista was awarded a Great Streets Challenge Grant. Lenore went on to report on funding efforts and to state that 8/21/15 is the deadline to give towards the project and have funds matched on ioby.org. Lenore described the project and spoke about the various aspects of the event, including the art projects and the pop-up bike lane.

5. New Business (30-65 minutes)
   a. Jessie Holzer, Mobility Deputy, CD11. Discussion of the year's worth of events leading up to the unveiling of CD11's pilot programs for Great Street Venice Boulevard. Jessie reviewed the overall process, which included the following: the January 25 2015 Mar Vista event with Mayor Garcetti and Councilman Mike Bonin leading a walking survey of Mar Vista; the April 2015 push for input at key locations such as the Venice Grind, Venice High School, the Mar Vista library and May 2015 data analyzing. Jessie discussed the various aspects that CD11 heard feedback as being key priorities for MV Stakeholders, such as: midblock crosswalks (to shorten crossing distances), protected bike lanes, (separation between bides and cars), more trash cans and collection, drought tolerant plants, community art and a more balanced transportation system.

      Councilman Mike Bonin said that he was impressed with the large outreach and feedback.

      Jessie went through the overview of what the CD 11 pilot programs will look like. The pilot protected bicycle lane will consist of temporary striping and signage as well studies before and after the implementation of the temporary pilot program.

      Justin Pascone of the Great Streets Studio shared that there have been 180 survey responses since the unveiling of the pilot program. 76% of those surveyed agreed with

the pilot program, while 14% were maybe responses and 10% disagreed. In terms of the pop up parklet idea, 100% like the concept.

Jessie discussed the pilot program midblock crosswalks project. They would be implemented the same time as the protected bike lanes, which would be Winter 2015/Spring 2016. There would be four additional crossings on Venice: Mountain View Blvd., Ocean View Blvd., Boise Avenue and Meier Street.

Jessie stated that there are currently no targeted locations yet for art or landscaping, but they are projects that would be part of the pilot program eventually.

Jessie and Justin then opened up the discussion to questions.
Greg Tedesco discussed using secondary streets for bike heavy traffic instead of Venice Blvd. so that bikes would be yielded to on these secondary streets.
Robin Doyno said that bikes may not want to ride where card are.

Steve Wallace mentioned his concern with cut-through traffic. He gave an example of an event on Venice and Sawtelle the prior year that caused cut through traffic.
How can we avoid cut through traffic? Steve Wallace brought up the example of a Larchmont type area but had concerns for cut through traffic.

Councilman Mike Bonin said that some streets may need protection from cut through traffic. He also shared that this pilot program is to figure out what a protected bike lane would be like and if it is workable.

Nat Gale of Great Streets Studio also responded to the cut through issue that the Dept. of Transportation (DOT) will need to gather data for potential impact(s) in more detail. Nat also stated that we have to determine how we want Venice Blvd. to serve Mar Vista. Venice should be the Main Street for Mar Vista.

Jessie Holzer said that the pilot program will be constantly monitored and evolving.

Sharon Commins brought up a concern that when Beethoven and Centinela get backed up, Wade gets cut through traffic. She likes the idea of a protected bike lane but is apprehensive that that a rapid transit street like Wilshire may take away from the character of the Mar Vista neighborhood.

There was some discussion of potential for bottleneck traffic and the timing of traffic signals at Venice and Lincoln and the bottleneck and gridlock that occurs there.

Greg discussed right turn barriers to prevent cut-through traffic.

Lenore French brought up her concerns arising from biking to work twice a week from Mar Vista to Century City. She mentioned clean air and preferring the most direct route. She shared that there are many concerns and thoughts among cyclist, but that we have to start somewhere and the CD11 Great Streets pilot program is a place to start. She referenced an online video of improvements to a Hollywood intersection.

Councilman Mike Bonin shared how many elements will change the character of Venice Blvd., such as mid-block crosswalks and curb bumpouts. He also discussed how the feel of less traffic lanes may cause the feel of driving slower and that consequently the street may become more alive. It is hard to predict what will happen.

Damien Newton of LA Streetblogs said that a road diet impact is hard to predict. It would be nice to consider bike boulevards. He also shared how scary the school drop-

off areas can get scary during rush hours and gave the example of Richland Elementary and Mark Twain Middle School.

Greg spoke about Montreal being a walkable city with not that much in terms of barriers, protectors but tons of striping, bike corrals and bike rentals.

There was a short discussion with Nat Gale and Councilman Mike Bonin discussing a Bike Share system that is meant to augment other transportation. Metro Bike system is looking to come downtown with possible docking stations or leave anywhere areas.

The discussion steered back to the mid-block crosswalks. Jessie shared that DOT requires these to be fully signalized but would not want to use in-pavement flashers. The design is not done yet.

Steve Wallace wondered if midblock crosswalks would also be stops for bikes as well.

Councilman Mike Bonin stressed the importance of continuing community engagement with mini-surveys and perhaps zone director studies. Both the councilmember and city staff promised that adjustments to the pilot could be made quickly if needed.

Jessie indicated that the Department of planning is working on a long-term streetscape for Venice Blvd.

Steve Wallace asked what the budget was.

Nat Gale expressed that there is a 1.5 million dollar budget for pilot programs for any street. For example, Caesar Chavez is doing curb radius treatments at 4-5 intersections vs. Mar Vista doing bollards (barriers) on Venice for a protected bike lane, spacing 1 per every 5 feet. These would be drilled into the ground plastic bollard but removable (model K71) like the Reseda Avenue protected bike lane in Northridge.

There was some discussion of getting the DOT engineers to attend the November 28 2015 event Make It Mar Vista to observe the pop up protected bike lane in order to better plan for the pilot launch.

Sharon Commins commented that with any surveys that are done, it is important to be sure that Mar Vista stakeholders are selected to fill out surveys for accurate results.

b. Public Comment
c. Future Agenda Items
d. Adjournment at 7:57 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday September 9 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve August 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
      1. Info about the LA County Community Impacts Arts Grant (CIAG).
   b. Report from Mar Vista Chamber of Commerce members.
5. New Business (30-65 minutes)
   a. Jessie Holzer, Mobility Deputy, CD11. Discussion about making some of the 11/28/15 Make It Mar Vista event art projects more permanent and brainstorming about other possible art ideas for the Great Streets corridor.
   b. Lenore French, GCI. Discussion of planning for a possible Mar Vista Art Walk and ArtZone.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday September 9, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:39 p.m.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)

3. Motion to approve August 2015 minutes (2 minutes). Lenore French called the motion and Robin Doyno seconded. Passed. 15-0-0
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
      1. LA County Community Impacts Arts Grant (CIAG) info was discussed.

   b. Report from Mar Vista Chamber of Commerce member Elaine Wood.
      Elaine discussed the upcoming 11/28/15 Make It Mar Vista/Small business Saturday event. She reported that the Team Make It Mar Vista is still accepting sponsors. Elaine went on to report on the planned pop-up bike lane and bike parade.

5. New Business (30-65 minutes)
   a. Jessie Holzer, Mobility Deputy, CD11. Discussion about making some of the 11/28/15 Make It Mar Vista event art projects more permanent and brainstorming about other possible art ideas for the Great Streets corridor. Jessie shared that CD11 is forming a committee to judge art submissions for the CD 11 Mar Vista Utility Box Art project. Contact Daniel Osztreicher at CD11 (Daniel.Osztreicher@LACity.org). Jessie said that there would be about (20) total utility boxes with approximately five (5) on the Great Street Venice Blvd.

      Beacon Midovsky gave an overview of the six art projects that will be a part of Make It Mar Vista event. They include:
      1) Art mural of Make It Mar Vista (paint by numbers).
      2) Chalk Street writing
      3) Wheelchair art art project
      4) Mosaic hopscotch board – Tracey Corinne
      5) Finding ABCs – Estefani Akmari of Umbrella Art Studio.
      6) Fence Decorating Project

      Lenore French of GCI commented that one of the goals of the 11/28/15 Make It Mar Vista event is to function as a pre-pilot program for art on Great Streets Venice Blvd.

      Eames Demetrios discussed his art and working in an alternate universe. He shared examples of his art such as concrete forms that use an underwater language, stone carving, stories about birds collecting shapes, toys so smart they go back in time.

The group discussed mural painting. Mitchelito Orquiola expressed his interest in doing a mural. He discussed having a mural that was worked on by several artists. The example of making murals with Beautify Earth was considered.

Michelle Pine-Rappaport brought up the possibility of street furniture art/furniture art. How could we do street furniture for Make It Mar Vista?
Jessie Holzer mentioned the concern of having to obtain permits for such items. Further investigation would be needed as to feasibility of such a project.

Esther Pearlman knows of decorated art furniture by another artist in a group art show that she is participating in Saturday September 12 2015.

Jessie Holzer mentioned the concern of having to obtain permits for such items. Further investigation would be needed as to feasibility of a street art furniture project.

Lenore French discussed a 2012 study by the National Trust for Historic Preservation on how to create art zones. Lenore explained that Venice Blvd. has several galleries from Centinela to Beethoven and that there are already things happening on Venice Blvd.

Eames Demetrious asked about permanent vs. temporary projects.
Jessie Holzer replied that CD11 was hoping to have artwork there for a decent amount of time.

Elaine Wood mentioned that the 11/28/15 Make It Mar Vista event was planning to have surfboards to serve as markers for shuttle shops, each decorated by an artist, planning for eight total. These could perhaps be part of a permanent art project.

Jessie Holzer also discussed speaking with DOT about decorated crosswalks, which would need a maintenance agreement.

b. Lenore French discussed creating an Art Zone and an Art Walk for Mar Vista. She shared a handout with the group. Her company, Green Communications Initiative (GCI), is also involved with way finding to encourage walkability, such as on Great Street Venice Blvd. Lenore considered the existing challenge of the area functioning as an art walk location since there are two (2) blocks of residential area on either side of the galleries located on Great Street Venice Blvd. Lenore discussed community art projects and the idea of being able to move forward using the will of people to help. She stated the need to examine how often to have events. She explained about the ancillary benefit of art walks and art zones. Lenore also mentioned the need to distinguish a Mar Vista Art Walk from Venice or DTLA art walks.

   Negar Shariatmadari mentioned possibly incorporating the Mar Vista Farmers Market with respect to art projects or art walks.

   Mitchelito shared that the Atmosphere Cafe has monthly art events and that Grand View Fine Arts Studios has open houses on the first Sunday of each month.
   He also brought up the idea of have a live painting event, perhaps in the residential area of perhaps in the cul-de-sac in the Vintage on Venice/LA Brakeless area.

   Elaine Wood said that she recently met with Scout Idea Ranch - which might be a good location for live painting to take place during the 11/28/15 Make It Mar Vista event.

Mitchelito said that he works with a partner and has already done projects with them that from start to finish take three (3) hours for live painting.

Jessie Holzer mentioned the question of having art inside vs. outside and the possible need for Caltrans/LA City permits depending on whether private driveways, parking lots or sidewalks are used for live painting locations.

Lee Ann Goya brought up the concept of having art walks be similar to progressive dinners with art and private screenings.

Esther mentioned a program airing on PBS on the subject of art walks that might be a good reference

c. Public Comment
d. Future Agenda Items
e. Adjournment at 7:57 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday October 14 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve September 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Team Make It Mar Vista. Planning for the 11/28/15 Make It Mar Vista/Small Business Saturday event. Discussion of outreach for volunteers and materials.
   b. Lenore French, Green Communications Initiative (GCI). Update on planning for a December 3 2015 Mar Vista Art Walk and ArtZone. Discussion and voting for an official name for the Mar Vista Art Walk.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday October 14, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:34 p.m.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Michelle announced that AB810, an act to amend Section 301 and 487 of the Streets and Highways Code was introduced by Sebastian Ridley-Thomas, and was approved by Governor Jerry Brown on October 7 2015. The bill was amended to read: "…the commission may, upon terms and conditions approved by it, relinquish to the City Of Los Angeles Route 187 within the city between the route's western terminus at Lincoln Boulevard (approximately postmile 3.5) and its eastern terminus at Cadillac Avenue near Route 10 (approximately postmile 8.9), if the department and the city enter into an agreement providing for that relinquishment." This action will hopefully speed up the future ownership of Venice Blvd. (Route 187) by the City of Los Angeles.
3. Motion to approve September 2015 minutes (2 minutes). Sarah Auerswald called the motion and Lenore French seconded. Passed. 8-0-0
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin.

   b. Report from Mar Vista Chamber of Commerce member Sarah Auerswald.
      Sarah stated that Team Make It Mar Vista was going to be the first Challenge Grant recipient to launch their event, Make It Mar Vista/Small Business Saturday, which will be held on Saturday, November 28 2015. Sarah shared that there are 125 businesses along Great Street Venice Blvd. from Inglewood Blvd. to Beethoven Street. She has been attending Caltrans and DOT meetings to prepare for the event.

5. New Business (30-65 minutes)
   a. Team Make It Mar Vista. Planning for the 11/28/15 Make It Mar Vista/Small Business Saturday event. Sarah Auerswald discussed that she had sourced a group of volunteers from the SMC Sustainable Works class. Storage may be an issue for advance materials. Sarah spoke about the large planters that will be used as bike lane barriers. There are donated plants for them already and a date will be set to do the planting as well as a date to build the planters. The bike parade will take place along the entire Great Streets Venice Blvd. while the pop-up bike lane will only between Centinela Ave. and Grand View Blvd. There will be approximately 4-5 parklets along Great Streets Venice Blvd. during the event. Sarah stated that she has sourced a free shuttle (golf cart) for the event that will transport people along the entire route.
      There will be a stage with entertainment that has been booked. Councilman Mike Bonin will be giving a speech at 11 am to kick off the event. Major Garcetti has been invited, as has State Assemblyman Sebastian Ridely-Thomas.

Tracey Corinne spoke about her mosaic art project that is planned for the event. She will have tile pre-cut and will be building stepping stones with ocean themes that will be placed in a hopscotch pattern near the lawn in front of the Mar Vista Library.

Sarah related that there will be photographers to document the event as it is important to document how people interact with Great Streets Venice Blvd. and also how people may want to interact with the area in the future. There will be data collection for the bike lane, walking, art projects and other projects as well as surveys for some participants.

b. Lenore French discussed the creation of an Art Zone and an Art Walk for Mar Vista. Mitchelito Orquiola is also working on this with Lenore. They have polled gallerists in Mar Vista and artists at the Grand View Fine Art Studios and decided that December would be good for a first MV Art Walk. The date for the inaugural event will be Thursday, December 3, 2015 from 6 pm to 9 pm. Lenore shared that what will distinguish the Mar Vista event from other events (such as the Venice Art walk and DTLA Artwalk) will be that it will include all of the arts, such as spoken word, kids, craft arts and Kenpo martial arts.

   Mitchelito discussed the use of the billboard that is located in the cul-de-sac in the Vintage on Venice/LA Brakeless area. He will be repurposing a billboard wrap to advertise the December 3rd event. Artists will paint on it and there will be sponsors' info placed at the bottom. Demetrious of Venice Grind will be a sponsor as will John from Louie's of Mar Vista.

   Lenore stated that there would be 3 clusters of art on December 3rd.
   The first cluster would be to the east from Grand View Blvd. to Centinela Ave. and would include the Grand View Fine Art Studios.

   The second cluster would be the North side of Venice from Centinela Ave. to Stewart and/or Wade. This includes Dream Echo, which repurposes household items as art objects.

   The third cluster would be from Moore St. to slightly west of Beethoven St., and include both the north and south sides and would include Trunk, Buckwild, Pieces Community Organization, Moving Joint, Veganics, the Changing Room and the Vanity Room.

   The next event will be planned for Thursday March 3, 2016.
   There was a vote for a name for the event. There were two options:
   1) Steppin' into the Art of Mar Vista
   2) Art Strides
   The first option won.

c. Public Comment There was a few questions for the CD11 reps Jessie and Len about the Three (3) utility boxes for art project. Would any be done by the 11/28/15 event?
   Daniel O. and Bill Koontz were working on this, but not sure.
   Sharon Commins said that we were lucky to have so much support from CD11.
d. Future Agenda Items
e. Adjournment at 7:44 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Thursday November 12 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin

   b. Report from Mar Vista Chamber of Commerce member.

5. New Business (30-65 minutes)
   a. Discussion of planning for the 11/28/15 Make It Mar Vista/Small Business Saturday event.

   b. Lenore French, Green Communications Initiative (GCI). Update on planning for the December 3 2015 event: Steppin' into the Art of Mar Vista.

   c. Discussion: Smart Bus Benches for Great Street Venice Blvd.

   d. Public Comment

   e. Future Agenda Items

   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Thursday November 12, 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:36 p.m.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Robin Doyno announced that the first utility box would be painted soon as a pilot for the utility box art project. Located at Grand View and Venice, the utility box is to contain images of 4 jazz musicians: Miles, Mingus, Charlie Parker and Billy Holiday.

   Patty Jausoro, of Safe Streets Silverlake (SSS), spoke about her experience with the Rowena Road Diet in her Silverlake neighborhood as it related to the upcoming Road Diet pilot program for Great Street Venice Blvd.

   Patty's experience stems from her Silverlake neighborhood traffic intensifying when nearby Rowena Avenue was reduced from four lanes to two lanes. The plan was nicknamed the "Rowena Road Diet."

   Patty shared how they were told it was initially to be a temporary program that would last three months. Two traffic lanes were taken away on Rowena between Glendale and Hyperion Blvds. after a fatal pedestrian accident in 2012. Then Councilman Tom LaBonge pushed for the change, which also added a center turn lane and later added two bicycle lanes.

   Patty spoke about the huge uptick in traffic that created cut through traffic on several streets. Most of these streets do not have sidewalks and some have street parking on one side of the street only. It is unsafe for kids for walk to school on these cross streets and unsafe at times for homeowners to get their mail.

   Patty said that this is a habitual problem with or without the Waze app. On Angus Street, there are an average of between 600-800 cars per hour during rush hour.
   Additionally, Patty spoke about how there were no additional mitigations such as traffic islands or additional cross walks added as well as no new bus routes.

   There has been no improvement to that area since traffic is going just as fast during non-rush hour times. In the last 48 hours prior to the 11/12/15 meeting, there were two accidents on Rowena. One month ago, a pedestrian was hit and injured at the T intersection who may never walk again.

   Patty's group asked DOT what the intention of the Road Diet was and did not get a real answer. DOT said that they thought traffic rates would decrease.

   Patty shared that DOT had an intern perform traffic studies via a hand count method after the Road Diet and they were not thorough or accurate with their studies. Safe Streets Silverlake group did traffic surveys as well and found that over the period of six (6) hours, there were 90 bicyclists. Per hour, there were 1000 cars in each direction.

Parking is also a concern as there are only 25 parking spaces on one side of the street.

Sharon Commins gave an overview of low-density concept.

Nat Gale, of the Great Streets Studio, discussed an overview of the surveys done by Council District 11 in Mar Vista. Stakeholders gave the feedback that Great Street Venice Blvd. should not be a highway, but should be a Main Street. Nat Gale stressed that the Great Street Venice Blvd. Road Diet is a pilot program only. There will be pneumatic tube studies and intern hand counting of traffic prior to the implementation of the Road Diet.

Nat Gale said that the design process for Great Street Venice Blvd. Road Diet was currently taking place and that the implementation would be during early to mid 2016.

Patty said that Safe Streets Silverlake (SSS) had met with current Councilman David Ryu who wants to work with the community on fixes. Patty also share that SSS was told by DOT that a reversal of the Rowena Road Diet would be expensive, including the DOT paint needed to restripe.

Nat made a note that he would look into that and try to reach out to those affected by Rowena Road Diet, even though it is not a Great Streets project.

There was a discussion of mid-block crosswalks and the need to align of traffic lights.

3. Motion to approve October 2015 minutes (2 minutes) was tabled for time consideration.

4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin.

   b. Report from Mar Vista Chamber of Commerce member was tabled.

5. New Business (30-65 minutes)
   a. Discussion of planning for the 11/28/15 Make It Mar Vista/Small Business Saturday event. Volunteers are needed.

   b. Steppin' into the Art of Mar Vista was discussed. Lenore was unable to attend due to a family medical emergency, but interested parties (for volunteering, etc.) were told to contact Lenore through Facebook and Twitter.

   c. There was a short discussion and overview of Smart Bus Benches for Great Street Venice Blvd. There is the issue of Caltrans still owning the Blvd. and possible locations for the Smart Bus Benches being limited. The Smart Bus Bench, being an LA City and Great Streets project, will be located on the south side of Venice in front of the Mar Vista Library.

   d. Public Comment
   e. Future Agenda Items
   f. Adjournment at 7:51 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday December 9 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October & November 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
5. New Business (30-65 minutes)
   a. Sarah Auerswald, Mar Vista Chamber of Commerce President and Make It Mar Vista Challenge Grant Team. Assessment of the 11/28/15 Make It Mar Vista/Small Business Saturday event.
   b. Lenore French, Green Communications Initiative (GCI). Assessment of December 3 2015 inaugural event: Steppin' into the Art of Mar Vista.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday December 9 2015, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:36 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October & November 2015 minutes (2 minutes) Sarah Auerswald moved to approve, Tracey Corinne seconded. Minutes passed 5-0-0.

4. Reports (15 Minutes)
   a. Great Streets Program brief definition -Michelle Krupkin

5. New Business (30-65 minutes)
   a. Sarah Auerswald, Mar Vista Chamber of Commerce President and head of the Make It Mar Vista Challenge Grant Team reported that the 11/28/15 Make It Mar Vista/Small Business Saturday event was a huge success that featured interactive art projects, live entertainment, a collaborative local "living history" project, pottery and Pilates demonstrations, a community bike ride and various other activities among 34 participating businesses. The block of Venice between Grand View Boulevard and Centinela Avenue was reduced from three lanes of traffic to two in order to demonstrate how parklets and protected bike lanes could further transform that whole corridor into an even more bicycle- and pedestrian-friendly environment. Mar Vista businesses saw great attendance on 11/28/15. Some businesses reported as much as five times the normal sales from the event and others reported twice last year's sales. The bike parade was a great success as was the tricycle derby. Storycore collected stories at the 826LA site. 826LA was very happy with the turnout and foot traffic. There was a ribbon cutting for Sweet Lucie's, which included President Obama's Cabinet member Administrator Maria Contreras-Sweet of the Small Business Administration. There was a brief general discussion of the budget from the Challenge Grant, some of which went into pre-production, the remainder being used for the event production. There was some trouble with parking signs that did not come on time from DOT. There were also some Caltrans issues, since their permit came only four days before the event. The event staff did a great job of engaging people for the survey. The survey data from the event is still being compiled. A few tips for next time were discussed: the event could have used more signs to delineate parking; the team could have used twenty more volunteers/key staff. Lilly O'Brien of Great Streets and Len Nguyen commented that the Venice Blvd. relinquishment from Caltrans is still being worked on and that the pilot program might

go forward even if the relinquishment is not complete. More pre-pilot program traffic counts were taking place on Venice Blvd. this week.

b. Lenore French of Green Communications Initiative (GCI) reported on the December 3, 2015 inaugural event: Steppin' into the Art of Mar Vista. The event took place around the one-mile stretch of Venice Boulevard between Beethoven Street and Inglewood Boulevard, with live painting to music and dance at Grand View Market and Vintage on Venice, improvisational live music and dance jam at The Moving Joint, spoken word at youth writing nonprofit 826LA's Time Travel Mart, a concert at TimeWarp Records, art performances by young adults affiliated with the nonprofit Pieces Art at Buckwild Gallery, art openings at the Trunk Gallery and C. Nichols Project, plus an environmentally themed scavenger hunt for repurposed household goods hosted by Dreameco Crafts. Full-Circle Pottery and Peach Tree Pottery also each hosted live clay-molding demonstrations. It was a great success with a wonderful turnout. Feedback was generally positive, with art encouraging people to get out of their cars and walk. A mural, painted by artist Mitchelito Orquiola and art partner Chalavie (a.k.a. Charlotte Vanhaecke) was hung on a billboard above The Venice Grind on Nov. 30, to attract, announce and advertise the art walk. There was no problem with sidewalk events, which actually had more foot traffic. The bands that performed were great! Clusters 2 and 3 were quite crowded. The next event, planned for March 3 2016, may go four hours instead of three.

c. Public Comment. Tracey Corinne discussed the possible placement of the hopscotch tiles that were created during the 11/28/15 Make It Mar Vista/Small Business Saturday. It was determined that Sarah and Tracey would meet with CD11 staff to continue the process of placing the hopscotch tiles as a functional art piece on the Venice Blvd. sidewalk.

d. Future Agenda Items: In 2016 there may be more transit items on agendas as we near the expansion of the Expo Line and it's potential to interface with Great Street Venice Blvd.

e. Adjournment 7:57 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday April 13, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve March 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald including the upcoming 5/19/16 Bike to Work Day event.
5. New Business (30-65 minutes)
   a. Great Streets Studio staff, presentation of preliminary data collected about Great Street Venice Blvd., including: Transportation data (Traffic, Bike and Ped counts), Pedestrian surveys, Business surveys.
   b. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from the Great Streets Supporters Meeting.
   c. Michelle Krupkin, MV Community Council, review of 4/02/16 Iconathon event.
   d. Lenore French, GCI, Preview of special event for the upcoming 6/02/16 Mar Vista Steppin' into Art walk event.
   e. Public Comment
   f. Future Agenda Items
   g. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday April 12 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve March 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, will give an overview of the upcoming CD11 Pilot Program as well as other Great Streets projects.
   b. Alan Nakagawa, LADOT's artist in residence, will present and discuss transportation art projects he is working on for the Great Street.
6. Public Comment
7. Future Agenda Items
8. Adjournment

** **PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS** – The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

** **PUBLIC POSTING OF AGENDAS** - MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, LA, CA 90066.* You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at *https://www.lacity.org/subscriptions*

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** **RECONSIDERATION AND GRIEVANCE PROCESS** - For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and at our website, http://www.marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday April 11 2018 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)
Co-Chair: Michelle Krupkin
Co-Chair: Rob Kadota

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (5 - 15 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people. Full info at http://lagreatstreets.org/what-we-do
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

   b. CD11 Field Deputy Hannah Levien will attend to discuss the CD11 Great Streets projects.

   c. Lenore French, GCI Communications, will give an overview of the March 1 2018 Mar Vista Art Walk and a preview of the upcoming June 7 Mar Vista Art Walk.

5. Old Business (15-30 minutes)
   Policy Motions (30 minutes)
   a. Support of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act request

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;

NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

STATUS UPDATE: **TABLED at the March 13 2018 MVCC BOD Meeting.**
Due to be heard at the April 11 2018 MVCC BOD Meeting

b. LADOT/CD 11 Great Streets - Venice Blvd Townhall meeting

WHEREAS, the Venice Blvd. "Great Street" pilot project was implemented on May 20, 2017; and

WHEREAS, the pilot project included removing one traffic lane in each direction to install a curbside protected bike lane, a buffer/loading zone and reconfigured on-street parking; and

WHEREAS, Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about perceived negative impacts of pilot project, including:

1) Gridlock on Venice Blvd.,

2) Cut through traffic onto residential streets adjacent to Venice Blvd,

3) A negative increase in emergency response times for LAFD and LAPD because of the gridlock,

4) An increase accidents on Venice Blvd and adjacent streets due to gridlock and cut through traffic,

5) Safety concerns about the protected bike lane, including reduced visibility and an increase in points of conflict between cars and bicycles,

6) An increase in bicycle vs. car accidents,

7) A lack of sidewalk improvements,

8) A lack of involvement of persons with disabilities in the planning and implementation phases of the project,

9) An ongoing lack of transparency in the planning, implementation and evaluation of this pilot project,

10) A lack of pre- and post-implementation data provided to the community from LADOT and Council District 11; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to the community's requests for assistance and information; and

THEREFORE, be it resolved that the Mar Vista Community Council will sent a letter forthwith to LADOT and Councilman Mike Bonin's office demanding a Town Hall meeting be held post haste on this issue, to present information, gather feedback, and address the concerns of Mar Vista and Venice Blvd stakeholders about the Great Streets - Venice Blvd pilot project.

STATUS UPDATE: **TABLED at the February 14 2018 Great Streets Ad Hoc Committee meeting.**

6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 10, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from Great Streets Projects components.
   b. Lenore French, GCI. Preview of plans for upcoming 9/01/16 Mar Vista Steppin' into Art walk event, which will focus on music.
   c. Michelle Krupkin, MV Community Council. Overview of DOT Vision Zero meeting.
   d. Public Comment
   e. Future Agenda Items
   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 9 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Geoffrey Straniere, Senior Project Coordinator, Access Compliance, LA City Department on Disability, will discuss ADA issues on Great Street Venice Blvd.
   b. Sandi Burnett, Disability Accommodations Consultant, will be part of an information exchange with an emphasis on disability access.
   c. Len Nguyen, CD11 Senior Field Deputy, will give an update on the CD11 Pilot Program as well as other Great Streets projects
   d. Lenore French, will give a preview of the upcoming Thursday September 7 Mar Vista Art Walk.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 8 2018 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chairs: Michelle Krupkin and Gabriel Hill

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. CD11 Mobility Deputy Alek Bartrosouf shares Mar Vista related mobility issues.

   c. Lenore French, will give a preview of the upcoming Thursday September 6 Mar Vista Art Walk, themed "Science."

5. Old Business (30-45 minutes)
   a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. STATUS: AMENDED AND PASSED at August 1 2018 Joint Transportation & Infrastructure and Great Streets Ad Hoc Meeting.

   b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. STATUS: AMENDED AND PASSED at August 1 2018 Joint Transportation & Infrastructure and Great Streets Ad Hoc Meeting.

6. New Business (30-45 minutes
   a. Geoffrey Straniere, Senior Project Coordinator, Access Compliance, LA City Department on Disability, will give an update on and discuss ongoing ADA issues on Great Street Venice Blvd.

   b. Autumn Elliot, Disability Rights CA, will discuss ongoing concerns of people with disabilities and seniors regarding ADA issues on Great Street Venice Blvd.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday December 13 2017 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve November 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Lenore French, GCI, will give an overview of the recent November 25 Small Business Saturday/Mar Vista Art Walk themed "Gratitude."
   b. Len Nguyen, CD11 Senior Field Deputy and Jessie Holzer, CD11 Mobility Deputy, will give updates on the CD11 Pilot Program including the newly installed double left turns from Venice Blvd. onto Centinela Ave. as well as other Great Streets projects.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC SUBCOMMITTEE
http://www.marvista.org/great-streets.php

Wednesday December 12 2018 6:30 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes)
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. CD11 Mobility Deputy Alek Bartrosouf, shares Mar Vista related mobility issues.

   c. Lenore French, will give an overview of the recent November 24 Small Business Saturday/Mar Vista Art Walk.

5. Old Business (10 minutes)
   a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. **STATUS**: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

   b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. **STATUS**: On the 12.11.18 BoD Meeting Agenda.

   c. Mission Statement discussion for Great Streets Ad Hoc Subcommittee page. **STATUS**: to finalized for posting on MVCC website.

   d. Independent Traffic Study Motion.
   WHEREAS, the Great Streets - Venice Boulevard pilot project has caused conflict and controversy in Mar Vista and the surrounding communities; and

   WHEREAS, numerous requests for pre- and post-project data to the Great Streets Initiative in Mayor Garcetti's office, the Active Transportation and Vision Zero offices in the Los Angeles Department of Transportation (LADOT), and Councilmember Mike Bonin's office have been non-responsive; and

   WHEREAS, the limited data and analysis that has been released from LADOT and Councilmember Bonin's office is contradictory to the experiences of the community members living near, conducting business on and otherwise using Venice Blvd.; and

   WHEREAS, numerous requests for Town Hall meetings with question and answer sessions have been denied by LADOT and Councilmember Bonin's office; and

   WHEREAS, the Silver Lake community, when faced with a similar situation, asked for and were granted funds to hire a transportation contractor to conduct an independent traffic study regarding the Rowena Avenue road diet by their Councilmember David Ryu; and

   WHEREAS, Mar Vista stakeholders, on behalf of the businesses and residents, commuters, emergency responders and others impacted by the Great Streets - Venice Blvd pilot project, would

like to seek the same remedy in order to receive answers to their questions and concerns that have heretofore been unaddressed by the Great Streets Initiative, LADOT and Councilmember Bonin.

THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel under the auspices of the Great Streets Ad Hoc Subcommittee, and

THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets - Venice Blvd pilot project, to be done within 2 months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.
STATUS: Passed 10.10 2018 at Great Streets Ad Hoc Subcommittee meeting. Motion amended and passed at BoD 11.13.18 meeting. *Sent back to Great Streets Ad Hoc Subcommittee to compose specific data request questions.*
Amended as follows:
THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel ~~under the auspices of the Great Streets Ad Hoc Subcommittee,~~ and

THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets - Venice Blvd pilot project **with a list of data requested to be provided by the Great Streets Ad Hoc Subcommittee**, to be ~~done~~ completed within ~~2~~ **four (4)** months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.

6. New Business (45 - 50 minutes)
   a. Tracey Corinne, Mosaic Artist. Discussion of current status of payment for the three (3) mosaic tile project at 12515 Venice Blvd. installed June 14 2018, and discussion of the future mosaic hopscotch project planned for placement near the Mar Vista Library.

   b. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy. Discussion about possible new designs for streetlight banners for Mar Vista on Great Street Venice Blvd. and update on the Venice Blvd. Downtown Mar Vista Gateway Signage project.

7. Public Comment
8. Future Agenda Items
9. Adjournment (by 7:50 pm)

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday February 10, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve January 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald, including Make It Mar Vista slideshow from Engage LA event.
5. New Business (30-65 minutes)
   a. Michelle Krupkin, Mar Vista Community Council, will give a brief update about the installation of the Soofa Smart Bench on Venice Blvd. Review of what other Great Streets have been up to and discussion/brainstorming if those ideas might work for Great Street Venice.
   b. Lenore French, Green Communications Initiative (GCI). Planning for March 3 2016 event: Steppin' into the Art of Mar Vista.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday February 8 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve January 2017 Great Streets minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, will give an overview of the upcoming CD11 Pilot Program Mid-Block Crosswalk installation as well as other Great Streets projects. The discussion will include a review of ideas regarding tree replacement on Great Street Venice Blvd. The segment also includes possible attendance by LA City Urban Forestry division personnel to participate in the discussion as well.
   b. Lenore French, GCI Communications, will give a preview of plans for the upcoming March 2 2017 Art Walk.
   c. Rachel Malarich, TreePeople, will discuss possible ideas regarding tree replacement on Great Street Venice.
6. d. Public Comment
7. e. Future Agenda Items
8. f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday February 14 2018 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Rob Kadota

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (5 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people. Full info at http://lagreatstreets.org/what-we-do
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

5. Old Business (15-20 minutes)
   Policy Motions (30 minutes)
   a. Support of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act request

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;

NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

b. LADOT/CD 11 Great Streets - Venice Blvd Townhall meeting

WHEREAS, the Venice Blvd. "Great Street" pilot project was implemented on May 20, 2017; and

WHEREAS, the pilot project included removing one traffic lane in each direction to install a curbside protected bike lane, a buffer/loading zone and reconfigured on-street parking; and

WHEREAS, Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about perceived negative impacts of pilot project, including:

1) Gridlock on Venice Blvd.,

2) Cut through traffic onto residential streets adjacent to Venice Blvd,

3) A negative increase in emergency response times for LAFD and LAPD because of the gridlock,

4) An increase accidents on Venice Blvd and adjacent streets due to gridlock and cut through traffic,

5) Safety concerns about the protected bike lane, including reduced visibility and an increase in points of conflict between cars and bicycles,

6) An increase in bicycle vs. car accidents,

7) A lack of sidewalk improvements,

8) A lack of involvement of persons with disabilities in the planning and implementation phases of the project,

9) An ongoing lack of transparency in the planning, implementation and evaluation of this pilot project,

10) A lack of pre- and post-implementation data provided to the community from LADOT and Council District 11; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to the community's requests for assistance and information; and

THEREFORE, be it resolved that the Mar Vista Community Council will sent a letter forthwith to LADOT and Councilman Mike Bonin's office demanding a Town Hall meeting be held post haste on this issue, to present information, gather feedback, and address the concerns of Mar Vista and Venice Blvd stakeholders about the Great Streets - Venice Blvd pilot project.

6. New Business
   a. CD11 Field Deputy Hannah Levien will attend to discuss the CD11 Great Streets projects.

   b. Lenore French, GCI Communications, will give an overview of plans for the upcoming March 1 2018 Mar Vista Art Walk.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC SUBCOMMITTEE
http://www.marvista.org/great-streets.php

Wednesday February 13 2019 6:30 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Gabriel Hill
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes)
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. CD11 Mobility Deputy Alek Bartrosouf, shares Mar Vista related mobility issues.

   c. Lenore French, will give a preview of the upcoming March 7 2019 Mar Vista Art Walk.

5. Old Business (10 minutes)
   a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. **STATUS**: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT. MVCC Secretary Roos to clarify.

   b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. **STATUS**: Postponed from the 1.08.19 BoD Meeting Agenda. Postponed to coordinate with future LA City Council action.

   c. Mission Statement discussion for Great Streets Ad Hoc Subcommittee page. **STATUS**: to finalized for posting on MVCC website. **STATUS**: As of January 2019 posted on the MVCC Website.

   d. Independent Traffic Study Motion. STATUS: Passed 10.10 2018 at Great Streets Ad Hoc Subcommittee meeting. Motion amended and passed at BoD 11.13.18 meeting. *Sent back to Great Streets Ad Hoc Subcommittee to compose specific data request questions.*
   Report: The Great Streets Ad Hoc Subcommittee discussed the list of data requested from the Board of Directors and determined that the following should be utilized in a data request:
   1. LADOT Transportation Impact Study Guide Lines, December 2016
   https://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf
   2. Typical Elements That Should Be Included In A Traffic Impact Study
   https://www.dot.ny.gov/divisions/operating/oom/transportation-systems/repository/Typical%20TIS%20requirements%20033115.pdf
   3. City of Los Angeles Complete Streets Design Guide - pages 121-132
   https://planning.lacity.org/documents/policy/CompleteStreetDesignGuide.pdf
   STATUS: Specific data request questions were not discussed due to time constraints at the 1.08.19 BoD Meeting. On the 2.12.19 BoD Agenda as Unfinished Business Item 14.2.

   e. ADA Evaluation Policy Motion.
   The Mar Vista Community Council (MVCC) supports an independent Americans with Disabilities Act (ADA) evaluation of the Great Street Venice Boulevard Pilot Project.
   STATUS: Policy motion sent to the 2.12.19 BoD meeting agenda and is on the 2.12.19 BoD

Agenda as Item 15.2.

6. New Business (45 - 50 minutes)
   a. Discussion and possible motion regarding the Pavement Mural Great Street project at Grand View and Pacific Ave.

   b. Discussion of planning for the Mosaic Hopscotch project that has been long planned for placement at the MV Library area.
   Dept. of Cultural Affairs personnel informed me of the following procedure/process which I hope is accurate:
   Full Funding - all funding for the project must be identified first and foremost (which specific LA city department(s) will be funding the project) with an estimated budget info including input as to estimated costs from the artist.
   Approval must be then be sought from Public Works for installation in the sidewalk.
   Once approved by Public Works, approval process then moves to Dept. of Cultural Affairs with an application and review process.
   Once DCA approval is granted, installation should be scheduled on the Public Works Great Streets Sidewalk Paving Crew calendar.
   Once scheduled, work on the actual physical hopscotch for installation should begin.

   c. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy. Possible update on the Venice Blvd. Downtown Mar Vista Gateway Signage project.

7. Public Comment
8. Future Agenda Items
9. Adjournment (by 7:50 pm)

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday January 13 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve December 2015 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, Mobility Deputy, CD11, will give a brief update about what LA City is working on for Great Street Venice Blvd. over the coming weeks.
   b. Supporter's Meeting recap. Michelle Krupkin, MVCC. A recap of what was discussed at the January 11 2016 meeting with Councilman Mike Bonin for those who did not attend.
   c. Lenore French, Green Communications Initiative (GCI). Planning for March 3 2016 event: Steppin' into the Art of Mar Vista.
   d. Public Comment
   e. Future Agenda Items
   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday January 11 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October and November 2016 Great Streets minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Preview of upcoming Saturday Nov. 26 Make It Mar Vista/Small Business Saturday event.
5. New Business (30-65 minutes)
   a. Henny Alamillo, CicLAvia Community Resource Manager, will give a preview of plans for the upcoming Sunday March 26 2017 CicLAvia event: Culver City meets Venice, presented by Metro which is coming to Mar Vista, Venice and Culver City.
   b. Jessie Holzer, CD11 Mobility Deputy, will give an overview of the upcoming CD11 Pilot Program Mid-Block Crosswalk installation as well as other Great Streets projects. The discussion will include a review of ideas regarding tree replacement on Great Street Venice Blvd. The segment also includes possible attendance by LA City Urban Forestry division personnel to participate in the discussion as well.
   c. Lenore French, GCI Communications, will give a report on the recent December 1 2016 Mar Vista Art Walk as well as a preview of plans for the upcoming March 2 2017 Art Walk.
   d. Public Comment
   e. Future Agenda Items
   f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday January 10 2018 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve November and December 2017 Great Streets minutes (5 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (15-20 minutes)
   a. Stakeholder Forum
6. Policy Motions (30 minutes)
   a. Support of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act request

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;

NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

   b. LADOT/CD 11 Great Streets - Venice Blvd Townhall meeting

WHEREAS, the Venice Blvd. “Great Street” pilot project was implemented on May 20, 2017; and

WHEREAS, the pilot project included removing one traffic lane in each direction to install a curbside protected bike lane, a buffer/loading zone and reconfigured on-street parking; and

WHEREAS, Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about perceived negative impacts of pilot project, including:

1) Gridlock on Venice Blvd.,

2) Cut through traffic onto residential streets adjacent to Venice Blvd,

3) A negative increase in emergency response times for LAFD and LAPD because of the gridlock,

4) An increase accidents on Venice Blvd and adjacent streets due to gridlock and cut through traffic,

5) Safety concerns about the protected bike lane, including reduced visibility and an increase in points of conflict between cars and bicycles,

6) An increase in bicycle vs. car accidents,

7) A lack of sidewalk improvements,

8) A lack of involvement of persons with disabilities in the planning and implementation phases of the project,

9) An ongoing lack of transparency in the planning, implementation and evaluation of this pilot project,

10) A lack of pre- and post-implementation data provided to the community from LADOT and Council District 11; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to the community's requests for assistance and information; and

THEREFORE, be it resolved that the Mar Vista Community Council will sent a letter forthwith to LADOT and Councilman Mike Bonin's office demanding a Town Hall meeting be held post haste on this issue, to present information, gather feedback, and address the concerns of Mar Vista and Venice Blvd stakeholders about the Great Streets - Venice Blvd pilot project.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC SUBCOMMITTEE
http://www.marvista.org/great-streets.php

Wednesday January 9 2019 6:30 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes)
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. CD11 Mobility Deputy Alek Bartrosouf, shares Mar Vista related mobility issues.

   c. Lenore French, will give an overview of the recent November 24 Small Business Saturday/Mar Vista Art Walk and a preview of the upcoming March 7 2019 Mar Vista Art Walk.

5. Old Business (10 minutes)
   a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. **STATUS**: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

   b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. **STATUS**: On the 1.08.19 BoD Meeting Agenda.

   c. Mission Statement discussion for Great Streets Ad Hoc Subcommittee page. **STATUS**: to finalized for posting on MVCC website. **STATUS**: As of January 2019 posted on the MVCC Website.

   d. Independent Traffic Study Motion.
   STATUS: Passed 10.10 2018 at Great Streets Ad Hoc Subcommittee meeting. Motion amended and passed at BoD 11.13.18 meeting. *Sent back to Great Streets Ad Hoc Subcommittee to compose specific data request questions.*
   Amended as follows:
   THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel ~~under the auspices of the Great Streets Ad Hoc Subcommittee,~~ and

   THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets - Venice Blvd pilot project **with a list of data requested to be provided by the Great Streets Ad Hoc Subcommittee**, to be ~~done~~ completed within ~~2~~ **four (4)** months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.
   STATUS: Report sent to MVCC for 1.08.19 BoD Meeting Agenda Packet.
   Report: The Great Streets Ad Hoc Subcommittee discussed the list of data requested from the Board of Directors and determined that the following should be utilized in a data request:
   1. LADOT Transportation Impact Study Guide Lines, December 2016
   https://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf

2. Typical Elements That Should Be Included In A Traffic Impact Study
https://www.dot.ny.gov/divisions/operating/oom/transportation-systems/repository/Typical%20TIS%20requirements%20033115.pdf
3. City of Los Angeles Complete Streets Design Guide - pages 121-132
https://planning.lacity.org/documents/policy/CompleteStreetDesignGuide.pdf

6. New Business (45 - 50 minutes)
   a. Discussion and possible motion regarding an ADA evaluation of Great Street Venice Blvd. Pilot Program Road Diet.

   b. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy. Discussion about possible new designs for streetlight banners for Mar Vista on Great Street Venice Blvd. and update on the Venice Blvd. Downtown Mar Vista Gateway Signage project.

7. Public Comment
8. Future Agenda Items
9. Adjournment (by 7:50 pm)

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday July 13, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from Great Streets Projects components including draft designs for streetlight banners.
   b. Michelle Krupkin, MV Community Council. Overview of Great Street Venice Blvd. Sidewalk condition draft report and call for further input.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday July 12, 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, will give an update on the CD11 Pilot Program as well as other Great Streets projects.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

Transportation and Infrastructure AND Great Streets Ad Hoc Committee Joint Meeting
Wednesday, July 11, 2018 7:00 PM - 9:00 PM
Windward School Boardroom 1030, Building C (by baseball diamond)
11350 Palms Blvd, Los Angeles, CA 90066 (SW corner of Palms and Sawtelle Blvds.)
Co-Chairs: Ken Alpern and Michelle Krupkin

1. Call to Order—Ken Alpern and Michelle Krupkin presiding
2. Introductions and Discussion of Items Not on Agenda
3. Approval of minutes of previous meetings
4. Public Comment
5. Transportation & Infrastructure and Great Streets Related Reports
   a. MVCC Liaison to Bi-Monthly CD11/LADOT/LAPD Traffic Committee Meeting - Linda Guagliano (10 min)

   b. LA DWP – NC MOU Committee and Reform Efforts/Goals

   c. MVCC Parking Study Update - Discussion and Update from Howard Weisberg

   d. Great Streets Program brief definition-Michelle Krupkin, MV Community Council

   e. CD11 Mobility Deputy Alek Bartrosouf shares Mar Vista related mobility issues

6. Old Business/Open Issues: Committee/Task Force/Updates
   a. Update of bus shelter info (from Hannah Levien, Joseph Galloway, and Francois Nion) to add, improve, replace and upgrade key bus locations.
   STATUS: No New information.

7. New Business
   a. **Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd.**
   WHEREAS: The Mar Vista Community Council (MVCC) supports maintenance and repairs on all of its major infrastructure assets, including vital thoroughfares such as Centinela Blvd., and

   WHEREAS: It has come to the attention of the MVCC that there is no street sweeping route on Centinela Blvd. between Palms Blvd. and National Blvd., and that there are no resources allotted to correcting this current lack of street maintenance,

   THEREFORE, LET IT BE RESOLVED: That the CD11 office, L.A. Bureau of Street Services (BOSS), and LADOT will work with any and all City budgeting and resources to initiate and implement regular and ongoing street sweeping to the aforementioned segment of Centinela Blvd.

   THEREFORE, LET IT ALSO BE RESOLVED: That the CD11 office, the CD5 office, BOSS, and LADOT will perform an analysis of all major thoroughfares within the confines of the MVCC to determine if regular and ongoing street sweeping, as well as other vital services and maintenance, is in order.

   b. **Policy Motion:** MVCC Support for the restoration of the “Opt-out” clause in the City of Los Angeles **Sidewalk Vending Program**
   Council File No: 13-1493, Related Legislation: SB 946

WHEREAS, the City Council, on April 18, 2018, adopted an Ordinance creating a Sidewalk Street Vending Program and,

WHEREAS, in the final draft of said ordinance, the "opt out" provision was removed, at the last minute, prior to approval, and

WHEREAS, local brick and mortar enterprises along Venice Blvd in Mar Vista, have spent years establishing their businesses based on a set of assumptions and rules, such as where they can be located, the taxes they are required to pay, and the best ways to attract customers, and

WHEREAS, sidewalk vendors in the proposed ordinance will probably sell similar types of goods and services as nearby brick and mortar businesses, but not be required to adhere to the same elaborate state and local permitting and land-use regulations, and

WHEREAS, the local brick and mortar businesses on Venice Blvd in Mar Vista, have contributed to the "main street" atmosphere that local residents value, and

WHEREAS, the local brick and mortar businesses along Venice Blvd in Mar Vista are mostly small ones, with small profit margins, and

WHEREAS the presence of sidewalk vendors along Venice Blvd in Mar Vista, for the reasons specified above, would constitute unfair competition for the local brick and mortar businesses on the same stretch,

THEREFORE, the MVCC moves to submit a Community Impact Statement to the City Council and Committees urging the restoration of the "opt-out" clause of the Los Angeles Sidewalk Vending Ordinance.

c. **Discussion and potential motion:**
Discussion of the need for a DASH bus/micro-transit service for Mar Vista serving Great Street Venice Blvd.

8. Public Comment
9. Future Agenda Items
10. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 8, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve May 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Lenore French, GCI. Report on Mar Vista Steppin' into Art walk event.
   b. Michelle Krupkin, MV Community Council. Overview of May 20 EXPO Line 7-station opening and info on the two new Big Blue Bus lines.
   c. Public Comment
   d. Future Agenda Items
   e. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 14, 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve May 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.

5. New Business (30-45 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, will give an update on the CD11 Pilot Program as well as other Great Streets projects.

   b. Lenore French, GCI Communications, will give a report on the June 1 2017 Art Walk.

6. Policy Motion
   a. Whereas there is stakeholder concern about the traffic impact on the community streets since the implementation of the CD11 Pilot Program on Great Street Venice Blvd., and

      Whereas the area impacted is bounded by Sepulveda Blvd. to the East, Lincoln Blvd. to the West, Culver Blvd. to the South and National Blvd. to the North;

      Therefore the MVCC requests the Los Angeles Department of Transportation and Council District 11 to provide a copy of any and all traffic studies done in advance of the commencement of the lane closures included in the CD11 Pilot Program on Great Street Venice Blvd. as well as a copy of any and all traffic studies performed after the implementation of the CD11 Pilot Program on Great Street Venice Blvd.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 13 2018 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)
Co-Chair: Michelle Krupkin
Co-Chair: Rob Kadota

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (5 - 15 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people. Full info at http://lagreatstreets.org/what-we-do
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

   b. Faye Cousin, Disaster Management Bureau (DMB) representative for the West Bureau, will share information on the "Ready Your LA Neighborhood" program as well as discussing other Emergency management issues.

   c. CD11 Field Deputy Hannah Levien will discuss the CD11 Great Streets projects including:
   Tree Planting efforts/call for involvement/volunteers for planting trees along the Great Street.
   Update on true impacts of Coastal TIMP funds.

   d. Lenore French, GCI Communications, will give an overview of the recent June 7 Mar Vista Art Walk, themed Vertical –having to do with Board Sports.

   e. CD11 Mobility Deputy Alek Bartrosouf shares Mar Vista related mobility issues.

5. Old Business (15-30 minutes) Policy Motions (30 minutes)
   a. Support of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act request

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and
WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and
WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and
WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and
WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;
NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.
STATUS UPDATE: **Passed at the May 8 2018 MVCC BOD Meeting**

6. New Business
   a. Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program

Council File No: 13-1493, Related Legislation: SB 946

WHEREAS, the City Council, on April 18, 2018, adopted an Ordinance creating a Sidewalk Street Vending Program and,

WHEREAS, in the final draft of said ordinance, the "opt out" provision was removed, at the last minute, prior to approval, and

WHEREAS, local brick and mortar enterprises along Venice Blvd in Mar Vista, have spent years establishing their businesses based on a set of assumptions and rules, such as where they can be located, the taxes they are required to pay, and the best ways to attract customers, and

WHEREAS, sidewalk vendors in the proposed ordinance will probably sell similar types of goods and services as nearby brick and mortar businesses, but not be required to adhere to the same elaborate state and local permitting and land-use regulations, and

WHEREAS, the local brick and mortar businesses on Venice Blvd in Mar Vista, have contributed to the "main street" atmosphere that local residents value, and

WHEREAS, the local brick and mortar businesses along Venice Blvd in Mar Vista are mostly small ones, with small profit margins, and

WHEREAS the presence of sidewalk vendors along Venice Blvd in Mar Vista, for the reasons specified above, would constitute unfair competition for the local brick and mortar businesses on the same stretch,

THEREFORE, the MVCC moves to submit a Community Impact Statement to the City Council and Committees urging the restoration of the "opt-out" clause of the Los Angeles Sidewalk Vending Ordinance.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday March 9, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve February 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Len Nguyen, Senior Field Deputy, CD11, will give a brief update about the second round of artist submissions for the CD11 Utility Art Box project.
   b. Jessie Holzer, Mobility Deputy, CD11, will give an introduction of the upcoming Westside Bicycling Event. Discussion of the concept for a coordinated effort from both CD11 and the City of Santa Monica on an event to kick off Bike Month in May 2016. Feedback on if/how the MVCC Great Streets Ad Hoc Committee would like to be involved.
   c. Great Streets Studio staff, discussion of the April 2 2016 Great Street Venice Blvd event: Iconathan workshop around the topic of livable communities.
   d. Lenore French, Green Communications Initiative (GCI). Review of March 3 2016 event: Steppin' into the Art of Mar Vista.
   e. Public Comment
   f. Future Agenda Items
   g. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday March 8 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve February 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, will give an overview of the upcoming CD11 Pilot Program as well as other Great Streets projects.
   b. Lenore French, GCI Communications, will give a report on the recent March 2 2017 Art Walk "Voices."
   c. Nat Gale, LADOT, will present and discuss LADOT's Artist in Residence's ideas for how LADOT can partner with local artists to install public art on the Great Street.
6. Funding Motion (15 minutes)
   a. Whereas the Mar Vista Community Council in coordination with Tree People will hold a Community Tree Planting Day on Saturday, April 8th 2017 from 9 am to noon on Great Street Venice Blvd. and, Whereas this event will provide a community service as well as adding environmental and beautification benefits and supports the Mayor's Sustainable Plan while providing outreach for the Mar Vista Community Council to our stakeholders,
   Therefore the Mar Vista Community Council approves an amount not to exceed $1,000.00 to cover expenses.
7. Policy Motion (15 minutes)
   a. WHEREAS, Vision Zero is an international movement to eliminate traffic deaths, based on the philosophy that each death is both unacceptable and preventable. Originating in Sweden, Vision Zero has since been adopted in many cities throughout the United States;

      WHEREAS, every year, more than 200 people are killed while trying to move throughout the City of Los Angeles. Nearly half the people killed on City streets are those who were walking or bicycling, and an alarming number of them are children and older adults;

      WHEREAS, Vision Zero Los Angeles is the City's commitment to eliminate all traffic deaths by 2025. As directed by Mayor Garcetti, this citywide effort brings together transportation engineers, police

officers, advocates, and policymakers to work together towards creating safer streets. Its focus will be protecting our most vulnerable road users, including children, older adults, and people walking and bicycling; and

WHEREAS, in January 2017, the City released its Vision Zero Action Plan (https://www.joomag.com/magazine/vision-zero-action-plan-2017/0893807001485436685?short), to identify actions and strategies to implement Vision Zero Los Angeles.

NOW, THEREFORE, the Mar Vista Community Council supports the City's Vision Zero initiative, and the implementation of an action plan.

8. Public Comment
9. Future Agenda Items
10. Adjournment

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Mar Vista Community Council

AGENDA

Joint Meeting of Great Street Ad Hoc

and Education, Arts and Culture Committees

Wednesday, May 30th 2018, 6:00pm

Coffee Connection
3838 S. Centinela Ave
Mar Vista, CA 90066

1. **Introductions ~ WELCOME!**
2. **Minutes** – 2/8/18 minutes approval
3. **Public Comment**
4. **Policy/Administrative Motion**
   I. Motion to support the selection and placement of street mosaics on Venice Blvd. Presentations will be given by Hannah Levien, CD 11 Field Deputy and mosaic artist.
5. **Public Comment**
6. **Future Agenda items**
7. **Adjourn (by 6:30pm)**

8. * PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS – The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board. * PUBLIC POSTING OF AGENDAS - MVCC agendas are posted for public review at Mar Vista Recreation Center, 11430 Woodbine Street, LA, CA 90066. You can also receive our agendas via email by subscribing to L.A. City's Early Notification System at https://www.lacity.org/subscriptions * THE AMERICAN WITH DISABILITIES ACT - As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices and other auxiliary aids and/or services, may be provided upon request. To ensure availability of services, please make your request at least 3 business days (72 hours) prior to the meeting you wish to attend by contacting chair@marvista.org. * PUBLIC ACCESS OF RECORDS – In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org. * RECONSIDERATION AND GRIEVANCE PROCESS - For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. Bylaws are available at our Board meetings and at our website, http://www.marvista.org.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 11, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

AGENDA

1. Call To Order and Welcome – Chair (1 min.)
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve April 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Sarah Auerwald, Mar Vista Chamber of Commerce. Final report on Make It Mar Vista. Details and report on upcoming 5/19/16 Bike to Work Day event.
   b. Lenore French, GCI. Preview of special event for upcoming 6/02/16 Mar Vista Steppin' into Art walk event.
   c. Michelle Krupkin, MV Community Council. Preview of May 20 EXPO Line 7-station opening and Big Blue Bus route/fare info.

      Two potential questions to discuss for the June 5 2016 Questionnaire/Survey DONE MVCC Election Day:

      1. If Great street Venice Blvd. belonged to LA City, what would be the first change you would like to see?
      1) Protected Bike Lane
      2) Sidewalk repair
      3) Street Furniture
      4) Parklets
      5) None of the Above
      6) Other item

2. What transportation amenities would you welcome on Great Street Venice Blvd.?
1) DASH connection to Expo Bundy stop

2) Headstart crosswalks (pedestrian traffic starts before vehicular traffic)

3) Mid-block Crosswalks

4) None of the Above

5) Other

d. Public Comment

e. Future Agenda Items

f. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 10, 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve March and April 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Len Nguyen, CD11 Senior Field Deputy, will give an update of the upcoming CD11 Pilot Program as well as other Great Streets projects.
   b. Lenore French, GCI Communications, will give a preview of plans for the upcoming June 1 2017 Art Walk.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 9 2018 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)
Co-Chair: Michelle Krupkin
Co-Chair: Rob Kadota

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (5 - 15 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people. Full info at http://lagreatstreets.org/what-we-do
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

   b. CD11 Field Deputy Hannah Levien will discuss the CD11 Great Streets projects including:
   Tree Planting efforts/call for involvement/volunteers for planting trees along the Great Street,
   Update on true impacts of Coastal TIMP funds
   Letter of support from MVCC to place a mosaic on the Great Street

   c. Lenore French, GCI Communications, will give a preview of the upcoming June 7 Mar Vista Art Walk.

   d. CD11 Mobility Deputy Alek Bartrosouf shares Mar Vista related mobility issues.

5. Old Business (15-30 minutes) Policy Motions (30 minutes)
   a. Support of Mar Vista Stakeholder's Great Streets Venice Blvd. California Public Records Act request

WHEREAS the Great Streets - Venice Blvd pilot project was implemented on May 20, 2017; and

WHEREAS Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about the planning, implementation and evaluation of said pilot project; and

WHEREAS the Mar Vista Community Council had passed 3 different motions in July, September and October calling for the pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS a California Public Records Act request was filed on behalf of the community by a Mar Vista stakeholder on August 8, 2017 requesting pilot project data from LADOT, Councilman Bonin's office and the Great Streets Initiative in Mayor Garcetti's office; and

WHEREAS to date, this request has not been fulfilled by LADOT; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to Mar Vista stakeholders requests for assistance and information;

NOW, THEREFORE, be in resolved that the Mar Vista Community Council will submit a letter in support of the stakeholder's August 8, 2017 California Public Records Act request, demanding that LADOT provide for inspection all of the information requested immediately and without further delay.

STATUS UPDATE: **TABLED at the March 13 2018 MVCC BOD Meeting.**
Due to be heard at the May 8 2018 MVCC BOD Meeting

b. LADOT/CD 11 Great Streets - Venice Blvd Townhall meeting

WHEREAS, the Venice Blvd. "Great Street" pilot project was implemented on May 20, 2017; and

WHEREAS, the pilot project included removing one traffic lane in each direction to install a curbside protected bike lane, a buffer/loading zone and reconfigured on-street parking; and

WHEREAS, Mar Vista and Venice Blvd. stakeholders have voiced ongoing concerns about perceived negative impacts of pilot project, including:

1) Gridlock on Venice Blvd.,
2) Cut through traffic onto residential streets adjacent to Venice Blvd,
3) A negative increase in emergency response times for LAFD and LAPD because of the gridlock,
4) An increase accidents on Venice Blvd and adjacent streets due to gridlock and cut through traffic,
5) Safety concerns about the protected bike lane, including reduced visibility and an increase in points of conflict between cars and bicycles,
6) An increase in bicycle vs. car accidents,
7) A lack of sidewalk improvements,
8) A lack of involvement of persons with disabilities in the planning and implementation phases of the project,
9) An ongoing lack of transparency in the planning, implementation and evaluation of this pilot project,
10) A lack of pre- and post-implementation data provided to the community from LADOT and Council District 11; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to monitor the delivery of City services to the community; and

WHEREAS, it is the responsibility of the Mar Vista Community Council to facilitate the delivery of City services and City government responses to the community's requests for assistance and information; and

THEREFORE, be it resolved that the Mar Vista Community Council will sent a letter forthwith to LADOT and Councilman Mike Bonin's office demanding a Town Hall meeting be held post haste on this issue, to present information, gather feedback, and address the concerns of Mar Vista and Venice Blvd stakeholders about the Great Streets - Venice Blvd pilot project.

STATUS UPDATE: **TABLED at the February 14 2018 and April 11 2018 Great Streets Ad Hoc Committee meeting.**

6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday November 8 2017 6:30 to 7:45 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Lenore French, GCI, will give a preview of the events scheduled for the upcoming Saturday November 25 Small Business Saturday/Mar Vista Art Walk themed "Gratitude."
   b. Susie Leonard, A Kid's Place Preschool, will discuss concerns and issues facing A Kid's Place Preschool arising from the CD11 Pilot Program.
   c. Jessie Holzer, CD11 Mobility Deputy, will give an update on the CD11 Pilot Program as well as other Great Streets projects.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Tuesday October 25, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve September 2016 Great Streets/T&I joint meeting minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald.
5. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy. Overview of Caltrans relinquishment and review of ideas from Great Streets Projects components.
   b. Public Comment
   c. Future Agenda Items
   d. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday October 11 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve September 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Nora Chin, LADOT, will give an overview of the proposed Micro-Transit Program.
   b. Lenore French, GCI, will give an overview of the events from the September 7 Mar Vista Art Walk themed "Psychedelic September."
   c. Jessie Holzer, CD11 Mobility Deputy, will give an update on the CD11 Pilot Program as well as other Great Streets projects.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday October 10 2018 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chairs: Michelle Krupkin and Gabriel Hill

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes)
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. CD11 Mobility Deputy Alek Bartrosouf, back from a vacation, shares Mar Vista related mobility issues.

5. Old Business (10 minutes)
   a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. STATUS: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

   b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. STATUS: Postponed for discussion no later than January 2019 at 8.31.18 Special Meeting of the BoD.

   c. Mission Statement discussion for Great Streets Ad Hoc Subcommittee page. STATUS: to finalized for posting on MVCC website.

6. New Business (45 - 50 minutes)
   a. Wajenda Chambeshi, Program Manager of Great Streets, discusses past and future projects on Great Street Venice Blvd.

   b. Tracey Corinne, Mosaic Artist. Discussion of current status of payment for the three (3) mosaic tile project at 12515 Venice Blvd. installed June 14 2018, and discussion of the future mosaic hopscotch project planned for placement near the Mar Vista Library.

   c. Discussion and possible motion: Should MVCC request an independent traffic study of the Pilot Program on Great Street Venice Blvd. similar to the independent traffic study completed in May 2018 for 4th District Councilmember David Ryu? Discussion and possible motion to follow.

   d. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy. Update on the Venice Blvd. Downtown Mar Vista Gateway Signage project.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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SERVICIOS DE TRADUCCION - Si requiere servicios de traducción, favor de avisar al Concejo Vecinal 3 días de trabajo (72 horas) antes del evento. Por favor contacte a chair@marvista.org para avisar al Concejo Vecinal.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL

Joint Meeting of the **Great Streets Ad Hoc Committee** & the **Transportation and Infrastructure Committee**

Thursday September 15, 2016, 7:00 PM - 9:00 PM

COFFEE CONNECTION, 3838 S Centinela Ave, Los Angeles, CA 90066

(NE corner of Centinela Blvd. and Pacific Ave.)

Great Streets Ad Hoc Committee

Co-Chairs: Michelle Krupkin and Greg Castelnuovo-Tedesco

Transportation and Infrastructure Committee

Co-Chairs: Michelle Krupkin and Ken Alpern

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting co-chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve August 2016 minutes (2 minutes)
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald, including info on the 2016 Great Streets Challenge Grant.

5. Policy Motions/Community Impact Statements:

   1) Whereas the LA City Council is due to vote on Council File 16-0147 in October 2016,
   Whereas the Mar Vista Community Council supports the relinquishment of Venice Blvd between Lincoln and Cadillac from Caltrans to the City of Los Angeles,
   Therefore be it resolved that the Mar Vista Community Council supports Council File 16-0147 and encourages the City of Los Angeles to work with the Mar Vista Community Council on utilizing a portion of the $14,500,000 payment from Caltrans to the City for the relinquishment for improvements along Venice Blvd between Walgrove and Sawtelle.

6. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from Great Streets Projects components and overview of progress on the relinquishment of Venice Blvd. to LA City.

   b. Len Nguyen, CD11 Senior Field Deputy. Discussion of street resurfacing in Mar Vista.

   c. Michelle Krupkin, MV Community Council. Overview of DOT Vision Zero meeting, info on 2016 Clean Streets Challenge Grant and overview of the Mar Vista Infrastructure repair list, including potholes and other items.

   d. Lenore French, GCI. Overview of 9/01/16 Mar Vista Steppin' into Art walk event.

   e. Public Comment

   f. Future Agenda Items

g. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday September 13 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve August 2017 Great Streets minutes (2 minutes)
4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
5. New Business (30-45 minutes)
   a. Lenore French, will give an overview of the events from the September 7 Mar Vista Art Walk themed "Psychedelic September."
   b. Jessie Holzer, CD11 Mobility Deputy, will give an update on the CD11 Pilot Program as well as other Great Streets projects.
6. Public Comment
7. Future Agenda Items
8. Adjournment

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday September 12 2018 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chairs: Michelle Krupkin and Gabriel Hill

AGENDA

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes)
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council. Also see Item 6a for discussion.

   b. CD11 Mobility Deputy Alek Bartrosouf shares Mar Vista related mobility issues.

   c. Lenore French, will give an overview of the most recent September 6 Mar Vista Art Walk, themed "Science."

5. Old Business (10 minutes)
   a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. STATUS: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

   b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. STATUS: Postponed for discussion no later than January 2019 at 8.31.18 Special Meeting of the BoD.

6. New Business (45 - 50 minutes)
   a. Discussion of Mission Statement for Great Streets Ad Hoc Subcommittee page.
   Looking at the below info, discussion and possible drafting of an updated Mission Statement for Great Streets Ad Hoc Subcommittee.
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time.
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

   b. Wajenda Chambeshi, Program Manager of Great Streets, discusses past and future projects on Great Street Venice Blvd.
   c. Discussion and possible motion: Silver Lake Neighborhood Council, asked their Councilman, David Ryu, for the funds to do an independent traffic study. He agreed and that study was

completed in May 2018. In the spirit of transparency, should MVCC request an independent traffic study of the Pilot Program on Great Street Venice Blvd.? Discussion and possible motion to follow.

d. Tracey Corinne, Mosaic Artist. Discussion of call for volunteers and other needs for the Mosaic Hopscotch planned for placement near the Mar Vista Library.

e. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy discusses design options for the Venice Blvd. Downtown Mar Vista Gateway Signage. The Mar Vista community and stakeholders are invited to participate in the discussion and decision making process.

7. Public Comment
8. Future Agenda Items
9. Adjournment

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SERVICIOS DE TRADUCCION - Si requiere servicios de traducción, favor de avisar al Concejo Vecinal 3 días de trabajo (72 horas) antes del evento. Por favor contacte a chair@marvista.org para avisar al Concejo Vecinal.

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday April 13, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:38 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Michelle Krupkin announced the Mar Vista Mega Yard Sale 4/23/16. Info: http://marvistamom.com/mega-garage-sale/
   Jessie Holzer announced the Gear Up Bike event 5/1/16. Info: http://smspoke.org/gearup/
3. Motion to approve March 2016 minutes (2 minutes) Sarah Auerswald made the motion, Lenore French seconded. Minutes passed.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald including the upcoming 5/19/16 Bike to Work Day event. Sarah gave a brief overview of the upcoming BTWD – with info on a Pit Stop in Mar Vista to be located between Inglewood and Centinela offering coffee and possibly juice at either Starbucks on Venice, Coffee Connection or Venice Grind. Details to be finalized soon. Support from LACBC and Metro. More next month as event develops.
5. New Business (30-65 minutes)
   a. Great Streets Studio staff, presentation of preliminary data collected about Great Street Venice Blvd., including: Transportation data (Traffic, Bike and Ped counts), Pedestrian surveys, Business surveys.

      Carter Rubin and Naomi Iwasaki of the Great Streets Studio gave a PowerPoint presentation of a Great Street Venice Blvd. Transportation Evaluation study with data collected in September 2015 by Fehr & Peers.
      The results will be published later this year. Overviews of the study included:
      1. Why measure streets? What we are measuring on Venice Blvd., how are we measuring it? Timeline and next steps for evaluation.
      2. How people get to Venice Blvd. (car, pedestrian, bike, public transit)
      3. How people travel through Venice Blvd. (using 4-6 pm on a weekday as a model). (94% car3 % pedestrian, 3% bike)
      4. Demographics of people walking/biking
         -Pedestrian observations 31% female, 0% mobility device i.e. wheelchair,
         -Bike Rider Observations: 13% female, 16% riding on sidewalk, 58% no helmet)

5. Perceptions of Venice Blvd.
   Variables: clean and well maintained, safe, attractive, active& lively, strong identity
6. Reason for visiting this neighborhood
   -54% live in Mar Vista, 13% work here, 9% came to eat/drink, 8% passing by, 2% for music/art, 3% to meet friends, 7% for school 2% other

There will be a rollout coming in June/July 2016 for all data from all 15 Council Districts and Great Streets.

b. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from Great Streets Supporters Meeting. Jessie spoke about keeping progress moving forward. There was discussion of the CD11 Pilot program and what can be done outside Caltrans framework:
-Moveable furniture with no permits needed
-Leading pedestrian intervals for crosswalks
-More Art -using private property
-Landscaping -using private property
-Marketing for events using: marques at MV Post Office, on bus benches
-Placemaking banners along Venice
-Possibility of using twinkle lights in tree canopy on Venice blvd. similar to Santa Monica main street – solar powered.
-Looking into Arts Activation Grants from LA Cultural Affairs

c. Michelle Krupkin, MV Community Council, review of 4/02/16 Iconathon event. Hosted by the Noun Project and the Goldhirsh Foundation, the event was a public design workshop where the goal was to create new civic minded symbols for the public domain. Concepts included Great Streets symbols such as economic revitalization and intergenerational play as well as physical improvements to streets like parklets, street furniture, and pedestrian scrambles. Great Streets Studio will also be working to install signs with these icons in the coming months.

d. Lenore French, GCI, Preview of special event for upcoming 6/02/16 Mar Vista Steppin' into Art walk event. Lenore discussed bringing something like Windward Walls, a Miami FL project, to Mar Vista as part of the Steppin' into Art walk event. She is working on getting grants to get both Mar Vista and outside artists to paint walls with a goal of creating a tour of art walls. Lenore also shared that Mar Vista has one of the oldest art colonies in the city. Vintage on Venice will be putting on a fashion show as part of the upcoming June 2nd event.

e. Public Comment

f. Future Agenda Items

g. Adjournment 7:56 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 10, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting co-chair: Michelle Krupkin 6:33 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve July 2016 minutes (2 minutes) After noting changes, Sarah Auerswald made the motion, Lenore French seconded, minutes passed unanimously.
4.
5. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah shared that Small Business Saturday, will be Saturday November 26 2016.

6. New Business (30-65 minutes)

   a. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from Great Streets Projects components. Jessie said that she is meeting this week with DOT to discuss the CD11 Pilot Program timeline. All four midblock crosswalks will be activated for the CD11 Pilot Program. DOT is recommending Leading Pedestrian Intervals (LPI) for all intersections on Great Street Venice Blvd. More notes about Great Street Venice Blvd.: The Bureau of Street Services is looking for additional sofa smart bus bench locations. Street banners will be placed on street light poles in November 2016. There will also be some Make It Mar Vista Banner going up. Scout/Camp is interested in doing parklets for the Sept. 1 Art Walk. DOT says yes to the following: Intersection mural at Grandview/Pacific and Driveway aprons at the Mar Vista Post Office. Timeline to be approximately June 2017. There was a discussion of café lights, which may be relevant for the December 1 Mar Vista ArtWalk as the theme of that event will be light.

   b. Lenore French, GCI. Lenore shared a preview of plans for upcoming 9/01/16 Mar Vista Steppin' into Art event, which will focus on music. Lenore said that there will be 42 venues for the September 1 2016 Mar Vista ArtWalk. The posters by Ryan Gilden are up at storefronts and elsewhere to publicize the event. Looking toward the next event, the December 1 Mar Vista ArtWalk poster artwork will be open for submission. There will be a call for submissions at the Mar Vista Fall Festival where the Mar Vista ArtWalk will have a booth. There will be extended hours of 6 pm-10pm for the September 1 Mar Vista ArtWalk. Highlights of the ArtWalk will include: The Do-Good Bus, a VCA Yappy Hour featuring Nepal Dogs Art, Pop-Up Movie Screen at the Coffee Connection space which will also have a stage for music, vendors and an info booth, Grand View Art Studios will be one of the new venues that is participating, music for the event will be curated by Sean of Timewarp Music and Casey Sexton-Riley, The Mar Vista

restaurant is trying for a soft opening, C. Nichols will have music/food truck in the back with a VIP check in, there will be a musical group in front of Vintage on Venice that includes a salsa ensemble. There will be a Passport Stamp game and raffle that has maps at every entry point with stamps from vendors and volunteers. All info will be posted on the Facebook page for the ArtWalk as well as the GCI site, including event maps.

c. Michelle Krupkin, MV Community Council. Overview of DOT Vision Zero meeting. Tabled to September 2016 meeting.

d. Public Comment

e. Future Agenda Items

f. Adjournment was at 7:53 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 9 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:34 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes) No Public Comments.
3. Motion to approve June 2017 Great Streets minutes (2 minutes) Jeff Khoury made the motion, Sheri Odere seconded. June 2017 Minutes passed unanimously.
4. Reports (5 Minutes)
   a. Great Streets Program brief definition- Michelle Krupkin, MV Community Council, gave a brief overview of Great Streets, the first initiative from Mayor Eric Garcetti.
   Full info at http://lagreatstreets.org/what-we-do
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. Our streets are the backbone of our neighborhoods – the places where we live, work, learn, and recreate on a daily basis. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people.
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health
5. New Business (30-45 minutes)
   a. Geoffrey Straniere, Senior Project Coordinator, Access Compliance, LA City Department on Disability, discussed ADA issues on Great Street Venice Blvd. After introducing himself and giving information on his background working with ADA and Access issues. He works with the Homeless Policy, Accessible Parking Zone Program/Blue Curb Program as well as the DOD point person for Safe Sidewalks LA in terms of accessibility requests. He is also part of Emergency Management Plans with regards to accessibility concerns. There was a Question and Answer period with questions and answers summarized below.

Geoffrey shared that he took the time to walk Great Street Venice Boulevard and took notes and saw room for improvement on the Pilot Program.

Beginning of question and answer period.
Question: How do I get a wheelchair passenger from the car to the curb? Offloading is difficult as

there are no curb cuts or slopes except at the end of each block.

Answer from Geoffrey: I agree this is a problem. There needs to be more turnouts and more curb cuts.

Question: How many blue curbs are there per block? Is there a specific number planned?

Answer from Geoffrey: The blue curb project or accessible parking project is on hold for seven years in LA. The goal is to make it accessible parking zones throughout Los Angeles and to come up with a number that works.

Question: I am concerned about the next step the bollards being replaced by a concrete divider and creating an island that would prevent a curb ramp and disability access.

Answer from Geoffrey: I'm not sure what the plans are since I was not involved in the design.

Question: Was the LA City Department of Disability consulted before the Great Street Pilot Program was designed or are they now putting out fires after the fact?

Answer from Geoffrey: I was not involved in the design stage or consulted for the current Great Street Venice Boulevard Pilot Program design. Access department is now hopefully going to be involved in the design stage going forward.

Question: So you weren't consulted on this design?

Answer from Geoffrey: Oh no. Although now going forward I am making sure that our constituency, the disabled population of LA, will be at the table before instead of after the fact.

Question: What is suggested for dealing with a person in a wheelchair with dementia? Where is a safe place to get in and out of a car since the parking section is now next to speeding traffic instead of next to the bike lane?

Answer from Geoffrey: There is no easy answer. I personally agree that this has to be addressed.

Question: When can the current mid block cut-outs be corrected? Visually impaired constituents need assistance to cross the street currently.

Answer from Geoffrey: We are looking into establishing a timeline to address those concerns -not sure of timing on that item.

Question: Are you compiling a list of what you can do and will do?

Answer from Geoffrey: We are one city department that feeds input into the Great Streets. I will meet with the Mayoral staff that oversee Great Streets and share the challenges and disenfranchisement of the disabled.

Question: When is the next meeting you have with Great Streets staff?

Answer from Geoffrey: The next meeting would be this month but is not a public meeting. It's an ongoing meeting. We would take into consideration concerns going forward. You guys have some work in place that needs addressing, that need consideration now because it may not be working for the community.

Question: Is putting cars next to the curb one option?

Answer from Geoffrey: That is one option.

Question: On a basic level, how is the design for the Pilot Program compliant with ADA guidelines? Was your office involved in planning?

Answer from Geoffrey: No, we were not involved in the planning.

Question: is the curb configuration in violation of ADA requirements?

Answer from Geoffrey: Not sure, there are some slope concerns.

Question: There was no EIR before installation of the Pilot Program, will there be one after? Does it address fumes created by gridlock?

Answer from Geoffrey: There is an EIR now for the Sidewalk Repair Program that is 94 pages. Not sure about the Pilot Program.

Question: How can we work with your department to get our voices heard?

Answer from Geoffrey: I encourage people to seek out the department and come to the office.

Question: Since the Pilot Program was implemented, have you been in touch with Westside Center for Independent Living?

Answer from Geoffrey: Not yet.

Question: Is there a plan to reach out to school-bus drivers?

Answer from Geoffrey: That is part of the concern.

Question: Are there any other areas in cities that have areas and elements that work?

Answer from Geoffrey: There are some elements that work and features that don't work. Some are a matter of code compliance versus what works best.

Question: There are examples in Long Beach where there are Green Streets that are bike streets only. And in Long Beach on Main Street, there is a protected bike lane with no parking. Other streets have cars parking at the curb, which is what we want on Venice Blvd. Would you be able to explain to the Great Streets Department that the implementation seems short sighted? Would you please ask them to please listen to the community?

Answer from Geoffrey: I understand the frustration. I can give an example as a resident of LA. I live in the Valley. One day the Great Street plan was installed. Now I can't go to my favorite pizza place because there is no parking or accessibility. It is critical that the community weighs in. Sometimes engineers are not the best community outreach folks.

b. Sandi Burnett, Disability Accommodations Consultant, was part of an information exchange with an emphasis on disability access. She is a long time resident of Mar Vista, residing on a side street west of Centinela. She recently retired after being the long-time ADA/504 Compliance Officer, ABI Program Faculty Leader, Disabled Student Programs and Services (DSPS) for Santa Monica College. Former Chair UCLA Chancellor's advisory committee on Disability and the Co-Founder and former Board Member of Westside Center for Independent Living.

Sandi Burnett also shared that she has had a lifelong experience with having a mobility disability. She was trained on the regulations with the Department of Justice as well as the EEOC, and architectural review of Accessibility.

Sandi stated that She discussed the requirements for public programs and shared that one of the primary requirements for public money is that all public programs and services should be accessible to people with disabilities. It's a requirement that they proactively seek out what the community or residents would prefer. Planners should seek out what the local communities' needs are and be inclusive.

For example, in Mar Vista, there is the McBride Scholl for Students with Disabilities, which is a physically accessible High School on Centinela south of Venice Blvd. Venice High School id designated a physically accessible High school for student that use wheelchairs and have other mobility issues. Additionally, on Grand View Blvd., there is a lot of low-income Section 8 housing that includes those with disabilities.

As a 32 year resident of Mar Vista, Sandi did not think that there ever has been a concerted effort to find out what this local community might need in the way of disability access. Shari thought that it would be appropriate for the LA City Department of Disability to really show what could be done on a local council level on this issue. Sandi doesn't think it's been done anywhere in the city.

Geoffrey commented that the accessible housing issue is really critical.

Sandi discussed the Great Streets Pilot Program and commented that there did not seem to be any concerted efforts to find out what could be done for the disabled as part of the plan.

Sandi shared that she personally has a scooter and that there is a lot more work needed that could be done on the sidewalks to make them accessible.

She stated that she appreciated the mid-block crossings that were part of the Pilot Program. Although she is aware that the installation of the mid-block crossings did create problems for some businesses, like Sunny Grill, which had it's accessibility ramp negatively impacted by the mid-block crossing construction.

There was a discussion of parking and disabled access.

There was a question for Sandi about why there wasn't more parking for businesses for the disabled.

Sandi shared that the ADA Guidelines do not address street parking, but rather talks more about parking lots.

Geoffrey also added that the LA City DOD was looking into what is required by businesses in terms of accessible parking.

Sandi discussed that there should be more parking in lots for disabled access, perhaps with use of easements.

Geoffrey commented that there were triggering situations where the city could look into easements.

There was a discussion about sidewalk safety, parking in Mar Vista and other subjects such as code and doing more than the ADAG code. Sandi discussed Santa Monica and how they go beyond the code.

There was an additional question and answer section.

Question: Wouldn't it be easier to reverse the current Pilot design and start anew from the drawing board?

Answer from Geoffrey: All I can say is that forums like this are being heard by disability. I know that a number of council members are reconsidering their street configurations.

Question: Why don't they use the median for bike lanes?

Answer from Sandi: The median is unavailable as it is used for various utilities such as a very important gas main. They don't want any infrastructure on top of that gas main.

There was a discussion about how the community is offering input but does not feel like they are being heard.

Geoffrey said that he understood their frustration and hoped that their councilman would be more receptive to feedback.

c. Len Nguyen, CD11 Senior Field Deputy, did not attend and there was no update on the CD11 Pilot Program as well as other Great Streets projects from CD11. Tabled due to his absence.

d. Lenore French, gave a preview of the upcoming Thursday September 7 Mar Vista Art Walk. It will be the 8th Mar Vista Art Walk. The Theme is Psychedelic September tying in with Burning Man and the anniversary of the Summer of Love occurring around the same time. Lenore discussed how the Mar Vista Art Walk is always the first Thursday of each quarter, occurring December, March, June and September as an outside event on Great Street Venice Blvd. from Inglewood Blvd. to Beethoven Street. Lenore also shared the time of the art walk, from 6 pm - 10 pm as well as explaining how the Mar Vista Art Walk is divided into three different Clusters of activity. At the last Mar Vista Art Walk between 2000-3000 people attended. Lenore also answered questions about the planned activities and live music and shared that information can be found on the Mar Vista Art Walk Facebook page. She hoped everyone would attend and enjoy the evening.

6. Public Comment

7. Future Agenda Items

8. Adjournment 7:57pm

** **PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS** – The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 2 minutes per speaker, unless adjusted by the presiding officer of the Board.*

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** **PUBLIC ACCESS OF RECORDS** – In compliance with Government Code section 54957.5, non-exempt writings that are distributed to a majority or all of the board in advance of a meeting may be viewed at website, http://www.marvista.org, or at the scheduled meeting. In addition, if you would like a copy of any record related to an item on the agenda, contact secretary@marvista.org.*

** **RECONSIDERATION AND GRIEVANCE PROCESS** - For information on MVCC's process for board action reconsideration, stakeholder grievance policy, or any other procedural matters related to this Council, please consult the MVCC Bylaws. The Bylaws are available at our Board meetings and at our website, http://www.marvista.org.*

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday August 8 2018 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chairs: Michelle Krupkin and Gabriel Hill

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Tracey Corinne, mosaic artist, discusses her upcoming needs as far as planning and working on the hopscotch mosaic for placement near the Mar Vista Library. She discusses four (4) different possible dates for community volunteer assistance sessions. The planned for dates are: September 29, as a build day, location TBD, need is for 12 volunteers. October 20, 2-6 volunteers needed to reverse the design, October 27 needs materials, November 10, possible concrete pouring making stepping stones, needs 14 volunteers. Tracey needs three (3) months lead time with the earliest finish target time period for installation being January or February 2019.
   The hopscotch dimensions will be approximately 91 3/8" in length and 26 ¾" wide.

3. Motion to approve recent Great Streets minutes (2 minutes) Selena made the motion and Sheri seconded. Minutes were approved.
4. Reports (5 Minutes)
   a. Great Streets Program -Michelle Krupkin, MV Community Council, gave a brief definition.

   b. CD11 Mobility Deputy Alek Bartrosouf shares Mar Vista related mobility issues. Alek discussed an upcoming artwork installation for 3 bus shelters on GS Venice Blvd., including one on the SW corner of Venice/McLaughlin and two for the NW and SW corners of Venice/Centinela. The installation is scheduled for August 16 2018 with a Photo Op ceremony planned for September 1 2018. There will be art on a poster facing traffic and a poem on the poster facing the other side viewable by pedestrian traffic. Gus Harper is the artist designing the poster side and Chase Maser is the poet for the narrative poems. The pavement mural planned for the center of the intersection of Grand View Blvd. and Pacific Ave. will be installed in September 2018 sometime as well.
   Alek also discussed the Hi-Visibility crosswalks aka continental crosswalks that are to be installed this month on McLaughlin Ave. and Charnock Road as well as McLaughlin and Victoria Ave. A stop sign is planned for placement the middle of two lanes. Some parking spaces may have to be lost for the safety improvement installation. Stakeholders expressed concern that a similarly placed stop sign between north and south bound traffic on Grand View Blvd. and Charnock Road was being run over very frequently.
   Alek also shared info about signs coming for four different roads in MV to address oversize vehicles (specifically RVs) and overnight parking. These roads include: Venice Blvd. between Inglewood and Globe, Matteson between Minerva and Bledsoe, Iowa Between Amherst and Centinela and Gateway between Stoner and Granville.
   The CD11 Parking Study has shifted from LA DOT to City Planning Dept. There is a meeting scheduled to discuss scope of work and adherence to AB 744.

We are starting to brainstorm and strategize other amenities that the community expressed interest in for Great Street Venice Blvd. such as street furniture, additional bus shelters, lighting at various crosswalks and bus stops, arrival boards for the bus shelters. There may be some coordination needed with Metro and Hannah for some items like arrival boards.

A stakeholder asks when the lane is going to be put back on Venice Blvd. Alek states they've thought it through and that it is a pilot program that is in place and is being studied. The city is gathering and obtaining data that once it is analyzed and gathered it will be shared with the community at the end of the year. The pilot was yearlong.
Stakeholders express that it would be nice to have even 6-month data, which has not been delivered.

c. Lenore French, gave a preview of the upcoming Thursday September 6 Mar Vista Art Walk, themed "Science" running from 6 pm to 10 pm. There were several stages with music as well as activations that involved Science and Art. A music act, Mr. Vampire Band, features a current UCLA neuroscientist that also does a Burning Man style Ted-talk about science and art and also going to do a community mural at the coffee connection. There is also a man who created the Iron Man wearable glove based on his fascination with Michael Jackson's glove. That will be at the MV Community Art Gallery. The Department of Cultural Affairs is funding both the bus bench art and the pavement mural from the 1% public art fund – a state bond fund. The last MV Art walk of 2018 will take place in conjunction with Small Business Saturday on November 24 2018 with a theme of "Inner Giving." The event will start at 10 am with family activities and run until the 10 pm. There is also activity at the MV Community Art Gallery -formerly Buckwild Gallery. Please check Facebook or the MV Art website for dates. An artist who does portraits of homeless residents will be exhibiting at the MV Community Art Gallery.

5. Old Business (30-45 minutes)
    a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. STATUS: AMENDED AND PASSED at August 1 2018 Joint Transportation & Infrastructure and Great Streets Ad Hoc Meeting.

    b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. STATUS: AMENDED AND PASSED at August 1 2018 Joint Transportation & Infrastructure and Great Streets Ad Hoc Meeting.

6. New Business (30-45 minutes
    a. Geoffrey Straniere, Senior Project Coordinator, Access Compliance, LA City Department on Disability, gave an update since visiting one year ago and discussed ongoing ADA issues on Great Street Venice Blvd. Geoffrey expressed that when he came a year ago and walked on GS Venice Blvd., it was his first real forensic evaluation of accessibility elements with relation to a Great Street since he had not been involved in the design of Great Street Venice Blvd. Some would say that it's not a Great Street without accessibility. He's had some opportunity to deal with some issues on the west side. Two new accessible parking stalls have been installed in the Del Rey lagoon along with removing tree roots and re-grading the sidewalk areas. On the west side, he is working on a scope of work along with West LA NC at the Corinth Blvd. facility to add accessibility.
    There was a question and answer period.
    Question: A stakeholder asked if he or anyone in the Department on Disability had been able to address any concerns about Venice Blvd. that were raised.
    Answer: There was a lot of talk last year – but he hasn't been able to affect any changes as of yet. He is willing to come back and draft a list of the actual concerns with regard to starting redesigns.

Q: Follow-up needed on high curbs on Venice Blvd. that are out of compliance with ADA standards. It was installed by LADOT improperly. People are falling off that sidewalk curb every day.
A: It's a challenging feature.
Q Who fixes that?
A: In general, the process for accessibility concerns is, then DOD puts together info and Bureau of Street services addresses the accessibility concerns.
Q Could we set a date to walk the boulevard to address concerns.
A Yes, let's do that moving forward.
Q: There was a question about parking and the Great Street Venice Blvd. and what is required in terms of specifications of on street and off-street accessible parking. The stakeholder stated that they don't see any accessible parking at all on Venice Blvd. They believed that the requirement not being met. In fact, now the parking has been moved so that disabled drivers would exit cars right next to a traffic lane. I read the ADA requirements and specifications and that seems not to be the requirements.
A: Accessible parking on the GS Venice Blvd. was an oversight in the current pilot design. It was not included in the design. Persons with accessibility or mobility concerns would be forced to exit their vehicle next to a traffic lane. Then they would have to navigate access to the curb by moving through the bike lane where there are no curb cutouts until the end of the blocks or corners.
We need to think about these things. You can't send people all the way down to the corner because there is no curb cutout for access.
Regarding how we establish accessible parking on public streets were there are meters particularly like this one, all these things need to be worked on and worked out.
Q: If you were involved in the design of Great Street Venice Blvd. knowing that it's just under one mile, and there many sections that are residential and that are business, at minimum, how many blue accessible parking stalls would you have requested?
A: Well, right now there is a tossed around 4% of metered parking should be blue spaces. The residential blue curb parking program is in sleep mode – approaching eight years since the last blue curb pavement marking and signpost has been placed. We are preparing to resuscitate the program. There is no one size fits all. You're always dealing with density issues, California building issues, revenue issues. But there needs to be more.
Q: Comment from stakeholder: We have noticed that since the last time you were here a year ago, we see bike traffic going in both directions now. There are also issues with bikes not yielding to pedestrians when pedestrians try to cross the bike lane.
A: There are safety and shared space issues for sure.
Q: There are also issues with close calls of bikes almost hitting kids. People are now offloading their kids into the preschool and the music school that are on Venice Blvd. and there are very concerning safety issues. Kids now have to cross the bike lane and also off load next to vehicular traffic.
There was discussion about scooters using the bike lane and sidewalk and causing issues as well.
A: Think there needs to be rules, helmets, should have to stop for pedestrians and those with access issues. There need to be simple enhancements.
Q: There was a comment that the lane needs to go back. There was another comment that drivers have to be hyperaware. There should be a test before people are allowed to drive or bike or walk on a Great Street.

b. Autumn Elliot, Disability Rights California, discussed ongoing concerns of people with disabilities and seniors regarding ADA issues on Great Street Venice Blvd. Andrew (Andy) Berg and Autumn Elliot gave an overview of Disability Rights California (DRC). They are a nonprofit agency that is the largest disability rights group in the nation.

DRC provides free legal resources to people with disability. There are multiple areas DRC works on including architectural planning and how it relates to public access. We look at an entire street such as Great Street Venice Blvd. and deal with 2 different types of work. One type is case involving disability that change law. Another type of work is giving legal advice. DRC works best when the organization is contacted before there is a problem. Andy stated that if you know someone with a disability with difficulty traversing an area such as Great Street Venice Blvd. please have them give us a call. Great Streets is a program of the City of LA and needs to be accessible to people with disabilities. How it affects people with disabilities has to be considered first before a design is implemented or it will leave people out and create unintended barriers.
DRC can be reached by phone, TTY, or by filling out a Short-Term Assistance Request Form on their website: www.disabilityrightsca.org
There was discussion about how to contact LA City Department on Disability. They are contactable via phone, fax, TTY and email.

7. Public Comment
8. Future Agenda Items
9. Adjournment 7:58 pm`

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC SUBCOMMITTEE
http://www.marvista.org/great-streets.php

Wednesday December 12 2018 6:30 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:40 pm.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   During Public Comment, the following was discussed:
   A stakeholder asked about the previously requested Town Hall. Michelle relayed that the Town Hall request motion passed the night before at the 12.11.18 Board of Directors meeting. A MVCC letter was due to be written and sent to LADOT, Great Streets Initiative and the office of Councilmember Mike Bonin demanding a Town Hall by January 26 2019 to present the one-year pilot project data and other information.
   The stakeholder said that they were concerned about scheduling and doing the outreach for it.
   Michelle relayed that when West LA/MV CD11 Deputy Hannah Levien was at the 12.11.18 Board of Directors meeting she said that LADOT was still going to present the one-year data by year's end but did not give details about when/ where the data would be presented.
   CD11 Mobility Deputy Alek Bartrosouf said that CD11 has been scrambling with LADOT and the consultants to get the report done by the end of the year. We're really hoping that it will be ready to be released very soon but we are still waiting on some key data points and there are still some things that are not finalized and he didn't have an update on when it released other than hoping by the end of 2018 as had been promised all year.
   A stakeholder asked if it was being released on the LADOT VeniceMarvista website by the end of the year?
   Alek said that he would have to ask the communications folks. He stated that LADOT has their own communication staff than CD11's communication staff. He wasn't sure how it was being released but either by email or social media but will be available to everyone.
   Michelle asked about getting an executive version.
   Alek said you're talking about an appendix. We made it clear to LADOT that an appendix should be provided.
   Alek said that there will be a final report that is a summary report which is probably going to be very similar to the benchmark report from earlier that you have seen that was released in the past.
   In addition to the summary there will be an appendix that will be a separate document that highlights and includes all the data and methodology.
   It was asked which specific department of LADOT is preparing the one-year report, was it Vision Zero and if Fehr and Peers is involved.
   Alek said that he was not sure. A stakeholder asked whether LADOT and CD11 intended the release of the report to take the place of a meeting in Mar Vista. Alek said he didn't know what the plans were for beyond the report. He said that he was specifically focusing on the report itself.
   Question from stakeholder: Since Nat Gale left LADOT Vision Zero, is there a new Nat Gale doing the report? A: Not sure if LADOT Vision Zero's plan is to replace Nat or if his job function has been shifted to other people on the team.
   A stakeholder said that if Alek speaks with them that we expect them to come out and touch base so we can see them and talk to them.

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A stakeholder asked whom do you deal with at LADOT? Alek said that he thinks Tim Conger LADOT Senior Transportation Engineer and Jaclyn Garcia LADOT Transportation Planning Associate.
Alek says it's coming but he doesn't know when. It was remarked that the holidays are approaching.
Alek says that no one wants to be scrambling to finalize a report around the holidays. He hopes the report comes out sooner than later.
Alek said that there was a benchmarking report that outlined all sorts of data sets evaluating pre-project conditions. The report is going to mirror that and give you a post-project conditions using those same data sets.
There was a discussion about what factors would determine whether the road diet was working.
Alek said by work there are different factors like volumes, traffic safety, economic data, business conditions, pedestrian etc.
A stakeholder asked if it compared to any other cities with road diets.
Alek said that this study doesn't include other cities. That it does a pre and post road diet comparison.
A stakeholder asked if the study looks at traffic on side streets and cut through traffic.
Alek said it would include volumes on possibly Palms, Victoria, Charnock and Pacific.
There are 4 or 5 streets. Possibly McLaughlin and Centinela.
The stakeholder asked about Walgrove and Beethoven.
Alek said he didn't know since it was a mirror of the pre-project report. If those streets were included in the pre-project report than they would be in the post project report.
Another stakeholder brought up something that he saw on the Facebook page Westside LA Today. They have a video there that is a post talking about Venice Blvd. and all the issues with businesses. They interview Demetrious about Venice Blvd.
At the end of the video there is a statement that they went around and spoke to a lot of business owners but they were too scared to talk on camera for fear of retaliation.
We know that they have people from the council office going around and harassing business owners. So we know that we have people from Venice Blvd. business fearing retaliation from government officials or city workers.

3. Motion to approve the October 10 2018 Great Streets minutes (2 minutes) Gabriel Hill made the motion. Seconded by Selena. Motion was passed and minutes were approved.

4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council gave a brief definition of the Great Streets program. Full info at http://lagreatstreets.org/what-we-do

   b. CD11 Mobility Deputy Alek Bartrosouf, shared Mar Vista related mobility issues.
      1. CD11 is looking at increasing pedestrian safety lighting for Great Streets Venice Blvd. CD 11 is working with Bureau of Street Lighting (BSL) and we are trying to allocate some of the Great Street funds to increase safety for pedestrians at intersections along the corridor. The lighting that we currently have on the Venice Blvd. Corridor is more geared for the road and drivers. Not sure if we can do all intersections to raise the visibility of pedestrians crossing the street but want to try to identify ID key areas that are particularly dark in the corridor. Alek stated that he is trying to do that assessment himself with BSL and also welcomes local input if anyone has specific suggestions of target locations where lighting would be helpful.

      A stakeholder expressed lighting concerns for the intersection of Venice Blvd. and Grand View Blvd. where the leading pedestrian interval (LPI) is located. Another stakeholder stated that there had been a number of pedestrian vs. car accidents at that intersection.

      A stakeholder shared their concerns about how dark it was on sidewalks in the residential sections of Venice Blvd. on the north side from Boise to Moore and on the east side of the street of Grand View near the post office between Venice and Pacific on Grand View.
      Alek said that if the streetlight is going to be placed on the block itself instead of the intersections, the businesses have to be assessed to pay for it. Even in a residential area, if your

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street wants lighting, you need to petition the community and there is a yearly fee on your property tax bill. That is citywide and includes commercial areas. In order to bypass that, I am only focusing on specific safety concerns at intersections and crosswalks. So that's how to avoid the requirement to assess businesses. If you notice a particularly dark intersection on the Great Street Venice Blvd. please shoot me an email about it.

A stakeholder said that she had questions about not only pedestrians but also people riding scooters and issues with poor lighting at night. The stakeholder said that scooters are crossing through red lights and dangerous. Alek said that the City of LA just passed a pilot program relating to those scooter devices including Birds. Michelle stated that the Transportation and Infrastructure Committee wrote and passed a motion regarding scooters, which subsequently the full MVCC passed, resulting in a Community Impact Statement (CIS) being submitted to that Scooter Pilot Program council file. Michelle also stated that the representatives from all the scooter companies are not being responsive to invitations to attend a Transportations and Infrastructure Committee meeting. Alek said that scooter companies do have lighting on the scooters but it is not enough.
Alek additionally said that if there are any issues with scooter companies are not responding to invitations from Neighborhood Councils please relay that to him and he can relay that to LADOT. LADOT is starting to think about what penalties to assess to the scooter companies that are not complying.

A stakeholder expressed concern about bikes and scooters traveling the wrong way in the bike lanes. He suggested posting signed with directional arrows. He mentioned areas near Wade and Beethoven Streets
Another stakeholder shared that a US Postal worker was struck while exiting her postal vehicle and then walking across the bike lane to deliver a package near Wade and Beethoven in the residential areas.
Alek said that he did not know of any signage that is not MUTCD (Manual on Uniform Traffic Control Devices) compliant –national standard for signage on streets that would be available. He said he could see if there is signage that would be relevant.

2. Alek's report continued. His second item concerned the interest in a left-turn signal at Wade and Venice. The traffic report is done and they are working on design. Anticipated installation is Spring 2019. This would be for lanes on Venice turning north and south onto Wade. He mentioned that he knows that there have been some collisions there and we are trying to address it that way.

3. Pavement Mural at the intersection of Grand View Blvd. and Pacific Ave.
Alek gave an update on the Pavement Mural which is not Great Streets per say but mentioned it in the past since it came out of this committee. We were aiming for January 2019. We were trying for this month December 2018 but there were some issues with the artist's schedule. It has been pushed back a few weeks probably to February 2019. That's all the update I have on this item. I was hoping that Lenore would be here to give a better update on this item. Lenore has been working on this with Hannah and LADOT on this so if there are any questions reach out to them on this. It is TBD January 2019.

4. Big Belly Bins. Hannah was trying to get some Big Belly Trash Bins for Great Street Venice Blvd. (GSVB). Funding has been acquired and now some of the regular trash bins along GSVB will converted to Big Belly Trash Bins.
This is planned for approximately 5-7 locations along GSVB. Some will have dual bins with a trash bin and a recycling bin and some will be just a trash bin. Michelle explains to the Subcommittee attendees how the Big Belly Trash bins work using solar power as an energy source to compact trash. A stakeholder requests placement of one in front of Grand View Market. Alek says that Hannah has the map of the planned locations for the Big Belly Bins. Alek states that if there is a trash problem, he doesn't think that there will be a problem to request

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adding another bin. Alek asks the stakeholder when the problem is worse. The stakeholder thinks that it is on MV Farmer's Market days when this is an issue and that the bin is missing the top. Michelle also mentions that the black trash bin on the SW corner of Venice and Inglewood next to the Metro Route 733 bus stop in front of the MV Library is also missing the top. Alek notes these issues.

5. Metro Bike Share. Alek stated that Metro staff and their BikeShare team were out in Mar Vista doing outreach recently at the December 11 2018 MVCC Board of Director's meeting. BikeStands for the Metro Bike Share are coming to Mar Vista soon with a roll out in Spring 2019. Metro Bikeshare currently operates in Downtown LA and Venice and are expanding to more neighborhoods on the Westside. That includes Del Rey, Mar Vista, Playa Vista and Playa Del Rey. These are docked and the device where you rent out the bike is on the bike itself. Technically they can be returned anywhere. There is an incentive built in to return the bike to the Metro BikeShare dock station. You are charged more if you don't return to a station. You can pay for the Metro Bike Share rental with a Metro Tap Card.
There will be rebalancing teams that go out and place bikes in the stations where people are expecting them. Bicycle Transit Systems (BTS) is the operating company. The tentative map is There are a few locations on the Great Street Venice Blvd. where the sidewalk are wide enough where it won't be impacting any parking. There are a couple locations were we are trying to determine whether we can put them near a bus stop or on a red curb. Details are still being figured out. Alek said he will hopefully have a better update about dock locations at the January 2019 Transportation and Infrastructure and Great Streets meetings. Michelle and Alek share the flyer that Metro Bike Share circulated at the December 11 2018 MVCC Board of Director's meeting. Michelle comments that the flyer specifies that there are 60-70 Metro Bike Share dock stations planned for the new areas including Del Rey, Mar Vista, Playa Vista, Playa Del Rey, Palms and possibly Marina Del Rey. Rollout was originally set for 2018 but they are having ordering issues with the docks and bikes since these are next generation bikes.
48 minutes
6. Landscaping. Alek shared that Hannah has been working with BSS to landscape the Great Street Venice Blvd. median. Part of the problem is that irrigation is broken and since the relinquishment happened the city hasn't been repairing or maintaining the irrigation system in the medians. That has been part of the hang up and cost of this. We can't put in plants without them being irrigated. So we wanted to test it out and see how it would work to landscape with a coordinated effort from different departments. The conservation core on this one helped out on a small section of the Great Street median and it worked out well. We are hoping to be able to extend it on other medians down the line. We are hoping to extend it to the rest of Great Street Venice Blvd. A stakeholder had a question about landscaping. She mentioned the landscaping in the Livable Boulevards Streetscapes Plan and that it shows narrowing the median. She said that she was all for plants but are we are planting plants that are going to get ripped out at some point when they narrow the media if that actually do that? Alek said that the Streetscape Plan is not going to happen for years. Whatever version that comes out of that Plan is not to be installed for 4, 5, 6 or 7 years. This was just a beautification project in the meantime. Alek said that it's too early to say what will happen to the medians. A stakeholder asked if any trees were being taken out of the medians. Alek said he didn't think so. There was a discussion about whether the trees planted in the media are being trimmed. There was a concern from a stakeholder about the trees since they are currently getting hit by truck and large vehicles driving on Venice Blvd. between Grand View and Centinela. Alek said that he can look into it.
52 minutes

c. Lenore French, will give an overview of the recent November 24 Small Business Saturday/Mar Vista Art Walk. UPDATE: Lenore French emailed earlier that day that she is sick. She was not in attendance – no report.

5. Old Business (10 minutes)

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a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. **STATUS**: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. **STATUS**: On the 12.11.18 BoD Meeting Agenda. Postponed to 1.08.19 BoD meeting.

c. Mission Statement discussion for Great Streets Ad Hoc Subcommittee page. **STATUS**: Finalized for posting on MVCC website.

d. Independent Traffic Study Motion.
WHEREAS, the Great Streets - Venice Boulevard pilot project has caused conflict and controversy in Mar Vista and the surrounding communities; and

WHEREAS, numerous requests for pre- and post-project data to the Great Streets Initiative in Mayor Garcetti's office, the Active Transportation and Vision Zero offices in the Los Angeles Department of Transportation (LADOT), and Councilmember Mike Bonin's office have been non-responsive; and

WHEREAS, the limited data and analysis that has been released from LADOT and Councilmember Bonin's office is contradictory to the experiences of the community members living near, conducting business on and otherwise using Venice Blvd.; and

WHEREAS, numerous requests for Town Hall meetings with question and answer sessions have been denied by LADOT and Councilmember Bonin's office; and

WHEREAS, the Silver Lake community, when faced with a similar situation, asked for and were granted funds to hire a transportation contractor to conduct an independent traffic study regarding the Rowena Avenue road diet by their Councilmember David Ryu; and

WHEREAS, Mar Vista stakeholders, on behalf of the businesses and residents, commuters, emergency responders and others impacted by the Great Streets - Venice Blvd pilot project, would like to seek the same remedy in order to receive answers to their questions and concerns that have heretofore been unaddressed by the Great Streets Initiative, LADOT and Councilmember Bonin.

THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel under the auspices of the Great Streets Ad Hoc Subcommittee, and

THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets - Venice Blvd pilot project, to be done within 2 months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.
STATUS: Passed 10.10 2018 at Great Streets Ad Hoc Subcommittee meeting. Motion amended and passed at BoD 11.13.18 meeting. *Sent back to Great Streets Ad Hoc Subcommittee to compose specific data request questions.*
Amended as follows:
THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel ~~under the auspices of the Great Streets Ad Hoc Subcommittee,~~ and

THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets - Venice Blvd pilot project **with a list of data requested to be provided by the Great Streets Ad Hoc Subcommittee**, to be ~~done~~ completed within ~~2~~ **four (4)** months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.
Minutes section:

DRAFT

Report: The Great Streets Ad Hoc Subcommittee discussed the list of data requested from the Board of Directors and determined that the following should be utilized in a data request:
1. LADOT Transportation Impact Study Guide Lines, December 2016
https://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf
2. Typical Elements That Should Be Included In A Traffic Impact Study
https://www.dot.ny.gov/divisions/operating/oom/transportation-systems/repository/Typical%20TIS%20requirements%20033115.pdf
3. City of Los Angeles Complete Streets Design Guide - pages 121-132
https://planning.lacity.org/documents/policy/CompleteStreetDesignGuide.pdf
These above documents will be sent to the 1.08.19 Board of Directors meeting.

6. New Business (45 - 50 minutes)
   a. Tracey Corinne, Mosaic Artist. Discussion of current status of payment for the three (3) mosaic tile project at 12515 Venice Blvd. installed June 14 2018, and discussion of the future mosaic hopscotch project planned for placement near the Mar Vista Library. Tracey was unable to attend and could not discuss future plans. Michelle was able to share that after much pestering the Dept. of Cultural Affairs and David Duran-Flores at CD11, Tracey received her long- overdue payment from the controller's office December 4 2018. There was a discussion about how there needs to be a procedure in place for the hopscotch project.

   b. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy. Discussion about possible new designs for streetlight banners for Mar Vista on Great Street Venice Blvd. and update on the Venice Blvd. Downtown Mar Vista Gateway Signage project.
   Hannah was not in attendance. Alek had an update from her that he read. Alek said that the streetlight banners are going to be the same design as last time. No update on the gateway sign.

7. Public Comment
8. Future Agenda Items –Discussion about having a Town Hall and doing outreach for it.
9. Adjournment (7:56 pm)

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DRAFT

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday February 10, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:39 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve January 2016 minutes (2 minutes) Sarah Auerswalk moved to approve, Lenore French seconded the motion, Minutes were approved unanimously.

4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald, which included a very informative Make It Mar Vista slideshow from the Engage LA event. Sarah gave a brief description of the 1/29/16 Engage LA Sarah event that included 3 pitches for the second round of IOBY Challenge Grants. The pitches came from the following candidates: Jump on It, LA-Más and 11:11 ACC (San Fernando Valley Art Collective). LA-Más won the competition. Sarah relayed that the data from the Make It Mark Vista 11/28/15 event will be due at the end of April 2016. Sarah also discussed that there will be a new MV Business directory this fall that will be put together by the MV Chamber of Commerce.

5. New Business (30-65 minutes)
   a. Michelle Krupkin, Mar Vista Community Council, gave a brief update about the installation of the Soofa Smart Bench on Venice Blvd. Michelle relayed that once Caltrans relinquishes the Great Street Venice Blvd. section of Route 187 (Venice Blvd.), the Soofa Smart Bench could be relocated to a better spot. Michelle gave an overview of recent and future events from other Great Streets locations including: [Re]Visit [Re]seda Blvd.)/I Heart [Re]seda (Reseda Blvd. Northridge, Street Beats (Crenshaw Blvd. Hyde Park), Connect the Dots (Van Nuys Blvd. Van Nuys), Youth Envisioned Streets (YES - Central Ave. S. LA), FigJam (N Figueroa St. Highland Park), Nuestra Avenida (Cesar Chavez Blvd. Boyle Heights), and Pacoima Street Values (Van Nuys Blvd., Pacoima). Michelle also mentioned that art grant money is available from the LA Dept. of Cultural Affairs in the form of an Arts Activation Fund Grant.

b. Lenore French, Green Communications Initiative (GCI). Lenore shared that the March 3 2016 Steppin' into the Art of Mar Vista event would focus on the element of live theatre, with several performances taking place in the former Canton Kitchen parking lot, including a scene from "Shine Darkly, Illyria" as performed by the Ovation winning theater group Fugitive Kind. As March and September will be the smaller events, there will be no billboards until the June and December events. 25 venues will be participating in the March 3rd 2016 event, including new additions: A Kid's Place, Status Kuo, Top Tomato and the School of Rock. Lenore is also applying for an Arts Activation Fund Grant from the LA Dept. of Cultural Affairs.

c. Public Comment –Len Nguyen, CD11 Senior Field Deputy, discussed that CD11 is still accepting applications for the ongoing Utility Box Art project.

d. Future Agenda Items

e. Adjournment at 7:28 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday February 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin began at 6:33 pm.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve January 2017 Great Streets minutes (2 minutes) Sarah Auerswald made the motion, Lenore French seconded. Minutes passed unanimously.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah is anticipating changes on Great Street Venice Blvd. and is very excited see what the next six months to one year hold.

5. New Business (30-65 minutes)

   a. Jessie Holzer, CD11 Mobility Deputy, gave an overview of the upcoming CD11 Pilot Program Mid-Block Crosswalk installation as well as other Great Streets projects. There will be a groundbreaking for the Midblock Crossings on Monday, February 13 2017 at 9 am. The street light banner will be up until November 2017. CD11 has a permit for these until November 2018. This committee should consider new designs for the total of 27 streetlight banners.

      Jessie went over feedback from LA City Dept. of Urban Forestry regarding the trees discussed during the January 2017 Great Streets Ad Hoc meeting. Urban Forestry said that of the tree varieties discussed, the African Fern Pine is the most drought tolerant, with the fastest growth rate and most pest resistant. African Fern Pine is also known as Potocarpus and Afrocarpus. Urban Forestry said that the Bay Laurel prefers partial shade, but would not fit on the parkway area. Urban Forestry said that the Pink Trumpet Tree would be ok for both the parkway and the median.

      Rachel from Tree People said that it is best to have two – three varieties in an area to avoid pest infestation. She also mentioned that the African Fern Pine can have less issues with pests and debris.

      Pat Karasick mentioned that there are Tipu Trees on Washington near La Brea that could be an example of possible planting for Venice Blvd. Rachel of TreePeople said that these are also called the Yellow Bottle Brush Tree and that they need 8' of room – best to be planted on wider sidewalks. Rachel said that it is important to consider what features in a tree planting local businesses are considering. Sarah Auerswald said that businesses are looking for low to no debris and also trees least likely not to block business signage.

Rachel shared that the Pink Trumpet Tree drops all their leaves in fall and flower in January-February. They are slow growing and good for the median since they can be messy in a parkway area. Rachel discussed Tipu Trees, which flower in June and July and are bar in March and April. Rachel also discussed camphor trees, which are large and need 35-40 feet between east tree and are best for the media areas.

Jessie shared that the trees will be taken away soon for the midblock crossings. 1-3 will be removed from the parkway area, and the rest (4 trees) will be removed from the median.

There was a discussion of empty tree wells and the long-term plan to enlarge tree wells, specifically for Great Street Venice Blvd. and then maybe throughout LA City. She is not sure how big the enlarged tree wells would be.

Rachel suggests finding 1-3 tree varieties that would be best on parkway areas. Jessie says Urban Forestry has an approved list of drought tolerant trees: 1) African Sumac, 2) Australian Willow and 3) New Zealand Christmas Tree. Clarissa of Tree People mentions that the African Sumac variety works well for the parkway and that an example of that can be seen in the Brentwood area.

There was a discussion about TreePeople's availability to do a community-planting event. Dates were discussed and Saturday April 8th from 9 am to noon was identified as a target date. Michelle Krupkin agreed to write a funding motion to support the possible community-planting event that would include outreach to local schools as well as supplies for the day.

Jessie discusses a list of addresses for tree replacement and also shares that she will be speaking to DOT regarding the Midblock Crossings installation timeline. From what she understands, they are shooting for April 2017. Tree People recommends planting no later than the second week of May.

b. Lenore French, GCI Communications, gave a preview of plans for the upcoming March 2 2017 Art Walk. The theme will be Voices and is inspired by Beat Poets and folk music, the Last Poets as well as Gil Scott Heron and hip-hop and the power of giving voice to political expression. March 2nd will include poetry, music such as hip-hop, folklore and opera. There will be 2 live outdoor stages including the Coffee Connection. Performers will include the daKAH Hip Hop Orchestra, Feisty Heart and the Night Owl Players. There will be interactive stations at the Mar Vista Art Department.

   The Bike Parade will be attending again as well as roving poets (Philosopher Stone Poets) with pedestrian lights moving between all three clusters of the art walk.

   GCI is bringing in new staff members that will result in a larger social media footprint for the events. Kirsten Zilm will be the new Deputy Director for the Art walk. Erik Charlot and Alex Prosser as well as Melinda Kramer will be heading the volunteer coordination team, with a call for volunteers to assist with the walk including supporting the passport scavenger hunt.

   Shane of Timewarp will again be curating the Timewarp Record Store stage. Ben Kernian will be curating the Promenade Car Wash & Spa space.

   Lenore also stated GCI was awarded the Phase 2 Arts Activation Grant. There will also be an upcoming Benefit for the GCI Art walk at the Barker Hanger March 30 2017.

c. Rachel Malarich and Clarissa Boyajian, TreePeople, discussed possible ideas regarding tree replacement on Great Street Venice Blvd. Please see section 5a above for their insightful commentary.

d. Public Comment

e. Future Agenda Items

f. Adjournment at 7:58 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday January 13 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:39 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes) Michelle Krupkin gave info on the upcoming Connect the Dots event on 2/20/16 and shared their need for volunteers. Contact Aja through their FB page: https://www.facebook.com/connectthedotsla/?fref=ts
   Michelle also discussed the CAReleaf grants, which if LA City owned Venice Blvd. would be a great project for which to apply for funding.
3. Motion to approve December 2015 minutes (2 minutes) Minutes were passed.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition –Michelle Krupkin

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Moved to later in the meeting due to Sarah's need to arrive at meeting later

5. New Business (30-65 minutes)
   a. Jessie Holzer, Mobility Deputy, CD11, gave a brief update about what LA City is working on for Great Street Venice Blvd. over the coming weeks. CD11 if making a push for Clatrans to give interim approval for the CD11 pilot program. There have been meetings with DOT and Caltrans. CD11 is shooting for summer implementation of the pilot plan, approximately June 2016. CD11 has been discussing crosswalk design with the both the LA City Bureau of Engineering and LA City Bureau of Street Services.

      Mar Vista Library has approved the installation of the Soofa Smart Bench on LA City property. CD11 is working with LA City Bureau of Street Services for an installation date, which will hopefully be soon.

      Utility box art update: The new CD11 Senior Planner, Ezra Gale, will be overseeing the project not just in Mar Vista, but CD11 wide. CD11 is going to start solicit artists again. There are to be 3 total boxes to be on Great Street Venice Blvd., one that has been completed and two to be painted/decorated. Applications are available from Jessie Holzer and submissions can be emails to ezra.gale@lacity.org. CD11 will be handling the selection of the artists.

   b. Supporters' Meeting recap. Michelle Krupkin, MVCC. A recap of what was discussed at the January 11 2016 meeting with Councilman Mike Bonin for those who did not

attend. TABLED. Supporters' meeting did not take place. Report will be issued after the meeting is rescheduled.

c. Lenore French, Green Communications Initiative (GCI). Planning for March 3 2016 event: Steppin' into the Art of Mar Vista. Lenore discussed what worked for the inaugural December 3 2015 event. The best aspect of the event was it was not just visual arts. There was something for everyone: Kids/Student and Adult volunteers performing Spoken Word at 826LA, dance at Moving Joint, video at Veganics. Also, sidewalk activities drew and kept people to sidewalk areas and encouraged people to walk the entire length of the three clusters of galleries and activities. Lenore is considering having more sidewalk activity for the upcoming 2016 June and December events. Lenore is planning to get sponsorship for the giant billboards mural to advertise the next event and have it put up one month before the event.

   There was discussion of having specific themes for the March and September events, such as having a theme of live theater. Lenore is considering asking Chris of Coffee Connection about having a stage at the Coffee Connection parking lot in order to have monologues, short scenes and live painting. Lenore will be visiting all the venues and investigating who will be participating for the March 3 2016 event. A Kids Place may be participating with skits. The start time will stay at 6 pm.

4 b. Sarah Auerswald arrives and speaks about livable streets and workforce affordable housing. Sarah and Jessie discuss parking studies of Great Street Venice Blvd. Fair and Peers did the surveys/studies and Great Streets Studio are managing the data studies.

d. Public Comment

e. Future Agenda Items

f. Adjournment 7:51 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday January 11 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin began at 6:33 pm.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve October and November 2016 Great Streets minutes (2 minutes) Sarah Auerswald made the motion, Lenore French seconded. Minutes passed unanimously.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Great Streets is like Urban Acupuncture. One small change can affect/improve a street and the corresponding neighborhood. Sarah gave an overview of the recent Nov 26 2016 event Make It Mar Vista/Small Business Saturday. Most people attending lived in the area but were able to discover businesses that were new to them. The event rained out later and ended early. Retail update: The Mar Vista Restaurant is now open. The District Skate shop is closing.

5. New Business (30-65 minutes)

   a. Rachel Burk, CicLAvia Community Resource Manager, gave a preview of plans for the upcoming Sunday March 26 2017 CicLAvia event: Culver City meets Venice, presented by Metro which is coming to Mar Vista, Venice and Culver City. CicLAvia is returning to the CicLAvia route from August 2015. There will be a large hub in Mar Vista on Venice and table space for the Mar Vista Community Council. CicLAvia is starting outreach the week of Jan 16 2017 with a second round of outreach including a leave behind flyer. They are working with Diana Rogers from the Mar Vista Farmer's Market. There will be adding bike marketing and a bike valet. Greg Castelnuovo-Tedesco suggested having a bike corral. Rachel said that CicLAvia will have a pedestrian zone on Venice from Grand View to Centinela. There will be K rails on Grand View. CicLAvia is trying to secure the Bolero parking lot for Mar Vista Farmer's Market customer parking as people will not be able to get to the Grand View Elementary lot or meter parking on Grand View. There will be two community meetings and outreach. CicLAvia will also have a presentation to the MVCC Board of Directors meeting on February 14 2017. Rachel also shared that there will be Ride Angels helping people during the ride with bike repairs as well as services at the four (4) hubs on this route. Greg Castelnuovo-Tedesco shared that the new Mar Vista Bicycle Committee will be having pre-CicLAvia bike tune-ups at the MV Farmer's Market. Sherri Akers suggested to Sarah Auerswald that she communicate with realtors from the Mar Vista Chamber of Commerce and advise them to avoid conflicts with open houses along the CicLAvia route. Sarah Auerswald suggested that CicLAvia do outreach to restaurants along the route so that they can be prepared for a large turnout and having

a big business day. Rachel also shared that LACBC and Bike Culver City will be participating at the event.

b. Jessie Holzer, CD11 Mobility Deputy, gave an overview of the upcoming CD11 Pilot Program Mid-Block Crosswalk installation as well as other Great Streets projects. This February, as part of the ongoing Great Streets project, construction will begin on four pedestrian midblock crossings on Venice Boulevard to improve pedestrian safety and help unify the north and south sides of the street. The intersections on Venice Blvd. will be located at Mountain View, Ocean View, Boise and Meier. The agencies involved in the mid-block crossing include: Bureau of Engineering, DOT, Street Services and urban Forestry. In order to build the midblock crossings, six trees will have to be removed. Tree removal is only considered when there are no other options. Michelle Krupkin mentions that she reached out to the City of Santa Monica to offer the trees for the Airport2Park project, but their Urban Landscaper said that the six trees were too large to accept for transplantation. Due to the LA City 2 for 1 policy, there will be a minimum of 12 replacement trees to be planted on Venice Blvd. and surrounding side streets. Jessie said that LA City is open to suggestions as to tree placement. There was a discussion of several possible tree options by all attendees that included the following varieties: African Fern Pine, Pink Trumpet Tree, Palo Verde Tree, Bay Laurel Tree as well as Black and Gray Bark Acacia Trees.

   Also discussed were trees used in Larchmont Village, such as the Indian Laurel Fig tree and the Jacaranda, both of which were not welcomed by attendees due to the mess of figs and sticky jacaranda flowers. Jessie said that she would reach out to Urban Forestry and ask their opinion regarding the trees discussed at this meeting. Urban Forestry also has to complete a study on tree placement.

   Michelle Krupkin asked about the use of tree wells for the new trash bins from Street Services. Jessie said that she would inquire about this. There is a chance that there will be space for some new trash bins since trees have to be spaced a certain way according to Urban Forestry.

   There was discussion of other Great Streets elements such as the mosaic hopscotch placement. CD11 is scouting possible locations such as near the Mar Vista Library or near 826LA. Tracey Corinne, who is involved in planning/designing 10 squares for this project, felt that the Mar Vista Library has some possibilities for placement in front of the vs. the library plaza.
   Jessie shared that they are investigating using the Adopt A Media program for funding the mosaic project as the program applies to sidewalks as well as medians.

   Jessie shared that Street Services will be redoing four block faces along Great Street Venice and that Street services is open to where the community wants the block faces to be done. Greg Castelnuovo-Tedesco commented that he would like to see the worst ares fixed in a strategic and thoughtful manner. Sarah asked if LA City could fix all sidewalks on Great Street Venice Blvd. Michelle asked if there are possibly any grants for sidewalk fixes as part of Great Streets or other possibilities. Jessie answered that she will look into it.

c. Lenore French, GCI Communications, gave a report on the recent December 1 2016 Mar Vista Art Walk. Having themes for each art walk is working very well and gives a new feel to each event as well as encouraging attendance with new demographics. Lenore said that outreach through NextDoor with the Mar Vista Council worked well to get a new demographic of attendees. New items were activated for the December 1 2016 Art Walk, such as Venice High School's acapella group caroling during the event. The Light Theme was quite successful. There were two winners for the Holiday Light contest: 1) CAMP and 2) Vintage on Venice. There were articles written about them. The passport game worked well during the event as 75 respondents played and 72 walked all three clusters with data being collected. The Mar Vista Art Walk has applied for grants and will also be instituting a silent auction of artwork from Mar Vista and other local artists.

   Lenore also discussed a preview of plans for the upcoming March 2 2017 Art Walk. The theme will be Voices and will include poetry, music such as hip hop, folklore and opera. The March and

September walks will have Music themes. There is a new GCI Board member, Rebecca Vest along with her husband, Michael Vest. Rebecca and Michael will be curating along with Shane from Timewarp and Van who will curate the Grand View Market. In all there will be four venues at least.

Greg Castelnuovo-Tedesco commented that he was very impressed with the turnout for the recent December 1 2016 Mar Vista Art Walk as well as the variety of music performed. He also wondered if artwork such as a sculpture garden similar to that in West Hollywood might be a project to consider in the future in order to expand public art in Mar Vista.

Lenore also stated that she is working on other projects such as the Pavement Murals and Apron Murals. She also shared that Beautify Earth is planning to do five murals within Mar Vista. Lenore stated that there is a crowd funding campaign called Razoo for the MV Art Walk going on which closes January 15 2017.

d. Public Comment. Francois Nion from Outfront/JC Decaux shared that the new bus stop at the southwest corner of Venice Blvd. and Centinela was installed in November. The solar board, Wi-Fi hotspot and USB port were installed with the arrival board to be installed in the future. Francois is working with NTA to get that happening. More bus shelters are possible and are being looked into. He has data from Metro that he will be sharing. Jessie said that she will be sharing bus stop info form Culver City and Santa Monica Big Blue Bus.

e. Future Agenda Items
f. Adjournment at 7:59 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday July 13, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

Minutes

1. Call To Order and Welcome – Chair (1 min.) 6:38 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve June 2016 minutes (2 minutes) Sarah Auerswald made the motion, Greg Tedesco seconded, minutes passed unanimously.

4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah announced that she is interested in getting more smart bus benches for Mar Vista. Sarah is in touch with the JCDecaux Company, which is in the process of installing smart benches throughout LA City. Sarah will inquire about the installation timeline, getting a possible Mar Vista installation overview as well as discussing other potential Mar Vista installation locations. The JCDecaux Company's smart bus benches will have Wi-Fi, a roof/shelter cover, real-time arrivals board and possibly a charging station.

5. New Business (30-65 minutes)

   a. Jessie Holzer, CD11 Mobility Deputy. Review of ideas from Great Streets Projects components including draft designs for streetlight banners. Jessie shared a few examples of drafts of streetlight banners that will be installed in November 2016, will be booked through November 2017 and are already fully funded. After these initial banners go up, there would be one year to redesign and fund a new design that would be installed in November 2017.

      Jessie discussed the possibility of getting a second Soofa Smart Bus Bench. There is not enough room for installation near the Santa Monica Big Blue Bus bench on Centinela Ave. Jessie is discussing other possible placements with LA Metro, including getting ridership numbers on existing bus stops. The placement will have to take place after Venice Blvd. relinquishment from Caltrans to LA City.

There was also a brief discussion of twinkle lights and the process to acquire them. Sarah suggested that Lenore pursue this project.

Jessie also reviewed the possibility of getting leading pedestrian intervals, which allow pedestrians to have a lead-time to cross an intersection. At some intersections, DOT installs signals that show a walk sign for a pedestrian before showing a green light to car traffic. Jessie is requesting them from DOT. DOT is doing studies now and will let us know if LPIs are possible for some Venice Blvd. intersections.

There was also a conversation about the possibility of murals being installed in the middle of traffic intersections. DOT is looking at potential intersections, including the Grand View alley driveway aprons, and reviewing a design sent by Lenore from of the Mar Vista artists.

b. Michelle Krupkin, MV Community Council. Michelle gave an overview of the five-page Great Street Venice Blvd. sidewalk condition draft report that included a list of problem areas by address/business location. She also discussed condition categories, out-of-condition criteria. Michelle also mentions possible ideas for storm water capture surfaces. Tracey brings up the possibility of art installations in sidewalks including mosaics. Len Nguyen gives a short overview of the LA City sidewalk program. Currently LA City is fixing sidewalks near public/LA City buildings first. Then the city will address ADA requirements. Under the Willits settlement, people with disabilities will be able to make requests for access fixes in their own neighborhoods, such as for curb ramp installations or tree root repairs.

c. Public Comment. Tracey Corrine asks if there is a theme or identity for Mar Vista. She suggests we come up with an identity. Mar Vista translates literally to Ocean View. Greg mentions that the MV Elementary has a dolphin mascot. Tracey suggests that we explore ocean and environment themes for future consideration.

d. Future Agenda Items

e. Adjournment 7:57 pm

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Mar Vista Community Council

Transportation and Infrastructure AND Great Streets Ad Hoc Committee Joint Meeting
Wednesday, July 11, 2018 7:00 PM - 9:00 PM
Windward School Boardroom 1030, Building C (by baseball diamond)
11350 Palms Blvd, Los Angeles, CA 90066 (SW corner of Palms and Sawtelle Blvds.)
Co-Chairs: Ken Alpern and Michelle Krupkin

MINUTES

1. Call to Order—Ken Alpern and Michelle Krupkin presiding 7:10 pm
2. Introductions and Discussion of Items Not on Agenda
3. Approval of minutes of previous meetings -Tabled.
4. Public Comment
   There was a discussion about Bird and Lime scooters. There was also a discussion about the Expo line and bike paths, both existing and needed.
5. Transportation & Infrastructure and Great Streets Related Reports
   a. MVCC Liaison to Bi-Monthly CD11/LADOT/LAPD Traffic Committee Meeting - Linda Guagliano (10 min). No report
   b. LA DWP – NC MOU Committee and Reform Efforts/Goals. No report
   c. MVCC Parking Study Update - Discussion and Update from Howard Weisberg.
      Update from Alek Bartrosouf, CD11 Mobility Deputy: Alek sent Howard's Statement of Work (SOW) to LADOT and is waiting for their response. Ken asked Alek about having a similar parking study done for the area including Overland and Sepulveda. There was a discussion of the need for parking in LA city, including a need for parking at Expo line locations.

   d. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
      Michelle shared the definition of GS. Full info at http://lagreatstreets.org/what-we-do
      She shared that despite one of the goals being increased economic viability, there unfortunately have been 13 businesses on GS Venice Blvd. that have closed since May 20 2017.
      Michelle also commented that although 14 trees were promised to replace the 7 that were removed for the 4 mid-block crossings, only 5 have been planted. Alek said he would relay that info to CD11 MV Deputy Hannah Levien.

   e. CD11 Mobility Deputy Alek Bartrosouf shared Mar Vista related mobility issues -see Item 7c.

6. Old Business/Open Issues: Committee/Task Force/Updates
   a. Update of bus shelter info (from Hannah Levien, Joseph Galloway, and Francois Nion) to add, improve, replace and upgrade key bus locations. **STATUS: No New information**.
      There was a discussion of the need for an arrival board at the bus stop located at the SW corner of Venice Blvd. and Centinela Ave., as this was a promised feature of the Great Streets program.

7. New Business
   a. **Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd.**
      WHEREAS: The Mar Vista Community Council (MVCC) supports maintenance and repairs on all of its major infrastructure assets, including vital thoroughfares such as Centinela Blvd., and

      WHEREAS: It has come to the attention of the MVCC that there is no street sweeping route on Centinela Blvd. between Palms Blvd. and National Blvd., and that there are no resources allotted to correcting this current lack of street maintenance,

DRAFT

THEREFORE, LET IT BE RESOLVED: That the CD11 office, L.A. Bureau of Street Services (BOSS), and LADOT will work with any and all City budgeting and resources to initiate and implement regular and ongoing street sweeping to the aforementioned segment of Centinela Blvd.

THEREFORE, LET IT ALSO BE RESOLVED: That the CD11 office, the CD5 office, BOSS, and LADOT will perform an analysis of all major thoroughfares within the confines of the MVCC to determine if regular and ongoing street sweeping, as well as other vital services and maintenance, is in order.
MOTION TABLED – waiting for more info. Alek requested time to connect with Mary Hruska, the author of the motion, regarding inquiry about Public Works denying Mary's request to add a street sweeping route on Centinela between Palms and National Blvds.

b. **Policy Motion:** MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles **Sidewalk Vending Program**
Council File No: 13-1493, Related Legislation: SB 946
WHEREAS, the City Council, on April 18, 2018, adopted an Ordinance creating a Sidewalk Street Vending Program and,

WHEREAS, in the final draft of said ordinance, the "opt out" provision was removed, at the last minute, prior to approval, and

WHEREAS, local brick and mortar enterprises along Venice Blvd in Mar Vista, have spent years establishing their businesses based on a set of assumptions and rules, such as where they can be located, the taxes they are required to pay, and the best ways to attract customers, and

WHEREAS, sidewalk vendors in the proposed ordinance will probably sell similar types of goods and services as nearby brick and mortar businesses, but not be required to adhere to the same elaborate state and local permitting and land-use regulations, and

WHEREAS, the local brick and mortar businesses on Venice Blvd in Mar Vista, have contributed to the "main street" atmosphere that local residents value, and

WHEREAS, the local brick and mortar businesses along Venice Blvd in Mar Vista are mostly small ones, with small profit margins, and

WHEREAS the presence of sidewalk vendors along Venice Blvd in Mar Vista, for the reasons specified above, would constitute unfair competition for the local brick and mortar businesses on the same stretch,

THEREFORE, the MVCC moves to submit a Community Impact Statement to the City Council and Committees urging the restoration of the "opt-out" clause of the Los Angeles Sidewalk Vending Ordinance.
MOTION TABLED – waiting for more info.

c. **Discussion and potential motion:**
Discussion of the need for a DASH bus/micro-transit service for Mar Vista serving Great Street Venice Blvd.
There was a discussion of the need for a DASH in the Mar Vista area. Michelle shared that Metro/LADOT has denied the request for a DASH in the MV area on several occasions.
She was told that LADOT "leans away" from having DASH routes in more affluent areas such as Mar Vista. Michelle stated there are many apartment dwellers in MV who would be well-served by a DASH route, as well as senior citizens who would be glad to avail themselves of a DASH route.
There is also the adjoining Del Rey area which is underserved as well.

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Currently, Mar Vista Gardens residents have to take multiple buses to get from their location to the Bundy Expo line destination. A DASH route that runs in Del Rey and MV would be a welcome method to reach out and encourage more participation in mass transit use.
CD11 Mobility Deputy Alek Bartrosouf said that LADOT is piloting a micro-transit project that encompasses both Mar Vista and Del Rey (including Mar Vista Gardens). The goal is to connect these communities (and others) to the Expo line. Metro is in the process of training drivers and perhaps launching later this year (2018). The area to be served is Palms, MV, Venice and Marina Del Rey.
Michelle and Ken expressed concern that many areas with multi-unit dwellings need coverage.
Michelle and Ken discussed that a micro-transit is not the same as a DASH service.

CD11 Mobility Deputy Alek Bartrosouf also shared that Metro Westside Bike-Share is coming to Mar Vista soon.

8. Public Comment. Michelle shared info from SoCal Gas about Mar Vista adjacent work in Del Rey and Playa Vista on Inglewood and Jefferson Blvds., to be completed by Spring 2019.
9. Future Agenda Items
10. Adjournment 9:00 pm.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 8, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:40 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Jessie Holzer, CD11 Mobility Deputy, spoke about Caltrans and the relinquishment process. She discussed the state of good repair and what that means in terms of relinquishment.
3. Motion to approve May 2016 minutes (2 minutes) Michelle made the motion, Greg Tedesco seconded. Minutes passed unanimously.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Tabled, as Sarah Auerswald was not in attendance.
5. New Business (30-65 minutes)
   a. Lenore French, GCI. Report on Mar Vista Steppin' into Art walk event. Item tabled, as Lenore was not in attendance and placed on August 2016 meeting agenda.
   b. Michelle Krupkin, MV Community Council. Michelle gave an overview of May 20 EXPO Line 7-station opening, sharing that it was extremely well attended and a huge success. There were celebrations at the 17th street station, the Bergamot (26th street) station, The Bundy Station as well as the Palms station.

      Michelle also gave info on new Santa Monica Big Blue Bus lines including new route 16 and changes to existing routes such as routes 41 and 42. Michelle also shared info on the new Blue at Night Your Late Night Connection to Expo service. There was also discussion of the bike lane that runs along the Expo line. Many wish it was continuous throughout the entire route from Santa Monica to downtown. Jessie shared that LACBC is working towards that possible goal.
   c. Public Comment. Jessie Holzer, CD11 Mobility Deputy, spoke about working on getting streetlight banners for Great Street Venice Blvd. CD 11 is getting pricing from the

Bureau of Street Lighting. In theory, there are 27 streetlights that are possible to use as banner locations along Great Street Venice Blvd. Some locations might be blocked by trees and not optimal. CD11 is investigating single vs. double banner cost. Cost consists of printing and installation. Streetlight banners would possibly be able to be placed on a one yearlong lease basis. Jessie also discussed smart bus benches. She is working on finding out is there is an extra sofa smart bus bench available from the Great Streets Studio. If so, CD11 will determine a placement spot, hopefully on the SE corner of Centinela and Venice near the Santa Monica Big Blue Bus stop. Jessie also shared that Len is working on additional utility art boxes. He Is working with artists on the new few selected in the CD11

d. Future Agenda Items

e. Adjournment 7:32 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday June 14, 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:35 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes). There was public comment regarding homeless encampments in various locations near the 405 freeway. The opinion expressed was of concern for safety and public hygiene near the encampments.

3. Motion to approve May 2017 Great Streets minutes (2 minutes). There was one correction to the minutes. After the correction, Curt Steindler made the motion and someone else seconded. The minutes passed unanimously.

4. Reports (5 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council, gave a brief overview of Great Streets, the first initiative from Mayor Eric Garcetti.
   Full info at http://lagreatstreets.org/what-we-do
   Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. Our streets are the backbone of our neighborhoods – the places where we live, work, learn, and recreate on a daily basis. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people.
   Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Tabled due to absence.

5. New Business (30-45 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy gave an update on the CD11 Pilot Program for Great Street Venice Blvd.as well as other Great Streets projects. She shared that there are ongoing efforts regarding the CD11 Pilot Program on Great Street Venice Blvd.
   Green paint will be applied to the protected bicycle lanes. Jessie mentioned that both LA Department of Transportation and the Film industry discussed the hue of green and are happy with the color of the paint that will be applied to the protected bicycle lanes.

Jessie also shared that the sidewalks on Great Street Venice Blvd. are to be fully reconstructed.

Jessie also mentions comments from the survey regarding Great Street Venice Blvd.

b. Lenore French, GCI Communications, gave a report on the June 1 2017 Mar Vista Art Walk. The most recent art walk featured an Art Battle in the car wash parking lot on the north side of Venice Blvd. near Stewart. There were two stages for music on which 12-15 bands performed - at Alana's and at the Coffee Connection. Grand View Market also had music on their stage.

   There were approximately between 2500 - 3000 total attendees, many of which actively used the mid-block crossings.
   There were between 50 – 100 artists at the June 1 2017 Mar Vista Art Walk.

   The next Mar Vista Art Walk will be September 1 2017 and the theme will be psychedelic.

6. Policy Motion. During the public comment section for the policy motion, there were twenty-nine (29) speakers. Their names and comments will be added to this draft minutes soon pending receipt of detailed speaker cards. To summarize, twenty-three (23) of twenty-nine (29) speakers were in favor of the policy motion requesting that the third lane of traffic be restored on Great Street Venice Blvd. Five (5) were in favor of the current configuration with protected bicycle lanes. The remaining speaker was leaning in favor of the current configuration with protected bicycle lanes, but had many concerns about the way the configuration was implemented and currently functions.

   a. Whereas the Venice Boulevard "Great Street" program has recently been implemented, including several changes to the roadway between Beethoven Avenue and Inglewood Boulevard, and

      Whereas, the changes include removing one traffic lane in each direction to accommodate a buffer zone for on-street passenger loading of parked vehicles (rather than from the sidewalk) and widening of the bicycle lane, and

      Whereas, Council District 11 circulated surveys to a very small minority of the community (approximately 450 total surveys, many to students who don't drive) and extrapolated "community-driven" support for many elements of the "Great Street," yet the surveys did not specifically ask the community about the lane reduction element of the program or obtain feedback from the vast majority of those who use Venice Boulevard on a daily basis, and

      Whereas, the lane reductions have caused significant daily traffic jams, increased cut-through traffic on surrounding residential streets, and increased traffic jams on alternate streets throughout the greater Mar Vista area, and increased pollution from idling vehicles, and

      Whereas the increased traffic on Mar Vista roadways has had an adverse impact on emergency response times of Fire and Police Department, and

      Whereas a grassroots movement of community members has emerged in recent weeks, and have obtained over 1200 electronic signatures asking for the return of the old three traffic lane in each direction configuration, and

      Whereas Council District 11 has communicated that the roadway changes consist of a pilot program, using inexpensive temporary materials, and that the City would keep what the community wants and remove what the community does not want,

Therefore Mar Vista Community Council moves to advise Council District 11 to immediately reverse the lane reduction and return Venice Boulevard to the long established six-lane configuration and further urges the City of Los Angeles Department of Transportation and the Council District 11 to provide a copy of any and all traffic studies done in advance of the commencement of the lane closures included in the CD11 Pilot Program on Great Street Venice Blvd. as well as a copy of any and all traffic studies performed after the implementation of the CD11 Pilot Program on Great Street Venice Blvd.

The vote took place on the above policy motion. The result was 56 were in favor of the policy motion, 16 were opposed and 2 abstained.
The motion passed.

7. Public Comment
8. Future Agenda Items
9. Adjournment 7:52 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday March 9, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

Minutes

1. Call To Order and Welcome – Chair (1 min.) 6:38 pm

2. Introductions and Public Comments (for items not on the agenda) (2 minutes) Sarah shared the announcement about the April 23 2016 Mega Garage Sale taking place at various locations in Mar Vista. Tax deductible donations are also being accepted at The Learning zone at the Vineyard Christian Fellowship on Friday 4/22 from 12 - 10 pm at 3838 S. Centinela Ave. All money raised from donations and the Learning Zone's sale on 4/23 will benefit the Learning ZONE's after school mentoring program for Mar Vista youth. Garage sales all over Mar Vista will be joining in this first-ever community-wide effort.

3. Motion to approve February 2016 minutes (2 minutes). Sarah Auerswald made the motion, Chris McKinnon seconded. Minutes passed 10-0-0.

4. Reports (15 Minutes)
   a. Great Streets Program brief definition -Michelle Krupkin gave an overview of the remaining Great Streets events for the month of March, including Nuestra Avendida and the Pacoima Street Values.

   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah reported that the CD11 Pilot program is coming soon.

5. New Business (30-65 minutes)
   a. Len Nguyen, Senior Field Deputy, CD11, gave a brief update about the second round of artist submissions for the CD11 Utility Art Box project. CD11 has identified 15 DOT boxes, 7 of which are on Venice Blvd., 4 on National Blvd. and 4 on Walgrove Ave. CD11 has received 13 submissions from different artists. There was a discussion about the interest in having the words "Mar Vista" as an identifier included as signage on at least one side of each utility box. Artist submissions are still welcome.
   Len also gave an update on the "Welcome to Mar Vista" signs. CD11 is discussing with Caltrans and trying to move forward on the placement of the signs.

   b. Jessie Holzer, Mobility Deputy, CD11, gave an overview of the upcoming Westside Bicycling Event. There will be a coordinated effort from both CD11 and the City of Santa Monica on an event to kick off Bike Month in May 2016, on Sunday May 1 called Gear Up, to be held at McKinley Elementary (2401 Santa Monica Blvd.) from 11 am to 2 pm. There will be a Bike Swap, a Raffle and a demo from Metro of how to put a bike on a bus.

Sarah Auerswald suggested that SM Breeze should come and explain their bike sharing/rental service at Gear Up.

Pat Karasick suggested that LAPD should attend Gear Up and share their info about Bike Safety and bike owners joining the LAPD Bike Registry.

c. Jessie Holzer shared info about the upcoming April 2 2016 Great Street Venice Blvd event: the Great Streets Iconathon workshop around the topic of livable communities. It will center on trying to find new graphic representations to communicate new concepts relating to all the Great Streets.

d. Lenore French, Green Communications Initiative (GCI). Lenore and Cigdem Akbay gave a wonderful overview of the March 3 2016 event: Steppin' into the Art of Mar Vista. They played three amazing videos.

   The first video of just over three minutes was shot by Jake Albrecht using a footage from a drone mounted camera and captured moments from the 3/03/16 event including live music, live painting, artwork in the various galleries, poetry performances, dancing and theater performances.

   The second video was a short teaser featuring bands at Timewarp Records and Grand View Market.

   The third video, at just under three minutes, included interviews with Lenore and Michelito about the concept: "Where everyday is an art walk." For the second Art Walk, Lenore shared that they almost doubled the number of participants from 18 participants/businesses on 12/03/16 to almost 30 participants for 3/03/16. A Kids Place was able to participate this time and there were other interesting collaborations between the vendors. There were 750 maps and guides printed and they ran out. There was feedback from attendees that people want more walking-friendly food options, such as take-away bites that can be taken with attendees and eaten as they walk along from cluster to cluster.

   The upcoming June 2 2016 event will have a billboard advertising the event at Venice and Centinela that three (3) artists will up cycle an old billboard to create. There may be a possible shuttle involved in the future.

e. Public Comment. Sarah Auerswald said that the MV Chamber of Commerce will be having an event during bike month, Bike to Work, most likely during the 2nd week of May.

f. Future Agenda Items

g. Adjournment 7:54 pm

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Mar Vista Community Council

Joint Meeting of Great Street Ad Hoc

and Education, Arts and Culture Committees

Wednesday, May 30th 2018, 6:00pm

DRAFT*

Meeting Minutes

Coffee Connection
3838 S. Centinela Ave
Mar Vista, CA 90066

1. **Introductions ~ WELCOME**

A. (Rob Kadota chaired the mtg. People in attendance:, Selena Inouye, Tom McHenry, Sara Roos, Debbie Rochlin, Paula Cervantes, Michelle Krupkin, Lenore French, Hannah Levien, Judy Schiller and Stephen Schiller)

B. Agendas, mosaic information created by Sara Roos and sign in sheet were distributed to those in attendance.

2. **Minutes** – 2/8/18 minutes approval – Not available for review or approval

3. **Public Comment**

A. Mar Vista Art Walk is Thursday, June 7th.

B. Michelle Krupkin gave some introductory remarks about history of the art enhancement projects associated with the Great Streets program.

C. Michelle Krupkin encouraged signage be placed at the entrance of the location directing people to the location of the meeting. Table signage was provided but no other signage. Rob will encourage all committee chairs to use this best practice.

4. **Policy/Administrative Motion**

A. Motion to support the selection and placement of street mosaics on Venice Blvd. Presentations will be given by Hannah Levien, CD 11 Field Deputy and mosaic artist.

I. Mosaic artist, Tracey Corinne was not available but sent a stakeholder and neighbor that has been working with her in assembling the current mosaics – Debbie Rochlin.

II. Debbie Rochlin brought one of the panels under construction and gave a brief overview of the current project, its state of completion and hoped for installation.

III. There was general support expressed about the desire to see the hopscotch mosaic be installed by the Mar Vista Library. The amount of time required to create the current three panel mosaics was discussed

Debbie talked about her volunteer experience and the likely opportunity for community members to volunteer to work with the mosaic artist - Tracey Corinne, on future mosaic projects. A color drawing of the hopscotch mosaic was available via phone (courtesy of Lenore French) and is also included in these minutes.

IV. Hannah Levien participated by phone and in person and discussed the project timeline and that City Councilmember Mike Bonin would not approve the installation of the proposed mosaics without the support of the Mar Vista Community Council. Funding issues for this project are covered. Bureau of Street Services will do most of the work June 8th but if there is not formal MVCC support for the project by that date the sidewalk repairs will be made so that the mosaics can be installed later pending MVCC approval.

V. Motion was passed unanimously by those present at the meeting to affirm the mosaic design and placement of the mosaic by the artist on the sidewalk area by 826LA Project and Alana's Coffee.

a. MVCC policy motion of support for mosaic tiles:

"The MVCC supports the installation of three-mosaic art tiles placed at the discretion of the artist, Tracey Corinne, between Wasatch and Colonial on the north side of the sidewalk of Venice Boulevard."

VI. Discussion about holding a special meeting of the Board of Directors of MVCC before next Wednesday's T&I Committee was explored without any formal action being taken.

5. **Public Comment**

6. **Future Agenda items**

A. Michelle Krupkin raised the question, opportunity and need for funding support by MVCC for future projects.

B. Recruitment of community volunteers to contribute time and labor to work with mosaic artist Tracy Corinne should be further explored as well.

7. **Meeting adjourned at approximately 7pm.**

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***Please send desired additions, corrections or omissions to Rob Kadota.**
rob@orl.ucla.edu

Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 11, 2016, 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Chair: Michelle Krupkin

MINUTES

1. Call To Order and Welcome – Chair (1 min.) 6:35 p.m.
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Jessie Holzer spoke about ideas for Great Street Venice Blvd. from CD11. They include: Light pole banners, possible chance for an additional smart bus bench (to possibly be located on Centinela near the Coffee Connection, painted sidewalk idea for a small area, additional art boxes.

3. Motion to approve April 2016 minutes (2 minutes) Sarah Auerswald made the motion, Lenore French seconded. Minutes passed.

4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald. Sarah shared that she hopes Caltrans will relinquish Venice Blvd. soon.

5. New Business (30-65 minutes)
   a. Sarah Auerwald, Mar Vista Chamber of Commerce. Sarah gave a beautiful powerpoint of the final report on Make It Mar Vista that gave a great overview of the November 28 2015 event. The goals of the event included encouraging residents to engage with businesses during Small Business Friday, to promote Mar Vista and to build connectivity while getting people out of cars and into the streets.
      The goals and needs for Great Street (GS) Venice Blvd. are:
      -City Control of GS Venice Blvd.
      -Light pole banners along GS Venice Blvd.
      -Bike Lane/midblock crosswalks
      -Streamline the event (permitting) process
      -Sidewalk repairs and maintenance
      -Long term study of parking structures
      -Short hop transportation e.g. Venice shuttle/UCLA pedicabs

      Sarah shared details on the upcoming 5/19/16 Bike to Work Day event.
      It takes place from 7 -9 am and there will be 6 venues serving coffee and juice:
      Coffee Connection, Venice Grind, Starbucks, Renewed Juicery, Grand View Market and Atmosphere Café. Metro will be providing Clif Bars and info on Bike safety.

   b. Lenore French, GCI, gave a preview of special event for upcoming 6/02/16 Mar Vista Steppin' into Art walk event. Lenore reported that there were many exciting things

happening with the Art walk. A new feature in June will be the Mar Vista Walls. It includes a new live painting kickoff event for a new tourist attraction, which is a series of street murals curated by nationally recognized street artist DJ Neff and friends. Trunk Gallery will have a group show entitled "The Von Restorff Effect" in which four artists collaborate on a large-scale installation of paint, video, sculpture, mixed media and sound. There will be spoken word by emerging artists at 826LA. The artwalk will also feature the NextGen millennial art exhibition and music with Live Talk about their work.

Lenore also shared an overview of how the Mar Vista Steppin' into Art walk event have grown. In December 2015,there were 18 venues participating. Then in March 2016, that number grew to 31. Lenore anticipates having 45 venues participating for the June 2016 event. The new venues will include the VCA with a "Yappy Hour" doggie portraits, A Tiny house store on wheels with portable food including vegan cheesecake and an experimental film to screen in the space behind the C. Nichols gallery. Additionally, attending is increasing. December attendance was approximately 750, March 2016 was between 1000-1500 with more anticipated for the June 2016 event.

There is a billboard going up 5/13/16 with different artists including Jules Muck and People of the Babak.

Volunteers can go to LA Works, Volunteerspot and I'm Golden to sign up to volunteer.

Lenore announced that the event is now being made possible in part by grants from the Department of Cultural Affairs in partnership with Community Partners and Sony Pictures Entertainment. Sponsors include Martian Ranch & Vineyard, Michelle Pine Rappoport KW Realty and Pamela Day Enterprises.

c. Michelle Krupkin, MV Community Council. Preview of May 20 EXPO Line 7-station opening and Big Blue Bus route/fare info. Michelle shared that Expo Line Station celebrations will be held at several of the new stations from Culver City to Santa Monica. The upcoming Expo Line Opening celebrations will feature Station parties from 10 am – 4 pm with a variety of entertainment, children's activities, food trucks, live music, DJs, bounce house, bike valet and bike-pit stops and information booths. All Expo line rides will be free from opening day May 20th until 2:30 am May 22. Rides will also be free on the Big Blue Bus as well as the Santa Monica Breeze Bikeshare service.

   Two potential questions to discuss for the June 5 2016 Questionnaire/Survey DONE
   MVCC Election Day: -tabled until next election

d. Public Comment
e. Future Agenda Items
f. Adjournment 7:56 p.m.

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday May 10, 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:39 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Tracey Corinne discussed her meting with Jessie during which they looked at possible locations for the mosaic hopscotch installation. Mar Vista Art Department and the Mar Vista Library were possible locations.

   There was a general discussion of bus benches and bus shelters and other options for shade shelter and general seating on Great Street Venice Blvd.

   Sheila G. mentions stamped and colored concrete sidewalk options. Len Nguyen said that it is not a good option as it wears away.

   Michelle Krupkin brought up the email she received from Chris McKinnon and a broken pipe issue occurring on Venice Blvd. west of Grand View. Len Nguyen commented that he is trying to follow up on this matter.

3. Motion to approve March and April 2017 Great Streets minutes (2 minutes)
   Lenore French made the motion to approve and Tracey Corinne seconded the motion.
   Lenore has some corrections that she will email to Michelle. The minutes passed unanimously.

4. Reports (5 Minutes)
   a. Great Streets Program brief definition. Michelle Krupkin, MV Community Council gave a brief overview of the Great Streets Program. Full info at http://lagreatstreets.org/what-we-do
      Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. Our streets are the backbone of our neighborhoods – the places where we live, work, learn, and recreate on a daily basis. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people.
      Goals:
      - Increased Economic Activity
      - Improved Access and Mobility
      - Enhanced Neighborhood Character
      - Greater Community Engagement
      - Improved Environmental Resilience
      - Safer and More Secure Communities
      - Improved Public Health

5. New Business (30-45 minutes)
   a. Len Nguyen, CD11 Senior Field Deputy, gave an update of the upcoming CD11 Pilot Program as well as other Great Streets projects. Len shared that it is an exciting moment for the Great Street Venice Blvd. Midblock crossings are currently going in, with the installations still in progress at Boise and Meier. There will be approximately one more month of construction. What still remains to be done: Installation of protected bike lane starts in mid- May 2017, hopefully to be done by June 1 or so.

      Michelle Krupkin shared from Jessie Holzer's notes on the street mural update: BOE and GSD completed testing. Only half the intersection met the skid resistance requirements so we are exploring options to make the intersection more "grippy" before the pavement mural can be installed.

      Lenore French answered questions about the nature of the Grand View/Pacific pavement murals. She said that an example of what will be installed can be found by searching online for City Repair Portland Street paintings. Go to the section on Intersection Paintings.
      Mar Vista would be the first LA City to have a pavement mural installed. DOT is currently doing many tests regarding distractions, slips skidding.
      Greg Castelnuovo-Tedesco commented that traditionally artists threw sand into paint, which can make the medium more "grippy."

      Michelle Krupkin communicated info from Jessie Holzer's notes on the mosaic sidewalk project: Tracey and Jessie did a site visit with LA City Bureau of Street Services. The locations in front of the library and in front of Mar Vista Art Department will work from their perspective. Next step is to pull together the application for the permit.
      Tracey commented that she needs letters of support from CD11 and the Mar Vista Community. She is still sourcing materials including adhesives. Great C suggests laying the project directly into the concrete. Tracey says that she presented four (4) different methods of tile installation to BSS and is going with the one that they approved. Michele Costa suggests the idea of sandblasting for tile installation.

      Michelle Krupkin shared from Jessie Holzer's notes about streetlight banners: if the committee wants to update the design for the streetlight banners we should start brainstorming what the design should be and find a designer. Lenore French stated that she is working on getting a designer.

      Also from Jessie Holzer's notes: there is No update on painting the new trashcans, we're still exploring options. Lenore French commented that we should make it a school project, possibly with a competition between all seven Mar Vista schools, with the winner getting their artwork installing on trash bins.

      Additional note from Jessie Holzer: the People Street applications for plaza are due at the end of May 2017. Len Nguyen stated that he has applications for a few CD11 locations, but that Mar Vista a People Street Plaza might not be a good fit.

   b. Lenore French, GCI Communications, went over a preview of plans for the upcoming June 1 2017 Mar Vista Art Walk. The Theme will be "The Art of The Game." John Snyder did the artwork for the posters, which will be available for sale along with high-end fine art prints.

      Originally when the Mar Vista Art Walk began, there were fifteen (15) businesses participating. Now there are well over forty (40) businesses.

      Lenore stated that they are going to try to activate the areas at the midblock crossings. For example between Inglewood and Grand View on the south side with be artists and Eddie's Block Party. Full Circle Pottery will have a blacksmith with a forge. The Coffee Connection and Vintage at Venice will have vendor spots for sale.

The main event will be an Art Battle in the car wash parking lot on the north side of Venice Blvd. near Stewart. There will be 4 artists participating and Judges including DJ Neff, Michelito, Leonardo, La Desma and Saturno.
There will be a parade of electric cars. There will also be a Battle of the Bands next to Alan's on the north side of Venice near Boise. There will be two stages for music – at Alana's and also at the Coffee Connection.

The Moving Joint will have a Sound Bath at 8 pm and also modern and tango dance performances.
There will also be the regular art shows, including live painting.
The NBA playoff game will be on at Grand View market and Louie's.
The Passport Game will be active again, with a need for volunteers. Lenore put out a call for volunteers to contact Eric Charlot, the volunteer coordinator as well as Alex Prosser.

Lenore stated that this will be the seventh (7th) Mar Vista Art Walk.

6. Public Comment. Michelle Krupkin shared the May 2017 Westways magazine article on Vision Zero that includes a photo of the Hollywood and Highland pedestrian scramble. Len Nguyen stated that the design of a pedestrian scramble needs high pedestrian volume in order to function properly. Venice and Centinela does not have enough pedestrian volume currently.

7. Future Agenda Items Review of the June 1 2017 Mar Vista Art Walk

8. Adjournment 7:55 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday October 10 2018 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chairs: Michelle Krupkin and Gabriel Hill

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:37 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   A stakeholder shared that Time Warp Music, a Venice Blvd. small business, would be closing. They will be approximately the 16th business on Great Street Venice Blvd. to close. Two stakeholders did outreach to the businesses on GS Venice Blvd. 39 businesses agreed to display the Restore Venice Blvd. signs. A business contacted a stakeholder and told him that they had been harassed by CD11's Mar Vista Deputy about the signs.
   Selena shared that although she was invited by Lily O'Brien, LADOT, to give a talk to NACTO walkshop conference participants at 1:45 pm on Thursday October 4, Selena received a call to cancel the talk at 1:47 pm. This sort of behavior is rude, unprofessional and unacceptable.
   Wajenda asked about the businesses closing on GS Venice Blvd. Selena replied that Time Warp Music will actually be the 21st business to leave since May 20 2017. A full list is posted on RestoreVeniceBlvd.com as well as a list of documented traffic accidents, which number over 70 since May 20 2017.

3. Motion to approve recent Great Streets minutes (2 minutes) There was a motion to approve the minutes, a second. The September minutes were approved.
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.

   b. CD11 Mobility Deputy Alek Bartrosouf, back from a vacation, shared Mar Vista related mobility issues. Metro Bike Share will be working on getting agendized to do a presentation to the MVCC Board of Directors soon. Metro Bike Share hubs will be coming to Mar Vista.

      Alek also shared that the LA Conservation Corps of Volunteers are organizing a cleanup on some of Venice Blvd.'s medians. Michelle mentioned the broken utility pipe on the median just west of Grand View that has been there for decades. Alek took note of that matter. Mary shared that on the Boise midblock crossing, the median walkway has uncovered bolts and cut-off pipes coming up out of the ground in the walkway near the fence, which is a hazard. Alek said he will also note this and follow up. Alek said that a Bus Arrival Board is coming very soon for the Metro Bus Shelter on the SW corner of Venice and Centinela.

      Another item Alek gave an update on was the Pavement Mural that is planned for installation on Pacific and Grand View. Alek said that LADOT is going through the signature paperwork and that Dept. of Cultural Affairs/Bureau of Street Services and LADOT would be working to install it sometime in November 2018. It is to be a design of yin and yang fish. A stakeholder heard about a similar yin and yang fish pavement mural in Germany. There was concern expressed that the design might too closely resemble the German artwork. It was hoped that the design is original and relevant to Mar Vista.

Michelle asked about the Venice Blvd. Streetlight Banners that Jessie Holtzer had said were due to be changed in November 2018. Alek said he was not familiar with the Streetlight Banners and wanted to try to find out more about them.

5. Old Business (10 minutes)
    a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. STATUS: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

    b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. STATUS: Postponed for discussion no later than January 2019 at 8.31.18 Special Meeting of the BoD.

    c. Mission Statement discussion for Great Streets Ad Hoc Subcommittee page. STATUS: to finalized for posting on MVCC website.

6. New Business (45 - 50 minutes)
    a. Wajenda Chambeshi, Program Manager of Great Streets, discussed past and future projects on Great Street Venice Blvd.

    Wajenda was asked if he knew what had Great Streets Initiative Department done in the past for Venice Blvd. and if are there any future ideas that Great Streets wants to propose in Mar Vista on Venice Blvd.

    Wajenda said that since he joined the Great Streets Department, the biggest project for Mar Vista has been the current Great Street Venice Blvd. Pilot Program Project. There was no traditional transitionary memo about the VB pilot program given to him because everyone in the department had left and what he found out had been through his own research. He felt that the part that is missing is interaction with the community.

    Based on how Great Streets is designed, the project is supposed to be community focused, in terms of ideas, more a bottom up sort of project. For example, the hopscotch board that is in the works. That idea and other ideas should come from the community since it's supposed to be a community interactive program.

    Michelle shared that before the relinquishment of Venice Blvd. from Caltrans to LA City which occurred November 1 2016, there was extensive discussion in the Great Streets Ad Hoc Subcommittee meetings about sidewalk repair, tree maintenance and replacement that never was acted on. There was a visit from personnel from LA Stormwater Dept. and a discussion of Stormwater capture possibilities on Venice Blvd. Now the sidewalks are currently being redone, but only in the traditional manner, without any Stormwater capture elements. We'd like to be able to embrace some of programs that Great Streets was supposed to be about.

    Street Furniture was another project that was discussed.

    Michelle asked about the fund that Caltrans gave LA City upon relinquishment – which was $14.8 million dollars. 1.5 million went into a fund for Great Streets and the rest went into another fund supposedly to upgrade the sidewalks. Venice Blvd. wasn't supposed to have to wait for a blitz, all the sidewalks on Great Street Venice Blvd. were supposed to be repaired. I am not sure who to speak to about that.

    Alek says that the relinquishment money is still there, sitting in a fund, and has not been spent outside of the 1.5 million. He was not sure, but said that he thought that the money had not been spent since there was a larger visioning exercise that had to take place. Venice Blvd. is a very long and wide street that encompasses three different council districts, so there is a larger conversation that has to take place to determine how that money is going to be spent.

Selena expressed that Mar Vista wants to be part of that conversations. We didn't get some things we were promised, like street furniture, beautification and other items. Instead we got things we didn't want, like reconfigured parking that is not working for businesses and stakeholders.

Selena went on to share that the community would like to wipe the slate clean, go back to square one, and have a process where there is community input. We would like a process where it's clear what is on the table. Transparent, accountable, community engagement are three things that are lacking with this project.

Selena expressed that we are not opposed to improving bicycle infrastructure. I don't know if local cyclists were even brought together to discuss options. I'm pretty sure that LA County Bicycle Coalition had input, but not local Mar Vista bicyclists.

Moving the parking created an ADA issue for people that used to off-load onto the sidewalk with their mobility devices. There is a difficulty getting to the curb for people with access issues with walkers, canes and wheelchairs when having to cross the bike lane after parking. Bicyclists are not yielding for pedestrians. There have been 2 pedestrians hit by bicyclists.

Selena went on to say that there is a question about Venice Blvd. being inappropriate for a road diet given on the number of cars travelling on it. There is a big discrepancy between the Caltrans data for annual average daily traffic (adt) and the one-day survey done by Fehr and Peers on the day before Yom Kippur in. 2015. A similar project was installed in Eagle Rock, with significantly lower adt than Venice Blvd.

Selena shared that two pedestrians were struck in December 2017 at two streets identified as cut-through traffic, McLaughlin and Charnock. One of those pedestrians died six days later from their injuries. This is very concerning. Cars speeding on cut through streets.

There are accidents and incidents that don't go the SWITRS database that we have concerns about.

Michelle spoke about a letter from LA County Bicycle Coalition to Connie Tipton of City Planning mentioning that bicycle design should adhere to NACTO standards which mandate that bicycle friendly streets should be implemented on streets that have with traffic volumes of less than 1500 cars per day and design speeds of 15 miles per hour.

Alek responded that that's a concept from Bicycle Friendly Streets, which doesn't apply here on the Great Street.

Selena spoke about making Pacific Ave. a bicycle boulevard, like Long Beach. There are great creative things that could be done for this community. Instead, we have a project that just doesn't make sense, causing over 20 businesses to leave or go out of business, causing problems for our emergency responders and other issues. We want a community-based solution. This design isn't the only one. We were presented only this design. There are other designs, like the designs in Livable Blvd. Plan part of West LA TIMP.

Another option is the Greening the Boulevard design plan. Mary discussed the benefits of some of the designs from that plan, including having a protected cycle track next to the sidewalk, with parking next to the curb.

Stakeholder Vianney Boutry says that he thought that this was supposed to be a temporary test, discuss what works and doesn't and then we figure out what would be best for the community.

Alek says that the data is being collected and there should be a report issued by the end of December 2018. Think of this one-year project as a one-year long community meeting.

A stakeholder commented that he feels that there is a consultant doing the planning, a consultant is doing the report but what is missing are the actual concerns of the community. Concerns about all

the businesses leaving. Concerns about all the accidents and cut through traffic and the problems that emergency responders have getting anywhere using Venice Blvd.
Perhaps the consultant should be here listening to us and taking these things into consideration.

Alek said that the consultant doing the one-year report is Fehr and Peers who did the six-month benchmarking study.

Selena said that Fehr and Peers reps were recently on Venice Blvd. a couple weekends ago and only asking vague questions about people's connection to the community on Venice Blvd. They were not asking what people thought about this project. They did the same questions pre-project. The Fehr and Peers rep was given a lot of feedback and she did not take notes.

Alek said that Fehr and Peers are not being paid to solicit public opinion. They are gathering data and that includes some intercept surveys. The benchmark study that was done before the project went in, all of those data sets and variable will be included in the year-long study that is due to come out before the end of December 2018. Data from the past, six-month data and year-long data will be presented.

Selena asked when the community will be given opportunities to give feedback.
Alek answered that the community will be given that chance at out-reach meetings as well as a town hall to present that data.

There was a discussion from a stakeholder of how benchmarking really would not reflect any changes such as the loss of businesses on Venice Blvd. or the traffic accidents or the cut through traffic.

Selena requested the executive version of the report from Fehr and Peers from Wajenda.
Wajenda and Selena discuss the professional and the lighter version of the report. She wants something more than the Open Source data that is not organized and has no context.
Alek discussed how data is going to be included and how methodology will be explained in the one-year report.

Mary asked What is the end game? The end game needs to be clear. Such as here is choice 1, choice 2 etc. Who is making the decisions? Are we going to have a seat at the table? It shouldn't be the city saying this is what we chose, are you ok with it? That's not community involvement.
That is the way this has been perceived. That we have no choices. Restriping, making it a different color is just the same design. That is not a choice.

Alek said that we don't want to have predetermined options. This is a process. We want to have the one-year meeting, digest that data, and continue having outreach meetings to see what the feedback from the community points us to.

A stakeholder said that the quality of life here has diminished precipitously as this design has been on Venice Blvd. There is more traffic on my street than I have ever seen before. There is more cut-through traffic, there is more pollution in the air, there are more angry neighbors. This has not brought the community together, it has separated everybody. The people that hate are over here, the three quarters of us and those that love it to pieces are over here, the one quarter. They won't communicate with you.

Mary also spoke about the ADA issues. Title 2 has specifications for street parking for persons with disabilities, I cannot see in any way how this iteration of the road design can be made to comply. There was a case called Fortyune vs. City of Lomita that resulted in the government writing specifications for on-street parking. For example, you have to have a 60-inch access aisle from the sidewalk with curb cuts around the spot and 60-inch access aisles to the spot so the person can get out. No vehicular traffic can cross that access to the spot. In the Venice Blvd. design, currently the bike lane crosses it. I don't see how it can be made to be ADA compliant. We have had Geoffrey Straniere from Department on Disability twice to these meetings and he said that his department was not involved in the design or implementation of the Venice Blvd. Pilot Program. The DOD might

be involved going forward, but they were certainly not involved with the design nor was there any ADA consultant that was part of the design.

Michelle commented that Venice Blvd. design is different than other Great Streets, curb cuts, parklets, etc.

Selena mentioned that Great Streets Reseda Blvd. was asked what they wanted to do.

A stakeholder comments that what they have done is taken a State Highway and flooded it through residential streets. It's a safety and traffic nightmare that these residential streets were never designed to accommodate. People go flying speeding down these streets. I live a mile away north near National. People speed, that's not improving safety and is an issue that is of great concern. The reason that we don't trust your process is that Councilman Bonin won't talk to people about this. People have told him we don't like what's happening, no response from Bonin. People are going out of business and Bonin doesn't talk to them. He doesn't communicate, he doesn't listen. It feels like a railroad to me.

Another stakeholder says, if you don't know the answer to constituent's questions, shouldn't you at least work on the process?

b. Tracey Corinne, Mosaic Artist. Discussion of current status of payment for the three (3) mosaic tile project at 12515 Venice Blvd. installed June 14 2018, and discussion of the future mosaic hopscotch project planned for placement near the Mar Vista Library.
Michelle gave a brief history of the mosaic project that has been in the works since 2016, but on hold until Venice Blvd. was relinquished to LA City by Caltrans. Tracey stated that she still had not yet been paid for the completed three (3) mosaic tile project. Tracey expressed frustration that the paperwork was continuing, including dealing with Rebecca at LA City Dept. of Cultural Affairs, Paul Ruelas at LA City Dept. of Risk Management, David Duran and Hannah Levien at CD11. Tracey said she was supposed to meet with Hannah Levien, CD11 West LA/Mar Vista Deputy, the following day to discuss the follow-up on this matter. Michelle stated that the efforts were two-fold, 1) to get Tracey paid for the completed three-mosaic tile project and 2) to get a proper plan in place with CD11, Bureau of Street Services and any other relevant entities going forward with the future mosaic hopscotch project planned for placement near the Mar Vista Library. This would be so that Tracey is not rushed into that project like she was unduly rushed on the three-mosaic tile project, to the detriment of other work she had to needlessly put aside due to the poor planning that transgressed surrounding the three-mosaic tile project. Tracey needs at least a three-month lead time and wants to have all paperwork done properly before the installation takes place. Wajenda Chambeshi stated that he would like to be involved and try to assist in the project as well.

   Michelle stated that since each Great Street gets one sidewalk repair blitz per fiscal year, it would be nice to know far in advance when that repair time is scheduled in order to plan fully for the mosaic project. No one at CD11 seemed to know that the repair blitz for fiscal year 2017-2018 was scheduled for June 2018 and thus did not communicate it to Tracey until the last minute, resulting in Tracey being very rushed on this project. Michelle wondered why other projects on Great Street Venice Blvd. are able to be completed properly with paperwork and payment and in contrast this project has been a great deal of stress, no proper paperwork path from the city and no payment even though work was completed almost 6 months ago.

c. Discussion and possible motion: Should MVCC request an independent traffic study of the Pilot Program on Great Street Venice Blvd. similar to the independent traffic study completed in May 2018 for 4th District Councilmember David Ryu?
There was discussion and a motion was written. Selena made the motion, Sheri seconded and the motion passed as follows:

   WHEREAS, the Great Streets Venice Boulevard pilot project has caused conflict and controversy in Mar Vista and the surrounding communities; and

   WHEREAS, numerous requests for pre- and post-project data to the Great Streets Initiative in

Mayor Garcetti's office, the Active Transportation and Vision Zero offices in the Los Angeles Depart ment of Transportation (LADOT), and Councilmember Mike Bonin's office have been non-responsive; and

WHEREAS, the limited data and analysis that has been released from LADOT and Councilmember Bonin's office is contradictory to the experiences of the community members living near, conducting business on and otherwise using Venice Blvd.; and

WHEREAS, numerous requests for Town Hall meetings with question and answer sessions have been denied by LADOT and Councilmember Bonin's office; and

WHEREAS, the Silver Lake community, when faced with a similar situation, asked for and were granted funds to hire a transportation contractor to conduct an independent traffic study regarding the Rowena Avenue road diet by their Councilmember David Ryu; and

WHEREAS, Mar Vista stakeholders, on behalf of the businesses and residents, commuters, emergency responders and others impacted by the Great Streets - Venice Blvd pilot project, would l ike to seek the same remedy in order to receive answers to their questions and concerns that have heretofore been unaddressed by the Great Streets Initiative, LADOT and Councilmember Bonin.

THEREFORE, in the spirit of community engagement, transparency and accountability, the Mar Vista Community Council (MVCC) will assemble a community panel under the auspices of the Great Streets Ad Hoc Subcommittee, and

THEREFORE, the MVCC requests that Councilmember Bonin provide the funding for an independent traffic study of the Great Streets - Venice Blvd pilot project, to be done within 2 months by an independent firm of the community panel's choosing, excluding current Great Streets contractor Fehr & Peers Transportation Consultants.

d. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy could not attend. Update from Alek B on the Venice Blvd. Downtown Mar Vista Gateway Signage project is that LA Conservation Corps of Volunteers is currently reviewing the installation contract.

7. Public Comment: The bike lane floods when it rains. Bad design.
8. Future Agenda Items: Mary Hruska suggests increasing the urban canopy along Venice Blvd.
9. Adjournment 7:57 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL

Joint Meeting of the **Great Streets Ad Hoc Committee** & the **Transportation and Infrastructure Committee**

Thursday September 15, 2016, 7:00 PM - 9:00 PM

COFFEE CONNECTION, 3838 S Centinela Ave, Los Angeles, CA 90066

Great Streets Ad Hoc Committee

Co-Chairs: Michelle Krupkin and Greg Castelnuovo-Tedesco

Transportation and Infrastructure Committee

Co-Chairs: Michelle Krupkin and Ken Alpern

MINUTES

1. Call To Order and Welcome – Chair (1 min.) acting co-chair: Michelle Krupkin 7:18 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes) Michelle Krupkin announced the Monday 9/19/16 Buckle Up: Zooming into the future with The Ride (KPCC event at the Petersen Automotive Museum).
3. Motion to approve August 2016 minutes (2 minutes) Michelle Krupkin made the motion, Lenore French seconded. Minutes passed.
4. Reports (15 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council.
   b. Report from Mar Vista Chamber of Commerce President Sarah Auerswald, including info on the 2016 Great Streets Challenge Grant. Sarah shared that she has recently observed DOT active on Venice Blvd. in preparation for future work. Sarah also shared that the 2016 Great Streets Challenge Grant contest is opening again, with any street in LA able to be included in the Grant process, not just Great Streets. Projects may include pop ups, build outs, etc. Sarah said that she will not be applying for a 2016 Great Streets Challenge Grant, but will be holding the Small Business Saturday/Make It Mar Vista event again this year on November 26 2016. Sarah also discussed midblock crosswalks and answered questions from stakeholders.

5. Policy Motions/Community Impact Statements:
   1) Whereas the LA City Council is due to vote on Council File 16-0147 in October 2016,
   Whereas the Mar Vista Community Council supports the relinquishment of Venice Blvd between Lincoln and Cadillac from Caltrans to the City of Los Angeles,
   Therefore be it resolved that the Mar Vista Community Council supports Council File 16-0147 and encourages the City of Los Angeles to work with the Mar Vista Community Council on utilizing a portion of the $14,500,000 payment from Caltrans to the City for the relinquishment for improvements along Venice Blvd between Walgrove and Sawtelle. Michelle Krupkin made the motion, Ken Alpern seconded. Motion passed unanimously.

6. New Business (30-65 minutes)
   a. Jessie Holzer, CD11 Mobility Deputy, was to give a review of ideas from Great Streets Projects components and overview of progress on the relinquishment of Venice Blvd. to LA City. As Jessie was not in attendance due to illness, Len Nguyen gave her update. Len shared that the LA City Council on August 31 2016 voted in favor of the relinquishment of Venice Blvd. from Caltrans to LA City of the portion from Lincoln Blvd. to Cadillac Ave. The motion passed. Len also spoke briefly to give an update on pavement murals. An MOA is being circulated among city departments and is moving forward. Regarding the subject of Leading Pedestrian Intervals (LPIs), there is a VECD grant that may be used.

   b. Len Nguyen, CD11 Senior Field Deputy. Discussion of street resurfacing in Mar Vista. Regarding street resurfacing vs. potholes, Len reviews the three current different methods of paving:
      1. Full recondition of street
      2. Regular road resurface

3. Slurry – a blacktop that allows a street surface to stay together longer.
Deciding which method to use is part art, part science. Art: how many stakeholder requests, Science: A DOT machine gives every LA City street a grade regarding condition.
The council sets priorities, as they cannot simply fix the worst streets over and over. Len states that Transportation Improvement and Mitigation Specific Plan (TIMP) funds are used to find transportation improvements. Sara Auerswald suggested having a stakeholder meeting about street resurfacing issues in the future.

c. Michelle Krupkin, MV Community Council, gave an overview of DOT Vision Zero meeting in which ideas were discussed to lower accidents and fatalities of bicyclists and pedestrians. She shared materials from the meeting as well as comments on bike safety and responsibility as well as best practices for pedestrians, bicyclists and vehicle drivers. Michelle also discussed the Clean Streets Grant program. Michelle stated that she attended a Palms Neighborhood Council Meeting and was trying to coordinate with Palms NC on a Clean Streets project. Len Nguyen shared that it may be possible to investigate black Auto Litter Bins (ALB) for Great Street Venice Blvd. LA City will be replacing all wire trashcans with ALBs in the future on a to be determined timeline. There was conversation about putting together an ongoing Mar Vista Infrastructure repair list, including potholes and other items. Sarah Auerswald suggested that we get a list together for all six Mar Vista zones.

d. Lenore French, GCI gave an overview of the September 1 2016 Mar Vista Steppin' into Art walk event, which was a huge success. The Art walk started in December 2015 with 18 participating venues and in now up to close to 50 participating venues. The September 1st Art walk theme was music and there were a total of 4 stages – two indoor and 2 outdoor with 35 bands/music acts participating. Many bands that performed were asked to come back to venues in the future; for example, a jazz band is now going to perform at the Atmosphere Café each Friday. Timewarp Records is now putting together an in-store section to feature recording from musical acts that performed live at the Art Walk. In addition, there was over 35 live artists painting/performing including fire dancers.

   The newly launched passport program, like the events themselves, has the capacity to increase the bottom line for businesses as well as attract more attention from LA City and result in more services for the neighborhood. Moving forward, Lenore wants to institutionalize the event and solidify the neighborhood community.

   Lenore is also looking forward to the one-year anniversary and next Art Walk on December 1 2016. She is trying to create a new experience with each event. The theme of the upcoming event will be light.

e. Public Comment
f. Future Agenda Items
g. Adjournment was at 8:57 pm

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Mar Vista Community Council

MAR VISTA COMMUNITY COUNCIL
GREAT STREETS AD HOC COMMITTEE
Wednesday September 13 2017 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chair: Michelle Krupkin
Co-Chair: Greg Castelnuovo-Tedesco

MINUTES

1. Call To Order and Welcome was at 6:33 pm - Chair (1 min.) acting chair: Michelle Krupkin
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
   Several issues were brought up during public comment. A stakeholder stated that there are issues with vendors on sidewalks and food trucks adding tables and chairs. The stakeholder has been in contact with the LA City Vendor Compliance Division and hopes this will be remedied.

   Another stakeholder commented that these vendors are dumping grease into the gutter, which should be a public safety issue. The sidewalks near the MV Ranch Market and O'Reilly Auto Parts are stained with black grease and are very slippery. The stakeholder observed that this food truck sets up near the bus stop on Venice and Centinela near Starbuck and are set up 7 days a week from around 6 pm to midnight.

   There was discussion of the homeless encampment on Venice Blvd. under the 405 overpass and concern about health and welfare of homeless.

   There was a comment about many RVs parking overnight on Venice Blvd. from the 405 to McLaughlin.

   There was a discussion about the traffic light at Centinela and concerns that the eastbound left arrow has too short a duration. The same stakeholder mentioned that they thought that the Mid-Block Crossing at Boise is located at an intersection with no real destination between the two sides of Venice Blvd. and is a bad choice for a the feature. Also, the light on the Boise Mid-Block crossing is turning green on it's own and the timing appears to be off. The stakeholder has called Rudy at LADOT about this several times and left voicemails with no response.

   Another stakeholder spoke about crime on Pacific Ave adjacent to the car wash. Alleged incidents include drug selling, late night parties and raves and possible prostitution. Pacific Division is working with Narco but things are not improving.

3. Motion to approve August 2017 Great Streets minutes (2 minutes) Sheri Odere made the motion, Selena Inouye seconded. Minutes were approved.

4. Reports (5 Minutes)
   a. Great Streets Program brief definition- Michelle Krupkin, MV Community Council, gave a brief overview of Great Streets, the first initiative from Mayor Eric Garcetti.
      Full info at http://lagreatstreets.org/what-we-do

Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time. Our streets are the backbone of our neighborhoods – the places where we live, work, learn, and recreate on a daily basis. All of our great neighborhoods deserve Great Streets that are livable, accessible, and engaging public spaces for people.
Goals:

- Increased Economic Activity
- Improved Access and Mobility
- Enhanced Neighborhood Character
- Greater Community Engagement
- Improved Environmental Resilience
- Safer and More Secure Communities
- Improved Public Health

5. New Business (30-45 minutes)

   a. Lenore French, did not attend and there was no overview of the events from the September 7 Mar Vista Art Walk themed "Psychedelic September." Tabled due to Lenore's absence at a conflicting appointment. Lenore was able to share that the next Mar Vista Art Walk will be November 25 2017 in conjunction with Small Business Saturday. The hours for the Mar Vista Art Walk were tentatively to be 11 am to 10 pm. The theme is to be Gratitude.

   b. Jessie Holzer, CD11 Mobility Deputy, gave an update on the CD11 Pilot Program as well as other Great Streets projects. Jessie had several updates. First up was a tree planting update: LADOT purchased 14 trees for planting in the parkway and median on Great Street Venice Blvd. They have been delivered to urban Forestry where they are undergoing inspection. There are 8 Australian Willow for the parkway and 6 Pink trumpets for the median. CD11 will try to coordinate with TreePeople to set up a Tree Planting day probably in Spring 2018.

      Jessie shared that they have a new contractor for trimming/landscaping the Great Street Venice Blvd. medians so hopefully they will be maintained properly going forward.

      Jessie stated that in response to stakeholder questions about the exact date of the CD11 Pilot Program Installation, it is officially May 20 2017.

      Jessie said LAFD Station 62 and Station 63 have received transponders from LADOT, one each for the Fire Engine and one for the Ambulance. The transponders will trigger the green light to let LAFD through intersections in order to respond to their calls.

      A stakeholder was concerned that getting through the intersections is not the problem according to employees at both Fire Stations, but rather gridlock and the inability to travel on Great Street Venice Blvd. in a timely manner is the real problem that adds to response time.

      Another stakeholder observed LAFD Station 42 trying to get through Venice Blvd. with a hook & ladder and a fire engine and having trouble.

      Jessie informed the committee how LADOT is collecting data. They are using different methods including manual data gathering as well as gathering data electronically. Manual Data gathering includes using radar guns. Travel time is collected electronically. There have been cameras added at the intersection of Venice and Centinela that feed input to LADOT downtown. Tubes were put out to measure cut through traffic. LADOT collected data on 22 streets before the installation of the CD11 Pilot Program. A stakeholder asked how to obtain the data. Jessie said that the data would be online at veniceblvdmarvista.org. Alternately people can email her for information.

      Another update from Jessie concerned the green paint for the bike lanes. There has been

coordination between FILLA and LADOT in order to reach an agreement on a specific color and material. LADOT is looking for a an alternate material since the one discussed takes time to install and has to be in sunlight to dry properly. LADOT is testing two alternate colors and materials that may be easier to install.

Jessie informed the committee that LADOT is working on a design for a double left turn from eastbound Venice Blvd. onto northbound Centinela and also westbound Venice Blvd onto southbound Centinela Blvd. There would be possibly be 2 lanes to go left from Venice Blvd. onto Centinela north from eastbound Venice Blvd. and south from westbound Venice Blvd.

Jessie also discussed the speed hump program. IN 2016-2017 there were 2 locations per Council District. In 2017-2018 there will be another 2 different corridors considered for installation.

Another update from Jessie was that LADOT is concerned about the visibility of cyclists at right turns. The current CD11 Pilot Program is being reconfigured in several locations. The locations include Grand View Blvd., where they will be removing parking spaces in both directions on Venice Blvd. and changing the right turn pockets for vehicles to those that are at Centinela Blvd. One parking space will be taken away in one direction at the following intersections, all on the north side of Venice Blvd.: Mountain View, Ocean View, Boise and Meier.

There was a short Q&A for Jessie.
One stakeholder spoke about her concern with skateboarders and bikes traveling on the sidewalks.

Another stakeholder expressed frustration with the midblock crossings at Mountain View and Ocean View. A pedestrian can't cross the full intersection on one green light, but has to wait at the median for a second green cycle.
Jessie replied that the mid-block crossing was times for pedestrians at first but then LADOT changed to a shorter time cycle to get cars through the intersections.

A stakeholder spoke about traffic backing up on Palms Blvd. regularly since the Pilot Program's installation.

Another stakeholder spoke about collector streets such as Victoria, Charnock and McCune, which are now getting a high volume of cut through traffic. Is LADOT monitoring these streets as well as Palms, National and Washington Place?

A stakeholder shared that these problems didn't occur when there was three vehicle lanes on Venice Blvd. in each direction.

6. Public Comment

7. Future Agenda Items –There was interest in getting a new representative from MV Chamber of Commerce to attend the Great Streets Ad Hoc Committee meetings.

8. Adjournment was at 7:56 pm.

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GREAT STREETS AD HOC COMMITTEE
Wednesday September 12 2018 6:30 to 8:00 pm
Mar Vista Library
12006 Venice Blvd., Mar Vista, CA 90066
(SW corner of Venice and Inglewood Blvds.)

Co-Chairs: Michelle Krupkin and Gabriel Hill

MINUTES DRAFT

1. Call To Order and Welcome – Chair (1 min.) acting chair: Michelle Krupkin 6:35 pm
2. Introductions and Public Comments (for items not on the agenda) (2 minutes)
3. Motion to approve recent Great Streets minutes (2 minutes) Minutes were approved with one correction.
4. Reports (15 -20 Minutes)
   a. Great Streets Program brief definition-Michelle Krupkin, MV Community Council. Also see Item 6a for discussion.

   b. CD11 Mobility Deputy Alek Bartrosouf shared Mar Vista related mobility issues. He discussed the two recently installed intersections at McLaughlin and Victoria and McLaughlin and Charnock. Alek also shared that DOT is moving to install crosswalks at the next two intersections on the list which are: the intersection of Beethoven, Zanja, and Caswell and the intersection of Zanja and Alla. These are in the process of going to contractors and are in the works. CD11

   c. Lenore French, gave an overview of the most recent September 6 2018 Mar Vista Art Walk (MVAW), themed "Science." She remarked that they learned their lesson from the March 2018 Art Walk and so did staging for the September 6 2018 Art Walk starting the night before. That made everything work much more smoothly. There was a slight problem which occurred at the pop-up beer garden at Alana's Roasters - music continued past 10 pm which should not have happened. This was the first time there was a pop-up beer garden, run by King Eddie Saloon who had the ABC license and is from downtown LA. There was science related art and talks during the event. The attendance was down from the June 2018 Art Walk but was still good – an estimated 3000 attendees. A stakeholder asked questions about current art curator for MVAW. Lenore said that Eddie Flores, son of restaurant owner of Don Chuey's, is one of two curators along with Monique. A stakeholder commented that the art on Venice Blvd. from Inglewood to Grand View looked more like a swap meet than an art walk and that he did not see any science theme. Lenore replied that the music performed was techno that was science based.
   A stakeholder asks Lenore about the upcoming NACTO conference walkshop in which she is listed as one of the walkshop speakers. Lenore says that it was news to her. She knows nothing about any of this.
   Michelle asks Alek is he knows who is funding this particular walkshop in Mar Vista and how the data came about that states that emergency vehicles are moving faster? What data is this lecture based on? Alek says that he does not know anything about this and suggests that Hannah, who was not in attendance 9/12/18, be contacted regarding this walkshop. The GS and T&I committee still haven't seen data that supports this supposition. We would like to know a little bit more about this.
   A stakeholder comments that there is no one on the walkshop speaker list from any of the groups that have concerns about Venice Blvd. It is not a balanced prospective.

   There was a motion to move discussion of Item 6e to the next item. The motion was seconded and voted for and passed. Item 6e was discussed next.

5. Old Business (10 minutes)
    a. Policy Motion: Establishment of Street-Sweeping Route and Services for Centinela Blvd. Between Palms Blvd. and National Blvd. STATUS: PASSED at 8/14/18 BoD meeting. Needs possible follow-up letter to CD11, CD5 BoSS and LADOT.

    b. Policy Motion Policy Motion: MVCC Support for the restoration of the "Opt-out" clause in the City of Los Angeles Sidewalk Vending Program. STATUS: Postponed for discussion no later than January 2019 at 8.31.18 Special Meeting of the BoD.

6. New Business (45 - 50 minutes)
    a. Discussion of Mission Statement for Great Streets Ad Hoc Subcommittee page.
    Looking at the below info, discussion and possible drafting of an updated Mission Statement for Great Streets Ad Hoc Subcommittee.
    Mayor Eric Garcetti launched the Great Streets Initiative to help re-imagine neighborhood centers, one main street at a time.
    Goals:
        - Increased Economic Activity
        - Improved Access and Mobility
        - Enhanced Neighborhood Character
        - Greater Community Engagement
        - Improved Environmental Resilience
        - Safer and More Secure Communities
        - Improved Public Health

    Discussion of a potential mission statement ensued. Draft mission statement:
    The Great Streets Ad hoc Subcommittee was founded in response to Mayor Eric Garcetti's Great Streets Initiative with the goals being increased economic activity, improved access and mobility, improved environmental resilience (see above for full list). The committee welcomes input from all Mar Vista stakeholders.

    b. Wajenda Chambeshi, Program Manager of Great Streets, discusses past and future projects on Great Street Venice Blvd. -Mr. Chambeshi was not able to be in attendance but is planning to attend the October 10 2018 Great Streets meeting.

    c. Discussion and possible motion: Silver Lake Neighborhood Council (SLNC)l, asked their Councilman, David Ryu, for the funds to do an independent traffic study. He agreed and that study was completed in May 2018. In the spirit of transparency, should MVCC request an independent traffic study of the Pilot Program on Great Street Venice Blvd.? Discussion and possible motion to follow.
    A stakeholder gave the background of the SLNC independent traffic study. There was a process wherein a community group of concerned stakeholders came together, with people on both sides of the issue. Independent contractors were interviewed that did not include any firms that had anything to do with the design or implementation of the Rowena Road Diet. Then the traffic study was done to examine existing conditions along Waverly Drive and Angus Street, which resulted in several suggested mitigations. Following this, a motion was passed at City Council requesting that LADOT report to City Council on the feasibility of implementing these potential mitigations and cost estimates.
    Stakeholders discussed that there should be a similar study for Venice Blvd. with a specific eye towards cut through traffic problem and have them complete a report with suggested mitigation factors. These are things have been asked for from LADOT and they have consistently not addressed these issues or provided this information. These are concerns that the community has wanted to address for over a year. There have been to date 76 accidents.
    Potential radius of the study was briefly discussed.
    Alek says that he thought that the study might not be necessary if the benchmark study had addressed these issues.

It was discussed by the stakeholders that cut-through traffic had actually not been addressed.
It was discussed that there was no response to the CA Public Records Act Request for all data pre and post pilot installation that concerned cut through data. Raw data has not supplied. No data has been delivered to the MVCC Transportation and Infrastructure Committee nor this Great Streets Ad Hoc Subcommittee.
Alek mentioned Fehr & Peers Consulting as a possibility.
Stakeholders disagreed, since that firm is not independent since they were involved in the design and implementation of the GS Venice Blvd. Pilot Program and thus would not be able to be an independent party. They were at the March 2018 LADOT Open House presenting charrettes in a positive and non-neutral manner.
Alek discussed the difference between the Rowena Road Diet and the Great Street Venice Blvd. Pilot Program, and discussed the benchmark study.
A stakeholder who is familiar with the benchmark report discussed that a one-day traffic study was done by Fehr & Peers on September 25 2015. That date was a Sunday which was the day before the Jewish holiday of Yom Kippur and said that there were 37,000 cars on Venice Blvd.
If you contrast that with a Caltrans report studying the intersection of Venice and Centinela, which said that there were 46,500 going through that intersection every day, the Caltrans report had peak hour numbers, which Fehr & Peers did not. Caltrans numbers are so different than the numbers Fehr & Peers came up with. Why is there such a huge discrepancy?
LADOT's Nat Gale said that they did not have the 6-month data at the March 2018 Open House. Who is the replacement for Nat Gale?
No one has been hired as of yet according to Alek.
If a traffic study is being done on a Monday or is not a week-long study, that will be questioned as an incomplete study.
Methods of measurement were discussed, such as pneumatic tubes, INRIX data, etc.
Alek discusses what kind of data might be presented in November 2018 or the end of the year.
Stakeholders discuss that nearby council districts such as CD5 and areas such as Palms and Westwood are not participating in road pilots and diets like this one.
A motion was not written due to time constraints, but planned for the next Great Streets Ad Hoc Subcommittee meeting in October.
A stakeholder also expresses concerns that the city wants to get cars off the streets, but there is no particulate data studied from the impact of cars before or during the pilot, due to the CEQA exemption.

d. Tracey Corinne, Mosaic Artist discussed that she still had not been paid for the three-mosaic tile project that was installed at 12515 Venice Blvd. on June 14 2018. She was putting the future Mosaic Hopscotch planned for near the Mar Vista Library on hold until she is paid for the 12515 Venice Blvd. project that had already been completed almost 3 months ago.

e. Hannah Levien, CD 11 West LA/Mar Vista Field Deputy discusses design options for the Venice Blvd. Downtown Mar Vista Gateway Signage. The Mar Vista community and stakeholders are invited to participate in the discussion and decision-making process.
Michelle shared background information on the MV Gateway Signage.
CD11's Alek gave some background information that he was given by Hannah, who couldn't attend the meeting tonight.
Steve Wallace and Chris McKinnon gave their background on the Downtown MV Welcome Signage dating back some years.
Background on the Downtown MV Welcome Signage was discussed.
There was discussion about which concept was finalized and then what happened when the design went to the city for design and installation phase.
There was a discussion about the large cost to install concrete footings on each of the two signs.
Steve said that that the process was dropped at some point and then it resurfaced.

Steve asked why if it was a loose-end project, why no one called Len Nguyen or him or Chris to touch base on the project. Steve shared that Hannah told him that the project was going to be funded by LA City. Steve knows that Rosendahl awarded money for the beautification of Venice Blvd. which was supposed to include the welcome signs.
Alek says that the money is there and that he will check-in with Hannah for a status update.
Chris comments that thinks that the words Mar Vista should be large so as to be readable when passing by.
There was more discussion of the design. There was agreement that it was Design A, with funding in place and concrete footing to be designed. Chris asked to see the budget and to see how much of the 62000 is being used. He also comments that the signage should be placed at Walgrove at the west end and the Culver City border on Venice Blvd. at the west end.

7. Public Comment
8. Future Agenda Items
9. Adjournment 7:57 PM

PUBLIC INPUT AT NEIGHBORHOOD COUNCIL MEETINGS – The public is requested to fill out a "Speaker Card" to address the Board on any agenda item before the Board takes an action on an item. Comments from the public on agenda items will be heard only when the respective item is being considered. Comments from the public on other matters not appearing on the agenda that are within the Board's jurisdiction will be heard during the General Public Comment period. Please note that under the Brown Act, the Board is prevented from acting on a matter that you bring to its attention during the General Public Comment period; however, the issue raised by a member of the public may become the subject of a future Board meeting. Public comment is limited to 3 minutes per speaker, unless adjusted by the presiding officer of the Board.
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The New York Times

Navigation Apps Are Turning Quiet Neighborhoods Into Traffic Nightmares

By Lisa W. Foderaro

Dec. 24, 2017

LEONIA, N.J. — It is bumper to bumper as far as the eye can see, the kind of soul-sucking traffic jam that afflicts highways the way bad food afflicts rest stops.

Suddenly, a path to hope presents itself: An alternate route, your smartphone suggests, can save time. Next thing you know, you're headed down an exit ramp, blithely following directions into the residential streets of some unsuspecting town, along with a slew of other frustrated motorists.

Scenes like this are playing out across the country, not just in traffic-choked regions of the Northeast. But one town has had enough.

With services like Google Maps, Waze and Apple Maps suggesting shortcuts for commuters through the narrow, hilly streets of Leonia, N.J., the borough has decided to fight back against congestion that its leaders say has reached crisis proportions.

In mid-January, the borough's police force will close 60 streets to all drivers aside from residents and people employed in the borough during the morning and afternoon rush periods, effectively taking most of the town out of circulation for the popular traffic apps — and for everyone else, for that matter.

"Without question, the game changer has been the navigation apps," said Tom Rowe, Leonia's police chief. "In the morning, if I sign onto my Waze account, I find there are 250,000 'Wazers' in the area. When the primary roads become congested, it directs vehicles into Leonia and pushes them onto secondary and tertiary roads. We have had days when people can't get out of their driveways."

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Even before the proliferation of navigation apps, Leonia was no stranger to traffic. Ringed by Interstate 95, and in the shadow of the George Washington Bridge, Leonia sits next to some of the most congested roadways in the country.



"We have had days when people can't get out of their driveways," said Tom Rowe, Leonia's police chief. Bryan Anselm for The New York Times

But Leonia is not alone. From Medford, Mass. to Fremont, Calif., communities are grappling with the local gridlock caused by well-intentioned traffic apps like Waze, which was purchased by Google in 2013 for $1.15 billion.

Since Waze uses crowd sourcing to update its information, some people — frustrated at the influx of outside traffic — have taken to fabricating reports of traffic accidents in their communities to try to deter the app from sending motorists their way. One suburb of Tel Aviv has even sued Waze, which was developed by an Israeli company.

Waze defends its practice of rerouting motorists from congested highways through residential streets in nearby communities. And the company says it shares free traffic data with municipal planners nationwide who might, for instance, want to monitor the effectiveness of a new time sequence for a traffic signal.

Terry Wei, a spokeswoman for Waze, said the app benefited from a community of local volunteer editors who ensure that the maps stay up-to-date and reflect the local law. "If a road is legally reclassified into a private road," she said, "our map editors will make that change. It is our goal to work holistically with our community of drivers, map editors and city contacts to improve the driving experience for all."

While a number of communities have devised strategies like turn restrictions and speed humps that affect all motorists, Leonia's move may be the most extreme response.

Leonia plans to issue residents yellow tags to hang in their cars, and nonresidents who use the streets in the morning and afternoon will face $200 fines. Its police department has already alerted the major traffic and navigation apps to the impending changes, which will take effect on Jan. 22 from 6 a.m. to 10 a.m., and from 4 p.m. to 9 p.m., seven days a week.

Chief Rowe said the borough had tried closing only a handful of streets in the past, posting temporary signs and alerting the navigation apps, but with little success. Traffic either got pushed onto nearby streets or drivers simply disregarded the signs.

"It's basically all or nothing," Chief Rowe said. "It's a very extreme measure for very extreme traffic. Would I prefer not to do this? Of course. But I would rather try something and fail than not try anything."

Traffic on Irving Street. Melissa Soesman, who lives on the street, said she has had to plead with motorists to make room for her to pull out of her driveway. Nanci Makroulakis

Borough officials say their measure is legal, although it may yet get tested in court. Some traffic engineers and elected officials elsewhere say the move may set a precedent that could encourage towns to summarily restrict public access to outsiders.

“It’s a slippery slope,” said Samuel I. Schwartz, the former traffic engineer for New York City known as Gridlock Sam, and the author of the early 1990s book “Shadow Traffic’s New York Shortcuts and Traffic Tips.” “Waze and other services are upsetting the apple cart in a lot of communities. But these are public streets, so where do you draw the line?”

Leonia’s council, which voted unanimously this month in favor of the new ordinance, was careful to keep open three major roadways that are controlled by either the county or state.

Some residents outside Leonia have chafed at the impending street closings, posting variously snarky and incredulous comments on news sites like NJ.com: “Terrible, shortsighted idea. How about the rest of N.J. fines Leonia residents for using all the other roads in the state?”

Mr. Schwartz pointed out that the state has ultimate authority over local roads. “I’d rather they put up temporary barriers,” he said. “To give people summonses who might be lost or might be frantic trying to get to an appointment on time — I do worry about this type of strategy. Every town can decide that we don’t want certain people to come through our community.”

There is also concern from neighboring communities like Fort Lee, whose place in traffic lore has been cemented by the so-called Bridgegate scandal, where members of Gov. Chris Christie’s administration deliberately worsened traffic by the George Washington Bridge, famously saying, “Time for some traffic problems in Fort Lee.”

Fort Lee’s mayor, Mark Sokolich, warned Leonia that its traffic-fighting strategy better not make things worse in his town. “If their initiative visits gridlock upon Fort Lee and, in particular, creates problems with our emergency service vehicles getting to and from where they need to go, they will hear from us,” he said.

But for residents like Melissa Soesman, a 44-year-old native of Leonia, the change cannot happen soon enough. The slender road she lives on, Irving Street, becomes a parking lot at least two or three times a week during the morning rush. On Tuesday, her son was a half-hour late to his college class because his car, which was parked on the street, was hemmed in by traffic.

Some mornings, Ms. Soesman has to plead with drivers to make room for her to pull out of her driveway onto Irving Street. “It’s horrific, and it’s all the time,” she said. “They will see that you are trying to get out, but they won’t let you. People are cranky; it’s the morning. By the time they are up here, who knows how long they have been sitting in traffic.”

A version of this article appears in print on Dec. 24, 2017, on Page A1 of the New York edition with the headline: Choked by App-Driven Traffic, A Community Closes Its Roads

CEDS
Community & Environmental Defense Services

410-654-3021
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Why Cut-Thru Traffic Is A Problem

Cul-De-Sac to Thru-Street Conversions

Making Neighborhood Streets Safer Success Examples

How Much Traffic Is Too Much for a Neighborhood Street

At What Point Does Main Road Congestion Cause Excessive Cut Thru Traffic

Reducing Cut-Thru Traffic

Ensuring Measures Really Do Calm Cut-Thru Traffic

Cul-De-Sacs & Quality of Life

Preventing Cul-De-Sac Extensions

Why Excessive Cut-Thru Traffic Reflects Flawed Growth Management

Winning Responsible Growth & Traffic Management

Vision Zero

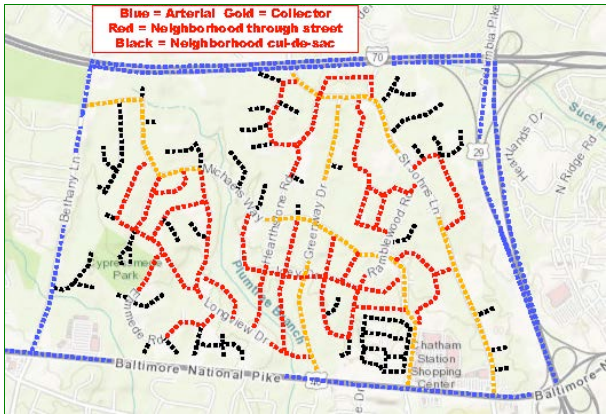
About CEDS

Making Neighborhood Streets Safer

If you're concerned about a cut-thru traffic or other neighborhood safety issues anywhere is the U.S. contact CEDS at 410-654-3021 or Help@ceds.org for an initial no-cost discussion of strategy options.

Latest CEDS Success: Texas cul de sac residents win first round of battle to keep their street safe. More

Of all our roads, neighborhood streets have the highest accident rate. And these accidents involve a substantially higher percentage of pedestrians and cyclists when compared to those occurring on other roads. Excessive cut-thru traffic is a key factor jeopardizing the safety of our neighborhood streets. As main roads become more congested, cut-thru traffic increases. Main road congestion is a result of poorly managed growth. There are a number of measures which can reduce cut-thru traffic making a neighborhood street safe again. Other measures can then prevent future growth from threatening safety once again.



The map above shows a road network typical of many residential areas. As main roads *(blue arterials and gold collectors above)* become increasingly congested, drivers seek out ways for getting around traffic jams. Unfortunately, the alternative usually involves a neighborhood through-street like those in red and gold above. This cut-thru traffic makes neighborhood streets noisier and more dangerous.



Research shows that cut-thru traffic operates at a higher speed, which increases the likelihood of accidents and the severity of injury. A pedestrian is six times more likely to die if struck by a car traveling at 30 mph compared to 20 mph. Of even greater concern are situations where traffic volume increases because a court or other cul-de-sac (dead-end) street is turned into a through-street.

Congested roads and rising

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Comprehensive Plans, Master Plans & Quality of

neighborhood cut-thru traffic are a result of poorly managed growth. In this webpage we'll explain how to resolve both in ways that can make neighborhood streets safer while accommodating a reasonable amount of growth. Contact CEDS at 410-654-3021 or Help@ceds.org if you have any questions or would like our assistance making your street safer.

Top

Why Cut-Thru Traffic Is A Problem

As traffic volume increases on a neighborhood street so does vehicle speed, accident frequency, noise, and even crime. All of these impacts then decrease property value.

Table 1, below, shows that local roads/streets in urban areas have the highest crash (accident) rate. In an urban setting, most of these local roads would be residential or neighborhood streets.

TABLE 1 Comparison of crash rates by roadway classification in urban areas (*1*)

Roadway Classification	Fatal Crashes	Vehicle-Miles Traveled (millions)	Crash Rate (crashes per 100 million vehicle-miles)
Interstate	1,791	285,325	0.6
Other Freeway	1,619	128,242	1.3
Minor Arterial	5,081	338,987	1.5
Major Collector	3,171	240,402	1.3
Collector	1,149	107,272	1.1
Local Roads/Streets	**2,928**	**188,365**	**1.6**
Unknown	27	--	--
Total	15,766	1,288,593	1.2

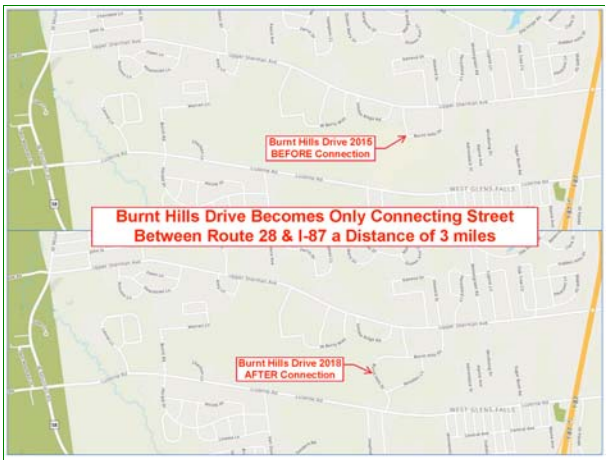
This table is from Comprehensive Engineering Approach to Achieving Safe Neighborhoods

Table 1, shows that neighborhood streets are our most dangerous. Research has determined that those using neighborhood streets to avoid main road congestion tend to drive at a higher speed. The combined effect of cut-thru traffic increased speed and volume makes a neighborhood street even more dangerous.

It is generally true that as traffic volume increases, the value of homes along a street declines. This is especially true for those living on courts and other cul-de-sac streets where homes can sell for up to 20% more than those located on through streets.

Cul-De-Sac to Thru-Street Conversion

There is a large body of literature touting the benefits of maximizing street connections. This research has prompted many local planning agencies to require conversion of cul-de-sacs to thru-streets. Usually this opportunity only arises when a proposed development project abuts a cul-de-sac neighborhood. An example of this situation is pictured below.



Burnt Hills Drive is located in Queensbury, NY. Note that in 2015 Burnt Hills Drive was a cul-de-sac. It was then converted to a thru-street when new homes were built. After clicking on

Life Growth Management

Highways & Other Road Projects

Historic Resource Threats

Landfills
Transfer Stations, Incinerators, Recycling, Composting, Sewage Sludge & Other Waste Facilities

Land Preservation

Light Trespass

Making Neighborhood Waters More Child Safe & Friendly

Making Pollution Laws Work

Mining

Neighborhood Quality of Life

Noise

Nuisances

Politically Oriented Advocacy

Property Value

Scenic View Preservation

Schools & Growth

Smart Legal Strategies

Special Exceptions & Conditional Uses

Strategy Analysis
For Protecting Your Neighborhood & Environment

Traffic

Transmission Lines

Watershed Audit

Zoning & Rezoning

the map above to get a closer view you'll see that Burnt Hills Drive became the only connecting street along a three-mile stretch between Luzerne Road and Upper Sherman Avenue and between I-87 and Route 58. As a result whenever the two east-west streets become heavy drivers use Burnt Hills Drive in hopes of bypassing the congestion.

There were two dozen homes on Burnt Hills Drive before the connection. These homes would have generated about 25 peak-hour trips. A recent traffic study revealed that peak-hour traffic on Burnt Hills Drive is ***now more than ten times higher!*** Burnt Hills Drive residents are now seeking to win the cooperation of their elected representatives to employ measures to reduce and slow down the large volume of cut-thru traffic.

The irony of the Burnt Hills Drive situation is that the local comprehensive plan contained the following text regarding cul-de-sac to thru-street conversions:

> *"Despite the advantages that connections bring, it is not practical or even necessary to force every residential subdivision to open up roads to its neighbors. Rather, it is important to establish the right connections between the right places."*

Here's an example of a "right connection":

1. If funds had been available to convert a number of other cul-de-sacs to thru-streets between Route 58 and I-87 so the impact to any one neighborhood would be minimized, and
2. Traffic calming measures were installed to force most traffic to obey a 25 mph speed limit.

The reality is that local officials have resisted installing traffic calming measures on Burnt Hills Drive post-connection. So if they cannot afford these relatively inexpensive safeguards it is unlikely they would have had the funds to convert other cul-de-sacs to thru-streets.

Of course local officials should have required that the developer who profited from the Burnt Hills Drive connection pay for installing calming measures. Why this was not done is unclear even though the following comprehensive plan text clearly called for this:

> *"Any new automobile connections must be accompanied by specific and extensive traffic calming interventions to mitigate the possibility of increased traffic on some residential streets."*

Finally, in most existing communities cul-de-sacs are so numerous that conversions of all to thru-streets is exceedingly unlikely. It is only in the few instances where proposed development abuts a cul-de-sac neighborhood that conversion is likely. In other words, a few neighborhoods fall victim to an unrealistic policy.

However, it would be far less expensive and beneficial to use development projects to enhance neighborhood quality of life by creating connecting pedestrian-cyclist paths. As the last bit of irony, the following town comprehensive plan text encouraged this:

> *"Pedestrian and bike connections can achieve many connectivity goals at a fraction of the cost."*

Following is a description of the many benefits enjoyed by cul-de-sac residents.

Cul-De-Sac Benefits

Those who live on cul-de-sacs paid a premium to enjoy the enhanced quality of life motivating their choice.

Converting cul-de-sacs to through streets interferes with the close neighbor relations that adds so much to quality of life. For example, one sociologist found that:



"people who live in traditional bulb cul-de-sacs have the highest levels of attitudinal and behavioral cohesion (covering both how they feel about their neighbors and how much they actually interact with them). People who live on your average residential through-street have the lowest levels..."

For parents living on courts or other low-volume streets, a rise in traffic volume may increase anxiety about allowing children - particularly younger kids - to play outside. Children between the ages of 5 and 9 are particularly at risk to traffic-caused injury. Converting cul-de-sacs to through-streets robs both children and their parents of a sense of safety and freedom many cherish.

With regard to crime, one study noted that:

*"Furthermore, hierarchical, **discontinuous** street systems have lower burglary rates than easily traveled street layouts; **criminals will avoid street patterns where they might get trapped**. For example, the troubled Five Oaks district of Dayton, Ohio, was restructured to create several small neighborhoods by converting many local streets to cul-de-sacs by means of barriers. Within a short time **traffic declined 67 percent and traffic accidents fell 40 percent**. Overall **crime decreased 26 percent, and violent crime fell by half.** At the same time, **home sales and values increased**."*

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Making Neighborhood Streets Safer Success Examples

Between 2013 and 2016, New York City reduced traffic-related fatalities by 23% while nationally they increased by 7%.

Speed humps and tables have reduced crashes on neighborhood streets by up to 45%.

Holding back left-turning traffic for 3-7 seconds at signalized intersections has reduced pedestrian injuries by 60%.

A sizeable portion of cut-thru traffic can be attributed to apps that steer drivers from congested main roads onto neighborhood streets. Very frustrated officials in one town felt they had no choice but to close off neighborhood streets to rush hour cut-thru traffic.

These are but a few of many examples of measures that can make neighborhood streets safer. This goal is best achieved by mobilizing the widespread support needed to allow government to conduct a comprehensive analysis of opportunities such as those serving as the basis for Vision Zero plans. These and other measures are addressed in further detail below.

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How Much Traffic Is Too Much for a Neighborhood Street

While every through-street will carry traffic from one main road to another, neighborhood quality of life suffers when the volume crosses a certain threshold.

Where is that threshold?

The table below is from a paper that appeared in the Institute for Transportation Engineers Journal. The term *"environment"* in the table is defined as:

"one where residents can live, work and move about in freedom from the hazards of motor traffic."

Environment	Vehicles Per	Vehicles Per

	Minute	Day
Excellent	0.5	300
Good	0.5-1.0	300-600
Acceptable	1.0-2.0	600-1200
Poor	>2.0	>1200

To put these numbers in perspective, each single-family detached home generates one peak-hour trip and ten trips per day. This includes not just the cars and SUVs driven by residents but delivery trucks and all other traffic entering-exiting a neighborhood. One would anticipate that those who live on a residential street prefer that traffic volume remain in the *good to excellent* range or less than 600 vehicles per day. In other words, land use decisions should not cause traffic volume to exceed 600 vehicles per day on a neighborhood street.

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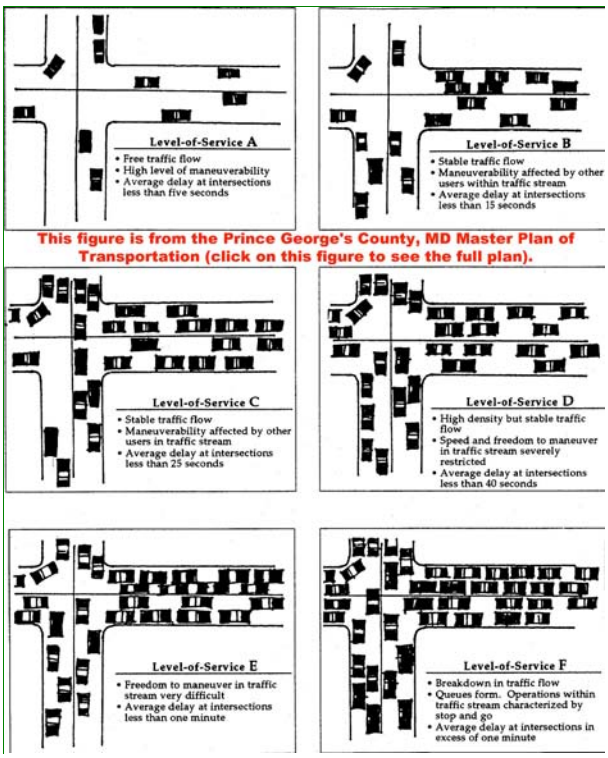
At What Point Does Main Road Congestion Cause Excessive Cut Thru Traffic

Commuters begin seeking alternate routes when congestion cuts main road (arterial-collector) speed to half the free-flow (mid-morning) speed. For example, if free-flow speed is 40 mph then drivers begin seeking out alternates when congestion causes average speed to drop to 20 mph. Of course the alternate route is frequently a through-street passing through a residential neighborhood.

As shown in the figure below, traffic congestion is rated using a system known as Level of Service ranging from A to F. That "half-free-flow-speed" where drivers begin seeking alternate routes in earnest lies between a Level of Service of C to D. So, to keep cut-thru traffic at a reasonable volume main road traffic congestion should not reach Level of Service D-E or F.



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Reducing Existing Cut-Thru Traffic

If traffic on your street exceeds the good to excellent range (300-600 vpd) given above, then consider calling for one or more of the many measures listed proven to reduce both cut-thru speed and volume. The permanent measures given below

are more effective and long-lasting. For further detail click on the green measure name below. For assistance in forming a traffic management strategy for your street(s) contact CEDS at 410-654-3021 or Help@ceds.org.

Measure	Volume Reduction	Speed Reduction	Crash Reduction
Permanent:			
Full street closure	44%		
Half closure	42%	19%	
Diagonal diverters	35%	4%	
Speed hump	18-22%	22-23%	13-40%
Speed table	12%	18%	45%
Roadway narrowing	10%	4%	
Chokers	20%	14%	
Traffic circles	5%	11%	28%
Temporary:			
Speed trailers	9%	7%	10%
Speed limit signs	4%	7%	3%
Increased enforcement	8%	28%	28%

The data presented in this table is from Comprehensive Engineering Approach to Achieving Safe Neighborhoods

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Ensuring Measures Really Do Calm Cut-Thru Traffic

Many transportation agencies face a conflict when it comes to traffic calming measures. On the one hand, no one would argue that calming measures make neighborhood streets safer by discouraging cut-thru traffic. On the other hand, traffic agencies rely upon cut-thru traffic to reduce main road congestion.

This conflict can result in the design of calming measures that serve more as a pacifier rather than achieving the goal of making neighborhood streets safer. For example, one study showed a substantial difference in the effectiveness of speed humps with an entrance ramp slope of less than 5%. This same study documented that speed humps spaced 82 feet achieved a 25% lower speed compared to a spacing of 1300 feet. Combined, a slope of >5% and spacing of 82 feet slowed traffic by an average of 5 mph more compared to speed humps with <5% slope and 1300-foot spacing.

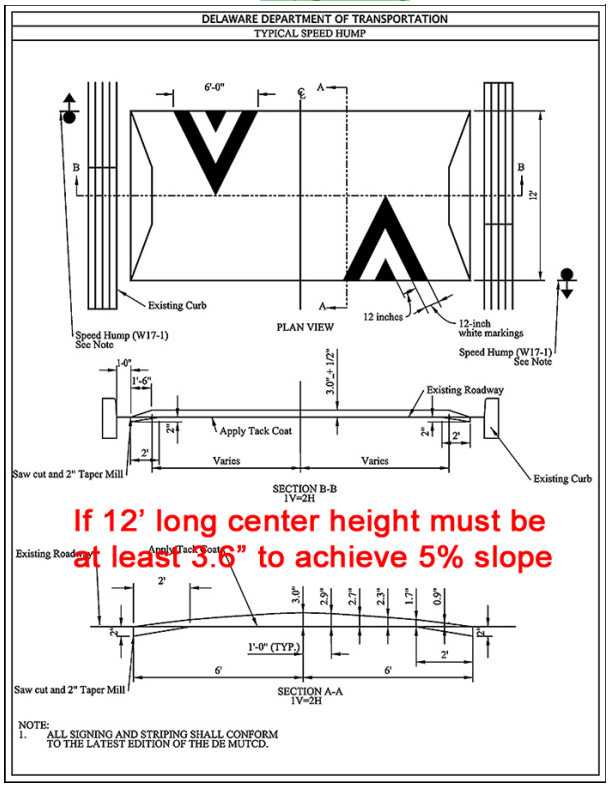


It is not uncommon that folks say that while their neighborhood streets have speed humps or other calming measures they do not seem to have much effect on cut-thru traffic volume or speed. We suspect the poor performance is mostly due to poor design. In other words, the measures may have been designed more as pacifiers than to achieve a significant improvement in neighborhood street safety.

The recommended spacing for speed humps is every 260- to 500-feet. A typical speed hump:

- Extends from edge of street pavement to edge of pavement,
- Has a length of 12 feet, which
- Means it must be at least 3.6-inches high to achieve a 5% entrance ramp slope.

If the speed humps on your street does not meet these specifications then they *may* be less than fully effective. Contact CEDS at 410-654-3021 or Help@ceds.org to discuss.



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Cul-De-Sacs & Quality of Life

Following is a summary of research demonstrating why cul-de-sacs and other dead-end neighborhood streets should not be converted into through-roads.

In a paper entitled *The Cul-de-sac Effect: Relationship between Street Design and Residential Social Cohesion*, published in the Journal of Urban Planning and Development, Volume 141 Issue 1 - March 2015, sociologist Thomas R. Hochschild reported:

> "This study utilized a quasi-experimental design to assess differences in residential social cohesion for residents of "bulb" cul-de-sacs, "dead-end" cul-de-sacs, and through streets. My data reveal that bulb residents experience the highest levels of attitudinal and behavioral cohesion, followed by dead-ends, then through streets."

5 Benefits of Cul-De-Sacs: "Promotes friendships and neighborly interaction: This hanging out potential also applies to whole families: parents, kids and other relatives and friends. As the cul-de-sac emphasizes the closeness of the houses within and the visibility of homes and families. In this way, the families are naturally encouraged to connect as well. Smiling and waving, checking in, connecting and even joining in games, parties and other social events naturally rise up in this design."

Reconsidering the Cul-De-Sac: "Residents also preferred the cul-de-sac as a place to live, even if they actually lived on a through or loop street. People said they felt cul-de-sac streets were safer and quieter because there was no through traffic and what traffic there was moved slowly. They also felt they were more likely to know their neighbors. One resident's comment was typical: "Our pets and kids are safer when there is a no-

outlet street; you feel kidnapping is less likely—there is more of a sense of neighborhood." Thus, the study generally corroborated earlier transportation research on the values of a hierarchical discontinuous street pattern. It also supported claims that cul-de-sacs are more frequently and more safely used by children.

The Benefits of Living in A Cul-De-Sac: "Because cul-de-sacs tend to have fewer homes than traditional streets, it is easier for people to get to know their neighbors in the cul-de-sac. Cul-de-sacs also are a natural place for neighbors to plan block parties or picnics because with proper permits from the local authorities, a cul-de-sac can be blocked off to any incoming or outgoing traffic during the block party. Homes in a cul-de-sac generally face outward toward the other homes, creating a greater sense of community for the residents as they can see their neighbors' front doors from their own."

Residential Street Design and Play: A literature review of policy, guidance and research on residential street design and its influence on children's independent outdoor activity: "Both traffic speed and volume have been found to have an effect on how streets are used. Appleyard's study of three similar streets in San Francisco showed that residents' quality of life was measurably affected by the volume of traffic in the street (Appleyard, 1981). Those living on a light-trafficked street knew more of their neighbors, felt a greater sense of belonging and were more familiar with its physical features. The study was replicated on residential streets in Bristol in 2011 and the findings resonated strongly with Appleyard's (Hart & Parkhurst, 2011)."

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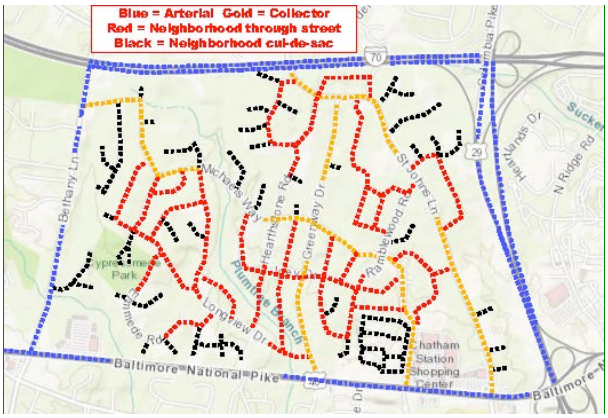
Preventing Cul-De-Sac Extensions

If you're concerned about a proposal to turn your cul-de-sac into a through-street then contact CEDS at 410-654-3021 or Help@ceds.org to discuss strategy options.





Take a look at the streets highlighted black, above. About a fourth to a third of the streets are courts or other cul-de-sacs. The same is probably true for most of the U.S.

Those who live on these cul-de-sacs paid up to 20% more for the increased safety and tranquility of these low-volume streets. It is understandable then that cul-de-sac residents become irate when a proposal is made to open their street to cut-thru traffic. It's even more infuriating when this is done to allow an adjacent property to be developed.

Usually the justification for the extension is to provide a second means of emergency vehicle access should the main entrance ever be blocked by a downed tree, floodwaters, vehicle accident, etc. Another justification is to increase road connectivity to relieve congestion on main routes. The relief is achieved, of course, by increasing neighborhood street cut-thru traffic.

As stated above, increasing neighborhood cut-thru traffic to relieve congestion is a symptom of poor growth management. While a second means of emergency access is certainly a legitimate need, there are ways of accommodating this need without forcing residents to sacrifice the safety and tranquility of their neighborhoods.

Before a cul-de-sac conversion is considered, all other options must be exhausted.

CEDS has helped a number of communities with this issue. We can frequently find an alternate, second access such as creating a new road off an existing collector or arterial that prevents neighborhood impact.

If an alternate access is not available then other options must be considered. If cul-de-sac extension is the only means for creating a second access and the second access is genuinely needed for public safety, then consideration should be given to gating the access so it can only be opened by fire, ambulance, police and other emergency services personnel.



To see an example of how CEDS can help you protect your cul-de-sac from being turned into a through-street click on: Preventing Cul-De-Sacs From Becoming Through Roads.

If for some reason an emergency-access-only gate is not an option, then a number of measures should be considered that reduce cut-thru traffic speed, volume and crash rates, like the speed humps referenced in the table above. Public officials may argue that these measures interfere with snow-plowing and emergency vehicle travel time. Rarely though do the ***benefits*** of the measures come up in these arguments.

As stated at the beginning of this webpage, neighborhood streets have the highest accident rate of all road types. Homes located on cul-de-sacs are valued for up to 20% more, which generates higher property-tax revenue. It's simply wrong to ask people to sacrifice the safety and tranquility of their neighborhood without exhausting all other options. I suspect that if elected officials were aware of the higher accident rates, lower tax revenue, and injustice then more responsible policies would be adopted with regard to the conversion of cul-de-sacs into through streets.

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Why Excessive Cut-Thru Traffic Reflects Flawed Growth Management

Responsible growth management seeks to prevent congestion from reaching the threshold *(Level of Service D-E or F)* where cut-thru traffic harms neighborhood quality of life.

Ironically, increasing main road congestion seems to create pressure on public officials to engage in two practices that exacerbate neighborhood cut-thru traffic:

- Allowing cul-de-sacs to be converted into through streets, and
- Resisting calls for speed humps and other measures that would slow cut-thru traffic speed-volume.

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Winning Responsible Growth & Traffic Management

So how would responsible growth management prevent main road congestion from reaching the point where rush-hour cut-thru traffic becomes excessive? More importantly, how can you provide elected officials with the public support they need to manage growth responsibly?

Responsible growth management begins with a plan that identifies existing and future congestion problems then recommends solutions. Next elected officials must allocate the funds required to make the infrastructure improvements many solutions require. Finally, Concurrency and Adequate Public Facilities Ordinance (APFO) laws must be in place to prevent additional growth from being approved before solutions are fully implemented.

CEDS has found that far too many growth management plans fail to show both existing and future congestion. Without this information plan readers are left in the dark as to whether growth will make their streets safer or more dangerous. To see what a good plan should provide see the Traffic Congestion section of the CEDS Comprehensive Plans, Master Plans & Quality of Life Growth Management webpage.

Infrastructure improvements frequently come years after congestion has become excessive. Instead, the infrastructure projects must be included in capital improvement plan then fully funded, preferably through the use of impact fees.

Far too many APFO-Concurrency laws are so poorly written or enforced as to be ineffective. This leaves local residents wondering if congestion is inevitable. Of course it isn't. A common flaw is that the congestion cut-off is set well beyond the point where cut-thru traffic becomes serious.

Earlier this point was given as when average speed is cut in half and Level of Service drops below C-D. Urban-suburban growth restrictions should kick in and postpone development which would add traffic to roads that will be at or below Level of Service D-E. Instead the cut-off is frequently set at the point where average speed is reduced by 75% and congestion reaches Level of Service E-F.

Winning responsible traffic and growth management begins with homeowner and other neighborhood associations taking the following actions:

- Identify issues affecting the safety and tranquility of your streets,
- Develop solutions for each issue (see CEDS Traffic webpage),
- Employ Politically Oriented Advocacy to provide elected officials with the public support needed to implement the solutions, then
- Form a coalition with kindred groups throughout your town, city or county to create the political clout needed to effectively advocate for better growth plans, full funding of solutions, and effective, fully enforced APFO laws so growth is postponed until it can be accommodated without making neighborhood streets more dangerous.

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Vision Zero

The Vision Zero website describes this concept as...

> "...a strategy to eliminate all traffic fatalities and severe

> injuries, while increasing safe, healthy, equitable mobility for all. First implemented in Sweden in the 1990s, Vision Zero has proved successful across Europe — and now it's gaining momentum in major American cities."

Vision Zero seeks to achieve this goal by...

- "lowering speed limits
- redesigning streets,
- implementing meaningful behavior change campaigns, and
- enhancing data-driven traffic enforcement."

Consider urging your local elected officials to adopt a Vision Zero plan for your village, borough, town, city or county. For further detail visit the Vision Zero resources page at: https://visionzeronetwork.org/resources/

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Breaking CEDS News

Texas Cul De Sac Street Preserved: The developer of a massive 1700-unit Fort Worth housing project proposed using Clark Road - a narrow, neighborhood cul de sac street - as a second access point. Had this proposal been approved traffic volume on Clark Road could have gone from a few hundreds cars a day to more than 37,000!

The cul de sac residents were preparing for a Plan Commission hearing when they retained CEDS. Our Initial Strategy Analysis research showed two key factors:

1. The developer had other options for access, and
2. The Plan Commission had a history of denying approval for similar projects.

These two factors prompted us to urge the cul de sac residents to testify at the hearing using a letter drafted by CEDS. But rather than calling for denial we recommended that our clients ask the Commission to:

- Requiring the developer to use an alternate access,
- Require an emergency-services only gate, and to
- Continue the hearing so the residents could work with the developer to find a mutually satisfactory solution.

This testimony prompted the Plan Commission to grant the continuance and sent strong signals to the developer that he needed to find a way to resolve cul de sac resident concerns. Our clients are now in negotiations.

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Neighborhood Traffic Management Program

Background

Late in 2014, the Town embarked upon a project to develop a Neighborhood Traffic Management Program (NTMP) to help the Town manage and address neighborhood traffic issues such as speeding and cut through traffic. The NTMP is a policy document that will be designed with the help of the Town Council, community, and affected Town resources so that the list of improvements provided in the tool box available are reflective of the their needs.



The Town is served by north-south arterial corridors El Camino Real, Middlefield Road and Alameda De Las Pulgas. Because east-west access throughout Town is handled by streets that have residential frontage, complaints regarding speeding and cut through traffic are prevalent. Access to the north-south corridors can be difficult and congestion during peak periods creates the potential for cut through traffic utilizing local streets. The existing roadway network, lack of east-west collector streets, and long straight local street segments creates the desire to manage local streets with a combination of the four (4) E's, Engineering, Enforcement, Education, and Encouragement. The NTMP program is intended to help the Town staff and local law enforcement implement the 4 E's as projects are identified and funded.

The City Council awarded a contract to the Engineering firm, Hatch Mott MacDonald, in April of 2015 to make recommendations and prepare the Neighborhood Traffic Management Program (NTMP).

Summary

The Neighborhood Traffic Management Program (NTMP) is an important policy document which provides a comprehensive, thoughtful, and systematic program to address neighborhood traffic concerns, improve pedestrian and bicycle safety, and maintain the scenic and quiet rural character of Atherton neighborhoods. It is a community-based approach to reduce vehicle speeds and improve the behaviors of drivers to "calm" traffic in residential neighborhoods.

Town staff has the authority to implement necessary traffic control measures. The NTMP does not affect staff authority to implement necessary traffic control measures in residential neighborhoods in response to observed traffic safety concerns. The NTMP is an additional tool which provides a systematic framework to educate and encourage residents to participate in identifying and implementing equitable and effective neighborhood traffic solutions.

There are no single answers or solutions to the emotional issues of excessive vehicle speeds on residential streets. There are also varying opinions regarding appropriate solutions and the installation of devices to calm neighborhood traffic. All successful Neighborhood Traffic Management Programs includes involvement of the affected neighborhoods to identify and agree on neighborhood traffic problems and then take responsibility for the solutions. Accordingly, an important program element includes criteria which must be met to qualify for the NTMP along with a survey mechanism to insure a high level of neighborhood support prior to the installation of any devices or improvements. This NTMP provides a framework for the selection, application, and implementation of traffic calming improvement measures in the Town of Atherton.

Current Status

The process involves steps to identify the residents' traffic concern(s), demonstrate neighborhood support for traffic calming measure(s), to determine if the traffic concerns meet the NTMP qualifying criteria, to identify (by Town staff) the most appropriate and effective improvement measure(s), and to prioritize and implement the plan.

The process is initiated by a request from a resident to resolve a speeding and/or traffic problem in their neighborhood. The requestor must complete a *Neighborhood Action Request Form*(NARF), describing the problem, its location and suggested improvement to remedy the problem. A ***Getting Started Packet (PDF)*** provides a summary of the NTMP, a description of neighborhood traffic management devices, and the Neighborhood Action Request Form.

The ***NTMP Policy (PDF)*** is also available for review.

NTMP Program Goals

The Town of Atherton establishes its NTMP with a number of goals as follows:

- Improve local residents' sense of well-being about their neighborhood streets and enhance traffic safety in residential areas.
- Incorporate the preferences and interests of residents into the design and operation of streets within their neighborhoods.
- Provide objective criteria to help Town staff identify and prioritize projects.
- Provide residents of residential streets with protection and relief from disproportionate traffic increases.
- Provide a NTMP format that is responsive and equitable to all neighborhoods in the Town of Atherton.
- Ensure the program is cost effective by encouraging high standards of acceptance before measures are implemented.
- Clearly state procedures to provide clarity to the process and the basis for determining appropriate measures.

NTMP Program Objectives

The objectives of the NTMP are as follows:

- Provide a format for citizen involvement and collaboration in identifying traffic concerns and objectives, as well as traffic management measures that best suit the needs of their neighborhood.
- Provide a process that includes clear opportunities for members of the affected community to provide input on the recommended plan prior to its implementation.
- Integrate engineering, enforcement, and education initiatives to encourage positive driver behavior in residential neighborhoods.
- Improve neighborhood livability by encouraging compliance with designated speed limits.
- Discourage cut-through traffic within residential neighborhoods.
- Maintain capacity and facilitate traffic flow on the Town's arterial and collector roadway network.
- Effectively balance public safety interests including traffic mitigations and emergency response. In other words, recommend neighborhood traffic improvement plans that clearly address provisions for emergency response

Prior Presentations:

July 15, 2015 City Council Presentation (PDF)

For More Information Contact:

Atherton Town Engineer
Marty Hanneman
650-752-0532
Email Marty Hanneman

Explore the
Town of Atherton

Meeting Videos ***Communicate & Engage*** ***Quiet Zone*** ***Fire Services Fiscal Review***
Water Capture Facility ***Special Parcel Tax*** ***Civic Center Project*** ***Citizen RIMS - Crime Stats***
Bicycle Lanes Improvement ***Aircraft Noise*** ***E-News Archive*** ***Atherton Fiber***

Venice Boulevard Road Diet Impact on North-South Commuter and Residential Street Cut-Thru Traffic

Study by Bill Pope, March 7, 2019

The Great Streets project on Venice Boulevard was also a Road Diet project. It reduced the number of motor-vehicle through-lanes from three to two. In an attempt to make two remaining motor-vehicle lanes carry as much traffic as the previous three lanes, traffic signal "Green Time" was taken away from Centinela Avenue's North-South lanes and given to Venice Boulevard's East-West lanes.

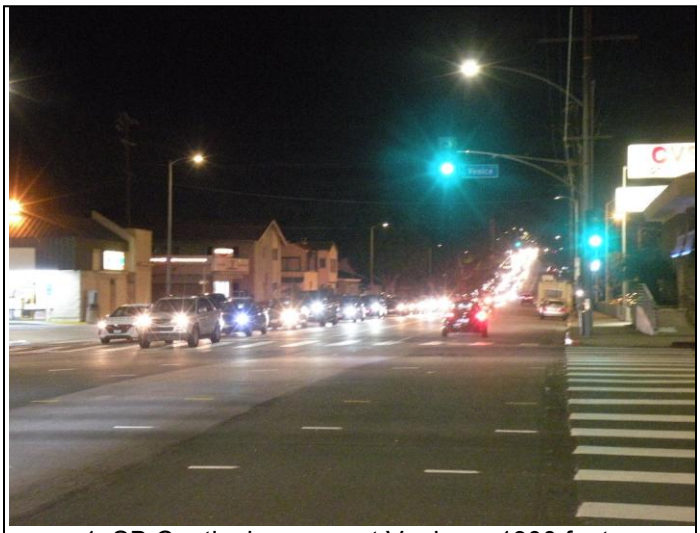
PM Commute Period Times	Before Venice Bl Road Diet	After Venice Bl Road Diet
Venice/Centinela Total Signal Cycle Time	2 minutes	2 minutes, 20 seconds
Centinela Green Time per Signal Cycle	58 seconds	50 seconds
Venice Green Time per Signal Cycle	58 seconds	90 seconds
Signal Cycles per Hour	30	25
Centinela Green Time per Hour	29 minutes (50%)	21 minutes (35%)
Venice Green Time per Hour	29 minutes (50%)	37 minutes (65%)
All Red and Pedestrian Lead Time	2 minutes	2 minutes

This exacerbated the problems caused by there being 40% fewer North-South lanes on the Westside than there are East-West lanes.

The transfer of Green Time from North-South commuter arterials to Venice Boulevard in an attempt to remedy the reduced through-put problem caused by the Venice Road Diet has:

- Reduced the number of vehicles Centinela can carry across Venice,
- Increased Centinela's Venice-intersection-approach queue length (Photo 1) creating an imbalance (Photo 2),
- Increased Centinela's Venice-Intersection-approach delay time, and consequently
- Pushed more regional commuter into residential neighborhoods on streets like Grand View Boulevard (Photo 3) and Inglewood Boulevard (Photo 4).

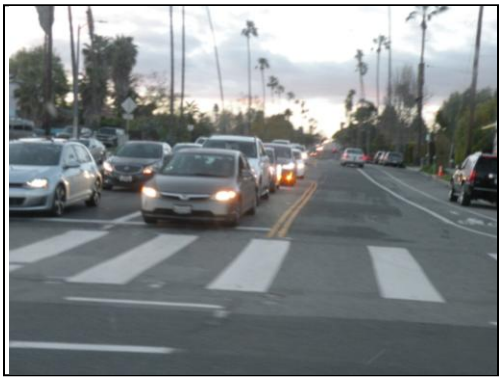
The U.S. Highway Department's guidelines for managing intersections is to balance intersection-delays at in BOTH directions. The delay in Centinela's approach to Venice is now about twice the delay in Venice's approach to Centinela.



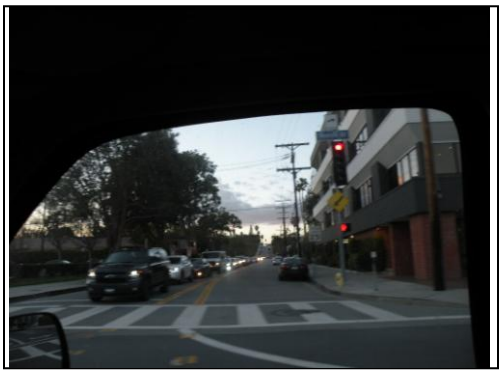
1. SB Centinela queue at Venice = 1900 feet.
SB Centinela ½ mile travel time Palms to Venice = 5:32



2. WB Venice queue at Centinela = 360 feet.
WB Venice ½ mile travel time McLaughlin to Centinela = 3:15



3. Venice Road Diet increased Cut-turn traffic on residential street of Grand View Boulevard. https://youtu.be/v1lwc77hCQE



4. Venice Road Diet increased Cut-turn traffic on residential street of Inglewood Boulevard. https://youtu.be/46lQUjHylqI

Venice Blvd Great Street Pilot

Update:
Improving Right Hand Turns at Intersections

Basic Info

***What** are we doing?*

LADOT is improving the safety of right-hand turns at certain intersections. Some intersections will receive a new right-hand turn configuration and some intersections will receive modifications that improve visibility.

A new right-hand turn configuration will be installed at Mountain View, Grand View and Boise.

Visibility improvements without reconfiguring the right-hand turn lane will be installed at

***Why** are we doing it?*

We received feedback from the community that there is not enough visiblity for people turning right at certain intersections.

These changes are part of the pilot process and we will continue to incorporate community feedback into the project wherever feasible.

***What** are the benefits?*

People driving will have better visibility when turning right which will reduce the potential for a conflict with a person walking or biking.

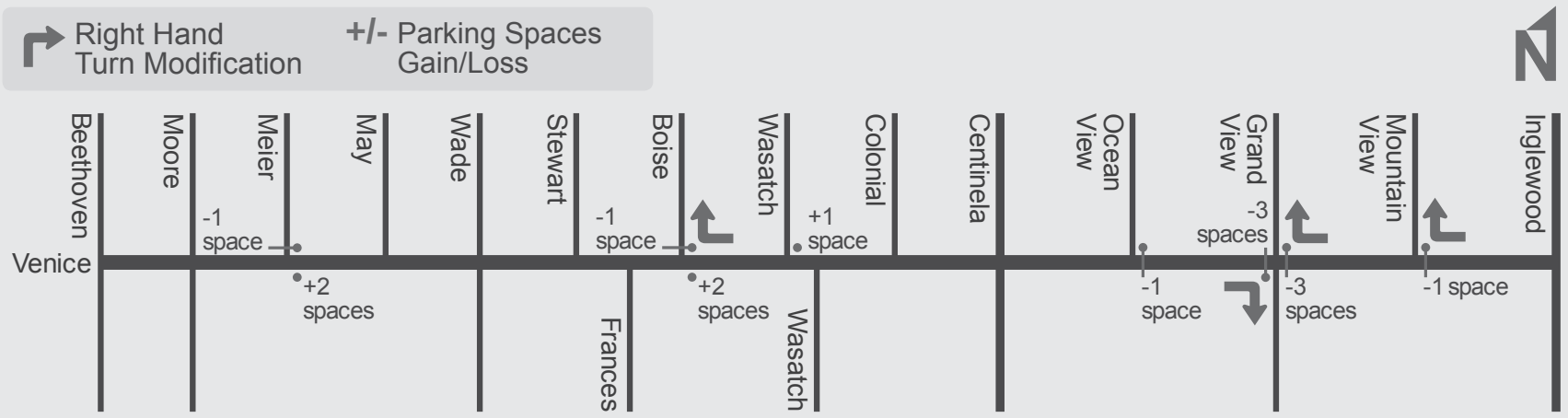
***What** are the impacts?*

There will be a net loss of five parking spaces across six intersections.

***When** is this happening?*

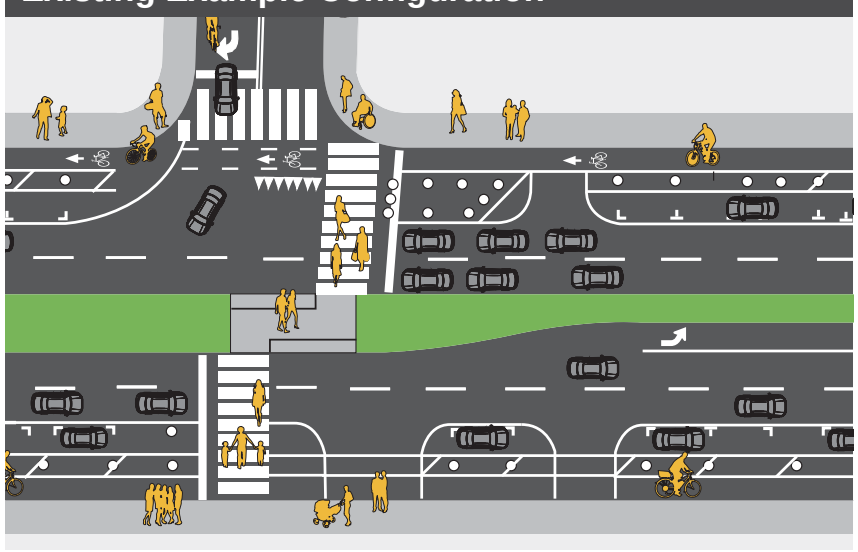
Restriping will take place this fall.

Proposed Intersections for Right Hand Turn Improvements and Parking Gain/Loss

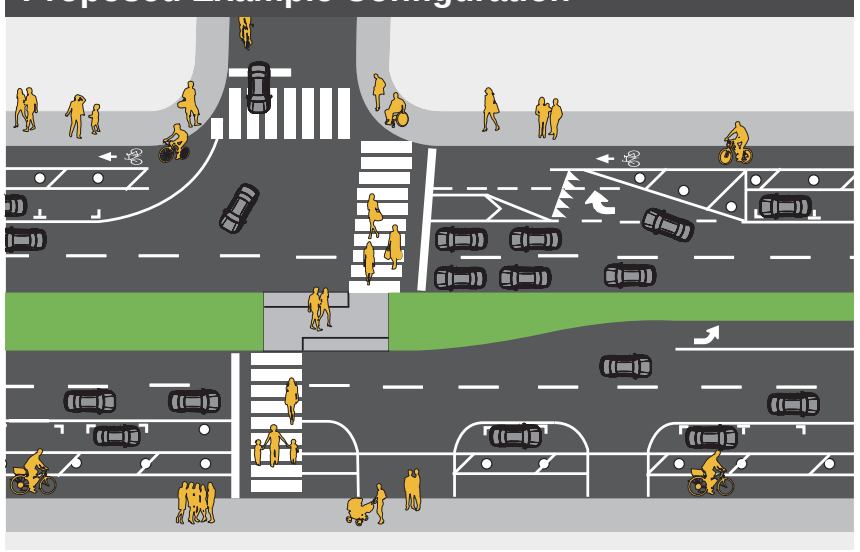


Right-Hand Turn Modifications

Existing Example Configuration

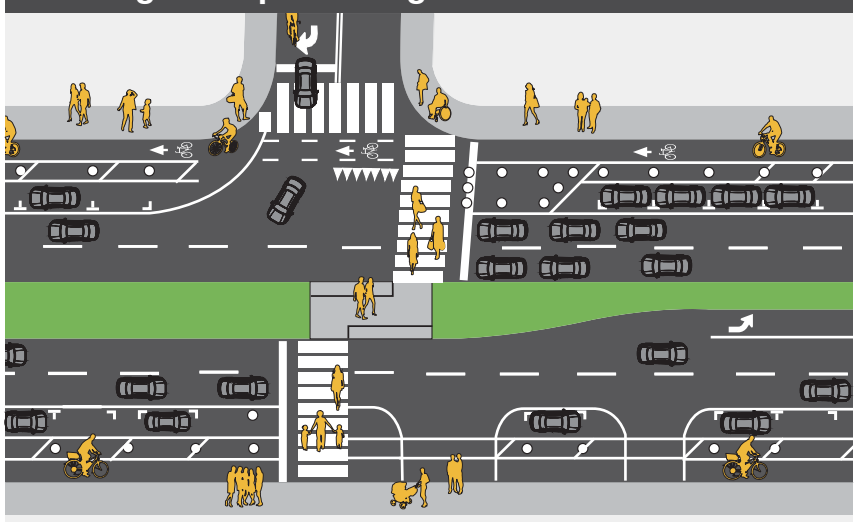


Proposed Example Configuration

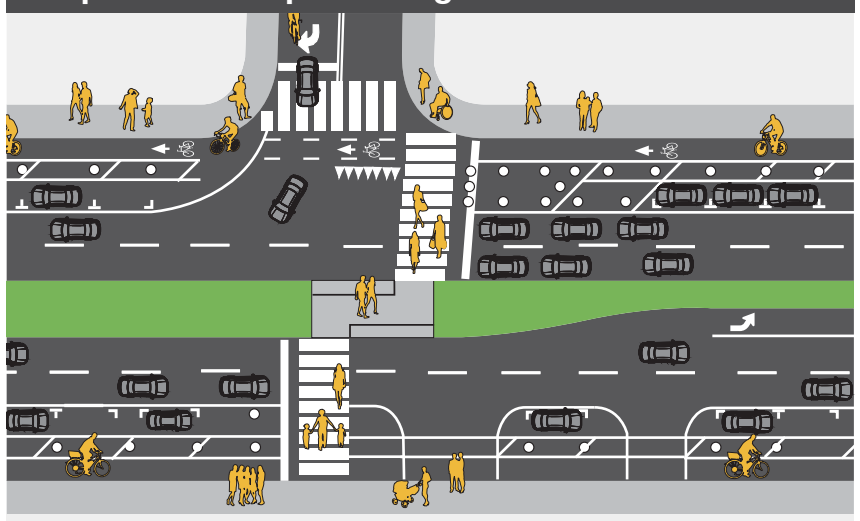


Visibility Improvement Modifications

Existing Example Configuration



Proposed Example Configuration



For more information go to **www.veniceblvdmarvista.org**
Send comments and questions to **ladot.veniceblvdmarvista@lacity.org**

LADOT

Communications Strategy Session

Wednesday August 2, 2017
10 am – 1 pm

Attendees:

LADOT
Seleta Reynolds
Jennifer Cohen
Nat Gale
Lilly O'Brien
Patrick Wontor

Rally
Leo Wallach
Lara Bergthold
Rachel Horning
Annie Kim

CD 11
Chad Molnar

Agenda

1. Desired Outcomes: **10 minutes**
    a. Agreed upon "path to victory" for Venice Blvd / Mar Vista
    b. Agreed upon tactics & messages for shifting broader Vision Zero public dialogue
    c. Necessary resources to accomplish a + b
    d. Others?

2. What have we accomplished so far? **15 minutes**
    a. Questions:
        i. What have we spent so far?
        ii. Where have we been successful?
        iii. Where have we struggled?
        iv. Where are we successfully countering opposition?
        v. Where is opposition dominating conversation?
    b. Considerations: Resources deployed to date:
        i. Website
        ii. Open House
        iii. Media Inquiries
        iv. Social Media

3. What is/are our goal/s for the remainder of our scope? **30 minutes**
    a. Questions:
        i. What is success?
        ii. What is the ideal timeline? 3 months? 6 months?
        iii. What are key milestones along the way?
    b. Considerations:
        i. Data (public opinion, traffic, budget)
        ii. Audience
        iii. Opposition
        iv. Third Party Support
        v. Larger Great Streets and Vision Zero narratives

4. What is/are our message/s? **30 minutes**

a. Questions:
   i. What messages have been compelling thus far (either from us or from supporters)
   ii. What are people confused about/concerned with?
   iii. What messages have worked in other cities? And is any of that translatable here?

5. Break **15 minutes**

6. What are our tactics to get the message out? **20 minutes**

a. Questions:
   i. What are the strengths and weaknesses of these tactics?
   ii. Where is our opposition focused?
   iii. What tactics have worked for us in the past?
   iv. What tactics have worked for similar efforts in the past?
   v. Who can help us execute these tactics? Who are our messengers?
b. Considerations:
   i. Digital
   ii. Mail/phone
   iii. Outreach/Field/Canvassing
   iv. Supporter/coalition Mobilization
   v. Earned Media
   vi. Others?

7. What are the citywide implications of this campaign? **30 minutes**

a. Questions:
   i. Where do the Vision Zero message and the Venice message diverge? Westside v Los Angeles?
   ii. How do we manage that diversion?
   iii. Where do we have negative exposure? Where are we exposing ourselves to risk?
b. Considerations:
   i. Elements of this scope that can/should be replicated citywide
   ii. Elements of this message that must be amplified citywide to shift public dialogue

8. How do we put this plan in motion? **30 minutes**

a. Questions:
   i. Do we have the right resources?
b. Considerations:
   i. Campaign calendar

RALLY **STRATEGIC PLAN FRAMEWORK**

PROBLEM

- **Recent safety improvement projects have angered residents and commuters and spurred them to take vocal action.**
- **Organized effort to play catch up on public outreach and messaging**

CURRENT STATE

- There is an air of criticism and crisis around the projects, and an accompanying press narrative around public outrage and big traffic impacts.
- Actual impacts are significant in Playa, but smaller and improving in Mar Vista.
- Opponents are targeting Bonin, although he is holding strong.
- Opponents are funded and partly organized by South Bay players, but probably have local organization/support.
- Activist, right leaning energy with online trolling, talk radio.
- Some broadening by opponents to attack overall Great Streets, V/Zero, bike safety.
- Mar Vista lumped in with two playa projects.
- Have supporters, including VZ alliance and some residents, but not vocally part of narrative yet
- Probably will have long term support in Mar Vista, although we have to communicate well; Playa residents probably conflicted.

Defining Tactics

- Facebook ads that reintroduce projects
- More in-depth Q&A in the right venue

Facts and Research

INSIGHTS > Guide Our Approach

- In LA, one person's shortcut is another person's quality of life. Opponents will fight hard because it impacts family time, work options,. We need to offer some hope, even as we explain acute safety needs for changes.
- Some opponents are very unsympathetic, but it is not easy to feed that counter narrative. Need to get safety frame established and put things in perspective first.
- Perceived lack of empathy, flexibility, balance is feeding opponents and press narrative. What level gridlock in Playa acceptable to Bonin/LADOT? Would unlimited gridlock be traded for safety? Safety is our primary frame, but traffic flow needs to be valued and addressed.
- In VZ polling, wealthy, white men (primarily from the Westside) are the hardest demographic to move with arguments about safe streets.
- Mar Vista is easier than the others and can also benefit from softer neighborhood improvement messaging.
- Non controversy and public acceptance is not a story; our opponents get some advantages by being the opponents.

STRATEGY > Defines Our Approach

- ESTABLISH MESSAGE CONSISTENCY: frame around specific local safety problems. Messages touch on listening to community, monitoring traffic, making tweaks. Avoid traps on slower traffic, road diets, lack of concern for commuters.
- LOCALIZE: Use paid media and outreach to talk to Playa and Mar Vista residents as neighborhood, isolated from outside forces that take the narrative negative. Mar Vista can be sold on benefits; Playa is more managing problems.
- ACTIVATE SUPPORTERS: Message trained supporters available for meetings and press; more edgy support on social media; supporter commentary in Next Door from neighbors.
- BUSINESS & INFLUENCER OUTREACHED: Triaged outreach to keep small business on board.
- MANAGE TIMING OF PLAYA ADJUSTMENTS: Even minor on Jefferson/Culver is a helpful step. August timing of announcement makes sense, but need to discuss media roll out. .

Audiences



CONSTRAINTS

- **Bonin and LADOT are working together well and closely, but are not completely in sync with their messaging.**

DESIRED STATE

- Supporters of the project are empowered to speak up in its defense, and beginning to balance dialog.
- Able to address criticisms from position of strength
- If possible, a new narrative about overcoming challenges or about unsympathetic opponents versus neighbors
- Mar Vista project is seen, after the adjustment period, as a beneficial project with local support, and an example for other places.
- Playa projects fall out of fire line, and needed safety changes are maintained.

Broad Timeline

- Planning/website/messaging (end of June)
- Event planning/field outreach/social media campaign (beginning – mid July)
- Event execution/direct mail (end of July)

DRAFT

The Brookings Institution
POLICY BRIEF
January 2004
Policy Brief #128

Related Brookings Resources

- *Still Stuck in Traffic*
  Anthony Downs
  (forthcoming, 2004)
- *TEA-21 Reauthorization: Getting Transportation Right for Metropolitan America*
  Bruce Katz, Robert Puentes, and Scott Bernstein
  (2003)

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Traffic: Why It's Getting Worse, What Government Can Do

ANTHONY DOWNS

Rising traffic congestion is an inescapable condition in large and growing metropolitan areas across the world, from Los Angeles to Tokyo, from Cairo to Sao Paolo. Peak-hour traffic congestion is an inherent result of the way modern societies operate. It stems from the widespread desires of people to pursue certain goals that inevitably overload existing roads and transit systems every day. But everyone hates traffic congestion, and it keeps getting worse, in spite of attempted remedies. Commuters are often frustrated by policymakers' inability to do anything about the problem, which poses a significant public policy challenge. Although governments may never be able to eliminate road congestion, there are several ways cities and states can move to curb it.



The Northern Virginia Smart Traffic Center, run by the Virginia Department of Transportation, monitors traffic flow on over 100 miles of roads.

THE REAL PROBLEM

Traffic congestion is not primarily a problem, but rather the solution to our basic mobility problem, which is that too many people want to move at the same times each day. Why? Because efficient operation of both the economy and school systems requires that people work, go to school, and even run errands during about the same hours so they can interact with each other. That basic requirement cannot be altered without crippling our economy and society. The same problem exists in every major metropolitan area in the world.

In the United States, the vast majority of people seeking to move during rush hours use private automotive vehicles, for two reasons. One is that most Americans reside in low-density areas that public transit cannot efficiently serve. The second is that privately owned vehicles are more comfortable, faster, more private, more convenient in trip timing, and more flexible for doing multiple tasks on one trip than almost any form of public transit. As household incomes rise around the world, more and more people shift from slower, less

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expensive modes of movement to privately owned cars and trucks.

With 87.9 percent of America's daily commuters using private vehicles, and millions wanting to move at the same times of day, America's basic problem is that its road system does not have the capacity to handle peak-hour loads without forcing many people to wait in line for that limited road space. Waiting in line is the definition of congestion, and the same condition is found in all growing major metropolitan regions. In fact, traffic congestion is worse in most other countries because American roads are so much better.

COPING WITH THE MOBILITY PROBLEM

There are four ways any region can try to cope with the mobility challenge. But three of them are politically impractical or physically and financially impossible in the United States.

Charging peak-hour tolls. Governments can charge people money to enter all the lanes on major commuting roads during peak hours. If tolls were set high enough and collected electronically with "smart cards," the number of vehicles on each major road during peak hours could be reduced enough so that vehicles could move at high speeds. That would allow more people to travel per lane per hour than under current, heavily congested conditions.

Transportation economists have long been proponents of this tactic, but most Americans reject this solution politically for two reasons. Tolls would favor wealthier or subsidized drivers and harm poor ones, so most Americans would resent them, partly because they believe they would be at a disadvantage.

The second drawback is that people think these tolls would be just another tax, forcing them to pay for something they have already paid for through gasoline taxes. For both these reasons, few politicians in our democracy—and so far, anywhere else in the world—advocate this tactic. Limited road-pricing schemes that have been adopted in Singapore, Norway, and London only affect congestion in crowded downtowns, which is not the kind of congestion on major arteries that most Americans experience.

Greatly expanding road capacity. The second approach would be to build enough road capacity to handle all drivers who want to travel in peak hours at the same time without delays. But this "cure" is totally impractical and prohibitively expensive. Governments would have to widen all major commuting roads by demolishing millions of buildings, cutting down trees, and turning most of every metropolitan region into a giant concrete slab. Those roads would then be grossly underutilized during non-peak hours. There are many occasions when adding more road capacity is a good idea, but no large region can afford to build enough to completely eliminate peak-hour congestion.

Greatly expanding public transit capacity. The third approach would be to expand public transit capacity enough to shift so many people from cars to transit that there would be no more excess demand for roads during peak hours. But in the United States in 2000, only 4.7 percent of all commuters traveled by public transit. (Outside of New York City,

only 3.5 percent use transit and 89.3 percent use private vehicles.) A major reason is that most transit commuting is concentrated in a few large, densely settled regions with extensive fixed-rail transit systems. The nine U.S. metropolitan areas with the most daily transit commuters, when taken together, account for 61 percent of all U.S. transit commuting, though they contain only 17 percent of the total population. Within those regions, transit commuters are 17 percent of all commuters, but elsewhere, transit carries only 2.4 percent of all commuters, and less than one percent in many low-density regions.

Even if America's existing transit capacity were tripled and fully utilized, morning peak-hour transit travel would rise to 11.0 percent of all morning trips. But that would reduce all morning private vehicle trips by only 8.0 percent—certainly progress, but hardly enough to end congestion—and tripling public transit capacity would be extremely costly. There are many good reasons to expand the nation's public transit systems to aid mobility, but doing so will not notably reduce either existing or future peak-hour traffic congestion.

Living with congestion. This is the sole viable option. The only feasible way to accommodate excess demand for roads during peak periods is to have people wait in line. That means traffic congestion, which is an absolutely essential mechanism for American regions—and most other metropolitan regions throughout the world—to cope with excess demands for road space during peak hours each day.

Although congestion can seem intolerable, the alternatives would be even worse. Peak-hour congestion is the balancing mechanism that makes it possible for Americans to pursue other goals they value, including working or sending their children to school at the same time as their peers, living in low-density settlements, and having a wide choice of places to live and work.

THE PRINCIPLE OF TRIPLE CONVERGENCE

The least understood aspect of peak-hour traffic congestion is the principle of triple convergence, which I discussed in the original version of *Stuck in Traffic* (Brookings/Lincoln Institute of Land Policy, 1992). This phenomenon occurs because traffic flows in any region's overall transportation networks form almost automatically self-adjusting relationships among different routes, times, and modes. For example, a major commuting expressway might be so heavily congested each morning that traffic crawls for at least thirty minutes. If that expressway's capacity were doubled overnight, the next day's traffic would flow rapidly because the same number of drivers would have twice as much road space. But soon word would spread that this particular highway was no longer congested. Drivers who had once used that road before and after the peak hour to avoid congestion would shift back into the peak period. Other drivers who had been using alternative routes would shift onto this more convenient expressway. Even some commuters who had been using the subway or trains would start driving on this road during peak periods. Within a short time, this triple convergence onto the expanded road during

All data in this policy brief concerning population and travel behavior are from the Census Bureau, primarily from the 2000 Census, unless otherwise noted.



"If a region's population is growing rapidly, as in Southern California or Florida, any expansions of major expressway capacity may soon be swamped by more vehicles generated by the added population."

peak hours would make the road as congested as it was before its expansion.

Experience shows that if a road is part of a larger transportation network within a region, peak-hour congestion cannot be eliminated for long on a congested road by expanding that road's capacity.

The triple convergence principle does not mean that expanding a congested road's capacity has no benefits. After expansion, the road can carry more vehicles per hour than before, no matter how congested it is, so more people can travel on it during those more desirable periods. Also, the periods of maximum congestion may be shorter, and congestion on alternative routes may be lower. Those are all benefits, but that road will still experience some period of maximum congestion daily.

TRIPLE CONVERGENCE AND OTHER PROPOSALS

Triple convergence affects the practicality of other suggested remedies to traffic congestion. An example is staggered work hours. In theory, if a certain number of workers are able to commute during less crowded parts of the day, that will free up space on formerly congested roads. But once traffic moves faster on those roads during peak hours, that will attract other drivers from other routes, other times, and other modes where conditions have not changed to shift onto the improved roads. Soon the removal of the staggered-working-hour drivers will be fully offset by convergence.

The same thing will happen if more workers become telecommuters and work at home, or if public transit capacity is expanded on off-road routes that parallel a congested expressway. This is why building light rail systems or even new subways rarely reduces peak-hour traffic congestion. In Portland, where the light rail system doubled in size in the 1990s, and in Dallas, where a new light rail system opened, congestion did not decline for long after these systems were up and running. Only road pricing or higher gasoline taxes are exempt from the principle of triple convergence.

HOW POPULATION GROWTH CAN SWAMP TRANSPORTATION CAPACITY

A ground transportation system's equilibria can also be affected by big changes in the region's population or economic activity. If a region's population is growing rapidly, as in Southern California or Florida, any expansions of major expressway capacity may soon be swamped by more vehicles generated by the added population. This result is strengthened because America's vehicle population has been increasing even faster than its human population. From 1980 to 2000, 1.2 more automotive vehicles were added to the vehicle population of the United States for every 1.0 person added to the human population (though this ratio declined to 1 to 1 in the 1990s). The nation's human population is expected to grow by around 60 million by 2020—possibly adding another 60 million vehicles to our national stock. That is why prospects for reducing peak-hour traffic congestion in the future are dim indeed.

Shifts in economic activity also affect regional congestion. During the internet and telecommunications boom of the

late 1990s, congestion in the San Francisco Bay Area intensified immensely. After the economic "bubble" burst in 2000, congestion fell markedly without any major change in population. Thus, severe congestion can be a sign of strong regional prosperity, just as reduced congestion can signal an economic downturn.

The most obvious reason traffic congestion has increased everywhere is population growth. In a wealthy nation, more people mean more vehicles. But total vehicle mileage traveled has grown much faster than population. From 1980 to 2000, the total population of the United States rose 24 percent, but total vehicle miles traveled grew 80 percent because of more intensive use of each vehicle. The number of vehicles per 1,000 persons rose 14 percent and the number of miles driven per vehicle rose 24 percent. Even without any population gain in those two decades, miles driven would have risen 47 percent.

One reason people drove their vehicles farther is that a combination of declining real gas prices (corrected for inflation) and more miles per gallon caused the real cost of each mile driven to fall 54 percent from 1980 to 2000. That helped raise the fraction of U.S. households owning cars from 86 percent in 1983 to 92 percent in 1995.

Furthermore, American road building lagged far behind increases in vehicle travel. Urban lane-miles rose by 37 percent, versus an 80 percent increase in miles traveled. As a result, the amount of daily traffic that was congested in the 75 areas analyzed in studies by the Texas Transportation Institute went from 16 percent in 1982 to 34 percent in 2001.

Another factor in road congestion is accidents and incidents, which some experts believe cause half of all traffic congestion. From 1980 to 2000, the absolute number of accidents each year has remained amazingly constant, and the annual number of traffic deaths in the United States fell 18 percent, in spite of the great rise in vehicle miles traveled. So accidents could only have caused more congestion because roads were more crowded, and each accident may now cause longer back-ups than before.

Incidents are non-accident causes of delay, such as stalled cars, road repairs, overturned vehicles, and bad weather. No one knows how many incidents occur, but it is a much greater number than accidents. And the number of incidents probably rises along with total driving. So that could have added to greater congestion, and will in the future.

LOW-DENSITY SETTLEMENTS

Another crucial factor contributing to traffic congestion is the desire of most Americans to live in low-density settlements. In 1999, the National Association of Homebuilders asked 2,000 randomly-selected households whether they would rather buy a $150,000 townhouse in an urban setting that was close to public transportation, work, and shopping or a larger, detached single-family home in an outlying suburban area, where distances to work, public transportation, and shopping were longer. Eighty-three percent of respondents chose the larger, farther-out suburban home. At the same time, new workplaces have been

"Severe congestion can be a sign of strong regional prosperity, just as reduced congestion can signal an economic downturn."

spreading out in low-density areas in most metropolitan regions.

Past studies, including one published in 1977 by Boris S. Pushkarev and Jeffery M. Zupan, have shown that public transit works best where gross residential densities are above 4,200 persons per square mile; relatively dense housing is clustered close to transit stations or stops; and large numbers of jobs are concentrated in relatively compact business districts.

But in 2000, at least two thirds of all residents of U.S. urbanized areas lived in settlements with densities of under 4,000 persons per square mile. Those densities are too low for public transit to be effective. Hence their residents are compelled to rely on private vehicles for almost all of their travel, including trips during peak hours.

Recognizing this situation, many opponents of "sprawl" call for strong urban growth boundaries to constrain future growth into more compact, higher-density patterns, including greater reinvestment and increased densities in existing neighborhoods. But most residents of those neighborhoods vehemently oppose raising densities, and most American regions already have densities far too low to support much public transit. So this strategy would not significantly reduce future traffic congestion.

POSSIBLE IMPROVEMENTS

While it is practically impossible to eliminate congestion, there are several ways to slow its future rate of increase:

Create High Occupancy Toll (HOT) lanes. Peak-hour road pricing would not be politically feasible if policymakers put tolls on all major commuter lanes, but HOT lanes can increase traveler choices by adding new toll lanes to existing expressways, or converting underused high-occupancy vehicle (HOV) lanes to HOT lanes, and leaving present conventional lanes without tolls. True, HOT lanes do not eliminate congestion. But they allow anyone who needs to move fast on any given day to do so, without forcing all low-income drivers off those same roads during peak periods. In some regions, whole networks of HOT lanes could both add to overall capacity and make high-speed choices always available to thousands of people in a hurry.

Respond more rapidly to traffic-blocking accidents and incidents. Removing accidents and incidents from major roads faster by using roving service vehicles run by government-run Traffic Management Centers equipped with television and electronic surveillance of road conditions is an excellent tactic for reducing congestion delays.

Build more roads in growing areas. Opponents of building more roads claim that we cannot build our way out of congestion because more highway capacity will simply attract more travelers. Due to triple convergence, that criticism is true for established roads that are already overcrowded. But the large projected growth of the U.S. population surely means that we will need a lot more road and lane mileage in peripheral areas.

Install ramp-metering. This means letting vehicles enter expressways only gradually. It has improved freeway speed

during peak hours in both Seattle and the Twin Cities, and could be much more widely used.

Use Intelligent Transportation System devices to speed traffic flows. These devices include electronic coordination of signal lights on local streets, large variable signs informing drivers of traffic conditions ahead, one-way street patterns, Global Positioning System equipment in cars and trucks, and radio broadcasts of current road conditions. These technologies exist now and can be effective on local streets and arteries and informative on expressways.

Create more HOV (High Occupancy Vehicle) lanes. HOV lanes have proven successful in many areas such as Houston. More regions could use HOV lanes effectively if there were more lanes built for that purpose, rather than trying to convert existing ones. Merely converting existing lanes would reduce overall road capacity.

Adopt "parking cash-out" programs. Demonstration programs have shown that if firms offer to pay persons now receiving free employee parking a stipend for shifting to carpooling or transit, significant percentages will do so. That could reduce the number of cars on the road. However, this tactic does not prevent the offsetting consequences of triple convergence.

Restrict very low-density peripheral development. Urban growth boundaries that severely constrain all far-out suburban development will not reduce future congestion much, especially in fast-growing regions. And such boundaries may drive up peripheral housing prices. But requiring at least moderate residential densities—say, 3,500 persons per square mile (4.38 units per net acre)—in new growth areas could greatly reduce peripheral driving, compared to permitting very low densities there, which tend to push growth out ever farther. In 2000, thirty-six urbanized areas had fringe area densities of 3,500 or more. Those thirty-six urbanized areas contained 18.2 percent of all persons living in all 476 U.S. urbanized areas.

Cluster high-density housing around transit stops. Such Transit Oriented Developments (TODs) would permit more residents to commute by walking to transit, thereby decreasing the number of private vehicles on the roads. However, the potential of this tactic is limited. In order to shift a significant percentage of auto commuters to transit, the number of such "transit circles" within each region would have to be very large, the density within each circle would have to be much greater than the average central city density in America's fifty largest urbanized areas, and the percentage of workers living in the TODs who commuted by transit would have to greatly exceed the 10.5 percent average for central cities in 2000. Even so, developing many of these high-density clusters might make public transit service more feasible to many more parts of large regions.

Give regional transportation authorities more power and resources. Congress has created Metropolitan Planning Organizations to coordinate ground transportation planning over all modes in each region. If these were given

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more technical assistance and power, more rational systems could be created. Without much more regionally focused planning over land uses as well as transportation, few anti-congestion tactics will work effectively.

Raise gasoline taxes. Raising gas taxes would notably slow the rate of increase of all automotive travel, not just peak-hour commuting. But Congress has refused to consider it because it is politically unpopular and fought by industry lobbyists. Despite Americans' vocal complaints about congestion, they do not want to pay much to combat it.

CONCLUSION

Peak-hour traffic congestion in almost all large and growing metropolitan regions around the world is here to stay. In fact, it is almost certain to get worse during at least the next few decades, mainly because of rising populations and wealth. This will be true no matter what public and private policies are adopted to combat congestion.

But this outcome should not be regarded as a mark of social failure or misguided policies. In fact, traffic congestion often results from economic prosperity and other types of success.

Although traffic congestion is inevitable, there are ways to slow the rate at which it intensifies. Several tactics could do that effectively, especially if used in concert, but nothing can eliminate peak-hour traffic congestion from large metropolitan regions here and around the world. Only serious economic recessions—which are hardly desirable—can even forestall an increase.

For the time being, the only relief for traffic-plagued commuters is a comfortable, air-conditioned vehicle with a well-equipped stereo system, a hands-free telephone, and a daily commute with someone they like.

Congestion has become part of commuters' daily leisure time, and it promises to stay that way.

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Traffic Safety Reports: Pedestrian Injuries in California 2007-2013

June 2017

Introduction

Walking is the oldest, most basic, and beneficial form of human transportation that provides many personal and societal benefits.[1,2] The number of individuals walking in the United States is steadily increasing.[1] Unfortunately, pedestrians represent a growing percentage of total traffic fatalities.[3] In 2007 pedestrian fatalities comprised 11 percent of all traffic deaths nationwide and 15 percent in 2013.[3] This report presents California 2007-2013 data on the overall frequency, severity, and characteristics of fatal and non-fatal pedestrian injuries involving motor vehicles, using the California Highway Patrol's (CHP) Statewide Integrated Traffic Records System (SWITRS) data.[4] The pedestrian injury information is presented as follows:

- Overview
- Environmental Characteristics
- Time of Day and Day of the Week
- Age Groups
- Gender
- Alcohol Involvement
- Fatal Injuries by County
- Non-Fatal injuries by County, and
- Summary

Highlights

- Pedestrian fatality rates increased by 11%, from 1.8 per 100,000 (2007) to 2.0 per 100,000 California residents (2013).
- In contrast, pedestrian non-fatal injury rates decreased by 13.5% from a high of 39 per 100,000 in 2007 to 32 per 100,000 in 2013.
- Most pedestrian injuries occurred in fall (35%) followed by summer and winter (31%).
- Majority of the pedestrian injuries occurred from 3 p.m. to 8:59 p.m., while the least occurred from 3 a.m. to 5:59 a.m.
- One-fifth (21%) of total persons killed in traffic crashes were pedestrians.
- One-third (29%) of children 14 and younger killed in traffic crashes were pedestrians.
- 33% of all pedestrians killed and 7% of all pedestrian non-fatal injuries were comprised of people 65 and older.
- More than two-thirds (68%) of the pedestrians fatalities in traffic crashes were males and the pedestrian fatality rate (2.4) is more than double the rate of females (1.1 per 100,000).
- Pedestrians 45 to 54 years old who were drinking had the highest fatality rate (1.2 per 100,000) compared to other age groups.
- Kern and Humboldt were the top two counties for pedestrian fatalities.
- San Francisco and Los Angeles were the top two counties for non-fatal pedestrian injuries.

Overview

In California there was an average of about 238,000 fatal and non-fatal traffic injuries annually from 2007-2013, for a total of nearly 1.7 million injuries. Table 1 presents a distribution of all pedestrian injuries (fatal and non-fatal combined) as a percentage of total motor vehicle traffic injuries from 2007 to 2013. Pedestrian traffic injuries comprised nearly 6 percent (n=95,758) of the total traffic injuries, of which 95 percent were non-fatal and 5 percent were fatal injuries. Overall, the 13,083 pedestrian injuries in 2013 represent a nearly 9 percent decrease from 14,329 pedestrian injuries in 2007. Pedestrian age-adjusted fatality rates increased by 11 percent from 1.8 per 100,000 residents in 2007 (n=666) to 2.0 per 100,000 in 2013 (n=752). In contrast, pedestrian age-adjusted non-fatal injury rates decreased by 13.5 percent from a high of 39 per 100,000 in 2007 (n=13,663) to 32 per 100,000 in 2013 (n=12,331).

Table 1: Total Fatal and Non-Fatal Traffic and Pedestrian Injuries, 2007-2013

Year	Total Injuries number	Total Pedestrian Injuries number	Percent of Total Injuries	Total Injury Rate*	Pedestrian Injury Rate*	95% CI**
2007	270,654	14,329	5.3	731.9	39.0	37.6 - 40.4
2008	245,274	14,047	5.7	657.0	38.0	36.6 - 39.4
2009	235,853	13,679	5.8	627.1	36.7	35.3 - 38.1
2010	232,093	13,291	5.7	612.0	35.3	33.9 - 36.7
2011	228,437	13,347	5.8	597.8	35.1	33.7 - 36.5
2012	229,539	13,982	6.1	595.8	36.5	35.1 - 37.9
2013	226,232	13,083	5.8	583.4	33.9	32.5 - 35.3
Total	**1,668,082**	**95,758**	**5.7**	**629.1**	**36.4**	**35.0 - 37.8**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Age adjusted rates per 100,000 using California Population data (CDoF- CDPH-EPI Center) and Year 2000 US Standard Population Weights; **Confidence interval (CI) with lower and upper limits for Pedestrian injury rates

Environmental Characteristics

In this section, information on four environmental characteristics (i.e., geography, pedestrian location, light condition, and time of day and season) of where and when pedestrian injuries occurred during 2007-2013 are presented.

As shown in Table 2, the vast majority of fatal and non-fatal pedestrian injuries occurred in urban areas (98.6 percent) compared to rural areas (1.4 percent)[5] and thus the rates of pedestrian injuries were lower in rural areas (22.4 versus 36.9, respectively). In contrast, the rates for total traffic injuries were higher in rural areas than urban areas (i.e., 717 versus 636, respectively). In rural areas, the percentage of total fatal pedestrian injuries (2.1 percent) was significantly higher than the percentage of non-fatal pedestrian injuries (1.3 percent), although the rates were similar.

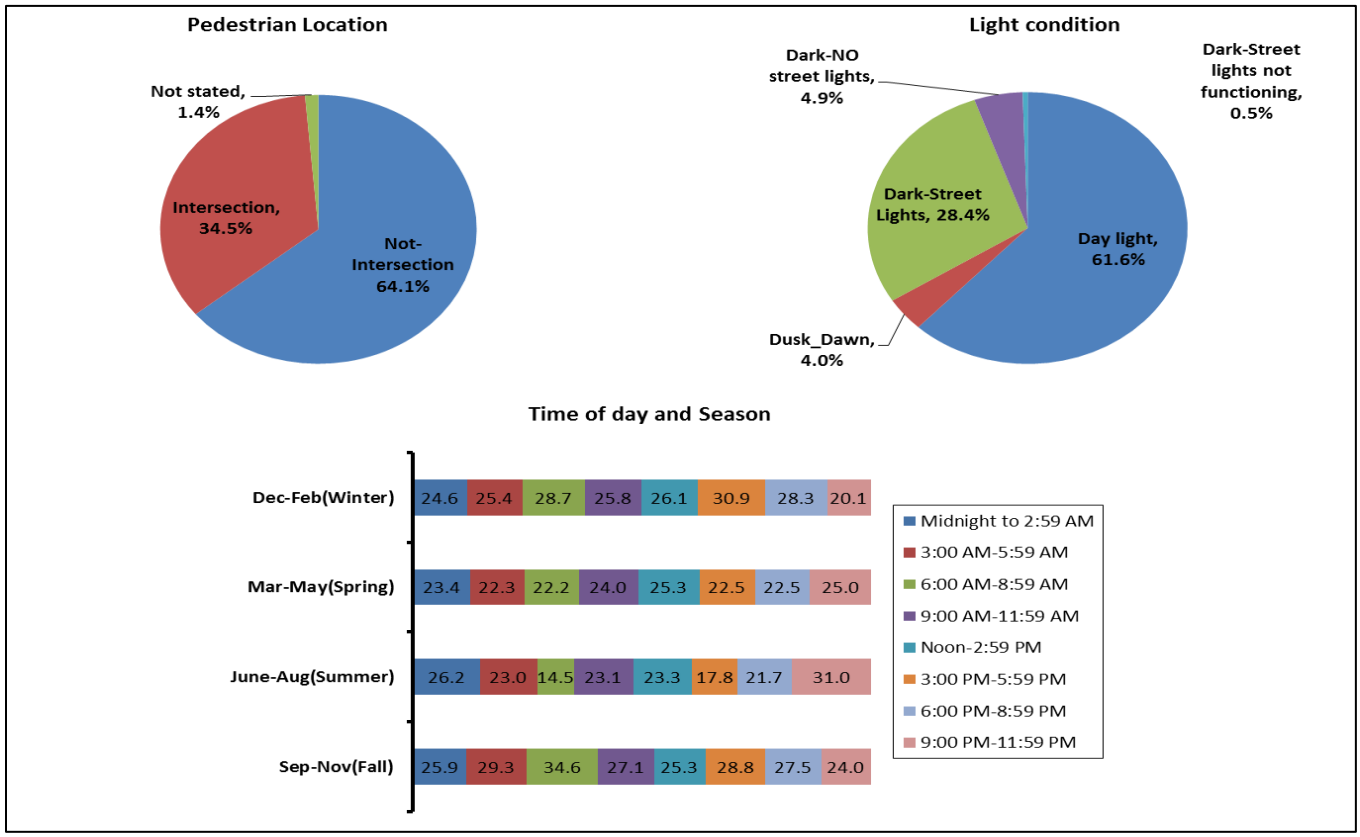
Table 2: Pedestrian Injuries in Traffic Crashes by Geography, 2007-2013

Region	Total number	Total percent	Total Rate **	Fatal number	Fatal percent	Fatal Rate**	Non-Fatal number	Non-Fatal percent	Non-Fatal Rate**
Urban	94,431	98.6	36.9	4,539	97.9	1.8	89,892	98.7	35.2
Rural	1,327	1.4	22.4	98	2.1	1.7	1,229	1.3*	20.7
Total	**95,758**	No data	**36.6**	**4,637**	No data	**1.8**	**91,121**	No data	**34.8**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013 * P<0.003 rural % fatal vs non-fatal injuries;** Age-specific rate per 100,000 using California Population data (from the CDoF- CDPH-EPI Center)

Figure 1 displays the role of pedestrian location, lighting, and time of day and season. The majority (64 percent) of pedestrian injuries occurred at not-intersections and during daylight hours (62 percent), but a substantial portion also occurred during the night time in areas with street lights (28 percent). In the winter months, around 30 percent of pedestrian injuries occurred between 6 a.m. to 8:59 a.m. and 3 p.m. to 8:59 p.m. In spring, about 25 percent of the pedestrian injuries occurred from 9 a.m. to 2:59 p.m. and 9 p.m. to 11:59 p.m. Nearly 30 percent of the pedestrian injuries occurred from 9 p.m. to 2:59 a.m. in summer months. In fall, the majority of pedestrian injuries occurred from 3 a.m. to 8:59 a.m.

Figure 1: Percentage of Fatal and Non-Fatal Pedestrian Injuries in Relation to Pedestrian Location, Light Condition, and *Time of Day and Season, 2007-2013

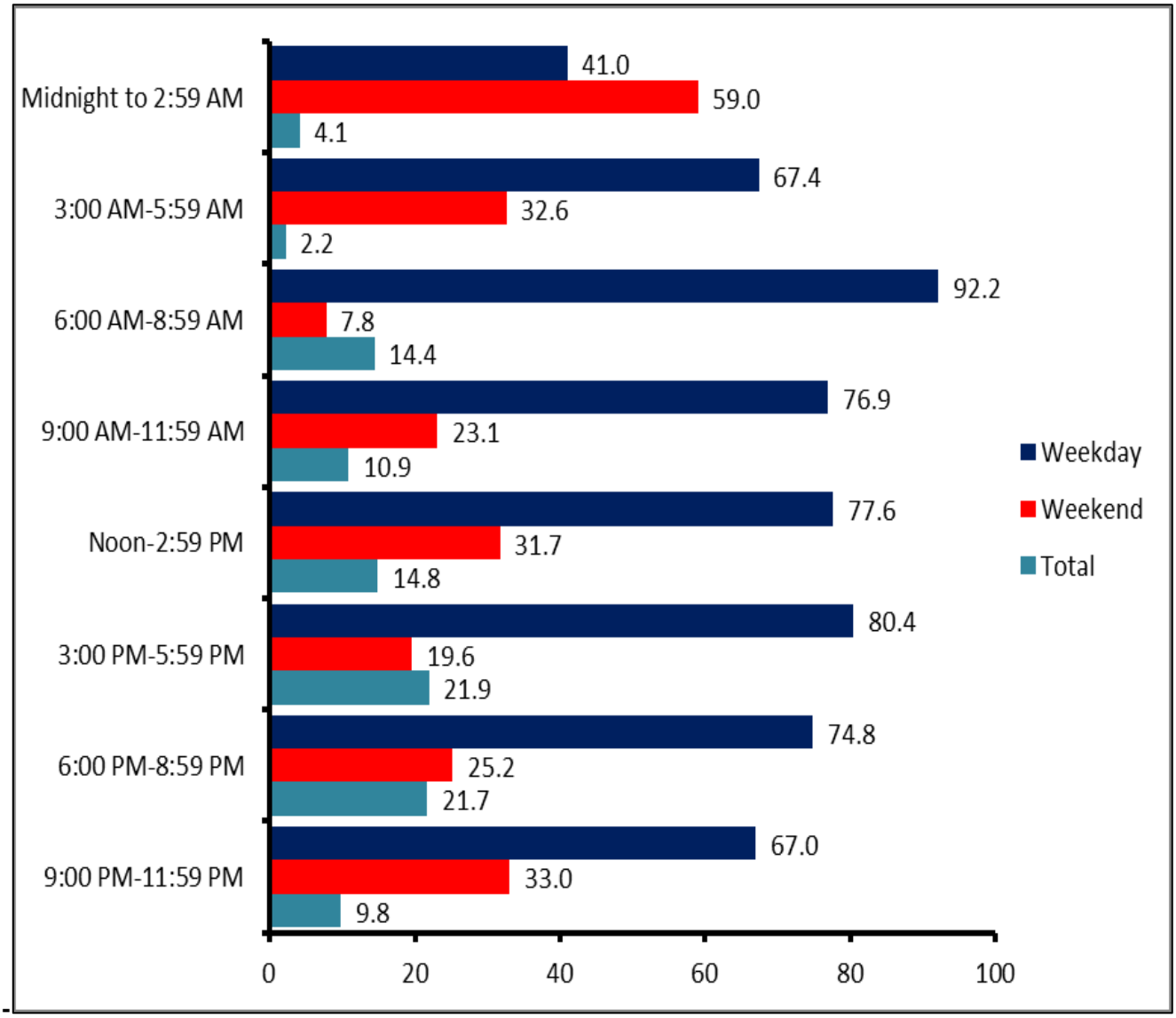


Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Time of day is divided into eight three-hour time intervals starting at midnight, and season is defined by months

Time of Day and Day of the Week

Figure 2 provides information on the time of day and day of the week of pedestrian traffic injuries. Over three-quarters of all pedestrian injuries occurred on weekdays during the daylight hours of 6 a.m. to 9 p.m. The highest percentages (22 percent) of total pedestrian injuries occurred from 3 p.m. to 5:59 p.m. and 6 p.m. to 8:59 p.m. and the lowest total percentage (2 percent) occurred from 3 a.m. to 5:59 a.m. followed by 4 percent from midnight to 2:59 a.m. At least two-thirds of all pedestrian injuries occur on weekdays for every time period except midnight to 2:59 a.m., where the pattern was reversed.

Figure 2: Percentage of Pedestrian injuries by *Time of day and Day of Week, 2007-2013.



Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Time of day is divided into eight three-hour time intervals starting at midnight, and day of week is defined as weekday (Monday-Friday) and weekend (Saturday-Sunday)

Age Groups

Tables 3 and 4 respectively, display the number of fatal and non-fatal pedestrian injuries by age group from 2007 to 2013. Table 3 shows one-fifth (21 percent) of the total persons killed in traffic crashes were pedestrians whereas for children 14 and younger and seniors 65 and above, one-third of these deaths were pedestrians (29.4 percent and 33.1 percent, respectively). Total traffic crash fatality rates were highest among the 15-24 age group (12.5) and 65+ adults (12.2). In contrast, the highest rates of pedestrian fatalities were among 65 and older age groups. The average age of pedestrians killed in traffic crashes was 50.

Table 3: Total Traffic and Pedestrian Fatalities, by Age Group, 2007-2013

Age group (years)	Total Fatalities number	Pedestrians Fatalities number	Percent of Total Fatalities	Total Fatality Rate*	Pedestrian Fatality Rate*
0-14	848	249	29.4	1.6	0.5
15-24	4,867	564	11.6	12.5	1.5
25-34	3,857	550	14.3	10.4	1.5
35-44	2,880	509	17.7	7.9	1.4
45-54	3,384	856	25.3	9.3	2.3
55-64	2,599	689	26.5	9.2	2.4
65+	3,682	1,220	33.1	12.2	4.0
Total	**22,117**	**4,637**	**21.0**	**8.5**	**1.8**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Age specific rates per 100,000 using California Population data (CDoF- CDPH-EPI Center)

Among non-fatal traffic injuries shown in Table 4, the 15-24 age group had the highest rates for both total crash (1053.1) and pedestrian (52.3) injuries. The average age of the pedestrians injured in traffic crashes was 41.

Table 4: Total Non-Fatal Traffic and Pedestrians Injuries, by Age Group, 2007-2013

Age group (years)	Total Non-Fatal Injuries number	Pedestrian Non-Fatal Injuries number	Percent of Total Non-Fatal Injuries	Total Non-Fatal Injury Rate*	Pedestrian Non-Fatal Injury Rate*
0-14	119,344	16,856	14.1	222.4	31.4
15-24	410,919	20,358	5.0	1053.1	52.3
25-34	312,604	12,101	3.9	839.6	32.5
35-44	247,696	10,349	4.2	676.7	28.2
45-54	242,194	12,144	5.0	663.9	33.3
55-64	161,802	9,381	5.8	572.6	33.2
65+	151,406	9,932	6.6	503.7	32.8
Total	**1,645,965**	**91,121**	**5.5**	**629.9**	**34.8**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Age specific rates per 100,000 using California Population data (CDoF- CDPH-EPI Center)

Gender

Table 5 displays the number and rate of pedestrians killed by gender and age group. More than two-thirds (68 percent, 3,148 out of 4,637) of pedestrian fatalities in traffic crashes were males with a fatality rate of 2.4 per 100,000 male California residents. This is more than double the rate for females (1.1). For both males and females, the total fatality rates were highest among the 45 and older age groups. The total fatality rate for pedestrians 65 and older was 4.0.

Table 5: Pedestrians Fatalities in Traffic Crashes and Fatality Rates, by Age and Gender, 2007-2013

Age group (years)	Total Fatal Injuries number	Total Fatal Injuries Rate	Male-Fatal Injuries number	Male-Fatal Injury Rate*	Female-Fatal Injury number	Female-Fatal Injury Rate*
0-14	249	0.5	159	0.6	89	0.3
15-24	564	1.5	407	2.0	157	0.8
25-34	550	1.5	406	2.1	143	0.8
35-44	509	1.4	359	1.9	148	0.8
45-54	856	2.3	606	3.3	247	1.3
55-64	689	2.4	474	3.5	210	1.4
65+	1,220	4.0	737	5.6	474	2.8
Total	**4,637**	**1.8**	**3,148**	**2.4**	**1,468**	**1.1**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; * Total includes 21 unknown gender;**Age-specific rate per 100,000 using California Population data (CDoF- CDPH-EPI Center)

Table 6 contains the number of non-fatally injured pedestrians by gender and age group. The total male pedestrian injury rate was 37.0, which is 1.2 times higher than the female injury rate (29.0). Combing the fatal and non-fatal totals, the age groups with the highest pedestrian injury rates were the 15-24 and 65+ age groups (53.8, 36.9 per 100,000, respectively).

Table 6: Pedestrian Non-fatal Injuries in Traffic Crashes and Injury Rates by Age &Gender, 2007-2013

Age group (years)	Total Non-Fatal Injuries number	Total Non-Fatal Injuries Rate	Male-Non-Fatal Injuries number	Male-Non-Fatal Injury Rate*	Female-Non-Fatal Injury number	Female-Non-Fatal Injury Rate*
0-14	16,856	31.4	10,022	36.6	6,229	23.7
15-24	20,358	52.3	10,847	53.8	8,567	45.7
25-34	12,101	32.5	6,310	33.1	5,212	28.7
35-44	10,349	28.2	5,520	29.9	4,335	23.8
45-54	12,144	33.3	6,383	35.2	5,164	28.1
55-64	9,381	33.2	4,686	34.3	4,237	29.0
65+	9,932	32.8	4,932	37.4	4,420	25.9
Total	**91,121**	**34.8**	**48,700**	**37.4**	**38,164**	**29.0**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Total includes 4,257 unknown gender;**Age-specific rate per 100,000 using California Population data (CDoF- CDPH-EPI Center)

Alcohol Involvement

Alcohol involvement is defined in SWITRS as at least one driver or non-occupant (pedestrian) involved in the crash had consumed alcohol.[6] Indication of alcohol involvement does not indicate that a crash or fatality was caused by the presence of alcohol.[7]

Tables 7A and 7B provide data on alcohol involvement for traffic crashes and pedestrian fatalities by age groups. Alcohol involvement of the driver or non-occupant was observed in 33 percent of motor vehicle involved fatalities (7,386 out of 22,117 total fatalities) and 35 percent of pedestrian fatalities (1,624 out of 4,637) from 2007-2013. Total fatality rates with alcohol involvement were highest in 15 to 24 years age group (5.3). Pedestrians of 45 to 54 year age group who were in crashes where the driver or the pedestrian had alcohol involvement had the highest fatality rate (1.2) among all the age groups (Table 7B).

Table 7A: Alcohol Involvement in Fatal Traffic crashes by Age group, .2007-2013

Age group (years)	Alcohol not involved number	Alcohol not involved Rate*	Alcohol involved number	Alcohol involved Rate*
0-14	768	1.4	80	0.1
15-24	2,809	7.2	2,058	5.3
25-34	2,023	5.4	1,834	4.9
35-44	1,730	4.7	1,150	3.1
45-54	2,166	5.9	1,218	3.3
55-64	1,985	7.0	614	2.2
65+	3,250	10.7	432	1.4
Total	**14,731**	**5.6**	**7,386**	**2.8**

Table 7B: Alcohol Involvement in Fatal Pedestrian injuries by Age group, 2007-2013

Age group (years)	Alcohol not involved number	Alcohol not involved Rate*	Alcohol involved number	Alcohol involved Rate*
0-14	245	0.5	4	**N/A
15-24	312	0.8	252	0.6
25-34	266	0.7	284	0.8
35-44	274	0.7	235	0.6
45-54	432	1.2	424	1.2
55-64	455	1.6	234	0.8
65+	1,029	3.4	191	0.6
Total	**3,013**	**1.2**	**1,624**	**0.6**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; **Total # is <20, thus rates were not computed; *Age-specific rate per 100,000 using California Population data (CDoF- CDPH-EPI Center)

Tables 8A and 8B provide crash data on alcohol involvement in non-fatal traffic crashes and pedestrian injuries by age groups. Data are stratified based on alcohol involvement of the driver or pedestrian.

Seven percent of the total traffic non-fatal (118,268 out of 1,645,965) and 8 percent of pedestrian non-fatal injuries (7,224 out of 91,121) were alcohol involved. Total traffic injury rates with alcohol involvement were highest in 15 to 24 and 25-34 year olds (109.3 and 83.6, respectively). Total non-fatal injury rates with no alcohol involvement were also highest in 15-24 and 25-34 year olds (947.2 and 755.2) (Table 8A). Pedestrian non-fatal injury rates were highest in 15 to 24 years with no alcohol involvement (48.4) and 45-54 years old adults with alcohol involvement (4.4) (Table 8B).

Table 8A: Alcohol Involvement in Non-Fatal Traffic crashes by Age group. 2007-2013

Age group (years)	Alcohol not involved number	Alcohol not involved Rate*	Alcohol involved number	Alcohol involved Rate*
0-14	116,536	217.2	2,808	5.2
15-24	368,420	947.2	42,499	109.3
25-34	281,446	755.5	31,158	83.6
35-44	230,543	628.7	17,153	46.8
45-54	228,037	624.4	14,157	38.8
55-64	155,272	549.0	6,530	23.1
65+	147,443	487.2	3,963	13.1
Total	**1,527,697**	**584.1**	**118,268**	**45.2**

Table 8B: Alcohol Involvement in Non-Fatal Pedestrian injuries by Age group, 2007-2013

Age group (years)	Alcohol not Involved number	Alcohol not involved Rate*	Alcohol involved number	Alcohol involved Rate*
0-14	16,752	31.2	104	0.2
15-24	18,840	48.4	1,518	3.9
25-34	10,603	28.5	1,498	4.0
35-44	9,035	24.6	1,314	3.6
45-54	10,544	28.9	1,600	4.4
55-64	8,573	30.3	808	2.9
65+	9,550	31.6	382	1.3
Total	**83,897**	**32.1**	**7,224**	**2.8**

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; *Age specific rate per 100,000 using California Population data (CDoF-CDPH-EPI Center)

Fatal Injuries by County

Table 9 presents for each county the total traffic fatalities, pedestrian fatalities, percentage of pedestrian fatalities of total fatalities, proportion of pedestrian fatalities per 100,000 population and rank based on fatality rate. As indicated by the ranking, the highest pedestrian fatality rates were in Kern County (2.9) and Humboldt County (2.7). Fifteen counties have rates higher than the state average of 1.8. The individual county percentages of pedestrian fatalities by total traffic fatalities ranged from a low of 11 percent (Imperial) to a high of 52 percent (San Francisco) compared to the state average of 21 percent.

Table 9: Motor Vehicle and Pedestrian Traffic Crash Fatalities, Numbers, Rates and Rankings, by County, 2007- 2013

County*	Total Traffic Fatalities number	Pedestrian Fatalities number	Percent of Total Traffic Fatalities	Pedestrian Fatality Rate**	Pedestrian Fatality Rate Rank
Kern	903	157	17.4	2.9	1
Humboldt	177	25	14.1	2.7	2
Madera	215	26	12.1	2.5	3
Merced	327	41	12.5	2.4	4
Butte	200	38	19	2.4	5
Shasta	164	29	17.7	2.4	6
Tulare	490	65	13.3	2.3	7
San Bernardino	1,849	307	16.6	2.2	8
Fresno	887	147	16.6	2.2	9
San Francisco	257	134	52.1	2.2	10
Sacramento	808	213	26.4	2.2	11
Imperial	222	25	11.3	2.1	12
Los Angeles	4,431	1382	31.2	2.0	13
San Joaquin	584	94	16.1	2.0	14
Stanislaus	396	69	17.4	1.9	15
Riverside	1,636	267	16.3	1.8	16
San Diego	1,606	384	23.9	1.7	17
Santa Barbara	249	52	20.9	1.7	18
Monterey	277	43	15.5	1.5	19
Santa Clara	655	179	27.3	1.4	20
Alameda	551	147	26.7	1.4	21
Solano	231	41	17.7	1.4	22
Orange	1,093	287	26.3	1.3	23
Sonoma	264	45	17	1.2	24
Placer	176	28	15.9	1.2	25
San Mateo	266	63	23.7	1.1	26
Contra Costa	404	87	21.5	1.1	27
Ventura	441	60	13.6	1.0	28

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; * Thirty counties had less than 20 fatalities, and thus were excluded from the list; **Pedestrian fatality rate (Age adjusted rates per 100,000 using California Population data (CDoF- CDPH-EPI Center) and Year 2000 US Standard Population Weights) is a seven year cumulative rate for fatalities.

Non-Fatal Injuries by County

For each county, Table 10 presents the total traffic injuries (non-fatal), pedestrian injuries (non-fatal), percentage of pedestrian injuries of total injuries (non-fatal), and proportion of non-fatal pedestrian injuries per 100,000 population and rank based on non-fatal injury rates.

The highest county pedestrian injury rate was in San Francisco (94.2), followed by Los Angeles (51.3) and Alameda (42.9). Five counties have non-fatal injury rates higher than the state average of 34.5. The individual county percentages of pedestrian injuries by total traffic injuries ranged from a low of 1.4 percent (Amador and Calaveras) to a high of 18 percent (San Francisco County) compared to the state average of 5.5 percent.

Table 10: Non-Fatal Motor Vehicle and Pedestrian Traffic Crash Injuries, Numbers, Rates and Rankings by County, 2007-2013 (continued on to page 11)

County*	Total Non-Fatal Traffic Injuries number	Pedestrian Non-Fatal Injuries number	Percent of Total Traffic Non-Fatal Injuries	Pedestrian Non-Fatal Injury Rate**	Pedestrian Non-Fatal Injury Rate Rank
San Francisco	31,494	5,536	17.6	94.2	1
Los Angeles	519,976	35,653	6.9	51.3	2
Alameda	61,725	4,574	7.4	42.9	3
Humboldt	6,437	356	5.5	37.7	4
Santa Barbara	18,217	1,104	6.1	37.2	5
San Mateo	23,561	1,672	7.1	33.7	6
Santa Cruz	10,497	629	6.0	33.0	7
San Diego	129,227	7,251	5.6	32.9	8
Marin	9,427	539	5.7	32.3	9
Stanislaus	25,290	1,126	4.5	30.5	10
Sacramento	72,644	3,035	4.2	30.2	11
Monterey	14,170	859	6.1	29.3	12
Santa Clara	63,221	3,496	5.5	28.3	13
Orange	135,950	5,849	4.3	27.6	14
San Joaquin	32,367	1,299	4.0	26.7	15
Tuolumne	3,123	98	3.1	26.5	16
Kern	34,255	1,576	4.6	25.9	17
Solano	16,814	754	4.5	25.9	18
Ventura	35,009	1,484	4.2	25.6	19
Del Norte	1,459	47	3.2	25.2	20
Sonoma	20,093	843	4.2	25.1	21
Merced	11,825	448	3.8	24.6	22
Sutter	4,485	166	3.7	24.5	23
Mono	828	24	2.9	23.4	24
Napa	6,751	222	3.3	23.4	25
Contra Costa	31,334	1,671	5.3	23.0	26

County*	Total Non-Fatal Traffic Injuries number	Pedestrian Non-Fatal Injuries number	Percent of Total Traffic Non-Fatal Injuries	Pedestrian Non-Fatal Injury Rate**	Pedestrian Non-Fatal Injury Rate Rank
Tulare	18,091	701	3.9	22.3	27
Mendocino	4,217	132	3.1	22.3	28
San Luis Obispo	10,099	423	4.2	22.1	29
Nevada	3,999	134	3.4	21.9	30
Butte	8,165	339	4.2	21.1	31
Shasta	8,539	254	3.0	21.0	32
Kings	5,814	229	3.9	20.9	33
San Bernardino	86,563	3,062	3.5	20.7	34
Yuba	2,555	109	4.3	20.7	35
San Benito	2,187	80	3.7	19.9	36
Tehama	2,819	86	3.1	19.9	37
Lake	2,808	82	2.9	19.8	38
Inyo	1,268	26	2.1	19.1	39
Madera	6,812	196	2.9	18.3	40
Yolo	7,232	268	3.7	17.8	41
Fresno	33,002	1,171	3.5	16.9	42
Colusa	1,295	26	2.0	16.8	43
Riverside	82,601	2,613	3.2	16.7	44
Glenn	1,151	30	2.6	15.8	45
Imperial	5,458	196	3.6	15.8	46
Siskiyou	2,042	43	2.1	14.7	47
Amador	2,305	33	1.4	13.5	48
Calaveras	2,360	34	1.4	13.2	49
Placer	12,627	306	2.4	13.1	50
El Dorado	6,721	159	2.4	13.0	51
Lassen	1,291	27	2.1	11.0	52

Source: CDPH ISES/SACB SWITRS data sets 2007-2013; * Six Counties had less than 20 non-fatal injuries, and thus were excluded from the list; ** Pedestrian injury rate (Age adjusted rates per 100,000 using California Population data (CDoF- CDPH-EPI Center) and Year 2000 US Standard Population Weights) is a seven year cumulative rate for non-fatal injuries.

Summary

Data from the CHP-SWITRS are used to provide a broad overview of both fatal and non-fatal traffic related injuries among pedestrians in California from 2007 to 2013. There were a total of about 1.7 million fatal and non-fatal traffic injuries during the study period. Pedestrian traffic injuries comprised 5.7 percent (n=95,758) of the total traffic injuries, of which 95 percent were non-fatal and 5 percent were fatal injuries. Pedestrian fatality rates increased by 11 percent from 1.8 in 2007 to 2.0 in 2013, while the non-fatal pedestrian injury rates decreased by 13.5 percent from a high of 39 per 100,000 to 32 per 100,000 during the same time period.

This report provides a detailed look at multiple characteristics and circumstances surrounding motor-vehicle related fatal and non-fatal pedestrian injuries. Data are presented on environmental characteristics, age groups, gender, alcohol involvement in pedestrian injuries, and include breakdowns by county numbers, rates, and rankings. The vast majority of fatal and non-fatal pedestrian injuries occurred in urban areas compared to rural areas; thus the rates were lower in rural areas. In contrast, the rates for total traffic injuries were higher in rural areas than urban areas. Non-intersection locations accounted for 64 percent of pedestrian injuries and 62 percent occurred during day light hours. Alcohol was involved (driver or pedestrian) in seven percent of the total traffic and 8 percent of pedestrian non-fatal injuries. The age groups with the highest pedestrian injury rates were the 15-24 and 65+ age groups. There was wide variation in the pedestrian injury and fatality rates across counties. For instance, San Francisco County ranked No. 1 for rate of non-fatal pedestrian injuries and No. 10 for rate of pedestrian fatalities. Similarly, Kern County ranked No. 1 for pedestrian fatalities and No. 17 for non-fatal pedestrian injuries.

These summary findings are intended to provide practical information for identifying potential areas for pedestrian safety improvements. With the high numbers of pedestrian injuries overall and the increasing fatality rates in California, this report highlights the importance of addressing pedestrian traffic safety and may serve as guidance for counties in formulating policy decisions aimed at decreasing pedestrian injuries and improving traffic safety. Some of the suggested evidence-based practices for pedestrian traffic safety that may mitigate pedestrian exposure to vehicle traffic include engineering, education, and enforcement approaches. Road treatments that separate pedestrians from traffic flow and reduce vehicle speeds have a direct impact on the likelihood of fatality for pedestrians and motor-vehicle drivers in general[8] (e.g., sidewalks, in-street pedestrian crossing signs, high-visibility cross walk signs with advance yield markings). Education strategies for both pedestrians and drivers on pedestrian awareness include using sidewalks when available, staying alert (e.g., not under the influence or distracted), being visible (e.g., wearing bright color clothing or reflective material), and crossing streets at crosswalks or intersections, when possible.

Methods

Data Sources

The California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) data sets from 2007 to 2013 were used for the analyses presented in this report.

Definitions

A *pedestrian* is any person walking, or in/on a pedestrian conveyance such as roller blades, a baby stroller or a wheelchair. Pedestrian injuries included in this report are those where a pedestrian is struck by a motor vehicle. Collision records indicating a pedestrian victim were obtained from SWITRS data.

Limitations

Data for the seven years (2007 to 2013) were combined due to low numbers in some counties. Thus it is possible that some of the effects in a given year, county or demographic, etc. may be masked due to this aggregation. Population rates and confidence intervals have been presented to alleviate some of these issues. Pedestrian injury rates are calculated based on the number of injuries divided by the overall state or county population which doesn't take into account the actual exposure of pedestrians to traffic (i.e., how many and for how often/long pedestrians are in or near traffic areas). This limitation is due to the lack of reliable or generalizable measures of pedestrian behavior and may mask important differences in exposure across many traffic situations. Therefore, it is suggested that sufficient caution be paid during interpretation of the data.

Acknowledgements

Funding for the Crash Medical Outcomes Data (CMOD) Program is provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration. For further information about this report, contact Ravi Dasu, Ph.D. e-mail: ravi.dasu@cdph.ca.gov

CALIFORNIA OFFICE OF TRAFFIC SAFETY

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[5] The total number of pedestrian injuries presented here may differ from those of Center for Health Statistics and Informatics (death data) and the Office of Statewide Health Planning & Development (Inpatient Hospitalization and Emergency Department data) due to the inherent procedures as to how the data was acquired and processed.

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Stop the Unsafe Streets Project on Venice Blvd.



Lisa Young Zullo started this petition to Mayor of Los Angeles Eric Garcetti and 2 others

STOP the Great Street Project on Venice Blvd. in MAR VISTA

www.restoreVeniceBlvd.com - #RestoreVeniceBlvd

Petition to Councilman Mike Bonin, City of Los Angeles

Summary

We the undersigned stakeholders of Venice Blvd. - commuters, visitors, tourists, businesses, area residents, bicyclists, pedestrians and everyone else - strongly object to the removal of the car lanes on Venice Boulevard.

The removal of a lane on both sides of Venice Blvd. has Increased TRAFFIC exponentially on a Major street artery along the Westside. What was meant to create a safer street, promote alternate forms of transportation, and increase patronage for locally-owned businesses has actually resulted in the opposite.

It INCREASES traffic congestion, becomes a safety hazard due to confusion and drivers' impatience, causes drivers to search for alternate routes home and work, increases vehicle spillover into the residential neighborhood (which creates SAFETY HAZARDS for local residents and children), makes it difficulty for LAFD and LAPD to respond quickly, and causes decreased support of businesses along Venice Blvd. as local residents choose alternate routes to avoid the gridlock that previously wasn't there.

The residential streets are now thoroughfares because of this pilot project. The Waze app redirects drivers to use residential side streets to avoid the gridlock on Venice Blvd. With one less lane on Venice, the Waze app users will undoubtedly increase traffic 10x on the residential side streets. This is unacceptable.

Imagine this summer when crowds of non-area residents travel this major artery to go to the beach. Already a major congested street in the summertime, Venice Blvd. will become a nightmare!

Please sign if you support changing this imminent nightmare

3,594 have signed. Let's get to 5,000!

Lisa Smith signed this petition

First name

Last name

Email

Los Angeles, 90066
United States

Display my name and comment on this petition

Sign this petition

By signing, you accept Change.org's Terms of Service and Privacy Policy, and agree to receive occasional emails about campaigns on Change.org. You can unsubscribe at any time.

before It becomes permanent!

Donate at: www.GoFundMe.com/restore-venice

Join our mailing list at: http://eepurl.com/cSwLQr

Lisa Young Zullo
Los Angeles, CA

Report a policy violation

Start a petition of your own
This petition starter stood up and took action. Will you do the same?
Start a petition

Updates



The Restore Venice Blvd. project is still fighting for you!
We filed a new lawsuit in January 2019 against the Great Streets ...

Lisa Young Zullo
2 weeks ago

View all updates

Reasons for signing

Carlos Leal · 2 years ago
Whoever came up with this plan did not think it through. I saw the paramedics get stuck on Inglewood and Venice on Friday. They couldn't get through, it eventually made it way to the bike lane and got through but then got stuck again on... Read more

26 · Report

Gloria Halfacre · 2 years ago
I am signing this because while the intention was good,the reality is a nightmare. 45 minutes to drive from Centinela to Beethoven is absurd! This may be one of the dumbest ideas I have seen. They should have done a temporary trial before going in blazing.

26 · Report

View all reasons for signing

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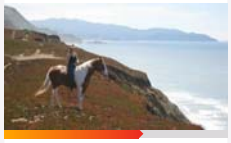

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Join the growing group of concerned bay area residents, business owners, horse lovers and

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County Line Road between Owen and Monroe Counties is one of the most traveled roads in Owen... Read more

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Our Planning Commission recently approved

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We ask that the City of Pittsfield honor and abide by the community-led master plan for

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We are a group of kids hoping to work with our local government to build a skate park in our

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I support the City of Jacksonville's efforts to obtain a Grant to provide a pedestrian / bike

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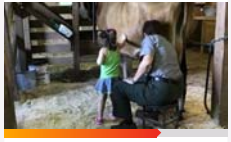

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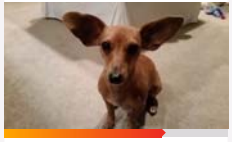

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Deutsch

Environmental determinants of allergy and asthma in early life

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Overall Purpose/Goal: To provide excellent reviews on key aspects of allergic disease to those who research, treat, or manage allergic disease.

Target Audience: Physicians and researchers within the field of allergic disease.

Accreditation/Provider Statements and Credit Designation: The American Academy of Allergy, Asthma & Immunology (AAAAI) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The AAAAI designates this journal-based CME activity for a maximum of 1.00 *AMA PRA Category 1 Credit*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

List of Design Committee Members: Allison J. Burbank, MD, Amika K. Sood, MD, Matthew J. Kesic, PhD, David B. Peden, MD, MS, and Michelle L. Hernandez, MD

Disclosure of Significant Relationships with Relevant Commercial Companies/Organizations: M. L. Hernandez has received grants from the American Academy of Allergy, Asthma & Immunology Foundation. The rest of the authors declare that they have no relevant conflicts of interest.

Activity Objectives:

1. To describe the effect of microbial exposure and childhood infections on the risk of allergic disease.
2. To understand the link between indoor allergen exposure and the risk of atopy.
3. To determine the effect of environmental exposure from tobacco smoke and air pollution on allergic disease.

Recognition of Commercial Support: This CME activity has not received external commercial support.

List of CME Exam Authors: Tamar N. Rubin, MD, Rahul Datta, MD, PhD, Jason Catanzaro, MD, Ravdeep Kaur, MD, Joel Brooks, DO, Tao Zheng, MD, and Francis Lobo, MD

Disclosure of Significant Relationships with Relevant Commercial Companies/Organizations: The exam authors disclosed no relevant financial relationships.

Allergic disease prevalence has increased significantly in recent decades. Primary prevention efforts are being guided by study of the exposome (or collective environmental exposures beginning during the prenatal period) to identify modifiable factors that affect allergic disease risk. In this review we explore the evidence supporting a relationship between key components of the external exposome in the prenatal and early-life periods and their effect on atopy development focused on microbial, allergen, and air pollution exposures. The abundance and diversity of microbial exposures during the first months and years of life have been linked with risk of allergic sensitization and disease. Indoor environmental allergen exposure during early life can also affect disease development, depending on the allergen type, dose, and timing of exposure. Recent evidence supports the role of ambient air pollution in allergic disease inception. The lack of clarity in the literature surrounding the relationship between environment and atopy reflects the complex interplay between cumulative environmental factors and genetic susceptibility, such that no one factor dictates disease development in all subjects. Understanding the effect of the summation of environmental exposures throughout a child's development is needed to identify cost-effective interventions that reduce atopy risk in children. (J Allergy Clin Immunol 2017;140:1-12.)

Key words: *Environment, allergy, asthma, exposure, microbiome, infection, endotoxin, allergen, air pollution, tobacco smoke*

Like many chronic health conditions, allergic disease likely results from complex gene-environment interactions. Mapping of the human genome has advanced our understanding of genetic risk factors for allergic diseases. However, the increase in the

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A.J.B. is supported by grant 2T32GM086330. D.B.P. is supported by grants R01ES023349 and P30ES010126. M.L.H. is supported by the AAAAI ARTrust Gail G. Shapiro Clinical Faculty Development Award.

Received for publication March 20, 2017; revised May 15, 2017; accepted for publication May 16, 2017.

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0091-6749/$36.00

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http://dx.doi.org/10.1016/j.jaci.2017.05.010

prevalence of allergic disease over the past few decades has occurred too rapidly to be accounted for by changes in the genome alone and is more likely to be the result of changes in environmental factors that are in some cases accompanied by epigenetic changes. These observations have led to increasing interest in understanding the effect of the exposome on the development of atopic disease. In 2005, Christopher Wild framed our understanding of the exposome concept to include 3 types of exposures: (1) the general external environment, including factors such as urban-rural residence, climate, air pollution, social capital, and education; (2) one's specific external environment, including diet, physical activity, tobacco exposure, infection, and occupation; and (3) the internal environment, which includes the biological and metabolic/toxicological manifestations of these exposures in the body.[1] In this review we explore the effect of a variety of environmental exposures in early life that have been found to influence the development of allergic disease, with particular focus on exposures to microbes, allergens, and ambient air pollutants.

MICROBIAL EXPOSURE

The increase in the prevalence of allergic disease, particularly in the Western world, has coincided with significant environmental changes that have reduced microbial exposure in early life, such as improved sanitation and increased rates of immunization. Many have proposed that among genetically susceptible subjects, these changes in environmental conditions might alter normal development of the immune system and thus affect susceptibility to allergic disease, the basis of the hygiene hypothesis.[2] In this section we will discuss key findings from studies examining both endogenous and exogenous microbial exposures.

The host microbiome

The human microbiome consists of all microbial communities within the body, including the gut, airways, skin, and others. Alteration of the host microbiome is suspected to play a role in susceptibility to allergic disease, particularly during early life, coinciding with maturation of the immune system. Establishment of the microbiome begins *in utero* and is likely the result of maternal transmission.[3-5] During infancy, differences in the gut microbial environment between those who go on to have atopy and those who do not are apparent in the first few months of life. Reduced diversity of stool flora at age 1 month was predictive of atopic eczema at age 2 years and allergic sensitization and allergic rhinitis at age 6 years.[6]

Similarly, diversity of microbial species in the infant gut was shown to be inversely related to risk of atopic sensitization, allergic rhinitis, and eosinophilia.[7] Atopic children showed reduced early life colonization with *Lactobacillus* species,[8] *Bifidobacterium* species,[8,9] and *Bacteroides* species and increased colonization with *Clostridia* species[8] and yeasts.[9] A greater abundance of *Bacteroides* and *Lactobacillus* species has been associated with protection against allergy, whereas abundance of *Clostridia* species has been associated with wheezing, allergic sensitization, and atopic eczema.[10,11]

Microbial colonization of the airways also begins early in life. Colonization with *Streptococcus* species at age 2 months was associated with increased risk for earlier first lower respiratory tract illness, which has been linked to later asthma development.[12] Similarly, in a study from the Copenhagen Prospective Studies on Asthma in Childhood birth cohort, asymptomatic 1-month-old neonates colonized with *Streptococcus pneumoniae*, *Moraxella catarrhalis*, or *Haemophilus influenzae* through hypopharyngeal aspirate were at greater risk of a first wheezing episode, persistent wheeze, severe exacerbation of wheeze, and hospitalization for wheeze.[13] Lower airway colonization with these organisms was also associated with higher blood eosinophil counts and total IgE levels but not specific IgE levels at 4 years and with bronchodilator reversibility and development of asthma at age 5 years. In a study of children younger than 3 years hospitalized for virus-induced wheezing, 60% demonstrated nasopharyngeal colonization with *Streptococcus pneumoniae*, *Moraxella catarrhalis*, or *Haemophilus influenzae*, and this was associated with increased risk of recurrent wheezing episodes during the following year.[14] Importantly, antibiotic use might select for these organisms.[12]

Many factors can affect microbial colonization in infants and young children, including prenatal and postnatal antibiotic exposure, mode of delivery, and early diet. Wu et al[15] identified dose-dependent relationships between risk of childhood asthma and maternal urinary tract infections during pregnancy or infant antibiotic use during the first year of life. The increase in risk is presumably due to changes in the abundance and diversity of the host's commensal microbes, as demonstrated by Penders et al,[16] who reported that antibiotic use in infancy was associated with decreased abundance of *Bifidobacterium* and *Bacteroides* species.

Mode of delivery is also an important determinant of the infant microbiome,[17] although the effect of vaginal versus caesarean delivery on development of allergic disease is debated. Vaginally delivered infants tended to be colonized with vaginal (*Lactobacillus* species) and fecal (*Prevotella* species) flora, whereas infants born by means of caesarean section tended to be colonized by skin flora (*Staphylococcus* and *Corynebacterium* species),[17] with increased abundance of *Clostridium difficile* and reduced *Bifidobacterium* and *Bacteroides* species.[16] Meta-analyses of studies examining the association between delivery mode and allergic disease in Western countries found an increased risk of childhood asthma,[18,19] allergic rhinitis,[18] and food allergy[18] in children born by means of caesarean section compared with vaginal births. However, studies from outside the United States and Europe have not consistently shown these effects.[20-22]

Diet during early life can also be important for establishing the infant's microbiome. Breast-feeding was associated with greater microbial diversity compared with formula feeding,[23] and a recent study reported that breast-feeding was associated with a trend toward increased *Bifidobacterium* and reduced *Clostridia* species at 3 to 6 months of age.[24]

Despite this evidence, it remains unclear whether these differences in the infant microbiome promote development of allergy or merely serve as a marker of immune dysregulation early in life that leads to allergic disease.

The external microbial environment

Exposure to abundant and diverse microbes in the environment appears to augment the risk of allergic disease. The "biodiversity

hypothesis" suggests that reduced exposure during childhood to the rich environmental microbiome inherent within natural green spaces impedes cultivation of a robust host microbial community, leading to immune dysregulation, although the exact mechanisms of this interplay are unknown.[25] To this effect, Ruokolainen et al[26] demonstrated that children living in homes surrounded by forests and agricultural land had lower rates of aeroallergen sensitization compared with their counterparts in industrialized environments.

In addition to environmental biodiversity, specific microbial products have been identified as key players in immune tolerance. Endotoxin, a component of gram-negative bacterial cell walls and a marker of microbial exposure, was among the first microbial products implicated in protection against atopic asthma and other allergic diseases.[27-30] The Allergy and Endotoxin cross-sectional survey found that higher levels of endotoxin in child mattresses were associated with reduced risk of allergic sensitization, hay fever symptoms, and atopic asthma.[27] The precise mechanism for this effect is not known. One theory suggests that increased exposure to environmental endotoxin leads to downregulation of inflammatory responses.[27] Others have suggested the protective effect is the result of polymorphisms within the *CD14* gene, which encodes a coreceptor for Toll-like receptor 4 with high specificity for LPS, and in fact, a recent systematic review found a significant gene-environment interaction between *CD14* polymorphisms and microbial exposure.[31] The timing of endotoxin exposure also appears to be important, with more significant protective effects seen with early-life exposure.[28,32]

The microbial environment within the home is dictated by its human and nonhuman occupants. For instance, homes with dogs contain richer and more diverse bacterial communities compared with homes without pets.[33] Differences in microbial exposure are seen with increasing family size,[15] as well as with certain activities of the occupants, particularly farming. It has long been recognized that the prevalence of allergic disease among the children of farmers is lower than in nonfarming families.[28,34-36] A number of studies have been conducted to identify farm-specific factors, such as consumption of raw milk[37-40] and exposure to high amounts of endotoxin in animal stables, that influence inception of allergic disease.

A recently published study compared the incidence of allergic disease in children from an Amish traditional farming community with those from a Hutterite community that, although genetically similar to the Amish, practices modern industrial farming. The authors reported a significantly lower prevalence of allergic disease in Amish children. Amish homes were found to contain higher levels of endotoxin in airborne house dust, and comparisons of bacteria isolated from mattress dust showed distinct microbial profiles between Amish and Hutterite households. To further examine the effects of the Amish environment on allergy, the authors administered Amish house dust intranasally to ovalbumin (OVA)–sensitized mice and demonstrated reduced airway hyperresponsiveness and bronchoalveolar lavage eosinophilia in response to OVA challenge. Conversely, intranasal administration of Hutterite house dust led to exacerbation of OVA-induced airway hyperresponsiveness and eosinophilia. Although the precise components responsible for this protective effect are unknown, the inhibitory effects of Amish house dust for OVA-mediated inflammation were reduced in mice deficient in myeloid differentiation response gene–88 and TIR-domain-containing adapter-inducing interferon-β (TRIF), suggesting the protective effects were primarily mediated by the innate immune response.[41]

Role of childhood respiratory tract infections

For asthma development in particular, there is abundant literature suggesting a critical role for viral respiratory tract infection in early life. Respiratory syncytial virus (RSV) and human rhinovirus (HRV) are most frequently associated with wheezing episodes in young children.[42-44] In the prospective cohort RSV Bronchiolitis in Early Life study, approximately 50% of the 206 infants with lower respiratory tract illness caused by RSV during the first 12 months of life subsequently had persistent asthma up to age 7 years.[45] Similarly, in a case-control study of infants hospitalized with RSV versus healthy control subjects followed to age 18 years, a significantly higher prevalence of current asthma was seen in the RSV group compared with the control group; RSV was the major risk factor in subsequent asthma development (odds ratio, 7.2; 95% CI, 2.1-23.9).[43]

Others have found that HRV infection might be equally or more important for development of asthma than RSV. Asthma development by school age was 4 times greater in wheezing infants with HRV infection compared with the incidence in infants with other viruses in one study.[44] In the Childhood Origins of Asthma (COAST) birth cohort, a group at high risk for development of asthma, HRV-induced wheezing in infancy was the strongest predictor of persistent wheezing at age 3 years and diagnosis of asthma at age 6 years.[46,47]

Prevention of viral infection in early life has been proposed as a strategy for primary prevention of asthma, but thus far, this has not been possible given the difficulties with synthesizing an effective vaccine against HRV. A few trials have been conducted with palivizumab, or RSV-specific IgG. Simoes et al[48] reported a lower incidence of recurrent wheezing in premature infants treated with palivizumab compared with untreated control subjects. In a randomized controlled trial Blanken et al[49] found that premature infants receiving palivizumab had fewer wheezing days during the first year of life. Whether these effects would translate into reduced incidence of asthma remains unknown.

INDOOR ALLERGEN EXPOSURE

The indoor environmental allergen milieu is of particular interest in the study of the determinants of allergic disease because of constant exposure during early childhood and the potential for intervention. In samples taken from 831 homes across the United States, at least 6 detectable allergens were found in more than 50% of homes.[50] Allergens from house dust mite (HDM), furred pets (cats and dogs), mice, cockroaches, and fungi comprise the most common indoor allergens implicated in patients with atopic disease.[51-53] The strong relationship between allergic sensitization and development of allergic rhinitis and asthma has been well documented.[53-57] Recently, Rubner et al[54] demonstrated that aeroallergen sensitization before the age of 5 years significantly increased the risk of asthma with persistence into adolescence. Although the role of allergen sensitization in the

pathogenesis of allergic rhinitis and asthma is clear, the causal relationship between individual allergen exposure and the development of these conditions has been more difficult to delineate, likely because of the complexity of interactions between various environmental factors, the timing and dose of exposure, and genetic predisposition. Similarly, the direct effect of indoor allergens on the development of atopic dermatitis (AD) has not been clearly established, although the correlation between indoor allergen sensitization and disease activity is better understood.[58-60] In turn, AD enhances the development of allergic rhinitis and asthma by providing an epicutaneous route of sensitization to aeroallergens through transepidermal water loss and epidermal barrier dysfunction.[61] In this section we briefly discuss some of the existing literature surrounding each of the indoor allergens and their role in allergic disease.

HDM exposure

HDM allergen has long been implicated as an important determinant of atopic disorders. An early prospective study by Sporik et al[62] followed 65 children from birth to age 11 years and demonstrated increased risk of allergic sensitization and asthma in children exposed to high levels of HDM during the first year of life. Subsequently, similar studies have provided evidence for a causal relationship between HDM sensitization early in life and allergic rhinitis, persistent wheeze, and asthma.[63-67] Although sensitization has a positive correlation with asthma development, studies from European birth cohorts have established that exposure to HDM alone is not sufficient to incur an increased risk of asthma,[68,69] indicating that IgE sensitization is the bridge between allergen exposure and asthma development; however, innate immune responses triggered by HDM have also been implicated in allergic disease pathogenesis.[70] Tovey et al[71] suggest a nonlinear dose-response relationship between HDM exposure and development of allergic disease, with exposure to both very low and very high levels of allergen correlating with decreased risk of sensitization and asthma and exposure to intermediate levels of allergen correlating with increased risk. Whether host or concomitant environmental factors alter the otherwise positive association between HDM exposure and atopy at these critically low and high levels remains unknown. Exposure to intermediate concentrations of HDM allergen has also been linked to atopic disease severity.[72,73] More recent studies have focused on differing routes of early HDM exposure, such as placental and breast milk transfer, as additional potential risk factors for development of allergic respiratory disease.[74,75]

Household pest exposure

In addition to HDM, exposure to mouse and cockroach allergens has been linked to allergic disease prevalence and severity, particularly in urban settings.[76-86] In a prospective birth cohort of 505 infants of atopic parents from the metropolitan Boston area, Gold et al[79] found that exposure to cockroach allergen levels in the family room of greater than 0.05 U/g of dust was an independent predictor for early wheeze. Evidence for cockroach exposure as a risk factor for persistent wheeze and asthma was provided by an evaluation of 222 siblings of the above infants, with those exposed to higher concentrations of allergen having the greatest risk.[80] Data from the same Boston cohort also illustrated an association between early mouse allergen exposure and early wheeze[82] and a nonstatistically significant trend toward predicting asthma, allergic rhinitis, and AD at 7 years of age.[87] In a similar prospective study of infants followed for 3 years, Donohue et al[78] not only found a significant effect of mouse and cockroach sensitization on the prevalence of AD, allergic rhinitis, and asthma but also demonstrated a dose-response relationship between higher cockroach or mouse-specific IgE levels and increased prevalence of allergic disease. Thus the evidence for mouse and cockroach allergen exposure predicting the development of atopic disorders, especially in inner-city children, is compelling.

Furred pet exposure

In contrast, a plethora of contradictory associations exists between furred pet exposure and development of atopy. Studies examining the link between pet ownership and risk of atopic disease have generally focused on the most common household pets, cats and dogs, or examined pet keeping in general. The ubiquitous nature of cat and dog allergens[88-90] makes epidemiologic studies assessing the risk of "exposure" quite difficult. To this effect, Liccardi et al[91] questioned whether surveys regarding the presence of pets in the home or home allergen measurements are sufficient to accurately convey a subject's exposure.

A number of systematic reviews examining the effect of pet exposure on allergic disease have been conducted, a few of which will be highlighted here. Takkouche et al[92] reviewed cohort studies from 1996-2007 that assessed pet allergen exposure. Although dog exposure had no significant effect on asthma, exposure to cat allergen yielded a relative risk for asthma of 0.72 (95% CI, 0.55-0.93); exposure to either pet was found to be slightly protective for allergic rhinitis (relative risk, 0.79; 95% CI, 0.68-0.93). No associations between asthma and early exposures to cat and dog allergens were found in 17 and 13 birth cohorts included in a systematic review, respectively.[93] Finally, pooled analysis of data from 11 European birth cohorts found no effect of early pet ownership on asthma development or allergic rhinitis when examining mutually exclusive pet ownership categories (cat only, dog only, cat and dog only, bird only, or rodent only).[94] Overall, the cumulative evidence suggests no increase in risk of allergic disease from pet allergen exposure, with a possible decreased risk of asthma associated with cat allergen exposure in one study. More recent studies focus on subgroup analyses, which might explain some of the variability in results of existing data.[95]

Indoor fungal exposure

Similar to pet allergens, fungi are ubiquitous in both indoor and outdoor environments, and both predictive and protective associations of indoor fungal exposure on atopic disorders have been discovered. Qualitative assessments of fungal exposure in the form of mildew odor or visible mold have been linked to increased risk of allergic rhinitis and asthma.[96-98] This finding is corroborated by studies using quantitative fungal measures, such as DNA-based analyses[99] and β-1,3-glucan measurements.[100,101] In a longitudinal birth cohort of high-risk infants, Iossifova

et al[97,100] demonstrated an increased risk of asthma with exposure to low levels of β-1,3-glucan but a protective effect on exposure to levels of β-1,3-glucan greater than 60 μg per gram of dust, suggesting a possible nonlinear dose-response relationship similar to that observed for HDM allergen. However, although increased levels of β-1,3-glucan might indicate greater fungal concentrations, it could also represent a more diverse fungal population. In fact, exposure to greater fungal diversity offered protection against sensitization to aeroallergens and early childhood wheeze in a German longitudinal birth cohort, mirroring the protective effects of microbial diversity in the human microbiome.[102] Importantly, the predictive effect of fungal exposure on asthma development seems to occur independently of fungal sensitization. Zhang et al[103] demonstrated that nonallergenic components of fungi promote T_H17 responses through direct activation of innate immune receptors. Fungal components also potentiate allergen-induced T_H2 responses through non–IgE-mediated pathways. The mechanism by which greater fungal diversity confers protection against allergic disease remains unclear.

Overall, convincing data exist for the role of environmental indoor allergens in the pathogenesis of allergic disorders. The positive effect of multifaceted environmental interventions on disease prevalence and morbidity[104,105] highlights this point. Further studies are needed that examine the complex interplay of environment and genetics to determine the most effective intervention strategies for reducing the risk of allergic disease.

AMBIENT AIR POLLUTION EXPOSURE

Great strides have been made in understanding the effects of environmental air pollutants on population health, which has affected environmental health policy and consequently improved public health. However, despite overall improvements in air quality, indoor and outdoor air pollutants continue to cause adverse health effects and have been shown recently to promote the onset of atopic disease.

The World Health Organization reported in 2016 that 92% of the world's population lives in places where air quality levels exceed the World Health Organization's ambient air quality guidelines for annual mean particulate matter (PM) with a diameter of less than 2.5 μm ($PM_{2.5}$).[106] Those thought to be especially susceptible to the effects of air pollution include the very young and those of lower socioeconomic status because of increased exposure to pollutants in poor housing conditions. The respiratory tract is particularly susceptible to air pollution because of continuous exposure to the ambient environment. In this section we will discuss the effects of 2 key sources of environmental air pollution, traffic-related air pollution (TRAP) and environmental tobacco smoke (ETS), on the development of allergic airway disease. Markers of TRAP include (but are not limited to) carbon monoxide, nitrogen oxides, black carbon, PM, benzene, and ultrafine particles.

Effects of TRAP on lung development and asthma risk

Numerous studies throughout the world have shown that TRAP (particularly $PM_{2.5}$) negatively affects lung development[107-109] with potential consequences for the development of asthma and chronic obstructive pulmonary disease. The effects of early-life exposure, both prenatal and postnatal, are of particular interest in efforts to prevent detrimental effects on lung development.

The Spanish Infancia y Medio Ambiente cohort examined the association of TRAP exposure during specific trimesters of pregnancy on lung function in children aged 4.5 years.[110] Exposure to higher levels of benzene and nitrogen dioxide (NO_2) during the second trimester of pregnancy was associated with increased risk of clinically significant low lung function (FEV_1 <80% of predicted value). These studies collectively demonstrate that exposure to air pollution has systemic implications, with significant consequences for fetal lung development. Efforts to promote prevention focus on examination of prenatal exposures on asthma development. The Asthma Coalition on Community, Environment and Social Stress project, an urban pregnancy cohort, found that prenatal exposures to black carbon and PM were associated with a significant risk of wheezing by age 2 years.[111] Moreover, exposure to increased $PM_{2.5}$ levels during the second trimester of pregnancy was significantly associated with asthma at age 6 years, particularly in boys.[112]

Postnatal exposure to TRAP, particularly during the first years of life, is also an important determinant of lung function and asthma development. A birth cohort from the Boston metropolitan area recruited between 1999 and 2002 demonstrated that TRAP was associated with reduced lung development in elementary school–aged children, as measured by means of spirometry.[113] Despite improvements in $PM_{2.5}$ levels (less than current US Environmental Protection Agency standards) for most of the cohort during the study, lifetime and prior year exposure to TRAP was associated with a reduction in forced vital capacity, and exposure to $PM_{2.5}$ was specifically associated with higher odds of clinically significant airway obstruction. A Swedish birth cohort examined the effect of TRAP during the first year of life on lung function in later childhood.[114,115] At age 8 years, exposure to PM measuring between 2.5 and 10 μm in diameter during the first year of life had a bigger effect on reduced FEV_1 in children sensitized to food and aeroallergens, with less effect on lung function if exposure occurred later in childhood. Additionally, high exposure to NO_2 during the first year of life was associated with increased odds of having significantly decreased FEV_1 and forced vital capacity values.

Although many studies have demonstrated an association between early-life exposure to pollutants and asthma or persistent wheezing,[116-123] conflicting evidence recently emerged from a cross-sectional examination of 5 European birth cohorts in which no associations were found between air pollutant exposure and asthma prevalence.[124] To further examine these discrepancies, a recent longitudinal examination using birth cohort data from more than 14,000 children from The Netherlands, Germany, and Sweden evaluated the relationship of annual air pollution concentrations (from birth through age 14-16 years) with asthma and rhinoconjunctivitis incidence and prevalence.[125] This study, using both meta-analyses and pooled analyses, found that increasing exposure to NO_2 and $PM_{2.5}$ at the birth address was associated with increased asthma incidence through adolescence. There was no effect of air pollutants on rhinoconjunctivitis. Other European and North American cohorts have shown that increased

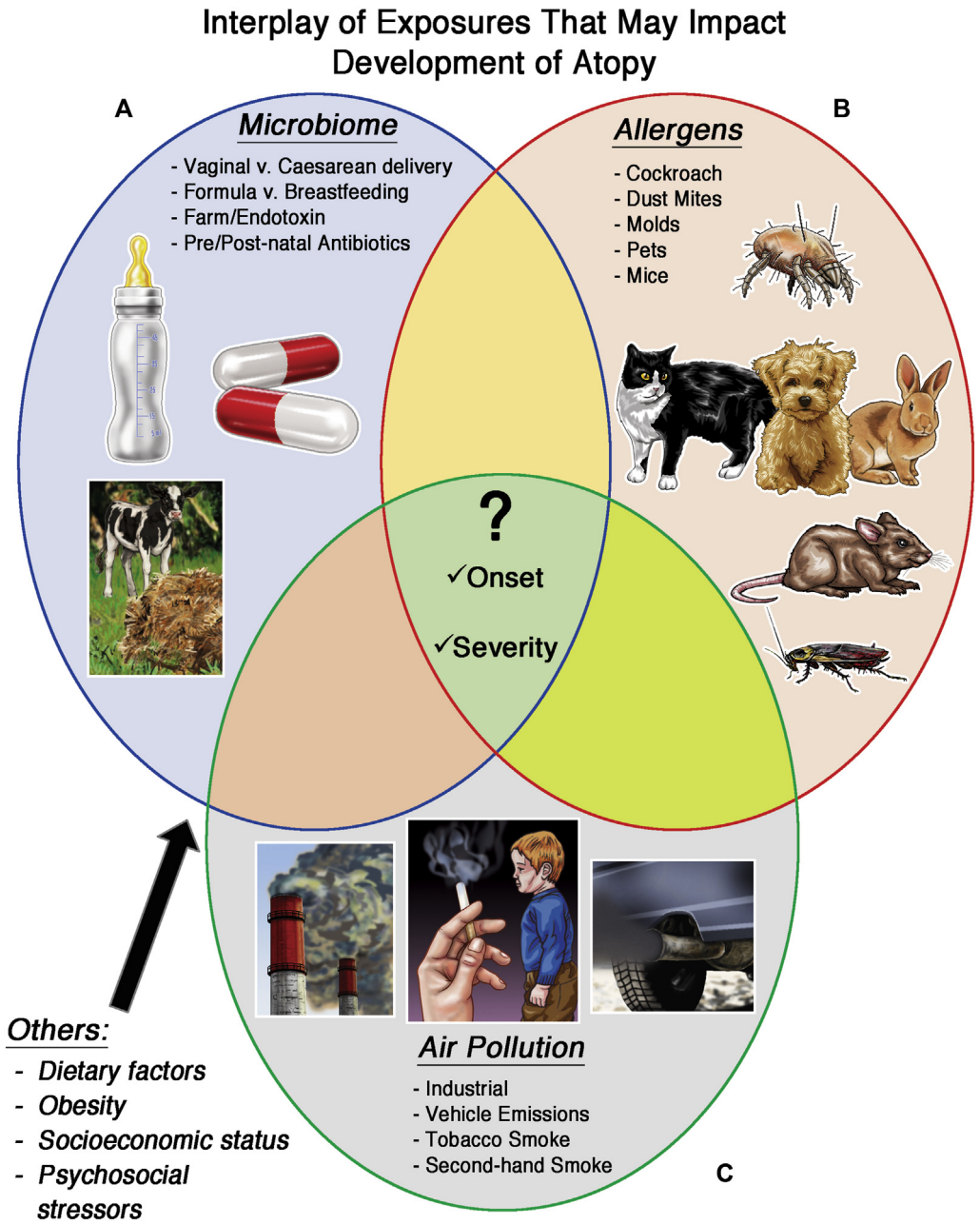

FIG 1. Interplay of early-life exposures that affect allergic disease development. Allergic disease development is influenced by many different factors. This figure displays several of the identified environmental triggers that increase susceptibility to allergic disease. **A,** Common behaviors and determinants that influence a subject's microbiome and external microbial environment, thereby influencing susceptibility to allergic disease. **B,** Allergens that have been linked to development of atopy. **C,** Air pollution exposures that not only influence lung function but also contribute to the immune response. Collectively, this Venn diagram demonstrates the overlapping contributions of each exposure. The center of the figure shows the questions that have yet to be elucidated, including how any of the numerous combinations of these common exposures influence the onset of disease or affect disease severity.

childhood exposure to $PM_{2.5}$ and black carbon was associated with increased risk of asthma at age 12 years.[126]

Effects of ETS on asthma and allergy risk

However, the most profound prenatal and early-life influences of air pollution emerge from ETS. Despite great improvements in reducing the rate of smoking and second-hand smoke (SHS) exposure in the US population, approximately 25% of nonsmokers in the United States (58 million people) were still exposed to SHS in 2011-2012.[127] Of these, 15 million were children aged 3 to 11 years. ETS exposure has been identified as a major risk factor for asthma[128,129] and allergic sensitization,[130] especially with *in utero* or

TABLE I. Early-life exposures affecting allergic disease development

Protective against allergic disease	References	Promoting allergic disease	References
Vaginal birth	16-19	Prenatal/postnatal antibiotics	15,16
Increased microbial/fungal diversity	6-11, 23-26, 102	Viral lower respiratory tract infection (RSV, HRV)	42-47
Increased no. of siblings; later birth order	15	HDM, cockroach, mouse, and fungal exposure	62-67, 71-86, 96-101
Farm exposure	28, 34-40	Prenatal/postnatal exposure to air pollution	110-123, 125,126, 133-136
Endotoxin exposure	27-33	Prenatal/postnatal tobacco smoke exposure	131, 132, 138-140

early-life exposures. The health effects of maternal exposure to SHS have more recently been elucidated. Pooled analyses from 15 European birth cohorts found that children whose mothers were exposed to SHS during pregnancy were more likely to wheeze at age 2 years; this risk was further increased by postnatal SHS exposure and further increased in children of atopic families.[131] SHS exposure during pregnancy alone (in nonsmoking mothers) was recently found to be associated with physician-diagnosed asthma at age 7 years.[132] With the increasing popularity of e-cigarettes throughout the world, it will be imperative to examine the effects of vaporized nicotine, vehicles (eg, propylene glycol), and an endless variety of flavoring agents on the development of asthma and airway disease.

Pollutants and allergen sensitization

A Swedish birth cohort[133] found that high exposure to NO_2 during the first year of life was associated with increased risk of sensitization to pollens (assessed by means of blood IgE measurement) at age 4 years and food sensitization at age 8 years. In North American cohorts diesel exhaust particle exposure in the first year of life was associated with greater aeroallergen sensitization in early childhood than in children with low exposure.[134,135] Children who were aeroallergen sensitized and had high exposure to TRAP during the first year of life had an almost 3-fold higher risk of asthma development compared with children who were not sensitized to allergens,[135] nor did sensitization alone increase the risk of asthma in children exposed to low levels of TRAP, suggesting that the combination of early-life pollutant exposure and allergic sensitization contributes to asthma development.

Exposure to increased levels of TRAP during infancy has also been associated with atopy to foods and perennial aeroallergens at age 1 year.[136] These effects might extend to the prenatal period. The EDEN birth cohort study found that increased maternal exposure to PM measuring between 2.5 and 10 μm in diameter was associated with reduced numbers of infant regulatory T (Treg) cells and increased $CD8^+$ T-cell numbers at birth,[137] with potential to increase the risk of atopy development and/or affecting responses to viral infection in these infants.

The strongest links between pollutant exposure and allergic sensitization relate to ETS exposure. In the absence of maternal smoking, exposure to SHS in infancy was associated with an increased risk of food sensitization at age 4, 8, and 16 years[138] and an increased risk of eczema with allergic sensitization. The German Lifestyle and Environmental Factors and their Influence on Newborns Allergy risk birth cohort found that increased exposure to products of ETS during pregnancy was associated with increased eosinophil/basophil progenitor cell counts in cord blood and that cord blood IL-4 and IL-13 levels were associated with the development of these progenitor cells.[139] This group later described that maternal smoking or ETS exposure during pregnancy was associated with reduced numbers of infant Treg cells at birth and that these infants with reduced numbers of Treg cells had increased risk of allergic sensitization in the first year of life.[140]

Potential mechanisms for effects of air pollution on development of atopic disease

Recent mechanistic studies investigating the effect of pollutant exposure on the development of allergic disease have been guided by key findings from birth cohorts, including the role of oxidative stress on promoting epigenetic modifications that regulate gene expression of Treg cells through microRNAs (miRNAs) and DNA methylation.[129,141] miRNAs are small noncoding RNAs that repress target protein expression through numerous mechanisms, including destabilizing mRNA and translational silencing.[142] ETS exposure during pregnancy was associated with increased maternal and cord blood expression of miRNA-223,[143] an miRNA previously linked with Treg cell development and function.[144-146] Increased miRNA-223 expression was associated with reduced Treg cell numbers in maternal and cord blood; in turn, these reduced Treg cell numbers at birth were associated with increased risk of AD during the first 3 years of life.

Among the most common mechanisms for epigenetic modifications is DNA methylation, in which increased methylation at the promoter and the 3′ end silences a gene, negatively correlating with gene expression. Increased forkhead box P3 methylation from salivary DNA was associated with increased pollutant exposure during childhood, affecting both increased risk of asthma diagnosis at age 7 years[147] and asthma severity.[148] Although pollutant-induced epigenetic modifications are not restricted to Treg cell development and function, their dysregulation has potential to affect the development of allergic disease over the lifespan.[149]

CONCLUSIONS AND FUTURE DIRECTIONS

The effect of microbial, allergen, and air pollutant exposures has been artificially subdivided in this review; in reality, these exposures and many others interact simultaneously with

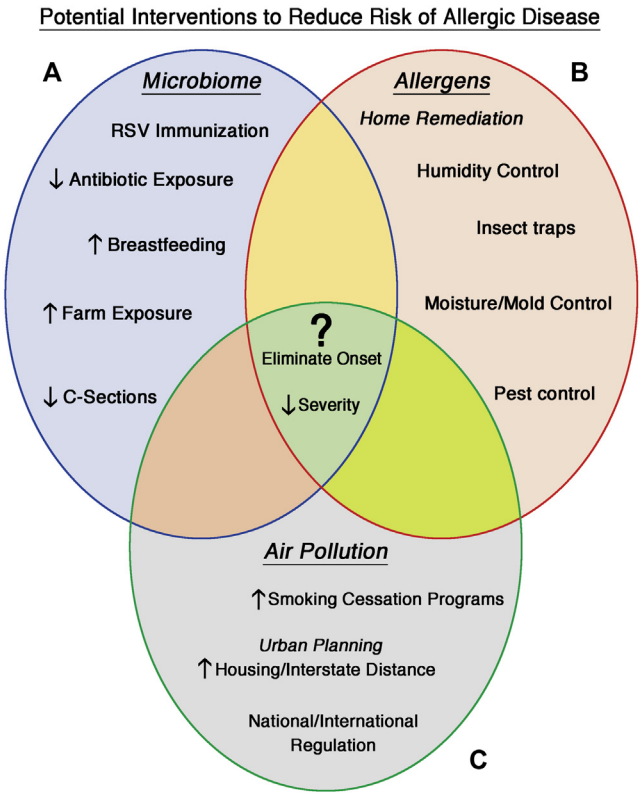

FIG 2. Potential interventions reducing the risk of allergic disease development. **A,** Certain modifications can positively influence a subject's microbiome or select for a protective external microbial environment. **B,** Reducing the quantity of allergen exposure might reduce development of allergic disease. **C,** Although the highest pollutant exposures occur from exposure to ETS, mitigating industrial and TRAP exposures will have to come from national and local regulatory agencies throughout the world. The center of the figure highlights the questions that have yet to be elucidated. Could these interventions affect the incidence of allergic disease, and if so, which are the most pragmatic and cost-effective and have the highest potential effect in different societies? *C-section*, Caesarian section.

each other to promote or prevent allergic disease (Fig 1). For example, air pollution and climate change can promote oxidative stress in pollen-producing plants, increasing both the amounts and allergenicity of pollen grains.[150] Individual factors identified in this review as protective for or promoting the development of atopy are summarized in Table I.* The types of exposures explored here are in no way exhaustive because many other exposures in early life have been linked to allergy and asthma development, including diet, obesity, pharmaceuticals, lifestyle factors, and maternal psychological stress in the prenatal and postnatal period. For example, vitamin D deficiency in the first decade of life was recently associated with increased susceptibility to sensitization and AD by age 3 years and increased risk of persistent asthma by age 10 years.[151] Additionally, the effect of maternal psychological stress on atopic disease development is being pursued by the South Korean Cohort for Childhood Origin of Asthma and Allergic Diseases, who recently demonstrated that increased prenatal maternal depression or anxiety was associated with increased risk of infant AD by age 6 months.[152]

Because human subjects do not develop in exposure silos, future studies should focus on identifying the effect of the summation of these exposures with different degrees of interaction among them in addition to the epigenetic effects of these exposures. This approach can more effectively identify the interventions that will have the greatest effect, both at the legislative and individual levels, on the development and sequelae of atopic disease. Examples of proposed interventions to date are provided in Fig 2. Several research initiatives focused on the exposome are being pursued in Europe (EXPOsOMICS, HELIX, and Heals) and the United States (Hercules) to simultaneously assess a large set of exposures while linking these exposures with the body's response through -omics approaches. These investments might identify atopy risk factors that are underestimated or perhaps yet undiscovered. Use of environment-wide association study approaches to identify associations with adverse health effects will bring their own challenges, highlighted by recent publications noting that some exposures might be highly correlated among each other and some might be synergistic to promote adverse health effects.[153] Additionally, it will be challenging to identify the effect of an early-life exposure on the sensitivity to future exposures over the lifespan. Exposome-focused projects are inherently expensive at this time given the large sample sizes required to assess numerous exposures in addition to the use of numerous tools required to assess both external and internal exposome components, including use of environmental monitoring technology (by using both geographic information system-based pollutant models and personal sensors) and -omics technologies. The cost and efficiency of applying an exposome-focused approach to human disease will have to be improved to make discoveries with the highest effect.

In the interim, integrating data from numerous birth cohort studies throughout the world will aide in more clearly defining the environmental determinants driving atopy and perhaps elucidate the optimal time to implement interventions. The Mechanisms of the Development of Allergy study incorporated data from more than 44,000 European children participating in birth cohort studies, and the Environmental Influences on Child Health Outcomes program in the United States includes more than 50,000 children. Large-scale birth cohort studies with harmonized exposure and outcome assessments throughout the world will need to be pursued as we define the peak susceptibility periods to a variety of exposures during the prenatal and postnatal periods and which exposures relevant to specific geographic areas should be the primary targets for interventions. An important example of harmonized outcome assessments is clearly delineating between allergic versus nonallergic asthma when assessing the effect of various exposures on this outcome. Once key exposures and potential interventions are identified, an integrative approach among clinicians, children and their caregivers, health care organizations, insurance providers, government agencies, and urban planners must be undertaken to establish cost-effective primary and secondary prevention strategies to reduce these risks and promote wellness.

*References 6-11, 15-19, 23-40, 42-47, 62-67, 71-86, 96-102, 110-123, 125, 126, 131-136, and 138-140.

What do we know?

- **The microbiome differs between atopic and nonatopic subjects, and these differences are seen in the first few months of life.**
- **Children exposed to farms and biodiversity in green spaces during early life are at reduced risk of allergic disease, whereas early-life exposure to HDM, cockroach, mice, and fungi promotes development of allergic disease.**
- **Wheezing episodes associated with RSV and HRV infection increase the risk of asthma in later childhood.**
- **There is no clear evidence that cat or dog exposure promotes or prevents atopy development.**
- **Prenatal and early-life exposure to both indoor and outdoor air pollutants negatively affects lung development and increases the risk of wheezing and asthma.**
- **Maternal smoking or exposure to SHS increases the risk of asthma, allergic sensitization, and AD.**

What is still unknown?

- **Does alteration of the diversity and abundance of commensal microbes in early life directly affect the development of allergic disease, or are these differences merely markers of immune dysregulation?**
- **What are the mechanisms by which early-life farm exposure imparts protection against allergic disease?**
- **Can asthma development be prevented by RSV and/or HRV immunization?**
- **What air quality standards are sufficient to prevent detrimental effects on lung development and atopic disease in children?**
- **When are children most susceptible to the effects of air pollution (prenatal, first year of life, or cumulative lifetime exposure), and what personalized interventions can be developed to reduce the risks associated with pollution exposure?**
- **What are the most cost-effective environmental intervention strategies to prevent allergic disease, and how do these strategies vary geographically?**

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Selena Inouye, So Marvista-Venice

Poll: Are you for or against the Venice Blvd lane reductions?

If you like the new two lanes for cars configuration on Venice Blvd. and would like it to stay, please select FOR.

If you don't like the new two lane configuration and would like the third lanes on Venice Blvd. restored, please select against.

Wanting the lanes back doesn't mean you don't want a safe street. It doesn't mean you're against a safe bike path or the new mid-block crossings. I personally think those are great ideas. This poll is simple about the DRIVING lanes for cars on Venice Blvd.: FOR the lane reductions or AGAINST the lane reductions.

Choose one:

- AGAINST - restore the third lanes 70%
- FOR - keep the two lanes 27%
- Don't know/don't care/unsure 4%

Voted 1010 votes

16 Oct · 20 neighborhoods in General



Chris Reese 3
East Venice

Poll: For or Against the Venice Blvd lane reductions?

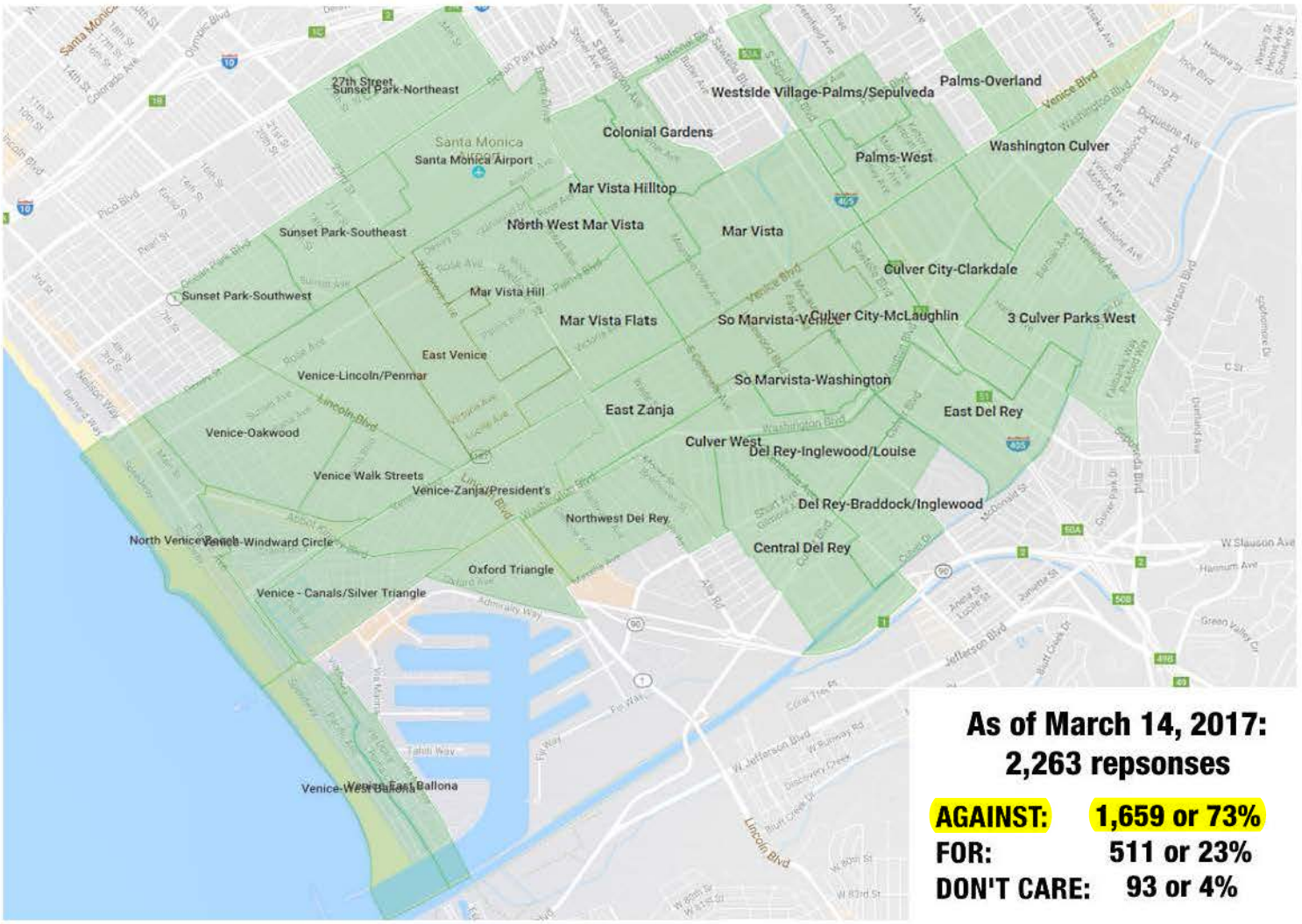
If you like the new two lane configuration and would like it to stay, select FOR.

If you do not like the new two lane configuration and would like Venice Blvd to be restored to 3 lanes, select AGAINST.

Wanting the lanes back does not mean you don't want a safe street. It does not mean you don't want a safe bike lane or mid block crosswalks. I personally think those are all great ideas. I am simply talking about the DRIVING lanes on Venice Blvd. FOR the lane reductions or AGAINST the lane reductions.

- FOR - keep two lanes 19%
- AGAINST - restore the lanes 76%
- Don't care either way 4%

1253 votes



As of March 14, 2017:
2,263 repsonses

AGAINST:	**1,659 or 73%**
FOR:	**511 or 23%**
DON'T CARE:	**93 or 4%**

Due to the abundance of driveways and unsignalized intersections, Venice Blvd. was NOT an appropriate roadway for a protected bike lane.

Bicycle Enhancements

5.3 Protected Bicycle Lane

A protected bicycle lane, or "cycle track," is a type of bicycle facility that provides a physical separation for bicyclists traveling on the roadway.

Benefits

- Decreases injuries and fatalities while providing a safer, more comfortable bicycling experience
- Encourages bicyclists to travel in a protected bicycle lane on the roadway, as opposed to on the sidewalk
- Mitigates conflicts between bicyclists and motorists by providing greater clarity about roadway behavior
- Increases bicycle ridership

Applications

- Protected bicycle lanes are typically applied:
  - ♦ one-way on each side of two-way streets
  - ♦ one-way on one side of a one-way street, two-way on one side of a one-way street, and are separated from vehicles and pedestrians by pavement markings or coloring, bollards, curbs/ medians and on-street parking, or a combination of these elements.
- Protected bicycle lanes should be applied along corridors with adequate right- of-way. Sidewalks or other pedestrian facilities should not be narrowed to accommodate the Cycle Track, as pedestrians will likely walk on the Protected Bicycle Lane if sidewalk capacity is reduced.
- Apply in relation to school routes, dense commercial districts, and arterials heavily traveled by bicyclists.
- Apply along streets with long blocks and few or no driveway or midblock access points for vehicles. Protected Bicycle Lanes located on one-way streets will have fewer potential conflicts than those on two-way streets.



A Complete Street rendering incorporating protected bicycle lanes with on-street parking and bus boarding islands (image courtesy of NACTO)

Source: City of Los Angeles Complete Streets Design Guide

CITY OF LOS ANGELES
INTER-DEPARTMENTAL MEMORANDUM

Date: August 22, 2016

To: The Honorable Mike Bonin, Chair
Transportation Committee
Los Angeles City Council

From: Gary Lee Moore, PE, ENV SP
City Engineer
Bureau of Engineering

Seleta J. Reynolds, General Manager
Department of Transportation

Subject: **RELINQUISHMENT OF STATE ROUTE 187 (VENICE BOULEVARD) BETWEEN LINCOLN BOULEVARD AND CADILLAC AVENUE**

SUMMARY

At its meeting of February 24, 2016, the Transportation Committee considered a Motion (Bonin-O'Farrell, CF 16-0147, Attachment A), which directed the Department of Transportation (LADOT) and the Bureau of Engineering (BOE) to prepare a report relative to the relinquishment to the City of Los Angeles State Route 187 (SR-187) otherwise known as Venice Boulevard between Lincoln Boulevard and Cadillac Avenue, and State Route 1 (SR-1) otherwise known as Lincoln Boulevard between the southern city limit of the City of Santa Monica and Route 105. The City and the California Department of Transportation (Caltrans) agreed to defer the relinquishment of Lincoln Boulevard to a later date as Caltrans has not issued the final Relinquishment Assessment Report (RAR) for SR-1.

The Motion was drafted in response to a resolution (Bonin-Krekorian, CF 15-0002-S48, Attachment B) supporting Assembly Bill (AB) 810, which authorizes the California Transportation Commission (CTC) to streamline the relinquishment process to facilitate the implementation of the City's Great Streets initiative on Venice Boulevard, among other objectives. In response to the Transportation Committee instructions, BOE and LADOT entered into discussions with Caltrans.

The relinquishment process transfers control of portions of the state highway system owned and operated by the California Department of Transportation (Caltrans) to local jurisdictions when it is in the mutual interests of both parties. Caltrans policy encourages relinquishments of portions of state highways that can be characterized as conventional city streets and that do not serve regional or statewide transportation needs, as they represent opportunities to reduce ongoing maintenance costs and tort liability, among other benefits to the State. This incentive drives the State "to negotiate with local agencies a level of work or contribution to facilitate the relinquishment".

Because the proposed relinquishment would be accomplished by legislative enactment[1], Caltrans is not obligated to bring SR-187 to a "state of good repair"[2], which had been the City's

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[1] California Streets and Highways Code, Section 73, identifies four types of relinquishments: Legislative Enactment, Superseded by Relocation, Collateral Facilities, and Nonmotorized Transportation Facilities. The latter three types of relinquishments require a formal initiation process that culminates with a Project Initiation Document (PID), in which the costs and funding for

standard in previous negotiations. Caltrans has characterized its proposed financial contribution of $14M for street improvements and sidewalks and ramps and an additional $0.5M for a previously programmed project for a total of $14.5M as the "cost to relinquish"[3]. The City's estimate for rehabilitation of Venice Boulevard is $21.5M to bring the entire 5.4-mile stretch of roadway into compliance with current City standards.

RECOMMENDATIONS

That the City Council, subject to approval of the Mayor:

1. FIND that the relinquishment of Venice Boulevard (State Route 187) from Lincoln Boulevard to Cadillac Avenue to Caltrans is in the best interest of the City and approve the relinquishment and District Agreement No 07-5097.
2. AUTHORIZE the Mayor to execute District Agreement No 07-5097 with Caltrans, subject to review by the City Attorney as to form and legality, for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue.
3. AUTHORIZE the Director of the Office of Accounting, Board of Public Works, to receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue and to deposit the funds as follows:
    a. $13,000,000 into the Subventions and Grants Fund No. 305, Department No. 50, and appropriated into a new account within the Fund entitled "Venice Boulevard Relinquishment"; and,
    b. $1,500,000 into the Transportation Trust Fund No. 655, Department No. 94, and appropriated into a new account within the Fund entitled "Venice Boulevard Great Streets Improvements".
4. AUTHORIZE the Department of Transportation to issue non-participating change orders as part of ongoing transportation construction contracts in order to expedite the construction and enhance safety at five intersections along the Great Street section of Venice Boulevard.
5. AUTHORIZE the Director of the Office of Accounting, Board of Public Works, to make any technical accounting corrections or clarifications to the above instructions in order to effectuate the intent of the Mayor and City Council.

DISCUSSION

Background

In 2007, the City considered a similar proposal at the request of the request of Council District 11 for "Greening the Boulevard", a Master Plan concept prepared by the Mar Vista Community

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the relinquishment are discussed. Deletion of Routes by Legislative Enactment, in contrast, is not as clearly defined and is subject to differences in interpretation. A PID is required only if there is a cost to relinquish, as in the present case.

[2] California Streets and Highways Code, Section 73, defines a street to be "in a 'state of good repair' when it is a safe, drivable, well-maintained road. Capacity increasing improvements or betterments are not included when bringing a highway to a state of good repair" (Project Development Procedures Manual [PDPM], 12/12/14, Ch. 25, "Relinquishments"). The Bureau of Street Services defines "state of good repair" as streets having a Pavement Condition Index or PCI rating of 71 or higher on a 100-point scale.

[3] Ibid. "Cost to relinquish" is defined as "a level of work or financial contribution to facilitate the relinquishment." Caltrans proposes transferring $10.5M previously programmed for improvements to SR-187 in FY2018 in the State Highway Operation and Protection Program or SHOPP (Attachment E) and an additional $4M to the City as its financial contribution to facilitate the relinquishment.

Council. Over four months, Public Works and LADOT prepared a Class C-level estimate[4] totaling $46.9M for Venice Boulevard (Attachment D), which Caltrans rejected. Renewed interest in the relinquishment was spurred by the designation of Venice Boulevard between Beethoven Street and Inglewood Boulevard as one of 15 Great Streets, part of the Mayor's Great Streets initiative. The Great Streets initiative was one of the justifications cited for AB 810, adopted on October 7, 2015. The passage of AB 810 demonstrates support for Great Streets at the State level. Locally, Council District 11, the Mar Vista Community Council and other community stakeholders support the Venice Boulevard Great Street concept.

Venice Boulevard from Abbot Kinney Boulevard to 12th Street is also on the City's High Injury Network (HIN), so designated because of a disproportionate number of fatalities and serious injuries involving pedestrians. LADOT has proposed the installation of safety-enhancement and traffic calming measures for HIN streets as part of its Vision Zero initiative to achieve zero traffic fatalities by 2025. The pilot program proposed for Venice consists of a road diet between Beethoven and Inglewood, reducing six traffic lanes to four. The existing Class II bike lane would become a protected bike lane with bollards, and four mid-block crossings with traffic signals would be installed near unsignalized intersections. Temporary modifications for even a pilot program would require encroachment permits, entailing a lengthy review process that could jeopardize funding for time-sensitive projects. Another project supported by Council District 11, the installation of gateway signs at Bledsoe Avenue and Redwood Avenue, would face a budget shortfall if encroachment permits were required.

Accepting the relinquishment would enable the City to implement improvements and modifications that align with the City's Great Streets and Vision Zero initiatives without the need for encroachment permits[5]. These benefits should be factored into the costs of ADA-compliance and the rehabilitation, maintenance and protection of the 5.4-mile segment between Lincoln and Cadillac, as quantified in the City's revised Class "O"-level estimate[6] (Table 1).

2016 Estimate Methodology

The updated estimate represents a reasonable, but not exhaustive, effort to capture those costs and should not be construed as the cost of reconstructing SR-187 to current City standards. The following sources were used to assist in the development of the City's Class O estimate:

1. 2008 Class C level estimate (Attachment D);
2. Site visits;
3. Mapping applications such as Navigate LA and Google Maps Street View;
4. Caltrans data on projects completed after 2008[7];

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[4] Definitions for cost estimates used in this report come from BOE's Project Delivery Manual (PDM). Developed during the pre-design phase, the Class "C" level estimate is based on a rough idea of the project's size and location and also based upon similar projects in the same area. The Class C estimate includes BOE labor percentages from BOE budget templates. The Class C estimate is used to develop BOE's annual Work Programs and three-year Master Schedules.

[5] Caltrans had already committed $0.5M for its share of a project to install left-turn phasing at the intersection of Venice and Grandview. The Relinquish Agreement would include this financial commitment.

[6] The Class "O" level estimate as an "opinion of cost" developed based on a preliminary understanding of the project.

[7] Caltrans furnished a list of projects awarded or completed between 2008 and 2015 on SR-187 but not the project budgets. Site visits confirmed that Venice from Lincoln to just east of Sepulveda Boulevard saw street improvements since 2008. The most intensive project was initiated at the Director's order to address pavement failures between Lincoln to Sepulveda in 2011, with subsequent resurfacing work in 2015. A sidewalk repair project was completed in 2012, but the work does not conform to current ADA standards. Without as-built plans, the City was unable to determine the expected performance life of the improvements. The 2013 Caltrans Pavement Condition Survey Inventory and the 2013 SHOPP application indicate that both left and right lanes from Lincoln to Sawtelle Boulevard are largely in "good condition" with "no distress observed". However, pavement quality diminishes significantly east of Sepulveda.

5. 2013 application for State Highway Operation and Protection Program (SHOPP) funding in 2014 programming year [Attachment E];
6. Input from the BOE, Bureau of Street Services (BSL), Bureau of Street Lighting (BSL) and LADOT.

Table 1: City Estimate* of Cost to Relinquish SR-187 (2016)

Item	Description	Quantity	Unit	Unit Price	Item Total
1	Mobilization (10% of Subtotal)	1	LS		$ 1,209,700.00
2	Field Office	1	LS		$ 10,000.00
3	Contamination clean up	1	LS		$100,000.00
	Annual median landscaping maintenance	*1*	*LS*		*$139,462.00*
Remove:					
4	Curb and Gutter (a=2')	2,890	LF	$ 22.00	$ 63,580.00
5	Conc. Sidewalk	137,200	SF	$ 5.50	$ 754,600.00
6	Driveway	12,150	SF	$ 10.00	$ 121,500.00
7	6" AC Pavement	1,200	SF	$ 44.00	$ 52,800.00
8	8" Conc. Pavement	27,000	SF	$ 12.00	$ 324,000.00
9	Unclassified Excavation	5,000	CY	$ 70.00	$ 350,000.00
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	2,890	LF	$ 38.00	$ 109,820.00
11	Conc. Curb	5,000	LF	$ 30.00	$ 150,000.00
12	Driveway	24,860	SF	$ 27.50	$ 683,650.00
13	Conc. Sidewalk (t=4")	137,610	SF	$ 11.00	$ 1,513,710.00
14	4" CMB	159,340	SF	$ 2.00	$ 318,680.00
15	AC Pavement (0.2' Hot Mix)	45,000	TON	$ 80.00	$ 3,600,000.00
16	AC Pavement (Cold Plane 0.2')	300,000	SY	$ 1.00	$ 300,000.00
16	AC Pavement (Crack Treatment)	35	Ln-Mi		$ 125,000.00
17	8" Conc. Pavement (Bus Pad)	25	EA	$ 12,960.00	$ 324,000.00
18	8" CMB	1,200	SF	$ 3.50	$ 4,200.00
19	Upgrade Drainage inlets/Grates	1	LS	$ 5,000.00	$ 5,000.00
20	Adjust Maintenance Holes and Valves to Grade	1	LS	$ 70,000.00	$ 70,000.00
21	Traffic Control /Management / Public Information	1	LS	$ 660,000.00	$ 660,000.00
22	Traffic Striping	1	LS		$ 300,000.00
23	Street Lighting	1	LS		$ 510,000.00
24	Portable Changeable Message Sign	1	LS		$ 28,000.00
25	Traffic Signal / Detectors	1	LS		$ 101,750.00
26	Relocate Electrical pull boxes, poles	1	LS		$ 500,000.00
27	Curb Ramps	150	EA	$ 5,000.00	$ 750,000.00
28	Tree Removals	58	EA	$ 1,000.00	$ 58,000.00
29	Furnish & Plant 24" Box Size Tree	116	EA	$ 1,200.00	$ 139,200.00
30	Storm water	1	LS	$ 150,000.00	$ 150,000.00
31	Road signs	1	LS	$ 10,000.00	$ 10,000.00
32	Utilities Right of Way	1	LS	$ 10,000.00	$ 10,000.00
	Subtotal:				**$ 13,407,190.00**
	Contingency (20%):				$ 2,681,438.00
	Design, Bid & Award, Construction Management & Inspection (40%):				$ 5,362,876.00
	Total:				$ 21,451,504.00
	Total Rounded Project Cost				**$ 21,500,000.00**

*Estimate does not include costs for utility relocations.

Key:
Grey - items on City's initial estimate but not counted by Caltrans in its SHOPP funding application
Yellow - items identified by both City and Caltrans (higher quantity prevails)
Blue - items on Caltrans' SHOPP funding application but not counted on City's initial estimate

BOE updated the quantities and unit costs from the 2008 estimate, cross-referencing data published in the SHOPP application (see footnote). The 2008 estimate assumed extensive structural work involving the removal and reconstruction of existing concrete, necessitating more excavation and base material and asphalt concrete based on evidence of base failure – which Caltrans partially addressed in 2011. The 2016 estimate would allow for the resurfacing of up to approximately five (5) miles and the reconstruction of certain sections within the limits of the relinquishment where resurfacing would be insufficient.

The 2008 estimate also included the cost of upgrading traffic signals, street lighting and landscaping. The street lighting request included as Line Item No. 23 for $510,000 is for funding to complete the conversion of high- to low-voltage circuitry for LED lighting. This serves the City's long term goal of reducing energy consumption and enhancing public safety.

The City's estimate includes soft costs and contingency, which the funding conveyed by the relinquishment agreement would not cover. Furthermore, the relinquishment agreement would transfer the cost of maintenance of landscaping, lighting, tree trimming, etc. from Caltrans to the City. Currently, the City receives $139,462 for annual maintenance for Venice under Delegated Maintenance Agreement 19-5939, dated January 1, 2005, and updated on January 23, 2013 (Attachment F).

Assumptions and Qualifications

The estimate incorporates sidewalks, curbs, driveways and other items not listed in the SHOPP application (grey), as well as items listed in the SHOPP application not included in initial estimates (blue). Where the City and Caltrans diverge in quantities or costs for overlapping items, BOE inserted the greater quantity (yellow).

In contrast to previous relinquishments that relied on a Class C estimate, the patchwork nature of improvements and the composite approach to developing the Class O estimate complicate predictions about the useful life of recently completed improvements to SR-187. Road failures and maintenance costs are difficult to project without boring and in-depth testing, and this could equate to substantial costs for the City in the future.

ADA Compliance

The Relinquishment Assessment Report for SR-187 (Attachment G) clearly states that "[s]idewalks and curb ramps and driveways are not fully in compliance with Americans with Disabilities Act (ADA) of 1990 and Section 4450 of the California Government Code. ADA standards are required on all resurfacing projects" (p. 18).




Examples of non-compliant sidewalks

The City has estimated that sidewalk improvements would cost at a minimum $4.4M (Line Items Nos. 4 – 14).

Other Risks

The RAR identifies potential liability issues on pp. 17-18 in addition to ADA compliance. Namely, SR-187 is located within a liquefaction zone and Seismic Zone 4.

In addition to the risks outlined in the RAR, the State's Office Environmental Engineering (OEE) memo dated May 13, 2016 (Attachment H) summarizes the findings of a literature survey evaluating the potential for releasing hazardous substances or petroleum products on Rosemead Boulevard and Venice Boulevard. For Venice, the report identified twenty properties with groundwater contamination, three of which show groundwater information on the State's Geotracker application as shown in Table 2. The City's Geotechnical Engineering Division (GED) noted that three of the twenty sites are located at the intersection of Venice and Sepulveda, with the Mobil station having tanks adjacent to SR-187. Remediating underground [fuel] storage tanks (USTs), hydrocarbon plumes and possible lead-contaminated soil would cost an estimated $100,000 (Line Item No. 3) or more, pending more extensive excavation or regulatory requirements.

Table 2: Potential Sites for Groundwater Contamination

Site	Distance from SR-187	Status	Determination
Chevron #9-0545	10 ft	Open but eligible for closure	Low threat criteria met by the regional board.
TWS Products	500 ft	Open-remediation site; quarterly groundwater monitoring has been requested	Soil and groundwater impacted by VOCs and hydrocarbons
Thrifty #247	2500 ft	Open-remediation site under semi-annual monitoring	Gradient plume may be migrating on a southwesterly direction toward Venice

Coordination with Culver City
BOE and LADOT recommend early outreach to Culver City to facilitate the relinquishment. As shown in Exhibit A - Relinquishment Map 3 (Attachment I) of the draft Relinquishment Agreement (Attachment C), the southerly portion of Venice Boulevard between Bledsoe Avenue to Overland Avenue is within Culver City's jurisdiction. Although Caltrans could relinquish the City's portion of SR-187 independently of Culver City, the City's proposed modifications would likely have traffic impacts on Culver City, suggesting the need for coordinated mitigation measures.

FISCAL IMPACT

The City will receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue. A minimum estimated amount of $7,000,000 in improvements along Venice Boulevard would remain to be addressed. It is anticipated that the additional funds could be secured by pursuing outside grant funding opportunities.

Attachments:

Attachment A	Motion (Bonin-O'Farrell, CF 16-0147)
Attachment B	Resolution (Bonin-Krekorian, CF 15-0002-S48)
Attachment C	Draft Relinquishment Agreement and Financial Contribution Agreement, with Relinquishment Map
Attachment D	2008 City Estimate
Attachment E	Capital Preventive Maintenance Project (CPM) Report to Request SHOPP, July 30, 2013
Attachment F	2005 Delegated Maintenance Agreement 19-5939 and 2013 update
Attachment G	Relinquishment Assessment Report (RAR) dated February 28, 2015
Attachment H	Hazardous Materials Disclosure and Geotracker Maps
Attachment I	Draft Relinquishment Map 1260

Venice Blvd Relinquishment Cost Estimate Summary		
Segment	**Distance (Miles)**	**Total Cost per Segment**
Lincoln Blvd. to Centinela Ave.	1.3	$15,200,000
Centinela Ave to 405 Fwy.	1.1	$10,300,000
405 Fwy to Motor Ave	1.1	$9,700,000
Motor Ave to 10 Fwy.	2.0	$11,700,000
Total Project Cost	**5.5**	**$46,900,000**

Note: Much of the AC alligator cracking observed in the field investigation along Venice Blvd was between Lincoln Blvd and 405 San Diego Fwy. This segment was reconstructed in the early 70's.The alligator cracking is an indication of base failure which requires roadway reconstruction and higher costs than the other segments. The section of Venice Blvd between the 405 San Diego Fwy and 10 Santa Monica Fwy was mostly reconstructed in the early 80's.

PRELIMINARY COST ESTIMATE

Project Title: Venice Blvd. Relinquishment - Lincoln Blvd to Centinela Ave.

7/15/2016

Item	Description	Quantity	Unit	Unit Price	Item Total
Remove:					
1	Curb and Gutter (a=2')	740	LF	$6.90	$5,106
2	Sidewalk	33,000	SF	$2.50	$82,500
3	Driveway	350	SF	$3.00	$1,050
4	6" AC Pavement	202,000	SF	$2.40	$484,800
5	Cold Plane AC Pavement	375,000	SF	$1.00	$375,000
6	8" Conc. Pavement (Cement Treated Base)	202,000	SF	$7.00	$1,414,000
7	Cross Gutter (g=4')	1,600	SF	$8.00	$12,800
8	Bus Pad	6,000	SF	$8.00	$48,000
9	Unclassified Excavation	12,134	CY	$80.00	$970,720
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	740	LF	$35.00	$25,900
11	Driveways	350	SF	$7.00	$2,450
12	Conc. Sidewalk (t=3")	33,000	SF	$5.00	$165,000
13	4" CMB	33,350	SF	$1.50	$50,025
14	4" AC Pavement	202,000	SF	$3.00	$606,000
15	Variable Thickness AC Pavement (t=3")	7,613	TN	$120.00	$913,560
16	8" Conc. Pavement (Bus Pad)	6,000	SF	$9.00	$54,000
17	12" CMB	211,080	SF	$3.00	$633,240
18	8" Conc. Pavement	202,000	SF	$8.00	$1,616,000
19	Cross Gutter (g=4')	1,600	SF	$10.00	$16,000
20	Landscaping Elements	1	LS		$337,217
21	Traffic Control During Construction	1	LS		$96,000
22	Street Lighting	1	LS		$226,872
23	Traffic Signals	1	LS		$138,660
24	Signs & Striping	1	LS		$64,800
25	Inductive Loop Detectors	1	LS		$25,920
26	Public Relations	1	LS		$50,000
				Subtotal:	**$8,415,620**
				Mobilization & Field Office (10%):	**$841,562**
				Contingency (20%):	$1,683,124
				Design, Bid & Award, Construction Management & Inspection (22%):	$1,851,436
				Subtotal:	$12,791,742
				Cost Escalation (9% for two years):	$2,406,127
				TOTAL ROUNDED PROJECT COST:	**$15,200,000**

PRELIMINARY COST ESTIMATE

Project Title: Venice Blvd. Relinquishment - Centinela Ave. to 405 San Diego Fwy.

7/15/2016

Item	Description	Quantity	Unit	Unit Price	Item Total
Remove:					
1	Curb and Gutter (a=2')	680	LF	$6.90	$4,692
2	Sidewalk	16,000	SF	$2.50	$40,000
3	Driveway	900	SF	$3.00	$2,700
4	6" AC Pavement	122,000	SF	$2.40	$292,800
5	Cold Plane AC Pavement	366,000	SF	$1.00	$366,000
6	8" Conc. Pavement (Cement Treated Base)	122,000	SF	$7.00	$854,000
7	Cross Gutter (g=4')	400	SF	$8.00	$3,200
8	Bus Pad	4,500	SF	$8.00	$36,000
9	Unclassified Excavation	7,332	CY	$80.00	$586,560
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	680	LF	$35.00	$23,800
11	Driveways	900	SF	$7.00	$6,300
12	Conc. Sidewalk (t=3")	16,000	SF	$5.00	$80,000
13	4" CMB	16,900	SF	$1.50	$25,350
14	4" AC Pavement	122,000	SF	$3.00	$366,000
15	Variable Thickness AC Pavement (t=3")	7,430	TN	$120.00	$891,600
16	8" Conc. Pavement (Bus Pad)	4,500	SF	$9.00	$40,500
17	12" CMB	128,260	SF	$3.00	$384,780
18	8" Conc. Pavement	122,000	SF	$8.00	$976,000
19	Cross Gutter (g=4')	400	SF	$10.00	$4,000
20	Landscaping Elements	1	LS		$208,000
21	Traffic Control During Construction	1	LS		$80,000
22	Street Lighting	1	LS		$189,060
23	Traffic Signals	1	LS		$133,920
24	Signs & Striping	1	LS		$54,000
25	Inductive Loop Detectors	1	LS		$21,600
26	Public Relations	1	LS		$30,000
				Subtotal:	**$5,700,862**
				Mobilization & Field Office (10%):	**$570,086**
				Contingency (20%):	$1,140,172
				Design, Bid & Award, Construction Management & Inspection (22%):	$1,254,190
				Subtotal:	$8,665,310
				Cost Escalation (9% for two years):	$1,629,945
				TOTAL ROUNDED PROJECT COST:	**$10,300,000**

PRELIMINARY COST ESTIMATE

Project Title: Venice Blvd. Relinquishment - 405 San Diego Fwy. to Motor Ave.

4/18/2008

Item	Description	Quantity	Unit	Unit Price	Item Total
Mobilization:	(10% of Subtotal)	1	LS	$222,701.75	$222,701.75
1	Field Office	1	LS	$50,000.00	$50,000.00
Remove:					
1	Curb and Gutter (a=2')	530	LF	$8.00	$4,240
2	Sidewalk	35,000	SF	$3.00	$105,000
3	Driveway	800	SF	$3.50	$2,800
4	6" AC Pavement	97,600	SF	$2.40	$234,240
5	Cold Plane AC Pavement	390,300	SF	$0.54	$210,762
6	8" Conc. Pavement (Cement Treated Base)	97,600	SF	$4.00	$390,400
7	Cross Gutter (g=4')	300	SF	$4.00	$1,200
8	Bus Pad	1,600	SF	$4.00	$6,400
9	Unclassified Excavation	4,178	CY	$80.00	$334,240
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	530	LF	$35.00	$18,550
11	Driveways	800	SF	$7.00	$5,600
12	Conc. Sidewalk (t=3")	35,000	SF	$7.00	$245,000
13	4" CMB	35,800	SF	$4.00	$143,200
14	4" AC Pavement	97,600	SF	$4.00	$390,400
15	Variable Thickness AC Pavement (t=3")	7,923	TN	$100.00	$792,300
16	8" Conc. Pavement (Bus Pad)	1,600	SF	$9.00	$14,400
17	12" CMB	99,860	SF	$8.00	$798,880
18	8" Conc. Pavement	97,600	SF	$9.00	$878,400
19	Cross Gutter (g=4')	300	SF	$10.00	$3,000
20	Landscaping Elements	1	LS	$52,000	$52,000
21	Traffic Control During Construction	1	LS	$80,000	$80,000
22	Street Lighting	1	LS	$278,000	$278,000
23	Traffic Signals	1	LS	$263,603	$263,603
24	Signs & Striping	1	LS	$54,000	$54,000
25	Inductive Loop Detectors	1	LS	$32,054	$32,054
26	Public Relations	1	LS	$20,000	$20,000
				Subtotal:	**$5,631,371**
				Contingency (20%):	$1,126,274
				Design, Bid & Award, Construction Management & Inspection (22%):	$1,238,902
				Subtotal:	$7,996,546
				Cost Escalation (10% for two years):	$1,679,275
				TOTAL ROUNDED PROJECT COST:	**$9,700,000**

NOTES:

1. Unit cost of R&R 1.0 S.F of Sidewalk is equivalent to $15.00, which is congruent with BSS.
2. Unit cost of R&R Curb & Gutter = $43/LF
3. Item No.12 includes Ramps.
4. Bus pad unit cost = $14/SF which is equivalent withn BSS.
5. Bureau of Street Lighting new estimate as 4/17/08 Item No. 22.
6. Venice Blvd. Cross section based on As-Built of Dwg. D-20112 p.1

CDLF 4-18-08

PRELIMINARY COST ESTIMATE

Project Title: Venice Blvd. Relinquishment - Motor Ave. to 10 Santa Monica Fwy.

7/15/2016

Item	Description	Quantity	Unit	Unit Price	Item Total
Remove:					
1	Curb and Gutter (a=2')	800	LF	$6.90	$5,520
2	Sidewalk	50,000	SF	$2.50	$125,000
3	Driveway	7,400	SF	$3.00	$22,200
4	8" AC Pavement	44,400	SF	$3.20	$142,080
5	Cold Plane AC Pavement	843,000	SF	$1.00	$843,000
6	8" Conc. Pavement (Cement Treated Base)	0	SF	$7.00	$0
7	Cross Gutter (g=4')	0	SF	$8.00	$0
8	Bus Pad	8,400	SF	$8.00	$67,200
9	Unclassified Excavation	3,770	CY	$80.00	$301,600
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	800	LF	$35.00	$28,000
11	Driveways	7,400	SF	$7.00	$51,800
12	Conc. Sidewalk (t=3")	50,000	SF	$5.00	$250,000
13	4" CMB	57,400	SF	$1.50	$86,100
14	4" AC Pavement	44,400	SF	$3.00	$133,200
15	Variable Thickness AC Pavement (t=3")	17,113	TN	$120.00	$2,053,560
16	8" Conc. Pavement (Bus Pad)	8,400	SF	$9.00	$75,600
17	12" CMB	54,400	SF	$3.00	$163,200
18	8" Conc. Pavement	44,400	SF	$8.00	$355,200
19	Cross Gutter (g=4')	0	SF	$10.00	$0
20	Landscaping Elements	1	LS		$702,783
21	Traffic Control During Construction	1	LS		$144,000
22	Street Lighting	1	LS		$340,308
23	Traffic Signals	1	LS		$383,970
24	Signs & Striping	1	LS		$97,200
25	Inductive Loop Detectors	1	LS		$38,880
26	Public Relations	1	LS		$40,000
				Subtotal:	**$6,450,401**
				Mobilization & Field Office (10%):	**$645,040**
				Contingency (20%):	$1,290,080
				Design, Bid & Award, Construction Management & Inspection (22%):	$1,419,088
				Subtotal:	$9,804,610
				Cost Escalation (9% for two years):	$1,844,247
				TOTAL ROUNDED PROJECT COST:	**$11,700,000**

Venice Blvd Relinquishment Quantity Take Off					
Removal Items	Venice Blvd Cut Off Intersections				
	Units	Lincoln to Centinela	Centinela to 405 Fwy.	405 Fwy to Motor	Motor to 10 Fwy.
Curb and Gutter	LF	740	680	530	800
Sidewalk	SF	33,000	16,000	35,000	50,000
Driveway	SF	350	900	800	7,400
6" AC Pavement	SF	202,000	122,000	97,600	44,400
Cold Plane AC Pavement	SF	375,000	366,000	390,300	843,000
8" Conc. Pvmt.(Cement Treated Base)	SF	202,000	122,000	97,600	0
Cross Gutter	SF	1,600	400	300	0
Bus Pad	SF	6,000	4,500	900	8,400
Unclassified Excavation	CY	12,134	7,332	4,178	3,770
Construction Items	Venice Blvd Cut Off Intersections				
	Units	Lincoln to Centinela	Centinela to 405 Fwy.	405 Fwy to Motor	Motor to 10 Fwy.
Conc. Int Curb and Gutter	LF	740	680	530	800
Driveway	SF	350	900	800	7,400
Conc. Sidewalk	SF	33,000	16,000	35,000	50,000
4"CMB	SF	33,350	16,900	35,800	57,400
4" AC Pvmt.	SF	202,000	122,000	61,000	44,400
Variable Thickness AC Pvmt.	TN	7,613	7,430	7,923	17,113
Bus Pad	SF	6,000	4,500	900	8,400
12" CMB	SF	211,080	128,260	99,860	54,400
8" Conc. Pvmt.	SF	202,000	122,000	61,000	44,400
Cross Gutter	SF	1,600	400	300	0

Lincoln to Centinela - Unclassified Excavation			
Item	Depth (FT)	Area (FT^2)	Volume (CY)
Street	1.5	202,000	11,222
Sidewalk	0.33	33,000	403
Driveway	0.33	350	4
Bus Pad	1.5	6,000	333
Cross Gutter	1.5	1,600	89
Curb and Gutter	1.5	1,480	82
		Total	12,134

Lincoln to Centinela - 4" CMB	
Item	Area (FT^2)
Sidewalk	33,000
Driveway	350
Total	33,350

Lincoln to Centinela - 12" CMB	
Street	202,000
Bus Pad	6,000
Curb and Gutter	1,480
Cross Gutter	1,600
Total	211,080

Centinela to 405 Fwy. - Unclassified Excavation			
Item	Depth (FT)	Area (FT^2)	Volume (CY)
Street	1.5	122,000	6,778
Sidewalk	0.33	16,000	196
Driveway	0.33	900	11
Bus Pad	1.5	4,500	250
Cross Gutter	1.5	400	22
Curb and Gutter	1.5	1,360	76
		Total	7,332

Centinela to 405 Fwy. - 4" CMB	
Item	Area (FT^2)
Sidewalk	16,000
Driveway	900
Total	16,900

Centinela to 405 Fwy. - 12" CMB	
Street	122,000
Bus Pad	4,500
Curb and Gutter	1,360
Cross Gutter	400
Total	128,260

405 Fwy to Motor - Unclassified Excavation			
Item	Depth (FT)	Area (FT^2)	Volume (CY)
Street	1	97,600	3,615
Sidewalk	0.33	35,000	428
Driveway	0.33	800	10
Bus Pad	1.5	900	50
Cross Gutter	1.5	300	17
Curb and Gutter	1.5	1,060	59
		Total	4,178

405 Fwy to Motor - 4" CMB	
Item	Area (FT^2)
Sidewalk	35,000
Driveway	800
Total	35,800

405 Fwy to Motor - 12" CMB	
Street	97,600
Bus Pad	900
Curb and Gutter	1,060
Cross Gutter	300
Total	99,860

Motor to 10Fwy. - Unclassified Excavation			
Item	Depth (FT)	Area (FT^2)	Volume (CY)
Street	1.5	44,400	2,467
Sidewalk	0.33	50,000	611
Driveway	0.5	7,400	137
Bus Pad	1.5	8,400	467
Cross Gutter	1.5	0	0
Curb and Gutter	1.5	1,600	89
		Total	3,770

Motor to 10Fwy. - 4" CMB	
Item	Area (FT^2)
Sidewalk	50,000
Driveway	7,400
Total	57,400

Motor to 10Fwy. - 12" CMB	
Street	44,400
Bus Pad	8,400
Curb and Gutter	1,600
Cross Gutter	0
Total	54,400

Lincoln to Centinela (North Side Venice)	6,864 LF Total			42 LF (Street Width)
Street Area =	288,288	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		172,973	SF
% of Street	60%			
			Value Based on % of Street	UNIT
Conversion Factor	0.0203	TN Per SF		
Volume=	72,072	CF	43,243	CF
	2,669	CY	1,602	CY
Weight=	5,852	TON	3,511	TON
Replacement of Street			Value Based on % of Street	UNIT
Unclassified Excavation, Depth=	1.5		115,315	SF
% of Street	40%			
			Value Based on % of Street	UNIT
Conversion Factor	0.0203	TN Per SF		
Volume=	432,432	CF	172,973	CF
	16,016	CY	6,406	CY
Weight=	5,852	TON	2,341	TON

Lincoln to Centinela (South Side Venice)	6,864 LF Total			42 LF (Street Width)
Street Area =	288,288	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		201,802	SF
% of Street	70%			
			Value Based on % of Street	UNIT
Conversion Factor	0.0203	TN Per SF		
Volume=	72,072	CF	50,450	CF
	2,669	CY	1,869	CY
Weight=	5,852	TON	4,097	TON
Replacement of Street			Value Based on % of Street	
Unclassified Excavation, Depth=	1.5		86,486	SF
% of Street	30%			
			Value Based on % of Street	UNIT
Conversion Factor	0.0203	TN Per SF		
Volume=	432,432	CF	129,730	CF
	16,016	CY	4,805	CY
Weight=	5,852	TON	1,756	TON

Cold Plane AC/Resurface				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Resurfacing Area =	374,774	SF		
AC Weight Required =	7,608	TN		
Replacement of Street				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Replacement Area =	201,802	SF		
Street Replacement Volume =	11,211	CY		

Centinela to 405 San Diego Fwy. (North Side Venice)	5,808 LF Total			42 LF (Street Width)
Street Area =	243,936	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		121,968	SF
% of Street	50%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	60,984	CF	30,492	CF
	2,259	CY	1,129	CY
Weight=	4,952	TON	2,476	TON
Replacement of Street			Value Based on % of Street	UNIT
Unclassified Excavation, Depth=	1.5		121,968	SF
% of Street	50%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	365,904	CF	182,952	CF
	13,552	CY	6,776	CY
Weight=	4,952	TON	2,476	TON

Centinela to 405 San Diego Fwy. (South Side Venice)	5,808 LF Total			42 LF (Street Width)
Street Area =	243,936	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		243,936	SF
% of Street	100%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	60,984	CF	60,984	CF
	2,259	CY	2,259	CY
Weight=	4,952	TON	4,952	TON
Replacement of Street			Value Based on % of Street	
Unclassified Excavation, Depth=	1.5		0	SF
% of Street	0%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	365,904	CF	0	CF
	13,552	CY	0	CY
Weight=	4,952	TON	0	TON

Cold Plane AC/Resurface				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Resurfacing Area =	365,904	SF		
AC Weight Required =	7,428	TN		
Replacement of Street				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Replacement Area =	121,968	SF		
Street Replacement Volume =	6,776	CY		

405 San Diego Fwy. to Motor (North Side Venice)	5,808 LF Total			42 LF (Street Width)
Street Area =	243,936	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		195,149	SF
% of Street	80%			
			Value Based on % of Street	UNIT
Conversion Factor	0.0203	TN Per SF		
Volume=	60,984	CF	48,787	CF
	2,259	CY	1,807	CY
Weight=	4,952	TON	3,962	TON
Replacement of Street			Value Based on % of Street	UNIT
Unclassified Excavation, Depth=	1.0		48,787	SF
% of Street	20%			
			Value Based on % of Street	UNIT
Conversion Factor for 8" of AC	0.0516	TN Per SF		
Volume=	48,787	CF	32,525	CF
TOTAL EXCAVATION	1,807	CY	1,205	CY
Weight=			2,517	TON
	TOTAL TONS OF AC :		6479	TON

405 San Diego Fwy. to Motor (South Side Venice)	5,808 LF Total			42 LF (Street Width)
Street Area =	243,936	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		195,149	SF
% of Street	80%			
			Value Based on % of Street	UNIT
Conversion Factor	0.0203	TN Per SF		
Volume=	60,984	CF	48,787	CF
	2,259	CY	1,807	CY
Weight=	4,952	TON	3,962	TON
Replacement of Street			Value Based on % of Street	
Unclassified Excavation, Depth=	1.0		48,787	SF
% of Street	20%			
			Value Based on % of Street	UNIT
Conversion Factor for 8" of AC	0.0516	TN Per SF		
Volume=	48,787	CF	32,525	CF
TOTAL EXCAVATION	1,807	CY	1,205	CY
Weight=			2,517	TON
	TOTAL TONS OF AC :		6,479	TON

Cold Plane AC/Resurface				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Resurfacing Area =	390,298	SF		
AC Weight Required =	7,923	TON		
Replacement of Street				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Replacement Area =	97,574	SF		
TOTAL EXCAVATION =	3,614	CY		
Street Replacement Volume of AC =	2,409	CY		
GREAT TOTAL TONS OF AC =	5,035	TON		

Motor to 10 Santa Monica Fwy. (North Side Venice)	10,560 LF Total			42 LF (Street Width)
Street Area =	443,520	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		421,344	SF
% of Street	95%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	110,880	CF	105,336	CF
	4,107	CY	3,901	CY
Weight=	9,003	TON	8,553	TON
Replacement of Street			Value Based on % of Street	UNIT
Unclassified Excavation, Depth=	1.5		22,176	SF
% of Street	5%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	665,280	CF	33,264	CF
	24,640	CY	1,232	CY
Weight=	9,003	TON	450	TON

Motor to 10 Santa Monica Fwy. (South Side Venice)	10,560 LF Total			42 LF (Street Width)
Street Area =	443,520	SQ Ft		
Cold Plane AC/Resurface			Value Based on % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		421,344	SF
% of Street	95%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	110,880	CF	105,336	CF
	4,107	CY	3,901	CY
Weight=	9,003	TON	8,553	TON
Replacement of Street			Value Based on % of Street	
Unclassified Excavation, Depth=	1.5		22,176	SF
% of Street	5%			
			Value Based on	
Conversion Factor	0.0203	TN Per SF	% of Street	UNIT
Volume=	665,280	CF	33,264	CF
	24,640	CY	1,232	CY
Weight=	9,003	TON	450	TON

Cold Plane AC/Resurface				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Resurfacing Area =	842,688	SF		
AC Weight Required =	17,107	TN		
Replacement of Street				
Item	**Total**	**Units**	Rounded up Value Used for Cost Estimate	Units
Street Replacement Area =	44,352	SF		
Street Replacement Volume =	2,464	CY		

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Lincoln Blvd														
	200	50		132			65						324	
	90			990			50							
	55													
			395			1122			115					
Superior Ave														
	225			2450										
	25													
	54													
			304			2450								
Penmar Ave														
	335			175			45							
	125													
			460			175			45					
Walnut Ave														
	25	25		300			30	40						25
	100			284										
	176													
			326			584			70					
Glyndon Ave														
	240	100					20							
	140	200					25							
	200													
			880						45					
Louella Ave														
	620	200		115			10	10						
	230													
	130													
			1180			115			20					
Glencoe Ave														
	105	100		90			15	20						
	110	100												
	150	200												
	100													
			865			90			35					
Walgrove Ave														
	930			528						800				
			930			528						800		
Redwood Ave														
	525	80		2105				40						
			605			2105			40					
Ashwood Ave														
	750													
			750											
Maplewood Ave														
	175	10000		3400			10							
	100						22							
			10275			3400			32					

Length = 1.30 Miles

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Rosewood Ave														
	1000		1000	2414		2414								

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Greenwood Ave														
	200 1575 600 70 450		2895	1152		1152	50		50	800		800		
Beethovens St														
	480 1440	500	2420											
Moore St														
		300	300	4200		4200								
May St														
	150		150	2940		2940								
Wade St														
	60 440	1000 100	1600	1260 2596		3856			0					
Stewart Ave														
	20 1056 400 650		2126	306		306								
Boise Ave														
	375 204 450		1029				60		60					
Wasatch Ave														
	2990 195	500	3685	450		450	10	10	20					
Colonial Ave														
	160 475		635	1170		1170	200		200					
Centinela Ave														
Totals			32810			27057			732			1600		

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Centinela Ave														
	1608						45							
	2530													
			4138						45					
Ocean View Ave														
	770			120			25							
	144						150							
			914			120			175					
Grand Views Blvd														
	765			720			55							
	434			891										
	364													
	912													
			2475			1611			55					
Moutain View Ave														
	730						50							
			730						50					
Inglewood Blvd														
	960	100					20						315	
	476						80						147	
	570													
			2106						100					
Barrington Ave														
	190			200			35						264	
			190			200			35					
Barry Ave														
	143			900										
	154			225										
				1836										
			297			2961								
Mclaughlin Ave														
	400	920		1020			50			400				
	600	1040		2160			35							
	375			5000										
	200			1335										
	240													
			3775			9515			85			400		
Butler Ave														
	280			410			36						100	
	100			1380			38							
	230			350										
			610			2140			74					
Sawtelle Blvd														
	300						54							
	350													
			650						54					
405 San Diego FWY														
Totals			15885			16547			673			400		

Length = 1.1 Miles

VENICE BLVD RELINQUISHMENT

Street Name		Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
		North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
405 San Diego FWY															
		275		275				55 12		67					
Sepulveda Blvd															
		1800 143 1125 728		3796							300		300		
Bently Ave															
		105 185		290	1680 333		2013								
Tilden Ave															
		580 189 272		1041											
Military Ave															
		75 1155 280 324	200	2034	165 616 135		916								
Greenfield Ave															
		266		266	185		185							517	
Veteran Ave															
		576 1458		2034				18 38		56					
Kelton Ave															
		84 875 975 600	1250 1440	5224	270		270		35	35				225	
Midvale Ave															
		3100 1100 84 400	780 500	5964				80	80	160					
Westwood Blvd															
		9000		9000											
Glendon Ave															

Length = 1.1 Mile

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
	500 200		700											
Overland														
	100	1560 675	2335					110	110					
Keystone Ave														
		810 690 500	2000		490	490		100	100					
Motor Ave														
Total			34959			3874			528			300		

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Motor Ave														
	4400	1145 625	6170		850 2000	2850		230	230					
Vinton Ave														
	200	400 700	1300											
Jasmine Ave														
		310 175	485											
Clarington Ave														
					1275	1275								990
Dunn Drive														
	800	770 840	2410					50	50					
Hughes Ave														
		620 900	1520		28880	28880								
Watseka Ave														
	300	250	550											
Cardiff Ave														
	1120	1500	2620	2500		2500								
Bagley Ave														
	1000		1000											
Canfield Ave														
					105	105								
Culver Blvd														
	1000	100	1100											
Robertson Blvd														
	400	1000	1400	3500		3500								
National Ave														
				1700		1700								
Ivy St														
Helms Ave														
	750			377										

Length = 2 Miles

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
				416										
				468										
				280										
			750			1541								
Hutchison Ave														
	700	200		1573										
			900			1573								
Halm Ave														
	100	1050					75	30						
	750	770												
	125													
	310													
	700													
			3805						105					

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Cattaraugus Ave														
	1260	300			500								750	480
	952	1150												
			3662			500								
Hervey St														
	350	500		1980										125
	150	175												125
	620	840												
			2635			1980								
Olin St														
							65							
									65					
Chariton St														
	500	176		2600	750								500	1200
	1750	640		500	1550								421	500
	200	675		1600	825								880	450
	400			650	825								880	
	992				1125									
			5333			10425								
La Cienega Blvd														
	440	1750					60	175						
	6160	2400					105							
		3300												
▼			14050						340					
10 HWY Santa Monica														
Totals			49690			56829			790			0		
Totals			**133344**			**104307**			**2723**			**2300**		

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				50%	0%	Heavy Traffic Lanes
324						
				100%	0%	Aligator Cracks
				100%	0%	Aligator Cracks
				0%	0%	100% Resurfacing
25						
	900			0%	0%	100% Resurfacing
			900			
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
	1496			0%	0%	100% Resurfacing
			1496			
				50%	0%	Aligator Cracks
	900			50%	0%	Aligator Cracks
			900			
				50%	0%	Aligator Cracks/Heavy Traffic Lanes

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				50%	0%	Aligator Cracks/Heavy Traffic Lanes

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
	900			50%	0%	Aligator Cracks/Heavy Traffic Lanes
			900			
				30%	0%	At Intersection Bus Ln.
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
	900			50%	0%	At Intersections on both ends
			900			
				100%	0%	Aligator Cracks
				50%	0%	At Intersection W/ Wasatch Ave
				30%	0%	At Intersection W/Colonial Ave
	900			30%	0%	100% Of Intersection W/ Centinela Ave
			900			
349			5996	38%	0%	Avg

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				30%	0%	At Intersection of both ends
	900		900	30%	0%	At Intersection of both ends
				50%	0%	At Intersection of both ends & Heavy Traffic Lanes
				30%	0%	At Intersection of both ends
462	900		900	50%	0%	At Intersection of both ends & Heavy Traffic Lanes
264				30%	0%	At Intersection of both ends
	900		900			
	900		900	100%	0%	At intersection W/Mclaughlin Ave
100	900		900	30%	0%	At intersection W/Sawtelle Blvd
				100%	0%	Due to Heavy Equipment Caltrans Bridge Construction
826			4500	50%	0%	Avg

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
	900		900	100%	0%	Due to Heavy Equipment Caltrans Bridge Construction
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
517				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
225				0%	50%	100% Resurfacing Aligator Cracks
				0%	50%	100% Resurfacing Aligator Cracks
				0%	50%	100% Resurfacing Aligator Cracks

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				0%	50%	100% Resurfacing Aligator Cracks
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
742			900	8%	15%	Avg

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
		225	225	0%	0%	100% Resurfacing
				0%	50%	100% Resurfacing
		900	900	0%	0%	100% Resurfacing
990				0%	0%	
		500	500	0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
	900	900	1800	0%	0%	100% Resurfacing
	450	900	1350	0%	0	100% Resufacing
				0%	0	100% Resurfacing
				0%	0	100% Resurfacing
				0%	0	100% Resurfacing
				0%	0	100% Resurfacing
				0%	0%	100% Resurfacing

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				0%	0%	100% Resurfacing
	900			0%		100% Resurfacing
					0%	100% Resurfacing
			900			

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
		900		0%		100% Resurfacing
1230			900		0%	100% Resurfacing
				0%		100% Resurfacing
250					0%	100% Resurfacing
					0%	100% Resurfacing
				0%		100% Resurfacing
4831					0%	100% Resurfacing
	900	900		0%		100% Resurfacing
					0%	100% Resurfacing
			1800			
7301			8375	0%	2%	Avg
9218			**19771**	24%	4%	Avg

Lincoln to 10 Hwy Santa Monica (South Side Venice)	29,040	LF Total	44	LF (Street Width)
Street Area	1,277,760	SQ Ft		
Cold Plane AC/Resurface			Value Per % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		958,320	SF
% of Street	75%			
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT
Volume=	319,440	CF	239,580	CF
	11,831	CY	8,873	CY
Weight=	25,939	TON	19,454	TON
Replacement of Street			Value Per % of Street	
Unclassified Excavation, Depth=	1.5		319,440	SF
% of Street	25%			
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT
Volume=	1,916,640	CF	479,160	CF
	70,987	CY	17,747	CY
Weight=	25,939	TON	6,485	TON

10 Hwy Santa Monica to Lincoln (North Side Venice)	29,040	LF Total	44	LF (Street Width)	Total	Units	Round Up Value Used for Cost Estimate	Units
Street Area	1,277,760	SQ Ft						
Cold Plane AC/Resurface			Value Per % of Street	UNIT				
Variable Thickness AC Pavement (t=3") Depth=	0.25		1,086,096	SF	2,044,416	SF	2,044,500	SF
% of Street	85%							
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT				
Volume=	319,440	CF	271,524	CF				
	11,831	CY	10,056	CY				
Weight=	25,939	TON	22,048	TON	41,502	TN	41,550	TN
Replacement of Street			Value Per % of Street	UNIT				
Unclassified Excavation, Depth=	1.5		191,664	SF	511,104	SF	511,200	SF
% of Street	15%							
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT				
Volume=	1,916,640	CF	287,496	CF				
	70,987	CY	10,648	CY	28,395	CY	28,400	CY
Weight=	25,939	TON	3,891	TON				

South Sidewalk (South Side Venice)		17,415	SQ FT Total
	50	SQ FT	
	25	SQ FT	
	100	SQ FT	
	200	SQ FT	
	200	SQ FT	
	100	SQ FT	
	100	SQ FT	
	200	SQ FT	
	80	SQ FT	
	10000	SQ FT	
	500	SQ FT	
	300	SQ FT	
	1000	SQ FT	
	100	SQ FT	
	500	SQ FT	
	100	SQ FT	
	920	SQ FT	
	1040	SQ FT	
	200	SQ FT	
	100	SQ FT	
	100	SQ FT	
	100	SQ FT	
	1000	SQ FT	
	100	SQ FT	
	200	SQ FT	
	100	SQ FT	
Side Walk Area		17,415	SQ Ft

North Sidewalk (North Side Venice)		62,565	SQ FT Total
	305	SQ FT	
	10940	SQ FT	
	2130	SQ FT	
	840	SQ FT	
	400	SQ FT	
	1000	SQ FT	
	1000	SQ FT	
	1120	SQ FT	
	300	SQ FT	
	800	SQ FT	
	200	SQ FT	
	100	SQ FT	
	700	SQ FT	
	9000	SQ FT	
	1550	SQ FT	
	500	SQ FT	
	2700	SQ FT	
	500	SQ FT	
	3750	SQ FT	
	3000	SQ FT	
	250	SQ FT	
	900	SQ FT	
	2000	SQ FT	
	1000	SQ FT	
	500	SQ FT	
	1000	SQ FT	
	200	SQ FT	
	300	SQ FT	
	200	SQ FT	
	2500	SQ FT	
	200	SQ FT	
	1000	SQ FT	
	900	SQ FT	
	2400	SQ FT	
	600	SQ FT	
	800	SQ FT	
	500	SQ FT	
	400	SQ FT	
	1600	SQ FT	
	250	SQ FT	
	230	SQ FT	
	900	SQ FT	
	1000	SQ FT	
	100	SQ FT	
	1600	SQ FT	
	200	SQ FT	
	200	SQ FT	
Side Walk Area		62,565	SQ Ft

Sidewalk

Total	Units	Round Up Value Used for Cost Estimate	Units
79,980	SF	80,000	SF

Curb & Gutter (South Side Venice)		136	LF
	40	LF	
	10	LF	
	20	LF	
	10	LF	
	16	LF	
	10	LF	
	10	LF	
	10	LF	
	10	LF	
Total Curb & Gutter Replacement		136	LF

Curb & Gutter (North Side Venice)		255	LF
	55	LF	
	200	LF	
		LF	
		LF	
		LF	
		LF	
		LF	
		LF	
		LF	
Total Curb & Gutter Replacement		255	LF

Curb & Gutter

Total	Units	Round Up Value Used for Cost Estimate	Units
391	LF	400	LF

Drive Way (South Side Venice)		1,000	SQ FT
	1000	SQ FT	
		SQ FT	
Total Drive Way Replacement		1,000	SQ FT

Drive Way (North Side Venice)		1,000	SQ FT
	600	SQ FT	
	200	SQ FT	
	200	SQ FT	
		SQ FT	
Total Drive Way Replacement		1,000	SQ FT

Drive Way

Total	Units	Round Up Value Used for Cost Estimate	Units
2,000		2,000	SF

Bus Pad (South Side Venice)		2160	SQ FT
	1080	SQ FT	
	1080	SQ FT	
		SQ FT	
		SQ FT	
		SQ FT	
		SQ FT	
Total Bus Pad Area		2160	SQ FT

Bus Pad (North Side Venice)		5400	SQ FT
	1080	SQ FT	
	1080	SQ FT	
	1080	SQ FT	
	1080	SQ FT	
	1080	SQ FT	
		SQ FT	
Total Bus Pad Area		5400	SQ FT

Bus Pad

Total	Units	Round Up Value Used for Cost Estimate	Units
7,560		7,600	SF

Land Scape (South Side Venice)		94,000	SQ FT Total
	47000	SQ FT	
	47000	SQ FT	
Landscape Area		94,000	SQ Ft

Land Scape (North Side Venice)		47,000	SQ FT Total
	1500	SQ FT	
	1700	SQ FT	
	3500	SQ FT	
	2500	SQ FT	
	1000	SQ FT	
	2000	SQ FT	
	2000	SQ FT	
	2400	SQ FT	
	6000	SQ FT	
	2000	SQ FT	
	1000	SQ FT	
	4000	SQ FT	
	3000	SQ FT	
	2000	SQ FT	
	2000	SQ FT	
	3800	SQ FT	
	400	SQ FT	
	600	SQ FT	
	2000	SQ FT	
	1600	SQ FT	
	2000	SQ FT	
		SQ FT	
		SQ FT	
		SQ FT	

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Lincoln Blvd														
	200	50		132			65						324	
	90			990			50							
	55													
			395			1122			115					
Superior Ave														
	225			2450										
	25													
	54													
			304			2450								
Penmar Ave														
	335			175			45							
	125													
			460			175			45					
Walnut Ave														
	25	25		300			30	40						25
	100			284										
	176													
			326			584			70					
Glyndon Ave														
	240	100					20							
	140	200					25							
	200													
			880						45					
Louella Ave														
	620	200		115			10	10						
	230													
	130													
			1180			115			20					
Glencoe Ave														
	105	100		90			15	20						
	110	100												
	150	200												
	100													
			865			90			35					
Walgrove Ave														
	930			528						800				
			930			528						800		
Redwood Ave														
	525	80		2105				40						
			605			2105			40					
Ashwood Ave														
	750													
			750											
Maplewood Ave														
	175	10000		3400			10							
	100						22							
			10275			3400			32					

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Rosewood Ave														
	1000		1000	2414		2414								
Greenwood Ave														
	200 1575 600 70 450		2895	1152		1152	50		50	800		800		
Beethovens St														
	480 1440	500	2420											
Moore St														
		300	300	4200		4200								
May St														
	150		150	2940		2940								
Wade St														
	60 440	1000 100	1600	1260 2596		3856			0					
Stewart Ave														
	20 1056 400 650		2126	306		306								
Boise Ave														
	375 204 450		1029				60		60					
Wasatch Ave														
	2990 195	500	3685	450		450	10	10	20					
Colonial Ave														
	160 475		635	1170		1170	200		200					
Centinela Ave														
	1608 2530		4138				45		45					
Ocean View Ave														
	770			120			25							

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
	144						150							
			914			120			175					
Grand Views Blvd														
	765			720			55							
	434			891										
	364													
	912													
			2475			1611			55					
Moutain View Ave														
	730						50							
			730						50					
Inglewood Blvd														
	960	100					20						315	
	476						80						147	
	570													
			2106						100					
Barrington Ave														
	190			200			35						264	
			190			200			35					
Barry Ave														
	143			900										
	154			225										
				1836										
			297			2961								
Mclaughlin Ave														
	400	920		1020			50			400				
	600	1040		2160			35							
	375			5000										
	200			1335										
	240													
			3775			9515			85			400		
Butler Ave														
	280			410			36						100	
	100			1380			38							
	230			350										
			610			2140			74					
Sawtelle Blvd														
	300						54							
	350						12							
	275						55							
			925						121					
Sepulveda Blvd														
	1800									300				
	143													
	1125													
	728													
			3796									300		
Bently Ave														
	105			1680										

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
	185		290	333		2013								
Tilden Ave														
	580 189 272		1041											
Military Ave														
	75 1155 280 324	200	2034	165 616 135		916								
Greenfield Ave														
	266		266	185		185							517	
Veteran Ave														
	576 1458		2034				18 38		56					
Kelton Ave														
	84 875 975 600	1250 1440	5224	270		270		35	35				225	
Midvale Ave														
	3100 1100 84 400	780 500	5964				80	80	160					
Westwood Blvd														
	9000		9000											
Glendon Ave														
	500 200		700											
Overland														
	100	1560 675	2335					110	110					
Keystone Ave														
		810 690 500	2000		490	490		100	100					

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
Motor Ave														
	4400	1145 625	6170		850 2000	2850		230	230					
Vinton Ave														
	200	400 700	1300											
Jasmine Ave														
		310 175	485											
Clarington Ave														
					1275	1275								990
Dunn Drive														
	800	770 840	2410					50	50					
Hughes Ave														
		620 900	1520		28880	28880								
Watseka Ave														
	300	250	550											
Cardiff Ave														
	1120	1500	2620	2500		2500								
Bagley Ave														
	1000		1000											
Canfield Ave														
					105	105								
Culver Blvd														
	1000	100	1100											
Robertson Blvd														
	400	1000	1400	3500		3500								
National Ave														
				1700		1700								
Ivy St														
Helms Ave														
	750			377										

VENICE BLVD RELINQUISHMENT

Street Name	Side Walk (SF)			Parkways (SF)			Curb & Gutter (LF)			Cross Gtr (SF)			Drive Way (SF)	
	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side	Total	North Side	South Side
				416										
				468										
				280										
			750			1541								
Hutchison Ave														
	700	200		1573										
			900			1573								
Halm Ave														
	100	1050					75	30						
	750	770												
	125													
	310													
	700													
			3805						105					
Cattaraugus Ave														
	1260	300			500								750	480
	952	1150												
			3662			500								
Hervey St														
	350	500		1980										125
	150	175												125
	620	840												
			2635			1980								
Olin St														
							65							
									65					
Chariton St														
	500	176		2600	750								500	1200
	1750	640		500	1550								421	500
	200	675		1600	825								880	450
	400			650	825								880	
	992				1125									
			5333			10425								
La Cienega Blvd														
	440	1750					60	175						
	6160	2400					105							
		3300												
			14050						340					
10 HWY Santa Monica														
Totals			**133344**			**104307**			**2723**			**2300**		

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				50%	0%	Heavy Traffic Lanes
324						
				100%	0%	Aligator Cracks
				100%	0%	Aligator Cracks
				0%	0%	100% Resurfacing
25						
	900			0%	0%	100% Resurfacing
			900			
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
	1496			0%	0%	100% Resurfacing
			1496			
				50%	0%	Aligator Cracks
	900			50%	0%	Aligator Cracks
			900			
				50%	0%	Aligator Cracks/Heavy Traffic Lanes

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				50%	0%	Aligator Cracks/Heavy Traffic Lanes
	900			50%	0%	Aligator Cracks/Heavy Traffic Lanes
			900			
				30%	0%	At Intersection Bus Ln.
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
	900			50%	0%	At Intersections on both ends
			900			
				100%	0%	Aligator Cracks
				50%	0%	At Intersection W/ Wasatch Ave
				30%	0%	At Intersection W/Colonial Ave
	900			30%	0%	100% Of Intersection W/ Centinela Ave
			900			
				30%	0%	At Intersection of both ends
	900			30%	0%	At Intersection of both ends

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
			900			
				50%	0%	At Intersection of both ends & Heavy Traffic Lanes
				30%	0%	At Intersection of both ends
	900			50%	0%	At Intersection of both ends & Heavy Traffic Lanes
462			900			
				30%	0%	At Intersection of both ends
264						
	900					
			900			
	900			100%	0%	At intersection W/Mclaughlin Ave
			900			
	900			30%	0%	At intersection W/Sawtelle Blvd
100			900			
	900			100%	0%	Due to Heavy Equipment Caltrans Bridge Construction
			900			
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
				0%	0%	100% Resurfacing
517						
				0%	0%	100% Resurfacing
				0%		100% Resurfacing
					50%	Aligator Cracks
225						
				0%		100% Resurfacing
					50%	Aligator Cracks
				0%		100% Resurfacing
					50%	Aligator Cracks
				0%		100% Resurfacing
					50%	Aligator Cracks
				0%		100% Resurfacing
				0%		100% Resurfacing

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
		225	225	0%		100% Resurfacing
				0%	50%	100% Resurfacing
		900	900	0%		100% Resurfacing
990						
		500	500	0%		100% Resurfacing
				0%		100% Resurfacing
				0%		100% Resurfacing
				0%		100% Resurfacing
	900	900	1800	0%		100% Resurfacing
	450	900	1350	0%		100% Resufacing
				0%		100% Resurfacing
				0%		100% Resurfacing
				0%		100% Resurfacing
				0%		100% Resurfacing
				0%	0%	100% Resurfacing

	Bus Pad (SF)			AC Replacement		
Total	North Side	South Side	Total	North Side	South Side	Comment
				0%	0%	100% Resurfacing
	900			0%		100% Resurfacing
					0%	100% Resurfacing
			900			
		900		0%		100% Resurfacing
					0%	100% Resurfacing
1230			900			
				0%		100% Resurfacing
					0%	100% Resurfacing
250						
					0%	100% Resurfacing
				0%		100% Resurfacing
					0%	100% Resurfacing
4831						
	900	900		0%		100% Resurfacing
					0%	100% Resurfacing
			1800			
9218			19771			

Lincoln to 10 Hwy Santa Monica (South Side Venice)	29,040	LF Total	42	LF (Street Width)
Street Area	1,219,680	SQ Ft		
Cold Plane AC/Resurface			Value Per % of Street	UNIT
Variable Thickness AC Pavement (t=3") Depth=	0.25		975,744	SF
% of Street	80%			
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT
Volume=	304,920	CF	243,936	CF
	11,293	CY	9,035	CY
Weight=	24,760	TON	19,808	TON
Replacement of Street			Value Per % of Street	
Unclassified Excavation, Depth=	1.5		243,936	SF
% of Street	20%			
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT
Volume=	1,829,520	CF	365,904	CF
	67,760	CY	13,552	CY
Weight=	24,760	TON	4,952	TON

10 Hwy Santa Monica to Lincoln (North Side Venice)	29,040	LF Total	42	LF (Street Width)	Total	Units	Round Up Value Used for Cost Estimate	Units
Street Area	1,219,680	SQ Ft						
Cold Plane AC/Resurface			Value Per % of Street	UNIT				
Variable Thickness AC Pavement (t=3") Depth=	0.25		914,760	SF	1,890,504	SF	1,900,000	SF
% of Street	75%							
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT				
Volume=	304,920	CF	228,690	CF				
	11,293	CY	8,470	CY				
Weight=	24,760	TON	18,570	TON	38,377	TN	39,000	TN
Replacement of Street			Value Per % of Street	UNIT				
Unclassified Excavation, Depth=	1.5		304,920	SF	548,856	SF	550,000	SF
% of Street	25%							
Conversion Factor	0.0203	TN Per SF	Value Per % of Street	UNIT				
Volume=	1,829,520	CF	457,380	CF				
	67,760	CY	16,940	CY	30,492	CY	30,500	CY
Weight=	24,760	TON	6,190	TON				

PRELIMINARY COST ESTIMATE

Project Title: Venice Blvd. Relinquishment - Lincoln Blvd to 10 Santa Monica Fwy.

7/15/2016

Item	Description	Quantity	Unit	Unit Price	Item Total
Remove:					
1	Curb and Gutter (a=2')	2,730	LF	$6.90	$18,837
2	Sidewalk	133,400	SF	$2.50	$333,500
3	Driveway	9,300	SF	$3.00	$27,900
4	6" AC Pavement	550,000	SF	$3.00	$1,650,000
5	Cold Plane AC Pavement	1,900,000	SF	$1.80	$3,420,000
6	8" Conc. Pavement (Cement Treated Base)	550,000	SF	$5.00	$2,750,000
7	Cross Gutter (g=4')	2,300	SF	$4.10	$9,430
8	Bus Pad	19,800	SF	$5.00	$99,000
9	Unclassified Excavation	30,500	CY	$80.00	$2,440,000
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	2,730	LF	$35.00	$95,550
11	Driveways	9,300	SF	$7.00	$65,100
12	Conc. Sidewalk (t=3")	133,400	SF	$5.00	$667,000
13	4" CMB	133,400	SF	$1.50	$200,100
14	4" AC Pavement	550,000	SF	$3.00	$1,650,000
15	Variable Thickness AC Pavement (t=3")	39,000	TN	$120.00	$4,680,000
16	Bus Pad	19,800	SF	$12.00	$237,600
17	12" CMB	550,000	SF	$3.00	$1,650,000
18	8" Conc. Pavement	550,000	SF	$8.00	$4,400,000
19	Cross Gutter (g=4')	2,300	SF	$10.00	$23,000
20	Landscaping Elements	1	LS		$1,300,000
21	Traffic Control During Construction	1	LS		$400,000
22	Street Lighting	1	LS		$945,300
23	Traffic Signals	1	LS		$880,460
24	Signs & Striping	1	LS		$270,000
25	Inductive Loop Detectors	1	LS		$108,000
				Subtotal:	**$28,320,777**
				Mobilization & Field Office (10%):	**$2,832,078**
				Contingency (20%):	$5,664,155
				Design, Bid & Award, Construction Management & Inspection (22%):	$6,230,571
				Subtotal:	$43,047,581
				Cost Escalation (5% for two years):	$4,412,377
04/19/07				**TOTAL ROUNDED PROJECT COST:**	**$47,000,000**

AGREEMENT FOR MAINTENANCE OF STATE HIGHWAYS IN THE CITY OF LOS ANGELES

THIS AGREEMENT is made effective this 1st day of January, 2005, by and between the State of California, acting by and through the Department of Transportation, hereinafter referred to as " STATE", and City of Los Angeles hereinafter referred to as "CITY".

I. The Parties desire that CITY perform specific delegated maintenance functions on those portions of the State Highways identified herein which are located within CITY's jurisdiction, as is authorized in Section 130 of the Streets and Highways Code, and described under Exhibit "A" hereof, or as said Exhibit may be subsequently modified with the consent of the parties hereto, acting by and through their authorized representatives.

II. This Agreement shall supersede any previous agreement and/or amendments thereto entered into with CITY for the maintenance of the same identified portion of those State highways.

III. The degree or extent of maintenance work to be performed, and the standards therefore, shall be in accordance with the provisions of Section 27 of the Streets and Highways Code and the current edition of the State Maintenance Manual (a copy of which has been provided to CITY), or as may be prescribed from time to time in writing by the District Director and agreed to by CITY in writing. "District Director," as used herein, means the District Director of the Department of Transportation assigned to the territory in which CITY is located, or an authorized representative.

IV. A. At all CITY street vehicular or pedestrian overcrossings of STATE Freeways, which were elevated to allow construction of that freeway, CITY is responsible for maintenance, at CITY expense, of the deck and/or surfacing (including water imperviousness) and all portions of the structure above the bridge deck, including, but not limited to, lighting installations, as well as all traffic service facilities (signals, signs, pavement markings, rails, etc.) that may be required for the benefit or control of traffic using the overcrossing. STATE will maintain, at STATE expense, the structure below the deck surface and any screening installed by STATE on overpasses over the freeway on which pedestrians are permitted (except any non-standard screening requested by CITY).

B. At all CITY street vehicular or pedestrian undercrossings of elevated STATE Freeways, CITY is responsible for the maintenance, at CITY expense, of the roadway sections, including the traveled way, shoulders, curbs, sidewalks, wall and slope surfaces (including graffiti removal), drainage installations, lighting installations (including soffit lighting), and traffic service facilities that may be required for the benefit or control of traffic using the undercrossings. The STATE will maintain, at STATE expense, the structure proper of those elevated freeway facilities constructed to allow the passage of CITY traffic.

V. The functions and levels of maintenance service delegated to CITY in the attached Exhibit A - Delegation of Maintenance Functions by Routes, have been considered in setting authorized total dollar reimbursement amounts. CITY may perform additional work if desired, but STATE will not reimburse CITY for any work outside of the specific delegated maintenance work or in excess of the authorized dollar limits established herein or for the performance of any work not described in said Exhibit "A".

VI. A. STATE will reimburse CITY for the actual direct and indirect costs, using a unit rate basis as necessary, of all routine maintenance work performed by CITY as delegated under Exhibit "A" to this Agreement. It is agreed that during any fiscal year, the maximum expenditure on any designated route shall not exceed the amount as shown available for that route in Exhibit "A" to this Agreement unless such expenditure is revised by an amended Agreement or otherwise adjusted or modified as hereinafter provided.

B. The cost of operating, maintaining, repairing, replacing and upgrading STATE-owned traffic signals and safety lighting now in place at the intersection of any State highway route and any CITY street/road shall be shared as shown in Exhibits "B" and "C" respectively.

C. The expenditure per designated route for routine maintenance work, as referred to above, may only be increased or decreased, redistributed between routes, or additional expenditures authorized for specific projects, when such are an adjustment of expenditures for routine maintenance or such specific work is authorized in advance and in writing by the STATE District Director or an authorized representative and is accepted by CITY in the form of an amendment to Exhibit "A".

D. Additional expenditures, or an adjustment of expenditures, once authorized, shall apply only during the fiscal year designated therein and shall not be deemed to permanently modify or change the basic maximum expenditure per route as hereinafter specified. An adjustment of any said maximum expenditure; either as an increase or decrease shall not affect any other term of this Agreement.

VII. A. A new Exhibit A – Delegation of Maintenance Functions by Routes, a new Exhibit B – Cost Distribution for Traffic Signals, and a new Exhibit C - Cost Distribution for Traffic Safety Lighting, will be provided annually by STATE and approved by CITY for each fiscal year.

B. CITY's actual direct maintenace cost for each fiscal year of this Agreement, provided it is not terminated according to the provisions herein, shall not increase or decrease in excess of the increase or decrease (if any) in the U.S. Department of Labor, Bureau of Labor Statistics, all Urban Consumers, Consumer Price Index (CPI) for the Los Angeles-Long Beach region.

C. Said increase or decrease shall be determined as of the month preceding the 120th day before the conclusion of the anniversary date of the Agreement for each fiscal year and shall be based upon the percentage increase or decrease (if any) of the CPI for the twelve months preceding the date of such determination and adopted into said Exhibits "A", "B" or "C" as appropriate.

D. In the event the actual change in the CPI should exceed six (6) percent during any one year, CITY may negotiate adjustments to the rate structure with STATE.

VIII. A. CITY shall submit duplicate signed invoices quarterly on the last day of the months of November, February, May and August. STATE shall pay CITY within thirty (30) calendar days of receipt of those invoices, from available funds encumbered from the applicable State Budget Act. Bills for any fiscal year (July 1 through June 30) must be submitted promptly following the close of STATE's fiscal year, but not later than that following November 30th, and should be coded according to the Caltrans HM Program

Code as outlined in this Agreement. Bills submitted after that date for work performed in that preceding fiscal year will be deemed waived and will not be honored.

STATE shall submit duplicate signed invoices quarterly on the last day of the months of November, February, May and August. CITY shall pay STATE within thirty (30) calendar days of receipt of those invoices, from available funds encumbered from the applicable City Budget Act. Bills for any fiscal year (July 1 through June 30) must be submitted promptly following the close of CITY's fiscal year, but not later than that following November 30th, and should be coded according to the Caltrans HM Program Code as outlined in this Agreement. Bills submitted after that date for work performed in that preceding fiscal year will be deemed waived and will not be honored.

B. The unit rate basis computation will include both direct and indirect costs. Maintenance services provided by contract will exclude additional indirect costs. An actual handling charge by CITY for the direct cost of processing this type of bill of **1/2%** of the total invoice will be allowed.

C. CITY shall retain and make available for Audit by STATE or a designee of STATE all records, documents and sources necessary to identify and properly allocate allowable costs paid under this Agreement for a period of three 3 years from the date of receipt by CITY of STATE's last payment made for these contracted services.

IX. Nothing in the provisions of this Agreement is intended to affect the legal liability of either STATE or CITY by imposing any standard of care respect of the maintenance of State highways different from the standard of care imposed by law.

X. It is understood and agreed that neither STATE nor any of its officers or employees are responsible for any damage or liability occurring by reason of anything done or omitted to be done by CITY under or in connection with any work, authority or jurisdiction delegated to CITY under this Agreement. It is understood and agreed that, pursuant to Government Code Section 895.4, CITY shall defend, indemnify and hold harmless STATE and all of its officers and employees from all claims, suits or actions of every name, kind and description brought for or in account of injuries to or death of any person or damage to property resulting from anything done or omitted to be done by CITY under or in connection with any work, authority or jurisdiction delegated to CITY under this Agreement.

XI. It is understood and agreed that neither CITY nor any officer or employee thereof is responsible for any damage or liability occurring by reason of anything done or omitted to be done by STATE under or in connection with any work, authority or jurisdiction delegated to STATE under this Agreement. It is understood and agreed that, pursuant to Government Code Section 895.4, STATE shall defend, indemnify and save harmless CITY and all of its officers and employees from all claims, suits or actions of every name, kind and description brought for or on account of injuries to or death of any person or damage to property resulting from anything done or omitted to be done by STATE under or in connection with any work, authority or jurisdiction delegated to STATE under this Agreement.

XII. Costs and expenses authorized to be incurred by STATE under the terms of this Agreement are conditioned upon the passage of the annual State of California Budget by the Legislature, the allocation of funding by the California Transportation Commission as appropriate, and the encumbrance of funding to the District Office of STATE to pay billings by CITY each fiscal year.

XIII. This Agreement shall remain in full force and effect until amended by the mutual consent of the parties thereto or terminated by either party upon thirty (30) days' prior written notice to the other party.

IN WITNESS WHEREOF, the parties hereto have set their hands and seal the day and year first above written.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

WILLIAM A. KEMPTON
Director of Transportation
By

Douglas R. Failing
District Director

THE CITY OF LOS ANGELES
By

DEC 17 2004

James K. Hahn
Mayor

APPROVED AS TO FORM AND LEGALITY
Rockard J. Delgadillo
City Attorney
By

Shelley I. Smith
Assistant City Attorney

*Approved as to form and procedure:
By

Attorney (State)
Department of Transportation

ATTEST:
J. Michael Carey
City Clerk
By

12-17-04

Deputy City Clerk

C-107755

* Approval by STATE's Attorney is not required unless changes are made to this form, in which case the draft will be submitted for Headquarters' review and approval by STATE's Attorney as to form and procedures.

EXHIBIT "A"

DELEGATION OF MAINTENANCE FUNCTIONS BY ROUTES

The specific maintenance function indicted below (and on "EXHIBITS "B" and "C"") is hereby delegated to CITY. This delegation of maintenance function set forth herein does not include the control and maintenance areas and functions, which rest with CITY under the terms of executed Freeway Agreements and/or Freeway Maintenance Agreements.

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
1			HM2C – Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 27,691 $ 112,116 $ 17,855 **$162,662**
1A	4.68	**PACIFIC COAST HIGHWAY** from city limits near Hobson Avenue OH, PM 8.418 to city limits contiguous with the City of Lomita at PM 13.10, a length of 4.68 miles for this portion; also,	HM2C HM2D HM4K	
1A	1.44	**SEPULVEDA BOULEVARD** from city limits at Imperial Highway, PM 25.92, to Lincoln Boulevard, PM 27.36 a length of 1.44 miles for this portion; also **Special Maintenance Responsibilities See Attachment 2 Items (7), (10), (13)&(14).**	HM2C HM2D HM4K	
1A	2.15	**LINCOLN BOULEVARD** from south boundary of old Pacific Electric Railway R/W PM 31.19, to city limits contiguous with the City of Santa Monica at PM 33.34, a length of 2.15 miles for this portion.	HM2C HM2D HM4K	
1A	1.70	**LINCOLN BOULEVARD** from northwest boundary of International Airport near 94th Street, PM 28.46, to city limits 0.605 mile south east of Jefferson Boulevard, PM 30.16 a length of 1.70 miles for this portion; also **Special Maintenance Responsibilities See Attachment 2 item (7) & (13).**	HM2C HM2D HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
1B	3.24	**PACIFIC COAST HIGHWAY** From city limits near Adelaide Drive, PM 36.80, to city limits near Castle Rock, PM 40.04, a length of 3.24 miles for this portion. **Special Maintenance Responsibilities See Attachment 2 item (2) & (6).**	HM2C HM2D HM4K	
1C	1.10	**LINCOLN BOULEVARD** from Sepulveda Boulevard, PM 27.36 to Northwest boundary of the International Airport near 94th Street, PM 28.46, a length of 1.10 miles **Special Maintenance Responsibilities See Attachment 2 item (7) & (13).**		
2			HM2C – Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 28,896 $118,553 $ 25,079 **$177,528**
2A	1.36	**SANTA MONICA BOULEVARD** from west city limits at west line of Centinela Avenue, PM 2.32, to Cotner, PM 3.68. **Special Maintenance Responsibilities See Attachment 2 item (7) & (14).**	HM2C HM2D HM4K	
	2.12	**SANTA MONICA BOULEVARD** from city limits 0.04 mile east of La Brea Avenue, PM 10.62, to off-Ramp southbound Hollywood Freeway, Route 101, PM 12.74, a length of 2.12 miles.	HM2C HM2D HM4K	
2B	1.47	**ALVARADO STREET** from Hollywood Freeway, Rt. 101, PM 12.74, to Glendale Boulevard; PM14.21, a total of 1.47 miles for this area.		
	4.64	**GLENDALE FREEWAY** from Glendale Boulevard PM 14.21, to LA/Glendale CL PM R18.03, also Glendale Freeway; from LA/Glendale CL PM18.20 to LA/Glendale CL PM R19.02 A total of 4.64 miles for this area.	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
5	12.13	**SANTA ANA FREEWAY** from east city limits at Indiana Street PM14.96, to Golden State Freeway; Golden State Freeway from Santa Ana Freeway to city limits contiguous with the City of Glendale near Riverside Drive, PM 27.09, a length of 12.13 miles for this portion; also, **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 55,620 $ 19,137 **$ 74,757**
	13.73	**GOLDEN STATE FREEWAY** from city limits at Cohassett Street PM 31.87, to north city limits near junction with Route 14, PM 45.60, a length of 13.73 miles. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	0.53	**COLORADO BOULEVARD EXTENION** from Golden State Freeway, PM 25.78 to city limits of Glendale, PM 25.25 near Elk Ave.		
10			HM4K –Electrical Traffic Signals Safety Lights **Total**	 $ 75,860 $ 17,142 **$ 93,002**
10A	14.07	**SANTA MONICA FREEWAY** from west city limits near Centinela Avenue Pico Boulevard UC, PM R4.32, to JCT. RT. 10/05/101, PM 18.39. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
10B	1.94	**SAN BERNARDINO FREEWAY** from JCT. of RT. 101 Freeway, PM S0. 00 to JCT. Golden State Freeway, PM S0.66; from JCT. Golden State Freeway PM 18.39 to east city limits, PM 19.67, 650 ft. east of Evergreen. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
27B	9.38	**TOPANGA CANYON BOULEVARD** from city limits, PM 10.68,which is 0.38 miles south of Mulholland Drive, to the NCL (PM 20.06) at LA/CO. line, a length of 9.38miles. **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (14).**	HM2C – Drainage HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 79,928 $ 9,795 **$94,723**
47A			HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 4,275 $ 2,322 **$ 6,597**
	.86	**ROUTE 47 FREEWAY** from junction with Harbor Freeway, Route 110, PM 0.00 to Harbor Boulevard UC PM 0.86. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**		
	1.50	**ROUTE 47 FREEWAY** from Vincent Thomas Bridge, PM 0.8057, to end of construction portion of Seaside Avenue, PM 2.31. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	.40	**ROUTE 47 FREEWAY** (Terminal Island Freeway) from south city limits, PM4.16 near Cerritos Channel to route 103, south of Pennington Avenue, PM 4.565 **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
60	1.94	**POMONA FREEWAY** from Junction Route 10 near Los Angeles River, PM 0.00 to east City limits at centerline Indiana Street, PM R1.94 **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 3,863 $ 918 **$ 4,781**

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
90	2.42	**ROUTE 90 FREEWAY** from Lincoln Boulevard PM 0.92 to E/O Mesmer Avenue PM 2.37 and a small portion at Route 90/405 Interchange. **Special Maintenance Responsibilities See Attachment 2 items (3) & (7).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 18,901 $ 2,224 **$ 21,125**
101	1.33	**SANTA ANA FREEWAY** Spur from JCT. Routes 05 Golden State Freeway N/10, Santa Monica Freeway W, PM S0.00, to Junction Route, 10, Spur-San Bernardino Freeway E, PM S1.33, length. **Special Maintenance Responsibilities See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 126,999 $ 29,008 **$ 156,007**
	1.62	**SANTA ANA FREEWAY** from Junction Route 10 Spur, PM 0.00 to beginning Hollywood Freeway at Route 110 Sep. PM 1.62. **Special Maintenance Responsibilities See Attachment 2 item (3).**	HM4K	
	8.39	**HOLLYWOOD FREEWAY** from Route 110 Sep. PM 1.62 to Ventura Freeway at Routes 101/134/170 Interchange, PM 10.01. **Special Maintenance Responsibilities See Attachment 2 items (3) & (5).**	HM4K	
	15.42	**VENTURA FREEWAY** from Hollywood Freeway at Route 101/134/170 Interchange, PM 11.63, to west city limits near Calabasas, PM 27.059. **Special Maintenance Responsibilities See Attachment 2 item (3).**	HM4K	
103	1.42	**103 FREEWAY**, from Route 47, PM 0.0 to S/O Pacific Coast Highway PM 1.42	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 1,288 $ 451 **$ 1,739**

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
105	2.00	**105 FREEWAY**, from Imperial Hwy. PM 0.0 to La Cienaga Bl. PM 2.0.	HM4K – Electrical Traffic Signals **Total**	$ 11,138 **$ 11,138**
	2.10	**105 FREEWAY**, from Vermont Ave. PM 6.8 to Central Ave. PM 8.9.		
110			HM2C –Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 2,154 $101,970 $ 28,528 **$137,652**
110A	0.74	**GAFFEY STREET** from 9th Street, PM 0.00, to junction with Harbor Freeway near Oliver Street, PM 0.74. **Special Maintenance Responsibilities** **See Attachment 2 items (7).**	HM2C HM2D HM4K	
110B	3.89	**HARBOR FREEWAY** from Gaffey Street near Oliver Street, PM 0.74, to city limits at Lomita Street UC, PM4.63 **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	4.23	**HARBOR FREEWAY** from city limits at 190th Street UC, 9.07, to 290 feet north of Athens Boulevard OC, PM 13.30. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K HM4K	
	10.26	**HARBOR FREEWAY**, from city limits 250 feet north of 121st Street, PM 13.44, to Junction with Pasadena Freeway at four Level Interchange, 23.7. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	6.38	**PASADENA FREEWAY**, from Junction with Harbor Freeway at Four Level Interchange, PM 23.7 to city limits contiguous with the city of South Pasadena near Hough Street, PM 30.08. **Special Maintenance Responsibilities** **See Attachment 2 item (3), & (4).**		

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
118A	12.02	**RONALD REAGAN FREEWAY** PM R2.4, Near Canoga Ave to Juncton with 210 Freeway at PM 14.42. **Special Maintenance Responsibilities** **See Attachment 2 item (3) & (8).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 33,887 $ 4,183 **$ 38,070**
134C	1.55	**ROUTE 134 FREEWAY** from Routes 101/134/170 Interchange, PM 0.00 to city limits contiguous with the city of Burbank at Clybourn avenue, PM 1.55. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K- Electrical Traffic Signals Safety Lights **Total**	 $ 13,699 $ 2,215 **$ 15,914**
134C	2.77	**ROUTE 134 FREEWAY** from city limits 0.09 mile west of Forest Lawn Drive UC, PM 3.0 to city limits contiguous with the city of Glendale near Junction route 5 Freeway, PM R05.77. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	2.85	**ROUTE 134 FREEWAY** from city limits 0.07 mile west of Route 134/2 Separation, PM R8.9, to east city limits 00.32 mile east of Figueroa Street UC, PM R11.75. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**		
170			HM2C- Drainage HM2D-Sweeping HM4K- Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 25,451 $ 43,827 $ 8,387 **$ 82,665**
170A	2.69	**HIGHLAND AVENUE** from Santa Monica Boulevard, Route 02 PM 9.10 to Hollywood Freeway, Route101, PM 10.69, a length 1.59 miles.	HM2C HM2D	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
		CAHUENGA BOULEVARD WEST from Highland Avenue to Cahuenga Boulevard U.C, Br. No. 53-866K. A length of 0.54 miles.	HM4K	
		ODIN STREET from Highland Ave. to Cahuenga Blvd. East, a length of approx. 0.2 miles.	HM2C HM2D HM4K	
		CAHUENGA BOULEVARD EAST from Odin St. to entrance of on-ramp approx. 0.02 mi. west of Pilgrimage O.C., a length of 0.36 miles.	HM2C HM2D HM4K	
170B	6.05	**HOLLYWOOD FREEWAY** from Junction Route 170/101/134 Separation, PMR14.50, to Junction routes 170/5, PM R20.55, a length of 6.05 miles. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM2C HM2D HM4K	
187	5.41	**VENICE BOULEVARD** from Lincoln Boulevard, PM 3.50 to Cadillac Avenue, PM 8.91. **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (14).** **Note**: The south half width of the 0.4-mile section which lies within Culver City will be maintained by the City of Los Angeles as part of the Maintenance of Route 187.	HM2C – Drainage HM2D – Sweeping HM2D – Graffiti HM4K –Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 15,987 $ 57,011 $ 12,860 **$ 90,858**
210 A	11.16	**FOOTHILL FREEWAY** from Junction 210/5 Separation, PM R0.00, to Sunland/Fenwick Ave. PM R11.16. **Special Maintenance Responsibilities** **See Attachment 2 item (3) & (8).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 31,879 $ 2,722 **$ 34,601**

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
213	5.14	**WESTERN AVENUE** from Lomita CL, PM 4.83 near 261st Street to Carson Street, PM 7.983, a length of 3.15 miles. **Note**: City will sweep and maintain traffic signals on Western Avenue from 25th street (PM 0.00) to Carson Street (PM7.983), except in the cities of Rancho Palos Verde and Lomita, Summerland, PM 1.99 to PM 4.83. **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (12).**	HM2C – Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 14,968 $ 51,449 $ 3,574 **$ 74,991**
405	0.16	**SAN DIEGO FREEWAY** from city limits 0.17 mile west McHelen, PM 8.62, to city limits at Alameda Street, PM 8.78. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K- Electrical Traffic Signals Safety Lights **Total**	$ 90,022 $ 11,251 **$ 101,273**
	1.13	**Freeway** from city limits at 190th Street PM 13.29 to city limits contiguous with city of Torrance at Western Ave, PM 14.42. **Special Maintenance Responsibilities** **See Attachment 2 items (3).**	HM4K	
	0.12	**Freeway** from city limits at 116th Street PM 21.11 to city limits at Imperial Highway, PM 21.23. **Special Maintenance Responsibilities** **See Attachment 2 items (3) & (8).**	HM4K	
	1.48	**Freeway** from city limits contiguous with the City of Inglewood 0.11 mile northwest of La Cienega Boulevard southbound roadway OC, PM 23.82, to city limits contiguous with the City of Culver City near Centinela Ave. OH, PM 25.30. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
405 (Con't)	0.35	**Freeway** from city limits contiguous with the City of Culver City at PM25.61, to city limits at north line of Jefferson Boulevard, PM 25.96. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	0.49	**Freeway** from city limits at north line of Ballona Creek, PM 26.53, to city limits contiguous with the City of Culver City at Barman Avenue, PM 27.02. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	3.11	**Freeway** form city limits at Venice Boulevard, Route 405/187 Separation, PM 27.96, to city limits at Ohio Avenue UC, PM 31.07. **Special Maintenance Responsibilities** **See Attachment 2 item (3), (8) & (11).**	HM4K	
	16.73	**Freeway** from city limits 0.37 mile north of Wilshire Boulevard UC, PM 31.91, to Junction Route5 (Golden State Freeway) 405 separation, PM 48.64. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
710	0.01	**LONG BEACH FREEWAY** from SCL S/O Valley Blvd., PM T27.47 to Valley Blvd., PMT27.48. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals **Total**	$ 5,150 **$5,150**

AUTHORIZED EXPENDITURES **$1,392,160**

(Includes 1/2% handling charge)

Attachment 1

MAINTENANCE FUNCITION DESCRIPTION

HM2C – DRAINAGE –SIDEWALK S

1. Non-Landscaped Tree/Brush Vegetation
2. Drainage obstruction-Drains/Culverts

This provides for cleaning, maintaining, and repairing culverts, ditches and drains on an emergency basis only. Emergency repairs requiring expenditures exceeding $5,000 will require prior approval, from the State's District Region Manager.

HM2D – SWEEPING

This provides for removal of litter and debris from roadway surface and roadside. The following problems are included.

1. *Sweeping

***Sweeping is based on a $14.00 per curb mile rate to be performed no less than once a month, but may be increased to once a week as needed to meet NPDES requirements**

HM4K – ELECTRICAL

This includes maintenance work performed on highway electrical facilities including traffic signals, traffic-signal systems, safety lighting and sign lighting. It also includes the electrical energy for these items.

Attachment 2

SPECIAL MAINTENANCE RESPONSIBILITY OF THE CITY AND THE STATE

1) City will maintain, at CITYexpense, the structure, lighting, pump plant, ventilation and all tunnel related signs of International Airport tunnel. State will be responsible for the roadway including the sidewalks.

2) City will maintain at CITY'S expense lighting, signs, debris removal and graffiti eradications at the following pedestrian crossings: PUC, Br. 53-498, PM 36.89; Roosevelt PUC, Br. 53-499, PM 37.05; Castelmare POC 53-68, PM 39.62; Cobble PUC, Br. 53-502, PM 39.94. Maintenance of the structure will be the responsibility of the State.

3) City will maintain traffic signals at freeway ramp terminals specified in Exhibit "B". City will maintain highway safety lighting at ramp terminals with certain exceptions subject to written concurrence between CITY and STATE District Maintenance Engineer.

4) Pursuant to Sections 114 and 116 of the Streets and Highways Code the City is authorized to post and maintain at no expense to the State "NO TRESPASSING" signs on the barrier fences and to police the area between the signs on that portion of the highways rights of way along the Pasadena Freeway over and adjacent to the tunnels in Elysian Park. Nothing in this section, however, is intended to restrict or interfere with normal operations by the State or its authorized personnel when performing any phase of highway or landscaping maintenance within the right of way.

5) State will maintain, at City expense, the bus loading facilities on the Hollywood Freeway at Alvarado Street, Vermont Avenue and Western Avenue.

6) State will maintain traffic signals and City will maintain highway safety lighting.

7) Mowing, pruning, replanting, weeding and irrigation in landscaped traffic median areas **only will be performed at City expense**.

8) City will maintain traffic signals, and highway safety lighting, in the vicinity of State highway, as identified on Exhibits "A", "B" and "C".

9) The State will maintain the structure of the Oliver Street pedestrian over crossing (POC) (#53-2046), over Gaffey Street in San Pedro below the top of the concrete deck surface. The City will maintain, at City expense, the top of the concrete deck surface, together with any surface treatment and including soffit lighting installation, as well as all traffic service facilities that may be required for the benefit or control of City street traffic.

10) The State will maintain the structure of the Century Boulevard over crossing (53-1843 R/L) over Sepulveda Boulevard. below the top of the concrete deck surface. The City will maintain, at City expense, the top of concrete deck surface, together with any surface treatment and including lighting installation as well as all traffic service facilities that may be required for the benefit or control of City street traffic.

11) Mowing, pruning, replanting, weeding and irrigation of landscaped areas on Santa Monica Boulevard, within the freeway interchange, **only at City's expense**.

12) City will maintain trees along Western Ave, from 1.9/11.1 at City Expense per Letter Dated July 15.1998.

13) The Los Angeles World Airports has proposed to install, under permit (6) Overhead, and (6) Ground mounted sings on State Route 1, Lincoln Boulevard and Sepulveda Blvd. between postmiles 26.178 (north of the south runways tunnel), and postmile 28.60 (south of La Tijera). This installation and maintenance of signs will be at LAWA expense. LAWA will provide notification by letter to the State when final installation is completed.

14) City is responsible, at City expense, for maintenance of all freeways or State highway related signing located outside State Right-of-Way.

WORK SCHEDULES/BILLING:

Schedules reflecting days City is performing sweeping function on State Routes identified in this Agreement should be furnished to the Caltrans Maintenance Support Office a minimum of twice a year. The Schedules will assist in responding to public inquires.

Any additional expenditure arising from specific projects, as outlined in article VI-B, will not be paid without prior authorization of work needing to be performed.

Signed invoices should be sent in triplicate to the STATE District Office, located at:

Department of Transportation
Maintenance Agreement Unit MS-3
120 South Spring Street
Los Angeles, CA 90012
Attention: Agreements Unit

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
1	ALAMEDA ST	PACIFIC COAST HWY	CITY	1A	9.25		50%	
2	BLINN AV	PACIFIC COAST HWY	CITY	1A	9.53	50%	50%	
3	PACIFIC COAST HWY	WATSON AV	CITY	1A	9.68	50%	50%	
4	EUBANK AV	PACIFIC COAST HWY	CITY	1A	10.16	50%	50%	
5	BROAD AVE*	PACIFIC COAST HWY	CITY	1A	10.44	0%	100%	
6	AVALON BL	PACIFIC COAST HWY	CITY	1A	10.49	50%	50%	
7	ISLAND AVE*	PACIFIC COAST HWY	CITY	1A	10.74	50%	50%	
8	NEPTUNE AV	PACIFIC COAST HWY	CITY	1A	10.94	50%	50%	
9	PACIFIC COAST HWY	RONAN AVE*	CITY	1A	11.09	0%	100%	
10	PACIFIC COAST HWY	WILMINGTON BL	CITY	1A	11.24	50%	50%	
11	FIGUEROA ST	PACIFIC COAST HWY	CITY	1A	11.60	50%	50%	
12	PACIFIC COAST HWY	VERMONT AV	CITY	1A	12.15	50%	50%	
13	NORMANDIE AV	PACIFIC COAST HWY	CITY	1A	12.55	50%	50%	
14	PACIFIC COAST HWY	PRESIDENT AV	CITY	1A	12.95	50%	50%	
15	PACIFIC COAST HWY	WESTERN AV	CITY	1A	13.10	0%	100%	
16	CENTURY BL	SEPULVEDA BL	CITY	1C	26.96	33%	67%	
17	LINCOLN BL	SEPULVEDA BL	CITY	1C	27.36	33%	67%	
18	LA TIJERA BL	LINCOLN BL	CITY	1A	28.72	50%	50%	
19	LINCOLN BL	LOYOLA BL	CITY	1A	28.84	33%	67%	
20	LINCOLN BL	MANCHESTER AV	CITY	1A	29.08	50%	50%	
21	84TH ST	LINCOLN BL	CITY	1A	29.26	50%	50%	
22	83RD ST	LINCOLN BL	CITY	1A	29.37	50%	50%	
23	HUGHES TERRACE	LINCOLN BL	CITY	1A	29.65	33%	67%	
24	LINCOLN BL	TEALE ST	CITY	1A	29.90	33%	67%	
25	JEFFERSON BL	LINCOLN BL	CITY	1A	30.30	50%	50%	
26	CULVER BL	LINCOLN BL	CITY	1A	30.47	50%	50%	
27	FIJI WY	LINCOLN BL	CITY	1A	30.73	25%	50%	25% (COUNTY)
28	LINCOLN BL	MINDANAO WY	CITY	1A	30.92	25%	50%	25% (COUNTY)
29	BALI WY	LINCOLN BL	CITY	1A	31.11	0%	67%	33% (COUNTY)
30	LINCOLN BL	MARINA EXPRESS WAY	CITY	1A	31.28	0%	100%	
31	LINCOLN BL	MARINA POINTE DR-MAXELLA AV	CITY	1A	31.37	50%	50%	
32	LINCOLN BL	WASHINGTON BL	CITY	1A	31.78	50%	50%	
33	LINCOLN BL	VENICE BL	CITY	1A	32.17	25%	75%	
34	LINCOLN BL	SUPERBA AV	CITY	1A	32.48	50%	50%	
35	CALIFORNIA AV	LINCOLN BL	CITY	1A	32.71	50%	50%	
36	BROOKS AV	LINCOLN BL	CITY	1A	32.82	50%	50%	
37	LINCOLN BL	ROSE AV	CITY	1A	33.17	50%	50%	
38	CENTINELA AV	SANTA MONICA BL	CITY	2A	2.32	50%	50%	
39	BUNDY DR	SANTA MONICA BL	CITY	2A	2.60	50%	50%	
40	BROCKTON AV	SANTA MONICA BL	CITY	2A	2.74	50%	50%	
41	SANTA MONICA BL	WESTGATE AV	CITY	2A	2.87	50%	50%	
42	BARRINGTON AV	SANTA MONICA BL	CITY	2A	3.08	50%	50%	
43	FEDERAL AV	SANTA MONICA BL	CITY	2A	3.21	50%	50%	
44	COLBY AV	SANTA MONICA BL	CITY	2A	3.28	50%	50%	
45	BUTLER AV	SANTA MONICA BL	CITY	2A	3.35	50%	50%	
46	PURDUE AV	SANTA MONICA BL	CITY	2A	3.42	50%	50%	
47	CORINTH AV	SANTA MONICA BL	CITY	2A	3.48	50%	50%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
48	SANTA MONICA BL	SAWTELLE BL	CITY	2A	3.56	50%	50%	
49	BELOIT AV	SANTA MONICA BL	CITY	2A	3.63	0%	100%	
50	COTNER AV	SAN DIEGO FWY NB RAMPS-SANTA MONICA BL	CITY	2A	3.68	50%	50%	
51	ORANGE DR	SANTA MONICA BL	CITY	2A	10.72	50%	50%	
52	HIGHLAND AV	SANTA MONICA BL	CITY	2A	10.90	0%	100%	
53	LAS PALMAS AV	SANTA MONICA BL	CITY	2A	11.02	50%	50%	
54	SANTA MONICA BL	WILCOX AV	CITY	2A	11.33	50%	50%	
55	COLE AV	SANTA MONICA BL	CITY	2A	11.39	50%	50%	
56	CAHUENGA BL	SANTA MONICA BL	CITY	2A	11.45	50%	50%	
57	SANTA MONICA BL	VINE ST	CITY	2A	11.58	50%	50%	
58	EL CENTRO AV	SANTA MONICA BL	CITY	2A	11.71	50%	50%	
59	GOWER ST	SANTA MONICA BL	CITY	2A	11.83	50%	50%	
60	SANTA MONICA BL	VAN NESS AV	CITY	2A	12.21	50%	50%	
61	SANTA MONICA BL	WILTON PL	CITY	2A	12.33	50%	50%	
62	SANTA MONICA FWY EB RAMP	ST. ANDREWS PL - JOG NR WILTON PL-SANTA MONICA BL	CITY	2A	12.47	50%	50%	
63	SANTA MONICA BL	WESTERN AV	CITY	2A	12.58	50%	50%	
64	HOLLYWOOD FWY SB RAMP	OXFORD AV-SANTA MONICA BL	CITY	2A	12.70	75%	25%	
65	ALVARADO ST	KENT ST-JOG NR-CLINTON ST	CITY	2A	12.94	33%	67%	
66	ALVARADO ST	SUNSET BL	CITY	2A	13.19	50%	50%	
67	ALVARADO ST	RESERVOIR ST	CITY	2A	13.29	50%	50%	
68	ALVARADO ST	MONTANA ST	CITY	2A	13.41	50%	50%	
69	BERKELEY AVE	ALVARADO ST-GLENDALE BL	CITY	2A	13.59	67%	33%	
70	ALVARADO ST	BERKELEY AV-GLENDALE BL	CITY	2A	13.61	50%	50%	
71	ALLESANDRO ST-JOG NR WATERLOO ST	GLENDALE BL	CITY	2A	14.10	33%	67%	
72	FARGO ST	GLENDALE BL-GLENDALE FWY WB OFF RAMP	CITY	2B	14.35	80%	20%	
73	ALLESANDRO ST	GLENDALE FWY SB OFF RAMP-RIVERSIDE DR	CITY	2B	14.98	75%	25%	
74	FLETCHER DR	GLENDALE FWY WB RAMPS	CITY	2B	15.62	67%	33%	
75	GLENDALE FWY NB OFF RAMPS	SAN FERNANDO RD	CITY	2B	16.02	67%	33%	
76	GLENDALE FWY SB RAMPS	SAN FERNANDO RD	CITY	2B	16.03	50%	50%	
77	EAGLE ROCK BL	VERDUGO RD NR AVE 37	CITY	2B	16.82	60%	40%	
78	GLENDALE FWY SB RAMPS	VERDUGO RD	CITY	2B	17.00	50%	50%	
79	COLORADO BL	EAGLEDALE AV-GLENDALE FWY NB OFF RAMP	CITY	2B	18.52	50%	50%	
80	COLORADO BL	EAGLE DALE AV-GLENDALE FWY SB ON RAMP	CITY	2B	18.53	75%	25%	
81	OVERLAND AV	SANTA MONICA BL S. RDWY	CITY	2A	S4.511	50%	50%	
82	CENTURY PARK WEST	SANTA MONICA BL SRDWY	CITY	2A	S5.36	33%	67%	
83	AVENUE OF THE STARS	SANTA MONICA BL S. RDWY	CITY	2A	S5.58	33%	67%	
84	8TH ST	SANTA ANA FWY SB ON RAMP	CITY	5	16.50	67%	33%	
85	SANTA ANA FWY NB RAMPS	SOTO ST	CITY	5	16.61	50%	50%	
86	4TH ST	CUMMINGS ST-GOLDEN STATE FWY NB RAMPS	CITY	5	17.56	50%	50%	
87	CESAR E. CHAVEZ AV	GOLDEN STATE FWY NB OFF RAMP	CITY	5	18.06	67%	33%	
88	GOLDEN STATE FWY SB RAMPS	MISSION RD	CITY	5	18.78	50%	50%	
89	AVENUE 21	GOLDEN STATE FWY NB ON RAMP-N. BROADWAY	CITY	5	19.73	50%	50%	
90	GOLDEN STATE FWY SB COLLECTOR RD	NORTH BROADWAY	CITY	5	19.74	50%	50%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
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91	GOLDEN STATE FWY NB ON RAMP	PASADENA AV	CITY	5	19.86	50%	50%	
92	AVENUE 21	GOLDEN STATE FWY SB OFF RAMP-PASADENA AV	CITY	5	19.87	50%	50%	
93	AVENUE 26	GOLDEN STATE FWY NB OFF RAMP-LACY ST	CITY	5	20.31	75%	25%	
94	EADS ST	GOLDEN STATE FWY NB OFF RAMP-RIVERSIDE DR	CITY	5	21.69	60%	40%	
95	GOLDEN STATE FWY SB RAMPS	LANDA ST-STADIUM WY	CITY	5	21.97	75%	25%	
96	GOLDEN STATE FWY NB OFF RAMP	LOS FELIZ BL	CITY	5	24.33	67%	33%	
97	GLENOAKS BL G. STATE FWY NB RAMPS	HOLLYWOOD WY-SHADY SPRINGS DR	CITY	5	32.49	50%	50%	
98	GOLDEN STATE FWY NB RAMPS	SUNLAND BL	CITY	5	33.68	50%	50%	
99	ROSCOE BL	SUNLAND BL	CITY	5	33.69	50%	50%	
100	GOLDEN STATE FWY NB RAMPS	LANKERSHIM BL	CITY	5	34.99	50%	50%	
101	CAYUGA AV	GOLDEN STATE FWY SB RAMPS-LANKERSHIM BL	CITY	5	35.00	75%	25%	
102	BRANFORD ST	GOLDEN STATE FWY NB OFF RAMP	CITY	5	36.86	67%	33%	
103	GOLDEN STATE FWY NB RAMPS	OSBORNE ST	CITY	5	37.41	50%	50%	
104	GOLDEN STATE FWY SB RAMPS	OSBORNE ST	CITY	5	37.42	50%	50%	
105	CHATSWORTH DR	GOLDEN STATE FWY NB RAMPS	CITY	5	39.92	50%	50%	
106	GOLDEN STATE FWY NB OFF RAMP	SAN FERNANDO MISSION BL	CITY	5	40.26	67%	33%	
107	GOLDEN STATE FWY SB RAMPS	SAN FERNANDO MISSION BL	CITY	5	40.27	50%	50%	
108	ENCINITAS AV	GOLDEN STATE FWY NB OFF RAMP-ROXFORD ST	CITY	5	42.65	50%	50%	
109	20TH ST	SANTA MONICA FWY WB OFF RAMP	CITY	10A	14.13	50%	50%	
110	17TH ST	GRAND AV-SANTA MONICA FWY WB ON RAMP	CITY	10A	15.16	50%	50%	
111	18TH ST	FLOWER ST-SANTA MONICA FWY EB ON RAMP	CITY	10A	15.26	50%	50%	
112	18TH ST	GRAND AV	CITY	10A	15.29	80%	20%	
113	17TH ST	LOS ANGELES ST-SANTA MONICA FWY WB RAMPS	CITY	10A	15.64	75%	25%	
114	18TH ST	MAPLE AV	CITY	10A	15.78	75%	25%	
115	16TH ST	SAN PEDRO ST-CENTRAL	CITY	10A	15.82	75%	25%	
116	ALAMEDA ST	SANTA MONICA FWY EB RAMPS	CITY	10A	15.82	50%	50%	
117	17TH ST	NAOMI AV	CITY	10A	16.48	87%	13%	
118	14TH ST	ALAMEDA ST	CITY	10A	16.99	75%	25%	
119	SAN BERNARDINO FWY WB RAMPS	STATE ST	CITY	10B	18.52	50%	50%	
120	SAN BERNANDINO FWY EB OFF RAMP	SOTO ST-WABASH AV	CITY	10B	18.98	75%	25%	
121	CHARLOTTE ST	SAN BERNANDINO FWY WB OFF RAMP-SOTO ST	CITY	10B	19.18	75%	25%	
122	LA BREA AV	STA MONICA FWY EB OFF RAMP NR ADAMS BL	CITY	10A	R10.43	50%	50%	
123	23RD ST	LA BREA AV-SANTA MONICA FWY WB OFF RAMP	CITY	10A	R10.47	75%	25%	
124	CRENSHAW BL	SANTA MONICA FWY EB RAMPS	CITY	10A	R11.39	50%	50%	
125	CRENSHAW BL	SANTA MONICA FWY WB RAMPS	CITY	10A	R11.40	50%	50%	
126	ARLINGTON AV	SANTA MONICA FWY WB RAMPS	CITY	10A	R12.32	50%	50%	
127	ARLINGTON AV	SANTA MONICA FWY EB RAMPS	CITY	10A	R12.33	50%	50%	
128	SANTA MONICA FWY WB RAMPS	WESTERN AV	CITY	10A	R12.82	50%	50%	
129	SANTA MONICA FWY EB RAMPS	WESTERN AV	CITY	10A	R12.83	50%	50%	
130	NORMANDIE AV	SANTA MONICA FWY WB RAMP	CITY	10A	R13.34	50%	50%	
131	NORMANDIE AV	SANTA MONICA FWY EB RAMPS	CITY	10A	R13.35	50%	50%	
132	SANTA MONICA FWY WB RAMPS	VERMONT AV	CITY	10A	R13.84	50%	50%	
133	SANTA MONICA FWY EB RAMPS	VERMONT AV	CITY	10A	R13.85	50%	50%	
134	HOOVER ST	SANTA MONICA FWY RAMPS	CITY	10A	R14.25	50%	50%	
135	CENTINELA AV	SANTA MONICA FWY WB RAMPS	CITY	10A	R4.24	50%	50%	
136	CENTINELA AV	SANTA MONICA FWY EB ON RAMP	CITY	10A	R4.35	67%	33%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
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137	BUNDY DR	SANTA MONICA FWY EB ON RAMP	CITY	10A	R4.54	67%	33%	
138	NATIONAL BL	OVERLAND AV-SANTA MONICA FWY WB OFF RAMP	CITY	10A	R6.41	75%	25%	
139	OVERLAND AV	SANTA MONICA FWY EB ON RAMP	CITY	10A	R6.42	67%	33%	
140	NATIONAL BL	SANTA MONICA FWY EB OFF RAMP	CITY	10A	R6.44	67%	33%	
141	MANNING AV	NATIONAL BL-SANTA MONICA FWY OFF RAMP	CITY	10A	R7.24	75%	25%	
142	NATIONAL BL	SANTA MONICA FWY EB ON RAMP	CITY	10A	R8.00	67%	33%	
143	KINCARDINE AV	ROBERTSON BL-SANTA MONICA FWY WB OFF RAMP	CITY	10A	R8.01	75%	25%	
144	DAVID AV	LA CIENEGA BL-SANTA MONICA FWY WB ON RAMP	CITY	10A	R8.83	75%	25%	
145	CADILLAC AV	SANTA MONICA FWY WB OFF RAMP-VENICE BL	CITY	10A	R9.00	50%	50%	
146	APPLE ST	SANTA MONICA FWY WB OFF RAMP-WASHINGTON BL	CITY	10A	R9.31	75%	25%	
147	APPLE ST	FAIRFAX AV-SANTA MONICA FWY EB OFF RAMP	CITY	10A	R9.34	75%	25%	
148	MULHOLLAND DR	TOPANGA CANYON BL	CITY	27B	11.06	50%	50%	
149	DUMETZ RD	TOPANGA CANYON BL	CITY	27B	11.47	50%	50%	
150	MARTINEZ ST	TOPANGA CYN BL	CITY	27B	11.87	50%	50%	
151	TOPANGA CANYON BL	VENTURA BL	CITY	27B	12.28	50%	50%	
152	CLARENDON ST	TOPANGA CANYON BL	CITY	27B	12.36	33%	67%	
153	BURBANK BL	TOPANGA CANYON BL	CITY	27B	12.52	50%	50%	
154	OXNARD ST	TOPANGA CANYON BL	CITY	27B	13.02	50%	50%	
155	ERWIN ST	TOPANGA CANYON BL	CITY	27B	13.27	50%	50%	
156	TOPANGA CANYON BL	VICTORY BL	CITY	27B	13.55	50%	50%	
157	KITTRIDGE ST	TOPANGA CANYON BL	CITY	27B	13.84	50%	50%	
158	LA CIENEGA BL	SAN DIEGO FWY SB OFF RAMP NR 97TH ST	CITY	27B	13.84	8%	33%	59% (INGLEW.)
159	TOPANGA CANYON BL	VANOWEN ST	CITY	27B	14.05	50%	50%	
160	BASSETT ST	TOPANGA CANYON BL	CITY	27B	14.16	33%	67%	
161	SHERMAN WY	TOPANGA CANYON BL	CITY	27B	14.55	50%	50%	
162	TOPANGA CANYON BL	VALERIO ST	CITY	27B	14.79	50%	50%	
163	SATICOY ST	TOPANGA CANYON BL	CITY	27B	15.04	50%	50%	
164	STRATHERN ST	TOPANGA CYN BL	CITY	27B	15.54	33%	67%	
165	ROSCOE BL	TOPANGA CANYON BL	CITY	27B	15.83	50%	50%	
166	SCHOENBORN ST	TOPANGA CANYON	CITY	27B	15.91	33%	67%	
167	CHASE ST	TOPANGA CANYON BL	CITY	27B	16.14	50%	50%	
168	PARTHENIA ST	TOPANGA CANYON BL	CITY	27B	16.50	50%	50%	
169	NORDHOFF ST	TOPANGA CANYON BL	CITY	27B	17.01	50%	50%	
170	PLUMMER ST	TOPANGA CANYON BL	CITY	27B	17.52	33%	67%	
171	MARILLA ST	TOPANGA CYN BL	CITY	27B	17.87	33%	67%	
172	LASSEN ST	TOPANGA CANYON BL	CITY	27B	18.13	50%	50%	
173	DEVONSHIRE ST	TOPANGA CANYON BL	CITY	27B	18.63	50%	50%	
174	HIAWATHA ST	TOPANGA CANYON BL	CITY	27B	18.75	50%	50%	
175	CHATSWORTH ST	TOPANGA CANYON BL	CITY	27B	19.13	50%	50%	
176	SANTA SUSANA PASS RD	TOPANGA CANYON BL	CITY	27B	19.38	33%	67%	
177	GAFFEY ST	SUMMERLAND AV V. THOMAS BRIDGE WB OFF RAMP	CITY	47A	0.00	75%	25%	
178	HARBOR BL	SWINFORD ST -PVT- VT BRIDGE-RAMP EB OFF RAMP	CITY	47A	0.86	75%	25%	
179	NAVY WY	SEASIDE AVE	CITY	47A	2.60	67%	33%	
180	6TH ST	LORENA ST-POMONA FWY WB ON RAMP	CITY	60	1.48	75%	25%	
181	LORENA ST	POMONA FWY EB RAMPS	CITY	60	1.49	50%	50%	
182	MARINA FWY EXPRESSWAY WB	MINDANAO WY	CITY	90	1.20	50%	50%	
183	MARINA FWY EXPRESSWAY EB	MINDANAO WY	CITY	90	1.21	50%	50%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
184	ALLA RD	MARINA FWY-WB FRONTAGE RD	CITY	90	1.71	33%	67%	
185	CENTINELA AV	MARINA FWY WB OFF RAMP-SANFORD ST	CITY	90	1.72	50%	50%	
186	CENTINELA AV	MARINA FWY EB RAMPS	CITY	90	1.73	50%	50%	
187	CULVER BL	MARINA EXPRESSWAY MARINA FWY EB RAMPS	CITY	90	1.75	50%	50%	
188	CULVER BL	MARINA EXPRESSWAY MARINA FWY WB OFF RAMP	CITY	90	1.77	50%	50%	
189	MISSION RD	SANTA ANA FWY SB OFF RAMP	CITY	101	0.10	50%	50%	
190	4TH ST	SANTA ANA FWY NB OFF RAMP	CITY	101	0.62	67%	33%	
191	ALISO ST	HOLLYWOOD FWY SB RAMP-LOS ANGELES ST	CITY	101	0.87	75%	25%	
192	ALAMEDA ST	ARCADIA ST	CITY	101	0.88	75%	25%	
193	1ST ST	SANTA ANA FWY NB RAMP	CITY	101	0.91	50%	50%	
194	ALISO ST	HOLLYWOOD FWY SB OFF RAMP-NORTH BROADWAY	CITY	101	1.08	75%	25%	
195	HOLLYWOOD FWY SB RAMPS	HOPE ST-TEMPLE ST	CITY	101	1.43	75%	25%	
196	BELLEVUE AV	ECHO PARK AV-HOLLYWOOD FWY NB RAMPS	CITY	101	2.39	50%	50%	
197	ALVARADO ST	HOLLYWOOD FWY NB RAMPS	CITY	101	2.87	50%	50%	
198	ALVARADO ST	HOLLYWOOD FWY SB RAMPS	CITY	101	2.88	50%	50%	
199	HOLLYWOOD FWY NB RAMPS	SILVER LAKE BL	CITY	101	3.76	67%	33%	
200	HOLLYWOOD FWY SB OFF RAMP	SILVER LAKE BL	CITY	101	3.80	67%	33%	
201	HOLLYWOOD FWY NB RAMPS	VERMONT AV	CITY	101	4.40	50%	50%	
202	HOLLYWOOD FWY SB ON RAMP	OAKWOOD AV-VERMONT AV	CITY	101	4.41	75%	25%	
203	ALEXANDRIA AV	HOLLYWOOD FWY NB OFF RAMP-MELROSE AV	CITY	101	4.85	75%	25%	
204	HOLLYWOOD FWY NB OFF RAMP	SANTA MONICA BL-SERRANO AV	CITY	101	5.55	50%	50%	
205	HOLLYWOOD BL	HOLLYWOOD FWY NB RAMP-VAN NESS AV	CITY	101	6.51	75%	25%	
206	HOLLYWOOD BL	HOLLYWOOD FWY SB RAMPS	CITY	101	6.53	50%	50%	
207	BEACHWOOD DR	FRANKLIN AV	CITY	101	6.91	75%	25%	
208	ARGYLE AV	FRANKLIN AV-HOLLYWOOD FWY NB RAMP	CITY	101	7.06	80%	20%	
209	FRANKLIN AV	HOLLYWOOD FWY SB OFF RAMP VINE ST	CITY	101	7.18	75%	25%	
210	CAHUENGA BL -WEST-	HOLLYWOOD FWY SB RAMPS NR BENNETT DR	CITY	101	7.39	50%	50%	
211	CAHUENGA BL	HOLLYWOOD FWY NB OFF RAMP	CITY	101	7.40	67%	33%	
212	HIGHLAND AV	HOLLYWOOD BOWL RD-HOLLYWOOD FWY SB ON	CITY	101	7.84	17%	83%	
213	BARHAM BL	CAHUENGA BL E.-CORAL DR	CITY	101	9.22	67%	33%	
214	CAHUENGA BL -WEST-	HOLLYWOOD FWY SB RAMPS-REGAL PL	CITY	101	10.20	75%	25%	
215	HOLLYWOOD FWY NB OFF RAMP	LANKERSHIM BL UNIVERSAL PL	CITY	101	10.34	75%	25%	
216	CAMPO DE CAHUENGA WAY	HOLLYWOOD FWY NB RAMPS	CITY	101	10.56	50%	50%	
217	HOLLYWOOD FWY SB RAMPS	VINELAND AV	CITY	101	11.15	50%	50%	
218	HOLLYWOOD FWY NB OFF RAMP	VINELAND AV	CITY	101	11.24	67%	33%	
219	LAUREL CANYON BL	VENTURA FWY EB RAMPS	CITY	101	12.85	50%	50%	
220	LAUREL CANYON BL	VENTURA FWY WB RAMPS	CITY	101	12.86	50%	50%	
221	COLDWATER CANYON AV	VENTURA FWY EB RAMPS	CITY	101	13.88	50%	50%	
222	COLDWATER CANYON AV	VENTURA FWY WB RAMPS	CITY	101	13.89	50%	50%	
223	VENTURA FWY EB RAMPS	WOODMAN AV	CITY	101	14.89	50%	50%	
224	VENTURA FWY WB RAMPS	WOODMAN AV	CITY	101	14.90	50%	50%	
225	VAN NUYS BL	VENTURA FWY WB RAMPS	CITY	101	15.91	50%	50%	
226	VAN NUYS BL	VENTURA FWY EB RAMPS	CITY	101	15.94	50%	50%	
227	SEPULVEDA BL	VENTURA FWY WB RAMPS	CITY	101	16.94	67%	33%	
228	MISSION RD	SANTA ANA FWY NB ON RAMP	CITY	101	18.30	50%	50%	
229	HAYVENHURST AV	MAGNOLIA BL-VENTURA FWY EB ON RAMP	CITY	101	18.50	75%	25%	
230	HAYVENHURST AV	VENTURA FWY WB OFF RAMP	CITY	101	18.63	67%	33%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
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231	BALBOA BL	VENTURA FWY EB RAMPS	CITY	101	19.22	50%	50%	
232	BALBOA BL	VENTURA FWY WB RAMPS	CITY	101	19.24	50%	50%	
233	VENTURA FWY EB RAMPS	WHITE OAK AV	CITY	101	20.23	50%	50%	
234	VENTURA FWY WB RAMPS	WHITE OAK AV	CITY	101	20.25	50%	50%	
235	RESEDA BL	VENTURA FWY WB RAMPS	CITY	101	21.25	50%	50%	
236	RESEDA BL	VENTURA FWY EB RAMPS	CITY	101	21.27	67%	33%	
237	VANALDEN AV	VENTURA BL-VENTURA FWY EB ON RAMP	CITY	101	22.07	75%	25%	
238	TAMPA AV	VENTURA FWY WB RAMPS	CITY	101	22.25	50%	50%	
239	TAMPA AV	VENTURA FWY EB RAMPS	CITY	101	22.26	75%	25%	
240	VENTURA FWY WB RAMPS	WINNETKA AV	CITY	101	23.26	50%	50%	
241	VENTURA FWY EB RAMPS	WINNETKA AV	CITY	101	23.29	50%	50%	
242	DE SOTO AV	VENTURA FWY EB RAMPS	CITY	101	24.31	50%	50%	
243	DE SOTO AV	VENTURA FWY WB RAMPS	CITY	101	24.33	50%	50%	
244	CANOGA AV	VENTURA FWY EB ON RAMP	CITY	101	24.85	67%	33%	
245	CANOGA AV	VENTURA FWY WB OFF RAMP	CITY	101	24.87	67%	33%	
246	VENTURA BL	VENTURA FWY EB ON RAMP NR FARRALONE	CITY	101	25.76	50%	50%	
247	VENTURA BL	VENTURA FWY WB OFF RAMP-WOODLAKE AV	CITY	101	26.88	75%	25%	
248	LONG VALLEY RD	VALLEY CIRCLE BL- VENTURA FWY NB OFF RAMP	CITY	101	27.30	75%	25%	
249	CALABASAS RD	VENTURA FWY SB RAMPS	CITY	101	28.04	50%	50%	
250	HENRY FORD AV	TERMINAL ISL. FWY NB OFF RAMP-PENNINGTON AV	CITY	103	0.07	75%	25%	
251	GLENN M.ANDERSON FWY WB OFF RAMP	IMPERIAL HWY-NASH ST	CITY	105	0.98	25%	25%	50%(EL SEG.)
252	CONTINENTAL CITY DR	GLENN M ANDERSON FWY W/B OFF IMPERIAL HWY	CITY	105	1.524	75%	25%	
253	GLENN ANDERSON FWY WB RAMPS	VERMONT AV	CITY	105	6.74	33.3%	33.0%	33.3%(COUNTY)
254	GLENN ANDERSON FWY EB RAMPS	VERMONT AV	CITY	105	6.75	33.3%	33.3%	33.3%(COUNTY)
255	CENTRAL AV	GLENN ANDERSON FWY WB RAMPS	CITY	105	8.90	50%	50%	
256	CENTRAL AV	GLENN ANDERSON FWY EB RAMPS	CITY	105	9.44	50%	50%	
257	9TH S -SAN PEDRO	GAFFEY ST	CITY	110A	0.00	75%	25%	
258	7TH ST-SAN PEDRO	GAFFEY ST	CITY	110A	0.12	50%	50%	
259	5TH ST-SAN PEDRO	GAFFEY ST	CITY	110A	0.25	50%	50%	
260	1ST ST-SAN PEDRO	GAFFEY ST	CITY	110A	0.50	50%	50%	
261	GAFFEY ST	HARBOR FWY NB ON & SB OFF RAMPS	CITY	110A	0.74	50%	50%	
262	HARBOR FWY NB RAMPS	AMER. PRESIDENT LINES DWY JOHN S. GIBSON BL	CITY	110B	1.39	75%	25%	
263	HARBOR FWY SB RAMPS	PACIFIC COAST HWY	CITY	110B	4.06	0%	100%	
264	190TH ST	HARBOR FWY SB OFF RAMP	CITY	110B	9.07	67%	33%	
265	HARBOR FWY SB RAMPS	REDONDO BEACH BL	CITY	110B	11.24	50%	50%	
266	HARBOR FWY NB RAMPS	REDONDO BEACH BL	CITY	110B	11.25	50%	50%	
267	HARBOR FWY SB RAMPS	ROSECRANS AV	CITY	110B	11.89	50%	50%	
268	HARBOR FWY NB RAMPS	ROSECRANS AV	CITY	110B	11.9	50%	50%	
269	EL SEGUNDO BL	HARBOR FWY SB RAMPS	CITY	110B	12.76	50%	50%	
270	EL SEGUNDO BL	HARBOR FWY NB RAMPS	CITY	110B	12.86	50%	50%	
271	GRAND AV	HARBOR FWY SB ON RAMP-IMPERIAL HWY	CITY	110B	13.97	50%	50%	
272	HARBOR FWY NB OFF RAMP	IMPERIAL HWY-OLIVE ST	CITY	110B	13.98	50%	50%	
273	BOND ST-CHERRY ST	HARBOR FWY NB OFF RAMP-S. MONICA FWY WB OFF	CITY	110B	14.8	50%	50%	
274	CENTURY BL	HARBOR FWY NB ON RAMP-OLIVE ST	CITY	110B	14.97	50%	50%	
275	CENTURY BL	FLOWER ST-HARBOR FWY SB ON RAMP	CITY	110B	14.99	50%	50%	
276	HARBOR FWY SB RAMPS	MANCHESTER AV	CITY	110B	15.97	50%	50%	
277	HARBOR FWY NB RAMPS	MANCHESTER AV	CITY	110B	15.98	50%	50%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
278	FLORENCE AV	FLOWER ST-HARBOR FWY SB OFF RAMP	CITY	110B	17.00	50%	50%	
279	FLORENCE AV	GRAND AV	CITY	110B	17.01	50%	50%	
280	GAGE AV	GRAND AV-HARBOR FWY NB RAMPS	CITY	110B	17.51	50%	50%	
281	FLOWER ST	GAGE AV-HARBOR FWY SB RAMPS	CITY	110B	17.53	50%	50%	
282	FLOWER ST	HARBOR FWY SB RAMPS-SLAUSON AV	CITY	110B	17.98	50%	50%	
283	HARBOR FWY NB RAMPS	OLIVE ST-SLAUSON AV	CITY	110B	17.99	50%	50%	
284	FLOWER ST	HARBOR FWY SB OFF RAMP-VERNON AV	CITY	110B	19.00	50%	50%	
285	GRAND AV	HARBOR FWY NB RAMPS-VERNON AV	CITY	110B	19.01	50%	50%	
286	FLOWER ST	HARBOR FWY SB RAMPS-MARTIN LUTHER KING JR BL	CITY	110B	19.50	50%	50%	
287	GRAND AV HARBOR FWY NB ON RAMP	HILL ST-MARTIN LUTHER KING JR BL	CITY	110B	19.51	67%	33%	
288	39TH ST	HARBOR FWY TRANSITWAY NB OFF RAMP	CITY	110B	19.68	50%	50%	
289	37TH ST	HARBOR FWY NB OFF RAMP-HOPE ST	CITY	110B	19.93	75%	25%	
290	EXPOSITION BL	FLOWER ST-HARBOR FWY SB OFF RAMP	CITY	110B	20.03	75%	25%	
291	ADAMS BL	HARBOR FWY NB OFF RAMP	CITY	110B	20.71	75%	25%	
292	23RD ST	HARBOR FWY SB OFF RAMP	CITY	110B	21.04	75%	25%	
293	11TH ST	CHERRY ST-HARBOR FWY NB RAMP	CITY	110B	21.99	75%	25%	
294	11TH ST	BLAINE ST-HARBOR FWY SB ON RAMP	CITY	110B	22.00	80%	20%	
295	9TH ST	GEORGIA ST-HARBOR FWY NB ON RAMP	CITY	110B	22.27	75%	25%	
296	8TH ST	GARLAND AV-HARBOR FWY SB RAMPS	CITY	110B	22.29	80%	20%	
297	9TH ST	FRANCISCO ST-HARBOR FWY NB OFF RAMP	CITY	110B	22.39	80%	20%	
298	8TH ST	BIXEL ST-HARBOR FWY SB ON RAMP	CITY	110B	22.44	75%	25%	
299	6TH ST	FIGUEROA ST-HARBOR FWY NBSB RAMPS	CITY	110B	22.74	87%	13%	
300	BEAUDRY AV	HARBOR FWY-SB OFF RAMP NR-2ND ST	CITY	110B	23.21	67%	33%	
301	HARBOR FWY NB RAMPS	TEMPLE ST	CITY	110B	23.74	67%	33%	
302	ALPINE ST	FIGUEROA ST-PASADENA FWY NB ON RAMP	CITY	110B	23.96	75%	25%	
303	GOLDEN STATE FWY NB ON RAMP	PASADENA FWY NB OFF RAMP-RIVERSIDE DR	CITY	110B	25.47	50%	50%	
304	AVENUE 22	FIGUEROA ST-PASADENA FWY SB ON RAMP	CITY	110B	25.79	75%	25%	
305	LAUREL CYN BL	RONALD REAGAN FWY EB OFF RAMP	CITY	118A	11.57	67%	33%	
306	PAXTON ST	RONALD REAGAN FWY EB RAMPS	CITY	118A	13.2	50%	50%	
307	SEPULVEDA BL	RONALD REAGAN FWY EB RAMPS	CITY	118A	R10.10	0%	100%	
308	SEPULVEDA BL	RONALD REAGAN FWY WB RAMPS	CITY	118A	R10.11	0%	100%	
309	SAN FERNANDO RD	RONALD REAGAN FWY EB RAMPS	CITY	118A	R12.37	50%	50%	
310	GLENOAKS BL	RONALD REAGAN FWY WB RAMPS	CITY	118A	R13.32	50%	50%	
311	RONALD REAGAN FWY EB RAMPS	TAMPA AV	CITY	118A	R4.63	50%	50%	
312	RONALD REAGAN FWY WB RAMPS	TAMPA AV	CITY	118A	R4.64	50%	50%	
313	AMIGO AV	RINALDI ST-RONALD REAGAN FWY WB OFF RAMP	CITY	118A	R5.60	75%	25%	
314	RESEDA BL	RONALD REAGAN FWY EB RAMPS	CITY	118A	R5.80	50%	50%	
315	BALBOA BL	RONALD REAGAN FWY EB RAMPS	CITY	118A	R7.80	50%	50%	
316	BALBOA BL	RONALD REAGAN FWY WB RAMPS	CITY	118A	R7.81	50%	50%	
317	LANKERSHIM BL	VENTURA FWY WB OFF RAMP	CITY	134C	0.63	67%	33%	
318	CAHUENGA BL	VENTURA FWY EB RAMPS	CITY	134C	0.89	50%	50%	
319	CAHUENGA BL	VENTURA FWY WB RAMPS	CITY	134C	0.90	67%	33%	
320	COLORADO BL	EAGLEDALE AV-VENTURA FWY WB RAMPS	CITY	134C	9.56	50%	50%	
321	COLORADO BL	VENTURA FWY EB ON & WB OFF RAMPS	CITY	134C	9.6	50%	50%	
322	FIGUEROA ST	VENTURA FWY EB RAMPS	CITY	134C	11.48	50%	50%	
323	FOUNTAIN AV	HIGHLAND AV	CITY	170A	9.35	50%	50%	
324	DE LONGPRE AV	HIGHLAND AV	CITY	170A	9.48	50%	50%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
325	HIGHLAND AV	SUNSET BL	CITY	170A	9.61	50%	50%	
326	HIGHLAND AV	SELMA AV	CITY	170A	9.74	33%	67%	
327	HIGHLAND AV	HOLLYWOOD BL	CITY	170A	9.85	50%	50%	
328	FRANKLIN AV	FRANKLIN PL-HIGHLAND AV	CITY	170A	10.04	33%	67%	
329	FRANKLIN AV	HIGHLAND AV (NEAR EMMET TERR)	CITY	170A	10.15	33%	67%	
330	CAMROSE DR	HIGHLAND AV	CITY	170A	10.36	50%	50%	
331	HIGHLAND AV	ODIN ST	CITY	170A	10.51	33%	67%	
332	HOLLYWOOD FWY SB OFF RAMP	KRAFT AV-RIVERSIDE DR	CITY	170B	14.78	75%	25%	
333	HOLLYWOOD FWY SB RAMPS	MAGNOLIA BL	CITY	170B	15.37	50%	50%	
334	HOLLYWOOD FWY NB RAMPS	MAGNOLIA BL	CITY	170B	15.38	50%	50%	
335	BURBANK BL	HOLLYWOOD FWY NB OFF RAMP-TROOST AV	CITY	170B	16.03	75%	25%	
336	BURBANK BL	HOLLYWOOD FWY SB OFF RAMP-MORELLA AV	CITY	170B	16.04	75%	25%	
337	HOLLYWOOD FWY NB RAMPS	MAY CO DWY-OXNARD ST	CITY	170B	16.64	75%	25%	
338	HOLLYWOOD FWY SB RAMPS	SHERMAN WY	CITY	170B	18.27	50%	50%	
339	HOLLYWOOD FWY SB RAMPS	ROSCOE BL	CITY	170B	19.75	50%	50%	
340	HOLLYWOOD FWY NB OFF RAMP	SHELDON ST	CITY	170B	20.19	67%	33%	
341	VENICE BL	WALGROVE AV	CITY	187	3.92	50%	50%	
342	MAPLEWOOD AV	VENICE BL	CITY	187	4.08	33%	67%	
343	BEETHOVEN ST	VENICE BL	CITY	187	4.27	50%	50%	
344	VENICE BL	WADE ST	CITY	187	4.48	50%	50%	
345	CENTINELA AV	VENICE BL	CITY	187	4.78	50%	50%	
346	GRAND VIEW BL	VENICE BL	CITY	187	4.94	50%	50%	
347	INGLEWOOD BL	VENICE BL	CITY	187	5.10	50%	50%	
348	MCLAUGHLIN AV	VENICE BL	CITY	187	5.40	50%	50%	
349	SAWTELLE BL	VENICE BL	CITY	187	5.74	25%	50%	25% (CULVER)
350	SEPULVEDA BL	VENICE BL	CITY	187	5.91	25%	50%	25% (CULVER)
351	GIRARD AV	MIDVALE AV-VENICE BL	CITY	187	6.34	25%	50%	25% (CULVER)
352	OVERLAND AV	VENICE BL	CITY	187	6.62	50%	50%	
353	MOTOR AV	VENICE BL	CITY	187	6.84	50%	50%	
354	CLARINGTON AV	VENICE BL	CITY	187	7.09	50%	50%	
355	HUGHES AV	VENICE BL	CITY	187	7.19	50%	50%	
356	BAGLEY AV	VENICE BL	CITY	187	7.45	50%	50%	
357	CULVER BL	VENICE BL	CITY	187	7.63	50%	50%	
358	EXPOSITION BL	ROBERTSON BL-VENICE BL	CITY	187	7.79	60%	40%	
359	NATIONAL BL	VENICE BL	CITY	187	7.93	50%	50%	
360	HELMS AV	VENICE BL	CITY	187	8.14	50%	50%	
361	CATTARAUGUS AV	VENICE BL	CITY	187	8.34	50%	50%	
362	LA CIENEGA BL	VENICE BL	CITY	187	8.64	50%	50%	
363	FOOTHILL FWY NB RAMPS	ROXFORD ST	CITY	210A	1.92	50%	50%	
364	FOOTHILL FWY NB RAMPS	POLK ST	CITY	210A	3.31	50%	50%	
365	FOOTHILL FWY SB RAMPS	HUBBARD ST	CITY	210A	4.12	50%	50%	
366	FOOTHILL FWY NB RAMPS	MACLAY ST	CITY	210A	4.95	50%	50%	
367	ARROYO ST	FOOTHILL BL	CITY	210A	5.42	6%	94%	
368	FOOTHILL BL	FOOTHILL FWY EB RAMPS	CITY	210C	7.82	50%	50%	
369	FOOTHILL BL	FOOTHILL FWY WB RAMPS	CITY	210C	7.86	50%	50%	
370	FOOTHILL FWY SB RAMPS	SUNLAND BL	CITY	210C	11.08	50%	50%	
371	FENWICK ST	FOOTHILL FWY NB OFF RAMP-SUNLAND BL	CITY	210C	11.16	75%	25%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
372	FOOTHILL FWY NB RAMPS	HUBBARD ST	CITY	210A	R4.12	50%	50%	
373	FOOTHILL FWY SB RAMPS	MACLAY ST	CITY	210A	R4.13	50%	50%	
374	FOOTHILL FWY SB RAMPS	POLK ST	CITY	210A	R4.95	50%	50%	
375	25TH ST	WESTERN AV	CITY	213	0.00	75%	25%	
376	19TH ST	MORSE DR-WESTERN AV	CITY	213	0.31	50%	50%	
377	9TH ST	WESTERN AV	CITY	213	1.03	50%	50%	
378	BYNNER DR	WESTERN AV	CITY	213	1.25	50%	50%	
379	WESTERN AV	WEYMOUTH AV- WEYMOUTH PL	CITY	213	1.67	50%	50%	
380	1ST ST	WESTERN AV	CITY	213	1.77	60%	40%	
381	ANAHEIM ST	WESTERN AV	CITY	213	4.89	33%	67%	
382	253RD ST	WESTERN AV	CITY	213	5.45	50%	50%	
383	LOMITA BL	WESTERN AV	CITY	213	5.66	50%	50%	
384	247TH ST	WESTERN AV	CITY	213	5.88	50%	50%	
385	242ND PL	WESTERN AV	CITY	213	6.15	50%	50%	
386	238TH ST	WESTERN AV	CITY	213	6.41	33%	67%	
387	SEPULVEDA BL	WESTERN AV	CITY	213	6.99	25%	50%	25% (TORR.)
388	223RD ST	WESTERN AV	CITY	213	7.48	25%	50%	25% (TORR.)
389	220TH ST	WESTERN AV	CITY	213	7.72	25%	50%	25% (TORR.)
390	CARSON ST	WESTERN AV	CITY	213	7.98	25%	50%	25% (TORR.)
391	213TH ST	WESTERN AV	CITY	213	8.27	25%	50%	25%(TORR.)
392	TORRANCE BL	WESTERN AV	CITY	213	8.46	25%	50%	25%(TORR.)
393	190TH ST	WESTERN AV	CITY	213	9.84	25%	50%	25%(TORR.)
394	SAN DIEGO FWY N/B RAMPS	WESTERN AV	CITY	213	9.94	50%	50%	
395	SAN DIEGO FWY NB RAMPS	NORMANDIE AV	CITY	405	13.86	50%	50%	
396	NORMANDIE AV	SAN DIEGO FWY SB RAMPS	CITY	405	14.00	75%	25%	
397	116TH ST	LA CIENEGA BL-SAN DIEGO FWY SB ON RAMP	CITY	405	21.10	75%	25%	
398	LA CIENEGA BL	SAN DIEGO FWY SB RAMPS 300' NO 104TH ST	CITY	405	22.07	9%	29%	62% (COUNTY)
399	LA CIENEGA BL	SAN DIEGO FWY SB RAMPS N/O IMPERIAL HWY	CITY	405	23.57	9%	29%	62% (COUNTY)
400	LA TIJERA BL	SAN DIEGO FWY NB RAMPS	CITY	405	24.27	50%	50%	
401	LA TIJERA BL	SAN DIEGO FWY SB RAMPS	CITY	405	24.28	50%	50%	
402	HOWARD HUGHES PARKWAY	SAN DIEGO FWY SB RAMPS	CITY	405	24.7	50%	50%	
403	HOWARD HUGHES PARKWAY	SAN DIEGO FWY NB RAMPS	CITY	405	24.93	50%	50%	
404	JEFFERSON BL	SAN DIEGO FWY NB RAMPS	CITY	405	25.96	50%	50%	
405	JEFFERSON BL	SAN DIEGO FWY SB RAMPS	CITY	405	25.97	75%	25%	
406	NATIONAL BL	SAN DIEGO FWY NB RAMPS	CITY	405	29.16	67%	33%	
407	NATIONAL BL	SAN DIEGO FWY SB ON RAMP	CITY	405	29.17	67%	33%	
408	SAN DIEGO FWY SB OFF RAMP	SAWTELLE BL-TENNESSEE AV	CITY	405	29.96	75%	25%	
409	SAN DIEGO FWY NB OFF RAMP	SEPULVEDA BL NR MONTANA AV	CITY	405	32.45	67%	33%	
410	SAN DIEGO FWY NB RAMPS	SUNSET BL	CITY	405	33.00	50%	50%	
411	CHURCH LN	SUNSET BL	CITY	405	33.01	75%	25%	
412	CHURCH LN	SAN DIEGO FWY SB RAMPS	CITY	405	33.05	50%	50%	
413	MORAGA DR	SAN DIEGO FWY NB OFF RAMP-SEPULVEDA BL	CITY	405	33.30	75%	25%	
414	SAN DIEGO FWY NB OFF RAMP	SEPULVEDA BL NR GETTY CENTER DR	CITY	405	34.65	67%	33%	
415	SAN DIEGO FWY SB RAMPS	SEPULVEDA BL-SKIRBALL CENTER DR	CITY	405	36.72	50%	50%	
416	SAN DIEGO FWY NB RAMPS	SKIRBALL CENTER DR	CITY	405	36.86	50%	50%	
417	MULHOLLAND DR	SKIRBALL CENTER DR	CITY	405	37.03	50%	50%	
418	SAN DIEGO FWY SB RAMPS	SEPULVEDA BL	CITY	405	38.59	50%	50%	

EXHIBIT B: COST DISTRIBUTION FOR TRAFFIC SIGNALS

Effective: November 21, 2003

No.	Street 1	Street 2	Maintained By	Route No	Post Mile	Percent Cost Distribution		
						City of LA	State	Other Agency
419	GREENLEAF ST	SAN DIEGO FWY NB RAMPS-SEPULVEDA BL	CITY	405	38.92	75%	25%	
420	SAN DIEGO FWY SB OFF RAMP	SHERMAN OAKS AV-VENTURA BL	CITY	405	39.03	75%	25%	
421	BURBANK BL	SAN DIEGO FWY SB RAMPS	CITY	405	40.29	50%	50%	
422	BURBANK BL	SAN DIEGO FWY NB RAMPS	CITY	405	40.30	50%	50%	
423	SAN DIEGO FWY NB RAMPS	VICTORY BL	CITY	405	41.36	50%	50%	
424	HASKELL AV	HAYNES ST-SAN DIEGO FWY SB OFF RAMP	CITY	405	41.57	50%	50%	
425	FIRMAMENT AV	SAN DIEGO FWY NB ON RAMP-SHERMAN WAY	CITY	405	42.36	75%	25%	
426	HASKELL AV	SAN DIEGO FWY SB OFF RAMP NR WYANDOTTE ST	CITY	405	42.49	50%	50%	
427	ROSCOE BL	SAN DIEGO FWY SB RAMPS	CITY	405	43.76	50%	50%	
428	ROSCOE BL	SAN DIEGO FWY NB RAMPS	CITY	405	43.77	50%	50%	
429	NORDHOFF ST	SAN DIEGO FWY SB RAMPS	CITY	405	44.76	50%	50%	
430	NORDHOFF ST	SAN DIEGO FWY NB RAMPS	CITY	405	44.77	50%	50%	
431	BLUCHER AV	DEVONSHIRE ST-SAN DIEGO FWY SB RAMPS	CITY	405	46.24	25%	75%	
432	DEVONSHIRE ST	SAN DIEGO FWY NB RAMPS	CITY	405	46.25	0%	100%	
433	ORION AV	SAN DIEGO FWY SAN FERNANDO-MISSION BL	CITY	405	47.24	75%	25%	
434	RINALDI ST	SAN DIEGO FWY SB RAMPS	CITY	405	47.76	50%	50%	
435	SAN DIEGO FWY NB OFF RAMP	SEPULVEDA BL	CITY	405	47.79	67%	33%	
436	LONG BEACH FWY NB OFF RAMP	VALLEY BL	CITY	710	27.47	67%	33%	
437	LONG BEACH FWY SB ON RAMP	VALLEY BL	CITY	710	27.48	33%	67%	

**Note: Traffic Signal added on November 21st, 2003*

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
001-0000	LINCOLN BLVD AT MANCHESTER	29.08	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28
001-1005	LINCOLN BL AT MACHADO DR	33.301	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
001-1010	LINCOLN BL AT COMMONWEALTH AVE	33.302	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
001-1015	LINCOLN BL AT WARREN AVE	33.221	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-1020	LINCOLN BL AT ROSE AVE	33.171	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28
001-1025	LINCOLN BL AT FLOWER AVE	33.091	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
001-1030	LINCOLN BL AT FLOWER AVE	33.091	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
001-1035	LINCOLN BL AT SUNSET AVE	33.001	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
001-1040	LINCOLN BL AT SUNSET AVE	33.001	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
001-1045	LINCOLN BL AT VERNON AVE	32.961	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1050	LINCOLN BL AT INDIANA AVE	32.881	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1055	LINCOLN BL AT LAKE AVE	32.85	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
001-1060	LINCOLN BL AT BROOKS AVE	32.821	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1065	LINCOLN BL AT BROADWAY	32.751	3	0	200-HSE	257.40	67 %	172.46	33 %	84.94	43.11
001-1070	LINCOLN BL AT CALIFORNIA AVE	32.711	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
001-1075	LINCOLN BL AT MILWOOD AVE	32.651	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1076	LINCOLN BL AT MILWOOD AVE	32.651	1	0	250-HSE	101.28	67 %	67.86	33 %	33.42	16.96
001-1077	LINCOLN BL AT MILWOOD AVE	32.651	1	0	150-HSE	72.00	67 %	48.24	33 %	23.76	12.06
001-1080	LINCOLN BL AT PALMS BL	32.581	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
001-1081	LINCOLN BL AT PALMS BL	32.581	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
001-1082	LINCOLN BL AT PALMS BL	32.581	1	0	150-HSE	72.00	50 %	36.00	50 %	36.00	9.00
001-1085	LINCOLN BL AT NOWITA PLACE	32.521	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1090	LINCOLN BL AT SUPERA AVE	32.481	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
001-1095	LINCOLN BL AT MARCO PLACE	32.441	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1100	LINCOLN BL AT AMOROSO PLACE	32.381	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1105	LINCOLN BL AT VENEZIA AVE	32.351	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1110	LINCOLN BL AT VICTORIA AVE	32.311	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1115	LINCOLN BL AT LUCILLE AVE	32.251	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1120	LINCOLN BL AT VENICE AVE	32.166	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1120	LINCOLN BL AT VENICE AVE	32.166	4	0	310-HSE	466.20	50 %	233.10	50 %	233.10	58.28
001-1120	LINCOLN BL AT VENICE AVE	32.166	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
001-1125	LINCOLN BL AT HARDING AVE	32.141	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
001-1130	LINCOLN BL AT MELROSE AVE	32.081	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1135	LINCOLN BL AT COEUR D ALENE	32.071	4	0	200-HSE	343.20	67 %	229.94	33 %	113.26	57.49

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
001-1136	LINCOLN BL AT COEUR D ALENE	32.071	1	0	150-HSE	72.00	67 %	48.24	33 %	23.76	12.06
001-1137	LINCOLN BL AT SUNSET		1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
001-1140	LINCOLN BL AT GARFIELD AVE	32.001	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1145	LINCOLN BL AT VAN BUREN AVE	31.941	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1150	LINCOLN BL AT ELM ST	31.911	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1155	LINCOLN BL AT GRANT AVE	31.871	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1160	LINCOLN BL AT HARRISON AVE	31.821	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1165	LINCOLN BL AT WASHINGTON BL	31.78	8	0	250-HSE	810.24	50 %	405.12	50 %	405.12	101.28
001-1170	LINCOLN BL AT MINDANAO WAY	30.92	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
001-1175	PACIFIC COAST HWY AT GOODRICH AVE	9.161	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-1180	PAC COAST HWY AT ALAMEDA ST EAST RDWY	9.253	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
001-1181	PAC COAST HWY AT ALAMEDA ST WEST RDWY	9.281	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
001-1185	PAC COAST HWY AT ALAMEDA ST WEST RDWY	9.281	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
001-1190	PAC COAST HWY AT ALAMEDA ST WEST RDWY	9.281	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
001-1195	PACIFIC COAST HWY AT COIL AVE	9.451	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
001-1200	PACIFIC COAST HWY AT DRUMM AVE	9.481	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-1205	PACIFIC COAST HWY AT BLINN AVE	9.531	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
001-1206	PACIFIC COAST HWY AT BLINN AVE.	9.531	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
001-1210	PACIFIC COAST HWY AT MAHAR AVE	9.611	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
001-1215	PACIFIC COAST HWY AT WATSON AVE	9.681	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
001-1220	PACIFIC COAST HWY AT PIONEER AVE	9.761	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
001-1225	PACIFIC COAST HWY AT SANFORD AVE	9.851	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
001-1230	PACIFIC COAST HWY AT EUBANK AVE	10.123	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
001-1231	PACIFIC COAST HWY AT EUBANK AVE	10.123	2	0	250-HSE	202.56	50 %	101.28	50 %	101.28	25.32
001-1235	PACIFIC COAST HWY AT BROAD AVE	10.436	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
001-1240	PACIFIC COAST HWY AT AVALON BL	10.532	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
001-1245	PACIFIC COAST HWY AT MARINE AVE	10.607	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1250	PACIFIC COAST HWY AT FRIES AVE	10.672	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
001-1251	PACIFIC COAST HWY AT FRIES AVE	10.672	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
001-1255	PACIFIC COAST HWY AT ISLAND AVE	10.744	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1256	PACIFIC COAST HWY AT ISLAND AVE	10.744	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
001-1260	PACIFIC COAST HWY AT LAGOON AVE	10.796	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1265	PACIFIC COAST HWY AT RAVENNA AVE	10.849	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1270	PACIFIC COAST HWY AT NEPTUNE AVE	10.901	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
001-1275	PACIFIC COAST HWY AT BAY VIEW AVE	10.963	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1280	PACIFIC COAST HWY AT MCDONALD AVE	11.024	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
001-1285	PACIFIC COAST HWY AT RONAN AVE	11.085	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1290	PACIFIC COAST HWY AT GULF ST	11.145	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1295	PACIFIC COAST HWY AT WILMINGTON BLVD	11.208	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
001-1300	PACIFIC COAST HWY AT FRIGATE AVE	11.36	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
001-1301	PACIFIC COAST HWY AT FRIGATE AVE	11.36	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
001-1305	PACIFIC COAST HWY AT FIGUEROA ST	11.559	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1306	PACIFIC COAST HWY AT FIGUEROA ST	11.559	6	0	250-HSE	607.68	50 %	303.84	50 %	303.84	75.96
001-1310	PACIFIC COAST HWY AT HARBOR FWY RAMPS	11.61	4	0	250-HSE	405.12	100 %	405.12	0 %	0.00	101.28
001-1315	PACIFIC COAST HWY AT FIGUEROA PL	11.66	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
001-1320	PACIFIC COAST HWY AT DODGE AVE	12.01	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
001-1325	PACIFIC COAST HWY AT DODGE AVE	12.01	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
001-1330	PACIFIC COAST HWY AT MCCOY AVE	12.065	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
001-1335	PACIFIC COAST HWY AT BIXBY AVE	12.12	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
001-1340	PACIFIC COAST HWY AT VERMONT AVE	12.171	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
001-1341	PACIFIC COAST HWY AT VERMONT AVE	12.171	7	0	250-HSE	708.96	50 %	354.48	50 %	354.48	88.62
001-1345	PACIFIC COAST HWY AT 257TH ST	12.369	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
001-1350	PACIFIC COAST HWY AT NORMANDIE AVE	12.517	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
001-1351	PACIFIC COAST HWY AT NORMANDIE AVE	12.517	7	0	200-HSE	600.60	50 %	300.30	50 %	300.30	75.08
001-1355	PACIFIC COAST HWY AT FRAMPTON AVE	12.662	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
001-1355	PACIFIC COAST HWY AT FRAMPTON AVE	12.662	1	0	250-HSE	101.28	0 %	0.00	100 %	101.28	0.00
001-1360	PACIFIC COAST HWY AT BELLE FORTE AVE	12.733	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1365	PACIFIC COAST HWY AT SENATOR AVE	12.823	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
001-1370	PACIFIC COAST HWY AT PRESIDENT AVE	12.912	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
001-1373	PACIFIC COAST HWY AT WESTERN AVE	13.1	7	0	200-HSE	600.60	100 %	600.60	0 %	0.00	150.15
001-1374	PACIFIC COAST HWY AT WESTERN AVE	13.1	1	0	250-HSE	101.28	100 %	101.28	0 %	0.00	25.32
001-1375	SEPULVEDA BL AT IMPERIAL HIGHWAY	25.92	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
001-1380	SEPULVEDA BL AT IMPERIAL HWY EAST RAMP	25.921	5	0	MV-E	693.00	67 %	464.31	33 %	228.69	116.08
001-1385	SEPULVEDA BL AT IMPERIAL HWY WEST RAMP	25.919	6	0	MV-E	831.60	67 %	557.17	33 %	274.43	139.29
001-1390	SEPULVEDA BL AT CENTURY BL RAMPS W/B	26.962	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
001-1395	SEPULVEDA BL AT CENTURY BL RAMPS	26.954	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
001-1400	SEPULVEDA BL AT CENTURY BL RAMPS	26.954	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-1405	SEPULVEDA BL AT CENTURY BL RAMPS	26.954	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
001-1410	SEPULVEDA BL AT 98TH ST	27.061	3	0	MV-E	415.80	67 %	278.59	33 %	137.21	69.65
001-1415	SEPULVEDA BL AT 96TH ST	27.151	8	0	MV-E	1,108.80	50 %	554.40	50 %	554.40	138.60
001-1420	SEPULVEDA BL AT INTERCEPTOR ST	27.231	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-1425	SEPULVEDA BL AT SEPULVEDA EAST WAY	27.35	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
001-1430	SEPULVEDA BL AT LINCOLN BLVD	27.363	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
001-1435	SEPULVEDA BL AT LINCOLN BLVD RAMP		2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
001-1440	LINCOLN BLVD AT 94TH ST	28.442	1	0	250-HSE	101.28	67 %	67.86	33 %	33.42	16.96
001-1445	LINCOLN BLVD AT LA TIJERA BLVD	28.719	4	0	250-HSE	405.12	67 %	271.43	33 %	133.69	67.86
001-1450	LINCOLN BLVD AT LA TIJERA BLVD	28.719	2	0	150-HSE	144.00	67 %	96.48	33 %	47.52	24.12
001-1455	LINCOLN BLVD AT LOYOLA BLVD	28.841	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-1460	LINCOLN BLVD AT LOYOLA BLVD	28.841	1	0	4-E	114.72	67 %	76.86	33 %	37.86	19.22
001-1465	LINCOLN BLVD AT MANCHESTER AVE	29.084	9	0	250-HSE	911.52	50 %	455.76	50 %	455.76	113.94
001-1470	LINCOLN BLVD AT MANCHESTER AVE	29.084	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
001-1475	LINCOLN BLVD AT 85TH ST	29.171	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
001-1480	LINCOLN BLVD AT 84TH ST	29.261	4	0	MV-E	554.40	67 %	371.45	33 %	182.95	92.86
001-1485	LINCOLN BLVD AT 83RD ST	29.371	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
001-1495	LINCOLN BLVD AT HUGHES TERRACE	29.62	5	0	200-HSE	429.00	67 %	287.43	33 %	141.57	71.86
001-4005	PACIFIC COAST HWY AT ENTRADA DRIVE	37.001	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
001-4010	PACIFIC COAST HWY AT CHAUTAUQUA BLVD	37.045	3	0	MV-E	415.80	67 %	278.59	33 %	137.21	69.65
001-4015	PACIFIC COAST HWY AT CHAUTAUQUA BLVD		1	0	MV-U	145.32	67 %	97.36	33 %	47.96	24.34
001-4020	PACIFIC COAST HWY AT TEMESCAL CANYON RD	38.111	4	0	250-HSE	405.12	67 %	271.43	33 %	133.69	67.86
001-4025	PACIFIC COAST HWY AT BEL AIR BAY RD	38.741	2	0	250-HSE	202.56	50 %	101.28	50 %	101.28	25.32
001-4030	PACIFIC COAST HWY AT BEL AIR BAY RD	38.741	1	0	MV-U	145.32	50 %	72.66	50 %	72.66	18.17
001-4035	PACIFIC COAST HWY AT SUNSET BLVD	39.296	7	0	250-HSE	708.96	67 %	475.00	33 %	233.96	118.75
001-4040	PACIFIC COAST HWY AT PORTO MARINA WAY	39.641	1	0	250-HSE	101.28	67 %	67.86	33 %	33.42	16.96
001-4045	PACIFIC COAST HWY AT PORTO MARINA WAY	39.641	1	0	400-HSE	146.64	67 %	98.25	33 %	48.39	24.56
001-4050	PACIFIC COAST HWY AT PORTO MARINA WAY	39.641	1	0	MV-U	145.32	67 %	97.36	33 %	47.96	24.34
Summary for ROUTE No. 001 (129 detail records)		TOTAL PER ROUTE:				$ 39,452.28		$ 22,116.65		$ 17,335.63	$ 5,529.16
002-1100	GLENDALE FWY AT ALLESANDRO ST	14.101	5	0	MV-E	693.00	25 %	173.25	75 %	519.75	43.31
002-1130	GLENDALE BL AT ALLESANDRO ST NR.CLIFFORD	14.081	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1131	GLENDALE BLVD AT ALLESANDRO ST	14.101	1	0	MV-U	145.32	50 %	72.66	50 %	72.66	18.17
002-1135	GLENDALE BLVD AT CLIFFORD ST	14.021	2	0	MV-U	290.64	50 %	145.32	50 %	145.32	36.33
002-1140	GLENDALE BLVD AT BRANDEN ST	13.951	2	0	MV-U	290.64	50 %	145.32	50 %	145.32	36.33
002-1145	GLENDALE BLVD AT AARON ST	13.881	2	0	MV-U	290.64	50 %	145.32	50 %	145.32	36.33
002-1150	GLENDALE BLVD AT EFFIE ST	13.781	3	0	250-HSE	303.84	40 %	121.54	60 %	182.30	30.38
002-1151	GLENDALE BLVD AT EFFIE ST	13.781	1	0	200-HSE	85.80	40 %	34.32	60 %	51.48	8.58
002-1152	GLENDALE BLVD AT ALLESANDRO NR EFFIE	13.782	1	0	MV-E	138.60	40 %	55.44	60 %	83.16	13.86
002-1155	GLENDALE BLVD AT BERKELEY AVE	13.612	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
002-1158	ALVARADO ST AT GLENDALE BLVD	13.592	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
002-1159	ALVARADO ST AT GLENDALE BLVD	13.592	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1160	ALVARADO ST AT SCOTT AVE	13.521	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1163	ALVARADO ST AT SCOTT AVE	13.521	8	0	4-E	917.76	50 %	458.88	50 %	458.88	114.72
002-1164	ALVARADO ST AT MONTANA ST	13.411	2	0	4-E	229.44	50 %	114.72	50 %	114.72	28.68
002-1165	ALVARADO ST AT MONTANA ST	13.411	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
002-1170	ALVARADO ST AT RESERVOIR ST	13.291	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
002-1171	ALVARADO ST AT ELSINORE ST	13.221	2	0	4-E	229.44	67 %	153.72	33 %	75.72	38.43
002-1172	ALVARADO ST AT ELSINORE ST	13.221	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
002-1174	ALVARADO ST AT SUNSET BLVD	13.19	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1175	ALVARADO ST AT SUNSET BLVD	13.19	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
002-1177	ALVARADO ST AT MONTROSE ST	13.081	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
002-1180	ALVARADO ST AT MARATHON ST	13.051	3	0	MV-E	415.80	67 %	278.59	33 %	137.21	69.65
002-1183	ALVARADO ST AT SANTA YNEZ ST	13.001	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
002-1184	ALVARADO ST AT KENT ST	12.941	3	0	MV-E	415.82	50 %	207.91	50 %	207.91	51.98
002-1185	ALVARADO ST AT KENT ST	12.941	2	0	4-E	229.44	50 %	114.72	50 %	114.72	28.68
002-1190	ALVARADO ST AT CLINTON ST	12.875	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
002-1193	ALVARADO ST AT BELLEVUE AVE	12.811	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
002-1195	ALVARADO ST AT HOLLYWOOD FWY N/B RAMPS	12.771	3	0	MV-E	415.80	100 %	415.80	0 %	0.00	103.95
002-1195	ALVARADO ST AT HOLLYWOOD FWY N/B RAMPS	12.771	1	0	200-HSE	85.80	100 %	85.80	0 %	0.00	21.45
002-1196	ALVARADO ST AT HOLLYWOOD FWY S/B RAMPS	12.75	3	0	MV-E	415.80	100 %	415.80	0 %	0.00	103.95
002-1360	SANTA MONICA BLVD AT SAWTELLE BLVD	3.561	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1362	SANTA MONICA BLVD AT SAWTELLE BLVD	3.561	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1363	SANTA MONICA BLVD AT CORINTH AVE	3.481	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1364	SANTA MONICA BLVD AT PURDUE AVE	3.421	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1365	SANTA MONICA BLVD AT BUTLER AVE	3.351	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1366	SANTA MONICA BLVD AT COLBY AVE	3.275	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1367	SANTA MONICA BLVD AT FEDERAL AVE	3.211	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1368	SANTA MONICA BLVD AT FEDERAL AVE	3.211	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1369	SANTA MONICA BLVD AT BARRY AVE	3.141	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1370	SANTA MONICA BLVD AT BARRINGTON AVE	3.081	4	0	310-HSE	466.20	50 %	233.10	50 %	233.10	58.28
002-1371	SANTA MONICA BLVD AT BARRINGTON AVE	3.081	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
002-1372	SANTA MONICA BLVD AT STONER AVE	3.011	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1374	SANTA MONICA BLVD AT GRANVILLE AVE	2.941	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1376	SANTA MONICA BLVD AT WESTGATE AVE	2.871	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1378	SANTA MONICA BLVD AT ARMACOST AVE	2.801	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
002-1380	SANTA MONICA BLVD AT BROCKTON AVE	2.741	4	0	310-HSE	466.20	50 %	233.10	50 %	233.10	58.28
002-1385	SANTA MONICA BLVD AT SALTAIR AVE	2.671	4	0	MMWE	1,232.64	40 %	493.06	60 %	739.58	123.26
002-1390	SANTA MONICA BLVD AT SALTAIR AVE	2.671	2	0	6-E	282.48	40 %	112.99	60 %	169.49	28.25
002-1393	SANTA MONICA BLVD AT BUNDY DR	2.6	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1395	SANTA MONICA BLVD AT BUNDY DR	2.6	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1396	SANTA MONICA BL AT AMHERST AVE	2.531	3	0	MMWE	924.48	67 %	619.40	33 %	305.08	154.85
002-1397	SANTA MONICA BL AT WELLESLEY AVE	2.461	4	0	MMWE	1,232.64	50 %	616.32	50 %	616.32	154.08
002-1398	SANTA MONICA BL AT CARMELINA AVE	2.391	4	0	MMWE	1,232.64	67 %	825.87	33 %	406.77	206.47
002-1399	SANTA MONICA BL AT ROCHESTER AVE	2.341	1	0	MMWE	308.16	67 %	206.47	33 %	101.69	51.62
002-1400	SANTA MONICA BL AT ROCHESTER AVE	2.341	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
002-1401	SANTA MONICA BL AT CENTINELA BL	2.321	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
002-1402	SANTA MONICA BL AT CENTINELA BL	2.321	2	0	MMWE	616.32	25 %	154.08	75 %	462.24	38.52
002-1580	SANTA MONICA BL AT GLENDON AVE	4.321	1	0	4-E	114.72	67 %	76.86	33 %	37.86	19.22
002-1583	SANTA MONICA BL AT GLENDON AVE	4.321	1	0	10-U	214.44	67 %	143.67	33 %	70.77	35.92
002-1585	SANTA MONICA BL AT GLENDON AVE	4.321	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
002-1590	SANTA MONICA BL AT MIDVALE AVE	4.181	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
002-1595	SANTA MONICA BL AT MIDVALE AVE	4.181	1	0	4-E	114.72	67 %	76.86	33 %	37.86	19.22
002-1600	SANTA MONICA BL AT KELTON AVE	4.121	2	0	4-E	229.44	67 %	153.72	33 %	75.72	38.43
002-1605	SANTA MONICA BL AT GREENFIELD AVE	3.991	2	0	4-E	229.44	67 %	153.72	33 %	75.72	38.43
002-1610	SANTA MONICA BL AT CAMDEN AVE	3.921	2	0	4-E	229.44	67 %	153.72	33 %	75.72	38.43
002-1615	SANTA MONICA BL AT HOLLYWD FWY OFF RAMP	12.771	2	0	MV-E	277.20	75 %	207.90	25 %	69.30	51.98
002-1620	SANTA MONICA BL AT HOLLYWD FWY OFF RAMP	12.771	2	0	250-HSE	202.56	75 %	151.92	25 %	50.64	37.98
002-1625	SANTA MONICA BL AT HOLLYWD FWY ON RAMP	12.701	4	0	250-HSE	405.12	75 %	303.84	25 %	101.28	75.96
002-1630	SANTA MONICA BL AT OXFORD AVE	12.661	3	0	250-HSE	303.84	67 %	203.57	33 %	100.27	50.89
002-1635	SANTA MONICA BL AT WESTERN AVE	12.58	8	0	250-HSE	810.24	50 %	405.12	50 %	405.12	101.28
002-1640	SANTA MONICA BL AT ST ANDREWS PL	12.471	8	0	250-HSE	810.24	50 %	405.12	50 %	405.12	101.28
002-1645	SANTA MONICA BL AT WILTON PL	12.32	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
002-1650	SANTA MONICA BL AT WILTON PL	12.32	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1655	SANTA MONICA BL AT RIDGEWOOD PL	12.271	2	0	250-HSE	202.56	67 %	135.72	33 %	66.84	33.93
002-1660	SANTA MONICA BL AT VAN NESS AVE	12.211	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
002-1665	SANTA MONICA BL AT VAN NESS AVE	12.211	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
002-1670	SANTA MONICA BL AT BRONSON AVE	12.081	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
002-1690	SANTA MONICA BL AT TAMARIND AVE	12.021	4	0	200-HSE	343.20	67 %	229.94	33 %	113.26	57.49
002-1700	SANTA MONICA BL AT GORDON ST	11.961	4	0	200-HSE	343.20	67 %	229.94	33 %	113.26	57.49
002-1705	SANTA MONICA BL AT BEACHWOOD DR	11.901	3	0	200-HSE	257.40	67 %	172.46	33 %	84.94	43.11
002-1715	SANTA MONICA BL AT GOWER ST	11.831	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
002-1730	SANTA MONICA BL AT LODI PL	11.761	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
002-1740	SANTA MONICA BL AT EL CENTRO AVE	11.711	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
002-1750	SANTA MONICA BL AT VINE ST	11.581	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
002-1760	SANTA MONICA BL AT LILLIAN WAY	11.511	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1770	SANTA MONICA BL AT CAHUENGA BL	11.451	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
002-1780	SANTA MONICA BL AT COLE AVE	11.391	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
002-1790	SANTA MONICA BL AT WILCOX AVE	11.331	5	0	200-HSE	429.00	50 %	214.50	50 %	214.50	53.63
002-1800	SANTA MONICA BL AT WILCOX PLAVE	11.301	3	0	200-HSE	257.40	67 %	172.46	33 %	84.94	43.11
002-1810	SANTA MONICA BL AT HUDSON AVE	11.251	5	0	200-HSE	429.00	67 %	287.43	33 %	141.57	71.86
002-1820	SANTA MONICA BL AT SEWARD ST	11.201	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1825	SANTA MONICA BL AT LAS PALMAS AVE	11.021	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
002-1830	SANTA MONICA BL AT LAS PALMAS AVE	11.021	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1850	SANTA MONICA BL AT MCCADDEN PL	10.961	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1860	SANTA MONICA BL AT HIGHLAND AVE	10.896	8	0	200-HSE	686.40	100 %	686.40	0 %	0.00	171.60
002-1870	SANTA MONICA BL AT CITRUS AVE	10.821	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
002-1875	SANTA MONICA BL AT MANSFIELD AVE	10.781	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1880	SANTA MONICA BL AT ORANGE DR	10.721	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-1890	SANTA MONICA BL AT SYCAMORE AVE	10.651	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
002-2005	GLENDALE FWY N/B OFF AT COLORADO BL	18.296	2	0	MV-E	277.20	75 %	207.90	25 %	69.30	51.98
002-2010	GLENDALE FWY S/S ON AT COLORADO BL	18.237	2	0	MV-E	277.20	75 %	207.90	25 %	69.30	51.98
002-2015	GLENDALE FWY N/B ON AT DELEVAN PL	17.32	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
002-2020	GLENDALE FWY S/B OFF AT YORK BL	17.506	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
002-2025	GLENDALE FWY RAMPS AT VERDUGO RD	16.631	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
002-2030	GLENDALE FWY RAMPS AT EAGLE ROCK BL		7	0	200-HSE	600.60	25 %	150.15	75 %	450.45	37.54
002-2035	GLENDALE FWY S/B ON AT SAN FERNANDO RD	16.101	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
002-2040	GLENDALE FWY N/B OFF AT SAN FERNANDO RD	15.937	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
002-2045	GLENDALE FWY N/B ON AT SAN FERNANDO RD	15.925	3	0	200-HSE	257.40	20 %	51.48	80 %	205.92	12.87
002-2050	GLENDALE FWY N/B ON AT SAN FERNANDO RD	15.925	1	0	MV-U	145.32	20 %	29.06	80 %	116.26	7.27
002-2055	GLENDALE FWY N/B ON AT SAN FERNANDO RD	15.925	1	0	100-HSE	56.52	20 %	11.30	80 %	45.22	2.83
002-2060	GLENDALE FWY S/B OFF AT FLETCHER DR	15.683	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
002-2065	GLENDALE FWY S/B OFF AT FLETCHER DR	15.683	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
002-2070	GLENDALE FWY N/B ON AT FLETCHER DR	15.719	1	0	15-E	270.84	33 %	89.38	67 %	181.46	22.34
002-2075	GLENDALE FWY N/B ON AT FLETCHER DR	15.719	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
002-2080	GLENDALE FWY N/B ON AT FLETCHER DR	15.719	3	0	200-HSE	257.40	33 %	84.94	67 %	172.46	21.24
002-2085	GLENDALE FWY S/B ON AT RIVERSIDE DR	14.995	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
002-2090	GLENDALE FWY RAMPS AT NEWELL ST	15.271	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
002-2095	GLENDALE FWY S/B OFF AT GLENDALE BLVD	14.341	5	0	MV-E	693.00	33 %	228.69	67 %	464.31	57.17
002-2100	GLENDALE FWY N/B ON AT GLENDALE BLVD	14.348	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
Summary for ROUTE No. 002 (120 detail records)		TOTAL PER ROUTE:				$ 53,422.69		$ 27,594.28		$ 25,828.41	$ 6,898.57
005-0002	GOLDEN STATE FWY AT SAN FERNANDO RD	43.685	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0003	GOLDEN STATE FWY AT SAN FERNANDO RD	43.685	1	0	MV-U	145.32	33 %	47.96	67 %	97.36	11.99
005-0005	GOLDEN STATE FWY AT ROXFORD S/O FWY	42.788	4	0	MV-E	554.40	40 %	221.76	60 %	332.64	55.44
005-0006	GOLDEN STATE FWY AT ROXFORD N/O FWY	42.666	2	0	700-MWE	451.68	50 %	225.84	50 %	225.84	56.46
005-0007	GOLDEN STATE FWY AT ROXFORD N/O FWY	42.666	1	0	700-MWE	225.84	40 %	90.34	60 %	135.50	22.58
005-0012	GOLDEN STATE FWY AT KALISHER ST	40.27	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
005-0015	GOLDEN STATE FWY AT SAN FERNANDO MISSION	40.24	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
005-0016	GOLDEN STATE FWY AT SAN FERNANDO MISSION	40.24	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
005-0020	GOLDEN STATE FWY AT BRAND BLVD	39.98	7	0	MV-E	970.20	100 %	970.20	0 %	0.00	242.55
005-0025	GOLDEN STATE FWY AT CHATSWORTH N/O FWY	39.92	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
005-0030	GOLDEN STATE FWY AT CHATSWORTH S/O FWY	39.786	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
005-0035	GOLDEN STATE FWY AT PAXTON ST	39.05	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
005-0036	GOLDEN STATE FWY AT PAXTON ST	39.05	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
005-0037	GOLDEN STATE FWY AT PAXTON ST	39.05	1	0	100-HSE	56.52	25 %	14.13	75 %	42.39	3.53
005-0040	GOLDEN STATE FWY AT VAN NUYS BLVD	38.5	9	0	MV-E	1,247.40	50 %	623.70	50 %	623.70	155.93
005-0050	GOLDEN STATE FWY AT TERRA BELLA N/O FWY	37.99	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0051	GOLDEN STATE FWY AT TERRA BELLA S/O FWY	39.96	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
005-0052	GOLDEN STATE FWY AT TERRA BELLA S/O FWY	39.96	1	0	200-HSE	85.80	25 %	21.45	75 %	64.35	5.36
005-0055	GOLDEN STATE FWY AT OSBORNE ST	37.41	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28
005-0056	GOLDEN STATE FWY AT OSBORNE ST	37.41	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
005-0060	GOLDEN STATE FWY AT BRANFORD S/O FWY	36.86	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
005-0065	GOLDEN STATE FWY AT BRANFORD N/O FWY	36.222	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0070	GOLDEN STATE FWY AT LAUREL CYN S/O FWY	35.94	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
005-0072	GOLDEN STATE FWY AT LAUREL CYN N/O FWY		3	0	MV-E	415.81	25 %	103.95	75 %	311.86	25.99
005-0080	GOLDEN STATE FWY AT SHELDON ST	36	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
005-0085	GOLDEN STATE FWY AT LANKERSHIM BLVD	34.99	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
005-0090	GOLDEN STATE FWY AT LANKERSHIM BLVD	34.99	3	0	MV-E	415.82	50 %	207.91	50 %	207.91	51.98
005-0095	GOLDEN STATE FWY AT TUXFORD S/O FWY	34.65	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
005-0097	GOLDEN STATE FWY AT TUXFORD N/O FWY	34.795	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
005-0100	GOLDEN STATE FWY AT PENROSE ST	34.28	2	0	MV-E	277.21	33 %	91.48	67 %	185.73	22.87
005-0105	GOLDEN STATE FWY AT PENROSE ST	34.28	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
005-0107	GOLDEN STATE FWY AT ROSCOE BL NR SUNLAND	33.28	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0110	GOLDEN STATE FWY AT SUNLAND BLVD	33.68	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
005-0112	GOLDEN STATE FWY AT ROSCOE BLVD	33.17	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0113	GOLDEN STATE FWY AT ROSCOE BLVD	33.17	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0115	GOLDEN STATE FWY AT HOLLYWOOD WAY	32.35	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
005-0120	GOLDEN STATE FWY AT HOLLYWOOD WAY	32.35	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
005-0122	GOLDEN STATE FWY AT ZOO DRIVE	25.29	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0125	GOLDEN STATE FWY AT CRYSTAL SPRING DR	24.61	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0130	GOLDEN STATE FWY AT LOS FELIZ BLVD	24.33	3	0	MV-E	415.82	50 %	207.91	50 %	207.91	51.98
005-0135	GOLDEN STATE FWY AT LOS FELIZ BLVD	24.33	7	0	15-E	1,895.88	50 %	947.94	50 %	947.94	236.99
005-0136	GOLDEN STATE FWY AT LOS FELIZ BLVD	24.33	2	2	15-E*	408.48	50 %	204.24	50 %	204.24	51.06
005-0137	GOLDEN STATE FWY AT LOS FELIZ BLVD	24.33	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
005-0140	GOLDEN STATE FWY AT GLENDALE BLVD	24.844	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
005-0146	GOLDEN STATE FWY @ RIVERSIDE N/O GLENDAL	23.588	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
005-0147	GOLDEN STATE FWY AT FLETCHER DR	22.97	6	0	200-HSE	514.80	33 %	169.88	67 %	344.92	42.47
005-0148	GOLDEN STATE FWY AT STADIUM WAY	22.298	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
005-0149	GOLDEN STATE FWY AT EADS ST	21.708	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
005-0150	GOLDEN STATE FWY AT ELMGROVE ST	20.99	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
005-0151	GOLDEN STATE FWY AT DUVALL ST	20.94	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
005-0152	GOLDEN STATE FWY @ RIVERSIDE DR @ BARCLY	20.93	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
005-0153	GOLDEN STATE FWY AT AVE.26 N/O LACY	20.27	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
005-0154	GOLDEN STATE FWY AT AVE.26 AT LACY	20.26	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
005-0155	GOLDEN STATE FWY AT PASADENA E/O FWY	19.86	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
005-0160	GOLDEN STATE FWY AT PASADENA W/O FWY	19.85	3	0	MV-E	415.80	40 %	166.32	60 %	249.48	41.58
005-0165	GOLDEN STATE FWY AT PASADENA W/O FWY	19.85	1	0	175-MWE	72.00	40 %	28.80	60 %	43.20	7.20
005-0170	GOLDEN STATE FWY AT N BROADWAY	19.73	3	0	10-E	625.68	50 %	312.84	50 %	312.84	78.21
005-0175	GOLDEN STATE FWY AT N BROADWAY	19.73	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
005-0175	GOLDEN STATE FWY AT N.BROADWAY	19.73	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
005-0180	GOLDEN STATE FWY AT DALY ST	19.301	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
005-0185	GOLDEN STATE FWY AT DARWIN AVE	19.21	1	0	MV-E	138.60	40 %	55.44	60 %	83.16	13.86
005-0190	GOLDEN STATE FWY AT MISSION RD	18.78	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
005-0200	GOLDEN STATE FWY AT MARENGO ST	18.76	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
005-0205	GOLDEN STATE FWY AT STATE E/O FWY	18.26	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
005-0206	GOLDEN STATE FWY AT STATE W/O FWY	18.25	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
005-0210	GOLDEN STATE FWY AT STATE E/O FWY	18.26	3	0	200-HSE	257.40	33 %	84.94	67 %	172.46	21.24
005-0215	GOLDEN STATE FWY AT BROOKLYN AVE	18.06	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
005-0220	GOLDEN STATE FWY AT BROOKLYN AVE	18.06	3	0	10-E	625.68	33 %	206.47	67 %	419.21	51.62
005-0221	GOLDEN STATE FWY AT BROOKLYN AVE	18.06	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
005-0225	GOLDEN STATE FWY AT 4TH ST	17.717	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
005-0230	GOLDEN STATE FWY AT 4TH & CUMMINGS	17.56	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
005-0231	GOLDEN STSTE FWY AT 4TH & CUMMINGS	17.56	1	0	100-HSE	56.52	50 %	28.26	50 %	28.26	7.07
005-0235	GOLDEN STATE FWY AT 4TH ST	16.9	1	0	175-MWE	72.00	40 %	28.80	60 %	43.20	7.20
005-0240	GOLDEN STATE FWY AT BOYLE ST		1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
005-0245	GOLDEN STATE FWY AT BREED ST	16.8	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
005-0246	SANTA ANA FWY AT BREED ST	16.75	1	0	250-MWE	94.68	33 %	31.24	67 %	63.44	7.81
005-0250	GOLDEN STATE FWY AT SOTO ST	16.73	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
005-0255	SANTA ANA FWY AT SOTO ST	16.711	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
005-0256	SANTA ANA FWY AT 4TH ST		2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
005-0260	SANTA ANA FWY AT 8TH ST	16.486	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
005-0265	SANTA ANA FWY AT EUCLID S/O FWY	16.275	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
005-0270	SANTA ANA FWY AT EUCLID N/O FWY	16.05	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
005-0275	SANTA ANA FWY AT EUCLID N/O FWY	16.05	1	0	250-MWE	94.68	25 %	23.67	75 %	71.01	5.92
005-0280	SANTA ANA FWY AT GRANDE VISTA AVE	15.771	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
005-0285	SANTA ANA FWY AT CONCORD ST	15.752	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
005-0290	SANTA ANA FWY AT CALZONA S/O FWY	15.12	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
005-0291	SANTA ANA FWY AT CALZONA S/O FWY	15.12	1	0	250-MWE	94.68	25 %	23.67	75 %	71.01	5.92
005-0295	SANTA ANA FWY AT CALZONA N/O FWY	15.118	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
005-0300	SANTA ANA FWY AT CALZONA N/O FWY	15.118	1	0	100-MWE	50.88	50 %	25.44	50 %	25.44	6.36
Summary for ROUTE No. 005 (89 detail records)		TOTAL PER ROUTE:				$ 31,878.76		$ 13,298.49		$ 18,580.28	$ 3,324.62
010-2005	SANTA MONICA FWY AT CENTINELA AVE	4.24	4	0	250-HSE	405.12	33 %	133.69	67 %	271.43	33.42
010-2006	SANTA MONICA FWY AT CENTINELA AVE	4.24	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
010-2015	SANTA MONICA FWY AT BUNDY S/O FWY	4.99	4	0	200-HSE	343.20	33 %	113.26	67 %	229.94	28.31
010-2016	SANTA MONICA FWY AT BUNDY N/S FWY	4.703	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
010-2020	SANTA MONICA FWY AT OVERLAND N/O FWY	6.4	6	0	MV-E	831.60	25 %	207.90	75 %	623.70	51.98
010-2021	SANTA MONICA FWY AT OVERLAND S/O FWY	6.39	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
010-2030	SANTA MONICA FWY, NATIONAL BL N/O VENICE	7.359	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
010-2035	SANTA MONICA FWY, NATIONAL BL AT MANNING	7.21	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
010-2040	SANTA MONICA FWY, NATIONAL E/O OVERLAND	6.377	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
010-2045	SANTA MONICA FWY AT MANNING AVE	7.09	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
010-2046	SANTA MONICA FWY AT ROBERTSON BLVD	7.92	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
010-2047	SANTA MONICA FWY AT ROBERTSON BLVD	7.92	3	0	200-HSE	257.40	25 %	64.35	75 %	193.05	16.09
010-2048	SANTA MONICA FWY AT EXPOSITION BLVD	7.678	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
010-2049	SANTA MONICA FWY AT EXPOSITION BLVD	7.678	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
010-2050	SANTA MONICA FWY AT LA CIENEGA S/O FWY	8.82	5	0	MV-E	693.00	33 %	228.69	67 %	464.31	57.17
010-2055	SANTA MONICA FWY AT LA CIENEGA N/O FWY	8.83	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
010-2060	SANTA MONICA FWY AT VENICE BLVD S/O FWY	9	1	0	MMWE	308.16	33 %	101.69	67 %	206.47	25.42
010-2061	SANTA MONICA FWY AT VENICE BLVD N/O FWY	9.001	2	0	310-HSE	233.10	25 %	58.28	75 %	174.83	14.57
010-2061	SANTA MONICA FWY AT VENICE BLVD N/O FWY	9.001	1	0	200-HSE	85.80	25 %	21.45	75 %	64.35	5.36
010-2065	SANTA MONICA FWY AT VENICE BLVD N/O FWY	9.001	3	0	MMWE	924.48	25 %	231.12	75 %	693.36	57.78
010-2070	SANTA MONICA FWY AT FAIRFAX AVE	9.31	5	0	MV-E	693.00	25 %	173.25	75 %	519.75	43.31
010-2071	SANTA MONICA FWY AT FAIRFAX AVE	9.31	1	0	200-HSE	85.80	25 %	21.45	75 %	64.35	5.36
010-2073	APPLE ST. N/O WASHINGTON BLVD	9.34	2	0	MV-E	277.20	100 %	277.20	0 %	0.00	69.30
010-2075	SANTA MONICA FWY, WASHINGTON BL S/O FWY	9.515	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
010-2081	SANTA MONICA FWY, WASHINGTON BL N/O FWY	9.551	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
010-2082	SANTA MONICA FWY, WASHINGTON BL N/O FWY	9.551	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
010-2085	SANTA MONICA FWY AT LA BREA AVE	10.43	13	0	200-HSE	1,115.40	50 %	557.70	50 %	557.70	139.43
010-2090	SANTA MONICA FWY AT CRENSHAW BLVD	11.39	9	0	MV-E	1,247.40	50 %	623.70	50 %	623.70	155.93
010-2095	SANTA MONICA FWY AT ARLINGTON AVE	12.32	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
010-2096	SANTA MONICA FWY AT WESTERN AVE	12.82	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
010-2100	SANTA MONICA FWY AT NORMANDIE AVE	13.3	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
010-2101	SANTA MONICA FWY AT NORMANDIE AVE.	13.3	3	0	250-HSE	303.84	50 %	151.92	50 %	151.92	37.98
010-2105	SANTA MONICA FWY AT VERMONT AVE	13.8	3	0	250-HSE	303.84	50 %	151.92	50 %	151.92	37.98
010-2106	SANTA MONICA FWY AT VERMONT AVE.	13.8	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
010-2110	SANTA MONICA FWY AT 20TH STREET	14.237	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
010-2111	SANTA MONICA FWY AT HOOVER ST	14.25	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
010-2112	SANTA MONICA FWY AT WASHINGTON NR OAK	14.51	2	0	150-HSE	144.00	33 %	47.52	67 %	96.48	11.88
010-2113	SANTA MONICA FWY AT TOBERMAN ST	14.5	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
010-2114	SANTA MONICA FWY AT TOBERMAN ST	14.5	1	0	175-MWE	72.00	25 %	18.00	75 %	54.00	4.50
010-2115	SANTA MONICA FWY AT FLOWER ST	15.261	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
010-2116	SANTA MONICA FWY AT FLOWER ST	15.261	2	0	10-E	417.12	33 %	137.65	67 %	279.47	34.41
010-2117	SANTA MONICA FWY AT FLOWER ST	15.261	4	0	100-MWE	203.52	33 %	67.16	67 %	136.36	16.79
010-2118	SANTA MONICA FWY AT 18TH ST NR HOPE ST	15.102	3	0	MV-E	415.81	33 %	137.22	67 %	278.59	34.30

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
010-2119	SANTA MONICA FWY AT 17TH ST NR GRAND AVE	15.101	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
010-2120	SANTA MONICA FWY, LOS ANGELES ST N/O FWY	15.781	3	0	MMWE	924.48	25 %	231.12	75 %	693.36	57.78
010-2121	SANTA MONICA FWY, LOS ANGELES ST S/O FWY	15.821	6	0	100-MWE	305.28	33 %	100.74	67 %	204.54	25.19
010-2122	SANTA MONICA FWY AT 18TH ST NR MAPLE	15.648	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
010-2123	SANTA MONICA FWY AT MAPLE AVE	15.592	4	0	100-MWE	203.52	33 %	67.16	67 %	136.36	16.79
010-2124	SANTA MONICA FWY AT 16TH ST NR SAN PEDRO	15.821	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
010-2125	SANTA MONICA FWY AT 17TH ST NR GRIFFITH	16.01	3	0	MV-E	415.81	33 %	137.22	67 %	278.59	34.30
010-2126	SANTA MONICA FWY AT 16TH ST NR CENTRAL	16.207	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
010-2127	SANTA MONICA FWY AT 17TH ST NR NAOMI	16.489	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
010-2130	SANTA MONICA FWY AT SAN PEDRO ST	16.217	1	0	10-E	208.56	33 %	68.82	67 %	139.74	17.21
010-2140	SANTA MONICA FWY AT NAOMI AVE	16.842	1	0	10-E	208.56	100 %	208.56	0 %	0.00	52.14
010-2145	SANTA MONICA FWY AT NEWTON ST	16.93	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
010-2150	SANTA MONICA FWY AT ALAMEDA ST	16.944	1	0	MV-E	138.61	50 %	69.30	50 %	69.30	17.33
010-2151	SANTA MONICA FWY AT ALAMEDA ST	16.944	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
010-2155	SANTA MONICA FWY AT 14TH ST	17.298	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
010-2156	SANTA MONICA FWY AT 14TH ST	17.298	2	0	100-MWE	101.76	33 %	33.58	67 %	68.18	8.40
010-2157	SANTA MONICA FWY AT 14TH ST	17.298	1	0	MV-U	145.32	33 %	47.96	67 %	97.36	11.99
010-2158	SANTA MONICA FWY AT OLYMPIC BLVD	17.425	3	0	MV-E	415.81	25 %	103.95	75 %	311.86	25.99
010-2159	SANTA MONICA FWY AT MATEO ST	17.576	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
010-2160	SANTA MONICA FWY AT 8TH ST	17.69	2	0	MV-E	277.21	50 %	138.61	50 %	138.61	34.65
010-2165	SANTA MONICA FWY AT SANTA FE AVE	17.7	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
010-2170	SANTA MONICA FWY AT PORTER ST	17.609	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
010-3009	SAN BERNARDINO FWY AT STATE ST	18.52	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
010-3010	SAN BERNARDINO FWY AT SOTO ST	18.808	8	0	700-MWE	1,806.72	25 %	451.68	75 %	1,355.04	112.92
010-3015	SAN BERNARDINO FWY AT SOTO ST	18.808	1	0	MV-U	145.32	25 %	36.33	75 %	108.99	9.08
010-3020	SAN BERNARDINO FWY AT MARENGO ST	19.309	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
Summary for ROUTE No. 010 (69 detail records)		TOTAL PER ROUTE:				$ 25,127.87		$ 9,084.38		$ 16,043.48	$ 2,271.10
027-2020	TOPANGA CANYON BLVD AT BUENAVENTURA ST	11.361	2	0	2.5-E	193.80	50 %	96.90	50 %	96.90	24.23
027-2025	TOPANGA CANYON BLVD AT VISCANIO ST	11.421	2	0	2.5-E	193.80	50 %	96.90	50 %	96.90	24.23
027-2030	TOPANGA CANYON BLVD AT DUMETZ RD	11.471	5	0	200-HSE	429.00	50 %	214.50	50 %	214.50	53.63
027-2035	TOPANGA CANYON BLVD AT PROVIDENCIA ST	11.531	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
027-2040	TOPANGA CANYON BLVD AT SAN MIGUEL ST	11.571	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2045	TOPANGA CANYON BLVD AT DE LA OSA ST	11.641	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
027-2050	TOPANGA CANYON BLVD AT DE LA OSA ST	11.641	1	0	70-HSE	48.60	50 %	24.30	50 %	24.30	6.08

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
027-2055	TOPANGA CANYON BLVD AT VELICATA ST	11.701	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2060	TOPANGA CANYON BLVD AT LOPEZ ST	11.761	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2065	TOPANGA CANYON BLVD AT CELES ST	11.811	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2070	TOPANGA CANYON BLVD AT MARTINEZ ST	11.871	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2075	TOPANGA CANYON BLVD AT GALVEZ ST	11.931	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
027-2080	TOPANGA CANYON BLVD AT DE LA GUERRA ST	11.991	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2085	TOPANGA CANYON BLVD AT CRESPI ST	12.051	1	0	70-HSE	48.60	50 %	24.30	50 %	24.30	6.08
027-2086	TOPANGA CANYON BLVD AT CRESPI ST	12.051	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
027-2090	TOPANGA CANYON BLVD AT AVENUE SAN LUIS	12.101	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2095	TOPANGA CANYON BLVD AT DEL VALLE ST	12.161	2	0	70-HSE	97.20	50 %	48.60	50 %	48.60	12.15
027-2100	TOPANGA CANYON BLVD AT COSTANSO ST	12.211	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
027-2105	TOPANGA CANYON BLVD AT COSTANSO ST	12.211	1	0	70-HSE	48.60	50 %	24.30	50 %	24.30	6.08
027-2110	TOPANGA CANYON BLVD AT VENTURA BLVD	12.276	7	0	200-HSE	600.60	50 %	300.30	50 %	300.30	75.08
027-2120	TOPANGA CANYON BLVD AT CLARENDON ST	12.361	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
027-2125	TOPANGA CANYON BLVD AT VENTURA FWY RAMPS	12.406	2	0	MV-E	277.20	100 %	277.20	0 %	0.00	69.30
027-2126	TOPANGA CANYON BLVD AT VENTURA FWY RAMPS	12.406	2	0	200-HSE	171.60	100 %	171.60	0 %	0.00	42.90
027-2130	TOPANGA CANYON BLVD AT BURBANK BLVD	12.521	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
027-2135	TOPANGA CANYON BLVD AT COLLINS ST	12.681	1	0	100-HSE	56.52	67 %	37.87	33 %	18.65	9.47
027-2140	TOPANGA CANYON BLVD AT COLLINS ST	12.681	4	0	200-HSE	343.20	67 %	229.94	33 %	113.26	57.49
027-2145	TOPANGA CANYON BLVD AT MARYLEE ST	12.741	1	0	150-HSE	72.00	67 %	48.24	33 %	23.76	12.06
027-2150	TOPANGA CANYON BLVD AT MARYLEE ST	12.741	1	0	200-HSE	85.80	67 %	57.49	33 %	28.31	14.37
027-2155	TOPANGA CANYON BLVD AT TOPANGA CANYON PL	12.811	4	0	200-HSE	343.20	67 %	229.94	33 %	113.26	57.49
027-2160	TOPANGA CANYON BLVD AT CALIFA ST	12.86	4	0	200-HSE	343.20	67 %	229.94	33 %	113.26	57.49
027-2165	TOPANGA CANYON BLVD AT CALIFA ST	12.86	1	0	150-HSE	72.00	67 %	48.24	33 %	23.76	12.06
027-2170	TOPANGA CANYON BLVD AT OXNARD ST	13.021	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
027-2175	TOPANGA CANYON BLVD AT CALVERT ST	13.151	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
027-2180	TOPANGA CANYON BLVD AT ERWIN ST	13.271	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
027-2185	TOPANGA CANYON BLVD AT ERWIN ST	13.271	1	0	150-HSE	72.00	50 %	36.00	50 %	36.00	9.00
027-2187	TOPANGA CANYON BLVD AT ERWIN ST	13.271	1	0	100-HSE	56.52	50 %	28.26	50 %	28.26	7.07
027-2190	TOPANGA CANYON BLVD AT VICTORY BLVD	13.557	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
027-2195	TOPANGA CANYON BLVD AT KITTRIDGE ST	13.841	2	0	200-HSE	171.60	67 %	114.97	33 %	56.63	28.74
027-2200	TOPANGA CANYON BLVD AT VANOWEN ST	14.05	6	0	MV-E	831.60	67 %	557.17	33 %	274.43	139.29
027-2205	TOPANGA CANYON BLVD AT BASSETT ST	14.161	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
027-2210	TOPANGA CANYON BLVD AT SCHOOLCRAFT ST	14.231	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
027-2215	TOPANGA CANYON BLVD AT HART ST	14.291	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2220	TOPANGA CANYON BLVD AT GAULT ST	14.411	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2225	TOPANGA CANYON BLVD AT SHERMAN WAY	14.55	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
027-2230	TOPANGA CANYON BLVD AT CANTLAY ST	14.601	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2235	TOPANGA CANYON BLVD AT WYANDOTTE ST	14.651	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2240	TOPANGA CANYON BLVD AT LEADWELL ST	14.731	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2245	TOPANGA CANYON BLVD AT VALERIA ST	14.791	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2250	TOPANGA CANYON BLVD AT RUNNYMEDE ST	14.851	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2255	TOPANGA CANYON BLVD AT CHASSETT ST	14.911	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2260	TOPANGA CANYON BLVD AT COVELLO ST	14.981	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2265	TOPANGA CANYON BLVD AT SATICOY ST	15.041	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
027-2266	TOPANGA CANYON BLVD AT SATICOY ST	15.041	5	0	200-HSE	429.00	50 %	214.50	50 %	214.50	53.63
027-2270	TOPANGA CANYON BLVD AT ELKWOOD ST	15.361	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2275	TOPANGA CANYON BLVD AT STRATHERN ST	15.541	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2276	TOPANGA CANYON BLVD AT STRATHERN ST	15.541	2	0	250-MWE	189.36	50 %	94.68	50 %	94.68	23.67
027-2280	TOPANGA CANYON BLVD AT LANARK ST	15.651	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2285	TOPANGA CANYON BLVD AT ROSCOE BL	15.83	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
027-2290	TOPANGA CANYON BLVD AT SCHOENBORN ST	15.911	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2291	TOPANGA CANYON BLVD AT SCHOENBORN ST	15.911	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
027-2295	TOPANGA CANYON BLVD AT CHASE ST	16.141	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2300	TOPANGA CANYON BLVD AT PARTHENIA ST	16.471	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28
027-2301	TOPANGA CANYON BLVD AT PARTHENIA ST	16.471	1	0	100-HSE	56.52	50 %	28.26	50 %	28.26	7.07
027-2302	TOPANGA CANYON BLVD AT PARTHENIA ST	16.471	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
027-2305	TOPANGA CANYON BLVD AT GRESHAM ST	16.701	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2310	TOPANGA CANYON BLVD AT NORDHOFF ST	17.007	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
027-2315	TOPANGA CANYON BLVD AT PRAIRE ST	17.261	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
027-2320	TOPANGA CANYON BLVD AT PRAIRE ST	17.261	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
027-2325	TOPANGA CANYON BLVD AT PLUMMER ST	17.521	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2330	TOPANGA CANYON BLVD AT LASSEN ST	18.131	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
027-2335	TOPANGA CANYON BLVD AT LASSEN ST	18.131	1	0	4-U	120.24	50 %	60.12	50 %	60.12	15.03
027-2340	TOPANGA CANYON BLVD AT MAYALL ST	18.381	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
027-2345	TOPANGA CANYON BLVD AT MAYALL ST	18.381	2	0	175-MWE	144.00	50 %	72.00	50 %	72.00	18.00
027-2350	TOPANGA CANYON BLVD AT CRAGGY VIEW ST	18.501	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
027-2355	TOPANGA CANYON BLVD AT CRAGGY VIEW ST	18.501	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
027-2360	TOPANGA CANYON BLVD AT DEVONSHIRE ST	18.629	7	0	200-HSE	600.60	50 %	300.30	50 %	300.30	75.08
027-2365	TOPANGA CANYON BLVD AT DEVONSHIRE ST	18.629	1	0	MV-U	145.32	50 %	72.66	50 %	72.66	18.17

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
027-2370	TOPANGA CANYON BLVD AT HIAWATHA ST	18.751	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
027-2375	TOPANGA CANYON BLVD AT HIAWATHA ST	18.751	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
027-2380	TOPANGA CANYON BLVD AT SAN JOSE ST	18.96	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
027-2385	TOPANGA CANYON BLVD AT SAN JOSE ST	18.96	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
027-2390	TOPANGA CANYON BLVD AT ANDORA AVE	19.071	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
027-2395	TOPANGA CANYON BLVD AT CHATSWORTH ST	19.131	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
Summary for ROUTE No. 027 (83 detail records)		TOTAL PER ROUTE:				$ 21,685.56		$ 12,175.74		$ 9,509.82	$ 3,043.93
047-1005	TERMNL ISLD FWY,SUMMERLAND AV & GAFFEY	0.04	8	0	MV-E	1,108.80	25 %	277.20	75 %	831.60	69.30
047-1010	TERMNL ISLD FWY,SUMMERLAND AV & GAFFEY P	0.13	3	0	700-MWE	677.52	33 %	223.58	67 %	453.94	55.90
047-1015	TERMINAL ISLAND FWY AT HARBOR BLVD	0.43	4	0	215-HSE	372.96	25 %	93.24	75 %	279.72	23.31
047-1020	TERMINAL ISLAND FWY AT HARBOR BLVD	0.43	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
047-1025	TERMINAL ISLAND FWY AT FERRY ST	2.309	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
047-1030	TERMINAL ISLAND FWY AT SEASIDE AVE	2.308	6	0	250-HSE	607.68	33 %	200.53	67 %	407.15	50.13
Summary for ROUTE No. 047 (6 detail records)		TOTAL PER ROUTE:				$ 3,182.76		$ 920.68		$ 2,262.08	$ 230.17
060-1005	POMONA FWY AT SOTO ST N/RAMPS	0.512	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
060-1010	POMONA FWY AT SOTO ST S/RAMPS	0.511	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
060-1015	POMONA FWY AT WHITTIER BLVD	1.25	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
060-1020	POMONA FWY AT LORENA ST S/O FWY	1.48	2	0	MV-E	277.21	50 %	138.61	50 %	138.61	34.65
060-1025	POMONA FWY AT LORENA ST N/O FWY	1.76	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
Summary for ROUTE No. 060 (5 detail records)		TOTAL PER ROUTE:				$ 1,386.01		$ 494.81		$ 891.20	$ 123.70
090-0001	MARINA FWY AT CENTINELA AVE	1.72	10	0	MV-E	1,386.00	50 %	693.00	50 %	693.00	173.25
090-0006	MARINA FWY AT CULVER BLVD	1.746	11	0	MV-E	1,524.60	50 %	762.30	50 %	762.30	190.58
090-0011	MARINA FWY AT ALLA ROAD	1.707	6	0	MV-E	831.60	67 %	557.17	33 %	274.43	139.29
090-0016	MARINA FWY AT MINDANAO WAY	1.201	10	0	200-HSE	858.00	50 %	429.00	50 %	429.00	107.25
Summary for ROUTE No. 090 (4 detail records)		TOTAL PER ROUTE:				$ 4,600.20		$ 2,441.47		$ 2,158.73	$ 610.37
101-0005	VENTURA FWY AT LONG VALLEY RD	27.59	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
101-0010	VENTURA FWY AT VALLEY CIRCLE BLVD	27.514	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
101-0015	VENTURA FWY AT AVE SAN LUIS	27.221	2	0	MV-E	277.21	33 %	91.48	67 %	185.73	22.87
101-0020	VENTURA FWY AT WOODLAKE AVE	26.93	6	0	250-HSE	607.68	25 %	151.92	75 %	455.76	37.98
101-0025	VENTURA FWY AT RIGOLETTO ST	26.6	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
101-0030	VENTURA FWY AT VENTURA BLVD W/O FWY	25.79	2	0	15-E	541.68	33 %	178.75	67 %	362.93	44.69
101-0032	VENTURA FWY AT VENTURA BLVD E/O FWY	25.694	4	0	15-E	1,083.36	50 %	541.68	50 %	541.68	135.42
101-0034	VENTURA FWY AT VENTURA BLVD E/O FWY	25.69	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
101-0035	VENTURA FWY AT BURBANK BLVD W/O TOPANGA	25.47	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0040	VENTURA FWY AT CANOGA AVE	24.85	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
101-0041	VENTURA FWY AT CANOGA AVE	24.85	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08
101-0045	VENTURA FWY AT DE SOTO AVE	24.31	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0050	VENTURA FWY AT WINNETKA AVE	23.26	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0052	VENTURA FWY AT WINNETKA AVE	23.26	1	0	MV-U	145.32	50 %	72.66	50 %	72.66	18.17
101-0055	VENTURA FWY AT TAMPA AVE N/O FWY	22.391	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
101-0057	VENTURA FWT AT TAMPA AVE S/O FWY	22.149	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08
101-0060	VENTURA FRY AT VANALDEN AVE	22.07	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
101-0065	VENTURA FWY AT RESEDA BLVD N/O FWY	21.27	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
101-0067	VENTURA FWY AT RESEDA BLVD S/O FWY	21.25	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0070	VENTURA FWY AT BURBANK BLVD NR RESEDA	20.91	1	0	MV-U	145.32	33 %	47.96	67 %	97.36	11.99
101-0075	VENTURA FWY AT WHITE OAK AVE	20.122	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0080	VENTURA FWY AT BALBOA BLVD	19.22	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0085	VENTURA FWY AT HAYVENHURST AVE S/O FWY	18.497	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
101-0090	VENTURA FWY AT HAYVENHURST AVE N/O FWT	18.48	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
101-0095	VENTURA FWY AT HASKELL AVE	17.53	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
101-0100	VENTURA FWY AT SEPULVEDA BLVD	16.789	5	0	MV-E	693.00	33 %	228.69	67 %	464.31	57.17
101-0105	VENTURA FWY AT VAN NUYS BLVD	15.91	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
101-0110	VENTURA FWY AT WOODMAN AVE	14.89	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0115	VENTURA FWY AT COLDWATER CYN AVE	13.88	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
101-0116	VENTURA FWY AT COLDWATER CYN AVE	13.88	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
101-0120	VENTURA FWY AT LAUREL CYN BLVD	12.79	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
101-0125	VENTURA FWY AT TUJUNGA AVE	11.83	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0127	VENTURA FWY AT TUJUNGA AVE	11.83	1	0	10-E	208.56	33 %	68.82	67 %	139.74	17.21
101-0130	VENTURA FWY AT BELLFLOWER AVE	11.46	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0135	VENTURA FWY AT MOORPARK ST	11.45	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0140	HOLLYWOOD FWY AT VINELAND AVE	11.11	6	0	MV-E	831.60	33 %	274.43	67 %	557.17	68.61

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
101-0145	HOLLYWOOD FWY AT RIVERTON AVE	10.86	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
101-0150	HOLLYWOOD FWY AT VENTURA BLVD	10.413	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
101-0155	HOLLYWOOD FWY AT LANKERSHIM BLVD		4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0160	HOLLYWOOD FWY AT REGAL PL	9.951	8	0	310-HSE	932.40	25 %	233.10	75 %	699.30	58.28
101-0165	HOLLYWOOD FWY AT CAHUENGA BLVD WEST	9.34	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
101-0170	HOLLYWOOD FWY AT BARHAM BLVD	9.22	1	0	MV-E	138.60	20 %	27.72	80 %	110.88	6.93
101-0175	HOLLYWOOD FWY AT BARHAM BLVD	9.22	3	0	4-E	344.16	20 %	68.83	80 %	275.33	17.21
101-0177	HOLLYWOOD FWY AT BARHAM BLVD	9.22	1	0	10-E	208.56	20 %	41.71	80 %	166.85	10.43
101-0180	HOLLYWOOD FWY AT LAKERIDGE RD	8.1	1	0	700-MWE	225.84	25 %	56.46	75 %	169.38	14.12
101-0182	HOLLYWOOD FWY AT LAKERIDGE RD	8.1	1	0	4-E	114.72	25 %	28.68	75 %	86.04	7.17
101-0185	HOLLYWOOD FWY AT LAKERIDGE RD	8.1	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0186	CAHUENGA BLVD W AT PILGRIMAGE TR	8.05	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
101-0187	CAHUENGA BLVD W AT PILGRIMAGE TR	8.05	1	0	15-E	270.84	67 %	181.46	33 %	89.38	45.37
101-0188	CAHUENGA BLVD W AT PILGRIMAGE TR	8.05	2	0	4-E	229.44	67 %	153.72	33 %	75.72	38.43
101-0189	CAHUENGA BLVD W AT HILLPARK DR	7.59	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0190	HOLLYWOOD FWY AT CAHUENGA BLVD EAST	8.173	1	0	700-MWE	225.84	33 %	74.53	67 %	151.31	18.63
101-0195	HOLLYWOOD FWY AT CAHUENGA BLVD EAST	8.173	2	0	4-E	229.44	33 %	75.72	67 %	153.72	18.93
101-0200	HOLLYWOOD FWY AT HIGHLAND AVE.	7.8	2	0	MV-E	277.20	100 %	277.20	0 %	0.00	69.30
101-0201	HOLLYWOOD FWY AT HIGHLAND AVE.	7.8	11	0	200-HSE	943.80	100 %	943.80	0 %	0.00	235.95
101-0202	HOLLYWOOD FWY AT HIGHLAND AVE.	7.8	4	0	310-HSE	466.20	100 %	466.20	0 %	0.00	116.55
101-0203	HOLLYWOOD FWY AT HIGHLAND AVE.	7.8	9	0	400-HSE	1,319.76	100 %	1,319.76	0 %	0.00	329.94
101-0205	HOLLYWOOD FWY AT ODIN ST S/O CAHUENGA TE	7.74	1	0	15-E	270.84	33 %	89.38	67 %	181.46	22.34
101-0207	HOLLYWOOD FWT AT ODIN ST S/O CAHUENGA TE	7.74	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0210	HOLLYWOOD FWY AT ODIN ST S/O CAHUENGA TE	7.74	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0215	HOLLYWOOD FWY AT ODIN ST S/O CAHUENGA TE	7.74	0	1	MV-E	0.00	25 %	0.00	75 %	0.00	0.00
101-0220	HOLLYWOOD FWY AT ODIN ST S/O CAHUENGA TE	7.74	1	0	15-E	270.84	25 %	67.71	75 %	203.13	16.93
101-0225	HOLLYWOOD FWY AT ODIN ST W/O WHITLEY TER		1	0	10-E	208.56	25 %	52.14	75 %	156.42	13.04
101-0230	HOLLYWOOD FWY AT CAHUENGA BLVD N/O FWY	7.49	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0235	HOLLYWOOD FWY AT CAHUENGA BLVD S/O FWY	7.46	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0240	HOLLYWOOD FWY AT FRANKLIN AVE AT VINE	7.272	5	0	MV-E	693.00	25 %	173.25	75 %	519.75	43.31
101-0241	HOLLYWOOD FWY AT FRANKLIN AVE AT ARGYLE	7.06	8	0	MV-E	1,108.80	20 %	221.76	80 %	887.04	55.44
101-0245	HOLLYWOOD FWY AT ARGYLE AVE	6.947	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
101-0250	HOLLYWOOD FWY AT ARGYLE AVE	6.947	0	1	MV-E	0.00	25 %	0.00	75 %	0.00	0.00
101-0254	HOLLYWOOD FWY AT GOWER ST N/O FWY	6.93	1	0	15-E	270.84	33 %	89.38	67 %	181.46	22.34
101-0255	HOLLYWOOD FWY AT GOWER ST N/O FWT	6.93	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0256	HOLLYWOOD FWY AT GOWER ST S/O FWY	6.882	1	1	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0257	HOLLYWOOD FWY AT GOWER ST S/O FWY	6.882	1	0	15-E	270.84	25 %	67.71	75 %	203.13	16.93
101-0258	HOLLYWOOD FWY AT BEACHWOOD DR	6.785	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
101-0260	HOLLYWOOD FWY AT HOLLYWOOD BLVD E/O FWY	6.656	5	0	MV-E	693.00	40 %	277.20	60 %	415.80	69.30
101-0261	HOLLYWOOD FWY AT HOLLYWOOD BLVD W/O FWY	6.52	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
101-0262	HOLLYWOOD FWY AT HAROLD WAY	6.647	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0263	HOLLYWOOD FWY AT WILTON PL	6.302	2	0	MV-E	277.20	20 %	55.44	80 %	221.76	13.86
101-0264	HOLLYWOOD FWY AT WILTON PL	6.302	1	0	MV-E	138.60	20 %	27.72	80 %	110.88	6.93
101-0265	HOLLYWOOD FWY AT SUNSET BLVD E/O FWY	6.3	7	0	200-HSE	600.60	20 %	120.12	80 %	480.48	30.03
101-0266	HOLLYWOOD FWY AT SUNSET BLVD W/O FWY	6.15	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08
101-0270	HOLLYWOOD FWY AT LEXINGTON AVE	5.957	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0275	HOLLYWOOD FWY AT WESTERN AVE	5.81	3	0	250-HSE	303.84	33 %	100.27	67 %	203.57	25.07
101-0280	HOLLYWOOD FWY AT ARDMORE AVE	5.114	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0285	HOLLYWOOD FWY AT NORMANDIE AVE	4.99	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0286	HOLLYWOOD FWY AT NORMANDIE AVE	4.99	1	0	MV-U	145.32	25 %	36.33	75 %	108.99	9.08
101-0290	HOLLYWOOD FWY AT MELROSE AVE	4.85	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
101-0292	HOLLYWOOD FWY AT MELROSE AVE	4.85	2	0	10-E	417.12	25 %	104.28	75 %	312.84	26.07
101-0295	HOLLYWOOD FWY AT MELROSE AVE	4.85	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
101-0296	HOLLYWOOD FWY AT NEW HAMPSHIRE AVE	4.848	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
101-0300	HOLLYWOOD FWY AT VERMONT AVE N/O FWY	4.534	4	1	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
101-0302	HOLLYWOOD FWY AT VERMONT AVE @ OAKWOOD	4.4	2	2	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
101-0305	HOLLYWOOD FWY AT SILVERLAKE BLVD	3.76	8	0	MV-E	1,108.80	50 %	554.40	50 %	554.40	138.60
101-0310	HOLLYWOOD FWY AT BENTON WAY	3.39	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0315	HOLLYWOOD FWY AT RAMPART BLVD	3.248	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
101-0317	HOLLYWOOD FWY AT RAMPART BLVD	3.248	1	0	MV-U	145.32	25 %	36.33	75 %	108.99	9.08
101-0320	HOLLYWOOD FWY AT BELMONT AVE	2.545	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0325	HOLLYWOOD FWY AT ECHO PARK AVE	2.365	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
101-0330	HOLLYWOOD FWY AT ECHO PARK AVE	2.365	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
101-0340	HOLLYWOOD FWY AT TEMPLE ST	1.362	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
101-0350	HOLLYWOOD FWY AT GRAND AVE	1.32	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
101-0355	HOLLYWOOD FWY AT GRAND AVE	1.32	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
101-0360	HOLLYWOOD FWY AT NORTH BROADWAY S/O FWY	1.181	7	0	MV-E	970.20	25 %	242.55	75 %	727.65	60.64
101-0365	HOLLYWOOD FWY AT NORTH BROADWAY N/O FWY	1.08	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0400	SANTA ANA FWY AT SPRING ST	1.01	4	0	10-E	834.24	33 %	275.30	67 %	558.94	68.82
101-0405	SANTA ANA FWY AT LOS ANGELES ST	0.87	1	0	15-E	270.84	33 %	89.38	67 %	181.46	22.34
101-0406	SANTA ANA FWY AT LOS ANGELES ST	0.87	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
101-0407	SANTA ANA FWY AT LOS ANGELES ST	0.87	2	0	400-HSE	293.28	33 %	96.78	67 %	196.50	24.20
101-0408	SANTA ANA FWY AT LOS ANGELES ST	0.87	2	0	MMWE	616.32	33 %	203.39	67 %	412.93	50.85
101-0410	SANTA ANA FWY AT ALAMEDA ST N/O FWY	0.786	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0412	SANTA ANA FWY AT ALAMEDA ST N/O FWY	0.786	1	0	10-E	208.56	33 %	68.82	67 %	139.74	17.21
101-0415	SANTA ANA FWY AT ALAMEDA ST S/O FWY	0.76	7	0	MV-E	970.20	25 %	242.55	75 %	727.65	60.64
101-0420	SANTA ANA FWY AT HEWITT ST	0.689	1	0	15-E	270.84	25 %	67.71	75 %	203.13	16.93
101-0425	SANTA ANA FWY AT RAMIREZ ST & VIGNES	0.433	2	0	15-E	541.68	25 %	135.42	75 %	406.26	33.86
101-0426	SANTA ANA FWY AT RAMIREZ ST & VIGNES	0.433	2	0	150-HSE	144.00	25 %	36.00	75 %	108.00	9.00
101-0427	SANTA ANA FWY AT RAMIREZ ST & VIGNES	0.433	1	0	15-U	276.36	25 %	69.09	75 %	207.27	17.27
101-0430	SANTA ANA FWY AT RAMIREZ ST E/O VIGNES	0.456	1	0	15-E	270.84	33 %	89.38	67 %	181.46	22.34
101-0435	SANTA ANA FWY AT VIGNES ST	0.433	1	0	15-E	270.84	20 %	54.17	80 %	216.67	13.54
101-0440	SANTA ANA FWY AT MISSION RD S/O FWY	1.28	3	0	MV-E	415.80	40 %	166.32	60 %	249.48	41.58
101-0445	SANTA ANA FWY AT MISSION RD N/O FWY	1.215	5	0	MV-E	693.00	60 %	415.80	40 %	277.20	103.95
101-0450	SANTA ANA FWY AT KEARNEY ST	1.206	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
101-0455	SANTA ANA FWY AT 1ST ST W/O FWY	0.931	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
101-0460	SANTA ANA FWY AT 1ST ST E/O FWY	0.837	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
101-0462	SANTA ANA FWY AT PECAN ST	0.92	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0465	SANTA ANA FWY AT 4TH ST	0.62	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
101-0475	SANTA ANA FWY AT WHITTIER BLVD	0.255	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
101-0480	SANTA ANA FWY AT 7TH ST E/O FWY	0.075	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
101-0485	SANTA ANA FWY AT 7TH ST W/O FWY	0	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
Summary for ROUTE No. 101 (128 detail records)		TOTAL PER ROUTE:				$ 46,679.65		$ 18,517.16		$ 28,162.49	$ 4,629.29
103-1035	TERMNL ISLD FWY @ HNRY FRD AV-PENGTN		1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
103-1040	TERMINAL ISLAND FWY AT HENRY FORD AVE	0.68	1	0	MV-U	145.32	25 %	36.33	75 %	108.99	9.08
103-1045	TERMINAL ISLAND FWY AT ANAHEIM ST	0.9	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
103-1050	TERMINAL ISLAND FWY AT ANAHEIM ST	0.9	1	0	MV-U	145.32	33 %	47.96	67 %	97.36	11.99
103-1055	TERMINAL ISLAND FWY AT HOBSON AVE	1.412	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
Summary for ROUTE No. 103 (5 detail records)		TOTAL PER ROUTE:				$ 706.44		$ 268.62		$ 437.82	$ 67.16
110-0000	HARBOR FWY AT MANCHESTER (NORTH BOUND)	15.98	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
110-0000	HARBOR FWY AT MANCHESTER (SOUTH BOUND)	15.97	3	0	250-HSE	303.84	50 %	151.92	50 %	151.92	37.98
110-1005	GAFFEY ST AT 9TH ST	0	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
110-1006	GAFFEY ST AT 9TH ST	0	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
110-1008	GAFFEY ST AT 8TH ST	0.061	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1010	GAFFEY ST AT 7TH ST	0.121	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
110-1011	GAFFEY ST AT 7TH ST	0.121	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1013	GAFFEY ST AT 6TH ST	0.181	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
110-1014	GAFFEY ST AT 6TH ST	0.181	1	0	250-HSE	101.28	50 %	50.64	50 %	50.64	12.66
110-1019	GAFFEY ST AT 5TH ST	0.251	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1022	GAFFEY ST AT 4TH ST	0.311	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1024	GAFFEY ST AT 3RD ST	0.371	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1029	GAFFEY ST AT 2ND ST	0.441	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1032	GAFFEY ST AT 1ST ST	0.5	4	0	200-HSE	343.20	50 %	171.60	50 %	171.60	42.90
110-1035	GAFFEY ST AT SANTA CRUZ ST	0.585	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
110-1036	GAFFEY ST AT SEPULVEDA ST	0.651	6	0	200-HSE	514.80	50 %	257.40	50 %	257.40	64.35
110-1040	GAFFEY ST AT O'FARRELL ST	0.701	3	0	200-HSE	257.40	67 %	172.46	33 %	84.94	43.11
110-1045	GAFFEY ST AT HARBOR FWY	0.74	2	0	200-HSE	171.60	100 %	171.60	0 %	0.00	42.90
110-1046	GAFFEY ST AT HARBOR FWY	0.74	3	0	700-MWE	677.52	100 %	677.52	0 %	0.00	169.38
110-1047	GAFFEY ST AT HARBOR FWY	0.74	1	0	10-E	208.56	100 %	208.56	0 %	0.00	52.14
110-1048	GAFFEY ST AT HARBOR FWY	0.74	1	0	2.5-E	96.90	100 %	96.90	0 %	0.00	24.23
110-2001	HARBOR FWY AT MIRAFLORES AVE	1.152	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
110-2002	HARBOR FWY AT MIRAFLORES AVE	1.152	1	0	6-E	141.24	25 %	35.31	75 %	105.93	8.83
110-2003	HARBOR FWY AT JOHN GIBSON BLVD	1.39	5	0	MV-E	693.00	33 %	228.69	67 %	464.31	57.17
110-2005	HARBOR FWY AT C ST	2.77	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2006	HARBOR FWY AT C ST	2.77	1	0	250-HSE	101.28	25 %	25.32	75 %	75.96	6.33
110-2007	HARBOR FWY AT C ST	2.77	1	0	100-HSE	56.52	25 %	14.13	75 %	42.39	3.53
110-2008	HARBOR FWY AT G ST	3.26	4	0	700-MWE	903.36	25 %	225.84	75 %	677.52	56.46
110-2009	HARBOR FWY AT I ST	3.41	4	0	700-MWE	903.36	25 %	225.84	75 %	677.52	56.46
110-2010	HARBOR FWY AT MAURETANIA ST	4.05	2	0	700-MWE	451.68	25 %	112.92	75 %	338.76	28.23
110-2011	HARBOR FWY AT FIGUEROA ST	4.09	1	0	400-HSE	146.64	33 %	48.39	67 %	98.25	12.10
110-2011	HARBOR FWY AT FIGUEROA ST	4.09	3	0	200-HSE	257.40	33 %	84.94	67 %	172.46	21.24
110-2012	HARBOR FWY AT 190TH ST	9.07	3	0	200-HSE	257.40	33 %	84.94	67 %	172.46	21.24

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
110-2015	HARBOR FWY N/B ON/OFF @ REDONDO BEACH BL	11.24	4	0	200-HSE	343.20	33 %	113.26	67 %	229.94	28.31
110-2016	HARBOR FWY S/B ON/OFF @ REDONDO BEACH BL	11.25	5	0	200-HSE	429.00	50 %	214.50	50 %	214.50	53.63
110-2020	HARBOR FWY AT ROSECRANS AVE	11.89	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
110-2025	HARBOR FWY AT EL SEGUNDO BLVD	12.9	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
110-2026	HARBOR FWY AT IMPERIAL HWY	13.97	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2027	HARBOR FWY AT 111 TH PL	14.18	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
110-2030	HARBOR FWY AT CENTURY BLVD	14.97	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
110-2031	HARBOR FWY AT CENTURY BLVD	14.97	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
110-2035	HARBOR FWY AT COLDEN AVE	15.22	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
110-2042	HARBOR FWY AT 76 TH ST	16.72	3	0	175-MWE	216.00	25 %	54.00	75 %	162.00	13.50
110-2043	HARBOR FWY AT 76 TH ST	16.72	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2045	HARBOR FWY AT FLORENCE AVE	16.98	9	0	MV-E	1,247.40	25 %	311.85	75 %	935.55	77.96
110-2045	HARBOR FWY AT FLORENCE AVE	16.98	1	0	100-HSE	56.52	25 %	14.13	75 %	42.39	3.53
110-2045	HARBOR FWY AT FLORENCE AVE	16.98	1	0	250-HSE	101.28	25 %	25.32	75 %	75.96	6.33
110-2046	HARBOR FWY AT FLORENCE AVE	16.98	2	0	175-MWE	144.00	25 %	36.00	75 %	108.00	9.00
110-2047	HARBOR FWY AT FLORENCE AVE	16.98	1	0	200-HSE	85.80	25 %	21.45	75 %	64.35	5.36
110-2048	HARBOR FWY AT GAGE ST	17.51	2	0	175-MWE	144.01	50 %	72.01	50 %	72.01	18.00
110-2049	HARBOR FWY AT GAGE ST	17.51	8	0	MV-E	1,108.80	50 %	554.40	50 %	554.40	138.60
110-2049	HARBOR FWY AT GAGE ST	17.51	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
110-2050	HARBOR FWY AT FLOWER ST S/O SLAUSON	17.8	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
110-2051	HARBOR FWY AT OLIVE ST	17.97	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08
110-2052	HARBOR FWY AT SLAUSON AVE	17.98	8	0	MV-E	1,108.80	25 %	277.20	75 %	831.60	69.30
110-2055	HARBOR FWY AT 51ST ST	18.49	3	0	MV-E	415.80	20 %	83.16	80 %	332.64	20.79
110-2056	HARBOR FWY AT 51ST ST	18.49	3	0	250-MWE	284.04	20 %	56.81	80 %	227.23	14.20
110-2060	HARBOR FWY AT VERNON AVE	19	3	0	MV-E	415.80	20 %	83.16	80 %	332.64	20.79
110-2061	HARBOR FWY AT VERNON AVE	19	2	0	175-MWE	144.00	20 %	28.80	80 %	115.20	7.20
110-2062	HARBOR FWY AT VERNON AVE	19	9	0	200-HSE	772.20	20 %	154.44	80 %	617.76	38.61
110-2063	HARBOR FWY AT 40TH PL	19.35	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
110-2064	HARBOR FWY AT 40TH PL	19.35	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
110-2065	HARBOR FWY AT MARTIN L. KING E/O FWY	19.348	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
110-2070	HARBOR FWY AT MARTIN L. KING W/O FWY	19.35	6	0	MV-E	831.60	25 %	207.90	75 %	623.70	51.98
110-2075	HARBOR FWY AT 37TH ST	19.93	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
110-2080	HARBOR FWY AT EXPOSITION BL W/O FWY	20.03	2	0	MV-E	277.20	20 %	55.44	80 %	221.76	13.86
110-2081	HARBOR FWY AT EXPOSITION BL W/O FWY	20.03	1	0	10-E	208.56	20 %	41.71	80 %	166.85	10.43

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
110-2082	HARBOR FWY AT EXPOSITION BL E/O FWY	20.141	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
110-2085	HARBOR FWY AT ADAMS ST	20.71	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2087	HARBOR FWY AT FLOWER ST N/O ADAMS	20.76	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
110-2088	HARBOR FWY AT FLOWER ST N/O ADAMS	20.76	4	0	4-E	458.88	33 %	151.43	67 %	307.45	37.86
110-2090	HARBOR FWY AT FIGUEROA ST N/O ADAMS	20.92	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
110-2095	HARBOR FWY AT 23RD ST	20.94	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2096	HARBOR FWY AT 23RD ST	20.94	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
110-2101	HARBOR FWY AT 18TH ST	21.26	3	0	MV-E	415.81	33 %	137.22	67 %	278.59	34.30
110-2102	HARBOR FWY AT 18TH ST	21.26	1	0	175-MWE	72.00	33 %	23.76	67 %	48.24	5.94
110-2103	HARBOR FWY AT CHERRY ST	21.62	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
110-2104	HARBOR FWY AT 11TH ST W/O FWY	21.98	4	0	MV-E	554.40	20 %	110.88	80 %	443.52	27.72
110-2106	HARBOR FWY AT 11TH ST E/O FWY	21.99	5	0	250-HSE	506.40	25 %	126.60	75 %	379.80	31.65
110-2107	HARBOR FWY AT CONNECTICUT ST	22.01	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
110-2108	HARBOR FWY AT 9TH ST & FRANCISCO	22.15	1	0	200-HSE	85.80	20 %	17.16	80 %	68.64	4.29
110-2109	HARBOR FWY AT 9TH ST & FRANCISCO	22.15	1	0	200-HSE	85.80	20 %	17.16	80 %	68.64	4.29
110-2110	HARBOR FWY AT 9TH ST & FRANCISCO	22.15	1	0	200-HSE	85.80	20 %	17.16	80 %	68.64	4.29
110-2111	HARBOR FWY AT 9TH ST & GEORGIA	22.27	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
110-2112	HARBOR FWY AT 9TH ST & GEORGIA	22.27	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
110-2115	HARBOR FWY AT 8TH PL	22.42	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
110-2120	HARBOR FWY AT 8TH ST	22.44	2	0	10-E	417.12	25 %	104.28	75 %	312.84	26.07
110-2121	HARBOR FWY AT 8TH ST	22.44	1	0	4-E	114.72	25 %	28.68	75 %	86.04	7.17
110-2122	HARBOR FWY AT 8TH ST	22.44	0	1	4-E	0.00	25 %	0.00	75 %	0.00	0.00
110-2125	HARBOR FWY AT 8TH ST	22.44	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
110-2126	HARBOR FWY AT 8TH ST & FRANCISCO	22.45	1	0	310-HSE	116.55	33 %	38.46	67 %	78.09	9.62
110-2128	HARBOR FWY AT BEAUDRY AV N/O WHILSHIRE	22.76	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
110-2129	HARBOR FWY AT 6TH ST	22.8	3	0	MMWE	924.48	20 %	184.90	80 %	739.58	46.22
110-2130	HARBOR FWY AT 6TH ST	22.8	3	0	400-MHE	429.48	20 %	85.90	80 %	343.58	21.47
110-2131	HARBOR FWY AT 6TH ST	22.8	1	0	400-MHE	143.16	20 %	28.63	80 %	114.53	7.16
110-2135	HARBOR FWY AT 5TH ST	22.83	1	0	10-E	208.56	25 %	52.14	75 %	156.42	13.04
110-2136	HARBOR FWY AT 5TH ST	22.83	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2137	HARBOR FWY AT 5TH ST	22.83	1	0	400-MHE	143.16	25 %	35.79	75 %	107.37	8.95
110-2145	HARBOR FWY AT 4HT ST	23.01	1	0	400-MHE	143.16	33 %	47.24	67 %	95.92	11.81
110-2155	HARBOR FWY AT 4TH ST	23.01	2	0	15-E	541.68	33 %	178.75	67 %	362.93	44.69
110-2160	HARBOR FWY AT 3RD ST	23.12	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
110-2161	HARBOR FWY AT 3RD ST	23.12	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08
110-2162	HARBOR FWY AT 3RD ST	23.12	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
110-2163	HARBOR FWY AT 3RD ST	23.12	2	0	400-MHE	286.32	33 %	94.49	67 %	191.83	23.62
110-2165	HARBOR FWY AT FIGUEROA ST NR 3RD ST	23.093	8	0	400-MHE	1,145.28	20 %	229.06	80 %	916.22	57.26
110-2166	HARBOR FWY AT FIGUEROA ST NR 3RD ST	23.093	1	0	MV-E	138.60	20 %	27.72	80 %	110.88	6.93
110-2170	HARBOR FWY AT BEAUDRY AV N/O 3RD ST	23.215	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
110-2171	HARBOR FWY AT BEAUDRY AV N/O 3RD ST	23.215	1	0	10-E	208.56	33 %	68.82	67 %	139.74	17.21
110-2200	PASADENA FWY AT FIGUEROA ST AT ALPINE	23.96	0	2	10-E	0.00	25 %	0.00	75 %	0.00	0.00
110-2205	PASADENA FWY AT FIGUEROA ST AT ALPINE	23.96	1	0	15-E	270.84	25 %	67.71	75 %	203.13	16.93
110-2210	PASADENA FWY AT FIGUEROA ST AT ALPINE	23.96	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
110-2215	PASADENA FWY AT FIGUEROA TER	24.057	2	0	250-MWE	189.36	33 %	62.49	67 %	126.87	15.62
110-2220	PASADENA FWY AT HILL ST	24.55	2	0	10-E	417.12	50 %	208.56	50 %	208.56	52.14
110-2225	PASADENA FWY AT HILL ST	24.55	1	0	250-MWE	94.68	50 %	47.34	50 %	47.34	11.84
110-2230	PASADENA FWY AT HILL ST	24.55	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
110-2235	PASADENA FWY AT STADIUM WAY W/O FWY	24.73	6	0	MV-E	831.60	40 %	332.64	60 %	498.96	83.16
110-2240	PASADENA FWY AT STADIUM WAY E/O FWY	24.427	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
110-2245	PASADENA FWY AT AMADOR ST	25.04	1	0	MV-E	138.60	25 %	34.65	75 %	103.95	8.66
110-2250	PASADENA FWY AT SOLANO AVE	25.06	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
110-2255	PASADENA FWY AT ACADEMY RD	25.09	1	0	250-MWE	94.68	50 %	47.34	50 %	47.34	11.84
110-2260	PASADENA FWY AT SAN FERNANDO	25.64	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
110-2265	PASADENA FWY AT FIGUEROA ST & AVE 22	25.774	5	0	200-HSE	429.00	40 %	171.60	60 %	257.40	42.90
110-2270	PASADENA FWY AT AVENUE 26	26.009	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
110-2271	PASADENA FWY AT AVENUE 26	26.009	2	0	4-E	229.44	33 %	75.72	67 %	153.72	18.93
110-2275	PASADENA FWY AT AVENUE 43 & HOMER	27.073	1	0	200-HSE	85.80	20 %	17.16	80 %	68.64	4.29
110-2280	PASADENA FWY AT AVENUE 43 & CARLOTA	27.179	2	0	100-HSE	113.04	25 %	28.26	75 %	84.78	7.07
110-2285	PASADENA FWY AT AVENUE 43 & CARLOTA	27.179	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
110-2290	PASADENA FWY AT AVENUE 52 & GLN ELLEN	28.095	2	0	100-HSE	113.04	40 %	45.22	60 %	67.82	11.30
110-2295	PASADENA FWY AT AVENUE 52 E/O FWY	28.008	4	0	100-HSE	226.08	50 %	113.04	50 %	113.04	28.26
110-2300	PASADENA FWY AT AVENUE 52 W/O FWY	28.007	1	0	200-HSE	85.80	33 %	28.31	67 %	57.49	7.08
110-2306	PASADENA FWY AT VIA MARISOL AVE	28.37	4	0	100-HSE	226.08	50 %	113.04	50 %	113.04	28.26
110-2310	PASADENA FWY AT AVENUE 60	28.76	2	0	200-HSE	171.60	25 %	42.90	75 %	128.70	10.73
110-2315	PASADENA FWY AT SHULTS ST	28.704	1	0	200-HSE	85.80	25 %	21.45	75 %	64.35	5.36
110-2320	PASADENA FWY AT SHULTS ST	28.704	1	0	150-HSE	72.00	25 %	18.00	75 %	54.00	4.50
110-2330	PASADENA FWY AT MARMION WAY	29.28	3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
Summary for ROUTE No. 110 (135 detail records)		TOTAL PER ROUTE:				$ 43,189.79		$ 15,493.18		$ 27,696.61	$ 3,873.30
118-0390	SIMI VALLEY FWY AT TAMPA AVE	4.639	10	0	200-HSE	858.00	50 %	429.00	50 %	429.00	107.25

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
118-0395	SIMI VALLEY FWY AT AMIGO AVE	5.638	5	0	200-HSE	429.02	40 %	171.61	60 %	257.41	42.90
118-0400	SIMI VALLEY FWY AT RESEDA BLVD	5.804	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
118-0405	SIMI VALLEY FWY E/B ON AT BALBOA BL	7.772	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
118-0406	SIMI VALLEY FWY E/B ON AT BALBOA BL	7.772	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
118-0410	SIMI VALLEY FWY W/B OFF AT BALBOA BL	7.8	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
118-0411	SIMI VALLEY FWY W/B OFF AT BALBOA BL	7.8	1	0	250-HSE	101.28	33 %	33.42	67 %	67.86	8.36
118-0415	SIMI VALLEY FWY AT HAYVENHURST AV	8.381	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
118-0420	SIMI VALLEY FWY AT WOODLEY AV	9.037	5	0	MV-E	693.00	33 %	228.69	67 %	464.31	57.17
118-0425	SIMI VALLEY FWY AT LAUREL CYN BL	11.34	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
118-0430	SIMI VALLEY FWY AT SAN FERNANDO RD	12.375	9	0	MV-E	1,247.40	33 %	411.64	67 %	835.76	102.91
118-0435	SIMI VALLEY FWY AT PAXTON ST	13.89	4	0	200-HSE	343.20	33 %	113.26	67 %	229.94	28.31
118-0440	SIMI VALLEY FWY AT PAXTON ST	13.89	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
118-0445	SIMI VALLEY FWY AT GLENOAKS BL	13.174	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
Summary for ROUTE No. 118 (14 detail records)		TOTAL PER ROUTE:				$ 6,754.10		$ 2,693.10		$ 4,061.00	$ 673.27
134-0001	COLORADO BLVD FWY EXTN @ EDENHURST AVE	4.9	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
134-0002	COLORADO BLVD FWY EXTN @ COLORADO BLVD	4.7	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
134-2005	VENTURA FWY AT FIGUEROA ST	11.44	2	0	700-MWE	451.68	33 %	149.05	67 %	302.63	37.26
134-2010	VENTURA FWY AT SCHOLL CYN	11.43	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
134-2015	VENTURA FWY @ RIVERSIDE DR E/O FOREST LA	4.82	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
134-2016	VENTURA FWY @ RIVERSIDE DR E/O FOREST LA	4.82	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
134-2017	VENTURA FWY @ RIVERSIDE DR E/O FOREST LA	4.82	2	0	2.5-E	193.80	33 %	63.95	67 %	129.85	15.99
134-2022	VENTURA FWY AT FOREST LAWN DR S/O FWY	3.82	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
134-2023	VENTURA FWY AT FOREST LAWN DR N/O FWY	3.81	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
134-2028	VENTURA FWY AT CAHUENGA BLVD S/O FWY	0.986	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
134-2029	VENTURA FWY AT CAHUENGA BLVD N/O FWY	0.86	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
134-2031	VENTURA FWY AT LANKERSHIM BLVD	0.75	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
134-2032	VENTURA FWY AT RIVERSIDE DR NR VINELAND	0.56	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
134-2033	VENTURA FWY AT VINELAND AVE	0.35	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
Summary for ROUTE No. 134 (14 detail records)		TOTAL PER ROUTE:				$ 3,450.48		$ 1,303.59		$ 2,146.89	$ 325.90
170-0005	HIGHLAND AVE AT LEXINGTON AVE	9.231	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
170-0010	HIGHLAND AVE AT FOUNTAIN AVE	9.351	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
170-0015	HIGHLAND AVE AT FOUNTAIN AVE	9.351	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
170-0016	HIGHLAND AVE AT FOUNTAIN AVE	9.351	1	0	250-MWE	94.68	50 %	47.34	50 %	47.34	11.84
170-0020	HIGHLAND AVE AT LONGPRE AVE	9.481	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
170-0025	HIGHLAND AVE AT LELAND WAY	9.541	2	0	250-HSE	202.56	67 %	135.72	33 %	66.84	33.93
170-0030	HIGHLAND AVE AT SUNSET BLVD	9.61	8	0	250-HSE	810.24	50 %	405.12	50 %	405.12	101.28
170-0035	HIGHLAND AVE AT SELMA AVE	9.741	3	0	250-HSE	303.84	67 %	203.57	33 %	100.27	50.89
170-0040	HIGHLAND AVE AT SELMA AVE	9.741	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
170-0045	HIGHLAND AVE AT HAWTHORNE AVE	9.781	2	0	250-HSE	202.56	67 %	135.72	33 %	66.84	33.93
170-0050	HIGHLAND AVE AT HOLLYWOOD BLVD	9.85	4	0	250-HSE	405.12	50 %	202.56	50 %	202.56	50.64
170-0055	HIGHLAND AVE AT HOLLYWOOD BLVD	9.85	4	8	700-MWE	903.36	50 %	451.68	50 %	451.68	112.92
170-0060	HIGHLAND AVE AT YUCCA ST	9.971	3	0	250-HSE	303.84	67 %	203.57	33 %	100.27	50.89
170-0065	HIGHLAND AVE AT YUCCA ST	9.971	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
170-0070	HIGHLAND AVE AT FRANKLIN AVE & PL	10.041	7	0	250-HSE	708.96	50 %	354.48	50 %	354.48	88.62
170-0075	HIGHLAND AVE AT FRANKLIN AVE & PL	10.041	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
170-0080	HIGHLAND AVE AT FRANKLIN AVE	10.151	2	0	250-HSE	202.56	67 %	135.72	33 %	66.84	33.93
170-0085	HIGHLAND AVE AT FRANKLIN AVE	10.151	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
170-0090	HIGHLAND AVE AT MILNER RD	10.361	3	0	400-HSE	439.92	50 %	219.96	50 %	219.96	54.99
170-0095	HIGHLAND AVE AT ALTA LOMA TER	10.451	4	0	MV-E	554.40	67 %	371.45	33 %	182.95	92.86
170-0100	HIGHLAND AVE AT ODIN ST	10.511	6	0	MV-E	831.60	67 %	557.17	33 %	274.43	139.29
170-2005	HOLLYWOOD FWY S/B OFF AT RIVERSIDE DR	14.78	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
170-2010	HOLLYWOOD FWY N/B ON AT TUJUNGA AVE	14.88	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
170-2015	HOLLYWOOD FWY RAMPS AT MAGNOLIA BL	15.37	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
170-2020	HOLLYWOOD FWY N/B OFF AT BURBANK BL	15.99	2	0	MV-E	277.20	25 %	69.30	75 %	207.90	17.33
170-2025	HOLLYWOOD FWY N/B ON AT BURBANK BL	16	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
170-2030	HOLLYWOOD FWY S/B ON AT BURBANK BL	16.01	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
170-2035	HOLLYWOOD FWY S/B OFF AT BURBANK BL	16.02	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
170-2040	HOLLYWOOD FWY RAMPS AT OXNARD ST	16.63	5	0	MV-E	693.00	33 %	228.69	67 %	464.31	57.17
170-2045	HOLLYWOOD FWY S/B ON AT OXNARD ST	16.66	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
170-2050	HOLLYWOOD FWY N/B ON AT ST CLAIR AVE	17.25	1	0	6-E	141.24	33 %	46.61	67 %	94.63	11.65
170-2055	HOLLYWOOD FWY N/B ON AT ST CLAIR AVE	17.25	2	0	10-E	417.12	33 %	137.65	67 %	279.47	34.41
170-2060	HOLLYWOOD FWY N/B RAMPS AT VICTORY BL	17.26	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
170-2065	HOLLYWOOD FWY S/B RAMPS AT VICTORY BL	17.28	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
170-2070	HOLLYWOOD FWY N/B ON-OFF AT SHERMAN WY	18.208	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28
170-2075	HOLLYWOOD FWY S/B ON-OFF AT SHERMAN WY	18.27	2	0	250-HSE	202.56	50 %	101.28	50 %	101.28	25.32
170-2080	HOLLYWOOD FWY N/B ON-OFF AT ROSCOE WY	19.72	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
170-2085	HOLLYWOOD FWY S/B ON-OFF AT ROSCOE WY	19.73	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
170-2090	HOLLYWOOD FWY S/B ON AT ARLETA AVE	20.1	2	0	400-HSE	293.28	33 %	96.78	67 %	196.50	24.20
170-2095	HOLLYWOOD FWY N/B OFF AT SHELDON ST	20.18	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
Summary for ROUTE No. 170 (40 detail records)		TOTAL PER ROUTE:				$ 15,822.60		$ 7,679.23		$ 8,143.37	$ 1,919.81
187-0005	VENICE BLVD AT SUPERIOR AVE	3.541	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
187-0010	VENICE BLVD AT SUPERIOR AVE	3.541	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0015	VENICE BLVD AT PENMAR AVE	3.611	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0020	VENICE BLVD AT WALNUT AVE	3.671	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0025	VENICE BLVD AT GLYNDON AVE	3.731	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
187-0030	VENICE BLVD AT LOUELLA AVE	3.801	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0035	VENICE BLVD AT GLENCOE AVE	3.861	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0040	VENICE BLVD AT GLENCOE AVE	3.861	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
187-0045	VENICE BLVD AT WALGROVE AVE	3.921	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
187-0050	VENICE BLVD AT REDWOOD AVE	3.971	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0055	VENICE BLVD AT ASHWOOD AVE	4.021	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0060	VENICE BLVD AT MAPLEWOOD AVE	4.081	3	0	MV-E	415.80	67 %	278.59	33 %	137.21	69.65
187-0065	VENICE BLVD AT ROSEWOOD AVE	4.131	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0070	VENICE BLVD AT GREENWOOD AVE	4.181	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0075	VENICE BLVD AT LYCEUM AVE	4.211	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0080	VENICE BLVD AT LYCEUM AVE	4.211	1	0	MV-E	138.60	67 %	92.86	33 %	45.74	23.22
187-0085	VENICE BLVD AT BEETHOVEN ST	4.271	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
187-0090	VENICE BLVD AT MOORE ST	4.321	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0095	VENICE BLVD AT MOORE ST	4.321	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
187-0100	VENICE BLVD AT MEIER ST	4.381	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0105	VENICE BLVD AT MAY ST	4.431	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0110	VENICE BLVD AT WADE ST	4.481	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
187-0115	VENICE BLVD AT STEWART AVE	4.541	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0120	VENICE BLVD AT FRANCES AVE	4.57	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0125	VENICE BLVD AT FRANCES AVE	4.57	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
187-0130	VENICE BLVD AT BOISE AVE	4.601	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0135	VENICE BLVD AT WASATCH AVE	4.665	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0140	VENICE BLVD AT WASATCH AVE	4.665	1	0	175-MWE	72.00	50 %	36.00	50 %	36.00	9.00
187-0145	VENICE BLVD AT COLONIAL AVE	4.721	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0150	VENICE BVLD AT CENTINELA AVE	4.78	8	0	250-HSE	810.24	50 %	405.12	50 %	405.12	101.28

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
187-0155	VENICE BLVD AT OCEAN VIEW AVE	4.861	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0160	VENICE BLVD AT GRAND VIEW BLVD	4.941	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
187-0165	VENICE BLVD AT MOUNTAIN AVE	5.021	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0170	VENICE BLVD AT INGLEWOOD BLVD	5.101	6	0	MV-E	831.60	50 %	415.80	50 %	415.80	103.95
187-0175	VENICE BLVD AT NORTH PARK AVE WEST	5.11	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0180	VENICE BLVD AT NORTH PARK AVE WEST	5.11	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
187-0185	VENICE BLVD AT BARRINGTON AVE	5.251	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0195	VENICE BLVD AT NORTH PARK AVE EAST	5.39	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0200	VENICE BLVD AT NORTH PARK AVE EAST	5.39	1	0	175-MWE	72.00	67 %	48.24	33 %	23.76	12.06
187-0205	VENICE BLVD AT MCLAUGHLIN AVE	5.401	5	0	MV-E	693.00	50 %	346.50	50 %	346.50	86.63
187-0210	VENICE BLVD AT MCLAUGHLIN AVE	5.401	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
187-0215	VENICE BLVD AT COOLIDGE AVE	5.451	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0220	VENICE BLVD AT COOLIDGE AVE	5.451	1	0	100-HSE	56.52	67 %	37.87	33 %	18.65	9.47
187-0225	VENICE BLVD AT BERRYMAN AVE	5.501	1	0	100-HSE	56.52	67 %	37.87	33 %	18.65	9.47
187-0230	VENICE BLVD AT BERRYMAN AVE	5.501	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
187-0235	VENICE BLVD AT BUTLER AVE	5.555	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0240	VENICE BLVD AT BUTLER AVE	5.555	1	0	100-HSE	56.52	50 %	28.26	50 %	28.26	7.07
187-0245	VENICE BLVD AT PURDUE AVE	5.611	1	0	100-HSE	56.52	50 %	28.26	50 %	28.26	7.07
187-0250	VENICE BLVD AT PURDUE AVE	5.611	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0255	VENICE BLVD AT ALBRIGHT AVE	5.671	4	0	MV-E	554.40	67 %	371.45	33 %	182.95	92.86
187-0260	VENICE BVLD AT SAWTELLE BLVD	5.741	7	0	MV-E	970.20	50 %	485.10	50 %	485.10	121.28
187-0265	VENICE BLVD AT GLOBE AVE	5.801	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0270	VENICE BLVD AT TULLER AVE	5.855	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0275	VENICE BLVD AT SEPULVEDA BLVD	5.91	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
187-0280	VENICE BLVD AT SEPULVEDA BLVD	5.91	2	0	MMWE	616.32	50 %	308.16	50 %	308.16	77.04
187-0285	VENICE BLVD AT SEPULVEDA BLVD	5.91	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
187-0290	VENICE BLVD AT SEPULVEDA BLVD	5.91	1	0	MV-U	145.32	50 %	72.66	50 %	72.66	18.17
187-0295	VENICE BLVD AT DUFRESNE CT	5.951	2	0	MMWE	616.32	67 %	412.93	33 %	203.39	103.23
187-0300	VENICE BLVD AT BENTLEY AVE	6.001	2	0	MMWE	616.32	67 %	412.93	33 %	203.39	103.23
187-0305	VENICE BLVD AT TILDEN AVE	6.076	1	0	4-E	114.72	50 %	57.36	50 %	57.36	14.34
187-0310	VENICE BLVD AT TILDEN AVE	6.076	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
187-0315	VENICE BLVD AT MILITARY AVE	6.139	3	0	MMWE	924.48	50 %	462.24	50 %	462.24	115.56
187-0320	VENICE BLVD AT GREENFIELD AVE	6.186	2	0	MMWE	616.32	67 %	412.93	33 %	203.39	103.23
187-0325	VENICE BLVD AT PROSPECT AVE	6.212	2	0	MMWE	616.32	67 %	412.93	33 %	203.39	103.23
187-0330	VENICE BLVD AT VETERAN AVE	6.238	2	0	MMWE	616.32	67 %	412.93	33 %	203.39	103.23
187-0335	VENICE BLVD AT KELTON AVE	6.285	2	0	MMWE	616.32	50 %	308.16	50 %	308.16	77.04

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
187-0340	VENICE BLVD AT MIDVALE AVE	6.349	2	0	MMWE	616.32	50 %	308.16	50 %	308.16	77.04
187-0341	VENICE BLVD AT MIDVALE AVE	6.349	2	0	310-HSE	233.10	50 %	116.55	50 %	116.55	29.14
187-0345	VENICE BLVD AT SPAD AVE	6.394	2	0	MMWE	616.32	67 %	412.93	33 %	203.39	103.23
187-0350	VENICE BLVD AT WESTWOOD BLVD	6.433	2	0	MMWE	616.32	50 %	308.16	50 %	308.16	77.04
187-0355	VENICE BLVD AT GLENDON AVE	6.49	3	0	MMWE	924.48	67 %	619.40	33 %	305.08	154.85
187-0360	VENICE BLVD AT SELBY AVE	6.545	2	0	MMWE	616.32	50 %	308.16	50 %	308.16	77.04
187-0365	VENICE BLVD AT LAS FLORES CT	6.581	2	0	MMWE	616.32	50 %	308.16	50 %	308.16	77.04
187-0370	VENICE BLVD AT OVERLAND AVE	6.623	3	0	310-HSE	349.65	50 %	174.83	50 %	174.83	43.71
187-0375	VENICE BLVD AT OVERLAND AVE	6.623	3	0	MMWE	924.48	50 %	462.24	50 %	462.24	115.56
187-1090	VENICE BLVD AT BARRY AVE	5.321	2	0	MV-E	277.20	67 %	185.72	33 %	91.48	46.43
Summary for ROUTE No. 187 (76 detail records)		TOTAL PER ROUTE:				$ 28,940.19		$ 16,455.06		$ 12,485.13	$ 4,113.76
210-1001	FOOTHILL FWY AT YARNELL ST E/B	0.84	2	0	310-HSE	233.10	50 %	116.55	50 %	116.55	29.14
210-1002	FOOTHILL FWY AT YARNELL ST W/B	0.87	1	0	310-HSE	116.55	25 %	29.14	75 %	87.41	7.28
210-1003	FOOTHILL FWY AT YARNELL ST W/B	0.87	2	0	100-HSE	113.04	25 %	28.26	75 %	84.78	7.07
210-1006	FOOTHILL FWY AT ROXFORD ST E/B	1.92	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1007	FOOTHILL FWY AT ROXFORD ST W/B	1.95	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1010	FOOTHILL FWY AT POLK ST E/B	3.28	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1011	FOOTHILL FWY AT POLK ST W/B	3.3	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1012	FOOTHILL FWY AT SAYRE ST.		3	0	200-HSE	257.40	50 %	128.70	50 %	128.70	32.18
210-1017	FOOTHILL FWY AT HUBBARD ST E/B	3.969	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1018	FOOTHILL FWY AT HUBBARD ST W/B	4.11	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1024	FOOTHILL FWY AT MACLAY ST E/B	4.94	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-1025	FOOTHILL FWY AT MACLAY ST W/B	4.95	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
210-2465	FOOTHILL FWY AT FOOTHILL BLVD	7.82	8	0	MV-E	1,108.80	50 %	554.40	50 %	554.40	138.60
210-2470	FOOTHILL FWY AT WHEATLAND AVE	9.433	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
210-2475	FOOTHILL FWY E/B OFF AT SUNLAND BL	11.084	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
210-2480	FOOTHILL FWY E/B ON AT SUNLAND BL	11.085	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
210-2485	FOOTHILL FWY W/B ON AT SUNLAND BL	11.131	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
210-2490	FOOTHILL FWY W/B OFF AT SUNLAND BL	11.132	5	0	MV-E	693.00	25 %	173.25	75 %	519.75	43.31
210-2495	FOOTHILL FWY AT LA TUNA CANYON BL	14.173	7	0	MV-E	970.20	33 %	320.17	67 %	650.03	80.04
210-2500	FOOTHILL FWY AT HONOLULU AVE	15.75	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
Summary for ROUTE No. 210 (20 detail records)		TOTAL PER ROUTE:				$ 7,927.29		$ 3,285.32		$ 4,641.97	$ 821.33
213-0005	WESTERN AVE AT LOMITA BLVD	5.665	4	0	MV-E	554.40	25 %	138.60	75 %	415.80	34.65
213-0010	WESTERN AVE AT 251ST ST	5.59	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0015	WESTERN AVE AT 252ND ST	5.522	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0020	WESTERN AVE AT 253RD ST	5.451	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0025	WESTERN AVE AT 254TH ST	5.384	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0030	WESTERN AVE AT 255TH ST	5.293	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0035	WESTERN AVE AT 256TH ST	5.225	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0040	WESTERN AVE AT 257TH ST	5.154	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0045	WESTERN AVE AT 259TH ST	4.997	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
213-0050	WESTERN AVE AT 259TH PL	4.948	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
213-0051	WESTERN AVE AT 259TH PL	4.948	2	0	310-HSE	233.10	50 %	116.55	50 %	116.55	29.14
213-0055	WESTERN AVE AT ANAHEIM ST	4.894	6	0	310-HSE	699.30	50 %	349.65	50 %	349.65	87.41
213-0056	WESTERN AVE AT ANAHEIM ST	4.894	1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
213-0060	WESTERN AVE AT 261ST ST	4.818	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
Summary for ROUTE No. 213 (14 detail records)		TOTAL PER ROUTE:				$ 6,700.80		$ 3,211.80		$ 3,489.00	$ 802.95
405-0005	SAN DIEGO FWY AT RINALDI S	47.74	3	0	MV-E	415.80	50 %	207.90	50 %	207.90	51.98
405-0010	SAN DIEGO FWY AT SEPULVEDA BLVD	47.75	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
405-0015	SAN DIEGO FWY AT SAN FERNANDO MISSION BL	47.24	7	0	MV-E	970.20	33 %	320.17	67 %	650.03	80.04
405-0030	SAN DIEGO FWY AT NORDOFF ST	44.77	8	0	200-HSE	686.40	50 %	343.20	50 %	343.20	85.80
405-0035	SAN DIEGO FWY AT ROSCOE BLVD	43.76	8	0	MV-E	1,108.80	50 %	554.40	50 %	554.40	138.60
405-0045	SAN DIEGO FWY AT SHERMAN WAY S RAMP	42.36	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
405-0050	SAN DIEGO FWY AT SHERMAN WAY S RAMP	42.36	2	0	200-HSE	171.60	33 %	56.63	67 %	114.97	14.16
405-0053	SAN DIEGO FWY AT SHERMAN WAY N RAMP	42.4	5	0	200-HSE	429.00	25 %	107.25	75 %	321.75	26.81
405-0055	SAN DIEGO FWY AT HAYNES ST	41.492	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
405-0060	SAN DIEGO FWY AT VICTORY BLVD	41.36	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
405-0061	SAN DIEGO FWY AT VICTORY BLVD	41.36	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
405-0065	SAN DIEGO FWY AT BURBANK BLVD	40.29	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
405-0070	SAN DIEGO FWY AT VENTURA BLVD W/O FWY	39	5	0	MV-E	693.00	40 %	277.20	60 %	415.80	69.30
405-0071	SAN DIEGO FWY AT VENTURA BLVD E/O FWY	38.99	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
405-0075	SAN DIEGO FWY AT SEPULVEDA BL &GREENLEAF	38.628	3	0	MV-E	415.80	40 %	166.32	60 %	249.48	41.58

EXHIBIT C: COST DISTRIBUTION FOR TRAFFIC SAFETY LIGHTING

ROUTE No.	LOCATION	POST MILE	AN	AM	SIZE	ANNUAL COST $	STATE PERCENT	STATE AMOUNT $	CITY PERCENT	CITY AMOUNT $	13 WEEK PERIOD
405-0080	SAN DIEGO FWY AT SEPULVEDA BL S/O FIUME	38.58	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
405-0085	SAN DIEGO FWY AT SEPULVEDA BL & FIUME	38.59	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
405-0090	SAN DIEGO FWY AT RIMERTON RD E/O FWY	36.99	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
405-0090	SAN DIEGO FWY AT RIMERTON RD E/O FWY	36.99	2	0	200-HSE	171.60	50 %	85.80	50 %	85.80	21.45
405-0091	SAN DIEGO FWY AT RIMERTON RD W/O FWY	36.988	1	0	250-HSE	101.28	33 %	33.42	67 %	67.86	8.36
405-0092	SAN DIEGO FWY AT RIMERTON RD W/O FWY	36.988	1	0	310-HSE	116.55	33 %	38.46	67 %	78.09	9.62
405-0093	SAN DIEGO FWY AT SEPULVEDA BL W/O FWY	38.6	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
405-0094	SAN DIEGO FWY AT SEPULVEDA BL E/O FWY	38.59	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
405-0095	SAN DIEGO FWY AT MORAGA DR	33.3	8	0	MV-E	1,108.80	25 %	277.20	75 %	831.60	69.30
405-0096	SAN DIEGO FWY AT MORAGA DR	33.3	1	0	175-MWE	72.00	25 %	18.00	75 %	54.00	4.50
405-0100	SAN DIEGO FWY AT SUNSET BL W/O FWY	33.01	2	0	MV-E	277.20	50 %	138.60	50 %	138.60	34.65
405-0105	SAN DIEGO FWY AT SUNSET BL E/O FWY	33	4	0	15-E	1,083.36	33 %	357.51	67 %	725.85	89.38
405-0107	SAN DIEGO FWY AT CHURCH LANE	32.99	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
405-0108	SAN DIEGO FWY AT SEPULVEDA BL NR MONTANA	32.5	1	0	MV-E	138.60	33 %	45.74	67 %	92.86	11.43
405-0115	SAN DIEGO FWY AT WATERFORD ST	32.078	1	0	MV-E	138.60	50 %	69.30	50 %	69.30	17.33
405-0120	SAN DIEGO FWY AT SAWTELLE BLVD		1	0	310-HSE	116.55	50 %	58.28	50 %	58.28	14.57
405-0121	SAN DIEGO FWY AT SAWTELLE BLVD		1	0	200-HSE	85.80	50 %	42.90	50 %	42.90	10.73
405-0140	SAN DIEGO FWY AT NATIONAL BLVD	29.16	4	0	MV-E	554.40	33 %	182.95	67 %	371.45	45.74
405-0145	SAN DIEGO FWY AT JEFFERSON BLVD	25.93	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
405-0150	SAN DIEGO FWY AT SEPULVEDA & CENTINELA	25.099	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
405-0155	SAN DIEGO FWY AT LA TIJERA BLVD	23.82	4	0	MV-E	554.40	50 %	277.20	50 %	277.20	69.30
405-0160	SAN DIEGO FWY AT IMPERIAL HWY	21.23	4	0	MV-E	554.40	67 %	371.45	33 %	182.95	92.86
405-0161	SAN DIEGO FWY AT IMPERIAL HWY	21.23	1	0	MV-U	145.32	67 %	97.36	33 %	47.96	24.34
405-0163	SAN DIEGO FWY AT LA CIENEGA BL & 116 ST	23.71	3	0	MV-E	415.80	25 %	103.95	75 %	311.85	25.99
405-0164	SAN DIEGO FWY AT LA CIENEGA BL & 116 ST	23.71	1	0	MV-U	145.32	25 %	36.33	75 %	108.99	9.08
405-0165	SAN DIEGO FWY AT WESTERN AVE	14.4	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
405-0170	SAN DIEGO FWY AT 190TH ST W/O NORMANDIE	13.87	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
405-0175	SAN DIEGO FWY AT NORMANDIE AVE	13.83	3	0	MV-E	415.80	33 %	137.21	67 %	278.59	34.30
405-0180	SAN DIEGO FWY AT VERMONT AVE	13.3	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
405-0185	SAN DIEGO FWY AT 190TH ST	13.29	2	0	MV-E	277.20	33 %	91.48	67 %	185.72	22.87
Summary for ROUTE No. 405 (45 detail records)		TOTAL PER ROUTE:				$ 18,049.38		$ 7,126.63		$ 10,922.75	$ 1,781.66
		GRAND TOTAL:				$ 358,956.85		$ 164,160.20		$ 194,796.65	$ 41,040.05

07-LA-187, PM 3.5/8.9
Program Code: 20.xx.201.121
EA: 30300K, Project ID: 0713000493
July 2013

Capital Preventive Maintenance Project (CAPM)
Project Report
To
Request Programming in the 2014 SHOPP

PROJECT LOCATION: Route 187, PM 3.5/8.9; From Lincoln Blvd. to Cadillac Blvd.

APPROVAL RECOMMENDED:

for Hamid Saadatnejadi, *DISTRICT PROGRAM MANAGER*

APPROVAL RECOMMENDED:

Mabel Tran, *PROJECT MANAGER*

APPROVED:

Michael Miles, *DISTRICT DIRECTOR*

7/30/13
DATE

This project initiation document has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

7-26-13

JERRY CHEN, REGISTERED CIVIL ENGINEER *DATE*



1. INITIATING OFFICE/INITIATOR

The Headquarters and District Program Managers for the CAPM Program (201.121) have established that a project is needed on LA-187 from post mile (PM) 3.5 to 8.9 that meets the qualification for the Program.

This project initiation document provides approval of the proposal and a recommendation to program the project into the State Highway Operation and Protection Program. It is anticipated that this project will be programmed into the 2014 SHOPP cycle for funding in the fiscal year 2017/18.

2. PURPOSE AND NEED

Purpose:

The purpose of this project is to preserve and extend the life of the existing pavement and improve ride quality.

Need:

The Pavement Condition Survey for this section of road has an overall PCS/PMS priority number 10 which characterizes the road as having minor pavement distress and bad ride.

3. PAVEMENT CONDITION SUMMARY

(07-LA-187-PM 3.5/8.9)

PMS Category (1-29) 10 Priority Classification (.1-.4) 0.3

International Ride Index 148 – 312 (predominantly below 224)

*Rigid Pavement: *Flexible Pavement:
* From latest PMS-Pavement Condition Inventory Survey Data.

3rd Stage Cracking %	NO	Alligator B Cracking %	0-100%
Faulting%	NO	Patching %	NO
Joint Spalls	NO	Rutting	YES
Pumping	NO	Bleeding	NO
Corner Breaks %	2%	Raveling	YES

Existing Facility

The project limits are from Lincoln Boulevard (PM 3.5) to Cadillac Avenue (PM 8.9). The conventional highway currently has 6 lanes (3 in each direction). The lane width is 12 feet, and the median width is 16 feet. Shoulder width varies from 8 feet and up.

4. PROJECT PROPOSAL ON LA-187

Pavement Strategy:

Travelled Way:

- From PM 3.5 to PM 8.9, seal cracks wider than ¼".
- From PM 3.5 to PM 8.9, Cold Plane 0.2' existing asphalt pavement and overlay with 0.2' Hot Mix Asphalt, Super Pave from edge of pavement to edge of pavement
- Digout and replace failed asphalt pavement with new pavement.
- Adjust manholes and valves to grade as necessary.

Shoulders/Parking Areas

- Excessively damaged Bus Pads will be repaired, replaced, or upgraded to meet current standards in the Highway Design Manual.

Curb Ramp Upgrade (ADA)

Install or upgrade curb ramps at intersections where pedestrian facilities exist.

Dikes/Curbs

Dikes and Curbs will be repaired, replaced, or upgraded to meet current standards in the Highway Design Manual.

Drainage Inlets

Existing drainage grates will be upgraded with bicycle friendly grates as needed.

Traffic Delineation

Traffic Delineation will be restriped within the limits of paving and grinding. Upgrades to current bicycle lane standards will also be part of this project.

Loop Detectors

Loop detectors impacted by pavement work will need to be restored. Upgrades will also be made to include bicycle loop detectors per current standards.

Incidental Work (not to exceed 20% project core costs):

- Road Signs

  Replace damaged or missing roadside signs.

- Storm Water

  Construction best management practices (BMP) will be included as part of the project for any excavation. Permanent Treatment BMPs are not required with CAPM projects. A short form Storm Water Data Report is attached (See Attachment C).

- Roadside Safety Improvement

  Pavement elements which minimize exposure to workers should be considered where practical as part of this project. Coordinate with District Landscape and Maintenance during the Design phase.

5. DESIGN CONSIDERATIONS

R/W:

- All work will be within Caltrans right of way. Curb ramps may impact right of way.

Electrical elements:

- There might be electrical impacts at ADA Curb Ramps locations. Determination will be made during the Design phase. The cost is included in Section 6, Capital Costs.

Railroad Agreements:

- There is no railroad involvement.

Geometrics:

The purpose of a CAPM project is to preserve and extend the life of existing pavement and roadway. Existing roadway geometric conditions (including pedestrian and bicycle facilities) will be maintained or, where modified as a result of paving operations (such as bridge vertical clearance) not be reduced below the current standards in the Highway Design Manual and associated Design Information Bulletins.

Traffic Management

For cost estimating purposes, this PID assumes traffic will be managed by *day and night closures.* Final traffic management details will be developed during the Design phase of this project.

System Coordination:

This project is consistent with the Caltrans Maintenance program and other planned projects in the area. No other projects are currently proposed within the project limits within the next 20 years.

Environmental Compliance:

- Environmental Determination:

  The anticipated environmental document for the proposed CAPM project is a Categorical Exemption [Class 1] and Categorical Exclusion [Activity (d)] under NEPA/CEQA guidelines. This document level [CE/CE] has been selected based on the proposed scope of work identified in PID. The scope of the proposed project is limited to pavement rehabilitation and minor alternations to existing facilities and structures within Caltrans right-of-way and subject to Caltrans Standard Specification and Special Provisions and applicable permit conditions.

- Schedule and Resources for PA&ED, PS&E and Construction Phases:
  The Project Management Division shall create a work plan for establishing a proper schedule and resources for required phases, activities and cost centers.

Potential Agencies Involved:

No anticipated permit need is identified at this stage. It will be finalized in the design phase.

Hazardous Waste:

An evaluation of potential hazardous waste or contamination issues will be addressed during the design phase of the project. Based on historical information from prior projects within the project vicinity, the following issues may be encountered:

- Removal of Yellow Striping

Materials Disposal and Coordination:

The contractor will be responsible for collection, containment and disposal of all waste produced from work done on this project, including potential hazardous waste, in compliance with all applicable Federal, State and local waste laws/regulations.

Access / Staging / Storage areas:

The location for access, staging, and storage will be finalized in the design phase.

Other:

None.

6. PROGRAMMING

This project does 32.4 lane-miles of travelled way work.
Total Capital Cost in today's dollar is $9,330,000.
Escalated Capital Cost in 2017/2018 (@3% per year) is $10,500,000

Capital Costs

Core Work	Quantity		Cost
AC Travelled Way Pavement (Cold Plane 0.2' Asphalt Concrete Pavement from PM 3.5/8.9)	300,000	Sq-yd	$300,000

AC Travelled Way Pavement (0.2' Hot Mix Asphalt Super Pave from PM 3.5/8.9)	45,000	Tons	$4,000,000
AC Travelled Way Pavement (Crack Treatment from PM 3.5/8.9)	35	Ln-Mi	$125,000
PCC Shoulder Pavement (Replace Bus Pad)	25 of 52	each	$250,000
Dig outs (20% of asphalt pavement) [2]	1	LS	$800,000
Curb Ramps	150	each	$450,000
Relocate electrical elements including signals, pull boxes, and light poles	1	LS	$500,000
Upgrade existing Curbs	5,000	Feet	$175,000
Upgrade Drainage Inlets/Grates	1	LS	$5,000
Adjust Manholes and Valves to grade	1	LS	$70,000
Traffic Delineation	210,000	Feet	$210,000
Loop Detectors	407	Each	$101,750
Traffic Control	1	Lump Sum	$250,000
Transportation Management Plan – Public Information	1	Lump Sum	$200,000
Portable Changeable Message Sign	1	Lump Sum	$28,000
CORE COSTS SUBTOTAL			$7,464,750

Incidental Work	**Quantity**		**Cost**
Road Signs	1	LS	$10,000
Storm Water	1	Lump Sum	$150,000
RE Office Fund	1	Lump Sum	$144,000
INCIDENTAL COSTS SUBTOTAL[3]			$304,000
SUM OF SUBTOTALS			$7,768,750
20% Supplemental (for Time Related Overhead / Mobilization / State Furnished Materials/Contingency etc..)			$1,553,750
TOTAL CONSTRUCTION COST			$9,320,000

Right of Way	**Does the Project Include? (Yes/No)**	**Cost ($)**
Utilities	Yes	$10,000
Railroad Agreements	No	0
TOTAL RIGHT OF WAY COST		$10,000

TOTAL CAPITAL COST $9,332,500
SAY **$9,333,000**

PROJECT SUPPORT COMPONENTS									
Estimated	PA&ED 0 Phase		Design 1 Phase		Right of Way 2 Phase		Construction 3 Phase		Total
	District	DES	District	DES	District	DES	District	DES	
Personnel Years (PYs)	0.6	0	3.85	0	0.18	0	6.8	0	11.43
Personnel Services Dollars (PS $)	100	0	700	0	30	0	1,200	0	1,930
Personnel Year Equivalent Dollars (PYE $)									
Total Dollars	100	0	700	0	30	0	1,200	0	1,930

TOTAL SUPPORT COST $1,930,000

TOTAL PROJECT COST $11,263,000

7. SCHEDULE

Milestones	Target Delivery Date (Month, Day, Year)
PA & ED *(Type of Env Doc)*	7/30/2015
Project PS&E	9/1/2017
Right of Way Certification	9/1/2017
Ready to List	10/30/2017
Approve Contract	7/1/2018
Contract Acceptance	7/1/2019
End Project	1/16/2020

8. SCOPE TEAM MEMBERS AND REVIEW DATE

The following individuals have reviewed and participated in the scoping team field reviews and/or meetings on dates indicated and support the scope proposed in this document.

PID Project Engineer: Jerry Chen Date: 6/26/2013

District Maintenance Region Engineer: Kevin Atassi Date: 6/26/2013

District Traffic Engineering: Moe Bhuyian Date: 6/26/2013

HQ 121 Program Advisor: Leo Mahserelli Date: 6/26/2013

District 121 Program Advisor: Godson Okereke Date: 6/26/2013

District Project Manager: Mabel Tran Date: 6/26/2013

Maintenance Field: Cynthia Williams, Superintendent Date: 6/26/2013

Chief – Maintenance Engineering: Paul Crispi(acting) Date: 6/26/2013

STE – Maintenance Engineering: Peter Dinh(acting) Date: 6/26/2013

FHWA Coordination

Per Moving Ahead for Progress In The 21st Century (MAP-21) Act, this project is eligible for federal-aid funding and is considered to be State Authorized under current FHWA-Caltrans Stewardship Agreements. No FHWA action is required for this project.

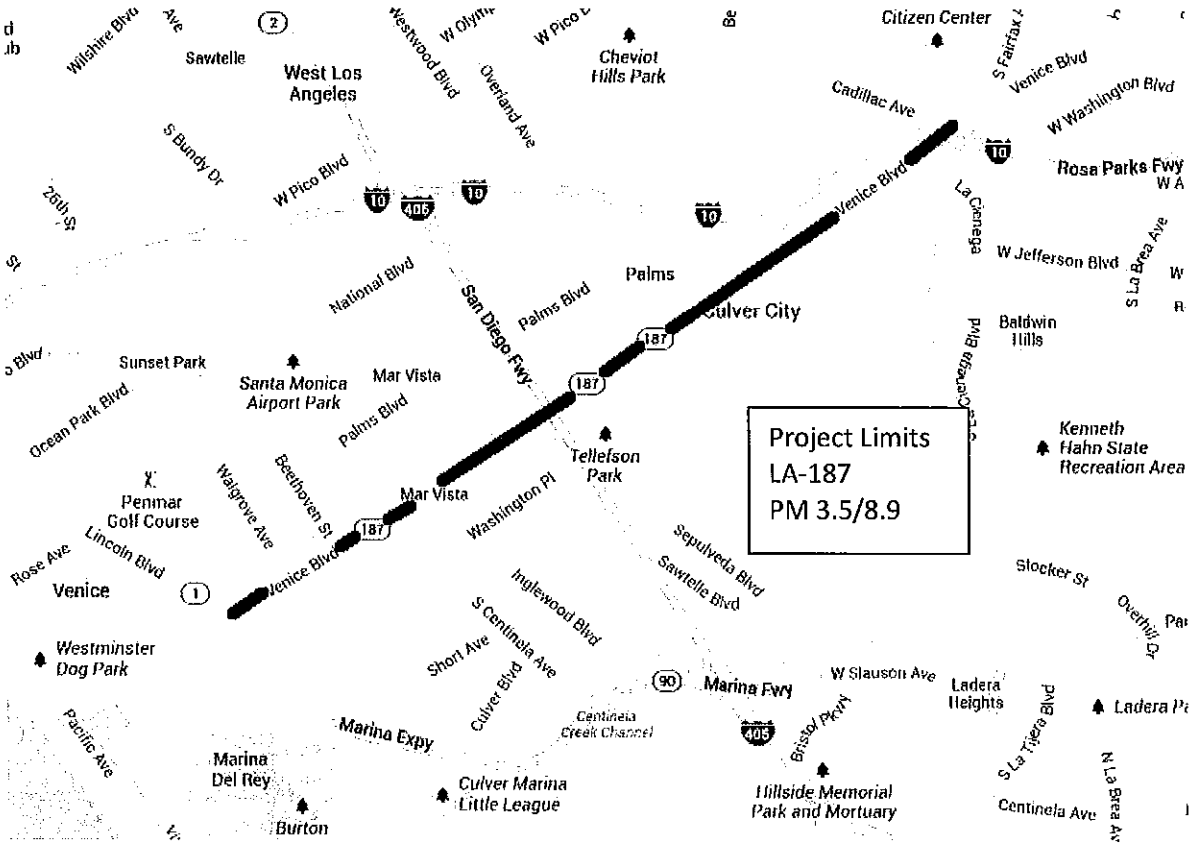
9. ATTACHMENT

A. Vicinity Map
B. Pavement Condition Report
C. Storm Water Data Report Cover Sheet
D. Risk Assessment
E. SHOPP Project Performance Output

Attachment A

Vicinity Map

Vicinity Map



Attachment B

Pavement Condition Report

Caltrans Maintenance Program
2009 Pavement Summary
Caltrans Drive Order
District 7, LA, Rte 187, PM 3.5 - 8.9

District	**7**
County	**LA**
Route	**187**
Begin PM	**3.500**

District 7 County LA Route 187

Priority	County	Route	Begin PM	-	End PM	Length	Pave Type	Dir.	Trig. Dir.	Trig. Ln Mi	AADT (,000)	MSL	Maximum Observed Values: Allig. A	Allig. B	Patching	Bleeding	Rutting	1st St. Crk.	3rd St. Crk.	Corner Crk.	Faulting	Int'l Rough. Index	Defect
2	LA	187	3.500	-	4.500	1.000	F	R	R	3.000	35	2	50	100								304	HIGH ABC, RIDE
2	LA	187	3.500	-	4.500	1.000	F	L	L	3.000	35	2	50	100								280	HIGH ABC, RIDE
2	LA	187	4.500	-	5.500	1.000	F	R	R	3.000	47	2		100								252	HIGH ABC, RIDE
2	LA	187	4.500	-	5.500	1.000	F	L	L	3.000	47	2		100								312	HIGH ABC, RIDE
2	LA	187	5.500	-	6.500	1.000	F	R	R	3.000	54	2		100			Rut.					226	HIGH ABC, RIDE
2	LA	187	5.500	-	6.500	1.000	F	L	L	2.000	54	2		100								243	HIGH ABC, RIDE
2	LA	187	6.500	-	7.500	1.000	F	R	R	3.000	53	2	50	58								185	HIGH ABC, RIDE
2	LA	187	6.500	-	7.500	1.000	F	L	L	3.000	53	2	61	36								204	HIGH ABC, RIDE
2	LA	187	7.500	-	8.500	1.000	F	R	R	3.000	67	2		100								204	HIGH ABC, RIDE
2	LA	187	7.500	-	8.500	1.000	F	L	L	3.000	67	2	50	50								192	HIGH ABC, RIDE
2	LA	187	8.500	-	8.905	0.405	F	R	R	1.215	50	2	50	100								254	HIGH ABC, RIDE
6	LA	187	8.500	-	8.905	0.405	F	L	L	1.215	50	2	25									249	RIDE

Total Triggered Lane Miles **31.430**

Note: HA Project locations highlighted in bold typeface.

Collection Date: / / : : AM
Printed: 06/19/2013

Caltrans Maintenance Program
2009 Pavement Condition Survey Inventory
Caltrans Drive Order

District 7, LA, Rte 187, PM 3.5 - 8.9

District	7
County	LA
Route	187
Begin PM	3.500

District 7 County LA Route 187

Begin PM - End PM		Length	LaneMi. (Est.)	Type	AADT (,000)	MSL						
Lane	Surface Type	Alligator Cracking A %	Alligator Cracking B %	Alligator Cracking C (Y/N)?	Rutting, Bleeding	Slab Cracking 1st %	Slab Cracking 3rd %	Slab Cracking Corner %	Faulting	Patching Area %	Patching Poor Cond.?	Ride, IRI	Priority	Skid	Defect
3.500 - 4.500		**1.000**	**6.000**	**MLD**	**34**	**2**									
L1	F-DG											30 187	6		RIDE
L2	F-DG	50	50									27 175	2		HIGH ABC, RIDE
L3	F-DG	0	100									54 280	2		HIGH ABC, RIDE
R1	F-DG											28 177	6		RIDE
R2	F-DG	50	50									26 171	2		HIGH ABC, RIDE
R3	F-DG	0	100									60 304	2		HIGH ABC, RIDE
4.500 - 5.500		**1.000**	**6.000**	**MLD**	**47**	**2**									
L1	F-DG											36 209	6		RIDE
L2	F-DG	0	100									31 190	2		HIGH ABC, RIDE
L3	F-DG	0	100									62 312	2		HIGH ABC, RIDE
R1	F-DG											28 177	6		RIDE
R2	F-DG	0	100									24 162	8		HIGH ABC
R3	F-DG	0	100									47 252	2		HIGH ABC, RIDE
5.500 - 6.500		**1.000**	**6.000**	**MLD**	**54**	**2**									
L1	F-DG											24 162	98		GOOD CONDITION
L2	F-DG	0	100									26 168	8		HIGH ABC
L3	F-DG	0	100									45 243	2		HIGH ABC, RIDE
R1	F-DG											26 171	6		RIDE
R2	F-DG	0	100									23 158	8		HIGH ABC
R3	F-DG	0	100		Rutting							40 226	2		HIGH ABC, RIDE
6.500 - 7.500		**1.000**	**6.000**	**MLD**	**53**	**2**									
L1	F-DG											35 204	6		RIDE
L2	F-DG	58	36									26 169	8		HIGH ABC
L3	F-DG	61	0									28 179	6		RIDE
R1	F-DG											30 185	6		RIDE
R2	F-DG	50	50									21 148	8		HIGH ABC
R3	F-DG	0	58									29 180	2		HIGH ABC, RIDE

*Surface type of 'EB' is Enhanced Binder.

Collection Date: / / : : AM
Printed: 06/19/2013

Caltrans Maintenance Program
2009 Pavement Condition Survey Inventory
Caltrans Drive Order

District 7, LA, Rte 187, PM 3.5 - 8.9

District	7
County	LA
Route	187
Begin PM	7.500

District 7 County LA Route 187

Begin PM - End PM	Length	LaneMi. (Est.)	Type	AADT (,000)	MSL
7.500 - 8.500	1.000	6.000	MLD	67	2
8.500 - 8.905	0.405	2.430	MLD	50	2

Lane	Surface Type	Alligator Cracking A %	Alligator Cracking B %	Alligator Cracking C (Y/N)?	Rutting, Bleeding	Slab Cracking 1st %	Slab Cracking 3rd %	Slab Cracking Corner %	Faulting	Patching Area %	Patching Poor Cond.?	Ride, IRI	Priority	Skid	Defect
L1	F-DG											26 171	6		RIDE
L2	F-DG	50	50									28 179	2		HIGH ABC, RIDE
L3	F-DG	24	46									32 192	2		HIGH ABC, RIDE
R1	F-DG											32 194	6		RIDE
R2	F-DG	0	63									27 175	2		HIGH ABC, RIDE
R3	F-DG	0	100									35 204	2		HIGH ABC, RIDE
L1	F-DG											43 236	6		RIDE
L2	F-DG	25	0									37 211	6		RIDE
L3	F-DG	19	0									46 249	6		RIDE
R1	F-DG											47 254	6		RIDE
R2	F-DG	50	0									42 231	6		RIDE
R3	F-DG	0	100									47 253	2		HIGH ABC, RIDE

*Surface type of 'EB' is Enhanced Binder.

Attachment C

Storm Water Data Report Cover Sheet

Short Form - Storm Water Data Report

Dist-County-Route: 07-LA-187
Post Mile Limits: 3.5/8.9
Project Type: Pavement Rehabilitation
Project ID (or EA): 0713000493 (30300K)
Program Identification: 201.121 (CAPM)
Phase: ☒ PID
☐ PA/ED
☐ PS&E

Regional Water Quality Control Board(s): Los Angeles – Region 4

1.	Is the project required to consider incorporating Treatment BMPs?	Yes ☐	No ☒
2.	Does the project disturb 5 or more acres of soil?	Yes ☐	No ☒
3.	Does the project disturb more than 1 acre of soil and not qualify for the Rainfall Erosivity Waiver?	Yes ☐	No ☒
4.	Does the project potentially create permanent water quality impacts?	Yes ☐	No ☒
5.	Does the project require a notification of ADL reuse	Yes ☐	No ☒

If the answer to any of the preceding questions is "Yes", prepare a Long Form – Storm Water Data Report.

Estimate Construction Start Date: 7/1/2018 Construction Completion Date: 7/1/2019
Separate Dewatering Permit (if yes, permit number) Yes ☐ Permit # _____ No ☒
Erosivity Waiver Yes ☐ Date: _____ No ☒

This Short Form – Storm Water Data Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the data upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

7-17-13
Jerry Chen, Registered Project Engineer *Date*

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

7/11/2013
Shirley Pak, District/Regional SW Coordinator or Designee *Date*

[Stamp Required for PS&E only]

Attachment D

Risk Assessment

District 7 Risk Management Identification and Management System (RIMS) v2.0 |

Risk Register

RiskID	RiskID Alt	Status	Primary Consequence	Overall Rate	Risk Description	Thr/ Opp	Probability	Impact	Impact Description	Risk Response	Mitigation Strategy
22929		Active	Time	M (12)	Unidentified utilities	Thr	(3)	(4)	Encounter unidentified utilities, delay schedule and increase cost	Avoid	Review possible utility conflicts with all utility owners. Perform potholing prior to construction.
22945		Active	Cost	M (9)	Change requests due to differing site conditions	Thr	(3)	(3)	Cost increase and project delay	Avoid	Conduct a thorough PS&E review
22930		Active	Cost	L (6)	Street or ramp closures not coordinated with local community	Thr	(2)	(3)	Project delay and potential cost increase since there are many businesses along the highway.	Avoid	Coordinate street and entry/exit closures with city and property/business owners.
22931		Active	Cost	L (4)	Insufficient or limited construction or staging areas	Thr	(2)	(2)	Construction delay and cost increase due to contractor not having an adequate space and/or staging area.	Avoid	Design and Construction to meet and decide on proper construction and staging area for the contractor.
22928		Active	Time	[redacted]	Permit work window time is insufficient	Thr	(1)	(2)	Permit(s) will be needed from the city/county	Avoid	Submit permit applications in a timely manner.

Attachment E

SHOPP Project Performance Output

SHOPP Project Performance Output

Update Date:	Source		Program	Fiscal	RTL	Programming Information ($1,000)		
District - County - Rte -PM	EA	PPNO	Code	Year	Date	R/W 10	Construction $ 9320	Support $ 1930
7-LA-187-3.5/8.9	30300K	4691	201.121	17/18	10/30/2017	Project Manager :	Mabel Tran	
Location: From Lincoln Boulevard to Cadillac Boulevard						HQ Program Manager:	Susan Massey	
Project Discription: Cold Plane Overlay								

PROGRAM	ACCT. CODE 20.XX.	Quantity of Performance Output						CCA	After Constr uction	PERFORMANCE units
		Ten Year Plan	PID		PA&ED	RTL				
Approval Date				Output Cost ($1,000)			Output Cost ($1,000)			
Construction Cost ($1,000)										
Right of Way Cost ($1,000)										
Support Cost Cost ($1,000)										
EMERGENCY RESPONSE										
Major Damage Restoration	201.130									Locations
Permanent Restoration	201.131									Locations
COLLISION REDUCTION										
Safety Improvements	201.010									Collision Reduce
Collision Severity Reduction	201.015									Collision Reduce
Median Barrier Upgrade	201.020									Centerline Miles
MANDATES										
Relinquishments	201.160									Lane Miles
Noise Attenuation for Schools	201.270									Locations
Railroad	201.325									Locations
Hazardous Waste Mitigation	201.330									Locations
Storm Water	201.335									Acres Treated / Pollutant
ADA Compliance	201.361		150.000	450.000						Curb Ramps
SHOPP TEA	201.736									Locations
BRIDGE PRESERVATION										
Bridge Rehabilitation	201.110									Bridges
Bridge Scour Mitigation	201.111									Bridges
Bridge Rail Replacement/Upgrade	201.112									Linear Feet
Bridge Seismic Restoration	201.113									Bridges
Bridge Widening	201.114									Bridges
Trans Permit Requirements for Bridges	201.322									Bridges
ROADWAY PRESERVATION										
Roadway Rehabilitation (3R)	201.120									Lane Miles
Pavement Preservation (CAPM)	201.121		32.400	6670.000						Lane Miles
Pavement Rehabilitation (2R)	201.122									Lane Miles
Long-Life Pavement Corridors (4R)	201.125									Lane Miles
Roadway Protective Betterment	201.150									Locations
Drainage System Restoration	201.151									Culverts
Signs and Lighting Rehabilitation	201.170									Signs Light Fixtures
MOBILITY										
Operational Improvements	201.310									Daily Vehicle Hours of delay
Transportation Management Systems	201.315									Field Elements Miles of fiber
Truck Inspection & WIM Facilities	201.321									Locations
ROADSIDE PRESERVATION										
Highway Planting Restoration	201.210									Acres
Freeway Maintenance Access	201.230									Locations
Roadside Enhancement	201.240									Locations
Beautification and Modernization	201.245									Centerline Miles
Safety Roadside Rest Area Restoration	201.250									Locations
New Safety Roadside Rest Areas	201.260									Locations
FACILITIES										
Equipment Facilities	201.351									Locations
Maintenance Facilities	201.352									Locations
Office Buildings	201.353									Locations
Materials Lab	201.354									Locations
Additional Performance Units										
Paved Shoulders	201.121		10.800	2200.000						Lane Miles

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 MAIN STREET, MS-3
LOS ANGELES, CA 90012-3606
PHONE (213) 897-0951
FAX (213) 897-3752

Flex your power!
Be energy efficient!

January 29, 2013

Mr. Jaime de la Vega
Interim General Manager
City of Los Angeles, Department of Transportation
100 South Main Street, 10th Floor
Los Angeles, CA 90012

Re: Delegated Maintenance Agreement 19-5939. Revision of Exhibit "A", Attachment 1, section HM2D, regarding "Sweeping" and section HM2C, regarding "Drainage" and "Vegetation".

Dear Mr. de la Vega:

Attached for your review and approval is an amendment to the Exhibit "A" , Attachment 1, section HM2D of the Delegated Maintenance Agreement between the City of Los Angeles and the California Department of Transportation, dated January 1, 2005.

First, this amendment will modify the definition of HM2D-SWEEPING. For purposes of clarification, the words "and roadside" have been removed. The new definition reads as follows, *"This provides for removal of litter and debris from roadway surface. The following problems are included. 1. Sweeping."*

Second, this amendment increases the curb mile rate for sweeping from $14.00 to $57.40. The new sentence regarding the cost for sweeping shall read as follows: *"*Sweeping is based on a $57.40 curb mile rate to be performed no less than once a month, but may be increased to once a week, as needed, to meet NPDES requirements."*

The attached Exhibit "A" includes the revised section HM2D - SWEEPING, Attachment 1 and the mutually agreed upon updates for section HM2C - DRAINAGE and VEGETATION. Please discard the old Exhibit "A" of the Agreement dated January 1, 2005 and replace it with the attached version, dated January 29, 2013.

Mr. Jaime de la Vega
January 29, 2013

Your signature on this letter will serve as concurrence regarding the inclusion of these changes. Please sign and return this letter to:

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 MAIN STREET, MS-3
LOS ANGELES, CA 90012-3606
Attention: Mario C. De Jesús
Agreements Coordinator

Sincerely,

RICHARD GORDON
Office Chief
Maintenance Support

I CONCUR:

JAIME DE LA VEGA
General Manager
Los Angeles Department of
Transportation

I CONCUR:

NAZARIO SAUCEDA
Director
Bureau of Street Services
Department of Public Works
City of Los Angeles

Enclosures:
Exhibit "A"
Letter of Concurrence

EXHIBIT "A"

DELEGATION OF MAINTENANCE FUNCTIONS BY ROUTES

The specific maintenance function indicated below (and on "EXHIBITS "B" and "C"") is hereby delegated to CITY. This delegation of maintenance function set forth herein does not include the control and maintenance areas and functions, which rest with CITY under the terms of executed Freeway Agreements and/or Freeway Maintenance Agreements.

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
1			HM2C–1 Vegetation HM2C–2 Drainage HM2D – Sweeping HM4K – Electrical **Traffic Signals** **Safety Lights** **Total**	$ 10,000 $ 15,000 $ 102,379 $ 112,116 + $ 17,855 **$ 257,350**
1A	4.68	**PACIFIC COAST HIGHWAY** from city limits near Hobson Avenue OH, PM 8.418 to city limits contiguous with the City of Lomita at PM 13.10, a length of 4.68 miles for this portion; also, HM2C–1 Vegetation only from Stanford Avenue to Eubank Avenue. All other instances below refer to HM2C–2 Drainage.	HM2C–1Vegetation HM2D HM4K	
1A	1.44	**SEPULVEDA BOULEVARD** from city limits at Imperial Highway, PM 25.92, to Lincoln Boulevard, PM 27.36 a length of 1.44 miles for this portion; also **Special Maintenance Responsibilities** **See Attachment 2 Items (1), (7), (10), (13)&(14).**	HM2C–2 Drainage HM2D HM4K	
1A	2.15	**LINCOLN BOULEVARD** from south boundary of old Pacific Electric Railway R/W PM 31.19, to city limits contiguous with the City of Santa Monica at PM 33.34, a length of 2.15 miles for this portion.	HM2C–2 Drainage HM2D HM4K	
1A	1.70	**LINCOLN BOULEVARD** from northwest boundary of International Airport near 94th Street, PM 28.46, to city limits 0.605 mile south east of Jefferson Boulevard, PM 30.16 a length of 1.70 miles for this portion; also **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (13).**	HM2C–2 Drainage HM2D HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
1B	3.24	**PACIFIC COAST HIGHWAY** From city limits near Adelaide Drive, PM 36.80 to city limits near Castle Rock, PM 40.04, a length of 3.24 miles for this portion. **Special Maintenance Responsibilities See Attachment 2 item (2) & (6)**	HM2C–2 Drainage HM2D HM4K	
1C	1.10	**LINCOLN BOULEVARD** from Sepulveda Boulevard, PM 27.36 to Northwest boundary of the International Airport near 94th Street, PM 28.46, a length of 1.10 miles **Special Maintenance Responsibilities See Attachment 2 item (7) & (13).**		
2			HM2C – 2 Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$5,000 $30,774 $118,553 + $ 25,079 **$179,406**
2A	1.36	**SANTA MONICA BOULEVARD** from west city limits at west line of Centinela Avenue, PM 2.32, to Cotner, PM 3.68. **Special Maintenance Responsibilities See Attachment 2 item (7) & (14).**	HM2C–2 Drainage HM2D HM4K	
	2.12	**SANTA MONICA BOULEVARD** from city limits 0.04 mile east of La Brea Avenue, PM 10.62, to off-Ramp southbound Hollywood Freeway, Route 101, PM 12.74, a length of 2.12 miles.	HM2C–2 Drainage HM2D HM4K	
2B	1.47	**ALVARADO STREET** and GLENDALE BOULEVARD, from Hollywood Freeway, Rt. 101, PM 12.74, to Glendale Freeway; PM14.21, a total of 1.47 miles for this area.	HM2C–2 Drainage HM2D HM4K	
	4.64	**GLENDALE FREEWAY** from Glendale Boulevard PM 14.21, to LA/Glendale CL PM R18.03, also Glendale Freeway; from LA/Glendale CL PM18.20 to LA/Glendale CL PM R19.02 A total of 4.64 miles for this area.	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
5	12.13	**SANTA ANA FREEWAY** from east city limits at Indiana Street PM14.96, to Golden State Freeway; Golden State Freeway from Santa Ana Freeway to city limits contiguous with the City of Glendale near Riverside Drive, PM 27.09, a length of 12.13 miles for this portion; also. **Special Maintenance Responsibilities** **See Attachment 2 item (3) & (15).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 55,620 +$ 19,137 **$ 74,757**
	13.73	**GOLDEN STATE FREEWAY** from city limits at Cohassett Street PM 31.87, to north city limits near junction with Route 14, PM 45.60, a length of 13.73 miles. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	0.53	**COLORADO BOULEVARD EXTENION** from Golden State Freeway, PM 25.78 to city limits of Glendale, PM 25.25 near Elk Ave.		
10			HM4K –Electrical Traffic Signals Safety Lights **Total**	 $ 75,860 + $ 17,142 **$ 93,002**
10A	14.07	**SANTA MONICA FREEWAY** from west city limits near Centinela Avenue Pico Boulevard UC, PM R4.32, to JCT. RT. 10/05/101, PM 18.39. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
10B	1.94	**SAN BERNARDINO FREEWAY** from JCT. of RT. 101 Freeway, PM S0. 00 to JCT. Golden State Freeway, PM S0.66; from JCT. Golden State Freeway PM 18.39 to east city limits, PM 19.67, 650 ft. east of Evergreen. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
27B	9.38	**TOPANGA CANYON BOULEVARD** from city limits, PM 10.68,which is 0.38 miles south of Mulholland Drive, to the NCL (PM 20.06) at LA/CO. line, a length of 9.38miles. **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (14).**	HM2C–2 Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 111,990 $ 79,928 + $ 9,795 **$ 206,713**
47A	.86	**ROUTE 47 FREEWAY** from junction with Harbor Freeway, Route 110, PM 0.00 to Harbor Boulevard UC PM 0.86. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 4,275 + $ 2,322 **$ 6,597**
	1.50	**ROUTE 47 FREEWAY** from Vincent Thomas Bridge, PM 0.8057, to end of construction portion of Seaside Avenue, PM 2.31. **Special Maintenance Responsibilities** **See Attachment 2 item (3) & (16).**	HM4K	
	.40	**ROUTE 47 FREEWAY** (Terminal Island Freeway) from south city limits, PM4.16 near Cerritos Channel to route 103, south of Pennington Avenue, PM 4.565 **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
60	1.94	**POMONA FREEWAY** from Junction Route 10 near Los Angeles River, PM 0.00 to east City limits at centerline Indiana Street, PM R1.94 **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 3,863 +$ 918 **$ 4,781**

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
90	2.42	**ROUTE 90 FREEWAY** from Lincoln Boulevard PM 0.92 to E/O Mesmer Avenue PM 2.37 and a small portion at Route 90/405 Interchange. **Special Maintenance Responsibilities** **See Attachment 2 items (3) & (7).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 18,901 + $ 2,224 **$ 21,125**
101	1.33	**SANTA ANA FREEWAY** Spur from JCT. Routes 05 Golden State Freeway N/10, Santa Monica Freeway W, PM S0.00, to Junction Route, 10, Spur-San Bernardino Freeway E, PM S1.33, length. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 126,999 + $ 29,008 **$ 156,007**
	1.62	**SANTA ANA FREEWAY** from Junction Route 10 Spur, PM 0.00 to beginning Hollywood Freeway at Route 110 Sep. PM 1.62. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	8.39	**HOLLYWOOD FREEWAY** from Route 110 Sep. PM 1.62 to Ventura Freeway at Routes 101/134/170 Interchange, PM 10.01. **Special Maintenance Responsibilities** **See Attachment 2 items (3) & (5).**	HM4K	
	15.42	**VENTURA FREEWAY** from Hollywood Freeway at Route 101/134/170 Interchange, PM 11.63, to west city limits near Calabasas, PM 27.059. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
103	1.42	**103 FREEWAY**, from Route 47, PM 0.0 to S/O Pacific Coast Highway PM 1.42	HM4K – Electrical Traffic Signals Safety Lights **Total**	 $ 1,288 + $ 451 **$ 1,739**

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
105	2.00 2.10	**105 FREEWAY**, from Imperial Hwy. PM 0.0 to La Cienaga Bl. PM 2.0. **105 FREEWAY**, from Vermont Ave. PM 6.8 to Central Ave. PM 8.9.	HM4K – Electrical Traffic Signals **Total**	+ $ 11,138 **$ 11,138**
110			HM4K – Electrical Traffic Signals Safety Lights **Total**	$101,970 + $ 28,528 **$130,498**
110A	0.74	**GAFFEY STREET** from 9th Street, PM 0.00, to junction with Harbor Freeway near Oliver Street, PM 0.74.	Relinquished 06-17-2009	
110B	3.89	**HARBOR FREEWAY** from Gaffey Street near Oliver Street, PM 0.74, to city limits at Lomita Street UC, PM4.63 **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	4.23	**HARBOR FREEWAY** from city limits at 190th Street UC, 9.07, to 290 feet north of Athens Boulevard OC, PM 13.30. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	10.26	**HARBOR FREEWAY**, from city limits 250 feet north of 121st Street, PM 13.44, to Junction with Pasadena Freeway at four Level Interchange, 23.7. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	6.38	**PASADENA FREEWAY**, from Junction with Harbor Freeway at Four Level Interchange, PM 23.7 to city limits contiguous with the city of South Pasadena near Hough Street, PM 30.08. **Special Maintenance Responsibilities.** **See Attachment 2 item (3).**	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
118A	12.02	RONALD REAGAN FREEWAY **PM R2.4,** **Near Canoga Ave to Juncton with 210 Freeway at PM 14.42.** **Special Maintenance Responsibilities** **See Attachment 2 item (3) & (8).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 33,887 + $ 4,183 **$ 38,070**
134C	1.55	**ROUTE 134 FREEWAY** from Routes 101/134/170 Interchange, PM 0.00 to city limits contiguous with the city of Burbank at Clybourn avenue, PM 1.55. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K- Electrical Traffic Signals Safety Lights **Total**	$ 13,699 + $ 2,215 **$ 15,914**
134C	2.77 2.85	**ROUTE 134 FREEWAY** from city limits 0.09 mile west of Forest Lawn Drive UC, PM 3.0 to city limits contiguous with the city of Glendale near Junction route 5 Freeway, PM R05.77. **Special Maintenance Responsibilities** **See Attachment 2 item (3).** **ROUTE 134 FREEWAY** from city limits 0.07 mile west of Route 134/2 Separation, PM R8.9, to east city limits 00.32 mile east of Figueroa Street UC, PM R11.75. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
170A		**HIGHLAND AVENUE** from Santa Monica Boulevard, Route 02 PM 9.10 to Hollywood Freeway, Route 101, PM 10.69, a length of 1.59 miles.	**Relinquished 1/06**	
170A **170A** **170A** **170B**	 6.05	**CAHUENGA BOULEVARD WEST** from Highland Avenue to Cahuenga Boulevard U.C, Br. No. 53-866K. A length of 0.54 miles. **ODIN STREET** from Highland Ave. to Cahuenga Blvd. East, a length of approx. 0.2 miles. **CAHUENGA BOULEVARD** EAST from Odin St. to entrance of on-ramp approx. 0.02 mi. west of Pilgrimage O.C., a length of 0.36 miles. **HOLLYWOOD FREEWAY** from Junction Route 170/101/134 Separation, PMR14.50, to Junction routes 170/5, PM R20.55, a length of 6.05 miles. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	**Relinquished 1/06** **Relinquished 1/06** **Relinquished 1/06** HM4K-Electrical Traffic Signals Safety Lights **Total**	 $ 21,915 + $ 4,194 **$ 26,109**

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
187	5.41	**VENICE BOULEVARD** from Lincoln Boulevard, PM 3.50 to Cadillac Avenue, PM 8.91. **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (14).** **Note**: The south half width of the 0.4-mile section which lies within Culver City will be maintained by the City of Los Angeles as part of the Maintenance of Route 187.	HM2C–2 Drainage HM2D – Sweeping HM2D - Graffiti HM4K –Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 64,591 $ 57,011 + $ 12,860 **$139,462**
210 A	11.16	**FOOTHILL FREEWAY** from Junction 210/5 Separation, PM R0.00, to Sunland/Fenwick Ave. PM R11.16. **Special Maintenance Responsibilities** **See Attachment 2 item (3) & (8).**	HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 31,879 + $ 2,722 **$ 34,601**
213	5.14	**WESTERN AVENUE** from 25th street (PM 0.00) to Carson Street (PM 7.983), except in the cities of Rancho Palos Verde and Lomita, Summerland, PM 1.99 to PM 4.83, a length of 5.14 miles. **Special Maintenance Responsibilities** **See Attachment 2 item (7) & (12).**	HM2C–2 Drainage HM2D – Sweeping HM4K – Electrical Traffic Signals Safety Lights **Total**	$ 5,000 $ 61,367 $ 51,449 + $ 3,574 **$121,390**
405	0.16	**SAN DIEGO FREEWAY** from city limits 0.17 mile west McHelen, PM 8.62, to city limits at Alameda Street, PM 8.78. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K- Electrical Traffic Signals Safety Lights **Total**	$ 90,022 + $ 11,251 **$ 101,273**
	1.13	**Freeway** from city limits at 190th Street PM 13.29 to city limits contiguous with city of Torrance at Western Ave, PM 14.42. **Special Maintenance Responsibilities** **See Attachment 2 items (3).**	HM4K	
	0.12	**Freeway** from city limits at 116th Street PM 21.11 to city limits at Imperial Highway, PM 21.23. **Special Maintenance Responsibilities** **See Attachment 2 items (3) & (8).**	HM4K	
	1.48	**Freeway** from city limits contiguous with the City of Inglewood 0.11 mile northwest of La Cienega Boulevard southbound roadway OC, PM 23.82, to city limits contiguous with the City of Culver City near Centinela Ave. OH, PM 25.30. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	

Route No.	Length Miles	Description of Routing	Maintenance Family Delegated	Maximum Annual Authorized Expenditure
405 (Con't)	0.35	**Freeway** from city limits contiguous with the City of Culver City at PM25.61, to city limits at north line of Jefferson Boulevard, PM 25.96. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	0.49	**Freeway** from city limits at north line of Ballona Creek, PM 26.53, to city limits contiguous with the City of Culver City at Barman Avenue, PM 27.02. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
	3.11	**Freeway** form city limits at Venice Boulevard, Route 405/187 Separation, PM 27.96, to city limits at Ohio Avenue UC, PM 31.07. **Special Maintenance Responsibilities** **See Attachment 2 item (3), (8) & (11).**	HM4K	
	16.73	**Freeway** from city limits 0.37 mile north of Wilshire Boulevard UC, PM 31.91, to Junction Route5 (Golden State Freeway) 405 separation, PM 48.64. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K	
710	0.01	**LONG BEACH FREEWAY** from SCL S/O Valley Blvd., PM T27.47 to Valley Blvd., PMT27.48. **Special Maintenance Responsibilities** **See Attachment 2 item (3).**	HM4K – Electrical Traffic Signals **Total**	+ $ 5,150 **$5,150**

AUTHORIZED EXPENDITURES **$1,625,082**

***(Includes 0.5 % handling charge)** ***$1,633,207**

Attachment 1

MAINTENANCE FUNCTION DESCRIPTION

HM2C–2 Drainage - DRAINAGE - SIDEWALKS

1. Non-Landscaped Tree/Brush Vegetation
2. Drainage obstruction-Drains/Culverts

This provides for cleaning, maintaining, and repairing culverts, ditches and drains on an emergency basis only. Emergency repairs requiring expenditures exceeding $10,000 will require prior approval, from the State's District Region Manager. This also provides for weed and brush control by chemical, biological, manual or mechanical methods, trimming and removal of trees, and pest control only at Pacific Coast Highway from Stanford Avenue to Eubank Avenue.

HM2D - SWEEPING

This provides for removal of litter and debris from roadway surface. The following are included.

1. *Sweeping

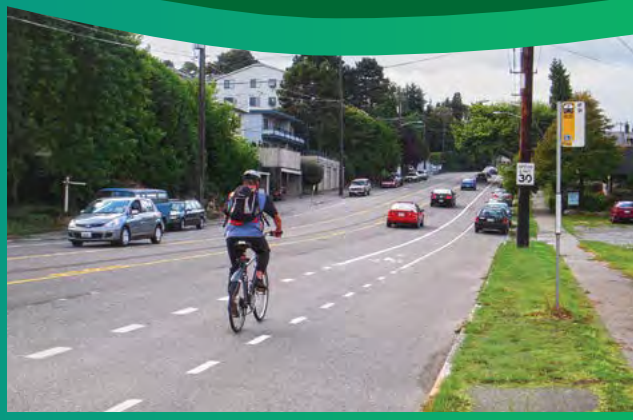
***Sweeping is based on a $57.40 per curb mile rate to be performed no less than once a month, but may be increased to once a week, as needed to meet NPDES requirements.**

HM4K - ELECTRICAL

This includes maintenance work performed on highway electrical facilities including traffic signals, traffic-signal systems, safety lighting and sign lighting. It also includes the electrical energy for these items.

Road Diet
Informational Guide







FHWA Safety Program

U.S. Department of Transportation
Federal Highway Administration

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA-SA-14-028		

4. Title and Subtitle	5. Report Date
Road Diet Informational Guide	November 2014
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Keith Knapp, Brian Chandler, Jennifer Atkinson, Thomas Welch, Heather Rigdon, Richard Retting, Stacey Meekins, Eric Widstrand, and R.J. Porter.	

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Leidos 11251 Roger Bacon Drive Reston, VA 20190 Subconsultants: Iowa State University, Sam Schwartz Engineering, University of Utah	11. Contract or Grant No. Contract No. DTFH61-10-D-00024, Task Order No. T-12-004

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Federal Highway Administration Office of Safety 1200 New Jersey Avenue SE Washington, DC 20590	Informational Guide Book August 2011 to July 2014
	14. Sponsoring Agency Code HSA

15. Supplementary Notes

Rebecca Crowe (rebecca.crowe@dot.gov), Office of Safety Technologies (http://safety.fhwa.dot.gov/), served as the Technical Manager for the Federal Highway Administration (FHWA). The following FHWA staff members contributed as technical working group members, reviewers and/or provided input or feedback to the project at various stages: Peter Eun, David Morena, Tamara Redmond, and Jeff Shaw.

16. Abstract

A classic Road Diet converts an existing four-lane undivided roadway segment to a three-lane segment consisting of two through lanes and a center two-way left turn lane (TWLTL). A Road Diet improves safety by including a protected left-turn lane for mid-block left-turning motorists, reducing crossing distance for pedestrians, and reducing travel speeds that decrease crash severity. Additionally, the Road Diet provides an opportunity to allocate excess roadway width to other purposes, including bicycle lanes, on-street parking, or transit stops. This Informational Guide includes safety, operational, and quality of life considerations from research and practice, and guides readers through the decision-making process to determine if Road Diets are a good fit for a certain corridor. It also provides design guidance and encourages post-implementation evaluation.

17. Key Words	18. Distribution Statement
Road Diet, four-lane, undivided, three-lane, two-way-left-turn-lane, cross section, safety, operations, reconfiguration, queuing.	No restrictions.

19. Security Clasif. (of this report)	20. Security Clasif. (of this page)	21. No. of Pages	21. Price
Unclassified	Unclassified	72	N/A

Acknowledgements

Many State and local agencies made significant contributions to this project. Special thanks to the following:

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Des Moines, IA	Mark Parrington, Snyder and Associates Jennifer Bohac and Mike Ring, City of Des Moines, Iowa
New Hampton, IA	David Little, Iowa DOT City of New Hampton Police Department
Manchester, IA	Tim Vick, City of Manchester Ryan Wicks, TeKippe Engineering
Waterloo, IA	Eric Thorson and Dennis Gentz, City of Waterloo
Las Vegas, Nevada	OC White, City of Las Vegas
Los Angeles, CA	Tim Fremaux and Pauline Chan, LADOT Bike Group
Pasadena, CA	Mike Bagheri, Pasadena DOT
Santa Monica, CA	Sam Morrissey, City of Santa Monica
Grand Rapids, MI Genesee County, MI Lansing, MI	Dave Morena and Andrea Dewey, FHWA Tracie Leix and Mike Premo, Michigan DOT Christopher Zull, City of Grand Rapids Carissa McQuiston, Michigan DOT Derek Bradshaw and Jason Nordberg, Genesee County Metropolitan Planning Commission Ken Johnson, Genesee County Road Commission Jill Bauer, City of Flint Tom Svrcek, City of Swartz Creek Andy Kilpatrick, City of Lansing
New York City	Ryan Russo, New York City DOT Ann Marie Doherty, New York City DOT
Seattle, Washington	Dongho Chang and Brian Dougherty, City of Seattle
Reston and Dunn Loring	Randy Dittberner, Virginia DOT

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Upper Right: City of Seattle
Lower Right: Virginia Department of Transportation

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Acronyms

3R	Resurfacing, Restoration, and Rehabilitation
AASHTO	American Association of State Highway and Transportation Officials
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
CRF	Crash Reduction Factor
CSS	Context Sensitive Solutions
DOT	Department of Transportation
GCMPC	Genesee County Metropolitan Planning Commission
FDF	Feasibility Determination Factor
FHWA	Federal Highway Administration
HSM	Highway Safety Manual
ITE	Institute of Transportation Engineers
KTC	Kentucky Transportation Center
LOS	Level of Service
MPH	Miles Per Hour
MUTCD	Manual on Uniform Traffic Control Devices
NACTO	National Association of City Transportation Officials
NCHRP	National Cooperative Highway Research Program
NHS	National Highway System
PDO	Property Damage Only
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
TWLTL	Two Way Left Turn Lane
VPHPD	Vehicles Per Hour Per Day
VPD	Vehicles Per Day

Executive Summary

Four-lane undivided highways have a history of relatively high crash rates as traffic volumes increase and as the inside lane is shared by higher-speed through traffic and left-turning vehicles.

One option for addressing this safety concern is a "Road Diet." A Road Diet involves converting an existing four-lane undivided roadway segment to a three-lane segment consisting of two through lanes and a center two-way left-turn lane (TWLTL). The reduction of lanes allows the roadway cross section to be reallocated for other uses such as bike lanes, pedestrian refuge islands, transit stops, or parking (see Figure 1).[1]

Road Diet Definition

Conversion of a four-lane undivided road to a three-lane undivided road made up of two through lanes and a center two-way-left-turn-lane.

Benefits of Road Diet installations may include:

- An overall crash reduction of 19 to 47 percent.
- Reduction of rear-end and left-turn crashes through the use of a dedicated left-turn lane.
- Fewer lanes for pedestrians to cross and an opportunity to install pedestrian refuge islands.
- The opportunity to install bicycle lanes when the cross-section width is reallocated.

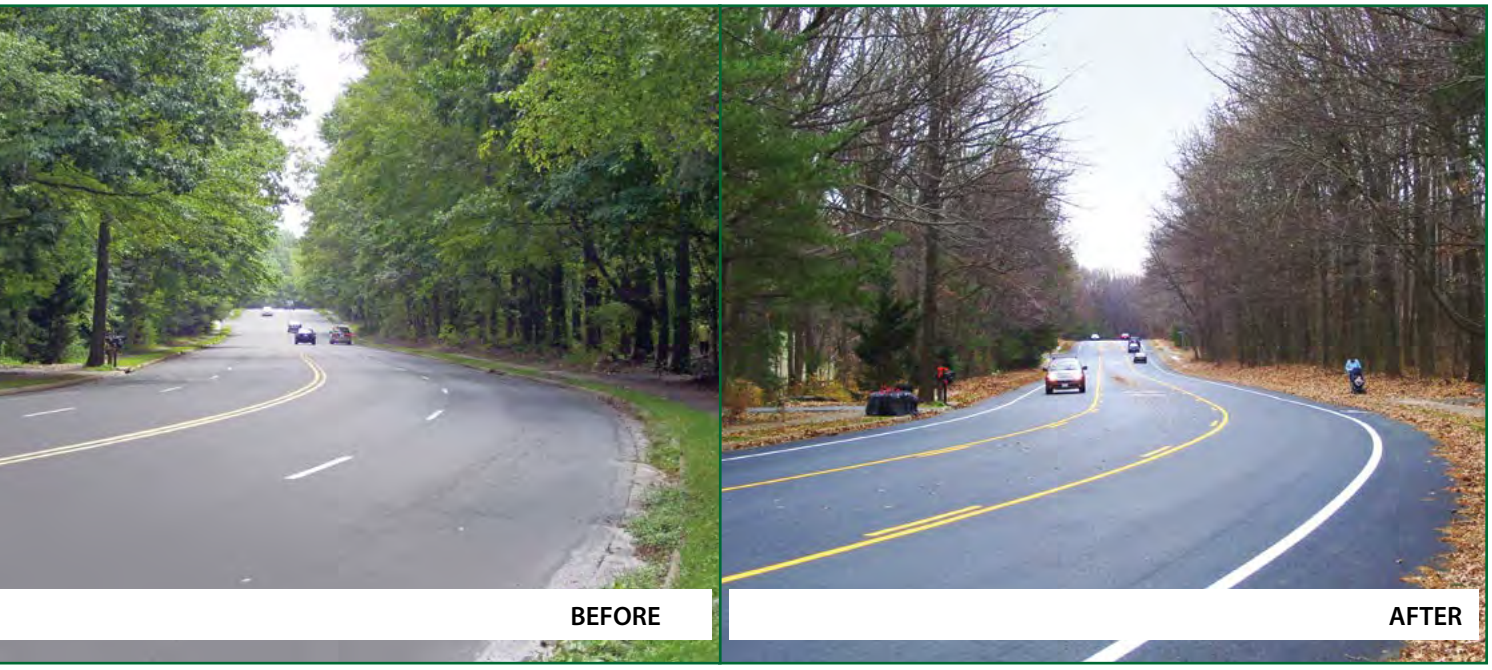


Figure 1. Road Diet
Photo Credit: Virginia Department of Transportation

- Reduced right-angle crashes as side street motorists must cross only three lanes of traffic instead of four.
- Traffic calming and reduced speed differential, which can decrease the number of crashes and reduce the severity of crashes if they occur.
- The opportunity to allocate the "leftover" roadway width for other purposes, such as on-street parking or transit stops.
- Encouraging a more community-focused, "Complete Streets" environment.
- Simplifying road scanning and gap selection for motorists (especially older and younger drivers) making left turns from or onto the mainline.

A Road Diet can be a low-cost safety solution, particularly in cases where only pavement marking modifications are required to make the traffic control change. In other cases, the Road Diet may be planned in conjunction with reconstruction or simple overlay projects, and the change in cross section allocation can be incorporated at no additional cost.

Geometric and operational design features should be considered during the design of a Road Diet. Intersection turn lanes, traffic volume, signing, pavement markings, driveway density, transit routes and stops, and pedestrian and bicyclist facilities should be carefully considered and appropriately applied during the reconfiguration for appropriate Road Diet implementation.[2] As with any roadway treatment, determining whether a Road Diet is the most appropriate alternative in a given situation requires data analysis and engineering judgment.

Once installed, it is important to monitor the safety and operational effects of the roadway, and to make changes as necessary to maintain acceptable traffic flow and safety performance for all road users. Evaluation of Road Diets will provide practitioners the information needed to continue implementing reconfiguration projects in their jurisdictions.

Table 1. Problems Potentially Correctable by Road Diet Implementation

Category	Problem	Rationale
Safety	Rear-end crashes with left-turning traffic due to speed discrepancies	Removing stopped vehicles attempting to turn left from the through lane could reduce rear-end crashes
	Sideswipe crashes due to lane changes	Eliminating the need to change lanes reduces sideswipe crashes
	Left-turn crashes due to negative offset left turns from the inside lanes	Eliminating the negative offset between opposing left-turn vehicles and increasing available sight distance can reduce left-turn crashes
	Bicycle and pedestrian crashes	Bicycle lanes separate bicycles from traffic; pedestrians have fewer lanes to cross and can use a refuge area, if provided
Operational	Delays associated with left-turning traffic	Separating left-turning traffic has been shown to reduce delays at signalized intersections
	Side street delays at unsignalized intersections	Side-street traffic requires shorter gaps to complete movements due to the consolidation of left turns into one lane
	Bicycle operational delay due to shared lane with vehicles or sidewalk use	Potential for including a bike lane eliminates such delays
Other	Bicycle and pedestrian accommodation due to lack of facilities	Opportunity to provide appropriate or required facilities, increasing accessibility to non-motorized users
	Unattractive aesthetic	Provisions can be made for traversable medians and other treatments
	Vehicles speeds discourage pedestrian activity	Potential for more uniform speeds; opportunity to encourage pedestrian activity

Adapted from Kentucky Transportation Center's Guidelines for Road Diet Conversions[3]

1 Introduction

Improving safety is a top priority for the U.S. Department of Transportation, and the Federal Highway Administration (FHWA) remains committed to reducing highway fatalities and serious injuries on our Nation's roadways through the use of proven safety countermeasures, including Road Diets.

Four-lane, undivided highways experience a number of crash types as traffic volumes increase, including:

- Rear-end and sideswipe crashes caused by speed differential between vehicles;
- Sideswipe crashes caused by frequent and sudden lane changing between two through lanes;
- Rear-end crashes caused by left-turning vehicles stopped in the inside travel lane;
- Left-turn crashes caused by mainline left-turning motorists feeling pressure to depart the shared through/left lane by following motorists and making a poor gap judgment;
- Angle crashes caused by side street traffic crossing four lanes to make a through movement across an intersection, or turning left across two lanes;
- Bicycle crashes due to a lack of available space for bicyclists to ride comfortably; and
- Pedestrian crashes due to the high number of lanes for pedestrians to cross with no refuge.

As traffic volumes and turning movements (at intersections and driveways) increase, more and more four-lane, undivided roadways experience the above safety concerns. Additionally, as active transportation increases, communities desire more livable spaces, pedestrian and bicycle facilities, and transit options. One solution that benefits all modes is a Road Diet.

1.1. What is a Road Diet?

A Road Diet is generally described as "removing travel lanes from a roadway and utilizing the space for other uses and travel modes."[4] This informational guide will focus on the most common Road Diet reconfiguration, which is the conversion of an undivided four lane roadway to a three-lane undivided roadway made up of two through lanes and a center two-way left-turn lane (TWLTL). The reduction of lanes allows the roadway cross section to be reallocated for other uses such as bike lanes, pedestrian refuge islands, transit uses, and/or parking (see Figure 2).[5]

Will a Road Diet Increase Costs?

"We planned our Road Diet installation as part of the overlay, so there was no additional cost to the construction budget."

- Robert Rocchio, Managing Engineer, Traffic Management & Highway Safety, Rhode Island DOT

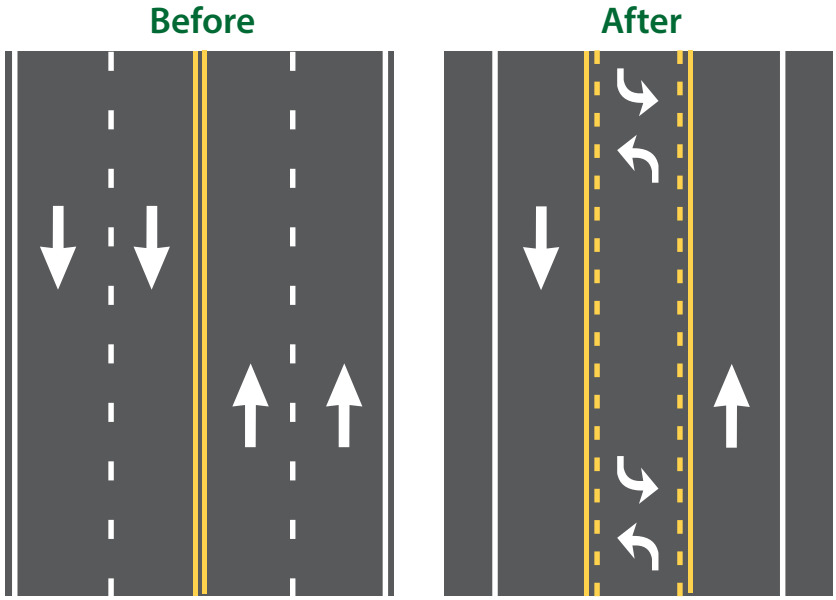
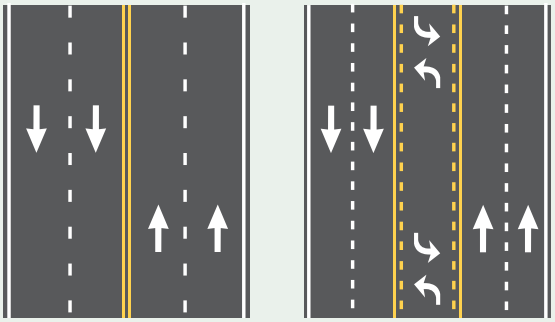
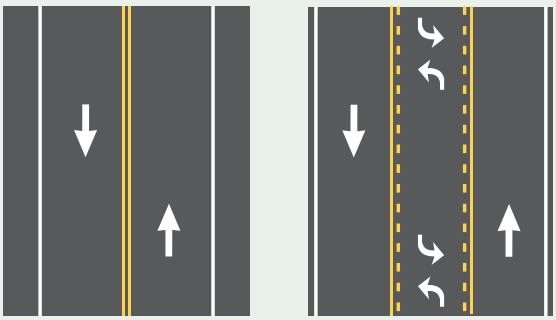
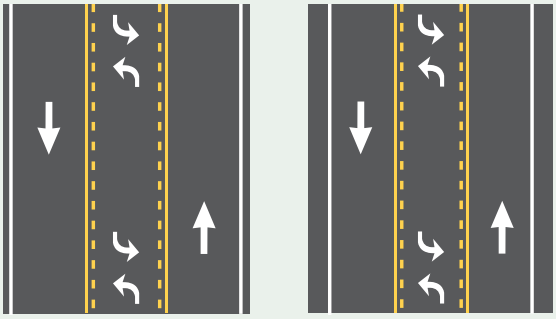
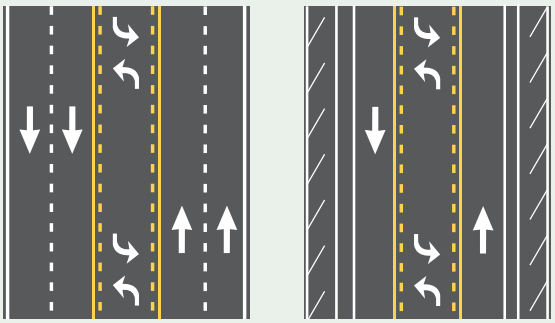


Figure 2. Typical Road Diet Basic Design

Other Roadway Reconfigurations

In addition to four- to three-lane configurations, other roadway reconfigurations, such as those depicted below, can also provide safety benefits:

4-lane to 5-lane: In some cases it is necessary to keep two lanes in each direction for capacity purposes. Narrowing lane width to provide a TWLTL introduces the benefits of separating turning vehicles and reducing operating speeds.	
2-lane to 3-lane: If a capacity expansion of an existing two-lane road is desired, in some cases a three-lane cross section can provide similar operational benefits to a four-lane cross section while maintaining the safety benefits of the three-lane configuration.	
3-lane to 3-lane: In some cases practitioners could reduce the width of each lane instead of reducing the number of lanes. Converting an existing three-lane roadway to a three-lane cross section with narrowed lanes can accommodate bicycle lanes or parking, and provide some traffic calming benefit.	
5-lane to 3-lane In some cases jurisdictions have reconfigured five-lane sections to three lanes, adding features such as diagonal parking and protected bicycle lanes with the extra cross section width.	

Other Combinations: Some cases may require allocating the cross section differently by providing unbalanced lane splits (e.g., two in one direction, one in the other), separated left turn lanes for opposite directions, or providing shoulders for other uses (e.g., parking, bicycle lanes, sidewalks). The basic concepts of Road Diets still apply, although in some cases there may be different safety and operational effects than with a classic 4-to-3 Road Diet.

1.2 History of Road Diets

The focus of roadway projects during the 1950s and 1960s was on system and capacity expansion, not contraction. Whenever and wherever traffic volumes on a section of road outgrew what a 2-lane road could accommodate efficiently, the next step in roadway design in most cases was to increase the cross-section to 4 lanes. No engineering guidance during that period encouraged consideration of a three-lane alternative.

Consequently, four-lane roadways became the norm throughout the country. Some of these roadways accommodated high traffic volumes requiring four-lane cross-sections; but many accommodated much less traffic for which a smaller cross-section simply had not been considered.

1.2.1 History of Road Diet Installations

Lane reduction projects have occurred for many years; they simply have not been recorded or studied. One of the first known installations of a Road Diet occurred in 1979 in Billings, Montana. Here, 17th Street West was converted from a four-lane undivided highway to three lanes (including a two-way left-turn lane, or TWLTL). The roadway width was 40 feet, and the average daily traffic (ADT) was approximately 10,000 vehicles. An unpublished report referenced in a number of previous studies indicated a reduction in crashes with no appreciable change to vehicle delay.[6]

Road Diets increased in popularity in the 1990s, with installations occurring in Iowa, Minnesota, and Montana, among many other states.[7] In some instances the appreciation for Road Diets was shown first in urban areas, such as Seattle, Washington, and Portland, Oregon. More recently, FHWA deemed Road Diets and other roadway reconfigurations a "Proven Safety Countermeasure" and promoted it as a safety-focused alternative cross section to a four-lane undivided roadway.

1.2.2 History of Road Diet Safety Evaluations

Numerous studies have examined the estimated safety effects of converting four-lane undivided roads to three-lane cross sections with TWLTLs. The majority of treatment sites and crash data in these studies come from California, Iowa, and Washington, with additional analysis of Road Diets in Florida, Georgia, Michigan, Minnesota, and New York. Several studies used the same, or virtually the same, treatment sites in Iowa. Average Daily Traffic (ADT) for treatment sites in these studies ranged from 2,000 to 26,000, with most sites having an ADT below 20,000.

In the late 1970s, Nemeth conducted a research study focused on TWLTLs that included one field study location that was a four-lane undivided highway converted to three lanes in a commercial district. Results included a reduction in operating speed and increased delay.[8]

The safety analysis methods and the reliability of the findings vary widely. Some studies considered multiple treatment sites and used advanced statistical techniques such as the empirical Bayes methodology to estimate the change in total crashes and crash rates. Other studies were conducted using simple before-and-after analysis without controls, did not account for potential regression-to-the-mean effects, and examined crash data at a single treatment site for only several months following Road Diet implementation.

Pawlovich, et al., (2005) conducted a Bayesian data analysis of 15 Iowa Road Diet treatment sites and 15 control sites over a 23-year period. Traffic volumes ranged from approximately 2,000 to 15,000 vehicles per day. The study concluded that a Road Diet produced a 25.2 percent reduction in crashes per mile of roadway and an 18.8 percent reduction in the crash rate.[9]

A study by Noyce et al. (2006) first analyzed data using traditional approaches, which involved a comparison of before-and-after crashes. Crash data were analyzed by yoked-pair comparison analysis and the empirical Bayes approach. The traditional before-and-after approach estimated a reduction in total crashes of approximately 42 percent. A yoked-pair comparison analysis found a 37 percent reduction in total crashes and a 46 percent reduction in property damage only (PDO) crashes (both statistically significant). The estimated reductions in crash rates (per vehicle mile traveled) were 47 percent for total crashes and 45 percent for PDO crashes (both statistically significant), and the empirical Bayes approach estimated a 44 percent reduction in total crashes.

In 2010, FHWA conducted an empirical Bayes evaluation of total crash frequency before-and-after Road Diet implementation. Results indicated a statistically significant reduction in crashes due to the Road Diet treatment in two separate data sets (one data set for 15 sites in Iowa and one set for 30 sites in California and Washington), as well as for the results of all 45 sites combined. The Iowa data indicate a 47 percent reduction in total crashes while the California and Washington data indicate a 19 percent decrease. Combining both data sets results in an estimated 29 percent reduction in total crashes.[10]

The FHWA report indicated that differences between the Iowa sites and those in California and Washington may be a function of traffic volumes and characteristics of the urban environments where the Road Diets were implemented. Annual average daily traffic (AADT) for the Iowa sites ranged from 3,718 to 13,908 and locations were predominately on U.S. or State routes passing through small towns; AADT for the sites in California and Washington ranged from 6,194 to 26,376 and were predominately on corridors in suburban environments that surrounded larger cities. Sites with lower crash modification factors (CMFs) generally had higher traffic volumes, suggesting the possibility of diminishing safety benefits as traffic volumes increase. The authors recommended that the choice of which CMF to use should be based on characteristics of the site being considered. If the proposed treatment site is more like the small-town Iowa sites, then the 47 percent reduction found in Iowa should be used. If the treatment site is part of a corridor in a suburban area of a larger city, then the 19 percent reduction should be used. If the proposed site matches neither of these site types, then the combined 29 percent reduction is most appropriate.

Based on the history of safety studies presented in this section, installing a Road Diet can lead to an expected crash reduction of 19 to 47 percent. Variables affecting safety effectiveness include pre-installation crash history, installation details, traffic volumes, and the urban or rural nature of the corridor.

Appendix A provides summaries of the key findings from Road Diet safety assessments and additional detail about the individual studies.

1.3 Purpose and Objectives of the Informational Guide

The *Road Diet Informational Guide* provides safety, operational, and quality-of-life considerations from research and practice that may impact all users along a corridor – motorists, commercial vehicles, and non-motorized traffic. This document will guide readers through the decision-making process to determine if Road Diets are a good fit for a certain corridor. The guide will also discuss Road Diet feasibility, design, and post-implementation evaluation.

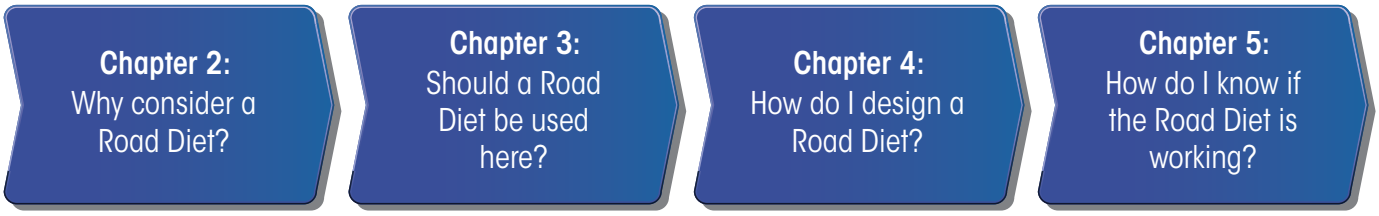


Figure 3. Focus of Each Informational Guide Chapter

1.4 Organization of the Guide

The *Road Diet Informational Guide* is organized in the following manner, as illustrated in Figure 3 and described below:

Chapter 2 presents a high-level overview of how a Road Diet can improve safety and maintain operations for motorized and non-motorized road users along a corridor, enhance the quality of life and livability, and be implemented at a low cost.

Chapter 3 takes an in-depth look at impacts that a Road Diet may have on safety and operations for motorists, pedestrians, bicyclists, and transit along a corridor. This chapter includes feasibility determination factors that assist practitioners with selecting corridors that may be candidates for Road Diets and presents guidance for discussing Road Diets with a community.

Chapter 4 leads practitioners through the Road Diet design process. This chapter provides geometric design, operational design, and both Complete Street and system-wide considerations. The intent of this chapter is to walk a practitioner through the design process for the corridor that will be converted to a Road Diet design.

Chapter 5 details post-implementation evaluation processes to measure Road Diet performance. Several evaluations exist for determining the effect a Road Diet has on safety, operations, non-motorized transportation modes, and transit.

2 Why Consider a Road Diet?

Road Diets have the potential to improve safety, convenience, and quality of life for all road users. Road Diets can be relatively low cost if planned in conjunction with reconstruction or simple overlay projects since applying Road Diets consists primarily of restriping.[11]

2.1 Benefits of Road Diets

For roads with appropriate traffic volumes, there is strong research support for achieving safety benefits through converting four-lane undivided roads to three-lane cross sections with TWLTLs. Operational and design changes associated with Road Diets that promote safety include reduced vehicle speeds, reduced vehicle-pedestrian, -bicycle, and -vehicle conflicts. For detailed information about the research behind the safety impacts of Road Diets, see Appendix A.

2.1.1 Improved Safety

As noted previously, Road Diets reduce vehicle-to-vehicle conflicts that contribute to rear-end, left-turn, and sideswipe crashes by removing the four-lane undivided inside lanes serving both through and turning traffic. Studies indicate a 19 to 47 percent reduction in overall crashes when a Road Diet is installed on a previously four-lane undivided facility as well as a decrease in crashes involving drivers under 35 years of age and over 65 years of age.[12,13]

Road Diets improve safety by reducing the speed differential. On a four-lane undivided road, vehicle speeds can vary between travel lanes, and drivers frequently slow or change lanes due to slower or stopped vehicles (e.g., vehicles stopped in the left lane waiting to turn left). Drivers may also weave in and out of the traffic lanes at high speeds. In contrast, on three-lane roads with TWLTLs the vehicle speed differential is limited by the speed of the lead vehicle in the through lane, and through vehicles are separated from left-turning vehicles. Thus, Road Diets can reduce the vehicle speed differential and vehicle interactions, which can reduce the number and severity of vehicle-to-vehicle crashes. Reducing operating speed decreases crash severity when crashes do occur.

The figures below illustrate conflict points and safety issues related to turning movements for four-lane undivided roadways and three-lane cross sections.

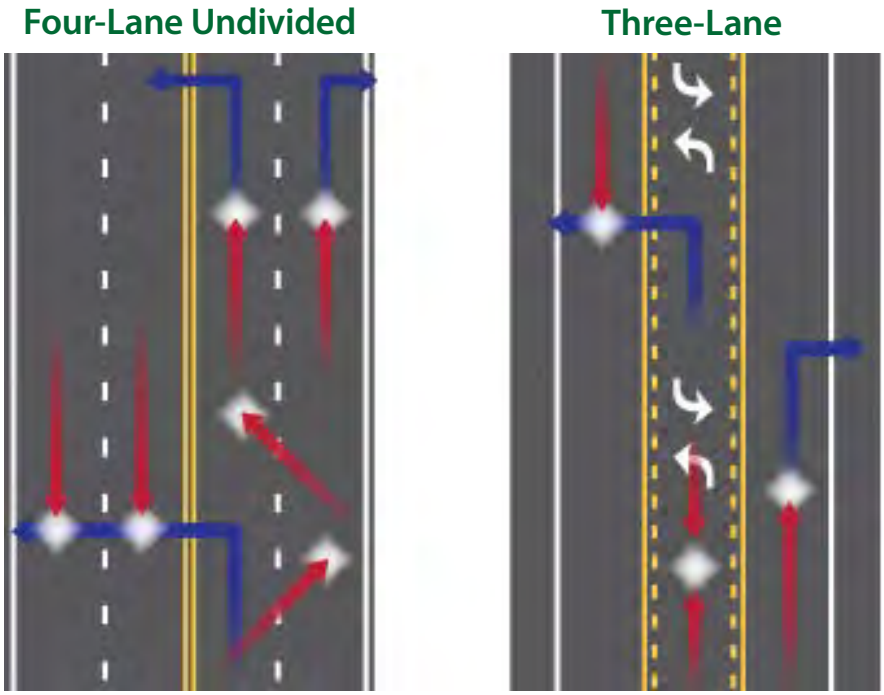


Figure 4. Mid-Block Conflict Points for Four-Lane Undivided Roadway and Three-Lane Cross Section (Adapted from *Welch*, 1999)

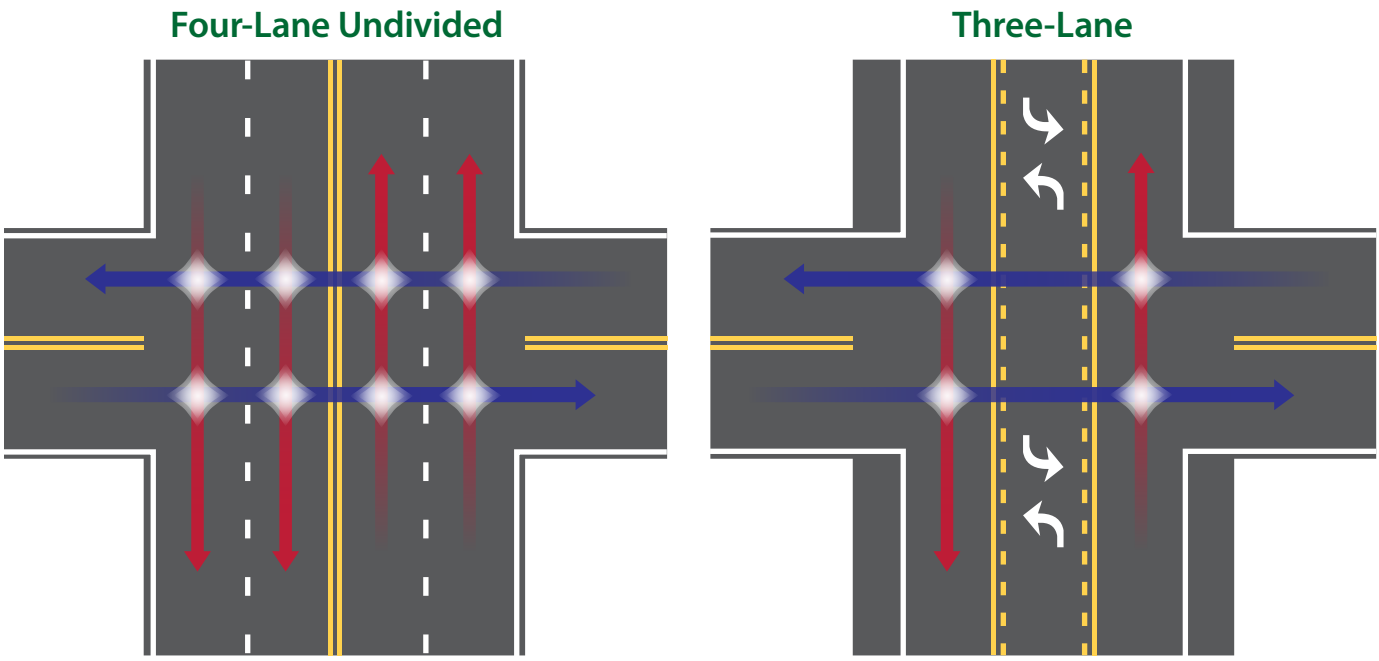


Figure 5. Crossing and Through Traffic Conflict Points at Intersections for a Four-Lane Undivided Roadway and a Three-Lane Cross Section (Adapted from *Welch*, 1999)

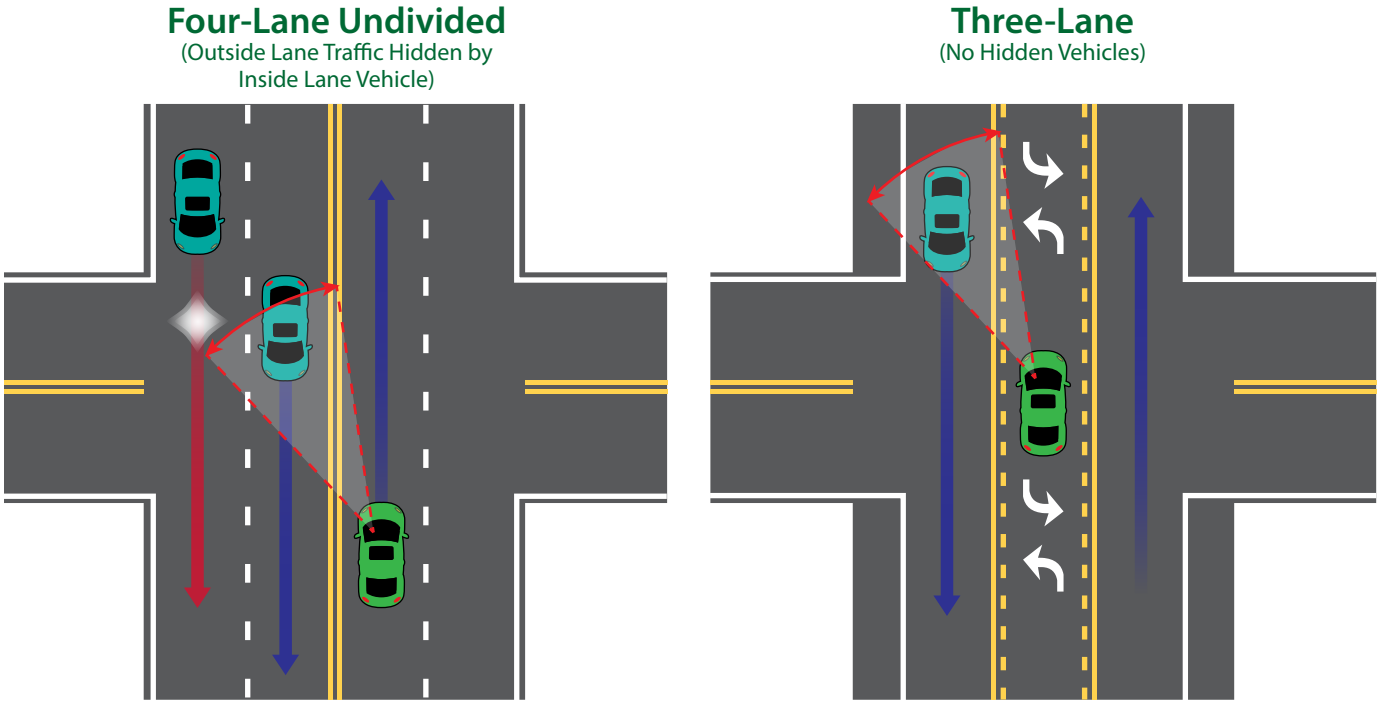


Figure 6. Major-Street Left-Turn Sight Distance for Four-Lane Undivided Roadway and Three-Lane Cross Section (Adapted from *Welch*, 1999)

2.1.2 Operational Benefits

Additionally, a Road Diet can provide the following operational benefits:

- **Separating Left Turns.** Separating left-turning traffic has been shown to reduce delays at signalized intersections.
- **Side-street Traffic Crossing.** Side-street traffic can more comfortably enter the mainline roadway because there are fewer lanes to cross. This can reduce side-street delay.
- **Speed Differential Reductions.** The reduction of speed differential due to a Road Diet provides more consistent traffic flow and less "accordion-style" slow-and-go operations along the corridor.

On some corridors the number and spacing of driveways and intersections leads to a high number of turning movements. In these cases, four-lane undivided roads can operate as de facto three-lane roadways. The majority of the through traffic uses the outside lanes due to the high number of left-turning traffic in the inside shared through and left-turn lane. In these cases a conversion to a three-lane cross section may not have much effect on operations.



Figure 7. Addition of a Bike Lane Creates a Buffer between Pedestrians and Moving Vehicles
Photo Credit: Jennifer Atkinson



Figure 8. Mid-block Pedestrian Refuge Island
Photo Credit: Jennifer Atkinson

2.1.3 Pedestrian and Bicyclist Benefits

Road Diets can be of particular benefit to non-motorized road users. They reallocate space from travel lanes— space that is often converted to bike lanes or in some cases sidewalks, where these facilities were lacking previously. These new facilities have a tremendous impact on the mobility and safety of bicyclists and pedestrians as they fill in a gap in the existing network. Even the most basic Road Diet has benefits for pedestrians and bicyclists, regardless of whether specific facilities are provided for these modes. As mentioned above, the speed reductions that are associated with Road Diets lead to fewer and less severe crashes. The three-lane cross-section also makes crossing the roadway easier for pedestrians, as they have one fewer travel lanes to cross and are exposed to moving traffic for a shorter period of time.

Uncontrolled and midblock pedestrian crossing locations tend to experience higher vehicle travel speeds, contributing to increased injury and fatality rates when pedestrian crashes occur. Midblock crossing locations account for more than 70 percent of pedestrian fatalities.[14] Zegeer et al. (2001) found a reduction in pedestrian crash risk when crossing two- and three-lane roads compared to roads with four or more lanes.[15] With the addition of a pedestrian refuge island – a raised island placed on a street to separate crossing pedestrians from motor vehicles (see Figure 8) – the crossing becomes shorter and less complicated. Pedestrians only have to be concerned with one direction of travel at a time. Refuge islands have been found to provide important safety benefits for pedestrians.[16]

Lessons Learned

In one case in Grand Rapids, Michigan, the transit agency moved a bus route that had become too slow and unpredictable after a Road Diet.

Road Diets often include either on–street parking or a bike lane, which create a buffer between pedestrians and moving vehicles. This is especially beneficial in central business districts if officials desire to improve the pedestrian experience.

For bicyclists, the biggest benefit of Road Diets is through the addition of bicycle facilities. A Road Diet can transform a street that was formerly difficult for a bicyclist to travel along to a comfortable route that attracts many more bicyclists. When bicycle lanes are striped, bicyclists are more visible and motorists know where to look for them, speeds are reduced, and bicycle safety can be improved. In some cases, buffered bicycle lanes are added by providing a visual or even physical barrier between modes of travel (e.g., adding flexible delineators on the lane line between motor vehicles and bicycles.) This further enhances the comfort of the route and may encourage increased usage.

Even without a dedicated bicycle lane or buffer, a motorist on a three-lane roadway is able to move over closer to the center lane on a three-lane roadway when approaching a bicycle. A motorist on a four-lane undivided roadway will have less opportunity to move over to the left as it is an active travel lane.

2.1.4 Livability Benefits

Added to the direct safety benefits, a Road Diet can improve the quality of life in the corridor through a combination of bicycle lanes, pedestrian improvements, and reduced speed differential, which can improve the comfort level for all users. Livability is, "about tying the quality and location of transportation facilities to broader opportunities such as access to good jobs, affordable housing, quality schools, and safer streets and roads."[17] Road Diets can help achieve desired livability on certain roadways.

Pedestrian Refuge

Pedestrian refuge islands can reduce pedestrian-related crashes by up to 46 percent.[18]

2.2 Synergies and Trade-offs

Interviews with agencies that have implemented Road Diets found many synergies between improvements for one mode and their impacts on another. The City of Chicago found that the addition of pedestrian refuge islands, as illustrated in Figure 9, was a significant benefit of their Road Diets. In some cases, improving pedestrian safety was the main objective of the Road Diet, but in other cases, the original intent was to add bicycle lanes or to simply address general traffic safety and/or operations issues.

Table 2 summarizes the positive and negative potential impacts of various features of Road Diets based on findings from researcher field visits and agency interviews.

Some of the treatments for one mode have obvious synergies with other modes, such as bicycle lanes that not only provide added comfort for bicyclists, but also for pedestrians by increasing their separation from vehicles. Other relationships are not as obvious. For instance, Road Diets in Iowa and Chicago generated increased vehicular traffic on the corridor, indicating an increase in demand after installation. In Pasadena, the unexpected benefit of a Road Diet to a pedestrian crossing (the pedestrians were able to safely cross more easily) eliminated the need for a pedestrian traffic signal, resulting in cost savings and the potential impacts of the traffic signal on traffic flow.



Figure 9. Pedestrian Refuge Island on a Road Diet Corridor in Chicago
Photo Credit: Stacey Meekins

Benefits for Buses

A Road Diet on Ingersoll Avenue in Des Moines, IA provided a benefit to buses: instead of stopping in a through lane and blocking traffic as they had done before the reconfiguration, the new design accommodated transit buses with a bus turn out.

The impacts on transit varied among the Road Diets studied. In some cases, the Road Diet was seen as a positive by the transit agency. In other cases, particularly in less urban areas, the reduction of travel lanes caused congestion as traffic backed up behind buses loading and unloading at the curb. A similar consequence as a result of mail delivery was also found in less urban areas. Prior to the Road Diet, vehicles were able to pass stopped buses or mail carrier vehicles using the inside lane. The back-ups that occurred after the conversion resulted in some vehicles making illegal maneuvers to pass the bus in the two-way left turn lane (TWLTL). Some Road Diets include measures to address this issue, such as shoulders or dedicated pull-outs that allow buses and mail trucks to make their stops outside the travel lane.

Road Diets can also introduce some traffic safety concerns. One concern is the use by pedestrians of TWLTLs as a refuge, which could make pedestrians vulnerable to being struck by vehicles traveling in the TWLTL. However, as evidenced in published assessments of Road Diet implementations, pedestrian safety is generally enhanced by this type of roadway reconfiguration, especially if a pedestrian refuge island is included.

Some impacts are seen as a positive by some agencies and a negative by others, which may be dependent on the context and users of the roadway. In Iowa, a Road Diet along a truck route narrowed lanes from 13 feet to 10 feet; these seemed too narrow to commercial vehicle drivers. Meanwhile, in Chicago and Michigan, shoulders and buffers between bicycle lanes and travel lanes were added primarily to keep travel lanes to 12 feet wide or less. In these cases, the wider lanes were undesirable because they encourage faster speeds.

In addition, a common concern in implementing Road Diets is that drivers on cross-streets or driveways may have difficulty finding a suitable gap in traffic to enter the main roadway because through traffic is now using a single through lane. However, in Chicago it was found that some side street traffic had an easier time crossing the corridor after the Road Diet was installed because the traffic patterns were simpler and gaps were easier to find.

In some States maintenance funding can be affected. Lane-miles are sometimes used as the measurement to calculate budgets for maintenance activities, defined only as those miles used for motor vehicle traffic – not bicycle lanes, parking, or other uses. When a Road Diet is introduced, one-quarter of the motor vehicle lane-miles are removed, which can equate to a similar reduction in maintenance funds. Discussions are underway in affected states to address this situation.

Table 2. Practitioner Interview Results Summary: Road Diet Installation Observations

Road Diet Feature	Primary/Intended Impacts	Secondary/Unintended Impacts	
		Positive	Negative
Bike lanes	• Increased mobility and safety for bicyclists, and higher bicycle volumes • Increased comfort level for bicyclists due to separation from vehicles	• Increased property values	• Could reduce parking, depending on design
Fewer travel lanes	• Reallocate space for other uses	• Pedestrian crossings are easier, less complex • Can make finding a gap easier for cross-traffic • Allows for wider travel lanes	• Mail trucks and transit vehicles can block traffic when stopped • May reduce capacity • In some jurisdiction, maintenance funding is tied to the number of lane-miles, so reducing the number of lanes can have a negative impact on maintenance budgets • Similarly, some Federal funds may be reduced • If travel lanes are widened, can encourage increased speeds
Two-Way Left Turn Lane	• Provide dedicated left turn lane	• Makes efficient use of limited roadway area	• Could be difficult for drivers to access left turn lane if demand for left turns is too high
Pedestrian refuge island	• Increased mobility and safety for pedestrians	• Makes pedestrian crossings safer and easier • Prevents illegal use of the TWLTL to pass slower traffic or access an upstream turn lane	• May create issues with snow removal • Can effectively increase congestion by preventing illegal maneuvers
Buffers (grass, concrete median, plastic delineators)	• Provide barriers and space between travel modes	• Increases comfort level for bicyclists by increasing separation from vehicles • Barrier can prevent users entering a lane reserved for another mode	• Grass and delineator buffers will necessitate ongoing maintenance.

3 Road Diet Feasibility Determination

While Road Diets can improve safety and accommodate motorized and non-motorized transportation modes along a corridor, they may not be appropriate or feasible in all locations. There are many factors to consider before implementing a Road Diet. Agencies should consider the objective of the Road Diet, which could be one or more of the following:

- Improve safety
- Reduce speeds
- Mitigate queues associated with left-turning traffic
- Improve pedestrian environment
- Improve bicyclist accessibility
- Enhance transit stops.

Identifying the objective(s) will help determine whether the Road Diet is an appropriate alternative for the corridor that is being evaluated.

Driveway density, transit routes, the number and design of intersections along the corridor, as well as operational characteristics are some considerations to be evaluated before deciding to implement a Road Diet.

Other considerations include roadway function and access control, turning volumes and 85th percentile speed, crash type and patterns, pedestrian and bicycle activity, and right-of-way availability and cost.[19]

Low-Cost Solution

The vast majority of Road Diets are installed on existing pavement within the right-of-way.



Figure 10. Road Diet in Flint, Michigan, Central Business District
Photo Credit: Jennifer Atkinson

3.1 Safety Factors

One of the primary reasons for a Road Diet installation is to address an identified crash problem. Four-lane undivided highways have inherent design aspects that make them susceptible to crashes. Left-turning and through movements sharing a single lane contributes to rear-end crashes, left-turn crashes, and speed discrepancies. In most cases, current four-lane undivided cross sections do not include accommodations for bicyclists, and most have no refuge for pedestrians to cross four lanes of traffic. When a Road Diet is considered for safety reasons, practitioners must determine if the crash patterns are those that can be addressed with this alternative.

Overall, the statistical analyses of Road Diet conversion safety impacts have shown a range of positive results, with differences often related to whether the installation occurred in a rural or urban area. As such, this difference should be considered when determining Road Diet conversion feasibility. A more detailed discussion of expected safety improvements from a Road Diet conversion is contained in Chapter 2. The reduction in conflict points at intersections, improved sight distance, easier maneuverability for vehicles turning left, and the elimination of weaving are also contributors to the safety improvements at case study Road Diet conversion locations. It is speculated in the Iowa Road Diet guidelines that the only crash type that might increase with this type of conversion would be those related to the additional stop/start conflicts occurring between through and right-turn vehicles and due to the potential increase in congestion.[20]

3.2 Context Sensitive Solutions and Complete Streets

FHWA defines a context sensitive solution (CSS) as a "collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist."[21]

The topic of CSS comes into play when determining whether or not a Road Diet is "right" for a specific location. FHWA and the American Association of State Highway and Transportation Officials (AASHTO) have directives and strong policy-level support for context-sensitive design. According to FHWA, CSS includes the following seven qualities of design excellence:

Complete Streets Commitment

More than 600 State, regional, and local jurisdictions have adopted Complete Streets policies or have made a written commitment to do so.

1. The project satisfies the purpose and needs as agreed to by a full range of stakeholders. This agreement is forged in the earliest phase of the project and amended as warranted as the project develops.
2. The project is a safe facility for both the user and the community.
3. The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area.
4. The project exceeds the expectations of both designers and stakeholders and achieves a level of excellence in people's minds.
5. The project involves efficient and effective use of the resources (time, budget) of all involved parties.
6. The project is designed and built with minimal disruption to the community.
7. The project is seen as having added lasting value to the community.[22]

When considering whether to implement a Road Diet, part of the practitioner's evaluation process should include whether it will meet these qualities.

The concept of Complete Streets is similar to CSS in that it suggests that the street network should be planned, designed, maintained, and operated in a way that accommodates all road users and those who use the surrounding environment; not doing so will result in "incomplete" streets. The concept impacts the planning and design phases of a roadway as well as the day-to-day operations.

What it means for a street to be complete is inherent to the context and will differ depending on how the street is intended to function, what types and volumes of road users it should accommodate, the destinations it serves, and the right-of-way available. Many communities have embraced this concept by adopting Complete Streets policies, establishing the expectation that all future roadway projects will adhere to the principle that streets should be designed with all users in mind rather than simply providing enough capacity for vehicle through-put. To aid in implementing the policy, many communities are also developing Complete Streets design guidelines, which address the examples listed and other intricacies of how the design of a roadway should relate to the surrounding context.

3.3 Operational Factors

Consider the following common operational issues when determining the feasibility of a site for a Road Diet.

3.3.1 De Facto Three-Lane Roadway Operation

The traditional definition of a roadway function is based on vehicular mobility and access. The functional goal for a potential Road Diet corridor should consider impacts on the mobility and access of all road users. Practitioners should also consider the adjacent land uses along a corridor. For example, a Road Diet is likely to succeed operationally if the roadway is already operating as a "de facto three-lane roadway." A de facto three-lane roadway is one in which the left-turning vehicles along the existing four-lane undivided roadway have resulted in the majority of the through traffic using the outside lanes (see Figure 11). The overall objective of the Road Diet is to match the design with the intended or preferred function of the roadway for all road users.

3.3.2 Speed

When possible, match vehicle speed to the context of surrounding land uses, such as through central business districts and neighborhoods, and to all road users. Sometimes this means that lower vehicle speeds are more desirable. These areas often have higher pedestrian and bicycle volumes in addition to younger pedestrians and bicyclists. The need to "calm" or reduce vehicle speeds is often cited as a reason for Road Diet conversions.[23]

Road Diets can reduce speed differential. The case study and simulation results of operational analyses from *Converting Four-Lane Undivided Roadways to a Three-Lane Cross Section - Factors to Consider* show that 85th percentile and average speed along conversions are likely to decrease by 3 to 5 mph.[24] Anecdotal evidence from several case studies has shown that this type of conversion can result in lower vehicle speed variability.

If speeding was documented in the four-lane undivided configuration, a Road Diet can be a useful tool for reducing speeds, especially high-end speeders. Studies have shown a reduction in 85th percentile speed of less than 5 mph [25,26] and in reducing the number of vehicles speeding excessively—defined as those going over 36 mph in a 30 mph speed zone.[27] Another study also reported a 7 percent reduction in vehicles traveling over the posted speed limit.[28] A greater reduction in speed was observed on corridors with higher traffic volumes.[29]

3.3.3 Level of Service (LOS)

Level of Service (LOS) is a qualitative measure of traffic conditions using a quantitative stratification of a performance measure or measures. Consider LOS for two components: intersections and arterial segments. Corridors with closely spaced signalized intersections may have a larger impact on the Road Diet operation due to queuing affecting adjacent signalized intersections. This impact could be mitigated by signal timing and coordination between adjacent signals, allowing the corridor to be "flushed" with each green cycle. The City of Lansing, Michigan, goes a step further, considering updates to everything along a new Road Diet corridor, including potential changes to traffic control (e.g., signal removal, roundabout installation).



Figure 11. Four-lane Undivided Roadway Intersection Operating as a de facto Three-lane Cross Section
Photo Credit: Tom Welch

The LOS on urban arterials would provide a more accurate view of conditions for roads with longer distances between signalized intersections or no signalized intersections in the corridor. The arterial LOS as measured by vehicle speed is affected by signal spacing, access point frequency, number of left turning vehicles, and number of lanes.

The difference in delays and queues should also be considered when determining the feasibility of a Road Diet conversion. After the conversion, the through vehicle delay due to turning traffic should typically decrease. The delays for left-turning vehicles, however, may increase because a similar through volume is now using one through lane rather than two. Through-vehicle delay and queuing along the main line and minor street approaches may also increase and should be considered during detailed analysis of this type of conversion. Once again, the difference in these measures can be small if the existing four-lane undivided roadway is generally operating at or close to that of a de facto three-lane roadway. Several measures that also can be used to mitigate and minimize these operational impacts include, but are not limited to, signal optimization and coordination, turn lane additions, and driveway consolidation. Of particular interest and focus should be minor street delays and queues at signalized intersections and the available gaps at unsignalized intersections or driveways. Practitioners should consider the mitigation of any negative impacts during the more detailed alternative analysis and evaluation and weigh them against benefits for non-motorized road users.

3.3.4 Quality of Service

Quality of service is defined as a "quantitative indicator of the operational conditions of a facility or service and users' perception of these conditions."[30] Agencies have used a number of objective and subjective measures, including "perceived level of safety and comfort" in Florida's bicycle and pedestrian level of service methodologies.[31]

Practitioners should consider user quality of service for individual intersections and arterial segments as well as the overall facility. New methodologies for urban street facilities in the 2010 Highway Capacity Manual (HCM) allow analysts to determine quality of service measures for automobiles, pedestrians, bicyclists, and transit.

The HCM 2010 notes that automobile mode quality of service is based on performance measures that are field-measurable, while the pedestrian and bicyclist qualities of service are based on traveler-reported scores based on perceived quality of service. Transit quality of service is based on changes in transit patronage that come from changes in service quality. In this context, a multimodal LOS (MMLOS) analysis is included to evaluate the LOS of each travel mode simultaneously (note that a combined LOS is not calculated). Strengths of the MMLOS analysis include the ability to quantify and assess quality of service trade-offs between modes and to help prioritize possible improvements that may impact each mode differently.[32]

What about Capacity?

There is often concern about apparently reducing the capacity of a four-lane undivided roadway in half by converting it to a three-lane cross section with a Road Diet. Practitioners have found some cases of the four-lane undivided road operating as a de facto three-lane roadway due to turning movements and driver behavior. Therefore, the effective capacity reduction is much less than the theoretical reduction assumed before implementation.

Some of the following general trends are expected.

- Pedestrian LOS scores are likely to improve due to the lane reduction, speed reduction, and the reallocation of traveled way width to bicycle lanes and on-street parking.
- Bicycle LOS scores will improve as a result of some of the same factors, as well as the addition of a bicycle lane.
- Applying a Road Diet configuration on a corridor with frequent signalized intersections will have a larger impact on automobile operations than it would on a corridor with more infrequent signal spacing. Frequently spaced signals are more likely to have queued traffic back up into adjacent signals' effective areas, causing congestion issues at multiple intersections. In some cases this impact can be mitigated by optimizing the signal timing and coordinating between signals. The arterial automobile LOS will provide a more accurate view of conditions when there are longer distances between signalized intersections or only unsignalized intersections in the corridor.
- The following factors will affect automobile LOS, as measured by vehicle speed: signal spacing, access point frequency, number of left-turning vehicles, and number of lanes.

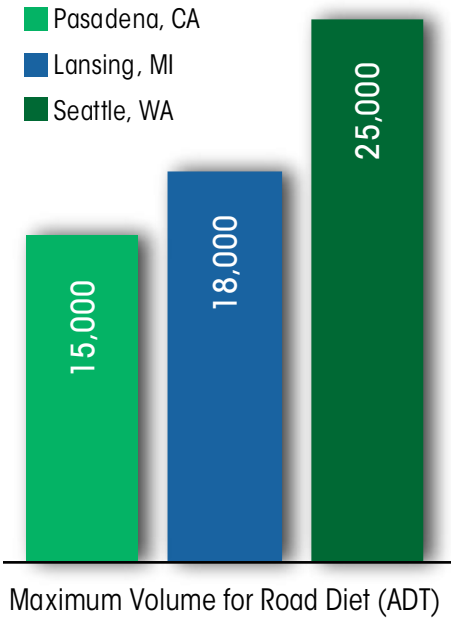


Figure 12. Road Diet Implementation Maximum Volume Thresholds by Agency

One study conducted a sensitivity analysis to determine at what hourly volume the arterial LOS would decline. It found that a two-way peak hour volume of 1,750 vehicles per hour (875 each direction) was the threshold when a decrease in LOS was observed.[33] It also found this could be mitigated by signal timing optimization.[34]

3.3.5 Average Daily Traffic (ADT)

The ADT provides a good first approximation on whether or not to consider a Road Diet conversion. If the ADT is near the upper limits of the study volumes, practitioners should conduct further analysis to determine its operational feasibility. This would include looking at peak hour volumes by direction and considering other factors such as signal spacing, turning volumes at intersections, and other access points. Each practitioner should use engineering judgment to decide how much analysis is necessary and take examples from this report as a guide.

- A 2011 Kentucky study showed Road Diets could work up to an ADT of 23,000 vehicles per day (vpd).[35]
- In 2006, Gates, et al. suggested a maximum ADT of between 15,000 and 17,500 vpd.[36]

Knapp, Giese, and Lee have documented Road Diets with ADTs ranging from 8,500 to 24,000 vpd.[37] The FHWA advises that roadways with ADT of 20,000 vpd or less may be good candidates for a Road Diet and should be evaluated for feasibility. Figure 12 shows the maximum ADTs used by several agencies to determine whether to install a Road Diet. Road Diet projects have been completed on roadways with relatively high traffic volumes in urban areas or near larger cities with satisfactory results.

3.3.6 Peak Hour and Peak Direction

The peak hour volume in the peak direction will be the measure of volume driving the analysis and can determine whether the Road Diet can be feasibly implemented. This is the traffic volume that would be used in calculating LOS analysis for intersections or the arterial corridor.

Peak-hour volumes along urban roadways typically represent 8 to 12 percent of the ADT along a roadway. The Iowa guidelines suggest, from an operational point of view, the following volume-based Road Diet feasibility conclusions (assuming a 50/50 directional split and 10 percent of the ADT during the peak hour):[38]

- Probably feasible at or below 750 vehicles per hour per direction (vphpd) during the peak hour.
- Consider cautiously between 750 – 875 vphpd during the peak hour.
- Feasibility less likely above 875 vphpd during the peak hour and expect reduced arterial LOS during the peak period.

3.3.7 Turning Volumes and Patterns

The volume and pattern of turning vehicles influences roadway safety and operation. Practitioners should assess turn volumes and patterns when considering the feasibility of a Road Diet conversion. In general, four-lane undivided roadways begin to operate in a manner similar to a three-lane roadway as the number of access points and left-turn volumes increase. In this situation the four-lane undivided roadway begins to operate as a de facto three-lane roadway and the operational impacts of a Road Diet conversion may be smaller. This type of situation, if expected during the entire design period, would be more likely to define a feasible Road Diet conversion location.[39] If it is determined that the four-lane undivided to three-lane conversion is a feasible option along a roadway corridor, a more detailed operational analysis of the existing and expected through and turning volumes is necessary (see Chapter 4).

The operation of each corridor is unique and requires an evaluation to determine if a Road Diet cross-section conversion is feasible. For example, if a major driveway exists along the corridor, it could change the potential impacts of a Road Diet by introducing another (often closely-spaced) opportunity for additional vehicular turning movements. If motorists are trying to turn into driveways opposite each other, opposite-direction vehicles could end up in the TWLTL and have potential conflicts.

Offset intersections can cause a similar problem, as vehicular left-turning traffic can enter the TWLTL from opposite directions, desiring the same space from which to make their turn. Depending on the design of intersections and driveways, along with the volume of left turning traffic, this can result in potential conflicts.

3.3.8 Frequently Stopping and Slow-Moving Vehicles

The number and frequency of slow-moving and frequently stopping vehicles using a roadway corridor is a factor to consider when evaluating the application of a Road Diet conversion. Some examples of these types of vehicles include agricultural equipment, transit buses, curb-side mail delivery, trash pick-up, and horse-drawn vehicles. These types of vehicles have a greater impact on the operation of a three-lane roadway than a four-lane undivided roadway. The primary reason for this increased impact is the inability of other vehicles to legally pass frequently stopping or slow-moving vehicles. When determining the feasibility of a Road Diet conversion, practitioners should take into account the number and duration of vehicle stops along the corridor (particularly during peak hours), as well as the enforcement levels needed to deter illegal passing. One potential mitigation measure to minimize the impact of frequently stopping vehicles is to provide pull-out areas at specific locations along the corridor. Another potential mitigation is to use some of the existing cross section for these types of vehicles (e.g., a transit lane). Improvements to intersection and driveway radii or pavement markings to serve these types of vehicles should also be considered if the Road Diet is selected as a feasible option.



Figure 13. Bus Loading Zone in Seattle, Washington
Photo Credit: City of Seattle

Simulated comparisons of a quarter-mile, four-lane, undivided roadway with a three-lane roadway, each having different percentages of heavy vehicles, one to two bus stops, and various headways and dwell times (with a set amount of entering volumes, number of access points, and turning volumes) showed that the impact of these vehicles on average arterial travel speed was much higher along the three-lane cross section than that of the four-lane undivided roadways.[40] Vehicles illegally passing stopped or slow-moving vehicles in the TWLTL did not appear to be a regular problem in the Iowa case studies. If this does occur, consider enforcement and education about the use of TWLTLs as appropriate.

3.4 Bicycles, Pedestrians, Transit, and Freight Considerations

Embarking on a Road Diet presents an opportunity to dedicate more space to other roadway users and create a more balanced transportation system. For bicyclists in particular, Road Diets often include adding bicycle lanes to a street with little or no accommodation for bicyclists. The bicycle lane makes that route an option for many who would have been too intimidated to use the street previously. For pedestrians, Road Diets help reduce vehicle speeds and speed discrepancies midblock, making crossings easier and safer.[41] Transit vehicles may find more space available for bus stops but may also face new challenges, such as blocking the single through lane along a corridor when stopped. Freight operators have special needs, especially for delivery of goods to businesses, that should be accommodated along the corridor.

Community members feel Road Diet conversions improve their quality of life. Iowa case study results found that pedestrians and bicyclists, along with adjacent land owners, often preferred the three-lane cross section. Conflicts between bicyclists, pedestrians, and vehicles can be reduced and the complexity of crossing maneuvers decreased. Road Diet effects on quality of life are discussed in more detail in *Road Diet Handbook: Setting Trends for Livable Streets*.[42]

If corridors have existing or planned transit routes, the interrelation between transit operations (e.g., number of dedicated stops and frequency of trips) and other roadway users (i.e., vehicles, bicycles, pedestrians) should be assessed before determining whether or not to implement a Road Diet. The following sections present considerations and examples of how Road Diets may be implemented with pedestrians, bicycles, transit, and freight operations in mind.

3.4.1 Bicycle Considerations

Bicycle routes should be part of an overall network. One of the things to consider when determining whether a street is appropriate for a Road Diet is whether it fills in a gap in the overall network, or if it is part of a planned network. Many agencies, including the Los Angeles, Seattle, and Chicago DOTs, have sought out potential locations for Road Diets to complete the networks identified in their bicycle master plans.

If a formal bicycle network has not been identified, the roadway in question may still benefit from bicycle facilities. The street should first be studied to determine if there is any existing bicycle activity along it. If bicyclists are already using the roadway without a facility, significantly more bicyclists will likely use the route after a Road Diet. Whether or not there is existing activity, demand for a bicycle facility should be estimated. In cases where there are already bicycle facilities, a Road Diet may be an opportunity to further enhance the comfort of bicyclists by adding buffer space or converting a standard bicycle lane to a protected bicycle lane. Adding buffers may have additional benefits to other users as well. For instance, where the goal is to lower speeds, adding buffers to narrow travel lanes may accomplish that, which would be a benefit to pedestrians as well as bicyclists (see Figure 14).



Figure 14. Buffered Bicycle Lanes on Wabash Avenue in Chicago
Photo Credit: Stacey Meekins



Figure 15. Pedestrians Buffered from Traffic in Reston, VA
Photo Credit: Richard Retting

3.4.2 Pedestrian Considerations

The primary items for consideration for pedestrians are similar in nature to those for bicyclists – is there already a sidewalk available; what is the level of pedestrian activity; could the activity be expected to increase with the addition of facilities? If there are no sidewalks currently lining the roadway, designers should consider adding them with the Road Diet. In rural contexts, a sidewalk may not be necessary, but in these situations, a paved shoulder should at least be considered as a pedestrian accommodation. Along a section of Soapstone Road in Reston, Virginia, a Road Diet converted the road from two travel lanes in each direction to one lane of travel and a bicycle lane in each direction, separated by a TWLTL. Pedestrians can be observed walking in the road at locations that lacked sidewalks near the transition into the three-lane section, as shown in Figure 15. In this case the Road Diet treatment provides a safety benefit by increasing the separation between pedestrians and motor vehicles.



Figure 16. 55th Street in Chicago: Transit and Bicycles Share an Area at the Intersection (left); Transit Stop and Bicycle Lane (right); Photo Credit: Stacey Meekins

The history of pedestrian crashes should factor into the decision as to whether to implement a Road Diet and what the components of the Road Diet ought to be. Crashes can be reduced by adding sidewalks or a shoulder, adding pedestrian refuge islands, and simply by slowing cars and reducing the number of lanes pedestrians must cross.

Pedestrian refuge islands should also be considered. The land use and the intended pedestrian environment will also factor into the decision as to whether to implement a Road Diet.

3.4.3 Transit Considerations

It is important to consider transit operations along a corridor being evaluated for a Road Diet, and also to consider the impacts of new transit needs that affect all road users. The conversion should not result in transit causing undue additional delay to general purpose traffic, though in many cases buses that stopped in the rightmost through lane before the conversion will stop in the only through lane after the Road Diet is installed. Bus stops are typically located along the curb with on-street parking removed, although some corridors may include pull outs to prevent buses from blocking through traffic. Pull-outs are often not preferred by transit operators due to difficulties with ingress and egress from the mainline.

Agencies should work with transit providers in the corridor to make sure their needs are being addressed. This is also a good time to have the transit provider look at bus stop spacing and location. Some stops could potentially be eliminated or moved from either near-side or far-side locations at intersections to provide a better pedestrian connection or to prevent buses from blocking the line of sight between pedestrians and motorists. If buses end up partially blocking the through lane after a Road Diet conversion, then vehicles may end up passing the bus in the two-way left turn lane. This issue can be remediated by applying physical barriers (e.g., channelizing devices along the outer edge line of the TWLTL) to prevent the maneuver, depending on the frequency and severity of the violation.

On 55th Street in Chicago, the City installed a Road Diet from Cottage Grove Avenue to Woodlawn Avenue. This corridor served as an existing transit route, and the City also wanted to incorporate bicycle facilities. Significant coordination with the Chicago Transit Authority was necessary to address the needs of the transit providers, while also accommodating the new bicycle lanes. Figure 16 shows how transit and bicycle lanes are both accommodated on 55th Street.

The City of Seattle works closely with transit providers in corridors where Road Diets are proposed. The transit agency reviews the proposed geometry and comments on needed changes to accommodate buses. In addition, Seattle has developed transit priority corridors with the following attributes:

- Bus priority at traffic signals.
- Queue jump lanes for buses at signalized intersections.
- In-lane bus stops for transit efficiency.
- Pedestrian safety treatments for transit users and on-time bus service.

Road Diet Effects on Seattle's Electric Buses

The City of Seattle has a fleet of electric buses that use overhead wires to provide eco-friendly and cost-effective services. For a proposed Road Diet project on Myrtle Street, King County Metro asked if the bus could continue using the same overhead wires with the new lane configuration. If so, then the Road Diet would be a low-cost solution. If not, it would be very expensive to move the wires. After testing the situation they determined that the buses could reach the wires, so the Road Diet project was installed.

3.4.4 Freight Considerations

There are instances where a corridor proposed for a Road Diet will need to accommodate truck movements. Freight operations on corridors are largely driven by demand-induced truck volumes, the proximity of alternative or parallel corridors, and the land use characteristics along or near the corridor. Freight operations can range from routine deliveries along the corridor to throughput of freight generated within and outside a region. When evaluating a corridor for a Road Diet, current and future freight operations should be considered.

While there is limited information available on freight considerations when compared to other areas addressed in this section, the Complete Streets guide published by The New York State Association of Metropolitan Planning Organizations (NYSAMPO) notes that, "Complete streets are often used to stimulate economic development, ideally as compact mixed-use with retail, commercial, and residential spaces. Designers must consider how stores and restaurants will receive deliveries, and where visitors and residents will park their cars without interfering with the needs of pedestrians, cyclists, or transit. Concepts include rear delivery access and strategically placed loading zones with time restrictions." [43]

Road Diets can appropriately accommodate freight movements while also serving other transportation users if some key factors are considered during the planning process. The NYSAMPO has identified the following considerations that should be factored in when addressing truck movements in complete streets settings.[44]

1) **Current Land Use.** Different uses generate different volumes and types of large truck movements. For example, restaurants may generate relatively high volumes of trucks, while lower density residential typically will not. Keeping the land uses along a corridor in mind will help agencies appropriately design Road Diets to meet local needs.
2) **Truck Size.** Corridors that serve or connect to larger industrial properties may serve larger trucks that cannot easily maneuver on narrower roads. By contrast, commercial retail stores and offices are often served by smaller unit delivery trucks.
3) **Delivery Parking Areas.** Some urban areas can accommodate deliveries via alleys or side streets, thereby avoiding trucks stopping on the main street to deliver. Other options include dedicated curbside delivery parking areas or off-street parking lots. Still other urban areas lack dedicated truck delivery parking areas, making it more difficult for delivery trucks to find parking and increasing conflicts for all users.
4) **Intersection Design.** Intersections where large trucks are often making turns should be designed with wider curb radii to accommodate truck movements. Intersections that experience few truck movements, few truck turns, and/or almost exclusively serve smaller trucks have lesser intersection turning radii requirements.

Engaging freight stakeholders early in the project planning and development process provides an opportunity to align freight mobility with the goals of a planned Road Diet. Outreach to stakeholders such as business owners, commercial and industrial property owners, and local carriers can be useful to identify potential issues with a Road Diet implementation. While engagement with freight stakeholders does not guarantee all conflicts will be resolved, it increases the likelihood of agreement on a Road Diet approach that balances freight mobility, safety, economic growth, and community needs to enhance quality of life.

3.5 Other Feasibility Determination Factors

The feasibility of converting a four-lane, undivided roadway to a three-lane cross section as a possible alternative along a particular corridor can be evaluated, at least partially, through the consideration of several feasibility determination factors (FDFs), as discussed earlier in this chapter. If the existing or preferred characteristics of the FDFs match the objectives or goals for the corridor under consideration, the Road Diet configuration should be included as one option in a more detailed alternative cross-section analysis and comparison.

Overall, Road Diet feasibility is tied to the ability to design the facility within the existing roadway cross section or right-of-way. However, in some cases, the corridor FDFs may require some mitigation to achieve a desirable outcome after a Road Diet conversion. The acceptability and impacts of this type of mitigation should be considered in general when determining the feasibility of the Road Diet option. A more detailed analysis would need to be completed when all feasible corridor cross section alternatives are evaluated and compared. Planning/policy, geometrics, safety, and operational details for Road Diets are discussed in other sections of this guide.

The factors discussed in this section include the following:

- Right-of-Way availability and cost.
- Parallel parking.
- Public outreach, public relations, and political considerations.
- Parallel roadways.
- At-grade railroad crossings.

The content of the discussion that follows was generally derived from *Converting Four-Lane Undivided Roadways to a Three-Lane Cross Section: Factors to Consider.* Other information has been added based on more recent research efforts and agency experience with Road Diet implementation and evaluation. Appendix B includes a summary table of feasibility factors, their characteristics, and a series of sample evaluative questions.

3.5.1 Right-of-Way Availability and Cost

Practitioners frequently consider the conversion of a four-lane, undivided cross section to three lanes when additional right-of-way or project funding is limited. Many Road Diet conversions can be completed within the existing curb-to-curb or roadway pavement envelope. However, changes in width at specific locations and occasionally additional right-of-way may be necessary (e.g., at intersections for right-turn lanes). A Road Diet conversion may be less feasible when these types of activities increase. In many cases a Road Diet conversion may only consist of changes in pavement markings. The inclusion of a Road Diet conversion as a feasible option for further consideration is more likely if there are limitations on available right-of-way.

3.5.2 Parallel Roadways

Road Diets can cause some diversion of traffic to parallel routes. A determination will be needed to establish whether the parallel routes would be desirable by through vehicle drivers on the corridor of interest. This can be established through discussions with those that travel the roadway or the application of appropriate simulation software. The distance between parallel arterials should also be considered. It is less likely that vehicles will divert to parallel routes that are farther away or that are just as congested. The other consideration is vehicles shifting to parallel non-arterial streets as "cut-through" traffic. Collecting before-and-after traffic data can inform the practitioner if this is occurring. Some community members may be more sensitive to this, so having data can help clearly define whether this is a problem. If there is an increase in cut-through traffic, traffic calming or other mitigation measures on parallel streets may be warranted.

3D Visualization

The use of 3D visualization may serve as an effective tool to help local stakeholders visualize a proposed Road Diet and assess impacts associated with the installation. Design visualization allows viewers to see the corridor from several vantage points, such as a commercial vehicle, a motor vehicle, a bicycle, or a pedestrian.

3.5.3 Parallel Parking

The existence of parallel parking (full-time or only during part of the day) and its impact on the feasibility of a Road Diet conversion should be evaluated. The difference in the impacts of the parking maneuvers on the four-lane undivided versus the three-lane cross section need to be compared. In addition, if a bicycle lane is added after the conversion, the interaction between bicyclists and vehicles being parked should be considered. Parallel parking can be and has been included along three-lane roadways.

3.5.4 At-Grade Railroad Crossings

An important consideration in the feasibility of converting four-lane, undivided roadway to three lanes is the existence of railroad crossings. Vehicles queued at an at-grade rail crossing will need to be served by one through lane after the Road Diet conversion. This could result in queues that are approximately twice as long. If this type of queuing is not acceptable along the three-lane cross section, it could affect feasibility. It is also important to consider at-grade crossings for railroads that closely parallel the corridor of interest. In the case of a nearby parallel railroad, the additional queuing due to a train would occur in the TWLTL in one direction and the through lane in the other direction. If operation of the converted corridor is needed while a train passes, the addition of a right-turn lane with adequate storage may be necessary for mitigation. The consideration of the signalization at these intersections (if it exists) also requires special attention both before and after the Road Diet conversion (if it occurs).

3.5.5 Public Outreach, Public Relations, and Political Considerations

According to the Delaware Valley Regional Planning Commission's *Regional Road Diet Analysis Feasibility Assessment,* "Education and outreach play a critical role in the success of a Road Diet. Many projects have demonstrated that public opposition can be strong in the early stages of a project. However, with committed stakeholders and an organized education and outreach program, the public can be better informed about the advantages and disadvantages of Road Diets." [45]

Road Diet conversions have been implemented for more than three decades. Their implementation, however, can still be very challenging. This type of conversion is relatively unusual and new to most transportation professionals, local jurisdictions, and the traveling public. In some cases the consideration of or proposal for a Road Diet can lead to some concern due to unfamiliarity.

A temporary trial basis implementation of a Road Diet conversion has been used to address public concerns. This approach requires the restriping of the pavement within the proposed Road Diet area for a period of time before a determination is made to continue with a permanent Road Diet installation. Temporary pavement marking materials similar to those used in construction work zones can be considered for this purpose.

Consider signalization adjustments and any potential issues related to turning vehicles. During the trial basis time period, a series of before-and-after operational studies can be completed; some preliminary crash analysis can be performed; and surveys can be conducted among adjacent land owners, first responders, etc. If the trial yields positive results, consider implementing a more permanent Road Diet conversion. If it is determined that a Road Diet is not the best option for the corridor, the roadway can be changed back to its original lane configuration.

Michigan DOT (MDOT), with support from FHWA, has implemented Road Diets using the trial basis approach to appeal to communities where Road Diets may be feasible but are not embraced locally. In a few localities where citizens or local officials have objected to an MDOT-proposed Road Diet, MDOT has tempered its proposal with a guarantee: the agency will install the Road Diet on a trial basis, and will return the road to four lanes at the end of the trial if the community requests it. The evaluation criterion in this case is simple: what does the community want? As a result, many corridors have retained their Road Diet conversion with only two corridors being returned to four-lane undivided sections in Michigan. MDOT and FHWA believe that this is an effective approach to demonstrate the safety countermeasure to a community.

3.6 Case Studies: Feasibility Determination Decision-making

Several agencies apply general "rules of thumb" when first considering Road Diets. This section summarizes the factors and design parameters agencies should use when considering a Road Diet.

Seattle DOT considers the following facets of transportation operations, mobility, and safety in the selection of a Road Diet corridor: [46]

- Volume of traffic – up to 25,000 vehicles per day
- Vehicle speed
- Freight usage
- Travel time
- Number of collisions – all modes (motor vehicle, pedestrian, bicycle)
- Number of lanes
- Bus stops and routing
- Accessibility.

To guide Road Diet implementations, Seattle DOT developed the flow chart shown in Figure 17 to support its Road Diet decision-making process. First, the city calculates the ADT of the roadway segment in question, combined with signal spacing. In some cases this will lead to additional operational analyses of the entire corridor or key intersections. Depending on the results of this additional analysis, further modeling may be required (e.g., via Highway Capacity Software or Synchro). Those results may require modifications to the design to accommodate traffic. Once the simulation results are satisfactory, the Traffic Operations Manager and Signal Operations Manager must formally approve the Road Diet project to move forward.

Chicago DOT (CDOT) has started developing guidelines for when and where to implement Road Diets at the time of this writing. Crashes are the most important reason for them to consider a Road Diet, followed by traffic volumes that do not warrant the current number of lanes.

CDOT considers a roadway up to 15,000 – 18,000 ADT to be a good candidate for a Road Diet. However, the agency believes that the design hourly volume (DHV) may be a better parameter to use than ADT. A Road Diet would be feasible with a peak hourly volume of 1,000; at higher volumes, signal modifications may be necessary, and implementing left-turn phases is important where the traffic volumes are high.

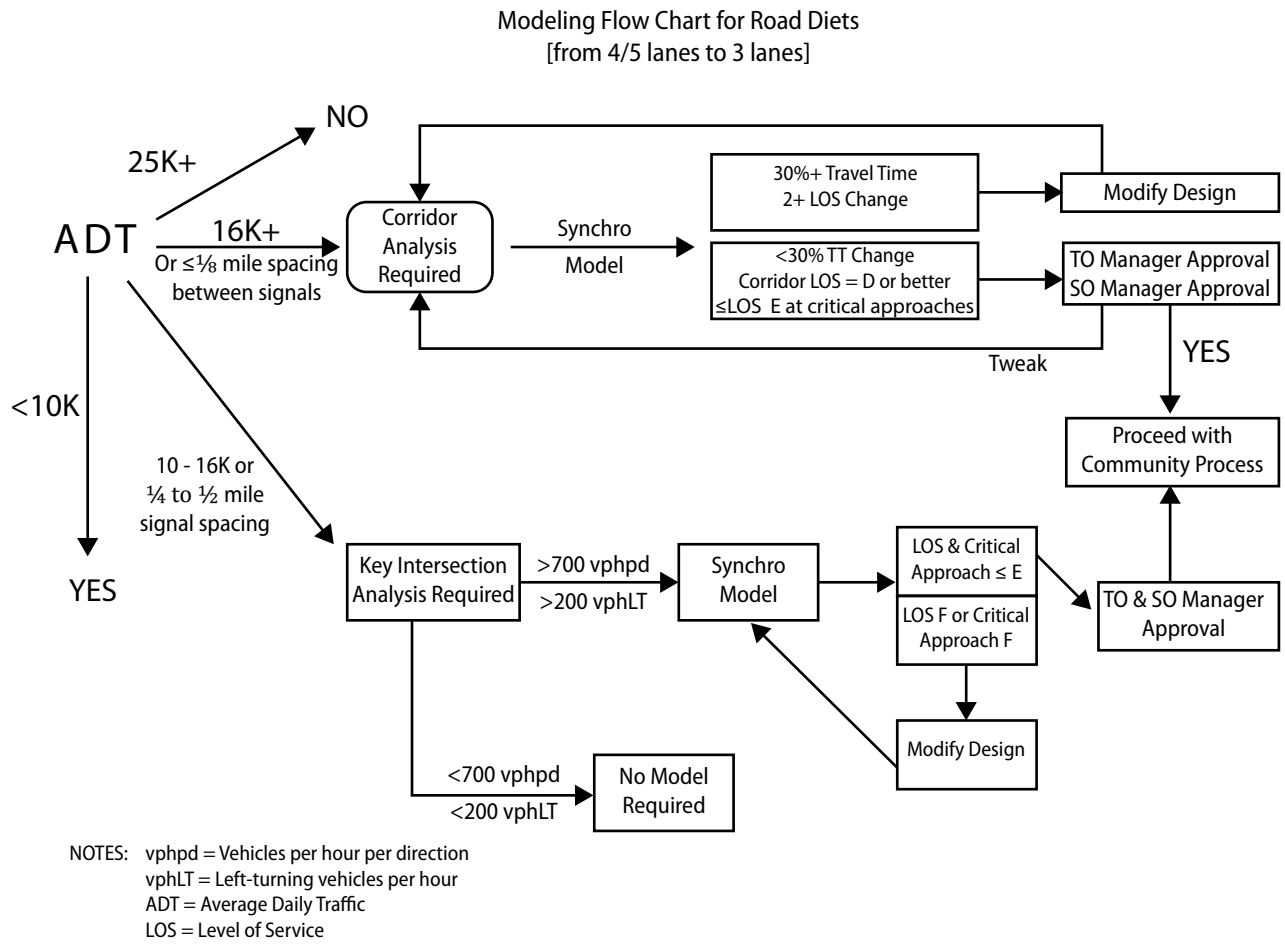


Figure 17. City of Seattle Modeling Flow Chart for Road Diet Feasibility Determination

Michigan DOT gives the following outline for guidance related to reducing lanes when considering implementation of a Road Diet:

1. Planning and Policy – Includes information on the purpose and need for the Road Diet, planning considerations for the local community and regional planning agency, Transportation Improvement Program (TIP) processes, etc.
2. Feasibility Determination Factors – Includes information regarding traffic volumes, traffic modeling, turning movements, level of service, crash analysis, etc.
3. Operational Criteria – Includes information regarding acceptable Level of Service (LOS) and improvements related to certain crash types.
4. Geometric Design Criteria – Describes maintaining proper geometrics using major road standards.
5. Systems Considerations – Includes considerations regarding parking, pedestrian and bicycle issues, school routes, etc.
6. Project Costs – Describes financial arrangements for cost-share projects.
7. Public Involvement – Describes the communication process prior to implementation.[47]

Michigan DOT has chosen to view all existing four-lane, undivided roads as potential implementation sites. Many local Michigan agencies believe that a three-lane cross-section is the desirable road section compared to two-lane and four-lane undivided sections, and they actively work to identify which four-lane undivided roads are good candidates for Road Diets.

The City of Grand Rapids, MI takes a holistic view of Road Diet implementations by first identifying all four-lane, undivided facilities within their jurisdiction. For each road or segment identified, the agency then records and tracks traffic volumes, corridor use (whether a commercial route, incident bypass route, neighborhood traffic, school bus/transit route, etc.), and how the corridor operates under existing conditions.[48]

The City of Lansing, MI has established the following minimum post-implementation lane width guidance:

- 11-ft. through lanes
- 5-ft. bike lanes[49]
- 10-ft. turn lanes (left and right).

This guidance was established based on the city's experience; at some vehicle lane widths the roadway encourages side-by-side traffic, and some bicycle lane widths can encourage parking. Where undesignated pavement width exists, the city paints a buffer zone between the travel lane and bike lane, as shown in Figure 18. This provides a buffer between vehicles and bicycle traffic and helps allocate unused pavement without creating wide lanes.



Figure 18. Painted Buffer Between Through Lane and Bicycle Lane in Lansing, Michigan
Photo Credit: Jennifer Atkinson

The Genesee County Metropolitan Planning Commission (GCMPC) in Michigan is both progressive and aggressive in its approach to installing Road Diets. Although the first Road Diet in the GCMPC area occurred in 1990, the real boost to widespread implementation of Road Diets within this area occurred in 2009. The catalyst was the completion of a technical study in which the GCMPC assessed more than 140 miles of four-lane undivided road in its jurisdiction for potential conversion to three lanes. This study provided a summary of operating features and crash results for eight completed Road Diets in the area and offered a comparative assessment ranking the desirability of all remaining four-lane sections for Road Diet consideration.[50]

The local agencies within the region first targeted routes with low ADTs that would allow for easy conversion and result in safety benefits; routes carrying 6,000 – 8,000 AADT were selected for the first conversions. After several conversions and positive public opinions of Road Diets, GCMPC began selecting implementation sites with higher volumes – up to 15,000 AADT.

Each year, GCMPC selects competitive road improvement projects submitted by its 32 local agencies. Potential Road Diet locations are scored and prioritized on criteria such as the following:

- Existing level of service;
- Lane width (existing and proposed);
- Number of driveway approaches within the Road Diet segment; and
- Crash types that may be mitigated by installation.

The GCMPC involves representatives from all modes of transportation, elected officials, and local agency partners. These stakeholders are involved from the beginning of the planning process and collaborate through the Road Diet installation. GCMPC feels that working together with these stakeholders gives a sense of project awareness and buy-in. It also helps to overcome obstacles or concerns that arise along the way, leading to smoother implementation. GCMPC encourages local agencies within their jurisdiction to restripe existing four-lane undivided segments as three-lane Road Diets as a part of their ongoing annual or bi-annual restriping plans. During the Road Diet study, GCMPC looked at several parameters to determine conversion suitability. Using these criteria, a 4-scale rating system was developed to measure compatibility of each road segment. These included:

- **Crash data.** Rates of traffic crashes for sideswipe, head-on, head-on-left-turn, angle, rear-end, and rear-end-left-turn crashes that are higher than the average for roadways with similar functional classification can be a good indicator for compatibility.
- **Lane width.** Four-lane roadways with lanes widths less than 12 feet may be good candidates as the narrow lanes can cause conflicts for passing vehicles.
- **Speed limits and operating speeds.** A Road Diet may be beneficial where traffic calming is needed.
- **Surface type.** A road that has concrete on the inside lanes and asphalt on the outside lanes (or the other way around) may be a poor candidate as the difference in pavement color may be used to distinguish travel lanes rather than the painted lane markers. This is especially true during inclement weather events or evening/morning driving as a result of sun glare.
- **ADT.** GCMPC considers ADT less than 10,000 feasible, between 10,000 and 20,000 potentially feasible depending on site-specific conditions, and more than 20,000 likely not feasible.
- **Number of traffic signals.** This is one of the many factors used to determine compatibility and is site specific.
- **Land use.** A Road Diet may be beneficial on corridors that have a lot of turning movements such as a block-style street grid, shopping areas, school zones, etc.

Overall, the efforts of GCMPC to install Road Diets have resulted in a number of installations. Four years ago, a Road Diet proposal from a local agency would have been unusual, but they are common now in GCMPC's annual call for projects. From the local agencies' standpoint, they feel that the extraordinary efforts of the planning agency and subsequent educational follow-up by GCMPC have facilitated implementation at the local level.

Based on recent interviews with practitioners, agency considerations for Road Diet implementation are shown in Table 3.

Table 3. Road Diet Implementation Considerations by Agency

Road Diet Implementation Considerations														
	Maximum Volume, ADT	Maximum Peak Volumes, DHV	Minimum Lane Width, ft.			Crash History	Vehicle Speed	Number of Lanes	Turning Volumes	Freight Usage	Presence of Transit	Presence of Bicycles	Travel Time or LOS	Accessibility
			Through	Left/Right	Bicycle									
Chicago DOT	●	●	●	●	●	●	●		●			●	●	
Seattle DOT	●					●	●	●		●	●		●	●
City of Lansing, MI	●		●	●	●									
Michigan DOT						●			●		●		●	●
Delaware Valley Regional Planning Commission	●								●				●	
City of Las Vegas, NV							●					●		●
Genesee County (MI) Metropolitan Planning Commission	●		●			●	●				●		●	

3.7 Funding Road Diets

Road Diets can be funded from a number of different sources based on the needs of the agency. Road Diets are typically eligible for Surface Transportation Program (STP), Highway Safety Improvement Program (HSIP) or other Federal-aid funds where data support the expenditure.

However, there are other benefits of Road Diets and other reasons for their installation, so the other funding sources available vary widely from Federal, State, and local sources. For example, the Seattle DOT (SDOT) has used funding from such sources as Safe Routes to School grants, Washington State DOT pedestrian and bicycle funds, and transit grants. The agency also monitors the city's road resurfacing projects to see whether upcoming streets scheduled for upcoming roadway overlay projects are good candidates for Road Diets. This allows Seattle DOT to use the annual paving program funds for some installations.

4 Designing a Road Diet

As with any project development process, practitioners designing a Road Diet should take into account the principles and practices that guide design decisions, including geometric design and operational design.

4.1 Geometric Design

Geometric design includes identifying details of the project in plan, profile, and cross section. It is necessary to apply the standard principles and practices of geometric design. Geometric designers are guided by standards and policies that include design criteria. The criteria serve as a guide to design and provide uniformity, but are not intended to be inflexible. Designers need flexibility to achieve context-specific needs and objectives. This is particularly true for Road Diet implementations. FHWA's *Flexibility in Highway Design* illustrates the different methods available to highway engineers and project managers to design roads that move people and goods in a safe, efficient, and reliable way while at the same time fully considering community values for the corridor and broader location.[51] AASHTO's *A Guide for Achieving Flexibility in Highway Design* also shows how community and environmental issues can be integrated into decision-making throughout the project development process.[52] Additional information about design flexibility pertaining to pedestrian and bicyclist facilities can be found in FHWA's August 2013 Bicycle and Pedestrian Facility Design Flexibility memo.[53]

The practice of designing roads geometrically is evolving towards more performance-based approaches to analysis, where the expected transportation outcomes of geometric design decisions are quantified and used to support informed design decision-making. Performance-based analysis complements the ideas of design flexibility, context sensitive design, and practical design. Performance-prediction tools, such as the *Highway Safety Manual*, *Highway Capacity Manual* and others quantify how geometric design decisions impact measures of user accessibility, mobility, quality of service, reliability, and safety. A framework for conducting performance-based analysis is provided in the final report for NCHRP 15-34A, *Performance-Based Analysis of Geometric Design of Highways and Streets*.

4.1.1 Road Function and Context

The functional classification system described by FHWA's *Functional Classification Guidelines and Updated Guidance for the Functional Classification of Highways* often serves as a basis for establishing design criteria for a Road Diet project. AASHTO's *Green Book*, for example, includes chapters organized by functional classification, with arterials divided into freeway and non-freeway facilities (e.g., Chapter 5, Local Roads and Streets; Chapter 6, Collector Roads and Streets; Chapter 7, Rural and Urban Arterials; and Chapter 8, Freeways). Alternative road classifications also exist. These alternative classification systems guide designers towards establishing design criteria that are complimentary to location-specific context where the Road Diet is being implemented. For example, the *Smart Transportation Guidebook*,[54] jointly published by the Pennsylvania and New Jersey DOTs, more explicitly considers project setting by defining seven context areas from least to most developed:

1) Rural

2) Suburban neighborhood

3) Suburban corridor

4) Suburban center

5) Town/village neighborhood

6) Town center

7) Urban core.

Table 4. Quantifiable Characteristics of Land User Contexts (NJDOT & PennDOT, 2008)

Characteristic	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town Center	Urban Core
Density Units (DU)[a] per acre (ac)	1 DU/20 ac[b]	1-8 DU/ac	2-30 DU/ac	3-20 DU/ac	4-30 DU/ac	8-50 DU/ac	16-75 DU/ac
Building Coverage	NA[c]	< 20%	20-35%	35-45%	35-50%	50-70%	70-100%
Lot Size/Area in square feet (sf)	20 ac	5,000 - 80,000 sf	20,000-200,000 sf	25,000-100,000 sf	2,000-12,000 sf	2,000-20,000 sf	25,000-100,000 sf
Lot Frontage[d]	NA	50 -200 ft.	100-500 ft.	100-300 ft.	18-50 ft.	25-200 ft.	100-300 ft.
Block Dimensions	NA	400 ft. wide x variable length	200 ft. wide x variable length	300 ft. wide x variable length	200 ft. wide x 400 ft. long	200 ft. wide x 400 ft. long	200 ft. wide x 400 ft. long
Max. Height	1-3 stories	1.5 -3 stories	1 story retail; 3-5 story office	2-5 stories	2-5 stories	1-3 stories	3-60 stories
Min./Max. Setback	Varies	20-80 ft.	20-80 ft.	20-80 ft.	10-20 ft.	0-20 ft.	0-20 ft.

[a] The guidebook does not define a density unit and may instead be referring to a dwelling unit; dwelling units per acre are used in the guidebook to define high-, medium-, and low-density areas.
[b] acre
[c] not applicable
[d] The distance measured between points where side property lines meet road right-of-way lines

The guidebook includes a set of quantifiable characteristics for each of the seven context areas and a recommendation that the land use context be identified based on this information. The quantifiable characteristics are summarized in Table 4. Land use contexts are broadly defined for road segments greater than 600 feet in length due to practical limitations on the frequency of changing the roadway typical section over a short stretch of road.

Once the context area of the Road Diet is defined, the *Smart Transportation Guidebook* includes a "matrix of design values" with design criteria as rows and land use contexts as columns for five different roadway types: 1) regional arterial, 2) community arterial, 3) community collector, 4) neighborhood collector, and 5) local road. An example for regional arterials is shown in Table 5. This roadway typology is different than the existing functional classification system outlined by FHWA and was proposed to capture the actual role of the roadway in the surrounding community. Access, mobility, and speed are considered on the road segment of interest as opposed to using only one functional classification for an entire highway. This alternative approach to classifying the context area of the Road Diet beyond more traditional functional classification will encourage design criteria that are consistent with broader project surroundings and area characteristics.

4.1.2 Design Controls

Design controls are fixed factors outside of the design process, but may dictate the result. Examples include vehicles, environment, traffic (non-motorized and motorized), and others, including applicable financial and regulatory influences. Candidate Road Diet locations may be identified due to the characteristics of these design controls at that location (see, for example, discussion in Chapter 3 of this guidebook). More broadly, designers should understand the intended project outcomes as well as the characteristics of the stakeholders that the Road Diet implementation is intended to serve. A thorough discussion of design controls appears in AASHTO's A *Policy on Geometric Design of Highways and Streets*.[55] This section summarizes some key points.

Table 5. Regional Arterial Design Matrix (NJDOT & PennDOT, 2008)

Regional Arterial		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width	11′ to 12′	11′ to 12′ (14′ to 15′ outside lane if no shoulder or bike lane)	11′ to 12′ (14′ to 15′ outside lane if no shoulder or bike lane)	11′ to 12′ (14′ outside lane if no shoulder or bike lane)	10′ to 12′ (14′ outside lane if not shoulder or bike lane)	10′ to 12′ (14′ outside lane if not shoulder or bike lane)	10′ to 12′ (14′ outside lane if not shoulder or bike lane)
	Paved Shoulder Width	8′ to 10′	8′ to 10′	8′ to 12′	4′ to 6′ (if no parking or bike lane)	4′ to 6′ (if no parking or bike lane)	4′ to 6′ (if no parking or bike lane)	4′ to 6′ (if no parking or bike lane)
	Parking Lane	NA	NA	NA	8′ parallel	8′ parallel; see 7.2 for angled	8′ parallel; see 7.2 for angled	8′ parallel
	Bike Lane	NA	5′ to 6′ (if no shoulder)	6′ (if no shoulder)	5′ to 6′	5′ to 6′	5′ to 6′	5′ to 6′
	Curb Return	30 ′ to 50′	25′ to 35′	30′ to 50′	25′ to 50′	15′ to 40′	15′ to 40′	15′ to 40′
	Number of Travel Lanes	2 to 6	2 to 6	4 to 6	4 to 6	2 to 4	2 to 4	2 to 6
Roadside	Clear Sidewalk Width	NA	5′	5′ to 6′	5′ to 6′	6′ to 8′	6′ to 10′	6′ to 12′
	Buffer	NA	6′+	6′ to 10′	4′ to 6′	4′ to 6′	4′ to 6′	4′ to 6′
	Shy Distance	NA	NA	NA	0′ to 2′	0′ to 2′	2′	2′
	Total Sidewalk Width	NA	5′	5′ to 6′	9′ to 14′	10′ to 16′	12′ to 18′	12′ to 20′
Speed	Desired Operating Speed (mph)	45-55	35-40	35-55	30-35	30-35	30-35	30-35

Design Vehicles. Geometric designers "should consider the largest design vehicle that is likely to use [a] facility with considerable frequency or a design vehicle with special characteristics appropriate to a particular location in determining the design of such critical features as radii at intersections and radii of turning roadways."[56] Given that Road Diets are likely implemented as part of an overlay and restriping project, the design vehicle for the location has likely already been predetermined. Design vehicle characteristics are important when considering the new lane and shoulder widths (including possible traveled way widening on horizontal curves), storage lengths, and turning radii. Given that Road Diet implementation has reduced the number of lanes to one in each direction, design vehicle performance will have a greater impact on overall vehicle operations and the grade and critical length of grade may become more influential features impacting performance than for the four-lane, undivided cross section.

Drivers. Considering driver performance remains as critical for Road Diet design as for any other facility type. Road Diet designs should be compatible with driver capabilities and limitations and should be laid out to meet driver expectations. Designers should consider positive guidance to all road users (e.g., pavement marking, signing, delineation) to make the desired path clear. Driver considerations in highway design are covered in FHWA's *A User's Guide to Positive Guidance* and NCHRP's *Human Factors Guidelines for Road Systems*.[57, 58]

Road Diets can be particularly beneficial for older drivers who have slower reaction times and reflexes. According to FHWA's *Public Roads*, "The safety potential of conversion to a three-lane cross-section (also called Road Diets) was so compelling to Iowa DOT officials, based on studies done in Minnesota, Montana, and Washington, that Iowa DOT made this project type a staple of its agency's older driver program at the program's inception in 1999."[59] Additional guidance on highway design, operational, and traffic engineering features, including Road Diets, for older road users is available in the FHWA *Handbook for Designing Roadways for the Aging Population*.

Non-motorized Users. When appropriately applied, Road Diets have generated benefits to users of all modes of transportation, including bicyclists, pedestrians, and motorists. Specific benefits to non-motorized users were covered previously. Pedestrian volumes and characteristics will influence the design of sidewalks, crosswalks, traffic control features, curb cuts, bus stops, and other locations where pedestrian traffic is expected. Guidance for designing roadways to accommodate pedestrians as well as designing pedestrian facilities themselves is contained in AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. Road Diets also provide the opportunity to add bicycle lanes to roads on which bicyclists previously shared lanes with motor vehicles or navigated between travel lanes and the edge of pavement. Bicycle dimensions and operating characteristics influence the design of bicycle facilities, as identified in AASHTO's *Guide for the Development of Bicycle Facilities*.[60]

Furthermore, the FHWA supports the consideration of additional design options found in the National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide* and the ITE *Designing Walkable Urban Thoroughfares* manuals in addition to the AASHTO bicycle and pedestrian guides to aid in designing safe and comfortable bicycle and pedestrian facilities. These resources expand practitioners' options in how to accommodate these users.[61]

Speed. Speed is one of the most important and complex factors that both influences and is influenced by road geometrics. Drivers select travel speeds based on their perceptions of the road. Sometimes geometric design criteria can lead to operating speeds that are higher than design speeds for design speeds less than 55 mph. Road Diets have the potential to reduce operating speed differentials, but tend to have a modest effect on the average operating speed of the corridor (i.e., about 3 to 5 mph). The reduction in the number of through lanes can affect the speed differential by removing the ability to pass slower moving vehicles. Changes in the road cross section may also influence drivers' perceptions of appropriate free-flow speeds. Geometric designers should seek to achieve speed harmony, defined in FHWA's *Speed Concepts: Informational Guide*, as the condition that results when:

- The designated design speed is within a specified range (i.e., ± 5mph) of the observed 85th percentile operating speed;
- The 85th percentile operating speed is within a specified range (i.e., ± 5mph) of the posted speed limit;
- The inferred design speed is equal to or greater than the designated design speed; and
- The posted speed is less than or equal to the designated design speed.[62]

4.1.3 Elements of Design

Principal elements of geometric design include sight distance, horizontal alignment, superelevation, and vertical alignment. Conversions do not generally involve significant changes in sight distance and alignment, but these characteristics may require additional assessment due to changes in cross-section allocation and use.

Sight Distance. Drivers need sufficient sight distance to control the operation of their vehicles and avoid striking unexpected objects in the travel way. Stopping sight distance, decision sight distance, and intersection sight distance are most relevant to Road Diet locations. Stopping sight distance, or the distance required for a vehicle to stop before reaching a stationary object in its path, should be available at all points on the road. Decision sight distance should be provided at complex locations where drivers must make instantaneous decisions, where information is difficult to perceive, or where unexpected maneuvers are needed. Significant changes in alignment are not expected during Road Diet conversions, so changes in sight distance due to the alignment design are likely to be insignificant. Changes in vehicle position due to the cross section changes may have some impact on horizontal sight distance (i.e., available sight distance while traversing a horizontal curve, limited by sight obstructions on the inside of the curve). Critical sight distance analysis for Road Diet conversions will include pedestrian crossings, transit stops, and locations where on-street parked cars serve as possible sight obstructions.

Road Diets can provide sight distance improvements for mid-block, left-turning drivers at entrances due to the conversion of the four-lane, undivided roadway to a TWLTL. Drivers in a four-lane, undivided situation experience negative offset with opposing traffic, which can block their view. In a TWLTL this negative offset is removed, so drivers making left turns have improved sight distance to make a safe movement.

Grade. Designers select grades to provide uniform operation and enable operating speeds near the design speed of the roadways. Grades at locations with Road Diet conversions will likely already be determined. Maximum grades typically range from 5 to 12 percent and are determined based on functional classification, design speed, and terrain. The effects of grades on truck speeds are much greater than effects on passenger cars. Given that Road Diet implementation has reduced the cross section to one through lane in each direction, design vehicle performance will have a greater impact on overall vehicle operations and the grade and critical length of grade may become more influential features impacting performance than they were for the four-lane undivided cross section.

Horizontal Curvature and Superelevation. Road Diet conversions are not likely to involve any significant changes in horizontal curvature and superelevation. Basic design speed, side friction, and superelevation relationships apply, and guidance is available in AASHTO's *A Policy on Geometric Design of Highways and Streets*.

Access Management. Given the operational change that will occur through a lane reduction in each direction of travel as well as the addition of a TWLTL, access management should be analyzed during the Road Diet conversion. Driveways are, in effect, low-volume intersections.

The re-analysis should consider:

- Operations and efficiency of the intersecting roadway (that underwent the Road Diet)
- Ensuring high-volume driveways are not offset in the "wrong direction"
- Access to property
- Sight distance between vehicles and pedestrians
- How driveways are used (e.g., backing out vs. forward-out-only)
- Sidewalk continuity for pedestrians
- Accessibility requirements
- Accommodating bicycle lanes
- Potential conflicts with bus stop locations.

FHWA provides additional resources related to access management, including *Access Management in the Vicinity of Intersections Technical Summary*.[63]

4.1.4 Cross Sectional Elements

There are a number of cross sectional elements to consider for a Road Diet conversion. For example, practitioners need to consider the commonly accepted range of lane widths, but the design must also fit within the existing curb-to-curb distance using flexibility in commonly used design manuals. The sections below discuss individual cross sectional design criteria.

Lane widths. Lane width influences operations, safety, quality of service, and the security felt by road users. Widths of 10 to 12 feet are typically used in practice. Auxiliary lanes (i.e., turn lanes) at intersections are often the same width as through lanes, and seldom less than 10 feet. The width of the TWLT lane provided as part of a lane width conversion typically ranges from 10 to 16 feet. The width for a bus lane along these roadways is usually 11 to 15 feet.[64]

Median. A median is defined as the area between opposing travel lanes. Its main purpose is to separate opposing traffic. Design width depends upon the type of roadway and its location. On urban area arterial streets, a TWLTL can effectively accommodate left-turning traffic. When a flush median is used, practitioners should expect crossing and turning movements in and around the median.[65]

Pedestrian Refuge Island. A pedestrian refuge island both shortens the time and distance that a pedestrian is exposed to moving traffic while also simplifying the crossing. It provides a protected space in the roadway, allowing the pedestrian to make the crossing in two stages if necessary. In this situation, the pedestrian only has to focus on finding a gap in one direction of travel at a time. The refuge island should be a minimum of 6 feet wide, in the direction of pedestrian travel, with 8 to 10 feet preferred. The island should include detectable warning tiles where it meets the roadway. On streets with a TWLTL, pedestrian refuge islands can use the turn lane space where turns are prohibited, such as at an intersection with a one-way street, or can be installed adjacent to the TWLTL where space allows.

Cross Slope. Generally, the crown or highpoint of the converted cross section is located in the center of the TWLTL, with the slope of the pavement the same as the adjacent through lanes. Typical cross slopes are 1.5 to 2 percent, and may be as high as 2.5 percent in areas of intense rainfall. Additional information on minimum accessibility standards is available in the *Draft Public Rights of Way Accessibility Guidelines* (PROWAG).

Shoulders. Shoulders are the portions of the roadway adjacent to the traveled way. In most Road Diet applications, curb-to-curb widths and the desire to allocate the space to traffic, bicycle lanes, and parking limit ability to provide shoulders. Painted buffers are sometimes provided between the traveled way and bicycle lanes, and those buffers offer some similar advantages as shoulders. Chapter 3 of this guide includes marking examples for undesignated pavement widths, including painted buffers between the traveled way and bicycle lanes.

Curbs. Curbs may already be present at the Road Diet conversion location, as they are commonly used in lower speed urban and suburban areas. Curbs have multiple functions, including drainage, delineation, right-of-way reduction, and delineation of pedestrian walkways.

Drainage. Drainage facilities include bridges, culverts, channels, curbs, gutters, and various types of drains. Road Diet conversions usually do not require significant changes in drainage design, as pavement widths and slopes remain relatively unchanged. AASHTO's *Highway Drainage Guidelines* and *Model Drainage Manual* are two key drainage references used by designers.[66, 67]

Pedestrian Facilities. Road Diet conversions will not typically involve changes to the pedestrian sidewalk facilities outside the curb. They do benefit pedestrian performance in a number of other ways that have been noted throughout this document. For example, Road Diets may introduce the opportunity for on-street parking, creating a buffer between pedestrians and moving vehicles. The change in the roadway cross section also results in fewer travel lanes for pedestrians to cross. Separating opposing directions of travel by a TWLTL can provide space for a refuge island at pedestrian crossing locations, if necessary. Adding dedicated bike lanes to a roadway can positively impact pedestrians by getting bicyclists off the sidewalk and into the street. For any changes to the pedestrian facilities, including the addition of pedestrian refuge islands, designers can reference AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities* and the *Public Rights-of-Way Accessibility Guidelines*.[68, 69]

Bicycle Facilities. Road Diets allow the addition or expansion of bicycle facilities. On roads where bicyclists previously shared lanes with motor vehicles or navigated between travel lanes and the edge of pavement, the opportunity to provide a separate facility arises. Where bicycle lanes already existed, the Road Diet presents an opportunity to provide even more separation by adding a painted buffer or a physical separation using parked cars, bollards, or curb. Bicycle lane widths should be determined based on context and anticipated use, including the speed, volume, and types of vehicles in adjacent lanes. AASHTO's *Guide for the Development of Bicycle Facilities* covers the design of these bicycle lanes.[70] Under typical circumstances, the width of a one-way bicycle lane is 5 feet. A minimum width of 4 feet can be used on roadways with no curb and gutter. Wider bicycle lanes should be considered when feasible, and especially at locations with narrower parking lanes (e.g., 7 feet), high bicycle volumes, and higher speed roadways or roadways with a significant number of larger vehicles. When 7 feet or more is available for the bicycle facility, a buffered or protected bike facility should be considered. Typical bicycle lane cross sections are illustrated in Figure 20. The presence of a bicycle lane influences the recommended design of on-street parking accommodations as well.



Figure 19. Bicycle Lane on Rural 3-Lane Section, Lawyers Road, Reston, VA
Photo Credit: Virginia DOT

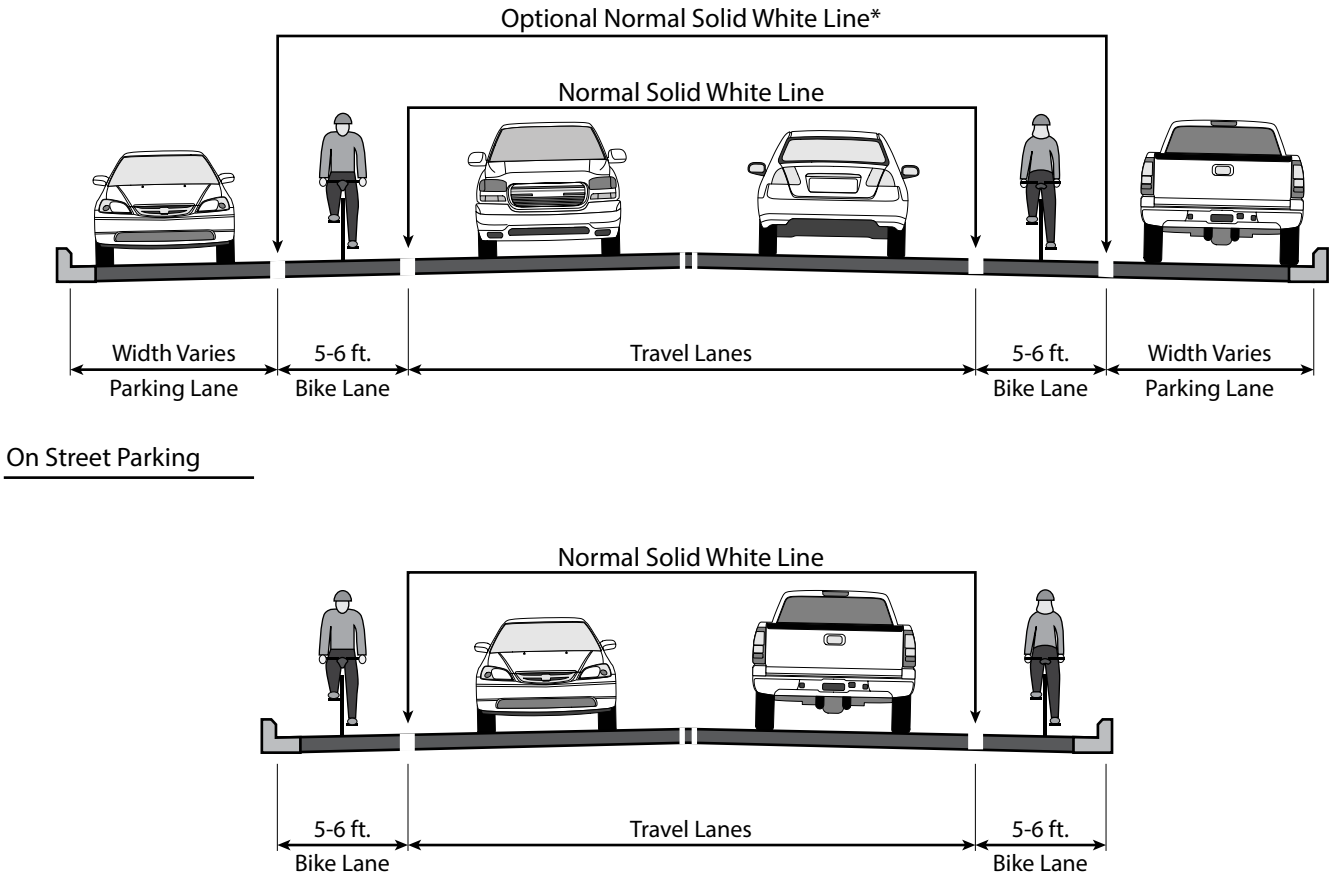


Figure 20. Typical Bike Lane Cross Sections (Adapted from AASHTO)

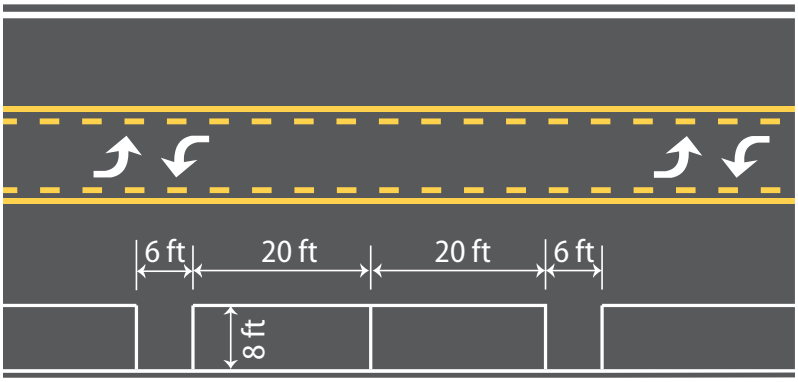


Figure 21. Paired Parking Illustration

On-street Parking. Road Diets provide the opportunity for parallel or diagonal on-street parking. The desirable minimum width of a parallel parking lane is 8 feet, as most vehicles will occupy approximately 7 feet of actual street space when parallel parked. A parking lane width of 10 to 12 feet may be desirable to provide additional clearance from the traveled way and accommodate transit operations, though some jurisdictions have used parking lane widths as narrow as 7 feet, particularly where only passenger cars need to be accommodated in the parking lane.[71] As noted, parallel parking lanes may also be separated from bicycle lanes by an optional solid white line. Where parallel parking and bike lanes are present, but a parking lane line or stall markings are not used, the recommended width of the shared bicycle and parking lane is 13 feet. In addition, practitioners could consider "paired parking" to reduce conflicts and delays with vehicle parking (see Figure 21).

The treatment of a parking lane approaching an intersection requires special consideration. If the lane is carried up to the intersection, right-turning vehicles may use it in the absence of parked vehicles, potentially leading to undesirable operations. However, keeping a parking lane can increase the effective corner radius for large right-turning vehicles. Other options include using a parking lane transition (i.e., a "bulb out," as shown in Figure 22) or prohibiting parking a certain distance from the intersection.

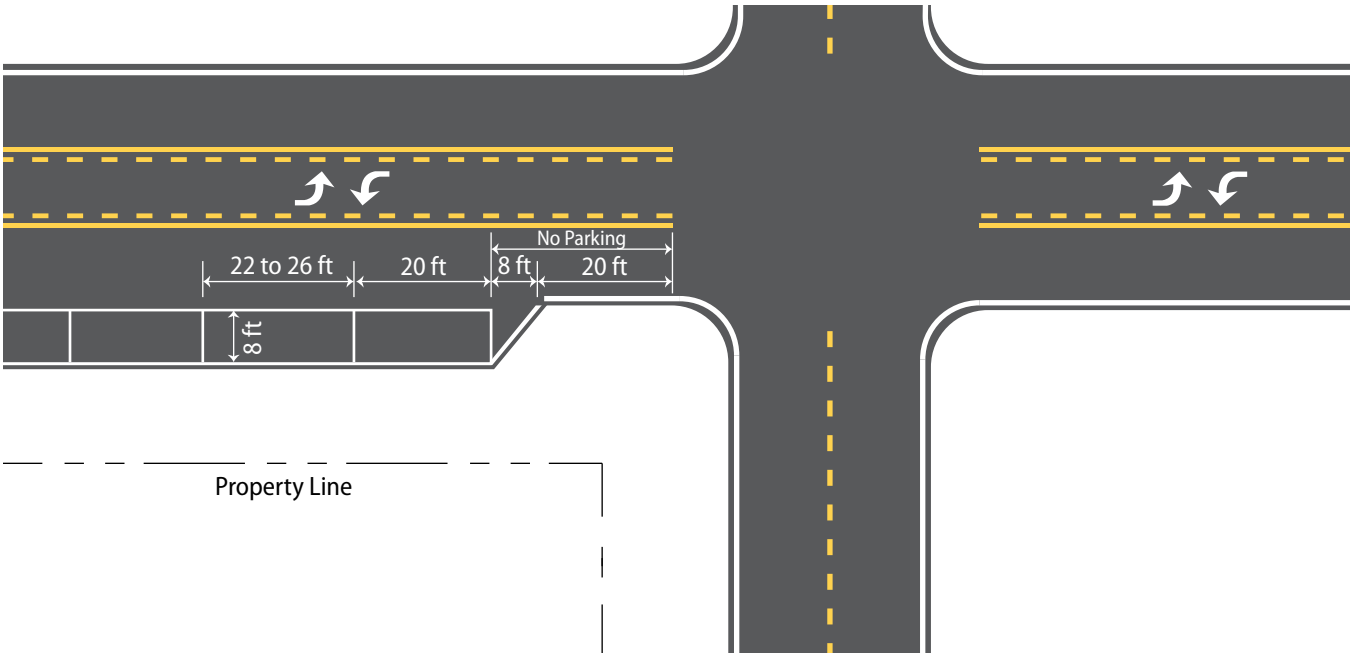


Figure 22. Example Parking Lane Transition at Intersection (Adapted from AASHTO, 2011)

Bus Turnouts. One potential concern with a Road Diet installation is that stopped buses in the now-singular through lane block all downstream vehicles while loading and unloading. The paved width available with the installation of a Road Diet provides space for potential accommodations for bus operations (e.g., stopping, loading, unloading) away from the traveled way by using a turnout. Bus stop locations should provide about 50 feet in length for each bus. In some cases, there may be room to provide deceleration and entry tapers using a combination of pavement markings. A taper of about 5:1, longitudinal to transverse, is a desirable minimum. When the stop is on the near or far side of an intersection, the width of the cross street is generally adequate for merging back into traffic or diverging to the bus stop, respectively.

Keep in mind, however, that most transit operators prefer in-lane stops versus turn-outs due to the difficulties of through lane ingress from the turn-out.

Bus stops located at the near side or far side of intersections provide pedestrian access from both sides of the street and connections to intersecting bus routes. The presence of curb extensions also facilitates passenger access. Additional discussion can be found in Transit Cooperative Research Program (TCRP) Report 19, *Guidelines for the Location and Design of Bus Stops*, ITE's *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, and agency guidance on bus stop placement and design. *Guidelines for the Location and Design of Bus Stops* provides additional information on the location and design of bus stops.[72]

Cross Section Transitions. The starting point and ending point of a Road Diet conversion may require a transition from or to a different cross section. The design of these locations is typically a function of the width of the lane to be dropped and the posted or design speed at the lane drop locations. The *Manual on Uniform Traffic Control Device*s provides additional detail. Taper ratios for lane additions are typically around 15:1, longitudinal to transverse.

Another important decision with respect to the cross section transitions that are part of the Road Diet is the location of the transitions. Overall, continuity of the two through lanes and one TWLTL lane is important, and transition points should occur at locations where the only decision a driver needs to make is related to the lane drop or addition. The objective when selecting a transition point location is to minimize the complexity of the transition area and the number of decisions or potential conflicts that could occur while a driver is merging or diverging. For this reason, transitions should not occur at or near intersections or major driveways (within their influence area). The Iowa guidelines further propose that Road Diet conversions should be questioned if additional through lanes are needed at the signalized intersections along the corridor. This type of transition may have a negative result on safety and lessen the benefits of the Road Diet conversion.



Figure 23. Transition from 3-lane to 2-lane Cross Section, Oak Street, Merrifield, VA
Photo Credit: Virginia DOT

Some transitions are less complicated than others. For example, the transition from a two-lane undivided roadway to a three-lane roadway is relatively simple and straightforward (see Figure 23). The general concerns noted above about the selection of transition point locations should still be taken into account. The transition from a four-lane undivided to a three-lane roadway requires dropping the outside through lanes in advance of the complete cross section conversion. This type of transition requires closer attention and involves the potential for through-vehicle conflicts. Overall, the lane drop and the introduction of the TWLTL should be installed in close proximity to each other. The transition from a five-lane roadway to a three-lane roadway is a similar situation but the introduction of a new TWLTL is not necessary. The same issues will also be encountered when transitioning from a three-lane roadway to some other type of cross section.

Overall, it is also important to look at the roadway cross sections near the end of the "project limits" for a Road Diet conversion. The overall objective is to minimize the number of transitions within a short distance. In other words, it may sometimes be more appropriate to extend the "project limits" to avoid this situation. Through lanes should also not be dropped as a turn lane at an intersection. This type of lane drop is not good design. It will often "catch" vehicles that want to continue through the intersection and drivers may then make inappropriate maneuvers.

4.1.5 Intersection Design

Basic principles of intersection design apply to intersections bordering or within the Road Diet area. Given the cross sectional change during Road Diet implementation, practitioners should perform a new operational analysis at each intersection (see Chapter 5). New lane arrangements and signal phasing are also possibilities, as discussed in other sections of this guide. The remainder of this section will include an overview of some design considerations for intersections bordering or within the Road Diet area with references to other documents as appropriate.

Alignment and Profile of Intersection Approaches. Intersecting roads should meet at or nearly at right angles and the grades should be as flat as possible. These characteristics are likely predetermined at locations experiencing a Road Diet conversion, but designers should be aware of their negative effects on capacity, sight distance, and safety and look for opportunities to implement possible countermeasures.

Intersection Sight Distance. Check intersection sight distance at each intersection bordering or within the Road Diet area. Drivers of approaching vehicles should have an unobstructed view of the entire intersection as well as sufficient lengths along the intersecting road to allow the observance and avoidance of potential conflicts with other vehicles. Drivers of stopped vehicles should also have a sufficient view of the intersecting highway to decide when to enter (with a left or right turn) or cross it. These design objectives are achieved by providing sight triangles. Approach and departure sight triangles are discussed in detail in AASHTO's *A Policy on Geometric Design of Highways and Streets*. It is likely that the sight distance needs for minor streets intersecting the new three-lane cross section decrease following the Road Diet conversion due to entering vehicles needing to cross fewer lanes. Other sections of this document also note how available sight distance for vehicles turning left from the TWLTL is likely greater than that along a four-lane, undivided cross section.

State Laws Regarding Driver Use of TWLTLs

Several states have enacted traffic laws that define and govern driver use of TWLTLs. The provisions of these laws vary widely, and most States do not appear to have enacted such traffic laws. Based on an Internet search of key terms related to "two way left turn lanes" and "center turn lanes", the research team identified laws in 18 States that define and govern driver use of TWLTLs. Six types of laws were identified and are labeled "a" through "g" below. More than half of the 18 States specify the following:

- **(a)** Where a TWLTL is provided, motorists may not turn left from any other lane
- **(b)** Vehicle shall not be driven in a TWLTL except when preparing for or making a left turn/U-turn

Ten States have enacted laws that **(c)** limit the distance a motorist may travel in a TWLTL – either a specified maximum distance, or the shortest distance practicable and safe, as summarized in Table 6:

Table 6. Maximum Allowable Travel Distance in TWLTL

Distance	State
150 Feet	Virginia
200 Feet	California, Louisiana, Oklahoma, Rhode Island
300 Feet	Georgia, Washington
500 Feet	Missouri
Shortest practicable distance/safe distance	Maryland, Tennessee

Four States have enacted laws that **(d)** stipulate that TWLTLs shall not be used for passing/overtaking another vehicle.

Tennessee is unique in passing laws that specify the following:

- **(e)** When vehicle enters turn lane, no other vehicle proceeding in opposite direction shall enter that turn lane if that entrance would prohibit the vehicle already in the lane from making the intended turn
- **(f)** When vehicles enter the turn lane proceeding in opposite directions, the first vehicle to enter the lane shall have the right-of-way

Arkansas is the only State to enact the following provision:

- **(g)** It is permissible for vehicle making a left turn from an intersecting street or driveway to utilize TWLTL to gain access to or to merge into the traffic lanes, except not permissible to use the center left-turn lane as an acceleration lane

In terms of guidelines, the six types of TWLTL laws identified in the 18 States provide reasonable instructions to drivers and can help promote safe driver actions on corridors with TWLTLs. Although it is unclear what factors or data the States used to determine the maximum allowable travel distance in TWLTL, limiting the distance drivers are permitted to travel in TWLTLs– if not overly restrictive – can enhance safety by reducing opportunities for opposing-direction crashes, as well as crashes involving pedestrians that use TWLTLs as a crossing refuge. One concern about stipulating short maximum travel distances is the risk of failing to account for the need for drivers to decelerate from highway speeds when entering TWLTLs.

Regardless of the specific TWLTL laws enacted, it is suggested that State driver manuals define proper use of TWLTLs, including information regarding laws that govern TWLTLs.

Right Turn Lanes. With the Road Diet conversion, it may be possible and desirable to provide an exclusive lane for right-turning traffic. The delay impact of vehicles turning right should be evaluated and a decision made about whether a right-turn lane is needed. Some cases may require additional right-of-way or pavement width. The volume of turning vehicles and the types of vehicles to be accommodated govern the widths of turning roadways. Always consider pedestrian safety when deciding whether to add a right-turn lane at intersections. If the right-turn lane is free flow, yield controlled, or if right turn on red is allowed at the intersection, then pedestrians will be affected.

Turning radii are functions of turning speed and vehicle type. There are three types of designs for right-turning roadways at intersections: 1) minimum edge of traveled way, 2) design with a corner triangular island, and 3) free-flow design using a simple radius or compound radii. A detailed discussion is provided in AASHTO's *A Policy on Geometric Design of Highways and Streets*. Where pedestrians and bicyclists are present and trucks are only occasionally present, it may be desirable to use smaller turning radii to decrease the intersection area and reduce turning speeds.

However, the designer should analyze likely turning paths and encroachments when a larger vehicle does use the intersection and its effect on traffic operations and safety. Depending on truck volumes, the typical size of trucks using the intersection, and nearby truck traffic generators, practitioners should consider larger radii to accommodate these road users.

Driveway geometrics are also the focus of *NCHRP 659 Guide for the Geometric Design of Driveways*.[73] The inside and outside turning radius of design vehicles should also be considered when the corridor being converted is not straight (e.g., the main designated route that is converted is two legs of an intersection that are at right angles to each other). Pavement marking and corner radii should be designed in combination to serve the left- and right-turn movement of the design vehicle at these locations.

Roundabouts. A single-lane roundabout can be a good fit geometrically as part of a Road Diet installation. A roundabout will provide additional opportunities for improved safety by eliminating most angle and head-on crash types, and by reducing intersection operating speeds.

Care should be taken, however, regarding public reaction to installing a Road Diet and roundabout(s) on the same corridor. Depending on public sentiment, adding a roundabout to the discussion could create additional concerns from nearby residents, business owners, and road users if they are not familiar with navigating roundabouts.

Bicycle Design Considerations. Where the Road Diet includes on-street bicycle lanes, intersection designs should be modified accordingly. The bicycle facility should be carried up to and through the intersection. Where right- turn lanes are added, lane markings will be needed to channelize and separate bicycles from right-turning vehicles. Additional considerations include provisions for left-turn bicycle movements, use of bicycle boxes, and bicycle-specific traffic signals.

Details related to these intersection design features are contained in AASHTO's *Guide for the Development of Bicycle Facilities* and NACTO *Urban Bikeway Design Guide*.

Curb Ramp Design. Pedestrian facilities must also accommodate all users, including those with mobility, vision, cognitive and other impairments. Curb ramps must land within the width of the pedestrian street crossing they serve, and wholly outside the parallel vehicle travel lane. A distinct curb ramp should be provided for each crossing direction. Where possible, aligning the curb ramp with the direction of the crosswalk is preferred. Keeping the curb radius small, including a buffer space between the sidewalk and the curb, and adding curb extensions are all strategies that aid in being able to achieve two distinct ramps at a corner that are compliant with the design requirements per the Americans with Disabilities Act (ADA). Additional guidance on curb ramp design is available from the *Draft Public Rights-of-Way Accessibility Guidelines*. While these guidelines are still in draft form, they and their successors are considered to be the leading guidance on the subject.

Curb Extensions. On roadways with on-street parking, curb extensions at intersections can be added to shorten pedestrian crossing distances and make the pedestrian waiting at the corner more visible to drivers. Similarly, it gives the pedestrian a better view of oncoming traffic without having to step into the roadway. Curb extensions should only be used where on-street parking is permitted and should be slightly narrower than the parking lane, so that the extension is not bumping out into the traveled way for either bicyclists or motor vehicles.

Other Pedestrian Design Considerations. Intersection design should facilitate safe and convenient crossings. Curb radii should be kept as low as practical in order to slow vehicle speeds as they turn. The radius will also impact the crossing distance, making it shorter as the radii get smaller. The addition of on-street parking or bicycle lanes may enable a smaller curb radii at intersections as the effective radius of the vehicle path gets larger with the separation from the curb that the parking and bike lanes provide. Additional discussion is provided in AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities* and FHWA's *Maintaining Pedestrian Facilities*.

4.2 Operational Design

The success of a Road Diet cross-section conversion is often based on whether the operation and safety of the roadway are maintained or improved for all road users. The operational impacts of a Road Diet conversion, as noted in previous chapters, can be relatively small if properly implemented in an appropriate location (e.g., a four-lane undivided roadway that already operates similar to a "de facto" three-lane roadway). Past experiences with this type of conversion, however, have also shown that there a number of decisions that users of these guidelines may want to consider closely before the design and implementation of a Road Diet conversion in order to increase its potential success.

This section includes a brief description of some of the factors to consider in decisions related to:

- Cross section allocation
- Pedestrian crossings
- Signalization changes
- Transition points
- Pavement marking and signing
- Intersection design elements.

The list above should not be considered exhaustive. Each corridor will have its own unique issues and needs. Engineering judgment and expertise need to be applied to each corridor design in order to respond to these situations. In addition, not all of the situations listed above are applicable to every corridor. The objective of this section, however, is to discuss the subjects above; note what has been learned in the past about how or why they need to be addressed; and, if applicable, identify some of the resources that could be used to respond appropriately. This section assumes that the Road Diet conversion option has already been selected through the input and involvement of all road users, adjacent land owners, and the appropriate public agencies and jurisdictions.

4.2.1 Cross-Section Allocation

Road Diet conversions typically require the reallocation of the existing curb-to-curb or pavement-edge-to-pavement-edge distance, and the decision of how to allocate these distances can be complex. In fact, in many cases the Road Diet conversion option is selected because of its minimal impacts on the general "footprint" of the roadway and because there is typically no need for right-of-way acquisition (although spot locations of "widening" may occur). The reallocation of an existing cross section should take into account the objectives for the existing corridor as well as the needs of the road users it serves. In addition, practitioners must choose the type and width of each "lane." The lane types along three lane roadways have included, but not been limited to, through lanes, TWLTLs, bike lanes, transit lanes, and parking lanes. Each corridor that is being converted should be individually evaluated and designed. Before installation, the TWLTL was used illegally for loading due to lack of other available space. Seattle DOT added "Load Zones" on Dexter Avenue in Seattle, Washington, to address delivery truck needs.

In NCHRP Report 282, the authors suggest that there are situations with high left-turn volumes and lower through volumes in which conversion of a four-lane, undivided roadway to a three-lane cross section might be accomplished without lowering "operational efficiency."[74] In NCHRP Report 330 the authors suggest an eight-step process to select curb-to-curb cross section design alternatives.[75] Both documents discuss the advantages and disadvantages of different cross-section designs.

4.2.2 Crossing Pedestrians

In some cases, pedestrians crossing a three-lane (or five-lane) roadway may use the TWLTL as an unofficial refuge area, which may result in conflicts with motorists who do not expect to see pedestrians in that travel lane. This issue can be mitigated with pedestrian refuge islands. Pedestrian refuge islands should be used with caution, and care should be taken with their design, because they introduce a potential obstacle for vehicles in the TWLTL.

Corner or midblock curb bulb outs can reduce the length of the pedestrian crossing, and this may also allow a reduction in signal timing to serve pedestrians. Care should be taken in the design of the bulb out. Bulb outs should not extend into the path of a bicyclist and, therefore, are best used in conjunction with on-street parking. Also consider the reduction in turning radius at intersections if a pedestrian bulb out is installed.

The addition of a pedestrian refuge island at an intersection may also result in the need for more pavement width. There are a number of other measures that can also be applied to improve the experience of crossing pedestrians. One reference that includes a discussion of several pedestrian crossing treatments at unsignalized locations is *TCRP Report 112/NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings* (a guideline for pedestrian crossing treatments is in the appendix).[76] Another resource that may be of value is the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*.[77] The FHWA webpage for Pedestrian and Bicycle Safety also includes many resources – including an article entitled *Proven Countermeasures for Pedestrian Safety* in the March/April 2012 issue of *Public Roads*.[78]

4.2.3 Intersection Control Changes

Re-evaluate traffic signal phasing and timing when converting a four-lane undivided roadway to three lanes. Perform an operational analysis to evaluate the acceptability of the potential impacts of the existing and proposed cross section and signalization on major and minor street vehicle and pedestrian delay and queue lengths. This evaluation should also consider the potential impact of heavy vehicles. In general, signal timing and phasing, along with the type and number of lanes on all intersection approaches, may need to be altered to minimize the operational impact of the Road Diet conversion. Specifically, mainline traffic may need additional green time due to the lane capacity reduction, especially during peak hours, to maintain mainline level of service. This could increase side-street delay during those time periods.

It is also important to adjust the positioning of the signal heads for a Road Diet conversion so the signal heads align with the new lane configuration, and there is a minimum of one signal head installed over each traffic lane. The reader is referred to the signalization information in the *Manual on Uniform Traffic Control Devices* (MUTCD), particularly Part 4, which focuses on highway traffic signals and includes a discussion of pedestrian controls. The signing needed for signalized locations is also contained in the MUTCD. Another document that may be of value to the readers is the FHWA *Signalized Intersections Informational Guide*. The FHWA intersection safety website also includes a number of resources.

Experience has indicated that it may not be appropriate to complete a Road Diet conversion when new signalization locations are needed along the same corridor. This is especially true if a Road Diet conversion is a new option within a jurisdiction. In general, it is important for the road users to understand what type of delays, if any, may be due to the Road Diet conversion. The source of additional delays is not clear when a Road Diet conversion is implemented along with new signalization location(s). Each corridor is unique, however, and the success of a Road Diet conversion is based on the objectives for each roadway. The two improvements might also be implemented separately (e.g., the signalization could be done before or after the Road Diet conversion).

Roundabouts can be considered as well. In some cases a mini-roundabout will fit within the existing right-of-way and footprint of the previously stop-controlled or signalized intersection. Roundabouts can provide operational improvements to the intersection by reducing queues and providing more consistent flow. Additional information is available in *NCHRP Report 672, Roundabouts Informational Guide, 2nd Edition*.

4.2.4 Pavement Marking and Signing

The signing and markings for a three-lane roadway should follow the requirements and suggestions in the MUTCD. Many of the parts in the current MUTCD apply to three-lane roadways (e.g., Parts 2, 3, 4, 9). These parts focus on signing (e.g., regulatory, warning, and guide), pavement markings (e.g., lane lines, edge lines, and the TWLTL), signals, bicycles, and pedestrians. It is necessary to provide proper pavement markings and signing for, among other things, the TWLTL, right-turn lanes, pedestrian crossings, and refuge islands.

Pavement markings can also be used to properly position both stopped and turning vehicles so they can safely make turning maneuvers. The proper positioning (e.g., at a stop line) and turning radius of the design vehicle should be considered. Edge lines and/or parking space pavement markings may also sometimes be used to position through vehicles. Finally, if a Road Diet conversion only involves the re-marking of lane lines along an existing roadway cross section, it is extremely important that the old pavement markings are completely removed. More than one Road Diet conversion has resulted in unintended consequences and driver confusion because "ghost markings" (remnants of paint or other material) remained after implementation.

4.2.5 Intersection Design Elements

Intersection design guidance may also be found in the AASHTO *Green Book* and local or State roadway design guidance documents. The guidance contained in these documents should be followed when designing a three-lane roadway. Agencies considering a Road Diet may want to consider several intersection design elements, including traffic signalization, corner radii, and offset intersections.

Traffic Signalization. The signalization discussion in this chapter noted that timing, phasing, and approach lane arrangements may need to be adjusted with a Road Diet conversion. Minor street volumes are a critical input to this activity. More generally, the potential impacts of the conversion on traffic entering and exiting all minor streets and driveways need to be closely evaluated. The delay and queuing changes that may occur due to changes in signalization timing and phasing, and the availability of adequate gaps for minor street or driveway traffic (at unsignalized locations), should be well understood. Practitioners should quantify and compare any additional delays and queues to what is considered acceptable along the corridor of interest. The delay, safety, and through-vehicle impacts of vehicles backing on to the converted roadway should also be discussed.

Corner Radii. Corner radii and right-turn lanes are both part of intersection design. Right-turn lanes may need to be added along three-lane roadways at intersections and major driveways. Evaluate the delay impact of vehicles turning right and decide if a right-turn lane is needed. Some cases may require additional right-of-way or pavement width. Practitioners should consider the radii or turning radius of the design vehicle at each corridor intersection and driveway. The AASHTO *Green Book* includes information about the proper design of turn lanes and corner radii. Driveway geometrics are also the focus of *NCHRP 659, Guide for the Geometric Design of Driveways*.[79] The inside and outside turning radius of design vehicles should also be considered when the corridor being converted is not straight (e.g., the main designated route that is converted is two legs of an intersection that are at right angles to each other). Design pavement markings and corner radii in combination to serve the left- and right-turn movement of the design vehicle at these locations.

Offset Intersections and Driveways. Lastly, it is important to understand the impact of offset intersections and high-volume driveways on turning and through traffic. Operational and safety concerns may be introduced if there is a significant amount of "through" traffic on an offset minor street or major driveways. If the offset is oriented so that the minor street or driveway "through" vehicles turn right onto the main roadway, there is a greater possibility that opposing vehicles may want to travel in the TWLTL for an intersection or driveway offset distance. This situation occurs when one of the minor street vehicles entering the mainline may stop in the TWLTL and negatively impact other vehicles or make another unsafe maneuver.[80]

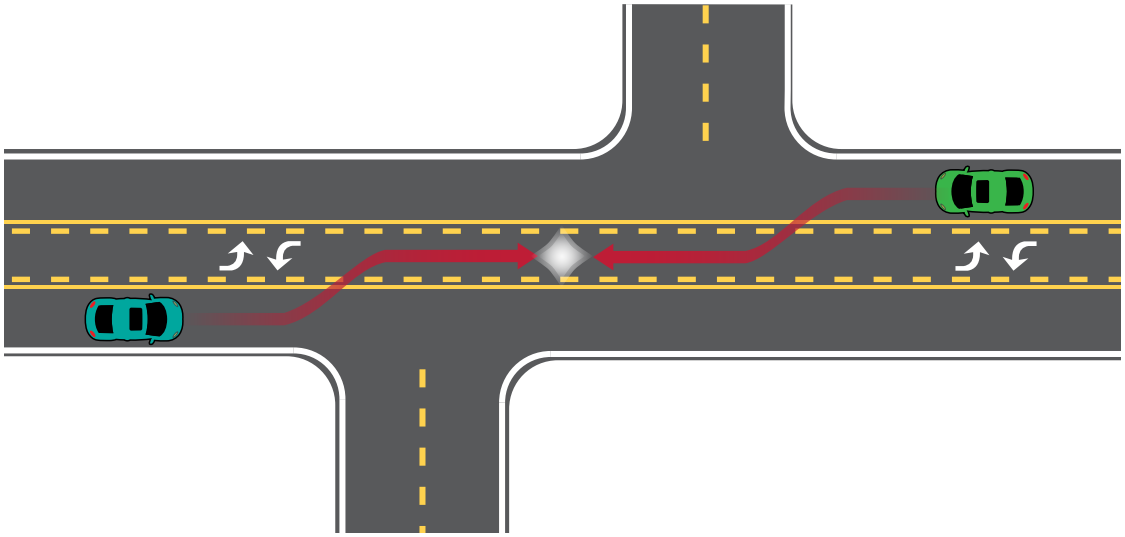


Figure 24. Offset Driveways Causing Conflict Points in the TWLTL
Source: FHWA-SA-10-002

5 Determining if the Road Diet is Effective

Post-implementation evaluation of the Road Diet will determine safety, operational, and livability impacts. Impacts associated with roadway conversions include the following:

- Safety (e.g., crash frequency/type/severity, pedestrian-vehicle conflicts)
- Travel speeds (e.g., average travel time, mean/85th percentile speeds, percent of vehicles traveling at high speeds)
- Arterial level of service, delay, queuing
- Intersection operations (e.g., turn delays; v/c ratios; signal operations)
- Traffic volume, including diversion to parallel routes
- Corridor operations including transit operations and similar, the two-way left-turn lane operations, and the ability to evaluate "stopped traffic" in one through lane
- Pedestrian and bicycle safety and operations
- Economic impact / livability.

For example, Seattle DOT conducts follow-up studies after implementation to determine the effects on each treated corridor. Specifically, the department compares the before-and-after conditions for the following:[81]

- Volume of the principal street's peak hour capacity
- Speed and collisions
- Traffic signal level of service
- Volume of traffic on parallel arterials
- Travel times
- Bicycle volumes.

5.1 Safety Analysis of a Road Diet

The process of implementing significant (and often controversial) changes in roadway geometry such as Road Diets often incorporates a formal safety evaluation plan to assess crash effects and other safety impacts.

5.1.1 Data Needs

Practitioners typically use police-reported crashes for periods before and after changes have been implemented to conduct observational before-and-after studies. Typically a minimum of 3 years of crash data before and after treatment is preferred, although shorter time periods may be used to assess initial crash outcomes. Crash data can either come from State or local police agencies, State or local DOTs, or State DMV offices. In addition to crash data, traffic volume data is desirable to account for vehicle exposure, thus allowing the safety analysis to compute crash rates before and after treatment. Beyond crash studies, safety analysis can include field evaluations of pedestrian-vehicle conflicts and bicycle-vehicle conflicts, in which case the data needs include well-defined and reliably collected observational measures of road user behavior.

Two basic types of observational evaluations are used to estimate associated safety impacts:[82]

Before-and-After Studies. Observational before-and-after studies are the most common approach used in safety effectiveness evaluation. An observational before-and-after study requires crash data and volume data from both before and after implementation. These studies can be conducted for any site where changes have been made; however, if a site was selected for an improvement because of an unusually high short-term crash frequency, evaluating this site may introduce the regression-to-the mean (RTM) bias. It is likely that even if no improvement was made, the crash experience would decrease (regress to the mean). Thus, RTM effects can be mistaken for the effects of crash countermeasures. Empirical Bayes techniques account for the effect of regression-to-the mean, but require appropriate statistical knowledge to apply.[83] The *Highway Safety Manual* has been developed to assist practitioners and researchers to conduct robust observational before-after studies that provide results to support decision-making.[84]

Cross-Sectional Studies. Cross-sectional studies involve studying a treatment where there are few sites where a treatment was implemented, but there are many sites that are similar except they do not have the identified treatment. In some cases, evaluations have been performed only after the fact, and all data were not available for the performance measure during the before period. In such cases, cross-sectional studies may be necessary. These studies might also be necessary when the evaluation needs to account explicitly for effects of roadway geometrics or other related features by creating a CMF function rather than a single value for a CMF. Limitations exist when using a cross-sectional study; for example, confidence in the results may not be high since trends over time are not taken into account, and the inability to account for RTM, which threatens the validity of the results, especially if treated sites were selected because they were identified as high-crash locations. The *Highway Safety Manual* has been developed to assist practitioners and researchers to conduct robust cross-sectional studies.

5.1.2 Observational Before-and-After Studies of Road Diets

This section focuses on observational before-and-after studies, which are most applicable to State and local evaluations of Road Diet implementations.

A before-and-after study is used to estimate the crash effects associated with implementation of a traffic safety measure such as a Road Diet. The change in crash occurrence is estimated from the change in crash frequency between the periods before and after the implementation of the Road Diet. Before-and-after safety analyses can also consider changes in crash rates, which account for estimated traffic volumes during the before and after periods. Crash outcomes associated with Road Diet implementation can include the following:

- Change in the annual number of crashes on the corridor
- Change in the crash rate per million vehicle miles traveled
- Change in the severity of crashes that occur (e.g., percent of crashes that involve either any type of injury, or serious injuries)
- Change in certain targeted crash type(s) associated with Road Diet implementation
- Sideswipe
- Left-turn related
- Pedestrian-related or bicycle-related
- Right angle
- Changes in the number of crashes occurring during the peak-hours.

To account for changes in crashes unrelated to the safety treatment (e.g., overall traffic volume trends, changes in traffic laws, weather, economic conditions), a proper before-and-after study should incorporate an untreated comparison group that is similar in nature to the treatment group. For a before-and-after evaluation of a Road Diet, the comparison group might be comprised of one or more similar, untreated (four-lane, undivided) roads located in the same geographic region.

When planning a comparison group before-and-after safety evaluation, it is important to include a sufficient number of crashes to enable the expected change in safety to be statistically detectable. Four variables impact the sample size requirements:

1. The size of the treatment group, in terms of the number of crashes in the before period
2. The relative duration of the before and after periods
3. The likely crash reduction (CR) value (expected crash reduction or desirable reduction)
4. The size of the comparison group in terms of the number of crashes in the before and after periods.

After the treatment and comparison sites have been identified and the before-and-after crash data assembled, the next step is to conduct the crash analysis. A number of methodologies and statistical procedures are available to analyze before-and-after crash data. These range in complexity and ease of use. Note that some basic forms of before-and-after studies (e.g., naïve before/after, before/after with yoked pairs) are not recommended due to issues with the statistical soundness of results.

Observational Before-and-After Evaluation Using a Comparison Group. Observational before-and-after studies can incorporate non-treatment sites into the evaluation by using a comparison group (or control sites). A comparison group typically consists of non-treated sites that are comparable in traffic volume, geometrics, and other site characteristics to the treated sites but which do not have the improvement being evaluated. Crash and traffic volume data should be collected for the same time period for both the treated sites and the comparison group.[85]

Safety data analysis statistical techniques are available to address regression-to-the-mean and other limitations of before-and-after evaluations. Regression-to-the-mean is the natural variation in crash data. If regression-to-the-mean is not accounted for, the conclusions of a before-and-after study could be erroneous. Many of the methods in the *Highway Safety Manual* account for regression-to-the-mean and can result in more effectively identifying the safety effect of installing a Road Diet on a particular corridor.[86]

Empirical Bayes (EB) Before-and-After Safety Evaluation Method. From the *Highway Safety Manual*, "[This] method can be used to compare crash frequencies at a group of sites before and after a treatment is implemented. The EB method explicitly addresses the regression-to-the-mean issue by incorporating crash information from other but similar sites into the evaluation. This is done by using a Safety Performance Function (SPF) and weighting the observed crash frequency with the SPF-predicted average crash frequency to obtain an expected average crash frequency."[87] Recommended data include 10-20 sites at which the treatment has been implemented, 3-5 years of before-installation crash and traffic volume data, 3-5 years of after-installation crash and traffic volume data, and Safety Performance Functions for the treatment site types.

5.1.3 Surrogate Measures of Safety for Road Diets

In addition to conducting formal safety assessments of Road Diets using data-driven analysis techniques based on pre- and post-installation crash data, surrogate measures of safety can provide valuable feedback to State and local agencies regarding both actual and perceived safety outcomes. A surrogate measure of safety can provide information on the level of safety of a location or system using information other than crash data.

Traffic Conflicts. One such surrogate measure involves the analysis of traffic conflicts before and after Road Diets are implemented. A traffic conflict is defined as a traffic event involving the interaction of two or more road users, at least one of whom takes evasive action such as braking or swerving to avoid a collision.[88] Examples of pedestrians taking evasive action to avoid crashes include pedestrians jumping back or running out of the way of an approaching vehicle. A traffic conflict survey is a systematic method of observing and recording traffic conflicts and other events associated with safety and operations. With regard to conducting conflict analyses for Road Diets, agencies might focus on before-after changes in the numbers/rates of rear-end conflicts, sideswipe conflicts, and motor vehicle conflicts involving pedestrians and bicyclists.

Speed. Both speed magnitude and speed variability can have an effect on safety and, in the absence of observational crash data, provide information to determine relative safety of the corridor. Because high travel speeds increase the risk of crashes as well as crash severity, it is important to determine whether Road Diets help to reduce speeding. Likewise, because inconsistent travel speeds between vehicles can increase the risk of rear-end and sideswipe crashes, it is important to determine whether Road Diets help to reduce speed variation.

Level of Comfort. Another surrogate measure of safety involves "level of comfort," a subjective measure which is especially applicable for bicyclists and pedestrians for Road Diet projects. The concept of road user comfort in transportation engineering is not new. For example, the parameters used to establish the minimum horizontal curve radius are the maximum side friction factor and maximum rate of superelevation. Values for the maximum side friction factor are based on driver comfort, not on physical side friction supply and demand relationships. The result is a significant "margin of safety."[89] With regard to assessing the level of comfort for Road Diets, options include conducting systematic visual assessments of pedestrian and bicyclist interaction with motor vehicles and conducting interviews with sufficient samples of non-motorized road users.

5.2 Operational Analysis

The operational effects of Road Diets have been summarized to some degree, but the research is limited to a relatively small number of publications. The literature shows that a properly located and designed Road Diet can result in maintained traffic operations. The general objective of this section will be to discuss ways in which Road Diet operation can be measured.

5.2.1 Analyzing Vehicle Operations

Traffic Volumes. Before-and-after studies should examine if changes occur in daily traffic and peak hour traffic. Evaluate potential changes to determine if there was diversion as a result of a Road Diet installation or if variations from year to year may be the result of background traffic changes. A broader downturn in the economy may result in lower traffic volumes, but patterns going back several years should also be examined for longer-term trends.

Level of Service. Evaluate the level of service of arterial segments and intersections. The facility type that carries the most leverage is based on factors such as signal spacing and segment length. For intersections, the overall LOS should be considered, but the analysis should also drill down to determine how LOS changes for individual movements at an intersection approach. Consider the LOS guidelines for each jurisdiction when determining whether a certain level of vehicular LOS degradation is acceptable. This requires weighing safety benefits as well as improved LOS or QOS for pedestrians and bicyclists. Corridor LOS is generally determined by traffic flow. Intersection LOS is measured by average vehicle delay.

Speed. Practitioners should evaluate the actual speed change (if any) as a result of the Road Diet. Data are collected through the use of before-and-after speed studies using radar, tubes or a pace car. It is important to collect and compare average speed, 85th percentile speed and speed paces in 10 mph increments. This last group is important to determine if the number of high-end speeders has been reduced.

Two-Way Left-Turn Lane Operation. The addition of a TWLTL will improve operations for through vehicles by removing turning vehicle from the through lane and reducing the uncertainty it causes. Left turning traffic may have additional delay since all through vehicles are in one lane, which could result in fewer gaps. This depends on gaps created by traffic signal timing, on-street parking maneuvers, and vehicles stopping for pedestrians crossing the street.

Queue Lengths. This measure is closely related to signalized intersection LOS described above. It may increase due to only one through lane, but this could be offset due to left turning vehicles no longer queuing in a through lane. Signal spacing needs to be considered so that queues do not extend to the upstream intersection. This may only be a concern for higher volume corridors with closely spaced signalized intersections. Modeling the before and after conditions can provide guidance as to expectations relating to vehicle queue lengths. Signalized intersections in the corridor may need to be re-timed to provide optimal progression.

Trucks, Slow-Moving Vehicles, and Buses. Reducing the number of through lanes from two to one in each direction may create an impact if there are grade changes or if heavy vehicles such as buses, semi-trucks or farm equipment are present. Bus stop placement and the transit policy for whether or not to stop in-lane is also a consideration for Road Diet operation. Give special consideration to these heavy vehicles driving through a corridor and also using the Road Diet corridor circulation to side streets. This is described further in the section below.

Turning Traffic. The Road Diet may make it easier for larger vehicles to make right turns with small curb radii by increasing the effective radius due to the addition of a bike lane. The vehicle mix needs to be considered for each location. Some intersections may not need to accommodate larger semi-truck traffic as they may only be present at such an infrequent interval that it is not an issue. The land use type and demand for smaller single unit type vehicles should also be considered.

5.2.2 Non-Motorized Operations

Non-motorized operations can be measured with respect to pedestrian accessibility and bicyclist use along the corridor. Three studies reported increased bicycle and pedestrian usage along the corridor after a Road Diet conversion.[90, 91, 92]

Pedestrian Wait Time. Study the wait time for pedestrians crossing at unsignalized intersections and pedestrian "comfort" with crossing the corridor. A before-and-after study of pedestrian crossing behavior can be challenging because many pedestrians may avoid crossing a four-lane undivided arterial due to the level of discomfort or perceived safety issues. Pedestrians may choose to cross exclusively at signalized intersections if there are few gaps in traffic.

Vehicle Yield/Stop Compliance Rate for Pedestrians Crossing the Street. The Road Diet eliminates the risk of the "multiple vehicle threat" pedestrians can face when crossing two lanes of traffic traveling in the same direction. The term describes a scenario in which the first vehicle stops for the pedestrian but a vehicle in the second adjacent lane does not or fails to see the pedestrian in enough time to stop. The prevalence of this problem can be measured in the before and after conditions.

Increased Bicyclist and Pedestrian Volumes. Pedestrians and bicyclists may avoid traveling on a four-lane undivided arterial due to discomfort or perceived safety concerns with no dedicated bicycle lanes or pedestrian facilities. They may switch to a street that has been reconfigured due to increased comfort or perception of improved safety that clearly delineated bicycle lanes and pedestrian facilities (e.g., sidewalks, fewer lanes to cross, or pedestrian refuge islands) can provide.

Some bicyclists may not find a bike lane adjacent to a vehicle lane comfortable enough, which is why the use of a buffered bicycle lane or protected lane is advisable when the street cross section provides enough room. The buffering can come in the form of either a painted barrier between the bike lane and the vehicle lane, a raised barrier, or, in some cases, by placing the bike lane against the curb and placing the parking lane between the bike lane and the vehicle through lane.

5.2.3 Tools and Methods to Evaluate Impacts

Input Requirements. The data needed for this analysis consists of intersection turning movement counts, daily traffic volumes by direction, and operating speed information. If these volumes have been observed to create delay in the before condition, visually observe delays caused by mid-block, left-turning traffic at driveways. The physical characteristics and complexity of corridor determine how detailed the analysis should be; some corridors may only require corridor analysis while others will need analysis of signalized intersection operations. The traffic volume along the corridor, transit operations, and the number of access points will all help determine whether the analysis procedures presented in the *2010 Highway Capacity Manual* are sufficient or whether a macro- (such as Synchro) or micro-level computer simulation (such as VISSIM) is needed to determine the projected outcome of a Road Diet.

Output Provided. The output provided will depend on the tool used for analysis. The factors to consider depend on the type of analysis and the questions posed.

Complexities with Analyzing Three-lane Sections. The intersection analysis should be straightforward, but practitioners must ensure field conditions are accurately analyzed between signalized intersections, too. Some of the factors to consider are parallel parking maneuvers using a through lane, buses maneuvering into and out of a bus stop (whether it is along the curb or in the lane), left-turning vehicles (from stopping in the through lane to slowing to enter the two-way, left-turn lane), cross-street traffic looking for a gap to turn or cross the arterial, and pedestrians crossing the street at unsignalized intersections. It is helpful to observe the corridor operating conditions in the four-lane, undivided configuration to determine a "baseline" condition and see where existing conflict points are and what causes them prior to evaluating the corridor in the "after" condition to determine how overall conditions have changed.

6 Conclusion

The most common Road Diet involves converting an existing four-lane, undivided roadway segment to a three-lane segment consisting of two through lanes and a center two-way, left-turn lane (TWLTL). Road Diets can be used to address safety concerns with four-lane, undivided highways associated with relatively high crash rates as traffic volumes increase and as the inside lane is shared by high-speed and left-turning vehicles. The reduction of lanes allows the roadway cross section to be reallocated for other uses such as bike lanes, pedestrian refuge islands, or parking.[90]

The benefits of Road Diets include improved safety, traffic calming, and the opportunity to repurpose segments of the roadway to create on-street parking, bike lanes, or transit stops. Based on the history of safety studies presented in this guide, practitioners can expect a crash reduction of 19 to 47 percent after installing a Road Diet. Variables include pre-installation crash history, installation details, and the urban or rural nature of the corridor.

When planning for or designing a Road Diet, it is important to be aware of the opportunities and potential drawbacks that one type of treatment may have on other travel modes. When deciding whether a particular element is appropriate for an individual street, or whether a Road Diet in general is appropriate, the surrounding context should be taken into consideration, including the extended roadway network. Each decision will have to be made on a case-by-case basis and will depend on the desired operation of the street in question. Consider coordinating with non-motorized advocacy groups, transit agencies, freight stakeholders, and emergency responders as necessary to understand their needs through the design of a Road Diet. Common feasibility factors include the following:

- The need for improved safety for all road users
- A desire to incorporate context sensitive solutions and Complete Streets features
- Operational considerations, such as:
  - Whether the existing roadway operates as a de facto three-lane roadway
  - The need for reduced speed or traffic calming
  - Average daily traffic
  - Multimodal level of service
  - Peak hour volumes and peak direction
  - Turning volumes and patterns
  - The presence of slow-moving or frequently stopping vehicles, such as transit, curb-side mail delivery, and others
- A desire to better accommodate bicycles, pedestrians, and transit service
- Right-of-Way availability and cost
- The existence of parallel roadways, parallel parking, and at-grade railroad crossings.
- Public outreach, public relations, and political considerations.

Geometric and operational design features are important during the design of a Road Diet reconfiguration. Geometric design includes identifying details of the project in plan, profile, and cross-section. Important issues include overarching principles of design, design controls, design elements, cross-section design, intersection design, and consideration for all road users. The following list represents just a few of the geometric design considerations one should consider during the Road Diet design phase:

- Road functional classification
- Design vehicles, driver characteristics, and presence of non-motorized users
- Corridor sight distance, grade, horizontal curvature, and superelevation
- Cross-sectional elements, such as lane widths, cross slope, presence of curbs or shoulders, access management, and presence of on-street parking or bus turnouts
- Intersection design elements, such as alignment and profile of intersection approaches and intersection sight distance.

Practitioners must make a number of operational decisions as well, including cross-section allocation, pedestrian accommodations, signalization changes, transition points, and pavement marking and signing. As with any roadway treatment, data analysis and engineering judgment are required to determine whether a Road Diet is the most appropriate alternative in a given situation.

Once implemented, it is important to evaluate the effectiveness of the Road Diet. This typically occurs through studying pre- and post-installation crash data, operating speeds, and operational level of service. Additional tools and methods, both specific and general, should be used to evaluate conversion impacts, including the following:

- Safety (e.g., crash frequency/type/severity, pedestrian-vehicle conflicts)
- Travel speeds (e.g., average travel time, mean/85th percentile speeds, percent of vehicles traveling at high speeds)
- Arterial level of service, delay, queuing
- Intersection operations (e.g., turn delays; volume/capacity ratios; signal operations)
- Traffic volume, including diversion to parallel routes
- Corridor operations including transit operations and similar, the two-way left-turn lane operations, and the ability to evaluate "stopped traffic" in one through lane
- Pedestrian and bicycle safety and operations
- Economic impact / livability.

In conclusion, a Road Diet can be a low-cost safety solution when the installation is coordinated with scheduled pavement marking modifications or planned in conjunction with reconstruction or simple overlay projects. Road Diets have the potential to solve a number of traffic operations and safety issues and to incorporate non-motorized users when applied at the most appropriate locations.

Appendix A – Road Diet Safety Assessment Studies

The following table provides an overview of recent Road Diet safety analyses, including the number of treatment sites, traffic volume, and key safety results. Following that are synopses for each reference.

Reference	Treatment Sites	ADT	Key Safety Results
FHWA, 2010	45 sites in California, Iowa, and Washington	3,718 to 26,376	Iowa data: 47% reduction in total crashes California and Washington data: 19% reduction in total crashes Combined data: 29% reduction in total crashes
Noyce et al., 2006	7 treatment sites throughout Minnesota	8,900 to 17,400	Traditional before-after approach: 42-43% reduction in crashes. Yoked/group comparison analysis: 37% reduction in total crashes and 47% reduction in crash rates. EB approach: 44% reduction in total crashes.
Pawlovich et al., 2006	15 treatment sites throughout Iowa	4,766 to 13,695	25.2% reduction in crash frequency per mile; 18.8% reduction in crash rate.
Li and Carriquiry, 2005	15 treatment sites throughout Iowa	3,007 to 15,333	29% reduction in the frequency of crashes per mile; 18% reduction in the crash rate.
Huang et al., 2003	12 treatment sites in California and Washington	10,179 to 16,070	6% reduction in total crashes relative to control; no reduction in crash rate.
Lyles et al., 2012	24 treatment sites throughout Michigan	3,510 to 17,020	9% reduction in total crashes (non-significant).
Stout, 2005 Stout et al., 2005 Stout (year unknown)	11 to 15 treatment sites in various Iowa cities	2,000 to 17,400	21 to 38 percent reduction in total crashes; similar reduction in crash rates.
Clark, 2001	One treatment site in Athens-Clarke County, GA	18,000 to 20,000	52.9% reduction in total crashes; 51.1% reduction in crash rate (first 6 months).
City of Orlando, 2002	One treatment site in Orlando, FL	18,000 to 20,000	34% reduction in crash rate; 68% reduction in injury rate (first 4 months).
Preston, 1999	Minnesota	Not Provided	27% lower crash rate on three-lane roads than on four-lane undivided roadways (cross-sectional comparison – not a before-after study)

The table below provides additional details for these Road Diet safety assessments.

Reference	FHWA. 2010. Evaluation of Lane Reduction "Road Diet" Measures on Crashes. FHWA Report No. FHWA-HRT-10-053.
Location	45 treatment sites in California, Iowa, and Washington
ADT	3,718 – 26,376
Safety Analysis Method	The empirical Bayes (EB) methodology was used to estimate the change in total crashes.
Reported Safety Effects	The EB evaluation of total crash frequency indicated a statistically significant effect of the Road Diet treatment in both data sets and when the results are combined. The Iowa data indicate a 47% reduction in total crashes while the California and Washington data indicate a 19% decrease. Combining both data sets results in a 29% reduction in total crashes.
Comments	This is arguably the strongest crash-based evaluations of Road Diet implementation. Two likely reasons the results differ from the original Iowa results (below) is that the re-analysis involved a much larger reference group than was used in the original study, and the re-analysis provided more weight to longer sites (while the original study weighted all treatment sites equally regardless of length). Differences between the IA sites and those in CA/WA may be a function of traffic volumes and characteristics of the urban environments where the Road Diets were implemented. AADT for the IA sites ranged from 3,718 to 13,908 and were predominately on U.S. or State routes passing through small towns; AADT for the sites in CA and WA ranged from 6,194 to 26,376 and were predominately on corridors in suburban environments that surrounded larger cities. Sites with lower crash reduction factors (CRFs) generally had higher traffic volumes, suggesting the possibility of diminishing safety benefits as traffic volumes increase. The authors recommended that the choice of which CRF to use should be based on characteristics of the site being considered. If the proposed treatment site is more like the small-town Iowa sites, then the 47% reduction found in IA should be used. If the treatment site is part of a corridor in a suburban area of a larger city, then the 19% reduction should be used. If the proposed site matches neither of these site types, then the combined 29% reduction is most appropriate.

Reference	Noyce, D.A.; Talada, V.; and Gates T.J. 2006. Safety and Operational Characteristics of Two-Way Left-Turn Lanes. Minnesota DOT Report No. MN/RC 2006-25.
Location	7 treatment sites throughout Minnesota
ADT	8,900 – 17,400
Safety Analysis Method	Crash data were first analyzed using traditional approaches involving a comparison of the before and after crashes. Crash data were also analyzed by yoked/group comparison analysis and the empirical Bayes (EB) approach.
Reported Safety Effects	The traditional before-and-after approach estimated a reduction in total crashes between 42 and 43%. A yoked/group comparison analysis found a 37% reduction in total crashes and a 46% reduction in PDO crashes (both statistically significant). The reductions in crash rates (per vehicle mile traveled) were 47% for total crashes and 45% for PDO crashes (both statistically significant). The empirical Bayes (EB) approach estimated a 44% reduction in total crashes.
Comments	This is one of the stronger crash-based evaluations of Road Diet implementation, although the number of treatment sites (7) is small. One limitation of the authors' use of the empirical Bayes (EB) approach involves the relatively small group of reference sites (17). By comparison, the EB analysis by FHWA (2010) summarized 296 reference sites.

Reference	Pawlovich, M.D.; Li, W.; Carriquiry, A.; and Welch, T.M. 2006. Iowa's Experience with "Road Diet" Measures: Impacts on Crash Frequencies and Crash Rates Assessed Following a Bayesian Approach. TR Record Issue Number 1953
Location	15 treatment sites throughout Iowa
ADT	4,766 to 13,695
Safety Analysis Method	A before-and-after study implemented from a Bayesian perspective to assess crash history effects. The study used both monthly crash data and estimated volumes over 23 years (1982 to 2004). Crash data were analyzed at each site before and after the conversions were completed.
Reported Safety Effects	Results indicate a 25.2% (23.2% to 27.8%) reduction in crash frequency per mile and an 18.8% (17.9% to 20.0%) reduction in crash rate. The values in parentheses represent the 95% confidence interval.
Comments	This is a relatively strong crash-based evaluation of Road Diet implementation. The methodology is a refinement from the 2005 study by Li and Carriquiry. Unlike the use of linear regression models to estimate expected crash frequencies, this study allowed for different slopes during the "before" and the "after" periods by including a change-point in the model and for the interaction of treatment and slope. As a result, the model allows for a slight increase in crash frequency during the months immediately preceding and following the conversion. The number of comparison sites (15) is much smaller than the number of reference sites (296) used in the EB analysis performed by FHWA (2010).

Reference	Li, W. and Carriquiry, A. 2005. The Effect of Four-Lane to Three-Lane Conversion on the Number of Crashes and Crash Rates in Iowa Roads. Department of Statistics, Iowa State University.
Location	15 treatment sites throughout Iowa
ADT	3,007 – 15,333
Safety Analysis Method	The authors assessed the effectiveness of the four to three lane conversion by comparing the average expected annual crash frequency per mile during years preceding and following the conversion at the site level and also as an average over all sites in each of the two groups (Road Diets and comparison sites).
Reported Safety Effects	In general, with elapsed time, the expected number of crashes per mile at each site in the treatment group continues to decrease faster than the number at the corresponding paired site in the control group. For all treatment sites combined, the frequency of crashes per mile decreased an estimated 34.8%, from 23 pre-treatment to 15 post-treatment, whereas the crash frequency per mile for control sites decreased 6.2%, from 16 pre to 15 post. This would suggest an estimated 29% net reduction in the frequency of crashes per mile associated with the Road Diet treatments. For all treatment sites combined, the annual crash rate per 100MVMT decreased an estimated 43.9%, from 792 pre-treatment to 442 post, whereas the crash rate for control sites decreased 25.5%, from 652 pre to 486 post. This would suggest an estimated 18% net reduction in the crash rate per 100MVMT associated with the Road Diet treatments.
Comments	While the results suggest that traffic safety is significantly improved by converting four lane roads to three lanes, there was significant variability in crash numbers across sites. It is not clear how much of an impact the wide range in ADT (3,007 – 15,333) had on the overall safety analysis. The suitability of the control sites may be questionable given markedly lower crash frequencies and crash rates at the control sites compared with the treatment sites, pre-intervention.

Reference	Huang, H.; Stewart, J. R.; Zegeer, C.; and Tan Esse; C. 2003. How Much Do You Lose When Your Road Goes on a Diet? Submitted to the 2nd Urban Street Symposium.
Location	12 treatment sites in California and Washington
ADT	10,179 to 16,070 pre-conversion
Safety Analysis Method	The authors conducted before-and-after analysis using a yoked comparison study of the Road Diet and comparison sites. Further analysis used a negative binomial model controlling for possible changes in ADT, study period, and other factors.
Reported Safety Effects	After accounting for trends at comparison sites, the number of crashes at Road Diet sites in the after period declined by about 6%. Crash rates, however, did not change significantly from the "before" period to the "after" period.
Comments	Although the authors identified 30 Road Diets and 50 comparison sites in 8 cities, it is unclear why only 12 treatment sites and 25 comparison sites were included in this paper. ADTs were not available for some treatment and comparison sites, and some of the ADTs were of "questionable accuracy." The selection of comparison sites is a key function of the yoked comparison study design, and little information is provided regarding the criteria used to select comparison sites.

Reference	Lyles, R.; Siddiqui, M.A.; Taylor, W.; Malik, B.; Siviy, G.; and Haan, T. 2012. Safety and Operational Analysis of four-lane to three-lane Conversions (Road Diets) in Michigan. Michigan DOT Report Number RC-1555
Location	24 treatment sites throughout Michigan
ADT	3,510 – 17,020
Safety Analysis Method	Simple before-and-after crash analysis adjusted for trends of an untreated comparison group.
Reported Safety Effects	Average CMFs, adjusted for citywide trends, were calculated across all 24 sites. The result was that the overall naïve (unadjusted) CMF was estimated as 0.63, and 0.91 after adjustment. While the best estimate of a usable CMF is 0.91, this is not statistically different from 1.0 and is an average across all sites. Perhaps more importantly, there is a great deal of variation from site to site.
Comments	The analysis was limited by the fact that good/acceptable comparison sites could be identified for only a few of the 24 sites. The authors caution that Road Diets should not be "oversold" with respect to expected benefits, especially safety benefits. Actual benefits of a Road Diet can vary significantly by site.

Reference	Stout, T.B. 2005. Before and After Study of Some Impacts of Four-lane to Three-lane Roadway Conversions. Unpublished paper: Iowa State University. Stout, T.B; Pawlovich, M.; Souleyrette, R.R.; and Carriquiry, A. 2005. Safety Impacts of "Road Diets" in Iowa. Unpublished paper: Iowa State University. Stout, T.B. Year unknown. Matched Pair Safety Analysis of Four-Lane to Three-Lane Roadway Conversions In Iowa. Unpublished paper: Iowa State University.
Location	Various Iowa cities
ADT	2,000 – 17,400
Safety Analysis Method	Before-and-after study using yoked comparison pairs and a comparison to the cities in which the sites were located.
Reported Safety Effects	The three sets of analyses examined before-and-after changes at largely the same group of converted sites, with some additional locations added with the passage of time. The studies reported reductions in crash frequency that ranged from 21 to 38 percent. The studies reported somewhat similar reductions in crash rates, as well as reductions in the numbers of crashes related to left turns and stopped traffic.
Comments	The studies reported a greater difference in crash reduction between the study segments and the yoked segments than was found between the study segments and the citywide data, which the author(s) attributed to greater variation in the changes in crashes in the yoked segments. The implied degree of effectiveness for the yoked comparison was larger than for the citywide comparisons, and according to the author, might be an artifact of the selection of the yoked segments. The methodology did not account for possible regression-to-mean effects, and no tests of statistical significance were provided.

Reference	Clark, D.E. 2001. Road Diets: Athens-Clarke County's Experience in Converting Four-lane Roadways into Three-lane Roadways. Washington DC. Proceedings of the Institute of Transportation Engineers Annual Meeting.
Location	One treatment site in Athens-Clarke County, GA
ADT	18 – 20K
Safety Analysis Method	Simple before-and-after
Reported Safety Effects	During the first 6 months after the change in lane configuration there were 40 reported crashes along the treated corridor compared with 85 crashes during the same 6 month period for the previous year. That corresponds to a 52.9% reduction. Crashes per million vehicles declined 51.1%, from 19.74 to 9.65.
Comments	The results of this study support other studies that show safety benefits associated with Road Diet implementation, but the relatively short post-intervention period and the lack of robust safety analysis methodology limit the utility of these findings.

Reference	City of Orlando. 2002. Edgewater Drive Before & After Re-Striping Results. City of Orlando - Transportation Planning Bureau.
Location	One treatment site in Orlando, FL
ADT	18 – 20K
Safety Analysis Method	Simple before-and-after
Reported Safety Effects	During the first 4 months after the change in lane configuration the annualized crash rate per MVM declined 34%, from 12.6 (for 3 years preceding implementation) to 8.4. The injury rate per MVM declined 68%, from 3.6 to 1.2 (for the same time periods).
Comments	The results of this study support other studies that show safety benefits associated with Road Diet implementation, but the relatively short post-intervention period and the lack of robust safety analysis methodology limit the utility of these findings.

Reference	Preston, H. 1999. Access Management – A Synthesis of Research. Report MN/RC – REV 1999-21. Minnesota Department of Transportation.
Location	Minnesota
ADT	N/A
Safety Analysis Method	This was not a before-and-after study. The author presents a simple cross-sectional comparison using 1991-1993 statewide crash data.
Reported Safety Effects	The crash rate per Million VMT for urban four-lane undivided roads was 6.75 versus a crash rate of 4.96 for three-lane roads. This comparison suggests that three-lane roads have a crash rate that is 27% lower than the rate for four-lane undivided roadways.
Comments	The number of miles of three-lane roads was small – 14 miles, versus 299 miles of four-lane undivided roads. The simple cross-sectional comparison does not take into account many confounding factors such as speed limits, pedestrian activity, land use, intersection spacing, driveway access, etc.

Appendix B – Feasibility Determination Factors, Characteristics, and Sample Evaluative Questions

Factor	Characteristics	Sample Evaluative Questions
Roadway Function and Environment	• Actual, Expected, and Desired Primary Function (Access, Mobility, or a Combination of the Two) • Community Objectives or Goals for the Roadway • Available Right-of-Way • Current and Expected Adjacent Land Use • Jurisdictional Plan or Policy for Conversions • Jurisdictional Context Sensitive or Complete Street Policy	• What is the primary current, expected, and desired function of the roadway? • Is the roadway primarily a collector or minor arterial roadway? • Does the current roadway primarily operate as a "de facto" three-lane cross section? • Is the goal for the roadway improvement increased safety with somewhat lower mobility? • Is the right-of-way limited? • Will the adjacent land use remain relatively stable throughout the design period? • Will the proposed cross section match the desired function of the roadway? • Will the answers to the above questions remain the same throughout the design period of the project? • Does the jurisdiction have a plan or policy related to these types of conversions? • Does the jurisdiction have a context sensitive or Complete Streets policy that may apply?
Crash Types and Patterns	• Type of Crashes • Location of Crashes • Number and Location of Pedestrians and Bicyclists • Parallel Parking Needs	• Can the crashes that are occurring be reduced with a conversion? • Will a reduction in speed and speed variability increase safety? • Are there safety concerns related to parallel parking maneuvers? • Do pedestrians and bicyclists have safety concerns?
Pedestrian and Bike Activity	• Number and Location of Pedestrians • Number and Location of Bicyclist Use • Characteristics of Pedestrians and Bicyclists (e.g., Age) • Bicycle and Pedestrian Friendliness of Roadway • Cross-section Width • Parallel Parking Need • Bus Stop Locations	• What is the pedestrian and bicyclist friendliness of the roadway? • Do pedestrians and bicyclists have safety concerns? • Will the addition of a TWLTL assist pedestrians and bicyclists? • How will pedestrians and bicyclists interact with parallel parking? • Can a bike lane be added after the conversion?

Factor	Characteristics	Sample Evaluative Questions
Overall Traffic Volume and Level of Service	• Total Daily Volume • Peak-Hour Volume (Morning/Noon/Evening) • Directional Split • Intersection and Arterial Level of Service • Side Street and Driveway Vehicle Delay • Volume of Frequent-Stop or Slow-Moving Vehicles • Vehicle Classification • Signal Timing or Phasing • Arterial Travel Speeds and Vehicle Delays • Existence of Turn Lanes	• What is an acceptable increase in minor street or signal-related delay due to the conversion? • Is a decrease in arterial travel speed of 5 mph or less acceptable? • What is an acceptable reduction in intersection level of service? • What level of daily traffic volume and peak hour exists or is expected in the design year? • Does the signal timing or phasing need to be changed? • Does the current roadway primarily operate as a "de facto" three-lane cross section? • What is the potential impact during off-peak hours?
Turning Volumes and Patterns	• Number and Location of Turn Volumes and Access Points • Peak Time Period of Turn Volumes • Existence of Left-Turn and Right-Turn Lanes • Design of Access Points and Intersections • Turn Volume of Frequent-Stop or Slow-Moving Vehicles • Minor Street and Access Point Vehicle Delay • Signal Timing or Phasing	• Does the signal timing or phasing need to be changed or optimized? • How important is it that right-turning vehicles quickly enter or exit the roadway? • Do the access point and intersections need to be redesigned (e.g., radii, approach slopes, location)? • Are right-turn lanes needed at particular locations? • Does the proposed marking allow the design vehicle (e.g., tractor-trailer) to turn properly? • What is an acceptable increase in minor street vehicle delay and left-turning vehicle delay? • Does the current roadway primarily operate as a "de facto" three-lane cross section?
Frequent-Stop and/or Slow-Moving Vehicles	• Volume, Location, and Time of Frequent-Stop and/or Slow-Moving Vehicles • Type, Design (Length, Width, Turning Radius, etc.) and Speed of Vehicles • Arterial Travel Speeds and Vehicle Delays • Level of Enforcement for Proper TWLTL Use (i.e., No Passing Allowed)	• What is the acceptable delay with respect to frequent-stop and/or slow-moving vehicles? • Can these vehicles turn properly at the access points and intersections? • Can passing prohibitions be feasibly enforced? • Are there locations for pull-outs for these vehicles? • Can some or all of the stop locations for the frequent-stop vehicles be combined? • What are the potential peak and off-peak impacts?

Factor	Characteristics	Sample Evaluative Questions
Weaving, Speed, and Queues	• Signal Timing or Phasing • Number of Existing Lane Changes • Turn Volume and Location • Arterial Travel Speeds and Vehicle Delays • Level of Enforcement for Proper TWLTL Use (i.e., No Passing Allowed) • Number and Location of Turn Volumes and Access Points • Peak Time Period of Turn Volumes • Existence of Left-Turn and Right-Turn Lanes • Design of Access Points and Intersections • Turn Volume of Frequent-Stop or Slow-Moving Vehicles • Minor Street and Access Point Vehicle Delay • Queue Length • Number of Speeders	• Does the signal timing or phasing need to be changed or optimized? • How important is it that right-turning vehicles quickly enter or exit the roadway? • Do the access point and intersections need to be redesigned (e.g., radii, approach slopes, location)? • Are right-turn lanes needed at particular locations? • What is an acceptable increase in minor street and left-turning vehicle delay? • Is a decrease in arterial travel speed of 5 miles per hour or less acceptable? • What is an acceptable change in queues? • Are there safety concerns related to weaving? • Can no passing be enforced? • Can drivers be educated about proper use of TWLTL? • Is a reduction in speeders and speed variability preferred? • Can all the old markings be completely removed? • Does the current roadway primarily operate as a "de facto" three-lane cross section?
Right-of-Way Availability, Cost, and Acquisition Impacts	• Available Right-of-Way • Cost of Right-of-Way • Existence of Left-Turn and Right-Turn Lanes • Design of Access Points and Intersections • Number of Properties Needed and Environmental Impacts (e.g., Tree Removal) • Cross Section Width • Parallel Parking Needs	• Is the right-of-way limited? • Will the cost of right-of-way acquisition be significant? • Do the access point and intersections need to be redesigned (e.g., radii, approach slopes, location)? • Are right-turn lanes needed at particular locations? • What is necessary in the cross section (e.g., bike lane, parallel parking, etc.)?
General Characteristics		
Parallel Roadways	• Roadway Network Layout • Volume and Characteristics of Through Vehicles Diverted • Impact of Diversion on Parallel Roadways	• Is a decrease in arterial travel speed of 5 miles per hour or less acceptable? • Does the signal timing or phasing need to change or be optimized? • Will conversion divert through vehicles to parallel roadways? • Is it possible to avoid or reroute the diverted traffic? • What is the impact on the parallel roadway environment?

Factor	Characteristics	Sample Evaluative Questions
Offset Minor Street Intersections	• Volume and Time of Left Turns • Queue Lengths • Distance between Minor Street Approaches	• Do left turns occur into both minor street and access point approaches at a similar time? • Are the left-turn volumes significant? • Will the left-turn volumes produce queues in the through lanes of a three-lane roadway?
Parallel Parking	• Parallel Parking Needs • Number of Parking Maneuvers • Operational and Safety Impacts of Parallel Parking • Design of Existing or Proposed Parallel Parking	• Does parallel parking exist? • How many parking maneuvers occur during peak travel times? • What are the safety and delay concerns related to parallel parking maneuvers? • Is it possible to design these spaces for easy entry or exit (i.e., to minimize delay)? • Will it be necessary to reduce the number of parking spaces? • Does parallel parking reduce the ability of vehicles to turn in and out of minor streets and access points?
Corner Radii	• Design of Access Points and Intersections • Number and Location of Turn Volumes and Access Points • Peak Time Period of Turn Volumes • Existence of Left-Turn and Right-Turn Lanes • Turn Volume of Frequent-Stop or Slow-Moving Vehicles • Minor Street and Access Point Vehicle Delay	• How important is it that right-turning vehicles quickly enter or exit the roadway? • Do the access points and intersections need to be redesigned (e.g., radii, approach slopes, location)? • Are right-turn lanes needed at particular locations? • Does the proposed marking allow the design vehicle (e.g., tractor-trailer) to turn properly? • Do parallel parking spaces need to be removed to allow proper turning?
At-Grade Railroad Crossing	• Volume, Location, and Time of Train Crossing • Length of Crossing Train • Delay Impacts of Train Crossing • Queue Impacts of Train Crossing • Total Daily Vehicle Volume • Peak-Hour Vehicle Volume (Morning/Noon/Evening) • Directional Split of Vehicles	• Do trains cross during peak travel periods? • What is the typical delay from a train crossing? • Is double the current queue length (with four-lane undivided cross section) at a railroad at-grade crossing acceptable? • Is there a nearby parallel at-grade intersection where impacts may need to be mitigated?

Adapted from Knapp, Welch, and Witmer, 1999.

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For More Information:

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FHWA-SA-14-028

RELINQUISHMENT ASSESSMENT REPORT

For State Route 187 relinquishment within the City of Los Angeles and Culver City

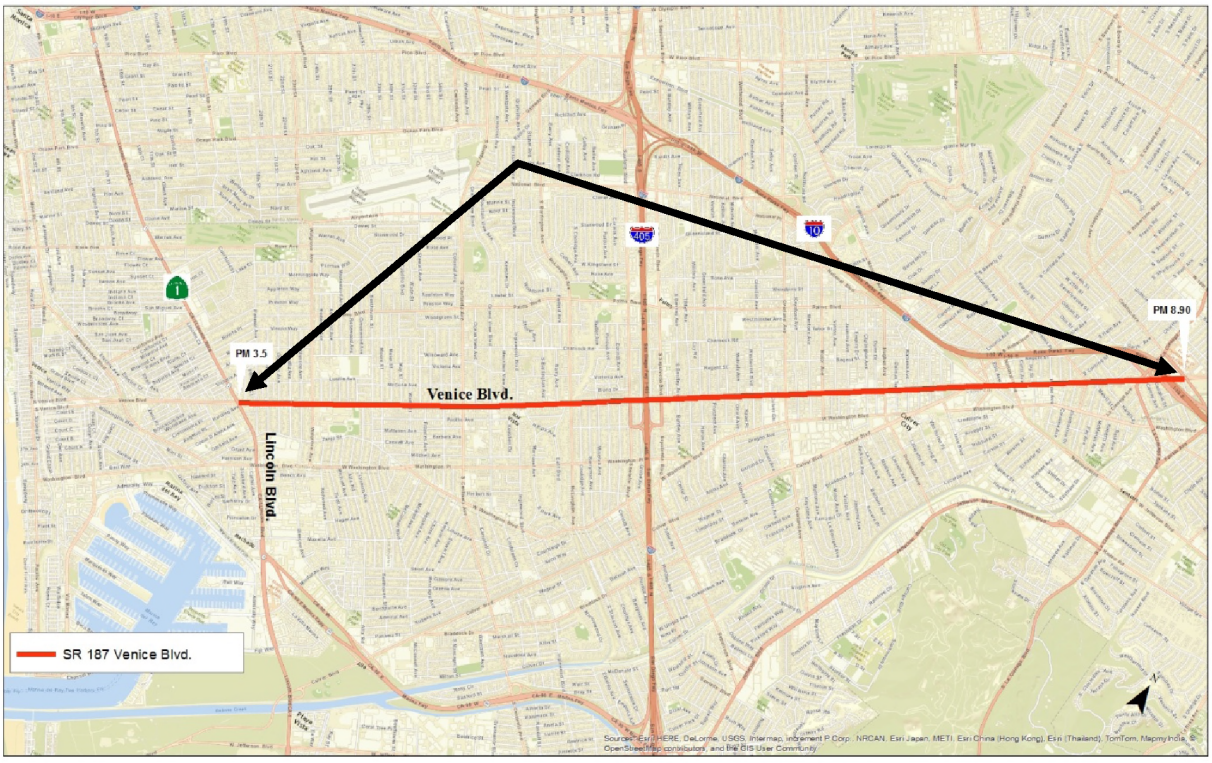
DISTRICT 7

FEBRUARY 28, 2015

Prepared by

Office of Transportation Planning
Division of Planning and Local Assistance
District 7, Department of Transportation

PROPOSED RELINQUISHMENT



State Route (SR) 187, known as Venice Boulevard, extends from PM 3.5 – PM 8.905. This Route is 5.405 miles long and is located from SR-1 (Lincoln Blvd) to Cadillac Ave, just past Interstate 10 (I-10).

Disclaimer: The information and data contained in this document are for planning purposes only and should not be relied upon for final design of any project. Any information in this Relinquishment Assessment Report (RAR) is subject to modification as conditions change and new information is obtained. Although planning information is dynamic and continually changing, the District 07 Transportation Planning Office makes every effort to ensure the accuracy and timeliness of the information contained in the RAR. The information in the RAR does not constitute a standard, or regulation, nor is it intended to address design policies and procedures.

California Department of Transportation

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

I approve this Relinquishment Assessment Report of the proposed relinquishment of State Route 187 to the City of Los Angeles.

David Sosa
Acting Deputy District Director
Division of Planning
District 07

David Sosa

Date: 2/26/15

Carrie Bowen
District Director
District 07

Carrie L Bowen

Date: 2/26/15

Approved:

Reza Nevai

Reza Nevai
Chief, Office of Multimodal
System Planning

Date: 3/10/15

Katie Benouar

Katie Benouar
Chief, Division of
Transportation Planning

Date: 3/12/15

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Elements of the State Route Relinquishment Assessment Report

The information provided below should be used by the District and the System Planning Branch in Headquarters to determine whether there is a State Highway System need to retain state ownership of the highway or whether the facility is appropriate for relinquishment. Both the state route RAR and the park and ride lot RAR have six elements to help describe and document the relinquishment. Within each element are various actions that help describe each element. For example, element 1 of a state route relinquishment has five actions which are indicated by the letters A-E. This information is the basis of the RAR Template.

1. Description of Route and Basis of Request for Relinquishment

A. Action: provide county, route-number, post miles, functional classification, and other designations such as Surface Transportation Assistance Act (STAA) truck terminal access route, Interregional Road System (IRRS), or other designations as applicable.

- **County, Route, Post Mile and Location Description**
  - County of Los Angeles, Venice Boulevard, also known as State Route 187 (SR-187), from Post Mile (PM) 3.5 – PM 8.905. SR-187 is 5.405 miles long and is located from SR-1 (Lincoln Blvd) to Cadillac Ave, just past Interstate 10 (I-10) within the City of Los Angeles. Except for a small segment from approximately Bledsoe Ave. (PM 5.6) to Overland Ave. (PM 6.6), that shares City of Los Angeles boundaries with the city limits of Culver City inside SR-187 right of way. SR-187 is a 6- lane conventional highway type.

- **Route Classification**
  - **Functional classification:** The Functional Classification system, implemented by the Federal government in 1976 to help states and their DOT's for many years as a management tool in a variety of areas pertaining to highways. Federal, State, and local government use this tool to assign jurisdictional responsibility, allocate funds, and establish appropriate design standards for roadways.
  - The Functional Classification of SR-187 is "Other Principal Arterial" in its entirety.

- **Route designations:**

    - SR- 187 is federally designated as a Terminal Access Route Surface Transportation Assistance Act (STAA), which allows large trucks to operate on State routes.

    - SR-187 is not in the IRRS, and it is not a part of the Freeway and Expressway System.

B. Action: Demonstrate that the District has identified the route or route segment as a relinquishment candidate in the District System Management Plan (DSMP), Transportation Concept Report (TCR), and/or other district planning documents

- SR- 187 is included in the Two Tier System Report as part of the Secondary system. The District concurs with this designation; SR-187 is predominantly used for local use, as evidenced by its traffic use patterns.

- The most recent, April 1991, TCR proposed this route to be relinquished.

C. Action: Evaluate if the segment proposed is in fact between two logical termini and identify any issues with the proposed limits of the relinquishment. Indicate how identified issues will be addressed. Examples of issues with logical termini are relinquishments that will create a stub route, terminate in mid block or intersection, a break in extra legal truck route, etcetera.

- SR-187 proposed relinquishment is within two logical termini – From SR-1 (Lincoln Ave.) to I-10. No issues are identified. The Route's primary function is for local use, the relinquishment will not impact its traffic use patterns.

- A small segment of SR-187, approximately from Bledsoe Ave. (PM 5.6) to Overland Ave. (PM 6.6), shares City of Los Angeles boundaries with the city limits of Culver City inside SR-187 right of way.

- Ultimately, District 7 intends to relinquish all the Secondary System segments, including SR-187 within Los Angeles County. Due to the authority given and limitations by legislation, plus the challenges of multi-jurisdictional agreements and commitments, it is a general practice to legislatively relinquish route segments in a piece-meal fashion. Though the relinquishment of entire State Highway Route to the local jurisdiction is not occurring simultaneously, this approach would ensure that the relinquishment occurs at the earliest time possible, and avoid the potential of delay or rescission of relinquishment project.

D. Action: Describe the basis of the request for the relinquishment and identify local jurisdiction(s) requesting it. Indicate why the city or county does not want the state route designation. Explain the issues and history including request for encroachment permits and issues with approving or denying requests. Include district/local jurisdiction local development discussions, comments, and issues. Document context sensitive solutions efforts and what could and could not be resolved under state ownership of the route. Explain how the relinquishment benefits local planning and community design and circulation considerations.

- The City of Los Angeles requested the relinquishment in an effort to better meet the needs of and directly serve its community. The City's interest in pursuing the relinquishment is primarily for the flexibility in making future improvements to the corridor. The relinquishment of SR-187 will allow the City of Los Angeles to expedite proposed improvements and maintenance without going through the encroachment permit process, reducing delays. Currently, the City of Los Angeles is planning for a complete street concept project. The relinquishment would allow more for flexibility and resources to expedite this proposed improvement.

- The City of Culver City has not formally expressed interest in pursuing relinquishment of SR-187 within its city limits. However, Culver City has been made aware of the proposed improvement project planned by the City of Los Angeles. The City of Culver City is supportive of the proposed improvement. The City of Los Angeles staff will further coordinate with the City of Culver City regarding the proposed improvement and relinquishment of SR-187 within their city Limits.

- Currently, there are a number of permits that are issued to private owners, government agencies, utility companies, etc. -one to be noted, is the permit issued to the City of Los Angeles, under permit number 713-NUK-1039 to excavate four pits for depth of 12 to 25 feet and to excavate a section of Venice Blvd to place/push a 60" sewer line from Kelton Ave. to Overland Ave.

- City of Los Angeles has recently updated their General Plan's Transportation Element (Mobility Plan), which is consistent with the State's Complete Streets policies and Smart Mobility Framework. Due to the urbanized nature of this route, right-of-way is highly constrained, and the City's potential improvements to enhance mobility options along SR-187 (to be consistent with Complete Streets policies) may not be possible if the City must adhere to State's design criteria. By relinquishing the roadway to the local agency, proposed

improvements to bicycle, pedestrian, and transit modes may become more viable.

- The IGR Branch has no objections to the proposed relinquishment of SR-187. No significant changes to the transportation/circulation system are anticipated as the result of the proposed relinquishment. No major local development projects in the vicinity of SR-187 have been reviewed by the IGR Branch.

E. Action: Identify the status of the route in the local agencies "circulation element" of the general plan and any currently applicable local planning studies or community initiatives that may impact the request.

- There are no known conflicts with the City's General Plan and Circulation Element as a result of relinquishing SR-187 in the City of Los Angeles. The relinquishment would benefit the local agency's planning process with an opportunity to adopt context sensitive solutions, complete streets, community design elements and incorporate local values. The relinquishment is consistent with Caltrans goal to relinquish the entire route.

- The relinquishment is not expected to change the status of the route in the City's Circulation Element or in the City's General Plan. There are no current local planning studies or community initiatives that would negatively impact the relinquishment.

- The City of Los Angeles identifies SR-187 (Venice Boulevard) as a Divided Major Class II highway. The selection criteria for this designation are:

    - **Major highways (Class II)** should typically be located one mile apart in a grid system.
        - 30,000 to 50,000 ADT

    - **Performance Criteria:**
        - Three travel lanes in each direction during peak hours+ left turn lanes at signalized intersections.
        - 2400 vph in each direction during peak hours.

2. Route or Corridor Concept and Recommendations for Route Development

A. Action: Identify the route development or relinquishment recommendation in the most recent District TCR, District System Management Plan (DSMP), or other applicable internal reports or studies.

- The April 1991 TCR proposed this route to be relinquished.

B. Action: Describe current and projected future traffic and components of the traffic stream (5-plus axle trucks) for the route, as it exists on the State Highway System and any system restrictions for large trucks. Identify how this is forecasted to change based on the relinquishment.

- Truck data from the 2012 AADT for SR-187 ranges from 40,000 at SR-1 (Lincoln Blvd) to 70,000 at Route 405.
    - The truck AADT at Lincoln Blvd. is 1323, or 3.31 percent of AADT. Of these, 84.4 percent are 2 axle, 9.83 are 3 axle, 3.03 are 4 axle, and 2.74 are 5 axle.
    - At Route 405, the truck AADT is 1771, or 2.53 percent of AADT. Of these, 84.54 percent are 2 axle, 9.6 percent are 3 axle, 1.67 percent are 4-axle, and 4.19 are 5 axle.

- No significant changes to the current or future highway and circulation system would be anticipated as a result of the relinquishment.

- No truck restriction is currently imposed on this segment of SR-187. There is no known plan to restrict truck access by the City of Los Angeles upon the relinquishment.

C. Action: Identify the primary origins and destinations for travel on the route segment in terms of interregional and major regional trips and sub area functions that may impact relinquishment considerations, for example, connectivity to a regional mall, a regional area industrial park, regional airport, and other functions.

- SR-187 (Venice Boulevard), serves the neighborhoods of Palms, Venice and Mar Vista in West Los Angeles, as well as the City of Culver City.

- ***Trip generators on State Route 187 include:***
  - Venice High School
  - Mark Twain Middle School
  - The Actors' Gang Theater
  - The Culver City Station for the Expo Light Rail Line
  - The Helms Bakery Building (shops and restaurants)
  - The Museum of Jurassic Technology
  - The Mar Vista Branch Public Library
  - Culver City Gospel Hall
  - Hare Krishna Temple
  - And a variety of restaurants and small businesses

- ***Trip generators near State Route 187 include:***
  - Culver Studios
  - Sony Pictures
  - The Culver Hotel (a National Historic Landmark)
  - The Pacific Ocean
  - Marina Del Rey
  - Venice Beach (and the Venice Boardwalk)
  - The Ballona Wetlands Ecological Reserve
  - Santa Monica Airport
  - The Kirk Douglas Theater

- SR-187 also provides access to SR-1 (Lincoln Blvd).

- Bicycles are permitted on SR-187 (Class II facility).

- **Current Transit**

  - ***Buses:***

    1) Metropolitan Transit Authority:

    Metro Bus #33: The 33 bus serves Venice Blvd from Lincoln Ave to Rte 10 and continues on into Downtown Los Angeles. Regular fare is $1.75 and senior fare is $1.00. Metro Rapid Transit line 733 serves Venice Blvd from Ocean and Santa Monica to Union Station in Downtown Los Angeles.

    2) City of Santa Monica Big Blue Bus:

    There are two Big Blue Bus routes that serve small portions of Venice Blvd:

Rte 1: The Route 1 bus serves Venice Blvd from Lincoln Blvd. to Walgrove Ave with "select trips" involving every other bus.

Rte 12: The Route 12 bus serves Venice Blvd from Bagley Ave. to National Blvd.

Regular fare for either route is $1.00 and senior fare is 50 cents.

- ***Light Rail:***

The Culver City Station for the Expo Light Rail Line is located at Venice and Robertson (to the west) and National and Washington (to the east). The actual address is 8817 Washington Blvd, Culver City. The Expo line runs from Culver City to downtown Los Angeles. Additionally, Exposition Transit Corridor, Phase 2 is extending the Metro Expo Line west to Santa Monica from the Culver City Station, running along the old Pacific Electric Exposition right-of-way to 4th St. and Colorado Ave. in downtown Santa Monica.

The 6.6 mile second phase will connect Santa Monica by rail to Downtown LA, Pasadena, San Fernando Valley, South Bay, Long Beach and dozens of points in between. With seven new stations serving diverse LA neighborhoods such as Century City, West Los Angeles, and Santa Monica, the Metro Rail system will expand to 87 stations and over 93 miles of rail to destinations across L.A. County.

Major construction began in 2012 and is scheduled to be completed in 2015. The Exposition Construction Authority awarded the design-build contract for Phase 2 to Skanska-Rados, Joint Venture in March 2011.

Metro is scheduled to begin train safety tests in late 2015, with a projected line opening in early 2016.

Phase 2 includes new stations at:

- Palms
- Westwood/Rancho Park
- Expo/Sepulveda
- Expo/Bundy
- 26th St./Bergamot
- 17th St./SMC

- Downtown Santa Monica

- ***Light Rail Park and Ride Lots:***

  Culver City Station Park and Ride Lot
  8817 W. Washington Blvd
  Culver City, CA
  Open 24 hours, 7 days a week. 586 spaces/8 bike racks/16 bike lockers

- Very little or no impact to transit is expected from the relinquishment. Any future impacts will occur as a result of Metro or the City of Santa Monica transit changes to the existing lines or adding new lines, if needed. Metro re-evaluates all lines biannually in December and June. Poor performing (low ridership) lines are either cancelled or rerouted in the hope of increasing performance. The City of Santa Monica also conducts service assessments twice a year, once in March and again right before the summer.

- A balance is expected between increased gas prices and periodic fare increases. As gas prices increase, a small percentage of riders turn to transit. However, as with any increase in transit fares, a small percentage (conservatively 1% to 2%, depending on the fare increase) of transit riders will forego public transportation and find other modes, usually returning to driving alone, carpooling, bicycling or even walking if the distance is short enough. These increases not only affect home/work trips, but also students, the elderly and the transit dependant.

- SR-187 has existing sidewalks and Class II bike lanes. Primary origins and destinations for pedestrians and bicyclists include all the same primary origins and destinations as for motor vehicles: beaches, harbor, commercial, retail, service business, offices, restaurants, schools, parks, theaters, and residences. Bicyclists have access to the Pacific Coast Bike Route on SR-1, and the Marvin Braude Bike Trail, a Class I bike path, on the coastline is used by both pedestrians and bicyclists.

- No impact to the regional and interregional transportation system would be anticipated due to the relinquishment.

D. Action: Identify issues that could negatively impact interregional or regional travel and connectivity, inter-modal transfer for freight, and other functions. Identify how the

concerns will be addressed. This includes potential local restriction of truck access and truck delivery issues.

- Use of this route for long haul trucking purposes has not been a primary use of SR-187, given other Freeway options, the urbanized nature of this portion of the route and the need for frequent stops on an urban arterial street.

- Relinquishment of this route is not expected to negatively impact interregional, regional travel, connectivity or the trucking industry because its design limits use of this facility for this purpose.

E. Action: Identify if the relinquishment is expected to cause diversion of interregional and regional trips (including large trucks) to other state routes or local arterials thus creating a potential need for additional improvements to accommodate increased travel demand on other routes.

- No diversion is anticipated. It is not anticipated that City of Los Angeles will have access restriction through this segment.

- Relinquishment of this route is not expected to negatively impact interregional or regional travel and connectivity or the trucking industry because its design limits use of this facility for this purpose.

- Interregional and regional travel is accommodated to the North, connecting at the East terminus of SR-187, and running East to West, by I-10 (Santa Monica Freeway). Running North-South, perpendicular and intersecting SR-187, is the I-405 (San Diego Freeway), which connects to I-5 to the north in Los Angeles County, and to the south, in Orange County.

F. Action: Identify any compatibility issues for adjoining jurisdictions created by the proposed relinquishment (such as gaps created by the relinquishment). For example, will a relinquishment terminate at an intersection or mid-way in an identified bikeway segment creating potential traveler confusion or difference in design standards? Identify how compatibility issues will be resolved.

- No compatibility issues exist. With the exception of a small portion where the City of Los Angeles and Culver City share their boundaries within SR-187, from approximately Bledsoe Ave. (PM 5.6) to Overland Ave. (PM 6.6), SR-187 is proposed to be relinquished and lies within the City of Los Angeles, and terminates at logical points, SR-1 and I-10.

- Venice Blvd. (SR-187) is included in the City of Los Angeles Bicycle Plan, which represents a new commitment by the City to complete streets, toward a sustainable transportation system which supports both motor vehicle use as well as other modes of transportation, such as bicycling. The plan includes three bikeway networks: the Backbone network (of which Venice Blvd is part of), the Neighborhood Network, and the Green Network. These bicycle networks have established three goals: (1) increase the number and types of bicyclists who bicycle in the City; (2) make every street a safe place to ride a bicycle; and (3) make the City of Los Angeles a bicycle friendly community. The SR-187 relinquishment will pave the way form the City of Los Angeles to facilitate the transformation of Venice Blvd. to complete streets.

- The Southern California Association of Governments (SCAG), as well as the Los Angeles County Metropolitan Transportation Authority (Metro) support strategies and projects that promote various modes of transportation, such as walking and bicycling.

G. Action: Identify any issues with signs, pavement markings, signal coordination and control along the route and existing agreements with local jurisdictions that will need to be modified as a result of the relinquishment. Identify recommended actions to resolve.

- Traffic signals on SR-187 are currently operated and maintained by the City of Los Angeles Department of Transportation as per a delegated maintenance agreement.

- The relinquishment will have no adverse impact to traffic signal operation within SR-187.

- A traffic sign installation order is in progress for Terminal Access signs (G66-56) at various locations on SR-187:

    - Eastbound on SR-187 (Venice Blvd), just East of SR-1 (Lincoln Blvd).
    - Eastbound on SR-187 at the corner of Melvil St., combined with a G66-21(CA) (mod) END sign.
    - Eastbound on SR-187, at west of La Cienega, combined with a G66-21(CA) (mod) END sign.
    - Westbound on SR-187 Just East of Redwood Ave., combined with a G66-21(CA) (mod) END sign.
    - Westbound I-10 freeway off ramp to Venice Blvd. /La Cienega Blvd., Combined with a G66-21A (CA) (mod) End sign.

- The sign installation is not expected to affect this relinquishment.

H. Action: Identify actions that may be needed to advise interregional travelers and the trucking industry on connecting routes if the segment recommended for relinquishment will impact throughput or connecting trips (based on anticipated or known local redesign and development plans). Include justification for creating this impact; for example, requiring an extra legal transportation permit from local jurisdictions.

- No notification need is currently foreseen, as through and connecting truck trips must still be accommodated, given the commercial properties adjacent to SR-187. Other vehicles can access any route open to trucks.

I. Action: Identify any Department of Transportation funded studies ongoing or completed that impact the route portion (Environmental Justice, Community Planning, State Planning, Research Innovation and System Information, etc.) and related recommendations.

- The Office of Projects and Special Studies shows no projects or documents being prepared that may impact this relinquishment.

- The IGR Branch is not involved in any current planning studies in the vicinity of this proposed relinquishment.

- No other Units contacted have indicated that there are any studies that may impact this relinquishment.

J. Action: Identify adjacent local agency position(s) on the relinquishment and how they have been coordinated and addressed between jurisdictions. This should include tribal governments and law enforcement where applicable.

- No adjacent agencies will be negatively impacted by this relinquishment. The entire relinquishment lies within the City of Los Angeles, except for a small portion (approximately PM 5.6-6.6) where the city of Los Angeles and Culver City share boundaries inside SR-187 right of way. Culver City is the only City adjacent to this relinquishment. City of Los Angeles is in coordination with the City of Culver City regarding the planned improvement project and the relinquishment of SR-187.

K. Action: Identify potential liability issues of relinquishment including but not limited to seismic zones, inundation, and issues pertaining to the American Disabilities Act (ADA).

- SR-187 is located in Los Angeles County, an area prone to earthquake activity. Per the California Department of Conservation, the areas in the vicinity of Routes SR-1/SR-187 interchange, as well as the area in the vicinity of I-10/SR-187 interchange, are located in a liquefaction zone. This should not negatively impact this relinquishment. SR-187 proposed relinquishment is within City of Los Angeles boundaries, and the City is aware of seismic conditions in the area. The department of conservation makes maps available to the public and jurisdictions at the following link: http://www.conservation.ca.gov/cgs/rghm/ap/Pages/Index.aspx

- The complete route is within Seismic Zone 4 (.040 g).

- Fault activity shows quaternary faults less than 130,000 years.

- The route is within proximity of the Newport-Inglewood Fault Zone

    - Newport-Inglewood Fault line is a right-lateral; local reverse slip
    - Approximately 75 km.
    - 0.6 mm/yr slip rate.

- There are five structures within SR-187 right of way: 53-2658M, 53-2659M, 53-3070L/53-3070R, 53-1610G. The two 'M' structures are culvert type. The two 'L/R' structures are newly constructed for light-rail trains, and recently been added into our system. The last 'G' structure is at the I-10 on-ramp, and it should remain in the State's inventory. This structure is approximately 667 feet from the beginning of the structure measured perpendicular to the center line of SR-187.

- SR-187 is not within a flood zone, as determined by the Los Angeles County Department of Public Works Flood Zone Determination Website: http://dpw.lacounty.gov/wmd/floodzone/

- The requirement to provide equivalent access to facilities for all individuals, regardless of disability, is stated in several laws adopted at both the State and Federal level. Two of the most notable references are The Americans with Disabilities Act of 1990 (ADA) which was enacted by the Federal Government and took effect on January 26, 1992, and Section 4450 of the California Government Code.

- ADA standards are required on all new resurfacing projects.

- Future Projects:

    - PID 713000493 - Rehabilitate pavement. – LA 187 PM 3.5 to PM 8.9
    - Mabel Tran Project Manager
    - Program for Fiscal Year 17/18

L. Action: Identify any environmental issues.

- Los Angeles is known for traffic congestion and its impacts. Pollution of various types is typical in this region. Air quality, noise and water pollution are common. Below is the latest California Air Resources Board attainment/nonattainment status of SR-187 Corridor which falls in the South Coast Air Basin.

    - **POLLUTANTS STATE DESIGNATION**
        - Ozone (1hr) -Nonattainment
        - Ozone (8hr) -Nonattainment
        - CO (8hr) - Attainment
        - PM10 (24 hr.) - Nonattainment
        - PM2.5 (24 hr.) - Nonattainment
        - NO2 (Annual) - Attainment
        - SO2 (1 hr) - Attainment
        - Lead - Nonattainment

M. Action: Identify coordination with transit agencies that may provide service on the segment.

- Caltrans Planning has been in contact with Metro. Metro has not expressed any concerns, and has no projects planned that will negatively impact this relinquishment.

N. Action: Identify coordination with neighboring Caltrans districts that may be affected by the relinquishment.

- SR-187 is centrally located within Caltrans District 7. No neighboring District will be affected.

3. District Coordination with RTPA's

A. Action: Identify steps the district has taken to coordinate the relinquishment request with the Regional Transportation Planning Agency (RTPA) and/or Metropolitan Planning Organization (MPO).

- Caltrans District 7 Planning has notified and been in contact with SCAG regarding this relinquishment. SCAG has not expressed any concerns that will adversely affect this relinquishment.

B. Action: Identify the route development strategy in the Regional Transportation Plan and any supportive or contrary recommendations on the relinquishments.

- A specific route development strategy for SR-187 was not prepared as part of SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS).

- SCAG, as well as Metro, support strategies and projects that promote various modes of transportation, such as walking and bicycling.

- SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) invests $6.7 billion towards increasing bikeways, bringing sidewalks into compliance with Americans with Disabilities Act, safety improvements and other Active Transportation Strategies. SCAG supports and encourages implementation of Complete Streets policies in the 2012–2035 RTP/SCS.

- SR 187 relinquishment will pave the way for the City of Los Angeles to facilitate the transformation of Venice Boulevard to Complete Streets.

C. Action: Describe District actions to provide relinquishment information and recommendations to the regional agency Technical Advisory Committee (TAC) and other applicable groups.

- District staff has contacted Metro's Technical Advisory Committee, to advise of SR 187 relinquishment, and request comments. Metro does not anticipate any negative impact resulting from this relinquishment.

D. Action: Identify regional studies that include the proposed route or route segment. Do the recommendations in these studies support, or run contrary to, the relinquishment request?

- Caltrans District 7 maintains and prepares various documents such as the Transportation Concept Report (TCR), Corridor System Management Plan (CSMP), District System Management Plan (DSMP) and others that are constantly coordinated with SCAG, Metro and locally impacted partners. The relinquishment of SR-187 is supported and recommended by the TCR, and is consistent with transportation planning's efforts for comprehensive congestion management.

- The Los Angeles Department of Transportation is leading the Westside Mobility Plan, a comprehensive study to develop potential short-term solutions as well as long-term plans to address congestion and mobility challenges in the Westside. The study boundary is comprised of two areas: the West Los Angeles Transportation Area and the Coastal Transportation Corridor Area. The Coastal area is comprised of the boundaries defined in the Coastal Transportation Corridor Specific Plan, and includes the communities of Venice, Mar Vista, Playa Vista, Westchester and LAX. The Plan is creating a transportation blueprint for the Westside and upon completion will develop recommendations to improve the connectivity of the transit network, better serve all modes of transportation, improve the efficiency of the transportation system, and enhance the livability of the major boulevards in Westside communities. The Westside Council of Governments lists the Westside Mobility Plan as a current project. The plan is in line with City of Los Angeles plans to improve SR-187 to Complete Streets.

4. Coordination with State, Federal, and Tribal Plans and Programs

A. Action: Identify any known plans from other State agencies, departments, local agencies, or non-profits that would potentially impact (or would be impacted by) the relinquishment decision. (e.g. - coastal plans, truck routes, bike plans, pedestrian plans, environmental mitigation).

- SR-187 has existing sidewalks and Class II bike lanes. Bicyclists traveling on SR-187 have access to the Pacific Coast Bike Route on SR-1. This relinquishment is not anticipated to negatively impact these facilities.

- No other known plans other than those already identified in this RAR.

B. Action: Identify any state regulatory agencies that may require input on the relinquishment such as the Coastal Commission, California Environmental Protection Agency.

- The California Coastal Commission (CCC) was contacted and they find SR-187 outside of the coastal zone boundaries.

- The California Coastal Act of 1976 requires local governments to prepare and implement Local Coastal Programs, or LCP, to carry out the mandate to protect coastal resources and maximize public access to the shoreline. In September 5, 2013, the City of Los Angeles applied for a grant from the CCC to develop the "Venice Local Coastal Program", which includes portions of SR-187, from Lincoln Blvd. (SR-1) to Walgrove Ave., and from Walgrove Ave. to Lyceum Ave. This Portion of SR-187 will be part of the "Coastal Transportation Corridor" specific plan mentioned above (Action 3, sec D). The portion of the plan dealing with Climate Resiliency will address the impact of Climate change and sea level rise and include developing a framework for the protection of and development in the City's coastal areas. SR-187 relinquishment will aid City of Los Angeles efforts and coordination with the CCC.

C. Action: Identify projects that are now programmed or planned on the State Highway System within the area or in adjacent segments that may be impacted by the relinquishment. Include all programs regardless of funding type (STIP, SHOPP, Local Programs – CMAQ, and RSTP) and include transit capital projects as applicable.

- Caltrans recently programmed a capital preventive maintenance project for funding fiscal year 2017/2018. The project limits are between SR-1 (Lincoln Blvd), and Cadillac Ave. just past east of I-10, effectively the entire SR-187. The purpose of the project is to preserve and extend the life of the existing pavement and improve ride quality. The strategy is cold plane and AC overlay. Construction is scheduled to start in summer 2018 and will take approximately one year.

- A $630,000 minor project is underway at the intersection of Venice Blvd and Motor Avenue involving signalization of the intersection for operational improvement. Construction started in June and expected to last 4.5 months.

- Additionally, a protective left turn signal phasing has been proposed for Venice Blvd. (SR-187), at the intersection of Grand View Blvd.

- Other improvements made by Caltrans in recent years include:
  - Median island and curb ramp improvements at Maplewood Ave., completed in June 2011 at a cost of $245,000.
  - Installation of left-turn phasing signal and upgrade curb ramps at Beethoven Street, completed in October 2012 at a cost of $301,000.

D. Action: Identify coordination and formal consultation with Native American Tribal Governments that may be affected by the relinquishment.

- No Native American Tribal Governments will be affected by this relinquishment

E. Action: Identify coordination with Federal Agencies (National Park Service, Department of Defense, and Bureau of Land Management).

- SR-187 does not impact any access to lands that are part of the National Park Service, or the Bureau of Land Management.

- SR-187 does not connect to any military bases or part of the Strategic Highway Network; it is not identified as part of the STRAHNET network.

5. Internal District Coordination

A. Action: Identify the functional unit in the district, project manager for the relinquishment package, and the staff contact person for questions on SHS evaluation.

- For relinquishment, contact Richard Chiang (Assistant Relinquishment Program Advisor) at (213) 897-3768.
- For Project Manager, contact David Yan (Senior Project Engineer) at (213) 897-9126.
- For System Analysis, contact Neil Hashiba (Branch Chief, Transportation System Information, Office of Advanced Planning, Division of Planning and Local Assistance) at (213) 897-4369

B. Action: Identify the responsible unit and individual for coordinating the revised state highway information based on the proposed relinquished segment within the district (Maintenance, Traffic Operations Design, etc.) and headquarters division. Ensure local enforcement and safety agencies are informed of the change in route status when it occurs.

- David Yan (Project Manager, Program Project Management) - (213) 897-9126.

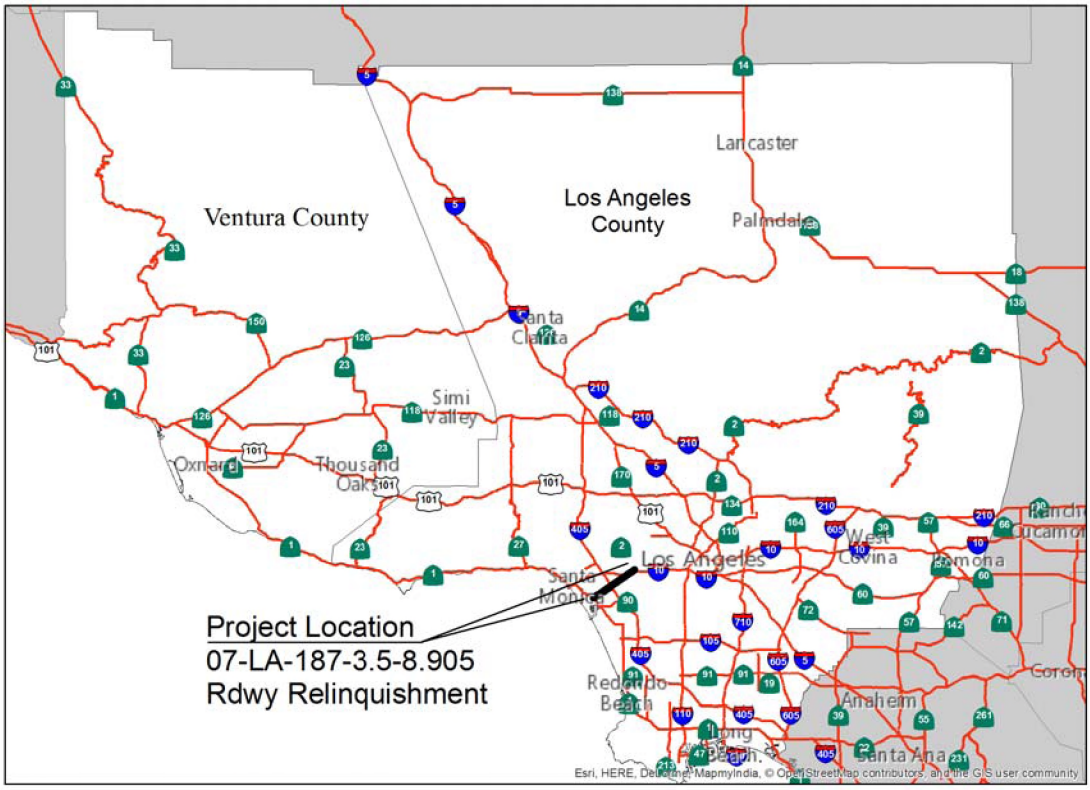
C. Action: Identify functional unit and responsible position in the district for ensuring that the State Highway Inventory accurately reflects the relinquished segment post miles with final approval.

- Neil Hashiba (Branch Chief, Transportation System Information, Office of Advanced Planning, Division of Planning and Local Assistance) - (213) 897-4369.

6. Maps and Photos

A. Action: For highway relinquishment maps include segment limits with post miles.

Location Map



B. Action: Provide photos that support the analysis within the RAR.

Photos of Proposed Termini of Relinquishments
SR-187

South-West Termini at Lincoln Blvd. (SR-1)



North-East Termini at Cadillac Ave.



Original Research

ENVIRONMENTAL EPIDEMIOLOGY

OPEN

Residential exposure to fine particulate matter air pollution and incident breast cancer in a cohort of Canadian women

Paul J. Villeneuve[a,b*], Mark S. Goldberg[c], Dan L. Crouse[d], Teresa To[e,f], Scott A. Weichenthal[g], Claus Wall[f], Anthony B. Miller[f]

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Background: Air pollution has been classified as a human carcinogen based largely on epidemiological studies of lung cancer. Recent research suggests that exposure to ambient air pollution increases the risk of breast cancer.

Methods: Our aim was to characterize associations between residential exposure to ambient fine particulate matter ($PM_{2.5}$) and the incidence of breast cancer in a cohort of 89,247 women enrolled in the Canadian National Breast Screening Study between 1980 and 1985. Vital status and incident cancers were determined through record linkage to the national registry data through 2005. Individual-level estimates of exposures to $PM_{2.5}$ at baseline were derived from satellite observations. Six thousand five hundred three incident breast cancers were identified during follow-up. We classified menopausal status using self-reported information collected at baseline and by attained age (50, 52, and 54 years) as women were followed-up. We computed hazard ratios (HRs) and their 95% confidence intervals (CI) using age as the time axis. Models were adjusted for several individual risk factors, including reproductive history, as well as census-based neighborhood-level characteristics.

Results: The median residential concentration of $PM_{2.5}$ was 9.1 $\mu g/m^3$. In models adjusted for personal and contextual risk factors, a 10-$\mu g/m^3$ increase in $PM_{2.5}$ was associated with an elevated risk of premenopausal (HR = 1.26; 95% CI = 0.99, 1.61) but not postmenopausal breast cancer (HR = 1.01; 95% CI = 0.94, 1.10). The elevated risk of premenopausal breast cancer from $PM_{2.5}$ was only evident among those randomized to the screening arm of the study.

Conclusions: Our findings support the hypothesis that exposure to low concentrations of $PM_{2.5}$ increase the risk of premenopausal breast cancer.

Keywords: Breast cancer, Canada, Cohort study, Fine particulate matter, Menopausal status, Screening

Introduction

Exposure to fine particulate matter ($PM_{2.5}$) is recognized as a leading cause of mortality. The recently published Global Burden of Disease report estimated that in 2010, annual $PM_{2.5}$ accounted for 3.1 million deaths and around 3.1% of global disability-adjusted life years.[1] Although chronic exposure to air pollution is associated with increased rates of mortality and morbidity for cardiovascular and respiratory disease,[2] in 2013, the International Agency for Research on Cancer classified air pollution as a human carcinogen.[3] The decision was based primarily on the findings of several epidemiological studies that found positive associations with lung cancer.

There have been far fewer studies of associations between past exposures to $PM_{2.5}$ and other sites of cancer. In Canada, recent work has suggested that female breast cancer and prostate cancer may be associated with traffic-related air pollution.[4–8] As the risk factors of female breast cancer vary by menopausal status,[9] epidemiological studies of air pollution should investigate their possible modifying effects. Hystad et al.[6] observed stronger associations between exposure to ambient to $PM_{2.5}$ air pollution and incident breast cancer among Canadian premenopausal women.[7] These findings of stronger associations in younger women are consistent with a recent meta-analysis of the associations between environmental

What this study adds

While the International Agency for Research on Cancer has classified air pollution as a carcinogen, the studies conducted to date have largely focused on lung cancer. Over the past few years, a small number of papers have emerged linking ambient air pollution to an increased risk of female breast cancer. This study adds to this literature, and our design has notable strengths that include a prospective design, relatively large sample size, ability to control for other risk factors for breast cancer, and the use of remote sensing to assign air pollution concentrations. We found that exposure to air pollution was associated with an increased risk of premenopausal but not postmenopausal breast cancer. Also, our analyses suggest that future studies of air pollution and breast cancer may need to account for screening behaviors.

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Dr. Weichenthal received support from a GRePEC salary award funded by the Cancer Research Society, the Quebec Ministry of Economy, Science and Innovation, and FRQS (Fonds de Recherche du Québec- Santé).

Sponsorships or competing interests that may be relevant to content are disclosed at the end of the article.

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Environmental Epidemiology (2018) 2:e021

Received: 22 December 2017; Accepted 11 May 2018

Published online 9 July 2018

DOI: 10.1097/EE9.0000000000000021

tobacco smoke and breast cancer, where associations were noted in premenopausal but not in postmenopausal women.[10] Despite this, increased air pollution risks of postmenopausal breast cancer have been observed among Montreal women[7] and more recently among women enrolled in 15 European cohorts within the European study of cohorts for air pollution effects (ESCAPE) project.[11] Analyses of the Danish Nurse Cohort,[12] as well as the US Nurses' Health Study,[13] found no association between particulate matter air pollution and breast cancer. Similarly, longitudinal analyses of the Sister Study cohort found no association between $PM_{2.5}$ air pollution and breast cancer; however, an increased risk was observed between NO_2 and estrogen receptor (ER)(+)/progesterone receptor (PR)(+) breast cancer.[14] Positive associations between particulate matter air pollution and breast cancer have also been observed for other size fractions such as PM_{10}, $PM_{2.5-<10}$, and ultrafine particles (UFPs).[7,11] The excess risks found in some studies of breast cancer and air pollution are interesting in light of the finding of associations with occupationally generated carbon monoxide (occurring as combustion products) and polycyclic aromatic hydrocarbons from combustion of petroleum liquids, especially among cases with ER+/PR+ status, found in a case–control study of postmenopausal breast cancer in Montreal.[15]

The purpose of this study was to determine whether there was an association between past exposures to ambient $PM_{2.5}$ and the incidence of breast cancer in a cohort of approximately 90,000 Canadian women with a 25-year follow-up interval. We have found previously in the same cohort associations between $PM_{2.5}$ and mortality.[16]

Material and methods

Study population

Our study population included participants of the Canadian National Breast Screening Study, which was a randomized controlled trial of screening for breast cancer.[17–19] Briefly, the study included 89,835 women who were recruited from the general population between 1980 and 1985 and were between the ages of 40 and 59 years. Those who were between the ages of 40 and 49 years were randomized to receive either annual mammography screening and a physical examination of the breasts or into the control group where they received a single physical examination of the breasts and annual follow-up through a mailed, self-administered questionnaire. Those in the control group were taught breast self-examination and remained under the care of their family physician. At the time of the study, mammography was not available for screening; however, it could be used for diagnosis if women developed symptoms. Among those between the ages of 50 and 59, for ethical reasons, it was determined that some screening for breast cancer should be provided, so these women were randomized into a group that received annual mammography and breast examination or into a control group that received annual breast examination alone. Women aged 50–59 years were also taught breast self-examination. A detailed breakdown of the numbers of women, by age, who were randomized into mammography and control groups has been published.[19] The screening centers were located in teaching hospitals or in cancer centers across the country, and the study center was at the University of Toronto. Women were healthy and free of cancer at the time of enrollment.

A self-administered questionnaire was used to elicit information on their demographic, reproductive, and lifestyle characteristics. Women's height, weight, and skinfold thickness were measured by a trained health professional, and body mass index (BMI) was calculated using these weight and height measurements. We modeled BMI as a covariate using the cut points developed for the following categories: <20, 20 to 24, 25 to 29, and ≥30 kg/m^2. Residential address information was obtained at baseline, and six-character, Canadian postal codes were collected for all participants. In urban areas, six-character postal codes represent one block face between two intersecting streets.

The questionnaire comprised information on accepted risk factors. Women were asked whether they still had menstrual periods and, if so, to report the date of their last period and if their periods were regular. Women were asked to provide information on past pregnancies, including numbers of stillbirths, miscarriages, live births, and age when their first live child was born. Participants were asked whether any of their female relatives had breast cancer and to indicate their relationship to them. They were also asked about their history of oral contraceptive and estrogen use, as well as whether they had had any x-ray examination of their breasts. Women were also asked to describe their occupation in as much detail. From these details, occupations were classified into broadly based categories (homemaker, clerical, medicine and health, teaching, management of administration, sales, service, arts, retired, social sciences, teaching, unemployed, or other). We did not have information on the consumption of alcohol.

At the time of screening, women indicated in the interview whether they were postmenopausal, regardless of age. This information was not available in a time-dependent fashion throughout the follow-up period, and we thus used attained age as an indicator for menopausal status. Recent data published from the Canadian Longitudinal Study of Aging indicated that the median age of menopause among Canadian women was 51 years of age.[20] Therefore, we chose to conduct separate analyses using ages 50, 52, and 54 years as plausible cutoffs for being menopausal. Thus, if a woman declared she was menopausal at the time of entry into the study, she remained in that category throughout follow-up. If she was not menopausal at baseline, she would accumulate person-time in the premenopausal category until she attained one of these cutoffs. For incident breast cancers, we did not have any information on receptor status or other markers.

Ascertainment of vital status and cancer incidence

We ascertained vital status using a probabilistic record linkage to the Canadian Mortality Database[21] until the end of 2005. This database provides data on all deaths occurring in Canada, as well as Canadian deaths that occur in approximately 20 US states. The accuracy of identifying deaths has been estimated to be approximately 98%.[22] Until 1999, the underlying cause of death was coded using the ninth revision of the *International Classification of Diseases*; from 2000 onward, the 10th revision was used.

Incident cases of cancer were identified through record linkage to the Canadian Cancer Registry[23] between 1968 and 2005. A small number of women were found to have had a previous history of breast cancer from the record linkage and therefore were excluded from further analyses. The date of diagnosis associated with the first diagnosis of breast cancer was used to censor participants; secondary diagnoses of breast cancer were not considered in the analyses.

Exposure assessment

To assign exposure to $PM_{2.5}$, we used satellite-based estimates of surface concentrations of $PM_{2.5}$.[24] These satellite-based concentrations were derived from aerosol optical depth data from the Moderate Resolution Imaging Spectroradiometer (MODIS), Multiangle Imaging Spectroradiometer (MISR), and Sea-viewing Wide Field-of-view Sensor (SeaWiFS) instruments. Using satellite data collected from January 1, 1998, to December 31, 2006, long-term average concentrations of $PM_{2.5}$ were derived at a resolution of approximately 10 × 10 km. These estimates combined the values from models developed in 2010,[25] with optimal estimation-based values developed in 2013[26] to produce an improved representation of $PM_{2.5}$ with extended temporal range and greater accuracy than either of the earlier models. We used these multiyear, longer-term mean concentrations to overcome limitations and biases associated with persistent cloud cover or presence of forest fires or mineral dust, which prevent accurate sampling over shorter periods

of time. These measures cover nearly all of North America except for some coastal and mountain areas where retrieval of images is not possible. These satellite-based average concentrations of $PM_{2.5}$ have been shown to correlate well with ground-based measurements at fixed-site stations across North America (Pearson correlation coefficient r = 0.76, slope = 0.96, n = 974).[24] Similar satellite-based exposure surfaces have been applied previously to examine the associations between long-term exposure to air pollution and mortality.[27–29] Residential measures of exposure were determined by mapping the geospatial coordinates of the centroid of each postal code to the $PM_{2.5}$ surface.

Statistical methods

We excluded women who were diagnosed with an incident breast cancer before they enrolled in the study. This was done on the basis of information provided on the questionnaire, as well as those identified through the record linkage. We censored women at the earliest date of first diagnosis of breast cancer, death, or December 31, 2005. We estimated associations between residential concentrations of $PM_{2.5}$ and incident breast cancer using the Cox proportional hazards model, with age as the time axis. The use of age as the time axis has the advantage that unlike using calendar time as the axis and adjusting parametrically for age, it does not assume a known functional relationship between age and disease.[30] Furthermore, given our interest in generating hazard ratios for time-dependent measures of menopause, this approach facilitated generating these estimates. A continuous measure of $PM_{2.5}$ was included in this model, and we verified the linear assumption using penalized splines on four degrees of freedom. As all analyses for $PM_{2.5}$ were consistent with linearity (see results), we computed adjusted hazard ratios and their 95% confidence limits in relation to an increase of 10 $\mu g/m^3$.

We fitted models that successively included covariates from previous models. First, we fitted a model that contained $PM_{2.5}$ only (model I) and then another model that also contained individual-level factors for occupation, marital status, and attained education (model II). A third model included the covariates from the previous models, as well as body mass index and cigarette pack-years. Model IV included additional covariables representing reproductive factors (ever pregnant, oral contractive use, hormone replacement therapy, age at menarche), breast self-examination, and family history of breast cancer. Model V included the terms in Model IV, as well as contextual measures of neighborhood characteristics obtained from the 1991 Canadian census data, namely median household income, proportion of individuals with high-school education, percentage of low-income households, and unemployment rate. We followed this approach as it facilitated comparisons for previous risk estimates for all-cause mortality generated in this cohort.[16]

We conducted additional analyses to determine whether the associations between $PM_{2.5}$ and incident breast cancer were modified by place of birth (in Canada or elsewhere), whether participants had moved after the annual screens had been completed (between 3 and 5 years after baseline interview), obesity (BMI > 30 kg/m^2), residential mobility, and whether they had smoked cigarettes (tobacco). We inspected the estimates associated with these first-order interaction terms, as well as *P* values from likelihood ratio tests. Finally, we examined associations between air pollution and breast cancer separately for those who were randomized into: (i) the screened and (ii) non-screened arms of the study. This was done to evaluate whether earlier detection of breast cancers may impact the air pollution risk estimates.

Results

There were a total of 89,835 women in the Canadian National Breast Screening Study. We excluded 15 women who, based on the probabilistic record linkage, were diagnosed with an incident breast cancer before entry into the study. Residential measures of $PM_{2.5}$ were assigned to 99.4% of subjects (n = 89,262). Estimates could not be assigned to 573 women due to errors in postal codes or because the remote sensing was unable to provide estimates of air pollution in some areas of Canada. Thus, there were a total of 89,247 women in our analyses. In total, 9,419 women died during the 25-year follow-up and a total of 6503 women were diagnosed with breast cancer. To facilitate comparisons between models, analyses were restricted to women who were not missing data for any of the key covariates. After applying these exclusions, hazard ratios were generated based on 6,427 incident breast cancers, and using an attained age of menopause of 52 years, 646 of these cases were premenopausal, while the remaining 5781 were postmenopausal.

Figures that depict participants' places of residence at the time of enrollment and estimates of ambient $PM_{2.5}$ determined from the satellite observations over the period 1998 to 2006 have been published previously.[16] The median exposure to ambient $PM_{2.5}$ that was assigned to the residences at time of entry into the study using these exposure estimates was 9.1 $\mu g/m^3$ (SD = 3.4 $\mu g/m^3$), while the 25th and 75th percentiles were 6.4 and 12.4 $\mu g/m^3$, respectively. Mean concentrations of $PM_{2.5}$ at baseline were identical between the women who were randomized between the mammography screening and control groups (9.5 $\mu g/m^3$).

Table 1 shows the distribution of selected sociodemographic characteristics of the participants, the number of incident cases of breast cancer, and mean concentrations of $PM_{2.5}$. Women were initially screened between ages 40 and 59 years, with about equal numbers in each 5-year age group, except for 55 to 60 year (18.4%). Most women were born in Canada (82.2%), most were married (79.8%), about 26% had less than a high-school education, and about 55% had college or higher education. There was little variation of concentrations of $PM_{2.5}$ by age group or educational status. Women born outside of North America had higher concentrations as compared to those born in Canada or the United States, and women who were married or widowed had lower concentrations as compared to those in other categories.

Table 2 shows similar information for accepted or suspected risk factors for breast cancer. About 87% of the population had a body mass index under 30, 30% had a family history of breast cancer, 59.3% started their periods after age 13 years, 27% took hormonal replacement therapy, 60% took oral contraceptive therapy, 88% were pregnant, and 49% smoked cigarettes. There was little variation in exposures to $PM_{2.5}$ by categories of each of these risk factors.

Table 3 shows adjusted hazards ratios for each of the five models by menopausal status and for the entire cohort. There was no association between $PM_{2.5}$ and incident breast cancer among postmenopausal women as shown in the fully adjusted model (hazard ratio [HR] was 1.00; 95% confidence interval [CI] = 0.92, 1.09). Among premenopausal women (using 52 years of age as the cutoff), there was evidence of some confounding by the contextual covariates, and the HR was 1.37 (95% CI = 1.09, 1.73) when adjusted for all personal variables (model IV) but decreased to 1.27 (95% CI = 0.99, 1.63) when the contextual-wide variables were added (model V). The HR for all women combined was 1.02 (95% CI = 0.95, 1.10; model IV).

Table 4 shows little variation in the hazard ratios according to the three definitions for premenopausal status; among premenopausal women, the HRs varied between 1.27 and 1.37.

Findings from various stratified analyses are presented in Table 5. We found no statistical evidence of effect modification according to any of the other characteristics examined.

Figure 1 shows the fully adjusted (model V) response pattern of ambient concentrations of $PM_{2.5}$ for the entire cohort. Hazard ratios (HR) in this analysis and other analyses (data not shown) were consistent with linearity. The adjusted hazard ratios in premenopausal and postmenopausal women, based on whether they were assigned to the screened or control arm of the study, are presented in Figure 2. The adjusted hazard ratio for a 10 $\mu g/m^3$ increase in $PM_{2.5}$ for premenopausal breast cancer in the screened arm was 1.54 (95% CI =1.10, 2.15), and in the non-screened arm, it was 0.99 (95% CI = 0.69, 1.42).

Table 1

Selected sociodemographic characteristics of the 89,247 participants of the Canadian National Breast Screening Study whose residential exposure to ambient $PM_{2.5}$ could be determined

Characteristic	Value	Number and Percentage of Women		Incident Breast Cancers	Mean $PM_{2.5}$[a] (Interquartile Range)
Age at entry (y)	40–45	26,455	29.6	1677	9.44 (6.60–12.20)
	45–50	23,644	26.5	1728	9.48 (6.40–12.30)
	50–55	22,684	25.4	1735	9.55 (6.40–12.60)
	55–60	16,464	18.5	1363	9.55 (6.30–12.70)
Birthplace	Canada	73,397	82.2	5422	9.34 (6.40–12.20)
	United Kingdom	6854	7.7	494	10.45 (6.30–14.30)
	European (excluding UK)	5137	5.8	342	10.27 (7.10–13.20)
	United States	1757	2.0	122	9.73 (5.80–14.00)
	Other	2102	2.4	123	9.80 (6.00–13.50)
Marital status	Never married	5696	6.4	494	10.39 (7.60–13.10)
	Married	71,188	79.8	5180	9.35 (6.30–12.20)
	Divorced	5790	6.5	367	10.00 (6.30–13.10)
	Separated	2759	3.1	192	10.27 (7.10–13.10)
	Widowed	3709	4.2	257	9.56 (6.50–12.70)
	Unknown	105	0.1	13	10.48 (5.70–14.40)
Education	Less than high school	23,292	26.1	1569	9.47 (7.10–12.20)
	Completed high school	11,118	12.5	788	9.97 (7.00–13.00)
	Trade\vocational school	5001	5.6	362	9.24 (6.10–12.20)
	College\business	30,849	34.6	2269	9.25 (6.10–12.20)
	University	18,916	21.2	1504	9.72 (6.30–12.80)
	Unknown	71	0.1	11	9.59 (7.60–12.20)
Total		89,247	100	6503	9.50 (6.40–12.40)

[a]$PM_{2.5}$ concentrations were assigned to participants' place of residence at baseline based on remote-sensing data collected between 1998 and 2006.

Table 2

Mean concentrations of $PM_{2.5}$[a] across accepted or suspected risk factors for breast cancer

Risk Factor	Value	Number and Percentage of Women		Incident Breast Cancers	Mean $PM_{2.5}$ (Interquartile Range)
Body mass index	<18.5	1308	1.5	82	10.25 (7.60–13.10)
	18.5–24	51,294	57.5	3687	9.63 (6.60–12.60)
	25–29	24,786	27.8	1846	9.25 (6.20–12.20)
	30–34	7631	8.6	563	9.19 (6.20–12.20)
	35+	3204	3.6	246	9.13 (6.10–12.20)
	Unknown	1024	1.2	79	11.46 (9.40–13.40)
Breast self-examination	Yes	44,497	49.9	3404	9.34 (6.30–12.20)
	No	44,281	49.6	3066	9.64 (6.70–12.70)
	Unknown	469	0.5	33	10.18 (6.80–14.10)
Family history of breast cancer	Yes	27,157	30.4	2383	9.39 (6.30–8.80)
	No	50,013	56.0	3326	9.61 (6.70–12.60)
	Uncertain	11,822	13.3	775	9.28 (6.10–12.30)
	Unknown	255	0.3	19	9.89 (5.50–14.10)
Age at menarche (in years)	<12	14,991	16.8	1112	9.52 (6.40–12.60)
	12	20,686	23.2	1557	9.45 (6.40–12.20)
	13	25,986	29.1	1920	9.45 (6.30–12.30)
	14+	26,978	30.2	1871	9.57 (6.70–12.40)
	Unknown	606	0.7	43	9.48 (6.10–13.00)
Hormonal replace therapy	Yes	23,719	26.6	1721	9.58 (6.60–12.30)
	No	64,151	71.9	4683	9.47 (6.40–12.40)
	Unknown	1377	1.5	99	9.37 (5.20–13.38)
Oral contraceptive use	Yes	53,330	59.8	3760	9.45 (6.30–12.30)
	No	35,751	40.1	2728	9.57 (6.80–12.40)
	Unknown	166	0.2	15	9.47 (5.40–12.70)
Smoking status	Never	44,004	49.3	3109	9.47 (6.60–12.20)
	Ever	45,047	50.5	3383	9.52 (6.30–12.60)
	Unknown	196	0.2	11	10.55 (7.40–14.10)
Ever pregnant	Yes	78,535	88.0	5543	9.42 (6.30–12.20)
	No	10,656	11.9	958	10.03 (7.20–13.20)
	Unknown	56	0.1	2	10.05 (5.70–14.60)
Total		89,247	100	6503	9.50 (6.40–12.40)

[a]$PM_{2.5}$ concentrations were assigned to participants' place of residence at baseline based on remote-sensing data collected between 1998 and 2006.

Table 3

Adjusted hazard ratios of incident breast cancer in relation to an increase of 10 μg/m³ of $PM_{2.5}$,[a] by menopausal status defined at age 52 years, Canadian National Breast Screening Study, 1982–2005

	Hazard Ratio (95% CI)		
Regression model	Premenopausal (n = 646)	Postmenopausal (n = 5781)	All Breast Cancers (n = 6427)
Model I	1.35 (1.08–1.70)	1.00 (0.93–1.08)	1.03 (0.96–1.11)
Model II	1.36 (1.08–1.71)	0.98 (0.91–1.06)	1.01 (0.94–1.09)
Model III	1.37 (1.09–1.72)	0.98 (0.91–1.06)	1.01 (0.94–1.09)
Model IV	1.37 (1.09–1.73)	0.99 (0.92–1.06)	1.02 (0.95–1.10)
Model V	1.26 (0.99–1.61)	1.00 (0.92–1.09)	1.01 (0.94–1.10)

Model I, unadjusted model; Model II, adjusted for occupation, marital status, attained education; Model III, includes terms in Model II and further adjustment for body mass index and cigarette pack-years; Model IV, includes terms in Model II and further adjustment for ever pregnant, oral contractive use, hormone replacement therapy, age at menarche, breast self-examination, and family history of breast cancer; Model V, includes terms in Model IV and further adjustment for contextual measures (median income, proportion with high school education, percentage of low income households, and unemployment rate).

[a]$PM_{2.5}$ concentrations were assigned to participants' place of residence at baseline based on remote-sensing data collected between 1998 and 2006.

Table 4

Adjusted hazard ratios (HRs) of incident breast cancer in relation to an increase of 10 μg/m³ of $PM_{2.5}$[a] by varying definitions of age of menopause, Canadian National Breast Screening Study, 1982–2005

	Premenopausal			Postmenopausal		
Age at Menopause (years)	Breast Cancers	HR[b]	95% CI	Breast Cancers	HR	95% CI
50	467	1.34	1.02–1.76	5960	1.01	0.93–1.09
52	646	1.37	1.09–1.73	5781	0.99	0.92–1.06
54	855	1.27	1.04–1.55	5572	0.99	0.92–1.07

[a]$PM_{2.5}$ concentrations were assigned to participants' place of residence at baseline based on remote-sensing data collected between 1998 and 2006.

[b]Using model IV, which included age, occupation, marital status, attained education, ever pregnant, Breast self examination (BSE), oral contraceptive (OC) use, Hormone replacement therapy (HRT), family history of breast cancer (BC) and age at menarche.

Table 5

Adjusted hazard ratios (HRs) and 95% CIs for the incidence of breast cancer in relation to an increase of 10 μg/m³ increase in $PM_{2.5}$[a] by various factors, Canadian National Breast Screening Study 1982–2005

	Breast Cancer	
	Incident Cases	HR[b] and 95% CI
Overall	6427	1.02 (0.95–1.10)
Canadian born	5357	0.96 (0.82–1.13)
Non-Canadian born	1070	1.05 (0.97–1.14)
Obese (BMI ≥ 30)	801	1.02 (0.94–1.10)
Non-obese (BMI < 30)	5548	1.09 (1.02–1.18)
Mover	1168	1.04 (0.88–1.23)
Non-Mover	5259	1.02 (0.94–1.10)
Never Smoker	3072	1.05 (0.95–1.15)
Ever Smoker	3346	1.00 (0.90–1.11)

[a]$PM_{2.5}$ concentrations were assigned to participants' place of residence at baseline based on remote-sensing data collected between 1998 and 2006.

[b]Using model IV, which included age, occupation, marital status, attained education, ever pregnant, Breast self examination (BSE), oral contraceptive (OC) use, Hormone replacement therapy (HRT), family history of breast cancer (BC) and age at menarche.

Discussion

In this cohort study of approximately 88,000 Canadian women, we found excess risks of breast cancer in premenopausal women that were positively associated with satellite measurements of $PM_{2.5}$ at a resolution of approximately 10×10 km, at their residences at time of enrollment. The magnitude of this association was approximately a 26% increased risk per 10 μg/m³ increase of $PM_{2.5}$. This increase was only evident among those women who were randomized into the screening arm of the study. We found no evidence of associations among postmenopausal women.

In a number case–control studies, increased risks of breast cancer have been reported among those with higher exposures to traffic-related air pollution.[4,6,7] In the Sister Study,[14] associations were found for $PM_{2.5}$ and nitrogen dioxide (NO_2), a marker for traffic-related air pollution, among cases with positive estrogen receptor and positive progesterone receptor (ER+/PR+) status. No association was found among cases with negative estrogen receptor and negative progesterone receptor status ER(-)/PR(-). Recently, we showed in another population-based case–control study conducted in Montreal no evidence of associations for UFPs across all subjects but found slightly higher associations among cases with positive estrogen and progesterone receptor status.[7]

Comparison of the present results with findings of other studies is complicated by different exposure metrics used to represent the complex mixture that is air pollution. In our study, we estimated national, spatially resolved concentrations of $PM_{2.5}$, but in other studies, other pollutants, notably NO_2 and UFPs, were measured and at other resolutions. NO_2 measured at local scales, such as at street level (e.g., Crouse et al.[4,31]), is an accepted marker for traffic-related air pollution,[32,33] whereas the sources for fine particulates include combustion of fossil fuels, other industrial processes, resuspended dusts, soils, crustal materials from farming, wear of roads and tires, pollen, and also mold spores, and so forth. UFPs, such as used in a case-control study in Montreal,[7,34] are secondary particles that form through other processes, and while related to combustion sources, notably mobile diesel sources, appear to have a spatial distributions that is different from NO_2, at least in Montreal, and vary considerably.

Another complication is that pre- and postmenopausal breast cancer likely reflect different diseases with differing, albeit overlapping, etiologies. In some studies, no distinction is made between these types of breast cancer. In addition, there may be subtypes of breast cancer, perhaps characterized by morphology but also receptor status in which risks may differ. For example, in a population-based case–control study conducted in Montreal between 2008 and 2011, we did not find evidence of associations for ultrafine particles (UFPs) across all subjects but found slightly higher associations among cases with positive estrogen and progesterone receptor status.[7]

The positive associations we observed between ambient $PM_{2.5}$ and premenopausal breast cancer were only apparent among those women who were randomly assigned to the screening group. We were surprised by this result, given the absence of a positive association with post-menopausal breast cancer and given that women's self-reported indication of breast self-examination did not substantially alter the risk estimates. These findings should be interpreted cautiously as the study had limited statistical power to evaluate effect modification due to the relatively small number of premenopausal breast cancers. In particular, the *P* value associated with the first-order interaction term to test for effect modification was 0.08. Our finding of a stronger association between air pollution and premenopausal breast cancer among women with mammography screening differs from the finding of Hystad et al.[6] who found attenuated risk estimates. More work is needed to better understand the role of screening on associations between air pollution and breast cancer.

Although we adjusted for most accepted and suspected risk factors, residual confounding effects may have occurred because not all risk factors were measured (e.g., alcohol consumption, X- or gamma-radiation, dieldrin, digoxin, ethylene oxide, polychlorinated biphenyls, or shift work).[35] From the ones that we did measure, there were no notable differences in concentrations of $PM_{2.5}$, thus suggesting that any residual confounding would likely be minor.

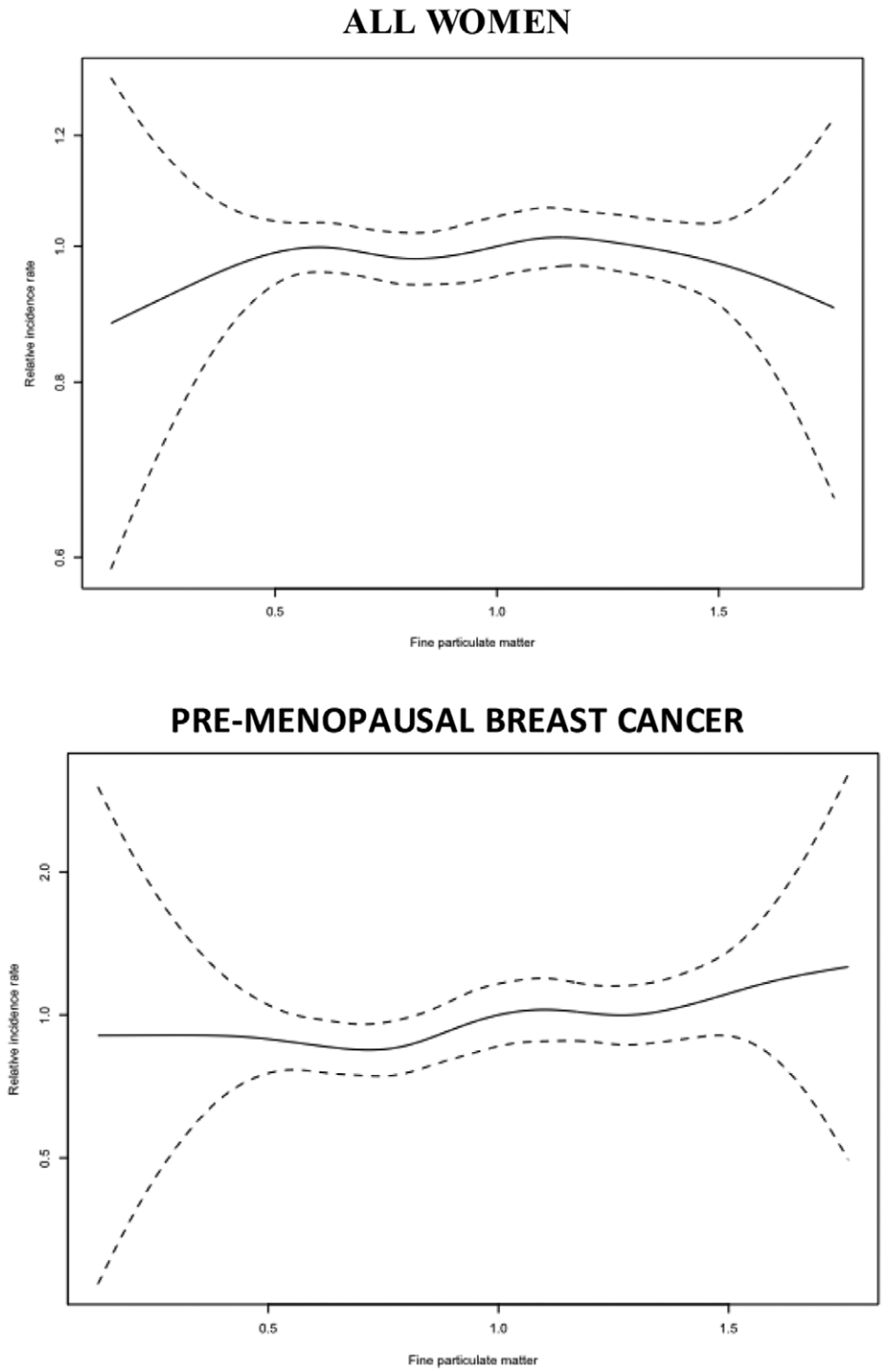

Figure 1. The association between the incidence of pre- and post-menopausal breast cancer and concentrations of $PM_{2.5}$* using a penalized spline on 4 degrees of freedom, adjusted for age, personal, and ecological covariates. The response function is centred on a concentration of 10 μg/m^3 (approximately the mean). The maximum likelihood estimate is shown as the solid line, and the broken lines represent the upper and lower pointwise 95% confidence limits. *$PM_{2.5}$ concentrations were assigned to participants' place of residence at baseline based on remote-sensing data collected between 1998 and 2006. $PM_{2.5}$, fine particulate matter.

This study has a number of other strengths. First, we had a large number of cases of incident breast cancer, thereby providing sufficient statistical power to estimate response patterns. Second, the use of remote sensing–derived estimates of $PM_{2.5}$ allows us to assign exposure to virtually the entire cohort. Previous methods that relied on fixed-site measures of traffic-related pollution are limited in that they are restricted to urban areas where monitoring systems are in place. Another important strength of our study was the availability of individual-level risk factors that allowed us to adjust for smoking behaviors and obesity. Third, we were able to adjust for contextual effects through the use of small-area data obtained from the Canadian census.

A limitation of the study is that because we did not have direct contact with participants after the first six years of following, we could not unambiguously assign menopausal status using other information, such as the WHO criteria for menopausal status

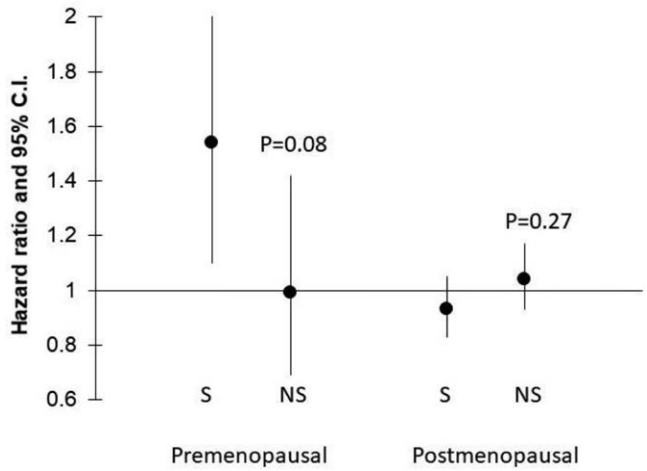

Figure 2. Adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for the incidence of breast cancer in relation to an increase of 10 μg/m^3 increase in $PM_{2.5}$* by screening group and menopausal status, Canadian National Breast Screening Study 1982–2005. *The hazard ratios were adjusted for age, occupation, marital status, attained education, ever pregnant, Breast self examination (BSC), oral contraceptive (OC) use, Hormone replacement therapy (HRT), family history ofbreast cancer (BC), and age at menarche. The above *P* values represent those associated with the test of significance for the first-order interaction term of screening status and $PM_{2.5}$ (i.e., to test for effect modification by screening status). NS, the women who were not randomized to screening; $PM_{2.5}$, fine particulate matter; S, women randomized to screening.

that accounts for hormone replacement therapy, hysterectomy, and bilateral oophorectomy).[36,37] As the hazard ratios did not vary dramatically according to three different age cutoffs to classify women as postmenopausal, this may not be an important limitation.

Another limitation of our study is the inevitability of some exposure misclassification introduced by relying on assigning exposure to the place of residence at time of entry. Given the length of the follow-up interval, many subjects likely would have moved. Under a classical error model assumption, this would introduce nondifferential exposure measurement error that would serve to understate any true association. Our sensitivity analysis that examined risk differences between those who moved within the first 3 to 5 years of follow-up and those who did not found they were similar. Approximately 19% of individuals had moved during this time frame. This suggests that residential mobility is unlikely to greatly influence the risk estimates.

In addition to misclassification of exposure due to residential mobility, errors in measurement may have also been introduced from the assignment of $PM_{2.5}$ concentrations using remote sensing data collected from 1998 onwards. As the diagnosis of premenopausal breast cancer would have generally occurred at an earlier stage of the follow-up period than for postmenopausal breast cancer, this potential exposure misclassification would have a greater impact on air pollution risks for premenopausal women. Assuming this exposure measurement error to be nondifferential between those who develop and do not develop breast cancer, this suggest that our risk estimate among those who were diagnosed with premenopausal breast cancer are attenuated to a greater degree than those diagnosed in postmenopausal women. Given the lack of $PM_{2.5}$ monitoring in Canada before 1990, it is difficult to evaluate the extent of these biases as it is not possible to describe the spatial and temporal changes in $PM_{2.5}$ concentration during the first 10 years of follow-up of this cohort. However, recent modeling suggests that overall Canadian concentrations of $PM_{2.5}$ have changed very little since 1990. Specifically, Brauer et al.[38] estimated that the population-weighted estimates of $PM_{2.5}$ in Canada in 1990, 2000, and 2010 were 11.25, 10.47, and 11.89 μg/m^3, respectively.

In summary, our findings suggest that ambient exposure to $PM_{2.5}$ increases the risk of developing premenopausal breast cancer. Additionally, it suggests that low levels of air pollution, observed in Canadian studies, are relevant from a population health perspective.

Conflicts of interest statement

The authors have no conflicts of interest to declare.

Sources of funding

Funding for this study was provided by Health Canada's Clean Air Regulatory Agenda program.

Description of process to obtain data: Due to ethics requirements, individual-level data from this study cannot be distributed.

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For Tuesday, May 12th

RULES, ELECTIONS & INTERGOVERNMENTAL RELATIONS

REGULAR COUNCIL AGENDA NEXT TO BE POSTED

#53

RESOLUTION

WHEREAS, any official position of the City of Los Angeles with respect to legislation, rules, regulations or policies proposed to or pending before a local, state or federal government body or agency must have first been adopted in the form of a Resolution by the City Council with the concurrence of the Mayor; and

WHEREAS, existing law provides for the relinquishment of portions of a state highway to a local jurisdiction when an act of the Legislature has deleted the portion of highway from the state highway system; and

WHEREAS, AB 810, introduced on February 26, 2015 by Assemblymember Ridley-Thomas and amended on April 20, 2015, would authorize the California Transportation Commission to relinquish to the City of Los Angeles, the portion of State Route 187 (Venice Boulevard), between Lincoln Boulevard and Cadillac Avenue, and the portion of State Route 1 between the Southern City Limit of the City of Santa Monica and Route 105; and

WHEREAS, a section of Venice Boulevard has been selected as part of the City's Great Streets Initiative and local control is necessary to implement road and streetscape projects, as well as to maintain flexibility to experiment with innovative solutions to meet the community's challenging needs; and

WHEREAS, State Route 1 (Lincoln Boulevard), is an important north-south thoroughfare where the City envisions implementing a series of roadway improvement, which will also require local control of the corridor;

NOW, THEREFORE BE IT RESOLVED, that with the concurrence of the Mayor, that by adoption of this Resolution, the City of Los Angeles hereby includes in its 2015-16 State Legislative Program SUPPORT for AB 810 (Ridley-Thomas) that would authorize the California Transportation Commission to relinquish the following roadway segments to the City of Los Angeles: State Route 187 (Venice Boulevard) between Lincoln Boulevard and Cadillac Avenue, and State Route 1 (Lincoln Boulevard) between the Southern City Limit of the City of Santa Monica and Route 105 IF AMENDED to: a) delete all references to the County of Los Angeles, and b) replace "agrees to pay one half the" with "agrees to negotiate the cost of plans and construction."

PRESENTED BY: _____
MIKE BONIN
Councilmember, 11th District

SECONDED BY: _____

ORIGINAL

MAY 8 2015

Item 46A

MOTION

I MOVE that the Transportation Committee report relative to the relinquishment of certain portions of State Route 187 (Venice Boulevard) in the City of Los Angeles, Item #46 on today's Council agenda (CF 16-0147), BE AMENDED to adopt an additional recommendation, as follows:

- ADOPT the attached resolution, as required by Section 73 of the Streets and Highway Code, that would relinquish Venice Boulevard between Lincoln Boulevard and Cadillac Avenue (State Route 187 PM 3.5-PM 8.8) to the City of Los Angeles and facilitate the California Transportation Commission to allocate $14,500,000 to the City as the cost of relinquishment.

PRESENTED BY: _____
MIKE BONIN
Councilmember, 11th District

SECONDED BY: _____

msr

AUG 3 1 2016

RESOLUTION

WHEREAS, any official position of the City of Los Angeles with respect to legislation, rules, regulations or policies proposed to or pending before a local, state or federal governmental body or agency must have first been adopted in the form of a Resolution by the City Council with the concurrence of the Mayor; and

WHEREAS, Venice Boulevard, also known as State Route 187 (SR-187), is 5.3 miles long and is located from SR-1 (Lincoln Blvd) to Cadillac Ave, just past Interstate 10 (I-10) within the City; and

WHEREAS, on May 13, 2015, the Council approved a resolution (C.F. 15-0002-S48) that supported legislation authorizing California Transportation Commission (CTC) to relinquish Venice Boulevard to the City; and

WHEREAS, the legislation was approved by the Legislature and the Governor and chaptered into law on October 7, 2015, which allowed Caltrans to begin the relinquishment process; and

WHEREAS, the City's interest in the relinquishment is supported by the designation of Venice Boulevard between Beethoven Street and Inglewood Boulevard as one of 15 Great Streets, as well as the installation of safety-enhancement and traffic calming measures along Venice Boulevard from Abbot Kinney Boulevard to 12th Street as part of the City's Vision Zero initiative; and

WHEREAS, in order to implement the needed roadway improvements, it is necessary that Venice Boulevard be placed under the jurisdiction of the City; and

WHEREAS, Section 73 of the Streets and Highway Code states that a relinquishment shall be by resolution; and

WHEREAS, the State of California, acting through Caltrans, and the City have negotiated a transfer of ownership of Venice Boulevard, including a payment of $14,500,000 from the State as the cost of relinquishment; and

WHEREAS, the City will waive the State's obligation to provide ninety days prior notice of the State's "Intention to Relinquish" as set forth in Section 73 of the Streets and Highways Code; and

WHEREAS, District Agreement No. 07-5097, defining the terms and conditions of the relinquishment, will facilitate the CTC approval of the relinquishment and fund allocation;

NOW THEREFORE BE IT RESOLVED, with the concurrence of the Mayor, that the City approves District Agreement No. 07-5097 with the California Department of Transportation that would relinquish Venice Boulevard between Lincoln Boulevard and Cadillac Avenue (State Route 187 PM 3.5-PM 8.8) to the City of Los Angeles and facilitate the California Transportation Commission to allocate $14,500,000 to the City as the cost of relinquishment.

Restore Venice Blvd Neighborhood Traffic Watch Program
info.restore-venice.com/accidents

Include date, time, intersection/address, photo wherever possible
All citizen reporters' names have been removed.

SUMMARY

Total number of accidents to date: 80

- *car vs car: 50*
- *car vs bike: 15*
- *car vs pedestrian: 1*
- *details unknown: 4*
- *car vs motorcycle/scooter: 6*
- *car vs skateboarder: 1*
- *bike vs bike: 1*
- *bike vs pedestrian: 2*

Saturday, May 20, 2017 (1) 🚲

Time unknown at Venice Blvd. and Wasatch: A bicycle/car accident occurred when a bike was going straight in bike lane and a car was turning right onto Wasatch. Reported by on Nextdoor.

Monday, May 29, 2017 (2) 🚲

Time unknown at Venice Blvd. and Beethoven: Accident involving a bicycle on the south side of the street. Reported by on Nextdoor. No photo available.

Friday, June 2, 2017 (3) 🚲 🚲

Afternoon at Venice Blvd. between Centinela and Colonial: 2 Bike collision on north side of the street. Information and photo provided by from.



Sunday, June 4, 2017 (4) 🚵

Afternoon at Venice Blvd. and Colonial: Bike and car collision on north side of the street. Information and photo provided by from, who also called 911 for this accident. Second photo provided by.





Tuesday, June 20, 2017 (5)

Approx 4:22pm at Venice Blvd. just west of Grand View: 3 car collision involving a white Tacoma, white SUV, and black SUV. (info and photo by)



Thursday, June 22, 2017 (6)

Approx 8:45am at Venice Blvd. and Ocean View: A skateboarder was hit by a car at the intersection of Venice/Ocean View. Broken glass in crosswalk suggests collision happened there. (info and photo by)



Wednesday, June 28, 2017 (7)

Approx 8:00am at Venice Blvd. and Wasatch: Car collided with minivan when making a right-turn onto eastbound Venice Blvd. from Wasatch Ave. Info and photos provided by.





Friday, June 30, 2017 (8) 🚲
Approx 9:00am at Venice Blvd. and Inglewood: Cyclist being attended to by LAFD on the south side of Venice before Inglewood. Info provided by and who both witnessed. No pictures available.

Monday, July 10, 2017 (9) 🚲
Approx 7:00am at Venice Blvd. and Centinela: Truck and bike collision in the intersection. Bike was seen wedged under truck. This was a second-hand account told to. No pictures available.

Monday, July 17, 2017 (10)
Approx 4:30pm at Venice Blvd. and Wade: Silver Tacoma struck a 4-door car (that was making a U-turn) pushing it onto the median and then struck a parked Honda. Tacoma caught on fire and was extinguished by resident with water hose. Honda was doing a u-turn, not enough room for it, now that Venice is only two lanes each way. The pickup was coming down Venice going West. Couldn't get around the honda, ended up smashing into a parked car in the new parking lane, setting the pickup on fire. (Info from and)





Thursday, July 20,2017 (11) 🚲

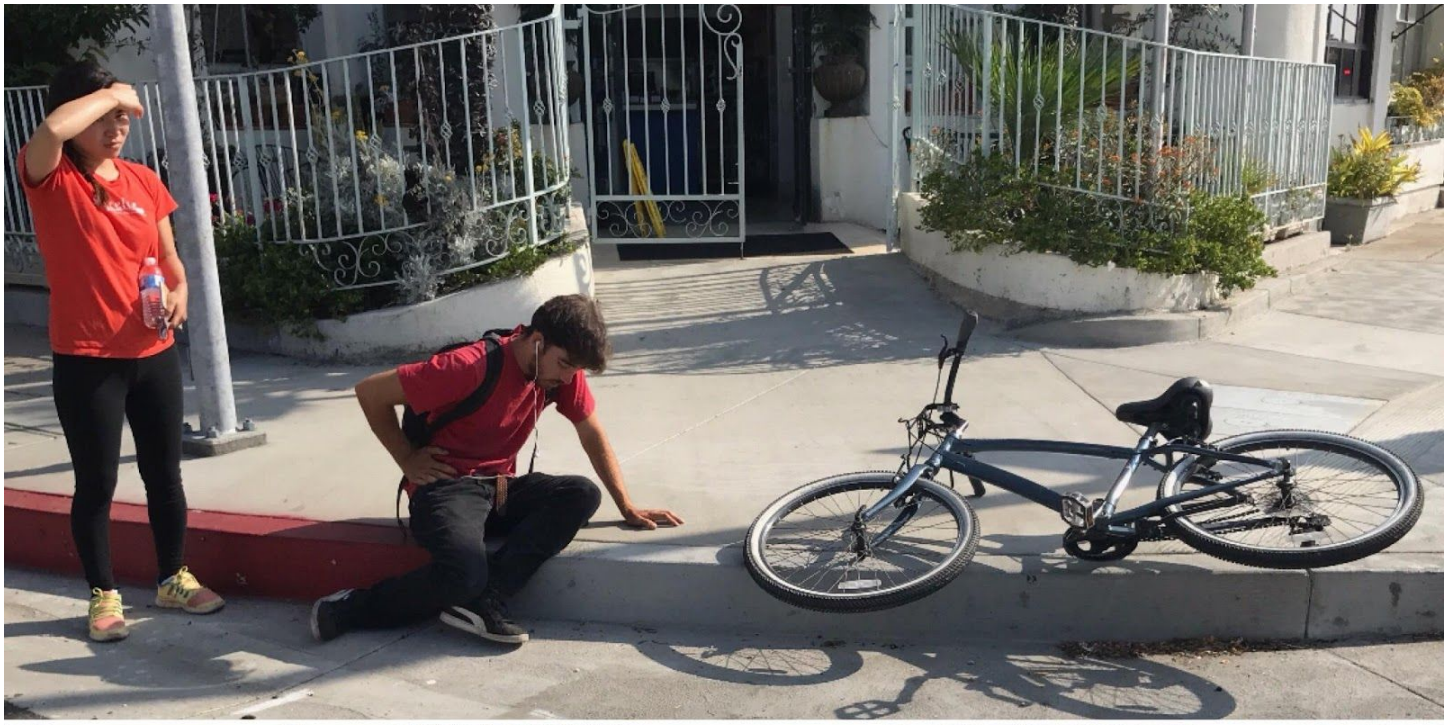
Approx 4:00pm at Venice Blvd. and Stewart: Electric bicycle in protected lane t-bones red car making a right turn from south side of Venice onto Stewart. Impact at rear passenger door, rear passenger window busted out. Driver states she never saw cyclist until he hit her. Bicyclist suffered likely broken ribs and several lacerations. Police say bicyclist at fault. (info and photos by)



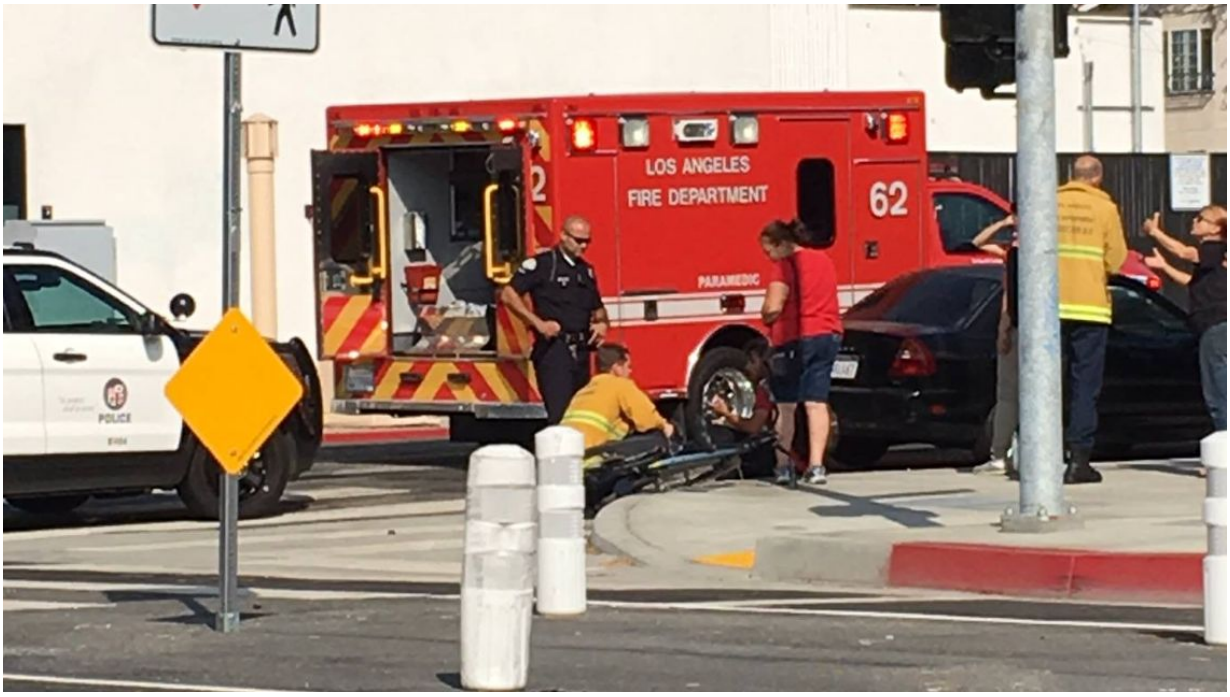


Friday, July 21, 2017 (12) 🚲

Approx 8:30am at Venice Blvd. and Mountain View: A black Mitsubishi Mirage made a right turn from the north side of Venice onto Mountain View and collided with a cyclist in the protected lane. Cyclist complained of hip pain and could not stand up, was taken away via ambulance. (photos provided by and from. Eyewitness account provided by from to)







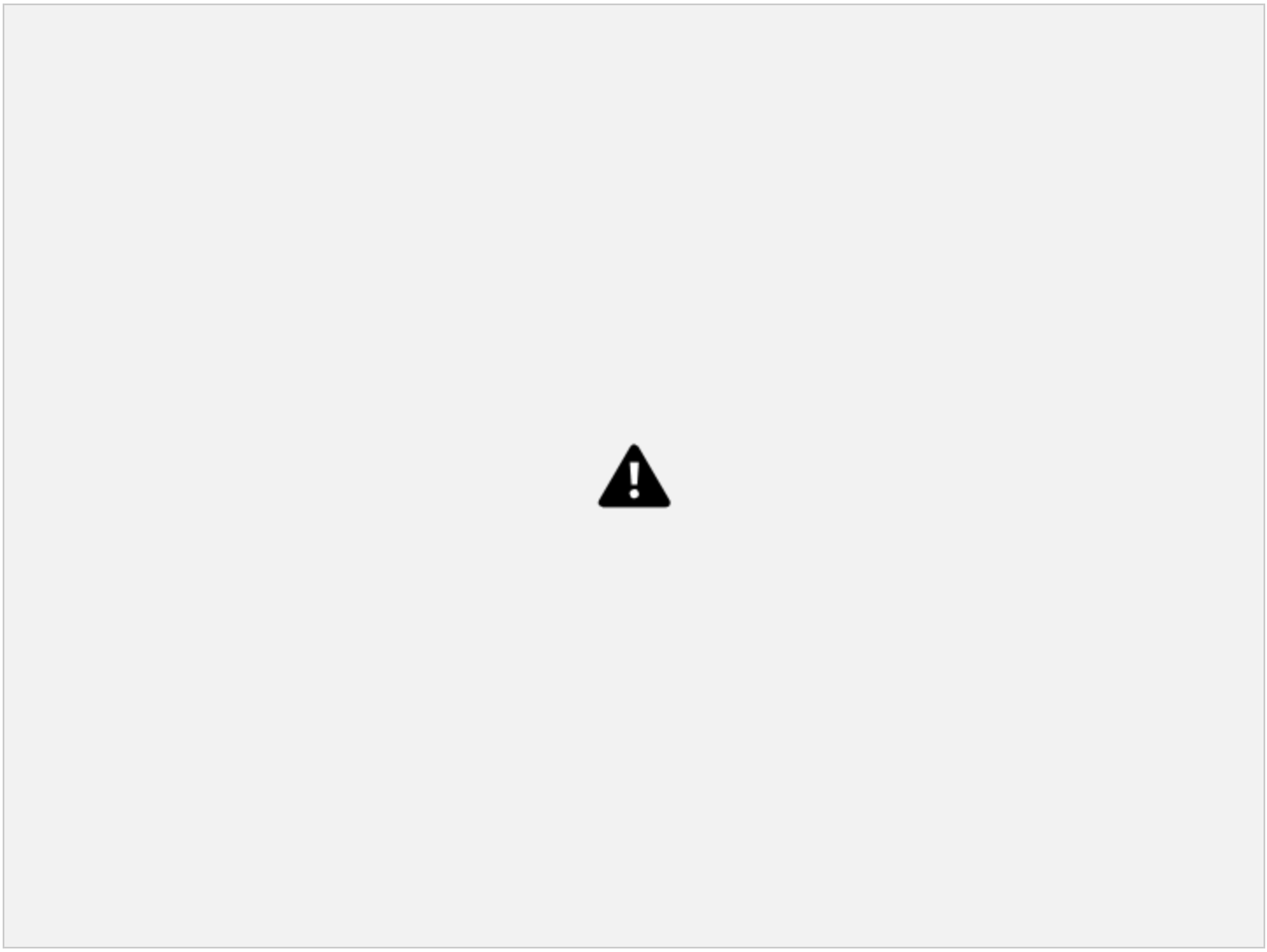
Tuesday, July 25, 2017 (13)
Approx 6:45pm at Venice Blvd. and ?: Accident reported by on Councilmember Mike Bonin's Facebook page. is a friend of the person who was involved in the accident.

Friday, July 28, 2017 (14)
Approx 6:00pm at Venice Blvd near Moore St: Black car and silver car accident in eastbound lanes. at Shop heard the accident and saw aftermath as he was catching the bus, thinks 4 cars were involved, did not see any emergency responders. (photo by)



Monday, July 31, 2017 (15)

Late afternoon at Venice Blvd between Centinela and Colonial. Police and fire activity, unclear what happened here (need more info). Photo by.



Sunday, August 6, 2017 (16 and 17)

Approx 1:44pm at Venice Blvd. between Centinela and Wasatch: reported on Councilmember Mike Bonin's Facebook page that she witnessed 2 separate accidents by the bike lanes involving cars near DiDi Hirsch.

Sunday, August 6, 2017 (18)

Approx 2:50pm at Venice Blvd. just west of Inglewood: 2 car accident on the north side of the street. Drivers were seen standing outside their cars taking photos of damage. Info provided by. Accident confirmed by Taco Bell employees. No photos available.

Saturday, August 26, 2017 (19)

Approx 7:15pm at Venice Blvd. and Wade: accident in intersection. Photos and info provided by and Nextdoor.





Friday, September 8, 2017 (20)
Mid-afternoon, Venice Blvd. just west of Grand View in front of Venice Grind Coffee Company: Car hit by another car while exiting a parallel parking space on Venice Blvd. Bumper was ripped off the car exiting the parking space. Info from.

Tuesday, September 12, 2017 (21)
Approx 6:00am at Venice Blvd and Beethoven: Head-on collision involving 2 cars. Info reported by whose husband drove by the accident. No pictures available.

Tuesday, September 12, 2017 (22)
Approx 7:30am at Venice Blvd and Wade: Accident in intersection of Venice/Wade. Info and photo provided by on Restore Venice Blvd. Facebook page.





Sunday, September 24, 2017 (23)
Approx 9:45pm at Venice Blvd. just east of Centinela: Traffic collision involving 2 cars, one with airbag deployed. Info provided by @Culvercity311 Twitter account.

Tuesday, October 3, 2017 (24)
Approx 8am at Venice Blvd. and Centinela: Accident reported by on the Restore Venice Blvd Facebook page. No other info or pictures available.

Tuesday, October 3, 2017 (25)
Approx 4:55pm at Venice Blvd and Wade: Accident involving 2 cars, airbags deployed in silver Honda. Photos by and.

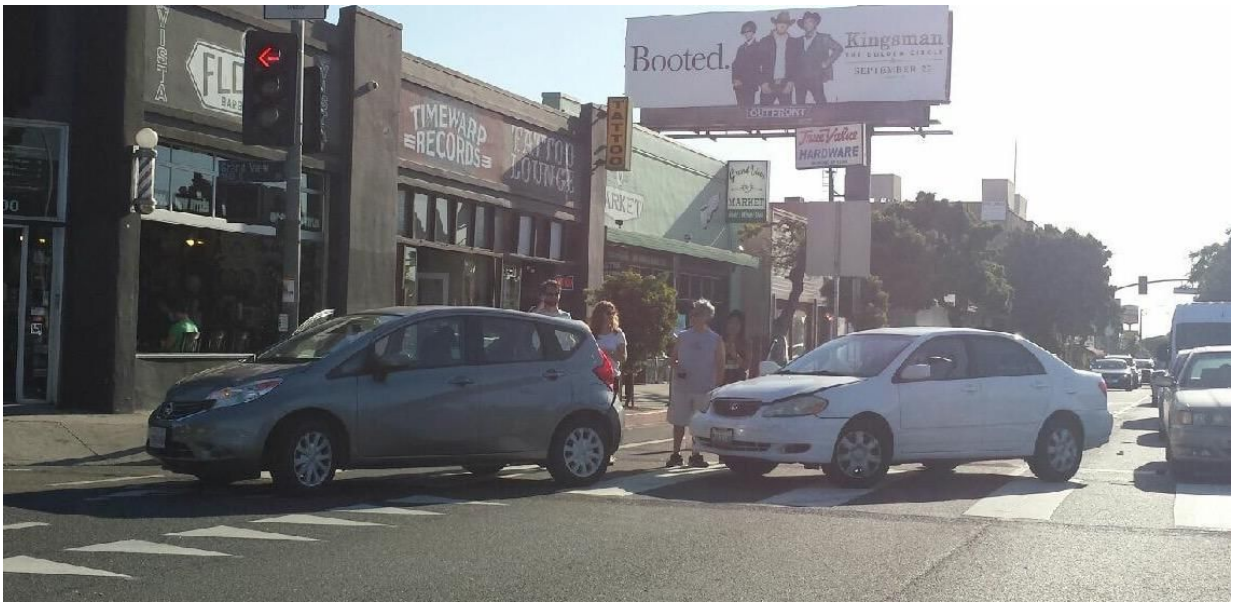




Wednesday, October 4, 2017 (26)

Approx 4:20pm at Venice Blvd and Grand View: 2 cars involved in accident in intersection. Info and photo by, additional photo by.

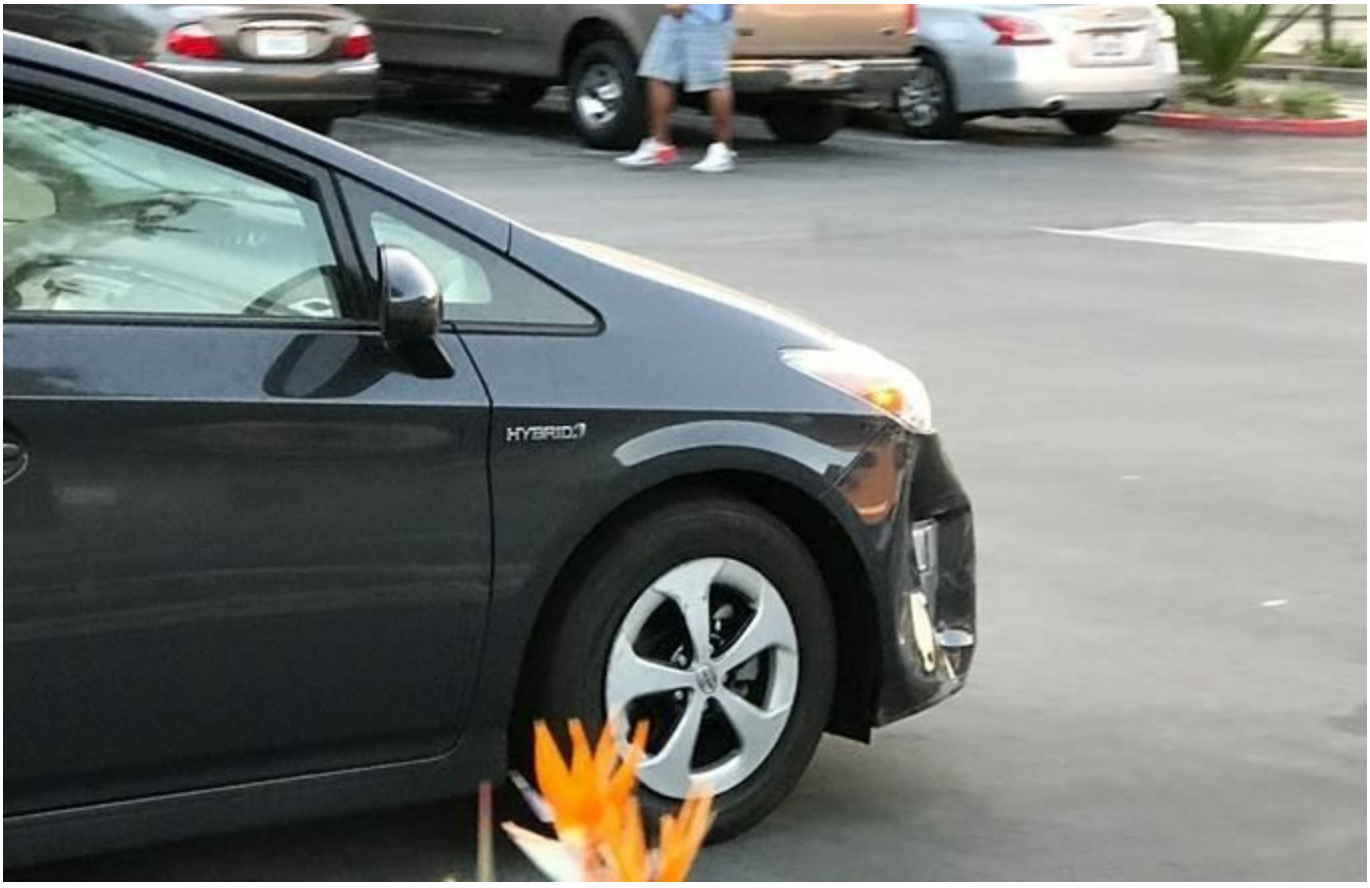




Thursday, October 5, 2017 (27) 🚲

Approx 6pm at Venice Blvd just east of Centinela: Prius turning into the Chase bank parking lot from the north side of Venice is T-boned by a cyclist. Cyclist was traveling at a high rate of speed and went over the car's hood. Eyewitness info and photos by.





Saturday, October 7, 2017 (28)
Approx 8:30pm at Venice Blvd and Centinela: Traffic collision between 2 cars reported over LAPD scanner, heard by.

Saturday, November 4, 2017 (29)
Approx 11am at Venice Blvd just east of Grand View: Traffic collision between at least 2 cars. Info and photo by.



Monday, November 6, 2017 (30)

Approx 6am at Venice Blvd and Colonial: ex-wife was hit by another car while attempting to turn right from Venice to Colonial. The other vehicle fled the scene. ex-wife followed the other car for 6 blocks to Wade and Victoria where the other car finally came to a stop because the front tire blew out. Info and photos provided by.





Monday, November 6, 2017 (31)

Approx 1pm at Venice Blvd in front of VCA Animal Hospital: A car and motorcycle were involved in an accident where the motorcyclist was knocked over. The motorist and motorcyclist then got into a fight in the middle of the street. Police, fire, and ambulance all responded to the scene. Eyewitness account from.

Saturday, November 11, 2017 (32) 🚲

Approx 9:15am at Venice Blvd just east of Centinela: on Next Door reported she was riding bikes with her family in the protected bike lane on the north side of Venice when another cyclist passed them near the Bowlero at a high rate of speed. When her family reached the entrance to the CVS parking lot she noticed the same cyclist had a collision with a white pick-up truck.

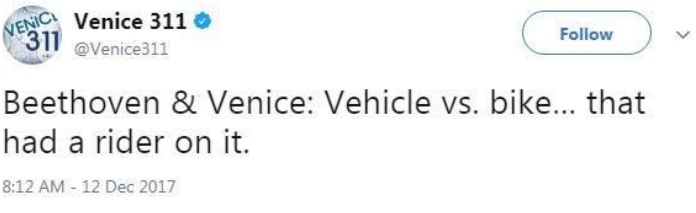
Friday, November 17, 2017 (33)

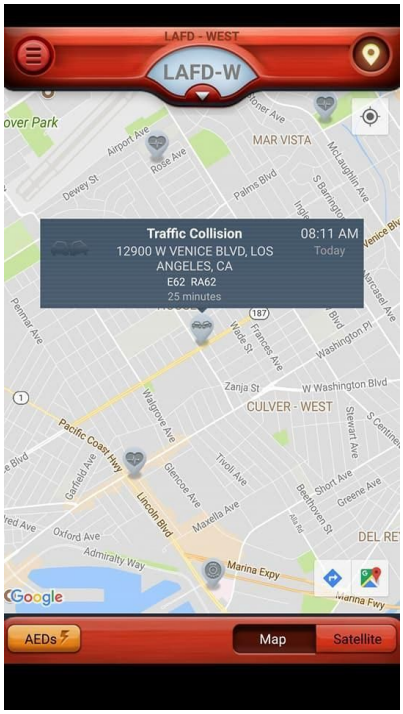
Approx 3pm at Venice Blvd. and Grand View: Small car and pick-up truck involved in accident. Police on scene. Photos provided by.





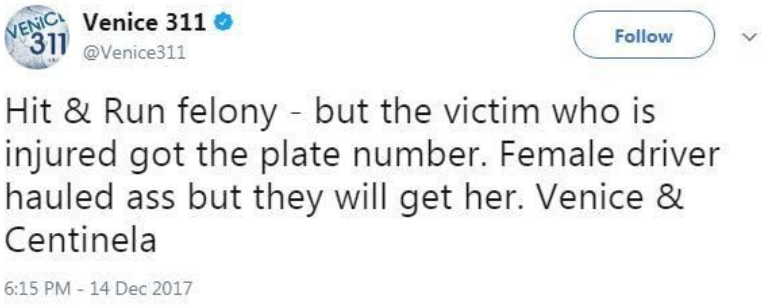
December 12, 2017 (34)
Approx 8:11am at Venice Blvd and Beethoven: Accident involving car and bicycle. drove by the accident and witnessed bike overturned. Reported by both Venice311 twitter and the PulsePoint app.





December 12, 2017 (35)
Approx 3pm at Venice Blvd just east of Grand View: Cyclist in the bike lane hit a pedestrian who was feeding the parking meter. Cyclist did not stop to see if the pedestrian was okay. Incident described by the man who was hit:
“Yesterday on 12/12/2017 at around 3 p.m. I was hit by a bicyclist. I was on Venice Blvd off Grand View at 12120 Venice Blvd. It used to be sidewalk, parking and bike lane. Now it is sidewalk, bike lane and parking spaces divided by white pylons. I crossed the bike lane and was checking to see what side of the parking meter the money goes in, the curb side or the building side. The bicyclist who was in the bike lane and too close to the curb hit my right leg and ankle with his wheel and knee. He didn't even stop. He just yelled "sorry." I am okay but sore. I think he might have tried to avoid hitting someone or something else. The bike lanes are unsafe because drivers walk across them to get from their cars to the sidewalk and vice versa.”

December 14, 2017 (36)
Approx 6:15pm at Venice Blvd and Centinela: Hit and run felony with injured victim. Reported on Venice311 twitter.



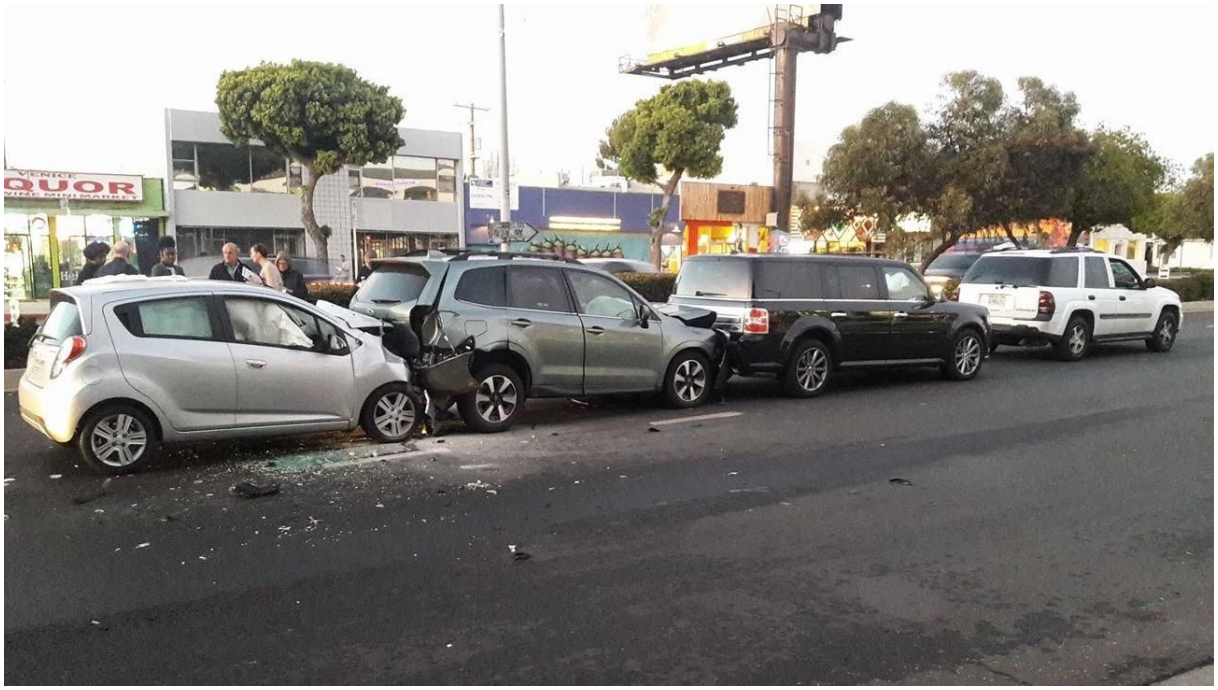
December 15, 2017 (37)

Approx 7:54am at Venice Blvd and Centinela: 2 car collision, both cars had been moved off the street into the 7-11 parking lot and car wash. Paramedics seen attending to victims in 7-11 parking lot. Info and photo provided by.



January 10, 2018 (38)

Approx 4:40pm at Venice Blvd and Wasatch: 4 car collision, airbags deployed and emergency responders seen removing occupants from car.Info and photos from and.





January 17, 2018 (39)

Approx 3:30pm at Venice Blvd and Grand View: 2 car collision, silver BMW rear-ended another car and was seen being towed away. Info provided by and. Photo by.



January 26, 2018 (40)

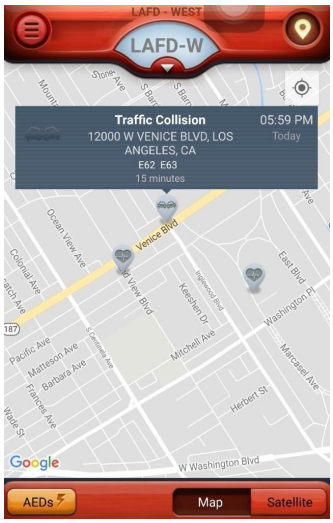
Approx 11:35am at Venice Blvd and Inglewood: 2 car collision in intersection. Large field of debris was spotted in intersection and drivers were seen exchanging info on Inglewood. Info and pics by.





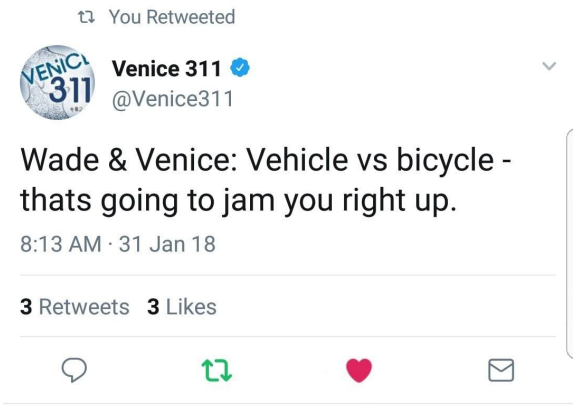
January 29, 2018 (41)

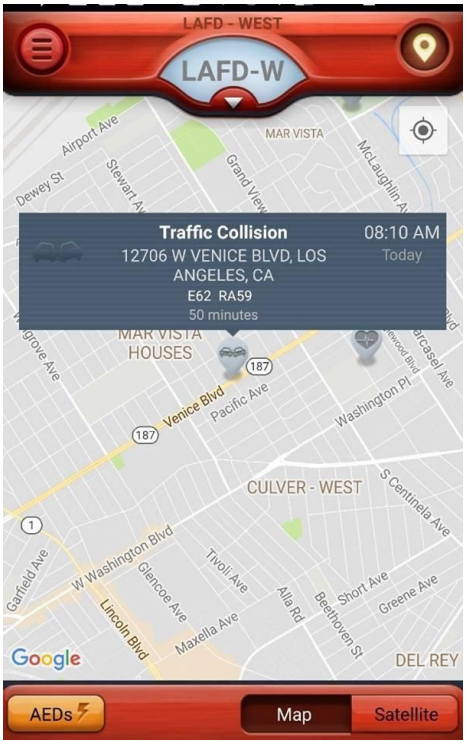
Approx 5:59pm at Venice Blvd and Inglewood: Traffic collision reported on the PulsePoint app.



January 31, 2018 (42)

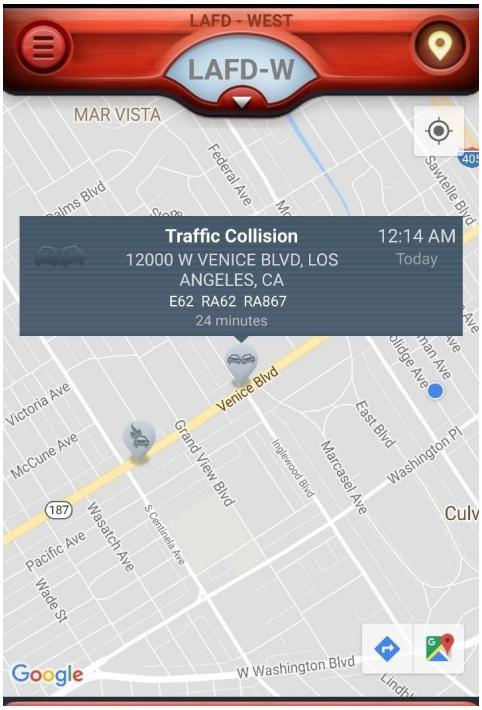
Approx 8:10am at Venice Blvd and Wade: Traffic collision between car and bicycle. reported fire and police departments on scene. Accident reported on both the Venice 311 Twitter account and the PulsePoint app.





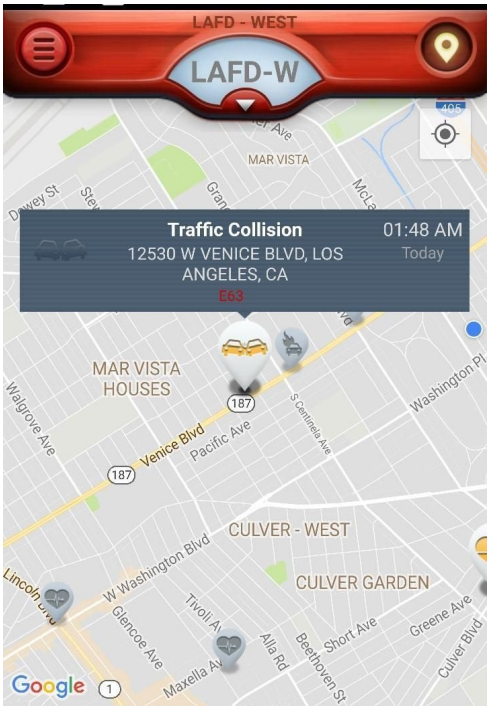
February 5, 2018 (43)

Approx 12:14am at Venice Blvd and Inglewood: Traffic collision reported on the PulsePoint app.



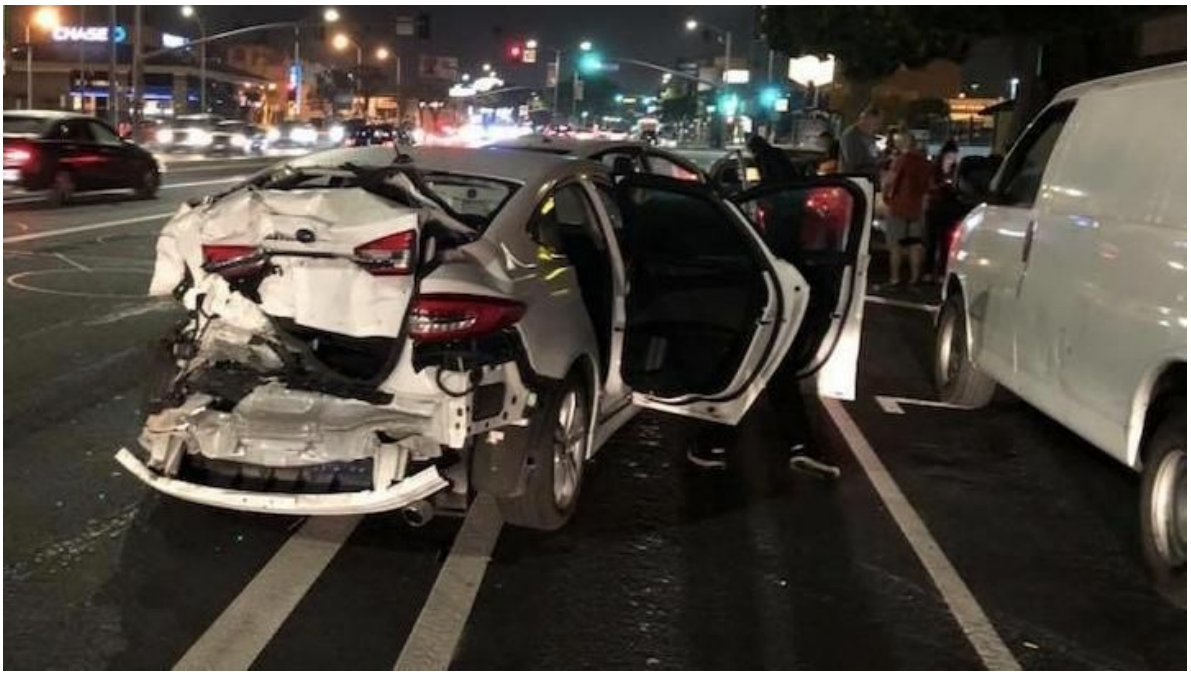
February 5, 2018 (44)

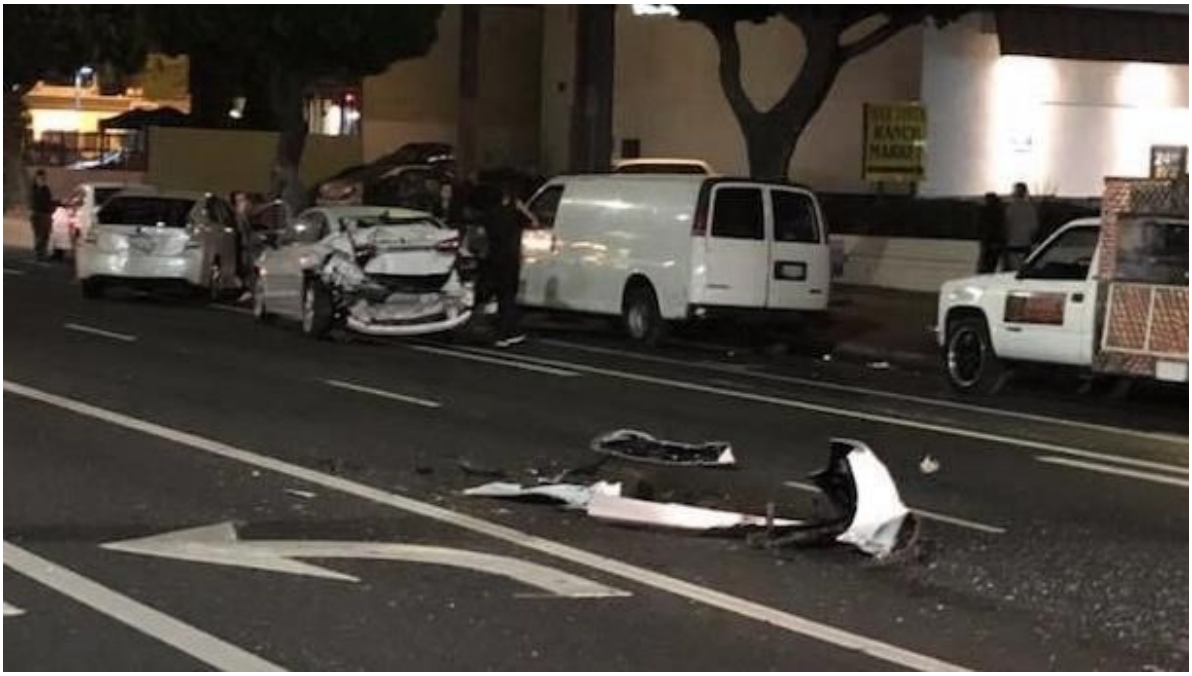
Approx 1:48am at Venice Blvd between Frances and Wasatch: Traffic collision reported on the PulsePoint app.



February 6, 2018 (45)

Approx 8pm at Venice just west of Centinela: 5 car collision, a truck rear-ended a Prius at a high rate of speed pushing it into the 3 cars ahead. Prius driver hit his steering wheel. Fire and police departments both at sceen. Info and pics from.

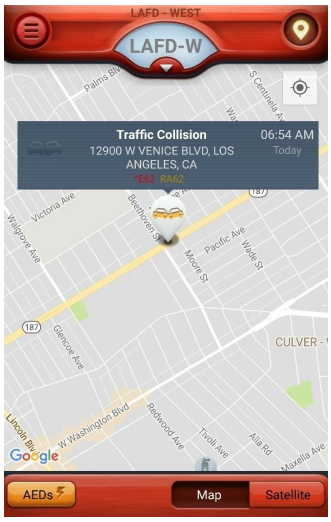




February 8, 2018 (46)

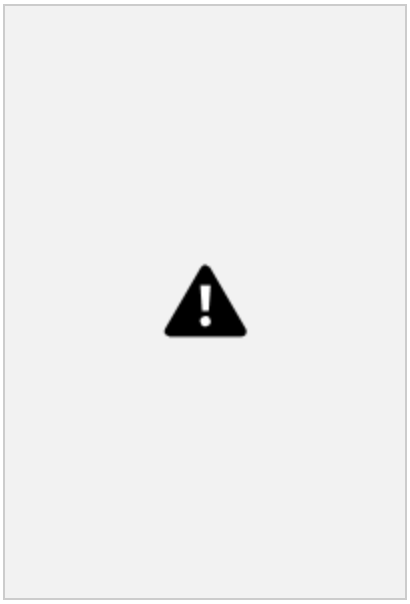
Approx 6:54am at Venice Blvd and Beethoven: Traffic collision between a car and motorcycle. Reported on the PulsePoint app. Photo and additional info from.





February 12, 2018 (47)

Approx 3:41pm at Venice Blvd and Centinela: Traffic collision reported on the PulsePoint app.



February 27, 2018 (48)

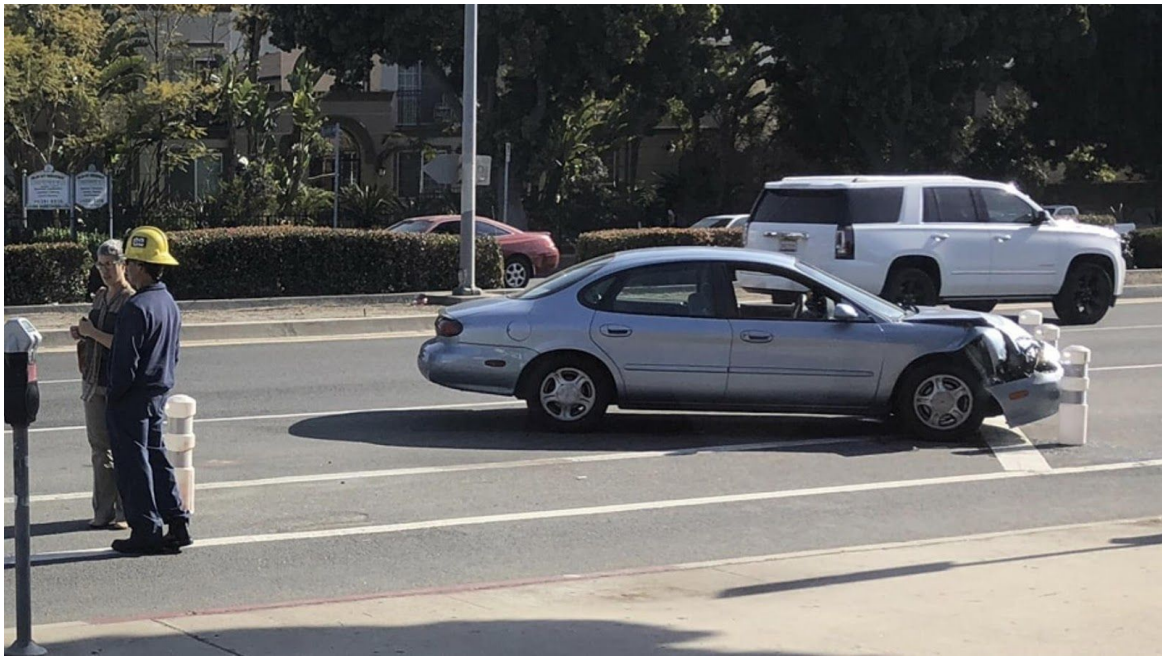
Approx 8:10pm at Venice Blvd and Centinela: Collision between and SUV and Prius in the intersection. Photo and info provided by and reported on the Venice 311 Twitter account.





March 8, 2018 (49)

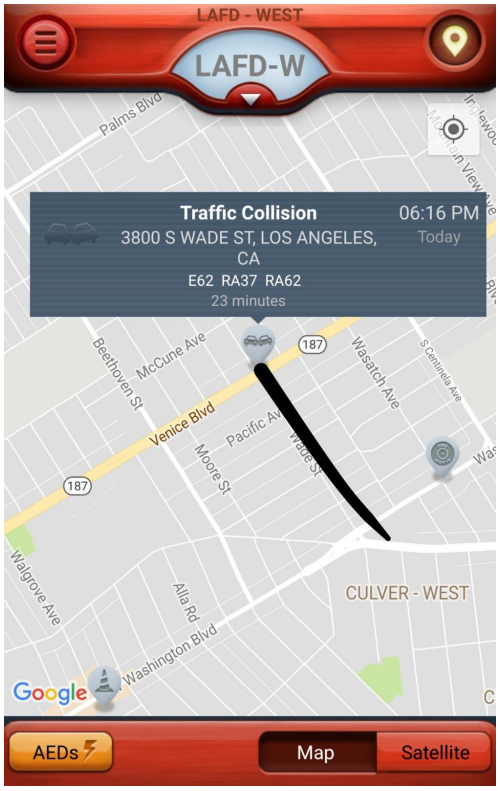
Approx 2:57pm at Venice Blvd and Wasatch: Traffic collision reported by the PulsePoint app. Confirmed by employees at. Photos from and.

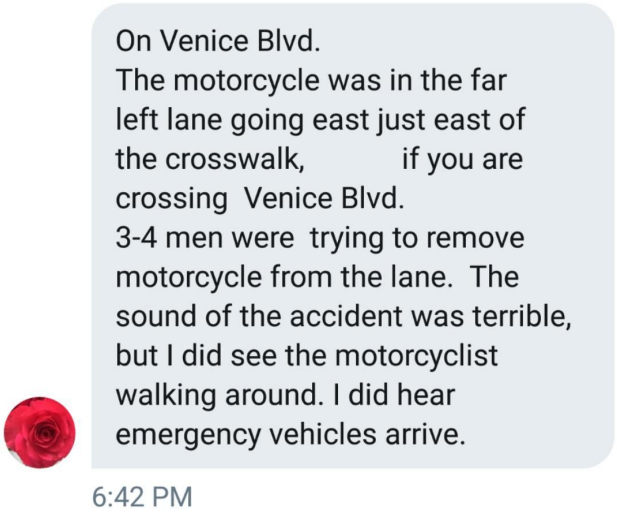




March 9, 2018 (50)

Approx 6:16pm at Venice Blvd and Wade: Traffic collision reported on the PulsePoint app. Twitter user heard the accident and witnessed aftermath. A car and motorcycle were involved. Emergency vehicles responded.





March 19 or 20, 2018 (51) 🚲

Approx 2:30pm at Venice Blvd between Wasatch and Boise: from the Venice Farmers Market told she witnessed a bicycle/pedestrian collision in the protected bike lane.

March 27, 2018 (52)

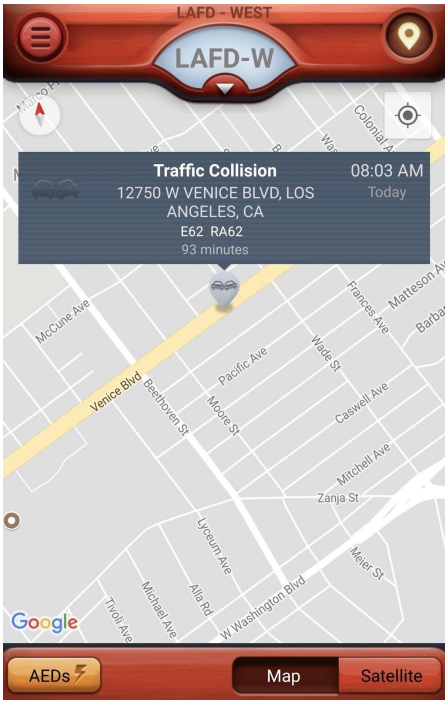
Approx 2:30pm at 12226 Venice Blvd: Collision between car and utility/work truck. Info and photos from.





March 28, 2018 (53)

Approx 8:03am at 12750 Venice Blvd: Traffic collision reported on the PulsePoint app.



April 3, 2018 (54)

Approx 2pm at Venice Blvd just west of Grand View: 3 car traffic collision, police were on scene. Photos and info provided by and.





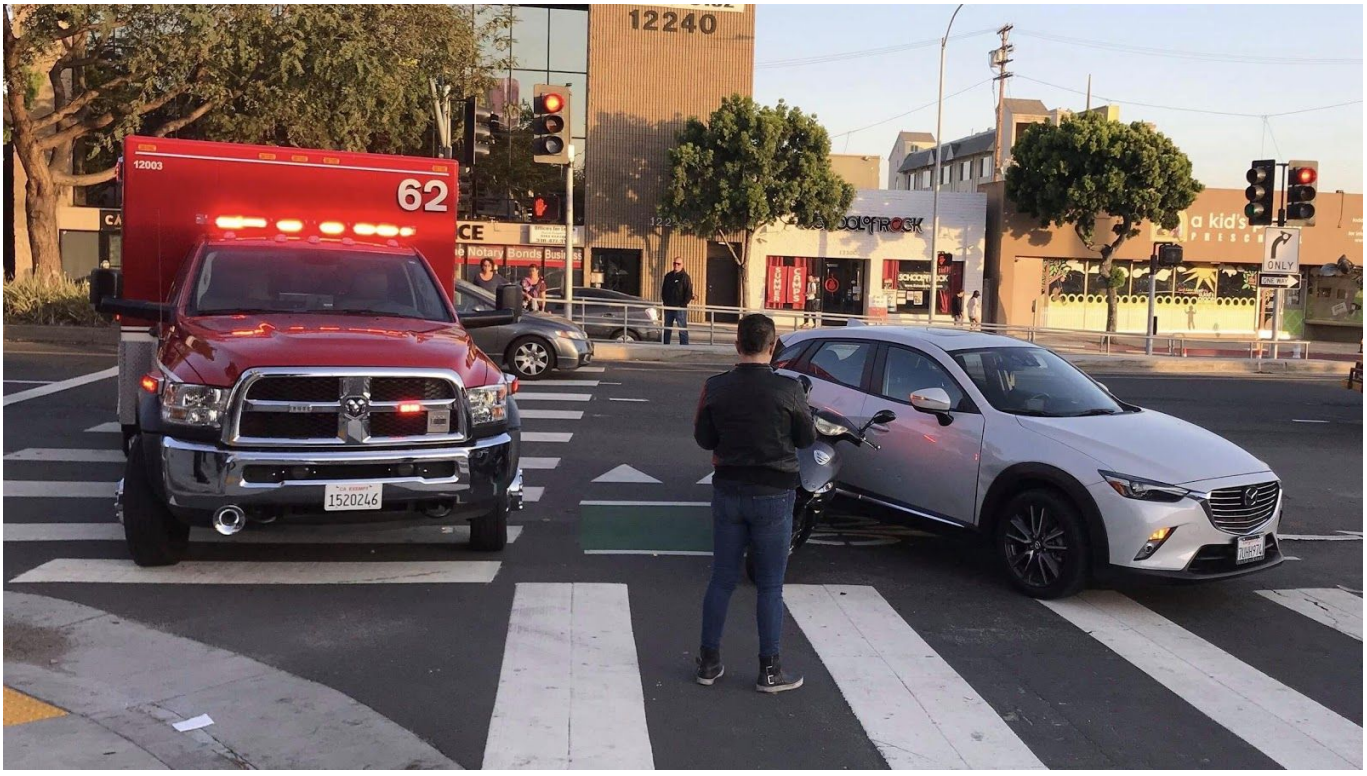
April 3, 2018 (55)

Approx 4:30pm at Venice Blvd just west of Grand View: 2 cars involved in an accident. Photo and info provided by.



April 9, 2018 (56)

Approx 6:30pm at Venice Blvd and Ocean View: A scooter traveling in the bike lane T-boned a car making a right turn. Scooter driver had visible injuries and was bleeding. Emergency responders on scene. Photo and info provided by eyewitness.

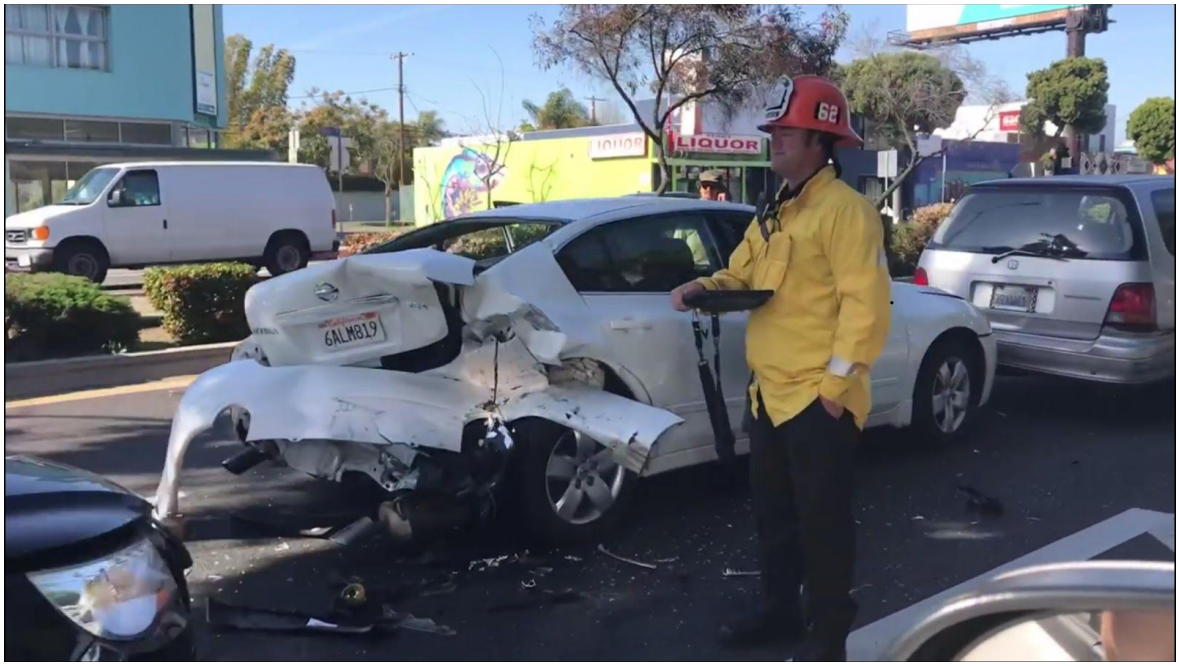


April 13, 2018 (57)

Approx 3:55pm at Venice Blvd between Beethoven and Wade: Accident involving a pickup truck rear-ending a car. Info provided by.

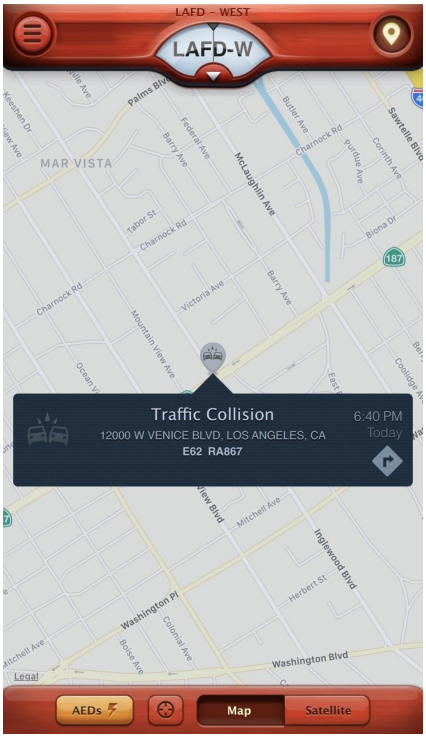
April 25, 2018 (58)

Approx 4:20pm at Venice Blvd and Wasatch: 3 car accident with fire department on scene. Info and photo from.



May 14, 2018 (59)

Approx 6:40pm at Venice Blvd and Inglewood: Traffic collision reported on the PulsePoint app.



May 16, 2018 (60)

Approx 4:15pm at Venice Blvd and Grand View: 2 cars involved in accident with lots of debris scattered on the road. Info provided by who drove by the accident.

May 27, 2018 (61)

Approx 6:40pm at Venice Blvd and Inglewood: Accident involving SUV and motorcycle. The motorcyclist was taken away in an ambulance. Info and photos from and.

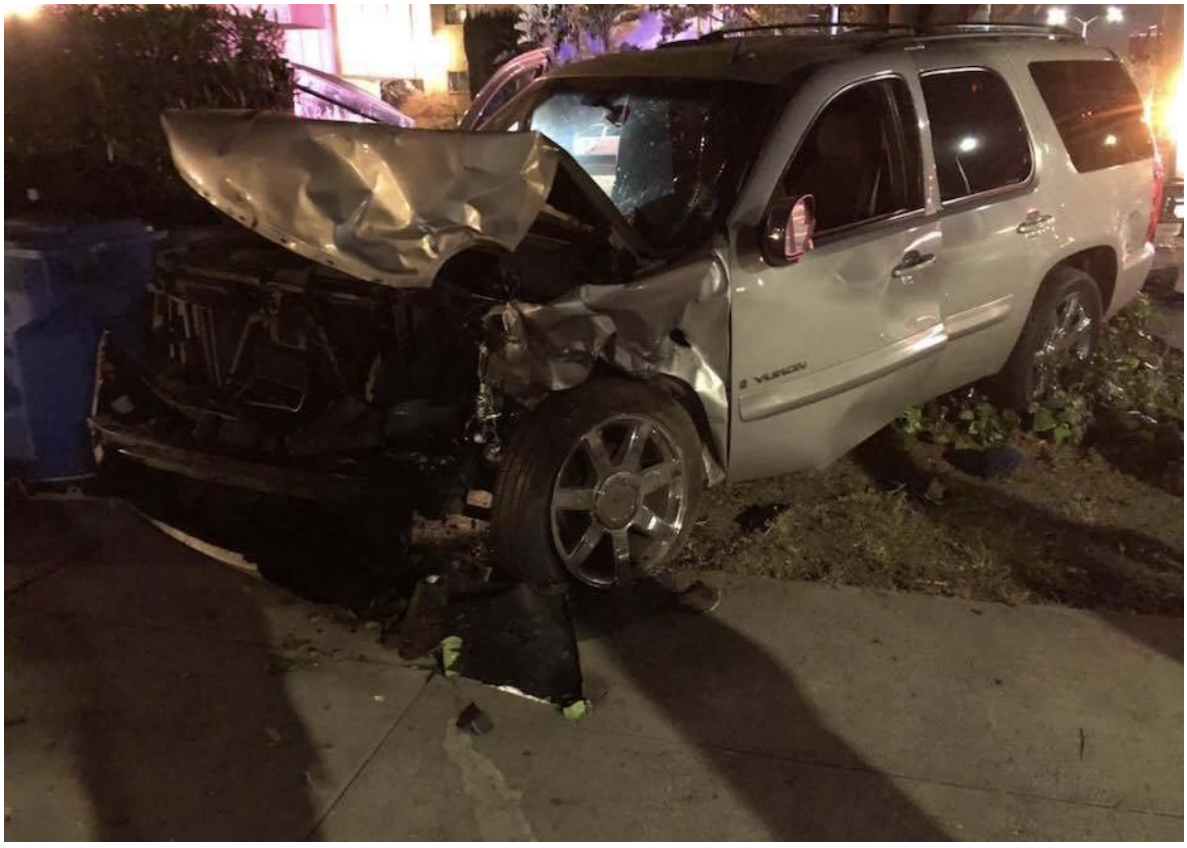




June 04, 2018 (62)
Approx 5:15pm at Venice Blvd and Mountain View: Accident involving 2 cars, woman sitting on sidewalk appeared upset/shaken. Info from.

June 06, 2018 (63)
Approx 8:37pm at Venice Blvd and Wade: Accident in intersection involving 2 SUVs that sent one over a bus bench and onto the sidewalk. Info and photos from and.

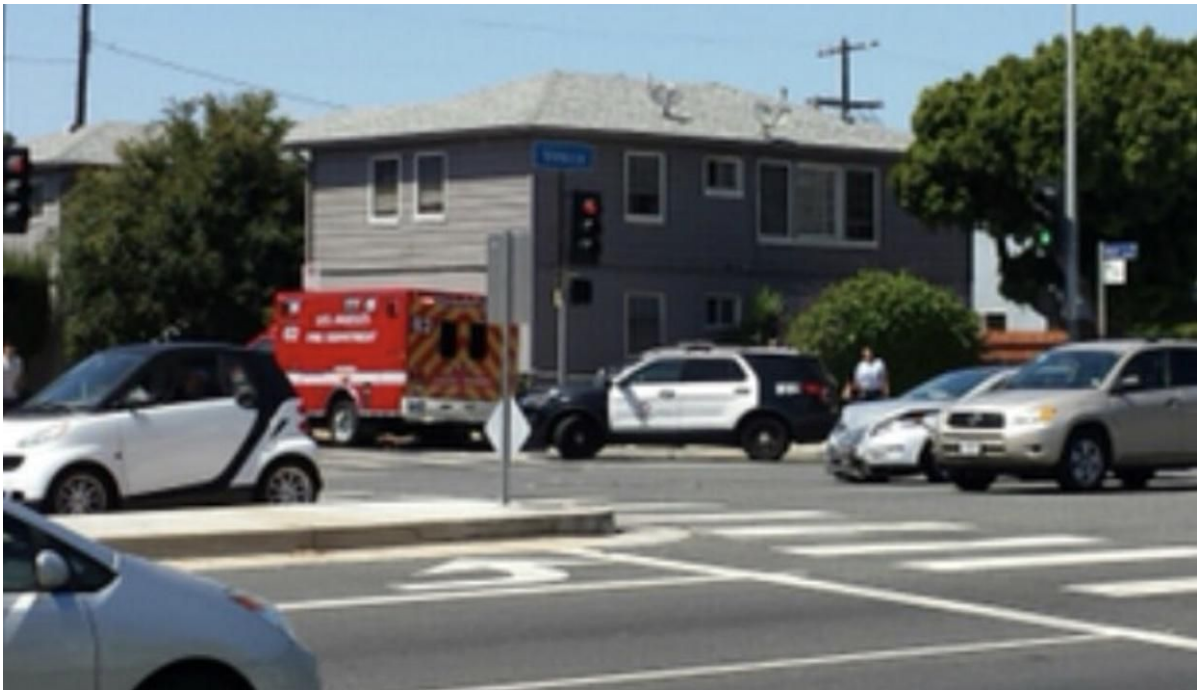






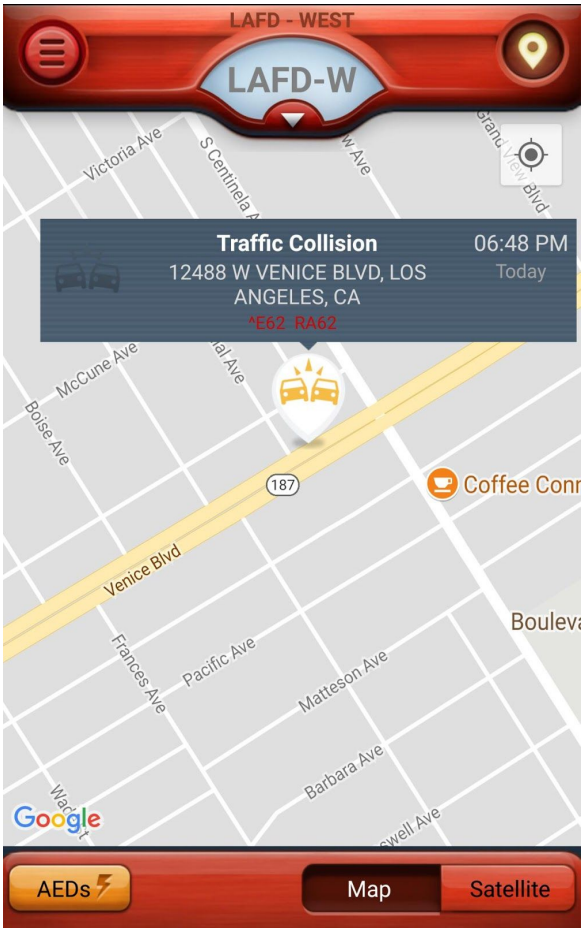
June 12, 2018 (64)

Approx 2:30pm at Venice Blvd and Wade: Accident involving an SUV and car. Police and ambulance were on scene. Info from.



June 13, 2018 (65) 🚵

Approx 6:48pm at 12488 Venice Blvd: Traffic collision reported on the PulsePoint app. Witness said a cyclist was hit by a taxi and the cyclist was taken away by ambulance.



June 28, 2018 (66)

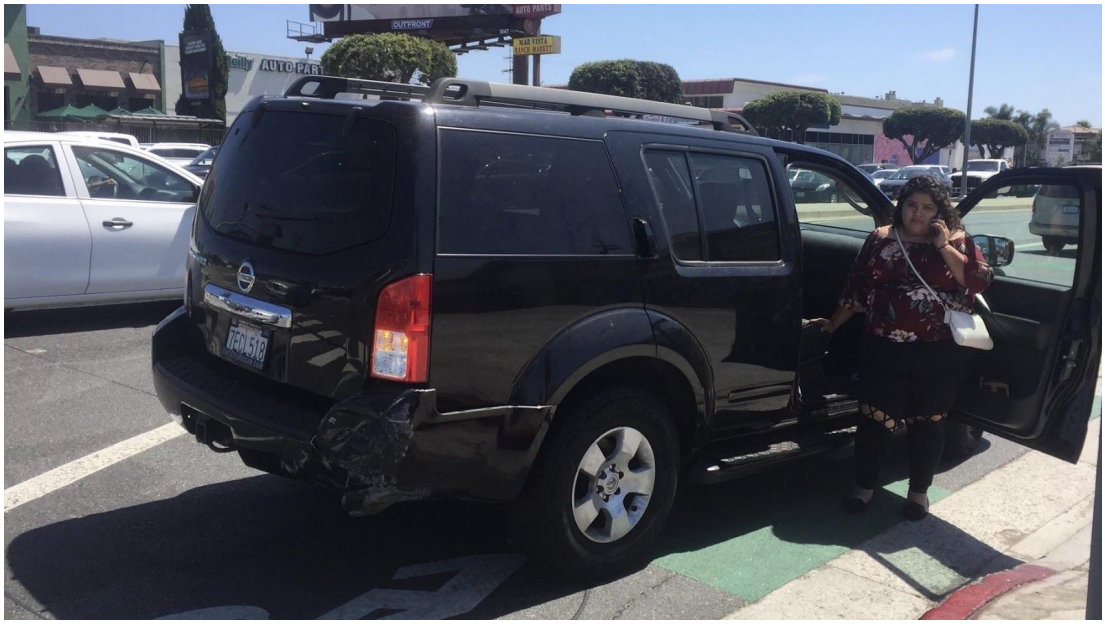
Approx morning at Venice Blvd and Mountain View: 3 car accident witnessed by.



July 14, 2018 (67)

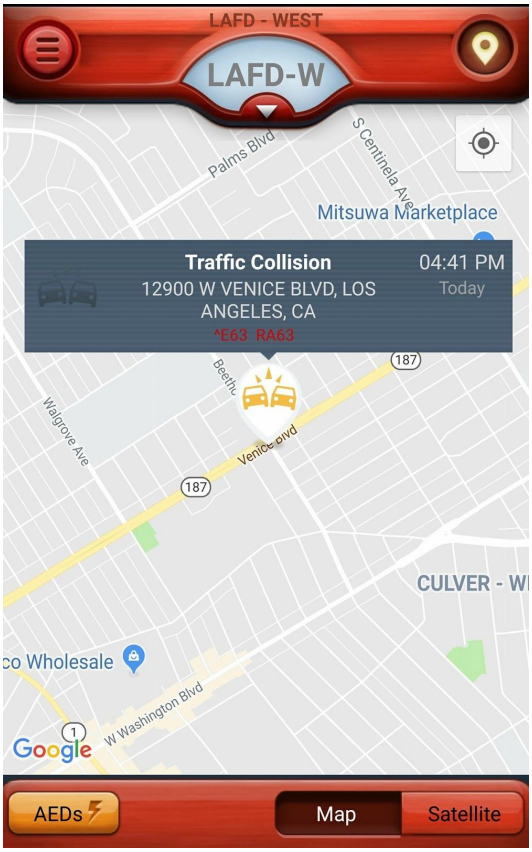
Approx 2:55pm at Venice Blvd and Centinela: Accident between 2 cars in the intersection, blue BMW was towed from scene. Photos and info from.





July 14, 2018 (68)

Approx 4:41pm at Venice Blvd and Beethoven: Traffic collision reported on the PulsePoint app.



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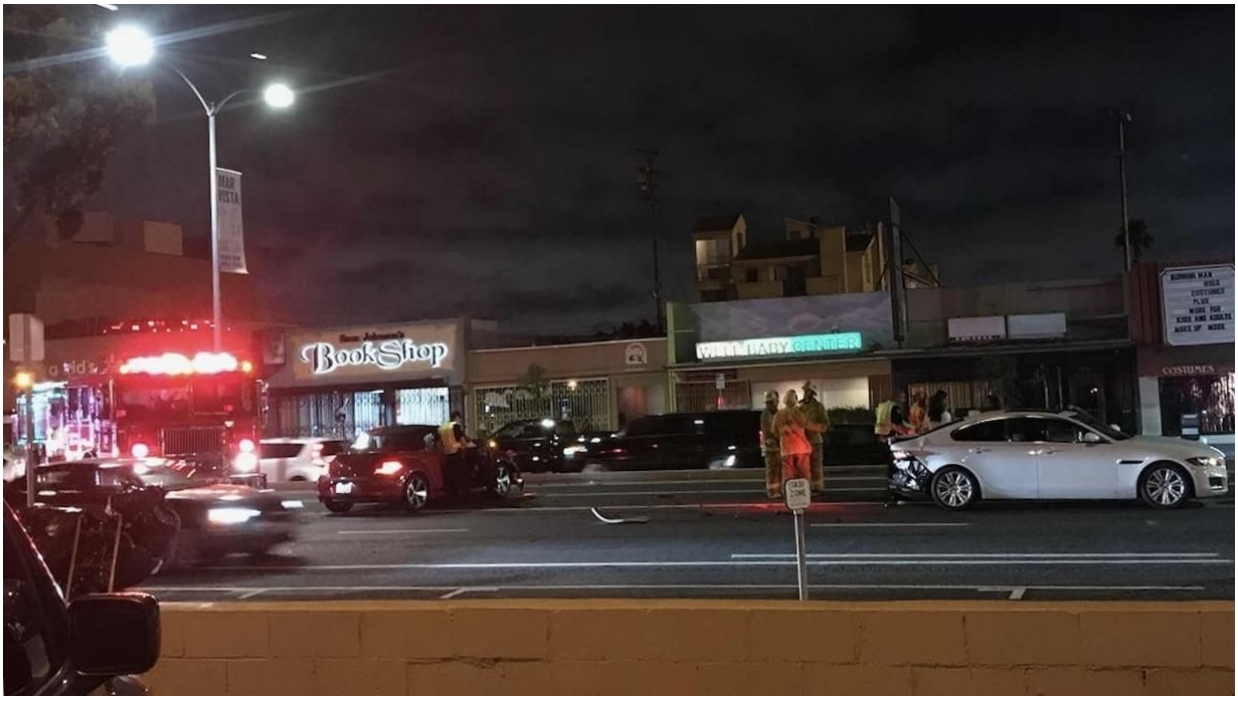
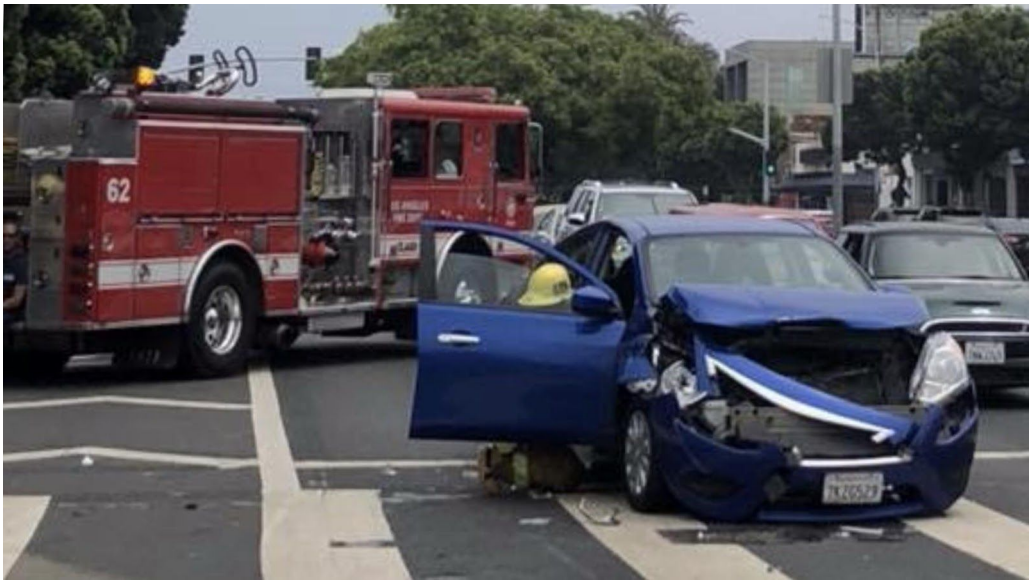
July 20, 2018 (69)

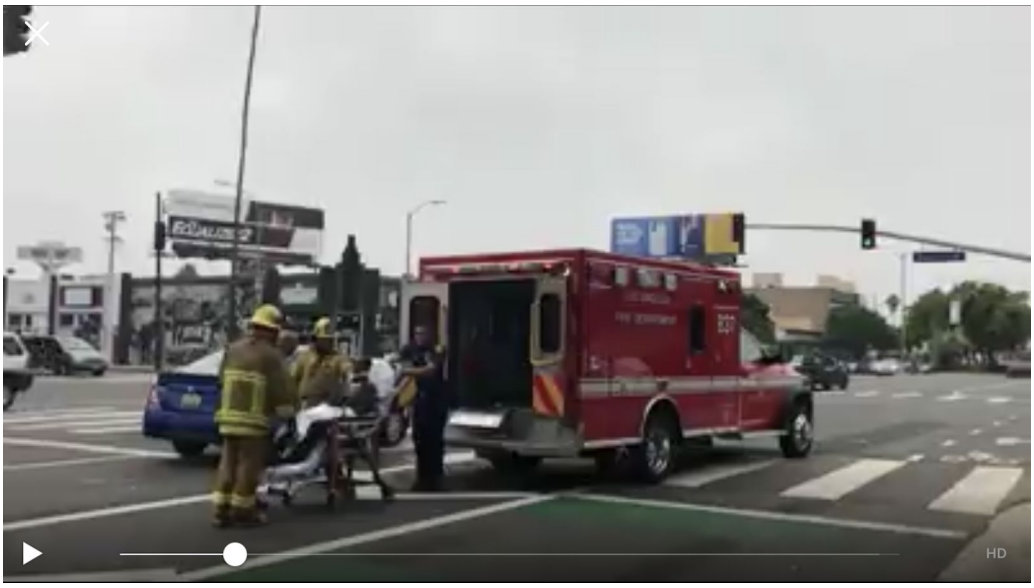
Approx 9pm at Venice Blvd between Mountain View and Centinela: 2 car accident with emergency responders on scene. Photo and info by.



July 26, 2018 (70)

Approx 12:03pm at Venice Blvd and Grand View: 3 car accident with at least 1 person taken away by ambulance. Photos and info by.





July 27, 2018 (71) 🚲

Approx 5:14pm at Venice Blvd and Stewart: Accident involving a car and bicycle. Cyclist was taken away via ambulance. Info by photo by.



August 07, 2018 (72)

Approx 11:47am at Venice Blvd and Inglewood: Person being attended to by an ambulance in the crosswalk. Photos and info by.



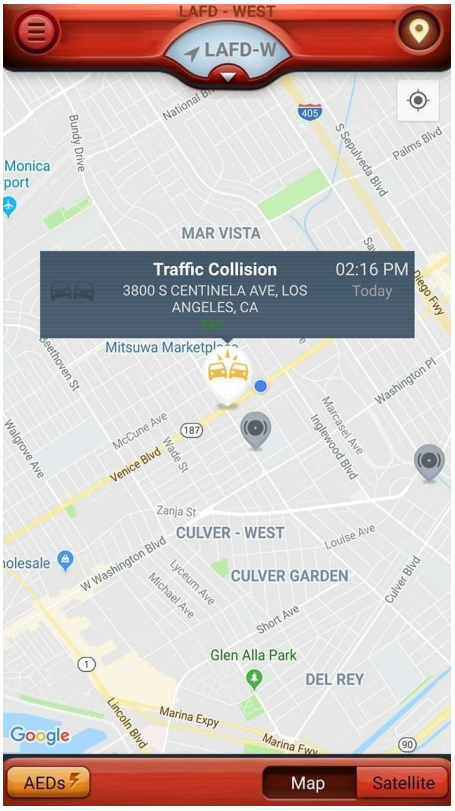
August 18, 2018 (73)

Approx 3:50pm at Venice Blvd and Wade: 2 car accident in intersection. Photo and info by Twitter user @.



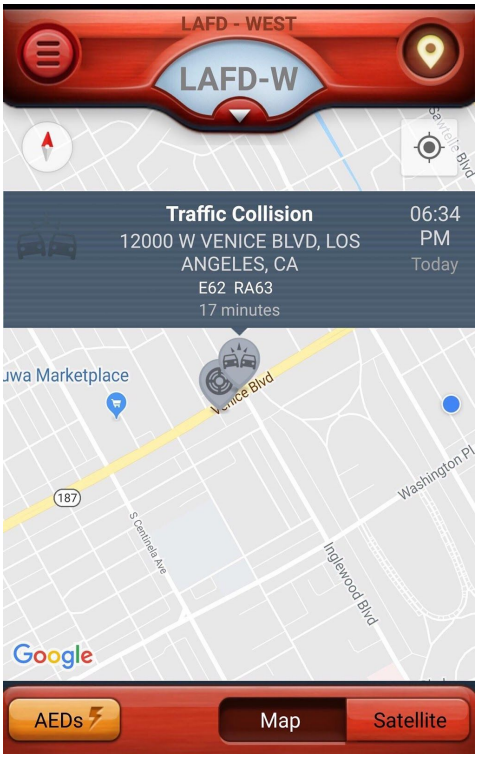
August 24, 2018 (74)

Approx 2:16pm at Venice Blvd and Centinela: Traffic collision with injuries reported on the PulsePoint app.



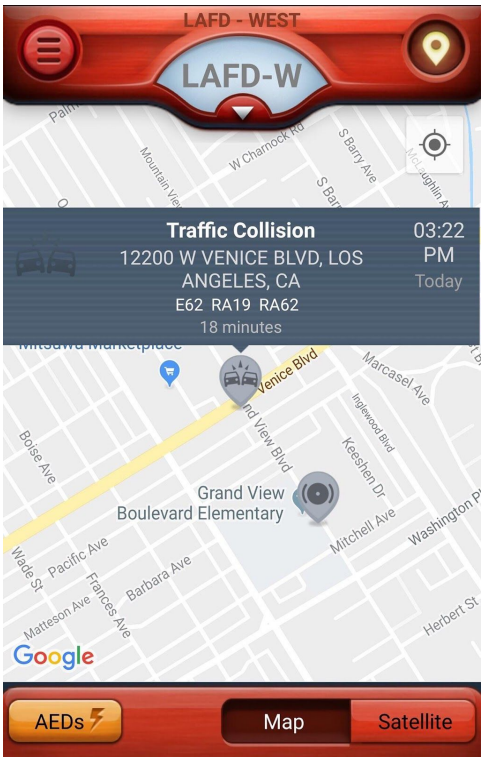
August 26, 2018 (75)

Approx 6:34pm at Venice Blvd and Centinela: Traffic collision reported on the PulsePoint app.



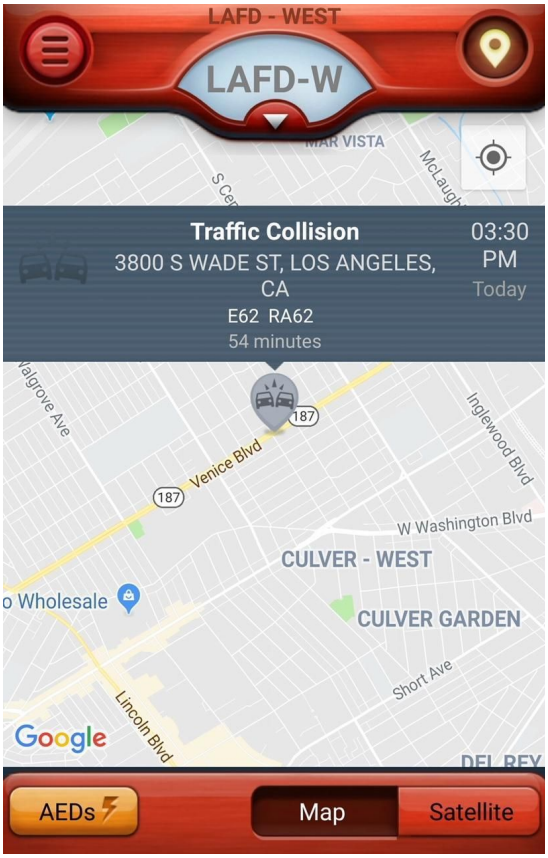
September 4, 2018 (76)

Approx 3:22pm at Venice Blvd and Grand View: Traffic collision reported on the PulsePoint app.



September 13, 2018 (77) 🚵

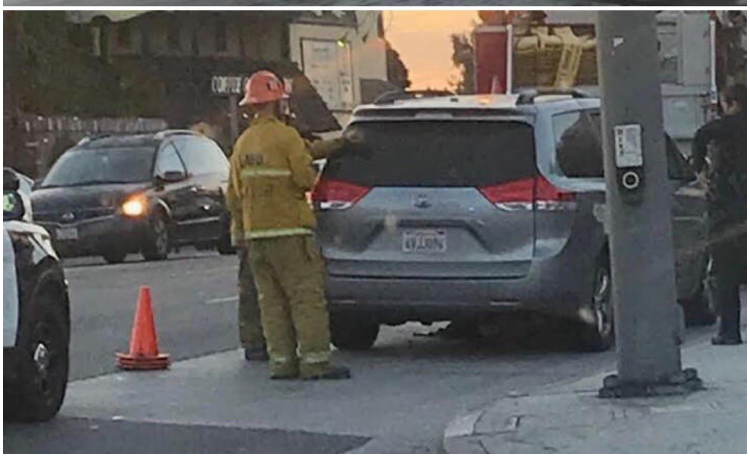
Approx 3:30pm at Venice Blvd and Wade: Traffic collision between a car and bicycle. Cyclist was transported from scene by ambulance. Info from.



October 01, 2018 (78) 🚲

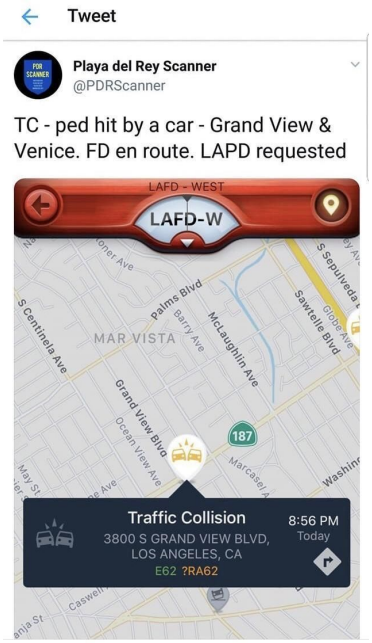
Approx 6:45am at Venice Blvd and Centinela: A cyclist traveling westbound on Venice Blvd was hit by a vehicle traveling southbound on Centinela, the cyclist then became trapped under a second vehicle. The first vehicle fled the scene and the second vehicle stopped and cooperated with authorities. The cyclist was transported from the scene by ambulance. Info provided to from the driver and passenger of the second vehicle. Photos from.





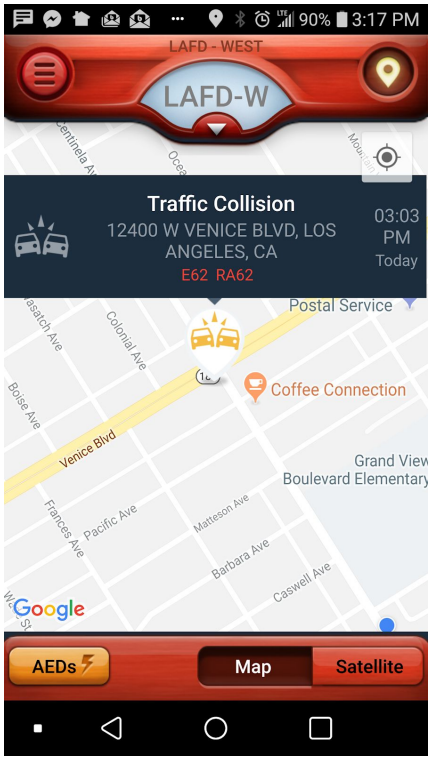
October 01, 2018 (79)

Approx 8:56pm at Venice Blvd and Grand View: Pedestrian hit by a car. Fire Dept and Police responded to scene.



October 12, 2018 (80)

Accident reported at 3:03 PM on Venice Blvd at Centinela Ave. Witnesses on scene stated that the motorcycle was merging left into the northmost left turn only lane and was in the delivery truck's blind spot. The truck slowly rolled over the motorcycle, crushing the rider's leg.






LAFD
LAFD


SYSCO
BEST BUDS
IGNITE
STARBUCKS COFFEE

Grand Rapids, Michigan – Division Street

LIVABILITY IMPROVES AS NUMBER OF LANES DECREASES

OBJECTIVE

- Improve business environment, commercial activity, and sales
- Increase parking

FEATURES

- Trial basis Road Diet
- Solicited public feedback
- Commercial district with closely spaced traffic signals

RESULTS

- Slower speeds
- Improved livability
- Increased travel times

LIVABILITY Tying the quality and the location of transportation facilities to opportunities such as access to good jobs, affordable housing, quality schools and safer streets.



Division Street has on-street parking and signals at every intersection through downtown.



BACKGROUND

The City of Grand Rapids has taken a holistic view of Road Diet implementations by identifying all 4-lane facilities within its jurisdiction, and then recording and tracking traffic volumes, corridor use, and the overall operation under existing conditions. The city recognizes the safety benefits of Road Diets and is aware of a roadway reconfiguration's potential effect on traffic operations They also recognize that Road Diets can bring a higher quality of life for users and can encourage commercial activity and sales.

This approach led the City of Grand Rapids to install a Road Diet on Division Street, from I-196 to Wealthy Street. The roadway's cross section changed from four and five vehicle lanes to three lanes and a mixture of dedicated bicycle lanes and shared lanes. Although on-street parking already existed prior to the Road Diet, the reconfiguration allowed for additional parking spots.

PUBLIC INVOLVEMENT

The city conducted two public meetings before this Road Diet was implemented to gain public support and to educate those who use the route. During these meetings, officials learned that citizens wanted the opportunity to try the Road Diet for a trial period and reconvene before implementing permanently.



The city posted signs along the corridor to solicit feedback on the Road Diet project

RESULTS

After the Division Street Road Diet installation, the City of Grand Rapids reported that businesses along the corridor are generally happy with the project because of the perceived improvement in the quality of life attributes and livability of the community. A few residential facilities along Division Street that were previously unrented for 2 years have been rented after the Road Diet brought improved bicycle accessibility. The owner of those housing facilities believes that the bicycle enthusiasts who want to live along the corridor and bike to work have contributed to an overall increase in economic activity in the area.

One lesson the city learned from this project was the need to carefully evaluate the potential effects Road Diets could have on the reliability of transit schedules. Before installation, Division Street served as a local transit route. However, the bus company decided to relocate the route to another corridor after the Road Diet because of increased travel times.

Based on positive public feedback, the City of Grand Rapids ultimately chose to retain the Road Diet permanently. While the Road Diet project produced many positive outcomes, the project resulted in some negative aspects as well. The benefits and trade-offs are summarized in the following table.[1]

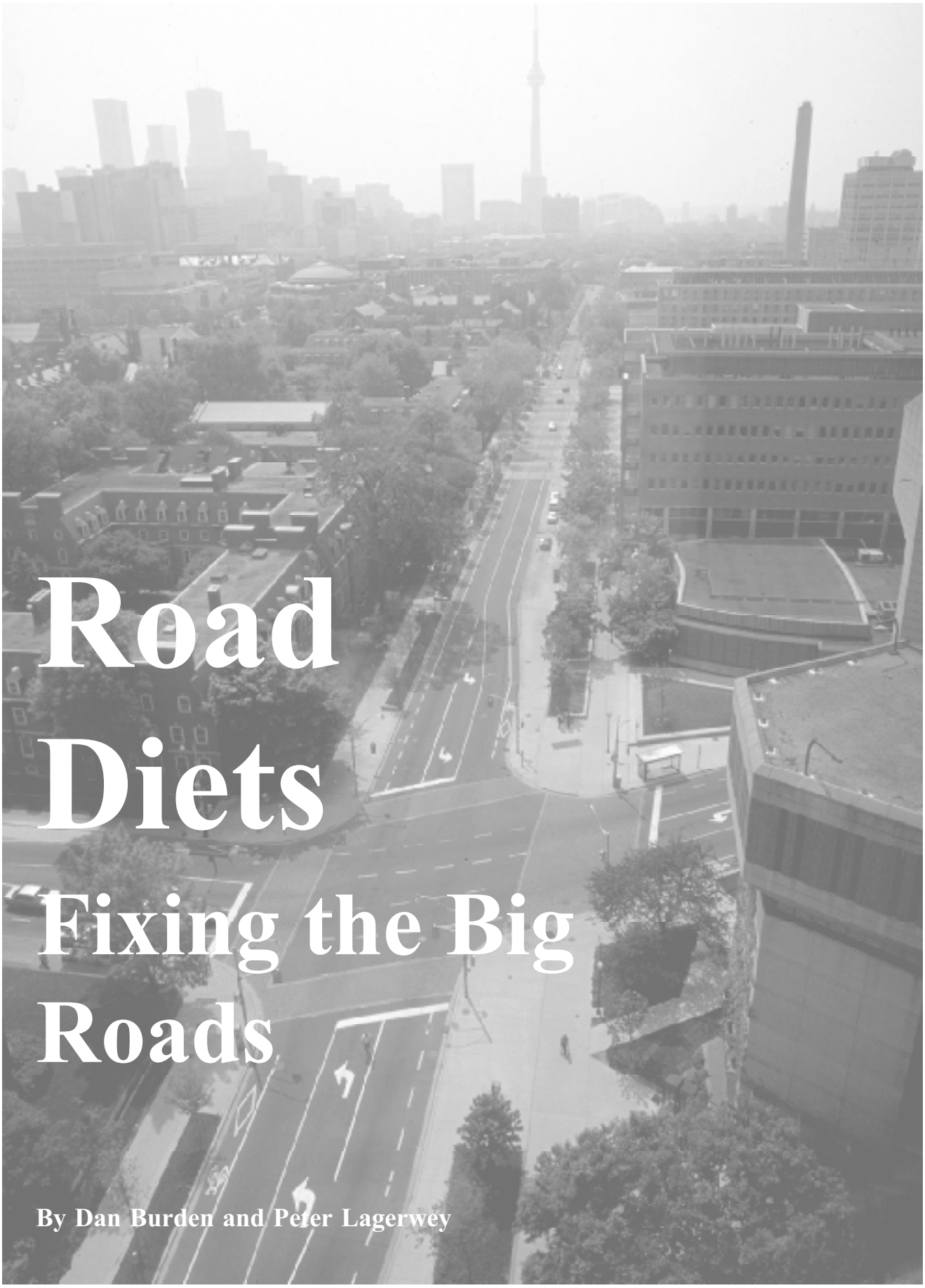
Positive Outcomes	Trade-offs
Increased parking	Increased delay
Decreased vehicle speeds (-1 to -4 mph)	Longer queues (i.e. Northbound increased from 81 feet before to 180 feet after in the PM)
Improved bicycle facilities (bike lanes/shared lanes)	Longer travel times (average increase of 19 to 52 seconds through corridor)
Reduction in head-on left turn (-38%)*, angle (-17%), and sideswipe crashes (-20%)	Rear-end crashes nearly tripled after installation.
Increased pedestrian/bicycle flow (+13% PM, +57% off-peak, and -14% AM)	Increased emissions (+19.8% AM, +1.1% off-peak, and -5.3% PM)
Decreased volumes (-18% to -29% north of Wealthy Street)	Diversion from the corridor

* Calculated from data in the referenced Report (eight crashes before to five crashes after); this percentage varies from the percentage published in the Report table

Increased emissions (+19.8% AM, +1.1% off-peak, and -5.3% PM)

From: https://safety.fhwa.dot.gov/road_diets/case_studies/

© Walkable Communities, Inc. March 1999



Road Diets

Fixing the Big Roads

By Dan Burden and Peter Lagerwey

Road Diets

Losing width and gaining respect

Can our nation's roads gain efficiency, mode share and safety by getting leaner? Many are doing just that.

Nationwide, engineers are putting roads on "diets," helping them lose lanes and width. In the process formerly "fat" streets often become leaner, safer, and more efficient. They become multi-modal and more productive. In many cases these former "warrior" roadways are tamed and turned into "angels."

Often these changed roads set the stage for millions or mega-millions of dollars in new commercial and residential development. The change can increase value of existing properties. In some cases costs of reconstructing roadways are repaid in as little as one year through increased sales tax or property tax revenue.

Roadway conversions discussed here may be just the ticket to start remaking unhealthy, unsafe city neighborhoods or commercial districts and turn them into more robust, vital, economically sound places. Road conversion may be undertaken to create safer, more efficient ways to provide access and mobility for pedestrians, bicycle riders and transit users, as well as motorists. They improve livability and quality of life for residents and shoppers. Just as with human diets, road diets without doctors' (transportation planners and engineers) analyses and prescriptions, might be foolhardy.



Turn Lanes Help Road Capacity

Capacity remains the same. *By keeping the full number of lanes at intersections, 4-lane to 2-lane conversions often keep the same high capacity of original 4-lane roadways. Turn lanes can be created at intersections.*

Mobility and Access Improve. Four-lane roadways significantly discourage mobility and access of transit users (cannot cross these streets), pedestrians and bicyclists. Communities, interested in providing higher levels of service and broadening transportation choices, find street conversions essential to success. Cities like Toronto in Ontario, Canada; Santa Monica, Pasadena, Arcada and Mountain View in California; Seattle, Kirkland, Gig Harbor, University Place and Bellevue in Washington; and Portland, Eugene and Bend in Oregon; are finding funds to increase mobility and access by reducing the number of lanes and widths of arterial and collector streets.

Conversions are Not New. Transportation engineers and safety specialists have long known that overloaded two-lane or four-lane roads of any volume can be risky places to drive, conduct business, attempt to access transit, walk or bicycle. On such roadways, frequent turning movements into commercial and residential driveways can result in high crash levels. On multi-lane roadways lane swapping adds friction and reduces performance.

Safety Improvements. In the 1980's Pennsylvania DOT engineers used FHWA safety monies to fully fund a study and to convert a one-mile section of Electric Avenue in Lewistown, Pennsylvania, from four lanes to three. The roadway was carrying 13,000 ADT. After reviewing hours of time-lapse video

and analyzing crash statistics and other data, the team concluded that more uniform flow, reduced conflicts and great reduction in crashes would result from four to three-lane conversion. The change was made facing 95% opposition from local residents, who felt that their trip times would increase.

Once the new roadway section was completed, new time-lapse photography and data collection began. Dangerous maneuvers and crashes dropped to nearly zero. Overall trip times were unaffected. Today nearly 95% of those fearing the change are openly thankful to PennDOT for making the roadway better for safety, mobility and access.



Full roadway diets still move cars, but now the corridor moves people as well. *Both Bellevue, Washington, and Mountain View, California, have converted formerly four-lane sections to pedestrian and bicycle friendly roads. Motorists benefit from more border width to fixed objects and are more comfortable with bicyclists and pedestrians.*

,

Many Roadways Await Change. America has a plethora of "leftover" four-lane roadways. Many bypasses and other road improvements leave four-lane roads ready for conversion. At the same time thousands of miles of new four-lane sections are proposed and built each year. Many of these roadways would be better designed with odd numbers of lanes or two lanes, plus medians with turning pockets.

During the past twenty years many new roadways have been constructed with three or five lanes. (Third or fifth lanes are scramble or two-way left turn lanes - TWLTLs.) These lanes add as much as 30 percent to efficiency of movement, and they often cut number of crashes in half. Significant bodies of research have proven the value of shifting left turn movements from main through movement. Typically in these cases, however, roadways have been widened from two to three lanes or from four to five lanes.

This widening often converts sidewalks and paved shoulders or requires high cost, right-of-way acquisition. In many such cases "roadway improvements" only allow more cars into traffic streams, encouraging communities to become more car dependent. Increased congestion sends roadways' *level of service* into long-term slide. Changes often generate more speed, noise and danger to people trying to walk, shop or live on main streets or neighborhood collectors. Property values can diminish, and towns lose their livability factors and competitive edges. This process of roadway widening can be thought of as fattening a patient. The belt is let out another notch, and the patient puts on a few more unhealthy pounds toward auto dependency.

The Road Diet. "Road dieting" is a new term applied to "skinnying up" patients (streets) into leaner, more productive members of society. The ideal roadway patient is often a four-lane road carrying 12-18,000 auto trips per day. Other roadway patients may be helped through this same process. Some especially sick four-lane patients may be carrying 19-25,000 cars per day, but still qualify for diets. What are the symptoms that scream for change? What roadways are ideal patients? And what are the upper limits?



Spare Lanes Reward Speeders

NW 8th Avenue in Gainesville, Florida. *This four-lane roadway is an excellent candidate for "road dieting." Today, motorists race from the signal anticipating the merge to 2-lanes, 3000 feet ahead. Excessive speeds of 50 mph are common. School, park and bicycle trail crossing are located here. Two-lane roadway with bike lanes, medians and turning lane at the intersection is suggested by safety advocates as an alternative. The redesigned roadway would increase capacity by lowering speed.*

Sick Road Patient Symptoms. Four lane roadways often generate excessive speeds. These roadways also erode the ability for transit, walking and bicycling to succeed. How does this happen? Motorists using four-lane roadways, note that there are always spare lanes in their direction. They tend to drive faster than they should. Motorists using multi-lane roads seek to match speeds of other drivers. Imprudent, speeding drivers tend to set prevailing speeds. As traffic volumes increase, especially at rush hour, risk of high-speed driving increases. During peak volumes, right or left-turning movements occur. Also during these times, many motorists drive close to one another creating "screens" of impeded view. Last minute, instant swapping of lane behavior to stay in motion leads to serious rear-end crashes. Motorists move from lanes of slowing vehicles directly into the backs of other motorists who have already slowed for their turns. The upper comfort range for arterial conversions appears to be between 20-25,000 ADT. Higher numbers have been achieved. Santa Monica officials feel most comfortble capping at 20,000, although they have hit 25,000.

Pedestrians at Risk. Pedestrians have rugged times finding gaps across four lanes. Crash rates and severity of conflicts with autos result in almost certain death (83% of pedestrians hit at 40 mph die). Many bicyclists find four-lane roads too narrow to ride comfortably. Transit users cannot safely cross streets at most locations. Thus, many people, who have formerly had mode choice, give up trying to cross streets converted to four lanes. Instead they join the daily traffic stream and add to the roadways' level of service drain.

Typical Patient and Process. Burcham Road in East Lansing, Michigan, was formerly a "fat road." Speeds were excessive. Pedestrians near the high school found it unsafe to cross the four-lane roadway. Neighbors complained about noise and danger. East Lansing's traffic engineer, John Matusik, P.E., felt that this roadway was a prime candidate for a road diet. The roadway carried 11-14,000 cars per day (AADT). Viewed from another perspective, 14,000 cars in four lanes over a ten hour period is only 3,500 per lane per day, or 350 per hour for a ten-hour period. Each lane is capable of carrying 1,900 cars per hour. Thus, cutting the number of lanes in half wouldn't affect traffic capacity.

The Diet Begins. The change on Burcham Road was made (see picture). With "leftover" road space John added turn lane (TWLTL) and bike lanes. The bike lanes give motorists more border width, moving them six feet further from fixed objects such as utility poles, hydrants and other fixed objects. Cars move today at more uniform speeds (prudent drivers set prevailing speeds). People are able to enter and exit driveways more easily.



Burcham Road's Four-Lanes to Three-Lanes

Pedestrians and motorists are more comfortable today. Motorists are easily 10 feet from fixed objects. As much as sixteen feet separate pedestrians from motorists.

Pedestrians have six feet more separation from motorists. Comfort levels of all people using the corridor have markedly improved.

Bigger Roads, Same Diet. Once John had proven he could make a moderate volume, four lane into a healthier patient, he pushed Michigan DOT to use the same diet strategy on a higher volume road, the central artery through East Lansing, Grand River Boulevard. The 23,000 AADT roadway had been sluggish and risky for years. People did not enjoy living along it or driving, walking, using transit or bicycling this corridor. This roadway section was 1.1 miles in length. The roadway serves as a regional traffic distributor. It has minimal number of commercial driveways, thus turning movements are modest.

Two Stage Implementation. Michigan DOT staff took deep, uncertain breaths and made this higher volume road conversion in two safe, evaluative steps. As Michigan DOT resurfaced Grand River Boulevard, they wanted the option of going back to four lanes if the "experiment" didn't work. They painted new lane markings, using two-lanes, plus center turn lane (TWLTL). They omitted bike lanes in the first stage. Some drainage grates needed to be swapped before they added bike lanes. But they also wanted the chance to switch back. The conversion worked, but it was slightly shaky. With the loss of two lanes on the departure side of signalized intersections, traffic now merged into orderly, lower paced movement. Speeds came down to more preferred speed of around 35 mph (down from 40). Yet, some confusion remained. Resulting travel lanes were sixteen feet wide. Second stage markings were made six months later. Bike lanes were added, narrowing travel lanes to twelve feet. Speeds were reduced slightly more, and confusion ended. Today planners and engineers from both city and state report greater safety, efficiency, and more than adequate movement during peak hours. Again, people walking, using transit and bicycling find the area more comfortable and safe. Crash records are being kept. Potential conflicts and speeds are greatly reduced. Property owners are pleased with reduced speeding, noise and challenge of entering and exiting their driveways safely. Bike lanes give them more turning radius and improved sight triangles.

Today East Lansing is in the early stages of converting two to six more roadways. They find that they can make many of these conversions at no cost. They wait for lane markings to fade (easy with winter snow plow scraping), or they make changes with resurfacing projects.

Other Cities, Higher Numbers. East Lansing is not the first community to make these changes. Seattle, Portland and Santa Monica are three communities that have been making these lane

reductions for years. Seattle made its first conversion (N 45th Street in 1972. Since then they have successfully converted 8 additional roadways. Many of these include commercial sections.

Kirkland, Washington, Pushes Numbers to the Limit. So far, the record for roadway conversion with highest traffic counts is Lake Washington Boulevard in Kirkland, Washington. This largely residential street travels by high priced homes with spectacular views of Lake Washington. When Lake Washington Boulevard was operated with four lanes, capacity problems were reached most evenings. Residents trying to enter or exit driveways on both sides of the road tended to constrain the flow on the 20,000 AADT roadway. Switching to three-lanes on the roadway was easy. The results were impressive not only to drivers, but to pedestrians, transit users and bicyclists as well. Motorists now had substantial added border width to fixed objects. Residents saw reduction in speeding and noise levels, and they could now enter and exit their driveways much more easily.

High Volume Conversion in Kirkland



For a short period during area road construction, Kirkland's Lake Washington Boulevard picked up additional load and was successfully carrying 30,000 ADT. This four-lane to three-lane conversion has been very successful. Note how much easier it is for motorists to enter and exit driveway., Added border width provides motorists safer conditions. Caution, this 30,000 figure is real for one portion of this roadway, but may be beyond the comfort range of many. For a more comfortable number 20-23,000 is achieveable in most areas.

Kirkland Tests Ceiling with Lake Washington Boulevard. In 1995, Kirkland closed another roadway for reconstruction. They forced totals of 30,000 vehicles (ADT) onto the two + TWLTLroadway. The roadway never crashed. These extremely high numbers continue to astound researchers. What is the upper limit? This 30,000 ADT may be it. In most cases carrying capacity numbers must be lower. Researchers do not have enough knowledge to say where and how peaks are reached, but many feel comfortable with 20-23,000 ADT's. Each community must set its own upper limits.

Four-Lane to Two-Lane Conversions. More aggressive diets drop four lanes down to two. Fewer roadways can undergo this more aggressive conversion. Roadway conversions in Toronto, Ontario, are proving safety and livability benefits of these changes, while holding to previous capacities. More than six formerly four-lane roadways have been converted to either two-lane roads with medians and turning pockets, or simply two lanes. St. George Street, a principal arterial through the University of Toronto Campus is perhaps the best known. This 16,000 ADT roadway owes its success to low number of driveways. The roadway holds its full capacity at intersections by keeping the previous number of storage lanes. The 1.l mile roadway project was launched when a local benefactor to the University of Toronto challenged the city to the improvement by putting up her $1 million in match money. The University contributed $500,000 (Canadian), and the City of Toronto gave the additional $2.5 million match for a total rebuild price of $4 million. The road was totally reconstructed. New foundations, improved intersections, greatly widened sidewalks, bike lanes and full canopy of

St. George Street in Toronto, Ontario



(Right and Above) In 1997 this one-mile section of St. George Street was converted from four lanes to two lanes at a cost of $4 M Canadian. The roadway carries the same capacity as before. Note capacity is well handled at each intersection. The project began when a benefactor to the University of Toronto pledged $1M on the condition that the University and City would contribute the balance of $3million.

trees were placed. Today walking, transit and bicycling are pleasurable activities; speeding has dropped, and the center of campus has come alive with people.

Other Four-Lane to Two-Lane Conversions. Toronto has also converted five other roadways. In each case the same volume of auto traffic is serviced, always at lower, more appropriate speeds. As with four-lane to three-lane conversions, prudent drivers set the speed. Many of these additional roadways operate with 11-17,000 ADT. Some sections are reduced from four lanes to two lanes to incorporate critical pedestrian crossings; then they widened back out 1,000 feet further downstream. Many combinations of road diet techniques are practicable. Seattle, Washington; Portland, Oregon; Santa Monica and Mountain View, California; and dozens of other cities are making similar conversions. These streets are made more business, resident, transit, bicycle and pedestrian friendly by placing medians with turning pockets and bike lanes in the mix.

What is the future? In the past two years the principle author of this article, Walkable Communities Director, Dan Burden, has been to more than 500 cities in North America. Almost every town he visits has at least two or three streets ideal for conversion. In California, alone, more than 20 cities have made successful conversions. Dan's advice, "Elected officials, business leaders and engineers should look for easy conversions first." All but the most self-evident projects are likely to generate concern from business leaders and nearby residents who worry that traffic might back into their neighborhood streets. The public has come to believe that the only way to improve roadways is to widen entire sections. Model projects are needed.

Best Model Projects. First projects should include roadways with some of the following criteria:

- Ö Moderate volumes (8-15,000 ADT)
- Ö Roads with safety issues
- Ö Transit corridors
- Ö Popular or essential bicycle routes/links
- Ö Commercial reinvestment areas
- Ö Economic enterprise zones
- Ö Historic streets
- Ö Scenic roads
- Ö Entertainment districts
- Ö Main streets

The Process of Change. Street conversions are as much process as they are product. Due to the controversial nature of the first road diet conversions, it is essential to involve the public through highly interactive processes. As pointed out earlier in this article with Electric Avenue in Lewistown, Pennsylvania, 95 percent of the citizens were against the change.



Effective process often includes focus groups, and highly interactive workshops and designs. Citizens, residents and business owners should help design both process and product. Many cities are learning to conduct 3-6 day planning charrettes to gain input from a variety of people who then gain ownership of the results.Atlantic Boulevard in downtown Del Ray Beach, Florida, was converted from four-lane to two-lane roadway at the request of retailers. This request was the reverse of previous thinking. Merchants often feel that more traffic passing their doors is better for business. In Del Ray Beach the decaying downtown forced merchants to take another look. Retailers worked with the city manager, elected officials, and chamber of commerce to weigh their risks and suggest changes. The net result of this street conversion is one of the more successful downtowns in Florida, and significant increase in local sales and tax base for the town. Motorists did not leave Atlantic Boulevard to take advantage of two new lanes of travel on parallel streets. They come through the now attractive center, cruising at 15 mph.

Lane Reductions of Select Street Conversions-- Volume Changes

Roadway Section	Change	ADT (Before)	(After)	Notes
1. Lake Washington Blvd., Kirkland, Washington South of 83	4 lanes to 2 + TWLTL + bike lanes	23,000	25,913	
2. Lake Washington Blvd, Kirkland, Washington Near downtown	4 lanes to 2+ TWLTL + bike lanes	11,000	12,610	
3. Electric Avenue, Lewistown, Pennsylvania	4 lanes to 2 + TWLTL + bike lanes	13,000	14,500	
4. Burcham Road, East Lansing, Michigan	4 lanes to 2 + TWLTL + bike lanes	11-14,000	11-14,000	
5. Grand River Boulevard, East Lansing, Michigan	4 lanes to 2 + TWLTL + bike lanes	23,000	23,000	
6. St. George Street, Toronto, Ontario, Canada	4 lanes to 2 + bike lanes + wide sidewalks	15,000	15,000	
7. 120th Avenue, NE Bellevue, Washington	4 lanes to 2 + TWLTL	16,900	16,900	
8. Montana (commecial street) Bellevue, Washington	4 lanes to 2 lanes + TWLTL 4 lanes to 2 + median + bike lanes	18,500	18,500	
9. Main Street Santa Monica, California	4 lanes to 2 lanes + TWLTL 4 lanes to 2 + median + bike lanes	20,000	18,000	

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Lane Reductions of Select Street Conversions-- Volume Changes

Roadway Section	Change and Date	ADT (Before)	ADT (After)
9. Danforth Toronto, Ontario, Canada	4 lanes to 2 + bike lanes 4 lanes to 2+ turning pockets+ bike lanes	22,000	22,000
Seattle, Washington			
10. Greenwood Avenue N, from N. 80th St to N 50th	4 lanes to 2, plus TWLTL Plus Bike lanes April, 1995	11,872	11,2427
11. N 45th Street in Wallingford Area Seattle, Washington	4 lanes to 2 lanes plus TWLTL December, 1972	19,421	20,274
12. 8th Ave. NW in Ballard Area Seattle, Washington	4 lanes to 2 lanes plus planted median with turn pockets January, 1994	10,549	11,858
13. Martin Luther King Jr. Way, north of I-90	4 lanes to 2 lanes plus TWLTL, plus bike lanes Jan 1994	12,336	13,161
14. Dexter Avenue, N. East side of Queen Anne Area	4 lanes to 2 lanes plus TWLTL and bike lanes	13,606	14,949
15. 24th Ave. NW, from NW 85th St. to NW 65th St.	4 lanes to 2 lanes plus TWLTL	9,727	9,754
16. Madison St., from 7th Ave. to Broadway	4 lanes to 2 lanes plus TWLTL	16,969	18,075
17. W. Government Way/Gilman Ave. W,. from W Ruffner St. to 31st Ave. W.	4 lanes to 2 lanes plus TWLTL plus bike lanes	12,916	14,286

Dan Burden served for sixteen years as state bicycle and pedestrian coordinator for the Florida Department of Transportation. In his new role as the director of Walkable Communities, Inc., Dan has promoted and helped the process for more than a dozen conversions of collector and arterial streets. Dan teaches courses for the Federal Highway Administration, National Highway Institute and the National Highway Traffic Safety Administration. Dan is the author of the Healthy Streets booklet which provides guidelines for building traditional neighborhood development (TND), published by the Local Government Commission, Center for Livable Communities. For more information contact webpage: www.lgc.org/clc/

Peter Lagerwey is the pedestrian/bicycle coordinator for the City of Seattle Engineering Department. Peter has overseen and monitored conversion of four street lane reduction projects. Peter recently spent a full year on assignment as pedestrian/bicycle planner for Perth, Australia. Peter is an instructor for FHWA's Pedestrian Road Show, as well as for a number of state agencies.

Additional Article: See Andrew G. MacBeth, P.E. Calming Arterials in Toronto, paper delivered to the 68th ITE Annual Meeting, August 10, 1998 (Accepted by ITE for 1999 publication in ITE Journal)

Data on Street Conversions - Seattle, Washington

ROADWAY SECTION	DATE CHANGE	ADT (BEFORE)	ADT (AFTER)	CHANGE
Greenwood Ave. N, from N 80th St. to N 50th St.	April 1995	11872	12427	4 lanes to 2 lanes plus TWLTL plus bike lanes
N 45th Street in Wallingford Area	December 1972	19421	20274	4 lanes to 2 lanes plus TWLTL
8th Ave. NW in Ballard Area	January 1994	10549	11858	4 lanes to 2 lanes plus planted median with turn pockets as needed
Martin Luther King Jr. Way , north of I-90	January 1994	12336	13161	4 lanes to 2 lanes plus TWLTL plus bike lanes
Dexter Ave. N, East side of Queen Anne Area	June 1991	13606	14949	4 lanes to 2 lanes plus TWLTL plus bike lanes
24th Ave. NW, from NW 85th St. to NW 65th St.	October 1995	9727	9754	4 lanes to 2 lanes plus TWLTL
Madison St., from 7th Ave. to Broadway	July 1994	16969	18075	4 lanes to 2 lanes plus TWLTL
W Government Way/Gilman Ave. W, from W Ruffner St. to 31st Ave. W	June 1991	12916	14286	4 lanes to 2 lanes plus TWLTL plus bike lanes
12th Ave., from Yesler Way to John St.	March 1995	11751	12557	4 lanes to 2 lanes plus TWLTL plus bike lanes

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			CAR & CAR		Sub tot-al			Sub total	CAR & PED		Sub total	TOTAL	% CHA-NGE	FATAL		TOTAL	INJURIES		TOTAL	% CHAN-GE
			I	M-B		I	M-B		I	M-B				I	M-B		I	M-B		
1	Greenwood Ave N & N 80 Street	BEFORE	19	5	24	0	0	0	0	0	0	24	-58.3	0	0	0	10	5	15	-20.0
		AFTER	5	4	9	0	1	1	0	0	0	10		0	0	0	6	6	12	
2	N 45 Street & Wallingford Av N	BEFORE	6	37	43	0	0	0	1	1	2	45	-48.9	0	1	1	2	5	7	+14.3
		AFTER	11	12	23	0	0	0	0	0	0	23		0	0	0	3	5	8	
3	8 Ave NW & NW 65 Street	BEFORE	8	7	15	2	0	2	0	1	1	18	-61.1	0	0	0	6	2	8	-37.5
		AFTER	5	1	6	0	0	0	1	0	1	7		0	0	0	4	1	5	
4	ML King Jr Wy & Yesler Way	BEFORE	8	7	15	0	0	0	0	0	0	15	-60.0	0	0	0	4	6	10	-80.0
		AFTER	4	2	6	0	0	0	0	0	0	6		0	0	0	2	0	2	
5	Dexter Ave N & Roy Street	BEFORE	12	4	16	1	0	1	2	0	2	19	-15.8	0	1	1	6	1	7	+114.3
		AFTER	9	7	16	0	0	0	0	0	0	16		0	0	0	6	9	15	
6	24 Ave NW & NW 80 Street	BEFORE	11	3	14	0	0	0	0	0	0	14	-28.6	0	0	0	9	1	10	+60.0
		AFTER	5	4	9	0	0	0	1	0	1	10		0	0	0	10	6	16	
7	Madison Street & Boren Avenue	BEFORE	12	15	27	0	0	0	0	1	1	28	0	0	0	0	9	7	16	-37.5
		AFTER	9	18	27	0	0	0	1	0	1	28		0	0	0	5	5	10	
8	Gilman Ave W & W Emerson Pl	BEFORE	5	1	6	0	0	0	0	0	0	6	0	0	0	0	0	2	2	-100.0
		AFTER	3	3	6	0	0	0	0	0	0	6		0	0	0	0	0	0	
9	12 Avenue & Cherry Street	BEFORE	5	8	13	1	0	1	2	0	2	16	0	0	0	0	5	1	6	+16.7
		AFTER	4	11	15	1	0	1	0	0	0	16		0	0	0	3	4	7	
	TOTAL	BEFORE	86	87	173	4	0	4	5	3	8	185	-34.1	0	2	2	51	30	81	-7.4
		AFTER	55	62	117	1	1	2	3	0	3	122		0	0	0	39	36	75	

* LEGEND: I = Intersection
M-B = Mid-Block

Additional Road Diets Experiences

Santa Barbara

Over a decade ago, the City of Santa Barbara created bike lanes on two parallel one-way streets by removing one of the two existing traffic lanes. The City's original proposal was to remove parking from one side to keep two traffic lanes plus put in a bike lane. But since the streets are mostly residential, the people pressured the City to keep parking and lose a traffic lane instead. Just about everybody thinks that it's a good solution.

In the next two months, another street will change from 4 traffic lanes to three (middle turn lane) plus bike lanes on both sides.

Ralph Fertig
Santa Barbara Bicycle Coalition
www.sbbike.org

Palo Alto

Palo Alto did so on two streets (University Ave. & East Meadow Drive) in 1974 as part of its overall bikeways plan. Since then Mountain View has done so on at least two streets, and just recently Sunnyvale has approved doing so on part of Mathilda.

Ellen Fletcher

Sacramento

In Sacramento, on Auburn Boulevard, the city installed a bike lane by taking out on-street parking. After a few months of this, the businesses howled. The City Council decided that the viability of the businesses were more important, so they took the bike lane back out and put the parking back in.

This didn't happen that easily, though, since I put the question to the traffic engineers about taking the travel lane space and give it to bikeway space. We were lucky this time, since there were two travel lanes one direction and one travel lane going the other. When we challenged the staff to find out if they could shift the center line over so that it was one travel lane in each direction, they answered that, yes, indeed this was a possibility. So they did it, and we got our bike lanes back and the businesses had their parking! My only complaint was the time it took to get the final product. It took them less than a week to re-establish the on street parking, and over a year to re-adjust the lane striping. So, in a round-about way, we did get a travel lane removed for the installation of a bike lane. But it was with a lot of luck that this happened. It isn't that common to find a spare travel lane that has a low enough ADT to let the traffic engineers feel like giving it over to the bicycles. This incident is unusual for Sacramento, so I wouldn't necessarily consider it to be the result of progressive thinking--they still need some help in that department.

Ed Cox
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Santa Cruz

Santa Cruz has proposed reducing Soquel Avenue from 4 lanes to 3 (two plus turn lane) in order to install bike lanes, but has not yet done so.

Cambridge

A portion of Massachusetts Avenue, the main drag of Cambridge, MA (also a state numbered route) was redesigned, going from 4 lanes to 3, allowing not only bicycle lanes but also wider sidewalks and maintaining parking. ADT is approx. 21,000. There are a couple of turning lanes. The project was completed about a year ago.

Cara Seiderman
City of Cambridge, MA

Mountain View and Sunnyvale

1) A few years ago Mountain View, CA restriped the section of Dana Street from Calderon to Pioneer (across Highway 85, the Stevens Creek Freeway), from 2 lanes each direction to 1 lane + bike lane in each direction, adding a planted median. Contact rene.dalton@ci.mtnview.ca.us, their BAC staffer, for details.

2) Mountain View also restriped Cuesta (Drive?) west of Miramonte from 4 lanes down to 3 (i.e. center turn) with bike lanes. This was done during a sewer line upgrade that required tearing up that whole stretch anyway. That end of Cuesta abuts neighboring Los Altos, which never did 4-lane their collector streets back when Silicon Valley was rapidly building out its street network; I believe that stretch of Cuesta didn't really need 4-lane capacity anyway.

3) Sunnyvale, CA just decided to restripe Mary Avenue between Fremont Avenue and Homestead Road to add bike lanes. I don't know the details on before and after lane counts on that stretch, but believe it's currently 2 lanes with on-street parking and a center 2-way left turn lane. Contact pubworks@ci.sunnyvale.ca.us or BAC staffer Jack Witthaus <jwitthaus@ci.sunnyvale.ca.us>.

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Greenbelt, MD

Glad you asked. The City of Greenbelt, MD eliminated two traffic lanes on Ivy Lane and Cherrywood Lane to make room for bicycle lanes to the new Greenbelt Metro Station. The objectives were to (1) improve bicycle access to the Metro Station (2) to calm traffic (3) to improve aesthetics and (4) to provide a median area for pedestrians crossing the road. We are very happy with the results. Eventually, we plan to landscape the median. The plans caused a tremendous uproar in 1996. The City received letters and complaints from the County Executive, the Governor and our Congressman. They called Cherrywood Lane crucial to development plans near the Greenbelt Metro Station.

The configuration was 12'-12'-12'-12'-12 narrowing to 12'-12' 12'-12' at an overpass. The configuration today is 8'-6'-11'-18'median-11'-6' narrowing to 6'-11'-14'median-11'-6' at the overpass. The 8' lane is a parking lane. The 6' lanes are marked and signed as bike lanes.

Greenbelt has a 60 year tradition of innovative planning and of making bicycle and pedestrian access a priority. Our City Council loves to talk about Greenbelt's bike lanes.

Bill Clarke
Chairman, Greenbelt Bicycle Coalition

Austin, TX

To date we have removed travel lanes from two streets to make bike lanes. These streets were operating below capacity as striped and we could demonstrate that the level of service would be acceptable after the changes. There has been serious opposition to one near a federal IRS/Treasury/Veteran's complex. The administrators were convinced that the roadway with bike lanes would make their lives miserable due to increased congestion. They continue to pressure the department and City Council so the final outcome is uncertain at this time.

We are considering several other streets to remove travel lanes in favor of bike lanes, but it will take some time to go through the political process to get this done.

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Bicycle and Pedestrian Program Coordinator
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Ottawa

We have a project in Ottawa where a bridge is being reconstructed. The original cross-section included two HOV (buses only) lanes and four car lanes (2 in each direction). The new cross-section includes two HOV (buses only) in the outside lanes, then two car lanes and two bicycle lanes (one in each direction). A median was also added. In essence, two car lanes were given over to bicycle lanes and a median. The bridge opens this spring - we can hardly wait!

Daphne Hope
Alternative Transportation Planner

Denver

In Denver, we are removing 2 lanes of traffic on a collector street for approximately 2000' alongside a city golf course so that we can build a 12' wide bikeway/multi use trail alongside the golf course frontage. The lanes on the street were very narrow (10' wide I think) and the center turn lane served little purpose. The bike route that we will sign runs the full width of the city - this was the major missing link. The process to do this was NOT FUN.

James MacKay

Boulder

Last year, after significant public process, the City of Boulder also removed a traffic lane to add a bike climbing lane on Table Mesa Drive. The roadway was build in a era of different development expectations, and traffic counts indicated that this could easily be done. However there was still significant public concern, which was in part addressed by first doing a trial run where we blocked the lane with barricades for three weeks and collected data, and then by selecting a non-structural project design where the changes were made by paint rather than moving the curb face. This addition links several significant bike facilities and is working great.

Randall Rutsch
Transportation Planner
City of Boulder, CO

Salem, OR

The city of Salem, Oregon reconfigured 4 lanes to two lanes plus center turn lane and bike lanes on 17th Street and possible others.

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http://www.odot.state.or.us/techserv/bikewalk/index.htm

Portland & Corvallis

The cities of Corvallis and Portland removed a travel lane from one-way couplets that had 4 lanes in each direction (they now have 3). On top of bike lanes, motorists benefit from the reduced need to weave (getting from one side to the other in anticipation of having to turn left or right), and pedestrians benefit from easier crossing (Portland reduced pavement width and widened sidewalks and built curb extensions at sidewalks). ODOT bicycle and pedestrian program was instrumental in preventing a couplet project from going to four lanes in one direction, and keeping at 3 (Albany). So it's not uncommon. Seattle does it for traffic-calming.

Michael Ronkin
Bicycle and Pedestrian Program Manager
Oregon Department of Transportation
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Hamilton, Canada

Just to add a Canadian perspective: The City of Hamilton, Ontario converted Stone Church Road from 4 lanes to 3 lanes (center left turn lane) with bicycles being accommodated in wide curb lanes. A similar conversion will take place this spring on Lawrence Road, this time using painted bicycle lanes. We also converted 2 major five-lane streets to 4-lane with wide curb lanes in 1994, but Regional Council directed conversion back to the original configuration about six months into the trial.

Hart Solomon
Manager of Traffic Engineering and Operations
City of Hamilton, Ontario

London, UK

I think it has been done here in London, England. For example, the London Borough of Ealing, has, I believe, removed some car lanes on the Uxbridge Road, the A4020, that heads west out of London, adding bike lanes instead. The current cry by bike activists here in England is 'reallocating road space' How much it is actually being done, though, I do not know. Bike lanes are somewhat new here in England, and all the fiascoes of a quarter a century ago in the USA seem to be being repeated here

JeremyParker@compuserve.com
London, England

Toronto

In Toronto, we have removed traffic lanes on approximately 18 km (12 miles) of downtown streets (eight different streets) to provide bike lanes. These routes represent about two thirds of our existing bike lanes.

Typical downtown arterial widths are 12.8 to 14.0 meters wide and striped as four lane two way roads with both curb lanes accommodating parking in the off-peak hours. During peak hours parking is generally prohibited on both sides so the roads operate as four lane roads.

To incorporate bike lanes on a road 12.8 meters (42 feet) wide we permit 24-hour parking on one side (2.0 meters wide) , provide a bike lane (2.0 meters) next to parking, two general traffic lanes (3.5 meters) and a bike lane next to the curb (1.8 meters). Left turn lanes are provided at signalized intersections to maintain capacity. The length of the left turn slot is determined by the left turn demand, with a typical length being 15 meters. Curbside parking stops in advance of the intersection to accommodate the additional lane required for left turns and to make the transition between a bike lane adjacent to parking and a bike lane next to the curb. It is a fine balance because the longer the left turn slot the less parking we can provide. Parking is definitely the most politically sensitive issue when implementing bike lanes.

To incorporate a bike lane on a road 14.0 meters (46 feet) wide we permit 24-hour parking on both sides (2.0 meters wide), provide two bike lanes (1.8 meters) next to parking and two general traffic lanes (3.2 meters). Again, left turn lanes are provided at signalized intersections to maintain capacity.

Based on our experience in the past few years we have concluded that the two above designs can work well on roads with up to approx. 18,000 vehicles per day.

We have also provided bike lanes through three railway underpasses by, in each case, eliminating two general traffic lanes (from four to two lanes -one in each direction) in order to provide two bike lanes. One of these carried 22,000 vehicles per day.

On another 1.6 km stretch of roadway (55,000 vehicles per day) we reduced six general traffic lanes to five lanes to accommodate two bike lanes over a bridge connecting east end neighborhoods to the Central Area. Bicycle volumes on this route increased to approximately 3,000 bicycles per summer weekday; weekday average throughout the year is 1,800 bicycles per day). In another case we reduced a six lane road with 30,000 vehicles per day to four general traffic lanes (five at signalized intersections) to accommodate bicycle lanes in each direction.

Greater Vancouver's experience:

"In the Greater Vancouver Region, two municipalities have removed a traffic lane for bikes. The City of Surrey along their East Whalley Ring Road and the City of Richmond along Williams Road. In both instances, four lanes of traffic (two in each direction) were reduced to three lanes to provide bike lanes. The third middle lane functions as a left turn lane for both directions of traffic. I can give contacts if anyone wants more details.

Doug Louie, P.Eng.
City of Vancouver."

Traffic Calming Fact Sheets

May 2018 Update

Road Diet

Description:

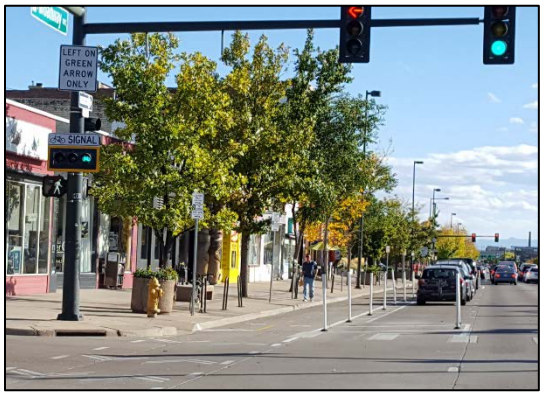
- Revision of lane use or widths to result in one travel lane per direction with minimum practical width, with goal of reducing cross-section; common application involves conversion of four-lane Two-way road to three-lane road – two through lanes and center two-way left-turn lane (TWLTL)
- Can also involve narrowing of existing travel lanes
- Alternate cross-section uses can include dedicated bicycle facilities, left-turn lanes, on-street parking, raised medians, pedestrian refuge islands, sidewalks, etc.

Applications:

- High likelihood of acceptability for nearly all roadway functional classifications
- Can be applied in urban, suburban, or rural settings
- Appropriate for most common urban speed limits
- Can be applied at/near intersections or along road segments
- Appropriate along bus routes



(Source: Chuck Huffine, Phoenix, AZ)



(Source: Chuck Huffine, Denver, CO)

ITE/FHWA Traffic Calming EPrimer: https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm

Design/Installation Issues:

- Must consider transitions from adjacent roadway sections and through intersections
- AADT can be considered but is not the primary volume factor that needs to be evaluated

Potential Impacts:

- Usually reduces number of available travel lanes – impacts demand that can be accommodated; typical acceptable threshold of 1000 vehicles per direction during peak hour
- Reduction of through lanes tends to reduce speeds
- Can improve pedestrian crossing ease and safety
- Can improve bicycle accessibility if travel lanes can be used for shoulders/bike lanes instead

Emergency Response Issues:

- Generally accepted from emergency services; leaves available space for through flow of emergency vehicles

Typical Cost (2017 dollars):

- $6000 or less, depending on physical geometric changes and length of application
- The biggest impact to cost involves signal modifications, if applicable; other primary costs include pavement marking and signing revisions
- Costs can be much higher if outside portion of pavement is converted to other non-motorized uses (dedicated bicycle facilities, sidewalks, grass buffers)

P01-06515

U.S.Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
Investment in roadway safety saves lives

ROAD DIET



CASE STUDIES



INTRODUCTION

BACKGROUND

Four-lane undivided highways have a history of increased crashes as traffic volumes rise, due to motorists sharing the inside lane for higher speed through movements and left turns. Additionally, as active transportation increases, communities desire more livable spaces, pedestrian and bicycle facilities, and transit options, which are not easily accommodated by a 4-lane undivided roadway. One solution that benefits all modes is a Road Diet (Roadway Reconfiguration).

A Road Diet is generally described as removing vehicle lanes from a roadway and reallocating the extra space for other uses or travelling modes, such as parking, sidewalks, bicycle lanes, transit use, turn lanes, medians or pedestrian refuge islands.

Road Diets have the potential to improve safety, provide operational benefits, and increase the quality of life for all road users. Road Diets can be relatively low cost if planned in conjunction with reconstruction or resurfacing projects since applying Road Diets consists primarily of restriping.

For additional information about Road Diets, visit the FHWA Office of Safety Road Diets website at http://safety.fhwa.dot.gov/road_diets.

ROAD DIET CASE STUDIES

Improving safety is a top priority for the U.S. Department of Transportation, and the Federal Highway Administration (FHWA) remains committed to reducing highway fatalities and serious injuries on our Nation's roadways through the use of proven safety countermeasures, including Road Diets. Along with the development of the Road Diet Informational Guide, the FHWA Office of Safety commissioned a series of 24 case studies highlighting Road Diet implementations throughout the United States. The aim of this document is to provide State and local agencies and Tribal governments with examples and advice that can assist them in planning and implementing Road Diets in their own jurisdictions.

Many of the concepts described in this publication are illustrated in photographs and drawings. The drawings are for illustrative purposes only; they are not to scale and should not be used for design purposes. It is important to note that the lettering styles, arrows and symbols used in these case studies are not always consistent with those prescribed in the Manual on Uniform Traffic Control Devices (MUTCD). When employing treatments included in the case studies, only MUTCD-approved lettering styles, arrows and symbols should be used. Additionally, any highway agency wishing to implement a treatment that has not been included in the most recent edition of the MUTCD must request experimentation approval from the FHWA.

Road Diet Case Studies - Introduction

Agency	Location	Title	Key Focus of the Case Study
Genesee County Metropolitan Planning Commission	Genesee County, Michigan	Communities Embrace Widespread Road Diet Use	Assessment and ranking of all 4-lane roads to determine Road Diet potential
City of Grand Rapids	Division Street Grand Rapids, Michigan	Livability Improves as Number of Lanes Decreases	Trial-basis Road Diet; highlights the positive outcomes and trade-offs of Road Diets
City of Grand Rapids	Burton Street Grand Rapids, Michigan	Road Diet and Transit Working Together	Traffic congestion concerns; transit stops
City of Chicago	55th Street Chicago, Illinois	Road Diet Includes Parking-Separated Bicycle Lanes	Improving bicycle safety and connectivity while maintaining efficient bus operation
City of Chicago	Franklin Boulevard Chicago, Illinois	Road Diet Improves Bicycle Connectivity, Enhances Livability	Livability benefits; improving safety and mobility for bicyclists
City of Chicago	Wabash Avenue Chicago, Illinois	Capacity Improved After Road Diet	Before-and-after capacity analysis; buffered bicycle lanes; signal optimization
City of Pasadena	Cordova Street Pasadena, California	Road Diet Improves Multimodal Level of Service	Improvement in multimodal level of service; addressing speeding issues
City of Santa Monica	Ocean Park Boulevard Santa Monica, California	Road Diet Improves Safety Near School	Addressing safety issues near school
City of Los Angeles	Seventh Street Los Angeles, California	Road Diet: Key Ingredient in Los Angeles' Bicycle Master Plan	Improving bicycle mobility and encouraging bicycle ridership
Virginia Department of Transportation	Lawyers Road Reston, Virginia	All-Around Success for Safety and Operations	Community input and public perception survey; crash reduction; bicycle connectivity
Virginia Department of Transportation	Soapstone Drive Reston, Virginia	There's More Than One Way to Complete a Road Diet	Multiple configurations of Road Diets; crash reduction; bicycle connectivity
Virginia Department of Transportation	Oak Street Dunn Loring, Virginia	Improving Safety and Livability	Reducing aggressive driving behaviors; providing consistent lane configuration
City of Des Moines	Ingersoll Avenue Des Moines, Iowa	Temporary Road Diet Becomes Permanent	Trial-basis Road Diet; public perception survey
Regional Transportation Commission of Washoe County	Reno, Nevada	Educating the Public on Road Diets	Public outreach method for education on Road Diet projects
Regional Transportation Commission of Washoe County	California Avenue Reno, Nevada	A Feasibility Evaluation Using Traffic Simulation Software	Using traffic simulation software to determine feasibility of a Road Diet
Regional Transportation Commission of Washoe County	Wells Avenue Reno, Nevada	Road Diet Improves Safety for Motorized and Non-motorized Users	Evaluating the safety and operational effects of the Road Diet
New York City Department of Transportation	Luten Avenue Staten Island, New York	Safety Solution Near School is a Road Diet	Addressing safety issues near school; reducing speeds
New York City Department of Transportation	Ninth Avenue Manhattan, New York	Road Diet on One-Way Street Designed for All Users	One-way street; parking-separated bicycle path; bicycle signals; pedestrian refuge islands
New York City Department of Transportation	Empire Boulevard Brooklyn, New York	Road Diet Improves Pedestrian Safety	Increasing pedestrian safety; reducing speeds and calming traffic
New York City Department of Transportation	West Sixth Street Brooklyn, New York	NYCDOT Responds to Tragedy with Road Diet	Addressing pedestrian safety issues
Seattle Department of Transportation	Dexter Avenue Seattle, Washington	Two-Stage Road Diet	4-lane to 3-lane to 2-lane Road Diet; bus bulb-outs, buffered bicycle lanes; high bicyclist volume and bus ridership
Seattle Department of Transportation	Nickerson Street Seattle, Washington	Safety Improved & Extreme Speeding Virtually Eliminated	Reducing speeds; improving overall safety; pedestrian safety features
Seattle Department of Transportation	Stone Way Seattle, Washington	Despite Early Opposition, Road Diet Produces Great Results	Public sentiment on Road Diet project; increased bicycle use
City of Indianapolis	Indianapolis Cultural Trail Indianapolis, Indiana	Road Diets Lead to Economic Development	Public outreach, planning, and design; economic development success

Case Studies

Genesee County, Michigan

COMMUNITIES EMBRACE WIDESPREAD ROAD DIET USE

OBJECTIVE

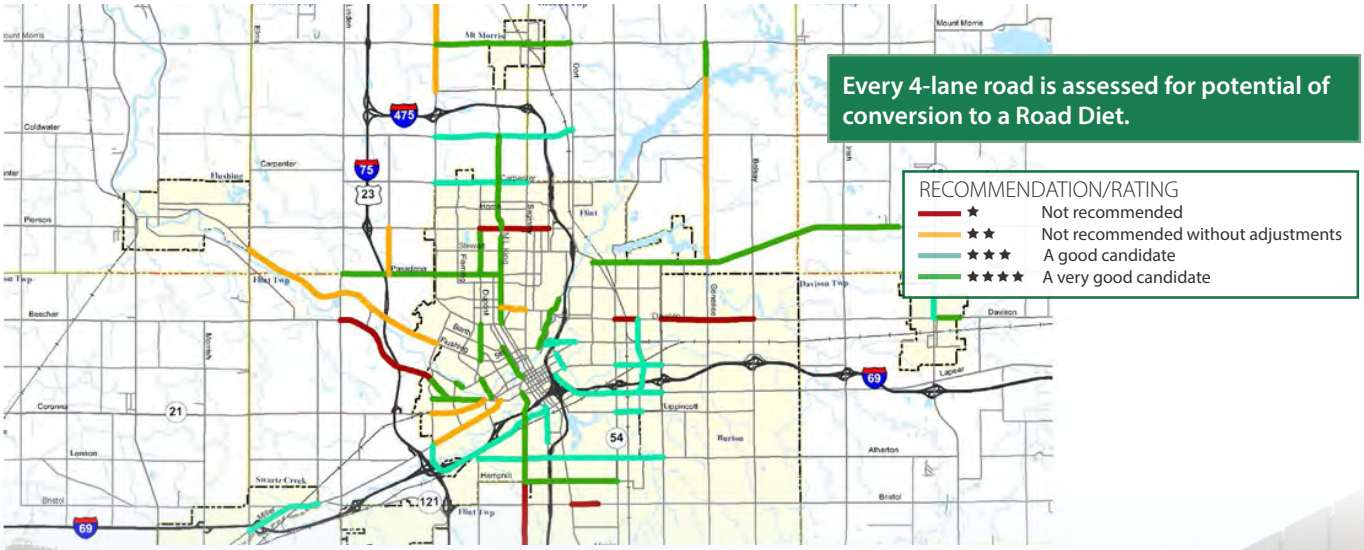
- Improve safety throughout county
- Encourage walking, bicycling, and transit use

FEATURES

- Evaluation of 4-lane roads
- Stakeholder collaboration and planning
- Education on Road Diet benefits

RESULTS

- Crash reduction
- Improved livability
- Community support



Since 2009, Road Diets have rapidly become culturally accepted in Michigan, and agencies are scouring their systems to identify which 4-lane roads are the best candidates for a Road Diet.

Genesee County Metropolitan Planning Commission (GCMPC), encompassing one county and 33 municipalities, has been both progressive and aggressive with Road Diet installations. Since the introduction of this safety treatment to the public, the GCMPC set out to make Road Diets a positive treatment in the community's eyes. The 4- to 3-lane Road Diet conversions in the county have been so successful that citizens now favor the 3-lane cross section where it is operationally feasible.

Road Diet in downtown Flint, Michigan, features on-street parking and bicycle lanes using striping on a brick pavement surface. Photo: Jennifer Atkinson

Genesee County, Michigan

COMMUNITIES EMBRACE WIDESPREAD ROAD DIET USE

The GCMPC stated that...

"Road Diets are seen as treatments that can be used to keep a downtown area 'current' and follow the national [livability] trends."



City of Clio

BACKGROUND

The real boost to widespread implementation of Road Diets in the region occurred in 2009 with the adoption of a Complete Streets program and completion of a technical study in which the GCMPC assessed every 4-lane road in its jurisdiction for potential of conversion to 3 lanes, ranking the desirability of each for Road Diet consideration.

In the beginning, routes with lower volumes (6,000 to 8,000 vehicles per day) were targeted in order to allow for easy conversion, and the results included immediate safety benefits. After several successful conversions with positive outcomes, GCMPC began selecting implementation sites with higher volumes – up to 15,000 vehicles per day.

GCMPC has encouraged local agencies in the county to try out a low-cost Road Diet by restriping existing 4-lane segments to three lanes as part of their ongoing restriping plans. After a trial period, if the conversion is not operating as desired or publicly accepted, the road can be restriped back to the original layout.

STAKEHOLDER INVOLVEMENT, EDUCATION, AND BUY-IN

GCMPC uses an educational approach to gain public support for Road Diets. Selecting appropriate Road Diet locations within the county based on engineering studies is the first step. The GCMPC then approaches individual city agencies about the potential Road Diet corridor and educates the stakeholders on the benefits. This collaboration begins early in the planning process and continues through the Road Diet installation. Working together with these stakeholders gives a sense of project awareness and buy-in to all involved, and it helps to overcome obstacles that arise along the way, leading to smoother implementation.



5th Ave - City of Flint

SAFETY

Road Diet installations have improved safety in Genesee County. Analyzing the traffic crash data from 1996 to 2007, the GCMPC completed a before-and-after safety study using seven Road Diet sites, with results showing an overall reduction of crashes.

Average Annual Crash Reduction Rates After Road Diets in Genesee County

Crash Type	Davison Rd	Dupont St	Flushing/Fifth Ave	ML King Jr Blvd	Miller Rd	University Ave	Vienna Rd	OVERALL
Head-on	-17%	-31%	-100%	129%	-43%	-100%	-62%	-32%
Head-on Left Turn	-28%	-74%	-100%	-41%	-37%	-100%	-24%	-58%
Rear End	-16%	-54%	-29%	-46%	-29%	-53%	-21%	-35%
Rear End Left Turn	92%	-79%	-100%	-17%	-37%	-100%	-13%	-36%
Side Swipe Same Side	-18%	-56%	-48%	-42%	-15%	-31%	-20%	-33%
Side Swipe Opposite Side	-31%	-5%	-100%	-17%	-33%	-100%	-55%	-39%
All Non-alcohol & Non-deer	-16%	-47%	-42%	-38%	-23%	-35%	-26%	-32%

Case Studies

Grand Rapids, Michigan – Division Street

LIVABILITY IMPROVES AS NUMBER OF LANES DECREASES

OBJECTIVE

- Improve business environment, commercial activity, and sales
- Increase parking

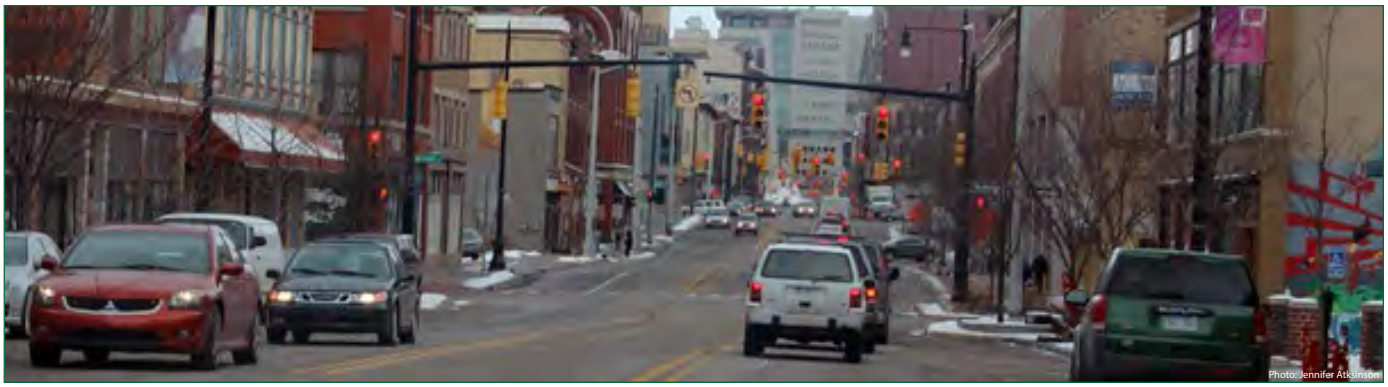
FEATURES

- Trial basis Road Diet
- Solicited public feedback
- Commercial district with closely spaced traffic signals

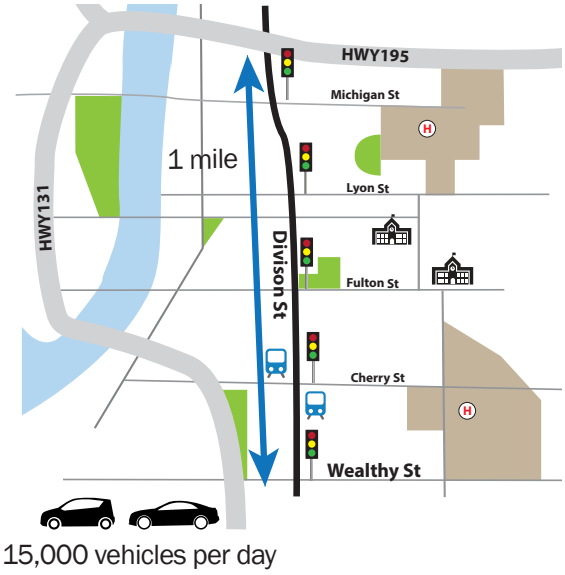
RESULTS

- Slower speeds
- Improved livability
- Increased travel times

LIVABILITY Tying the quality and the location of transportation facilities to opportunities such as access to good jobs, affordable housing, quality schools and safer streets.



Division Street has on-street parking and signals at every intersection through downtown.



15,000 vehicles per day

BACKGROUND

The City of Grand Rapids has taken a holistic view of Road Diet implementations by identifying all 4-lane facilities within its jurisdiction, and then recording and tracking traffic volumes, corridor use, and the overall operation under existing conditions. The city recognizes the safety benefits of Road Diets and is aware of a roadway reconfiguration's potential effect on traffic operations They also recognize that Road Diets can bring a higher quality of life for users and can encourage commercial activity and sales.

This approach led the City of Grand Rapids to install a Road Diet on Division Street, from I-196 to Wealthy Street. The roadway's cross section changed from four and five vehicle lanes to three lanes and a mixture of dedicated bicycle lanes and shared lanes. Although on-street parking already existed prior to the Road Diet, the reconfiguration allowed for additional parking spots.

Grand Rapids, Michigan – Division Street

LIVABILITY IMPROVES AS NUMBER OF LANES DECREASES

PUBLIC INVOLVEMENT

The city conducted two public meetings before this Road Diet was implemented to gain public support and to educate those who use the route. During these meetings, officials learned that citizens wanted the opportunity to try the Road Diet for a trial period and reconvene before implementing permanently.



The city posted signs along the corridor to solicit feedback on the Road Diet project

RESULTS

After the Division Street Road Diet installation, the City of Grand Rapids reported that businesses along the corridor are generally happy with the project because of the perceived improvement in the quality of life attributes and livability of the community. A few residential facilities along Division Street that were previously unrented for 2 years have been rented after the Road Diet brought improved bicycle accessibility. The owner of those housing facilities believes that the bicycle enthusiasts who want to live along the corridor and bike to work have contributed to an overall increase in economic activity in the area.

One lesson the city learned from this project was the need to carefully evaluate the potential effects Road Diets could have on the reliability of transit schedules. Before installation, Division Street served as a local transit route. However, the bus company decided to relocate the route to another corridor after the Road Diet because of increased travel times.

Based on positive public feedback, the City of Grand Rapids ultimately chose to retain the Road Diet permanently. While the Road Diet project produced many positive outcomes, the project resulted in some negative aspects as well. The benefits and trade-offs are summarized in the following table.[1]

Positive Outcomes
Increased parking
Decreased vehicle speeds (-1 to -4 mph)
Improved bicycle facilities (bike lanes/shared lanes)
Reduction in head-on left turn (-38%)*, angle (-17%), and sideswipe crashes (-20%)
Increased pedestrian/bicycle flow (+13% PM, +57% off-peak, and -14% AM)
Decreased volumes (-18% to -29% north of Wealthy Street)

Trade-offs
Increased delay
Longer queues (i.e. Northbound increased from 81 feet before to 180 feet after in the PM)
Longer travel times (average increase of 19 to 52 seconds through corridor)
Rear-end crashes nearly tripled after installation.
Increased emissions (+19.8% AM, +1.1% off-peak, and -5.3% PM)
Diversion from the corridor

* Calculated from data in the referenced Report (eight crashes before to five crashes after); this percentage varies from the percentage published in the Report table.

[1] City of Grand Rapids, Michigan, "Revision Division Road Diet Traffic Impact Study: Final Report," February 2013.

Case Studies

Grand Rapids, Michigan – Burton Street

ROAD DIET AND TRANSIT WORKING TOGETHER

OBJECTIVE

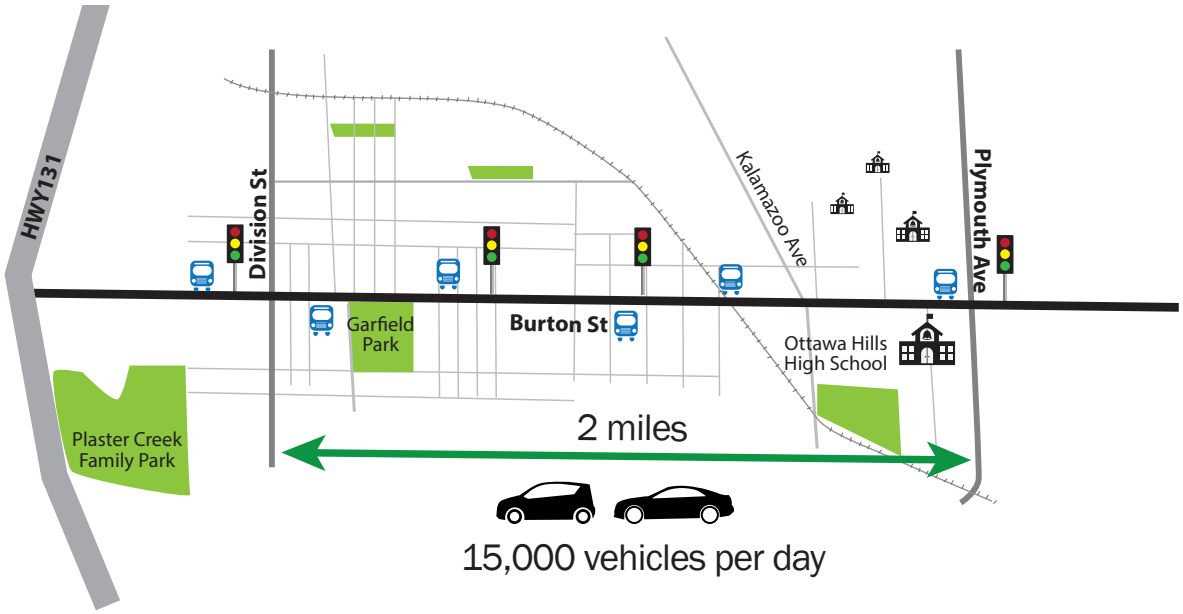
- Install bicycle lanes
- Improve safety
- Accommodate needs of school bus and transit bus stops

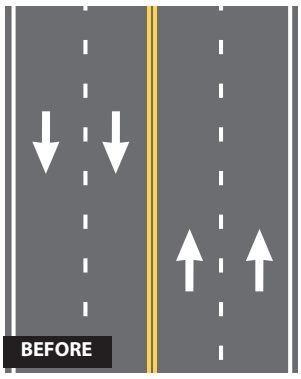
FEATURES

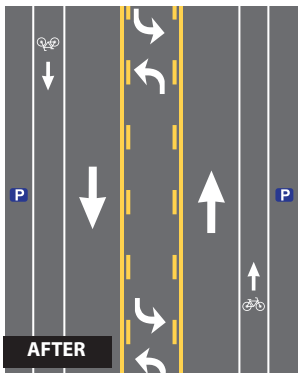
- Several schools and a public park nearby
- Congestion concerns
- Frequent school buses and transit stops

RESULTS

- Improved roadway for bicyclists
- Slower speeds
- Addressed transit needs and congestion concerns









BACKGROUND

In 2012, the City of Grand Rapids, Michigan, installed a Road Diet on Burton Street stretching from Division Street to Plymouth Avenue. At just over 2 miles long with a mix of residential and commercial businesses, this segment of Burton Street experiences approximately 15,000 vehicles per day and is home to several schools and a public park. In addition to buses transporting students to school, a transit route also runs along this section.

Grand Rapids, Michigan – Burton Street

ROAD DIET AND TRANSIT WORKING TOGETHER







Photos: Jennifer Atkinson

Public Opinion[3]

"I BELIEVE IN BOTH IMPROVING OUR ROAD'S SAFETY AND INCREASING THE BIKE FRIENDLINESS OF GRAND RAPIDS. THE BURTON ROAD DIET BRINGS THE BEST OF BOTH WORLDS"

TRAFFIC CONGESTION CONCERNS

Although recent Road Diets in Grand Rapids had proved successful, there were still apprehensions when the city announced the Burton Street Road Diet conversion. Opponents were worried that traffic congestion might occur as a result of the frequent stops of school and transit buses traveling within the corridor.[1] Residents in the area were also concerned about having sufficient gaps to turn onto Burton Street at stop-controlled intersections.

Rick DeVries, Assistant City Engineer, was well aware of the traffic congestion concerns brought to the city's attention, "You try to balance what you're trying to do safety-wise, and quality of life, with those kinds of concerns."[2]

A PRACTICAL COMPROMISE

The city needed a solution that addressed the concern that frequent bus stops might contribute to traffic congestion if Burton Street underwent a Road Diet. While transit stops are often equipped with bus pull-offs, transit providers in the area indicated they prefer to not remove the bus completely from the travel lane, as it interferes with their ability to merge back into mainline traffic.

In response, the city's Road Diet design included the addition of a designated bicycle lane that served a dual purpose: it accommodated Burton Street bicycle traffic and provided a place for transit buses to make routine stops. Transit buses are able to utilize the bicycle lane during stops and still leave the majority of the through lane available for motorists behind the bus to use if they desire. This practical solution met the needs of the transit providers in the area while also improving the roadway for bicyclists.

To further address congestion concerns, the city optimized the traffic signal timing along the corridor, improving the progression of traffic and allowing motorists to more easily access Burton Street at stop-controlled intersections by providing gaps in traffic.

In the end, those living along Burton Street are enjoying the slower speeds and bicycle lanes the Road Diet has provided.

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[1] Zane McMillin, "Grand Rapids leaders make case for Burton Street 'diet' as business owners cry foul," mLIVE, January 10, 2012. Assessed March 23, 2015. Available at: http://www.mlive.com/news/grand-rapids/index.ssf/2012/01/grand_rapids_leaders_make_case.html

[2] Ibid.

[3] Comment from Amy Baas on "Move forward with planned Burton Street (Grand Rapids, MI) Road Diet," an online petition posted by Joshua Leffingwell. Accessed March 23, 2015. Available at: https://www.change.org/p/bike-friendly-gr-move-forward-with- planned-burton-street-grand-rapids-mi-road-diet

Chicago, Illinois – 55th Street

ROAD DIET INCLUDES PARKING-SEPARATED BICYCLE LANES

OBJECTIVE

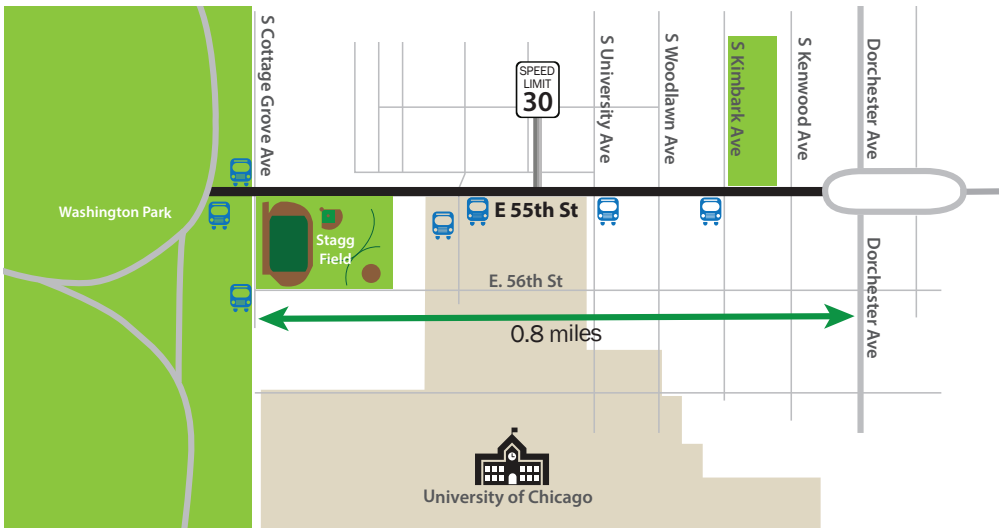
- Improve safety and connectivity for bicyclists
- Maintain efficient bus operation

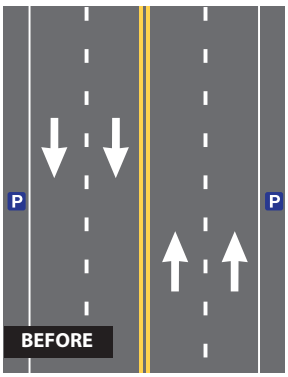
FEATURES

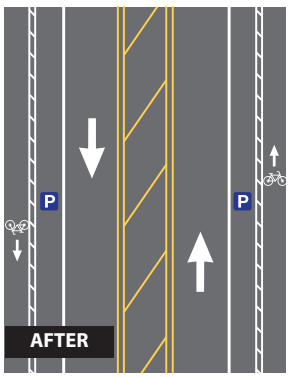
- Transit route
- University and athletic fields
- Residential and commercial uses
- Fire station

RESULTS

- Reduced speeds
- Easier crossing at intersections
- Livability benefits
- Increased bicycle use









BACKGROUND

In 2011, an announcement from Chicago's mayor that the city would install 100 miles of separated bicycle lanes was the starting point that led to the Road Diet on 55th Street. From Cottage Grove Avenue to Dorchester Avenue, this 0.8-mile segment of roadway runs along the University of Chicago campus and ends on the west end at Washington Park. This Road Diet transformed a 4-lane roadway with parking on both sides to a 3-lane roadway with parking-separated bicycle lanes.

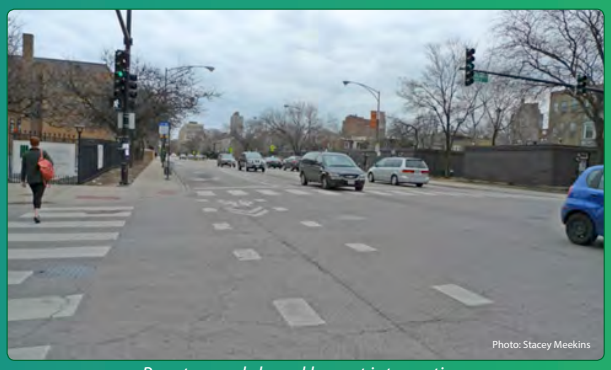
The land use along 55th Street is primarily a mix of institutional, residential, commercial, and service uses, including a fire station. The University of Chicago buildings and athletic fields abut 55th Street on one side, and a service drive parallels a portion of this corridor.

Chicago, Illinois – 55th Street

ROAD DIET INCLUDES PARKING-SEPARATED BICYCLE LANES



Bus entry

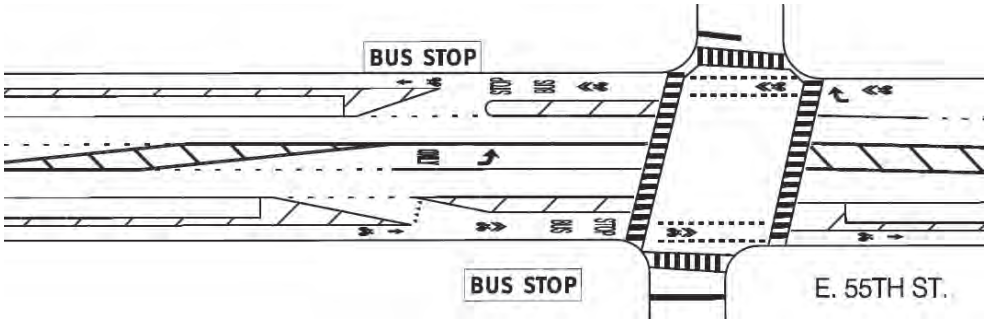


Bus stop and shared lane at intersection, through intersection markings

DESIGNING FOR BUS STOPS AND SEPARATED BICYCLE LANES

The Chicago Transit Authority (CTA) has a primary bus route along this corridor, with headways ranging from 5 to 20 minutes throughout the day. The city coordinated extensively with the CTA on the design of the Road Diet. The overall design and layout of the bus stops in coordination with the separated bicycle lanes was a critical issue to maintain efficient bus operation.

THE ADDITION OF BICYCLE LANES IS A **GREAT ADVANTAGE** TO UNIVERSITY OF CHICAGO STUDENTS, STAFF, AND VISITORS



RESULTS

The 55th Street Road Diet experienced the following results after installation.

- Speeding had been an issue on the corridor prior to the Road Diet, but since the conversion, drivers have been closely adhering to the 30 mph speed limit.
- One business owner was concerned about losing on-street parking spaces, but overall he felt that cars were driving slower now and he saw the bicycle lane as an important addition.
- According to a city engineer, the Road Diet has made it easier for pedestrians to cross 55th Street at intersecting roadways.
- The community expressed that the Road Diet has benefited livability. Since 55th Street runs along the University of Chicago campus, the addition of bicycle lanes was a great advantage to students, staff, and visitors.

Case Studies

Chicago, Illinois – Franklin Boulevard

ROAD DIET IMPROVES BICYCLE CONNECTIVITY, ENHANCES LIVABILITY

OBJECTIVE

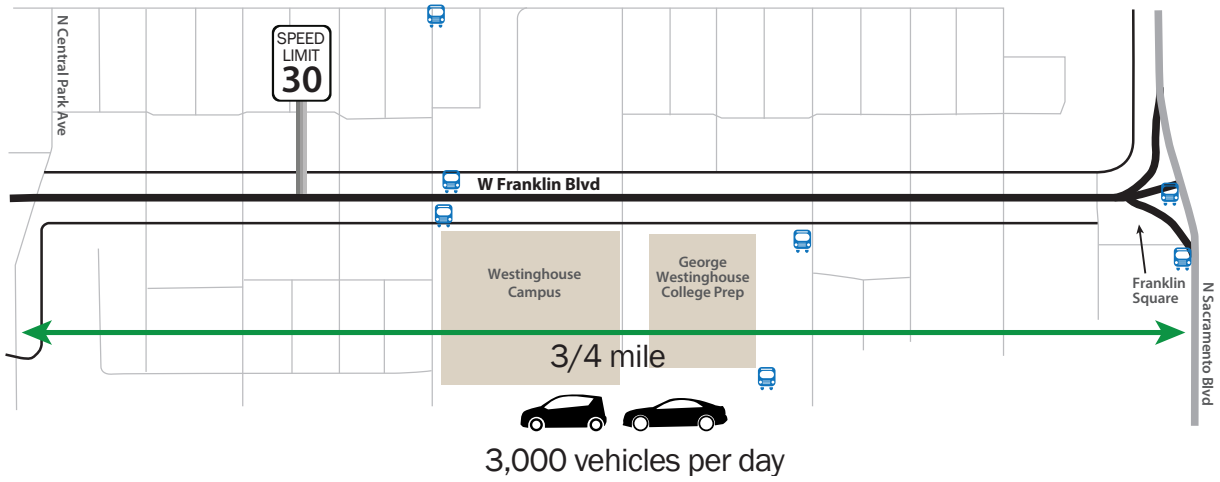
- Improve safety and connectivity for bicyclists

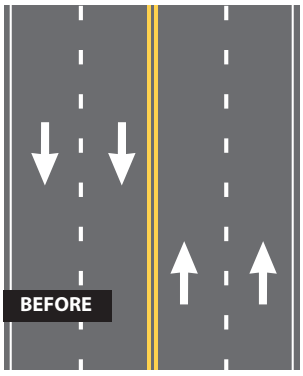
FEATURES

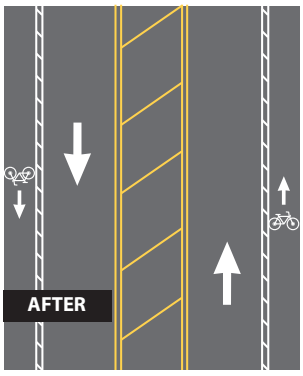
- Separated bicycle lanes
- Neighborhood parks, veterans retirement home, nearby schools
- Access management/parallel outer roads

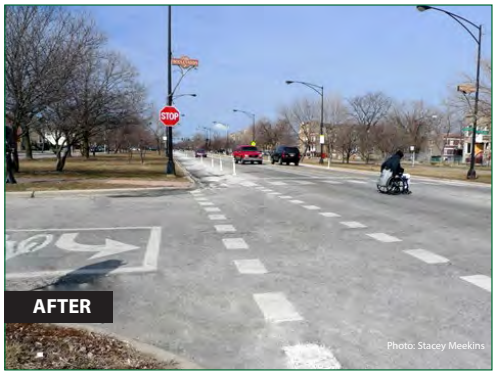
RESULTS

- Improved safety and mobility for bicyclists
- Livability benefits
- Improved pedestrian crossings









BACKGROUND

As part of Chicago's plan to expand the mileage of bicycle lanes, the ¾-mile Road Diet on Franklin Boulevard from Sacramento Boulevard to Central Park Avenue transformed a 4-lane roadway to a 3-lane roadway with separated bicycle lanes in each direction.

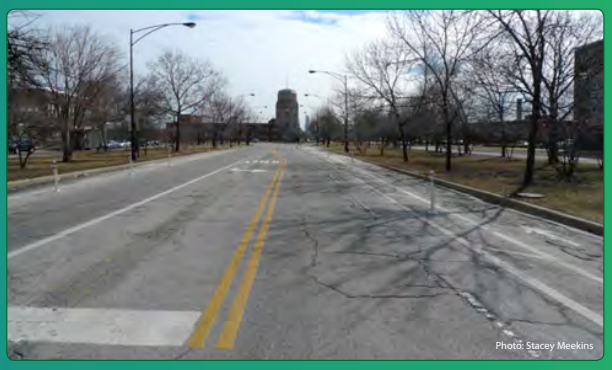
Franklin Boulevard has good access management, with limited intersecting roadways and parallel one-way service roads alongside the main throughway separated by a planted median. The sidewalks serving the neighborhood are located along the service roads. The land use along Franklin Boulevard is primarily residential but also contains two schools, a veterans home, and a hospital.

Chicago, Illinois – Franklin Boulevard

ROAD DIET IMPROVES BICYCLE CONNECTIVITY, ENHANCES LIVABILITY



3-lane cross-section with bollard-separated bicycle lanes



Cross-section at an all-way stop intersection

SEPARATED BICYCLE LANES

With Franklin Boulevard's relatively low average daily traffic (ADT) of approximately 3,000 vehicles, traffic congestion was not an issue on this corridor. The reason for this Road Diet conversion was due to Chicago's plans to further expand and connect the bicycle facilities throughout the city. The project allowed for the installation of bicycle lanes with a buffer space delineated with vertical bollards to separate vehicles and bicycles.

The biking community has been excited and supportive of Chicago's overall expansion plans, "Thanks to these new facilities, Chicago's streets have never been safer for people on bicycles. And people of all ages are taking their first bicycle ride in years, further expanding Chicago's bicycling community and helping us build momentum for better cycling conditions."[1]

"CHICAGO'S STREETS HAVE NEVER BEEN SAFER FOR PEOPLE ON BIKES"

RESULTS

Speeding and congestion were not issues for this corridor before or after the conversion, but the Road Diet produced positive "livability" or "quality of life" changes, such as:

- Residents along Franklin Boulevard felt the re-design improved both safety and the ability of children to bicycle to school.
- A veterans home along Franklin Boulevard, which provides bicycles to their residents and visitors, expressed appreciation for the addition of the separated bicycle lanes in the area to keep this particularly vulnerable user group safe and mobile.
- The additional bicycle lanes connect three area parks – Garfield Park, Central Park Boulevard, and Franklin Square – lengthening the mileage for recreational bicyclists.
- The additional bicycle lanes improved the connectivity to public transit, community institutions, and several parks.

[1] "Chicago Bikeways Continue to Bloom This Week - Read the Latest Update!" Blogpost Active Transportation Alliance, May 21, 2012. Accessed March 30, 2015. Available at: http://activetrans.org/node/9098

Chicago, Illinois - Wabash Avenue

CAPACITY IMPROVED AFTER ROAD DIET

OBJECTIVE

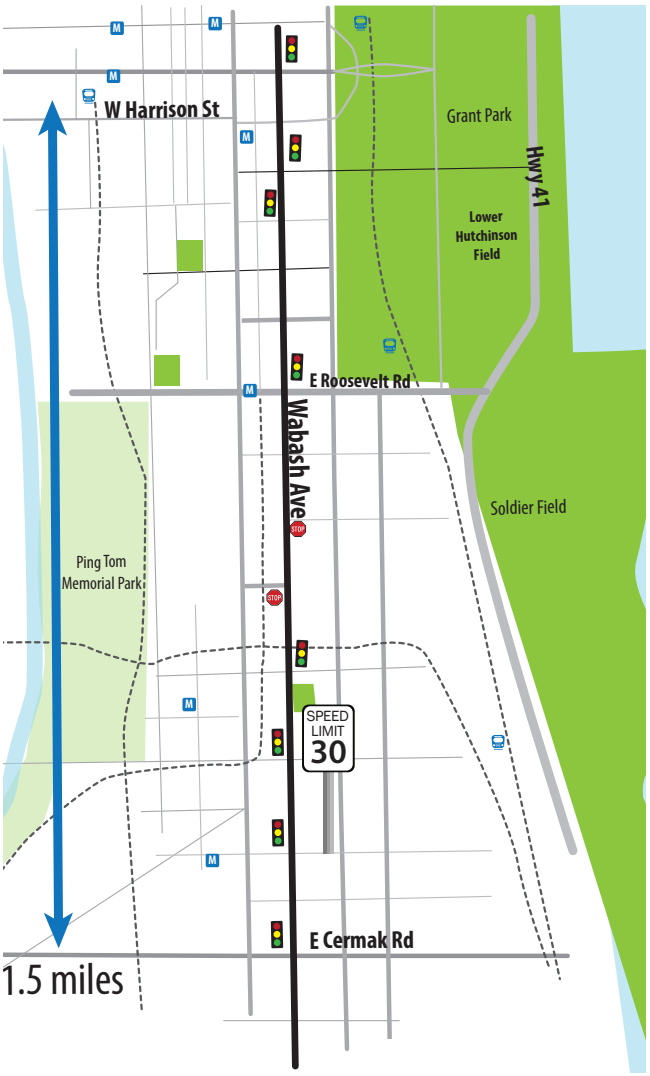
- Improve connectivity for bicyclists

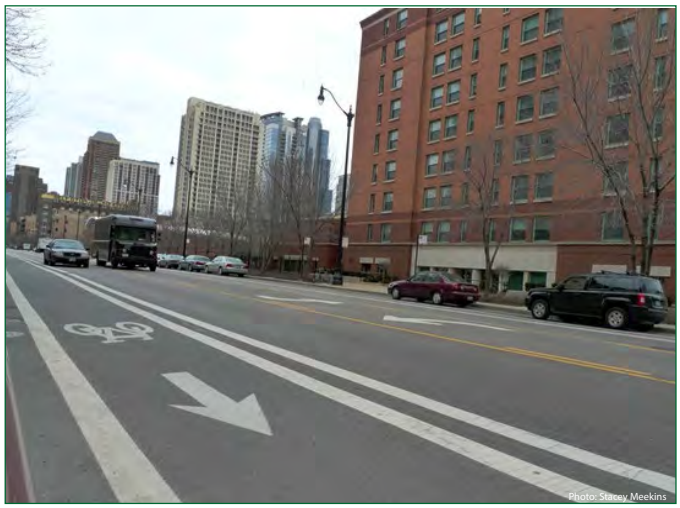
FEATURES

- Commercial and service-oriented businesses, college, connections to nearby parks
- Buffered bicycle lanes
- Signal optimization

RESULTS

- Overall capacity and level of service improved
- Improved safety and connectivity for bicyclists





Buffered Bicycle lane

Developing bicycle lanes along Wabash Avenue as part of Chicago's bicycle plan implementation was the city's primary reason for the 1.5-mile Road Diet from Cermak Road to Harrison Street. The cross section of this corridor was originally 4-lanes with on-street parking. It was converted to a 3-lane cross section with on-street parking and buffered bicycle lanes on both sides.

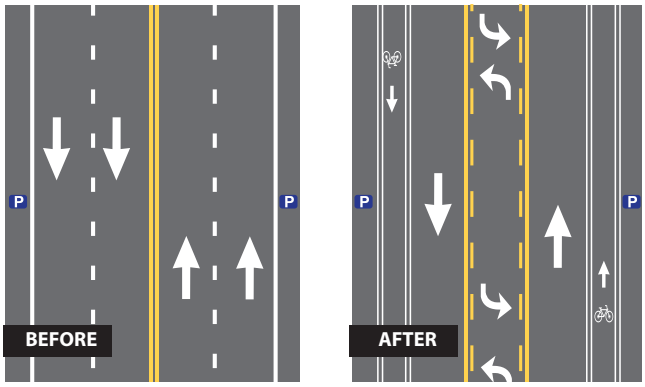
Located just south of Chicago's main business district, "The Loop," the land use on Wabash Avenue is a combination of commercial and service-oriented businesses, as well as institutional, with a college being located in the area. Intersections along the 30-mph corridor are mostly controlled by traffic signals with the exception of two T-intersections that are all-way stop-controlled.

Chicago, Illinois - Wabash Avenue

CAPACITY IMPROVED AFTER ROAD DIET

The striping plans created separation between vehicles and vehicles and bicycles with a 2-ft wide painted buffer zone, and it allowed for the addition of left-turn lanes at the intersections.





IMPLEMENTATION PLAN

Scheduled to undergo a phased resurfacing plan, the city took the opportunity to install buffered bicycle lanes along Wabash Avenue when the corridor was re-striped. Just north of the entire corridor, Wabash is a one-way street, which provided a logical terminus for the bicycle lanes and the Road Diet. The striping plans created separation between vehicles and vehicles and bicycles with a 2-ft wide painted buffer zone, and it allowed for the addition of left-turn lanes at the intersections. The traffic signals along Wabash Avenue also underwent a signal optimization with the Road Diet conversion to mitigate any traffic operations concerns.

RESULTS

A capacity analysis using simulation software revealed that capacity improved along Wabash Avenue after installation of the Road Diet and signal optimization.

Pasadena, California – Cordova Street

ROAD DIET IMPROVES MULTIMODAL LEVEL OF SERVICE

OBJECTIVE

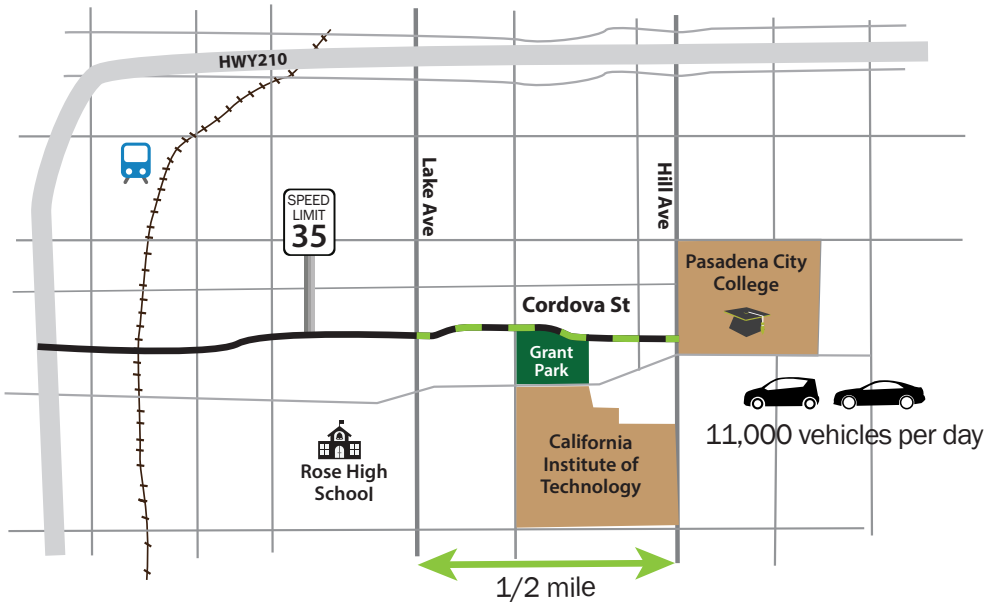
- Lower speeds
- Improve pedestrian safety
- Install bicycle lanes
- Improve pavement conditions

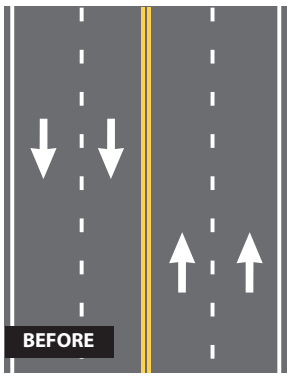
FEATURES

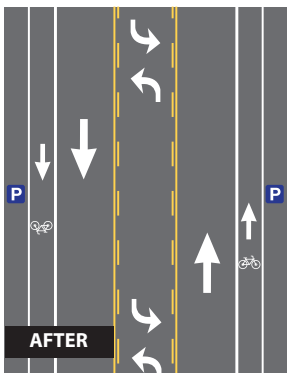
- Multi-family residential
- High traffic
- Excessive speeding
- School, park, and college

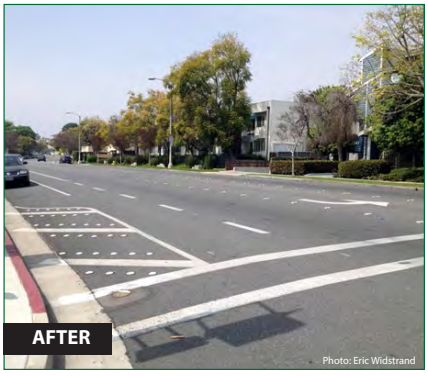
RESULTS

- Increased safety without added traffic signals
- Speeds reduced
- Increased bicycle ridership









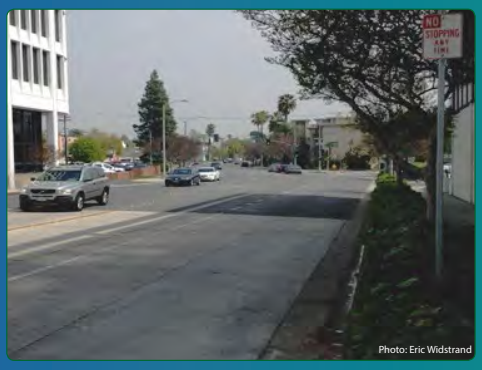
Cordova St at Chester Ave looking west

BACKGROUND

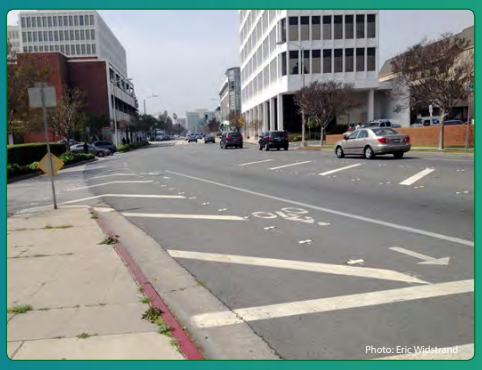
With the intent to reduce speeds and improve safety, the City of Pasadena completed a Road Diet in June 2010 on Cordova Street in conjunction with a repaving project. In support of the city's Bicycle Master Plan, the project spanned just over one-half mile, from Lake Avenue to Hill Avenue and provided bicycle lanes along the corridor.

Pasadena, California – Cordova Street

ROAD DIET IMPROVES MULTIMODAL LEVEL OF SERVICE



Cordova St looking east



Cordova St at Mentor Ave looking west toward Lake Ave



Cordova St at Hill Ave cross section

MULTIMODAL LEVEL OF SERVICE:

Analysis that assesses how well a street serves the needs of all users.

The city's analysis followed the guidelines presented in *NCHRP Report 616 Multimodal Level of Service Analysis for Urban Streets.*

Located adjacent to the Central Business district, Cordova Street includes multi-family residential and commercial property and is home to a private school, park, and community college along the Road Diet corridor. Cordova Street carries approximately 11,000 vehicles per day, with AM and PM peak hour traffic volumes varying between 600 and 1,000 vehicles.

PLANNING AND OUTREACH

Using funds from the American Recovery and Reinvestment Act, a basic repaving project planned for Cordova Street allowed for the Road Diet conversion and helped fulfill the city's goal of installing bicycle lanes and enhancing existing curb parking along this corridor.

The City of Pasadena conducted outreach through the city council's office and the city's website prior to beginning the transformation.

> *"Pasadena is always looking for new ways to provide non-vehicular alternative modes of travel to its citizens," said city Transportation Director Fred Dock. "This project will serve the bicyclists traveling between the South Lake District and Pasadena City College, making it safer for pedestrians to cross at intersections and potentially reducing the driving speed of motorists."*[1]

Preceding this project, there had been some speeding issues on Cordova Street, and because of safety concerns residents had requested the installation of additional traffic signals to help pedestrians cross the street. The Road Diet was able to benefit pedestrians without installing new traffic signals by removing two through lanes of traffic and adding painted curb extensions at intersections, providing ample opportunities to cross at unsignalized intersections along the corridor.

RESULTS

A before-and-after study completed in late 2011 examined traffic speeds, volumes, safety, and the multimodal level of service. The results showed an improved bicycle level of service and no changes to pedestrian or vehicular levels of service along the corridor. There was also a slight reduction in total collisions and injuries. After the Road Diet, traffic speeds were reduced and compliance with the posted speed limit increased.

[1] The City of Pasadena, "Cordova Street To Be Placed On A Road Diet," June 14, 2010. Accessed March 17, 2015. Available at: http://www.ci.pasadena.ca.us/EkContent.aspx?theme=Navy&id=8589935066&bid=2970&style=news

Case Studies

Santa Monica, California – Ocean Park Boulevard

ROAD DIET IMPROVES SAFETY NEAR SCHOOL

OBJECTIVE

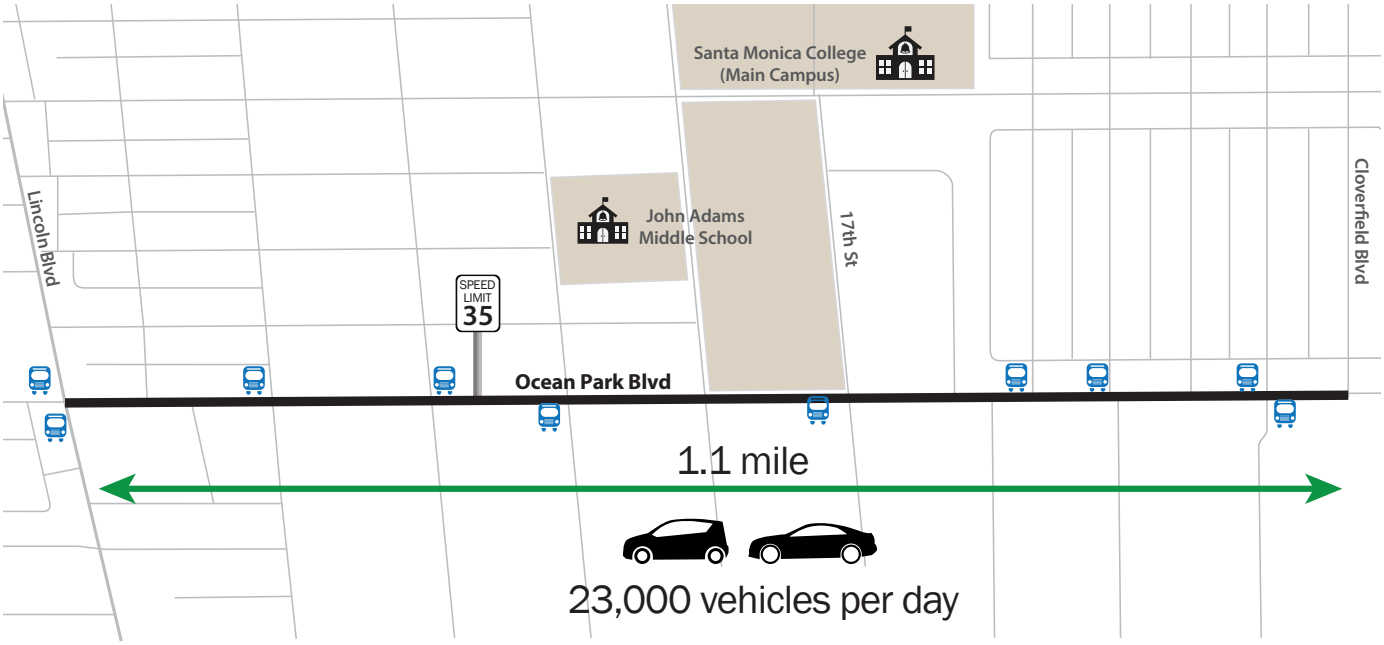
- Improve safety and pedestrian crossing conditions along Ocean Park Blvd from 16th to 18th Streets

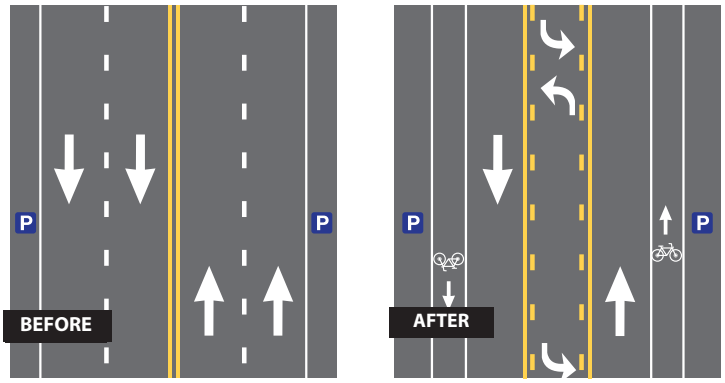
FEATURES

- School zone
- Previous safety improvements had little influence on speeding and number of crashes

RESULTS

- 65% reduction in collisions
- 60% reduction in injury collisions
- Reduction of speeds





BACKGROUND

The City of Santa Monica installed an interim Road Diet on Ocean Park Boulevard in 2008 with hopes of improving safety for pedestrians and bicyclists in the area. Extending 1.1 miles, from Lincoln Boulevard to Cloverfield Boulevard, the Road Diet included restriping, bicycle lanes, and on-street parking.

The corridor is a transit route and carries approximately 23,000 vehicles per day, the upper end of traffic volumes typically recommended for a 3-lane Road Diet. The land use along Ocean Park Boulevard includes several schools and a neighborhood commercial district. The speed limit on the corridor is 35 mph, with a school zone area of 25 mph when children are present.

Santa Monica, California – Ocean Park Boulevard

ROAD DIET IMPROVES SAFETY NEAR SCHOOL



Ocean Park Boulevard looking east at 16th Street



Ocean Park Boulevard looking east at 18th Street marked crosswalk and bicycle lane

THIS ROAD DIET CONFIGURATION RESULTED IN A **65%** REDUCTION IN COLLISIONS

SAFETY ISSUES

The main focus area of the Ocean Park Boulevard Road Diet was a short segment from 16th Street to 18th Street, which includes the Will Rogers Elementary School, the John Adams Middle School, and recreational facilities. With such a high volume of student activity in this area, vehicle speeds and a recent increase in crashes were concerning for parents, school faculty, and nearby residents.

It became apparent to city officials that additional safety improvements were necessary since previous efforts such as adding crossing guards, flashing crosswalks, and speed feedback signs had little influence on speeding and the number of crashes. [1]

RESULTS

In the first 9 months following the reconfiguration, collision data indicated there was a 65 percent reduction (from 35 to 12 crashes), as compared to the same 9-month period in the year prior to the Road Diet installation. Injury collisions were reduced by 60 percent following the reconfiguration.

Travel speeds, based on statistics from the local transit provider in the corridor, have generally remained constant throughout the day. The 85th percentile speed within the Road Diet is at or below 27 mph, and speeds are approximately 10 mph higher outside the Road Diet limits.

Utilizing a survey available online and distributed by mail, the city gauged the community's sentiment on the Road Diet installation. Many people appreciated the improved conditions for bicyclists and pedestrians, but others were dissatisfied by delays and a perception that the reconfiguration caused motorists to shift onto parallel streets.

The city collected traffic counts on Ocean Park Boulevard and the nearby roadways. Volumes on Ocean Park Boulevard decreased by approximately 3,000-4,500 vehicles per day after the conversion. The city's analysis was inconclusive on where these trips shifted. Some of the vehicles appeared to move to I-10 Freeway, but traffic counts showed the volumes on nearby local streets have been relatively stable.

Because of the resulting safety improvements and reduction of speed, the city made the decision in 2010 to retain the Road Diet configuration permanently as part of a resurfacing project along Ocean Park Boulevard.



[1] Ashley Archibald, "Ocean Park Blvd. Lane Change Project Made Permanent" *Santa Monica Daily Press*, April 12, 2011. Assessed March 17, 2015. Available at: http://smdp.com/ocean-park-blvd-lane-change-project-made-permanent/78451

Case Studies

Los Angeles, California – Seventh Street

ROAD DIET: KEY INGREDIENT IN LOS ANGELES' BICYCLE MASTER PLAN

OBJECTIVE

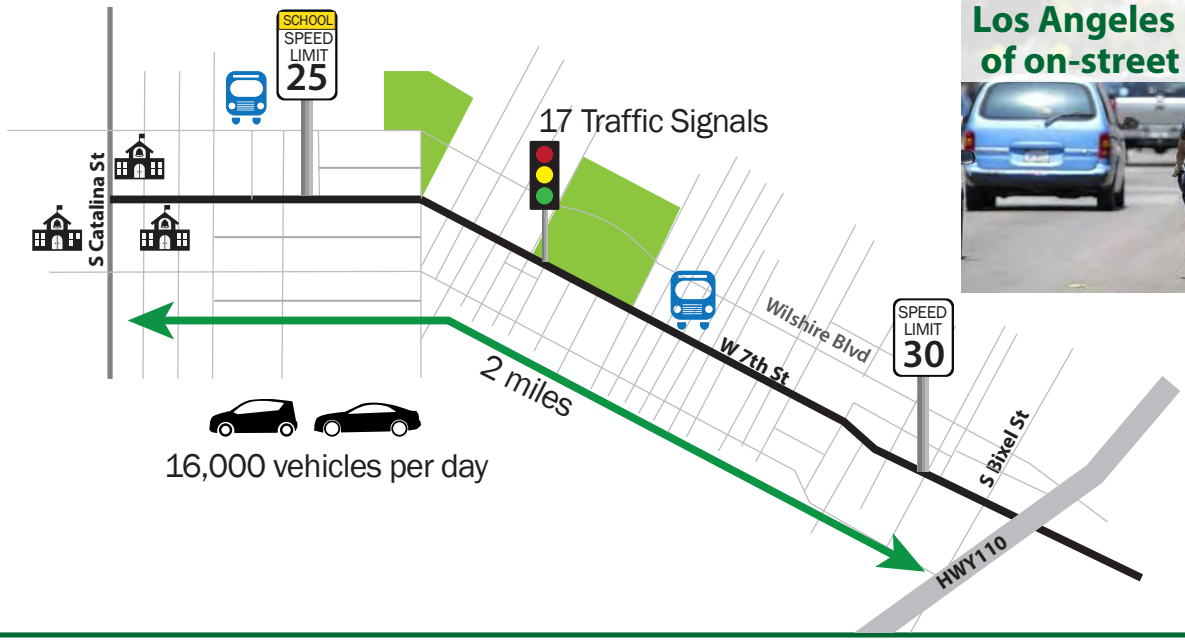
- Install bicycle lanes
- Improve pedestrian safety
- Increased bicycle usage

FEATURES

- Urban environment
- High density pedestrians
- Several schools nearby
- Bus routes

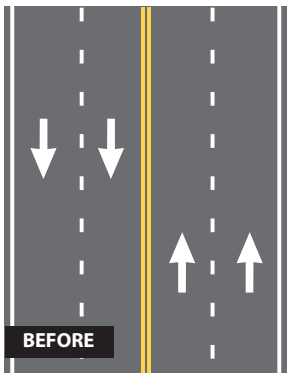
RESULTS

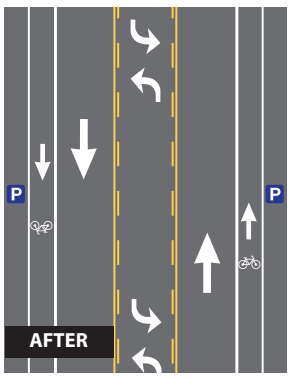
- Community leader support
- Bicycle activists support
- Increased bicycle ridership

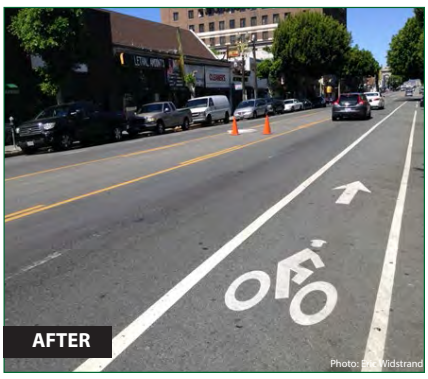




SOURCE: Alliance of Biking and Walking
PHOTO: Jabin Botsford / Los Angeles Times





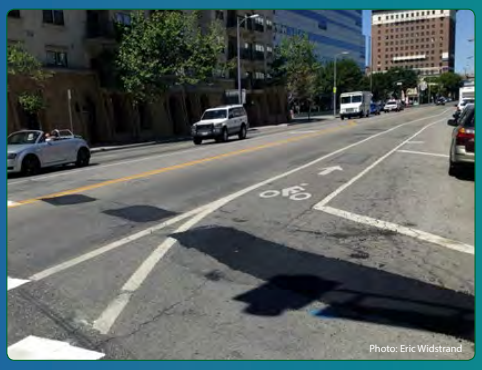


BACKGROUND

In 2011, the Los Angeles Department of Transportation (LADOT) completed a Road Diet on Seventh Street in order to install bicycle lanes along this east-west arterial just west of downtown Los Angeles from Bixel Street to Catalina Street. With traffic volumes of approximately 16,000 vehicles per day and a high number of pedestrians and bicyclists, this corridor is busy with several transportation modes.

Los Angeles, California – Seventh Street

ROAD DIET: KEY INGREDIENT IN LOS ANGELES' BICYCLE MASTER PLAN



7th Street looking west at Bixel Avenue



7th Street looking west at Bixel Avenue



7th Street looking west at Coronado

BICYCLE USE IN THE CORRIDOR **TRIPLED** ONCE THE ROAD DIET AND NEW BICYCLE LANES WERE COMPLETED

This 2-mile stretch of Seventh Street contains 17 traffic signals and serves numerous metro bus routes. The land use is mainly multi-family residential and commercial, with several large parks along the corridor. A high school is located on the west end, and there are two middle schools nearby. The speed limit for the roadway is 30 mph except in areas where there are 25 mph school speed zones.

The City of Los Angeles developed a Bicycle Master Plan that provides direction for improving bicycle mobility and encouraging more bicycle ridership by expanding the existing bikeway network and improving connectivity. As a result of this Bicycle Master Plan, the installation of bicycle lanes is a major driving force for Road Diets in Los Angeles, but the overarching goal for the conversions is safety.

OUTREACH

Prior to the implementation of the Road Diet, LADOT prepared a presentation that discussed expected benefits to safety, traffic calming, non-motorized accessibility, business access, and community health. LADOT discovered that emphasizing the safety benefits of Road Diets is important in gaining public acceptance.

Each corridor is unique, and LADOT found that working with their city council was essential to beginning a successful outreach process. The Los Angeles County Bicycle Coalition and other bicycle activists and community leaders strongly supported the project and assisted in the community outreach.[1]

RESULTS

After the completion of the Seventh Street Road Diet, LADOT received positive feedback from users, and a before-and-after bicycle count conducted by the Los Angeles County Bicycle Coalition showed that bicycle use in the corridor tripled once the Road Diet and new bicycle lanes were completed. LADOT also conducted some traffic analyses at several key intersections along the corridor and found that the results were satisfactory.

[1] Joe Linton, "Seventh Street Bike Lanes Installed," CICLAVIA, August 15, 2011. Accessed March 17, 2015. Available at: https://ciclavia.wordpress.com/2011/08/15/seventh-street-bike-lanes-installed/

Case Studies

Reston, Virginia – Lawyers Road

ALL-AROUND SUCCESS FOR SAFETY AND OPERATIONS

OBJECTIVE

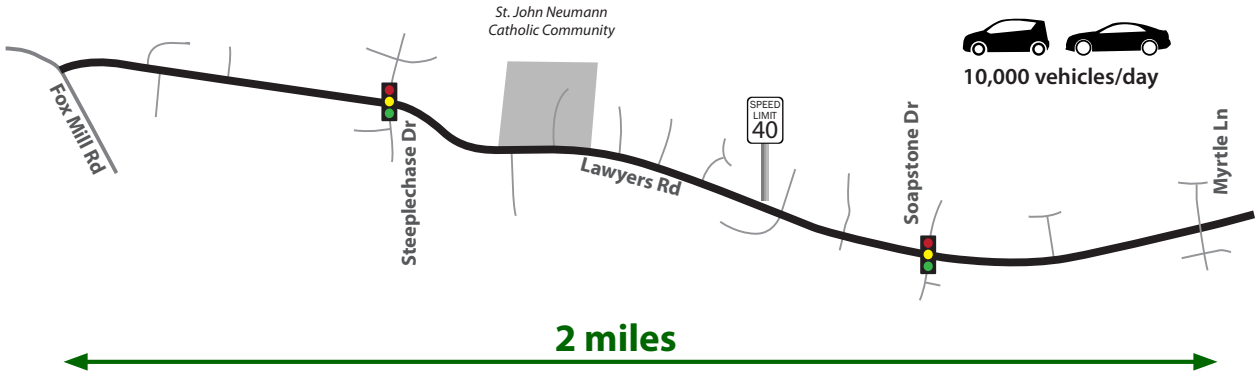
- Reduce crashes and speeding
- Improve safety and connectivity for bicyclists

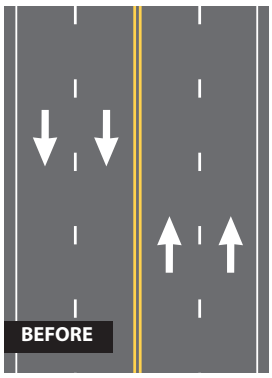
FEATURES

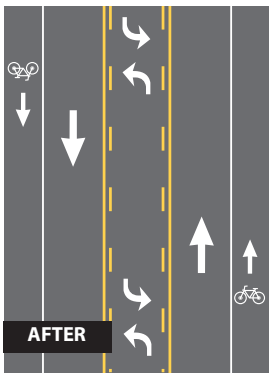
- Suburban area
- Public meetings
- Community "after" survey

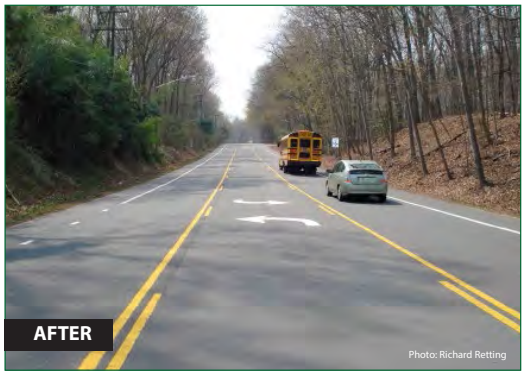
RESULTS

- 70% reduction in crashes
- Travel time remained consistent
- Bicycle use increases









BACKGROUND

As part of a scheduled repaving project, the Virginia Department of Transportation (VDOT) implemented a Road Diet on a 2-mile section of Lawyers Road in Reston, Virginia, extending from Fox Mill Road to Myrtle Lane. Prior to the installation, Lawyers Road had two lanes in each direction; after the Road Diet, the corridor has one travel lane and a bicycle lane in each direction, separated by a two-way left-turn lane.

The land use on Lawyers Road is low-density residential with mostly single family homes and relatively long segments between intersections. There are no curbs or sidewalks through this area, and the traffic volume is approximately 10,000 vehicles per day.

Reston, Virginia – Lawyers Road

ALL-AROUND SUCCESS FOR SAFETY AND OPERATIONS



Road Diet treatment on Lawyers Road

FEASIBILITY AND COMMUNITY INPUT

VDOT planned to repave Lawyers Road in 2009 and took that opportunity to evaluate the feasibility of a Road Diet along this roadway. A 2-mile segment was identified, and VDOT's evaluation concluded that the traffic volumes in this area would be accommodated easily with a 3-lane section. After analyzing the crash types that were occurring between Fox Mill Road and Myrtle Lane, VDOT determined that a number of the crashes occurring could be addressed with a Road Diet conversion. Rear-end crashes involving vehicles waiting to turn left from the left through lane is one crash type that can be mitigated when converting a 4-lane roadway into a 3-lane roadway.

Prior to implementation, VDOT discussed the proposed Road Diet at community meetings to answer residents' questions and solicit feedback. Despite some concerns regarding potential traffic congestion and feelings that bicycle lanes were unnecessary on the corridor, many supported the Road Diet conversion. Bicyclists favored the 5-ft bicycle lanes proposed in the Road Diet, which would improve their overall safety and connectivity in the area.

RESULTS

A before/after analysis of speeds confirmed that operating speeds were reduced after Road Diet implementation. In response, VDOT lowered the speed limit on the 2-mile section of Lawyers Road from 45 mph to 40 mph.

Five years after the Road Diet conversion, a safety study revealed a 70 percent reduction in crashes between Fox Mill Road and Myrtle Lane.

In Fall 2010, VDOT conducted a survey to gauge the community's thoughts regarding the Road Diet on Lawyers Road. The key findings are summarized below:[1]

- 69 percent of respondents said Lawyers Road seems safer after the Road Diet was implemented.
- 47 percent of respondents bicycled on Lawyers Road more often than before, indicating that the Road Diet encourages bicycling as a travel mode.
- 69 percent said auto travel times have not increased, even though 59 percent said speeds dropped.
- 74 percent agreed the Road Diet project improved Lawyers Road.

[1] "Lawyers Road Diet Survey Results Report" December 2010. Assessed March 23, 2015. Available at: http://www.smartgrowthamerica.org/documents/cs/resources/vdot-lawyersroad-survey.pdf

Case Studies

Reston, Virginia – Soapstone Drive

THERE'S MORE THAN ONE WAY TO COMPLETE A ROAD DIET

OBJECTIVE

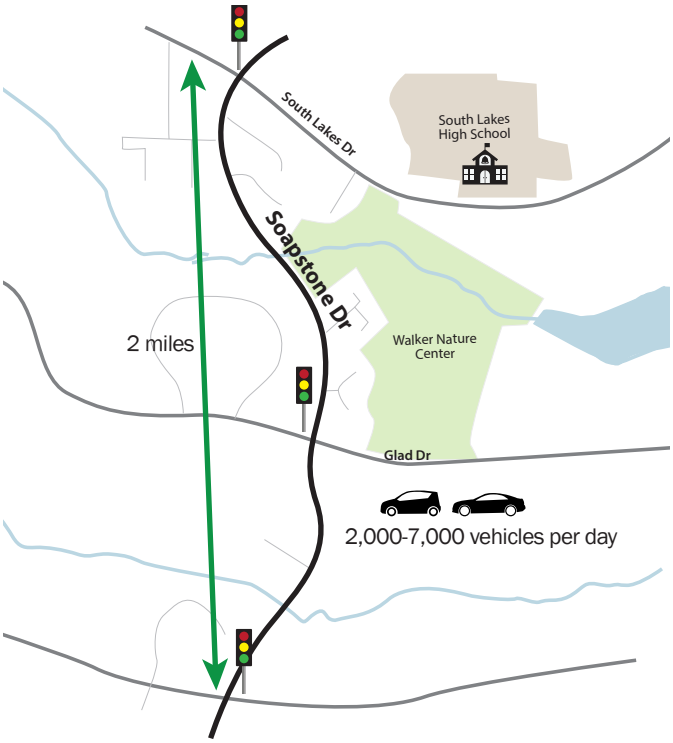
- Improve safety/mobility for pedestrians/bicyclists
- Reduce crashes
- Address issues with street parking

FEATURES

- Three different reconfigurations
- Nature center, parks, recreational trails
- Rural/suburban

RESULTS

- 70% crash reduction
- Improved access to transit station for bicyclists



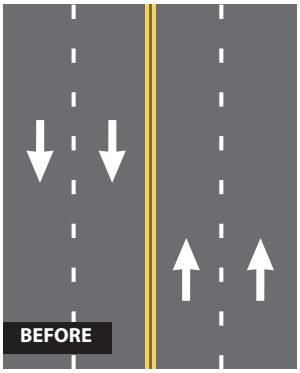
BACKGROUND

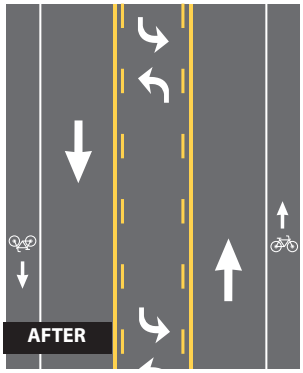
The success of the Road Diet on Lawyers Road convinced the Virginia Department of Transportation (VDOT) to try their second conversion on nearby Soapstone Drive. VDOT once again took advantage of a regularly-scheduled repaving project to implement the Road Diet which stretched from Sunrise Valley Drive to Lawyers Road. Carrying 2,000 to 7,000 vehicles per day, the cross section, land use, and speed limit vary on this nearly 2-mile segment of Soapstone Road, requiring a number of different reconfigurations along the corridor.

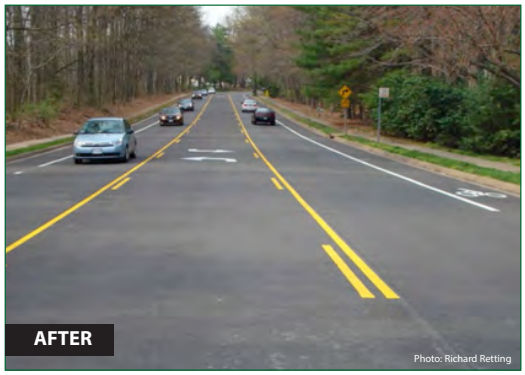
The most typical Road Diet conversion transforms a roadway with two lanes in each direction to a road with a single lane in each direction and a center turn lane, with the extra space often being used for bicycle lanes or parking. VDOT's Road Diet on Soapstone Road highlights a variety of ways a Road Diet can be implemented.

SUNRISE VALLEY DRIVE TO SOUTH LAKES DRIVE

This 35 mph section of Soapstone Drive is more urban than the following segments, with sidewalks, multi-family housing, and light retail. A golf course and an elementary school are located nearby.





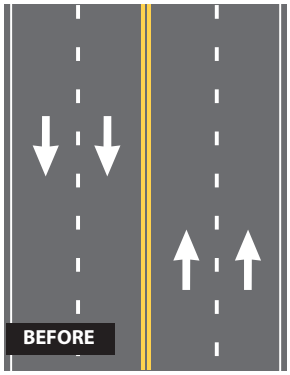


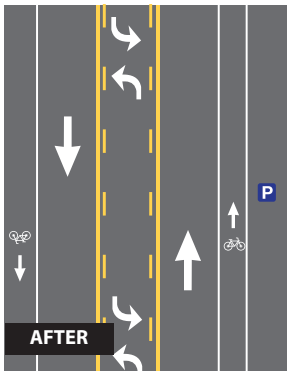
Reston, Virginia – Soapstone Drive

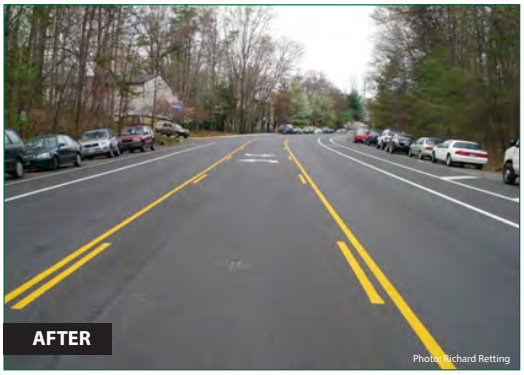
THERE'S MORE THAN ONE WAY TO COMPLETE A ROAD DIET

SOUTH LAKES DRIVE TO GLADE DRIVE

South Lakes Drive to Glade Drive has a wider cross-section and is located adjacent to the Walker Nature Center. With a mix of multi-family housing and commercial activity on one end and woodland areas and single family homes on the other, this middle section is transitioning from urban to a slightly rural feel.

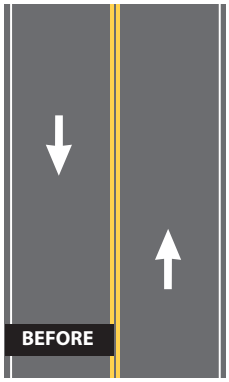


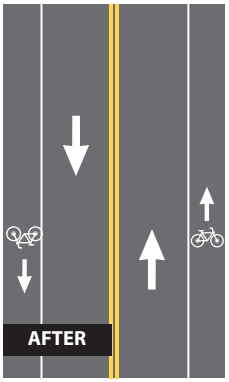


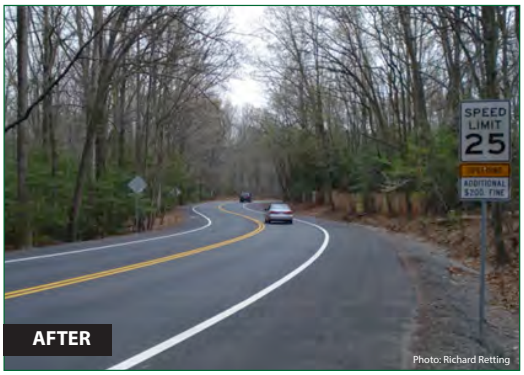


GLADE DRIVE TO LAWYERS ROAD

While not a traditional Road Diet, VDOT restriped 18-ft lanes down to 12-ft and carried the bicycle lanes throughout. With a speed limit of 25 mph, this section of Soapstone Road includes low-density residential neighborhoods with single family homes. The surrounding land contains woodland areas and parks with recreational trails that attract pedestrian and bicycle traffic.







RESULTS

- Much like the success on Lawyers Road, the Road Diet on Soapstone Road achieved great results, improving safety with a crash reduction of 70 percent.
- The resulting linked network of bicycle lanes on Soapstone Road and Lawyers Road provides an excellent travel option for access to the nearby transit station.
- The success of the Reston projects is leading VDOT to greatly expand its use of Road Diets regionwide.

"A big thank you to VDOT for having the vision to modify Soapstone and Lawyers, making both roads safer for everyone and creating dedicated bike facilities for cyclists."[1]

FABB Blog: Fairfax Advocates for Better Bicycling

[1] Bruce Wright, "Soapstone Bike Lane Project Starts Monday," FABB Blog - Fairfax Advocates for Better Bicycling. October 14, 2011. Accessed March 23, 2015. Available at: http://fabb-bikes.blogspot.com/2011_10_01_archive.html

Case Studies

Dunn Loring, Virginia – Oak Street

IMPROVING SAFETY AND LIVABILITY

OBJECTIVE

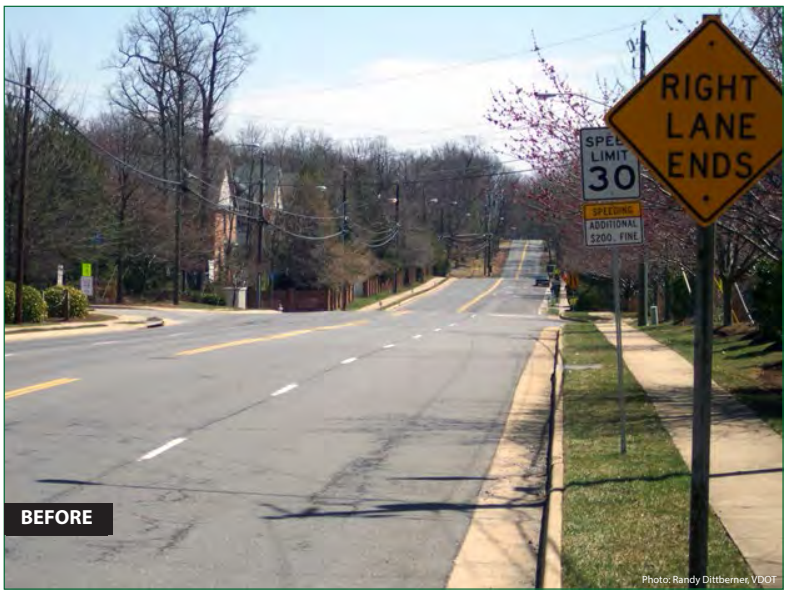
- Provide consistent lane configuration
- Reduce speed violations
- Fix pavement problems

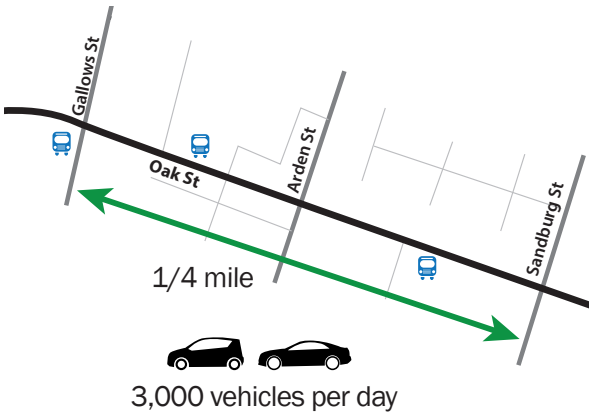
FEATURES

- 3,000 vehicles per day
- Residential neighborhood
- Sudden transition from 4-lanes to 2-lanes

RESULTS

- Improved safety
- Reduced aggressive driving behaviors
- Improved livability with addition of bicycle lanes and parking







With hopes of providing a more consistent lane configuration and eliminating the most egregious speeding violations, the Virginia Department of Transportation (VDOT) implemented a Road Diet on a ¼-mile segment of Oak Street between Gallows Road and Sandburg Street.

Traffic volumes along this section of Oak Street are approximately 3,000 vehicles per day, and the surrounding neighborhood is mainly residential with single- and multi-family housing.

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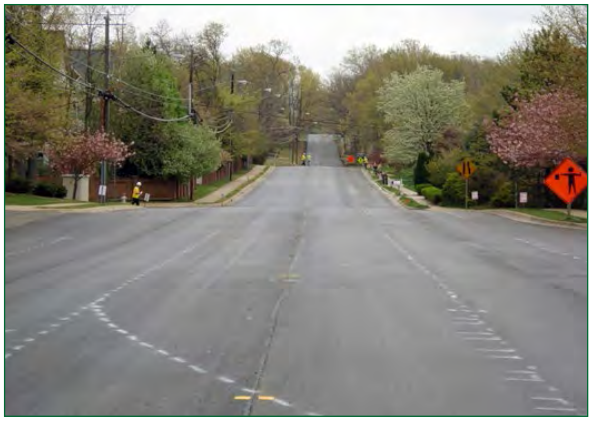
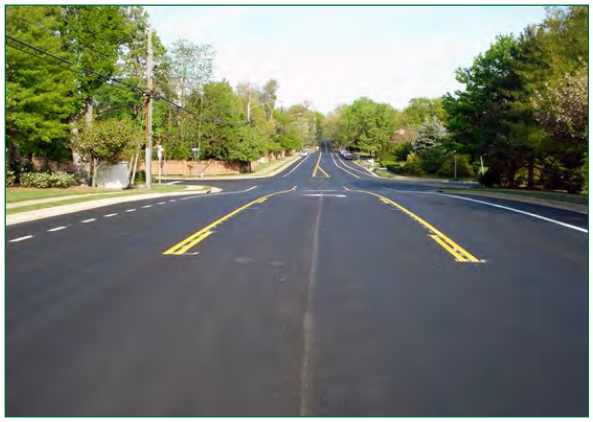
Dunn Loring, Virginia – Oak Street

IMPROVING SAFETY AND LIVABILITY





Oak Street after resurfacing and prior to installation of Road Diet markings





Oak Street after installation of Road Diet markings

This roadway had an uncomfortable transition, and circumstances required an overlay due to wear. VDOT used that opportunity to fix the transition with a Road Diet, which also brought about safety and livability benefits.

BACKGROUND

Prior to the Road Diet, this 4-lane section of Oak Street ended abruptly just east of Sandburg Street, transitioning to a 2-lane roadway. This sudden lane drop often caused confusion for unfamiliar motorists in the area. In the 4-lane section, speeding and aggressive drivers often used the extra through lane in order to weave through traffic.

When a parallel street was temporarily closed for a bridge replacement, Oak Street absorbed a substantial increase in traffic volume, which accelerated the wear on its pavement. VDOT took advantage of the unplanned resurfacing to quickly design and implement a Road Diet, taking this 4-lane section of Oak Street to a 3-lane roadway with bicycle lanes and on-street parking.

RESULTS

While Oak Street had averaged less than a single crash per year in this short segment before the Road Diet was installed, VDOT is pleased to report that there have been no crashes in the first year following the project's completion in 2013.

"Through this Road Diet, we've been able to create center turn lanes, bike lanes, and on-street parking, all of which helped improve the safety and livability of the roadway," said Randy Dittberner of VDOT.

Des Moines, Iowa – Ingersoll Avenue

TEMPORARY ROAD DIET BECOMES PERMANENT

OBJECTIVE

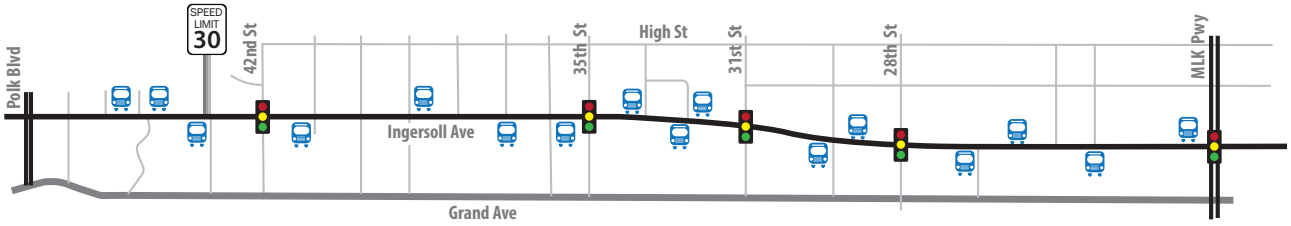
- Calm traffic
- Improve pedestrian and bicycle access
- Enhance business environment

FEATURES

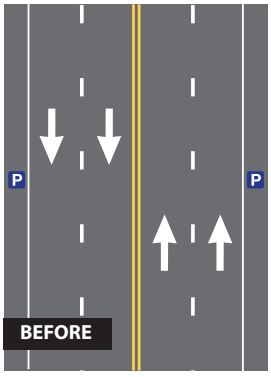
- Transit route
- Commercial businesses
- Community concerns

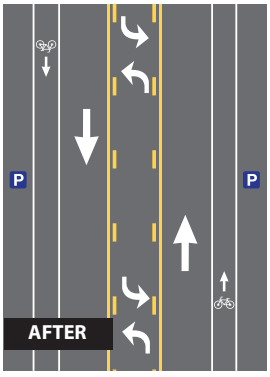
RESULTS

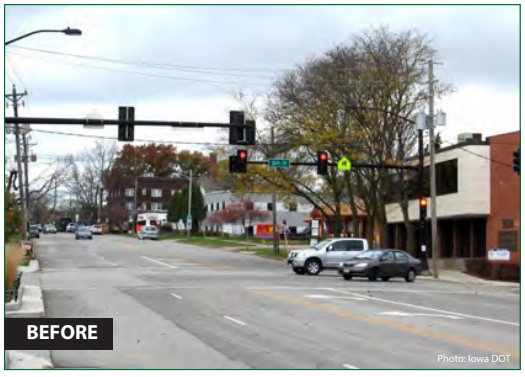
- 50 percent reduction in crashes
- Majority favored keeping Road Diet



2 miles







BACKGROUND

In 2010, the City of Des Moines, decided to "try out" a Road Diet on 4-lane Ingersoll Avenue between Polk Boulevard and Martin Luther King Jr. Parkway for a trial period. The 2-mile long Road Diet was implemented primarily as a Context Sensitive Solution (CSS) project to enhance the business environment with traffic calming, improve pedestrian and bicycle access, and add landscaping.

Des Moines, Iowa – Ingersoll Avenue

TEMPORARY ROAD DIET BECOMES PERMANENT

"We were critical of the Des Moines City Council for its decision to approve the restriping of Ingersoll Avenue to change it from four lanes to three lanes…On all accounts, we were wrong. Our concerns proved to be unwarranted."

Cityview, Central Iowa's Independent Weekly[1]



An online survey revealed that a majority of the community favored keeping the Road Diet and felt the road was safer.

Carrying 11,000 to 17,000 vehicles per day and serving as a transit bus route, Ingersoll Avenue is primarily developed with small, locally owned retail stores and restaurants. After the completion of the Road Diet, the final cross section included a 3-lane roadway with parking and bicycle lanes in both directions. The city provided right-turn lanes at the signalized intersections by prohibiting parking prior to the traffic signal.

COMMUNITY CONCERNS

The community initially expressed concerns about a potential Road Diet, mostly centered on reducing traffic lanes to accommodate bicyclists. Critics were worried the Road Diet would cause more congestion, thereby encouraging motorists to avoid the area and hurting the businesses along Ingersoll. The community was also worried the change could result in an increase in crashes.

The city's response was to offer a 6-month trial period for the Road Diet. If the public's concerns came to fruition, then the city would happily convert Ingersoll back to a 4-lane roadway.

RESULTS

Six months after the conversion, no major traffic problems had developed during the Ingersoll Avenue Road Diet. Although the Road Diet was not initially proposed and promoted as a safety improvement project, a simple before-and-after crash study revealed a 50 percent reduction in crashes.

Overall, traffic volumes did not decrease. In fact, there was a 5 percent increase in traffic from 11:00 AM to 1:00 PM, which suggests that motorists found the Ingersoll corridor to be more comfortable and inviting during their lunchtime.

The city conducted an online survey to gauge the public's view of the Road Diet after implementation. Although there remained some opposition, the results revealed that fewer people opposed the project after implementation than when the project was first proposed, and a majority favored keeping the Road Diet and felt the road was safer.

As a result of these findings, the Des Moines City Council voted to retain the Ingersoll Avenue Road Diet.

[1] Editorial Page, "Our View: Road diet makes Ingersoll fit" *Cityview*, Central Iowa's Independent Weekly, November 18, 2010. Accessed March 17, 2015. Available at: http://dmcityview.com/2010/11/18/columns/ourview.html.

Reno, Nevada

EDUCATING THE PUBLIC ON ROAD DIETS

OBJECTIVE

- Educate the public about the benefits of Road Diets

FEATURES

- Information provided on how to interact with new lane markings for drivers and bicyclists
- Answers to frequently asked questions

RESULTS

- Increased public's knowledge of Road Diet's benefits
- Implementation for successful Road Diet

BACKGROUND

The Regional Transportation Commission (RTC) of Washoe County has implemented many Road Diets within the City of Reno to allow for the addition of bicycle lanes. These projects were created as part of the Complete Street initiative to stimulate economic development and improve citizens' quality of life. The RTC has been proactive in educating the public during the entire process of implementing Road Diets. Once projects are complete, the RTC also publicizes the annualized crash rates1 for the road segments which have undergone the Road Diet treatment. This increases the public's understanding of the safety benefits.

PUBLIC OUTREACH



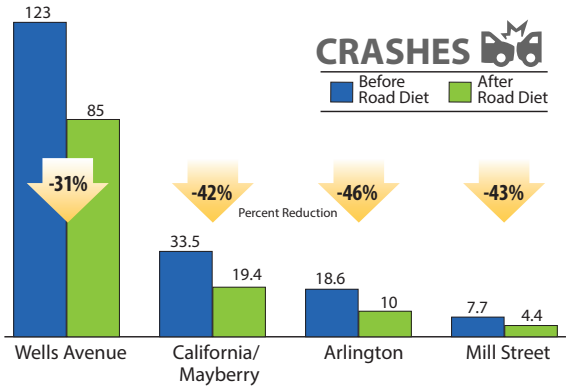
Prior to their Road Diet implementations, the RTC developed a two-page flyer that explains the basic concept of a Road Diet, discusses its associated benefits, and describes how to interact with the new lane markings.

The simple document describes Road Diets in terms that citizens understand and addresses issues the public cares about such as improving traffic flow, reducing crashes, and increasing the number of parking spaces.

The flyer provides answers to the most frequently asked questions:

- What is a Road Diet?
- How can a road with fewer lanes carry the same amount of traffic?
- How does a Road Diet make walking safer?
- How does a Road Diet making bicycling safer?
- What are the benefits of a Road Diet?
- What is a shared lane marking?
- Are bicycles supposed to move to the right?
- If I see these markings in a lane, is the lane only for bicycles?

The RTC also publicizes the annualized crash rates[1] for the road segments which have undergone the Road Diet treatment. This increases the public's understanding of the safety benefits.



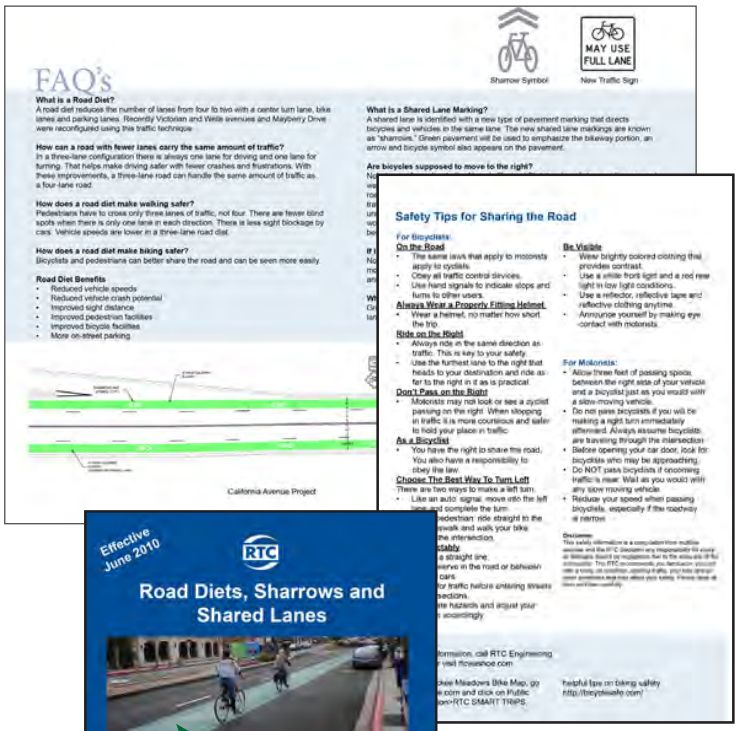
1 These crash rates are based on before-and-after studies of four Washoe County Road Diet locations. The numbers of crashes have been annualized to show a direct comparison between the locations. The percentages are intended for informational purposes only.

Reno, Nevada

EDUCATING THE PUBLIC ON ROAD DIETS

The Road Diet provides opportunities to increase on-street parking, which benefits motorists and businesses. The safety and improved flow are especially beneficial on roads like California and Arlington with lots of driveways and side streets. Moving the people making turns out of the traffic stream improves flow and reduces rear end collisions.

Excerpt from RTC's public outreach flyer, ***Road Diets, Sharrows and Shared Lanes***



In an effort to promote safety, the flyer provides additional safety tips for bicyclists and motorists as they adjust to sharing the same lanes. These tips include reminding bicyclists that they are required to obey traffic laws and traffic control devices and encouraging them to ride predictably and to consider when drivers may or may not see them (e.g., passing traffic on the right-hand side or entering intersections when a driver's view may be obstructed). Other safety tips include suggesting motorists leave 3 feet of lateral space when passing a bicyclist, being aware of bicyclists when turning right across a bicycle lane, and checking for bicyclists before opening car doors on street-side parking.

RESULTS

The RTC's approach to Road Diet public education and outreach has been a key component in the success of their projects and has allowed them to continue to implement Road Diet treatments in Reno.

Experimenting with green-colored pavement in a continuous, longitudinal manner in conjunction with the shared-lane marking remains discontinued at this time. *More information on the FHWA's active official experiments for green-colored pavement to communicate a continuous, longitudinal direction in conjunction with shared-lane markings can be found at the following websites: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/mutcd/gcp_slm.cfm and the MUTCD Official Rulings Database at http://mutcd.fhwa.dot.gov/orsearch.asp*



Case Studies

Reno, Nevada – California Avenue

A FEASIBILITY EVALUATION USING TRAFFIC SIMULATION SOFTWARE

OBJECTIVE

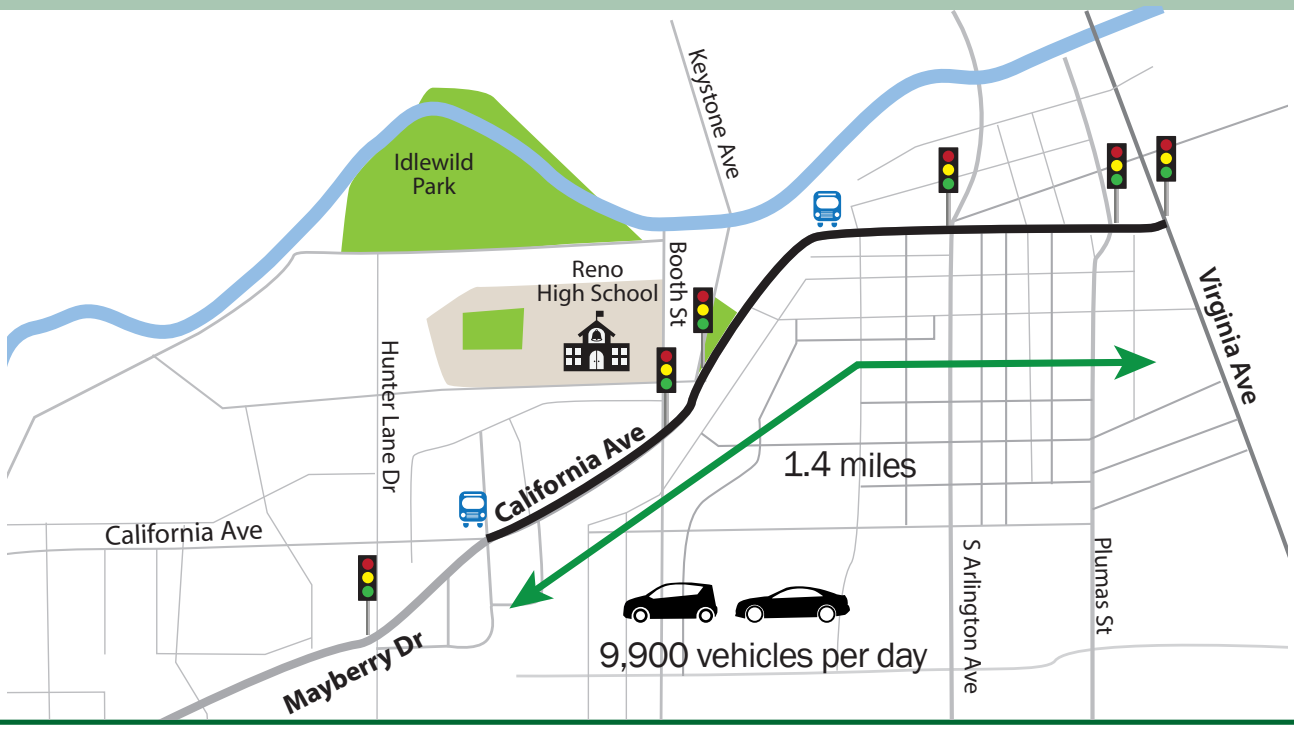
- Evaluate feasibility of Road Diet and its impact on traffic flow

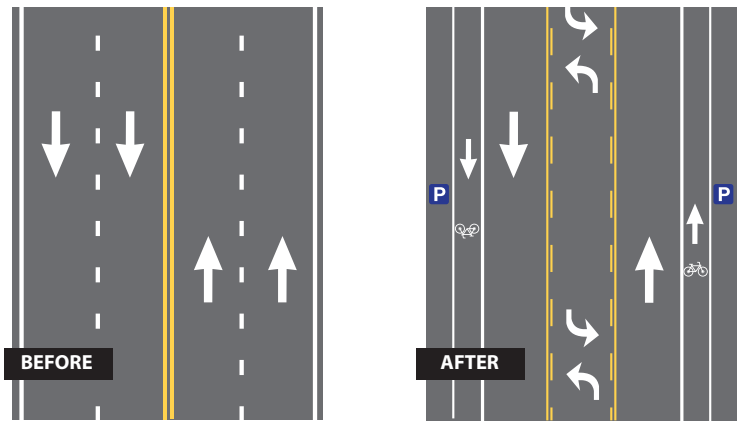
FEATURES

- Collection of traffic volumes, speed data, turning movement counts
- Traffic simulation software analysis

RESULTS

- Maintained acceptable level of service
- Feasibility study supported the completion of the Road Diet





The Regional Transportation Commission (RTC) of Washoe County installed a Road Diet on California Avenue between Mayberry Drive and South Virginia Street in Reno, Nevada. To evaluate the feasibility of completing the Road Diet and to evaluate its impact on the existing traffic flow, the RTC used traffic simulation software.

Reno, Nevada – California Avenue

A FEASIBILITY EVALUATION USING TRAFFIC SIMULATION SOFTWARE

RESEARCH PLAN

Researchers collected 24-hour directional volume counts and spot speed data at three locations along California Avenue. Additionally, turning movement counts were manually collected at all intersections along the study corridor in order to collect baseline levels of service at each intersection.

The researchers utilized simulation software to mimic the intended roadway configuration after the Road Diet and its effect on traffic. Future traffic growth was not considered in the analysis in order to have a direct one-to-one comparison of before-and-after level of service outcomes.

PROCEDURE

Researchers followed a four-step process for completing the Road Diet simulation.

1. **Collection of traffic counts**
   The research team collected one week of 24-hour directional traffic volume counts using tube-counters at three locations along the proposed segment.
2. **Collection of speed data**
   The research team collected spot speed data at the same three locations as the traffic counts. The team determined the 50th and 85th percentile speeds as inputs to the simulation data.
3. **Collection of turning movement data at signalized intersections**
   Researchers obtained manual turning movement counts during morning and evening peak hours at intersections along the proposed segment. This data was used to determine the level of service (LOS) of the intersections before the Road Diet conversion.
4. **Simulation analysis**
   Researchers simulated the Road Diet conditions at two combined intersections and at the access points. For the purpose of the simulation, the access points were treated as two-way stop-controlled intersections.

RESULTS

The intersections experienced unchanged LOS or dropped by one LOS category (e.g., from LOS B to C). The outcome of the simulation indicated that none of the intersections dropped below LOS D.

Signalized Intersection Performance along California Avenue

	a.m. peak hour				p.m. peak hour			
	Existing		Future		Existing		Future	
Intersection	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
Booth St.	B	0.77	C	0.84	B	0.30	C	0.43
Keystone Ave.	B	0.76	C	0.88	B	0.53	C	0.69
S. Arlington Ave./Clay St.	B	0.11	C	0.13	C	0.53	D	0.87
S. Sierra St.	A	0.49	A	0.58	A	0.58	B	0.73
S. Virginia St.	A	0.37	A	0.37	B	0.43	B	0.43

Overall, the results showed that implementation of a Road Diet along this section of road would likely reduce the overall LOS, but only to a level still deemed acceptable by the RTC of Washoe County. Based on this finding, the RTC concluded that the traffic simulation analysis provided enough support to proceed with the Road Diet, and it was implemented in 2010.

Source: Li, H. and Tian, Z., "Feasibility Evaluation of Road Diet Projects - A Case Study in Reno, NV" Accessed March 17, 2015. Available at: http://www.westernite.org/annualmeetings/sanfran10/Papers/Poster%20Papers/ITE%20Paper_Poster-Li.pdf

Case Studies

Reno, Nevada – Wells Avenue

ROAD DIET IMPROVES SAFETY FOR MOTORIZED AND NON-MOTORIZED USERS

OBJECTIVE

- Reduce crashes along the corridor
- Improve pedestrian and bicyclist safety

FEATURES

- Bicycle lanes
- Curb extensions
- Medians
- Crosswalks
- Pedestrian refuge areas

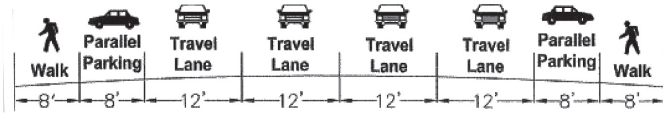
RESULTS

- More than 30% decrease in overall crashes
- Reduced pedestrian crashes by 54%
- Reduced speeds 5-9 mph





Wells Avenue after the completion of the Road Diet.



BEFORE



AFTER

In 2003, the Regional Transportation Commission (RTC) of Washoe County installed a Road Diet on Wells Avenue between Stewart Street and South Virginia Street in Reno, Nevada. This section of Wells Avenue spans mostly commercial property. The original 4-lane cross section of Wells Avenue was converted to one vehicle lane in each direction, a center turn lane, a dedicated bicycle lane on each side, and wider sidewalks. The modification maintained the existing on-street parking on the corridor.

Reno, Nevada - Wells Avenue

ROAD DIET IMPROVES SAFETY FOR MOTORIZED AND NON-MOTORIZED USERS

IMPLEMENTATION PLAN

The Road Diet on Wells Avenue was completed as a part of the RTC's Complete Streets initiative. The reconfiguration allowed for the addition of bicycle lanes and designated parking lanes, and the design integrated safety features such as curb extensions, frequent crossing opportunities, medians, pedestrian refuge islands, and lighting. To improve the aesthetics and livability of the corridor, the RTC also incorporated landscaping, benches, and public art into the project.

PEDESTRIAN CRASHES HAVE BEEN REDUCED BY **54%**

RESULTS

Two years after the completion of the Road Diet along Wells Avenue, the RTC reported the reductions in crashes were most evident in rear-end, angle, and overtaking sideswipe crashes, which were the most common crash types prior to the modifications. The Road Diet is also credited with reducing the number of pedestrian crashes by 54 percent.

Crash Type	Before	After
Angle	33	19
Pedestrian	13	6
Rear End	52	43
Sideswipe, Overtaking	13	4
Head On	0	2
Sideswipe, Meeting	0	3
Rear-to-rear	0	1
Backing	0	2
Unknown	12	5
TOTAL	123	85

After the Road Diet, average traffic speeds had decreased between 5 and 9 miles per hour (14-24 percent reduction).

The roadway segment also experienced an approximate 10 percent drop in traffic volume (from 15,854 to 14,244 vehicles/day). Although RTC has not confirmed that the traffic has shifted to parallel streets, this sometimes occurs when a road undergoes a Road Diet.

The RTC reported no change to the road's level of service after the Road Diet implementation. The RTC speculates that this is likely due to the existence of exclusive left-turn lanes at signalized intersections. At unsignalized intersections, the exclusive two-lane left-turn lane provides improved service to main street left-turn and side street left-turn traffic.

Source: The Regional Transportation Commission of Washoe County," Wells Avenue Traffic Study, Four-to-Three Lane Conversion, Final Report," June 1, 2008. Accessed March 23, 2015. Available at: http://www.westofwells.com/PDImages/docs2/WellsStudy%20Final.pdf

Staten Island, New York – Luten Avenue

SAFETY SOLUTION NEAR SCHOOL IS A ROAD DIET

OBJECTIVE

- Calm traffic
- Reduce speeding
- Improve pedestrian safety

FEATURES

- High school and park
- Heavy pedestrian activity
- Medians and painted crosswalks
- Pedestrian refuge islands

RESULTS

- Reduction in vehicles exceeding speed limit
- Improved pedestrian safety





The New York City Department of Transportation (NYCDOT) utilized the Road Diet concept to address safety issues along Luten Avenue in Staten Island by converting a 4-lane roadway to a 2-lane roadway with a center median and parking lanes.

With Luten Avenue running parallel to both Tottenville High School property and Wolfes Pond Park, the area experiences heavy pedestrian activity, especially during school hours and after school activities. The east side of Luten Avenue contains mainly dense vegetation with some access to residential areas.

Staten Island, New York - Luten Avenue

SAFETY SOLUTION NEAR SCHOOL IS A ROAD DIET



A Road Diet was installed along Luten Avenue to enhance safety for all road users.



A pedestrian refuge island improves safety for pedestrians near Tottenville High School.

BACKGROUND

A tragic fatal crash involving a student pedestrian brought the NYCDOT, the Staten Island Community Board 3 (CB3), Tottenville High School, and other community groups together to formulate a plan for implementing safety strategies along Luten Avenue. They needed a treatment to reduce excessive speeds and to provide for safer pedestrian crossings.

NYCDOT used the information gained from these meetings to develop a proposed Road Diet on Luten Avenue, reducing the through lanes in each direction from two to one. To further narrow the roadway and calm traffic, the project included a painted center median and parking lanes. To address pedestrian safety, the agency installed pedestrian refuge islands and crosswalks. Along with a new signal at the intersection of Deisius Street and Luten Avenue, NYCDOT provided left-turn lanes at intersections along the corridor to improve traffic operations.

RESULTS

NYCDOT reports that most segments along Luten Avenue have experienced reduced speeds due to the Road Diet, with a marked improvement of the vehicles traveling over the speed limit. **The percentage of vehicles exceeding the speed limit decreased by 34 percent along southbound Luten Avenue and decreased by 21 percent in the northbound direction.**

Crash data showed the number of crashes involving injuries to motor vehicle occupants and pedestrians after the Road Diet was lower than the average for the 3 years prior to project implementation.

Crashes with Injuries along Luten Avenue - *Amboy Road to Hylan Boulevard*

	Before* (3 previous years)			After
Total Crashes with Injuries	6	2	2	2.3
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	5	1	0	1.7
Pedestrians	1	1	2	0.6

* Before columns show the crash history for each of the 3 years immediately prior to project implementation. After column shows number of crashes since implementation (through January 2012) at annual rate.

Source: New York City DOT, "Sustainable Streets Index 2011." Accessed March 23, 2015. Available at: http://www.nyc.gov/html/dot/downloads/pdf/sustainable_streets_index_11.pdf

Case Studies

Manhattan, New York - Ninth Avenue

ROAD DIET ON ONE-WAY STREET DESIGNED FOR ALL USERS

OBJECTIVE

- Create a safer street that accommodates all users

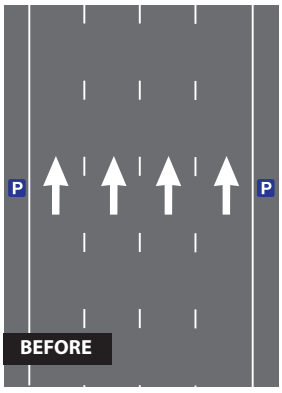
FEATURES

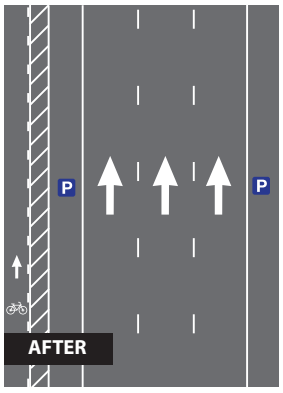
- One-way street
- Parking, separated bicycle path
- Bicycle signals
- Pedestrian refuge islands

RESULTS

- 58% decrease in injuries for all users
- Improved bicyclist experience
- Project received ITE Best Program Award









BACKGROUND

In 2007, New York City Department of Transportation (NYCDOT) implemented a Road Diet that completely redesigned Ninth Avenue. Prior to the reconfiguration, Ninth Avenue, a one-way street, consisted of four through lanes with parking on both sides, but no bicycle facilities and few pedestrian safety features. The redesign included three through lanes, a separated bicycle path located between the parking lane and sidewalk, and pedestrian refuge islands.

Located within a very active and dense, mixed-use, central business district, the Ninth Avenue Road Diet extended from West 23rd Street to West 16th Street. NYCDOT's primary project goal was to create a safe street that would accommodate all road users.

Manhattan, New York - Ninth Avenue

ROAD DIET ON ONE-WAY STREET DESIGNED FOR ALL USERS

"Turning onto Ninth Avenue and heading down the bike lane was a spectacular experience – I immediately felt comfortable and safe, and my stress level decreased by orders of magnitude."[1]



Bicycle lane, parking, and pedestrian refuge island on Ninth Avenue.

PLANNING AND DESIGN

During the planning and design process, NYCDOT communicated openly to determine potential issues and address concerns from stakeholders and community representatives. The design considered the needs of all street users including bicyclists, pedestrians, motorists, bus riders, delivery persons, and emergency response personnel. Design considerations included the following:

- DOT staff analyzed traffic volumes to ensure excess congestion would not occur with one less through lane.
- Designers placed the bicycle path between the parking lane and the sidewalk, creating a safe and comfortable atmosphere for bicyclists. New bicycle signals provided traffic control on the bicycle path.
- At intersections where vehicle left-turns cross over the bicycle lane, designers added left turn bays adjacent to the bicycle lane and provided protected turn phases to completely separate the conflicting through cyclist and left-turning vehicle movements.
- The project included pedestrian refuge islands, narrowing the crossing distance of Ninth Avenue for pedestrians by almost 30 feet. The design of the islands also accommodated an opening of 11 feet from the curb to allow for ease of curbside cleaning for the city's mechanical sweepers.
- Special parking locations were incorporated along the corridor such as commercial loading zones that utilize multi-space parking meters and parking spaces in high-use areas just for taxi drivers.



RESULTS

"The innovative design [on Ninth Avenue] has created a safe, comfortable, and unique street that will be the foundation for the future expansion of our bicycle network in heavily trafficked areas of our city", says NYCDOT. "This groundbreaking design is one that can be utilized by other jurisdictions to promote bicycling while providing safe streets for all users."[2]

In 2008, the Institute of Transportation Engineers (ITE) honored the success and creativity of NYCDOT's Road Diet project on Ninth Avenue by awarding it the Transportation Planning Council Best Program Award. The project's success was confirmed further in 2012 when NYCDOT reported that Ninth Avenue experienced a **58 percent decrease in injuries to all street users**.[3]

[1] Nick Grossman ,"Ninth Avenue Gets a Physically Separated Bike Lane" Streetfilms Blog, October 3, 2007. Accessed March 19, 2015. Available at: http://www.streetfilms.org/ninth-avenue-gets-a-physically-separated-bike-lane/

[2] R. Russo, R. Wade, J. Benson, C. Lucas, "Ninth Avenue Bicycle Path and Complete Street," page 6. Accessed March 19, 2015. Available at: http://www.nyc.gov/html/dot/downloads/pdf/rr_ite_08_9thave.PDF

[3] New York City DOT, "Measuring the Street: New Metrics for 21st Century Streets" page 4. Accessed March 19, 2015. Available at: http://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf

Case Studies

Brooklyn, New York – Empire Boulevard

ROAD DIET IMPROVES PEDESTRIAN SAFETY

OBJECTIVE

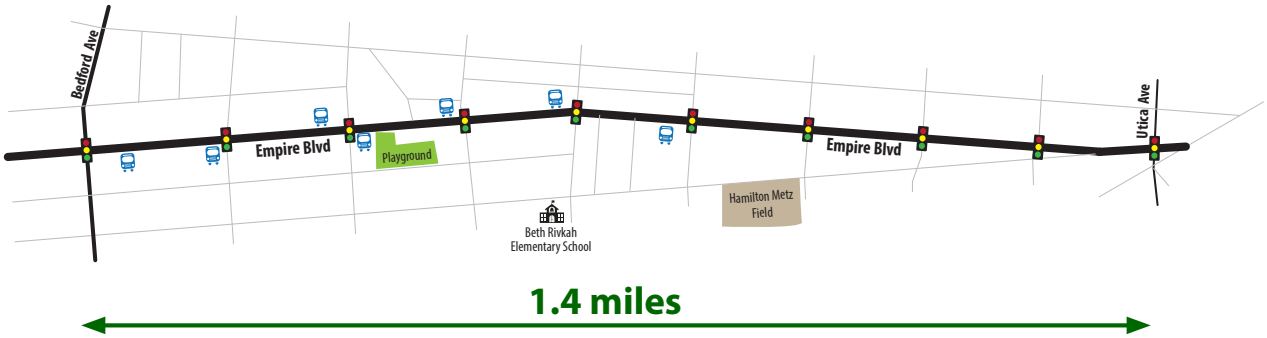
- Increase pedestrian safety and comfort
- Calm traffic
- Improve aesthetic of the overall streetscape

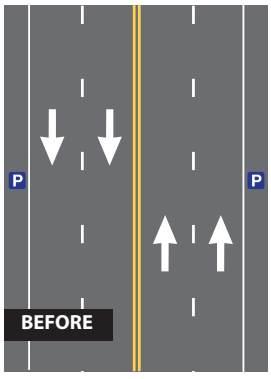
FEATURES

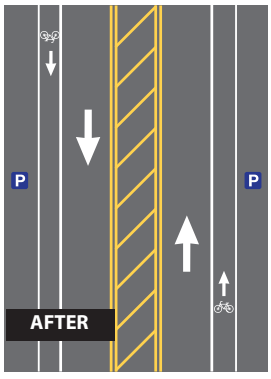
- High number of crashes and speeding
- Public school, commercial and residential
- Pedestrian refuge islands
- Turn bays at intersections

RESULTS

- 27% fewer injuries
- 9% decrease in total crashes









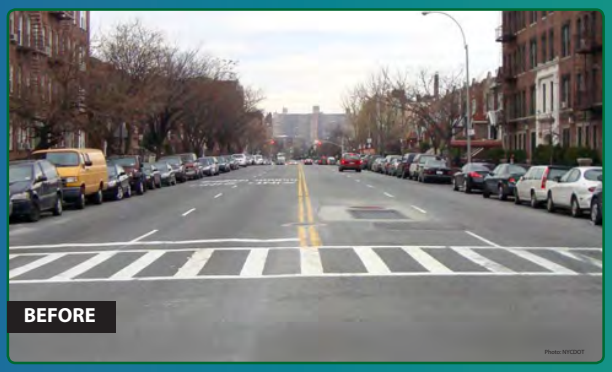
BACKGROUND

In 2009, the New York City Department of Transportation (NYCDOT) implemented a Road Diet on Empire Boulevard between Utica Avenue and Bedford Avenue. The project aimed to increase pedestrian safety and comfort, calm traffic, and improve the aesthetic appeal of the overall streetscape.

The area surrounding Empire Boulevard is a mix of businesses, restaurants, and single-family and multi-family housing. There is a public school located on the east end of the corridor.

Brooklyn, New York – Empire Boulevard

ROAD DIET IMPROVES PEDESTRIAN SAFETY





Road Diet treatment on Empire Boulevard has significantly improved pedestrian safety.

SPEEDING AND PEDESTRIAN SAFETY

In 2007, the intersection of Empire Boulevard and Troy Avenue was listed as the second highest pedestrian crash location in New York City. Over the prior 10 years, the corridor had experienced a high proportion of mid-block crashes, including 6 fatalities and 33 serious injuries. NYCDOT found that the 85th percentile speeds during various times of day often exceeded the 30 mph statutory speed limit by 5-10 mph.

With data to support speeding and pedestrian safety concerns, NYCDOT sought changes for Empire Boulevard. The agency determined the existing 4-lane cross section was unnecessary for handling the traffic volumes occurring on Empire Boulevard. Since excessive capacity often encourages higher speeds, NYCDOT reduced the roadway cross section to two lanes (one in each direction) and allocated the extra space for bicycle lanes.

Under existing conditions, the length of the pedestrian crossing on Empire Boulevard was approximately 60 feet, with no raised medians to shelter pedestrians. The Road Diet plan included pedestrian refuge islands and shorter crossing paths. NYCDOT also added turn bays at intersections, preserved the parking spaces along Empire Boulevard, and improved the streetscape with trees and landscaping.

RESULTS

NYCDOT's Road Diet project improved safety for nearly all users. Pedestrian injuries decreased by 19 percent and overall crash injuries reduced by 27 percent. The area also experienced noticeable reductions in motor vehicle crashes and total crashes. Ultimately, the new layout improved both bicycle and pedestrian accessibility and comfort by reducing vehicle speeds and incorporating bicycle and pedestrian safety features into the streetscape.

CRASHES AND INJURIES
Three-Year After Analysis, Empire Boulevard (Bedford Avenue to Utica Avenue)

	Before				After				Change	
	'06 - '07	'07 - '08	'08 - '09	Average	'09 - '10	'10 - '11	'11 - '12	Average	Actual	Percent
Total Crashes	268	297	301	**288.7**	284	251	252	**262.3**	-26.3	**-9%**
Injuries	88	77	74	**79.7**	73	62	67	**67.3**	-12.3	**-15%**
Motor Vehicle Occupant	109	119	81	**103.0**	61	71	68	**66.7**	-36.3	**-35%**
Pedestrian	35	29	19	**27.7**	28	21	18	**22.3**	-5.3	**-19%**
Cyclist	4	5	3	**4.0**	10	8	10	**9.3**	5.3	**133%**
TOTAL INJURIES	148	153	103	**134.7**	99	100	93	**98.3**	-36.3	**-27%**

Each before year is the 12-month period beginning June 1 and ending May 31. The 3-year after period is Sept. 1, 2009 to August 31, 2012. The implementation period of June 1, 2009 to August 31, 2009 is excluded. Source: NYPD AIS/TAMS Crash Database.

Brooklyn, New York – West Sixth Street

NYCDOT RESPONDS TO TRAGEDY WITH ROAD DIET

OBJECTIVE

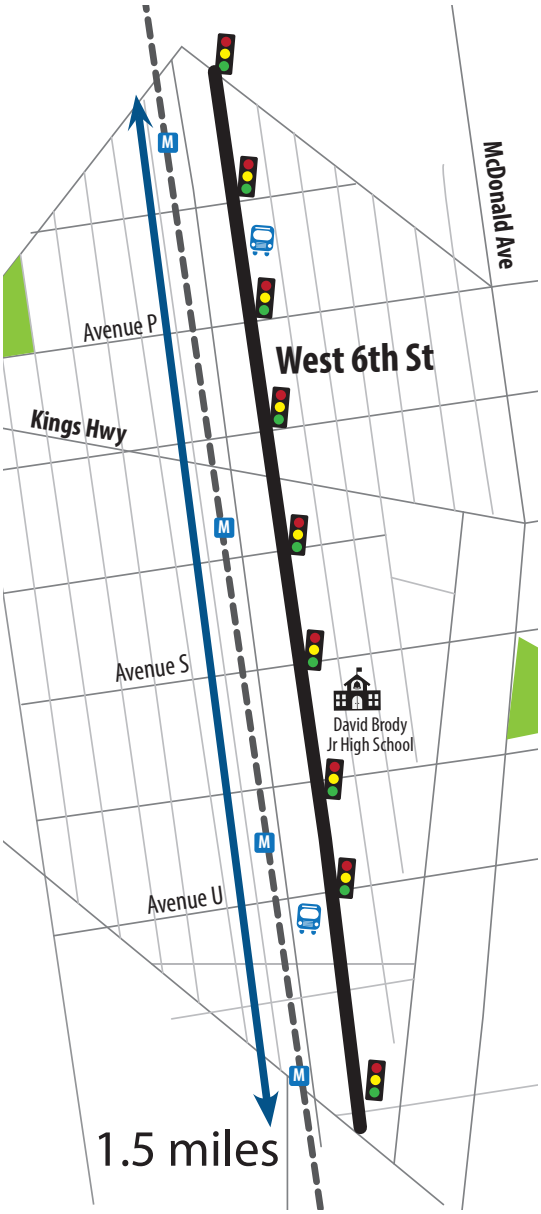
- Calm traffic
- Improve pedestrian safety in response to fatal crashes

FEATURES

- Residential neighborhood
- Four subway stops within corridor
- High speeds

RESULTS

- Lower speeds
- Reduction in crashes
- Pedestrian refuge islands improve pedestrian safety





Following three pedestrian fatalities on the same roadway in Brooklyn, the New York City Department of Transportation (NYCDOT) conducted a study of West Sixth Street in November 2009. This 1.5-mile corridor carried fast-moving through traffic along with a high number of pedestrians heading to subway stations in the area. West Sixth Street was a 4-lane undivided arterial with excess capacity, long crossing distances for pedestrians, and significant separation between marked crosswalks, which led to illegal midblock crossings.

Located near residential neighborhoods, West Sixth Street runs parallel to the "N" subway train located one block to the west. There are four subway stops within the project corridor.

Brooklyn, New York - West Sixth Street

NYCDOT RESPONDS TO TRAGEDY WITH ROAD DIET

Crashes have been reduced and speeds have decreased along West Sixth Street since the Road Diet.





Photos: NYCDOT

THE PLAN

NYCDOT needed a solution to help calm traffic, reduce speeds, and improve pedestrian safety. Since West Sixth Street had excess capacity, NYCDOT adjusted the road to one vehicle lane in each direction and used the extra space to install a wide parking lane and painted median with left-turn bays at key intersections.

At the locations with a high frequency of pedestrian crashes, the agency installed pedestrian refuge islands and high visibility crosswalk markings. The design and installation of the pedestrian refuge islands included prohibiting some left turns to reduce conflicts with pedestrians and opposing left turning traffic.

RESULTS

NYCDOT's plan effectively calmed traffic and improved safety along West Sixth Street. The agency analyzed crash data and performed speed studies along the corridor before and after the project was completed, with results indicating improved safety and speed reductions following the Road Diet.

Overall average speeds on West Sixth Street decreased by 8 to 12 percent, and the percentage of vehicles exceeding the speed limit showed a reduction of nearly 30 percent in the northbound direction and more than 40 percent in the southbound direction. The before-and-after crash analysis revealed a reduction in the number of injury crashes after installation.

CRASHES WITH INJURIES ALONG WEST 6TH STREET (65th St. to 86th St.)

	BEFORE (three previous years)			AFTER
Total Crashes with Injuries	36	22	27	21.5
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	15	11	14	8.8
Pedestrian	20	10	9	10.1
Bicyclists	1	1	4	2.5

WEST 6TH STREET (Avenue V to Avenue W)	Average Traffic Speeds (m.p.h.)		Percentage of Vehicles Over the Speed Limit	
	BEFORE	AFTER	BEFORE	AFTER*
Northbound	30.4	27.9	53%	34%
Southbound	31.3	27.7	60%	18%

*After column shows number of crashes since implementation (through Jan 2012) at annual rate.

Source: New York City DOT, "Sustainable Streets Index 2011." Accessed March 23, 2015. Available at: http://www.nyc.gov/html/dot/downloads/pdf/sustainable_streets_index_11.pdf

Seattle, Washington – Dexter Avenue

TWO-STAGE ROAD DIET

OBJECTIVE

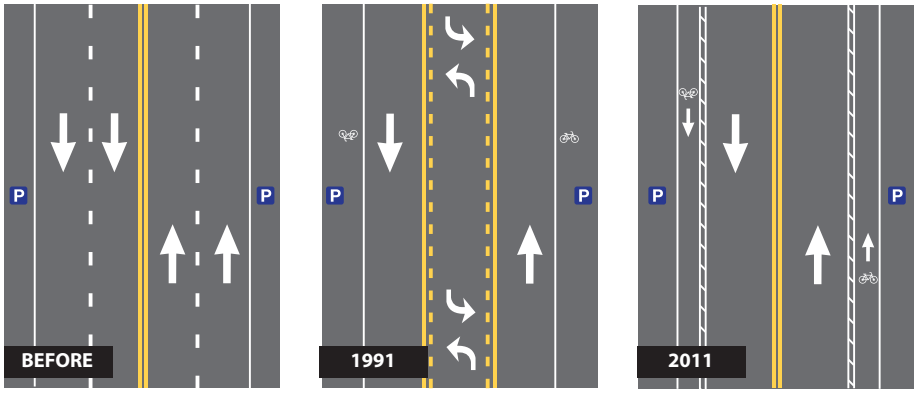
- Improve Dexter Avenue for all users

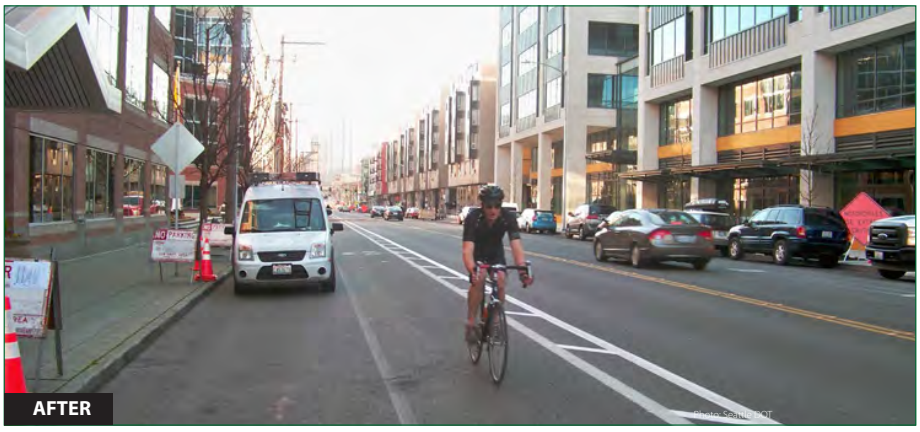
FEATURES

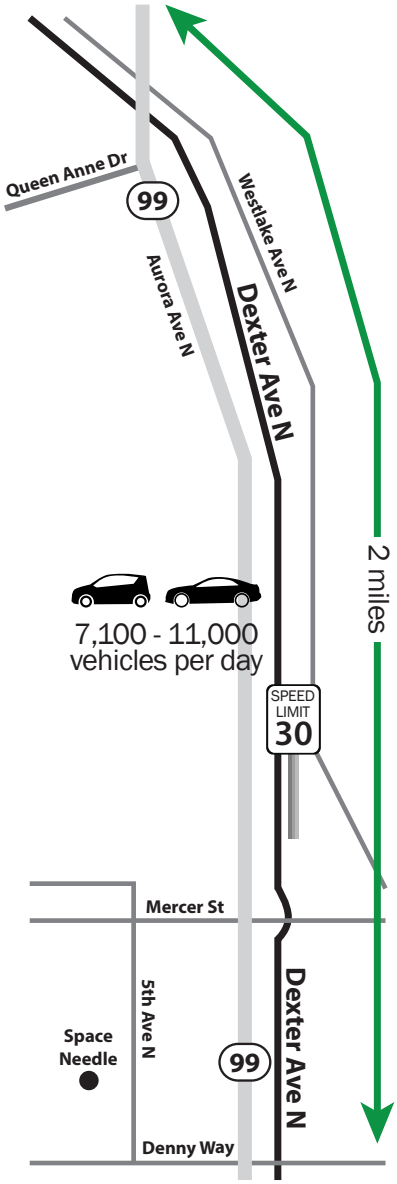
- Transit Route
- Converted from 4 to 3 to 2 lanes over time
- High bicycle volumes

RESULTS

- Favorable public opinion
- Transit travel times remain consistent
- Bus ridership increased







BACKGROUND

More than 20 years ago, Seattle Department of Transportation (SDOT) completed a Road Diet on Dexter Avenue, converting it from a 4-lane roadway to a 3-lane roadway with a bicycle lane in each direction. In 2011, SDOT revisited the design during a planned repaving project. With traffic volumes ranging from 7,100 to 11,000 vehicles per day and a low volume of left-turning vehicles, the SDOT determined a center left-turn lane was unnecessary. Therefore, SDOT went one step further on its original Dexter Avenue Road Diet and converted the 3-lane roadway to a 2-lane roadway with buffered bicycle lanes and bus bulbs.

Seattle, Washington – Dexter Avenue

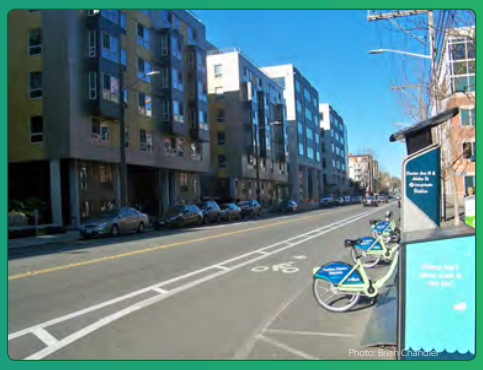
TWO-STAGE ROAD DIET



Bicycle lane and floating bus stop



Transit and non-motorized users are prioritized on Dexter



Bicycle rental station utilizes "extra space"

Dexter Avenue runs north from Seattle's Belltown neighborhood, west of Lake Union. The street is located in a mixed-use area zoned for multi-family housing; the north end of the corridor contains primarily single-family homes.

DEXTER AVENUE IS THE PRIMARY BICYCLE CORRIDOR TO DOWNTOWN, WITH 300 SOUTHBOUND CYCLISTS IN THE AM PEAK HOUR.

THE DESIGN

Bicycle Lanes. Initially, SDOT considered parking-separated bicycle lanes on Dexter Avenue, but with a high driveway density and relatively steep grade of the roadway, there was a concern that sight distance and visibility could be a safety issue. As an alternative, SDOT placed the bicycle lanes adjacent to the travel lane separated by a 2-ft buffered area.

Transit. SDOT prioritized buses over general purpose traffic by moving several bus stops to in-lane, creating bus bulbs. The bicycle lanes were routed behind the bus stop pads towards the curb, creating "floating" bus stops.

Two-Way Left-turn Lane (TWLTL) Removal. With Aurora Avenue (Washington State Route 99) running parallel near Dexter Avenue on one side and a bluff on the other, there are very few left-turns onto side streets. This allowed SDOT to feel comfortable removing the TWLTL in the corridor. At the few places with significant left-turns, SDOT added left-turn pockets when the two-way left-turn lane (TWLTL) was removed.

Delivery Trucks. The TWLTL had been used by delivery trucks when loading and unloading, so there was concern about losing this space. SDOT added "Load Zones" on the route to address this need.

RESULTS

Public opinion on the Road Diet has been favorable, especially among bicyclists. Dexter Avenue is the primary bicycle corridor to reach downtown, with 300 southbound bicyclists per hour during the AM peak. During the same time, there are approximately 850 motorists per hour heading south. Transit travel times have remained consistent and bus ridership has increased by 30 percent between 2010 and 2013.

Source: National Association of City Transportation Offices (NACTO), "Seattle's Dexter Avenue Bus Bulb," *NACTO Urban Street Design Guide*. Accessed March 23, 2015. Available at: http://nacto.org/usdg/street-design-elements/curb-extensions/bus-bulbs/

Case Studies

Seattle, Washington – Nickerson Street

SAFETY IMPROVED & EXTREME SPEEDING VIRTUALLY ELIMINATED

OBJECTIVE

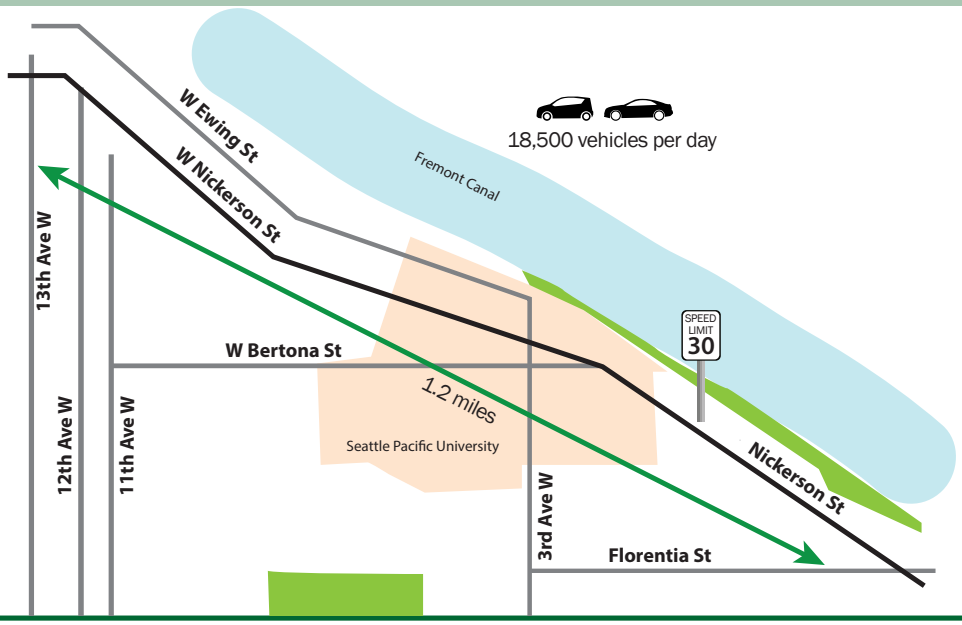
- Improve pedestrian safety
- Increase driver compliance with speed limit

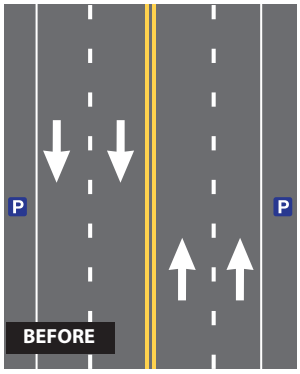
FEATURES

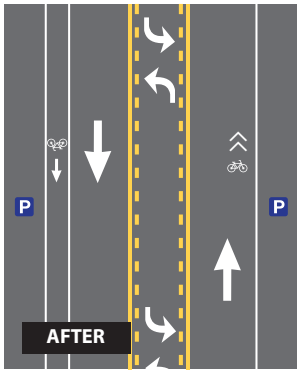
- Reintroduction of crosswalks
- Addition of curb bulb-outs and pedestrian refuge islands

RESULTS

- 23% reduction in collisions
- More than 90% drop in top-end speeders









In August 2010, the Seattle Department of Transportation (SDOT) completed a Road Diet on Nickerson Street from 13th Avenue West to Florentia Street. The goal of this project was to improve pedestrian safety by reducing exposure to multiple lanes of traffic and increase driver compliance with the speed limit. Prior to the reconfiguration, there were two travel lanes in each direction. The street was restriped to one lane in each direction with a center two-way left-turn lane and bicycle lanes.

Carrying approximately 18,500 vehicles per day, Nickerson Street is in the Queen Anne neighborhood of Seattle. The corridor land use is mixed, including service-oriented businesses, restaurants, multi-unit residences, and the Seattle Pacific University campus.

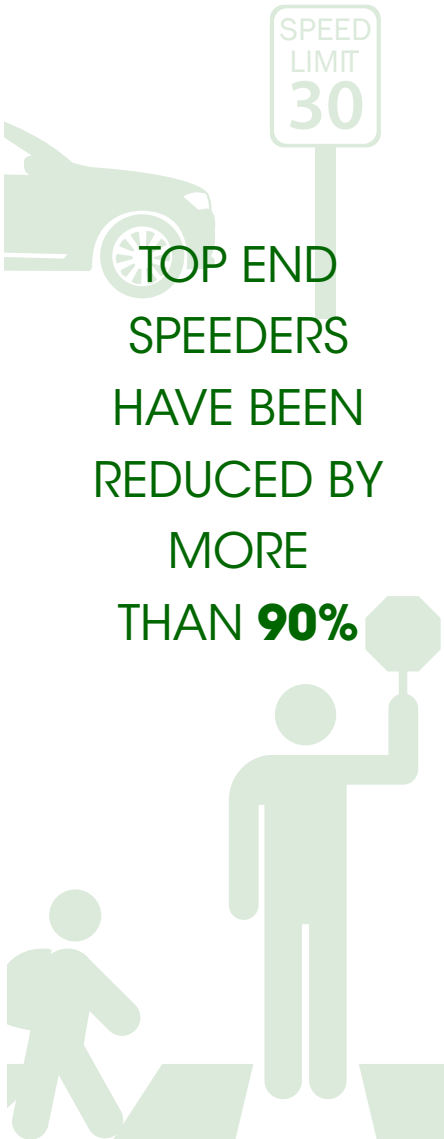
Seattle, Washington – Nickerson Street

SAFETY IMPROVED & EXTREME SPEEDING VIRTUALLY ELIMINATED





To improve pedestrian safety, the Road Diet project incorporated crosswalks with curb bulb-outs and pedestrian refuge islands



TOP END SPEEDERS HAVE BEEN REDUCED BY MORE THAN **90%**

BACKGROUND

Prior to the Road Diet, SDOT was removing mid-block crosswalks on the city's 4-lane roads due to safety considerations. This decision was not popular with the community, and as a way of addressing the concerns, SDOT implemented the Nickerson Street Road Diet, which included the reintroduction of marked crosswalks and addition of curb bulb-outs and refuge islands. This configuration provides an opportunity for increased safety since pedestrians do not have to cross all lanes of traffic at once.

By decreasing the travel lanes to only one in each direction, SDOT also hoped to lower the speeds along Nickerson Street. In 2007, the agency completed a speed study and found that 90 percent of drivers were exceeding the 30 mph speed limit.

RESULTS

One year after the conversion, SDOT completed a before-and-after study on the Nickerson Street Road Diet. The outcome was what SDOT had hoped for – a safer road. Speeding along Nickerson Street decreased dramatically, and collisions were reduced. The results also showed that the Road Diet accomplished this without significant diversion of traffic to parallel routes. Nickerson Street only experienced a 1 percent decrease in traffic volumes between 2009 and 2011.

TOP END SPEEDERS
Percent 10+ mph over the speed limit

	Before	After	Change
Westbound	17%	1.4%	-92%
Eastbound	38%	1.5%	-96%

CHANGE IN NUMBER OF COLLISIONS
from 13th Ave W to N Florentia St

5-Year Average	One Year Post Project	Change
33.6	26	-23%

Source: City of Seattle Department of Transportation, "Nickerson Street Rechannelization Before and After Report," 2012.

Seattle, Washington – Stone Way

DESPITE EARLY OPPOSITION, ROAD DIET PRODUCES GREAT RESULTS

OBJECTIVE

- Improve facility for bicycling
- Improve pedestrian safety

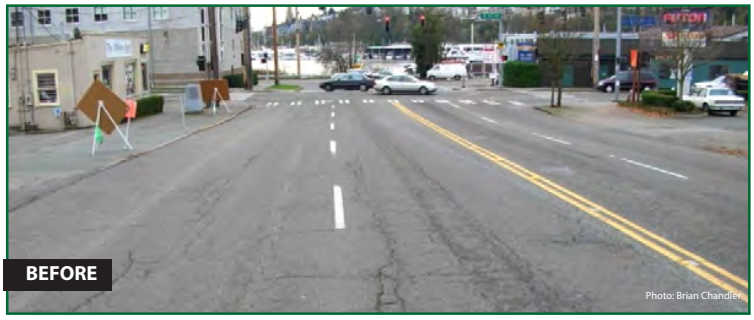
FEATURES

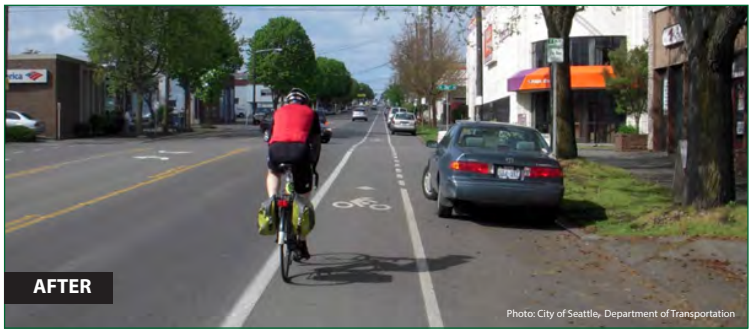
- Repaving project
- Parks, trail, and zoo
- Nearby school and bus route
- Local business opposition

RESULTS

- Reduction in vehicles exceeding speed limit
- Improved pedestrian safety
- Increased bicycle usage







As part of a repaving project in 2007, Seattle Department of Transportation (SDOT) completed a Road Diet on Stone Way from 34th Street to 45th Street. It was the twenty-third lane reduction project undertaken by the city since 1972. Along with implementing the Stone Way Road Diet, the city also adopted a Bicycle Master Plan, which aimed to make Seattle the best community for bicycling in the United States.[1] The Stone Way conversion supported this new initiative by adding bicycle lanes.

Connecting the Fremont and Wallingford neighborhoods in Seattle, Stone Way is a north-south arterial that carries approximately **13,000 vehicles per day and numerous Metro bus routes**. There are many pedestrian generators in the area including parks, a trail, the Woodland Park Zoo, and several schools.

[1] City of Seattle, "Seattle Bicycle Master Plan," 2007.

Seattle, Washington - Stone Way

DESPITE EARLY OPPOSITION, ROAD DIET PRODUCES GREAT RESULTS





Photos: Brian Chandler

The Stone Way Road Diet improved pedestrian and bicycle safety by incorporating pedestrian refuge islands and a combination of shared lanes and bicycle lanes.

OPPOSITION AND SUPPORTERS

Although the residents in Seattle were not strangers to Road Diets, there remained some strong opposition to the proposed Stone Way reconfiguration. Local business owners felt Stone Way is a vital arterial and should not be changed. "We need the road. We need to move traffic, particularly trucks. It's not a good idea to narrow the street down because traffic will overflow on other streets. This is our arterial. We want the four lanes of traffic." [2]

On the other hand, the bicycle activist community in Seattle vigorously supported the implementation of the project by organizing traffic counts, a demonstration ride, and commissioning an outside consultant report that asserted that undue congestion would not occur.[3]

RESULTS

In 2010, SDOT completed a before-and-after study to evaluate the effects of the Stone Way Road Diet. The results are as follows:[4]

- **Top-end speeders reduced.**
  Top speeders (those traveling more than 10 mph over the speed limit) decreased by more than 80 percent.
- **Collisions reduced.**
  Total collisions were reduced by 14 percent and injury collisions decreased by 33 percent.
- **Pedestrian crossings are safer**.
  Pedestrian collisions were reduced by 80 percent.
- **Bicycle volume has increased.**
  The volume of bicyclists increased 35 percent from 2007 to 2010.
- **Motor vehicle traffic has not diverted to neighborhood streets.**
  Daily traffic counts on parallel streets are down by 12 to 34 percent, which is a greater decrease than the slight decline of 6 percent recorded on Stone Way.
- **Peak hour capacity has been maintained.**
  The study confirmed the corridor has sustained its capacity to carry the same number of motor vehicles in spite of the reduction in the number of travel lanes.

2 S. Gilmore, "City Wants to Put Four-Lane Stone Way on Road Diet" *The Seattle Times*, October 12, 2006. Accessed March 23, 2015. Available at: http://www.seattletimes.com/seattle-news/city-wants-to-put-four-lane-stone-way-on-road-diet/

3 S. Ullman, "Stone Way: 1 of 34 Rightsizing Projects Making Seattle Safer and More Livable" Project for Public Spaces. Accessed March 23, 2015. Available at: http://www.pps.org/reference/stone-way-one-of-34-rightsizing-projects-making-seattle-safer-and-more-livable/

4 "Stone Way N Rechannelization: Before and After Study, N 34th Street to N 50th Street," City of Seattle Department of Transportation, May 2010

Indianapolis, IN - Indianapolis Cultural Trail

ROAD DIETS LEAD TO ECONOMIC DEVELOPMENT

OBJECTIVE

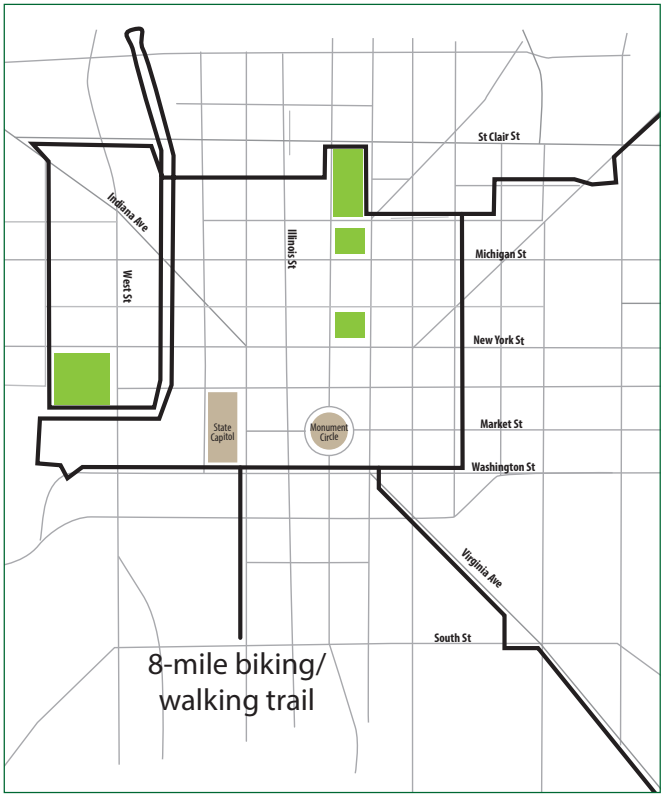
- Improve interconnectivity among Indianapolis' cultural districts, neighborhoods, and greenway systems
- Improve safety for all users

FEATURES

- Public-private partnership
- Bicycle and pedestrian trails
- Cultural Trail used as marketing strategy by Indiana Visitor's Bureau

RESULTS

- Improved economic development
- Significant increase in pedestrian and bicycle traffic in downtown Indianapolis





Alabama Street

The City of Indianapolis, through a public-private partnership, completed the Indianapolis Cultural Trail, an 8-mile biking and walking trail system that connects the cultural districts, neighborhoods, and the city's greenway system. In order to complete this trail system, streets in downtown Indianapolis underwent Road Diets.

The streets in downtown Indianapolis were mostly five or six lanes wide, and speeds could reach close to 50 mph. The design team reduced both the number of lanes and lane widths as a way of both slowing speeds and gaining extra space within the right of way to allow for the separate pedestrian and bicyclist trail. The completed trail loops around downtown and connects to greenways with two spurs. The trail includes shared space for bicyclists and pedestrians, and some areas incorporate two separate facilities for pedestrians and bicyclists.

Indianapolis, IN - Indianapolis Cultural Trail

ROAD DIET LEAD TO ECONOMIC DEVELOPMENT



The ICT has brought a significant increase in pedestrian and bicycle traffic to downtown Indianapolis.



Pedestrian travel is separated from bicycle travel on this segment of ICT.



Riding the Pacers Bikeshare on the Cultural Trail.

PUBLIC OUTREACH, PLANNING, AND DESIGN

Central Indiana Community Foundation (CICF) and the Mayor of Indianapolis envisioned that by providing improved multi-modal connectivity throughout Indianapolis' cultural districts and historic neighborhoods, economic development in the area would improve. Leaders of the proposed trail project spent years explaining the potential benefits to politicians, philanthropists, and community officials and collecting private donations.

With the project consisting of seven phases and construction lasting almost 6 years, team members felt their commitment to public involvement and engagement throughout was a key component of the project's success. Early in the conceptual phase, the design team held a workshop to present the concept to the stakeholders. The team created a project website with up-to-date progress information and conducted many public meetings throughout the duration of the project.

Improving safety for all users was one of the project team's goals. In addition to the traffic calming effect the Road Diets provided, the design also included other safety features, such as curb bulb-outs at intersections to reduce crossing distance, chicanes in the bicycle facilities to alert bicyclists of an upcoming intersection, and countdown timers and audible pedestrian signals.

OVER $300 MILLION OF NEW DEVELOPMENT HAS BEEN CONSTRUCTED ALONG THE ROUTE SINCE 2008.

RESULTS

Although the last phase of the trail was not completed until the end of 2012, new construction and redevelopment started happening in the area well before the project was finished. Over $300 million of new development has been constructed along the route since 2008. While tax assessment data from 2007-2010 from nearby areas decreased by 1.2 percent, the assessed value along the Cultural Trail showed a small increase.

Using the Cultural Trail as its main marketing strategy, the visitor's bureau sees the trail's influence in downtown revitalization success. Vacant lots are being developed into restaurants and businesses. Local developers have opened several mixed-use, multi-family residential developments.

This innovative redesign of the area has improved economic development and has brought a significant increase in pedestrian and bicycle traffic to downtown Indianapolis as people of all ages and abilities have embraced the trail.

Source: Pedestrian & Bicycle Information Center, "Indianapolis Cultural Trail", webpage. Accessed March 18, 2015. Available at: http://www.pedbikeinfo.org/data/library/details.cfm?id=4919

P01-06566





U.S.Department of Transportation
Federal Highway Administration

PUBLICATION: FHWA-SA-15-052

http://safety.fhwa.dot.gov/road_diets

DAVID E. RYU
COUNCILMEMBER, FOURTH DISTRICT

August 31, 2018

Dear Neighbor,

Recently, my office released the *Rowena Avenue, Waverly Drive, Angus Street Cut-Through Traffic Study*, conducted by Kimley-Horn and Associates. This study was commissioned to evaluate and address the issues of pedestrian, cyclist and motorist safety on a number of local and collector streets near Rowena Avenue. After convening a number of working group meetings with community stakeholders, we released the study to allow the wider community to offer input. The full study can be downloaded and viewed on my website.

I introduced a motion this week instructing the Department of Transportation to review and report back on the feasibility of the transportation and infrastructure strategies proposed in Kimley-Horn's traffic study (Council File #11-2130-S4). Once the report from the Department of Transportation is finalized, my office will hold a community meeting in which Kimley-Horn and the Department will present the report and findings to community members who will have the opportunity to learn more about the proposed traffic mitigations, ask questions, and provide input.

As part of reviewing possible safety improvements, we want to take all community input into consideration. We seek and value feedback from the neighborhood council, local businesses, parents, students, and neighbors. Together, we hope to develop solutions that ensure the safety of pedestrians, cyclists and motorists alike.

If you have any questions, or would like to be included in updates as the process continues, please contact my Field Deputy, Rachel Fox, at: 323.957.6415 or rachel.fox@lacity.org.

Sincerely,

David E. Ryu
Councilmember, District Four

200 NORTH SPRING STREET ● LOS ANGELES, CALIFORNIA 90012
PHONE: (213) 473-7004 ● FAX: (213) 473-2311





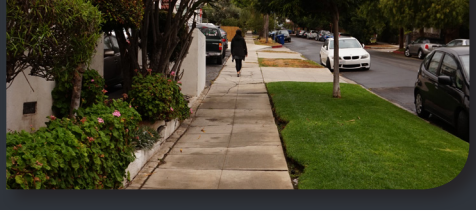
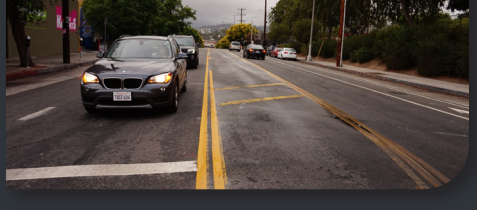
ROWENA AVENUE, WAVERLY DRIVE, ANGUS STREET

CUT-THROUGH TRAFFIC STUDY



Kimley»Horn

May 2018

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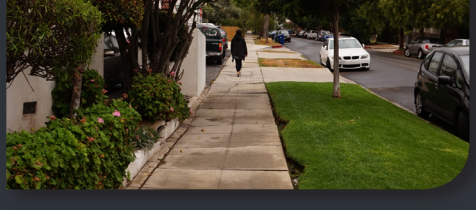
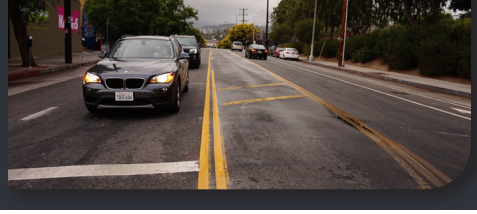



EXISTING CONDITIONS

INTRODUCTION

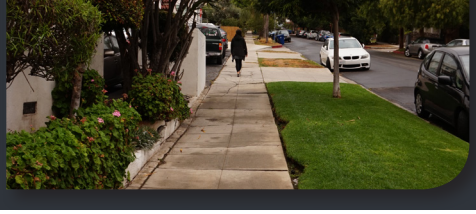
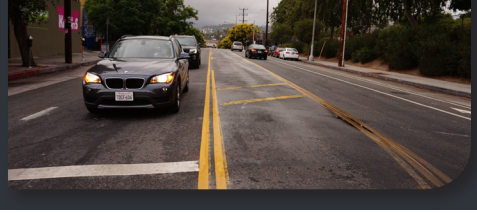
The Silver Lake neighborhood, located northeast of U.S. Route 101, west of California State Route 2, and southwest of Interstate Highway 5, contains many shops, eateries, cafés, and local gathering places – making this east-side Los Angeles neighborhood an eclectic enclave and destination. The neighborhood is utilized by vehicles, bicycles, and pedestrians sharing major and local streets that connect the Silver Lake neighborhood to the rest of Los Angeles and beyond.

In 2013, after a 90-day testing period, a former four-lane portion of Rowena Avenue became a permanent two-lane road (one traffic lane in each direction) with a middle turning lane and dedicated bike lanes on both sides of the street adjacent to on-street parking. Since implementation of the road diet, concerns have been raised by community members related to the potential effects of the road diet on other streets in the area. Specifically, recent concerns regarding cut-through traffic on Waverly Drive and Angus Street have been discussed and highlighted. Concerned community members have raised concerns that more vehicles are traveling along these streets increasing the potential for conflict with pedestrians, including children walking to school, parents with strollers, and joggers.

This study focuses on the traffic patterns along Waverly Drive and Angus Street as these corridors relate to Rowena Avenue. Angus Street is a windy, hill-based residential corridor; Waverly Drive is also a residential corridor, with partial curb. Rowena Avenue is a mix of residential and commercial based properties. Additionally, Rowena Avenue serves as a major thoroughfare to and from California State Route 2 (SR-2) and Interstate Highway 5 (I-5) and as an alternative for connecting the eastern and western portions of the City of Los Angeles.

The City of Los Angeles' Council District 4 office recommended initiating this study to analyze and examine existing conditions in the area, specifically along Waverly Drive and Angus Street. This study will present existing traffic conditions in the project area, identify issues, and recommend potential strategies to help mitigate or alleviate those issues. Recommendations presented in this report are based on solutions developed through public input, technical analysis, and a cost/benefit analysis.



PROJECT AREA

The Project Area limits are Riverside Drive to the north, Maxwell Street to the west, Glendale Boulevard to the east, and Scotland Street to the South. The Project Area was defined through discussion with the two Project Working Groups. **Figure 1- Project Area Boundary** illustrates the Project Area boundaries. **Figure 2 - Project Area Points of Interest** highlights points of interest within the Project Area to provide contextual reference for the area.

Figure 1- Project Area Boundary



Figure 2- Project Area Points of Interest



PROJECT WORK-GROUPS

Additional insight and data points regarding the current conditions, and the real and perceived functions of the corridor, were gathered through two work-group meetings. These work-groups were appointed by the L.A City Council District 4 member David Ryu, and were comprised of local residents and stakeholders.

The work-group meetings were designed to facilitate open dialogue about the challenges and opportunities within the Project Area. Discussion was directed toward mobility and the needs of motorists, bicyclists, and pedestrians.

The first work-group meeting was held on September 25, 2017 at the Hollywood District Office. Members at this meeting expressed positive views regarding the two-way center-turn-lane implemented as part of the Rowena Avenue reconfiguration. The desire to keep this amenity while improving transportation on the street network was stated.

Other points of discussion included (but was not limited to) a desire for more signalized crosswalks, continuous sidewalks along Angus Street, and restricting traffic movement on Rokeby. **Figure 3 - Work group Comments and Notes Map 1** displays some of the notes from this meeting.

The second work-group meeting was held on October 5, 2017 at the Hollywood District Office. During this meeting, group members expressed similar concerns as the first work-group, including a desire for more pedestrian friendly areas, restricting through traffic movements on neighborhood streets, and maintaining facilities for alternative modes of transportation. **Figure 4 - Work-group Comments and Notes Map 2** displays notes from this meeting.

The areas of interest and perceived areas of conflict were used as a starting point to gather data on the existing conditions of Rowena Avenue, Waverly Drive, and Angus Street.

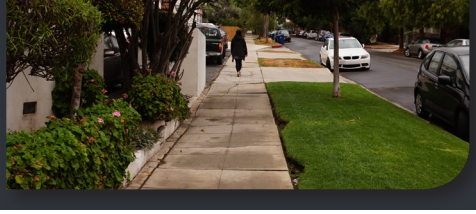
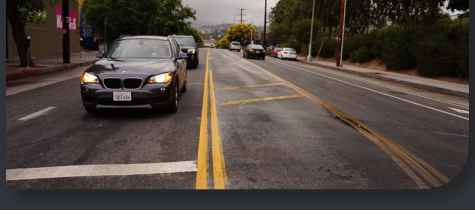




Figure 3-Work-group Comments and Notes Map 1 - Page 1/2

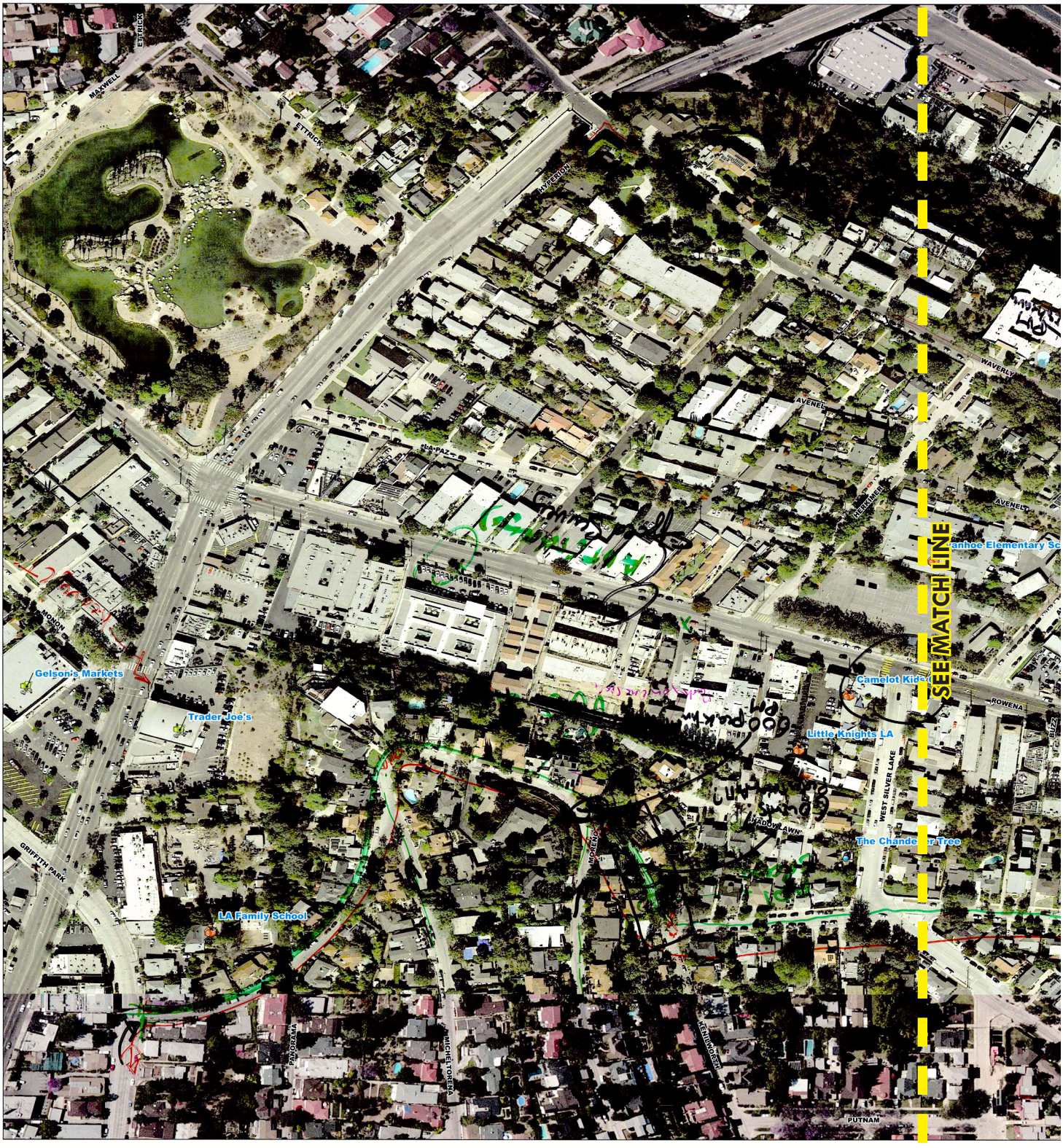
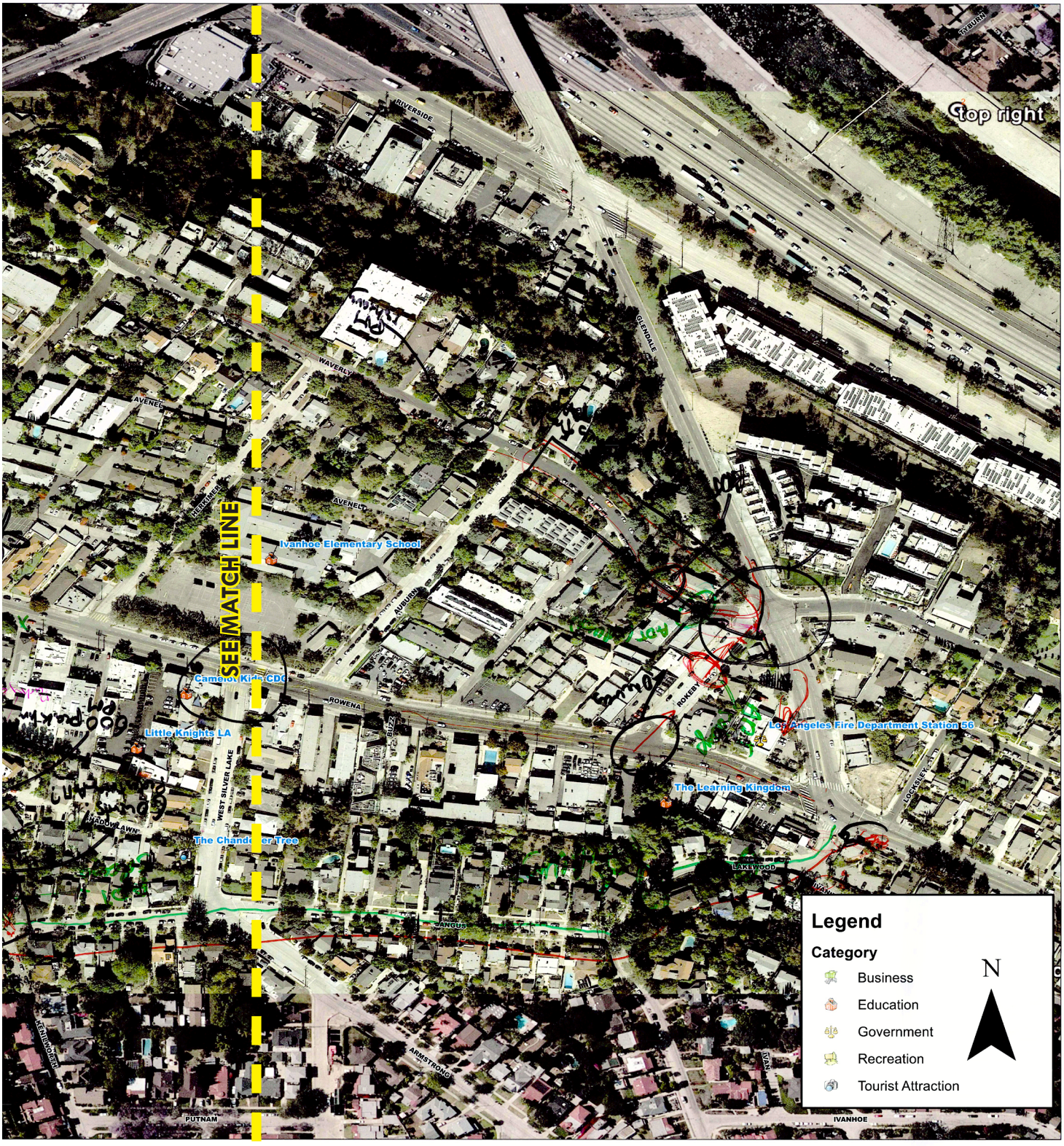
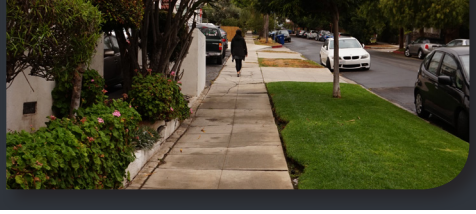


Figure 3-Work-group Comments and Notes Map 1 - Page 2/2







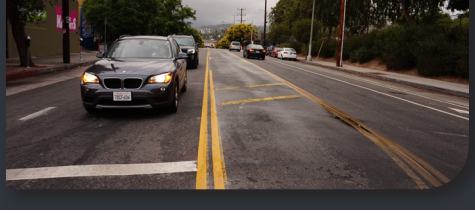


Figure 4-Work-group Comments and Notes Map 2 - Page 1/2

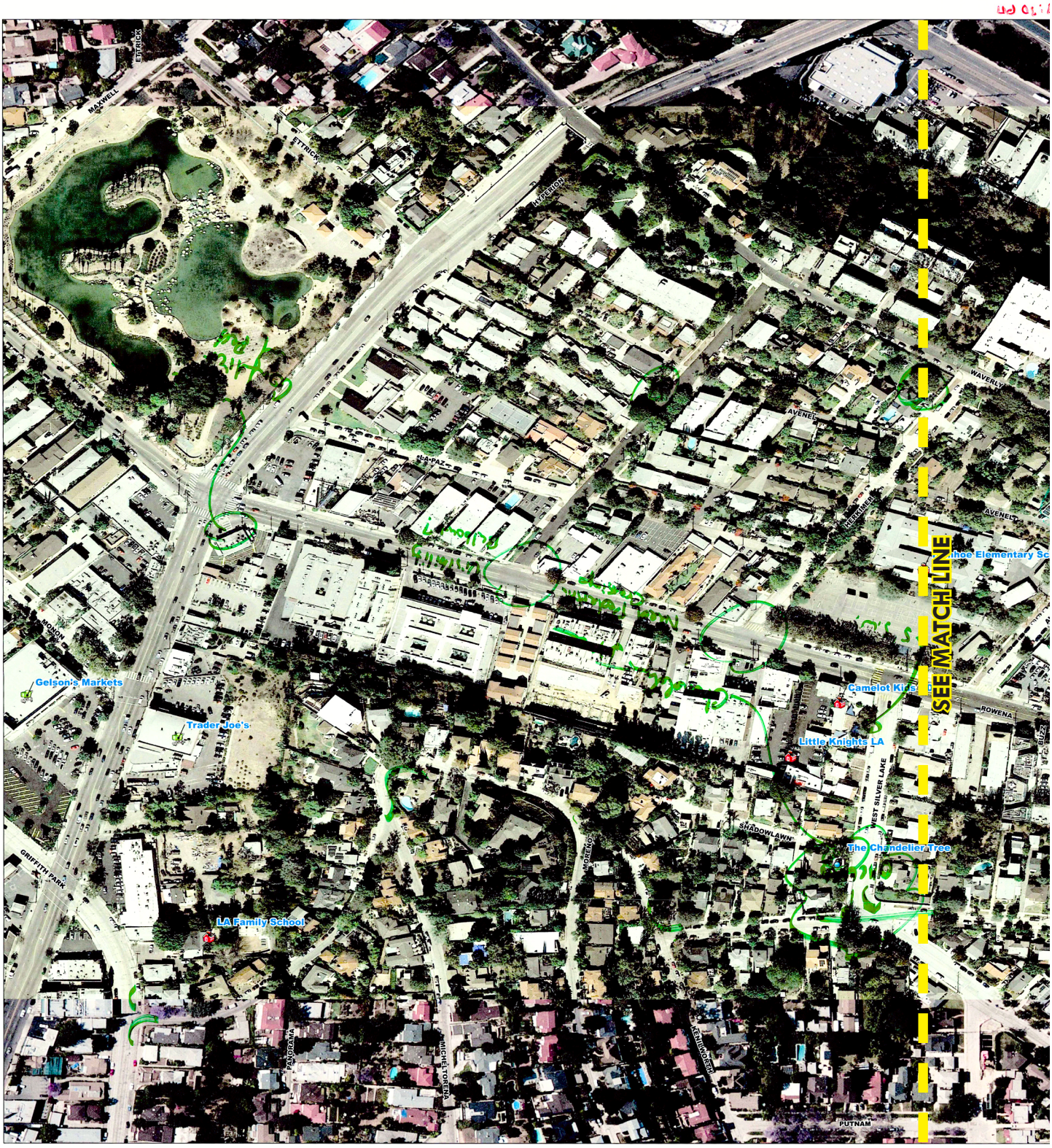
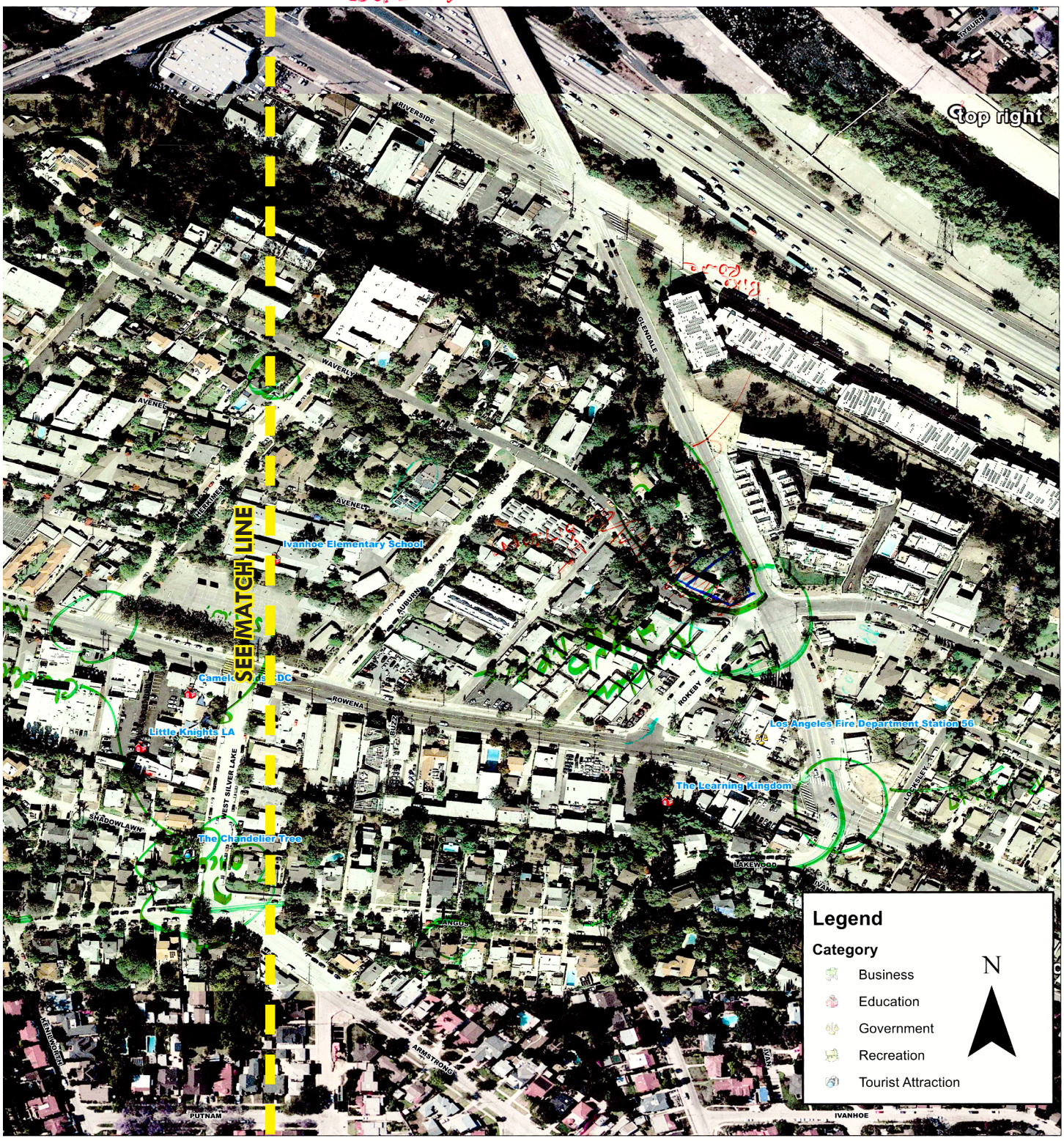
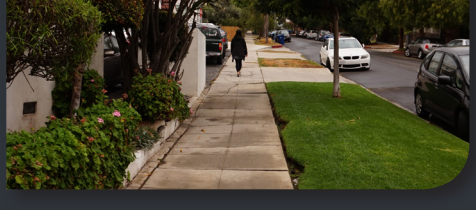
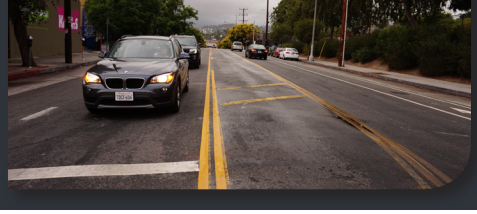


Figure 4-Work-group Comments and Notes Map 2 - Page 2/2



EXISTING CONDITIONS

LAND USE

EXISTING LAND USE

Existing (on-the-ground) land uses within the project area include a mix of single-family and multi-family residential uses. Other uses, mostly along Rowena Avenue, include neighborhood commercial and retail, small offices, schools, and restaurants. Existing land uses are shown in **Figure 5 – Existing Land Use.** Waverly Drive and Angus Street are lined with Single and Multi-Family residential.

GENERAL PLAN LAND USE

The General Plan Land Use map shows a mix of commercial, residential, and public facilities land use designations within the project area. As shown in **Figure 6 – General Plan Land Use Designations**, commercial land use designations are mostly located along Rowena Avenue, Hyperion Avenue, and Glendale Boulevard. Residential land use designations are located adjacent to commercial uses, but oriented along smaller residential streets such as Waverly Drive and Angus Street.

ACTIVITY GENERATORS

There are several locations within the project area that are considered "activity generators." These locations contain existing uses that contribute to traffic patterns and volumes in the area, including (but not limited to) Ivanhoe Elementary School, Camelot Kids CDC, Trader Joe's, and Gelson's Market. A new multi-unit development is slated to be constructed along Waverly Drive.

MOBILITY

CORRIDORS

Rowena Avenue impacts the connecting streets within the local and larger transportation network. This section of the Study Area (Rowena Avenue from Hyperion Avenue to Glendale Boulevard) is approximately 2,552 feet or 0.48 mile. Traffic patterns and behaviors along this corridor impact the two parallel streets which provide connections from Hyperion Avenue to Glendale Boulevard. These residential streets – Waverly Drive and Angus Street – are often used as alternatives to traveling along Rowena Avenue during peak period traffic.

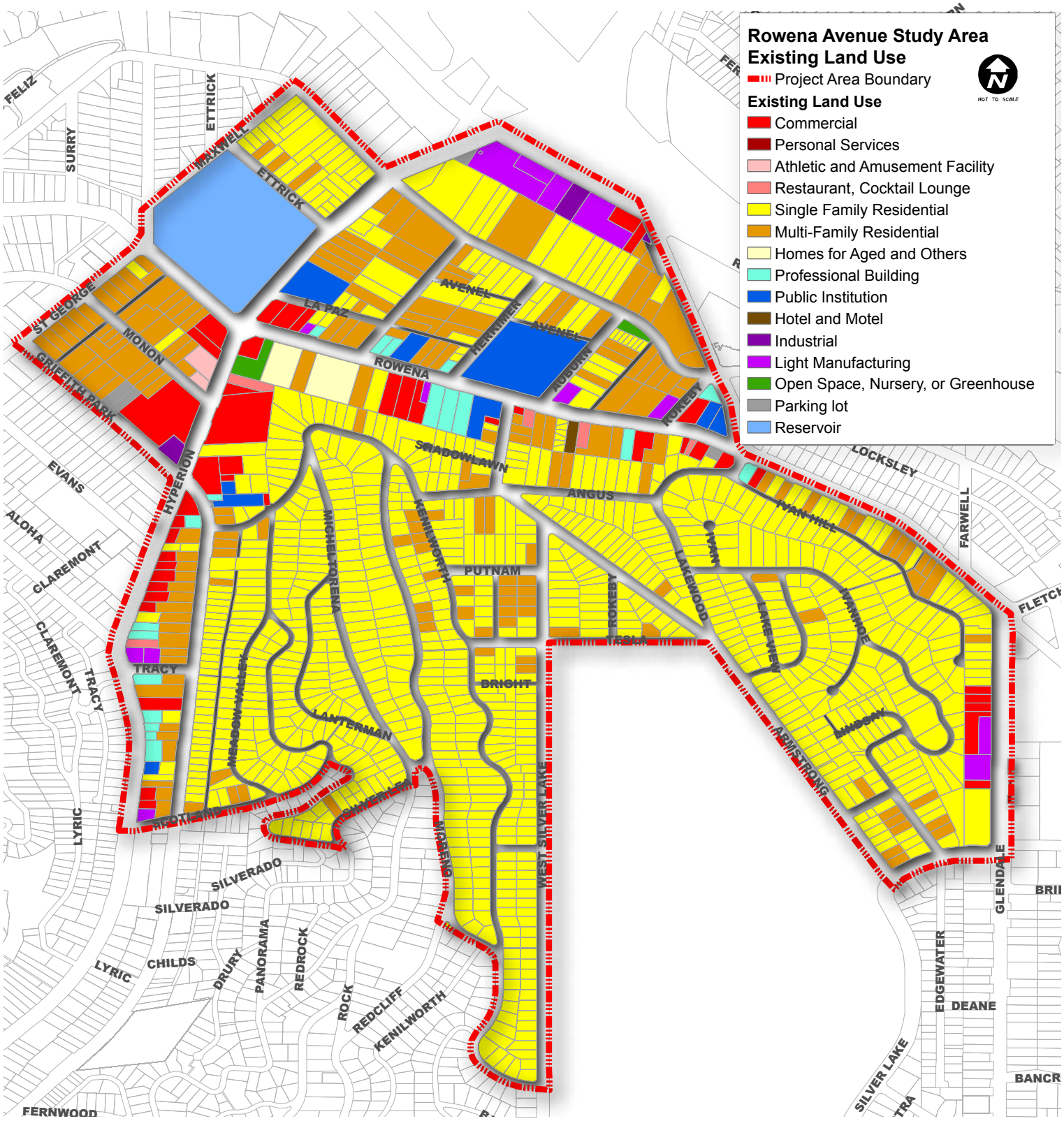
Waverly Drive is a residential street, lined with single- and multi-family units. On-street parking is available on one side of the corridor; parking alternates between angled and parallel. The street is used as part of the Ivanhoe Elementary School's traffic routing for children drop-off/pick-up. Drivers are routed north along Herkimer Street and Auburn Street to continue either east or west along Waverly Drive.

Angus Street, also a residential street, provides access to the many single-family residences along the street. It serves as a connection to Micheltorena Street, Moreno Drive, and Kenilworth Avenue as well. Angus Street is curvilinear as it proceeds up and down a slight hill in the area.



Rowena Avenue looking west

Figure 5- Existing Land Use



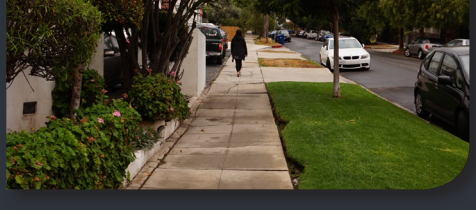
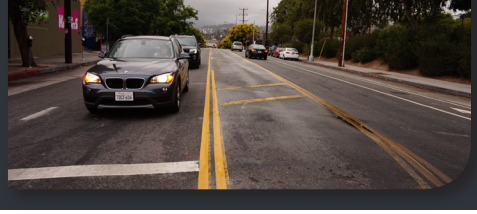
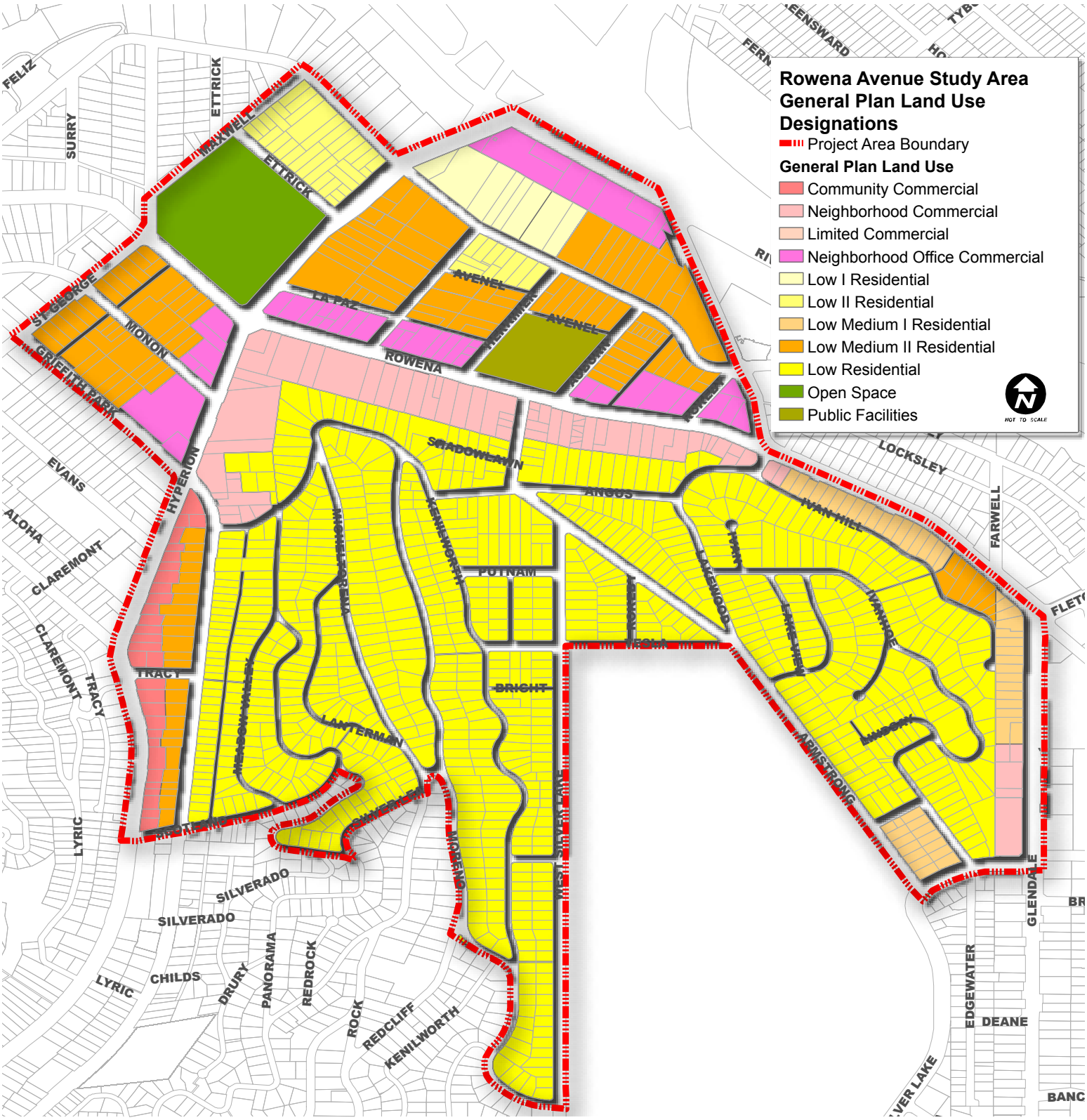




Figure 6- General Plan Land Use Designations





Waverly Drive on-street parking



Angus Street on-street parking

STREET NETWORK

Rowena Avenue is classified as an Avenue II under the Citywide General Plan Circulation System. As portrayed in this Plan, Rowena Avenue provides connections in the street network to two other corridors classified as Avenue II: Hyperion Avenue and Glendale Boulevard/Fletcher Drive. An Avenue II designation means that the corridor is designed with 86 feet of right-of-way with 56 feet of roadway width. The "roadway width" is typically described as the area between curbs.

Other collector and local streets connect with Rowena Avenue within the immediate neighborhood street network. Waverly Drive and Angus Street are not designated on the Citywide General Plan Circulation System.

Rowena Avenue is designed as a three-lane undivided avenue, which includes a center two-way left-turn lane. It maintains bicycle lanes in both directions of travel as well as metered on-street parking on both sides of the corridor.

Waverly Drive and Angus Street, are designed as residential streets. Waverly Drive is currently a two-lane corridor without center striping and with on-street parking on the south side of the corridor. Existing parking alternates between parallel and head-in parking. Curbs are present along small segments on the north side of the street.

Angus Street is a winding residential street with elevation change. The majority of Angus Street is a two-way residential street without center striping, with on-street parallel parking permitted on the north side of the corridor. On the east side of Angus Street, a small portion of the street allows for parking no both sides. Both Waverly Drive and Angus Street have minimal to non-existent sidewalk facilities.

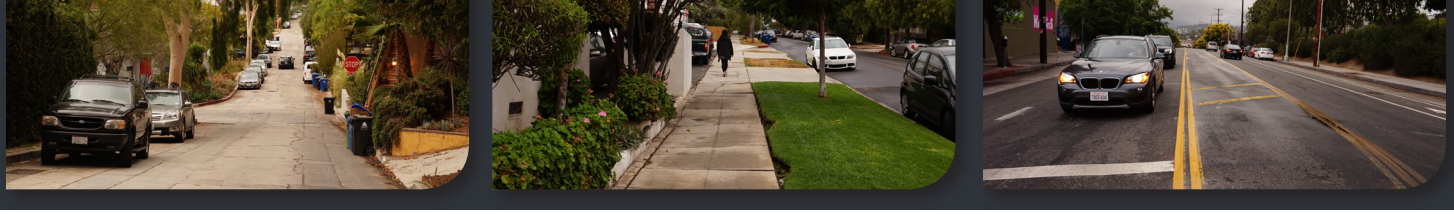
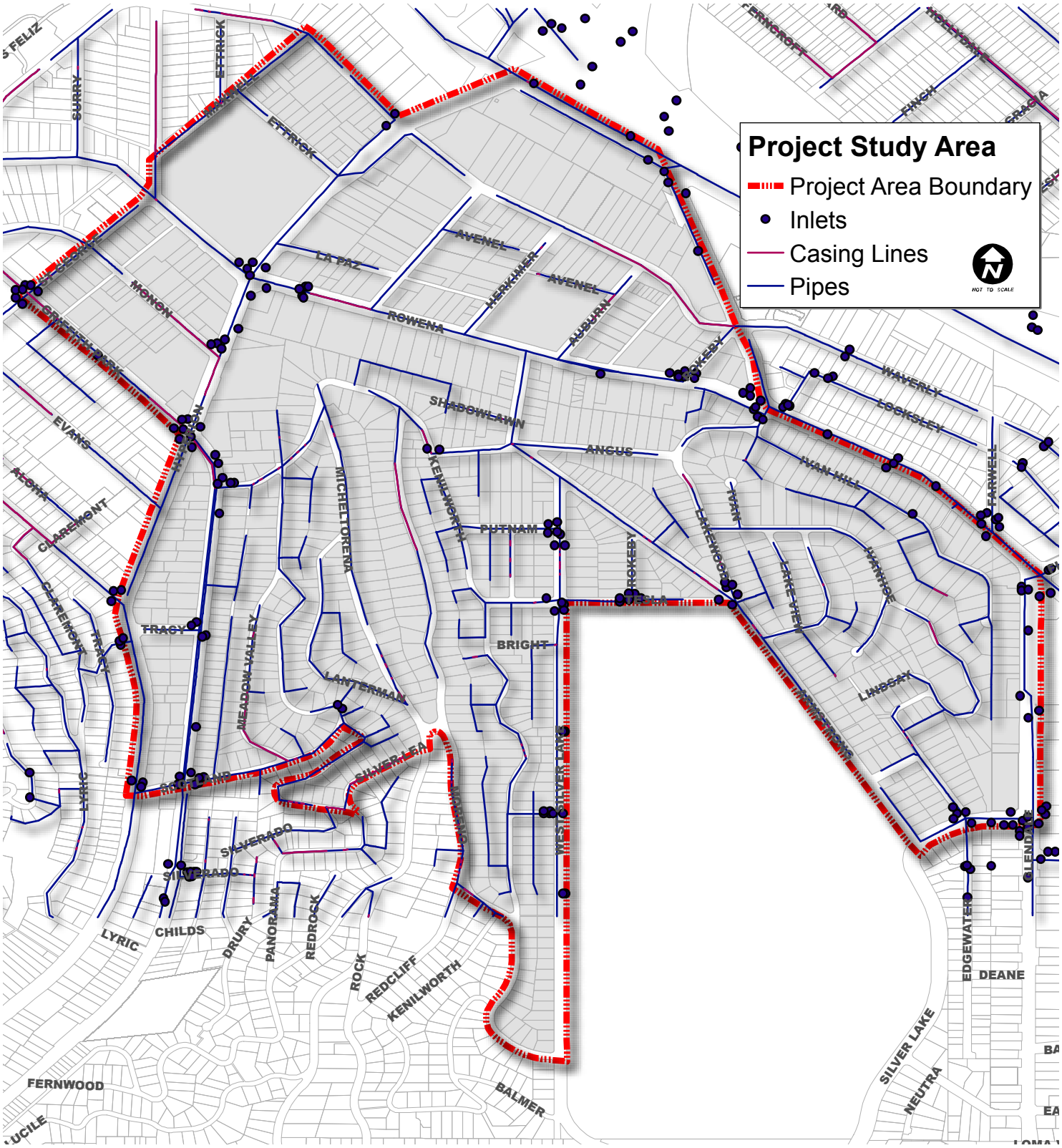


Figure 7- Infrastructure and Utility Locations Map



INFRASTRUCTURE

The location, condition, and accessibility of utilities and basic infrastructure features can greatly affect daily operations, construction timelines, and funding capabilities. Acknowledging these potential impacts, **Figure 7 - Infrastructure and Utilities Map** displays the water and stormwater utilities present within the Study Area. The location of these utilities has the potential to impact the ability and cost of any construction/reconstruction that may occur within the study area.

Signalized intersections within this study area are generally located where more commercial oriented streets intersect. Whereas, stop-controlled intersections typify the intersection of residential streets. Within the study area, traffic signals are located at the intersections of:

- Glendale Blvd/Rowena Ave/Lakewood Ave
- Glendale Blvd/Fletcher Dr/Silver Ridge Ave
- Glendale Boulevard/Silver Lake Boulevard
- W Silver Lake Drive/Rowena Avenue
- Hyperion Avenue/Rowena Avenue
- Hyperion Avenue/Monon Street
- Hyperion Avenue/Tracy Street
- Griffith Park Blvd/Hyperion Avenue

Additionally, the City DOT staff recently studied the intersection of Waverly Drive and Glendale Boulevard. The findings of the study indicated that the intersection is warranted for a traffic signal. This recommendation will be included in the recommendations of this study.



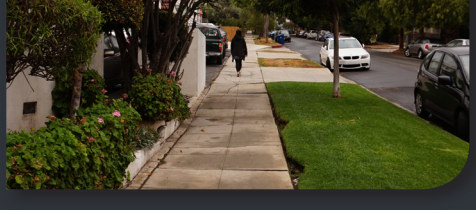
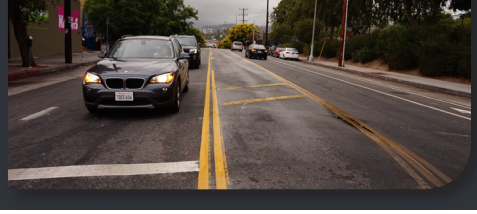
Utility hole coverings on Angus Street



Signalized Intersection of W Silver Lake Drive & Rowena Avenue



Stop-controlled intersection of W Silver Lake Drive and Angus Street

PUBLIC TRANSIT FACILITIES

Bus service is available along a portion of the Rowena Avenue Corridor via LA Metro Local or Limited Line service. Route 201 travels along Rowena Avenue east of West Silver Lake Drive. Routes 92 and 96 travel north/south and intersect Rowena Avenue at Glendale Avenue, then travel east/west along Glendale. **Table 1 - Metro Route Headways** represents the headways of these routes as expressed by Metro.

A physical bus stop is present along Rowena Avenue. It is located on the north side of Rowena Avenue (westbound traffic) in front of the fire station. This stop includes a shelter and bench, and has additional space for a bus "pull-out" in the area that is dedicated to on-street parking along the remainder of Rowena Avenue.

BICYCLE FACILITIES

The County of Los Angeles Bicycle Master Plan (2012) identifies existing and proposed bicycle network for the County. Griffith Park Boulevard and Silver Lake Avenue are designated by this plan as existing Class II – Bike Lane facilities. This means that the bike lane does not have a striped or physical buffer separating bicyclists from motorists. Also noted on this plan are bicycle facilities as proposed by other jurisdictions including: Glendale Boulevard, Fletcher Drive, Rowena Avenue, W Silver Lake Drive, and Armstrong Avenue. As part of the reconstruction that took place on Rowena Avenue in 2013, the street now includes a Class II bicycle facility (dedicated bicycle lane without a buffer that separates bicyclists and motorists).



Rowena Avenue Southside Bicycle Lane (looking East)

Table 1 - Metro Route Headways

	Weekdays			Saturdays		Sundays	
Line	Peaks	Day	Eve	Day	Eve	Day	Eve
91	16-20	25	50-60	26-30	60	40	60
96	30-35	40	60a	50-55	50-60a	60	-
201	50	50	-	60	-	60	-

[1] 24-hour Owl service
[a] No late-evening service

PEDESTRIAN FACILITIES

Pedestrian facilities vary greatly within the study area from wide sidewalks in some areas to non-existent pedestrian facilities in other areas. Along Rowena Avenue, sidewalks are generally wide with occasional street trees and landscaping as buffers between pedestrians and vehicles. They are in good-to-fair condition. However, the high number of driveways impact the consistency of the sidewalk facilities.

Designated pedestrian crossings across Rowena Avenue are present at the intersections with Glendale Boulevard, W Silver Lake Drive, and Hyperion Avenue. These crossing are equipped with pedestrian countdown signal heads.

Beginning where Waverly Drive crosses Hyperion Avenue and continues east, sidewalks do not exist on either side of the roadway until Auburn Street. East of Auburn Street, five-foot sidewalks are present on both sides of the street. Streets that provide connections from Rowena Avenue up to Waverly Drive (such as Avenel Street, Herkimer Street, Auburn Street, etc.) have relatively steep slopes; although they have typical sized sidewalks, their grade makes for problematic ADA facilities - especially in regards to ramps.

Angus Street from Griffith Park Boulevard to Kenilworth Avenue contains a sidewalk facility on the north side of the street. However, the facility is approximately two- to two and one-half feet wide; which primarily allows a designated space for 'doorswing' for vehicles parked on the street.

The Project Area lacks a consistent pedestrian oriented wayfinding network.

Figure 8 - Transit, Bicycle, and Pedestrian Facilities represents some of the existing facilities within the Project Area.



Rowena Avenue Southside Sidewalk (looking West)



Missing Sidewalk along Waverly Drive (looking West)



Minimal and Missing Sidewalks along Angus Street

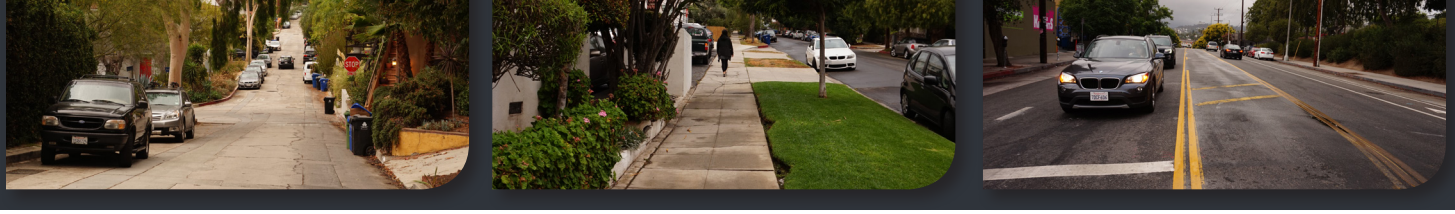
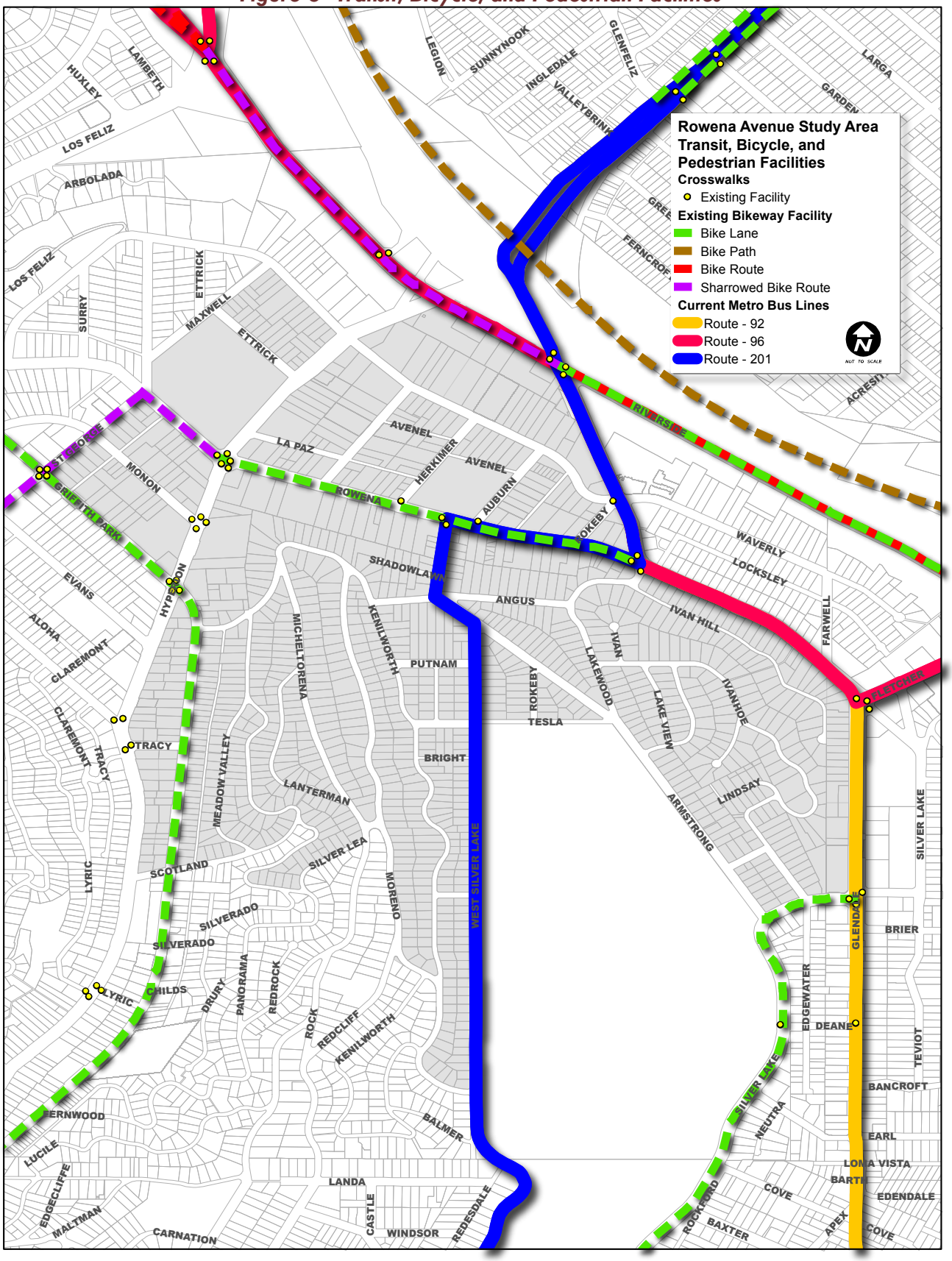


Figure 8- Transit, Bicycle, and Pedestrian Facilities



PARKING FACILITIES

On-street parking is currently available along most of Rowena Avenue on both the north and south sides. This on-street parallel parking is metered and subject to two-hour time limits. Parking is heavily utilized by those venturing to the commercial and retail uses found along Rowena Avenue.

On-street parking is also present along residential streets in the study area. Along Angus Street, the narrow right-of-way and curvature of the road also allows the presence of on-street parking.

Waverly Drive maintains on-street parking along one-side of the corridor, transitioning between parallel parking to head-in, angled parking.



On-Street Parking along Angus Street

OPERATIONS

TRAFFIC COUNTS

Vehicles accessing the corridor and their various travel patterns greatly impact the overall corridor operations. **Table 2 - Average Daily Traffic Volumes** identifies the Average Daily Traffic (ADT) of three major corridors within the Study Area.

The daily volumes presented in this report are a combination of historical data and recently collected volumes.

The recent volumes for Rowena Avenue, Hyperion Avenue, and Glendale Drive were collect in March and September of 2017.

TURNING MOVEMENT COUNTS

Turning movement counts were gathered for specific intersections within the study area. **Figure 9- Turning Movement Count** displays the location, and the corresponding AM/PM turning movement vehicular counts.

At the intersection of Hyperion Avenue and Rowena Avenue, more westbound vehicles on Rowena Avenue turn south onto Hyperion Avenue than north. The opposite is true for eastbound vehicles. A similar pattern can be seen for those traveling north/south along Hyperion Avenue: more northbound travelers turn east onto Rowena Avenue than west; more southbound travelers turn west onto Rowena Avenue than east.

The intersection of Silver Lake Drive and Angus Street indicates that for eastbound travel along Angus Street, there are almost seven times the number of vehicles traveling in the PM peak hour than the AM peak hour. A similar pattern was not displayed in the westbound movements.

Turning movement counts for intersections within the Study Area presented in this Report were taken in September of 2017.

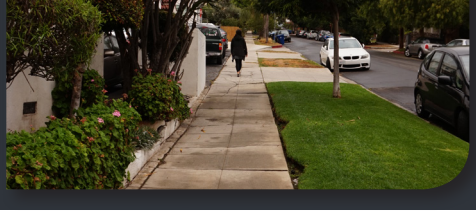
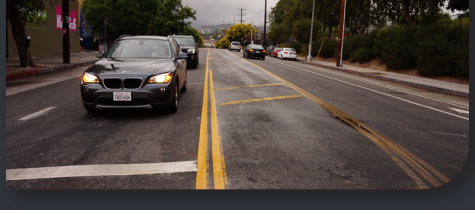




Table 2 - Average Daily Traffic Volumes

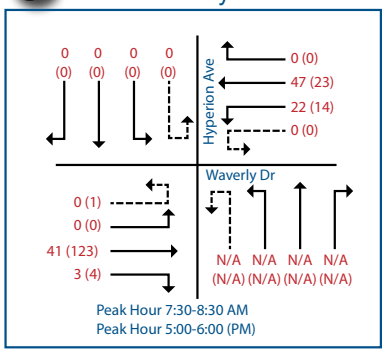
Corridor	Start Limit	End Limit	North bound	South bound	West bound	East bound
Rowena Avenue	Glendale Boulevard	Hyperion Avenue	N/A	N/A	12,949	12,551
Hyperion Avenue	Griffith Park Boulevard	Waverly Drive	19,281	19,151	N/A	N/A
Glendale Boulevard	Riverside Drive	Waterloo Street	13,030	12,575	N/A	N/A

Figure 9- Turning Movement Count Locations Map



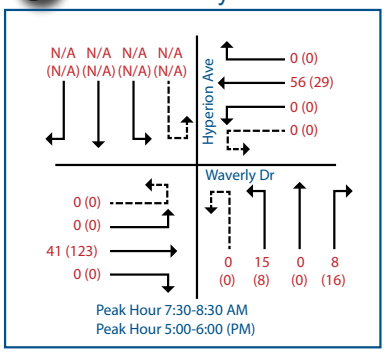
Figure 9 continued- Turning Movement Counts

1 Hyperion Ave (west leg) & Waverly Dr



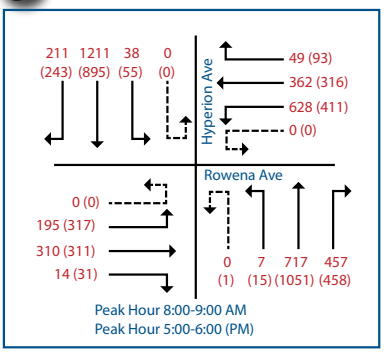
Peak Hour 7:30-8:30 AM
Peak Hour 5:00-6:00 (PM)

2 Hyperion Ave (east leg) & Waverly Dr



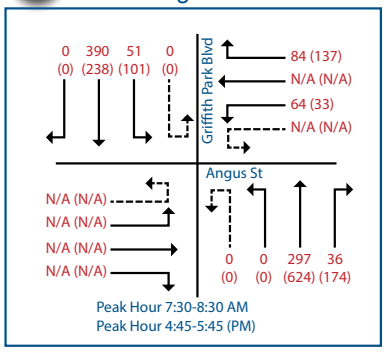
Peak Hour 7:30-8:30 AM
Peak Hour 5:00-6:00 (PM)

3 Hyperion Ave & Rowena Ave



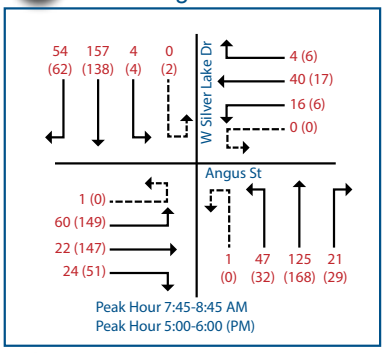
Peak Hour 8:00-9:00 AM
Peak Hour 5:00-6:00 (PM)

4 Griffith Park Blvd & Angus St



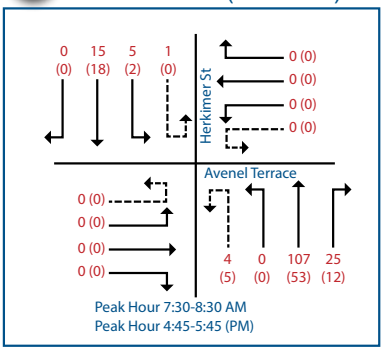
Peak Hour 7:30-8:30 AM
Peak Hour 4:45-5:45 (PM)

5 W Silver Lake Dr & Angus St



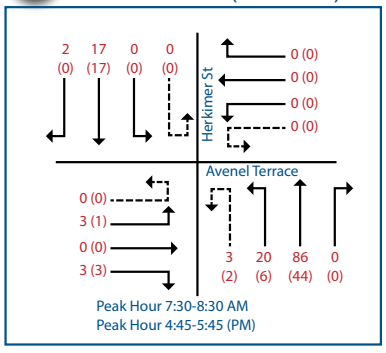
Peak Hour 7:45-8:45 AM
Peak Hour 5:00-6:00 (PM)

6 Herkimer St & Avenel Terrace (Southern)



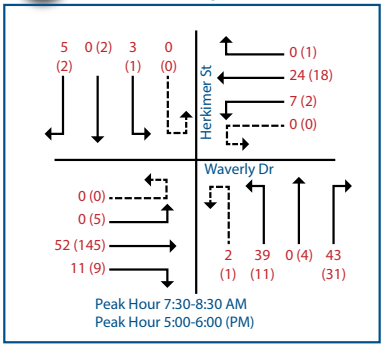
Peak Hour 7:30-8:30 AM
Peak Hour 4:45-5:45 (PM)

7 Herkimer St & Avenel Terrace (Northern)



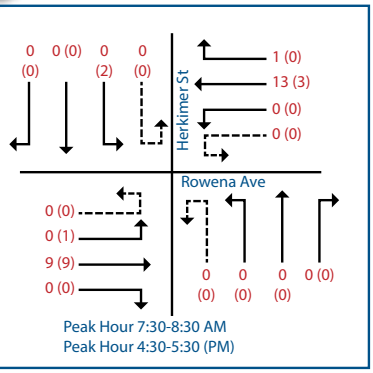
Peak Hour 7:30-8:30 AM
Peak Hour 4:45-5:45 (PM)

8 Herkimer St & Waverly Dr



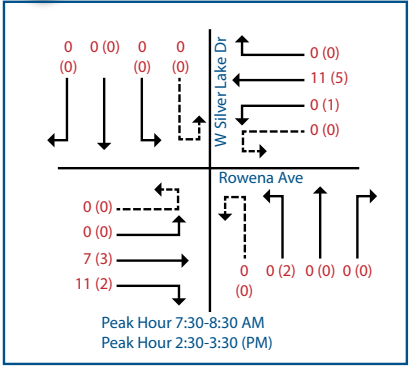
Peak Hour 7:30-8:30 AM
Peak Hour 5:00-6:00 (PM)

9 Rowena Ave & Herkimer St



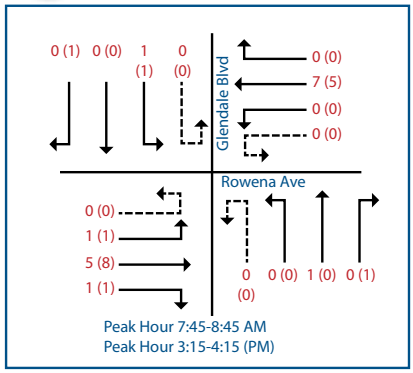
Peak Hour 7:30-8:30 AM
Peak Hour 4:30-5:30 (PM)

10 Rowena Ave & W Silver Lake Dr

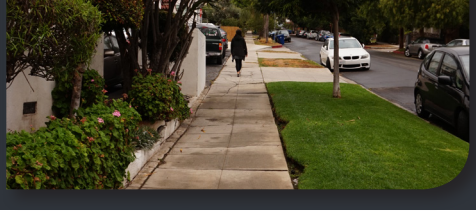
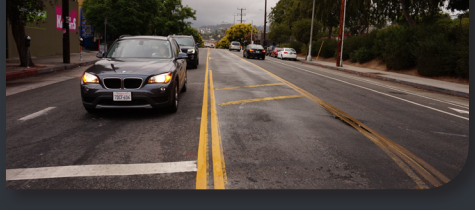


Peak Hour 7:30-8:30 AM
Peak Hour 2:30-3:30 (PM)

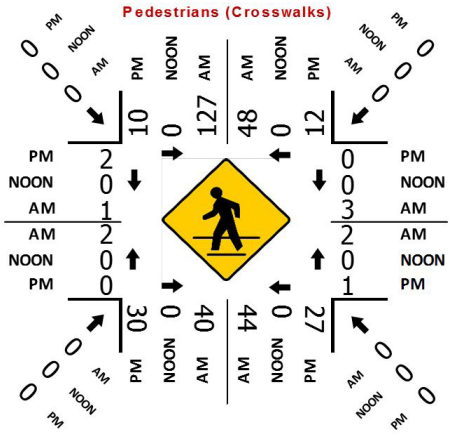
11 Rowena Ave & Glendale Blvd



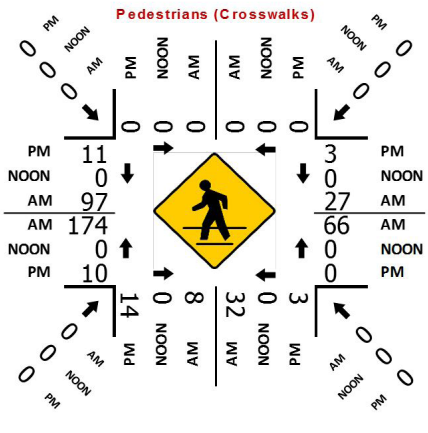
Peak Hour 7:45-8:45 AM
Peak Hour 3:15-4:15 (PM)

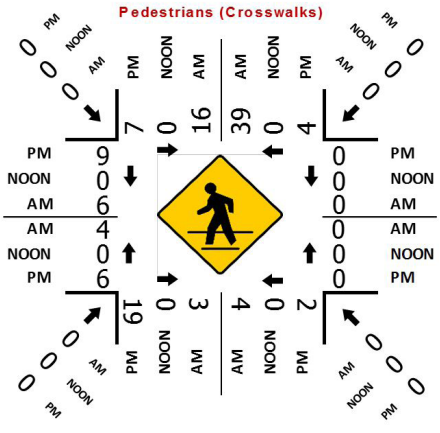
Figurev10 - Pedestrian Turning Movements



Intersection of Rowena Avenue (east/west) and Herkimer Boulevard (north/south)



Intersection of Rowena Avenue (east/west) and W Silver Lake Drive (north/south)



Intersection of Rowena Avenue (east/west) and Glendale Boulevard (north/south)

BIKE/PED COUNTS

Figure 9- Turning Movement Count displays the location of Bicycle counts at three key intersections along Rowena Avenue. Bicycle traffic along Rowena Avenue is consistent. The highest turning movement from Rowena Avenue are cyclist turning southbound onto W Silver Lake Drive in the AM peak hour.

Pedestrian Movements for those three intersections are displayed in **Figure 10- Pedestrian Turning Movements**. Rowena Avenue and Silver Lake Drive displayed the highest pedestrian traffic with a total of 240 pedestrians crossing from the south to the north side of Rowena Avenue.

The eastbound pedestrian traffic along Rowena Avenue at the intersection with Herkimer was also high, totally 127 pedestrians on the north leg and 40 on the south leg in the AM peak hour.

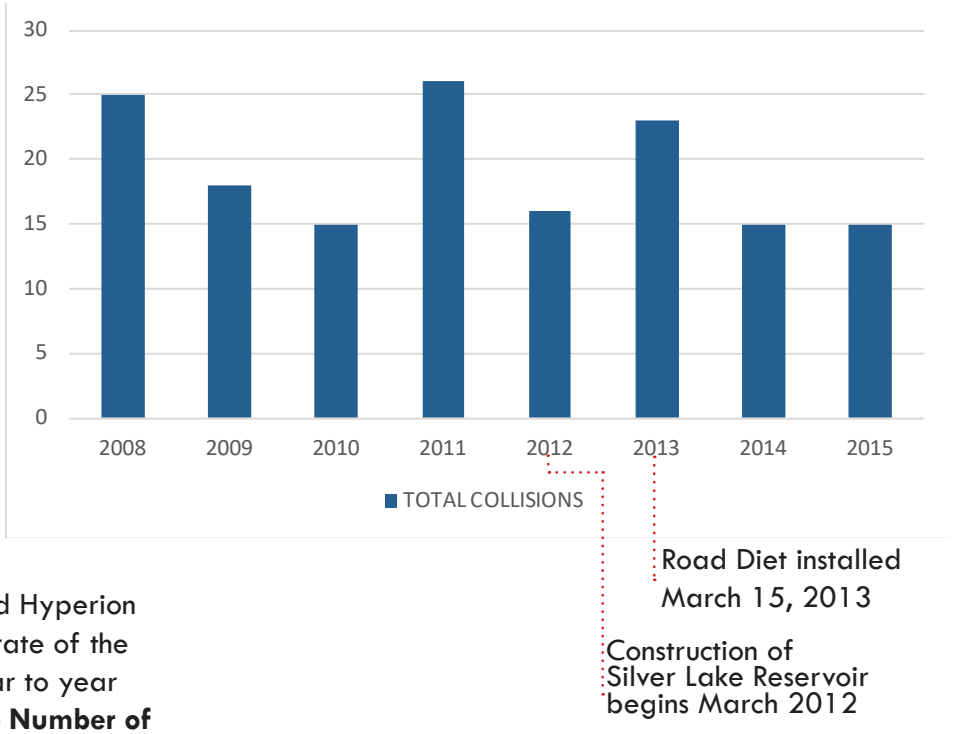
SPEED DATA

The perception of speed along the corridor by observers can vary greatly. Three independent speed surveys taken during 2017 collected data for the pace of vehicles, as well as the highest speed captured above posted speed limit. The posted speed for Hyperion Avenue, Glendale Boulevard, and Rowena Avenue is 35 miles per hour (MPH). The average speed of vehicles for Hyperion and Glendale were slightly above the posted speed; Rowena Avenue's average speed was 33 MPH, two MPH under the posted speed. Between 75 and 96 percent of vehicle traveled "in pace" along the corridor, meaning within a range of the posted speed limit.

CORRIDOR COLLISION HISTORY

A primary factor for conducting an evaluation of this Study Area was the perceived number of collisions occurring along Rowena Avenue and other closely related streets in the adjacent roadway network. **Figure 14 displays 2008-2012 Collisions and Figure 15 displays the 2013-2015 Collisions.** To identify major changes before/after the installation of the complete street design alternatives along Rowena Avenue, collision data is separated before and after 2013 (The road diet was installed on March 15, 2013).

Figure 11 - Total Number of Collisions Along Rowena Avenue



The intersection of Rowena Avenue and Hyperion Avenue maintains the highest collision rate of the intersections within the Study Area year to year between 2011 and 2015. **Figure 11 - Number of Collisions** displays the total number of collisions by year from 2011-2015 along streets where collision data was available. **Figure 12 - Type of Collisions by Year** represents the type of collision by year.

Figure 12 - Type of Collision Along Rowena by Year

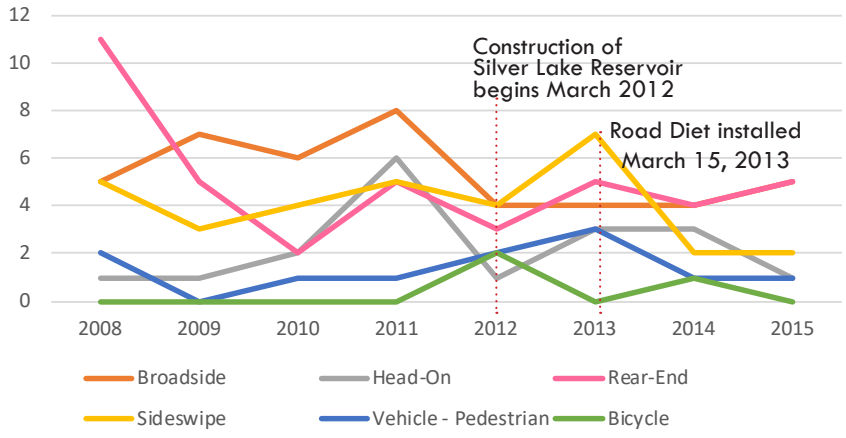
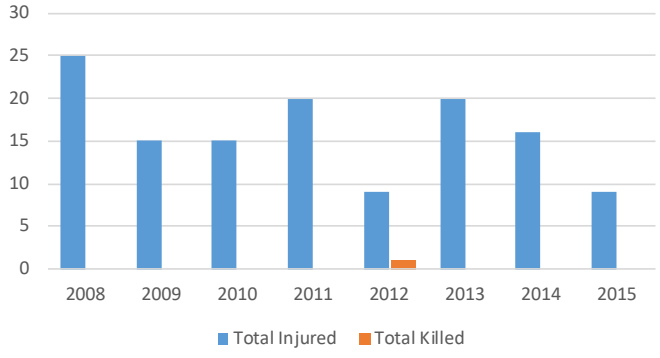
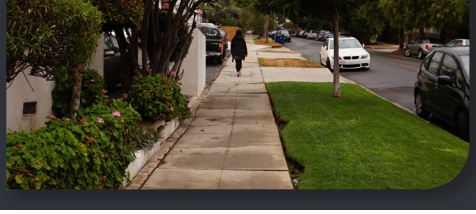


Figure 13 - Number of Injuries and Deaths Along Rowena by Year







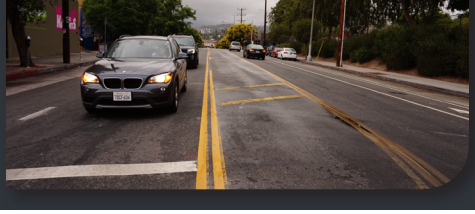


Figure 14 - 2008-2012 Collisions

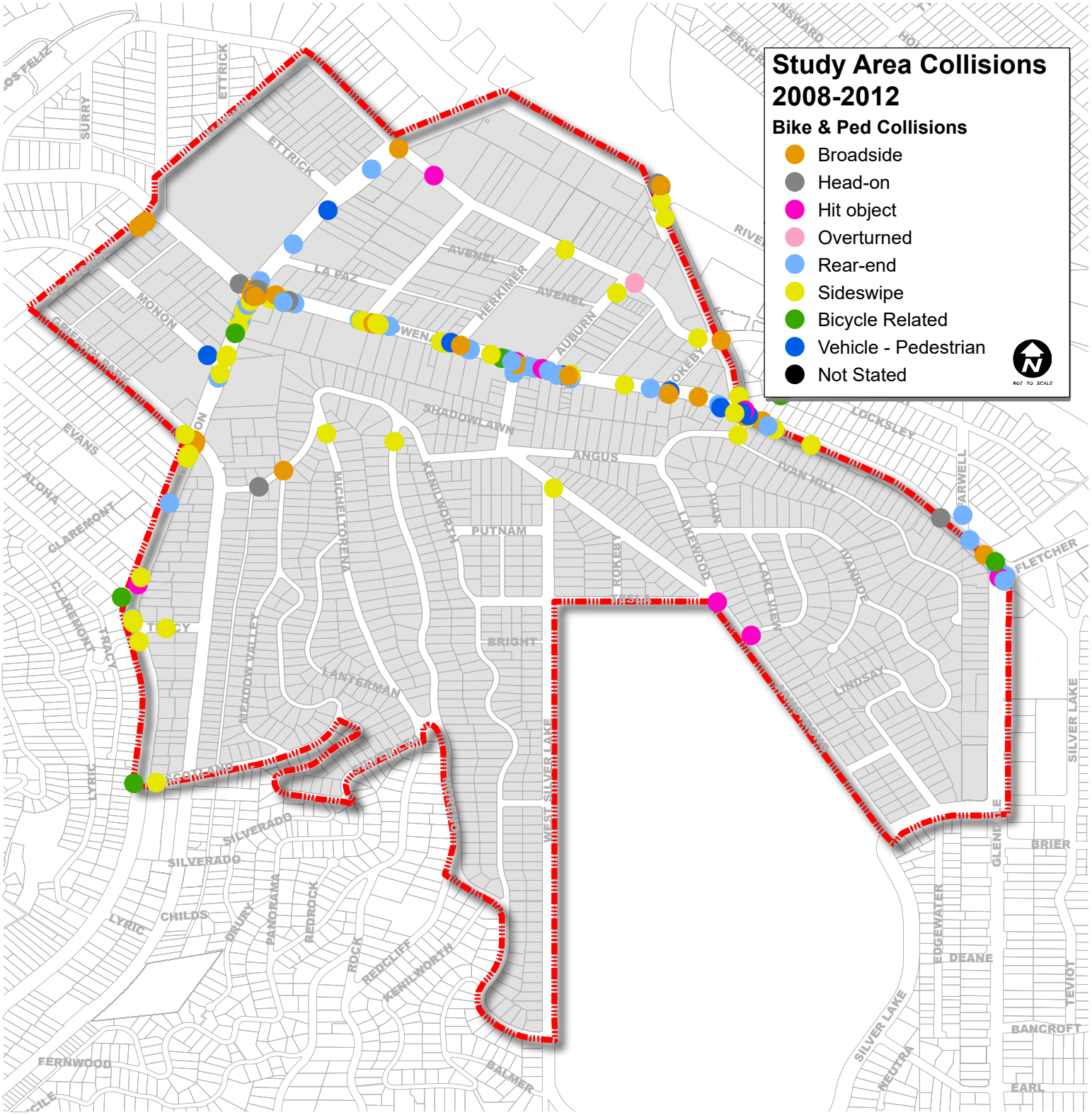
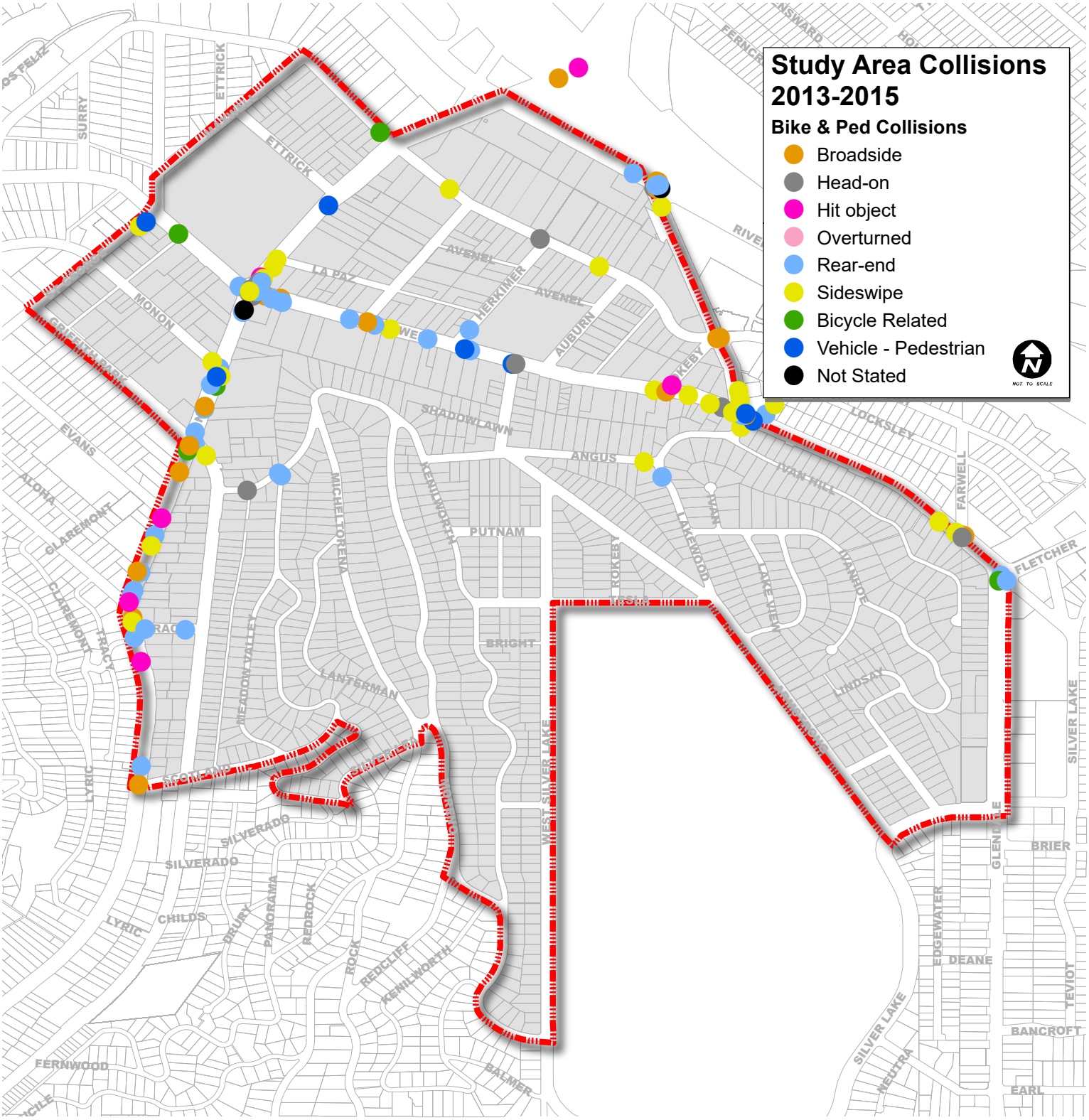
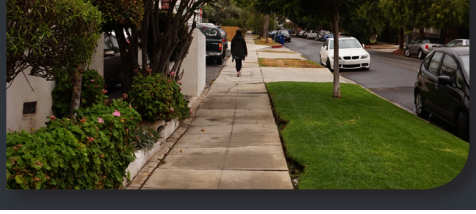
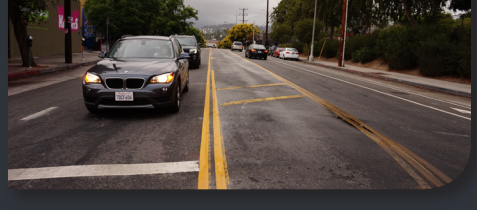


Figure 15 - 2013-2015 Collisions



IMPROVEMENT RECOMMENDATIONS

CHALLENGES AND OPPORTUNITIES

CHALLENGES

Several concerns emerged as priorities during discussions with participants in the Work Group, during analysis of existing conditions of the area, speed data, volume data, collision data, and visual impacts observed during multiple field visits. Identified challenges included:

- Cut-through traffic along Angus Street and Waverly Drive during peak hours;
- Incomplete or missing sidewalk infrastructure;
- Limited pedestrian facilities such as signalized crosswalks;
- Poor pedestrian-scaled lighting.

Additionally, there are the number of collisions regularly experienced at key intersections within the Project Area. The intersection of Rowena Avenue and Hyperion Boulevard has the highest density of collisions from 2011-2015.

The existing conditions evaluation showed that between 2012 and 2013 several pedestrian and bicycle related collisions occurred at the intersection of Rowena Avenue and Glendale Boulevard.

GENERAL IMPROVEMENT RECOMMENDATIONS

The following recommendations are sorted by mode of transportation. These recommendations can be applied as stand-a-lone items, or as packages within the alternatives expressed previously.

AUTO

1. Work with WAZE to understand what changes to street functions needed to restrict through-commuter traffic along local streets including Waverly Drive and Angus Street.

PEDESTRIAN

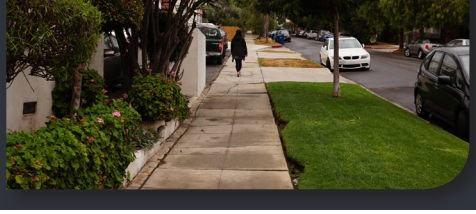
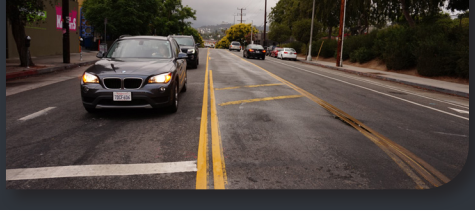
1. Install pedestrian-scaled lighting along Rowena Avenue from Hyperion Avenue to Glendale Boulevard.
2. Where feasible, install bulb-outs to enhance visibility of crosswalks at intersections.
3. Where feasible, install high visibility crosswalks.

BICYCLE

1. Where feasible, focus improvements at intersections where conflict points are high. Improvements include continued bicycle striping through the intersection and high-visibility green paint.

IMPROVEMENTS FOR CONSIDERATION

The following concepts were developed for improvements along streets within the Project Area. These include specific geometric or policy changes. These alternatives have the potential to be implemented individually or packaged with other alternatives. The improvements are categorized as: Intersections, Angus Street, Waverly Drive, and Rowena Avenue.

INTERSECTION OF GRIFFITH PARK BOULEVARD AND HYPERION AVENUE:

1. Intersection improvements such as high visibility crosswalks, enhanced pedestrian ramps, and if feasible through an engineering study, bulb-outs. **Figures 16 and 17** is an example of typical intersection improvements.

Figure 16 - High visibility crosswalks



Figure 17 - Ramps with Rumble Strips

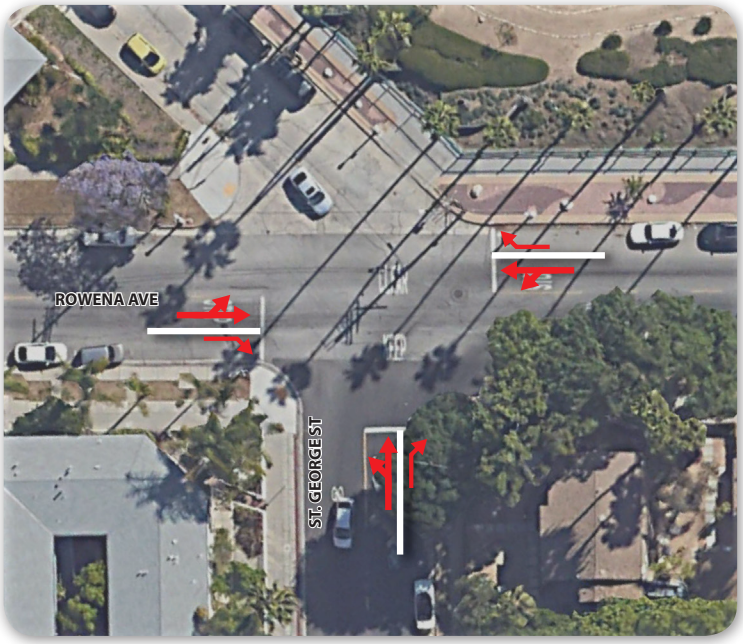


INTERSECTION OF ROWENA AVENUE AND ST. GEORGE STREET:

1. At the northbound approach of the intersection, right-of-way can be delineated to provide a right-turn bay, and a through/left-turn lane, helping to alleviate some queuing. (See **Figure 18**)

2. This improvement could also be applied to both the eastbound and westbound movements on Rowena Avenue with a right-turn bay installed.

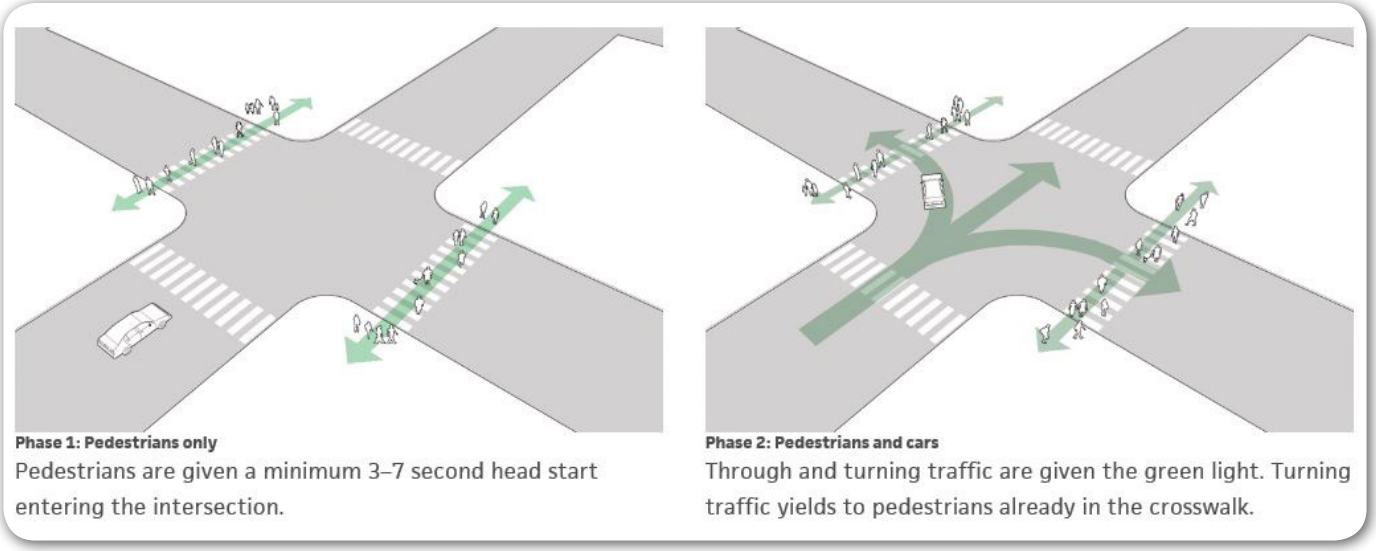
Figure 18- Delineate Right-Turn Bay Within Existing Right-of-Way



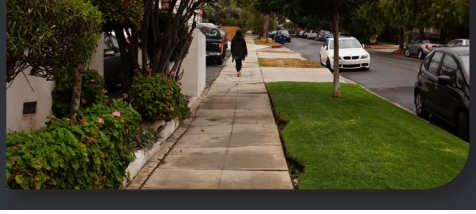
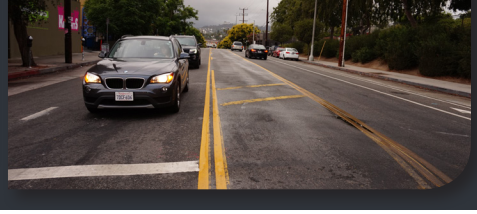
INTERSECTION OF ROWENA AVENUE AND W SILVER LAKE DRIVE

1. In addition to the aesthetic and general pedestrian improvements discussed at the beginning of this section, a potential signal phase improvement is recommended. The inclusion of a Leading Pedestrian Interval (LPI) can improve traffic flow and enhance pedestrian safety. When active, an LPI provides a designated time for pedestrians to cross the street before allowing the green movement of vehicles.

Figure 19 - Implement a Leading Pedestrian Interval



Source: NACTO.org. Urban Street Design Guide. Leading Pedestrian Interval

UPPER ANGUS STREET IMPROVEMENT OPTIONS:

1. Relocate the existing curb face at Angus to add sidewalk on one side of the street. (See **Figure 20 and Figure 21**) This improvement would result in the elimination of on-street parking. Communication with the Technical Working Group expressed a desire from local residents to prioritize a continuous sidewalk over on-street parking.

2. Stripe an edge-line with cross-hedge markings along Angus Street to provide a designated pedestrian realm (See **Figure 22**).

3. Restrict through traffic on Angus Street between Moreno Drive and Kenilworth Avenue to one-way westbound traffic; restricting right-turn movements from Morena Drive onto Angus Street at the intersection of Moreno Drive and Angus Street (See **Figure 23**).

   a. Additionally, this would call for advanced warning signs for turn restrictions in prior to the intersection: one along Moreno Drive, one at the intersection of Griffith Park Boulevard with Angus Street, and one at the intersection of Angus Street and Moreno Drive.

   b. Closing off this street via a cul-de-sac or dead end is not a viable option for this area. Closing the area would eliminate a through route for fire and emergency vehicles and is not recommended.

LOWER ANGUS STREET IMPROVEMENT OPTIONS:

1. With the implementation of the one-way street segment as shown in **Figure 23**, cut-through traffic along lower Angus Street from Hyperion Avenue is likely to be reduced as well.

Figure 20 - Cross Section depicting current configuration of a portion of Upper Angus Street

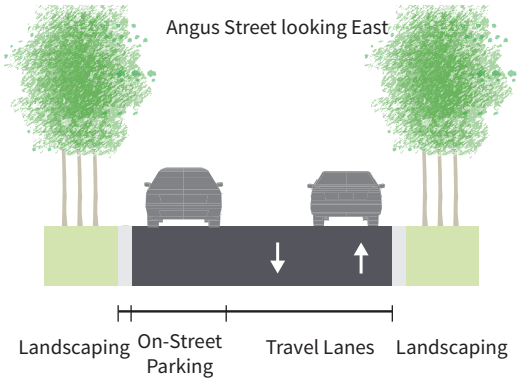


Figure 21 - Cross Section depicting Upper Angus Option 1

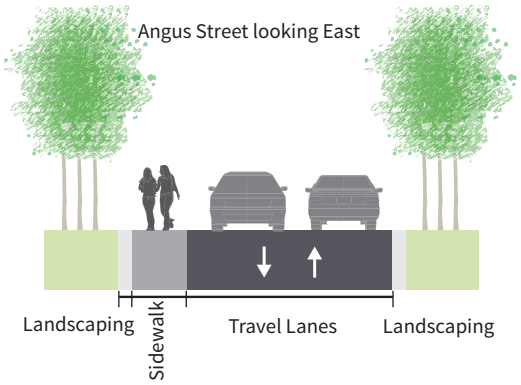


Figure 22 - Cross Section depicting Upper Angus Option 2

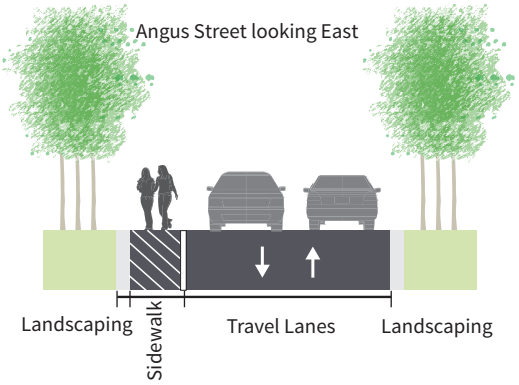
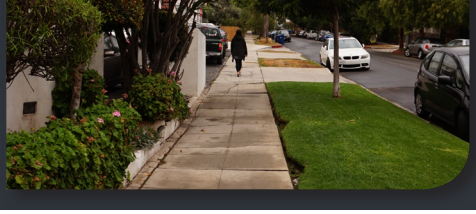
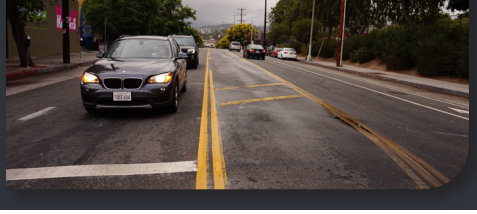


Figure 23 - High-level concept graphic depicting restrictions along Angus Street from Angus Option 3









WAVERLY DRIVE/ROKEBY STREET IMPROVEMENT OPTIONS:

1. Create a continuous sidewalk along one-side of Waverly Drive. (See **Figure 24 and Figure 25**)

2. Change all current on-street parking on Waverly Drive to 45-degree angled parking and add a sidewalk between the parking and the curb. (See **Figure 25 and Figure 26**).

3. Close the northern portion of Rokeby Street at the intersections with Waverly Drive and Glendale Boulevard. Reconfigure the geometry to a cul-de-sac. (See **Figure 27**)

Figure 24 - Cross Section depicting current configuration of a portion of Waverly Drive

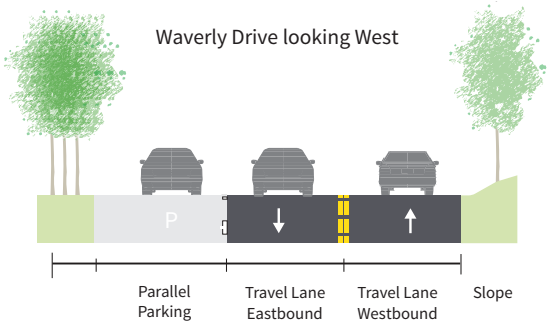


Figure 25 - Cross Section depicting Waverly Option 1 and 2

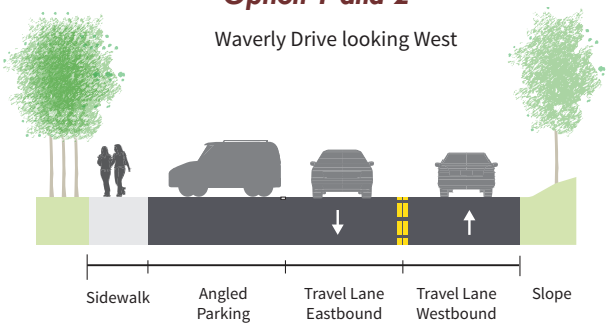


Figure 26 - Existing locations of parking along Waverly - Option 2

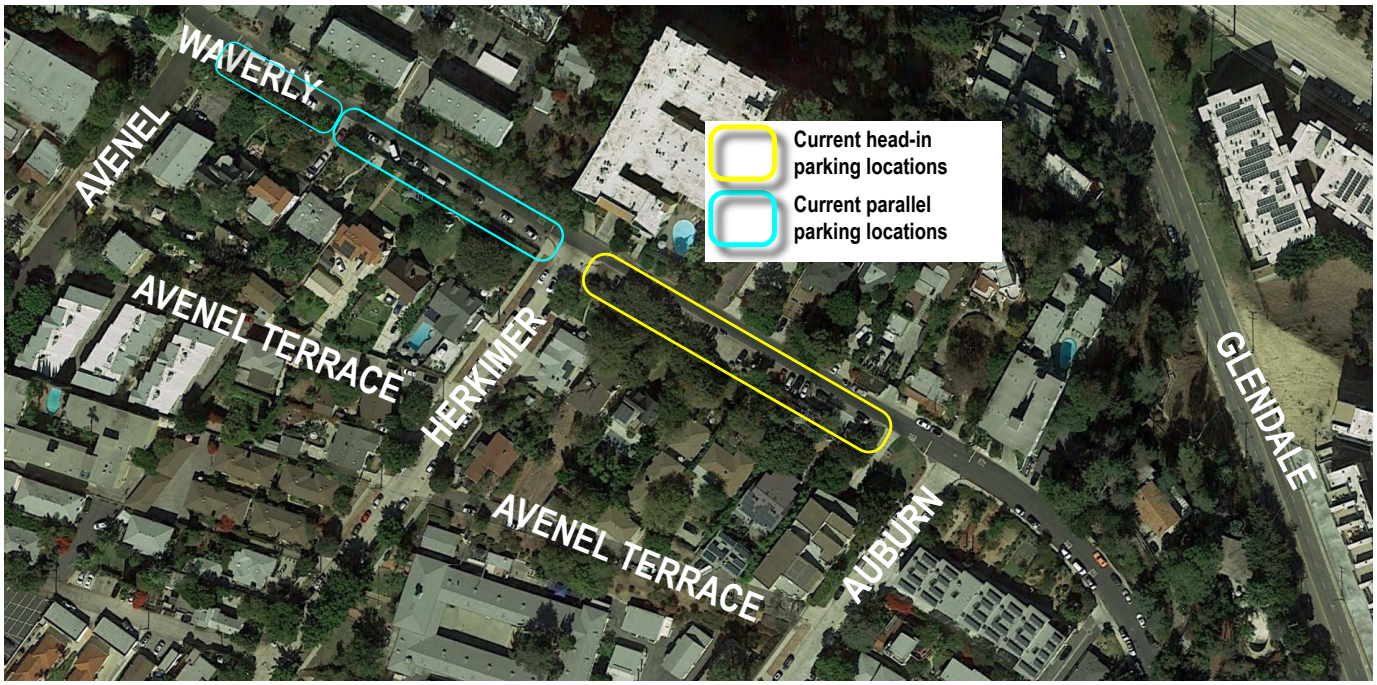
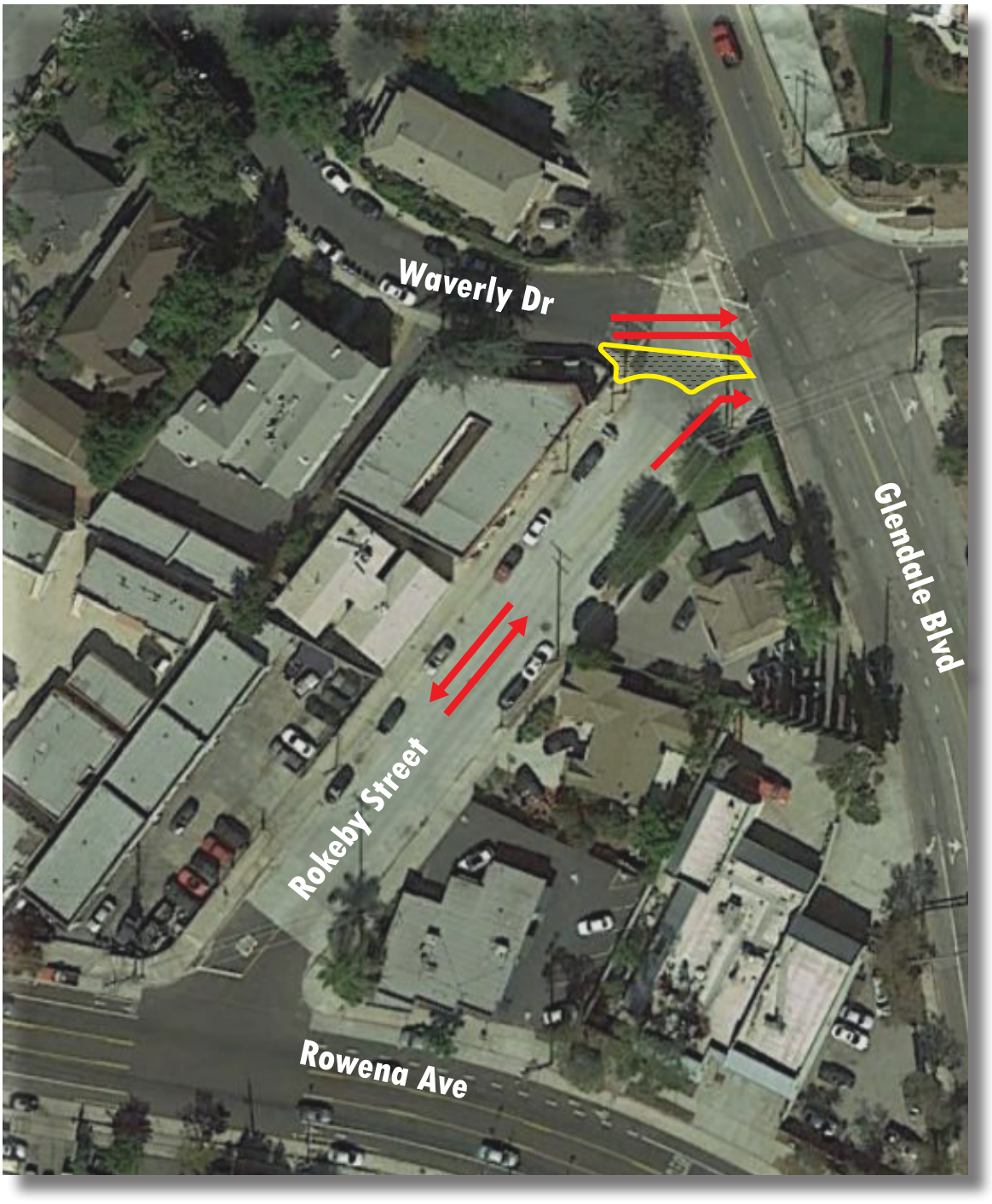
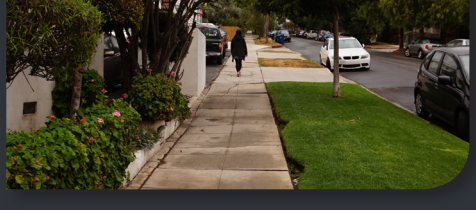
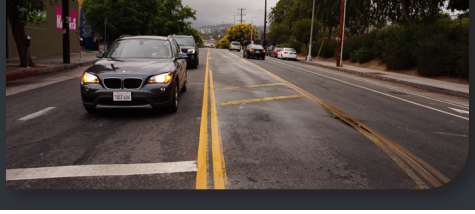


Figure 27 - High-level concept graphic depicting Waverly/Rokeby Option 3



ROWENA AVENUE IMPROVEMENT OPTIONS:

1. No roadway geometry changes would be made. Focus would be to prioritize minimal pedestrian improvements along Rowena Avenue including:

   a. Bulb-outs at crosswalks as seen **Figure 28,** to be further studied at locations in **Figure 31**

   b. Installation of pedestrian-scaled lighting. (See **Figure 29** for example of scale)

   c. Pedestrian street crossings in two locations along Rowena Avenue (Herkimer Street and Avenel Street) and (See **Figure 30 and Figure 31**)



Figure 28 - Example of intersection bulb-out (Rowena Option 1a)

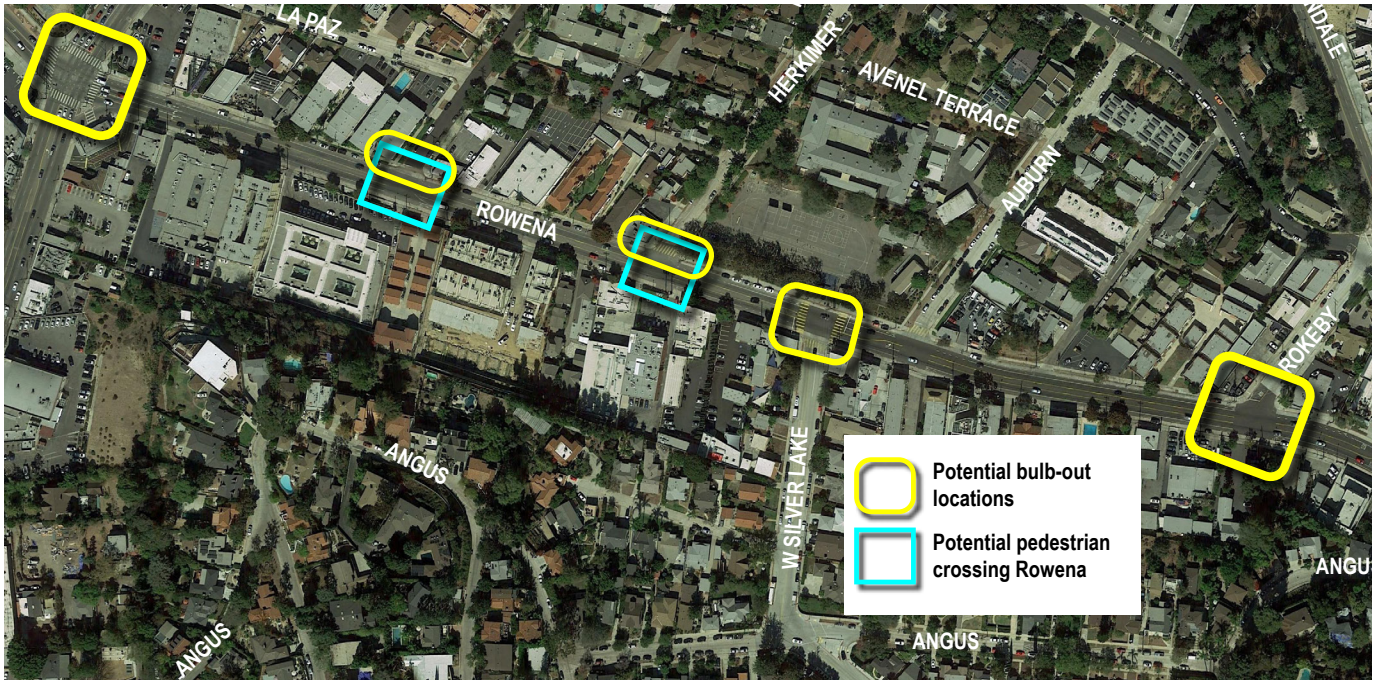


Figure 29 - Example of pedestrian-scaled lighting (Rowena Option 1b)



Figure 30 - Example of pedestrian-street crossing (Rowena Option 1c)

Figure 31 - Potential high-level locations of bulb-outs along Rowena Option 1a



ROWENA AVENUE IMPROVEMENT OPTIONS (CONTINUED):

2. Remove bicycle lane striping from both directions of travel on Rowena Avenue. Re-purpose this right-of-way for use as an additional eastbound travel lane. This alternative would maintain on-street parking on both sides of the street. (See **Figure 33**)

3. Remove the on-street parking and bicycle lane in the eastbound travel direction only on Rowena Avenue. Re-purpose this right-of-way for use as an additional eastbound travel lane with Sharrow markings. This alternative maintains the on-street parking and the bicycle lane for the westbound direction of travel. (See **Figure 34**)

Figure 32 - Cross Section depicting Existing Conditions of Rowena Ave

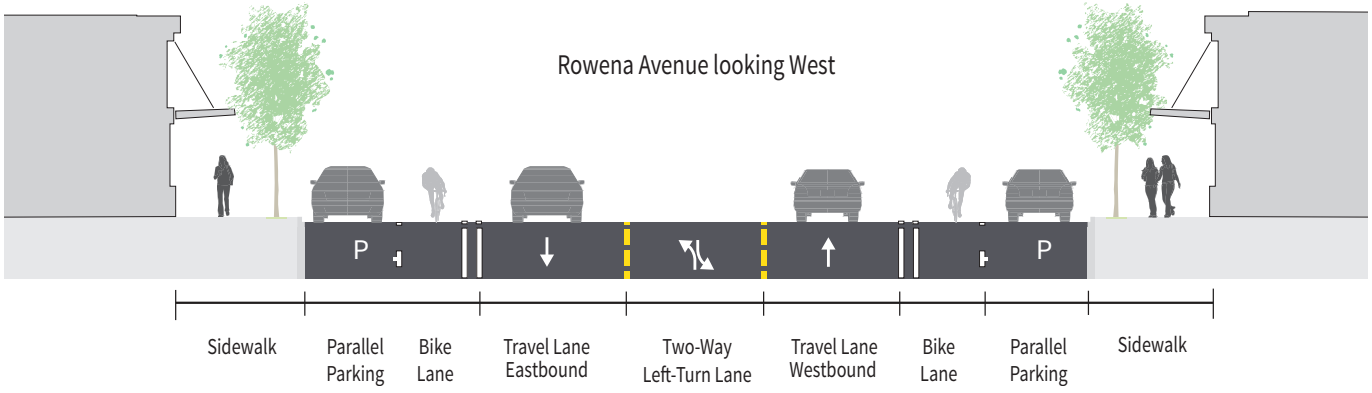


Figure 33 - Cross Section depicting Rowena Option 2

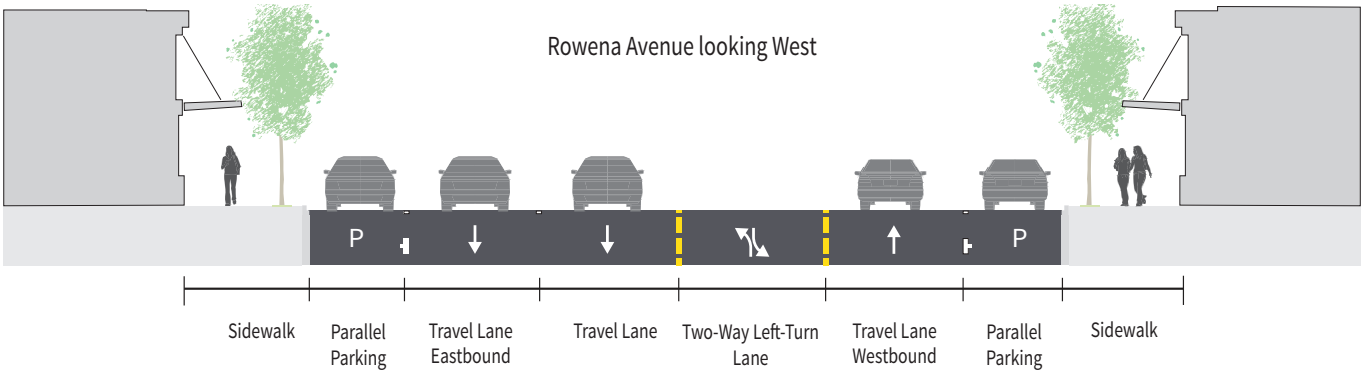
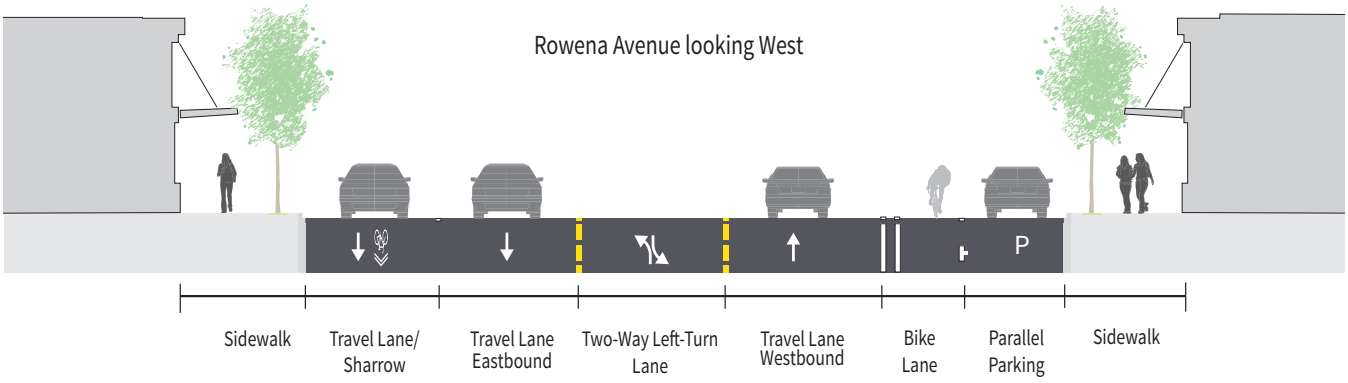
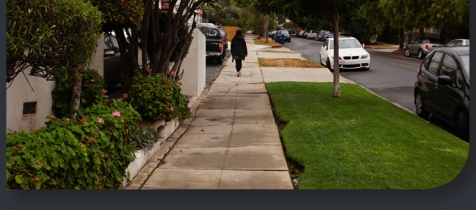
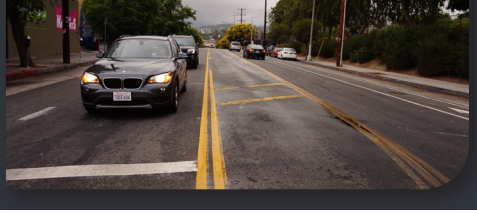


Figure 34 - Cross Section depicting Rowena Option 3



ROWENA AVENUE IMPROVEMENT OPTIONS (CONTINUED):

4. Restrict on-street parking during peak AM and PM commute hours on Rowena Avenue. During this designated time, the outside lane would be used as a travel lane and sharrow in both directions. (See **Figure 35 and Figure 36**)

Figure 35 - Cross Section depicting Rowena Option 4

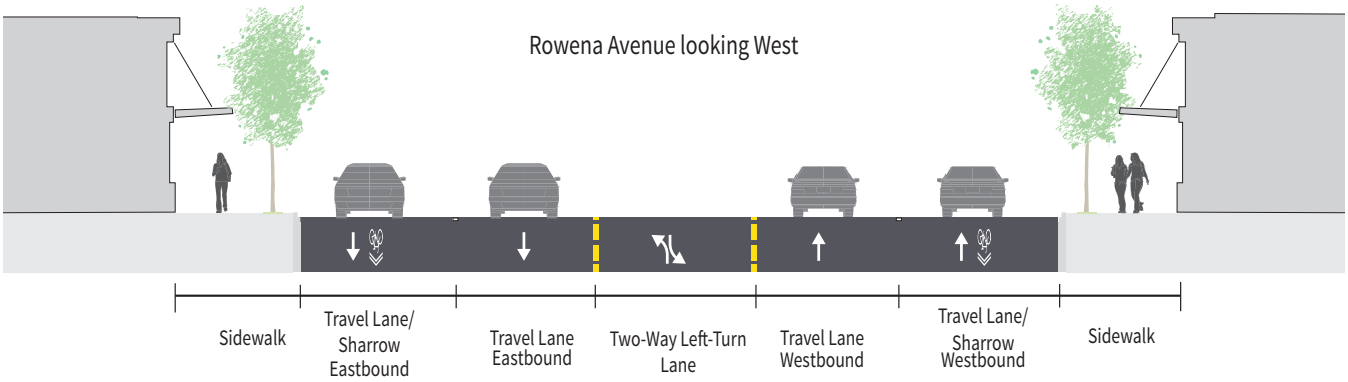




Figure 36 - Example of time-restriction signage for on-street parking for Rowena Option 4

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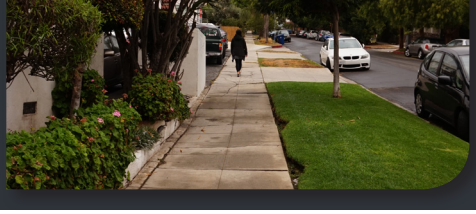
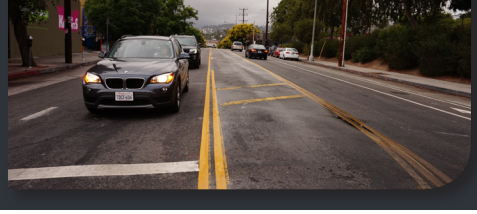

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An ITE Recommended Practice

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach

Institute of Transportation Engineers

Congress for the New Urbanism

The Institute of Transportation Engineers is an international educational and scientific association of transportation professionals who are responsible for meeting mobility and safety needs. ITE facilitates the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development and management for any mode of ground transportation. Through its products and services, ITE promotes professional development of its members, supports and encourages education, stimulates research, develops public awareness programs and serves as a conduit for the exchange of professional information.

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This project was partially funded by a cooperative agreement from the Environmental Protection Agency's Office of Sustainable Communities.

Publication No. RP-036A
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1000/GP/BH/0310

Printed in the United States of America
ISBN-13: 978-1-933452-52-4
ISBN-10: 1-933452-52-8

Preface and Acknowledgments

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, RP-036A was approved in 2010 as a recommended practice of the Institute of Transportation Engineers (ITE). It supersedes the proposed recommended practice, *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*, RP-036, dated March 2006. The comment period on the proposed recommended practice closed on December 31, 2006. Comments on the proposed recommended practice have been incorporated into this document.

ITE wishes to thank the Federal Highway Administration's Office of Infrastructure, Office of Planning, Environment and Realty and the Environmental Protection Agency's Office of Sustainable Communities for financially supporting this work effort and providing leadership and guidance in the development of this report.

This report was produced by ITE and the Congress for the New Urbanism (CNU) and is the result of several years of concerted effort by dedicated volunteers, including ITE members, CNU members and many other interested parties. ITE wishes to thank the members of each of the following committees for their respective roles in the preparation of this repot.

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PART 1

Introduction



Chapter 1
Foundation

Purpose of This Report

This report has been developed in response to widespread interest for improving both mobility choices and community character through a commitment to creating and enhancing walkable communities. Many agencies will work toward these goals using the concepts and principles in this report to ensure the users, community and other key factors are considered in the planning and design processes used to develop walkable urban thoroughfares.

Traditionally, through thousands of years of human settlement, urban streets have performed multiple functions. Mobility was one of the functions, but economic and social functions were important as well. Retail and social transactions have occurred along most urban thoroughfares throughout history. It is only in the 20th century that streets were designed to separate the mobility function from the economic and social functions. This report is intended to facilitate the restoration of the complex multiple functions of urban streets. It provides guidance for the design of walkable urban thoroughfares in places that currently support the mode of walking and in places where the community desires to provide a more walkable thoroughfare, and the context to support them in the future.

While the concepts and principles of context sensitive solutions (CSS) are applicable to all types of transportation facilities, this report focuses on applying the concepts and principles in the planning and design of urban thoroughfares—facilities commonly designated by the conventional functional classifications of arterials and collectors. Freeways, expressways and local streets are not covered in this report. The following chapters emphasize thoroughfares in "walkable communities"—compact, pedestrian-scaled villages, neighborhoods, town centers, urban centers, urban cores and other areas where walking, bicycling and transit are encouraged. Practitioners working on places and thoroughfares that do not completely fit within this report's definition of walkable urban thoroughfares may also find this guidance useful in gaining an understanding of the flexibility that is inherent in the "Green Book"—the American Association of State Highway and Transportation Officials' (AASHTO's) *Policy on Geometric Design of Highways and Streets* (AASHTO, 2004a).

Throughout this report, for brevity, the terms "principles of CSS" and "CSS" are used interchangeably.

CSS and This Report

The principles of CSS promote a collaborative, multidisciplinary process that involves all stakeholders in planning and designing transportation facilities that:

- Meet the needs of users and stakeholders;
- Are compatible with their setting and preserve scenic, aesthetic, historic and environmental resources;
- Respect design objectives for safety, efficiency, multimodal mobility, capacity and maintenance; and
- Integrate community objectives and values relating to compatibility, livability, sense of place, urban design, cost and environmental impacts. (FHWA and Atlanta Regional Commission)

Applying the principles of CSS enhances the planning and design process by addressing objectives and considerations not only for the transportation facility but also for the surrounding area and its land uses, developments, economic and other activities and environmental conditions. With a thorough understanding of the CSS principles and design process, the practitioner planning or designing a thoroughfare seeks to integrate community objectives, accommodate all users and make decisions based on an understanding of the trade-offs

that frequently accompany multiple or conflicting needs.

Applying the principles of CSS in the transportation planning or project development process identifies objectives, issues and trade-offs based on stakeholder and community input starting at the regional planning process and continuing through each level of planning and project development (for example, network, corridor and project). This report provides guidance in how CSS principles may be considered and applied in the processes involved with planning and developing roadway improvements for walkable urban thoroughfares.

As documented in *Context-Sensitive Design Around the Country* (TRB 2004), *A Guide to Best Practices for Achieving Context Sensitive Solutions* (TRB 2002) and other sources, the principles of CSS are successfully used in towns and cities as well as in rural areas. Agencies are transforming the current project development process to meet the expectations of all users and stakeholders. Integrating CSS principles into the project development process results in the consideration of a broad range of objectives and an attempt to balance these objectives based on the needs and conditions specific to each project and its context. The use of CSS principles in the project development process is resulting in community interests, user needs and environmental issues being considered early in the development of roadway improvement projects—specifically in defining the project's purpose and need and, as appropriate, in other decisions in each phase of the project.

Objectives of this Report

The objectives of this report are to

1. Identify how CSS principles can be applied in the processes (for example, network, corridor, project development) involved with planning and developing roadway improvement projects on urban thoroughfares for walkable communities;
2. Describe the relationship, compatibility and trade-offs that may be appropriate when balancing the needs of all users, adjoining land uses, environment and community interests when making decisions in the project development process;
3. Describe the principles of CSS and the benefits and importance of these principles in transportation projects;
4. Present guidance on how to identify and select appropriate thoroughfare types and corresponding design parameters to best meet the walkability needs in a particular context; and
5. Provide criteria for specific thoroughfare elements, along with guidance on balancing stakeholder, community and environmental needs and constraints in planning and designing walkable urban thoroughfare projects.

Walkable Communities

Walkable communities are urban places that support walking as an important part of people's daily travel through a complementary relationship between transportation, land use and the urban design character of the place. In walkable communities, walking is a desirable and efficient mode of transportation. Although nearly every human environment can accommodate some degree of walking, walkable communities give additional value and support to make walking an enjoyable experience (see sidebar regarding the "continuum of walkability").

Principles for walkable communities include the following:

1. Accommodating pedestrians, bicycles, transit, freight and motor vehicles within a fine-grained urban circulation network where the allocation of right of way on individual thoroughfares is based on urban context, often determined through the process in this report;
2. Providing a compact and mixed-use environment of urban buildings, public spaces and landscapes that support walking directly through the built environment and indirectly by supporting human and economic activities associated with adjacent and surrounding land uses;
3. Achieving system-wide transportation capacity by using a high level of multimodal network connectivity, serving walkable commu-

nities with appropriately spaced and properly sized pedestrian, bicycle, transit and vehicular components rather than by increasing the vehicular capacity of individual thoroughfares; and

4. Creating a supportive relationship between thoroughfare and context by designing thoroughfares that will change as the surroundings vary in urban character.

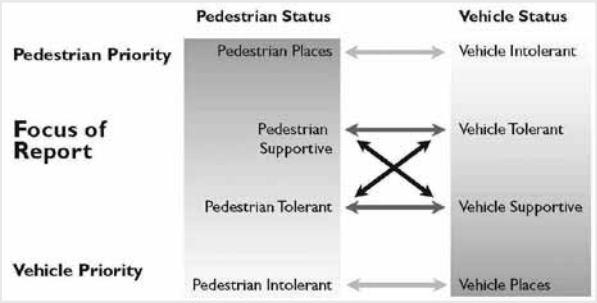
Walkable communities have the following characteristics:

1. A mix of land uses in close proximity to one another;
2. A mix of density including relatively compact developments (both residential and commercial);
3. Building entries that front directly onto the sidewalk without parking between entries and the public right of way;
4. Building, landscape and thoroughfare design that is pedestrian-scale—in other words, that provides architectural and urban design features scaled and detailed to be appreciated by persons who are traveling slowly and observing from the sidewalk at street level;
5. Thoroughfares designed to serve the activities generated by the adjacent context in terms of the mobility, safety, access and place-making functions of the public right of way; and
6. A highly connected, multimodal circulation network, usually with a fine "grain" created by relatively small blocks providing safe, continuous and balanced multimodal facilities that capitalize on compact urban development patterns and densities.

The above principles and characteristics are the qualities found in urban places where development pattern, intensity and design combine to facilitate frequent walking and transit use. In these places, the nonauto modes are attractive and efficient choices for many people, in concert with automobiles and their convenient and accessible parking. An increasing number of communities are recognizing the value of these features and are embracing them in land use, urban design and transportation

Continuum of Walkability

At some level nearly every place in the built environment is walkable. Some places, such as freeways or highways do not allow for pedestrians. At the other extreme, public spaces such as plazas, parks and pedestrian malls are primarily for pedestrians and generally exclude vehicles. Thoroughfares that are in between these two extremes require trade-offs between pedestrian and vehicle priority. The focus of this report is on the thoroughfares that are "pedestrian supportive" as shown in the spectrum of pedestrian and vehicle supportiveness below. Some of the concepts in this report can be used in pedestrian-tolerant areas as well.



Pedestrian priority on urban thoroughfares falls into the following ranges:

- Pedestrian places—mixed-use areas with a significant pedestrian presence, not dominated by, and sometimes prohibiting, vehicles;
- Pedestrian supportive—mixed-use areas with moderate to significant pedestrian presence;
- Pedestrian tolerant—areas that minimally accommodate pedestrians but do not support a high level of pedestrian activity and are usually vehicle dominant; and
- Pedestrian intolerant—areas with little support for walking or that prohibit pedestrians and are vehicle dominant.

Thoroughfares that are pedestrian supportive range from being tolerant to supportive of vehicular access and mobility. The specifics of the community's objectives, transportation needs and priorities are resolved through the CSS process to arrive at the proper thoroughfare design solutions.

Source: Adapted from a system for describing "degrees of walkability" for street environments, Charlier Associates.

plans, often using techniques drawn from planning and design movements such as smart growth and new urbanism.

As the successful design of walkable communities is complex and is not the primary focus of this report, the following references are provided as some of the many sources for useful guidance regarding the overall design of walkable communities:

1. *Promoting Sustainable Transportation Through Site Design: An ITE Recommended Practice,* 2010. This document provides specific guidance regarding the design of sites to create a context that supports walkable urban thoroughfares.
2. *SmartCode v9.2,* (Andres Duany, Sandy Sorlien, and William Wright, 2008). This document is a model development code for walkable communities that is based upon the Transect.

Applicability of this Recommended Practice

This recommended practice provides guidance for designing urban thoroughfares—facilities designated as arterials or collectors—to support walkable communities. Most applications of the design guidance included in this report will often apply in one of the following two circumstances:

1. A thoroughfare project in an existing walkable community where its multimodal character is to be preserved and enhanced; or
2. A thoroughfare project in an area where community goals call for a walkable context, in which case applying this design guidance will shape public investment to advance those goals.

Both circumstances can apply to either new construction or retrofit projects.

Commitment to walkable communities as a goal means that throughout the design process, location will serve as a design control (see Chapter 7). As a result, design decisions will consistently favor those elements and dimensions that are most supportive of walkable community characteristics. Examples of the design-decision processes favoring walkable community outcomes are provided in Chapter 5.

Other development contexts will also benefit from applying the guidance presented in this report. These include places characterized by business parks, residential subdivisions and strip commercial development. In areas such as these, outside of existing and evolving walkable communities, this report can help designers provide benefits including

- Safe and comfortable facilities for pedestrians;
- Attractive streetside areas;
- Appropriate sizing of facilities with respect to pavement width, with associated potential for cost savings in right-of-way acquisition, construction and maintenance;
- Successful integration of transit facilities and operations; and
- Speed management.

In cases where the design guidance is being used in development contexts other than walkable communities (existing or planned), design controls other than location may dominate trade-off decisions.

Relationship to Other Guidance

This report supplements and expands on policies, guides and standards commonly used by state and local transportation, engineering and public works engineers and planners. Those publications include *A Policy on Geometric Design of Highways and Streets* (AASHTO 2004a); *Guide for the Planning, Design and Operation of Pedestrian Facilities* (AASHTO 2004b); *Guide for the Development of Bicycle Facilities* (AASHTO 1999); *Highway Safety Design and Operations Guide* (AASHTO 1997); *Roadside Design Guide* (AASHTO 2002); as well as state department of transportation design policies and manuals, local municipal street design standards, urban design guides and guidances published by other standard-setting organizations. This publication expands on information published by the Federal Highway Administration (FHWA) in *Flexibility in Highway Design* (1997) and the *Manual on Uniform Traffic Control Devices* (2009) and builds upon the considerations in devel-

oping context sensitive solutions described in *A Guide for Achieving Flexibility in Highway Design* (AASHTO 2004c). **This report is intended to illustrate how AASHTO guidance can be applied to roadway improvement projects to make them more compatible with community objectives and context in urban areas.**

The flexibility encouraged in this report is consistent with the policies and intent expressed in the American Association of State Highway and Transportation Officials' (AASHTO) *Policy on Geometric Design of Highways and Streets*. Most of the criteria in this report are based on AASHTO design criteria, and this report shows how the criteria can be applied to create context sensitive designs in places with the qualities of traditional urbanism. This report presents guidance from sources other than AASHTO, citing these sources at the end of each chapter. This report incorporates by reference consistency with guidelines and standards published in the latest version of the *Americans with Disabilities Act Accessibility Guidelines* (ADAAG) as well as the *Public Rights-of-Way Accessibility Guidelines* (PROWAG), which both can be found at www.access-board.gov.

This report augments information found in the above resources by providing guidance on

1. Applying CSS principles in the planning and design of urban thoroughfares;
2. Considering a broader set of factors during the planning and design of walkable urban thoroughfares;
3. Recognizing the importance of context, the role of sites and buildings and how context influences the design of the thoroughfare and vice versa; and
4. Providing an understanding of how thoroughfare design criteria should vary depending on the context through which the thoroughfare passes.

Organization

This report is divided into three parts: introduction, planning and design. There are ten chapters:

- Chapter 1 provides the introduction.
- Chapters 2 through 4 describe how CSS principles are used in the planning and project development processes.
- Chapters 5 through 10 address the thoroughfare design process and specific design criteria.
- The appendices contain definitions of key terms and concepts, as well as a primer on CSS.

Table 1.1 lists the chapters and provides an overview of the material that is addressed in each chapter.

Chapter 6 provides general design parameters and example designs for urban thoroughfares with speeds up to 35 mph in areas with high levels of pedestrian, bicycle and transit activity. Chapter 7 presents general design controls that apply to urban thoroughfare design. Design guidelines in Chapters 8 through 10 focus on the streetside, traveled way and intersection design of lower-speed thoroughfares, but much of this guidance also can be applied to higher-speed facilities.

Who Should Use This Report

This report is for practitioners and stakeholders involved in planning and designing urban thoroughfares for walkable communities. Users are encouraged to consider the principles and guidelines in this report in conjunction with applicable local policies and manuals. **Table 1.2** presents many of the intended users and their responsibilities where CSS principles may be considered. Each user listed in **Table 1.2** represents a different set of stakeholders that bring different perspectives and responsibilities to the transportation planning and project development processes to best meet the needs of all the stakeholders. However, all users may benefit from an understanding of CSS principles and how they might be integrated into their work.

Table 1.1 Contents of This Report

Chapter Title	Material that is Addressed
Part 1: Introduction	
1—Foundation	The background behind this guidance and an overview of the principles of CSS.
Part 2: Planning	
2—Planning and Developing Context Sensitive Urban Thoroughfares	An overview of the transportation planning and project development process and how CSS principles are applied with these processes.
3—Network and Corridor Planning	An overview of thoroughfare network types, characteristics of successful networks and network design guidelines. An overview of the corridor planning process and the role of CSS.
4—A Framework for Walkable Urban Thoroughfare Design	An introduction into the design framework for context sensitive thoroughfare design, context zones, their characteristics and the features that create context and a description of thoroughfare types and their relationship with functional classifications, compatibility with context zones and general design parameters.
Part 3: Design	
5—Thoroughfare Design Process	A process for using this report to design thoroughfares, how to design thoroughfares within constrained rights of way and flexibility in the application of design criteria.
6—Thoroughfare Designs for Walkable Urban Areas	General design parameters for thoroughfare types, variations in the streetside and traveled way under varying conditions and example thoroughfare designs.
7—Design Controls	A discussion of the engineering controls and level of flexibility critical in context sensitive design, including design vehicle, roadway geometrics and design speed.
8—Streetside Design Guidelines	General principles, design considerations and detailed guidance for the design of the elements that comprise the streetside.
9—Traveled Way Design Guidelines	General principles, design considerations and detailed guidance for the design of the elements that comprise the traveled way.
10—Intersection Design Guidelines	General principles, design considerations and detailed guidance for the design of the elements that comprise multimodal intersections.

Table 1.2 Intended Users and Responsibilities

User	Responsibilities
All Users	• Participate in preparing transportation plans; • Help establish community vision and project goals and objectives; and • Help develop and evaluate thoroughfare concepts, alternatives and impacts.
Transportation Planner	• Develops and evaluates long-range transportation plans; • Helps establish community vision and project goals and objectives; • Develops and evaluates thoroughfare concepts, alternatives and impacts; and • Works with public, stakeholders and multidisciplinary teams to integrate transportation and land use planning.
Traffic/Civil Engineer	• Prepares purpose and need for transportation projects; • Develops initial thoroughfare concepts and prepares detailed evaluations of these concepts; • Identifies design controls and parameters, constraints and trade-offs; • Works with public, stakeholders and multidisciplinary teams to resolve design challenges; and • Prepares preliminary and final engineering plans.
Land Use Planner	• Develops long-range land use plans; • Helps establish community vision and goals and objectives for neighborhoods and corridors; • Works with multidisciplinary team to establish and identify context; • Formulates land use policy that affects thoroughfare design; and • Establishes land use regulations (subdivision, zoning and so forth) that guide context.
Design Professional - Architect - Urban Designer - Landscape Architect	• Designs integral elements of the thoroughfare and its surrounding context including buildings, sites and streetscape features; • Works with public, stakeholders and multidisciplinary teams to resolve design challenges; and • Prepares environmental assessments; identifies impacts and mitigation measures.
Stakeholders - Elected Officials - Appointed Commissioners - Developers - Local, Regional and State Agencies - Citizens	• Provide local and regional input and leadership; • Provide funding and financing mechanisms for development of context and thoroughfares; • Have jurisdiction and approval authority over plans and designs; and • Work closely with the general public to achieve community acceptance of projects.

Works Cited

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U.S. Architectural and Transportation Barriers Compliance Board. 1999. *Accessible Rights-of-Way: A Design Guide.*

Sources of Additional Information

Transportation Research Board. 2004. NCHRP 69: *Performance Measures for Context Sensitive Solutions-A Guidebook for State DOTs.* [NCHRP Web-Only Document 69 (Project 20-24(30)).] Washington, DC: TRB.



PART 2

Planning



Chapter 2

Planning and Developing Context Sensitive Urban Thoroughfares

Purpose

This chapter describes, in general terms, the transportation planning and project development processes. It provides a broad overview of each stage of the processes and emphasizes that CSS principles can be applied at each stage. The transportation planning overview in this chapter provides the background for the practitioner to understand the principles and guidance on network and corridor planning presented in Chapter 3. Similarly, the overview of the project development process introduces the stages for planning and designing roadway improvement projects, which supports the information presented in Chapters 4 through 10.

Objectives

This chapter

1. Broadly describes how CSS principles can be integrated into the transportation planning process; and
2. Describes how CSS can be integrated into the project development process and identifies the applicable steps.

CSS in the Transportation Planning Process

Transportation planning is a continuing, comprehensive and collaborative process to encourage the development of a multimodal transportation system to ensure safe and efficient movement of people and goods while balancing environmental and community needs. The process is designed to promote involvement by all levels of government, stakeholders and the general public. The transportation planning process is concentrated at four levels of government: federal, state, metropolitan, or regional, and local agency. **Table 2.1** describes the planning roles and responsibilities at the various government levels and shows how CSS can be applied at each level.

The planning process examines demographic characteristics and travel patterns for a given area, shows how these characteristics will change over a given period of time and evaluates alternative improvements for the transportation system. **Table 2.1** also summarizes how CSS can be applied in each of the planning tiers. The planning tiers are divided into four levels:

1. National—Responsible for legislation and oversight and development of policies and regulations, as well as providing funding for transportation projects at the state, regional and local level.
2. Statewide—Responsible for long- and short-range transportation planning, development of transportation regulations and standards, oversight and development of transportation programs, transportation funding and implementation, and maintenance and operation of the state highway system.
3. Metropolitan or Regional–Responsible for areawide planning, projections and coordination; generally these agencies are metropolitan planning organizations (MPOs) in urbanized areas with more than 50,000 population or cover rural and small city regions outside the MPO areas. MPOs also coordinate metropolitan plan adoption, project selection and allocation of federal and some state funding.
4. Local Agency—Responsible for local planning and project development, operations and maintenance of transportation facilities.

The consideration of CSS principles can allow the different agency planning-level goals and objectives to be reflected in the initial or early development of individual projects and may convey information for use in defining the purpose and need. In addition, CSS considerations in transportation planning can identify issues or decisions facing the region, allowing for consensus and a shared understanding of the major sources of change that affect the future.

Table 2.1 Transportation Planning Tiers and CSS Applications

Tier	Responsibilities	CSS Applications
National	• Authorizing legislation • Federal regulations • Federal policy • Research programs • Highway construction funding	• Interpreting legislation • Federal policy and regulations • Development of CSS and flexible design guidance • Demonstration projects • Research programs addressing design issues
Statewide	**Statewide State DOT Long-Range Planning (10 to 50 Years)** • Strategic plans • Transportation plans • Plans and programs **Programs and System Plans (5 to 10 Years)** • System and corridor planning • Strategic system plans • Regional/agency operational programs and plans • State transportation improvement programs (STIP) • Highway construction funding	• Network design and connectivity plans • Multimodal and CSS policies • Public participation in CSS vision and plan development • Developing CSS and flexible design guidance • State design manual revisions • Context sensitive designs of highways and thoroughfares • Coordination with resource agencies • Demonstration programs • Staff and local agency training • CSS funding partnerships
Regional/Metropolitan	**Regional Long-Range Planning (10 to 50 Years)** • Agency strategic plans • Regional transportation plans • Agency plans and programs **Programs and System Plans (5 to 10 Years)** • System and corridor planning • Strategic system plans • Agency and regional transportation improvement programs (TIPs) • Transportation construction funding, coordination and prioritization	• Network design and connectivity plans • Multimodal and CSS policies • Context sensitive highway and thoroughfare corridor studies • Coordinating among agencies • Staff and local agency training • CSS funding partnerships
Local Agency	• Operations, management strategies and plans • Roadway improvement projects • Planning, design and enhancements • Support services • Capital improvement programs	• Local design manual/standards • Corridor plans • Thoroughfare plans • Multimodal and CSS policies in comprehensive plans • Integrating CSS into project development process (includes public participation)

Source: Adapted from *Freeway Management and Operations Handbook*, Federal Highway Administration

Integrating CSS principles within the transportation planning process assists regions and communities in reaching their transportation goals by encouraging the consideration of land use, transportation and infrastructure needs in an integrated manner. When transportation planning reflects community input and takes into consideration the impacts on both natural and human environments, it also promotes partnerships that lead to "balanced" decision making. Incorporating CSS considerations within transportation planning also produces better environmental results by advancing the ability to identify sensitive environmental resources while facilitating cooperative interagency relationships.

The benefits of integrating CSS in the planning process encourages public support for transportation plans and cooperation among agencies, reduces project delays by minimizing controversy and saves time and funds. CSS also fosters conservation of environmental and community resources. The probable benefits when working collaboratively with stakeholders includes the production of a full range of options, an understanding of trade-offs and consensus on key decisions. This results in information that directly feeds into, and accelerates the project development process.

Without adoption and support of CSS principles by agencies (for example, policies, procedures, standards and programs), it will be challenging and difficult to apply CSS in either a transportation planning process or improvement project. If a regional long-range transportation plan or local corridor plan has not incorporated a process that considers CSS, it may limit the range of options and the best overall solution. For example, changing the functional classification of a roadway to be more compatible with its surroundings should be considered at the level of the long-range transportation plan so that the change can be evaluated within the context of the entire network. Without a large-scale evaluation and adoption of the change in a plan, it will be difficult to change the functional classification at the project development stage, even if conditions justify the change.

Complete Streets

Some communities have adopted "complete streets" laws and policies to ensure that their roads and streets are routinely designed and operated to provide the safest achievable access for all users, including motorists, bicyclists, pedestrians and transit riders. In communities with complete streets policies, the objective is for pedestrians, bicyclists, motorists and transit riders of all ages and abilities to be able to safely move along and across an urban street.

A complete streets policy creates a routine process for providing for all travel modes whenever a street is built, altered, or maintained. Such policies have been adopted at the state level in the United States (Oregon, California, Illinois, South Carolina and Virginia), by MPOs (Central Ohio, California Bay Area) and by local governments (Charlotte, NC; Sacramento, CA; Boulder, CO; and Chicago, IL).

Communities with street projects will benefit greatly from the application of CSS principles. The recommendations of this report can help communities implement complete streets policies.

While context sensitive solutions involve stakeholders in considering a transportation facility in its entire social, environmental and aesthetic context, complete street policies are a reminder that providing for safe travel by users of all modes is the primary function of the corridor. Under complete streets, basic accommodations for bicyclists, pedestrians, transit users and disabled travelers are necessities rather than optional items. All modes and users are important on all thoroughfares.

For more information on complete streets, visit www.completestreets.org.

The process usually involves the steps shown in **Figure 2.1.** The general process is introduced here to demonstrate how each stage provides an opportunity to integrate CSS principles, beginning with the first step in the process—developing a vision, goals and policies. Below is a brief discussion of each step and the possible outcomes when CSS is part of the process.

Vision and Goals: It is at this step that the overall vision and goals for how the transportation system shall be designed, built, operated and maintained is decided. Applying CSS principles, at this level

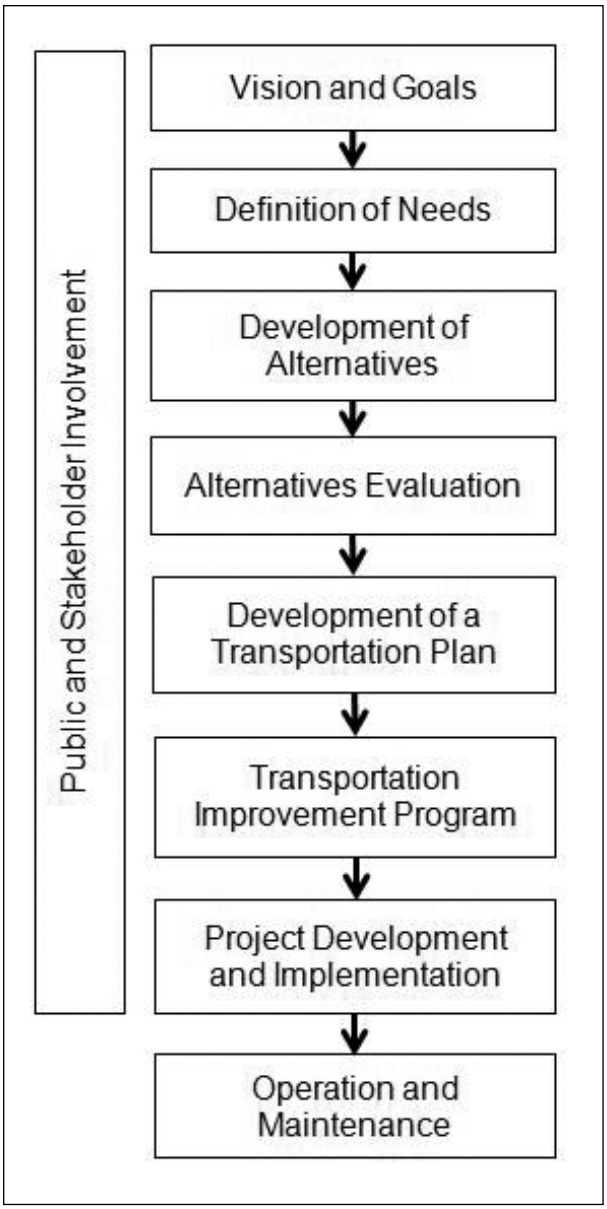

Figure 2.1 Transportation planning process.
Source: Kimley-Horn and Associates, Inc.

helps to integrate the regional, local and neighborhood vision for the physical nature and economic vitality of communities. CSS principles can result in compatibility between the facility and its surroundings so that the two are mutually supportive, whether in urban or rural settings. Possible outcomes of this step include:

- Long-range vision for the community and project;
- Community values and issues;
- Supporting data;
- Community and agency priorities;
- Development of a multidisciplinary team;
- Education of stakeholders regarding issues, process and constraints; and
- An established planning process that identifies decision points and stakeholder roles and responsibilities.

Definition of Needs: A process that incorporates CSS, inclusive of all stakeholders, can help define the needs of the transportation plan or project based on the goals, objectives and visions established earlier. By proactively identifying stakeholder values, issues and concerns, CSS allows development of an inclusive problem/need statement consistent with applicable policies and requirements. The possible outcomes of this step include:

- Acceptance of a problem statement that reflects community and agency perspectives;
- A broad and comprehensive needs statement reflecting community values as well as the transportation need; and
- Evaluation criteria and performance measures.

Development of Alternatives: CSS encourages use of the vision, goals and needs as the basis for developing a full range of options in a collaborative and participatory process, resulting in flexible and innovative solutions. Objectivity in developing the alternatives is critical. What seem at first sight to be infeasible options often can be refined into workable solutions. The possible outcomes of this step include:

- A full range of alternatives that meet the needs statement;
- Avoiding unlikely (straw man) alternatives;
- Opportunities for enhancement and flexibility to modify alternatives;
- Consideration of all modes and all users;
- Consideration of innovative and feasible solutions; and
- Clear, understandable and graphical portrayal of alternatives.

Alternatives Evaluation: CSS encourages objective evaluation of the trade-offs between different alterna-

tives, always relating back to evaluation criteria. As a result, stakeholders will be better able to support and endorse plans and designs. The possible outcomes of this step include:

- Participatory and transparent evaluation process;
- Clear assessment of trade-offs;
- Equal level of assessment for accurate comparison;
- Information to assist decision makers; and
- Clear reasoning behind rejection of alternatives.

Development of a Transportation Plan and Transportation Improvement Program (TIP): CSS principles can be integrated into the development of a long-term transportation network, with a goal of achieving increasingly diverse travel modes and improving the overall operation of the transportation system. As a strategy that enhances safety and encourages all travel modes, CSS projects (transportation enhancements) may draw upon different funding sources than do conventional projects. The possible outcomes of this step include a plan that:

- Reflects the vision and community values and meets the needs statement;
- Identifies opportunities to enhance community resources;
- Encompasses traditional and innovative solutions; and
- Engenders community ownership and endorsement.

Project Development and Implementation: CSS principles can have the most profound effect on this step in the planning and design process as transportation projects are taken from the conceptual stage to implementation. The possible outcomes of this step include:

- Innovative solutions that meet project needs, reflect community values and enhance resources;
- Expedited approval of projects through early and consistent stakeholder involvement;
- Application of design flexibility and documentation of design decisions;
- Continuation of stakeholder input through design and construction; and
- Assurance that commitments made in the planning process are honored through construction.

Public and Stakeholder Involvement: CSS by definition is a process that involves, and attempts to build consensus among, a diverse group of stakeholders. The possible outcomes of this step include:

- Early involvement;
- A variety of traditional and innovative ways to engage the community (e.g., workshops, cha-

Transportation Visioning

Communities determine their own vision for transportation—describing an ideal that reflects their values, concerns and priorities. Below are examples of a transportation vision from two communities.

"Moving people and goods within and across the metropolitan boundaries safely, conveniently and reliably by providing an integrated and accessible transportation system comprised of a balanced range of travel options."

The Livable Metropolis, official plan of the Municipality of Metropolitan Toronto,

"Traffic in the corridors will be calmed to foster a relaxed, accessible, outdoor-oriented, pedestrian-friendly urban village. The issues outlined below expand upon the vision statement and become a set of principles to guide future public and private investment and also create a "measuring stick" by which to evaluate consistency with the vision, and thereby appropriateness, of these future investments:

- Slow the traffic;
- Divert cut-through traffic around Upper Arlington;
- Build safe crosswalks;
- Build sidewalks and bikeways;
- Plant more street trees; and
- Encourage redevelopment that is scaled to encourage/foster street life.

"100-year lifespan vision of Upper Arlington Streets"
Lane Avenue and Tremont Road
Street Planning and Transportation Vision, City of Upper Arlington, Ohio.

rettes, newsletters, focus groups, Web sites, interviews);

- A high level of agency credibility and public trust throughout the involvement process;
- Engagement of underserved and minority communities;
- Equal participation of stakeholders; and
- Education of the public regarding the planning and project development processes, constraints and agency perspectives.

Operations and Maintenance: The transportation planning and project development processes consider the effects of decisions on costs, liability risks and operations and maintenance. Application of CCS principles and design guidance can affect these aspects of project development and need to be carefully considered. Examples include the need to maintain landscaping, the effects of CSS design on utility maintenance and liabilities associated with certain design elements in public places. The possible outcomes of this step include:

- Plans to monitor performance (particularly design exceptions) and receive feedback; and
- Commitment to maintain facilities.

CSS in the Project Development Process

Figure 2.2 combines the basic phases of the transportation planning and project development processes for transportation facilities involving federal funds. This figure illustrates how the transportation planning process relates to the project development process. The figure is intended to show how information for transportation improvements to a thoroughfare developed in the transportation process provides input into the project development process. This type of information includes:

- Multimodal role of thoroughfares within the network;
- Relationship between land uses and the transportation system;
- Travel demand forecasts for various modes of travel;
- Performance measures and criteria used to evaluate individual transportation projects;
- Multimodal performance of the network and individual corridors;
- Specific capital projects and funding sources;
- Goals and policies that provide direction for the development of individual transportation projects; and
- Prioritization of projects.

The information presented in this report requires an understanding of the existing and future context in urban areas. The application of CSS principles also requires one to know the ways to use the design of the thoroughfare itself to provide mutual support between the thoroughfare and existing and planned adjacent land uses and development patterns. While CSS principles should be considered at the highest level of planning and be integrated into the culture of transportation agencies, in project development, CSS principles should be introduced at the earliest stage—the needs study.

Integrating CSS in the project development process significantly influences the development of project concepts. Project concepts should emerge from a full understanding of the relationship between the thoroughfare, adjoining property and character of the broader urban area. Modal emphasis should be established in the early stages of project development, not addressed as an afterthought in preliminary engineering. In the project scoping or planning step, which includes an environmental review, all alternative analyses may incorporate the principles of CSS.

CSS highlights the need for context sensitive performance measures and criteria for selecting the preferred alternative at this stage of project development. The project development process in **Figure 2.2** illustrates where the information in this report can be used in the process. The steps discussed are highlighted in the flowcharts that follow (**Figures 2.3** through **2.6**):

- **Long-Range Transportation Plan:** In this part of the process, the report's network planning and design guidelines (Chapter 3) can be used to help prepare long-range transportation plans and network connectivity supporting context-based thoroughfares. Additionally, the thorough-

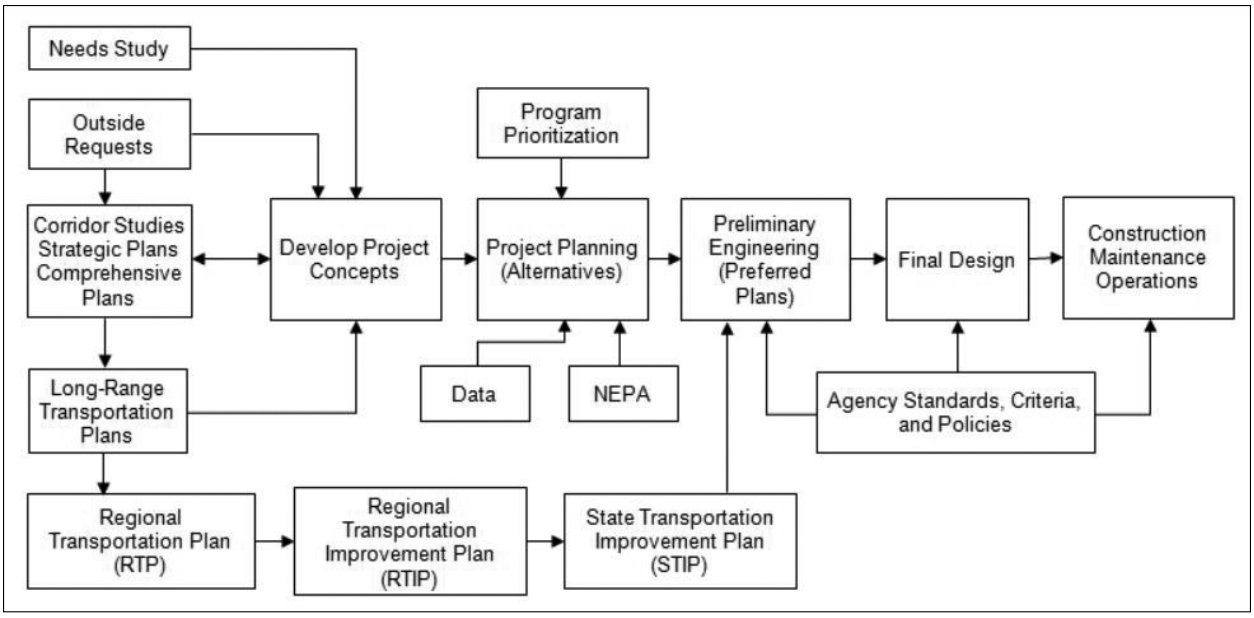

Figure 2.2 Transportation planning and project development processes. Source: Kimley-Horn and Associates, Inc.

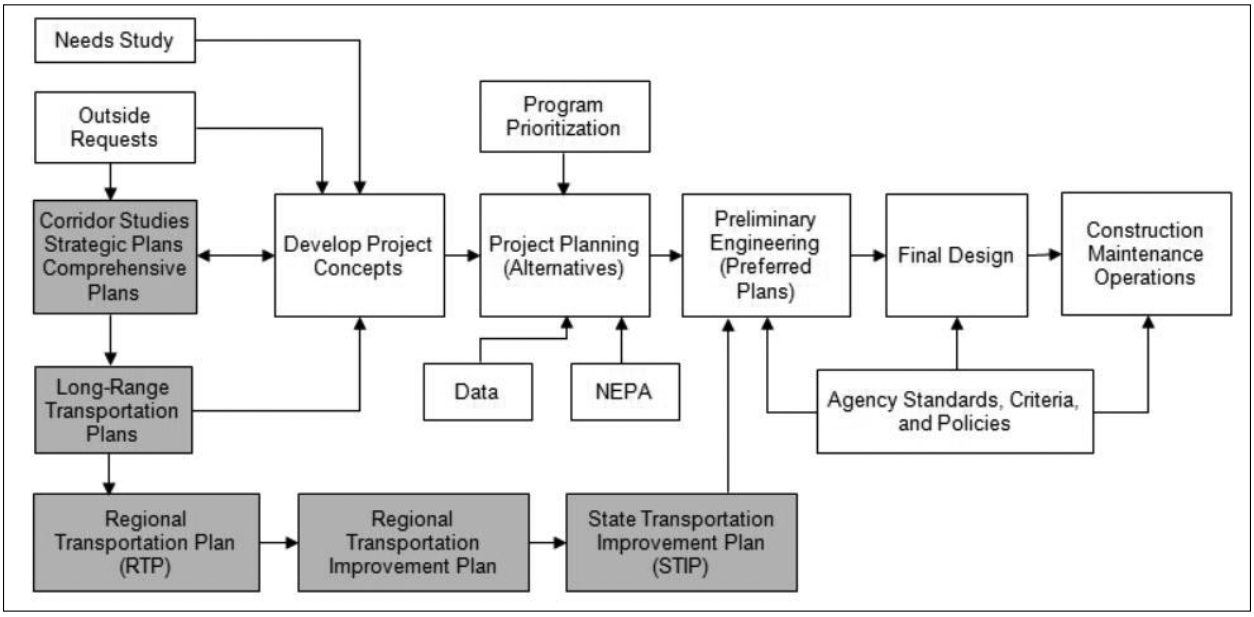

Figure 2.3 Applicable Steps in Planning Process for Long-Range Transportation Plan (shown as highlighted boxes)

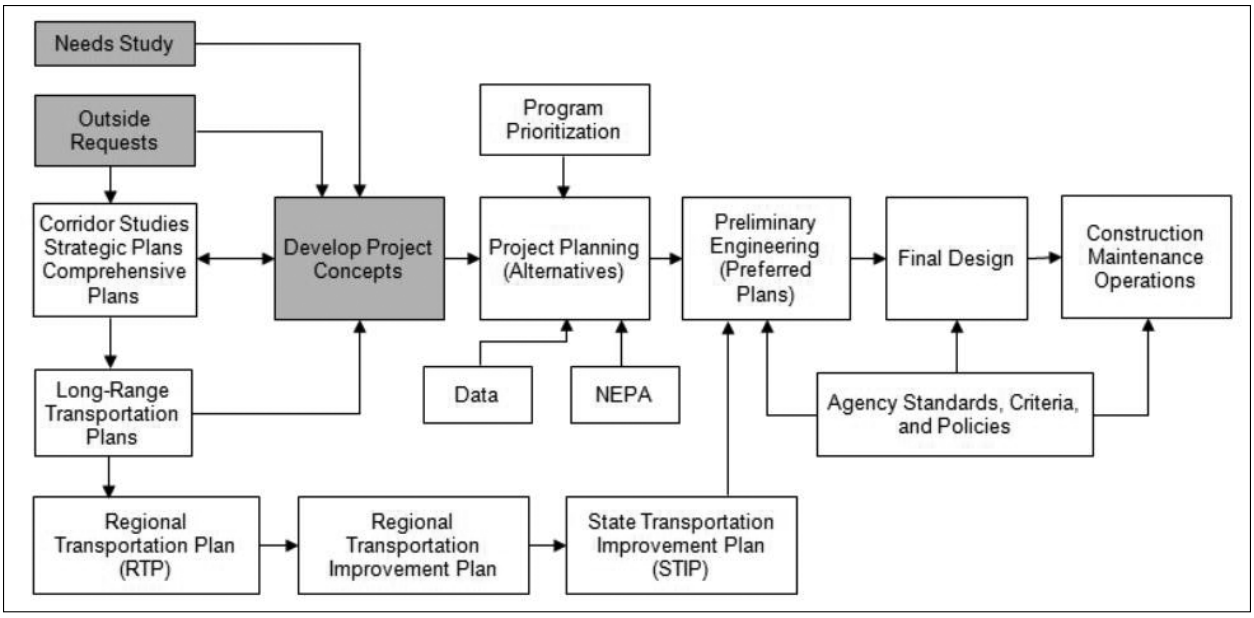

Figure 2.4 Applicable Steps in Planning Process for Needs Study and development of Project Concepts (shown as highlighted boxes)

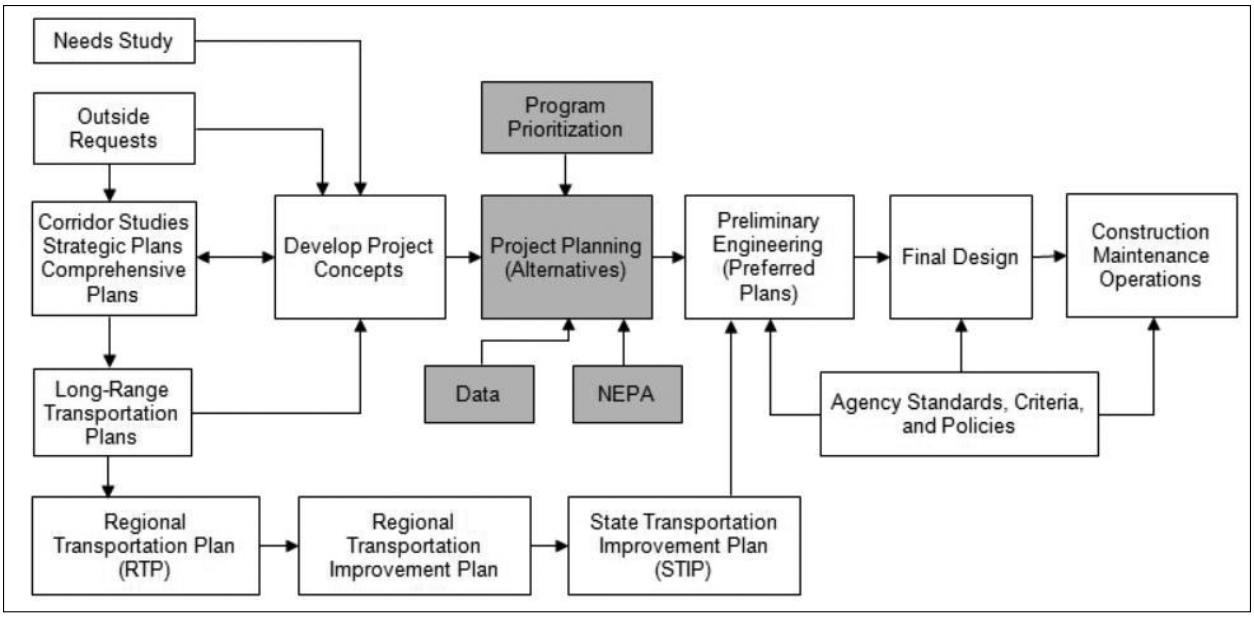

Figure 2.5 Applicable Steps in Planning Process for Project Planning and Alternatives Analysis (shown in highlighted boxes)

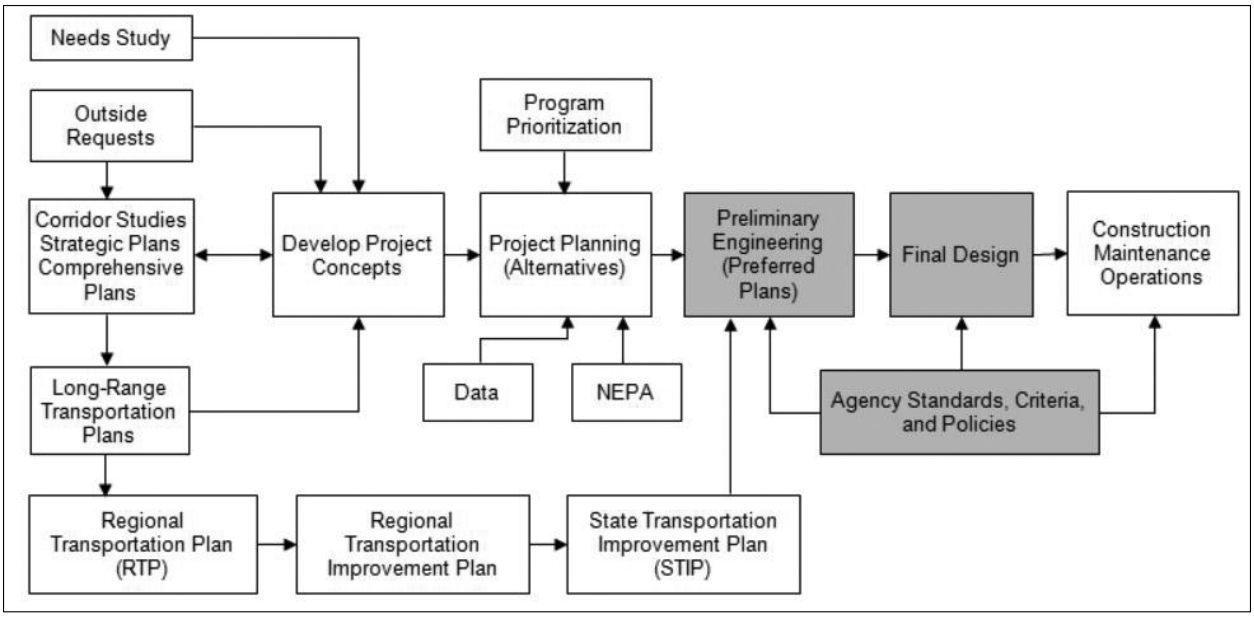

Figure 2.6 Applicable Steps in Planning Process for Preliminary Engineering and Final Design (shown in highlighted boxes)

fare types described in Chapter 4 may be integrated into the development of long-range plans. The long-range transportation planning process provides an opportunity to identify those places where local agency land use and development policies can best support urban CSS, such as pedestrian-scale districts, town center designs and transit corridors. These policy decisions can then be reflected in the development of thoroughfare classifications.

- **Needs Study and Project Concepts:** The fundamentals of urban context sensitive design, the design framework introduced in Chapter 3 and the thoroughfare design process and example thoroughfare designs (Chapters 5 and 6) are important tools in the needs study and development of project concepts. Multidisciplinary team and stakeholder involvement is critical in this early step.

  The project concept will emerge from an understanding of the relationships between thoroughfare types and context zones, along with other unique project circumstances, values, or objectives. Additionally, a thoroughfare's modal emphasis should be clearly identified in the project concept phase. Chapters 3 and 5 provide the tools for corresponding specific thoroughfare types to various contexts and describe how to prioritize design elements and assemble the cross sections based on context and potentially constrained conditions. Data input to the project concept phase of project development should include information relating to land use development patterns and design features that support present conditions and, equally important, the vision for the future context.

- **Project Planning and Alternatives Analysis:** Includes development and evaluation of alternatives and environmental review. The development of alternatives may use the techniques and design criteria presented in this report, including accessibility. Each alternative should incorporate the appropriate design characteristics compatible with the context.

- **Preliminary Engineering and Final Design:** The processes described in Part 3 of this report—thoroughfare design controls and detailed guidelines—are suitable tools for use in the preliminary engineering and final design phases of the project development process. These chapters provide information to establish an initial design for testing, identify trade-offs and prepare a final concept for engineering.

Sources of Additional Information

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Chapter 3
Network and Corridor Planning

Purpose

This chapter describes the interrelationship between the broader transportation network, corridors and individual thoroughfare segments. It presents how the principles of CSS can be used in the planning for urban thoroughfares at the network, region, or corridor levels to support or create walkable places. Understanding this relationship will contribute to the consideration of key issues and community objectives and to the development of a broader set of alternatives and improved flexibility when planning and developing transportation improvement projects.

This chapter provides the network plan context from which transportation projects are selected for further development and design. The chapter is intended to provide background related to network planning, but other documents; such as the upcoming ITE *Planning Urban Roadway Systems* and the CNU Statement of Principles on Transportation Networks contain recommendations on how to prepare such plans.

This report emphasizes the introduction of CSS principles early in the planning process. Network and corridor planning is an early opportunity to integrate community goals into specific urban thoroughfare projects. This helps expedite the project development process by identifying and addressing key issues and community objectives early, rather than for the first time during the planning and design of an individual thoroughfare project. Integrating CSS principles into the network and corridor planning process can:

- Determine how decisions for individual thoroughfare segments affect the corridor and network as a whole;
- Establish objectives, operational concepts, performance measures and thresholds, land uses, access control and functional classification for an entire network or corridor, which can be applied to individual thoroughfare segments in project development; and

The Roles of Network and Corridor Plans

Long Range or Regional Network Plan:

- Links transportation system to other metropolitan functions such as land use, environment, economy and so forth;
- Defines the transportation system for large areas in terms of corridors and guidance for the finer-grained network between corridors;
- Integrates multimodal systems such as highways, streets, freight, transit, bicycle and pedestrian; and
- Develops modal networks such as a thoroughfare plan, rail system, bus system, or bicycle network.

Corridor Plan:

- Links corridor to surrounding metropolitan functions such as land use;
- Coordinates and integrates multiple modes of transportation within the corridor; and
- Establishes the function and operation and design criteria for the individual facilities in the corridor.

Project Development Process:

- Confirms need for facility improvement;
- Develops conceptual, preliminary and final designs;
- Provides analysis of potential environmental impacts and mitigation measures; and
- Establishes costs and implementation program.

- Allow for policy, political and public debate on issues that impact a broader area than an individual thoroughfare segment (e.g., regional, corridor, community).

The early integration of CSS principles will influence desired change systematically rather than a piecemeal process.

Objectives

This chapter

1. Provides CSS principles and considerations for planning and designing transportation networks and corridors;
2. Provides guidelines on how CSS principles can be applied and design issues addressed at the network or corridor planning level;
3. Emphasizes that solutions may be found at the scale of the network and corridor rather than the individual thoroughfare (such as a denser network of streets or parallel facilities that provide equivalent function and capacity to the alternative of widening an individual thoroughfare); and
4. Shows how thoroughfares function within a network and how the CSS approach to improvements of specific segments of a thoroughfare relate to the thoroughfare's role in the network.

The guidelines presented in this chapter apply to both new development and retrofit conditions. Improving an existing situation will depend on the degree of connectivity, flexibility and capacity of the existing network, and the extent the network can be modified to accommodate the desired improvements.

Introduction

Chapter 2 presented a broad overview of the transportation planning and project development processes and described how CSS principles can be applied in each step of the process. This chapter builds on Chapter 2 by describing principles and guidelines that can be used at the network and corridor scales to create or improve urban walkable areas.

Network, or "system," planning sets the strategic direction and framework around which the various components and facilities will eventually be constructed or redeveloped. It is a series of high-level incremental plans leading to the design of individual thoroughfare segments that is consistent with the framework. Network planning defines goals for all modes of transportation and facilities. These long-range plans typically contain:

- A vision for the ultimate transportation system, goals and policies related to each mode of travel;
- Technical information on travel patterns and forecasts;
- A capital program for individual projects as part of the transportation system; and
- An action plan for implementing the plan over time.

The long-range transportation plan should consider the role and function of a multimodal transportation network for an entire region or metropolitan area. Corridors are transportation pathways that provide for the movement of people and goods between and within activity centers. A corridor plan encompasses single or multiple transportation routes or facilities (such as thoroughfares, public transit, railroads, highways, bikeways, trails, or sidewalks), the adjacent land uses and the connecting network of streets.

Corridor planning encompasses a scale that is large enough to consider the context and network, but small enough to be comprehensible by the public. Corridor planning applies multiple strategies to achieve specific land use and transportation objectives along a transportation corridor, combining capital improvements and management strategies into a unified plan for the corridor.[1]

CSS in Network Planning

Oftentimes the challenges encountered creating more walkable urban thoroughfares can be resolved at the scale of the network or the corridor. Network planning:

- Establishes a framework for the transportation system;

1 Corridor planning as defined by the New York State Department of Transportation.

- Distinguishes for individual segments;
  - Functions;
  - Modal emphasis; and
  - Operational features.

Familiar characteristics addressed include:

- Alignment;
- Spacing;
- Functional classification;
- Access control;
- Determination of number of lanes; and
- Designation for major freight and transit routes.

Ideally, network planning takes place at the early stages of regional development and is integrated into a comprehensive planning process that concurrently addresses land use, transportation and environmental resource management. In practice, especially in areas with multiple jurisdictions, network planning is often conducted in a piecemeal manner by multiple agencies with different geographic jurisdictions, missions and powers. For the practitioner planning or designing a thoroughfare segment, considering network design and function can lead to solutions that balance between demands for vehicle throughput and support for adjacent development.

The design process—the subject of this report—needs to recognize the role of a thoroughfare as part of a large-scale, multimodal network. The project development process should consider the regional, subregional and neighborhood functions of the thoroughfare in relation to urban form and character. The design of the individual thoroughfare, therefore, is linked to both its context and the performance of the network. A multimodal network may identify some thoroughfares that emphasize vehicles or trucks, while others emphasize pedestrians and transit.

CSS merges a community's comprehensive corridor objectives with mobility objectives in a manner acceptable to a variety of stakeholders. Two critical common characteristics for desirable thoroughfares are compatibility and support for the corridor context and providing a high degree of multimodal connectivity.

The context may vary along the length of the thoroughfare. The combination of function, context, or other changes may cause the design of the thoroughfare to vary along its length.

Network characteristics have a meaningful impact on urban development patterns. For example, compact, mixed-use areas are dependent on a pattern of highly connected local and major thoroughfares. The high level of connectivity results in short blocks that provide many choices of routes to destinations, support a fine-grained urban lot pattern and provide direct access to many properties. Walkable suburban areas should be similarly supported by a high level of street or path connectivity.

One fundamental tension that is commonly encountered in the application of CSS principles is between the desire of local residents to emphasize character and walkability in thoroughfare design and the desire of transportation agencies to emphasize vehicle capacity or the ability to accommodate projected regional travel demand. The tension between these objectives is best addressed through consideration of the broader network and corridor in conjunction with the individual thoroughfare.

Network characteristics are factors that provide opportunity for CSS. Connectivity, parallel routes and corridor capacity contribute to a transportation system that can accommodate projected demand by dispersing traffic, transit, freight and bicyclists across a system of parallel roadways.

This report addresses urban thoroughfares except limited-access facilities and local streets. However, when considering network design, properly located express thoroughfares—freeways/tollways, expressways and parkways—supplement the urban arterial thoroughfare network by providing high-speed, high-capacity service for longer trips. High vehicular capacity facilities permit other thoroughfares to balance the movement of traffic with other local objectives. If well connected to the larger thoroughfare network, local streets can also provide parallel capacity in the network to accommodate local, shorter trips.



Figure 3.1 Example of a conventional network.
Source: Data available from U.S. Geological Survey, EROS Data Center, Sioux Falls, SD.



Figure 3.2 Example of a traditional network.
Source: Data available from U.S. Geological Survey, EROS Data Center, Sioux Falls, SD.

Effective Network Planning for Walkable Areas

Network planning at the regional scale by regional or metropolitan planning agencies typically includes only highways, arterials and major collector systems. The planning of the finer grid of local residential and commercial streets is typically prepared at the county and/or city scale. As described above, regional network planning establishes the framework for the planning of county- and citywide networks. County- and citywide transportation plans establish a framework for planning and designing the local street system and individual thoroughfares. Finally, site planning and the project development process achieve the highest level of detail. The network types discussed below encompass both regional and local scales, since later discussions on thoroughfare design are influenced by the pattern of fine-grain networks.

Network Types

Most urban areas have a system of arterial streets, some of which may be highways. The most efficient systems have arterials with extended continuity, usually traversing all or much of an urban area except where barriers exist. The most efficient urban networks—which provide enough parallel streets to provide route flexibility and an opportunity for special street functions—have arterials spaced at half a mile or less. The important features of the arterial systems are connectivity and continuity.

Within the arterial street framework is a finer network of thoroughfares. These finer networks are sometimes characterized as either "traditional" or "conventional."

The typical conventional street network is often characterized by a framework of widely spaced arterial roads with connectivity limited by a system of large blocks, curving streets and a branching hierarchical pattern often terminating in cul-de-sacs (**Figure 3.1**). In contrast, traditional networks (**Figure 3.2**) are typically characterized by a less hierarchical pattern of short blocks and straight streets with a high density of intersections.

The prototypical traditional and conventional networks differ in three easily measurable respects: (1) block size, (2) degree of connectivity and route choice and (3) degree of curvature. While the last measure does not significantly affect network performance, differences in block size and connectivity create very different characteristics.

Comparative Advantages

Both network design types have advantages. Advantages of traditional grids include

- Dispersing traffic rather than concentrating it onto a limited number of thoroughfares, thereby reducing the impacts of high traffic volumes on residential collectors;
- More direct routes, which generate fewer vehicle miles of travel (VMT) than conventional suburban networks;

- Reducing travel delay by allowing travelers to choose alternate routes to destinations for convenience, variety, or to avoid construction or other blockages and to increase reliability of the network;
- Facilitating circulation within an area by all travel modes;
- Encouraging walking and biking with direct routing and options to travel along high- or low-volume streets and development patterns that can offer a variety of complementary destinations within close proximity;
- More transit-friendly systems, which offer users relatively direct walking routes to transit stops;
- A smaller block structure where land use can evolve and adapt over time, providing development flexibility;
- A redundancy of the network, which benefits emergency service providers, offering multiple ways to access an emergency site;
- Regularly spaced traffic signals that can be synchronized to provide a consistent speed and more frequent pedestrian crossings; and
- Opportunities for special thoroughfare uses and designs.

In contrast, conventional networks have some advantages over traditional urban grids. Advantages of conventional networks include:

- Concentration of traffic on a few routes—beneficial for auto-centric business needs;
- Reduction of through traffic within neighborhoods that results in lower traffic volumes on local streets (although traffic is higher on streets outside neighborhoods);
- Some very low-volume cul-de-sacs, which may be desirable to many residents;
- Perception of increased neighborhood security and more flexibility to accommodate large developments; and
- Increased adaptability to areas with severe topographic constraints or other barriers.

Both traditional grid and conventional networks have livability impacts that may be considered a benefit or detriment, depending on the context and one's perspective. The impact of traditional grids results from the dispersion of traffic, resulting in some local residential streets experiencing higher traffic volumes than a similar street in a conventional network. The impact of conventional networks is the concentration of traffic, congestion and associated impacts into fewer residential arterials and collectors.

Urban Form and Transportation Networks

Transportation and land use interact with each other. Such relationships can vary by land use type, whether on a regional, community, or localized scale. This section describes this relationship.

Metropolitan planning organizations (MPOs) model travel behavior using area types such as central business district, fringe and rural. The U.S. Census Bureau definitions aid in planning by defining urban areas and dividing them into urbanized areas having more than 50,000 population and urban clusters having less than 50,000 population. Rural areas make up the remainder of the land area. Urbanized areas have structured MPO planning procedures and guide the allocation of federal transportation funding. Comprehensive plans for communities also identify areas as commercial, residential, or office use.

None of these definitions sufficiently describes urban context at a level of detail that relates the context to the transportation system or to thoroughfare design. Designers need to know the intensity of urban development and the desired travel modes that best serve its users. Context intensity gradations—called context zones—distinguish the urban built environment adjacent to and surrounding thoroughfares.

Context zones describe the physical form and character of a place. This includes the mass or intensity of development within a neighborhood or along a thoroughfare. Context zones are typically applied at the neighborhood or community level, but for the purposes of thoroughfare design, context zones are interpreted on a block-by-block basis to re-

spond to specific physical and activity characteristics. Chapter 4 further describes context zones and describes how they are used in designing walkable urban thoroughfares. In planning, understanding the context zones sets the scale for design of the regional transportation network as well as individual transportation facilities.

Planning Urban Transportation Networks

Urban thoroughfare design should be based on a combination of local needs and the role of the thoroughfare in the area or region's transportation network. The thoroughfare network should be planned to support the needs generated by the planned land uses (including intensity) while at the same time being compatible with the characteristics of the resulting neighborhoods and community—areas that may have widely varying needs, features and activity levels. The community may also have a variety of goals associated with specific neighborhoods, areas, or corridors that the thoroughfares (individual and as a network) should support.

The thoroughfare network develops from its existing state and expands in accordance with a community's comprehensive plan (or transportation plan). The density (spacing) of the network, the capacity (lanes, walkway, bicycle, transit), the space for furnishings and other components of the right of way should encourage and support the development pattern, land use type and level of development intensity in accordance with the plan. The total transportation network should function as a system of thoroughfares consisting of vehicular, pedestrian, bicycle and transit facilities that together meet and support the needs of the communities' desired urban form and growth.

Figure 3.3 shows a simplified example of a network of thoroughfares, along with context zones. For illustrative purposes, the network contains a principal street that passes through several different context zones, typical of many major thoroughfares. Also shown are boulevards, avenues and streets in a highly connected network that ultimately connects to the regional highway system. Network capacity, in the form of a dense system of thoroughfares (not necessarily more travel lanes on individual facilities), needs to be greatest in the high-intensity areas.

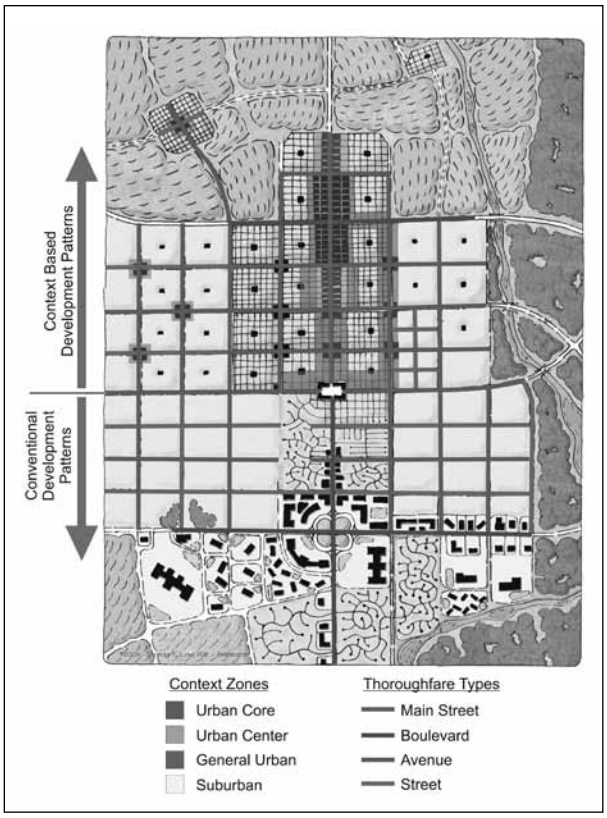

Figure 3.3 Context based development patterns are formed around a highly connected network of walkable thoroughfares. Source: Thomas Low (DPZ) and Digital Media Productions.

The level of capacity in these high-intensity areas will depend on the degree of interaction among local land uses, the amount of multimodal activity generated and the amount of through travel using the network. As further described in Chapter 4, the design of the individual thoroughfare needs to respond, adjust and support the different development and activities associated with changes in context zone.

Network Planning Principles for Walkable Urban Thoroughfares

The following principles describe an approach for planning and designing urban thoroughfare networks that are sensitive to community objectives and context and will help create a more walkable environ-

ment on appropriate facilities in the network. These principles should be considered together to create effective networks.

Planning Multimodal Networks

- Multimodal network planning should be integrated into long-range comprehensive plans that address land use, transportation and urban form.
- Network planning should address mobility and access needs associated with passenger travel, goods movement, utilities placement and emergency services.
- Reserving right of way for the ultimate width of thoroughfares should be based on long-term needs defined by objectives for both community character and mobility.

Indices For Network Connectivity and Accessibility

- **Links and nodes** (index): Roadway (or modal) links divided by the number of nodes (intersections). Ranges from 1.00 (poorest level; all cul-de-sacs) to 2.50 (full grid). Minimum index defining a walkable community is 1.4 to1.6.
- **Intersection ratio:** The ratio of intersections divided by intersections and dead ends, expressed on a scale from zero to 1.0 (US EPA, 2002). An index of more than 0.75 is desirable.
- **Average intersection spacing:** For walkability, a maximum distance of 660 feet; desirable spacing is less than 400 feet.
- **Intersection density:** The number of surface street intersections within a given area, such as a square mile. The more intersections, the greater the degree of connectivity.
- **Blocks per square mile:** For walkability this index should be at least 100.
- **Directness (index):** Actual travel distance divided by direct travel distance. Ideal index is 1.0. For walkability, index should be 1.5 or less.

Sources: Texas Transportation Institute, Adapted from: Donohue, Nick, "Secondary Street Acceptance Requirements," Office of the Secretary of Transportation, Commonwealth of Virginia. Spring 2008. "Smart Growth Index Model," U.S. EPA 2002.

Network planning should be refined and updated to define alignments and to establish the role of thoroughfares as more detailed planning and development occur.

Street Connectivity and Spacing

- Networks should provide a high level of connectivity so that drivers, pedestrians and transit users can choose the most direct routes and access urban properties. Connectivity should support the desired development patterns. Networks should provide intermodal connectivity to easily transfer between modes.
- Intersperse arterial thoroughfares with a system of intermediate collector thoroughfares serving local trips connecting neighborhood and subregional destinations.
- Expand the typical definition of collectors to recognize their role in connecting local origins and destinations in order to distribute trips efficiently, keep short local trips off the arterial system and provide a choice of routes for transit, pedestrians, drivers and bicyclists (**Figure 3.4**).
- Build network capacity and redundancy through a dense, connected network rather than through an emphasis on high levels of vehicle capacity on individual arterial facilities. This approach (more thoroughfares rather than wider thoroughfares) ensures that the network and thoroughfare facilities can support other objectives such as pedestrian activity, multimodal safety and support for adjacent development.
- Highly connected networks may reduce or eliminate the need for additional capacity that results from poorly connected thoroughfares by providing highly connected networks.
- Minimize property access directly onto arterials through design of a connected network of closely spaced arterial and collector thoroughfares and local street connections. With fewer driveway-type interruptions, arterial thoroughfares can perform more efficiently for both vehicles and for pedestrians. Thus, network connectivity can provide a foundation for access management strategies to increase corridor capacity and accessibility.

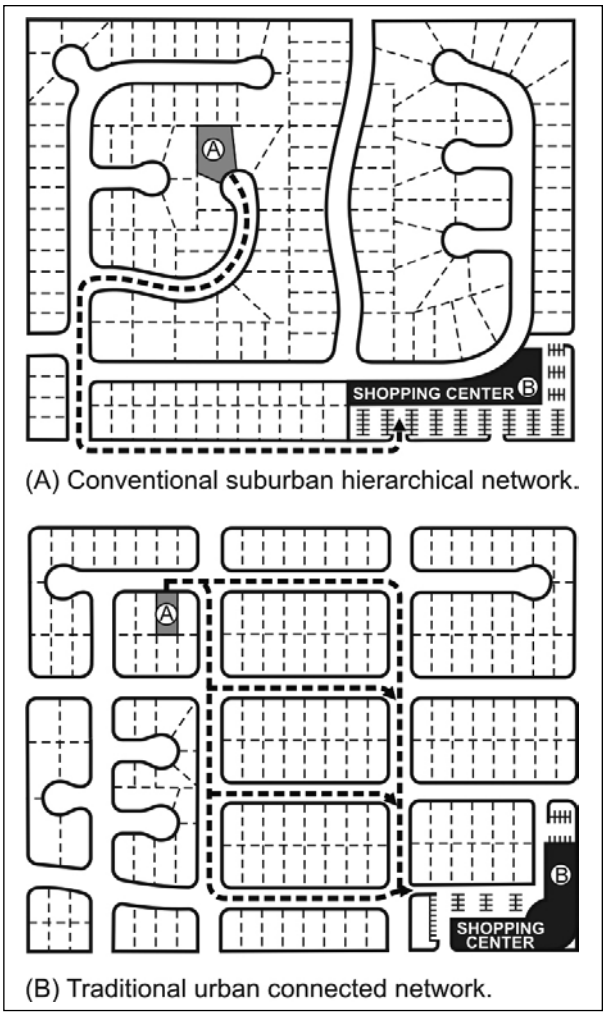

Figure 3.4 The collector in a typical hierarchical network (A) channels traffic from local streets to the arterial street system. A system of parallel connectors (B) provides multiple and direct routes between origins and destinations. Source: Kimley-Horn and Associates, Inc. and Digital Media Productions.

Performance Measures

Performance measures should be selected to describe how well the system will perform in accordance with network objectives. Such measures are often used to compare network plan alternatives or measure performance of a network according to specific objectives. The following may aid in selecting appropriate measures:

- Select transportation performance measures that reflect stakeholder objectives and priorities for the system or facility being planned or designed. Some of these may not be strictly transportation measures but include economic development and other types of measures.
- Use performance measures that recognize all modes.
- Performance goals can vary for different parts of the network as long as direct comparisons are made to the same measures.
- Performance measures could include conventional measures of vehicle congestion, capacity and density, considered at a networkwide or corridorwide level.
- To reflect walkability and compact development, consider measures such as a connectivity index, intersection density measures and pedestrian environment measures.
- Selected performance measures should include measures of safety for all users.

NCHRP Report 446, A Guide to Performance-Based Transportation Planning, provides more information on performance measurement.

Network Design Guidelines

This section provides specific considerations and guidelines for network design. The guidelines provided in this section are applicable for:

1. Greenfield development—establishing, augmenting, or reconfiguring a system of thoroughfares to serve an undeveloped or newly developing area or long-range plans for future development.
2. Reuse and redevelopment—large projects in mature urban areas that permit reconfiguration or changes in the function of adjacent or nearby thoroughfares. In these situations, changes might include the following:
   - Surrounding land uses;
   - Thoroughfare alignment or the addition of new routes or connections;
   - Emphasis in mode or usage (such as exclusive busways, wider sidewalks to serve adjacent economic activities and addition of bike lanes) or accommodating freight movement;
   - Functional classifications; and
   - Modal split allowing reallocation of (network) right of way among modes.

Ten Thoroughfare Network Planning Principles

Major thoroughfare networks should

1. Connect and provide access to and between communities, centers of activity and neighborhoods of all types, as well as recreational and cultural facilities;
2. Form a gridlike pattern of continuous thoroughfares except as precluded by topographic barriers;
3. Conform with and follow natural topographic features and avoid adverse impacts to natural resource areas;
4. Meet spacing and connectivity criteria similar to those presented in this chapter;
5. Be designed to efficiently accommodate emergency vehicles, providing multiple routes to reach any block;
6. Have thoroughfares interconnected with specified distances between intersections to provide choices of routes to reduce travel distances; to promote use of transit, bicycles and walking; and to efficiently accommodate utility needs;
7. Provide signalized crossings to encourage use of walking, bicycles and transit;
8. Be comprehensible to the average traveler;
9. Communicate the intended functions of individual thoroughfares through both design characteristics and appearance; and
10. Develop operating plans to serve all modes and all users, with uses varying on some thoroughfares according to context, needs, objectives and priorities while considering overall network needs.

3. Facility reconstruction—reconstruction of major sections of one or more thoroughfares provides an opportunity to make network changes more compatible with existing context/land uses, such as converting from a two-way thoroughfare to a one-way couplet (or vice versa), realigning a thoroughfare to improve accessibility to surrounding properties and reallocating right of way to better balance design elements among various modes of travel.

General Network Guidelines

- The system of multimodal thoroughfares may be organized by the context zones, functional classifications and thoroughfare types as described in Chapter 4.
- The thoroughfare network should be designed to serve transit, pedestrians and bicycles as well as private and commercial vehicles.
- Transit networks should focus on and take advantage of built or planned transit-oriented and transit-adjacent developments.
- Planning for right of way should consider needs based on multimodal network performance measures that allow capacity and level of service to be considered in conjunction with other measures, both quantitative and qualitative. The CSS process should be open to the selection of decision criteria that balance community character and capacity enhancement or congestion relief.

Street Spacing Guidelines for Walkable Areas

- The basic form of the thoroughfare system is shaped by the spacing and alignment of arterial thoroughfares. The system of arterials should be continuous and networked in a general rectilinear form. In urban areas, arterial spacing may need to be one-half mile or less. In denser urban centers and core areas, arterials may need to be spaced at one-quarter mile or less.
- In more conventional suburban areas that are intended to remain so, arterial spacing of up to one mile may suffice if facilities of up to six lanes are acceptable to the community. The arterial thoroughfares should be supplemented by thoroughfares spaced at most one-half-mile apart. Such areas typically are interspersed with areas of mixed-use and walkable activity, such as commercial districts and activity centers. These centers require more frequent and connected networks of local streets.
- Closer spacing of thoroughfares (one-quarter mile for collectors) may be needed depending on pedestrian activity levels, desired block patterns and

continuity. Natural features, preserved lands, or active agriculture may break up the pattern.

- Sketch planning demand estimation or travel forecasting models should be among the tools used to estimate the spacing and capacity needs for urban thoroughfares within the minimum spacing described above. However, for walkable areas, walkability criteria may require closer spacing.
- The network should include a system of bicycle facilities with parallel routes, with direct connections to major trip generators such as schools, retail districts and parks. Bicycle facilities may include on-street bike lanes, separated paths, or shared lanes on traffic-calmed streets with low motor vehicle volumes.

Local streets should be configured in a fine-grained, multimodal network internal to the neighborhood, with many connections to the system of thoroughfares. Where streets cannot be fully networked, they should be supplemented by pedestrian and/or bike-pedestrian facilities to provide the desired connectivity.

Pedestrian facilities should be spaced so block lengths in less dense areas (suburban or general urban) do not exceed 600 feet (preferably 200 to 400 feet) and relatively direct routes are available. In the densest urban areas (urban centers and urban cores), block length should not exceed 400 feet (preferably 200 to 300 feet) to support higher densities and pedestrian activity.

Urban Corridor Thoroughfare Planning for Walkable Urban Areas

Corridors are transportation pathways that provide for the movement of people and goods between and within activity centers. A corridor encompasses a single transportation route or multiple transportation routes or facilities (such as thoroughfares, public transit, railroads, highways, bikeways and so forth), the adjacent land uses and the connecting network of streets (**Figure 3.5**).

Corridor planning is one of the incremental steps for network planning in the long-range transportation plan to thoroughfare design in the project development stage (see **Figure 3.5**). The purpose of corridor planning is to comprehensively address future transportation needs and recommend a series of physical improvements and operational and management strategies within a corridor. Corridor planning fills the gap between long-range transportation planning and project development. It identifies and provides a link between corridor land-use planning and corridor transportation planning and provides an opportunity to direct future development within the corridor. An important benefit of corridor planning is that it addresses issues prior to reaching the project development stage for transportation improvements within the corridor. Finally, it promotes interagency cooperation and broad stakeholder and public involvement. Corridor plans should address the following: (ID DOT 1998)



Figure 3.5 Corridors include multiple transportation facilities, adjacent land uses and connecting streets. Source: Kimley-Horn and Associates, Inc.

- Long-range vision for the corridor;
- Existing conditions of the transportation system and analysis with regard to the performance objectives;
- Existing and future environmental, land-use and socioeconomic conditions in the corridor area, including a community profile, current and planned land uses, historical and cultural buildings and sites, and key environmental resources and environmental issues;
- Public and stakeholder involvement strategy;
- Purpose, need and the relative importance of corridor needs through project goals and community objectives;
- Expected future multimodal travel demand and performance of existing and programmed transportation improvements;
- Identification of feasible alternatives by evaluating all options and comparing costs, impacts, trade-offs and the degree to which the alternative meets established goals;
- Available and expected funding for transportation improvements in the corridor; and
- Long- and short-range recommendations.

The corridor planning process generally mirrors the transportation planning process in its fundamental steps of a needs study, alternatives development, alternatives evaluation and selection of a preferred alternative, which leads to either the developing a detailed plan or implementing the project development process (preliminary design).

Integrating CSS into urban corridor thoroughfare planning requires stakeholders to consider the economic, social and environmental consequences of alternatives. It defines the short- and long-term needs of the corridor, develops goals and objectives that will achieve the vision of the corridor and evaluates feasible multimodal alternatives.

The outcome of CSS in urban corridor thoroughfare planning goes beyond just street improvements. Corridor planning integrally addresses transportation improvement, land development and redevelopment, economic development, scenic and historic preservation, community character and environmental enhancement. Because urban corridor thoroughfare planning affects a broad spectrum of the community, public and stakeholder involvement is a central element of the process. The basic steps in the planning process include:

- Corridor vision;
- Project needs;
- Alternatives development;
- Alternatives evaluation; and
- Selection of preferred alternative.

In some cases, urban corridor thoroughfare planning may be integral with environmental studies leading to a National Environmental Policy Act document (www.epa.gov/compliance/nepa) or other environmental impact assessment. **Figure 3.6** illustrates the steps in the corridor planning process and identifies the type of input needed at various stages in the process.

The basic steps in the process, and how CSS principles can be integrated, are described below:

- **Corridor Vision:** Similar to any application of CSS principles, the process begins with a vision for the corridor. A vision is a corridorwide expression of how the corridor will be viewed in the future. Goals for the corridor expand on the vision by identifying the achievements that will result from implementing the corridor's plan. Developing objectives and a vision for a corridor can occur as part of a long-range transportation plan or as part of the corridor planning process. Public and stakeholder input and involvement are critical inputs when developing a vision, because the vision needs to reflect the goals and objectives of the community and address more than the transportation function of the corridor. The corridor vision feeds directly into the project needs step.
- **Needs:** As with developing a vision, the needs for the project may be developed in a long-range transportation plan if there is one or may be developed as part of the corridor planning process. The project needs include a problem statement that reflects the needs of all users and also reflect the corridor's existing (and future) context and characteristics. Stakeholder input is necessary to identify values, issues, priorities, goals and objec-

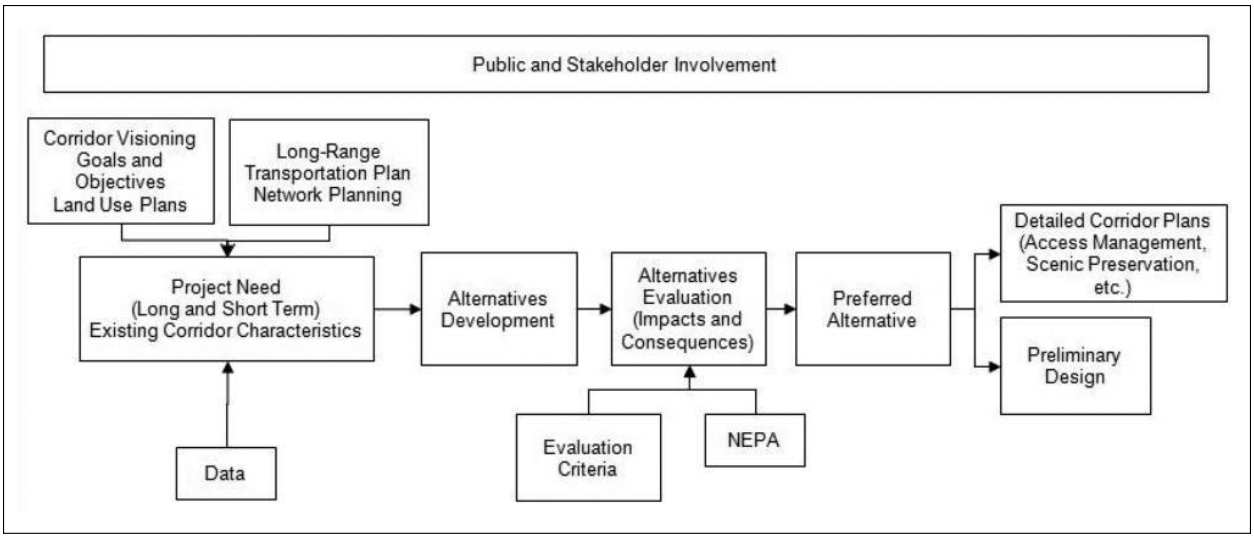

Figure 3.6 The corridor planning process. Source: Kimley-Horn and Associates, Inc.

tives. Much of this same input will help form criteria for assessing alternatives in the next phase.

- **Alternatives Development:** The corridor planning process includes a participatory public process to define and develop alternatives. The alternatives need to address the problem statement identified in the project needs step and also reflect the community vision and objectives. Stakeholder input is necessary to identify values, issues, priorities and criteria for assessing alternatives. The CSS outcome of this step is an inclusive problem statement, a short- and long-range vision for the corridor and goals and objectives that will direct the development of alternatives.

Corridor Vision and Needs

CSS Approach

- Public and stakeholder input
- Corridor and context characteristics
- Identify values and issues

CSS Outcome

- Inclusive problem statement
- Corridor vision
- Goals and objectives

With a CSS approach, the needs may be stated in terms of context, economic, or other community aspects, as well as mobility needs. The CSS outcome of this step is to provide stakeholders and decision makers (bodies that approve the funding and implementation of projects) with a wide range of choices derived from a collaborative and participatory process. The alternatives should be competitive in that they address as many of the goals and objectives as possible. Solutions should be innovative and flexible in the application of design guidance. The solutions should include ways to enhance and meet the needs of the context, activities generated by adjacent and nearby land uses and objectives that are part of the community vision for the corridor.

Alternatives Development

CSS Approach

- Interactive and participatory process
- Alternatives address problem statement and reflect objectives

CSS Outcome

- Broad range of solutions derived from collaboration
- Innovation and flexibility

To the extent not already included in the community vision, consideration should also be given to potential environmental consequences when developing the corridor alternatives. Alternatives may include different alignments and parallel routes, cross-sections, modal combinations, streetside treatments, interaction with adjacent development, streetscape approaches, business and community activity and support infrastructure. The important thing to remember is that the alternatives in CSS are developed to meet the full range of a specific community or neighborhood's objectives.

- **Alternatives Evaluation:** The goal of the alternatives evaluation is to provide an objective and balanced assessment of impacts, trade-offs and benefits of each alternative (**Figure 3.7**). This requires careful selection of, and stakeholder agreement on, evaluation criteria. The criteria need to reflect not just transportation objectives but the community and environmental objectives as well. Examples of evaluation criteria categories and related measures include:

Alternatives Evaluation

CSS Approach

- Public and stakeholder input
- Evaluation criteria that reflects community, environmental and transportation objectives and concerns

CSS Outcome

- Clear assessment of trade-offs
- Participatory process

Mobility for All Users: travel demand, roadway capacity, level of service, travel time, connectivity, circulation, access, truck movement, access to multiple travel modes and so forth.

Social and Economic Effects: socioeconomic and cultural environment (historic, cultural and archaeological resources; environmental justice; residential and business displacement/dislocation; socioeconomics and equity; neighborhood integrity and cohesion; economic development; place making qualities; and so forth).

Environmental Effects: positive and negative effects of natural environment (air quality, noise, energy consumption, water quality and quantity, vegetation, wildlife, soils, open space, park lands, ecologically significant areas, drainage/flooding aesthetics and visual quality); and land use (residential patterns, compatible uses, development suitability according to community values and so forth.).

Cost-Effectiveness and Affordability: capital costs, operations and maintenance costs, achievement of benefits commensurate with resource commitment, sufficiency of revenues and so forth.

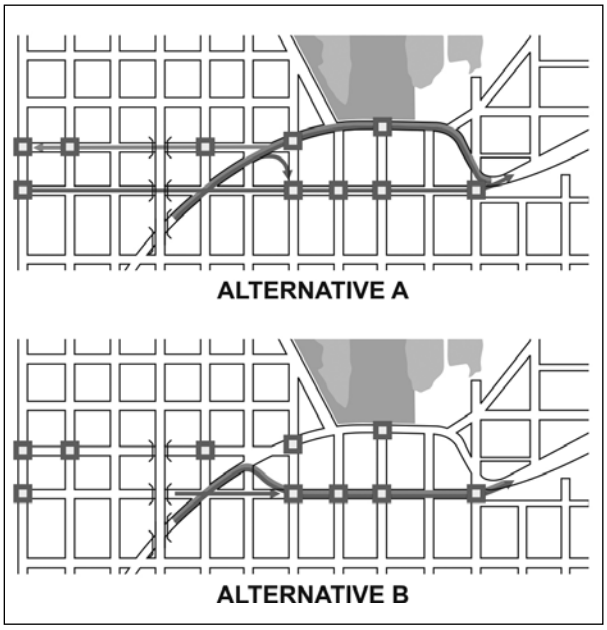

Figure 3.7 Corridor planning involves the consideration of trade-offs between alternatives. In this example of a corridor study, different alignments and reconfiguration of streets are evaluated and compared. Source: City of Seattle, CHM2Hill, South Lake Union Transportation Study, Mercer Corridor Project.

Other Factors: compatibility with local and regional plans and policies, constructability, construction effects and so forth.

The alternatives evaluation step includes a comprehensive evaluation of applicable issues and options using selected criteria such as those described above (such as modal capacity; alignment; design concept; costs; right of way; environmental, social and economic impacts; operations; safety; and so forth). Alternatives can be a combination of capital improvements and management and operations strategies. The outcome of this step is the clear communication of trade-offs to the public, stakeholders and decision makers, developed and discussed in a transparent and participatory process.

- **Selection of Preferred Alternative:** The selection of a preferred alternative is, ideally, a consensus-based process. Consensus building in this step engenders community ownership in the selected alternative and helps achieve a commitment toward implementation of the plan or project. The CSS process uses an array of tools for selecting, refining and building consensus on alternatives. A successful selection of a preferred alternative is one that is compatible with the context(s), reflects the needs of all users and best achieves the objectives and vision established for the corridor.

The selection of a preferred alternative leads to either the development of a detailed corridor plan, such as a thoroughfare plan, access management plan, scenic preservation plan, streetscape plan, or economic vitalization plan. It can also lead to the preliminary design of an individual thoroughfare, network of thoroughfares, or multimodal transportation corridor with parallel thoroughfares, rail, transit, highway and bikeway systems.

Selection of Preferred Alternatives

CSS Approach

- Participatory process, using workshops or charettes to refine concepts
- Consensus building

CSS Outcome

- Alternative fits within the context
- Composite solution for all modes and users
- Preferred alternative that balances across objectives and evaluation criteria

Corridor planning varies in level of effort ranging from large-scale planning efforts for corridors in newly developing areas to small-scale planning of segments of individual thoroughfares within constrained rights of way. The outcome of corridor planning ranges from broad policies to statewide and regional long-range transportation plans to multimodal systems plans, as well as to local thoroughfare plans and individual segment concepts and designs (**Figure 3.8**). CSS plays a role in any type of corridor planning. The remainder of this report focuses on the detailed design of thoroughfares.

CSS Example in Corridor Planning—Developing Evaluation Criteria

SR 179 Corridor Plan

The Arizona Department of Transportation (ADOT) worked with the community of the greater Sedona area in the Coconino National Forest to design and construct improvements to the 9-mile stretch of SR 179. This road carries millions of tourists each year through one of the most pristine and unique areas of the world. The road is also the only route connecting the business and residential communities of the greater Sedona area. While there have been improvements to SR 179, continuing traffic buildup will continue to exacerbate the capacity and safety issues of the road during the next 20 years.



Figure 3.8 Corridor planning results range from broad policies to detailed concepts for corridor segments. Source: Contra Costa County Dept. of Public Works and Whitlock & Weinberger Transportation, Inc.

This example addresses the selection of evaluation criteria for rural scenic segments and urban segments of the corridor. It is an example of a process that integrates CSS principles to work with stakeholders to evaluate corridor alternatives. The evaluation process could be used to evaluate projects in any context.

The goal of the project was to develop a transportation corridor that addressed safety, mobility and the preservation of scenic, aesthetic, historic, environmental and other community values and to reach consensus on the planning, design and construction of SR 179.

The SR 179 project is a good example of a CSS corridor plan involving the public. The collaborative community-based process used an innovative process called the needs-based implementation plan (**Figure 3.9**). This process depended on the community to actively participate and provide input throughout the process.

Developing Evaluation Criteria

A unique aspect of the SR 179 Corridor project was the process used to develop and select the preferred planning concepts, particularly the evaluation criteria. The screening process is illustrated in **Figure 3.10**. The development of evaluation criteria began with working with the community to identify its core values for the corridor. The core values are also components of the vision for the corridor. Core values include in priority order:

- Scenic beauty—preservation of scenic features and viewpoints;
- Public safety—preventing crashes and providing efficient emergency services;
- Environmental preservation—maintaining the natural and physical environment;

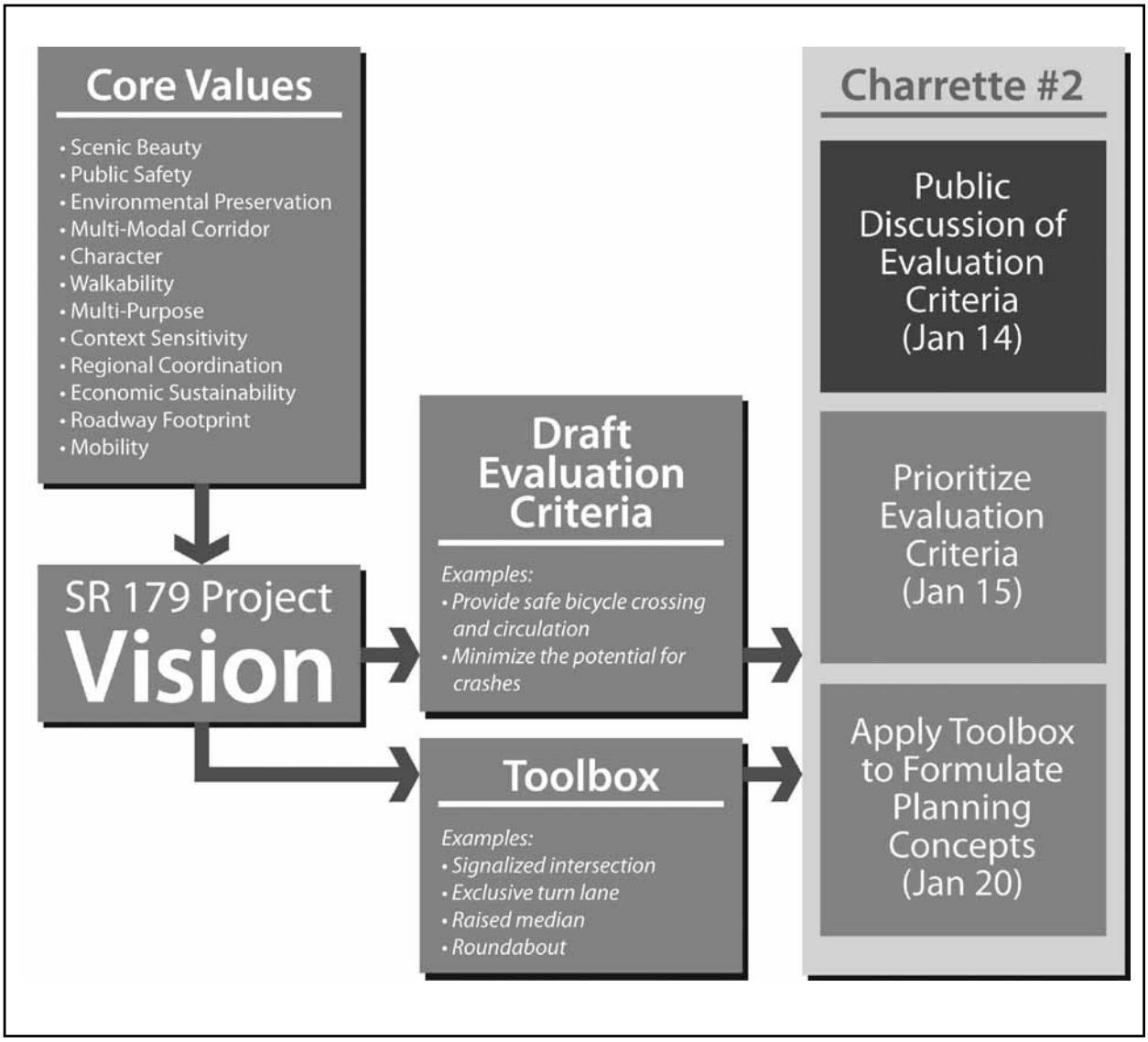

Figure 3.9 The needs-based implementation plan included a community-based process to develop criteria to evaluate corridor alternatives. Source: Arizona Department of Transportation, DMJM+Harris.

- Multimodal—provisions for modes of travel that include bicycles and transit;
- Character—the unique look and feel of the corridor;
- Walkability—ability of pedestrians to circulate in the corridor and reach points within the corridor;
- Multipurpose—a corridor that serves many needs including commuting, shopping, tourism and social trips;
- Context sensitivity—compatibility with the unique context of the SR 179 corridor;
- Regional coordination—a process involving stakeholders throughout the region;
- Economic sustainability—contribution to the economic vitality of the area;
- Roadway footprint—the width and cross-section of the corridor; and
- Mobility—ability to provide efficient and reliable transportation services.

Using the core values as a base, the project team worked with the community to develop, prioritize and build consensus on criteria for evaluating cor-

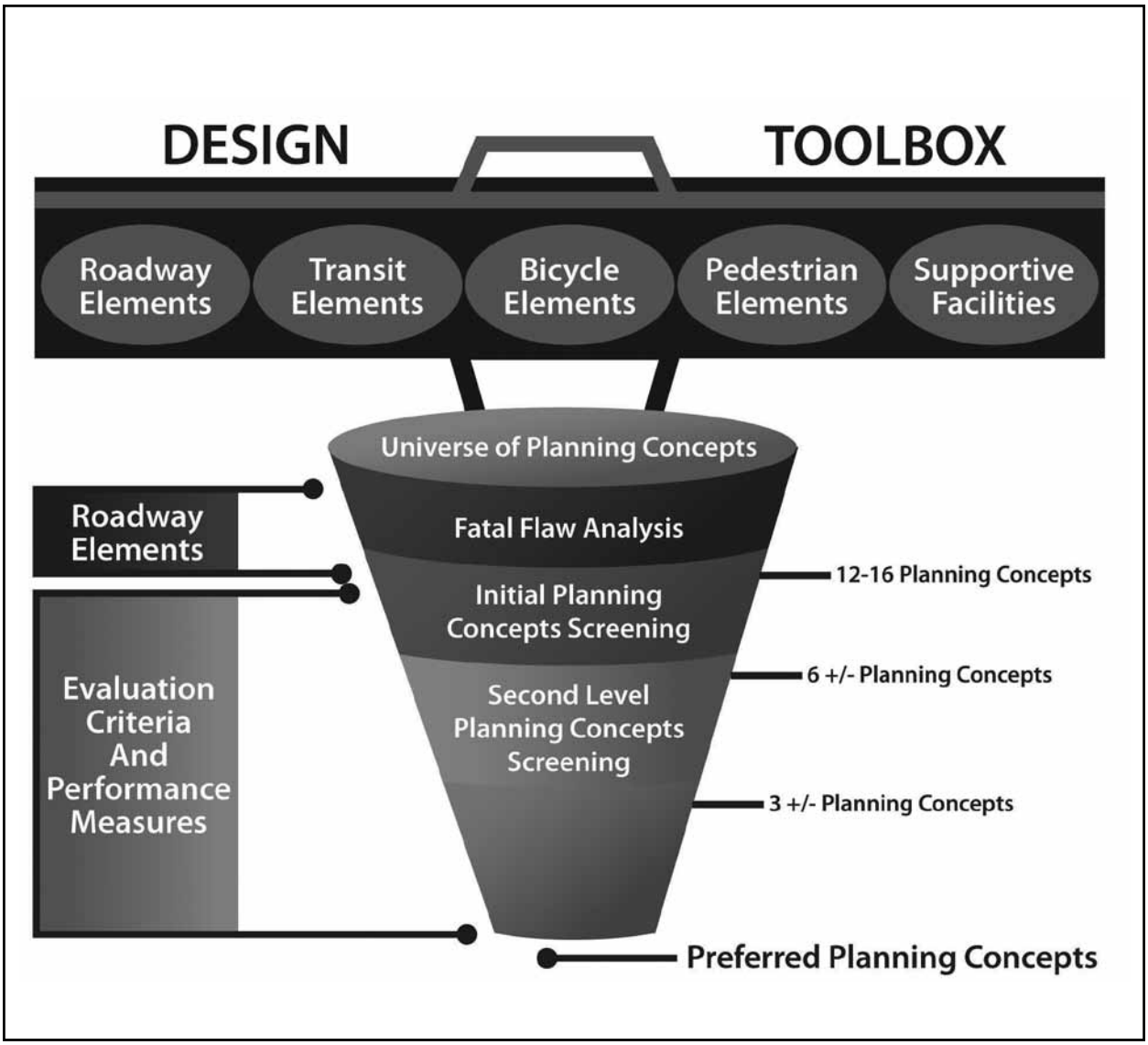

Figure 3.10 The screening process started with a wide range of alternatives and used public participation and evaluation criteria to narrow alternatives to a preferred planning concept. Source: Arizona Department of Transportation, DMJM+Harris.

ridor alternatives. The evaluation criteria and performance measures were used in a screening process to narrow the alternatives to a preferred planning concept for each segment of the corridor. **Figure 3.11** presents a sample of the evaluation criteria and associated performance measures.

An Important Note About Implementation

The benefits of a highly connected, multimodal network developed through a CSS process will not be fully realized unless the complete network is implemented. Complete implementation requires state, county and municipal transportation agencies to preserve and protect right of way, then fund and construct (or have developers construct) the major and local thoroughfare system.

To gain network benefits early and avoid interim oversizing of roads, it is important that as development starts, the network should also be constructed in usable segments. For example, when a parcel at the intersection of two county roads is developed, the local street

Evaluation Criterion	Performance Measures
Retain and enhance the natural appearance of the landscape and the ability to enjoy scenic views from the corridor.	Number of sensitively placed scenic pullouts
	Number of new scenic vistas available
	Appropriate scenic viewing opportunity potential
Provide a distinctive corridor identity and unique experience for the user.	Opportunity for artistic and landscape amenities
	Opportunity to preserve and interpret architectural and cultural themes of the Sedona/Red Rock area
	Opportunity for design creativity to contribute to the corridor identity
Provide safe and attractive wayfinding aids (signage and informational features) for tourists and others who may be relatively unfamiliar with the corridor.	Total number of sites for wayfinding information
	Opportunities for context sensitive wayfinding signage visible from the roadway and pathways
	Opportunities to provide access to new Forest Service Ranger District Office and other connecting facilities
Provide safe vehicular and emergency access to, from and across the corridor.	Number of new safe crossings (signals or roundabouts)
	Number of locations on the mainline with left-turn storage lane or roundabout
	Number of acceleration and deceleration lanes
	Number of "right-in, right-out" ingress/egress locations
	Number of mainline entry locations
Provide safe pedestrian crossings and circulation.	Number of new safe pedestrian crossings
	Opportunities for pedestrian amenities and enhancements at intersections
	Square feet of pathways/sidewalks
	Number of trailheads directly accessible on foot from the corridor
	Number of key destinations in the corridor accessible via a connected pedestrian system

Figure 3.11 Example evaluation criteria and performance measures used in the SR 179 Corridor Plan.
Source: Arizona Department of Transportation, DMJM+Harris.

network planned within the development by the MPO, county, or municipality should also be constructed.

Furthermore, at least one street should be constructed and connected through or around the initial development to ensure alternative routes are available in case of emergency, congestion, or temporary blockage.

If this approach continues as development progresses, this implementation approach will ensure that the network will evolve to completion.

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Chapter 4
A Framework for Walkable Urban Thoroughfare Design

Purpose

This chapter describes a set of tools for use by practitioners planning and designing walkable urban thoroughfares. It describes a design framework to identify and classify context and thoroughfares and describes how the controls of context and thoroughfare type are used in the design process to establish design parameters.

The functional classification system classifies context as either rural or urban. In this report, the definition and description of the conventional urban context is expanded to provide more detailed descriptions of adjacent surroundings and to provide a way to use context as a criterion in the selection of thoroughfare type and design criteria. Context zones are used to classify urban contexts into discrete types, ranging from lower to higher density and intensity of development.

The approach described in this chapter introduces thoroughfare types as a complement to functional classification to provide a broader range of thoroughfare design choices. The use of thoroughfare types restores the former practice of distinguishing streets by their design characteristics in addition to their functional classification.

Objectives

This chapter:

1. Defines context as used in urban thoroughfare design and explains the features of urban areas that create and shape context;
2. Introduces the concept of "context zones" and provides guidance to help practitioners use this tool;
3. Describes the features that create context including land use, site design and urban form, and building design;
4. Describes the different types of thoroughfares and their relationship to functional classifications; and
5. Describes features of thoroughfare types and context zones that result in compatibility.

Introduction

The design of viable, well-functioning urban thoroughfares depends on a clear understanding of the application of CSS principles in designing thoroughfares in the urban environment. Once urban context is understood, the function of each thoroughfare can be established and the design parameters can be selected to achieve a balance between land use and transportation design. This linkage demands special tools. While it is possible to "feel" the character of an urban area, it can be hard to define and describe the specific features that collectively give shape and character to a particular urban setting, whether it is a small town, activity center, main street, or high-density regional downtown.

Not only does context influence the design of thoroughfares, but the design of the thoroughfare itself helps to define and shape the context as much as adjacent land uses and buildings define and shape context. For these reasons, this document recommends a clear focus on context first, followed by detailed transportation planning to support the context in a balanced way.

Conventional thoroughfare design processes emphasize vehicular mobility and the provision of automobile access to adjoining land uses, primarily using functional classification, traffic volume and design speed as the determinants for design parameters. The principles of CSS expand the design process to better integrate thoroughfares with their surroundings. The result in many communities is a new emphasis on urban thoroughfares with features that emphasize multimodal safety and mobility as well as support for the activities of the adjacent land uses. Walkability, a key focus of this document, is better planned with an initial, clear focus on context.

A main tenet of walkable thoroughfare design is encapsulated in the phrase "one size does not fit all," which means the function of a thoroughfare and its design should complement the context that it serves,

and the design of the thoroughfare should change as the existing and planned context changes. This tenet challenges the conventional design process used by many state and municipal agencies, which applies a single roadway cross-section, based on functional classification, to a thoroughfare—regardless of the context. In this report, it is context and the change in context that determines the need to transition from one thoroughfare type to another and also determines the corresponding change in design parameters.

Thoroughfare planning and engineering requires evaluating capacity, connectivity and safety considerations in combination with meeting local objectives for urban character. The selection of appropriate design controls and performance measures, discussed further in Chapter 7, is a key step in developing suitable design solutions. The design scenarios presented in Chapter 6 provide illustrations of how context sensitive objectives can be evaluated under alternative designs and integrated into a preferred alternative.

Features that Create Context

Often, transportation planning and design considers context only in terms of land use (traffic generation) and two elements of site design—parking and access (driveways). The CSS design process for walkable urban thoroughfares expands this understanding of context to include the aspects of building and site design that create support for pedestrian and transit activity and that relate to the design of thoroughfares to result in integrated walkable environments.

Land Use

Land use is a common criterion for characterizing urban development and estimating vehicle trip generation, particularly in single-use, vehicle-dominated locations. The design framework in this report identifies land use as an important contributor to context and a major factor in the selection of design criteria (particularly as these relate to levels of pedestrian activity), assembly of the cross-section components and allocation of the width of the right of way.

In addition to having a fundamental impact on automobile travel demand, variations in adjacent land use affect the width and design of the streetside, the part of the thoroughfare between the curb and edge of right of way including sidewalks. As detailed in Chapter 8, residential uses typically have less need for sidewalk space than similarly scaled mixed-use blocks with ground floor commercial retail uses, where space for window shopping, outdoor dining, newspaper racks and other street appurtenances add to the sidewalk width. Areas that disperse land uses into single-use areas and that rely on hierarchical circulation networks generally result in longer trips, less walking and bicycling and more dependence on motor vehicles. Commercial uses generate higher volumes of pedestrian travel and business activities that use the streetside compared to similarly scaled residential uses. With respect to the traveled way, the part of the thoroughfare between curbs, variations between residential and commercial areas include parking- and travel-lane width. Commercial areas typically have a higher volume of large vehicles such as delivery trucks and buses and have a higher turnover of on-street parking than residential areas. Thus, a predominantly commercial thoroughfare often requires a wider traveled way when compared to a predominantly residential thoroughfare in the same context zone. Commercial areas usually generate more traffic than residential areas, which affects decisions related to the number of lanes, access control and intersection design.

Site Design and Urban Form

The ways in which buildings, circulation, parking and landscape are arranged on a site has an effect on where a thoroughfare and its context fall in the continuum of walkability (see sidebar on the Continuum of Walkability in Chapter 1). The specific elements of site design that contribute to defining urban context include:

- **Building orientation and setback:** In places that have less priority for walking, buildings typically will be less related to the street either by large setbacks into private property or oriented toward a parking lot rather than the street. By contrast, a context with traditional urban character will have buildings oriented toward and often adjacent to the thoroughfare and therefore a higher priority for pedestrian travel. The directness of the pedestrian connection to the building entry from the thoroughfare—and whether the building itself is integrated into the thoroughfare's streetside with stoops, arcades,

cafes, and so forth—distinguishes a context with traditional urban character. In these locations, buildings may form a continuous built edge or street wall (a row of buildings that have no side yards and consistent setback at the thoroughfare edge).

- **Parking type and orientation:** Parking provided in surface lots between buildings and streets defines a vehicle-dominated context with a lower priority for walking. On-street parking, and parking under or behind buildings and accessed by alleys is an urban characteristic. Thoroughfares in these areas should have a higher priority for walking.
- **Block length:** Development patterns with traditional urban characteristics usually have short block lengths with a system of highly connected thoroughfares, local streets and alleys. Vehicle-dominated contexts have larger blocks, less complete street connectivity and usually no alleys; this pattern makes walking distances longer and, therefore, it is likely that fewer people will walk between destinations. Generally, the desirable block length is 200 to 400 feet and should not exceed 600 feet. See Chapter 3 for more on block spacing.

Building Design

The design of buildings is a significant contributor to context and the priority that the context gives to walking. Building height, density and floor-area ratio, architectural elements, mass and scale, relationship to adjacent buildings and thoroughfares, orientation of the entry, and the design and type of ground floor land uses can help shape context and create an environment that is more or less walkable.

Development in contexts that give a lower priority to walking generally are more internally oriented as evidenced by how the buildings sit on their sites (as discussed above) and how the ground floor uses lack supportive relationships with adjacent streetsides and sidewalks. The lack of walkability in these contexts is not correlated with building intensity but with features of building and site design.

Buildings in locations with a traditional urban character that contributes to a walkable community are typically oriented toward the street. Ground floor uses in urban buildings are usually oriented to the pedestrian passing on the adjacent sidewalk (for example, retail, restaurant, services) and incorporate architectural elements that are interesting, attractive and scaled to the pedestrian (**Figure 4.1**). Some aspects of how building design helps define urban context include:



Figure 4.1 Pedestrian-scaled architectural elements. Source: Community, Design + Architecture.

- **Building height and thoroughfare enclosure:** Buildings are the primary feature of urban contexts that create a sense of definition and enclosure on a thoroughfare—an important urban design element that helps create the experience of being in a city and in a place that is comfortable for pedestrians. The threshold when pedestrians first perceive enclosure is a 1:4 ratio of building height to thoroughfare width—typical of low-density environments. In denser urban contexts, height-to-width ratios between 1:3 and 1:2 create an appropriate enclosure on a thoroughfare (**Figure 4.2**). Highly walkable thoroughfares do not require tall buildings. Street trees may be used to provide a similar sense of definition and enclosure in contexts with lower height and less dense buildings.

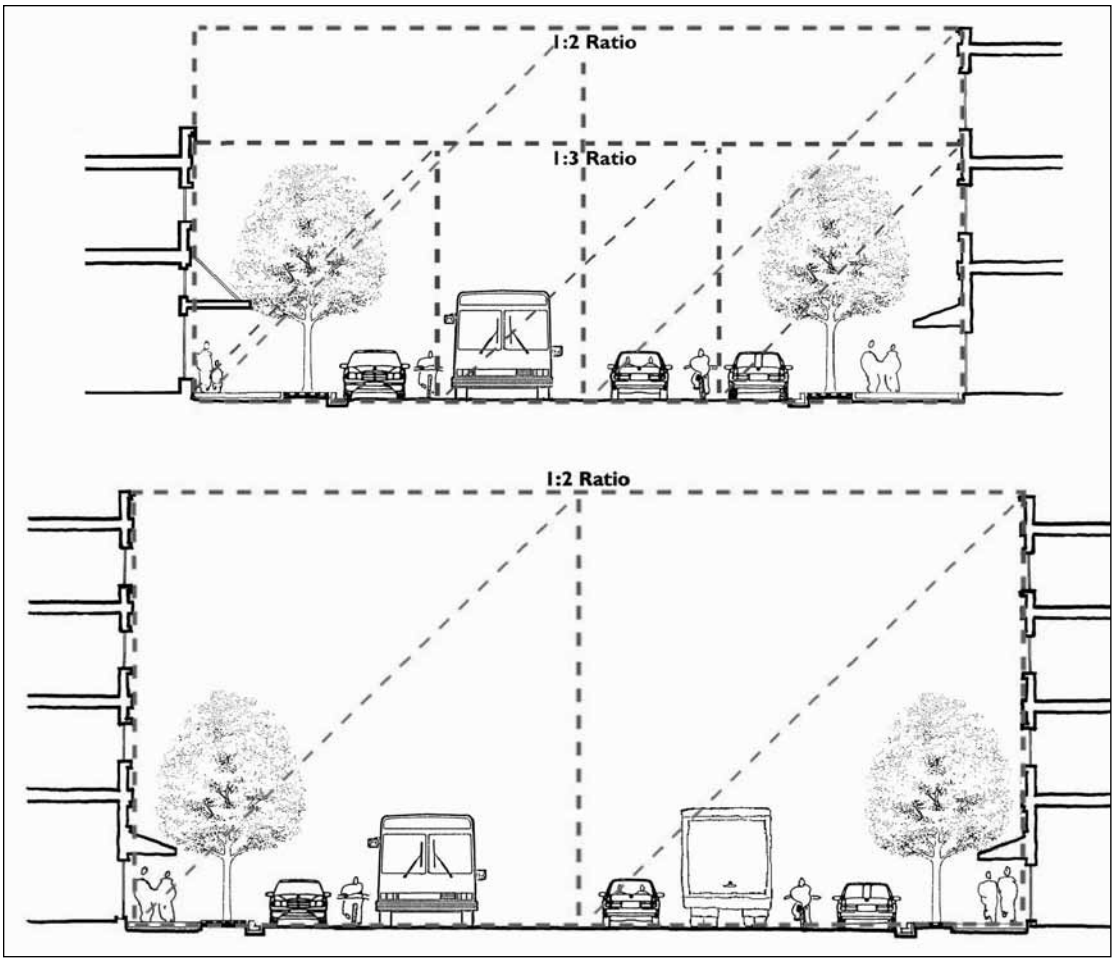

Figure 4.2 Illustration of height to width ratios that create a scale on thoroughfares that is comfortable to people and encourages walking (human scale). Human scale ratios fall between 1:3 and 1:2 as measured from the building fronts. Source: Community, Design + Architecture.

- **Building width:** Building width, like building height, contributes to the sense of enclosure of the thoroughfare. There are three elements of width: (1) the percentage of a building's width fronting the street, which should range from about 70 percent in suburban environments to nearly 100 percent in urban environments; (2) the distance between buildings or building separation, which should range from 0 to 30 feet; and (3) the articulation of buildings (an architectural term that refers to dividing building facades into distinct parts to reduce the appearance of the building's mass adjacent to the sidewalk, identify building entrances and minimize uninviting blank walls) resulting in a scale of building that is comfortable to a person walking adjacent to it and adding architectural diversity and interest (**Figure 4.3**).
- **Building scale and variety:** This helps define the context and character of a thoroughfare and encourages walking by providing visual interest to the thoroughfare. The scale and variety of buildings should help define the scale of the pedestrian environment. Vehicle-oriented building scale maximizes physical and visual accessibility by drivers and auto passengers, contributing to contexts that discourage walking.
- **Building entries:** Building entries are important in making buildings accessible and interesting for pedestrians. To maintain or create traditional urban character, buildings should have frequent entries directly from adjacent



Figure 4.3 The frequency of articulation of a building facade contributes to a scale that is comfortable to pedestrians. Source: Community, Design + Architecture.

thoroughfares to improve connectivity and to break down the scale of the building. Frequent entries from parking lots and secondary thoroughfares should be provided as well.

More information on how building design promotes context sensitivity and sustainability can be found in *Promoting Sustainable Transportation through Site Design*, an ITE recommended practice and in the *SmartCode* (see References for Further Reading at the end of this chapter). All elements of building design provide strong cues for the selection of a thoroughfare design.

Context Zones

Context zones describe the physical form and character of a place. This includes the mass or intensity of development within a neighborhood or along a thoroughfare. Context zones are applied at the community unit level, but for the purposes of thoroughfare design must be interpreted on a block-by-block basis to respond to specific physical and activity characteristics. **Figure 4.4** contains the descriptions of the six context zones. Zones C-3 through C-6 are urban zones that relate to urban thoroughfare design.

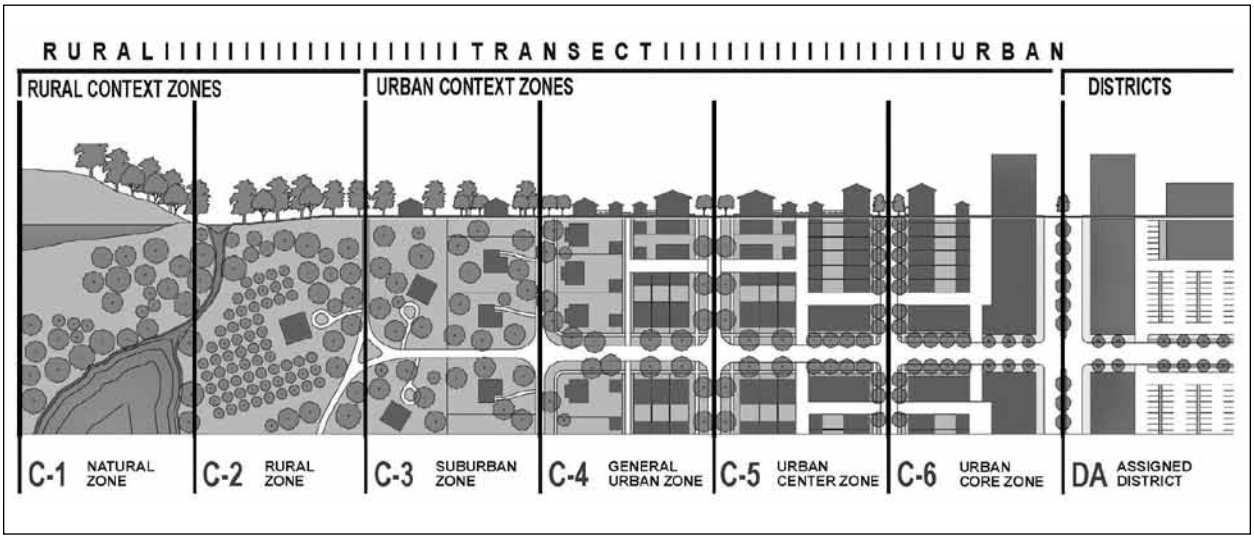

Figure 4.4 Illustration of a gradient of development patterns ranging from rural in Context Zone 1 (C-1), to the most urban in C-6. Source: Duany Plater-Zyberk and Company.

Selecting a Context Zone in Thoroughfare Design

The design process presented in this report uses context zones as a primary consideration in selecting the design parameters of urban thoroughfares. This is a refinement to the "rural" and "urban" classifications that are critical in selecting design criteria in *A Policy on the Geometric Design of Highways and Streets* (AASHTO 2004). Context zones are an important determinant of basic design criteria in traditional urban thoroughfares. This chapter helps the practitioner identify and select context zones as one of the first steps in the design process.

As **Table 4.1** shows, context is defined by multiple parameters, including land use, density and design features. **Table 4.1** presents the full range of context zones, but this report focuses on urban contexts (C-3 through C-6). The "distinguishing characteristics" column in the table, for example, describes the overall relationship between buildings and landscape that contributes to context. In addition to the distinguishing characteristics and general character, four attributes assist the practitioner in identifying a context zone: (1) building placement—how buildings are oriented and set back in relation to the thoroughfare; (2) frontage type—what part of the site or building fronts onto the thoroughfare; (3) typical building height; and (4) type of public open space.

Guidelines for identifying and selecting a context zone include the following:

1. Consider both the existing conditions and the plans for the future, recognizing that thoroughfares often last longer than adjacent buildings.
2. Assess area plans and review general, comprehensive and specific plans, zoning codes and community goals and objectives. These often provide detailed guidance on the vision for the area.
3. Compare the area's predominant land use patterns, building types and land uses to the characteristics presented in **Table 4.1**.
4. Pay particular attention to residential densities and building type, commercial floor-area ratios and building heights.
5. Consider dividing the area into two or more context zones if an area or corridor has a diversity of characteristics that could fall under multiple context zones.
6. Identify current levels of pedestrian and transit activity or estimate future levels based on the type, mix and proximity of land uses. This is a strong indicator of urban context.
7. Consider the area's existing and future characteristics beyond the thoroughfare design, possibly extending consideration to include entire neighborhoods or districts.

Thoroughfare Types

The design process in this report refers to both functional classification and thoroughfare type to classify streets.

The purpose of each classification as used in CSS applications for areas with traditional urban characteristics is described below.

- Functional classification—defines a thoroughfare's function and role in the network, in addition to governing the selection of certain design controls. The practitioner may use functional class to determine:
  - Continuity of the thoroughfare through a region and the types of places it connects (such as major activity centers);
  - Purpose and lengths of trips accommodated by the thoroughfare;
  - Level of land access and level of access management;
  - Type of freight service; and
  - Types of public transit services (for example, bus, bus rapid transit, fixed guideway and so forth).

These factors are used to inform the practitioner's decisions related to both the physical design and operations of the thoroughfare.

Table 4.1 Context Zone Characteristics

Context Zone	Distinguishing Characteristics	General Character	Building Placement	Frontage Types	Typical Building Height	Type of Public Open Space	Transit (Where Provided)
C-1 Natural	Natural landscape	Natural features	Not applicable	Not applicable	Not applicable	Natural open space	None
C-2 Rural	Agricultural with scattered development	Agricultural activity and natural features	Large setbacks	Not applicable	Not applicable	Agricultural and natural	Rural
C-3 Suburban	Primarily single family residential with walkable development pattern and pedestrian facilities, dominant landscape character. Includes scattered commercial uses that support the residential uses, and connected in walkable fashion.	Detached buildings with landscaped yards, normally adjacent to C-4 zone. Commercial uses may consist of neighborhood or community shopping centers, service or office uses with side or rear parking.	Varying front and side yard setbacks	Residential uses include lawns, porches, fences and naturalistic tree planting. Commercial uses front onto thoroughfare.	1 to 2 story with some 3 story	Parks, greenbelts	Local, express bus
C-4 General Urban	Mix of housing types including attached units, with a range of commercial and civic activity at the neighborhood and community scale	Predominantly detached buildings, balance between landscape and buildings, presence of pedestrians	Shallow to medium front and side yard setback	Porches, fences	2 to 3 story with some variation and few taller workplace buildings	Parks, greenbelts	Local, limited stop bus rapid transit, express bus; fixed guideway
C-5 Urban Center	Attached housing types such as townhouses and apartments mixed with retail, workplace and civic activities at the community or subregional scale.	Predominantly attached buildings, landscaping within the public right of way, substantial pedestrian activity	Small or no setbacks, buildings oriented to street with placement and character defining a street wall	Stoops, dooryards, storefronts and arcaded walkways	3 to 5 story with some variation	Parks, plazas and squares, boulevard median landscaping	Local bus; limited stop rapid transit or bus rapid transit; fixed-guideway transit
C-6 Urban Core	Highest-intensity areas in subregion or region, with high-density residential and workplace uses, entertainment, civic and cultural uses	Attached buildings forming sense of enclosure and continuous street wall landscaping within the public right of way, highest pedestrian and transit activity	Small or no setbacks, building oriented to street, placed at front property line	Stoops, dooryards, forecourts, storefronts and arcaded walkways	4+ story with a few shorter buildings	Parks, plazas and squares, boulevard median landscaping	Local bus; limited stop rapid transit or bus rapid transit; fixed-guideway transit
Districts	To be designated and described locally, districts are areas that are single-use or multi-use with low-density development pattern and vehicle mobility priority thoroughfares. These may be large facilities such as airports, business parks and industrial areas.						As applicable

(Based on transect zone descriptions in *SmartCode* Version 9.2, 2008. Source: Duany Plater-Zyberk & Company.)
Shaded cells represent Context Zones that are not addressed in this report.

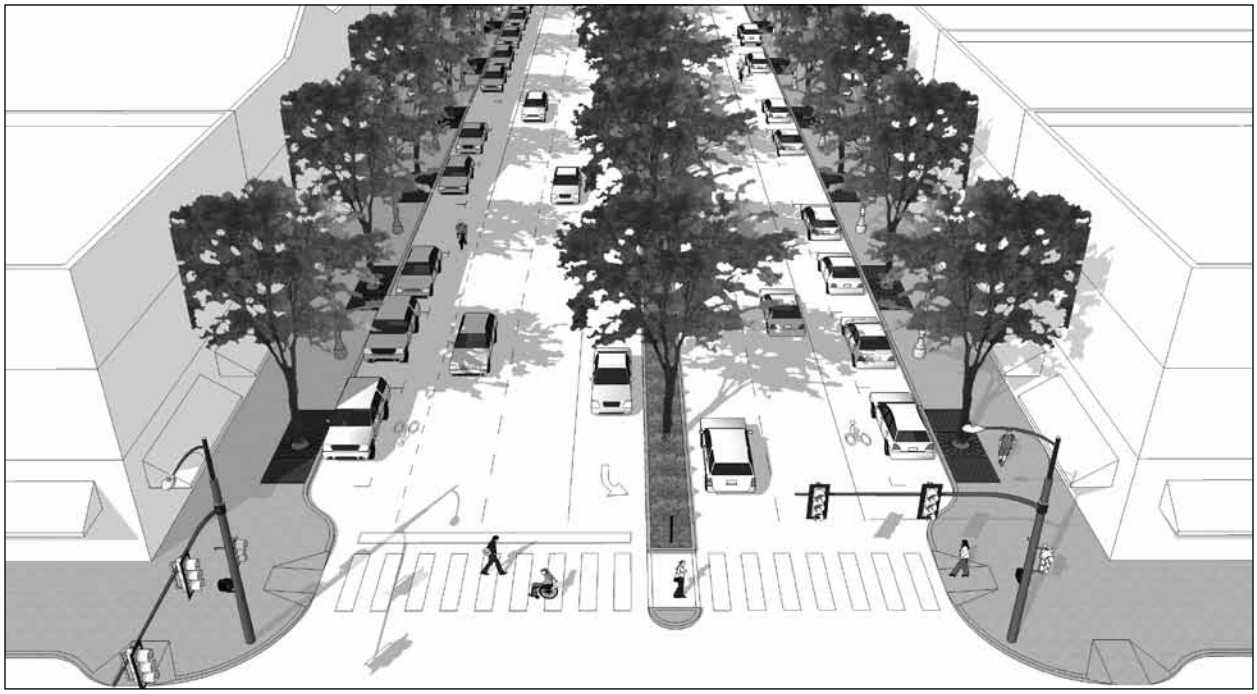

Figure 4.5 Illustration of a boulevard. Source: Claire Vlach, Bottomley Design & Planning.

- Thoroughfare type—governs the selection of the thoroughfare's design criteria and, along with the surrounding context, is used to determine the physical configuration of the thoroughfare. Design criteria and physical configuration address which elements are included in the design and selection of dimensions. Use thoroughfare types, along with context zones, to develop designs for:
    - Streetside (sidewalks, planting strips);
    - Traveled way (lanes, medians, on-street parking, bicycle lanes); and
    - Intersections.

Additionally, use thoroughfare type to determine the following design controls:

- Target speed (see Chapter 7); and
- Sight distance.

Table 4.2 shows specific thoroughfare types that are commonly used in the United States and gives a general description of each type. As this report focuses on urban thoroughfares in walkable areas, only three of the types in **Table 4.2** fall into this category: boulevards, avenues and streets. These thoroughfare types typically serve a mix of modes, including pedestrian, bicycle users, private motor vehicles (for passenger and freight) and transit.

Boulevards are typically larger thoroughfares with medians (**Figure 4.5**). They serve a mix of regional and local traffic and carry the most important transit routes. The multiway boulevard is a variant of a boulevard that contains separated roadways for through and local access traffic. Multiway boulevards may be considered when balancing the needs of abutting land uses (for example, curb parking, pedestrian facilities, land access, fronting buildings) with arterial functions. See Chapter 6 for more discussion of multiway boulevards.

Avenues (**Figure 4.6**) and streets (**Figure 4.7**) are similar to each other in form but avenues can be up to four lanes with a median. Streets are generally two lanes and serve predominantly local traffic. In walkable areas, all thoroughfare types have a strong pedestrian orientation.

Table 4.3 shows the relationship between thoroughfare types and functional classification. In general,



Figure 4.6 Illustration of an avenue. In this example on-street parking is dropped to gain width for a left turn lane at the intersection. Source: Claire Vlach, Bottomley Design & Planning.

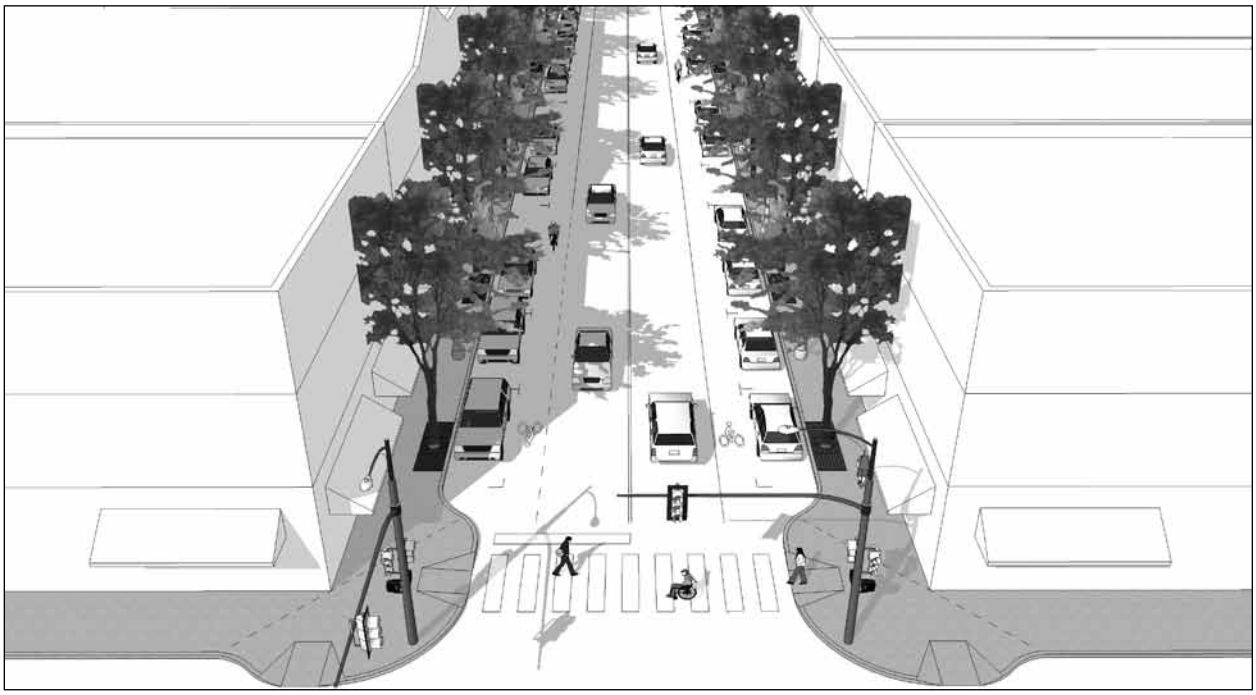

Figure 4.7 Illustration of a street. Source: Claire Vlach, Bottomley Design & Planning.

Table 4.2 Thoroughfare Type Descriptions

Thoroughfare Type	Functional Definition
Freeway/Expressway/ Parkway	Freeways are high-speed (50 mph +), controlled-access thoroughfares with grade-separated interchanges and no pedestrian access. Includes tollways, expressways and parkways that are high- or medium-speed (45 mph +), limited-access thoroughfares with some at-grade intersections. On parkways, landscaping is generally located on each side and has a landscaped median. Truck access on parkways may be limited.
Rural Highway	High-speed (45 mph +) thoroughfare designed both to carry traffic and to provide access to abutting property in rural areas. Intersections are generally at grade.
Boulevard (see Chapters 8, 9 and 10 for design guidance)	Walkable, low-speed (35 mph or less) divided arterial thoroughfare in urban environments designed to carry both through and local traffic, pedestrians and bicyclists. Boulevards may be long corridors, typically four lanes but sometimes wider, serve longer trips and provide pedestrian access to land. Boulevards may be high-ridership transit corridors. Boulevards are primary goods movement and emergency response routes and use vehicular and pedestrian access management techniques. Curb parking is encouraged on boulevards.
	Multiway boulevards are a variation of the boulevard characterized by a central roadway for through traffic and parallel access lanes accessing abutting property, parking and pedestrian and bicycle facilities. Parallel access lanes are separated from the through lanes by curbed islands with landscaping; these islands may provide transit stops and pedestrian facilities. Multiway boulevards often require significant right of way.
Avenue (see Chapters 8, 9 and 10 for design guidance)	Walkable, low-to-medium speed (25 to 35 mph) urban arterial or collector thoroughfare, generally shorter in length than boulevards, serving access to abutting land. Avenues serve as primary pedestrian and bicycle routes and may serve local transit routes. Avenues do not exceed 4 lanes, and access to land is a primary function. Goods movement is typically limited to local routes and deliveries. Some avenues feature a raised landscaped median. Avenues may serve commercial or mixed-use sectors and usually provide curb parking.
Street (see Chapters 8, 9 and 10 for design guidance)	Walkable, low speed (25 mph) thoroughfare in urban areas primarily serving abutting property. A street is designed to (1) connect residential neighborhoods with each other, (2) connect neighborhoods with commercial and other districts and (3) connect local streets to arterials. Streets may serve as the main street of commercial or mixed-use sectors and emphasize curb parking. Goods movement is restricted to local deliveries only.
Rural Road	Low speed (25 to 35 mph) thoroughfare in rural areas primarily serving abutting property.
Alley/Rear Lane	Very low-speed (5 to 10 mph) vehicular driveway located to the rear of properties, providing access to parking, service areas and rear uses such as secondary units, as well as an easement for utilities.

Shaded cells represent thoroughfare types that are not addressed in this report.

Table 4.3 Relationship Between Functional Classification and Thoroughfare Type

	Thoroughfare Types						
Functional Classification	**FREEWAY/ EXPRESS-WAY/PARK-WAY**	**RURAL HIGHWAY**	**BOULEVARD**	**AVENUE**	**STREET**	**RURAL ROAD**	**ALLEY/REAR LANE**
Principal Arterial	■	■	■	■	■		
Minor Arterial		■	■	■	■		
Collector				■	■	■	
Local					■	■	■

Shaded cells represent thoroughfare types that are not addressed in this report.

boulevards serve an arterial function, avenues may be arterials or collectors and streets typically serve a collector or local function in the network.

More detailed descriptions of the general design parameters and desired operating characteristics of the thoroughfare types are given in **Table 4.4**. As mentioned above, this document focuses on the three types that can be considered urban thoroughfares: boulevards, avenues and streets. Those thoroughfare types serving areas with traditional urban characteristics are suitable for the four urban context zones C-3, C-4, C-5 and C-6.

Chapter 5 provides an overview of the design process and identifies how the selection of context zones and thoroughfare types relates to each stage of thoroughfare design. Chapter 6 presents design parameters and criteria for each thoroughfare type based on a combination of functional class, context zone and whether the surrounding land use is predominantly commercial or residential.

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Table 4.4 Urban Thoroughfare Characteristics

Urban Thoroughfare Type	Number of Through Lanes	Desired Operating Speed (mph)	Transit Service Emphasis	Median	Driveway Access	Curb Parking	Pedestrian Facilities [1]	Bicycle Facilities	Freight Mvmt. [2]
Freeway	4 to 6+	45–65	Express	Required	No	No	No	Optional separated pathway or shoulder	Regional truck route
Expressway/ Parkway	4 to 6	45–55	Express	Required	No	No	Optional separated pathway	Optional separated pathway or shoulder	Regional truck route
Boulevard	4 to 6	30–35	Express and Local	Required	Limited	Optional	Sidewalk	Bike lanes or parallel route	Regional truck route
Multiway Boulevard	4 to 6	25–35	Express and Local	Required on access lanes	Yes from access lane	Yes on access roadway	Sidewalk		Regional route/ local deliveries only on access roadway
Avenue	2 to 4	25–30	Local	Optional	Yes	Yes	Sidewalk	Bike lanes or shared	Local truck route
Street	2	25	Local or none	No	Yes	Yes	Sidewalk	Shared	Local deliveries only
Rural Road	2	25–35	Local or none	No	Yes	No	No	Shared or shoulder	Local deliveries only
Local Street	2	25	Local or none	No	Yes	Yes	Sidewalk	Shared	Local deliveries only
Alley/Rear Lane	1	5–10	None	No	Yes	No	Shared	Shared	Local deliveries only

Shaded cells represent thoroughfare types that are not addressed in this report.

Notes:

[1] Boulevard, Multiway Boulevard, Avenue, and Street thoroughfare types have sidewalks on both sides. Sidewalk width varies as a function of context zone, fronting land use and other factors.

[2] Freight movement is divided into three categories: 1) Regional truck route, 2) Local truck route and 3) Local deliveries only. Cells show highest order of truck movement allowed.



PART 3

Design



Chapter 5
Thoroughfare Design Process

Purpose

This chapter outlines a five-stage process for designing thoroughfares in walkable urban contexts where the community has determined that the character of the thoroughfare and its integration with its surroundings are a high priority. It also presents an approach to designing thoroughfares within constrained rights of way and discusses the flexibility the designer has in applying design parameters. While the focus of this report's approach to design is on walkable thoroughfares in mixed-use areas, the design process presented in this chapter is applicable to all types of areas and thoroughfares, regardless of their modal emphasis.

This chapter presents design criteria that form the basis for the design guidance presented in subsequent chapters. As with the design process, the fundamental design criteria and the flexibility inherent in the interpretation and application of the criteria are applicable to all types of thoroughfares in all types of contexts.

Applicability of Design Criteria

The guidance presented in this report focuses on the design of urban thoroughfares in walkable contexts. As with the design process, the fundamental design criteria and the flexibility inherent in the interpretation and application of the criteria is applicable to all types of thoroughfares in all types of contexts. However, most of the guidance is also applicable to thoroughfares in other contexts where vehicle travel may be a priority. When designing a thoroughfare in a walkable area or a vehicle mobility priority thoroughfare, the practitioner can use this report to identify the sections with relevant and applicable considerations and guidance. If not identified in the report, the guidance provided in the AASHTO *A Policy for the Geometric Design of Highways and Streets*, otherwise known as the "Green Book" (2004), is recommended.

Objectives

This chapter:

1. Describes the various components of the thoroughfare and describes fundamental features of CSS in thoroughfare design;
2. Defines terms that are used in the thoroughfare design process;
3. Provides an overview and describes the five stages of the thoroughfare design process; and
4. Outlines a process for designing thoroughfares in constrained rights of way.

Definitions

Walkable urban thoroughfare design requires attention to many elements of the public right of way and how these elements integrate with adjoining properties. To assist the designer in successfully assembling the elements of the thoroughfare, this report organizes definitions, design principles and criteria into four sections corresponding to the components of a thoroughfare. The three components that comprise the cross-section of the thoroughfare are illustrated in **Figure 5.1** (context, streetside and traveled way), while the fourth component, intersections, is discussed below.

Figure 5.2 illustrates many of the fundamental elements of walkable thoroughfare design, including elements in the traveled way and streetside, and as part of the context.

Each of the components can be described as follows:

- Context—encompasses a broad spectrum of environmental, social, economic and historical aspects of a community and its people. All of these aspects are important in applying CSS principles to thoroughfare design. Thus, context can be the built environment or part of the natural environment. The built environment consists of properties and activities within and adjacent to the public right of way and the thoroughfare it-

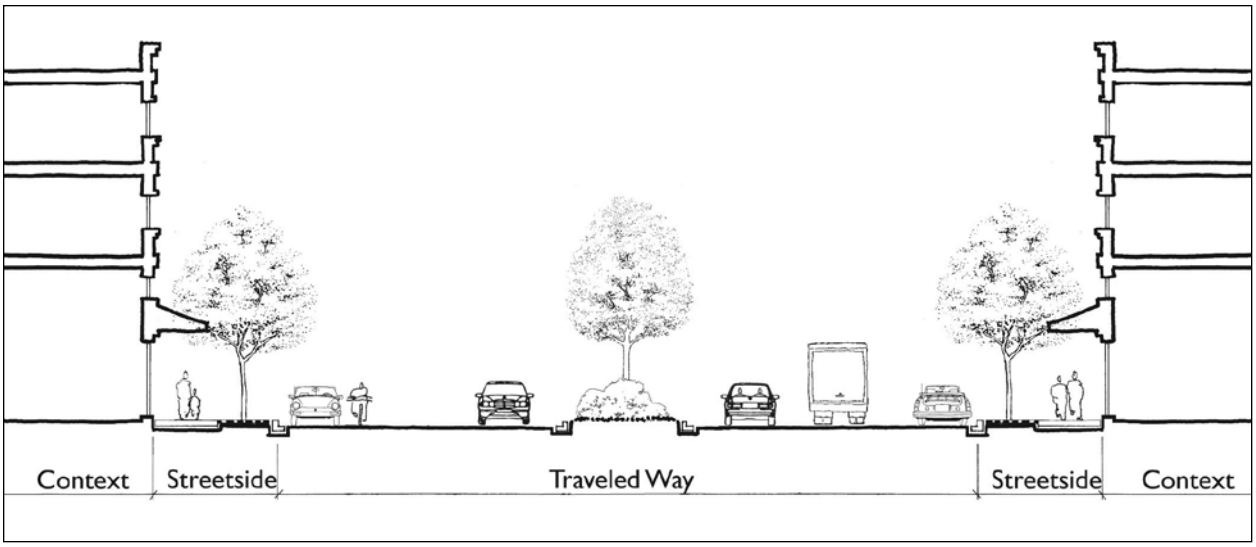

Figure 5.1 Components of an urban thoroughfare. Source: Community, Design + Architecture.

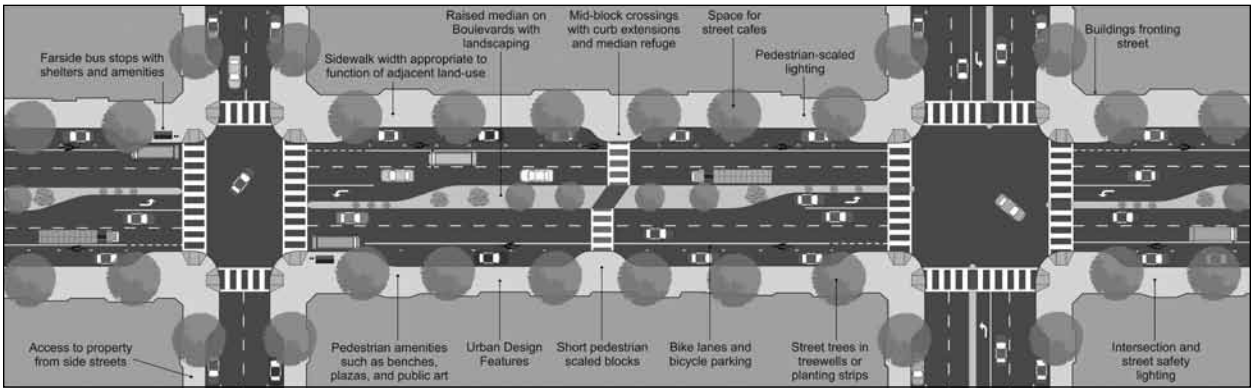

Figure 5.2 An illustration of the elements of a context sensitive thoroughfare. Source: Concept by Community, Design + Architecture, illustration by Digital Media Productions.

self, with surroundings that contribute to characteristics that define the context zone.

Buildings, landscaping, land use mix, site access and public and semipublic open spaces are the primary shaping elements of the built context. The natural environment includes features such as water or topography. In both environments, context can reflect historic or other protected resources. An urban thoroughfare will often change as the context changes from one zone to another. The thoroughfare itself and the activity it handles become part of the context after it is completed. Finally, all contexts whether built or natural, include the equally important elements of economics, time, community perspective, political positions, trade-offs and a multitude of other factors that will directly or indirectly influence the shaping of the context and thoroughfare design.

- Streetside—the public right of way typically includes planting area and sidewalk, from the back of the curb to the front property line of adjoining parcels. The streetside is further divided into a series of zones that emphasize different functions, including frontage, throughway, furnishings and edge zones (**Table 5.1** and Chapter 8 provide detailed descriptions). The function of streetside zones and the level of pedestrian use of

Table 5.1 Definition of Terms and Concepts in Chapter 5

Term or Concept	Definition
Frontage Zone	One of the zones comprising the streetside, the frontage zone is the space between the pedestrian travel way and building faces or private property. At a minimum it provides a buffer distance from vertical surfaces or walls and allows people to window shop or enter/exit buildings without interfering with moving pedestrians. The frontage zone provides width for overhanging elements of adjacent buildings such as awnings, store signage, bay windows and so forth. If appropriate width is provided, the frontage zone may accommodate a variety of activities associated with adjacent uses, such as outdoor seating or merchant displays.
Throughway Zone	The streetside zone in which pedestrians travel. The throughway must provide a minimum horizontal and vertical clear area in compliance with PROWAG accessible route requirements.
Furnishings Zone	The furnishings zone is a multipurpose area of the streetside. It serves as a buffer between the pedestrian travel way and the vehicular area of the thoroughfare within the curbs, and it provides space for streetside appurtenances such as street trees, planting strips, street furniture, utility poles, sidewalk cafes, sign poles, signal and electrical cabinets, phone booths, fire hydrants, bicycle racks and bus shelters.
Edge Zone	The edge zone, sometimes also referred to as the "curb zone," is the transition area between the thoroughfare traveled way and the furnishings zone of the streetside and provides space for the door swing from vehicles in the parking lane, for parking meters and for the overhang of diagonally parked vehicles.
Right of way	Right of way is the publicly owned land within which a thoroughfare can be constructed. Outside of the right of way, the land is privately owned and cannot be assumed to be available for thoroughfare construction without acquiring the land through dedication or purchase.

(See Chapters 8 and 9 for further definitions and design guidelines for the components of the streetside and the traveled way.)

the streetside are directly related to the activities generated by the adjacent context.

- Traveled way—the public right of way between curbs that includes parking lanes and the travel lanes for private vehicles, goods movement, transit vehicles and bicycles. Medians, turn lanes, transit stops and exclusive transit lanes, curb and gutter and loading/unloading zones are included in the traveled way (see Chapter 9 for detailed descriptions).
- Intersections—the junction where two or more public streets meet and where pedestrians share the traveled way. Intersections are characterized by a high level of activity and shared use, multimodal conflicts, complex movements and special design treatments (Chapter 10 contains detailed descriptions).

This chapter uses terms that are commonly used in transportation planning and engineering and introduces new terms and concepts that require definition.

Overview of the Design Process

The context sensitive thoroughfare design process presented in this report encompasses the project development steps from developing project concepts to final design. Briefly introduced in Chapter 2, the design process is composed of the five stages shown in **Figure 5.3**. While this report presents the process in five discrete stages for simplicity, the thoroughfare design process is an iterative process that requires collaboration with the public, stakeholders and a multidisciplinary team of professionals. As stated earlier, this process is applicable for the design of all thoroughfare types under any context.

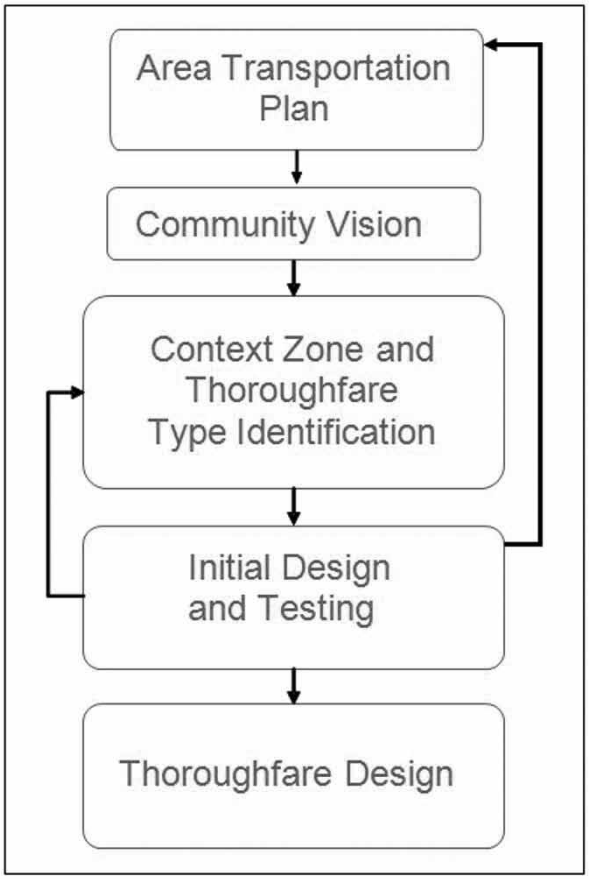

Figure 5.3 Thoroughfare design stages. Source: Kimley-Horn and Associates, Inc.

Stage 1: Review or develop an area transportation plan.

An area transportation plan is a long-range plan based on a public/stakeholder process that establishes goals and objectives for the area, town, or region. The plan results in the pattern of the thoroughfare network, the initial sizing of individual thoroughfares and prioritization of transportation improvements.

The area transportation plan entails development of land use and travel demand forecasts and testing of network alternatives in considering context and area objectives. Often this stage is already available and serves as a direction or resource for the thoroughfare designer. This first stage provides the overall basis for thoroughfare design. The transportation plan establishes guiding principles and policies for the broader community and region. It develops and evaluates the network to ensure the transportation system accommodates projected land use growth.

The plan should identify performance measures for each mode of transportation at the intersection, corridor and network level and should identify how the network supports the community's key goals.

The plan should identify and prioritize discrete thoroughfare projects from which the project development process begins. If an area transportation plan has not been prepared, one should be prepared as part of the thoroughfare design process. Area transportation plans can be in the form of regional transportation plans, comprehensive or general plans, or focused district, area, or specific plans. Chapter 3 provides background and guidance on network systems and design.

Stage 2: Understand community vision for context and thoroughfare.

Understanding the vision, goals and objectives of the place a thoroughfare serves is a critical step. This includes understanding the context as well as the thoroughfare's role in the transportation system. Context sensitive thoroughfare design considers today's conditions but also reflects plans for the future.

In this stage, the designer collaborates with the public, stakeholders and a multidisciplinary team to develop goals and objectives for the project.

If the community in which the project is located has developed a vision and established goals and objectives, this stage entails a thorough knowledge and understanding to ensure that the project achieves the vision. This stage requires review of planning documents, transportation and circulation plans, and land use and zoning codes. Through the community vision, a multidisciplinary team can determine both the existing and future context for the area served by the thoroughfare. It is the future context that defines the long-term transportation and place-making function of the thoroughfare.

If the community lacks a vision, desires a change, or requires further detail in the project area, this is an opportunity to use a public and/or stakeholder process to answer questions that will form the basis of a vision: What do we want the community to be? What do we want the community to look like? How do we want the community to function? Frequently, it is desirable to use a participatory process to develop concepts and alternatives, even if a vision exists. This establishes public ownership in the project and helps meet the requirements of the National Environmental Policy Act (NEPA), where applicable.

The process for working with the public and stakeholders to develop a vision is outside the scope of this report. However, there are resources available to explain the process such as *Public Involvement Techniques for Transportation Decision-Making* by the U.S. DOT Federal Transit Administration.

Stage 3: Identify compatible thoroughfare types and context zones.

Stage 3 determines the compatibility between the existing and future context and the appropriate thoroughfare type. It considers land use and transportation integration, modal requirements, place-making objectives and the functional roles of the adjacent land use and street.

This report provides the tools for this stage in Chapter 4—a framework for urban thoroughfare design. Stage 3 relies on an understanding of the existing and future context identified in Stage 2. Stages will result in the identification of opportunities, design controls and constraints that will dictate thoroughfare design elements and project phasing.

Chapter 4 guides the thoroughfare design team through the process of identifying context and alternative thoroughfare types best suited for the identified context zone. The initial relationship between the context zone and the thoroughfare is tentative, leading to stage 4 of the process.

Stage 3 entails close examination of modal requirements (such as transit, bicycle, pedestrian and freight needs) and establishes design controls such as traffic volumes, speed, corridorwide operations, right-of-way constraints and other fundamental engineering controls (Chapter 7 provides additional information). This stage might be an iterative process that compares needs with constraints, identifies trade-offs and establishes priorities. Specific steps in this stage include:

1. Determining the context zone(s) within which each segment of the thoroughfare is located.The context zones, whether existing or projected, are determined from a community or regional comprehensive plan if one is available. In the absence of such a plan, the context zones can be derived from the description of the function and configuration, the type of the buildings fronting the thoroughfare and whether the context is predominantly residential or commercial. Note that the context zone will likely vary throughout the length of a corridor, requiring the thoroughfare to be divided into segments that may have varying design parameters and elements. **Table 4.1** in Chapter 4 can assist in identifying context zones; and
2. Selecting the appropriate thoroughfare type based on context zone and purpose of the thoroughfare as determined from the area plan, including its functional classification designation.

Tables 4.2, 4.3 and **4.4** in the previous chapter assist a multidisciplinary team in developing the character and general design parameters of the thoroughfare. The thoroughfare's functional classification establishes the role of the thoroughfare in the transportation network. The thoroughfare type helps determine certain design controls such as target speed, the physical design of the thoroughfare and the design elements that serve the activities of the adjacent uses. For urban thoroughfares in walkable communities, the combination of thoroughfare type, functional classification and context zone is used to select the appropriate general design parameters presented in Chapter 6 and the streetside, traveled way and intersection design guidelines presented in Chapters 8 through 10, respectively.

Stage 4: Develop and test the initial thoroughfare concept.

Understanding the balance between the regional functions and local needs of the thoroughfare is a key factor in selecting the appropriate design criteria and prepar-

ing the initial thoroughfare concept. Stage 4 determines whether the boulevard, avenue, or street concept of initial width is appropriate. This step in the process feeds back into the previous stages if the evaluation of the concept results in the need to change the initial thoroughfare type or modify the system design. In this stage a multidisciplinary team uses the design parameters identified by the context zone/thoroughfare type combination selected in stage 3 (**Tables 6.1** through **6.4** in Chapter 6) to determine the basic elements of the thoroughfare that affect its width, including on-street parking, bicycle facilities, number and width of travel lanes, median and general configuration of the streetside.

In stage 4, initial thoroughfare concepts are developed by establishing vital parameters such as speed, number of lanes, travel way and streetside widths, right of way and other design parameters. In this stage, the thoroughfare's function beyond the limits of the project are considered along with its multimodal and place-making functions to ensure both the community vision and the overall network operate as planned.

The team then tests and validates the initial concept at the corridor and network level of performance. A successful urban thoroughfare concept is one that, when viewed as part of an overall system, maintains acceptable systemwide performance even though the individual thoroughfare intersections may experience congestion. Network performance should include multimodal performance measures. Chapter 3 describes the role of the thoroughfare in the network and references network-connectivity guidelines.

Evaluation of the thoroughfare at the corridor and network level will either validate the initial concept or indicate the need to revisit the context zone/thoroughfare type relationship or modify the design parameters. The evaluation might even indicate the need to revise regional or subregional land use and circulation plans.

Stage 5: Develop a detailed thoroughfare design.

Once a successful initial concept has been developed and validated, the process leads to the final step of

The evaluation and initial designs in the previous stages lead to stage 5—refinements and development of a detailed thoroughfare design that reflects the project objectives. This step culminates in final engineering design and environmental approvals.

detailing the thoroughfare design. Stage 5 involves using the guidance to integrate the design of the street components, context, streetside, travelway and intersections. As with any design process, this stage is iterative, resulting in a thoroughfare plan and cross-sections. This stage then leads into preliminary and final engineering. Specific steps in this stage include:

1. *Identifying available right of way and other constraints.*

   In new developments, this step establishes the necessary right of way to accommodate the thoroughfare type and its desirable elements. In existing built areas, this step identifies the available right of way as an input to the thoroughfare design process. It is important to identify any other constraints that will affect the design, such as utility placement.

   In existing areas, an initial cross-section of the desirable streetside and traveled way elements is prepared (see design examples in Chapter 6) and compared with the available right of way. If the total width of the desirable design elements exceeds the right of way, determine the feasibility of acquiring the necessary right of way or eliminating or reducing nonvital elements.

2. *Design the traveled way elements.*

   First identify and select the design controls appropriate for the thoroughfare type and context zone identified in stage 3. These controls include target speed (affects sight distance and alignment), control/design vehicle (affects lane width and intersection design) and modal requirements, such as level of pedestrian activity, parking, bike routes, primary freight routes, or transit corridor and so forth. A trade-offs evaluation may be necessary if right of way is constrained. The design controls and context, along with the available right of way, assist in the selection of the appropriate dimensions for each design element.

3. *Design the streetside elements.*

   The design of the streetside elements requires understanding the characteristics and activity of the adjacent existing or future context. For example, does or will the context include ground floor retail or restaurants that require a wider frontage zone to accommodate street cafes? Does or will the thoroughfare include a transit corridor that requires a wider furnishings zone to accommodate waiting areas and shelters? This report provides general guidance on the optimal and constrained streetside width used initially, but the actual design might require more analysis of existing and future activity levels.

4. *Assemble the thoroughfare components.*

   This is an iterative process, particularly in constrained rights of way. This process entails identifying trade-offs to accommodate the streetside and traveled way elements within the right of way. It is important to refer back to the community vision stage to understand and evaluate the trade-offs. The last section of this chapter provides an approach to design thoroughfares in constrained conditions.

Flexibility in Application of Design Criteria

Flexibility in the application of design criteria requires an understanding of the functional basis for the criteria and the ramifications of changing dimensions or adding/eliminating design elements. Dimensions, whether for elements in the streetside, traveled way, or intersection, should not be applied arbitrarily but should be based on a specific rationale. The concept of design flexibility is not limited to thoroughfares in walkable areas but is a concept that recognizes the unique circumstances of every project under every setting. The challenge that this concept presents is aptly summarized in the Federal Highway Administration's *Flexibility in Highway Design* (1997):

> *For each potential project, designers are faced with the task of balancing the need for the highway improvement with the need to safely integrate the design into the surrounding natural and human environments.*

To correctly apply flexibility, the thoroughfare designer should understand the relationship between a recommended criterion and its role in safety and mobility for all users. The American Association of State Highway and Transportation Officials (AASHTO) emphasizes this requirement in the following quote from *A Guide for Achieving Flexibility in Highway Design* (2004c):

> *Only by understanding the actual functional basis of the criteria and design values can designers and transportation agencies recognize where, to what extent and under what conditions a design value outside the typical range can be accepted as reasonably safe and appropriate for the site-specific context.*

Flexibility is related to the design controls used in the selection of criteria. Design controls recognized by AASHTO include functional classification, location (urban versus rural), traffic volumes and level of service, design vehicle and driver and target speed. All of these design controls are important, regardless of whether the designer believes the thoroughfare design is context sensitive or not.

Design Process in Constrained Right of Way

The nature of thoroughfare design is balancing the desired design elements of the thoroughfare with right-of-way constraints. The thoroughfare designs presented in this report illustrate the desired elements within the cross-section, but actual conditions frequently limit the width of the street. Designing thoroughfares in constrained rights of way requires prioritizing the design elements and emphasizing the higher-priority elements in constrained conditions. Higher-priority design elements are those that help the thoroughfare meet the vision and context sensitive objectives of the community (the objectives established in stage 2). Lower-priority elements have less influence on achieving the objectives and can be relinquished in cases of insufficient right of way.

Often the width of the public right of way varies along the thoroughfare, making the job of the designer even more challenging. When the width of the right of way

varies, it is useful to prioritize design elements and develop a series of varying cross-sections representing:

1. Optimal conditions—sections without right-of-way constraints that can accommodate all desirable elements;
2. Predominant—representing sections of the predominant right-of-way width in the corridor that accommodate all of the higher-priority elements;
3. Functional minimum—representing a typically constrained section where most of the higher-priority elements can be accommodated; and
4. Absolute minimum—representing severely constrained sections where only the highest-priority design elements can be accommodated without changing the type of thoroughfare.

Below the absolute minimum, or if the predominant right of way is equal to or less than the absolute minimum, consider changing the thoroughfare to a different type while attempting to maintain basic function, or consider converting the thoroughfare to a pair of one-way thoroughfares (couplet)—or, further still, consider other solutions that achieve the community vision. This requires recycling through the steps of the design process, potentially requiring a review of the community vision for the thoroughfare and the area transportation plan and/or identifying a new context zone/thoroughfare relationship. If the vision for the corridor is long range, then the necessary right of way should be acquired over time as the adjacent property redevelops. Under these circumstances the optimal (or the predominant) thoroughfare width can be phased in over time, beginning with the functional or absolute minimum design in the initial phase.

In constrained conditions it might be tempting to minimize the streetside width and only provide the minimum pedestrian throughway (5 feet). In urban areas, however, even under constrained conditions, it is critical to provide at least a minimum width furnishing zone to accommodate street trees, utility poles and other appurtenances. Without the furnishings zone, trees, utilities, benches and shelters and other street paraphernalia might encroach into the throughway for pedestrians or result in an inadequate width streetside when the community's vision for the context zone is ultimately achieved.

Table 5.2 provides minimum recommended dimensions for the streetside in constrained conditions, which vary by the predominant land use. In residential areas, the furnishings zone can be a minimum of 3 feet. This width continues to provide a buffer between pedestrians and the traveled way and also allows a minimal width for plantings and utilities. The clear throughway for pedestrians should be a minimum of 5 feet. The frontage zone should be a minimum of 1 foot adjacent to buildings or eliminated adjacent to landscaping. These dimensions result in a minimum residential streetside width of 9 feet.

In predominantly commercial areas with ground floor retail, the furnishings zone minimum width is 4 feet to allow for street trees, utilities and so forth. The clear throughway for pedestrians is a minimum of 6 feet to allow for a higher level of pedestrian activity, and the frontage zone minimum is 2 feet to provide a buffer between moving pedestrians and buildings, resulting in a 12-foot streetside width. When a wider frontage zone is needed (for street cafes and so forth), consider requiring the adjacent property to provide an easement to effectively expand the streetside width.

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Table 5.2 Minimum Recommended Streetside Dimensions for Thoroughfares in Walkable Areas Under Constrained Conditions

Streetside Zone	Minimum Dimension
Residential (All Context Zones)	
Edge and Furnishing Zone (Planting Strip, utilities, etc.)	3 feet
Clear Pedestrian Travel Way	5 feet
Frontage Zone	1 foot
Total Minimum Streetside Width:	9 feet
Commercial with Ground Floor Retail (All Context Zones)	
Edge and Furnishing Zone (Treewell[1], utilities, bus stops, etc.)	4 feet
Clear Pedestrian Travel Way	6 feet
Frontage Zone	2 feet
Total Minimum Streetside Width:	12 feet

[1] Plant only small caliper trees (4" diameter when mature) in 4-foot treewells.

The minimum recommended streetside dimensions for thoroughfares in other areas (such as vehicle-oriented areas) should be based on the designer's understanding of the community's objectives, the future desired traversability of the area, the future potential redevelopment of the adjacent property and the need to accommodate all users.

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Chapter 6
Thoroughfare Designs for Walkable Urban Areas

Purpose

This chapter identifies how design elements can be combined to produce a thoroughfare in urban walkable areas with traditional characteristics. This chapter includes tables of common cross-sectional design elements for thoroughfare types in each context zone and provides design examples under various situations. The variation in design criteria are presented by context zone (C-3 through C-5/6), thoroughfare type (boulevard, avenue and street) and whether the thoroughfare serves a predominantly residential or commercial area with fronting ground floor retail.

The design criteria presented in this chapter focus primarily on thoroughfares in walkable areas, but many of the principles and design examples in this chapter are fully applicable to other areas as well.

Objectives

This chapter:

1. Describes how variables such as context zone and land use type can affect the design of thoroughfares; and
2. Provides design examples that guide the practitioner through the design process.

Basis for Thoroughfare Design Examples

The thoroughfare examples illustrate variations in the traveled way and streetside based on the variables of existing right-of-way constraints, context zone, functional classification, thoroughfare type and predominant surrounding land use and ground floor uses. The general influence of each variable on the design of a thoroughfare is summarized in **Table 6.1**.

General Walkable Thoroughfare Design Parameters

While walkable thoroughfares can be any functional classification of thoroughfare—arterial, collector, or local—this report addresses only arterial and collector thoroughfares. Within those functional classifications, all three thoroughfare types—boulevards, avenues and streets—may be employed and should be designed to be walkable. The remainder of this chapter provides basic design criteria for developing initial cross-section characteristics. However, despite the presentation of these criteria, designers are reminded that each thoroughfare design is unique, and the ultimate design needs to address the context, objectives, priorities and design con-

Table 6.1 Effect of Variables on Thoroughfare Design Elements

Variable	Effect on Design Elements
Context Zone	A designation of design character that affects general design parameters including the selection of thoroughfare type, target speed and the width and treatment of certain streetside elements.
Thoroughfare Type	Affects general design parameters of thoroughfares including target speed, number of through lanes, basic travel lane width, medians and the width of certain streetside elements.
Predominant Land Use and Ground Floor Use	Divided into predominantly residential or commercial. Residential areas affect streetside width, parking lane width, landscaping and building setback. Commercial, particularly where there is ground floor retail, affects the width of the streetside uses for pedestrian facilities, bus stops, landscaping, outdoor cafes and so forth. Adjacent land uses, pedestrian activity, building orientation and so forth directly influence the target speed (and related design elements).

Table 6.2 Selected Characteristics of Walkable Thoroughfares

Characteristic	Walkable Thoroughfares	Vehicle-Oriented Thoroughfares
Target speed range	From Table 6.4.	25–35 mph.
Pedestrian separation from moving traffic	Curb parking and streetside furnishing zone.	Optional, typically separation achieved with planting strip.
Streetside width	Minimum 9 feet (residential) and 12 feet (commercial) to accommodate sidewalk, landscaping and street furniture.	Minimum 5 feet.
Block lengths	200–660 feet.	Up to one-quarter mile.
Protected pedestrian crossing frequency (pedestrian signals or high-visibility markings at unsignalized crossings)	200–600 feet.	As needed to accommodate pedestrian demands.
Pedestrian priority at signalized intersection	Pedestrian signals and pedestrian countdown heads, adequate crossing times, shorter cycle lengths and median refuges for very long crossings.	Vehicle priority; may have longer cycle lengths and require two cycles for slower pedestrians to cross wide streets with medians.
Pedestrian crossings	High-visibility crosswalks shortened by curb extensions where there is on-street parking.	Full street width.
Median width	6 feet minimum width at crosswalk, if used as pedestrian refuge, plus 10 feet for left-turn lane, if provided. 14 foot total width for left-turn lane if no refuge needed.	14–18 feet for single left-turn lane; 26–30 feet for double left-turn lane.
Vehicular access across sidewalks	24 feet or less, except if specific frequent design vehicle requires added width.	As needed.
Curb parking	Normal condition except at bus stops and pedestrian crossings.	None.
Curb return radius	10–30 feet; low-speed channelized right turns where other options are unworkable.	30–75 feet; high-volume turns channelized.

Table 6.3 Design Elements Influenced by Functional Classification

Characteristic	Arterials	Collectors
Network Characteristic		
Continuity	Longer, extending intercity, interarea or serving major corridors.	Shorter, connecting neighborhoods and providing local connections to activity centers; usually 1–2 miles.
Trip lengths	Longer (local and regional).	Shorter (local only).
Role in bicycle network	Designated bikeway with bike lanes or shared lanes depending on context and target speed.	Bike lanes, signed routes, or shared facilities.
Segment Characteristic		
Target speed range (see Table 6.4)	30–35 mph.	25–30 mph.
Traffic volumes (daily)	10,000–50,000.	1,000–10,000.
Transit	Major regional fixed guideway corridor, express, or local bus routes.	Local bus service only, where provided.

cept established for the facility and corridor. Consequently, the thoroughfare designs resulting from use of this guidance may deviate from the initial parameters presented here.

For purposes of comparison, **Table 6.2** presents some of the common characteristics that should be provided for all walkable thoroughfares and contrasts these characteristics with those of conventional vehicle-oriented thoroughfares.

While the characteristics for walkable thoroughfares of all functional classifications and thoroughfare types have much in common, the thoroughfare's functional classification does influence some of the design characteristics, only a few of which affect cross-section. **Table 6.3** compares those design characteristics that vary depending on functional classification.

Table 6.4 presents the recommended initial cross-section and other design criteria to be used in the design of walkable thoroughfares. Chapters 8 though 10 provide additional criteria and discussion on how and when to use the various design elements. While **Table 6.4** focuses on thoroughfares in walkable areas, many of the design elements are applicable in other areas.

Specialized Thoroughfare Designs

This section discusses the design of two specialized types of thoroughfares: main streets and multiway boulevards.

Main Streets

Main streets used to be the principal thoroughfares of American towns, where people could find all types of goods and services. They were the center of commercial, social and civic activities. Main streets thrived up until the 1960s and 70s, when larger-scale, auto-oriented shopping centers became popular. Many communities are revitalizing their main streets to return to a traditional small town mercantile environment or are creating hybrids of traditional and contemporary commercial centers.

Table 6.4 Design Parameters for Walkable Urban Thoroughfares

Thoroughfare Design Parameters for Walkable Mixed–Use Areas									
	Suburban (C–3)						General Urban (C–4)		
	Residential			Commercial			Residential		
	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street
Context									
Building Orientation (entrance orientation)	front, side	front, side	front, side	front, side	front, side	front, side	front	front	front
Maximum Setback [2]	20 ft.	20 ft.	20 ft.	5 ft.	5 ft.	5 ft.	15 ft.	15 ft.	15 ft.
Off-Street Parking Access/Location	rear, side	rear, side	rear, side	rear, side	rear, side	rear, side	rear	rear, side	rear, side
Streetside									
Recommended Streetside Width [3]	14.5–16.5 ft.	14.5 ft.	11.5 ft.	16 ft.	16 ft.	15 ft.	16.5-18.5 ft.	14.5 ft.	11.5 ft.
Minimum sidewalk (throughway) width	6 ft.	6 ft.	6 ft.	6 ft.	6 ft.	6 ft.	8 ft.	6 ft.	6 ft.
Pedestrian Buffers (planting strip exclusive of travel way width) [3]	8 ft. planting strip	6–8 ft. planting strip	5 ft. planting strip	7 ft. tree well	6 ft. tree well	6 ft. tree well	8 ft. planting strip	8 ft. planting strip	6 ft. planting strip
Street Lighting	For all thoroughfares in all context zones, intersection safety lighting, basic street lighting, and pedestrian-scaled lighting is recommended. See Chapter 8 (Streetside Design Guidelines) and Chapter 10 (Intersection Design Guidelines).								
Traveled Way									
Target Speed (mph)	25–35	25–30	25	25–35	25–35	25	25–35	25–30	25
Number of Through Lanes [5]	4–6	2–4	2	4–6	2–4	2	4–6	2–4	2
Lane Width [6]	10–11 ft.	10–11 ft.	10–11 ft.	10–12 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.
Parallel On-Street Parking Width [7]	7 ft.	7 ft.	7 ft.	8 ft.	7-8 ft.	7-8 ft.	7 ft.	7 ft.	7 ft.
Min. Combined Parking/Bike Lane Width	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.
Horizontal Radius (per AASHTO) [8]	200–510 ft.	200–330 ft.	200 ft.	200–510 ft.	200–510 ft.	200 ft.	200–510 ft.	200–330 ft.	200 ft.
Vertical Alignment	Use AASHTO minimums as a target, but consider combinations of horizontal and vertical per AASHTO Green Book.								
Medians [9]	4–18 ft.	Optional 4–16 ft.	None	4–18 ft.	Optional 4–18 ft.	None	4–18 ft.	Optional 4–16 ft.	None
Bike Lanes (min./preferred width)	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.
Access Management [10]	Moderate	Low	Low	High	Moderate	Low	Moderate	Low	Low
Typical Traffic Volume Range (ADT) [11]	20,000–35,000	1,500–25,000	500–5,000	20,000–50,000	1,500–35,000	1,000–10,000	10,000–35,000	1,500–20,000	500–5,000
Intersections									
Roundabout [12]	Consider urban single–lane roundabouts at intersections on avenues with less than 20,000 entering vehicles per day, and urban double–lane roundabouts at intersections on boulevards and avenues with less than 40,000 entering vehicles per day.								
Curb Return Radii/Curb Extensions and Other Design Elements	Refer to Chapter 10 (Intersection Design Guidelines)								

Table 6.4 Notes:

1. Multiway boulevards are a special form of boulevards. Generally they add one–way, 16–20 foot wide access lanes adjacent to the outer curb and separated from the through traffic lanes by a longitudinal island at least 6 ft. wide (10 ft. if accommodating transit stops). Access lanes have curb parallel parking plus one moving traffic/bike lane with a target speed of 15–20 mph. All vehicular traffic on the access lanes is local. See Chapter 6 section on multiway boulevards for additional information.
2. For all context zones with predominantly commercial frontage, this table shows the maximum setback for buildings with ground floor retail. In suburban contexts, office buildings are typically set back 5 ft. further than retail buildings to provide a privacy buffer. In general urban and urban center/core areas, office buildings are set back 0–5 ft. Setback exceptions may be granted for important civic buildings or unique designs.
3. Streetside width includes edge, furnishing/planting strip, clear throughway, and frontage zones. Refer to Chapter 8 (Streetside Design Guidelines) for detailed description of sidewalk zones and widths in different context zones and on different thoroughfare types. Dimensions in this table reflect widths in unconstrained conditions. In constrained conditions streetside width can be reduced to 12 ft. in commercial areas and 9 ft. in residential areas (see Chapter 5 on designing within constrained rights of way).
4. Desired target speeds on avenues serving C–4 and C–5/6 commercial main streets with high pedestrian activity should be 25 mph.
5. Six lane facilities are generally undesirable for residential streets because of concerns related to neighborhood livability (i.e., noise, speeds, traffic volume) and perceptions as a barrier to crossing. Consider a maximum of four lanes within residential neighborhoods.
6. Lane width (turning, through and curb) can vary. Most thoroughfare types can effectively operate with 10–11 ft. wide lanes, with 12 ft. lanes desirable on higher speed transit and freight facilities. Chapter 9 (Traveled Way Design Guidelines) (lane width section) identifies the considerations used in selecting lane widths. Curb lane width in this report is measured to curb face unless gutter pan/catch basin inlets do not accommodate bicycles, then it is measured from the edge of travel lane. If light rail transit or streetcars are to be accommodated in a lane with motor vehicles, the minimum lane width should be the

Table 6.4 Design Parameters for Walkable Urban Thoroughfares (continued)

Thoroughfare Design Parameters for Walkable Mixed–Use Areas									
	General Urban (C–4)			Urban Center/Core (C–5/6)					
	Commercial			Residential			Commercial		
	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street
Context									
Building Orientation (entrance orientation)	front	front	front	front	front	front	front	front	front
Maximum Setback [2]	0 ft.	0 ft.	0 ft.	10 ft.	10 ft.	10 ft.	0 ft.	0 ft.	0 ft.
Off-Street Parking Access/Location	rear, side	rear, side	rear, side	rear	rear	rear, side	rear	rear	rear, side
Streetside									
Recommended Streetside Width [3]	19 ft.	16 ft.	16 ft.	21.5 ft.	19.5 ft.	16 ft.	21.5 ft.	19.5 ft.	16 ft.
Minimum sidewalk (throughway) width	8 ft.	6 ft.	6 ft.	10 ft.	9 ft.	6 ft.	10 ft.	9 ft.	6 ft.
Pedestrian Buffers (planting strip exclusive of travel way width) [3]	7 ft. tree well	6 ft. tree well	6 ft. tree well	7 ft. tree well	6 ft. tree well	6 ft. tree well	7 ft. tree well	6 ft. tree well	6 ft. tree well
Street Lighting	For all thoroughfares in all context zones, intersection safety lighting, basic street lighting, and pedestrian-scaled lighting is recommended. See Chapter 8 (Streetside Design Guidelines) and Chapter 10 (Intersection Design Guidelines).								
Traveled Way									
Target Speed (mph)	25–35	25–30 [4]	25	25–35	25–30	25	25–35	25–30 [4]	25
Number of Through Lanes [5]	4–6	2–4	2–4	4–6	2–4	2–4	4–6	2–4	2–4
Lane Width [6]	10–12 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.
Parallel On-Street Parking Width [7]	8'	7–8 ft.	7–8 ft.	7 ft.	7 ft.	7 ft.	8 ft.	8 ft.	7–8 ft.
Min. Combined Parking/Bike Lane Width	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.
Horizontal Radius (per AASHTO) [8]	200–510 ft.	200–330 ft.	200 ft.	200–510 ft.	200–330 ft.	200 ft.	200–510 ft.	200–330 ft.	200 ft.
Vertical Alignment	Use AASHTO minimums as a target, but consider combinations of horizontal and vertical per AASHTO Green Book.								
Medians [9]	4–18 ft.	Optional 4–18 ft.	None	4–18 ft.	Optional 4–16 ft.	None	4–18 ft.	Optional 4–18 ft.	None
Bike Lanes (min./preferred width)	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.
Access Management [10]	High	Low–Moderate	Low–Moderate	Moderate	Low–Moderate	Low–Moderate	High	Low–Moderate	Low–Moderate
Typical Traffic Volume Range (ADT) [11]	15,000–50,000	1,500–30,000	1,000–15,000	15,000–30,000	1,500–20,000	500–5,000	15,000–40,000	1,500–30,000	1,000–15,000
Intersections									
Roundabout [12]	Consider urban single–lane roundabouts at intersections on avenues with less than 20,000 entering vehicles per day, and urban double–lane roundabouts at intersections on boulevards and avenues with less than 40,000 entering vehicles per day.								
Curb Return Radii/Curb Extensions and Other Design Elements	Refer to Chapter 10 (Intersection Design Guidelines)								

width of the transit vehicle plus 1 ft. of clearance on either side. Most modern streetcars or light rail vehicles (LRT) can be accommodated in an 11 or 12 ft. wide lane but designers need to consider the LRT vehicle's "dynamic envelope" when designing on horizontal curves and intersections.

7. An 8 ft. wide parking lane is recommended in any commercial area with a high turnover of parking.
8. For guidance on horizontal radius—see AASHTO's "green book" section on "Minimum Radii for Low Speed Urban Streets—Sharpest Curve Without Superelevation." Dimensions shown above are for noted target speeds and are found on Exhibit 3–16 (Page 151) in *A Policy on Geometric Design of Highways and Streets* (2004), assuming a superelevation of –2.0 percent reflecting typical cross slope. Depending on design vehicle, horizontal curves may require lane widening to accommodate large vehicle off–tracking. See AASHTO's section on "Traveled Way Widening on Horizontal Curves" for guidance.
9. See also Chapter 9 for additional detail on medians. For curb to curb intersection crossing distances of 60 ft. or more, medians should be at least 6 ft. wide to serve as a pedestrian refuge, otherwise the median should be at least 4 ft. wide. Where left turn lanes are to be provided, median widths should be increased by the width of the turn lane(s). Where left turn lanes are not needed (e.g., long blocks) median widths may be as little as 4 ft.
10. Access management involves providing (i.e., managing) access to land development in such a way as to preserve safety and reasonable traffic flow on public streets. Low, moderate and high designations are used for the level of access restrictions. A high level of access management uses medians to restrict mid–block turns, consolidate driveways and control the spacing of intersections. A low level of access management limits full access at some intersections, but generally uses minimal measures to restrict access.
11. These ranges of typical traffic volumes are intended to help determine the characteristics of thoroughfares. Volumes can fluctuate widely on all thoroughfare types. These ranges are not intended to establish guidelines or upper bounds for designing thoroughfares.
12. Double–lane roundabouts are not recommended in urban areas with high levels of pedestrians and bicyclists.



Figure 6.1 Buildings on main streets are typically located on small lots and front the streetside. Parking is either located in the rear of the building, on-street, or in nearby public parking facilities. Source: Kimley-Horn and Associates, Inc.



Figure 6.2 The design of main streets supports active uses such as social interaction, street cafes, window shopping and strolling. Source: Kimley-Horn and Associates, Inc.

The value of today's main streets is summarized in this quote from Portland, Oregon Metro's *Main Street Handbook:*

> *"Main streets flourish because they provide a variety of goods and services, a pleasant community environment and efficiency for those who frequent them. When people do their shopping at a main street, they simply accomplish more with less travel and may find the experience more entertaining."*

Creating Quality Main Streets

While main streets vary from community to community, there are some universal characteristics. Main streets may be located in any context zone but are most commonly found in suburban (C-3), general urban (C-4) and urban center (C-5) contexts. They are usually short, walkable segments of arterial or collector streets, often only a few blocks in length. They are within a grid or interconnected system of local streets serving the commercial center of town with short blocks, minimal or no driveways and buildings often served by alleys.

Land uses on main streets consist of compact, mixed-use development, usually with a strong retail and entertainment emphasis on the ground floors and an equal mix of residential and/or commercial office or services on the upper floors. The buildings are low-scale (generally one to three stories) and are oriented to the street without setback. Also, they are closely spaced as shown in **Figure 6.1**. Parking lots or garages are located behind or to the side of buildings. Public parking consists of on-street parking and may include strategically located parking lots or garages that support a "park once" environment.

The design of main streets includes wide streetsides that support active uses such as street cafes, social interactions, strolling and window shopping (**Figure 6.2**). Main streets, by tradition and design, are pedestrian friendly and may have historic or contemporary urban design features, public spaces, or public art. Main streets typically are no wider than two travel lanes, provide on-street parking and may contain bicycle lanes. Transit consists of local service.

The key ingredients for a successful main street include:

- The architecture of the adjacent buildings, urban design features, the appearance of the street frontage and the provision of public spaces;
- The types and mix of uses, particularly those that generate pedestrian activity and create an active day and evening place;.
- Street design that accommodates low-speed traffic, pedestrians, bicyclists and transit;
- Physical and visual thoroughfare and urban design elements that draw together both sides of the street and encourage frequent traversal of the street; and



Figure 6.3 The width of the streetside should be planned to accommodate the activities generated by the adjacent land uses. Source: Kimley-Horn and Associates, Inc.

- A public parking strategy that encourages walking.

According to a report prepared for the New Jersey Department of Transportation (*Scoring Formula for New Jersey's Main Streets*, Rutgers University, March 2003) and based on a visual preference survey, the attributes of a main street that positively affect how people view the street include:

- The proportion of street frontage with active commercial uses;
- A low proportion of street frontage with dead space such as vacant lots, parking lots and blank walls;
- The proportion of the street frontage with parked cars generating activity, providing a buffer between traffic and the streetside and slowing traffic;
- The proportion of the street with a tree canopy;
- Width of sidewalk, with wider facilities providing more public space and greater levels of activity (see **Figure 6.3**); and
- Visible curb extensions that provide for shorter crossing distances and space for plantings, street furniture and traffic calming.

Attributes of a main street that negatively affect how people view the street include:

- A high proportion of street frontage with dead space such as vacant lots, parking lots and blank walls (a negative response is associated with more blank walls); and
- The number of travel lanes, where streets with more than two lanes are perceived as having higher speeds, more traffic, longer crossing distances and a less attractive appearance.

Design Factors That Create Main Street Thoroughfares

The multidisciplinary design team needs to consider a number of factors to create an appropriate main street environment. This process often requires trade-offs, such as balancing traffic throughput with economic development goals.

Traveled Way

In designing the traveled way, there are three important factors to consider: speed, width and parking. Because of the pedestrian-oriented nature of main streets, the target speed should be kept low (25–30 miles per hour) in main street segments, even on thoroughfares designated as principal arterials. This speed not only improves the user's perception of the street but also creates a safer environment, accommodates frequent parking maneuvers and is consistent with restricted sight distances encountered in urban places. The visual interest drivers experience on main streets requires lower speeds.

The width of the traveled way affects users' perceptions of the speed and volume of the street. Wide streets may be perceived as a barrier to crossing where frequent crossings are desired and encouraged. Typically, main streets are two lanes wide with parallel parking on both sides, resulting in a traveled way width of 36 to 38 feet (**Figure 6.4**) or 44 to 48 feet on streets with bicycle lanes. Wider streets may be required to accommodate angled parking (see discussion on implementing angled parking below). An increased number of travel lanes to three or four may be appropriate based on community objectives, the main street's role in the network, and the existence or lack of parallel thoroughfares.

On-street parking is considered an important design element on main streets. It provides a source of short-term parking for adjacent retail and service uses, buf-



Figure 6.4 A typical configuration of a main street traveled way. Source: Reid Ewing and Michael King.

fers pedestrians from traffic, creates friction that slows traffic and produces a higher level of street activity. Parallel parking lane width should be 8 feet to accommodate the high level of parking turnover experienced on main streets.

Main streets, as avenue or street thoroughfare types, should forego raised medians, as they create a physical and visual separation of the two sides of the street in an environment in which pedestrians are encouraged to cross the street frequently. Main streets, as boulevards or any thoroughfare wider than 60 feet, may use medians for pedestrian refuge or turn lanes. Landscaping and urban design elements within the median may be used to provide a unifying theme connecting both sides of the street. Landscaping is an important element of main streets. It serves as an amenity to pedestrians and helps provides a uniform theme, often as part of a planned streetscape. Landscaping on main streets should be designed and maintained so that it enhances the visibility and attraction of storefronts, signs and lighting. On new and redeveloping main streets, the design of building facades and signage should anticipate mature landscaping and accommodate its growth without interfering with visibility.

Common design issues related to main street traveled ways include:

- **Excessive street width:** Whether two- or four-lane cross-sections, excessively wide main streets create barriers to pedestrian crossings, reduce the street enclosure created by the ratio of street width to building height and encourage high travel speeds. The practitioner may consider the following design solutions after assessing the traffic operations and other needs served by the street:
  - Convert four-lane undivided sections to a three-lane section (one travel lane in each direction and a center turn lane or median with left-turn lanes at intersections). Use the width gained to add on-street parking, bike lanes, or, in the case of street reconstruction, wider sidewalks.
  - A five-lane section on streets designated as collectors may be converted to a three-lane section with the remaining width used to provide angled parking on one or both sides of the street, depending on the total width of the street.
  - Wide two-lane sections may be visually narrowed with the addition of a painted center turn lane (or raised median on boulevards), bike lanes, striping parking lane lines, or edge lines. Raised and landscaped curb extensions within parking lanes and at intersections can physically narrow the street.
  - On avenue and street thoroughfares, relatively short (20 to 30 feet in length) raised and landscaped medians can be used to break up the width of the street, provide neck-down areas (especially when combined with curb



Figure 6.5 Angled parking is used to maximize on-street parking on main streets. On narrow streets, some communities use angled parking on one side and parallel parking on the other, and alternate the arrangement from block to block. Source: Kimley-Horn and Associates, Inc.

extensions) and can be used as pedestrian refuges when used in conjunction with mid-block crossings.

- On very wide thoroughfares (exceeding 90 feet curb to curb) or on very wide main streets where traffic throughput needs to be retained, consider implementing a multiway boulevard, potentially on only one side of the street.

- **Implementing angled parking:** Angled parking is one strategy to maximize the public parking supply on main streets, particularly in areas where off-street parking is limited. On low-volume, low-speed collector avenues and streets in commercial main street areas, where sufficient curb-to-curb width is available, angled parking may be appropriate. Angled parking can be implemented on both sides of the street or on one side of the street, with parallel parking on the other side (see **Figure 6.5**). On some main streets, angled and parallel parking are alternated in each block.

  Angled parking can create sight distance problems associated with cars backing out of parking spaces. The use of reverse (back-in) angled parking in some cities has overcome these sight distance concerns and is considered safer for bicyclists traveling adjacent to angled parking. Angled parking requires a wider adjacent travel lane than parallel parking to allow vehicles to back out (or back in) without encroaching onto the opposing travel lane. Because the depth of the angled parking spaces themselves and wider adjacent lanes increase the overall width of the street, the practitioner needs to assess the trade-offs between the addition of parking spaces and the negative effects associated with wider streets.

- **Main street is a state highway:** Many main streets are state highways, especially in smaller towns where rural highways or principal arterials pass through the community's historical commercial district. The design, maintenance and operation of these streets are controlled by the state department of transportation (DOT) and are subject to the state's policies and design standards. During redevelopment projects or during the planning of improvements to state highways, the community may desire features that conflict with state standards. While many DOTs recognize the value the community places on their main streets and are amenable to applying flexibility in the application of their standards using the "design exception" process, some desired design features may not be acceptable to the DOT, even if the local municipality regularly includes these features on its streets. DOTs typically will work with municipalities and the community to find solutions. The key elements to successful planning and implementation of walkable main streets on state highways include:

  - Involving the DOT in the earliest stages of planning and redevelopment projects located adjacent to a state highway;
  - Including the DOT as a key stakeholder in all stages of the project but especially when proposing any change or streetscape design to a state highway or connecting street;
  - Working collaboratively with the DOT and all other stakeholders to define a vision, goals and objectives and to identify a purpose and need statement for the project;
  - Identifying potential tensions early in the process and resolving them so they don't hold up the project in its last stages of planning and design;

- Understanding the DOT's project development and design exception process, as these are the mechanisms through which any nonstandard feature will be accepted;
- Discussing design flexibility with the state's design engineers and establishing the ranges of acceptability prior to developing street designs; and
- Developing an early consensus on the concept plan and nonstandard design features. Build this consensus with a small subset of the ultimate stakeholders before going to the public and decision makers; this avoids establishing public and stakeholder expectations that will not be supported by the DOT, thus also avoiding dissatisfaction with the final concept plan.

Streetside

Streetside design features include an appropriate width to accommodate anticipated levels and types of activity. The provision of distinct streetside zones is very important on main streets. The clear pedestrian throughway should be wide enough, at a minimum, to allow two people to walk side-by-side. The frontage zone should allow for window shopping, seating, displays and pedestrian activity at building entrances.

The furnishings zone needs to accommodate many functions, including street trees, planting strips, street furniture, utilities, bicycle racks, transit facilities and public art. If community objectives desire, and regulations encourage restaurants, then ensure the streetside furnishings zone can accommodate potential street cafes.

The edge zone will need to accommodate frequent car door openings, parking meters and signing. Lighting in the streetside should provide both safety illumination of the traveled way and intersections and also pedestrian-scaled decorative light standards illuminating the pedestrian way.

Requirements for Great Streets

Great Streets author Allan B. Jacobs describes the physical qualities that are required to make great streets. He states that most of the qualities are directly related to social and economic criteria and designable qualities for creating good cities; accessibility, bringing people together, publicness, livability, safety, comfort, participation, and responsibility.

Some of these qualities may be challenging for the thoroughfare designers to quantify in the design, or are outside of the designer's responsibility, thus underscoring the importance of multidisciplinary teams, stakeholder involvement and understanding the community's vision. Jacobs' requirements for great streets include:

- Places for people to walk with some leisure
- Physical comfort
- Definition of the street's edge
- Qualities that engage the eyes without being disorienting
- Complementary building height and appearance
- Maintenance
- Quality of construction and design

For further information on these qualities, refer to Part Four of *Great Streets*.

Intersections

Main street intersection design should emphasize slow speeds and the management of conflicts through appropriate traffic control and improved visibility. Intersections on main streets should emphasize pedestrian convenience, as these types of streets encourage frequent crossing. Main street intersections should be as compact as possible with short crossing distances, using curb extensions where possible. Curb-return radii should be minimized and based on the design and control vehicles selected (see Chapter 7). Crosswalks need to be allowed on all approaches of the intersection. Midblock crossings are usually not necessary due to short block lengths but may be considered where

blocks are unusually long and there is a demonstrated demand to cross. Typical main street intersections would include the following design elements:

- Crosswalks on all approaches of signalized and unsignalized intersections using highly visible markings (e.g., longitudinal crosswalks) or alternative paving material;
- Curb extensions on streets with on-street parking;
- Curb-return radius as small as practicable on streets without on-street parking or where design/control vehicle warrants a larger radius;
- Channelized right-turn lanes are generally inappropriate for main street environments but—where needed due to intersection angle or required design vehicle—design should be low speed, with adequate-sized island for pedestrian refuge and possible signal control in high pedestrian-volume locations;
- Pedestrian countdown timers at signalized intersections; indications should not require button activation;
- Short cycle lengths to reduce pedestrian waiting time, and pedestrian clearance intervals set for slower-walking pedestrians; and
- Wheelchair-accessible curb ramps and audible indicators conforming to Public Rights-of-Way Accessibility Guidelines (PROWAG).

A more detailed discussion of the intersection design elements listed above are presented in Chapter 10.

Main Street Design Parameters

Table 6.5 provides general design parameters for commercial avenues and streets in context zones C-3 through C-5 that may be applicable in the design of main streets.

Multiway Boulevards

The multiway boulevard is an alternative to conventional higher-volume, higher-speed arterial streets. This thoroughfare type may be used where the community's objective is to accommodate urban mixed use or residential development and a walkable environment on corridors with high traffic demands. A multiway boulevard combines a central thoroughfare for higher-speed through movements bordered by landscaped medians that separate the central thoroughfare from one-way access lanes on each side of the boulevard. The access lanes provide for slower local traffic, parking, bicycle travel and a pedestrian-oriented streetside and are designed to discourage through traffic. Multiway boulevards may be considered where a community desires to make a very wide arterial street more pedestrian friendly yet recognizes the need to retain traffic capacity.

Characteristics of Multiway Boulevards

The general configuration of a multiway boulevard is a bidirectional central roadway that contains four or more lanes and may be divided or undivided, with one-way access lanes on both sides separated from the central roadway with medians. Characteristics of the central roadway and access lanes include:

- Central roadway—emphasizes through traffic movement and therefore should minimize impediments to this function. This includes access control between intersections, simplified phasing at signalized intersections and restricted movements onto and from the central roadway. The central roadway may contain a raised landscaped median separating the two directions of travel (in addition to the medians separating the central roadway from the access lanes), depending on right of way and landscaping desires. Parking is generally prohibited on the central roadway. For purposes of this report, the central roadway's target speed would be 35 miles per hour (mph) or less. The design and operation of cross-street intersections is addressed below.
- Access lanes—emphasize local interface with adjacent land uses. The access lanes are narrow, one-lane, very low-speed one-way streets that include on-street parking and potentially a shared vehicle/bicycle lane. Through traffic on access lanes is discouraged through design. Bike lanes may be provided, but it is preferred that bikes share the vehicular lane.[2] The design and operation of cross-street intersections is addressed below. Access lanes preferably should not provide driveway access to adjacent properties.

2 Designers are encouraged to consult the MUTCD for the current signing and marking for this configuration. Traffic control device applications of this type are evolving.

Table 6.5 Main Street Design Parameters

Context	Suburban (C-3)		General Urban (C-4)		Urban Center (C-5)	
	Commercial Main Streets					
	Avenue	Street	Avenue	Street	Avenue	Street
Streetside						
Building Orientation (entrance location)	front, side	front, side	front	front	front	front
Maximum Building Setback	5 ft.	5 ft.	0 ft.	0 ft.	0 ft.	0 ft.
Off–Street Parking Access/Location	rear, side	rear, side	rear, side	rear, side	rear, side	rear, side
Recommended Streetside Width	15 ft.	14 ft.	16 ft.	14 ft.	19.5 ft.	16 ft.
Edge Zone	1.5 ft. minimum for operational clearance. Use 2.5 ft. if angled parking is considered. Ensure edge zone is wide enough to accommodate parking meters, utilities and signs.					
Furnishings Zone Width	6 ft. tree well	6 ft. tree well	6 ft. tree well	6 ft. tree well	6 ft. tree well	6 ft. tree well
	Wider furnishings zone is needed to provide public spaces and if main street uses include the potential for street cafes.					
Pedestrian Throughway (minimum)	6 ft.	6 ft.	6 ft.	6 ft.	9 ft.	6 ft.
Frontage Zone	2.5 ft. to 3 ft. minimum to accommodate commercial activity along building fronts. Wider frontage zone is needed (6 ft. or wider) if potential for street cafes or merchandise displays.					
Street Lighting	Intersection safety lighting, basic street lighting and pedestrian–scaled lighting.					
Traveled Way						
Target Speed (mph)	25	20–25	25	20–25	25	20–25
Number of Through Lanes	2–4	2	2–4	2	2–4	2
Lane Width	10–12 ft.	10–12 ft.	10–12 ft.	10–12 ft.	10–11 ft.	10–11 ft.
Parallel On–Street Parking Width	8 ft.	8 ft.	8 ft.	8 ft.	8 ft.	8 ft.
Min. Combined Parking/Bike Lane Width	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.
Medians	Optional	None	Optional	None	Optional	None
Bike Lanes (minimum/preferred width)	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.
Access Management	Minimize driveways on main streets. Access land uses via cross streets and/or alleys.					
Typical Traffic Volume Range (vehicles per day)	5,000–20,000+	1,000–15,000	5,000–20,000+	1,000–15,000	5,000–20,000+	1,000–15,000
Intersections						
Curb Extensions (with on–street parking)	Yes	Yes	Yes	Yes	Yes	Yes
Minimum Curb Return Radii (if extensions not used)	10–15 ft.	10–15 ft.	10–15 ft.	10–15 ft.	10–15 ft.	10–15 ft.
Roundabouts	Not recommended on main streets, except as gateway intersections					

Property should be accessed from cross-streets or alleys, although access lanes may be intersected by local streets or consolidated driveways without direct access to the central roadway. Access lanes provide on-street parking that may be associated with curb extensions at intersections or extensions that contain street trees. The width of access lanes is composed of the parking lane (7 to 8 feet) and a shared travel lane (10 to 11 feet). Some fire departments may require wider access lanes. However, for emergency access purposes, buildings may be able to be accessed from the central roadway. The maximum width of an access lane should be 17 feet with parking on one side and 24 feet with parking on both sides.

- Median islands—raised medians are used to separate the access lanes from the central roadway. The width of these medians varies because they may serve multiple functions. At a minimum, the median contains landscaping, including trees, streetlights, traffic signs and other utilities. On transit streets, the medians accommodate bus stops or stations. On multiway boulevards with very wide medians, sidewalks, seating and other urban design features may be provided. Medians may be designed with mountable curbs and load-bearing surfaces on the access lane side to accommodate emergency vehicles. Median breaks are provided on some traditional multiway boulevards to allow vehicles into the access lane and entry back into the central roadway where turn movements are restricted at the intersections.
- Streetside—provides a highly pedestrian-oriented environment and access to building entrances. On residential boulevards, the streetside emphasizes planting strips or tree wells and pedestrian-scaled lighting. On commercial boulevards, the streetside is designed to accommodate the activities of the adjacent ground floor uses, emphasizing wide furnishing zones for street trees, seating, urban design features and street cafes. See Chapter 8 for details on the streetside.

General Cross-Section Design Parameters and Right-of-Way Requirements

Because of their multiple components, the multiway boulevard typically has greater right-of-way requirements than other types of boulevards. Although streetside and median widths can vary substantially, the minimum right of way for a basic four-lane multiway boulevard is 104 feet, composed of the following elements (see **Figure 6.6**):

- 9-foot-wide streetsides;

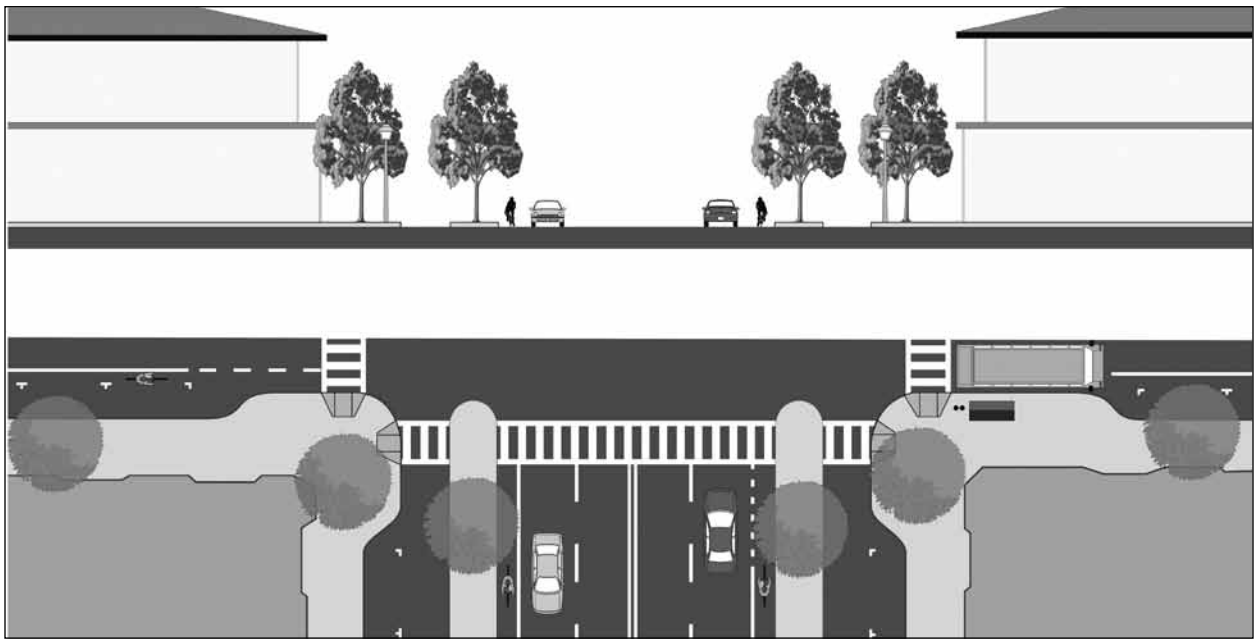

Figure 6.6 A multiway boulevard is characterized by a central roadway with a pair of one-way access lanes. This type of thoroughfare can combine high vehicular capacity with pedestrian-friendly streetsides. Source: Digital Media Productions.

- 7-foot parking lanes;
- 10-foot access lanes;
- 6- to10-foot medians (allows for street trees and utilities); and
- Four 10- to 11-foot central roadway travel lanes.

As an example of a more desirable multiway boulevard width in an urban center (C-5) commercial context, the recommended right of way of a four-lane multiway boulevard, based on the design parameters presented in **Table 6.4** and Chapters 8 and 9, would be 149 feet composed of

- 21.5-foot streetsides;
- 7-foot parking lanes;
- 10-foot access lanes;
- 14-foot medians (space for canopy trees, street lighting, bus stops with seating/shelters and pedestrian refuge); and
- Four 11-foot central roadway travel lanes.

It may be desirable to provide a raised median within the central roadway to provide for access management, street lighting, trees, pedestrian refuge and left-turn lanes at intersections. The width of a median in the central roadway will vary depending on function (see Chapter 9 for recommended median widths), but would add 4 to 18 feet or more to the right-of-way requirements. Bicycle lanes may also be a part of the central roadway, which would require another 10 feet of right-of-way width.

The right of way of several existing two-way multiway boulevards in the United States ranges from 165 feet (The Esplanade in Chico, CA) to 210 feet (Ocean Parkway in Brooklyn, NY). The differences in width are related to the number of central roadway lanes (four versus six), existence of medians in the central roadway and width of access lanes and access lane medians (Bosselman, MacDonald, Kronemeyer. *Environmental Quality of Multiple Roadway Boulevards*, Institute of Urban and Regional Development, University of California at Berkeley, 1997). **Figure 6.7** is an example of a multiway boulevard that merges the access lane in advance of the intersection (see the next section on intersection design).



Figure 6.7 This multiway boulevard merges the access lane into the central roadway in advance of intersections. Source: Kimley-Horn and Associates, Inc.

Multiway Boulevard Intersection Design

Intersections on multiway boulevards provide one of the most challenging aspects of designing this type of thoroughfare. For successful multiway boulevard design, it is essential that all of the design elements work together to manage the various traffic flows safely.

The most frequent concern about multiway intersection design usually relates to how to control the side access lanes. However, if properly designed, the side access lanes will have low volumes, and potential conflicts will be minimal. Proper geometric design and signing are also needed to communicate which user has the right of way at any given time. The access lanes should not be used to carry vehicles going several blocks along the multiway boulevard. Narrow side access lanes and proper intersection control will discourage through use of the access lanes. Because of the proximity of the access lane to the central roadway, queuing on the cross-streets can block access lanes, and this will further discourage use of the access lanes as through routes. Traffic engineers may also be concerned with conflicts between vehicles turning right from the central roadway and vehicles entering the intersection from the access lane. This is best addressed by having tight corner radii for both the central roadway and the access lanes and good sight lines between the central roadway and the access lanes so the turning driver can avoid a conflict.

At this time there is no widely agreed-upon way to design and operate a multiway boulevard intersection. Multiway boulevards, both old and new, exist in many



Figure 6.8 This multiway boulevard provides stop control for the low-volume, low-speed access lanes. The central roadway is controlled by a traffic signal. Source: Kimley-Horn and Associates, Inc.

places in Europe and the United States, and the challenges of the intersections have been addressed in many ways. The traditional design of multiway boulevard intersections is to provide stop control for the access lanes and signalized or stop control for the cross-streets and central roadway (see **Figure 6.8**). In urban areas, the access lanes are often controlled with traffic signals and sometimes restrict selected movements from both the central roadway and the access lanes. Common traffic control and operational configurations for traditional multiway boulevard intersections are described in **Table 6.6** and illustrated in **Figure 6.9**.

Alternative Multiway Intersection Designs

Thoroughfare designers have developed a number of alternatives to the traditional multiway boulevard intersection. These alternatives include:

- Access road slip ramps prior to and after intersections to provide conventional four-leg intersections;
- Forced right turns from the access lane to the cross-street. Where turning movements are restricted, cross-streets should be part of a well-connected grid of streets so vehicles leaving the access lanes can easily return to the central roadway;
- Access lanes diverted away from the central roadway at cross streets increase separation and reduce the complexity of the intersection. This design concept significantly affects the placement of buildings at intersection corners; and
- Access lanes beginning just past an intersection (either with or without a lane drop), and ending with or without a lane addition just before an adjacent intersection, similar to the design of frontage roads.

All of the above alternatives disrupt the continuity of the access lane along the length of the boulevard. This is an important factor in considering local circulation, particularly if the access lanes provide for bicycle travel along the corridor.

Design Examples

The following design examples provide a brief synopsis of the design process, illustrating some of the key steps in developing and evaluating solutions to thoroughfare design problems. The examples do not represent all of the possible combinations but do show some common thoroughfare situations. The four examples respectively illustrate the following thoroughfare design scenarios:

1. Creation of a retail-oriented and pedestrian-friendly main street collector avenue;

Table 6.6 Traffic Control and Operation Configurations for Multiway Boulevard Intersections

Type of Approach Control (Refer to Fig. 6.9)		Special Treatments or Movement Restrictions	Conditions for Application
A	Two-Way Stop Intersection • Central roadway uncontrolled • Cross-street stop controlled • Access lane stop controlled	• No restricted movements, or • Access lane restricted to through-right turn only	• Low-volume cross-street traffic • Moderate-volume central roadway traffic • Residential or low-intensity mixed use and commercial areas
B	All-Way Stop Intersection • Central roadway stop controlled • Cross-street stop controlled • Access lane stop controlled	• No restricted movements, or • Access lane restricted to through-right turn only	• Low cross-street traffic volume • Low to moderate central roadway traffic volume • Residential or low-intensity mixed use and commercial area
C	Two-Phase Signalized Intersection • Central roadway signalized • Cross-street signalized • Access lane stop controlled	• Access lane through and right turns may proceed with central roadway through movement after stop • Central roadway right turns may be prohibited	• Low to moderate cross-street traffic volume • Low to moderate central roadway traffic volume • Residential or low-intensity mixed use and commercial area
D	Multi-Phase Signalized Intersection #1 • Central roadway signalized • Cross-street signalized • Access lane signalized	• Central roadway may have protected left-turn phasing • Access lanes restricted to through and right-turn only • Access lane proceeds during central roadway through movement • Cross-street has permissive turn phasing • Central roadway right-turns prohibited	• Moderate to high cross-street traffic volume • Moderate to high central roadway traffic volume • High-intensity mixed use and commercial area
E	Multi-Phase Signalized Intersection #2 • Central roadway signalized • Cross-street signalized • Access lane signalized	• Central roadway may have protected left-turn phasing • Cross-street has permissive turn phasing • Access lanes have split phasing, allowing all movements	• Moderate to high cross-street traffic volume • Moderate to high central roadway traffic volume with high volume of left turns • High-intensity mixed use and commercial area
F	Multi-Phase Signalized Intersection #3 • Central roadway signalized • Cross-street signalized • Access lane stop controlled	• Access lane right turns only may proceed after stop • Central roadway has permissive turn phasing • Cross-street has permissive turn phasing, and may use split phasing	• Low to moderate cross-street traffic volume • Low to moderate central roadway traffic volume • Residential or low-intensity mixed use and commercial area

2. Transformation of an obsolete suburban arterial to a boulevard in a mixed use area;
3. Design of a high-capacity arterial boulevard in a newly urbanizing area; and
4. Four- to three-lane arterial avenue conversion in a central business district.

The design process used in the examples follows the design stages introduced and described in Chapter 5. The design examples provide a general overview of the process to illustrate the five stages of design. The details of the evaluation and development of the actual design are omitted in the four examples.

Remember Network Potential

In all cases of designing walkable urban thoroughfares, part of the analysis will be to analyze network capabilities, contexts and travel patterns to determine whether and how much the network can accommodate some of the study thoroughfare's existing or projected traffic. This may require operational or physical improvements. However, it may lead to a more contextually desirable improvement and more effective overall solution.

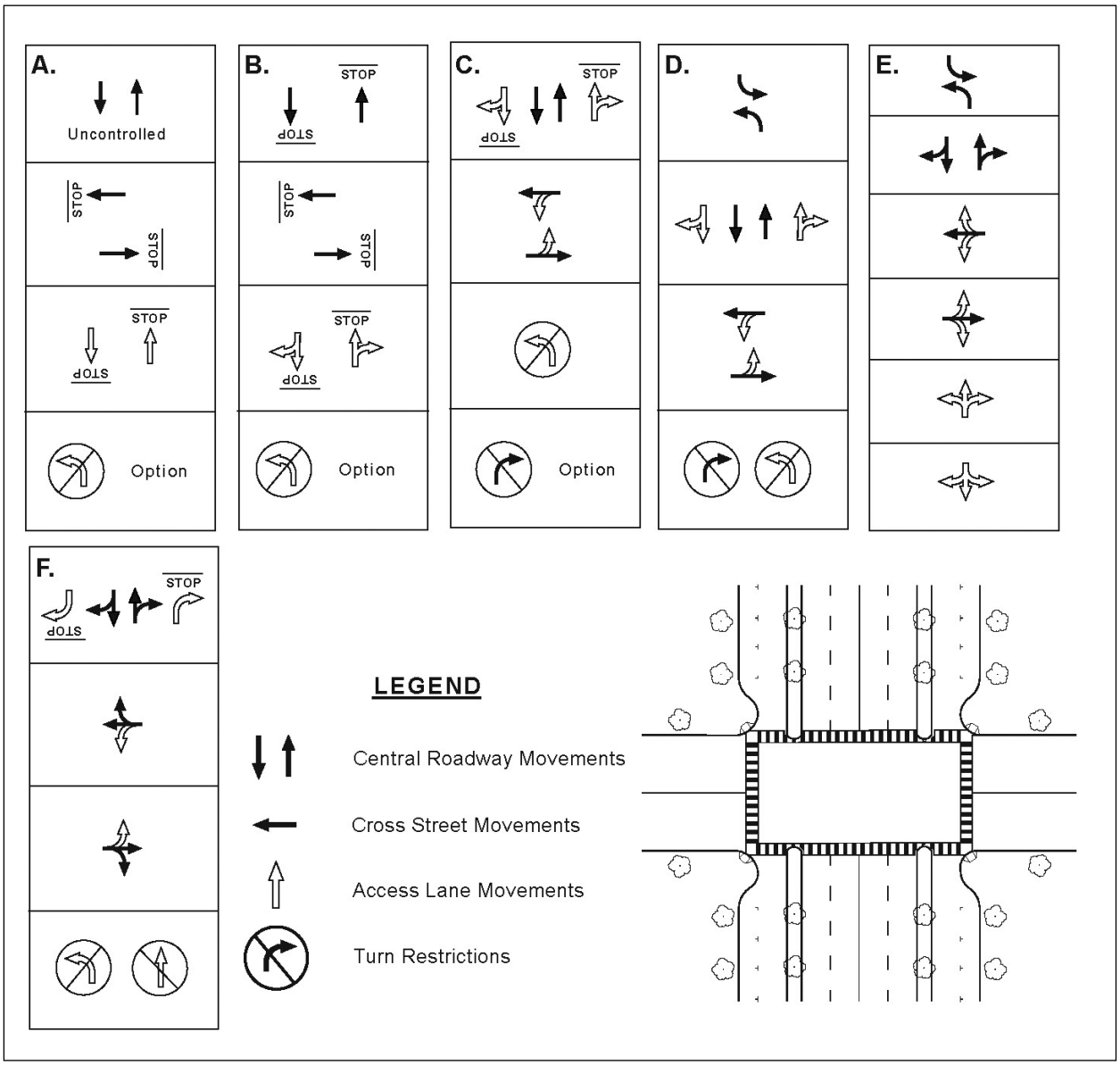

Figure 6.9 Various traffic control and turn restriction options can be employed at multiway boulevard intersections. See **Table 6.6**. Source: Kimley-Horn and Associates, Inc.

Design Example #1: Creating a Retail-Oriented Main Street

Objective

Convert an existing four-lane minor collector street into a commercial-oriented street that supports an adjacent mix of retail, restaurants and entertainment uses on the ground floor.

Stage 1: Review or develop an area transportation plan

Review the area transportation plan to determine how the subject thoroughfare relates to the overall network, types of modes served, functional classification, existing and future operational characteristics and so forth. Collect existing and projected data as necessary.

Existing Street Characteristics
Existing street is a four-lane, undivided collector street with the following characteristics (see **Figures 6.10** and **6.11**).

- Functional classification: minor collector.
- Right of way: 60 feet.
- Four through-traffic lanes plus 6-foot sidewalks on each side.
- On-street parking: none.
- Average daily traffic (ADT): 10,000–13,000 vehicles per day (vpd).
- Speed limit: 35 mph.
- Percent heavy vehicles: 2–3 percent.
- Intersection spacing: 600–700 feet.
- Network pattern: grid.
- Center turn lane: none.
- Transit: low-frequency local route.
- Bicycle facilities: not a designated bike route.
- No landscaping.
- Conventional street and safety lighting.

Stage 2: Understand community vision for context and thoroughfare

Vision
An existing commercial street in a suburban (C-3) area undergoing change to an urban center (C-5). Emphasizes an active street life that is to be achieved through the mix and intensity of land uses, site and architectural design, with an emphasis on pedestrian facilities and on-street parking.

Stage 3: Identify compatible thoroughfare types and context zones

Existing context is identified by assessing the character and attributes of existing land uses such as building orientation to the street, building height, parking orientation, mix and density of uses and so forth. Future context is determined by interpreting the vision, goals and objectives for the area. Thoroughfare type is selected based on the urban thoroughfare characteristics (Table 4.2 in Chapter 4).

- Existing context zone: C-3.
- Future context zone: C-5.
- Desired thoroughfare type: avenue.

Stage 4: Develop and test the initial thoroughfare design

Desirable Design Elements (in prioritized order based on vision)

- Lower target speed.
- On-street parking.
- Wide sidewalks.
- Street furniture and landscaping including benches and space for cafes, public space and so forth.
- Pedestrian-scaled lighting.
- Street trees.
- Bus stops with shelters.
- Transitions between main street and adjacent higher-volume segments.

- Midblock crosswalks on long block sections.
- Bike accommodations.

Factors to Consider/Potential Trade-Offs

- Right-of-way constrained to 60 feet.
- Maximizing parking with angled versus parallel parking; changing to angled parking may increase accidents and delays.
- Reduction in the number of through lanes and vehicle capacity versus wider sidewalks and on-street parking.
- Accommodation of large vehicles versus narrowing lane width and smaller curb-return radii to reduce pedestrian crossings.
- Accommodation of bicyclists versus width of other design elements.

Possible Alternative Solutions (see **Figure 6.12**)

1. Emphasize vehicular capacity by retaining existing four-lane section with 10-foot-wide travel lanes to allow 10-foot-wide sidewalks.
2. Emphasize parking by providing angled parking on one side, parallel parking on the other side and narrowing the two remaining travel lanes.
3. Emphasize parking and wider sidewalks by providing parallel parking on both sides, two travel lanes and 12-foot-wide sidewalks.
4. Emphasize parking and vehicular capacity with parallel parking on both sides, 9-foot-wide sidewalks, two travel lanes and a center turn lane.

In all cases use grid network to divert some traffic from project thoroughfare so reduced number of traffic lanes will suffice. This may require operational or physical improvements to other streets. Traffic to be diverted will depend on travel patterns, context and design of other thoroughfares.

Compare benefits of the four alternatives. **Figure 6.13** demonstrates one way of showing such a comparison.

Selected Alternative

Alternative #3:

- Maximizes sidewalk width;
- Provides moderate to good level of on-street parking;
- Balances street width with accommodation of larger vehicles and speed reduction;
- Allows for left-turn lanes at intersections by restricting parking; and
- Provides 10-foot minimum travel lane width.

Stage 5: Develop detailed thoroughfare design

Figure 6.14 shows a rough schematic view of how the selected alternative might be designed.

Solution Design Features

Traveled Way:

- Target speed: 25 mph.
- Traffic signals synchronized to target speed.
- Two 10-foot travel lanes.
- Two 8-foot parallel parking lanes.

Streetside:

- 12-foot sidewalks.
- Pedestrian-scaled lighting.
- Street trees in tree wells.
- 6-foot furnishings and edge zone.
- 6-foot clear pedestrian throughway.
- No frontage zone.

Intersections:

- Curb extensions to reduce pedestrian crossing distance unless left-turn lane is provided.
- High-visibility crosswalk markings.
- Safety lighting.
- Far-side bus stops with curb extension and shelters.
- ADA compliance.

Parallel thoroughfares (as needed):

- Directional signing.
- Operational adjustments or improvements.
- Physical improvements.



Figure 6.10 View of existing street. Source: Kimley-Horn and Associates, Inc.

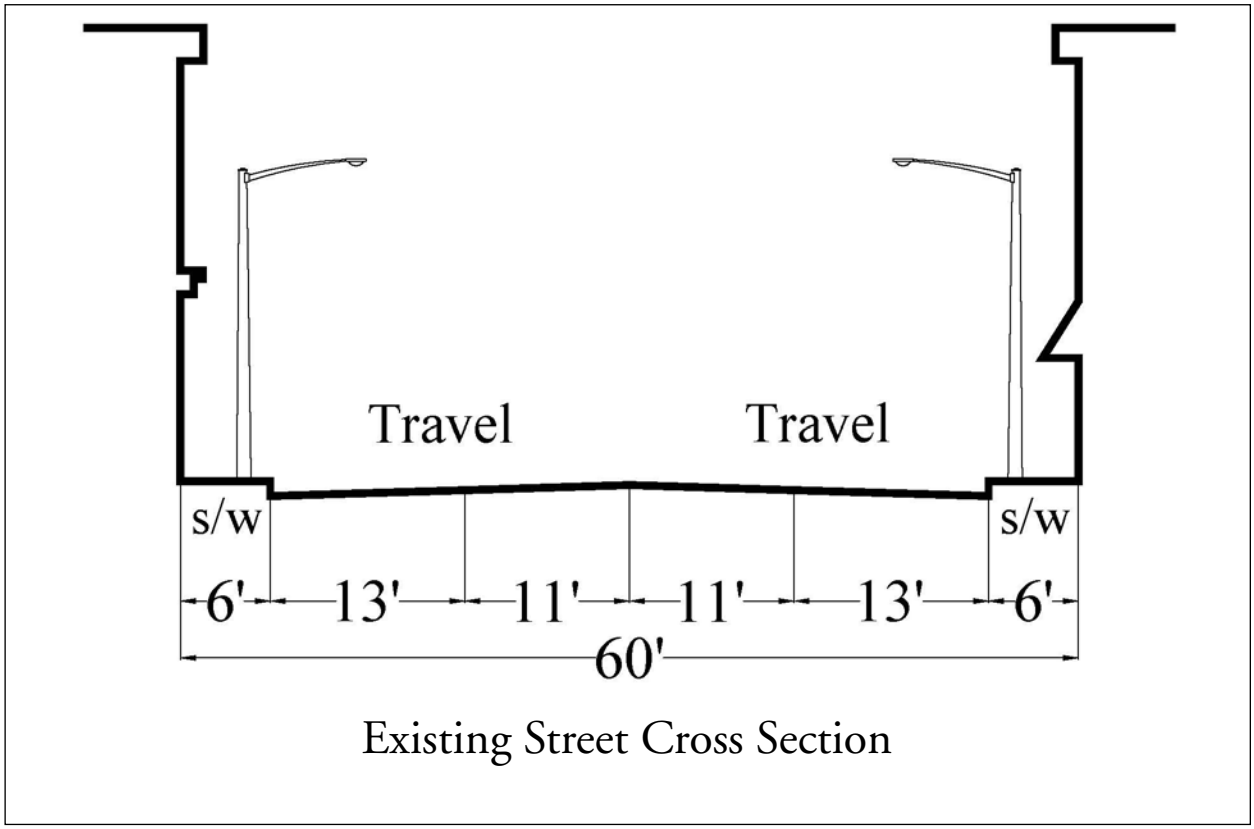

Figure 6.11 Existing street cross section. Source: Kimley-Horn and Associates, Inc.

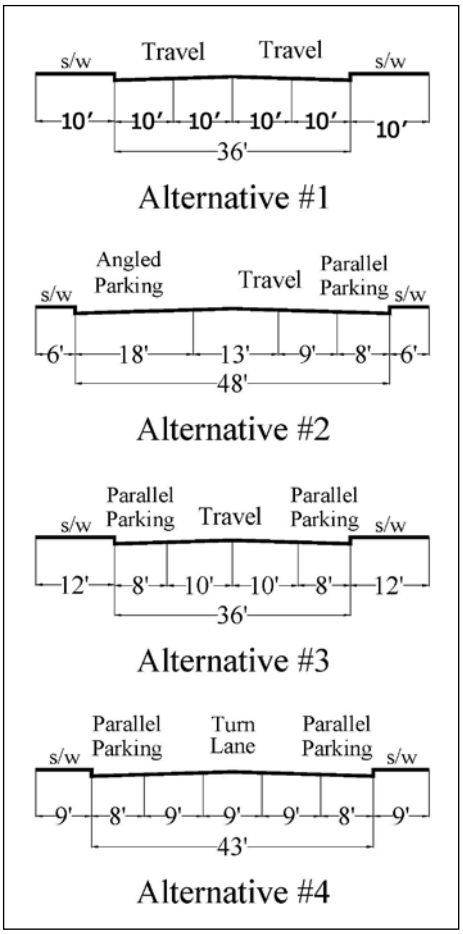

Figure 6.12 Alternative street cross sections. Source: Kimley-Horn and Associates, Inc.

Relative Comparison of Trade-Offs

Alternative	Parking	Sidewalk Width	Vehicular Capacity	Large Vehicle Accommodation	Pedestrian Crossing Width	Left Turn Lanes	Bike Accommodation	Ped. Amenity Accommodation	Speed Reduction
Existing	- -	- -	+ +	+ +	- -	- -	- -	- -	- -
1	- -	+ +	+ +	- -	- -	-	- -	+ +	+
2	+ +	- -	-	+	+ +	+ +	- -	- -	-
3	+	+ +	-	+ +	+ +	-	- -	+ +	+
4	+	-	+	- -	+	+ +	- -	-	+ +

Score (relative to other alternatives)

+ +	Good (achieves objectives)
+	Fair
-	Poor
- -	Fails to meet/achieve objectives

Figure 6.13 Relative comparison of alternative trade-offs. Source: Kimley-Horn and Associates, Inc.

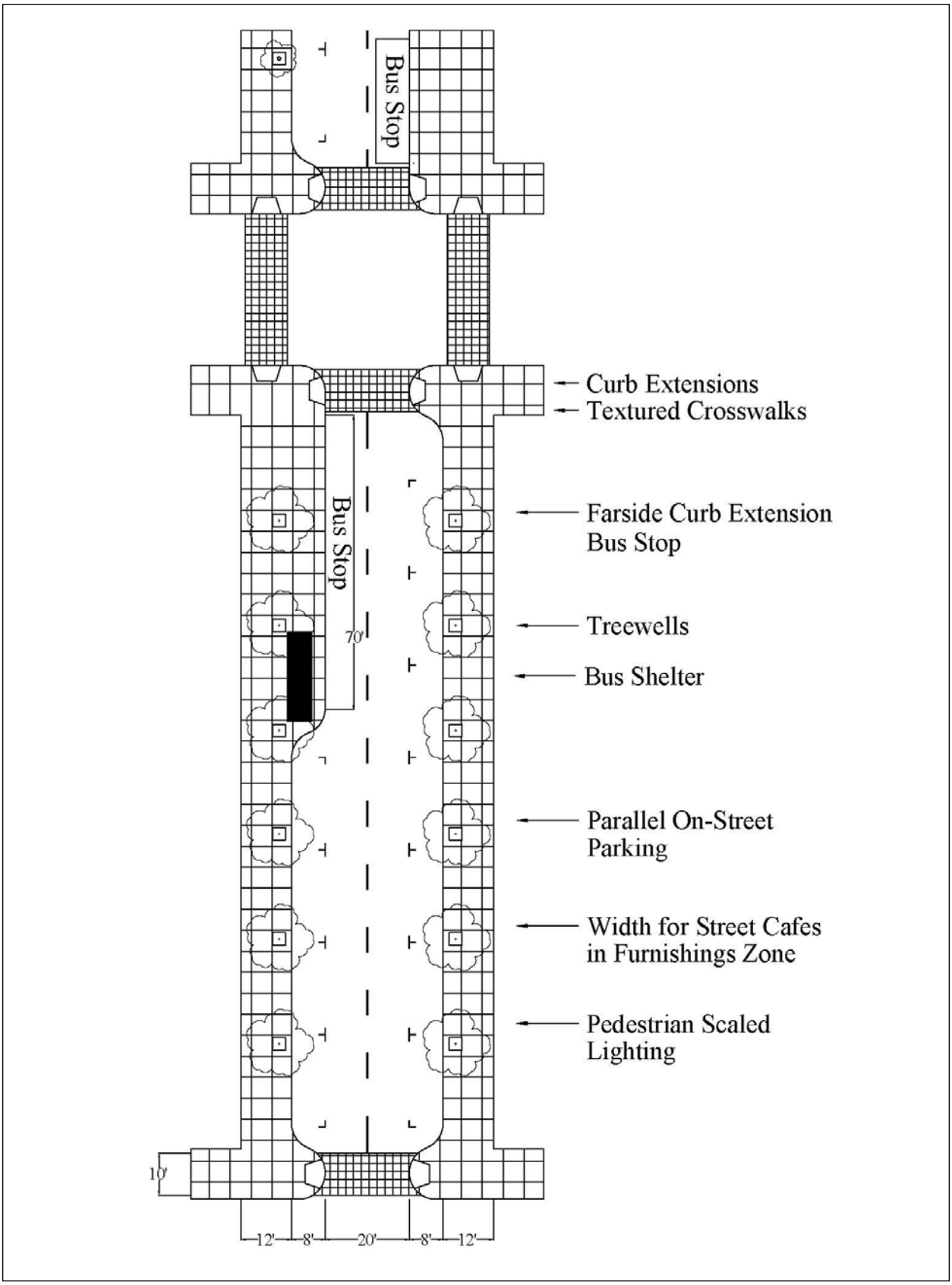

Figure 6.14 Schematic plan view of Alternative #3. Source: Kimley-Horn and Associates, Inc.

Design Example #2: Transforming a Suburban Arterial

Objective

Transform an obsolete suburban arterial into a boulevard serving a mixed-use commercial-oriented street in an area evolving from a typical suburban pattern (C-3) to a mixed environment with commercial activity and walkable development pattern (C-4).

Stage 1: Review or develop an area transportation plan

Existing Street Characteristics (see **Figures 6.15 and 6.16)**
Existing street is a seven-lane undivided arterial street with the following characteristics:

- Functional classification: principal arterial.
- Right of way: 100 feet.
- Six through-traffic lanes plus center turn lane.
- On-street parking: none.
- ADT: 32,000–40,000 vpd.
- Speed limit: 45 mph.
- Percent heavy vehicles: 4–5 percent.
- Intersection spacing: 1,250 feet.
- Network pattern: 1 mile arterial grid.
- Center turn lane: 14-foot two-way left-turn lane (TWLTL) with turn bays at intersections
- Transit: high-frequency regional route.
- Bicycle facilities: not a designated bicycle route.
- No sidewalks (4-foot, unpaved utility easement in right of way on both sides).
- No landscaping.
- Conventional street and safety lighting.

Stage 2: Understand community vision for context and thoroughfare

Vision
Community supports higher-intensity, higher-value development in an existing strip commercial corridor, transforming the suburban character of the corridor to general urban (C-4). Redesign of the street to create an attractive, walkable boulevard is a public-sector investment strategy to stimulate change. The corridor is envisioned to support a diverse mix of pedestrian-oriented retail, office and entertainment.

Stage 3: Identify compatible thoroughfare types and context zones

- Existing context zone: C-3.
- Future context zone: C-4.
- Desired thoroughfare type: boulevard.

Stage 4: Develop and test the initial thoroughfare design

Desirable Design Elements (in prioritized order based on vision)

- Lower target speed (35 mph).
- Gradual speed transition from higher-speed segments to study segment.
- Landscaped median.
- Wide sidewalks.
- Street trees.
- Typical multimodal intersection design.
- Pedestrian facilities including benches and space for cafes, public spaces and so forth.
- Pedestrian-scaled lighting.
- Bus stops with shelters.
- On-street parking.
- Increased crossing opportunities using consolidated signalized driveways.

Factors to Consider/Potential Trade-Offs

- Reduction in the number of through lanes and vehicle capacity versus wider sidewalks and median.
- Accommodation of large vehicles versus narrowing lane width.
- Provision of on-street parking versus median and wider sidewalks.
- Right-of-way acquisition to accommodate desirable features.

- Need to gradually reduce speed on higher-speed segments approaching the lower-speed segment under design.

Alternative solutions (see **Figure 6.17**)

1. Provide parking, median and minimum-width sidewalks by reducing to four travel lanes.
2. Provide wide landscaped median and sidewalks by reducing to four travel lanes without providing on-street parking.
3. Provide all desirable features, including median, wide sidewalks and parking, by reducing to four travel lanes and acquiring right of way or require private development to dedicate 7 feet.
4. Emphasize vehicular capacity and provide median and sidewalks by retaining six narrower travel lanes without providing on-street parking. Alternatively, the 11-foot outside lanes could be used for curb parking during off-peak periods and converted to travel lanes during the peak. This alternative would not provide curb extensions at intersections.

In all cases use grid network to divert some traffic from project thoroughfare so a reduced number of traffic lanes will suffice. This may require operational or physical improvements to other streets. Traffic to be diverted will depend on travel patterns, context and design of other thoroughfares.

Compare benefits of the four alternatives. **Figure 6.18** demonstrates one way of showing such a comparison.

Selected Alternative

Alternative #1:

- Near-term: Provides all desirable design features, except that it results in narrower sidewalks than other alternatives.
- Long-term: As corridor redevelops, right of way can be acquired or development can be required to provide an easement to widen sidewalks further.
- Selected alternative provides a balance between competing needs and provides most of the desirable design features without requiring right-of-way acquisition.

Stage 5: Develop detailed thoroughfare design

Figure 6.19 shows a schematic view of how the selected alternative might be designed.

Solution Design Features

Traveled Way:

- Target speed: 35 mph.
- Four 11-foot travel lanes.
- Two 8-foot parallel parking lanes.
- Tree planters in parking lane to increase planting opportunity.
- Signalized intersection spacing at 400 feet at consolidated driveways or midblock pedestrian signals to create crossing opportunities.

Streetside:

- 12-foot sidewalks.
- Pedestrian-scaled lighting.
- Street trees in tree wells.
- 6-foot furnishings zone and edge zone.
- 6-foot clear pedestrian throughway.
- Throughway and frontage zone ultimately expanded with redevelopment.

Intersections:

- Curb extensions to reduce pedestrian crossing distance.
- High-visibility crosswalks.
- Safety lighting.
- Far-side bus stops within parking lanes.

Parallel thoroughfares (as needed):

- Directional signing.
- Operational adjustments or improvements.
- Physical improvements.



Figure 6.15 View of existing street. Source: Kimley-Horn and Associates, Inc.

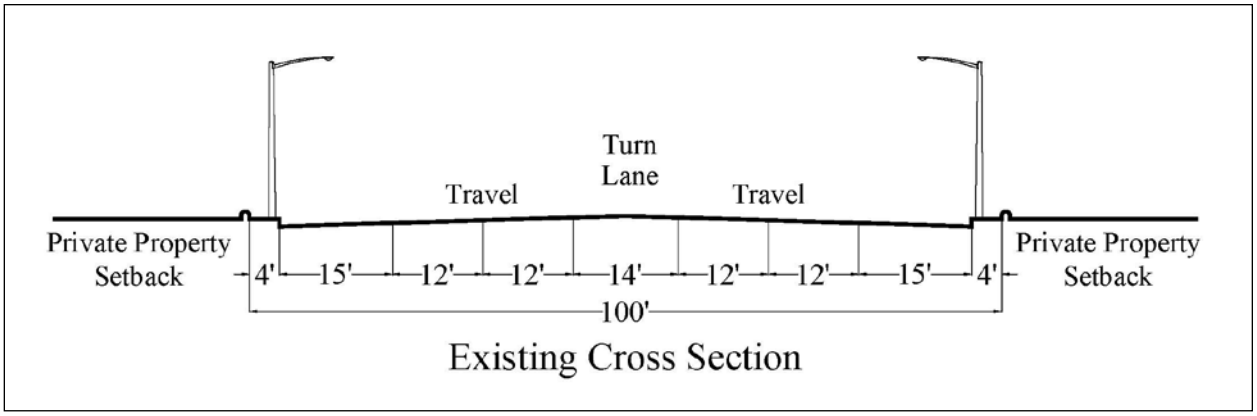

Figure 6.16 Existing cross section. Source: Kimley-Horn and Associates, Inc.

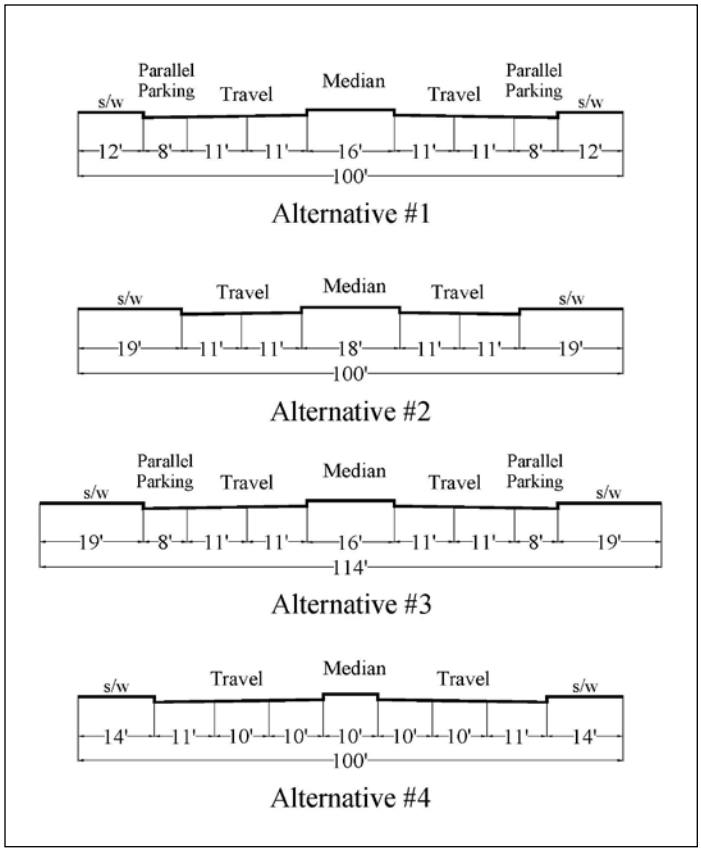

Figure 6.17 Alternative street cross-sections. Source: Kimley-Horn and Associates, Inc.

Relative Comparison of Trade-Offs

Alternative	Parking	Sidewalk Width	Vehicular Capacity	Large Vehicle Accommodation	Pedestrian Crossing Width	Left Turn Lanes	Landscaped Median	Ped. Amenity Accommodation	Speed Reduction	Right-of-way Acquisition
Existing	- -	- -	+ +	+ +	- -	+ +	- -	- -	- -	+ +
1	+ +	-	+	+	+ +	+ +	+ +	- -	+	+ +
2	- -	+ +	+	+	+ +	+ +	+ +	+ +	+	+ +
3	+ +	+ +	+	+ +	+	+ +	+ +	+ +	+	- -
4	- -	+	+ +	-	- -	+	- -	-	-	+ +

Score (relative to other alternatives)

+ +	Good (achieves objectives)
+	Fair
-	Poor
- -	Fails to meet/achieve objectives

Figure 6.18 Relative comparison of alternative trade-offs. Source: Kimley-Horn and Associates, Inc.

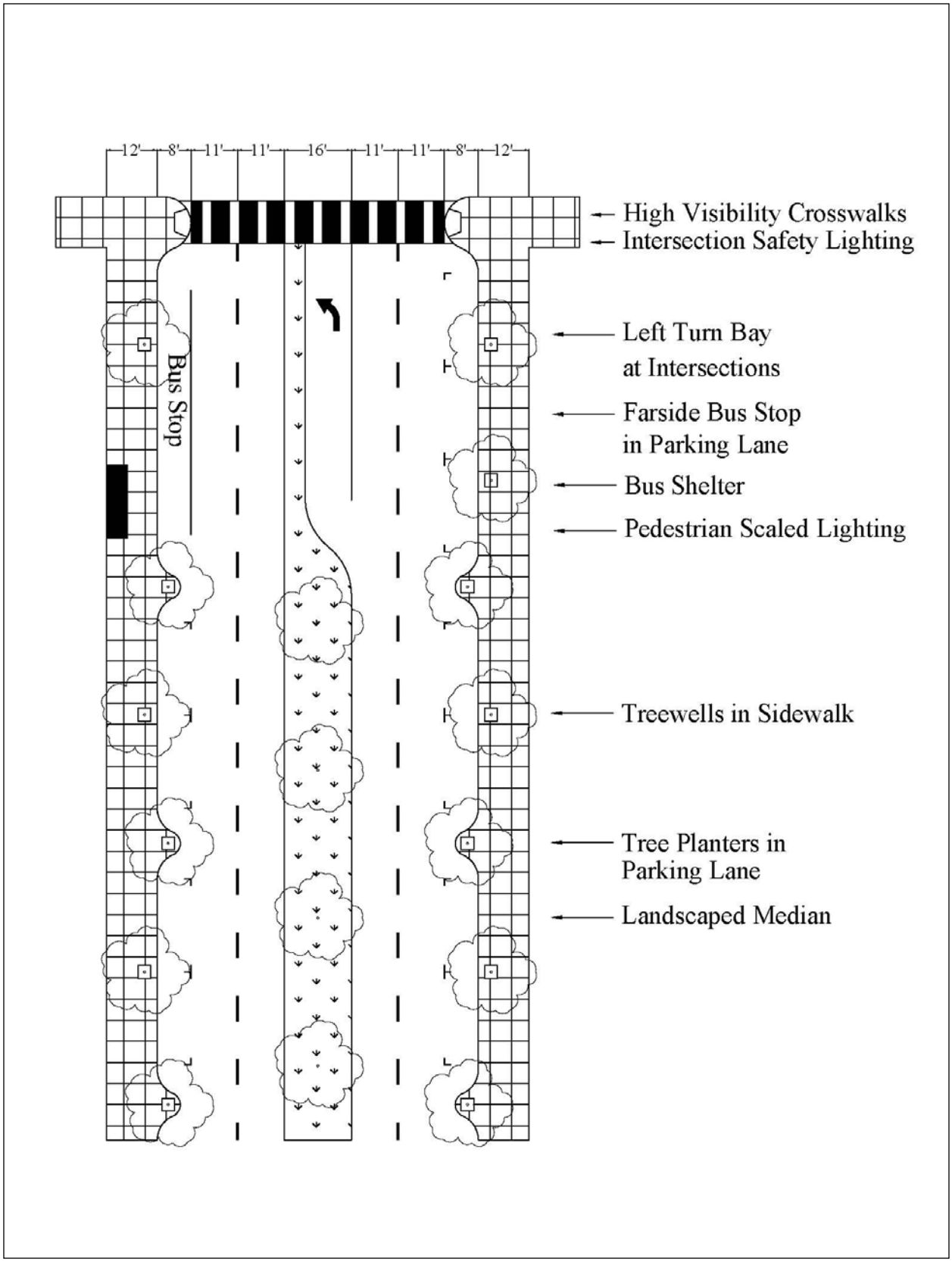

Figure 6.19 Schematic plan view of Alternative #3. Source: Kimley-Horn and Associates, Inc.

Design Example #3: High-Capacity Thoroughfare in Urbanizing Area

Objective

Design a thoroughfare in a newly urbanized area that accommodates high levels of traffic and buffers adjacent land uses from traffic impacts.

Stage 1: Review or develop an area transportation plan

Existing Street Characteristics (see **Figures 6.20 and 6.21**)
Existing street is a five-lane undivided arterial street with the following characteristics:

- Functional classification: minor arterial.
- Right of way: 90 feet.
- Four through-traffic lanes plus center turn-lane, median.
- On-street parking: none.
- Existing ADT: 25,000–30,000 vpd.
- Projected ADT: 45,000 vpd.
- Speed limit: 40 mph.
- Percent heavy vehicles: 4–5 percent.
- Intersection spacing: 600–700 feet, with many driveways.
- Network pattern: Suburban curvilinear; few alternative parallel routes.
- Center turn lane: TWLTL with turn bays at intersections.
- Transit: moderate-frequency regional and local routes.
- Bicycle facilities: designated bicycle route with 8-foot-wide paved shoulders on both sides.
- Narrow attached sidewalks (5 feet) on both sides.
- No landscaping within right of way.
- Conventional street and safety lighting.

Stage 2: Understand community vision for context and thoroughfare

Vision

Area plans envision a mix of high-density housing, retail centers and low-intensity commercial uses fronting the street. Because the roadway accommodates high levels of through traffic, access control is desired. The roadway is currently a bicycle route with bicyclists using the paved shoulder, but bicycle lanes are desired to close gaps in the bicycle system. Adjacent properties provide off-street parking, but some fronting residential and commercial uses would benefit from on-street parking. The area will generate pedestrians who desire buffering from adjacent traffic. The area plan calls for a boulevard design including an alternative for a multiway boulevard with fronting access lanes to provide on-street parking and buffer proposed mixed use development with ground floor retail and housing above.

Stage 3: Identify compatible thoroughfare types and context zones

- Existing context zone: C-3.
- Future context zone: C-5.
- Thoroughfare type: boulevard.

Stage 4: Develop and test the initial thoroughfare design

Desirable Design Elements (in prioritized order based on vision)

- Lower target speed (35 mph).
- Emphasis on vehicular capacity.
- Access management with landscaped median.
- Bicycle lanes.
- Streetside buffered from traffic.
- Street trees.
- Bus stops with shelters.
- Increased crossing opportunities at signalized intersections.
- Pockets of on-street parking adjacent to fronting commercial or mixed use development.
- Multiway boulevard design adjacent to mixed use development.

Factors to Consider/Potential Trade-Offs

- Effective width for streetside buffer versus width requirements for elements in traveled way.
- Accommodation of wider than minimum sidewalks, particularly in commercial areas.
- Provision of on-street parking in select segments versus other design elements.
- Intersections spaced to optimize traffic flow versus need for increased crossing opportunities.
- Accommodation of large vehicles, particularly turning at intersections.
- Right-of-way requirements for implementing a multiway boulevard.
- Efficient intersection operations with multiway boulevard.

Alternative Solutions (see **Figure 6.22**)

1. Emphasize streetside buffering and provision of bike lanes; provide minimal width median for access control and narrower travel lanes.
2. Implement multiway boulevard with local access streets that provide on-street parking and shared bicycle/vehicle environment. This allows a wider streetside area and removes bicycles from higher-speed roadway. This configuration requires 15 feet of right-of-way acquisition on each side of roadway, or adjacent development dedicates streetside and on-street parking lane.
3. Emphasize landscaped median and bicycle lanes by narrowing streetside. Provides minimal sidewalk width and reduced buffer area.

In all cases use grid network to divert some traffic from project thoroughfare. This may require operational or physical improvements to other streets. Traffic to be diverted will depend on travel patterns, context and design of other thoroughfares.

Compare benefits of the three alternatives. **Figure 6.23** demonstrates one way of showing such a comparison.

Selected Alternative

Alternative #2:

- Provides desirable design features, including the desire for a multiway boulevard.
- Is feasible to implement in newly urbanizing area with redevelopment opportunities.
- Requires either dedication or right-of-way acquisition, but could be implemented in phases.
- Requires special design of intersections to maintain efficient operations.

Stage 5: Develop detailed thoroughfare design

Figures 6.24 through **6.26** show a schematic view of how the selected alternative might be designed.

Solution Design Features

Traveled Way:

- Target speed: 35 mph.
- Four, 11-foot travel lanes in central roadway.
- Parallel, 18-foot-wide local access lanes separated by 8-foot-wide landscaped medians.
- Local access roads provide shared vehicle/bicycle lane and 9-foot travel lane.
- Left turn lanes on central roadway at intersections.

Streetside:

- 12-foot sidewalks.
- Pedestrian-scaled lighting.
- Street trees in tree wells.

Intersections:

- Special design treatment required to accommodate multiple movements between central roadway and local access lanes.
- Intersections widened to accommodate left-turn lane within the central roadway.

Parallel thoroughfares (as needed):

- Directional signing.
- Operational adjustments or improvements.
- Physical improvements.



Figure 6.20 View of existing street. Source: Kimley-Horn and Associates, Inc.

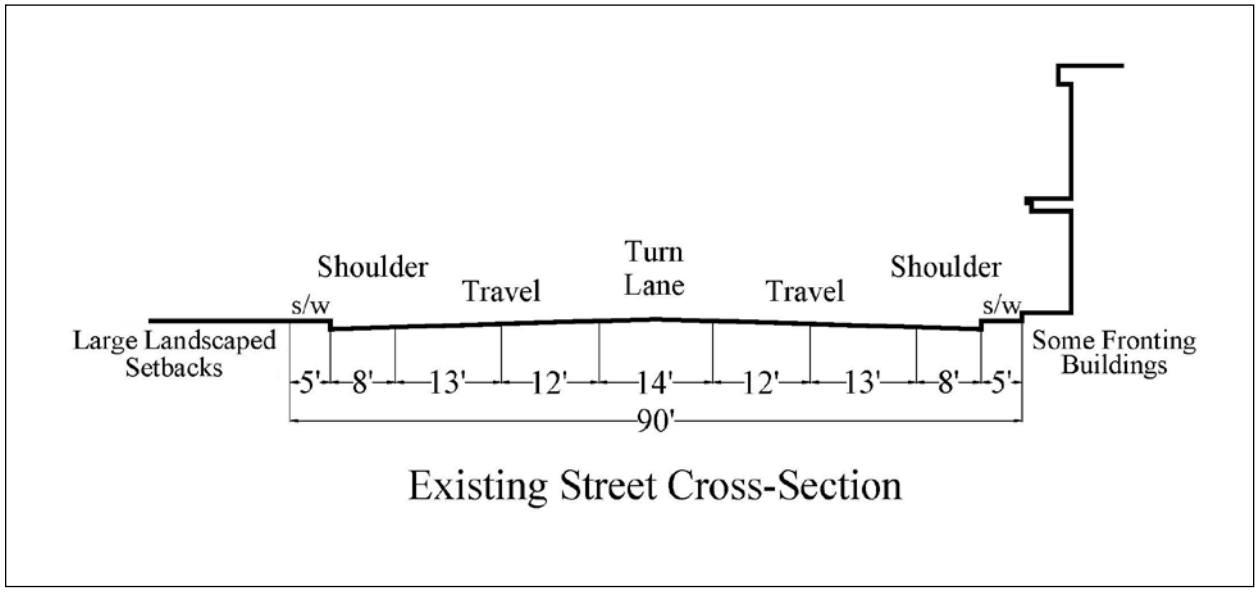

Figure 6.21 Existing street cross-section. Source: Kimley-Horn and Associates, Inc.

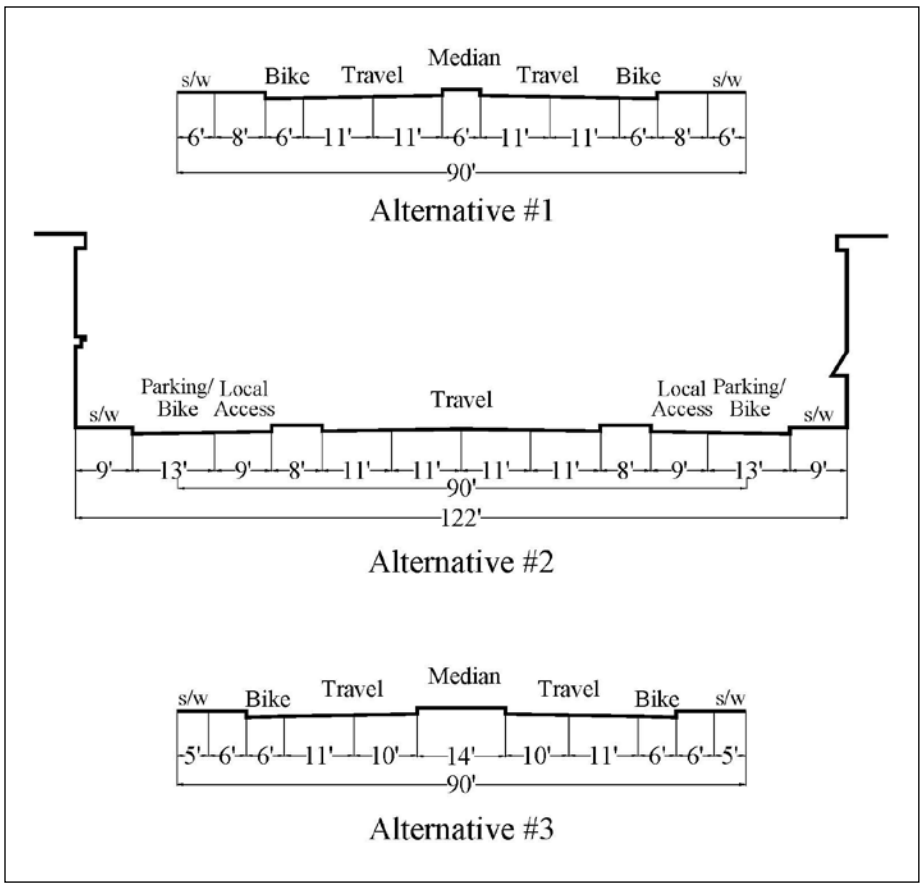

Figure 6.22 Alternative street cross-sections. Source: Kimley-Horn and Associates, Inc.

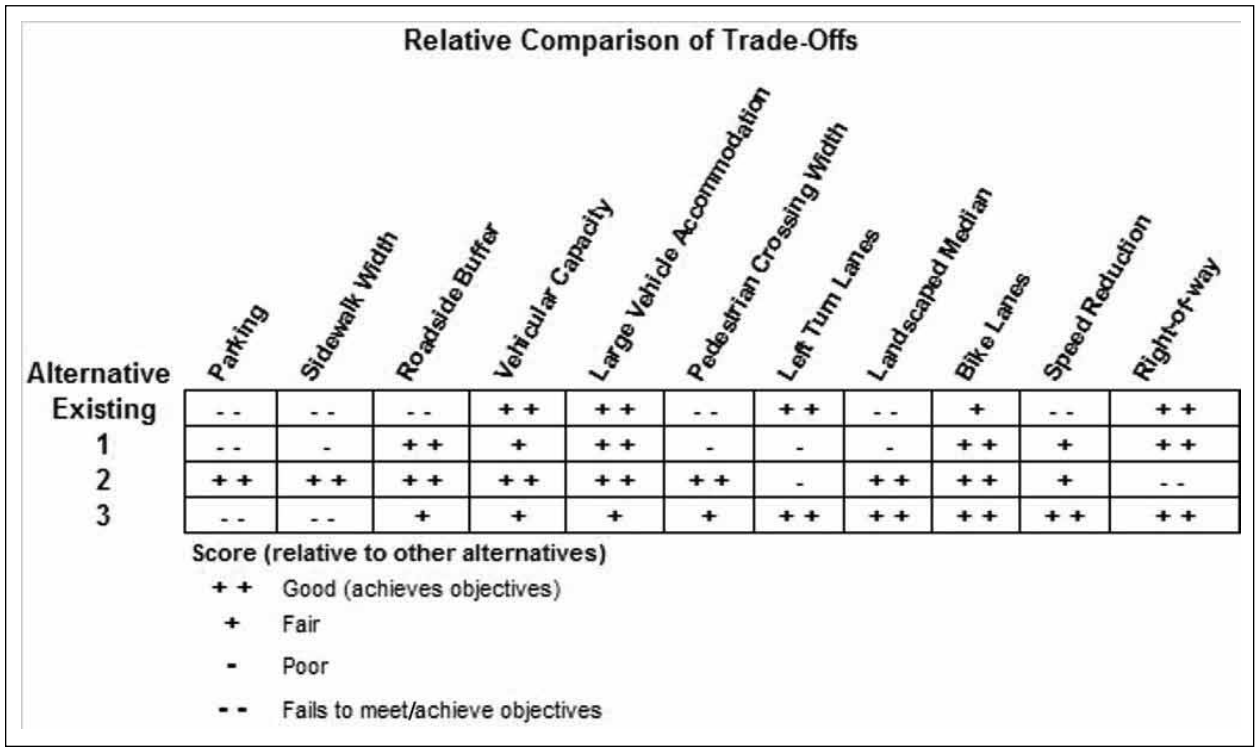

Figure 6.23 Relative comparison of alternative trade-offs. Source: Kimley-Horn and Associates, Inc.

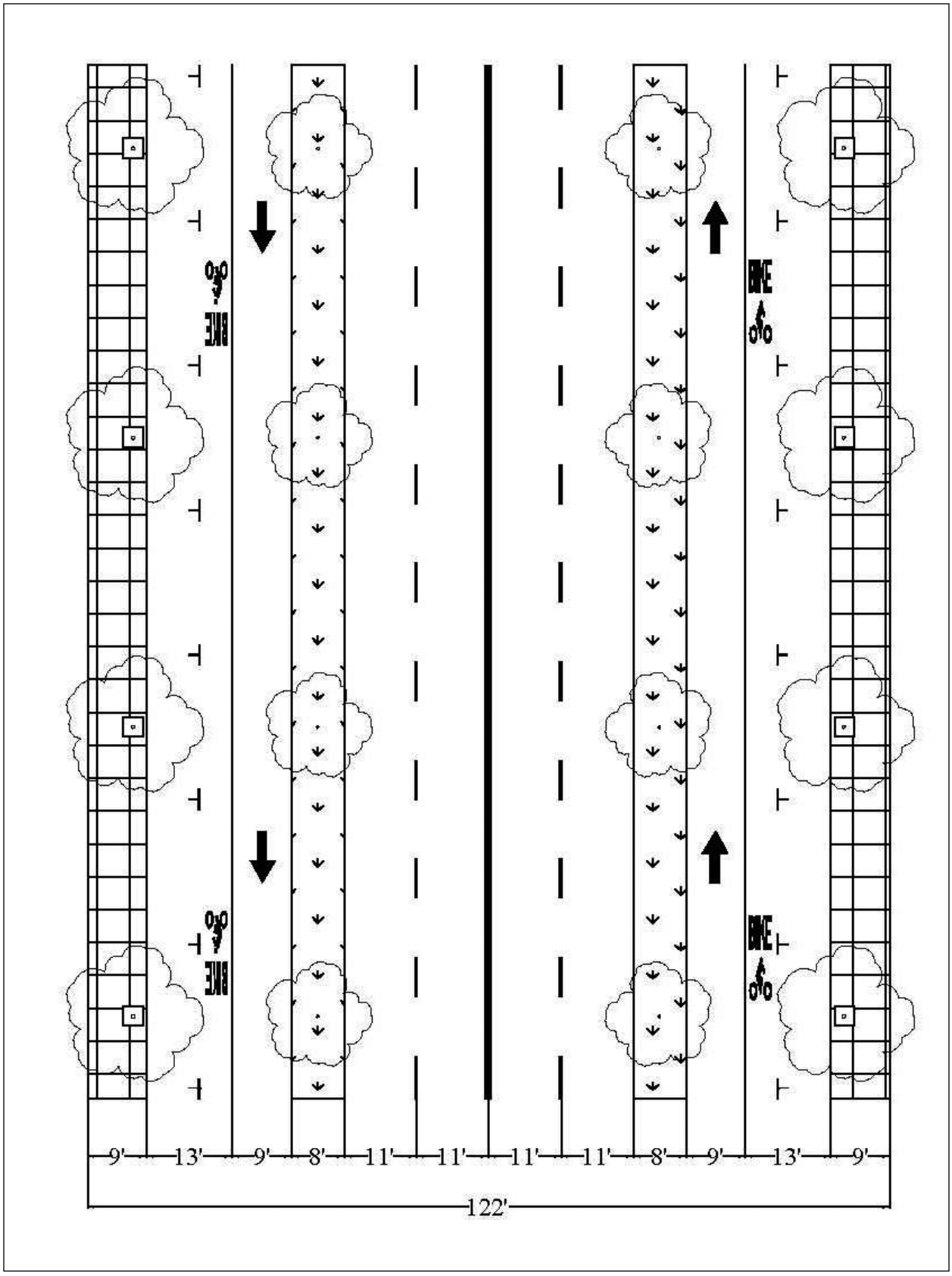

Figure 6.24 Schematic plan view of Alternative #2. Source. Kimley-Horn and Associates, Inc.

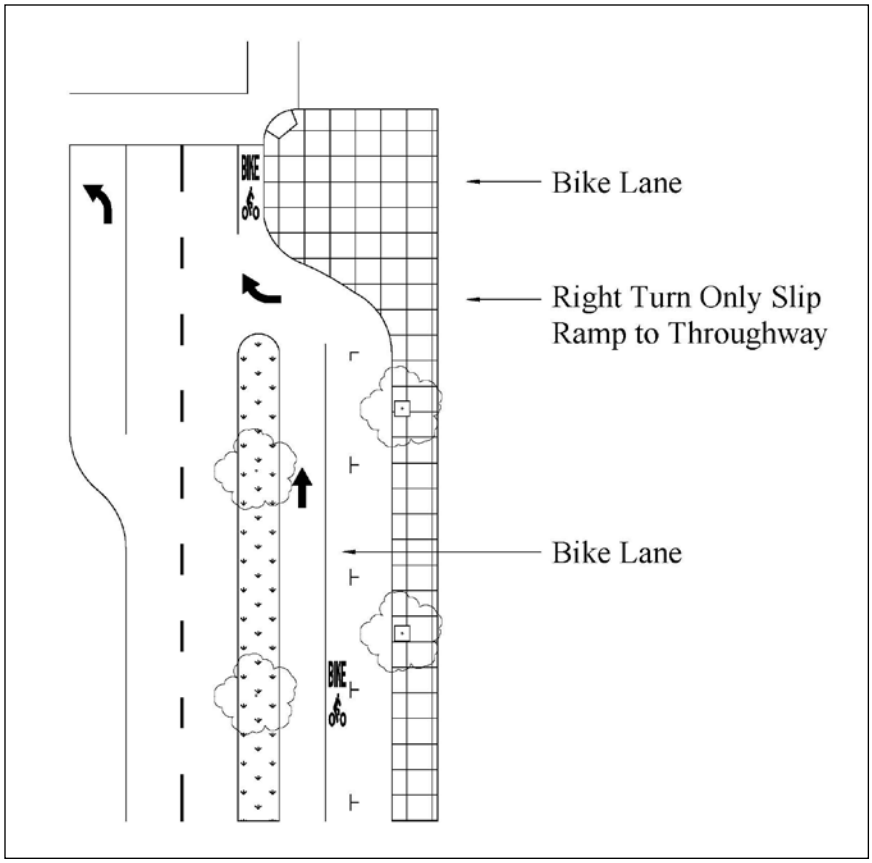

Figure 6.25 Alternative intersection design for Alternative #2. Source: Kimley-Horn and Associates, Inc.

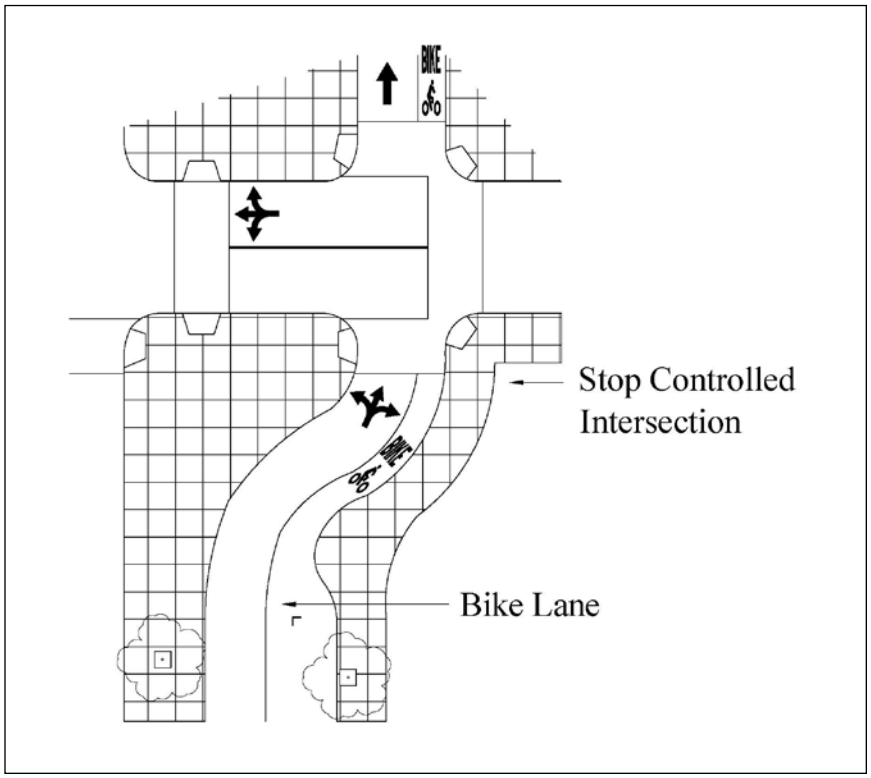

Figure 6.26 Alternative intersection design for Alternative #2. Source: Kimley-Horn and Associates, Inc.

Design Example #4: Central Business District Four- to Three-Lane Conversion

Objective

Convert an undivided four-lane arterial with parking on one side to three lanes plus parking and bicycle lanes on both sides in a central business district. The purpose of the conversion is to increase on-street parking, provide width for bicycle lanes and remove turning traffic from through lanes.

Stage 1: Review or develop an area transportation plan

Existing Street Characteristics (see **Figures 6.27 and 6.28**)
Existing street is a four-lane undivided arterial street with the following characteristics:

- Functional classification: minor arterial.
- Right of way: 100 feet.
- Four through-traffic lanes plus parallel parking on one side.
- Existing ADT: 12,000–15,000 vpd.
- Projected ADT: 18,000 vpd.
- Speed limit: 30 mph.
- Percent heavy vehicles: 2 percent.
- Intersection spacing: 400 feet.
- Network pattern: traditional downtown grid.
- Center turn lane: none.
- Transit: high-frequency regional and local routes.
- Bicycle facilities: designated bicycle route.
- 20-foot-wide sidewalks.
- Street trees in tree wells.
- Conventional street and safety lighting and pedestrian-scale lighting on sidewalks.

Stage 2: Understand community vision for context and thoroughfare

Vision
The central business district is not envisioned to change significantly in terms of its context. It will remain the highest-intensity development in the city with a mix of commercial uses, ground floor retail and office above. The district has very high levels of pedestrian and transit use; however, new high-rise residential development is increasing the downtown population. There is continued demand for on-street parking and an anticipated increase in pedestrian and bicycle travel as new residents increase 24-hour activities. The city has been implementing its bicycle plan over time by adding bicycle lanes to many of the arterial streets. The traffic engineering department continues to look for opportunities to improve intersection operations and pedestrian safety by adding left-turn bays, curb extensions and protected-only left-turn signal phasing.

Stage 3: Identify compatible thoroughfare types and context zones

- Existing context zone: C-6.
- Future context zone: C-6.
- Thoroughfare type: avenue.

Stage 4: Develop and test the initial thoroughfare design

Desirable Design Elements

- Lower target speed (25 mph).
- Emphasis on pedestrian safety.



Figure 6.27 View of existing street. Source: Kimley-Horn and Associates, Inc.

- Improved operations at intersections.
- Bicycle lanes as part of city's master bicycle plan.
- Retention of wide sidewalks.
- Street trees.
- Far-side bus stops with shelters.
- Maximization of on-street parking.
- Reduced crossing width.

Factors to Consider/Potential Trade-Offs

- Vehicular capacity versus width required for all desirable elements.
- Efficiency/safety benefits of turn lanes and protected-only left-turn signal phasing versus four travel lanes.
- Provision of on-street parking in select segments versus other design elements.
- Accommodation of large vehicles, particularly turning at intersections, versus curb extensions and reduced crossing width.
- Ability to bypass double-parked vehicles and emergency vehicle access versus reduced number of lanes.
- Effective turning radius with addition of bicycle lanes.
- Addition of bicycle lanes on major transit route and conflicts with stopped buses.

Alternative Solution (see **Figure 6.29**)

Only one alternative design is considered in this design example:

1. Reduce number of through lanes to one in each direction; add an alternating center turn lane, on-street parking and bicycle lanes on both sides. Implement curb extensions at intersections. Retain existing streetside width.

In all cases the existing grid network may need to divert some traffic from project thoroughfare so a reduced number of traffic lanes will suffice. Traffic diversion could require operational or physical improvements to other streets.

Compare benefits of the existing and alternative conditions. **Figure 6.30** demonstrates one way of showing such a comparison.

Selected Alternative

Alternative #1:

- Projected traffic volumes can be accommodated with two lanes, and added turning lane improves intersection operations.
- Substantial parking supply added.
- Addition of bicycle lanes on both sides of the roadway closes gaps in the bicycle network and improves safety.
- Curb extensions and protected-only left-turn signal phasing provide substantial pedestrian benefit by reducing crossing distance, improving visibility and eliminating left-turn conflicts.

Stage 5: Develop detailed thoroughfare design

Figure 6.31 shows a rough schematic view of how the selected alternative might be designed.

Solution Design Features

Traveled Way:

- Target speed: 25 mph.
- Two 11-foot travel lanes and 12-foot alternating center turn lane.
- Combined 13-foot-wide parking/bike lanes on both sides.

Streetside:

- Retain existing 20-foot streetsides, pedestrian-scaled lighting and street trees in tree wells.

Intersections:

- Curb extensions and protected-only left-turn signal phasing.

Parallel thoroughfares (as needed):

- Directional signing.
- Operational adjustments or improvements.
- Physical improvements.

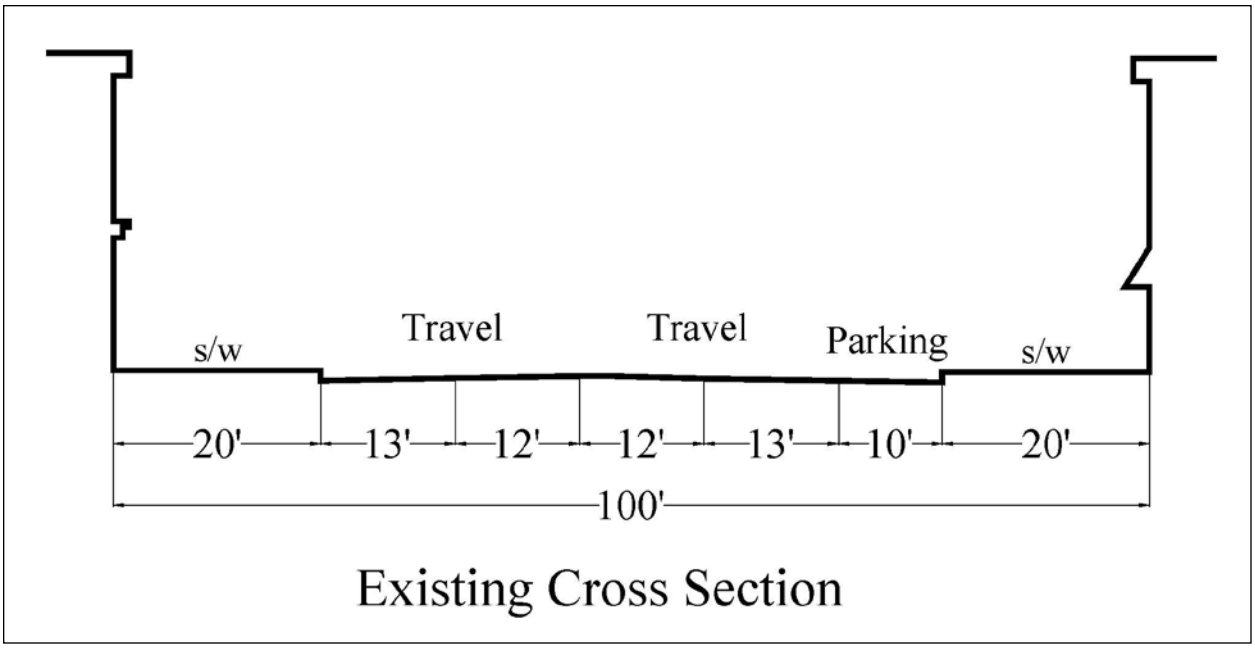

Figure 6.28 Existing street cross-section. Source: Kimley-Horn and Associates, Inc.

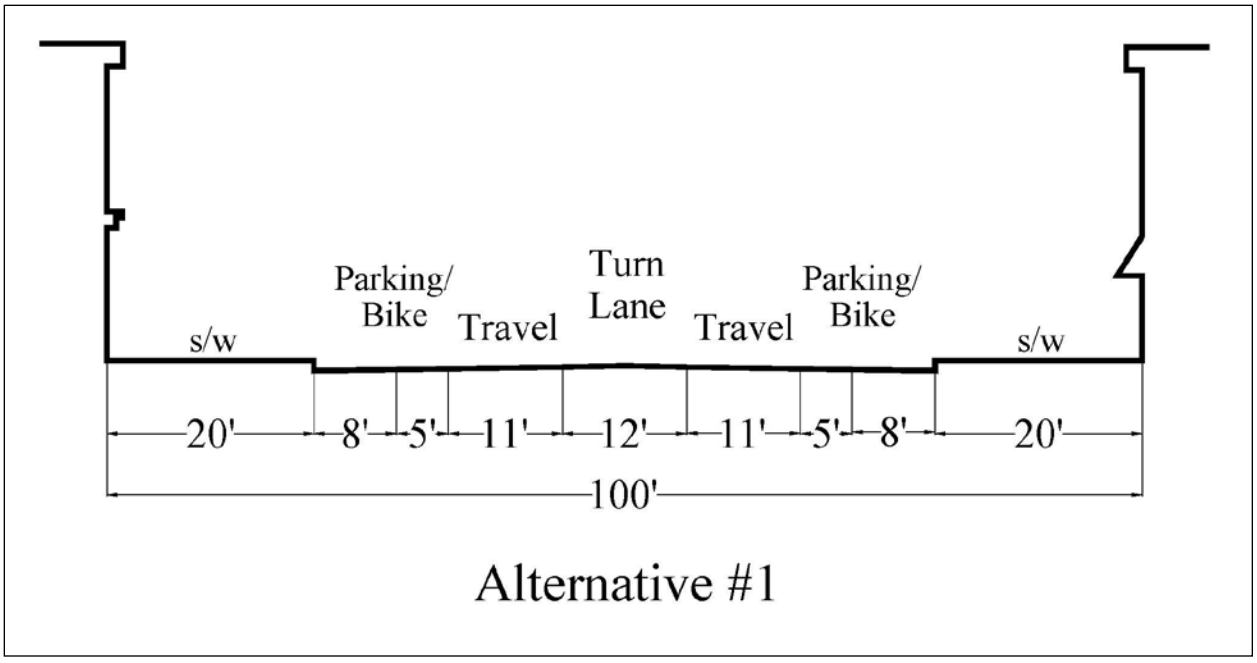

Figure 6.29 Alternative street cross-section. Source: Kimley-Horn and Associates, Inc.

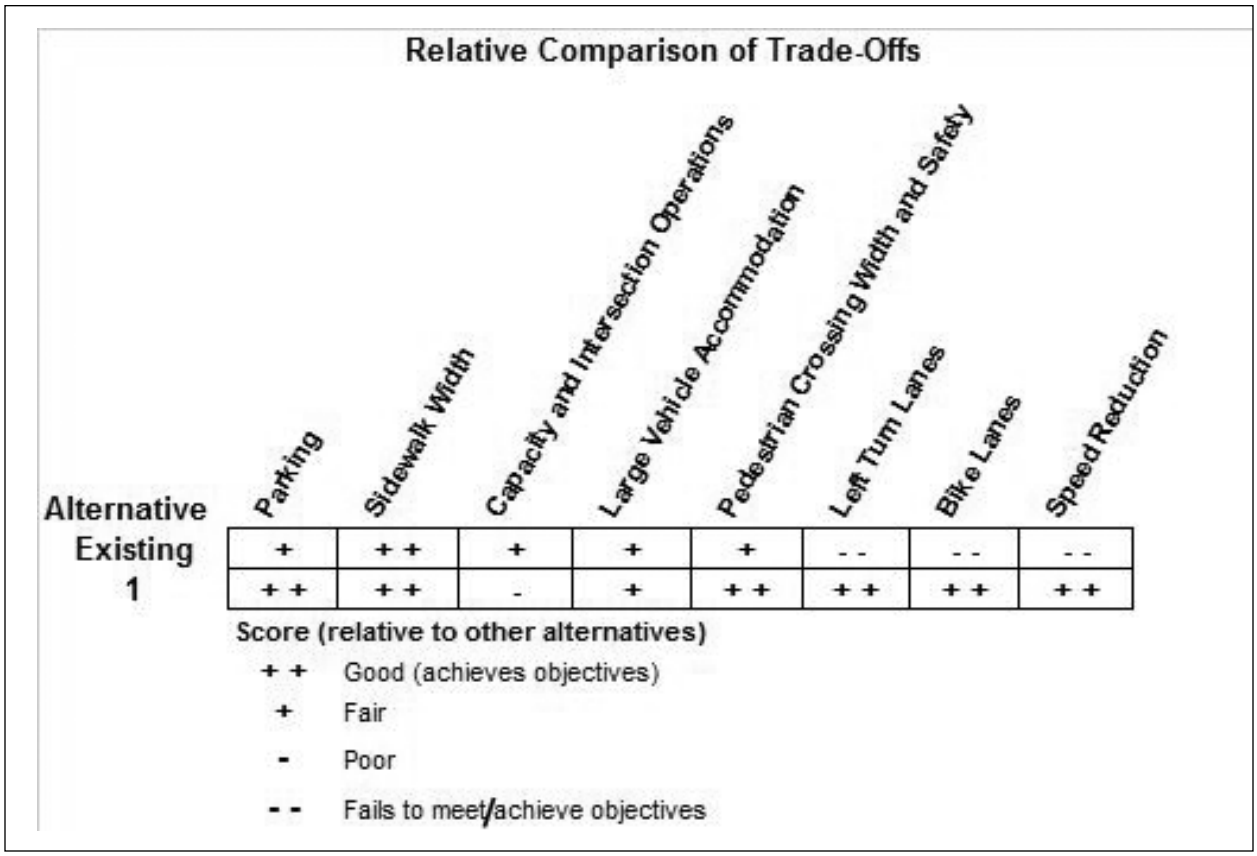

Figure 6.30 Relative comparison of alternative trade-offs. Source: Kimley-Horn and Associates, Inc.

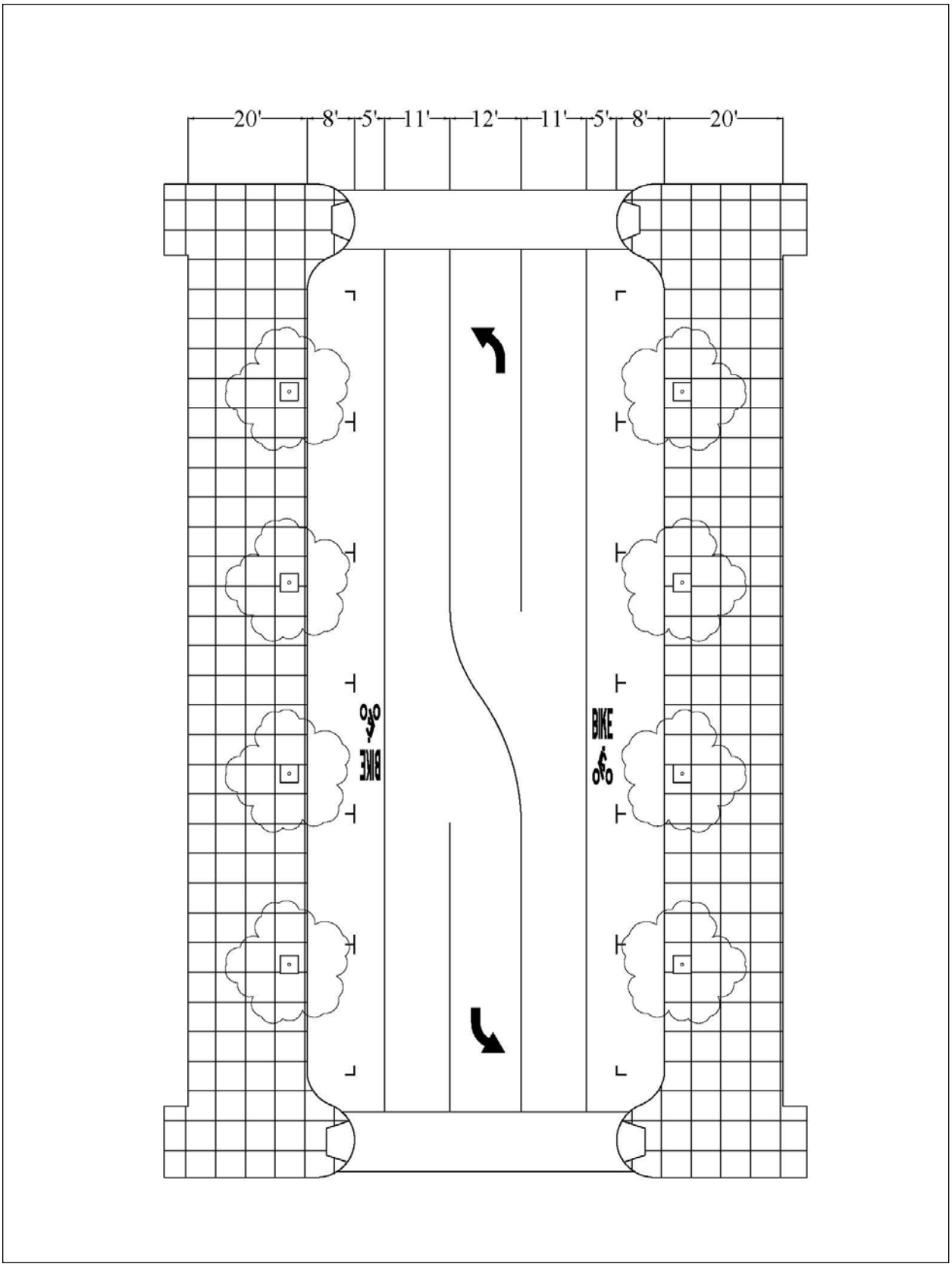

Figure 6.31 Schematic plan view of Alternative #1. Source: Kimley-Horn and Associates, Inc.

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Chapter 7
Design Controls

Purpose

This chapter discusses the fundamental design controls that govern urban thoroughfare design. This chapter is a prelude to the following chapters that present detailed design guidance for the streetside, traveled way and intersections. This chapter identifies the consistencies and divergences between design controls used where capacity is the dominant consideration and where walkability and the character of the thoroughfare is the dominant consideration.

Objectives

This chapter:

1. Defines the term "design controls" and identifies the controls used in the conventional design process;
2. Identifies design controls used in the CSS process and explains how they differ from conventional practice;
3. Discusses the concept of a "target speed" for selecting design criteria;
4. Identifies factors that can be used in thoroughfare design to influence speed;
5. Discusses the concept of a "control vehicle" in combination with a design vehicle to select intersection design criteria; and
6. Provides an overview of the design controls recommended.

Introduction

Controls are physical and operational characteristics that guide the selection of criteria in the design of thoroughfares. Some design controls are fixed—such as terrain, climate and certain driver-performance characteristics—but most controls can be influenced in some way through design and are determined by the designer.

The American Association of State Highway and Transportation Officials (AASHTO) Green Book and its supplemental publication, *A Guide for Achieving Flexibility in Highway Design* (2004b), identify location as a design control and establish different design criteria for rural and urban settings. AASHTO recognizes the influence context has on driver characteristics and performance. The Green Book defines the environment as "the totality of humankind's surroundings: social, physical, natural and synthetic" and states that full consideration to environmental factors should be used in the selection of design controls. This report focuses on design controls and critical design elements in the urban context.

Design Controls Defined by AASHTO

AASHTO guidelines identify functional classification and design speed as primary factors in determining highway design criteria. The Green Book separates its design criteria by both functional classification and context—rural and urban. The primary differences between contexts are the speed at which the facilities operate, the mix and characteristics of the users and the constraints of the surrounding context.

In addition to functional classification, speed and context, AASHTO presents other design controls and criteria that form the basis of its recommended design guidance. The basic controls are:

- Design vehicle;
- Vehicle performance (acceleration and deceleration);
- Driver performance (age, reaction time, driving task, guidance and so forth);
- Traffic characteristics (volume and composition);
- Capacity and vehicular level of service;
- Access control and management;
- Pedestrians and bicyclists; and
- Safety.

AASHTO's Green Book presents the pedestrian needs as a factor in highway design and recognizes the pedestrian as the "lifeblood of our urban areas." Pedestrian characteristics that serve as design controls include walking speed, walkway capacity and the needs of persons with disabilities. AASHTO's *Guide for the Planning, Design and Operation of Pedestrian Facilities* (2004c) and *Guide for the Development of Bicycle Facilities* (1999) expand significantly on the Green Book, presenting factors, criteria and design controls. This report emphasizes pedestrians and bicyclists as a design control in all contexts but particularly in the walkable, mixed-use environments primarily addressed.

Differences from Conventional Practice

This report presents design guidance that is generally consistent with the AASHTO Green Book, AASHTO's supplemental publications and conventional engineering practice. There are, however, four design controls in the application of CSS principles that are used differently than in the conventional design process. These controls are:

- Speed;
- Location;
- Design vehicle; and
- Functional classification.

Speed

The most influential design control, and the design control that provides significant flexibility in urban areas, is speed. Thoroughfare design should be based on target speed.

Target speed is the highest speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multimodal activity generated by adjacent land uses to provide both mobility for motor vehicles and a safe environment for pedestrians and bicyclists. The target speed is designed to become the posted speed limit. In some jurisdictions, the speed limit must be established based on measured speeds. In these cases, it is important for the design of the thoroughfare to encourage the desired operating speed to ensure actual speeds will match the target speed.

Conventionally, design speed—the primary design control in the AASHTO Green Book—has been encouraged to be as high as is practical. In this report, design speed is replaced with target speed, which is based on the functional classification, thoroughfare type and context, including whether the ground floor land uses fronting the street are predominantly residential or commercial. Target speed then becomes the primary control for determining the following geometric design values:

- Minimum intersection sight distance;
- Minimum sight distance on horizontal and vertical curves; and
- Horizontal and vertical curvature.

Target speed ranges from 25 to 35 mph for the primary thoroughfare types described in this report. A lower target speed is a key characteristic of thoroughfares in walkable, mixed use, traditional urban areas.

Design Factors that Influence Target Speed

Establishing a target speed that is artificially low relative to the design of the roadway will only result in operating speeds that are higher than desirable and difficult to enforce. Consistent with AASHTO, this report urges sound judgment in the selection of an appropriate target speed based on a number of factors and reasonable driver expectations. Factors in urban areas include transition from higher- to lower-speed roadways, terrain, intersection spacing, frequency of access to adjacent land, type of roadway median, presence of curb parking and level of pedestrian activity. AASHTO's *A Guide for Achieving Flexibility in Highway Design* (2004c) aptly summarizes the selection of speed in urban areas:

> *"Context-sensitive solutions for the urban environment often involve creating a safe roadway environment in which the driver is encouraged by the roadway's features and the surrounding area to operate at lower speeds."*

Urban thoroughfare design for walkable communities should start with the selection of a target speed. The target speed should be applied to those geometric design elements where speed is critical to safety, such as horizontal and vertical curvature and intersection sight distance. The target speed is not set arbitrarily but rather is achieved through a combination of measures that include the following:

- Setting signal timing for moderate progressive speeds from intersection to intersection;
- Using narrower travel lanes that cause motorists to naturally slow their speeds;
- Using physical measures such as curb extensions and medians to narrow the traveled way;
- Using design elements such as on-street parking to create side friction;
- Minimal or no horizontal offset between the inside travel lane and median curbs;
- Eliminating superelevation;
- Eliminating shoulders in urban applications, except for bicycle lanes;
- Smaller curb-return radii at intersections and elimination or reconfiguration of high-speed channelized right turns;
- Paving materials with texture (e.g., crosswalks, intersection operating areas) detectable by drivers as a notification of the possible presence of pedestrians; and
- Proper use of speed limit, warning, advisory signs and other appropriate devices to gradually transition speeds when approaching and traveling through a walkable area.

Other factors widely believed to influence speed include a canopy of street trees, the enclosure of a thoroughfare formed by the proximity of a wall of buildings, the striping of edge lines or bicycle lanes, or parking lanes. These are all elements of walkable, mixed-use urban areas but should not be relied upon as speed-reduction measures until further research provides a definitive answer.

The practitioner should be careful not to relate speed to capacity in urban areas, avoiding the perception that a high-capacity street requires a higher target speed. Under interrupted flow conditions, such as on thoroughfares in urban areas, intersection operations and delay have a greater influence on capacity than speed.

The *Highway Capacity Manual* (TRB 2000) classifies urban streets (Class I through IV) based on a range of free-flow speeds. The thoroughfares upon which this report focuses have desired operating speeds in the range of 25 to 35 mph (Class III and IV based on the *Highway Capacity Manual*). Level of service C or better is designated by average travel speeds ranging from 10 to 30 mph. Therefore, adequate service levels can be maintained in urban areas with lower operating speeds. Capacity issues should be addressed with highly connected networks; sound traffic operations management, such as coordinated signal timing; improved access management; removal of unwarranted signals; and the accommodation of turning traffic at intersections.

Location

Conventional thoroughfare design is controlled by location to the extent that it is rural or urban (sometimes suburban). This report broadens the choices for context using the urban transect, ranging from suburban to high-density urban cores. Additionally, the variation in design elements controlled by location is expanded to include predominant ground floor uses such as residential or commercial. Land uses govern the level of activity, which in turn influences the design of the thoroughfare. These influences include, but are not limited to, pedestrians and bicyclists, transit, economic activity of adjacent uses and right-of-way constraints. The CSS approach may also consider planned land uses that represent a departure from existing development patterns and special design districts that seek to protect scenic, environmental, historic, cultural, or other resources.

Design Vehicle

The design vehicle influences the selection of design criteria such as lane width and curb-return radii. Some practitioners will conservatively select the largest design vehicle (WB 50 to WB 67) that could use a thoroughfare, regardless of the frequency. Consistent with AASHTO, CSS emphasizes an analytical approach in the selection of a design vehicle, including evaluation of the trade-offs involved in selecting one design vehicle over another.

In urban areas it is not always practical or desirable to choose the largest design vehicle that might occasionally use the facility, because the impacts to pedestrian crossing distances, speed of turning vehicles and so forth may be inconsistent with the community vision and goals and objectives for the thoroughfare. In contrast, selection of a smaller design vehicle in the design of a facility regularly used by large vehicles can invite frequent operational problems. The practitioner should select the design vehicle that will use the facility with considerable frequency (for example, bus on bus routes, semi-tractor trailer on primary freight routes or accessing loading docks and so forth). Two types of vehicle are recommended:

- Design vehicle—must be regularly accommodated without encroachment into the opposing traffic lanes. A condition that uses the design vehicle concept arises when large vehicles regularly turn at an intersection with high volumes of opposing traffic (such as a bus route).
- Control vehicle—infrequent use of a facility must be accommodated, but encroachment into the opposing traffic lanes, multiple-point turns, or minor encroachment into the streetside is acceptable. A condition that uses the control vehicle concept arises when occasional large vehicles turn at an intersection with low opposing traffic volumes (such as a moving van in a residential neighborhood or once-per-week delivery at a business) or when large vehicles rarely turn at an intersection with moderate to high opposing traffic volumes (such as emergency vehicles).

In general, the practitioner should obtain classification counts to determine the mix of traffic and frequency of large vehicles and should estimate how this mix will change as context changes and keep consistent with the community's long-range vision. If there are no specific expectations, the practitioner may consider the use of a single-unit truck as an appropriate design vehicle.

Although state highways have traditionally served through and heavy/large vehicle traffic, modern thoroughfare system planning tries to accommodate movements where they are best handled from a network and context consideration. Large, heavy and unusually demanding vehicles need to be accommodated with reasonable convenience. However, in some

Multimodal Level of Service Measures

A fundamental goal of CSS is to effectively serve all modes of travel. Although good network planning, access management and innovative street designs can provide significant vehicle capacity while accommodating bicycles and pedestrians, trade-offs among modes can be an issue. Evaluating these trade-offs has historically been hampered by the fact that performance measures were developed primarily to measure vehicle movement. However, the traditional *Highway Capacity Manual* level of service framework has been adapted to evaluate performance from a transit, pedestrian and bicycle perspective.

These multimodal performance measures focus as much on the quality and convenience of facilities as they do on movement and flow. For example, the adequacy of pedestrian facilities is not determined by how crowded a sidewalk is but by the perception of comfort and safety. For transit services, frequency is an important attribute, but "on-time performance" and the pedestrian environment surrounding bus and rail stations are also critical aspects of the traveler experience. Below are examples of multimodal performance measures.

Bicycle Level of Service Measures

- Effective width of the outside through lane
- Traffic volumes
- Traffic speeds
- Truck volumes

Pedestrian Level of Service Measures

- Existence of a sidewalk
- Lateral separation of pedestrians from motorized vehicles
- Motorized vehicle traffic volumes
- Motorized vehicle speeds

For more information on multimodal level of service, see References for Further Reading at the end of this chapter.

cases, routes other than state highways may be more appropriate or more easily accommodating. Any such diversions from state routes need to be clearly marked.

Chapter 10 (Intersection Design Guidelines) provides further guidance on the design of intersections to accommodate large vehicles.

Functional Classification

Functional classification describes a thoroughfare's theoretical function and role in the network, as well as governs the selection of certain design parameters, although the actual function is often quite different. As discussed in Chapter 4, functional class may influence some aspects of the thoroughfare such as its continuity through an area, trip purposes and lengths of trips accommodated, level of land access it serves, type of freight service and types of public transit served. These functions are important factors to consider in the design of the thoroughfare, but the physical design of the thoroughfare in CSS is determined by the thoroughfare type designation (as introduced in Chapter 4 and further discussed in Chapter 6).

The Role of Capacity and Vehicular Level of Service in CSS

The conventional design process uses traffic projections for a 20-year design period and strives to provide the highest practical vehicular level of service. CSS takes traffic projections and level of service into account and then balances the needs of all users or emphasizes one user over another depending on the context and circumstances (for example, reduces number of mixed-flow travel lanes to accommodate bicycle lanes or an exclusive busway). While capacity and vehicular level of service play a role in selecting design criteria, they are only two of many factors the practitioner considers and prioritizes in the design of urban thoroughfares. Often in urban areas, thoroughfare capacity is a lower priority than other factors such as economic development or historical preservation, and higher levels of congestion are considered acceptable. The priority of level of service is a community objective; however, variance from the responsible agency's adopted performance standards will require concurrence from that agency. CSS also considers network capacity in determining the necessary capacity of the individual thoroughfare (see Chapter 3).

Thoroughfare Speed Management

Under the conventional design process, many arterial thoroughfares have been designed for high speeds and traffic volumes. As the context of these thoroughfares change over time, such as to walkable compact mixed-use areas, the speed encouraged by the design becomes a matter of concern. Further, municipalities establishing speed limits based on the measured 85th percentile speed are finding they are required to establish higher speed limits than the community desires for the area. In these cases, traffic engineers are tasked with identifying methods to reduce arterial speeds. This section identifies research and the practical experience of agencies in managing arterial speeds.

It is popularly held that higher operating speeds result in higher crash rates and higher severity of crashes. Research on the effect of actual operating speed on crash rate is inconclusive (TRB 1998). However, research does show that higher operating speeds do result in higher crash severity—higher percentages of injury and fatality crashes and more serious property damage. Hence, lower vehicular traffic speeds will be beneficial when collisions occur with other vehicles or pedestrians.

Speed management is an approach to controlling speeds using enforcement, design and technology applications. While "traffic calming" is a type of speed management usually used on local residential streets, speed management can be used on all types of thoroughfares. Speed management methods can use technologies that provide feedback to the motorist about their speed, or designs in which the motorist perceives the need for a lower speed. These techniques include signage, signalization, enforcement, street designs and built environments that encourage slower speeds. Other methods include physical devices that force drivers to slow down, such as roundabouts, raised intersections, or narrowed sections created by curb extensions and raised medians. Physical devices are generally more effective at changing driver behavior but may be more costly to implement and may not be appropriate on all thoroughfares.

Speed management is often a multidisciplinary decision because it requires input from emergency services, engineering, street maintenance departments,

law enforcement and transit service providers. The process of implementing a speed management program benefits from public involvement to understand how the community uses thoroughfares and how it perceives various speed management methods. Bicycle and pedestrian advocacy groups should also be involved in the process. Effective speed management requires knowledge of the existing traffic patterns, both quantitative and qualitative. Quantitative measures of traffic counts, intersection turn movements and speeds help to determine the existing condition and the need. Qualitative information, often gathered from the public or through observation, can explain behavioral issues. Implementation of speed management should be examined along corridors and across jurisdictions. It is important for a corridor to have a consistent speed through different jurisdictions if the character and context also remain constant.

The following is a list of speed management techniques or measures commonly used in the United States on thoroughfares designated as arterials or collectors:[1]

Active Measures

- Roundabouts, particularly when used within a "roundabout corridor."
- Road diets (reducing the number of lanes by adding medians, converting travel lanes to parking, or adding bike lanes).
- Lateral shifts or narrowing (curb extensions with a center island or other techniques that require vehicles to move out of a straight path or create neckdowns).
- Smaller curb-return radii to slow turning vehicles and the elimination of free-flow channelized right-turn lanes.
- Provision of on-street parking where adjacent land uses and activities will generate demand.
- Speed humps and speed tables (not widely used on arterials and lack support of emergency service providers).
- Speed cushions or speed platforms (less impact on emergency vehicles than hump and tables).
- Narrowed travel lanes.
- Raised crosswalks combined with curb extensions to narrow street.
- Speed actuated traffic signals where a vehicle traveling at excessive speeds will trigger the signal to change to red.

Passive Measures

- Synchronized signals to create progression at an appropriate speed.
- Radar trailers/speed feedback signs flashing "SLOW DOWN" message when speed exceeds a preset limit (most effective when coupled with enforcement).
- Visually narrowing road using pavement markings.
- Visually enclosing street with buildings, landscaping and street trees.
- Variable speed limits (using changeable message signs based on conditions).
- Speed enforcement corridors combined with public education.
- Flashing beacons on intersection approaches to slow traffic through the intersection.
- Speed limit markings on pavement.
- Mountable cobblestone medians or flush concrete bands delineating travel lanes for visual narrowing
- Shared streets using signs and pavement markings (such as bicycle boulevards).
- Automated speed enforcement (including red-light enforcement).

Additional Controls to Consider in Thoroughfare Design

In addition to the design controls discussed previously, other critical design controls in the conventional de-

1 Based on interviews with public agencies and experts in the field of speed management. Source: "Best Practices in Arterial Speed Management," prepared for the City of Pasadena. Kimley-Horn and Associates, Inc, and *ITE Journal* article "Complete Streets: We Can Get There From Here," LaPlante, J. and McCann, B., May 2008.

sign process remain applicable in the application of CSS principles. Design controls related to roadway geometry—sight distance, horizontal and vertical alignment and access control—continue to be based on conventional design practices.

Pedestrian and Bicyclist Requirements as Design Controls

Pedestrian and bicyclist requirements affect the utilization of a thoroughfare's right of way. Thoroughfares with existing or desired high levels of pedestrian and bicycle usage require appropriate streetside and bicycle facilities to be included in transportation projects. This requirement usually affects the design elements in the traveled way. Therefore, pedestrian and bicycle requirements function as design controls that influence decisions for the utilization and prioritization of the right of way. For example, requirements for bicycle lanes might outweigh the need for additional travel lanes or a median, resulting in a design that reduces the vehicular design elements to provide bicycle design elements. The design of walkable urban thoroughfares emphasizes allocating right of way appropriately to all modes depending on priority and as defined by the surrounding context and community objectives. This process results in a well thought out and rationalized design trade-off—the fundamental basis of context sensitive solutions.

Sight Distance

Sight distance is the distance that a driver can see ahead in order to observe and successfully react to a hazard, obstruction, decision point, or maneuver. Adequate sight lines remain a fundamental requirement in the design of walkable urban thoroughfares. The criteria presented in the AASHTO Green Book for stopping and signalized stop- and yield-controlled intersection sight distances based on the target speeds described above should be used in urban thoroughfare design.

Horizontal and Vertical Alignment

The design of horizontal and vertical curves is a controlling feature of a thoroughfare's design. The criteria for curvature is affected by speed and is dependent on the target speed. For urban thoroughfares, careful consideration must be given to the design of alignments to balance safe vehicular travel with a reasonable operating speed. The AASHTO Green Book provides guidance on the design of horizontal and vertical alignments for urban streets.

Access Management

Access management is defined as the management of the interference with through traffic caused by traffic entering, leaving and crossing thoroughfares. Access management can be a regulatory, policy, or design tool. Access management on urban thoroughfares controls geometric design by establishing criteria for raised medians and median breaks, intersection and driveway spacing, and vehicle movement restrictions through various channelization methods. The AASHTO Green Book and the Transportation Research Board's *Access Management Manual* (2003) provide extensive guidance on this subject. Chapter 9 (Traveled Way Design Guidelines) provides an overview of access management methods and general guidelines for managing access on urban thoroughfares.

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Chapter 8
Streetside Design Guidelines

Purpose

This chapter provides principles and guidance for the design of a thoroughfare's streetside and the specific elements that comprise the streetside. It addresses how the design of the streetside varies with changes in context. The guidance in this chapter is used in conjunction with the guidance for the other two thoroughfare components—the traveled way (Chapter 9) and intersections (Chapter 10).

Objectives

This chapter:

1. Defines and discusses four distinct zones that comprise the streetside: edge, furnishings, throughway and frontage;
2. Describes the uses and activities that are typically accommodated within the streetside in urban areas;
3. Describes fundamental design principles of the streetside as they relate to intersection sight distance, speed and clear zones and lateral clearance;
4. Describes the role and placement of streetside facilities, public spaces and public art; and
5. Provides principles, considerations and design guidance for streetside width and functional requirements.

Introduction

The streetside is the portion of the thoroughfare that accommodates nonvehicular activity—walking as well as the business and social activities—of the street. It extends from the face of the buildings or edge of the private property to the face of the curb. A well-designed streetside is important to the thoroughfare's function as a "public place." Thoroughfares are the most extensively used civic spaces or in our communities.

Streetside Zones and Buffering

This chapter addresses the design of sidewalks and the buffers between sidewalks, moving traffic, parking and/or other traveled-way elements. The streetside consists of the following four distinct functional zones:

1. Edge zone—the area between the face of curb and the furnishing zone that provides the minimum necessary separation between objects and activities in the streetside and vehicles in the traveled way;
2. Furnishings zone—the area of the streetside that provides a buffer between pedestrians and vehicles, which contains landscaping, public street furniture, transit stops, public signage, utilities and so forth;
3. Throughway zone—the walking zone that must remain clear, both horizontally and vertically, for the movement of pedestrians. The Americans with Disabilities Act (ADA) establishes a minimum width for the throughway zone; and
4. Frontage zone—the distance between the throughway and the building front or private property line that is used to buffer pedestrians from window shoppers, appurtenances and doorways. It contains private street furniture, private signage, merchandise displays and so forth and can also be used for street cafes. This zone is sometimes referred to as the "shy" zone.

Figure 8.1 illustrates the four zones using the example of a streetside in a commercial area. Guidance is provided for each of these zones, with the width varying in relation to thoroughfare type and function, context zone and specific land use characteristics.

Urban Design Elements

The streetside can contain a variety of urban design elements, ranging from large-scale elements such as plazas, seating areas, transit stops and other public

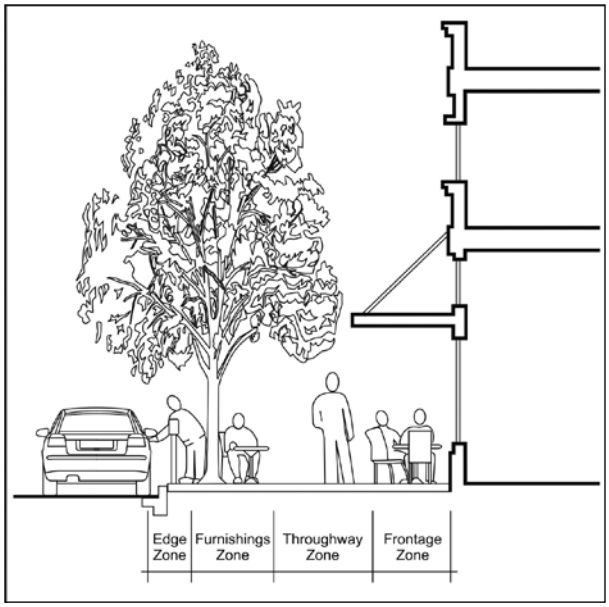

Figure 8.1 Streetside zones. Source: Concept by Community, Design + Architecture, illustration by Digital Media Productions.

spaces to the details of street furniture, street trees, public art and materials used for constructing sidewalks, walls and so forth.

Technical Considerations

There is a broad range of technical and engineering considerations that need to be coordinated with the design of the streetside, including the requirements of *Americans with Disabilities Act Accessibility Guidelines* (ADAAG) and *Public Rights-of-Way Accessibility Guidelines* (PROWAG) (www.access-board.gov/), need for utilities (including lighting for both the traveled way and streetside), provision of signage for traffic and pedestrians and evaluation of multimodal accessibility. This chapter provides guidance for how these technical issues can be addressed in coordination with the other elements of urban thoroughfares.

The Urban Streetside: Uses and Activities

The basic functions of the streetside in any context are the accommodation of pedestrians, access to adjoining buildings and properties and the provision of clear zones and space for utilities and other streetside appurtenances. In urban contexts these basic functions are shared with the activities generated by the adjacent land use and general civic functions, which can include aesthetics (such as street trees and public art), sidewalk cafes, plazas and seating areas, transit amenities (such as benches, shelters, trash receptacles and waiting areas), merchandise display and occasional public activities (such as farmers' markets or art shows).

Streetside functions vary by context zone and predominant ground floor land use. The width of certain elements of the streetside (for example, the furnishings zone functions as a traffic buffer) will vary by thoroughfare type depending on the existence or lack of on-street parking and the speed and volume of vehicular traffic on the thoroughfare. Variations in the width of the streetside are addressed in the design guidelines in the section on streetside width and functional requirements.

Design Principles

Safety

When designing the streetside, the practitioner is concerned about the safety of all users of the thoroughfare. Streetside safety concerns in urban contexts are different than those in rural contexts, where speeds are higher and most travel is by vehicle. In designing the streetside for traditional walkable urban areas, the practitioner is concerned about the safety of a wider range of users, including pedestrians on the sidewalk, motorists, motorcyclists and bicyclists using the traveled way. The practitioner should consider the context of the thoroughfare, including competing demands within limited right of way and time when the space may be needed.

Streetside safety in urban areas is achieved by separating modes of different speeds and vulnerabilities to the extent possible by both space and time (bicyclists from pedestrians and pedestrians from vehicles), informing all users of the presence and mix of travel modes and through provision of adequate sight distance. The difficulty for the practitioner lies in developing solutions to resolve the inherent conflicts where modes of travel cross paths. Design guidelines for improving pedestrian safety at intersections are discussed in Chapter 10.

Streetside safety for the users of the traveled way in traditional urban areas focuses on meeting user expectations, providing uniform and predictable designs and traffic control, removing clearly hazardous streetside obstacles and establishing an appropriate target speed, which in turn controls the speed-related geometric design elements of the thoroughfare. The practitioner should be familiar with the concepts and guidance provided in AASHTO's *Roadside Design Guide* (2002).

Relationship of Speed to Streetside Design

A person's decision to walk is influenced by many factors, including distance, perceived safety and comfort, convenience and visual interest of the route (AASHTO 2004b). In the streetside, pedestrians feel exposed and vulnerable when walking directly adjacent to a high-speed travel lane. Vehicle noise, exhaust and the sensation of passing vehicles reduce pedestrian comfort. Factors that improve pedestrian comfort include a separation from moving traffic and a reduction in speed. In walkable urban environments, a buffer zone that improves pedestrian comfort can be achieved with the width of the edge and furnishings zones, landscaping and on-street parking.

Clear Zones

The application of a clear zone is most critical on high-speed roadways and is usually not implemented on low-speed urban thoroughfares with right-of-way constraints. In many cases the hazard of streetside obstacles is substantially less in urban areas because of lower speeds or parked vehicles.

Public Space

Civic and community functions on the streetside may require additional space to complement adjacent civic or retail land uses or to accommodate the high pedestrian flows of adjacent uses or transit facilities. Public spaces in the streetside are often used for these functions and are an important complement to the thoroughfare as a public place. Public spaces include public plazas, squares, outdoor dining, transit stops and open spaces. Transit stops and some plazas are generally within the streetside. Design considerations should account for the context of the public space within the thoroughfare and the surrounding land use context. Public spaces should be designed to serve functions that enhance the surrounding context, such as public gatherings, special events, farmers' markets, quiet contemplation, lunch time breaks and so forth (**Figure 8.2**). General principles for the design of public spaces include the following:

- Public spaces in private property adjacent to the streetside should be visible and accessible from the streetside. These public spaces can accommodate higher levels of pedestrian activity at entries to major buildings or retail centers.
- Public spaces in the streetside should not impede the circulation of pedestrians and should provide appropriate features such as seating and lighting to make them attractive and functional places for people to use.
- The streetside and public space design should integrate the functions of both in a compatible and mutually supportive maneuver. Functions should interconnect by design.
- Special paving and materials may be used to unify the look of the sidewalk, parking lane and crosswalks.
- There should be a continuity of design in adjacent streetside and public spaces. This may include paving, lighting, landscape plants and materials and other features.
- Street trees, light fixtures, public art and other elements with a unified design can be used to highlight a segment of a thoroughfare that is specifically designed to function as a public gathering place.

Placement of Streetside Facilities

Following the division of the streetside into edge, furnishings, throughway and frontage zones, the placement of streetside facilities (such as kiosks and retail stands, trash receptacles, water fountains, restrooms, public art and small ancillary structures) should occur in the furnishings and frontage zones as well as in curb extensions. In no case should the placement of features reduce the width of the clear pedestrian throughway to less than 5 feet or reduce vertical clearance below 80 inches. All placements should be compliant with the most recent U.S. Access Board and PROWAG requirements and FHWA PROWAAC guidelines: *Special Report: Ac-*



Figure 8.2 Public space adjacent to the pedestrian realm should relate to the activities on the thoroughfare. Source: Kimley-Horn and Associates, Inc.

cessible Public Rights-of-Way: Planning and Designing for Alterations.

Other considerations regarding streetside facilities are as follows:

1. Place facilities in locations where their use will produce pedestrian activity levels similar to a main street or where an activity focus is desired. Features such as public art should be located in highly visible areas, including the center islands of low-speed roundabouts (ensuring sight triangles are maintained and placement does not constitute a streetside hazard).
2. Select the type, design and materials of streetside facilities to reflect the local character of the context and streetside. This will maximize the facility's contribution to creating a sense of community identity.
3. Coordinate design elements (street furniture, light fixtures and poles, tree grates and so forth) to fit into a desired theme or unified style for a given thoroughfare. This can be best achieved through the preparation of a streetscape improvement plan.
4. Streetside facilities are particularly well suited for placement on very wide sidewalks or large curb extensions. Locate facilities at street corners in a manner that maintains clear sight triangles. (For more information, review the discussions on sight triangles and curb extensions in Chapter 10.)
5. Consider vehicle overhangs and door swings of parked vehicles.
6. Facilities should never obstruct the clear pedestrian throughway, curb ramps, or any accessible element of the streetside.
7. Place vertical elements so they provide the required lateral clearance to the face of the curb and satisfactory shoulder clearance from the clear pedestrian throughway zone.



Figure 8.3 Public art adds interest to a walking route. Source: Kimley-Horn and Associates, Inc.

Context Zones

The placement of streetside facilities should be focused in urban center (C-5) or urban core (C-6) context zones with predominantly retail- and entertainment-related ground floor uses with a main street level of pedestrian activity. The need for and benefits from facilities such as kiosks, restrooms, or small-scale retail stands is typically highest in C-5 and C-6 zones.

Facilities in the general urban (C-4) or suburban (C-3) context zones should be located at nodes of increased intensity of ground floor retail and entertainment uses that produce high levels of pedestrian activity. The provision of facilities at public transit transfer centers should be considered in all context zones.

Public Art

Pedestrian improvements create an opportunity to implement public art (**Figure 8.3**). On a large scale, public art has the ability to identify a district or contribute to a design theme. It can be an effective means of encouraging pedestrian travel by adding interest to the route and creating community identity. The redesign of thoroughfares creates opportunities for the implementation of public art as part of an urban design or streetscape plan. This includes, but is not limited to artistically designed paving; design of furnishings, light fixtures, railings, or low walls; and sculptural objects, murals or other surface treatments. Placement of public art and monuments should not obstruct the driver's view of traffic control devices, be a distraction, or be located in a manner that could create a streetside hazard to motorists.

Design Guidance

Design guidance for the streetside elements of the thoroughfare is provided in the following sections. Specifically, design guidance is provided for streetside width and functional requirements, pedestrian buffers and edge and furnishings zone elements (trees and parkways, sidewalk crossings of driveways and alleys, utilities, street furniture and landscaping).

Streetside Width and Functional Requirements

Related Thoroughfare Design Elements

- Intersections.
- Edge, furnishings, throughway and frontage zone principles and considerations.
- Streetside facilities.
- Snow removal.
- Curb extensions.



Figure 8.4 A streetside with well defined zones. Source: Community, Design + Architecture.

Background and Purpose

The streetside, including the sidewalk, provides for the mobility of people and is an important social space where people interact and walk together, wait for transit, window shop, access adjoining uses, or have a cup of coffee at a street cafe. The streetside must be wide enough to accommodate movement as well as the important social functions related to the land uses located along the thoroughfare. The width and function of the streetside influence safety and help achieve accessibility. The optimal streetside width varies with the expected streetside activities, character of adjacent land uses and speed and volume of vehicular traffic in the thoroughfare.

General Principles and Considerations

General principles in the selection of appropriate streetside width include the following:

- The streetside should have well-defined zones so that the pedestrian throughway is clearly demarcated (**Figure 8.4**).
- Sidewalks should be provided on both sides of the street in urban contexts. In a small number of conditions, a sidewalk on only one side of the street is appropriate when unusual land uses, such as a canal, steep vertical wall, or railroad, exist and people do not have a need to access that side of the street.
- Care should be given where driveways and alleys cross sidewalks. At these locations there is a potential for conflict between drivers and pedestrians and an increased possibility that pedestrian safety will be compromised. Crossings of driveways, garage accesses, alleys and such should maintain the elevation of the sidewalk and may be considered for special materials, colors, textures and markings alerting motorists that they are traversing a pedestrian zone.
- Utilities should not interfere with pedestrian circulation or block entrances to buildings or curb cuts or interfere with sight distance triangles.
- Space requirements for, and access to, transit facilities (such as bus shelters) should be included in the design of the streetside but must be outside of the clear pedestrian travel way.
- Sidewalks must provide convenient connections between building entries and transit facilities.
- Designers should coordinate with utility providers regarding the location of utility elements such as poles, cabinets, vaults, grates and manholes.
- Sidewalks should be as straight and direct as possible except to avoid mature trees or unavoidable obstacles. Pedestrians in urban and suburban contexts have a desire to walk a straight course.

Edge Zone Principles and Considerations

The edge zone, which is sometimes referred to as the "curb zone," is the interface between the traveled way and the furnishing zone and provides an operational offset to:

Streetside Zones
A Avenue, Lake Oswego, OR

A Avenue is classified as a major arterial thoroughfare located in a general urban context zone (C-4) in Lake Oswego's downtown central business district and civic center area. Downtown land uses consist of low to medium density commercial mixed use (office over retail/service) with low to medium density residential located one block from A Avenue. The ground floor uses are primarily commercial with a mix of retail, services and restaurants.



Although the streetside on A Avenue is narrow, it contains distinct zones for edge, furnishing, clear throughway and frontage. The edge zone is about 18 inches, allowing an operational clearance for opening car doors.

The furnishings zone (4–5 feet) contains street trees in wells with decorative grates, light standards, shrubs in moveable planters, seating and a collection of public art.

Underground utilities and vaults are also located in this zone. The clear throughway ranges from 5–8 feet and the frontage zone (about 2–3 feet) contains planters, window shopping areas and seating for outdoor cafes.





- Prevent vehicle overhangs from hitting vertical objects when turning or backing toward the curb;
- Provide clearance from tall vehicles that are parked next to the curbs on highly crowned pavements;
- Provide clearance for extended bus and truck mirrors; and
- Permit the opening of parked vehicle doors.

Other principles and considerations include:

- In compact mixed-use urban areas with on-street parking, particularly those areas with ground floor retail activity, the edge zone should be a minimum of 1.5 feet to accommodate the door swing of a parallel parked car and prevent potential conflicts with elements in the furnishing zone. While this zone should generally be kept clear of any objects, parking meters can be placed here with consideration to door swings.
- The width of the edge zone adjacent to angled parking should account for the depth of vehicle overhang, which can vary between 1.5 and 2.5 feet depending on the angle of the parking spaces.



Figure 8.5 Utility poles and other fixtures should not interfere with the pedestrian throughway. This example shows a bus shelter and other street furniture properly located in the furnishings zone. Source: Kimley-Horn and Associates, Inc.

- If reverse (back-in) angled parking is considered, the edge zone lateral clearance must be at least 30 inches due to the added overhang of the rear of most vehicles.
- At transit stops with shelters, the edge zone should be widened to a minimum of 4 feet to provide wheelchair access to and in front of the shelter. A curb extension that stretches the length of the transit stop can also be an effective way to increase the width of the edge zone. Curb extension bus stops have additional advantages for transit operations, including faster passenger loading and unloading, more space for waiting passengers and less time for buses to re-enter the flow of traffic.

Furnishings Zone Principles and Considerations

The furnishings zone is the key buffer component between the active pedestrian walking area (throughway zone) and the thoroughfare traveled way. Principles and considerations concerning furnishings zones include the following:

- Street trees, planting strips, street furniture, utility poles, signal poles, signal and electrical cabinets, telephones, traffic signal cabinets, signs, fire hydrants, bicycle racks and the like should be consolidated in this zone to keep them from becoming obstacles in the throughway zone.
- The furnishings zone accommodates curbside transit stops, including boarding areas, shelters and passenger queuing areas (**Figure 8.5**).
- When signal control cabinets, signal poles and other traffic equipment are installed, they must leave pedestrians in clear sight of, and in alignment with, motorist's views at all times. This might require special setbacks for oversized equipment.
- Retail kiosks, stands, or other business activities are appropriate in the furnishings zone (see earlier section in this chapter on streetside fa-

cilities and public art) if the furnishings zone is sufficiently wide to maintain a 1.5-foot minimum lateral clearance from the curb and overhanging parked vehicles.

- Installation of curb extensions (see the section in Chapter 10 on curb extensions) is an effective way to increase sidewalk space in the furnishings zone adjacent to crosswalks where pedestrians will wait before crossing the thoroughfare.
- Where no furnishings zone exists, elements that would normally be placed there, such as benches, light poles, signals, trash receptacles and so forth, may occupy the frontage zone to keep the clear pedestrian travel way unobstructed and comply with PROWAG requirements.

Throughway Zone Principles and Considerations

Principles and considerations concerning throughway zones include the following:

- Clear pedestrian throughway zones are intended for pedestrian travel only and should be entirely clear of obstacles and provide a smooth walking surface. According to PROWAG, running slopes should not exceed the grade of the adjacent street, and cross slopes should not exceed 2 percent, including across driveways.
- Width of the throughway zone should vary by context and the activity of the adjacent land use (**Table 8.1**).
- Recommended clear pedestrian throughway zone minimum width in constrained conditions is 5 feet in residential and 6 feet in commercial areas (see **Table 5.2** in Chapter 5).
- For very high pedestrian volume areas, such as subway exits, transit transfer points and assembly arena entrances and exits, additional width and special design attention, particularly at crossings, should be provided.
- Within the "station area" of high-capacity transit stations, sidewalks should be sufficiently wide to accommodate expected pedestrian volume surges and provide opportunities for faster pedestrians to overtake slower pedestrians.

Frontage Zone Principles and Considerations

The frontage zone is the area adjacent to the property line that may be defined by a building facade, landscaping, fence, or screened parking area. Principles and considerations concerning frontage zones include the following:

- Use the frontage zone to create pedestrian comfort. Generally, pedestrians do not feel comfortable moving at a full pace directly along a building facade or wall. The width of the frontage zone may vary to accommodate a variety of activities associated with adjacent uses, such as outdoor seating or merchant displays. In all cases, the 18 inches adjacent to a building wall should be considered minimum lateral or shoulder clearance for pedestrians. It should not be included as throughway zone width.
- Sidewalk businesses or other business activities should be conducted preferably in the frontage zone or, in some cases, the furnishings zone. Private furnishings permitted in the frontage zone may include seating and tables, portable signage and merchandise displays. These furnishings may require permits from the agency that owns the right of way.
- Overhanging elements such as awnings, store signage, bay windows and so forth may occupy this zone and extend over the clear pedestrian travel way. These elements add vitality and visual interest to the street but also must comply with local building codes and zoning ordinances. Overhanging elements require a vertical clearance of at least 80 inches.
- Where the streetside passes a parking lot, a buffer, such as a hedge or a low wall, should be used to prevent parked vehicles from overhanging into the frontage zone and to maintain an attractive frontage along the streetside. Where surface parking is exposed to a thoroughfare right of way, and a buffering hedge or low wall cannot be accommodated within the private property, the frontage zone should be widened to provide space for the hedge (2 to 3 feet) or low wall (0.5 to 1 foot) with a visual screen up to 6 feet in height.

Table 8.1 Recommended Streetside Zone Dimensions

	Sidewalk Zone [1]	C-6 and C-5			C-4 w/ Predominantly Commercial Ground Floor Use			C-4 w/ Predominantly Residential Frontage			C-3 w/ Predominantly Commercial Ground Floor Use			C-3 w/ Predominantly Residential Frontage		
Boulevard	Edge	1.5 feet 2.5 feet at diagonal parking	21.5 foot (recommended)	12 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	19 foot (recommended)	12 foot (constrained)	1.5 feet	17.5 foot (recommended)	9 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	15.5 foot (recommended)	9 foot (constrained)
	Furnishings	7 feet (trees in tree wells)			7 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses or groundcovers)			7 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses, or groundcovers)		
	Throughway	10 feet			8 feet			8 feet			6 feet			6 feet		
	Frontage	3 feet			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences			1.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences		
Avenue	Edge	1.5 feet 2.5 feet at diagonal parking	19.5 foot (recommended)	12.0 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	15.5 foot (recommended)	9 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	15.5 foot (recommended)	9 foot (constrained)
	Furnishings	6 feet (trees in tree wells)			6 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses or groundcovers)			6 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses or groundcovers)		
	Throughway	9 feet			6 feet			6 feet			6 feet			6 feet		
	Frontage	3 feet			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences		
Street	Edge	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12.0 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	13.5 foot (recommended)	9 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	15 foot (recommended)	12 foot (constrained)	1.5 feet	12.5 foot (recommended)	9 foot (constrained)
	Furnishings	6 feet (trees in tree wells)			6 feet (trees in tree wells)			6 feet (landscape strip w/ trees and grasses or groundcovers)			6 feet (trees in tree wells)			5 feet (landscape strip w/ trees and grasses or groundcovers)		
	Throughway	6 feet			6 feet			6 feet			6 feet			6 feet		
	Frontage	2.5 feet			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences			1.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences		

Notes: Recommended dimensions for the throughway zone may be wider in active commercial areas.
See Table 5.2 in Chapter 5 for discussion of minimum streetside zone widths in constrained conditions.
[1] In AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, the furnishing zone is termed the "buffer" zone, and the frontage zone is termed the "shy distance."

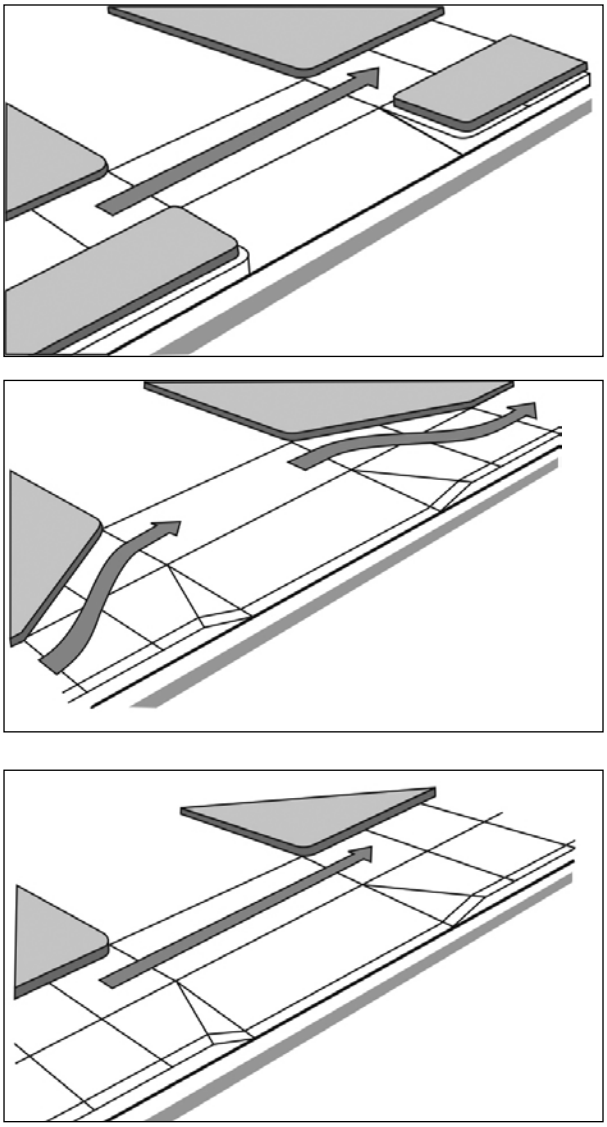

Figure 8.6 Preferred accessible designs for driveway and alley crossings. Source: based on *Designing Sidewalks and Trails for Access*. Illustration by Digital Media Productions.

Table 4.1 in Chapter 4 includes a discussion of context zones and frontage types.

Driveway Crossing Principles and Considerations

Principles and considerations concerning driveway crossings include the following:

- Appearance of the sidewalk (scoring pattern or special paving) should be maintained across driveway and alley access points to indicate that, although a vehicle may cross, the area traversed by a vehicle remains part of the pedestrian travel way.
- It is desirable to minimize, consolidate, or eliminate curb cuts and driveways in areas of highest pedestrian activity such as urban center (C-5) and urban core (C-6) commercial areas. In these areas, driveway and curb cut frequencies and spacing should be kept to a practical minimum, ideally not more than one curb cut per block.
- Consolidation of driveways is particularly important in areas with predominantly commercial ground floor uses in suburban (C-3) and general urban (C-4) context zones.
- Driveway crossings should maintain the elevation of the sidewalk.
- Driveway aprons should not extend into the clear pedestrian travel zone, where cross slopes are limited to a maximum of 2 percent; steeper driveway slopes are permitted in the furnishing and edge zones of the streetside (see **Figure 8.6**).
- Along boulevards and avenues, the elimination of driveways and conflict points may be aided by the presence of continuous medians that restrict left turns.

Recommended Practice

Table 8.1 provides an overview of recommended width for each of the streetside zones described in this chapter. The table provides the recommended width of each of the zones by context zone, thoroughfare type and under varying predominant ground floor use conditions. **Table 8.1** also provides the total width of the streetside for a constrained condition.

Additional Guidelines

Driveway Crossings

- The width of driveways for two-way traffic should not exceed 24 feet unless a specific frequent design vehicle requires a wider dimension. Some driveway volumes warrant two lanes in each direction. In these cases, consider designing a median between directions to separate opposing traffic and to provide a pedestrian refuge.

When a driveway is one way only, a maximum width of 14 feet should be considered.

- In driveway or alley crossing locations, a minimum 5-foot-wide clear pedestrian throughway must be provided. **Figure 8.6** illustrates various designs under this minimum condition. The full pedestrian throughway is maintained across the entire driveway, and the slope does not exceed 2 percent. Note that the sidewalk remains level and the driveway apron does not extend into the sidewalk.

Utilities

- Aboveground utilities should be placed at least 18 inches from the back of curb and may not interfere with the minimum pedestrian throughway. If buildings do not abut the right of way, place utilities behind the sidewalk, where they will not interfere with the use of the adjacent property.
- Placing utilities underground avoids conflicts and clutter caused by poles and overhead wires and should be coordinated with street tree planting planning efforts to avoid conflicts between the trees and below-ground utilities and aboveground utility boxes. Placing utilities underground can be costly, particularly in retrofit situations.
- The design of sidewalks, planting strips, medians and other street elements must allow for service access to underground and overhead utilities.
- Longitudinal underground utility lines should be located in a uniform alignment as close to the right-of-way line as practical or within a planting strip. In urban areas with abutting buildings, locate utilities within the parking lane or planting strip.

Refer to AASHTO's *A Guide to Accommodating Utilities Within Highway Right-of-Way* (2005) for additional information on the design and placement of utilities.

Street Furniture

Street furniture placed along a sidewalk is an amenity that encourages walking. Street furniture—such as public telephones, seating, trash receptacles and drinking fountains—provides both a functional service to pedestrians and visual detail and interest. Street furniture also conveys to other users of the thoroughfare that pedestrians are likely to be present. Guidelines include the following:

- Street furniture may be placed within curb extensions as long as it does not obstruct the clear pedestrian throughway, access to curb ramps, or sight distance at crossing locations. Bicycle parking or landscaped areas with seating walls can be accommodated in curb extensions.
- Street furniture should be placed on thoroughfares expected to have high pedestrian activity. When resources are limited, prioritize locations for the placement of street furniture. Examples of priority locations for street furniture include:
  - Transit stops;
  - Major building entries;
  - Retail and mixed-use main streets; and
  - Restaurants.
- Select the type, design and materials of street furniture to reflect the local character of the surrounding context and contribute to a sense of community identity.
- Ensure that placement of furniture does not reduce the width of the clear pedestrian throughway to less than 5 feet.

Landscaping

Landscaping is typically located in the furnishings zone of the streetside. Vegetation, especially trees, adds soft textures and bright colors to the concrete and asphalt surfaces of the thoroughfare and thereby increases comfort and distinguishes an area's identity. Landscaping also offers important ecological benefits. Trees are frequently the most visibly significant improvement, if properly selected, planted and maintained. They provide shade from the sun, intercept stormwater and buffer pedestrians from passing vehicle traffic. Guidelines include the following:

- Ground cover, grasses and shrubs might be appropriate supplements to add character along residential streets. Raised planters along mixed-use main streets can be used as seating and may increase pedestrian comfort by providing a visual buffer between pedestrians and traffic.



Figure 8.7 Street tree planted in curb extension in parking lane. Source: Kimley-Horn and Associates, Inc.

- Select plants that are adapted to the local climate and fit the character of the surrounding area.
- Consider the use of structural soils to allow for the planting of healthy street trees in narrow furnishing zones.
- Use street trees and other landscaping to complement street lighting and streetside facilities in creating a distinct character for specific streets, districts, or neighborhoods. Because lighting is an important aspect of thoroughfare safety, the practitioner needs to consider the effect of landscaping on the effectiveness of the lighting.
- If a continuous canopy of trees is desired by the community, space street trees between 15 and 30 feet on center, depending upon species, to shade the streetside, define the edge of the street and buffer the streetside from the traveled way.
- Landscape plantings in urban center (C-5) and urban core (C-6) context zones may have a formal characteristic (in a more linear and symmetrical pattern), with plantings becoming less formal in less-intensive context zones (C-3 and C-4).
- In the more urban C-5 and C-6 context zones and along thoroughfare segments with predominantly commercial ground floor uses, trees should be planted in tree wells covered by tree grates to maximize the surface area for pedestrian circulation. Tree grates or landscaped cutouts should be considered for other context zones where commercial ground floor uses predominate.
- Prune trees so that branches do not interfere with pedestrians, street lighting, parked vehicles and sight distance to crossing pedestrians, as well as any traffic control devices. The minimum vertical clearance should be 8 feet above the pedestrian travel way in the streetside and at least

Utilities and Street Trees

Both overhead and underground utilities can pose conflicts with street trees.

Mature trees' branches may interfere with overhead wires and lead to "topping" by utility providers. This practice is unattractive and can be detrimental to the tree's branching structure. To avoid this situation, consider under-grounding utility lines or select shorter trees whose branches will remain below the utility lines.

When planning for street tree planting, identify and avoid any underground utilities that could be damaged during the installation process or tree roots.

Plan to "train" newly planted trees in the first years of growth to guide branch development and vertical clearance.

To avoid damage to utilities, sidewalks and pavement, encourage deep roots with use of watering tubes that allow water to seep into the soil below the roots.

Consider "root barriers," underground barriers enclosing roots, where there is potential for root damage.



Figure 8.8 A combination of on-street parking, furnishings zone and wide pedestrian throughway provides ample buffer from moving traffic. Source: Kimley-Horn and Associates, Inc.

13 feet from the top of curb in the traveled way to provide clearance for larger vehicles.

- On commercial streets with business signs, work with a landscape architect to select the appropriate types of tree and pruning techniques that minimize interference with sign visibility.
- Maintenance issues should be discussed in advance of the preparation of a streetscape improvement plan to ensure clear understanding of pruning and maintenance requirements.
- The width of the streetside landscaped strip should be at least 5 feet (preferred width is 8 feet) to support healthy tree growth.
- Trees can be planted in curb extensions between parking bays (**Figure 8.7**). This helps reduce the visual width of the street and can be part of a design that maintains a wider pedestrian throughway, especially in constrained conditions.

Pedestrian Buffer

The buffering of the streetside from vehicle traffic in the traveled way is one of the most important factors in providing pedestrian comfort along urban thoroughfares. The effectiveness of buffers is largely dependent on width (see the section in this chapter on streetside width and functional requirements) and the contributing buffer elements, such as street furniture and landscaping, that can create a visual and sound barrier between the pedestrian and moving traffic (**Figure 8.8**). On-street parking and edge and furnishings zones combine to provide buffering from traffic. Guidelines include:

- On-street parking should provide a buffer between pedestrians on the sidewalk and moving traffic; especially in areas with ground floor commercial uses and/or where high volumes of pedestrian activity are expected. Texturing parking lanes or bays with the same material as the sidewalk can visually reduce the width of the roadway when the parking lane is empty;

- For thoroughfares without on-street parking and travel speeds of 30 mph or less, the width of the furnishings zone as a buffer for pedestrians should be at least 6 feet wide;
- If necessary to achieve an appropriately wide pedestrian buffer within the furnishings zone, consider reducing the frontage zone to its minimum or eliminating it;
- Bicycle lanes can serve as a buffer if desired streetside widths cannot be achieved or if streetside widths can only be achieved at the lower end of the ranges shown in **Table 8.1**.

Justification

Although the recommendations in this chapter are generally consistent with the guidelines contained in the AASHTO *Guide for the Planning, Design and Operation of Pedestrian Facilities* (2004b), the recommendations for buffer widths in this chapter are wider than those recommended in the AASHTO guide.

Recommendations related to street furniture and landscaping in this chapter are based on recently published best practices, specifically the Santa Clara Valley (California) Transportation Authority's *Pedestrian Technical Guidelines* (2003), which describes the principles behind the use of street furniture and landscaping to encourage pedestrian activity.

The effect of on-street parking as a pedestrian buffer is generally recognized by practitioners as one factor in creating a comfortable pedestrian environment. Some pedestrian level of service methodologies place significant weight on the presence of on-street parking as a buffer for passing traffic.

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Chapter 9
Traveled Way Design Guidelines

Purpose

This chapter provides principles and guidance for the design of a thoroughfare's traveled way, which includes the elements between the curbs such as parking lanes, bicycle lanes, travel lanes and medians. The traveled way also includes midblock bus stops and midblock crosswalks. The guidance in this chapter is used in conjunction with the guidance for the other two thoroughfare components—the streetside (Chapter 8) and intersections (Chapter 10).

Objectives

This chapter:

1. Introduces and defines the elements of the traveled way;
2. Presents traveled way design considerations, including key factors in determining cross-sections;
3. Describes principles for transitioning urban thoroughfares when there is a change in context, thoroughfare type, or geometric elements; and
4. Provides design guidance for the primary elements of the traveled way, which are lane width, medians, bicycle lanes, on-street parking, geometric transition design, midblock crossings, pedestrian refuge islands, transit, bus stops and stormwater management.

Introduction

The traveled way comprises the central portion of the thoroughfare (**Figure 9.1**). It contains the design elements that allow for the movement of vehicles, transit, bicycles and freight. The traveled way is also where vehicles, via on-street parking, interface with the streetside. Many of the conflicts that occur on thoroughfares occur within the traveled way between two or more moving vehicles, moving and parking vehicles, bicyclists and vehicles, and vehicles and pedestrians crossing at midblock locations and intersections.

Fundamental principles of the design of this portion of the thoroughfare include uniform cross-section along the length of the thoroughfare and transitions designed to move vehicles laterally or change speed where cross-section elements change.

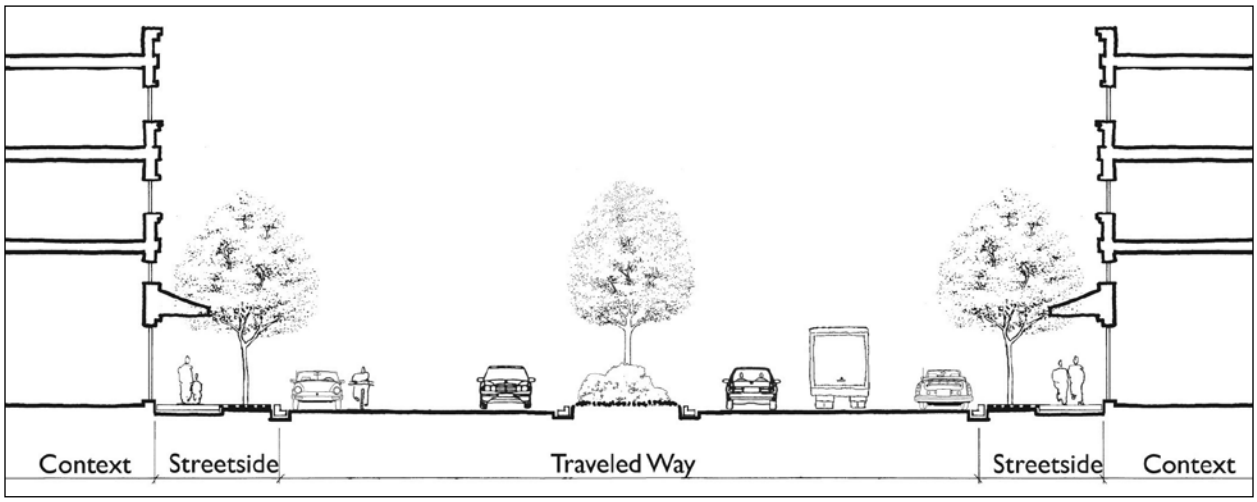


Figure 9.1 The traveled way is the component of the thoroughfare between the curbs. Source: Community, Design + Architecture.

This report addresses the following considerations for the thoroughfare traveled way:

- Cross-section determination;
- Access management;
- Emergency vehicle operations; and
- Transition principles.

This report addresses the following guidelines for the thoroughfare traveled way:

- Lane width;
- Medians;
- Bicycle facilities;
- On-street parking and configuration;
- Transition design;
- Midblock crosswalks;
- Pedestrian refuge islands;
- Transit design;
- Bus stops in the traveled way;
- Special consideration for stormwater management; and
- Special consideration for snow removal.

Design Considerations

Cross-Section Determination

The following design considerations are used to determine the optimum cross section:

1. Determine context zone and identify thoroughfare type based on **Tables 4.1** (Context Zone Characteristics), **4.2** (Thoroughfare Type Descriptions), **4.3** (Relationship Between Functional Classification and Thoroughfare Type), **4.4** (Urban Thoroughfare Characteristics), **6.4** (Design Parameters for Walkable Urban Thoroughfares) and **8.1** (Recommended Streetside Zone Dimensions). This establishes the general parameters for the cross-section (such as median width, parking lane width, streetside width and function).
2. Determine the preliminary number of lanes through a combination of community objectives, thoroughfare type, long-range transportation plans and corridor-wide and network capacity analysis. Network capacity (the ability of parallel routes to accommodate travel demand) should influence the number of lanes on the thoroughfare. Thoroughfare in compact mixed-use urban areas are recommended to have a maximum of six through lanes where necessary because network connectivity is limited. A maximum of four lanes is recommended for new corridors.
3. Select the design and control vehicle for the thoroughfare by identifying the most common type of vehicle to accommodate without encroachment into opposing travel lanes. Chapter 7 describes the selection of a design and/or control vehicle and criteria for accepting encroachment of vehicles into opposing lanes.
4. Determine the preliminary number of turn lanes at critical intersections. Intersection design in CSS may require evaluation of trade-offs between vehicular capacity, level of service, pedestrian crossing distance and exposure to traffic.
5. Identify transit, freight and bicycle requirements for the thoroughfare and establish the appropriate widths for each design element.
6. Develop the most appropriate cross-section and compare the width to the available right of way:
   - If the cross section is wider than the right of way, identify whether right-of-way acquisition is necessary or whether design elements can be narrowed; and
   - If the cross section is narrower than the available right of way, determine which elements should be widened (such as the streetside) to utilize the available right of way.

Avoid combining minimal widths for adjacent elements, except on very low-speed facilities (25 mph maximum). For example, avoid combining minimal parking and bicycle lanes adjacent to minimum width travel lanes. Establish priorities for each mode and allocate the right-of-way width appropriately to that mode's design element. Use appropriate lane widths to accommodate the speed and design vehicle selected for the thoroughfare. Avoid maximum-width travel lanes if not warranted, as this creates overly wide thoroughfares that encourage high speeds.

Access Management

Access management is the practice of properly locating and designing access to adjoining properties to re-

duce conflicts and improve safety while maintaining reasonable property access and traffic flow on the public street system. Effective access management includes setting access policies for streets and abutting development, linking designs to these policies, having the access policies incorporated into legislation and having the legislation upheld in the courts.

Access management addresses the basic questions of when, where and how access should be provided or denied and what legal or institutional provisions are needed to enforce these decisions. It has been shown that good access management can reduce crashes by 50 percent or more, depending on the condition and treatment used (TRB 2003). The need for rigorous access management in compact urban areas can be lessened by proper network planning, because traffic distributed to a grid of streets reduces the concentration on any one thoroughfare.

The following principles define access management techniques:

- Classify the street system by function, context and thoroughfare type;
- Establish standards or regulations for intersection spacing (see Chapter 3 for guidance);
- On streets that serve an access function (the focus of this report), minimize curb cuts in urban areas to reduce conflicts between vehicles, pedestrians and bicyclists, locate driveways and major entrances away from intersections and away from each other to minimize effects on traffic operations, minimize potential for crashes, provide for adequate storage lengths for turning vehicles and reduce conflicts with pedestrians using the streetside;
- Use curbed medians and locate median openings to manage access and minimize conflicts; and
- Use cross streets and alleys to provide access to parking and loading areas behind buildings. This topic is discussed in Chapter 3 on network planning and in Chapter 8 on streetside design.

There are a number of resources listed at the end of this chapter that provide detailed guidance on access management.

Emergency Vehicle Operations

Urban thoroughfares are the primary conduits for emergency response vehicles, including police, fire and ambulance. Common design for thoroughfares encourages speed and capacity. This can lead to fatality- and injury-producing crashes. On the other hand, the emergency responder bears the responsibility for both response times and reasonable access to incidents within the community. A balance between these two interests must be established for the appropriate design of context sensitive thoroughfares. Both interests can work together to find response strategies that create safe and comfortable places for the non-motorist.

Emergency vehicle access and operations should always be considered in thoroughfare and site design. Local operational conditions will vary from place to place, and emergency response strategies are specific to the locale. Consequently, the practitioner should collaborate with emergency responders to learn their specific needs and response strategies and tactics used on similar streets. Asking the following questions will help in understanding issues when working with fire departments:

- What types of fire apparatus are used in responding to different emergencies that might occur on or adjacent to the thoroughfare?
- Does the type of vehicle change depending on where vehicles are responding (e.g., suburban residential versus urban core high rise)?
- In urban areas with tall buildings, how does the department deploy its ladders and how much width is needed between the vehicle and building? How much clear space is needed adjacent to the building? Do they require gaps in sidewalk furnishings to access buildings? Do they need to fully extend their vehicle's stabilizers?
- What are the characteristics of the apparatus that affect thoroughfare design (e.g., wheel turning path, overhang turning path, apparatus width)?
- In a block of attached multistory buildings, does the number of stories cause a difference in firefighting tactics that would affect the design of the adjacent street?

Fire codes may have additional guidance on emergency access requirements, such as minimum travel way clear widths and minimum space to deploy certain types of equipment, such as ladders, to reach high buildings. The following should be considered in designing networks and traveled ways to accommodate emergency vehicles:

- Many emergency responder concerns can be addressed at the network planning level. High levels of street connectivity improve emergency response by providing alternate routes, and can alleviate the need for passing stopped fire fighting vehicles. Measure network connectivity using metrics such as intersections per square mile. The threshold number of intersections per square mile should be somewhere around 150 (not including alleys). Other considerations are maximum block perimeter, existing or proposed thoroughfare connectivity and intersection types (cross, tee and so forth). A block perimeter of 1,140 feet is a reasonable length for pedestrians and emergency vehicles. Exceptions can be made, and the thoroughfare design practitioner and fire officials must come to a mutually acceptable decision based on specific local conditions.
- Alleys benefit emergency responders by creating a secondary means of approaching structure fires with smaller equipment. As secondary approaches, alleys are not primary access and need not be designed for the largest fire vehicle.
- In urban areas with tall buildings, consider no-parking zones or staging areas at the midblock to accommodate large ladder trucks. The length and frequency of these zones should be determined with the emergency responder but should not be longer than 50 feet to minimize loss of on-street parking.
- When establishing new or reviewing existing access management configurations, care should be taken to permit direct routing capability for emergency vehicles.
- Use emergency vehicles as a design vehicle for the design of curb return radii only if the vehicle would use the roadway frequently (e.g., primary travel route from fire station to its service area). Otherwise, emergency vehicles are generally able to encroach into opposing travel lanes. Consider using demonstration projects in the field to determine or confirm the optimal geometry for fire vehicles.
- On streets with medians or other access management features, emergency response time may be reduced by implementing mountable median curbs to allow emergency vehicles to cross (see **Figure 9.2**).
- Consider the use of bike lanes that are at least 6 feet wide on thoroughfares that have one lane in each direction and medians. This will provide the opportunity for vehicles to pull into the bike lane and allow emergency vehicles to pass them.
- Thoroughfare design in high-rise building environments may be constrained by the required distance between the building face and the centerline of ladder trucks. In many cases, this is 35 feet. However, this dimension varies and should be examined with fire officials.

Operational Considerations

Operational and technological strategies to enhance emergency vehicle response in urbanized areas include:

1. Reducing nonrecurring congestion using techniques such as traffic incident management and information, special events traffic management, work zone management and emergency management planning; and
2. Reducing recurring congestion using techniques such as freeway and arterial management, cor-



Figure 9.2 A mountable median allows emergency vehicles to access side streets. Source: Kimley-Horn and Associates, Inc.

ridor traffic management and travel demand management. These include techniques to improve day-to-day operations such as signal systems management, emergency vehicle preemption, access management, traveler information and intelligent transportation systems (ITS), which encompass many of the strategies listed in item 1 above.

Finally, it should be noted that firefighters are trained in many techniques that address context sensitive streets, mainly because narrow, low-speed, pedestrian oriented streets exist in many towns and cities. Many fire departments have experience with historic networks of narrow streets. Their experience provides a basis for allowing new neighborhoods to be built on networks of relatively narrow streets. The designer should be particularly sensitive to the local fire official's experience and operational needs on urban thoroughfares.

Transition Principles

Transitions refer to a change in thoroughfare type, context (rural to urban), right-of-way width, number of lanes, or neighborhood or district. For purposes of this report, transitions in the geometric design of thoroughfares refer to the provision of a smooth taper of appropriate length where lanes or shoulders change width, lanes diverge or merge, or lanes have been added or dropped.

In context sensitive thoroughfare design, however, transitions extend beyond geometric design requirements and reflect changes in context zone and associated levels of multimodal activity. As such, transitions can serve as a visual, operational and environmental cue of the following upcoming changes in:

- Functional emphasis from auto to pedestrian oriented;
- Thoroughfare type, particularly where functional classification and speed changes;
- Width of roadway, either a narrowing/widening of lanes or decrease/increase in number of lanes (see section on Geometric Transition Design later in this chapter); and
- Neighborhood or district, such as a transition between a commercial and residential district.

Principles for designing effective transitions include

- Using the established guidance—*Manual on Uniform Traffic Control Devices* (MUTCD), AASHTO Green Book—to properly design, mark and sign geometric transitions; and
- Designing transitions on a tangent section of roadway, avoiding areas with horizontal and vertical sight distance constraints. It is best if the entire transition length is visible to the driver.

If the purpose of the transition is to signal a change in context, neighborhood or district and/or change in speed zone, the transition principles include:

1. Providing a transition speed zone. The purpose of a transition speed zone is to avoid large reductions in the speed limit by providing two or more speed limit reductions. At a minimum, speed-reduction zones use regulatory speed limit signs. Speed limit reductions should occur on tangent sections distant from intersections. Changes in speed zones can utilize other traffic control devices such as warning signs, beacons and so forth as appropriate or can utilize appropriate traffic calming devices such as speed platforms or rumble strips where the zone is particularly short.
2. Providing visual cues to changes in context or environment. The intent of this principle is to combine regulatory speed change with traveled way or streetside features that influence driver speed. Visual cues can include streetside urban design features (landscaping, curbs, on-street parking, street light standards with banners, entry signs, thematic street furniture and so forth) and alternative pavement texture/material at intersections and crosswalks. Land uses and building style can provide visual cues as well. Progressively introducing taller buildings closer to the street affects driver perception of the change from rural or suburban to urban character. Vertical elements, such as street trees in which the vertical height is equal to or greater than the street width, may influence driver perception of the environment and indicate a change. Visual cues should culminate in a gateway at the boundary of the change in district, neighborhood, or thoroughfare. Gate-

ways (**Figure 9.3**) can be achieved with urban design features or unique intersections such as modern roundabouts.

3. Changing the overall curb to curb width of the street as appropriate for the context, thoroughfare type and traffic characteristics. This can apply to transitions where streets narrow from four to two lanes or widen from two to four lanes. Means of reducing overall street and traveled way pavement width include reducing the number of lanes, reducing lane widths, dropping through lanes as turning lanes at intersections, providing on-street parking or bicycle lanes, applying curb extensions at intersections and midblock crossings and providing a raised curbed median.

Design Guidance

Design guidance for the traveled way elements of the thoroughfare are provided in the following sections.

Lane Width

Background and Purpose

Street width is necessary to support desirable design elements in appropriate contexts, such as to provide adequate space for safe lateral positioning of vehicles, on-street parking, landscaped medians and bicycle lanes. Wide streets (greater than 60 feet), however, create barriers for pedestrians and encourage higher vehicular speeds. Wide streets can reduce the level of pedestrian interchange that supports economic and community activity. Wide streets discourage crossings for transit connections. The overall width of the street affects the building height to width ratio, a vertical spatial definition that is an important visual design component of urban thoroughfares. Lane width is only one component of the overall width of the street but is often cited as the design element that most adversely affects pedestrian crossings. In fact, many factors affect pedestrian crossing safety and exposure, including the number of lanes, presence of pedestrian refuges, curb extensions, walking speed and conflicting traffic movements at intersections.



Figure 9.3 An arterial gateway into a downtown area composed of a raised intersection, public art, building orientation and attractive materials. Source: Kimley-Horn and Associates, Inc.

General Principles and Considerations

General principles and considerations in the selection of lane widths include the following considerations.

- Determine the overall width of the street and the traveled way on the accumulated width of the desired design elements (e.g., parking, bicycle lanes, travel lanes and median). Prioritize design elements that constitute an ideal cross-section and eliminate lower-priority elements when designing in constrained rights of way. Reducing lane width is one means of fitting the design into the available right of way.
- Curb lane widths should be measured to the face of curb unless the gutter and catch basin

Related Thoroughfare Design Elements

- Cross-section determination
- On street parking and configuration
- Access and speed management
- Bicycle lanes
- Bus stops
- Intersection layout
- Geometric transition
- Transit design

inlets do not accommodate bicycles and motor vehicles. However, to preserve available width for best use, inlets should be designed to safely accommodate bicycle and motor vehicle travel.

- Many fire districts require a minimum 20-foot-clear traveled way. This is usually not difficult to achieve on urban thoroughfares but could present challenges on thoroughfares that have one travel lane in each direction, on street parking and raised medians (the configuration of some four- to three-lane street conversions). In these circumstances consider adding bicycle lanes, mountable curbs on medians, median breaks, or flush cobblestone medians with periodic raised medians for plantings.
- Where adjacent lanes are unequal in width, the outside lane should be the wider lane to accommodate large vehicles and bicyclists (only where bicycle lanes are not practical), and facilitate the turning radius of large vehicles.
- While it may be advantageous to use minimum dimensions under certain circumstances, avoid combining minimum dimensions on adjacent elements to reduce street width where it could affect the safety of users. For example, avoid combining minimum-width travel lanes adjacent to a minimum-width parking/bicycle lane—a situation that reduces the separation between vehicles and bicyclists.
- When wider curb lanes are required, consider balancing the total width of the traveled way by narrowing turn lanes or medians to maintain the same overall pedestrian crossing width.
- Consider wider lanes along horizontal curves to accommodate vehicle off-tracking, based on a selected design vehicle. This measure is an alternative to increasing the curve's radius to accommodate off-tracking. The AASHTO Green Book provides guidance on widening for vehicle off-tracking.
- If a network evaluation determines that sufficient capacity exists to accommodate corridor- or areawide traffic demands, consider reducing the number of travel lanes to accommodate the desired design elements in constrained right of way. On streets with very high turning movements, replacing through lanes (where turns are occurring from the inside through lane) with a turning lane can significantly improve traffic capacity.
- Where there is insufficient network travel lane capacity and right of way to meet thoroughfare design objectives, consider converting two parallel streets into a pair of one-way streets (couplet) to increase capacity before considering widening thoroughfares. While sometimes the subject of debate and controversy, one-way couplets have appropriate applications under the right circumstances. Strive to keep the number of lanes in each direction to three or less. This measure requires a comprehensive study of the ramifications for pedestrian and bicycle safety, transit and vehicle operations, economic issues and so forth. See the ITE *Traffic Engineering Handbook* for more on comparative advantages of one-way and two-way streets.

Recommended Practice

Select lane widths based on the following four key considerations:

- Target speed—on the lower-speed urban thoroughfares addressed in this report (target speeds of 35 mph or less), a range of lane widths from 10 to 12 feet on arterials and 10 to 11 feet on collectors is appropriate. On arterials with target speeds below 30 mph, widths in the lower end of the range are appropriate (10 to 11 feet). On collectors with a target speed below 30 mph, a 10-foot lane width may be appropriate unless the following design considerations or other factors warrant a wider lane. Turn lanes that are 10- to 11-feet wide are appropriate in urban areas with target speeds of 35 mph or less.
- Design vehicle—vehicles such as transit buses or large tractor-trailers require wider lanes, particularly in combination with higher design speeds if they frequently use the thoroughfare. Modern buses can be 10.5 feet wide from mirror to mirror and require a minimum 11-foot-wide lane on roadways with 30 to 35 mph target speeds. Wider curb lanes, between 13 to 15 feet

for short distances, should only be used to help buses negotiate bus stops and help trucks and buses negotiate right turns without encroaching into adjacent or opposing travel lanes.

- Right of way—balance the provision of the design elements of the thoroughfare with the available right of way. This balance can mean reducing the width of all elements or eliminating lower-priority elements.
- Width of adjacent bicycle and parking lanes—the width of adjacent bicycle and parking lanes influences the selection of lane width. If the adjacent bicycle or parking lane is narrower than recommended in this report, first consider widening the bicycle lane. If a design vehicle or target speed justifies such, provide a wider travel lane to provide better separation between lanes (**Figure 9.4**).

AASHTO highlights benefits of narrower (10 to 11 feet) travel lanes on lower-speed urban streets, including a reduction in pedestrian crossing distance, ability to provide more lanes in constrained rights of way and lower construction cost. The recommended travel lane widths in this report are also consistent with design guidelines in AASHTO's *Guide for Development of Bicycle Facilities* (1999) and the recommendations in *A Guide for Achieving Flexibility in Highway Design* (2004b).

Research on the relationship between lane width and traffic crashes found no statistically significant relationship between lane width and crash rate on arterial streets (TRB 1986).



Figure 9.4 Bike lanes on the Embarcadero in San Francisco. This multimodal boulevard along the waterfront was formerly an elevated freeway. Source: Dan Burden, walklive.org.

Medians

Background and Purpose

Medians are the center portion of a street that separates opposing directions of travel. Medians vary in width and purpose and can be raised with curbs or painted and flush with the pavement. Medians on low-speed urban thoroughfares are used for access management, accommodation of turning traffic, safety, pedestrian refuge, landscaping and lighting and utilities. Based on these functions, this guidance addresses raised curbed medians with a discussion of alternate applications such as flush medians interspersed with landscaped median islands.

In addition to their operational and safety functions, well-designed and landscaped medians can serve as a focal point of the street or an identifiable gateway into a community, neighborhood, or district. Medians can be used to create tree canopies over travel lanes, offer attractive landscaping and provide space for lighting and urban design features. Wider medians can provide pedestrian refuge at long intersection crossings and midblock crossings. Medians vary in width depending on available right of way and function. Because medians increase the width of a street, the designer must weigh the benefits of a median against the increase in pedestrian crossing distance and possible decrease in available streetside widths.

Operational and safety benefits of medians include storage for turning vehicles, enforcing turn restrictions, reducing conflicts, pedestrian refuge, snow storage, reducing certain types of crashes such as head-on colli-

Related Thoroughfare Design Elements

- Cross-section determination
- Access management
- Pedestrian refuge islands
- Intersection layout
- Lane width
- Transit design
- Midblock crossings

sions and space for vehicles crossing the thoroughfare at unsignalized intersections. With some innovation in design, curbed medians can provide biofiltration swales to retain and improve the quality of stormwater runoff.

Flexibility in median width design revolves around the median's function, appurtenances and landscaping to be accommodated in the median and available right of way. The designer needs to consider the trade-offs between the provision of a median and other design elements, particularly in constrained rights of way.

General Principles and Considerations

General principles and design considerations regarding medians include the following:

- Where medians are provided at intersections as refuge, they should be wide enough to accommodate groups of pedestrians, wheelchair users, bicyclists and people pushing strollers. To keep streets compact and pedestrian-scaled, median width typically should not exceed 18 feet in walkable urban environments except on ceremonial view corridors and parkways or where dual left turns are provided.
- On boulevards and wide avenues (more than 60 feet) where median dimensions need to remain continuous and left turn lanes are provided, medians should be 16–18 feet, to allow for a turn lane plus pedestrian refuge.
- Apply medians as part of a corridor access management strategy to improve safety and multimodal operational efficiency. Evaluate impacts on land access and ensure adequate locations for U-turns.

Median width may vary to accommodate a pedestrian refuge and/or turn lane. For example, designers may remove on-street parking near intersections in order to laterally shift the travel lanes to accommodate a median with a turn pocket. Where right of way is available, a continuous dimension for the median is preferred.

- Use an appropriate design vehicle for left- and U-turns when designing median width (see **Chapter 7**).
- Avoid providing overly wide medians at the expense of unreasonably narrowing the streetside. In walkable urban contexts, streetsides of appropriate width should take higher priority than wide medians. However, the design needs to balance the safety, operational and pedestrian comfort needs of the street.
- In contrast to medians in rural areas, the width of medians at intersections in urban areas should only be as wide as necessary to provide the desired function (accommodation of longitudinal left turns, pedestrian refuge and so forth). Otherwise, the intersection loses operation efficiency and vehicles crossing the median may use the width inappropriately (side-by-side queuing, angled stopping and so forth).
- On multilane thoroughfares, medians aid pedestrians in their crossing. A median of 6 to 8 feet can be more desirable to a crossing pedestrian than the same width added to another element of the thoroughfare.
- If the median will not be landscaped, consider using alternative contrasting materials to create visual interest and an aesthetic appearance.
- Raised medians in low-speed urban contexts should be constructed with vertical curbs to provide refuge for pedestrians, access management and a place to install signs, utilities and landscaping. In snow conditions, raised medians improve delineation of the median. If emergency access is a concern, mountable curbs should be considered in special locations (where medians are carried across intersections, access managed thoroughfares near fire stations, or within 200 to 300 feet of an intersection approach that frequently experiences long queues). Mountable medians can be super-reinforced with grasscrete pavers or concrete with added rebar.
- Narrow medians (4 feet or less) should only be used to restrict turning movements, to separate opposing directions of traffic and to provide space for traffic control devices (**Figure 9.5**). A 4-foot median may also be landscaped with shrubs.

In constrained rights of way, consider narrower medians with attractive hardscape and urban design features in lieu of planting, or provide a discontinuous median as right of way permits.

Where flush medians are desirable to maintain access to fronting property (e.g., suburban commercial

corridors), consider using textured or colored paving or stamped concrete for the median lane interspersed with raised landscaped islands to channelize turning traffic, divide opposing lanes of traffic and provide pedestrian refuge where appropriate (such as midblock and intersection crossings).

Landscaping on medians should be designed in a manner that does not obstruct sight-distance triangles.

Recommended Practice

Table 9.1 presents the recommended practice for median widths for various functions within low-speed thoroughfares (35 mph or less). The recommendations assume arterial and collector streets in urban contexts (C-3 to C-6) with operating speeds of 35 mph or less. Most of the guidance in this report is not applicable to flush or depressed medians or to raised medians with mountable curbs. Note that median widths are measured from face of curb to face of curb.

Additional Guidelines

Additional guidelines regarding medians also include the following:

- At lower urban speeds (25 to 30 mph) there is no need to provide an offset between the median curb face and the travel lane;
- Pave inside travel lane up to the face of the median curb unless a gutter pan is required for drainage; use 6-inch to 1-foot gutter pans unless typical flow requires more; avoid placement of catch basins in median gutters;
- Design the median nose using state, local, or AASHTO guidelines, ensuring proper end treatments to guide vehicles away from the median and pedestrian refuges;
- Design median turn lanes, tapers and transitions using state, local, or AASHTO guidelines for intersection design; and
- At intersection crossings, where the median is wide enough (see **Table 9.1**), extend the median nose beyond the crosswalk to provide an enclosed pedestrian refuge (**Figure 9.6**).

Trees and Landscaping in Medians

In urban areas, the community may find it desirable to plant trees in raised curbed medians for aesthetic purposes. In general, the guidance in this report is consistent with AASHTO in regards to low-speed urban thoroughfares. Additional information and mitigative strategies on trees within the public right of way may be found in *A Guide for Addressing Collisions with Trees in Hazardous Locations* (TRB 2003). General guidelines for median trees include the following:



Figure 9.5 Narrow medians, such as on this boulevard in Chicago, should only be used to restrict turning movements, separate opposing traffic and create space for traffic control devices. Source: The Congress for the New Urbanism.



Figure 9.6 Median nose extended beyond the crosswalk to provide an enclosed pedestrian refuge. Source: Kimley-Horn and Associates, Inc.

Table 9.1 Recommended Median Widths on Low Speed Walkable Thoroughfares (35 mph or less)

Thoroughfare Type	Minimum Width	Recommended Width
Median for access control		
All thoroughfare types	4 feet	6 feet[1]
Median for pedestrian refuge		
All thoroughfare types	6 feet	8 feet
Median for street trees and lighting		
All thoroughfare types	6 feet[2]	10 feet[3]
Median for single left-turn lane		
Collector avenues and streets	10 feet[4]	14 feet
Arterial boulevards and avenues	12 feet	16–18 feet
Median for dual left-turn lane		
Arterial boulevards and avenues	20 feet	22 feet
Median for transitway		
Dedicated rail or transit lanes	22 feet	22–24 feet
Added median width for platforms	10 feet for each side platform 30 feet for center platform	

[1] A 6-foot-wide median is the minimum width for providing a pedestrian refuge.

[2] Six feet (measured between curb faces) is generally considered a minimum width for proper growth of small trees less than 4 inches in diameter at maturity. A 10-foot median is recommended for larger trees.

[3] Wider medians to provide generous landscaping are acceptable, if desired by the community. However, avoid designing medians wider than necessary to support its desired function at intersections. This can reduce the operational efficiency of the intersections and invite undesirable behavior of crossing traffic such as side-by-side queues, angled stopping and so forth.

[4] A 10-foot wide median allows for a striped left-turn lane (9 to 10 feet wide) without a median nose.

- Small-caliper trees can be healthy in medians that are at least 6 feet wide, as long as a critical root area is provided. A 10-foot-wide median is recommended for larger trees. Consult an urban forester for guidance on health requirements for trees in medians. Consider the safety issues of large-caliper trees.
- Maintain a horizontal offset (minimum of 18 inches) between the trunk and median curb face and prune to maintain sight distance (**Figure 9.7**).
- Trees closer than 50 feet from the ends of medians must be regularly pruned to maintain sight distance. Trees should always be located and maintained so that the motorists' clear vision of any traffic control signs or signals will be assured at all times, retaining a vertical clearance between 2.5 feet (or 3 feet from pavement surface) and 8 feet from the top of the curb.



Figure 9.7 Maintain a minimum 18-inch offset between the face of median tree (at maturity) and the face of curb. Source: Dan Burden, walklive.org.

Example Landscape Setbacks from Utilities

Overhead electric—10, 15, or 20 feet, depending on tree height

Sanitary sewer main—15 feet all tree species

Water main—10, 15, or 20 feet, depending on tree size

Fire hydrant—5 feet all landscaping, 10 feet all trees

Water meter—5 feet all landscaping, 10 feet all trees

Gas lines—5, 10, or 15 feet, depending on tree size

Underground electric—5, 10, or 15 feet, depending on tree size

Street lights—10 feet all trees

Electric transformers—10 feet front access, 5 feet other sides—all landscaping

Switch cabinet—10 feet front and back access, 5 feet other sides.

Source: Gainesville, FL, *Regional Utilities Vegetation Management Tree Planting Guidelines*

- Should the community desire a continuous canopy of trees in the median, space trees between 15 and 30 feet on center, depending upon species.
- Branches that extend beyond the curb into the travel lane should be pruned to a minimum height of 13 feet above the pavement.
- Plan tree spacing and canopy height along with other elements such as light standard spacing and height, utility placement and height and traffic control devices to minimize interference and provide adequate lighting and sight lines when trees are mature. Contact local utility providers to ensure compliance with required setbacks (see sidebar for an example of setback requirements).
- When hardscape is used between median trees, structural cells (modular, preengineered cell systems designed for water management, soil and tree roots), supported reinforced panels, or other methods should be used to promote healthy roots under the hardscape.
- To maintain healthy median landscaping, an adequate watering and drainage system needs to be provided. Drought-tolerant plantings should be used when an irrigation system is not available. Provide underdraining when needed for soil conditions.

Landscaping and trees in medians are strongly encouraged in context sensitive design, not only for aesthetics but also for shade, heat island reduction and stormwater interception. The use of medians for pedestrian refuge is recommended to reduce the pedestrian barriers created by wide urban arterials and to support safe design of midblock crossings. As refuges, medians allow pedestrians to focus on crossing one direction of the street at a time, therefore reducing conflicts and decisions. At intersections, pedestrian refuges assist all pedestrians, especially the elderly, to safely cross streets (**Figure 9.8**).

Some agencies require the use of crash tested barriers when large trees are planted in narrow medians. Consult with the agency on aesthetic treatment of such barriers.

Justification

The same rationale for medians on rural highways and conventional urban streets can be applied to context-based design of urban thoroughfares—to provide traffic safety and operational benefits by separating traffic flows, reducing conflicts and creating



Figure 9.8 This boulevard median serves as a pedestrian refuge, a community gateway and area for landscaping. Source: Kimley-Horn and Associates, Inc.

space for turning vehicles and utilities in the center of the street. In the design of walkable urban streets, the use of medians for traffic safety and operations remains a primary objective but is expanded to emphasize the median's role as an aesthetic amenity to the street and community and to provide pedestrian refuge on wider street crossings.

Bicycle Lanes

Background and Purpose

Bicycle travel should be served on multimodal streets. Bicyclists vary in their level of skill and confidence, trip purpose and preference for facility types; thus, the mobility needs of bicyclists in urban contexts vary as well. Bicycle facilities should encompass a system of interconnected routes, paths and on-street bicycle lanes that provide for safe and efficient bicycle travel. This report focuses only on the provision of bicycle lanes on major thoroughfares— streets that are designated as arterials or collectors. Refer to AASHTO's *Guide for the Development of Bicycle Facilities* for planning and design guidance for other types of bicycle facilities.

Not all urban thoroughfares will include bicycle lanes. However, except for freeways and streets where bicycling is specifically prohibited, bicyclists are permitted to use any street for travel, even if bicycle lanes are not provided. The design of bicycle lanes on major urban thoroughfares is typically coordinated with a community's or region's master bicycle plan to ensure overall connectivity and the selection of the best streets for implementation of bicycle lanes. However, absence of a designation in a bicycle plan does not exclude the practitioner from providing bicycle lanes if the need exists. The width of the street and the speed and volume of adjacent traffic are the most critical factors in providing safe bicycle lanes. If adequate facilities cannot be provided, then the safety of both the bicyclist and driver is compromised. In urban areas the practitioner is faced with two conditions in designing bicycle lanes: adjacent to curb or adjacent to on-street parking (**Figure 9.9**). This section addresses these conditions.



Figure 9.9 A bike lane adjacent to parallel parking on an avenue. Source: Kimley-Horn and Associates, Inc.

Related Thoroughfare Design Elements

- Cross-section determination
- Lane width
- Bicycle lane treatment at intersections
- On-street parking and configuration
- Transit design
- Modern roundabouts
- Curb extensions

General Principles and Considerations

Implementation of bicycle lanes can meet many community objectives, including accessibility, connectivity between destinations, youth mobility and increased system capacity. General principles and considerations regarding bicycle lanes include the following:

- Bicycle lanes are not required on every street. It is desirable to provide bicycle lanes on major thoroughfares with target speeds of 30 mph or more and on streets with high traffic volumes and speeds less than 30 mph.

- Availability of parallel bicycle facilities does not eliminate the need to have a bicycle lane on thoroughfares. Bicyclists need to access properties along corridors, and they often benefit from traffic signals and other controls found on urban thoroughfares.
- The decision to place bicycle lanes on major urban thoroughfares should be based upon a number of factors, including:
  - Interconnectivity between other bicycle facilities and direct connections between origins and destinations, including transit access points; and
  - Ability to provide a continuous facility and overcome barriers such as topography, rivers, railroads, freeways and so forth.
- As published in *Selecting Roadway Design Treatments to Accommodate Bicyclists* (FHWA, 1994), a "design bicyclist" refers to the skill level of the bicyclist and, along with the factors described above, affects decisions on implementation of bicycle lanes. The three types of bicyclists, each of which has different needs, are (1) advanced or experienced bicyclists (require facilities for directness and speed and are comfortable riding in traffic and shared lanes), (2) basic or casual bicyclists (require comfortable and direct routes on lower-speed and lower-volume thoroughfares and prefer separated and delineated bicycle facilities), and (3) children (require adult supervision and typically only travel on separated paths or very low-volume and low-speed residential streets).
- Walkable urban thoroughfares should at least meet the needs of type 2, the basic or casual bicyclists.
- When considering additional operating space in urban areas, it is a constant challenge to balance competing needs on multimodal thoroughfares. Nowhere is this more evident than in providing bicycle facilities. As stated in the Chapter 9 section on lane width, avoid combining minimum dimensions to implement all of the desirable design elements, particularly on designated bicycle routes.
- It is often more prudent to provide the recommended or maximum dimensions for bicycle facilities, curb lanes and parking lanes and to eliminate other design elements to maximize bicyclist safety. For example it may be desirable to convert a four-lane undivided street to a three-lane street with left-turn lanes to provide bicycle lanes rather than narrowing all of the other design elements to retain four lanes.
- Designated bicycle facilities adjacent to head-in angled parking are discouraged because of the lack of visibility between bicyclists and drivers backing out of spaces. Converting from angled to parallel parking provides width for bicycle lanes.
- Where possible on one-way streets, angled parking can be implemented on the left side of the street while the bicycle lane remains adjacent to parallel parking on the right side of the street. Some communities use reverse (back-in) angled parking, which improves driver visibility of bicyclists (**Figure 9.10**).
- Bicycle travel on sidewalks should be discouraged, even if the sidewalk width meets the width requirements of a shared multi-use path. Bicycles on sidewalks travel at higher speeds than pedestrians, creating the potential for serious injury. Bicyclists might collide with obstacles on sidewalks including street furniture, sign posts and so forth. Additionally, drivers do not expect bicyclists on sidewalks, creating conflicts at intersections and driveways. Con-



Figure 9.10 Reverse (back-in) angled parking improves driver visibility of bicyclists. Source: Dan Burden, walklive.org.

Table 9.2 Recommended Practice for Bicycle Lanes on Walkable Urban Thoroughfares

	Minimum Width	Recommended Width
Bicycle lane width—combined with on-street parking lane		
All thoroughfare types	13 feet	13 feet
Bicycle lane width—no on-street parking		
All thoroughfare types	5 feet[1]	6 feet

Table notes:
[1] Requires a minimum 3-foot ridable surface outside of gutter pan. If no gutter pan is present, the minimum width is 5 feet. Bicycle routes without marked lanes are acceptable for low-volume thoroughfares with target speeds of 25 mph or less.

venient alternatives will limit the attractiveness of sidewalk riding. While on-street facilities designed to the guidelines above are preferred, alternative routes on parallel streets or a separated off-street multi-use path may be a better choice in some situations.

The design of bicycle lanes in urban areas is well documented. Refer to the *Manual on Uniform Traffic Control Devices* (FHWA 2009) and *Guide for the Development of Bicycle Facilities* (AASHTO 1999). For alternative ways to accommodate bicyclists refer to *Innovative Bicycle Treatments* (ITE 2002).

Recommended Practice

Table 9.2 presents the recommended practice for bicycle facilities on thoroughfares. The recommendations assume arterial and collector streets in urban contexts with target speeds of 35 mph or less.

Justification

Urban thoroughfares within the bicycle network should provide bicycle lanes, particularly where the width of shared lanes is prohibitive or undesirable. The type and experience level of bicycle riders and the volume of bicyclists is a consideration in determining the need for bicycle lanes. Where bicycle lanes are needed and right of way is constrained, the designer needs to understand the trade-offs between adding bicycle lanes and eliminating or reducing the width of other thoroughfare design elements.

On-Street Parking Configuration and Width

Background and Purpose

The presence and availability of on-street parking serves several critical needs on urban thoroughfares: to meet parking needs of adjacent uses, protect pedestrians from moving traffic and increase activity on the street. Usually, on-street parking cannot by itself meet all of the parking demand created by adjacent land uses and typically will supplement the off-street parking supply. On-street parking provides the following benefits:

- Supports local economic activity of merchants by providing proximate access to local uses, as well as visitor needs in residential areas;
- Increases pedestrian comfort by providing a buffer between pedestrians and moving traffic helping reduce vehicle splash, noise and fumes;
- Slows traffic, making pedestrian crossing safer;

- Enables drivers and their passengers to become pedestrians conveniently and safely;
- Provides an indication to the motorist that desired operating speeds are reduced and that they are entering a low or moderate travel speed area;
- Provides the shortest accessible route to a street fronting building entrance for pedestrians who have disabilities;
- Increases pedestrian activity on the street since people will walk between their parking space and destination, providing more exposure to ground floor retail and increasing opportunities for social interactions;
- Supports local economic activity by increasing the visibility of storefronts and signs to motorists parking on street;
- Reduces development costs for small business by decreasing on-site parking needs, particularly in urban infill development on small lots;
- Requires less land per space than off-street parking and is thereby an efficient and cost-effective way to provide parking; and
- Provides space for on-street loading and unloading of trucks, increasing the economic activity of the street and supporting commercial retail uses.

Related Thoroughfare Design Elements

- Lane width
- Curb extensions
- Bicycle lanes
- Cross-section determination

Trade-Offs

While this report supports on-street parking as an inherent element of walkable, compact, mixed-use urban areas and a component of the economic health of urban businesses, the practitioner designing walkable streets should always consider the trade-offs of integrating on-street parking. These include:

- A reduction in traffic capacity and increased friction in the flow of traffic;
- Conflicts with the provision of bicycle lanes and increased hazards to bicyclists;
- Use of thoroughfare width that could be used for other functions (e.g., wider streetsides);
- Visual obstructions for pedestrians crossing intersections, vehicles moving along the thoroughfare and vehicles exiting driveways;
- The need for, and administration of, parking enforcement; and
- An increase in crashes.

On-street parking can result in a 3 to 30 percent decrease in the capacity of the adjacent travel lane, depending on the number of lanes and frequency of parking maneuvers. The designer needs to balance traffic capacity and local access needs when deciding where and when to permit on-street parking. There are methods for minimizing the impact of parking maneuvers on traffic flow. For example, see MUTCD (Figure 3B–17**,** referenced in Section 3B.18) showing a parallel parking configuration that allows vehicles to drive forward into the parking space.

General Principles and Considerations

General principles and considerations regarding on-street parking include the following:

- On-street parking should be located based on the characteristics of the thoroughfare type, needs of the adjacent land uses and applicable local policies and plans for parking management.
- On-street parking should be primarily parallel parking on higher-volume urban arterial boulevards and avenues. Angled parking may be used on low-speed and low-volume collector avenues and streets with ground floor commercial uses, primarily those serving as main streets (see **Figure 9.11** and the Chapter 6 section on special thoroughfare types).
- On-street parking should be prohibited on streets with speeds greater than 35 mph due

to potential hazards associated with maneuvering in and out of spaces.

- Width of the parking space is dependent on the context zone, thoroughfare type and the anticipated frequency of parking turnover.
- Conform to local and PROWAG accessibility requirements and provide appropriate number of accessible spaces.
- Use metered parking, or a similarly appropriate technology, to enforce parking time limits that provide reasonable short-term parking for retail customers and visitors while discouraging long-term parking.
- In developing and redeveloping areas, provide the amount of on-street parking for planned, rather than existing, land use densities. If more parking is needed, consider public or shared parking structures or integrate the design of parking facilities with adjacent land uses.

Recommended Practice

The preferred width of a parallel on-street parking lane is 8 feet wide on commercial thoroughfares (all types) or where there is an anticipated high turnover of parking and 7 feet wide on residential thoroughfares. These dimensions are inclusive of the gutter pan and applicable to all context zones (C-3 through C-6).



Figure 9.11 Angled parking on a retail-oriented main street in Hayward, CA. Source: Kimley-Horn and Associates, Inc.

On low-volume, low-speed avenues and streets in commercial main street areas, where sufficient curb-to-curb width is available, angled parking may be appropriate. Angled parking should have the dimensions shown in **Table 9.3** for a variety of different angles. Head-in angled parking can create sight distance problems associated with vehicles backing out of parking spaces. The use of reverse (back-in) angled parking can be used to overcome sight distance concerns and is considered safer for bicyclists traveling adjacent to angled parking (**Figure 9.12**).

Table 9.3 Minimum Dimensions for Head-In Angled On-Street Parking*

Angle	Stall Width	Stall Depth (Perpendicular to Curb)	Min. Width of Adjacent Lane	Curb Overhang
45°	8.5–9.0 feet	17 feet 8 inches	12 feet 8 inches	1 foot 9 inches
50°	8.5–9.0 feet	18 feet 3 inches	13 feet 3 inches	1 foot 11 inches
55°	8.5–9.0 feet	18 feet 8 inches	13 feet 8 inches	2 feet 1 inches
60°	8.5–9.0 feet	19 feet 0 inches	14 feet 6 inches	2 feet 2 inches
65°	8.5–9.0 feet	19 feet 2 inches	15 feet 5 inches	2 feet 3 inches
70°	8.5–9.0 feet	19 feet 3 inches	16 feet 6 inches	2 feet 4 inches
90°	8.5–9.0 feet	18 feet 0 inches	24 feet 0 inches	2 feet 6 inches

Source: *Dimensions of Parking*, 4th Edition, Urban Land Institute

Notes:
Typical design vehicle dimensions: 6 feet 7 inches by 17 feet 0 inches. Use 9.0 feet wide stall in commercial areas with moderate to high parking turnover.
*For back-in angled parking, reduce curb overhang by one foot.



Figure 9.12 Reverse (back-in) angled parking improves driver visibility. Source: Dan Burden, walklive.org.

Additional Guidelines

Additional guidelines regarding on-street parking include the following:

- Where traffic capacity needs to be balanced with on-street parking, consider using the curb lane for parking during off-peak periods and for traffic during peak periods. It is important to consider the trade-offs of this strategy. It requires consistent daily enforcement and immediate towing of violators. Removal of parking will impact the walkability of the streetside by removing the parking buffer. This strategy should be used when traffic congestion causes significant impacts to adjacent residential neighborhoods or in conditions with poorly connected networks and limited alternative routes.
- Angled parking should be allowed in C-4 and C-5 context zones where operating speeds are 25 mph or less and where the community finds the delay produced by parking maneuvers acceptable. Where practical or on bicycle routes, back-in diagonal parking is preferable to front-in parking. Consider the trade-offs associated with different angles of parking; lower-angle parking results in fewer parking spaces, while higher-angle parking requires a wider adjacent travel lane to keep vehicles exiting parking spaces from backing into the opposing travel lane.
- For parallel parking provide a minimum 1.5-foot wide operational offset between the face of curb and edge of potential obstructions such as trees and poles. This will allow the unobstructed opening of car doors.
- Parking should be prohibited within 10 feet of either side of fire hydrants (or per local code), at least 20 feet from nearside of midblock crosswalks (those without curb extensions) and at least 20 feet from the curb return of intersections (30 feet from an approach to a signalized intersection) unless curb extensions are provided (see Chapter 10).
- At bus stops, intersections and various midblock locations, extend curbs by 6 feet into the parking lane to improve pedestrian visibility and to provide additional space for street furniture and landscaping (see Chapter 10 section on curb extensions).
- Reverse (back-in) angled parking requires a wider edge zone in the streetside due to the longer overhang at the rear of most vehicles. This extra width can be compensated by the narrower travel lane needed adjacent to parking for maneuvering and less depth for the parking stall since the longer overhang is over the curb.

Justification

The recommendations in this report are based on the principles presented in the AASHTO Green Book and pedestrian facilities guide. The Green Book states that the "designer should consider on-street parking so that the proposed street or highway improvement will be compatible with the land use ... the type of on-street parking should depend on the specific function and width of the street, the adjacent land use, traffic volume, as well as existing and anticipated traffic operations."

Geometric Transition Design

Background and Purpose

Transitions refer to a change in the width or speed of a thoroughfare or the need to laterally shift vehicles. In terms of geometric design, transitions refer to the provision of an adequate taper where lanes shift or narrow, shoulders widen, lanes diverge or merge and where deceleration lanes are provided. Geometric transitions are usually required when there is a change in the thoroughfare type and associated change in width, particularly

where functional classification and speed changes and where a change in the width of roadway, either a narrowing or widening of lanes, or a decrease or increase in number of lanes is introduced. Refer to the section transition principles earlier in this chapter for guidance on nongeometric transitions.

Recommended Practice

For changes in roadway width and space designing a geometric transition such as a lateral shift, lane addition or drop, lane or shoulder narrowing and so forth, use the established guidance in the MUTCD, where the length of the transition taper is computed by the following equation:

- $L = WS^2/60$ (for speeds less than 45 mph)

where L equals the length of the transition taper (feet), W equals the width of the lateral shift or offset (feet) and S equals the 85th percentile operating speed in mph or posted speed in mph (whichever is higher) or the target speed in new construction projects (**Figure 9.13**).

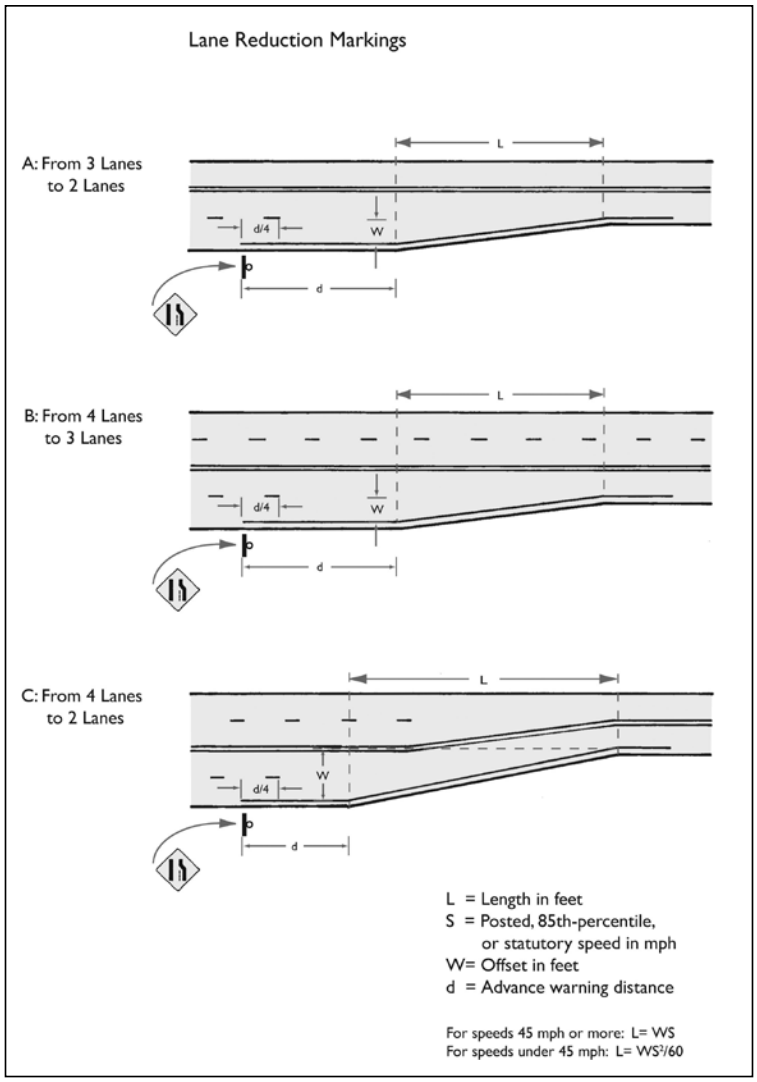


Figure 9.13 Typical transition design and markings. Source: Community, Design + Architecture, adapted from the *Manual on Uniform Traffic Control Devices* (FHWA).

Additional Guidelines

- Transitions should be accompanied by appropriate warning signs (refer to MUTCD).
- Transitions should occur on a tangent section of roadway, avoiding areas with horizontal and vertical sight distance constraints.
- Ensure the entire transition length is visible to the driver.
- The transition design described above is unnecessary when roadways widen or lanes are added. In these cases, a transition taper of 10 to 1 is sufficient. Speed-change lanes at intersections (transitions to left- or right-turn lanes) usually require a shorter taper and deceleration distance. AASHTO recommends 100 feet for single-turn lanes and 150 feet for dual-turn lanes.

Four-Lane to Three-Lane Conversions (Road Diets)

A road diet is the conversion of a wide street to a narrower one, such as the conversion of a four-lane undivided thoroughfare into a three-lane street composed of two travel lanes and a two-way left-turn lane. This conversion provides additional space to accommodate other desirable features such as bike lanes, wider streetsides, pedestrian refuge, landscaping, or on-street parking. Case studies demonstrate that road diets reduce conflicts at intersections, reduce accidents and have minimal effects on traffic capacity and diversion on thoroughfares under 20,000 vehicles per day.

Three-lane roadways can improve emergency response by allowing emergency vehicles to bypass congestion by using the two-way left-turn lane. They create opportunities for pedestrian refuges at midblock and intersection crossings and eliminate the common "multiple threat" hazards pedestrians experience crossing four-lane roads. Other benefits include easier egress from driveways (improved sight distance), smaller curb return radius by increasing the effective radius of the road, improvements for transit (allows curbside stops outside of travel lane) and buffers street tree branches from closely passing trucks. Road diets can improve the flow of traffic and reduce travel speeds, particularly when used in conjunction with roundabouts (see Chapter 10 section on modern roundabouts). **Figure 9.14** shows a street before and after a road diet.

Converting four-lane roads to three lanes and adding a raised median and on-street parking may result in the thoroughfare failing to meet local fire districts minimum clear travelway requirements. See discussion on emergency vehicle operations earlier in this chapter.

For more detailed information, design guidance and case studies, refer to *Road Diet Handbook: Setting Trends for Livable Streets,* Second Edition (Parsons Brinkerhoff, Rosales, 2007).

Midblock Crossings

Background and Purpose

Midblock crossings provide convenient locations for pedestrians to cross urban thoroughfares in areas with infrequent intersection crossings or where the nearest intersection crossing creates substantial out-of-direction travel. When the spacing of intersection crossings is far apart or when the pedestrian destination is directly across the street, pedestrians will cross where necessary to get to their destination directly and conveniently, exposing themselves to traffic where drivers might not expect them. Midblock crossings, therefore, respond to pedestrian behavior. Properly designed and visible midblock crosswalks, signals and warning signs warn drivers of potential pedestrians, protect crossing pedestrians and encourage walking in high-activity areas.

Related Thoroughfare Design Elements

- On-street parking
- Pedestrian refuge islands
- Medians
- Curb extensions
- Bicycle lanes

General Principles and Considerations

Installing midblock crosswalks can help channel pedestrians to the safest midblock location, provide visual cues to allow approaching motorists to anticipate pedestrian activity and unexpected stopped vehicles and provide pedestrians with reasonable opportunities to cross during heavy traffic periods when there are few natural gaps in the approaching traffic streams (**Figure 9.15**). General principles and considerations regarding midblock crossings include the following:

- Appropriate stopping sight distance is a critical part of the design of midblock crossings. Refer to AASHTO's *Policy on Geometric Design of Streets and Highways* (2004) for guidance in determining sight distance.
- The practitioner should always evaluate a number of factors before installing midblock crosswalks, including proximity to other crossing points, sight distance, vehicle speed, crash records, illumination, traffic volumes, pedestrian volumes and nearby pedestrian generators.
- In the urban environment, pedestrians should not be expected to make excessive or inconvenient diversions in their travel path to cross at an intersection. On the other hand, because midblock crossings are not generally expected by motorists, they should be used only where truly needed and appropriately signed, marked and illuminated.
- Midblock crossings should be identifiable to pedestrians with vision impairments. Where there is a signal, a locator tone at the pedestrian detector might be sufficient. A tactile strip across the width of the sidewalk at the curbline and

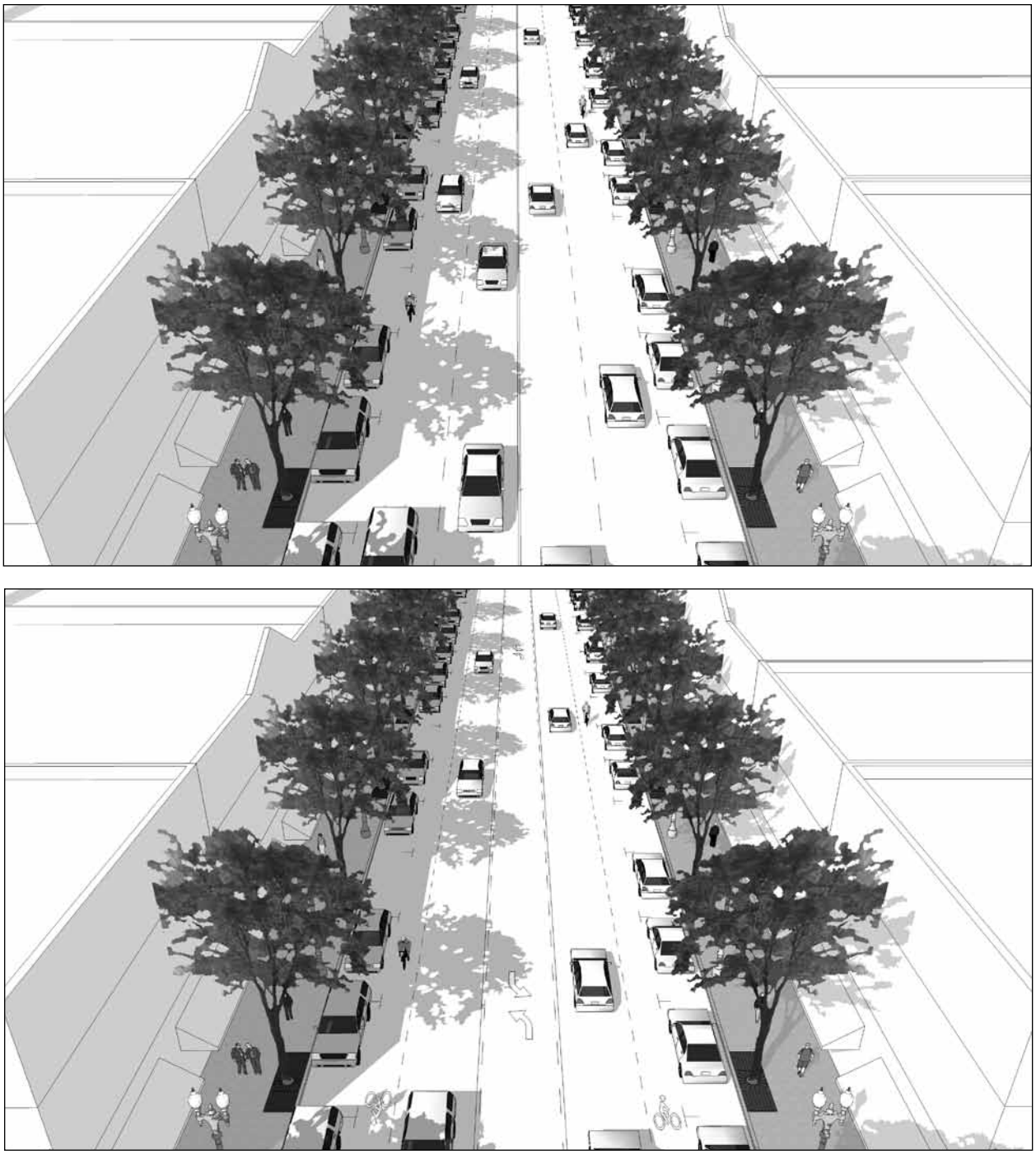


Figure 9.14 Before and after illustration of a road diet. Source: Claire Vlach, Bottomley Design & Planning.

at pedestrian refuge islands needs to be used so that visually impaired pedestrians are alerted to the presence of the crossing.

- For a crosswalk to exist at a midblock location, it must be a marked crosswalk and have high visibility to drivers who may not anticipate a midblock crossing. Midblock crosswalks should be marked with a higher-visibility crosswalk marking such as longitudinal or diagonal lines or should be constructed with a high-contrast alternative pavement.
- When an unsignalized midblock crosswalk is installed, warning signs should be placed for both directions of traffic. A pedestrian warning sign with an "AHEAD" notice or a distance plaque should be placed in advance of the crossing, and a pedestrian warning sign with a downward diagonal arrow plaque should be placed at the crossing location. On multilane facilities, an advanced stop bar should be considered.

Recommended Practice

The recommended practice for midblock crossings on urban thoroughfares is shown in **Table 9.4.** Examples are provided in **Figures 9.16 through 9.19.**

Justification

Street life and activity entering and leaving buildings are often oriented toward midblock locations rather than intersections. Pedestrian convenience is related to walking distance as well as safety in crossing the roadway. Well-designed midblock crosswalks are highly visible to motorists, bicyclists and pedestrians; reduce walking distance; and contribute to pedestrian convenience.



Figure 9.15 Midblock crosswalks provide opportunities to cross streets with long distances between intersection crossings. Source: Claire Vlach, Bottomley Design & Planning.

Table 9.4 Recommended Practice for Midblock Crossings

General
The decision to locate a midblock crosswalk will be based on numerous factors. Generally, however, consider providing a marked midblock crossing when protected intersection crossings are spaced greater than 400 feet or so that crosswalks are located no greater than 200 to 300 feet apart in high pedestrian volume locations, and meet the criteria below.
Midblock crossings may be considered when there is significant pedestrian demand to cross a street between intersections, such as connecting to major generators or transit stops.
Midblock crosswalks should be located at least 100 feet from the nearest side street or driveway so that drivers turning onto the major street have a chance to notice pedestrians and properly yield to pedestrians who are crossing the street.
Criteria
Streets with an average daily traffic volume (ADT) of 12,000 vehicles per day or less.
Multilane streets carrying less than 15,000 ADT if a raised pedestrian refuge median is provided.
Operating speeds less than 40 mph.
A minimum pedestrian crossing volume of 25 pedestrians per hour for at least four hours of a typical day.
Adequate sight distance is available for pedestrians and motorists.
Recommendations
Conform to PROWAG guidelines for the disabled and visually impaired.
Unsignalized midblock crosswalks should not be provided on streets where traffic volumes do not have gaps in the traffic stream long enough for a pedestrian to walk to the other side or to a median refuge. At locations with inadequate gaps that also meet MUTCD signalization warrants, consider a signalized midblock crossing.
Consider a signalized midblock crosswalk (including locator tone and audio pedestrian signal output as well as visual pedestrian countdown signal heads) where pedestrians must wait more than an average of 60 seconds for an appropriate gap in the traffic stream. When average wait times exceed 60 seconds, pedestrians tend to become impatient and cross during inadequate gaps in traffic. If this initial threshold is met, check pedestrian signal warrants in the MUTCD.
Provide overhead safety lighting on the approach sides of both ends of midblock crosswalks.
Provide wheelchair ramps or at-grade channels at midblock crosswalks with curbs and medians.
Provide raised median pedestrian refuge at midblock crossings where the total crossing width is greater than 60 feet, and on any unsignalized multi-lane thoroughfare crossing.
Use high-visibility (ladder-style) crosswalk markings to increase visibility longitudinally.
Provide advance stop or yield lines to reduce multiple-threat crashes.
Provide advance crosswalk warning signs for vehicle traffic.
Provide curb extensions at midblock crosswalks with illumination and signing to increase pedestrian and driver visibility.
"Z" crossing configurations should be used for midblock crossings with medians wherever possible (see **Figure 9.16**). Provide an at-grade channel in median at a 45-degree angle toward advancing traffic to encourage pedestrians to look for oncoming traffic.
Other Considerations
A strategy to calm traffic speeds in advance of and at a midblock crossing is to raise the pavement to meet the sidewalk elevation by use of gentle ramps (see **Figure 9.17**). Consider use of overhead flashing beacons.

Sources:
Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, FHWA, 2002
Manual on Uniform Traffic Control Devices, FHWA, 2009 Edition
Guide for the Planning, Design and Operation of Pedestrian Facilities, AASHTO, 2004

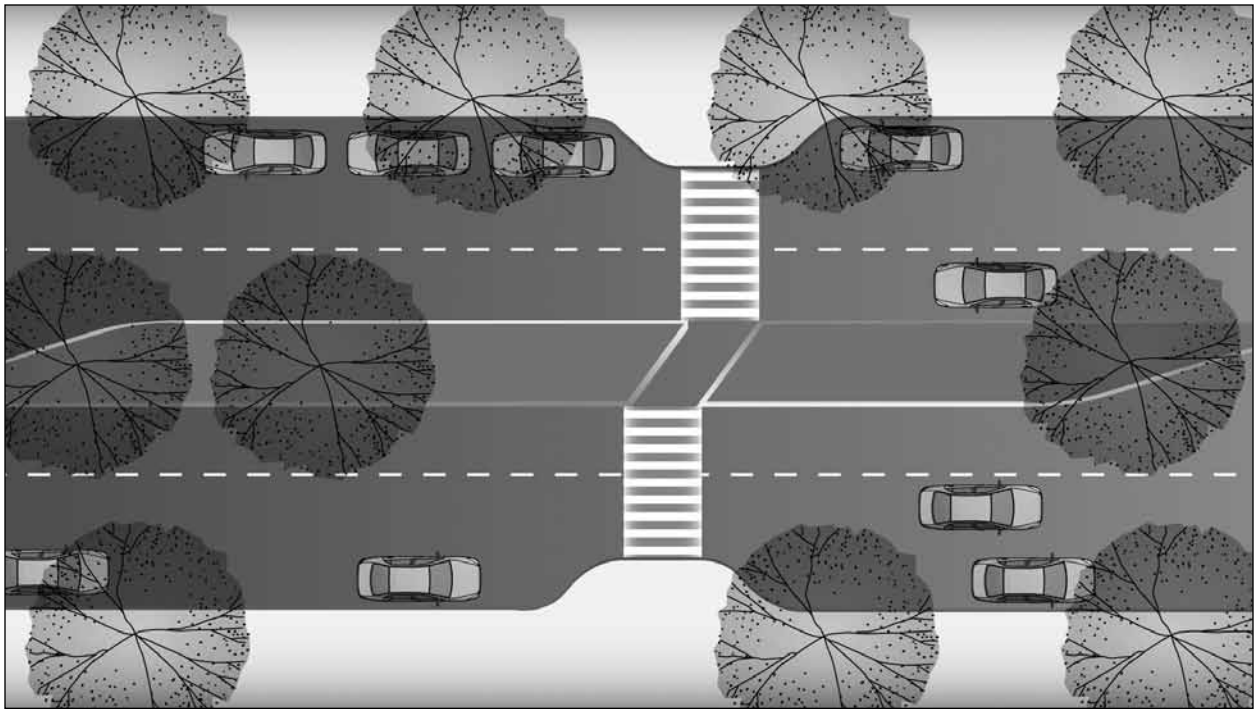


Figure 9.16 Midblock crossings with a "Z" configuration force pedestrians crossing the median to look toward oncoming traffic. Avoid street trees that interfere with visibility. Source: Kimley-Horn and Associates, Inc.

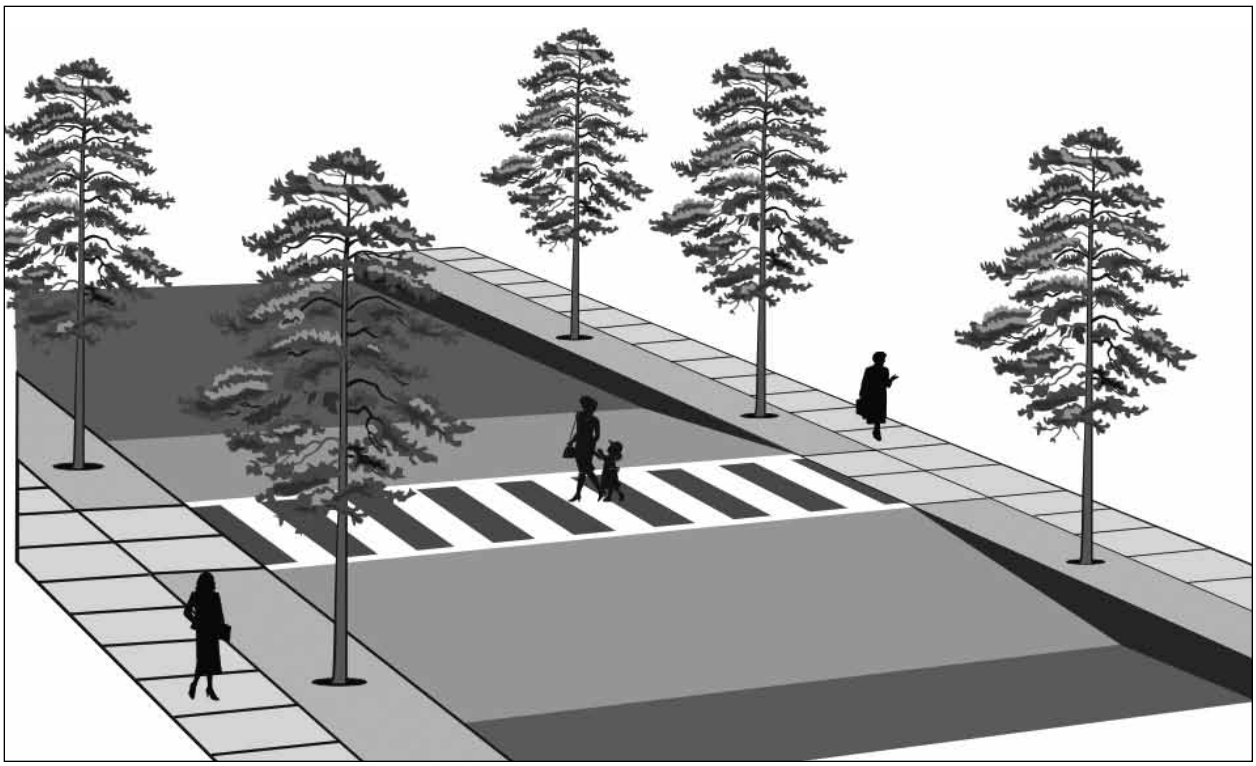


Figure 9.17 The raised roadway crosswalk concept combines midblock crosswalks with traffic calming devices. Source: Kimley-Horn and Associates, Inc.



Figure 9.18 Midblock crossing with pedestrian detection and in-pavement lights. Source: Kimley-Horn and Associates, Inc.



Figure 9.19 Example of a signalized midblock crossing. Source: Kimley-Horn and Associates, Inc.

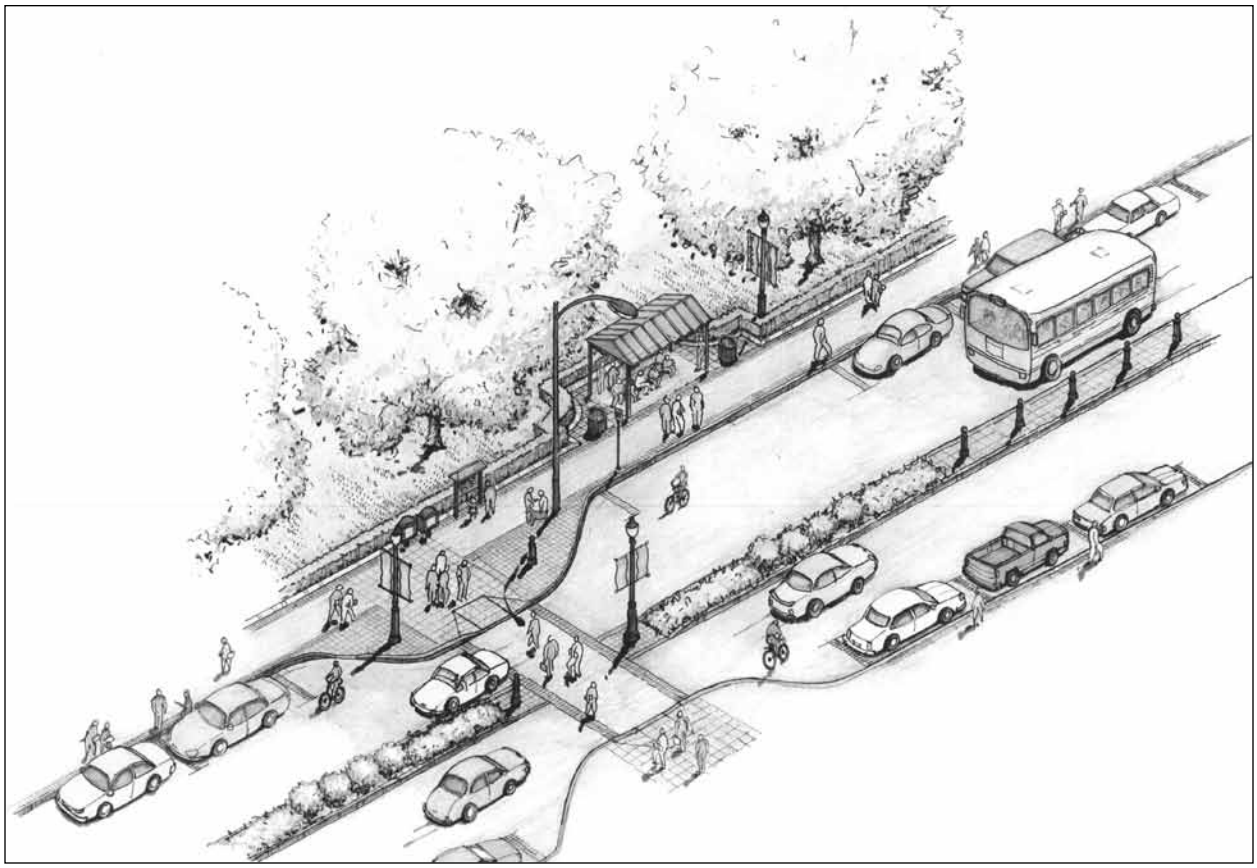


Figure 9.20 Refuge islands can be used at midblock locations, channelized right turns, or at long intersection crossings. Source: Kimley-Horn and Associates, Inc.

Pedestrian Refuge Islands

Background and Purpose

Refuge islands provide pedestrians and bicyclists a refuge area within intersection and midblock crossings. While in walkable urban areas it is desirable that thoroughfares have short crossings, on wide thoroughfares, or where less mobile pedestrians need to cross, refuge islands provide a location for pedestrians or bicyclists to wait partially through their crossing. Refuge islands also break up crosswalks at complex multilane and multilegged intersections into shorter and easier portions for pedestrians to cross.

Related Thoroughfare Design Elements

- Lane width
- Right-turn channelization
- Modern roundabouts
- Medians
- Midblock crossings
- Curb extensions

General Considerations

Refuge islands are provided in the median and on right-turn channelized islands (**Figure 9.20**). Refuge islands should be considered for intersections and midblock crossings for which one or more of the following conditions apply:

- Unsignalized midblock and intersection crossings of a high-volume thoroughfare of four or more lanes to allow crossing pedestrians and bicyclists to concentrate on crossing one direction of travel at a time; or

- Signalized crossings frequently used by a number of people who walk slower than 3.5 feet per second, such as older persons, schoolchildren, persons with disabilities and so forth.

At signalized intersections, the provision of pedestrian refuges increases the crossing distance of most pedestrians (walking at a rate of 3.5 to 4 feet per second) who do not need to use the refuge and increases the traffic signal's overall cycle length and resulting delay (delay that is also experienced by pedestrians). Thus, the practitioner needs to balance the needs of all users when considering a refuge in the second condition above.

Recommended Practice

Recommended practices regarding pedestrian refuge islands include the following:

- Islands should be sufficiently large to command attention. For pedestrian refuge, islands should have an area at least 120 square feet with minimum dimensions of 6 feet wide and 20 feet long.
- Refuge islands are generally good practice in urban areas to reduce pedestrian exposure to traffic. Specifically, refuge islands may be considered on urban thoroughfares where the unsignalized pedestrian crossing crosses four or more lanes or greater than 60 feet, or under special circumstances such as school crossings and where elderly pedestrians cross.
- Medians expected to be used as pedestrian refuges should have vertical curbs to delineate the pedestrian refuge from the surrounding roadway.
- If part of a designated multi-use trail system, refuge islands are recommended to be 10 feet wide (8 feet minimum).
- Crossing through pedestrian refuges must be accessible with channels at street grade, detectable warnings and audio and visual output at signalized crossings.

Justification

Short crosswalks help pedestrians cross streets more safely with less exposure to vehicle traffic. They also require shorter pedestrian signal phases to cross, thereby reducing traffic delays. Pedestrian comfort and safety when crossing wide intersections is an essential component of good pedestrian facility design. On wide streets, the median can provide a refuge for those who begin crossing too late or are slow walkers. At unsignalized intersection and midblock crossings, medians permit crossings to be accomplished in two stages, so that pedestrians only have to concentrate on crossing one direction of the roadway at a time.

Transit Design

Background and Purpose

Many urban thoroughfares accommodate public transportation. The types of services accommodated on thoroughfares ranges from local bus service to bus rapid transit (BRT) to trolleys and light rail transit (LRT). These types of transit service can be accommodated either within a dedicated right of way in the thoroughfare or in mixed-flow lanes. In both cases the design of the thoroughfare needs to consider the special requirements of transit vehicles, running ways and operations, whether they exist or are planned for the future. The purpose of this section is to identify

Related Thoroughfare Design Elements

- Cross-section determination
- Lane width
- Medians
- Bike lanes
- Curb return radii
- Curb extensions
- Bus stops in the traveled way
- Bus stops at intersections

Table 9.5 Types of Public Transportation Using Urban Thoroughfares

Transit Type	Definition
Local Bus	Bus service operating at a fixed frequency that serves designated stops along a fixed route. Fares are collected onboard by the bus operator. Local bus service usually operates in mixed-flow lanes on urban thoroughfares. The typical average operating speed is low and is dependent on the operating speed of the urban thoroughfare.
Rapid Bus	Bus service similar to local bus serves designated stops along fixed route but with fewer stops than local service. This service is also known as commuter express. Fares are collected onboard by the bus operator. Rapid bus service usually operates along mixed-flow lanes on urban thoroughfares. Rapid buses may operate only during peak travel periods along peak directions. Some rapid bus systems use transit priority signal systems to improve headways, and queue jump lanes to bypass congestion at intersections.
Bus Rapid Transit (BRT)	Enhanced bus service that operates within its own right of way or designated lanes along the urban thoroughfares. BRT may utilize off-board fare collection to minimize boarding delays. BRT stops are typically spaced one mile apart and operate with high-frequency headways. The average speed of BRT is higher than that of rapid bus. BRT buses and stations are branded to distinguish them from local bus services. Stations frequently have more passenger amenities than typical bus stops. BRT systems use transit priority signal systems to improve headways, and queue jump lanes to bypass congestion at intersections.
Streetcar/Light Rail Transit (LRT)	Streetcars and LRT are fixed guideway transit systems. Streetcars (or trolleys) are electrically powered vehicles that may share the street with other modes of transportation and operate in mixed-flow lanes. LRT is typically electrical powered rail cars within exclusive rights of way in thoroughfare medians but may also operate in mixed-flow lanes. LRT is provided with traffic signal prioritization at intersections and requires special signal phasing to reduce conflicts. LRT utilizes off-board fare collection at transit stations. Transit stations, whether on the median or edges of thoroughfares, may require substantial right of way.

the key elements of transit that affect the design of thoroughfares. Detailed design guidance on dedicated transitways, particularly for rail systems, is beyond the scope of this report, but the information presented here can inform the thoroughfare planning and design process.



Figure 9.21 An example of a dedicated transitway in the outside lane of an urban thoroughfare. Note the bike lane located between the curb and the transitway. Source: Kimley-Horn and Associates, Inc.

Types of Transit on Thoroughfares

The different types of public transportation systems that use urban thoroughfares have varying physical and operating characteristics that will establish the design controls and geometric design parameters in thoroughfare design. It is important for the practitioner to understand the dimensions and capabilities of the type of transit using, or expecting to use, the thoroughfare and the ramifications the transit vehicles, their operation and their stops and stations will have on the design of the thoroughfare.

Table 9.5 describes the common types of public transportation systems using urban thoroughfares.

Transit Facilities on Thoroughfares

Transit on urban thoroughfares can utilize one or more of the following running way configurations:

- Mixed-flow travel lanes;
- Transit or high-occupancy vehicle (HOV) lanes in median or adjacent to mixed-flow lanes used for transit either full time or during peak periods;

- Reversible or contraflow dedicated transit lanes (in median or in outside travel lanes);
- Dedicated and separated transitway in inside or outside travel lanes (**Figures 9.21** and **9.22**); and
- Dedicated and separated transitway within thoroughfare median (**Figure 9.23**);
- Transit-only streets, busways, or transit malls.

Each running way configuration requires that the practitioner understand the right of way and dimensions required (not only for the running ways but for stops and stations), the transition required when changing from one configuration to another and how the transit vehicle will use intersections. Further, rail systems can be single tracked, double tracked, or both, which affects thoroughfare width planning.

Like running ways, bus and rail stops and stations can have multiple configurations depending on the type of transit, the available right of way, the type of service and other factors. As used in this report, a "stop" is a location where a transit vehicles stops to allow passengers to board or alight. A stop, at a minimum, is identified by a sign but may have some passenger amenities such as benches and shelters. A "station" is a more elaborate transit stop with substantial passenger amenities and may have facilities such as ticket offices, restrooms, or other services. Stations may accommodate multiple vehicles or have integrated intermodal facilities. Stops and stations can utilize one or more of the following configurations:

Local, Rapid and Bus Rapid Transit

- Midblock bus stop (curbside, pullout or bay, or bus bulb; see section on Bus Stops in the Traveled Way in this chapter);
- Near-side or far-side intersection bus stop (curbside, pullout or bay, or bus bulb; see Bus Stops at Intersections in Chapter 10); and
- Center median station with single center or dual outside platforms (midblock or near and far side of intersection), potentially with crossover for buses with right-side doors.

Light Rail, Streetcar, or Trolley Transit

- Median station with dual side platforms;
- Median station with single center platform;
- Median station with single side platform (midblock or near and far side of intersection); and
- Curbside station at outside edge of thoroughfare traveled way.

The thoroughfare designer needs to coordinate with the responsible transit agencies to identify the appro-



Figure 9.22 A simulation of a bus rapid transit center median station with dual outside platforms located at the far side of an intersection. Source: AC Transit.



Figure 9.23 This thoroughfare in Houston, Texas has light rail transit running in dedicated inside travel lanes. Source: Texas Transportation Institute.

Table 9.6 Integrating Transit into Thoroughfare Planning and Project Development

Thoroughfare Planning or Project Development Stage	Transit Considerations
Systems and Network Planning Identify thoroughfare network deficiencies and conceptual solutions	Identify transit system deficiencies and long range transit needs
Corridor Planning Develop and assess alternatives for corridor	Develop and assess thoroughfare and transit alternatives within the corridor
Project Scoping Develop project definitions that address deficiencies	Identify transit elements to be included in the definition of thoroughfare projects
Programming Prioritize projects and define program based on funding availability	Develop transit project phasing and identify transit elements to be included in project funding
Environmental and Design Design project, assess impacts and estimate cost	Identify transit requirements to be integrated into thoroughfare design

Adapted from *Transit Vehicles and Facilities on Streets and Highways (Phase II) Final Report*. Transit Cooperative Research Program Project D-09, 2007. Privileged Document.

priate running way configuration, transitions and location and design of stops and stations.

Planning for Transit

Transit systems are planned at the regional, citywide and/or corridor level (see Chapter 2). Most large-scale rail transit system decisions (technology, type, service and routing) are made in statewide or regional long-range transportation plans. Typically, an alternatives analysis that evaluates the feasibility of implementing the transit system on the proposed routes is prepared for major public transportation systems such as LRT or BRT that seek federal funding. These studies may even include preliminary engineering. Transit systems planning and corridor planning follow the same general process outlined in Chapter 2 for the thoroughfare planning process.

Transit considerations can be integrated into thoroughfare planning and design at several stages within the regional planning, corridor planning and project development processes as outlined in **Table 9.6**.

When designing thoroughfares that are identified as future transit corridors, the practitioner will need to consider a number of factors in order to reserve the appropriate right of way and to ensure the design is relatively easily converted to accommodate transit. Some of these factors are identified in **Table 9.7**. In addition to specific design issues, the practitioner may need to consider other planning considerations such as:

- Potential for converting bus transit to LRT needs to consider LRT design parameters for vertical clearance, track integration, right of way, grades, pavement structural design, drainage and utilities for LRT power and communication.
- Stop and station locations and spacing to meet changing context and future development.
- Potential change in transit routing.
- Alternatives analysis and trade-offs assessment of transit priority treatments.
- Coordinating with transit agencies to install fiber-optic cabling to serve intelligent transportation systems (ITS) on transit corridors, such as automated passenger information systems at stops and stations.

Transit Design Parameters

Although it is not the intent of this report to present guidelines for the extensive field of transit facility design, **Table 9.8** presents a select number of minimum dimensions and design parameters for some of the more common transit facility components that might be useful to the thoroughfare design practitioner in determining cross-sectional elements.

Table 9.7 Transit Related Factors to Consider in Thoroughfare Design

Thoroughfare Design Component	Factors to be Considered
Streetside (Chapter 8)	Streetside width at stops or stations
	Space for passenger requirements such as shelters, seating, waiting areas, trees, lighting and so forth.
	Accessibility requirements (lift pads)
Traveled Way (Chapter 9)	Available total right of way to accommodate running ways, stops and stations
	Lane width to accommodate transit vehicle in mixed-flow lanes
	Type of running way and separation (dedicated transitway, reversible/contraflow, HOV, median lanes, concurrent lanes)
	Median width to accommodate running ways and stations
	Pedestrian access to median stations
	Ability to accommodate on-street parking on transit streets
	Parking restrictions near stops and stations
	Bike/bus conflicts where buses stop in bike lane
	Pavement depth to accommodate buses; concrete pads at bus stops
	Additional width for transit facilities versus pedestrian crossing distance
	Roadway structural design for LRT
	Horizontal and vertical clearances for transit; maintenance requirements such as tree pruning
	Necessity for bus bays
	Transit operations on one-way streets, location of stops, turns
	Provision of an enforcement area on exclusive bus facilities (e.g., extended bus turnouts)
	Prohibition of turns across median running ways
	Overhead clearance for catenary power supply or trolley wires and space to mount poles
Intersections (Chapter 10)	Transit vehicle turning radius and curb return/extension design
	Queue jump lanes and special signal phasing
	Accommodating transit vehicles in roundabouts
	Near-side or far-side bus stops, BRT or rail stations and traffic operations
	Transit priority signal systems or special phasing for rapid and BRT
	Bus priority treatments; intersection design when contraflow bus lanes are used
	Special signal phasing and equipment for LRT
	Vehicle left-turn lanes adjacent to median stations
	Vehicle turn prohibitions in constrained rights of way or for operational efficiency
	Curb extension bus stop versus curbside stop
	Pavement grades through intersections and bus passenger comfort
	Movement restrictions and bus exemptions

Table 9.8 Minimum Dimensions for Transit Facilities in Thoroughfares

Transit Facility or Design Element	Minimum Dimension
Lane width to accommodate standard urban bus, LRT vehicle, or streetcar	11 feet
Curbside bus stop length and no-parking zone (add 20 feet for articulated vehicles)	
Near-side bus stop	100 feet
Far-side bus stop	80 feet (Plus 5 feet from crosswalk or curb return)
Far-side bus stop after turn	90 feet (Plus 5 feet from crosswalk or curb return)
Midblock	120 feet
Bus bulb stop length (near side or far side)	40 feet
Distance between front of vehicle at near-side stop and crosswalk	10 feet
Single-side LRT/BRT platform width conforming to ADA guidelines	10 feet (8 feet plus 2 feet tactile strip)
Distance between LRT double track centerlines	12 feet
Maximum grade for LRT operation	6%
Height of platform	Low: 10 inches High: 36 inches
Width of two-track LRT channel	22 feet
Vertical clearance for LRT (top of rail to bottom of wire)	11.5 feet
Width of right of reserve for two tracks	19–33 feet
LRT/BRT station widths (including running way)	
Dual outside platforms	41 feet
Single center platform	55 feet
Single outside platform	31 feet

Bus Stops in the Traveled Way

Background and Purpose

There are more than 9.4 billion trips made by transit in the United States each year, with nearly 5.3 billion trips made by bus (National Transit Database 2006). Buses are the most common form of mass transit in the country, and the majority of bus travel occurs on urban thoroughfares in metropolitan areas. Since urban thoroughfares serve as the primary access and mobility routes for mass transit, they are the best locations for investment in transit facilities and public amenities that provide direct access to bus stops and functional, attractive and comfortable places to wait for transit. The placement and design of bus stops affect the efficiency of the transit system, traffic operations, safety and people's choices to use transit. Since there is no equivalent to the AASHTO Green Book for transit design guidance, transit agencies develop guidelines and practices for bus stop planning, placement and design. Design guidelines include compliance with ADA requirements to ensure that transit is accessible. This section addresses general guidance for the planning and design of bus stops on urban thoroughfares compiled from the design guidelines of transit agencies. Location-specific guidance should be obtained from local transit agencies.

Related Thoroughfare Design Elements

- Lane width
- Midblock crossings
- Curb extensions
- Transit design
- On-street parking and configuration

General Principles and Considerations

Fundamentals of Bus Stop Placement

The location of a bus stop must address both traffic operations and passenger accessibility issues. If possible, the bus stop should be located in an area where typical amenities, such as a bench or shelter, can be placed in the public right of way. A bus stop location should consider potential ridership, traffic and rider safety and bus operations elements that require site-specific evaluation. Significant emphasis should be placed on factors affecting personal security. Well-lit open spaces visible from the street create a safer environment for waiting passengers.

Elements to consider when determining bus stop placement include:

- Proximity to major trip generators;
- Presence of sidewalks, crosswalks and curb ramps;
- Nearby enhanced crossings, either midblock or at an intersection;
- Access for people with disabilities;
- Passenger transfers to other routes; and
- Effect on adjacent property owners.

Traffic and rider safety elements to consider in bus stop placement include:

- Conflict between buses, other traffic and pedestrians;
- Crossing to an opposite bus stop—every bus stop should be considered a pedestrian crossing point;
- Passenger protection from passing traffic;
- Width of sidewalks;
- Width of furnishings zone as well as locations of any obstructions;
- Pedestrian activity adjacent to stop;
- All weather surface to step to/from the bus;
- Open and visible spaces for personal security and passenger visibility; and
- Street illumination.

Bus operations elements to consider in bus stop placement include:

- Accessibility and availability of convenient curb space;
- Adequate curb space for the number of buses expected at the stop at any one time;
- On-street automobile parking and truck delivery zones;

Table 9.9 Advantages and Disadvantages of Midblock Bus Stops

Advantages	Disadvantages
Minimizes sight distance problems for motorists and pedestrians	Requires additional distance for no-parking restrictions
Might result in passenger waiting areas experiencing less pedestrian congestion	Increases walking distance for patrons crossing at an intersection or requires special features to assist pedestrians with midblock crossing
Might be closer to passenger origins or destinations on long blocks	Encourages uncontrolled midblock pedestrian crossings
Might result in less interference with traffic flow	Only serves adjacent generators and does not afford system transfers to other lines often found at intersections

- Traffic control devices near the bus stop, such as signals or STOP signs;
- Volumes and turning movements of other traffic, including bicycles;
- Proximity and traffic volumes of nearby driveways;
- Street grade;
- Ease of reentering traffic stream; and
- Proximity to rail crossings.

The preferred location for bus stops is the near side or far side of an intersection (see the section on intersection bus stops in Chapter 10). Intersection stops provide the best pedestrian accessibility from both sides of the street and the cross streets and provides connection to intersecting bus routes.

Bus stops may also be placed at a midblock location on long blocks or to serve a major transit generator. At midblock bus stops ensure crosswalks are placed behind the bus stop, so passengers do not cross in front of the bus, where they are hidden from passing traffic. **Table 9.9** presents the advantages and disadvantages of midblock bus stops.

Stops should be placed to minimize the difficulties associated with lane changes and weaving maneuvers of approaching vehicles. Where it is not acceptable to stop the bus in traffic and a bus pullout is justified, a far-side

Standard transit bus dimensions

Overall height: 10 feet, 6 inches

Overall width: 10 feet, 4 inches (including mirrors)

Overall length (large bus): 40 feet

Overall length (articulated bus): 60 feet

Wheelchair lift dimensions

Width: 4 feet

Extension (from edge of bus): 4 feet, 6 inches

Turning radii

40-foot coach:

Inner rear wheel – 25.5 feet

Outer front corner – 47.8 feet

Centerline radius – 40.8 feet

60-foot articulated:

Inner rear wheel – 21.3 feet

Outer front corner – 44.3 feet

Centerline radius – 35.5 feet

Source: Orange County Transportation Authority (OCTA) *Bus Stop Safety and Design Guidelines*, Orange County, California

or midblock curbside stop is generally preferred (see section on intersection bus stops in Chapter 10).

Spacing of Bus Stops

Optimal bus stop spacing varies depending upon the type of transit service provided, urban context zone, location of major attractors, physical barriers and local community goals. Appropriate spacing ranges from 400 to 500 feet for downtown circulator shuttles and low-volume community service routes to greater than 2,000 feet (up to one mile) for bus rapid transit and express lines. Designers should consult with the local transit provider for design guidance on bus stop spacing and placement.

Recommended Practice

Design Vehicle

On urban thoroughfares with transit routes, the bus is one of the design vehicles used in thoroughfare design. Some transit agencies use smaller, urban-scaled transit vehicles (32-foot coach) and use of vehicles with the smallest possible turning radii should be encouraged. Most fleets use standard coaches with the design specifications described here. Important dimensions of standard and articulated buses are shown in the sidebar, including the turning radii requirements for a 40-foot coach and 60-foot articulated bus. The minimum inside radius is 21 to 26 feet and the minimum outer radius is 44 to 48 feet. Turning templates should be used in the design of facilities to identify curb return radius and required pavement width to avoid vehicle encroachment into opposing travel lanes. Additional allowance should be made for:

- Bicycle racks on front of bus (which adds 3 feet to the length of the bus); and
- Restrictions to bus overhang.

Parking Restrictions at Bus Stops

It is important that parking restrictions (either curb markings or NO PARKING signs) be placed at bus zones (**Figure 9.24**). The lack of parking restrictions impacts bus operations, traffic movement, safe sight distance and passenger access. Considerations include:



Figure 9.24 Parking restrictions at a bus stop.
Source: Texas Transportation Institute.

- Bus may have to double park when at a stop, interfering with traffic movements;
- Passengers would have to maneuver between parked vehicles when entering or exiting the bus, which can endanger the passengers; and
- Bus could not use the curb/sidewalk to deploy its lift to board or alight wheelchair passengers.

In addition to a minimum 40- to 60-foot long bus stop, no-parking zones before and after the bus stop allow buses to pull into the bus stop and reenter traffic. Use the following dimensions for no- parking zones at midblock bus stops that typically accommodate a single bus:

- Before stop: 40-foot minimum.
- After stop: 40-foot minimum.

Parking restrictions are not necessary when curb extension bus stops are provided.

Curb Extension Bus Stops at Midblock Locations

Bus bulbs (or curb extension bus stops) are bus stops in which the curb is extended into the on-street parking lane, and the bus stops within the travel lane. Refer to Chapter 10 (Curb Extension Bus Stops) for more information on this type of stop.



Figure 9.25 A typical bus turnout on an arterial Avenue. Source: Kimley-Horn and Associates, Inc.

Bus Turnouts

Bus turnouts (a recessed curb area located adjacent to the traffic lane as shown in **Figure 9.25**) are desirable only under selected conditions because of the delay created when the bus must reenter traffic. Bus turnouts are typically used only on thoroughfares with higher target speeds than those included in this report.

Bus turnouts have the following advantages:

- Allow traffic to proceed around the bus, reducing delay for other traffic;
- Maximize vehicular capacity of high-volume vehicle mobility priority thoroughfares;
- Clearly define the bus stop;
- Passenger loading and unloading can be conducted in a more relaxed manner; and
- Eliminate potential rear-end accidents.

Bus turnouts have the following disadvantages:

- Make it more difficult for buses to reenter traffic, increasing bus delay and average travel time for buses;
- Difficulty of buses pulling parallel to curb, reducing accessibility;
- Greater crash risk for buses pulling back into traffic than buses stopped in traffic lane; and
- Use additional space and might require right-of-way acquisition.

Bus Turnout Design

Typical urban bus turnouts are usually comprised of an entrance taper (40 to 60 feet), stopping area (40 to 60 feet per each standard and articulated bus respectively) and exit taper (40 to 60 feet).

Passenger Boarding Area

The bus stop passenger boarding area is the area described as a firm, solid platform for deployment of wheelchair lifts and for other bus stop features, such as shelters, and benches. The boarding area must include a front and rear loading area free of obstacles. The boarding area may also be a pathway, but greater clearance than a typical sidewalk is required to allow deployment of the wheelchair lift. **Figure 9.26** shows a basic boarding area.

The following criteria for boarding areas should be used to ensure compliance with PROWAG requirements:

- Door clearance: minimum of 5 feet wide along the curb by 8 feet deep (from face of curb to back of boarding area);
- Distance between front and rear boarding area is 18 feet;
- Surface material is stable, firm and slip resistant;
- Slope does not exceed 1 foot vertical over 20 feet horizontal (5 percent);
- Cross slope does not exceed 1 foot vertical over 50 feet horizontal (2 percent);



Figure 9.26 A simple passenger boarding area. Source: Kimley-Horn and Associates, Inc.

- Clear throughway width of 48 inches maintained in boarding area; and
- Vertical clearance of 84 inches maintained in boarding area.

Every bus stop should include the following minimum elements for passenger accessibility, safety and comfort:

- In streetsides with a detached sidewalk (planting strip between curb and sidewalk), practitioners should:
  - Provide a landing area adjacent to the curb for a minimum distance of 34 feet in length and a minimum of 8 feet in depth (from face of curb); and
  - Provide a connecting pathway from pedestrian throughway to landing area.
- Provide convenient pedestrian pathways/access ways to and from adjacent buildings.
- Locate the bus stop so coach operators have a clear view of passengers and waiting passengers can see oncoming buses.
- Minimize driveways in and adjacent to the bus stop area.
- Locate street furniture more than 2.5-feet tall in such a way as to provide motorists exiting nearby driveways clear visibility of the street.
- Passenger boarding area: Pads must have a smooth, broom-finished surface to accommodate high heels and wheelchairs and must have high-strength capacity to bear the weight of a shelter. Pavers (textured/decorative tiles) can be used in combination with a concrete pad for aesthetics. Slope of pad should match slope of adjacent sidewalk and allow drainage of pad (2 percent maximum per PROWAG requirements).
- Landscaping near the passenger boarding area is encouraged to maximize passenger comfort but should be placed far enough back from the curb face to not interfere with the bus or passenger visibility. All landscaping should be located so as not to obstruct the shelter canopy or obscure sight lines at the bus stop. Shade trees are desirable and the preferred location is at the back of the sidewalk.
- Maintain at least 5 feet of clearance between bus stop components and fire hydrants.
- Locate bus stops where there is a standard curb in good condition. Bus stops are designed with the assumption that the bus is the first step. It is more difficult for the elderly and mobility-impaired passengers if the curb is absent or damaged.
- All street furniture should be surrounded by at least 4 feet of horizontal clearance wherever possible for access and maintenance between components. **Figure 9.27** illustrates a typical layout of a shelter and other street furniture.
- There should be at least 10 feet of clearance between the front edge of a pedestrian crosswalk and the front of a bus at a near-side bus stop, and 5 feet between the back edge of a crosswalk and the rear of the bus at a far-side bus stop.
- Whenever possible, avoid placing a bus stop so that the bus wheels will cross over a catch basin as it pulls to the curb, causing the bus to lurch and possibly throw off passenger balance. Additionally, it could eventually cause excessive settlement of the catch basin's structure.
- To avoid splashing waiting passengers as the bus pulls to the curb in wet weather, consider draining away from the curb (**Figure 9.28**).

Passenger Security

Security is one of the primary issues associated with the design of bus stops. Personal security is consistently mentioned in transit studies as a major concern among transit users. The following guidelines should be considered to improve security at bus stops:

- Place bus stops in locations that provide between 2 to 5 lumens of illumination within the bus stop area. If street lighting does not exist, solar lighting could be considered to enhance security at night.
- Ensure adjacent shrubbery is trimmed low and thinned so passengers can view over and behind any hedges. Consider using plants that are open and do not form solid hedges of vegetation.
- Ensure clear visibility of, through and around the bus stop for both passenger surveillance of the environment and law enforcement surveillance. Pro-



Figure 9.27 An example layout of a shelter and other street furniture. Source: Texas Transportation Institute.



Figure 9.28 This bus stop is designed so that stormwater drains away from the curb into a slot drain located in the travel lane. This design keeps buses from splashing waiting passengers when pulling to the curb. Source: Texas Transportation Institute.

vide adequate lines of sight for passengers and law enforcement officers approaching the bus stop.

- Ensure that the pedestrian circulation routes through bus stops and waiting areas are not blocked from view by walls or other structures.
- When placing bus stops, avoid nearby edges and corners of walls that create blind spots.
- Avoid design features that degrade access and security, including sound walls or similar structures that isolate passengers from surrounding neighborhoods. In general, there is no reason to locate bus stops adjacent to sound walls or tall fences, as these locations preclude direct access from adjacent land uses. If unavoidable, provide a pedestrian passage through the wall.
- If possible, provide a public telephone or place the bus stop in view of a public telephone. Consider installation of emergency call boxes at isolated locations.
- Provide secure bicycle parking and ensure that proper clearances are maintained when bicycles are parked.
- If possible, provide multiple exits from bus shelters.
- Remove all evidence of vandalism and regularly repair and maintain benches and shelters to provide passengers with a sense of security.

Justification

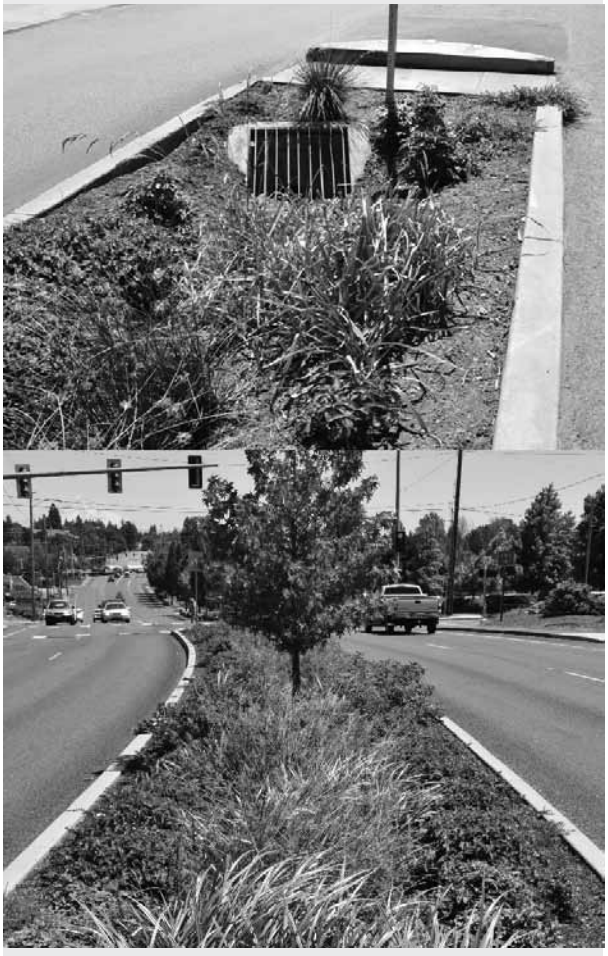
Bus stops should be designed to first expedite the safe and efficient loading and unloading of passengers (including those with disabilities) and to allow for efficient transition of the bus between the travel lanes and the bus stop. Because of the multimodal function of urban thoroughfares and to make transit competitive with auto travel, consideration should be given to design features that minimize delay for buses reentering the traffic stream (far-side bus stop placement and curb extension bus stops). The boarding area must be designed, at a minimum, to accommodate ADA/PROWAG requirements, but consideration should be given to boarding areas that can accommodate passenger amenities such as shelters, benches, trees and bicycle parking, even if these amenities will be implemented in the future.

Special Consideration with Stormwater Management

The management of stormwater on walkable urban thoroughfares improves the walking and bicycling environment, aesthetics and the quality of the community as a whole. Green stormwater management practices add value and multiple functionality and should be considered in thoroughfare improvement projects.

Swales in Stormwater Management

Green swale areas can be located in medians, planting strips, islands and other landscaped areas to which stormwater can be directed. Swales are depressed areas that are normally highly porous but are planted with low-maintenance, frequently indigenous types of grass or vegetation that are compatible with the detention, absorption and filtration functions they are designed to serve. The photos below show an example of a median swale, but similar swales can be located in planting strips adjacent to curbs or other locations within the right of way.



If the local soil doesn't percolate or if the median slopes, the design will need a subsurface drain inlet to the storm drain system at the downstream end (as shown in the photo above). Consider that loose soil around the plants would be carried into the storm drain with the first storm requiring fabric or other erosion control on the soil or a sediment trap in the inlet structure.

Source: City of Gresham, OR

Stormwater runoff from thoroughfares and their streetsides must be handled in the right of way. Different communities treat stormwater differently. For some the conventional way is to collect and carry it in storm sewer pipe networks to a treatment plant then an outfall into a water body. For other communities, stormwater is controlled at the source or through treatment control best management practices.

Related Thoroughfare Design Elements

- Streetside
- On-street parking
- Medians
- Street trees and street trees in medians

Background and Purpose

Urban areas have a high percentage of impervious surfaces. This creates the need for stormwater systems that can carry the runoff away from the area or treat, absorb and/or detain the runoff at its source. Failure to sufficiently handle stormwater can result in increased volume and rate of runoff from impervious surfaces increasing the demand for stormwater system capacity. If the system capacity cannot be increased, this can cause flooding and erosion, increase sedimentation and damage the natural habitats that accept the runoff. Further, the concentration of pollutants in the runoff can impact water quality.

A "green street" is a thoroughfare that provides water-quality treatment, retention and/or detention for some or most stormwater within the right of way through use of vegetated facilities, usually swale areas, to reduce, delay and/or filter the amount of water piped directly to outfalls. This report provides a brief discussion of reducing and treating stormwater using source control or treatment control best management practices (BMPs). BMPs are used to accommodate stormwater runoff in one or more ways:

1. **Infiltration**—water enters the ground directly or through pervious surfaces and percolates into the soil.

2. **Retention and detention**—methods to store runoff for later release. Detention measures store water for up to several days after a storm and are usually dry until the next storm. Retention measures are permanent basins that retain water.
3. **Biofiltration**—allow runoff to flow slowly through vegetated slopes and channels, which also capture sediment and pollutants.
4. **Mechanical filtering, screening and de-sedimentation**—devices that can be installed in or adjacent to thoroughfares within the public right of way that use various means to capture solids, such as litter and leaves, or fine particulates, such as dirt and metals.

Where thoroughfare designs can accommodate significant green space, vegetated or grass swales in the streetside or the median can be used to absorb, detain and/or filter runoff. This can reduce the necessary storm sewer capacity and treatment of the runoff.

General Principles

While there are numerous practices for addressing stormwater runoff on sites, the following principles are specific to urban thoroughfare design. These principles represent an objective that either slows or delays the movement of stormwater runoff into the storm drain system, filtrates sediment and pollutants from runoff, or both. Municipalities should encourage developers to implement landscape designs and site BMPs that mitigate increases in site runoff. This reduces the runoff that reaches thoroughfares from adjacent development.

- Minimize the width of the street to the extent feasible to reduce impervious surface.
- Provide pervious surfaces where possible. For example, use streetside planting strips to collect runoff from sidewalks or use pervious hardscape within streetsides of urbanized areas where parkrows are not provided. Consider the maintenance and longevity implications of surfaces that take vehicle loads.
- When retention or detention methods are used, incorporate them into urban water features that add aesthetic and place-making value to the function.
- Provide mechanical traps to capture pollutants and particulate matter such as dirt and leaves. Consider the maintenance requirements of these features.
- Where the context allows, direct runoff into biofilters or swales rather than underground storm drains.

Where a rigid pavement edge is necessary, consider that swales or other filtration devices can run parallel to the street (in the streetside planting strip or in the median) but also can intersect the street at cross-angles and run between residential lots or within parks or open space.

Guidelines

Complete guidance in relation to storm water management is beyond the scope of this report. Designers are encouraged to seek out other references, such as those outlined at the end of this chapter, or to seek guidance from their local stormwater management agency or water quality control board. However, several guidelines can be followed to develop an initial concept for using a green approach to stormwater management:

- Consider swales for use in medians, planting strips, planters, curb extension, islands, or other green areas of significant size where runoff can be collected and detained until filtered or absorbed or flowed into inlets at the end of swales.
- Employ swales where they can slope downward from the curb or sidewalk.
- Design gutters and curbs so water can enter the swale through breaks or other openings in the curbs; provide for runoff to enter swales directly from adjacent sidewalks or piped from elsewhere in the right of way.
- Considering appearance, cleaning, maintenance and amount of stormwater to be handled in the design of BMPs.
- Blend BMPs in with the rest of the thoroughfare design and context; consider pedestrian con-

nectivity; parking, bicycle and transit needs and provisions; safety; and emergency access.

- Use native, flood-tolerant plants that need little watering, fertilizers, or maintenance.
- Develop and implement a cleaning and maintenance program to preserve stormwater system functionality, appearance and plants.
- Install various commercially available traps, filters and detention or retention devices. Consider the maintenance requirements of these devices.

Recommended Practice

Pervious surfaces and "green" stormwater management should be used in medians, planting strips, planters, islands, sidewalk extensions and other applicable spaces within the right of way where natural stormwater detention, filtration, or absorption is desired, soil conditions are compatible, and where a suitable design is compatible with and supportive of the desired use and appearance of the thoroughfare and surrounding context.

Justification

The growing amount of impervious surfaces in urban areas is increasing runoff and therefore the need for increased stormwater management infrastructure. It also is carrying more waterborne street pollutants needing treatment. The Environmental Protection Agency's (EPA's) Clean Water Act has authorized the National Pollutant Discharge Elimination System (NPDES), regulations for improving water quality by addressing point sources that discharge pollutants into waterways, such as stormwater collected in thoroughfares. Use of BMPs within the thoroughfare rights of way can reduce the demand for both storm sewer and treatment facility capacity and also can serve multiple functions.

Special Consideration with Snow Removal

Background and Purpose

During and after a snowstorm, most snow plows operate in emergency or "hurry-up" mode, focusing on opening up lanes for vehicles. Often, when snow is scraped from the vehicular lanes, it is piled up in the bicycle lane, parking lane, or along the sidewalk, thus making it difficult for bicyclists and pedestrians to use the facilities that have been provided for them.

Snow and ice blockages can force pedestrians onto the street at a time when walking in the roadway is particularly treacherous. Many localities that experience regular snowfalls have enacted legislation requiring homeowners and businesses to clear the sidewalks fronting their property within a reasonable time after a snowfall occurs. In addition, many public works agencies adopt snow removal programs that ensure that the most heavily used pedestrian routes are cleared, including bus stops and curb ramps at street crossings, so that snow plows do not create impassable ridges of snow. Adding to the problem, piled snow can create sight distance restrictions.

In some states snow plow operations clear the entire roadway from curb to curb. After the roadway is cleared, a smaller "snow blow" (such as brushes, pickups and plows) are used to clear pedestrian facilities.

In areas that receive regular snow, there will be tradeoffs between the recommendations of this report and the efficiency of snow plowing. Some of the recommended design elements such as curb extensions and on-street parking will affect snow plowing operations.

Related Thoroughfare Design Elements

- Streetside
- Bicycle lanes
- On-street parking and configuration
- Medians

These trade-offs need to be clearly communicated in the design process. Further, early collaboration with officials in charge of snow removal is imperative for a successful design.

Recommended Practice

The following practices are recommended regarding snow removal in the design of walkable urban thoroughfares:

- Streetsides should be designed to accommodate a normal level of plowed snow behind the curb without blocking the pedestrian throughway. A wide planting strip or furnishings zone can accommodate plowed snow.
- Avoid designing objects in the furnishings zone that interfere with the ability to plow snow onto the streetside, such as large raised planters, continuous hedges and large utility and traffic control cabinets. Objects that snow can wrap around include trees, signs and light poles.
- The salting of streets for deicing can adversely affect landscaping in the streetside. If salt is used, design the furnishings zone with hardscape or setback plantings and trees beyond the plow line.

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Chapter 10

Intersection Design Guidelines

Introduction

Multimodal intersections operate with pedestrians, bicycles, cars, buses and trucks, and in some cases, trains. The diverse uses of intersections involve a high level of activity and shared space. Intersections have the unique characteristic of accommodating the almost-constant occurrence of conflicts between all modes, and most collisions on thoroughfares take place at intersections. This characteristic is the basis for most intersection design standards, particularly for safety.

Designing multimodal intersections with the appropriate accommodations for all users is performed on a case-by-case basis. The design extends beyond the immediate intersection and encompasses the approaches, medians, streetside and driveways, and adjacent land uses (**Figure 10.1**). The designer should begin with an understanding of the community objectives and priorities related to design trade-offs such as vehicular capacity and level of service, large-vehicle turning requirements, conflicts, pedestrian and bicycle convenience, accessibility and the efficiency of public transit service. Intersections are perhaps the most sensitive operational component of thoroughfare systems (**Figure 10.2**).

In urban areas, intersections have a significant placemaking function as well as a transportation func-

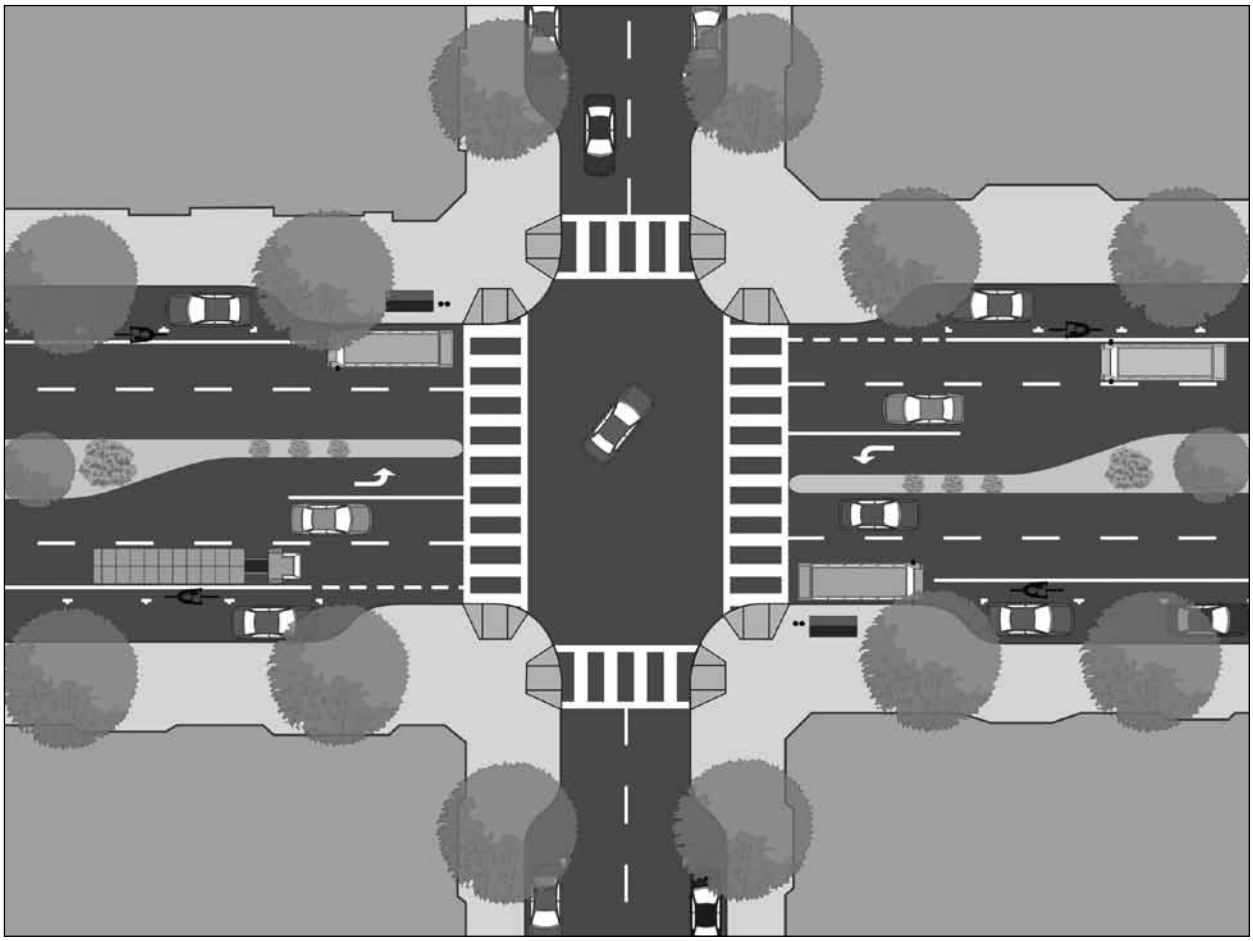


Figure 10.1 The design of intersections encompasses the intersection itself and the approaches to the intersection. It can even affect adjacent land uses. Source: Digital Media Productions.



Figure 10.2 Intersections have the unique characteristic of accommodating the almost-constant occurrence of conflicts between all modes. Source: Texas Transportation Institute.

tion. Significant land uses and architecturally significant buildings are located at intersections and might provide pedestrian access directly from the corners. Intersections may also serve as gateways and are frequently the first thing visitors see when they enter a neighborhood (**Figure 10.3**). It is often requested that the practitioner include aesthetic treatments in intersection design.

Objectives

This chapter:

1. Describes several fundamental aspects of intersection design, including managing multimodal conflicts, sight distance and layout; and
2. Provides general principles, considerations and design guidelines for key intersection components including curb return radii, channelized right turns, modern roundabouts, crosswalks, curb extensions, bicycle lanes and bus stops.

General Principles and Considerations

Intersections are required to meet a variety of user expectations, particularly for users of motor vehicles. Drivers expect to safely pass through intersections with minimal delay and few conflicts. Drivers of large vehicles expect to be able to negotiate turns easily. In urban areas, however, expectations based on rural and suburban experiences are unreasonable. Intersection users in urban areas will experience delays and conflicts between vehicles, pedestrians and bicyclists. Driver expectations need to shift toward taking turns with other modes and a sense of uncertainty, which creates a slower, vigilant and safer environment.

Successful multimodal intersection design is based on several fundamental geometric design and operational principles. These principles include:

- Minimize conflicts between modes (such as signal phasing that separates vehicle movements and pedestrian crossings, bicycle lanes extended to the crosswalk, pedestrian refuge islands, low-speed channelized right turns and so forth.) Provide crosswalks on all approaches.
- Accommodate all modes with the appropriate levels of service for pedestrians, bicyclists, transit and motorists given the recommended speed, volume and expected mix of traffic.



Figure 10.3 Intersections are community gateways. Landscaping in the center island of an intersection. Source: Kimley-Horn and Associates, Inc.



Figure 10.4 Intersections must be accessible to pedestrians with disabilities. This curb extension is equipped with curb ramps and high-contrast detectable warnings. Source: Kimley-Horn and Associates, Inc.

- Avoid elimination of any travel modes due to intersection design. Intersection widening for additional turn lanes to relieve traffic congestion should be balanced against impacts to pedestrians, bicyclists and transit.
- Provide good driver and nondriver visibility through proper sight distance triangles and geometric features that increase visibility, such as curb extensions.
- Minimize pedestrian exposure to moving traffic. Keep crossing distances as short as practical and use operational techniques (protected left-turn signal phasing and prohibited right turn on red) to separate pedestrians and traffic as much as possible.
- Design for slow speeds at critical pedestrian-vehicle conflict points, such as corners, by using smaller curb return radii or low-speed channelized right-turn lanes.
- Avoid extreme intersection angles and break up complex intersections with pedestrian refuge islands. Keep intersections easily and fully comprehensible for all users. Strive for simplicity in intersection design—avoid designing intersections with more than four approaches (or consider a modern roundabout) and keep cross streets as perpendicular as possible.
- Ensure intersections are fully accessible to the disabled and hearing and sight impaired. Provide flush access to crossings, visual and audio information about WALK/DON'T WALK phases and detectable warnings underfoot to distinguish pedestrian from vehicular areas (**Figure 10.4**).

Considerations regarding intersection design include the following:

- The preferred location for pedestrian crossings is at intersections. However, if the block length exceeds 400 feet, consider adding a midblock crossing. The target spacing for pedestrian crossings in more intensive urban areas (C-4 to C-6) is every 200 to 300 feet.
- Increases in intersection vehicular capacity by adding lanes increase pedestrian wait times and crossing distances, and discourage pedestrian activity and bicycle use. Therefore, consider interconnecting streets in the network, using parallel routes and other strategies before increasing the number of travel lanes beyond the number of lanes recommended in **Table 6.4** in Chapter 6.
- Where possible, facilitate shared cross-access legal agreements between adjacent properties to close and consolidate nonresidential driveways near an intersection. Integrate access management policies and techniques into long-range transportation plans, area plans and design standards.
- If needed to reduce speeds along a thoroughfare, use speed tables or narrower lanes starting on

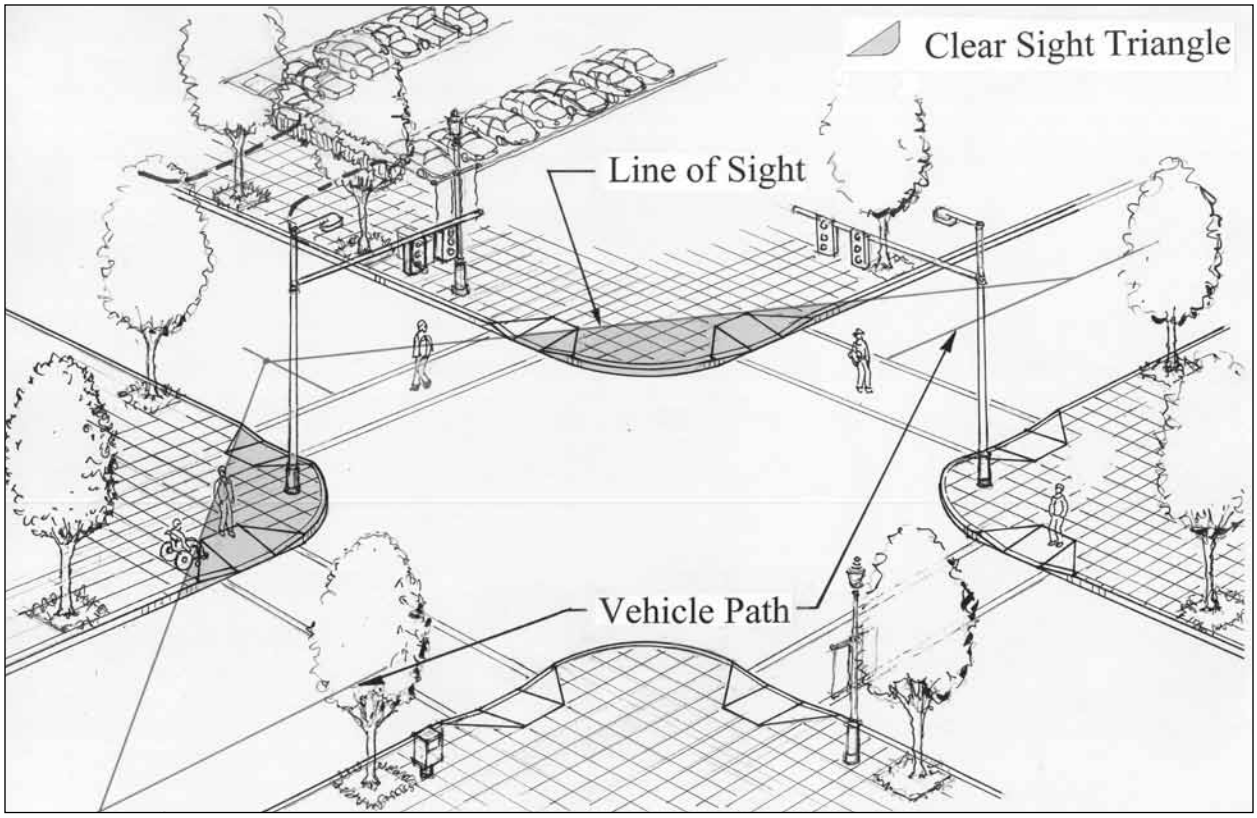


Figure 10.5 Sight distance triangle at intersections. The required sight distance varies with the type of intersection control. Refer to AASHTO Green Book for more details. Source: Kimley-Horn and Associates, Inc.

the approach to intersections, or other speed-management techniques (see Chapter 9 section on Speed Management).

- Traffic control alternatives should be evaluated for each intersection, including stop control, traffic signals and modern roundabouts.
- Design for U-turn movements to facilitate access to property whenever adding a raised median. Use local, state, or the American Association of State Highway and Transportation Officials (AASHTO) guidelines to determine the U-turn radii needs. While local standards vary, it is desirable to use a passenger car as the design vehicle for U-turns on walkable urban thoroughfares.
- The median or the median nose adjacent to a turn lane should extend to the crosswalk. Medians can end prior to the crosswalk for a continuous pedestrian crossing or can extend through the crosswalk if a channel at street grade or a ramp is provided through the median. Median noses extended through the crosswalk provide a refuge area for pedestrians. Carefully review turning radii of large vehicles that may strike the extended median nose.

Intersection Sight Distance

Specified areas along intersection approaches, called clear sight triangles (shown in **Figure 10.5**), should be free of obstructions that block a driver's view of potentially conflicting vehicles or pedestrians entering the traveled way. The determination of sight triangles at intersections varies by the target speed of the thoroughfares, type of traffic control at the intersection and type of vehicle movement.

In urban areas, intersection corners are frequently entrances to buildings and are desirable locations for urban design features, landscaping and other streetside features. In designing walkable urban thoroughfares, the practitioner works in an interdisciplinary environment and has a responsibility to balance the desire for these streetside features with the provision of adequate sight distance, ensuring safety for all users. In urban

areas, examples of objects that limit sight distance include vehicles in adjacent lanes, parked vehicles, bridge piers and abutments, large signs, poorly pruned trees, tall shrubs and hedges, walls, fences and buildings.

Considerations regarding intersection sight distance include the following:

- Based on AASHTO guidelines, urban traffic controls (e.g., traffic signals, stop signs) alleviate the need for large sight triangles where such controls are employed. Where necessary sight triangles cannot be achieved, target speed, intersection traffic control types, sight line obstructions and/or other design elements should be changed.
- If the sight triangle for the appropriate target speed and intersection control is obstructed, every effort should be made to eliminate or move the obstruction or mitigate the obstruction (for example, install curb extensions to improve visibility of crossing pedestrians, prune street trees to branch height greater than 8 feet, or use lower appurtenances).

Managing Modal Conflict at Intersections

Strategies to eliminate or avoid conflict can result in designs that favor one mode over others. For example, eliminating crosswalks at an urban intersection with a high volume of turning vehicles as a strategy to eliminate conflicts will discourage walking. The practitioner must weigh the ever-present trade-offs between vehicle level of service, large-vehicle accommodation and pedestrian and bicycle connectivity and convenience. For the most part, in urban areas, the trade-offs are clear; every user shares the intersection and equally shares in the benefits and drawbacks of multimodal design.

In locations where the community places a high priority on vehicular level of service, intersection designs should incorporate mitigating measures such as pedestrian countdown signals, pedestrian refuge islands and the replacement of free-flow right turns with low-speed channelized right turns (see applicable section in this chapter).

When improving safety at intersections, it is important that the measures that are used to improve vehicle traffic flow or reduce vehicle crashes not compromise pedestrian and bicycle safety. Safety aspects need to be identified in an engineering review. The following strategic decisions need to be considered when improving intersection safety design and operation:

- Minimize vehicle-pedestrian conflicts without reducing accessibility or mobility for any user;
- When it is not possible to minimize all conflicts, reduce the exposure of pedestrians and bicyclists to motor vehicle traffic while maintaining a comfortable walking environment; and
- Design intersections so that when collisions do occur, they are less severe.

Traffic engineering strategies can be highly effective in improving intersection safety. These strategies consist of a wide range of devices and operational modifications. Some examples include the following:

- **Addition of left turn lanes at intersections.** Turn lanes are used to separate turning traffic from through traffic. Studies have shown that providing turn lanes for left-turning vehicles can reduce accidents. In walkable urban areas, turn lanes should be limited to a single left-turn lane. The operational benefits of adding turn lanes should be weighed against the increase in pedestrian crossing time.
- **Signals.** Increase the size of signal lenses from 8 to 12 inches to increase their visibility; provide separate signal faces over each lane; install high-intensity signal indications; and change signal timing, including the length of yellow-change and red-clearance intervals. Consider protected left-turn phasing as a strategy to reduce vehicle-pedestrian conflicts.
- **Innovative intersection design.** In appropriate applications, consider innovative intersection designs such as modern roundabouts. Roundabouts reduce speed, eliminate certain types of crashes and lessen the severity of other types of crashes. Examples of an alternate intersection design include “indirect left-turn” intersections, where left turns are accommodated at midblock U-turns to convert left turns to right turns, or “bowtie” intersections where left turns from the major street are directed to nearby roundabouts on the minor street where they make a U-turn

followed by a right turn at the major intersection. Each alternative design has advantages and disadvantages and handles pedestrians and bicyclists differently. The CSS process needs to weigh the trade-offs to select the best alternative.

- **Improve drivers' visibility of pedestrians.** Restrict parking near intersections, properly trim vegetation, move stop lines back from crosswalks by 4 feet, use longitudinal crosswalk striping and use curb extensions.

Design Elements for Intersections in Walkable Areas

Most urban signalized intersections provide basic pedestrian facilities, including crosswalks, pedestrian signal heads, curb ramps and appropriate pedestrian clearance times. Many urban and especially suburban unsignalized intersections are unmarked for pedestrians. Older intersections in walkable urban areas need to be updated to conform to Americans with Disabilities Act (ADA) Public Rights-of-Way Accessibility Guidelines (PROWAG) requirements, better serve bicyclists, improve transit operations, or to simply enhance the pedestrian environment. This section provides a summary of intersection design features the practitioner may want to consider when designing walkble urban intersections.

Uncontrolled Intersections

Common engineering practice is to exclude marked crosswalks from intersections without traffic control approaching the crossing. This is due to a number of factors including avoiding a false sense of security provided by crosswalks when traffic is uncontrolled, encouraging pedestrian caution when legally crossing at intersections without crosswalks, as well as raising liability and maintenance concerns. Indeed, several research studies have shown that pedestrian-vehicle crash rates are higher at unsignalized intersections with marked crosswalks versus those without.

The authors of NCHRP Report 562, *Improving Pedestrian Safety at Unsignalized Intersections*, found that the "safest and most effective pedestrian crossings use several traffic control devices or design elements to meet the information and control needs of both motorists and pedestrians." The NCHRP study and other research has found that marked crosswalks alone are insufficient and, when used, should be used in conjunction with other measures depending on the circumstances. In combination with marked crossings, measures to enhance uncontrolled intersections include:

- High visibility crosswalk markings such as longitudinal bars;
- A median refuge island (minimum of 6 feet) to make the street crossing in stages and more convenient;
- Street and crosswalk illumination;
- Advanced yield lines to improve the visibility of crossing pedestrians and reduce "multiple threat" type crashes;
- Installation of curb extensions to shorten crossing distance and improve driver and pedestrian visibility;
- Installation of pedestrian-activated flashing beacons to warn motorists of crossing pedestrians;
- Motorist signs to indicate that pedestrians have the legal right of way, "YIELD TO PEDESTRIANS," "STOP HERE FOR PEDESTRIANS," or internally illuminated pedestrian crossing signs; and
- Pedestrian signs or median designs ("Z" crossings) that encourage or facilitate looking for potential conflicts.

Signalized Intersections

Signalized intersections, while providing some level of pedestrian protection by controlling traffic, have many available design features that increase pedestrian visibility, information and convenience. These features are listed in **Table 10.1**.

Design Guidance

Intersection Geometry

This section provides general principles, considerations and guidelines on the geometric layout of urban at-grade multimodal intersections and the key components that comprise geometric and operational design. These guidelines include a section on the application and design of modern roundabouts as an alternative to the conventional intersection.

Table 10.1 Pedestrian and Bicycle Features at Signalized Intersections

Shorter and more visible crosswalks	• Crosswalks on all approaches; • Longitudinal markings (possible use of colored and/or textured paving); • Reduced overall street widths by reducing the number of travel and turn lanes, or narrowing travel lanes; • Curb extensions with pedestrian push buttons on extensions; and • Median refuges on wide streets (greater than 60 feet) with median push buttons.

Priority for pedestrians, bicyclists, and accessibility	• Shorter cycle lengths, meeting minimum pedestrian clearances (also improves transit travel times);
	• Longer pedestrian clearance times (based on 3.5 feet/sec. to set flashing (clearance) time and 3.0 feet/sec for total crossing time);
	• Reduced conflicts between pedestrians and turning vehicles achieved with:
	  • Pedestrian lead phases;
	  • Scramble phases in very high pedestrian volume locations;
	  • Restricted right turns on red when pedestrians are present during specified hours; and
	  • Allowing right turns during cross-street left turn phases reduces the number of right turn conflicts during pedestrian crossing phase.

Low speed channelized right turn lanes	• Adequate sized islands for pedestrian refuge; • Raised pedestrian crossing/speed table within channelized right turn lane; and • Signal control of channelized right turn in high pedestrian volume locations.
Improved pedestrian information	• Pedestrian countdown timers; and • "Look Before Crossing" markings or signs.
Bicycle features	• Bicycle lanes striped up to crosswalk (using "skip lines" if vehicular right turns are allowed); • Bicycle detectors on high volume routes, or bicyclist-accessible push buttons; • Adequate clearance interval for bicyclists; • Colored paving in bicycle/vehicle lanes in high-conflict areas; and • "Bike Boxes" (painted rectangle along right hand curb or behind crosswalk) to indicate potential high-conflict area between bicycles continuing through an intersection and right turning vehicles, and to allow bicyclists to proceed through intersection or turn in advance of vehicles.
High-priority transit thoroughfare elements	• Adaptive Transit Signal Priority (TSP) when transit detected: • Extended green phase on bus route (rapid transit signal priority); • Truncated green phase for cross street; • Re-order phasing to provide transit priority (transit priority not to be given in two successive cycles to avoid severe traffic impacts); • Other bus priority signal phasing (sequencing) • Queue jump lanes and associated signal phasing; and • Curb extension bus stops, bus bulbs.

Accessibility and space for pedestrians	• Properly placed pedestrian actuation buttons, with audible locator tones;
	• Detectable warnings;
	• Two curb ramps per corner depending on radius of curb return and presence of curb extensions;
	• Clear pedestrian paths (and shoulder clearances) ensuring utilities and appurtenances are located outside pedestrian paths;
	• Vertical and overhang clearance of street furnishings for the visually impaired;
	• Properly placed signal poles and cabinets:
	  • Behind sidewalks (in landscaping or in building niches);
	  • In planting strips (furnishings zone); and
	  • In sidewalk or curb extensions, at least three feet from curb ramps.

Traffic operations for safe speeds and pedestrian convenience	• Target speeds between 25–35 mph; • Signal progression at target speeds; and • Fewer very long/very short cycle lengths.
Higher priority on aesthetics	• Textured and colored material within the streetside; • Colored material within crosswalks, but avoid coarse textures which provide rough surfaces for the disabled; • Attractive decorative signal hardware, or specialized hardware; and • Attention to landscaping and integration with green street stormwater management techniques.

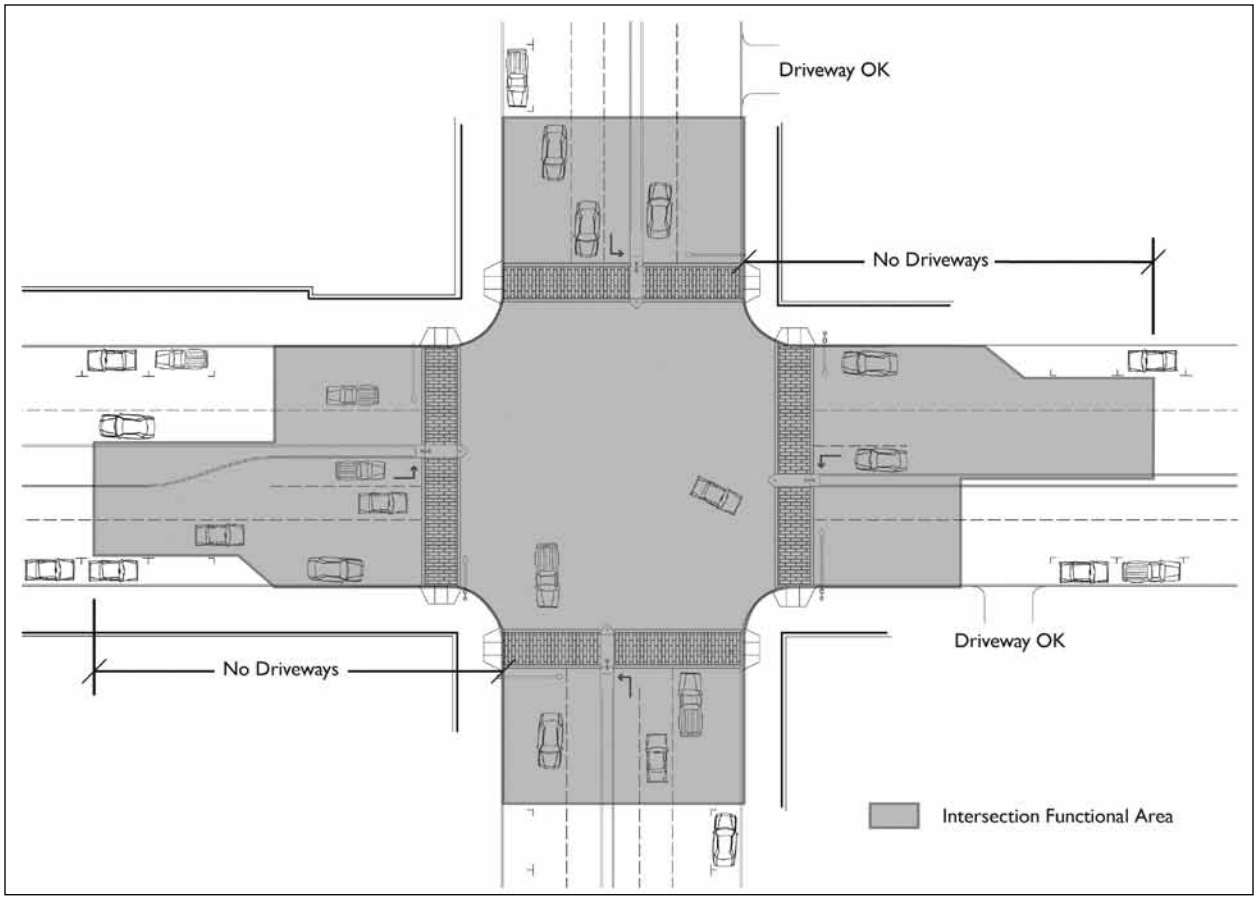


Figure 10.6 Many decisions are made within the functional area of an intersection.
Source: Community, Design + Architecture.

General Intersection Layout

Intersection layout is primarily composed of the alignment of the legs; width of traffic lanes, bicycle lanes, crosswalks, and sidewalks on each approach number of lanes, median and streetside elements; and the method of treating and channelization of turning movements. Like the design of the thoroughfare's cross-section, the design of an intersection's layout requires a balance between the needs of pedestrians, bicyclists, vehicles, freight and transit in the available right of way. Beyond intersection layout, the practitioner needs to work with a multidisciplinary team to address accessibility, traffic control and placement of equipment, traffic operations, lighting (safety and pedestrian scaled), landscaping and urban design.

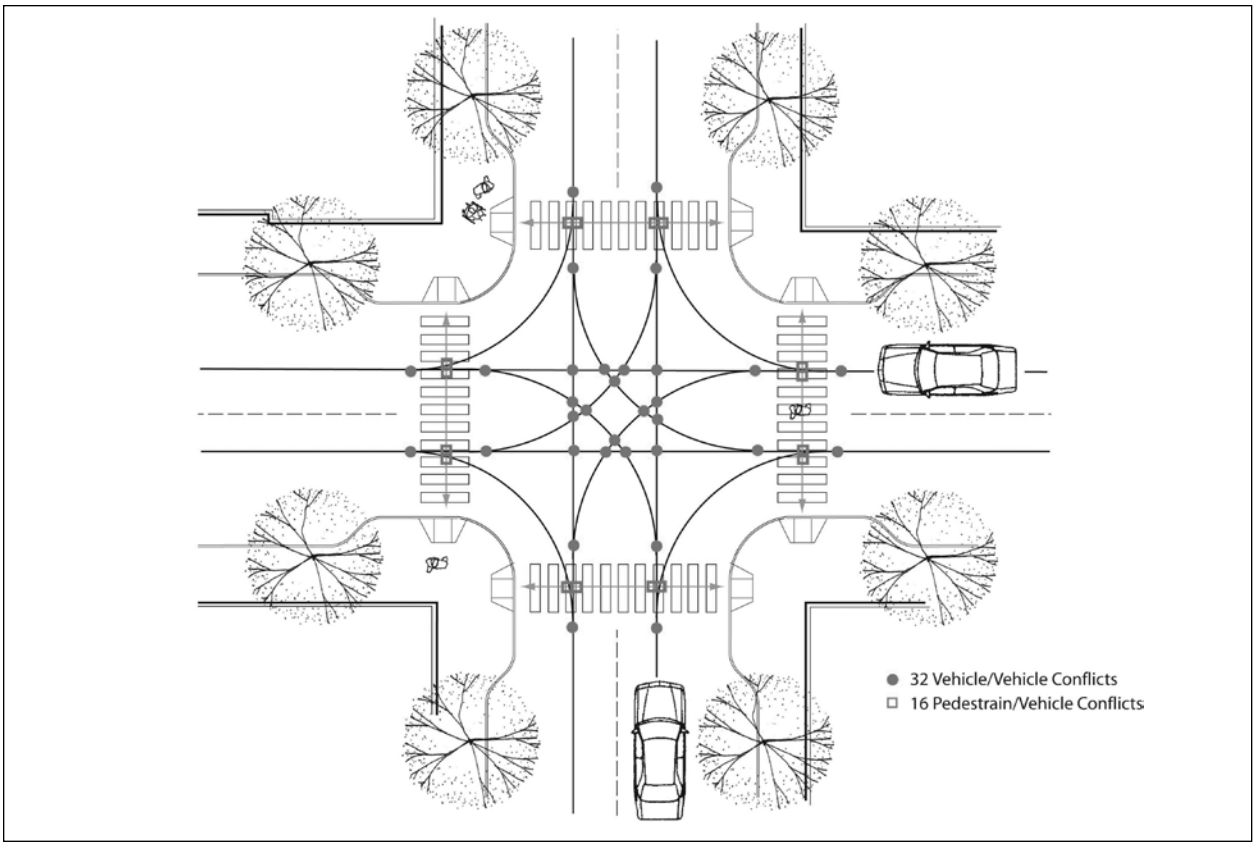
Intersection Fundamentals

Intersections are composed of a physical area—the area encompassing the central area of two intersecting streets as shown in **Figure 10.6**. The functional area is where drivers make decisions and maneuver into turning movements. The three parts of the functional area include (1) the perception-reaction distance, (2) maneuver distance and (3) storage distance. AASHTO's *A Policy on Geometric Design of Highways and Streets* (2004a) addresses the issues and provides guidance for the detailed geometric design of the functional area.

The basic types of intersections in urban contexts include the T-intersection (a three-leg intersection), cross-intersection (four-leg intersection), multileg intersection (containing five or more legs) and the modern roundabout, which is discussed later in this chapter.

Intersection Conflicts

Intersections, by their very nature, create conflicts between vehicles, pedestrians and bicyclists. **Figure 10.7** illustrates the number of conflicts between different



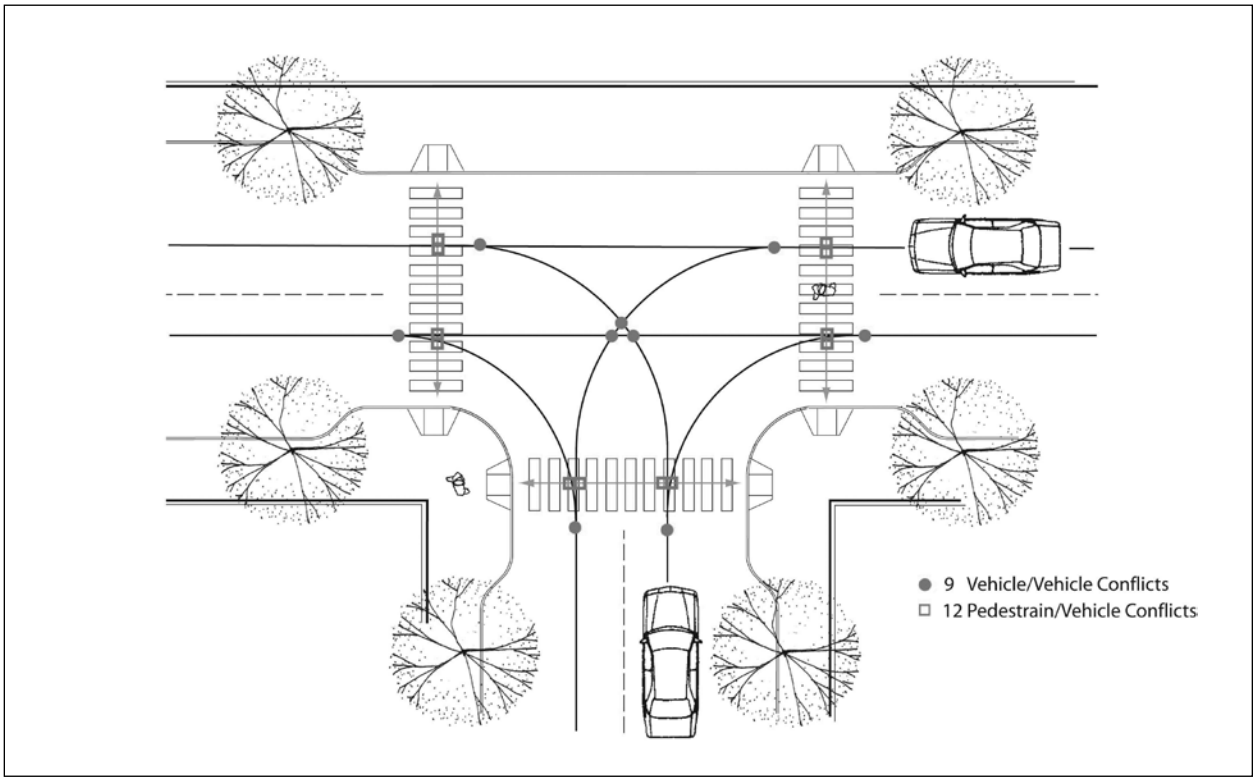


Figure 10.7 Vehicle and pedestrian conflicts at three- and four-leg intersections. Source: Community, Design + Architecture, adapted from an illustration by Michael Wallwork.

modes at three- and four-leg intersections. According to AASHTO's *Guide for the Planning, Design and Operation of Pedestrian Facilities* (2004b), the following are principles of good intersection design for pedestrians:

- **Clarity**—making it clear to drivers that pedestrians use the intersections and indicating to pedestrians where the best place is to cross;
- **Predictability**—drivers know where to expect pedestrians;
- **Visibility**—good sight distance and lighting so that pedestrians can clearly view oncoming traffic and be seen by approaching motorists;
- **Short wait**—providing reasonable wait times to cross the street at both unsignalized (via gaps created in traffic or two-stage crossings) and signalized intersections (via signal cycle length);
- **Adequate crossing time at signalized intersections**—the appropriate signal timing for all types of users to cross the street;
- **Limited exposure**—reducing conflict points where possible, reducing crossing distance and providing refuge islands when necessary; and
- **Usable crossing**—eliminating barriers and ensuring accessibility for all users.

General Principles and Considerations

General principles and considerations for the design of intersection layouts include the following:

- Intersections should be designed as compact as practical in urban contexts. Intersections should minimize crossing distance, crossing time and exposure to traffic and should encourage pedestrian travel.
- A design speed appropriate for the context. Motorists traveling at slower speeds have more time to perceive and react to conflicts at intersections.
- Intersection approaches should permit motorists, pedestrians and bicyclists to observe and react to each other. Intersection approaches should, therefore, be as straight and flat as possible, and adequate sight distances should be maintained.
- Avoid providing very short radius horizontal curves approaching the major street to mitigate acute approach alignments, as motorists might encroach into opposing travel lanes at such curves.
- Avoid placing intersections on sharp horizontal or vertical curves where sight distances may be reduced. Intersections should not be placed on either end of a curve unless sufficient sight distance is available.
- Functional areas of adjacent intersections should not overlap.
- Channelizing islands to separate conflicts are important design elements within intersection functional areas. These include properly designed channelized right turns (see section on right-turn channelization in this chapter).
- Intersections that accommodate fixed-guideway transit have special challenges (see section on Transit Design in Chapter 9).

Curb Return Radii

Background and Purpose

Related Thoroughfare Design Elements

- Transit design
- On-street parking and configuration
- Right-turn channelization
- Pedestrian refuge islands
- Bicycle lanes

Curb returns are the curved connection of curbs in the corners formed by the intersection of two streets. A curb return's purpose is to guide vehicles in turning corners and separate vehicular traffic from pedestrian areas at intersection corners. The radius of the curve varies, with larger radii used to facilitate the turning of large trucks and buses. Larger radius corners increase the length of pedestrian crosswalks, and increase vehicular turning speeds.

In designing walkable urban thoroughfares, the smallest practical curb-return radii are used to shorten the length of the pedestrian crosswalks. Based on this function, this report suggests a general strategy for selecting curb-return radii design criteria and discusses situations requiring larger design vehicles. The primary benefits of smaller curb-return radii to pedestrians in urban areas include:

- Increasing motorist visibility of pedestrians waiting to cross the street;
- Reducing pedestrian crossing distance (which also benefits vehicles with a shorter cycle length at signalized intersections) and exposure to traffic;
- Providing the shortest accessible route for disabled persons as required under ADA; and
- Reducing speed of turning vehicles and severity of crashes if they occur.

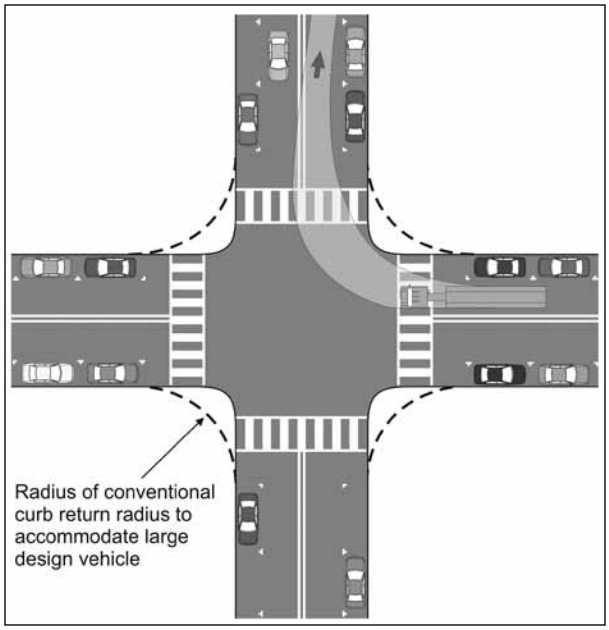


Figure 10.8 Smaller curb-return radii shorten the distance that pedestrians must cross at intersections. The occasional turn made by large trucks can be accommodated with slower speeds and some encroachment into the opposing traffic lanes. Source: Kimley-Horn and Associates, Inc.

General Principles and Considerations

General principles and considerations regarding curb return radii include the following:

- In walkable areas, the first consideration is keeping crossing distance as short as possible. Consider alternatives to lengthening the curb radius first, then consider lengthening the radius if no other alternative exists.
- Curb-return radii should be designed to accommodate the largest vehicle type that will frequently turn the corner (sometimes referred to as the design vehicle). This principle assumes that the occasional large vehicle can encroach into the opposing travel lane as shown in **Figure 10.8.** If encroachment is not acceptable, alternative routes for large vehicles should be identified.
- Curb-return radii should be designed to reflect the "effective" turning radius of the corner. The effective turning radius takes into account the wheel tracking of the design vehicle utilizing the width of parking and bicycle lanes. Use of the effective turning radii allows a smaller curb-return radius while retaining the ability to accommodate larger design vehicles (**Figure 10.9**).

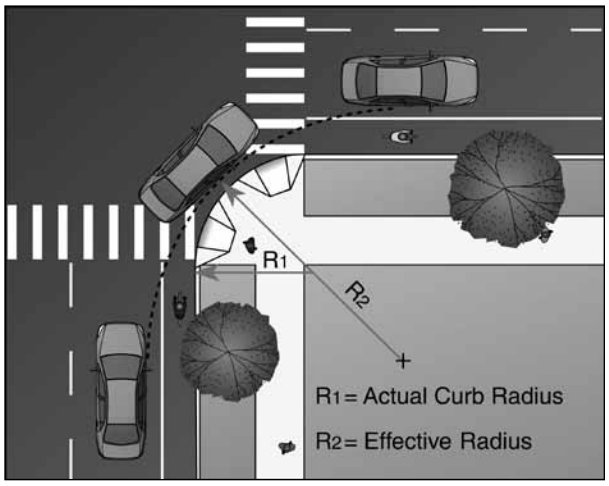


Figure 10.9 The existence of parking and bicycle lanes creates an "effective" turning radius that is greater than the curb-return radius. Source: Kimley-Horn and Associates, Inc., adapted from the *Oregon Bicycle and Pedestrian Plan.*

- In urban centers (C-5) and urban cores (C-6) where pedestrian activity is intensive, curb-return radii should be as small as possible.
- On multilane thoroughfares, large vehicles may encroach entirely into the adjacent travel lanes (in the same direction of travel).

- To help select a design vehicle, identify bus routes to determine whether buses are required to turn at the intersection. Also check transit service plans for anticipated future transit routes. Map existing and potential future land uses along both streets to evaluate potential truck trips turning at the intersection.
- Curb-return radii of different lengths can be used on different corners of the same intersection to match the design vehicle turning at that corner. Compound, spiral, or asymmetrical curb returns can be used to better match the wheel tracking of the design vehicle (see the AASHTO Green Book for the design of spiral and compound curves).
- If large vehicles need to encroach into an opposing travel lane, consider placing the stop line for opposing traffic further from the intersection.
- The designer must consider lane widths, curb radii, locations of parking spaces, grades and other factors in designing intersections. Designers are discouraged from using combinations of minimum dimensions unless the resulting design can be demonstrated to be operationally practical and safe.

Recommended Practice

Flexibility in the design of curb return radii revolves around the need to minimize pedestrian crossing distance, the choice of design vehicle, the combination of dimensions that make up the effective width of the approach and receiving lanes and the curb return radius itself. The practitioner needs to consider the trade-offs between the traffic safety and operational effects of infrequent large vehicles and the creation of a street crossing that is reasonable for pedestrians. The guidelines assume arterial and collector streets in urban contexts (C-3 to C-6) with turning speeds of city buses and large trucks of 5 to 10 mph. The guidance is not applicable to intersections without curbs.

Recommended practices include the following:

- In urban centers (C-5) and urban cores (C-6) at intersections with no vehicle turns, the minimum curb return radii should be 5 feet.
- A curb return radius of 5 to 15 feet should be used where:
  1. High pedestrian volumes are present or reasonably anticipated;
  2. Volumes of turning vehicles are low;
  3. The width of the receiving intersection approach can accommodate a turning passenger vehicle without encroachment into the opposing lane;
  4. Large vehicles constitute a very low proportion of the turning vehicles;
  5. Bicycle and parking lanes create additional space to accommodate the "effective" turning radius of vehicles;
  6. Low turning speeds are required or desired; and
  7. Occasional encroachment of turning school bus, moving van, fire truck, or oversized delivery truck into an opposing lane is acceptable.
- Curb radii may need to be larger where:
  1. Occasional encroachment of a turning bus, school bus, moving van, fire truck, or oversized delivery truck into the opposing lane is not acceptable;
  2. Curb extensions are proposed or might be added in the future; and
  3. Receiving thoroughfare does not have parking or bicycle lanes and the receiving lane is less than 12 feet in width.

An alternative to increasing curb-return radii is setting back the stop line of the receiving street to allow large vehicles to swing into opposing lane as they turn. However, setbacks to accommodate right-turn encroachment need to be examined on a case-by-case basis since very tight right turns may require long setbacks.

Recommendations for Curb Radii on Transit and Freight Routes

Truck routes should be designated outside of or on a minimum number of streets in walkable areas to reduce the impact of large turning radii. Where designated local or regional truck routes conflict

with high pedestrian volumes or activities, analyze freight movement needs and consider redesignation of local and regional truck routes to minimize such conflicts.

On bus and truck routes, the following guidelines should be considered:

- Curb-return radii design should be based on the effective turning radius of the prevailing design vehicle.
- Where the potential for conflicts with pedestrians is high and large vehicle turning movements necessitate curb radii exceeding 50 feet, evaluate installation of a channelized right-turn lane with a pedestrian refuge island (see the section on pedestrian refuge islands in Chapter 9 and the section on channelized right-turn lanes in Chapter 10). To better accommodate the path of large vehicles use a three-centered compound curve in the design of the island (see the AASHTO Green Book's Chapter 9 for design guidance).
- Where frequent turning of large vehicles takes place, avoid inadequate curb-return radii as they could potentially cause large vehicles to regularly travel across the curb and into the pedestrian waiting area of the streetside.

Justification

Intersections designed for the largest turning vehicle traveling at significant speeds with no encroachment result in long pedestrian crossings and potentially high-conflict areas for pedestrians and bicyclists. Radii designed to accommodate the occasional large vehicle will allow passenger cars to turn at high speeds. In designing walkable urban thoroughfares, the selection of curb returns ranging from 5 to 25 feet in radius is preferable to shorten pedestrian crossings and slow vehicle-turning speeds to increase safety for all users.

Channelized Right-Turns

Background and Purpose

Related Thoroughfare Design Elements

- Curb return radii
- Crosswalks
- Bicycle lanes at intersections
- Transit design

In urban contexts, high-speed channelized right turns are generally inappropriate because they create conflicts with pedestrians and bicyclists and also increase turning speeds. Under some of the circumstances described below, providing channelized right-turn lanes on one or more approaches at a signalized intersection can be beneficial, but unless designed correctly, these right-turn lanes can be undesirable for pedestrians. According to the *Oregon Bicycle and Pedestrian Plan* a well-designed channelization island can:

- Allow pedestrians to cross fewer lanes at a time and judge conflicts separately;
- Provide refuge for slower pedestrians;
- Improve accessibility to pedestrian push-buttons; and
- Reduce total crossing distance, which provides signal-timing benefits.

Right-turning drivers may not have to stop for the traffic signal when a channelized right-turn lane is provided. Even where pedestrian signal heads are provided at the intersection, pedestrians are usually expected to cross channelized right-turn lanes without the assistance of a traffic signal. Most channelized right-turn lanes consist of only one lane, and the crossing distance tends to be relatively short. However, drivers are usually looking to their left to merge into cross-street traffic and are not always attentive to the presence of pedestrians.



Figure 10.10 A channelized right-turn lane typically provides a pedestrian refuge island and an uncontrolled crosswalk. Source: Dan Burden, walklive.org.

General Principles and Considerations

The general principles and considerations regarding channelized right turns include the following:

- Avoid using channelized right-turn lanes where pedestrian activity is or is expected to be significant. If a channelized right-turn lane is unavoidable, use design techniques described in this report to lessen the impact on pedestrians.
- Exclusive right-turn lanes should be limited. A right-turning volume threshold of 200–300 vehicles per hour is an acceptable range for the provision of right-turn lanes. Once determined that a right-turn lane is necessary, a well-designed channelization island can help slow down traffic and separate conflicts between right-turning vehicles and pedestrians (**Figure 10.10**).
- If channelized right-turn lane is justified, design it for low speeds (5 to 10 mph) and high-pedestrian visibility.
- For signalized intersections with significant pedestrian activity, it is highly desirable to have pedestrians cross fully under signal control. This minimizes vehicle-pedestrian conflicts and adds to the comfort of pedestrians walking in the area.

Recommended Practice

Recommended practices regarding channelized right-turn lanes include the following:

- The provision of a channelized right-turn lane is appropriate only on signalized approaches where right-turning volumes are high or large vehicles frequently turn and conflicting pedestrian volumes are low and are not expected to increase greatly.
- Where channelized right-turn lanes already exist at a high-pedestrian-activity signalized intersection, pedestrians can best be served by installing pedestrian signals to the right-turn lane crossing. This enables the pedestrian to cross the legs of the intersection fully under signalized control.
- Removing channelized right-turn lanes also makes it possible to use signing, such as NO TURN ON RED, turn-prohibition signs, or exclusive pedestrian signal phases to further assist pedestrians in safely crossing the street.
- When channelized right-turn lanes are justified for traffic capacity or large vehicle purposes, the following practices should be used:
  - Provide a low-angle right turn (about 112 degrees). This angle slows down the speed of right-turning vehicles and improves driver visibility of pedestrians within and approaching the crosswalk (**Figure 10.11**).
  - Use longitudinal crosswalk striping for visibility and place crosswalks so that a motorist has a clear view of pedestrians.
  - A well-illuminated crossing point should be placed where drivers and pedestrians have good sight distance and can see each other in advance of the crossing point. Unless no other choices are available, the crossing point should not be placed at the point where right-turning drivers must yield to other vehicles and therefore might not be watching for pedestrians.
  - Provide accessible islands. The island that forms the channelized right-turn lane must be a raised island of sufficient size (at least 120 square feet) for pedestrians to safely wait in a position where they are at least

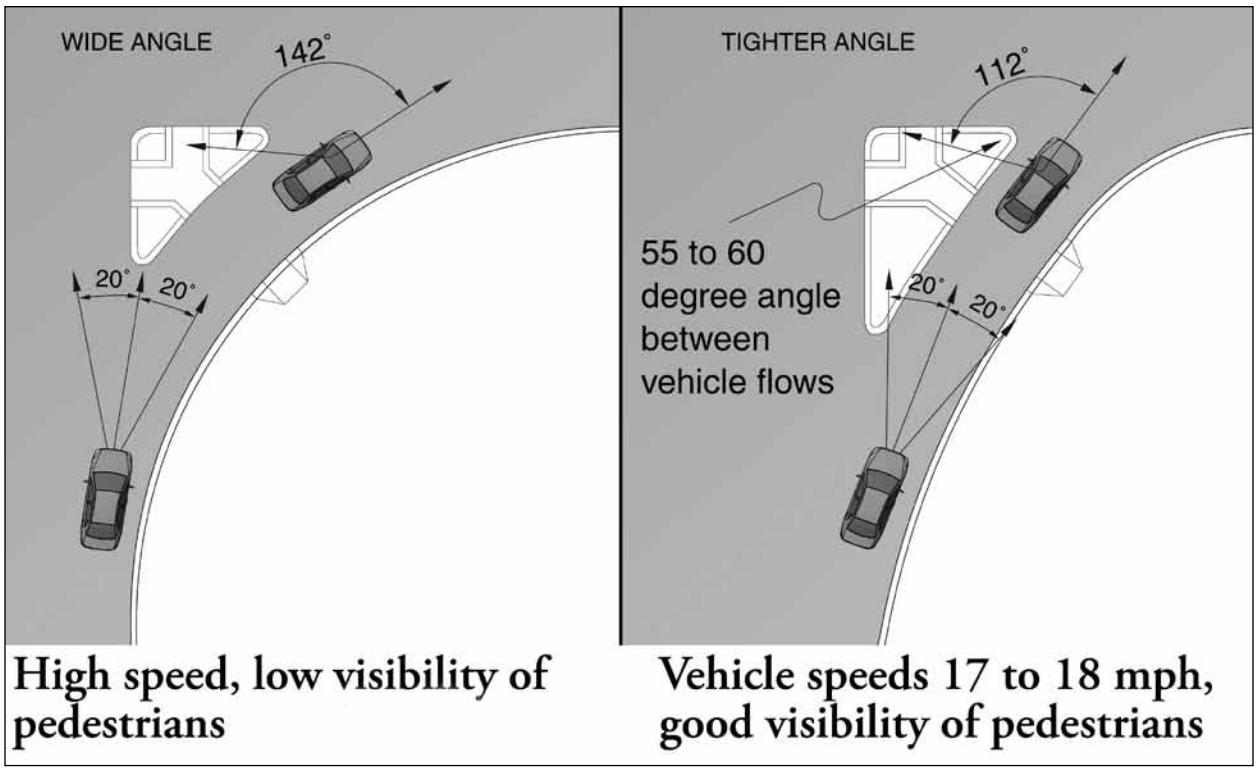


Figure 10.11 The preferred design of a channelized right-turn lane uses an approach angle that results in a lower speed and improved visibility. Source: Kimley-Horn and Associates, Inc., adapted from an illustration by Dan Burden.

4 feet from the face of curb in all directions. A painted island is not satisfactory for pedestrians. The island also has to be large enough to accommodate accessible features, such as curb ramps (usually in three separate directions) or channels cut through the raised island that are flush with the surrounding pavement. If the crossing of the right-turn lane is signalized, the island needs to be large enough to contain pedestrian push buttons.

- Unless the turning radii of large vehicles, such as tractor-trailers or buses must be accommodated, the pavement in the channelized right-turn lane should be no wider than 16 feet. For any width right-turn lane, mark edge lines and cross-hatching to restrict the painted width of the travel way of the channelized right-turn lane to 12 feet to slow smaller vehicles.
- If vehicle-pedestrian conflicts are a significant problem in the channelized right-turn lane, it might be appropriate to provide signing to remind drivers of their legal obligation to yield to pedestrians crossing the lane in the marked crosswalk. Regulatory signs such as the TURNING TRAFFIC MUST YIELD TO PEDESTRIANS (R10-15) or warning signs such as the PEDESTRIAN CROSSING (W11-2) could be placed in advance of or at the crossing location.
- Signalize the channelized right-turn movement to eliminate significant vehicle-pedestrian conflicts. Signalization may be provided when there is/are (1) multiple right-turning lanes; (2) something inherently unsafe about the unsignalized crossing, such as poor sight distance or an extremely high volume of high-speed right-turning traffic; or (3) high pedestrian-vehicle crash experiences.

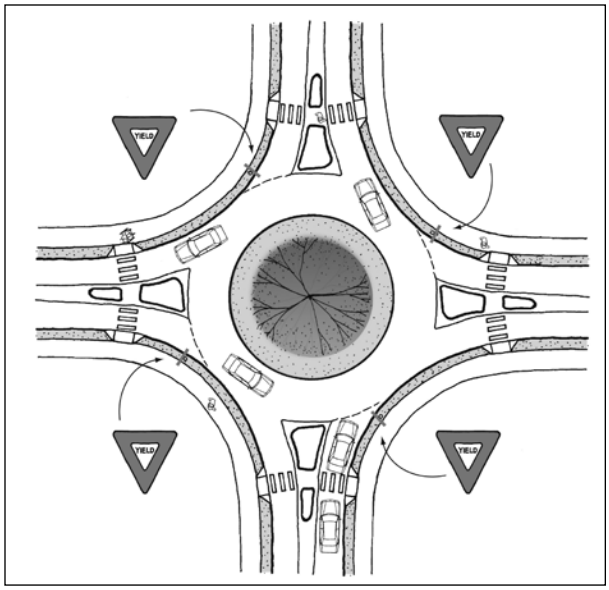


Figure 10.12 A typical single-lane modern roundabout design provides yield control on all approaches and deflects approaching traffic to slow speeds. Source: Community, Design + Architecture, adapted from an illustration in *Roundabouts, An Informational Guide* (FHWA).

Modern Roundabouts

Background and Purpose

Related Thoroughfare Design Elements

- Pedestrian refuge islands
- Transit design
- Bicycle treatments at intersections
- Bus stops at intersections
- Bicycle lanes

Modern roundabouts are an alternative form of intersection control that is becoming more widely accepted in the United States. In the appropriate circumstances, significant benefits can be realized by converting stop-controlled and signalized intersections into modern roundabouts. These benefits include improved safety, speed reduction, reduction in certain types of vehicle crashes, opportunities for aesthetics and urban design, and operational functionality and capacity.

Studies conducted in the United States and published by the Federal Highway Administration in *Roundabouts: An Informational Guide* (2000) indicate that modern single-lane roundabouts in urban areas can result in up to a 61 percent reduction in all crashes and a 77 percent reduction in injury crashes when compared with stop-controlled intersections. When signalized intersections are replaced by modern single-lane roundabouts in urban areas, they have resulted in up to a 32 percent reduction in all crashes and up to a 68 percent reduction in injury crashes.

There remain some concerns regarding roundabouts and pedestrian and bicycle safety and how the disabled are accommodated. Care should be taken in areas with particularly high pedestrian volumes to provide adequate crosswalk widths and island dimensions to serve the volume of pedestrians moving around the roundabout. Double-lane roundabouts are of particular concern to pedestrians with visual impairments and bicyclists.

General Principles and Considerations

The purpose of a modern roundabout is to increase vehicle capacity at the intersection, slow traffic and reduce the severity of collisions. They are not generally used to enhance pedestrian and bicycle safety. Roundabouts are not always the appropriate solution. General principles and considerations for the design of modern roundabouts include the following:

- The application of roundabouts requires close attention to a number of issues, including:
  - Type of design vehicle;
  - Use by disabled and visually impaired persons; and
  - Effects on pedestrian route directness.
- A modern roundabout should be designed to reduce the relative speeds between conflicting traffic streams and the absolute speed of vehicles to improve pedestrian safety. The curved path that vehicles must negotiate slows the traffic. Vehicles entering need to be properly deflected and yield to traffic already in the circulating roadway of the roundabout (**Figure 10.12**).

- Selecting a roundabout as the appropriate traffic control for an intersection requires location-specific analysis. Intersections with more than four legs are also good candidates for conversion to modern roundabouts, as are streets intersecting at acute angles.
- Locating pedestrian crossings at least 25 feet from the roundabout entry point.
- Accomodating bicyclists by (1) preferably mixing with the flow of vehicular traffic (but without pavement markings delineating a bicycle lane) or (2) alternatively, use of a slip ramp from the street to the sidewalk proceeding around the intersection along separate paths, which is usually combined with pedestrian facilities. This situation can create conflicts between bicyclists and pedestrians that must be addressed through good design and signage, and it is inconvenient for the bicyclist. To accommodate different ability levels of bicyclists, both options could be implemented at the same roundabout unless specific conditions warrant otherwise.
- Single-lane roundabouts (**Figure 10.13**) may typically accommodate up to 20,000 entering vehicles per day, depending on a location-specific analysis. A double-lane roundabout typically accommodates up to 40,000 vehicles per day. Capacity analyses should be conducted to determine peak hour operating conditions and levels of service. Specific dimensions need to accommodate such volumes, as are determined using roundabout analysis tools. Refer to *Roundabouts: An Informational Guide* (FHWA 2000) for more information.
- If considering a double-lane roundabout on a boulevard, carefully evaluate pedestrian crossings. It may be desirable to provide crosswalks at midblock locations away from the roundabout. Double-lane roundabouts are not recommended in areas with high levels of pedestrian and bicycle activity.
- Intersections near active railroad-grade crossings are typically not good candidates for roundabouts since traffic would be blocked in all directions when trains are present.



Figure 10.13 Typical layout of a single lane modern roundabout. Source: Kimley-Horn and Associates, Inc.

- Sight distance for drivers entering the roundabout should be maintained to the left so that drivers are aware of vehicles and bicycles in the circle. Visibility across the center of the circle is not critical.
- Roundabouts provide an opportunity to visually enhance the area. Appropriate landscaping is encouraged, even in the center island. However, for safety, pedestrians are not permitted to walk to the center island. Thus, water features or features that might attract pedestrians to the center island should be discouraged.
- Proper signing and pavement markings should be designed for motorists, bicyclists and pedestrians in advance of and at the location of the roundabout. Consideration should be given to the use of a "yield line" where appropriate, as per Section 3B.16 of the *Manual on Uniform Traffic Control Devices* (MUTCD) (FHWA 2009).
- At some locations, pedestrian volumes may be high enough to warrant signal control of roundabout approaches to provide gaps for vehicles (since pedestrians have the right of way). Pedestrian-demand signals may be required at multilane roundabout crossings in order to create and identify gaps for some types of pedestrians: for example, children, the elderly and people who have visual or cognitive impairments.

Recommended Practice

Table 10.2 provides guidance for the selection of modern roundabouts for various thoroughfare types and presents general design parameters. There are three general roundabout design philosophies in use in the United States. First, many older traffic circles and rotaries are being eliminated or redesigned to modern roundabouts. Second, the Australian model of smaller-diameter and slower speed roundabouts is gaining popularity in the United States, as is the third, the British model of larger-diameter, multilane, higher-speed roundabouts. The designer should reference the planning section of FHWA's informational guide to aid in the decision-making process.

Justification

Roundabouts exist at more than 15,000 intersections in Europe and Australia, with decades of successful operation, research and improvements. Introduced into the United States in the 1990s, modern roundabouts are much improved over older American traffic circles and rotaries. Significant benefits related to crash and delay reduction are cited by researchers based on conversion of four-way stop-controlled and signal-controlled intersections in eight states.

Table 10.2 Recommended Practice for Modern Roundabouts

Parameter	Minimum "Mini-Roundabout"	Urban Compact Roundabout	Urban Single-Lane Roundabout	Urban Double-Lane Roundabout*
Maximum Entry Speed (mph)	15	15	20	25
Design Vehicle	Bus and single-unit truck drive over apron	Bus and single-unit truck	Bus and single-unit truck WB-50 with lane encroachment on truck apron	WB-67 with lane encroachment on truck apron
Inscribed circle diameter (feet)	45 to 80	80 to 100	100 to 130	150 to 180
Maximum number of entering lanes	1	1	1	2
Typical capacity (vehicles per day entering from all approaches)	10,000	15,000	20,000	40,000
Applicability by Thoroughfare Type:				
Boulevard	Not Applicable	Not Applicable	Not Applicable	Applicable
Arterial Avenue	Not Applicable	Not Applicable	Applicable	Applicable
Collector Avenue	Applicable	Applicable	Applicable	Not Applicable
Street	Applicable	Applicable	Applicable	Not Applicable

* Note the pedestrian and bicycle conflicts are inherent in multilane roundabouts unless they are signalized.

Pedestrian Treatments at Intersections—Crosswalks

Background and Purpose

Related Thoroughfare Design Elements

- Midblock crossings
- Channelized right turns
- Curb extensions
- Curb-return radii
- Modern roundabouts
- Pedestrian refuge islands

Crosswalks are used to assist pedestrians in crossing streets. The definition provided in the MUTCD of an unmarked crosswalk makes it clear that unmarked crosswalks can exist only at intersections, whereas the definition of a marked crosswalk makes it clear that marked crosswalks can exist at intersections "or elsewhere." Crosswalks also provide the visually impaired with cues and wayfinding, as long as they have appropriate contrast.

If sidewalks exist on one or more quadrants of the intersection at a signalized or unsignalized intersection, then crosswalks are legally present at the intersection whether they are marked or not. Even if sidewalks do not exist at the intersection, in some states crosswalks may be legally present.

Even if unmarked crosswalks legally exist at a signalized intersection, it is almost always beneficial to provide marked crosswalks from the perspective of pedestrian safety. Marked crosswalks alert drivers approaching and traveling through the intersection of the potential presence of pedestrians. Marked crosswalks also direct legal pedestrian movements to desirable crossing points.

If an unmarked crosswalk legally exists across a stop-controlled approach to an intersection, it is usually not necessary to mark the crosswalk. However, if engineering judgment determines that pedestrian safety or the minimization of vehicle-pedestrian conflicts is especially important, then providing a marked crosswalk along with advanced warning signs and markings would be appropriate.

General Principles and Considerations

In designing thoroughfares, the issue of crosswalks is not isolated to an individual intersection. The intent of CSS in walkable areas is to create an environment in which pedestrians and bicycles are expected and to support this expectation with consistent and uniform application of signing, markings and other visual cues for motorists and pedestrians. The following principles and considerations should help guide the planning or design of pedestrian crossings:

- Assume that pedestrians and bicyclists want and need safe access to all destinations that are accessible to motorists. Additionally, pedestrians will want to have access to destinations not accessible to motorists.
- Typical pedestrian and bicyclist generators and destinations include residential neighborhoods, schools, parks, shopping areas and employment centers. Most transit stops require that pedestrians be able to cross the street.
- Pedestrians need safe access at many uncontrolled locations, including intersections and midblock locations.
- Pedestrians must be able to cross streets at regular intervals. Unlike motor vehicles, pedestrians should not be expected to go more than 300 to 400 feet out of their way to take advantage of a controlled intersection.
- Intersections provide the best locations to control motorized traffic to permit pedestrian crossings.
- In order to effectively indicate to motorists that they are in, or approaching, a pedestrian area and that they should expect to encounter pedestrians crossing the street, the design of the crosswalk must be easily understood, clearly visible

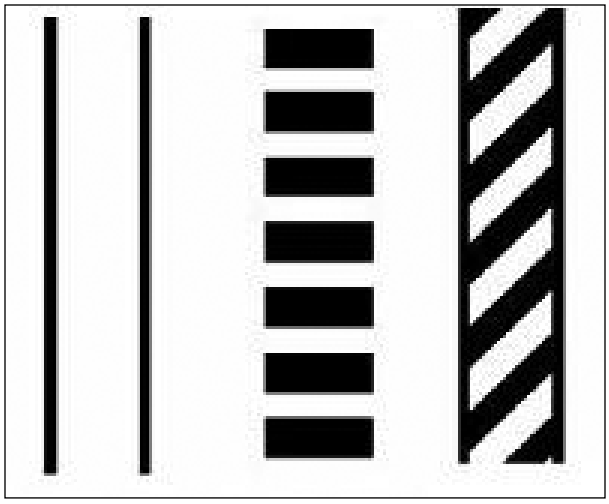


Figure 10.14 The three primary types of crosswalk markings (from left to right) are transverse, longitudinal and diagonal. Source: Kimley-Horn and Associates, Inc.



Figure 10.15 Crosswalks with colored bricks contrast with concrete pavement. However, over time, colored bricks stain and lose contrast. Painted stripes marking brick or colored concrete crosswalks would increase their visibility. Otherwise use standard crosswalk markings for long-term visibility. Source: Kimley-Horn and Associates, Inc.

and incorporate realistic crossing opportunities for pedestrians.

- There are three primary marking options: transverse, longitudinal and diagonal (zebra) lines (**Figure 10.14**). The placement of lines for longitudinal markings should avoid normal wheel paths, and line spacing should not exceed 2.5 times the line width.
- At unsignalized or uncontrolled crossings, special emphasis longitudinal or diagonal markings should be used to increase visibility. High-contrast markings also aid people with vision impairments, but no MUTCD provisions for the use of high-contrast pavement markings has yet been developed.
- In highly urban areas (C-5 and C-6), at compact signalized intersections and at other locations with higher levels of pedestrian activity, pedestrian signals should automatically show the WALK sign without requiring activation.
- Although it is not a traffic control device, colored and textured crosswalk design treatments are sometimes used between transverse lines to further delineate the crosswalk, provide contrast for the visually impaired, provide tactile feedback to drivers and improve aesthetics (**Figure 10.15**). Care should be taken to ensure that the material used in these crosswalks is smooth, nonslip and visible. Avoid using a paver system that may shift and/or settle or that induces a high degree of vibration in wheelchair wheels.

Recommended Practice

The following practice is recommended:

- Provide marked crosswalks at urban signalized intersections for all legs of the intersection; and
- Provide a marked crosswalk across an approach controlled by a STOP sign where engineering judgment determines there is significant pedestrian activity and pedestrian safety or the minimization of vehicle-pedestrian conflicts is especially important at that particular location (also see section titled Design Elements for Intersections in Walkable Areas in this chapter).

Justification

Marked crosswalks are one tool to get pedestrians safely across the street and they should be used in combination with other treatments (such as curb extensions, pedestrian refuge islands, proper light-

ing and so forth). In most cases, marked crosswalks alone (without other treatments) should not be installed within an uncontrolled environment when speeds are greater than 40 mph according to AASHTO's *Guide for the Planning, Design and Operation of Pedestrian Facilities* (2004b) and FHWA's *Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations* (2002).

Pedestrians can legally cross the street at any intersection, whether a marked crosswalk exists or not. To enhance awareness by motorists, install crosswalks on all approaches of signalized intersections. If special circumstances make it unsafe to do so, attempt to mitigate the circumstance.

Curb Extensions

Background and Purpose

Curb extensions (also called nubs, bulb-outs, knuckles, or neck-downs) extend the line of the curb into the traveled way, reducing the width of the street. Curb extensions typically occur at intersections but can be used at midblock locations to shadow the width of a parking lane, bus stop, or loading zone. Curb extensions can provide the following benefits:

- Reduce pedestrian crossing distance and exposure to traffic;
- Improve driver and pedestrian visibility at intersections;
- Separate parking maneuvers from vehicles turning at the intersections;
- Visually and physically narrow the traveled way, resulting in a calming effect;
- Encourage and facilitate pedestrian crossing at preferred locations;
- Keep vehicles from parking too close to intersections and blocking crosswalks;
- Provide wider waiting areas at crosswalks and intersection bus stops;
- Reduce the effective curb-return radius and slow turning traffic;
- Provide space for level landings and clear space required at pedestrian push buttons, as well as double perpendicular curb ramps with detectable warnings; and
- Provide space for streetscape elements if extended beyond crosswalks.

Curb extensions serve to better define and delineate the traveled way as being separate from the parking lane and streetside. They are used only where there is on-street parking and the distance between curbs is greater than what is needed for the vehicular traveled way.

Related Thoroughfare Design Elements

- Curb-return radii
- Channelized right turns
- Lane width
- Crosswalks
- Midblock crossings
- Bus stops at intersections
- Bus stops in the traveled way

General Principles and Considerations

General principles and considerations regarding curb extensions include the following:

- Curb extensions may be used at intersections in any context zone but are emphasized in urban centers (C-5), urban cores (C-6) and other locations with high levels of pedestrian activity.
- Curb extensions help manage conflict between modes, particularly between vehicles and pedestrians. The curb extension is an effective measure to improve pedestrian safety and comfort and might contribute to slower vehicle speed.
- The design of the curb extension should create an additional pedestrian area in the driver's field of vision, thereby increasing the visibility of pedestrians as they wait to cross the street, as shown in **Figure 10.16.**

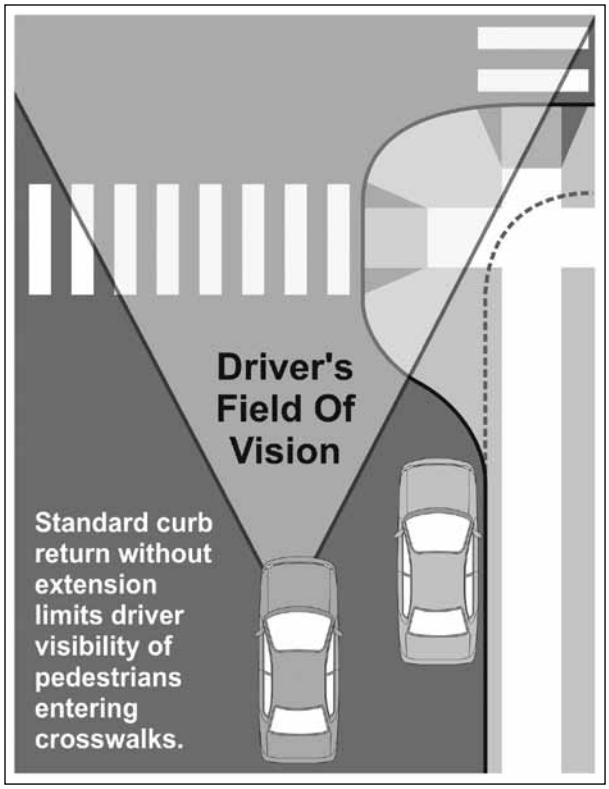


Figure 10.16 Curb extensions can improve pedestrian visibility and reduce crossing distance. Source: Digital Media Productions.

- Curb extensions are used only where there is on-street parking and where only a small percentage of turning vehicles are larger than the design vehicle.
- Curb extensions are not applicable to intersections with exclusive right-turn lanes adjacent to the curb, or intersections with a high volume of right-turning trucks or buses turning into narrow cross streets.
- Carefully consider drainage in the design of curb extensions to avoid interrupting the flow of water along the curb, thus pooling water at the crosswalk.
- Curb extensions work especially well with diagonal parking, shadowing the larger profile of the row of parking and providing large areas in the pedestrian realm.
- Adjusting the curb-return radius can accommodate emergency vehicles and large design vehicles. An "effective" radius can accommodate the design vehicle through the use of a mountable (or flush with pavement) extension with bollards to delineate the pedestrian area as shown in **Figures 10.17** and **10.18**. Flush curb extensions are frequently combined with raised intersections. However, care should be taken to provide adequate vehicle turning paths outside the designated pedestrian waiting area.
- Where bicycle lanes exist, the curb extension must be outside the width of the bicycle lane.
- Design curb-extension radii to allow street cleaning vehicles to reach and turn all inside and outside corners. Normally this requires a radius of 15 feet. This will also help stormwater flow in the gutters around corners.
- Ensure good street lighting not only for pedestrians but so that the extension is visible to drivers at night and in adverse weather.



Figure 10.17 A mid block crossing with a flush curb in New Zealand. Pedestrians are separated from passing vehicles with bollards. Source: Community, Design + Architecture.



Figure 10.18 Use of contrasting material and bollards to delineate the pedestrian and vehicle areas. Source: Kimley-Horn and Associates, Inc.

Recommended Practice

The following practices are recommended when designing curb extensions on urban thoroughfares:

- Reduce crossing width at intersections by extending the curb line into the street by 6 feet for parallel parking and to within 1 foot of stall depth with angled parking. Ensure that the curb extension does not extend into travel or bicycle lanes.
- Apply the appropriate curb-return radius in the design of a curb extension. If necessary, use three-centered or asymmetric curb returns to accommodate design vehicles.
- Where buses stop in the travel lane, curb extensions can be used to define the location of the stop and create additional waiting areas and space for shelters, benches and other pedestrian facilities.
- When possible, allow water to drain away from the curb extension. In other cases a drainage inlet may need to be installed and connected to an existing underground storm-drain system.
- Curb extensions are usually constructed integral with the curb. In retrofit projects, curb extensions may be constructed away from the curb to allow drainage along the original flowline (**Figure 10.19**). Consider that this design might require additional maintenance to keep the flowline clear.
- When considering construction of curb extensions where an existing high road crown exists, reconstruction of the street might be necessary to avoid back draining the sidewalk toward abutting buildings. Slot drains along the sidewalk may provide an alternate solution.
- Sidewalks, ramps, curb extensions and crosswalks should all align with no unnecessary meandering.

Justification

Curb extensions in unused or underutilized street space can be used to shorten pedestrian crossing distance, increase pedestrian visibility and provide additional space for pedestrian queuing and support activity. Extensions can increase safety, efficiency and attractiveness.



Figure 10.19 Curb extensions may be used as landscaping or hardscape opportunities. This example shows a retrofit curb extension with drainage retained between the extension and the curb. Source: Community, Design + Architecture.

Bicycle Lane Treatment at Intersections

Background and Purpose

Selecting appropriate bicycle lane treatments at intersections requires providing uniformity in facility design, signs and pavement markings for bicyclists and motorist safety. The objective is to promote a clear

Related Thoroughfare Design Elements

- Bicycle lanes
- Curb extensions
- Right-turn channelization
- Lane width

understanding of safe paths through all intersection movements for bicyclists and motorists.

General Principles and Considerations

General principles and considerations regarding bicycle lane treatment at intersections include the following:

- Since bicyclists ride on the right-hand side of adjacent motor vehicle traffic, bicyclists desiring to travel straight through an intersection conflict with motor vehicles that are making a right turn at the intersection. On intersection approaches that have a shared through/right-turn lane, bicyclists not turning right need to position themselves in the center of the through/right lane to safely traverse the intersection and avoid conflicts with right-turning vehicles. For this reason, the bike lane, if used, should be dashed on the approach to the intersection stop bar to indicate that the motorist should share the space with the bicyclists.
- Similarly, bicycle lanes should be dashed in bus stops to encourage buses to pull all the way to the curb.
- On intersection approaches that have an exclusive right-turn lane, the bicycle lane should be positioned to the left of the right-turn lane. Drivers of right-turning motor vehicles moving into the turn lane have an obligation to yield to any present bicyclists. The higher-speed motor vehicle is usually approaching the beginning of the turn lane from behind the bicyclist and has a better view of the potential conflict.
- A more complex situation exists when an exclusive right-turn lane is created by dropping a through lane. The bike lane can typically transition from the right of the right-turn lane to the left of the right-turn lane with a shift in alignment.
- Where there are numerous left-turning bicyclists, a left-turn bicycle lane may be provided on an intersection approach. This lane is located between the vehicular left-turn lane and the adjacent through lane so that bicyclists can keep to the outside as they turn left.
- On approaches to roundabout intersections, the bicycle lane needs to be terminated 100 feet before the crosswalk, yield line or limit of circulatory roadway and should not be provided on the circulatory roadway of the roundabout intersection.

Recommended Practice

The recommended practice for bicycle lane treatment at intersections on urban thoroughfares is shown in **Table 10.3**.

Justification

At intersections, bicyclists proceeding straight through and motorists turning right must cross paths unless the cyclist moves to the center of the through-right travel lane. Therefore, striping bike lanes up to the stop bar conflicts with this movement. Striping and signing configurations that encourage crossings in advance of the intersection in a weaving fashion reduce conflicts at the intersection and improve bicycle and motor vehicle safety. Similarly, modifications such as special sight distance considerations, wider roadways to accommodate on-street lanes, special lane markings to channelize and separate bicycles from right-turning vehicles, provisions for left-turn bicycle movements and special traffic signal designs (such as conveniently located push buttons at actuated signals or even separate signal indications for bicyclists) also improve safety and operations and balance the needs of both transportation modes when on-street bicycle lanes or off-street bicycle paths enter an intersection.

Bus Stops at Intersections

Background and Purpose

Walkable thoroughfare design for bus stops at intersections emphasizes an improved environment for pedestrians and techniques for efficient transit operations. Design considerations for buses are addressed in detail in the section on midblock bus stops in Chapter 9.

Table 10.3 Recommended Practice for Bicycle Lane Treatment at Intersections on Walkable Urban Thoroughfares

Intersection Conditions and Related Recommendations
With pedestrian crosswalks
• Bike lane striping should not be installed across any pedestrian crosswalks, and, in most cases, should not continue through any street intersections.
With no pedestrian crosswalks
• Bike lane striping should stop at the intersection stop line, or the near side cross street right-of-way line projection, and then resume at the far side right-of-way line projection. • Dash the bike lane prior to the stop line per MUTCD, to warn both motorists and cyclists of the need to prepare for right-turn movements at the intersection. • Bike lane striping may be extended through complex intersections with the use of dotted or skip lines.
Parking considerations
• The same bike lane striping criteria apply whether parking is permitted or prohibited in the vicinity of the intersection.
Bus stop on near side of intersection or high right-turn volume at unsignalized minor intersections with no stop controls
• A 6 to 8-inch solid line should be replaced with a dashed line with 2-foot dashes and 6-foot spaces for the length of the bus stop. Bike lane striping should resume at the outside line of the crosswalk on the far side of the intersection. • In the area of a shared through/right turn, the solid bike lane, if used, should be dashed to the stop bar to indicate that the right-turning motorist should share the space with bicyclists.
Bus stop located on far side of the intersection
• Solid white line should be replaced with a dashed line for a distance of at least 80 feet from the crosswalk on the far side of the intersection.
T-intersections with no painted crosswalks
• Bike lane striping on the far side across from the T-intersection should continue through the intersection area with no break. If there are painted crosswalks, bike lane striping on the side across from the T-intersection should be discontinued through the crosswalks.
Pavement markings
• Bike lane markings should be installed according to the provisions of Chapter 9C of the MUTCD. • The standard pavement symbols are one of two bicycle symbols (or the words "BIKE LANE") and an optional directional arrow as specified in the MUTCD. Symbols should be painted on the far side of each intersection. Pavement markings should be white and reflectorized.
Signs
• Bike lanes should be accompanied by appropriate signing at intersections to warn of conflicts (see Chapter 9B of the MUTCD).
Actuation at Traffic Signals
• If bike lane extends to the stop bar, provide a detector in the lane and appropriate pavement marking to indicate where the bicyclist should stop. • If the bicyclist shares a travel lane, provide a detector (and pavement marking) in the center of the lane. • If in-pavement or video detection is not possible, install a push-button on the curb accessible to the bicyclist.

Related Thoroughfare Design Elements

- Lane width.
- Curb extensions.
- Bus stops in the traveled way.
- Curb-return radius.
- Crosswalks.

Recommended Practice

Placement of Bus Stops at Intersections

The preferred location for bus stops is the near side or far side of an intersection. This location provides the best pedestrian accessibility from both sides of the street and connection to intersecting bus routes. While not preferred, bus stops on long blocks may be placed at a midblock location or to serve a major transit generator (See Chapter 9). Guidance and considerations related to bus stops at intersections include the following:

- Consider a near-side stop on two-lane thoroughfares where vehicles cannot pass a stopped bus.
- Consider a far-side stop on thoroughfares with multiple lanes where vehicular traffic may pass uncontrolled around the bus.
- On thoroughfares where vehicular traffic is controlled by a signal, the bus stop may be located either near side or far side, but far side is preferable.
- Where it is not desirable to stop the bus in a travel lane and a bus pullout is warranted, a far side or midblock stop is generally preferred. As with other elements of the roadway, consistency of stop placement lessens the potential for operator and passenger confusion.
- When locating a bus stop in the vicinity of a driveway, consider issues related to sight distance, blocking access to development and potential conflicts between automobiles and buses.
- The approach to a bus stop from the sidewalk to the bus must be fully accessible as defined by the U.S. Access Board. Bus stop access must in every case include a safe and accessible street crossing. It must also contain a loading area of at least 5 feet by 8 feet for wheelchairs to board. (see Chapter 9)

The placement of bus stops at intersections varies from site to site. However, general considerations for the placement of bus stops at intersections include the following:

- When the route alignment requires a left turn, the preferred location for the bus stop is on the far side of the intersection after the left turn is completed.
- When the route alignment requires a left turn and it is infeasible or undesirable to locate a bus stop far side of the intersection after the left turn, a midblock location is preferred. A midblock bus stop should be located far enough upstream from the intersection so a bus can maneuver into the proper lane to turn left.
- If there is a high volume of right turns at an intersection or when the transit route turns right at an intersection, the preferred location for a stop is on the far side of the intersection.
- In circumstances where the accumulation of buses at a far-side stop would spill over into the intersection and additional length is not available, the stop should be placed on the near side of the intersection.
- At complex intersections with dual right- or left-turn lanes, far-side stops are preferred because they remove the buses from the area of complicated traffic movements.
- When there is substantial transfer activity between two bus routes on opposite sides of the street, placing one stop near side and one at the adjacent far-side location can minimize the number of crossings required to transfer between buses.

Table 10.4 summarizes the advantages and disadvantages of far-side and near-side bus stop placements.

Curb Extension Bus Stops (Bus Bulbs)

A curb extension may be constructed along streets with on-street parking. Curb extensions may be designed in conjunction with bus stops to facilitate bus operations and passenger access. The placement of a

Table 10.4 Advantages and Disadvantages of Far side and Near side Bus Stops

Far Side Bus Stops	
Advantages	**Disadvantages**
• Minimizes conflict between buses and right turning vehicles traveling in the same direction • Minimizes sight distance problems on approaches to the intersection • Encourages pedestrians to cross behind the bus • Minimizes area needed for curbside bus zone • If placed just beyond a signalized intersection in a bus turnout, buses may more easily re-enter the traffic stream • If a turnout is provided, vehicle capacity through intersection is unaffected • Can better take advantage of traffic signal priority for buses	• If bus stops in travel lane, could result in traffic queued into intersection behind the bus (turnout will allow traffic to pass around the stopped bus) • If bus stops in travel lane, could result in rear-end accidents as motorists fail to anticipate stopped traffic • May cause passengers to access buses further from crosswalk • May interfere with right turn movement from cross street • May obscure sight distance for crossing vehicles • If signal priority not in use, bus may have to stop twice, once at signal and then at bus stop
Near Side Bus Stops	
Advantages	**Disadvantages**
• Minimizes interference when traffic is heavy on the far side of an intersection • Allows passengers to access buses close to crosswalk • Driver may use the width of the intersection to pull away from the curb • Allows passengers to board and alight when the bus is stopped for a red light • Provides the driver with the opportunity to look for oncoming traffic, including other buses with potential passengers	• Stopped bus interferes with right turns • May cause sight distance problem for approaching traffic, cross-street traffic and pedestrians • If located in a pullout or shoulder or at a signalized intersection, a traffic queue may make it difficult for buses to re-enter the traffic stream • Prohibits through traffic movement with green light, similar to far side stop without a bus turnout • May cause pedestrians to cross in front of the bus at intersections • Limits use of traffic signal priorities

Source: *Bus Stop Safety and Design Guidelines Manual*, Orange County Transportation Authority and Kimley-Horn and Associates, Inc.

bus stop on a curb extension should follow the same guidelines as those previously stated (a near-side stop is preferred on two-lane streets where vehicles cannot pass a stopped bus; in the case of a street with multiple lanes where vehicular traffic may pass uncontrolled around the bus, a far-side stop is preferred for sight distance issues).

A bus stop on the near side of a single-lane approach of an uncontrolled intersection should completely obstruct the traffic behind it. Where it is not acceptable to have stopped buses obstruct a lane of traffic and a bus turnout is justified according to the criteria presented in Chapter 9 (section on midblock bus stops), a bus stop may be placed on the far side in the parking lane just beyond the curb extension. It might be appropriate to place a bus stop on a far-side curb extension at an uncontrolled intersection if the warrants for a bus pullout are not met and its placement will not create a traffic hazard.

Near-side curb extensions are usually about 6 feet in width and of sufficient length to allow passengers to use the front and back doors of a bus. A near-side curb extension bus stop is shown in **Figure 10.20**.

Besides reducing the pedestrian crossing distances, curb extensions with near-side bus stops can reduce the impact to parking (compared to typical bus zones), mitigate traffic conflicts with autos for buses merging back into the traffic stream, make crossing pedestrians more visible to drivers and create additional space for passenger queuing and amenities, such as a shelter and/or a bench.



Figure 10.20 A near-side curb extension bus stop. Source: Kimley-Horn and Associates, Inc.

In areas where curb extensions are desired, but it is not acceptable to have the bus stop in the travel lane, a far-side pullout area can be created in the parking lane. This location and design eliminates the safety hazard of vehicles passing the bus prior to entering the intersection. However, bus stop length will likely be increased over the normal far-side length because of the need to add an approach taper to the stop downstream from the curb extension.

Queue Jumpers

Queue jumpers provide priority treatment for buses along arterial streets by allowing buses to bypass traffic queued at congested intersections. Queue jumpers evolved from the need to reduce bus delays at intersections or other congested locations. In the past, traffic engineers constructed bus turnouts to move buses out of the traffic stream while they are stopped for passengers. Bus turnouts introduce significant travel time penalties to bus patrons because buses are delayed while attempting to reenter the traffic stream. Queue jumpers provide the double benefit of removing stopped buses from the traffic stream to benefit the general traffic and getting buses through congested intersections so as to benefit bus operations.

Queue jumpers consist of a near-side right-turn lane (buses excepted) and a far-side bus stop and/or acceleration lane. Buses are allowed to use the right-turn lane to bypass traffic congestion and proceed through the intersection. Additional enhancements to queue jumpers could include an exclusive bus-only lane upstream from the traffic signal, extension of the right-turn lane to bypass traffic queued at the intersection, or advanced green indication allowing the bus to pass through the intersection before general traffic does.

Queue Jumper With an Acceleration Lane

This option includes a near-side right-turn lane (buses excepted), near-side bus stop and acceleration lane for buses with a taper back to the general purpose lanes on the far-side of the intersection.

Queue Jumper With a Far-Side Bus Stop

This option may be used when there is a heavy directional transfer to an intersecting transit route. Buses can bypass queues either using a right-turn lane (buses excepted) or an exclusive bus queue jump lane. Since the bus stop is located on the far side, a standard transition can be used for buses to reenter the traffic

stream. Queue jumpers at urban thoroughfare intersections should be considered when:

1. High-frequency bus routes have an average headway of 15 minutes or less;
2. Forecasted traffic volumes exceed 500 vehicles per hour in the curb lane during the peak hour and right-turn volumes exceed 250 vehicles per hour during the peak hour; and
3. Intersection operates at an unacceptable level of service (defined by the local jurisdiction).

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Appendix 1

Key Terms and New Concepts

Accessibility—A term describing the degree to which something is accessible by as many people as possible. In transportation design, accessibility is often used to focus on people with disabilities and their right of access to thoroughfares, buildings and public transportation. Accessibility also refers to transportation facilities that comply with *Public Rights-of-Way Accessibility Guidelines* (PROWAG).

Access Management—Access management is defined as the management of the interference with through traffic caused by traffic entering, leaving and crossing thoroughfares. It is also the control and regulation of the spacing and design of driveways, medians, median openings, traffic signals and intersections on arterial streets to improve safe and efficient traffic flow on the road system.

Arterial—A street that typically emphasizes a high level of traffic mobility and a low level of property access. Arterials accommodate relatively high levels of traffic at higher speeds than other functional classes and serve longer distance trips. Arterial streets serve major centers of activity of a metropolitan area and carry a high proportion of the total urban area travel. Arterials also serve significant intra-area travel, such as between central business districts and outlying residential areas, between major inner city communities or major suburban centers. Arterial streets carry important intra-urban as well as intercity bus routes.

Articulation—An architectural term that refers to dividing building facades into distinct parts that reduce the appearance of the building's mass adjacent to the sidewalk, identify building entrances and minimize uninviting blank walls.

Bicycle Boulevard—A roadway that motorists may use that prioritizes bicycle traffic through the use of various treatments. Through motor vehicle traffic is discouraged by periodically diverting it off the street. Remaining traffic is slowed to approximately the same speed as bicyclists. STOP signs and signals on the bicycle boulevard are limited to the greatest extent possible, except when aiding bicyclists in crossing busy streets.

Collector—A street that typically balances traffic mobility and property access. Collector streets provide land access and traffic circulation within residential neighborhoods, commercial and industrial areas. Collector streets pass through residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination. Collector streets also collect traffic from local streets in residential neighborhoods and channel it into the arterial system. In the central business district, and in other areas of like development and traffic density, the collector system may include the street grid that forms a logical entity for traffic circulation.

Community—A group of people living within a defined geographic area or political boundary such as a neighborhood, district, town, city, or region. It is both a physical place of streets, buildings, schools and parks and a socioeconomic structure, often defined by qualities including social traits, values, beliefs, culture, history, government structure, issues of concern and type of leadership.

Community Livability—Refers to the environmental and social quality of an area as perceived by residents, employees, customers and visitors, including safety and health, local environmental conditions, quality of social interactions, opportunities for recreation and entertainment, aesthetics and existence of unique cultural and environmental resources.

Context—The nature of the natural or built environment created by the land, topography, natural features, buildings and associated features, land use types and activities on property adjacent to streets and on sidewalks and a broader area created by the surrounding neighborhood, district, or community. Context also refers to the diversity of users of the environment.

Context Sensitive Solutions (CSS)—Collaborative, interdisciplinary process that involves all stakeholders to design a transportation facility that fits its applicable setting and preserves scenic, aesthetic, historic and environmental resources while maintaining safety and mobility. CSS respects design objectives for safety, efficiency, capacity and maintenance while integrating community objectives and values relating to compatibility, livability, sense of place, urban design, cost and environmental impacts.

Context Zone—One of a set of categories used to describe the overall character of the built and natural environment, building from the concept of the "transect"—a geographical cross section through a sequence ranging from the natural to the highly urbanized built environment. There are six context zones plus special districts describing the range of environments including four urban context zones for the purpose of CSS—suburban, general urban, urban center and urban core.

Control Vehicle—A vehicle that infrequently uses a facility and must be accommodated, but encroachment into the opposing traffic lanes, multiple-point turns, or minor encroachment into the roadside is acceptable. A condition that uses the control vehicle concept arises where occasional large vehicles turn at an intersection with low opposing traffic volumes (e.g., a moving van in a residential neighborhood or once per week delivery at a business) or where large vehicles rarely turn at an intersection with moderate to high opposing traffic volumes (e.g., emergency vehicles).

Corridor—A transportation pathway that provides for the movement of people and goods between and within activity centers. A corridor encompasses single or multiple transportation routes or facilities (such as thoroughfares, public transit, railroads, highways, bikeways, etc.), the adjacent land uses and the connecting network of streets.

Corridor Plan—Document that defines a comprehensive package of recommendations for managing and improving the transportation system within and along a specific corridor, based upon a 20-year planning horizon. Recommendations may include any effective mix of strategies and improvements for many modes.

Corridor Planning—Process that is collaborative with local governments and includes extensive public participation opportunities. A corridor may be divided into logical, manageable smaller areas for the purpose of corridor planning.

Design Control—Factors, physical and operational characteristics, and properties that control or significantly influence the selection of certain geometric design criteria and dimensions. Design speed, traffic and pedestrian volumes, location and sight distance are examples of design controls.

Design Vehicle—Vehicle that must be regularly accommodated without encroachment into the opposing traffic lanes. A condition that uses the design vehicle arises where large vehicles regularly turn at an intersection with high volumes of opposing traffic (e.g., a bus route).

Edge Zone—The area between the face of curb and furnishing zone, an area of required clearance between parked vehicles or traveled way and appurtenances or landscaping.

Environment—The natural and built places within or surrounding a community. The natural environment includes the topography, natural landscape, flora and fauna, streams, lakes and watersheds, and other natural resources, while the human/built environment includes the physical infrastructure of the community, as well as its institutions, neighborhoods, districts, and historical and cultural resources.

Frontage Zone—The distance between the throughway and the building front or private property line that is used to buffer pedestrians from window shoppers, appurtenances and doorways. It contains private street furniture, private signage, merchandise displays, etc. The frontage zone can also be used for street cafes. This zone is sometimes referred to as the "shy" zone.

Functional Classification—A system in which streets and highways are grouped into classes according to the character of service they intended to provide.

Furnishings Zone—The area of the roadside that provides a buffer between pedestrians and vehicles. It

contains landscaping, public street furniture, transit stops, public signage, utilities, etc.

Human Scale—How humans perceive the size of their surroundings and their comfort with the elements of the natural and built environment relative to their own size. In urban areas, human scale represents features and characteristics of buildings that can be observed within a short distance and at the speed of a pedestrian, and sites and districts that are walkable. In contrast, auto scale represents a built environment where buildings, sites, signs, etc. are designed to be observed and reached at the speed of an automobile.

Intermodal—Refers to the connections between transportation modes.

Intersection—Where two or more public streets meet. They are characterized by a high level of activity and shared use, multi-modal conflicts, complex movements and special design treatments.

Local Street—Streets with a low level of traffic mobility and a high level of land access, serving residential, commercial and industrial areas. Local governments typically have jurisdiction for these streets.

Major Thoroughfare—As defined for this report, major streets (and rights-of-way, including improvements between the pavement edge and right-of-way line) in urban areas that fall under the conventional functional classes of arterials and collector streets. Thoroughfares are multimodal in nature and are designed to integrate with and serve the functions of the adjacent land uses.

Mixed-Use—The combining of, or zoning for, retail/commercial and/or service uses with residential or office use in the same building or on the same site either vertically (with different uses stacked upon each other in a building) or horizontally (with different uses adjacent to each other or within close proximity).

Mixed-use Area—Areas comprised of a mix of land uses, scales and densities that provide some level of internal pedestrian connectivity. The Urban Land Institute (ULI) defines mixed-use as "three or more significant revenue producing uses with significant functional and physical integration of the different uses that conform to a coherent plan."

Mobility—The movement of people or goods within the transportation system.

Multimodal—Refers to the availability of transportation options within a system or corridor whether it be walking, bicycling, driving, or transit.

Multi-use Area—Areas containing two or more land uses that may or may not be complementary and interactive, but that have little or no internal connectivity by any travel mode, and have little or no shared access or shared parking, Nearly all interaction between buildings in this type of area is by motor vehicle travelling on public streets rather than within large parking areas.

New Urbanism—A multidisciplinary movement dedicated to the restoring of existing urban centers and towns within metropolitan regions, reconfiguring sprawling suburbs into real neighborhoods and diverse districts, conserving natural environments and preserving a community's built legacy. The new urbanist vision is to transform sprawl and establish compact, walkable, sustainable neighborhoods, streets, and towns.
(Source: Charter of the New Urbanism and www.cnu.org)

Place/Placemaking—A holistic and community-based approach to the development and revitalization of cities and neighborhoods. Placemaking creates unique places with lasting value that are compact, mixed-use, and pedestrian and transit oriented, and that have a strong civic character.
(Source: www.placemakers.com and Chuck Bohl, "Placemaking")

Public Participation—A collaborative process that encourages stakeholders to participate in the formation, evaluation and conclusion of a plan or transportation improvement project.

Right of way—The publicly owned land within which a thoroughfare can be constructed. Outside of the right-of-way the land is privately owned and cannot be assumed to be available for thoroughfare construction without acquiring the land through dedication or purchase.

Safety—A condition of being safe, free from danger, risk, or injury. In traffic engineering, safety involves reducing the occurrences of crashes, reducing the severity of crashes, improving crash survivability, developing programmatic safety programs and applying appropriate design elements in transportation improvement projects.

Sight Distance—Distance that a driver can see ahead in order to observe and successfully react to a hazard, obstruction, decision point, or maneuver.

Single-use Area—Single-use areas may be corridors or districts which are predominantly comprised of a single type of land use. Often the scale of single-use areas, their lack of a mix of uses and their associated roadway networks tend not to be conducive to walking. Transportation in single-use areas is primarily by motor vehicles, although transit and bicycling can be viable modes. Single-use areas might contain large tracts of housing such as subdivisions or commercial, or industrial uses that rely on freight movement and therefore need to accommodate significant numbers of large vehicles.

Smart Growth—Land use development practices that create more resource efficient and livable communities, with accessible land use patterns. It is an alternative to sprawl development patterns.

Stakeholders—Groups or individuals that have an interest (stake) in the outcome of the planning or project development process. Typical stakeholders include elected officials, appointed commissioners, metropolitan planning organizations, state and local departments of transportation, transit authorities, utility companies, business interests, neighborhood associations and the general public.

Streetside—The public right-of-way, which typically includes the planting area and sidewalk, from the back of the curb to the front property line of adjoining parcels. The roadside is further divided into a series of zones that emphasize different functions including the frontage, throughway, furnishings and edge zones. Transportation facilities, including bus shelters, waiting areas and bicycle parking, may be part of the roadside.

Thoroughfare—As defined for this report, major streets (and their rights-of-way, including improvements between pavement edge and right-of-way line) in urban areas that fall under the conventional functional classifications of arterials and collector streets excluding limited-access facilities. Thoroughfares are multi-modal in nature, and are designed to integrate with and serve the functions of the adjacent land uses.

Throughway Zone—The walking zone that must remain clear both horizontally and vertically for the movement of pedestrians.

Traditional Urban Environments—Places with development pattern, intensity and design characteristics that combine to make frequent walking and transit use attractive and efficient choices, as well as provide for automobiles and convenient and accessible parking. Traditional urban environments typically have mixed land uses in close proximity to one another, building entries that front directly on the street, building, landscape and thoroughfare design that is pedestrian-scale, relatively compact development, a highly-connected, multimodal circulation network, usually with a fine "grain" created by relatively small blocks, thoroughfares and other public spaces that contribute to "placemaking" (the creation of unique locations that are compact, mixed-use, and pedestrian and transit oriented, that have a strong civic character and with lasting economic value).

Transect—A continuum of contexts ranging from the natural and agricultural (parks, open space, farmland) to varying intensities of urbanism (from suburban to urban core). The transect is the basis for the four urban context zones used in this guidance.

Transitions—A change in thoroughfare type, context (e.g., rural to urban), right-of-way width, number of lanes, or neighborhood or district. Geometrically, transitions refer to the provision of a proper smooth taper where lanes or shoulders change width, lanes diverge or merge, or lanes have been added or dropped.

Traveled Way—The public right-of-way between curbs, including parking lanes, and the travel lanes for private vehicles, goods movement, transit vehicles and bicycles. Medians, turn lanes, transit stops and exclusive transit lanes, curb and gutter, and loading/unloading zones are included in the traveled way.

Traversable Community—Denotes the ability to travel within an area based on the area's size, network connectivity, availability of multimodal facilities, and mix of uses that elicit the need to travel within the area. Large and predominantly single-use districts are most easily traversed by automobile; whereas compact mixed-use districts can be viably traversed by walking or bicycling.

Urban Area—As defined by federal-aid highway law (Section 101 of Title 23, U.S. Code) urban area means an urbanized area as an urban place as designated by the Bureau of the Census having a population of 5,000 or more.

Values—Attributes and characteristics regarded by a community as having ultimate importance, significance, or worth. Community values encompass the natural and built environment, its social structure, people and institutions. The term often refers to a set of principles, standards, or beliefs concerning the elements of the community that are of ultimate importance.

Vision—Part of the process of planning a community that involves residents looking into the future, thinking creatively and establishing what they want their community to be in a 20- or 50-year planning horizon. A vision describes an ideal picture and guides goal-setting, policies and actions by helping to understand community concerns, prioritize issues, determine necessary actions and identify indicators to measure progress. Successful visions include a future that:

- Balances economic, environmental and social needs from a long-term perspective in terms of decades or generations instead of years;
- Incorporates the views of a wide cross-section of the community; and
- Tracks its progress in reaching the future.

(Source: www.communitiescommittee.org)

Walkable—Streets and places designed or reconstructed to provide safe and comfortable facilities for pedestrians, and are safe and easy to cross for people of all ages and abilities. Walkable streets and places provide a comfortable, attractive and efficient environment for the pedestrian including an appropriate separation from passing traffic, adequate width of roadside to accommodate necessary functions, pedestrian-scaled lighting, well-marked crossings, protection from the elements (e.g., street trees for shade, awnings, or arcades to block rain), direct connections to destinations in a relatively compact area, facilities such as benches, attractive places to gather or rest such as plazas and visually interesting elements (e.g., urban design, streetscapes, architecture of adjacent buildings).

Walkable Communities—Walkable communities possess these two attributes: first, by location, in a mixed-use area within an easy and safe walk of goods (such as housing, offices, and retail) and services (such as transportation, schools, libraries) that a community resident or employee needs on a regular basis. Second, by definition, walkable communities make pedestrian activity possible, thus expanding transportation options, and creating a streetscape that better serves a range of users—pedestrians, bicyclists, transit riders and automobiles. To foster walkability, communities must mix land uses and build compactly, and ensure safe and inviting pedestrian corridors.
(Source: www.smartgrowth.org)

Additional Sources of Definitions

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Appendix 2

Introduction to Context Sensitive Solutions (CSS)

What is CSS?

CSS is a different way to approach the planning and design of transportation projects. It is a process of balancing the competing needs of many stakeholders starting in the earliest stages of project development. It is also flexibility in the application of design controls, guidelines and standards to design a facility that works for all users regardless of the mode of travel they choose.

There are many definitions of CSS (see sidebar for example definitions from state DOTs) but they share a common set of tenets:[1]

- "Balance safety, mobility, community and environmental goals in all projects;
- Involve the public and stakeholders early and continuously throughout the planning and project development process;
- Use a multidisciplinary team tailored to project needs;
- Address all modes of travel including pedestrians, transit/paratransit, bicycles, private motor vehicles and freight;
- Accommodate all types of travelers including young, old and disabled, as well as able bodied adults safely, conveniently and comfortably on all thoroughfares;
- Apply flexibility inherent in applying design guidelines and standards; and
- Incorporate aesthetics and accessibility as an integral part of good design."

These tenets can be applied to the planning and design of any type of transportation project in any context, the result of which is aptly summarized in the following quote from *A Guide to Achieving Flexibility in Highway Design* (AASHTO 2004):

"…a highway or transportation project that reflects a community consensus regarding purpose and need, with the features of the project developed to produce an overall solution that balances safety, mobility and preservation of scenic, aesthetic, historic and environmental resources."

CSS as Defined by State Departments of Transportation

"Context sensitive solutions use innovative and inclusive approaches that integrate and balance community, aesthetic, historic and environmental values with transportation safety, maintenance and performance goals. Context sensitive solutions are reached through a collaborative, interdisciplinary approach involving all stakeholders." **California Department of Transportation**

"Context Sensitive Solutions (CSS) is a philosophy wherein safe transportation solutions are designed in harmony with the community. CSS strives to balance environmental, scenic, aesthetic, cultural and natural resources, as well as community and transportation service needs. Context sensitive projects recognize community goals, and are designed, built and maintained to be sustainable while minimizing disruption to the community and environment." **New York State Department of Transportation**

"The essence of CSS is that a proposed transportation project must be planned not only for its physical aspects as a facility serving specific transportation objectives, but also for its effects on the aesthetic, social, economic and environmental values, needs, constraints and opportunities in a larger community setting. WSDOT endorses the CSS approach for all projects, large and small, from early planning through construction and eventual operation. CSS is a process that places a high value on seeking and, if possible, achieving consensus. WSDOT's belief is that consensus is highly advantageous to all parties and may help avoid delay and other costly obstacles to project implementation." **Washington State Department of Transportation**

1. Expanded from a list of Principles from the Minnesota Department of Transportation as published on the University of Minnesota's Center for Transportation Studies Web site www.cts.umn.edu/education/csd/index.html

Why CSS is Important

CSS principles applied to the planning and design of a transportation project can make the difference between a successful project valued by the community or an embattled project taking years or even decades to complete, if ever. There are numerous examples of transportation projects that have ground to a halt or that have been held up in the courts long before final design is ever reached. Why? One common theme in these unsuccessful projects is not just contention over the project, but a lack of understanding of what the community values and a failure to address stakeholder issues and concerns. Some common issues that affect transportation projects include:

- Real or perceived incompatibility with surroundings;
- Community impacts;
- Emphasis on mobility without consideration of other community values;
- Disproportionate distribution of benefits or impacts (environmental justice); and
- Lack of stakeholder education and participation throughout the planning and design processes.

A CSS approach to the planning and design of a transportation project (otherwise referred to as a CSS process) cannot guarantee resolution of issues or even alleviate all contention. It can, however, minimize problems and delays by ensuring stakeholder involvement, identification of issues and community values and evaluation of alternative solutions that meet the needs and purpose of the project and address issues to the extent possible. A successful CSS process builds consensus on the best possible solution and promotes community ownership in the results.

Benefits of CSS

"As an approach to transportation, CSS has spread rapidly since 1998. In large part this is because CSS practitioners and advocates understand and embrace its many important benefits:

- CSS solves the right problem by broadening the definition of "the problem" that a project should solve, and by reaching consensus with all stakeholders before the design process begins.
- CSS conserves environmental and community resources. CSS facilitates and streamlines the process of NEPA compliance.
- CSS saves time. It shortens the project development process by gaining consensus early, thereby minimizing litigation and redesign and expediting permit approvals.
- CSS saves money. Shortening the project development process and eliminating obstacles save money and time.
- CSS builds support from the public and the regulators. By partnering and planning a project with the transportation agency, these parties bring full cooperation, and often additional resources as well.
- CSS helps prioritize and allocate scarce transportation funds in a cost-effective way, at a time when needs far exceed resources.
- Group decisions are generally better than individual decisions. Research supports the conclusion that decisions are more accepted and mutually satisfactory when made by all who must live with them.
- CSS is the right thing to do. It serves the public interest, helps build communities and leaves a better place behind."

Source: www.contextsensitivesolutions.org

Elements of Effective CSS

An effective CSS approach to transportation planning and project development can take many different forms, but should include the following key elements:

- A common understanding of the purpose and need of the transportation project;
- Stakeholder involvement at critical points in the project;
- Multidisciplinary team approach to planning and design;
- Attention to community values and qualities including accessibility, environment, scenic, aesthetic, historic and natural resources, as well as safety and mobility; and

- Objective evaluation of a full range of alternatives.

Purpose and need: Understanding the purpose and need of the project includes developing an inclusive problem definition/statement that represents a common viewpoint of the problem among the stakeholders. According to the Federal Highway Administration (2005), "the purpose and need is the foundation of the decision-making process, influencing the rest of the project development process, including the range of alternatives studied and, ultimately, the selected alternative." The generally accepted characteristics of an effective purpose and need statement include:

- The statement should be concise, easy-to-read and readily understandable.
- It should focus on essential needs, goals and policies for the project, which generally relate to transportation issues (such as mobility, safety, accessibility and reliability); it should be careful to delineate other desirable elements (environmental protection, scenic improvements) as separate from the purpose and need.
- It should be supported by data and policy that justify the need.
- It should focus on the problems that need to be addressed, and for which a proposed project is being considered, (for example, the purpose is to improve safety along a highway segment that has a high accident rate), and should not be written in a way that prematurely focuses on a specific solution or too narrowly constrains the range of alternatives (e.g., the purpose is to widen the highway).

Stakeholder involvement: Stakeholders are agencies, organizations, or individuals who have some level of authority over, an interest in, or may be potentially impacted by a transportation project. An effective CSS approach allows for meaningful stakeholder participation—meaning that stakeholders have an opportunity to participate in decisions or contribute in a way that can influence decisions. The CSS process can range from information dissemination, education and the provision of stakeholder input and comments to proactive hands-on involvement through town meetings, workshops, charrettes and advisory committees.

Multidisciplinary team approach: A multidisciplinary approach to planning and design incorporates the viewpoints of the various agencies, stakeholders and professionals who have roles or areas of concern in the transportation project. The different viewpoints allow coordination between different activities and resolution of competing interests. A multidisciplinary team approach can also result in a broader range of potential alternatives that meet multiple objectives. The makeup of planning and design teams can vary significantly depending on the nature of the project and can include anyone or any organization connected with the project, including, but not limited to, the following:

- Transportation planners;
- Highway/traffic and transit engineers;
- Environmental scientists;
- Resource agency representatives;
- Land use planners;
- Urban designers, architects;
- Landscape architects, urban foresters;
- Property owners;
- Users;
- Utility and transit owners/operators;
- Community and interest group leaders/representatives;
- Elected or appointed officials; and
- Fire, police, highway maintenance representatives.

Attention to community values and important qualities: Citizens value specific attributes of their community, whether it is the economic vitality of their downtown, their history, ease of mobility and safe streets, the quality of schools, natural resources, scenic qualities, or their system of parks. These important values can be overlooked in the evaluation process. The CSS approach works with stakeholders and the community to identify their values. It strives to integrate these values into evaluation criteria, and develop alternatives to preserve and enhance community attributes and address concerns.

Objective evaluation of a full range of alternatives: At a minimum, the development of alternatives must meet the purpose and need of the project. Ideally,

alternatives developed in a CSS approach meet the purpose and need, preserve and enhance community values and address stakeholder concerns. They also educate the design professional about factors that are important for project success and acceptance. Objectivity is important and all possibilities should be screened in a process that involves the stakeholders. The development, evaluation and screening of alternatives are opportunities to educate non-technical stakeholders.

For a more detailed discussion of the elements of an effective CSS process refer to *NCHRP Report 480: A Guide to Best Practices in Achieving Context Sensitive Solutions* (TRB 2002).

Conventional Process Versus CSS

There are fundamental differences in the approaches to design that can result in different outcomes. Conventional thoroughfare design is frequently driven by traffic demand and level of service objectives. The first two design elements of a thoroughfare are typically determined in the transportation planning process—functional classification and number of lanes. The outcome of this vehicle mobility-focused process influences the rest of the design process, from working with stakeholders to the final design. A pre-determined outcome can be a source of conflict with stakeholders that delays or even stops projects because the thoroughfare design may not be considered compatible with its surroundings or does not address the critical concerns of the community.

CSS-inspired thoroughfare design also begins the transportation planning process with an emphasis on identifying critical factors and issues before establishing design criteria. Certainly functional classification, travel forecasts and levels of service are factors to consider in CSS, and may be a high priority objective under many circumstances. Through a multidisciplinary approach, including a full range of stakeholders, the process seeks to identify the core issues/problems, develop a spectrum of alternatives and reach consensus on the best solution. The process may determine that level of service needs to be balanced along with environmental, historic preservation, or economic development objectives in the community. This process results in a well thought out and rationalized design tradeoff—the fundamental basis of CSS.

An inclusive process is not a guarantee of success, but it often results in early acceptance and community ownership of transportation projects. The tenets of CSS in thoroughfare design are summarized in the principles described in the next section.

CSS Principles, Processes and Outcomes

The qualities and characteristics of a transportation project were originally developed at a conference in Maryland in 1998 entitled "Thinking Beyond the Pavement." In 2007, at a meeting of the AASHTO Standing Committee on Highways, a group of FHWA, state department of transportation and institutional representatives refined the definition and principles of CSS resulting in a list of process characteristics and outcomes. These process characteristics and outcomes have become measures by which successful context sensitive solutions are judged.[2]

Based on the refined definition, context sensitive solutions is guided by a process which:

- Establishes an interdisciplinary team early, including a full range of stakeholders, with skills based on the needs of the transportation activity.
- Seeks to understand the landscape, the community, valued resources and the role of all appropriate modes of transportation in each unique context before developing engineering solutions.
- Communicates early and continuously with all stakeholders in an open, honest and respectful manner, and tailors public involvement to the context and phase.
- Utilizes a clearly defined decision-making process.

2 Refer to "Results of Joint AASHTO/FHWA Context Sensitive Solutions Strategic Planning Process, Summary Report, March 2007". Prepared by the Center for Transportation and the Environment at North Carolina State University. The document can be found at www.contextsensitivesolutions.org.

- Tracks and honors commitments through the life cycle of projects.
- Involves a full range of stakeholders (including transportation officials) in all phases of a transportation program.
- Clearly defines the purpose and seeks consensus on the shared stakeholder vision and scope of projects and activities, while incorporating transportation, community and environmental elements.
- Secures commitments to the process from local leaders.
- Tailors the transportation development process to the circumstances and uses a process that examines multiple alternatives, including all appropriate modes of transportation, and results in consensus.
- Encourages agency and stakeholder participants to jointly monitor how well the agreed-upon process is working, to improve it as needed, and when completed, to identify any lessons learned.
- Encourages mutually supportive and coordinated multimodal transportation and land-use decisions.
- Draws upon a full range of communication and visualization tools to better inform stakeholders, encourage dialogue and increase credibility of the process.

Context sensitive solutions lead to outcomes that:

- Are in harmony with the community and preserve the environmental, scenic, aesthetic, historic, and natural resource values of the area.
- Are safe for all users.
- Solve problems that are agreed upon by a full range of stakeholders.
- Meet or exceed the expectations of both designers and stakeholders, thereby adding lasting value to the community, the environment and the transportation system.
- Demonstrate effective and efficient use of resources (people, time and budget,) among all parties.



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Costs and Benefits of a Road Diet Conversion

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Citation to *this* Version: Noland, Robert B., Gao, Dong, Gonzales, Eric J. & Brown, Charles. Costs and Benefits of a Road Diet Conversion. *Case Studies on Transport Policy 3*(4), 449-458. Retrieved from doi:10.7282/T3Q2424F.



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Costs and Benefits of a Road Diet Conversion

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Final version published in:

Case Studies on Transport Policy, 15 Sept 2015
doi:10.1016/j.cstp.2015.09.002

Abstract

The analysis presented here is of a cost benefit evaluation of a road diet conversion, reducing an urban arterial street from two-lanes in each direction to one-lane in each direction with a middle turning lane. Livingston Avenue is located in New Brunswick, New Jersey, and is an oversized arterial corridor accessing the center of the city. The costs include increases in travel time from the capacity reduction. These are modeled with a VISSIM micro-simulation of the street. Safety benefits of road diets are one of the main reasons that these are pursued. Evidence on the safety effect suggests that road diet conversions of arterial streets in urban areas will achieve about a 19% reduction in crashes. The benefits of crash reductions and the costs of increased delay are evaluated based on the value of statistical lives saved versus the cost of travel time. This is done for various different scenarios and includes robustness checks. Results overwhelmingly find benefits exceed costs over a 20 year period.

Introduction

Complete Streets policies are aimed at balancing the needs of all roadway users, encouraging and allowing safe travel by bicyclists, pedestrians, transit users, and freight, in addition to existing car traffic. This is made possible through the transformation of the built environment and may include the installation of bicycle lanes, crosswalks, sidewalks, pedestrian signals, and transit stops. It may also include the addition of median islands, curb extensions, or the occasional road diet. The latter is the focus of this analysis for Livingston Avenue in New Brunswick, New Jersey, a major arterial road that cuts through a residential area and feeds the center of the city. There is substantial pedestrian traffic that crosses the street at both signalized and unsignalized crosswalks. This study was a collaboration funded by a Rutgers University Community-University partnership grant. The focus was on determining the costs and benefits of implementing a road diet along Livingston Avenue.

The City of New Brunswick adopted a Complete Streets policy in May 2009. The policy reinforced the city's commitment to "creating a comprehensive, integrated, connected street network that safely accommodates all road users of all abilities and for all trips."*(1)* The city has since made plans to increase investment in bicycle and pedestrian infrastructure*(2, 3)* and has also passed legislation and increased traffic enforcement in an attempt to eradicate preventable vehicular-pedestrian crashes. *(4, 5)* This study, thus, is an instrumental part of this plan. However, at initial stages of this work, it was clear that the City was concerned about public opposition to any reductions in road capacity that might slow traffic entering the City.[1]

This analysis is intended to evaluate the feasibility of a road diet on Livingston Avenue to understand how this may affect traffic flow and also to evaluate the benefits and costs of the conversion. There is evidence that road diets are effective at reducing crashes and reducing speeds *(6-8)* and some evidence that there is no effect *(9)*. A synthesis of the literature concluded that road diets are effective at reducing crashes (12). Specifically, the costs are primarily associated with any traffic delay that might occur, while the benefits are based on potential reductions in traffic crashes, including those with pedestrians.

The approach taken here is to investigate the feasibility of a road diet by analyzing the results of a micro-simulation of the traffic network using VISSIM software. VISSIM is a microscopic, time step and behavior-based simulation model developed to model urban traffic and public transport operations *(10)*. VISSIM is particularly useful for examining different scenarios with altered lane configurations and signal timings. The key output provided by the model is the total travel time within the network as well as the time each vehicle is delayed. This provides a means of assessing how the relative level of service of Livingston Avenue and the key intersections are affected by various road diet

[1] This was expressed in an early meeting with city staff. There was a desire to complete the work prior to the start of a mayoral election campaign, since the plan was seen as controversial and would likely be opposed by voters.

configurations. Estimates of crash and injury reduction are based on recent research suggesting that road diets can reduce crashes by 19% *(8)* ,and additional scenario analysis is conducted to investigate the robustness of the cost/benefit analysis.

Background

New Brunswick is located in central New Jersey and sits along the Raritan River. It is the county seat of Middlesex County. The population is about 50% Hispanic, 16% African-American and totals about 55,000 residents. Over one-third of the population is foreign born. About 25% of the population is below the poverty line and median household income is $40,280 based on the American Community Survey 5-year estimate, and average household income is $53,854. New Brunswick is home to the main campus of Rutgers University with an enrollment of over 40,000 students. The city is relatively densely populated at about 10,500 residents per square mile (4,075 per sq. km) *(11, 12)*. Employment in the city has grown to about 27,000 jobs from 20,000 in 1990. Rutgers University and Johnson & Johnson (which is headquartered in New Brunswick) are the two major employers in the city.

The northeast corridor offers direct train service to New York City, which has led to major redevelopment of the city as a transit-oriented development. About 10% of the population commutes to work by public transportation and slightly over 3% walk to work. Much of the city is very walkable, with adequate sidewalks along almost all major and minor streets *(11)*.

Livingston Avenue (also known as county route 691), the subject of this study, is a major local street corridor that connects downtown New Brunswick with US route 1 in the south. It stretches about 3.5 miles (5.6 km) and provides access to the many neighborhoods within the city. Livingston Avenue has two lanes in each direction with a 25 mph speed limit for almost its entire length in New Brunswick. The roadway has an AM peak traffic volume of about 14,000 vehicles and a PM peak volume of about 17,500-18,000 vehicles, over three hours for each peak. Most vehicles exceed the speed limit of 25 mph. Land uses along the street are a mix of residential, retail, and small offices. A number of uses fronting on Livingston Avenue attract vulnerable road users, including three elementary schools, a rehabilitation center for the blind, the public library, a 50-unit senior citizen apartment building, multiple churches and a Rutgers University academic building. Total pedestrian activity tabulated during this study amounted to over 9,000 street crossings for both the morning and evening peak periods (over three hours in each peak), for counts at nine intersections along Livingston Avenue.

The street enters North Brunswick to the south where it reduces to three lanes, one of which is a central turn lane and has an increased speed limit (of 35 mph). Along this final stretch in North Brunswick the environment becomes more suburban in character and the sidewalks disappear.

Livingston Avenue has been identified as having on over-representation of pedestrian crashes among county roads in Middlesex county *(13)*. Classified as an urban minor arterial, it is meant to interconnect with and augment the principal highway system. According to a road safety audit conducted in 2011 there were a total of 113 vehicle crashes between 2007 and 2009. Of these, 17% involved a pedestrian and 6% involved a bicyclist *(13)*. Over two-thirds of the pedestrian crashes occurred at night and most were at major intersections along Livingston Avenue. According to the safety audit, 49 of the 113 crashes (43%) resulted in an injury, with 54 people having injuries; there were no fatal crashes during this time period. One issue noted in the audit is that the police department reported that many pedestrian crashes occur when vehicles that are stopped for the pedestrian block the view of other vehicles that are passing. The road safety audit recommended consideration of a road diet as one way to mitigate these occurrences.

A road diet generally consists of converting a four lane road to a three lane road where the middle lane is a two-way turning lane; Figure 1 displays a typical cross-section. Bicycle lanes (or wider shoulders) are also often part of the redesign of the road as there is now adequate space for them. Figure 2 and Figure 3 show before and after photos of a road diet on Livingston Avenue. The study area for this project includes only the 1.5 mile segment of Livingston Avenue (shown in Figure 4) that lies fully within the City of New Brunswick. There are a number of key pedestrian attractors shown in Figure 5, in addition to bus stops that line the street.

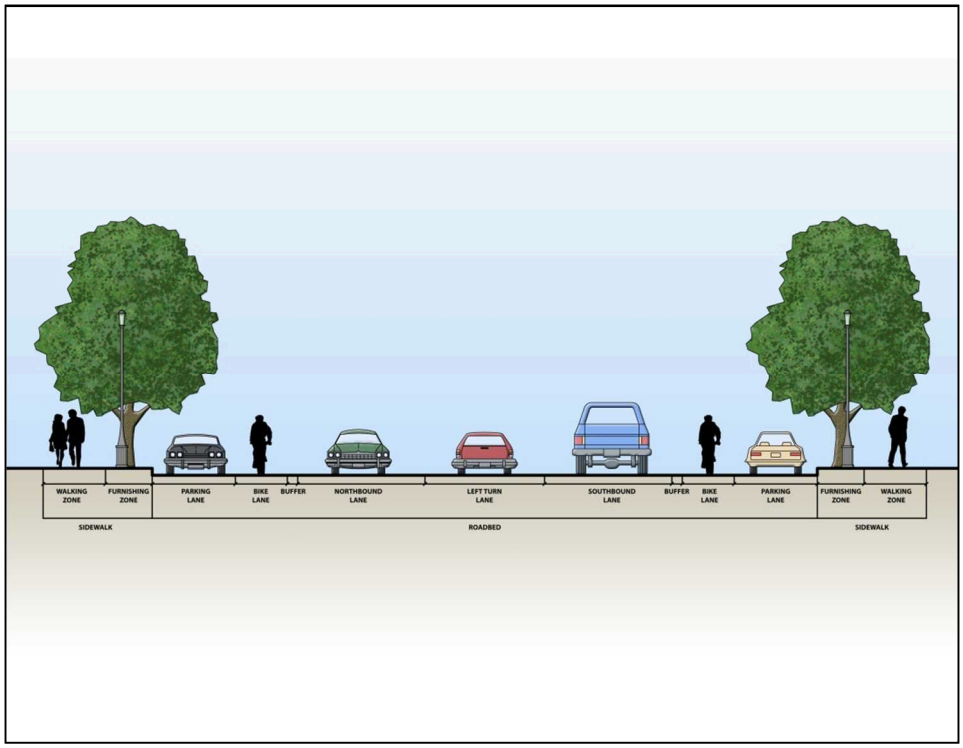

Figure 1: Road diet cross-section showing a typical configuration



Figure 2: Livingston Avenue as it is currently configured



Figure 3: A photo simulation of Livingston Avenue with a road diet

Recent research has demonstrated that road diets can significantly reduce crashes *(8)*. A review commissioned by the FHWA synthesized the available research that has evaluated crash rates before and after implementation of a road diet. While not many projects have been evaluated, the results of this synthesis suggest that in large urban areas crashes can be reduced by about 19%. For rural highways that pass through smaller urban areas this can be as much as a 47% reduction in crashes. No studies have evaluated the impact on traffic fatalities and more severe injuries, but one would expect these to also be reduced.

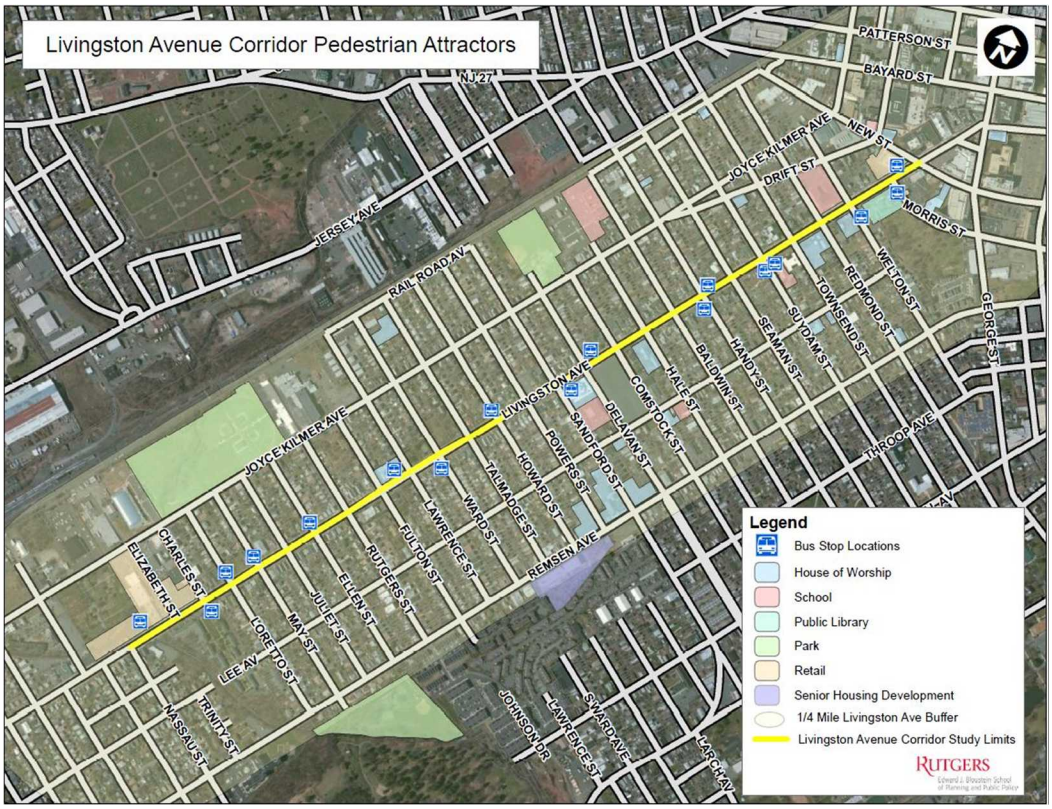

Figure 4: Livingston Avenue Study Area, with key pedestrian attractors

Data

Traffic counts

To estimate travel times, a VISSIM model was calibrated for Livingston Avenue. In order to calibrate the VISSIM model to actual traffic conditions, traffic counts were collected at various sites along the corridor. Physical turning movement counts at each of the five major signalized intersections were also collected, and one representative unsignalized intersection location. These data were collected on weekdays in November and December, 2012 for 3 hours duration for both AM peak hour (7AM~10AM) and PM peak hour (3PM~6PM). Two additional counts were performed during the AM and PM peak period to confirm the proportion of truck and bus traffic on Livingston Avenue.

In setting up the traffic assignment in VISSIM, we used the average counts for each signalized intersection. The traffic flow at each unsignalized intersection was scaled proportionally based on the counts from one unsignalized intersection. Thus, the turning movements for each unsignalized intersection were proportionally equivalent, but scaled up or down based on the Livingston Avenue traffic flow passing each unsignalized intersection. Pedestrian counts were also obtained at these intersections, plus three additional locations with large pedestrian attractors. The total number of pedestrians who crossed Livingston Avenue for the six hours in which counts were made is 3393 pedestrians, indicating a high degree of exposure and potential risk. Our simulation did not include vehicle-pedestrian interactions.

Road Geometry

The road geometry data are derived from the 2012 New Jersey High Resolution Orthophotography, downloaded from the New Jersey Geographic Information Network *(14)*. The images were combined together in ArcGIS from which an image was exported to serve as the base map for the simulation. The map provides basic road geometry data, such as the edges of the roads, the centerline of the roads and other geometry. The basic road network was then plotted in VISSIM using this image as background.

Signal Timings

The existing traffic signals are timed with actuated signals at the intersections of Livingston Avenue with New Street, Suydam Street, Handy Street, Sandford Street, and Nassau. There are separate timing plans for the morning and evening. The signals operate on simple two- or three-phase plans allowing for extended green time when the pedestrian request is called in order to allow sufficient time for pedestrians to safely cross Livingston Avenue. The cycle length is fixed at 90 sec for New Street and Nassau Street. Variable cycle lengths are allowed at Suydam Street (52-80 sec), Handy Street (56-80 sec), and Sandford Street (54-80 sec).

For the study of the Livingston Avenue corridor, we did not collect sufficiently detailed data to record how often the signal is actuated for pedestrians or how often the vehicle extension was actuated. The analysis was conducted treating the signal timings as fixed as though there were high traffic and pedestrian demand in every cycle. The fixed timing plans used as the existing case for the study are summarized in Table 1. This is consistent with operation of the corridor at its capacity when all of the actuated phases would be at their maximum length. In the interest of studying the performance of the corridor during the height of the AM and PM peaks, we are able to provide an estimate of the worst-case level of service for car traffic during the busiest time of the day. Therefore predictions of future performance are conservative and robust if pedestrian traffic in the corridor were to increase substantially in the future.

Table 1: Existing Timing Plan (sec)

Intersection	Green	Yellow	All Red	Phase Total
New Street (6AM – 9AM)				
Livingston Ave (All Movements)	38	3	3	44
New St (WB Lead)	10	3		13
New St (All Movements)	26	3	4	33
New Street (All Other Times)				
Livingston Ave (All Movements)	28	3	3	34
New Street (WB Lead)	10	3		13
New Street (All Movements)	36	3	4	43
Suydam Street				
Livingston Ave (All Movements)	34	4	2	40
Suydam St (All Movements)	34	4	2	40
Handy Street				
Livingston Ave (All Movements)	39	3	2	44
Handy St (All Movements)	30	4	2	36
Sandford Street				
Livingston Ave (All Movements)	36	4	2	42
Sandford St (All Movements)	32	4	2	38
Nassau Street				
Livingston Ave (All Movements)	36	4	2	42
Nassau St (All Movements)	32	4	2	38

The simulation model was calibrated to recreate existing traffic conditions with the current signal timings and traffic flows. The road diet on Livingston Avenue was then simulated with these existing signal timings to estimate the effect on intersection level of service from changing the street geometry without adjusting the traffic signals. The simulations resulted in excess congestion during the evening peak period. A set of re-optimized signal timings were developed specifically for the evening peak period to better reflect the changed traffic conditions.

Synchro 8 was used to re-optimize the cycle length, phase lengths, and offsets in order to provide coordination for an efficient green wave for the peak travel direction (i.e., outbound from downtown New Bunswick), and minimize the effects of queue spillbacks blocking other intersections. Since the proposed road diet reduces the capacity at intersections, a longer cycle length is needed in order to reduce the effect of the lost time between phases on the intersection's capacity. The optimized signal timing plan for the evening peak, accounting for the changed geometry of the road diet, is summarized in Table 2.

Table 2. Re-optimized Timing Plan for PM Peak (sec)

Intersection	Green	Yellow	All Red	Phase Total
New Street (Offset = 0)				
Livingston Ave (All Movements)	32	3	3	38
New St (WB Lead)	10	3		13
New St (All Movements)	42	3	4	49
Suydam Street (Offset = 61)				
Livingston Ave (All Movements)	48	4	2	54
Suydam St (All Movements)	40	4	2	46
Handy Street (Offset = 52)				
Livingston Ave (NB Lead)	6	3		9
Livingston Ave (All Movements)	49	3	2	54
Handy St (All Movements)	31	4	2	37
Sandford Street (Offset = 98)				
Livingston Ave (All Movements)	51	4	2	57
Sandford St (All Movements)	37	4	2	43
Nassau Street (Offset = 0)				
Livingston Ave (All Movements)	51	4	2	62
Nassau St (All Movements)	32	4	2	38

Note: All offsets are for the beginning of the first listed phase relative to the intersection at New Street.

The cycle length is set to 100 sec at all intersections so that the signal phases are coordinated in every signal cycle. All phases are greater in length than the minimum time required for pedestrians to cross the intersection as estimated from existing pedestrian signal phases along Livingston Avenue.

Simulation Assumptions

Various assumptions and settings must be made in VISSIM prior to running a simulation. These include speed distribution assumptions, vehicle composition, and driver and pedestrian behavior.

For the speed distribution we use an “S” curve based on a speed limit of 30 mph, despite the posted limit being 25 mph. Observation of the street suggested that only a small fraction of vehicles observed the posted speed limit. Resource limitations prevented us from collecting actual speed data for Livingston Avenue. Average speed along Livingston Ave. within the simulation was 15.35 mph during the AM peak period and 14.71 mph during the PM peak period. This takes into account any vehicle stops at signalized intersections and other vehicles in the roadway.

Data on vehicle mix was collected. Buses and trucks are a very small proportion of the traffic flow during peak periods. We set both as Heavy Goods Vehicles (HGV) in VISSIM. During the AM peak the percent HGV was 5%, while during the PM peak the percent HGV was 3%.

The settings for driver behavior were assumed to be the urban (motorized) environment default parameters as specified by VISSIM. These are based on Wiedeman's car following model *(10, 15)*. The driving behavior parameters as specified in VISSIM are as follows: look ahead distance, minimum: 0 ft, maximum: 820.21 ft; look back distance minimum: 0 ft, maximum: 492.13 ft.; average standstill distance: 6.56 ft, additive part of safety distance: 2.00 ft, and multiplicative part of safety distance: 3.00 ft.

The road diet was configured in VISSIM by realigning the lanes for vehicular traffic to fit within a narrower right of way that would allow for installation of bicycle lanes on both sides of Livingston Avenue. Since VISSIM does not have a straightforward way to model a shared left turn lane, the lane alignment at each intersection has been carefully constructed so that left turning vehicles from Livingston Avenue and from side streets interact in a realistic way. The simulated network with the road diet has been configured to recreate the vehicular interactions that would result from a shared left turn lane and, most importantly, to exhibit the expected capacity for vehicular traffic in the corridor.

For turning behavior we assume that if a vehicle is turning right from a side street to Livingston Ave, it will enter the right side lane of Livingston Ave. Left turning vehicles will enter the left side lane of Livingston Ave. Our road diet scenarios (discussed below) include a center lane that left turning vehicles will turn into from side streets, prior to merging with the flow of traffic.

Road Diet Scenarios

Our base case scenarios included both peak hours, AM and PM, based on our traffic counts and the signal cycles discussed previously. The model was calibrated and adjusted as needed to match these counts and achieve a smooth flow without any major backups at intersections. Of particular note is the intersection with New Street at the northern end of Livingston Avenue. This is just prior to the core area of downtown New Brunswick. Most of the inbound traffic turns right, flowing towards NJ state route 18, a controlled access road that parallels the Raritan River, both bypassing downtown New Brunswick to the north and headed towards US route 1 and the New Jersey Turnpike towards the south.

Our first road diet scenario included a center turning lane for the entire length of Livingston Avenue, from New Street to Nassau Street. The traffic lanes were reduced to one lane in each direction from two lanes in each direction in the base case. Bicycle lanes were also included, although we did not simulate bicycle traffic.

In our initial road diet simulations, the PM peak hour model resulted in significant congestion and spillback at the northern end of Livingston Avenue. This resulted in blocking side street turns into Livingston Avenue. We re-optimized the signal timing in an attempt to fix this problem. Unfortunately, these changes were insufficient to alleviate the spillback problem.

Given the problem with this simulation we tested what would happen by incrementally reducing the total traffic volume from 2% up to 10%, at intervals of 2%. The simulation performed adequately with the traffic volume reduced by 10% with the original signal timings. With modified signal timings (discussed previously) the simulation was adequate with an 8% reduction in traffic.

We feel that an 8-10% reduction in volume may be a realistic outcome when the road diet is implemented. First, if the road were to congest to the extent that our simulation suggested with a major spillback, then some drivers would opt to find different routes. In theory, the increase in congestion should lead to some suppression of demand. The opposite effect, induced demand, is a documented response to increased road capacity *(16)*. As we are reducing road capacity by up to 50% for the 1.5 mile stretch of Livingston Avenue, applying a lower bound lane-mile elasticity of 0.2 would result in a 20% reduction in vehicle-miles of travel along the road *(16)*. Thus, we feel an 8-10% reduction is at the low range of probable responses.

An alternative scenario was also tested that would not require any assumptions on reducing total traffic. Since most of the spillback problem is between New Street and Handy Street we tested alternative modifications to the road network between these streets.

One scenario involved not implementing the road diet between these two intersections. Thus, this part of Livingston Avenue would continue to be a four-lane road. This is not an optimal design from a walkability perspective as it is precisely this end of Livingston Avenue that is closest to downtown New Brunswick and has the most pedestrian traffic. This scenario worked well with the original signal timings, and if this scenario were not included as an option, then the analysis would not be able to provide any solution, due to the spillback between New Street and Handy Street.

Our other scenario to alleviate this problem was to keep two lanes for the southbound travel direction from New Street to Handy Street while the northbound flow would remain one lane. There were no spillback issues with the northbound flow, so this solution was aimed at allowing better flow for those vehicles turning into Livingston Avenue from New Street. This scenario worked well with the re-optimized signal timing.

Simulation Results

In total seven simulations were run. These included our base case AM and PM calibrations that provide a baseline for existing traffic conditions. Road diet scenarios included one AM scenario with the full road diet. For the PM road diet scenarios several simulations were run, given the spillback problems that occurred. PM road diet scenarios included 8% and 10% traffic reduction, the former with the re-optimized signal plan, one with no road diet from New St. to Handy St., and one with one northbound and two southbound lanes between New St. and Handy St. Each simulation was run for three hours of traffic, omitting the first and last five minutes of the simulation in calculating results. Details of each scenario are listed in Table 3.

Table 3. Scenarios Simulated with VISSIM

Scenario Number	Scenario	Scenario Description
1	Base case	AM
2		PM
3	Road Diet	AM
4		PM – 8% traffic reduction, re-optimized signal timings
5		PM – 10% traffic reduction, original signal timings
6		PM – 4 lanes maintained from New St. to Handy St.
7		PM – 2 southbound lanes maintained from New St. to Handy St., and 1 northbound lane

As VISSIM is a stochastic model, each simulation was run ten times and each measure of effectiveness was evaluated based on its mean and standard deviation. The standard deviation in all our simulations is small, thus random variation in results is not an issue. The vehicles in the simulations were calibrated to actual traffic count data but vary slightly due to stochasticity. For the AM peak the simulation count is generally slightly less than 14,000 vehicles and for the PM peak about 18,500 to 19,000 vehicles (except for those scenarios where the vehicles are intentionally reduced). These results are shown in Table 4.

We measured the total travel time per vehicle along the corridor, the delay time per vehicle, and the delay time per vehicle for each of the signalized intersections, allowing the Level of Service (LOS) to be evaluated. Results for total travel along the corridor and corresponding delay times per vehicle are shown in Table 4. These are evaluated relative to the AM and PM base case scenarios.

The base case scenarios (1 and 2) both have an average delay of slightly over 30 seconds. For our road diet simulations this increases to about 47 seconds for the AM period. Of the various PM road diet scenarios tested, the lowest delay occurs in scenario 6, when no road diet is implemented for the northern blocks of Livingston Avenue, avoiding the spillbacks in the simulation. If we assume a 10% reduction in traffic (scenario 5), the average delay is similar. When only two southbound lanes are maintained (scenario 7) the increase in delay is larger than implementing the entire road diet (with a reduction in traffic). The last column shows the increase in total delay relative to the base case (AM and PM respectively). Using the road diet results with the lowest level of delay for both AM and PM periods we have a total increase calculated for all vehicles of 61.89 and 56.15 hours of delay per workday, respectively, or 118.04 hours. This does not account for any alternative routes that the 10% reduction in PM traffic may have taken to avoid the more congested road.

An alternative measure is to examine the change in travel times for those vehicles traversing the length of Livingston Avenue. These would likely be vehicles making non-local trips and commute trips. Table 4 also displays the result for both northbound and

southbound average travel times and average delay as well as the increase in average delay time (relative to the base case AM and PM scenarios). VISSIM does not provide data on the number of vehicles traversing the length of Livingston Avenue, thus we cannot calculate a total aggregate delay.

Base case average travel times are about 300 seconds, for both the AM and PM peaks in both directions. The road diet increases these average travel times to no more than about 400 seconds, with most scenarios less than 400 seconds.

The final column summarizes the average increase in delay time for each scenario. This is the sum of the northbound and southbound increase in average delay. The road diet scenarios add about 120 seconds of additional delay; the lowest increase in average delay is when no road diet is implemented between Handy St. and New St. (scenario 6).

Delay at each signalized intersection is also analyzed. Results are shown in Table 5 for the five signalized intersections along Livingston Avenue that were simulated. Both average delay time for all vehicles entering each intersection as well as the Level of Service (LOS) are reported. For New Street and Nassau Street the LOS does not change for any of the scenarios, remaining at C for New Street and B for Nassau Street. The other three intersections are all at LOS B in the base case analysis; some deteriorate to LOS C, but this is still considered an adequate LOS. Those intersections that deteriorate from LOS B to LOS C show minor changes in total average delay.

383 **Table 4. Performance measures for simulated results.**

Scenario Number	Scenario	Average delay per vehicle (s)	Average speed (mph)	Average Number of vehicles	Total increase in delay (hrs)	Average travel time - New St. to Nassau (south-bound) (s)	Average travel time - Nassau St. to New St. (north-bound) (s)	Average delay time - New St. to Nassau (south-bound) (s)	Average delay time - Nassau St. to New St. (north-bound) (s)	Increase in average delay (south-bound) (s)	Increase in average delay (north-bound) (s)	Total increase in average delay, both directions (s)
1	Base case	31.10	15.35	13964	-	297.33	319.78	66.86	89.83	-	-	-
2		32.44	14.71	18963	-	316.98	304.56	85.21	74.48	-	-	-
3	Road Diet	47.03	13.32	13984	61.89	333.29	406.58	101.94	176.03	35.08	86.20	121.27
4		49.31	12.57	17798	83.36	385.64	368.59	153.75	138.72	68.53	64.24	132.77
5		44.00	13.11	17499	56.15	381.52	360.96	150.27	129.61	65.06	55.13	120.19
6		43.47	13.25	18975	58.14	375.45	348.08	143.41	119.30	58.20	44.82	103.02
7		52.66	12.30	18982	106.61	390.08	391.21	157.50	159.69	72.29	85.21	157.50

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387 **Table 5. Average delay and Level of Service (LOS) at each signalized intersection**

Scenario Number	Scenario	New Street		Suydam Street		Handy Street		Sanford Street		Nassau Street	
		Average Delay Time	LOS	Average Delay Time	LOS	Average Delay Time	LOS	Average Delay Time	LOS	Average Delay Time	LOS
1	Base case	22.32	C	17.81	B	16.60	B	16.22	B	15.77	B
2		23.11	C	19.59	B	17.95	B	17.61	B	16.23	B
3	Road Diet	21.84	C	18.68	B	19.58	B	18.15	B	16.41	B
4		26.11	C	25.57	C	25.14	C	21.64	C	17.85	B
5		22.08	C	23.54	C	19.22	B	18.08	B	16.63	B
6		23.15	C	19.76	B	18.31	B	21.02	C	17.28	B
7		25.27	C	23.58	C	26.39	C	22.49	C	18.78	B

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Benefit-Cost Analysis of Road Diet Implementation

Implementation of a road diet results in benefits to a community from the reduction of traffic crashes that would otherwise occur. The trade-off is that this also involves an increase in travel time for those using the road, as one objective of a road diet is to slow traffic down. The benefits and costs of implementation can be compared by conducting a benefit-cost analysis of the impacts of the road diet. This is based on analyzing the estimated dollar value of crash reduction and the dollar value of increases in travel time. The US Department of Transportation provides guidance on how to conduct these analyses *(17, 18)*.

To analyze the benefits of crash reduction, US DOT guidance provides estimates of the value of a statistical life. This is defined as "the additional cost that individuals would be willing to bear for improvements in safety…that, in the aggregate, reduce the expected number of fatalities by one." *(17)*. The value estimated for the year 2011 is $9.1 million with the recommendation that low and high values of $5.2 million to $12.9 million be evaluated. This value is indexed by 1.07% per year, under the assumption that increases in median real wages over time will result in higher valuations of statistical life. Therefore, for 2014 the value is $9,295,782 with the corresponding low and high values being $5,311,875 and $13,177,537, respectively.

While these values apply to fatal crashes, most crashes do not result in a fatality. Thus, guidance is also provided on crashes that result in a range of different levels of severity. These are valued as a fraction of the value of a statistical life as shown in Table 6.

Table 6. Relative Disutility Factors by Injury Severity Level (AIS)

AIS Level	Severity	Fraction of VSL
AIS 1	Minor	0.003
AIS 2	Moderate	0.047
AIS 3	Serious	0.105
AIS 4	Severe	0.266
AIS 5	Critical	0.593
AIS 6	Unsurvivable	1.000

Source: *(17)*

Note: AIS is Abbreviated Injury Scale

As previously mentioned, the road audit of Livingston Avenue reported 113 crashes over 3 years, so this is slightly less than 38 crashes per year, on average.[2] Some 17% involved pedestrians and 6% involved bicyclists, and 43% involved an injury, or 49 crashes with 54 injuries in total *(13)*. Assuming an estimated reduction in crashes of 19%, this would be 7.16 crashes per year, on average *(8)* and assuming an equivalent

[2] The road safety audit only measured crashes between Suydam and Nassau St., about a one-mile stretch of the full 1.5 mile road. Thus, this is a low estimate.

reduction in injuries, this would be 3.42 fewer injuries per year. Slightly more than half the crashes were property-damage only crashes; these have additional costs that are not considered in this analysis.

The road safety audit of Livingston Avenue does not provide full information on the severity of crashes. About 6-7% of all pedestrian casualties are fatal in the state of New Jersey, but we don't expect this high a fraction on roads in urban areas, so we assume 1% is not survivable. For vehicle only crashes we assume 0.01% are not survivable. Based on this information we assume the distribution of severity as displayed in Table 7.

Table 7. Assumptions on Severity of Crashes on Livingston Avenue

AIS Level	Severity	Distribution of crashes vehicle crashes	Distribution of non-motorized crashes
AIS 1	Minor	80.00%	20.00%
AIS 2	Moderate	10.00%	40.00%
AIS 3	Serious	6.99%	20.00%
AIS 4	Severe	2.00%	12.00%
AIS 5	Critical	1.00%	7.00%
AIS 6	Unsurvivable	0.01%	1.00%

The assumptions in Table 7 can be combined to develop a weighted value of statistical life based on this distribution of crashes and the split of vehicle versus non-motorized crashes on Livingston Ave. This is shown for low, mean, and high estimates of the value of a statistical life in Table 8 for annual crashes on Livingston Avenue.

Table 8. Cost of All Annual Crashes on Livingston Avenue Based on Statistical Value of Life and Weighted Severity Assumptions

AIS Level	Severity	Low valuation	Mean valuation	High valuation
AIS 1	Minor	$144,720	$253,259	$359,016
AIS 2	Moderate	$1,094,486	$1,915,351	$2,715,167
AIS 3	Serious	$1,324,522	$2,317,913	$3,285,833
AIS 4	Severe	$1,728,502	$3,024,879	$4,288,015
AIS 5	Critical	$2,199,585	$3,849,274	$5,456,663
AIS 6	Unsurvivable	$465,065	$813,864	$1,153,719
TOTAL		$6,956,880	$12,174,540	$17,258,413

Assuming the road diet results in a 19% reduction in crashes, and that the distribution of severity levels stay the same, the cost savings from the road diet in 2014 would be as shown in Table 9.

Table 9. Cost Savings based on Value of a Statistical Life and Severity Weighting Assumptions, for year 2014

AIS Level	Severity	Low valuation	Mean valuation	High valuation
AIS 1	Minor	$27,497	$48,119	$68,213
AIS 2	Moderate	$207,952	$363,917	$515,882
AIS 3	Serious	$251,659	$440,403	$624,308
AIS 4	Severe	$328,415	$574,727	$814,723
AIS 5	Critical	$417,921	$731,362	$1,036,766
AIS 6	Unsurvivable	$88,362	$154,634	$219,207
TOTAL		$1,321,807	$2,313,163	$3,279,099

The cost of the increase in travel time associated with the road diet can be estimated based on the value of travel time *(18)*. Guidance from the US DOT recommends that for personal travel this is 50% of the nationwide median household income, with plausible ranges varying from 35-60%. For business travel, the value of travel time is 100% of the nationwide median household income. Both are inflated by 1.6% per year, reflecting estimates of increases in the valuation of time. The nationwide median household income was $53,046 in 2012. New Jersey has a higher median household income of $71,637, while Middlesex County's median household income is even higher at $79,442. New Brunswick however has a median household income of only $40,280. This suggests a range of values to use for estimating travel time costs for this analysis; we analyze results assuming New Brunswick household income (low), Middlesex County household income (high), as well as US household income. Hourly value of time assumptions are shown in Table 10. These are applied for 260 work days per year based on US DOT guidance *(18)*.

Table 10. Value of travel time assumptions

	Value of time per hour	
	Personal travel (50%)	Business travel (100%)
New Brunswick	$9.68	$19.37
Nationwide	$12.75	$25.50
New Jersey	$17.22	$34.44
Middlesex County	$19.10	$38.19

Travel for business must also be taken into account. While our traffic counts could not discern all business travel, we did count heavy-goods vehicles and buses. These were 5% of the count during the PM peak and 3% during the AM peak.

We also assume that average occupancy of each vehicle is 1.2 people. We did not count occupancy rates, but this is a reasonable assumption as most vehicles are single-occupant.

Based on these assumptions, we can estimate how each road diet scenario will increase the cost of travel time in 2014, including both AM and PM peak periods when delay occurs. Results for each scenario are presented, summing both the AM and PM analysis of delay. These are shown in Table 11.

The construction costs of converting the road must also be taken into account. While we don't have any specific values, road diet conversions can be relatively cheap and mainly involve restriping of the road. Removal of existing stripes would also be necessary. Based on contractor estimates from New Jersey bid sheet data, we assume that the cost for both striping and restriping is about $2000 per mile. This would be done for a 1.5 mile length; four existing stripes would be removed while an additional eight new stripes would be painted. A bicycle lane would also be required for each side of the road; we assume the bicycle lanes cost as much as putting down eight stripes. This gives a cost estimate of $60,000.

Table 11. Estimated cost of delay for one year for different value of travel time assumptions (2012 valuations)

Scenario, combining AM and PM delay	Total cost of delay (New Brunswick household income)	Total cost of delay (US household income)	Total cost of delay (Middlesex County household income)
4	$396,001	$593,849	$883,474
5	$320,650	$481,987	$717,276
6	$326,161	$490,168	$729,431
7	$460,386	$689,431	$1,025,485

The total cost and benefits of the annual travel time costs and safety benefits are evaluated over a 20 year project lifetime. Construction costs occur in the first year and the stream of costs and benefits are discounted to the present. We assume a 4% discount rate. This provides a net present value for the project.

Results are presented for all combinations of estimates for each road diet scenario. In Table 12 we present the results using US DOT recommended valuations of travel time (based on median US household income), for low, middle, and high valuations of statistical lives saved. In Table 13 we include the highest value of time estimates, based on Middlesex County median incomes. All scenarios show a large positive net present value over 20 years.

Table 12. Net present value of road diet, assuming US median household income for estimates of travel time costs

Scenario, combining AM and PM delay	Low VSL	Middle VSL	High VSL
4	$9,789,504	$21,315,067	$38,946,998
5	$11,643,283	$23,168,846	$40,800,777
6	$11,507,707	$23,033,270	$40,665,201
7	$8,205,515	$19,731,077	$37,363,009

VSL = valuation of statistical life

Table 13. Net present value of road diet, assuming Middlesex County median household income for estimates of travel time costs

Scenario, combining AM and PM delay	Low VSL	Middle VSL	High VSL
4	$4,989,838	$16,515,401	$34,147,332
5	$7,744,071	$19,269,634	$36,901,565
6	$7,542,641	$19,068,204	$36,700,135
7	$2,636,441	$14,162,004	$31,793,935

VSL = valuation of statistical life

These results assume a 19% reduction in crashes and that the cost of restriping is $60,000. Both these assumptions could be off. To evaluate this, the break-even crash reduction needed to have a benefit is calculated by varying these assumptions for the scenario with the highest travel time cost and the lowest VSL. Assuming a $60,000 construction cost, a crash reduction of only 16.46% is needed to break even. If the cost were $6,000,000, then the crash reduction needed would be 22.19%. Both of these are within the margin of error one would expect and given that this is the most conservative scenario, it is clear that overall there would be net benefits from a road diet conversion.

Our analysis did not account for growth in traffic over time. While there is evidence of a saturation in growth of travel (otherwise known as “peak car”)*(19)*, we might still expect some growth in traffic associated with further development in New Brunswick. While we did not run a simulation model with additional traffic, we adjusted the travel cost for each scenario to assume a 3% annual growth in traffic over 20 years. This is probably unrealistic, but the bottom line is that it results in only two negative net present value over a 20 year lifetime (scenarios 4 and 7 with a low valuation of statistical life). Thus, the results are very robust with respect to growth in traffic.

Many other factors not accounted for in this analysis may affect both the benefits and costs of the road diet conversion. On the benefits side, we have not accounted for the benefits that pedestrians receive from less time crossing Livingston Avenue and how

their travel time may be reduced. We have also not accounted for the benefits that bicyclists receive, such as health benefits, or the savings associated with using a lower cost mode of travel. Reducing property damage only crashes also is a benefit, and this has not been included in the valuations. On the cost side, we have not accounted for the costs associated with diverting some traffic or suppressing demand, as well as how travel time and crashes may change on parallel routes. Given the large magnitude of the benefits, we would not expect these to change the finding that the road diet provides a positive net present value.

Conclusions

Our results have shown that implementation of a road diet, consistent with a complete streets policy along Livingston Avenue will result in some extra delay to traffic both along and within the corridor. However, the costs of the delay to traffic are less than the large benefits associated with the reduction in traffic crashes, based on a cost/benefit analysis. Furthermore, the implementation of a road diet with modifications to the signal timing to improve traffic flow will result in no or little change in the Level of Service (LOS) along Livingston Avenue. Where the LOS is degraded, the new LOS is still within acceptable service levels. Additionally, as a large majority of vehicles on the roadway have been identified as traveling in excess of the speed limit, the minor increases in travel time on the road should result in lower overall speeds. Lower vehicle speeds correlate with reduced traffic crashes. Research suggests that road diets may decrease crashes by about 19% on urban arterials such as Livingston Avenue.

The AM peak period is not affected as much as the PM peak period. Various adjustments to signal timings and reducing the flow of traffic provide some mitigation to the increase in delay; additional exploration of other mitigation options might be worth exploring, however one of the objectives of a road diet is to reduce speed, thus one would expect to see delay times increase.

The use of micro-simulation software is one approach to assessing changes in road configurations. This analysis is limited by any inherent assumptions embedded within the model, although our analysis was robust to multiple simulations for each scenario. The standard deviations in travel time and delay were minor for each scenario. Probably the main limitation is how travelers react to a new configuration. Some may divert to alternative routes, some may opt to bicycle along the corridor if it is safer; while we estimated results with up to a 10% reduction in traffic during the PM period, shifts in traffic behavior may be greater.

The decision to move forward with a road diet plan for Livingston Avenue depends on a balancing of the costs and benefits by the City of New Brunswick and Middlesex County. Our benefit/cost analysis balances the costs of travel time delay with the benefit of reducing crashes, and shows overwhelmingly positive benefits outweighing the travel time costs associated with the road diet conversion. The net present value over 20 years is estimated to range from $2.6 million to over $37 million for the road diet conversion. This assumes a 19% crash reduction. Robustness checks that vary the

crash reduction rate and the construction costs also result in benefits for almost every scenario analyzed.

Epilogue

This report was completed in February 2014. In March 2014, the City of New Brunswick announced that it intended to make changes to Livingston Avenue to improve safety for pedestrians and bicyclists.

New Brunswick Mayor James Cahill stated that "Initiatives such as a road diet for Livingston Avenue are part of the City's effort to make New Brunswick as 'walkable' and healthy a city as possible." *(20)* In May 2014, three children were injured while crossing Livingston Avenue as they were walking home from school.*(21)* One of the children sustained major injuries, while the other two had more minor injuries. In response, there was widespread demand in the community that something be done about Livingston Avenue.*(22)*

Within days of the protests, the City worked with Middlesex County to have two sections of the street restriped.*(23)* This can be seen in Figure 5. As of September 2015, no additional restriping has been done, however, the city has developed alternative designs to complete the work. Anecdotally, there does not seem to be any disruption to traffic on the road from the two sections that have been changed.

From a policy perspective, one of the interesting conclusions is the reaction of the public. The protests demanded that the something be done about unsafe traffic on Livingston Avenue. At the early phases of this project, the City appeared concerned about the political consequences of implementing a road diet. Yet the protests suggested the public was very much in favor of changes. Public officials should be less timid in their approach to implementing positive changes that improve safety and walkability, even at the expense of potential delays to traffic.



Figure 5. Restriping of Livingston Avenue in May 2014

Acknowledgements

Funding for this project was received by Rutgers University as a Community-University Research Partnership Grant for New Brunswick. These are intended to recognize Rutgers University as a strong partner serving the City of New Brunswick. We also thank Glenn Patterson of the City of New Brunswick for comments on an earlier draft and James Van Schoick, formerly of the Voorhees Transportation Center who coordinated student researchers to conduct traffic counts; we also thank all the students who worked on this project.

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Article information:

To cite this document: Tom Brijs, Ali Pirdavani, "Urban and Suburban Arterials" *In* Safe Mobility: Challenges, Methodology and Solutions. Published online: 09 Apr 2018; 85-106.
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CHAPTER 5

URBAN AND SUBURBAN ARTERIALS

Tom Brijs and Ali Pirdavani

ABSTRACT

Purpose – *Urban and suburban arterials carry a large share of urban traffic and contend with a relatively large proportion of transport network crashes. Road crashes and their consequent societal costs diminish the sustainability of transportation systems, highlighting the need to identify road safety problems and their corresponding solutions. This chapter briefly outlines problems and solutions associated with crash risk on urban and suburban arterials. In addition, this chapter studies and discusses several safety countermeasures – ranging from local treatments to integral frameworks – and their effectiveness on improving traffic safety of urban and suburban arterials.*

Approach – *Crash occurrence on urban and suburban arterials is affected by numerous contributing factors. This chapter pays attention primarily to the effects of traffic characteristics and road design features. In this regard, several pertinent variables which have been extensively examined in the literature are reviewed and their contributions to the safety of urban and suburban arterials are discussed.*

Findings – *A review of the literature identifies a number of variables as influential factors of crashes on urban and suburban arterials. Although*

Safe Mobility: Challenges, Methodology and Solutions
Transport and Sustainability, Volume 11, 85–106
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ISSN: 2044-9941/doi:10.1108/S2044-994120180000011005

the associations of some variables (e.g., traffic volume) are consistent with expectations, others (e.g., lane width and speed) show mixed and sometimes counterintuitive results. These findings signify that additional research is needed to reveal the correct functional form and magnitude of these relationships.

Practical implications – *The results show that while the general direction and magnitude of effects of some engineering and management-related treatments are known, additional research is needed to consolidate the impact and effectiveness of integrated approaches.*

Keywords: Crash contributing factor; explanatory/predictive variables; safety countermeasures; sustainable safety; urban and suburban arterials

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INTRODUCTION

This chapter is the first of five chapters focusing on influences of the transport network on crash risk. While this chapter focuses on urban and suburban arterials, it complements the current knowledge regarding the crash risks related to the operation of controlled access facilities (Chapter 6), rural and urban intersections (Chapter 7), roundabouts (Chapter 8) and real-time traffic operations and safety (Chapter 9).

Urban and suburban arterials provide for the majority of urban traffic and experience a relatively large proportion of crashes, including severe crashes. Safety-related concerns on urban and suburban arterials are quite complicated due to the diverse mix of road users and large variety of design and operational features of these facilities, including traffic control devices, access controls and roadway design elements. Hence, it is essential to review the characteristics of these facilities to appropriately address their traffic safety-related challenges.

Urban and suburban arterial roads are major roads that carry large amounts of traffic within, between or through major activity centres. These roads are generally high-capacity and high-speed roads, and mainly serve long-distance traffic ('Federal Highway Administration Planning Glossary' (U.S. Department of Transport, 2008)). According to the concept of functional classification (The Federal Highway Administration (FHWA), 2013), arterial roads tend to be relatively limited access roads with a high degree of throughput. However, slightly different definitions of urban arterials are seen across countries. The FHWA (2008) defines urban arterials as

'Major streets or highways, many of multi-lane or freeway design, serving high-volume traffic corridor movements that connect major generators of travel'. The European Union has its own definition of urban arterials: urban arterials are roads that serve medium- to long-distance movements and may cross through urban areas to provide suburban movements (Saurabh, 2013). According to the system of roads classification in the United Kingdom (UK), urban arterials are major roads intended to 'provide large-scale transport links within or between areas or to feed traffic between A roads and smaller roads on the network' ('Guidance on Road Classification and the Primary Route Network' (GOV.UK, 2012)). As seen from these definitions, common characteristics and similar functionality exist. Considering these definitions, urban and suburban arterials generally (FHWA, 2013):

- Carry high traffic volumes of moderate- to long-distance trips.
- Provide continuity of rural arterials' traffic flow from and towards urban areas.
- Serve large portions of urban traffic on a relatively small share of total urban road network length.

Urban and suburban arterials are often categorised into 'minor' and 'major or principal' arterials. Although the general definition and functionality of these arterials are comparable, among transportation agencies their specifications and designs can vary. For instance, speed limits may vary between 40 kph and 90 kph (30 mph and 60 mph) or geometric properties and traffic volume orders can be significantly diverse depending on the surrounding development. Urban and suburban arterials are diverse and difficult facilities to manage, not only by transportation engineers and designers, but also by road users. Unlike other types of facilities (e.g., motorways) where distinct measures and unique design features adequately convey their functionality to road users, urban and suburban arterials may give rise to misperceptions for road users. For example, imagine driving on a continuous stretch of arterial road that crosses a suburban area and goes through an urban neighbourhood. The speed limit changes from 70 kph to 50 kph; however, other road features remain unchanged, leading to inappropriate driving behaviour and potentially leading to crashes as a result of inappropriate speed adaptation. The abovementioned example illustrates one dimension of the complexity, with facilities having different designs and operational features classified as urban and suburban arterials and, naturally, as a result the traffic safety challenges, solutions and analysis techniques appropriate for these facilities will also be complex.

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Moreover, urban and suburban arterial facilities comprise two major components: road segments and intersections. These components may be different from site to site based on neighbouring land uses, degree of access, traffic control features and geometric design. Arterial road segments can be configured as two-lane or multi-lane, divided or undivided, with frequent or limited access points, with or without parking sidewalks, crosswalks, bike lanes, etc. Intersections can be signalised and stop-controlled with a range of attributes, including number of intersection legs, existence of left- and/or right-turn lanes, presence of pedestrian facilities, etc. These differences imply that the constituent components of urban and suburban arterials are intrinsically disparate – confronting road users with a reliably unpredictable set of design and operational features. Accordingly, the management of traffic safety of these facilities is a challenging and complex task.

Crashes on road segments and intersections are inherently different. On road segments the majority of crashes are 'rear-end' collisions, followed by a significantly lower share of 'sideswipe same direction' collisions, while at intersections 'rear-end' and 'angle' collisions are the predominant collision types (American Association of State Highway and Transportation Officials (AASHTO, 2010)). In addition, the severity distributions of crashes are different for road segments and intersections.

As highlighted by the previous discussion, due to their diversity and complexity, urban and suburban arterial road segments and intersections should be studied, analysed and modelled separately. Moreover, crash severity should also be considered when analysing traffic crashes on urban and suburban arterials. Societal impacts and associated costs of injury crashes are known to be much greater than the costs of property-damage-only crashes and, therefore, reducing these serious crashes leads to a more sustainable transport system.

The remainder of this chapter is organised as follows. First, the most frequently employed variables relevant to the safety performance of urban and suburban arterials are summarised. Next, different methodological approaches for evaluating the traffic safety of these facilities are discussed, followed by a summary of potential solutions to alleviate road safety concerns on urban and suburban arterials. Lastly, conclusions wrap up this chapter.

MEASURING CRASH RISK ON URBAN AND SUBURBAN ARTERIALS

Traffic unsafety can be measured using various measures, such as crash frequency, crash rate or surrogate safety measures (Gettman & Head, 2003). Crash frequency and rate can further be categorised based on crash type (e.g., multiple-vehicle crashes, bicycle and pedestrian crashes, etc.) and crash severity

(e.g., injury crashes, fatal crashes, total crashes, etc.). Since crashes with higher injury severity and crashes involving vulnerable road users often cause relatively greater social costs, alleviating them will have a greater impact on the sustainability of transportation systems. Hence, it is of great importance to account for different severity levels as well as crash types when evaluating traffic safety performance of urban and suburban arterials. Results of traffic safety analyses of any kind will be undermined if merely the total number of crashes is taken into account, without acknowledging crash severity and involvement of vulnerable road users.

FACTORS KNOWN TO INFLUENCE CRASH RISK ON URBAN AND SUBURBAN ARTERIALS

Road crashes on urban and suburban arterials are influenced by many contributing factors. These factors are generally associated with traffic and road characteristics, driver behaviour and vehicle characteristics. The remainder of this section focuses on the traffic and road characteristics (i.e., geometric design and physical features) of urban and suburban arterials.

The most frequently examined explanatory variables to either explain or predict traffic safety performance of urban and suburban arterials, broken down by road segments and intersections, is provided below (a full list of all potential variables can be found in the final report of the NCHRP Project (Harwood et al., 2007):

- Road segments:
  - traffic volume per day (veh/day) or traffic volume in peak period (veh/h);
  - posted or observed speeds;
  - lane width;
  - access density (number and type of driveways/km);
  - intersection density (intersections/km);
  - number of lanes;
  - horizontal and vertical alignment;
  - median (number and type of openings);
  - shoulder width and type;
  - lighting.
- Intersections:
  - traffic volume per day (veh/day) or traffic volume in peak period (veh/h) by intersection approach;
  - posted or observed speeds on approach;
  - sight distance;

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— type of traffic control;
— signal phasing;
— presence and number of left- and right-turn lanes;
— intersection approach angles;
— number of intersection legs;
— lane widths on approaches;
— number of lanes on approaches;
— lighting.

The most important variables, as reflected in the literature, are briefly reviewed next. The challenges regarding their application in road safety management of urban and suburban arterials are then identified.

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Traffic Volume

Traffic volume at a site is one of the most important predictors of traffic safety (Saha, Alluri, & Gan, 2015), as it is the only variable that captures the potential exposure of motorists to risk. It is measured in a variety of ways, such as average annual daily traffic, average daily traffic (ADT), hourly traffic volume and vehicle kilometres travelled – all with slightly different interpretations. The inclusion of an exposure variable is essential in conducting a safety performance evaluation, because the potential for single and multiple vehicle crashes are related – in different ways – to the opportunities for collision as captured by exposure. As one might imagine, the relationship between crashes and exposure is quite complex; for example, single vehicle crashes may decrease with increasing volumes, whereas multiple vehicle crashes may increase, such that traffic volumes are often an approximation of a more complex underlying relationship. While it is often difficult to obtain an exposure measure for the entire year, a daily or hourly measure can serve as a reliable replacement (e.g., ADT; Harwood et al., 2007). The primary difference in traffic volume on road segments and intersections is that traffic flow is sufficient to capture exposure on road segments, whereas entering volumes and conflicting traffic volumes at intersections complicate the exposure–crash relationship. It may also be advantageous for each road user group (i.e., vehicles, pedestrians and cyclists) and each vehicle class (e.g., heavy vehicles, passenger cars and motorcyclists) to have their own exposure metrics; however, while desirable, often exposure metrics for these sub-populations are not available. See Chapters 10 and 11 for detailed discussions related to crash risk estimation for pedestrians and cyclists, respectively.

In general, research has shown that increasing traffic volume is associated with increasing crash frequency on both road segments and intersections (C. Wang, Quddus, & Ison, 2013). Traffic volume is also associated with severe crashes (Ma, Yan, Abdel-Aty, Huang, & Wang, 2010; Nevarez, Abdel-Aty, Wang, & Santos, 2009; Pande & Abdel-Aty, 2009). It is often the most influential predictive variable in safety performance evaluations of urban and suburban arterials (Abdel-Aty, Devarasetty, & Pande, 2009; Berhanu, 2004; Chen & Persaud, 2014; Das & Abdel-Aty, 2011; Dixit, Pande, Abdel-Aty, Das, & Radwan, 2011; Ma et al., 2010; P. Y. Park & Abdel-Aty, 2011; J. Park, Abdel-Aty, Lee, & Lee, 2015; Saha et al., 2015; Sultana, Qin, Chitturi, & Noyce, 2014). While exposure is undoubtedly a critical factor in crash explanation and prediction, exploring alternative functional forms of this complex relationship, along with the inclusion of sub-population exposure metrics, is likely to remain the focus of future research.

Access and Intersection Density

Access features, such as driveways, median openings and median treatments, have substantial impacts on the safety performance of urban and suburban arterials (Harwood et al., 2007). The existence of driveways and median openings increases the number of potential conflict points along the arterials and raises the crash occurrence risk. Specifically, the number, type, location and spacing of driveways and median openings have been shown to have significant associations with traffic safety on urban and suburban arterials. Recurring access points to and from arterials, frequent traffic signals and arterials without medians have been found to be positively associated with crash occurrence and severity (Sultana et al., 2014). In a study conducted by Eisele and Frawley (2005), it was concluded that access point density is positively associated with crashes. C. Lee, Xu, and Nguyen (2012) studied midblock crashes on urban arterials and found a positive relation between crashes and the presence of an access point. Similar associations were found by other researchers indicating that access density has a positive relation with crash frequency and severity of crashes on urban and suburban arterials (Avelar, Dixon, Brown, Mecham, & van Schalkwyk, 2013; X. Wang, Song, Yu, & Schultz, 2014). In addition to access density, signal spacing impacts safety on urban and suburban arterials. Signal spacing includes both signal density and uniformity of signal placement. Similar to signal density, studies have revealed that crash frequency is positively associated with intersection density (El-Basyouny & Sayed, 2009; Mauga & Kaseko, 2010).

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To summarise, there is a positive association between access control, signal placement and density, and intersection density and traffic safety on urban and suburban arterials in line with expectations, as access points and intersections give rise to increased potential vehicle conflicts. Often, careful decision-making regarding access control features (e.g., median width and type, signing and striping and signage) is a trade-off between ease and convenience of mobility and crash risk.

Speed

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Vehicle speed is a traffic-related variable that has been shown to affect traffic safety through influences on crash frequency and severity. Vehicle speed is often measured imprecisely and most commonly through posted speed limits and less commonly through observed speeds (i.e., radar or loop detectors). Several studies have found empirical evidence for an association between speed and crashes on urban and suburban arterials (Abdel-Aty et al., 2009; Das & Abdel-Aty, 2011; Dixit et al., 2011; Ma et al., 2010; Mauga & Kaseko, 2010; X. Wang & Chen, 2012). Other less commonly examined measures of speed include speed variance and roadway design speed.

The existence of a causal relationship between speed and safety has been studied for many years. Accumulation of evidence suggests that the crash risk increases when driving fast due to reduced control of the vehicle, greater reaction time demands and greater distances travelled per unit time when travelling at higher speeds (Li, El-Basyouny, & Kim, 2015). Higher speeds are directly associated with more severe crashes, consistent with Newton's laws of motion, where kinetic energy increases in proportion to the square of velocity, leading to more forceful impacts and subsequently higher injury-severity levels (Tay & Rifaat, 2007; Yasmin, Eluru, Bhat, & Tay, 2014). The results of several studies have shown that both road segments and intersections on urban arterial roads with higher speed limits experience more severe crashes compared with arterials with lower speed limits (Das & Abdel-Aty, 2011; Dixit et al., 2011).

The association between speed and crash frequency is, however, complex. Although a positive relation between speed and crash frequency has been observed, several studies have obtained opposite results, with crash frequency inversely associated with average speed or posted speed limit. A study undertaken by Mauga and Kaseko (2010) showed that posted speed limit was negatively associated with all crash types at all severity levels. Similar results have been obtained by other researchers (Abdel-Aty et al., 2009; Das & Abdel-Aty,

2011; De Pauw, Daniels, Thierie, & Brijs, 2014c; X. Wang & Chen, 2012). A critical determining factor is the way in which speed is measured; that is, average speed, speed variance or posted speed limit. Hence, it is possible that lower average speeds are associated with larger speed variances. Moreover, larger speed variances have been found to be more problematic than average speed (Brijs, Wets, Krimpenfort, & Offermans, 2006; Quddus, 2013). As a result of this complex relationship between safety and speed, statistical associations may change from positive to negative, and vice versa, depending on the way in which speed data are collected. From a statistical modelling point of view, these potentially counterintuitive relationships are attributable to omitted-variable bias, multicollinearity among explanatory variables and inappropriate or mis-specified model functional forms (Lord & Mannering, 2010). Considering these relationships, driving at higher speeds is presumably more risky due to the greater distance travelled for a fixed reaction time and due to the resulting higher crash impact speeds. It is possible that some drivers are more cautious when driving faster due to increased perception of risk. Finally, facilities with higher speed limits may be equipped with higher quality safety features that aim to reduce both the risk and severity of crashes.

Taking prior research into account, speed has been found to have mixed impacts on the traffic safety of urban and suburban arterials. Additional research is needed to determine the precise nature of association between speed and crash frequency on urban and suburban arterials, and which speed measurements best capture crash risk. In this respect, researchers are advised to pursue two research directions: (1) make a clear distinction between crash severity and crash frequency when analysing crashes and (2) examine and explore different speed measures (i.e., average speed, speed limit, speed variance and potentially other speed measures) to the extent possible so as to reveal all possible associations between crash and speed variables. The former is important in the sense that mitigating crashes with higher injury severities contributes substantially more to the sustainability of transport systems in comparison to property-damage-only crashes. The latter will play a key role in gaining an improved understanding of the causal relationship and reveal the nature of association between crashes and speed, perhaps as a function of other factors.

Lane Width

Lane width is one of the most frequently employed variables to explain and predict the safety performance of urban and suburban arterials. The effect this variable has on crash occurrence has revealed inconsistent results. Although wider lanes

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may provide more space between adjacent travel lanes, and therefore increase the buffer area for lateral drift between adjacent vehicles, they also increase crossing distances for pedestrians (see Chapter 10) and impose potential threats on these particular road users (Potts, Harwood, & Richard, 2007). This is particularly relevant in urban and suburban contexts where pedestrian activity is significant and safe pedestrian movements are needed. Moreover, wider lanes may encourage drivers to travel faster and feel relatively more safe, which could possibly increase crash risk and severity (Hauer, Council, & Mohammedshah, 2004). While some researchers have shown statistically insignificant relationships (J. Park et al., 2015; Strathman, Dueker, Zhang, & Williams, 2003; Yanmaz-Tuzel & Ozbay, 2010) between lane width and crash occurrence, others have concluded that increasing lane widths is expected to decrease crash rates on undivided urban arterials (Hadi, Aruldhas, Chow, & Wattleworth, 1995), or that wider lanes are associated with higher crash frequencies (Hauer et al., 2004). A recent study by Potts et al. (2007) revealed that there was no statistically significant association between lane width and safety conditions of both road segments and approaches towards intersections of urban and suburban arterials. They suggest that there is no evidence of reduced traffic safety as a result of narrowed lanes, with the extra width available to support turning lanes, bicycle lanes or pedestrian sidewalks, or to facilitate median treatments.

METHODOLOGICAL APPROACHES USED TO EVALUATE ROAD SAFETY ON URBAN AND SUBURBAN ARTERIALS

Several crash estimation methodologies are applicable for evaluating the traffic safety performance of urban and suburban arterials. These methods include statistically analysing existing (historical) crash data, road safety audits (site visits and assessments by road safety engineering teams) and evaluating surrogate safety measures (AASHTO, 2010). Often the choice of approach will be suited to motivation, resources and time constraints.

Statistical analysis is the most commonly employed approach for crash estimation. For several years researchers have been establishing and advancing statistical techniques to analyse crashes. Statistical models have been developed to characterise the association between crash occurrence and explanatory/predictive variables. Like for any other road network facility, statistical models for urban and suburban arterials have been evolving from simple methods (Hadi et al., 1995; Hauer et al., 2004; Ma et al., 2010; Retting, Weinstein, Williams, & Preusser, 2001; Sawalha & Sayed,

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2001; Strathman et al., 2003; Tay & Rifaat, 2007) to more sophisticated techniques (Das & Abdel-Aty, 2011; P. Y. Park & Abdel-Aty, 2011; Yasmin et al., 2014). There are numerous chapters in this book devoted to addressing the challenges of analysing crash data. Chapter 12 in this book details the estimation of models based on cross-sectional crash data, whereas Chapter 13 examines the use of time-series crash data, Chapter 14 explores the challenges of analysing crash data when samples are small or there are a large number of zeroes and Chapter 15 looks at crash severity modelling. Chapter 16 explores the challenges with detecting crash hot-spots and Chapter 17 the use of crash surrogate safety measures. Several applications of surrogate safety measures have been conducted to assess the traffic safety performance of urban and suburban arterials (Abdel-Aty et al., 2009; Dixit et al., 2011; Eisele & Frawley, 2005; J. Lee, Park, Malakorn, & So, 2013; Pirdavani, Brijs, Bellemans, & Wets, 2010; Polders et al., 2015; Stevanovic, Stevanovic, & Kergaye, 2013; Tao, Foomani, & Alecsandru, 2015; Wen & Luo, 2011).

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STRATEGIES FOR IMPROVING ROAD SAFETY ON URBAN AND SUBURBAN ARTERIALS

One of the most significant social costs of transportation is crash occurrence. Therefore, reducing the risk of road crashes will contribute to the sustainability of transportation networks. To this end, a variety of traffic safety strategies can be implemented to improve the traffic safety of road networks. These strategies can be divided into two major categories or groupings: engineering and behavioural change strategies (VTPI, 2012). Engineering strategies involve investing in safer vehicles and roads, while behavioural strategies involve programs, policies and investments focused on improving human interaction with the vehicle (e.g., fatigued driving, impaired driving, licensing and education, speed enforcement, etc.). Behaviour- and engineering-related strategies are often interrelated, as certain measures may influence road users' behaviour through physical changes applied to the roads (i.e., self-enforcing). As an example, in the case of traffic calming, driver behaviours change after a speed hump physically restricts their speeds.

Expected crash frequencies and severities can be reduced by implementing appropriate treatments, which are interchangeably and often referred to as safety countermeasures, interventions or actions. These potential actions include geometric design elements of roads, traffic control systems and devices, as well as operational aspects of road networks (AASHTO, 2010). The *Highway Safety Manual* (AASHTO, 2010) includes an extensive review

of safety countermeasures and reports their expected traffic safety effects based on current available evidence. Their safety effects are referred to as crash modification factors and are estimates of the reduction (or increase) in crashes expected as a result of implementing specific countermeasures. Most of these countermeasures are engineering related and involve enhancements to physical attributes of the roads or roadside environments. The magnitude of effects of countermeasures is determined by road type and function, in addition to the surrounding land-use environment. The following section elaborates on the potential safety benefits of several significant, design-related actions appropriate for urban and suburban arterials.

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Access Management

Access management describes a set of actions that influence or limit access to roadways and includes features such as median openings, driveway policies and intersection spacing and design. While access management aims to appropriately balance or trade off mobility and accessibility, it can also be applied to improve the safety performance of roadways. Access management is achieved through feature design, such as signal spacing, driveway density, median opening density and median treatments, including raised medians and two-way, left-turn lanes. Several research teams have evaluated the impact of access management features on traffic safety of urban and suburban arterials. The installation of median barriers, providing a raised median and extending the width of existing median openings, has been shown to significantly reduce crash risk and severity (Eisele & Frawley, 2005; C. Lee et al., 2012; Ma et al., 2010; Mauga & Kaseko, 2010; Schultz, Allen, & Boschert, 2010; Schultz, Braley, & Boschert, 2009; Yanmaz-Tuzel & Ozbay, 2010). Moreover, reducing the frequency of driveways, median openings and intersection densities can significantly reduce crash frequencies and injury severities on urban and suburban arterials (Avelar et al., 2013; Sultana et al., 2014; X. Wang et al., 2014; Williams, Stover, Dixon, & Demosthenes, 2014). This finding implies that restricting the number of intersections, driveways and median openings on urban and suburban arterials serve as effective countermeasures for addressing safety issues on these facilities. A practical consideration is that 'accident migration' can arise from access restriction. For example, vehicles that otherwise would turn across an access-restricted median might instead utilise a turning lane at the nearest downstream intersection to make a 'U-turn', and possibly increase potential conflicts at that intersection. These and similar cases where conflict points are moved to other network locations should

be considered where access is concerned. Ideally, potential conflicts through access control will be 'migrated' to points with greater control of vehicle movements, lower vehicle speeds and improved sight distances for drivers.

Traffic Calming Strategies

Traffic calming concerns a variety of design features and strategies that are chiefly envisioned to reduce traffic speed on road networks. Among others, speed reduction programs, together with some physical interventions such as road diet and installation of speed humps, are effective strategies to improve the traffic safety level of urban and suburban arterials. A recent study conducted by Li et al. (2015) showed that implementing automated mobile speed enforcement on urban arterial roads can reduce severe crashes up to 20%. It was also confirmed by De Pauw, Daniels, Brijs, Hermans and Wets (2014a) that installing speed and red light cameras at intersections decreases severe crashes by 14%, whereas fixed speed cameras on road segments decrease severe injury crashes by 29% (De Pauw, Daniels, Brijs, Hermans, & Wets, 2014b). Other measures and techniques, such as transversal rumble strips (Ariën et al., 2014), repetition of speed signs (Jongen, Brijs, Mollu, Brijs, & Wets, 2011), additional road marking (Daniels, Vanrie, Dreesen, & Brijs, 2010) or speed enforcement by means of mobile radar with advance warning signs (Wilmots, Hermans, Brijs, & Wets, 2013), are proven to reduce speed that can translate to higher safety. Speed reduction programs in general and speed enforcement in particular are predominantly effective in reducing fatal and severe crashes (Elvik, 2005; Soole, Watson, & Fleiter, 2013). The reason lies in the fact that travelling at high speed is associated with possible collisions with greater impact (discussed above in the speed section).

'Road diet' refers to another traffic calming strategy that is mainly adopted on high-volume arterials (Rosales & Brinckerhoff, 2006). A road diet is actually the conversion of a four-lane arterial into a three-lane arterial: two through-lanes and a centre left-turn lane. In return, the extra width can be dedicated to bicycle lanes or pedestrian sidewalks. In a study undertaken by Stout, Pawlovich, Souleyrette, and Carriquiry (2006), the crash frequency per mile and number of injury crashes reduced by 25% and 34%, respectively, after implementing road diet settings. Harkey et al. (2008) found that road diets are expected to reduce crashes at all severity levels by almost 30% on urban and suburban arterials. Speed humps are most frequently installed on urban or suburban arterials with lower speed regimes and are particularly effective in improving traffic safety near school arterials (AASHTO, 2010).

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Treatments for Pedestrians and Cyclists

This section addresses specific treatments for vulnerable road users – pedestrians and cyclists – in relation to urban and suburban arterials, and complements more in-depth discussions provided in this book about crash risks for pedestrians (Chapter 10) and cyclists (Chapter 11).

Road crashes involving vulnerable road users are usually injury crashes at different severity levels. Hence, it is of great importance to pay specific attention to these types of crashes in order to enhance a sustainable transportation system. Several safety countermeasures proven to improve traffic safety of pedestrians and cyclists on urban and suburban arterials are outlined below:

- *Providing a sidewalk or a wide shoulder* seems to reduce 'walking-along-roadway' pedestrian crashes (McMahon et al., 2002). It is also shown that benefits will be substantially greater for residential zones with higher pedestrian exposure levels.
- *Installation of raised pedestrian crosswalks* is also found to be beneficial in reducing frequency of particularly injury crashes. This is mainly due to the fact that these facilities reduce driving speed (Elvik, Høye, Vaa, & Sørensen, 2009).
- *Providing a raised median and refuge island* is known to have safety benefits for pedestrians crossing at both intersections and midblock cross points on urban and suburban arterials (AASHTO, 2010). It should be noted that although some advantages are obtained for pedestrians these installations might result in vehicle–island crashes, which didn't occur before the installation of these new settings.
- *Widening medians* to the extent possible may also reduce pedestrian crashes, mostly in areas with higher pedestrian exposure. This is because pedestrians will have more space to safely stand between two opposite directions (AASHTO, 2010).
- *Providing dedicated bicycle lanes* is widely proven to reduce bicycle–vehicle crashes on urban arterials (AASHTO, 2010). Dedicated bicycle lanes should be visually distinguishable by means of sufficient pavement markings or different pavement colour to maximise effectiveness.
- *Providing separate bicycle facilities* is a desirable alternative, mainly on principal arterials where vehicle exposure and operational speeds are high. As proposed by a Dutch guideline, cycling facilities should be physically separated from motorised traffic movements where the speed limit is equal and higher than 50 kph (Dijkstra, Eenink, & Wegman, 2007). These facilities practically eliminate any possible interaction between cyclists and vehicles

alongside the roads and are, therefore, favourable for roadways with higher traffic exposures (e.g., principal/major urban arterials). Having said that, designers should be cautious about the potential conflict zones between cyclists and other road users, specifically at intersections or crossovers.

Other Measures

In addition to the abovementioned treatments, there are other measures that can improve the traffic safety level of urban and suburban arterials. There exist two major types of parking facilities: off-street parking in parking lots and on-street parking. Reviewing the literature shows that prohibiting on-street parking can reduce injury crashes up to 20% (Elvik et al., 2009). Appropriate lighting of roadways, sidewalks and cycle paths is also known to noticeably reduce fatal and injury night-time crashes. As indicated by the *Handbook of road safety measures* (Elvik et al., 2009), at night fatal pedestrian crashes appear to reduce by almost 80% in urban areas, while all fatal crashes are expected to reduce by nearly 40%. Another effective countermeasure to improve traffic safety on urban and suburban arterials is prohibiting certain movements when they are found to be dangerous. Prohibiting left-turn and/or U-turn movements seem to reduce left-turn, U-turn and intersection crashes by up to 70% (AASHTO, 2010). However, it should be noted that crash migration is a potential downside that needs to be accounted for when considering prohibiting certain movements at certain locations. In addition to these measures, there appear to be other interventions, such as streetscape designs (Harvey & Aultman-Hall, 2015), signal coordination (Stevanovic et al., 2013) and unconventional designs (e.g., superstreet design; Ott, Haley, Hummer, Foyle, & Cunningham, 2012) that can improve traffic safety on urban and suburban arterials.

Sustainable Safety

So far, most of the strategies that have been discussed are local treatments that can be applied individually or in combination with other measures. Alleviating crash risk and its consequent social costs can also be viewed in a broader framework by which several aspects of road safety can be addressed. One applicable comprehensive road safety concept is 'sustainable safety'. Sustainable safety refers to a systematic approach that aims to prevent crashes or reduce their severity by adapting transportation systems' properties to human limitations – including physical and cognitive capacities

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(Wegman, Aarts, & Bax, 2008). Since human errors are inevitable, sustainable safety aims at minimising the reliance of traffic safety on road users by creating inherently safe transportation systems. In order to achieve sustainable safety several principles have been defined. Since the whole concept and the principles can be applied on different types of facilities, their application to urban and suburban arterials seems to be beneficial.

Sustainable safety principles advise that roads should be mono-functional and the homogeneity of mass, speed and direction should be guaranteed to the extent possible. In addition, forgiveness of the environment is another key principle. A road's environment and elements should provide road users the opportunity to correct and minimise the consequences of their erroneous actions. Forgiving roads are designed safer and are equipped with elements that reduce the severity of crashes. As an example, changing roadside barriers to less rigid types (e.g., from concrete barriers to steel guardrails or cable barriers) on urban and suburban arterials is expected to reduce fatal and injury run-off-road crashes significantly, or installing more flexible crash cushions appears to considerably reduce the severity of fixed-object crashes (AASHTO, 2010).

Predictability of roads is another important principle of sustainable safety. Road layout and elements should be designed in a distinctive way, so that road users can easily identify the functionality and characteristics of the road. This is commonly referred to as the concept of 'self-explaining' roads. Self-explaining roads provide consistent and clear information to road users concerning their expected behaviour. Unlike some self-enforcing treatments (e.g., traffic calming), which directly influence road users' behaviour by physical restrictions, self-explaining roads try to affect the road users' behaviour psychologically.

Although the self-explaining concept has been predominantly adopted on motorways its application on other road classes, such as urban or suburban arterials, seems to be relevant and useful. One major concern, specifically on suburban arterials, is that the transition zones between rural and built-up areas usually lack sufficient and standard design elements and information to help drivers behave appropriately in response to different road settings, such as speed limits. This problem can be remedied by appropriately implementing the self-explaining concept.

SYNTHESIS AND CONCLUSIONS

Urban and suburban arterials represent a vast and yet diverse variety of road network facilities. These road network features consist of two major elements – road segments and intersections – that accommodate mobility for a mixture

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of road users. The design traits of urban and suburban arterials can be quite different in terms of traffic control, access features and operational characteristics such as speed. Hence, it is of great importance to distinguish between different road elements when analysing crashes. In addition, due to the presence of different road users (e.g., cyclists, pedestrians and motor vehicle users) it is essential to account for different crash types separately. Moreover, crash severity should also be taken into account when analysing road safety on urban and suburban arterials, due to the greater impact of more severe crashes on the sustainability of the whole road network system. It is evident that the actual traffic safety level of a facility is substantially undermined if the involvement of vulnerable road users or severity of crashes is not acknowledged.

There are several contributing factors for crashes, categorised as traffic and road characteristics, driver behaviour or vehicle properties. This chapter paid special attention to the traffic and road characteristics. In this regard, it reviewed a few of the most important factors that have been extensively used in the literature within the context of urban and suburban arterials. Reviewing the literature showed that the association between crashes and some of these variables (e.g., speed and lane width) is rather disputed, signified by counterintuitive results. This could be attributed to different reasons, such as the omitted-variable bias, multicollinearity among explanatory variables or inappropriate and mis-specified model functions. Here the important lesson to be learnt is that causality should always be considered superior to statistical associations.

Several strategies can be adopted in order to improve traffic safety on urban and suburban arterials. The strategies that have been studied in this chapter are either engineering- or behaviour-related. Although urban and suburban arterials are characterised as facilities on which mobility is the most important function, it is their access feature that contributes more to their safety conditions. Hence, implementing access management strategies is regarded as a useful solution in alleviating crashes and their consequences. Speed is known to be the primary factor in severe crash occurrence. Traffic calming strategies are found to be appropriate strategies through which to improve traffic safety levels of urban and suburban arterials. Due to the importance of the safety of vulnerable road users and their immense contribution to the sustainability of transportation systems, certain solutions should be foreseen to address crashes which involve vulnerable road users. This chapter also discussed a number of solutions that have been proven to be beneficial for pedestrians and cyclists on urban and suburban arterials (see also Chapters 10 and 11).

Besides these rather localised treatments, there appears to be a broader framework that can be applied to improve the safety of road network facilities, named

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'sustainable safety'. This road safety concept aims at making roads inherently safe by adapting road design features to human capacities and limitations. This is a proactive approach that works by integrating several principles. Although the implementation of this approach sounds promising in addressing safety issues on urban and suburban arterials more empirical research is needed this area.

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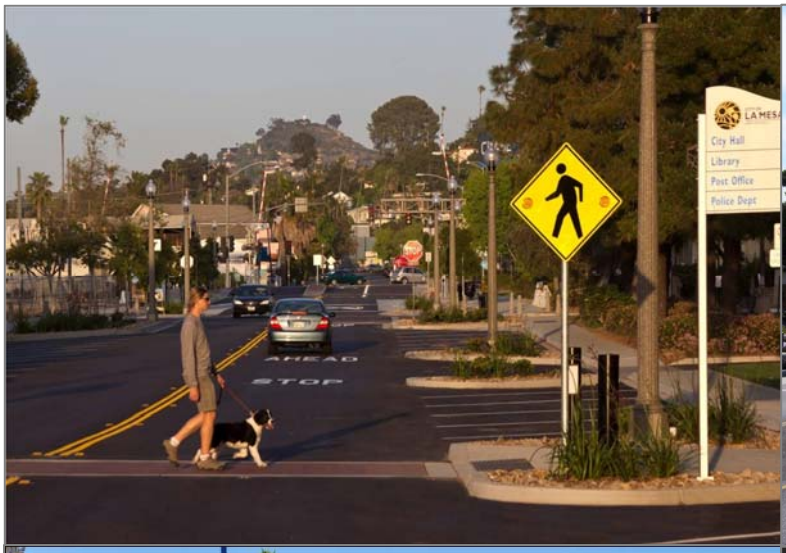







2011 Street Design Benchmark Study

for the

San Diego Region

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Acknowledgements

WalkSanDiego is grateful for a grant from The San Diego Foundation's Climate Smart Fund that made this report possible.

Numerous planners, engineers and staff members from jurisdictions around San Diego County gave generously of their time in providing information and insights. We are thankful for their help.

We would also like to thank the many individuals who helped with the research, writing and preparation of this report.

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*We gratefully acknowledge the support of **Sharp Health Plan** for underwriting the cost of printing and distributing this report.*

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EXECUTIVE SUMMARY

San Diego policies at the regional, local and community level consistently cite walkability as a primary goal. Yet the San Diego region is largely a suburban patchwork of low-density, single-use developments connected by high-volume, high-speed roads designed to serve motor vehicles. The predictable outcome is that we must drive to do almost anything. Residents who can't or don't drive -- one-third of the population -- face disproportionate dangers, restricted travel options, or both.

Appropriate land use and improved public transit are important pieces of the solution, but they do not get at the fundamental question of whether the streets we build and maintain are safe for everyone to truly encourage walking and biking as an alternative to driving.



Safe, walkable streets?

This report reveals what our cities are doing -- or not doing -- to make streets safer for all users. It also examines how cities around the country, under the banner of Complete Streets, are rethinking decades-old road standards to improve the safety and livability of their communities. The report provides a call to action for the region's 19 local governments to better align our street design practices with goals of walkable, bikeable communities.

THE STATE OF BIKING AND WALKING

On an annual basis, approximately 65 pedestrians and nine bicyclists are killed in the San Diego region. About a thousand pedestrians and an equal number of bicyclists are injured. According to a 2011 national report, San Diego ranks fifth in most dangerous regions for walking. Fully 22% of traffic deaths here are pedestrians, almost double the national average of 12%. How did we get to this point?

Since the 1930s, roads in the U.S. have been designed for automobiles, with goals such as improving vehicular Level of Service (LOS) based on the Average Daily Traffic (ADT) volume. Graded on a scale of A through F depending on how efficiently traffic moves, this methodology ignores the effects on pedestrians, bicyclists, transit riders, and emissions of air pollutants and greenhouse gases.

These standards were introduced several decades ago during a time dominated by new road construction and a desire to move vehicles quickly. As planning goals changed and cities refocused attention on revitalizing urban areas, however, these standards did not change. As a result, our daily road improvements perpetuate vehicle speeds dangerous for everyone and discourage other modes of travel, even to the detriment of our personal health.

BEST PRACTICES - TAKING A NEW ROAD ON STREET DESIGN

Providing basic pedestrian infrastructure such as sidewalks and medians is critical to improving pedestrian safety. However, this is only a start. Cities taking a new road on street design use three common strategies:

- Revisions to roadway policies and standards to balance the needs of motorists with those of pedestrians, bicyclists, people with disabilities, and transit riders.
- Routinely considering all street users in street design decisions avoiding the usual traffic-flow-at-all-cost approach that ignores the local neighborhood context.
- Using innovative, low-cost solutions that improve safety for everyone, and implementing them during routine road maintenance projects such as roadway resurfacing or restriping of travel lanes.

SAN DIEGO'S CURRENT APPROACH

In San Diego, roads are still largely designed with a concentration on the automobile. Several challenges exist for cities to turn down a new road:

- Lack of strategic, comprehensive transportation plans with measurable objectives. Improvements for pedestrian and bicycle safety are outlined in separate plans and there is little accountability for implementation.
- A culture of risk avoidance. Traffic engineers are cautioned to avoid new techniques not spelled out in engineering standards for fear of liability and potential lawsuits.
- Perception that traffic congestion is a primary public concern. Surveys and meetings around the region show that residents' primary traffic concern is having safe streets, including accessible walking and bicycling routes for them and their children.

THE GOOD NEWS

Cities in the region have the tools for changing the way they build streets. Many have experimented with traffic calming devices, newer crosswalk designs, and other techniques to improve safety around schools and in residential neighborhoods. Developing strategies to expand these individual projects, initiated by citizen complaints, into a proactive, comprehensive plan will make providing Complete Streets the new way of doing business.

RECOMMENDATIONS FOR CHANGE

Seven recommendations for local jurisdictions are outlined in the report based on the best practices cited and interviews with local staff at each city. In general, the recommendations emphasize the need to think comprehensively, strategically and consistently about how design decisions affect all users of the street. Specific tools to aid in this process are also recommended. Recommendations are also offered for the San Diego Association of Governments as it adopts the 2011 Regional Transportation Plan and distributes local transportation funds.

2011 Street Design Benchmark Study for the San Diego Region

Stuck in Traffic

Like much of the United States, the San Diego region is largely a suburban patchwork of low-density, single-use developments connected by high-volume, high-speed roads designed to serve motor vehicles. The predictable outcome is that we must drive to do almost anything. Unfortunately, our planet, our health, our economy, and basic concerns about fairness suggest we cannot sustain this pattern indefinitely.

In San Diego, 46% of greenhouse gas emissions (GHGs) are emitted by on-road cars and trucks.[1] To reduce this emission source, California Senate Bill 375 (2008) requires each metropolitan planning organization (including SANDAG, the San Diego Association of Governments) to tie together land use, housing, and the Regional Transportation Plan into a new Sustainable Community Strategy (SCS). More specifically, the law requires each Metropolitan Planning Agency (MPO) to reduce GHGs to state assigned targets and outline within its SCS how future transportation infrastructure investments will help the region meet the established targets. SANDAG's state assigned targets are a 7% reduction in GHGs by 2020 and a 13% reduction by 2035.

The new legislation provides San Diego and SANDAG the chance to be a statewide leader in adopting safe street policies and healthier community design practices as a centerpiece strategy to lower GHGs and VMT. This report proposes that a new approach to road design be a critical piece to this strategy. Appropriate land use and improved public transit are just part of the solution. The streets we're building and maintaining must be safe for all users to truly encourage walking and biking as an alternative to driving. Other regions and cities around the state and country are implementing comprehensive change and demonstrating that it's possible to rethink street design and provide safer conditions for all streets users even while boosting the economic development, health, and quality of life of our communities.

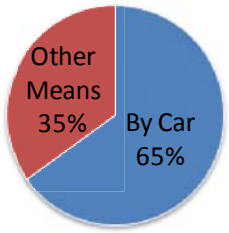
San Diegans Support Bold Action

San Diegans are ready for a new transportation paradigm. In a 2010 survey commissioned by the San Diego Foundation,[2] 72% of respondents said the region should take a leadership position in reducing greenhouse gases. Seventy percent supported SB375 implementation, and 79% supported making neighborhoods more walkable as a greenhouse gas solution.

The State of Walking and Biking in the San Diego Region

What's it like to walk or bike in San Diego? Anecdotally, residents often cite dangerous streets and fast moving cars as a reason *not* to bicycle or walk. Statistics suggest that San Diego is one of the least safe cities for walking.[3]

Transportation Mode for Trips Less than One Mile in Metropolitan Areas



Source: National Complete Streets Coalition, Gas Prices Fact Sheet



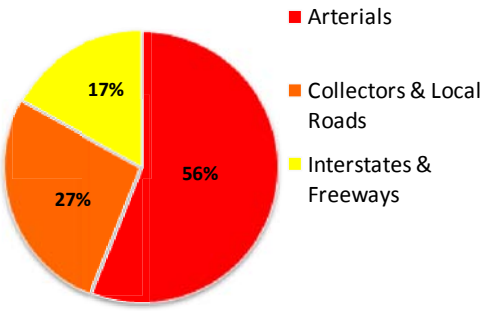
The car is invited to the party but he never wants to leave. He drinks a lot and coughs a lot and has an exaggerated sense of his own importance. He always wants more space and is a very demanding person.

– Jaime Lerner, Former Mayor, Curitiba Brazil, International Advocate for Integrated Transit Systems



Every mile traveled by bicycle instead of automobile saves one pound of Green House Gas emissions.

Pedestrian Fatalities in Urban Areas by Road Type (2007-2008)



Transportation for America and Surface Transportation Policy Partnership, 2009, Dangerous by Design

- Around 4% of commute trips in the region are made by walking[4], and about 3% are by bicycle.[5] Approximately three percent of commute trips are taken with public transportation.[6]
- The percentage of total San Diego area traffic deaths in 2010 that were pedestrians was 22%, ranked 5th in the nation.[7]
- In the San Diego region, 63 pedestrians were killed and 998 were injured in 2008; 7 bicyclists were killed and 959 were injured.[8]
- SANDAG's 2050 Regional Growth Forecast estimates a regional population increase from 3.1 million to 4.4 million by 2050.[9]
- To accommodate this growth, SANDAG estimates 97% and 42% of new housing and jobs, respectively, will occur in compact "smart growth opportunity areas". Motivating people to take to the streets either by transit, bike, or on foot will depend largely on the region's success in designing streets to invite them to come for the ride.

TAKING A NEW ROAD ON STREET DESIGN

Roads in the U.S. have historically been designed for automobiles, with goals such as improving vehicular Level of Service (LOS) based on the Average Daily Traffic (ADT) volume. Graded on a scale of A through F depending on how efficiently traffic moves, this methodology disregards pedestrians, bicyclists, transit riders, and emissions of air pollutants and greenhouse gases. The functional street classification system typically used by cities as a backbone to street design (i.e. arterials, urban majors, majors, etc.), further emphasizes auto efficiency and ignores factors like bicylists and adjacent land uses.

Tradeoffs Between Traffic Flow and Safety

Local transportation policies should reflect the perspective of all users within the context of a community's economic, environmental, and social values. Unfortunately, conventional traffic Level of Service (LOS) measures inherently value traffic delay reduction over every other consideration:

1. **Cost:** Because LOS policies influence the size and type of transportation infrastructure investment, maintaining a higher LOS may be an inefficient use of public funds. Balancing LOS with other considerations can reduce costs. This is particularly timely for cities struggling with shrinking infrastructure budgets.
2. **Safety:** Higher LOS thresholds are associated with higher vehicle speeds for peak and especially non-peak hours, which increase the likelihood of fatal collisions and discourages bicycling and walking. Traditional LOS measures driver comfort and convenience but often results in negative impacts to pedestrians and bicyclists including increased crossing distances at ever-wider intersections and decreased safety at mid-block crossings due to substantial road width.
3. **Physical Space:** The goal of an efficient transportation network is to increase the capacity for person-trips, not just vehicle-trips. Current LOS policies focus only on moving vehicles through the network

Source: Transportation Analysis gets a Failing Grade when it Comes to Climate Change and Smart Growth, Fehr and Peers, 2008

A particular problem is the tendency to design roads for speeds that are not only dangerous for everyone but discourage anyone not in a car This is especially true for large, high-volume "arterial" roads linking neighborhoods or funneling local traffic to and from freeways. Yet, these roads typically attract more walkers and bicyclists because of their physical connection to the rest of the street system and because they serve major transit lines. In urban areas, 56% of the 4,378[10] U.S. pedestrian fatalities in 2008 occurred on arterial roadways.

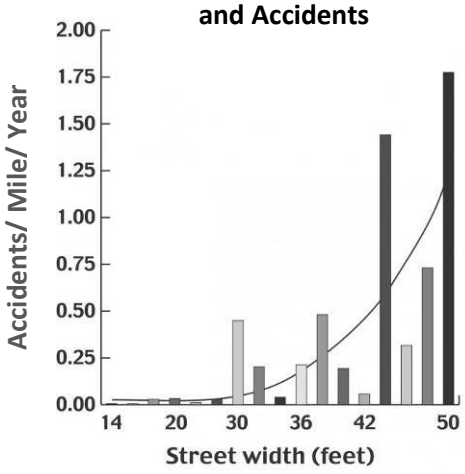
Research shows that a pedestrian's chance of survival when hit by a vehicle traveling 40 mph is 15%, at 30 mph it's 55%, and at 20 mph, it's 95%.[11] The adage "speed kills" is truer than most people suspect. Unfortunately, achieving safe roadway speeds is not simply a matter of posting lower speed limits. The only effective way to moderate speeds is to intentionally design roadways to achieve this goal. Retrofitting residential streets for lower speeds is called "traffic calming". A more limited menu of treatments is also available for arterial streets, and is often referred to as "traffic taming".

A recent safety review from the Federal Highway Administration (FHWA) found that designing the street with pedestrians in mind—sidewalks, raised medians, turning access controls, better bus stop placement, better lighting, traffic taming measures, and treatments for disabled travelers—all improve pedestrian, bicyclist and motorist safety.[12] Findings included the following:

- Providing sidewalks reduces pedestrian crashes by 88%,
- Medians reduce pedestrian crashes 40%, and
- Road diets (reducing the number or width of lanes) reduce pedestrian crashes 29%[13]

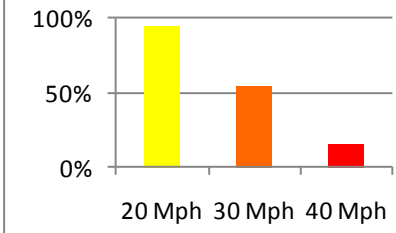
As safety improves, the one-third of the population that doesn't drive, and therefore depends on other modes, is far better served.

Residential Street Width and Accidents



Swift, Painter, Goldstein, 2006, Residential Street Typology and Injury Accident Frequency

Pedestrian Survival Rate by Vehicle Speed



Transportation for America and Surface Transportation Policy Partnership, 2009, Dangerous by Design,

DESIGNING FOR CARS OR PEOPLE? A CHANGING PARADIGM

Providing basic pedestrian infrastructure such as sidewalks and medians is critical to improving pedestrian safety. However, this is only a start. Providing safe accommodations for all users of the street – providing a "Complete Street" -- requires rethinking our priorities and consistently and strategically funding street treatments that improve road safety for all.

In many U.S. cities, traffic planners are doing exactly that, replacing rigid street design formulas based on a street's classification with context-sensitive design solutions that reflect local needs and priorities.

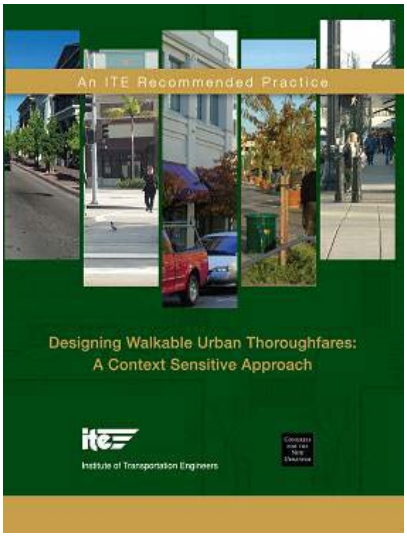
*Complete Streets are **designed and operated to enable safe and efficient access for all legal users.** Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to move safely along and across corridors. This applies in rural, suburban, and urban areas.*

- Definition of Complete Streets, Caltrans Deputy Directive 64-R1 signed October 2, 2008

CALIFORNIA GETS INTO THE (COMPLETE STREETS) ACT

In September 2008, then-Governor Arnold Schwarzenegger signed into law Assembly Bill 1358, the Complete Streets Act. As of January 1, 2011, the law

requires cities and counties to ensure that updated land use plans, known as "general plans," account for the needs of all roadway users. A prior bill, Senate Bill 97 (2007) directed that implementation guidelines for the state's keystone environmental law, the California Environmental Quality Act (CEQA), should be amended to include analysis and mitigation of greenhouse gas emissions, as well as potential negative impacts on bicyclists and pedestrians. Similarly, Caltrans produced the *Complete Streets Action Plan* and *Smart Mobility 2010* guidelines that echo the emphasis on accommodating all modes safely.



In its 2006 publication, the ITE and CNU partnered together to target thoroughfares as priority streets to redesign and improve walkability.

Agencies and professional organizations around the country are also reflecting this paradigm shift by issuing so-called "multi-modal" street design tools in both federal standards and professionally recommended guidelines. Some examples include:

- National standards from the American Association of State Highway and Transportation Officials (AASHTO) have been changed to reflect a multimodal approach in the traffic engineering "bible" known as the *Policy on Geometric Design of Highways and Streets*.
- The Federal Highway Administration has promoted speed reduction as key congestion relief technique as part of the federal Congestion Mitigation and Air Quality program (CMAQ).
- The Institute of Traffic Engineers (ITE), in partnership with the Congress for New Urbanism (CNU) published *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach.*

COPENHAGEN: FROM "CARS ARE US" TO MULTI-MODAL CITY

In 1962 the City of Copenhagen, long dominated by automobile traffic, began to experiment with the notion that the way people move about mostly reflects what transportation facilities they are provided – a radical idea at the time. City leaders asked the question: What if we built our transportation system around the needs of the pedestrian first, then the bicyclist, then the automobile? Urban designers and transportation engineers began to experiment with this concept--one block at a time. Success bred further success.





Today Copenhagen commuters travel far differently -- 4% walking, 37% bicycle, 28% transit, and 31% auto. Although reducing GHG was never the goal -- the primary objective was improving pedestrian safety and city livability -- Copenhagen now boasts the lowest carbon footprint of any large city in the world.

BEST PRACTICES – CITIES RETHINKING STREET DESIGN

Cities all over the U.S. have recognized that streets can play a much larger role than simply moving vehicles; in these places, city leaders are re-evaluating their entire approach to street design. This section highlights some of the current best street design practices in the U.S. and the San Diego region.

New York and Long Beach – Integration and Innovation

New York, NY

While many U.S. cities try to encourage downtown pedestrian traffic, the City of New York has long had more pedestrians than it can comfortably handle. To address this challenge, the New York Department of Transportation in 2006 hired Copenhagen's visionary urban designer Jan Gehl to evaluate the potential for enhancing New York's public spaces, including its streets. His report, *World Class Streets: Remaking New York City's Public Realm,* along with two previous city documents, *PlaNYC* (2007) and the *Sustainable Streets Strategic Plan* (2008) laid out a vision for a new approach.

The 2009 NYC Street Design Manual, championed by Mayor Michael Bloomberg, established a dramatic shift in the way the city designed its streets. The Manual contains many best practices, but one noteworthy element is the willingness to test new street design techniques that have been successful elsewhere.

Invitation to Innovation

In a groundbreaking departure from the way traffic engineers typically operate, the Street Design Manual explicitly encourages experimentation and borrowing of best practices from other cities in the U.S. and around the world. This is reflected in the manual's street treatment 'toolbox,' which tags each treatment with one of three labels:

- *Wide:* In wide use throughout New York City
- *Limited:* In limited use/contingent on site-specific conditions
- *Pilot:* Currently in limited use, but employed successfully in other US and international cities.

The 'pilot' tag allows temporary roadway changes that can be easily evaluated before being installed permanently For example, street spaces were "re-purposed" using rubber curbs, or delimited only by paint or with movable cement planters. In this way, the city discovered pent-up demand for both pedestrian and bicycle facilities and public gathering spaces as residents flocked to the new "pilot" facilities.

> The NYC Street Design Manual 'builds on the experience of innovation in street design, materials, and lighting that has developed around the world. It is designed to be a flexible document that will change and grow, incorporating new treatments as appropriate after testing.'
>
> - *NYC Street Design Manual*

Best Practice #1
Innovation

Encourage the use of innovative street design techniques on a pilot basis. Evaluate, adjust and actively build upon successful pilot projects.





Cycle tracks in New York City are one example of pilot projects introduced.



Times Square was reintroduced as a pedestrian mall.

Examples of the more innovative and highly successful improvements include the conversion of Times Square into a public plaza, the transformation of an unused freight rail line into a landscaped pedestrian pathway, the installation of several protected "cycle tracks," and two Bus Rapid Transit (BRT) lanes painted red (with more under development). The city is also studying over 40 corridors for future BRT service. Fueling the new spirit was the strong support of Mayor Bloomberg and the city's Traffic Commissioner Janette Sadik-Kahn.

Long Beach, CA

The City of Long Beach wants to be one of the nation's top bicycling cities. The goal is driving innovative solutions to promote safe bicycling and walking throughout the City. Improvements to date include a bevy of new bicycling facilities such as cycle tracks, sharrows with unique green striping, Southern California's first bicycle boulevard[14], and hundreds of additional bike racks. These are coupled with a newly revised Bicycle Plan to outline an ambitious network of new facilities throughout the City.

According to Charlie Gandy, the City's Mobility Coordinator, the City fully expects the changes to be a transformational experience for Long Beach residents. The City is reallocating the space in the street specifically for residents' benefit in lieu of people who simply drive through the area. As a result, the City is one of the lead cities in the nation using an innovative approach to make streets safer for everyone.

A World of Innovative Bike Design

The Urban Bikeway Design Guide recently released by the National Association of City Transportation Officials (NACTO) highlights experience with innovative bicycle facilities from cities around the world. Most of the treatments cited are not directly referenced in traditional design standards such as the AASHTO Guide to Bikeway Facilities or MUTCD although many of these elements are found within the documents. The purpose of publishing the Guide is to showcase successful efforts piloted by cities around the world, but not yet developed as roadway standards.

Painted bike lane, Chicago, IL
NACTO Urban Bikeway Design Guide



Charlotte & Sacramento–
Designing Streets to Match Surrounding Land Uses

Charlotte, NC

The City of Charlotte, NC was one of the first cities in the U.S. to adopt VMT reduction goals and to promote Complete Streets. The Charlotte Urban Street Design Guidelines (2007) 'prioritize street balance and maintain safety for all.'[15] The Guidelines respond to the city's Transportation Action Plan (2006) which integrates into one document land use and transportation goals — including automobile, transit, biking, and walking. Two basic issues drove development of the Guidelines: (a) Charlotte's need to better plan for continued growth and development, and (b) Charlotte residents' desire for better streets.[16] Thanks to an inclusive public process and leadership from city officials, the city completed more than 100 miles of new sidewalks, 65 miles of newly striped bike lanes, and at least nine road diets within five years of the Guidelines' approval.[17]

Best Practice #2
Design Flexibility

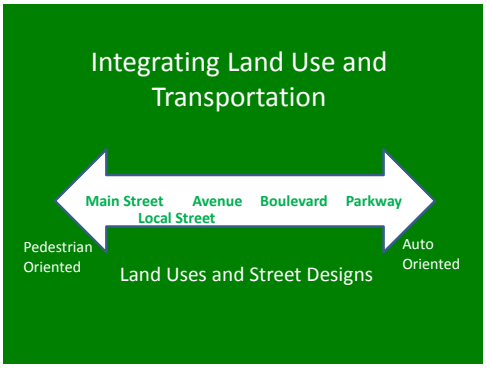
Develop street typologies that reflect surrounding land uses.

Two key elements of the Guidelines are highlighted here as best practices:

(a) The introduction of new context-sensitive street types to better integrate land use and transportation, and
(b) The establishment of a 6-step evaluation process for all proposed street construction projects.

Context Sensitive Design

The Design Guidelines address all travel modes while emphasizing land use context, street function, and allocation among competing uses for existing right-of-way. This emphasis is reflected in the five new street types, ranging from most pedestrian-friendly to most auto-oriented: Main Streets, Local Streets, Avenues, Boulevards, and Parkways.



City of Charlotte, NC, Continuum of street typologies, Urban Street Design Guidelines, 2007



East Boulevard was a four-lane, undivided street carrying more than 20,000 vehicles a day through the heart of one of Charlotte's historic neighborhoods. Through a road diet, the street was successfully converted to three lanes with bicycle lanes and pedestrian refuge islands.



A road diet on this street in Charlotte changed a four-lane road to two lanes, narrowed the left-over travel lanes from 12 feet to 10 feet, and added wider sidewalks and bike lanes – all within the existing right of way.

Best Practice #3
Democratize the Street

De-emphasize traffic-flow-at- all-cost and instead establish a decision-making process that considers adjacent land uses and all users of the street.

Once a street is classified as a certain type, subsequent street design and land use decisions are coordinated accordingly. Mark Cole, Charlotte's Design Section Manager explains, 'What helps with our approach is recognizing that not all streets are the same. Some are more auto-oriented than others. The street types developed have been helpful to clarify decision making points'.. Emphasizing this point, the street types have also been integrated into a broad-based evaluation process described below and a multi-modal Level of Service (traffic flow planning) system (see box).

Six-Step Evaluation Process

Accompanying the street classification system is a national model decision process. With a goal to avoid a 'one-size-fits-all' approach and to acknowledge each project's context, the process analyzes the land use and urban design context and current deficiencies before considering the street's original classification. This is contrary to U.S. traffic planning practice, where a street classification based on traffic volume is assigned at the outside and limits all subsequent design options. Again, according to Mr. Cole, 'Most of our changes are completed through our street retrofit program, i.e. existing streets with a limited right of way. The six-step process has been an enormous help in adequately determining a tradeoff process that helps decide the ultimate result'. The six steps are:

(1) Define the existing and future land use and urban design context,
(2) Define the existing and future transportation context,
(3) Identify deficiencies (congestion, inadequate disability access, etc.),
(4) Describe future objectives,
(5) Recommend street classification and test initial cross-section, and
(6) Describe trade-offs and select cross-section (width, number of lanes, etc.).

Using this process, the city discovered that many improvements could be completed in the course of routine street resurfacing. The key has been to integrate **all users** into **all decisions**.

Using Multi-Modal Level of Service (Traffic Flow) Standards

The Technical Index to Charlotte's Transportation Action Plan includes the city's first effort to evaluate signalized intersections from the perspective of every user – motorist, bicyclist, pedestrian, etc. Importantly, the city does *not* try to accommodate all users equally on every street. Instead, the objective for automobiles vs. pedestrians and bikes changes according to the street classification and adjacent land uses. How have these standards changed the city's approach to intersection design? 'Whereas in the past staff would have looked at high congestion or accident history as reasons for change, they now also include consideration of how well the intersection functions for bicycles and pedestrians', says Mark Cole.



At left, an intersection before and after implementation of a multi-modal LOS analysis. Improvements include revised striping to shorten pedestrian crossing distance and installation of a count down timer and median.

Sacramento

Similar to Charlotte, the City of Sacramento developed new street types and allowed greater flexibility in the design process to be more responsive to local needs. The City had already adopted pedestrian and bicycle design guidelines, but the street typologies – adopted in the General Plan -- emphasized the City's desire to include these facilities as part of street design generally. This has proved especially helpful in communicating street construction requirements to developers.

Another key component of the updated General Plan was the inclusion of 'exemptions' from automobile LOS standards for certain streets, for example, streets located within a ¼ mile of transit and for a number of specific roadway segments.

Street Typology System Integrating Street Function and Type						
Functional Class	*Street Type*					
	Residential Street	*Main Street*	*Mixed-Use Street*	*Commercial Street*	*Industrial Street*	*Boulevard*
Major Arterial				●	●	●
Minor Arterial	●	●	●	●	●	●
Major Collector	●	●	●	●	●	●
Minor Collector	●	●	●	●	●	
Local	●	●	●		●	

Sacramento, CA, General Plan, Mobility Element, 2009

The exemptions allowed the City to ensure that these streets could prioritize bicycle and pedestrian movement over vehicles. For example, Folsom Avenue, a three-lane arterial between a light rail station and Sacramento State University, is currently being rebuilt with these priorities in mind. Although traffic demand suggests an additional lane be considered, the City instead is accepting less vehicle access, removing one travel lane and a turn lane, while adding wider sidewalks, on-street parking, and bicycle lanes.[18]

Seattle, Washington –
Implementing Complete Street Goals in All Decisions

Best Practice #4

Continually infuse street design policies into the daily decisions of all city departments making Complete Streets everyone's mission.

In 2006, Seattle voters approved a nine-year $365 million transportation funding levy ('Bridging the Gap') to reduce its backlog of transportation maintenance projects and to revamp streets throughout the city. Shortly thereafter, the city council approved a Complete Streets Ordinance. And like Charlotte, these two efforts came on the heels of the city's creation and adoption of a Transportation Strategic Plan to outline 'specific strategies, projects, and programs that implement the broader city-wide goals and policies for transportation in Seattle.'

The result? Legislative authority and political support to ensure that decisions about project design were made with the needs of all modes in mind. Today, the Seattle Department of Transportation (SDOT) requires all major road maintenance projects to undergo a thorough Complete Streets review, using a standard Complete Streets checklist. It prompts city staff to simultaneously consider multiple components: opportunities for natural drainage, improvement of transit access and efficiency, feasibility of a road diet, and improvement of routes to neighborhood schools, among other elements. When repaving a street for example, staff will consider a new configuration in the existing right-of-way that creates space for bicyclists or improves traffic flow for cars.

SDOT set clear goals for change: 117 blocks of new sidewalks, restriping 5,000 crosswalks, planting 8,000 new street trees, and developing a pedestrian master plan. Annual progress toward meeting these goals is provided on the city's website.

In 2010, successes included 15 new blocks of sidewalks, 42 crossing improvements as part of pedestrian master plan implementation, 20 miles of newly striped bike lanes and sharrows (share-the-road arrows), and 350 new bike parking spaces to keep up with growing demand. In addition, as of 2010, a total of 24 road diet (lane reduction) projects had also been implemented to narrow travel lanes and enable installation of bike lanes.[19]

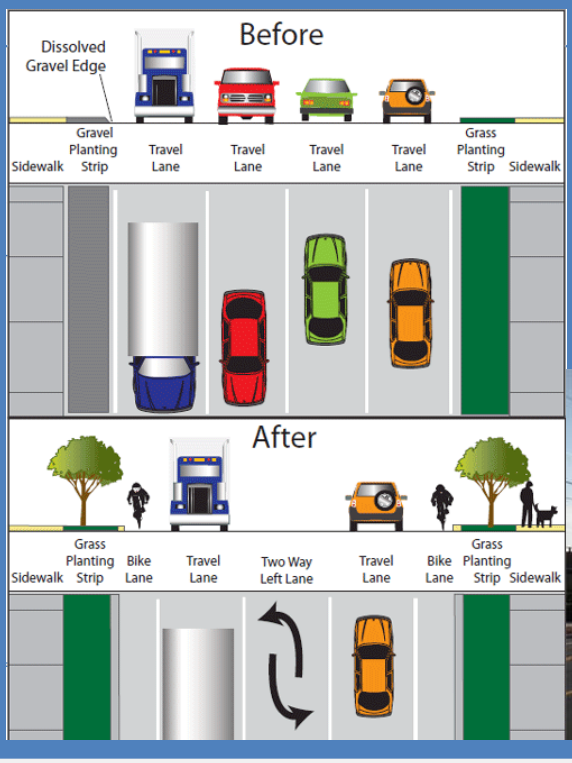
Seattle's experience demonstrates the benefits of infusing Complete Streets principles into all guiding documents—the transportation strategic plan, the transit plan, and the pedestrian and bicycle master plans, among others—as defined in the ordinance, so that these practices become standard operating procedure.



Sharrow installation by SDOT

South Columbian Way Goes on a (Road) Diet

In 2010, SDOT reconfigured South Columbian Way, a four-lane arterial, as part of its Bridging the Gap program. The project included the planting of nearly 100 new trees lining the street, new curb ramps, new bike lanes, a new two-way center turn-lane, and a new dedicated right-turn lane into the Seattle VA Medical Center. The net effect was improved motor vehicle safety and access, pedestrian access and bicycle usage. Project components were identified through the city's routine street resurfacing program.





Best Practice #5
Monitor Progress

Issue an annual Mobility Report Card to measure and report progress implementing Complete Streets.

Redmond, WA -
Monitoring Progress and Success

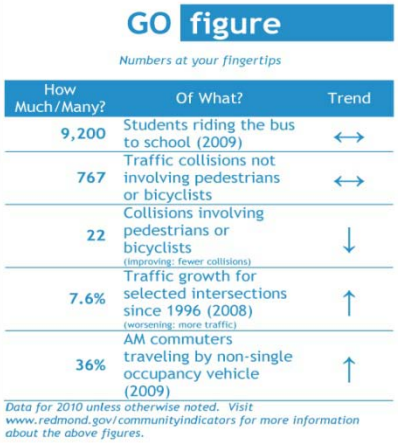
Many cities have incorporated ongoing performance and evaluation programs to monitor success over time as part of their new approach to street design. In 2005, the suburban City of Redmond, Washington adopted a comprehensive Transportation Master Plan (TMP) to support development of the land uses envisioned by the Comprehensive Plan. The effort relied on substantial public input to outline plan goals.

Once the plan was adopted, the city also established a system of annual monitoring and performance reporting to enable the public and the city's elected officials to gauge how effective the transportation programs had been. The plan also requires a Five Year Transportation Status Report which is to be prepared just prior to TMP update.

Annual Mobility Report Card

The yearly performance of the TMP is summarized in a Mobility Report Card. All of the tracking measures, including average daily transit ridership, average daily vehicle miles of travel, average daily traffic, annual traffic accidents, annual bicycle and pedestrian accidents, are predetermined for ease of comparison over multi-year time horizons. The Mobility Report Card also assesses progress on meeting Level of Service objectives for transit, vehicular traffic, bicycle system, pedestrian system and mode split.

According to Joel Pfundt, a Principal Planner, the greatest value of both the TMP and Report Card is how they clarify the need to integrate policies with implementation tasks.[20] The TMP serves as a 'crosswalk' to existing policies. Knowing the City is accountable for reporting progress each year in the Report Card, Complete Street goals are maximized with every task. Another



GO figure

Numbers at your fingertips

How Much/Many?	Of What?	Trend
9,200	Students riding the bus to school (2009)	↔
767	Traffic collisions not involving pedestrians or bicyclists	↔
22	Collisions involving pedestrians or bicyclists (improving: fewer collisions)	↓
7.6%	Traffic growth for selected intersections since 1996 (2008) (worsening: more traffic)	↑
36%	AM commuters traveling by non-single occupancy vehicle (2009)	↑

Data for 2010 unless otherwise noted. Visit www.redmond.gov/communityIndicators for more information about the above figures.

Redmond, WA, 2011 Mobility Report Card

A Vision for Better Streets

As in Redmond, the New York City DOT developed a comprehensive transportation plan and monitoring program to chart progress towards a revised street system. The 2008 Sustainable Streets Strategic Plan outlines broad policies supported by clear, measureable actions in seven key areas including safety, mobility, world class streets, infrastructure, greening, and global leadership. Each year the NYDOT issues a progress report on the Sustainable Streets Plan filled with quantitative measures and commentary on plan accomplishments.



contribution of the Report Card is its accessibility and transparency. Citizens can easily see the progress made in transforming the City's street system.

La Mesa, CA –
Integrating Bicycling/Walking Safety and Design

Best Practice #6

Integrate bicycles and pedestrians into routine road design considerations.

The City of La Mesa Walkability Plan provides an excellent example of what can be accomplished by a pedestrian master plan in the San Diego Region. The purpose of the plan is to create a broad community-based vision and action plan for a more walkable community. Although the term Complete Streets is not used in the document, It considers the need to reconfigure entire streets to improve safety and better serve pedestrians and bike riders alike. The focus is not exclusively on sidewalks or places where pedestrians might come into conflict with cars. Rather it reflects a comprehensive look at how streets can be designed to accommodate all users.

The plan also provides important street design guidance for the city, outlining street types, recommended lane widths, the establishment of a retrofit program, illustrated cross-sections and an extensive traffic calming toolbox. Because of this detail, the Walkability Plan is a key document informing the City's General Plan Mobility Element Update (currently in process) and as a basis for updated street design guidelines.



A modification at the University and Yale intersection includes recommendations to:

- *Add bike lanes,*
- *Use curb extensions to shorten crossings and improve access, and*
- *Reduce all travel and turn lanes to 10 feet.*

Typical recommendations include the use of road diets, lane width reductions, and reduced curb radii to slow traffic speeds and create a safer environment for pedestrians. All recommendations are tailored to individual circumstances.

Similar to the Charlotte and Sacramento examples mentioned above, La Mesa's Walkability Plan also introduces new context-sensitive street categories as a framework for the recommended improvements. These include Hillside Local Streets, Non-Hillside Local Streets, Downtown Streets, University Avenue, El Cajon Boulevard, and Fletcher Parkway. In this way, the Plan serves as the City's *de facto* street design manual.

Best Practice #7
Reallocate Underused Pavement

Use existing right of way to implement multiple features that improve mobility and pedestrian and bicycle safety.



A road diet is planned for this stretch of Coast Highway 101 in Encinitas and will result in new bike lanes, sidewalks and on-street parking.



High intensity Activated crosswalk – HAWK – signals have been proven to dramatically reduce pedestrian crashes at mid-block crossings and intersections. They are included in the 2011 Manual on Uniform Traffic Control Devices (MUTCD).

Encinitas and National City –
Using Less is More Philosophy with Road Diets

Encinitas and National City are two jurisdictions that have made use of road diets, one of the most effective and cost-effective tools within the Complete Streets toolbox. As discussed elsewhere in this report, road diets can increase mobility and safety for multiple users of the street. They can be inexpensively installed in the course of routine street resurfacing, and without changing the existing right of way. The typical road diet converts a four-lane road carrying 12-18,000 auto trips per day into a two-lane road with center turn-lane, although roads carrying as much as 30,000 daily trips have also been successfully converted.[21] 'Leftover' right of way can be used to stripe bicycle lanes, widen sidewalks, include planting strips, or any treatment prioritized by the city or citizens.

According to one city official interviewed by WalkSanDiego, 'Using the additional space provided through a road diet is a tradeoff among multiple decisions. Reducing travel lane widths can become a popular option if bicycle lanes are valued and the right of way width is limited.' Before and after traffic analyses show that road volume is not impacted. In fact, in many cases, volumes increase. This is because drivers are no longer able to weave between lanes (which reduces road capacity) in an effort to maintain high speeds.[22] Road diets have also been shown to reduce pedestrian crashes by 29%.[23]

By reducing the number of travel lanes and reallocating the excess right-of-way for other uses, road diets have numerous benefits:

- Additional space for new bike lanes, on-street parking, landscaping, and/or sidewalks—even dedicated transit lanes,
- Improved safety due to reduced vehicle speeds and less weaving,
- Improved traffic flow for multiple users, and
- Fewer collisions and injuries.

Encinitas, CA

In 2010, the City of Encinitas approved a road diet along North Coast Highway 101 as part of its Coast Highway Streetscape project. Road diets in the 2.5-mile project resulted through the City's public workshop process in order to make room for other benefits within the existing right-of-way. Other Complete Street tools recommended for the project are the inclusion of HAWK pedestrian crossing signals, expanded sidewalks, additional bike lanes, curb extensions, the restoration of tree canopy planted along the roadway and in the center median, and a total of five roundabouts. Other North County coastal cities are also considering improvements.

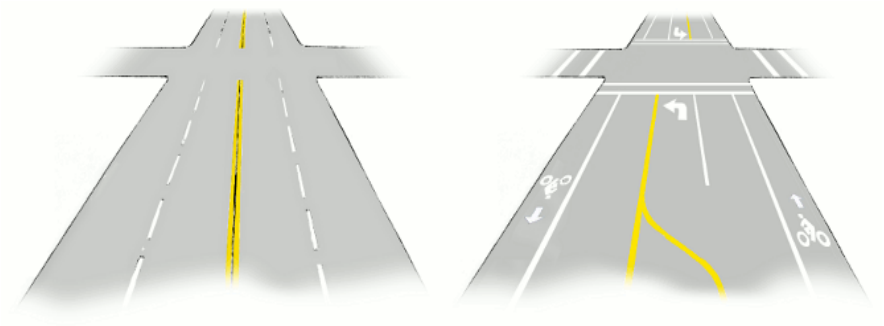
National City, CA

In 2010, National City completed a road diet (four lanes to three) on East 8th Street from Palm Avenue to Harbison Avenue using funds from the City's Street Resurfacing Capital Improvements Program. This project is part of the City's plan to implement a road diet on the entire 0.8-mile 8th Street corridor. In addition, the City is looking for funds to install raised pedestrian refuge islands and advanced warning beacons for mid-block crosswalks to further enhance pedestrian safety along this corridor.

The roadway change is one project included in the city's newly designated Community Corridors program. Significantly, this program includes a new street typology introduced through a general plan update to emphasize streets meant to be more pedestrian and bicycle friendly and those that connect community resources such as parks and the library.



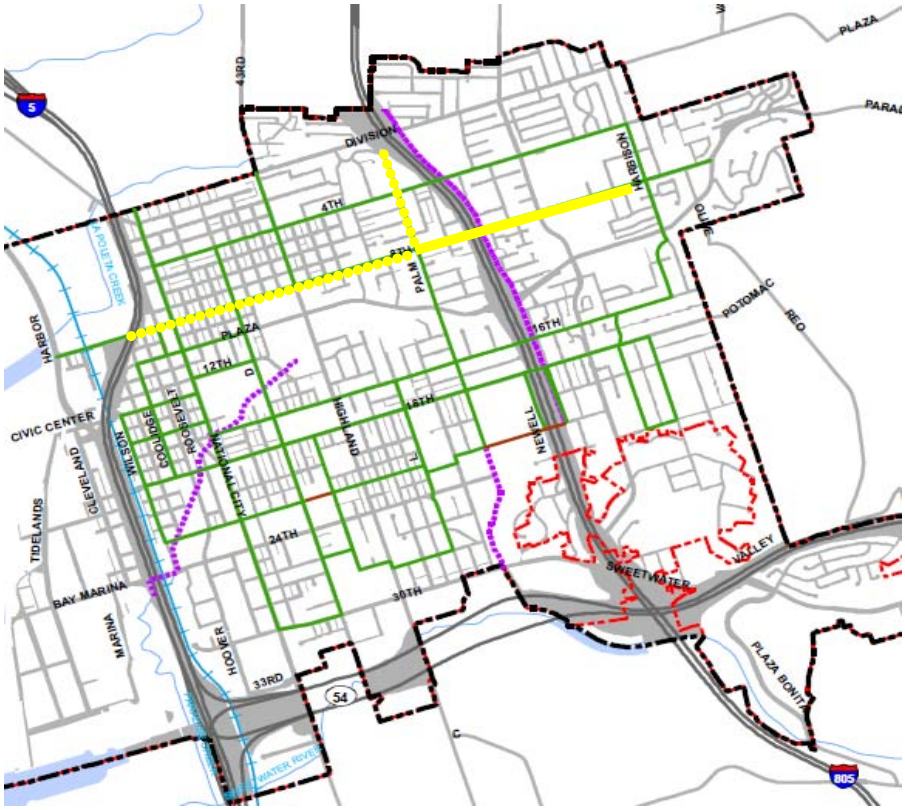
Above: National City's recently completed road diet along the 8th Street corridor.



At right: typical road diet reducing four lanes to three.

Below: National City's existing and proposed road diets. Graphic taken from its DRAFT Community Corridors map created as part of the City's General Plan update.

Solid yellow line = existing
Dotted yellow line = proposed



Residents of downtown would have an average of 6.3 VMT compared to a suburban resident with 19.8 VMT per day.

- Centre City Green

Centre City Green –
Centre City Development Corporation
Making Streets an Integral Part of Community Design

Centre City Green, Centre City Development Corporation's (CCDC) downtown sustainability plan, illustrates one of the region's first efforts to implement 'Green Streets'. The concept of Green Streets was identified as one of seven street typologies for downtown's street system. This approach includes landscaping, reduced water run-off, and improvements for bicycles and pedestrians.[24]

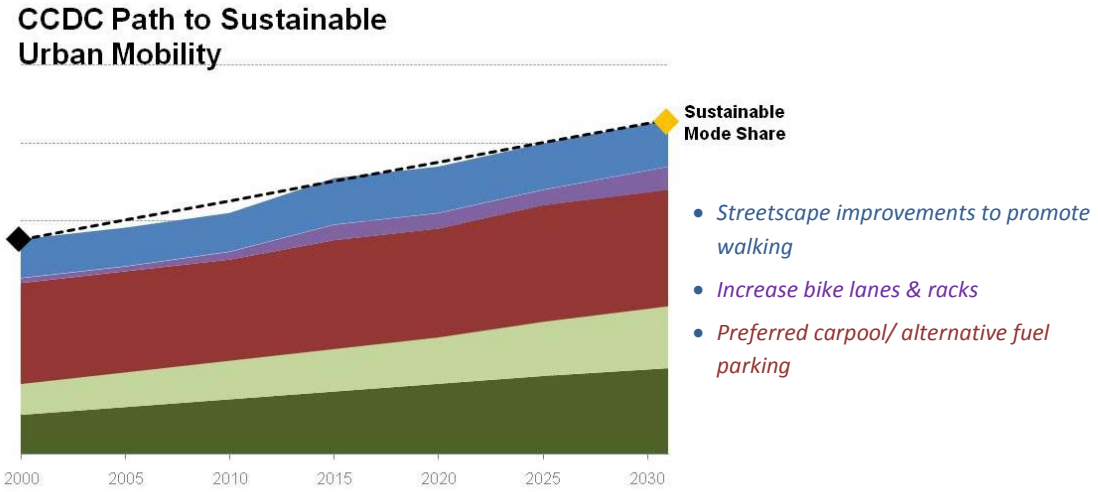


Bike corrals like this one in Portland, Oregon are one of the elements to be implemented through CCDC's Green Streets program for downtown San Diego.

The Centre City Green plan takes the Green Streets concept one steps further by making the streets an integral component of a larger effort to ensure downtown's sustainability. In this exemplary draft plan, the 'Green Streets Pilot Project and Program' highlight the importance of the spaces between buildings. The program defines a Green Streets Base Plan and a framework for future CCDC capital improvements prioritizing treatments such as road diets along several streets to make room for wider sidewalks and dedicated bike lanes, bike (parking) corrals, and dense plantings of trees and other landscaping.

The Streetscape vitality indicator included in the Plan tracks the development of streetscapes that promote social interaction and a sense of place through sidewalks, and view corridors. The goal is to 'make centre city a top-of-class streetscape environment that promotes walking over all other modes of transit.'

A well designed green street calms vehicular traffic and offers a more pleasant pedestrian environment by narrowing vehicular pavement and providing street-side native plantings that shade the pavement, allow natural (LID) infiltration of stormwater and provide habitat for song birds.'



Downtown San Diego's vision: Dependence on wholesale street improvements achieve sustainable urban mobility

SAN DIEGO REGION'S CURRENT APPROACH

WalkSanDiego interviewed city planners and traffic engineers from each of the region's eighteen cities to understand each city's individual approach to street design. Questions were divided into sections regarding how cities (1) *plan* for streets safe for all modes, (2) *implement* these plans and other techniques, and (3) *evaluate* the effectiveness of existing plans and techniques.

This section highlights key findings from the interviews and lists answers to eight specific questions regarding:

1. Street design guidelines
2. Vehicle and multi-modal Level of Service (LOS)
3. Vehicle speed
4. Strategies to prioritize street improvements
5. The degree to which pilot projects have been tested
6. Projects, plans or programs that have been adopted or implemented with demonstrated success
7. Evaluation and measurement tools for multi-modal transportation modes
8. Other notable strategies or programs to plan or implement roads for all users

A general summary of the findings is provided below. More details are outlined beginning on page 22.

1. Does the City have a Street Design Manual or functionally equivalent set of street design standards?

This question was asked to understand underlying principles the City uses in street design and yielded a variety of responses. Street design criteria range from basic Regional Standard Drawings (El Cajon, Imperial Beach, Santee) dating back to the early 1980s to detailed guidelines (Carlsbad, San Diego, San Marcos). Many cities use a combination of their Circulation/Mobility Element of the General Plan, Specific Plans, and/or Bicycle and Pedestrian Master Plans to augment design guidelines. However, basic design guidelines focus on functional street classifications and anticipated traffic volumes. This diminishes safety and marginalizes efforts to include pedestrian and bike facilities.

The best example of comprehensive design guidelines is the City of San Diego's 2002 Street Design Manual. However, this too outlines street treatments based on vehicle-focused street classifications and does not consider contextual land uses. Throughout the San Diego region, pedestrians and bicyclists remain a low priority in street design decisions.

Cities going through General Plan updates have an excellent opportunity for cities to re-evaluate transportation policies and street design guidelines that will balance bicycle and pedestrian safety as an integral component of street improvement projects. Many cities are taking advantage of this opportunity to do so.

2. **Does the City allow reduced LOS – D, E, or F? Are pedestrian and bicycle LOS considered?**

   This question was asked to understand what role vehicular LOS plays in decision making. Most cities interviewed have a target LOS of C or D. According to the American Association of State Highway and Transportation Officials (AASHTO), roads and intersections graded with LOS C allow for a 'stable flow of traffic'. Roads and intersections graded with LOS D are 'approaching unstable flow'.[25] Some cities have allowed for lower LOS (more congestion) from a new development because of benefits to pedestrians or bike access. However, such examples are rare. Typically, engineers must present mitigation measures or "overriding considerations" of traffic impacts under California Environmental Quality Act (CEQA) approval to allow LOS lower than C or D.

   A few cities in the region have introduced some flexibility to this requirement through their General Plans. For example, National City's recently updated General Plan (scheduled for adoption in Summer 2011) accepts LOS E or F along the designated Community Corridors and other streets if added benefits are gained for modes such as biking and walking.

   One challenge in overcoming the dominance of vehicle-based LOS standards is the lack of an alternative multi-modal methodology that evaluates conditions for bikes and pedestrians. Cities indicated they were aware of the development of a multi-modal LOS methodology, but only one has experimented with them to date. Most cities were hesitant to be among the first jurisdictions to adopt this practice. A multi-modal approach has been included in the 2011 update of the Highway Capacity Manual. This will provide cities with an excellent opportunity to experiment and evaluate street design decisions on bike and pedestrian safety.

3. **Does the City design streets to accommodate "maximum" speed or "target" speed? Are traffic taming techniques used to maintain a target speed that is safer for pedestrians?**

   This question was asked in order to understand the role of vehicular speed in street design and whether there was any intentional effort to slow speeds in certain areas. The question generally led to a discussion of the difference between 'design speed' and 'target speed'. Design speed is 'the maximum safe speed that can be

maintained over a specified section of highway.' It is determined by the road's functional classification and anticipated traffic volume. Target speed, on the other hand, is a tool used to design road improvements targeting a particular vehicle speed and is generally more responsive to surrounding land use. Five cities acknowledged a preference for designing for target speeds.

However, many cities had at least one example where traffic engineers had worked to calm traffic speeds, particularly in areas around schools for Safe Routes to School projects and in response to community concerns about excessive vehicle speeds. These sample projects are detailed in the individual summaries beginning on page 22. Some cities such as Encinitas, Oceanside, Carlsbad, and Vista have established neighborhood traffic calming programs that allow citizens to communicate concerns about specific streets or intersections where they would like to lower vehicle speeds.

4. **How are street retrofit projects prioritized and funded? Does the City have any policy outlining how to prioritize street improvements?**

This question was asked to understand the extent to which cities strategically identify roadway improvements and how bicycle and pedestrian friendly design components are integrated into the strategy. Most cities in the region prioritize street retrofits through a pavement management system to repair degrading streets on a cyclical basis. These are coordinated with improvements identified in Bicycle Master Plans, Pedestrian/Trails Master Plans, a variety of Specific Plans, especially in downtown areas, Capital Improvement Projects (CIP) lists, as well as concerns from residents about particular intersections or corridors.

Other cities such as Imperial Beach, National City, Escondido, San Marcos and Chula Vista strategically target street improvements along community corridors driven by safety concerns or land use changes (e.g., areas targeted for economic development and mixed use such as integrated residential and commercial zoning). These are notable as resulting design could better integrate surrounding land uses.

Most cities coordinate bicycle and pedestrian improvements with street upgrades. However, cities use separate funding for these improvements rather than integrate the improvements in routine street upgrades. This is mostly due to limited funding, but also to a philosophy that bicycle and pedestrian related projects are considered separately from everyday street upgrades.

Many cities have also established transportation committees to receive input from residents on roadway priorities (e.g., Coronado, Encinitas, Chula Vista).

5. **Does the City allow for pilot programs to test techniques that may vary from or go beyond the current street design standards?**

   This question was asked to understand the cities' general willingness to implement innovative ideas piloted elsewhere. Eight cities highlighted efforts to use what they considered to be pilot projects. These projects included road diets, roundabouts, innovative bike facilities such as sharrows and colored bike lanes, and back-in diagonal parking. Each of these cities uses the outcome of the pilot project to evaluate future use. Cities not using pilot programs indicated their staff and City Council are reluctant to try techniques not yet tested elsewhere or that have not been nominated as recognized engineering standards.

6. **What is a project, plan, or program that has been adopted or implemented with demonstrated success?**

   A menu of responses to this question was provided by WalkSanDiego, based on information obtained during the interview. The most common item selected was "an exemplary traffic calming project implemented or planned to balance safety needs for a variety of street users". Cities such as Carlsbad, Chula Vista, Del Mar, Encinitas, Escondido, La Mesa, National City, Oceanside, San Marcos and Solana Beach listed projects in which traffic engineers responded to resident concerns about high vehicle speeds and designed improvements that made the road safer for all users. A variety of tools were employed, such as the narrowing of vehicle travel lanes, the use of beacons or flashing lights, and the implementation of road diets, corner curb extensions, roundabouts, and mid-block crossings to slow traffic and make drivers more aware of pedestrians and bicyclists. These projects demonstrate that cities have the tools for safer street design. These tools are currently being used on a limited basis and have much room to be integrated in a comprehensive, consistent strategy.

   Another success mentioned by cities (Chula Vista, National City and Vista) was the completion of comprehensive Safe Routes to School (SRTS) programs. Using state or federal SRTS grant funding, cities worked with residents to prioritize areas for improvements to make walking to school safer.

   Unique to the City of El Cajon was a successful Annual School Survey Traffic Request Summary. This document outlines a comprehensive list of improvements identified by school families and residents around the city's schools. Included in the summary are City

responses detailing the planned approach to implement the needed improvements.

The cities of Carlsbad, Encinitas, Escondido, Del Mar, Lemon Grove, and El Cajon prioritized improvements in their downtown streets, including enhancements to street design. Consequently, these areas now attract more people and stimulate economic activity. Again, these examples demonstrate cities' ability to balance the needs of multiple street users should be strategically integrated in a more comprehensive manner throughout the city.

7. Does the City measure bicycle and pedestrian traffic?

Most of the cities interviewed do not conduct ongoing evaluations of pedestrian and bike improvements or counts. Most common are occasional counts required for grant requests. This is in great contrast to the ongoing, detailed counts of vehicle traffic.

8. What are notable initiatives the City has taken to improve pedestrian or bicycle safety?

Several notable initiatives have been implemented by cities in the San Diego region. They are highlighted below for their alignment with the best practices discussed earlier:

(a) A comprehensive approach to prioritizing street improvements based on land use or complete street related goals.

Cities such as Chula Vista, Escondido, Imperial Beach, National City and San Marcos are prioritizing street improvements as a component of land use. In corridors where mixed use development is proposed, or for corridors that connect community facilities, these cities are prioritizing a multi-modal street design. A good example of this is in Escondido where staff is considering designating certain streets as 'complete streets' to highlight these as pedestrian and bike friendly corridors and to attract economic development. These streets are mixed-use thoroughfares that bisect the City.

(b) An integrated approach to multiple modes of transportation

As a component of its General Plan update and to reflect in detail residents' 'core values', the city of Carlsbad put together nine working papers, each to reflect a top priority cited by the community. One of these was entitled '*Walking, Biking, Public Transportation and Connectivity Working Paper'.* It provides a great example for other cities by introducing the concept of complete streets, LOS alternatives and street typologies, as well as assessing how transportation planning can be more comprehensive for a variety of modes. Two of the observations from the working paper are outlined below.

'Expansion of the traffic calming program may be considered to encourage slowing vehicle speeds, thereby enhancing safety of non-motorized travelers. In addition, pursuit of complete street designs to balance usage of the roadway by multiple users traveling at varying speeds will help make Carlsbad's transportation system safer.'

['Improvements in roadway operation standards] could be complemented with new performance measures that track trade-offs between motorized and non-motorized mode of travel and the issues associated with accepting reduced levels of service for vehicular flows in the name of enhanced walking and bicycling. The City could also consider data collection and monitoring programs necessary to support calculation of performance measures on an ongoing basis. The City could also look at land use character-based approaches, allowing variation or exemption from LOS standards for districts that are more pedestrian-oriented (such as the Village).'

Details from individual interviews follow.

Carlsbad

Street Design Regulations	The City has a set of engineering design standards that show roadway cross sections for functional street classifications that corresponds with the Circulation Element of the General Plan. The standards include target volumes and design speeds for each street classification.
Vehicle LOS	The City's established LOS target is level D. The City has not experienced efforts to allow for a lower LOS. However, staff believes mindset is starting to change, especially through the City's General Plan update in consideration of Complete Streets and non-vehicular modes of transportation. Staff welcomes the opportunity to realign LOS with other decisions. They have not used multi-modal LOS yet but expect to consider it as part of the complete streets requirements.
Speed	The City has a neighborhood traffic calming program in place which outlines a process to introduce traffic calming treatments on neighborhood streets. The City is revising the program to include more cost effective measures such as residential stop signs, speed cushions, speed tables and roadway striping as possible residential traffic management tools. The City has had to re-evaluate certain speed zones recently. The police department has found that the current speed limits are unenforceable because the posted speed limit is much lower than the actual speeds as measured by speed surveys. As a result, the City has had to raise certain speed limits. Staff would prefer not to raise speed limits but are constrained by State law.
Street improvement prioritization	Street retrofits are currently prioritized through the City's pavement management program. As part of this, all streets have been inventoried and scheduled for resurfacing. Bike and pedestrian improvement projects (listed in the City's 2007 Bicycle Master Plan and CIP) are coordinated with these improvements to the extent possible.
Pilot projects	Through the City's neighborhood traffic calming program, it is installing more residential stop signs as a traffic calming measure. Although not ideal, they can provide them at a lower cost than other improvements and are finding it's a good solution especially for low volume streets.
Successes	Staff has been authorized to implement pedestrian access improvements on Carlsbad Boulevard (Coast Highway) and the Village area. Improvements under consideration include in-pavement flashing lights,

	rectangular rapid flashing beacons (RRFB) and countdown pedestrian signal indications. In addition, a Safe Routes to School project in front of Kelly Elementary School was initiated to narrow crossing distance and slow vehicle speeds on Kelly Drive, which functions as a residential street but was built to arterial width. Proposed road improvements include sidewalk popouts at the school driveway, a median and a traffic circle at Kelly Drive and Park Drive.
Evaluation and Measurement	The City has a consultant who completes an annual traffic monitoring program. Part of the City's Growth Management Plan, the traffic monitoring program measures traffic and determines level of service at various intersection and midblock locations.
Notable	The City is currently going through a General Plan update and produced a working paper, *Walking, Biking, Public Transportation and Connectivity,* to look at solutions for a variety of transportation modes. This is a very good resource in that it provides a comprehensive look at connections among all modes of transportation in the city. However, target vehicle LOS is still highlighted as a goal. The city is initiating public outreach for an arterial traffic calming program for La Costa Avenue in April 2011 to look at alternatives that will reduce vehicle speeds and improve access at intersections and driveways for residents. Improvements being proposed include a road diet, narrowing of lanes, and roundabouts. This process and the street improvements, once completed, will provide a good example for the region of how to slow speeds on arterials with higher volumes of traffic and make the road safer for all users.

Chula Vista

Street design regulations	The City relies on a Construction Design Manual and its Subdivision Manual for design criteria as well as drawings from the various planning documents where applicable. These are consolidated into a Traffic Engineering Checklist. Traffic Engineering tries to make sure that the designs implement the policies of the General Plan's Land Use and Circulation Element, the Urban Core Specific Plan, the Bicycle Master Plan and the Pedestrian Master Plan.
Vehicle LOS	In general, the City designs its streets to meet vehicular LOS standards. LOS C is accepted everywhere but no more than two hours each day of D. Staff is looking to implement a policy where LOS standards in the Urban Core Specific Plan area would not be as stringent. They have not used multi-modal LOS.
Speed	The City designs it streets to meet vehicular LOS standards. There is little demand for slower speeds on the prime arterials and expressways that connect to the eastern area.
Street improvement prioritization	The city has several corridor upgrade projects in process: Streetscape Master Plans for Main Street west of 805 and 3rd Avenue in the central business district. Both incorporate bike lanes and propose roundabouts. These are good examples of a more comprehensive approach to street redesign. In general, intersections are upgraded primarily in response to reported safety issues.
Pilot projects	The City has considered reverse angle parking on Third Avenue (between F and G) but will likely not implement until other improvements such as a proposed road diet and bike lane striping are put in place first. In general, they only use techniques that are in the professionally approved design manuals. They prefer a baby step approach for pilot projects in order to allay resident and City Council concerns over unfamiliar designs.
Successes	The City completed a comprehensive Safe Routes To School project with 36 elementary schools. Field surveys or walk audits were conducted for each of these schools to provide detailed comments about the existing conditions. This effort helped create the first ever pedestrian master plan for the City. It has also helped attract substantial grant funding for improvements. The City has a Safety Commission with staff members and seven residents to provide a forum for

	residents to discuss traffic and transportation issues (bicycle and pedestrian projects) with staff.
Evaluation and Measurement	The City collects and evaluates pedestrian and bike crash data provided through the Statewide Integrated Traffic Records System (SWITRS). It also counts bicycle traffic on the Bayshore Bikeway. This count is easier in this area than others because counting tubes can be placed on the ground which only allows for bicycle traffic (no cars).
Notable	The Urban Core Specific Plan supports multi-modal streets and was an early pioneer in the San Diego region to use street classifications determined by land use rather than historical functional classifications based on vehicle use. Successful corridor projects in the Urban Core may increase demand for complete streets in other areas of the City. City staff is making a thorough effort to coordinate bike and pedestrian upgrades.

Coronado

Street design regulations	The City uses the Circulation Element from its General Plan (1995) as its design manual. This Element includes design specifics based on traditional functional street classifications. This will be updated as the newly created Bicycle Master Plan is being implemented.
Vehicle LOS	The City's established LOS target for arterial streets is level C with a peak hour goal of D. They have not used multi-modal LOS.
Speed	All streets are 25 mph except for portions of Orange Avenue within Caltrans jurisdiction. There is a segment of Orange within the City's jurisdiction where the city recently reduced the speed limit from 30 to 25. This was allowed through a stipulation within the California Vehicle Code to reduce speed by 5 mph in areas that meet a certain density requirement.
Street improvement prioritization	Street improvements are prioritized through an annual traffic report. There are few accidents in the City and most are happening on Orange or SR75. Sidewalk and street maintenance projects are included in the CIP program each year. On average, every City street receives some form of pavement maintenance once every seven years.
Pilot projects	The City constructed a temporary roundabout in 2009 to test its viability. The temporary structure will remain until a permanent installation is funded and is now accompanied by visual improvements to make it visually more attractive. It has successfully slowed vehicle speeds at the intersection.
Successes	The City recently formed a Citizen Transportation Committee with participation from an elected official and residents to provide a forum to discuss traffic and transportation issues.
Evaluation and Measurement	The City evaluates pavement conditions on an on-going basis. No evaluation of pedestrian or bike facilities although the recent approval of a Bicycle Master Plan will most likely result in the creation of some form of annual evaluation process.
Notable	The City has prioritized pedestrian improvements in its downtown as called for through the Orange Avenue Specific Plan. The City completed its first Bicycle Master Plan in March 2011 and will be implementing improvements. Innovative facilities such as sharrows and green bike lanes were proposed but some were eventually taken out due to concerns from the business community and community at large.

Del Mar

Street design regulations	The City's Camino del Mar Streetscape Plan serves as its street design manual. The plan calls out the need for pedestrian and bike friendly infrastructure and has helped shape the community.

Vehicle LOS	The City does not have a target LOS. They have not used multi-modal LOS.
Speed	The City has concentrated on lowering vehicle speeds through its downtown area. Speeds in residential areas tend to be slow because of existing narrow streets. There have been improvements on road such as Jimmy Durante Boulevard, but nothing geared towards slowing traffic.
Street improvement prioritization	Prioritization occurs through ongoing road maintenance. Biggest goal for the city is to revitalize the downtown Village area, to ensure appropriate access to commercial outlets and make a continuous sidewalk network to connect to adjacent areas. Expanding the sidewalk network will require working with individual property owners to acquire right of way.
Pilot projects	The City had proposed a road diet on Camino del Mar Road to convert the existing two lanes to one lane with back-in parking. Council declined the project due to concerns that it would cause major backups into neighborhoods and negatively impact neighboring cities since so much traffic is through traffic.
Successes	A focus on pedestrians has always been a priority for the downtown Village area and has really shaped the community.
Evaluation and Measurement	The city does not conduct ongoing evaluations of its street improvements.
Notable	The City is using mid-block crossings with horizontal flashing beacons along Camino del Mar Road. They have been successful in slowing vehicle traffic in this section and making area safer for pedestrians crossing. These provide a good example for the region on successful use of mid-block crossings.

El Cajon

Street design regulations	The City uses regional standard drawings and Public Works Standards as street design guidelines. These outline basic construction standards for different street classifications.
Vehicle LOS	The City does not maintain a target LOS, but improved LOS is the ultimate goal. The City has not used multi-modal LOS although they are aware of its existence and open to exploring its use.
Speed	Design speeds are used. The City does not have examples where they have lowered vehicle speeds, other than some examples of speed hump installation. There are many many streets posted over 35 mph.
Street improvement prioritization	Street improvements are prioritized based on the City's pavement management system. Projects from the City's Bicycle Master Plan (2010) are also slowly being incorporated into these improvements, however, the City generally seeks special funding implement the bike improvements.
Pilot projects	The City is open to piloting projects but does not have specific examples. El Cajon is currently planning to narrow travel lanes on Broadway in order to make room for Class II bicycle lanes. The City tested a chicane in a residential neighborhood to lower vehicle speeds.
Successes	Annual School Survey Traffic Request Summary - El Cajon summarizes traffic safety requests from all schools within its school district each year through an Annual School Survey Traffic Request Summary. In this, the City lists the various requests for street improvements around schools as well as specific action items for staff. This is a good model for other cities as a way to document and synthesize street improvements around schools.
Evaluation and Measurement	The City does not conduct ongoing evaluation of its street improvements.

Notable	The City's existing grid pattern street network is very good. The City has focused much of its recent efforts on improvements in its 541-acre downtown area which is very appealing and walkable. A section of the City's Main Street was recently narrowed in order to allow for wider sidewalks and angled parking. A draft of its Downtown Specific Plan is out for comment and will be approved by Council in Summer 2011. This will guide further development of the downtown area.

Encinitas

Street design regulations	The City currently has street design guidelines. These will be updated to correspond with newer policies established through the General Plan update process. One challenge of the guidelines will be addressing the unique characteristics of five distinct neighborhoods within the City. Some neighborhoods for example don't want sidewalks because they like the informal, beach feel.
Vehicle LOS	The current Circulation Element calls for LOS threshold D. City staff has presented statements of overriding considerations to City Council in the past to allow 'failing' LOS tied with a proposed development project. This is facilitated by ongoing resident support of improved walkability in their communities. The City is not using multi-modal LOS yet. The traffic engineers are familiar with some of the newer techniques but feel they are not ready to use them routinely. The City is considering whether to revise the current LOS standards to reduce the need for roadway widening at key locations, in order to preserve community character and the environment and encourage multi modes of transportation are being considered a s part of the City's General Plan Update.
Speed	The City designs for target speeds and typically likes to post lowest speed legally possible within 85th percentile rules outlined in California Vehicle Code. Two new roundabouts were added in 2008 on Leucadia Boulevard west of I-5. These were successful in reducing vehicle speeds along the corridor and as a result, the City is considering to reduce the speed limit 5 mph. Residents have generally been supportive of the roundabouts and cities such as Carlsbad are looking at this example to emulate. There are 20 streets in Encinitas posted at 40 mph or greater. Currently another roundabout (unfunded) is planned for Leucadia Blvd. and as part of Caltrans improvements roundabouts are planned for the I-5 & Birmingham interchanges (North- and South-bound on and off ramps). Additionally, roundabouts are a normal consideration for the City when studying traffic control improvements at intersections.
Street improvement prioritization	Projects are generally prioritized by funding availability (matching funding goals), crash data, and city council goals. Pedestrian and bicycle crash data are also used to prioritize projects on an ongoing basis.
Pilot projects	The City has experimented with pilot projects such as roundabouts and is planning a road diet along Coast Highway 101. In addition to funding, staff noted that the biggest potential impediment to implementing more pilot projects is working with residents to maintain the City's current character while still invoking change. A significant amount of outreach has been completed for the Coast Highway 101 improvements. Ideas such as the roundabouts and a road diet were developed by residents through the public workshop process.
Successes	With participation from City staff, a Pedestrian Safety Assessment was completed for the City from the Berkeley safety program two years ago and the results of the assessment are utilized by staff when reviewing other projects.
Evaluation and Measurement	The City does not conduct ongoing formal evaluation of its street improvements; however, it does monitor crash data and evaluates accident scenes and makes road changes as appropriate.
Notable	The City is planning a series of traffic calming improvements along Coast Highway 101 to include a road diet, lane narrowing, installation of HAWK signals, and the planting of more trees. These positive

	changes were initiated through public outreach and will provide an excellent example for the San Diego region of complete streets.

Escondido

Street design regulations	The City currently has street design guidelines. These will be updated to correspond with newer policies established through the General Plan update process. Existing design criteria are categorized by functional street classifications based on ADT and LOS desired. Street design also takes into consideration goals outlined in the Bicycle Master Plan, and Downtown Specific Plan.
Vehicle LOS	The City LOS threshold is a goal of level C. With the General Plan update, the City would like to develop 'urban' LOS which allows for lower vehicle LOS in areas the city wants to make more walkable. This aligns with the City's overall strategy of prioritizing specific roads for pedestrian improvements. The City has not used multi-modal LOS but could include this with the updated mobility element in general plan.
Speed	In an effort to lower speeds, the City is looking at posting signs along signal corridors identifying the optimum speed of travel and not list speed. The City tries to implement traffic calming projects in key areas, especially where there is resident concern. Grand Avenue in the downtown area has been a priority to add curb extensions and high visibility crosswalks to slow speeds.
Street improvement prioritization	Prioritization of street improvements to promote walkability in the City is being driven by land use, specifically in corridors where the city wants to promote mixed use and higher density. The main priority is revitalizing Escondido Boulevard. The City will then try to duplicate these efforts on other main corridors such as Grand Avenue, 2nd Avenue, and Valley Parkway. The new General Plan will lay out street design guidelines for pedestrian oriented streets. These guidelines will tie in with proposed land use changes and existing plans such as the Downtown Specific Plan.
Pilot projects	The City piloted a road diet on Grand Avenue to turn the four-lane road into a two-lane road, include angled parking, and widen the existing bike lane. It was deemed a successful program.
Successes	The City has a strategic approach to pedestrian/bike friendly street improvements based on land use and community input. With the main focus downtown, the city will strengthen linkages on potentially five of its major corridors to name as complete streets and concentrate improvements for bike and pedestrian safety. The City has successfully established a substantial amount of Class I bike facilities to link downtown with Daley Ranch.
Evaluation and Measurement	City staff evaluates each project informally as a team to understand lessons learned. In addition, Escondido follows a mantra of 'Popular Projects' – or those projects that garner wide public support from residents. As a result, the City routinely gathers input from local street users for use in construction documents. Success is measured by functionality and expectations of citizens.
Notable	The City is looking at two focus areas to improve walking connections and take advantage of existing grid street network. The two areas are at Ash and Valley Parkway where the city would like to promote an urban village and the connection between Palomar Hospital and existing Sprinter station.

Imperial Beach

Street design	The City uses Regional Standard Drawings to guide street design decision. The City also uses its Bicycle

regulations	Master Plan (2009) to integrate these improvements with road construction projects, however, the City generally seeks special funding to implement the bike improvements.
Vehicle LOS	The City doesn't consider LOS because it doesn't have projects that increase the Average Daily Trip (ADT) number. City staff has presented statements of overriding considerations to City Council in the past to allow 'failing' LOS in favor of other bike and pedestrian improvements.
Speed	The City has done some traffic calming projects, most recently at Central Elementary. These improvements consist primarily of curb extensions and raised crosswalks.
Street improvement prioritization	Making streets friendlier for biking and walking is a priority for the City. The city's strategy for updating streets is tied with the commercial redevelopment of major corridors such as Palm Avenue, Seacoast Drive, and 13th Street Corridor. Criteria for other improvements are based on physical street conditions. A city-wide street conditions study was completed in 2008.
Pilot projects	The City has contemplated back-in parking but has not implemented. Sharrows are included as proposed improvements of the Bicycle Master Plan. These have not yet been painted although the City has requested grant funding to complete.
Successes	The City's focus on prioritizing traffic calming projects on streets with higher volumes of traffic has been land use driven and coordinated with an effort to revitalize commercial development. The City has been successful in the areas where funding was found to implement, such as Main Street. The challenge remains to find additional funding. The City acknowledged they would like to create a pedestrian friendly environment in order to stimulate the economic revitalization.
Evaluation and Measurement	The City has taken bike counts for the Bayshore Bikeway. There is no ongoing evaluation of projects.
Notable	Through its Commercial Zoning Review program, the City is evaluating how to incentivize more and better retail development, specifically mixed use development. To reach this goal the City is proposing seven performance based standards to offer developers in exchange for a height and/or residential density bonus. If the developer incorporates at least two of the seven options in proposed development plans, additional height and/or density can be offered on the project. One of these standards would ask that developers dedicate an additional one foot of private property to public Right of Way for the length of the project. This additional space could allow for a wider sidewalk or bike lane for example. Another standard asks developers to provide an additional 100 square feet of public open space/plaza space/ public community amenities (with a minimum of 600 square feet in one place) within the project in order to allow for more height and density. These incentives demonstrate a creative approach for other cities in the region to enhance walkability.

La Mesa

Street design regulations	The City has its own street design regulations. These will be updated in the near term in order to integrate concepts and goals from the Walkability Plan.
Vehicle LOS	The City of La Mesa General Plan Circulation Element outlines the significance threshold and states, 'When a traffic analysis indicates that the LOS for a street reaches "D" or below, the City will determine what improvements or changes in operations are needed to maintain or improve the LOS, and identify potential funding and prioritization for the necessary improvements through the Capital Improvement Program.'
Speed	The City has a policy to utilize traffic calming techniques to keep speeds within 7 mph of the posted speed limit. There is one street in La Mesa, Fletcher Parkway, with a posted speed limit above 35 mph. The City systematically looks for opportunities to reduce corner radii on all street upgrades.

Street improvement prioritization	The City's street retrofit program is guided by the La Mesa Walkability Plan. A road diet was implemented for 70th Street and the intersection of Yale and University Avenue was enhanced to reduce the pedestrian crossing distance. A major project to narrow Allison Avenue near Palm Avenue and add curb extensions at intersections and mid-block crossings is currently in process. Other projects are on the CIP but are waiting for future funding.
Pilot projects	La Mesa has tested colored pavement for bicycle lanes and reverse diagonal parking. Pilot projects are typically evaluated for applicability to other areas.
Successes	The City of La Mesa received a Complete Streets award from the San Diego Section of the American Planning Association in May 2011 for the Allison Avenue Street Improvement Project. This is one example of successful implementation of complete streets in La Mesa.
Evaluation and Measurement	The City feels that the Walkability Plan has been effective. The City experiences pedestrian/bike crashes but the data is generally not evaluated on a routine basis. As part of the Safe Routes to School Grant program the City is required to collect bicycle and pedestrian data before implementing a project. Staff would like new technology to conduct more pedestrian and bicycle counts.
Notable	The La Mesa Walkability Plan integrates bike and pedestrian improvements for a complete streets approach in the San Diego region. A map with a complete system of walking and bicycling facility network was adopted with the Plan. It also provides an example of a context sensitive design street approach for the San Diego region as design treatments are recommended by street context: hillside, streets, etc. The Plan seeks to prioritize connections within and between neighborhoods making walking and bicycling a first choice for short and medium distance trips. The City has followed through implementing components of the Plan and using it as a guide to drive decision making.

Lemon Grove

Street Design Regulations	The City uses the Mobility Element from its General Plan (1996) for street design standards. Included in this Element is a Pedestrian Corridor Plan which illustrates the City's major pedestrian corridors where more people are walking and where safety improvements should be made. The City also has a Bicycle Master Plan (2006) it uses to guide decisions on bike facility improvements. The City is currently assessing whether to update its General Plan, specifically to comply with Assembly Bill 1358 (the 'complete streets' bill).
LOS	The City LOS target is C but will allow for Level D. They prefer not to have Levels E or F. Staff acknowledges that decisions are mostly based on ADT as it is necessary to accommodate cars among other modes.
Speed	The City's roads are largely built out so engineers are not able to design roads for design speed. The city has not experimented much with slowing traffic. The City experimented with a road diet on Massachusetts Avenue where a four-lane road was converted to two lanes with a turn lane in the middle. A major improvement is being implemented along Broadway and Main Street to divert pass-through traffic and provide a pedestrian friendly environment around the trolley station.
Street improvement prioritization	Lemon Grove relies on its Pavement Management Program and collision reports produced in the sheriff's office to prioritize funding for street improvements. Staff acknowledged that it is currently difficult to plan major improvement projects due to budget constraints for construction and maintenance. The City's improvements are largely limited to curb ramp and sidewalk improvements where necessary. Frontage improvements and street dedications are happening one at a time with development proposals.
Pilot projects	The City is open to trying pilot projects, but do not yet have specific examples. A roundabout was proposed within the city was later taken out due to emergency response questions.

Successes	The City has invested significantly in its downtown area which surrounds a trolley depot.
Evaluation and Measurement	The City measures and evaluates pedestrian traffic on a limited project by project level, typically as required by the Safe Routes to School program.
Notable	Lemon Grove is investigating the feasibility of creating a major pedestrian promenade adjacent to the downtown area and its primary trolley stop on Broadway. If completed, the promenade would create a friendly oasis for all trolley users and provide an excellent, safe connection to downtown and city hall. In addition, a feasibility study is underway to evaluate extending this pedestrian promenade from the planned segment in the Downtown area to the southernmost boundary of the City.

National City

Street Design Regulations	The City does not currently have a street design manual. However, new guidelines will be put in place with approval of the General Plan Circulation Element. This will include suggested roadway cross sections for each street classification, including the newly created Community Corridors. The updated General Plan is expected to be approved in Summer 2011. Traffic calming concepts are also outlined in the City's Westside Specific Plan.
Vehicle LOS	As part of the General Plan update, the City developed their own roadway LOS thresholds based on SANTEC Guidelines. The City will accept LOS E or F along the designated Community Corridors and other streets if added benefits are gained for modes such as biking and walking. Once adopted, future traffic analyses for the City will include these guidelines. All City streets have speeds of 35 mph or less except Paradise Valley Road and Harbor Drive. The City is considering using multi-modal LOS standards in the future, since they are now included in the 2010 Highway Capacity Manual.
Speed	The city conducts certified speed surveys consistent with the California MUTCD and California Vehicle Code to determine 85th percentile speeds and appropriately sets speed limits. Staff considers the most effective way to reduce speeds is through traffic calming.
Street improvement prioritization	Priorities for street improvements are identified through the City's 5-Year CIP, implementation of the City's first Bicycle Master Plan (2011), traffic calming improvements on Community Corridors identified in the updated General Plan, and enhancements to the 8th Street Corridor. The City also has a program to upgrade traffic signals which includes pedestrian countdowns, audible pedestrian signals protected left turn phasing and enhanced signal communications. The City maintains an inventory of sidewalks to address gaps in the system and substandard curb ramps, sidewalks and crossings to be consistent with the Americans with Disabilities Act.
Pilot projects	The City has piloted a road diet program along the 8th Street corridor: They recently completed a road diet on this corridor from Palm Avenue east to Harbison Avenue, funded through its street resurfacing CIP. Additional road diets are planned from Palm Avenue west to Harbor Drive. SANDAG Smart Growth Incentive Program Grant funds, Safe Routes to School Grant funds and HSIP Grant funds will be used to implement these projects. The City is also in the process of installing its first roundabout as part of its Safe Routes to School Program.
Successes	The City has completed a successful Citywide Safe Routes to School Program to address safety at all 14 schools in the city. Enhancements included 37 solar-powered radar speed feedback signs with flashing beacons, 26 additional solar-powered flashing beacons, 6 in-roadway warning lighted crosswalk systems (pedestrian actuated and solar powered) and pedestrian countdown signals at 18 intersections. The final phase of the citywide project will enhance school crossings with bulbouts, pedestrian refuge islands, and enhanced signing and striping as well as incorporate an education component. As part of the program, the City established a Safe Routes to School Task Force that meets bi-annually to discuss issues and provide project updates.

	The City is preparing a Climate Action Plan as part of the General Plan update. The CAP will address GHG reduction goals, include VMT targets, and provide one of the first examples of this kind of plan in the region.
Evaluation and Measurement	The City uses the Crossroads GIS traffic collision database to evaluate vehicle and pedestrian crashes. The City also has its own pavement management system which they update annually.
Notable	The proposed Community Corridors, which are designed as Complete Streets, illustrate an innovative approach to integrating land use and multi-modal transportation into street design decisions and serve as a good model for other cities to prioritize areas for pedestrian and bicycle safety.

Oceanside

Street design regulations	The Engineering Department maintains a street design manual for it purposes (1991) and is augmented by other planning documents that require specific treatments for various locations within the City.
Vehicle LOS	The City's updated General Plan Circulation Element will target a LOS threshold D.- The Traffic Engineering Department is looking into multi-modal LOS indicators, but there is no plan to use this in the immediate future. The City is interested in information regarding California cities who have adopted an ordinance to adopt multi-modal LOS indicators and lower vehicle LOS, specifically allowed through CEQA.
Street improvement prioritization	Most retrofitting work is done in response to safety concerns and in response to project priorities identified in the bicycle and pedestrian master plans. The City also has some visionary plans that call for Complete Street retrofits on major corridors such as the Coast Highway, but implementation has been limited due to inadequate funding. Installing count-down signals and painting crosswalks at intersections is a current priority for the City.
Pilot projects	The City is experimenting with reverse angle parking and has installed sharrows along several corridors throughout the City.
Successes	The City recently updated its Pedestrian and Bicycle Master Plans. These comprehensive plans are being used to inform an update to the General Plan Circulation Element currently in process. With Class II bike lanes on all major arterials, the City can boast of a complete bicycle network. Oceanside considers itself to be a Bicycle Friendly City and has a robust outreach program driven by local bicycle advocates. Successful projects include the San Luis Bike Trail Facility, the San Luis Rey Bridge, and the 2001 Pier Undercrossing. It is the only city in the region to have a Bicycle Committee. The City recently adopted a Neighborhood Traffic Calming program outlining a process for residents to introduce traffic calming treatments to neighborhood streets which will be included in the appendix of the updated Circulation Element.
Evaluation and Measurement	The City did an extensive evaluation of pedestrian and bicycle crash data during the development of the pedestrian and bicycle plans. The City monitors and responds to crash data but does not have a regular analysis cycle.
Notable	In the City of Oceanside, the Complete Streets concept is most highly articulated in specific plans like the Coast Highway Vision and Strategic Plan, the Mission Avenue proposed couplets, and the El Corazon Specific Plan. The Coast Highway Vision and Strategic Plan promises to enhance "transit-rich" western Oceanside into a thriving, pedestrian friendly, mixed-use area. The Mission Avenue improvements will allow for significantly wider sidewalks and commercial/retail friendly street orientation while beautifying this critical gateway to the downtown and beach areas. The City is the only in the region to be named a 'Bike Friendly Community' by the League of American Bicyclists.

	The City is planning to paint the 8'-wide pedestrian/ bike path on a portion of The Strand which runs parallel with a vehicle travel lane. The approximate ½-mile section between Seagaze Drive and Wisconsin Avenue will be painted dark red to distinguish the bike/ped travel lane from the vehicles'.

Poway

Street design guidelines	The City's General Plan, recently updated and approved in June 2010, outlines the City's street design guidelines. Arterials in the City were a particular focus of the recent update to change the methodology used to arrive at Average Daily Trips (ADT). The City looked at travel times and vehicle LOS to back into an optimal ADT rather than using ADT to inform other outputs. This resulted in limiting some arterial roads to three lanes instead of widening the road to build new lanes. Updated design criteria focus on traditional functional street classifications.
Vehicle LOS	The City uses a threshold LOS of level C or D. City staff has not presented overriding considerations in the past. The City has not used multi-modal LOS.
Speed	The City generally uses design speeds. It has lowered the speed limit in limited areas given the surrounding land uses. On Pomerado Road for example, speeds were decreased from 45 mph to 35 mph after travel lanes were narrowed and a bike lane added.
Street improvement prioritization	The City has focused in recent years on arterials to move traffic more efficiently along these corridors. Most of these roads are newer with bike lanes and sidewalks included. The City does not have a particular prioritization process. There are few accidents but the City prioritizes these as they occur.
Pilot projects	The City considered a roundabout near the downtown area to keep traffic moving at a slower speed. It was ultimately not approved by the City Council. Other opportunities for pilot projects have not come up.
Successes	The City has had success with the Safe Routes to School program resulting in intersection improvements around two elementary schools. There improvements included a road diet to reduce a four lane road to three lanes and add a sidewalk, median and curb extensions. The City has worked to build its regional bike path to connect Ted Williams Parkway and County parks and to complete an entire loop.
Evaluation and Measurement	The City does not conduct an ongoing evaluation of projects.
Notable	The City will begin a corridor study for Poway Drive, the most highly utilized street in the City in Summer or Fall 2011. The City's goal in creating the plan is to integrate land use and street design. It is currently a wide corridor with three and four lanes of travel in each direction, bike lanes, sidewalks and a center landscaped median. The City wants to look at emphasizing the mixed land uses in this corridor and make it friendlier to pedestrians and bicyclists as it is a major connector in the City between Highway 15 and the downtown area.

San Diego

Street design regulations	The City has its Street Design Manual (2002) and uses it regularly to review proposed development projects and initiate street improvements. The Manual is one of the most detailed in the region in that it also provides a toolbox for traffic calming solutions, policies for sidewalks and parkways, streetlights, and street tree plantings. Design criteria are categorized by functional street classifications based on ADT and LOS desired.
Vehicle LOS	The City accepts LOS D on major streets and collectors where the Average Daily Trips count exceeds a

	defined level. Below the defined level, the goal is LOS C.
Speed	Collector design speeds are 30-35 mph. Major street design speeds are 45-55 mph. Traffic calming tools are outlined in the Street Design Manual to be used by developers in proposed projects.
Street improvement prioritization	Street retrofit projects are coordinated with the City's General Plan Mobility Element, Bicycle Master Plan, Pedestrian Master Plan and Capital Improvement Plan. Council Policy governs project prioritization, however, initiation is closely tied to the Community Plan and Pedestrian Master Plan update process. Projects to address existing deficiencies in streets, intersections, sidewalks, bike lanes, and ADA compliance are continually added to the funded and unfunded capital improvements project list. The backlog of unfunded project is extensive due to the limited funding resources.
Pilot projects	The Green Streets Pilot Project in the Draft Centre City Green Plan will involve several Complete Street/road diets in downtown San Diego. Other Complete Street pilot projects are planned or in the planning stages for University Avenue Corridor and Rosecrans Corridor. The City painted bike sharrow lanes along Adams Avenue.
Successes	The La Jolla Boulevard Corridor Project in the Bird Rock Community involved a road-diet and five roundabouts. Traffic was slowed, walking across boulevard increased dramatically, and business revenue increased.
Evaluation and Measurement	The City does not conduct ongoing evaluations.
Notable	The City has initiated comprehensive Pedestrian and Bicycle Plans that when implemented, will improve multi-modal safety, especially in urban neighborhoods where pedestrian and bicycle collisions are concentrated. The City will need to seek additional funding to realize these improvements.

San Marcos

Street design regulations	The City has its 'Urban Street Design Criteria' which outlines design criteria for functional street classifications based on ADT and LOS desired. This is supplemented by guidelines outlined in multiple specific plans, a Bicycle Master Plan and a Trails Plan. The City is also considering completing a Pedestrian Master Plan in order to detail infrastructure related improvements hat are needed around the City.
Vehicle LOS	The City has a target LOS D and does not recall having presented overriding considerations to the Council in the past. They recognized that cumulative impacts must be considered which typically push through higher LOS. Staff believes the City's desire to achieve high LOS has facilitated cut-through traffic from drivers trying to avoid congestion on the freeway. The City would like to look at lowering LOS as a means to discouraging the cut-through traffic in the city. The City will look at multi-modal LOS as part of its General Plan update currently underway.
Speed	The City has used a design speed method. Most of the roads in the city, outside of residential and commercial districts, are 35 mph or greater. There have been some examples of using traffic calming on street sections to slow traffic speeds (as generally requested by residents). As part of its General Plan update, San Marcos is proposing to introduce more mixed use development, and Complete Streets design, along certain corridors. Staff believes this would then drive the mobility strategy. For example, Rancho Santa Fe Road is currently a six-lane arterial. The city is now asking does it need to be so wide? By narrowing, they can make the road more walkable/bikable and also decrease use of the road by commuters.
Street	San Marcos has many new streets with ample sidewalks and bike lanes. The need for new sidewalks is

improvement prioritization	not acute here as in other regional cities. The City uses the GIS-based CrossRoads system to track crashes and prioritize improvements. Reports from the sheriff's office are also used. One particular priority mentioned is the area near Palomar College. As it is starting to redevelop, much of the area will become mixed use. This may drive the need for different road designs to provide more options, especially to connect to the Sprinter.
Pilot projects	The City is interested in testing pilot projects and keeps an ongoing assessment of lessons learned from various projects completed.
Successes	The City has had success with traffic calming projects to increase pedestrian and bicycle safety. Rock Springs Road, an 80'-wide collector with lots of school traffic from surrounding high school, middle school and elementary school(s) was designated for four lanes but constructed for two lanes. San Marcos, with input from residents and school parents, designed a plan to install two roundabouts and narrow vehicle travel lanes in order to slow traffic and separate pedestrian traffic from vehicle traffic. Another example is at the Marcos Street Sprinter Crossing near Buelow Park. The City narrowed vehicle travel lanes, rebuilt and extended a linear park, and created an at grade rail crossing across the Sprinter line (between Autumn and Mission Roads) in order to improve pedestrian safety and walkability in a low income, mixed use neighborhood. The at-grade crossing took several years of design iterations and working with the CPUC for approval.
Evaluation and Measurement	The City evaluates streets for performance on a regular basis and has been successful at obtaining grants for Safe Routes to School and safety and congestion management projects because of its pro-active efforts in constantly evaluating its transportation infrastructure.
Notable	The city has a history of winning awards for its specific plans including ones for San Elijo Hills, and the recently completed Creek District, and University District. Generally, these plans outline pedestrian and bike friendly streets. The Creek District and University District Plans will transform 70 and 100 acres respectively into walkable, bike friendly communities in areas within a 2-mile radius of the Sprinter Line. The city is planning an inter-city shuttle to connect job and university centers to transit hubs in order to offer residents additional transportation options. It will circulate through the Creek and University Districts and be free to riders. Additionally, the City has received recent design awards for the Marcos Street Sprinter Crossing and the San Marcos Boulevard Smart Corridor as well as being named Local Agency of the Year by the San Diego Chapter of the Institute of Transportation Engineers.

Santee

Street design regulations	The City uses Public Works Standards (1982) as its street design manual. This is a relatively short document that outlines recommended roadway design criteria (width, turning radii, grading) based on traditional functional street classifications. The City reinforces this with its Bicycle Master Plan (2009) to provide bicycle facilities.
Vehicle LOS	The City's General Plan targets LOS C. City staff has presented overriding considerations to Council in the past, especially with newer development. They can accept lower LOS but must make a convincing case. These kinds of decisions are contextual. The city has not yet used multi-modal LOS, although they have heard of it and would be interested in learning more.
Speed	The City typically uses design speeds. The City has installed radar speeds in the past to slow traffic and done some traffic calming.
Street improvement prioritization	The City prioritizes street improvements through a pavement management system and based on input from residents. Other projects have been proposed based on proximity to schools and retail. The City would like to implement more Safe Routes to School projects and fill gaps within the bicycling network

	as outlined in its Bicycle Master Plan.
Pilot projects	Sharrows are included within the city's Bicycle Master Plan. Roundabouts are proposed in the Fanita Ranch Specific Plan.
Successes	Recently narrowed vehicular travel lanes to 10' and added bike lanes to on Mast Boulevard to reduce speed. The project was completed in response to neighborhood complaints about high speeds and difficulty backing out of driveways.
Evaluation and Measurement	The City does not conduct an ongoing evaluation. There are some counts of pedestrians included with vehicle turning movement counts.
Notable	The Fanita Ranch Specific Plan outlines guidelines for narrow vehicle travel lanes and roundabouts. In general, the street design calls for many traffic calming measures.

Solana Beach

Street design regulations	The City uses the Circulation Element from its General Plan and the Highway 101 Specific Plan (2003) for guidance on street design. These are also supplemented by the City's Bicycle Master Plan (1993).
Vehicle LOS	The City has a target LOS C. Staff has presented overriding considerations to council in the past to allow for lower LOS in order to promote. The City has not used multi-modal LOS standards.
Speed	Solana Beach typically designs for target speed and routinely introduces traffic calming features to slow cars. It has painted bike lanes, narrowed travel lane widths and installed curb extensions at intersections. One example of this occurred in the South Cedros neighborhood where, after residents complained of high vehicular speeds, the City narrowed travel lanes, introduced medians and curb extensions and lowered the speed limit from 30 mph to 25 mph.
Street improvement prioritization	The City prioritizes road improvements through a pavement resurfacing program. All comments/concerns from the public are incorporated into this plan. Improvements to Coast Highway 101 area and the Cedros Design District have also been a major priority in recent years.
Pilot projects	The City is interested in testing pilot programs. Painted sharrows and back- in parking are proposed with improvements for Coast Highway 101.
Successes	The City has prioritized improvements in the Cedros Design District and has stimulated economic development as a result. The City has also established a Public Safety Commission, a group that meets monthly with citizens and a commissioner appointed by the Mayor to discuss traffic and pedestrian and bike safety.
Evaluation and Measurement	The City has a Traffic Technical Advisory Committee which meets monthly and combines staff from multiple departments. This committee drafts priorities that are later proposed for the Capital Improvements Project (CIP) list. Staff believes this is a critical element to coordinating improvements throughout the city.
Notable	The City in general has enjoyed much support for walkability from the community and city council. Road improvements proposed for Coast Highway 101 reflect 'complete street' goals by balancing use of the road for multiple users, e.g. pedestrians, bikes and vehicles. Specific improvements include the narrowing of traffic lanes to allow for angled parking, widened and additional bike lanes. The improvements provide a good model for the region in street revitalization. Solana Beach will be initiating a General Plan update Summer 2011.

Vista

Street design regulations	The City's Circulation Element from its General Plan, which includes a Pedestrian Element, is the primary resource for street design criteria. This Element outlines criteria based on standard street classifications. The city's Bicycle Master Plan (2009) also informs street design decisions.
Vehicle LOS	Vehicle LOS is still a fundamental component to decision making. The City generally strives for C or D, although does allow for lower LOS in favor of other bike/ pedestrian improvements. The city has not used multi-modal LOS although this could happen as an element of the General Plan update.
Speed	Currently, high traffic volumes throughout the City are keeping speeds down. However, the City does receive complaints from residents that speeds are high, especially on collectors. Current strategies to lower speeds include using radar trailers, signage, markings, electronic driver feedback signs, enforcement, and turn restrictions. The City also has a Traffic Calming Program to reduce speed of motorists driving through residential neighborhoods. The program was established to outline a process for residents to provide valuable input on street design in areas where they are concerned about speed.
Street improvement prioritization	The City uses multiple resources to prioritize street improvements including a Pavement Management System, an ongoing sidewalk inventory, and crash data produced through its GIS-based Crossroads system. In addition, the City likes to consider improvements based on standard street classifications in the order of arterials, then collectors, then residential. Staff strives to include bicycle facilities, specifically facilities to fill in gaps where there are no facilities. The City has an agreement with the Vista School District to prioritize schools and related sidewalk improvement projects. As a result, they have produced many applications for Safe Routes to School funding and have been successful.
Pilot projects	Staff is continually keeping up-to-date on the latest research and technological advances and innovations in the transportation engineering field in an effort to implement new devices and technologies which have achieved useful results. They have not yet experimented with road diets but staff anticipates a project like this happening on South Santa Fe Road as part of redevelopment of the area.
Successes	The City's Safe Routes to School program has yielded positive results. The City has recently constructed several pieces of missing sidewalk amounting to hundreds of feet in front various schools.
Evaluation and Measurement	The City routinely looks at crash data organized through a GIS-based system call Crossroads. They use this data to choose grant projects. The City includes pedestrian counts as part of vehicular turning movement counts on an ongoing basis and on a limited basis as required for grant applications.
Notable	The City has a very clear understanding of how to prioritize street improvements. In addition, it has an ongoing sidewalk inventory where it will monitor 25% of sidewalks in any given year.

RECOMMENDATIONS FOR LOCAL JURISDICTIONS

The complete street case studies and best implementation practices presented in this report point to seven primary recommendations applicable to local jurisdictions in the San Diego region: ,

1. In designing roadway improvements, utilize the 2010 Highway Capacity Manual's Multi-Modal LOS methodology, or other suitable metrics, for examining the tradeoffs between vehicle capacity and accommodations for transit, bicyclists, and pedestrians.

2. Amend the General Plan or other policy documents as needed to allow the City to accept LOS E or F in corridors where additional safety and access via biking and walking is a priority.

3. Assess corridors where travel speeds exceed 35 mph for potential complete street improvements, especially near schools, mixed-use corridors, and transit routes.

4. Conduct a comprehensive assessment of streets with excess capacity where a road diet would make room available within the right of way for bike/pedestrian safety improvements.

5. Combine pedestrian, bike, and Americans with Disabilities Act (ADA) transition plans with specific transportation goals into a 5-year comprehensive Transportation Action Plan and update it regularly with citizen involvement.

6. Revise traffic impact study guidelines to reflect Complete Streets goals and requirements (AB 1358) and the 2010 CEQA Guidelines (SB 97).

7. Adopt a city-wide Complete Streets Ordinance to establish the goal of designing and implementing streets that accommodate all users.

REGIONAL RECOMMENDATIONS FOR SANDAG

In addition to the pivotal role of *local governments* in completing our streets, the San Diego Association of Governments also has an important *regional* role to play. Through administration of numerous transportation programs and funding sources, SANDAG has the opportunity to lead the region toward safer accommodations for all street users.

As discussed on Page 1, SANDAG is responsible for planning the regional mobility system while reducing per capita driving and attendant greenhouse gas emissions. In recognition of this role, the following recommendations are made for incorporation into SANDAG's Regional Transportation Plan (RTP), the Sustainable Communities Strategy, and the Regional Comprehensive Plan. The recommendations are based on best practice examples of street design approaches outlined above and are firmly rooted in the concept of Complete Streets which ensures that transportation agencies routinely design and operate the entire right of way to enable safe access for all users, regardless of age, ability or mode of transportation.

REGIONAL RECOMMENDATION 1 –

Adopt a comprehensive Complete Streets policy to integrate the Regional Bike Plan, the Model Pedestrian Design Guidelines, and the Smart Growth Design Guidelines into all relevant SANDAG transportation planning documents.

- Adopt a board resolution renaming Board Policy No. 031-Routine Accommodations - as the 'Complete Streets' policy.
- Update Board Policy No. 031 to be consistent with AB 1358, The Complete Streets Act, and to offer additional guidelines to local jurisdictions for designing intersections using a multi-modal Level of Service methodology. Include a decision-making checklist that encourages local jurisdictions to prioritize alternatives to road widening as a mobility strategy for congested roadways..
- Combine the regional bike plan and pedestrian guidelines into one comprehensive Active Transportation Program, complete with a proposed budget for future implementation. Ensure this program takes a comprehensive approach to restoring balance to street design and safety among multiple users around the region.
- Include complete street policies and goals within the Sustainable Communities Strategy as a tool to promote walkable and bikable communities and to provide better access to transit.

REGIONAL RECOMMENDATION 2 –

For funding of all bicycle and pedestrian improvement projects, prioritize existing Smart Growth Areas, Smart Growth Opportunity Areas, and school access routes.

For SANDAG, enhancement of existing smart growth communities, existing and planned transit corridors, and successful implementation of smart growth opportunity areas, are paramount to the region's successful assimilation of additional housing and jobs. As a result, these are also the areas likely to draw high levels of car, foot and bike traffic, especially in urban areas.

- In awarding all transportation project funds, prioritize Complete Streets treatments for existing and planned smart growth areas.
- Develop a phasing plan to program as Early Action Projects, the Active Transportation component of the RTP. Implement these projects within the next ten years to provide visual examples of Complete Streets.

REGIONAL RECOMMENDATION 3 –

Require project applicants for SANDAG funding to utilize the 2010 revisions to the CEQA Guidelines, including completion of a multi-modal LOS analysis.

The Highway Capacity Manual includes guidelines for multi-modal LOS measures. In addition, cities like Charlotte, NC have produced their own multi-modal standards for intersections. This is an important step in creating multi-modal environments.

- In designing in-house (SANDAG) projects or in awarding local funds, utilize the 2010 Highway Capacity Manual's Multi-Modal LOS

methodology, or other suitable metrics, for examining the tradeoffs between vehicle capacity and accommodations for transit, bicyclists, and pedestrians.

- Include criteria for implementing the revised CEQA Guidelines in awarding local funds, including the evaluation of greenhouse gas emissions from new development and reduced emphasis on vehicle LOS.

REGIONAL RECOMMENDATION 4 –

Encourage and reward innovation in street design.

- Reward through TransNet funding criteria jurisdictions who propose innovative pedestrian, bicycle, or traffic calming improvements.

- Encourage local jurisdictions, through grant criteria, to adopt and regularly update a 5-year Transportation Action Plan, created with extensive public involvement.

REGIONAL RECOMMENDATION 5 –

Establish an evaluation, monitoring and reporting system for active transportation projects.

- Using TransNet funding, analyze and publicize VMT impacts, safety outcomes, and GHG contributions of all active transportation projects receiving grant funding.
- Establish a monitoring and evaluation report card to monitor progress and effectiveness of active transportation and transportation projects.

CHALLENGES AND OPPORTUNITIES AHEAD

Challenges

Cities face many challenges in implementing some of the recommendations in this report:

- Limited funding for street retrofit projects. Cities interviewed reported that the long list of improvements they would like to make far exceeds available funding.
- Insufficient training for staff in complete street concepts. There is interest in new street design concepts among some engineers, but several are only comfortable with existing techniques.
- A culture of risk avoidance. Unless solutions are firmly spelled out in approved engineering standards, engineers are afraid to test slightly new techniques for fear of liability and potential lawsuits. This could be overcome with political leadership for the changes discussed in this

report. Changes in design manuals such as the Highway Capacity Manual are critical to give cities the 'cover' they desire to implement change.

- Lack of strategic, comprehensive transportation plans with measurable objectives. Cities usually adopt an annual capital improvement program and list of street retrofit projects according to a detailed pavement management plan. Proposed bike and pedestrian facilities are detailed in separate plans and there is little accountability for implementation. A strategic plan could streamline funding and produce greater results by integrating completion of improvements.

- False perception that traffic congestion is a primary public concern. WalkSanDiego's extensive experience working with neighborhoods all over the region, as well as SANDAG phone surveys, show that residents' primary traffic concern is having safe streets, including accessible walking and bicycling routes for them and their children. When asked, residents consistently state they would prefer safer streets to fewer traffic delays. With this in mind, city officials and staff should seek and learn from citizen input on traffic planning decisions, and provide the appropriate balance accommodating all users of the street.

Opportunities

The paradigm shift discussed throughout this report presents many opportunities:

- In the state of California, SB375 and AB1358 have shed light on the need for more compact land use patterns and alternatives to the automobile. Changes in street design practices should be one of the key elements in meeting these goals.

- An updated Highway Capacity Manual has introduced a multi-modal LOS methodology for cities across the country to use. This presents an excellent opportunity to qualify and quantify benefits gained from improving walkability and bikability.

- A 2006 report produced by the Institute of Transportation Engineers (ITE) and the Congress for New Urbanism (CNU), entitled *Designing Walkable Thoroughfares, a Context Sensitive Approach to Design,* outlines ideal street design metrics and components that architects and traffic planners have reached agreement on.

- Several of the region's cities are completing General Plan updates. In the process, they are re-evaluating planning priorities, including adopting land uses patterns and transportation policies to promote more active lifestyles. This provides an excellent opportunity to strategically address how street improvements can improve access for all users.

- General Plan updates involve extensive public outreach and cross-learning among citizens, elected officials, and city staff. The movement for changing the way streets are conceived of and designed requires a champion in every jurisdiction before it can move forward. The General Plan update process provides an opportunity for such leaders to emerge.

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May 2011

Safety and Operational Analysis of 4-lane to 3-lane Conversions (Road Diets) in Michigan

Final Report

ORBP Number: OR09118
MDOT Report Number: RC-1555
MSU Contract Number: 61-7930

10 January 2012

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Technical Report Documentation Page

1. Report No. RC-1555	**2. Government Accession No.** N/A	**3. MDOT Project Manager** Tracie Leix	
4. Title and Subtitle Safety and Operational Analysis of 4-Lane to 3-Lane Conversions (Road Diets) in Michigan		**5. Report Date** January 2012	
		6. Performing Organization Code N/A	
7. Author(s) Richard W. Lyles, PhD, PE; M. Abrar Siddiqui, PhD; William C. Taylor, PhD, PE; Bilal Z. Malik; Gregory Siviy; and Tyler Haan		**8. Performing Org. Report No.** N/A	
9. Performing Organization Name and Address Department of Civil and Environmental Engineering Michigan State University East Lansing, Michigan 48824-1226		**10. Work Unit No. (TRAIS)** N/A	
		11. Contract No. 2010-0294	
		11(a). Authorization No. Z2	
12. Sponsoring Agency Name and Address Michigan Department of Transportation Office of Research and Best Practices 425 West Ottawa Street Lansing MI 48933		**13. Type of Report & Period Covered** Final Report	
		14. Sponsoring Agency Code N/A	
15. Supplementary Notes None			

16. Abstract

Road diets, specifically 4-to-3 lane conversions, implemented in various locations in Michigan were studied to determine the safety- and delay-related impacts, develop crash modification factors (CMFs), and develop guidelines that would be useful in deciding when it might be desirable to implement such road diets. The results of the operational analysis support a guideline that suggests that 4-to-3 lane conversions result in significant delay when average daily traffic (ADT) exceeds 10,000 and, more importantly, when peak hour volumes exceed 1,000. A CMF of 0.91 (after adjustment for background citywide trends) for all crash types is recommended although the factor is not statistically different from 1.0. There was considerable site-to-site variation among the 24 sites studied, and this should always be considered when a road diet is contemplated. A study-by-study literature review and suggestions for implementation strategies are also included.

17. Key Words road diets, 4-to-3 lane conversions, crash modification factor, safety, operations		**18. Distribution Statement** No restrictions. This document is available to the public through the Michigan Department of Transportation.	
19. Security Classification - report Unclassified	**20. Security Classification - page** Unclassified	**21. No. of Pages** 58 + 230 (app)	**22. Price** N/A

Acknowledgement

This project was undertaken with funding from the Michigan Department of Transportation (MDOT). In addition, the contributions of numerous individuals with MDOT are acknowledged. These contributions included time spent in providing the authors with access to data and reviewing various documents and reports. Most importantly, the contributions of Tracie Leix, who shepherded this project from its inception to its completion, are noted.

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EXECUTIVE SUMMARY

Priorities for the design of roadways have shifted over the years—from a primary emphasis of increasing capacity to considering the purpose of streets and roads in the context of specific settings (and often referred to as "context sensitive" design). A technique that has gained popularity in recent years is the so-called "road diet" where traditionally-designed 4-lane roads with two lanes in each direction have been converted/reduced to three lanes (often with the addition of bike lanes) with one lane in each direction and a center left-turn-only lane. Such conversions have potential impacts on both travel delay and safety.

The objectives of the study are straightforward and focused on travel delay and safety for typical 4-to-3-lane conversions in Michigan:

1. Determine the safety-related impacts of the conversions.
2. Determine the delay-related impacts of the conversions.
3. Develop a statistically sound crash modification factor for conversions.
4. Develop a guideline that addresses/incorporates the results from the above that would be of assistance to MDOT and other agencies in deciding when it might be desirable to implement such "road diets."

While the report includes a literature and state of practice review, anecdotal observations regarding pedestrian and bicyclist use of road diets, and comments regarding the successful implementation of road diets in communities, this summary is focused on the operational and safety aspects of road diet implementation.

From the operational analysis of several Michigan road diet sites—

- The operational analysis of the several sites provide reasonably consistent results and support a guideline that suggests that 4-to3-lane road diet conversions result in significant increases in delay for **ADTs over 10,000**.
- More importantly, 4-to-3-lane road diet conversions increase delay when **peak hour volumes exceed 1,000**.

- However, it is clear that "local" conditions (e.g., varying geometry, significant variation in turning movements, and variations in cross-street traffic) can have a significant impact on the viability of any proposed road diet. Thus, while an initial culling of potential road diet sites can be accomplished using the general guidelines above, in all instances a detailed operational analysis of the corridor (including operations at each intersection) for both 4- and 3-lane sections should be undertaken before the road diet conversion is implemented.

From the safety analysis of selected 4-to-3 lane road diets in Michigan—

- There is considerable site-to-site variation in the crash-related results although in almost all instances, there was a reduction in the number of crashes.
- Examination of the background (e.g., citywide, countywide) trends showed that in all cases there was a trend toward lower crash frequencies over time.
- The most appropriate methods for controlling for background trends were a simple control for citywide trends and the consideration of comparison sites.
- Average crash modification factors (CMFs), adjusted for citywide trends, were calculated across all 24 sites. The result was that the overall naïve (unadjusted) CMF was estimated as 0.63, and **0.91** after adjustment. Considering only those crash types expected to be affected by the road diet (not necessarily only reduced), the CMF was 0.90. And, finally, considering only those crash types expected to be reduced by a road diet, the adjusted CMF was 0.59. Use of the latter is problematic since there are typically offsetting changes in crash type frequencies. Only the CMF for the "correctable" crashes was statistically different from 1.0.
- While **the best estimate of a usable CMF is 0.91**, it should be noted that this is not statistically different from 1.0 and is an average across all sites. Perhaps more importantly, there is a great deal of variation from site to site.

- Considering effects of other variables on the overall CMF, it was seen that there was not much change due to controlling for other variables except for adjacent land use—residential sites tended to have a lower CMF than mixed-use or commercial sites.
- Changes in crash severity due to road diets were examined and the distributional shift over all sites was estimated (and then compared to statewide changes). The finding was that although there was a slightly more substantial shift to less severe crashes for the road diet sites, it did not seem operationally significant. Moreover, the shift could have easily been due to changes in operating speeds or enforcement rather than the road diets themselves.

Road diets are a useful tool in the traffic engineer's arsenal of making streets and roads a more integral part of the community. As a part of broader plans, they open up "traditional" roads to greater use by pedestrians and, especially, bicyclists. In general, safety benefits can be expected but vary greatly from site to site. When corrected for citywide trends, the results here indicate that only a relatively modest CMF (0.91) is appropriate. This indicates that crash/safety benefits are likely to be considerably less than what is suggested by naïve comparison of before and after crash statistics. Similarly, the results reported here also suggest that operational analyses should always be performed early on in the consideration of a road diet proposal. Moreover, the commonly-quoted threshold ADT of 20,000 for consideration of a road diet should be lower (10,000) and, more importantly, realistic peak-hour analyses (based on actual counts) are much more useful. For the sites evaluated here, the peak-hour threshold volume is estimated as 1,000 vph although this could vary with varying volumes of cross traffic at intersections.

INTRODUCTION AND STATEMENT OF THE PROBLEM

Priorities for the design of roadways have shifted over the years—from a primary emphasis of increasing capacity to considering the purpose of streets and roads in the context of specific settings (and often referred to as "context sensitive" design). Examples of this shift can be seen with the increasing popularity of traffic calming, once the bane of traffic engineers for which the efficient movement of vehicles was the principal criterion, becoming widely accepted and applied. Another technique that has gained popularity in recent years is the so-called "road diet" where traditionally-designed 4-lane roads with two lanes in each direction have been converted/reduced to three lanes (often with the addition of bike lanes) with one lane in each direction and a center left-turn-only lane. Such conversions have potential impacts on both travel delay and safety. In this context, the basic question addressed in this study is "what are the impacts of such conversions in Michigan?" The results of the study will be of use to both MDOT and local road agencies.

OBJECTIVES OF THE STUDY

The original objectives of the study are straightforward and focused on travel delay and safety for typical 4-to-3-lane conversions in Michigan:

5. Determine the safety-related impacts of the conversions.
6. Determine the delay-related impacts of the conversions.
7. Develop a statistically sound crash modification factor for conversions.
8. Develop a guideline that addresses/incorporates the results from the above that would be of assistance to MDOT and other agencies in deciding when it might be desirable to implement such "road diets."

BACKGROUND AND SIGNIFICANCE OF WORK

Lane conversions/reductions are popular with many communities as the technique is viewed as a method that puts concerns of the local community, bicyclists, and pedestrians on a par with motorists passing through neighborhoods. The impacts of such conversions can include increased motorist delay, increases and/or decreases in crashes, and better access to

the transportation system for other user groups among others. Like new traffic signals, the impacts often appear to be situation-specific meaning that in some instances traffic crashes can be shown to increase while for others they decrease. The results of the study provide MDOT and other agencies with needed background information so that the outcomes of conversions in specific types of situations will be better understood.

While addressing different issues, work done under previous MDOT contracts on conversions of 2-way streets to 1-way pairs (Lyles et al. 2001) and the effect of new signals (Lyles et al. 1997) both showed that crash and operational changes varied according to the sites being considered. This same phenomenon was noted by Huang and others (2001) in a study of sites in California and Washington specifically for roads where a "road diet" was implemented. Results from several other studies showed that both crash-related and operational measures of effectiveness may vary. In the latter case, for example, if there are significant left-turn volumes on the corridor to be treated, but not particularly high through volumes, operational benefits can be accrued because of the separation of left turns into the center left-turn lane. However, if through volumes are high and the left-turning volume is not, elimination of a through lane can cause operational problems. In previous work done by Taylor for MDOT on road diets (2001), it was found that the crash reduction factor was 27.6% across all volume levels (which, at the time, compared favorably to the 25-30% reduction noted elsewhere). This included a consistent reduction in pedestrian and bicycle-related crashes. Not surprisingly, changes in delay were associated with the volumes on the treated street and the minor/side streets. When volumes were lower (e.g., in residential areas) delay increases were not significant but when major street volumes approach 2,000 vph and minor street volumes approach 200 vph, delay increases and becomes prohibitive.

One of the attractive characteristics of lane conversions is that it is a low-cost alternative—often consisting of only traffic signing and pavement marking changes. If crashes are reduced, benefit-cost ratios are very favorable. Even if there are negative operational impacts, the crash reduction potential may still trump increases in delay. The significant benefit of this project is that it provides MDOT and other agencies of a reliable source of information

that can be used in determining whether to propose (or support the proposal of others) lane reduction/road diets.

ORGANIZATION OF THE REPORT

The results of the project are presented in the pages that follow. Syntheses for the several tasks that were completed are presented in the body of the report with more complete results presented in appendices. The following are the sections to the report:

- The literature review includes both traditional technical literature and more informal information from various local studies/presentations on road diets. (See also Appendix A.)
- Results from (qualitative) on-site reviews of several (Michigan) sites focusing on use by pedestrians and bicyclists. (See also Appendix B.)
- An operational analysis of several Michigan sites which focused on determining traffic volume thresholds which indicate when road diets are contraindicated from a delay perspective. (See also Appendix C.)
- A safety-related analysis of 24 sites in Michigan which focused on developing a reliable crash modification factor (CMF) that could be used in determining whether a road diet is appropriate for a given site. (See also Appendix D.)
- Suggestions related to implementation of road diets at new locations were developed based on the experience gained in completing this project and on the experiences elsewhere. (See also Appendix E.)

STUDY SITES

While the mechanism for selecting sites for inclusion in this study is addressed in more detail later in the report, Figure 1 on the next page shows the general location of the 24 sites that were analyzed plus the additional sites (in East Lansing) that were visited to observe pedestrian/bicyclist use.

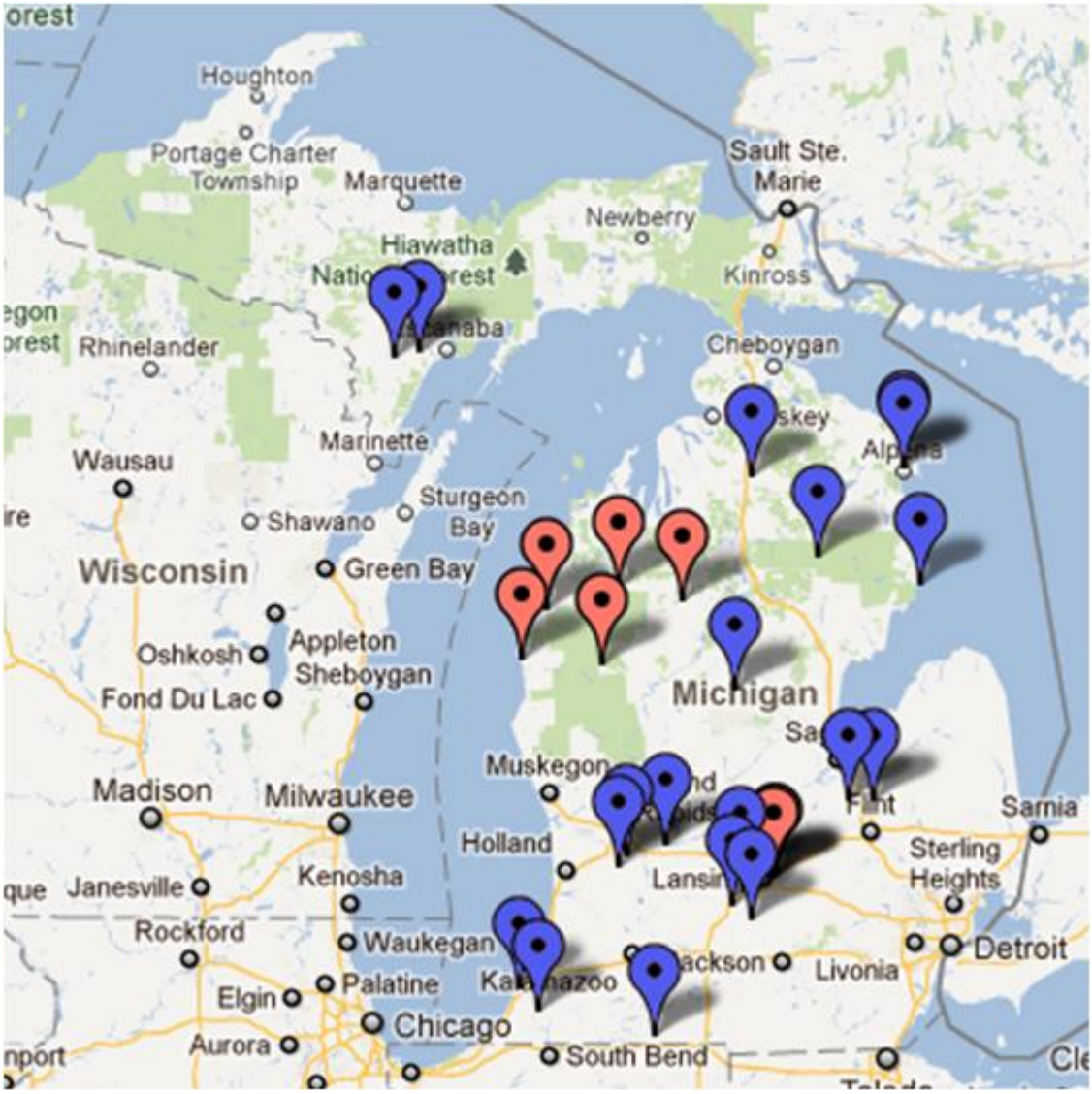


Figure 1. Study sites

The figure shows the sites that were used in the safety analysis in blue and, in red, the sites that were used in the safety analysis and visited as part of the review of pedestrian/bicyclist operations. The exception to the latter are the two (red) sites in East Lansing which were only part of the latter (the site markers overlap and are not visible in the figure). Graphical representations of each site are provided in Appendix F.

METHODS

Several different methods of analysis were utilized in this project and are briefly summarized below. Considerably more detail is provided in the appropriate section of the report.

- **Pedestrian and bicyclist operations.** These operations were qualitatively reviewed through on-site visits. Visual observations were made and recorded at several sites and some users were engaged in discussion although no formal survey instrument was used.
- **Operational analysis of road-diet sites.** Traffic operations of several road-diet sites were quantitatively assessed (using existing traffic data) to determine when potential level of service/delay issues occur when road diets are implemented. The widely-used Synchro software package was used to estimate delay and level of service for the selected sites under conditions of increasing traffic volumes. This was done to ascertain threshold values for when road diets may be contraindicated (from a delay/level of service perspective).
- **Safety-related analysis of road diet sites.** In the context of determining crash-modification factors (CMFs) for road diet implementation, before-and-after safety analyses were undertaken for several road diet sites. Both naïve and more sophisticated analyses were done including variations of case-control approaches where observed changes in overall and selected crash frequencies were controlled for background variation. Further details of these methods are presented in later sections of the report.
- **Acquisition of site information.** A straightforward survey instrument (Appendix G) was used to solicit information about tentative sites from MDOT and local agency personnel.

LITERATURE AND STATE-OF-PRACTICE REVIEW

The literature review included both a search of the traditional literature and a review of road-diet-related experiences in the field. The latter was identified from searching electronic media and following leads obtained from mailing lists and traffic professionals (several of whom could generally be perceived as "advocates" of road-diet-type projects). Some 33 different studies were reviewed for this project as well as several overarching reports. Details are provided in a study-by-study format in Appendix A.

Before discussing the literature, a point should be made about the variation in definition of various crash-related factors. Some practitioners/researchers use the term "accident modification factor" (AMF), while others simply refer to reductions in crashes or percent reductions, and still others use the now-standard "crash modification factor" (CMF). In this report, the latter terminology is used. So, in a comparison of before and after crash statistics, a CMF is correctly interpreted as that number which, when multiplied by the frequency of "before" crashes would give you the expected number of "after" crashes. Thus, the following apply:

- A typically-reported crash reduction percentage between before and after conditions (e.g., crashes were reduced by 15%) would be "converted" to a CMF as follows:

  CMF = 1 minus the percentage change.

  For example, if crashes were reduced by 15%, the CMF = 1 – 0.15 = 0.85. So, for positive improvements (crashes are reduced), the CMF < 1.0.

- If crashes increased, the percentage change (as normally reported) would be negative. In such a case the CMF > 1.0. For example, if crashes increased by 15%, the CMF is calculated as 1 – (-.15) or 1.15.

The most interesting findings from the literature review can be summarized:

- As a general statement, crash reductions are experienced with most installations and are most typically reported as percentage changes (CMFs would be < 1.0). There is, however, significant variation in the magnitude of the reductions.

- While there appears to be significant "random variation," variation is also introduced because of the great variety in the before/after geometry and operating conditions (e.g., variation in ADT, existing left-turn driveway volumes and adjacent land uses). If the ADT is relatively low and there are few left turns, there is likely to be very little crash reduction; on the other hand, if there are many head-on/left turn crashes, crash reduction is more likely to be substantial. While head-on/left-turn and rear-end/left-turn crashes often are reduced, other crash types such as rear-end/straight in the right lane often increase because of the increased volumes in the right lane (due to the 2-to-1 lane reduction in a given direction).

- Most authors did not report estimates of CMFs per se. The most reliable estimates of CMFs are generally thought to be found on the FHWA-funded website "crash modification factors clearinghouse" maintained by the University of North Carolina Highway Safety Research Center [http://www.cmfclearinghouse.org/]. CMFs posted at this site have been vetted to some degree and a "star rating" is used as a measure of reliability. From that source, road diets are estimated to result in the following CMFs for unspecified roadway types in urban areas: all crash types/all severity levels = 0.63; all crash types/all injury crashes = 1.0; all crash types/property-damage-only (PDOs) = 0.54; angle crashes/all severity levels = 0.63-0.76; and rear-end crashes/all severity levels = 0.59. Based on another study (referenced at the same website), an estimated CMF for all crash types and all severities for minor urban arterials is 0.71.

- Many, if not most, studies were naive in that there was no control for background variation in crash trends. In virtually all areas, the general change in crashes at road diet locations must be somehow adjusted for overall decreases in crashes in the surrounding areas during the study period. Otherwise, too much of the changes in crashes may be attributed to the road diet.

- Travel speed decreases were reported for several studies as a result of road diet implementation. While this would be expected given the more restrictive geometry and

a driver's inability to pass another vehicle, an unknown amount of the reduction could simply be due to lowered speed limits and/or increased enforcement.

- In addition to safety, road diets are also implemented as a part of other system changes such as an overall effort in traffic calming or as part of creating a pedestrian/bicyclist-friendly environment.

ON-SITE REVIEWS OF PEDESTRIAN AND BICYCLIST OPERATIONS

As part of the project, several road-diet sites were visited and operations were observed with primary attention being paid to pedestrian and bicyclist use/operations. The intention of this exercise was not to collect extensive quantitative information but rather to get a qualitative idea about how pedestrians and bicyclists are using road diets and their perceptions of how useful they are.

Since the goal was not necessarily to have a representative sample, the investigated road diet sites (see Figure 1 for general locations) were selected based on having "pedestrian/bicyclist safety" identified as one of the motivations for implementing the road diet project (as per responses to the data collection survey) and close proximity from site to site (so that they could be visited in a short time-frame). Five of the eight sites that were visited were located in the northwestern part of Michigan (Cadillac Transportation Service Center [TSC]) and the others were in the East Lansing area:

- M-37 in Baldwin from the US-10 junction extending approximately 200 ft. south of 9th Street;
- M-55/M-66 in Lake City from W Beeler Road to Union Street (Davis Road);
- M-37/M-115 in Mesick from the M-115/M-37 junction to Clark Street;
- US-31 in Manistee from the M-55 junction extending approximately 300 feet northeast of M-110;
- M-116 in Ludington from US-10 to approximately 500 feet north of Lowell Street;
- Burcham Road in East Lansing from Abbot Road to Timberlane Street;
- Abbot Road in East Lansing from Albert Avenue to Whitehills Drive; and
- M-43 in East Lansing from Michigan Avenue to 200 feet northwest of Audubon Road.

For the five sites located within the Cadillac TSC area, visits were conducted during a major holiday weekend (high use expected) to gain as much insight as possible regarding impressions of operations and safety. For the sites located in East Lansing, visits were done during peak usage hours during the day. The primary focus was to investigate pedestrian/bicyclist use and a secondary focus was to investigate pedestrian/bicyclist-motorist interactions. More detailed

observations are provided on a site-by-site basis in Appendix B. The following remarks are based on all of the visits.

- Not surprisingly, a lack of pedestrian and bicyclist infrastructure along a road diet results in low levels of non-motorized use of the corridor. This was most evident at the Manistee site, which, despite listing pedestrian safety as a rationale behind conversion, did not have bike lanes or sidewalks over the length of the site.
- The two most notable characteristics of a well-functioning road diet with significant non-motorized use (besides simply having infrastructure) were the presence of pedestrian-oriented attractions and successful traffic calming:
    - Placement along corridors with commercial and pedestrian attractions:
        - The Lake City road diet was along a residential corridor of the road, just south of the city's commercial core. Despite having the infrastructure and observations being made during one of the busiest weekends of the year, there was very little pedestrian activity along the road diet, as there were no notable pedestrian-oriented attractions present; instead, all of the pedestrian activity took place north of the site, along the commercial strip of town.
        - The road diet in Baldwin ended just before reaching the main commercial district in town, therefore it had no apparent impact on pedestrian traffic.
        - While there was little activity observed during the visits to the Mesick site, it appeared (based on the signage, crosswalk locations, and proximity of a public school) that when school is in session, there is a reason for pedestrians and bicyclists to use the road diet infrastructure.
        - The Ludington site was adjacent to a public beach, which acted as a significant pedestrian generator for the road diet corridor.
        - The Burcham Road and Abbot Road sites in East Lansing both attracted a fair amount of pedestrian and bicyclist use by students from the nearby schools and Michigan State University (all of which were in session).

- Successful traffic calming:
  - Through observation and from conversations with local residents, the main cause of the increase in pedestrian usage of the Ludington site was the perception of "calmed" traffic. While the corridor has largely residential land use, the adjacent public beach had always acted as an attraction of pedestrians and bicyclists. Since the traffic was perceived to be moving more slowly (as a result of the road diet), the road was easier to cross and walk along, encouraging beachgoers to walk or bike there, rather than drive and use the parking lot.
  - Although the site in Baldwin was in a commercial area with pedestrian destinations, the road diet did not appear to be designed so that motorists perceived the need to slow down in the corridor, making it appear unsafe to cross or bike along.
  - At the Mesick site, even though the observed pedestrian traffic was low, the road diet appeared to have successfully calmed traffic—just by walking up and down the corridor, it seemed safe for pedestrian and bicyclist activity.
  - At the Burcham Road site, the local crossing guard remarked that she thought the road diet was unsuccessful at calming traffic, thus rendering the implementation somewhat of a failure.

- In several conversations with residents and in observations (both at various sites) of interactions between motorized and non-motorized traffic, it was apparent that there was an intentional lack of proper usage of the road diets by their users and/or a lack of knowledge of what usage is allowed.
  - Bicyclists were often observed riding on sidewalks rather than using the unmarked bike lanes. Pedestrians were also occasionally observed using bike lanes, even when there was an adjacent sidewalk. There appeared to be a better understanding of the purpose of bike lanes at the sites in East Lansing, where there were appropriate pavement markings.
  - There was a perceived lack of clarity regarding right-of-way at crosswalks along the road diets. Typically, motorists correctly assumed they had the right of way;

residents complained, however, that crossing was difficult when vehicles did not routinely yield to pedestrians (most notably in Ludington) even though the motorists actually had the right of way.

- Motorists occasionally used the two-way left-turn lane (TWLTL) as a waiting (or acceleration) lane in making left turns from a driveway or side-street onto the road diet.
  - On occasions when the TWLTL was used as a waiting/acceleration lane to turn into the far moving lane, motorists in the far lane appeared indecisive, perhaps thinking they were about to be cut off.
  - On a few occasions, motorists were seen making left turns from the right moving lane, rather than moving into the TWLTL and then making the left.

While generally "common sense," the following overarching comments are based on the on-site visits to (qualitatively) assess pedestrian/bicyclist use of road diet sites:

- provisions for pedestrians and bicyclists are most important when there are existing pedestrian/bicyclist generators on the site and/or when the road diet is part of a larger plan for an area;
- if pedestrian/bicyclist provisions are included in the road diet area, they need to be clearly and consistently marked; and
- there appears to be a need for additional information/education regarding appropriate use of the road and pedestrian/bicyclist facilities at road diet sites (by both pedestrians/cyclists *and* motorists), including the use of signs clearly indicating crosswalks and bike lanes at road diet sites.

OPERATIONAL ANALYSIS OF SEVERAL ROAD-DIET SITES

The objective for the operational analysis was to determine if there was a common traffic volume at which the 4-to-3 lane conversion will "fail" from a traffic operations perspective (e.g., level of service [LOS] will drop to D or below). The general rule of thumb is that a road diet should not be implemented when ADT exceeds 20,000 vehicles per day. Since the peak hour is not necessarily always the same fraction of ADT (e.g., in a tourist-oriented area, there may be a more uniform flow over the course of a day), the approach taken for this project was to look at the volume that leads to failure over the course of an hour. Examination of the limits of the traffic volume for which a road diet is appropriate is important since it is a question that typically comes up when road diets are proposed—e.g., will the lane reduction cause congestion; what happens when capacity is reduced?

The conversion of 4-lane to 3-lane sections will impact traffic operations in terms of intersection approach delay. The question is: At what volume does this degradation result in failure of the 3-lane section? To investigate this, a basic operational analysis was conducted using Synchro. The measure of effectiveness (MOE) used to evaluate and compare the operational differences between 4-lane and 3-lane sections for a given traffic volume was approach delay in sec/veh.

Nine signalized intersections from five study sites were used for analysis and are shown in Table 1. The existing data for signal timing, phases and peak hour traffic volumes, along with intersection geometry were obtained and used for the Synchro models.

Table 1. Sites/intersections used for Synchro analysis

Site #	County	City	Intersection
1	Alpena	Alpena	US-23 @ 11th Ave
8	Eaton	Charlotte	Lansing Rd @ Hall St/ Island Hwy
9	Eaton	Eaton Rapids	M-99 @ State St
			M-99 @ Knight St
			M-50 @ Canal St/Brook St
11	Genesee	Clio	M-57 @ Mill St
			M-57 @ Plaza Dr
13	Genesee	Montrose	M-57 @ Saginaw St
			M-57 @ Seymour Rd

The volumes for AM and PM peak hours were obtained, and the analysis was conducted for the worst case (i.e., the higher overall volume). In all instances, the PM peak hour was highest. The existing turning volume percentages for each approach were determined and held constant throughout the analysis. An analysis of existing conditions was done for each site and results were checked for any major issues such as high delay or queue length values (there was none). Once baseline conditions were established, each intersection was then subjected to increasing increments of mainline (road diet) volume to determine when "failure" would occur. The volume increments were 750, 1000, 1250, 1500, 1750, and 2000 vph.

The following assumptions were made:

- The volume increments were for the mainline road-diet approaches only instead of all four legs to avoid a rapid decline in intersection performance at relatively low volumes. In most instances, the non-road-diet approaches were already 3-lane sections and increasing their volumes by the same level would have made the intersection difficult to operate.
- Since it was desired to check the behavior of a 4-to-3-lane conversion at specific traffic volumes, the volume on those approaches was not increased by a fixed percentage, but rather by the same magnitude on both intersection approaches with the road diet.
- The existing signal phasing was used for the study; however, in some cases where the turning volumes were high (>100 vph) a turning bay or storage lane was provided to avoid interference with the mainline traffic. Without storage lanes, the approach delay exceeded LOS F (>80 sec/veh) at very low mainline volumes which was not realistic.
- The signal timings and splits were optimized for each mainline increment to obtain the minimum intersection delay.
- No parking was allowed on any of the intersection approaches.
- A heavy-vehicle percentage of 2% was used throughout. While in some cases this was a bit different from actual data, 2% was used for a uniform comparison.
- The upper limit of LOS D (55 sec/veh delay) was used as a threshold.

The approach delay vs. mainline volume increments (for each road-diet approach) were plotted for all intersections and visually examined to determine the critical volume associated with "failure." See the figure below for an example and Appendix C for results from all sites.

The graph below (Figure 2) shows the approach delay for both 4- and 3-lane sections (existing conditions [blue line] and road diet [red line]) as the mainline volume is varied from 750 to 2000 vph for a signalized intersection at site 9 (northbound direction). In this instance, the approach delay is less then 20 seconds/vehicle for both types of road when the mainline volume is less than 1000 but performance begins to degrade more rapidly for the 3-lane section for mainline volumes of 1250 and 1500 and very quickly beyond that. Graphs similar to this one are shown in Appendix C for each of the sites analyzed.

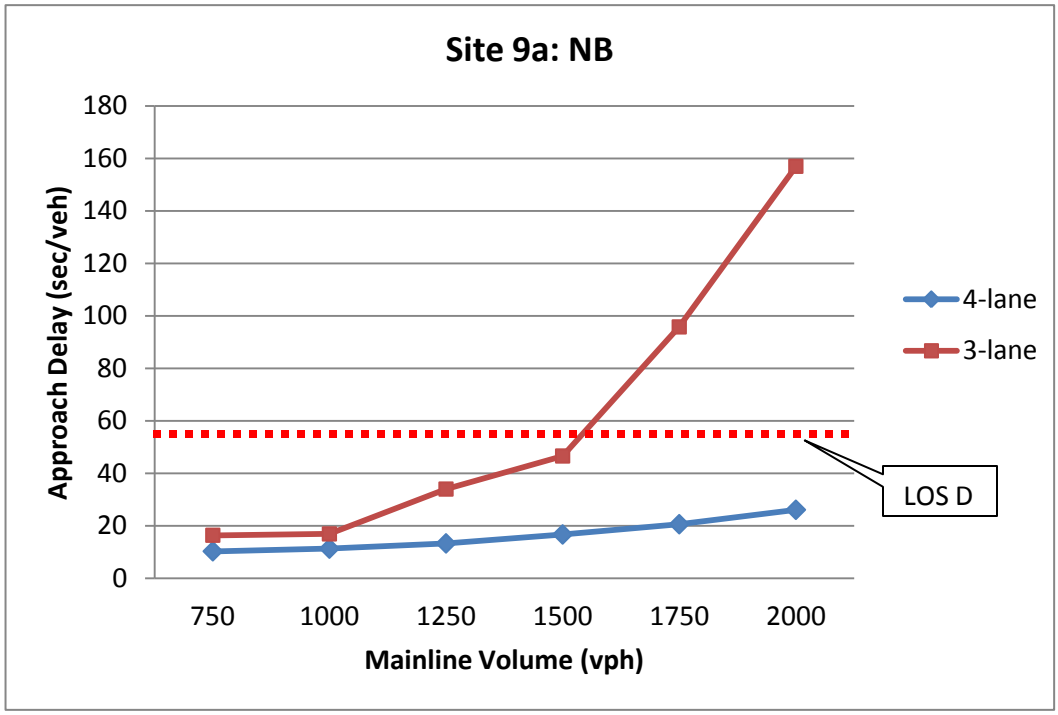


Figure 2. Typical results of approach delay versus mainline volume increments

The results (for all analyzed sites) indicate that for all cases, the approach delay for a road diet stays similar to the 4-lane section up to a mainline volume of approximately 1000 vph. When the mainline volume is increased from 1250 to 1500 vph, for most cases the approach delay for 3-lane sections increases and approached LOS D. It should be noted that the delay

results for the two different approaches (e.g., NB vs. SB) for a single intersection may be different. For example, for site 9 (Eaton Rapids), the intersection of M-50 (road diet) and Canal Street/Brook Street has very different delay thresholds for the 3-lane sections for the two approaches. This is attributed to heavy left-turn volume for one approach. Notwithstanding such differences, for most cases the trends are similar for both approaches if the turning volume patterns are similar. For all the 4-lane cases, the approach delays are relatively low and typically stay below the 55 sec/veh threshold for volumes up to ~2000 vph. An obvious reason for this "better" performance for 4-lane sections is more capacity; however, another factor could be the use of turning bays at the intersections and corresponding optimized signal timings. If there are no storage or turning lanes, the approach delay would increase significantly for 4-lane sections.

Table 2 shows a summary gleaned from the results of the Synchro analysis (over all six sites). In general, if the mainline volume increased beyond an interpolated value of 1000-1100 vph for these sites (consistent with the other assumption showed above), the conversion from 4-lane to 3-lane sections will typically have a negative impact on the traffic operations in terms of approach delays. Using a K factor of 0.10 for conversion from peak hour to ADT yields an ADT of 10-11,000 veh/day. This is considerably lower than the 20,000 ADT which appears to be a widely used rule of thumb. The results here suggest that an ADT of greater than 10,000 would be a better figure to use as a critical ADT where a road-diet conversion for a particular site requires detailed operational evaluation. For all of the 3-lane study sections, the average mainline volume was 1500 vph (corresponding ADT of 15,000 vpd) at which the approach delay reached the threshold of 55 sec/veh.

A corridor-level operational analysis study using microscopic simulation models (e.g., VISSIM) would provide an even more detailed evaluation of the operational impacts of a proposed road diet. More detained operational analysis can incorporate multiple factors (e.g., varying levels of heavy traffic volumes, turning movements at the intersection).

Table 2. Interpolated mainline volumes (vph) when approach delay ≥ 55 sec/veh (≥LOS D)

Site #	County	City	Intersection	Interpolated Mainline Volume at Threshold Delay (≥ 55 sec/veh)			
				4-lane		3-lane	
1	Alpena	Alpena	US-23 @ 11th Ave	SB		SB	
				-		1750	
8	Eaton	Charlotte	Lansing Rd @ Hall Street/ Island Highway	NE	SW	NE	SW
				-	-	1600	1550
9	Eaton	Eaton Rapids	M-99 @ State Street	NB	SB	NB	SB
				-	-	1550	1550
			M-99 @ Knight Street	NB	SB	NB	SB
				-	-	1350	1350
			M-50 @ Canal Street/Brook Street	SE	NW	SE	NW
				-	1750	1850	1100
11	Genesee	Clio	M-57 @ Mill Street	EB	WB	EB	WB
				-	-	1150	1300
			M-57 @ Plaza Drive	EB	WB	EB	WB
				-	-	1300	1800
13	Genesee	Montrose	M-57 @ Saginaw Street	EB	WB	EB	WB
				-	-	1350	1650
			M-57 @ Seymour Road	EB	WB	EB	WB
				-	-	1700	1650

The important summary points from the operational analysis include the following:

- The operational analysis of the several sites provide reasonably consistent results and support guidelines that suggest that 4-to-3-lane road diet conversions become problematic for **ADTs greater than 10,000**.
- More importantly, 4-to-3-lane road diet conversions result in increased delay for **peak hour volumes between 1,000 and 1,500**.
- However, it is clear that "local" conditions (e.g., varying geometry, variation in turning movements, and variations in cross-street traffic) can have a significant impact on the viability of any proposed road diet. Thus, while an initial culling for potential road diet sites can be accomplished using the general guidelines above, in all instances a detailed operational analysis of the corridor (including operations at each intersection) for both

4- and 3-lane sections should be undertaken before the proposed road diet conversion is implemented.

A SAFETY-RELATED ANALYSIS FOR SELECTED 4-TO-3 LANE ROAD DIETS

The overarching purpose of the project was to estimate a crash modification factor (CMF or CMFs) that could be used to estimate crash savings that result from the implementation of 4-to-3-lane road diets in Michigan. From the outset it needs to be clear that road diets can have any of the following results (or combinations of results):

- decreases in crashes since, for example, left-turning vehicles are moved out of a through lane and into the reserved turning lane (the TWLTL) at mid-block non-intersection locations;
- increases in crashes since two lanes of through vehicles are moved into a single through lane (e.g., rear-end crashes in the right-hand lane become more likely simply due to higher volumes in the lane);
- decreases in pedestrian and bicyclist crashes because of the provision of better infrastructure for these users; and
- increases in pedestrian and bicyclist crashes since such users/trips are attracted to the improved infrastructure.

In addition, crash increases or decreases can vary substantially given the prevailing ADTs, road usage patterns, adjacent land uses (e.g., are there pedestrian/bicyclist attractors adjacent to the road diet site), turning volumes (especially mid-block), peak hour characteristics, and type of area (e.g., tourist area, university campus, small town) among others. Finally, background variation in crash frequencies (e.g., all crashes are steadily decreasing in a particular city) must be considered when trying to isolate the effect of a road diet.

The point is that there is likely to be significant variation in existing conditions prior to the implementation of a road diet. Crash savings (if there are any) are, likewise, likely to vary substantially with all of these variables.

In this section, the development of a crash modification factor (CMF) for selected 4-to-3 lane road diet sites in Michigan is documented:

- first, site selection is reviewed;
- next, data collection and reduction (e.g., reclassification of crash types) are discussed;
- then, the data analysis is presented including consideration of various methods for controlling for background trends in crash history; and,
- finally, a general CMF for road diets in Michigan is presented.

SITE SELECTION

Site selection for this project was developed through a general solicitation of sites from various MDOT personnel (e.g., TSC and/or regional traffic engineers) and local agencies. MDOT personnel had developed a tentative contact list which was supplemented with suggestions from others. A survey (see Appendix F) was sent to the list with the purpose of identifying potential sites, locations of the road diets, basic information about the site (e.g., type of road diet such as 4-to-3 lane reductions), the reasons for implementing the road diet, start and end dates for the actual implementation, and other basic data. Some 43 initial sites were eventually identified via the survey. Although it had originally been envisioned that different types of road diets might be included in the study, review (with MDOT) of the set of sites that emerged from the survey led to the conclusion that the study be limited to the "standard" 4-to-3 lane road diet conversions.

Some sites were eliminated because they were too recent to have adequate (three years) "after-implementation" data. Other sites were too old to have crash data that were consistent with data for all other sites. Other reasons for eliminating sites included: length too short, other recent site changes, inconsistent or no ADT data, and on-street parking allowed. For the final analysis, a total of 24 sites were generally used. For some of the analysis (e.g., on-site visits to observe pedestrian/bicyclist operations) some older sites were used while for other parts of the analysis, some of the 24 were not used. The latter is discussed in more detail below. Locations of all of the sites (including some that were only visited) were shown earlier in Figure 1. A copy of the spreadsheet for each of the 24 sites used in the crash analysis is in Appendix D.

DATA COLLECTION AND REDUCTION

Once the sites had been identified and agreed-upon, crash data were retrieved for each site (both for the mainline and cross streets near the intersections) as were ADT and other traffic data (e.g., turning data for some sites for the operational analysis). In addition to the electronic crash records, the "hard copies" of all of the relevant UD-10s were retrieved so that the actual crash diagram and narrative could be examined for each crash. This allowed, for example, for a determination of whether cross-street crashes were correctly assigned to the intersection or the cross street itself (and back from the intersection)—i.e., were these crashes at all associated with the road diet.

In addition, crashes were "reclassified" using a more-detailed assignment so that the effects of the road diets could be more accurately assessed. An example of this "reclassification" is assigning a rear-end/straight crash to the right or left lane during the "before" period. Further, crash categories were classified as whether they were expected to be: 1) "correctable" by a road diet (e.g., a rear-end left-turn crash in the left lane which should be corrected with a road diet since the turning vehicle would be out of the regular travel lane as a result of the road diet); or 2) affected by the road diet (e.g., rear-end crashes in the curb lane might increase). Note that while "correctable" crashes are a benefit, the affected crashes might either increase or decrease. Details of the reclassification scheme can be seen in Appendix G.

During the review of the crash data, some crashes were eliminated from consideration in the subsequent analysis. For example, if the crash didn't have anything to do with the roadway or its geometry, it was eliminated. Examples of such an elimination include a crash where a driverless vehicle rolled out of a driveway and crossed the entire roadway before crashing; and another where a police traffic stop resulted in the admission by the (inebriated) driver that she had been involved in a crash "somewhere" within the preceding hour or so, and the crash was coded to the street where the stop occurred. Other crashes that were eliminated included those with animals, those that occurred during (any) construction, and those that occurred on (or were otherwise attributable to) the side streets.

DATA ANALYSIS

Once all of the data had been prepared and reconciled, the analysis was relatively straightforward except for the control for background trends. The data used for any site is illustrated in the spreadsheet on the next page (site 11). Copies of the spreadsheets for all 24 sites are in Appendix D.

With reference to the information shown on the next page, the top section contains a summary of the basic **site characteristics** for site 11 (e.g., county, city, road name). The next section contains the **descriptive statistics** which include the basic crash frequencies by before and after period (and further broken down by year) as well as all of the crash information for background trends (e.g., crashes for the city and county over the same time period). The third section shows a **naïve before/after crash analysis** (no correction for trends) including a graphical representation of the crash frequency by year for the site. The fourth section shows the **before/after crash analysis with a simple adjustment for various background trends**. The final section (only available for some sites) shows the **before/after crash analysis adjusted for trends of an untreated comparison group**. Each of these sections is discussed in more detail in the following paragraphs.

Site characteristics, in addition to simple identification of the site, are also used for grouping similar types of sites when the CMF is developed—for example, the number of driveways, intersections, and average daily traffic (ADT).

Descriptive statistics include all of the basic crash information for the site. For each site, three-year before and after windows are shown. While, in most, if not all, instances the construction duration was short-lived, the crash data for the entire year during which the construction/implementation of the road diet occurred are eliminated from the analysis. Thus, each year in the before-after window for every site is a full calendar year and all before-after comparisons are based on three full years before and after the construction year. This eliminates any issues with one site being completed in the spring while another is completed in the fall. In addition to the overall crash frequencies, crash data are also broken down by

Site Characteristics

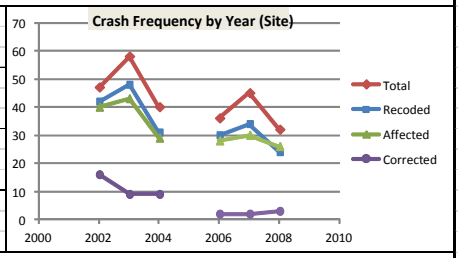
Site No.	11	Length (mi)	1.46
County	Genesee	Land Use	Mixed commercial-residential
City	Clio	No. of Driveways/Intersections	80/12
Route/Road Name	M-57	Treatment Type	Repaving within existing curbs with new markings
PR/CS No.	1494503/25101		
BMP	9.400	Nearest Cross Street	Washington St.
EMP	10.856	Nearest Cross Street	Liberty St.

Descriptive Statistics

	Before Period			After Period		
Year	2002	2003	2004	2006	2007	2008
ADT	14628	14614	14892	13726	13466	16108
Crash Frequency (Total)	47	58	40	36	45	32
Crash Rate	6.05	7.47	5.05	4.94	6.29	3.74
Crash Frequency (Recoded)	42	48	31	30	34	24
Crash Frequency (Intersection-related)	5	8	3	5	5	6
Crash Frequency (Driveway-related)	10	5	7	2	6	0
Crash Frequency (Affected by Road Diet)	40	43	29	28	30	26
Crash Frequency (Corrected by Road Diet)	16	9	9	2	2	3
Crash Frequency (Background, Countywide)	14306	14066	13285	10458	10701	10180
Crash Frequency (Background, Citywide)	44	63	46	43	44	43
Crash Frequency (Background, Trunklines-Countywide)	1854	1854	1752	1400	1321	1218
Crash Frequency (Background, Trunklines-Citywide)	33	39	24	18	30	20

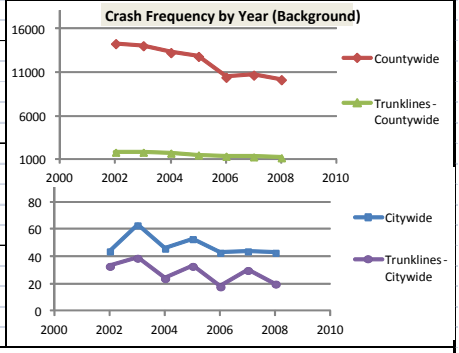
Crash Analysis Method: Simple (Naïve) Before/After Analysis

Average Crashes per Year (Before)	48.33
Average Crashes per Year (After)	37.67
Percentage Change	-22.07%
Average Crashes per Year (Recoded, Before)	40.33
Average Crashes per Year (Recoded, After)	29.33
Percentage Change	-27.27%
Average Crashes per Year (Affected, Before)	37.33
Average Crashes per Year (Affected, After)	28.00
Percentage Change	-25.00%
Average Crashes per Year (Corrected, Before)	11.33
Average Crashes per Year (Corrected, After)	2.33
Percentage Change	-79.41%



Crash Analysis Method: Before/After Comparison with Background Trends

Background Area Location (County, City)			
Average Crashes per Year (Countywide, Before)	41657	Average Crashes per Year (Site, Before)	48.33
Average Crashes per Year (Countywide, After)	31339	Average Crashes per Year (Site, After)	37.67
Percentage Change Overall Countywide	-24.77%	Percent Change (Site, Before/After)	-22.07%
Projected Average Crashes per Year using Countywide Background (Site, After)	36.36		
Percent Change for Site Adjusted for Countywide Background	2.70%		
Average Crashes per Year (Citywide, Before)	153		
Average Crashes per Year (Citywide, After)	130		
Percentage Change Overall Citywide	-15.03%		
Projected Average Crashes per Year using Citywide Background (Site, After)	41.07		
Percent Change for Site Adjusted for Citywide Background	-7.04%		
Average Crashes per Year (Trunklines-Countywide, Before)	5460		
Average Crashes per Year (Trunklines-Countywide, After)	3939		
Percentage Change Overall Trunkline-Countywide	-27.86%		
Projected Average Crashes per Year using Trunklines-Countywide Background (Site, After)	34.87		
Percent Change for Site Adjusted for Trunklines-Countywide Background	5.79%		
Average Crashes per Year (Trunklines-Citywide, Before)	96		
Average Crashes per Year (Trunklines-Citywide, After)	68		
Percentage Change Overall Trunkline-Citywide	-29.17%		
Projected Average Crashes per Year using Trunklines-Citywide Background (Site, After)	34.24		
Percent Change for Site Adjusted for Trunklines-Citywide Background	7.10%		



Crash Analysis Method: Before/After with Comparison Group

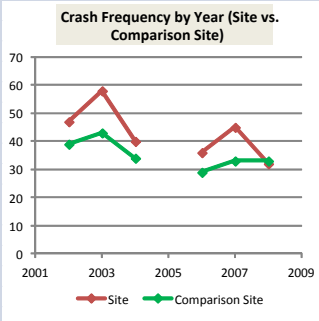
Comparison Site Location (County, City)	Shiawassee, Owosso	Route/Road Name	M-52
PR/CS No.	551706		
BMP	16.299	Nearest Cross Street	Main St.
EMP	17.759	Nearest Cross Street	Laura Ln.

Descriptive Statistics

	Before Period			After Period		
Year	2002	2003	2004	2006	2007	2008
Crash Frequency (Total)	39	43	34	29	33	33

Crash Modification Factor Computation

Sample Odds Ratio (year 1-2)	0.86	
Sample Odds Ratio (year 2-3)	1.09	
Mean of Sample Odds Ratios	0.98	
Standard Error of the Sample Odds Ratios	0.17	
95% Confidence Interval of the Sample Odds Ratio [LL, UL]	0.65	1.30
N-observed,T,B [total observed no. of crashes in before period for treatment group]	145.00	
N-observed,T,A [total observed no. of crashes in after period for treatment group]	113.00	
N-observed,C,B [total observed no. of crashes in before period for comparison group]	116.00	
N-observed,C,A [total observed no. of crashes in after period for comparison group]	95.00	
N-expected,T,A [expected no. of crashes that would have occurred in after period w/out treatment]	118.75	
Variance of N-expected,T,A	367.25	
Crash Modification Factor (CMF)	0.93	
Variance of CMF	0.03	
Standard Error of CMF	0.17	
95% Confidence Interval of the CMF [LL, UL]	0.60	1.26



whether they are intersection- or driveway-related and whether they are correctable or affected. Background data for assessing citywide and countywide trends are also shown. Finally, citywide-trunkline and countywide-trunkline trends are also shown. These can be used to "adjust" the basic before-after comparisons for background trends/variation (addressed below).

The **naïve before/after crash analysis** is a simple comparison of the three-year before and after crash frequencies. (Again, note that percentage reductions [in crashes] are discussed here—the percentage reductions in crashes can be converted to CMFs using the formula where the CMF = 1 – [percent reduction].) A percentage change (based on the before period) is also shown. In addition, similar numbers are shown using recoded crashes and then limiting the crash types to those that are presumed to be affected or correctable by the road diet. A graphical comparison of before and after frequencies is also shown (for total crashes, recoded crashes, affected crashes, and correctable crashes). It should be noted that the results shown for site 11 are fairly typical:

- Considerable year-to-year variation in crash frequencies are noted during both the before and after periods.
- In general, the crash frequencies are lower in the after period than during the before period. If there was no background variation, this would suggest that road diets result in significant crash reductions, regardless of which general group of crashes is examined.
- Crash reductions for "correctable" (by a road diet) crashes are the most substantial—a not-unexpected outcome.

The **before/after crash analysis with a simple adjustment for various background trends** is a consideration of the proposition that some of the observed reduction in crash frequencies is not because of the road diet but rather due to other causes (which may not be known). Background trends are shown for the county in which the road diet is located, for the city, and considering trends in only trunkline crashes for both the county and city. The trunkline trends were added since most of the road diets to be analyzed were on trunklines.

Various arguments can be made for which background trend "best" represents the overall environment for the road diet. After considering all of the sites, it was decided that the citywide trend is the most reasonable and realistic to use as the indicator of what else is occurring in the background of the implementation of the various road diets. The county level includes many roads that are quite different (in design and use) from those being "dieted" and, in some instances, may even include other larger urban areas. For this reason, the countywide data are not considered as representative as the citywide data. In addition, for some sites (in smaller cities), the trunkline category may primarily consist of the road diet site. Thus, the following analysis is based on using the "city trend" as indicative of the environment in which the road diet is undertaken. In each instance, the adjusted percentage change is also shown. That is, what is the effect of the road diet after considering (subtracting out) the background trend. Again, what is shown for site 11 is fairly typical of other results (see Appendix D for all sites):

- There is some year-to-year variation in background trends (i.e., the trend lines shown are not flat or monotonically increasing or decreasing).
- Notwithstanding year-to-year variations, the overarching background trends are that crash frequencies are decreasing.
- The simple (naïve) before-after trends associated with road diet implementation need to be adjusted for the general downward trend in crash frequency being experienced in the various cities where road diets were implemented.
- A considerable portion of the reduction in crash frequency that would be attributed to the road diet under a naïve scenario is accounted for by the background trend. For example (considering site 11 as shown), the average number of crashes per year is reduced from 48.3 to 37.7 or ~22% for the road diet site; but citywide crashes decreased from 153 to 130 or ~15%. Thus, much of the reduction on the road diet site is presumably attributable to the background trend—the modified crash reduction due to the road diet is reduced to ~7% (which corresponds to an adjusted CMF of 0.93).

The **before/after crash analysis adjusted for trends of an untreated comparison group** (last section in the example shown) is another attempt at controlling crash reduction for background trends. In the narrative here, the term CMF is used. As noted earlier, a CMF is used to estimate the number of crashes expected at a site following the implementation of a countermeasure or treatment. In addition to the naïve before/after analysis and comparison with background crash trends, the CMFs for each of the 24 project sites were computed. FHWA's 'A Guide to Developing Quality Crash Modification Factors' (Gross et al., 2010) provides several methods to compute crash modification factors and functions including before/after with comparison sites, empirical Bayes, and full-Bayes studies. While these (and other) methods differ primarily in statistical approach to modeling the crash data, a fundamental requirement for most methods is the availability of data for a group of "comparison sites" which are very similar to the "treatment sites" in physical and operational aspects.

To conduct a before/after analysis with a comparison group, comparison sites were identified using various characteristics such as length of road diet, area type (residential, commercial, or mixed), driveway and intersection density, number of lanes in the before period (including similar bike/pedestrian facilities), treatment year, and ADT. Given the practical difficulties in achieving ideal pairs of comparison and treatment sites, this exercise resulted in the identification of 17 potential comparison sites for 9 of the 24 treatment sites (multiple comparison sites were identified for six treatment sites). Crash data for comparison sites in the before period were then extracted to ascertain suitable matches with specific treatment sites.

In order to determine the suitability of the treatment-comparison pairs, sample odds ratios were computed using the crash data in the before period. The mean, standard error, and 95% confidence intervals of the sample odds ratios were computed to determine if crash frequencies at the comparison site were statistically similar to the treatment site in the before period. This crash data comparison further reduced the number of suitable comparison sites to five to match with the following treatment sites: 1, 3, 8, 11 (shown above), and 13.

For the five treatment sites for which the sample odds ratios resulted in viable comparison sites, the expected number of crashes that would have occurred in the after period

without treatment (N-expected,T,A) was computed. The CMF was then computed based on the observed number of crashes in the after period for treatment sites (N-observed,T,A) N-expected,T,A, and the variance of N-expected,T,A (Gross et al., 2010). The variance, standard error, and 95% confidence interval of the CMF were also computed.

The CMF for site 11 (see above) was computed to be 0.93 with a 95% confidence interval of 0.60-1.26. Since the confidence interval includes the value of 1.0, it cannot be stated with 95% confidence that the true value of the CMF is not 1.0. In other words, the treatment did not have a statistically significant effect in reducing the crashes at this site. By way of comparison, the naïve before/after analysis shows a decrease of ~22%, and comparison with background crashes shows a range from a **~7% reduction** when adjusted for citywide crashes to an **increase of ~7%** when adjusted for citywide trunk line crashes. A graphical illustration of the crash trends for site 11 and the comparison site is also shown.

For site 1 (see Appendix D), the CMF was computed as 0.98 with a 95% confidence interval of 0.62 and 1.35. Again, since the confidence interval contains the value of 1.0, it cannot be stated with 95% confidence that the true value of the CMF is not 1.0. In other words, the treatment did not have a statistically significant effect in reducing the crashes at this site. While the naïve before/after analysis shows a decrease of 15.6%, the uncertainly of the treatment effect is somewhat evident from the comparison with background crashes where the effect of treatment yields a reduction of 6.11% when adjusted for countywide crashes, and shows an increase of 6.07% when adjusted for citywide crashes.

For site 3 (see Appendix D), the CMF was computed to be 0.83 with a 95% confidence interval of 0.58 and 1.07. The results relative to the confidence interval are the same as above. The naïve before/after analysis shows a decrease of 34.03%, and comparison with background crashes shows a wide range from 20.58% reduction when adjusted for countywide crashes, and a reduction of only 2.34% when adjusted for citywide trunk line crashes.

The CMF for site 8 (see Appendix D) was computed to be 0.97 with a 95% confidence interval of 0.61 and 1.33. Again, these results are similar to those noted above. The CMF for site 13 (see Appendix D) was computed to be 0.80 with a 95% confidence interval of 0.48 and

1.12, so the results are similar. Overall, the CMFs computed using the before/after analysis with comparison groups were not found to be significant for any site.

The outcome of the exercise using comparison sites to adjust the percentage of crash reductions and/or the CMFs was somewhat disheartening. While it seems intuitively clear that there is some reduction in crashes due to road diets, the results of the most-detailed analysis indicated that it was not statistically significant. However, that analysis is highly dependent on the comparison sites that were selected. It was impossible to find sites that were an exact match for the road diets studied, notwithstanding some measure of statistical fit. Roadway segments upstream and downstream from the road diets were considered as were parallel routes; all to no avail. Sites in different locations were considered and those chosen were the "best possible," but far from perfect. The dilemma was whether to go forward with developing recommended CMFs which may not be statistically defensible. The decision was to go forward and, to the extent possible, develop CMFs based on citywide trends in crashes during the before and after periods. The caveat regarding the suitability of comparison groups being noted.

ESTIMATION OF CMFs AND DISCUSSION

As noted, the site-by-site results (as discussed above) for all 24 sites are presented in Appendix D. These results were synthesized to get a general result that could be used by MDOT as a guideline for what might be expected to result from a road diet implementation. Further work was also done to examine trends in crash severity.

The tasks below were completed to develop CMFs; the results are shown in the summary spreadsheets in the appendix. An abbreviated version of that spreadsheet (showing CMFs) is shown on the next page (Table 3). These spreadsheets contain the results from the following tasks:

- Site-by-site calculations were done as described above.
- A summary of selected site characteristics was prepared for each site and included:
    - site number,

Table 3. Abbreviated summary of CMF-related data

Summary/synthesis for crash analysis (CMFs)

							CMF correction factors											
site	~ADT	length (miles)	~avg annual crash	# of drivwys	# of intersecs	type	based on county trend	based on city trend	based on trunkline county trend	based on trunkline city trend	**basic CMF**	basic CMF corrected by city trend	**CMF based on recoded crashes**	recoded CMF corrected by city trend	**CMF for affected crashes**	affected CMF corrected by city trend	**CMF for corrected crashes**	corrected CMF corrected by city trend
1	13442	0.37	34	19	4	com	0.91	0.78	1.07	0.84	0.84	1.06	n/a	n/a	n/a	n/a	n/a	n/a
2	13261	1.44	41	26	17	com	0.98	0.56	0.88	0.47	0.47	0.91	0.47	0.91	0.39	0.83	0.13	0.56
3	10965	4.33	53	100	35	res	0.87	0.73	0.87	0.68	0.66	0.93	0.62	0.90	0.59	0.86	0.30	0.57
4	11062	0.53	3	16	8	com	0.78	0.63	0.83	0.72	0.36	0.72	0.18	0.55	0.22	0.59	1.00	1.37
8	14328	0.81	39	49	7	com	0.81	0.68	0.79	0.66	0.79	1.11	0.79	1.10	0.81	1.12	0.21	0.53
9	17020	0.43	38	16	8	com	0.81	0.60	0.78	0.54	0.46	0.86	0.45	0.86	0.52	0.92	0.33	0.74
11	14572	1.46	43	80	12	mix	0.75	0.85	0.72	0.71	0.78	0.93	0.73	0.88	0.75	0.90	0.21	0.36
13	9016	1.31	25	97	11	mix	0.84	0.64	0.83	0.51	0.61	0.98	0.56	0.92	0.50	0.86	0.15	0.51
16	12342	0.87	24	58	8	res	0.84	0.84	0.83	0.90	0.49	0.65	0.31	0.47	0.30	0.46	0.27	0.43
18	7137	0.96	5	55	6	res	0.76	0.80	0.71	10.43	0.80	1.00	0.77	0.97	0.83	1.04	0.17	0.37
20	12639	0.68	7	34	9	res	0.80	0.69	0.75	0.79	0.60	0.91	0.69	1.00	1.43	1.74	0.40	0.71
22	7663	0.22	6	12	3	com	0.93	0.47	0.77	0.41	0.52	1.05	n/a	n/a	n/a	n/a	n/a	n/a
23	14652	0.50	20	23	9	com	0.72	0.76	0.78	0.93	0.69	0.93	0.75	0.99	0.86	1.10	0.36	0.60
25	6512	0.79	10	38	4	res	0.81	0.71	0.89	0.72	0.59	0.88	0.58	0.87	0.88	1.16	0.80	1.09
26	10855	0.58	4	39	5	res	0.95	0.87	0.97	0.96	0.44	0.57	0.11	0.24	0.22	0.35	0.00	0.13
29	10747	0.49	7	30	4	res	0.78	0.79	0.86	0.83	0.32	0.53	0.40	0.61	0.24	0.44	0.00	0.21
30	7676	0.38	10	25	8	mix	0.76	0.76	0.80	0.90	0.76	1.00	1.50	1.74	0.69	0.93	0.30	0.54
33	7049	0.69	10	19	6	mix	0.81	0.53	0.87	0.67	0.51	0.98	0.59	1.06	0.67	1.13	0.33	0.80
34	7719	0.46	6	22	2	com	0.79	0.67	0.76	0.29	0.64	0.97	0.56	0.89	0.62	0.95	0.20	0.53
36	4995	0.86	5	42	5	mix	0.76	0.72	0.69	0.00	0.52	0.80	0.43	0.70	0.42	0.69	0.13	0.40
37	14164	0.30	10	4	4	com	0.87	0.88	0.81	0.91	0.49	0.61	0.68	0.80	0.50	0.62	0.33	0.46
39	n/a	0.39	19	14	5	res	0.81	0.69	0.91	0.77	0.48	0.79	0.81	1.13	0.92	1.23	0.24	0.55
40	3510	0.50	6	31	7	com	0.65	0.71	0.62	0.68	1.40	1.69	2.00	2.29	0.60	0.89	0.67	0.96
43	13660	0.62	46	27	11	mix	0.97	0.94	0.91	0.78	0.89	0.95	n/a	n/a	n/a	n/a	n/a	n/a
average	10652	1	20	37	8		0.824	0.721	0.821	1.088	**0.630**	**0.91**	**0.67**	**0.95**	**0.62**	**0.90**	**0.31**	**0.59**
std dev	3587.02	0.82	16.09	25.54	6.62		0.080	0.115	0.096	2.002	0.225	0.23	0.42	0.42	0.29	0.31	0.25	0.28
max	17020	4	53	100	35		0.978	0.936	1.073	10.429	1.400	1.69	2.00	2.29	1.43	1.74	1.00	1.37
min	3510	0	3	4	2		0.648	0.467	0.616	0.000	0.323	0.53	0.11	0.24	0.22	0.35	0.00	0.13
										n	24	24		21		21		21
										95% conf	0.090	0.092		0.182		0.134		0.122
										μ-95%	0.540	0.817		0.765		0.762		0.469
										μ+95%	0.720	1.001		1.128		1.030		0.712

- crashes,
- length of road diet,
- approximate average annual crash frequency (over all years—used later to divide sites into high and low accident frequencies), and
- type of site (residential, mixed and commercial—used later to divide sites).

- Percentage changes for the county trends, city trends, and trunklines were calculated for each site (as above) and transferred to the summary spreadsheet—these are used as alternative corrections for considering background variation.
- The percentage reductions (or increases) between the before and after period were calculated for all, recoded, affected, and correctable crashes and transferred to the summary sheet.
- Each of the basic reductions was then "adjusted" using the various corrections for city, county, and other trends (the abbreviated summary below shows only the corrections for city trends; the sheet in Appendix D shows all of the corrections).
- Once the above information was all transferred to the summary sheet, averages (and other statistics) were calculated over all sites with usable data. Confidence intervals for the relevant average CMFs were also calculated.
- All of the percent changes were converted to CMFs (a separate worksheet in the appendix which is shown in abbreviated form below).
- The sites were sorted by relatively high and low "before" crash frequencies (>19 crashes/year vs. 10 or fewer crashes/year), type of adjacent land use (residential, mixed residential and commercial, and commercial), number of driveways (>32 and <32), and number of intersections (8 or less, 9 or more).

The important CMFs in Table 3 are those in bold red. These are: the basic (unadjusted) CMF referred to earlier as the "naïve" CMF and based solely on the overall change in crash frequency between the before and after periods; the basic CMF adjusted for the citywide trend;

and the CMFs for recoded crashes, affected crashes, and correctable crashes. Similar CMFs were calculated considering different stratifications of the sites (e.g., by high and low frequencies of before crashes). (Details on these variations are not shown in the abbreviated version of the spreadsheet but are provided in Appendix D.)

The 95% confidence intervals for the mean values of the CMFs are also shown in the following spreadsheet. Note that in every instance (save for the "correctable" crashes) the confidence interval for the trend-corrected CMF contains the value of 1.0—therefore, the average CMFs are not statistically different from zero. This result is actually similar to that obtained from the more detailed analysis involving comparison sites discussed in the last section.

The relevant CMFs are further summarized in Table 4 below. The naïve CMF is 0.63—that is, if all of the reduction in crashes was attributed to the implementation of the road diets the "after" crashes would be 63% of the "before" crashes. However, it was argued above that the naïve CMFs needed to be adjusted for the background citywide trend in crash frequency. In all instances (see detailed results), the citywide trend over the seven-year period (3 years before, 1 year for construction, and 3 years after) studied was toward decreasing crashes. Thus, the "uncorrected CMF" is adjusted for that (average) trend with the result that the basic CMF (shown in bold green in the table) is estimated as 0.91. That is to say that after the adjustment for the background trend, the "after" crashes on road diet sites would be 91% of the "before" crashes (only a 9% reduction after adjustment). Looking at the recoded crashes and only affected crashes, it is seen that the CMF varies by only a few points. For the crashes expected to be "corrected" by a road diet, the CMF is 0.59—that is, for those crashes expected to be reduced by road diets the "after" crashes would be only 59% of the "before" crashes.

The basic CMF is the one that is suggested for general estimates for proposed road diet projects. This is with the strong caveat that there is significant variation among sites. For example, the results in Table 3 show that the (citywide-trend-adjusted) CMFs for the 24 sites studied varied from 0.53 to 1.69 although most sites had CMFs less than 1.0. It should be noted that the site with the highest CMF had a low number of crashes so that a large percentage

Table 4. Comparison of mean values of CMFs

type of CMF	un-corrected CMF	CMFs corrected for city trend			
		basic CMF	CMF for recoded crashes	CMF for affected crashes	CMF for corrected crashes
average over all sites	**0.63**	**0.91**	**0.95**	**0.90**	**0.59**
potential adjustments for different characteristics					
high crash	0.65	0.92	0.91	0.92	0.54
low crash	0.61	0.90	0.98	0.88	0.63
res	0.55	0.78	0.77	0.91	0.51
mix	0.68	0.94	1.06	0.90	0.52
com	0.67	0.99	1.05	0.88	0.72
low driveway density (<32)	0.63	0.93	1.07	0.87	0.66
high driveway density (>32)	0.63	0.88	0.81	0.92	0.51
low number of intersections (8 or less)	0.61	0.90	0.95	0.83	0.61
high number of intersection (9 or more)	0.67	0.93	0.93	1.05	0.55

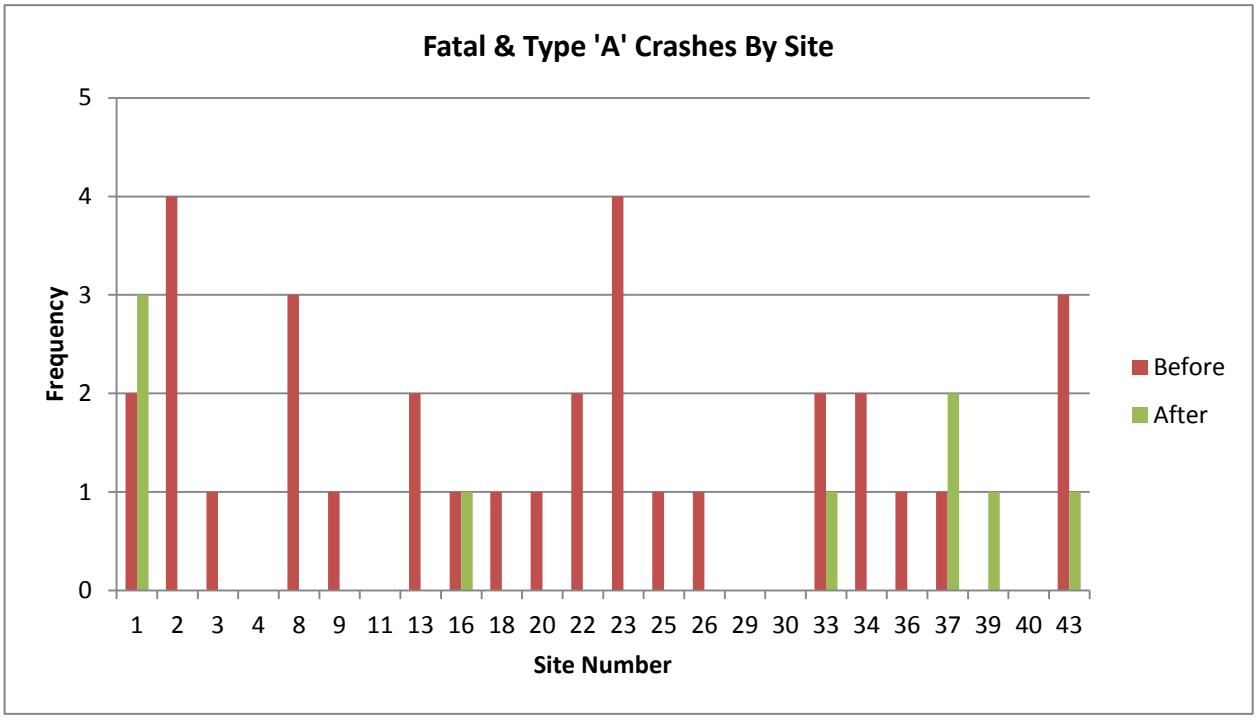
change was relatively easy to achieve. For such reasons, the sites were disaggregated by crash frequency (and other factors) as seen in Table 4—this was to illustrate how the CMF might vary from one grouping to another. For example, the basic (adjusted) CMF is seen to be 0.92 for "high" crash sites and 0.90 for "low" frequency sites. Looking at the "basic CMF" column, it is noted that most of the groupings don't make much difference—with only a couple of points of difference from one grouping to another. The most notable exception is the grouping by type of adjacent land use. The results here suggest that the CMF for "residential" sites might result in more crash savings (CMF = 0.78) than for commercial or mixed-use sites (CMFs = 0.99 and 0.94, respectively). The way the "potential adjustments" should be interpreted is, for example: while the overarching CMF for all sites is expected to be around 0.91, a residential site might result in a lower CMF than would be achieved at a mixed-use or primarily commercial site.

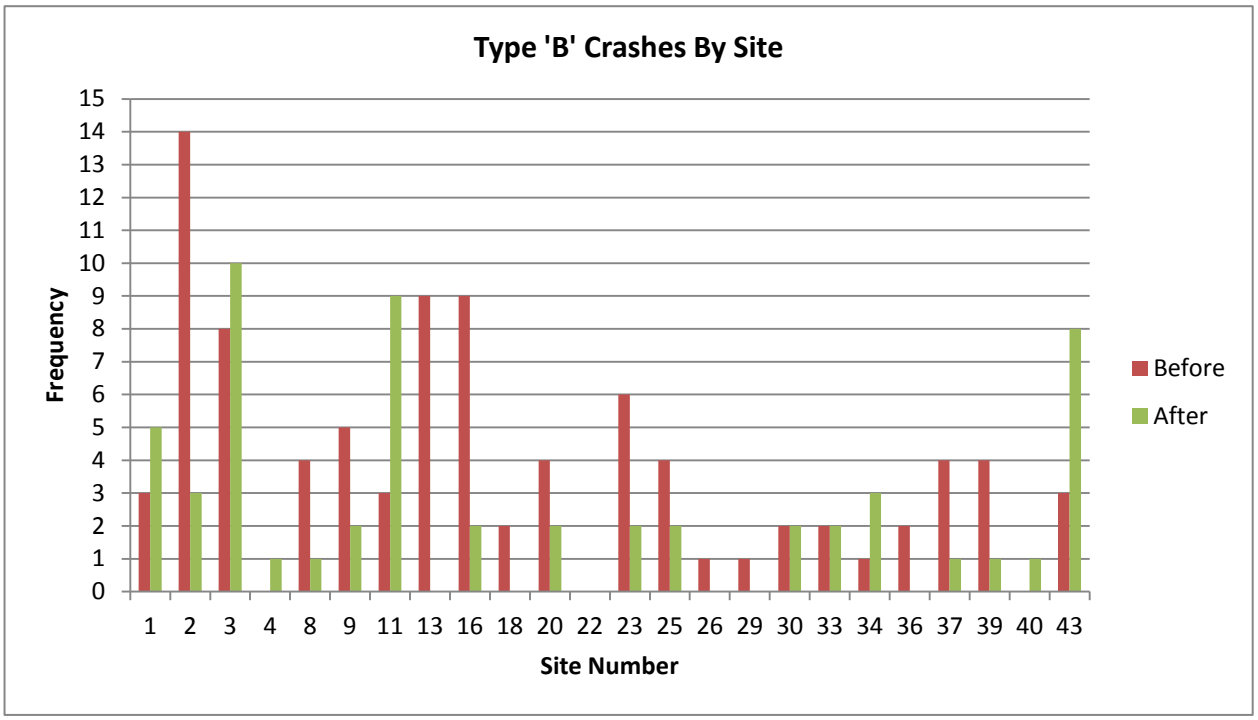
The exception to the above is the collection of those crash types that are expected to be "corrected" by a road diet. The overall CMF is estimated at 0.59 and (as shown in the detailed results) is statistically different from zero. So, while there is more confidence in this result, it should be noted that there are some offsetting changes in the frequencies of other crash types.

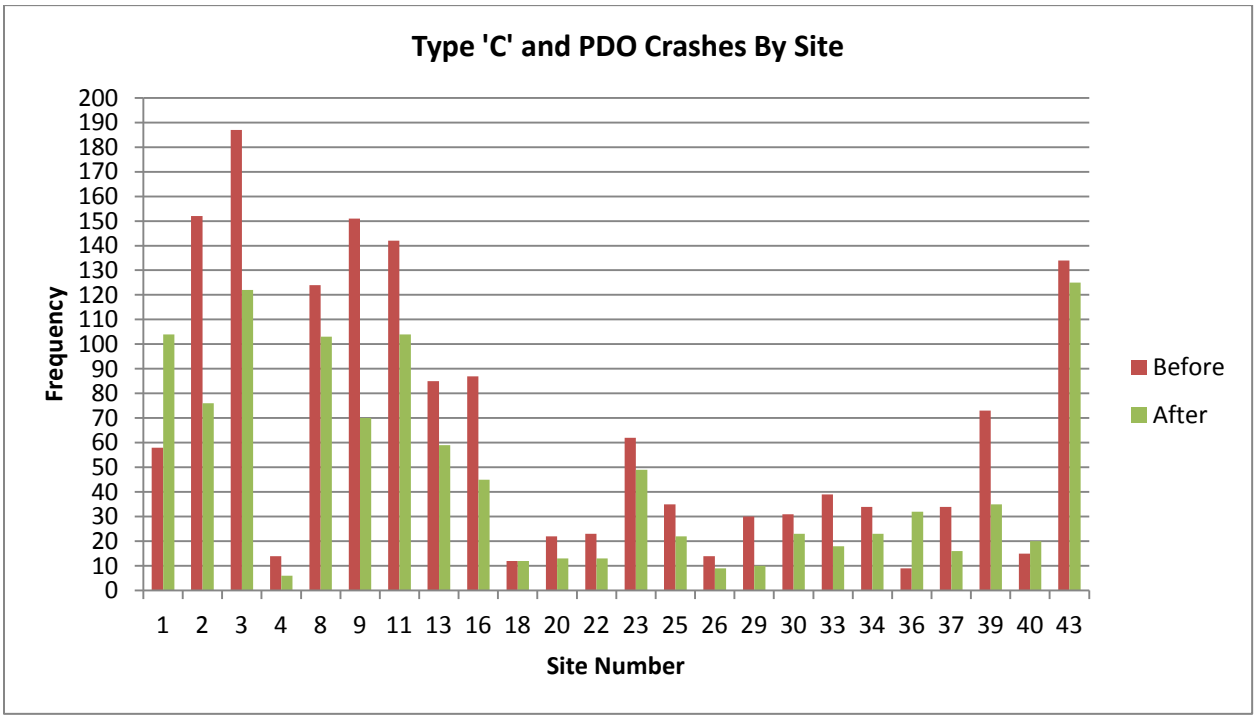
So, used only for selected crash types, this CMF has utility but it is not necessarily good for estimating overall changes.

CRASH SEVERITY

Changes in crash severity might also be expected as a result of the implementation of road diets. Changes in severity must be handled with care as there are many factors in play—e.g., changes in speed limits and/or operating speeds can shift severity distributions regardless of whether road diets are being implemented. The overarching trends in Michigan are that the total number of crashes and all types of severity are decreasing over time (from 1996 through 2010) although not without some year-to-year fluctuation. The three graphs below show the before and after frequency of three severity classifications (fatal + A crashes, B crashes, and C +







PDO crashes) by site. As can be seen, and has been repeatedly noted, there is considerable variation by site although the trend is for an overall reduction (which was noted earlier for all

crashes over all sites). Perhaps the best indication for severity effects is the shift in the distribution of severity for the sites studied. This overall trend (all sites combined) is shown in Table 5.

Table 5. Shift in crash severity for all sites

crash type	before	after
fatal + A	33 (2%)	9 (1%)
B	91 (5.4%)	57 (4.9%)
C + PDO	1567 (92.7%)	1109 (94.4%)

It would appear that there is a slight trend toward less severe crashes on the road diet sites. For rough comparison purposes, an examination of overall statewide trends in severity (using the same severity groupings as for Table 5) is shown below from 2001 to 2010.

Table 6. Shift in statewide crash severity between 2001 and 2010

crash type	2001	2004	2007	2010
fatal + A	2.4%	2.4%	2.3%	2.0%
B	5.2%	4.8%	4.7%	4.8%
C + PDO	92.4%	92.8%	93.1%	93.2%

One issue in comparing the severity shift for the sites is that the actual time periods for the before and after windows varies by site (for example, before-after for site 1 compares 1997-1999 with 2001-2003 while the before-after for site 2 compares 2004-2006 with 2008-2010). That notwithstanding, there are distributional shifts in overall statewide severity over the 10-year period of: a 0.4 percentage point decrease in fatal+A crashes, a 0.4 percentage point decrease in B crashes, and a 0.8 percentage point increase in C+PDO crashes. This compares to a 1 point decrease in fatal+A, a 0.5 point decrease in B, and a 1.7 point increase in C+PDO for the road diet sites. This suggests that the road diet shifts are slightly larger and more positive (from a safety perspective) than overall statewide trends would suggest over the last 10 years or so. Such small differences do not seem operationally significant and could easily be attributable to things like changes in operating speeds, changes in enforcement, or just random variation.

SUMMARY AND DISCUSSION

The development of a crash modification factor (or factors) for road diets in Michigan was the primary objective of this study. In all, 24 separate sites were studied with this goal in mind. Overall changes in crash experience before and after the implementation of the 4-to-3 lane road diets were evaluated and then controlled for background variation. The latter was done through examining citywide and countywide trends (trends on trunklines were also examined) and through consideration of comparison sites (i.e., untreated "control" sites). Changes in crash severity were also examined. The following is a summary of the results of those analyses.

- There is considerable site-to-site variation in the crash-related results although in almost all instances, there was a reduction in the number of crashes.
- Examination of the background (e.g., citywide, countywide) trends showed that in all cases there was a trend toward lower crash frequencies over time. This is a clear indication that before-to-after comparisons of road diet implementations (or any other change to the road system infrastructure) must be evaluated with explicit control for the background trends.
- Several approaches for controlling for background variation were pursued. The most appropriate were deemed to be a simple control for citywide trends and the consideration of comparison sites.
- Good/acceptable comparison sites could be identified for only a few of the 24 sites and none of the eventual comparisons gave statistically significant results—that is, the calculated CMFs for specific sites were not statistically different from 1.0.
- Average CMFs, adjusted for citywide trends, were calculated across all 24 sites. The result was that the overall naïve (unadjusted) CMF was estimated as 0.63 and **0.91** after adjustment. Considering only those crash types expected to be affected by the road diet (not necessarily only reduced), the CMF was 0.90. And, finally, considering only those crash types expected to be reduced by a road diet, the adjusted CMF was 0.59.

Use of the latter is problematic since there are typically offsetting changes in crash type frequencies. Only the CMF for the "correctable" crashes was statistically different from 1.0.

- While the best estimate of a usable CMF is 0.91, it should be noted that this is not statistically different from 1.0 and is an average across all sites. Perhaps more importantly, there is a great deal of variation from site to site.
- Considering effects of other variables on the overall CMF, it was seen that there was not much change due to high vs. low overall crash frequency sites, nor was there much difference due to driveway or intersection density. However, sites where the land use adjacent to the road diet was primarily residential tended to have a lower CMF than mixed-use or commercial sites.
- Changes in crash severity due to road diets were also examined. The question was whether the distribution of severity changed—i.e., do crashes tend to be more or less severe after road diets are put in place. Again, it was noted that there was considerable variation from site to site (and often the numbers of crashes, especially the more serious, were quite small). The distributional shift over all sites was estimated and compared to statewide shifts over the general analysis period. The finding was that although there was a slightly more substantial shift to less severe crashes for the road diet sites, it did not seem operationally significant. Moreover, the shift could have easily been due to changes in operating speeds, enforcement, or simply random variation rather than the road diets themselves.

IMPLEMENTATION OF ROAD DIETS

One of the issues with road diets (and, really, any street or road improvement) is how and when to engage the public if the action is being initiated by MDOT or other agency. Road diets in Michigan are typically perceived as a safety improvement although there may also be upkeep and maintenance savings as well. A more-detailed implementation guide is presented in Appendix E but summary comments are presented below.

Historically, traffic engineers (and the public agencies they work for) have been perceived as being primarily concerned with expanding or at least maintaining street and road capacity and enhancing traffic flow. However, over the last decade or so, there has been increasing interest in how streets and roads "fit" into the adjacent environment—conversations about complete streets, traffic calming, green design, accommodating pedestrians and bicyclists, and so forth have become much more common. The road diet concept has gained considerable traction with various agencies, and road diets are often proposed by traffic engineers as being better for non-motorized users and having safety benefits. Ironically, some communities resist proposals for road diets because they can reduce capacity in some situations. Regardless of why a road diet is being proposed (e.g., a single stand-alone project, part of a pedestrian/bicyclist plan, part of a complete streets program), there needs to be engagement of the local community if the project is to be smoothly implemented.

ROAD DIET IMPLEMENTATION

Road diets have been implemented in many states including California, Washington, Iowa, Minnesota, Florida, and, of course, Michigan. For the purpose of developing an implementation guide, studies that present information on the process of implementing a road diet were further reviewed. These studies included advantages and disadvantages of a road diet, motivating factors for conversion, and lessons learned following the project (e.g., Gallagher 2007).

The apprehension regarding (or overt dislike of) road diets stems from the counter-intuitiveness of reducing the capacity of the roadway while maintaining an acceptable level of

service. To challenge the general thinking, many agencies implementing road diets have experienced success by utilizing techniques that both educate and involve the community.

An implementation guide encompasses all aspects of the project in a beginning-to-end fashion. Continuous community involvement should be maintained through each phase of the road diet conversion. There are three basic phases: pre-construction (phase I), construction (phase II), and post-construction (phase III) with the following objectives for each phase:

- phase I—community education and acceptance for the road diet project;
- phase II (which can be very short if the project is primarily re-striping)—mitigate any negative effects associated with construction and roadway operations; and
- phase III—demonstrate how the road diet fulfilled community objectives while highlighting the benefits of the new corridor.

Success of a road diet project can be measured on several levels, however, when a road diet fulfills the needs of a community while maintaining the necessary function of the corridor, success is generally recognized.

In **phase I, community education and acceptance**, it is essential to promote community involvement and a sense of ownership from the outset. Many agencies implementing road diets have involved the public through town hall meetings, workshops, and newspaper postings which detail the road diet project specifically (Gallagher 2007). Others have found success by implementing road diet projects through city master plans or other citywide initiatives such as Complete Streets or a community bicycle plan. For example, Michigan's Genesee County Metropolitan Alliance adopted a "Complete Streets" approach where "Transportation improvements in Genesee County are planned, designed and constructed to encourage walking, bicycling, and transit use while promoting safety for all users" (GCMPC undated). Another example includes the "pedscape plan" adopted in Charlotte, North Carolina (Sak 2007). These techniques provide an accepting atmosphere because residents are more receptive to change and look forward to "reinventing" their community with a broader scope. Additionally,

this couples the road diet with other actions which may, for example, have as a goal restoring an out-dated downtown setting. The intent of public meetings during this phase should be to:

- gain an understanding of the needs of a community by generating a list of transportation, economic, and safety objectives;
- develop a broad plan (e.g., a master plan, complete streets program) which considers community objectives and provides a list of projects which fulfill these objectives and provides a context for the road diet;
- provide several alternatives to road diets and explain how different alternatives succeed or fail to meet the goals of corridor and the community;
- demonstrate how a road diet will affect all modes of transportation by providing equal access to motorists, cyclists, and walkers while maintaining safety; and
- perhaps most importantly, provide an unbiased assessment of both the advantages and disadvantages of road diets—overstating the benefits of a road diet sets the project up for failure in the public eye.

With reference to the last point, the operational and safety effects of road diets in Michigan presented earlier in this report provide realistic and relevant information that can be used in "phase I" activities. It is important to not oversell the effects of road diets and to point out the high degree of variance in the safety outcomes that are associated with them.

To maintain community involvement from beginning to end, many engineers/planners involved with road diet projects have utilized public forums such as blogs or social networking sites (e.g., Kazis 2011). This sort of public forum allows citizens to voice concerns, opinions, or support concerning the process of the design and implementation. In turn, this gives the agency an opportunity to answer questions which generally alleviate concerns voiced by community members. Such sites can also provide a central hub for pertinent information regarding street closures, detours, and project progress. Use of the electronic media is much better than relying solely on just one or two "standard" public hearings or meetings in that the new media allow for a dynamic process.

During **phase II, implementation/construction**, public concern, which can arise during the planning phase, can be heightened when construction begins. The degree of discontent will largely be based on the extent of the project. If a road diet is implemented simply by pavement marking re-striping, negative response will be minimal. If the project requires reconstruction, causing travel/commuting to become difficult, additional measures will be necessary to alleviate any concerns. Regardless of the size of the project, any precautions that will lessen the stress associated with the road diet should be taken. Based on past experiences, the following techniques have been used to maintain a positive attitude throughout the community during the construction phase:

- reduce the impact of constructing the road diet on the community by shortening the construction timeline as possible (Sak 2007);
- provide proper detours to maintain access and mobility through the area;
- if logical/possible, consider public transportation options through the corridor;
- select a design which uses the existing curb line;
- change traffic signal timing before construction to allow motorists to become acquainted with the new cycle lengths (Sak 2007);
- implement the road diet in concert with other projects (e.g., installing new utilities); and
- again, use a blog or website to keep users up-to-date on the progress of the project while relaying important detour and closure information.

An often overlooked part of a road diet project is **phase III, project follow-up** to analyze, for example, the post-implementation operational characteristics to understand if the project was successful. This assessment will be important to members of the community who will want to understand if the project met the intended objectives. Similarly, other agencies will be interested if this type of roadway conversion could be successful in their own communities. Success of a road diet should be based on the totality of the project and not just, for example, on motorist delay.

A follow-up evaluation of a road diet plays an important role in the success of the project. By assessing the characteristics of the updated roadway and presenting findings to

community members, a sense of satisfaction and accomplishment can be instilled in the community. Finally, information collected from a converted site can be of use to other agencies considering a similar roadway conversion.

TYPICAL QUESTIONS AND INFORMATION NEEDS REGARDING ROAD DIETS

It is instructive to present a list of typical questions that have come up (Sak 2007) or issues that have been identified (City of Orlando 2002) in various venues regarding road diets. Thinking about these questions/topics in the context of a specific proposal may help frame the content for future presentations.

Some questions (Sak 2007):

- Where does the additional traffic go when the capacity is reduced by half?
- When some communities are widening roadways, why are we narrowing ours?
- How will bus stops be accommodated with a road diet?
- How will emergency response units be affected?
- What if it doesn't work?

Some typical measures of effectiveness (MOEs) that might be developed for a project (City of Orlando 2002):

- increased traffic on neighboring streets
- speeding
- pedestrian and bicyclist volumes
- vehicle (and/or pedestrian/vehicle) crashes
- on-street parking use rates
- resident and merchant pedestrian satisfaction
- parking satisfaction

Actions to address overarching concerns:

- Conduct a thorough analysis of the corridor and make certain a road diet is suitable alternative for the roadway.

- Avoid implementing a road diet without community involvement.
- Develop a plan that not only encompasses the road diet project but the community as a whole such as complete streets or a new bicycle/pedestrian initiative.
- Avoid overstating the benefits of a road diet
- Publish road diet success stories in local newspapers or blogs.
- Use blogs or social networking sites to provide as much information as possible to community members while providing a forum to express any concerns.
- Provide opportunity for additional beautification elements such as stamped concrete, brick accents, planter boxes, curb out-crops, and added landscaping.

SUMMARY AND DISCUSSION

A three-phase process associated with planning, constructing/implementing, and follow-up on road diet projects was presented. The major points to be emphasized during execution of that process are:

- Road diets should not be "oversold" with respect to expected benefits, especially safety benefits. The estimated CMF (last section) is relatively modest and is an average of many sites—this suggests that "guaranteeing" crash savings of a certain magnitude would misrepresent what will be experienced in any specific situation. Actual benefits could be significantly higher or lower.
- Both the pros and cons associated with road diets need to be presented and thoughtfully discussed with the community.
- Use of social media to discuss (and resolve) road diet proposals can be successful as an adjunct to traditional public hearings and other traditional community-involvement techniques.

SUMMARY AND CONCLUSIONS

The summary and conclusions from this study of selected road diet conversions in Michigan include the following points.

From the literature and state of practice reviews—

- As a general statement, crash reductions are experienced with most installations and are most typically reported as percentage changes (CMFs would be < 1.0). There is, however, significant variation in the magnitude of the reduction.
- While there appears to be significant "natural variation" in crash reduction percentage (and CMFs), variation is also introduced because of the variance in the before/after geometry and operating conditions at road diet sites.
- Most studies did not result in the estimate of CMFs per se. The most reliable estimates of CMFs are generally thought to be found on the FHWA-funded website "crash modification factors clearinghouse" maintained by the University of North Carolina Highway Safety Research Center [http://www.cmfclearinghouse.org/]. From that source, road diets are estimated to result in the following CMFs for unspecified roadway types in urban areas: all crash types/all severity levels = 0.63; all crash types/all injury crashes = 1.0; all crash types/PDOs-only = 0.54; angle crashes/all severity levels = 0.63-0.76; and rear-end crashes/all severity levels = 0.59.
- Many, if not most, studies did not control for background variation in crash trends. In virtually all areas, the general decrease in crashes at road diet locations must be adjusted for overall changes in crashes in the surrounding areas during the study period. Otherwise, too much of the reduction in crashes may be attributed to the road diet.

From the on-site assessment of pedestrian and bicyclist use of road diets—

- Provisions for pedestrian and bicyclist are most important when there are existing pedestrian/bicyclist generators on the site and/or when the road diet is part of a larger plan for an area.

- If pedestrian/bicyclist provisions are included in the road diet area, they need to be clearly and consistently (i.e., always) marked.
- While there appears to be a need for additional information/education regarding appropriate use of the road and pedestrian/bicyclist facilities at road diet sites, supplemental signs indicating crosswalks and bike lanes should be considered for routine inclusion at road diet sites.

From the operational analysis of several Michigan road diet sites—

- The operational analysis of the several sites provide reasonably consistent results and support a guideline that suggests that 4-to3-lane road diet conversions result in significant increases in delay for **ADTs over 10,000**.
- More importantly, 4-to-3-lane road diet conversions increase delay when **peak hour volumes of exceed 1,000**.
- However, it is clear that "local" conditions (e.g., varying geometry, significant variation in turning movements, and variations in cross-street traffic) can have a significant impact on the viability of any proposed road diet. Thus, while an initial culling of potential road diet sites can be accomplished using the general guidelines above, in all instances a detailed operational analysis of the corridor (including operations at each intersection) for both 4- and 3-lane sections should be undertaken before the road diet conversion is implemented.

From the safety analysis of selected 4-to-3 lane road diets in Michigan—

- There is considerable site-to-site variation in the crash-related results although in almost all instances, there was a reduction in the number of crashes.
- Examination of the background (e.g., citywide, countywide) trends showed that in all cases there was a trend toward lower crash frequencies over time.
- The most appropriate methods for controlling for background trends were a simple control for citywide trends and the consideration of comparison sites.

- Good/acceptable comparison sites could be identified for only a few of the 24 sites and none of the eventual comparisons gave statistically significant results—that is, the calculated CMFs for specific sites were not statistically different from 1.0.
- Average CMFs, adjusted for citywide trends, were calculated across all 24 sites. The result was that the overall naïve (unadjusted) CMF was estimated as 0.63, and **0.91** after adjustment. Considering only those crash types expected to be affected by the road diet (not necessarily only reduced), the CMF was 0.90. And, finally, considering only those crash types expected to be reduced by a road diet, the adjusted CMF was 0.59. Use of the latter is problematic since there are typically offsetting changes in crash type frequencies. Only the CMF for the "correctable" crashes was statistically different from 1.0.
- While **the best estimate of a usable CMF is 0.91**, it should be noted that this is not statistically different from 1.0 and is an average across all sites. Perhaps more importantly, there is a great deal of variation from site to site.
- Considering effects of other variables on the overall CMF, it was seen that there was not much change due to controlling for other variables except for adjacent land use—residential sites tended to have a lower CMF than mixed-use or commercial sites.
- Changes in crash severity due to road diets were examined and the distributional shift over all sites was estimated (and then compared to statewide changes). The finding was that although there was a slightly more substantial shift to less severe crashes for the road diet sites, it did not seem operationally significant. Moreover, the shift could have easily been due to changes in operating speeds or enforcement rather than the road diets themselves.

From the implementation of road diets—

- Road diets should not be "oversold" with respect to expected benefits, especially safety benefits. Actual benefits of a road diet can vary significantly by site.

- Both the pros and cons associated with road diets need to be presented and thoughtfully discussed with the community.
- Use of social media to discuss (and resolve) road diet proposals can be successful as an adjunct to traditional public hearings and other traditional community-involvement techniques.

Road diets are a useful tool in the traffic engineer's arsenal of making streets and roads a more integral part of the community. As a part of broader plans, they open up "traditional" roads to greater use by pedestrians and, especially, bicyclists. In general, safety benefits can be expected but vary greatly from site to site. When corrected for citywide trends, the results here indicate that only a relatively modest CMF (0.91) is appropriate. This indicates that crash/safety benefits are likely to be considerably less than what is suggested by naïve comparison of before and after crash statistics. Similarly, the results reported here also suggest that operational analyses (e.g., using Synchro) should always be performed early on in the consideration of a road diet proposal. Moreover, the commonly-quoted threshold ADT of 20,000 for consideration of a road diet should be lower (10,000) and, more importantly, realistic peak-hour analyses (based on actual counts) are much more useful. For the sites evaluated here, the peak-hour threshold volume is estimated as 1,000 vph although this could vary with varying volumes of cross traffic at intersections.

RECOMMENDATIONS FOR IMPLEMENTATION OF RESEARCH FINDINGS

The recommendations for implementation of the research findings are presented below as "action items" for MDOT and based on the discussion in each section of the report.

- The results of the literature review and the article-by-article review in Appendix A should be made available to MDOT and local-agency engineers and planners who are interested in and/or dealing with road diet projects.
- When pedestrian/bicyclist provisions are included in a road diet, they need to be clearly and consistently (i.e., always) marked.
- MDOT should share the following quantitative, operations-related findings of this research with the FHWA and suggest changes to the appropriate section of the **Michigan Operations Manual** which is addressed to "4-to-3 Lane Conversions."
    - The ADT threshold for considering such road diets should be changed to ≤10,000.
    - More importantly, detailed operational analysis should be done when ADTs are 10,000 or more **OR** when peak hour volumes exceed 1,000.
    - Finally, because of the variation in intersection geometry, turning volumes, and signal timing from site to site, detailed operations analysis **always** be done.
- Results of the safety analysis and development of crash modification factors (CMFs) related to 4-to-3 lane road diets should also be shared with the FHWA (as above).
    - When studies of the effects (or effectiveness) of road diets are done, there must always be control for background trends with citywide trends generally being the most appropriate to consider.
    - The overall naïve (unadjusted) estimated CMF is 0.63 and **0.91** after adjusting for citywide trends. Considering only those crash types expected to be affected by the road diet (not necessarily only reduced), the estimated CMF is 0.90. If only those crash types expected to be reduced by a road diet are considered, the adjusted CMF is 0.59. Use of the latter is problematic since there are typically offsetting changes in crash type frequencies. Only the CMF for the "correctable" crashes was statistically different from 1.0.

- Operations- and safety-related results should be incorporated into any presentation material developed by MDOT and local agencies regarding the planning and implementation of road diets.
- Road diets should not be “oversold” with respect to expected benefits, especially safety benefits. Actual benefits of a road diet can vary significantly by site.
- Both the pros and cons associated with road diets need to be presented and thoughtfully discussed with the community.
- Use of social media to discuss (and resolve) road diet proposals can be successful as an adjunct to traditional public hearings and other traditional community-involvement techniques.

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THE EFFECTS OF COMPLETE STREETS ON MOBILITY AT THE ARTERIAL LEVEL

by

Sara E. Patterson

A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Applied Sciences in Civil Engineering

Spring 2012

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THE EFFECTS OF COMPLETE STREETS ON MOBILITY

AT THE ARTERIAL LEVEL

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ACKNOWLEDGMENTS

I would like to thank my advisor, Earl Lee, for working with me through this process. He helped me choose a topic that I'm truly interested in and can continue studying for a long time.

I would also like to thank my family and friends for being supportive throughout this process and throughout my academic career.

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ABSTRACT

With an increasing desire to design complete streets, it is crucial to determine what constitutes a complete street and how complete streets affect mobility. The general definition of a complete street is one that is safe for all users including drivers, pedestrians, cyclists, and transit riders. This definition is vague and allows the designer to make the decisions about what techniques should be used to create a complete street. To determine what techniques are best for a specific project, first transportation engineers must determine the effect each technique will have on the street, and the tradeoffs that a community may have to live with after construction. Specifically, when working with an existing street, there will be changes in LOS, capacity, delay, and emissions.

Chapter 1

INTRODUCTION

At a recent conference, a speaker stated that it would be more acceptable to have a road with a level of service of D that had a bike lane than to have a road with a level of service C without a bike lane. During a time in American history when global warming is becoming a more important topic, vehicle miles traveled (VMT) is raising at record rates, and obesity is threatening the lifespans of Americans, it is important to ask if bike lanes are the solution to all of these problems. A slightly broader question is equally important: will introducing better facilities for pedestrians, cyclists, and transit riders fix the problems of global warming and obesity in the US and around the world? The answer to this is a very complicated one, but asking the question is crucial to determine the validity of the earlier statement.

Another question that is pertinent to this discussion is how much should drivers be affected by making roads safer and more usable for others? For many decades, the US has been focusing most of its transportation planning on the automobile, often at the expense of other travel modes. This has led to a society that relies heavily on the car not only in daily activities but for longer planning decisions. If the US suddenly changes those policies to focus primarily on other travel modes, what affect will that have on large sections of the population who use their cars for everything?

These background questions lead to the most important questions: what are the tradeoffs associated with designing for all travel modes, and how can roads be

designed that improve usability without seriously affecting mobility for any users? These questions are the basis for complete streets design which focuses on designing roads that are safe and promote mobility for all users. To determine how to best move forward with respect to complete streets design, it is necessary to first answer these questions and decide what is best for a given community. The tradeoffs and road design will depend substantially on the context that a given road is found in. The contextual factors that will be most important are the community, the transportation network, and the density of the surrounding area.

Chapter 2

BACKGROUND AND LITERATURE REVIEW

2.1 Background

There are a significant number of problems related to the current American transportation networks including the obesity epidemic, high gasoline prices, air pollution, and mobility constraints experienced by aging baby boomers[1]. Countries with well-developed urban transit systems and an established bicycle infrastructure are better off than those that depend on cars if there is a downturn in world oil production[1]. The vast majority of trips are taken by car, and urban areas are designed around the ability to drive everywhere. Mobility is determined primarily on the affordability of the automobile because the transportation networks are designed solely for drivers. There is a need for a change at the network level to make streets safer for all users, but concentrating only on changing the transportation network will not fix all of these issues.

It is very difficult to change the status quo and most large social and infrastructural norm changes go through the "four stages": silly, controversial, progressive, and then obvious[2]. These stages take time, and each large infrastructural change requires a lot of work to convince the end users that the change might improve their mobility in the long term. Because of this, it is important to work with the community during the design process to understand what needs the community has and explain the implications of different design aspects.

Complete street techniques are viewed as the best solution to a long list of current problems that the US faces. Currently, there are many interest groups that are pushing for policy to be adopted at the city and state level that requires agencies to design complete streets. The wording is often vague and allows the designer to decide what determines complete street design. Context Sensitive Solutions and Complete Streets are often used interchangeably to explain the same type of street design: streets that are designed in a specific context that cater to the users of that street within a community. While complete streets techniques focus more on the safety of all road users, the techniques that are used in context sensitive design and complete street design are essentially the same.

Most of the interest in complete streets falls on the policy side of the issue. The goal is to design streets are safe for all users, causing people to switch travel modes (from driving to biking, walking, or riding transit), and this will improve the livability of communities and the health of the residents while reducing emissions and accidents. At the federal level, there are a number of groups that are advocates for complete street design including the Partnership for Sustainable Communities and the National Complete Streets Coalition.

The Interagency Partnership for Sustainable Communities (includes the USDOT, HUD, and EPA) attempts to provide more transportation options and support existing communities through transit-oriented, mixed-use development, and land recycling. This partnership defines complete streets as streets that are safe for all users, are customized to the context, and accommodates the needs and expectations of the travelers in and through the neighborhood, community, or region. The partnership

agrees with the National Complete Streets Coalition list of complete streets elements which includes

> "sidewalks, bicycle lanes (or wide, paved shoulders), shared-use paths, designated bus lanes, safe and accessible transit stops, and frequent and safe crossings for pedestrians, including median islands, accessible pedestrian signals, and curb extensions. Certainly, a design for a complete street in a rural area will look quite different from one in an urban or suburban area. For example, a complete street in a rural area could involve providing wide shoulders or a separate multiuse path instead of sidewalks. The common denominator, however, is balancing safety and convenience for everyone using the road." [3]

The partnership references Safe Routes to School, and Context Sensitive Solutions. At the federal level, there is statute 23 USC 217, which requires State DOTs to use a portion of certain Federal funds to hire a State bicycle and pedestrian coordinator. This position is responsible "for promoting and facilitating the increased use of nonmotorized modes of transportation."[3]

The National Complete Streets Coalition is an organization that is working to improve the safety of streets in the United States through education and promoting policy change in cities and states. According to the National Complete Streets Coalition, the benefits of creating complete streets policies are improving safety of roadways, encouraging walking and bicycling for health, addressing climate change and oil dependence, and fostering stronger communities[4]. Some of these benefits are easier to define and measure than others. For example, safety of the roadways can be measured in pedestrian and cyclist fatalities per year. The effectiveness of individual complete streets techniques can be determined by looking at the difference of fatalities before and after the installation. Encouraging walking and biking could be measured, but would need extensive pedestrian and cyclist counts before and after

installation. There are also other factors that affect the choice to drive or use another mode of transportation, for example distance of trip. Complete streets will only address climate change and oil dependence if a number of users switch transportation modes. Fostering strong communities is the most difficult to measure and define. It is important to look at the needs and wishes of a community during road design, but a complete street alone will not build a strong community without the necessary building blocks already in place.

Some techniques are easier to implement than others without affecting an existing road. Audible pedestrian signals do not have an effect on the existing road design and could greatly improve safety for blind pedestrians. Making crosswalks more visible is another way to improve the safety of existing crosswalks. This can be done by adding signs and a blinking light to warn drivers of a possible pedestrian. Adjusting signal timing to allow for the slower pedestrians to clear the intersection also does not affect the existing road design, but may have an effect on traffic because the red light would be longer. Increasing the number of crossing opportunities could affect the road design minimally if they are added at all existing intersections[4].

In addition to the national groups discussed above, there are a number of programs that were started in individual cities to promote the use of complete streets techniques in the design process. They deal primarily with the policy side of the issue instead of the design implementation. Programs include The Partnership for Active Communities in Sacramento CA and Active Seattle. In Sacramento the project continued over five years and supports increased walking and biking through in school programs, land-use development, and transportation infrastructure while focusing on safety of all street users[5]. The Active Seattle program set up a five year plan to

increase the physical activity in Seattle. The program looked at four core areas: planning and partnership, mapping program, physical infrastructure, and health promotion. The program focuses on adopting policy changes at the higher levels of government in Seattle while initiating interest at the neighborhood level[6]. In Hawaii, a comprehensive multilevel social ecological approach was used in the complete streets policy, which worked in conjunction with a Safe Routes to School policy. The approach counted on the collaboration of multiple stakeholders, and it focused on education, capacity building, and networking efforts[7]. None of these initiatives focus only on street design, but also on education and other programs that promote multi-modal use.

2.2 What Makes a Complete Street?

Burden and Litman define complete streets policy with a number of requirements including encouraging street connectivity and creating a comprehensive, integrated, connected network for all nodes, and state that complete streets' solutions are context specific. A number of things need to be done to reduce the negative effects associated with driving (including emissions, death, and obesity). Along with complete streets techniques, proper land development patterns and proper street design must be used together to create complete streets[8]. Complete Streets and Context Specific Solutions should be seen as complementary, not competitive. Complete streets' techniques should be introduced into the very beginning of the design project to make streets that are safe for everyone without adding costs at the end of the project to change designs to accommodate all users. A number of techniques can be used to improve safety for pedestrians and cyclists including road diet, raised medians, curb bulb-outs, and street parking[9].

One goal of complete streets is to make transportation more sustainable. To achieve this, complete streets endeavor to reduce vehicle emissions, reduce vehicle miles traveled, and use intelligent transportation systems (ITS) and traffic engineering applications that support sustainability. Roundabouts should be used instead of signaled intersections to improve safety and reduce emissions. To achieve transportation sustainability, changes would have to include designing systems to provide modal choices and working with land use planners to create connected street systems that reduce urban sprawl[10].

Another aspect of making streets more sustainable is to address the issues related to storm water management. Streets are often comprised of large areas of impervious surfaces which cause problems with storm water runoff. Low-impact development storm water designs are shown to effectively reduce contaminant loads from impervious surfaces. Porous asphalt is one option which improves wet pavement frictional assistance, reduced hydroplaning, and reduced pavement delay[11]. Porous concrete can also be used beneficially in similar applications. Along with using pervious road and sidewalk surfaces, street landscaping can be used to help manage storm water issues. Bioswales, planters, and rain gardens can be used to help curb storm water runoff in addition to making the street more visually interesting and comfortable. Some complete street techniques- chicanes, islands, and curb extensions- are places where street landscaping can be introduced into the existing design[12]. These storm water management techniques have a range of costs and maintenance requirements, but they are simple ways to improve existing streets without changing them too much.

While street design is the focus of complete streets policies, often other initiatives are required to promote the use of these streets. The initiatives that should be used in conjunction with complete streets policies are ones that educate the public about the importance of using different travel modes, increase the availability and promote the use of public transportation, and reduce urban sprawl (or at least the distance that people travel between home, work, and play). Without also addressing these issues, complete street design will not be used effectively and would waste money spent on providing for users who don't exist and will not be created.

2.3 Safety

Safety is the primary concern of complete streets advocates. If the roads are safe for all users, people will want to use them for other activities, not just driving. Depending on the users and the context, making a road safe could mean a number of different things. There is a big difference between the safety measures that should be implemented on an urban road with a lot of pedestrians and speeds of 25 mph or less and a rural road that carries large amount of horse and buggy traffic. In general, safety will focus on the most vulnerable user groups. Cyclists and pedestrians are more vulnerable than drivers, but among cyclists and pedestrians, there are individual groups that are especially vulnerable including the young, the elderly, and the disabled. While it is important to cater to the needs of all of these groups on all roads, it is crucial to focus on these groups in areas that have a large portion of vulnerable pedestrians (for example, areas surrounding a retirement community).

Areas near schools, playgrounds, and other places that attract large numbers of young people should be designed to accommodate the specific needs of young cyclists and pedestrians. The Walk to School movement has potential benefits that include

reducing childhood obesity and early onset diabetes[1]. Safe Routes to School is a program that focuses on making streets safer for children so more are able to walk and bike to school. This program focuses solely on the factors that affect the safety of children travelling to school including the fact that children walk and cycle slower than adults and require pedestrian signals that give them enough time to cross the street. Traffic volume has a negative effect on a child's ability to cross a street safely because they become impatient waiting for an acceptable break in heavy traffic. It becomes more difficult for children to wait for a find an appropriate time to cross the street [13]. Patience is not the only issue that children face. Mid-block collisions more often involved young pedestrians as compared to intersection collisions[14].

Another vulnerable user group, seniors, requires different infrastructure than children: smooth sidewalk surfaces and curb cuts to reduce falls, sidewalks that are wide enough to accommodate a walker, and benches for resting. Brisk walking is adequate for seniors to achieve positive health results and is correlated with neighborhood design [15]. To give seniors the ability to add brisk walking into their daily routines, the sidewalks need to be designed to accommodate their movements and the neighborhood needs to be designed in such a way that there are nearby destinations or public transit options. This allows seniors to have access to neighborhood resources without having to drive.

Disabled pedestrians and cyclists are the final vulnerable group that has specific needs. Disabled pedestrians that use wheelchairs or walkers have similar needs to senior pedestrians (wide, smooth sidewalks that slope down to the street). Blind pedestrians have different needs than pedestrians using walkers and wheelchairs, however. Many cities are designing "shared spaces" in their downtown areas which

are meant to slow down drivers because the road is shared between pedestrians and drivers. This puts blind and partially sighted people at a disadvantage because there is no delineation between safe pedestrian areas and areas that are shared with drivers. "Shared space" designers do not want to include traditional 120 mm curbs because they separate the pedestrian vehicle areas too much. Thomas found that a curb height of at least 60 mm is required to define the difference between the two areas. Along with the 60 mm curb height, dropped curb crossings and tactile paving should be used to mark the edge of the footpath for vulnerable pedestrians[16].

All pedestrians and cyclists are vulnerable groups when sharing the road with cars and the safety of all pedestrians and cyclists needs to be taken into account. Reducing accidents is the focus of many who are trying to improve the safety of pedestrians and cyclists. There have been a number of studies done that determine the factors that lead to accident involving vehicles and pedestrians or cyclists. The factors associated with a vehicle-pedestrian or vehicle-cyclist accidents are largely the same as those of vehicle-vehicle accidents: traffic conflicts and high vehicle speeds. The built environment has a large effect on driver error instead of the widely held belief that driver error is random and road design should reflect this belief (which leads to road design that is forgiving of driver error instead of trying to correct it)[17]. Pedestrian crashes are more common in business districts and in more densely settled residential neighborhoods with a large and less affluent population. The majority of accidents resulted from human error on the part of the pedestrian or the driver[14].

Human error is not something that can be eliminated, but there are a number of techniques that help reduce the impact of human error. Counter measures for improving safety of intersections include more visible pedestrian crossings, adding

pedestrian refuge islands and turn lanes, adding traffic lights instead of other signals, and lowering the speed limit[18]. For six-lane divided highways with high traffic volumes, implementation of the right turn/U-turn concept leads to a 26.4% reduction in crash rate as compared to direct left turns[19]. There are two factors that often determine crash severity and they are speed and sight lines. In loops and lollipops, vehicles are driving slower, but there are shorter sight lines, so there are more crashes, but they are less fatal[20].

The best way to reduce injuries in cyclists and pedestrians is to have facilities for these users that are separate from motorized traffic. Sidewalks and refuge islands are the most effective facilities for pedestrians, and on-road bike routes or off-road bike paths are the most effective facilities for cyclists. They are best placed in city centers, between contiguous neighborhoods, and along major arterial streets because this is where accidents are most likely to occur. Adding street lighting to areas that have poor visibility is also effective in improving safety for pedestrians and cyclists[21]. The most effective pedestrian safety measures include refuges, median openings, ice tracks, ramp for wheelchairs, zebra crossings, signal timing, flashing yellow lights at crossings, and better visibility for vehicles. Pedestrian safety measures are most effective if they are the result of comprehensive policy rather than piecemeal, isolated improvements[22]. There are a variety of low-cost signing and striping technologies or higher-cost geometric features (curb extensions and refuge islands) that can be used to improve safety. The use of marked crosswalks at uncontrolled locations on high-volume, multilane roads can lead to higher pedestrian-related collisions. To improve safety at these crossings, more notice to drivers is necessary by using a combination of signs, signals, and geometric features[23].

In studying an increase in lane width, installation of median barriers, vertical and horizontal improvements in the road alignment, and installation of guide rails on roads with a speed limit of 45 mph or less, all treatments reduced crash rates except the installation of guide rails. Vertical and horizontal alignment had the largest effect, followed by increased lane widths, and then median barriers[24]. While increasing lane widths may reduce the number of crashes, they may also increase speed. It is important to determine if the context requires wider lanes depending on how many crashes occur in the area and how fast people drive on the road and how fast people should be driving on the road.

In any accident involving a cyclist and a driver, one party has the right of way, and the other party is at fault. Type 1 crashes occurred when the cyclist had the right of way, and type 2 crashes when the motorist had the right of way. Type 1 crashes were more likely to occur at intersections with two-way bicycle tracks, well-marked, and reddish colored bicycle crossings. Type 1 crashes were negatively correlated to the presence of a raised bicycle crossing and other speed reducing strategies. Both well marked bike lanes and raised bike crossings have an effect on the cyclists' behavior, but only the raised bicycle crossing has an effect on the motorists' behavior[25].

Compliance rates are very low when pedestrians have to wait in the median for another signal because crossing time was lengthened significantly. One suggestion is to set signal times to allow the majority of pedestrians to cross in one stage, but place a pedestrian detector at the median to accommodate pedestrians that require two stages to cross. The compliance rate dropped significantly during cold and inclement

weather. During these times, pedestrians used unsafe behavior, which coupled with unsafe road conditions can lead to more pedestrian injuries and fatalities[26].

In a case study done of Queens Boulevard in New York City, the main issues were excessively long crosswalks, inadequate pedestrian reservoir space, excessive vehicular speeds, high number of pedestrian/auto accidents, long distances between signalized crossings, and inadequate pedestrian design elements. Another issue is that the medians do not extend to the far edge of the crosswalk so pedestrians do not have an adequate refuge area. The recommendations include more visible crosswalks, curb cuts and ramps, longer pedestrian signal times, refuge islands, new midblock pedestrian signals, and curb bulb-outs[27].

2.4 Bicycle Facilities

Bike facilities are an important aspect of road design when trying to design a complete street. To insure that cyclists use the provided bike facilities, there are a few issues that need to be addressed. Above all else, cyclists need to feel safe and comfortable. Depending on the cyclist's age and ability, this means different things. The top motivators among cyclists to ride were the availability of routes away from traffic noise and pollution, routes with beautiful scenery, and paths separated from traffic. The factors that are most likely to influence the likelihood of cycling were safety, ease of cycling, weather conditions, route conditions, and interactions with motor vehicles. Due to the little difference between the motivators and deterrents for potential and regular riders, the same improvements can increase ridership in both groups[28].

One major issue with bicycle facilities is that they typically take up space on an existing street which is a very controversial planning decision. The space that is

taken up could be travel lanes or parking lanes which are highly coveted in some high-traffic areas. New York is the scene of one of the more public and explosive controversies over a bike lane in the last few years. New York City is currently implementing a policy to calm and decrease automotive traffic by closing areas of the vehicular traffic in Times Square and by improving the facilities for cyclists and pedestrians. While one poll suggests that 59% of all New Yorkers (not just cyclists) approve of the bike lane program, some individual bike lanes are fiercely contested. One bike lane was installed in a neighborhood in Brooklyn near the residence of the city's former transportation commissioner, Iris Weinshall, who demanded the removal of the lane and took the case to the state supreme court where she eventually lost[2].

At intersections there are a few bike lane discontinuities that cause the most discomfort for cyclists: lanes switching sides of the street (right to left) after an intersection, introducing parking after the intersection, long distances across intersections, and width of curb lane. Other factors that affect the safety of cyclists included speed of traffic, a change in the number of traffic lanes, and the direction of the adjacent traffic[29]. A distance of 2 and 5 m between the side of the arterial road and the cycle track is safest for cyclists because cyclists are not riding in the motorists' blind spots and there is more time for turning vehicles to notice cyclists[25].

Current and potential cyclists are interested in bike lane designs that achieve separation from motor vehicle traffic. A separated bike lane can increase ridership by 18 to 20% as opposed to the 5 to 7% increase caused by a regular on-street bike lane[30]. Wide curb lanes and bike lanes should be used to improve riding conditions for cyclists, however if adequate space exists for a bike lane it should be installed

because of the cyclist comfort level is increased and may increase the amount of cycling on that roadway[31].

When designing a bike lane, it is important to understand the risks associated with different types of infrastructure and different contexts. For example, it is reasonable for cyclists to mix with traffic in a small roundabout. Larger roundabouts, however, will require a bike lane for safety[32]. Sidewalks and multi-use trails pose higher risks to cyclists, major roads are more hazardous than minor roads, and bicycle facilities (on and off-road bike lanes) create the lowest risk for cyclists[33]. If a crash occurs on a bike lane and one-way street, it is most likely a door crash[34].

More cyclists ride on cycle tracks (separated bike lanes) than on the streets. The relative risk of injury on cycle tracks was 0.72 compared with bicycling on the street. Since the relative risk is noticeable smaller for cycle tracks, the construction of cycle tracks should not be discouraged in the US. This paper looks at the number of riders in the Netherlands given their large network of cycle tracks[35].

There has been a lot of discussion about how adding bike facilities will affect ridership and vehicular traffic. When bike facilities are introduced, ridership has been found to increase. However, ridership only increased on roads with bike lanes while general ridership remained the same over the two year period of the study. The bike lanes had a minimal effect on vehicular traffic if any effect at all, but on average, bike traffic increased by 23%. Original bike traffic levels ranged from 550 to 1,500 and went up to between 570 and 1,900 cyclists[36].

After the integration of a bike lane on a street in New Orleans, numbers of bicycle riders and found an increase from 90 to 142.5 riders per day on the street. There was a 133% increase in the number of women riders and a 44% increase in the

number of male riders. While the numbers of cyclists riding illegally on the sidewalk did not change, the percentage of cyclists riding in the correct direction (with traffic) increased from 73.3% to 81.8%. This was also during a time when the price of gasoline decreased, which may have had an effect on the results[37].

While there are a number of important factors that determine whether or not people choose to ride over other modes, there seems to be one that has an enormous effect. Creating a network of bike facilities seems increase ridership substantially because people are able to travel from their origin to their destination without leaving a bike facility. Between 1991 and 2004 ridership in Portland increased by 210% and the miles of bikeways increased by 215% (from 65 to 230 miles). Hawthorne Bridge has the largest number of cyclists because of its facilities and proximity to downtown. While ridership had been increasing over time, it jumped 20% when another bridge opened which created a recreational loop within the city. Ridership increased significantly because of the combination of the quantity of facilities with the high quality of the facilities. A bikeway network must be well connected and provide continuous or mostly continuous service. This approach only works when the bike lanes are constructed to the highest standard and the trip distances are relatively short[38].

2.5 Changing Travel Behavior

According to Marchetti, throughout time and around the world humans have always been willing to travel for one hour per day on average regardless of the mode of travel[39]. This means that humans are willing to spend 30 minutes traveling to their destination, and thirty minutes returning. This time will be used to determine what distance is reasonable to commute on foot or bike. There are other factors that

affect an individual's choice to walk or bike versus drive to work and need to be accounted for.

The Federal Highway Administration completed a study in 1992 focusing on why individuals choose one travel mode over another (specifically why individuals choose driving over walking and bicycling for the vast majority of trips). The primary reason that people walk or bike is for exercise and enjoyment. The key findings for bicycles are that the primary individual factor for not cycling is age. The main environmental factor that increases bicycle use is the presence of a university. Other environmental factors that have an effect are commute distance, primary bicycle facilities (for example, parking), and a high ratio of bikeways to road mileage. High density areas have a higher number of cyclists, but having a network of bike facilities was required. Safety was also a primary concern of cyclists; increased bike facilities helped with the feeling of safety. The key findings for walking are that people walk when it is more convenient that other travel modes. Distance is the primary reason why people don't walk more often; other reasons are the hassle of carrying things, time limitations, and fear of crime. It is possible to increase the amount of walking because most short trips are not walked. It is important to make these trips more feasible and pleasant by adding sidewalks, crosswalks, greenery, and landscaping[40].

One of the interesting findings is that there is a discrepancy between the numbers of people who say they are interested in cycling more and the actual number of regular cyclists. The data gathered from surveys may not be as reliable as assumed because while people would be willing to drive, it is much more difficult to actually change behavior because of a number of factors[40].

This article stresses the importance of Active Living by Design (ALbD) projects and the 5Ps: preparation, promotion, programs, policy, and physical projects. These 5Ps work together to create a more successful project instead of using a "build it and they will come" model. This article recognizes the need for broad partnerships, community engagement, and context specific responses to address the issues in each community[41].

An increase in commute distance corresponds with a decrease in the value of attitudes toward other characteristics of bicycling. The characteristics that show a significant decrease from groups commuting less than 5 km to groups travelling more than 10 km are comfort, time-saving, flexible, cheap, pleasant, and suits lifestyle. The study also found that individuals who bike for a number of other purposes are more likely to commute by bicycle over all distances[42].

2.6 Effect of Street Design on Driving Behavior

Driving behavior is affected by the following street environment factors: occurrence and density of junctions controlled by traffic lights, speed limit, street function, and type of neighborhood. There are pronounced negative environmental effects due to regulating junctions with traffic lights. From an environmental point of view, roundabouts may be a better traffic solution than traffic lights[43].

Data shows that the reduction in free-flow speed due to narrow lanes in work zones was higher than reductions given in the *Highway Capacity Manual*. Speed reductions of 10, 7, 4.4, and 2.1 mph should be used for lane widths of 10, 10.5, 11, and 11.5 ft, respectively. The speed reduction for a 12 ft lane without a shoulder was found to be 5.6 mph numbers based on 55 mph work zone speed limit and a 65 mph

regular speed limit (without a work zone). Heavy vehicles reduced their speed more than passenger cars[44].

This study focused on the effects of narrowing a road from 10.8 ft to 9.8 ft with a one ft shoulder. The study found that speeds were not affected by lane narrowing, but drivers drove more to the center of the lane after the narrowing (when they drove more to the left before narrowing). Drivers also shifted more to the right when there was an oncoming vehicle after the lane narrowing[45].

The Highway Capacity Manual (2000) has a lane width factor for determining the speed change based on lane width based on a standard width of 12 feet. The factor equation is

$$f_w = 1 + \frac{(W - 12)}{30}$$

The result of this equation is then multiplied by the speed found using a 12 foot lane to determine the change[46].

2.7 Road Diet Treatments

A 6 block section of an arterial street (West Avenue) in Ocean City, NJ was used to test the efficacy of a road diet design. Four traffic lanes were reduced to three, and pedestrian refuge islands and bike lanes were introduced. The results were that the traffic volumes were unchanged, there was a modest reduction in speed, and the speed reduction was welcome but not as large as anticipated. Ocean City deemed the trial as successful- the new facilities were being utilized and there was not a noticeable increase in delay. The city has decided to extend the project 10 blocks south and is also evaluating the feasibility of extending the project to the north[47].

Crash frequency was reduced by six percent after a road diet treatment was implemented. Crash rate remained the same, however, when comparing the road diet

and comparison sites. Crash severity also remained unchanged. The reason for the reduction in the crash frequency is unknown[48].

This report replaces the previous one done in 2005 (*Evaluation of Lane Reduction "Road Diet" Measures and Their Effects on Crashes and Injuries*). The new research determined that there is an average 29% reduction in total crashes after a road diet plan is implemented. In small urban areas a 47% reduction was found, and in more suburban areas outside a major city a 19% reduction was found. These differences are most likely due to original AADT and 85th percentile speed of vehicles[49].

Chapter 3

METHODOLOGY

While there are many complete streets' techniques, all of them fall into one of the following categories that can affect traffic: lane width change, volume shifts, and delay due to pedestrians.

3.1 Lane Width Changes

Lane width changes occur when there is an existing road that has a set width, and different techniques are applied that were not accounted for in the original width of the road. Standard lane width is 12 ft, and widths of 10, 10.5, 11, and 11.5 ft are reasonable widths of road depending on the speed of the vehicles.

There are a number of sources that discuss the effects of changing lane width. Some describe the effects on capacity, while others focus on the effects on speed. With respect to speed, there are three sources that will be focused on in this study and they are a study on the effect of reducing lane width in a work zone, and the two most recent versions of the Highway Capacity Manual (2000 and 2010). In the 2000 manual, lane width was considered to have an impact on speed, but in 2010, the new Highway Capacity Manual changed the effect of lane width on speed. The current standard states that speed does not change for lane widths of 10 feet to 12.9 feet. If the lane width is between 8 and 10 feet, the factor that the free flow speed is multiplied by is 0.96[50]. Although the speed does not change, the capacity does change.

Table 3.1: Speed based on lane width with a free flow speed of 25 mph

Width (ft)	13	12	11.5	11	10.5	10	9.5
HCM 2010[50]	26.0	25.0	25.0	25.0	25.0	25.0	24
HCM 2000[46]	25.8	25.0	24.6	24.2	23.4	23.3	22.9
Work Zone[44]	N/A	25.0	24.0	23.0	21.8	20.5	N/A

By adding refuge islands, curb bulb-outs, bike lanes, and sidewalks, space is taken away from each lane to accommodate other users without widening the road. There are a number of different ways that an existing road can be changed to make it safer for all users without acquiring the necessary right-of-way to widen the road. For example, a road with two 12-foot travel lanes in each direction and parking lanes on both side can be changed in a number of different ways (Figure 3.1).



Figure 3.1: Different lane configurations based on 76 ft right-of-way

The original street design is meant to be indicative of many streets in urbanized areas across the country. This street design requires a pedestrian to cross 64 feet in one cycle which could be difficult for some pedestrians. It does not allow any separate space for cyclists and does not have any additional facilities for transit users. Using the original right-of-way area, many solutions are possible by reducing the lane width, reducing the number of travel lanes, and taking out one or both of the parking lanes.

Solution A reduces the distance that pedestrians have to cross by adding curb bulb-outs at pedestrian crossings while leaving in the parking lane where there is not a crossing. Curb bulb-outs are also used to increase the visibility of the pedestrians, so drivers see them before they walk into traffic. A median was also added, but the median cannot act as a refuge island because they must be a minimum size of six feet to accommodate pedestrians with disabilities. Solution A and B with two and four-foot islands are not sufficient, but they do create a potential for street vegetation and storm water systems. This is done by reducing each of the travel lanes to 11 feet wide instead of 12 feet.

Solution B reduces the lane width to 10 feet and introduces a median and one bike lane that can accommodate bike traffic in one direction only. The bike lane is protected from traffic by the parking lane. This makes cyclists feel more comfortable because of the separation and reduces the risk of door crashes because the travel lane is not next to the driver-side door. This solution keeps the curb bulb-outs on both sides, but it does accommodate the bike lane on one side.

Solution C has a 10 foot travel lane, and it takes away one parking lane to add a protected, two-direction, bike lane on the other side. It also adds a pedestrian refuge

island that is wide enough to accommodate pedestrians with disabilities. It significantly reduces the distance that a pedestrian has to cross, which changes the amount of time that is required to allow pedestrians to clear the intersection because they only need to make it to the refuge island.

Solution D removes one of the travel lanes in each direction and allows for a turning lane in the center. This is a road diet solution because travel lanes are taken out and replaced by a turning lane and other facilities. This solution keeps both parking lanes and allows for a bike lane on each side and for a slightly wider sidewalk. This option could have refuge islands instead of turning lanes at the intersections. Each of the solutions dramatically reduces the distance a pedestrian has to cross in one light cycle, and also makes pedestrians more visible to drivers using curb bulb-outs. Depending on the available space for a bike lane, there could be a bike lane on each side of the street that moves along with traffic (As shown in solution D), or there could be a two-way bike lane on one side or in the middle of the street (as in solution C).

To determine which techniques are best for a specific project, it is necessary to design based on the context. If the road has a large number of vulnerable pedestrians, the best solution would have short crossing distances. If there are a lot of cyclists in the area, the best solution would have adequate bike lanes to accommodate the users. This plan would require a large network of bike lanes which would take more time than just one project. If the road is near a school, the best solution would allow for young pedestrians and cyclists to travel safely alone or with a parent. These solutions would include different signal timing at intersections, very visible and more frequent crossing opportunities, and bike lanes that are protected from traffic.

Context specific solutions are necessary because each decision made will affect the traffic of the area in some way. Reducing capacity of the street will affect all of the drivers in the area. This may be a determining factor in whether to proceed with a project or not. If everyone in the community is trying to reduce the number of cars in their household, creating infrastructure to accommodate new types of users would be appropriate for the neighborhood. If, however, the community is not interested in reducing the number of cars per household, or if it is not close enough to a central business district, than reducing road capacity by adding in sidewalks is much less appropriate. This could result in an increase in delay and emissions for infrastructure that will go mostly unused.

The most significant impact that needs to be addressed is the change in capacity based on lane width change. To determine capacity change, Highway Capacity Software was used. Their software, Art Plan 2009, was used to simulate the effects of lane width change based on a street in a large urbanized area with two thru lanes in each direction and a free flow speed of 35 mph. A baseline service volume was determined based on the service volumes for this street with 12 foot lanes. The change in service volumes (based on level of service) was determined by using 11, 10, and 9 foot lanes. These service volumes can be used to determine what lane width is necessary for a certain street based on current and projected hourly volumes and the techniques that are desired for a given context.

3.2 Delay Changes

Delay caused by pedestrians can be caused either by changing the signal timing of existing crosswalks, or by adding additional, mid-block, crosswalks. Delay depends heavily on how many pedestrians there are and how compliant those

pedestrians are to the traffic laws. This can be affected by the volume shift if a significant number of users choose to walk instead of drive when using a certain road.

At intersections, signal timing needs to accommodate for the distance pedestrians have to travel using a 3.5 foot per second speed. Assuming pedestrians follow the laws and there is enough time for them to cross, there will be no additional delay. If there are long distances to cross, it is possible that some pedestrians would be left in the crosswalk after the signal has changed, and that could cause some delay.

Midblock crossings, on the other hand, do cause delay. Depending on the type of crossing and number of pedestrians, there could be substantial delay. The cost of each of the options differs depending on what safety features are included. The options range from adding pavement markings at midblock crossing to adding pedestrian signals (Hawks, Pelicans, or Puffins, for example). Midblock signals can be very expensive to install, but they are meant to improve safety for pedestrians. The difference between a signalized and an un-signalized midblock crossing is how the traffic is stopped. In some signalized midblock crossings, the pedestrian pushes a button which creates a red light for the driver and the pedestrian is allowed to cross. In an un-signalized crossing, the pedestrian has the right-of-way and walks out in to the crossing without any warning. Un-signalized crossings in highly-travelled areas can cause problems because there is a constant stream of pedestrians walking through the crossing. If the crossing is signalized, there are breaks in the stream of pedestrians which allow drivers to pass.

To determine the delay caused by pedestrians crossing at a midblock crossing, a simulation was done in VISSIM. This simulation focused on a section of road with two travel lanes in each direction and a midblock crossing. Simulations were done to

determine the travel times for vehicles using different vehicular and pedestrian volumes. Vehicular volumes of 500, 1000, 1500, 2000, and 2500 vehicles per hours were tested. Each vehicular volume was tested using a range of pedestrian volumes: 0 (to establish a travel time without a midblock crossing), 10, 50, 100, 150, 200, and 400 pedestrians per hour. These ranges were used to compare roads that have a low vehicular and pedestrian volume to roads that have a very high vehicular and pedestrian volume and everything in between. Once the travel times were found, the delay was determined by using the difference in travel time between each of the scenarios and the base case (with no midblock crossing). The results can be used as a decision tool for planning organizations to determine if increasing the delay for drivers is a reasonable tradeoff to give pedestrians an extra road crossing.

3.3 Volume Shifts

Volume shifts may occur because people choose to use a different mode of travel based on the current facilities. Drivers may also choose alternate routes because of delay that is caused or a perception that there may be increased delay do to the change in design. It is very difficult to determine what sort of effect this will have on the daily traffic volume. Instead of trying to determine how many drivers will switch modes based on a new road design, it is more important to determine how many drivers have to switch modes so the level of service does not change significantly. This number is based on the techniques chosen for a certain road and are affected by lane width and delay caused by pedestrians.

Chapter 4

RESULTS

4.1 Lane Width Changes

There is a marked difference between the service volumes of a street with 12 foot lanes and those with narrower lanes. Depending on the level of service, the service volume drops a certain amount each time a lane gets narrower. While this seems like common sense, it is important to understand the difference between choosing a 10 foot lane versus an 11 foot lane. Below shows the percentage drop in service volumes based on lane width.

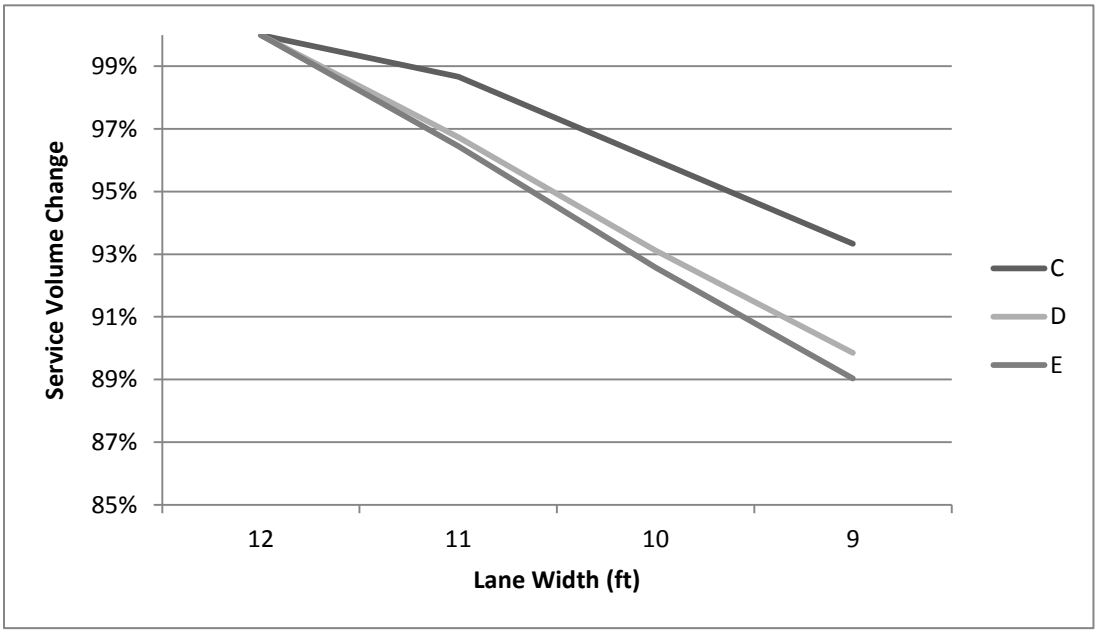

Figure 4.1: Service volume change based on lane width

As figure 4.1 shows, reducing the lane width by 3 feet can reduce the service volume by 10% depending on the level of service. However, a 1 foot reduction only reduces service volumes by 2-3%. This Service volume differs from capacity in that it focuses on a certain set of conditions and a given level of service. This data helps planners understand how much lane width can be reduced based on a target level of service and traffic forecasts for an area.

4.2 Delay Changes

Introducing additional pedestrian facilities at un-signalized intersections causes delay. The amount of delay for drivers depends on the number of vehicles and the number of pedestrians. As the number of pedestrians and vehicles increases, the delay increases substantially.

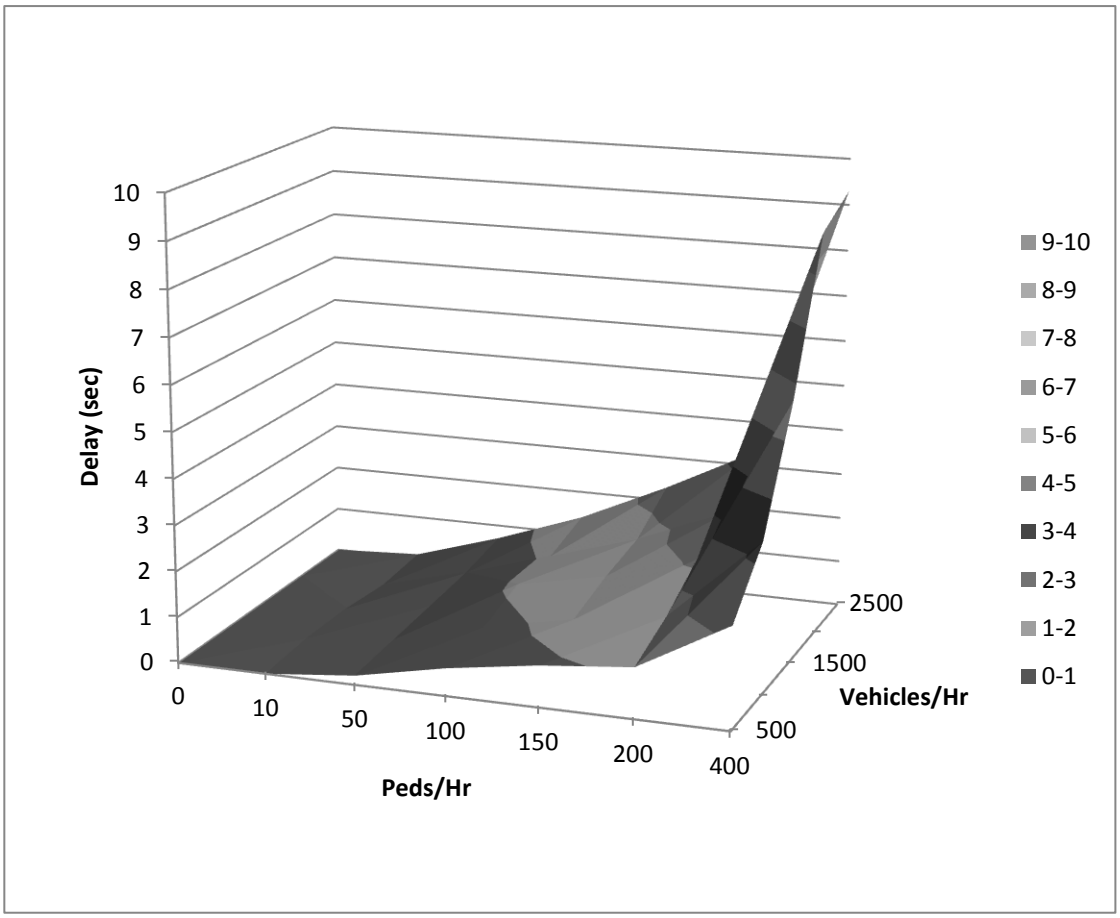

Figure 4.2: Delay based on pedestrian and vehicular volumes

Planners can use this information to determine if the number of vehicles and pedestrians warrants an un-signalized midblock crossing, or if no crossing or a signalized intersection is more appropriate for the context.

4.3 Volume Shifts

Volume shifts are required based on the results for delay changes and lane width changes. For lane width reductions, the volume shift would have to be equal to

the service volume reduction to maintain the same level of service. A road that originally accommodated an annual average daily traffic of 12,400 at a level of service D would only be able to accommodate an AADT of 12,000 if the lane were reduced to 11 feet. To maintain this level of service, 400 (3%) drivers would have to choose a different mode or different route every day. 900 (7%) drivers would have to switch modes or routes with a 10 foot lane, and 1,300 (10%) drivers would have to switch with a 9 foot lane. In all cases, a significant number of drivers would have to switch modes or routes to maintain the level of service.

Delay caused by pedestrians is more complicated. If a substantial number of drivers switched to pedestrians, delay could change if the midblock crossing is used by more people. The important thing to note about the delay change results is that doubling the number of vehicles has a much larger effect on delay than doubling the number of pedestrians.

Chapter 5

CONCLUSION

5.1 Tradeoffs

There is one essential question that all planners need to ask themselves: what techniques are appropriate for this context and this community? The answer to this question is going to vary widely from place to place. The context plays the largest part in determining the answer. Some techniques are only appropriate in dense urban areas, other techniques are appropriate for less dense areas. The primary goal of a complete street design is to increase the safety of all users. To meet this goal, it is important to understand who the users are, what the community wants, and what the community needs.

Difficult decisions are required to determine which techniques are the best to implement in a given area. In a densely populated area, the community may want a sidewalk, a bike lane, and street landscaping/storm water management. In a rural area, the community may want a good drainage system and a wide shoulder for walking and biking. These techniques might be appropriate for each community, but both solutions take up space that may be used currently as a vehicular travel or parking lane, or they might require more right-of-way. These changes could greatly affect the traffic in the area by increasing delay or reducing service volume.

The results shown give planners the opportunity to understand the tradeoffs that need to be part of the discussion. It may be appropriate to reduce the service volume to put in a bike lane if the community wants a bike lane, and the bike lane will

be used enough to warrant affecting traffic. This could cause the community to become divided over the issue, and there will have to be a discussion about whose needs will be met and where compromises need to be made. Compromises could be to add a bike lane only on one side of the road and leaving the parking on the other side.

These results allow planners to determine how much the lane width could be reduced to continue to meet the needs of the current drivers while implementing complete streets techniques that will address the needs of the other road users. As discussed earlier, it is possible to choose different techniques that fit in the current width of the street while not reducing the lane width dramatically. This is a problem that is especially difficult in areas where the areas along the street are developed and there is no additional space to increase the width of the road to accommodate all users. Increasing the width of the road does not meet the sustainability goals of complete street design, but it may be a compromise so all of the safety goals are met.

Deciding whether to add a midblock crossing has similar tradeoffs to deciding whether to reduce the lane width. Midblock crossings are useful in areas where there is a long distance between signalized intersections and have a number of pedestrians that have to go out of their way to get to a signalized intersection. If there are not a lot of pedestrians, a midblock crossing is not going to have a large effect on the drivers in the area, so the planners need to concern themselves only with what type of crossing they will be putting in and how much money they want to spend. If there is a large pedestrian population and fewer drivers, a midblock crossing is appropriate to accommodate many users. If there is a large pedestrian population and a lot of drivers, it is important to weigh the tradeoffs between accommodating the drivers and accommodating the pedestrians. One possible solution in this case could be to put in a

signalized crossing so more pedestrians cross in groups instead of a steady stream. This also lets the drivers and pedestrians know exactly when it is safe to go. Adding in a signalized crossing is much more expensive than adding an un-signalized crossing, but the pedestrian and driver populations might warrant a signalized crossing.

5.2 Future Work

Transportation planning occurs at different levels because individual roads are designed at different times, but all of these roads along with the public transit network all work together as a larger transportation network that impacts a region. This study focused only on the effects of complete streets techniques at the street/arterial level. Now that the impacts of lane width reduction and delay changes have been determined at a more detailed level, it is important to understand the impacts on the larger transportation network.

In 2010, the Highway Safety Manual was introduced which focuses on the safety of road users. Since the primary goal of designing complete streets, it is important to determine if there will be changes in safety based on the different techniques that are implemented. Planners need to determine if it is safer to introduce more pedestrians on a street versus keeping them in cars. If it is not safer to introduce pedestrians on that street, it is necessary to determine how the street could be designed to make it safer. Sometimes this could be difficult because the context makes streets more dangerous for pedestrians, but if there is something that can be done during design, focusing on the safety of all users is necessary to meet the goals of complete street design.

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Appendix A

LANE WIDTH CHANGE DATA

A.1 Highway Capacity Manual 2000

Table A.1: Speed changes based on lane width changes from HCM 2000

Speed (mph) \ Width	13	12	11.5	11	10.5	10	9.5
20	20.7	20.0	19.7	19.3	18.7	18.7	18.3
25	25.8	25.0	24.6	24.2	23.4	23.3	22.9
30	31.0	30.0	29.5	29.0	28.0	28.0	27.5
35	36.2	35.0	34.4	33.8	32.7	32.7	32.1
40	41.3	40.0	39.3	38.7	37.4	37.3	36.7
45	46.5	45.0	44.3	43.5	42.0	42.0	41.3
50	51.7	50.0	49.2	48.3	46.7	46.7	45.8
55	56.8	55.0	54.1	53.2	51.4	51.3	50.4

A.2 Work Zone Study

Table A.2: Speed changes based on lane width changes from Work Zone Study

		Width				
		12	11.5	11	10.5	10
	% Change	0%	96%	92%	87%	82%
Speed (mph)	20	20.0	19.2	18.4	17.5	16.4
	25	25.0	24.0	23.0	21.8	20.5
	30	30.0	28.9	27.6	26.2	24.5
	35	35.0	33.7	32.2	30.5	28.6
	40	40.0	38.5	36.8	34.9	32.7
	45	45.0	43.3	41.4	39.3	36.8
	50	50.0	48.1	46.0	43.6	40.9
	55	55.0	52.9	50.6	48.0	45.0

Appendix B

DATA COLLECTION

B.1 Midblock crossing:

Table B.1: Travel Time in seconds based on number of pedestrians and vehicles at midblock crossing

	Veh/hour				
	500	1000	1500	2000	2500
Peds/hour 0	4.2	4.2	4.2	4.3	4.3
10	4.2	4.3	4.3	4.3	4.4
50	4.4	4.5	4.6	4.8	5
100	4.8	5	5.3	5.4	5.7
150	5.1	5.4	5.7	6	6.6
200	5.3	5.7	6.3	6.8	7.6
400	6.4	7.5	9.9	13.1	13.6

Table B.2: Delay in seconds based on number of pedestrians and vehicles at midblock crossing

	Veh/hour				
Peds/hour	500	1000	1500	2000	2500
0	0	0	0	0	0
10	0	0.1	0.1	0	0.1
50	0.2	0.3	0.4	0.5	0.7
100	0.6	0.8	1.1	1.1	1.4
150	0.9	1.2	1.5	1.7	2.3
200	1.1	1.5	2.1	2.5	3.3
400	2.2	3.3	5.7	8.8	9.3

B.2 Service Volume Changes:

B.2.1 2 Lanes:

Table B.3: Service Volumes based on lane width in AADT for a two lane road

	LOS		
Lane Width	C	D	E
12	3400	12400	15000
11	3200	12000	14500
10	3000	11500	14100
9	3000	11100	13500

Table B.4: Percent change of service volumes for a two lane road

	LOS		
	C	D	E
Lane Width 12	100%	100%	100%
11	94%	97%	97%
10	88%	93%	94%
9	88%	90%	90%

B.2.2 4 Lanes:

Table B.5: Service Volumes based on lane width in AADT for a four lane road

	LOS		
	C	D	E
Lane Width 12	7500	27600	31000
11	7400	26700	29900
10	7200	25700	28700
9	7000	24800	27600

Table B.6: Percent change of service volumes for a four lane road

	LOS		
	C	D	E
Lane Width 12	100%	100%	100%
11	99%	97%	96%
10	96%	93%	93%
9	93%	90%	89%

Senate Bill No. 743

CHAPTER 386

An act to amend Sections 65088.1 and 65088.4 of the Government Code, and to amend Sections 21181, 21183, 21186, 21187, 21189.1, and 21189.3 of, to add Section 21155.4 to, to add Chapter 2.7 (commencing with Section 21099) to Division 13 of, to add and repeal Section 21168.6.6 of, and to repeal and add Section 21185 of, the Public Resources Code, relating to environmental quality.

[Approved by Governor September 27, 2013. Filed with Secretary of State September 27, 2013.]

LEGISLATIVE COUNSEL'S DIGEST

SB 743, Steinberg. Environmental quality: transit oriented infill projects, judicial review streamlining for environmental leadership development projects, and entertainment and sports center in the City of Sacramento.

(1) The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 requires a party bringing an action or proceeding alleging that a lead agency's approval of a project certified by the Governor as an environmental leadership development project is in violation of the California Environmental Quality Act to file the action or proceeding with the Court of Appeal with geographic jurisdiction over the project and requires the Court of Appeal to issue its decision within 175 days of the filing of the petition. The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 requires the lead agency to concurrently prepare the record of proceeding for the leadership project with the review and consideration of the project. The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 provides that the above provision does not apply to a project for which a lead agency fails to certify an environmental impact report on or before June 1, 2014. The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 is repealed by its own terms on January 1, 2015.

This bill would instead require the Judicial Council, on or before July 1, 2014, to adopt a rule of court to establish procedures applicable to actions or proceedings seeking judicial review of a public agency's action in certifying the environmental impact report and in granting project approval that requires the actions or proceedings, including any appeals therefrom, be resolved, within 270 days of the certification of the record of proceedings. The bill would extend the operation of the judicial review procedures unless the lead agency fails to certify an environmental impact report for an environmental leadership project on or before January 1, 2016. The bill would provide that the above provisions do not apply to a project if the Governor does not certify the project as an environmental leadership

development project prior to January 1, 2016. Because this bill would extend the time period for which a lead agency would be required to concurrently prepare the record of proceeding with the review and consideration of the environmental leadership development projects, this bill would impose a state-mandated local program. The bill would require the lead agency, within 10 days of the Governor's certification, to issue, at the applicant's expense, a specified public notice, thereby imposing a state-mandated local program. The bill would repeal the Jobs and Economic Improvement Through Environmental Leadership Act of 2011 on January 1, 2017.

(2) The California Environmental Quality Act, commonly known as CEQA, requires a lead agency, as defined, to prepare, or cause to be prepared, and certify the completion of, an environmental impact report on a project that it proposes to carry out or approve that may have a significant effect on the environment or to adopt a negative declaration if it finds that the project will not have that effect. CEQA also requires a lead agency to prepare a mitigated negative declaration for a project that may have a significant effect on the environment if revisions in the project would avoid or mitigate that effect and there is no substantial evidence that the project, as revised, would have a significant effect on the environment. CEQA establishes a procedure by which a person may seek judicial review of the decision of the lead agency made pursuant to CEQA.

This bill would provide that aesthetic and parking impacts of a residential, mixed-use residential, or employment center project, as defined, on an infill site, as defined, within a transit priority area, as defined, shall not be considered significant impacts on the environment. The bill would require the Office of Planning and Research to prepare and submit to the Secretary of the Natural Resources Agency, and the secretary to certify and adopt, revisions to the guidelines for the implementation of CEQA establishing criteria for determining the significance of transportation impacts of projects within transit priority areas.

This bill would, except for specified circumstances, exempt from CEQA residential, employment center, and mixed-use development projects meeting specified criteria. Because a lead agency would be required to determine the applicability of this exemption, this bill would impose a state-mandated local program.

This bill would require the public agency, in certifying the environmental impact report and in granting approvals for a specified entertainment and sports center project located in the City of Sacramento, including the concurrent preparation of the record of proceedings and the certification of the record of proceeding within 5 days of the filing of a specified notice, to comply with specified procedures. Because a public agency would be required to comply with those new procedures, this bill would impose a state-mandated local program. The bill would require the Judicial Council, on or before July 1, 2014, to adopt a rule of court to establish procedures applicable to actions or proceedings seeking judicial review of a public agency's action in certifying the environmental impact report and in granting project approval that requires the actions or proceedings, including any

appeals therefrom, be resolved, to the extent feasible, within 270 days of the certification of the record of proceedings. The bill would provide that the above provisions are inoperative and repealed on January 1 of the following year if the applicant fails to notify the lead agency before the release of the draft environmental impact report for public comment that the applicant is electing to proceed pursuant to the above provisions.

(3) Existing law requires the development, adoption, and updating of a congestion management program for each county that includes an urbanized area, as defined. The plan is required to contain specified elements and to be submitted to regional agencies, as defined, for determination of whether the program is consistent with regional transportation plans. The regional agency is then directed to monitor the implementation of all elements of each congestion management program. The required elements include traffic level of service standards for a system of designated highways and roadways. Existing law defines "infill opportunity zone" for purposes of the above-described provisions and exempts streets and highways in an infill opportunity zone from the level of service standards specified in the above-described provisions and instead requires alternate level of service standards to be applied. Existing law prohibits a city or county from designating an infill opportunity zone after December 31, 2009.

This bill would revise the definition of "infill opportunity zone," as specified. The bill would authorize the designation of an infill opportunity zone that is a transit priority area within a sustainable communities strategy or alternative planning strategy adopted by an applicable metropolitan planning organization.

(4) Existing law terminates the designation of an infill opportunity zone if no development project is completed within that zone within 4 years from the date of the designation.

This bill would repeal this provision.

This bill would make findings and declarations as to the necessity of a special statute for the City of Sacramento.

(5) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

The people of the State of California do enact as follows:

SECTION 1. (a) The Legislature finds and declares the following:

(1) With the adoption of Chapter 728 of the Statutes of 2008, popularly known as the Sustainable Communities and Climate Protection Act of 2008, the Legislature signaled its commitment to encouraging land use and transportation planning decisions and investments that reduce vehicle miles traveled and contribute to the reductions in greenhouse gas emissions required in the California Global Warming Solutions Act of 2006 (Division

25.5 (commencing with Section 38500) of the Health and Safety Code). Similarly, the California Complete Streets Act of 2008 (Chapter 657 of the Statutes of 2008) requires local governments to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel.

(2) Transportation analyses under the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) typically study changes in automobile delay. New methodologies under the California Environmental Quality Act are needed for evaluating transportation impacts that are better able to promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations.

(b) It is the intent of the Legislature to do both of the following:

(1) Ensure that the environmental impacts of traffic, such as noise, air pollution, and safety concerns, continue to be properly addressed and mitigated through the California Environmental Quality Act.

(2) More appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.

SEC. 2. The Legislature further finds and declares all of the following:

(a) The Federal Reserve has stated that "[m]ost policymakers estimate the longer-run normal rate of unemployment is between 5.2 and 6 percent." At 7.6 percent, the current United States unemployment rate remains markedly higher than the normal rate and both the unemployment rates in Sacramento County and California are higher than the current national unemployment rate.

(b) The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) requires that the environmental impacts of development projects be identified and mitigated. The act also guarantees the public an opportunity to review and comment on the environmental impacts of a project and to participate meaningfully in the development of mitigation measures for potentially significant environmental impacts.

(c) The existing home of the City of Sacramento's National Basketball Association (NBA) team, the Sleep Train Arena, is an old and outmoded facility located outside of the City of Sacramento's downtown area and is not serviced by the region's existing heavy and light rail transportation networks. It was constructed 25 years ago and a new, more efficient entertainment and sports center located in downtown Sacramento is needed to meet the city's and region's needs.

(d) The City of Sacramento and the region would greatly benefit from the addition of a multipurpose event center capable of hosting a wide range of events including exhibitions, conventions, sporting events, as well as musical, artistic, and cultural events in downtown Sacramento.

(e) The proposed entertainment and sports center project is a public-private partnership between the City of Sacramento and the applicant that will result in the construction of a new state-of-the-art multipurpose event center, and surrounding infill development in downtown Sacramento as described in the notice of preparation released by the City of Sacramento on April 12, 2013.

(f) The project will generate over 4,000 full-time jobs including employees hired both during construction and operation of the entertainment and sports center project. This employment estimate does not include the substantial job generation that will occur with the surrounding development uses, which will generate additional hospitality, office, restaurant, and retail jobs in Sacramento's downtown area.

(g) The project also presents an unprecedented opportunity to implement innovative measures that will significantly reduce traffic and air quality impacts and mitigate the greenhouse gas emissions resulting from the project. The project site is located in downtown Sacramento near heavy and light rail transit facilities, situated to maximize opportunities to encourage nonautomobile modes of travel to the entertainment and sports center project, and is consistent with the policies and regional vision included in the Sustainable Communities Strategy adopted pursuant to Chapter 728 of the Statutes of 2008 by the Sacramento Area Council of Governments in April of 2012. The project is also located within close proximity to three major infill development areas including projects (The Bridge District, Railyards, and Township Nine) that received infill infrastructure grants from the state pursuant to Proposition 1C.

(h) It is in the interest of the state to expedite judicial review of the entertainment and sports center project, as appropriate, while protecting the environment and the right of the public to review, comment on, and, if necessary, seek judicial review of, the adequacy of the environmental impact report for the project.

SEC. 3. Section 65088.1 of the Government Code is amended to read:

65088.1. As used in this chapter the following terms have the following meanings:

(a) Unless the context requires otherwise, "agency" means the agency responsible for the preparation and adoption of the congestion management program.

(b) "Bus rapid transit corridor" means a bus service that includes at least four of the following attributes:

(1) Coordination with land use planning.
(2) Exclusive right-of-way.
(3) Improved passenger boarding facilities.
(4) Limited stops.
(5) Passenger boarding at the same height as the bus.
(6) Prepaid fares.
(7) Real-time passenger information.
(8) Traffic priority at intersections.
(9) Signal priority.

(10) Unique vehicles.

(c) "Commission" means the California Transportation Commission.

(d) "Department" means the Department of Transportation.

(e) "Infill opportunity zone" means a specific area designated by a city or county, pursuant to subdivision (c) of Section 65088.4, that is within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan. A major transit stop is as defined in Section 21064.3 of the Public Resources Code, except that, for purposes of this section, it also includes major transit stops that are included in the applicable regional transportation plan. For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

(f) "Interregional travel" means any trips that originate outside the boundary of the agency. A "trip" means a one-direction vehicle movement. The origin of any trip is the starting point of that trip. A roundtrip consists of two individual trips.

(g) "Level of service standard" is a threshold that defines a deficiency on the congestion management program highway and roadway system which requires the preparation of a deficiency plan. It is the intent of the Legislature that the agency shall use all elements of the program to implement strategies and actions that avoid the creation of deficiencies and to improve multimodal mobility.

(h) "Local jurisdiction" means a city, a county, or a city and county.

(i) "Multimodal" means the utilization of all available modes of travel that enhance the movement of people and goods, including, but not limited to, highway, transit, nonmotorized, and demand management strategies including, but not limited to, telecommuting. The availability and practicality of specific multimodal systems, projects, and strategies may vary by county and region in accordance with the size and complexity of different urbanized areas.

(j) (1) "Parking cash-out program" means an employer-funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space. "Parking subsidy" means the difference between the out-of-pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space.

(2) A parking cash-out program may include a requirement that employee participants certify that they will comply with guidelines established by the employer designed to avoid neighborhood parking problems, with a provision that employees not complying with the guidelines will no longer be eligible for the parking cash-out program.

(k) "Performance measure" is an analytical planning tool that is used to quantitatively evaluate transportation improvements and to assist in determining effective implementation actions, considering all modes and

strategies. Use of a performance measure as part of the program does not trigger the requirement for the preparation of deficiency plans.

(*l*) "Urbanized area" has the same meaning as is defined in the 1990 federal census for urbanized areas of more than 50,000 population.

(m) Unless the context requires otherwise, "regional agency" means the agency responsible for preparation of the regional transportation improvement program.

SEC. 4. Section 65088.4 of the Government Code is amended to read:

65088.4. (a) It is the intent of the Legislature to balance the need for level of service standards for traffic with the need to build infill housing and mixed use commercial developments within walking distance of mass transit facilities, downtowns, and town centers and to provide greater flexibility to local governments to balance these sometimes competing needs.

(b) Notwithstanding any other provision of law, level of service standards described in Section 65089 shall not apply to the streets and highways within an infill opportunity zone.

(c) The city or county may designate an infill opportunity zone by adopting a resolution after determining that the infill opportunity zone is consistent with the general plan and any applicable specific plan, and is a transit priority area within a sustainable communities strategy or alternative planning strategy adopted by the applicable metropolitan planning organization.

SEC. 5. Chapter 2.7 (commencing with Section 21099) is added to Division 13 of the Public Resources Code, to read:

Chapter 2.7. Modernization of Transportation Analysis for Transit-Oriented Infill Projects

21099. (a) For purposes of this section, the following terms mean the following:

(1) "Employment center project" means a project located on property zoned for commercial uses with a floor area ratio of no less than 0.75 and that is located within a transit priority area.

(2) "Floor area ratio" means the ratio of gross building area of the development, excluding structured parking areas, proposed for the project divided by the net lot area.

(3) "Gross building area" means the sum of all finished areas of all floors of a building included within the outside faces of its exterior walls.

(4) "Infill site" means a lot located within an urban area that has been previously developed, or on a vacant site where at least 75 percent of the perimeter of the site adjoins, or is separated only by an improved public right-of-way from, parcels that are developed with qualified urban uses.

(5) "Lot" means all parcels utilized by the project.

(6) "Net lot area" means the area of a lot, excluding publicly dedicated land and private streets that meet local standards, and other public use areas as determined by the local land use authority.

(7) "Transit priority area" means an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program adopted pursuant to Section 450.216 or 450.322 of Title 23 of the Code of Federal Regulations.

(b) (1) The Office of Planning and Research shall prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to Section 21083 establishing criteria for determining the significance of transportation impacts of projects within transit priority areas. Those criteria shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. In developing the criteria, the office shall recommend potential metrics to measure transportation impacts that may include, but are not limited to, vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated. The office may also establish criteria for models used to analyze transportation impacts to ensure the models are accurate, reliable, and consistent with the intent of this section.

(2) Upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any.

(3) This subdivision does not relieve a public agency of the requirement to analyze a project's potentially significant transportation impacts related to air quality, noise, safety, or any other impact associated with transportation. The methodology established by these guidelines shall not create a presumption that a project will not result in significant impacts related to air quality, noise, safety, or any other impact associated with transportation. Notwithstanding the foregoing, the adequacy of parking for a project shall not support a finding of significance pursuant to this section.

(4) This subdivision does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements pursuant to the police power or any other authority.

(5) On or before July 1, 2014, the Office of Planning and Research shall circulate a draft revision prepared pursuant to paragraph (1).

(c) (1) The Office of Planning and Research may adopt guidelines pursuant to Section 21083 establishing alternative metrics to the metrics used for traffic levels of service for transportation impacts outside transit priority areas. The alternative metrics may include the retention of traffic levels of service, where appropriate and as determined by the office.

(2) This subdivision shall not affect the standard of review that would apply to the new guidelines adopted pursuant to this section.

(d) (1) Aesthetic and parking impacts of a residential, mixed-use residential, or employment center project on an infill site within a transit priority area shall not be considered significant impacts on the environment.

(2) (A) This subdivision does not affect, change, or modify the authority of a lead agency to consider aesthetic impacts pursuant to local design review ordinances or other discretionary powers provided by other laws or policies.

(B) For the purposes of this subdivision, aesthetic impacts do not include impacts on historical or cultural resources.

(e) This section does not affect the authority of a public agency to establish or adopt thresholds of significance that are more protective of the environment.

SEC. 6. Section 21155.4 is added to the Public Resources Code, to read:

21155.4. (a) Except as provided in subdivision (b), a residential, employment center, as defined in paragraph (1) of subdivision (a) of Section 21099, or mixed-use development project, including any subdivision, or any zoning, change that meets all of the following criteria is exempt from the requirements of this division:

(1) The project is proposed within a transit priority area, as defined in subdivision (a) of Section 21099.

(2) The project is undertaken to implement and is consistent with a specific plan for which an environmental impact report has been certified.

(3) The project is consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in either a sustainable communities strategy or an alternative planning strategy for which the State Air Resources Board, pursuant to subparagraph (H) of paragraph (2) of subdivision (b) of Section 65080 of the Government Code, has accepted a metropolitan planning organization's determination that the sustainable communities strategy or the alternative planning strategy would, if implemented, achieve the greenhouse gas emissions reduction targets.

(b) Further environmental review shall be conducted only if any of the events specified in Section 21166 have occurred.

SEC. 7. Section 21168.6.6 is added to the Public Resources Code, to read:

21168.6.6. (a) For the purposes of this section, the following definitions shall have the following meanings:

(1) "Applicant" means a private entity or its affiliates that proposes the project and its successors, heirs, and assignees.

(2) "City" means the City of Sacramento.

(3) "Downtown arena" means the following components of the entertainment and sports center project from demolition and site preparation through operation:

(A) An arena facility that will become the new home to the City of Sacramento's National Basketball Association (NBA) team that does both of the following:

(i) Receives Leadership in Energy and Environmental Design (LEED) gold certification for new construction within one year of completion of the first NBA season.

(ii) Minimizes operational traffic congestion and air quality impacts through either or both project design and the implementation of feasible mitigation measures that will do all of the following:

(I) Achieve and maintain carbon neutrality or better by reducing to at least zero the net emissions of greenhouse gases, as defined in subdivision (g) of Section 38505 of the Health and Safety Code, from private automobile trips to the downtown arena as compared to the baseline as verified by the Sacramento Metropolitan Air Quality Management District.

(II) Achieve a per attendee reduction in greenhouse gas emissions from automobiles and light trucks compared to per attendee greenhouse gas emissions associated with the existing arena during the 2012–13 NBA season that will exceed the carbon reduction targets for 2020 and 2035 achieved in the sustainable communities strategy prepared by the Sacramento Area Council of Governments for the Sacramento region pursuant to Chapter 728 of the Statutes of 2008.

(III) Achieve and maintain vehicle-miles-traveled per attendee for NBA events at the downtown arena that is no more than 85 percent of the baseline.

(B) Associated public spaces.

(C) Facilities and infrastructure for ingress, egress, and use of the arena facility.

(4) "Entertainment and sports center project" or "project" means a project that substantially conforms to the project description for the entertainment and sports center project set forth in the notice of preparation released by the City of Sacramento on April 12, 2013.

(b) (1) The city may prosecute an eminent domain action for 545 and 600 K Street, Sacramento, California, and surrounding publicly accessible areas and rights-of-way within 200 feet of 600 K Street, Sacramento, California, through order of possession pursuant to the Eminent Domain Law (Title 7 (commencing with Section 1230.010) of Part 3 of the Code of Civil Procedure) prior to completing the environmental review under this division.

(2) Paragraph (1) shall not apply to any other eminent domain actions prosecuted by the City of Sacramento or to eminent domain actions based on a finding of blight.

(c) Notwithstanding any other law, the procedures established pursuant to subdivision (d) shall apply to an action or proceeding brought to attack, review, set aside, void, or annul the certification of the environmental impact report for the project or the granting of any project approvals.

(d) On or before July 1, 2014, the Judicial Council shall adopt a rule of court to establish procedures applicable to actions or proceedings brought to attack, review, set aside, void, or annul the certification of the environmental impact report for the project or the granting of any project approvals that require the actions or proceedings, including any potential appeals therefrom, be resolved, to the extent feasible, within 270 days of certification of the record of proceedings pursuant to subdivision (f).

(e) (1) The draft and final environmental impact report shall include a notice in not less than 12-point type stating the following:

THIS EIR IS SUBJECT TO SECTION 21168.6.6 OF THE PUBLIC RESOURCES CODE, WHICH PROVIDES, AMONG OTHER THINGS, THAT THE LEAD AGENCY NEED NOT CONSIDER CERTAIN COMMENTS FILED AFTER THE CLOSE OF THE PUBLIC COMMENT PERIOD FOR THE DRAFT EIR. ANY JUDICIAL ACTION CHALLENGING THE CERTIFICATION OF THE EIR OR THE APPROVAL OF THE PROJECT DESCRIBED IN THE EIR IS SUBJECT TO THE PROCEDURES SET FORTH IN SECTION 21168.6.6 OF THE PUBLIC RESOURCES CODE. A COPY OF SECTION 21168.6.6 OF THE PUBLIC RESOURCES CODE IS INCLUDED IN THE APPENDIX TO THIS EIR.

(2) The draft environmental impact report and final environmental impact report shall contain, as an appendix, the full text of this section.

(3) Within 10 days after the release of the draft environmental impact report, the lead agency shall conduct an informational workshop to inform the public of the key analyses and conclusions of that report.

(4) Within 10 days before the close of the public comment period, the lead agency shall hold a public hearing to receive testimony on the draft environmental impact report. A transcript of the hearing shall be included as an appendix to the final environmental impact report.

(5) (A) Within five days following the close of the public comment period, a commenter on the draft environmental impact report may submit to the lead agency a written request for nonbinding mediation. The lead agency and applicant shall participate in nonbinding mediation with all commenters who submitted timely comments on the draft environmental impact report and who requested the mediation. Mediation conducted pursuant to this paragraph shall end no later than 35 days after the close of the public comment period.

(B) A request for mediation shall identify all areas of dispute raised in the comment submitted by the commenter that are to be mediated.

(C) The lead agency shall select one or more mediators who shall be retired judges or recognized experts with at least five years experience in land use and environmental law or science, or mediation. The applicant shall bear the costs of mediation.

(D) A mediation session shall be conducted on each area of dispute with the parties requesting mediation on that area of dispute.

(E) The lead agency shall adopt, as a condition of approval, any measures agreed upon by the lead agency, the applicant, and any commenter who requested mediation. A commenter who agrees to a measure pursuant to this subparagraph shall not raise the issue addressed by that measure as a basis for an action or proceeding challenging the lead agency’s decision to certify the environmental impact report or to grant one or more initial project approvals.

(6) The lead agency need not consider written comments submitted after the close of the public comment period, unless those comments address any of the following:

(A) New issues raised in the response to comments by the lead agency.

(B) New information released by the public agency subsequent to the release of the draft environmental impact report, such as new information set forth or embodied in a staff report, proposed permit, proposed resolution, ordinance, or similar documents.

(C) Changes made to the project after the close of the public comment period.

(D) Proposed conditions for approval, mitigation measures, or proposed findings required by Section 21081 or a proposed reporting and monitoring program required by paragraph (1) of subdivision (a) of Section 21081.6, where the lead agency releases those documents subsequent to the release of the draft environmental impact report.

(E) New information that was not reasonably known and could not have been reasonably known during the public comment period.

(7) The lead agency shall file the notice required by subdivision (a) of Section 21152 within five days after the last initial project approval.

(f) (1) The lead agency shall prepare and certify the record of the proceedings in accordance with this subdivision and in accordance with Rule 3.1365 of the California Rules of Court. The applicant shall pay the lead agency for all costs of preparing and certifying the record of proceedings.

(2) No later than three business days following the date of the release of the draft environmental impact report, the lead agency shall make available to the public in a readily accessible electronic format the draft environmental impact report and all other documents submitted to or relied on by the lead agency in the preparation of the draft environmental impact report. A document prepared by the lead agency or submitted by the applicant after the date of the release of the draft environmental impact report that is a part of the record of the proceedings shall be made available to the public in a readily accessible electronic format within five business days after the document is prepared or received by the lead agency.

(3) Notwithstanding paragraph (2), documents submitted to or relied on by the lead agency that were not prepared specifically for the project and are copyright protected are not required to be made readily accessible in an electronic format. For those copyright protected documents, the lead agency shall make an index of these documents available in an electronic format no later than the date of the release of the draft environmental impact report, or within five business days if the document is received or relied on by the lead agency after the release of the draft environmental impact report. The index must specify the libraries or lead agency offices in which hardcopies of the copyrighted materials are available for public review.

(4) The lead agency shall encourage written comments on the project to be submitted in a readily accessible electronic format, and shall make any

such comment available to the public in a readily accessible electronic format within five days of its receipt.

(5) Within seven business days after the receipt of any comment that is not in an electronic format, the lead agency shall convert that comment into a readily accessible electronic format and make it available to the public in that format.

(6) The lead agency shall indicate in the record of the proceedings comments received that were not considered by the lead agency pursuant to paragraph (6) of subdivision (e) and need not include the content of the comments as a part of the record.

(7) Within five days after the filing of the notice required by subdivision (a) of Section 21152, the lead agency shall certify the record of the proceedings for the approval or determination and shall provide an electronic copy of the record to a party that has submitted a written request for a copy. The lead agency may charge and collect a reasonable fee from a party requesting a copy of the record for the electronic copy, which shall not exceed the reasonable cost of reproducing that copy.

(8) Within 10 days after being served with a complaint or a petition for a writ of mandate, the lead agency shall lodge a copy of the certified record of proceedings with the superior court.

(9) Any dispute over the content of the record of the proceedings shall be resolved by the superior court. Unless the superior court directs otherwise, a party disputing the content of the record shall file a motion to augment the record at the time it files its initial brief.

(10) The contents of the record of proceedings shall be as set forth in subdivision (e) of Section 21167.6.

(g) (1) As a condition of approval of the project subject to this section, the lead agency shall require the applicant, with respect to any measures specific to the operation of the downtown arena, to implement those measures that will meet the requirements of this division by the end of the first NBA regular season or June of the first NBA regular season, whichever is later, during which an NBA team has played at the downtown arena.

(2) To maximize public health, environmental, and employment benefits, the lead agency shall place the highest priority on feasible measures that will reduce greenhouse gas emissions on the downtown arena site and in the neighboring communities of the downtown arena. Mitigation measures that shall be considered and implemented, if feasible and necessary, to achieve the standards set forth in subclauses (I) to (III), inclusive, of clause (ii) of subparagraph (A) of paragraph (3) of subdivision (a), including, but not limited to:

(A) Temporarily expanding the capacity of a public transit line, as needed, to serve downtown arena events.

(B) Providing private charter buses or other similar services, as needed, to serve downtown arena events.

(C) Paying its fair share of the cost of measures that expand the capacity of a public fixed or light rail station that is used by spectators attending downtown arena events.

(3) Offset credits shall be employed by the applicant only after feasible local emission reduction measures have been implemented. The applicant shall, to the extent feasible, place the highest priority on the purchase of offset credits that produce emission reductions within the city or the boundaries of the Sacramento Metropolitan Air Quality Management District.

(h) (1) (A) In granting relief in an action or proceeding brought pursuant to this section, the court shall not stay or enjoin the construction or operation of the downtown arena unless the court finds either of the following:

(i) The continued construction or operation of the downtown arena presents an imminent threat to the public health and safety.

(ii) The downtown arena site contains unforeseen important Native American artifacts or unforeseen important historical, archaeological, or ecological values that would be materially, permanently, and adversely affected by the continued construction or operation of the downtown arena unless the court stays or enjoins the construction or operation of the downtown arena.

(B) If the court finds that clause (i) or (ii) is satisfied, the court shall only enjoin those specific activities associated with the downtown arena that present an imminent threat to public health and safety or that materially, permanently, and adversely affect unforeseen important Native American artifacts or unforeseen important historical, archaeological, or ecological values.

(2) An action or proceeding to attack, set aside, void, or annul a determination, finding, or decision of the lead agency granting a subsequent project approval shall be subject to the requirements of Chapter 6 (commencing with Section 21165).

(3) Where an action or proceeding brought pursuant to this section challenges aspects of the project other than the downtown arena and those portions or specific project activities are severable from the downtown arena, the court may enter an order as to aspects of the project other than the downtown arena that includes one or more of the remedies set forth in Section 21168.9.

(i) The provisions of this section are severable. If any provision of this section or its application is held invalid, that invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

(j) (1) This section does not apply to the project and shall become inoperative on the date of the release of the draft environmental impact report and is repealed on January 1 of the following year, if the applicant fails to notify the lead agency prior to the release of the draft environmental impact report for public comment that the applicant is electing to proceed pursuant to this section.

(2) The lead agency shall notify the Secretary of State if the applicant fails to notify the lead agency of its election to proceed pursuant to this section.

SEC. 8. Section 21181 of the Public Resources Code is amended to read:

21181. This chapter does not apply to a project if the Governor does not certify a project as an environmental leadership development project eligible for streamlining provided pursuant to this chapter prior to January 1, 2016.

SEC. 9. Section 21183 of the Public Resources Code is amended to read:

21183. The Governor may certify a leadership project for streamlining pursuant to this chapter if all the following conditions are met:

(a) The project will result in a minimum investment of one hundred million dollars ($100,000,000) in California upon completion of construction.

(b) The project creates high-wage, highly skilled jobs that pay prevailing wages and living wages and provide construction jobs and permanent jobs for Californians, and helps reduce unemployment. For purposes of this subdivision, "jobs that pay prevailing wages" means that all construction workers employed in the execution of the project will receive at least the general prevailing rate of per diem wages for the type of work and geographic area, as determined by the Director of Industrial Relations pursuant to Sections 1773 and 1773.9 of the Labor Code. If the project is certified for streamlining, the project applicant shall include this requirement in all contracts for the performance of the work.

(c) The project does not result in any net additional emission of greenhouse gases, including greenhouse gas emissions from employee transportation, as determined by the State Air Resources Board pursuant to Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

(d) The project applicant has entered into a binding and enforceable agreement that all mitigation measures required pursuant to this division to certify the project under this chapter shall be conditions of approval of the project, and those conditions will be fully enforceable by the lead agency or another agency designated by the lead agency. In the case of environmental mitigation measures, the applicant agrees, as an ongoing obligation, that those measures will be monitored and enforced by the lead agency for the life of the obligation.

(e) The project applicant agrees to pay the costs of the Court of Appeal in hearing and deciding any case, including payment of the costs for the appointment of a special master if deemed appropriate by the court, in a form and manner specified by the Judicial Council, as provided in the Rules of Court adopted by the Judicial Council pursuant to subdivision (f) of Section 21185.

(f) The project applicant agrees to pay the costs of preparing the administrative record for the project concurrent with review and consideration of the project pursuant to this division, in a form and manner specified by the lead agency for the project.

SEC. 10. Section 21185 of the Public Resources Code is repealed.

SEC. 11. Section 21185 is added to the Public Resources Code, to read:

21185. On or before July 1, 2014, the Judicial Council shall adopt a rule of court to establish procedures applicable to actions or proceedings brought to attack, review, set aside, void, or annul the certification of the environmental impact report for an environmental leadership development

project certified by the Governor pursuant to this chapter or the granting of any project approvals that require the actions or proceedings, including any potential appeals therefrom, be resolved, within 270 days of certification of the record of proceedings pursuant to Section 21186.

SEC. 12. Section 21186 of the Public Resources Code is amended to read:

21186. Notwithstanding any other law, the preparation and certification of the administrative record for a leadership project certified by the Governor shall be performed in the following manner:

(a) The lead agency for the project shall prepare the administrative record pursuant to this division concurrently with the administrative process.

(b) All documents and other materials placed in the administrative record shall be posted on, and be downloadable from, an Internet Web site maintained by the lead agency commencing with the date of the release of the draft environmental impact report.

(c) The lead agency shall make available to the public in a readily accessible electronic format the draft environmental impact report and all other documents submitted to, or relied on by, the lead agency in the preparation of the draft environmental impact report.

(d) A document prepared by the lead agency or submitted by the applicant after the date of the release of the draft environmental impact report that is a part of the record of the proceedings shall be made available to the public in a readily accessible electronic format within five business days after the document is released or received by the lead agency.

(e) The lead agency shall encourage written comments on the project to be submitted in a readily accessible electronic format, and shall make any comment available to the public in a readily accessible electronic format within five days of its receipt.

(f) Within seven business days after the receipt of any comment that is not in an electronic format, the lead agency shall convert that comment into a readily accessible electronic format and make it available to the public in that format.

(g) Notwithstanding paragraphs (b) to (f), inclusive, documents submitted to or relied on by the lead agency that were not prepared specifically for the project and are copyright protected are not required to be made readily accessible in an electronic format. For those copyright-protected documents, the lead agency shall make an index of these documents available in an electronic format no later than the date of the release of the draft environmental impact report, or within five business days if the document is received or relied on by the lead agency after the release of the draft environmental impact report. The index must specify the libraries or lead agency offices in which hardcopies of the copyrighted materials are available for public review.

(h) The lead agency shall certify the final administrative record within five days of its approval of the project.

(i) Any dispute arising from the administrative record shall be resolved by the superior court. Unless the superior court directs otherwise, a party

disputing the content of the record shall file a motion to augment the record at the time it files its initial brief.

(j) The contents of the record of proceedings shall be as set forth in subdivision (e) of Section 21167.6.

SEC. 13. Section 21187 of the Public Resources Code is amended to read:

21187. Within 10 days of the Governor certifying an environmental leadership development project pursuant to this section, the lead agency shall, at the applicant's expense, issue a public notice in no less than 12-point type stating the following:

"THE APPLICANT HAS ELECTED TO PROCEED UNDER CHAPTER 6.5 (COMMENCING WITH SECTION 21178) OF THE PUBLIC RESOURCES CODE, WHICH PROVIDES, AMONG OTHER THINGS, THAT ANY JUDICIAL ACTION CHALLENGING THE CERTIFICATION OF THE EIR OR THE APPROVAL OF THE PROJECT DESCRIBED IN THE EIR IS SUBJECT TO THE PROCEDURES SET FORTH IN SECTIONS 21185 TO 21186, INCLUSIVE, OF THE PUBLIC RESOURCES CODE. A COPY OF CHAPTER 6.5 (COMMENCING WITH SECTION 21178) OF THE PUBLIC RESOURCES CODE IS INCLUDED BELOW."

The public notice shall be distributed by the lead agency as required for public notices issued pursuant to paragraph (3) of subdivision (b) of Section 21092.

SEC. 14. Section 21189.1 of the Public Resources Code is amended to read:

21189.1. If, prior to January 1, 2016, a lead agency fails to approve a project certified by the Governor pursuant to this chapter, then the certification expires and is no longer valid.

SEC. 15. Section 21189.3 of the Public Resources Code is amended to read:

21189.3. This chapter shall remain in effect until January 1, 2017, and as of that date is repealed unless a later enacted statute extends or repeals that date.

SEC. 16. With respect to certain provisions of this measure, the Legislature finds and declares that a special law is necessary and that a general law cannot be made applicable within the meaning of Section 16 of Article IV of the California Constitution because of the unique need for the development of an entertainment and sports center project in the City of Sacramento in an expeditious manner.

SEC. 17. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments

sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

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Falling Transit Ridership:

California and Southern California

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Prepared for the Southern California Association of Governments
January 2018

UCLA ITS INSTITUTE OF TRANSPORTATION STUDIES

REBUILDING CALIFORNIA SB1

SCAG INNOVATING FOR A BETTER TOMORROW

ACKNOWLEDGEMENTS

Tiffany Chu, Ryan Kurtzman, Joseph Marynak and Trevor Thomas all provided outstanding research assistance. UCLA ITS Staff Madeline Brozen, Will Livesley-O'Neill, Juan Matute and Marisa Cheung also assisted in production and logistics.

DISCLAIMER

This research was jointly funded by the University of California Institute of Transportation Studies Mobility Research Program, funded by California Senate Bill 1, and the Southern California Association of Governments (SCAG). The SCAG portion of the funding was financed in part through grants from the United States Department of Transportation (DOT). The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of any of the funding agencies, including SCAG and the DOT. This report does not constitute a standard, specification or regulation.

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EXECUTIVE SUMMARY

In the last ten years transit use in Southern California has fallen significantly. This report investigates that falling transit use. We define Southern California as the six counties that participate in the Southern California Association of Governments (SCAG) – Los Angeles, Orange, Riverside, San Bernardino, Ventura and Imperial. We examine patterns of transit service and patronage over time and across the region, and consider an array of explanations for falling transit use: declining transit service levels, eroding transit service quality, rising fares, falling fuel prices, the growth of Lyft and Uber, the migration of frequent transit users to outlying neighborhoods with less transit service, and rising vehicle ownership. While all of these factors probably play some role, we conclude that the most significant factor is increased motor vehicle access, particularly among low-income households that have traditionally supplied the region with its most frequent and reliable transit users.

Transit service and use trends in Southern California

Long associated with the automobile, in the last 25 years Southern California has invested heavily in public transportation. Since 1990, the SCAG region has added over 100 miles of light and heavy rail in Los Angeles County, and over 530 miles of commuter rail region-wide. These investments, however, have not been matched by increases in transit ridership. Transit ridership in the SCAG region reached its postwar peak in 1985. Through the 1990s and 2000s ridership rose and fell modestly, but never again reached its 1985 level. Figure ES-1 shows that per capita trips have been mostly declining in the SCAG region since 2007, and have fallen consistently since 2013.

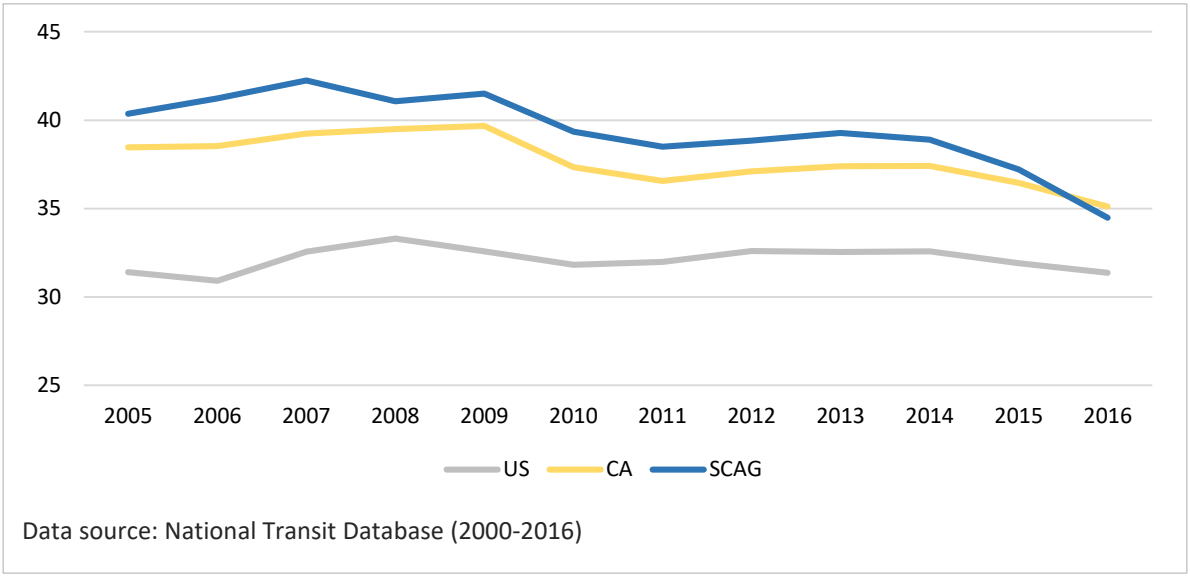


Figure ES 1. Transit trips per capita. *Relatively flat nationally, but down in California since 2009.*

This decline spans modes; it is not simply a case of bus ridership falling while rail ridership increases. Rail ridership, on net, is also down. Further, these aggregate numbers mask large asymmetries in transit service and use. Transit use in particular is heavily concentrated among a relatively small segment of the population, in a small number of the region's neighborhoods, and on a small share of the region's transit systems. As a result of these asymmetries, even small changes in these households, neighborhoods, or transit systems can have an outsized effect on regional transit use.

A few people make most of the trips

The average resident of the SCAG-region made about 35 transit trips in 2016, but the median resident made none. Only a minority of the population rides transit very frequently or even occasionally. About two percent of the population rides transit very frequently (averaging 45 trips/month), another 20 percent of the population rides transit occasionally (averaging 12 trips/month), and more than three-quarters of SCAG-region residents ride transit very little or not at all (averaging less than 1 trip/month). Heavy transit use, moreover, is concentrated among the low-income population, and especially low-income foreign born residents.

A few neighborhoods generate most of the trips

Ten percent of all of the people who commuted to and from work on transit in 2015 lived in 1.4 percent of the region's census tracts, which covered just 0.2 percent of the region's land area; the average number of transit commuters in these few tracts was almost 12 times the regional average. Fully 60 percent of the region's transit commuters lived in 21 percent of the region's census tracts, which occupied 0.9 percent of the region's land area. Overall, the most urban and transit-friendly neighborhoods in the SCAG region comprise less than one percent of the region's land area. These neighborhoods hold about 17 percent the

region's population, but 45 percent of its transit commuters. So while the region's transit systems are increasingly diverse and far reaching, transit riders remain highly concentrated.

A few operators carry most of the passengers

The SCAG region has over 100 transit operators, but just a few them carry the vast majority of riders. Figure ES-2 shows that nine percent of the region's operators are responsible for 60 percent of the region's transit service and carry about 80 percent of all transit riders.

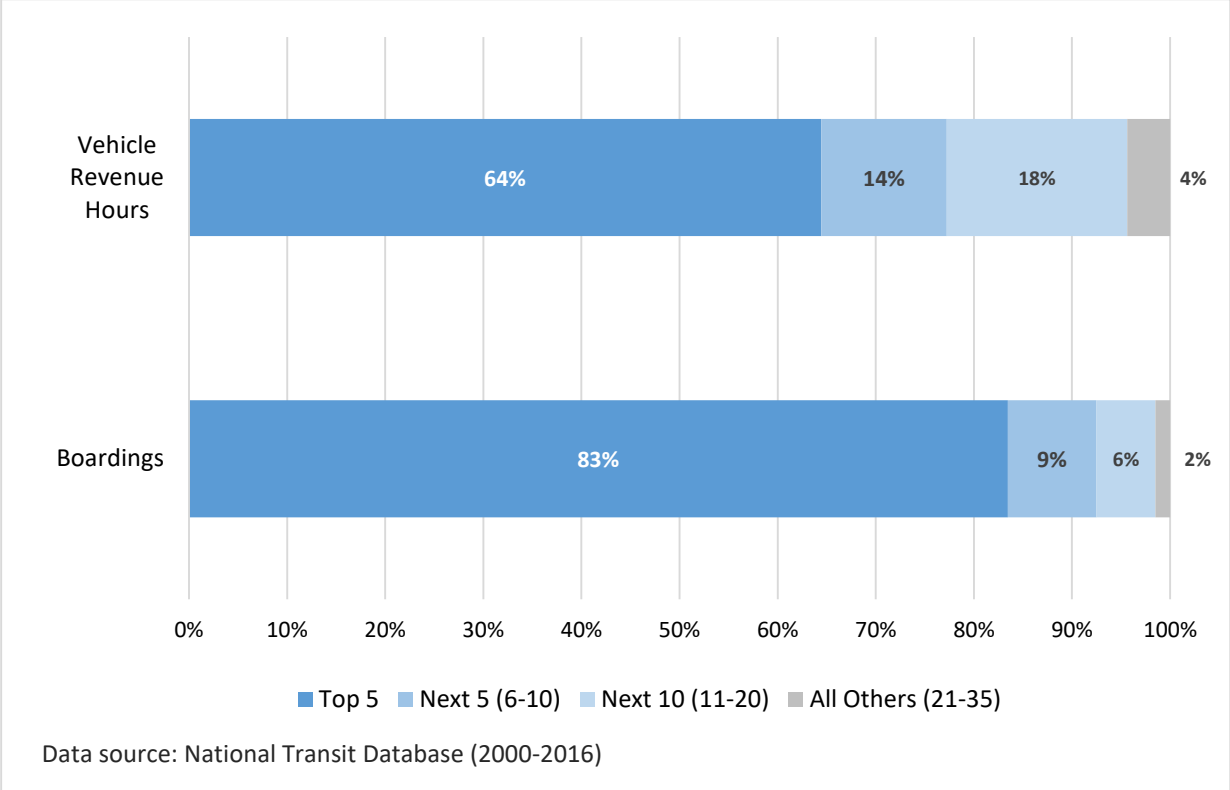


Figure ES 2. Key metrics by operating grouping. *14% of operators carry 83% of the trips.*

Because service and riders are concentrated on the largest systems, ridership losses are concentrated on these systems as well. Four SCAG-region operators—LA Metro, Orange County Transportation Authority (OCTA), Los Angeles Department of Transportation (LADOT), and the Santa Monica Big Blue Bus—accounted for 88 percent of the state's ridership losses between 2010 and 2016. LA Metro by itself accounted for a remarkable 72 percent of the state's losses. Because LA Metro's losses are themselves highly concentrated, a dozen *routes* in LA County account for 38 percent of all the lost ridership in California. In fact, half of California's total lost ridership is accounted for by 17 LA Metro routes (14 bus and 3 rail lines) and one OCTA route.

Possible causes of eroding transit use

Why is transit use falling? We consider a number of potential explanations, and review our findings below.

Changes in transit service and fares have mostly followed and not led falling ridership

Transit use can fall if transit becomes harder to use: if service declines, or fares rise. It does not appear, however, that these factors played a large role in the SCAG region's falling ridership. While transit fare increases are never popular, they are occasionally necessary to keep pace with rising costs. Figure ES-3 shows the inflation-adjusted trends in average fare paid per mile of transit travel between 2002 and 2016 in the U.S., California, and the SCAG region. Fares in Southern California are lower than those in the rest of the state and the country and have been remarkably flat over time.

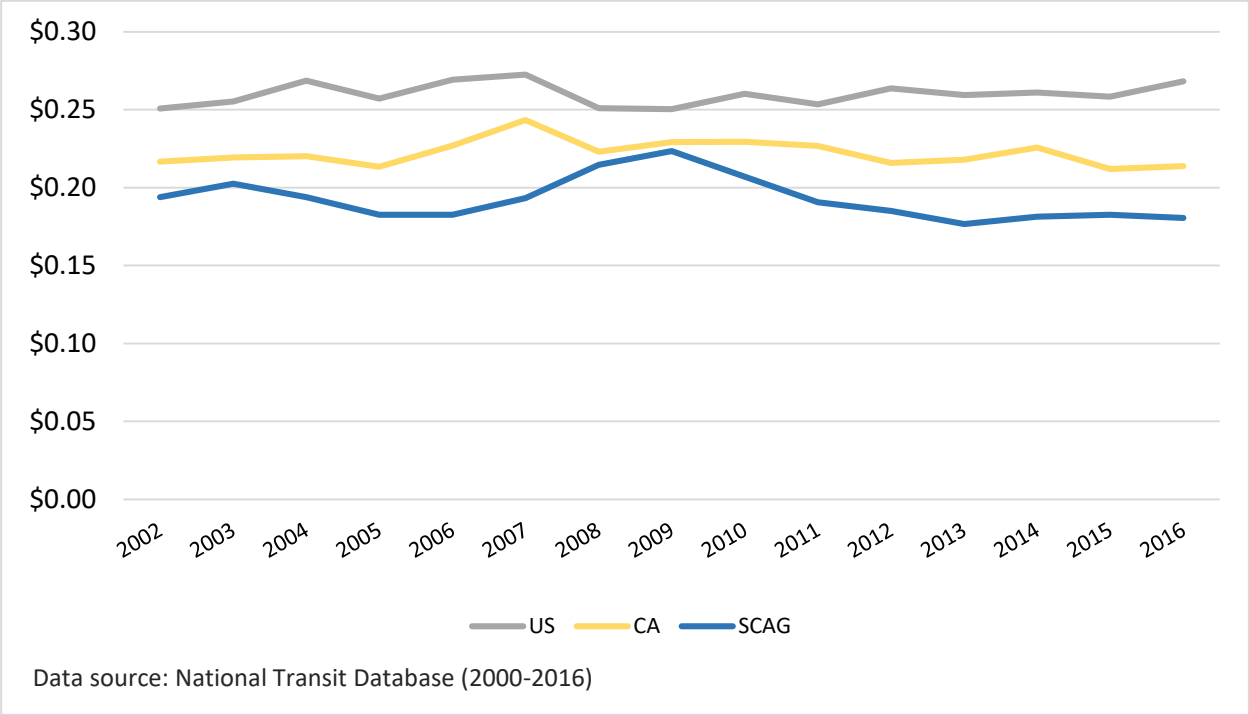


Figure ES 3. Average fare per passenger mile traveled in 2015 dollars. *Average fare per PMT remained fairly consistent and even declined a little since 2009.*

These regional averages can mask significant variation among transit operators. In particular, inflation-adjusted fares per boarding for both OCTA and the Big Blue Bus increased by about 50 percent between 2002 and 2016 — to nearly $1.25 and $0.75 per boarding respectively. So while fares have probably not caused significant ridership declines across the region, they may have played a role at operators like OCTA and Big Blue.

Transit service in the SCAG region, moreover, mostly rose while ridership was falling, and ridership fell even on routes that maintained excellent on-time records. These circumstances suggest that service quantity and reliability were not large factors in falling transit use. There is some evidence, admittedly limited, that riders felt unsafe on transit vehicles in recent years, which may have contributed to the ridership decline.

Fuel prices have likely played a contributing, but not leading role

Fuel prices have been volatile since 1998, but have fallen substantially since peaking in 2012. Figure ES-4 compares trends in fuel prices and transit use in the Los Angeles metropolitan area. While there is a generally positive relationship (as fuel prices rise so too does ridership), it is a relatively weak one – fuel prices rise and fall much more dramatically than transit patronage. The timing of transit's decline, moreover, is not conducive to a fuel price explanation. Per capita transit use in Southern California has been mostly falling since 2007, and it fell between 2009 and 2011 when fuel prices were rising sharply.

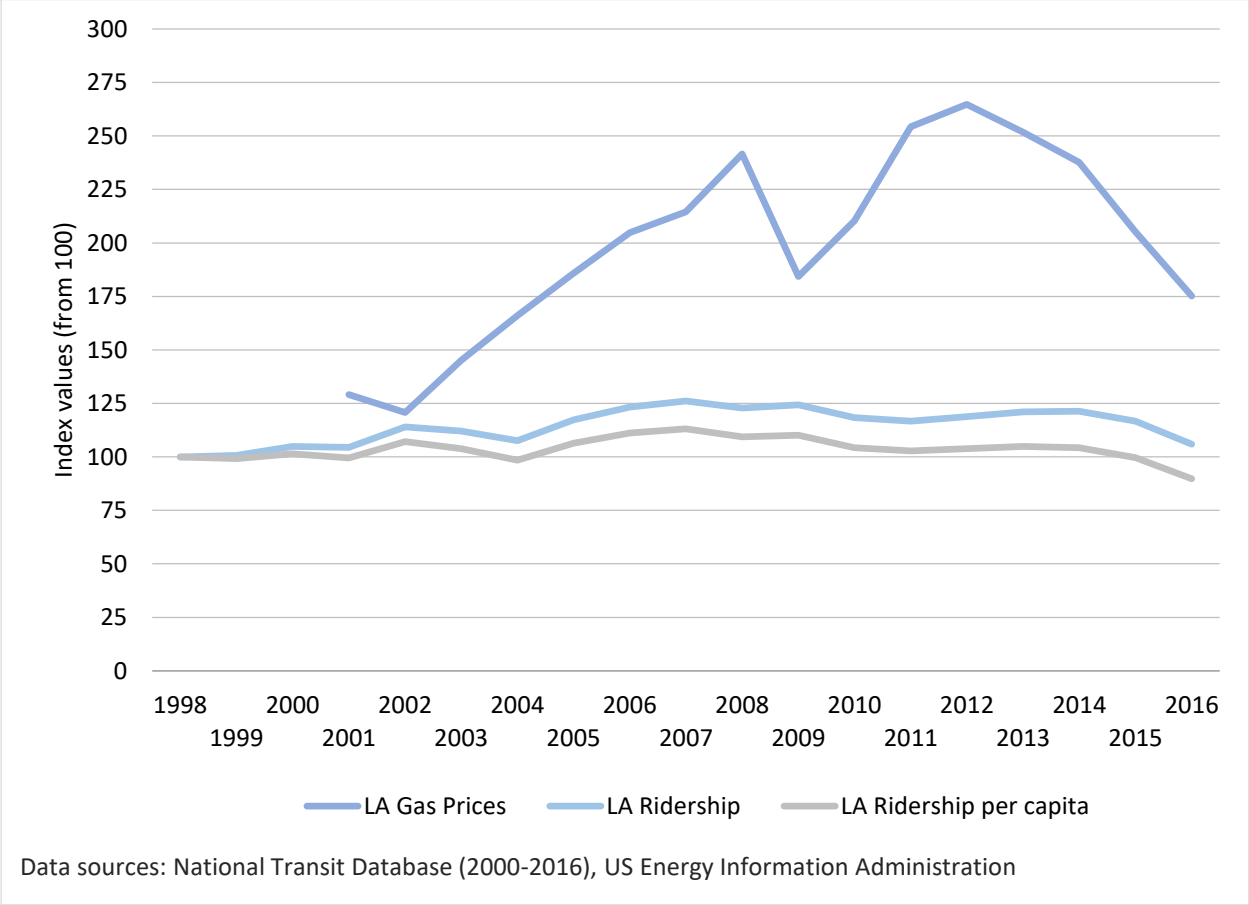


Figure ES 4. Transit ridership and gas prices in Los Angeles Metropolitan Area.

The Transportation Network Companies do not appear to have cannibalized transit

We have very little data that lets us directly measure the effect of transportation network companies (TNCs, like Lyft and Uber) on transit use. What evidence we do have suggests that most TNC trips are probably not replacing large numbers of transit trips. The typical TNC user does not resemble the typical transit rider, the typical TNC trip does not occur when and where most transit trips occur, and most TNC users report no change in their travel by other modes. However, if the pool of TNC users continues to expand, the effect of TNCs on transit use — both positive and negative — may expand as well.

Evidence about neighborhood change and migration of lower-income people is mixed, but suggestive

Transit is heavily-supplied in a small proportion of places, and heavily used by a small proportion of people. If the neighborhoods where transit quality is high change, and become less likely to hold the small group of people who use transit regularly, then transit use could fall. We find some evidence consistent with the idea that neighborhood change has been associated with less transit use. Areas that were heavily populated with transit commuters in the year 2000 became, in the next 15 years, slightly less poor, and significantly less foreign born. Perhaps most important, the share of households without vehicles in these neighborhoods fell notably. All these factors align with a narrative where a transit-using populace is replaced by people who are more likely to drive. We emphasize, however, that this relationship is not one we can measure with precision, and it would be premature to declare neighborhood change a large culprit in falling transit ridership.

Private vehicle access increased substantially from 2000 forward

A defining attribute of regular transit riders is their relative lack of private vehicle access. But between 2000 and 2015, households in the SCAG region, and especially lower-income households, dramatically increased their levels of vehicle ownership. Census data show that from 1990 to 2000 the region added 1.8 million people but only 456,000 household vehicles (or 0.25 vehicles per new resident). From 2000 to 2015, the SCAG region added 2.3 million people and 2.1 million household vehicles (or 0.95 vehicles per new resident).

The growth in vehicle access has been especially dramatic among subsets of the population that are among the heaviest users of transit. Between 2000 and 2015, the share of households in the region with no vehicles fell by 30 percent, and the share of households with fewer vehicles than adults fell 14 percent. Among foreign-born residents, zero-vehicle households were down 42 percent, and those with fewer vehicles than adults were down 22 percent. Finally, among foreign-born households from Mexico, the share of households without vehicles declined an astonishing 66 percent, while households with more adults than vehicles dropped 27 percent. Living in a household without a vehicle is perhaps the strongest single predictor of transit use; the decline of these households has powerful implications for transit in Southern California.

Vehicle ownership is not, of course, the only determinant of regional transit ridership—income, race, age, and nativity, to name a few, also matter. But vehicle access may well be the largest factor. We demonstrate the strong association between vehicle access and transit ridership by building a series of statistical models of transit ridership. The models cover the SCAG region, all of California, Los Angeles

County, and the SCAG region outside of LA County. Each model compares two predicted outcomes: the change in transit use we would expect to see based on due to changes in socioeconomic attributes *other than* vehicle ownership, and the change we would expect to see if we account, in addition, for changes in vehicle access. In short, we compare a scenario where incomes, nativity, racial composition, and various other attributes change the way they did from 2000-2015, but where vehicle access is unchanged, to a scenario where vehicle access changes as well.

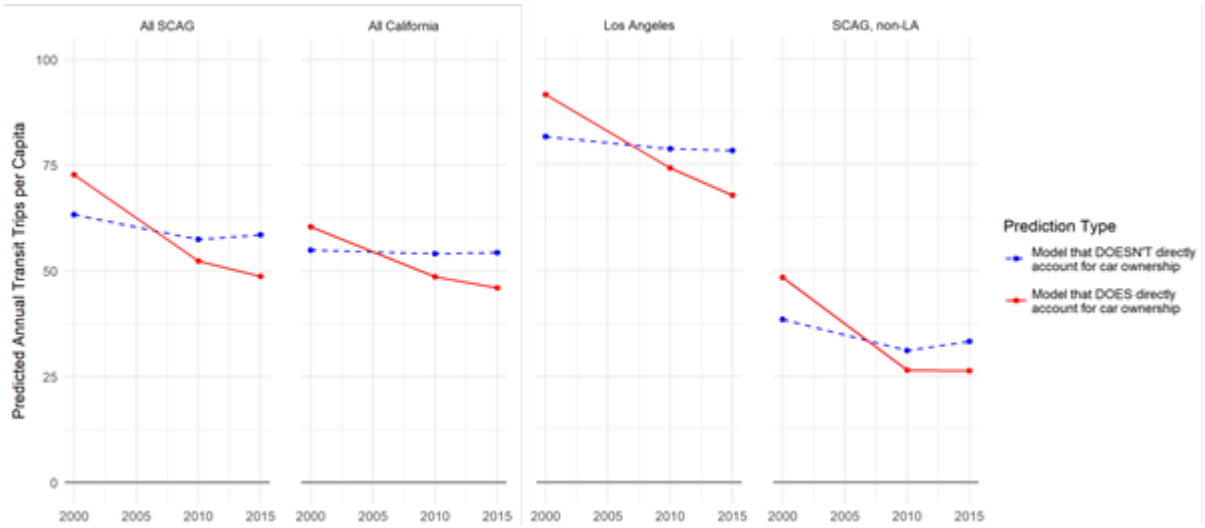


Figure ES 5. Transit use changes based on area.

Figure ES-5 shows the results of these models. The dotted blue line in each case is an estimate of transit ridership trends between 2000 and 2015 based on changes in the region's income, nativity, and so on, but assuming no change in vehicle ownership. The solid red lines represent these same models, but with the region's observed changes in vehicle access included. In all cases the blue line predicts transit use starting at a lower point and declining only modestly, while the red line shows transit use starting at a higher point and falling sharply, more in line with what we are actually observing. The models reinforce the idea that vehicle access is the decisive factor in transit use: income, age, and many other factors matter, but they matter largely because they predict the ability to access and use motor vehicles. In Southern California since 2000, that ability has increased, and transit use has fallen.

Conclusion

Public transportation is unlikely to fare well when Southern California is flooded with additional vehicles, especially when those vehicles are owned disproportionately by transit's traditional riders. Much of the region's built environment is designed to accommodate the presence of private vehicles and to punish their absence. Extensive street and freeway networks link free parking spaces at the origin and destination of most trips. Driving is relatively easy, while moving around by means other than driving is not. These circumstances give people strong economic and social incentives to acquire cars, and — once they have cars — to drive more and ride transit less.

The advantages of automobile access, which are particularly large for low-income people with limited mobility, suggest that transit agencies should not respond to falling ridership by trying to win back former riders who now travel by auto. A better approach may be to convince the vast majority of people who rarely or never use transit to begin riding occasionally instead of driving. This task is unquestionably more difficult than serving frequent-riding transit dependents, and it would likely require weakening or removing some of the state's and region's entrenched subsidies for motor vehicle use. But the opportunity is substantial. The SCAG region, between 2012 and 2016, lost 72 million transit rides annually. That number seems daunting, but the region has a population of 18.8 million, and about 77 percent of those people (roughly 14.5 million), ride transit rarely or never. If one out of every four of those people replaced a single driving trip with a transit trip once every two weeks, annual ridership would grow by 96 million — more than compensating for the losses of recent years. The future of public transit in the SCAG region, then, will be shaped less by the mobility needs of people who do not own vehicles, and more by policy decisions that encourage vehicle-owning households to drive less and use transit more.

FALLING TRANSIT RIDERSHIP: CALIFORNIA AND SOUTHERN CALIFORNIA

In the last 15 years Americans have supported public transportation more and demanded it less. California, the nation's most populous state, is in many ways emblematic of this pattern. Motivated by concerns about congestion and climate change, California's state and local governments have invested heavily in transit, often with the explicit approval of voters. This investment is particularly evident in Southern California. Since 1990, the six-county Southern California Association of Governments (SCAG) region has added over 100 miles of light and heavy rail in Los Angeles County, and over 530 miles of commuter rail region-wide. In November 2016, voters in LA County approved a $120 billion sales tax measure for transportation, with a plurality of the funding dedicated to expanding and improving transit (Measure M: Metro's Plan to Transform Transportation in LA 2016). This measure marked the third such countywide tax increase since 1990, and the fourth one overall. Other SCAG counties have also routinely passed sales tax measures for transportation and transit improvements.

Over the same period, however, California's transit use (depending on how one measures it) has varied from modest increases to relative stagnancy to—in more recent years—steep decline. Southern California is again illustrative. Despite its heavy investments in transit, in absolute terms the region's transit ridership reached its postwar peak in 1985. Through the 1990s and mid-2000s ridership rose and fell modestly, never reaching 1985 levels, and in 2012 it began declining. In per capita terms, ridership has fallen more steadily since the 1980s. Ridership per capita was flat in the early 2000s, but started trending down again in 2007. In California overall, per capita ridership was flat until 2009, when it began a decline from which it has not recovered (The National Transit Database (NTD), 2015).

Why is transit ridership falling? The question is not merely academic. The combination of rising supply and falling demand has profound fiscal implications for transit operators, since it substantially increases the public cost of moving each passenger. Increased transit supply has meant increased public investment, particularly in new rail services. Measured as a ten-year rolling average of capital and operating costs, transit investment in both the US and California rose almost 50 percent between 2000 and 2015. These rising expenditures, when combined with falling patronage, yield falling productivity. Between 2005 and 2016, transit productivity —measured as passenger boardings per vehicle revenue hour (VRH) —has fallen 5 percent in California and 14 percent in the SCAG region. Falling productivity is not sustainable; it usually ends with more subsidies or less service.

Beyond fiscal concerns, falling ridership calls into question a number of California's ambitious environmental goals. California's aggressive agenda for combatting climate change is predicated in part on many people using transit more and driving less. The carbon reduction targets set out in Senate Bill 375, California's landmark climate reduction bill of 2008, involve large mode shifts to transit and away from driving, while the California Department of Transportation's current Strategic Management Plan includes an explicit goal of doubling the state's transit mode share by 2020 (California Department of Transportation, 2015). But transit ridership, despite heavy transit investment, is trending very much in the opposite direction.

This report assesses California's, and particularly Southern California's, recent ridership downturn. We emphasize Southern California because — as we will show — California's falling ridership is in many ways Southern California's falling ridership. Had transit use not fallen in the SCAG region through 2016, it would not have fallen statewide.

Our study considers the years from 2000 to 2015 or 2016 (depending on data availability). While widespread concern about falling transit use did not begin until ridership began falling absolutely in 2012, we focus on the per capita decline that began about five years before that. The falling absolute ridership of the last few years is important, and we do pay outsized attention to it. But we view it as a particularly acute manifestation of the longer-run per capita decline, not as a phenomenon in itself. Absolute declines in ridership are at once more noticeable and less important than per capita declines. Ridership numbers that are not adjusted for population lack context, and focusing only on absolute ridership declines can for that reason yield incomplete or misleading results.

For example, since 2012 gas prices have fallen sharply, transportation network companies (TNCs) like Lyft and Uber have expanded dramatically, undocumented immigrants have been granted drivers' licenses, and the economy has rebounded from the Great Recession. All these factors may have depressed transit use, but all of them also occurred well *after* per capita transit ridership began to decline. Thus none of them, individually or in combination, can fully explain Southern California's, or California's, transit patronage losses.

Our analysis faces data limitations common to examinations of transit. Aggregate data on transit use are widely available through the National Transit Database (NTD), but users of NTD data can never be entirely sure of the data's accuracy.[1] NTD records are compiled from the reports of individual transit operators to the federal government, and for a variety of reasons — from failure to report to mistakes in reporting to errors in correcting those mistakes— NTD data do not always match up with operator data. We have checked some of the NTD data used in this report against operator data and been satisfied that they reasonably conform, but checking all the data would be impossible. We emphasize that this problem is almost universal in transit studies: all data are imperfect, but the NTD is the nation's standard source for transit data.

A second issue is that while data on transit use are easy to find, data on transit *users* are not. Public transportation is used by a small and hard-to-track subset of the population, making riders (and especially former riders) hard to study. The U.S. Census, in its annual American Community Survey (ACS), provides detailed economic and demographic information about transit commuters, but commutes are a minority of transit trips, and commuters (as we will show) are a minority of transit riders. More detailed data on transit users can be found in the California Household Travel Survey (CHTS) which provides an in-depth look at travel of all types by Californians, and complements those travel data with extensive person-level

[1] Transit operators who receive funding from the Federal Transit Administration's Urbanized Area Formula Program, or its Rural Formula program, must submit data to the NTD on the financial and operating conditions of their systems, as well as the conditions of their assets and rolling stock. Just over 660 operators receive such funding and report to the NTD. See https://www.transit.dot.gov/ntd

socioeconomic information. But the CHTS is a one-year snapshot, only available for 2012. As a result, we have a data mismatch: excellent data for a single year, but a research question – why is transit ridership declining? – that demands data on changes over time.

A last data obstacle is that the determinants of transit use are varied, ranging from gas prices to auto ownership to the quality of transit service, and no single data set contains all of them. Some factors thought to influence transit use, like the availability of free parking, are not systematically tracked at all.

To work around these limitations, we draw on an array of spatial, person-level, and administrative data. At different points we use the U.S. Census summary files, the Integrated Public Use Microdata (IPUMS) of the Census,[2] state and national travel diary data, gas price and economic data from the Energy Information Agency and the Bureau of Labor Statistics, and data and rider surveys conducted by some of Southern California's larger transit operators. One operator—the Los Angeles County Metropolitan Transportation Authority (Metro, or LA Metro)—by itself accounts for most of the region's transit use and has ample public data available. As a result, at different points in the report when data for the entire region is lacking, we draw on data specific to LA Metro.

Largely because of these data constraints, the case we build is circumstantial; we offer no definitive proof of cause-and-effect. But the evidence is nevertheless compelling. The primary factor we identify is automobile ownership. In the last 15 years, household vehicle access in the SCAG region has grown dramatically. Vehicle ownership has grown particularly sharply among subgroups most likely to use transit, such as the low-income and the foreign born from Latin America. The steep rise in vehicle access among these groups that occurred as transit ridership began to fall is not direct proof, but it is a smoldering if not a smoking gun. Public transportation is unlikely to fare well when Southern California is flooded with additional vehicles. Much of the region's built environment is designed to accommodate the presence of private vehicles and to punish their absence. Extensive street and freeway networks link free parking spaces at the origin and destination of most trips. These circumstances give people strong incentives to acquire cars, and — once they have cars — to drive more and ride transit less.

The surge in vehicle ownership does not explain all of the transit decline. And it may well have been reinforced by falling gas prices and the rise of TNCs— though again we note that increasing vehicle ownership and declining transit use began before TNCs existed and when gas prices were still high. But increased vehicle ownership by itself probably explains much of Southern California's lost transit ridership.

Our findings accord with previous research about transit patronage. Giuliano (2005) has shown that compared to Americans at large, the poor use transit more but like it less. The typical low-income rider wants to graduate to automobiles, while the typical driver might view transit positively but have little interest in using it (Manville & Cummins, 2015). These facts, coupled with the falling ridership of recent years, raise questions about transit's future.

Transit ridership is not, by itself, a legitimate goal of public policy. Transit use is instead a means to achieve other public ends. Traditionally, transit's goals have been twofold: Providing mobility to disadvantaged people who lack it, and mitigating the social and environmental costs of private automobiles by providing alternatives to them. The first goal has long accounted for more of transit's ridership, while the second

[2] The IPUMS data are from Ruggles et al (2017).

has accounted for more of its rhetoric. Throughout the United States, and particularly in Southern California, public transportation advocates have emphasized transit's potential to manage traffic and reduce pollution. In practice, however, transit has functioned overwhelmingly as a social service for low-income people with little private mobility (Taylor & Morris, 2015).

Because transit has primarily carried low-income people, rising vehicle ownership among those people suggests a future where public transportation's core ridership could dramatically shrink. While this outcome poses a grave problem for transit operators, it is not obvious that transit operators should try to win these low-income riders back, at least not to the very high levels at which they rode transit previously. With very few exceptions, acquiring an automobile in Southern California makes life easier along multiple dimensions, dramatically increasing access to jobs, educational institutions and other opportunities (Kawabata & Shen, 2006). As a result, pulling low-income former riders out of their cars and back onto trains and buses could make transit agencies healthier but the region poorer. If transit agencies want to protect their fiscal health while also increasing social welfare, they may need to convince the vast majority of people who never use transit to begin riding occasionally instead of driving. This task is unquestionably more difficult than serving a large pool of people who have few alternatives to transit. Convincing some drivers to start using transit would likely require weakening or removing some of the state's and region's entrenched subsidies for motor vehicle use. But transit is unlikely to grow substantially, to accomplish its environmental goals, if driving remains artificially inexpensive.

THE SPATIAL AND DEMOGRAPHIC DISTRIBUTION OF AMERICAN PUBLIC TRANSPORTATION

Public transportation use in the United States is distributed unevenly across people and places. Transit accounts for about two percent of all passenger miles travelled (PMT), and about two percent of personal trips overall (NHTS 2009). These small overall numbers, however, conceal transit's outsized importance to some people in some places. The average U.S. resident made about 32 transit trips in 2016 (Neff & Dickens, 2017; U.S. Census Bureau, 2016), but the modal resident made zero trips, and a small number of people rely on transit extensively. Chu (2012) shows that 20 percent of Americans live in neighborhoods without transit, while 60 percent live in neighborhoods with transit but have not used it in the previous month. Another 11 percent uses transit less than ten times per month, while eight percent take ten or more trips monthly.

The small share of people who use transit frequently is concentrated in a handful of metropolitan areas. In 2016, 65 percent of all transit boardings occurred on the nation's ten largest transit operators; the 15 systems in the New York region by themselves account for over 40 percent of the country's transit trips (FTA, 2016). Even within these transit-heavy areas, however, most people do not use transit regularly, because most transit use occurs in the central cities, and specifically among lower-income and foreign-

born people in these cities. And even within these subgroups, whose members are *more likely* to ride transit, *most* people do not use transit.

Why is transit use so rare? In the broadest terms, travelers will choose to ride transit when they believe transit has the lowest relative costs – in money, time, or risk and uncertainty – of the various transportation modes available to them. These factors help explain why so much transit use occurs in New York City. New Yorkers ride transit as much as they do not only because transit service is frequent and extensive, but also because riding a subway across Manhattan is often cheaper, faster and more reliable than driving. Manhattan's streets are clogged with unpredictable congestion and parking is scarce and expensive.[3] In most other places, driving is a faster door-to-door option, and one that people also believe is safer (Yoh, Iseki, Smart, & Taylor, 2011). Driving in these places is also more reliable: when congestion is low and transit service is sparse, riding transit might involve more time waiting at stops and transferring between vehicles, which make trips seem unpredictable, complicated and burdensome (Iseki & Taylor, 2009). For this reason, outside New York and a handful of other urban places, most transit users are people who for various reasons do not have the option of travelling by car.

The fact that so few people use transit regularly is important but often overlooked, especially in discussions about why ridership might fall. Per capita transit use can fall when current riders ride less, when the number of people who never ride grows, or both. Strictly speaking, there is no difference between these root causes. A person who rides and stops is a lost transit rider, but so is a person who moves to a transit service area and never rides. The decision to stop and the failure to start both reduce per capita transit use.

In practice, however, concerns about falling per capita ridership are rarely concerns about new residents who never start riding, and are instead concerns about current riders who leave. This dynamic is understandable, as riders who leave are easier to notice. But it is important to remember that transit riders leave transit regularly, even when ridership is stable or growing. If riders who leave are replaced by others, their departure from transit is less noticeable, and ridership might remain unchanged. For that matter, ridership can remain unchanged even when riders leave and are *not* replaced by other people. If an existing rider stops taking her daily trip and drives instead, but another frequent rider adds a daily trip, the number of riders falls but per capita ridership does not. Conversely, if two riders who take three trips a day each start taking two, the number of riders won't change but ridership will. Riders are not equivalent to ridership; stable ridership can conceal large churn among riders, and vice-versa.

The Spatial Concentration of Transit in California and Southern California

As it is in the nation at large, public transit use in California is unevenly distributed: a small share of people and places account for a large share of overall rides. Northern Californians use transit more intensively than Southern Californians, largely as a result of high ridership in San Francisco and its surrounding areas, but most of California's transit use occurs in Southern California, where a majority of the state's

[3] Manhattan also has relatively few highway lane-miles, which contributes to its surface-street congestion.

population lives (Figure 1). Transit accounts for 6 percent of all trips in the Bay Area, as opposed to 5 percent in the SCAG region, but the SCAG region – because it is so large – accounts for 52 percent of California's transit trips, while the Bay Area accounts for 28 percent. Southern California thus exerts a large influence on California's overall transit use.

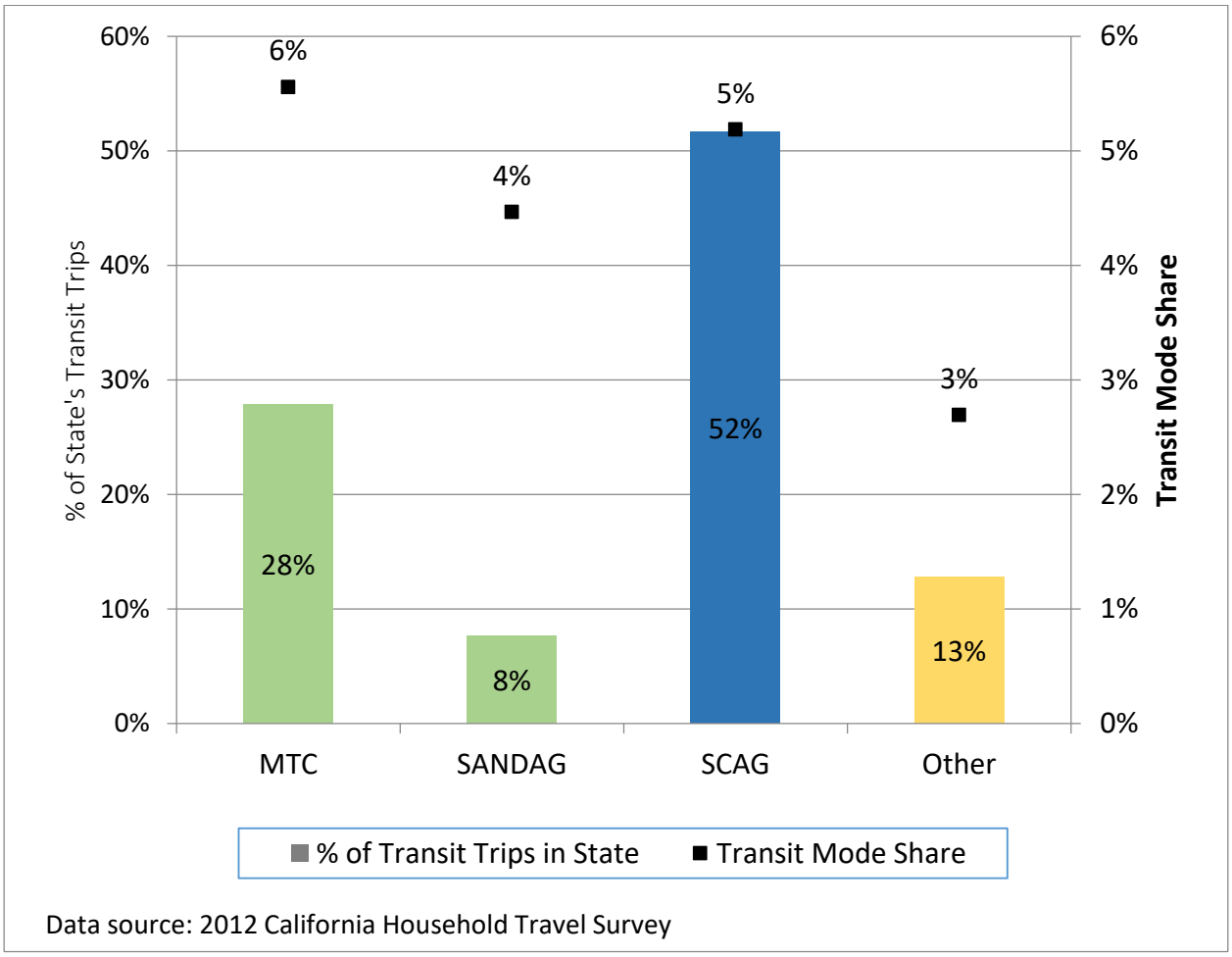


Figure 1. Transit mode share and distribution of transit trips by California region.

Figures 2 and 3 show the trend in transit boardings nationwide, in California, and the SCAG region between 2000 and 2016, first in absolute and then in relative terms. Absolute ridership was largely flat over this time in all three geographies. In relative terms ridership grew steadily between 2004 and 2007 (SCAG region), 2008 (the U.S.), and 2009 (California). This period of growth was followed by patronage losses from the start of the Great Recession through 2011, particularly in California. The recession's end brought a gradual transit patronage recovery, followed by steep declines from 2014 onward.

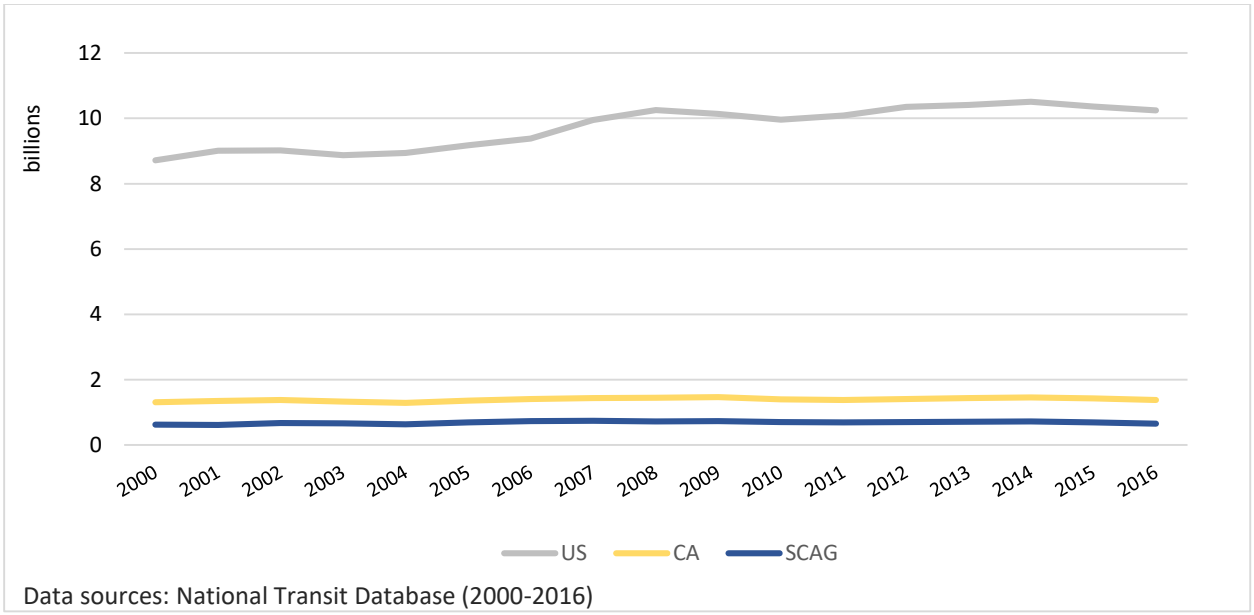


Figure 2. Boardings *(unlinked passenger trips). Growing nationwide, but relatively flat in California and SCAG.*

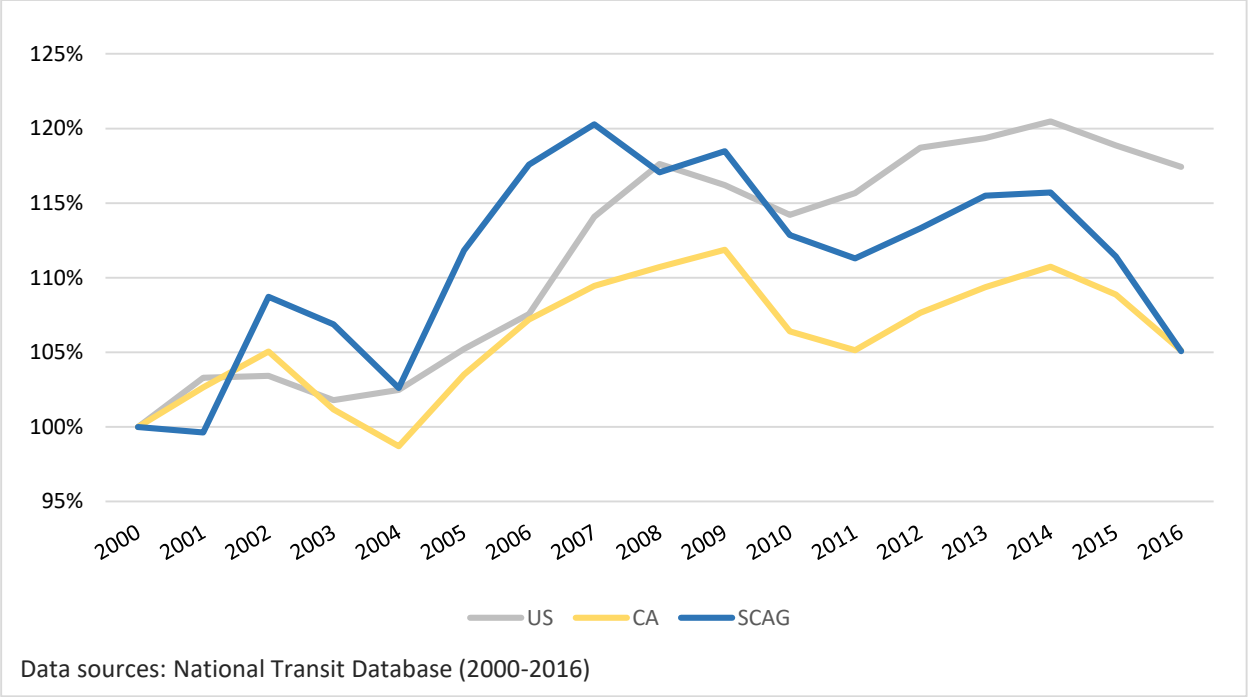


Figure 3. Indexed boardings. *Growing nationwide, but California and SCAG face steeper declines, returning to 2000 levels.*

Figure 4 expresses these ridership trends in per capita terms. Between 2005 and 2016, per capita ridership peaked in California in 2009, in the nation in 2008, and in the SCAG region in 2007. Since 2007, per capita transit use in the SCAG region has been mostly falling—before the recession, the rise of Lyft and Uber, or the post-2012 drop in fuel prices.

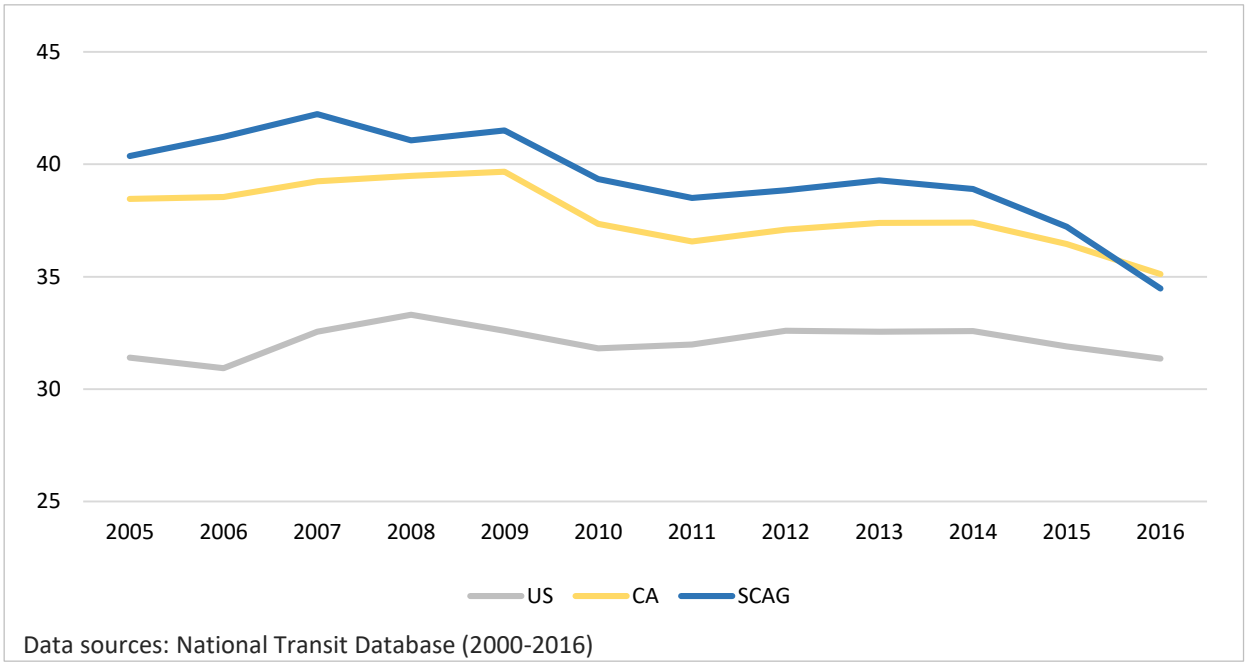


Figure 4. Transit trips per capita. *Relatively flat nationally, but down in California since 2009.*

Because the SCAG region accounts for so much of California's ridership, and because in recent years its decline has been so steep, losses in the SCAG region from 2012 to 2016 actually account for all of California's ridership losses during that time. Figure 5 shows changes in transit ridership across California from 2012 to 2016. During this time annual transit boardings statewide fell by 62.2 million. The SCAG region, however, lost *72 million* annual rides, or 120 percent of the state's total losses. Ridership outside the SCAG region actually rose 20 percent, largely as a result of gains made by transit systems in San Francisco. The Bay Area Rapid Transit District (BART) alone accounted for 28.4 percent of the state's increased transit ridership (although by 2017 ridership on BART, and in California outside the SCAG region, had also started to fall).



Figure 5. CA net change in ridership (2012-2016). *Losses in CA are driven by losses from the largest operators in the SCAG region, while Bay Area region saw growth in ridership.*

Within the SCAG region, transit trips (and lost trips) are similarly geographically concentrated. We can illustrate this concentration in a number of ways. For example, the CHTS shows that in 2012 82 percent of the transit trips in the SCAG region were in Los Angeles County. Another 8 percent were in Orange County, and the remaining ten percent were spread over the other four counties.

A second way to measure concentration, which allows us to examine smaller levels of geography, is to use census data and map the location of the region's transit commuters. While commuters are not the majority of transit riders, they do tend to use transit frequently and intensively, and we have high-quality data about their residential locations. Those locations are intensely concentrated. In 2000, 2010, and 2015, 60 percent of the SCAG region's transit commuters lived in 20 percent of its census tracts, which represented (depending on the year) one to three percent of the region's land area. In all three years, ten percent of the region's transit commuters lived in one percent of the region's census tracts, which accounted for two-tenths of one percent (0.2%) of the region's land area.[4] (Note that even in these tracts, *most* workers do not commute via transit – 7 out of 10 use some other means.) Unsurprisingly, these tracts are overwhelmingly located in LA County, followed by Orange County.

A third way to illustrate the concentration of transit use is to examine transit trips by operator. Figure 6 shows that the ten largest transit agencies in the SCAG region account for 60 percent of all transit service

[4] Calculated from summary file data of the Decennial Census 2000, and the 2010 and 2015 ACS.

(measured in vehicle-revenue hours), and 80 percent of all transit trips. The smallest 60 transit operators, by contrast, account for just over 6 percent of service and just over two percent of trips.

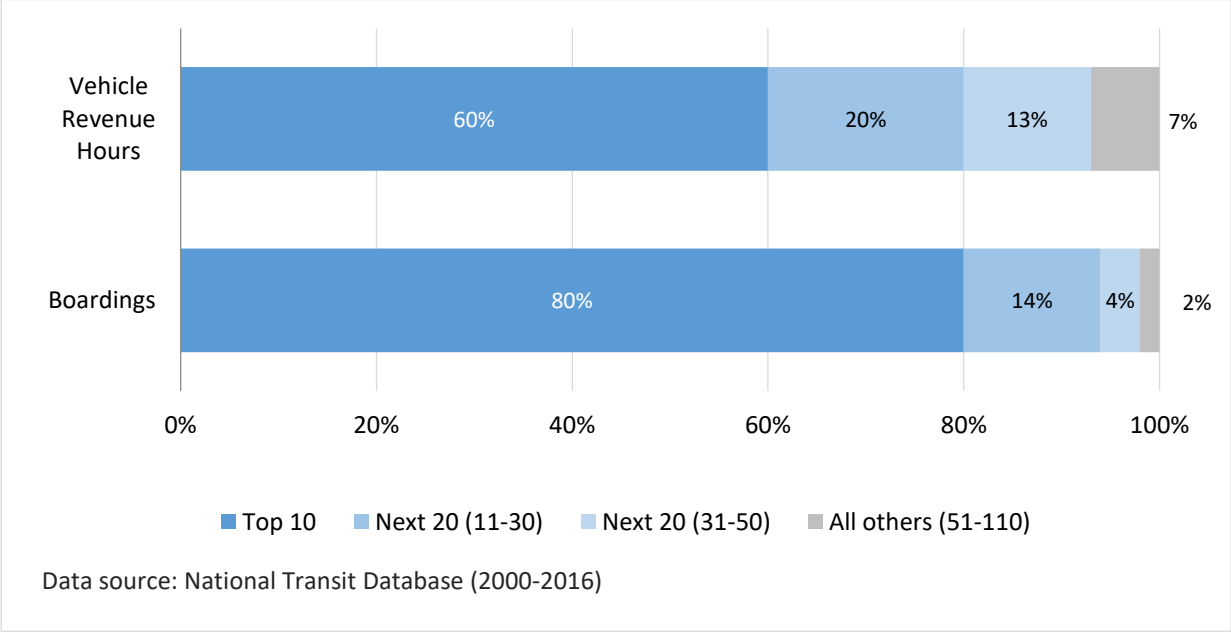


Figure 6. Key metrics by operator grouping. *9% of operators carry 80% of the trips*

Digging still deeper, the distribution of service and trips within these large operators is also highly skewed. LA Metro accounts for most of the SCAG region's trips, and LA Metro's ridership is itself highly concentrated. The agency has over 100 transit routes, but in both 2012 and 2016 over half of its total rides took place on 20 of those routes.[5] Metro's busiest routes are also, unsurprisingly, where the agency has suffered the largest ridership declines. A dozen Metro lines accounted for 53 percent of all the agency's lost rides between 2012 and 2016.

Putting all this information together, we see that declining transit patronage through 2016 in California is essentially declining patronage in Southern California, and that Southern California's ridership declines are themselves remarkably concentrated. As a result, the state's lost ridership can be traced to a small number of Southern California transit operators. Four SCAG operators (LA Metro, the Orange County Transportation Authority (OCTA), the Los Angeles Department of Transportation (LA DOT), and the Santa Monica Big Blue Bus) accounted for 88 percent of the state's ridership losses, and LA Metro by itself accounted for a remarkable 72 percent of the state's losses. Because LA Metro's losses are themselves highly concentrated, a dozen *routes* from LA Metro account for 38 percent of all the lost ridership in California. Half of California's total lost ridership is accounted for by 17 LA Metro routes (14 bus and 3 rail lines) and one OCTA route.

[5] Calculated from Metro ridership-by-line data, 2012 and 2016.

If we examine these routes more closely (Figures 7 and 8), we see that they include both bus and rail. Transit agencies nationwide – LA Metro included – have made substantial investments in rail service, but the bus remains the workhorse of public transit in the US, the SCAG region and LA County. Bus trips are 78 percent of all transit trips in California and 86 percent of transit trips in the SCAG region.[6] Given that buses carry the most passengers, it is not surprising that they have also seen the largest ridership declines, accounting for 84 percent of the lost rides between 2012 and 2016. While some bus routes gained ridership, the bus routes that lost riders lost more than the growing routes gained. The five bus lines with the largest declines were urban routes that travel in and out of downtown LA, while the five lines that gained the most ridership ran more outlying and circumferential routes.

Two Metro rail lines, meanwhile – the Gold and Expo – opened extensions after 2012, and partly as a result their ridership grew. But Metro's remaining rail lines, most of which also travel into downtown LA, saw steep ridership losses that exceeded the Gold and Expo Line's gains. The SCAG transit decline thus spans modes; it is not a simple story of buses falling behind while rail surges. Instead major routes that run into the heart of the city – the sort of routes where transit is traditionally strongest – are losing riders precipitously.

[6] Calculated from the 2012 California Household Travel Survey.

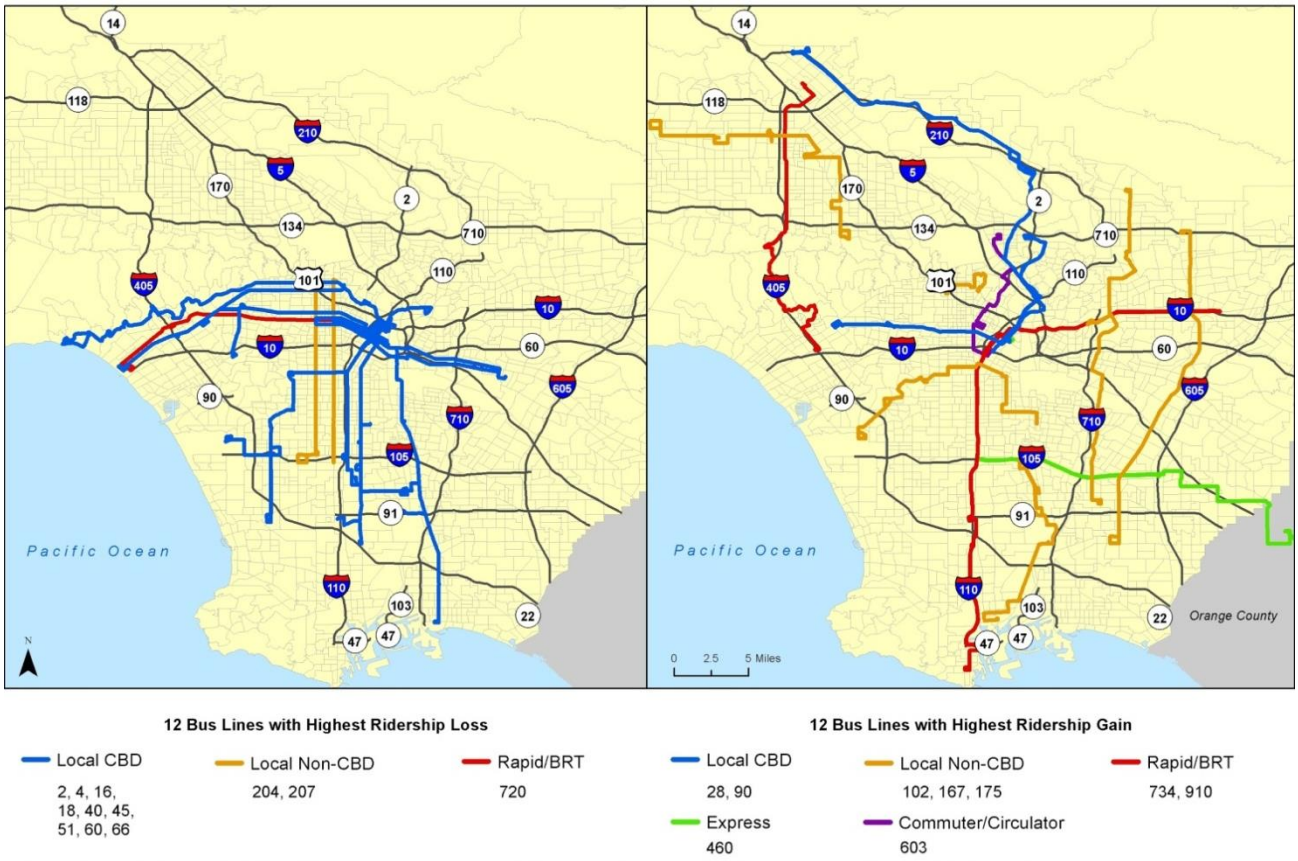


Figure 7. LA MTA: Bus lines with the most ridership change (2012-2016).



Figure 8. LA MTA: Net change in Ridership (2013-2016) by mode. *Buses made up 84% of loss and rail made up 12%.*

The Demographic Concentration of Transit Use in Southern California

Transit use in the SCAG region is concentrated among a small group of people as well as a small number of places. People ride transit for different reasons, but a common thread running through regular transit users is lack of access to a private vehicle. This trait is not universal; many commuter rail passengers, for example, could make their trips by car and choose not to, but commuter rail is a small portion of overall transit ridership. In general, transit ridership is powerfully associated with lack of vehicle access (Taylor & Fink, 2013). Note again, however, that this relationship is not symmetrical. While most regular transit users lack vehicle access, most people without vehicle access do not regularly use transit, in part because transit is unavailable in many places.

Lack of vehicle access might arise for economic reasons, for medical reasons, or out of personal preference or habit (Brown, 2017). The relationship between vehicle access and transit use could also run two ways. People might ride transit because they do not have a car (either they cannot afford a car or cannot use

one for medical or legal reasons) or they may not have access to a car *because* they ride transit (they live and work near high-quality transit and so need not spend money on vehicles).[7]

Non-economic reasons for lacking a vehicle include disabilities or medical conditions that prevent driving, and legal sanctions that forbid it (e.g. losing a license as a result of traffic infractions, or being in the country illegally). In Southern California, perhaps the largest non-economic source of low vehicle access is immigration. Even controlling for income, immigrants are less likely than the native born to have vehicles, and more likely to use public transportation. Why this is so remains something of a puzzle. Scholars have proposed various explanations, including immigrants' tendency to live in dense areas; their tendency to live in close-knit communities that allow for more communal resources, including sharing of cars; a habit of not driving carried over from the native country; and – if the immigrant is undocumented – legal barriers to owning and operating automobiles (Blumenberg & Smart, 2014; Chatman & Klein, 2009, 2013; Liu & Painter, 2012). The evidence suggests, however, that driving less and riding transit more is not universal among the foreign born – immigrants from some countries, particularly Mexico and many countries in Central America, are less likely than others to drive and more likely to ride (Chatman, Klein, & DiPetrillo, 2010). There is also substantial evidence that over time immigrants assimilate and begin to travel more like the native born, with more driving and less transit use (Blumenberg & Evans, 2010). Thus transit ridership cannot be sustained by immigration alone; it requires a steady stream of new immigrants from particular countries, who will arrive with a transit habit and replace those earlier arrivals who assimilate driving.

Economic reasons for lacking vehicle access can include both low incomes and the high cost of driving. In some parts of California, such as northeastern San Francisco, a combination of heavy congestion, high tolls, and scarce and expensive parking make the price of owning and operating a vehicle high, and encourage even affluent people to ride transit (notably, the same density that makes the city congested can makes transit service more effective by putting large numbers of trip origins and destinations within steps of transit stops). Yet there are few places in Southern California where driving is challenging in this way. Congestion is severe, but parking is abundant and often inexpensive if not free, and low-to-moderate densities make transit less able to effectively link many places. As a result, income becomes the principal determining factor in vehicle access, and thus of transit use.

Figure 9 uses CHTS data to illustrate the disproportionate propensity to use transit among the low-income, the foreign-born, and households with limited vehicle access. The figure's dashed vertical line represents the overall average of daily unlinked transit trips in the SCAG region, and the circle associated with each subgroup indicates its relative size in the overall population. The figure shows, in short, that transit use is more common among smaller segments of the population. African Americans and Hispanics ride transit about three times as much as Whites and Asians. Immigrants who have been in the country less than ten years ride substantially more than both the native-born and longtime immigrants who have been in the country longer. Households earning under $25,000 per year ride more than twice as much as households earning $25,000 to $50,000, and these households in turn ride twice as much as households earning over $50,000 annually. By far the largest differences, however, are those that represent vehicle availability. Households without vehicles take almost five times as many transit trips as households with one vehicle,

[7] These reasons might interact. People who cannot afford vehicles might choose to live near transit because of their lack of vehicle access (Glaeser, Kahn, & Rappaport, 2008).

and households with one vehicle take twice as many trips as households with two. If we measure vehicles per adult, households with one vehicle for every two adults take twice as many trips as households with one vehicle per adult. Finally, people without driver's licenses take many more transit trips than licensed residents.

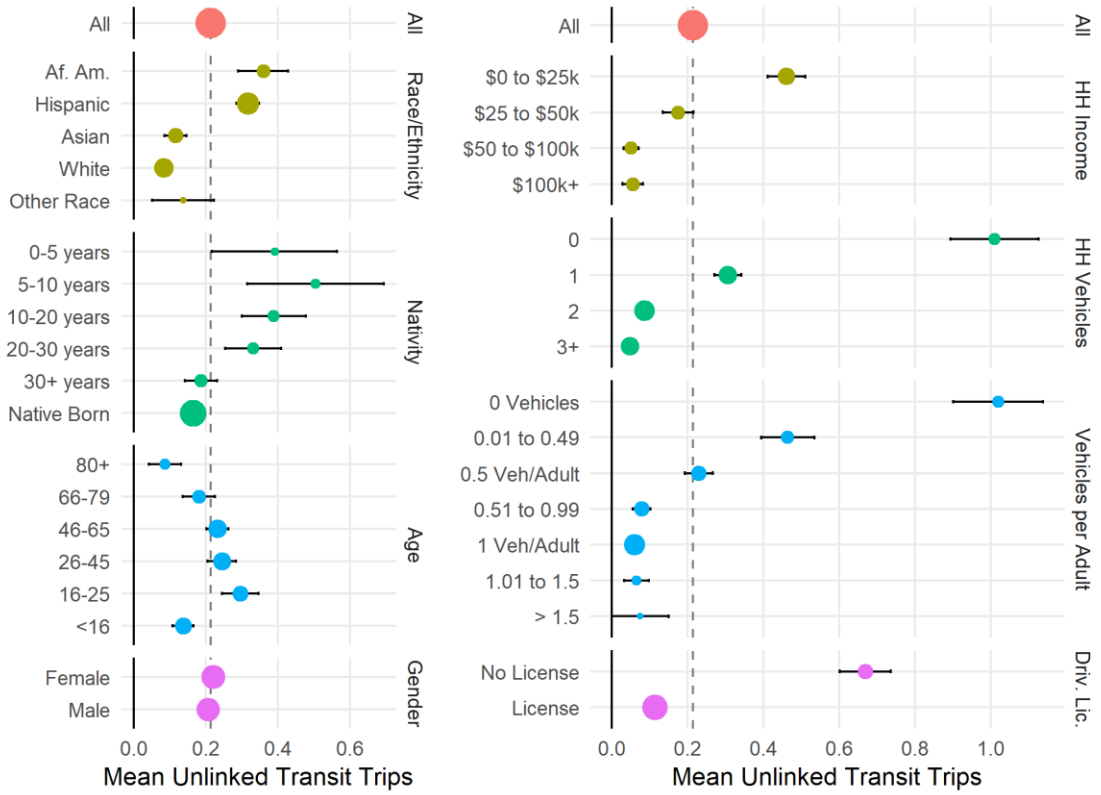


Figure 9. Mean transit trips by socio-economic characteristics and automobile access (CHTS).

The drawback of the CHTS, as we have mentioned before, is that it provides only one year of data. Table 1 uses LA Metro's annual rider surveys to show that the prevalence of people with low incomes and limited vehicle access on transit extends across years. We examine the 2005 survey (the earliest available) and then annual surveys from 2010 to 2016. Across both bus and rail riders, at least 69 percent of transit users (and often closer to 80%) report not having a vehicle available to make their trip. These proportions are higher for bus riders than rail riders, but even among rail riders between 58 and 65 percent (depending on the year) report not having a vehicle. The share of riders reporting not having a vehicle, furthermore, has grown over time.

In addition to limited vehicle access, Metro riders generally have low incomes and are strongly dependent on transit. Close to half of all surveyed LA Metro riders in each year have household incomes under $15,000. The median household income of riders hovers near $16,000, and the average income barely exceeds $25,000 in most years. In most years a strong majority of riders are habitual (riding over 4 days a

week) and a majority are longtime users (riding over 5 years). The riders are also overwhelmingly nonwhite.

All these characteristics make Metro riders – who are, again, most of SCAG's transit users – strikingly different from the population at large. The CHTS shows that in 2012, 73 percent of LA County residents took transit only occasionally or never, and the 2016 Census ACS shows that LA County residents are 26 percent non-Hispanic white, and that county median household income is $62,000. Only 5 percent of the county's households earn less than $15,000 per year. Thus SCAG's largest transit operator has for over a decade been dominated by low-income, nonwhite people with little vehicle access, people who live and move very differently from the typical Southern Californian.

	2005	2010	2012	2013	2014	2015
Share No Vehicle Available (%)	69	75	81	79	69	78
Bus Only	73	76	82	80	70	82
Rail Only	50	64	63	63	58	65
Share Earning Under $15k/Year			51	45	47	47
Median Household Income ($)			14,706	16,316	15,910	15,918
Mean Household Income ($)			26,025	25,540	23,223	25,747
Share White		8	9	10	9	9
Share Riding 5+ Days/Week		56	67	67	67	68
Share Riding 5+ Years		49	53	52	59	57

Source: Metro Rider Surveys. Not all questions asked every year. Dollars are nominal. "No vehicle" indicates that respondents lack access to a vehicle for the current trip.

Table 1. Characteristics of LA Metro riders, 2005-2015.

The importance of vehicle access is reinforced by evidence from other transit operators. A small operator in the SCAG region, the Montebello Bus Lines, surveyed residents (not just riders) in 2016. Most respondents did not ride transit, and 55 percent of non-riders said they would only ride if they lost access to their car. Most people who did ride did not have access to a vehicle (Diversified Transportation Solutions 2015). In 2016, the OCTA also surveyed Orange County residents about their travel behavior. The results were similar. Only three percent of people who always had vehicle access listed transit as their primary travel mode, compared to 33 percent of people who never had a vehicle (True North Research 2015).[8]

The OCTA survey also stands out for usefully disaggregating "lack of vehicle access," and demonstrating that vehicle access is not the same as vehicle ownership. Over 70 percent of OCTA transit users had a car in their household, but the car was not available to them. In most instances it was being used by someone else, but 19 percent of current riders were unable to drive, and another eight percent reported having a vehicle that was not working (True North Research 2015). People in households with vehicles can still lack

[8] Note that 2/3 of people without vehicle access still did not use transit regularly.

vehicle access. If a household has more adults than vehicles, and if most adults move around on most days, then someone is without a car, and the odds of using public transportation rise.

We emphasize again, however, that most people simply do not use public transportation very often. The four panels of Figure 10 use 2012 CHTS data to divide the California, Southern California, and LA County populations into three groups: *Transit Commuters* (respondents who use transit for the journey to work); *Transit Non-Commuters* (respondents who used transit in the week prior to the survey but do not use transit for the journey to work); and *Infrequent Transit Users* (respondents who do not use transit for the journey to work and did not use it in the previous week).

In general, and unsurprisingly, transit use is more intensive in the SCAG region than in California, and more intensive in LA County than in the SCAG region. Beyond this difference, the patterns relating to these three types of users are generally consistent across the three geographies. *Transit Commuters*, who garner perhaps the most attention from public officials and transit planners, ride most frequently (44 to 49 trips per month), but are a very small share (2% to 3%) of the population; as a result, they account for just 25 percent to 30 percent of all transit trips taken, despite their frequent use. *Transit Non-Commuters* ride transit less frequently (11 to 16 trips per month) than *Transit Commuters,* but account for a much larger share (20% to 23%) of the population, and as a result they actually account for over half (54% to 57%) of all transit trips. Finally, *Infrequent Transit Users* ride little or not at all, averaging only 0.9 to 1.5 trips per month across the three geographies. This group, however, comprises about three-quarters (73% to 78%) of the population, and because of this large base, *Infrequent Transit Users* account for better than one in seven (16% to 18%) of all transit trips.

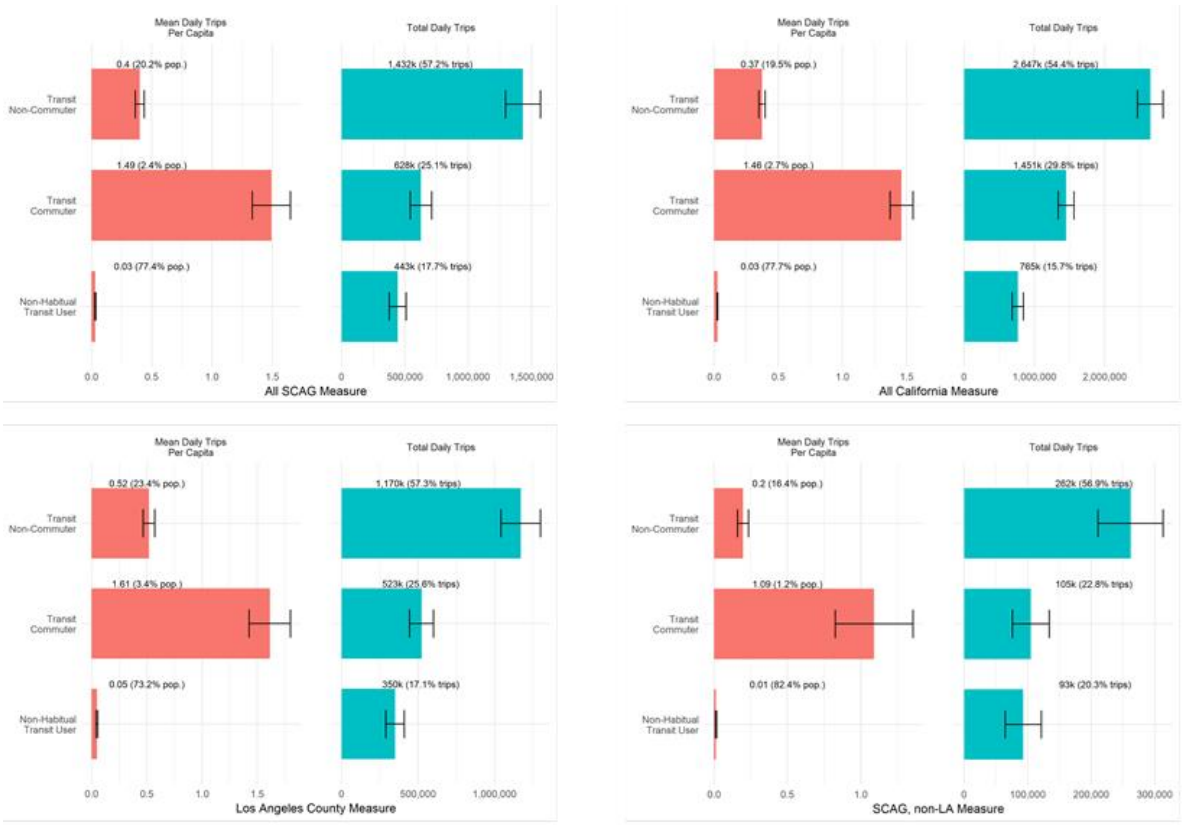


Figure 10. Mean and total daily trips by transit user group for the SCAG region, California, Los Angeles County, and non-Los Angeles SCAG region.

This snapshot of transit users is a picture of asymmetry, and this asymmetry suggests how transit ridership can fall dramatically and seemingly suddenly. The people who ride transit regularly are a narrow segment of the population. They come disproportionately from households with two or more adults per available vehicle, and especially from households with no vehicles. They have lower incomes, on average, and are more likely immigrants, young adults, and African-American or Latino. Many of them do *not* ride transit to or from work; transit commuters are just three percent of the population, and 13 percent of regular transit riders. The transit industry is thus heavily-dependent on a small subset of people, and very sensitive to even small changes in how those people choose to move around.

EXAMINING SOUTHERN CALIFORNIA'S DECLINE IN TRANSIT USE

Transit ridership can fall for multiple reasons. For convenience we divide these reasons into two categories: factors that transit operators (funding permitting) can control, and factors they cannot. We take these up in turn.

Factors Within Transit Operators' Control

The Quantity and Quality of Transit Service

People will ride transit less if service is slow, infrequent, or unreliable, and/or if rides are difficult or dangerous to take. As the quantity or quality of service falls, ridership should fall as well.

The Quantity of Transit Service

Some observers contend that recent drops in transit ridership can be tied directly to declining service quantity. For example, Hertz (2015) ties falling transit ridership to cuts in bus service, and articles in both the Wall Street Journal (Harrison, 2017) and New York Times(Rosenthal, Fitzsimmons, & LaForgia, 2017) make similar arguments. Freemark (2017) argues that LA's declining bus ridership is a function of Metro's falling service levels, and observes that average bus speeds fell 13 percent between 2005 and 2013.

Service levels certainly have a strong influence on ridership, even controlling for reverse causality – the fact that places with more riders often add more service (Alam, Nixon, & Zhang, 2015; Taylor, Miller, Iseki, & Fink, 2009). But service levels can be measured in many ways; two of the most common metrics are vehicle revenue miles (VRMs) and vehicle revenue hours (VRHs). VRM measures the distance transit vehicles cover while in service, while VRH measures the amount of time vehicles are in service. Both Hertz (2015) and Harrison (2017), in relating falling ridership to service declines, measure service using VRM. VRM alone, however, can be a problematic measure of transit service. In practical terms, VRM differentiates faster, longer-distance commuter services from lower speed local service. VRH, in contrast, measures the supply of different kinds of services (local bus service, bus rapid transit, rail transit, express bus, commuter rail, etc.) more similarly. VRH differentiates less among modes and service area types because the time between stops often varies far less than the distance travelled between them. A dozen stops spaced far apart in uncongested outlying suburbs can take a similar amount of time to serve as a dozen closely-spaced stops in a congested urban environment. The miles covered on the two routes will vary greatly, but the time required to serve them may not.

As a result, falling VRM *can* indicate service cuts, but can also reflect transit vehicles operating in higher levels of congestion, or agencies increasing local service rather than express service, or agencies redirecting service from outlying areas to central areas.

For example, if a transit agency shifts service from outlying suburban routes that travel longer distances at higher speeds to shorter, slower urban routes, VRM would almost certainly fall, as would average speed. But VRH may not change. Vehicles moved to dense areas typically cover less ground, but also move more slowly, stop more frequently, and dwell longer at each stop to allow more people to board and alight. In this case a "cut" in VRM would not necessarily be associated with a cut in VRH, and could actually deliver more service to more people.

In short, falling VRM is hard to interpret without also examining VRH. If VRM and VRH fall at roughly the same rate, then service is likely falling absolutely. But VRM falling substantially more than VRH suggests a change in service deployment or operating conditions (such as worsening congestion), rather than a service cut.

With this as background, we can consider the SCAG region's recent trends in VRM and VRH; we will show that rates of change in VRM and VRH have generally not been in concert. Figure 11 shows the relative trends in total VRM for the US, California, the SCAG region, and the SCAG region excluding LA Metro or OCTA between 2000 and 2016.

While VRM has increased across all four geographies, it has grown faster in the SCAG region than the U.S. or California as a whole, and faster still among SCAG's smaller transit operators – suggesting a relative shift in service delivery from LA Metro and OCTA to the smaller operators.

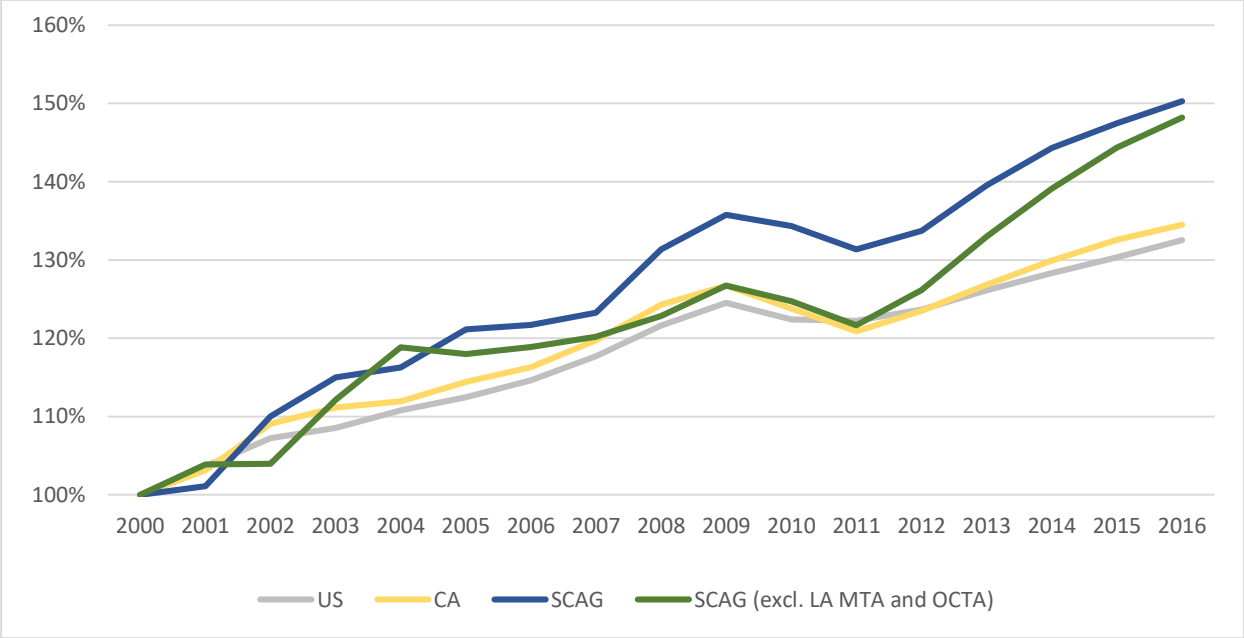


Figure 11. Indexed vehicle revenue miles. *Growth in service in the SCAG region outpaces national and state trends; within the SCAG region, all other operators have collectively added service at a faster rate than LA MTA or OCTA.*

This pattern is confirmed if we examine absolute VRM trends in the SCAG region separately for LA Metro, OCTA, and the remaining SCAG operators (Figure 12). Overall transit VRM has been growing for all three groups, but growing faster at the smaller operators.

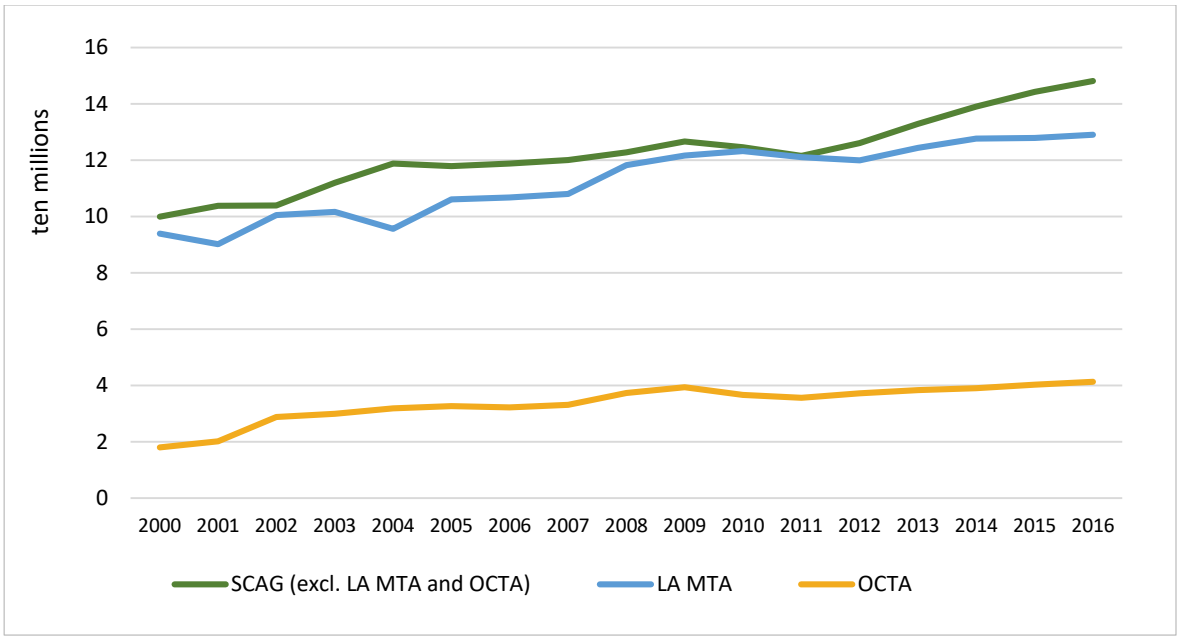


Figure 12. Vehicle revenue miles. *Service levels for LA MTA matches aggregate service provision for all other operators in the region (minus OCTA). Service is growing faster in the SCAG area excluding LA MTA and OCTA than at LA MTA or OCTA.*

While VRM rose in the aggregate from 2000 and 2016, it has not been climbing for all modes. Figure 13 shows the roller coaster that has been the VRM trend for local bus service over this period: Significant growth between 2000 and 2005, little change between 2005 and 2009, a steep drop between 2009 and 2013, and slow growth from 2014 to 2016. Rail service, in contrast, has been steadily rising, especially light rail (Figure 14).

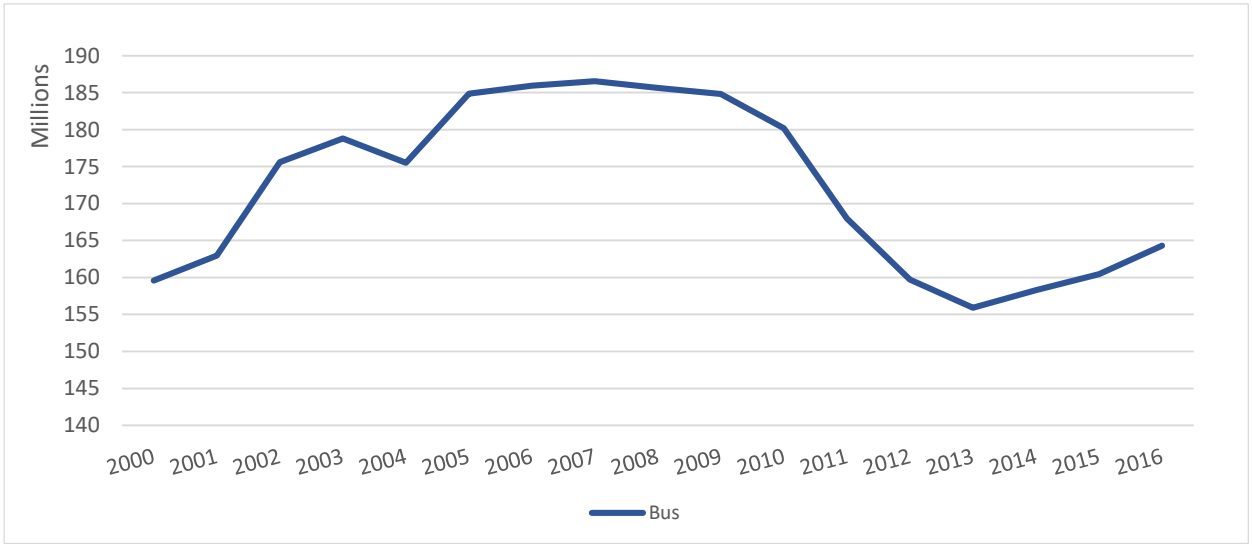


Figure 13. SCAG region: VRM for bus. *Service in miles traveled dropped by 15% between 2007 and 2013. Service has increased since. Hours of service has also declined, but not as rapidly as miles of service, indicating that service is cut on suburban bus lines.*

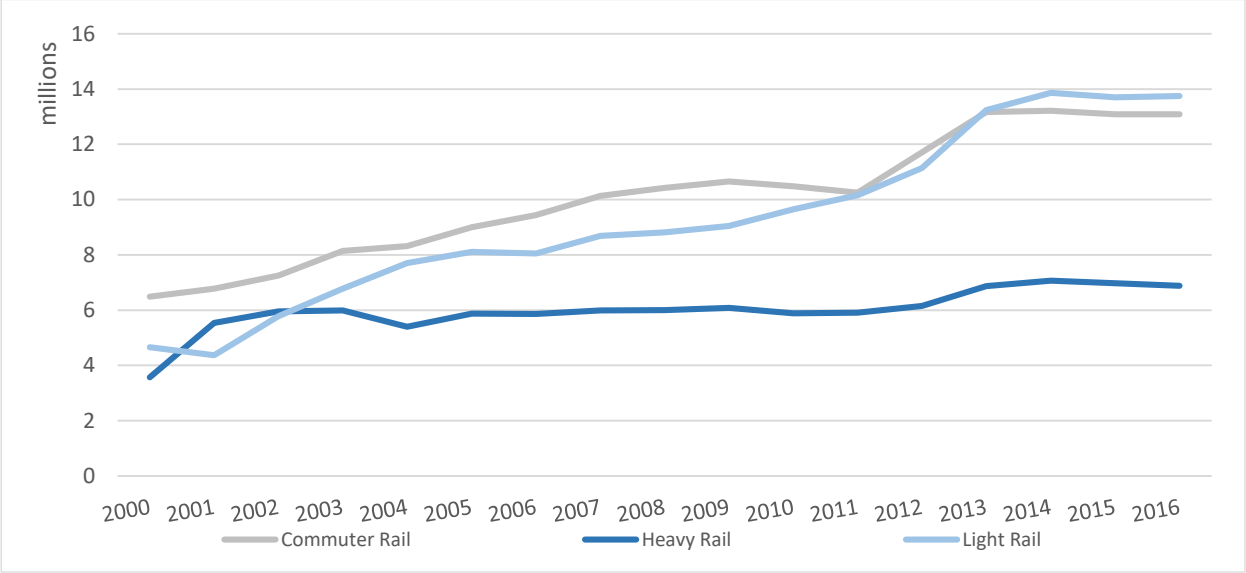


Figure 14. SCAG region: VRM for rail. *Substantial service increases for all commuter and light rail since 2000.*

If we examine service hours (VRH), we see similar aggregate trends. VRH rose from 2000 to 2009 in the US, California, and the SCAG region, fell from 2009 to 2011 during the Great Recession, and then climbed again across all three geographies through 2016 (Figure 15).

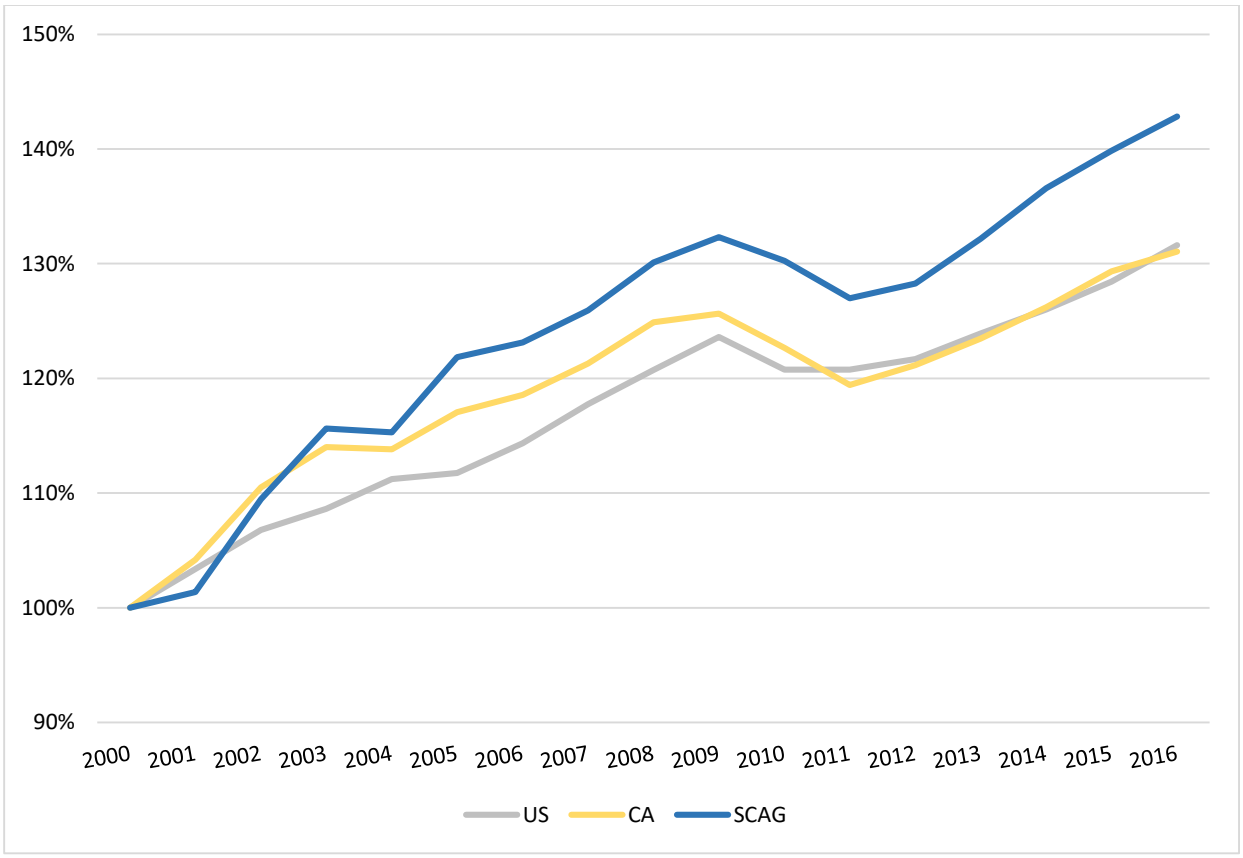


Figure 15. Indexed vehicle revenue hours. *Growth in service in the SCAG region outpaces national and state trends.*

Figure 16 shows the percent change in vehicle revenue hours over two time periods – 2005 to 2016 and 2010 to 2016 – across three geographies (US, California, SCAG region) and across four types of SCAG-region transit operators (Largest, Large, Medium, and Small). The figure shows that VRH increased during both time periods across all three geographies and all four operator types. It also shows, however, that VRH grew least among the largest operators that have lost the most riders, while it increased much more among the smaller operators.

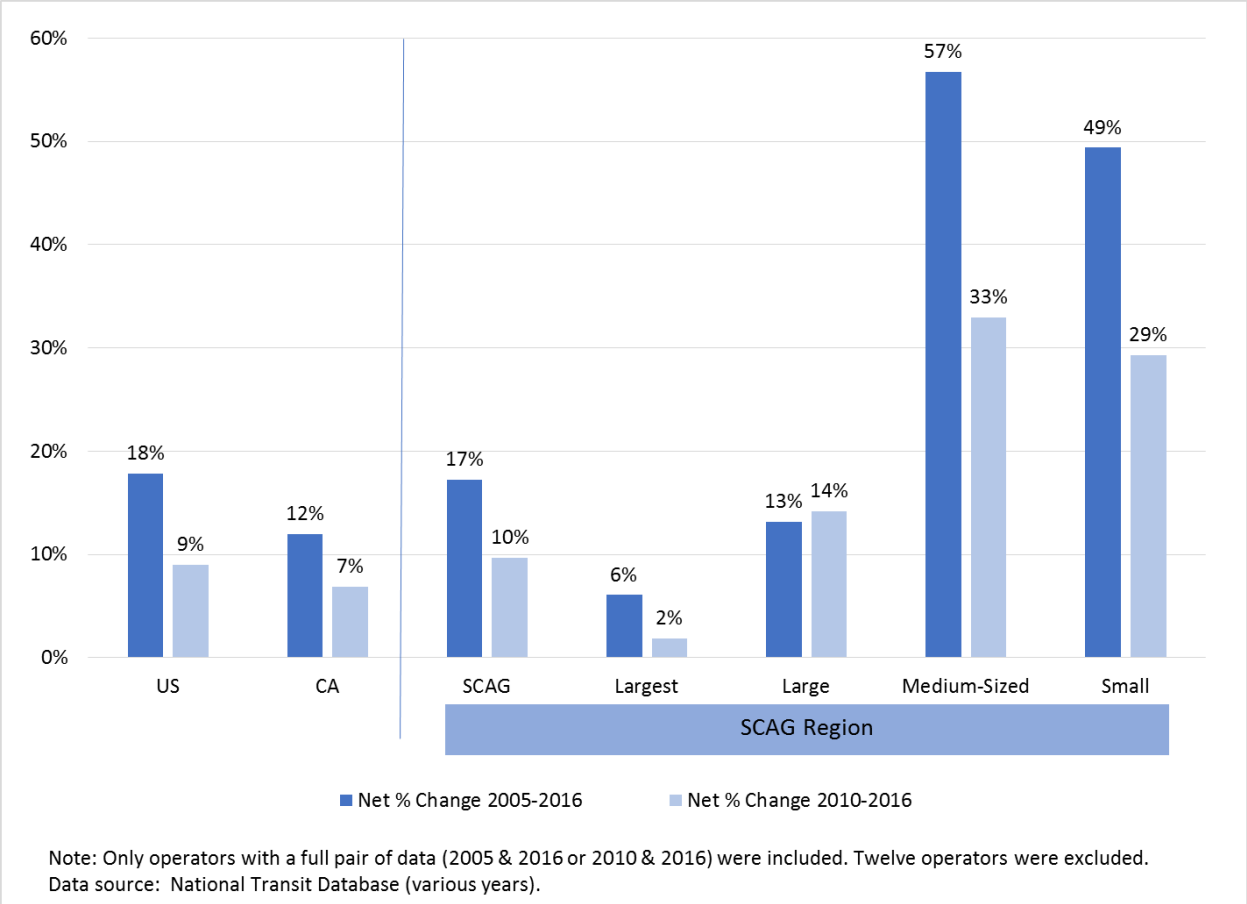
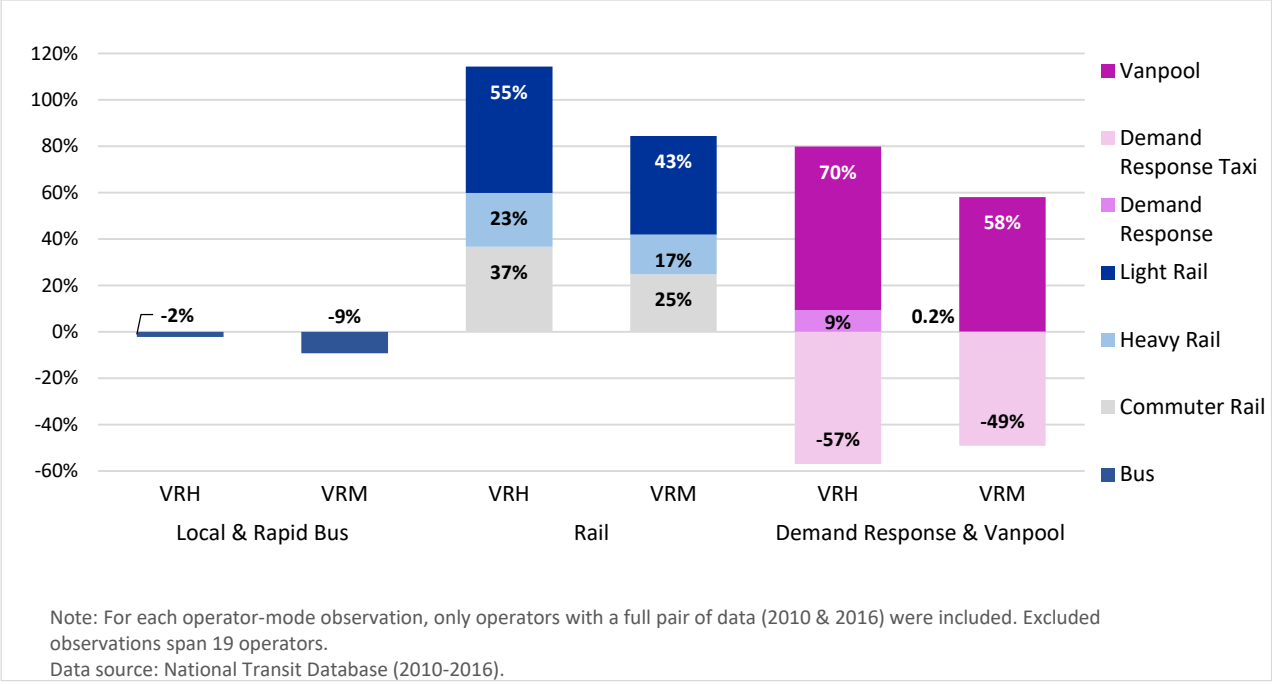


Figure 16. Changes in indexed vehicle revenue hours by region and SCAG transit operator size: 2005-2016 & 2010-2016. *Service growth among the largest SCAG operators was lower than national, state, or regional averages, and much small than smaller SCAG-region operators.*

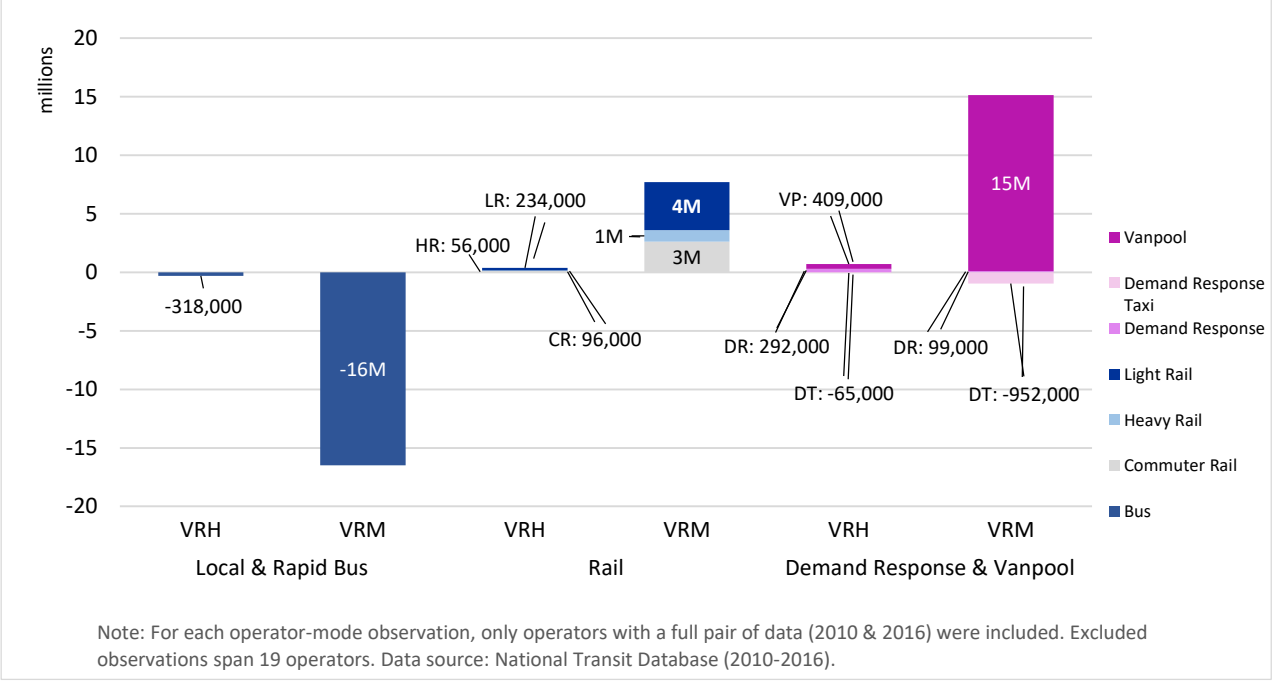
Finally, Figures 17 and 18 show the absolute and relative changes in VRM and VRH by mode between 2010 and 2016.[9] The figures show substantial overall shifts in service among modes, with local bus, rapid bus and demand response taxi service declining, while rail, commuter bus, and vanpool service increased. In absolute terms, local and rapid bus service declined most, while commuter bus and vanpool grew most; in relative terms, rail transit grew most while demand response fell most.

[9] Note that because Figure 17 shows absolute changes in both VRM and VRH on the same Y-axis, the VRM changes appear to be substantially larger than the proportional differences shown in Figure 16. These apparently large differences are mostly an artifact of transit service moving anywhere from about 6 (for the slowest urban bus service) to 40 (for the fastest commuter rail service) miles per hour, on average. This means that, for example, a one million VRH increase might be expected to have a corresponding 10 million or more VRM increase.



Note: For each operator-mode observation, only operators with a full pair of data (2010 & 2016) were included. Excluded observations span 19 operators.
Data source: National Transit Database (2010-2016).

Figure 17. Percent change in service (hours and miles) by mode: SCAG region 2010-2016. *Rail and vanpool have largest % gains, and service is added in the urban core, rather than to outlying areas. Bus service hours were slightly reduced, and came from outlying areas.*



Note: For each operator-mode observation, only operators with a full pair of data (2010 & 2016) were included. Excluded observations span 19 operators. Data source: National Transit Database (2010-2016).

Figure 18. Change in service (hours and miles) by mode: SCAG region 2010-2016. *A 9% reduction in bus service miles is equivalent to 16.5 million bus service miles cut. Vanpool had the most service miles added, reflecting the longer commutes that vanpool serves.*

Overall, these shifts in service provision reflect both the choices and mandates of public policy. For better than three decades Southern California, and Los Angeles County in particular, has chosen to invest heavily in new rail services. As these new services have come on line, they account for a growing share of the region's transit service. Second, federal civil rights legislation, in the form of the Americans with Disabilities Act, has mandated the delivery of both accessible and demand-response transportation services to a growing and aging population. In combination, these choices and mandates have shifted transit service away from buses and toward rail and van services.[10]

What do these changes in transit service supply mean for transit patronage? First, Figure 19 shows the trends per capita VRH and per capita transit boardings over the past quarter century in the SCAG region. Transit service supply has been mostly climbing in the SCAG region for better than a quarter century, while transit use has never reached the 1991 levels. Given this, there is no *prima facie* case that faltering transit service supply is driving down patronage.

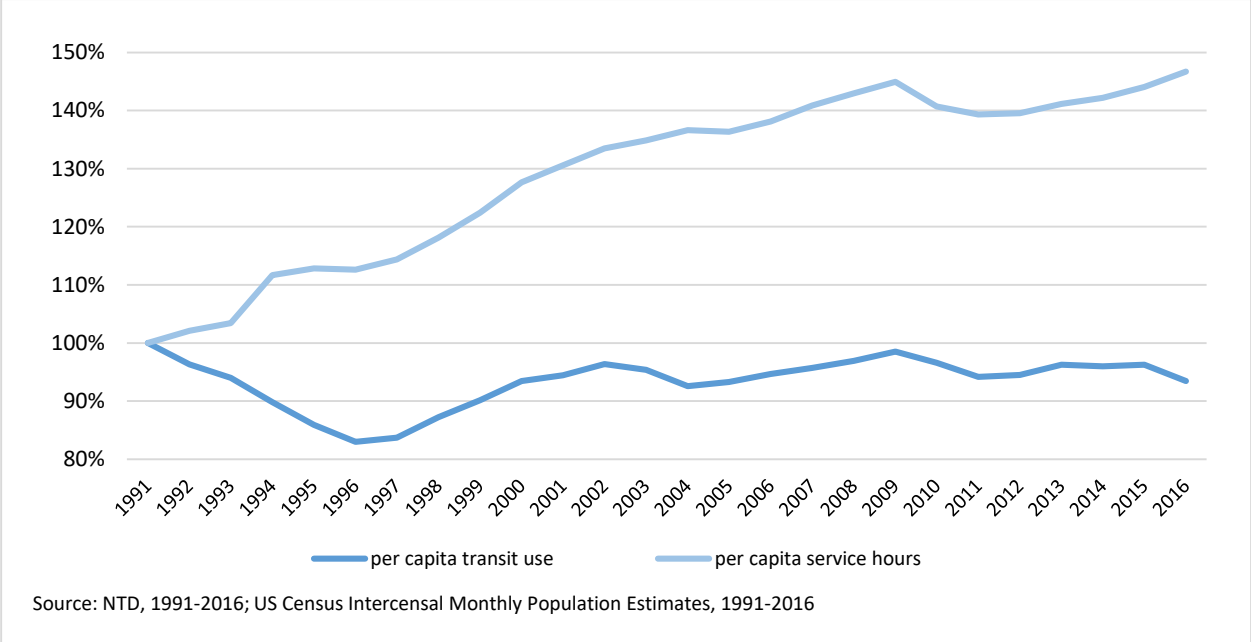


Figure 19. Transit trips and transit supply (1991-2016). *Per capita transit supply has increased 34% since 1991, while per capita transit use has not changed much.*

[10] Though not directly relevant to our question, these shifts have significant budgetary implications beyond just the deployment of various services (Taylor, Garrett, & Iseki, 2000). Local bus and bus rapid transit services (with the exception of those operating in exclusive rights-of-way) tend to be the cheapest to deliver and require the smallest per passenger subsidies. By contrast, the annualized capital plus operating expenses of rail transit tend to be substantially greater per passenger, while the per passenger subsidies for ADA demand response services tend to be the highest of all.

As a final way to examine the relationship between service levels and ridership, we examine the shifts between modes that occurred within the region's largest transit operator, LA Metro. Doing so allows us to address the possibility that aggregate increases in services are masking drops in those types of services— such as buses— that most transit riders rely on. The figures below show the indexed trends in boardings, service (VRH), and productivity (boardings/VRH) for LA Metro bus (Figure 20) and rail (Figure 21) service from 2000 to 2016, and demand response service (Figure 22) since 2008. For local bus and BRT service, transit service supply has tended to follow, rather than lead, changes in ridership — at least through 2014. Beginning in 2014, bus service rose slightly while boardings plunged. Rail service, not surprisingly, has increased more than 150 percent since 2000, and ridership has increased as well, though more slowly. Both service and patronage have tailed off since 2014, but largely in concert— there is no obvious sign of one leading the other. Finally, demand response and van service supply has grown steadily since 2008; boardings increased steadily, albeit more slowly than service, through 2015. Over the past year, service continued to gradually climb, while patronage began to fall.

Collectively, these data offer little evidence that service cuts are driving away customers. Instead service expansion has been accompanied by less ridership, with the main result being lost productivity, particularly for rapidly expanding rail and van services. Rail and van productivity (measured as boardings per VRH) has eroded steadily since 2009, while the service effectiveness of local bus and BRT service began dropping later (and more precipitously) in 2014. Falling service does not seem to be the culprit for falling ridership; falling ridership, in concert with expanding service, is the culprit for falling productivity.



Figure 20. LA MTA: Indexed bus and BRT boardings, service, and productivity. *Declining ridership since 2007, with services' slow growth in the post-recession period leading to declining productivity.*

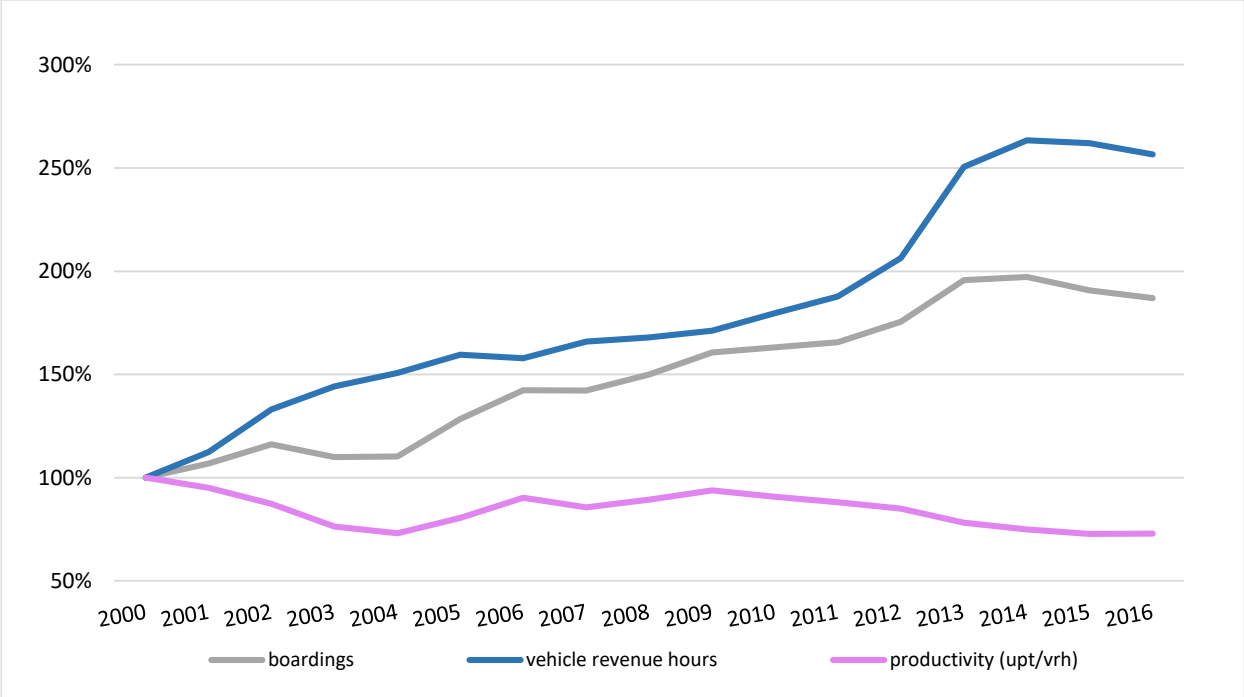


Figure 21. LA MTA: Indexed rail boardings, service, and productivity. *Light rail service doubles with the opening of the Expo Line. Boardings do increase, but slower than the amount of service added.*

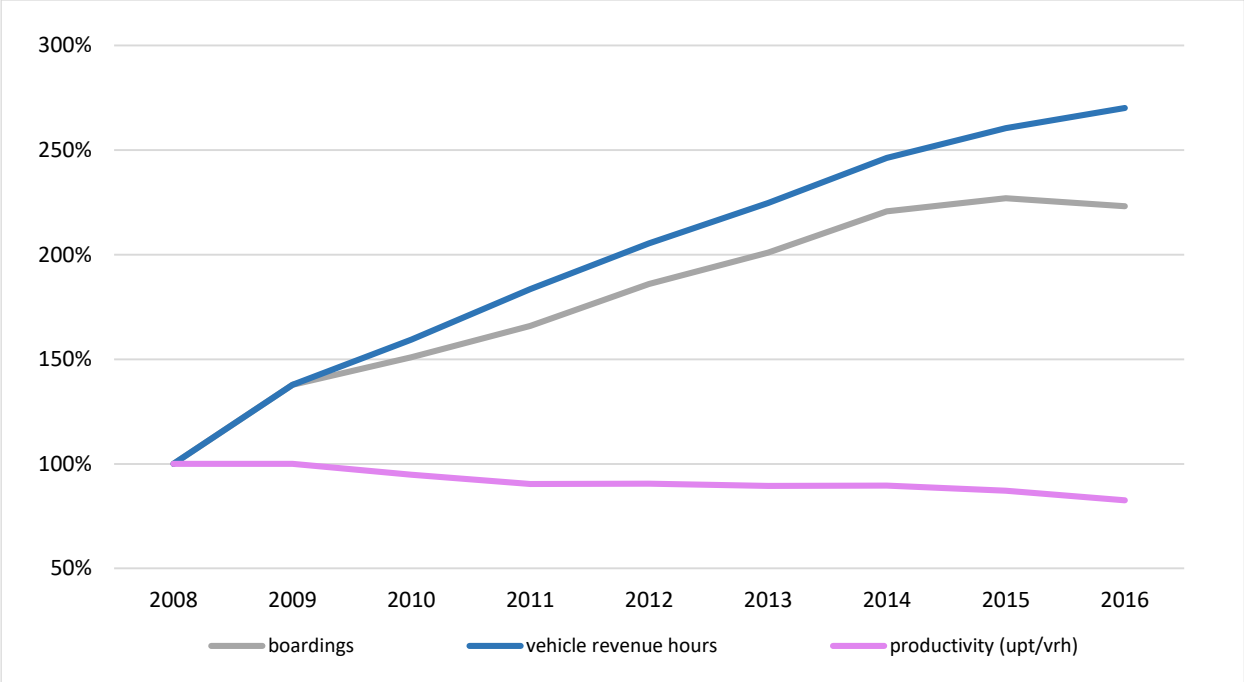


Figure 22. LA MTA: Indexed demand response boardings, service, productivity.
Ridership more than doubled, while service increased by 2.8x.

The Quality of Transit Service

Even if transit quantity does not change, transit quality might. Transit quality has no specific definition, but we can divide it into speed, reliability, and experience. Speed measures how quickly transit vehicles move throughout the region. Reliability is a measure of on-time performance: Do vehicles arrive and depart when they are supposed to? Experience is a measure of how safe or comfortable people feeling during their transit journey, including the time they spend waiting for and transferring among their buses and trains.

Local bus and BRT service in the SCAG region has been slowing down over time. This slowdown is likely a result of many factors, including worsening congestion, shifts from faster suburban to slower urban service, shorter stop spacing, and longer stop "dwell" times to load and unload passengers. Whatever the underlying causes, region-wide bus vehicle speeds declined five percent between 2000 and 2010, and another eight percent between 2010 and 2016, for a total drop in speed of nearly 13 percent over 16 years. By comparison, rail transit speeds were down only two percent between 2000 and 2016.

Falling speeds slow travel times, and if operators do not counteract falling speed by adding more vehicles, then headways (the time between vehicle arrivals at a stop) will rise. Rising headways make transit less attractive by increasing average wait times at stops and lengthening the times of transfers among vehicles. Research has shown that transit passengers find waiting for busses and trains to be especially burdensome, so increased headways can undermine the quality of transit service even if the quantity (in terms of vehicle revenue hours of service) stays unchanged (Iseki & Taylor, 2009).

The SCAG region has 41 transit agencies that operate fixed-route general public service, and on-time performance naturally varies across them.[11] Measuring reliability for all or even most of these operators is therefore beyond the scope of this report. We can, however, examine reliability for LA Metro, which again accounts for the lion's share of the SCAG region's transit trips and lost trips.

Historically, Metro has been unreliable relative to other large transit agencies. A 2008 study by the agency showed that compared to 9 peer operators, Metro had both a lower on-time target and a lower on-time percentage (a vehicle is considered "on-time" if it is less than 5 minutes late). Metro aimed to have 70 percent of its vehicles arrive on time, and attained a rate of 63 percent. In comparison, New York attempted an 83 percent on-time rate and attained an 82 percent rate (Flowers & Snoble, 2008). Metro's reliability problems occur almost entirely on buses, which can easily become trapped in congestion (and which, of course, can also exacerbate congestion).

In the intervening years, however, Metro's on-time performance appears to have improved substantially. An analysis of Metro data by local reporters (Mendelson, 2015) suggests that from 2010 to 2015 Metro rail maintained a 99 percent on-time rate (with subways being late 1 stop out of 200, and light rail 1 stop out of 50), while the buses improved their on-time rate to 81 percent. We say "appears" because this discussion comes with an important caveat: Reliability is a function of the conditions in which buses and trains operate, the efficacy of the bus and train operations, and the schedule that sets the performance expectations. Controlling for conditions or operations, schedules that assume few traffic disruptions and little layover or recovery times can be difficult to meet, while those that assume slower speeds and provide generous layover and recovery times at the ends of routes are easier to meet.

As a result, transit operators can improve measured reliability in two ways. The first involves steps like better field supervision, quicker boarding and alighting procedures that reduce dwell times, and giving buses their own lanes in chronically congested districts. All these steps can change operations, and lower the variability of travel times. But the second way to improve reliability is to change the schedule, by factoring in more slack. Doing so is not necessarily disingenuous, and may simply reflect the challenges of operating in heavy congestion. Adding slack to schedules can allow vehicles to maintain performance even in the face of disruptions (severe congestion, crashes, crowds of people boarding or alighting at particular stops, and so on). The downside to this approach, however, is that too much slack in the schedule might increase reliability on paper but manifest as poorer-quality service in the eyes of riders. As slack increases average vehicle speeds fall, headways rise, and so do timepoint holds (instances where vehicles wait at stops so as not to run ahead of schedule). A service that is on-time because its schedule makes it less frequent is not a high-quality service.

We could not, with the data and time available to us, determine if Metro's schedule adherence improved because its buses met the existing schedule more often, or because schedules themselves were changed. If bus performance improved on the street as opposed to on paper, then we would have little reason to think service reliability was a large factor in falling ridership – bus ridership would have fallen even as schedule adherence increased. But we cannot say for certain that this occurred. We do know, however,

[11] With another 69 systems operating demand-response and other types of transit services, for a total of 110 regional transit service providers.

that rail ridership fell even as rail maintained a near-perfect on-time record. So we have some reason to think that service reliability did not play a large role in the ridership downturn.

We should also note that the advent of mobile apps that track transit vehicles in real time may have diminished the problems caused by unreliable buses. Unreliability is a larger problem when it strands people at stops with little idea of when a vehicle will arrive. To the extent people can follow vehicles in real time and adjust their departures to minimize waiting, some of the worst aspects of irregular transit vehicle arrivals can be mitigated (Yoh et al., 2011). LA Metro has next bus and next train information at its rail stations and BRT stops, and real time information about local and express buses is available on multiple smartphone applications. Metro's 2016 rider survey shows that 51 percent of bus riders have a smartphone, and that 66 percent of these riders use the phone "very often" or "occasionally" to get information about Metro rides.

A transit vehicle that arrives on time can still have poor service quality, if the experience of using the vehicle – which includes walking to the stop, waiting at the stop, and riding – is unpleasant. Specifically, if people using transit feel unsafe or uncomfortable, ridership could fall (Delbosc & Currie, 2012; Iseki & Taylor, 2009). Safety perceptions are often gendered (Loukaitou-Sideris, 2015), and a slight majority of transit users in the SCAG region are women. Note that perceptions of safety are different from, and probably more important than, safety itself. Many behaviors that are not crimes, and that do not directly threaten other people, may nevertheless disturb people nearby, and can discourage them from using transit (Ellickson, 1996; Fink, 2012).

There is some reason to think that transit vehicles, stations, and stops in the SCAG region – and particularly along LA Metro routes – came to feel less safe to riders in recent years. In 2016, LA Metro surveyed former riders, and 28 percent said that the primary reason they stopped riding transit was that they felt either unsafe or uncomfortable. Unfortunately, this survey is not conclusive. Former transit riders are a hard group to reach, and there are responses in the survey that suggest that the overall sample may not have been representative. As a result, we cannot be certain that safety actually loomed so large for former riders. At the same time, even if the survey inflated safety concerns by a factor of two, a nontrivial share of former riders (14 percent) report leaving transit because they felt unsafe. And considerable anecdotal evidence suggests that in recent years transit users started to feel less safe — such reports prompted Metro to completely revamp its security procedures in 2017.

What might explain riders' perceptions that transit is less safe? Possibly some riders have *always* felt unsafe, and what changed was not conditions on transit but the option to leave (if people got access to vehicles or TNCs, for example). We do not discount this possibility, but will take it up later in this report. If we assume that perceptions of safety really did decline in recent years, one potential (and admittedly speculative) reason involves LA County's dramatic increase in homelessness after 2010. Table 2 shows changes in the LA County homeless population from 2005 to 2017, based on homeless counts done by the Los Angeles County Housing Services Administration. Homeless counts, and especially counts of the unsheltered homeless, are for obvious reasons prone to error. Nevertheless, the table suggests that homelessness, while not as severe today as it was in 2005, has in recent years both risen sharply and changed in composition. The unsheltered chronic homeless (people who are not just homeless but also have some sort of disabling condition) became a larger proportion of the homeless overall.

Year	All Homeless		Share	Chronic Homeless		Share
	Total	Unsheltered	Unsheltered	Total	Unsheltered	Unsheltered
2005	65,287	53,429	81.8%			
2007	59,956	39,168	74.0%			
2009	38,602	21,073	54.6%			
2011	39,153	20,157	52.4%			
2013	39,463	25,136	63.7%	7,475	6,652	89.0%
2015	44,359	31,025	69.9%	13,356	nd	nd
2016	46,874	34,701	74.0%	14,644	13,746	93.9%
2017	57,794	42,828	74.1%	17,531	13,321	93.1%
Pct Change, 2005-2017	-13.0%	-24.8%	-10.4%			
Pct Change, 2009-2017	33.2%	50.8%	26.3%			
Pct Change, 2013-2017	46.5%	70.4%	16.3%	57.4%	59.2%	4.4%

Source: Los Angeles Homeless Counts, Los Angeles Almanac
https://www.lahsa.org/homeless-count/reports
http://www.laalmanac.com/social/so14.php

Table 2. Changes in LA County homeless population, 2005-2017.

Homelessness— the simple condition of people being without housing— often arises from high housing prices that push some people out of the housing market (O'Flaherty, 1998). Chronic homelessness, however, which tends to be much more visible (in part because the chronic homeless are less likely to be sheltered) often has different underlying causes related to addiction or mental illness. In conversations with transit operators during the writing of this report, some mentioned the impact of California's prison realignment program, which led to many inmates being released from prisons and jails. The state's carceral institutions have traditionally held many mentally ill persons, and discharging them without any corresponding increase in other social services may have increased the number of people with addictions and disabilities living on the streets. No government entity tracks prison realignment's impact on homelessness, but some advocates estimate that up to 20 percent of the state prisoners discharged, and up to 10 percent of county jail inmates, have now become homeless(Holland, 2015). There is also small body of evidence, some academic and some journalistic, suggesting that the unsheltered homeless gather disproportionately around transit facilities. Transit vehicles can provide shelter and protection, while transit stops can provide a roof or even just a bench (Emmons, 2013; National Academies of Sciences, Engineering, and Medicine, Transportation Research Board, Transit Cooperative Research Program, & Boyle, 2016; Trevor, n.d.; Voorhees Center for Neighborhood and Community Improvement, 2016). To the extent some of these people use transit stops and transit vehicles as ad hoc shelters, and to the extent their presence or behavior disturbs others, realignment may have played a role in making transit seem less safe, and reducing ridership. We emphasize again that this line of thinking is quite speculative and warrants further research.

Transit Fares

Potential transit riders weigh the quality of a ride against its price. Like most goods, transit, even at constant quality, will become less attractive if its price rises, and more attractive if the price falls. The postwar high-water mark for transit in Los Angeles County occurred during a three-year program that cut bus fares in half from 1982 to 1985. When this program ended and bus fares returned to their previous levels, transit ridership fell substantially (Southern California Rapid Transit District, 1986).

The inverse relationship between fares and use, however, is complicated by two factors. First, the people who use transit the most – lower-income people with limited or no vehicle access – are generally more price sensitive in that they have less income, but *less* price sensitive in that they have few viable alternatives to transit. As a result, many transit riders are less sensitive to fare increases than one might expect given their incomes. Second, although every transit operator has a posted one-way fare, relatively few riders actually pay that rate, because agencies offer a variety of discounts and bulk payment mechanisms, including daily, weekly or monthly passes, youth and elderly discount passes, and so on that offer substantial discounts to particular classes of riders, including those who ride frequently (Yoh, Taylor, & Gahbauer, 2016). Heavy users who buy monthly passes will typically pay a per-ride rate much lower than the advertised fare. LA Metro's 2016 rider survey showed nearly half (49%) used a daily, weekly, or monthly pass, while about 25 percent paid a discounted fare.

Further complicating this issue is that transit fares can be calculated on a per-trip or per-mile basis. Arguably the most intuitive way to think about fare increases is per-trip: How much does a person pay to get aboard a vehicle? But once a passenger is on board, what follows might be a local bus trip of two blocks or a light rail trip of 22 miles. With the exception of commuter rail and some express bus routes, transit fares generally do not change with distance travelled. If the average fare to board a vehicle rises less quickly than the average distance of a trip, the per-mile fare could fall more than the per-trip fare rises, and transit may in a real sense become less expensive. For our purposes, the fare per trip is probably more relevant, as it is likely more salient to potential riders, but it remains worthwhile to consider both.

This wide array of payment methods and rates, and ways of considering these rates, makes calculating the actual fare paid by different classes of users beyond the scope of this report. We can, however, easily determine the average fare paid per boarding for a given system and the SCAG region, by simply dividing total fare revenues collected by either total boardings or passenger miles. While these metrics will fail to capture some of the nuances of fare payment among different types of users (they cannot completely control, for instance, the bulk discounts for heavy users of different lines) they are a measure of the fare payments actually made by people when they ride.

Figure 23 below displays the average inflation-adjusted fare paid per boarding across all transit systems in the US, California, and the SCAG region between 2002 and 2015. The figure shows, first, that the average transit fare paid is lower in the SCAG region than for California as a whole, which in turn is lower than the average transit fare paid nationwide. Second, the figure shows that the average inflation-adjusted fare paid per boarding in California began creeping up in 2012, and to a lesser extent in the US since 2013 and the SCAG region since 2015. Overall, however, the average inflation-adjusted fare per boarding in the SCAG region has been remarkably flat since 2002.

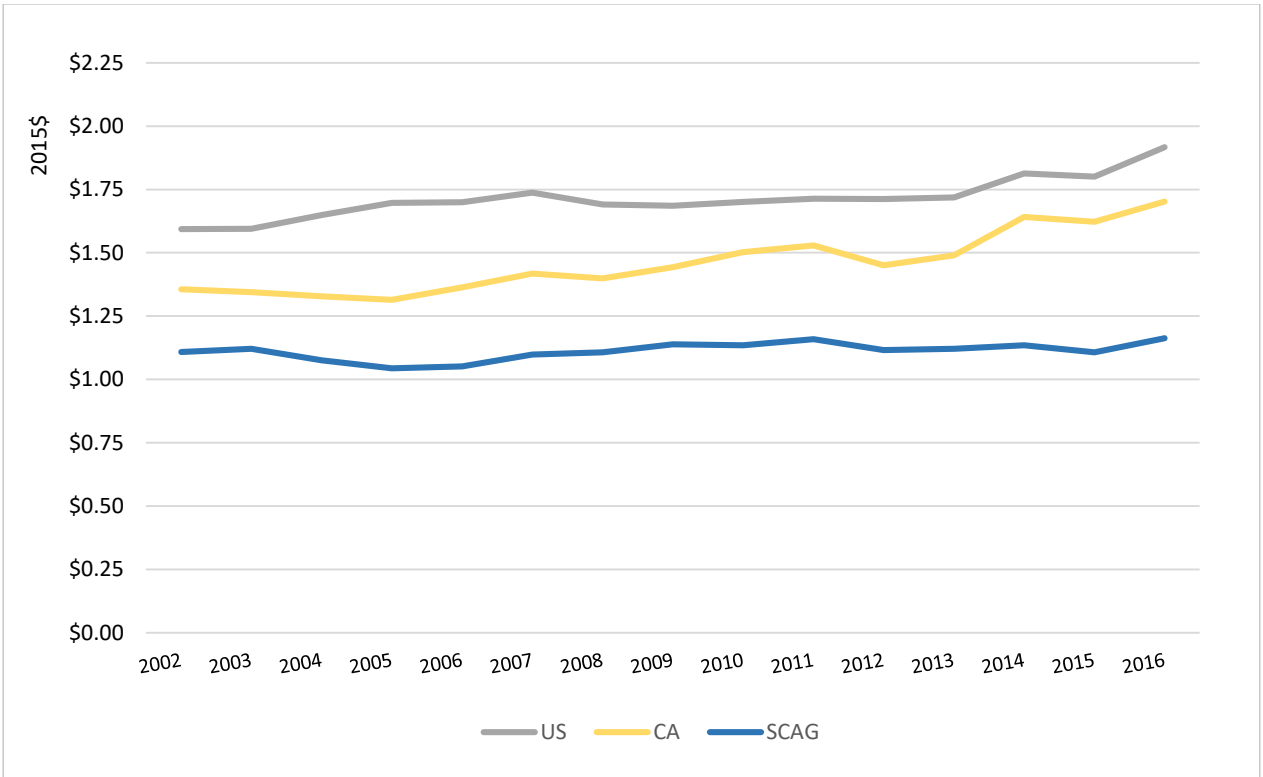


Figure 23. Average fare per boarding in 2015 dollars. *Average fare per boarding has stayed relatively constant in the SCAG region.*

National, state, and regional averages, of course, can mask considerable variation in fares paid across transit systems, services, and riders. Figure 24 shows the same inflation-adjusted trend in fares paid per boarding since 2002 for each of the six largest transit operators in the SCAG region. Focusing on these larger operators tells a different story. With the exception of Long Beach Transit, inflation-adjusted fare payments have been increasing over time on these operators. In particular, inflation-adjusted fares per boarding at both OCTA and the Big Blue Bus increased by about 50 percent between 2002 and 2016 — to nearly $1.25 and $0.75 per boarding respectively. Foothill transit had (in 2016) the highest average fares paid (at $1.25 per boarding), followed in order by OCTA, LA MTA, the Big Blue Bus and Long Beach Transit, while LA DOT had the lowest average fare paid (at just over $0.50 per boarding).

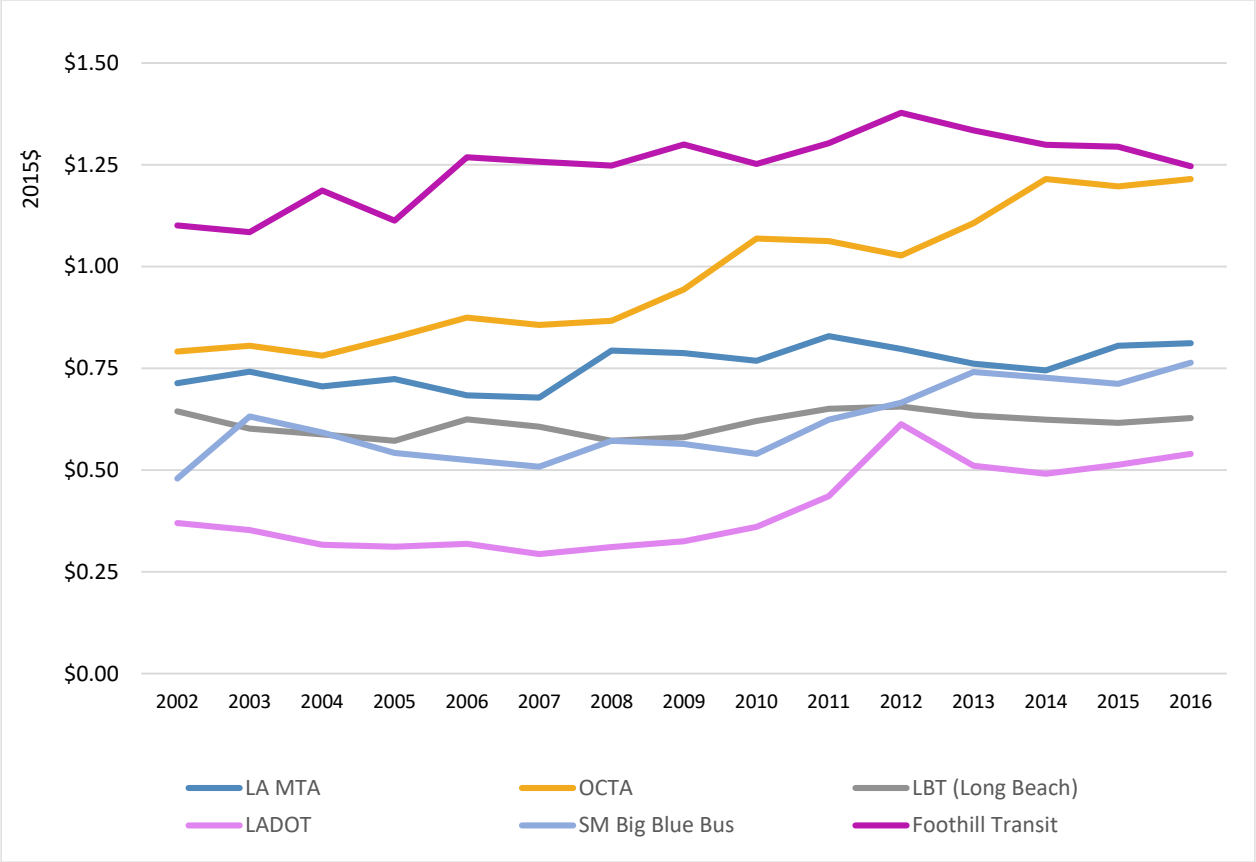


Figure 24. SCAG: Average fare per boarding for largest operators in 2015 dollars.
Inflation-adjusted average fares per boarding have increased the most rapidly for OCTA and LADOT.

Figure 25 shows the 14-year trend in real average fare paid per mile for the nation, California, and the SCAG region. Here we see that average fares paid per mile have remained largely unchanged in the U.S. and California, and in the SCAG region they have actually fallen. Despite being lower than average per mile fares in the state and nation, average per mile fares in the SCAG region have declined about 20 percent since 2009.

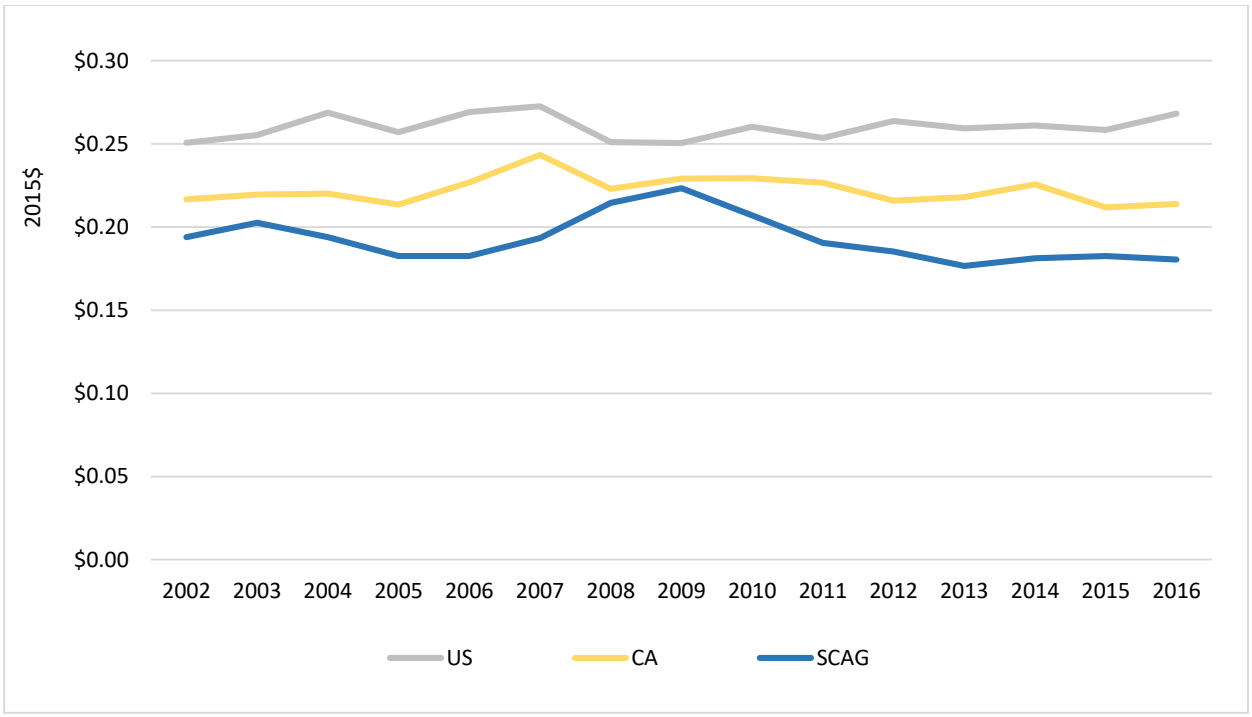


Figure 25. Average fare per passenger mile traveled in 2015 dollars. *Average fare per PMT remained fairly constant, and even declined a little since 2009.*

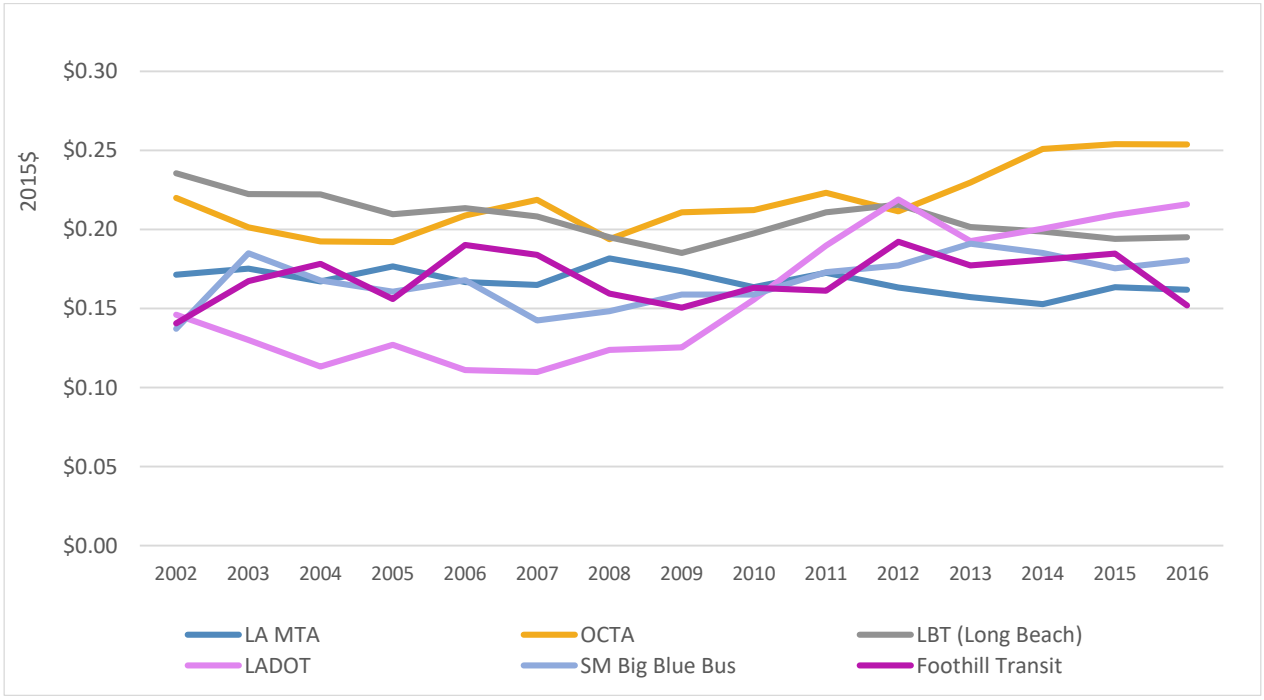


Figure 26. SCAG: Average fare per PMT for largest operators in 2015 dollars. *Average fare per PMT increased the most rapidly (about $0.07 per mile) for LADOT and slightly for OCTA ($0.04 per mile).*

If we zoom in on the six largest transit operators in the SCAG region, we see that inflation-adjusted fares per mile rose notably at two systems — LA DOT (+$0.07/mile) and OCTA (+$0.04/mile). On the Big Blue Bus and Foothill Transit per mile fares rose modestly, and at Long Beach Transit and LA Metro they fell (despite Metro's 2014 fare increase).

The most notable attribute of the figures above is the steep increase in fares for OCTA. OCTA's fares have risen over 50 percent since 2002, and OCTA is also the transit operator that has suffered the sharpest decline in ridership (about 35% since 2007). The transit industry's rule of thumb (sometimes called the Simpson-Curtin rule) suggests that a 10 percent increase in fares will be associated with about a 3 percent reduction in ridership. By this heuristic, OCTA's fare increases should have resulted in a 17 percent ridership decline.

To help isolate the association between fare increases and transit use, we estimated a multivariate regression statistical model using data for each transit operator in the SCAG region for each year between 2002 and 2016. Full details of this model are in the Appendix, but we used fixed effects to control for the panel nature of the data, and controlled for the level of service each operator provided, the average time between each bus or train arrival, and the density, size and population of the service area.

We find, after controlling for these factors, that higher fares are indeed associated with lower ridership, but by less than industry rules of thumb might suggest. Across the SCAG region over this time period, a 10 percent fare increase was associated with a roughly 1.6 percent decrease in ridership. This relationship is relatively "inelastic" (i.e. it suggests people are not very sensitive to prices) though it falls within the range of findings from other studies of how fare increases influence ridership (Cervero, 1990; Linsalata & Pham, 1991). Based on these results, we would expect OCTA patronage to have fallen about 8 percent since 2002, as a result of its fare increases.

It seems plausible, in light of these data, to suggest that fare increases played some role in OCTA's lost transit trips. But OCTA's losses, as large as they are, account for a small fraction of the SCAG region's total losses. The bulk of those losses were from LA Metro, and it is harder to suggest that fare increases played a big role in Metro's ridership decline.

Factors Outside Transit Operators' Control

Fuel Prices

Fuel prices are a large and highly salient operating cost of driving. As fuel prices rise people drive less, and as they fall people drive more. In general, a ten percent increase in the price of gasoline is associated with a long-run (5 year) one to three percent reduction in vehicle travel (Goodwin, Dargay, & Hanly, 2004). Driving more, however, is not the same as using transit less, since (again) the typical driver almost never uses transit. People who drive less when gas prices are high often walk, carpool, stay home, or drive to nearer destinations (e.g. a restaurant that is 2 miles away instead of 10). Similarly, for many regular transit riders changes in the price of gasoline are immaterial, because many transit users do not have access to private vehicles. As a result of these factors, much of the adjustment to fluctuating fuel gas prices that occurs in the U.S. has no bearing on transit use, and the relationship between fuel prices and transit ridership tends to be weaker than the relationship between fuel prices and driving.

"Weaker," however, is not "nonexistent," and in both Southern California and nationwide, fuel prices rose and fell sharply from the late 1990s through 2015. Prices increased at a record pace from 1998 to 2008, declined, and then rose sharply again until 2013, after which they plunged (Figure 27). Transit ridership also fell steeply from 2013 to 2016. It is reasonable to think that falling gas prices could contribute to falling transit ridership. A steep drop in gas prices could have lured some of the minority of transit riders who do have vehicles away from transit use. Even among riders without vehicles available, falling fuel prices could have an indirect impact. When fuel is cheap rides in cars become more available: Friends or family members who become more likely to drive, and people who might otherwise have used transit might start carpooling for some trips.

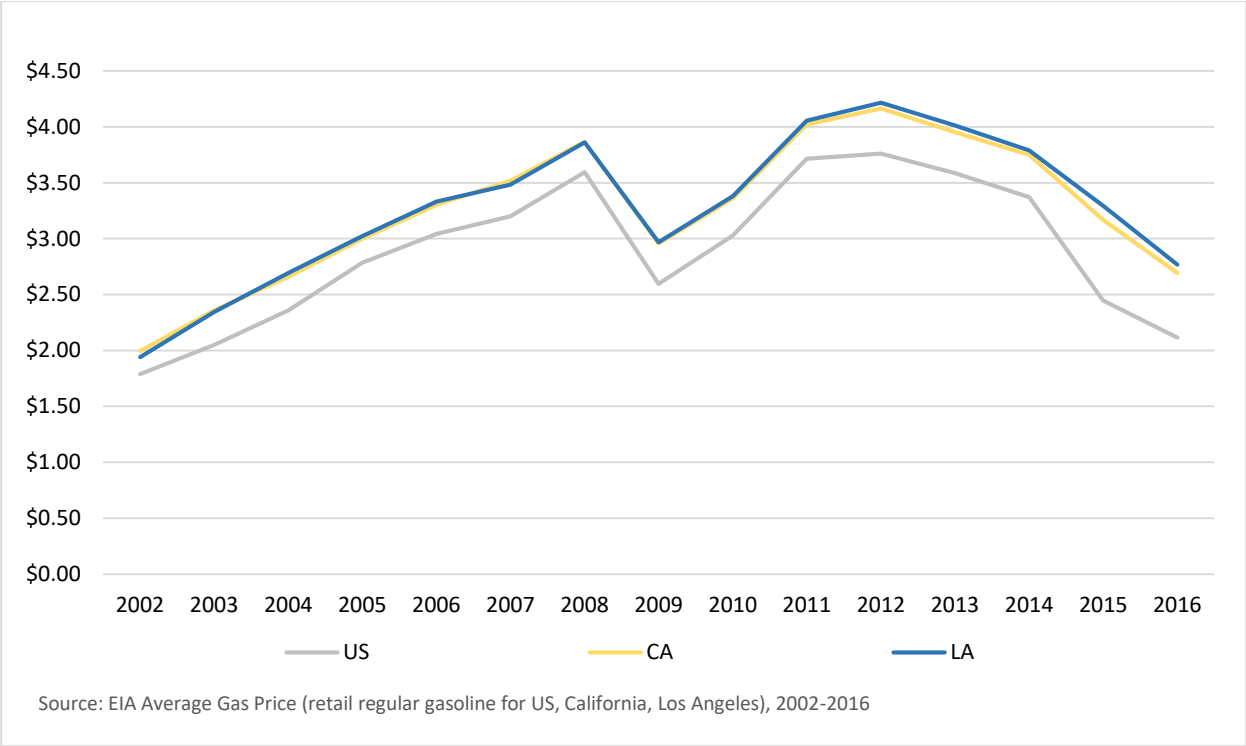
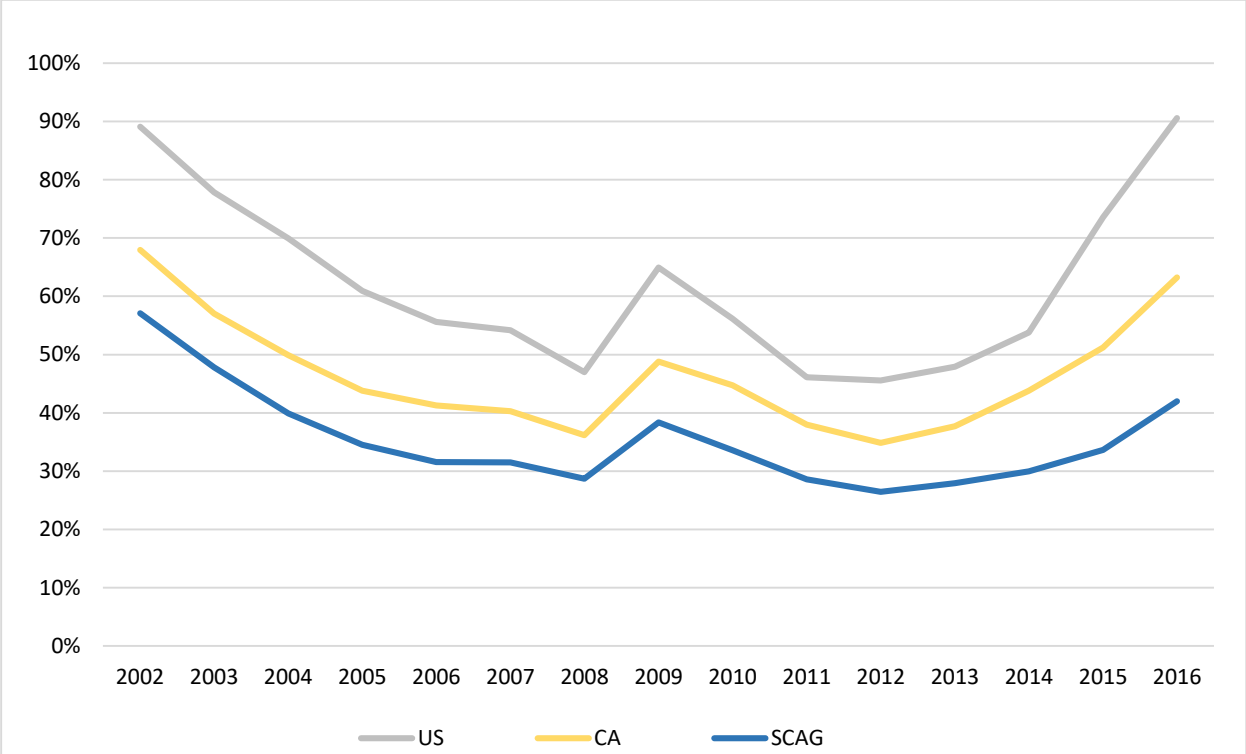


Figure 27. Average gas per gallon in 2015 dollars.

As to how much a steep drop in fuel prices might undermine transit use: the research literature reports a fairly wide array of elasticities (estimates of transit's sensitivity to gas price changes). These range from relatively large effects for commuter rail (0.37, when gasoline costs more than $3 per gallon) (Nowak & Savage, 2013) to much lower average estimates for bus ridership that range from -0.05 to 0.22 (Blanchard, 2009; Iseki & Ali, 2014; Mattson, 2008). Blanchard (2009) used gas price changes in LA County to estimate a bus ridership elasticity of 0.092, a subway elasticity of 0.011, a commuter rail elasticity of 0.126, and light rail elasticity of 0.071. Lane (2010), also studying LA, found similar results. All these estimates suggest that a 10 percent change in fuel prices is associated with about a half-percent change in transit use in the near term, and a 1 to 1.8 percent change in the longer-term. Gas prices fell 30 percent from 2012 to 2016,

which would imply a 3 percent reduction in bus ridership, and larger losses in rail and commuter rail, all else equal.

One way to consider this relationship of fuels prices to fares is to compare the ratio of average fare paid per boarding with the average price of gasoline in the SCAG region over this period (Figure 28). As with fares generally, we see that this fares-to-gas ratio is lower in the SCAG region than in California as a whole, and lower in California than the nation as a whole. Further, while the price of a transit trip relative to a gallon of gas has been climbing across all three geographies since about 2012, the ratio in the SCAG region today remains substantially lower than it was in 2002.



Source: NTD, 2002-2016; EIA Average Gas Price (retail regular gasoline), 2002-2016.
Note: Average LA gas prices are used for the SCAG region.

Figure 28. Average fare as a percent of region's average gas per gallon. *Average fare is consistently less than the cost of a gallon of gas, even as gas prices have been falling since 2014.*

Figure 29 plots the trend in gas prices against the trend in absolute and per capita transit ridership in the SCAG region (we use the Los Angeles Metropolitan Statistical Area average gas prices). The graph suggests a real but fairly modest relationship: Transit use does rise and fall with fuel prices, with a small lag. The response does not appear to be large, however, especially for ridership per capita. But with only one data point per year, we can only say so much about the role of gasoline prices. It would be surprising if falling gas prices did not contribute to the decline in transit ridership, but it is difficult to quantify their precise role. Overall, we consider falling fuel prices to be a real but probably minor driver in falling transit use.

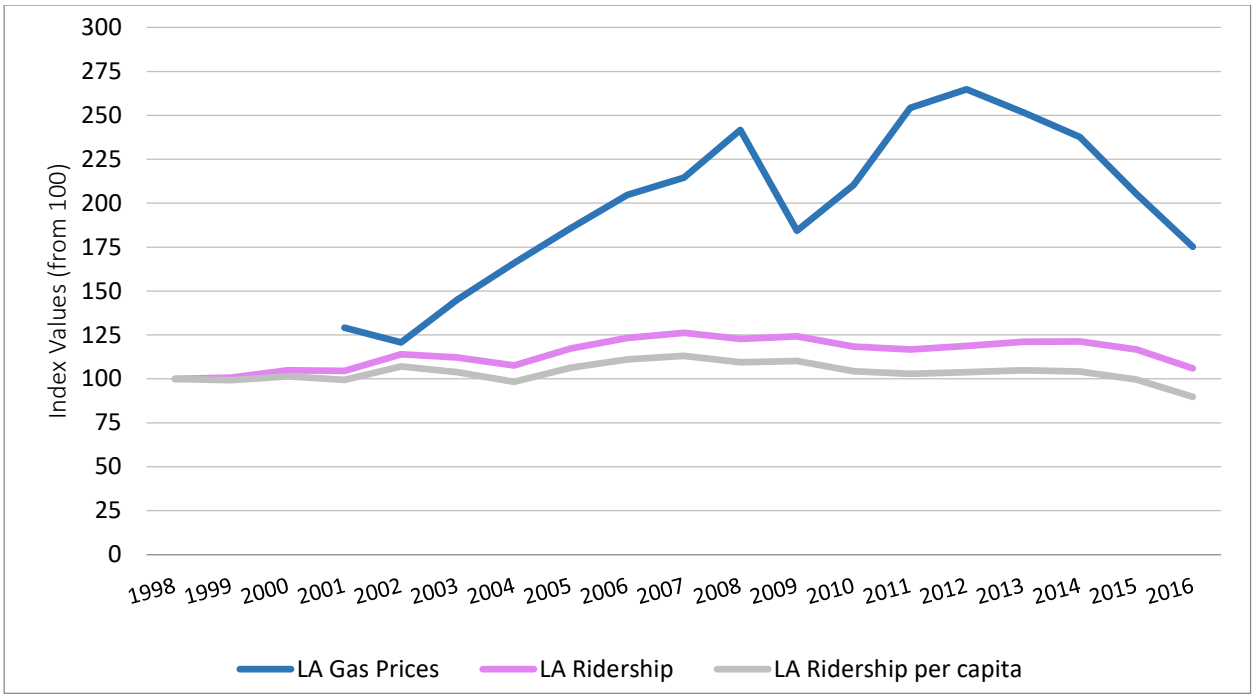


Figure 29. Transit ridership and gas prices in Los Angeles.

The Transportation Network Companies

The large absolute decline in transit ridership coincided not just with falling gas prices but also with the rise of Transportation Network Companies (TNC) like Lyft and Uber. TNCs are a plausible culprit in transit's decline. TNCs can offer the convenience of automobile travel to people who do not own automobiles, and could therefore become viable substitutes for public transportation. Any explanation for falling transit use that hinges on TNCs, however, faces a timing problem: TNCs began operating in Southern California in 2009, and did not begin serving people in large numbers until 2012. Per capita transit ridership began falling in 2007. So while the TNCs may affect transit use, they cannot by themselves explain transit's recent patronage decline.

Moreover, TNCs' influence on mode choice is theoretically ambiguous. On the one hand, TNCs let people purchase vehicle trips *a la carte*. If those trips are inexpensive, then TNCs can be a faster, more direct, less-crowded, and more comfortable substitute for transit. While some TNC trips are substantially more expensive than transit fares, the TNC shared ride services, like Lyft Line and Uber Pool, have sometimes seen fares fall low enough to be competitive with one-way transit fares. Given the speed and convenience these services offer, they could draw some riders away from transit, provided those riders have smartphones and credit cards.

On the other hand, TNCs could also *increase* transit use. TNCs could help solve first-mile/last mile problems, and get people to transit stops that are beyond walking distance. TNCs could also provide transit riders a form of insurance – if some people don't take transit because they worry an emergency might arise where they need a car (for instance, getting a sick child home from school) the option of calling

a TNC during one of those emergencies can lower the perceived risk of taking public transportation, and make it more attractive.

Finally, since most people in most regions do not use transit or even consider doing so, the average TNC trip may have little impact on transit ridership. If the typical Uber passenger has never used a bus and never considered doing so, Uber's growth cannot be blamed for transit's decline.

Because TNCs provide almost no operating data to the public, we do not have sufficient evidence to adjudicate between these scenarios. We do not know even basic information — such as the total number of TNC trips in the SCAG region year over year, or the general areas where those trips originate — that could cast light on the relationship between TNCs and public transportation (Transportation Research Board, & National Academies of Sciences, Engineering, and Medicine, 2016).[12]

What little evidence we do have suggests that most TNC trips do not replace transit trips. Surveys done by independent researchers and organizations suggest that the typical TNC user does not resemble the typical transit rider (TNC users are disproportionately college-educated and affluent), and that the most common times and places for TNC rides are Friday and Saturday nights in popular commercial districts, and trips to airports (Clewlow & Mishra, 2017; Feigon & Murphy, 2016; Rayle, Dai, Chan, Cervero, & Shaheen, 2016). Large surveys by Clewlow and Mishra (2017) and APTA (Murphy 2016) suggest that most TNC trips occur between 10 p.m. and 4 a.m., when transit runs infrequently and carries few riders. Clewlow and Mishra (2017) find that the majority of TNC users report no change in their use of other modes. All this evidence suggests little impact on transit.

The caveat attached to these findings, however, is that the subgroups most likely to take transit – low-income racial and ethnic minorities – are also difficult to survey. Even very large, well-funded surveys often struggle to get adequate coverage of poorer households. As such, we cannot rule out the possibility that actual TNC use in some poorer neighborhoods is higher than the current data suggest.

Moreover, as the pool of TNC users continues to expand, the TNCs' effect on transit use – both positive and negative – may well increase. These amplified effects will be still more likely if TNC prices fall, and TNC use grows disproportionately in dense, high transit ridership areas populated by residents with relatively low levels of household motor vehicle access. For this reason, the relationship between TNCs and transit should be monitored, and there may well be a public interest in letting transit agencies see at least basic data about the location and volume of TNC trips. But relatively little evidence suggests that TNCs are a big player in the current transit decline. The timing, again, does not match up well.

Neighborhood Change and Migration

Transit is heavily-supplied in a small proportion of places, and heavily used by a small proportion of people. This situation creates a potential matching problem. If the small group of people who use transit a lot becomes less likely to live in the small number of places that offers a lot of service, transit use could

[12] TNCs are required under California law to report a host of data on rides given, disability access, and drivers to the California Public Utilities Commission. Unlike transit data in the NTD, however, these TNC data are not public. The CPUC cannot easily turn those data over to the public or public agencies. Such conditions are common throughout the United States. For more - http://www.cpuc.ca.gov/General.aspx?id=3989

fall. Such a mismatch could occur for a number of reasons. The highest-profile explanation is gentrification-driven displacement. If gentrification pushes transit-riding lower-income households away from transit-rich neighborhoods, and replaces them with higher-income residents, transit use may fall. The new higher-income residents may use transit more than they did previously, but less than the lower-income residents they replace (Dominie, 2012).[13]

Gentrification and displacement, however, account for only a small portion of moves by poor and immigrant households. Most moves by such households are by choice, or for reasons unrelated to in-migration by the affluent—for example, a low-income resident might lose a job and be forced to move (either to find new work, or to find a place with lower rent), even if neighborhood rents are not rising (Freeman 2005; Freeman and Braconi 2004; Newman and Wyly 2006; Vigdor 2002). The relevant fact is that in recent years many poor households, when they move for whatever reason, relocate to the suburbs. As poor households suburbanize, they move farther from transit on average (Farrell, 2016; Kneebone, 2014; Kneebone & Garr, 2010; Singer, 2011; Zimmerman, Restrepo, Kates, & Joseph, 2015). Upon arriving in the suburbs, low-income people may well use transit more than other suburbanites, but less than they had used it when they lived in central-city neighborhoods. If they are not replaced in central-city neighborhoods by other people who ride at high rates, then as a result of their migration overall transit use could fall.

Ideally we could examine the extent to which migration influences transit use by following low-income households and their travel behavior over time and across neighborhoods. Unfortunately, the data that would allow us do this do not exist. What we can do instead is use census-tract level data to examine changes in the spatial location of transit commuters and in the characteristics of residents living in high-transit commuting neighborhoods. We approach this task in two ways: identifying tracts with transit-friendly built environments and seeing how they change over time, and identifying tracts with high levels of transit commuting, and examining change within those places over time. These approaches have limits, as we will explain, but in combination they show a decline in the number of transit commuters in many high-transit use neighborhoods in 2010 and 2015, a decline in transit mode share in these neighborhoods (particularly from 2000 to 2010), and a shift in the characteristics of neighborhood residents in ways that help to explain declining transit use.

We have two methods available to identify areas that are highly conducive to transit use. These are areas that, regardless of who lives in them, are transit-friendly, either because of their levels of transit service or attributes of their built environment. Our first measure of transit-conduciveness is SCAG's High Quality Transit Area designation. SCAG defines a High Quality Transit Area as an area within one-half mile of a fixed guideway transit stop or a bus transit corridor where buses arrive at a frequency of every 15 minutes or less during peak commuting hours. SCAG last identified existing High Quality Transit Areas using data for 2012. These High Quality Transit Areas are located in 762 census tracts—about 45 percent of the region's total Census tracts.

Our second measure of transit-conduciveness comes from a typology of neighborhoods developed at the UCLA Institute of Transportation Studies for the US Federal Highway Administration (Voulgaris, Taylor, Blumenberg, Brown, & Ralph, 2016), using data from 2010-2013 (Ramsey & Bell, 2014; Voulgaris et al.,

[13] This outcome could well result in lower transit ridership but also lower VMT and GHG, because the higher income in-migrants are more likely to replace driving with their transit trips (see Chapple et al. 2016, Chapter 4).

2016). This typology characterizes neighborhoods based on their built environment and transportation system characteristics (e.g. density, land use mix, age of housing stock, resident turnover, street network characteristics, and transit supply), but not on the characteristics of the people living in these neighborhoods. In this way the typology can capture how transit-friendly a neighborhood's built environment is. We focus in particular on one neighborhood type called "Old Urban," which indicates very-high density neighborhoods with high-levels of transit supply. Old Urban neighborhoods are much less common than SCAG High Quality Transit Areas—in 2010 there were 719 Old Urban neighborhoods in the region.

For our purposes, the limitations of both the SCAG designation and the Old Urban designation are that the data used to construct them are from 2010 or after. As a result, we can track changes in these neighborhoods from 2010-2015, but we do not have a good measure of tract-level transit supply or transit-conduciveness from 2000 to 2010, the time period when transit use in the SCAG region began to fall.

To examine changes from 2000 forward, we examine the clustering of transit commuters. This method is imperfect, since as we have shown commuters are a minority of transit users, but we assume for this exercise that as regular transit users, commuters tend to cluster in areas conducive to transit use. This assumption is contestable, but we have no other Census tract-level data on transit use that stretches back to 2000. We identify high-transit commuter neighborhoods with data on transit commuters by Census tract from the 2000 Decennial Census, and the 2010 and 2015 ACS.[14] For each year, we rank order tracts by the number of transit commuters in them. As we discussed earlier, transit commuters are highly concentrated in a very small fraction of the SCAG region's land area; eighty percent of transit commuters live on less than five percent of the land area and in less than 40 percent of census tracts. This distribution changed very little from 2000 to 2015.

We examine changes over time using the rank-ordered transit commuting data from the 2000 Census. We identified the census tracts that most intensively host transit commuters; these tracts, which are 1.43 percent of all census tracts in the region and 0.02 percent of the region's land area, hold ten percent of the region's transit commuters. We call these "10% Tracts." The mean number of transit commuters in these tracts is almost 12 times the regional average. For comparison, we also extracted data on the tracts where the top 60 percent of transit commuters live; these neighborhoods comprise 20.6 percent of all census tracts and 0.86 percent of the land area. We call these "60% Tracts." The mean number of transit commuters in these neighborhoods is 4.5 times the regional average. The number of ten percent tracts is extremely small: in 2000, just 48. The number of tracts that hold 60 percent of the commuters, in contrast, is 743—roughly the same number as are in the Old Urban designation.

The tracts in the 10% and 60% designations in 2000 strongly overlap with the SCAG High Quality Transit Area and Old Urban designations. If we take the 10% Tracts in 2000 and follow them forward, we see that about 85 percent are Old Urban tracts, and all of them are SCAG High Quality Transit tracts. Similarly, of the tracts in the 60% designation in 2000, in 2010 55 percent of them are Old Urban, and 85 percent are

[14] Because we are using tract-level data, the ACS data are from the 5-year samples. The 2010 data are from the 2006-2010 ACS, and the 2015 data are from the 2011-2015 ACS.

High Quality Transit. As such, following the trajectory of the 10% and especially the 60% Tracts may be a rough-but-reasonable proxy for following the trajectory of transit-rich areas.

As a first step, we follow three of these four tract designations – 60% Tracts, Old Urban, and High Quality Transit – over time, to the extent we can. For the latter two designations, this means only tracking changes from 2000 to 2015. We follow the year 2000 60% Tracts from 2000 to 2010, and then to 2015. (We use the 60% Tracts, rather than the 10% Tracts, because their numbers are more comparable to the Old Urban tracts).

Figure 30 summarizes the results. Essentially, the 60% Tracts saw substantial changes between 2000 and 2010, and these changes are consistent with the idea that the people most likely to use transit migrated away from transit-rich areas. From 2000 to 2010, the poverty rate in these tracts fell by four percentage points, the share foreign born fell from 48 percentto 45 percent, and the share of households without vehicles fell from 23 percent to 17 percent. From 2010 to 2015, in contrast, relatively little changed, and that same pattern holds if we examine Old Urban tracts and SCAG High Quality Transit Areas. Across all three neighborhood typologies, poverty rose slightly, the share of foreign born fell slightly, and – perhaps most important, given the importance of vehicle access to transit use – the share of households without vehicles stayed at the point it had fallen to. (The same general pattern holds for the 10% Tracts, although to conserve space these are not shown in the figure).

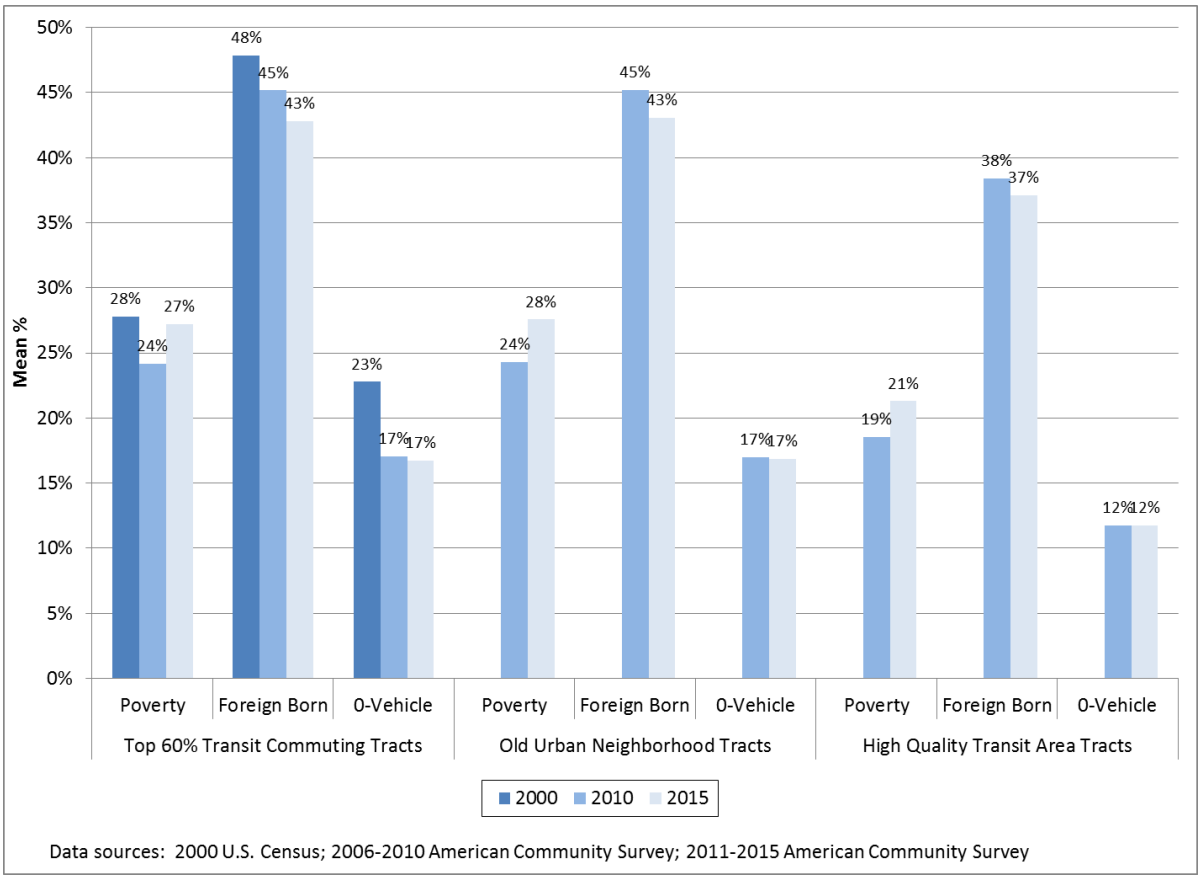


Figure 30. Characteristics of high-transit areas, 2000, 2010, and 2015 (2000 Census tracts over time)

Some additional data also suggest neighborhoods changing in ways not conducive to transit use. Figure 31, for example, shows that in both the 10% and 60% Tracts the transit commute mode share fell between 2000 and 2015 (with most of the decline occurring between 2000 and 2010.) Although not shown graphically, Census data also indicate that in these tracts, both the number of workers and overall earnings for workers rose, but earnings did *not* rise for those commuters using transit to get to work.

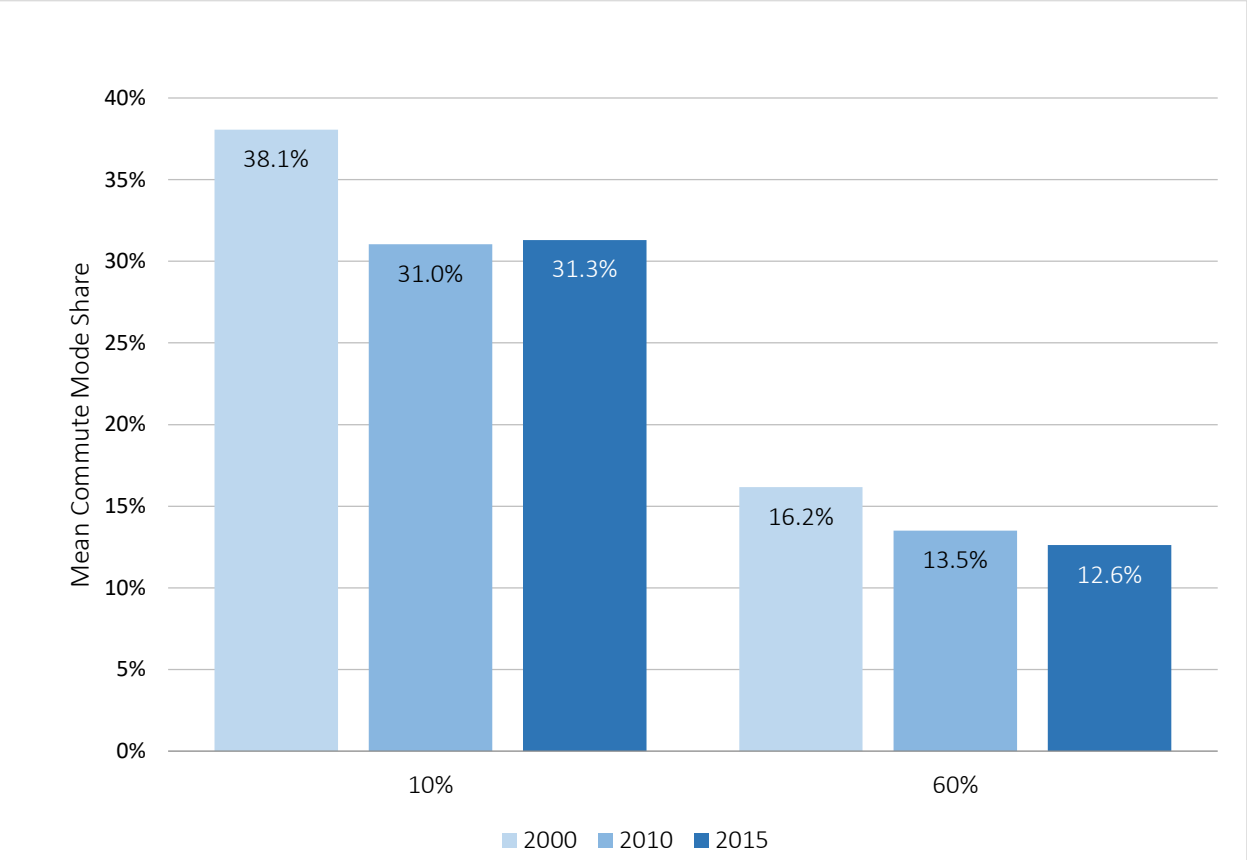


Figure 31. Mean transit commute mode share in high-transit neighborhoods, SCAG Region by year.

In summary, then, we observe changes in census tracts that in the year 2000 were most heavily-populated by transit commuters. These tracts, in turn, overlap substantially with tracts that we know in 2010 were rich in transit supply and/or had transit-friendly built environments, letting us infer (albeit with some uncertainty) that these neighborhoods were transit-rich in 2000 as well. Particularly between 2000 and 2010, in these neighborhoods we see falling transit commuting, falling population, a falling share of immigrants, falling poverty, more vehicle ownership, and higher earnings for workers overall but not those workers who commute via transit. All of this evidence is consonant with these neighborhoods becoming

more affluent, with that affluence being associated with less transit use, and with people left out of that affluence remaining on transit.

We emphasize that this story is far from conclusive. For the reasons we discussed above, the relationship between neighborhood change and transit use is very hard to measure. The data we have are consistent with neighborhood changes in the most transit-friendly SCAG-region neighborhoods contributing to falling transit use, but they are not conclusive. This is an area that warrants substantial further research.

Rising Vehicle Ownership

The defining attribute of regular transit riders is often a lack of vehicle access. Between 2000 and 2015, vehicle access in the SCAG region became much more common. Households in the SCAG region, and especially lower-income households, dramatically increased their levels of vehicle ownership. Census summary file data show that from 2000 to 2015, the SCAG region added 2.3 million people and 2.1 million household vehicles (or 0.95 vehicles per new resident). To put that growth in perspective, from 1990 to 2000 the region added 1.8 million people but only 456,000 household vehicles (0.25 vehicles per new resident). The growth of household vehicles in the last 15 years has been astonishing.

There are strong reasons to believe that this surge in vehicle ownership is largely responsible for the decline in transit use. A back of the envelope calculation can illustrate the magnitude of the problem this vehicle surge could pose for transit operators. Data from the US Consumer Expenditure Survey show that from 2000 to 2015, the average expenditure per household vehicle in LA County was about $3,729.[15] Since SCAG residents added 2.1 million vehicles in this time, a midrange estimate of private expenditures on household vehicle growth is $7.8 billion. Over the same period of time, LA Metro and Metrolink combined to spend about $6.4 billion opening new rail service, and about $7.4 billion on combined rail and Bus Rapid Transit service. Thus even a conservative estimate of private investment in vehicle growth shows it easily outpacing public investment in fixed-route, dedicated right-of-way transit— the type of transit that is supposed to be most competitive with driving. This level of increased vehicle ownership is in many ways incommensurate with robust transit use.

To be sure, much of this vehicle growth would not influence transit use. Because most SCAG residents had never used transit, increased vehicle ownership in most SCAG households would not contribute to transit's decline. The 2000s were when the Millennials, a demographically large cohort, reached ages when many would buy automobiles. Millennial car-buying could help explain the bulge in vehicle acquisition, but unless those Millennials would otherwise be on transit these additional vehicles would not necessarily explain falling transit use.

[15] The Consumer Expenditure Survey tracks the average net outlay per vehicle purchased. Data are not available for the other SCAG counties, but the average net outlays are probably similar across Southern California. Moreover, the $3,729 figure is the average of each annual average. Since more vehicles were purchased in the early to mid-2000s, and at higher prices, this figure likely underestimates the true average. See https://www.bls.gov/cex/csxmsa.htm

Some additional evidence, however, suggests that vehicle ownership did play a role in reducing ridership. When the OCTA surveyed its former riders in 2015, for example, 70 percent reported leaving transit because they had acquired a car (True North Research 2015).

Moreover, we have reason to think that the increase in vehicle ownership occurred disproportionately among populations that are more likely to take transit. Census data show that vehicle access increased most among lower-income households (we return to this point below, in Figure 40). Vehicle access also rose disproportionately among the foreign born. Table 4 shows changes in both zero-vehicle households and those with a vehicle "deficit" (that is, fewer vehicles than adults). Across the entire SCAG region, the share of households without vehicles fell 30 percent between 2000 and 2015, while the share of households with a vehicle deficit fell 14 percent. Among foreign-born households, these percent declines were larger — 42 percent and 22 percent — and among the foreign born from Mexico they were larger still. Among the foreign born from Mexico, the share of households without vehicles fell by two-thirds between 2000 and 2015, and the share with a vehicle deficit fell 28 percent. Thus car ownership rose across-the-board, but rose fastest among subgroups with a high propensity to ride transit. And these changes largely occurred between 2000 and 2010, which aligns with the timing of the transit downturn that began in 2007.

	All SCAG Share Households With:		Foreign Born Share Households With:		Mexican Foreign Born Share Households With:	
	No Vehicles	Vehicle Deficit	No Vehicles	Vehicle Deficit	No Vehicles	Vehicle Deficit
2000	10.2	30.1	14.1	47.1	15.7	57.2
2010	7.7	26.1	9.4	38.9	7.0	46.0
2015	7.1	25.9	8.2	36.6	5.4	41.6
Pct Change	-0.30	-0.14	-0.42	-0.22	-0.66	-0.27

Table 4. Vehicle ownership trends, SCAG region (US Census, Census IPUMs).

To refine our understanding of the association between vehicle ownership and transit use, we estimated a multivariate regression model. As a result of the data constraints we discussed earlier, this process involved two steps. Recall that our fundamental data obstacle was a mismatch between the availability of detailed, person-level information about travel behavior and our need to answer a question about changes over time. The CHTS provides detailed travel behavior, as well as demographic and socioeconomic data, but only for the year 2012. The Census provides detailed annual data, but for almost every category *except* travel behavior and transit use.

We resolve this problem by first using the CHTS to build a model that predicts total unlinked trips as a function of different demographic, socioeconomic, and neighborhood attributes. Importantly, all of these attributes – such as sex, nativity, income, vehicle ownership, and so on – are also tracked in 2000, 2010 and 2015 Census IPUMS microdata. This symmetry allows us to take the parameters of the CHTS model and apply them to time-series data from the Census. We use the CHTS, in short, to estimate the relationship between transit use and different social and economic characteristics, and then use the

Census to track how those characteristics have changed. Once we have measured that change in the Census, we can use the CHTS results to estimate how transit use would have changed as a result.

A core assumption of this approach is that the relationships between transit use and the socioeconomic and demographic attributes, which we can only measure in 2012, are relatively constant across time. We assume that changes in transit use from 2000 to 2015 are driven primarily by changes in the composition of the population, and not by changes in the propensity to use transit by people in different population groups. Our approach is more valid, for example, if transit use changes because there are more or fewer people in poverty, or with vehicles, and not because poor people or people with vehicles become more or less likely to use transit. The latter scenario is possible, but we cannot measure it.

We constructed models for California, the SCAG region, Los Angeles, and the SCAG region outside of Los Angeles. Figure 38 shows results from the first stage of our analysis: the major predictors of transit trips in in the SCAG region. Unsurprisingly, transit trips are highly associated with automobile ownership and access, even accounting for other potential determinants of transit use. Beyond automobile access, transit use is associated with lack of a driver's license, being nonwhite, and being foreign-born — especially being foreign-born and a new arrival.[16]

[16] While we experimented with different functional forms for the regression, we settled on a zero-inflated negative binomial regression. A negative binomial regression is a standard tool for analyzing overdispersed count data, and the zero-inflation corrects for bias that might otherwise be introduced when the value of the dependent variable is frequently zero, as it is with personal transit trips.

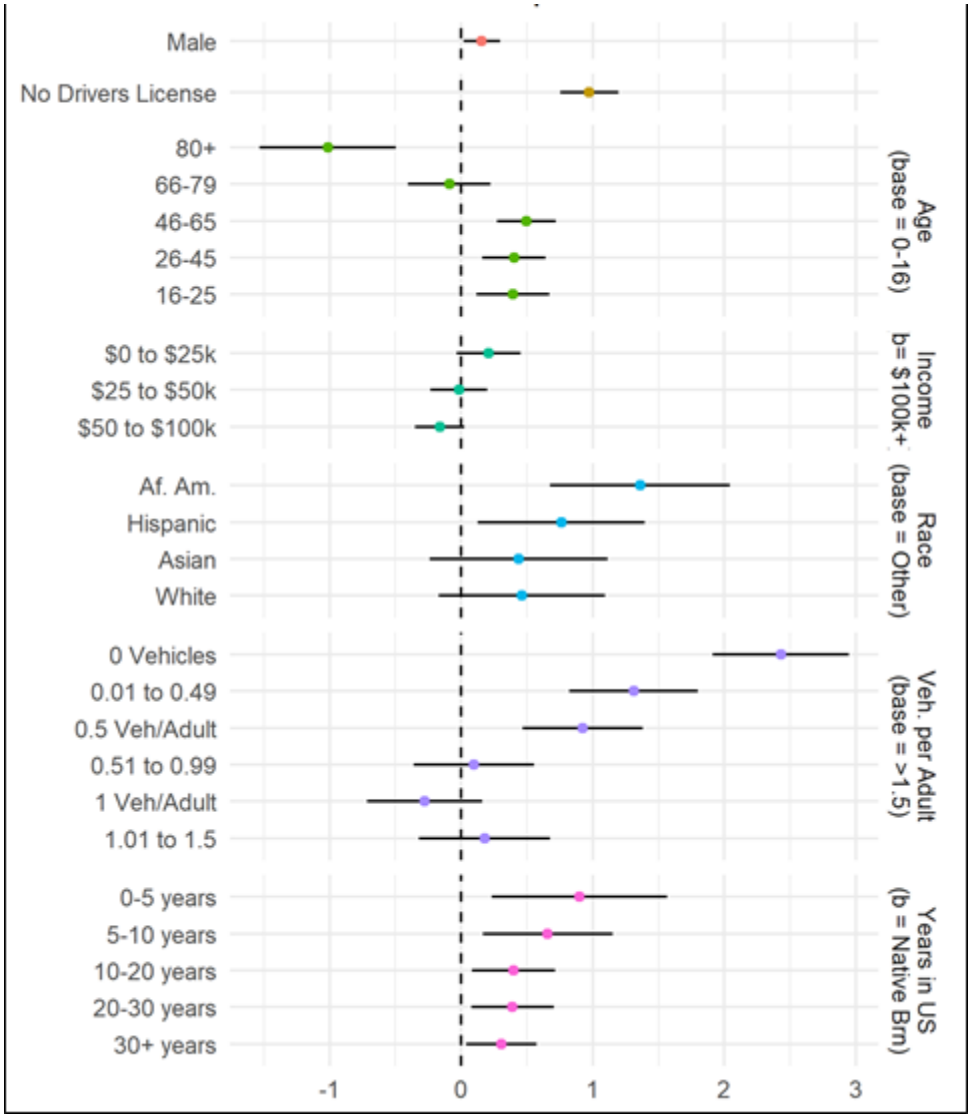


Figure 32. All SCAG unlinked trip predictors (CHTS).

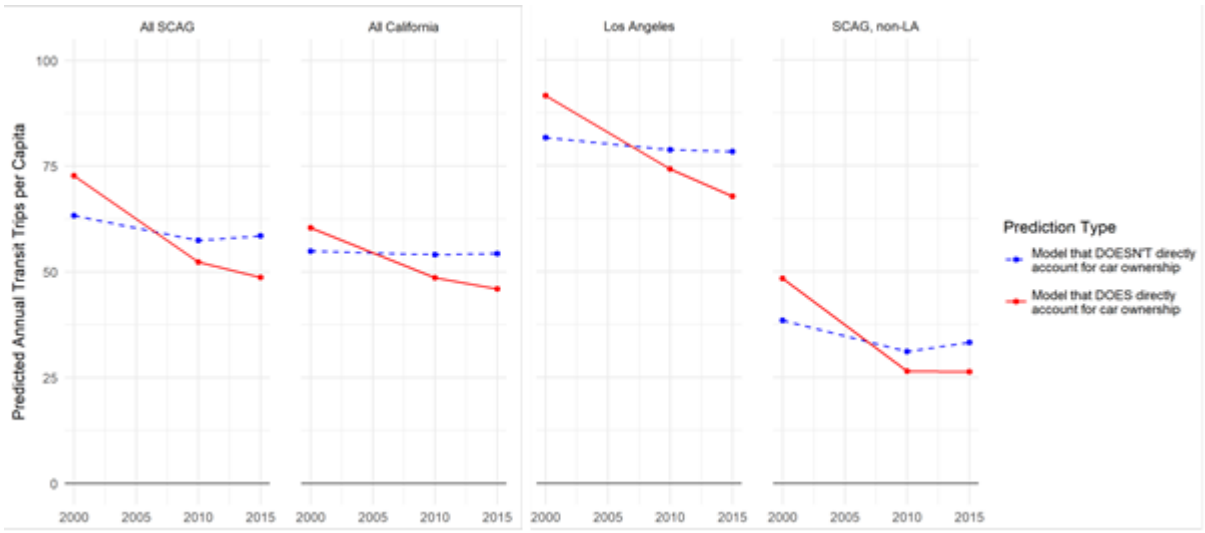


Figure 33. Relationship between increased vehicle ownership and falling transit trips (CHTS and US Census Bureau).

When we apply these parameters to Census IPUMS data from 2000, 2010 and 2015,[17] we see a powerful association between rising household vehicle access and falling transit trips. Figure 39 illustrates this relationship by graphing the results of two models. The first model, represented by the dashed line, predicts the change in county transit trips based on changes in all factors *except* vehicle access. In the SCAG region, the line has a mild negative slope from 2000 to 2010 and then a small positive slope from 2010 to 2015, suggesting that changes in these demographic, economic, and geographic factors would be associated with a small decline in transit use since 2000, albeit with a modest uptick between 2010 and 2015. The graphs for Los Angeles County and the SCAG region outside LA County suggest that this predicted modest uptick (which did not actually occur) would have taken place in SCAG's outlying counties. In Los Angeles County, transit trips were predicted to keep declining through 2015.

The second model, represented by the solid line, is identical to the first model but includes changes in automobile access. The difference in results is dramatic. This line starts at a higher point and falls sharply to a lower point, both of which suggest the important role automobile access has in influencing transit use. An absence of automobiles is associated with much more use, and the acquisition of automobiles is associated with much less. The line also suggests that many socioeconomic attributes play an essentially the intermediary role in mode choice. Income, nativity, age, location within the region, and many other factors can influence transit use, but they do so primarily by predicting people's access to private cars.

[17] A natural concern is that the CHTS might measure nativity, income, etc. differently than the Census. We validated our approach by first using the Census independent variables to replicate the CHTS estimates, suggesting this is not a problem.

Income alone, for example, does not take people off buses. Income helps people buy automobiles, and it is auto access that fuels an exodus from transit.[18]

Why did vehicle ownership rise so much? We cannot answer this question definitively, but as we discussed earlier in this report, vehicle ownership has both economic and non-economic determinants. The non-economic determinants include the growth or decline of immigrant groups who are less likely to acquire vehicles, and changes in licensure laws or other laws that surround owning and operating vehicles. The economic reasons can themselves be divided into two categories: changes in personal spending power, and changes in the price of vehicles themselves.

Since the foreign-born, and particularly the recently-arrived foreign-born, are less likely than the native-born to own vehicles, one possibility is that number or composition of immigrants changed. In absolute terms, the foreign-born population in the SCAG region grew between 2000 and 2015. However, it did not grow as fast as the overall population, so the region's share of foreign-born fell, albeit modestly (from 31% to just over 30%). This proportional decline occurred entirely within LA County, which has the most transit service. Every other SCAG county saw its share of foreign-born rise.

	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	All SCAG
2000	32.2%	36.2%	29.9%	19.0%	18.6%	20.7%	31.0%
2010	31.9%	35.6%	30.5%	22.4%	21.6%	22.9%	31.0%
2015	32.6%	34.7%	30.5%	22.0%	21.3%	22.8%	30.4%
% Change	1.2%	-4.3%	2.0%	13.7%	12.6%	9.2%	-2.0%

Table 5. Share foreign born residents, Southern California counties (2000-2015). US Census.

The *composition* of immigrants, however, changed more dramatically. Table 6 shows that between 2000 and 2015 (and especially between 2000 and 2010), the share of the foreign-born from Asia rose 23 percent, while the share from Central America fell ten percent, and the share from Mexico fell over 13 percent. In 2000, 48 percent of SCAG immigrants were from Mexico, while by 2015 only 41 percent were. Because existing evidence suggests that immigrants from Mexico and Central America are less likely to have automobiles and drive than immigrants from other origin countries, this shift could contribute to rising auto use, especially among the foreign born (US Census ACS 2015).

[18] We should note that these models are *not* predictive models – their purpose is not to yield output that precisely matches the observed transit ridership in the SCAG region (and in fact our predictions do not match observed ridership). We do not build a predictive model for two reasons. First, we are not using the correct data to do so. Regional ridership counts come from annual reporting to the NTD. Because we need person-level data that includes socioeconomic attributes, we are using one-day travel diary data from the 2012 CHTS, and then matching that to person-level data from three Census years. Second and more important, the goal of the regressions is to test a particular hypothesis – that vehicle access is the decisive factor in transit use – not to predict transit ridership. Our output thus yields an estimate of the relative magnitude of the importance of auto access, *not* a precise measure of how many trips each additional increment of auto access actually cost the SCAG region.

	2000	2010	2015	Change
Asia	28.7%	33.9%	35.3%	23.0%
Americas	63.7%	59.1%	57.7%	-9.4%
Latin America	62.4%	58.0%	56.5%	-9.5%
Central America	58.8%	54.5%	53.0%	-9.9%
Mexico	47.7%	42.4%	41.3%	-13.4%
South America	2.6%	2.7%	2.7%	3.8%

Source: US Census Summary File Data. US Census Bureau classifies Mexico as part of Central America. Data on Caribbean Americas omitted.

Table 6. Composition of SCAG immigrants (2010-2015).

Moreover, among both the foreign-born overall and the foreign-born from Mexico, in data from the US Census IPUMs we see both an assimilation effect and a cohort effect reinforcing the trend toward more vehicles. More recent waves of immigrants are more likely to have vehicles shortly after arrival, and those who do not are faster to acquire them as time goes on.

In the year 2000, for example, 31 percent of the foreign-born households in the SCAG region that had emigrated from Mexico between 1990 and 1999 had no household vehicle, and 74 percent had a vehicle deficit. By 2010, just 9.3 percent of this same cohort of immigrant households had no vehicle, and only 51 percent had a vehicle deficit. By 2015, these figures were 7 percent and 41 percent. This is the assimilation effect; as time passes, immigrants begin to behave more like the native -born.

The cohort effect, however, is more notable. The more recent waves of immigrants to Southern California are more likely to own vehicles shortly after arrival, and as such they have not fully replenish the stock of zero-vehicle households that shrank as existing immigrants assimilated toward cars. In 2010, only 17 percent of the Mexican immigrant households in the SCAG region that had arrived in the US between 2000 and 2009 had no vehicles, compared to 31 percent for those that arrived between 1990 and 1999 in the year 2000. Similarly, only 62 percent of these 2000-2010 arrivals had a vehicle deficit in 2010; in 2000, 74 percent of Mexican immigrants who had arrived since 1990 had a vehicle deficit. By 2015 the share of zero-vehicle households in thepost-2000 cohort was down to 10 percent, and the share with vehicle deficits down to 49 percent. And by in 2015, only 11 percent of Mexican immigrant households that had arrived in 2010 or after did not have a vehicle. A similar pattern holds for the foreign-born overall. More recent waves of immigrants acquired more vehicles more quickly, meaning that as previous waves of immigrants acquired cars, the ranks of the carless were shrinking rather than being replenished.

In sum, immigrants overall are now a slightly smaller share of the population, but also more likely to own vehicles, and to own them earlier after arrival. Mexican immigrants, who are a mainstay of transit ridership in Southern California, remain more likely than the foreign-born overall to live in households without vehicles, but since 2000 they have both added household vehicles and become a smaller share of total immigrants.

It is not clear *why* the foreign-born began adding more cars. In 2015, California began issuing driver's licenses to undocumented immigrants. While licensure may have increased vehicle ownership, for a variety of reasons we do not think it played a large role. First, a license makes a vehicle more useful, but not more affordable; if the barrier to acquiring a vehicle is price, a license does little to overcome that. One might argue in response that legality and not price was the actual barrier, but existing evidence suggests this is simply not the case: many undocumented immigrants, even without licenses, were already driving (Lovejoy & Handy, 2008). Indeed, the prevalence of undocumented driving was the primary motivation for the law that authorized licensure. The decision to issue licenses was justified primarily on safety, not mobility, grounds – there were concerns, for example, that unlicensed undocumented drivers would flee the scene of accidents. It is possible that undocumented immigrants drove *less* – and took transit more – before being licensed, and that licensing did help depress transit use. Even this scenario, however, has its limits. A law that took effect in 2015 cannot explain a per capita ridership decline that began in 2007 or an explosion in vehicle ownership that began in the early 2000s.

Ruling out legal changes brings us to possible economic factors for increased vehicle ownership: Perhaps immigrants (and others) began acquiring more cars because they had more money. A small but persuasive literature on personal consumption shows that poorer people tend to convert even small increases in income into vehicle purchases – a testament to how valuable vehicle access can be (Aaronson, Agarwal, & French, 2012; Adams, Einav, & Levin, 2009; Leininger, Levy, & Schanzenbach, 2010; Parker, Souleles, Johnson, & McClelland, 2013; Souleles, 1999).

The 2000-2015 period was volatile economically, as the economy grew steadily before cratering during the Great Recession. During most of this time, furthermore, median wages and incomes were stagnant. Median household income in LA County, for example, was about $59,000 in both 2000 and 2015, and was slightly lower during the recession in 2010. The Census suggests that newer waves of immigrants are if anything slightly poorer than the cohorts that came before them: In 2000 average incomes of immigrants that had arrived since 1990 was slightly higher than the average income of immigrants in 2010 who had arrived after 2000. Finally, we can see in Figure 40 that vehicle growth occurred across all income groups, for both the foreign-born and the native-born. In 2000 just under 40 percent of households earning less than $25,000 per year had a vehicle-deficit, as did 60 percent of immigrant households in the same income bracket. In 2015 less than 30 percent of native-born households in the same income bracket had a vehicle-deficit, as did just over 50 percent of immigrant households. The pattern holds for households earning $25,000 to $50,000, and for more affluent households.

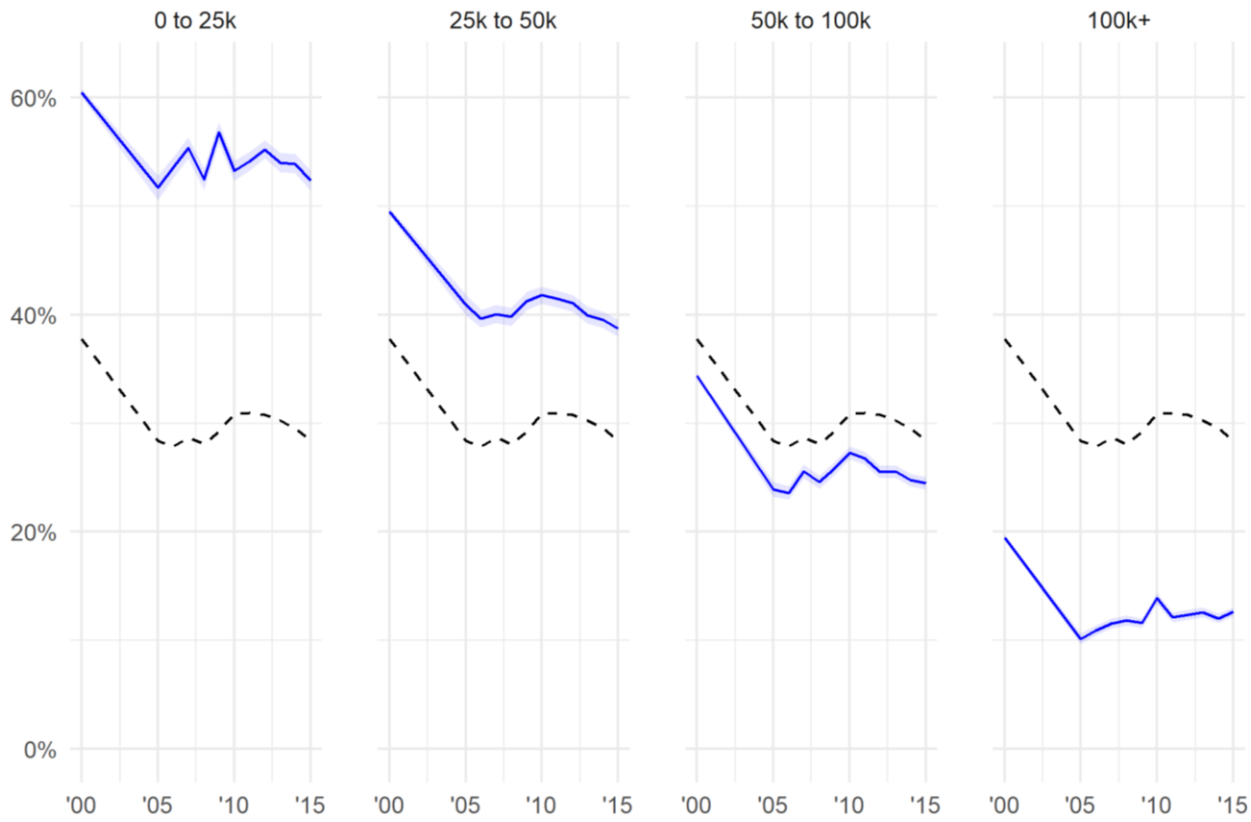


Figure 34. Share of households with vehicle deficits, by income and nativity, 2000-2015, US Census (solid line = foreign born, dashed line = native born).

It is therefore not obvious that rising incomes played a large role in rising vehicle ownership. Certainly the macro-economy played some role in changing levels of transit use. Transit use contracted during the Great Recession: A robust economy puts more people to work, which increases both commuting and discretionary travel. A faltering economy does the reverse. But these same economic trends do not appear to explain why people acquired so many more vehicles than they had in previous periods.

Even at constant incomes, households can acquire more vehicles if the effective price of those vehicles falls. The effective price reflects not the sticker price, but the actual outlay required of a consumer to drive the vehicle home. A large part of this outlay is often a down payment, meaning that vehicles can become more affordable not just if their price declines, but also if financing that price becomes easier.

Some evidence does suggest that vehicle finance became easier during this time. Although lost somewhat in the shadow of easy home-lending credit, automobile credit also surged in the run-up to the Great Recession. And unlike home lending, which tightened considerably after the crash, automobile lending has remained relatively loose. Consumers with good credit scores (typically above 700) can find auto loans with low- and sometimes even zero-interest rates. Since the recession, the share of SCAG-region residents with credit scores below 660 (considered subprime) has fallen (Figure 41), suggesting that consumers have gotten better access over time to low-interest loans (Federal Reserve Bank of New York and Equifax, various). Subprime auto loans also remain prevalent, allowing consumers with poor credit histories or low

incomes to finance vehicle purchases. U.S. auto loan originations among subprime consumers increased 140 percent from 2010 to 2015 (New York Fed Consumer Credit Panel / Equifax). We do not have local-level data on vehicle debt, but inflation-adjusted per capita vehicle debt in California rose 91 percent between 2000 and 2015 (Federal Reserve Bank of New York).[19]

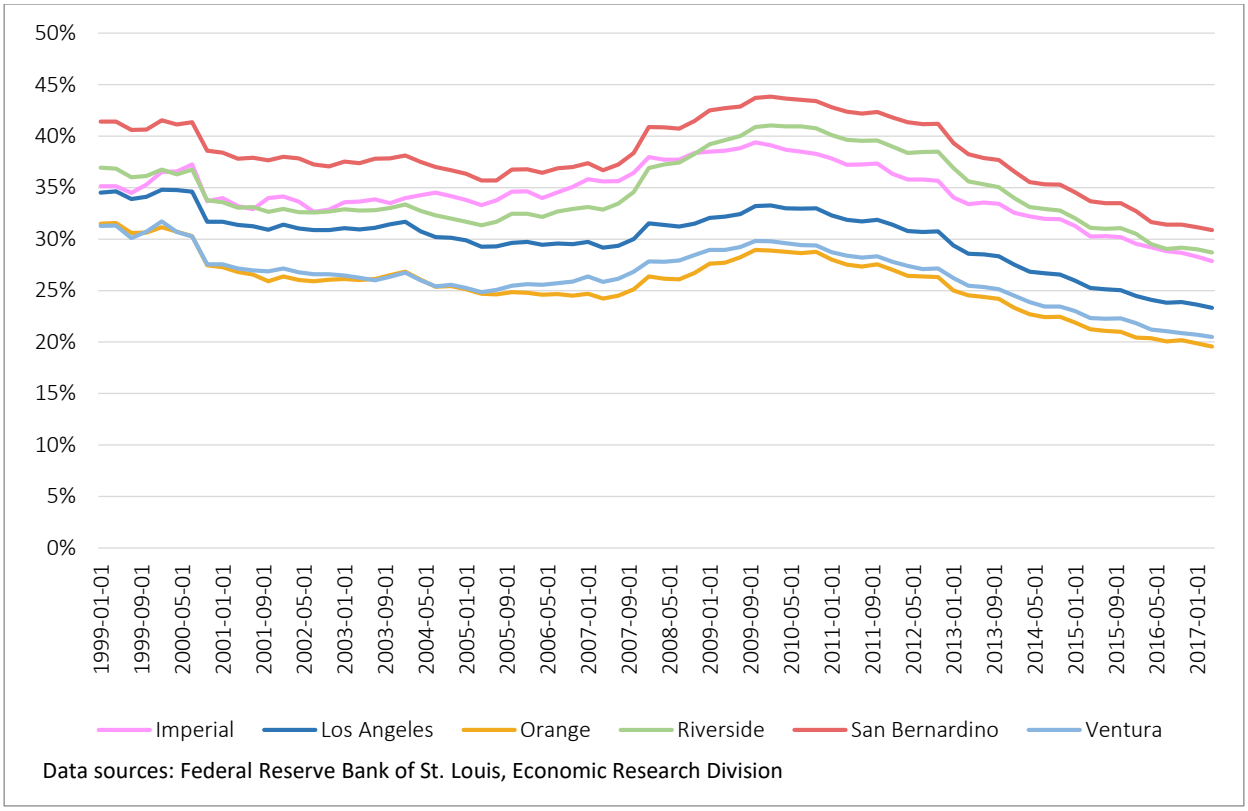


Figure 35. Percent of sample with credit scores below 660, by county in SCAG region.

CONCLUSION

Per capita transit ridership, long sluggish in Southern California, began to fall in 2007. In 2012 that per capita decline accelerated, and manifested as a more noticeable and more alarming absolute decline. The precise reasons for this decline are almost certainly manifold, and hard to disentangle. Gas prices fell sharply after rising steeply. The explosive growth of Uber and Lyft provided new mobility options to some people who had been mobility-constrained. In Orange County, fares rose substantially. On LA Metro, by at least some accounts, feelings of danger increased. Some of the people most likely to use transit moved to areas where transit was less prevalent. Especially in recent years, all these factors most likely contributed to transit's downturn.

[19] Data come from the New York Federal Reserve Bank's Consumer Credit Panel.

But in weighing the evidence, the overwhelming factor appears to be a dramatic increase in the stock of private automobiles. Between 2000 and 2015 Southern Californians acquired vehicles at nearly four times the rate they had between 1990 and 2000. This growth of the private vehicle stock lines up—in timing, in magnitude, and in theory—with the region's falling transit use. Vehicle access grew across all income levels and groups, but disproportionately among those groups, like the low-income and foreign-born, who are most likely to ride transit. Transit ridership in the SCAG region has long depended on a sizable minority of people who did not, largely for economic reasons, have access to cars. After 2000, many of these people acquired cars, and it should not surprise us that they started riding transit less.

To be sure, the case we build in reaching this conclusion is circumstantial. For reasons we have already enumerated, the data available to examine transit riders are scarce and fragmented, which leaves alternative explanations possible if not plausible. Certainly future research should emphasize more data collection. Given the data available today, however, in our judgement rising vehicle ownership is the best explanation for falling transit ridership.

If this explanation is sound, it poses a daunting problem for transit operators. When lower-income people graduate from transit to driving, transit agencies bear a cost, but the other side of that cost is a large benefit for both the people who start driving *and* for society overall. In the aggregate, Southern Californians drive too much, once the various costs of pollution, congestion and crashes are accounted for. But some Southern Californians – the poorest of them – drive *too little*, and both their lives and the region as a whole would be improved if they drove a bit more. The low-income person who acquires a vehicle often makes fewer trips than an affluent person (driving is expensive) and the trips they make are often essential, and have social benefits that exceed their social costs. A car trip by a low-income household is more likely than one by an affluent household to involve finding and keeping work, getting to school, or accessing better health and daycare options. These trips might modestly increase congestion and pollution, but they have large paybacks in employment, earnings, and overall well-being that exceed those costs. Affluent households, in contrast, make many more trips, and more trips whose social value is lower (they might increase congestion and pollution not just by driving to work, but also by driving to lunch, or to visit friends).

Given the powerful difference a car can make in the lives of low-income people, efforts by transit agencies to recapture low-income riders can have a perverse impact: they would target some of the highest-value vehicle trips in the region. Ideally, of course, transit agencies would pull people away from lower-value vehicle trips. It makes little sense to deprive a low-income person of their trip to work at a location poorly served by transit, when affluent people routinely drive for errands and visits that they could easily complete by foot or transit. A quick trip to a store a half mile away (or a trip to a store a mile away when a comparable store is a quarter mile away) is more likely to have social costs that exceed its benefits. And these trips are abundant.

Given this situation, and given the ambitious greenhouse gas reduction goals that California has assigned to transit, planners and operators may need to expand transit's target market. Transit should by no means abdicate its social service mission, but as we stated in the introduction, per capita transit use falls when current riders stop riding, and when new residents don't start. Transit today relies on a high rate of use by a narrow base of people. But if that narrow base of people is acquiring vehicles, transit's healthy future lies in reversing those circumstances, and striving for at least a low rate of use by a broad base of people. The SCAG region lost 72 million transit rides annually from 2012 to 2016. This number seems daunting,

but the region has 18.8 million people. According to the CHTS, about 77 percent of those people (roughly 14.5 million), ride transit rarely or never. Herein lies vast untapped potential. If one out of every four of those people replaced a single driving trip with a transit trip once every two weeks, annual ridership would grow by 96 million—more than compensating for the losses of recent years.

The obstacle to this outcome, however, is large and beyond the direct control of transit operators: driving is too cheap. The large subsidies given to transit in recent years pale next to the longstanding subsidies for automobiles that are hidden in unpriced road use, unpriced or underpriced street parking, high minimum parking requirements, and taxpayer- and developer-financed road-widenings. If public policy does not adequately confront underpriced driving, then transit ridership will likely continue to falter, and transit will not meet its ambitious environmental goals.

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Appendix A

Fare regression output.

Descriptive Data (data are in panel form; observations are agency-years). Route coverage = route miles/service area. Headways = route miles/ (revenue miles/service miles). The service area is in square miles. Service area and service population are the difference between UZA average level of service and service area/ service population.

Absolute Levels

	mean	sd	n
unlinked passenger trips	15,213,380	130,300,000	9,030
vehicle revenue hours	395,268	1,659,684	9,037
headway	33.07	51.01	6,954
route coverage	3.18	6.32	6,922
service area	713.2	8,963.3	9,793
service population	718,549	1,729,745	9,794
fare (2015$)	$1.71	$2.52	8,647

Change from Prior Year

	mean	sd	n
change in unlinked passenger trips	170,442	6,338,137	8,037
change in vehicle revenue hours	5,015	87,867	8,047
change in headway	0.02	18.81	6,277
change in route coverage	-0.07	5.45	6,255
change in service area	0.0	0.4	8,852
change in service population	0	0	8,853
change in fare (2015$)	$0.01	$0.64	7,702

Regression Output:
The regressions are linear and all variables are naturally log-transformed.
Models were run with the dependent variables being levels and changes.
Model 4 is the model discussed in the text.

* change from the prior year is calculated using absolute levels

y=passenger trips	(1)	(2)	(3)	(4)
VARIABLES	OLS	OLS	OLS	FE
vehicle revenue hours	1.264***	1.312***	1.289***	0.754***
	(0.00974)	(0.00950)	(0.00947)	(0.0108)
headway	-0.155***	-0.193***	-0.209***	-0.0152*
	(0.0128)	(0.0129)	(0.0116)	(0.00833)
route coverage	0.0416***	0.0635***	0.0824***	0.0164***
	(0.00809)	(0.00815)	(0.00697)	(0.00555)
service area (miles^2)	-0.126***	0.00594		
	(0.0129)	(0.0104)		
service pop	0.214***		0.139***	0.0380***
	(0.0128)		(0.0102)	(0.00679)
fare (2015$)	-0.0270**	-0.0105	-0.0249**	-0.162***
	(0.0106)	(0.0108)	(0.0107)	(0.00677)
Constant	0.0223	-0.434***	-0.134	5.708***
	(0.0918)	(0.0895)	(0.0910)	(0.123)
Observations	6,767	6,767	6,767	6,767
R-squared	0.868	0.862	0.866	0.498
Number of agencies				620

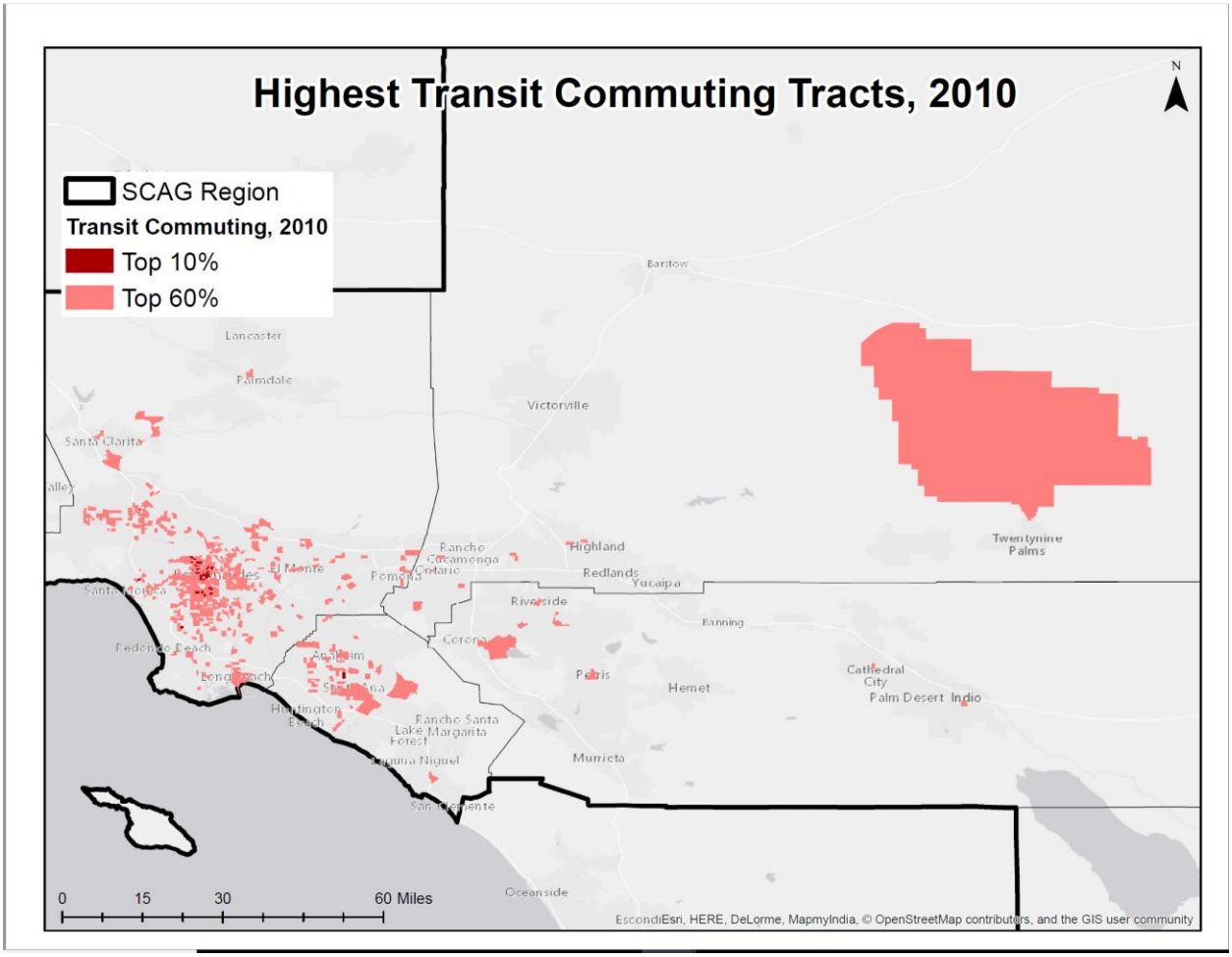
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

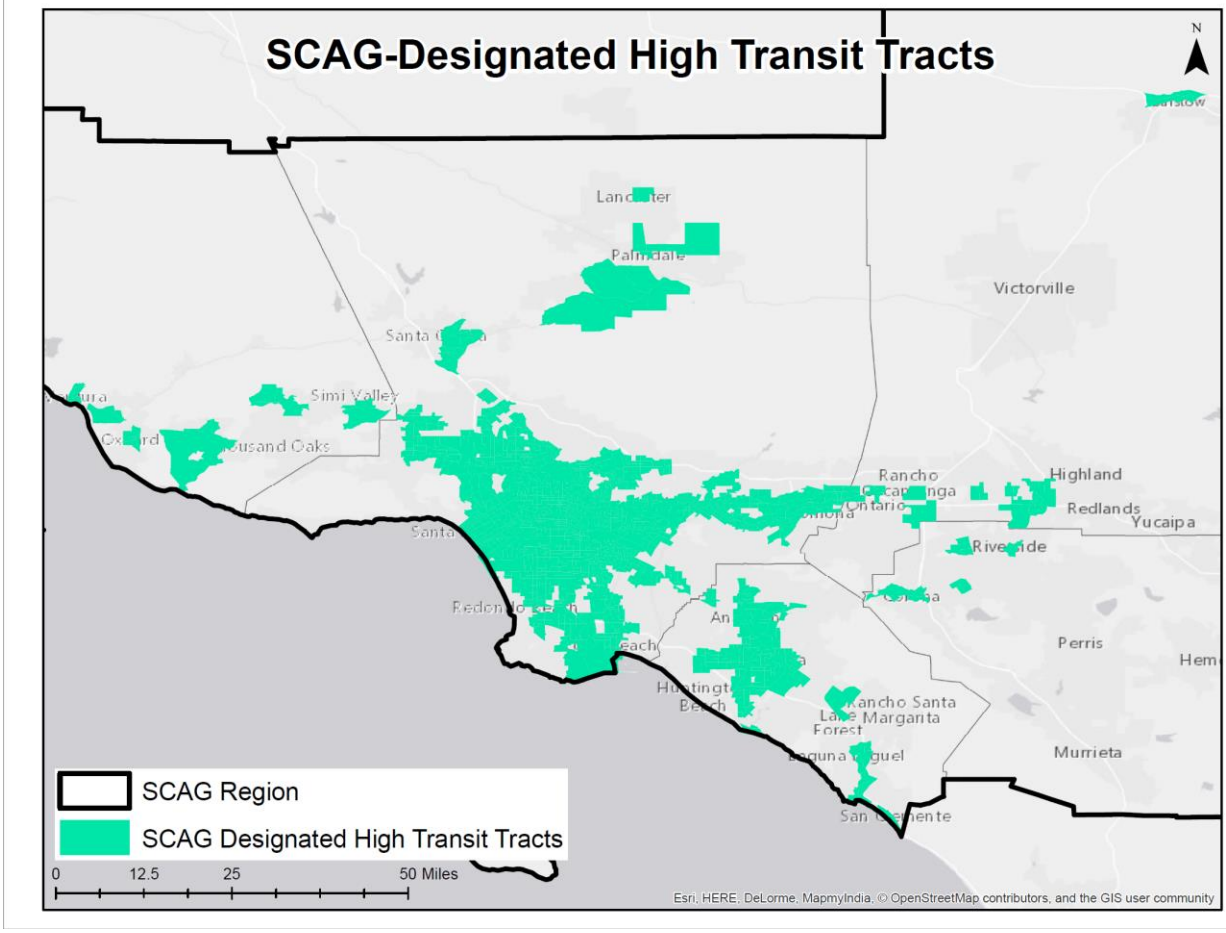
y=change in passenger trips	(1)	(2)	(3)	(4)
VARIABLES	OLS	OLS	OLS	FE
change in VRH	32.08***	32.08***	32.08***	27.19***
	(1.096)	(1.096)	(1.096)	(1.147)
change in headway	-12,979**	-12,973**	-13,133**	-9,162
	(5,995)	(5,994)	(5,981)	(6,095)
change in route coverage	28,528	28,498	29,237	18,718
	(20,642)	(20,637)	(20,554)	(21,703)
change in service area (miles^2)	-98,385	-95,007		
	(263,173)	(259,378)		
change in service pop	19,953		3,401	
	(262,368)		(258,587)	
change in fares (2015$)	-287,046*	-286,709*	-287,167*	-301,584*
	(172,940)	(172,869)	(172,928)	(178,218)
Constant	31,160	31,496	31,138	59,982
	(86,058)	(85,937)	(86,052)	(84,787)
Observations	6,102	6,102	6,102	6,102
R-squared	0.124	0.124	0.124	0.094
Number of agencies				602

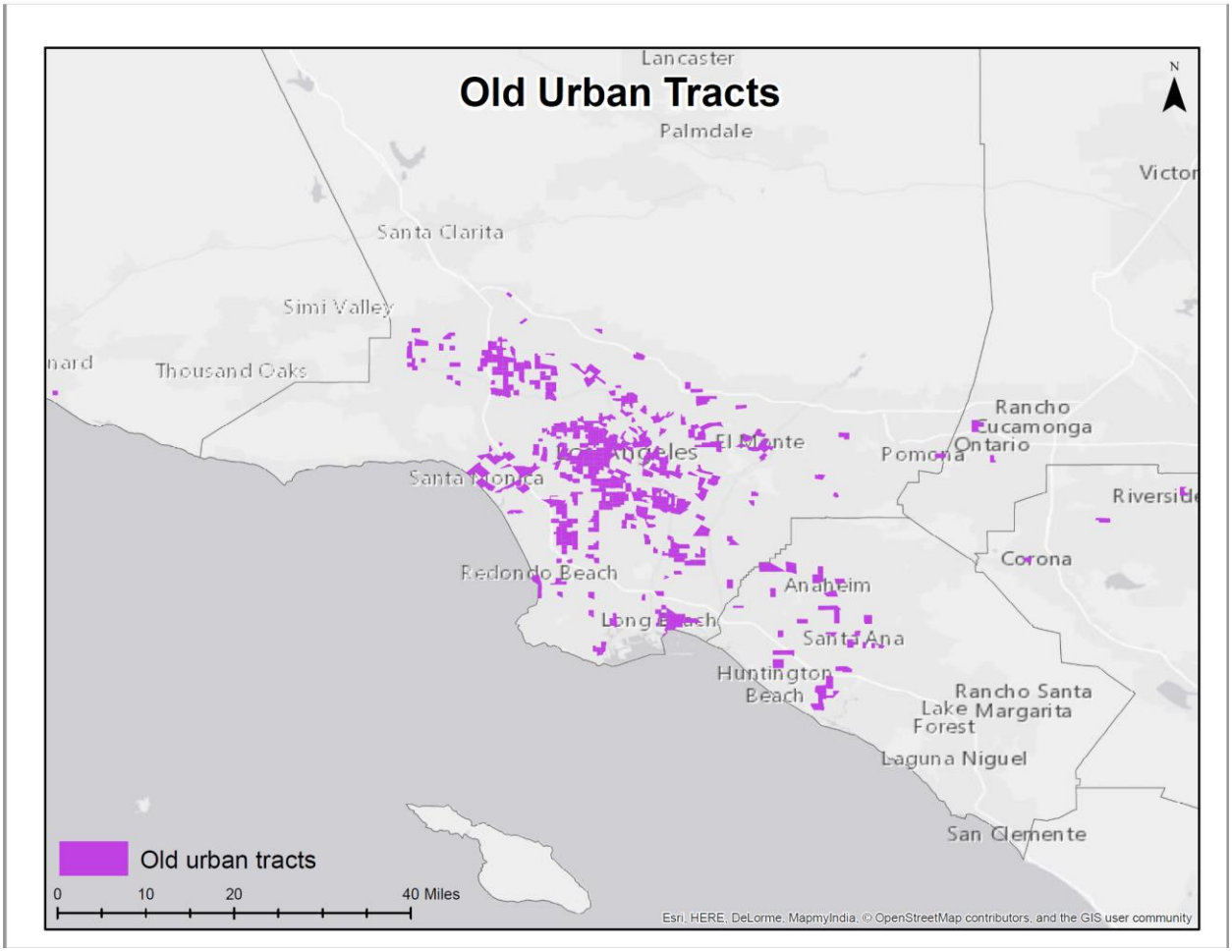
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix B

Neighborhood change attributes and locations.




SCAG-Designated High Transit Tracts
N
Victorville
Simi Valley
Rancho
Highland
Redlands
Yucaipa
Perris
Rancho Santa
Murrieta
SCAG Region
SCAG Designated High Transit Tracts
0
12.5
25
50 Miles
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

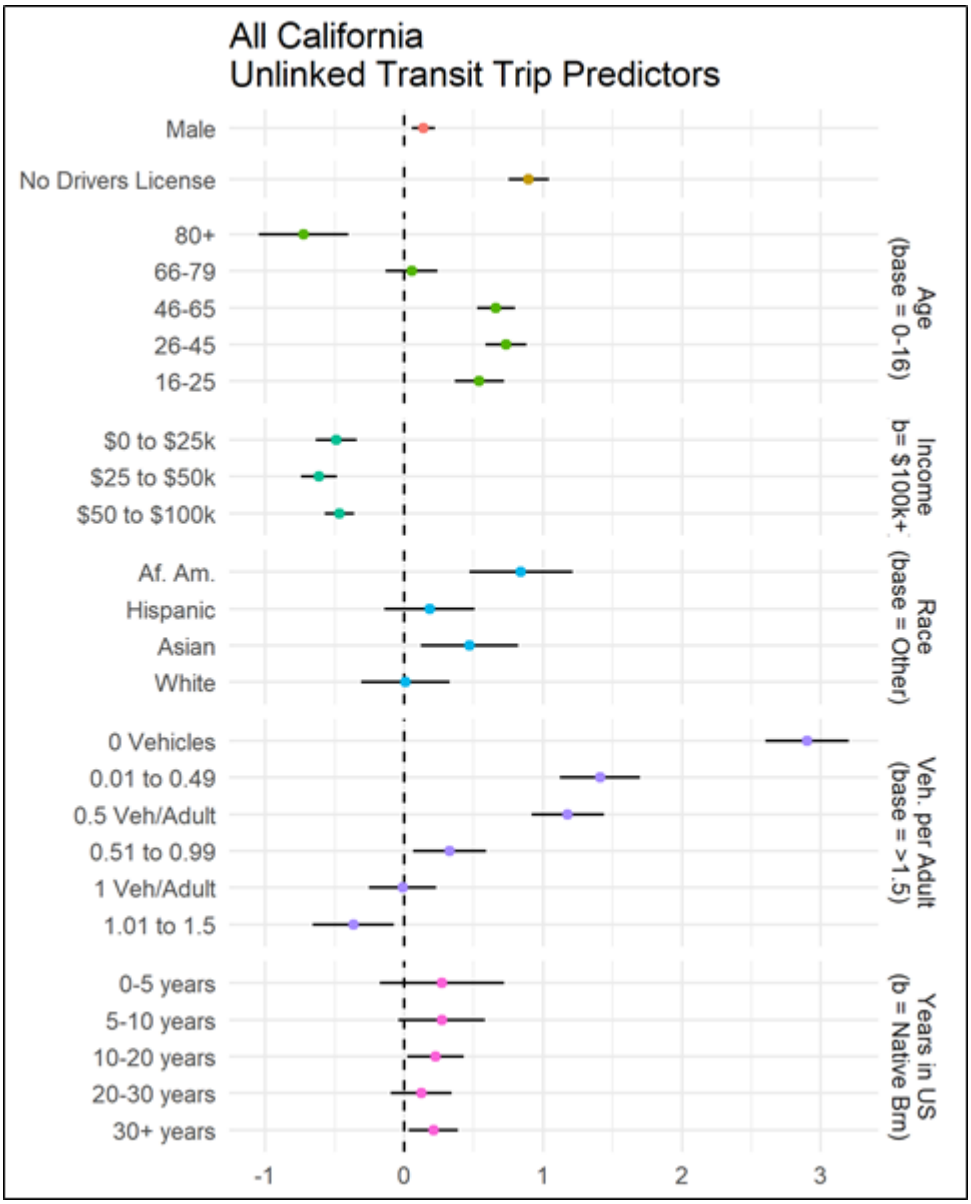


Mean Characteristics of Transit-Rich Neighborhoods:
Change over time in Tracts with High Concentrations of Transit Commuters in 2000

10 Percent	**2000**	**2010**	**2015**
% Transit Use	38%	33%	33%
% Poverty	38%	32%	36%
% Foreign Born	63%	62%	57%
% 0-Vehicle Households	43%	34%	34%
% NH White	9%	10%	8%
N Tracts	48	48	48
% of All Tracts in Region	1.4%	1.2%	1.2%
Total Tracts	3,393	3,954	3,953
60 Percent	**2000**	**2010**	**2015**
% Transit Use	16%	14%	13%
% Poverty	27.79	23.13	26.55
% Foreign Born	47.84	44.31	42.10
% 0-Vehicle Households	22.78%	15.76%	15.68%
% NH White	14.39	17.42	15.86
N Tracts	691	691	691
% of All Tracts in Region	20.4%	17.5%	17.5%
Total Tracts	3,393	3,954	3,953

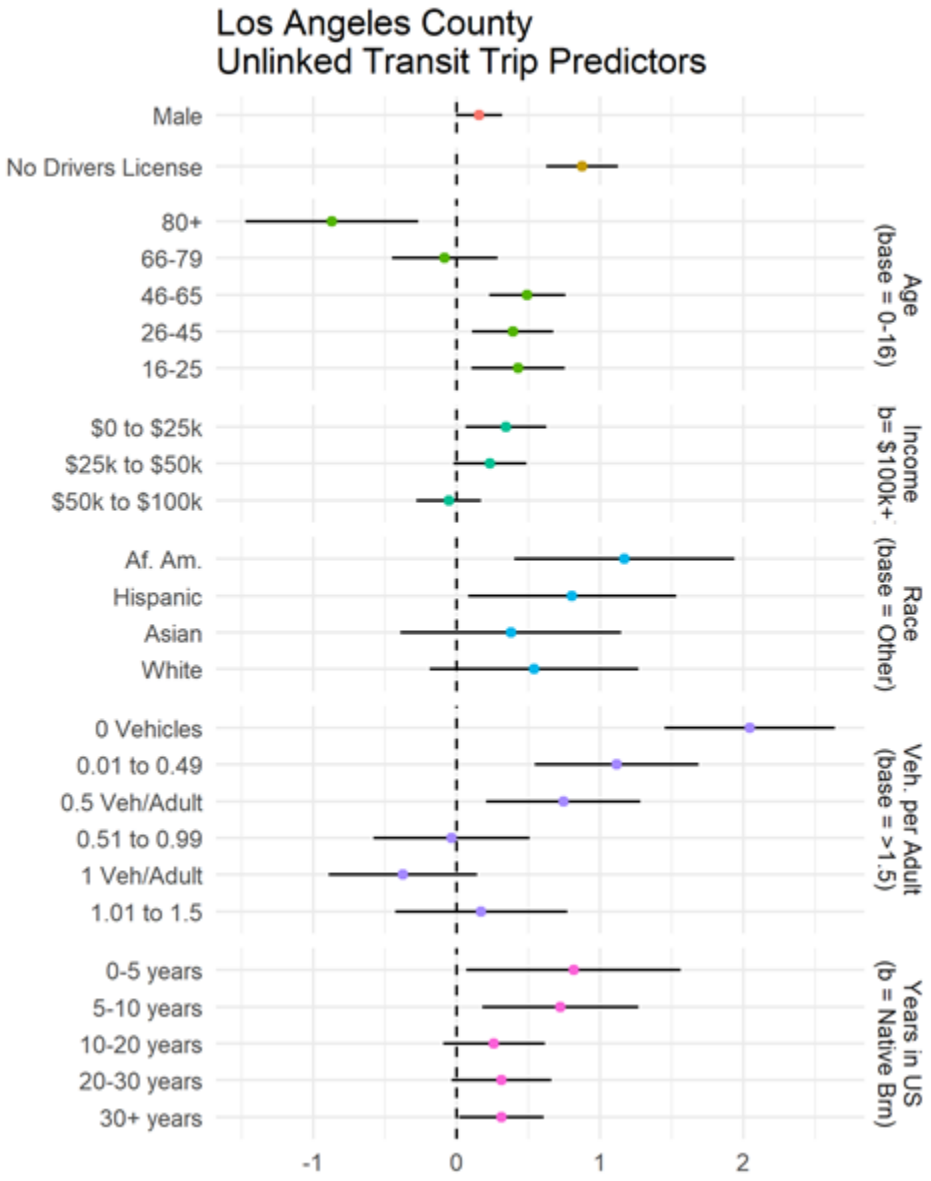
Sources: US Census 2000, ACS 2006-2010, ACS 2011-2015

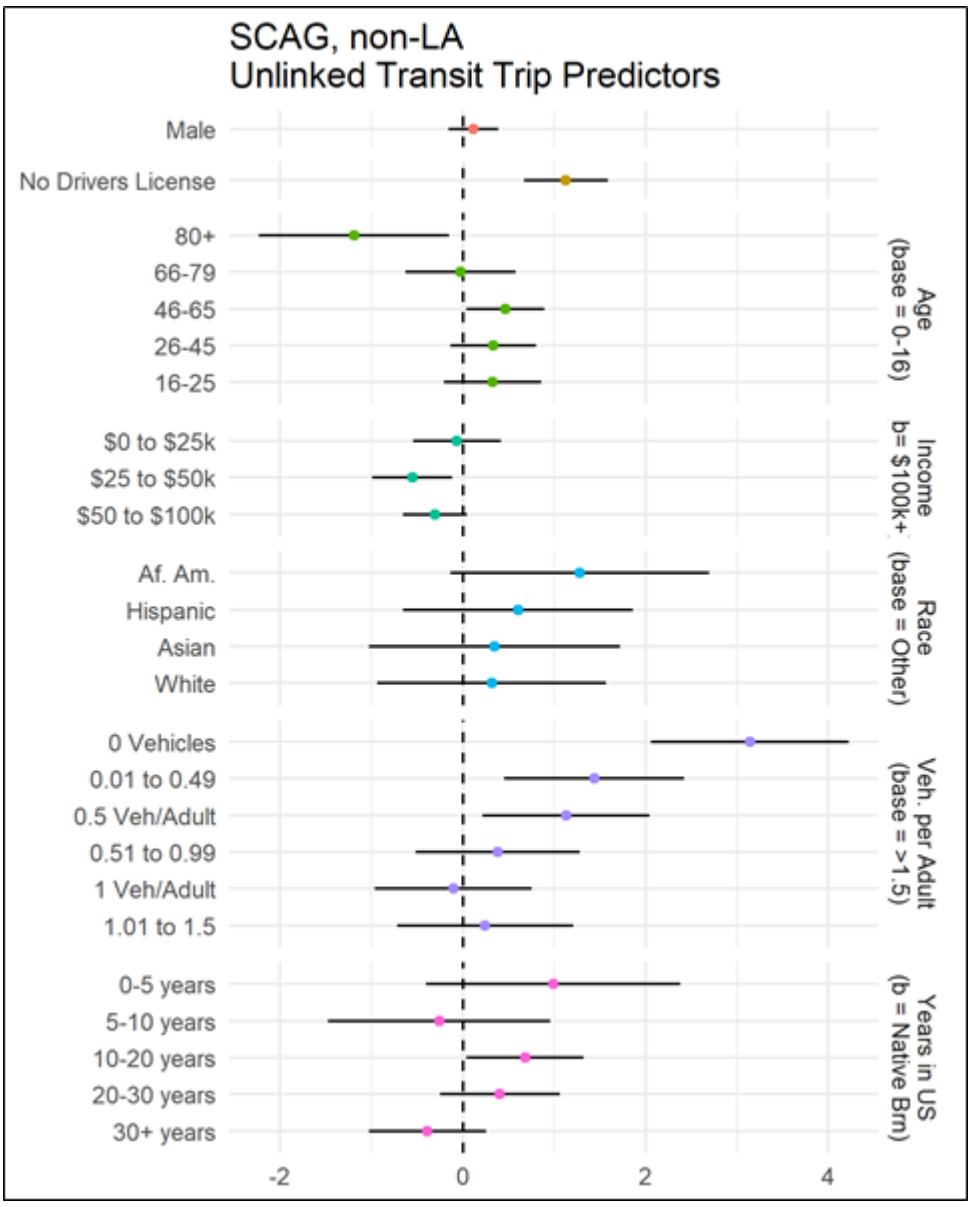
Appendix C

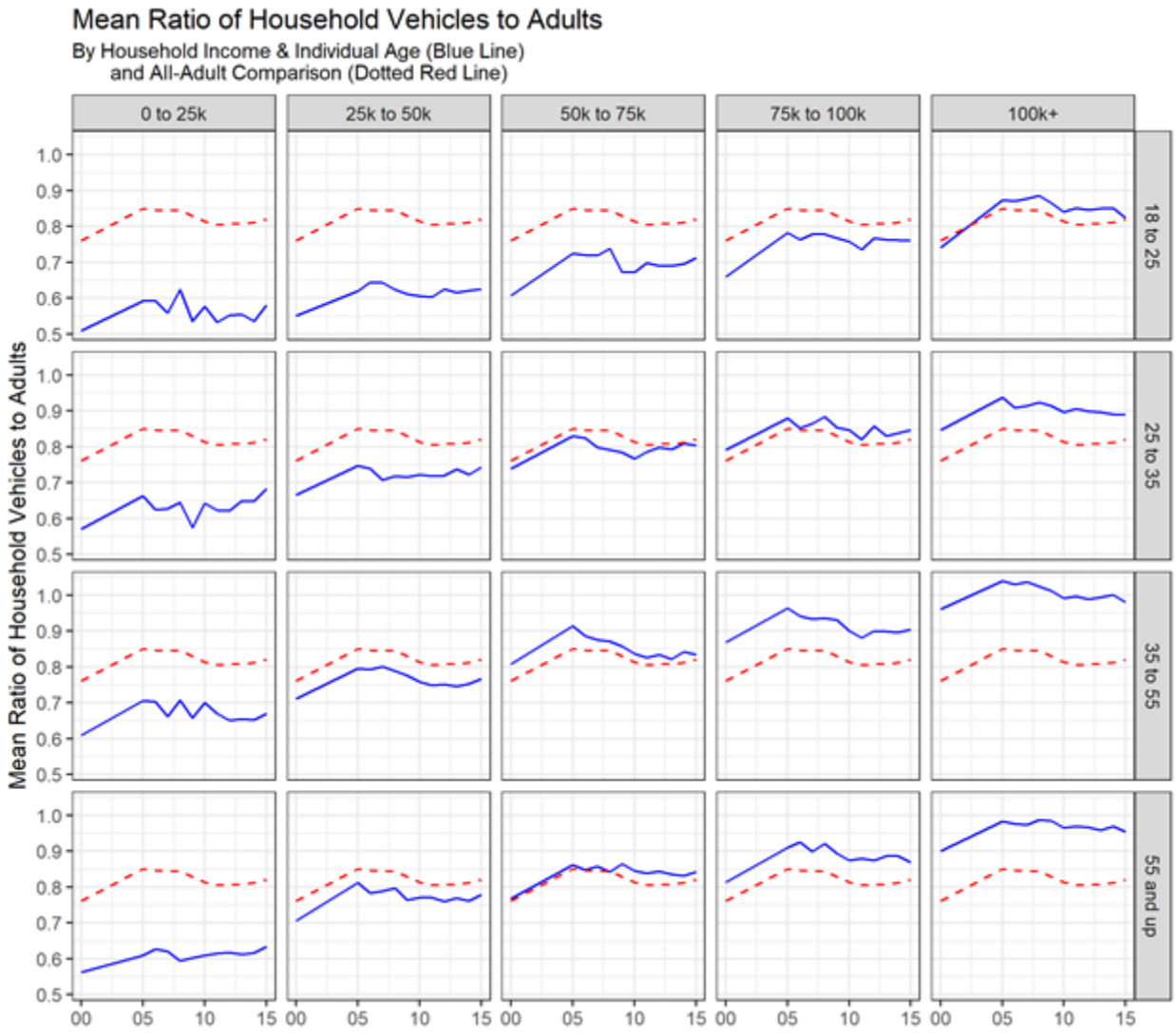

All California
Unlinked Transit Trip Predictors
Male
No Drivers License
80+
66-79
46-65
26-45
16-25
Age (base = 0-16)
$0 to $25k
$25 to $50k
$50 to $100k
Income (b= $100k+)
Af. Am.
Hispanic
Asian
White
Race (base = Other)
0 Vehicles
0.01 to 0.49
0.5 Veh/Adult
0.51 to 0.99
1 Veh/Adult
1.01 to 1.5
Veh. per Adult (base = >1.5)
0-5 years
5-10 years
10-20 years
20-30 years
30+ years
Years in US (b = Native Brn)
-1
0
1
2
3

Appendix D

Additional trip predictors and descriptive data.




SCAG, non-LA
Unlinked Transit Trip Predictors
Male
No Drivers License
80+
66-79
46-65
26-45
16-25
Age (base = 0-16)
$0 to $25k
$25 to $50k
$50 to $100k
Income b= $100k+
Af. Am.
Hispanic
Asian
White
Race (base = Other)
0 Vehicles
0.01 to 0.49
0.5 Veh/Adult
0.51 to 0.99
1 Veh/Adult
1.01 to 1.5
Veh. per Adult (base = >1.5)
0-5 years
5-10 years
10-20 years
20-30 years
30+ years
Years in US (b = Native Brn)
-2
0
2
4


Mean Ratio of Household Vehicles to Adults
By Household Income & Individual Age (Blue Line)
and All-Adult Comparison (Dotted Red Line)
0 to 25k
25k to 50k
50k to 75k
75k to 100k
100k+
18 to 25
25 to 35
35 to 55
55 and up
Mean Ratio of Household Vehicles to Adults
1.0
0.9
0.8
0.7
0.6
0.5
00
05
10
15



Who Wins When Streets Lose Lanes?

An Analysis of Safety on Road Diet Corridors in Los Angeles

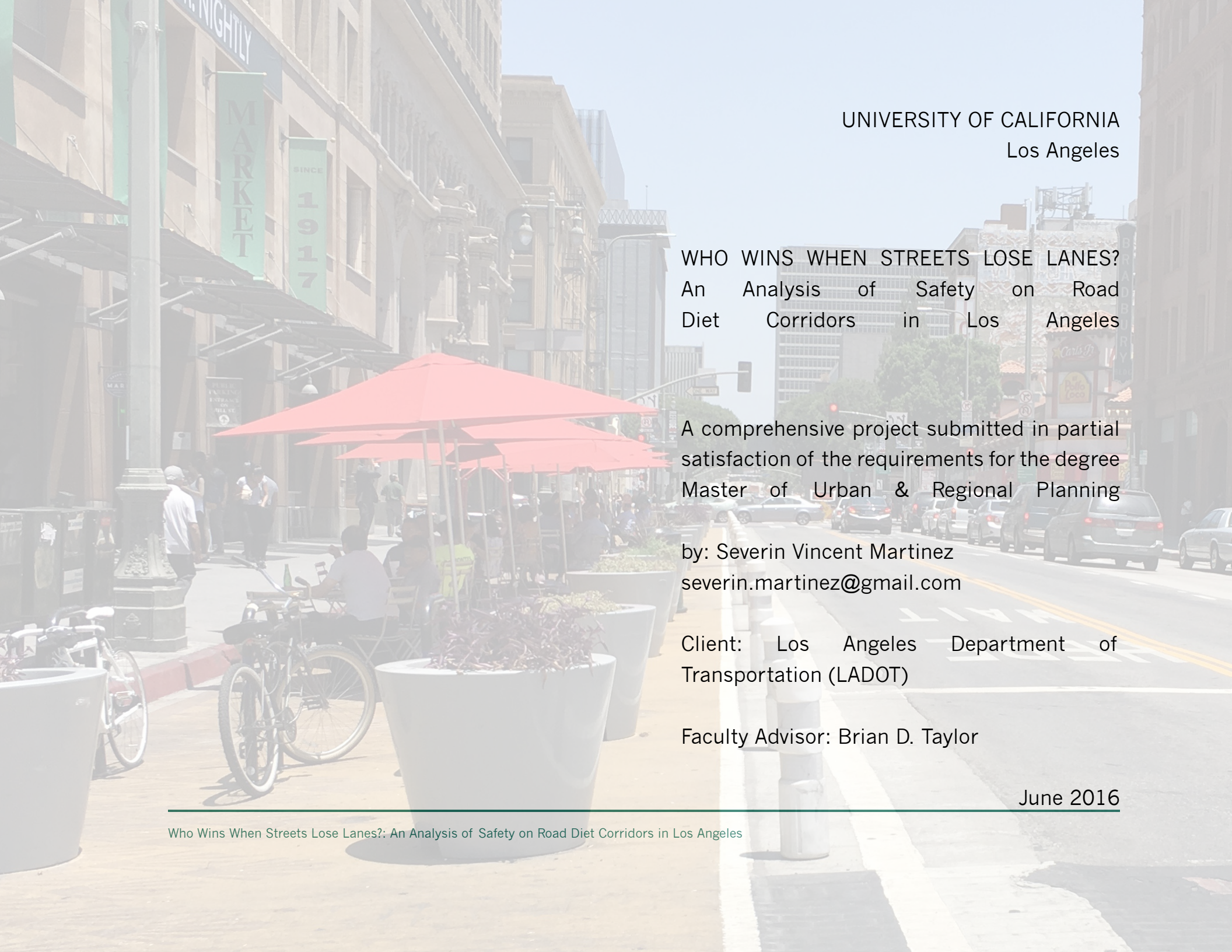
By: Severin Martinez

June 2016

ACKNOWLEDGEMENTS

I would like to thank the following individuals for the irreplaceable support, knowledge, and assistance they provided to help make this project possible:

Brian D. Taylor	UCLA, Faculty Advisor
Michelle Mowery	LADOT, Client Advisor
John Fisher	LADOT (Formerly)
Tim Fremaux	LADOT
Ryan Taylor-Gratzer	UCLA



UNIVERSITY OF CALIFORNIA
Los Angeles

WHO WINS WHEN STREETS LOSE LANES? An Analysis of Safety on Road Diet Corridors in Los Angeles

A comprehensive project submitted in partial satisfaction of the requirements for the degree Master of Urban & Regional Planning

by: Severin Vincent Martinez
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Client: Los Angeles Department of Transportation (LADOT)

Faculty Advisor: Brian D. Taylor

June 2016

DISCLAIMER

This report was prepared in partial fulfillment of the requirements for the Master in Urban and Regional Planning degree in the Department of Urban Planning at the University of California, Los Angeles. It was prepared at the direction of the Department and of Los Angeles Department of Transportation as a planning client. The views expressed herein are those of the authors and not necessarily those of the Department, the UCLA Luskin School of Public Affairs, UCLA as a whole, or the client.

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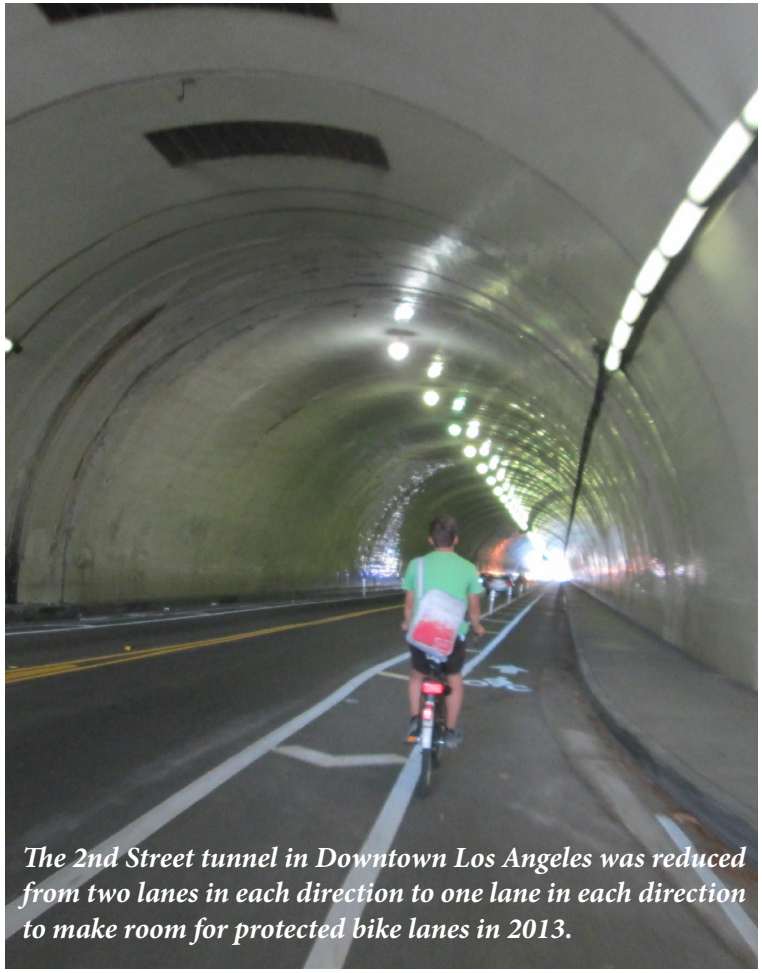

The 2nd Street tunnel in Downtown Los Angeles was reduced from two lanes in each direction to one lane in each direction to make room for protected bike lanes in 2013.

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Defiing a Center Turn Lane IV

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ABSTRACT

Traffic safety is a growing area of concern in the United States. In recent years, a number of cities have adopted so-called "Vision Zero" policies in an effort to eliminate severe and fatal traffic collisions. In 2015, Los Angeles joined the ranks of cities with such initiatives. One way in which Los Angeles officials hope to achieve this goal is through the implementation of "road diets." A road diet reduces the number of through travel lanes to create space for streetscape elements such as bike lanes, center left turn lanes, and on-street parking. The most common road diet – sometimes referred to as the classic road diet – restripes a street from two lanes in each direction, to a single lane in each direction with a center turn lane. According to the Federal Highway Administration (FHWA) this change is a proven safety countermeasure estimated to reduce crashes, on average, by about 29 percent.

This project analyzes changes in rates of collisions, injuries, and severe and fatal injuries on five streets that received the "classic" road diet treatment in Los Angeles between 2006 and 2009. Through an observational "before and after" analyses with comparison group, on average, the studied road diets experienced statistically significant reductions in crash and injury rates of 32.4 percent (+/-21.5%) and 36.7 percent (+/-15.4%), respectively. Meanwhile, severe and fatal injuries among the streets with road diets experienced an absolute decrease of 1, but no statistically significant change in incident rate. The comparison group, on the other hand, did not experience any statistically significant change in any of the categories studied.

The findings of these analyses echo those from similar and more extensive studies conducted elsewhere that collectively suggest road diets have a range of effectiveness but can typically reduce crashes between 20 and 30 percent. Looking ahead, road diets appear to be a cost-effective means of improving street safety in Los Angeles. However, given the relatively small number of road diets examined here, the City should conduct thorough before-and-after analyses where road diets are implemented to critically evaluate the performance of these projects on a case-by-case basis.

DEFINING A ROAD DIET

The term road diet was first used by pedestrian planner and activist Dan Burden in 1996 in an article he coauthored with Peter Lagerwey, titled "Road Diets: Fixing the Big Roads." Burden defines a road diet as "anytime you take any lane out of a road" (Press, 2011, 00:10). Typically this is done to create space for bike lanes, wider sidewalks, additional parking, medians or dedicated left turn lanes. Some also apply the term to situations in which travel lanes are narrowed, rather than removed (Road Diet Case Studies, 2015; Press, 2011). In my research I use the definition described by Burden but specify three subcategories (Figure 2,3,4):

1) **Removing a general purpose travel lane in one or both directions**

2) **Removing center left turn lane/two-way left-turn lane/ left turn channelization**

3) **Removing a peak-hour lane in one or both directions**

The City of Los Angeles has implemented all three types of road diets in order to create space for bicycle lanes, wider sidewalks, additional on-street parking, center left turn lanes, and medians. Only about 1 percent of the documented road diets

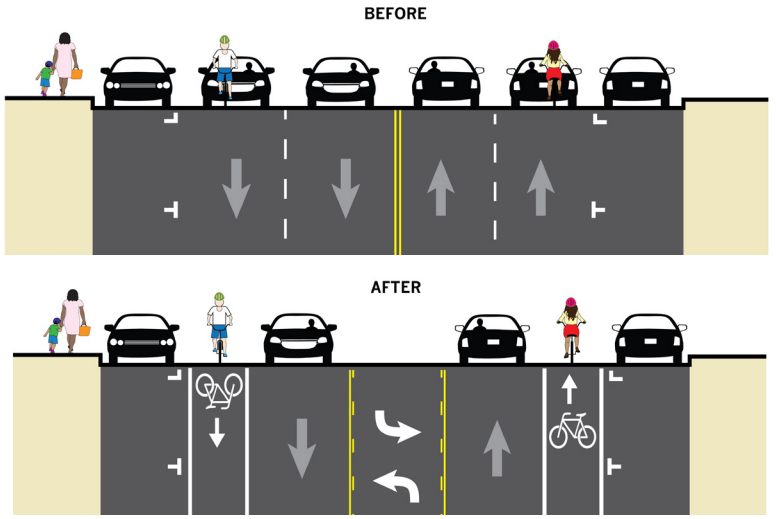


FIGURE 1: The most common type of road diet typically encountered. Sometimes referred to as the "classic" road diet, Los Angeles has implemented 55.7 miles of this type of configuration.

installed in Los Angeles to date involved lane reductions without adding any of the aforementioned street elements.

The most common type of road diet converts a street with two lanes in each direction into one with a single lane in each direction and a center turn lane (Figure 1). This change is sometimes known as the classic road diet or a four lane to three lane conversion.

DEFINING A ROAD DIET

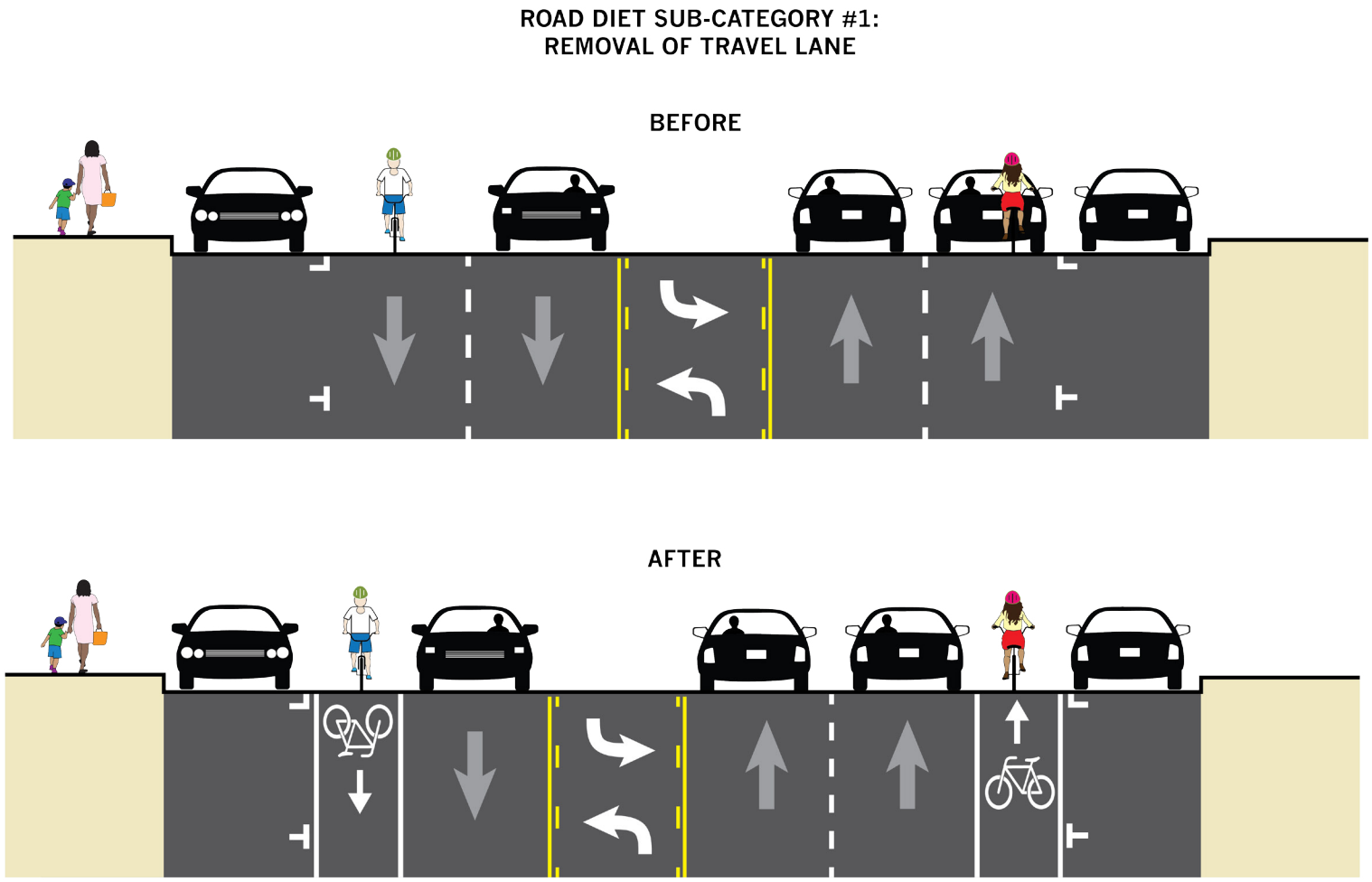


FIGURE 2

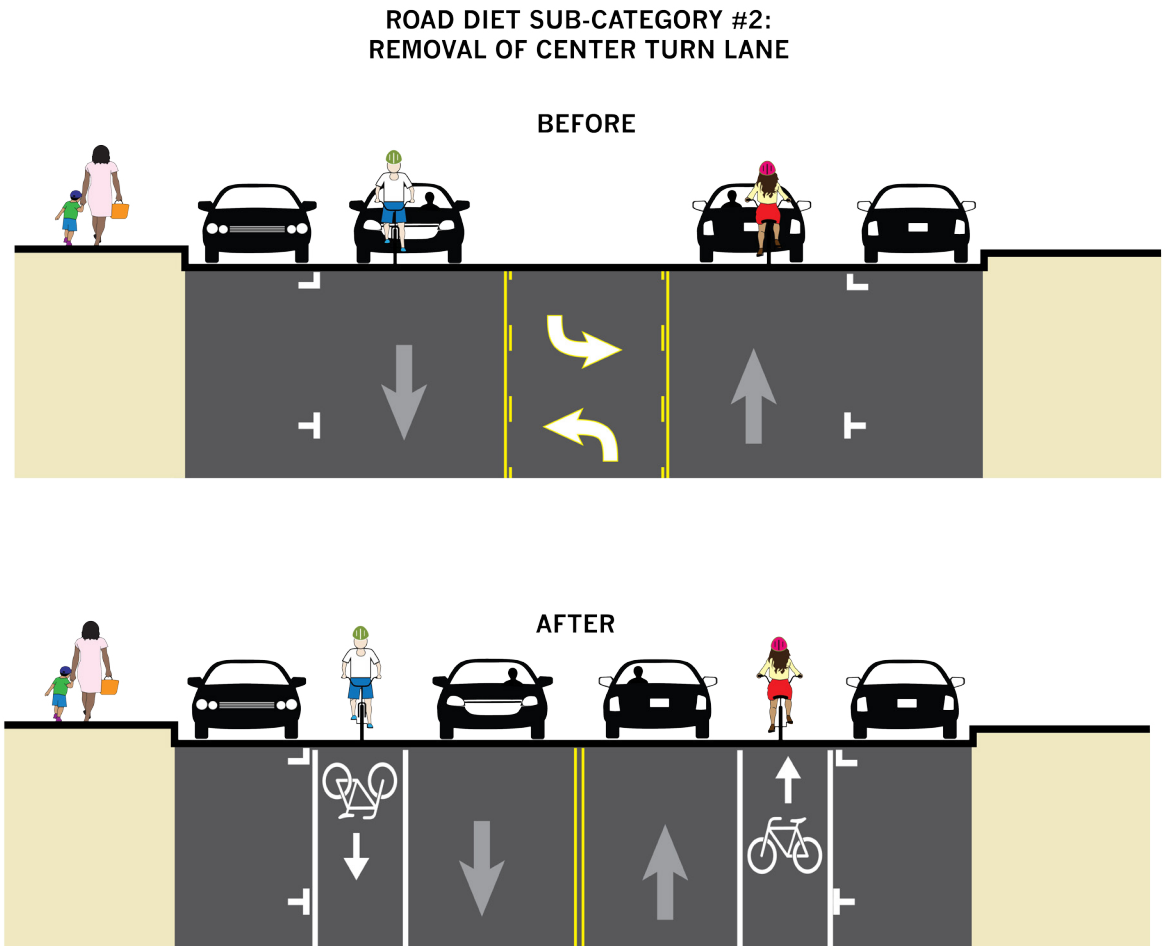

ROAD DIET SUB-CATEGORY #2:
REMOVAL OF CENTER TURN LANE
BEFORE
AFTER

FIGURE 3

DEFINING A ROAD DIET

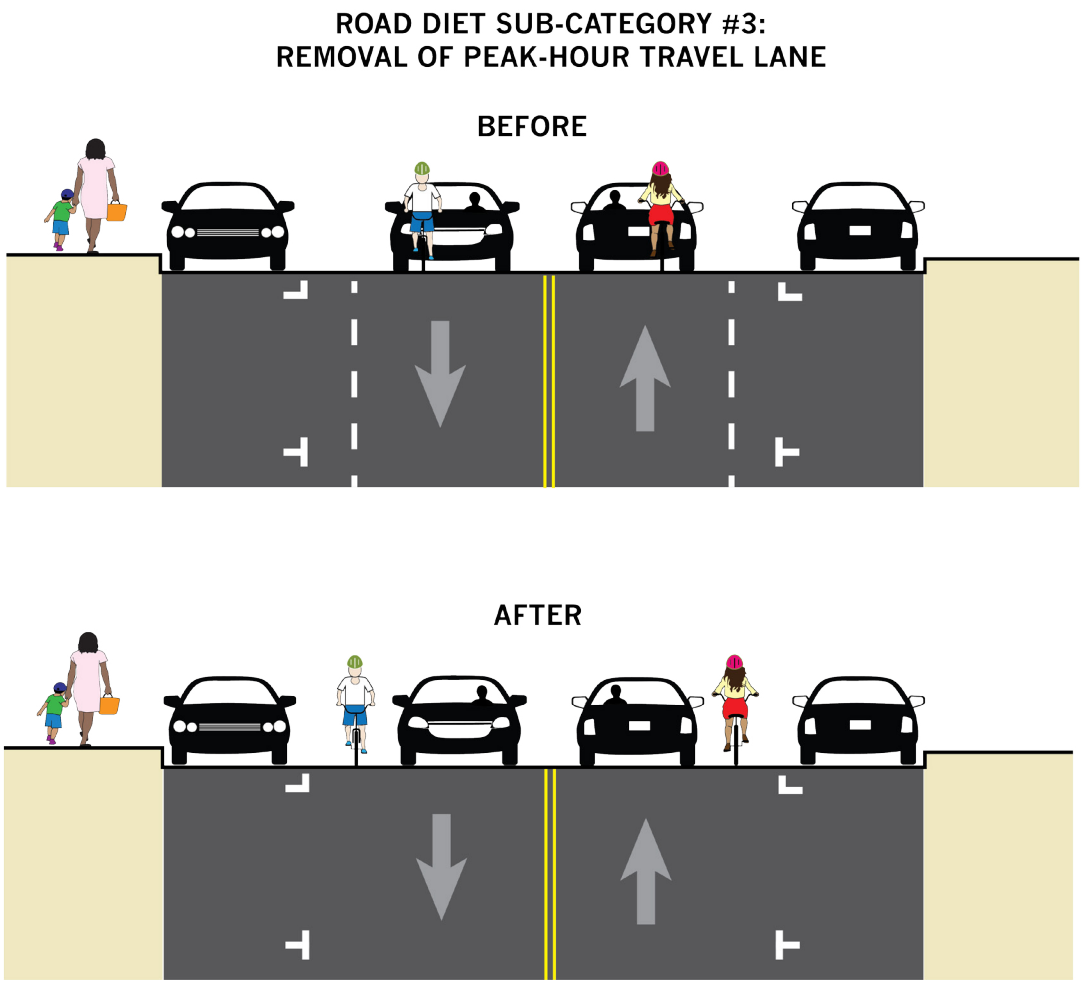


FIGURE 4

Of the roughly 113 miles of road diets documented in this research, 105 miles were implemented through travel lane removal, 6.5 miles through peak hour-lane removal, and 1.3 miles through center turn lane removal.

Road diets are sometimes mistaken as a measure that is only implemented to create space for bike lanes. Although the vast majority of road diets in the City of Los Angeles have produced bike lanes, only 32.6% have produced bike lanes exclusively. Many road diets produce center turn lanes or provide more on-street parking in addition to bike lanes. Approximately 30% of all documented road diets – 33.4 miles – did not receive any bike lanes when installed.

Road diets commonly create a dedicated lane that facilitates left turns removed from the general travel lanes. This space is variously called left turn channelization, two-way left turn lane (TWLTL), or center left turn lane (CLTL). While these terms are interchangeable, in this report I use the term "center left turn lane" because it describes the location of the lane and uses the most common language. I will sometimes shorten the term to "center turn lane" in order to simplify the terminology further.





Top Picture: Eastern Avenue in the City's El Sereno neighborhood requires left turning vehicles do so from the inner lane, which is also the lane faster moving vehicles are expected to use. It does not have a center turn lane. While the street is not scheduled to undergo a road diet at this time, it shows what the "before" situation is like on streets that do receive the "classic" road diet treatment.

Bottom Picture: This portion of San Pedro Street in South LA was formerly two lanes in each direction. It received the "classic" road diet treatment in 2013 and left turning vehicles are now separated from through travel.

1 – INTRODUCTION

Throughout the United States, city officials are increasingly concerned about traffic safety. This is apparent through the number of cities adopting so-called "Vision Zero" policies, which are efforts to eliminate serious and fatal injuries that result from traffic collisions on city streets. On August 24th, 2015, Los Angeles mayor Eric Garcetti formally signed into action Executive Directive Number 10, announcing that the City would institute a Vision Zero initiative. The goal? A 20 percent reduction to the approximately 200 traffic fatalities that occur in the City by the year 2017, and to fully eliminate traffic fatalities citywide by 2025 (Executive Directive, No. 10, 2015). The City has a variety of tools at its disposal to aid its efforts of eliminating traffic fatalities, but key to achieving the set benchmarks will be the implementation of safety enhancing infrastructure and physical reconfigurations to roadways. Unlike other techniques, such as public service announcements and traffic enforcement, which are temporary in both time and place, engineering interventions produce permanent changes to streets.

One tool for addressing traffic safety is an intervention known as the "road diet," a type of street reconfiguration which reduces the number of travel lanes to create space for other streetscape elements such as bike lanes, center left turn lanes, medians, and curbside parking. Often, road diets do not actually narrow the physical width of a roadway, but instead re-arrange how space is used curb-to-curb. The most commonly installed road diet converts a street with two lanes in each direction into a single lane in each direction with a center turn lane.

According to the Federal Highway Administration (FHWA), the road diet is a proven safety countermeasure, estimated to reduce crashes by about 29 percent (Persuad and Lyon, 2010). The reasons why road diets improve safety vary depending on their specific configurations. However, by reducing the number of travel lanes, they typically reduce unsafe lane changes, separate turning movements from through travel, and discourage speeding (Tan, 2011). Although they usually reduce the number of travel lanes, road diets generally have minimal impact on travel times if they are implemented on streets with excess carrying capacity (Tan, 2011). Sometimes, a street with two lanes in each direction might already operate as a "de facto" road diet if the inner lane is frequently used by left turning vehicles. In such situations, the street is effectively

reduced to a single lane of through traffic (Knapp, et. al, 2014, 9).

Not only are road diets an effective safety treatment, they are also comparatively inexpensive. Whereas a traffic signal can cost upward of $250,000 per intersection (Fortin, 2012; EGP Staff Report, 2013), a road diet can often be achieved for a fraction of the cost at approximately $50,000 per mile (Desmond, 2015; T. Fremaux, personal communication, 6 April 2016). If a road diet is implemented as part of routine street resurfacing (Knapp, et. al, 2014), even this cost is nearly entirely eliminated since restriping roadway markings is part of any resurfacing project. Recognizing the low-cost and high-impact of road diets, Los Angeles has implemented dozens of them in recent years, sometimes as part of routine resurfacing but also to explicitly address safety on high-collision corridors. While most road diets the Los Angeles Department of Transportation (LADOT) has installed predate Vision Zero, the majority were still motivated by the idea of improving safety (J. Fisher, personal communication. 29 January 2016).

"Whereas a traffic signal can cost upward of $250,000 per intersection, a road diet can often be achieved for a fraction of the cost at approximately $50,000 per mile."

Need for Research

Despite producing measurable safety improvements and having generally been well-received when implemented elsewhere, road diets have met with mixed reviews locally – especially where road diets have affected traffic as a result of reducing the number of lanes. Those opposed to road diets are sometimes concerned the projects might have unintended consequences, such as traffic jams during rush hour, diversions onto quieter local streets not designed for high volumes of traffic, or potentially delaying emergency responders (Zahniser and Nelson, 2015; Lopez, 2015). Others argue there are more effective ways of reducing collisions without reducing the number of lanes (Lopez, 2015), or that when a road diet is implemented to create bike lanes, the majority of travelers – those who drive – do not benefit from the change (Zahniser, 2015;

Feldman, 2015). Meanwhile, those in favor of additional such road diet projects cite national statistics demonstrating the benefits of road diets (Zahniser and Nelson, 2015; Zahniser, 2015), but struggle to point to any substantive findings in Los Angeles, despite the growing abundance of local examples. When a new road diet is proposed, it is not uncommon for people to share anecdotes about how well or poorly an existing road diet has worked nearby based on personal experience (Kohli, 2015; Meredith, 2015), but there are typically no hard facts on the table to steer the discussion.

Road diets in the City of Los Angeles will continue to be disputed when there is no immediately local evidence of how they impact traffic and safety. Road diets are a context sensitive solution (Knapp, et. al, 2014), so average estimates of safety improvements can undermine, or overstate, the actual effect road diets will have in a particular case. Existing studies suggest road diets can have a range of effectiveness depending on the circumstances in which they are implemented (Thomas, 2013; Harkey, et. al, 2008). Thus, evaluating existing projects would inform local road diet discussions since the City is considering additional such projects.

Project Outline

This research consists of two components that can help guide the on-going conversation of lane allocation and traffic safety. It catalogues all known and documented road diets installed within the City, based on research and consultation with current and former LADOT employees (Appendix A). Knowing where road diets have been installed, and how they have generally been implemented set the context for future discussion. This research also studies collision rates on five "classic" road diets implemented between 2006 and 2009 in different parts of the City, and compares these results with similar, but untreated, street corridors over the same time period. Because collisions can fluctuate randomly and due to broader citywide trends over time, the comparison corridors are used as a control to measure how traffic safety would have been affected had the studied road diets not been implemented.

Before conducting my analyses, I reviewed the literature on road diets, including both guidelines and safety evaluations. Road diets are not a Los Angeles-specific phenomenon and have been documented elsewhere from as early as the 1970's (Lagerwey and Burden, 1999; Knapp, et. al, 2014). Public agencies and researchers

across the country have developed guidelines under which road diets are best suited based on experience from other parts of the country (Knapp, et. al, 2014), and sometimes these guidelines followed in Los Angeles (Collision and Countermeasure Analysis, 2016). Understanding the national literature on road diets as well as the conditions under which road diets have been implemented in the City help frame the interpretation of my analysis and findings. My review finds robust road diet research, most of which controls for:

1) **Regression to the mean**
2) **Changes in traffic flow**
3) **General vehicle crash trends using a comparison group**

After the literature review I describe my methodology for selecting my study corridors and how I evaluate my chosen road diet projects. My goal was to include as many road diets as possible in my analysis from the roughly three dozen road diet projects implemented between 2006 and 2011 that would have at least three years of pre- and post-implementation data. Data constraints limited this list to five projects suitable for study. Based on the findings from the literature review and the data available at the time of this study, I apply a t-test to an observational before-and-after study of the five selected projects and a comparison group of corridors. The comparison group is used to control for general travel and traffic trends along similar streets that did not receive a road diet treatment. To control for changes in traffic volumes, I calculate before and after crash rates per million miles traveled. I do so using an average estimates of volumes based on traffic counts, albeit somewhat limited, available from the Department's Traffic Counts Division.

Using this applied methodology, I display changes in general crash rates and injury rates to see if there discernible differences between the road diet treated corridors and the similar but untreated corridors. Because road diets are to be included in Vision Zero efforts, I also look at changes in the rates of severe and fatal injuries. The results of the analyses reveal statistically significant reductions in crashes and injuries among the road diet projects. The comparison group, however, did not experience any statistically significant reduction in crashes or injuries. Neither

"The results of the analyses reveal statistically significant reductions in crashes and injuries among the road diet projects."

the road diet group nor the comparison group experienced a statistically significant reduction in severe and fatal injuries specifically. This may stem from the fact that this report looks at small samples and these types of injuries are comparatively rare occurrences. Although other factors may influence the findings, the reduction in overall crashes closely mirror the results from studies cited by the FHWA, lending credence to the argument that road diets improve safety where implemented.

Drawing on the results from my analyses and insights from the literature review, I close with recommendations for the City, some of which can be applied more broadly to other municipalities considering road diets. In order for more rigorous local studies to occur, there must be a deliberate effort to gather consistent traffic volume data, not only on streets considered for road diets, but on similar or parallel streets nearby as well. If other elements such as bicycle and pedestrian use are monitored, road diets can also be evaluated for other potential benefits in addition to improving overall safety as they might increase the number of people getting around by active modes of transportation. Lastly, if data determine road diets are successful in reducing collisions, additional streets should be identified and considered for road diets, especially if they can be implemented in tandem with resurfacing or other roadway work.

2 – BACKGROUND

In recent years the City of Los Angeles has implemented several road diet projects, primarily to reallocate space for bike lanes in order to expand the existing bicycle network. Some projects have been controversial due to their impact on vehicle travel times during peak traffic hours. Generally, though, such roadway reconfigurations are frequently contentious because motorists object to the idea of reducing the number of travel lanes – in particular to create bike lanes – which runs counter to popular perceptions of how street space is best used. Specifically, road diets challenge the widely held notions that streets are primarily for cars and that more lanes, all else equal, are better than fewer lanes.

An indicator of how contentious and topical road diets have become over the years in the City's lexicon can be observed in how often the term has been used in the region's principal newspaper, the Los Angeles Times (Figure 5). Although the Los Angeles Times has published on road diets since at least 1999, the ProQuest research platform indicates the term was first used in a local context on October 23rd, 2008. A column, "Road Sage," written by Steve Hymon makes a passing reference to a road diet, suggesting a lane reduction might improve safety on a wide

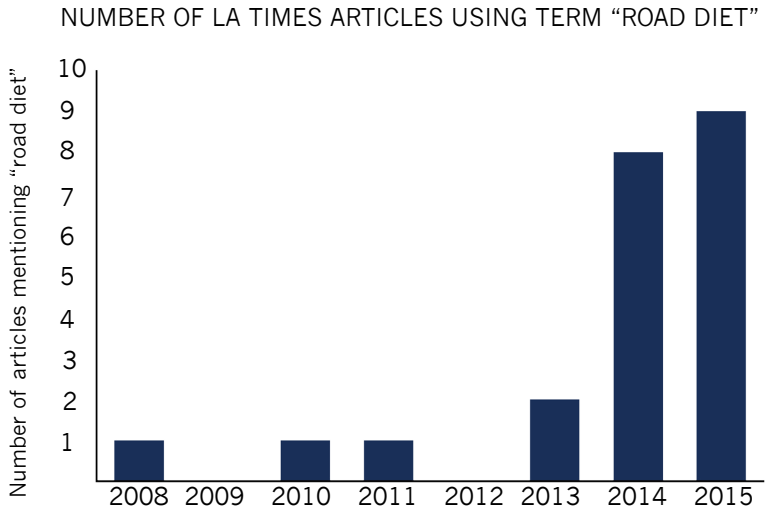


Figure 5: The number of times the term "road diet" appeared in the Los Angeles Times, according to the ProQuest research platform.

boulevard with a notorious safety record. Hymon writes:

> *The city is cracking down on [Colorado Boulevard] with more police patrols, surveillance cameras and a speed-sensitive light at the long exit ramp from the westbound 134 to Colorado and by unsyncing some traffic signals at night to prevent motorists from building a head of steam. All good ideas backed by [Councilmember] Huizar. The real problem here is Colorado's size, and I suggest it go on a road diet and be narrowed*

2 BACKGROUND

The term next appeared in September 2010 following the installation of a widely debated lane reduction on Wilbur Avenue in the Northridge neighborhood in the San Fernando Valley portion of the City (Banks, 2010). At the time, the Los Angeles Department of Transportation had been pressured to implement bike lanes because the city council was in the process of adopting an updated citywide bike plan. Wilbur Avenue was scheduled for a resurfacing and upon studying the traffic volumes, Assistant General Manager John E. Fisher determined it would be a suitable candidate for a road diet because traffic volumes were low (J. Fisher, personal communication. 29 January, 2016). In the article, titled "Bike lanes stop drivers short; Motorists fume at gridlock after paths are added to busy street," Sandy Banks of the LA Times wrote that the road diet turned a local speedway "into a parking lot." Banks revisited her perspective on the matter roughly half a year later (2011), stating that her trips are actually only a few minutes longer than they were before the road diet, and that encouraging more bicycling might not be a bad idea, especially for shorter trips. Following that article, the term was not used in the LA Times again until 2013, when it was used twice in articles about recently implemented bike lane projects. In 2014, "road diet" appeared in eight different issues in the form of articles and letters to the editor, and in 2015 the term surfaced at least nine times.

Recent road diets have been divisive, drawing enthusiastic support and opposition. The concept has gained traction in recent years as Los Angeles has moved forward with dozens of projects since 2012, but road diets are not new to the City. Although the City Department of Transportation does not catalogue all streets that have undergone lane reductions, the Department does archive hard-copy records of striping plans and street resurfacing projects from as early as the 1960s. Through a combination of consulting an informal record of bicycle-related road diet projects kept by LADOT engineer Tim Fremaux, surveying past striping plans, and speaking with current and former LADOT employees, I have documented approximately 113 miles of road diets striping plan installations within the City over the past 35 years.

In December 1980, the first documented road diets appeared on a pair of streets in the City's southernmost neighborhood of San Pedro to accommodate bicycle lanes as part of what was referred to at the time as a "Paseo Del Mar Bicycle

Route." Paseo Del Mar, a coastal street overlooking the Pacific Ocean was reduced from two travel lanes in each direction, to one lane westbound and two lanes eastbound with the left over space used to create bike lanes for a 1.38 mile segment between Western Avenue and Roxbury Street. Pacific Avenue, a north-south street not far away was reduced from two lanes in each direction to a single lane in each direction with a shared center turn lane and bike lanes on a 0.36 mile stretch between Shepard Street and 36th Street. While these are the earliest documented road diets in Los Angeles, there is photographic evidence suggesting the first road diet may trace back to as early as the mid-1950's when the City introduced continuous two-way left turn lanes as a means of separating left turn movements from through vehicle movement on a portion of Sunset Boulevard through the Silver Lake and Echo Park neighborhoods (J. Fisher, personal communication. 29 January, 2016).

Road diets as defined in this research may not be new, but they have become a controversial topic as motivations for such lane reductions have expanded over time. John E. Fisher worked for the Department of Transportation from 1973 to 2012; he was a longtime senior engineer whose career culminated as Assistant General Manager. During his time with the Department he designed and oversaw implementation of a number of the City's earliest documented road diets. Fisher describes the rationale of the pioneering road diets:

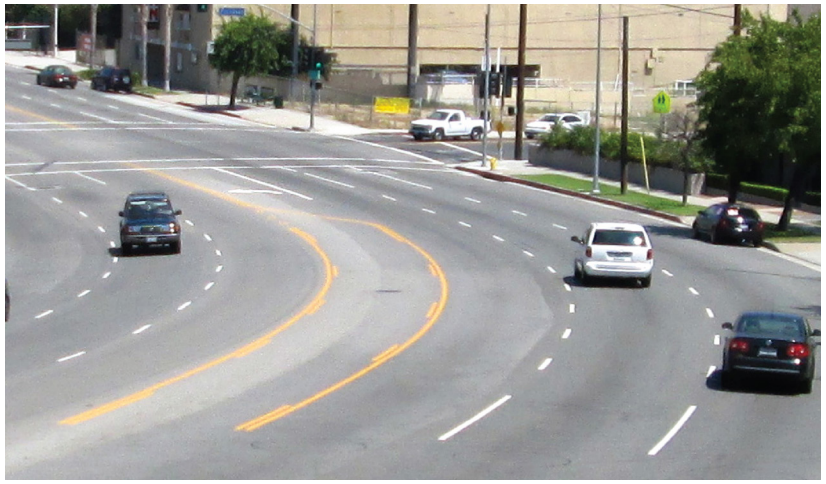
> *They were motivated by the thinking that having smoother and more predictable flow – although possibly with slightly slower speeds – along with the collision reduction that would ultimately accompany it, was a better alternative than having more through lanes that provided more theoretical but unrealized capacity. (personal communication, 29 January 2016)*

While at the Department, Fisher also helped introduce a neighborhood traffic management program that produced road diets, primarily residential streets, as an explicit measure to curb traffic volumes and speeds to improve residents' quality of life.

Road diets as implemented today are still grounded in safety, but increasingly they are implemented on busier streets with specific intent of promoting active forms of transportation through prioritizing safety of those walking and bicycling. The concept's

implementation is moving beyond strictly improving safety on residential streets and corridors with excess capacity. Whereas the majority of early documented road diets gained center left turn lanes, and occasionally curbside parking, since 2012 road diets have gained almost exclusively bike lanes, or bike lanes in addition to center left turn lanes. In 2013, City projects started to also take advantage of State Assembly Bill 2245, which was legislation passed in 2012 that exempts lane striping reconfigurations (including road diets) from full California Environmental Quality Act (CEQA) analyses. Incidentally, the City's first road diet implemented using AB 2245 was the same street Steve Hymon had suggested would benefit from fewer lanes in 2008. On October 4th, 2013 Colorado Boulevard was reduced from three lanes in each direction, to two lanes in each direction as part of a broader neighborhood-driven traffic calming initiative called "Take Back The Boulevard."

Right: Before it went on a road diet, Colorado Boulevard was three lanes in each direction with a center turn lane and curbside parking. The street was reduced to two lanes in each direction by converting a lane in each direction into buffered bike lanes.





Not only are road diets being applied in a wider variety of contexts in Los Angeles, but the pace of implementation has also increased dramatically (Figure 6). Between 1980 and 2010, my research suggests roughly 48.1 miles of road diets were implemented citywide. By 2016, the City had implemented an additional 64.5 miles of road diets, with 24 miles implemented in 2013 alone. Road diet projects are appearing more frequently and on streets with higher traffic volumes, which helps explain the increasing use of the term – more people are simply being exposed to the roadway reconfigurations in more places.

Sometimes affected stakeholders are concerned that road diets may result in more collisions. Even though road diets are recognized by the FHWA as a proven safety countermeasure, this determination is based primarily on studies of road diets in cities smaller in size and population than Los Angeles. Skeptics cite a variety of reasons for why road diets in Los Angeles might not be as effective as elsewhere. Arguments include that the roadway change could result in greater confusion due to the unfamiliarity with the configuration, or by slowing traffic down, the road diet might incite road rage from newly frustrated drivers stuck in traffic. As with many changes by government, locals cannot fully be convinced by successes in other cities. Los Angeles is not Portland, nor is it Seattle. Given that Los Angeles has implemented so many road diets to date but not conducted comprehensive evaluations of them, it is fair for skeptics to call the treatment into question. It thus would benefit both the Department of Transportation, as well as the public, to know how effective existing road diets have been.

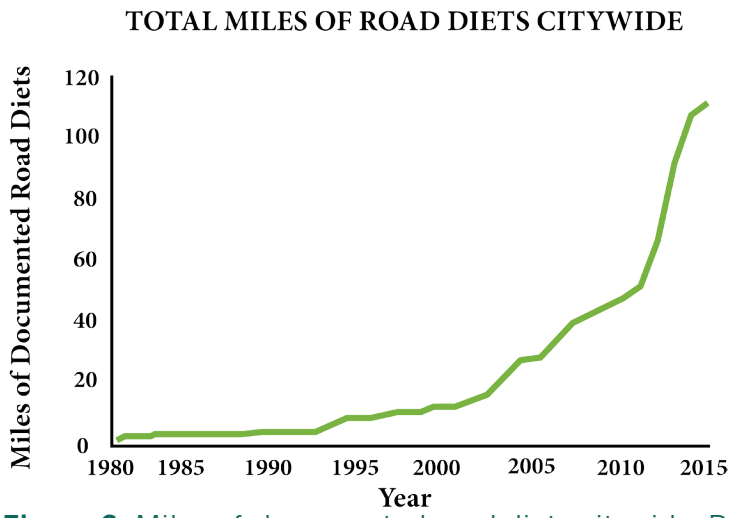


Figure 6: Miles of documented road diets citywide. Pace of road diet implementation has increased drastically over the past decade.

2 BACKGROUND

The current method of evaluating projects – sometimes only with post-implementation data – limits what characteristics can be studied and may undermine or overstate a project's effectiveness since there is no initial baseline to compare conditions before and after implementation. For example, a road diet may be installed with the intent of reducing collisions and increasing bicycle ridership. But if no counts of bicycle traffic are conducted, and collision data show an overall increase in collisions due to a spike in bicycle crashes, the road diet may easily be viewed as a failure. Although an increase in bicycle-related collisions could result from increased bicycle ridership, there is no way of verifying this. Similarly, analyses might show a 20 percent decrease in collisions on a road diet corridor and the project could be hailed as a success. However, if there has been a 20 percent decrease in overall traffic volumes as drivers divert onto different streets in response to the road diet, the road striping's effect on safety could be negligible or non-existent. As these examples suggest, new road diet projects will continue to be met with skepticism if the Department fails to produce more thorough, accurate, and telling project evaluations. Through researching past road diets and analyzing recent projects, I hope in this report to add some clarity to the local road diet conversation.

3 – LITERATURE REVIEW

Objectives and Structure

Road diets – also known as "roadway reconfigurations," "rechannelizations," or "lane reductions" – reduce a street's potential vehicle throughput capacity by converting travel lanes into space for other street elements such as bike lanes, medians, sidewalk extensions, additional curbside parking, and center left turn lanes. Many road diet proponents cite improvements in livability among the reasons to implement these roadway reconfigurations. They argue road diets make streets more accessible, environmentally-friendly, economically vibrant, and aesthetically appealing (Burden and Lagerwey, 1999). Although road diets in the United States have been implemented since at least the 1970's, the livability emphasis is new (Rosales, 2007). While an increasingly important consideration, livability is not the subject of this review. Rather, the primary reason for implementing these roadway reconfigurations since the concept was first introduced has been to improve traffic safety and that is my focus.

This literature review outlines: 1) a broad history of road diet implementation in the United States, 2) the basic principles guiding road diet implementation, and 3) existing research and evaluation methodologies on the effects road diets have on traffic safety. The motivation for early road diets helps clarify which circumstances they are believed to be most effective and what kind of roadway deficiencies they are intended to correct. The current guidelines recommended for road diet implementation set a baseline for comparing the relative successes or failures of the streets analyzed in this report. Lastly, understanding the most robust methodologies currently used in evaluating projects helps to determine the most appropriate ways to measure the effectiveness of road diets, given available data and their shortcomings.

History of Road Diet Implementation

During the 1950s and 1960s, many streets with a single lane in each direction were widened to two lanes in each direction to accommodate greater capacity (Knapp, et. al, 2014; Welch, 1999; Figure 7). Two lanes in each direction, while allowing greater vehicle throughput capacity than a single lane in each direction, resulted in growing numbers of collisions due to increased speeds and lane changes. Prior to widespread adoption of road diets, default solutions to address safety on streets with two lanes in each

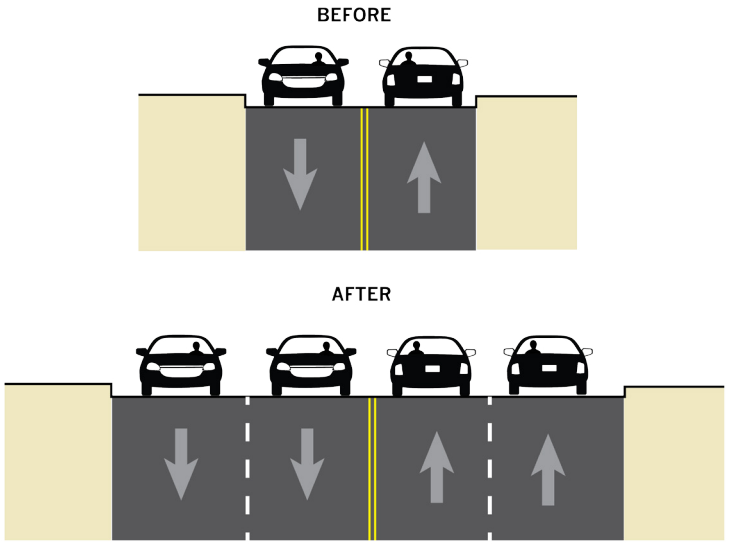


Figure 7: Widening a street from a single lane in each direction to two lanes in each direction allows for greater vehicle capacity

direction included: widening streets to include center left turn lanes, or placing a divider between opposing directions of traffic (Welch, 1999). However, further roadway widening was often unpopular among road-adjacent stakeholders for many of the reasons it is opposed today. Local residents argued widening streets would increase traffic speeds, make the streets noisier, and make it more difficult for pedestrians to cross (Welch, 1999). Because the proposed solutions often involved measures that would widen or speed up vehicular traffic, transportation departments sometimes refrained from widening beyond two lanes in each direction, due to popular backlash, and accepted the short-comings of this design. It was to this dilemma that the conventional or "classic" road diet – which converts a street with two lanes in each direction into a single lane in each direction with a shared center left turn lane – would emerge as a solution in contrast to decades of road widening. The primary goals of the classic road diet were to address the safety concerns of streets with two lanes in each direction and improve efficiency through separating left turning movement from through traffic (Welch, 1999).

One of the first known classic road diets occurred in 1972 on 45th Street in Seattle, Washington (Burden and Lagerwey, 1999). The street had an average daily traffic count (an estimate of the average number of vehicles passing through the corridor on a daily basis, also known as "ADT") of approximately 19,400 vehicles prior to the road diet implementation. After the road diet, the street recorded an ADT of 20,274. Despite an observed increase in

"One of the first known classic road diets occurred in 1972 on 45th Street in Seattle, Washington."

traffic volumes, the street experienced a 48.9 percent reduction in collisions. Another pioneering road diet was introduced on 17th Street in Billings, Montana in 1979, which an unpublished report indicated was a success as the street experienced a reduction in crashes and no significant change to vehicle delay (Knapp, et. al, 2015). The experience from Billings encouraged a state engineer from Iowa, Thomas Welch, to identify streets that might benefit by being put on the now-classic road diet conversion and see safety improve without adversely affecting traffic flow and capacity (Welch, 1999). In 1980, the Iowa Department of Transportation (IDOT) approved some widening of streets with a single lane in each direction to accommodate a center turn lane after having only approved widening to two lanes in each direction. Upon doing so, IDOT conducted one of the first studies comparing corridors with the conventional road diet configurations to corridors with two lanes in each direction, also known as a four-lane, undivided roadway. In comparing the two different conversions, Welch (1999) found that the three-lane configuration (a single lane in each direction and a center turn lane) had a vastly better safety record than the four-lane configuration while carrying comparable traffic volumes. By the 1990's, the concept of putting roads on "diets" became more popular throughout the nation as the safety gains of a three-lane configuration were becoming more apparent through a growing number of case studies (Burden and Lagerwey, 1999).

Road Diet Guidelines

Average Daily Trips (ADT)

Although the reasons for implementing road diets have changed over time, the basic premise was initially – and often still is – based on the argument that they can have minimal effects on carrying capacity and travel times while enhancing roadway safety. In most literature outlining the components of a successful conventional road diet, including guidelines put forward by the FHWA, it is often stated a three-lane roadway can carry as

much traffic as a four-lane roadway without compromising travel times or diverting traffic if the average daily traffic counts do not exceed 20,000 (FHWA). The origin of this threshold is unclear although several road diet guides and articles cite two separate articles published in 1999 that arrived at this conclusion. In Dan Burden and Peter Lagerwey's 1999 article "Road Diets, Fixing the Big Roads," the author's cite over 20 four-to-three lane road diet conversions deemed to be effective, stating of the traffic volumes, "the upper comfort range for arterial conversions appears to be between 20-25,000 ADT. Higher numbers have been achieved. Santa Monica officials feel most comfortable capping at 20,000, although they have hit 25,000" (4). The authors go on to assert, "Researchers do not have enough knowledge to say where and how peaks are reached, but many feel comfortable with 20-23,000 ADT's. Each community must set its own upper limits" (6).

The other article, also published in 1999, is "The Conversion of Four Lane Undivided Urban Roadways to Three Lane Facilities" by Thomas Welch. In it, Welch references a 1998 Minnesota Department of Transportation study that found three-lane roadways to function with ADT's "as high as 20,000 vpd [vehicles per day]" (4). The author of the Minnesota study, Howard Preston, an engineer, is quoted by Welch as stating he would convert most four-lane undivided urban roadways with ADT's less than 20,000 vpd to three lane facilities "in a heart beat" (4). Welch later writes, "At first glance, it is difficult for most...to accept that, in urban corridors with less than 20,000 vpd, reducing the number of traffic lanes will improve traffic safety and maintain an acceptable level of service" (4).

More recent studies, one from 2006 and the other from 2011 have indicated such four-to-three lane road diets are most effective when ADT does not exceed 17,500 (Gates, et. al, 2006) but can be applied when ADT is as high as 23,000 (Stamatiadis, et. al, 2011). In its Road Diet Informational Guide, the FHWA has compiled guidelines from local entities, with Genesee County and the cities of Chicago and Seattle providing specific ADT levels as guidelines for determining suitability for four-to-three lane road diet conversions. Among the three places studied, the upper ADT limit ranges from 18,000 to 25,000. While there is a point at which conventional road diets have significant impacts on travel times, there appears to be no strict limit on ADT as a

barrier to implementation as Burden and Lagerwey suggest. Several four-to-three lane road diets have been installed on streets with ADT's higher than 20,000, including in Los Angeles, and in at least two documented cases on streets where recorded ADT exceeded 30,000 either before or after implementation (Burden and Lagerwey, 1999; Rosales, 2007). As of this writing, Portland, Oregon currently has plans to move forward with a four-to-three lane road diet conversion on a 2.3 mile stretch of Foster Road, a street which carries roughly 30,000 vehicles a day (Law, 2016).

"While there is a point at which conventional road diets have significant impacts on travel times, there appears to be no strict limit on ADT as a barrier to implementation as Burden and Lagerwey suggest."

Peak Hour Traffic Volumes

The ADT threshold is specific to the four-to-three lane road diet conversion and exists in part simply because the majority of streets that have receive road diets have not exceeded 20,000 in average estimates of daily traffic. This threshold, however, is also tied to "peak hour" volumes. While wide streets may experience low traffic volumes most of the day, they are often built to accommodate peak hour demand, when use of the street is highest. This causes some to argue that peak hour volumes are perhaps more important than overall volumes when determining if a street is an appropriate candidate for a road diet, and in determining whether a road diet may cause travel delays or divert traffic.

The FHWA's Road Diet Informational Guide states peak-hour volumes along urban roadways typically represent between 8 and 12 percent of the roadway's total ADT, though this varies significantly depending on local circumstances. In the study "Converting Four-Lane Undivided Roadways to a Three-Lane Cross Section: Factors to Consider," its authors used Level of Service (LOS) analysis assuming 10 percent of ADT occurred in the peak-hour and that directional flow is roughly equal to determine if road diets are feasible for roadways with ADT below 20,000 (Knapp, et. al, 1999). This assumption suggests the conventional

three-lane road diet can carry up to 1,000 vehicles per hour (vph) in each direction during peak hours. Knapp and Giese concluded in a 2001 study that roadways with bi-directional peak-hour volumes less than 1,500 vehicles per hour (vph) should be considered for road diets. This figure was used by the authors to extrapolate that a road diet configuration can reasonably handle 750vph with a single lane in each direction (Knapp et. al, 2015). The same 2001 study also indicated road diets are unlikely to affect LOS if the peak-hour bi-directional volumes are less than 1,750vph (or 875vph per direction), or if the roadway already operates as a de facto road diet with so many left turn movements the intersections effectively reduce through travel to a single lane (10). While existing research offers general guidance, as with ADT guidelines there is no clear limit on maximum peak hour volumes for considering a road diet or what other factors should be considered.

Evaluation Methodologies and Findings from Existing "Before-and-After" Studies

Road diet evaluations vary. Some road diet studies are more robust than others because they control for confounding variables. Early road diet evaluations that helped advance the concept's popularity consisted strictly of simple before and after comparisons in collisions and traffic volumes along road diet corridors (Burden and Lagerwey, 1999).

In a 2013 white paper titled "Road Diet Conversions: A Synthesis of Safety Research," researcher Libby Thomas conducted a comprehensive search of road diet safety evaluation studies, focusing on peer-reviewed articles and reports published between 2002 and 2013. She identified six rigorously constructed road diet safety evaluation studies, three of which had been published in peer-reviewed publications. Thomas notes the more compelling studies use of methods to control for three factors in particular: regression to the mean; changes in traffic flow; and general crash trends using a comparison group. All studies compiled by Thomas found road diets to be successful in improving safety to varying degrees, in part depending on the analysis methodology used. Three of the identified studies used overlapping data from a total of 45 treated sites plus comparison sites (Pawlovich, et. al, 2006; Huang et. al, 2002; Harkey, et. al, 2008). All but one of the studies

(Lyles et. al, 2012) identified by Thomas used comparison sites to differentiate results from road diet corridors and similar but untreated corridors. The number of treatment sites used per study ranged from 8 to 450, while years of analysis covered between one and 21.

One report (Haung, et. al, 2002) looked at 11 road diets and 24 comparison sites across California and Washington. They used a standard yoked comparison analysis and employed a Cochran–Mantel–Haenszel test of overall significance, but did not analyze ADT. The results indicated crash frequencies along road diet corridors were approximately six percent lower than on the similar comparison corridors. In a separate analysis of crash rates only including corridors where ADT data were available, their sample shrunk to 8 road diets and 14 comparison sites and found no statistically significant reduction in crashes.

In 2006, Pawlovich, et al. conducted a full Bayes analysis of 15 road diets in Iowa and compared them to 14 untreated corridors and found a 25.2 percent reduction in crash frequency per mile and an 18.8 percent reduction in crash rate. The authors note the contrast of their results with those of Huang, et al.'s 2002 study, and suggest the difference might be explained by differences in the data. While the two studies applied similar models, Pawlovich, et al. collected 23 years' worth of data for their sites whereas Haung, et al. collected three years of pre- and post- and in some cases only had one year of data from before and after road diet implementation. They also suggest the differences could occur because road diets are not equally effective everywhere they are applied, stating, "Of course, it may also be the case that road diets are not as effective everywhere and that other factors may explain the different results. This possibility suggests that this type of study should be undertaken at other locations" (10).

Reanalyzing data from 2002 (Haung, et al.) and 2006 (Pawlovich, et al.), Harkey, et al. studied the safety impacts on 15 corridors in Iowa, and 30 corridors across Washington and California, that underwent the "classic" road diet treatment (2008). The sites were compared to 296 and 51 similar – but untreated – comparison sites using an empirical Bayes (or EB) before-and-after analysis. The results found a crash reduction of 47 percent for the Iowa sites and a 19 percent for the Washington and California sites. The authors speculate that the reason for the large discrepancy

between the two data sets is due to differences in traffic volumes and site settings. The Iowa sites were more rural in nature; corridor traffic volumes did not exceed 14,000 average daily trips (ADT), and were implemented along state routes in small towns with average populations of 17,000. By contrast, the Washington and California sites were more suburban in character, with corridor ADT ranging from 6,194 to 26,376 in cities with an average population of 269,000 in comparatively urban environments. This explanation lends support to Pawlovich, et al.'s speculation that not all road diets are equally effective. In 2010, Persuad, et al. analyzed the Iowa data using a full Bayes method and found crash reduction similar to Harkey, et al.'s using empirical Bayes.

In 2013, Chen, et al. studied 460 road diet sites in New York City. They analyzed five types of collisions: all, vehicle–vehicle collisions, pedestrian–vehicle collisions, bicycle–vehicle collisions, and collision-related injuries and fatalities. Using five years of pre-treatment data and two years of post-treatment data, Chen, et al. employed a two-group, pre-test post-test design to compare road diet segments with 3,364 untreated sites. Although they did not control for changes in ADT, they did observe an estimated 67 percent reduction in crashes along selected road diet segments and a 70 percent reduction in injuries and fatalities.

Unlike the other studies that only compared road diets to similar but untreated corridors, Lyles, et al. (2012) also compared their selected road diets to citywide crash trends. Their report produced an average crash modification factor (CMF) for 24 road diets in Michigan but was unable to yield any statistically significant results when adjusting for citywide trends or when comparing to similar but untreated corridors. This may partially stem from their small sample of four road diet and untreated sites using an empirical Bayes methodology. Lyles, et al. attempted to match road diet sites with corridors featuring nearly identical characteristics, including: ADT, number of driveways, segment length, intersection density, and crash frequencies. Commenting on this technique, Thomas observes, "...if a larger reference group is used, the importance of matching of exact characteristics takes on less importance. A larger reference group is also more effective in accounting for RTM [regression to the mean]" (12).

"Proven Safety Countermeasure"

Today roadway reconfigurations are recognized by the United States Department of Transportation's (USDOT's) Federal Highway Administration as one of nine "proven safety countermeasures." This means that road diets can be expected to reduce traffic collisions on streets where they are implemented (Furst, 2012). According to the FHWA's Proven Safety Countermeasure webpage, all proven safety countermeasure have "shown great effectiveness in improving safety." The Proven Safety Countermeasure page has a tab specifically for road diets, which states the following:

> *A classic Road Diet typically involves converting an existing four-lane, undivided roadway segment to a three-lane segment consisting of two through lanes and a center, two-way left-turn lane. The resulting benefits include a crash reduction of 19 to 47 percent, reduced vehicle speed differential, improved mobility and access by all road users, and integration of the roadway into surrounding uses that results in an enhanced quality of life.*

The reference to the "classic" road diets being able to reduce crashes by 19 to 47 percent comes the 2008 report by Harkey, et al. The benefit emphasized from reducing the number of through lanes in this particular type of conversion is gaining the center turn lane to decrease turning conflicts and dangerous lane changes. A growing number of cities, such as Los Angeles, are implementing road diets that simply reduce the number of through lanes without necessarily adding a center left turn lane.

Of the research reviewed by Thomas, only the 2013 article, "Safety countermeasures and crash reduction in New York City – Experience and lessons learned" by Chen, et al. studied non-conventional road diet conversions (such as reducing a six lane roadway to four lanes). Most of the 460 road diet segments Chen, et al. studied however consisted of the "classic" four-to-three lane road diet conversion and the effectiveness of road diets were measured as a whole, an average of all the road diet segments whether the "classic" road diet or not. It remains uncertain how effective non-conventional road diets are in reducing collisions and under what circumstances they perform best, especially if they do not result in the creation of a center turn lane. Existing guidance and studies regarding the effectiveness of four-to-three lane road diet conversions may be less applicable to the non-conventional road diets implemented in Los Angeles.

Takeaway from Literature

Road diet studies have focused on the four-to-three lane conversions and generally find the treatment to result in safer roadway conditions. As such they are formally recognized by the FHWA as a proven safety countermeasure. Much of the existing literature, however, comes from cities far smaller in size and population than Los Angeles. This is not due to a lack existing road diets within large cities. The City of Los Angeles, for example, has implemented over 100 miles of road diets (many of them the conventional four-to-three lane conversion) and non-safety related aspects of these roadway changes have been explored in some detail, including the economic impact of a road diet (McCormick, 2012) and the effects a road diet had on bicycle ridership (Road Diet Case Studies, 2015). Some basic road diet safety analyses have been conducted within Los Angeles County (Road Diet Case Studies, 2015); in Santa Monica and Pasadena for example, but no comprehensive studies have been undertaken in the County's largest city.

Transportation planners and engineers generally think an undivided four-lane roadway might be a good candidate for a "classic" road diet if the ADT is below 20,000, but some projects exceed this threshold. Burden and Lagerwey have documented four conventional road diets where ADT exceeds 20,000 either before or after implementation, and reference additional such road diets with ADT around 25,000 and 30,000. They conclude communities should set their own upper limits for conventional road diets. Others have determined 17,500 and 23,000 ADT

"Transportation planners and engineers generally think an undivided four-lane roadway might be a good candidate for a 'classic' road diet if the ADT is below 20,000, but some projects exceed this threshold."

should be the limit for four-to-three lane conversions if traffic delay is a concern. In the City of Los Angeles a growing number of conventional road diets are testing these conventional upper limits, sometimes with the recognition that an increase in delay is a worthwhile trade-off for anticipated safety gains.

In addition to overall ADT, some professionals contend peak-hour traffic volumes are a more accurate measure of whether a street is a good candidate for a road diet since streets are typically built to accommodate travel volumes during the busiest times of day. The literature in this review ranges from 750 vph to 1,000 vph as upper limits before a road diet may start to have impacts on traffic operations and result in significant delays or diversions. In Los Angeles, road diets have historically been applied to streets with low average daily and peak hour traffic volumes, but over the past few years have been implemented on streets with peak hours exceeding the range of vph recommended in this review.

Ultimately, several studies conclude that there can be exceptions to the rules of ADT and peak hour vph. Outside of these factors, road diets might be more – or less – appropriate on certain streets based on local context. Additional factors an implementing agency might consider include: amount of left turning traffic, the number of traffic signals along corridor, density of major intersections along corridor, number of driveways, bicycle volumes, and need to improve safety.

As Los Angeles continues to push the boundaries of road diet guidelines for four-to-three lane conversions, as well as implement other forms of lane reductions to create space for walking and bicycling as part of a shift in transportation priorities, the practice of reducing vehicle capacity on roadways is being increasingly considered. Approximately 60 miles of road diets have been implemented in the past 4 years alone, sparking spirited debates about their merits. Yet despite the noise generated both in favor and against to road diets in the City, comprehensive data indicating the local success or failure these reconfigurations have had in reducing collisions are essentially non-existent. Existing studies suggest road diets are a context sensitive solution. Studies from smaller cities with more traditional development patterns may not necessarily translate to Los Angeles.

Thomas (2013) notes in her thorough road diet literature review that most robust safety evaluations will control for: regression to the mean, changes in traffic flow, and general crash trends using a comparison group. This is important because there is a natural tendency for crashes to fluctuate from year to year, and what appears to be a trend could simply be the result annual variation in crashes. Similarly, traffic volumes could be affected

because or despite accommodating fewer lanes. Without evidence to the contrary, a decrease in crashes could potentially be a result of changes traffic volumes. By controlling for observed changes in traffic volumes in a road diet study, any improvements in safety can more clearly be attributed to a roadway reconfiguration. Lastly, sometimes there are broader, less apparent trends that could affect traffic safety in an area. Comparison groups help account for existing trends unrelated to street striping. Based on this determination my methodology accounts for all three factors and will be framed in the context of traditional road diet guidelines.

4 – METHODOLOGY

To determine if traffic safety has improved where road diets have been implemented, this research employs an observational before-and-after study with a comparison group. Specifically, I apply a one sample t-test to the road diet projects and to the comparison group with a 95 percent confidence interval. The difference is analyzed through three metrics of safety: collision rate, injury rate, and severe and fatal injury rate per million miles traveled. Each rate is calculated using the following formula in Figure 6:

$$\frac{\text{\# collisions OR injuries OR severe \& fatal injuries X 1,000,000}}{\text{average daily traffic estimate X 365 X corridor length}}$$

Figure 6: Formula for calculating rates of collisions, injuries, and severe and fatal injuries per million miles traveled. The estimated average daily traffic (ADT) is calculated from an average of all traffic counts available within each corridor in years prior and following road diet implementation. Traffic counts used to estimate ADT are found in Appendix B

With these data, before and after rates are estimated. I assume that if the road diets were not implemented, that changes in crash rate would be similar to that of the comparison corridors.

For this research, I have available collision data from 2003 through 2014, which provides at least one year of pre- and post-data for approximately 64 miles of the City's documented road diets. However, since just one year of pre- and post- data may be an insufficient indicator of trends in collision rates, I only consider road diets for which there are at least three years of before and after collision data, as recommended by the FHWA (Knapp, et al., 2015). This reduces my sample to anything occurring between 2006 and 2011 – or about 20 miles of road diets. From this group, I eliminate individual projects less than a quarter of a mile in length. I also eliminate road diet projects that were extended shortly after an initial segment was installed and where virtually no collisions occurred before and after road diet implementation. This removes the corridors least suitable for a before and after analysis, including several minor projects. Because the road diets are eventually compared to similar but untreated streets, I also exclude projects with highly unusual "before" configurations where it would be difficult to find suitable comparison corridors with the same roadway configuration.

Taking into account availability of pre- and post-road diet

traffic counts in the road diet treated corridors and potential comparison corridors yields the projects in Table 1. The road diets from Table 1 are matched with at least twice as many similar but untreated corridor miles in the same general geographic region. The comparison corridors I selected for the road diets are found in Tables 2 through 6.

Discussion of Method

Strengths and Weaknesses

I conducted a comprehensive before-and-after analysis of the available data. I compare streets that have undergone road diets with similar but untreated corridors, taking into account changes in ADT over time, which I then test for statistical significance. Each studied corridor have at least three years of pre- and post-collision data. The projects I look at primarily resulted from

Street	Extent 1	Extent 2	Length (mi)	Installation Date	Years of Pre- and Post- Collision Data	Pre- Road Diet ADT	Post- Road Diet ADT
York Bl	Eagle Rock Bl	Ave 54	1.3	3/16/2006	3	18,876	22,969
Colfax Ave	Riverside Dr	Burbank Bl	0.91	6/17/2006	3	11,730	12,192
Lorena St	4th St	Cesar Chavez Ave	0.46	11/1/2007	4	10,228	8,813
Main St	108th St	120th St	0.99	11/10/2007	4	12,518	9,746
Main St	92nd St	99th St	0.42	2/28/2009	5	11,814	11,923

Table 1: Overview of road diet corridors studied

resurfacing opportunities, not safety concerns, which reduces biases that might arise in looking at high collision corridors. Although these elements give the research strength compared to simple before-and-after analyses conducted in the past, it is not without shortcomings, some of which are unavoidable.

Imperfect ADT estimates

Because road diets in the City have historically been carried out simply as opportunities arise, there have been no deliberate efforts to collect data to measure potential outcomes. This research selected the road diets and comparison groups with

Street	Extent 1	Extent 2	Length (mi)	ADT During "Before" Period	ADT During "After" Period
Whittier Bl	Boyle Ave	Lorena St	1.16	20,709	21,687
Rowena Ave	Hyperion Ave	Glendale Bl	0.46	22,306	25,866
Soto St	4th St	Wabash Ave	0.96	20,494	20,982
Fletcher Dr	Weldon Ave	Larga Ave	1.08	18,249	16,330
Cesar Chavez Ave	Soto St	Bernal Ave	0.94	19,732	22,499

Table 2: York Bl Comparison Group

Street	Extent 1	Extent 2	Length (mi)	ADT During "Before" Period	ADT During "After" Period
San Fernando Mission Bl	Rufner Ave	Haskell Ave	1.23	11,838	11,129
Saticoy St	Fair Ave	Beck Ave	0.49	9,269	8,790

Table 3: Colfax Ave Comparison Group

the most consistent traffic counts available to calculate averages for the before and after time periods, but this is an imperfect measure. Some of the streets studied for this research had more counts available than others. Sometimes more ideal comparison corridors could not be used due to insufficient traffic counts for the before and after time periods. Although little can be done to address the ADT estimates for the studied road diet corridors, the size of the comparison groups is an attempt to eliminate undue influence of natural fluctuation in traffic volumes and potential outlier counts.

Imperfect Comparison groups

In any before-and-after study, seldom can comparison groups perfectly fit their assigned treated counterpart. While every

Street	Extent 1	Extent 2	Length (mi)	ADT During "Before" Period	ADT During "After" Period
Eastern Ave	**Huntington Dr**	**Valley Bl**	**1.42**	**16,636**	**16,446**
Alhambra Ave	**Lowell Ave**	**Druid St**	**1.12**	**16,958**	**16,041**

Table 4: Lorena St Comparison Group

Street	Extent 1	Extent 2	Length (mi)	ADT During "Before" Period	ADT During "After" Period
West Blvd	**Florence Ave**	**58th Pl**	**0.93**	**15,384**	**16,101**
San Pedro St	**Florence Ave**	**Imperial Hwy**	**3**	**11,742**	**10,773**

Table 5: Main St ('07) Comparison Group

effort was made to select the best possible comparison corridors, I was limited to streets with sufficient traffic counts. Also, because the Department of Transportation's implementation of road diets has escalated in recent years, some potential comparison corridors could not be considered because they received road diet treatment at some point during the studied time period. As with the traffic volume data, the size of the comparison group is partially remedies this issue.

Limited Sample Size

Due to data limitations, I look at five road diet projects and 12 streets in a comparison group. For the purposes of statistical analyses, these values are small. Although more streets could potentially be studied – as road diets or part of the comparison group – few had data to calculate "before" and "after" rates based on ADT. The primary shortcoming, like the imperfect comparison group and ADT estimates, is simply limited data.

Street	Extent 1	Extent 2	Length (mi)	ADT During "Before" Period	ADT During "After" Period
48th St	**Crenshaw Blvd**	**Halldale Ave**	**1.61**	**8,725**	**10,298**

Table 6: Main St ('09) Comparison Group

5 – FINDINGS

The findings of the analyses display the change in rate of collisions, injuries, and severe and fatal injuries on the road diet corridors studied. The displayed values for the rates and percentage changes are rounded to one decimal point. Along side these results are the changes observed for the similar but untreated comparison group. A 95% confidence interval is calculated for each category studied for both groups using a T-test.

Street	Collision Rate Before Road Diet	Collision Rate After Road Diet	Raw Change	% Change
York Bl	2.2	1.3	-0.9	-40.9%
Colfax Ave	2.0	1.7	-0.3	-15%
Lorena St	3.9	1.9	-2	-51.3%
Main St ('07)	3.3	1.9	-1.4	-42.4%
Main St ('09)	4.2	3.5	-0.7	-16.6%
Total	**3.1**	**2.1**	**-1**	**-32.4%**

Table 7: Collision rates before and after road diet conversion. Rate is per million vehicle miles traveled.

Crashes and Injuries

Overall, crashes decreased on all the studied corridors

Control Group	Collision Rate During "Before" Period	Collision Rate During "After" Period	Raw Change	% Change
York Bl Control	2.1	1.6	-0.5	-23.8%
Colfax Ave Control	2.6	2.7	0.1	+3.8%
Lorena Control	1.5	1.8	0.3	+20%
Main St ('07) Control	2.5	2.3	-0.2	-8%
Main St ('09) Control	4	3.3	-0.7	-17.5%
Total	**2.5**	**2.3**	**-0.2**	**-8%**

Table 8: Collision rates on similar but untreated comparison streets during same time period as the road diet group.

after the road diets were put in place, with some changes more substantial than others. As previously noted, the FHWA estimates road diets can generally be expected to reduce crashes by about 29 percent, and the literature suggests road diets have a wide range of effectiveness. After adjusting for changes in recorded traffic volumes, crashes on the studied corridors decreased by 32.4 percent (with a 95% confidence interval range of 10.9% to 53.9%), echoing findings from prior road diet studies (Pawlovich, et al., 2006; Harkey, et al., 2008). Similarly, injuries along the studied road diet corridors decreased 36.7 percent (with a 95% confidence interval

Street	Injury Rate Before Road Diet	Injury Rate After Road Diet	Raw Change	% Change
York Bl	3.3	2.2	-1.1	-33.1%
Colfax Ave	3.1	2.3	-0.8	-25.2%
Lorena St	5.8	2.9	-2.9	-50.7%
Main St ('07)	6.4	3.3	-3.1	-49.1%
Main St ('09)	6.6	4.9	-1.7	-25.7
Total	5.1	3.1	-1.9	-36.7%

Table 9: Injury rates before and after road diet conversion. Rate is per million vehicle miles traveled.

Control Group	Injury Rate During "Before" Period	Injury Rate During "After" Period	Raw Change	% Change
York Bl Control	3.3	2.6	-0.7	-21.2%
Colfax Ave Control	4.9	4.6	-0.3	-6.1%
Lorena Control	2.4	2.9	+0.5	+20.8%
Main St ('07) Control	3.9	4.2	+0.3	+7.7%
Main St ('09) Control	7.4	5.7	-1.7	-23%
Total	2.5	2.3	-0.2	-8%

Table 10: Injury rates on similar but untreated comparison streets during same time period as the road diet group.

range of 21.3% to 52.1 %). In light of the statistically significant reductions in crash rates, this finding comes as little surprise because most crashes in this study resulted in at least one injury – but occasionally more – and therefore the injury rate experienced a slightly greater reduction than the crashes.

Street	Severe and Fatal Rate Before Road Diet	Severe and Fatal Rate After Road Diet	Raw Change	% Change
York Bl	0.1	0.1	0	0%
Colfax Ave	0.2	0.2	0	0%
Lorena St	0.3	0	-0.3	-100%
Main St ('07)	0.2	0.2	0	0%
Main St ('09)	0.1	0.3	0.2	+200%
Total	0.2	0.2	0	0%

Table 11: Rates of severe and fatal injuries before and after road diet conversion. Rate is per million vehicle miles traveled.

Severe and Fatal Injuries

It is less clear from these data what effect road diets have had on severe and fatal collisions. Although there was an absolute

Control Group	Severe and Fatal Rate During "Before" Period	Severe and Fatal Rate During "After" Period	Raw Change	% Change
York Bl Control	0.2	0.1	-0.1	-50%
Colfax Ave Control	0.3	0.7	+0.4	+133%
Lorena Control	0.1	0	-0.1	-100%
Main St ('07) Control	0.1	0.2	+0.1	+100%
Main St ('09) Control	0.3	0.2	-0.1	-33.3%
Total	0.2	0.2	0	0%

Table 12: Rates of severe and fatal injuries on similar but untreated comparison streets during same time period as the road diet group.

decrease in this category on the road diet corridors, it was just by one. Also, when adjusted to a rate per million miles traveled, any discernible difference disappeared. Additionally, in absolute terms the comparison group also experienced a decrease, from 48 in the "before" period to 46 in the "after" period, a decrease of 2, but over a larger number of cases. Of the studies detailed in Thomas' 2013 review, only Chen, et al. (2013) measured changes in categories other than overall crashes. In their study, the authors looked at "injurous

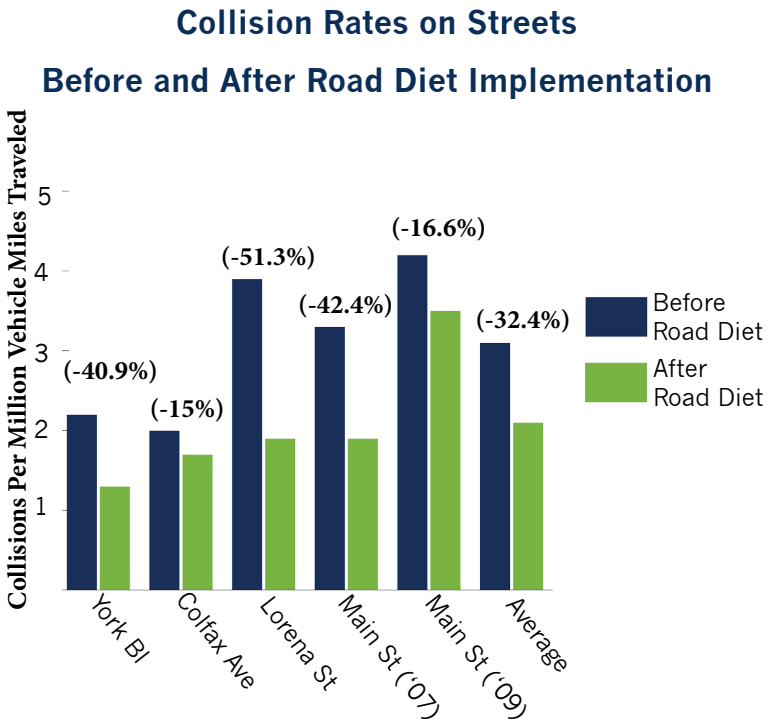


Figure 7: Collision rates on street corridors before and after road diet implementation.

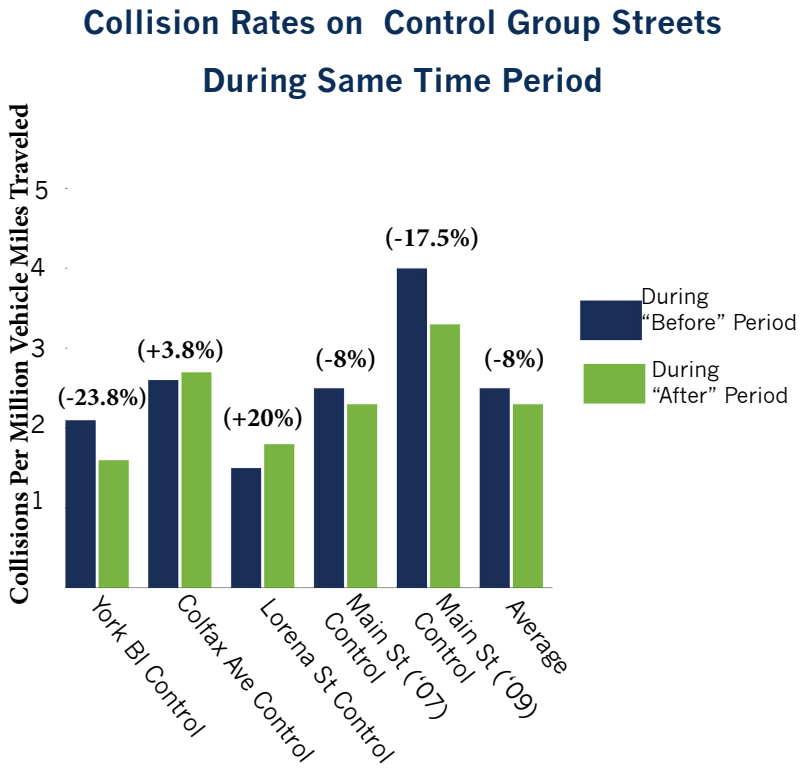


Figure 8: Collision rates for control groups during same time period.

and fatal crashes," for which they observed a 70 percent decrease, but they did not control for changes in traffic volumes. In reflecting upon the existing literature, Thomas herself concludes:

> *Impacts on more severe crashes (fatalities and injuries) and operating speed changes should be a prime consideration in future evaluations. Since it is typically more challenging to detect effects on lower numbers of severe crashes, documenting effects on travel speed distributions would help to document safety benefits and reduction in risk of more severe injuries. Motor vehicle speed is a prime safety consideration for pedestrians. (14)*

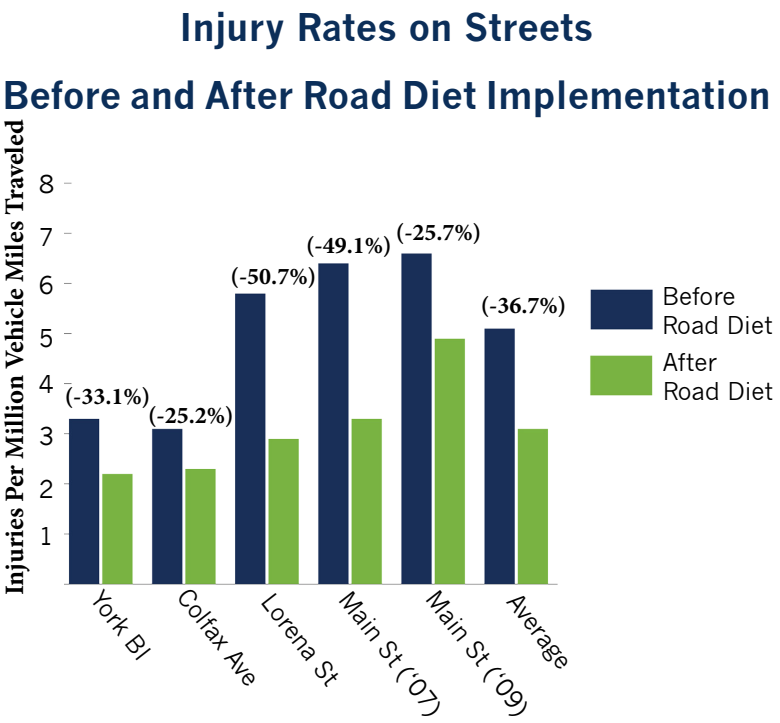


Figure 9: Injury rates on street corridors before and after road diet implementation.

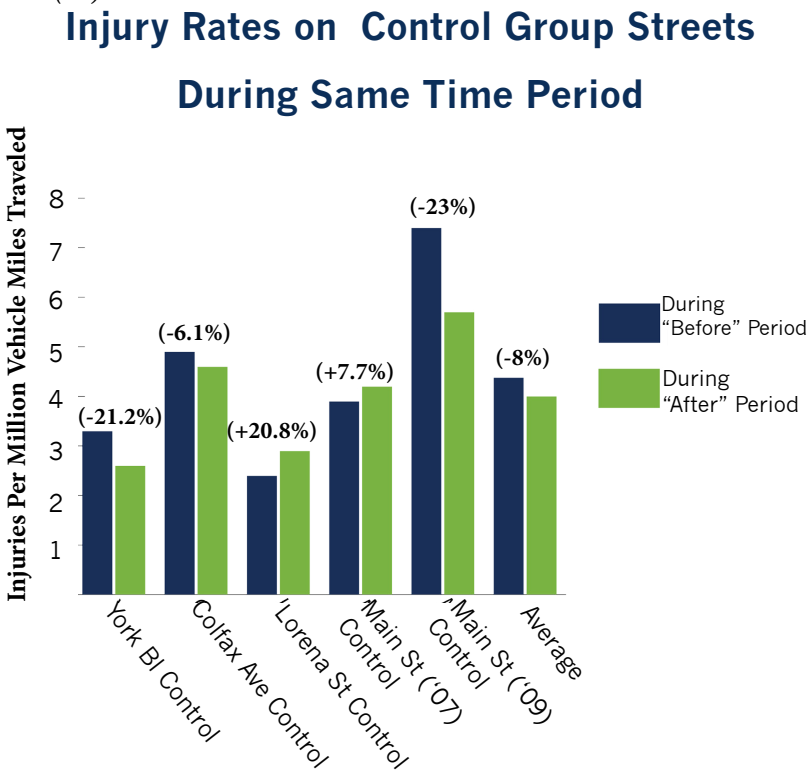


Figure 10: Injury rates for control groups during same time period.

Because serious injuries and deaths are rare, the comparatively few severe and fatal collisions that occur make it difficult to draw conclusions, especially from the small samples in this report. Additional research should be pursued to determine any effect on severe and fatal collisions by examining larger samples or focusing analyses on corridors where road diets are installed to address severe and fatal injuries specifically.

Severe and Fatal Injury Rates on Streets Before and After Road Diet Implementation

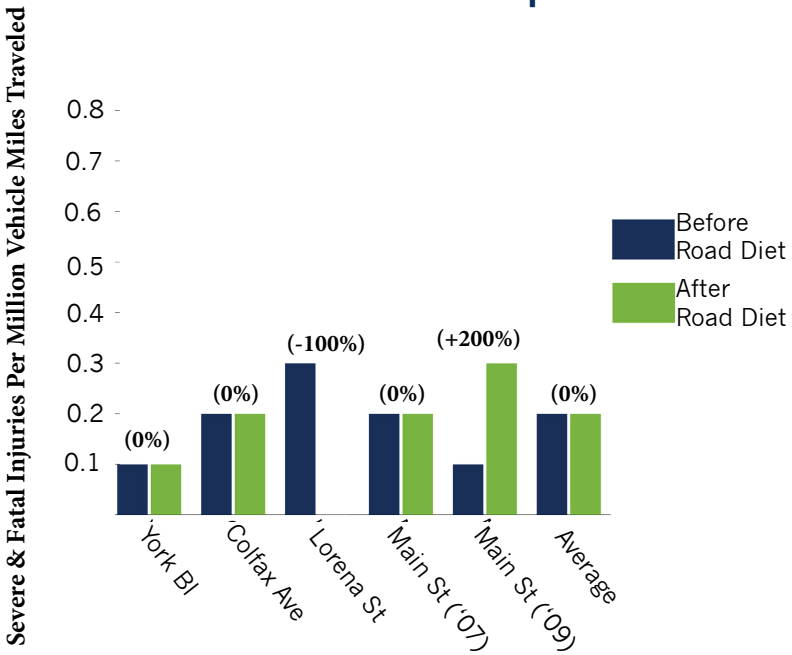


Figure 11: Severe and fata injury rates on street corridors before and after road diet implementation.

Severe and Fatal Injury Rates on Control Group Streets During Same Time Period

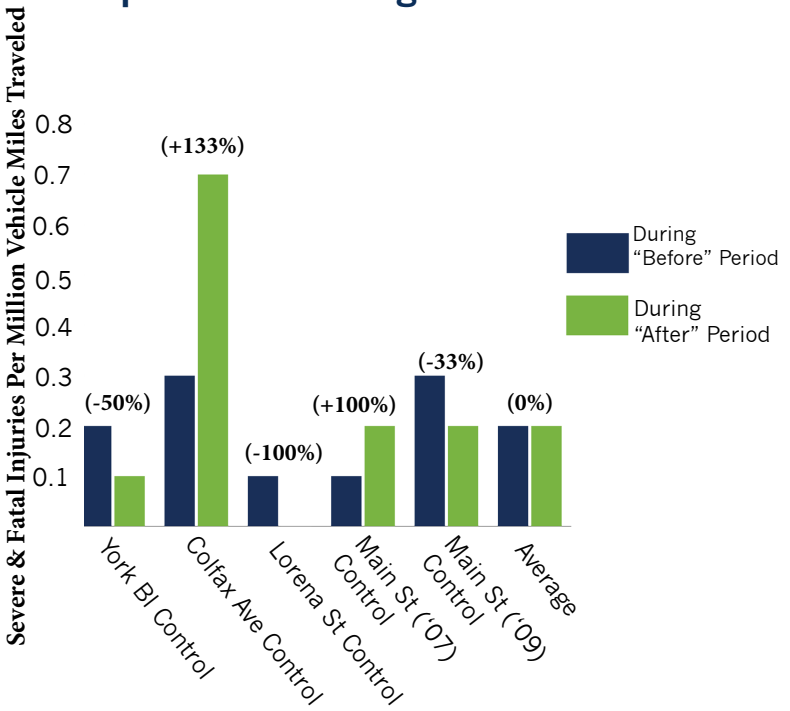


Figure 12: Severe and fatal injury rates for control groups during same time period.

Takeaways

The results of these analyses closely mirror the results of existing studies, as well as the summary estimates by the FHWA, suggesting that road diets have measurably improved safety in the City of Los Angeles. The results also suggest, in aggregate, that local road diets may not decrease the rate of severe and fatal injuries. Local road diets do not appear to increase the occurrence of severe and fatal injuries either, despite case studies from other cities indicating they increase the number of pedestrians and bicyclists (vulnerable

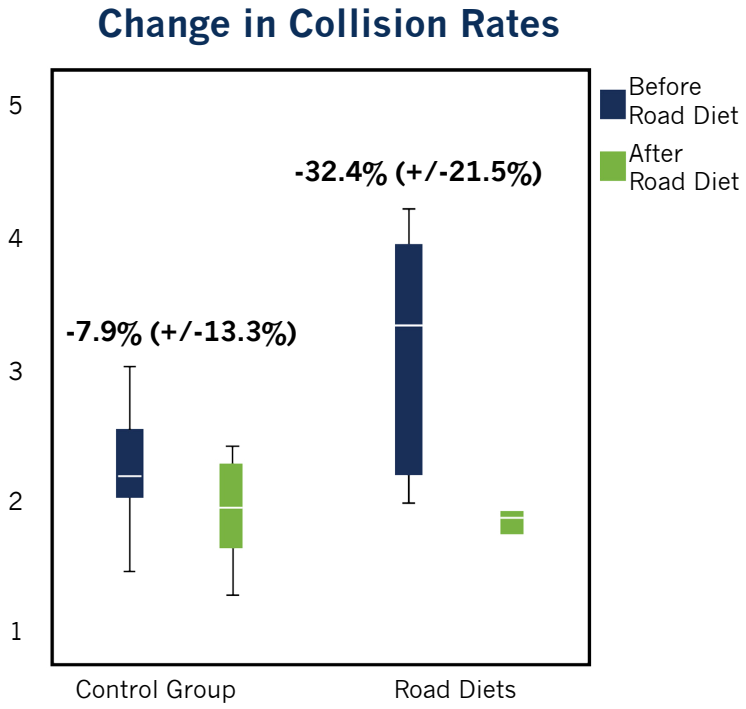


Figure 13: Box plots displaying change in collision rates for road diet corridors and control group

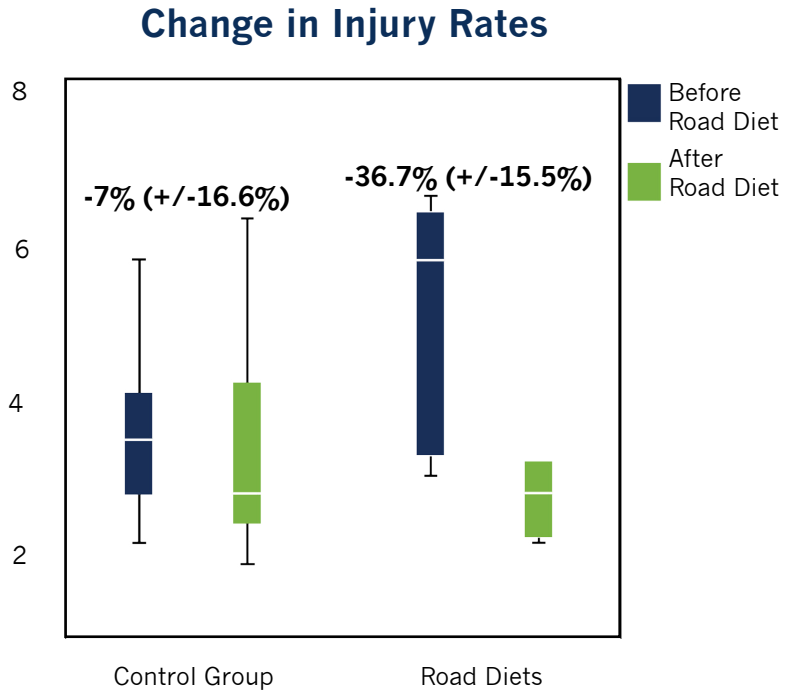


Figure 14: Box plots displaying change in injury rates for road diet corridors and control group

road users) out on the street (Road Diet Case Studies, 2015). Road diets may not be a "silver bullet" when it comes to improving traffic safety, but in the right situations they would appear to come close. When looked at holistically, they have the potential to provide an

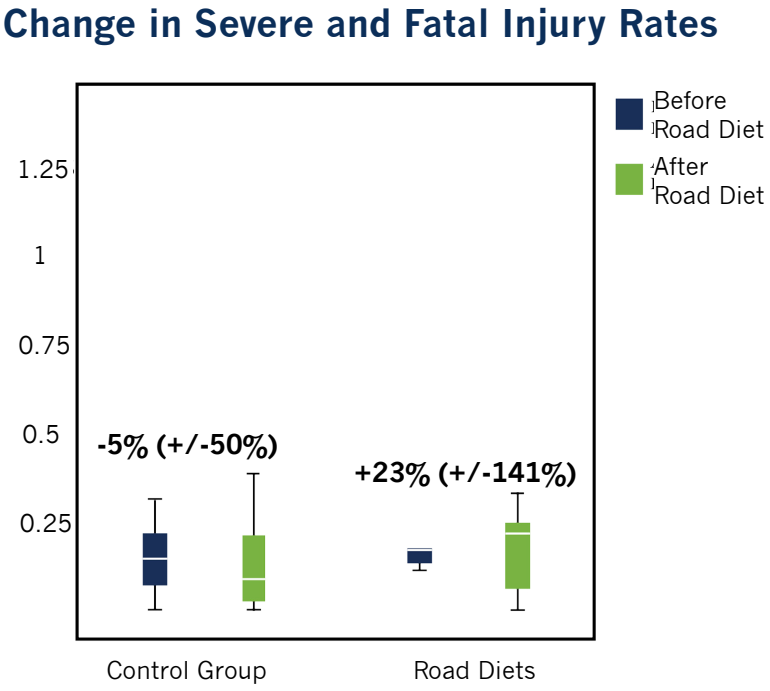


Figure 15: Box plots displaying change in severe and fatal injury rates for road diet corridors and control group

array of benefits, such as increasing levels of walking and bicycling, decreasing speed differentiations, improved perception of safety, and creating opportunities for planted medians, in addition to being among the more cost-effective means of reducing collisions. Oftentimes when there is a desire to improve safety there is a reflexive response among elected officials and the general public to install a stop sign or traffic signal, the latter of which costs five times as much as a mile of road diet and only focuses improvements to a single intersection. Increasingly cities like Los Angeles seek to

"Road diets may not be a 'silver bullet' when it comes to improving traffic safety, but in the right situations they would appear to come close."

address multiple transportation issues at once with changes to road geometries. City officials may not want only to reduce crashes, but also to promote walking and bicycling, enhance businesses along a corridor, reserve space for landscaping, and/or reduce speeding as well. In this regard, existing research suggests road diets might be more appropriate to complement these multiple goals than most other safety countermeasures.

6 – RECOMMENDATIONS

In a national context, there is little dispute that road diets improve safety and this report lends support to the FHWA's estimates that road diet treatments can reduce crashes upwards of 20 to 30 percent. While this report validates the findings of research elsewhere using data for Los Angeles, it does not address all concerns about road diets, nor does it explore their other potential benefits in any detail. With these caveats in mind, I offer the following recommendations in light of the findings presented here:

1) Study traffic and collisions on streets parallel to road diet corridors to better understand extent and effects of traffic diversion.

National best-practice suggests it is necessary to study similar but untreated corridors to extrapolate any effect of road diets (Thomas, 2013) and this report does just that. However, such adjacent control corridors may not be fully independent of the treatment if traffic is diverted by the road diets onto to the control corridors. In cases where it is accepted as fact that a proposed road diet will improve safety, some stakeholders (often nearby residents or motorists) object to them on the grounds that any safety or quality-of-life gains of a road diet might be off-set by rising collisions and traffic on parallel streets (Lopez, 2015). The possibility of traffic diverting in response to road diets is likely increased in an age with smartphone. Sometimes GPS applications (like Waze) direct people onto other routes, including lightly-traversed residential streets as a means of bypassing traffic on primary thoroughfares (Meredith, 2015). It would thus benefit debates over the merits of road diets to know the extent to which diversions occur by monitoring traffic volumes and collisions on nearby streets following the implementation of road diets.

A road diet project may warrant additional traffic calming features on nearby parallel streets to address local concerns and discourage traffic from diverting onto otherwise low-traffic, residential streets. Such traffic calming features can be built into the cost of the road diet as part of a mitigation measure before project implementation. Alternatively, traffic calming on parallel streets can be instituted after the road diet is implemented, if they are deemed necessary. Ultimately, it will be important to study nearby streets either way to better understand which conditions cause major traffic diversion, and where it diverts – if at all – after a road diet is installed.

2) Collect data to study variables other than traffic collisions.

Road diets are most often justified based on the grounds that they improve safety (Burden and Lagerwey, 1999; Knapp, et. al, 2014; J. Fisher, personal communication. 29 January 2016). Increasingly, however, it may not be sufficient for road diets to simply reduce collisions. Various city or community goals, especially those related to sustainability and economic development, may ask transportation projects be implemented to accomplish additional tasks such as promote bicycling, help attract local businesses, and improve local air quality. Research on road diets suggests that reducing the number of travel lanes can produce such "livability" benefits (Rosales, 2007; Knapp, et al., 2014). However, these potential benefits need to be studied in greater detail to determine how well road diets can advance multiple city initiatives and policy goals. Studying such factors can point to less tangible effects of road diets, such as the subjective safety and comfort they might afford (Road Diet Case Studies, 2015).

3) Combine road diets with other streetscape enhancements along corridor for greater effect.

This examination of road diet safety outcomes echoes findings from previous studies demonstrating that road diets are an effective way to reduce collisions. Road diets do not, however, address all neighborhood and safety concerns (Lopez, 2015; Zahniser and Nelson, 2015). To address these other concerns, it might be advisable to complement a road diet with other streetscape enhancements – such as landscaped medians, curb extensions, additional traffic signals – in the long-term to generate successful project delivery that addresses safety, community concerns, and local desired improvements.

4) Produce reports evaluating whether road diet project goals were met and make adjustments as needed.

Road diets are often most easily implemented through converting existing travel lanes into turning and bike lanes (Appendix A), but this latter reconfiguration can obscure the

public perception about what the road diet's goals are and whether the project should be considered a success. It is not uncommon for affected constituents to state that certain road diets have failed because the bike lanes created in the process are "underutilized." The goal of the road diet may not necessarily have been to increase bicycle ridership (Appendix A) but rather to create a center turn lane, reduce speeding, and decrease certain types of road conflicts (Road Diet Case Studies, 2015; Knapp, et. al, 2014; Burden and Lagerwey, 1999; J. Fisher, personal communication. 29 January 2016).

When implementing a road diet, it must be clear what the goals are to users of the corridor and toward that end the implementing agency (most likely the Department of Transportation) should produce and circulate follow-up reports on how effective the project was in achieving its goals (Road Diet Case Studies, 2015). If the primary goal was to reduce collisions, the project should be measured primarily on those terms. However, because a project may change the rate of driving, walking, and bicycling (Burden and Lagerwey, 1999; Road Diet Case Studies, 2015) it will be critical to collect traffic volume data. In some cases, the goal may indeed be to increase the amount of bicycling, or to reduce the number of people bicycling on the sidewalk. In such cases, data should be collected before road diet implementation to set the baseline conditions, and then evaluated based on how much it affected bicycle ridership. If a road diet does not achieve the desired change, it may need to be modified (Lopez, 2015). As noted in the previous recommendation, perhaps a road diet should be coupled with curb extensions to reduce collisions, or maybe the bike lane needs to be further enhanced by making it wider and painting it green to promote greater use.

Although the projects studied in this report all experienced varying degrees crash and injury reductions, it is unrealistic to assume all road diets will be resounding successes and not encounter any issues along the way (Meredith, 2015; Lopez 2015). The City should be willing to make adjustments as needed (perhaps an intersection might need a dedicated left turn signal phase or certain turning restrictions) without compromising the integrity and intent of road diet projects.

5) Consider road diets when resurfacing streets if there is a desire to improve safety along those corridors.

Of the roughly 113 miles of road diets documented as part of this research, at least 22 percent of them (about 25 miles) were installed as part of routine street resurfacing. The cost of a road diet is vastly reduced if implemented in conjunction with planned street resurfacing (Road Diet Case Studies, 2015; Knapp, et. al, 2014). Those 25 miles of road diets incurred negligible costs to the City as the streets were being partially or fully resurfaced anyway.

It is worthwhile to consider that of the five projects analyzed for this report, all but one (Lorena Street) were initiated by street resurfacing. These corridors experienced on average a 32.4 percent reduction in crashes, a 36.7 percent reduction in injuries, and required no road diet specific funding. The exact price tag of these projects is uncertain since they resulted mostly from street resurfacing. Using the estimated road diet cost of $50,000 per mile, the total for the 4.08 miles of road diets would be approximately $204,000. This is $46,000 less than estimated $250,000 to signalize a single intersection. In a time when transportation finance can be uncertain and projects compete for limited financial resources, the City should take advantage of street resurfacing opportunities to implement additional road diets as a means of addressing traffic safety.



Road diet under construction on Fairfax Avenue between Wiloughby Avenue and Melrose Avenue in May 2016. The street is being reduced from three lanes in each direction to two lanes in each direction to create space for buffered bike lanes.



Eagle Rock Boulevard between York Boulevard and Westdale Avenue in Northeast Los Angeles was reduced from three lanes to two lanes in the northbound direction to make room for a bike lane and a wider median in 1998.

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APPENDIX A: DOCUMENTED ROAD DIETS CITYWIDE

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Paseo Del Mar	Western Avenue	Roxbury Street	1.38	12/10/1980	2 lanes in each direction with curbside parking	1 lane westbound, 2 lanes eastbound, with bike lanes curbside parking	-
Pacific Avenue	Shepard Street	36th Street	0.3	12/10/1980	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Colfax Avenue	Moorpark Street	Chiquita Street	0.39	4/8/1981	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Crystal Springs Drive	Los Feliz Boulevard	Griffith Park Drive	1.45	10/8/1981	3 lanes in each direction	2 lanes in each direction with bike lanes	-
Eldridge Avenue	Polk Street	Sayre Street	0.53	1/4/1983	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Hope Street	18th Street	Washington Boulevard	0.09	11/4/1987	2 lanes in each direction with curbside parking	1 lane in each direction with angled parking on east side of street	-
San Pedro Street	3rd Street	5th Street	0.21	9/15/1988	3 lanes in each direction	2 lanes in each direction with curbside parking and center turn lane	Yes
Wilton Place	1st Street	2nd Street	0.14	9/14/1989	2 lanes in each direction	1 lane in each direction with center turn lane	-
Aviation Boulevard	93rd Street	Century Boulevard	0.42	11/1/1989	3 lanes in each direction	2 lanes in each direction with center turn lane	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Le Conte Avenue	Hillgard Avenue	Levering Avenue	0.4	4/29/1992	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Pershing Drive	Westchester Pkwy	Imperial Highway	1.6	1/26/1993	3 lanes in each direction	2 lanes in each direction with bike lanes	-
Wilton Place	3rd Street	2nd Street	0.13	7/1/1993	2 lanes in each direction	1 lane in each direction with center turn lane	-
Wilton Place	1st Street	Beverly Boulevard	0.2	7/1/1993	1 lane southbound, 2 lanes northbound	1 lane in each direction with center turn lane	-
Aviation Boulevard	Century Boulevard	Imperial Highway	1.98	7/21/1994	3 lanes in each direction	2 lanes in each direction with center turn lane	Yes
San Pedro Street	18th Street	Washington Boulevard	0.05	11/10/1994	3 lanes in each direction	2 lanes in each direction with center turn lane	Yes
103rd Street	Success Avenue	Compton Avenue	0.15	1/19/1996	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Via Marisol	Avenue 57	Monterey Road	0.4	6/7/1996	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
30th Street	McClintock Avenue	Royal Street	0.2	7/18/1996	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
McClintock Avenue	Jefferson Boulevard	30th Street	0.18	7/18/1996	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Rose Avenue	Lincoln Boulevard	7th Avenue	0.1	10/9/1996	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
6th Street	San Vicente Boulevard	Fairfax Avenue	0.66	5/22/1997	1 lane in each direction with curbside parking. 2 lanes in each direction during peak hours	1 lane in each direction with fulltime curbside parking	Yes
Ohio Avenue	Santa Monica Boulevard	Centinela Avenue	0.3	7/16/1997	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Boyle Avenue	540' North of Hollenbeck Drive	4th Street	0.25	11/17/1997	2 lanes in each direction	1 lane in each direction with center turn lane and curbside parking	-
Eagle Rock Boulevard	Avenue 34	Avenue 36	0.24	3/19/1998	3 lanes in each direction with center turn lane/ median and curbside parking	2 lanes in each direction with center turn lane/ median, bike lanes and curbside parking	-
Eagle Rock Boulevard	York Boulevard	Westdale Avenue	0.41	3/19/1998	3 lanes in each direction with center turn lane and curbside parking	2 lanes northbound, 3 lanes southbound, with center turn lane, bike lanes and curbside parking	-
Hauser Boulevard	6th Street	3rd Street	0.37	4/21/1998	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Pasadena Ave	Avenue 26	Avenue 35	0.5	5/6/1999	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Silver Lake Boulevard	Berkeley Avenue	Duane Street	0.54	6/24/1999	1 lane in each direction with center turn lane and curbside parking	1 lane in each direction with bike lanes and curbside parking	-
Silver Lake Boulevard	Sunset Boulevard	Berkeley Avenue	0.26	6/24/1999	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes, and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
9th Street	Western Avenue	Dodson Avenue	0.25	9/11/2000	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Westwood Boulevard	National Boulevard	Malcom Avenue	0.1	10/24/2000	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
111th Street	Aviation Boulevard	La Cienega Avenue	0.5	5/3/2001	2 lanes in each direction with no curbside parking	1 lane in each direction with center turn lane	Yes
Palms Boulevard	Sawtelle Boulevard	McLaughlin Avenue	0.31	5/16/2001	2 lanes in each direction with curbside parking	1 lane westbound, 2 lanes eastbound, with center turn lane and curbside parking	-
Wabash Avenue	Soto Street	Alma Avenue	0.7	11/6/2001	2 lanes eastbound, 1 lane westbound, with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Miraleste Drive	Suana Drive	1st Street / County Border	0.35	4/4/2002	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
9th Street	Western Avenue	Suana Drive	0.17	4/4/2002	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Cole Avenue	Cahuenga Boulevard	Melrose Avenue	0.84	7/15/2002	2 lanes in each direction with curbside parking	1 lane in each direction curbside parking on west side and angled parking on east side	-
Fair Park Avenue	Eagle Rock Boulevard	Maywood Avenue	0.2	9/12/2002	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Boyle Avenue	4th Street	1st Street	0.26	11/5/2002	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Commonwealth Avenue	Beverly Boulevard	Wilshire Boulevard	0.78	1/7/2003	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Monterey Road	City limit with South Pasadena	Huntington Drive	2	1/8/2003	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Avenue 64	York Boulevard	Meridian Street	0.4	1/23/2003	2 lanes in each direction	1 lane in each direction with curbside parking	-
York Boulevard	Glendale City Limit	Verdugo Road	0.41	2/26/2003	1 lane in each direction with center turn lane and curbside parking	1 lane in each direction with wide curbside parking lane	-
Motor Avenue	Pico Boulevard	Monte Mar Drive	0.51	9/25/2003	2 lanes in each direction with curbside parking. Made 2 lanes northbound, 1 lanes southbound, with center turn lane and curbside parking on 7/14/1998.	1 lane in each direction with center turn lane, bike lanes, and curbside parking	-
Coliseum Street	Sycamore Avenue	La Brea Avenue	0.05	10/2/2003	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Motor Avenue	National Boulevard	Manning Avenue	0.31	10/2/2003	2 lanes in each direction with curbside parking. Later 1 lane northbound, 2 lanes southbound, with center turn lane and curbside parking on 3/17/1999.	1 lane in each direction with center turn lane, bike lanes and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Pacific Avenue	36th Street	22nd Street	0.86	10/22/2003	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lane and curbside parking	-
Oxnard Street	De Soto Avenue	Winnetka Avenue	1.17	11/12/2003	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Avenue 66	York Boulevard	Meridian Street	0.5	1/12/2004	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, and curbside parking	-
Vista Street	Romaine Street	Wiloughby Avenue	0.1	1/17/2004	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
2nd Avenue	Slauson Avenue	54th Street	0.26	3/17/2004	1 lane in each direction with center turn lane and curbside parking	1 lane in each direction, angled parking on east side of street, curbside parking on west side of street	-
Fries Avenue	A Street	Anaheim Street	0.69	4/2/2004	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Tujunga Avenue	Dilling Street	Aqua Vista Street	0.11	4/28/2004	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Broad Avenue	Anaheim Street	Avalon Boulevard	0.73	6/22/2004	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Argyle Avenue	Dix Street	Holly Mont Drive	0.18	7/29/2004	1 lane in each direction with center turn lane and curbside parking	1 lane in each direction with angled parking on east side of street and curbside parking on west side of street	-
Hoover Street	109th Street	97th Street	0.71	10/29/2004	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Exposition Boulevard	Crenshaw Boulevard	Gramercy Place	1.24	12/21/2004	2 lanes in each direction	1 lane in each direction with center turn lane	-
Hope Street	Venice Boulevard	Pico Boulevard	0.22	2/10/2005	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane. Curbside parking on west side of street and angled parking on east side of street	-
Scott Avenue	Stadium Way	Elysian Park Drive	0.15	2/25/2005	2 lanes in each direction	1 lane in each direction with center turn lane	Yes
Buckingham Place / West Boulevard	Adams Boulevard	268' south of 23rd Street	0.18	7/19/2005	2 lanes in each direction	1 lane in each direction with center turn lane	Yes
2nd Street	Spring Street	Alameda Street	0.51	11/21/2005	1 lane in each direction with 2nd lane during peak hours	1 lane in each direction with curbside parking along some portions and center turn lane	-
Rose Avenue	Lincoln Boulevard	Walgrove Avenue	0.86	1/12/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
York Boulevard	Eagle Rock Boulevard	Avenue 55	1.3	3/16/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Union Avenue	Pico Boulevard	11th Street	0.21	6/1/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Union Avenue	Olympic Boulevard	9th Street	0.1	6/1/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Union Avenue	11th Street	Olympic Boulevard	0.09	6/1/2006	1 lane in each direction with 2 lanes during peak hours	1 lane in each direction with full-time curbside parking	-
Colfax Avenue	Riverside Drive	Burbank Boulevard	0.91	6/16/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Haskell Avenue	Roscoe Boulevard	South of Roscoe Boulevard	0.26	7/5/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Westchester Parkway	Pershing Drive	Georgetown Avenue	1.46	7/19/2006	3 lanes in each direction with median	2 lanes in each direction with median and bike lanes	Yes
Jefferson Boulevard	Main Street	Avalon Boulevard	0.46	7/21/2006	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Montana Street	Echo Park Avenue	Glendale Boulevard	0.21	2/8/2007	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Jefferson Boulevard	Grand Avenue	Main Street	0.21	3/7/2007	2 lanes in each direction with curbside parking	1 lane westbound, 2 lanes eastbound, with center turn lane and curbside parking	-
Montana Avenue	Bundy Drive	San Vicente Boulevard	0.19	3/16/2007	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Montana Avenue	San Vicente Boulevard	Barrington Avenue	0.17	3/16/2007	2 lanes in each direction with curbside parking	2 lanes southbound, 1 lane northbound with center turn lane and curbside parking	-
Montana Avenue	Barrington Avenue	Bringham Avenue	0.18	3/16/2007	2 lanes southbound, 1 lane northbound, with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Eldridge Avenue	Aztec Street	(El Cariso Golf Course Entrance)	0.26	8/28/2007	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, curbside parking on south side and angled parking on north side	-
Lorena Street	4th Street	Cesar E. Chavez Avenue	0.46	11/1/2007	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
La Tuna Canyon Road	Sunland Boulevard	3,248' E/O Elben Avenue	2.46	12/4/2007	2 lanes in each direction	1 lane in each direction with center turn lane and bike lanes	Yes
Main Street	108th Street	120th Street	0.99	12/10/2007	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Tujunga Avenue	Strathern Street	Saticoy Street	0.48	2/26/2008	2 lanes in each direction with center turn lane and curbside parking	2 lanes northbound, 1 lane southbound, with center turn lane and curbside parking	Yes
Santa Rosalia Drive	Hillcrest Drive	Marlton Avenue	0.21	3/6/2008	2 lanes southbound, 1 lane northbound with curbside parking	1 lane in each direction with center turn lane and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Santa Rosalia Drive	Coliseum Street	Hillcrest Drive	0.44	3/6/2008	2 lanes southbound, 1 lane northbound, with center turn lane and curbside parking	1 lane in each direction with angled parking on west side and curbside parking on east side	-
Tujunga Avenue	Sherman Way	Saticoy Street	0.48	5/1/2008	2 lanes in each direction with curbside parking	1 lane in ach direction with center turn lane and curbside parking	Yes
108th Street	Vermont Avenue	Hoover Street	0.24	7/9/2008	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	-
Anaheim Street	Farragut Avenue	Henry Ford Avenue	0.76	11/17/2008	3 lanes eastbound, 2 lanes westbound, with center turn lane between Sigsbee Avenue and Farragut Avenue	2 lanes in each direction with center turn lane (extended west to Henry Ford Avenue) and bike lanes	-
Myra Avenue	Fountain Avenue	Santa Monica Boulevard	0.39	2/9/2009	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Main Street	92nd Street	99th Street	0.42	2/28/2009	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Via Marisol	Monterey Road	Via Mia	0.25	3/29/2009	2 lanes in each direction with center turn lane	1 lane in each direction center turn lane	Yes
Jefferson Boulevard	Central Avenue	Avalon Boulevard	0.54	9/17/2009	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
James M. Woods Boulevard	Hoover Street	Golden Avenue	1.1	12/3/2009	2 lanes eastbound, 1 lane westbound, with center turn lane and curbside parking on north side	1 lane in each direction with center turn lane and curbside parking	Yes

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Hoover Street	120th Street	109th Street	0.9	3/16/2010	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
San Pedro Street	115th Street	120th Street	0.42	5/26/2010	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Louise Avenue	Lassen Street	Devonshire Street	0.48	7/28/2010	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Wilbur Avenue	Nordhoff Street	Mayall Avenue	1.24	8/26/2010	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Main Street	99th Street	108th Street	0.55	5/19/2011	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Via Dolce	Marquesas Way	Washington Boulevard	0.42	7/22/2011	2 lanes in each direction with center turn lane and curbside parking	1 lane southbound, 2 lanes northbound, with center turn lane, bike lanes and curbside parking	Yes
7th Street	Catalina Street	Figueroa Street	2.2	8/30/2011	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Spring Street	Cesar E. Chavez Avenue	9th Street	1.4	11/20/2011	3 full-time southbound lanes, 1 peak-hour southbound bus lane, 1 peak-hour southbound lane	3 full-time southbound lanes north of 2nd St., 2 full-time southbound lanes south of 2nd St., 1 peak-hour southbound lane south of 2nd St. Bike lanes throughout.	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Main Street	Marine Street	Winward Circle	0.64	1/29/2012	2 lanes each direction with curbside parking	1 lane each direction with center turn lane, bike lanes, and curbside parking	-
Liemert Boulevard	Vernon Avenue	Sutro Avenue	0.65	2/9/2012	3 lanes in each direction, landscaped median, curbside parking	2 lanes in each direction, landscaped median, angled parking	-
Main Street	16th Street	9th Street	0.68	2/12/2012	2 lanes in each direction with center turn lane and curbside parking	1 lane southbound, 2 lanes northbound, with center turn lane, bike lanes and curbside parking	-
Los Angeles Street	Alameda Street	1st Street	0.43	6/10/2012	3 full-time lanes each direction with center turn lane	2 lanes each direction with center turn lane and bike lanes	-
Winnetka Avenue	Devonshire Street	Nordhoff Street	1.74	6/10/2012	2 full-time lanes each direction, 1 peak-hour lane each direction with center turn lane	2 lanes each direction with center turn lane and bike lanes	-
1st Street	Grand Avenue	San Pedro Street	0.55	6/20/2012	2 full-time lanes each direction with center turn lane, 1 peak-hour lane each direction	2 lanes each direction with center turn lane and bike lanes	-
Main Street	9th Street	Cesar E. Chavez Avenue	1.5	6/25/2012	3 full-time northbound lanes, 1 full-time northbound bus lane from 9th St. to 6th St.; 3 full-time northbound lanes, 1 peak-hour northbound bus lane from 6th St. to 1st St.	3 northbound lanes from 9th St. to 5th St.; 2 full-time northbound lanes, 1 northbound peak-hour lane from 5th St. to 2nd St.; 3 northbound lanes from 2nd St. to 1st St. Bike lanes throughout	-

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Hoover Street	90th Street	88th Street	0.19	8/8/2012	2 lanes northbound, 1 lane southbound, with curbside parking	1 lane in each direction with curbside parking	-
Adams Boulevard	Main Street	Central Avenue	1.39	8/14/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
Gaffey Street	19th Street	23rd Street	0.23	9/20/2012	2 lanes in each direction with curbside parking	1 lane in each direction with curbside parking and center turn lane	Yes
Grand Avenue (S/B only)	Washington Boulevard	Wilshire Boulevard	1.3	9/23/2012	4 southbound lanes with curbside parking	3 southbound lanes with bike lanes and curbside parking	-
Olive Street	7th Street	Washington Boulevard	1.2	9/23/2012	4 northbound lanes with curbside parking	3 northbound lanes with bike lanes and curbside parking	-
York Boulevard	Avenue 55	Figueroa Street	0.85	10/2/2012	2 lanes in each direction with center turn lane and curbside parking	1 lane westbound, 2 lanes eastbound with center turn lane, bike lanes and curbside parking	-
Motor Avenue	Venice Boulevard	National Boulevard	0.7	10/26/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Santa Monica Boulevard	Virgil Avenue	Gateway Avenue	0.3	11/11/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
8th Street	Boyle Avenue	Olympics Boulevard	1.41	11/11/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Opp Street	Fries Avenue	Banning Boulevard	0.38	12/12/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Wilmington Boulevard	C Street	Anaheim Street	0.48	12/20/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Neptune Avenue	C Street	Anaheim Street	0.48	12/21/2012	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
5th Street	Mesa Street	Harbor Boulevard	0.33	1/25/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with angled parking on both sides	-
Alla Road	Maxella Avenue	Marina Expwy. (SR-90)	0.6	2/23/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane northbound, 2 lanes southbound, with center turn lane, bike lanes and curbside parking	-
Rowena Avenue	Hyperion Avenue	Glendale Boulevard	0.45	3/11/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Scott Avenue	Elysian Park Drive	McDuff Street	0.09	3/14/2013	1 lane in each direction with 2 lanes during peak hours	1 lane in each direction with bike lanes and full-time curbside parking	-
Cypress Avenue	Arroyo Seco Avenue	Idell Street	0.25	3/24/2013	3 lanes westbound, 1 lane eastbound with center turn lane and curbside parking	2 lanes westbound, 1 lane eastbound with center turn lane, bike lanes and curbside parking	-
Griffin Avenue	Altura Street	Mission Road	0.86	3/31/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Zonal Avenue	Mission Road	State Street	0.18	3/31/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
San Pedro Street	Vernon Avenue	Jefferson Boulevard	0.83	3/31/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Cylbourn Avenue	San Fernando Road	Sherman Way	0.98	4/3/2013	2 lanes in each direction with center turn lane and curbside parking	2 lanes southbound, 1 lane northbound, with center turn lane, bike lanes and curbside parking	-
54th Street	7th Avenue	Arlington Avenue	0.38	4/14/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
1st Street	Grand Avenue	Beaudry Avenue	0.34	4/14/2013	2 full-time lanes each direction with center turn lane, 1 peak-hour lane each direction	2 lanes each direction with center turn lane and bike lanes	-
Capitol Drive	Western Avenue	Gaffey Street	1.02	5/5/2013	2 lanes in each direction with center turn lane and curbside parking	2 lanes westbound, 1 lane eastbound, with center turn lane, bike lanes and curbside parking	-
Westmont Drive	Western Avenue	Gaffey Street	1.03	5/5/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
E Street	Avalon Boulevard	Alameda Street	0.7	5/8/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Eagle Rock Boulevard	Fair Park Avenue	Colorado Boulevard	0.19	5/10/2013	3 lanes in each direction with center turn lane and curbside parking	2 lanes in each direction with center turn lane, bike lanes and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Montana Street	Alvarado Street	Glendale Blvd	0.07	5/10/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Avalon Boulevard	L Street	Harry Bridges Boulevard	1.05	5/20/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Broad Avenue	Anaheim Street	PCH	0.75	5/29/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
San Pedro Street	115th Street	Florence Avenue	3.1	6/9/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
25th Street	Western Avenue	Patton Avenue	0.42	6/17/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
25th Street	Mermaid Drive	Western Avenue	0.69	6/17/2013	2 lanes eastbound, 1 lane westbound, with center turn lane	1 lane in each direction with center turn lane and bike lanes	-
E Street	Wilmington Boulevard	Alameda Street	1.4	6/17/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
120th Street	Hoover Street	Broadway	0.48	6/18/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
120th Street	Vermont Avenue	Hoover Street	0.24	6/18/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Mission Road	North Main Street	North Broadway	0.77	6/30/2013	2 lanes in each direction with center turn lane, and curbside parking (restricted during peak hours)	1 lane southbound, 2 lanes northbound, with center turn lane, bike lanes, and full-time curbside parking	-
San Pedro Place	Main Street	41st Place	0.46	6/30/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Compton Avenue	Century Boulevard	104th Street	0.3	7/1/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Paseo Del Mar	Roxbury Street	Gaffey Street	0.5	7/16/2013	2 lanes in each direction	1 lane in each direction with center turn lane and bike lanes	Yes
Main Street	Winward Circle	Venice Way	0.02	8/25/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
120th Street	Broadway	Main Street	0.23	8/25/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Grand Boulevard	Winward Circle	Venice Boulevard	0.33	8/25/2013	2 lanes in each direction with curbside parking	1 lane westbound, 2 lanes eastbound, with center turn lane, bike lanes and curbside parking	-
Colorado Boulevard	Broadway	Dahlia Drive	1.5	10/4/2013	3 lanes in each direction with center turn lane and curbside parking	2 lanes in each direction with center turn lane, bike lanes and curbside parking	-
Colorado Boulevard	Mount Helena Avenue	Figueroa Street	0.5	10/4/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane eastbound, 2 lanes westbound, with center turn lane, bike lanes, and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
7th Street	Figueroa Street	Main Street	0.6	10/31/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
2nd Street	Figueroa Street	Hill Street	0.37	11/11/2013	2 lanes in each direction	1 lane in each direction with bike lanes	-
2nd Street	Toluca Street	Figueroa Street	0.42	11/11/2013	2 lanes in each direction with center turn lane and curbside parking	1 lane westbound, 2 lanes eastbound, with center turn lane, bike lanes and curbside parking	-
2nd Street	Hill Street	Spring Street	0.13	11/11/2013	"1 lane eastbound, 2 lanes westbound, with curbside parking on south side of street during off-peak hours. During peak-hours, 2 lanes in each direction.	1 lane in each direction with bike lanes and full-time parking on south side of street.	-
Grand Avenue	30th Street	Washington Boulevard	0.95	12/15/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Clybourn Avenue	Victory Boulevard	Vanowen Street	0.48	12/31/2013	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Virgil Avenue	Santa Monica Boulevard	Fountain Avenue	0.32	1/17/2014	2 lanes in each direction with curbside parking	1 lane northbound, 2 lanes southbound, with center turn lane and curbside parking	Yes
Virgil Avenue	Santa Monica Boulevard	Melrose Avenue	0.48	1/17/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Broadway	1st Street	11th Street	1.22	1/29/2014	2 lanes in each direction with curbside parking and 3rd northbound peak hour lane	1 lane southbound, 2 lanes northbound, with widened sidewalks and curbside parking	-
Canoga Avenue	Devonshire Street	Germain Street	0.39	2/6/2014	2 lanes in each direction with center turn lane	1 lane in each direction with center turn lane and bike lanes	Yes
48th Street	Crenshaw Boulevard	Normandie Avenue	1.73	3/13/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
York Boulevard	Avenue 64	Arroyo Verde Dr (South Pasadena City Limit)	0.32	4/13/2014	2 lanes in each direction with center turn lane and curbside parking	1 lane eastbound, 2 lanes westbound, with center turn lane, bike lanes and curbside parking	Yes
Chase Street	Van Nuys Boulevard	Snowden Avenue	0.84	4/28/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
1st Street	Vermont Avenue	Commonwealth Avenue	0.32	4/28/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane and curbside parking	Yes
San Vicente Boulevard	Bundy Drive	Darlington Avenue	0.58	5/17/2014	2 lanes in each direction with center turn lane and curbside parking. Eastbound direction has 3rd peak hour lane.	2 lanes in each direction with center turn lane, bike lanes and full-time curbside parking.	-
Wilmington Avenue	Century Boulevard	104th Street	0.27	5/20/2014	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Loyola Boulevard	Westchester Parkway	Lincoln Boulevard	0.3	5/20/2014	1 lane southbound, 2 lanes northbound, with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
West Boulevard	Slauson Avenue	68th Street	0.82	5/20/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Grand Avenue	30th Street	39th Street	0.73	5/20/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Califa Street	Topanga Canyon Boulevard	De Soto Avenue	0.83	5/27/2014	2 lanes eastbound, 1 lane westbound, with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Foothill Boulevard	Balboa Boulevard	Filbert Street	0.74	6/9/2014	2 lanes in each direction with center turn lane	1 lane in each direction with center turn lane and bike lanes	-
Foothill Boulevard	1000' east of Bledsoe Street	1300' east of Glenoaks Boulevard	1.26	6/9/2014	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Foothill Boulevard	Yarnell Street	700' east of Excelsior Street	0.32	6/9/2014	2 lanes westbound, 1 lane eastbound, with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Figueroa Street	F Street	I Street	0.24	6/17/2014	2 lanes in each direction with curbside parking	1 lane southbound, 2 lanes northbound, with center buffer, bike lanes and curbside parking	Yes
Figueroa Street	Pacific Coast Highway	I Street	0.72	6/17/2014	2 lanes in each direction with center turn lane and curbside parking	1 lane southbound, 2 lanes northbound, with center turn lane, bike lanes and curbside parking	Yes
Venice Way	Pacific Avenue	Venice Boulevard	0.32	7/2/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-

Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Vineland Avenue	Ventura Boulevard	Moorpark Street	0.66	7/17/2014	3 lanes in each direction with center turn lane and curbside parking	2 lanes northbound, 3 lanes southbound, with center turn lane, bike lanes and curbside parking	Yes
Slauson Avenue	Alsace Avenue	Alviso Avenue	0.22	8/1/2014	2 lanes in each direction with center turn lane and curbside parking. 3 lanes in each direction during peak hours	2 lanes in each direction with center turn lane, bike lanes and full-time curbside parking	-
Slauson Avenue	Angeles Vista Boulevard	Alsace Avenue	0.2	8/1/2014	2 lanes in each direction with center turn lane and curbside parking. 3 lanes in each direction during peak hours	2 lanes westbound, 3 lanes eastbound, with center turn lane, bike lanes and full-time curbside parking on north side of street	-
Pacific Avenue	22nd Street	15th Street	0.42	8/6/2014	2 lanes in each direction with curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	Yes
Clybourn Avenue	Victory Boulevard	Chandler Boulevard	1.47	9/11/2014	2 lanes in each direction with center turn lane and curbside parking	1 lane in each direction with center turn lane, bike lanes and curbside parking	-
Imperial Highway	Vermont Avenue	Figueroa Street	0.49	11/18/2014	2 lanes in each direction with center turn lane and curbside parking. During peak-hours, 3 lanes in each direction	2 lanes in each direction with center turn lane and curbside parking.	Yes
Avalon Boulevard	Water Street	Harry Bridges Boulevard	0.28	2/21/2015	2 lanes in each direction	1 lane in each direction with center turn lane and bike lanes	Yes
Venice Boulevard	La Fayette Road	Crenshaw Boulevard	0.32	3/1/2015	3 lanes in each direction with center turn lane	2 lanes westbound, 3 lanes eastbound, with center turn lane and bike lanes	Yes

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Street	Extent 1	Extent 2	Length (mi)	Install Date	Old Configuration	New Configuration	Resurfacing Project?
Venice Boulevard	Crenshaw Boulevard	7th Avenue	0.2	3/1/2015	2 lanes in each direction with center turn lane and curbside paring. 3rd peak hour lane	2 lanes in each direction with center turn lane and bike lanes	Yes
Venice Boulevard	7th Avenue	Arlington Avenue	0.4	3/1/2015	3 lanes in each direction with center turn lane and curbside parking	2 lanes in each direction with center turn lane and curbside parking	Yes
Devonshire Street	Haskell Avenue	Sepulveda Boulevard	0.47	4/23/2015	3 lanes in each direction with center turn lane	2 lanes in each direction with center turn lane and bike lanes	-
Vineland Avenue	Ventura Boulevard	Moorpark Street	0.66	8/28/2015	2 lanes northbound, 3 lanes southbound, with center turn lane and curbside parking	2 lanes in each direction with center turn lane and curbside parking	Yes
Vineland Avenue	Moorpark Street	Chandler Boulevard	1.21	8/28/2015	3 lanes in each direction with center turn lane and curbside parking	2 lanes in each direction with center turn lane and curbside parking	Yes
Edgemont Street	Santa Monica Boulevard	Melrose Avenue	0.5	10/1/2015	1 lane in each direction with center turn lane and curbside parking	1 lane in each direction with bike lanes and curbside parking	Yes
Anaheim Street	Vermont Avenue	Western Avenue	0.65	12/21/2015	2 lanes in each direction	1 lane westbound, 2 lanes eastbound, with center turn lane	-
		Total	113.27				

APPENDIX B: LADOT TRAFFIC COUNTS USED IN STUDY

Alhambra Avenue

Intersection	Date	ADT
Hollister Ave	2/5/2003	17,019
Warwick Ave	4/30/2003	16,916
Warwick Ave	4/30/2003	16,938
Lowell Ave	4/13/2007	14,977
Lombardy Blvd	4/13/2007	17,954
Lowell Ave	5/17/2007	16,344
Lowell Ave	8/15/2007	15,959
Lowell Ave	10/12/2011	16,955
Warwick Ave	10/12/2011	16,177
Lombardy Blvd	10/12/2011	12,454
Druid St	10/12/2011	14,391
Druid St	11/3/2015	19,160

Cesar Chavez Avenue

Intersection	Date	ADT
Bernal Street	1/9/2002	20,148
Evergreen Avenue	1/9/2002	20,270
Soto Street	1/9/2002	19,699
Evergreen Avenue	3/29/2002	15,208
Evergreen Avenue	8/23/2002	21,854
Evergreen Avenue	8/24/2002	20,829
Evergreen Avenue	8/25/2002	18,685
Fresno Street	7/17/2003	18,259
Evergreen Avenue	7/12/2004	22,022
Soto Street	7/12/2004	18,313
Fresno Street	4/26/2005	20,332
Fickett Street	2/2/2006	21,170
Fickett Street	3/23/2006	18,725
Bernal Street	6/4/2008	24,726
Forest Avenue	4/24/2009	22,997
Saratoga Street	4/24/2009	23,549

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Colfax Avenue

Intersection	Date	ADT
Chandler Boulevard	6/2/2003	12,454
Chandler Boulevard	8/27/2003	10,983
Riverside Drive	4/6/2004	11,947
Mc Cormick Street	6/4/2004	10,269
Weddington Street	7/6/2004	12,222
Weddington Street	9/15/2005	11,807
Mc Cormick Street	9/15/2005	12,425
Magnolia Boulevard	8/21/2006	16,443
Chandler Boulevard	9/13/2006	12,482
Mc Cormick Street	1/22/2007	9,355
La Maida Street	10/26/2007	12,688
Burbank Boulevard	3/26/2008	12,594
Burbank Boulevard	9/14/2010	11,179
Riverside Drive	9/14/2010	13,091
Magnolia Boulevard	1/8/2014	11,791
Riverside Drive	1/8/2014	12,315
Chandler Boulevard	1/13/2014	9,986

Eastern Avenue

Intersection	Date	ADT
Druid Street	5/4/2007	15,147
Valley Boulevard	5/4/2007	14,480
Huntington Drive	5/17/2007	20,281
Klamath Street	4/29/2009	15,977
Gambier Street	4/20/2010	18,216
Norelle Street	4/20/2010	14,772
Huntington Drive	6/13/2013	18,700
Gambier Street	6/13/2013	16,495
Klamath Street	6/13/2013	15,628
Norelle Street	6/17/2013	14,767
Druid Street	6/17/2013	14,123
Valley Boulevard	6/17/2013	14,512
Gambier Street	9/24/2015	21,272

Fletcher Drive

Intersection	Date	ADT
San Fernando Road	5/24/2001	18,197
Larga Avenue	8/3/2001	19,173
San Fernando Road	2/27/2002	21,529
Larga Avenue	6/27/2002	19,407
Larga Avenue	8/6/2002	16,628
La Clede Avenue	8/7/2002	19,122
Atwater Avenue	8/14/2002	16,273
Avenue 32	6/17/2003	16,231
San Fernando Road	8/25/2003	18,537
Weldon Avenue	12/18/2003	16,107
Larga Avenue	6/14/2004	19,237
Larga Avenue	7/5/2005	18,547
Larga Avenue	6/12/2006	18,596
Avenue 35	6/14/2006	10,164
San Fernando Road	9/12/2006	19,374
Weldon Avenue	5/8/2007	13,148
Andrita Street	5/9/2007	13,160
Larga Avenue	6/8/2007	19,265
Larga Avenue	8/6/2008	17,933
Avenue 32	10/23/2008	13,796
Estara Avenue	10/23/2008	12,008
Larga Avenue	6/29/2009	19,899
Larga Avenue	6/28/2010	21,193
Larga Avenue	9/30/2010	17,422

Lorena Street

Intersection	Date	ADT
1st Street	6/25/2002	7,771
1st Street	8/23/2002	11,062
1st Street	8/24/2002	11,805
1st Street	8/25/2002	11,192
Cesar Chavez Avenue	7/9/2004	7,309
1st Street	7/9/2004	12,229
Cesar Chavez Avenue	1/9/2008	7,102
4th Street	6/10/2008	3,723
1 st Street	8/28/2009	3,882
Cesar Chavez Avenue	4/21/2010	6,868
1st Street	4/23/2010	11,734
1st Street	4/24/2010	7,955
1st Street	4/25/2010	13,402
1st Street	5/14/2010	10,941
1st Street	5/15/2010	11,329
1st Street	5/16/2010	10,559
1st Street	5/19/2010	9,449

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Main Street ('07)

Intersection	Date	ADT
Imperial Highway	7/2/2001	9,351
112th Street	4/29/2005	13,207
111th Street	1/31/2006	12,295
Imperial Highway	4/27/2007	15,219
118th Place	12/3/2008	8,350
Imperial Highway	4/6/2010	13,708
119th Street	4/7/2010	8,699
117th Street	7/27/2011	7,011
120th Street	7/27/2011	7,631
Imperial Highway	7/27/2011	9,524
111th Street	7/27/2011	10,259
108th Street	7/28/2011	8,347
119th Street	10/21/2014	8,188
117th Street	10/21/2014	8,605
111th Street	10/21/2014	15,037
108th Street	10/22/2014	11,596

Main Street ('09)

Intersection	Date	ADT
92 nd ST	7/5/2001	10,446
95 th ST	2/8/2008	12,671
92 nd ST	2/13/2008	12,324
92 nd ST	3/25/2010	11,929
92 nd ST	4/7/2010	11,175
95 th ST	7/26/2011	12,666

Rowena Avenue

Intersection	Date	ADT
Avenel Street	8/13/2002	18,417
Glendale Boulevard	12/6/2002	21,132
Hyperion Avenue	12/6/2002	20,146
Rokeby Street	12/6/2002	24,084
Avenel Street	12/9/2002	24,731
Silver Lake Drive	12/9/2002	23,462
Avenel Street	1/14/2004	25,807
Avenel Street	3/14/2006	20,671
Silver Lake Drive	6/9/2006	28,996
Silver Lake Drive	6/9/2006	27,629
Silver Lake Drive	6/12/2006	26,777
Silver Lake Drive	6/12/2006	25,767
Glendale Boulevard	10/22/2008	27,938
Hyperion Avenue	10/23/2008	19,059
Rokeby Street	10/27/2008	24,895

San Fernando Mission Boulevard

Intersection	Date	ADT
Woodley Avenue	2/2/2001	13,532
Hayvenhurst Avenue	8/6/2003	12,284
Gothic Avenue	8/7/2003	11,487
Gaynor Avenue	8/7/2003	10,375
Ruffner Avenue	8/18/2003	11,092
Haskell Avenue	12/2/2003	13,261
Hayvenhurst Avenue	1/7/2004	10,834
Woodley Avenue	6/29/2010	9,996
Haskell Avenue	8/9/2010	12,262

San Pedro Street

Intersection	Date	ADT
111th Street	12/17/2003	11,309
111th Street	4/14/2004	11,235
93rd Street	5/5/2004	10,058
84th Place	3/16/2005	10,364
94th Street	3/16/2005	9,837
110th Street	3/17/2005	15,485
109th Street	3/18/2005	12,302
78th Street	5/20/2005	12,053
78th Street	5/26/2005	13,307
Florence Avenue	8/15/2005	13,943
84th Street	10/11/2006	12,132
111th Street	10/18/2006	11,063
78th Street	1/8/2007	12,864
78th Street	1/10/2007	11,179
Imperial Highway	2/16/2007	10,537
87th Place	5/30/2007	11,821
87th Place	6/15/2007	10,133
111th Street	9/24/2008	12,852
76th Street	11/20/2008	11,870
113th Street	6/17/2009	9,475
93rd Street	10/23/2009	11,730
94th Street	10/23/2009	11814
93rd Street	10/28/2009	9189
94th Street	11/4/2009	9358
109th Street	2/17/2010	9818
78th Street	3/8/2010	10707
84th Place	3/12/2010	10335
113th Street	4/22/2010	9557
84th Place	11/18/2010	12568

Saticoy Street

Intersection	Date	ADT
Back Avenue	6/28/2004	11,021
Camellia Avenue	6/28/2004	9,487
Fair Avenue	6/30/2004	7,381
Beck Avenue	9/29/2006	8,954
Elmer Avenue	12/1/2008	8,093

Soto Street

Intersection	Date	ADT
Cesar Chavez Avenue	1/9/2002	21,555
4th Street	2/6/2002	22,607
Wabash Avenue	2/6/2002	22,176
1st Street	3/29/2002	21,989
Folsom Street	7/22/2002	20,749
Folsom Street	8/22/2002	16,786
1st Street	9/13/2002	22,523
1st Street	9/14/2002	19,491
1st Street	9/15/2002	16,433
1st Street	7/8/2004	20,626
Cesar Chavez Avenue	7/12/2004	20,837
4th Street	6/29/2006	16,452
Folsom Street	6/19/2008	22,782
Wabash Avenue	12/3/2008	23,677
4th Street	12/4/2008	21,978
1st Street	7/15/2009	20,022
Folsom Street	7/31/2009	22,884

West Boulevard

Intersection	Date	ADT
Hyde Park Boulevard	5/9/2001	16,828
Hyde Park Boulevard	6/5/2002	15,972
Hyde Park Boulevard	5/14/2003	14,955
Hyde Park Boulevard	5/24/2004	15,067
58th Place	1/19/2005	15,634
Florence Avenue	1/19/2005	11,398
Hyde Park Boulevard	6/13/2005	15,829
Hyde Park Boulevard	5/23/2006	16,372
Hyde Park Boulevard	12/19/2006	15,658
Hyde Park Boulevard	5/15/2007	16,126
Hyde Park Boulevard	7/23/2008	14,703
Hyde Park Boulevard	4/23/2009	16,689
Hyde Park Boulevard	5/10/2010	16,912

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Whittier Boulevard

Intersection	Date	ADT
Lorena Street	2/7/2002	25,493
Soto Street	2/7/2002	17,371
Fresno Street	6/11/2002	19,644
Orme Avenue	6/11/2002	19,019
Fresno Street	6/14/2002	23,942
Orme Avenue	7/2/2002	18,393
Fresno Street	7/19/2002	19,065
Fresno Street	7/19/2002	20,671
Lorena Street	3/8/2005	22,783
Boyle Avenue	3/5/2007	13,235
Soto Street	3/5/2007	18,767
Euclid Street	3/6/2007	20,550
Lorena Street	3/7/2007	27,887
Fresno Street	6/4/2008	23,094
Lorena Street	5/4/2010	27,179
Orme Avenue	7/28/2010	21,100

York Boulevard

Intersection	Date	ADT
Avenue 49	6/20/2003	17,757
Hazelwood Avenue	7/9/2004	23,690
Armadale Avenue	7/12/2004	22,996
Armadale Avenue	7/2/2007	22,562
Avenue 45	7/2/2007	22,749
Avenue 50	7/2/2007	22,337
Avenue 49	11/27/2007	22,057
Eagle Rock Boulevard	11/27/2007	17,636
Hazelwood Avenue	11/27/2007	23,291
Eagle Rock Boulevard	6/10/2008	32,021
Avenue 54	11/13/2008	21,871
Avenue 54	6/29/2009	22,199

48th Street

Intersection	Date	ADT
Western Avenue	7/11/2003	8,207
Western Avenue	8/3/2004	8,150
Crenshaw Boulevard	3/29/2005	8,491
11th Ave	4/8/2005	10,549
Western Avenue	7/25/2005	8,123
Western Avenue	7/14/2006	8,947
8th Ave	12/21/2006	9,477
Western Avenue	7/19/2007	7,919
Western Avenue	8/13/2008	7,574
Western Avenue	7/15/2009	9,350
Western Avenue	7/15/2010	8,109
Halldale Avenue	12/8/2010	10,794
Cimarron Avenue	12/8/2010	10,963
5th Avenue	12/8/2010	10,535
11th Avenue	12/8/2010	13,615
Western Avenue	7/2/2012	12,920
Western Avenue	7/11/2012	8,593
10th Avenue	1/29/2014	9,747
Halldale Avenue	5/8/2014	7,460
9th Avenue	11/12/2015	10,733
9th Ave	11/12/2015	10,757

RELINQUISHMENT ASSESSMENT REPORT

For State Route 187 relinquishment within the City of Los Angeles and Culver City

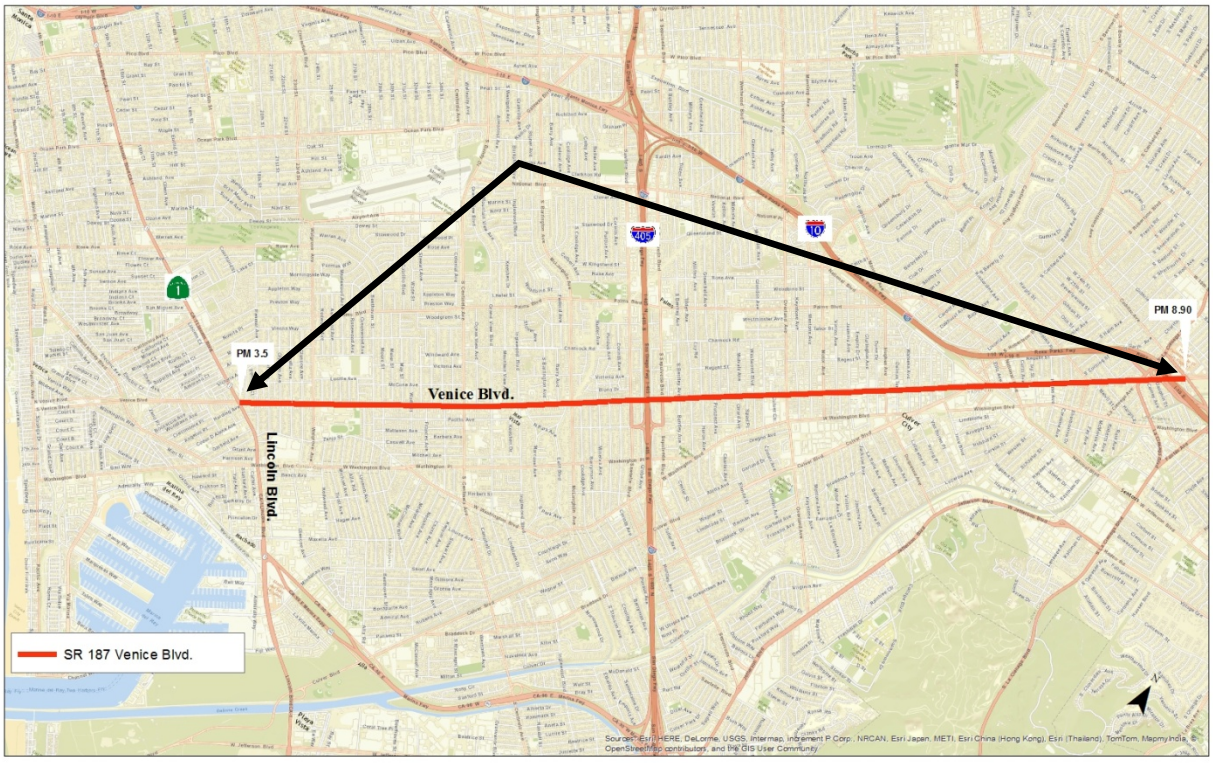
DISTRICT 7

FEBRUARY 28, 2015

Prepared by

Office of Transportation Planning
Division of Planning and Local Assistance
District 7, Department of Transportation

PROPOSED RELINQUISHMENT



State Route (SR) 187, known as Venice Boulevard, extends from PM 3.5 – PM 8.905. This Route is 5.405 miles long and is located from SR-1 (Lincoln Blvd) to Cadillac Ave, just past Interstate 10 (I-10).

Disclaimer: The information and data contained in this document are for planning purposes only and should not be relied upon for final design of any project. Any information in this Relinquishment Assessment Report (RAR) is subject to modification as conditions change and new information is obtained. Although planning information is dynamic and continually changing, the District 07 Transportation Planning Office makes every effort to ensure the accuracy and timeliness of the information contained in the RAR. The information in the RAR does not constitute a standard, or regulation, nor is it intended to address design policies and procedures.

California Department of Transportation

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

I approve this Relinquishment Assessment Report of the proposed relinquishment of State Route 187 to the City of Los Angeles.

David Sosa
Acting Deputy District Director
Division of Planning
District 07

David Sosa

Date: 2/26/15

Carrie Bowen
District Director
District 07

Carrie L Bowen

Date: 2/26/15

Approved:

Reza Nevai

Reza Nevai
Chief, Office of Multimodal
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Date: 3/10/15

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Katie Benouar
Chief, Division of
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Date: 3/12/15

Caltrans

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Elements of the State Route Relinquishment Assessment Report

The information provided below should be used by the District and the System Planning Branch in Headquarters to determine whether there is a State Highway System need to retain state ownership of the highway or whether the facility is appropriate for relinquishment. Both the state route RAR and the park and ride lot RAR have six elements to help describe and document the relinquishment. Within each element are various actions that help describe each element. For example, element 1 of a state route relinquishment has five actions which are indicated by the letters A-E. This information is the basis of the RAR Template.

1. Description of Route and Basis of Request for Relinquishment

A. Action: provide county, route-number, post miles, functional classification, and other designations such as Surface Transportation Assistance Act (STAA) truck terminal access route, Interregional Road System (IRRS), or other designations as applicable.

- **County, Route, Post Mile and Location Description**

  - County of Los Angeles, Venice Boulevard, also known as State Route 187 (SR-187), from Post Mile (PM) 3.5 – PM 8.905. SR-187 is 5.405 miles long and is located from SR-1 (Lincoln Blvd) to Cadillac Ave, just past Interstate 10 (I-10) within the City of Los Angeles. Except for a small segment from approximately Bledsoe Ave. (PM 5.6) to Overland Ave. (PM 6.6), that shares City of Los Angeles boundaries with the city limits of Culver City inside SR-187 right of way. SR-187 is a 6- lane conventional highway type.

- **Route Classification**

  - **Functional classification:** The Functional Classification system, implemented by the Federal government in 1976 to help states and their DOT's for many years as a management tool in a variety of areas pertaining to highways. Federal, State, and local government use this tool to assign jurisdictional responsibility, allocate funds, and establish appropriate design standards for roadways.

  - The Functional Classification of SR-187 is "Other Principal Arterial" in its entirety.

- **Route designations:**

    - SR- 187 is federally designated as a Terminal Access Route Surface Transportation Assistance Act (STAA), which allows large trucks to operate on State routes.

    - SR-187 is not in the IRRS, and it is not a part of the Freeway and Expressway System.

B. Action: Demonstrate that the District has identified the route or route segment as a relinquishment candidate in the District System Management Plan (DSMP), Transportation Concept Report (TCR), and/or other district planning documents

- SR- 187 is included in the Two Tier System Report as part of the Secondary system. The District concurs with this designation; SR-187 is predominantly used for local use, as evidenced by its traffic use patterns.

- The most recent, April 1991, TCR proposed this route to be relinquished.

C. Action: Evaluate if the segment proposed is in fact between two logical termini and identify any issues with the proposed limits of the relinquishment. Indicate how identified issues will be addressed. Examples of issues with logical termini are relinquishments that will create a stub route, terminate in mid block or intersection, a break in extra legal truck route, etcetera.

- SR-187 proposed relinquishment is within two logical termini – From SR-1 (Lincoln Ave.) to I-10. No issues are identified. The Route's primary function is for local use, the relinquishment will not impact its traffic use patterns.

- A small segment of SR-187, approximately from Bledsoe Ave. (PM 5.6) to Overland Ave. (PM 6.6), shares City of Los Angeles boundaries with the city limits of Culver City inside SR-187 right of way.

- Ultimately, District 7 intends to relinquish all the Secondary System segments, including SR-187 within Los Angeles County. Due to the authority given and limitations by legislation, plus the challenges of multi-jurisdictional agreements and commitments, it is a general practice to legislatively relinquish route segments in a piece-meal fashion. Though the relinquishment of entire State Highway Route to the local jurisdiction is not occurring simultaneously, this approach would ensure that the relinquishment occurs at the earliest time possible, and avoid the potential of delay or rescission of relinquishment project.

D. Action: Describe the basis of the request for the relinquishment and identify local jurisdiction(s) requesting it. Indicate why the city or county does not want the state route designation. Explain the issues and history including request for encroachment permits and issues with approving or denying requests. Include district/local jurisdiction local development discussions, comments, and issues. Document context sensitive solutions efforts and what could and could not be resolved under state ownership of the route. Explain how the relinquishment benefits local planning and community design and circulation considerations.

- The City of Los Angeles requested the relinquishment in an effort to better meet the needs of and directly serve its community. The City's interest in pursuing the relinquishment is primarily for the flexibility in making future improvements to the corridor. The relinquishment of SR-187 will allow the City of Los Angeles to expedite proposed improvements and maintenance without going through the encroachment permit process, reducing delays. Currently, the City of Los Angeles is planning for a complete street concept project. The relinquishment would allow more for flexibility and resources to expedite this proposed improvement.

- The City of Culver City has not formally expressed interest in pursuing relinquishment of SR-187 within its city limits. However, Culver City has been made aware of the proposed improvement project planned by the City of Los Angeles. The City of Culver City is supportive of the proposed improvement. The City of Los Angeles staff will further coordinate with the City of Culver City regarding the proposed improvement and relinquishment of SR-187 within their city Limits.

- Currently, there are a number of permits that are issued to private owners, government agencies, utility companies, etc. -one to be noted, is the permit issued to the City of Los Angeles, under permit number 713-NUK-1039 to excavate four pits for depth of 12 to 25 feet and to excavate a section of Venice Blvd to place/push a 60" sewer line from Kelton Ave. to Overland Ave.

- City of Los Angeles has recently updated their General Plan's Transportation Element (Mobility Plan), which is consistent with the State's Complete Streets policies and Smart Mobility Framework. Due to the urbanized nature of this route, right-of-way is highly constrained, and the City's potential improvements to enhance mobility options along SR-187 (to be consistent with Complete Streets policies) may not be possible if the City must adhere to State's design criteria. By relinquishing the roadway to the local agency, proposed

improvements to bicycle, pedestrian, and transit modes may become more viable.

- The IGR Branch has no objections to the proposed relinquishment of SR-187. No significant changes to the transportation/circulation system are anticipated as the result of the proposed relinquishment. No major local development projects in the vicinity of SR-187 have been reviewed by the IGR Branch.

E. Action: Identify the status of the route in the local agencies "circulation element" of the general plan and any currently applicable local planning studies or community initiatives that may impact the request.

- There are no known conflicts with the City's General Plan and Circulation Element as a result of relinquishing SR-187 in the City of Los Angeles. The relinquishment would benefit the local agency's planning process with an opportunity to adopt context sensitive solutions, complete streets, community design elements and incorporate local values. The relinquishment is consistent with Caltrans goal to relinquish the entire route.

- The relinquishment is not expected to change the status of the route in the City's Circulation Element or in the City's General Plan. There are no current local planning studies or community initiatives that would negatively impact the relinquishment.

- The City of Los Angeles identifies SR-187 (Venice Boulevard) as a Divided Major Class II highway. The selection criteria for this designation are:

    - **Major highways (Class II)** should typically be located one mile apart in a grid system.
        - 30,000 to 50,000 ADT

    - **Performance Criteria:**
        - Three travel lanes in each direction during peak hours+ left turn lanes at signalized intersections.
        - 2400 vph in each direction during peak hours.

2. Route or Corridor Concept and Recommendations for Route Development

A. Action: Identify the route development or relinquishment recommendation in the most recent District TCR, District System Management Plan (DSMP), or other applicable internal reports or studies.

- The April 1991 TCR proposed this route to be relinquished.

B. Action: Describe current and projected future traffic and components of the traffic stream (5-plus axle trucks) for the route, as it exists on the State Highway System and any system restrictions for large trucks. Identify how this is forecasted to change based on the relinquishment.

- Truck data from the 2012 AADT for SR-187 ranges from 40,000 at SR-1 (Lincoln Blvd) to 70,000 at Route 405.
    - The truck AADT at Lincoln Blvd. is 1323, or 3.31 percent of AADT. Of these, 84.4 percent are 2 axle, 9.83 are 3 axle, 3.03 are 4 axle, and 2.74 are 5 axle.
    - At Route 405, the truck AADT is 1771, or 2.53 percent of AADT. Of these, 84.54 percent are 2 axle, 9.6 percent are 3 axle, 1.67 percent are 4-axle, and 4.19 are 5 axle.
- No significant changes to the current or future highway and circulation system would be anticipated as a result of the relinquishment.
- No truck restriction is currently imposed on this segment of SR-187. There is no known plan to restrict truck access by the City of Los Angeles upon the relinquishment.

C. Action: Identify the primary origins and destinations for travel on the route segment in terms of interregional and major regional trips and sub area functions that may impact relinquishment considerations, for example, connectivity to a regional mall, a regional area industrial park, regional airport, and other functions.

- SR-187 (Venice Boulevard), serves the neighborhoods of Palms, Venice and Mar Vista in West Los Angeles, as well as the City of Culver City.

- ***Trip generators on State Route 187 include:***
  - Venice High School
  - Mark Twain Middle School
  - The Actors' Gang Theater
  - The Culver City Station for the Expo Light Rail Line
  - The Helms Bakery Building (shops and restaurants)
  - The Museum of Jurassic Technology
  - The Mar Vista Branch Public Library
  - Culver City Gospel Hall
  - Hare Krishna Temple
  - And a variety of restaurants and small businesses

- ***Trip generators near State Route 187 include:***
  - Culver Studios
  - Sony Pictures
  - The Culver Hotel (a National Historic Landmark)
  - The Pacific Ocean
  - Marina Del Rey
  - Venice Beach (and the Venice Boardwalk)
  - The Ballona Wetlands Ecological Reserve
  - Santa Monica Airport
  - The Kirk Douglas Theater

- SR-187 also provides access to SR-1 (Lincoln Blvd).

- Bicycles are permitted on SR-187 (Class II facility).

- **Current Transit**

  - ***Buses:***

    1) Metropolitan Transit Authority:

    Metro Bus #33: The 33 bus serves Venice Blvd from Lincoln Ave to Rte 10 and continues on into Downtown Los Angeles. Regular fare is $1.75 and senior fare is $1.00. Metro Rapid Transit line 733 serves Venice Blvd from Ocean and Santa Monica to Union Station in Downtown Los Angeles.

    2) City of Santa Monica Big Blue Bus:

    There are two Big Blue Bus routes that serve small portions of Venice Blvd:

Rte 1: The Route 1 bus serves Venice Blvd from Lincoln Blvd. to Walgrove Ave with "select trips" involving every other bus.

Rte 12: The Route 12 bus serves Venice Blvd from Bagley Ave. to National Blvd.

Regular fare for either route is $1.00 and senior fare is 50 cents.

- ***Light Rail:***

The Culver City Station for the Expo Light Rail Line is located at Venice and Robertson (to the west) and National and Washington (to the east). The actual address is 8817 Washington Blvd, Culver City. The Expo line runs from Culver City to downtown Los Angeles. Additionally, Exposition Transit Corridor, Phase 2 is extending the Metro Expo Line west to Santa Monica from the Culver City Station, running along the old Pacific Electric Exposition right-of-way to 4th St. and Colorado Ave. in downtown Santa Monica.

The 6.6 mile second phase will connect Santa Monica by rail to Downtown LA, Pasadena, San Fernando Valley, South Bay, Long Beach and dozens of points in between. With seven new stations serving diverse LA neighborhoods such as Century City, West Los Angeles, and Santa Monica, the Metro Rail system will expand to 87 stations and over 93 miles of rail to destinations across L.A. County.

Major construction began in 2012 and is scheduled to be completed in 2015. The Exposition Construction Authority awarded the design-build contract for Phase 2 to Skanska-Rados, Joint Venture in March 2011.

Metro is scheduled to begin train safety tests in late 2015, with a projected line opening in early 2016.

Phase 2 includes new stations at:

- Palms
- Westwood/Rancho Park
- Expo/Sepulveda
- Expo/Bundy
- 26th St./Bergamot
- 17th St./SMC

- Downtown Santa Monica

- ***Light Rail Park and Ride Lots:***

  Culver City Station Park and Ride Lot
  8817 W. Washington Blvd
  Culver City, CA
  Open 24 hours, 7 days a week. 586 spaces/8 bike racks/16 bike lockers

- Very little or no impact to transit is expected from the relinquishment. Any future impacts will occur as a result of Metro or the City of Santa Monica transit changes to the existing lines or adding new lines, if needed. Metro re-evaluates all lines biannually in December and June. Poor performing (low ridership) lines are either cancelled or rerouted in the hope of increasing performance. The City of Santa Monica also conducts service assessments twice a year, once in March and again right before the summer.

- A balance is expected between increased gas prices and periodic fare increases. As gas prices increase, a small percentage of riders turn to transit. However, as with any increase in transit fares, a small percentage (conservatively 1% to 2%, depending on the fare increase) of transit riders will forego public transportation and find other modes, usually returning to driving alone, carpooling, bicycling or even walking if the distance is short enough. These increases not only affect home/work trips, but also students, the elderly and the transit dependant.

- SR-187 has existing sidewalks and Class II bike lanes. Primary origins and destinations for pedestrians and bicyclists include all the same primary origins and destinations as for motor vehicles: beaches, harbor, commercial, retail, service business, offices, restaurants, schools, parks, theaters, and residences. Bicyclists have access to the Pacific Coast Bike Route on SR-1, and the Marvin Braude Bike Trail, a Class I bike path, on the coastline is used by both pedestrians and bicyclists.

- No impact to the regional and interregional transportation system would be anticipated due to the relinquishment.

D. Action: Identify issues that could negatively impact interregional or regional travel and connectivity, inter-modal transfer for freight, and other functions. Identify how the

concerns will be addressed. This includes potential local restriction of truck access and truck delivery issues.

- Use of this route for long haul trucking purposes has not been a primary use of SR-187, given other Freeway options, the urbanized nature of this portion of the route and the need for frequent stops on an urban arterial street.

- Relinquishment of this route is not expected to negatively impact interregional, regional travel, connectivity or the trucking industry because its design limits use of this facility for this purpose.

E. Action: Identify if the relinquishment is expected to cause diversion of interregional and regional trips (including large trucks) to other state routes or local arterials thus creating a potential need for additional improvements to accommodate increased travel demand on other routes.

- No diversion is anticipated. It is not anticipated that City of Los Angeles will have access restriction through this segment.

- Relinquishment of this route is not expected to negatively impact interregional or regional travel and connectivity or the trucking industry because its design limits use of this facility for this purpose.

- Interregional and regional travel is accommodated to the North, connecting at the East terminus of SR-187, and running East to West, by I-10 (Santa Monica Freeway). Running North-South, perpendicular and intersecting SR-187, is the I-405 (San Diego Freeway), which connects to I-5 to the north in Los Angeles County, and to the south, in Orange County.

F. Action: Identify any compatibility issues for adjoining jurisdictions created by the proposed relinquishment (such as gaps created by the relinquishment). For example, will a relinquishment terminate at an intersection or mid-way in an identified bikeway segment creating potential traveler confusion or difference in design standards? Identify how compatibility issues will be resolved.

- No compatibility issues exist. With the exception of a small portion where the City of Los Angeles and Culver City share their boundaries within SR-187, from approximately Bledsoe Ave. (PM 5.6) to Overland Ave. (PM 6.6), SR-187 is proposed to be relinquished and lies within the City of Los Angeles, and terminates at logical points, SR-1 and I-10.

- Venice Blvd. (SR-187) is included in the City of Los Angeles Bicycle Plan, which represents a new commitment by the City to complete streets, toward a sustainable transportation system which supports both motor vehicle use as well as other modes of transportation, such as bicycling. The plan includes three bikeway networks: the Backbone network (of which Venice Blvd is part of), the Neighborhood Network, and the Green Network. These bicycle networks have established three goals: (1) increase the number and types of bicyclists who bicycle in the City; (2) make every street a safe place to ride a bicycle; and (3) make the City of Los Angeles a bicycle friendly community. The SR-187 relinquishment will pave the way form the City of Los Angeles to facilitate the transformation of Venice Blvd. to complete streets.

- The Southern California Association of Governments (SCAG), as well as the Los Angeles County Metropolitan Transportation Authority (Metro) support strategies and projects that promote various modes of transportation, such as walking and bicycling.

G. Action: Identify any issues with signs, pavement markings, signal coordination and control along the route and existing agreements with local jurisdictions that will need to be modified as a result of the relinquishment. Identify recommended actions to resolve.

- Traffic signals on SR-187 are currently operated and maintained by the City of Los Angeles Department of Transportation as per a delegated maintenance agreement.

- The relinquishment will have no adverse impact to traffic signal operation within SR-187.

- A traffic sign installation order is in progress for Terminal Access signs (G66-56) at various locations on SR-187:

    - Eastbound on SR-187 (Venice Blvd), just East of SR-1 (Lincoln Blvd).
    - Eastbound on SR-187 at the corner of Melvil St., combined with a G66-21(CA) (mod) END sign.
    - Eastbound on SR-187, at west of La Cienega, combined with a G66-21(CA) (mod) END sign.
    - Westbound on SR-187 Just East of Redwood Ave., combined with a G66-21(CA) (mod) END sign.
    - Westbound I-10 freeway off ramp to Venice Blvd. /La Cienega Blvd., Combined with a G66-21A (CA) (mod) End sign.

- The sign installation is not expected to affect this relinquishment.

H. Action: Identify actions that may be needed to advise interregional travelers and the trucking industry on connecting routes if the segment recommended for relinquishment will impact throughput or connecting trips (based on anticipated or known local redesign and development plans). Include justification for creating this impact; for example, requiring an extra legal transportation permit from local jurisdictions.

- No notification need is currently foreseen, as through and connecting truck trips must still be accommodated, given the commercial properties adjacent to SR-187. Other vehicles can access any route open to trucks.

I. Action: Identify any Department of Transportation funded studies ongoing or completed that impact the route portion (Environmental Justice, Community Planning, State Planning, Research Innovation and System Information, etc.) and related recommendations.

- The Office of Projects and Special Studies shows no projects or documents being prepared that may impact this relinquishment.

- The IGR Branch is not involved in any current planning studies in the vicinity of this proposed relinquishment.

- No other Units contacted have indicated that there are any studies that may impact this relinquishment.

J. Action: Identify adjacent local agency position(s) on the relinquishment and how they have been coordinated and addressed between jurisdictions. This should include tribal governments and law enforcement where applicable.

- No adjacent agencies will be negatively impacted by this relinquishment. The entire relinquishment lies within the City of Los Angeles, except for a small portion (approximately PM 5.6-6.6) where the city of Los Angeles and Culver City share boundaries inside SR-187 right of way. Culver City is the only City adjacent to this relinquishment. City of Los Angeles is in coordination with the City of Culver City regarding the planned improvement project and the relinquishment of SR-187.

K. Action: Identify potential liability issues of relinquishment including but not limited to seismic zones, inundation, and issues pertaining to the American Disabilities Act (ADA).

- SR-187 is located in Los Angeles County, an area prone to earthquake activity. Per the California Department of Conservation, the areas in the vicinity of Routes SR-1/SR-187 interchange, as well as the area in the vicinity of I-10/SR-187 interchange, are located in a liquefaction zone. This should not negatively impact this relinquishment. SR-187 proposed relinquishment is within City of Los Angeles boundaries, and the City is aware of seismic conditions in the area. The department of conservation makes maps available to the public and jurisdictions at the following link: http://www.conservation.ca.gov/cgs/rghm/ap/Pages/Index.aspx

- The complete route is within Seismic Zone 4 (.040 g).

- Fault activity shows quaternary faults less than 130,000 years.

- The route is within proximity of the Newport-Inglewood Fault Zone

    - Newport-Inglewood Fault line is a right-lateral; local reverse slip
    - Approximately 75 km.
    - 0.6 mm/yr slip rate.

- There are five structures within SR-187 right of way: 53-2658M, 53-2659M, 53-3070L/53-3070R, 53-1610G. The two 'M' structures are culvert type. The two 'L/R' structures are newly constructed for light-rail trains, and recently been added into our system. The last 'G' structure is at the I-10 on-ramp, and it should remain in the State's inventory. This structure is approximately 667 feet from the beginning of the structure measured perpendicular to the center line of SR-187.

- SR-187 is not within a flood zone, as determined by the Los Angeles County Department of Public Works Flood Zone Determination Website: http://dpw.lacounty.gov/wmd/floodzone/

- The requirement to provide equivalent access to facilities for all individuals, regardless of disability, is stated in several laws adopted at both the State and Federal level. Two of the most notable references are The Americans with Disabilities Act of 1990 (ADA) which was enacted by the Federal Government and took effect on January 26, 1992, and Section 4450 of the California Government Code.

- ADA standards are required on all new resurfacing projects.

- Future Projects:

    - PID 713000493 - Rehabilitate pavement. – LA 187 PM 3.5 to PM 8.9
    - Mabel Tran Project Manager
    - Program for Fiscal Year 17/18

L. Action: Identify any environmental issues.

- Los Angeles is known for traffic congestion and its impacts. Pollution of various types is typical in this region. Air quality, noise and water pollution are common. Below is the latest California Air Resources Board attainment/nonattainment status of SR-187 Corridor which falls in the South Coast Air Basin.

    - **POLLUTANTS STATE DESIGNATION**
        - Ozone (1hr) -Nonattainment
        - Ozone (8hr) -Nonattainment
        - CO (8hr) - Attainment
        - PM10 (24 hr.) - Nonattainment
        - PM2.5 (24 hr.) - Nonattainment
        - NO2 (Annual) - Attainment
        - SO2 (1 hr) - Attainment
        - Lead - Nonattainment

M. Action: Identify coordination with transit agencies that may provide service on the segment.

- Caltrans Planning has been in contact with Metro. Metro has not expressed any concerns, and has no projects planned that will negatively impact this relinquishment.

N. Action: Identify coordination with neighboring Caltrans districts that may be affected by the relinquishment.

- SR-187 is centrally located within Caltrans District 7. No neighboring District will be affected.

3. District Coordination with RTPA's

A. Action: Identify steps the district has taken to coordinate the relinquishment request with the Regional Transportation Planning Agency (RTPA) and/or Metropolitan Planning Organization (MPO).

- Caltrans District 7 Planning has notified and been in contact with SCAG regarding this relinquishment. SCAG has not expressed any concerns that will adversely affect this relinquishment.

B. Action: Identify the route development strategy in the Regional Transportation Plan and any supportive or contrary recommendations on the relinquishments.

- A specific route development strategy for SR-187 was not prepared as part of SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS).

- SCAG, as well as Metro, support strategies and projects that promote various modes of transportation, such as walking and bicycling.

- SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) invests $6.7 billion towards increasing bikeways, bringing sidewalks into compliance with Americans with Disabilities Act, safety improvements and other Active Transportation Strategies. SCAG supports and encourages implementation of Complete Streets policies in the 2012–2035 RTP/SCS.

- SR 187 relinquishment will pave the way for the City of Los Angeles to facilitate the transformation of Venice Boulevard to Complete Streets.

C. Action: Describe District actions to provide relinquishment information and recommendations to the regional agency Technical Advisory Committee (TAC) and other applicable groups.

- District staff has contacted Metro's Technical Advisory Committee, to advise of SR 187 relinquishment, and request comments. Metro does not anticipate any negative impact resulting from this relinquishment.

D. Action: Identify regional studies that include the proposed route or route segment. Do the recommendations in these studies support, or run contrary to, the relinquishment request?

- Caltrans District 7 maintains and prepares various documents such as the Transportation Concept Report (TCR), Corridor System Management Plan (CSMP), District System Management Plan (DSMP) and others that are constantly coordinated with SCAG, Metro and locally impacted partners. The relinquishment of SR-187 is supported and recommended by the TCR, and is consistent with transportation planning's efforts for comprehensive congestion management.

- The Los Angeles Department of Transportation is leading the Westside Mobility Plan, a comprehensive study to develop potential short-term solutions as well as long-term plans to address congestion and mobility challenges in the Westside. The study boundary is comprised of two areas: the West Los Angeles Transportation Area and the Coastal Transportation Corridor Area. The Coastal area is comprised of the boundaries defined in the Coastal Transportation Corridor Specific Plan, and includes the communities of Venice, Mar Vista, Playa Vista, Westchester and LAX. The Plan is creating a transportation blueprint for the Westside and upon completion will develop recommendations to improve the connectivity of the transit network, better serve all modes of transportation, improve the efficiency of the transportation system, and enhance the livability of the major boulevards in Westside communities. The Westside Council of Governments lists the Westside Mobility Plan as a current project. The plan is in line with City of Los Angeles plans to improve SR-187 to Complete Streets.

4. Coordination with State, Federal, and Tribal Plans and Programs

A. Action: Identify any known plans from other State agencies, departments, local agencies, or non-profits that would potentially impact (or would be impacted by) the relinquishment decision. (e.g. - coastal plans, truck routes, bike plans, pedestrian plans, environmental mitigation).

- SR-187 has existing sidewalks and Class II bike lanes. Bicyclists traveling on SR-187 have access to the Pacific Coast Bike Route on SR-1. This relinquishment is not anticipated to negatively impact these facilities.

- No other known plans other than those already identified in this RAR.

B. Action: Identify any state regulatory agencies that may require input on the relinquishment such as the Coastal Commission, California Environmental Protection Agency.

- The California Coastal Commission (CCC) was contacted and they find SR-187 outside of the coastal zone boundaries.

- The California Coastal Act of 1976 requires local governments to prepare and implement Local Coastal Programs, or LCP, to carry out the mandate to protect coastal resources and maximize public access to the shoreline. In September 5, 2013, the City of Los Angeles applied for a grant from the CCC to develop the "Venice Local Coastal Program", which includes portions of SR-187, from Lincoln Blvd. (SR-1) to Walgrove Ave., and from Walgrove Ave. to Lyceum Ave. This Portion of SR-187 will be part of the "Coastal Transportation Corridor" specific plan mentioned above (Action 3, sec D). The portion of the plan dealing with Climate Resiliency will address the impact of Climate change and sea level rise and include developing a framework for the protection of and development in the City's coastal areas. SR-187 relinquishment will aid City of Los Angeles efforts and coordination with the CCC.

C. Action: Identify projects that are now programmed or planned on the State Highway System within the area or in adjacent segments that may be impacted by the relinquishment. Include all programs regardless of funding type (STIP, SHOPP, Local Programs – CMAQ, and RSTP) and include transit capital projects as applicable.

- Caltrans recently programmed a capital preventive maintenance project for funding fiscal year 2017/2018. The project limits are between SR-1 (Lincoln Blvd), and Cadillac Ave. just past east of I-10, effectively the entire SR-187. The purpose of the project is to preserve and extend the life of the existing pavement and improve ride quality. The strategy is cold plane and AC overlay. Construction is scheduled to start in summer 2018 and will take approximately one year.

- A $630,000 minor project is underway at the intersection of Venice Blvd and Motor Avenue involving signalization of the intersection for operational improvement. Construction started in June and expected to last 4.5 months.

- Additionally, a protective left turn signal phasing has been proposed for Venice Blvd. (SR-187), at the intersection of Grand View Blvd.

- Other improvements made by Caltrans in recent years include:
  - Median island and curb ramp improvements at Maplewood Ave., completed in June 2011 at a cost of $245,000.
  - Installation of left-turn phasing signal and upgrade curb ramps at Beethoven Street, completed in October 2012 at a cost of $301,000.

D. Action: Identify coordination and formal consultation with Native American Tribal Governments that may be affected by the relinquishment.

- No Native American Tribal Governments will be affected by this relinquishment

E. Action: Identify coordination with Federal Agencies (National Park Service, Department of Defense, and Bureau of Land Management).

- SR-187 does not impact any access to lands that are part of the National Park Service, or the Bureau of Land Management.

- SR-187 does not connect to any military bases or part of the Strategic Highway Network; it is not identified as part of the STRAHNET network.

5. Internal District Coordination

A. Action: Identify the functional unit in the district, project manager for the relinquishment package, and the staff contact person for questions on SHS evaluation.

- For relinquishment, contact Richard Chiang (Assistant Relinquishment Program Advisor) at (213) 897-3768.
- For Project Manager, contact David Yan (Senior Project Engineer) at (213) 897-9126.
- For System Analysis, contact Neil Hashiba (Branch Chief, Transportation System Information, Office of Advanced Planning, Division of Planning and Local Assistance) at (213) 897-4369

B. Action: Identify the responsible unit and individual for coordinating the revised state highway information based on the proposed relinquished segment within the district (Maintenance, Traffic Operations Design, etc.) and headquarters division. Ensure local enforcement and safety agencies are informed of the change in route status when it occurs.

- David Yan (Project Manager, Program Project Management) - (213) 897-9126.

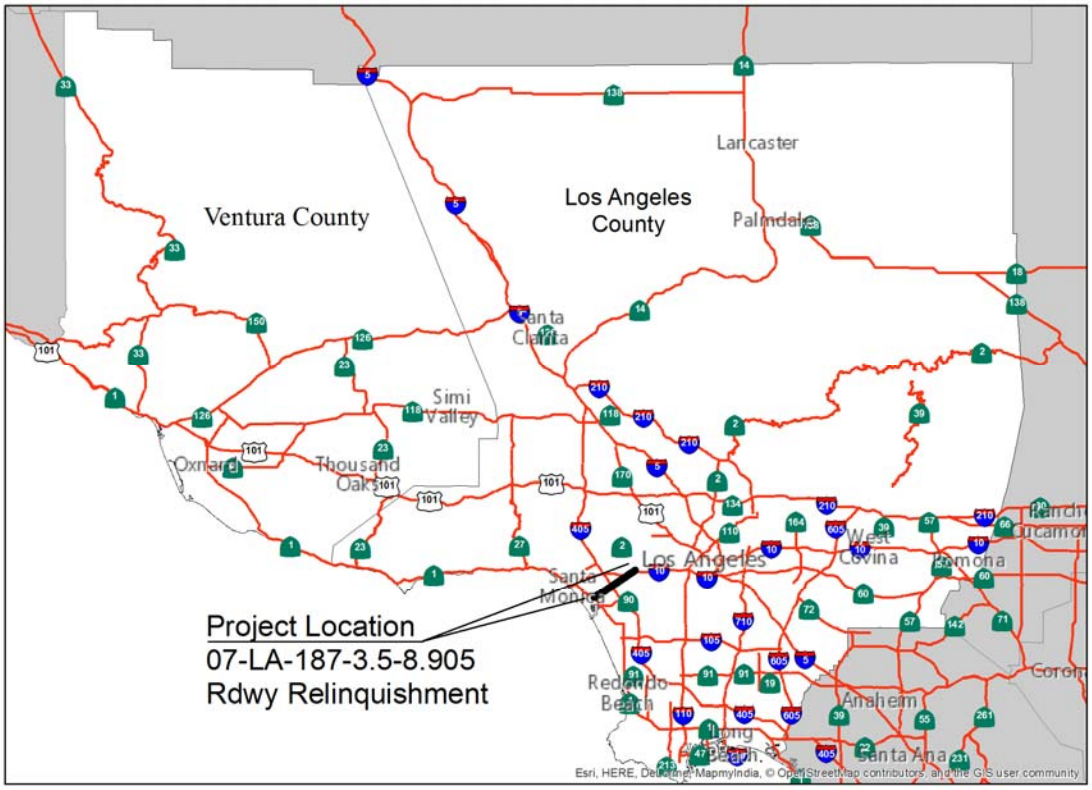
C. Action: Identify functional unit and responsible position in the district for ensuring that the State Highway Inventory accurately reflects the relinquished segment post miles with final approval.

- Neil Hashiba (Branch Chief, Transportation System Information, Office of Advanced Planning, Division of Planning and Local Assistance) - (213) 897-4369.

6. **Maps and Photos**

A. Action: For highway relinquishment maps include segment limits with post miles.

Location Map



B. Action: Provide photos that support the analysis within the RAR.

Photos of Proposed Termini of Relinquishments
SR-187

South-West Termini at Lincoln Blvd. (SR-1)



North-East Termini at Cadillac Ave.



MAY 17, 2017



Statewide Screening for Potential Lane Reconfiguration

Photo Credit: Keith Knapp Iowa LTAP

IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN

Office of Systems Planning
Office of Traffic and Safety
800 Lincoln Way
Ames, IA 50010

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Statewide Analysis to Identify Sites with the Potential for Lane Reconfiguration

What is a 4- to 3-Lane Conversion?

In general, a 4- to 3-lane conversion can simply be described as the removal of a travel lane to increase the utilization and efficiency of the roadway for the traveling public. Reallocating this space in the right locations has been shown to increase the safety and operation of the corridor.[1] In many cases the reallocation of space has provided municipalities an opportunity to grow their network of bike and pedestrian infrastructure and/or align with existing complete streets.

How to Determine Feasibility

The Iowa Department of Transportation's Office of Traffic and Safety (TAS) has expressed interest in developing a list of potential candidate sites for 4- to 3-lane conversion. A number of factors are usually considered to determine the feasibility of converting a four-lane roadway to a three-lane roadway. These factors include[2]:

- Roadway function and environment
- Overall traffic volume
- Level of operational service
- Turning volumes and patterns
- Frequent-stop and/ or slow-moving vehicles
- Weaving, speed, and queues
- Crash types and patterns
- Pedestrian and bike activity
- Right-of-way availability, cost and acquisition impacts
- General characteristics: parallel roadways, offset minor street intersections, parallel parking, corner radii, and at-grade railroad crossings

The above factors are typically analyzed at a corridor level and require significant data gathering and analysis to determine feasibility. A statewide analysis to screen the system for potential candidate sites will only be viable if the factors or data elements are easily accessible. Many of the factors above would require extensive data collection and local knowledge of the candidate locations. Therefore, such a comprehensive analysis would be impractical to perform at a statewide level. In the face of such limitations, it's important to adjust the complexity and scope of the analysis to ensure that potential candidate sites are identified with the understanding that conversion feasibility cannot be determined at such a high level of study.

[1] FHWA, "Road Diet Informational Guide: FHWA Safety Program." FHWA Report No. FHWA-SAT-14-028". (Washington, D.C:2014).

[2] Knapp, Keith, et. al. Guidelines for the Conversion of Urban Four-Lane Undivided Roadways to Three-Lane Two-Way Left-Turn Lane Facilities. Center for Transportation Research and Education, 2001

It was determined by TAS and the Office of Systems Planning (OSP) that a more streamlined approach would be taken to identify potential candidate sites. This approach would lean heavily on the use of existing roadway databases and geographic Information systems (GIS) for the screening. The following is a description of the data elements used and analysis performed to identify potential candidate sites.

Objective of Analysis

The objective of this analysis was to identify four-lane roadway segments, ½ mile or greater in length, that had the potential to be reconfigured to three-lane cross sections. As the analysis progressed, a secondary objective was established to also identify existing three-lane cross sections. It is envisioned that information collected in this effort could support future analyses and studies.

Possible Network Screening Data Elements

The data elements used for the network screening analysis are presented in Table 1 below. Other considerations included total crashes and the presence of signalized intersections.

Table 1: Possible Network Screening Data Elements for Road Diets

Data Element	Field Name/ Table	Source
Major Intersection	INTMAJOR/ ROAD_INV	GIMS
Minor Intersection	INTMINOR/ ROAD_INV	GIMS
Business Entrances	ENTBUSINESS/ ROAD_INV	GIMS
Private Entrances	ENTPRIVATE/ ROAD_INV	GIMS
Median Type	MEDTYPE/ ROAD_INFO	GIMS
Federal Functional Class	FEDFUNC/ ROAD_INFO	GIMS
Number of Lanes	NUMLANES/ ROAD_INFO	GIMS
Average Annual Daily Traffic (AADT)	AADT/ TRAFFIC	GIMS

GIMS stands for Geographic Information Management System

Scope of Analysis

The scope of this analysis included both urban and rural segments. It also included all jurisdictions from local to state-owned roads. In order to identify potential candidate sites, it was decided that an iterative process of filtering locations by attribute information and analyzing the selection for further filtering was the best approach. This process was continued until an optimal number of locations was identified that was neither too broad nor too restrictive. In order to screen the network, a combination of roadway data elements was used. This data was mostly obtained from the Iowa DOT's GIS REST services, but other crucial data elements were utilized, including five-year crash data from TAS and signalized intersection locations from the DOT's intersection database (developed by Iowa State University's Institute for Transportation (InTrans)).

Analysis Structure

This analysis was composed of five different phases. In the sections below, each phase of the analysis is described in summary level detail, which largely excludes the technical aspects of Phases 1-3 of the analysis.

First Phase: Querying of Data

The first phase of this analysis was a high level screening of the network utilizing Iowa DOT's roadway data. The goal of this phase was to simply identify all roadway segments within the state that had four through lanes, no median, and were open to two-way traffic. No other restrictions were made in terms of the roadway. This resulted in identifying segments of both varying lengths and annual average daily traffic (AADT).

Second Phase: Filtering and Calculations

In order to provide a more manageable pool of candidate locations, the segments were filtered by traffic volume. Since it was unlikely that conversion projects would occur on very high volume 4-lane roadways, segments with an AADT above 18,000 were excluded from the analysis. The remaining segments were classified into three traffic volume tiers: low AADT, medium AADT, and high AADT. Those tiers are defined below in Table 2.

Table 2: Road Diet Candidate List AADT Breakouts

AADT	Tier
0–6,000	Low AADT
6,000–12,000	Medium AADT
12,000–18,000	High AADT

As part of the second phase, access density was calculated for each segment using a summation of two roadway elements (business entrances and private entrances) divided by the functional length of the segment. Further, all signalized intersections within 1/8th of a mile of each other were identified through a buffer analysis and spatially joined to the candidate data set.

Third Phase: Geoprocessing and Aggregation

In the third phase of this analysis the segments identified within the previous two phases were aggregated so as to have continuous corridors. Since it was unlikely that conversion projects would take place on short corridors, a minimum corridor length of ½ mile was established. Those corridors less than ½ mile in length were excluded from the analysis. It should be noted that it is possible to consider a lane configuration outside of the thresholds established in this report. These thresholds were developed to manage the scope and number of listings identified through the screening process, but do not limit what could be considered. Finally, segment level crash data was spatially selected and aggregated to each corridor in order to calculate a crash rate and obtain the total number of severe injuries for each potential candidate site.

Fourth Phase: Identification of Existing Three-Lane Configurations (Secondary Screening)

It was determined during the screening process that it would also be helpful to identify and provide a listing of current three-lane roadways. This would give TAS a listing of all known three-lane roadways within the state. In order to identify existing three-lane configurations, the first three phases of analysis described above were repeated, with the only notable difference being in the initial query of the roadway data. Instead of querying the data set for four through lanes, it was queried for three lanes with two of the lanes being coded as through and the middle being coded as two-way left-turn lane (TWLTL).

The query for existing three-lane roadways was supplemented by two sources provided by TAS. The first source was an inventory of three-lane roadways that had been maintained by TAS in spreadsheet form. The second source was from a study titled "Iowa's Experience with Road Diet Measures: Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates." In Table 2 of that study (titled: Site Descriptive Information) there is a listing of three-lane roadways.[3] Both lists were combined and the corridors that still existed in that configuration were included in the final listings of this report.

Screening the network for existing three-lane sites was a secondary effort to the original scope of this project. Because of this, the results of that analysis are not included in the main body of this report. However, existing three-lane corridors are listed in Appendix 1, and also appear in some of the maps in Appendix 2.

Fifth Phase: Quality Control

Although Iowa has a very robust roadway database, like many other states, Iowa is not immune to inaccuracies within its database. For this reason, it was important to review the corridors that had been identified to ensure that they accurately represented either potential candidate or existing sites as intended. Each corridor that had been identified through the initial network screening and then filtered through to aggregation was visually inspected using a combination of aerial photography and street-level imagery. Each corridor was inspected to ensure that the number of lanes, approximate length, existence of curbs, etc. was correct. In some instances, aggregation of the segments resulted in discontinuous corridors. This was largely due to the original screening of the roadway data. For example, at an intersection, a four-lane roadway may either experience an increase in the number of lanes (usually turn lanes) or have medians. To resolve this issue and to ensure continuous corridors, segments at intersections where the cross section changed were manually selected and aggregated.[4] After the visual inspection and necessary resolutions were completed, a final listing of corridors was created which consisted of 223 potential candidate sites and 78 existing three-lane sites.

Results of Analysis

In summary, 223 potential candidate sites were identified through the statewide analysis. Of the sites identified, 52 fell within the Low AADT tier, 99 fell within the Medium AADT tier, and 72 fell within the High AADT tier.

Potential Candidates and Existing Three-Lane Sites

In Appendix 1, both the potential candidates and existing three-lane sites are listed. Table 3 presents the breakdown of sites by DOT district and AADT. In summary, both District 1 and District 6 are well represented in number of potential candidate sites. This is likely due to the larger metropolitan areas within both of these districts (notably Des Moines, Ames, Cedar Rapids, Davenport, Dubuque, and Iowa City). Similarly, District 1 had the largest number of existing three-lane sites while the district with the second-highest number came from District 5. Interestingly, District 5 is one of the more rural districts in the state, having no metropolitan areas (population >50,000).

[3] Pawlovich, M., Wen, L., Carriquiry, A., and Welch, T. (2006). "Iowa's Experience with Road Diet Measures: Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates," *Transportation Research Record 1953*, 163-171.

[4] In some instances, this manual selection of the segments and aggregation of corridors resulted in corridors with maximum AADT ranges above the originally defined threshold of 18,000 AADT. These corridors were retained in the table listings because the majority of their length was originally identified in the network screening query.

Table 3: Potential Candidates			
DOT District	AADT	Number of Sites	Total Number of Sites
District 1	0–6,000	4	50
	6,000–12,000	16	
	12,000–18,000	30	
District 2	0–6,000	14	44
	6,000–12,000	23	
	12,000–18,000	7	
District 3	0–6,000	11	30
	6,000–12,000	10	
	12,000–18,000	9	
District 4	0–6,000	8	16
	6,000–12,000	8	
	12,000–18,000	0	
District 5	0–6,000	8	34
	6,000–12,000	23	
	12,000–18,000	3	
District 6	0–6,000	6	49
	6,000–12,000	22	
	12,000–18,000	21	

Table Listings and Descriptions

For each district, a separate table has been created for the potential candidates and the existing three-lane sites. Each table is first sorted alphabetically by city and then by ascending AADT. These tables can be found in the next section. Some of the fields contained in the tables are self-explanatory, however, others need a brief description as to how they were calculated. Figure 1 shows the fields contained in the table listings, followed by a short description for the fields that were calculated.

Potential Candidates: District 6										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density	Traffic Signal	Crash Rate
6	BETTENDORF	BSRC	GREAT RIVER RD	.1 MILES W OF 244TH AVE	S BLUFF BLVD	8,600	2.32	3	NO	124
6	BETTENDORF	BSRC	18TH ST	HEATHER GLEN AVE	LINCOLN HWY	12,100	2.00	36	YES	501

Figure 1: Fields contained in table listing. Please note that the boxes for the District field may be represented in either grey or red. Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.

AADT

During the process of identifying the potential candidate sites and existing three-lane sites, segment-level AADT values were aggregated and calculations were performed on that field. Four different calculations were used during the process of aggregation including mean, range, min, and max. However, in order to have concise information in the table listing, only the maximum AADT value is presented. This value represents the highest segment AADT value for the corridor.

Access Density

The density of access points along a corridor can have an impact on traffic operations and safety. Four-lane corridors with higher access densities stand to benefit the most from a conversion to three lanes. A greater number of accesses results in a greater number of left turns. The addition of a continuous center turn-lane provides a safer means of accommodating left-turning vehicles by separating them from the through traffic.

Access density was calculated for each site within the analysis by summing the number of private and business entrances for each segment and dividing it by the segment's length. In the tables, access density is presented as the number of access points per mile

Signalized Intersections

The presence of traffic signals can affect the operational efficiency of a converted corridor. While the effects may be minimal at lower traffic volumes, they can be evident at higher traffic volumes. However, these effects can usually be overcome—and operations improved—by re-timing the signals or by removing those signals that are no longer warranted. A spatial analysis was performed on all signalized intersections within the state to identify those corridors having signalized intersections. In the tables below, the traffic signal field is populated by either a "Yes" or a "No". "Yes" indicates that at least one signalized intersection is located within the corridor, and that traffic flow in the three-lane configuration may be enhanced through a more in-depth analysis of signal operations.

Crash Rate

Reducing the number of lanes from four to three can have a substantial effect on the number of crashes on a roadway. Previous studies have indicated a 19 to 47 percent reduction in overall crashes when a roadway is reconfigured from four lanes to three lanes.[5] Including crash rates into this analysis increases the ability for candidate sites with the greatest potential for crash reductions to be identified. Figure 2 presents the equation used to calculate crash rates for sites. It should be noted that five years (2011-2015) of Iowa DOT crash data were used in this analysis. In the equation below, "Total Crashes" represents the aggregate number of crashes that occurred along a corridor. In the bottom of the equation, vehicle miles traveled (VMT) represents the aggregate volume of the corridor. Finally, "Years of crash history" represents total number of years of crash data. Crash Rate is presented in terms of crashes per 100 million vehicle miles traveled (HMVMT).

$$\left(\frac{\text{Total Crashes}}{\text{VMT*365*Years of crash history}}\right) * 100{,}000{,}000$$

Figure 2 : Equation used to calculate crash rate

[5] FHWA, "Evaluation of Lane Reduction 'Road Diet' Measures on Crashes." FHWA Report No. FHWA-HRT-10-053". (Washington, D.C:2010).

Limitations of Analysis

Data

As mentioned earlier, the completeness and accuracy of the data included in this report rely heavily on the geospatial data obtained through the Iowa DOT's REST services. There were a few instances where the data used was not representative of the current roadway environment, probably due to lags in reporting. Because of this, an extensive effort of visually inspecting the roadway was carried out to ensure the listing was as accurate as possible. However, due to the scope of the analysis, it is possible that errors still exist.

Statistical evaluation

Although a number of attributes aggregated for the sites could be utilized for further statistical analysis, it was not the intention of this effort to perform such analyses. Future efforts might leverage the additional attribute information that was included in the raw aggregate data. This information, if used properly, could lead to case study evaluations or cohort analysis.

Table Listings

Potential Candidates: District 1										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
1	ALTOONA	DMAMPO	ADVENTURELAND DR	34th AVE NW	PRARIE MEADOWS DRIVE	10,100	0.53	36	YES	1,140
1	AMES	AAMPO	24TH ST	STANGE RD	HAYES AVE	9,300	0.57	10	YES	162
1	AMES	AAMPO	N DAKOTA AVE	LINCOLN WAY	RELIABLE ST	9,800	0.98	18	YES	551
1	AMES	AAMPO	UNIVERSITY BLVD	LINCOLN WAY	STANGE RD	12,100	0.96	2	YES	174
1	AMES	AAMPO	S 4TH ST	BEACH AVE	S GRAND AVE	12,500	1.12	6	YES	652
1	AMES	AAMPO	DUFF AVE	E 2ND ST	20TH ST	13,600	1.26	70	YES	499
1	AMES	AAMPO	13TH ST	.12 MILES W OF HABER RD	DAYTON AVE	13,800	2.84	28	YES	331
1	AMES	AAMPO	STANGE RD	UNIVERSITY BLVD	24TH ST	17,200	1.03	2	YES	554
1	AMES	AAMPO	GRAND AVE/ US 69	LINCOLN WAY	.15 MILES N OF 20TH ST	17,500	1.37	64	YES	467
1	AMES	AAMPO	LINCOLN WAY/ US 30	.1 MILES W OF MARSHALL AVE	.2 MILES W OF FREEL DR	20,400	3.82	36	YES	891
1	ANKENY	DMAMPO	NW STATE ST	W 1ST ST	NW 18TH ST	7,500	1.03	49	YES	852
1	ANKENY	DMAMPO	W 1ST ST	NW GREENWOOD ST	N ANKENY BLVD	14,200	1.58	37	YES	360
1	ANKENY	DMAMPO	E 1ST ST	N ANKENY BLVD	NE HAYES DRIVE	18,000	0.76	18	YES	308
1	DES MOINES	DMAMPO	E GRAND AVE	E 5TH ST	E 18TH ST	12,400	1.28	34	YES	1,439
1	DES MOINES	DMAMPO	E 30TH ST	.15 MILES S OF DEAN AVE	STATE AVE	12,800	0.83	25	YES	1,131
1	DES MOINES	DMAMPO	FOREST AVE	BEAVER AVE	19TH ST	14,100	1.11	28	YES	1,204
1	DES MOINES	DMAMPO	HUBBELL AVE/ US 6	E 38TH ST	.15 MILES E OF NE 46TH ST	14,400	1.45	27	YES	495
1	DES MOINES	DMAMPO	E EUCLID AVE/ US 6	1ST ST	E 13TH ST	14,500	0.81	49	YES	1,001
1	DES MOINES	DMAMPO	HICKMAN RD	30TH ST	PROSPECT RD	14,500	1.45	44	YES	830
1	DES MOINES	DMAMPO	UNIVERSITY AVE	24TH ST	7TH ST	15,600	1.18	33	YES	1,102
1	DES MOINES	DMAMPO	SW 9TH ST	LALLY ST	SW MCKINLEY AVE	15,700	0.87	57	YES	494
1	DES MOINES	DMAMPO	DOUGLAS AVE/ US 6	MERLE HAY RD	LOWER BEAVER RD	16,500	1.79	113	YES	687

District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
1	DES MOINES	DMAMPO	ASHWORTH RD	.1 MILES E OF 72ND ST	63RD ST	16,700	5.23	44	YES	292
1	DES MOINES	DMAMPO	E 14TH ST/ US 69	GARFIELD AVE	ALPHA AVE	17,100	0.85	121	YES	689
1	DES MOINES	DMAMPO	GRAND AVE	.15 MILES N OF FULLER RD	18TH ST	17,200	5.83	50	YES	367
1	DES MOINES	DMAMPO	INDIANOLA AVE	SE 9TH ST	HILLSIDE AVE	17,300	1.19	58	YES	340
1	DES MOINES	DMAMPO	EUCLID AVE/ US 6	.1 MILES W OF 16TH ST	6TH AVE	18,700	0.87	74	YES	701
1	DES MOINES	DMAMPO	2ND AVE/ IOWA 415	INDIANA AVE	NW 43RD AVE	19,500	2.60	62	YES	622
1	FORT DODGE	RPA 5	N 15TH ST	CENTRAL AVE	20TH AVE N	10,900	1.40	37	YES	677
1	FORT DODGE	RPA 5	KENYON RD	US 169	AVE C	13,800	0.96	2	YES	447
1	FORT DODGE	RPA 5	5TH AVE S	S 12TH ST	S 25TH ST	15,400	0.89	61	YES	680
1	GRINNELL	RPA 6	6TH AVE/ US 6	PRINCE ST	PENROSE ST	7,200	1.51	31	YES	306
1	GRINNELL	RPA 6	WEST ST/ IOWA 146	.15 MILES N OF OGAN AVE	6TH AVE	11,900	1.43	42	YES	438
1	GRUNDY CENTER	RPA 7	G AVE/ IOWA 14	M AVE	5TH ST	6,300	0.91	42	YES	252
1	JEFFERSON	RPA 12	S ELM ST/ IOWA 4	250TH ST	E LINCOLN WAY	4,390	1.35	33	YES	153
1	JEFFERSON	RPA 12	N ELM ST/ IOWA 4	E LINCOLN WAY	US 30	7,000	1.25	30	NO	318
1	JOHNSTON	DMAMPO	NW 86TH ST	.1 MILES N OF NW 62ND AVE	NW 70TH AVE	5,400	0.86	4	NO	162
1	JOHNSTON	DMAMPO	MERLE HAY RD	NW 63RD PL	NW 70TH AVE	13,800	0.90	30	YES	123
1	MARSHALLTOWN	RPA 6	E OLIVE ST	S CENTER ST	S 18TH AVE	5,600	1.48	33	YES	642
1	MARSHALLTOWN	RPA 6	S 18TH AVE	E OLIVE ST	E MAIN ST	7,800	1.44	10	NO	140
1	MARSHALLTOWN	RPA 6	N 3RD AVE/ IOWA 14	E MAIN ST	.1 MILES N WOODLAND ST	10,600	1.04	53	YES	709
1	MARSHALLTOWN	RPA 6	S CENTER ST/ IOWA 14	CHERRY ST	E ANSON ST	17,600	0.53	74	YES	629
1	NEWTON	RPA 11	1ST AVE E/ US 6	E 17TH ST S	EAST 31ST ST N	9,700	0.91	49	YES	322
1	TAMA	RPA 6	STATE ST/ US 63	W 5TH ST	W 13TH ST	5,300	0.54	46	NO	103
1	TOLEDO	RPA 6	S COUNTY ROAD/ US 63	LINCOLN HWY	W HIGH ST	6,600	0.59	27	YES	300
1	TRAER	RPA 6	S MAIN ST/ US 63	TOLEDO ST	1ST ST	3,920	0.65	28	YES	305

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
1	URBANDALE	DMAMPO	70TH ST	PALM DR	MEREDITH DR	9,600	1.37	79	YES	442
1	URBANDALE	DMAMPO	MEREDITH DR	84TH ST	59TH ST	14,300	1.82	15	YES	276
1	WEBSTER CITY	RPA 5	SUPERIOR ST	FAIR MEADOW DR	3RD ST	7,900	1.09	40	YES	338
1	WEST DES MOINES	DMAMPO	E P TRUE PKWY	60TH ST	GRAND AVE	16,200	3.21	7	YES	258

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Potential Candidates: District 2

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
2	ALGONA	RPA 2	US 18	COUNTRY CLUB RD	N FINN DR	6,600	2.51	8	NO	268
2	ALGONA	RPA 2	S PHILLIPS ST/ US 169	S MINNESOTA ST	E STATE ST	7,000	0.84	37	YES	415
2	ALGONA	RPA 2	N JONES ST/ US 169	E STATE ST	US 18	8,700	0.96	21	YES	343
2	ALLISON	RPA 7	IOWA 3	.25 MILES W OF S MAIN ST	OAK ST	3,520	0.58	19	NO	106
2	APLINGTON	RPA 7	PARRIOTT ST/ IOWA 57	12TH ST	4TH ST	2,970	0.72	61	NO	141
2	BELMOND	RPA 5	RIVER AVE S/ US 69	.25 MILES S OF 5TH ST SE	MAIN ST W	3,640	0.57	32	YES	437
2	CEDAR FALLS	INRCOG	W VIKING RD	HUDSON RD	NORDIC DR	7,800	0.90	10	YES	600
2	CEDAR FALLS	INRCOG	MAIN ST	SEERLEY BLVD	E 6TH ST	10,200	1.19	37	YES	419
2	CEDAR FALLS	INRCOG	GREENHILL RD	HUDSON RD	KATOSKI DR	10,300	3.47	1	YES	320
2	CEDAR FALLS	INRCOG	WATERLOO RD	STATE ST	UNIVERSITY AVE	11,900	1.28	37	YES	293
2	CEDAR FALLS	INRCOG	1ST ST/ IOWA 57	HUDSON RD	TREMONT ST	14,600	0.74	61	YES	399
2	CHARLES CITY	RPA 2	S GRAND AVE/ US 18	US 218	ALLISON ST	8,000	1.76	18	NO	275
2	CLARION	RPA 5	CENTRAL AVE/ IOWA 3	4TH ST NW	14TH AVE	5,600	1.23	49	YES	409
2	CLEAR LAKE	RPA 2	4TH AVE S	S 8TH ST	US 35	5,900	1.35	18	YES	323
2	DECORAH	RPA 1	IOWA 9	US 52	TROUT RUN RD	13,900	2.77	2	YES	285
2	EAGLE GROVE	RPA 5	COMMERCIAL AVE/ IOWA 17	SW 10TH ST	BROADWAY ST	4,410	0.71	56	YES	353
2	EAGLE GROVE	RPA 5	N COMMERCIAL AVE/ IOWA 17	BROADWAY ST	12TH ST	4,410	0.87	30	YES	313

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
2	EVANSDALE	INRCOG	RIVER FOREST RD	DEERWOOD PARK RD	CENTRAL AVE	8,500	0.53	47	NO	158
2	FOREST CITY	RPA 2	350TH ST/ IOWA 9	NE HWY 69	.25 MILES E OF 180TH AVE	3,690	1.03	8	NO	141
2	FOREST CITY	RPA 2	170TH AVE/ US 69	.2 MILES S 350TH ST	SUNRISE DR	6,100	0.77	27	YES	196
2	HAMPTON	RPA 2	CENTRAL AVE W/ IOWA 3	OLIVE AVE	FEDERAL ST N	6,300	0.74	28	YES	554
2	HAMPTON	RPA 2	CENTRAL AVE E/ IOWA 3	FEDERAL ST N	8TH ST NE	6,400	0.50	18	YES	580
2	HUMBOLDT	RPA 5	10TH AVE N/ IOWA 3	13TH ST N	5TH ST N	6,100	0.69	3	YES	431
2	HUMBOLDT	RPA 5	13TH ST S/ US 169	.1 MILES N OR 240TH ST	HICKORY LN	8,100	1.21	9	NO	200
2	HUMBOLDT	RPA 5	13TH ST N/ US 169	HICKORY LN	10TH AVE N	8,200	0.72	79	NO	408
2	MASON CITY	RPA 2	S PIERCE AVE	19TH ST SW	9TH ST SW	4,450	0.65	23	YES	544
2	MASON CITY	RPA 2	N FEDERAL AVE/ US 65	6TH ST NE	NATURE CENTER RD	7,000	1.41	38	YES	450
2	MASON CITY	RPA 2	19TH ST SW	S HARDING AVE	S FEDERAL AVE	8,300	2.01	11	YES	240
2	MASON CITY	RPA 2	4TH ST SE/ IOWA 122	S VIRGINIA AVE	.1 MILES E OF S ILLINOIS AVE	10,300	0.89	51	YES	375
2	MASON CITY	RPA 2	S MONROE AVE	15TH ST SW	5TH ST SW	10,400	0.57	21	YES	672
2	MASON CITY	RPA 2	S FEDERAL AVE/ US 65	35TH ST SE	4TH ST SW	12,000	1.98	33	YES	682
2	NEW HAMPTON	RPA 7	S LINN AVE	.1 MILES S OF E CLEVELAND ST	W MAIN ST	3,500	0.74	80	YES	148
2	NEW HAMPTON	RPA 7	N LINN AVE/ IOWA 24	W MAIN ST	SARA LEE DR	5,300	0.69	52	YES	668
2	OELWEIN	RPA 1	FREDERICK AVE N/ IOWA 150	.1 MILES N OF 9TH ST NE	2ND ST NW	3,900	0.69	73	NO	234
2	OELWEIN	RPA 1	CHARLES ST E/ IOWA 3	1ST AVE NE	9TH AVE SE	4,460	0.58	35	YES	510
2	OELWEIN	RPA 1	PALACE RD/ IOWA 150	COUNTY LINE RD	3RD ST SE	6,300	2.20	2	YES	207
2	OSAGE	RPA 2	MAIN ST/ IOWA 9	N 1ST ST	S 14TH ST	6,300	1.14	39	YES	282
2	SUMNER	RPA 7	W 1ST ST/ IOWA 93	HOWARD ST	N GUILFORD ST	4,270	0.63	63	NO	62
2	WATERLOO	INRCOG	W CONGER ST	RIVER RD	BURTON AVE	9,900	0.60	8	NO	219
2	WATERLOO	INRCOG	W RIDGEWAY AVE	SERGEANT RD	KIMBALL AVE	11,700	1.92	21	YES	397
2	WATERLOO	INRCOG	FRANKLIN ST	E 1ST ST	NEVADA ST	12,800	1.39	35	YES	639

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
2	WATERLOO	INRCOG	KIMBALL AVE	US 20	ACADIA ST	13,200	1.47	13	YES	586
2	WATERLOO	INRCOG	ANSBOROUGH AVE	E SAN MARNAN DR	MAYNARD AVE	18,400	3.40	25	YES	334
2	WAVERLY	RPA 7	BREMER AVE/ IOWA 3	20TH ST NW	8TH ST SE	12,800	1.71	25	YES	575

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Potential Candidates: District 3										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
3	CARROLL	RPA 12	US 30	INDUSTRIAL PARK RD	.1 MILES S OF HEIRES AVE	10,400	1.29	8	YES	198
3	CARROLL	RPA 12	6TH ST/ US 30	N CARROLL ST	MONTEREY DR	13,500	2.07	40	YES	519
3	CHEROKEE	RPA 4	S 2ND ST/ US 59	LINDEN ST	W LOCUST ST	5,300	0.84	25	YES	154
3	CHEROKEE	RPA 4	N 2ND ST/ US 59	MAIN ST	INDIAN ST	9,500	1.01	33	YES	492
3	DENISON	RPA 12	4TH AVE S/ US 30	S 7TH ST	S 20TH ST	9,400	1.00	50	YES	630
3	EMMETSBURG	RPA 3	BROADWAY ST/ IOWA 4	23RD ST	MAIN ST	5,500	0.87	27	YES	263
3	EMMETSBURG	RPA 3	MAIN ST/ US 18	ADAMS ST	N HURON ST	8,400	1.29	38	YES	377
3	HARTLEY	RPA 3	3RD ST NE/ US 18	N CENTRAL AVE	N 8TH AVE E	4,590	0.50	40	NO	120
3	HOLSTEIN	RPA 4	S MAIN ST/ US 59	US 20	E 2ND ST	3,350	0.91	40	YES	119
3	HOLSTEIN	RPA 4	N MAIN ST/ US 59	E 2ND ST	INDUSTRIAL PARK	3,630	0.50	36	YES	143
3	IDA GROVE	RPA 4	OHIO ST/ IOWA 175	OAK GROVE DR	FATHER DAILEY DR	4,790	0.80	50	YES	245
3	LE MARS	RPA 4	HAWKEYE AVE	24TH ST	4TH ST SW	9,600	2.15	13	YES	266
3	MAPLETON	RPA 4	S 4TH ST/ IOWA 14	OAK ST	MAIN ST	2,640	0.59	39	YES	373
3	MILFORD	RPA 3	OKOBOJI AVE/ US 71	4TH ST	IOWA 86	12,900	1.69	44	YES	214
3	ONAWA	RPA 4	IOWA AVE/ IOWA 175	15TH ST	4TH ST	5,800	0.74	27	YES	574
3	POCAHONTAS	RPA 5	ELM AVE/ IOWA 3	SW 2ND ST	SE 6TH ST	3,820	0.68	25	NO	116
3	ROCK RAPIDS	RPA 3	1ST AVE/ IOWA 9	.25 MILES W OF S FAIRLAMB ST	S GREENE ST	5,100	0.76	38	YES	469
3	SAC CITY	RPA 12	MAIN ST	N 16TH ST	2ND ST	2,570	0.85	34	YES	483

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
3	SIOUX CITY	SIMPCO	RIVERSIDE BLVD/ IOWA 12	WAR EAGLE DR	MILITARY RD	7,700	1.75	50	YES	354
3	SIOUX CITY	SIMPCO	6TH ST	IOWA ST	LEWIS BLVD	11,400	0.77	8	YES	403
3	SIOUX CITY	SIMPCO	S LAKEPORT ST	LINCOLN WAY	4TH AVE	13,300	1.25	83	YES	499
3	SIOUX CITY	SIMPCO	LEWIS BLVD/ IOWA 376	7TH ST	OUTER DR N	15,100	2.42	26	YES	281
3	SIOUX CITY	SIMPCO	W 7TH ST	PANOAH ST	PEARL ST	16,540	0.64	30	YES	838
3	SIOUX CITY	SIMPCO	FLOYD BLVD	14TH ST	.1 MILES S OF 33RD ST	16,700	1.69	11	YES	329
3	SPENCER	RPA 3	HIGHWAY BLVD/ US 18	E 17TH ST	.25 MILES S OF E 30TH ST	11,400	0.78	40	YES	232
3	SPENCER	RPA 3	N GRAND AVE/ US 18	.15 MILES N OF 4TH ST SE	E 8TH ST	15,500	0.65	23	YES	743
3	SPIRIT LAKE	RPA 3	US 71	CHICAGO AVE	.25 MILES E OF 252ND AVE	7,900	0.78	15	NO	198
3	SPIRIT LAKE	RPA 3	18TH ST/ US 71	MEMPHIS AVE	CHICAGO AVE	11,100	0.77	50	YES	499
3	STORM LAKE	RPA 3	LAKE AVE	W 5TH ST	590TH ST	12,900	1.21	43	YES	652
3	WEST OKOBOJI	RPA 3	US 71	IOWA 86	LAKE ST	13,600	1.74	2	YES	61

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Potential Candidates: District 4										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
4	ATLANTIC	RPA 13	7TH ST/ US 71	E 6TH ST	635TH ST	11,000	1.00	10	YES	364
4	AUDUBON	RPA 12	US 71	POPLAR ST	.5 MILES N OF 190TH ST	4,130	0.67	15	NO	80
4	AUDUBON	RPA 12	MARKET ST/US 71 US 71	MANTZ AVE	POPLAR ST	5,500	1.01	49	YES	254
4	BEDFORD	RPA 14	IOWA 148	JACKSON ST	POLLOCK BLVD	3,410	0.79	40	YES	74
4	CRESTON	RPA 14	W TOWNLINE ST/ IOWA 25	COTTONWOOD RD	N SPRUCE ST	5,400	0.82	15	YES	263
4	CRESTON	RPA 14	NEW YORK AVE/ US 34	CROMWELL RD	LAUREL ST	5,900	0.65	23	YES	134
4	CRESTON	RPA 14	N SUMNER AVE/ IOWA 25	W ADAMS ST	W TOWNLINE ST	6,900	0.95	39	YES	432
4	CRESTON	RPA 14	E TAYLOR ST/ US 34	S VINE ST	COMMERCE RD	8,500	0.78	18	NO	69

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
4	CRESTON	RPA 14	W TAYLOR ST/ US 34	LAUREL ST	S VINE ST	9,700	0.86	35	NO	449
4	GUTHRIE CENTER	RPA 12	STATE ST/ IOWA 44	N 12TH ST	.15 MILES E OF BLUFF ST	3,450	0.71	31	NO	140
4	HARLAN	RPA 18	CHATBURN AVE/ IOWA 44	23RD ST	6TH ST	6,600	1.10	39	YES	470
4	PERRY	RPA 11	1ST AVE/ IOWA 144	IOWA 141	GRACELAND AVE	8,500	1.81	49	YES	474
4	SHENANDOAH	RPA 13	FREMONT ST/ US 59	W NISHNA RD	FERGUSON RD	8,900	1.03	31	YES	323
4	WEST DES MOINES	DMAMPO	VISTA DR	JORDAN CREEK PKWY	60TH ST	1,370	0.80	19	YES	1,286
4	WEST DES MOINES	DMAMPO	WESTOWN PKWY	71ST ST	60TH ST	7,100	0.74	8	NO	91
4	WINTERSET	RPA 11	W SUMMIT ST	.15 MILES W OF S 8TH AVE	CLARK TOWER RD	3,890	0.65	59	NO	418

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Potential Candidates: District 5										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
5	ALBIA	RPA 17	IOWA 5	CO RD. T35	14TH AVE W	6,700	0.51	6	NO	91
5	BLOOMFIELD	RPA 17	US 63	E ARKANSAS AVE	MADISON ST	5,500	0.57	24	NO	128
5	BLOOMFIELD	RPA 17	WASHINGTON ST/ US 63	E SOUTH ST	E ARKANSAS AVE	6,700	0.55	42	YES	666
5	BURLINGTON	RPA 16	MAIN ST	ANGULAR ST	US 34	6,400	0.78	29	YES	518
5	BURLINGTON	RPA 16	DIVISION ST	S ROOSEVELT AVE	N/S MAIN ST	8,000	2.05	46	YES	632
5	BURLINGTON	RPA 16	AGENCY ST	COLUMBUS DR	CURRAN ST	9,300	0.62	21	YES	874
5	BURLINGTON	RPA 16	CENTRAL AVE	MAPLE ST	COLUMBIA ST	10,700	0.64	39	YES	1,186
5	CORYDON	RPA 17	JEFFERSON ST/ IOWA 2	.1 MILES W OF N LINCOLN ST	.1 MILES E OF S EAST ST	4,540	0.88	38	NO	354
5	FORT MADISON	RPA 16	2ND ST	GREAT RIVER RD	335TH AVE	5,100	1.53	8	NO	514
5	FORT MADISON	RPA 16	AVE O	270TH AVE	AVENUE L	10,200	1.91	21	YES	565
5	FORT MADISON	RPA 16	AVE H	20TH ST	GREAT RIVER RD	10,900	1.73	24	YES	689
5	FORT MADISON	RPA 16	AVE L	39TH ST	20TH ST	11,600	1.31	49	YES	754

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
5	INDIANOLA	RPA 11	E 2ND AVE/ IOWA 92	S JEFFERSON WAY	.1 MILES W OF E 1ST	6,500	1.15	34	YES	747
5	KALONA	RPA 10	E AVE/ IOWA 22	1ST ST	9TH ST	6,500	0.63	35	YES	483
5	KEOKUK	RPA 16	7TH ST/ US 136	TWIN RIVERS DR	B ST	4,120	1.74	25	NO	57
5	KEOKUK	RPA 16	7TH ST S/ US 136	B ST	MAIN ST	4,120	0.67	15	YES	250
5	KEOKUK	RPA 16	N MAIN ST/ US 218	NAVAHO DR	US 61	11,300	0.95	30	NO	116
5	KEOKUK	RPA 16	S MAIN ST/ US 218	S 3RD ST	N 13TH ST	12,800	0.70	32	YES	278
5	KNOXVILLE	RPA 11	LINCOLN ST/ IOWA 14	ERIC DR	KERMIT DR	10,200	1.90	41	YES	559
5	MOUNT PLEASANT	RPA 16	235TH ST	OLD HWY 34	.15 MILES E OF N J AND J LN	4,370	0.93	15	NO	205
5	MOUNT PLEASANT	RPA 16	W WASHINGTON ST	.15 MILES E OF N J AND J LN	S MAIN ST	8,800	0.69	52	YES	495
5	MOUNT PLEASANT	RPA 16	E WASHINGTON ST	S MAIN ST	US 218	11,900	1.66	36	YES	373
5	MUSCATINE	RPA 9	OREGON ST	MILES AVE	GRANDVIEW AVE	5,100	0.50	40	NO	164
5	MUSCATINE	RPA 9	GRANDVIEW AVE	ROBY AVE	HERSHEY AVE	8,400	0.64	40	YES	363
5	MUSCATINE	RPA 9	ISETT AVE	WOODLAWN AVE	LAKE PARK BLVD	10,600	0.58	36	YES	312
5	MUSCATINE	RPA 9	E 2ND ST/ IOWA 38	MULBERRY AVE	PARK AVE	10,700	0.66	41	YES	264
5	MUSCATINE	RPA 9	PARK AVE/ IOWA 38	E 4TH ST	CLAY ST	10,800	0.88	29	YES	325
5	OSKALOOSA	RPA 15	S MARKET ST/ US 63	18TH AVE	ROCK ISLAND AVE	7,700	0.69	56	NO	427
5	OSKALOOSA	RPA 15	A AVE E IOWA 92	N MARKET ST	SOLAR DR	10,900	1.44	35	YES	411
5	OSKALOOSA	RPA 15	A AVE W/ IOWA 92	.1 MILES E OF HWY 432	N MARKET ST	13,400	0.94	48	YES	981
5	RICHLAND	RPA 15	OAK ST	IOWA 78	W DIVISION ST	2,080	0.86	30	NO	181
5	WASHINGTON	RPA 10	E WASHINGTON ST/ IOWA 92	N 2ND AVE	.1 MILES W OF WILEY AVE	9,600	1.31	53	YES	279
5	WEST BURLINGTON	RPA 16	MT PLEASANT ST	N GEAR AVE	N ROOSEVELT AVE	10,700	1.51	42	YES	388
5	WEST BURLINGTON	RPA 16	W AGENCY RD	WASHINGTON RD	DEREK LINCOLN DR	12,000	1.42	18	YES	814

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Potential Candidates: District 6										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
6	BELLE PLAINE	RPA 10	13TH ST/ IOWA 21	1ST AVE	7th AVE	3,110	0.51	41	NO	73
6	BELLE PLAINE	RPA 10	7TH AVE/ IOWA 21	5th ST	13th ST	4,640	0.62	60	YES	292
6	BETTENDORF	BSRC	GREAT RIVER RD/ US 67	24TH AVE	.25 MILES W OF W CANAL SHORE DR	8,600	2.32	3	NO	124
6	BETTENDORF	BSRC	18TH ST	SPRUCE HILLS DR	HEATHER GLEN AVE	12,100	2.00	36	YES	501
6	BETTENDORF	BSRC	SPRUCE HILLS DR	UTICA RIDGE RD	MIDDLE RD	14,400	1.25	48	YES	441
6	BETTENDORF	BSRC	DEVILS GLEN RD	STATE ST	SUMMERTREE AVE	17,900	2.95	27	YES	298
6	BETTENDORF	BSRC	MIDDLE RD	.2 MILES W OF OAKBROOK DR	BELMONT RD	22,700	2.28	29	YES	347
6	CASCADE	RPA 8	1ST AVE W	CLEVELAND ST NW	PIERCE ST SW	4,650	0.52	45	YES	294
6	CEDAR RAPIDS	CMPO	42ND ST NE	RIVER RIDGE DR NE	WENIG RD NE	8,600	0.94	20	YES	189
6	CEDAR RAPIDS	CMPO	JOHNSON AVE NW	1ST AVE SW	18TH ST NW	9,200	2.09	27	YES	490
6	CEDAR RAPIDS	CMPO	CENTER POINT RD NE	32ND ST NE	TEXAS AVE NE	11,300	0.46	68	NO	133
6	CEDAR RAPIDS	CMPO	BOWLING ST SW	US 30	WILSON AVE SW	11,900	2.00	20	YES	203
6	CEDAR RAPIDS	CMPO	WILEY BLVD SW	EDGEWOOD RD SW	WILLAMS BLVD SW	13,800	0.72	6	YES	545
6	CEDAR RAPIDS	CMPO	6TH ST SW	63RD AVE SW	2ND AVE SW	14,400	3.90	16	YES	270
6	CEDAR RAPIDS	CMPO	WILLIAMS BLVD/ IOWA 922	16TH AVE SW	18TH ST SW	15,200	0.79	108	YES	303
6	CEDAR RAPIDS	CMPO	1ST AVE E/ IOWA 922	1ST ST NE	13TH ST SE	16,400	0.97	39	YES	867
6	CEDAR RAPIDS	CMPO	MOUNT VERNON RD SE	MEMORIAL DR SE	EAST POST RD SE	16,500	1.09	75	YES	316
6	CLINTON	RPA 8	2ND AVE S	S 14TH ST	S 10TH ST	4,140	0.58	50	YES	682
6	CLINTON	RPA 8	S 14TH ST	US 30	S BLUFF BLVD	5,200	1.14	42	YES	767
6	CLINTON	RPA 8	S 2ND ST/ US 67	7TH AVE S	1ST AVE	8,000	0.43	30	YES	1,388
6	CLINTON	RPA 8	N BLUFF BLVD	IKES PEAK RD	7TH AVE N	9,200	0.64	39	NO	362
6	CLINTON	RPA 8	N 3RD ST	17TH AVE N	MAIN AVE	10,100	0.66	30	YES	1,101
6	CLINTON	RPA 8	13TH AVE N	16TH ST NW	N 2ND ST/ US 67	10,600	2.00	39	YES	489

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
6	CLINTON	RPA 8	S BLUFF BLVD	TERRACE DR	IKES PEAK RD	11,600	0.94	21	YES	549
6	CLINTON	RPA 8	N 2ND ST/ US 67	1ST AVE	18TH AVE N	12,700	1.41	44	YES	860
6	CORALVILLE	MPOJC	1ST AVE	5TH ST	9TH ST	17,600	0.54	45	YES	452
6	DAVENPORT	BSRC	W 35TH ST	N MARQUETTE ST	FAIR AVE	6,100	0.94	13	YES	489
6	DAVENPORT	BSRC	E 46TH ST	N BRADY ST/ BUS US 61	DEAD END	6,500	0.74	12	YES	569
6	DAVENPORT	BSRC	HICKORY GROVE RD	N THORNWOOD AVE	N DIVISION ST	9,500	1.24	51	YES	336
6	DAVENPORT	BSRC	N PINE ST	W 49TH ST	W 63RD ST	9,600	1.03	31	YES	295
6	DAVENPORT	BSRC	JERSEY RIDGE RD	KIMBERLY RD	BELLE CT	10,100	1.37	43	YES	954
6	DAVENPORT	BSRC	W 2ND ST/ US 67	N GAINES ST	IOWA ST	11,100	0.71	20	YES	1,093
6	DAVENPORT	BSRC	KIMBERLY RD	SHADY LN	E 32ND ST	12,500	1.07	27	NO	244
6	DAVENPORT	BSRC	MARQUETTE ST	W CENTRAL PARK AVE	W KIMBERLY RD/US 6	12,700	1.01	26	YES	672
6	DAVENPORT	BSRC	W CENTRAL PARK AVE	EMEIS PARK AVE	BRADY ST/BUS US 61	13,400	3.48	31	YES	734
6	DAVENPORT	BSRC	W 53RD ST	N PINE ST	N RIPLEY ST	14,600	1.70	39	YES	488
6	DAVENPORT	BSRC	EASTERN AVE	E 29TH ST	E 46TH ST	16,000	1.25	52	YES	848
6	DAVENPORT	BSRC	N DIVISION ST	W 3RD ST	W 53RD ST	20,000	3.60	30	YES	701
6	DE WITT	RPA 8	11TH ST	WESTWOOD DR	HUMESTON RD	8,700	1.85	51	YES	430
6	DUBUQUE	DMATS	CHAVENELLE RD	RADFORD RD	NW ARTERIAL/ IOWA 32	4,550	0.73	23	NO	165
6	DUBUQUE	DMATS	CENTRAL AVE/ US 52	RUBY ST	.5 MILES N OF RUBY ST/ CITY LIMITS	9,500	0.51	16	NO	189
6	HIAWATHA	CMPO	CENTER POINT RD	BLAIRS FERRY RD NE	BOYSON RD	12,200	1.11	26	YES	752
6	IOWA CITY	MPOJC	OAK CREST HILL RD SE	OAK CREST HILL RD SE	MORMON TREK BLVD	10,100	0.84	5	NO	96
6	IOWA CITY	MPOJC	HAWKINS DR	MELROSE AVE	2ND ST/ US 6	11,000	0.99	2	YES	2,377
6	IOWA CITY	MPOJC	OLD HIGHWAY 218	MORMON TREK BLVD	RUPPERT RD	11,300	1.04	11	NO	160
6	IOWA CITY	MPOJC	MORMON TREK BLVD	HWY 1/ IOWA 1	MELROSE AVE	14,100	1.71	7	YES	592
6	IOWA CITY	MPOJC	S GILBERT ST	MCCOLLISTER BLVD	IOWA AVE	17,300	2.37	29	YES	841

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
6	MARION	CMPO	7TH AVE	14TH ST	31ST ST	16,600	0.74	44	NO	525
6	SAGEVILLE	DMATS	US 52	.5 MILES N OF RUBY ST	W JOHN DEERE RD	10,000	1.86	5	YES	224

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Appendix 1: Secondary Analysis

As the original scope of project grew it was decided by TAS that a secondary effort to identify existing three-lane sites would benefit the results of the original project. By identifying existing three-lane sites this secondary screening will not only supplement the original project but also reduce any future efforts to identify such locations. The hope is that in future efforts, this information could be used as a starting point for future analysis.

Existing 3-Lane: District 1										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
1	ALTOONA	DMAMPO	1ST AVE S	NE 27th AVE	8th ST SW	7,800	1.74	2	YES	263
1	DES MOINES	DMAMPO	AURORA AVE	MERLE HAY RD	BEAVER AVE	7,400	1.02	50	YES	474
1	DES MOINES	DMAMPO	BEAVER AVE	URBANDALE AVE	AURORA AVE	15,200	1.20	69	YES	395
1	DES MOINES	DMAMPO	HUBBELL AVE	.3 MILES NE OF EASTON BLVD	E 29th ST	15,300	0.73	40	YES	575
1	DES MOINES	DMAMPO	INGERSOLL AVE	POLK BLVD	MARTIN LUTHER KING JR PKWY	16,400	1.91	57	YES	559
1	DIKE	RPA 7	160TH ST	U AVENUE	.2 MILES EAST OF 7TH ST	2,290	0.77	13	NO	193
1	FORT DODGE	RPA 5	S 29TH ST	5TH AVE S	2ND AVE N	7,700	0.50	20	YES	1,438
1	FORT DODGE	RPA 5	1ST AVE S	E 23RD ST	.3 MILES E OF S 32ND ST	9,900	0.81	74	YES	782
1	GRIMES	DMAMPO	1ST ST/ IOWA 44	NW MAPLEWOOD DR	NE LITTLE BEAVER ST	12,200	0.87	31	YES	346
1	IOWA FALLS	RPA 6	WASHINGTON AVE	SLAYTON AVE	HIGH ST	6,400	0.54	43	YES	134
1	IOWA FALLS	RPA 6	OAK ST/ US 65	.3 S OF MILES 140TH ST	.1 MILES N OF INDUSTRIAL RD	10,400	0.73	54	YES	131
1	JOHNSTON	DMAMPO	NW BEAVER DR	.112MI N OF NW FROST WAY	NW 66TH AVE	9,800	1.81	23	YES	141
1	MARSHALLTOWN	RPA 6	E NEVADA ST	3RD AVE	LENNOX DR	5,700	0.53	40	NO	88
1	MARSHALLTOWN	RPA 6	MADISON ST	S 9TH ST	3RD AVE	9,800	1.19	55	NO	400
1	MARSHALLTOWN	RPA 6	S 6TH ST	WESTWOOD DR	S 6TH ST	10,200	1.23	41	YES	230
1	NEVADA	RPA 11	LINCOLN HWY	1ST ST	15TH ST	5,500	0.99	31	YES	429
1	NEWTON	RPA 11	1ST AVE E/ US 6	1ST ST N	E 17TH ST S	10,100	1.07	60	YES	524
1	WEBSTER CITY	RPA 5	2ND ST	GROVE ST	PROSPECT ST	6,900	0.26	66	NO	377

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Existing 3-Lane: District 2										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
2	CEDAR FALLS	INRCOG	BRANDILYNN BLVD	ANDREA DR	GOLDENROD WAY	805	0.59	20	NO	366
2	CEDAR FALLS	INRCOG	CEDAR HEIGHTS DR	E GREENHILL RD	UNIVERSITY AVE	9,400	0.62	29	YES	635
2	CLEAR LAKE	RPA 2	US 18	N 16TH ST SW	N 6TH ST	13,300	1.32	15	YES	201
2	CRESCO	RPA 1	2ND AVE SE/ IOWA 9	S ELM ST	YORK ST	6,600	0.84	33	YES	86
2	CRESCO	RPA 1	2ND AVE SW/ IOWA 9	STOCK AVE	S ELM ST	7,100	0.67	52	YES	289
2	DECORAH	RPA 1	MONTGOMERY ST	IOWA 9	E BROADWAY ST	9,500	0.81	28	NO	152
2	ELKADER	RPA 1	IOWA 13	250TH ST	.2 MILES S OF FAWN HALLOW RD	4,520	0.66	12	NO	101
2	MASON CITY	RPA 2	4TH ST SE/ IOWA 22	S ILLINOIS AVE	THRUSH AVE	6,800	2.45	3	NO	153
2	OELWEIN	RPA 1	FREDERICK AVE S	12TH ST SW	4TH ST SW	3,550	0.87	68	NO	94
2	WATERLOO	INRCOG	W COMMERCIAL ST	WESTFIELD AVE	W MULLAN AVE	2,220	0.63	5	YES	2,116
2	WATERLOO	INRCOG	LAFAYETTE ST	E 11TH ST	FAY ST	10,000	1.42	48	YES	433

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Existing 3-Lane: District 3										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
3	ARNOLDS PARK	RPA 3	OKOBOJI GROVE RD/ US 71	LAKE ST	178TH ST	15,500	1.80	36	YES	161
3	SHELDON	RPA 3	PARK ST/ US 18	N 2ND AVE	IOWA 60	9,200	2.03	21	YES	497
3	SIBLEY	RPA 3	2ND AVE	12TH ST	4TH ST	3,860	0.76	42	YES	468
3	SIOUX CENTER	RPA 3	MAIN AVE/ US 75	12TH ST SW	.1 MILES N OF 9TH ST CIR NE	12,200	1.53	45	YES	346
3	SIOUX CITY	SIMPCO	TRANSIT AVE	GIBSON ST	S CECELIA ST	7,700	0.67	5	NO	345
3	STORM LAKE	RPA 3	MILWAUKEE AVE/ IOWA 7	NORTHWESTERN DR	E LAKESHORE DR	8,300	2.45	35	YES	381

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Existing 3-Lane: District 4										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
4	ATLANTIC	RPA 13	7TH ST/ US 6	W 10TH ST	.15 MILES E OF PLUM ST	11,000	1.90	40	YES	415
4	COUNCIL BLUFFS	MAPA	MID AMERICA DR	S 35TH ST	MARC BLVD	3,540	0.63	3	NO	104
4	COUNCIL BLUFFS	MAPA	9TH AVE	S 28TH ST	21ST ST	6,800	0.72	40	NO	279
4	COUNCIL BLUFFS	MAPA	BENNETT AVE	MADISON AVE	OLD HWY 6	11,700	1.27	45	YES	253
4	GLENWOOD	RPA 18	N LOCUST ST	.2 MILES S OF HAZEL ST	SHARP ST	7,900	0.51	55	YES	360
4	GLENWOOD	RPA 18	S LOCUST ST	SHARP ST	.1 MILES E OF HAZEL ST	8,800	0.69	51	YES	335
4	HARLAN	RPA 18	CYCLONE AVE	US 59	6TH ST	2,900	1.19	44	NO	84
4	HARLAN	RPA 18	US 59	INDUSTRIAL PKWY	CYCLONE AVE	4,960	1.79	2	NO	106
4	RED OAK	RPA 13	BROADWAY ST/ IOWA 48	OHIO AVE	ALIX ST	7,600	1.76	33	YES	245

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

Existing 3-Lane: District 5										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
5	BURLINGTON	RPA 16	MT PLEASANT ST	COTTONWOOD CT	RHEIN ST	11,100	1.38	49	NO	378
5	CENTERVILLE	RPA 17	W MAPLE ST/ IOWA 2	A ST	S MAIN ST	5,000	1.04	45	YES	224
5	CENTERVILLE	RPA 17	E MAPLE ST/ IOWA 2	S MAIN ST	S 18TH ST	7,000	0.37	58	YES	267
5	CENTERVILLE	RPA 17	S 18TH ST/ IOWA 5	E PRAIRIE ST	E MAPLE ST	9,200	0.13	95	YES	679
5	CENTERVILLE	RPA 17	N 18TH ST/ IOWA 5	E MAPLE ST	N 18TH DR	10,000	0.76	35	YES	335
5	FAIRFIELD	RPA 15	E BURLINGTON AVE	S MAIN ST	N MORGAN ST	7,700	0.75	44	YES	374
5	FAIRFIELD	RPA 15	W BURLINGTON AVE/ IOWA 1	N 28TH ST	S MAIN ST	13,200	1.63	36	YES	392
5	INDIANOLA	RPA 11	2ND AVE/ IOWA 92	CO RD R63	S JEFFERSON WAY	12,400	2.52	27	YES	288
5	MEDIAPOLIS	RPA 16	US 61	MEADOW ST	COLUMBIA ST	6,900	0.27	44	NO	480
5	MUSCATINE	RPA 9	CLAY ST	GOBBLE ST	PARK AVE	1,590	0.44	34	YES	1,222

District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
5	OSCEOLA	RPA 17	E MC LANE ST/ US 34	S MAIN ST	HARKEN HILLS DR	6,300	0.71	67	YES	517
5	OSCEOLA	RPA 17	W MC LANE ST/ US 34	.1 W OF S RIDGE RD	S MAIN ST	10,000	0.77	47	YES	298
5	OSKALOOSA	RPA 15	N MARKET ST/ US 63	A AVE W	E GLENDALE RD	7,600	1.13	54	YES	732
5	OTTUMWA	RPA 15	DAHLONEGA RD	INDIAN HILLS DR	US 63	2,810	1.19	10	NO	90
5	PELLA	RPA 11	OSKALOOSA ST	MAIN ST	E 8TH ST	8,000	0.64	41	YES	211
5	PELLA	RPA 11	E OSKALOOSA ST	E 8TH ST	SE 16TH ST	8,300	0.57	28	NO	150
5	PELLA	RPA 11	WASHINGTON ST	.15 MILES E OF OLD HWY 163	BROADWAY ST	10,460	1.31	36	YES	311
5	WASHINGTON	RPA 10	E MADISON ST/ IOWA 92	S IOWA AVE	S 3RD AVE	5,600	0.15	39	YES	1,436
5	WASHINGTON	RPA 10	W MADISON ST/ IOWA 92	250TH ST	S IOWA AVE	7,200	0.91	43	YES	339

**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

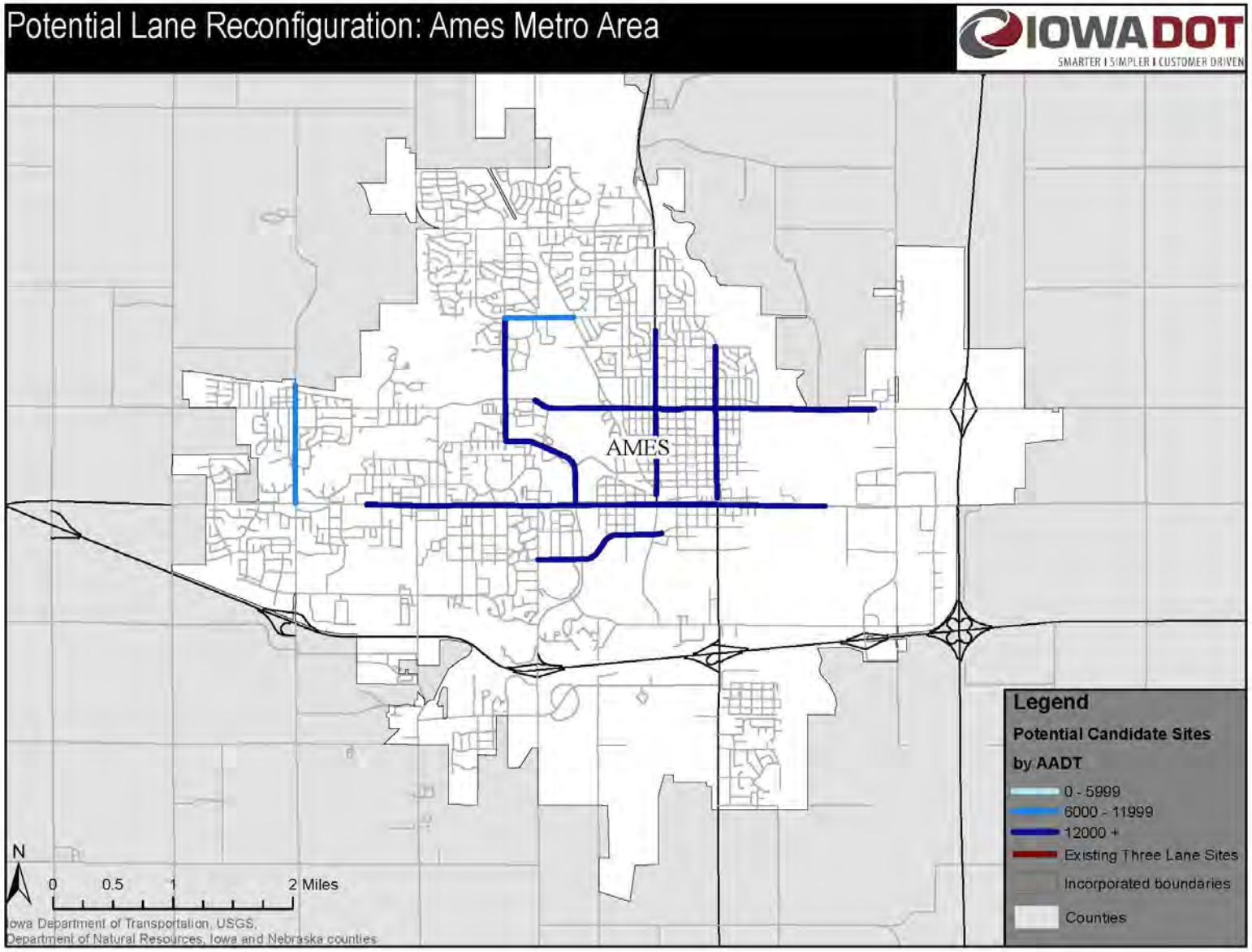
Existing 3-Lane: District 6										
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
6	BLUE GRASS	RPA 9	W MAYNE ST	65TH AVE	N MISSISSIPPI ST	3,080	0.50	24	YES	0
6	BLUE GRASS	RPA 9	E MAYNE ST	N MISSISSIPPI	.1 E OF TERRACE DR	3,490	0.32	38	YES	53
6	CEDAR RAPIDS	CMPO	60TH AVE SW	EDGEWOOD RD SW	LOCUST RD SW	2,690	1.51	2	NO	216
6	CEDAR RAPIDS	CMPO	C ST RD SW	US 30	41ST AVE DR SW	12,500	0.80	8	YES	179
6	DAVENPORT	BSRC	MARQUETTE ST	W RIVER DR	W LOCUST ST	9,600	1.31	47	YES	1,279
6	DUBUQUE	DMATS	PENNSYLVANIA AVE	NW ARTERIAL	JOHN F KENNEDY RD	14,600	1.02	19	YES	970
6	HIAWATHA	CMPO	CENTER POINT RD	DINA DR	TOWER TERRACE RD	12,200	0.91	13	NO	169
6	IOWA CITY	MPOJC	420TH ST	US 6	.2 MILES W OF TAFT AVE SE	1,340	0.71	3	NO	60
6	IOWA CITY	MPOJC	MORMON TREK BLVD	HWY 1	OAK CREST HILL RD SE	6,400	1.32	1	YES	817
6	MANCHESTER	RPA 8	S FRANKLIN ST	E MARION ST	E MAIN ST	4,210	0.13	16	YES	2,288
6	MANCHESTER	RPA 8	N FRANKLIN ST/ IOWA 13	E MAIN ST	.1 MILES N OF W BUTLER ST	8,900	0.15	13	YES	494

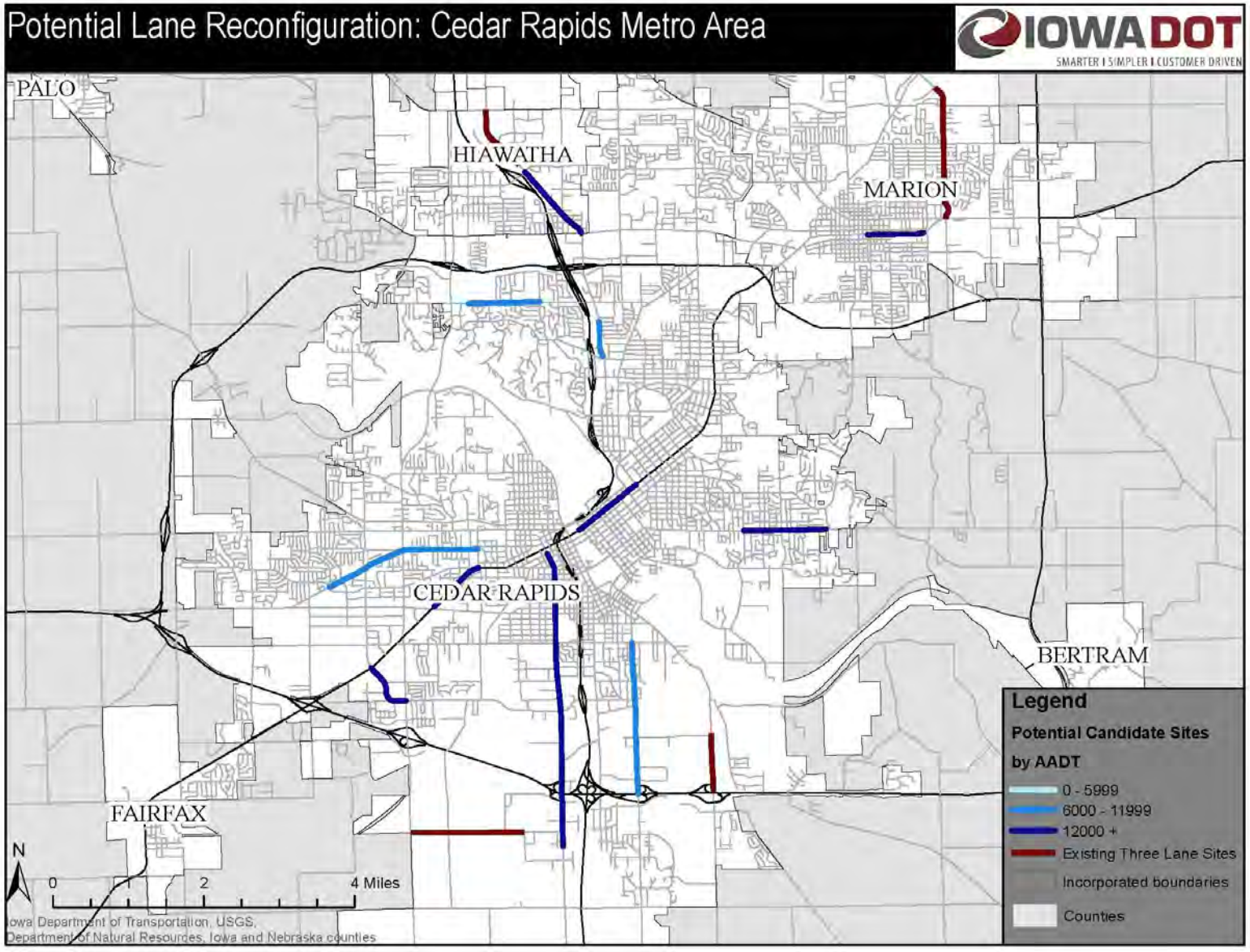
District	City	MPO/RPA	Route	Begin	End	AADT	Length(Mi.)	Access Density (per MI.)	Traffic Signal	Crash Rate (HMVMT)
6	MAQUOKETA	RPA 8	W PLATT ST/ IOWA 13	MCKINSEY AVE	S NIAGARA ST	8,800	0.66	53	YES	309
6	MARION	CMPO	35TH ST	7TH AVE	TOWER TERRACE RD	7,800	1.80	9	YES	565
6	MONTICELLO	RPA 10	S MAIN ST/ IOWA 38	CO RD E16	E WASHINGTON ST	8,000	0.68	42	YES	145

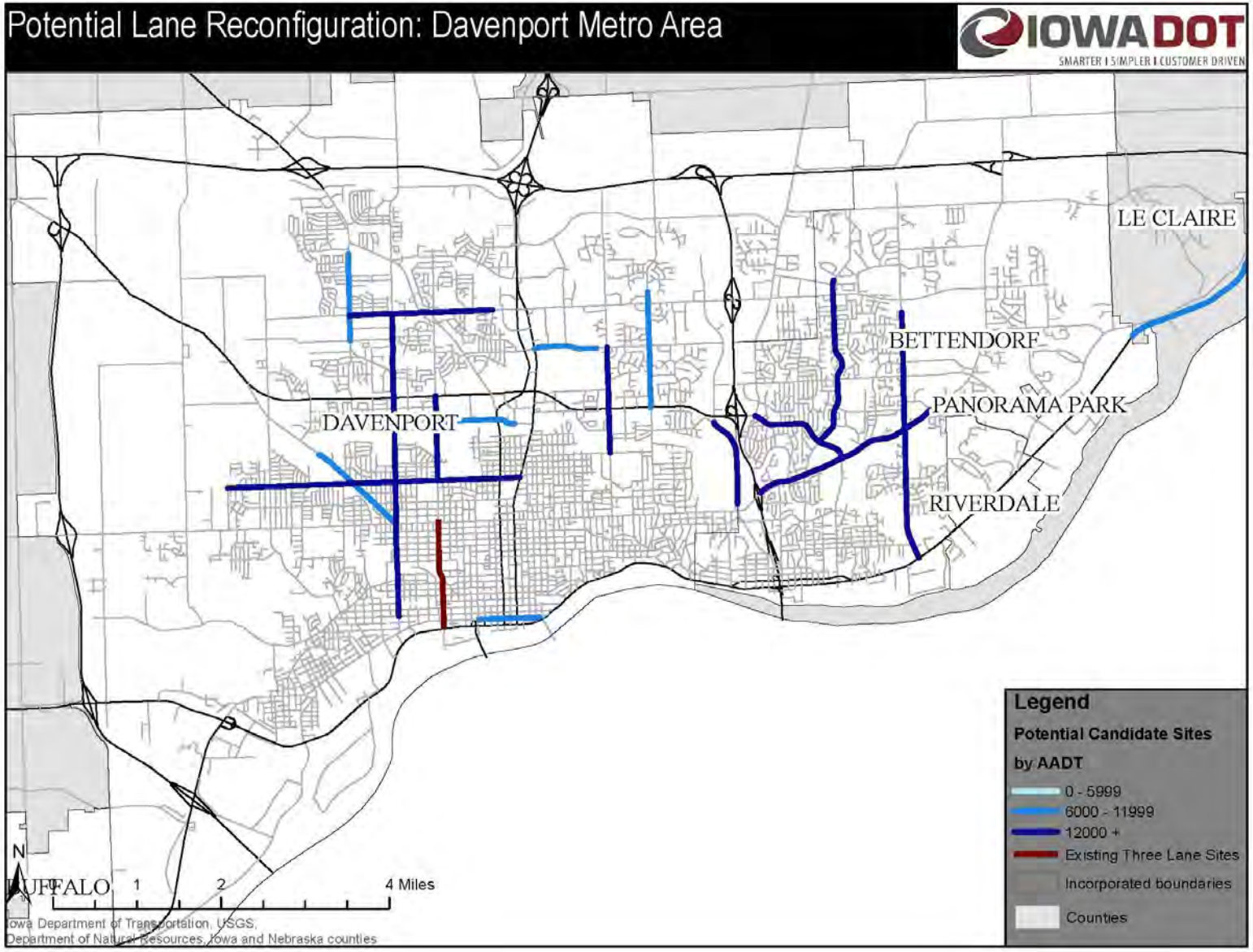
**District field: Red indicates that the site is at least partially located on a state route whereas grey indicates that the site is located exclusively on a municipal or county route.*

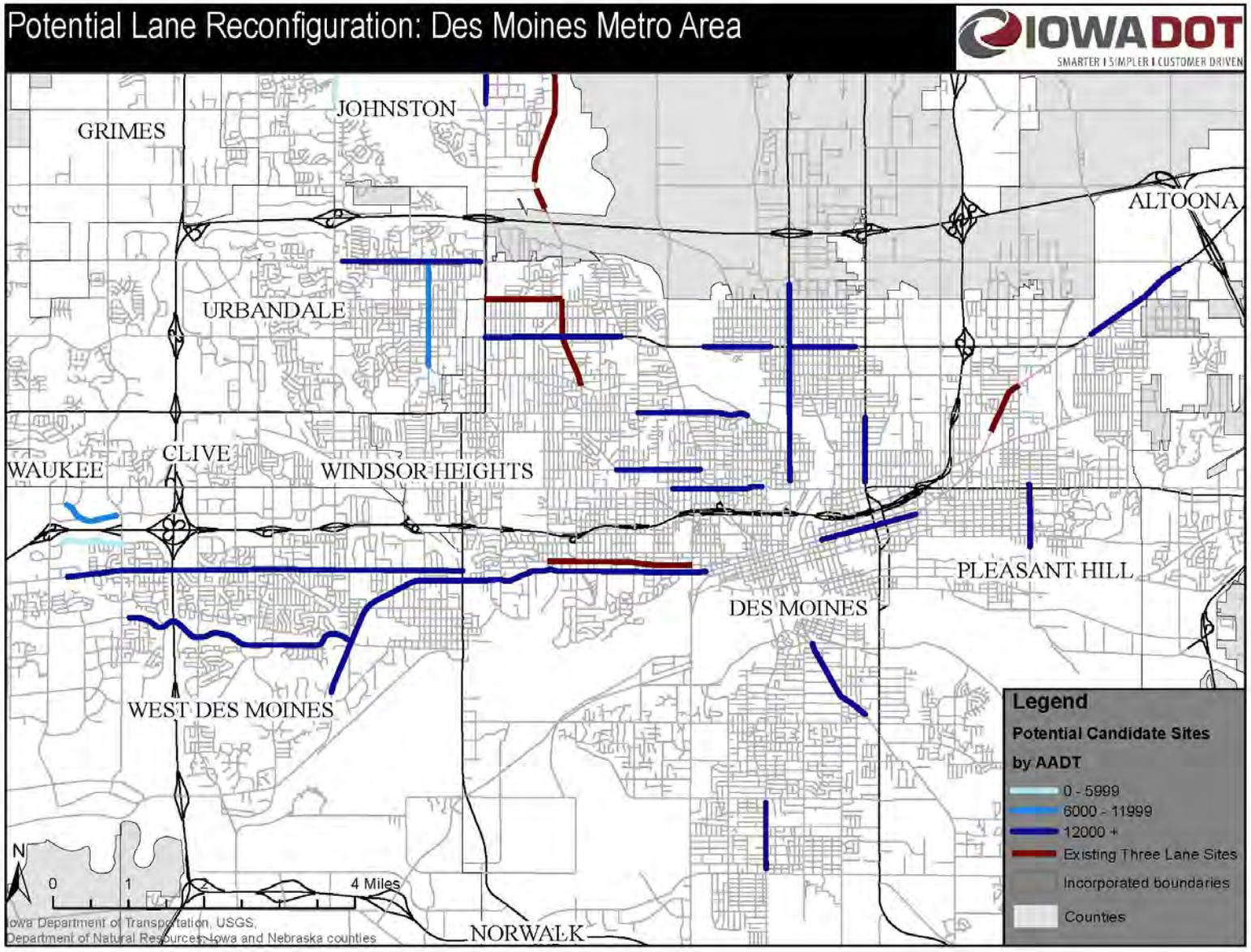
Appendix 2: Maps

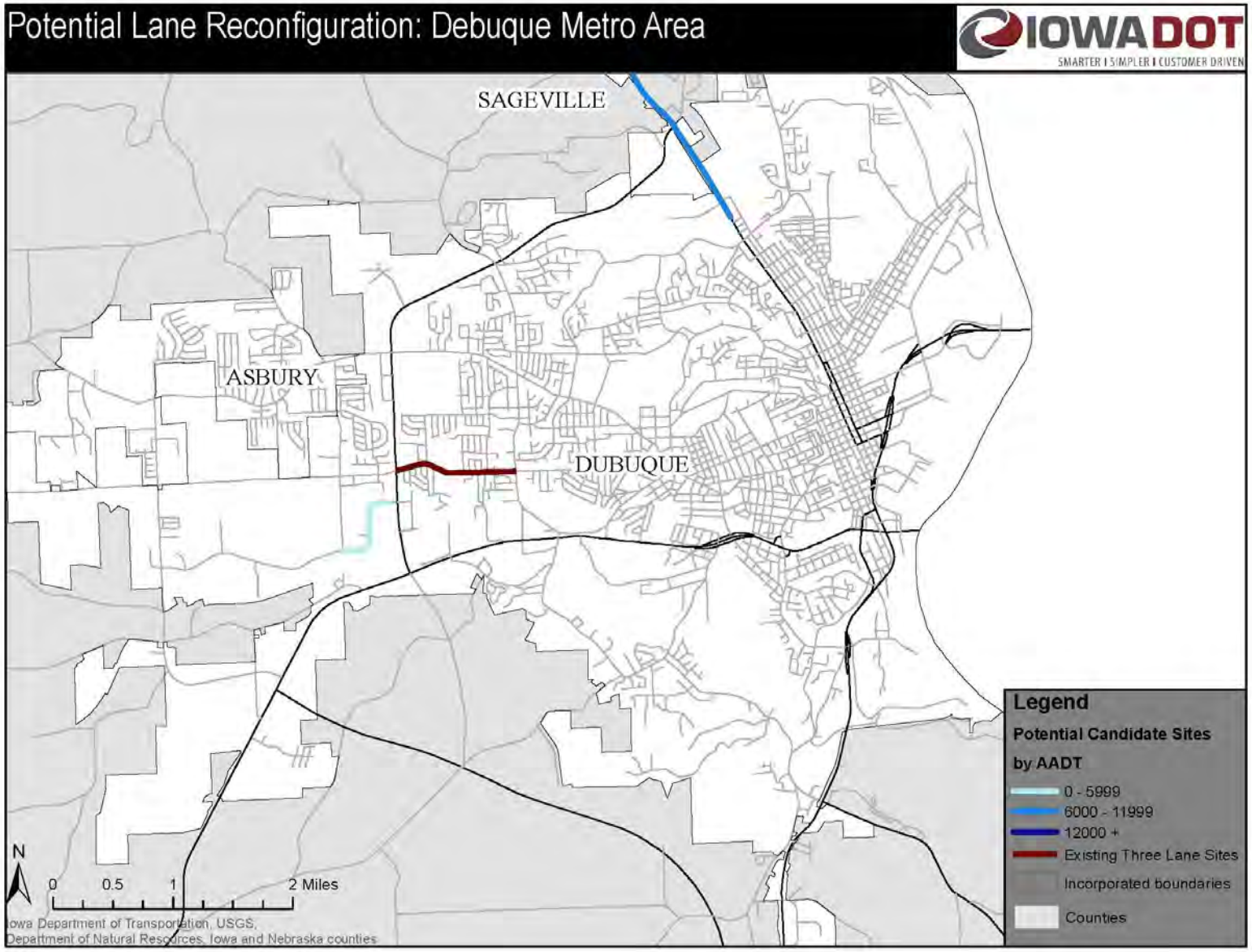
In the following pages the potential candidate sites and existing three-lane sites are presented in maps. The maps only include sites within the metro areas of Iowa. By focusing in on only this area it limits the number of maps that needed to be created. It should be noted that the Council Bluffs area was excluded from the maps because of a limited number of both potential candidate and existing three-lane sites.

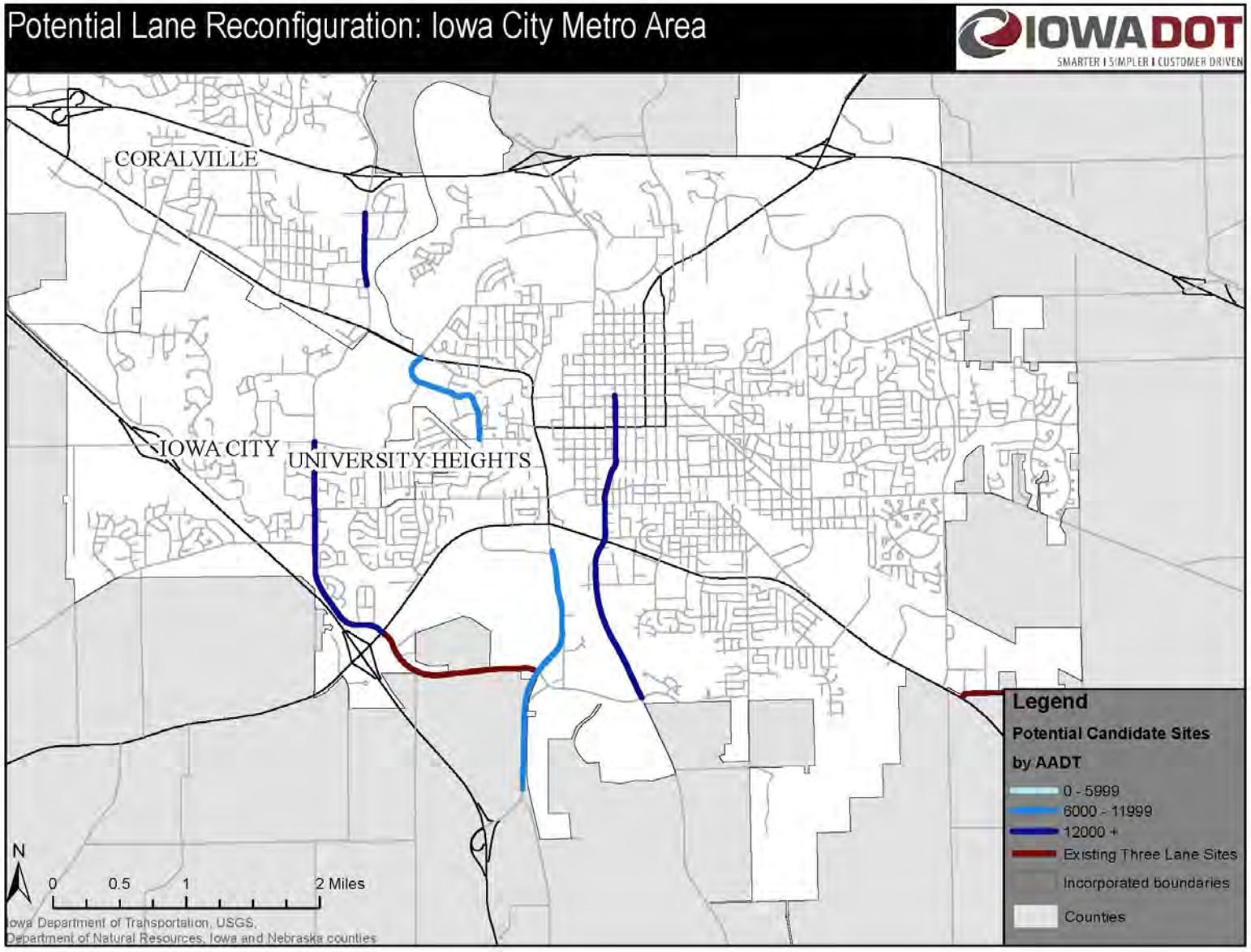

Potential Lane Reconfiguration: Ames Metro Area
IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
AMES
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties
N
0
0.5
1
2 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties

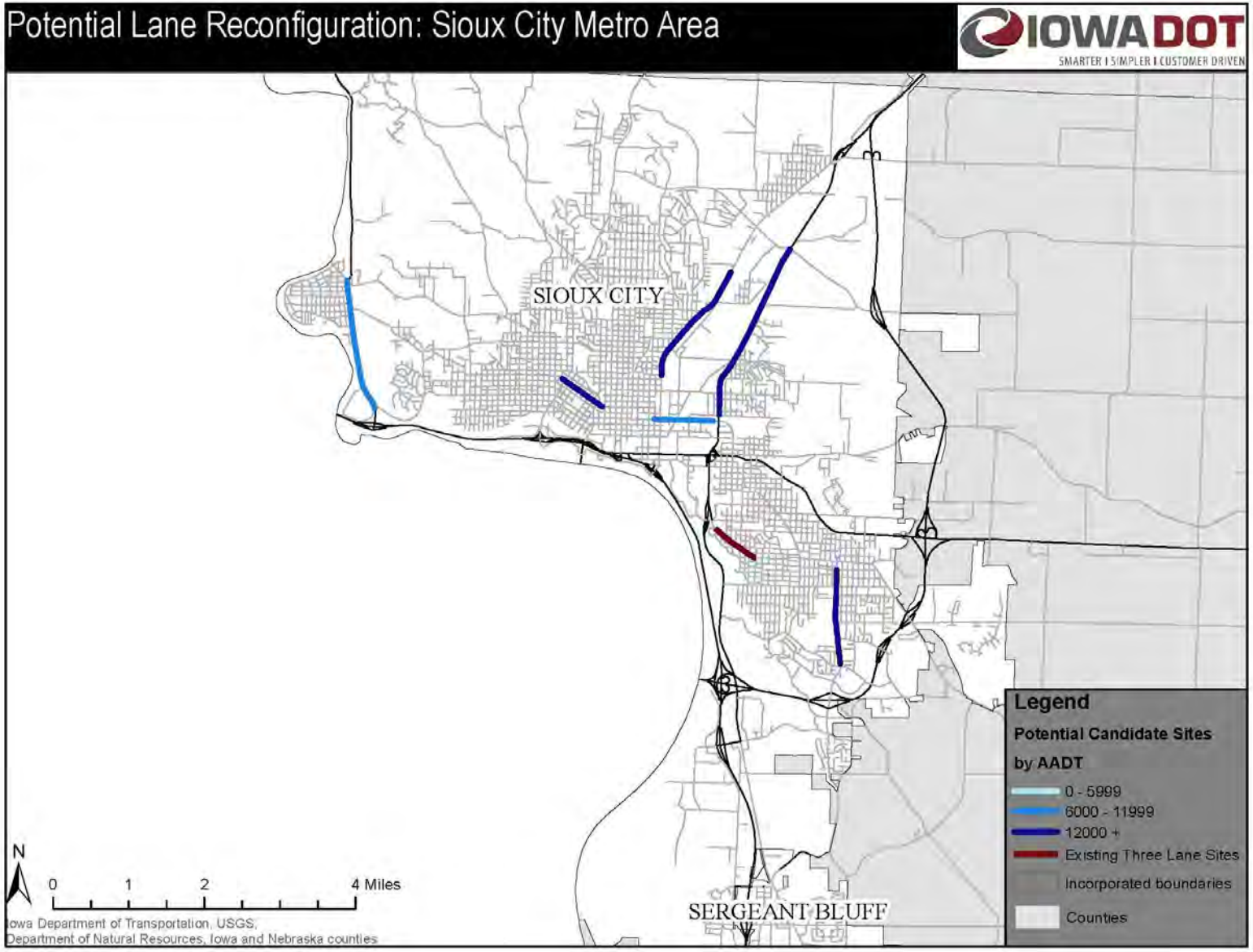

Potential Lane Reconfiguration: Cedar Rapids Metro Area
IOWADOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
PALO
HIAWATHA
MARION
CEDAR RAPIDS
BERTRAM
FAIRFAX
N
0
2
4 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties

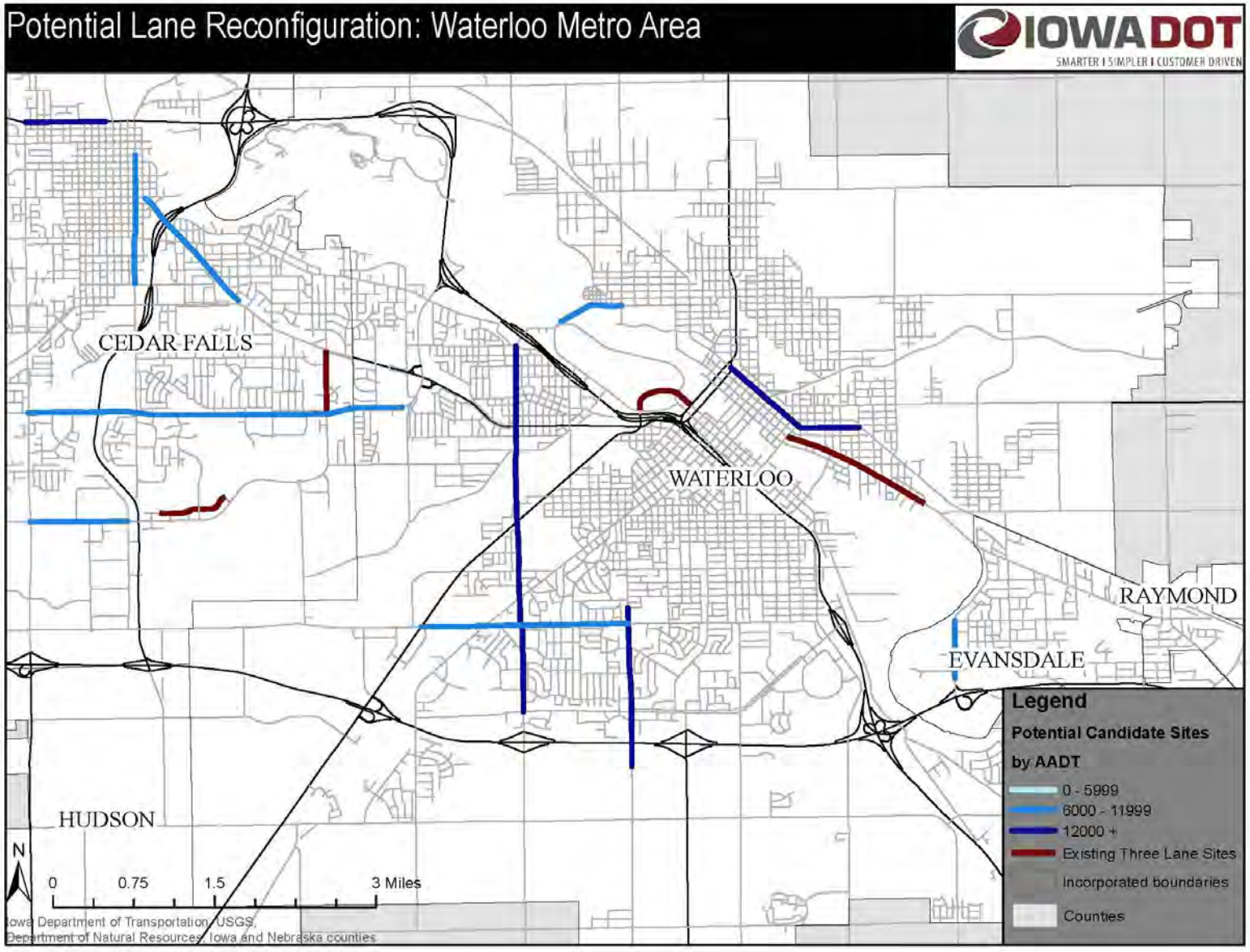

Potential Lane Reconfiguration: Davenport Metro Area
IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
LE CLAIRE
BETTENDORF
PANORAMA PARK
DAVENPORT
RIVERDALE
BUFFALO
N
1
2
4 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties


Potential Lane Reconfiguration: Des Moines Metro Area
IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
GRIMES
JOHNSTON
ALTOONA
URBANDALE
WAUKEE
CLIVE
WINDSOR HEIGHTS
PLEASANT HILL
DES MOINES
WEST DES MOINES
NORWALK
N
0
1
4 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties


Potential Lane Reconfiguration: Debuque Metro Area
IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
SAGEVILLE
ASBURY
DUBUQUE
N
0
0.5
1
2 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties


Potential Lane Reconfiguration: Iowa City Metro Area
IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
CORALVILLE
IOWA CITY
UNIVERSITY HEIGHTS
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties
N
0
0.5
1
2 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties


Potential Lane Reconfiguration: Sioux City Metro Area
IOWADOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
SIOUX CITY
SERGEANT BLUFF
N
0
1
2
4 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties


Potential Lane Reconfiguration: Waterloo Metro Area
IOWADOT
SMARTER I SIMPLER I CUSTOMER DRIVEN
CEDAR FALLS
WATERLOO
RAYMOND
EVANSDALE
HUDSON
N
0
0.75
1.5
3 Miles
Iowa Department of Transportation, USGS,
Department of Natural Resources, Iowa and Nebraska counties
Legend
Potential Candidate Sites
by AADT
0 - 5999
6000 - 11999
12000 +
Existing Three Lane Sites
Incorporated boundaries
Counties

2 copies

SPEED CONTROL IN RESIDENTIAL AREAS



ite

DRIVE MICHIGAN SAFELY

FORWARD

This document is a revision of the "Speed Control in Residential Areas" booklet original written by the Residential Area Speed Control Ad-Hoc Committee. This revision represents the latest information and findings of the Institute of Transportation Engineers (ITE) Michigan Section's Technical Project Committee. The makeup of the Technical Project Committee is as follows:

Lori Swanson, Chair	Hubbell, Roth & Clark, Inc.
John Abraham	City of Troy
Matthew Smith	McNamee, Porter & Seeley, Inc.
Mshadoni Smith	Hubbell, Roth & Clark, Inc.
Eric Tripi	Barton-Aschman Associates, Inc. of Michigan

The information presented in this document represents the findings of the authors and does not necessarily reflect the views of the Michigan Office of Highway Safety Planning.

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I. INTRODUCTION

The perception of speeding on local streets is probably the most persistent problem facing residents and traffic officials, alike. Although local or residential streets carry the lowest traffic volumes and suffer the fewest traffic crashes, they are the single largest consumer of a traffic engineer's time and energy. Residents observe vehicles being driven at speeds they perceive are too fast and conclude that the speeds would decrease if stop signs were installed. Speeds considered excessive by residents are considered reasonable by these same persons when they are driving in another neighborhood. Every traffic engineer has been shaken by these same residents who announce "if something is not done about the traffic problem on my street, someone is going to be killed and it will be your fault." This is usually followed by a demand for various traffic control measures and often backed up with petitions from residents. Traffic officials then must focus their attention on responding to these pressures, often diverting resources that could be dedicated to solving major capacity and traffic crash problems on other streets.

Residents' complaints are usually accompanied by a proposed solution to the speeding problem...stop signs. Traffic officials respond that stop signs installed to control speeding: (a) don't work, (b) are frequently violated, (c) are detrimental to safety, (d) are not warranted in the Manual* and, (e) actually increase speeds between stop signs. When residents are told that stop signs are not the answer to the speeding problem, they feel they must fight city hall to get them installed. A confrontational relationship is established between residents and traffic officials and the stop sign becomes a "trophy" which is awarded to the winner of the confrontation. Solving the speeding problem becomes secondary to winning the "trophy". The end results of this process are: (1) unhappy citizens, (2) continued complaints and requests for more stop signs, (3) increased political pressure and, (4) often, approval of stop sign installations to bring the controversy, temporarily, to an end. However, experience shows the

* The "Manual" refers to the *Michigan Manual of Uniform Traffic Control Devices* (MMUTCD that specifically states that stop signs should not be used for speed control).

speeding problem is usually not solved. Before and after studies show that stop signs usually increase mid-block speeds and create violators of the stop controls.

This booklet introduces traffic engineers, law enforcement officers, elected officials and community leaders to the concept of traffic calming which may help alleviate speeding in residential areas. Traffic calming is the combination of physical controls and community support to reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized users. Some objectives of traffic calming include: reducing speeds for motor vehicles, reducing crash frequency and severity, increasing safety, reducing the need for police enforcement, and reducing cut-through motor vehicle traffic.

Traffic calming measures are typically installed as part of an area wide traffic management scheme rather than on a single street to avoid shifting the problem from one street to another. A successful traffic calming program must include enforcement, education, engineering and community involvement. Community support and participation is an integral part of a successful traffic calming program. This booklet will give guidance on how to set up a successful traffic calming program in your community.

This booklet provides alternatives that may help decrease speeds on residential streets. It discusses the advantages and disadvantages of each alternative. It points out that there is no single, simple solution to all speeding problems that satisfies residents, is effective, and meets good engineering practices and standards. It also stresses that there may not be a tool to reduce speeds. Regardless of the approach used, there are certain criteria that should be followed:

- All devices must meet Michigan Manual of Uniform Traffic Control Devices requirements.

- The integrity of streets classified as Major under the provisions of Public Act 51 must be preserved.

- Permanent traffic control devices should be used to the minimum extent required to achieve the objectives.

- Access to all properties must be accommodated.
- Access from the nearest arterial to the destination should be as direct as practical.
- Local access to neighborhood facilities must be accommodated.
- All permanently installed devices must be designed to allow emergency vehicle access.
- Consideration must be given to circulation, parking and needs of customers and business owners.
- Consideration should be given to the access needs of essential commercial services such as garbage pickup, snow plowing, student busing, etc.
- Changes must not unduly impact adjacent areas.

It states that residents and local officials must work together with a full understanding of each other's problems, limitations and concerns for the common goal of safety on residential streets. One of the best ways to accomplish this is to have citizens involved in standing or ad hoc community traffic safety committees.

This booklet is intended to be used as a traffic safety tool by traffic engineers, law enforcement officers, elected officials, and community leaders in their day-to-day traffic control responsibilities.

References: 40, 41, 42

II. COMMUNITY INVOLVEMENT

An important component of any traffic calming program is community involvement. If citizens are involved, the chance for problem resolution and a successful traffic calming program is greatly improved. Often the problem cited is one of perception and not fact, and the solution proposed could be ineffective or even counter-productive. One way to avoid the knee-jerk approach to traffic engineering is to develop a process that involves the community. While there are many ways to accomplish public involvement, this section will describe two that have been successful.

Approaches to Citizen Involvement

Standing Committee

Some communities have successfully employed a standing committee, normally referred to as the "Citizen Traffic Committee," to deal with traffic control issues. The makeup, function and authority of the committee are described below:

a. The committee is appointed by the mayor or council. It should consist of an odd number of members who serve staggered terms.

b. Non-voting staff experts (police and engineers) are available to prepare agendas, collect data, provide input and send recommendations to the city council.

c. Efforts should be undertaken to make committee members as knowledgeable as possible about traffic engineering and enforcement principles. This can be realized by providing technical materials and training for committee members.

d. The Committee reviews citizen requests for traffic control devices and staff analysis of those requests, and makes recommendations to the city council.

The Committee should hold monthly, evening meetings. The standing committee offers several advantages; acts as a buffer between the council and citizens; lessens the pressure to install unwarranted devices; may be perceived as more objective than staff; provides technical and citizen input to the council; and dampens the adversary relationship that often develops between citizens and staff. On the other hand, there are some drawbacks: the committee can become politically motivated; one strong member can have too much influence; it can slow the process; and it requires some staff time.

Ad hoc committee

In this approach, an *ad hoc* or advisory committee is formed when a community seeks help in dealing with a specific traffic control problem. While the governmental agency has the ultimate responsibility, it is highly desirable that the committee and agency work through the process and arrive at a consensus. This process works as follows:

a. A working committee of neighborhood residents should be selected to represent different parts of the neighborhood. If the neighborhood has an organized association it should be asked to assist with the appointments; otherwise, volunteers are sought.

b. Committee members should identify the problem brought to their attention.

c. Staff collects the appropriate data and presents it to the committee. The committee sets goals which are quantifiable, e.g., reduce the average speed by a certain percentage, etc.

d. Options should be identified and alternatives presented, listing the pros, cons, cost, etc. of each.

e. Committee and staff reach agreement on the alternative to be recommended.

f. Committee with staff support presents the plan to the larger community through a large meeting or several small meet-

ings. One large meeting is enough if the plan is not controversial; the number of meetings should be directly related to the complexity of the plan. The purpose of the meetings is to obtain community support.

g. Once community support is achieved the plan is implemented. If possible, it is best to install temporary measures to determine the impact. This allows for adjustments and even removal if it is obvious that the measures will not produce the desired results.

The advantages of using advisory committees are that they will help develop neighborhood concerns and determine what, if anything, should be done; it builds a relationship between staff and residents to work through future problems; and the process creates a better understanding of traffic engineering and enforcement principles among lay people. Conversely, this process consumes considerable time and effort of staff. If consensus is not reached, the neighborhood can become divided. If not handled deftly by staff, the process can become unwieldy.

References: 19, 25, 28

III. PROBLEM IDENTIFICATION

The first step in a traffic calming program is to identify the problem. When a resident contacts their City, Village or County, a complaint is recorded. The resident will be directed to discuss their concerns with the other residents or an established traffic advisory committee. If an advisory committee has not been established, the public agency will give guidance on how to start one. Residents will assist the public agency in the identification of the problem.

These residents will also assist the public agency in the collection of data. Speed studies, traffic volume studies and license plate surveys, depending on need, will be performed at locations identified by the residents. The data collected will be analyzed to determine if there is a problem. If a problem is not identified, a letter with the supporting data will be sent to the residents explaining the findings and that no further action is required. If a problem is identified, then the public agency will move to the next steps of the program which include enforcement and education.

References: 42

IV. EDUCATION AND ENFORCEMENT

Once a speeding problem has been identified, the next steps in a traffic calming program is to initiate education and enforcement campaigns. Both of these steps should be conducted at the same time since many times a speeding problem can be reduced through effectively enforcing the traffic ordinances and educating the residents. From past enforcement activities, the City of Farmington Hills, Michigan found that most traffic violators within a residential area were the residents who live in the area. Therefore, it is critical to educate the residents of an area where a traffic problem is occurring.

Reference: 42

A. EDUCATION

1. Public Information And Education

An effective way to educate residents is through public information and education campaigns. Public information and education campaigns should be carried out through the mass media by law enforcement members of safety oriented groups. These campaigns "spread the word" about current enforcement emphasis and encourage voluntary compliance with the law. The perception that violators will be apprehended is essential to develop compliance with the law. Selecting the right media for your message is important. Clearly define the reason for the change; i.e., to reduce traffic crash casualties. The size of the audience and project will be a controlling factor in the media you select. An enforcement effort must be coordinated with the information and education campaign.

Reference: 5

2. Neighborhood Speed Watch Program

Another educational tool is the Neighborhood Speed Watch Program whereby residents can help control speeds with minimal police support.

A Neighborhood Speed Watch Program must involve law enforcement personnel and residents working as a team. Law enforcement's role is to provide the educational material and, if necessary traffic law enforcement. An effective tool used for education is speed radar trailers. The trailers are unmanned and equipped with radar equipment to detect the speed of vehicles. The trailer clocks the speed of an approaching vehicle and displays the speed on a display board that is visible to the motorist. This shows the motorist the actual speed at which they are traveling.

The neighbors must educate each other, establish their goals, and police themselves. Neighbors identify the speeders, the police make personal contact for the purpose of educating the speeder, and involve law enforcement as a last resort.

This program has the benefit of bonding the neighborhood together. The off-shoots of this are invaluable. The reduction of negative contacts with law enforcement enhances its image. The time involvement will depend on the individual's role and the size of neighborhood or community that is targeted. The media relationship involvement relates to the target area.

Neighborhood Speed Watch Programs rely on peer pressure and community spirit to increase awareness in a subdivision that may experience speeding traffic. It considers the fact that in a self-contained subdivision, the drivers involved are neighbors and friends of the people complaining of speeding. Neighborhood Speed Watch Programs have little or no effect on "through" traffic problems.

Typically, to be included in a Neighborhood Speed Watch Program, a street must (1) be a local street, (2) experience 85th percentile speeds in excess of 10 MPH greater than the posted speed, and (3) receive support from most of the households.

Once established, the following actions are taken:

a) A personal letter is sent to all households explaining the Program.

b) Neighborhood Speed Watch Program signs are posted.

c) Committee members call each household in the specific area to explain the program and appeal for cooperation.

d) Radar speed observations are made by local traffic personnel and personal letter are sent by the Chief of Police to drivers or owners of vehicles observed speeding.

e) Periodic speed studies are made to determine the Program's effectiveness.

f) Neighborhood organizations are involved as necessary.

Reference: 9, 42

B. ENFORCEMENT

1. Surveillance/Enforcement

Selective traffic law enforcement is the process of assigning police officers to a specific area at specific times to enforce traffic laws relating to a specific problem. The allocation of officers to the area is usually for a limited period.

When a police agency becomes aware of a particular traffic safety problem, officers can be assigned to the problem area to enforce related laws. Decisions must be made as to enforcement strategy, number of officers, time of day or any combination thereof, depending on the variables related to the location, type of violations, available officers, etc.

This type of activity tends to only solve the problem in the presence of the officer. The more officers assigned, the more effective this method. This is a costly process especially when it involves overtime or diverting officers from other assignments.

2. Automated Speed Enforcement Device

The newest tool in speed enforcement is the Automated Speed Enforcement Device, which is currently being tested at selected locations throughout the U.S. This device consists of a speed radar device and a 35 mm camera interfaced through a computer. It is located in an unmarked vehicle parked on the side of a road. As each vehicle comes within radar range its speed is determined. If that speed is over the preset threshold speed, the camera takes a photograph of the vehicle and its license plate.

The owner of the vehicle is then informed by either a warning letter or ticket of the date, time location, posted speed and travel speed of the vehicle. Currently, Michigan law does not permit the issuance of a ticket.

V. ENGINEERING

When the education and enforcement campaigns prove to be ineffective, the location qualifies for further analysis to determine what traffic engineering measure, if any at all, should be installed to effectively reduce speeds. In certain situations, vehicle speeds can only be effectively reduced by physical diversion of the traffic on the travelway. The application of traffic control devices, such as signs, alone normally are not effective in reducing vehicle speeds through residential neighborhoods. However, when used in conjunction with traffic calming devices, the proper use of traffic control signs can be an effective traffic management tool.

A. TRAFFIC CONTROL DEVICES

1. Stop Signs



The basic purpose of stop signs is to assign right-of-way to vehicles at intersections. There are Stop Sign Warrants outlined in the MMUTCD which must be satisfied before a stop sign can be installed. Stop signs are requested by residents more than any other traffic control device for the reduction of vehicle speeds and traffic volumes. Unfortunately, studies have shown that stop signs are largely ineffective in meeting the residents' requests for speed control.

a. Two-Way Stop

This is used to assign right-of-way to traffic on one of two intersecting streets by requiring traffic on one street to come to a complete stop. It is suitable where:

- one street is a major street;
- sight distances approaching the intersection are substandard, and traffic approaching under the general rules for uncontrolled intersections would run a strong risk of being involved in collisions;

- there is a history of a crash pattern that could be corrected by right-of-way controls, yet conditions do not require traffic on both streets to stop.

b. Four-Way Stop

This type of intersection control is intended primarily where two collector or major streets intersect and do not warrant a traffic signal. Its purpose is to assign right-of-way to traffic on both intersecting streets by requiring all approaching vehicles to come to a complete stop.

c. Effect on Traffic Volumes

When local streets offer significant savings in time over congested parallel major and collector routes, or allow avoidance of congestion points, traffic control devices, including stop signs, will do little to reduce traffic volumes. However, when the local streets offer only a slight savings in travel time over other routes, the time lost at stop signs may be enough to keep traffic off of local residential streets.

Stop signs may be installed at uncontrolled intersections in residential neighborhoods with a street network arranged in a grid pattern. Traffic would be stopped on every other block throughout the entire residential neighborhood. With no continuous "through" streets in the neighborhood, an even distribution of traffic would be encouraged.

d. Effect on Traffic Speed

Numerous studies have shown that stop signs are relatively ineffective as a speed control measure, except within 150 feet of the intersection. At the point of installation, speeds are reduced, but the effect on traffic approaching or leaving the stop-controlled intersection is negligible. In fact, some motorists actually increase their speed to make up for the "inconvenience" of stopping or disregard the stop signs. Studies show that more than 50% do not stop.

A study conducted in Boulder, Colorado, demonstrated that the 85th percentile speed and mean speeds on 25 mph and 35 mph roads were greater in areas that were controlled by stop signs.

Studies in various California cities showed a slight increase, or no change, in vehicle speeds after the installation of stop signs.

While the request for stop sign installation leads all resident requests for speed control measures, it must be emphasized that studies have proven there is little or no effect on vehicle speeds in residential road networks after installation.

e. Warrants/Compliance

Warrants for stop sign installations are included in the Michigan Manual of Uniform Traffic Control Devices (MMUTCD). These warrants relate to right-of-way assignment and respond to site safety consideration.

A stop sign observance study of unwarranted four-way stops in Troy, Michigan, found that the percentage of "no" or "roll" stops to be significant after installation of unwarranted stop signs, while there was no significant change in 85th percentile speeds.

Many studies have been conducted to determine the degree to which stop signs are obeyed. When not required to stop by cross street traffic, only 5 to 20 percent of all drivers come to a complete stop; 40 to 60 percent will come to a "rolling" stop below 5 MPH, and 20 to 40 percent will pass through at higher speeds. High-volume, four way stop-controlled intersections have demonstrated the highest compliance levels, while three-way stop controlled intersections have shown the lowest.

In Star City, West Virginia, before and after studies showed an increase in "no-stops" from 14.1% to 25.1% when two-way stop intersections were converted every summer to four-way stops for pedestrian safety. Mean Speed was not significantly affected by the presence of the four-way stops. The recommendation of this particular study was to end the practice of using four-way stops for speed control.

Studies have shown that when a driver does not believe that a stop sign appropriately reflects the actual traffic conditions, the driver often disregards it. The use of unwarranted stop signs not only decreases the compliance levels of motorists, but has the unintended effect of decreasing compliance at intersections where stop signs have been installed for warranted operation and collision reduction.

f. Effect on Traffic Safety

While no study has proven the effectiveness of stop signs as traffic safety measures, general engineering belief is that the unwarranted use of stop signs increases the safety hazard at the intersection. This is shown in the studies of the compliance rates at stop-controlled intersections. In addition, motorists disregard for unwarranted stop signs presents a significant hazard to crossing pedestrians.

Effects of unwarranted stop signs on driver behavior and safety at stop signs throughout a community are difficult to substantiate. Evidence to date on the safety effects of individual stop signs placed for volume and speed reduction purposes is mixed. At some intersections where a degradation in safety was measured, placement of the signs in poor visibility positions and lack of supplementary markings may account for the crash experience. Cases where safety experience was reportedly improved may include instances where traditional warrants for stop sign installation were actually met, or were close to being met.

g. Environmental Effects

Stop signs affect the environment around the intersection, and the use of unwarranted stops signs could unnecessarily add to this problem. Stopping and idling at intersections increases the amount of automobile exhaust in the area. In addition, tire noise and engine noise increase with the braking and acceleration associated with stop signs. Automobile fuel consumption is increased with the stopping, accelerating, and idling of vehicles at stop-controlled intersections.

h. Community Reaction

Residents often see stop signs as a solution to "near miss", as well as actual crashes. They are also viewed as being effective at controlling vehicle speeds. Suggestions that unwarranted stop signs have very poor compliance and that they might be detrimental to safety are generally discounted by residents. Residents also dismiss concerns over a community's exposure to tort liability for unwarranted use of traffic control devices. By disregarding the warrants presented in the MMUTCD, this presents potential liability concerns for the responsible jurisdiction. If a stop sign installation could be considered irresponsible or in clear contradiction to accepted standards, liability suits could result.

Objections to stop signs come mainly from residents at the intersections who are subjected to additional noise and pollution which come from decelerating and accelerating vehicles, and from motorists who think they are being stopped needlessly.

It should be the goal of the traffic engineer and local policy makers to explain to the public why unwarranted stop signs are ineffective at controlling vehicle speeds. Special attention should be given to explaining the adverse effects on the environment, motorist safety, and pedestrian safety.

A community's policy of installing 4-way stops at school crossings should be reviewed in light of the above items. Stops at these locations are only useful about 2% of the time. Therefore, 98% of the time, they can be serious traffic safety hazards.

References: 1, 2, 3, 4, 36, 37, 38, 39, 40

2. Speed Limit Signs

a. Speed Limit Signs/Speed Zoning

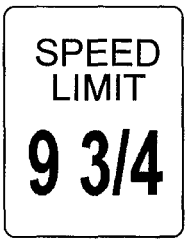


The speed limit sign is a regulatory device that informs drivers of the speed limit imposed by the governing agency. Some signs merely remind drivers of the limits applicable to the type of highway and area. Where the speed

limit is not applicable to specific sites because of special hazards, a deviation from that limit is shown by posting advisory speed signs. A new speed limit is determined by an engineering and traffic study of the street section involved. Special attention is given to the character of the street (sidewalks, driveways, and sight obstructions), horizontal and vertical alignment, pedestrian activities, and hazards which may not be easily detected by drivers. If no unusual safety problems are detected, the 85th percentile speed of traffic on a street is usually taken as an indication of the speed limit which could be implemented.

Studies that tested the effect of speed limit signs on speeds have been largely confined to major streets and expressways. Performance on these highways is not considered relevant to the local street situation. Studies have shown that speed limit signs have very little impact on drivers' speeds on major streets. Motorists drive at speeds that they consider reasonable, comfortable, convenient and safe under existing conditions. Drivers appear not to operate their vehicles by the speedometer, but by roadway conditions.

Speed limit signs, other than the standard 5 MPH increment (i.e., 28 MPH), are not standard and may be illegal. The desired effect of posting a non-standard speed limit sign is to gain compliance by capturing the driver's attention with a unique number. If drivers are consciously aware of the speed limit, they are more likely to comply with it. While the signs are inexpensive, they do not conform to the MMUTCD. Initially, the signs would be noticed and make drivers aware of their speed. Once drivers became used to the signs, they have no further effect on drivers' speeds.



If posted speed limits are significantly lower than prevailing traffic speed, residents normally place some hope in them or in subsequent enforcement. However, if the posted limits are within a few miles per hour of the previously prevailing traffic speed, they are not addressing the residents' problem.

b. Speed Limit Signs With Other Devices

Speed limit signs with flashing beacons have been shown to have a minor effect in reducing vehicular speeds. Such signs have been shown to be most effective in school zones. Other traffic activated signs with variable messages and warnings may also have minor effectiveness in reducing speeds.

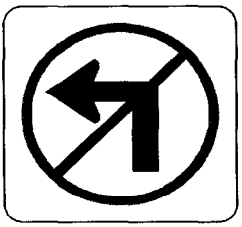
One such device is a trailer-mounted variable message sign with a radar speed gun which displays the posted speed limit and the approaching driver's speed. The intent is to increase the motorists' awareness of both posted speed limit and their own travel speed.

Observations show that most motorists reduce their speed when they see the device. In addition to reducing motorists' speeds, other advantages of the equipment include the creation of positive public relations, better acceptance of speeding tickets, and its ability to act as a teaching device. The disadvantages include potential vandalism to the equipment if left unattended, and it may encourage speeding by those who wish to "test" it. Its speed reduction effectiveness is isolated to the immediate area and time of its use, and this likely will diminish over time. However, effectiveness can be improved with the use of visible speed enforcement.

References: 5, 6, 7

3. Turn Prohibitions

Turn prohibitions will reduce traffic volumes, noise, and, in some cases, speeds on streets where they are applied. They may also improve traffic safety on streets to which they are applied. However, volumes, noise and speeds will increase on alternate routes. They are difficult to enforce, and reduce access for residents. In some cases, speeds may increase, and traffic safety may decrease, when motorists are forced to take alternate routes.



Turn prohibitions can be used to reduce traffic volumes on local streets by installing them on major/collector streets to prevent traffic from entering local streets. Such controls are usually in effect during peak traffic volume hours, when motorists are seeking less congested, alternate routes.

Although turn prohibitions have been in use for some time, very little quantitative research was found, and it was related to the number of violations. Violations in the range of 10% to 15% of the original turning volume can be expected.

Reference: 8

4. <u>One-Way Streets</u>

The use of one-way streets has mixed results. They are not useful in reducing speeds on local streets. In fact, the use of one-way signs may increase speeds in the permitted direction, and may increase the amount of cut-through traffic on other residential streets.

One-way streets can be used to make travel through a neighborhood difficult by creating a maze effect in the internal street pattern, which may discourage through traffic. However, the amount of traffic on other residential streets may be increased.

Reference: 8

5. <u>Commercial Vehicle Prohibitions</u>

It is a common practice in communities to prohibit commercial vehicles from most, if not all, local streets in residential areas. This is done to protect the pavements and eliminate nuisances. However, commercial vehicles are normally allowed to travel on any street when engaged in pickup and delivery. Such regulations are unlikely to affect vehicle speeds, but they will reduce truck traffic volume and noise.

Reference: 8

6. Special Warning Signs

Special warning signs such as "Children at Play", "Watch for Children", or others that warn of normal conditions are not effective in reducing speeds in residential areas. It is also likely that such signs encourage parents to believe that there is an added degree of protection, which is not the case. These signs suggest that it is acceptable for children to play in the street. The Michigan Vehicle Code prohibits the use of signs not deemed standard by the MMUTCD.

The MMUTCD provides standards for signs warning drivers that they are approaching recreational facilities such as parks and playgrounds. However, there is not enough evidence to determine the effect of these warning signs on vehicle speeds.

Reference: 40

7. Portable Signs

One growing trend in many communities is the use of portable stop signs placed in the street between crosswalks, to protect pedestrians. This has actually turned out to be a very controversial issue in many areas.

Municipalities feel that these signs are very effective in forcing traffic to stop for pedestrians in crosswalks. However, some state departments of transportation have banned the use of these portable signs, citing reports that the signs, when hit by vehicles, have caused injuries to nearby pedestrians. The MMUTCD states "As noted herein or for emergency purposes, portable or part-time STOP signs shall not be used". The exceptions refer to hand-held STOP signs used by construction flaggers and school crossing guards.

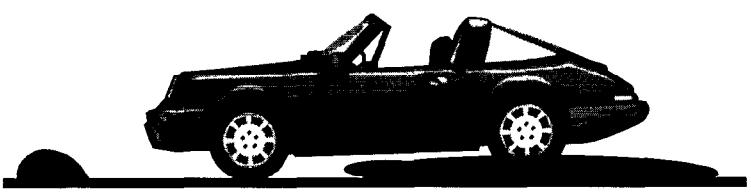
B. TRAFFIC CALMING DEVICES

1. Speed Humps and Bumps

The speed hump is generally 3 to 4 inches high, rounded section of pavement, approximately 12 feet in length. A speed bump is approximately 12" to 18" long, causing a more severe "bump" to be felt by the driver.

The speed hump was developed in the Transportation Road Research Laboratories (TRRL) in Great Britain and has been tested in closed test areas and on public roads. Tests in the United States and in various countries around the world, have shown speed humps to be effective in controlling vehicle speeds and in reducing traffic volumes in the immediate area of the hump or bump.

Studies in Australia, the United Kingdom, and the United States have shown reductions in 85th percentile speeds ranging from 3 MPH to 14 MPH between speed humps and from 6 MPH to 27 MPH at the speed hump location. Recent experience in a Michigan community indicated a 5 mph reduction in the 85th percentile speed. Volumes were found to be reduced from 1 to 55 percent.



SPEED BUMP **SPEED HUMP**

Another type of speed hump is the flat top hump or speed table. These humps are typically 22 inches long with a 10 foot flat

section and can be used on collector roads with more than 12,000 vehicles per day. This type of speed hump can serve as pedestrian crossings. Studies have shown these humps not only greatly reduce the 85th percentile speed of mainstream traffic but also have shown that, unlike speed humps, the speed between the humps and at the humps are essentially the same as before hump or bump installation.

Some of the negative effects of speed humps are an increase in noise level from individual vehicles near the humps caused by braking and acceleration, but not due to the sound of vehicles striking the humps. Studies have shown that speed humps have a more severe impact on longer wheel base vehicles and should not be used on neighborhood collectors, major fire and ambulance routes, or on routes frequently used by large trucks or buses. They are a major hindrance to snowplowing efforts.

Often the implementation of such traffic calming measures bring up liability issues. A recent survey of a number of communities using different traffic calming devices found that most had no legal problems at all while the remainder had mostly experienced threats and no action. As more and more traffic calming devices are installed, the question of the legality of these measures are becoming irrelevant.

The reports on speed humps have shown that both the design and location/spacing of speed humps are critical. For typical residential streets the most widely used design is the circular, parabolic speed hump. A series of speed humps is more effective than a single installation. The spacing of speed humps ranges from 200 feet to 750 feet, depending upon the desired 85th percentile speed between speed humps. Formulas have been developed to determine the optimal spacing of humps, depending on the use of either a 3 inch or a 4 inch high hump. Adequate pavement markings and traffic signs are important to warn drivers of speed humps. Speed humps can be installed on roadways carrying 3,000-8,000 vehicles per day. The cross-section design of humps or bumps is critical to their effectiveness.

The speed hump should not be confused with the speed bump that is 3 to 5 inches in height and 1 to 1 ½ feet in length. Because speed bumps are abrupt, they are considered to be potentially hazardous for motor vehicles. The main use of the speed bump

has been in private parking lots and on private roads. They are generally considered to be inappropriate by traffic engineers because they are not included in design guides.

As of September 10, 1997, The Institute of Transportation Engineers (ITE) plans to publish the recommended practices for Guidelines for the Design and Application of Speed Humps.

References: 10, 11, 12, 13, 14, 15, 16, 32, 33

2. Rumble Strips

Rumble strips are a series of either bumps or depressions in the pavement. They are intended to alert drivers of a special situation, such as a speed reduction or stop ahead condition. They are typically ½ to 1 ½ inches high or deep, 3 to 4 inches wide and placed 90° to traffic flow.

Rumble strips produce both an audible rumble and a vibration that creates an awareness of a condition for which a driver must react. They are used most frequently on shoulders of high-speed roadways to alert drivers that they are not driving in the travel lanes of a road. They are also commonly used to alert drivers in rural or high speed areas of an unexpected stop-ahead condition.

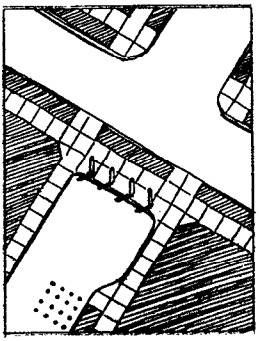
Many states now use 'portable' rumble strips, which are basically high density rubber sheets with a series of undulations. Though these are popularly used near construction zones, these may be used as a temporary measure in residential areas before installing permanent rumble strips.

Little research has been performed in residential areas for their use as a speed control device. A study in the City of Rochester Hills showed speed reductions of up to 2 MPH, whereas another study showed reductions of up to 15 MPH. Rumble strips can produce an annoying noise, cause vibration in nearby homes and be snow removal obstructions. One study suggests they should not be used where there is significant bus or truck activity or where traffic volumes exceed 2,500 vehicles per day. Due to the adverse effects, their installation must be carefully considered.

References: 4, 17, 18

3. Street Closures

The primary effect of street closures is to eliminate through traffic rather than to reduce speed. There may be some speed reduction because higher speed through traffic is discouraged from using the neighborhood streets. This is true particularly where a pattern of closures is carefully designed to accomplish this end. Street closures can be constructed at an intersection or at midblock. The midblock application can be effectively used where it is desired to restrict traffic in a residential section while allowing access to a high traffic generator adjacent to the residential area. Generally, whenever a street closure is used, a cul-de-sacs should be constructed so as not to "trap" a vehicle. Cul-de-sacs often require the purchase of right-of-way and often are constructed in a resident's front yard.



Among the disadvantages of street closures are:

- Restricted access to the neighborhood by service and emergency vehicles.
- Problems with vandalism and maintenance.
- Traffic is often transferred to neighboring streets, generating new problems and complaints.

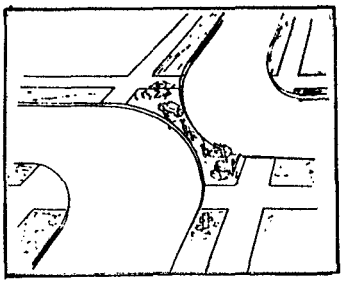
Street closures are difficult to apply to existing roadways and are better suited for newly developing subdivisions.

When cul-de-sacs are used, adequate turnaround areas must be provided at the end of the street. Proper signs must be installed to warn drivers of the end of the street.

Reference: 8, 28

4. Traffic Diverters

a. Diagonal Diverters



Diagonal diverters are barriers placed diagonally across an intersection. This converts a normal four-legged intersection into two separate roadways, each with a 90° turn. The purpose is to discourage "through" traffic by requiring it to take a circuitous route through the neighborhood.

Speeds of vehicles are only affected in the immediate vicinity of the diverter because drivers must make a 90° turn. Diverters may discourage drivers from using the street as a short-cut route. However, some drivers will simply move to another residential street, thus moving the problem. Since they create formidable barriers in the intersection, they must be marked similar to one-way streets and have appropriate lights so they can be seen at night.

References: 8, 9, 19

b. Semi-Diverters

A semi-diverter is a barrier placed transverse to traffic at the beginning of a block. It prohibits traffic from entering the block, but allows two-way traffic within the block. Since they create formidable barriers in the intersection, they must be marked similar to one-way streets and have appropriate lights so they can be seen at night.

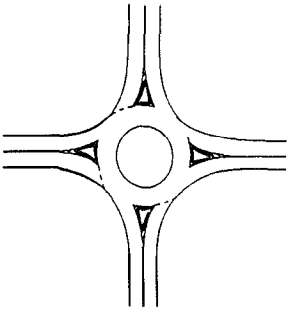
Semi-diverters have no effect on speeds other than in the immediate vicinity of the barrier. They can reduce traffic volumes, but only at the end of the block at which they are placed. The violation incidence can be quite high.

Reference: 8, 19

5. Traffic Islands

a. Traffic Roundabout

Modern roundabouts are different from traditional traffic circles, in that all approaching traffic yields right of way to circulating traffic. This is reinforced through the use of yield signs on the approaches. Other characteristics of roundabouts include deflection and flared approaches. Use of deflection helps slow entering vehicles, leading to safer merges with the circulating traffic stream. The use of splitter islands helps drivers perceive a change in the roadway geometry and enter the roundabout safely. Benefits of roundabouts realized in the states of California, Florida, Maryland and others include slowing of traffic, reducing delay and emissions when compared to stop/signal controlled intersections, improving safety and aesthetics.



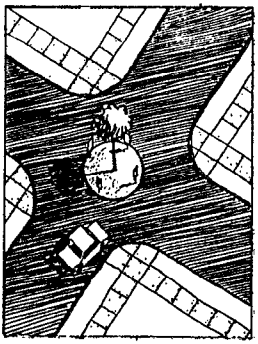
Its primary use is to reduce crash frequency at residential intersections. These roundabouts also have an effect on traffic volume and speeds.

At ten study locations, average speeds were reduced 4 MPH (from 27.5 MPH to 23.3 MPH) downstream from the circles, but only for short distances. Speed reductions can be even more significant near the circle, similar to speeds near stop signs.

One study shows a significant 77% decrease in crashes. Traffic volumes on the higher volume street at twenty study locations decreased an insignificant 2%. The construction cost of a roundabout is quite high ($10,000 - $30,000).

References: 4, 8, 19, 20, 30

b. Traffic Islands



A traffic island is a defined area, painted or raised, included in highway design for the primary purposes of controlling and directing traffic movements. They also provide refuge for pedestrians, reduce excessive pavement areas, and can be used to indicate proper use of an intersection or to locate traffic control devices.

Painted/striped islands do not affect speeds significantly; raised islands reduce vehicle speeds in some instances, mostly in combination with narrow lanes, which can create hazards.

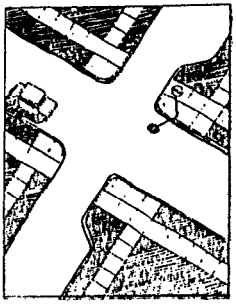
Improper islands make roadways unsafe. If an island is not large enough to command attention, motorists will drive over it. Curbed islands are sometimes difficult to see at night due to oncoming headlights or other light sources, thus causing crashes.

Islands do not reduce traffic volume by any significant amount, but can be an effective treatment for traffic movement and safety. If a traffic island is used, it might be beneficial to plan an island initially, then observe the effect and change the layout arrangement accordingly. The same process can be repeated until an optimum arrangement is established and a permanent raised island can be installed.

6. Chokers and Road Narrowing

Chokers are narrowed roadway widths using landscaped areas between the sidewalk and street. The pavement width between chokers can be constructed for one or two lanes of traffic. The choker can be constructed parallel to the traveled way or twisted to the direction of travel.

Road narrowing is a method used mostly in residential areas to control vehicle speeds and reduce traffic volume to improve safety. Another road narrowing technique can be found by the use of medians. In one community in Maryland, medians 20 to 50 feet or more in length have been constructed in advance of intersections. It was found to effectively reduce speeds though, it was necessary to construct bulb-outs to force drivers to shift over inconveniently. Once implemented, the 85th percentile speeds were reduced by 2-5 mph.



Chokers and road narrowing can control the speeds of vehicles efficiently and can increase safety and reduce traffic flow if properly installed. However, they should not be used on high volume streets, and sudden road narrowing should always be avoided. Curbside parking may have to be sacrificed to implement these methods. Proper signs should be installed to warn drivers of the chokers.

Reference: 4, 32

7. On-Street Parking

On-street parking is parking that is allowed on a street in the curb lane and is commonly permitted in residential areas.

Drivers of through vehicles generally reduce their speed in anticipation of conflict situations with parked vehicles or pedestrians. A study was done in Dallas where parking was removed in four central business districts. A 60-day study showed an increase of 26.7% in vehicle speed. In another study, only peak period prohibitions were reported which increased average speeds by 27%.

A clear relationship exists between crashes and vehicles parked on-street. One study in a community of 65,000 people found that 43% of all local and collector-street crashes involved on-street parking.

The angle of on-street parking has an affect on safety. Although angle parking allows for more parking spaces per unit of curb length than parallel parking, it requires more space for maneuvering, increases the amount of time a car is exposed to oncoming traffic, and can create a visibility problem for drivers when backing out into traffic. Therefore, angle parking has a substantially higher crash rate than parallel parking. Many studies have found that eliminating angle parking and replacing it with parallel parking reduces crashes 19 to 63 percent. A study in Maine found that parallel parking had a crash rate 12 percent lower than angle parking. A study in Nebraska concluded that parking should be of parallel rather than angle type to improve safety by reducing traffic crashes.

Several studies have been conducted that show the safety concerns of on-street parking. Primary hazards are:

1. Parked vehicles make the road width narrower and significantly restrict the flow of traffic. Parked vehicles can easily increase rear-end or side-swipe crashes due to hazardous maneuvers by drivers avoiding parked vehicles or drivers entering or leaving parking stalls.

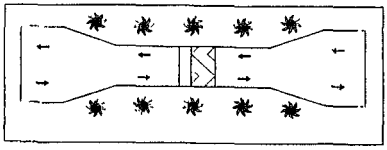
2. Drivers or rear-seat passengers getting out of parked vehicles on the side street present an added obstacle in the roadway. This produces both rear-end and side-swipe collisions.

3. Reduced sight distances involving pedestrians, especially children, attempting to cross the street from between parked vehicles or at intersections.

It is advisable to avoid on-street parking especially on residential streets because of the crash hazard, traffic volume/capacity/flow reduction, etc. It does, however, reduce speeds by restricting sight distances.

References; 21, 22, 23, 24, 34, 35

8. Combination of Physical Control Measures



Various combinations of traffic control and traffic calming measures can be used to enhance effectiveness. The combinations are governed by the major objectives or purpose for which the installation is planned. For example, the objective of reducing speeds and cut through traffic may be achieved by using a combination of a speed hump and street narrowing. The illustration presents such a combination. This combines the installation of a speed hump as well as street narrowing within the vicinity of the speed hump. The street narrowing helps to reduce speeds over a longer distance than a conventional speed hump.

References: 31

C. ROADWAY MARKINGS

1. Transverse Markings

Transverse pavement markings consist of a series of painted lines placed across the road. The spacing between the lines gradually decreases as the hazard is approached. The paint pattern is intended to give the illusion of high speed and causes drivers to reduce their speeds. In Maine, transverse pavement markings used in conjunction with standard speed limit signs, when entering a small town, increased the number of vehicles traveling below the speed limit by 10 percent. In Scotland, similar

success occurred when yellow transverse markings were applied in advance of a traffic circle. Initial results showed a 30 percent reduction in 85th percentile speeds. which were later reduced to 16 percent after one year. Crashes were reduced at the Scotland site from 14 crashes in the year prior to the installation to only 2 crashes in the 16 months following the installation.

A study in Great Britain showed that speeds were influenced by the existence or non-existence of a hazard following the transverse markings. If no hazard exists at the first location with transverse markings, the driver would not slow down at the second location even if a hazard existed.

It appears from the various studies that if transverse markings are used at locations in advance of potentially hazardous locations or in addition to normal speed limit signing when entering small towns, that speed reductions will occur at both types of locations and crashes will be reduced at the hazardous locations. However, it does not appear from the literature reviewed that reductions in speeds should be anticipated by applying transverse pavement markings in the middle of a typical residential area.

Reference: 27

2. Longitudinal Markings

Longitudinal pavement markings for speed control is intended to give drivers the impression of a narrow lane through which the vehicle must be guided. One study involved the striping of two residential streets to nine foot wide lanes. It was found that speeds changed in a range of a decrease of 1.4 MPH to an increase of 3.2 MPH. It was theorized that the narrowing by striping was ineffective because it actually made the drivers task of tracking the roadway easier.

3. Crosswalks

The use of painted crosswalks is to provide improved pedestrian safety by guiding them across the street and to notify drivers of the possibility of the presence of pedestrians. When painted

crosswalks are used, sidewalks on both sides of the road should also be provided. There is no indication in the literature that crosswalks result in lower vehicular speeds.

Reference: 16

D. PLANNING-RELATED ALTERNATIVES

1. Adequate Arterial Capacity

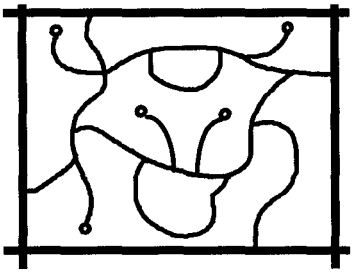
By providing adequate capacity on the surrounding major street network, the amount of through traffic using residential streets can be reduced. Although not specifically a speed regulating method, reducing the traffic volume can decrease the number of speed complaints on residential streets and can improve safety.

Though this is a costly means of reducing residential speeding complaints, improved traffic flow and crash reduction can be realized on residential streets.

Reference: 26

2. Subdivision Planning

Residential street design can influence the speed of vehicles through a neighborhood. Designs that feature curvilinear alignment, a narrow cross-section, short block length, reduced building setback and roadside tree planting can create a feeling of restriction and result in a speed reduction and may increase traffic crashes. Conversely, local streets built to high standards, in an attempt to improve safety, create an environment that allows increased vehicle speeds.



New subdivision streets can be designed to discourage cut-through traffic, which will reduce speeding complaints.

Care must be taken in the design process to ensure adequate sight distances along the roadway and at intersections, to provide the highest level of safety possible.

Reference: 26, 29

VI. CONCLUSIONS

An effective traffic calming program can be implemented by following the guidelines in this booklet. The key to a successful program is **community involvement**. Local officials and residents must work together for the common goal of improving safety on residential streets. This booklet provides alternatives that may help decrease speeds and/or reduce through traffic on residential streets. It also gives direction for developing a traffic calming program in those communities that currently use only traffic law enforcement to control speeds.

Whenever traffic calming devices are used, special care must be taken to advise drivers of the device by installing adequate warning signs and/or permanent markings.

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This pamphlet has been produced in cooperation with the Office of Highway Safety Planning, a division of the Department of State Police, State of Michigan, and funded by the U.S. Department of Transportation, National Highway Traffic Safety Administration. 15,000 copies were printed at $0.27 per copy, at a total cost of $4,084.00.

#OHSP 701 (2/98)

NOTICE:

The title II regulation was modified by the Pool Extension Final Rule and the ADA Amendments Act Final Rule, which can be found in the Title II Regulation Supplement. This document and the supplement should be read together for the most up-to-date regulation.

Alternatively, the fully updated regulation is available in html.



Americans with Disabilities Act Title II Regulations

Nondiscrimination on the Basis of Disability in State and Local Government Services

Department of Justice
September 15, 2010

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Title II Regulations

Supplementary Information

Department of Justice

DEPARTMENT OF JUSTICE

28 CFR Part 35

[CRT Docket No. 105; AG Order No. 3180–2010]

RIN 1190–AA46
Nondiscrimination on the Basis of Disability in State and Local Government Services

AGENCY: Department of Justice, Civil Rights Division.
ACTION: Final rule.

SUMMARY: This final rule revises the regulation of the Department of Justice (Department) that implements title II of the Americans with Disabilities Act (ADA), relating to nondiscrimination on the basis of disability in State and local government services. The Department is issuing this final rule in order to adopt enforceable accessibility standards under the ADA that are consistent with the minimum guidelines and requirements issued by the Architectural and Transportation Barriers Compliance Board (Access Board), and to update or amend certain provisions of the title II regulation so that they comport with the Department's legal and practical experiences in enforcing the ADA since 1991. Concurrently with the publication of this final rule for title II, the Department is publishing a final rule amending its ADA title III regulation, which covers nondiscrimination on the basis of disability by public accommodations and in commercial facilities.
DATES: *Effective Date:* March 15, 2011.
FOR FURTHER INFORMATION CONTACT:
Janet L. Blizard, Deputy Chief, or Barbara J. Elkin, Attorney Advisor, Disability Rights Section, Civil Rights Division, U.S. Department of Justice, at (202) 307–0663 (voice or TTY). This is not a toll-free number. Information may also be obtained from the Department's toll-free ADA Information Line at (800) 514–0301 (voice) or (800) 514–0383 (TTY).

This rule is also available in an accessible format on the ADA Home Page at *http://www.ada.gov*. You may obtain copies of this rule in large print or on computer disk by calling the ADA Information Line listed above.

SUPPLEMENTARY INFORMATION:

The Roles of the Access Board and the Department of Justice

The Access Board was established by section 502 of the Rehabilitation Act of 1973. 29 U.S.C. 792. The Board consists of 13 members appointed by the President from among the general public, the majority of whom must be individuals with disabilities, and the heads of 12 Federal departments and agencies specified by statute, including the heads of the Department of Justice and the Department of Transportation (DOT). Originally, the Access Board was established to develop and maintain accessibility guidelines for facilities designed, constructed, altered, or leased with Federal dollars under the Architectural Barriers Act of 1968 (ABA). 42 U.S.C. 4151 *et seq*. The passage of the ADA expanded the Access Board's responsibilities.

The ADA requires the Access Board to ''issue minimum guidelines that shall supplement the existing Minimum Guidelines and Requirements for Accessible Design for purposes of subchapters II and III of this chapter * * * to ensure that buildings, facilities, rail passenger cars, and vehicles are accessible, in terms of architecture and design, transportation, and communication, to individuals with disabilities.'' 42 U.S.C. 12204. The ADA requires the Department to issue regulations that include enforceable accessibility standards applicable to facilities subject to title II or title III that are consistent with the ''minimum guidelines'' issued by the Access Board, 42 U.S.C.

12134(c); 42 U.S.C. 12186(c), but vests in the Attorney General sole responsibility for the promulgation of those standards that fall within the Department's jurisdiction and for enforcement of the regulations.

The ADA also requires the Department to develop regulations with respect to existing facilities subject to title II (subtitle A) and title III. How and to what extent the Access Board's guidelines are used with respect to the barrier removal requirement applicable to existing facilities under title III of the ADA and to the provision of program accessibility under title II of the ADA are solely within the discretion of the Department.

Enactment of the ADA and Issuance of the 1991 Regulations

On July 26, 1990, President George H.W. Bush signed into law the ADA, a comprehensive civil rights law prohibiting discrimination on the basis of disability.[1] The ADA broadly protects the rights of individuals with disabilities in employment, access to State and local government services, places of public accommodation, transportation, and other important areas of American life. The ADA also requires newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities.

[1] On September 25, 2008, President George W. Bush signed into law the Americans with Disabilities Amendments Act of 2008 (ADA Amendments Act), Public Law 110-325. The ADA Amendments Act amended the ADA definition of disability to clarify its coverage of persons with disabilities and to provide guidance on the application of the definition. This final rule does not contain regulatory language implementing the ADA Amendments Act. The Department intends to publish a supplemental rule to amend the regulatory definition of "disability" to implement the changes mandated by that law.

42 U.S.C. 12101 *et seq*. Section 204(a) of the ADA directs the Attorney General to issue regulations implementing part A of title II but exempts matters within the scope of the authority of the Secretary of Transportation under section 223, 229, or 244. *See* 42 U.S.C. 12134. Section 229(a) and section 244 of the ADA direct the Secretary of Transportation to issue regulations implementing part B of title II, except for section 223. *See* 42 U.S.C 12149; 42 U.S.C. 12164. Title II, which this rule addresses, applies to State and local government entities, and, in subtitle A, protects qualified individuals with disabilities from discrimination on the basis of disability in services, programs, and activities provided by State and local government entities. Title II extends the prohibition on discrimination established by section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. 794, to all activities of State and local governments regardless of whether these entities receive Federal financial assistance. 42 U.S.C. 12131B65.

Title III prohibits discrimination on the basis of disability in the activities of places of public accommodation (businesses that are generally open to the public and that fall into one of twelve categories listed in the ADA, such as restaurants, movie theaters, schools, day care facilities, recreational facilities, and doctors' offices) and requires newly constructed or altered places of public accommodation—as well as commercial facilities (privately owned, nonresidential facilities like factories, warehouses, or office buildings)—to comply with the ADA Standards. 42 U.S.C. 12181B89.

On July 26, 1991, the Department issued rules implementing title II and title III, which are codified at 28 CFR part 35 (title II) and part 36 (title III). Appendix A of the 1991 title III regulation, which is republished as Appendix D to 28 CFR part 36, contains the ADA Standards for Accessible Design (1991 Standards), which were based upon the version of the Americans with Disabilities Act Accessibility Guidelines (1991

ADAAG) published by the Access Board on the same date. Under the Department's 1991 title III regulation, places of public accommodation and commercial facilities currently are required to comply with the 1991 Standards with respect to newly constructed or altered facilities. The Department's 1991 title II regulation gives public entities the option of complying with the Uniform Federal Accessibility Standards (UFAS) or the 1991 Standards with respect to newly constructed or altered facilities.

The Access Board's publication of the 2004 ADA/ABA Guidelines was the culmination of a long-term effort to facilitate ADA compliance by eliminating, to the extent possible, inconsistencies among Federal accessibility requirements and between Federal accessibility requirements and State and local building codes. In support of this effort, the Department is amending its regulation implementing title II and is adopting standards consistent with ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines, naming them the 2010 ADA Standards for Accessible Design. The Department is also amending its title III regulation, which prohibits discrimination on the basis of disability by public accommodations and in commercial facilities, concurrently with the publication of this rule in this issue of the **Federal Register**.

Development of the 2004 ADA/ABA Guidelines

In 1994, the Access Board began the process of updating the 1991 ADAAG by establishing an advisory committee composed of members of the design and construction industry, the building code community, and State and local government entities, as well as individuals with disabilities. In 1998, the Access Board added specific guidelines on State and local government facilities, 63 FR 2000 (Jan. 13, 1998), and building elements designed for use by children, 63 FR 2060 (Jan. 13, 1998). In 1999, based largely on the report and recommendations of the advisory committee, the Access Board issued a Notice of Proposed Rulemaking (NPRM) to update and revise its ADA and ABA Accessibility Guidelines. *See* 64 FR 62248 (Nov. 16, 1999). In 2000, the Access Board added specific guidelines on play areas. *See* 65 FR 62498 (Oct. 18, 2000). The Access Board released an interim draft of its guidelines to the public on April 2, 2002, 67 FR 15509, in order to provide an opportunity for entities with model codes to consider amendments that would promote further harmonization. In September of 2002, the Access Board set forth specific guidelines on recreational facilities. 67 FR 56352 (Sept. 3, 2002).

By the date of its final publication on July 23, 2004, the 2004 ADA/ABA Guidelines had been the subject of extraordinary review and public participation. The Access Board received more than 2,500 comments from individuals with disabilities, affected industries, State and local governments, and others. The Access Board provided further opportunity for participation by holding public hearings.

The Department was involved extensively in the development of the 2004 ADA/ABA Guidelines. As a Federal member of the Access Board, the Attorney General's representative voted to approve the revised guidelines. ADA Chapter 1 and ADA Chapter 2 of the 2004 ADA/ABA Guidelines provided scoping requirements for facilities subject to the ADA; ''scoping'' is a term used in the 2004 ADA/ABA Guidelines to describe requirements that prescribe which elements and spaces— and, in some cases, how many—must comply with the technical specifications. ABA Chapter 1 and ABA Chapter 2 provide scoping requirements for facilities subject to the ABA (*i.e.*, facilities designed, built, altered, or leased with Federal funds). Chapters 3 through 10 provide uniform technical specifications for facilities subject to either the ADA or ABA. This revised format is designed to eliminate unintended conflicts between the two sets of Federal accessibility standards and to minimize conflicts between the Federal regulations and the model

codes that form the basis of many State and local building codes. For the purposes of this final rule, the Department will refer to ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines as the 2004 ADAAG.

These amendments to the 1991 ADAAG have not been adopted previously by the Department as ADA Standards. Through this rule, the Department is adopting revised ADA Standards consistent with the 2004 ADAAG, including all of the amendments to the 1991 ADAAG since 1998. For the purposes of title II, the Department's revised standards are entitled ''The 2010 Standards for Accessible Design'' and consist of the 2004 ADAAG and the requirements in § 35.151. Because the Department has adopted the 2004 ADAAG as part of its title II and title III regulations, once the Department's final rules become effective, the 2004 ADAAG will have legal effect with respect to the Department's title II and title III regulations and will cease to be mere guidance for those areas regulated by the Department. In 2006, the (DOT) adopted the 2004 ADAAG. With respect to those areas regulated by DOT, these guidelines, as adopted by DOT have had legal effect since 2006.

The Department's Rulemaking History

The Department published an advance notice of proposed rulemaking (ANPRM) on September 30, 2004, 69 FR 58768, for two reasons: (1) To begin the process of adopting the 2004 ADAAG by soliciting public input on issues relating to the potential application of the Access Board's revisions once the Department adopts them as revised standards; and (2) to request background information that would assist the Department in preparing a regulatory analysis under the guidance provided in Office of Management and Budget (OMB) Circular AB4, sections D (Analytical Approaches) and E (Identifying and Measuring Benefits and Costs) (Sept. 17, 2003), available at *http://www.whitehouse.gov/OMB/circulars/a004/a-4.pdf* (last visited June 24, 2010). While underscoring that the Department, as a member of the Access Board, already had reviewed comments provided to the Access Board during its development of the 2004 ADAAG, the Department specifically requested public comment on the potential application of the 2004 ADAAG to existing facilities. The extent to which the 2004 ADAAG is used with respect to the program access requirement in title II (as well as with respect to the barrier removal requirement applicable to existing facilities under title III) is within the sole discretion of the Department. The ANPRM dealt with the Department's responsibilities under both title II and title III.

The public response to the ANPRM was substantial. The Department extended the comment deadline by four months at the public's request. 70 FR 2992 (Jan. 19, 2005). By the end of the extended comment period, the Department had received more than 900 comments covering a broad range of issues. Many of the commenters responded to questions posed specifically by the Department, including questions regarding the Department's application of the 2004 ADAAG once adopted by the Department and the Department's regulatory assessment of the costs and benefits of particular elements. Many other commenters addressed areas of desired regulation or of particular concern.

To enhance accessibility strides made since the enactment of the ADA, commenters asked the Department to focus on previously unregulated areas such as ticketing in assembly areas; reservations for hotel rooms, rental cars, and boat slips; and captioning. They also asked for clarification on some issues in the 1991 regulations, such as the requirements regarding service animals. Other commenters dealt with specific requirements in the 2004 ADAAG or responded to questions regarding elements scoped for the first time in the 2004 ADAAG, including recreation facilities and play areas. Commenters also provided some information on how to assess the cost of elements in small facilities, office

buildings, hotels and motels, assembly areas, hospitals and long-term care facilities, residential units, recreation facilities, and play areas. Still other commenters addressed the effective date of the proposed standards, the triggering event by which the effective date is calculated for new construction, and variations on a safe harbor that would excuse elements built in compliance with the 1991 Standards from compliance with the proposed standards.

After careful consideration of the public comments in response to the ANPRM, on June 17, 2008, the Department published an NPRM covering title II (73 FR 34466). The Department also published an NPRM on that day covering title III (73 FR 34508). The NPRMs addressed the issues raised in the public's comments to the ANPRM and sought additional comment, generally and in specific areas, such as the Department's adoption of the 2004 ADAAG, the Department's regulatory assessment of the costs and benefits of the rule, its updates and amendments of certain provisions of the existing title II and III regulations, and areas that were in need of additional clarification or specificity.

A public hearing was held on July 15, 2008, in Washington, D.C. Forty-five individuals testified in person or by phone. The hearing was streamed live over the Internet. By the end of the 60- day comment period, the Department had received 4,435 comments addressing a broad range of issues many of which were common to the title II and title III NPRMs, from representatives of businesses and industries, State and local government agencies, disability advocacy organizations, and private individuals, many of which addressed issues common to both NPRMs.

The Department notes that this rulemaking was unusual in that much of the proposed regulatory text and many of the questions asked across titles II and III were the same. Consequently, many of the commenters did not provide separate sets of documents for the proposed title II and title III rules, and in many instances, the commenters did not specify which title was being commented upon. As a result, where comments could be read to apply to both titles II and III, the Department included them in the comments and responses for each final rule.

Most of the commenters responded to questions posed specifically by the Department, including what were the most appropriate definitions for terms such as ''wheelchair,'' ''mobility device,'' and ''service animal''; how to quantify various benefits that are difficult to monetize; what requirements to adopt for ticketing and assembly areas; whether to adopt safe harbors for small businesses; and how best to regulate captioning. Some comments addressed specific requirements in the 2004 ADAAG or responded to questions regarding elements scoped for the first time in the 2004 ADAAG, including recreation facilities and play areas. Other comments responded to questions posed by the Department concerning certain specific requirements in the 2004 ADAAG.

Relationship to Other Laws

The Department of Justice regulation implementing title II, 28 CFR 35.103, provides the following:

(a) *Rule of interpretation.* Except as otherwise provided in this part, this part shall not be construed to apply a lesser standard than the standards applied under title V of the Rehabilitation Act of 1973 (29 U.S.C. 791) or the regulations issued by Federal agencies pursuant to that title.

(b) *Other laws.* This part does not invalidate or limit the remedies, rights, and procedures of any other Federal, State, or local laws (including State common law) that provide greater or equal protection for the rights of individuals with disabilities or individuals associated with them.

These provisions remain unchanged by the final rule. The Department recognizes that public entities subject to title II of the ADA may also be subject to title I of the ADA, which prohibits discrimination on the basis of disability in

employment; section 504 of the Rehabilitation Act of 1973 and other Federal statutes that prohibit discrimination on the basis of disability in the programs and activities of recipients of Federal financial assistance; and other Federal statutes such as the Air Carrier Access Act (ACAA), 49 U.S.C. 41705 *et seq*., and the Fair Housing Act (FHAct), 42 U.S.C. 3601 *et seq*. Compliance with the Department's title II and title III regulations does not necessarily ensure compliance with other Federal statutes.

Public entities that are subject to the ADA as well as other Federal disability discrimination laws must be aware of the requirements of all applicable laws and must comply with these laws and their implementing regulations. Although in many cases similar provisions of different statutes are interpreted to impose similar requirements, there are circumstances in which similar provisions are applied differently because of the nature of the covered entity or activity or because of distinctions between the statutes. For example, emotional support animals that do not qualify as service animals under the Department's title II regulation may nevertheless qualify as permitted reasonable accommodations for persons with disabilities under the FHAct and the ACAA. *See*, *e.g., Overlook Mutual Homes, Inc. v. Spencer*, 666 F. Supp. 2d 850 (S.D. Ohio 2009). Public entities that operate housing facilities must ensure that they apply the reasonable accommodation requirements of the FHAct in determining whether to allow a particular animal needed by a person with a disability into housing and may not use the ADA definition as a justification for reducing their FHAct obligations. In addition, nothing in the ADA prevents a covered entity subject to one statute from modifying its policies and providing greater access in order to assist individuals with disabilities in achieving access to entities subject to other Federal statutes. For example, a public airport is a title II facility that houses air carriers subject to the ACAA. The public airport operator is required to comply with the title II requirements, but is not covered by the ACAA. Conversely, the air carrier is required to comply with the ACAA, but is not covered by title II of the ADA. If a particular animal is a service animal for purposes of the ACAA and is thus allowed on an airplane, but is not a service animal for purposes of the ADA, nothing in the ADA prohibits an airport from allowing a ticketed passenger with a disability who is traveling with a service animal that meets the ACAA's definition of a service animal to bring that animal into the facility even though under the ADA's definition of service animal the animal could be lawfully excluded.

In addition, public entities (including AMTRAK) that provide public transportation services that are subject to subtitle B of title II should be reminded that the Department's regulation, at 28 CFR 35.102, provides: ''(a) Except as provided in paragraph (b) of this section, this part applies to all services, programs, and activities provided or made available by public entities. (b) To the extent that public transportation services, programs, and activities of public entities are covered by subtitle B of title II of the ADA, 42 U.S.C. 12141 *et seq*., they are not subject to the requirements of this part.'' The ADA regulations of DOT at 49 CFR 37.21(c) state that entities subject to DOT's ADA regulations may also be subject to the ADA regulations of the Department of Justice. As stated in the preamble to § 37.21(c) in DOT's 1991 regulation, ''[t]he DOT rules apply only to the entity's transportation facilities, vehicles, or services; the DOJ rules may cover the entity's activities more broadly.'' 56 FR 45584, 45736 (Sept. 6, 1991). Nothing in this final rule alters these provisions.

The Department recognizes that DOT has its own independent regulatory responsibilities under subtitle B of title II of the ADA. To the extent that the public transportation services, programs, and activities of public entities are covered by subtitle B of title II of the ADA, they are subject to the DOT regulations at 49 CFR parts 37 and

39. Matters covered by subtitle A are covered by this rule. However, this rule should not be read to prohibit DOT from elaborating on the provisions of this rule in its own ADA rules in the specific regulatory contexts for which it is responsible, after appropriate consultation with the Department. For example, DOT may issue such specific provisions with respect to the use of non-traditional mobility devices, *e.g.,* Segways®, on any transportation vehicle subject to subtitle B. While DOT may establish transportation-specific requirements that are more stringent or expansive than those set forth in this rule, any such requirements cannot reduce the protections and requirements set forth in this rule.

In addition, activities not specifically addressed by DOT's ADA regulation may be covered by DOT's regulation implementing section 504 of the Rehabilitation Act for its federally assisted programs and activities at 49 CFR part 27. Like other programs of public entities that are also recipients of Federal financial assistance, those programs would be covered by both the section 504 regulation and this part. Airports operated by public entities are not subject to DOT's ADA regulation, but they are subject to subpart A of title II and to this rule. The Department of Justice regulation implementing title II generally, and the DOT regulations specifically implementing subtitle B of title II, may overlap. If there is overlap in areas covered by subtitle B which DOT regulates, these provisions shall be harmonized in accordance with the DOT regulation at 49 CFR 37.21(c).

Organization of This Rule

Throughout this rule, the original ADA Standards, which are republished as Appendix D to 28 CFR part 36, will be referred to as the ''1991 Standards.'' The original title II regulation, 28 CFR part 35, will be referred to as the ''1991 title II regulation.'' ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines, codified at 36 CFR part 1191, app. B and D (2009) will be referred to as the ''2004 ADAAG.'' The Department's Notice of Proposed Rulemaking, 73 FR 34466 (June 17, 2008), will be referred to as the ''NPRM.'' As noted above, the 2004 ADAAG, taken together with the requirements contained in § 35.151 (New Construction and Alterations) of the final rule, will be referred to as the ''2010 Standards.'' The amendments made to the 1991 title II regulation and the adoption of the 2004 ADAAG, taken together, will be referred to as the ''final rule.''

In performing the required periodic review of its existing regulation, the Department has reviewed the title II regulation section by section, and, as a result, has made several clarifications and amendments in this rule. Appendix A of the final rule, ''Guidance on Revisions to ADA Regulation on Nondiscrimination on the Basis of Disability in State and Local Government Services,'' codified as Appendix A to 28 CFR part 35, provides the Department's response to comments and its explanations of the changes to the regulation. The section entitled ''Section-by-Section Analysis and Response to Comments'' in Appendix A provides a detailed discussion of the changes to the title II regulation. The Section-by-Section Analysis follows the order of the 1991 title II regulation, except that regulatory sections that remain unchanged are not referenced. The discussion within each section explains the changes and the reasoning behind them, as well as the Department's response to related public comments. Subject areas that deal with more than one section of the regulation include references to the related sections, where appropriate. The Section-by-Section Analysis also discusses many of the questions asked by the Department for specific public response. The section of Appendix A entitled ''Other Issues'' discusses public comments on several issues of concern to the Department that were the subject of questions that are not specifically addressed in the Section-by-Section Analysis.

The Department's description of the 2010 Standards, as well as a discussion of the public comments on specific sections of the 2004 ADAAG, is found in Appendix B of the final title III rule, ''Analysis and Commentary on the 2010 ADA Standards for Accessible Design,'' and codified as Appendix B to 28 CFR part 36.

The provisions of this rule generally take effect six months from its publication in the **Federal Register**. The Department has determined, however, that compliance with the 2010 Standards shall not be required until 18 months from the publication date of this rule. This exception is set forth in § 35.151(c) and is discussed in greater detail in Appendix A. *See* Appendix A discussion entitled ''Section 35.151(c) New construction and alterations.''

This final rule only addresses issues that were identified in the NPRM as subjects the Department intended to regulate through this rulemaking proceeding. Because the Department indicated in the NPRM that it did not intend to regulate certain areas, including equipment and furniture, accessible golf cars, and movie captioning and video description, as part of this rulemaking proceeding, the Department believes it would be appropriate to solicit more public comment about these areas prior to making them the subject of a rulemaking. The Department intends to engage in additional rulemaking in the near future addressing accessibility in these areas and others, including next generation 9–1–1 and accessibility of Web sites operated by covered public entities and public accommodations.

Additional Information

Regulatory Process Matters (SBREFA, Regulatory Flexibility Act, and Executive Orders)

The Department must provide two types of assessments as part of its final rule: an analysis of the costs and benefits of adopting the changes contained in this rule, and a periodic review of its existing regulations to consider their impact on small entities, including small businesses, small nonprofit organizations, and small governmental jurisdictions. *See* E.O. 12866, 58 FR 51735, 3 CFR, 1994 Comp., p. 638, as amended; Regulatory Flexibility Act of 1980 (RFA), 5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 610(a); OMB Circular A–4, available at *http://www.whitehouse.gov/ OMB/ circulars/a004/a-4.pdf* (last visited June 24, 2010); E.O. 13272, 67 FR 53461, 3 CFR, 2003 Comp., p. 247.

In the NPRM, the Department kept open the possibility that, if warranted by public comments received on an issue raised by the 2004 ADAAG, or by the results of the Department's Initial Regulatory Impact Analysis (available at *ada.gov/NPRM2008/ria.htm*) showing that the likely costs of making a particular feature or facility accessible were disproportionate to the benefits (including both monetized and nonmonetized benefits) to persons with disabilities, the Attorney General, as a member of the Access Board, could return the issue to the Access Board for further consideration. After careful consideration, the Department has determined that it is unnecessary to return any issues to the Access Board for additional consideration.

Executive Order 12866

This rule has been reviewed by the Office of Management and Budget (OMB) under Executive Order 12866. The Department has evaluated its existing regulations for title II and title III section by section, and many of the provisions in the final rule for both titles reflect its efforts to mitigate any negative effects on small entities. A Final Regulatory Impact Analysis (Final RIA or RIA) was prepared by the Department's contractor, HDR|HLB Decision Economics, Inc. (HDR). In accordance with Executive Order 12866, as amended, and OMB Circular A–4, the Department has reviewed and considered the Final RIA and has accepted the results of this analysis as its

assessment of the benefits and costs of the final rules.

Executive Order 12866 refers explicitly not only to monetizable costs and benefits but also to ''distributive impacts'' and ''equity,'' *see* E.O. 12866, section 1(a), and it is important to recognize that the ADA is intended to provide important benefits that are distributional and equitable in character. The ADA states, ''[i]t is the purpose of this [Act] (1) to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities; [and] (2) to provide clear, strong, consistent, enforceable standards addressing discrimination against individuals with disabilities[.]'' 42 U.S.C. 12101(b). Many of the benefits of this rule stem from the provision of such standards, which will promote inclusion, reduce stigma and potential embarrassment, and combat isolation, segregation, and second-class citizenship of individuals with disabilities. Some of these benefits are, in the words of Executive Order 12866, ''difficult to quantify, but nevertheless essential to consider.'' E.O. 12866, section 1(a). The Department has considered such benefits here.

Final Regulatory Impact Analysis

The Final RIA embodies a comprehensive benefit-cost analysis of the final rules for both title II and title III and assesses the incremental benefits and costs of the 2010 Standards relative to a primary baseline scenario (1991 Standards). In addition, the Department conducted additional research and analyses for requirements having the highest negative net present values under the primary baseline scenario. This approach was taken because, while the 1991 Standards are the only uniform set of accessibility standards that apply to public accommodations, commercial facilities, and State and local government facilities nationwide, it is also understood that many State and local jurisdictions have already adopted IBC/ANSI model code provisions that mirror those in the 2004 ADAAG. The assessments based on this approach assume that covered entities currently implementing codes that mirror the 2004 ADAAG will not need to modify their code requirements once the rules are finalized. They also assume that, even without the final rules, the current level of compliance would be unchanged. The Final RIA contains specific information, including data in chart form, detailing which States have already adopted the accessibility standards for this subset of six requirements. The Department believes that the estimates resulting from this approach represent a reasonable upper and lower measure of the likely effects these requirements will have that the Department was able to quantify and monetize.

The Final RIA estimates the benefits and costs for all new (referred to as ''supplemental'') requirements and revised requirements across all types of newly constructed and existing facilities. The Final RIA also incorporates a sophisticated risk analysis process that quantifies the inherent uncertainties in estimating costs and benefits and then assesses (through computer simulations) the relative impact of these factors when varied simultaneously. A copy of the Final RIA will be made available online for public review on the Department's ADA Home Page (*http://www.ada.gov*).

From an economic perspective (as specified in OMB Circular A–4), the results of the Final RIA demonstrate that the Department's final rules increase social resources and thus represent a public good because monetized benefits exceed monetized costs—that is, the regulations have a positive net present value (NPV). Indeed, under every scenario assessed in the Final RIA, the final rules have a positive NPV. The Final RIA's first scenario examines the incremental impact of the final rules using the ''main'' set of assumptions (*i.e.*, assuming a primary baseline (1991 Standards), that the safe harbor applies, and that for title III entities barrier removal is readily

achievable for 50 percent of elements subject to supplemental requirements).

Under this set of assumptions, the final rules have an expected NPV of $9.3 billion (7 percent discount rate) and $40.4 billion (3 percent discount rate). *See* Final RIA, table ES–1 & figure ES– 2.

Expected Impact of the Rules[2] (in billions)

Discount rate	Expected NPV	Total Expected PV (Benefits)	Total Expected PV (Costs)
3%	$40.4	$66.2	$25.8
7%	$9.3	$22.0	$12.8

Water Closet Clearances

The Department gave careful consideration to the costs and benefits of its adoption of the standards relating to water closet clearances in single-user toilet rooms. The primary effect of the Department's proposed final rules governing water closet clearances in single-user toilet rooms with in-swinging and out-swinging doors is to allow sufficient room for ''side'' or ''parallel'' methods of transferring from a wheelchair to a toilet. Under the current 1991 Standards, the requisite clearance space in single-user toilet rooms between and around the toilet and the lavatory does not permit these methods of transfer. Side or parallel transfers are used by large numbers of persons who use wheelchairs and are regularly taught in rehabilitation and occupational therapy. Currently, persons who use side or parallel transfer methods from their wheelchairs are faced with a stark choice at establishments with single-user toilet rooms—*i.e.*, patronize the establishment but run the risk of needing assistance when using the restroom, travel with someone who would be able to provide assistance in toileting, or forgo the visit entirely. The revised water closet clearance regulations would make single-user toilet rooms accessible to all persons who use wheelchairs, not just those with the physical strength, balance, and dexterity and the training to use a front-transfer method. Single-user toilet rooms are located in a wide variety of public and private facilities, including restaurants, fast-food establishments, schools, retail stores, parks, sports stadiums, and hospitals. Final promulgation of these requirements might thus, for example, enable a person who uses a side or parallel transfer method to use the restroom (or use the restroom independently) at his or her local coffee shop for the first time.

Because of the complex nature of its cost-benefit analysis, the Department is providing ''plain language'' descriptions of the benefits calculations for the two revised requirements with the highest estimated total costs: Water closet clearance in single-user toilet rooms with out-swinging doors (RIA Req. # 28) (section 604.3 of the 2010 Standards) and water closet clearance in single-user toilet rooms with in-swinging doors (RIA Req. # 32) (sections 604.3 and 603.2.3 Exception 2 of the 2010 Standards). Since many of the concepts and calculations in the Final RIA are highly technical, it is hoped that, by providing ''lay'' descriptions of how benefits are monetized for an illustrative set of requirements, the Final RIA will be more transparent and afford readers a more complete understanding of the benefits model generally. Because of the widespread adoption of the water closet clearance standards in existing State and local building codes, the following calculations use the IBC/ANSI baseline.

[2] The analysis assumes these regulations will be in force for 15 years. Incremental costs and benefits are calculated for all construction, alterations, and barrier removal that is expected to occur during these 15 years. The analysis also assumes that any new or revised ADA rules enacted 15 years from now will include a safe harbor provision. Thus, any facilities constructed in year 14 of the final rules are assumed to continue to generate benefits to users, and to incur any operating or replacement costs for the life of these buildings, which is assumed to be 40 years.

General description of monetized benefits for water closet clearance in single-user toilet rooms—out-swinging doors (Req. # 28). In order to assess monetized benefits for the requirement covering water closet clearances in single-user toilet rooms with out-swinging doors, a determination needed to be made concerning the population of users with disabilities who would likely benefit from this revised standard. Based on input received from a panel of experts jointly convened by HDR and the Department to discuss benefits related estimates and assumptions used in the RIA model, it was assumed that accessibility changes brought about by this requirement would benefit persons with any type of ambulatory (*i.e.*, mobility-related) disability, such as persons who use wheelchairs, walkers, or braces. Recent census figures estimate that about 11.9 percent of Americans ages 15 and older have an ambulatory disability, or about 35 million people. This expert panel also estimated that single-user toilet rooms with out-swinging doors would be used slightly less than once every other visit to a facility with such toilet rooms covered by the final rules (or, viewed another way, about once every two hours spent at a covered facility assumed to have one or more single-user toilet rooms with out-swinging doors) by an individual with an ambulatory disability. The expert panel further estimated that, for such individuals, the revised requirement would result in an average time savings of about five and a half minutes when using the restroom. This time savings is due to the revised water closet clearance standard, which permits, among other things, greater flexibility in terms of access to the toilet by parallel or side transfer, thereby perhaps reducing the wait for another person to assist with toileting and the need to twist or struggle to access the toilet independently. Based on average hourly wage rates compiled by the U.S. Department of Labor, the time savings for Req. # 28 is valued at just under $10 per hour.

For public and private facilities covered by the final rules, it is estimated that there are currently about 11 million single-user toilet rooms with out-swinging doors. The majority of these types of single-user toilet rooms, nearly 7 million, are assumed to be located at ''Indoor Service Establishments,'' a broad facility group that encompasses various types of indoor retail stores such as bakeries, grocery stores, clothing stores, and hardware stores. Based on construction industry data, it was estimated that approximately 3 percent of existing single-user toilet rooms with out-swinging doors would be altered each year, and that the number of newly constructed facilities with these types of toilet rooms would increase at the rate of about 1 percent each year. However, due to the widespread adoption at the State and local level of model code provisions that mirror Req. # 28, it is further understood that about half of all existing facilities assumed to have single-user toilet rooms with out-swinging doors already are covered by State or local building codes that require equivalent water closet clearances. Due to the general element-by-element safe harbor provision in the final rules, no unaltered single-user toilet rooms that comply with the current 1991 Standards will be required to retrofit to meet the revised clearance requirements in the final rules.

With respect to new construction, it is assumed that each single-user toilet room with an out-swinging door will last the life of the building, about 40 years. For alterations, the amount of time such a toilet room will be used depends upon the remaining life of the building (*i.e.*, a period of time between 1 and 39 years).

Summing up monetized benefits to users with disabilities across all types of public and private facilities covered by the final rules, and assuming 46 percent of covered facilities nationwide are located in jurisdictions that have adopted the relevant equivalent IBC/ ANSI model code provisions, it is expected that the revised requirement for water closet clearance in single-user toilet rooms with out-swinging doors will

result in net benefits of approximately $900 million over the life of these regulations.

General description of monetized benefits for water closet clearance in single-user toilet rooms—in-swinging doors (Req. # 32). For the water closet clearance in single-user toilet rooms with the in-swinging door requirement (Req. #32), the expert panel determined that the primary beneficiaries would be persons who use wheelchairs. As compared to single-user toilet rooms with out-swinging doors, those with in-swinging doors tend to be larger terms of square footage) in order to accommodate clearance for the in-swinging door and, thus, are already likely to have adequate clear floor space for persons with disabilities who use other types of mobility aids such as walkers and crutches.

The expert benefits panel estimated that single-user toilet rooms with in-swinging doors are used less frequently on average—about once every 20 visits to a facility with such a toilet room by a person who uses a wheelchair—than their counterpart toilet rooms with out-swinging doors. This panel also determined that, on average, each user would realize a time savings of about 9 minutes as a result of the enhanced clearances required by this revised standard.

The RIA estimates that there are about 4 million single-user toilet rooms with in-swinging doors in existing facilities. About half of the single-user toilet rooms with in-swinging doors are assumed to be located in single-level stores, and about a quarter of them are assumed to be located in restaurants. Based on construction industry data, it was estimated that approximately 3 percent of existing single-user toilet rooms with in-swinging doors would be altered each year, and that the number of newly constructed facilities with these types of toilet rooms would increase at the rate of about 1 percent each year. However, due to the widespread adoption at the State and local level of model code provisions that mirror Req. #32, it is further understood that slightly more than 70 percent of all existing facilities assumed to have single-user toilet rooms with in-swinging doors already are covered by State or local building codes that require equivalent water closet clearances. Due to the general element-by-element safe harbor provision in the final rules, no unaltered single-user toilet rooms that comply with the current 1991 Standards will be required to retrofit to meet the revised clearance requirements in the final rules.

Similar to the assumptions for Req. #28, it is assumed that newly constructed single-user toilet rooms with in-swinging doors will last the life of the building, about 40 years. For alterations, the amount of time such a toilet room will be used depends upon the remaining life of the building (*i.e.*, a period of time between 1 and 39 years). Over this time period, the total estimated value of benefits to users of water closets with in-swinging doors from the time they will save and decreased discomfort they will experience is nearly $12 million.

Additional benefits of water closet clearance standards. The standards requiring sufficient space in single-user toilet rooms for a wheelchair user to effect a side or parallel transfer are among the most costly (in monetary terms) of the new provisions in the Access Board's guidelines that the Department adopts in this rule—but also, the Department believes, one of the most beneficial in non-monetary terms. Although the monetized costs of these requirements substantially exceed the monetized benefits, the additional benefits that persons with disabilities will derive from greater safety, enhanced independence, and the avoidance of stigma and humiliation— benefits that the Department's economic model could not put in monetary terms—are, in the Department's experience and considered judgment, likely to be quite high. Wheelchair users, including veterans returning from our Nation's wars with disabilities, are taught to transfer onto toilets from the side. Side transfers are the safest, most efficient, and most independence-promoting way for wheelchair users to get onto the toilet. The opportunity

to effect a side transfer will often obviate the need for a wheelchair user or individual with another type of mobility impairment to obtain the assistance of another person to engage in what is, for most people, among the most private of activities. Executive Order 12866 refers explicitly not only to monetizable costs and benefits but also to ''distributive impacts'' and ''equity,'' *see* E.O. 12866, section 1(a), and it is important to recognize that the ADA is intended to provide important benefits that are distributional and equitable in character. These water closet clearance provisions will have non-monetized benefits that promote equal access and equal opportunity for individuals with disabilities, and will further the ADA's purpose of providing ''a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities.'' 42 U.S.C. 12101(b)(1).

The Department's calculations indicated that, in fact, people with the relevant disabilities would have to place only a very small monetary value on these quite substantial benefits for the costs and benefits of these water closet clearance standards to break even. To make these calculations, the Department separated out toilet rooms with out-swinging doors from those with in-swinging doors, because the costs and benefits of the respective water closet clearance requirements are significantly different. The Department estimates that, assuming 46 percent of covered facilities nationwide are located in jurisdictions that have adopted the relevant equivalent IBC/ANSI model code provisions, the costs of the requirement as applied to toilet rooms with out-swinging doors will exceed the monetized benefits by $454 million, an annualized net cost of approximately $32.6 million. But a large number of people with disabilities will realize benefits of independence, safety, and avoided stigma and humiliation as a result of the requirement's application in this context. Based on the estimates of its expert panel and its own experience, the Department believes that both wheelchair users and people with a variety of other mobility disabilities will benefit. The Department estimates that people with the relevant disabilities will use a newly accessible single-user toilet room with an out-swinging door approximately 677 million times per year. Dividing the $32.6 million annual cost by the 677 million annual uses, the Department concludes that for the costs and benefits to break even in this context, people with the relevant disabilities will have to value safety, independence, and the avoidance of stigma and humiliation at just under 5 cents per visit. The Department believes, based on its experience and informed judgment, that 5 cents substantially understates the value people with the relevant disabilities would place on these benefits in this context.

There are substantially fewer single-user toilet rooms with in-swinging doors, and substantially fewer people with disabilities will benefit from making those rooms accessible. While both wheelchair users and individuals with other ambulatory disabilities will benefit from the additional space in a room with an out-swinging door, the Department believes, based on the estimates of its expert panel and its own experience, that wheelchair users likely will be the primary beneficiaries of the in-swinging door requirement. The Department estimates that people with the relevant disabilities will use a newly accessible single-user toilet room with an in-swinging door approximately 8.7 million times per year. Moreover, the alteration costs to make a single-user toilet room with an in-swinging door accessible are substantially higher (because of the space taken up by the door) than the equivalent costs of making a room with an out-swinging door accessible. Thus, the Department calculates that, assuming 72 percent of covered facilities nationwide are located in jurisdictions that have adopted the relevant equivalent IBC/ANSI model code provisions, the costs of applying the toilet room accessibility standard to rooms with in-swinging doors will exceed the monetized benefits of doing so by $266.3 million over the

life of the regulations, or approximately $19.14 million per year. Dividing the $19.14 million annual cost by the 8.7 million annual uses, the Department concludes that for the costs and benefits to break even in this context, people with the relevant disabilities will have to value safety, independence, and the avoidance of stigma and humiliation at approximately $2.20 per visit. The Department believes, based on its experience and informed judgment, that this figure approximates, and probably understates, the value wheelchair users place on safety, independence, and the avoidance of stigma and humiliation in this context.

Alternate Scenarios

Another scenario in the Final RIA explores the incremental impact of varying the assumptions concerning the percentage of existing elements subject to supplemental requirements for which barrier removal would be readily achievable. Readily achievable barrier removal rates are modeled at 0 percent, 50 percent, and 100 percent levels. The results of this scenario show that the expected NPV is positive for each readily achievable barrier removal rate and that varying this assumed rate has little impact on expected NPV. *See* Final RIA, figure ES–3.

A third set of analyses in the Final RIA demonstrates the impact of using alternate baselines based on model codes instead of the primary baseline. The IBC model codes, which have been widely adopted by State and local jurisdictions around the country, are significant because many of the requirements in the final rules mirror accessibility provisions in the IBC model codes (or standards incorporated therein by reference, such as ANSI A117.1). The actual economic impact of the Department's final rules is, therefore, tempered by the fact that many jurisdictions nationwide have already adopted and are enforcing portions of the final rules—indeed, this was one of the goals underlying the Access Board's efforts to harmonize the 2004 ADAAG Standards with the model codes. However, capturing the economic impact of this reality poses a difficult modeling challenge due to the variety of methods by which States and localities have adopted the IBC/ANSI model codes (*e.g.*, in whole, in part, and with or without amendments), as well as the lack of a national ''facility census'' establishing the location, type, and age of existing ADA-covered facilities.

As a result, in the first set of alternate IBC baseline analyses, the Final RIA assumes that all of the three IBC model codes—IBC 2000, IBC 2003, and IBC 2006—have been fully adopted by all jurisdictions and apply to all facilities nationwide. As with the primary baseline scenarios examined in the Final RIA, use of these three alternate IBC baselines results in positive expected NPVs in all cases. *See* Final RIA, figure ES–4. These results also indicate that IBC 2000 and IBC 2006 respectively have the highest and lowest expected NPVs. These results are due to changes in the make-up of the set of requirements that is included in each alternative baseline.

Additionally, a second, more limited alternate baseline analysis in the Final RIA uses a State-specific and requirement-specific alternate IBC/ANSI baseline in order to demonstrate the likely actual incremental impact of an illustrative subset of 20 requirements under current conditions nationwide. For this analysis, research was conducted on a subset of 20 requirements in the final rules that have negative net present values under the primary baseline and readily identifiable IBC/ANSI counterparts to determine the extent to which they each respectively have been adopted at the State or local level. With respect to facilities, the population of adopting jurisdictions was used as a proxy for facility location. In other words, it was assumed that the number of ADA-covered facilities respectively compliant with these 20 requirements was equal to the percentage of the United States population (based on statistics from the Census Bureau) currently residing in those States or local jurisdictions that have adopted the

IBC/ANSI counterparts to these requirements. The results of this more limited analysis, using State-specific and requirement-specific alternate IBC/ANSI baselines for these 20 requirements, demonstrate that the widespread adoption of IBC model codes by States and localities significantly lessens the financial impact of these specific requirements. Indeed, the Final RIA estimates that, if the NPVs for these 20 requirements resulting from the requirement-specific alternate IBC/ANSI baseline are substituted for their respective results under the primary baseline, the overall NPV for the final rules increases from $9.2 billion to $12.0 billion. *See* Final RIA, section 6.2.2 & table 10.

Benefits Not Monetized in the Formal Analysis

Finally, the RIA recognizes that additional benefits are likely to result from the new standards. Many of these benefits are more difficult to quantify. Among the potential benefits that have been discussed by researchers and advocates are reduced administrative costs due to harmonized guidelines, increased business opportunities, increased social development, and improved health benefits. For example, the final rules will substantially increase accessibility at newly scoped facilities such as recreation facilities and judicial facilities, which previously have been very difficult for persons with disabilities to access. Areas where the Department believes entities may incur benefits that are not monetized in the formal analysis include, but may not be limited to, the following:

Use benefits accruing to persons with disabilities. The final rules should improve the overall sense of well-being of persons with disabilities, who will know that public entities and places of public accommodation are generally accessible, and who will have improved individual experiences. Some of the most frequently cited qualitative benefits of increased access are the increase in one's personal sense of dignity that arises from increased access and the decrease in possibly humiliating incidents due to accessibility barriers. Struggling to join classmates on a stage, to use a bathroom with too little clearance, or to enter a swimming pool all negatively affect a person's sense of independence and can lead to humiliating accidents, derisive comments, or embarrassment. These humiliations, together with feelings of being stigmatized as different or inferior from being relegated to use other, less comfortable or pleasant elements of a facility (such as a bathroom instead of a kitchen sink for rinsing a coffee mug at work), all have a negative effect on persons with disabilities.

Use benefits accruing to persons without disabilities. Improved accessibility can affect more than just the rule's target population; persons without disabilities may also benefit from many of the requirements. Even though the requirements were not designed to benefit persons without disabilities, any time savings or easier access to a facility experienced by persons without disabilities are also benefits that should properly be attributed to that change in accessibility. Curb cuts in sidewalks make life easier for those using wheeled suitcases or pushing a baby stroller. For people with a lot of luggage or a need to change clothes, the larger bathroom stalls can be highly valued. A ramp into a pool can allow a child (or adult) with a fear of water to ease into that pool. All are examples of ''unintended'' benefits of the rule. And ideally, all should be part of the calculus of the benefits to society of the rule.

Social benefits. Evidence supports the notion that children with and without disabilities benefit in their social development from interaction with one another. Therefore, there will likely be social development benefits generated by an increase in accessible play areas. However, these benefits are nearly impossible to quantify for several reasons. First, there is no guarantee that accessibility will generate play opportunities between children with and without disabilities. Second, there may be substantial overlap between interactions at accessible play areas and interactions at other facilities, such as schools and religious

facilities. Third, it is not certain what the unit of measurement for social development should be.

Non-use benefits. There are additional, indirect benefits to society that arise from improved accessibility. For instance, resource savings may arise from reduced social service agency outlays when people are able to access centralized points of service delivery rather than receiving home-based care. Home-based and other social services may include home health care visits and welfare benefits. Third-party employment effects can arise when enhanced accessibility results in increasing rates of consumption by disabled and non-disabled populations, which in turn results in reduced unemployment.

Two additional forms of benefits are discussed less often, let alone quantified: Option value and existence value. Option value is the value that people with and without disabilities derive from the option of using accessible facilities at some point in the future. As with insurance, people derive benefit from the knowledge that the option to use the accessible facility exists, even if it ultimately goes unused. Simply because an individual is a nonuser of accessible elements today does not mean that he or she will remain so tomorrow. In any given year, there is some probability that an individual will develop a disability (either temporary or permanent) that will necessitate use of these features. For example, the 2000 Census found that 41.9 percent of adults 65 years and older identified themselves as having a disability. Census Bureau figures, moreover, project that the number of people 65 years and older will more than double between 2000 and 2030—from 35 million to 71.5 million. Therefore, even individuals who have no direct use for accessibility features today get a direct benefit from the knowledge of their existence should such individuals need them in the future.

Existence value is the benefit that individuals get from the plain existence of a good, service or resource—in this case, accessibility. It can also be described as the value that people both with and without disabilities derive from the guarantees of equal treatment and non-discrimination that are accorded through the provision of accessible facilities. In other words, people value living in a country that affords protections to individuals with disabilities, whether or not they themselves are directly or indirectly affected. Unlike use benefits and option value, existence value does not require an individual ever to use the resource or plan on using the resource in the future. There are numerous reasons why individuals might value accessibility even if they do not require it now and do not anticipate needing it in the future.

Costs Not Monetized in the Formal Analysis

The Department also recognizes that in addition to benefits that cannot reasonably be quantified or monetized, there may be negative consequences and costs that fall into this category as well. The absence of a quantitative assessment of such costs in the formal regulatory analysis is not meant to minimize their importance to affected entities; rather, it reflects the inherent difficulty in estimating those costs. Areas where the Department believes entities may incur costs that are not monetized in the formal analysis include, but may not be limited to, the following:

Costs from deferring or forgoing alterations. Entities covered by the final rules may choose to delay otherwise desired alterations to their facilities due to the increased incremental costs imposed by compliance with the new requirements. This may lead to facility deterioration and decrease in the value of such facilities. In extreme cases, the costs of complying with the new requirements may lead some entities to opt to not build certain facilities at all. For example, the Department estimates that the incremental costs of building a new wading pool associated with the final rules will increase by about $142,500 on average. Some facilities may opt to not build such pools to avoid incurring this increased cost.

Loss of productive space while modifying an existing facility. During complex alterations, such as where moving walls or plumbing systems will be necessary to comply with the final rules, productive space may be unavailable until the alterations are complete. For example, a hotel altering its bathrooms to comply with the final rules will be unable to allow guests to occupy these rooms while construction activities are underway, and thus the hotel may forgo revenue from these rooms during this time. While the amount of time necessary to perform alterations varies significantly, the costs associated with unproductive space could be high in certain cases, especially if space is already limited or if an entity or facility is located in an area where real estate values are particularly high (*e.g.*, New York or San Francisco).

Expert fees. Another type of cost to entities that is not monetized in the formal analysis is legal fees to determine what, if anything, a facility needs to do in order to comply with the new rules or to respond to lawsuits. Several commenters indicated that entities will incur increased legal costs because the requirements are changing for the first time since 1991. Since litigation risk could increase, entities could spend more on legal fees than in the past. Likewise, covered entities may face incremental costs when undertaking alterations because their engineers, architects, or other consultants may also need to consider what modifications are necessary to comply with the new requirements. The Department has not quantified the incremental costs of the services of these kinds of experts.

Reduction in facility value and losses to individuals without disabilities due to the new accessibility requirements. It is possible that some changes made by entities to their facilities in order to comply with the new requirements may result in fewer individuals without disabilities using such facilities (because of decreased enjoyment) and may create a disadvantage for individuals without disabilities, even though the change might increase accessibility for individuals with disabilities. For example, the new requirements for wading pools might decrease the value of the pool to the entity that owns it due to fewer individuals using it (because the new requirements for a sloped entry might make the pool too shallow). Similarly, several commenters from the miniature golf industry expressed concern that it would be difficult to comply with the regulations for accessible holes without significantly degrading the experience for other users. Finally, with respect to costs to individuals who do not have disabilities, a very tall person, for example, may be inconvenienced by having to reach further for a lowered light switch.

Section 610 Review

The Department is also required to conduct a periodic regulatory review pursuant to section 610 of the RFA. The review requires agencies to consider five factors: (1) The continued need for the rule; (2) the nature of complaints or comments received concerning the rule from the public; (3) the complexity of the rule; (4) the extent to which the rule overlaps, duplicates, or conflicts with other Federal rules, and, to the extent feasible, with State and local governmental rules; and (5) the length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed in the area affected by the rule. *See* 5 U.S.C. 610(b). Based on these factors, the agency is required to determine whether to continue the rule without change or to amend or rescind the rule, to minimize any significant economic impact of the rule on a substantial number of small entities. *See id.* 610(a).

In developing the 2010 Standards, the Department reviewed the 1991 Standards section by section and, as a result, has made several clarifications and amendments in both the title II and title III implementing regulations. The changes reflect the Department's analysis and review of complaints or comments from the

public, as well as changes in technology. Many of the amendments aim to clarify and simplify the obligations of covered entities. As discussed in greater detail above, one significant goal of the development of the 2004 ADAAG was to eliminate duplication or overlap in Federal accessibility guidelines, as well as to harmonize the Federal guidelines with model codes. The Department has also worked to create harmony where appropriate between the requirements of titles II and III. Finally, while the regulation is required by statute and there is a continued need for it as a whole, the Department proposes several modifications that are intended to reduce its effects on small entities.

The Department has consulted with the Small Business Administration's Office of Advocacy about this process. The Office of Advocacy has advised that although the process followed by the Department was ancillary to the proposed adoption of revised ADA Standards, the steps taken to solicit public input and to respond to public concerns are functionally equivalent to the process required to complete a section 610 review. Therefore, this rulemaking fulfills the Department's obligations under section 610 of the RFA.

Final Regulatory Flexibility Analysis

The final rule also has been reviewed by the Small Business Administration's Office of Advocacy (Advocacy) in accordance with Executive Order 13272, 67 FR 53461, 3 CFR, 2003 Comp., p. 247. Chapter Seven of the Final RIA demonstrates that the final rule will not have a significant economic impact on a substantial number of small governmental jurisdictions or facilities. The Department has also conducted a final regulatory flexibility analysis (FRFA) as a component of this rulemaking. Collectively, the ANPRM, NPRM, Initial RIA, Final RIA, and 2010 Standards, include all of the elements of a FRFA required by the Regulatory Flexibility Act (RFA). *See* 5 U.S.C. 604(a)(1)–(5).

Section 604(a) lists the specific requirements for a FRFA. The Department has addressed these RFA requirements throughout the ANPRM, NPRM, the 2010 Standards, and the RIA. In summary, the Department has satisfied its FRFA obligations under section 604(a) by providing the following:

1. *Succinct summaries of the need for, and objectives of, the final rules.* The Department is issuing this final rule in order to comply with its obligations under both the ADA and the SBREFA. The Department is also updating or amending certain provisions of the existing title II regulations so that they are consistent with the title III regulations and accord with the Department's legal and practical experiences in enforcing the ADA.

The ADA requires the Department to adopt enforceable accessibility standards under the ADA that are consistent with the Access Board's minimum accessibility guidelines and requirements. Accordingly, this rule adopts ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines as part of the 2010 Standards, which will give the guidelines legal effect with respect to the Department's title II and title III regulations.

Under the SBREFA, the Department is required to perform a periodic review of its 1991 rule because the rule may have a significant economic impact on a substantial number of small entities. The SBREFA also requires the Department to make a regulatory assessment of the costs and benefits of any significant regulatory action. *See* preamble sections of the final rules for titles II and III entitled, ''Summary'' and ''The Department's Rulemaking History''; Department of Justice ANPRM, 69 FR 58768, 58768–70 (Sept. 30, 2004) (outlining the regulatory history, goals, and rationale underlying DOJ's proposal to revise its regulations implementing titles II and III of the ADA); Department of Justice NPRM, 73 FR 34508, 34508– 14 (June 17, 2008) (outlining the regulatory history and rationale underlying DOJ's

proposal to revise its regulations implementing titles II and III of the ADA).

2. *Summaries of significant issues raised by public comments in response to the Department's initial regulatory flexibility analysis (IRFA) and discussions of regulatory revisions made as a result of such comments.* The Department received no comments addressing specific substantive issues regarding the IRFA for the title II NPRM. However, the Office of Advocacy (Advocacy) of the U.S. Small Business Administration did provide specific comments on the title III NPRM, which may be relevant to the title II IRFA. Accordingly, the Department has included those comments here.

Advocacy acknowledged how the Department took into account the comments and concerns of small entities. However, Advocacy remained concerned about certain items in the Department's NPRM and requested clarification or additional guidance on certain items.

General Safe Harbor. Advocacy expressed support for the Department's proposal to allow an element-by-element safe harbor for elements that now comply with the 1991 ADA Standards and encouraged the Department to include specific technical assistance in the Small Business Compliance Guide that the Department is required to publish pursuant to section 212 of the SBREFA. Advocacy requested that technical assistance outlining which standards are subject to the safe harbor be included in the Department's guidance. The Department has provided a list of the new requirements in the 2010 Standards that are not eligible for the safe harbor in § 35.150(b)(2)(ii)(A) through § 35.150(b)(2)(ii)(L) of the final rule and plans to include additional information about the application of the safe harbor in the Department's Small Business Compliance Guide. Advocacy also requested that guidance regarding the two effective dates for regulations also be provided and the Department plans to include such guidance in its Small Business Compliance Guide.

Indirect Costs. Advocacy expressed concern that small entities would incur substantial indirect costs under the final rules for accessibility consultants, legal counsel, training, and the development of new policies and procedures. The Department believes that such ''indirect costs,'' even assuming they would occur as described by Advocacy, are not properly attributed to the Department's final rules implementing the ADA.

The vast majority of the new requirements are incremental changes subject to a safe harbor. All small entities currently in compliance with the 1991 Standards will neither need to undertake further retrofits nor require the services of a consultant to tell them so. If, on the other hand, elements at an existing facility are not currently in compliance with the 1991 Standards, then the cost of making such a determination and bringing these elements into compliance are not properly attributed to the final rules, but to lack of compliance with the 1991 Standards.

For the limited number of requirements in the final rule that are supplemental (*i.e.*, relating to accessibility at courthouses, play areas, and recreation facilities), the Department believes that covered entities simply need to determine whether they have an element covered by a supplemental requirement (*e.g.*, a swimming pool) and then conduct any work necessary to provide program access either in-house or by contacting a local contractor. Determining whether such an element exists is expected to take only a minimal amount of staff time. Nevertheless, Chapter 5.3 of the Final RIA has a high-end estimate of the additional management costs of such evaluation (from 1 to 8 hours of staff time).

The Department also anticipates that small entities will incur minimal costs for accessibility consultants to ensure compliance with the new requirements for New Construction and Alterations in the final rules. Both the 2004 ADAAG and the proposed requirements have been made public for some time and are already being incorporated into design plans by architects

and builders. Further, in adopting the final rules, the Department has sought to harmonize, to the greatest extent possible, the ADA Standards with model codes that have been adopted on a widespread basis by State and local jurisdictions across the country. Accordingly, many of the requirements in the final rules are already incorporated into building codes nationwide. Additionally, it is assumed to be part of the regular course of business—and thereby incorporated into standard professional services or construction contracts—for architects and contractors to keep abreast of changes in applicable Federal, State, and local laws and building codes. Given these considerations, the Department has determined that the additional costs, if any, for architectural or contractor services that arise out of the final rules are expected to be minimal.

Some business commenters stated that the final rules would require them to develop new policies or manuals to retrain employees on the revised ADA standards. However, it is the Department's view that because the revised and supplemental requirements address architectural issues and features, the final rules would require minimal, if any, changes to the overall policies and procedures of covered entities.

Finally, commenters representing business interests expressed the view that the final rules would cause businesses to incur significant legal costs in order to defend ADA lawsuits. However, regulatory impact analyses are not an appropriate forum for assessing the cost covered entities may bear, or the repercussions they may face, for failing to comply (or allegedly failing to comply) with current law. *See* Final RIA, Ch. 3, section 3.1.4, *id.*, at Ch. 5, *id.* at table 15.

3. *Estimates of the number and type of small entities to which the final rules will apply.* The Department estimates that the final rules will apply to approximately 89,000 facilities operated by small governmental jurisdictions covered by title II. *See* Final RIA, Ch. 7, ''Small Business Impact Analysis,'' table 17, and app. 5, ''Small Business Data of the RIA'' (available for review at *http:// www.ada.gov*); *see also* 73 FR 36964 (June 30, 2008), app. B: Initial Regulatory Assessment, sections entitled, ''Regulatory Alternatives,'' ''Regulatory Proposals with Cost Implications,'' and ''Measurement of Incremental Benefits'' (estimating the number of small entities the Department believes may be impacted by the NPRM and calculating the likely incremental economic impact of these rules on small facilities or entities versus ''typical'' (*i.e.*, average-sized) facilities or entities).

4. *A description of the projected reporting, record-keeping, and other compliance requirements of the final rules, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record.* The final rules impose no new recordkeeping or reporting requirements. *See* preamble sections of the final rule for titles II and III entitled, ''Paperwork Reduction Act.'' Small entities may incur costs as a result of complying with the final rules. These costs are detailed in the Final RIA, Chapter 7, ''Small Business Impact Analysis'' and accompanying Appendix 5, ''Small Business Data'' (available for review at *http://www.ada.gov*).

5. *Descriptions of the steps taken by the Department to minimize any significant economic impact on small entities consistent with the stated objectives of the ADA, including the reasons for selecting the alternatives adopted in the final rules and for rejecting other significant alternatives.* From the outset of this rulemaking, the Department has been mindful of small entities and has taken numerous steps to minimize the impact of the final rule on small governmental jurisdictions. Several of these steps are summarized below.

As an initial matter, the Department— as a voting member of the Access Board—was extensively involved in the development of the 2004 ADAAG. These guidelines, which are

incorporated into the 2010 Standards, reflect a conscious effort to mitigate any significant economic impact on small entities in several respects. First, one of the express goals of the 2004 ADAAG is harmonization of Federal accessibility guidelines with industry standards and model codes that often form the basis of State and local building codes, thereby minimizing the impact of these guidelines on all covered entities, but especially small entities. Second, the 2004 ADAAG is the product of a 10-year rulemaking effort in which a host of private and public entities, including groups representing government entities, worked cooperatively to develop accessibility guidelines that achieved an appropriate balance between accessibility and cost. For example, as originally recommended by the Access Board's Recreation Access Advisory Committee, all holes on a miniature golf course would be required to be accessible except for sloped surfaces where the ball could not come to rest. *See*, *e.g.,* ''ADA Accessibility Guidelines for Buildings and Facilities—Recreation Facilities and Outdoor Developed Areas,'' Access Board Advance Notice of Proposed Rulemaking, 59 FR 48542 (Sept. 21, 1994). Miniature golf trade groups and facility operators, who are nearly all small businesses or small governmental jurisdictions, expressed significant concern that such requirements would be prohibitively expensive, require additional space, and might fundamentally alter the nature of their courses. *See*, *e.g.,* ''ADA Accessibility Guidelines for Buildings and Facilities—Recreation Facilities,'' Access Board Notice of Proposed Rulemaking, 64 FR 37326 (July 9, 1999). In consideration of such concerns, and after holding informational meetings with miniature golf representatives and persons with disabilities, the Access Board significantly revised the final miniature golf guidelines. The final guidelines not only reduced significantly the number of holes required to be accessible to 50 percent of all holes (with one break in the sequence of consecutive holes permitted), but also added an exemption for carpets used on playing surfaces, modified ramp landing slope and size requirements, and reduced the space required for start of play areas. *See*, *e.g.,* ''ADA Accessibility Guidelines for Buildings and Facilities—Recreation Facilities Final Rule,'' 67 FR 56352, 56375B76 (Sept. 3, 2002) (codified at 36 CFR parts 1190 and 1191).

The Department also published an ANPRM to solicit public input on the adoption of the 2004 ADAAG as the revised Federal accessibility standards implementing titles II and III of the ADA. Among other things, the ANPRM specifically invited comment from small entities regarding the proposed rules' potential economic impact and suggested regulatory alternatives to ameliorate any such impact. *See* ANPRM, 69 FR 58768, 58778-79 (Sept. 30, 2004). The Department received over 900 comments and small entities' interests figured prominently. *See* NPRM, 73 FR 34466, 34468, 34501 (June 17, 2008).

Subsequently, when the Department published its NPRM in June 2008, several regulatory proposals were included to address concerns raised by small businesses and small local governmental jurisdictions in ANPRM comments. First, to mitigate costs to existing facilities, the Department proposed an element-by-element safe harbor that would exempt elements in compliance with applicable technical and scoping requirements in the 1991 Standards from any program accessibility retrofit obligations under the revised title II rules. *Id.* at 34485. While this proposed safe harbor applied to title-II covered entities irrespective of size, it was small governmental jurisdictions that especially stood to benefit since, according to comments from small entities, such jurisdictions are more likely to operate in older buildings and facilities. Additionally, the NPRM sought public input on the inclusion of reduced scoping provisions for certain types of small existing recreational

facilities (*i.e.*, swimming pools, play areas, and saunas). *Id.* at 34485-88.

During the NPRM comment period, the Department engaged in considerable public outreach to small entities. A public hearing was held in Washington, D.C, during which nearly 50 persons testified in person or by phone, including several small business owners. *See Transcript of the Public Hearing on Notices of Proposed Rulemaking* (July 15, 2008), available at *http://www.ada.gov/NPRM2008/ public_ hearing_transcript.htm*. This hearing was also streamed live over the Internet. By the end of the 60-day comment period, the Department had also received nearly 4,500 public comments on the NPRMs, including a significant number of comments reflecting the perspectives of small governmental jurisdictions on a wide range of regulatory issues.

In addition to soliciting input from small entities through the formal process for public comment, the Department also targeted small entities with less formal regulatory discussions, including a Small Business Roundtable convened by the Office of Advocacy and held at the offices of the Small Business Administration in Washington, DC, and an informational question-and-answer session concerning the title II and III NPRMs at the Department of Justice in which business representatives attended in-person and by telephone. These outreach efforts provided the small business community with information on the NPRM proposals being considered by the Department and gave small entities the opportunity to ask questions of the Department and provide feedback.

As a result of the feedback provided by representatives of small business interests on the title II NPRM, the Department was able to assess the impact of various alternatives on small governmental jurisdictions before adopting its final rule and took steps to minimize any significant impact on small entities. Most notably, the final rule retains the element-by-element safe harbor, for which the community of small businesses and small governmental jurisdictions voiced strong support. *See* Appendix A discussion of safe harbor (§ 35.150(b)(2)). The Department believes that this element-by-element safe harbor provision will go a long way toward mitigating the economic impact of the final rule on existing facilities owned or operated by small governmental jurisdictions.

Additional regulatory measures mitigating the economic impact of the final rule on entities covered by title II (including small governmental jurisdictions) include deletion of the proposed requirement for captioning of safety and emergency information on scoreboards at sporting venues, retention of the proposed path of travel safe harbor, and extension of the compliance date of the 2010 Standards as applied to new construction and alterations from 6 months to 18 months after publication of the final rule. *See* Appendix A discussions of captioning at sporting venues (§ 35.160), path of travel safe harbor (§ 35.151(b)(4)(ii)(C)), and accessibility standards compliance dates for new construction and alterations (§ 35.151(c)).

One set of proposed alternative measures that would have potentially provided some cost savings to small public entities—the reduced scoping for certain existing recreational facilities— was not adopted by the Department in the final rule. While these proposals were not specific to small entities, they nonetheless might have mitigated the impact of the final rule for some small governmental jurisdictions that owned or operated existing facilities at which these recreational elements were located. *See* Appendix A discussion of existing facilities. The Department gave careful consideration to how best to insulate small entities from overly burdensome costs under the 2010 Standards for existing small play areas, swimming pools, and saunas, while still ensuring accessible and integrated recreational facilities that are of great importance to persons with disabilities. The Department concluded that the

existing program accessibility standard (coupled with the new general element-by-element safe harbor), rather than specific exemptions for these types of existing facilities, is the most efficacious method by which to protect small governmental jurisdictions.

Once the final rule is promulgated, small entities will also have a wealth of documents to assist them in complying with the 2010 Standards. For example, accompanying the title III final rule in the **Federal Register** is the Department's ''Analysis and Commentary on the 2010 ADA Standards for Accessible Design'' (codified as Appendix B to 28 CFR part 36), which provides a plain language description of the revised scoping and technical requirements in these Standards and provides illustrative figures. The Department also expects to publish guidance specifically tailored to small businesses in the form of a small business compliance guide, as well as to publish technical assistance materials of general interest to all covered entities following promulgation of the final rule. Additionally, the Access Board has published a number of guides that discuss and illustrate application of the 2010 Standards to play areas and various types of recreational facilities.

Executive Order 13132

Executive Order 13132, 64 FR 43255, 3 CFR, 2000 Comp., p. 206, requires executive branch agencies to consider whether a rule will have federalism implications. That is, the rulemaking agency must determine whether the rule is likely to have substantial direct effects on State and local governments, a substantial direct effect on the relationship between the Federal Government and the States and localities, or a substantial direct effect on the distribution of power and responsibilities among the different levels of government. If an agency believes that a rule is likely to have federalism implications, it must consult with State and local elected officials about how to minimize or eliminate the effects.

Title II of the ADA covers State and local government programs, services, and activities and, therefore, clearly has some federalism implications. State and local governments have been subject to the ADA since 1991, and the majority have also been required to comply with the requirements of section 504. Hence, the ADA and the title II regulation are not novel for State and local governments. In its adoption of the 2010 Standards, the Department was mindful of its obligation to meet the objectives of the ADA while also minimizing conflicts between State law and Federal interests.

The 2010 Standards address and minimize federalism concerns. As a member of the Access Board, the Department was privy to substantial feedback from State and local governments throughout the development of the Board's 2004 guidelines. Before those guidelines were finalized as the 2004 ADA/ABA Guidelines, they addressed and minimized federalism concerns expressed by State and local governments during the development process. Because the Department adopted ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines as part of the 2010 Standards, the steps taken in the 2004 ADA/ABA Guidelines to address federalism concerns are reflected in the 2010 Standards.

The Department also solicited and received input from public entities in the September 2004 ANPRM and the June 2008 NPRM. Through the ANPRM and NPRM processes, the Department solicited comments from elected State and local officials and their representative national organizations about the potential federalism implications. The Department received comments addressing whether the ANPRM and NPRM directly affected State and local governments, the relationship between the Federal Government and the States, and the distribution of power and responsibilities among the various levels of government. This rule preempts State laws affecting entities subject to the ADA only to the extent that those laws conflict with the

requirements of the ADA, as set forth in the rule.

Title III of the ADA covers public accommodations and commercial facilities. These facilities are generally subject to regulation by different levels of government, including Federal, State, and local governments. The ADA and the Department's implementing regulations set minimum civil rights protections for individuals with disabilities that in turn may affect the implementation of State and local laws, particularly building codes. The Department's implementing regulations address federalism concerns and mitigate federalism implications, particularly the provisions that streamline the administrative process for State and local governments seeking ADA code certification under title III.

National Technology Transfer and Advancement Act of 1995

The National Technology Transfer and Advancement Act of 1995 (NTTAA) directs that as a general matter, all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, which are private, generally non-profit organizations that develop technical standards or specifications using well-defined procedures that require openness, balanced participation among affected interests and groups, fairness and due process, and an opportunity for appeal, as a means to carry out policy objectives or activities. Public Law 104– 113, section 12(d) (1) (15 U.S.C. 272 note). In addition, the NTTAA directs agencies to consult with voluntary, private sector, consensus standards bodies and requires that agencies participate with such bodies in the development of technical standards when such participation is in the public interest and is compatible with agency and departmental missions, authorities, priorities, and budget resources. *Id.* at section 12(d)(1). The Department, as a member of the Access Board, was an active participant in the lengthy process of developing the 2004 ADAAG, on which the 2010 Standards are based. As part of this update, the Board has made its guidelines more consistent with model building codes, such as the IBC, and industry standards. It coordinated extensively with model code groups and standard-setting bodies throughout the process so that differences could be reconciled. As a result, a historic level of harmonization has been achieved that has brought about improvements to the guidelines, as well as to counterpart provisions in the IBC and key industry standards, including those for accessible facilities issued through the American National Standards Institute.

Plain Language Instructions

The Department makes every effort to promote clarity and transparency in its rulemaking. In any regulation, there is a tension between drafting language that is simple and straightforward and drafting language that gives full effect to issues of legal interpretation. The Department operates a toll-free ADA Information Line (800) 514–0301 (voice); (800) 514–0383 (TTY) that the public is welcome to call at any time to obtain assistance in understanding anything in this rule. If any commenter has suggestions for how the regulation could be written more clearly, please contact Janet L. Blizard, Deputy Chief or Barbara J. Elkin, Attorney Advisor, Disability Rights Section, whose contact information is provided in the introductory section of this rule, entitled, **"FOR FURTHER INFORMATION CONTACT."**

Paperwork Reduction Act

The Paperwork Reduction Act of 1980 (PRA) requires agencies to clear forms and record keeping requirements with OMB before they can be introduced. 44 U.S.C. 3501 *et seq*. This rule does not contain any paperwork or record keeping requirements and does not require clearance under the PRA.

Unfunded Mandates Reform Act

Section 4(2) of the Unfunded Mandates Reform Act of 1995, 2 U.S.C. 1503(2), excludes from coverage under that Act any proposed or final Federal regulation that ''establishes or enforces any statutory rights that prohibit discrimination on the basis of race, color, religion, sex, national origin, age, handicap, or disability.'' Accordingly, this rulemaking is not subject to the provisions of the Unfunded Mandates Reform Act.

List of Subjects for 28 CFR Part 35

Administrative practice and procedure, Buildings and facilities, Civil rights, Communications, Individuals with disabilities, Reporting and recordkeeping requirements, State and local governments.

• By the authority vested in me as Attorney General by law, including 28 U.S.C. 509 and 510, 5 U.S.C. 301, and section 204 of the Americans with Disabilities Act of 1990, Pub. L. 101– 336, 42 U.S.C. 12134, and for the reasons set forth in Appendix A to 28 CFR part 35, chapter I of title 28 of the Code of Federal Regulations shall be amended as follows—

Title II Regulations

Revised Final Title II Regulation with Integrated Text

Department of Justice

This revised title II regulation integrates the Department's new regulatory provisions with the text of the existing title II regulation that was unchanged by the 2010 revisions.

PART 35—NONDISCRIMINATION ON THE BASIS OF DISABILITY IN STATE AND LOCAL GOVERNMENT SERVICES
(as amended by the final rule published on September 15, 2010)

Authority: 5 U.S.C. 301; 28 U.S.C. 509, 510; 42 U.S.C. 12134.

Subpart A—General

§ 35.101 Purpose.

The purpose of this part is to effectuate subtitle A of title II of the Americans with Disabilities Act of 1990 (42 U.S.C. 12131), which prohibits discrimination on the basis of disability by public entities.

§ 35.102 Application.

(a) Except as provided in paragraph (b) of this section, this part applies to all services, programs, and activities provided or made available by public entities.

(b) To the extent that public transportation services, programs, and activities of public entities are covered by subtitle B of title II of the ADA, they are not subject to the requirements of this part.

§ 35.103 Relationship to other laws.

(a) *Rule of interpretation.* Except as otherwise provided in this part, this part shall not be construed to apply a lesser standard than the standards applied under title V of the Rehabilitation Act of 1973 or the regulations issued by Federal agencies pursuant to that title.

(b) *Other laws.* This part does not invalidate or limit the remedies, rights, and procedures of any other Federal laws, or State or local laws (including State common law) that provide greater or equal protection for the rights of individuals with disabilities or individuals associated with them.

§ 35.104 Definitions.

For purposes of this part, the term—

1991 Standards means the requirements set forth in the ADA Standards for Accessible Design, originally published on July 26, 1991, and republished as Appendix D to 28 CFR part 36.

2004 ADAAG means the requirements set forth in appendices B and D to 36 CFR part 1191 (2009).

2010 Standards means the 2010 ADA Standards for Accessible Design, which consist of the 2004 ADAAG and the requirements contained in § 35.151.

Act means the Americans with Disabilities Act (Pub. L. 101-336, 104 Stat. 327, 42 U.S.C. 12101-12213 and 47 U.S.C. 225 and 611).

Assistant Attorney General means the Assistant Attorney General, Civil Rights Division, United States Department of Justice.

Auxiliary aids and services includes—

(1) Qualified interpreters on-site or through video remote interpreting (VRI) services; notetakers; real-time computer-aided transcription services; written materials; exchange of written notes; telephone handset amplifiers; assistive listening devices; assistive listening systems; telephones compatible with hearing aids; closed caption decoders; open and closed captioning, including real-time captioning; voice, text, and video-based telecommunications products and systems, including text telephones (TTYs), videophones, and captioned telephones, or equally effective telecommunications devices; videotext displays; accessible electronic and information technology; or other effective methods of making aurally delivered information available to individuals who are deaf or hard of hearing;

(2) Qualified readers; taped texts; audio recordings; Brailled materials and displays; screen reader software; magnification software; optical readers; secondary auditory programs (SAP); large print materials; accessible electronic and information technology; or other effective methods of making visually delivered materials available to individuals who are blind or have low vision;

(3) Acquisition or modification of equipment or devices; and

(4) Other similar services and actions.

Complete complaint means a written statement that contains the complainant's name and address and describes the public entity's alleged discriminatory action in sufficient detail to inform the agency of the nature and date of the alleged violation of this part. It shall be signed by the complainant or by someone authorized to do so on his or her behalf. Complaints filed on behalf of classes or third parties shall describe or identify (by name, if possible) the alleged victims of discrimination.

Current illegal use of drugs means illegal use of drugs that occurred recently enough to justify a reasonable belief that a person's drug use is current or that continuing use is a real and ongoing problem.

Designated agency means the Federal agency designated under subpart G of this part to oversee compliance activities under this part for particular components of State and local governments.

Direct threat means a significant risk to the health or safety of others that cannot be eliminated by a modification of policies, practices or procedures, or by the provision of auxiliary aids or services as provided in § 35.139.

Disability means, with respect to an individual, a physical or mental impairment that substantially limits one or more of the major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment.

(1)

(i) The phrase *physical or mental impairment* means—

(A) Any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological, musculoskeletal, special sense organs, respiratory (including speech organs), cardiovascular, reproductive, digestive, genitourinary, hemic and lymphatic, skin, and endocrine;

(B) Any mental or psychological disorder such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities.

(ii) The phrase *physical or mental impairment* includes, but is not limited to, such contagious and noncontagious diseases and conditions as orthopedic, visual, speech and hearing impairments, cerebral palsy, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, emotional illness, specific learning disabilities, HIV disease (whether symptomatic or asymptomatic), tuberculosis, drug addiction, and alcoholism.

(iii) The phrase *physical or mental impairment* does not include homosexuality or bisexuality.

(2) The phrase *major life activities* means functions such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working.

(3) The phrase *has a record of such an impairment* means has a history of, or has been misclassified as having, a mental or physical impairment that substantially limits one or more major life activities.

(4) The phrase *is regarded as having an impairment* means—

(i) Has a physical or mental impairment that does not substantially limit major life activities but that is treated by a public entity as constituting such a limitation;

(ii) Has a physical or mental impairment that substantially limits major life activities only as a result of the attitudes of others toward such impairment; or

(iii) Has none of the impairments defined in paragraph (1) of this definition but is treated by a public entity as having such an impairment.

(5) The term *disability* does not include—

(i) Transvestism, transsexualism, pedophilia, exhibitionism, voyeurism, gender identity disorders not resulting from physical impairments, or other sexual behavior disorders;

(ii) Compulsive gambling, kleptomania, or pyromania; or

(iii) Psychoactive substance use disorders resulting from current illegal use of drugs.

Drug means a controlled substance, as defined in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812).

Existing facility means a facility in existence on any given date, without regard to whether the facility may also be considered newly constructed or altered under this part.

Facility means all or any portion of buildings, structures, sites, complexes, equipment, rolling stock or other conveyances, roads, walks, passageways, parking lots, or other real or personal property, including the site where the building, property, structure, or equipment is located.

Historic preservation programs means programs conducted by a public entity that have preservation of historic properties as a primary purpose.

Historic properties means those properties that are listed or eligible for listing in the National Register of Historic Places or properties designated as historic under State or local law.

Housing at a place of education means housing operated by or on behalf of an elementary, secondary, undergraduate, or postgraduate school, or other place of education, including dormitories, suites, apartments, or other places of residence.

Illegal use of drugs means the use of one or more drugs, the possession or distribution of which is unlawful under the Controlled Substances Act (21 U.S.C. 812). The term illegal use of drugs does not include the use of a drug taken under supervision by a licensed health care professional, or other uses authorized by the Controlled Substances Act or other provisions of Federal law.

Individual with a disability means a person who has a disability. The term individual with a disability does not include an individual who is currently engaging in the illegal use of drugs, when the public entity acts on the basis of such use.

Other power-driven mobility device means any mobility device powered by batteries, fuel, or other engines—whether or not designed primarily for use by individuals with mobility disabilities—that is used by individuals with mobility disabilities for the purpose of locomotion, including golf cars, electronic personal assistance mobility devices (EPAMDs), such as the Segway® PT, or any mobility device designed to operate in areas without defined pedestrian routes, but that is not a wheelchair within the meaning of this section. This

definition does not apply to Federal wilderness areas; wheelchairs in such areas are defined in section 508(c)(2) of the ADA, 42 U.S.C. 12207(c)(2).

Public entity means—

(1) Any State or local government;

(2) Any department, agency, special purpose district, or other instrumentality of a State or States or local government; and

(3) The National Railroad Passenger Corporation, and any commuter authority (as defined in section 103(8) of the Rail Passenger Service Act).

Qualified individual with a disability means an individual with a disability who, with or without reasonable modifications to rules, policies, or practices, the removal of architectural, communication, or transportation barriers, or the provision of auxiliary aids and services, meets the essential eligibility requirements for the receipt of services or the participation in programs or activities provided by a public entity.

Qualified interpreter means an interpreter who, via a video remote interpreting (VRI) service or an on-site appearance, is able to interpret effectively, accurately, and impartially, both receptively and expressively, using any necessary specialized vocabulary. Qualified interpreters include, for example, sign language interpreters, oral transliterators, and cued-language transliterators.

Qualified reader means a person who is able to read effectively, accurately, and impartially using any necessary specialized vocabulary.

Section 504 means section 504 of the Rehabilitation Act of 1973 (Pub. L. 93-112, 87 Stat. 394 (29 U.S.C. 794), as amended.

Service animal means any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability. Other species of animals, whether wild or domestic, trained or untrained, are not service animals for the purposes of this definition. The work or tasks performed by a service animal must be directly related to the individual's disability. Examples of work or tasks include, but are not limited to, assisting individuals who are blind or have low vision with navigation and other tasks, alerting individuals who are deaf or hard of hearing to the presence of people or sounds, providing non-violent protection or rescue work, pulling a wheelchair, assisting an individual during a seizure, alerting individuals to the presence of allergens, retrieving items such as medicine or the telephone, providing physical support and assistance with balance and stability to individuals with mobility disabilities, and helping persons with psychiatric and neurological disabilities by preventing or interrupting impulsive or destructive behaviors. The crime deterrent effects of an animal's presence and the provision of emotional support, well-being, comfort, or companionship do not constitute work or tasks for the purposes of this definition.

State means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, the Trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands.

Video remote interpreting (VRI) service means an interpreting service that uses video conference technology over dedicated lines or wireless technology offering high-speed, wide-bandwidth video connection that delivers high-quality video images as provided in § 35.160(d).

Wheelchair means a manually-operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor, or of both indoor and outdoor locomotion. This definition does not apply to Federal wilderness areas; wheelchairs in such areas are defined in section 508(c)(2) of the ADA, 42 U.S.C. 12207 (c)(2).

§ 35.105 Self-evaluation.

(a) A public entity shall, within one year of the effective date of this part, evaluate its current services, policies, and practices, and the effects thereof, that do not or may not meet the requirements of this part and, to the extent modification of any such services, policies, and practices is required, the public entity shall proceed to make the necessary modifications.

(b) A public entity shall provide an opportunity to interested persons, including individuals with disabilities or organizations representing individuals with disabilities, to participate in the self-evaluation process by submitting comments.

(c) A public entity that employs 50 or more persons shall, for at least three years following completion of the self-evaluation, maintain on file and make available for public inspection:

(1) A list of the interested persons consulted;

(2) A description of areas examined and any problems identified; and

(3) A description of any modifications made.

(d) If a public entity has already complied with the self-evaluation requirement of a regulation implementing section 504 of the Rehabilitation Act of 1973, then the requirements of this section shall apply only to those policies and practices that were not included in the previous self-evaluation.

§ 35.106 Notice.

A public entity shall make available to applicants, participants, beneficiaries, and other interested persons information regarding the provisions of this part and its applicability to the services, programs, or activities of the public entity, and make such information available to them in such manner as the head of the entity finds necessary to apprise such persons of the protections against discrimination assured them by the Act and this part.

§ 35.107 Designation of responsible employee and adoption of grievance procedures.

(a) *Designation of responsible employee.* A public entity that employs 50 or more persons shall designate at least one employee to coordinate its efforts to comply with and carry out its responsibilities under this part, including any investigation of any complaint communicated to it alleging its noncompliance with this part or alleging any actions that would be prohibited by this part. The public entity shall make available to all interested individuals the name, office address, and telephone number of the employee or employees designated pursuant to this paragraph.

(b) *Complaint procedure.* A public entity that employs 50 or more persons shall adopt and publish grievance procedures providing for prompt and equitable resolution of complaints alleging any action that would be prohibited by this part.

§§ 35.108—35.129 [Reserved]

Subpart B—General Requirements

§ 35.130 General prohibitions against discrimination.

(a) No qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any public entity.

(b)

(1) A public entity, in providing any aid, benefit, or service, may not, directly or through

contractual, licensing, or other arrangements, on the basis of disability—

(i) Deny a qualified individual with a disability the opportunity to participate in or benefit from the aid, benefit, or service;

(ii) Afford a qualified individual with a disability an opportunity to participate in or benefit from the aid, benefit, or service that is not equal to that afforded others;

(iii) Provide a qualified individual with a disability with an aid, benefit, or service that is not as effective in affording equal opportunity to obtain the same result, to gain the same benefit, or to reach the same level of achievement as that provided to others;

(iv) Provide different or separate aids, benefits, or services to individuals with disabilities or to any class of individuals with disabilities than is provided to others unless such action is necessary to provide qualified individuals with disabilities with aids, benefits, or services that are as effective as those provided to others;

(v) Aid or perpetuate discrimination against a qualified individual with a disability by providing significant assistance to an agency, organization, or person that discriminates on the basis of disability in providing any aid, benefit, or service to beneficiaries of the public entity's program;

(vi) Deny a qualified individual with a disability the opportunity to participate as a member of planning or advisory boards;

(vii) Otherwise limit a qualified individual with a disability in the enjoyment of any right, privilege, advantage, or opportunity enjoyed by others receiving the aid, benefit, or service.

(2) A public entity may not deny a qualified individual with a disability the opportunity to participate in services, programs, or activities that are not separate or different, despite the existence of permissibly separate or different programs or activities.

(3) A public entity may not, directly or through contractual or other arrangements, utilize criteria or methods of administration—

(i) That have the effect of subjecting qualified individuals with disabilities to discrimination on the basis of disability;

(ii) That have the purpose or effect of defeating or substantially impairing accomplishment of the objectives of the public entity's program with respect to individuals with disabilities; or

(iii) That perpetuate the discrimination of another public entity if both public entities are subject to common administrative control or are agencies of the same State.

(4) A public entity may not, in determining the site or location of a facility, make selections—

(i) That have the effect of excluding individuals with disabilities from, denying them the benefits of, or otherwise subjecting them to discrimination; or

(ii) That have the purpose or effect of defeating or substantially impairing the accomplishment of the objectives of the service, program, or activity with respect to individuals with disabilities.

(5) A public entity, in the selection of procurement contractors, may not use criteria that subject qualified individuals with disabilities to discrimination on the basis of disability.

(6) A public entity may not administer a licensing or certification program in a manner that subjects qualified individuals with disabilities to discrimination on the basis of disability, nor may a public entity establish requirements for the programs or activities of licensees or certified entities that subject qualified individuals with disabilities to discrimination on the basis of disability. The programs or activities of entities that are licensed or certified by a public entity are not, themselves, covered by this part.

(7) A public entity shall make reasonable modifications in policies, practices, or

procedures when the modifications are necessary to avoid discrimination on the basis of disability, unless the public entity can demonstrate that making the modifications would fundamentally alter the nature of the service, program, or activity.

(8) A public entity shall not impose or apply eligibility criteria that screen out or tend to screen out an individual with a disability or any class of individuals with disabilities from fully and equally enjoying any service, program, or activity, unless such criteria can be shown to be necessary for the provision of the service, program, or activity being offered.

(c) Nothing in this part prohibits a public entity from providing benefits, services, or advantages to individuals with disabilities, or to a particular class of individuals with disabilities beyond those required by this part.

(d) A public entity shall administer services, programs, and activities in the most integrated setting appropriate to the needs of qualified individuals with disabilities.

(e)

(1) Nothing in this part shall be construed to require an individual with a disability to accept an accommodation, aid, service, opportunity, or benefit provided under the ADA or this part which such individual chooses not to accept.

(2) Nothing in the Act or this part authorizes the representative or guardian of an individual with a disability to decline food, water, medical treatment, or medical services for that individual.

(f) A public entity may not place a surcharge on a particular individual with a disability or any group of individuals with disabilities to cover the costs of measures, such as the provision of auxiliary aids or program accessibility, that are required to provide that individual or group with the nondiscriminatory treatment required by the Act or this part.

(g) A public entity shall not exclude or otherwise deny equal services, programs, or activities to an individual or entity because of the known disability of an individual with whom the individual or entity is known to have a relationship or association.

(h) A public entity may impose legitimate safety requirements necessary for the safe operation of its services, programs, or activities. However, the public entity must ensure that its safety requirements are based on actual risks, not on mere speculation, stereotypes, or generalizations about individuals with disabilities.

§ 35.131 Illegal use of drugs.

(a) General.

(1) Except as provided in paragraph (b) of this section, this part does not prohibit discrimination against an individual based on that individual's current illegal use of drugs.

(2) A public entity shall not discriminate on the basis of illegal use of drugs against an individual who is not engaging in current illegal use of drugs and who—

(i) Has successfully completed a supervised drug rehabilitation program or has otherwise been rehabilitated successfully;

(ii) Is participating in a supervised rehabilitation program; or

(iii) Is erroneously regarded as engaging in such use.

(b) *Health and drug rehabilitation services.*

(1) A public entity shall not deny health services, or services provided in connection with drug rehabilitation, to an individual on the basis of that individual's current illegal use of drugs, if the individual is otherwise entitled to such services.

(2) A drug rehabilitation or treatment program may deny participation to individuals who engage in illegal use of drugs while they are in the program.

(c) *Drug testing*.

(1) This part does not prohibit a public entity from adopting or administering reasonable policies or procedures, including but not limited

to drug testing, designed to ensure that an individual who formerly engaged in the illegal use of drugs is not now engaging in current illegal use of drugs.

(2) Nothing in paragraph (c) of this section shall be construed to encourage, prohibit, restrict, or authorize the conduct of testing for the illegal use of drugs.

§ 35.132 Smoking.

This part does not preclude the prohibition of, or the imposition of restrictions on, smoking in transportation covered by this part.

§ 35.133 Maintenance of accessible features.

(a) A public entity shall maintain in operable working condition those features of facilities and equipment that are required to be readily accessible to and usable by persons with disabilities by the Act or this part.

(b) This section does not prohibit isolated or temporary interruptions in service or access due to maintenance or repairs.

(c) If the 2010 Standards reduce the technical requirements or the number of required accessible elements below the number required by the 1991 Standards, the technical requirements or the number of accessible elements in a facility subject to this part may be reduced in accordance with the requirements of the 2010 Standards.

§ 35.134 Retaliation or coercion.

(a) No private or public entity shall discriminate against any individual because that individual has opposed any act or practice made unlawful by this part, or because that individual made a charge, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the Act or this part.

(b) No private or public entity shall coerce, intimidate, threaten, or interfere with any individual in the exercise or enjoyment of, or on account of his or her having exercised or enjoyed, or on account of his or her having aided or encouraged any other individual in the exercise or enjoyment of, any right granted or protected by the Act or this part.

§ 35.135 Personal devices and services.

This part does not require a public entity to provide to individuals with disabilities personal devices, such as wheelchairs; individually prescribed devices, such as prescription eyeglasses or hearing aids; readers for personal use or study; or services of a personal nature including assistance in eating, toileting, or dressing.

§ 35.136 Service animals.

(a) *General*. Generally, a public entity shall modify its policies, practices, or procedures to permit the use of a service animal by an individual with a disability.

(b) *Exceptions*. A public entity may ask an individual with a disability to remove a service animal from the premises if—

(1) The animal is out of control and the animal's handler does not take effective action to control it; or

(2) The animal is not housebroken.

(c) *If an animal is properly excluded*. If a public entity properly excludes a service animal under § 35.136(b), it shall give the individual with a disability the opportunity to participate in the service, program, or activity without having the service animal on the premises.

(d) *Animal under handler's control.* A service animal shall be under the control of its handler. A service animal shall have a harness, leash, or other tether, unless either the handler is unable because of a disability to use a harness, leash, or other tether, or the use of a harness, leash, or other tether would interfere with the service animal's safe, effective performance of work or tasks, in which case the service animal must be otherwise under the handler's control (*e.g.*, voice control, signals, or other effective means).

(e) *Care or supervision*. A public entity is not responsible for the care or supervision of a service animal.

(f) *Inquiries*. A public entity shall not ask about the nature or extent of a person's disability, but may make two inquiries to determine whether an animal qualifies as a service animal. A public entity may ask if the animal is required because of a disability and what work or task the animal has been trained to perform. A public entity shall not require documentation, such as proof that the animal has been certified, trained, or licensed as a service animal. Generally, a public entity may not make these inquiries about a service animal when it is readily apparent that an animal is trained to do work or perform tasks for an individual with a disability (*e.g.*, the dog is observed guiding an individual who is blind or has low vision, pulling a person's wheelchair, or providing assistance with stability or balance to an individual with an observable mobility disability).

(g) *Access to areas of a public entity*. Individuals with disabilities shall be permitted to be accompanied by their service animals in all areas of a public entity's facilities where members of the public, participants in services, programs or activities, or invitees, as relevant, are allowed to go.

(h) *Surcharges*. A public entity shall not ask or require an individual with a disability to pay a surcharge, even if people accompanied by pets are required to pay fees, or to comply with other requirements generally not applicable to people without pets. If a public entity normally charges individuals for the damage they cause, an individual with a disability may be charged for damage caused by his or her service animal.

(i) *Miniature horses*.

(1) *Reasonable modifications*. A public entity shall make reasonable modifications in policies, practices, or procedures to permit the use of a miniature horse by an individual with a disability if the miniature horse has been individually trained to do work or perform tasks for the benefit of the individual with a disability.

(2) *Assessment factors*. In determining whether reasonable modifications in policies, practices, or procedures can be made to allow a miniature horse into a specific facility, a public entity shall consider—

(i) The type, size, and weight of the miniature horse and whether the facility can accommodate these features;

(ii) Whether the handler has sufficient control of the miniature horse;

(iii) Whether the miniature horse is housebroken; and

(iv) Whether the miniature horse's presence in a specific facility compromises legitimate safety requirements that are necessary for safe operation.

(3) *Other requirements*. Paragraphs 35.136 (c) through (h) of this section, which apply to service animals, shall also apply to miniature horses.

§ 35.137 Mobility devices.

(a) *Use of wheelchairs and manually-powered mobility aids*. A public entity shall permit individuals with mobility disabilities to use wheelchairs and manually-powered mobility aids, such as walkers, crutches, canes, braces, or other similar devices designed for use by individuals with mobility disabilities in any areas open to pedestrian use.

(b)

(1) *Use of other power-driven mobility devices.* A public entity shall make reasonable modifications in its policies, practices, or procedures to permit the use of other power-driven mobility devices by individuals with mobility disabilities, unless the public entity can demonstrate that the class of other power-driven mobility devices cannot be operated in accordance with legitimate safety requirements that the public entity has adopted pursuant to § 35.130(h).

(2) *Assessment factors*. In determining whether a particular other power-driven mobility device can be allowed in a specific facility as a reasonable modification under paragraph (b)(1) of this section, a public entity shall consider—

(i) The type, size, weight, dimensions, and speed of the device;

(ii) The facility's volume of pedestrian traffic (which may vary at different times of the day, week, month, or year);

(iii) The facility's design and operational characteristics (*e.g.*, whether its service, program, or activity is conducted indoors, its square footage, the density and placement of stationary devices, and the availability of storage for the device, if requested by the user);

(iv) Whether legitimate safety requirements can be established to permit the safe operation of the other power-driven mobility device in the specific facility; and

(v) Whether the use of the other power-driven mobility device creates a substantial risk of serious harm to the immediate environment or natural or cultural resources, or poses a conflict with Federal land management laws and regulations.

(c)

(1) *Inquiry about disability*. A public entity shall not ask an individual using a wheelchair or other power-driven mobility device questions about the nature and extent of the individual's disability.

(2) *Inquiry into use of other power-driven mobility device.* A public entity may ask a person using an other power-driven mobility device to provide a credible assurance that the mobility device is required because of the person's disability. A public entity that permits the use of an other power-driven mobility device by an individual with a mobility disability shall accept the presentation of a valid, State-issued, disability parking placard or card, or other State-issued proof of disability as a credible assurance that the use of the other power-driven mobility device is for the individual's mobility disability. In lieu of a valid, State-issued disability parking placard or card, or State-issued proof of disability, a public entity shall accept as a credible assurance a verbal representation, not contradicted by observable fact, that the other power-driven mobility device is being used for a mobility disability. A "valid" disability placard or card is one that is presented by the individual to whom it was issued and is otherwise in compliance with the State of issuance's requirements for disability placards or cards.

§ 35.138 Ticketing.

(a)

(1) For the purposes of this section, "accessible seating" is defined as wheelchair spaces and companion seats that comply with sections 221 and 802 of the 2010 Standards along with any other seats required to be offered for sale to the individual with a disability pursuant to paragraph (d) of this section.

(2) *Ticket sales*. A public entity that sells tickets for a single event or series of events shall modify its policies, practices, or procedures to ensure that individuals with disabilities have an equal opportunity to purchase tickets for accessible seating—

(i) During the same hours;

(ii) During the same stages of ticket sales, including, but not limited to, pre-sales, promotions, lotteries, wait-lists, and general sales;

(iii) Through the same methods of distribution;

(iv) In the same types and numbers of ticketing sales outlets, including telephone service, in-person ticket sales at the facility, or third-party ticketing services, as other patrons; and

(v) Under the same terms and conditions as other tickets sold for the same event or series of events.

(b) *Identification of available accessible seating*. A public entity that sells or distributes tickets for a single event or series of events shall, upon inquiry—

(1) Inform individuals with disabilities, their companions, and third parties purchasing tickets for accessible seating on behalf of individuals with disabilities of the locations of all unsold or otherwise available accessible seating for any ticketed event or events at the facility;

(2) Identify and describe the features of available accessible seating in enough detail to reasonably permit an individual with a disability to assess independently whether a given accessible seating location meets his or her accessibility needs; and

(3) Provide materials, such as seating maps, plans, brochures, pricing charts, or other information, that identify accessible seating and information relevant thereto with the same text or visual representations as other seats, if such materials are provided to the general public.

(c) *Ticket prices*. The price of tickets for accessible seating for a single event or series of events shall not be set higher than the price for other tickets in the same seating section for the same event or series of events. Tickets for accessible seating must be made available at all price levels for every event or series of events. If tickets for accessible seating at a particular price level are not available because of inaccessible features, then the percentage of tickets for accessible seating that should have been available at that price level (determined by the ratio of the total number of tickets at that price level to the total number of tickets in the assembly area) shall be offered for purchase, at that price level, in a nearby or similar accessible location.

(d) *Purchasing multiple tickets.*

(1) *General.* For each ticket for a wheelchair space purchased by an individual with a disability or a third-party purchasing such a ticket at his or her request, a public entity shall make available for purchase three additional tickets for seats in the same row that are contiguous with the wheelchair space, provided that at the time of purchase there are three such seats available. A public entity is not required to provide more than three contiguous seats for each wheelchair space. Such seats may include wheelchair spaces.

(2) *Insufficient additional contiguous seats available*. If patrons are allowed to purchase at least four tickets, and there are fewer than three such additional contiguous seat tickets available for purchase, a public entity shall offer the next highest number of such seat tickets available for purchase and shall make up the difference by offering tickets for sale for seats that are as close as possible to the accessible seats.

(3) *Sales limited to less than four tickets.* If a public entity limits sales of tickets to fewer than four seats per patron, then the public entity is only obligated to offer as many seats to patrons with disabilities, including the ticket for the wheelchair space, as it would offer to patrons without disabilities.

(4) *Maximum number of tickets patrons may purchase exceeds four*. If patrons are allowed to purchase more than four tickets, a public entity shall allow patrons with disabilities to purchase up to the same number of tickets, including the ticket for the wheelchair space.

(5) *Group sales*. If a group includes one or more individuals who need to use accessible seating because of a mobility disability or because their disability requires the use of the accessible features that are provided in accessible seating, the group shall be placed in a seating area with accessible seating so that, if possible, the group can sit together. If it is necessary to divide the group, it should be divided so that the individuals in the group

who use wheelchairs are not isolated from their group.

(e) *Hold-and-release of tickets for accessible seating*.

(1) *Tickets for accessible seating may be released for sale in certain limited circumstances*. A public entity may release unsold tickets for accessible seating for sale to individuals without disabilities for their own use for a single event or series of events only under the following circumstances—

(i) When all non-accessible tickets (excluding luxury boxes, club boxes, or suites) have been sold;

(ii) When all non-accessible tickets in a designated seating area have been sold and the tickets for accessible seating are being released in the same designated area; or

(iii) When all non-accessible tickets in a designated price category have been sold and the tickets for accessible seating are being released within the same designated price category.

(2) *No requirement to release accessible tickets*. Nothing in this paragraph requires a facility to release tickets for accessible seating to individuals without disabilities for their own use.

(3) *Release of series-of-events tickets on a series-of-events basis.*

(i) Series-of-events tickets sell-out when no ownership rights are attached. When series-of-events tickets are sold out and a public entity releases and sells accessible seating to individuals without disabilities for a series of events, the public entity shall establish a process that prevents the automatic reassignment of the accessible seating to such ticket holders for future seasons, future years, or future series so that individuals with disabilities who require the features of accessible seating and who become newly eligible to purchase tickets when these series-of-events tickets are available for purchase have an opportunity to do so.

(ii) *Series-of-events tickets when ownership rights are attached.* When series-of-events tickets with an ownership right in accessible seating areas are forfeited or otherwise returned to a public entity, the public entity shall make reasonable modifications in its policies, practices, or procedures to afford individuals with mobility disabilities or individuals with disabilities that require the features of accessible seating an opportunity to purchase such tickets in accessible seating areas.

(f) *Ticket transfer.* Individuals with disabilities who hold tickets for accessible seating shall be permitted to transfer tickets to third parties under the same terms and conditions and to the same extent as other spectators holding the same type of tickets, whether they are for a single event or series of events.

(g) *Secondary ticket market.*

(1) A public entity shall modify its policies, practices, or procedures to ensure that an individual with a disability may use a ticket acquired in the secondary ticket market under the same terms and conditions as other individuals who hold a ticket acquired in the secondary ticket market for the same event or series of events.

(2) If an individual with a disability acquires a ticket or series of tickets to an inaccessible seat through the secondary market, a public entity shall make reasonable modifications to its policies, practices, or procedures to allow the individual to exchange his ticket for one to an accessible seat in a comparable location if accessible seating is vacant at the time the individual presents the ticket to the public entity.

(h) *Prevention of fraud in purchase of tickets for accessible seating*. A public entity may not require proof of disability, including, for example, a doctor's note, before selling tickets for accessible seating.

(1) *Single-event tickets*. For the sale of single-event tickets, it is permissible to inquire whether the individual purchasing the tickets for accessible seating has a mobility disability or a disability that requires the use of the accessible features that are provided in accessible seating, or is purchasing the tickets for an individual who has a mobility disability or a disability that requires the use of the accessible features that are provided in the accessible seating.

(2) *Series-of-events tickets.* For series-of-events tickets, it is permissible to ask the individual purchasing the tickets for accessible seating to attest in writing that the accessible seating is for a person who has a mobility disability or a disability that requires the use of the accessible features that are provided in the accessible seating.

(3) *Investigation of fraud.* A public entity may investigate the potential misuse of accessible seating where there is good cause to believe that such seating has been purchased fraudulently.

§ 35.139 Direct threat.

(a) This part does not require a public entity to permit an individual to participate in or benefit from the services, programs, or activities of that public entity when that individual poses a direct threat to the health or safety of others.

(b) In determining whether an individual poses a direct threat to the health or safety of others, a public entity must make an individualized assessment, based on reasonable judgment that relies on current medical knowledge or on the best available objective evidence, to ascertain: the nature, duration, and severity of the risk; the probability that the potential injury will actually occur; and whether reasonable modifications of policies, practices, or procedures or the provision of auxiliary aids or services will mitigate the risk.

Subpart C—Employment

§ 35.140 Employment discrimination prohibited.

(a) No qualified individual with a disability shall, on the basis of disability, be subjected to discrimination in employment under any service, program, or activity conducted by a public entity.

(b)

(1) For purposes of this part, the requirements of title I of the Act, as established by the regulations of the Equal Employment Opportunity Commission in 29 CFR part 1630, apply to employment in any service, program, or activity conducted by a public entity if that public entity is also subject to the jurisdiction of title I.

(2) For the purposes of this part, the requirements of section 504 of the Rehabilitation Act of 1973, as established by the regulations of the Department of Justice in 28 CFR part 41, as those requirements pertain to employment, apply to employment in any service, program, or activity conducted by a public entity if that public entity is not also subject to the jurisdiction of title I.

§§ 35.141—35.148 [Reserved]

Subpart D—Program Accessibility

§ 35.149 Discrimination prohibited.

Except as otherwise provided in § 35.150, no qualified individual with a disability shall, because a public entity's facilities are inaccessible to or unusable by individuals with disabilities, be excluded from participation in, or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any public entity.

§ 35.150 Existing facilities.

(a) *General.* A public entity shall operate each service, program, or activity so that the service, program, or activity, when viewed in its entirety,

is readily accessible to and usable by individuals with disabilities. This paragraph does not—

(1) Necessarily require a public entity to make each of its existing facilities accessible to and usable by individuals with disabilities;

(2) Require a public entity to take any action that would threaten or destroy the historic significance of an historic property; or

(3) Require a public entity to take any action that it can demonstrate would result in a fundamental alteration in the nature of a service, program, or activity or in undue financial and administrative burdens. In those circumstances where personnel of the public entity believe that the proposed action would fundamentally alter the service, program, or activity or would result in undue financial and administrative burdens, a public entity has the burden of proving that compliance with §35.150(a) of this part would result in such alteration or burdens. The decision that compliance would result in such alteration or burdens must be made by the head of a public entity or his or her designee after considering all resources available for use in the funding and operation of the service, program, or activity, and must be accompanied by a written statement of the reasons for reaching that conclusion. If an action would result in such an alteration or such burdens, a public entity shall take any other action that would not result in such an alteration or such burdens but would nevertheless ensure that individuals with disabilities receive the benefits or services provided by the public entity.

(b) *Methods.*

(1) *General*. A public entity may comply with the requirements of this section through such means as redesign or acquisition of equipment, reassignment of services to accessible buildings, assignment of aides to beneficiaries, home visits, delivery of services at alternate accessible sites, alteration of existing facilities and construction of new facilities, use of accessible rolling stock or other conveyances, or any other methods that result in making its services, programs, or activities readily accessible to and usable by individuals with disabilities. A public entity is not required to make structural changes in existing facilities where other methods are effective in achieving compliance with this section. A public entity, in making alterations to existing buildings, shall meet the accessibility requirements of § 35.151. In choosing among available methods for meeting the requirements of this section, a public entity shall give priority to those methods that offer services, programs, and activities to qualified individuals with disabilities in the most integrated setting appropriate.

(2)

(i) *Safe harbor.* Elements that have not been altered in existing facilities on or after March 15, 2012, and that comply with the corresponding technical and scoping specifications for those elements in either the 1991 Standards or in the Uniform Federal Accessibility Standards (UFAS), Appendix A to 41 CFR part 101–19.6 (July 1, 2002 ed.), 49 FR 31528, app. A (Aug. 7, 1984) are not required to be modified in order to comply with the requirements set forth in the 2010 Standards.

(ii) The safe harbor provided in § 35.150(b)(2)(i) does not apply to those elements in existing facilities that are subject to supplemental requirements (*i.e.*, elements for which there are neither technical nor scoping specifications in the 1991 Standards). Elements in the 2010 Standards not eligible for the element-by-element safe harbor are identified as follows—

(A) *Residential facilities dwelling units*, sections 233 and 809.

(B) *Amusement rides*, sections 234 and 1002; 206.2.9; 216.12.

(C) *Recreational boating facilities*, sections 235 and 1003; 206.2.10.

(D) *Exercise machines and equipment*,

sections 236 and 1004; 206.2.13.

(E) *Fishing piers and platforms*, sections 237 and 1005; 206.2.14.

(F) *Golf facilities*, sections 238 and 1006; 206.2.15.

(G) *Miniature golf facilities*, sections 239 and 1007; 206.2.16.

(H) *Play areas*, sections 240 and 1008; 206.2.17.

(I) *Saunas and steam rooms*, sections 241 and 612.

(J) *Swimming pools, wading pools, and spas*, sections 242 and 1009.

(K) *Shooting facilities with firing positions*, sections 243 and 1010.

(L) *Miscellaneous*.

(1) Team or player seating, section 221.2.1.4.

(2) Accessible route to bowling lanes, section. 206.2.11.

(3) Accessible route in court sports facilities, section 206.2.12.

(3) *Historic preservation programs*. In meeting the requirements of § 35.150(a) in historic preservation programs, a public entity shall give priority to methods that provide physical access to individuals with disabilities. In cases where a physical alteration to an historic property is not required because of paragraph (a)(2) or (a)(3) of this section, alternative methods of achieving program accessibility include—

(i) Using audio-visual materials and devices to depict those portions of an historic property that cannot otherwise be made accessible;

(ii) Assigning persons to guide individuals with handicaps into or through portions of historic properties that cannot otherwise be made accessible; or

(iii) Adopting other innovative methods.

(c) *Time period for compliance*. Where structural changes in facilities are undertaken to comply with the obligations established under this section, such changes shall be made within three years of January 26, 1992, but in any event as expeditiously as possible.

(d) *Transition plan*.

(1) In the event that structural changes to facilities will be undertaken to achieve program accessibility, a public entity that employs 50 or more persons shall develop, within six months of January 26, 1992, a transition plan setting forth the steps necessary to complete such changes. A public entity shall provide an opportunity to interested persons, including individuals with disabilities or organizations representing individuals with disabilities, to participate in the development of the transition plan by submitting comments. A copy of the transition plan shall be made available for public inspection.

(2) If a public entity has responsibility or authority over streets, roads, or walkways, its transition plan shall include a schedule for providing curb ramps or other sloped areas where pedestrian walks cross curbs, giving priority to walkways serving entities covered by the Act, including State and local government offices and facilities, transportation, places of public accommodation, and employers, followed by walkways serving other areas.

(3) The plan shall, at a minimum—

(i) Identify physical obstacles in the public entity's facilities that limit the accessibility of its programs or activities to individuals with disabilities;

(ii) Describe in detail the methods that will be used to make the facilities accessible;

(iii) Specify the schedule for taking the steps necessary to achieve compliance with this section and, if the time period of the transition plan is longer than one year, identify steps that will be taken during each year of the transition period; and

(iv) Indicate the official responsible for implementation of the plan.

(4) If a public entity has already complied

with the transition plan requirement of a Federal agency regulation implementing section 504 of the Rehabilitation Act of 1973, then the requirements of this paragraph (d) shall apply only to those policies and practices that were not included in the previous transition plan.

§ 35.151 New construction and alterations

(a) *Design and construction*.

(1) Each facility or part of a facility constructed by, on behalf of, or for the use of a public entity shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by individuals with disabilities, if the construction was commenced after January 26, 1992.

(2) *Exception for structural impracticability*.

(i) Full compliance with the requirements of this section is not required where a public entity can demonstrate that it is structurally impracticable to meet the requirements. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features.

(ii) If full compliance with this section would be structurally impracticable, compliance with this section is required to the extent that it is not structurally impracticable. In that case, any portion of the facility that can be made accessible shall be made accessible to the extent that it is not structurally impracticable.

(iii) If providing accessibility in conformance with this section to individuals with certain disabilities (*e.g.,* those who use wheelchairs) would be structurally impracticable, accessibility shall nonetheless be ensured to persons with other types of disabilities, (*e.g.,* those who use crutches or who have sight, hearing, or mental impairments) in accordance with this section.

(b) *Alterations*.

(1) Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992.

(2) The path of travel requirements of § 35.151(b)(4) shall apply only to alterations undertaken solely for purposes other than to meet the program accessibility requirements of § 35.150.

(3)

(i) Alterations to historic properties shall comply, to the maximum extent feasible, with the provisions applicable to historic properties in the design standards specified in § 35.151(c).

(ii) If it is not feasible to provide physical access to an historic property in a manner that will not threaten or destroy the historic significance of the building or facility, alternative methods of access shall be provided pursuant to the requirements of § 35.150.

(4) *Path of travel*. An alteration that affects or could affect the usability of or access to an area of a facility that contains a primary function shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the altered area and the restrooms, telephones, and drinking fountains serving the altered area are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, unless the cost and scope of such alterations is disproportionate to the cost of the overall alteration.

(i) *Primary function*. A "primary function" is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the dining area of a cafeteria, the meeting rooms

in a conference center, as well as offices and other work areas in which the activities of the public entity using the facility are carried out.

(A) Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, and corridors are not areas containing a primary function. Restrooms are not areas containing a primary function unless the provision of restrooms is a primary purpose of the area, *e.g.,* in highway rest stops.

(B) For the purposes of this section, alterations to windows, hardware, controls, electrical outlets, and signage shall not be deemed to be alterations that affect the usability of or access to an area containing a primary function.

(ii) A "path of travel" includes a continuous, unobstructed way of pedestrian passage by means of which the altered area may be approached, entered, and exited, and which connects the altered area with an exterior approach (including sidewalks, streets, and parking areas), an entrance to the facility, and other parts of the facility.

(A) An accessible path of travel may consist of walks and sidewalks, curb ramps and other interior or exterior pedestrian ramps; clear floor paths through lobbies, corridors, rooms, and other improved areas; parking access aisles; elevators and lifts; or a combination of these elements.

(B) For the purposes of this section, the term "path of travel" also includes the restrooms, telephones, and drinking fountains serving the altered area.

(C) *Safe harbor*. If a public entity has constructed or altered required elements of a path of travel in accordance with the specifications in either the 1991 Standards or the Uniform Federal Accessibility Standards before March 15, 2012, the public entity is not required to retrofit such elements to reflect incremental changes in the 2010 Standards solely because of an alteration to a primary function area served by that path of travel.

(iii) *Disproportionality*.

(A) Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20 % of the cost of the alteration to the primary function area.

(B) Costs that may be counted as expenditures required to provide an accessible path of travel may include:

(1) Costs associated with providing an accessible entrance and an accessible route to the altered area, for example, the cost of widening doorways or installing ramps;

(2) Costs associated with making restrooms accessible, such as installing grab bars, enlarging toilet stalls, insulating pipes, or installing accessible faucet controls;

(3) Costs associated with providing accessible telephones, such as relocating the telephone to an accessible height, installing amplification devices, or installing a text telephone (TTY); and

(4) Costs associated with relocating an inaccessible drinking fountain.

(iv) *Duty to provide accessible features in the event of disproportionality*.

(A) When the cost of alterations necessary to make the path of travel to the altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the extent that it can be made accessible without incurring disproportionate costs.

(B) In choosing which accessible elements to provide, priority should be given

to those elements that will provide the greatest access, in the following order—

(1) An accessible entrance;

(2) An accessible route to the altered area;

(3) At least one accessible restroom for each sex or a single unisex restroom;

(4) Accessible telephones;

(5) Accessible drinking fountains; and

(6) When possible, additional accessible elements such as parking, storage, and alarms.

(v) *Series of smaller alterations*.

(A) The obligation to provide an accessible path of travel may not be evaded by performing a series of small alterations to the area served by a single path of travel if those alterations could have been performed as a single undertaking.

(B)

(*1*) If an area containing a primary function has been altered without providing an accessible path of travel to that area, and subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to the primary function areas on that path of travel during the preceding three-year period shall be considered in determining whether the cost of making that path of travel accessible is disproportionate.

(*2*) Only alterations undertaken on or after March 15, 2011 shall be considered in determining if the cost of providing an accessible path of travel is disproportionate to the overall cost of the alterations.

(c) *Accessibility standards and compliance date*.

(1) If physical construction or alterations commence after July 26, 1992, but prior to September 15, 2010, then new construction and alterations subject to this section must comply with either the UFAS or the 1991 Standards except that the elevator exemption contained at section 4.1.3(5) and section 4.1.6(1)(k) of the 1991 Standards shall not apply. Departures from particular requirements of either standard

Appendix to § 35.151(c)

Compliance Dates for New Construction and Alterations	**Applicable Standards**
Before September 15, 2010	1991 Standards or UFAS
On or after September 15, 2010, and before March 15, 2012	1991 Standards, UFAS, or 2010 Standards
On or after March 15, 2012	2010 Standards

by the use of other methods shall be permitted when it is clearly evident that equivalent access to the facility or part of the facility is thereby provided.

(2) If physical construction or alterations commence on or after September 15, 2010, and before March 15, 2012, then new construction and alterations subject to this section may comply with one of the following: the 2010 Standards, UFAS, or the 1991 Standards except that the elevator exemption contained at section 4.1.3(5) and section 4.1.6(1)(k) of the 1991 Standards shall not apply. Departures from particular requirements of either standard by the use of other methods shall be permitted when it is clearly evident that equivalent access to the facility or part of the facility is thereby provided.

(3) If physical construction or alterations commence on or after March 15, 2012, then new construction and alterations subject to this section shall comply with the 2010 Standards.

(4) For the purposes of this section, ceremonial groundbreaking or razing of structures prior to site preparation do not commence physical construction or alterations.

(5) *Noncomplying new construction and alterations*.

(i) Newly constructed or altered facilities or elements covered by §§ 35.151(a) or (b) that were constructed or altered before March 15, 2012, and that do not comply with the 1991 Standards or with UFAS shall before March 15, 2012, be made accessible in accordance with either the 1991 Standards, UFAS, or the 2010 Standards.

(ii) Newly constructed or altered facilities or elements covered by §§ 35.151(a) or (b) that were constructed or altered before March 15, 2012 and that do not comply with the 1991 Standards or with UFAS shall, on or after March 15, 2012, be made accessible in accordance with the 2010 Standards.

(d) *Scope of coverage*. The 1991 Standards and the 2010 Standards apply to fixed or built-in elements of buildings, structures, site improvements, and pedestrian routes or vehicular ways located on a site. Unless specifically stated otherwise, the advisory notes, appendix notes, and figures contained in the 1991 Standards and the 2010 Standards explain or illustrate the requirements of the rule; they do not establish enforceable requirements.

(e) *Social service center establishments*. Group homes, halfway houses, shelters, or similar social service center establishments that provide either temporary sleeping accommodations or residential dwelling units that are subject to this section shall comply with the provisions of the 2010 Standards applicable to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

(1) In sleeping rooms with more than 25 beds covered by this section, a minimum of 5% of the beds shall have clear floor space complying with section 806.2.3 of the 2010 Standards.

(2) Facilities with more than 50 beds covered by this section that provide common use bathing facilities, shall provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat, and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower shall be provided for each group.

(f) *Housing at a place of education*. Housing at a place of education that is subject to this section shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806 subject to the following exceptions. For the purposes of the application of this section,

the term "sleeping room" is intended to be used interchangeably with the term "guest room" as it is used in the transient lodging standards.

(1) Kitchens within housing units containing accessible sleeping rooms with mobility features (including suites and clustered sleeping rooms) or on floors containing accessible sleeping rooms with mobility features shall provide turning spaces that comply with section 809.2.2 of the 2010 Standards and kitchen work surfaces that comply with section 804.3 of the 2010 Standards.

(2) Multi-bedroom housing units containing accessible sleeping rooms with mobility features shall have an accessible route throughout the unit in accordance with section 809.2 of the 2010 Standards.

(3) Apartments or townhouse facilities that are provided by or on behalf of a place of education, which are leased on a year-round basis exclusively to graduate students or faculty, and do not contain any public use or common use areas available for educational programming, are not subject to the transient lodging standards and shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

(g) *Assembly areas*. Assembly areas subject to this section shall comply with the provisions of the 2010 Standards applicable to assembly areas, including, but not limited to, sections 221 and 802. In addition, assembly areas shall ensure that—

(1) In stadiums, arenas, and grandstands, wheelchair spaces and companion seats are dispersed to all levels that include seating served by an accessible route;

(2) Assembly areas that are required to horizontally disperse wheelchair spaces and companion seats by section 221.2.3.1 of the 2010 Standards and have seating encircling, in whole or in part, a field of play or performance area shall disperse wheelchair spaces and companion seats around that field of play or performance area;

(3) Wheelchair spaces and companion seats are not located on (or obstructed by) temporary platforms or other movable structures, except that when an entire seating section is placed on temporary platforms or other movable structures in an area where fixed seating is not provided, in order to increase seating for an event, wheelchair spaces and companion seats may be placed in that section. When wheelchair spaces and companion seats are not required to accommodate persons eligible for those spaces and seats, individual, removable seats may be placed in those spaces and seats;

(4) Stadium-style movie theaters shall locate wheelchair spaces and companion seats on a riser or cross-aisle in the stadium section that satisfies at least one of the following criteria—

(i) It is located within the rear 60% of the seats provided in an auditorium; or

(ii) It is located within the area of an auditorium in which the vertical viewing angles (as measured to the top of the screen) are from the 40th to the 100th percentile of vertical viewing angles for all seats as ranked from the seats in the first row (1st percentile) to seats in the back row (100th percentile).

(h) *Medical care facilities*. Medical care facilities that are subject to this section shall comply with the provisions of the 2010 Standards applicable to medical care facilities, including, but not limited to, sections 223 and 805. In addition, medical care facilities that do not specialize in the treatment of conditions that affect mobility shall disperse the accessible patient bedrooms required by section 223.2.1 of the 2010 Standards in a manner that is proportionate by type of medical specialty.

(i) *Curb ramps*.

(1) Newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway.

(2) Newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads, or highways.

(j) *Facilities with residential dwelling units for sale to individual owners*.

(1) Residential dwelling units designed and constructed or altered by public entities that will be offered for sale to individuals shall comply with the requirements for residential facilities in the 2010 Standards including sections 233 and 809.

(2) The requirements of paragraph (1) also apply to housing programs that are operated by public entities where design and construction of particular residential dwelling units take place only after a specific buyer has been identified. In such programs, the covered entity must provide the units that comply with the requirements for accessible features to those pre-identified buyers with disabilities who have requested such a unit.

(k) *Detention and correctional facilities*.

(1) New construction of jails, prisons, and other detention and correctional facilities shall comply with the 2010 Standards except that public entities shall provide accessible mobility features complying with section 807.2 of the 2010 Standards for a minimum of 3%, but no fewer than one, of the total number of cells in a facility. Cells with mobility features shall be provided in each classification level.

(2) *Alterations to detention and correctional facilities*. Alterations to jails, prisons, and other detention and correctional facilities shall comply with the 2010 Standards except that public entities shall provide accessible mobility features complying with section 807.2 of the 2010 Standards for a minimum of 3%, but no fewer than one, of the total number of cells being altered until at least 3%, but no fewer than one, of the total number of cells in a facility shall provide mobility features complying with section 807.2. Altered cells with mobility features shall be provided in each classification level. However, when alterations are made to specific cells, detention and correctional facility operators may satisfy their obligation to provide the required number of cells with mobility features by providing the required mobility features in substitute cells (cells other than those where alterations are originally planned), provided that each substitute cell—

(i) Is located within the same prison site;

(ii) Is integrated with other cells to the maximum extent feasible;

(iii) Has, at a minimum, equal physical access as the altered cells to areas used by inmates or detainees for visitation, dining, recreation, educational programs, medical services, work programs, religious services, and participation in other programs that the facility offers to inmates or detainees; and,

(iv) If it is technically infeasible to locate a substitute cell within the same prison site, a substitute cell must be provided at another prison site within the corrections system.

(3) With respect to medical and long-term care facilities in jails, prisons, and other detention and correctional facilities, public entities shall apply the 2010 Standards technical and scoping requirements for those facilities irrespective of whether those facilities are licensed.

§ 35.152 Jails, detention and correctional facilities, and community correctional facilities.

(a) *General*. This section applies to public entities that are responsible for the operation or management of adult and juvenile justice jails, detention and correctional facilities, and community correctional facilities, either directly or through contractual, licensing, or other arrangements with public or private entities, in whole or in part, including private correctional facilities.

(b) *Discrimination prohibited*.

(1) Public entities shall ensure that qualified inmates or detainees with disabilities shall not, because a facility is inaccessible to or unusable by individuals with disabilities, be excluded from participation in, or be denied the benefits of, the services, programs, or activities of a public entity, or be subjected to discrimination by any public entity.

(2) Public entities shall ensure that inmates or detainees with disabilities are housed in the most integrated setting appropriate to the needs of the individuals. Unless it is appropriate to make an exception, a public entity–

(i) Shall not place inmates or detainees with disabilities in inappropriate security classifications because no accessible cells or beds are available;

(ii) Shall not place inmates or detainees with disabilities in designated medical areas unless they are actually receiving medical care or treatment;

(iii) Shall not place inmates or detainees with disabilities in facilities that do not offer the same programs as the facilities where they would otherwise be housed; and

(iv) Shall not deprive inmates or detainees with disabilities of visitation with family members by placing them in distant facilities where they would not otherwise be housed.

(3) Public entities shall implement reasonable policies, including physical modifications to additional cells in accordance with the 2010 Standards, so as to ensure that each inmate with a disability is housed in a cell with the accessible elements necessary to afford the inmate access to safe, appropriate housing.

§§ 35.153—35.159 [Reserved]

Subpart E—Communications

§ 35.160 General.

(a)

(1) A public entity shall take appropriate steps to ensure that communications with applicants, participants, members of the public, and companions with disabilities are as effective as communications with others.

(2) For purposes of this section, "companion" means a family member, friend, or associate of an individual seeking access to a service, program, or activity of a public entity, who, along with such individual, is an appropriate person with whom the public entity should communicate.

(b)

(1) A public entity shall furnish appropriate auxiliary aids and services where necessary to afford qualified individuals with disabilities, including applicants, participants, companions, and members of the public, an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity of a public entity.

(2) The type of auxiliary aid or service necessary to ensure effective communication will vary in accordance with the method of communication used by the individual; the nature, length, and complexity of the communication involved; and the context in which the communication is taking place. In determining what types of auxiliary aids and services are necessary, a public entity shall give primary consideration to the requests of individuals with disabilities. In order to be effective, auxiliary aids and services must be provided in accessible formats, in a timely manner, and in such a way as to protect the privacy and independence of the individual with a disability.

(c)

(1) A public entity shall not require an individual with a disability to bring another individual to interpret for him or her.

(2) A public entity shall not rely on an adult accompanying an individual with a disability to interpret or facilitate communication except—

(i) In an emergency involving an imminent threat to the safety or welfare of an individual or the public where there is no interpreter available; or

(ii) Where the individual with a disability specifically requests that the accompanying adult interpret or facilitate communication, the accompanying adult agrees to provide such assistance, and reliance on that adult for such assistance is appropriate under the circumstances.

(3) A public entity shall not rely on a minor child to interpret or facilitate communication, except in an emergency involving an imminent threat to the safety or welfare of an individual or the public where there is no interpreter available.

(d) *Video remote interpreting (VRI) services.* A public entity that chooses to provide qualified interpreters via VRI services shall ensure that it provides—

(1) Real-time, full-motion video and audio over a dedicated high-speed, wide-bandwidth video connection or wireless connection that delivers high-quality video images that do not produce lags, choppy, blurry, or grainy images, or irregular pauses in communication;

(2) A sharply delineated image that is large enough to display the interpreter's face, arms, hands, and fingers, and the participating individual's face, arms, hands, and fingers, regardless of his or her body position;

(3) A clear, audible transmission of voices; and

(4) Adequate training to users of the technology and other involved individuals so that they may quickly and efficiently set up and operate the VRI.

§ 35.161 Telecommunications.

(a) Where a public entity communicates by telephone with applicants and beneficiaries, text telephones (TTYs) or equally effective telecommunications systems shall be used to communicate with individuals who are deaf or hard of hearing or have speech impairments.

(b) When a public entity uses an automated-attendant system, including, but not limited to, voice mail and messaging, or an interactive voice response system, for receiving and directing incoming telephone calls, that system must provide effective real-time communication with individuals using auxiliary aids and services, including TTYs and all forms of FCC-approved telecommunications relay system, including Internet-based relay systems.

(c) A public entity shall respond to telephone calls from a telecommunications relay service established under title IV of the ADA in the same manner that it responds to other telephone calls.

§ 35.162 Telephone emergency services.

Telephone emergency services, including 911 services, shall provide direct access to individuals who use TDD's and computer modems.

§ 35.163 Information and signage.

(a) A public entity shall ensure that interested persons, including persons with impaired vision or hearing, can obtain information as to the existence and location of accessible services, activities, and facilities.

(b) A public entity shall provide signage at all inaccessible entrances to each of its facilities, directing users to an accessible entrance or to a location at which they can obtain information about accessible facilities. The international symbol for accessibility shall be used at each accessible entrance of a facility.

§ 35.164 Duties.

This subpart does not require a public entity to take any action that it can demonstrate would result in a fundamental alteration in the nature of a service, program, or activity or in undue

financial and administrative burdens. In those circumstances where personnel of the public entity believe that the proposed action would fundamentally alter the service, program, or activity or would result in undue financial and administrative burdens, a public entity has the burden of proving that compliance with this subpart would result in such alteration or burdens. The decision that compliance would result in such alteration or burdens must be made by the head of the public entity or his or her designee after considering all resources available for use in the funding and operation of the service, program, or activity and must be accompanied by a written statement of the reasons for reaching that conclusion. If an action required to comply with this subpart would result in such an alteration or such burdens, a public entity shall take any other action that would not result in such an alteration or such burdens but would nevertheless ensure that, to the maximum extent possible, individuals with disabilities receive the benefits or services provided by the public entity.

§§ 35.165—35.169 [Reserved]

Subpart F—Compliance Procedures

§ 35.170 Complaints.

(a) *Who may file*. An individual who believes that he or she or a specific class of individuals has been subjected to discrimination on the basis of disability by a public entity may, by himself or herself or by an authorized representative, file a complaint under this part.

(b) *Time for filing*. A complaint must be filed not later than 180 days from the date of the alleged discrimination, unless the time for filing is extended by the designated agency for good cause shown. A complaint is deemed to be filed under this section on the date it is first filed with any Federal agency.

(c) *Where to file*. An individual may file a complaint with any agency that he or she believes to be the appropriate agency designated under subpart G of this part, or with any agency that provides funding to the public entity that is the subject of the complaint, or with the Department of Justice for referral as provided in §35.171(a)(2).

§ 35.171 Acceptance of complaints.

(a) *Receipt of complaints*.

(1)

(i) Any Federal agency that receives a complaint of discrimination on the basis of disability by a public entity shall promptly review the complaint to determine whether it has jurisdiction over the complaint under section 504.

(ii) If the agency does not have section 504 jurisdiction, it shall promptly determine whether it is the designated agency under subpart G of this part responsible for complaints filed against that public entity.

(2)

(i) If an agency other than the Department of Justice determines that it does not have section 504 jurisdiction and is not the designated agency, it shall promptly refer the complaint to the appropriate designated agency, the agency that has section 504 jurisdiction, or the Department of Justice, and so notify the complainant.

(ii) When the Department of Justice receives a complaint for which it does not have jurisdiction under section 504 and is not the designated agency, it may exercise jurisdiction pursuant to § 35.190(e) or refer the complaint to an agency that does have jurisdiction under section 504 or to the appropriate agency designated in subpart G of this part or, in the case of an employment complaint that is also subject to title I of the Act, to the Equal Employment Opportunity Commission.

(3)

(i) If the agency that receives a complaint has section 504 jurisdiction, it shall process the complaint according to its procedures for enforcing section 504.

(ii) If the agency that receives a complaint does not have section 504 jurisdiction, but is the designated agency, it shall process the complaint according to the procedures established by this subpart.

(b) *Employment complaints*.

(1) If a complaint alleges employment discrimination subject to title I of the Act, and the agency has section 504 jurisdiction, the agency shall follow the procedures issued by the Department of Justice and the Equal Employment Opportunity Commission under section 107(b) of the Act.

(2) If a complaint alleges employment discrimination subject to title I of the Act, and the designated agency does not have section 504 jurisdiction, the agency shall refer the complaint to the Equal Employment Opportunity Commission for processing under title I of the Act.

(3) Complaints alleging employment discrimination subject to this part, but not to title I of the Act shall be processed in accordance with the procedures established by this subpart.

(c) *Complete complaints*.

(1) A designated agency shall accept all complete complaints under this section and shall promptly notify the complainant and the public entity of the receipt and acceptance of the complaint.

(2) If the designated agency receives a complaint that is not complete, it shall notify the complainant and specify the additional information that is needed to make the complaint a complete complaint. If the complainant fails to complete the complaint, the designated agency shall close the complaint without prejudice.

§ 35.172 Investigations and compliance reviews.

(a) The designated agency shall investigate complaints for which it is responsible under § 35.171.

(b) The designated agency may conduct compliance reviews of public entities in order to ascertain whether there has been a failure to comply with the nondiscrimination requirements of this part.

(c) Where appropriate, the designated agency shall attempt informal resolution of any matter being investigated under this section, and, if resolution is not achieved and a violation is found, issue to the public entity and the complainant, if any, a Letter of Findings that shall include—

(1) Findings of fact and conclusions of law;

(2) A description of a remedy for each violation found (including compensatory damages where appropriate); and

(3) Notice of the rights and procedures available under paragraph (d) of this section and §§ 35.173 and 35.174.

(d) At any time, the complainant may file a private suit pursuant to section 203 of the Act, 42 U.S.C. 12133, whether or not the designated agency finds a violation.

§ 35.173 Voluntary compliance agreements.

(a) When the designated agency issues a noncompliance Letter of Findings, the designated agency shall—

(1) Notify the Assistant Attorney General by forwarding a copy of the Letter of Findings to the Assistant Attorney General; and

(2) Initiate negotiations with the public entity to secure compliance by voluntary means.

(b) Where the designated agency is able to secure voluntary compliance, the voluntary compliance agreement shall—

(1) Be in writing and signed by the parties;

(2) Address each cited violation;

(3) Specify the corrective or remedial action to be taken, within a stated period of time, to come into compliance;

(4) Provide assurance that discrimination will not recur; and

(5) Provide for enforcement by the Attorney General.

§ 35.174 Referral.

If the public entity declines to enter into voluntary compliance negotiations or if negotiations are unsuccessful, the designated agency shall refer the matter to the Attorney General with a recommendation for appropriate action.

§ 35.175 Attorney's fees.

In any action or administrative proceeding commenced pursuant to the Act or this part, the court or agency, in its discretion, may allow the prevailing party, other than the United States, a reasonable attorney's fee, including litigation expenses, and costs, and the United States shall be liable for the foregoing the same as a private individual.

§ 35.176 Alternative means of dispute resolution.

Where appropriate and to the extent authorized by law, the use of alternative means of dispute resolution, including settlement negotiations, conciliation, facilitation, mediation, factfinding, minitrials, and arbitration, is encouraged to resolve disputes arising under the Act and this part.

§ 35.177 Effect of unavailability of technical assistance.

A public entity shall not be excused from compliance with the requirements of this part because of any failure to receive technical assistance, including any failure in the development or dissemination of any technical assistance manual authorized by the Act.

§ 35.178 State immunity.

A State shall not be immune under the eleventh amendment to the Constitution of the United States from an action in Federal or State court of competent jurisdiction for a violation of this Act. In any action against a State for a violation of the requirements of this Act, remedies (including remedies both at law and in equity) are available for such a violation to the same extent as such remedies are available for such a violation in an action against any public or private entity other than a State.

§§ 35.179—35.189 [Reserved]

Subpart G—Designated Agencies

§ 35.190 Designated Agencies.

(a) The Assistant Attorney General shall coordinate the compliance activities of Federal agencies with respect to State and local government components, and shall provide policy guidance and interpretations to designated agencies to ensure the consistent and effective implementation of the requirements of this part.
(b) The Federal agencies listed in paragraph (b)(1)-(8) of this section shall have responsibility for the implementation of subpart F of this part for components of State and local governments that exercise responsibilities, regulate, or administer services, programs, or activities in the following functional areas.

(1) *Department of Agriculture*: All programs, services, and regulatory activities relating to farming and the raising of livestock, including extension services.

(2) *Department of Education:* All programs, services, and regulatory activities relating to the operation of elementary and secondary education systems and institutions, institutions of higher education and vocational education (other than schools of medicine, dentistry,

nursing, and other health-related schools), and libraries.

(3) *Department of Health and Human Services*: All programs, services, and regulatory activities relating to the provision of health care and social services, including schools of medicine, dentistry, nursing, and other health-related schools, the operation of health care and social service providers and institutions, including "grass-roots" and community services organizations and programs, and preschool and daycare programs.

(4) *Department of Housing and Urban Development:* All programs, services, and regulatory activities relating to state and local public housing, and housing assistance and referral.

(5) *Department of Interior:* All programs, services, and regulatory activities relating to lands and natural resources, including parks and recreation, water and waste management, environmental protection, energy, historic and cultural preservation, and museums.

(6) *Department of Justice:* All programs, services, and regulatory activities relating to law enforcement, public safety, and the administration of justice, including courts and correctional institutions; commerce and industry, including general economic development, banking and finance, consumer protection, insurance, and small business; planning, development, and regulation (unless assigned to other designated agencies); state and local government support services (*e.g.,* audit, personnel, comptroller, administrative services); all other government functions not assigned to other designated agencies.

(7) *Department of Labor:* All programs, services, and regulatory activities relating to labor and the work force.

(8) *Department of Transportation:* All programs, services, and regulatory activities relating to transportation, including highways, public transportation, traffic management (non-law enforcement), automobile licensing and inspection, and driver licensing.

(c) Responsibility for the implementation of subpart F of this part for components of State or local governments that exercise responsibilities, regulate, or administer services, programs, or activities relating to functions not assigned to specific designated agencies by paragraph (b) of this section may be assigned to other specific agencies by the Department of Justice.

(d) If two or more agencies have apparent responsibility over a complaint, the Assistant Attorney General shall determine which one of the agencies shall be the designated agency for purposes of that complaint.

(e) When the Department receives a complaint directed to the Attorney General alleging a violation of this part that may fall within the jurisdiction of a designated agency or another Federal agency that may have jurisdiction under section 504, the Department may exercise its discretion to retain the complaint for investigation under this part.

§§ 35.191—35.999 [Reserved]

Title II Regulations

2010 Guidance and Section-by-Section Analysis

Department of Justice

Appendix A to Part 35—Guidance to Revisions to ADA Regulation on Nondiscrimination on the Basis of Disability in State and Local Government Services

Note: This Appendix contains guidance providing a section-by-section analysis of the revisions to 28 CFR part 35 published on September 15, 2010.

Section-By-Section Analysis and Response to Public Comments

This section provides a detailed description of the Department's changes to the title II regulation, the reasoning behind those changes, and responses to public comments received on these topics. The Section-by-Section Analysis follows the order of the title II regulation itself, except that, if the Department has not changed a regulatory section, the unchanged section has not been mentioned.

Subpart A—General

Section 35.104 Definitions.

''1991 Standards'' and ''2004 ADAAG''
The Department has included in the final rule new definitions of both the ''1991 Standards'' and the ''2004 ADAAG.'' The term ''1991 Standards'' refers to the ADA Standards for Accessible Design, originally published on July 26, 1991, and republished as Appendix D to part 36. The term ''2004 ADAAG'' refers to ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines, which were issued by the Access Board on July 23, 2004, 36 CFR 1191, app. B and D (2009), and which the Department has adopted in this final rule. These terms are included in the definitions section for ease of reference.

''2010 Standards''
The Department has added to the final rule a definition of the term ''2010 Standards.'' The term ''2010 Standards'' refers to the 2010 ADA Standards for Accessible Design, which consist of the 2004 ADAAG and the requirements contained in § 35.151.

''Auxiliary Aids and Services''
In the NPRM, the Department proposed revisions to the definition of auxiliary aids and services under § 35.104 to include several additional types of auxiliary aids that have become more readily available since the promulgation of the 1991 title II regulation, and in recognition of new technology and devices available in some places that may provide effective communication in some situations.

The NPRM proposed adding an explicit reference to written notes in the definition of ''auxiliary aids.'' Although this policy was already enunciated in the Department's 1993 Title II Technical Assistance Manual at II– 7.1000, the Department proposed inclusion in the regulation itself because some Title II entities do not understand that exchange of written notes using paper and pencil is an available option in some circumstances. *See* Department of Justice, *The Americans with Disabilities Act, Title II Technical Assistance Manual Covering State and Local Government Programs and Services* (1993), available at *http://www.ada.gov/ taman2.html.* Comments from several disability advocacy organizations and individuals discouraged the Department from including the exchange of written notes in the list of available auxiliary aids in § 35.104. Advocates and persons with disabilities requested explicit limits on the use of written notes as a form of auxiliary aid because, they argue, most exchanges are not simple and are not communicated effectively using handwritten notes. One major advocacy organization, for example, noted that the speed at which individuals communicate orally or use sign language averages about 200 words per minute or more while exchange of notes often leads to truncated or incomplete communication. For

persons whose primary language is American Sign Language (ASL), some commenters pointed out, using written English in exchange of notes often is ineffective because ASL syntax and vocabulary is dissimilar from English. By contrast, some commenters from professional medical associations sought more specific guidance on when notes are allowed, especially in the context of medical offices and health care situations.

Exchange of notes likely will be effective in situations that do not involve substantial conversation, for example, blood work for routine lab tests or regular allergy shots. Video Interpreting Services (hereinafter referred to as ''video remote interpreting services'' or VRI) or an interpreter should be used when the matter involves greater complexity, such as in situations requiring communication of medical history or diagnoses, in conversations about medical procedures and treatment decisions, or when giving instructions for care at home or elsewhere. In the Section-By-Section Analysis of § 35.160 (Communications) below, the Department discusses in greater detail the kinds of situations in which interpreters or captioning would be necessary. Additional guidance on this issue can be found in a number of agreements entered into with health-care providers and hospitals that are available on the Department's Web site at *http://www.ada.gov*.

In the NPRM, in paragraph (1) of the definition in § 35.104, the Department proposed replacing the term ''telecommunications devices for deaf persons (TDD)'' with the term ''text telephones (TTYs).'' TTY has become the commonly accepted term and is consistent with the terminology used by the Access Board in the 2004 ADAAG. Commenters representing advocates and persons with disabilities expressed approval of the substitution of TTY for TDD in the proposed regulation.

Commenters also expressed the view that the Department should expand paragraph (1) of the definition of auxiliary aids to include ''TTY's and other voice, text, and video-based telecommunications products and systems such as videophones and captioned telephones.'' The Department has considered these comments and has revised the definition of ''auxiliary aids'' to include references to voice, text, and video-based telecommunications products and systems, as well as accessible electronic and information technology.

In the NPRM, the Department also proposed including a reference in paragraph (1) to a new technology, Video Interpreting Services (VIS). The reference remains in the final rule. VIS is discussed in the Section-By- Section Analysis below in reference to § 35.160 (Communications), but is referred to as VRI in both the final rule and Appendix A to more accurately reflect the terminology used in other regulations and among users of the technology.

In the NPRM, the Department noted that technological advances in the 18 years since the ADA's enactment had increased the range of auxiliary aids and services for those who are blind or have low vision. As a result the Department proposed additional examples to paragraph (2) of the definition, including Brailled materials and displays, screen reader software, optical readers, secondary auditory programs (SAP), and accessible electronic and information technology. Some commenters asked for more detailed requirements for auxiliary aids for persons with vision disabilities. The Department has decided it will not make additional changes to that provision at this time.

Several comments suggested expanding the auxiliary aids provision for persons who are both deaf and blind, and in particular, to include in the list of auxiliary aids a new category, ''support service providers (SSP),'' which was described in comments as a navigator and communication facilitator. The Department believes that services provided by communication facilitators are already encompassed in the requirement to provide qualified interpreters. Moreover, the

Department is concerned that as described by the commenters, the category of support service providers would include some services that would be considered personal services and that do not qualify as auxiliary aids. Accordingly, the Department declines to add this new category to the list at this time.

Some commenters representing advocacy organizations and individuals asked the Department to explicitly require title II entities to make any or all of the devices or technology available in all situations upon the request of the person with a disability. The Department recognizes that such devices or technology may provide effective communication and in some circumstances may be effective for some persons, but the Department does not intend to require that every entity covered by title II provide every device or all new technology at all times as long as the communication that is provided is as effective as communication with others. The Department recognized in the preamble to the 1991 title II regulation that the list of auxiliary aids was ''not an all-inclusive or exhaustive catalogue of possible or available auxiliary aids or services. It is not possible to provide an exhaustive list, and an attempt to do so would omit the new devices that will become available with emerging technology.'' 28 CFR part 35, app. A at 560 (2009). The Department continues to endorse that view; thus, the inclusion of a list of examples of possible auxiliary aids in the definition of ''auxiliary aids'' should not be read as a mandate for a title II entity to offer every possible auxiliary aid listed in the definition in every situation.

''Direct Threat''

In Appendix A of the Department's 1991 title II regulation, the Department included a detailed discussion of ''direct threat'' that, among other things, explained that principles established in § 36.208 of the Department's [title III] regulation'' were ''applicable'' as well to title II, insofar as ''questions of safety are involved.'' 28 CFR part 35, app. A at 565 (2009). In the final rule, the Department has included an explicit definition of ''direct threat'' that is parallel to the definition in the title III rule and placed it in the definitions section at § 35.104.

''Existing Facility''

The 1991 title II regulation provided definitions for ''new construction'' at § 35.151(a) and ''alterations'' at § 35.151(b). In contrast, the term ''existing facility'' was not explicitly defined, although it is used in the statute and regulations for title II. *See* 42 U.S.C. 12134(b); 28 CFR 35.150. It has been the Department's view that newly constructed or altered facilities are also existing facilities with continuing program access obligations, and that view is made explicit in this rule.

The classification of facilities under the ADA is neither static nor mutually exclusive. Newly constructed or altered facilities are also existing facilities. A newly constructed facility remains subject to the accessibility standards in effect at the time of design and construction, with respect to those elements for which, at that time, there were applicable ADA Standards. And at some point, the facility may undergo alterations, which are subject to the alterations requirements in effect at the time. *See* § 35.151(b)–(c). The fact that the facility is also an existing facility does not relieve the public entity of its obligations under the new construction and alterations requirements in this part.

For example, a facility constructed or altered after the effective date of the original title II regulations but prior to the effective date of the revised title II regulation and Standards, must have been built or altered in compliance with the Standards (or UFAS) in effect at that time, in order to be in compliance with the ADA. In addition, a ''newly constructed'' facility or ''altered'' facility is also an ''existing facility'' for purposes of application of the title II program accessibility requirements. Once the 2010 Standards take effect, they will become the new

reference point for determining the program accessibility obligations of all existing facilities. This is because the ADA contemplates that as our knowledge and understanding of accessibility advances and evolves, this knowledge will be incorporated into and result in increased accessibility in the built environment. Under title II, this goal is accomplished through the statute's program access framework. While newly constructed or altered facilities must meet the accessibility standards in effect at the time, the fact that these facilities are also existing facilities ensures that the determination of whether a program is accessible is not frozen at the time of construction or alteration. Program access may require consideration of potential barriers to access that were not recognized as such at the time of construction or alteration, including, but not limited to, the elements that are first covered in the 2010 Standards, as that term is defined in § 35.104. Adoption of the 2010 Standards establishes a new reference point for title II entities that choose to make structural changes to existing facilities to meet their program access requirements.

The NPRM included the following proposed definition of ''existing facility.'' ''A facility that has been constructed and remains in existence on any given date.'' 73 FR 34466, 34504 (June 17, 2008). The Department received a number of comments on this issue. The commenters urged the Department to clarify that all buildings remain subject to the standards in effect at the time of their construction, that is, that a facility designed and constructed for first occupancy between January 26, 1992, and the effective date of the final rule is still considered ''new construction'' and that alterations occurring between January 26, 1992, and the effective date of the final rule are still considered ''alterations.''

The final rule includes clarifying language to ensure that the Department's interpretation is accurately reflected. As established by this rule, existing facility means a facility in existence on any given date, without regard to whether the facility may also be considered newly constructed or altered under this part. Thus, this definition reflects the Department's interpretation that public entities have program access requirements that are independent of, but may coexist with, requirements imposed by new construction or alteration requirements in those same facilities.

''Housing at a Place of Education''

The Department has added a new definition to § 35.104, ''housing at a place of education,'' to clarify the types of educational housing programs that are covered by this title. This section defines ''housing at a place of education'' as ''housing operated by or on behalf of an elementary, secondary, undergraduate, or postgraduate school, or other place of education, including dormitories, suites, apartments, or other places of residence.'' This definition does not apply to social service programs that combine residential housing with social services, such as a residential job training program.

''Other Power-Driven Mobility Device'' and ''Wheelchair''

Because relatively few individuals with disabilities were using nontraditional mobility devices in 1991, there was no pressing need for the 1991 title II regulation to define the terms ''wheelchair'' or ''other power-driven mobility device,'' to expound on what would constitute a reasonable modification in policies, practices, or procedures under § 35.130(b)(7), or to set forth within that section specific requirements for the accommodation of mobility devices. Since the issuance of the 1991 title II regulation, however, the choices of mobility devices available to individuals with disabilities have increased dramatically. The Department has received complaints about and has become aware of situations where individuals with mobility disabilities have utilized devices that are not designed primarily for use by an individual with

a mobility disability, including the Segway ® Personal Transporter (Segway ® PT), golf cars, all-terrain vehicles (ATVs), and other locomotion devices.

The Department also has received questions from public entities and individuals with mobility disabilities concerning which mobility devices must be accommodated and under what circumstances. Indeed, there has been litigation concerning the legal obligations of covered entities to accommodate individuals with mobility disabilities who wish to use an electronic personal assistance mobility device (EPAMD), such as the Segway ® PT, as a mobility device. The Department has participated in such litigation as *amicus curiae*. *See Ault v. Walt Disney World Co.*, No. 6:07–cv–1785–Orl–31KRS, 2009 WL 3242028 (M.D. Fla. Oct. 6, 2009). Much of the litigation has involved shopping malls where businesses have refused to allow persons with disabilities to use EPAMDs. *See*, *e.g.*, *McElroy v. Simon Property Group*, No. 08– 404 RDR, 2008 WL 4277716 (D. Kan. Sept. 15, 2008) (enjoining mall from prohibiting the use of a Segway ® PT as a mobility device where an individual agrees to all of a mall's policies for use of the device, except indemnification); Shasta Clark, *Local Man Fighting Mall Over Right to Use Segway*, WATE 6 News, July 26, 2005, available at *http://www.wate.com/Global/ story.asp?s=3643674* (last visited June 24, 2010).

In response to questions and complaints from individuals with disabilities and covered entities concerning which mobility devices must be accommodated and under what circumstances, the Department began developing a framework to address the use of unique mobility devices, concerns about their safety, and the parameters for the circumstances under which these devices must be accommodated. As a result, the Department's NPRM proposed two new approaches to mobility devices. First, the Department proposed a two-tiered mobility device definition that defined the term ''wheelchair'' separately from ''other power-driven mobility device.'' Second, the Department proposed requirements to allow the use of devices in each definitional category. In § 35.137(a), the NPRM proposed that wheelchairs and manually-powered mobility aids used by individuals with mobility disabilities shall be permitted in any areas open to pedestrian use. Section 35.137(b) of the NPRM provided that a public entity ''shall make reasonable modifications in its policies, practices, and procedures to permit the use of other power-driven mobility devices by individuals with disabilities, unless the public entity can demonstrate that the use of the device is not reasonable or that its use will result in a fundamental alteration of the public entity's service, program, or activity.''
73 FR 34466, 34504 (June 17, 2008).

The Department sought public comment with regard to whether these steps would, in fact, achieve clarity on these issues. Toward this end, the Department's NPRM asked several questions relating to the definitions of ''wheelchair,'' ''other power-driven mobility device,'' and ''manually-powered mobility aids''; the best way to categorize different classes of mobility devices; the types of devices that should be included in each category; and the circumstances under which certain mobility devices must be accommodated or may be excluded pursuant to the policy adopted by the public entity.

Because the questions in the NPRM that concerned mobility devices and their accommodation were interrelated, many of the commenters' responses did not identify the specific question to which they were responding. Instead, the commenters grouped the questions together and provided comments accordingly. Most commenters spoke to the issues addressed in the Department's questions in broad terms and general concepts. As a result, the responses to the questions posed are discussed below in broadly grouped issue categories rather than on a question-by-question basis.

Two-tiered definitional approach. Commenters supported the Department's proposal to use a two-tiered definition of mobility device. Commenters nearly universally said that wheelchairs always should be accommodated and that they should never be subject to an assessment with regard to their admission to a particular public facility. In contrast, the vast majority of commenters indicated they were in favor of allowing public entities to conduct an assessment as to whether, and under which circumstances, other power-driven mobility devices would be allowed on-site.

Many commenters indicated their support for the two-tiered approach in responding to questions concerning the definition of ''wheelchair'' and ''other-powered mobility device.'' Nearly every disability advocacy group said that the Department's two-tiered approach strikes the proper balance between ensuring access for individuals with disabilities and addressing fundamental alteration and safety concerns held by public entities; however, a minority of disability advocacy groups wanted other power-driven mobility devices to be included in the definition of ''wheelchair.'' Most advocacy, nonprofit, and individual commenters supported the concept of a separate definition for ''other power-driven mobility device'' because it maintains existing legal protections for wheelchairs while recognizing that some devices that are not designed primarily for individuals with mobility disabilities have beneficial uses for individuals with mobility disabilities. They also favored this concept because it recognizes technological developments and that the innovative uses of varying devices may provide increased access to individuals with mobility disabilities.

Many environmental, transit system, and government commenters indicated they opposed in its entirety the concept of ''other power-driven mobility devices'' as a separate category. They believe that the creation of a second category of mobility devices will mean that other power-driven mobility devices, specifically ATVs and off-highway vehicles, must be allowed to go anywhere on national park lands, trails, recreational areas, etc.; will conflict with other Federal land management laws and regulations; will harm the environment and natural and cultural resources; will pose safety risks to users of these devices, as well as to pedestrians not expecting to encounter motorized devices in these settings; will interfere with the recreational enjoyment of these areas; and will require too much administrative work to regulate which devices are allowed and under which circumstances. These commenters all advocated a single category of mobility devices that excludes all fuel-powered devices.

Whether or not they were opposed to the two-tier approach in its entirety, virtually every environmental commenter and most government commenters associated with providing public transportation services or protecting land, natural resources, fish and game, etc., said that the definition of ''other power-driven mobility device'' is too broad. They suggested that they might be able to support the dual category approach if the definition of ''other power-driven mobility device'' were narrowed. They expressed general and program-specific concerns about permitting the use of other power-driven mobility devices. They noted the same concerns as those who opposed the two-tiered concept—that these devices create a host of environmental, safety, cost, administrative and conflict of law issues. Virtually all of these commenters indicated that their support for the dual approach and the concept of other power-driven mobility devices is, in large measure, due to the other power-driven mobility device assessment factors in § 35.137(c) of the NPRM.

By maintaining the two-tiered approach to mobility devices and defining ''wheelchair'' separately from ''other power-driven mobility device,'' the Department is able to preserve the protection users of traditional wheelchairs and other manually powered mobility aids have had since the ADA was enacted, while also

recognizing that human ingenuity, personal choice, and new technologies have led to the use of devices that may be more beneficial for individuals with certain mobility disabilities.

Moreover, the Department believes the two-tiered approach gives public entities guidance to follow in assessing whether reasonable modifications can be made to permit the use of other power-driven mobility devices on-site and to aid in the development of policies describing the circumstances under which persons with disabilities may use such devices. The two-tiered approach neither mandates that all other power-driven mobility devices be accommodated in every circumstance, nor excludes these devices. This approach, in conjunction with the factor assessment provisions in § 35.137(b)(2), will serve as a mechanism by which public entities can evaluate their ability to accommodate other power-driven mobility devices. As will be discussed in more detail below, the assessment factors in § 35.137(b)(2) are designed to provide guidance to public entities regarding whether it is appropriate to bar the use of a specific ''other power-driven mobility device in a specific facility. In making such a determination, a public entity must consider the device's type, size, weight, dimensions, and speed; the facility's volume of pedestrian traffic; the facility's design and operational characteristics; whether the device conflicts with legitimate safety requirements; and whether the device poses a substantial risk of serious harm to the immediate environment or natural or cultural resources, or conflicts with Federal land management laws or regulations. In addition, if under § 35.130(b)(7), the public entity claims that it cannot make reasonable modifications to its policies, practices, or procedures to permit the use of other power-driven mobility devices by individuals with disabilities, the burden of proof to demonstrate that such devices cannot be operated in accordance with legitimate safety requirements rests upon the public entity.

Categorization of wheelchair versus other power-driven mobility devices. Implicit in the creation of the two-tiered mobility device concept is the question of how to categorize which devices are wheelchairs and which are other power-driven mobility devices. Finding weight and size to be too restrictive, the vast majority of advocacy, nonprofit, and individual commenters opposed using the Department of Transportation's definition of ''common wheelchair'' to designate the mobility device's appropriate category. Commenters who generally supported using weight and size as the method of categorization did so because of their concerns about potentially detrimental impacts on the environment and cultural and natural resources; on the enjoyment of the facility by other recreational users, as well as their safety; on the administrative components of government agencies required to assess which devices are appropriate on narrow, steeply sloped, or foot-and-hoof only trails; and about the impracticality of accommodating such devices in public transportation settings.

Many environmental, transit system, and government commenters also favored using the device's intended-use to categorize which devices constitute wheelchairs and which are other power-driven mobility devices. Furthermore, the intended-use determinant received a fair amount of support from advocacy, nonprofit, and individual commenters, either because they sought to preserve the broad accommodation of wheelchairs or because they sympathized with concerns about individuals without mobility disabilities fraudulently bringing other power-driven mobility devices into public facilities.

Commenters seeking to have the Segway® PT included in the definition of ''wheelchair'' objected to classifying mobility devices on the basis of their intended use because they felt that such a classification would be unfair and prejudicial to Segway® PT users and would stifle personal choice, creativity, and innovation. Other advocacy and nonprofit commenters

objected to employing an intended-use approach because of concerns that the focus would shift to an assessment of the device, rather than the needs or benefits to the individual with the mobility disability. They were of the view that the mobility-device classification should be based on its function—whether it is used for a mobility disability. A few commenters raised the concern that an intended-use approach might embolden public entities to assess whether an individual with a mobility disability really needs to use the other power-driven mobility device at issue or to question why a wheelchair would not provide sufficient mobility. Those citing objections to the intended use determinant indicated it would be more appropriate to make the categorization determination based on whether the device is being used for a mobility disability in the context of the impact of its use in a specific environment. Some of these commenters preferred this approach because it would allow the Segway® PT to be included in the definition of ''wheelchair.''

Many environmental and government commenters were inclined to categorize mobility devices by the way in which they are powered, such as battery-powered engines versus fuel or combustion engines. One commenter suggested using exhaust level as the determinant. Although there were only a few commenters who would make the determination based on indoor or outdoor use, there was nearly universal support for banning the indoor use of devices that are powered by fuel or combustion engines.

A few commenters thought it would be appropriate to categorize the devices based on their maximum speed. Others objected to this approach, stating that circumstances should dictate the appropriate speed at which mobility devices should be operated— for example, a faster speed may be safer when crossing streets than it would be for sidewalk use—and merely because a device can go a certain speed does not mean it will be operated at that speed. The Department has decided to maintain the device's intended use as the appropriate determinant for which devices are categorized as ''wheelchairs.'' However, because wheelchairs may be intended for use by individuals who have temporary conditions affecting mobility, the Department has decided that it is more appropriate to use the phrase ''primarily designed'' rather than ''solely designed'' in making such categorizations. The Department will not foreclose any future technological developments by identifying or banning specific devices or setting restrictions on size, weight, or dimensions. Moreover, devices designed primarily for use by individuals with mobility disabilities often are considered to be medical devices and are generally eligible for insurance reimbursement on this basis. Finally, devices designed primarily for use by individuals with mobility disabilities are less subject to fraud concerns because they were not designed to have a recreational component. Consequently, rarely, if ever, is any inquiry or assessment as to their appropriateness for use in a public entity necessary.

Definition of ''wheelchair.'' In seeking public feedback on the NPRM's definition of ''wheelchair,'' the Department explained its concern that the definition of ''wheelchair'' in section 508(c)(2) of the ADA (formerly section 507(c)(2), July 26, 1990, 104 Stat. 372, 42 U.S.C. 12207, renumbered section 508(c)(2), Public Law 110–325 section 6(a)(2), Sept. 25, 2008, 122 Stat. 3558), which pertains to Federal wilderness areas, is not specific enough to provide clear guidance in the array of settings covered by title II and that the stringent size and weight requirements for the Department of Transportation's definition of ''common wheelchair'' are not a good fit in the context of most public entities. The Department noted in the NPRM that it sought a definition of ''wheelchair'' that would include manually-operated and power-driven wheelchairs and mobility scooters (*i.e.*, those that typically are single-user, have three to four wheels, and are appropriate for both indoor and outdoor pedestrian

areas), as well as a variety of types of wheelchairs and mobility scooters with individualized or unique features or models with different numbers of wheels. The NPRM defined a wheelchair as ''a device designed solely for use by an individual with a mobility impairment for the primary purpose of locomotion in typical indoor and outdoor pedestrian areas. A wheelchair may be manually-operated or power-driven.'' 73 FR 34466, 34479 (June 17, 2008). Although the NPRM's definition of ''wheelchair'' excluded mobility devices that are not designed solely for use by individuals with mobility disabilities, the Department, noting that the use of the Segway® PT by individuals with mobility disabilities is on the upswing, inquired as to whether this device should be included in the definition of ''wheelchair.'' Many environment and Federal government employee commenters objected to the Department's proposed definition of ''wheelchair'' because it differed from the definition of ''wheelchair'' found in section 508(c)(2) of the ADA—a definition used in the statute only in connection with a provision relating to the use of a wheelchair in a designated wilderness area. *See* 42 U.S.C. 12207(c)(1). Other government commenters associated with environmental issues wanted the phrase ''outdoor pedestrian use'' eliminated from the definition of ''wheelchair.'' Some transit system commenters wanted size, weight, and dimensions to be part of the definition because of concerns about costs associated with having to accommodate devices that exceed the dimensions of the ''common wheelchair'' upon which the 2004 ADAAG was based.

Many advocacy, nonprofit, and individual commenters indicated that as long as the Department intends the scope of the term ''mobility impairments'' to include other disabilities that cause mobility impairments (*e.g.,* respiratory, circulatory, stamina, etc.), they were in support of the language. Several commenters indicated a preference for the definition of ''wheelchair'' in section 508(c)(2) of the ADA. One commenter indicated a preference for the term ''assistive device,'' as it is defined in the Rehabilitation Act of 1973, over the term ''wheelchair.'' A few commenters indicated that strollers should be added to the preamble's list of examples of wheelchairs because parents of children with disabilities frequently use strollers as mobility devices until their children get older.

In the final rule, the Department has rearranged some wording and has made some changes in the terminology used in the definition of ''wheelchair,'' but essentially has retained the definition, and therefore the rationale, that was set forth in the NPRM. Again, the text of the ADA makes the definition of ''wheelchair'' contained in section 508(c)(2) applicable only to the specific context of uses in designated wilderness areas, and therefore does not compel the use of that definition for any other purpose. Moreover, the Department maintains that limiting the definition to devices suitable for use in an ''indoor pedestrian area'' as provided for in section 508(c)(2) of the ADA, would ignore the technological advances in wheelchair design that have occurred since the ADA went into effect and that the inclusion of the phrase ''indoor pedestrian area'' in the definition of ''wheelchair'' would set back progress made by individuals with mobility disabilities who, for many years now, have been using devices designed for locomotion in indoor and outdoor settings. The Department has concluded that same rationale applies to placing limits on the size, weight, and dimensions of wheelchairs.

With regard to the term ''mobility impairments,'' the Department intended a broad reading so that a wide range of disabilities, including circulatory and respiratory disabilities, that make walking difficult or impossible, would be included. In response to comments on this issue, the Department has revisited the issue and has concluded that the most apt term to achieve this intent is ''mobility disability.'' In addition, the Department has decided that it is more appropriate

to use the phrase ''primarily'' designed for use by individuals with disabilities in the final rule, rather than ''solely'' designed for use by individuals with disabilities—the phrase proposed in the NPRM. The Department believes that this phrase more accurately covers the range of devices the Department intends to fall within the definition of ''wheelchair.''

After receiving comments that the word ''typical'' is vague and the phrase ''pedestrian areas'' is confusing to apply, particularly in the context of similar, but not identical, terms used in the proposed Standards, the Department decided to delete the term ''typical indoor and outdoor pedestrian areas'' from the final rule. Instead, the final rule references ''indoor or of both indoor and outdoor locomotion,'' to make clear that the devices that fall within the definition of ''wheelchair'' are those that are used for locomotion on indoor and outdoor pedestrian paths or routes and not those that are intended exclusively for traversing undefined, unprepared, or unimproved paths or routes. Thus, the final rule defines the term ''wheelchair'' to mean ''a manually operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor or of both indoor and outdoor locomotion.''

Whether the definition of ''wheelchair'' includes the Segway® PT. As discussed above, because individuals with mobility disabilities are using the Segway® PT as a mobility device, the Department asked whether it should be included in the definition of ''wheelchair.'' The basic Segway® PT model is a two-wheeled, gyroscopically-stabilized, battery-powered personal transportation device. The user stands on a platform suspended three inches off the ground by wheels on each side, grasps a T-shaped handle, and steers the device similarly to a bicycle. Most Segway® PTs can travel up to 12½ miles per hour, compared to the average pedestrian walking speed of three to four miles per hour and the approximate maximum speed for power-operated wheelchairs of six miles per hour. In a study of trail and other non-motorized transportation users including EPAMDs, the Federal Highway Administration (FHWA) found that the eye height of individuals using EPAMDs ranged from approximately 69 to 80 inches. *See* Federal Highway Administration, *Characteristics of Emerging Road and Trail Users and Their Safety* (Oct. 14, 2004), available at *http://www.tfhrc.gov/safety/ pubs/04103* (last visited June 24, 2010). Thus, the Segway® PT can operate at much greater speeds than wheelchairs, and the average user stands much taller than most wheelchair users.

The Segway® PT has been the subject of debate among users, pedestrians, disability advocates, State and local governments, businesses, and bicyclists. The fact that the Segway® PT is not designed primarily for use by individuals with disabilities, nor used primarily by persons with disabilities, complicates the question of to what extent individuals with disabilities should be allowed to operate them in areas and facilities where other power-driven mobility devices are not allowed. Those who question the use of the Segway® PT in pedestrian areas argue that the speed, size, and operating features of the devices make them too dangerous to operate alongside pedestrians and wheelchair users.

Comments regarding whether to include the Segway® PT in the definition of ''wheelchair'' were, by far, the most numerous received in the category of comments regarding wheelchairs and other power-driven mobility devices. Significant numbers of veterans with disabilities, individuals with multiple sclerosis, and those advocating on their behalf made concise statements of general support for the inclusion of the Segway® PT in the definition of ''wheelchair.'' Two veterans offered extensive comments on the topic, along with a few advocacy and nonprofit groups and individuals with disabilities for whom sitting is uncomfortable or impossible.

While there may be legitimate safety issues for EPAMD users and bystanders in some

circumstances, EPAMDs and other nontraditional mobility devices can deliver real benefits to individuals with disabilities. Among the reasons given by commenters to include the Segway® PT in the definition of ''wheelchair'' were that the Segway® PT is well-suited for individuals with particular conditions that affect mobility including multiple sclerosis, Parkinson's disease, chronic obstructive pulmonary disease, amputations, spinal cord injuries, and other neurological disabilities, as well as functional limitations, such as gait limitation, inability to sit or discomfort in sitting, and diminished stamina issues. Such individuals often find that EPAMDs are more comfortable and easier to use than more traditional mobility devices and assist with balance, circulation, and digestion in ways that wheelchairs do not. *See* Rachel Metz, *Disabled Embrace Segway*, New York Times, Oct. 14, 2004. Commenters specifically cited pressure relief, reduced spasticity, increased stamina, and improved respiratory, neurologic, and muscular health as secondary medical benefits from being able to stand.

Other arguments for including the Segway® PT in the definition of ''wheelchair'' were based on commenters' views that the Segway® PT offers benefits not provided by wheelchairs and mobility scooters, including its intuitive response to body movement, ability to operate with less coordination and dexterity than is required for many wheelchairs and mobility scooters, and smaller footprint and turning radius as compared to most wheelchairs and mobility scooters. Several commenters mentioned improved visibility, either due to the Segway® PT's raised platform or simply by virtue of being in a standing position. And finally, some commenters advocated for the inclusion of the Segway® PT simply based on civil rights arguments and the empowerment and self-esteem obtained from having the power to select the mobility device of choice. Many commenters, regardless of their position on whether to include the Segway® PT in the definition of ''wheelchair,'' noted that the Segway® PT's safety record is as good as, if not better, than the record for wheelchairs and mobility scooters.

Most environmental, transit system, and government commenters were opposed to including the Segway® PT in the definition of ''wheelchair'' but were supportive of its inclusion as an ''other power-driven mobility device.'' Their concerns about including the Segway® PT in the definition of ''wheelchair'' had to do with the safety of the operators of these devices (*e.g.*, height clearances on trains and sloping trails in parks) and of pedestrians, particularly in confined and crowded facilities or in settings where motorized devices might be unexpected; the potential harm to the environment; the additional administrative, insurance, liability, and defensive litigation costs; potentially detrimental impacts on the environment and cultural and natural resources; and the impracticality of accommodating such devices in public transportation settings. Other environmental, transit system, and government commenters would have banned all fuel-powered devices as mobility devices. In addition, these commenters would have classified non-motorized devices as ''wheelchairs'' and would have categorized motorized devices, such as the Segway® PT, battery-operated wheelchairs, and mobility scooters as ''other power-driven mobility devices.'' In support of this position, some of these commenters argued that because their equipment and facilities have been designed to comply with the dimensions of the ''common wheelchair'' upon which the ADAAG is based, any device that is larger than the prototype wheelchair would be misplaced in the definition of ''wheelchair.''

Still others in this group of commenters wished for only a single category of mobility devices and would have included wheelchairs, mobility scooters, and the Segway® PT as ''mobility devices'' and excluded fuel-powered devices from that definition.

Many disability advocacy and nonprofit commenters did not support the inclusion of the Segway® PT in the definition of ''wheelchair.'' Paramount to these commenters was the maintenance of existing protections for wheelchair users. Because there was unanimous agreement that wheelchair use rarely, if ever, may be restricted, these commenters strongly favored categorizing wheelchairs separately from the Segway® PT and other power-driven mobility devices and applying the intended-use determinant to assign the devices to either category. They indicated that while they support the greatest degree of access in public entities for all persons with disabilities who require the use of mobility devices, they recognize that under certain circumstances, allowing the use of other power-driven mobility devices would result in a fundamental alteration of programs, services, or activities, or run counter to legitimate safety requirements necessary for the safe operation of a public entity. While these groups supported categorizing the Segway® PT as an ''other power-driven mobility device,'' they universally noted that in their view, because the Segway® PT does not present environmental concerns and is as safe to use as, if not safer than, a wheelchair, it should be accommodated in most circumstances.

The Department has considered all the comments and has concluded that it should not include the Segway® PT in the definition of ''wheelchair.'' The final rule provides that the test for categorizing a device as a wheelchair or an other power-driven mobility device is whether the device is designed primarily for use by individuals with mobility disabilities. Mobility scooters are included in the definition of ''wheelchair'' because they are designed primarily for users with mobility disabilities. However, because the current generation of EPAMDs, including the Segway® PT, was designed for recreational users and not primarily for use by individuals with mobility disabilities, the Department has decided to continue its approach of excluding EPAMDs from the definition of ''wheelchair'' and including them in the definition of ''other power-driven mobility device.'' Although EPAMDs, such as the Segway® PT, are not included in the definition of a ''wheelchair,'' public entities must assess whether they can make reasonable modifications to permit individuals with mobility disabilities to use such devices on their premises. The Department recognizes that the Segway® PT provides many benefits to those who use them as mobility devices, including a measure of privacy with regard to the nature of one's particular disability, and believes that in the vast majority of circumstances, the application of the factors described in § 35.137 for providing access to other-powered mobility devices will result in the admission of the Segway® PT.

Treatment of ''manually-powered mobility aids.'' The Department's NPRM did not define the term ''manually-powered mobility aids.'' Instead, the NPRM included a non- exhaustive list of examples in § 35.137(a). The NPRM queried whether the Department should maintain this approach to manually powered mobility aids or whether it should adopt a more formal definition.

Only a few commenters addressed ''manually-powered mobility aids.'' Virtually all commenters were in favor of maintaining a non-exhaustive list of examples of ''manually-powered mobility aids'' rather than adopting a definition of the term. Of those who commented, a few sought clarification of the term ''manually-powered.'' One commenter suggested that the term be changed to ''human-powered.'' Other commenters requested that the Department include ordinary strollers in the non-exhaustive list of ''manually-powered mobility aids.'' Since strollers are not devices designed primarily for individuals with mobility disabilities, the Department does not consider them to be manually-powered mobility aids; however, strollers used in the context of transporting individuals with disabilities are subject to the same assessment required by the ADA's title II reasonable modification standards at

§ 35.130(b)(7). The Department believes that because the existing approach is clear and understood easily by the public, no formal definition of the term ''manually-powered mobility aids'' is required.

Definition of ''other power-driven mobility device.'' The Department's NPRM defined the term ''other power-driven mobility device'' in § 35.104 as ''any of a large range of devices powered by batteries, fuel, or other engines—whether or not designed solely for use by individuals with mobility impairments—that are used by individuals with mobility impairments for the purpose of locomotion, including golf cars, bicycles, electronic personal assistance mobility devices (EPAMDs), or any mobility aid designed to operate in areas without defined pedestrian routes.'' 73 FR 34466, 34504 (June 17, 2008).

Nearly all environmental, transit systems, and government commenters who supported the two-tiered concept of mobility devices said that the Department's definition of ''other power-driven mobility device'' is overbroad because it includes fuel-powered devices. These commenters sought a ban on fuel-powered devices in their entirety because they believe they are inherently dangerous and pose environmental and safety concerns. They also argued that permitting the use of many of the contemplated other power-driven mobility devices, fuel-powered ones especially, would fundamentally alter the programs, services, or activities of public entities.

Advocacy, nonprofit, and several individual commenters supported the definition of ''other power-driven mobility device'' because it allows new technologies to be added in the future, maintains the existing legal protections for wheelchairs, and recognizes that some devices, particularly the Segway® PT, which are not designed primarily for individuals with mobility disabilities, have beneficial uses for individuals with mobility disabilities. Despite support for the definition of ''other power-driven mobility device,'' however, most advocacy and nonprofit commenters expressed at least some hesitation about the inclusion of fuel-powered mobility devices in the definition. While virtually all of these commenters noted that a blanket exclusion of any device that falls under the definition of ''other power-driven mobility device'' would violate basic civil rights concepts, they also specifically stated that certain devices, particularly, off-highway vehicles, cannot be permitted in certain circumstances. They also made a distinction between the Segway® PT and other power-driven mobility devices, noting that the Segway® PT should be accommodated in most circumstances because it satisfies the safety and environmental elements of the policy analysis. These commenters indicated that they agree that other power-driven mobility devices must be assessed, particularly as to their environmental impact, before they are accommodated.

Although many commenters had reservations about the inclusion of fuel-powered devices in the definition of other power-driven mobility devices, the Department does not want the definition to be so narrow that it would foreclose the inclusion of new technological developments (whether powered by fuel or by some other means). It is for this reason that the Department has maintained the phrase ''any mobility device designed to operate in areas without defined pedestrian routes'' in the final rule's definition of other power-driven mobility devices. The Department believes that the limitations provided by ''fundamental alteration'' and the ability to impose legitimate safety requirements will likely prevent the use of fuel and combustion engine-driven devices indoors, as well as in outdoor areas with heavy pedestrian traffic. The Department notes, however, that in the future, technological developments may result in the production of safe fuel-powered mobility devices that do not pose environmental and safety concerns. The final rule allows consideration to be given as to whether the use of a fuel-powered device would create a substantial risk of serious harm to the environment

or natural or cultural resources, and to whether the use of such a device conflicts with Federal land management laws or regulations; this aspect of the final rule will further limit the inclusion of fuel-powered devices where they are not appropriate. Consequently, the Department has maintained fuel-powered devices in the definition of ''other power-driven mobility device.'' The Department has also added language to the definition of ''other power-driven mobility device'' to reiterate that the definition does not apply to Federal wilderness areas, which are not covered by title II of the ADA; the use of wheelchairs in such areas is governed by section 508(c)(2) of the ADA, 42 U.S.C. 12207(c)(2). '

''Qualified Interpreter''

In the NPRM, the Department proposed adding language to the definition of ''qualified interpreter'' to clarify that the term includes, but is not limited to, sign language interpreters, oral interpreters, and cued-speech interpreters. As the Department explained, not all interpreters are qualified for all situations. For example, a qualified interpreter who uses American Sign Language (ASL) is not necessarily qualified to interpret orally. In addition, someone with only a rudimentary familiarity with sign language or finger spelling is not qualified, nor is someone who is fluent in sign language but unable to translate spoken communication into ASL or to translate signed communication into spoken words.

As further explained, different situations will require different types of interpreters. For example, an oral interpreter who has special skill and training to mouth a speaker's words silently for individuals who are deaf or hard of hearing may be necessary for an individual who was raised orally and taught to read lips or was diagnosed with hearing loss later in life and does not know sign language. An individual who is deaf or hard of hearing may need an oral interpreter if the speaker's voice is unclear, if there is a quick-paced exchange of communication (*e.g.,* in a meeting), or when the speaker does not directly face the individual who is deaf or hard of hearing. A cued-speech interpreter functions in the same manner as an oral interpreter except that he or she also uses a hand code or cue to represent each speech sound.

The Department received many comments regarding the proposed modifications to the definition of ''interpreter.'' Many commenters requested that the Department include within the definition a requirement that interpreters be certified, particularly if they reside in a State that licenses or certifies interpreters. Other commenters opposed a certification requirement as unduly limiting, noting that an interpreter may well be qualified even if that same interpreter is not certified. These commenters noted the absence of nationwide standards or universally accepted criteria for certification.

On review of this issue, the Department has decided against imposing a certification requirement under the ADA. It is sufficient under the ADA that the interpreter be qualified. However, as the Department stated in the original preamble, this rule does not invalidate or limit State or local laws that impose standards for interpreters that are equal to or more stringent than those imposed by this definition. *See* 28 CFR part 35, app. A at 566 (2009). For instance, the definition would not supersede any requirement of State law for use of a certified interpreter in court proceedings.

With respect to the proposed additions to the rule, most commenters supported the expansion of the list of qualified interpreters, and some advocated for the inclusion of other types of interpreters on the list as well, such as deaf-blind interpreters, certified deaf interpreters, and speech-to-speech interpreters. As these commenters explained, deaf-blind interpreters are interpreters who have specialized skills and training to interpret for individuals who are deaf and blind; certified deaf interpreters are deaf

or hard of hearing interpreters who work with hearing sign language interpreters to meet the specific communication needs of deaf individuals; and speech-to-speech interpreters have special skill and training to interpret for individuals who have speech disabilities.

The list of interpreters in the definition of qualified interpreter is illustrative, and the Department does not believe it necessary or appropriate to attempt to provide an exhaustive list of qualified interpreters. Accordingly, the Department has decided not to expand the proposed list. However, if a deaf and blind individual needs interpreter services, an interpreter who is qualified to handle the needs of that individual may be required. The guiding criterion is that the public entity must provide appropriate auxiliary aids and services to ensure effective communication with the individual. Commenters also suggested various definitions for the term ''cued-speech interpreters,'' and different descriptions of the tasks they performed. After reviewing the various comments, the Department has determined that it is more accurate and appropriate to refer to such individuals as ''cued-language transliterators.'' Likewise, the Department has changed the term ''oral interpreters'' to ''oral transliterators.'' These two changes have been made to distinguish between sign language interpreters, who translate one language into another language (*e.g.*, ASL to English and English to ASL), from transliterators who interpret within the same language between deaf and hearing individuals. A cued-language transliterator is an interpreter who has special skill and training in the use of the Cued Speech system of handshapes and placements, along with non-manual information, such as facial expression and body language, to show auditory information visually, including speech and environmental sounds. An oral transliterator is an interpreter who has special skill and training to mouth a speaker's words silently for individuals who are deaf or hard of hearing. While the Department included definitions for ''cued speech interpreter'' and ''oral interpreter'' in the regulatory text proposed in the NPRM, the Department has decided that it is unnecessary to include such definitions in the text of the final rule.

Many commenters questioned the proposed deletion of the requirement that a qualified interpreter be able to interpret both receptively and expressively, noting the importance of both these skills. Commenters stated that this phrase was carefully crafted in the original regulation to make certain that interpreters both (1) are capable of understanding what a person with a disability is saying and (2) have the skills needed to convey information back to that individual. These are two very different skill sets and both are equally important to achieve effective communication. For example, in a medical setting, a sign language interpreter must have the necessary skills to understand the grammar and syntax used by an ASL user (receptive skills) and the ability to interpret complicated medical information—presented by medical staff in English—back to that individual in ASL (expressive skills). The Department agrees and has put the phrase ''both receptively and expressively'' back in the definition.

Several advocacy groups suggested that the Department make clear in the definition of qualified interpreter that the interpreter may appear either on-site or remotely using a video remote interpreting (VRI) service. Given that the Department has included in this rule both a definition of VRI services and standards that such services must satisfy, such an addition to the definition of qualified interpreter is appropriate.

After consideration of all relevant information submitted during the public comment period, the Department has modified the definition from that initially proposed in the NPRM. The final definition now states that ''[q]ualified interpreter means an interpreter who, via a video remote interpreting (VRI) service or an on-site appearance, is able to interpret effectively,

accurately, and impartially, both receptively and expressively, using any necessary specialized vocabulary. Qualified interpreters include, for example, sign language interpreters, oral transliterators, and cued-language transliterators.''

''Qualified Reader''

The 1991 title II regulation identifies a qualified reader as an auxiliary aid, but did not define the term. *See* 28 CFR 35.104(2). Based upon the Department's investigation of complaints alleging that some entities have provided ineffective readers, the Department proposed in the NPRM to define ''qualified reader'' similarly to ''qualified interpreter'' to ensure that entities select qualified individuals to read an examination or other written information in an effective, accurate, and impartial manner. This proposal was suggested in order to make clear to public entities that a failure to provide a qualified reader to a person with a disability may constitute a violation of the requirement to provide appropriate auxiliary aids and services.

The Department received comments supporting inclusion in the regulation of a definition of a ''qualified reader.'' Some commenters suggested the Department add to the definition a requirement prohibiting the use of a reader whose accent, diction, or pronunciation makes full comprehension of material being read difficult. Another commenter requested that the Department include a requirement that the reader ''will follow the directions of the person for whom he or she is reading.'' Commenters also requested that the Department define ''accurately'' and ''effectively'' as used in this definition.

While the Department believes that its proposed regulatory definition adequately addresses these concerns, the Department emphasizes that a reader, in order to be ''qualified,'' must be skilled in reading the language and subject matter and must be able to be easily understood by the individual with the disability. For example, if a reader is reading aloud the questions for a college microbiology examination, that reader, in order to be qualified, must know the proper pronunciation of scientific terminology used in the text, and must be sufficiently articulate to be easily understood by the individual with a disability for whom he or she is reading. In addition, the terms ''effectively'' and ''accurately'' have been successfully used and understood in the Department's existing definition of ''qualified interpreter'' since 1991 without specific regulatory definitions. Instead, the Department has relied upon the common use and understanding of those terms from standard English dictionaries. Thus, the definition of ''qualified reader'' has not been changed from that contained in the NPRM. The final rule defines ''qualified reader'' to mean ''a person who is able to read effectively, accurately, and impartially using any necessary specialized vocabulary.''

''Service Animal''

Although there is no specific language in the 1991 title II regulation concerning service animals, title II entities have the same legal obligations as title III entities to make reasonable modifications in policies, practices, or procedures to allow service animals when necessary in order to avoid discrimination on the basis of disability, unless the entity can demonstrate that making the modifications would fundamentally alter the nature of the service, program, or activity. *See* 28 CFR 35.130(b)(7). The 1991 title III regulation, 28 CFR 36.104, defines a ''service animal'' as ''any guide dog, signal dog, or other animal individually trained to do work or perform tasks for the benefit of an individual with a disability, including, but not limited to, guiding individuals with impaired vision, alerting individuals with impaired hearing to intruders or sounds, providing minimal protection or rescue work, pulling a wheelchair, or fetching dropped items.'' Section 36.302(c)(1) of the 1991 title III regulation requires that ''[g]enerally, a public accommodation shall modify policies, practices, or procedures to permit the use of a service animal by an individual with a

disability.'' Section 36.302(c)(2) of the 1991 title III regulation states that ''a public accommodation [is not required] to supervise or care for a service animal.''

The Department has issued guidance and provided technical assistance and publications concerning service animals since the 1991 regulations became effective. In the NPRM, the Department proposed to modify the definition of service animal, added the definition to title II, and asked for public input on several issues related to the service animal provisions of the title II regulation: whether the Department should clarify the phrase ''providing minimal protection'' in the definition or remove it; whether there are any circumstances where a service animal ''providing minimal protection'' would be appropriate or expected; whether certain species should be eliminated from the definition of ''service animal,'' and, if so, which types of animals should be excluded; whether ''common domestic animal'' should be part of the definition; and whether a size or weight limitation should be imposed for common domestic animals even if the animal satisfies the ''common domestic animal'' part of the NPRM definition.

The Department received extensive comments on these issues, as well as requests to clarify the obligations of State and local government entities to accommodate individuals with disabilities who use service animals, and has modified the final rule in response. In the interests of avoiding unnecessary repetition, the Department has elected to discuss the issues raised in the NPRM questions about service animals and the corresponding public comments in the following discussion of the definition of ''service animal.''

The Department's final rule defines ''service animal'' as ''any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability. Other species of animals, whether wild or domestic, trained or untrained, are not service animals for the purposes of this definition. The work or tasks performed by a service animal must be directly related to the individual's disability. Examples of work or tasks include, but are not limited to, assisting individuals who are blind or have low vision with navigation and other tasks, alerting individuals who are deaf or hard of hearing to the presence of people or sounds, providing non-violent protection or rescue work, pulling a wheelchair, assisting an individual during a seizure, alerting individuals to the presence of allergens, retrieving items such as medicine or the telephone, providing physical support and assistance with balance and stability to individuals with mobility disabilities, and helping persons with psychiatric and neurological disabilities by preventing or interrupting impulsive or destructive behaviors. The crime deterrent effects of an animal's presence and the provision of emotional support, well-being, comfort, or companionship do not constitute work or tasks for the purposes of this definition.''

This definition has been designed to clarify a key provision of the ADA. Many covered entities indicated that they are confused regarding their obligations under the ADA with regard to individuals with disabilities who use service animals. Individuals with disabilities who use trained guide or service dogs are concerned that if untrained or unusual animals are termed ''service animals,'' their own right to use guide or service dogs may become unnecessarily restricted or questioned. Some individuals who are not individuals with disabilities have claimed, whether fraudulently or sincerely (albeit mistakenly), that their animals are service animals covered by the ADA, in order to gain access to courthouses, city or county administrative offices, and other title II facilities. The increasing use of wild, exotic, or unusual species, many of which are untrained, as service animals has also added to the confusion.

Finally, individuals with disabilities who have the legal right under the Fair Housing Act (FHAct) to use certain animals in their homes as

a reasonable accommodation to their disabilities have assumed that their animals also qualify under the ADA. This is not necessarily the case, as discussed below.

The Department recognizes the diverse needs and preferences of individuals with disabilities protected under the ADA, and does not wish to unnecessarily impede individual choice. Service animals play an integral role in the lives of many individuals with disabilities and, with the clarification provided by the final rule, individuals with disabilities will continue to be able to use their service animals as they go about their daily activities and civic interactions. The clarification will also help to ensure that the fraudulent or mistaken use of other animals not qualified as service animals under the ADA will be deterred. A more detailed analysis of the elements of the definition and the comments responsive to the service animal provisions of the NPRM follows.

Providing minimal protection. As previously noted, the 1991 title II regulation does not contain specific language concerning service animals. The 1991 title III regulation included language stating that ''minimal protection'' was a task that could be performed by an individually trained service animal for the benefit of an individual with a disability. In the Department's ''ADA Business Brief on Service Animals'' (2002), the Department interpreted the ''minimal protection'' language within the context of a seizure (*i.e.*, alerting and protecting a person who is having a seizure). The Department received many comments in response to the question of whether the ''minimal protection'' language should be clarified. Many commenters urged the removal of the ''minimal protection'' language from the service animal definition for two reasons: (1) The phrase can be interpreted to allow any dog that is trained to be aggressive to qualify as a service animal simply by pairing the animal with a person with a disability; and (2) the phrase can be interpreted to allow any untrained pet dog to qualify as a service animal, since many consider the mere presence of a dog to be a crime deterrent, and thus sufficient to meet the minimal protection standard. These commenters argued, and the Department agrees, that these interpretations were not contemplated under the original title III regulation, and, for the purposes of the final title II regulations, the meaning of ''minimal protection'' must be made clear.

While many commenters stated that they believe that the ''minimal protection'' language should be eliminated, other commenters recommended that the language be clarified, but retained. Commenters favoring clarification of the term suggested that the Department explicitly exclude the function of attack or exclude those animals that are trained solely to be aggressive or protective. Other commenters identified nonviolent behavioral tasks that could be construed as minimally protective, such as interrupting self-mutilation, providing safety checks and room searches, reminding the individual to take medications, and protecting the individual from injury resulting from seizures or unconsciousness.

Several commenters noted that the existing direct threat defense, which allows the exclusion of a service animal if the animal exhibits unwarranted or unprovoked violent behavior or poses a direct threat, prevents the use of ''attack dogs'' as service animals. One commenter noted that the use of a service animal trained to provide ''minimal protection'' may impede access to care in an emergency, for example, where the first responder, usually a title II entity, is unable or reluctant to approach a person with a disability because the individual's service animal is in a protective posture suggestive of aggression.

Many organizations and individuals stated that in the general dog training community, ''protection'' is code for attack or aggression training and should be removed from the definition. Commenters stated that there appears to be a broadly held misconception that aggression-trained animals are appropriate service

animals for persons with post traumatic stress disorder (PTSD). While many individuals with PTSD may benefit by using a service animal, the work or tasks performed appropriately by such an animal would not involve unprovoked aggression but could include actively cuing the individual by nudging or pawing the individual to alert to the onset of an episode and removing the individual from the anxiety-provoking environment.

The Department recognizes that despite its best efforts to provide clarification, the ''minimal protection'' language appears to have been misinterpreted. While the Department maintains that protection from danger is one of the key functions that service animals perform for the benefit of persons with disabilities, the Department recognizes that an animal individually trained to provide aggressive protection, such as an attack dog, is not appropriately considered a service animal. Therefore, the Department has decided to modify the ''minimal protection'' language to read ''nonviolent protection,'' thereby excluding so-called ''attack dogs'' or dogs with traditional ''protection training'' as service animals. The Department believes that this modification to the service animal definition will eliminate confusion, without restricting unnecessarily the type of work or tasks that service animals may perform. The Department's modification also clarifies that the crime-deterrent effect of a dog's presence, by itself, does not qualify as work or tasks for purposes of the service animal definition.

Alerting to intruders. The phrase ''alerting to intruders'' is related to the issues of minimal protection and the work or tasks an animal may perform to meet the definition of a service animal. In the original 1991 regulatory text, this phrase was intended to identify service animals that alert individuals who are deaf or hard of hearing to the presence of others. This language has been misinterpreted by some to apply to dogs that are trained specifically to provide aggressive protection, resulting in the assertion that such training qualifies a dog as a service animal under the ADA. The Department reiterates that title II entities are not required to admit any animal whose use poses a direct threat under § 35.139. In addition, the Department has decided to remove the word ''intruders'' from the service animal definition and replace it with the phrase ''the presence of people or sounds.'' The Department believes this clarifies that so-called ''attack training'' or other aggressive response types of training that cause a dog to provide an aggressive response do not qualify a dog as a service animal under the ADA.

Conversely, if an individual uses a breed of dog that is perceived to be aggressive because of breed reputation, stereotype, or the history or experience the observer may have with other dogs, but the dog is under the control of the individual with a disability and does not exhibit aggressive behavior, the title II entity cannot exclude the individual or the animal from a State or local government program, service, or facility. The animal can only be removed if it engages in the behaviors mentioned in § 35.136(b) (as revised in the final rule) or if the presence of the animal constitutes a fundamental alteration to the nature of the service, program, or activity of the title II entity.

Doing ''work'' or ''performing tasks.'' The NPRM proposed that the Department maintain the requirement, first articulated in the 1991 title III regulation, that in order to qualify as a service animal, the animal must ''perform tasks'' or ''do work'' for the individual with a disability. The phrases ''perform tasks'' and ''do work'' describe what an animal must do for the benefit of an individual with a disability in order to qualify as a service animal.

The Department received a number of comments in response to the NPRM proposal urging the removal of the term ''do work'' from the definition of a service animal. These commenters argued that the Department should emphasize the performance of tasks instead. The

Department disagrees. Although the common definition of work includes the performance of tasks, the definition of work is somewhat broader, encompassing activities that do not appear to involve physical action.

One service dog user stated that in some cases, ''critical forms of assistance can't be construed as physical tasks,'' noting that the manifestations of ''brain-based disabilities,'' such as psychiatric disorders and autism, are as varied as their physical counterparts. The Department agrees with this statement but cautions that unless the animal is individually trained to do something that qualifies as work or a task, the animal is a pet or support animal and does not qualify for coverage as a service animal. A pet or support animal may be able to discern that the individual is in distress, but it is what the animal is trained to do in response to this awareness that distinguishes a service animal from an observant pet or support animal.

The NPRM contained an example of ''doing work'' that stated ''a psychiatric service dog can help some individuals with dissociative identity disorder to remain grounded in time or place.'' 73 FR 34466, 34504 (June 17, 2008). Several commenters objected to the use of this example, arguing that grounding was not a ''task'' and therefore, the example inherently contradicted the basic premise that a service animal must perform a task in order to mitigate a disability. Other commenters stated that ''grounding'' should not be included as an example of ''work'' because it could lead to some individuals claiming that they should be able to use emotional support animals in public because the dog makes them feel calm or safe. By contrast, one commenter with experience in training service animals explained that grounding is a trained task based upon very specific behavioral indicators that can be observed and measured. These tasks are based upon input from mental health practitioners, dog trainers, and individuals with a history of working with psychiatric service dogs.

It is the Department's view that an animal that is trained to ''ground'' a person with a psychiatric disorder does work or performs a task that would qualify it as a service animal as compared to an untrained emotional support animal whose presence affects a person's disability. It is the fact that the animal is trained to respond to the individual's needs that distinguishes an animal as a service animal. The process must have two steps: Recognition and response. For example, if a service animal senses that a person is about to have a psychiatric episode and it is trained to respond for example, by nudging, barking, or removing the individual to a safe location until the episode subsides, then the animal has indeed performed a task or done work on behalf of the individual with the disability, as opposed to merely sensing an event.

One commenter suggested defining the term ''task,'' presumably to improve the understanding of the types of services performed by an animal that would be sufficient to qualify the animal for coverage. The Department believes that the common definition of the word ''task'' is sufficiently clear and that it is not necessary to add to the definitions section. However, the Department has added examples of other kinds of work or tasks to help illustrate and provide clarity to the definition. After careful evaluation of this issue, the Department has concluded that the phrases ''do work'' and ''perform tasks'' have been effective during the past two decades to illustrate the varied services provided by service animals for the benefit of individuals with all types of disabilities. Thus, the Department declines to depart from its longstanding approach at this time.

Species limitations. When the Department originally issued its title III regulation in the early 1990s, the Department did not define the parameters of acceptable animal species. At that time, few anticipated the variety of animals that would be promoted as service animals in the years to come, which ranged from pigs and

miniature horses to snakes, iguanas, and parrots. The Department has followed this particular issue closely, keeping current with the many unusual species of animals represented to be service animals. Thus, the Department has decided to refine further this aspect of the service animal definition in the final rule.

The Department received many comments from individuals and organizations recommending species limitations. Several of these commenters asserted that limiting the number of allowable species would help stop erosion of the public's trust, which has resulted in reduced access for many individuals with disabilities who use trained service animals that adhere to high behavioral standards. Several commenters suggested that other species would be acceptable if those animals could meet nationally recognized behavioral standards for trained service dogs. Other commenters asserted that certain species of animals (*e.g.,* reptiles) cannot be trained to do work or perform tasks, so these animals would not be covered.

In the NPRM, the Department used the term ''common domestic animal'' in the service animal definition and excluded reptiles, rabbits, farm animals (including horses, miniature horses, ponies, pigs, and goats), ferrets, amphibians, and rodents from the service animal definition. 73 FR 34466, 34478 (June 17, 2008). However, the term ''common domestic animal'' is difficult to define with precision due to the increase in the number of domesticated species. Also, several State and local laws define a ''domestic'' animal as an animal that is not wild. The Department agrees with commenters' views that limiting the number and types of species recognized as service animals will provide greater predictability for State and local government entities as well as added assurance of access for individuals with disabilities who use dogs as service animals. As a consequence, the Department has decided to limit this rule's coverage of service animals to dogs, which are the most common service animals used by individuals with disabilities.

Wild animals, monkeys, and other nonhuman primates. Numerous business entities endorsed a narrow definition of acceptable service animal species, and asserted that there are certain animals (*e.g.,* reptiles) that cannot be trained to do work or perform tasks. Other commenters suggested that the Department should identify excluded animals, such as birds and llamas, in the final rule. Although one commenter noted that wild animals bred in captivity should be permitted to be service animals, the Department has decided to make clear that all wild animals, whether born or bred in captivity or in the wild, are eliminated from coverage as service animals. The Department believes that this approach reduces risks to health or safety attendant with wild animals. Some animals, such as certain nonhuman primates including certain monkeys, pose a direct threat; their behavior can be unpredictably aggressive and violent without notice or provocation. The American Veterinary Medical Association (AVMA) issued a position statement advising against the use of monkeys as service animals, stating that ''[t]he AVMA does not support the use of nonhuman primates as assistance animals because of animal welfare concerns, and the potential for serious injury and zoonotic [animal to human disease transmission] risks.'' AVMA Position Statement, *Nonhuman Primates as Assistance Animals,* (2005) available at *http://www.avma.org/issues/policy/ nonhuman_primates.asp* (last visited June 24, 2010).

An organization that trains capuchin monkeys to provide in-home services to individuals with paraplegia and quadriplegia was in substantial agreement with the AVMA's views but requested a limited recognition in the service animal definition for the capuchin monkeys it trains to provide assistance for persons with disabilities. The organization commented that its trained capuchin monkeys undergo scrupulous veterinary examinations to ensure that the animals pose

no health risks, and are used by individuals with disabilities exclusively in their homes. The organization acknowledged that the capuchin monkeys it trains are not necessarily suitable for use in State or local government facilities. The organization noted that several State and local government entities have local zoning, licensing, health, and safety laws that prohibit nonhuman primates, and that these prohibitions would prevent individuals with disabilities from using these animals even in their homes.

The organization argued that including capuchin monkeys under the service animal umbrella would make it easier for individuals with disabilities to obtain reasonable modifications of State and local licensing, health, and safety laws that would permit the use of these monkeys. The organization argued that this limited modification to the service animal definition was warranted in view of the services these monkeys perform, which enable many individuals with paraplegia and quadriplegia to live and function with increased independence.

The Department has carefully considered the potential risks associated with the use of nonhuman primates as service animals in State and local government facilities, as well as the information provided to the Department about the significant benefits that trained capuchin monkeys provide to certain individuals with disabilities in residential settings. The Department has determined, however, that nonhuman primates, including capuchin monkeys, will not be recognized as service animals for purposes of this rule because of their potential for disease transmission and unpredictable aggressive behavior. The Department believes that these characteristics make nonhuman primates unsuitable for use as service animals in the context of the wide variety of public settings subject to this rule. As the organization advocating the inclusion of capuchin monkeys acknowledges, capuchin monkeys are not suitable for use in public facilities.

The Department emphasizes that it has decided only that capuchin monkeys will not be included in the definition of service animals for purposes of its regulation implementing the ADA. This decision does not have any effect on the extent to which public entities are required to allow the use of such monkeys under other Federal statutes. For example, under the FHAct, an individual with a disability may have the right to have an animal other than a dog in his or her home if the animal qualifies as a ''reasonable accommodation'' that is necessary to afford the individual equal opportunity to use and enjoy a dwelling, assuming that the use of the animal does not pose a direct threat. In some cases, the right of an individual to have an animal under the FHAct may conflict with State or local laws that prohibit all individuals, with or without disabilities, from owning a particular species. However, in this circumstance, an individual who wishes to request a reasonable modification of the State or local law must do so under the FHAct, not the ADA.

Having considered all of the comments about which species should qualify as service animals under the ADA, the Department has determined the most reasonable approach is to limit acceptable species to dogs.

Size or weight limitations. The vast majority of commenters did not support a size or weight limitation. Commenters were typically opposed to a size or weight limit because many tasks performed by service animals require large, strong dogs. For instance, service animals may perform tasks such as providing balance and support or pulling a wheelchair. Small animals may not be suitable for large adults. The weight of the service animal user is often correlated with the size and weight of the service animal. Others were concerned that adding a size and weight limit would further complicate the difficult process of finding an appropriate service animal. One commenter noted that there is no need for a limit because ''if, as a practical matter, the size or weight of an individual's service animal

creates a direct threat or fundamental alteration to a particular public entity or accommodation, there are provisions that allow for the animal's exclusion or removal.'' Some common concerns among commenters in support of a size and weight limit were that a larger animal may be less able to fit in various areas with its handler, such as toilet rooms and public seating areas, and that larger animals are more difficult to control.

Balancing concerns expressed in favor of and against size and weight limitations, the Department has determined that such limitations would not be appropriate. Many individuals of larger stature require larger dogs. The Department believes it would be inappropriate to deprive these individuals of the option of using a service dog of the size required to provide the physical support and stability these individuals may need to function independently. Since large dogs have always served as service animals, continuing their use should not constitute fundamental alterations or impose undue burdens on title II entities.

Breed limitations. A few commenters suggested that certain breeds of dogs should not be allowed to be used as service animals. Some suggested that the Department should defer to local laws restricting the breeds of dogs that individuals who reside in a community may own. Other commenters opposed breed restrictions, stating that the breed of a dog does not determine its propensity for aggression and that aggressive and non-aggressive dogs exist in all breeds.

The Department does not believe that it is either appropriate or consistent with the ADA to defer to local laws that prohibit certain breeds of dogs based on local concerns that these breeds may have a history of unprovoked aggression or attacks. Such deference would have the effect of limiting the rights of persons with disabilities under the ADA who use certain service animals based on where they live rather than on whether the use of a particular animal poses a direct threat to the health and safety of others. Breed restrictions differ significantly from jurisdiction to jurisdiction. Some jurisdictions have no breed restrictions. Others have restrictions that, while well-meaning, have the unintended effect of screening out the very breeds of dogs that have successfully served as service animals for decades without a history of the type of unprovoked aggression or attacks that would pose a direct threat, *e.g.,* German Shepherds. Other jurisdictions prohibit animals over a certain weight, thereby restricting breeds without invoking an express breed ban. In addition, deference to breed restrictions contained in local laws would have the unacceptable consequence of restricting travel by an individual with a disability who uses a breed that is acceptable and poses no safety hazards in the individual's home jurisdiction but is nonetheless banned by other jurisdictions. State and local government entities have the ability to determine, on a case-by-case basis, whether a particular service animal can be excluded based on that particular animal's actual behavior or history—not based on fears or generalizations about how an animal or breed might behave. This ability to exclude an animal whose behavior or history evidences a direct threat is sufficient to protect health and safety.

Recognition of psychiatric service animals but not "emotional support animals." The definition of ''service animal'' in the NPRM stated the Department's longstanding position that emotional support animals are not included in the definition of ''service animal.'' The proposed text in § 35.104 provided that ''[a]nimals whose sole function is to provide emotional support, comfort, therapy, companionship, therapeutic benefits or to promote emotional well-being are not service animals.'' 73 FR 34466, 34504 (June 17, 2008).

Many advocacy organizations expressed concern and disagreed with the exclusion of comfort and emotional support animals. Others have been more specific, stating that individuals with disabilities may need their emotional support animals in order to have equal access. Some commenters noted that individuals with

disabilities use animals that have not been trained to perform tasks directly related to their disability. These animals do not qualify as service animals under the ADA. These are emotional support or comfort animals.

Commenters asserted that excluding categories such as ''comfort'' and ''emotional support'' animals recognized by laws such as the FHAct or the Air Carrier Access Act (ACAA) is confusing and burdensome. Other commenters noted that emotional support and comfort animals perform an important function, asserting that animal companionship helps individuals who experience depression resulting from multiple sclerosis.

Some commenters explained the benefits emotional support animals provide, including emotional support, comfort, therapy, companionship, therapeutic benefits, and the promotion of emotional well-being. They contended that without the presence of an emotional support animal in their lives they would be disadvantaged and unable to participate in society. These commenters were concerned that excluding this category of animals will lead to discrimination against, and the excessive questioning of, individuals with non-visible or non-apparent disabilities. Other commenters expressing opposition to the exclusion of individually trained ''comfort'' or ''emotional support'' animals asserted that the ability to soothe or de-escalate and control emotion is ''work'' that benefits the individual with the disability.

Many commenters requested that the Department carve out an exception that permits current or former members of the military to use emotional support animals. They asserted that a significant number of service members returning from active combat duty have adjustment difficulties due to combat, sexual assault, or other traumatic experiences while on active duty. Commenters noted that some current or former members of the military service have been prescribed animals for conditions such as PTSD. One commenter stated that service women who were sexually assaulted while in the military use emotional support animals to help them feel safe enough to step outside their homes. The Department recognizes that many current and former members of the military have disabilities as a result of service-related injuries that may require emotional support and that such individuals can benefit from the use of an emotional support animal and could use such animal in their home under the FHAct. However, having carefully weighed the issues, the Department believes that its final rule appropriately addresses the balance of issues and concerns of both the individual with a disability and the public entity. The Department also notes that nothing in this part prohibits a public entity from allowing current or former military members or anyone else with disabilities to utilize emotional support animals if it wants to do so.

Commenters asserted the view that if an animal's ''mere presence'' legitimately provides such benefits to an individual with a disability and if those benefits are necessary to provide equal opportunity given the facts of the particular disability, then such an animal should qualify as a ''service animal.'' Commenters noted that the focus should be on the nature of a person's disability, the difficulties the disability may impose and whether the requested accommodation would legitimately address those difficulties, not on evaluating the animal involved. The Department understands this approach has benefitted many individuals under the FHAct and analogous State law provisions, where the presence of animals poses fewer health and safety issues, and where emotional support animals provide assistance that is unique to residential settings. The Department believes, however, that the presence of such animals is not required in the context of title II entities such as courthouses, State and local government administrative buildings, and similar title II facilities.

Under the Department's previous regulatory framework, some individuals and entities assumed

that the requirement that service animals must be individually trained to do work or perform tasks excluded all individuals with mental disabilities from having service animals. Others assumed that any person with a psychiatric condition whose pet provided comfort to them was covered by the 1991 title II regulation. The Department reiterates that psychiatric service animals that are trained to do work or perform a task for individuals whose disability is covered by the ADA are protected by the Department's present regulatory approach. Psychiatric service animals can be trained to perform a variety of tasks that assist individuals with disabilities to detect the onset of psychiatric episodes and ameliorate their effects. Tasks performed by psychiatric service animals may include reminding the individual to take medicine, providing safety checks or room searches for persons with PTSD, interrupting self-mutilation, and removing disoriented individuals from dangerous situations.

The difference between an emotional support animal and a psychiatric service animal is the work or tasks that the animal performs. Traditionally, service dogs worked as guides for individuals who were blind or had low vision. Since the original regulation was promulgated, service animals have been trained to assist individuals with many different types of disabilities.

In the final rule, the Department has retained its position on the exclusion of emotional support animals from the definition of ''service animal.'' The definition states that ''[t]he provision of emotional support, well-being, comfort, or companionship, * * * do[es] not constitute work or tasks for the purposes of this definition.'' The Department notes, however, that the exclusion of emotional support animals from coverage in the final rule does not mean that individuals with psychiatric or mental disabilities cannot use service animals that meet the regulatory definition. The final rule defines service animal as follows: ''[s]ervice animal means any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability.'' This language simply clarifies the Department's longstanding position.

The Department's position is based on the fact that the title II and title III regulations govern a wider range of public settings than the housing and transportation settings for which the Department of Housing and Urban Development (HUD) and DOT regulations allow emotional support animals or comfort animals. The Department recognizes that there are situations not governed by the title II and title III regulations, particularly in the context of residential settings and transportation, where there may be a legal obligation to permit the use of animals that do not qualify as service animals under the ADA, but whose presence nonetheless provides necessary emotional support to persons with disabilities. Accordingly, other Federal agency regulations, case law, and possibly State or local laws governing those situations may provide appropriately for increased access for animals other than service animals as defined under the ADA. Public officials, housing providers, and others who make decisions relating to animals in residential and transportation settings should consult the Federal, State, and local laws that apply in those areas (*e.g.,* the FHAct regulations of HUD and the ACAA) and not rely on the ADA as a basis for reducing those obligations.

Retain term "service animal." Some commenters asserted that the term ''assistance animal'' is a term of art and should replace the term ''service animal.'' However, the majority of commenters preferred the term ''service animal'' because it is more specific. The Department has decided to retain the term ''service animal'' in the final rule. While some agencies, like HUD, use the term ''assistance animal,'' ''assistive animal,'' or ''support animal,'' these terms are used to denote a broader category of animals

than is covered by the ADA. The Department has decided that changing the term used in the final rule would create confusion, particularly in view of the broader parameters for coverage under the FHAct, *cf*., preamble to HUD's Final Rule for Pet Ownership for the Elderly and Persons with Disabilities, 73 FR 63834–38 (Oct. 27, 2008); HUD Handbook No. 4350.3 Rev–1, Chapter 2, Occupancy Requirements of Subsidized Multifamily Housing Programs (June 2007), available at *http://www.hud.gov/offices/adm/hudclips/handbooks/hsgh/4350.3* (last visited June 24, 2010). Moreover, as discussed above, the Department's definition of ''service animal'' in the title II final rule does not affect the rights of individuals with disabilities who use assistance animals in their homes under the FHAct or who use ''emotional support animals'' that are covered under the ACAA and its implementing regulations. *See* 14 CFR 382.7 *et seq*.; *see also* Department of Transportation, *Guidance Concerning Service Animals in Air Transportation*, 68 FR 24874, 24877 (May 9, 2003) (discussing accommodation of service animals and emotional support animals on aircraft).

''Video Remote Interpreting'' (VRI) Services

In the NPRM, the Department proposed adding Video Interpreting Services (VIS) to the list of auxiliary aids available to provide effective communication described in § 35.104. In the preamble to the NPRM, VIS was defined as ''a technology composed of a video phone, video monitors, cameras, a high-speed Internet connection, and an interpreter. The video phone provides video transmission to a video monitor that permits the individual who is deaf or hard of hearing to view and sign to a video interpreter (*i.e.*, a live interpreter in another location), who can see and sign to the individual through a camera located on or near the monitor, while others can communicate by speaking. The video monitor can display a split screen of two live images, with the interpreter in one image and the individual who is deaf or hard of hearing in the other image.'' 73 FR 34446, 34479 (June 17, 2008). Comments from advocacy organizations and individuals unanimously requested that the Department use the term ''video remote interpreting (VRI),'' instead of VIS, for consistency with Federal Communications Commission (FCC) regulations. *See* FCC Public Notice, DA– 0502417 (Sept. 7, 2005), and with common usage by consumers. The Department has made that change throughout the regulation to avoid confusion and to make the regulation more consistent with existing regulations.

Many commenters also requested that the Department distinguish between VRI and ''video relay service (VRS).'' Both VRI and VRS use a remote interpreter who is able to see and communicate with a deaf person and a hearing person, and all three individuals may be connected by a video link. VRI is a fee-based interpreting service conveyed via videoconferencing where at least one person, typically the interpreter, is at a separate location. VRI can be provided as an on-demand service or by appointment. VRI normally involves a contract in advance for the interpreter who is usually paid by the covered entity.

VRS is a telephone service that enables persons with disabilities to use the telephone to communicate using video connections and is a more advanced form of relay service than the traditional voice to text telephones (TTY) relay systems that were recognized in the 1991 title II regulation. More specifically, VRS is a video relay service using interpreters connected to callers by video hook-up and is designed to provide telephone services to persons who are deaf and use American Sign Language that are functionally equivalent to those provided to users who are hearing. VRS is funded through the Interstate Telecommunications Relay Services Fund and overseen by the FCC. *See* 47 CFR 64.601(a)(26). There are no fees for callers to use the VRS interpreters and the video connection, although there may be relatively inexpensive initial costs

to the title II entities to purchase the videophone or camera for on-line video connection, or other equipment to connect to the VRS service. The FCC has made clear that VRS functions as a telephone service and is not intended to be used for interpreting services where both parties are in the same room; the latter is reserved for VRI. The Department agrees that VRS cannot be used as a substitute for in-person interpreters or for VRI in situations that would not, absent one party's disability, entail use of the telephone.

Many commenters strongly recommended limiting the use of VRI to circumstances where it will provide effective communication. Commenters from advocacy groups and persons with disabilities expressed concern that VRI may not always be appropriate to provide effective communication, especially in hospitals and emergency rooms. Examples were provided of patients who are unable to see the video monitor because they are semi-conscious or unable to focus on the video screen; other examples were given of cases where the video monitor is out of the sightline of the patient or the image is out of focus; still other examples were given of patients who could not see the image because the signal was interrupted, causing unnatural pauses in the communication, or the image was grainy or otherwise unclear. Many commenters requested more explicit guidelines on the use of VRI, and some recommended requirements for equipment maintenance, high-speed, wide-bandwidth video links using dedicated lines or wireless systems, and training of staff using VRI, especially in hospital and health care situations. Several major organizations requested a requirement to include the interpreter's face, head, arms, hands, and eyes in all transmissions. Finally, one State agency asked for additional guidance, outreach, and mandated advertising about the availability of VRI in title II situations so that local government entities would budget for and facilitate the use of VRI in libraries, schools, and other places.

After consideration of the comments and the Department's own research and experience, the Department has determined that VRI can be an effective method of providing interpreting services in certain circumstances, but not in others. For example, VRI should be effective in many situations involving routine medical care, as well as in the emergency room where urgent care is important, but no in-person interpreter is available; however, VRI may not be effective in situations involving surgery or other medical procedures where the patient is limited in his or her ability to see the video screen. Similarly, VRI may not be effective in situations where there are multiple people in a room and the information exchanged is highly complex and fast-paced. The Department recognizes that in these and other situations, such as where communication is needed for persons who are deaf-blind, it may be necessary to summon an in-person interpreter to assist certain individuals. To ensure that VRI is effective in situations where it is appropriate, the Department has established performance standards in § 35.160(d).

Subpart B—General Requirements

Section 35.130(h) Safety.

Section 36.301(b) of the 1991 title III regulation provides that a public accommodation ''may impose legitimate safety requirements that are necessary for safe operation. Safety requirements must be based on actual risks, and not on mere speculation, stereotypes, or generalizations about individuals with disabilities.'' 28 CFR 36.301(b). Although the 1991 title II regulation did not include similar language, the Department's 1993 ADA Title II Technical Assistance Manual at II–3.5200 makes clear the Department's view that public entities also have the right to impose legitimate safety requirements necessary for the safe operation of services, programs, or activities. To ensure consistency between the title II and title III regulations, the Department has added a new

§ 35.130(h) in the final rule incorporating this longstanding position relating to imposition of legitimate safety requirements.

Section 35.133 Maintenance of accessible features.

Section 35.133 in the 1991 title II regulation provides that a public entity must maintain in operable working condition those features of facilities and equipment that are required to be readily accessible to and usable by qualified individuals with disabilities. *See* 28 CFR 35.133(a). In the NPRM, the Department clarified the application of this provision and proposed one change to the section to address the discrete situation in which the scoping requirements provided in the 2010 Standards reduce the number of required elements below the requirements of the 1991 Standards. In that discrete event, a public entity may reduce such accessible features in accordance with the requirements in the 2010 Standards.

The Department received only four comments on this proposed amendment. None of the commenters opposed the change. In the final rule, the Department has revised the section to make it clear that if the 2010 Standards reduce either the technical requirements or the number of required accessible elements below that required by the 1991 Standards, then the public entity may reduce the technical requirements or the number of accessible elements in a covered facility in accordance with the requirements of the 2010 Standards.

One commenter urged the Department to amend § 35.133(b) to expand the language of the section to restocking of shelves as a permissible activity for isolated or temporary interruptions in service or access. It is the Department's position that a temporary interruption that blocks an accessible route, such as restocking of shelves, is already permitted by § 35.133(b), which clarifies that ''isolated or temporary interruptions in service or access due to maintenance or repairs'' are permitted. Therefore, the Department will not make any additional changes in the final rule to the language of § 35.133(b) other than those discussed in the preceding paragraph.

Section 35.136 Service animals.

The 1991 title II regulation states that ''[a] public entity shall make reasonable modifications in policies, practices, or procedures when the modifications are necessary to avoid discrimination on the basis of disability, unless the public entity can demonstrate that making the modifications would fundamentally alter the nature of the service, program or activity.'' 28 CFR 130(b)(7). Unlike the title III regulation, the 1991 title II regulation did not contain a specific provision addressing service animals.

In the NPRM, the Department stated the intention of providing the broadest feasible access to individuals with disabilities and their service animals, unless a public entity can demonstrate that making the modifications to policies excluding animals would fundamentally alter the nature of the public entity's service, program, or activity. The Department proposed creating a new § 35.136 addressing service animals that was intended to retain the scope of the 1991 title III regulation at § 36.302(c), while clarifying the Department's longstanding policies and interpretations, as outlined in published technical assistance, *Commonly Asked Questions About Service Animals in Places of Business* (1996), available at *http:// www.ada.gov/qasrvc.ftm* and *ADA Guide for Small Businesses* (1999), available at *http:// www.ada.gov/smbustxt.htm*, and to add that a public entity may exclude a service animal in certain circumstances where the service animal fails to meet certain behavioral standards. The Department received extensive comments in response to proposed § 35.136 from individuals, disability advocacy groups, organizations involved in training service animals, and public entities.

Those comments and the Department's response are discussed below.

Exclusion of service animals. In the NPRM, the Department proposed incorporating the title III regulatory language of § 36.302(c) into new § 35.136(a), which states that ''[g]enerally, a public entity shall modify its policies, practices, or procedures to permit the use of a service animal by an individual with a disability, unless the public entity can demonstrate that the use of a service animal would fundamentally alter the public entity's service, program, or activity.'' The final rule retains this language with some modifications.

In addition, in the NPRM, the Department proposed clarifying those circumstances where otherwise eligible service animals may be excluded by public entities from their programs or facilities. The Department proposed in § 35.136(b)(1) of the NPRM that a public entity may ask an individual with a disability to remove a service animal from a title II service, program, or activity if: ''[t]he animal is out of control and the animal's handler does not take effective action to control it.'' 73 FR 34466, 34504 (June 17, 2008).

The Department has long held that a service animal must be under the control of the handler at all times. Commenters overwhelmingly were in favor of this language, but noted that there are occasions when service animals are provoked to disruptive or aggressive behavior by agitators or troublemakers, as in the case of a blind individual whose service dog is taunted or pinched. While all service animals are trained to ignore and overcome these types of incidents, misbehavior in response to provocation is not always unreasonable. In circumstances where a service animal misbehaves or responds reasonably to a provocation or injury, the public entity must give the handler a reasonable opportunity to gain control of the animal. Further, if the individual with a disability asserts that the animal was provoked or injured, or if the public entity otherwise has reason to suspect that provocation or injury has occurred, the public entity should seek to determine the facts and, if provocation or injury occurred, the public entity should take effective steps to prevent further provocation or injury, which may include asking the provocateur to leave the public entity. This language is unchanged in the final rule.

The NPRM also proposed language at § 35.136(b)(2) to permit a public entity to exclude a service animal if the animal is not housebroken (*i.e.*, trained so that, absent illness or accident, the animal controls its waste elimination) or the animal's presence or behavior fundamentally alters the nature of the service the public entity provides (*e.g.,* repeated barking during a live performance). Several commenters were supportive of this NPRM language, but cautioned against overreaction by the public entity in these instances. One commenter noted that animals get sick, too, and that accidents occasionally happen. In these circumstances, simple clean up typically addresses the incident. Commenters noted that the public entity must be careful when it excludes a service animal on the basis of ''fundamental alteration,'' asserting for example that a public entity should not exclude a service animal for barking in an environment where other types of noise, such as loud cheering or a child crying, is tolerated. The Department maintains that the appropriateness of an exclusion can be assessed by reviewing how a public entity addresses comparable situations that do not involve a service animal. The Department has retained in § 35.136(b) of the final rule the exception requiring animals to be housebroken. The Department has not retained the specific NPRM language stating that animals can be excluded if their presence or behavior fundamentally alters the nature of the service provided by the public entity, because the Department believes that this exception is covered by the general reasonable modification requirement contained in § 35.130(b)(7).

The NPRM also proposed at § 35.136(b)(3) that a service animal can be excluded where ''[t]he animal poses a direct threat to the health or safety of others that cannot be eliminated by reasonable modifications.'' 73 FR 34466, 34504 (June 17, 2008). Commenters were universally supportive of this provision as it makes express the discretion of a public entity to exclude a service animal that poses a direct threat. Several commenters cautioned against the overuse of this provision and suggested that the Department provide an example of the rule's application. The Department has decided not to include regulatory language specifically stating that a service animal can be excluded if it poses a direct threat. The Department believes that the addition of new § 35.139, which incorporates the language of the title III provisions at § 36.302 relating to the general defense of direct threat, is sufficient to establish the availability of this defense to public entities.

Access to a public entity following the proper exclusion of a service animal. The NPRM proposed that in the event a public entity properly excludes a service animal, the public entity must give the individual with a disability the opportunity to access the programs, services, and facilities of the public entity without the service animal. Most commenters welcomed this provision as a common sense approach. These commenters noted that they do not wish to preclude individuals with disabilities from the full and equal enjoyment of the State or local government's programs, services, or facilities, simply because of an isolated problem with a service animal. The Department has elected to retain this provision in § 35.136(a).

Other requirements. The NPRM also proposed that the regulation include the following requirements: that the work or tasks performed by the service animal must be directly related to the handler's disability; that a service animal must be individually trained to do work or perform a task, be housebroken, and be under the control of the handler; and that a service animal must have a harness, leash, or other tether. Most commenters addressed at least one of these issues in their responses. Most agreed that these provisions are important to clarify further the 1991 service animal regulation. The Department has moved the requirement that the work or tasks performed by the service animal must be related directly to the individual's disability to the definition of ''service animal'' in § 35.104. In addition, the Department has modified the proposed language in § 35.136(d) relating to the handler's control of the animal with a harness, leash, or other tether to state that ''[a] service animal shall have a harness, leash, or other tether, unless either the handler is unable because of a disability to use a harness, leash, or other tether, or the use of a harness, leash, or other tether would interfere with the service animal's safe, effective performance of work or tasks, in which case the service animal must be otherwise under the handler's control (*e.g.*, voice control, signals, or other effective means).'' The Department has retained the requirement that the service animal must be individually trained (*see* Appendix A discussion of § 35.104, definition of ''service animal''), as well as the requirement that the service animal be housebroken.

Responsibility for supervision and care of a service animal. The NPRM proposed language at § 35.136(e) stating that ''[a] public entity is not responsible for caring for or supervising a service animal.'' 73 FR 34466, 34504 (June 17, 2008). Most commenters did not address this particular provision. The Department recognizes that there are occasions when a person with a disability is confined to bed in a hospital for a period of time. In such an instance, the individual may not be able to walk or feed the service animal. In such cases, if the individual has a family member, friend, or other person willing to take on these responsibilities in the place of the individual with disabilities, the individual's obligation to be responsible for the care and supervision of the

service animal would be satisfied. The language of this section is retained, with minor modifications, in § 35.136(e) of the final rule.

Inquiries about service animals. The NPRM proposed language at § 35.136(f) setting forth parameters about how a public entity may determine whether an animal qualifies as a service animal. The proposed section stated that a public entity may ask if the animal is required because of a disability and what task or work the animal has been trained to do but may not require proof of service animal certification or licensing. Such inquiries are limited to eliciting the information necessary to make a decision without requiring disclosure of confidential disability-related information that a State or local government entity does not need. This language is consistent with the policy guidance outlined in two Department publications, *Commonly Asked Questions about Service Animals in Places of Business* (1996), available at *http:// www.ada.gov/qasrvc.htm*, and *ADA Guide for Small Businesses,* (1999), available at *http:// www.ada.gov/smbustxt.htm*.

Although some commenters contended that the NPRM service animal provisions leave unaddressed the issue of how a public entity can distinguish between a psychiatric service animal, which is covered under the final rule, and a comfort animal, which is not, other commenters noted that the Department's published guidance has helped public entities to distinguish between service animals and pets on the basis of an individual's response to these questions. Accordingly, the Department has retained the NPRM language incorporating its guidance concerning the permissible questions into the final rule.

Some commenters suggested that a title II entity be allowed to require current documentation, no more than one year old, on letterhead from a mental health professional stating the following: (1) That the individual seeking to use the animal has a mental health-related disability; (2) that having the animal accompany the individual is necessary to the individual's mental health or treatment or to assist the person otherwise; and (3) that the person providing the assessment of the individual is a licensed mental health professional and the individual seeking to use the animal is under that individual's professional care. These commenters asserted that this will prevent abuse and ensure that individuals with legitimate needs for psychiatric service animals may use them. The Department believes that this proposal would treat persons with psychiatric, intellectual, and other mental disabilities less favorably than persons with physical or sensory disabilities. The proposal would also require persons with disabilities to obtain medical documentation and carry it with them any time they seek to engage in ordinary activities of daily life in their communities—something individuals without disabilities have not been required to do. Accordingly, the Department has concluded that a documentation requirement of this kind would be unnecessary, burdensome, and contrary to the spirit, intent, and mandates of the ADA.

Areas of a public entity open to the public, participants in services, programs, or activities, or invitees. The NPRM proposed at § 35.136(g) that an individual with a disability who uses a service animal has the same right of access to areas of a title II entity as members of the public, participants in services, programs, or activities, or invitees. Commenters indicated that allowing individuals with disabilities to go with their service animals into the same areas as members of the public, participants in programs, services, or activities, or invitees is accepted practice by most State and local government entities. The Department has included a slightly modified version of this provision in § 35.136(g) of the final rule.

The Department notes that under the final rule, a healthcare facility must also permit a person with a disability to be accompanied by a service animal in all areas of the facility in which that

person would otherwise be allowed. There are some exceptions, however. The Department follows the guidance of the Centers for Disease Control and Prevention (CDC) on the use of service animals in a hospital setting. Zoonotic diseases can be transmitted to humans through bites, scratches, direct contact, arthropod vectors, or aerosols.

Consistent with CDC guidance, it is generally appropriate to exclude a service animal from limited-access areas that employ general infection-control measures, such as operating rooms and burn units. *See* Centers for Disease Control and Prevention, *Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee* (June 2003), available at *http://www.cdc.gov/hicpac/pdf/guidelines/ eic_in_HCF_03.pdf* (last visited June 24, 2010). A service animal may accompany its handler to such areas as admissions and discharge offices, the emergency room, inpatient and outpatient rooms, examining and diagnostic rooms, clinics, rehabilitation therapy areas, the cafeteria and vending areas, the pharmacy, restrooms, and all other areas of the facility where healthcare personnel, patients, and visitors are permitted without added precaution.

Prohibition against surcharges for use of a service animal. In the NPRM, the Department proposed to incorporate the previously mentioned policy guidance, which prohibits the assessment of a surcharge for the use of a service animal, into proposed § 35.136(h). Several commenters agreed that this provision makes clear the obligation of a public entity to admit an individual with a service animal without surcharges, and that any additional costs imposed should be factored into the overall cost of administering a program, service, or activity, and passed on as a charge to all participants, rather than an individualized surcharge to the service animal user. Commenters also noted that service animal users cannot be required to comply with other requirements that are not generally applicable to other persons. If a public entity normally charges individuals for the damage they cause, an individual with a disability may be charged for damage caused by his or her service animal. The Department has retained this language, with minor modifications, in the final rule at § 35.136(h).

Training requirement. Certain commenters recommended the adoption of formal training requirements for service animals. The Department has rejected this approach and will not impose any type of formal training requirements or certification process, but will continue to require that service animals be individually trained to do work or perform tasks for the benefit of an individual with a disability. While some groups have urged the Department to modify this position, the Department has determined that such a modification would not serve the full array of individuals with disabilities who use service animals, since individuals with disabilities may be capable of training, and some have trained, their service animal to perform tasks or do work to accommodate their disability. A training and certification requirement would increase the expense of acquiring a service animal and might limit access to service animals for individuals with limited financial resources.

Some commenters proposed specific behavior or training standards for service animals, arguing that without such standards, the public has no way to differentiate between untrained pets and service animals. Many of the suggested behavior or training standards were lengthy and detailed. The Department believes that this rule addresses service animal behavior sufficiently by including provisions that address the obligations of the service animal user and the circumstances under which a service animal may be excluded, such as the requirements that an animal be housebroken and under the control of its handler.

Miniature horses. The Department has been persuaded by commenters and the available research to include a provision that would require

public entities to make reasonable modifications to policies, practices, or procedures to permit the use of a miniature horse by a person with a disability if the miniature horse has been individually trained to do work or perform tasks for the benefit of the individual with a disability. The traditional service animal is a dog, which has a long history of guiding individuals who are blind or have low vision, and over time dogs have been trained to perform an even wider variety of services for individuals with all types of disabilities. However, an organization that developed a program to train miniature horses, modeled on the program used for guide dogs, began training miniature horses in 1991.

Although commenters generally supported the species limitations proposed in the NPRM, some were opposed to the exclusion of miniature horses from the definition of a service animal. These commenters noted that these animals have been providing assistance to persons with disabilities for many years. Miniature horses were suggested by some commenters as viable alternatives to dogs for individuals with allergies, or for those whose religious beliefs preclude the use of dogs. Another consideration mentioned in favor of the use of miniature horses is the longer life span and strength of miniature horses in comparison to dogs. Specifically, miniature horses can provide service for more than 25 years while dogs can provide service for approximately 7 years, and, because of their strength, miniature horses can provide services that dogs cannot provide. Accordingly, use of miniature horses reduces the cost involved to retire, replace, and train replacement service animals.

The miniature horse is not one specific breed, but may be one of several breeds, with distinct characteristics that produce animals suited to service animal work. The animals generally range in height from 24 inches to 34 inches measured to the withers, or shoulders, and generally weigh between 70 and 100 pounds. These characteristics are similar to those of large breed dogs such as Labrador Retrievers, Great Danes, and Mastiffs. Similar to dogs, miniature horses can be trained through behavioral reinforcement to be ''housebroken.'' Most miniature service horse handlers and organizations recommend that when the animals are not doing work or performing tasks, the miniature horses should be kept outside in a designated area, instead of indoors in a house.

According to information provided by an organization that trains service horses, these miniature horses are trained to provide a wide array of services to their handlers, primarily guiding individuals who are blind or have low vision, pulling wheelchairs, providing stability and balance for individuals with disabilities that impair the ability to walk, and supplying leverage that enables a person with a mobility disability to get up after a fall. According to the commenter, miniature horses are particularly effective for large stature individuals. The animals can be trained to stand (and in some cases, lie down) at the handler's feet in venues where space is at a premium, such as assembly areas or inside some vehicles that provide public transportation. Some individuals with disabilities have traveled by train and have flown commercially with their miniature horses.

The miniature horse is not included in the definition of service animal, which is limited to dogs. However, the Department has added a specific provision at § 35.136(i) of the final rule covering miniature horses. Under this provision, a public entity must make reasonable modifications in policies, practices, or procedures to permit the use of a miniature horse by an individual with a disability if the miniature horse has been individually trained to do work or perform tasks for the benefit of the individual with a disability. The public entity may take into account a series of assessment factors in determining whether to allow a miniature horse into a specific facility. These include the type, size, and weight of the miniature horse; whether the handler has sufficient

control of the miniature horse; whether the miniature horse is housebroken; and whether the miniature horse's presence in a specific facility compromises legitimate safety requirements that are necessary for safe operation. In addition, paragraphs (c)–(h) of this section, which are applicable to dogs, also apply to miniature horses.

Ponies and full-size horses are not covered by § 35.136(i). Also, because miniature horses can vary in size and can be larger and less flexible than dogs, covered entities may exclude this type of service animal if the presence of the miniature horse, because of its larger size and lower level of flexibility, results in a fundamental alteration to the nature of the programs activities, or services provided.

Section 35.137 Mobility devices.

Section 35.137 of the NPRM clarified the scope and circumstances under which covered entities are legally obligated to accommodate various ''mobility devices.'' Section 35.137 set forth specific requirements for the accommodation of ''mobility devices,'' including wheelchairs, manually-powered mobility aids, and other power-driven mobility devices.

In both the NPRM and the final rule, § 35.137(a) states the general rule that in any areas open to pedestrians, public entities shall permit individuals with mobility disabilities to use wheelchairs and manually-powered mobility aids, including walkers, crutches, canes, braces, or similar devices. Because mobility scooters satisfy the definition of ''wheelchair'' (*i.e.*, ''manually-operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor, or of both indoor and outdoor locomotion''), the reference to them in § 35.137(a) of the final rule has been omitted to avoid redundancy.

Some commenters expressed concern that permitting the use of other power-driven mobility devices by individuals with mobility disabilities would make such devices akin to wheelchairs and would require them to make physical changes to their facilities to accommodate their use. This concern is misplaced. If a facility complies with the applicable design requirements in the 1991 Standards or the 2010 Standards, the public entity will not be required to exceed those standards to accommodate the use of wheelchairs or other power-driven mobility devices that exceed those requirements.

Legal standard for other power-driven mobility devices. The NPRM version of § 35.137(b) provided that ''[a] public entity shall make reasonable modifications in its policies, practices, and procedures to permit the use of other power-driven mobility devices by individuals with disabilities, unless the public entity can demonstrate that the use of the device is not reasonable or that its use will result in a fundamental alteration in the public entity's service, program, or activity.'' 73 FR 34466, 34505 (June 17, 2008). In other words, public entities are by default required to permit the use of other power-driven mobility devices; the burden is on them to prove the existence of a valid exception.

Most commenters supported the notion of assessing whether the use of a particular device is reasonable in the context of a particular venue. Commenters, however, disagreed about the meaning of the word ''reasonable'' as it is used in § 35.137(b) of the NPRM. Advocacy and nonprofit groups almost universally objected to the use of a general reasonableness standard with regard to the assessment of whether a particular device should be allowed at a particular venue. They argued that the assessment should be based on whether reasonable modifications could be made to allow a particular device at a particular venue, and that the only factors that should be part of the calculus that results in the exclusion of a particular device are undue burden, direct threat, and fundamental alteration.

A few commenters opposed the proposed provision requiring public entities to assess whether reasonable modifications can be made to allow other power-driven mobility devices, preferring instead that the Department issue guidance materials so that public entities would not have to incur the cost of such analyses. Another commenter noted a ''fox guarding the hen house''-type of concern with regard to public entities developing and enforcing their own modification policy.

In response to comments received, the Department has revised § 35.137(b) to provide greater clarity regarding the development of legitimate safety requirements regarding other power-driven mobility devices and has added a new § 35.130(h) (Safety) to the title II regulation which specifically permits public entities to impose legitimate safety requirements necessary for the safe operation of their services, programs, and activities. (*See* discussion below.) The Department has not retained the proposed NPRM language stating that an other power-driven mobility device can be excluded if a public entity can demonstrate that its use is unreasonable or will result in a fundamental alteration of the entity's service, program, or activity, because the Department believes that this exception is covered by the general reasonable modification requirement contained in § 35.130(b)(7).

Assessment factors. Section 35.137(c) of the NPRM required public entities to ''establish policies to permit the use of other power-driven mobility devices'' and articulated four factors upon which public entities must base decisions as to whether a modification is reasonable to allow the use of a class of other power-driven mobility devices by individuals with disabilities in specific venues (*e.g.*, parks, courthouses, office buildings, etc.). 73 FR 34466, 34504 (June 17, 2008).

The Department has relocated and modified the NPRM text that appeared in § 35.137(c) to new paragraph § 35.137(b)(2) to clarify what factors the public entity shall use in determining whether a particular other power-driven mobility device can be allowed in a specific facility as a reasonable modification. Section 35.137(b)(2) now states that ''[i]n determining whether a particular other power-driven mobility device can be allowed in a specific facility as a reasonable modification under (b)(1), a public entity shall consider'' certain enumerated factors. The assessment factors are designed to assist public entities in determining whether allowing the use of a particular other power-driven mobility device in a specific facility is reasonable. Thus, the focus of the analysis must be on the appropriateness of the use of the device at a specific facility, rather than whether it is necessary for an individual to use a particular device.

The NPRM proposed the following specific assessment factors: (1) The dimensions, weight, and operating speed of the mobility device in relation to a wheelchair; (2) the potential risk of harm to others by the operation of the mobility device; (3) the risk of harm to the environment or natural or cultural resources or conflict with Federal land management laws and regulations; and (4) the ability of the public entity to stow the mobility device when not in use, if requested by the user.

Factor 1 was designed to help public entities assess whether a particular device was appropriate, given its particular physical features, for a particular location. Virtually all commenters said the physical features of the device affected their view of whether a particular device was appropriate for a particular location. For example, while many commenters supported the use of another power-driven mobility device if the device were a Segway® PT, because of environmental and health concerns they did not offer the same level of support if the device were an off-highway vehicle, all-terrain vehicle (ATV), golf car, or other device with a fuel-powered or combustion engine. Most commenters noted that indicators such as speed, weight, and dimension really were an assessment of the appropriateness of a

particular device in specific venues and suggested that factor 1 say this more specifically.

The term ''in relation to a wheelchair'' in the NPRM's factor 1 apparently created some concern that the same legal standards that apply to wheelchairs would be applied to other power-driven mobility devices. The Department has omitted the term ''in relation to a wheelchair'' from § 35.137(b)(2)(i) to clarify that if a facility that is in compliance with the applicable provisions of the 1991 Standards or the 2010 Standards grants permission for an other power-driven mobility device to go on-site, it is not required to exceed those standards to accommodate the use of other power-driven mobility devices.

In response to requests that NPRM factor 1 state more specifically that it requires an assessment of an other power-driven mobility device's appropriateness under particular circumstances or in particular venues, the Department has added several factors and more specific language. In addition, although the NPRM made reference to the operation of other power-driven mobility devices in ''specific venues,'' the Department's intent is captured more clearly by referencing ''specific facility'' in paragraph (b)(2). The Department also notes that while speed is included in factor 1, public entities should not rely solely on a device's top speed when assessing whether the device can be accommodated; instead, public entities should also consider the minimum speeds at which a device can be operated and whether the development of speed limit policies can be established to address concerns regarding the speed of the device. Finally, since the ability of the public entity to stow the mobility device when not in use is an aspect of its design and operational characteristics, the text proposed as factor 4 in the NPRM has been incorporated in paragraph (b)(2)(iii).

The NPRM's version of factor 2 provided that the ''risk of potential harm to others by the operation of the mobility device'' is one of the determinants in the assessment of whether other power-driven mobility devices should be excluded from a site. The Department intended this requirement to be consistent with the Department's longstanding interpretation, expressed in § II–3.5200 (Safety) of the 1993 Title II Technical Assistance Manual, which provides that public entities may ''impose legitimate safety requirements that are necessary for safe operation.'' (This language parallels the provision in the title III regulation at § 36.301(b).) However, several commenters indicated that they read this language, particularly the phrase ''risk of potential harm,'' to mean that the Department had adopted a concept of risk analysis different from that which is in the existing standards. The Department did not intend to create a new standard and has changed the language in paragraphs (b)(1) and (b)(2) to clarify the applicable standards, thereby avoiding the introduction of new assessments of risk beyond those necessary for the safe operation of the public entity. In addition, the Department has added a new section, 35.130(h), which incorporates the existing safety standard into the title II regulation.

While all applicable affirmative defenses are available to public entities in the establishment and execution of their policies regarding other power-driven mobility devices, the Department did not explicitly incorporate the direct threat defense into the assessment factors because § 35.130(h) provides public entities the appropriate framework with which to assess whether legitimate safety requirements that may preclude the use of certain other power-driven mobility devices are necessary for the safe operation of the public entities. In order to be legitimate, the safety requirement must be based on actual risks and not mere speculation regarding the device or how it will be operated. Of course, public entities may enforce legitimate safety rules established by the public entity for the operation of other power-driven mobility devices (*e.g.*, reasonable speed restrictions). Finally, NPRM

factor 3 concerning environmental resources and conflicts of law has been relocated to § 35.137(b)(2)(v).

As a result of these comments and requests, NPRM factors 1, 2, 3, and 4 have been revised and renumbered within paragraph (b)(2) in the final rule.

Several commenters requested that the Department provide guidance materials or more explicit concepts of which considerations might be appropriate for inclusion in a policy that allows the use of other power-driven mobility devices. A public entity that has determined that reasonable modifications can be made in its policies, practices, or procedures to allow the use of other power-driven mobility devices should develop a policy that clearly states the circumstances under which the use of other power-driven mobility devices by individuals with a mobility disability will be permitted. It also should include clear, concise statements of specific rules governing the operation of such devices. Finally, the public entity should endeavor to provide individuals with disabilities who use other power-driven mobility devices with advanced notice of its policy regarding the use of such devices and what rules apply to the operation of these devices.

For example, the U.S. General Services Administration (GSA) has developed a policy allowing the use of the Segway® PT and other EPAMDs in all Federal buildings under GSA's jurisdiction. *See* General Services Administration, I*nterim Segway® Personal Transporter Policy* (Dec. 3, 2007), available at *http://www.gsa.gov/graphics/pbs/ Interim_Segway_Policy_121007.pdf* (last visited June 24, 2010). The GSA policy defines the policy's scope of coverage by setting out what devices are and are not covered by the policy. The policy also sets out requirements for safe operation, such as a speed limit, prohibits the use of EPAMDs on escalators, and provides guidance regarding security screening of these devices and their operators.

A public entity that determines that it can make reasonable modifications to permit the use of an other power-driven mobility device by an individual with a mobility disability might include in its policy the procedure by which claims that the other power-driven mobility device is being used for a mobility disability will be assessed for legitimacy (*i.e.*, a credible assurance that the device is being used for a mobility disability, including a verbal representation by the person with a disability that is not contradicted by observable fact, or the presentation of a disability parking space placard or card, or State-issued proof of disability); the type or classes of other power-driven mobility devices are permitted to be used by individuals with mobility disabilities; the size, weight, and dimensions of the other power-driven mobility devices that are permitted to be used by individuals with mobility disabilities; the speed limit for the other power-driven mobility devices that are permitted to be used by individuals with mobility disabilities; the places, times, or circumstances under which the use of the other power-driven mobility device is or will be restricted or prohibited; safety, pedestrian, and other rules concerning the use of the other power-driven mobility device; whether, and under which circumstances, storage for the other power-driven mobility device will be made available; and how and where individuals with a mobility disability can obtain a copy of the other power-driven mobility device policy.

Public entities also might consider grouping other power-driven mobility devices by type (*e.g.,* EPAMDs, golf cars, gasoline-powered vehicles, and other devices). For example, an amusement park may determine that it is reasonable to allow individuals with disabilities to use EPAMDs in a variety of outdoor programs and activities, but that it would not be reasonable to allow the use of golf cars as mobility devices in similar circumstances. At the same time, the entity may address its concerns about factors such as space limitations by disallowing use of EPAMDs by members

of the general public who do not have mobility disabilities.

The Department anticipates that, in many circumstances, public entities will be able to develop policies that will allow the use of other power-driven mobility devices by individuals with mobility disabilities. Consider the following example:

A county courthouse has developed a policy whereby EPAMDs may be operated in the pedestrian areas of the courthouse if the operator of the device agrees not to operate the device faster than pedestrians are walking; to yield to pedestrians; to provide a rack or stand so that the device can stand upright; and to use the device only in courtrooms that are large enough to accommodate such devices. If the individual is selected for jury duty in one of the smaller courtrooms, the county's policy indicates that if it is not possible for the individual with the disability to park the device and walk into the courtroom, the location of the trial will be moved to a larger courtroom.

Inquiry into the use of other power-driven mobility device. The NPRM version of § 35.137(d) provided that ''[a] public entity may ask a person using a power-driven mobility device if the mobility device is needed due to the person's disability. A public entity shall not ask a person using a mobility device questions about the nature and extent of the person's disability.'' 73 FR 34466, 34504 (June 17, 2008).

Many environmental, transit system, and government commenters expressed concern about people feigning mobility disabilities to be able to use other power-driven mobility devices in public entities in which their use is otherwise restricted. These commenters felt that a mere inquiry into whether the device is being used for a mobility disability was an insufficient mechanism by which to detect fraud by other power-driven mobility device users who do not have mobility disabilities. These commenters believed they should be given more latitude to make inquiries of other power-driven mobility device users claiming a mobility disability than they would be given for wheelchair users. They sought the ability to establish a policy or method by which public entities may assess the legitimacy of the mobility disability. They suggested some form of certification, sticker, or other designation. One commenter suggested a requirement that a sticker bearing the international symbol for accessibility be placed on the device or that some other identification be required to signal that the use of the device is for a mobility disability. Other suggestions included displaying a disability parking placard on the device or issuing EPAMDs, like the Segway® PT, a permit that would be similar to permits associated with parking spaces reserved for those with disabilities.

Advocacy, nonprofit, and several individual commenters balked at the notion of allowing any inquiry beyond whether the device is necessary for a mobility disability and encouraged the Department to retain the NPRM's language on this topic. Other commenters, however, were empathetic with commenters who had concerns about fraud. At least one Segway® PT advocate suggested it would be permissible to seek documentation of the mobility disability in the form of a simple sign or permit.

The Department has sought to find common ground by balancing the needs of public entities and individuals with mobility disabilities wishing to use other power-driven mobility devices with the Department's longstanding, well-established policy of not allowing public entities or establishments to require proof of a mobility disability. There is no question that public entities have a legitimate interest in ferreting out fraudulent representations of mobility disabilities, especially given the recreational use of other power-driven mobility devices and the potential safety concerns created by having too many such devices in a specific facility at one time. However, the privacy of individuals with mobility disabilities and respect for those individuals, is also vitally important.

Neither § 35.137(d) of the NPRM nor § 35.137(c) of the final rule permits inquiries into the nature of a person's mobility disability. However, the Department does not believe it is unreasonable or overly intrusive for an individual with a mobility disability seeking to use an other power-driven mobility device to provide a credible assurance to verify that the use of the other power-driven mobility device is for a mobility disability. The Department sought to minimize the amount of discretion and subjectivity exercised by public entities in assessing whether an individual has a mobility disability and to allow public entities to verify the existence of a mobility disability. The solution was derived from comments made by several individuals who said they have been admitted with their Segway® PTs into public entities and public accommodations that ordinarily do not allow these devices on-site when they have presented or displayed State-issued disability parking placards. In the examples provided by commenters, the parking placards were accepted as verification that the Segway® PTs were being used as mobility devices.

Because many individuals with mobility disabilities avail themselves of State programs that issue disability parking placards or cards and because these programs have penalties for fraudulent representations of identity and disability, utilizing the parking placard system as a means to establish the existence of a mobility disability strikes a balance between the need for privacy of the individual and fraud protection for the public entity. Consequently, the Department has decided to include regulatory text in § 35.137(c)(2) of the final rule that requires public entities to accept the presentation of a valid, State-issued disability parking placard or card, or State-issued proof of disability, as verification that an individual uses the other power-driven mobility device for his or her mobility disability. A ''valid'' disability placard or card is one that is presented by the individual to whom it was issued and is otherwise in compliance with the State of issuance's requirements for disability placards or cards. Public entities are required to accept a valid, State-issued disability parking placard or card, or State-issued proof of disability as a credible assurance, but they cannot demand or require the presentation of a valid disability placard or card, or State-issued proof of disability, as a prerequisite for use of an other power-driven mobility device, because not all persons with mobility disabilities have such means of proof. If an individual with a mobility disability does not have such a placard or card, or State-issued proof of disability, he or she may present other information that would serve as a credible assurance of the existence of a mobility disability.

In lieu of a valid, State-issued disability parking placard or card, or State-issued proof of disability, a verbal representation, not contradicted by observable fact, shall be accepted as a credible assurance that the other power-driven mobility device is being used because of a mobility disability. This does not mean, however, that a mobility disability must be observable as a condition for allowing the use of an other power-driven mobility device by an individual with a mobility disability, but rather that if an individual represents that a device is being used for a mobility disability and that individual is observed thereafter engaging in a physical activity that is contrary to the nature of the represented disability, the assurance given is no longer credible and the individual may be prevented from using the device.

Possession of a valid, State-issued disability parking placard or card or a verbal assurance does not trump a public entity's valid restrictions on the use of other power-driven mobility devices. Accordingly, a credible assurance that the other power-driven mobility device is being used because of a mobility disability is not a guarantee of entry to a public entity because, notwithstanding such credible assurance, use of the device in a particular venue may be at odds with the legal standard in § 35.137(b)(1) or with

one or more of the § 35.137(b)(2) factors. Only after an individual with a disability has satisfied all of the public entity's policies regarding the use of other power-driven mobility devices does a credible assurance become a factor in allowing the use of the device. For example, if an individual seeking to use an other power-driven mobility device fails to satisfy any of the public entity's stated policies regarding the use of other power-driven mobility devices, the fact that the individual legitimately possesses and presents a valid, State-issued disability parking placard or card, or State-issued proof of disability, does not trump the policy and require the public entity to allow the use of the device. In fact, in some instances, the presentation of a legitimately held placard or card, or State-issued proof of disability, will have no relevance or bearing at all on whether the other power-driven mobility device may be used, because the public entity's policy does not permit the device in question on-site under any circumstances (*e.g.,* because its use would create a substantial risk of serious harm to the immediate environment or natural or cultural resources). Thus, an individual with a mobility disability who presents a valid disability placard or card, or State-issued proof of disability, will not be able to use an ATV as an other power-driven mobility device in a State park if the State park has adopted a policy banning their use for any or all of the above-mentioned reasons. However, if a public entity permits the use of a particular other power-driven mobility device, it cannot refuse to admit an individual with a disability who uses that device if the individual has provided a credible assurance that the use of the device is for a mobility disability.

Section 35.138 Ticketing

The 1991 title II regulation did not contain specific regulatory language on ticketing. The ticketing policies and practices of public entities, however, are subject to title II's nondiscrimination provisions. Through the investigation of complaints, enforcement actions, and public comments related to ticketing, the Department became aware that some venue operators, ticket sellers, and distributors were violating title II's nondiscrimination mandate by not providing individuals with disabilities the same opportunities to purchase tickets for accessible seating as they provided to spectators purchasing conventional seats. In the NPRM, the Department proposed § 35.138 to provide explicit direction and guidance on discriminatory practices for entities involved in the sale or distribution of tickets.

The Department received comments from advocacy groups, assembly area trade associations, public entities, and individuals. Many commenters supported the addition of regulatory language pertaining to ticketing and urged the Department to retain it in the final rule. Several commenters, however, questioned why there were inconsistencies between the title II and title III provisions and suggested that the same language be used for both titles. The Department has decided to retain ticketing regulatory language and to ensure consistency between the ticketing provisions in title II and title III.

Because many in the ticketing industry view season tickets and other multi-event packages differently from individual tickets, the Department bifurcated some season ticket provisions from those concerning single-event tickets in the NPRM. This structure, however, resulted in some provisions being repeated for both types of tickets but not for others even though they were intended to apply to both types of tickets. The result was that it was not entirely clear that some of the provisions that were not repeated also were intended to apply to season tickets. The Department is addressing the issues raised by these commenters using a different approach. For the purposes of this section, a *single event* refers to an individual performance for which tickets may be purchased. In contrast, *a series of events* includes, but is not limited to, subscription events,

event packages, season tickets, or any other tickets that may be purchased for multiple events of the same type over the course of a specified period of time whose ownership right reverts to the public entity at the end of each season or time period. Series-of-events tickets that give their holders an enhanced ability to purchase such tickets from the public entity in seasons or periods of time that follow, such as a right of first refusal or higher ranking on waiting lists for more desirable seats, are subject to the provisions in this section. In addition, the final rule merges together some NPRM paragraphs that dealt with related topics and has reordered and renamed some of the paragraphs that were in the NPRM.

Ticket sales. In the NPRM, the Department proposed, in § 35.138(a), a general rule that a public entity shall modify its policies, practices, or procedures to ensure that individuals with disabilities can purchase tickets for accessible seating for an event or series of events in the same way as others (*i.e.*, during the same hours and through the same distribution methods as other seating is sold). 73 FR 34466, 34504 (June 17, 2008). ''Accessible seating'' is defined in §35.138(a)(1) of the final rule to mean ''wheelchair spaces and companion seats that comply with sections 221 and 802 of the 2010 Standards along with any other seats required to be offered for sale to the individual with a disability pursuant to paragraph (d) of this section.'' The defined term does not include designated aisle seats. A ''wheelchair space'' refers to a space for a single wheelchair and its occupant.

The NPRM proposed requiring that accessible seats be sold through the ''same methods of distribution'' as non-accessible seats. Comments from venue managers and others in the business community, in general, noted that multiple parties are involved in ticketing, and because accessible seats may not be allotted to all parties involved at each stage, such parties should be protected from liability. For example, one commenter noted that a third-party ticket vendor, like Ticketmaster, can only sell the tickets it receives from its client. Because § 35.138(a)(2)(iii) of the final rule requires venue operators to make available accessible seating through the same methods of distribution they use for their regular tickets, venue operators that provide tickets to third-party ticket vendors are required to provide accessible seating to the third-party ticket vendor. This provision will enhance third-party ticket vendors' ability to acquire and sell accessible seating for sale in the future. The Department notes that once third-party ticket vendors acquire accessible tickets, they are obligated to sell them in accordance with these rules.

The Department also has received frequent complaints that individuals with disabilities have not been able to purchase accessible seating over the Internet, and instead have had to engage in a laborious process of calling a customer service line, or sending an e-mail to a customer service representative and waiting for a response. Not only is such a process burdensome, but it puts individuals with disabilities at a disadvantage in purchasing tickets for events that are popular and may sell out in minutes. Because § 35.138(e) of the final rule authorizes venues to release accessible seating in case of a sellout, individuals with disabilities effectively could be cut off from buying tickets unless they also have the ability to purchase tickets in real time over the Internet. The Department's new regulatory language is designed to address this problem.

Several commenters representing assembly areas raised concerns about offering accessible seating for sale over the Internet. They contended that this approach would increase the incidence of fraud since anyone easily could purchase accessible seating over the Internet. They also asserted that it would be difficult technologically to provide accessible seating for sale in real time over the Internet, or that to do so would require simplifying the rules concerning the purchase of multiple additional accompanying

seats. Moreover, these commenters argued that requiring an individual purchasing accessible seating to speak with a customer service representative would allow the venue to meet the patron's needs most appropriately and ensure that wheelchair spaces are reserved for individuals with disabilities who require wheelchair spaces. Finally, these commenters argued that individuals who can transfer effectively and conveniently from a wheelchair to a seat with a movable armrest seat could instead purchase designated aisle seats.

The Department considered these concerns carefully and has decided to continue with the general approach proposed in the NPRM. Although fraud is an important concern, the Department believes that it is best combated by other means that would not have the effect of limiting the ability of individuals with disabilities to purchase tickets, particularly since restricting the purchase of accessible seating over the Internet will, of itself, not curb fraud. In addition, the Department has identified permissible means for covered entities to reduce the incidence of fraudulent accessible seating ticket purchases in § 35.138(h) of the final rule.

Several commenters questioned whether ticket websites themselves must be accessible to individuals who are blind or have low vision, and if so, what that requires. The Department has consistently interpreted the ADA to cover websites that are operated by public entities and stated that such sites must provide their services in an accessible manner or provide an accessible alternative to the website that is available 24 hours a day, seven days a week. The final rule, therefore, does not impose any new obligation in this area. The accessibility of websites is discussed in more detail in the section of Appendix A entitled ''Other Issues.''

In § 35.138(b) of the NPRM, the Department also proposed requiring public entities to make accessible seating available during all stages of tickets sales including, but not limited to, pre-sales, promotions, lotteries, waitlists, and general sales. For example, if tickets will be presold for an event that is open only to members of a fan club, or to holders of a particular credit card, then tickets for accessible seating must be made available for purchase through those means. This requirement does not mean that any individual with a disability would be able to purchase those seats. Rather, it means that an individual with a disability who meets the requirement for such a sale (*e.g.,* who is a member of the fan club or holds that credit card) will be able to participate in the special promotion and purchase accessible seating. The Department has maintained the substantive provisions of the NPRM's § 35.138(a) and (b) but has combined them in a single paragraph at § 35.138(a)(2) of the final rule so that all of the provisions having to do with the manner in which tickets are sold are located in a single paragraph.

Identification of available accessible seating. In the NPRM, the Department proposed § 35.138(c), which, as modified and renumbered as paragraph (b)(3) in the final rule, requires a facility to identify available accessible seating through seating maps, brochures, or other methods if that information is made available about other seats sold to the general public. This rule requires public entities to provide information about accessible seating to the same degree of specificity that it provides information about general seating. For example, if a seating map displays color-coded blocks pegged to prices for general seating, then accessible seating must be similarly color-coded. Likewise, if covered entities provide detailed maps that show exact seating and pricing for general seating, they must provide the same for accessible seating.

The NPRM did not specify a requirement to identify prices for accessible seating. The final rule requires that if such information is provided for general seating, it must be provided for accessible seating as well.

In the NPRM, the Department proposed in

§ 35.138(d) that a public entity, upon being asked, must inform persons with disabilities and their companions of the locations of all unsold or otherwise available seating. This provision is intended to prevent the practice of ''steering'' individuals with disabilities to certain accessible seating so that the facility can maximize potential ticket sales by releasing unsold accessible seating, especially in preferred or desirable locations, for sale to the general public. The Department received no significant comment on this proposal. The Department has retained this provision in the final rule but has added it, with minor modifications, to § 35.138(b) as paragraph (1).

Ticket prices. In the NPRM, the Department proposed § 35.138(e) requiring that ticket prices for accessible seating be set no higher than the prices for other seats in that seating section for that event. The NPRM's provision also required that accessible seating be made available at every price range, and if an existing facility has barriers to accessible seating within a particular price range, a proportionate amount of seating (determined by the ratio of the total number of seats at that price level to the total number of seats in the assembly area) must be offered in an accessible location at that same price. Under this rule, for example, if a public entity has a 20,000-seat facility built in 1980 with inaccessible seating in the $20-price category, which is on the upper deck, and it chooses not to put accessible seating in that section, then it must place a proportionate number of seats in an accessible location for $20. If the upper deck has 2,000 seats, then the facility must place 10 percent of its accessible seating in an accessible location for $20 provided that it is part of a seating section where ticket prices are equal to or more than $20—a facility may not place the $20-accessible seating in a $10-seating section. The Department received no significant comment on this rule, and it has been retained, as amended, in the final rule in § 35.138(c).

Purchase of multiple tickets. In the NPRM, the Department proposed § 35.138(i) to address one of the most common ticketing complaints raised with the Department: That individuals with disabilities are not able to purchase more than two tickets. The Department proposed this provision to facilitate the ability of individuals with disabilities to attend events with friends, companions, or associates who may or may not have a disability by enabling individuals with disabilities to purchase the maximum number of tickets allowed per transaction to other spectators; by requiring venues to place accompanying individuals in general seating as close as possible to accessible seating (in the event that a group must be divided because of the large size of the group); and by allowing an individual with a disability to purchase up to three additional contiguous seats per wheelchair space if they are available at the time of sale. Section 35.138(i)(2) of the NPRM required that a group containing one or more wheelchair users must be placed together, if possible, and that in the event that the group could not be placed together, the individuals with disabilities may not be isolated from the rest of the group.

The Department asked in the NPRM whether this rule was sufficient to effectuate the integration of individuals with disabilities. Many advocates and individuals praised it as a welcome and much-needed change, stating that the trade-off of being able to sit with their family or friends was worth reducing the number of seats available for individuals with disabilities. Some commenters went one step further and suggested that the number of additional accompanying seats should not be restricted to three.

Although most of the substance of the proposed provision on the purchase of multiple tickets has been maintained in the final rule, it has been renumbered as § 35.138(d), reorganized, and supplemented. To preserve the availability of accessible seating for other individuals with disabilities, the Department has not expanded the rule beyond three additional contiguous seats. Section 35.138(d)(1) of the final rule requires

public entities to make available for purchase three additional tickets for seats in the same row that are contiguous with the wheelchair space provided that at the time of the purchase there are three such seats available. The requirement that the additional seats be ''contiguous with the wheelchair space'' does not mean that each of the additional seats must be in actual contact or have a border in common with the wheelchair space; however, at least one of the additional seats should be immediately adjacent to the wheelchair space. The Department recognizes that it will often be necessary to use vacant wheelchair spaces to provide for contiguous seating.

The Department has added paragraphs (d)(2) and (d)(3) to clarify that in situations where there are insufficient unsold seats to provide three additional contiguous seats per wheelchair space or a ticket office restricts sales of tickets to a particular event to less than four tickets per customer, the obligation to make available three additional contiguous seats per wheelchair space would be affected. For example, if at the time of purchase, there are only two additional contiguous seats available for purchase because the third has been sold already, then the ticket purchaser would be entitled to two such seats. In this situation, the public entity would be required to make up the difference by offering one additional ticket for sale that is as close as possible to the accessible seats. Likewise, if ticket purchases for an event are limited to two per customer, a person who uses a wheelchair who seeks to purchase tickets would be entitled to purchase only one additional contiguous seat for the event.

The Department also has added paragraph (d)(4) to clarify that the requirement for three additional contiguous seats is not intended to serve as a cap if the maximum number of tickets that may be purchased by members of the general public exceeds the four tickets an individual with a disability ordinarily would be allowed to purchase (*i.e.*, a wheelchair space and three additional contiguous seats). If the maximum number of tickets that may be purchased by members of the general public exceeds four, an individual with a disability is to be allowed to purchase the maximum number of tickets; however, additional tickets purchased by an individual with a disability beyond the wheelchair space and the three additional contiguous seats provided in § 35.138(d)(1) do not have to be contiguous with the wheelchair space.

The NPRM proposed at § 35.138(i)(2) that for group sales, if a group includes one or more individuals who use a wheelchair, then the group shall be placed in a seating area with accessible seating so that, if possible, the group can sit together. If it is necessary to divide the group, it should be divided so that the individuals in the group who use wheelchairs are not isolated from the rest of the members of their group. The final rule retains the NPRM language in paragraph (d)(5).

Hold-and-release of unsold accessible seating. The Department recognizes that not all accessible seating will be sold in all assembly areas for every event to individuals with disabilities who need such seating and that public entities may have opportunities to sell such seating to the general public. The Department proposed in the NPRM a provision aimed at striking a balance between affording individuals with disabilities adequate time to purchase accessible seating and the entity's desire to maximize ticket sales. In the NPRM, the Department proposed § 35.138(f), which allowed for the release of accessible seating under the following circumstances: (i) When all seating in the facility has been sold, excluding luxury boxes, club boxes, or suites; (ii) when all seating in a designated area has been sold and the accessible seating being released is in the same area; or (iii) when all seating in a designated price range has been sold and the accessible seating being released is within the same price range.

The Department's NPRM asked ''whether additional regulatory guidance is required or appropriate in terms of a more detailed or set

schedule for the release of tickets in conjunction with the three approaches described above. For example, does the proposed regulation address the variable needs of assembly areas covered by the ADA? Is additional regulatory guidance required to eliminate discriminatory policies, practices and procedures related to the sale, hold, and release of accessible seating? What considerations should appropriately inform the determination of when unsold accessible seating can be released to the general public?'' 73 FR 34466, 34484 (June 17, 2008).

The Department received comments both supporting and opposing the inclusion of a hold-and-release provision. One side proposed loosening the restrictions on the release of unsold accessible seating. One commenter from a trade association suggested that tickets should be released regardless of whether there is a sell-out, and that these tickets should be released according to a set schedule. Conversely, numerous individuals, advocacy groups, and at least one public entity urged the Department to tighten the conditions under which unsold tickets for accessible seating may be released. These commenters suggested that venues should not be permitted to release tickets during the first two weeks of sale, or alternatively, that they should not be permitted to be released earlier than 48 hours before a sold-out event. Many of these commenters criticized the release of accessible seating under the second and third prongs of § 35.138(f) in the NPRM (when there is a sell-out in general seating in a designated seating area or in a price range), arguing that it would create situations where general seating would be available for purchase while accessible seating would not be.

Numerous commenters—both from the industry and from advocacy groups—asked for clarification of the term ''sell-out.'' Business groups commented that industry practice is to declare a sell-out when there are only ''scattered singles'' available— isolated seats that cannot be purchased as a set of adjacent pairs. Many of those same commenters also requested that ''sell-out'' be qualified with the phrase ''of all seating available for sale'' since it is industry practice to hold back from release tickets to be used for groups connected with that event (*e.g.,* the promoter, home team, or sports league). They argued that those tickets are not available for sale and any return of these tickets to the general inventory happens close to the event date. Noting the practice of holding back tickets, one advocacy group suggested that covered entities be required to hold back accessible seating in proportion to the number of tickets that are held back for later release.

The Department has concluded that it would be inappropriate to interfere with industry practice by defining what constitutes a ''sell-out'' and that a public entity should continue to use its own approach to defining a ''sell-out.'' If, however, a public entity declares a sell-out by reference to those seats that are available for sale, but it holds back tickets that it reasonably anticipates will be released later, it must hold back a proportional percentage of accessible seating to be released as well.

Adopting any of the alternatives proposed in the comments summarized above would have upset the balance between protecting the rights of individuals with disabilities and meeting venues' concerns about lost revenue from unsold accessible seating. As a result, the Department has retained § 35.138(f) (renumbered as § 35.138(e)) in the final rule.

The Department has, however, modified the regulation text to specify that accessible seating may be released only when ''all nonaccessible tickets in a designated seating area have been sold and the tickets for accessible seating are being released in the same designated area.'' As stated in the NPRM, the Department intended for this provision to allow, for example, the release of accessible seating at the orchestra level when all other seating at the orchestra level is sold. The

Department has added this language to the final rule at § 35.138(e)(1)(ii) to clarify that venues cannot designate or redesignate seating areas for the purpose of maximizing the release of unsold accessible seating. So, for example, a venue may not determine on an ad hoc basis that a group of seats at the orchestra level is a designated seating area in order to release unsold accessible seating in that area.

The Department also has maintained the hold-and-release provisions that appeared in the NPRM but has added a provision to address the release of accessible seating for series-of-events tickets on a series-of-events basis. Many commenters asked the Department whether unsold accessible seating may be converted to general seating and released to the general public on a season-ticket basis or longer when tickets typically are sold as a season-ticket package or other long-term basis. Several disability rights organizations and individual commenters argued that such a practice should not be permitted, and, if it were, that conditions should be imposed to ensure that individuals with disabilities have future access to those seats.

The Department interprets the fundamental principle of the ADA as a requirement to give individuals with disabilities equal, not better, access to those opportunities available to the general public. Thus, for example, a public entity that sells out its facility on a seasonticket only basis is not required to leave unsold its accessible seating if no persons with disabilities purchase those season-ticket seats. Of course, public entities may choose to go beyond what is required by reserving accessible seating for individuals with disabilities (or releasing such seats for sale to the general public) on an individual-game basis.

If a covered entity chooses to release unsold accessible seating for sale on a season-ticket or other long-term basis, it must meet at least two conditions. Under § 35.138(g) of the final rule, public entities must leave flexibility for game-day changeouts to accommodate ticket transfers on the secondary market. And public entities must modify their ticketing policies so that, in future years, individuals with disabilities will have the ability to purchase accessible seating on the same basis as other patrons (*e.g.,* as season tickets). Put differently, releasing accessible seating to the general public on a season-ticket or other long-term basis cannot result in that seating being lost to individuals with disabilities in perpetuity. If, in future years, season tickets become available and persons with disabilities have reached the top of the waiting list or have met any other eligibility criteria for seasonticket purchases, public entities must ensure that accessible seating will be made available to the eligible individuals. In order to accomplish this, the Department has added § 35.138(e)(3)(i) to require public entities that release accessible season tickets to individuals who do not have disabilities that require the features of accessible seating to establish a process to prevent the automatic reassignment of such ticket holders to accessible seating. For example, a public entity could have in place a system whereby accessible seating that was released because it was not purchased by individuals with disabilities is not in the pool of tickets available for purchase for the following season unless and until the conditions for ticket release have been satisfied in the following season. Alternatively, a public entity might release tickets for accessible seating only when a purchaser who does not need its features agrees that he or she has no guarantee of or right to the same seats in the following season, or that if season tickets are guaranteed for the following season, the purchaser agrees that the offer to purchase tickets is limited to non-accessible seats having to the extent practicable, comparable price, view, and amenities to the accessible seats such individuals held in the prior year. The Department is aware that this rule may require some administrative changes but believes that this process will not create undue financial and administrative burdens. The Department believes that this approach is balanced and beneficial. It will allow public entities to sell all

of their seats and will leave open the possibility, in future seasons or series of events, that persons who need accessible seating may have access to it.

The Department also has added § 35.138(e)(3)(ii) to address how season tickets or series-of-events tickets that have attached ownership rights should be handled if the ownership right returns to the public entity (*e.g.,* when holders forfeit their ownership right by failing to purchase season tickets or sell their ownership right back to a public entity). If the ownership right is for accessible seating, the public entity is required to adopt a process that allows an eligible individual with a disability who requires the features of such seating to purchase the rights and tickets for such seating.

Nothing in the regulatory text prevents a public entity from establishing a process whereby such ticket holders agree to be voluntarily reassigned from accessible seating to another seating area so that individuals with mobility disabilities or disabilities that require the features of accessible seating and who become newly eligible to purchase season tickets have an opportunity to do so. For example, a public entity might seek volunteers to relocate to another location that is at least as good in terms of its location, price, and amenities, or a public entity might use a seat with forfeited ownership rights as an inducement to get a ticket holder to give up accessible seating he or she does not need.

Ticket transfer. The Department received many comments asking whether accessible seating has the same transfer rights as general seats. The proposed regulation at § 35.138(e) required that individuals with disabilities must be allowed to purchase season tickets for accessible seating on the same terms and conditions as individuals purchasing season tickets for general seating, including the right—if it exists for other ticket-holders—to transfer individual tickets to friends or associates. Some commenters pointed out that the NPRM proposed explicitly allowing individuals with disabilities holding season tickets to transfer tickets but did not address the transfer of tickets purchased for individual events. Several commenters representing assembly areas argued that persons with disabilities holding tickets for an individual event should not be allowed to sell or transfer them to third parties because such ticket transfers would increase the risk of fraud or would make unclear the obligation of the entity to accommodate secondary ticket transfers. They argued that individuals holding accessible seating should either be required to transfer their tickets to another individual with a disability or return them to the facility for a refund.

Although the Department is sympathetic to concerns about administrative burden, curtailing transfer rights for accessible seating when other ticket holders are permitted to transfer tickets would be inconsistent with the ADA's guiding principle that individuals with disabilities must have rights equal to others. Thus, the Department has added language in the final rule in § 35.138(f) that requires that individuals with disabilities holding accessible seating for any event have the same transfer rights accorded other ticket holders for that event. Section 35.138(f) also preserves the rights of individuals with disabilities who hold tickets to accessible seats for a series of events to transfer individual tickets to others, regardless of whether the transferee needs accessible seating. This approach recognizes the common practice of individuals splitting season tickets or other multi-event ticket packages with friends, colleagues, or other spectators to make the purchase of season tickets affordable; individuals with disabilities should not be placed in the burdensome position of having to find another individual with a disability with whom to share the package.

This provision, however, does not require public entities to seat an individual who holds a ticket to an accessible seat in such seating if the individual does not need the accessible features of the seat. A public entity may reserve the right to switch these individuals to different seats if they are available, but a public entity is not required

to remove a person without a disability who is using accessible seating from that seating, even if a person who uses a wheelchair shows up with a ticket from the secondary market for a non-accessible seat and wants accessible seating.

Secondary ticket market. Section 35.138(g) is a new provision in the final rule that requires a public entity to modify its policies, practices, or procedures to ensure that an individual with a disability, who acquires a ticket in the secondary ticket market, may use that ticket under the same terms and conditions as other ticket holders who acquire a ticket in the secondary market for an event or series of events. This principle was discussed in the NPRM in connection with § 35.138(e), pertaining to season-ticket sales. There, the Department asked for public comment regarding a public entity's proposed obligation to accommodate the transfer of accessible seating tickets on the secondary ticket market to those who do not need accessible seating and vice versa.

The secondary ticket market, for the purposes of this rule, broadly means any transfer of tickets after the public entity's initial sale of tickets to individuals or entities. It thus encompasses a wide variety of transactions, from ticket transfers between friends to transfers using commercial exchange systems. Many commenters noted that the distinction between the primary and secondary ticket market has become blurred as a result of agreements between teams, leagues, and secondary market sellers. These commenters noted that the secondary market may operate independently of the public entity, and parts of the secondary market, such as ticket transfers between friends, undoubtedly are outside the direct jurisdiction of the public entity.

To the extent that venues seat persons who have purchased tickets on the secondary market, they must similarly seat persons with disabilities who have purchased tickets on the secondary market. In addition, some public entities may acquire ADA obligations directly by formally entering the secondary ticket market.

The Department's enforcement experience with assembly areas also has revealed that venues regularly provide for and make last-minute seat transfers. As long as there are vacant wheelchair spaces, requiring venues to provide wheelchair spaces for patrons who acquired inaccessible seats and need wheelchair spaces is an example of a reasonable modification of a policy under title II of the ADA. Similarly, a person who has a ticket for a wheelchair space but who does not require its accessible features could be offered non-accessible seating if such seating is available.

The Department's longstanding position that title II of the ADA requires venues to make reasonable modifications in their policies to allow individuals with disabilities who acquired non-accessible tickets on the secondary ticket market to be seated in accessible seating, where such seating is vacant, is supported by the only Federal court to address this issue. *See Independent Living Resources v. Oregon Arena Corp.*, 1 F. Supp. 2d 1159, 1171 (D. Or. 1998). The Department has incorporated this position into the final rule at § 35.138(g)(2).

The NPRM contained two questions aimed at gauging concern with the Department's consideration of secondary ticket market sales. The first question asked whether a secondary purchaser who does not have a disability and who buys an accessible seat should be required to move if the space is needed for someone with a disability.

Many disability rights advocates answered that the individual should move provided that there is a seat of comparable or better quality available for him and his companion. Some venues, however, expressed concerns about this provision, and asked how they are to identify who should be moved and what obligations apply if there are no seats available that are equivalent or better in quality.

The Department's second question asked

whether there are particular concerns about the obligation to provide accessible seating, including a wheelchair space, to an individual with a disability who purchases an inaccessible seat through the secondary market.

Industry commenters contended that this requirement would create a ''logistical nightmare,'' with venues scrambling to reseat patrons in the short time between the opening of the venues' doors and the commencement of the event. Furthermore, they argued that they might not be able to reseat all individuals and that even if they were able to do so, patrons might be moved to inferior seats (whether in accessible or non-accessible seating). These commenters also were concerned that they would be sued by patrons moved under such circumstances.

These commenters seem to have misconstrued the rule. Covered entities are not required to seat every person who acquires a ticket for inaccessible seating but needs accessible seating, and are not required to move any individual who acquires a ticket for accessible seating but does not need it. Covered entities that allow patrons to buy and sell tickets on the secondary market must make reasonable modifications to their policies to allow persons with disabilities to participate in secondary ticket transfers. The Department believes that there is no one-size-fits-all rule that will suit all assembly areas. In those circumstances where a venue has accessible seating vacant at the time an individual with a disability who needs accessible seating presents his ticket for inaccessible seating at the box office, the venue must allow the individual to exchange his ticket for an accessible seat in a comparable location if such an accessible seat is vacant. Where, however, a venue has sold all of its accessible seating, the venue has no obligation to provide accessible seating to the person with a disability who purchased an inaccessible seat on the secondary market. Venues may encourage individuals with disabilities who hold tickets for inaccessible seating to contact the box office before the event to notify them of their need for accessible seating, even though they may not require ticketholders to provide such notice.

The Department notes that public entities are permitted, though not required, to adopt policies regarding moving patrons who do not need the features of an accessible seat. If a public entity chooses to do so, it might mitigate administrative concerns by marking tickets for accessible seating as such, and printing on the ticket that individuals who purchase such seats but who do not need accessible seating are subject to being moved to other seats in the facility if the accessible seating is required for an individual with a disability. Such a venue might also develop and publish a ticketing policy to provide transparency to the general public and to put holders of tickets for accessible seating who do not require it on notice that they may be moved.

Prevention of fraud in purchase of accessible seating. Assembly area managers and advocacy groups have informed the Department that the fraudulent purchase of accessible seating is a pressing concern. Curbing fraud is a goal that public entities and individuals with disabilities share. Steps taken to prevent fraud, however, must be balanced carefully against the privacy rights of individuals with disabilities. Such measures also must not impose burdensome requirements upon, nor restrict the rights of, individuals with disabilities.

In the NPRM, the Department struck a balance between these competing concerns by proposing § 35.138(h), which prohibited public entities from asking for proof of disability before the purchase of accessible seating but provided guidance in two paragraphs on appropriate measures for curbing fraud. Paragraph (1) proposed allowing a public entity to ask individuals purchasing single-event tickets for accessible seating whether they are wheelchair users. Paragraph (2) proposed allowing a public entity to require the individuals purchasing accessible seating for season tickets or other multi-event ticket packages

to attest in writing that the accessible seating is for a wheelchair user. Additionally, the NPRM proposed to permit venues, when they have good cause to believe that an individual has fraudulently purchased accessible seating, to investigate that individual.

Several commenters objected to this rule on the ground that it would require a wheelchair user to be the purchaser of tickets. The Department has reworded this paragraph to reflect that the individual with a disability does not have to be the ticket purchaser. The final rule allows third parties to purchase accessible tickets at the request of an individual with a disability.

Commenters also argued that other individuals with disabilities who do not use wheelchairs should be permitted to purchase accessible seating. Some individuals with disabilities who do not use wheelchairs urged the Department to change the rule, asserting that they, too, need accessible seating. The Department agrees that such seating, although designed for use by a wheelchair user, may be used by non-wheelchair users, if those persons are persons with a disability who need to use accessible seating because of a mobility disability or because their disability requires the use of the features that accessible seating provides (*e.g.,* individuals who cannot bend their legs because of braces, or individuals who, because of their disability, cannot sit in a straight-back chair).

Some commenters raised concerns that allowing venues to ask questions to determine whether individuals purchasing accessible seating are doing so legitimately would burden individuals with disabilities in the purchase of accessible seating. The Department has retained the substance of this provision in § 35.138(h) of the final rule, but emphasizes that such questions should be asked at the initial time of purchase. For example, if the method of purchase is via the Internet, then the question(s) should be answered by clicking a yes or no box during the transaction. The public entity may warn purchasers that accessible seating is for individuals with disabilities and that individuals purchasing such tickets fraudulently are subject to relocation.

One commenter argued that face-to-face contact between the venue and the ticket holder should be required in order to prevent fraud and suggested that individuals who purchase accessible seating should be required to pick up their tickets at the box office and then enter the venue immediately. The Department has declined to adopt that suggestion. It would be discriminatory to require individuals with disabilities to pick up tickets at the box office when other spectators are not required to do so. If the assembly area wishes to make face-to-face contact with accessible seating ticket holders to curb fraud, it may do so through its ushers and other customer service personnel located within the seating area.

Some commenters asked whether it is permissible for assembly areas to have voluntary clubs where individuals with disabilities self-identify to the public entity in order to become a member of a club that entitles them to purchase accessible seating reserved for club members or otherwise receive priority in purchasing accessible seating. The Department agrees that such clubs are permissible, provided that a reasonable amount of accessible seating remains available at all prices and dispersed at all locations for individuals with disabilities who are non-members.

§ 35.139 Direct threat.

In Appendix A of the Department's 1991 title II regulation, the Department included a detailed discussion of ''direct threat'' that, among other things, explained that ''the principles established in § 36.208 of the Department's [title III] regulation'' were ''applicable'' as well to title II, insofar as ''questions of safety are involved.'' 28 CFR part 35, app. A at 565 (2009). In the final rule, the Department has included specific requirements related to ''direct threat'' that parallel those in the title III rule. These

requirements are found in new § 35.139.

Subpart D—Program Accessibility

Section 35.150(b)(2) Safe harbor

The ''program accessibility'' requirement in regulations implementing title II of the Americans with Disabilities Act requires that each service, program, or activity, *when viewed in its entirety*, be readily accessible to and usable by individuals with disabilities. 28 CFR 35.150(a). Because title II evaluates a public entity's programs, services, and activities in their entirety, public entities have flexibility in addressing accessibility issues. Program access does not necessarily require a public entity to make each of its existing facilities accessible to and usable by individuals with disabilities, and public entities are not required to make structural changes to existing facilities where other methods are effective in achieving program access. *See id*. [3] Public entities do, however, have program access considerations that are independent of, but may coexist with, requirements imposed by new construction or alteration requirements in those same facilities.

Where a public entity opts to alter existing facilities to comply with its program access requirements, the entity must meet the accessibility requirements for alterations set out in § 35.151. Under the final rule, these alterations will be subject to the 2010 Standards. The 2010 Standards introduce technical and scoping specifications for many elements not covered by the 1991 Standards. In existing facilities, these supplemental requirements need to be taken into account by a public entity in ensuring program access. Also included in the 2010 Standards are revised technical and scoping requirements for a number of elements that were addressed in the 1991 Standards. These revised requirements reflect incremental changes that were added either because of additional study by the Access Board or in order to harmonize requirements with the model codes.

Although the program accessibility standard offers public entities a level of discretion in determining how to achieve program access, in the NPRM, the Department proposed an addition to § 35.150 at § 35.150(b)(2), denominated ''Safe Harbor,'' to clarify that ''[i]f a public entity has constructed or altered elements * * * in accordance with the specifications in either the 1991 Standards or the Uniform Federal Accessibility Standard, such public entity is not, solely because of the Department's adoption of the [2010] Standards, required to retrofit such elements to reflect incremental changes in the proposed standards.'' 73 FR 34466, 34505 (June 17, 2008). In these circumstances, the public entity would be entitled to a safe harbor for the already compliant elements until those elements are altered. The safe harbor does not negate a public entity's new construction or alteration obligations. A public entity must comply with the new construction or alteration requirements in effect at the time of the construction or alteration. With respect to existing facilities designed and constructed after January 26, 1992, but before the public entities are required to comply with the 2010 Standards, the rule is that any elements in these facilities that were not constructed in conformance with UFAS or the 1991 Standards are in violation of the ADA and must be brought into compliance. If elements in existing facilities were altered after January 26, 1992, and those alterations were not made in conformance with the alteration requirements in effect at the time, then those alteration violations must be corrected. Section 35.150(b)(2) of the final rule specifies that until the compliance date for the Standards (18 months from the date of publication of the rule), facilities or elements covered by § 35.151(a) or (b) that are noncompliant with either the 1991 Standards or UFAS shall be made accessible in accordance with the 1991 Standards, UFAS, or

[3]The term ''existing facility'' is defined in § 35.104 as amended by this rule.

the 2010 Standards. Once the compliance date is reached, such noncompliant facilities or elements must be made accessible in accordance with the 2010 Standards.

The Department received many comments on the safe harbor during the 60-day public comment period. Advocacy groups were opposed to the safe harbor for compliant elements in existing facilities. These commenters objected to the Department's characterization of revisions between the 1991 and 2010 Standards as incremental changes and assert that these revisions represent important advances in accessibility for individuals with disabilities. Commenters saw no basis for ''grandfathering'' outdated accessibility standards given the flexibility inherent in the program access standard. Others noted that title II's ''undue financial and administrative burdens'' and ''fundamental alteration'' defenses eliminate any need for further exemptions from compliance. Some commenters suggested that entities' past efforts to comply with the program access standard of 28 CFR 35.150(a) might appropriately be a factor in determining what is required in the future.

Many public entities welcomed the Department's proposed safe harbor. These commenters contend that the safe harbor allows public entities needed time to evaluate program access in light of the 2010 Standards, and incorporate structural changes in a careful and thoughtful way toward increasing accessibility entity-wide. Many felt that it would be an ineffective use of public funds to update buildings to retrofit elements that had already been constructed or modified to Department-issued and sanctioned specifications. One entity pointed to the ''possibly budget-breaking'' nature of forcing compliance with incremental changes.

The Department has reviewed and considered all information received during the 60-day public comment period. Upon review, the Department has decided to retain the title II safe harbor with minor revisions. The Department believes that the safe harbor provides an important measure of clarity and certainty for public entities as to the effect of the final rule with respect to existing facilities. Additionally, by providing a safe harbor for elements already in compliance with the technical and scoping specifications in the 1991 Standards or UFAS, funding that would otherwise be spent on incremental changes and repeated retrofitting is freed up to be used toward increased entity-wide program access. Public entities may thereby make more efficient use of the resources available to them to ensure equal access to their services, programs, or activities for all individuals with disabilities.

The safe harbor adopted with this final rule is a narrow one, as the Department recognizes that this approach may delay, in some cases, the increased accessibility that the revised requirements would provide, and that for some individuals with disabilities the impact may be significant. This safe harbor operates only with respect to elements that are in compliance with the scoping and technical specifications in either the 1991 Standards or UFAS; it does not apply to supplemental requirements, those elements for which scoping and technical specifications are first provided in the 2010 Standards.

Existing Facilities

Existing play areas. The 1991 Standards do not include specific requirements for the design and construction of play areas. To meet program accessibility requirements where structural changes are necessary, public entities have been required to apply the general new construction and alteration standards to the greatest extent possible, including with respect to accessible parking, routes to the playground, playground equipment, and playground amenities (*e.g.*, picnic tables and restrooms). The Access Board published final guidelines for play areas in October 2000. The guidelines extended beyond general playground access to establish specific scoping and technical

requirements for ground-level and elevated play components, accessible routes connecting the components, accessible ground surfaces, and maintenance of those surfaces. These guidelines filled a void left by the 1991 Standards. They have been referenced in Federal playground construction and safety guidelines and have been used voluntarily when many play areas across the country have been altered or constructed.

In adopting the 2004 ADAAG (which includes the 2000 play area guidelines), the Department acknowledges both the importance of integrated, full access to play areas for children and parents with disabilities, as well as the need to avoid placing an untenable fiscal burden on public entities. In the NPRM, the Department stated it was proposing two specific provisions to reduce the impact on existing facilities that undertake structural modifications pursuant to the program accessibility requirement. First, the Department proposed in § 35.150(b)(4) that existing play areas that are not being altered would be permitted to meet a reduced scoping requirement with respect to their elevated play components. Elevated play components, which are found on most playgrounds, are the individual components that are linked together to form large-scale composite playground equipment (*e.g.,* the monkey bars attached to the suspension bridge attached to the tube slide, etc.) The 2010 Standards provide that a play area that includes both ground level and elevated play components must ensure that a specified number of the ground-level play components and at least 50 percent of the elevated play components are accessible.

In the NPRM, the Department asked for specific public comment with regard to whether existing play areas should be permitted to substitute additional ground-level play components for the elevated play components they would otherwise have been required to make accessible. The Department also queried if there were other requirements applicable to play areas in the 2004 ADAAG for which the Department should consider exemptions or reduced scoping. Many commenters opposed permitting existing play areas to make such substitutions. Several commenters stated that the Access Board already completed significant negotiation and cost balancing in its rulemaking, so no additional exemptions should be added in either meeting program access requirements or in alterations. Others noted that elevated components are generally viewed as the more challenging and exciting by children, so making more ground than elevated play components accessible would result in discrimination against children with disabilities in general and older children with disabilities in particular. They argued that the ground components would be seen as equipment for younger children and children with disabilities, while elevated components would serve only older children without disabilities. In addition, commenters advised that including additional ground-level play components would require more accessible route and use zone surfacing, which would result in a higher cost burden than making elevated components accessible.

The Department also asked for public comment on whether it would be appropriate for the Access Board to consider issuing guidelines for alterations to play and recreational facilities that would permit reduced scoping of accessible components or substitution of ground-level play components in lieu of elevated play components. Most commenters opposed any additional reductions in scoping and substitutions. These commenters uniformly stated that the Access Board completed sufficient negotiation during its rulemaking on its play area guidelines published in 2000 and that those guidelines consequently should stand as is. One commenter advocated reduced scoping and substitution of ground play components during alterations only for those play areas built prior to the finalization of the guidelines.

The Department has considered the comments it has received and has determined that it is not

necessary to provide a specific exemption to the scoping for components for existing play areas or to recommend reduced scoping or additional exemptions for alteration, and has deleted the reduced scoping proposed in NPRM § 35.150(b)(4)(i) from the final rule. The Department believes that it is preferable for public entities to try to achieve compliance with the design standards established in the 2010 Standards. If this is not possible to achieve in an existing setting, the requirements for program accessibility provide enough flexibility to permit the covered entity to pursue alternative approaches to provide accessibility.

Second, in § 35.150(b)(5)(i) of the NPRM, the Department proposed language stating that existing play areas that are less than 1,000 square feet in size and are not otherwise being altered, need not comply with the scoping and technical requirements for play areas in section 240 of the 2004 ADAAG. The Department stated it selected this size based on the provision in section 1008.2.4.1 of the 2004 ADAAG, Exception 1, which permits play areas less than 1,000 square feet in size to provide accessible routes with a reduced clear width (44 inches instead of 60 inches). In its 2000 regulatory assessment for the play area guidelines, the Access Board assumed that such ''small'' play areas represented only about 20 percent of the play areas located in public schools, and none of the play areas located in city and State parks (which the Board assumed were typically larger than 1,000 square feet).

In the NPRM, the Department asked if existing play areas less than 1,000 square feet should be exempt from the requirements applicable to play areas. The vast majority of commenters objected to such an exemption. One commenter stated that many localities that have parks this size are already making them accessible; many cited concerns that this would leave all or most public playgrounds in small towns inaccessible; and two commenters stated that, since many of New York City's parks are smaller than 1,000 square feet, only scattered larger parks in the various boroughs would be obliged to become accessible. Residents with disabilities would then have to travel substantial distances outside their own neighborhoods to find accessible playgrounds. Some commenters responded that this exemption should not apply in instances where the play area is the only one in the program, while others said that if a play area is exempt for reasons of size, but is the only one in the area, then it should have at least an accessible route and 50 percent of its ground-level play components accessible. One commenter supported the exemption as presented in the question.

The Department is persuaded by these comments that it is inappropriate to exempt public play areas that are less than 1,000 square feet in size. The Department believes that the factors used to determine program accessibility, including the limits established by the undue financial and administrative burdens defense, provide sufficient flexibility to public entities in determining how to make their existing play areas accessible. In those cases where a title II entity believes that present economic concerns make it an undue financial and administrative burden to immediately make its existing playgrounds accessible in order to comply with program accessibility requirements, then it may be reasonable for the entity to develop a multiyear plan to bring its facilities into compliance.

In addition to requesting public comment about the specific sections in the NPRM, the Department also asked for public comment about the appropriateness of a general safe harbor for existing play areas and a safe harbor for public entities that have complied with State or local standards specific to play areas. In the almost 200 comments received on title II play areas, the vast majority of commenters strongly opposed all safe harbors, exemptions, and reductions in scoping. By contrast, one commenter advocated a safe harbor from compliance with the 2004 ADAAG play area requirements along with

reduced scoping and exemptions for both program accessibility and alterations; a second commenter advocated only the general safe harbor from compliance with the supplemental requirements.

In response to the question of whether the Department should exempt public entities from specific compliance with the supplemental requirements for play areas, commenters stated that since no specific standards previously existed, play areas are more than a decade behind in providing full access for individuals with disabilities. When accessible play areas were created, public entities, acting in good faith, built them according to the 2004 ADAAG requirements; many equipment manufacturers also developed equipment to meet those guidelines. If existing playgrounds were exempted from compliance with the supplemental guidelines, commenters said, those entities would be held to a lesser standard and left with confusion, a sense of wasted resources, and federally condoned discrimination and segregation. Commenters also cited Federal agency settlement agreements on play areas that required compliance with the guidelines. Finally, several commenters observed that the provision of a safe harbor in this instance was invalid for two reasons: (1) The rationale for other safe harbors—that entities took action to comply with the 1991 Standards and should not be further required to comply with new standards—does not exist; and (2) concerns about financial and administrative burdens are adequately addressed by program access requirements.

The question of whether accessibility of play areas should continue to be assessed on the basis of case-by-case evaluations elicited conflicting responses. One commenter asserted that there is no evidence that the case-by-case approach is not working and so it should continue until found to be inconsistent with the ADA's goals. Another commenter argued that case-by-case evaluations result in unpredictable outcomes which result in costly and long court actions. A third commenter, advocating against case-by-case evaluations, requested instead increased direction and scoping to define what constitutes an accessible play area program.

The Department has considered all of the comments it received in response to its questions and has concluded that there is insufficient basis to establish a safe harbor from compliance with the supplemental guidelines. Thus, the Department has eliminated the proposed exemption contained in § 35.150(b)(5)(i) of the NPRM for existing play areas that are less than 1,000 square feet. The Department believes that the factors used to determine program accessibility, including the limits established by the undue financial and administrative burdens defense, provide sufficient flexibility to public entities in determining how to make their existing play areas accessible.

In the NPRM, the Department also asked whether there are State and local standards addressing play and recreation area accessibility and, to the extent that there are such standards, whether facilities currently governed by, and in compliance with, such State and local standards or codes should be subject to a safe harbor from compliance with applicable requirements in the 2004 ADAAG. The Department also asked whether it would be appropriate for the Access Board to consider the implementation of guidelines that would permit such a safe harbor with respect to play and recreation areas undertaking alterations. In response, commenters stated that few State or local governments have standards that address issues of accessibility in play areas, and one commenter organization said that it was unaware of any State or local standards written specifically for accessible play areas. One commenter observed from experience that most State and local governments were waiting for the Access Board guidelines to become enforceable standards as they had no standards themselves to follow. Another commenter offered that public entities across the United States already include in their playground construction bid specifications language that requires compliance with the Access

Board's guidelines. A number of commenters advocated for the Access Board's guidelines to become comprehensive Federal standards that would complement any abbreviated State and local standards. One commenter, however, supported a safe harbor for play areas undergoing alterations if the areas currently comply with State or local standards.

The Department is persuaded by these comments that there is insufficient basis to establish a safe harbor for program access or alterations for play areas built in compliance with State or local laws.

In the NPRM, the Department asked whether ''a reasonable number, but at least one'' is a workable standard to determine the appropriate number of existing play areas that a public entity must make accessible. Many commenters objected to this standard, expressing concern that the phrase ''at least one'' would be interpreted as a maximum rather than a minimum requirement. Such commenters feared that this language would allow local governments to claim compliance by making just one public park accessible, regardless of the locality's size, budget, or other factors, and would support segregation, forcing children with disabilities to leave their neighborhoods to enjoy an accessible play area. While some commenters criticized what they viewed as a new analysis of program accessibility, others asserted that the requirements of program accessibility should be changed to address issues related to play areas that are not the main program in a facility but are essential components of a larger program (*e.g.*, drop-in child care for a courthouse).

The Department believes that those commenters who opposed the Department's ''reasonable number, but at least one'' standard for program accessibility misunderstood the Department's proposal. The Department did not intend any change in its longstanding interpretation of the program accessibility requirement. Program accessibility requires that each service, program, or activity be operated ''so that the service, program, or activity, when viewed in its entirety, is readily accessible to and usable by individuals with disabilities,'' 28 CFR 35.150(a), subject to the undue financial and administrative burdens and fundamental alterations defenses provided in 28 CFR 35.150. In determining how many facilities of a multi-site program must be made accessible in order to make the overall program accessible, the standard has always been an assessment of what is reasonable under the circumstances to make the program readily accessible to and usable by individuals with disabilities, taking into account such factors as the size of the public entity, the particular program features offered at each site, the geographical distance between sites, the travel times to the sites, the number of sites, and availability of public transportation to the sites. In choosing among available methods for meeting this requirement, public entities are required to give priority ''to those methods that offer services, programs, and activities * * * in the most integrated setting appropriate.'' 28 CFR 35.150(b)(1). As a result, in cases where the sites are widely dispersed with difficult travel access and where the program features offered vary widely between sites, program accessibility will require a larger number of facilities to be accessible in order to ensure program accessibility than where multiple sites are located in a concentrated area with easy travel access and uniformity in program offerings.

Commenters responded positively to the Department's question in the NPRM whether the final rule should provide a list of factors that a public entity should use to determine how many of its existing play areas should be made accessible. Commenters also asserted strongly that the number of existing parks in the locality should not be the main factor. In addition to the Department's initial list—including number of play areas in an area, travel times or geographic distances between play areas, and the size of the public entity—commenters recommended such factors as availability of accessible pedestrian routes to

the playgrounds, ready availability of accessible transportation, comparable amenities and services in and surrounding the play areas, size of the playgrounds, and sufficient variety in accessible play components within the playgrounds. The Department agrees that these factors should be considered, where appropriate, in any determination of whether program accessibility has been achieved. However, the Department has decided that it need not address these factors in the final rule itself because the range of factors that might need to be considered would vary depending upon the circumstances of particular public entities. The Department does not believe any list would be sufficiently comprehensive to cover every situation.

The Department also requested public comment about whether there was a ''tipping point'' at which the costs of compliance with the new requirements for existing play areas would be so burdensome that the entity would simply shut down the playground. Commenters generally questioned the feasibility of determining a ''tipping point.'' No commenters offered a recommended ''tipping point.'' Moreover, most commenters stated that a ''tipping point'' is not a valid consideration for various reasons, including that ''tipping points'' will vary based upon each entity's budget and other mandates, and costs that are too high will be addressed by the limitations of the undue financial and administrative burdens defense in the program accessibility requirement and that a ''tipping point'' must be weighed against quality of life issues, which are difficult to quantify. The Department has decided that comments did not establish any clear ''tipping point'' and therefore provides no regulatory requirement in this area.

Swimming pools. The 1991 Standards do not contain specific scoping or technical requirements for swimming pools. As a result, under the 1991 title II regulation, title II entities that operate programs or activities that include swimming pools have not been required to provide an accessible route into those pools via a ramp or pool lift, although they are required to provide an accessible route to such pools. In addition, these entities continue to be subject to the general title II obligation to make their programs usable and accessible to persons with disabilities.

The 2004 ADAAG includes specific technical and scoping requirements for new and altered swimming pools at sections 242 and 1009. In the NPRM, the Department sought to address the impact of these requirements on existing swimming pools. Section 242.2 of the 2004 ADAAG states that swimming pools must provide two accessible means of entry, except that swimming pools with less than 300 linear feet of swimming pool wall are only required to provide one accessible means of entry, provided that the accessible means of entry is either a swimming pool lift complying with section 1009.2 or a sloped entry complying with section 1009.3.

In the NPRM, the Department proposed, in § 35.150(b)(4)(ii), that for measures taken to comply with title II's program accessibility requirements, existing swimming pools with at least 300 linear feet of swimming pool wall would be required to provide only one accessible means of access that complied with section 1009.2 or section 1009.3 of the 2004 ADAAG.

The Department specifically sought comment from public entities and individuals with disabilities on the question whether the Department should ''allow existing public entities to provide only one accessible means of access to swimming pools more than 300 linear feet long?'' The Department received significant public comment on this proposal.

Most commenters opposed any reduction in the scoping required in the 2004 ADAAG, citing the fact that swimming is a common therapeutic form of exercise for many individuals with disabilities. Many commenters also stated that the cost of a swimming pool lift, approximately $5,000, or other nonstructural options for pool access such as transfer steps, transfer walls,

and transfer platforms, would not be an undue financial and administrative burden for most title II entities. Other commenters pointed out that the undue financial and administrative burdens defense already provided public entities with a means to reduce their scoping requirements. A few commenters cited safety concerns resulting from having just one accessible means of access, and stated that because pools typically have one ladder for every 75 linear feet of pool wall, they should have more than one accessible means of access. One commenter stated that construction costs for a public pool are approximately $4,000– 4,500 per linear foot, making the cost of a pool with 300 linear feet of swimming pool wall approximately $1.2 million, compared to $5,000 for a pool lift. Some commenters did not oppose the one accessible means of access for larger pools so long as a lift was used. A few commenters approved of the one accessible means of access for larger pools. The Department also considered the American National Standard for Public Swimming Pools, ANSI/NSPI–1 2003, section 23 of which states that all pools should have at least two means of egress.

In the NPRM, the Department also proposed at § 35.150(b)(5)(ii) that existing swimming pools with less than 300 linear feet of swimming pool wall be exempted from having to comply with the provisions of section 242.2. The Department's NPRM requested public comment about the potential effect of this approach, asking whether existing swimming pools with less than 300 linear feet of pool wall should be exempt from the requirements applicable to swimming pools.

Most commenters were opposed to this proposal. A number of commenters stated, based on the Access Board estimates that 90 percent of public high school pools, 40 percent of public park and community center pools, and 30 percent of public college and university pools have less than 300 linear feet of pool wall, that a large number of public swimming pools would fall under this exemption. Other commenters pointed to the existing undue financial and administrative burdens defenses as providing public entities with sufficient protection from excessive compliance costs. Few commenters supported this exemption.

The Department also considered the fact that many existing swimming pools owned or operated by public entities are recipients of Federal financial assistance and therefore, are also subject to the program accessibility requirements of section 504 of the Rehabilitation Act.

The Department has carefully considered all the information available to it including the comments submitted on these two proposed exemptions for swimming pools owned or operated by title II entities. The Department acknowledges that swimming provides important therapeutic, exercise, and social benefits for many individuals with disabilities and is persuaded that exemption of many publicly owned or operated pools from the 2010 Standards is neither appropriate nor necessary. The Department agrees with the commenters that title II already contains sufficient limitations on public entities' obligations to make their programs accessible. In particular, the Department agrees that those public entities that can demonstrate that making particular existing swimming pools accessible in accordance with the 2010 Standards would be an undue financial and administrative burden are sufficiently protected from excessive compliance costs. Thus, the Department has eliminated proposed §§ 35.150(b)(4)(ii) and (b)(5)(ii) from the final rule.

In addition, although the NPRM contained no specific proposed regulatory language on this issue, the NPRM sought comment on what would be a workable standard for determining the appropriate number of existing swimming pools that a public entity must make accessible for its program to be accessible. The Department asked whether a ''reasonable number, but at least one'' would be a workable standard and, if not, whether there was a more appropriate specific standard. The Department also asked if, in the alternative,

the Department should provide ''a list of factors that a public entity could use to determine how many of its existing swimming pools to make accessible, *e.g.*, number of swimming pools, travel times or geographic distances between swimming pools, and the size of the public entity?"

A number of commenters expressed concern over the ''reasonable number, but at least one'' standard and contended that, in reality, public entities would never provide more than one accessible existing pool, thus segregating individuals with disabilities. Other commenters felt that the existing program accessibility standard was sufficient. Still others suggested that one in every three existing pools should be made accessible. One commenter suggested that all public pools should be accessible. Some commenters proposed a list of factors to determine how many existing pools should be accessible. Those factors include the total number of pools, the location, size, and type of pools provided, transportation availability, and lessons and activities available. A number of commenters suggested that the standard should be based on geographic areas, since pools serve specific neighborhoods. One commenter argued that each pool should be examined individually to determine what can be done to improve its accessibility.

The Department did not include any language in the final rule that specifies the ''reasonable number, but at least one'' standard for program access. However, the Department believes that its proposal was misunderstood by many commenters. Each service, program, or activity conducted by a public entity, when viewed in its entirety, must still be readily accessible to and usable by individuals with disabilities unless doing so would result in a fundamental alteration in the nature of the program or activity or in undue financial and administrative burdens. Determining which pool(s) to make accessible and whether more than one accessible pool is necessary to provide program access requires analysis of a number of factors, including, but not limited to, the size of the public entity, geographical distance between pool sites, whether more than one community is served by particular pools, travel times to the pools, the total number of pools, the availability of lessons and other programs and amenities at each pool, and the availability of public transportation to the pools. In many instances, making one existing swimming pool accessible will not be sufficient to ensure program accessibility. There may, however, be some circumstances where a small public entity can demonstrate that modifying one pool is sufficient to provide access to the public entity's program of providing public swimming pools. In all cases, a public entity must still demonstrate that its programs, including the program of providing public swimming pools, when viewed in their entirety, are accessible.

Wading pools. The 1991 Standards do not address wading pools. Section 242.3 of the 2004 ADAAG requires newly constructed or altered wading pools to provide at least one sloped means of entry to the deepest part of the pool. The Department was concerned about the potential impact of this new requirement on existing wading pools. Therefore, in the NPRM, the Department sought comments on whether existing wading pools that are not being altered should be exempt from this requirement, asking, ''[w]hat site constraints exist in existing facilities that could make it difficult or infeasible to install a sloped entry in an existing wading pool? Should existing wading pools that are not being altered be exempt from the requirement to provide a sloped entry? '' 73 FR 34466, 34487–88 (June 17, 2008). Most commenters agreed that existing wading pools that are not being altered should be exempt from this requirement. Almost all commenters felt that during alterations a sloped entry should be provided unless it was technically infeasible to do so. Several commenters felt that the required clear deck space surrounding a pool provided sufficient

space for a sloped entry during alterations.

The Department also solicited comments on the possibility of exempting existing wading pools from the obligation to provide program accessibility. Most commenters argued that installing a sloped entry in an existing wading pool is not very feasible. Because covered entities are not required to undertake modifications that would be technically infeasible, the Department believes that the rule as drafted provides sufficient protection from unwarranted expense to the operators of small existing wading pools. Other existing wading pools, particularly those larger pools associated with facilities such as aquatic centers or water parks, must be assessed on a case-by-case basis. Therefore, the Department has not included such an exemption for wading pools in its final rule.

Saunas and steam rooms. The 1991 Standards do not address saunas and steam rooms. Section 35.150(b)(5)(iii) of the NPRM exempted existing saunas and steam rooms that seat only two individuals and were not being altered from section 241 of the 2004 ADAAG, which requires an accessible turning space. Two commenters objected to this exemption as unnecessary, and argued that the cost of accessible saunas is not high and public entities still have an undue financial and administrative burdens defense.

The Department considered these comments and has decided to eliminate the exemption for existing saunas and steam rooms that seat only two people. Such an exemption is unnecessary because covered entities will not be subject to program accessibility requirements to make existing saunas and steam rooms accessible if doing so constitutes an undue financial and administrative burden. The Department believes it is likely that because of their prefabricated forms, which include built-in seats, it would be either technically infeasible or an undue financial and administrative burden to modify such saunas and steams rooms. Consequently, a separate exemption for saunas and steam rooms would have been superfluous. Finally, employing the program accessibility standard for small saunas and steam rooms is consistent with the Department's decisions regarding the proposed exemptions for play areas and swimming pools.

Several commenters also argued in favor of a specific exemption for existing spas. The Department notes that the technical infeasibility and program accessibility defenses are applicable equally to existing spas and declines to adopt such an exemption.

Other recreational facilities. In the NPRM, the Department asked about a number of issues relating to recreation facilities such as team or player seating areas, areas of sport activity, exercise machines, boating facilities, fishing piers and platforms, and miniature golf courses. The Department's questions addressed the costs and benefits of applying the 2004 ADAAG to these spaces and facilities and the application of the specific technical requirements in the 2004 ADAAG for these spaces and facilities. The discussion of the comments received by the Department on these issues and the Department's response to those comments can be found in either the section of Appendix A to this rule entitled ''Other Issues,'' or in Appendix B to the final title III rule, which will be published today elsewhere in this volume.

Section 35.151 New construction and alterations

Section 35.151(a), which provided that those facilities that are constructed or altered by, on behalf of, or for the use of a public entity shall be designed, constructed, or altered to be readily accessible to and usable by individuals with disabilities, is unchanged in the final rule, but has been redesignated as § 35.151(a)(1). The Department has added a new section, designated as § 35.151(a)(2), to provide that full compliance with the requirements of this section is not required where an entity can demonstrate that it is structurally impracticable to meet the

requirements. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features. This exception was contained in the title III regulation and in the 1991 Standards (applicable to both public accommodations and facilities used by public entities), so it has applied to any covered facility that was constructed under the 1991 Standards since the effective date of the ADA. The Department added it to the text of § 35.151 to maintain consistency between the design requirements that apply under title II and those that apply under title III. The Department received no significant comments about this section.

Section 35.151(b) Alterations

The 1991 title II regulation does not contain any specific regulatory language comparable to the 1991 title III regulation relating to alterations and path of travel for covered entities, although the 1991 Standards describe standards for path of travel during alterations to a primary function. *See* 28 CFR part 36, app A., section 4.1.6(a) (2009).

The path of travel requirements contained in the title III regulation are based on section 303(a)(2) of the ADA, 42 U.S.C. 12183(a)(2), which provides that when an entity undertakes an alteration to a place of public accommodation or commercial facility that affects or could affect the usability of or access to an area that contains a primary function, the entity shall ensure that, to the maximum extent feasible, the path of travel to the altered area—and the restrooms, telephones, and drinking fountains serving it—is readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs.

The NPRM proposed amending § 35.151 to add both the path of travel requirements and the exemption relating to barrier removal (as modified to apply to the program accessibility standard in title II) that are contained in the title III regulation to the title II regulation. Proposed § 35.151(b)(4) contained the requirements for path of travel. Proposed § 35.151(b)(2) stated that the path of travel requirements of § 35.151(b)(4) shall not apply to measures taken solely to comply with program accessibility requirements.

Where the specific requirements for path of travel apply under title III, they are limited to the extent that the cost and scope of alterations to the path of travel are disproportionate to the cost of the overall alteration, as determined under criteria established by the Attorney General.

The Access Board included the path of travel requirement for alterations to facilities covered by the standards (other than those subject to the residential facilities standards) in section 202.4 of 2004 ADAAG. Section 35.151(b)(4)(iii) of the final rule establishes the criteria for determining when the cost of alterations to the path of travel is ''disproportionate'' to the cost of the overall alteration.

The NPRM also provided that areas such as supply storage rooms, employee lounges and locker rooms, janitorial closets, entrances, and corridors are not areas containing a primary function. Nor are restroom areas considered to contain a primary function unless the provision of restrooms is a primary purpose of the facility, such as at a highway rest stop. In that situation, a restroom would be considered to be an ''area containing a primary function'' of the facility.

The Department is not changing the requirements for program accessibility. As provided in § 35.151(b)(2) of the regulation, the path of travel requirements of § 35.151(b)(4) only apply to alterations undertaken solely for purposes other than to meet the program accessibility requirements. The exemption for the specific path of travel requirement was included in the regulation to ensure that the specific requirements and disproportionality exceptions for path of travel are not applied when areas are being altered to meet the title II program accessibility requirements in § 35.150.

In contrast, when areas are being altered to meet program accessibility requirements, they must comply with all of the applicable requirements referenced in section 202 of the 2010 Standards. A covered title II entity must provide accessibility to meet the requirements of § 35.150 unless doing so is an undue financial and administrative burden in accordance with § 35.150(a)(3). A covered title II entity may not use the disproportionality exception contained in the path of travel provisions as a defense to providing an accessible route as part of its obligation to provide program accessibility. The undue financial and administrative burden standard does not contain any bright line financial tests.

The Department's proposed § 35.151(b)(4) adopted the language now contained in § 36.403 of the title III regulation, including the disproportionality limitation (*i.e.*, alterations made to provide an accessible path of travel to the altered area would be deemed disproportionate to the overall alteration when the cost exceeds 20 percent of the cost of the alteration to the primary function area). Proposed § 35.151(b)(2) provided that the path of travel requirements do not apply to alterations undertaken solely to comply with program accessibility requirements.

The Department received a substantial number of comments objecting to the Department's adoption of the exemption for the path of travel requirements when alterations are undertaken solely to meet program accessibility requirements. These commenters argued that the Department had no statutory basis for providing this exemption nor does it serve any purpose. In addition, these commenters argued that the path of travel exemption has the effect of placing new limitations on the obligations to provide program access. A number of commenters argued that doing away with the path of travel requirement would render meaningless the concept of program access. They argued that just as the requirement to provide an accessible path of travel to an altered area (regardless of the reason for the alteration), including making the restrooms, telephones, and drinking fountains that serve the altered area accessible, is a necessary requirement in other alterations, it is equally necessary for alterations made to provide program access. Several commenters expressed concern that a readily accessible path of travel be available to ensure that persons with disabilities can get to the physical location in which programs are held. Otherwise, they will not be able to access the public entity's service, program, or activity. Such access is a cornerstone of the protections provided by the ADA. Another commenter argued that it would be a waste of money to create an accessible facility without having a way to get to the primary area. This commenter also stated that the International Building Code (IBC) requires the path of travel to a primary function area, up to 20 percent of the cost of the project. Another commenter opposed the exemption, stating that the trigger of an alteration is frequently the only time that a facility must update its facilities to comply with evolving accessibility standards.

In the Department's view, the commenters objecting to the path of travel exemption contained in § 35.151(b)(2) did not understand the intention behind the exemption. The exemption was not intended to eliminate any existing requirements related to accessibility for alterations undertaken in order to meet program access obligations under § 35.149 and § 35.150. Rather, it was intended to ensure that covered entities did not apply the path of travel requirements in lieu of the overarching requirements in this Subpart that apply when making a facility accessible in order to comply with program accessibility. The exemption was also intended to make it clear that the disproportionality test contained in the path of travel standards is not applicable in determining whether providing program access results in an undue financial and administration burden within the meaning of § 35.150(a)(3). The exemption

was also provided to maintain consistency with the title III path of travel exemption for barrier removal, *see* § 36.304(d), in keeping with the Department's regulatory authority under title II of the ADA. *See* 42 U.S.C. 12134(b); *see also* H. R Rep. No. 101B485, pt. 2, at 84 (1990) (''The committee intends, however, that the forms of discrimination prohibited by section 202 be identical to those set out in the applicable provisions of titles I and III of this legislation.'').

For title II entities, the path of travel requirements are of significance in those cases where an alteration is being made solely for reasons other than program accessibility. For example, a public entity might have six courtrooms in two existing buildings and might determine that only three of those courtrooms and the public use and common use areas serving those courtrooms in one building are needed to be made accessible in order to satisfy its program access obligations. When the public entity makes those courtrooms and the public use and common use areas serving them accessible in order to meet its program access obligations, it will have to comply with the 2010 Standards unless the public entity can demonstrate that full compliance would result in undue financial and administrative burdens as described in § 35.150(a)(3). If such action would result in an undue financial or administrative burden, the public entity would nevertheless be required to take some other action that would not result in such an alteration or such burdens but would ensure that the benefits and services provided by the public entity are readily accessible to persons with disabilities. When the public entity is making modifications to meet its program access obligation, it may not rely on the path of travel exception under § 35.151(b)(4), which limits the requirement to those alterations where the cost and scope of the alterations are not disproportionate to the cost and scope of the overall alterations. If the public entity later decides to alter courtrooms in the other building, for purposes of updating the facility (and, as previously stated, has met its program access obligations) then in that case, the public entity would have to comply with the path of travel requirements in the 2010 Standards subject to the disproportionality exception set forth in § 35.151(b)(4).

The Department has slightly revised proposed § 35.151(b)(2) to make it clearer that the path of travel requirements only apply when alterations are undertaken solely for purposes other than program accessibility.

Section 35.151(b)(4)(ii)(C) Path of travel— safe harbor

In § 35.151(b)(4)(ii)(C) of the NPRM, the Department included a provision that stated that public entities that have brought required elements of path of travel into compliance with the 1991 Standards are not required to retrofit those elements in order to reflect incremental changes in the 2010 Standards solely because of an alteration to a primary function area that is served by that path of travel. In these circumstances, the public entity is entitled to a safe harbor and is only required to modify elements to comply with the 2010 Standards if the public entity is planning an alteration to the element.

A substantial number of commenters objected to the Department's imposition of a safe harbor for alterations to facilities of public entities that comply with the 1991 Standards. These commenters argued that if a public entity is already in the process of altering its facility, there should be a legal requirement that individuals with disabilities be entitled to increased accessibility by using the 2010 Standards for path of travel work. They also stated that they did not believe there was a statutory basis for ''grandfathering'' facilities that comply with the 1991 Standards.

The ADA is silent on the issue of ''grandfathering'' or establishing a safe harbor for measuring compliance in situations where the covered entity is not undertaking a planned

alteration to specific building elements. The ADA delegates to the Attorney General the responsibility for issuing regulations that define the parameters of covered entities' obligations when the statute does not directly address an issue. This regulation implements that delegation of authority.

One commenter proposed that a previous record of barrier removal be one of the factors in determining, prospectively, what renders a facility, when viewed in its entirety, usable and accessible to persons with disabilities. Another commenter asked the Department to clarify, at a minimum, that to the extent compliance with the 1991 Standards does not provide program access, particularly with regard to areas not specifically addressed in the 1991 Standards, the safe harbor will not operate to relieve an entity of its obligations to provide program access.

One commenter supported the proposal to add a safe harbor for path of travel.

The final rule retains the safe harbor for required elements of a path of travel to altered primary function areas for public entities that have already complied with the 1991 Standards with respect to those required elements. The Department believes that this safe harbor strikes an appropriate balance between ensuring that individuals with disabilities are provided access to buildings and facilities and potential financial burdens on existing public entities that are undertaking alterations subject to the 2010 Standards. This safe harbor is not a blanket exemption for facilities. If a public entity undertakes an alteration to a primary function area, only the required elements of a path of travel to that area that already comply with the 1991 Standards are subject to the safe harbor. If a public entity undertakes an alteration to a primary function area and the required elements of a path of travel to the altered area do not comply with the 1991 Standards, then the public entity must bring those elements into compliance with the 2010 Standards.

Section 35.151(b)(3) Alterations to historic facilities

The final rule renumbers the requirements for alterations to historic facilities enumerated in current § 35.151(d)(1) and (2) as § 35.151(b)(3)(i) and (ii). Currently, the regulation provides that alterations to historic facilities shall comply to the maximum extent feasible with section 4.1.7 of UFAS or section 4.1.7 of the 1991 Standards. *See* 28 CFR 35.151(d)(1). Section 35.151(b)(3)(i) of the final rule eliminates the option of using UFAS for alterations that commence on or after March 15, 2012. The substantive requirement in current § 35.151(d)(2)—that alternative methods of access shall be provided pursuant to the requirements of § 35.150 if it is not feasible to provide physical access to an historic property in a manner that will not threaten or destroy the historic significance of the building or facility—is contained in § 35.151(b)(3)(ii).

Section 35.151(c) Accessibility standards for new construction and alterations

Section 35.151(c) of the NPRM proposed to adopt ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the Americans with Disabilities Act and Architectural Barriers Act Guidelines (2004 ADAAG) into the ADA Standards for Accessible Design (2010 Standards). As the Department has noted, the development of these standards represents the culmination of a lengthy effort by the Access Board to update its guidelines, to make the Federal guidelines consistent to the extent permitted by law, and to harmonize the Federal requirements with the private sector model codes that form the basis of many State and local building code requirements. The full text of the 2010 Standards is available for public review on the ADA Home Page (*http://www.ada.gov*) and on the Access Board's Web site (*http:// www.access-board.gov/gs.htm*) (last visited June 24, 2010). The Access Board

site also includes an extensive discussion of the development of the 2004 ADA/ABA Guidelines, and a detailed comparison of the 1991 Standards, the 2004 ADA/ABA Guidelines, and the 2003 International Building Code.

Section 204 of the ADA, 42 U.S.C. 12134, directs the Attorney General to issue regulations to implement title II that are consistent with the minimum guidelines published by the Access Board. The Attorney General (or his designee) is a statutory member of the Access Board (*see* 29 U.S.C. 792(a)(1)(B(vii)) and was involved in the development of the 2004 ADAAG. Nevertheless, during the process of drafting the NPRM, the Department reviewed the 2004 ADAAG to determine if additional regulatory provisions were necessary. As a result of this review, the Department decided to propose new sections, which were contained in § 35.151(e)–(h) of the NPRM, to clarify how the Department will apply the proposed standards to social service center establishments, housing at places of education, assembly areas, and medical care facilities. Each of these provisions is discussed below.

Congress anticipated that there would be a need for close coordination of the ADA building requirements with State and local building code requirements. Therefore, the ADA authorized the Attorney General to establish an ADA code certification process under title III of the ADA. That process is addressed in 28 CFR part 36, subpart F. Revisions to that process are addressed in the regulation amending the title III regulation published elsewhere in the **Federal Register** today. In addition, the Department operates an extensive technical assistance program. The Department anticipates that once this rule is final, revised technical assistance material will be issued to provide guidance about its implementation.

Section 35.151(c) of the 1991 title II regulation establishes two standards for accessible new construction and alteration. Under paragraph (c), design, construction, or alteration of facilities in conformance with UFAS or with the 1991 Standards (which, at the time of the publication of the rule were also referred to as the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (1991 ADAAG)) is deemed to comply with the requirements of this section with respect to those facilities (except that if the 1991 Standards are chosen, the elevator exemption does not apply). The 1991 Standards were based on the 1991 ADAAG, which was initially developed by the Access Board as guidelines for the accessibility of buildings and facilities that are subject to title III. The Department adopted the 1991 ADAAG as the standards for places of public accommodation and commercial facilities under title III of the ADA and it was published as Appendix A to the Department's regulation implementing title III, 56 FR 35592 (July 26, 1991) as amended, 58 FR 17522 (April 5, 1993), and as further amended, 59 FR 2675 (Jan. 18, 1994), codified at 28 CFR part 36 (2009).

Section 35.151(c) of the final rule adopts the 2010 Standards and establishes the compliance date and triggering events for the application of those standards to both new construction and alterations. Appendix B of the final title III rule (Analysis and Commentary on the 2010 ADA Standards for Accessible Design) (which will be published today elsewhere in this volume and codified as Appendix B to 28 CFR part 36) provides a description of the major changes in the 2010 Standards (as compared to the 1991 ADAAG) and a discussion of the public comments that the Department received on specific sections of the 2004 ADAAG. A number of commenters asked the Department to revise certain provisions in the 2004 ADAAG in a manner that would reduce either the required scoping or specific technical accessibility requirements. As previously stated, although the ADA requires the enforceable standards issued by the Department under title II and title III to be consistent with the minimum guidelines published by the Access Board, it is the sole responsibility

of the Attorney General to promulgate standards and to interpret and enforce those standards. The guidelines adopted by the Access Board are ''minimum guidelines.'' 42 U.S.C. 12186(c).

Compliance date. When the ADA was enacted, the effective dates for various provisions were delayed in order to provide time for covered entities to become familiar with their new obligations. Titles II and III of the ADA generally became effective on January 26, 1992, six months after the regulations were published. *See* 42 U.S.C. 12131 note; 42 U.S.C. 12181 note. New construction under title II and alterations under either title II or title III had to comply with the design standards on that date. *See* 42 U.S.C. 12183(a)(1). For new construction under title III, the requirements applied to facilities designed and constructed for first occupancy after January 26, 1993—18 months after the 1991 Standards were published by the Department. In the NPRM, the Department proposed to amend § 35.151(c)(1) by revising the current language to limit the application of the 1991 standards to facilities on which construction commences within six months of the final rule adopting revised standards. The NPRM also proposed adding paragraph (c)(2) to § 35.151, which states that facilities on which construction commences on or after the date six months following the effective date of the final rule shall comply with the proposed standards adopted by that rule.

As a result, under the NPRM, for the first six months after the effective date, public entities would have the option to use either UFAS or the 1991 Standards and be in compliance with title II. Six months after the effective date of the rule, the new standards would take effect. At that time, construction in accordance with UFAS would no longer satisfy ADA requirements. The Department stated that in order to avoid placing the burden of complying with both standards on public entities, the Department would coordinate a government-wide effort to revise Federal agencies' section 504 regulations to adopt the 2004 ADAAG as the standard for new construction and alterations.

The purpose of the proposed six-month delay in requiring compliance with the 2010 Standards was to allow covered entities a reasonable grace period to transition between the existing and the proposed standards. For that reason, if a title II entity preferred to use the 2010 Standards as the standard for new construction or alterations commenced within the six-month period after the effective date of the final rule, such entity would be considered in compliance with title II of the ADA.

The Department received a number of comments about the proposed six-month effective date for the title II regulation that were similar in content to those received on this issue for the proposed title III regulation. Several commenters supported the six-month effective date. One commenter stated that any revisions to its State building code becomes effective six months after adoption and that this has worked well. In addition, this commenter stated that since 2004 ADAAG is similar to IBC 2006 and ICC/ANSI A117.1– 2003, the transition should be easy. By contrast, another commenter advocated for a minimum 12-month effective date, arguing that a shorter effective date could cause substantial economic hardships to many cities and towns because of the lengthy lead time necessary for construction projects. This commenter was concerned that a six-month effective date could lead to projects having to be completely redrawn, rebid, and rescheduled to ensure compliance with the new standards. Other commenters advocated that the effective date be extended to at least 18 months after the publication of the rule. One of these commenters expressed concern that the kinds of bureaucratic organizations subject to the title II regulations lack the internal resources to quickly evaluate the regulatory changes, determine whether they are currently compliant with the 1991 standards, and determine what they have to do to comply with the new standards. The other commenter argued that 18 months is

the minimum amount of time necessary to ensure that projects that have already been designed and approved do not have to undergo costly design revisions at taxpayer expense.

The Department is persuaded by the concerns raised by commenters for both the title II and III regulations that the six-month compliance date proposed in the NPRM for application of the 2010 Standards may be too short for certain projects that are already in the midst of the design and permitting process. The Department has determined that for new construction and alterations, compliance with the 2010 Standards will not be required until 18 months from the date the final rule is published. Until the time compliance with the 2010 Standards is required, public entities will have the option of complying with the 2010 Standards, the UFAS, or the 1991 Standards. However, public entities that choose to comply with the 2010 Standards in lieu of the 1991 Standards or UFAS prior to the compliance date described in this rule must choose one of the three standards, and may not rely on some of the requirements contained in one standard and some of the requirements contained in the other standards.

Triggering event. In § 35.151(c)(2) of the NPRM, the Department proposed that the commencement of construction serve as the triggering event for applying the proposed standards to new construction and alterations under title II. This language is consistent with the triggering event set forth in § 35.151(a) of the 1991 title II regulation. The Department received only four comments on this section of the title II rule. Three commenters supported the use of ''start of construction'' as the triggering event. One commenter argued that the Department should use the ''last building permit or start of physical construction, whichever comes first,'' stating that ''altering a design after a building permit has been issued can be an undue burden.''

After considering these comments, the Department has decided to continue to use the commencement of physical construction as the triggering event for application of the 2010 Standards for entities covered by title II. The Department has also added clarifying language at § 35.151(c)(4) to the regulation to make it clear that the date of ceremonial groundbreaking or the date a structure is razed to make it possible for construction of a facility to take place does not qualify as the commencement of physical construction.

Section 234 of the 2010 Standards provides accessibility guidelines for newly designed and constructed amusement rides. The amusement ride provisions do not provide a ''triggering event'' for new construction or alteration of an amusement ride. An industry commenter requested that the triggering event of ''first use,'' as noted in the Advisory note to section 234.1 of the 2004 ADAAG, be included in the final rule. The Advisory note provides that ''[a] custom designed and constructed ride is new upon its first use, which is the first time amusement park patrons take the ride.'' The Department declines to treat amusement rides differently than other types of new construction and alterations. Under the final rule, they are subject to § 35.151(c). Thus, newly constructed and altered amusement rides shall comply with the 2010 Standards if the start of physical construction or the alteration is on or after 18 months from the publication date of this rule. The Department also notes that section 234.4.2 of the 2010 Standards only applies where the structural or operational characteristics of an amusement ride are altered. It does not apply in cases where the only change to a ride is the theme.

Noncomplying new construction and alterations. The element-by-element safe harbor referenced in § 35.150(b)(2) has no effect on new or altered elements in existing facilities that were subject to the 1991 Standards or UFAS on the date that they were constructed or altered, but do not comply with the technical and scoping specifications for those elements in the 1991 Standards or UFAS. Section 35.151(c)(5) of the

final rule sets forth the rules for noncompliant new construction or alterations in facilities that were subject to the requirements of this part. Under those provisions, noncomplying new construction and alterations constructed or altered after the effective date of the applicable ADA requirements and before March 15, 2012 shall, before March 15, 2012, be made accessible in accordance with either the 1991 Standards, UFAS, or the 2010 Standards. Noncomplying new construction and alterations constructed or altered after the effective date of the applicable ADA requirements and before March 15, 2012, shall, on or after March 15, 2012 be made accessible in accordance with the 2010 Standards.

Section 35.151(d) Scope of coverage

In the NPRM, the Department proposed a new provision, § 35.151(d), to clarify that the requirements established by § 35.151, including those contained in the 2004 ADAAG, prescribe what is necessary to ensure that buildings and facilities, including fixed or built-in elements in new or altered facilities, are accessible to individuals with disabilities. Once the construction or alteration of a facility has been completed, all other aspects of programs, services, and activities conducted in that facility are subject to the operational requirements established in this final rule. Although the Department may use the requirements of the 2010 Standards as a guide to determining when and how to make equipment and furnishings accessible, those determinations fall within the discretionary authority of the Department.

The Department also wishes to clarify that the advisory notes, appendix notes, and figures that accompany the 1991 and 2010 Standards do not establish separately enforceable requirements unless specifically stated otherwise in the text of the standards. This clarification has been made to address concerns expressed by ANPRM commenters who mistakenly believed that the advisory notes in the 2004 ADAAG established requirements beyond those established in the text of the guidelines (*e.g.,* Advisory 504.4 suggests, but does not require, that covered entities provide visual contrast on stair tread nosing to make them more visible to individuals with low vision). The Department received no significant comments on this section and it is unchanged in the final rule.

Definitions of residential facilities and transient lodging. The 2010 Standards add a definition of ''residential dwelling unit'' and modify the current definition of ''transient lodging.'' Under section 106.5 of the 2010 Standards, ''residential dwelling unit'' is defined as ''[a] unit intended to be used as a residence, that is primarily long-term in nature'' and does not include transient lodging, inpatient medical care, licensed long-term care, and detention or correctional facilities. Additionally, section 106.5 of the 2010 Standards changes the definition of ''transient lodging'' to a building or facility ''containing one or more guest room(s) for sleeping that provides accommodations that are primarily short-term in nature.'' ''Transient lodging'' does not include residential dwelling units intended to be used as a residence. The references to ''dwelling units'' and ''dormitories'' that are in the definition of the 1991 Standards are omitted from the 2010 Standards.

The comments about the application of transient lodging or residential standards to social service center establishments, and housing at a place of education are addressed separately below. The Department received one additional comment on this issue from an organization representing emergency response personnel seeking an exemption from the transient lodging accessibility requirements for crew quarters and common use areas serving those crew quarters (*e.g*., locker rooms, exercise rooms, day room) that are used exclusively by on-duty emergency response personnel and that are not used for any public purpose. The commenter argued that since emergency response personnel must meet certain physical qualifications that have the effect of

exempting persons with mobility disabilities, there is no need to build crew quarters and common use areas serving those crew quarters to meet the 2004 ADAAG. In addition, the commenter argued that applying the transient lodging standards would impose significant costs and create living space that is less usable for most emergency response personnel.

The ADA does not exempt spaces because of a belief or policy that excludes persons with disabilities from certain work. However, the Department believes that crew quarters that are used exclusively as a residence by emergency response personnel and the kitchens and bathrooms exclusively serving those quarters are more like residential dwelling units and are therefore covered by the residential dwelling standards in the 2010 Standards, not the transient lodging standards. The residential dwelling standards address most of the concerns of the commenter. For example, the commenter was concerned that sinks in kitchens and lavatories in bathrooms that are accessible under the transient lodging standards would be too low to be comfortably used by emergency response personnel. The residential dwelling standards allow such features to be adaptable so that they would not have to be lowered until accessibility was needed. Similarly, grab bars and shower seats would not have to be installed at the time of construction provided that reinforcement has been installed in walls and located so as to permit their installation at a later date.

Section 35.151(e) Social service center establishments

In the NPRM, the Department proposed a new § 35.151(e) requiring group homes, halfway houses, shelters, or similar social service center establishments that provide temporary sleeping accommodations or residential dwelling units to comply with the provisions of the 2004 ADAAG that apply to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

The NPRM explained that this proposal was based on two important changes in the 2004 ADAAG. First, for the first time, residential dwelling units are explicitly covered in the 2004 ADAAG in section 233. Second, the 2004 ADAAG eliminates the language contained in the 1991 Standards addressing scoping and technical requirements for homeless shelters, group homes, and similar social service center establishments. Currently, such establishments are covered in section 9.5 of the transient lodging section of the 1991 Standards. The deletion of section 9.5 creates an ambiguity of coverage that must be addressed.

The NPRM explained the Department's belief that transferring coverage of social service center establishments from the transient lodging standards to the residential facilities standards would alleviate conflicting requirements for social service center providers. The Department believes that a substantial percentage of social service center establishments are recipients of Federal financial assistance from the Department of Housing and Urban Development (HUD). The Department of Health and Human Services (HHS) also provides financial assistance for the operation of shelters through the Administration for Children and Families programs. As such, these establishments are covered both by the ADA and section 504 of the Rehabilitation Act. UFAS is currently the design standard for new construction and alterations for entities subject to section 504. The two design standards for accessibility— the 1991 Standards and UFAS—have confronted many social service providers with separate, and sometimes conflicting, requirements for design and construction of facilities. To resolve these conflicts, the residential facilities standards in the 2004 ADAAG have been coordinated with the section 504 requirements. The transient lodging standards, however, are not similarly coordinated. The deletion of section 9.5 of the

1991 Standards from the 2004 ADAAG presented two options: (1) Require coverage under the transient lodging standards, and subject such facilities to separate, conflicting requirements for design and construction; or (2) require coverage under the residential facilities standards, which would harmonize the regulatory requirements under the ADA and section 504. The Department chose the option that harmonizes the regulatory requirements: coverage under the residential facilities standards.

In the NPRM, the Department expressed concern that the residential facilities standards do not include a requirement for clear floor space next to beds similar to the requirement in the transient lodging standards and as a result, the Department proposed adding a provision that would require certain social service center establishments that provide sleeping rooms with more than 25 beds to ensure that a minimum of 5 percent of the beds have clear floor space in accordance with section 806.2.3 of the 2004 ADAAG.

In the NPRM, the Department requested information from providers who operate homeless shelters, transient group homes, halfway houses, and other social service center establishments, and from the clients of these facilities who would be affected by this proposed change, asking, ''[t]o what extent have conflicts between the ADA and section 504 affected these facilities? What would be the effect of applying the residential dwelling unit requirements to these facilities, rather than the requirements for transient lodging guest rooms?'' 73 FR 34466, 34491 (June 17, 2008).

Many of the commenters supported applying the residential facilities requirements to social service center establishments, stating that even though the residential facilities requirements are less demanding in some instances, the existence of one clear standard will result in an overall increased level of accessibility by eliminating the confusion and inaction that are sometimes caused by the current existence of multiple requirements. One commenter also stated that ''it makes sense to treat social service center establishments like residential facilities because this is how these establishments function in practice.''

Two commenters agreed with applying the residential facilities requirements to social service center establishments but recommended adding a requirement for various bathing options, such as a roll-in shower (which is not required under the residential standards).

One commenter objected to the change and asked the Department to require that social service center establishments continue to comply with the transient lodging standards. One commenter stated that it did not agree that the standards for residential coverage would serve persons with disabilities as well as the 1991 transient lodging standards. This commenter expressed concern that the Department had eliminated guidance for social service agencies and that the rule should be put on hold until those safeguards are restored. Another commenter argued that the rule that would provide the greatest access for persons with disabilities should prevail.

Several commenters argued for the application of the transient lodging standards to all social service center establishments except those that were ''intended as a person's place of abode,'' referencing the Department's question related to the definition of ''place of lodging'' in the title III NPRM. One commenter stated that the International Building Code requires accessible units in all transient facilities. The commenter expressed concern that group homes should be built to be accessible, rather than adaptable.

The Department continues to be concerned about alleviating the challenges for social service providers that are also subject to section 504 and would likely be subject to conflicting requirements if the transient lodging standards were applied. Thus, the Department has retained the requirement that social service center establishments comply with the residential dwelling standards. The Department believes,

however, that social service center establishments that provide emergency shelter to large transient populations should be able to provide bathing facilities that are accessible to persons with mobility disabilities who need roll-in showers. Because of the transient nature of the population of these large shelters, it will not be feasible to modify bathing facilities in a timely manner when faced with a need to provide a roll-in shower with a seat when requested by an overnight visitor. As a result, the Department has added a requirement that social service center establishments with sleeping accommodations for more than 50 individuals must provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower shall be provided for each group. This supplemental requirement to the residential facilities standards is in addition to the supplemental requirement that was proposed in the NPRM for clear floor space in sleeping rooms with more than 25 beds.

The Department also notes that while dwelling units at some social service center establishments are also subject to the Fair Housing Act (FHAct) design and construction requirements that require certain features of adaptable and accessible design, FHAct units do not provide the same level of accessibility that is required for residential facilities under the 2010 Standards. The FHAct requirements, where also applicable, should not be considered a substitute for the 2010 Standards. Rather, the 2010 Standards must be followed in addition to the FHAct requirements.

The Department also notes that whereas the NPRM used the term ''social service establishment,'' the final rule uses the term ''social service center establishment.'' The Department has made this editorial change so that the final rule is consistent with the terminology used in the ADA. *See* 42 U.S.C. 12181(7)(k).

Section 35.151(f) Housing at a place of education

The Department of Justice and the Department of Education share responsibility for regulation and enforcement of the ADA in postsecondary educational settings, including its requirements for architectural features. In addition, the Department of Housing and Urban Development (HUD) has enforcement responsibility for housing subject to title II of the ADA. Housing facilities in educational settings range from traditional residence halls and dormitories to apartment or townhouse-style residences. In addition to title II of the ADA, public universities and schools that receive Federal financial assistance are also subject to section 504, which contains its own accessibility requirements through the application of UFAS. Residential housing in an educational setting is also covered by the FHAct, which requires newly constructed multifamily housing to include certain features of accessible and adaptable design. Covered entities subject to the ADA must always be aware of, and comply with, any other Federal statutes or regulations that govern the operation of residential properties.

Although the 1991 Standards mention dormitories as a form of transient lodging, they do not specifically address how the ADA applies to dormitories or other types of residential housing provided in an educational setting. The 1991 Standards also do not contain any specific provisions for residential facilities, allowing covered entities to elect to follow the residential standards contained in UFAS. Although the 2004 ADAAG contains provisions for both residential facilities and transient lodging, the guidelines do not indicate which requirements apply to housing provided in an educational setting, leaving it to the adopting agencies to make that choice. After evaluating both sets of standards, the Department concluded that the benefits

of applying the transient lodging standards outweighed the benefits of applying the residential facilities standards. Consequently, in the NPRM, the Department proposed a new § 35.151(f) that provided that residence halls or dormitories operated by or on behalf of places of education shall comply with the provisions of the proposed standards for transient lodging, including, but not limited to, the provisions in sections 224 and 806 of the 2004 ADAAG.

Both public and private school housing facilities have varied characteristics. College and university housing facilities typically provide housing for up to one academic year, but may be closed during school vacation periods. In the summer, they are often used for short-term stays of one to three days, a week, or several months. Graduate and faculty housing is often provided year-round in the form of apartments, which may serve individuals or families with children. These housing facilities are diverse in their layout. Some are double-occupancy rooms with a shared toilet and bathing room, which may be inside or outside the unit. Others may contain cluster, suite, or group arrangements where several rooms are located inside a defined unit with bathing, kitchen, and similar common facilities. In some cases, these suites are indistinguishable in features from traditional apartments. Universities may build their own housing facilities or enter into agreements with private developers to build, own, or lease housing to the educational institution or to its students. Academic housing may be located on the campus of the university or may be located in nearby neighborhoods.

Throughout the school year and the summer, academic housing can become program areas in which small groups meet, receptions and educational sessions are held, and social activities occur. The ability to move between rooms—both accessible rooms and standard rooms—in order to socialize, to study, and to use all public use and common use areas is an essential part of having access to these educational programs and activities. Academic housing is also used for short-term transient educational programs during the time students are not in regular residence and may be rented out to transient visitors in a manner similar to a hotel for special university functions.

The Department was concerned that applying the new construction requirements for residential facilities to educational housing facilities could hinder access to educational programs for students with disabilities. Elevators are not generally required under the 2004 ADAAG residential facilities standards unless they are needed to provide an accessible route from accessible units to public use and common use areas, while under the 2004 ADAAG as it applies to other types of facilities, multistory public facilities must have elevators unless they meet very specific exceptions. In addition, the residential facilities standards do not require accessible roll-in showers in bathrooms, while the transient lodging requirements require some of the accessible units to be served by bathrooms with roll-in showers. The transient lodging standards also require that a greater number of units have accessible features for persons with communication disabilities. The transient lodging standards provide for installation of the required accessible features so that they are available immediately, but the residential facilities standards allow for certain features of the unit to be adaptable. For example, only reinforcements for grab bars need to be provided in residential dwellings, but the actual grab bars must be installed under the transient lodging standards. By contrast, the residential facilities standards do require certain features that provide greater accessibility within units, such as more usable kitchens, and an accessible route throughout the dwelling. The residential facilities standards also require 5 percent of the units to be accessible to persons with mobility disabilities, which is a continuation of the same scoping that is currently required under UFAS, and is therefore applicable to any educational institution that is covered by section 504. The transient lodging

standards require a lower percentage of accessible sleeping rooms for facilities with large numbers of rooms than is required by UFAS. For example, if a dormitory had 150 rooms, the transient lodging standards would require seven accessible rooms while the residential standards would require eight. In a large dormitory with 500 rooms, the transient lodging standards would require 13 accessible rooms and the residential facilities standards would require 25. There are other differences between the two sets of standards as well with respect to requirements for accessible windows, alterations, kitchens, accessible route throughout a unit, and clear floor space in bathrooms allowing for a side transfer.

In the NPRM, the Department requested public comment on how to scope educational housing facilities, asking, ''[w]ould the residential facility requirements or the transient lodging requirements in the 2004 ADAAG be more appropriate for housing at places of education? How would the different requirements affect the cost when building new dormitories and other student housing?'' 73 FR 34466, 34492 (June 17, 2008).

The vast majority of the comments received by the Department advocated using the residential facilities standards for housing at a place of education instead of the transient lodging standards, arguing that housing at places of public education are in fact homes for the students who live in them. These commenters argued, however, that the Department should impose a requirement for a variety of options for accessible bathing and should ensure that all floors of dormitories be accessible so that students with disabilities have the same opportunities to participate in the life of the dormitory community that are provided to students without disabilities. Commenters representing persons with disabilities and several individuals argued that, although the transient lodging standards may provide a few more accessible features (such as roll-in showers), the residential facilities standards would ensure that students with disabilities have access to all rooms in their assigned unit, not just to the sleeping room, kitchenette, and wet bar. One commenter stated that, in its view, the residential facilities standards were congruent with overlapping requirements from HUD, and that access provided by the residential facilities requirements within alterations would ensure dispersion of accessible features more effectively. This commenter also argued that while the increased number of required accessible units for residential facilities as compared to transient lodging may increase the cost of construction or alteration, this cost would be offset by a reduced need to adapt rooms later if the demand for accessible rooms exceeds the supply. The commenter also encouraged the Department to impose a visitability (accessible doorways and necessary clear floor space for turning radius) requirement for both the residential facilities and transient lodging requirements to allow students with mobility impairments to interact and socialize in a fully integrated fashion.

Two commenters supported the Department's proposed approach. One commenter argued that the transient lodging requirements in the 2004 ADAAG would provide greater accessibility and increase the opportunity of students with disabilities to participate fully in campus life. A second commenter generally supported the provision of accessible dwelling units at places of education, and pointed out that the relevant scoping in the International Building Code requires accessible units ''consistent with hotel accommodations.''

The Department has considered the comments recommending the use of the residential facilities standards and acknowledges that they require certain features that are not included in the transient lodging standards and that should be required for housing provided at a place of education. In addition, the Department notes that since educational institutions often use their academic housing facilities as short-term transient lodging in the summers, it is important that accessible features be installed at the outset.

It is not realistic to expect that the educational institution will be able to adapt a unit in a timely manner in order to provide accessible accommodations to someone attending a one-week program during the summer.

The Department has determined that the best approach to this type of housing is to continue to require the application of transient lodging standards, but at the same time to add several requirements drawn from the residential facilities standards related to accessible turning spaces and work surfaces in kitchens, and the accessible route throughout the unit. This will ensure the maintenance of the transient lodging standard requirements related to access to all floors of the facility, roll-in showers in facilities with more than 50 sleeping rooms, and other important accessibility features not found in the residential facilities standards, but will also ensure usable kitchens and access to all the rooms in a suite or apartment.

The Department has added a new definition to § 35.104, ''Housing at a Place of Education,'' and has revised § 35.151(f) to reflect the accessible features that now will be required in addition to the requirements set forth under the transient lodging standards. The Department also recognizes that some educational institutions provide some residential housing on a year-round basis to graduate students and staff which is comparable to private rental housing, and which contains no facilities for educational programming.

Section 35.151(f)(3) exempts from the transient lodging standards apartments or townhouse facilities provided by or on behalf of a place of education that are leased on a year-round basis exclusively to graduate students or faculty, and do not contain any public use or common use areas available for educational programming; instead, such housing shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards. Section 35.151(f) uses the term ''sleeping room'' in lieu of the term ''guest room,'' which is the term used in the transient lodging standards. The Department is using this term because it believes that, for the most part, it provides a better description of the sleeping facilities used in a place of education than ''guest room.'' The final rule states that the Department intends the terms to be used interchangeably in the application of the transient lodging standards to housing at a place of education.

Section 35.151(g) Assembly areas

In the NPRM, the Department proposed § 35.151(g) to supplement the assembly area requirements of the 2004 ADAAG, which the Department is adopting as part of the 2010 Standards. The NPRM proposed at § 35.151(g)(1) to require wheelchair spaces and companion seating locations to be dispersed to all levels of the facility and are served by an accessible route. The Department received no significant comments on this paragraph and has decided to adopt the proposed language with minor modifications. The Department has retained the substance of this section in the final rule but has clarified that the requirement applies to stadiums, arenas, and grandstands. In addition, the Department has revised the phrase ''wheelchair and companion seating locations'' to ''wheelchair spaces and companion seats.''

Section 35.151(g)(1) ensures that there is greater dispersion of wheelchair spaces and companion seats throughout stadiums, arenas, and grandstands than would otherwise be required by sections 221 and 802 of the 2004 ADAAG. In some cases, the accessible route may not be the same route that other individuals use to reach their seats. For example, if other patrons reach their seats on the field by an inaccessible route (*e.g.*, by stairs), but there is an accessible route that complies with section 206.3 of the 2010 Standards that could be connected to seats on the field, wheelchair spaces and companion seats

must be placed on the field even if that route is not generally available to the public.

Regulatory language that was included in the 2004 ADAAG advisory, but that did not appear in the NPRM, has been added by the Department in § 35.151(g)(2). Section 35.151(g)(2) now requires an assembly area that has seating encircling, in whole or in part, a field of play or performance area such as an arena or stadium, to place wheelchair spaces and companion seats around the entire facility. This rule, which is designed to prevent a public entity from placing wheelchair spaces and companion seats on one side of the facility only, is consistent with the Department's enforcement practices and reflects its interpretation of section 4.33.3 of the 1991 Standards.

In the NPRM, the Department proposed § 35.151(g)(2) which prohibits wheelchair spaces and companion seating locations from being ''located on, (or obstructed by) temporary platforms or other moveable structures.'' Through its enforcement actions, the Department discovered that some venues place wheelchair spaces and companion seats on temporary platforms that, when removed, reveal conventional seating underneath, or cover the wheelchair spaces and companion seats with temporary platforms on top of which they place risers of conventional seating. These platforms cover groups of conventional seats and are used to provide groups of wheelchair seats and companion seats.

Several commenters requested an exception to the prohibition of the use of temporary platforms for public entities that sell most of their tickets on a season-ticket or other multi-event basis. Such commenters argued that they should be able to use temporary platforms because they know, in advance, that the patrons sitting in certain areas for the whole season do not need wheelchair spaces and companion seats. The Department declines to adopt such an exception. As it explained in detail in the NPRM, the Department believes that permitting the use of movable platforms that seat four or more wheelchair users and their companions have the potential to reduce the number of available wheelchair seating spaces below the level required, thus reducing the opportunities for persons who need accessible seating to have the same choice of ticket prices and amenities that are available to other patrons in the facility. In addition, use of removable platforms may result in instances where last minute requests for wheelchair and companion seating cannot be met because entire sections of accessible seating will be lost when a platform is removed. *See* 73 FR 34466, 34493 (June 17, 2008). Further, use of temporary platforms allows facilities to limit persons who need accessible seating to certain seating areas, and to relegate accessible seating to less desirable locations. The use of temporary platforms has the effect of neutralizing dispersion and other seating requirements (*e.g.*, line of sight) for wheelchair spaces and companion seats. *Cf. Independent Living Resources v. Oregon Arena Corp.*, 1 F. Supp. 2d 1159, 1171 (D. Or. 1998) (holding that while a public accommodation may ''infill'' wheelchair spaces with removable seats when the wheelchair spaces are not needed to accommodate individuals with disabilities, under certain circumstances ''[s]uch a practice might well violate the rule that wheelchair spaces must be dispersed throughout the arena in a manner that is roughly proportionate to the overall distribution of seating''). In addition, using temporary platforms to convert unsold wheelchair spaces to conventional seating undermines the flexibility facilities need to accommodate secondary ticket markets exchanges as required by § 35.138(g) of the final rule.

As the Department explained in the NPRM, however, this provision was not designed to prohibit temporary seating that increases seating for events (*e.g.*, placing temporary seating on the floor of a basketball court for a concert). Consequently, the final rule, at § 35.151(g)(3), has been amended to clarify that if an entire seating

section is on a temporary platform for a particular event, then wheelchair spaces and companion seats may be in that seating section. However, adding a temporary platform to create wheelchair spaces and companion seats that are otherwise dissimilar from nearby fixed seating and then simply adding a small number of additional seats to the platform would not qualify as an ''entire seating section'' on the platform. In addition, § 35.151(g)(3) clarifies that facilities may fill in wheelchair spaces with removable seats when the wheelchair spaces are not needed by persons who use wheelchairs.

The Department has been responsive to assembly areas' concerns about reduced revenues due to unused accessible seating. Accordingly, the Department has reduced scoping requirements significantly—by almost half in large assembly areas—and determined that allowing assembly areas to infill unsold wheelchair spaces with readily removable temporary individual seats appropriately balances their economic concerns with the rights of individuals with disabilities. *See* section 221.2 of the 2010 Standards.

For stadium-style movie theaters, in § 35.151(g)(4) of the NPRM the Department proposed requiring placement of wheelchair seating spaces and companion seats on a riser or cross-aisle in the stadium section of the theater and placement of such seating so that it satisfies at least one of the following criteria: (1) It is located within the rear 60 percent of the seats provided in the auditorium; or (2) it is located within the area of the auditorium where the vertical viewing angles are between the 40th to 100th percentile of vertical viewing angles for all seats in that theater as ranked from the first row (1st percentile) to the back row (100th percentile). The vertical viewing angle is the angle between a horizontal line perpendicular to the seated viewer's eye to the screen and a line from the seated viewer's eye to the top of the screen.

The Department proposed this bright-line rule for two reasons: (1) The movie theater industry petitioned for such a rule; and (2) the Department has acquired expertise on the design of stadium style theaters from litigation against several major movie theater chains. *See U.S. v. AMC Entertainment*, 232 F. Supp. 2d 1092 (C.D. Ca. 2002), *rev'd in part*, 549 F. 3d 760 (9th Cir. 2008); *U.S. v. Cinemark USA, Inc*., 348 F. 3d 569 (6th Cir. 2003), *cert. denied*, 542 U.S. 937 (2004). Two industry commenters—at least one of whom otherwise supported this rule—requested that the Department explicitly state that this rule does not apply retroactively to existing theaters. Although this rule on its face applies to new construction and alterations, these commenters were concerned that the rule could be interpreted to apply retroactively because of the Department's statement in the ANPRM that this bright-line rule, although newly-articulated, does not represent a ''substantive change from the existing line-of-sight requirements'' of section 4.33.3 of the 1991 Standards. *See* 69 FR 58768, 58776 (Sept. 30, 2004).

Although the Department intends for § 35.151(g)(4) of this rule to apply prospectively to new construction and alterations, this rule is not a departure from, and is consistent with, the line-of-sight requirements in the 1991 Standards. The Department has always interpreted the line-of-sight requirements in the 1991 Standards to require viewing angles provided to patrons who use wheelchairs to be comparable to those afforded to other spectators. Section 35.151(g)(4) merely represents the application of these requirements to stadium-style movie theaters.

One commenter from a trade association sought clarification whether § 35.151(g)(4) applies to stadium-style theaters with more than 300 seats, and argued that it should not since dispersion requirements apply in those theaters. The Department declines to limit this rule to stadium-style theaters with 300 or fewer seats; stadium-style theaters of all sizes must comply with this rule. So, for example, stadium-style theaters that must vertically disperse wheelchair and

companion seats must do so within the parameters of this rule.

The NPRM included a provision that required assembly areas with more than 5,000 seats to provide at least five wheelchair spaces with at least three companion seats for each of those five wheelchair spaces. The Department agrees with commenters who asserted that group seating is better addressed through ticketing policies rather than design and has deleted that provision from this section of the final rule.

Section 35.151(h) Medical care facilities

In the 1991 title II regulation, there was no provision addressing the dispersion of accessible sleeping rooms in medical care facilities. The Department is aware, however, of problems that individuals with disabilities face in receiving full and equal medical care when accessible sleeping rooms are not adequately dispersed. When accessible rooms are not fully dispersed, a person with a disability is often placed in an accessible room in an area that is not medically appropriate for his or her condition, and is thus denied quick access to staff with expertise in that medical specialty and specialized equipment. While the Access Board did not establish specific design requirements for dispersion in the 2004 ADAAG, in response to extensive comments in support of dispersion it added an advisory note, Advisory 223.1 General, encouraging dispersion of accessible rooms within the facility so that accessible rooms are more likely to be proximate to appropriate qualified staff and resources.

In the NPRM, the Department sought additional comment on the issue, asking whether it should require medical care facilities, such as hospitals, to disperse their accessible sleeping rooms, and if so, by what method (by specialty area, floor, or other criteria). All of the comments the Department received on this issue supported dispersing accessible sleeping rooms proportionally by specialty area. These comments, from individuals, organizations, and a building code association, argued that it would not be difficult for hospitals to disperse rooms by specialty area, given the high level of regulation to which hospitals are subject and the planning that hospitals do based on utilization trends. Further, commenters suggested that without a requirement, it is unlikely that hospitals would disperse the rooms. In addition, concentrating accessible rooms in one area perpetuates segregation of individuals with disabilities, which is counter to the purpose of the ADA.

The Department has decided to require medical care facilities to disperse their accessible sleeping rooms in a manner that is proportionate by type of medical specialty. This does not require exact mathematical proportionality, which at times would be impossible. However, it does require that medical care facilities disperse their accessible rooms by medical specialty so that persons with disabilities can, to the extent practical, stay in an accessible room within the wing or ward that is appropriate for their medical needs. The language used in this rule (''in a manner that is proportionate by type of medical specialty'') is more specific than that used in the NPRM (''in a manner that enables patients with disabilities to have access to appropriate specialty services'') and adopts the concept of proportionality proposed by the commenters. Accessible rooms should be dispersed throughout all medical specialties, such as obstetrics, orthopedics, pediatrics, and cardiac care.

Section 35.151(i) Curb ramps

Section 35.151(e) on curb ramps in the 1991 rule has been redesignated as § 35.151(i). In the NPRM, the Department proposed making a minor editorial change to this section, deleting the phrase ''other sloped areas'' from the two places in which it appears in the 1991 title II regulation. In the NPRM, the Department stated that the phrase ''other sloped areas'' lacks technical

precision. The Department received no significant public comments on this proposal. Upon further consideration, however, the Department has concluded that the regulation should acknowledge that there are times when there are transitions from sidewalk to road surface that do not technically qualify as ''curb ramps'' (sloped surfaces that have a running slope that exceed 5 percent). Therefore, the Department has decided not to delete the phrase ''other sloped areas.''

Section 35.151(j) Residential housing for sale to individual owners

Although public entities that operate residential housing programs are subject to title II of the ADA, and therefore must provide accessible residential housing, the 1991 Standards did not contain scoping or technical standards that specifically applied to residential housing units. As a result, under the Department's title II regulation, these agencies had the choice of complying with UFAS, which contains specific scoping and technical standards for residential housing units, or applying the ADAAG transient lodging standards to their housing. Neither UFAS nor the 1991 Standards distinguish between residential housing provided for rent and those provided for sale to individual owners. Thus, under the 1991 title II regulation, public entities that construct residential housing units to be sold to individual owners must ensure that some of those units are accessible. This requirement is in addition to any accessibility requirements imposed on housing programs operated by public entities that receive Federal financial assistance from Federal agencies such as HUD.

The 2010 Standards contain scoping and technical standards for residential dwelling units. However, section 233.3.2 of the 2010 Standards specifically defers to the Department and to HUD, the standard-setting agency under the ABA, to decide the appropriate scoping for those residential dwelling units built by or on behalf of public entities with the intent that the finished units will be sold to individual owners. These programs include, for example, HUD's public housing and HOME programs as well as State-funded programs to construct units for sale to individuals. In the NPRM, the Department did not make a specific proposal for this scoping. Instead, the Department stated that after consultation and coordination with HUD, the Department would make a determination in the final rule. The Department also sought public comment on this issue stating that ''[t]he Department would welcome recommendations from individuals with disabilities, public housing authorities, and other interested parties that have experience with these programs. Please comment on the appropriate scoping for residential dwelling units built by or on behalf of public entities with the intent that the finished units will be sold to individual owners.'' 73 FR 34466, 34492 (June 17, 2008).

All of the public comments received by the Department in response to this question were supportive of the Department's ensuring that the residential standards apply to housing built on behalf of public entities with the intent that the finished units would be sold to individual owners. The vast majority of commenters recommended that the Department require that projects consisting of five or more units, whether or not the units are located on one or multiple locations, comply with the 2004 ADAAG requirements for scoping of residential units, which require that 5 percent, and no fewer than one, of the dwelling units provide mobility features, and that 2 percent, and no fewer than one, of the dwelling units provide communication features. *See* 2004 ADAAG Section 233.3. These commenters argued that the Department should not defer to HUD because HUD has not yet adopted the 2004 ADAAG and there is ambiguity on the scope of coverage of pre-built for sale units under HUD's current section 504 regulations. In addition, these commenters expressed concern that HUD's current regulation, 24 CFR 8.29, presumes that

a prospective buyer is identified before design and construction begins so that disability features can be incorporated prior to construction. These commenters stated that State and Federally funded homeownership programs typically do not identify prospective buyers before construction has commenced. One commenter stated that, in its experience, when public entities build accessible for-sale units, they often sell these units through a lottery system that does not make any effort to match persons who need the accessible features with the units that have those features. Thus, accessible units are often sold to persons without disabilities. This commenter encouraged the Department to make sure that accessible for-sale units built or funded by public entities are placed in a separate lottery restricted to income-eligible persons with disabilities.

Two commenters recommended that the Department develop rules for four types of for-sale projects: single family pre-built (where buyer selects the unit after construction), single family post-built (where the buyer chooses the model prior to its construction), multi-family pre-built, and multi-family post-built. These commenters recommended that the Department require pre-built units to comply with the 2004 ADAAG 233.1 scoping requirements. For post-built units, the commenters recommended that the Department require all models to have an alternate design with mobility features and an alternate design with communications features in compliance with 2004 ADAAG. Accessible models should be available at no extra cost to the buyer. One commenter recommended that, in addition to required fully accessible units, all ground floor units should be readily convertible for accessibility or for sensory impairments technology enhancements.

The Department believes that consistent with existing requirements under title II, housing programs operated by public entities that design and construct or alter residential units for sale to individual owners should comply with the 2010 Standards, including the requirements for residential facilities in sections 233 and 809. These requirements will ensure that a minimum of 5 percent of the units, but no fewer than one unit, of the total number of residential dwelling units will be designed and constructed to be accessible for persons with mobility disabilities. At least 2 percent, but no fewer than one unit, of the total number of residential dwelling units shall provide communication features.

The Department recognizes that there are some programs (such as the one identified by the commenter), in which units are not designed and constructed until an individual buyer is identified. In such cases, the public entity is still obligated to comply with the 2010 Standards. In addition, the public entity must ensure that pre-identified buyers with mobility disabilities and visual and hearing disabilities are afforded the opportunity to buy the accessible units. Once the program has identified buyers who need the number of accessible units mandated by the 2010 Standards, it may have to make reasonable modifications to its policies, practices, and procedures in order to provide accessible units to other buyers with disabilities who request such units.

The Department notes that the residential facilities standards allow for construction of units with certain features of adaptability. Public entities that are concerned that fully accessible units are less marketable may choose to build these units to include the allowable adaptable features, and then adapt them at their own expense for buyers with mobility disabilities who need accessible units. For example, features such as grab bars are not required but may be added by the public entity if needed by the buyer at the time of purchase and cabinets under sinks may be designed to be removable to allow access to the required knee space for a forward approach.

The Department agrees with the commenters that covered entities may have to make reasonable modifications to their policies, practices, and procedures in order to ensure that when they offer pre-built accessible residential units for

sale, the units are offered in a manner that gives access to those units to persons with disabilities who need the features of the units and who are otherwise eligible for the housing program. This may be accomplished, for example, by adopting preferences for accessible units for persons who need the features of the units, holding separate lotteries for accessible units, or other suitable methods that result in the sale of accessible units to persons who need the features of such units. In addition, the Department believes that units designed and constructed or altered that comply with the requirements for residential facilities and are offered for sale to individuals must be provided at the same price as units without such features.

Section 35.151(k) Detention and correctional facilities

The 1991 Standards did not contain specific accessibility standards applicable to cells in correctional facilities. However, correctional and detention facilities operated by or on behalf of public entities have always been subject to the nondiscrimination and program accessibility requirements of title II of the ADA. The 2004 ADAAG established specific requirements for the design and construction and alterations of cells in correctional facilities for the first time.

Based on complaints received by the Department, investigations, and compliance reviews of jails, prisons, and other detention and correctional facilities, the Department has determined that many detention and correctional facilities do not have enough accessible cells, toilets, and shower facilities to meet the needs of their inmates with mobility disabilities and some do not have any at all. Inmates are sometimes housed in medical units or infirmaries separate from the general population simply because there are no accessible cells. In addition, some inmates have alleged that they are housed at a more restrictive classification level simply because no accessible housing exists at the appropriate classification level. The Department's compliance reviews and investigations have substantiated certain of these allegations.

The Department believes that the insufficient number of accessible cells is, in part, due to the fact that most jails and prisons were built long before the ADA became law and, since then, have undergone few alterations that would trigger the obligation to provide accessible features in accordance with UFAS or the 1991 Standards. In addition, the Department has found that even some new correctional facilities lack accessible features. The Department believes that the unmet demand for accessible cells is also due to the changing demographics of the inmate population. With thousands of prisoners serving life sentences without eligibility for parole, prisoners are aging, and the prison population of individuals with disabilities and elderly individuals is growing. A Bureau of Justice Statistics study of State and Federal sentenced inmates (those sentenced to more than one year) shows the total estimated count of State and Federal prisoners aged 55 and older grew by 36,000 inmates from 2000 (44,200) to 2006 (80,200). William J. Sabol *et al.*, *Prisoners in 2006*, Bureau of Justice Statistics Bulletin, Dec. 2007, at 23 (app. table 7), available at *http://bjs.ojp.usdoj.gov/ index.cfm?ty=pbdetail&iid=908* (last visited July 16, 2008); Allen J. Beck *et al*., *Prisoners in 2000,* Bureau of Justice Statistics Bulletin, Aug. 2001, at 10 (Aug. 2001) (Table 14), available at *bjs.ojp.usdoj.gov/ index.cfm?ty=pbdetail&iid=927* (last visited July 16, 2008). This jump constitutes an increase of 81 percent in prisoners aged 55 and older during this period.

In the NPRM, the Department proposed a new section, § 35.152, which combined a range of provisions relating to both program accessibility and application of the proposed standards to detention and correctional facilities. In the final rule, the Department is placing those provisions that refer to design, construction, and alteration

of detention and correction facilities in a new paragraph (k) of § 35.151, the section of the rule that addresses new construction and alterations for covered entities. Those portions of the final rule that address other issues, such as placement policies and program accessibility, are placed in the new § 35.152.

In the NPRM, the Department also sought input on how best to meet the needs of inmates with mobility disabilities in the design, construction, and alteration of detention and correctional facilities. The Department received a number of comments in response to this question.

New Construction. The NPRM did not expressly propose that new construction of correctional and detention facilities shall comply with the proposed standards because the Department assumed it would be clear that the requirements of § 35.151 would apply to new construction of correctional and detention facilities in the same manner that they apply to other facilities constructed by covered entities. The Department has decided to create a new section, § 35.151(k)(1), which clarifies that new construction of jails, prisons, and other detention facilities shall comply with the requirements of 2010 Standards. Section 35.151(k)(1) also increases the scoping for accessible cells from the 2 percent specified in the 2004 ADAAG to 3 percent.

Alterations. Although the 2010 Standards contain specifications for alterations in existing detention and correctional facilities, section 232.2 defers to the Attorney General the decision as to the extent these requirements will apply to alterations of cells. The NPRM proposed at § 35.152(c) that ''[a]lterations to jails, prisons, and other detention and correctional facilities will comply with the requirements of § 35.151(b).'' 73 FR 34466, 34507 (June 17, 2008). The final rule retains that requirement at § 35.151(k)(2), but increases the scoping for accessible cells from the 2 percent specified in the 2004 ADAAG to 3 percent.

Substitute cells. In the ANPRM, the Department sought public comment about the most effective means to ensure that existing correctional facilities are made accessible to prisoners with disabilities and presented three options: (1) Require all altered elements to be accessible, which would maintain the current policy that applies to other ADA alteration requirements; (2) permit substitute cells to be made accessible within the same facility, which would permit correctional authorities to meet their obligation by providing the required accessible features in cells within the same facility, other than those specific cells in which alterations are planned; or (3) permit substitute cells to be made accessible within a prison system, which would focus on ensuring that prisoners with disabilities are housed in facilities that best meet their needs, as alterations within a prison environment often result in piecemeal accessibility.

In § 35.152(c) of the NPRM, the Department proposed language based on Option 2, providing that when cells are altered, a covered entity may satisfy its obligation to provide the required number of cells with mobility features by providing the required mobility features in substitute cells (*i.e.*, cells other than those where alterations are originally planned), provided that each substitute cell is located within the same facility, is integrated with other cells to the maximum extent feasible, and has, at a minimum, physical access equal to that of the original cells to areas used by inmates or detainees for visitation, dining, recreation, educational programs, medical services, work programs, religious services, and participation in other programs that the facility offers to inmates or detainees.

The Department received few comments on this proposal. The majority who chose to comment supported an approach that allowed substitute cells to be made accessible within the same facility. In their view, such an approach balanced administrators' needs, cost considerations, and the needs of inmates with disabilities. One commenter noted, however, that with older facilities, required

modifications may be inordinately costly and technically infeasible. A large county jail system supported the proposed approach as the most viable option allowing modification or alteration of existing cells based on need and providing a flexible approach to provide program and mobility accessibility. It noted, as an alternative, that permitting substitute cells to be made accessible within a prison system would also be a viable option since such an approach could create a centralized location for accessibility needs and, because that jail system's facilities were in close proximity, it would have little impact on families for visitation or on accessible programming.

A large State department of corrections objected to the Department's proposal. The commenter stated that some very old prison buildings have thick walls of concrete and reinforced steel that are difficult, if not impossible to retrofit, and to do so would be very expensive. This State system approaches accessibility by looking at its system as a whole and providing access to programs for inmates with disabilities at selected prisons. This commenter explained that not all of its facilities offer the same programs or the same levels of medical or mental health services. An inmate, for example, who needs education, substance abuse treatment, and sex offender counseling may be transferred between facilities in order to meet his needs. The inmate population is always in flux and there are not always beds or program availability for every inmate at his security level. This commenter stated that the Department's proposed language would put the State in the position of choosing between adding accessible cells and modifying paths of travel to programs and services at great expense or not altering old facilities, causing them to become in states of disrepair and obsolescent, which would be fiscally irresponsible.

The Department is persuaded by these comments and has modified the alterations requirement in § 35.151(k)(2)(iv) in the final rule to allow that if it is technically infeasible to provide substitute cells in the same facility, cells can be provided elsewhere within the corrections system.

Number of accessible cells. Section 232.2.1 of the 2004 ADAAG requires at least 2 percent, but no fewer than one, of the cells in newly constructed detention and correctional facilities to have accessibility features for individuals with mobility disabilities. Section 232.3 provides that, where special holding cells or special housing cells are provided, at least one cell serving each purpose shall have mobility features. The Department sought input on whether these 2004 ADAAG requirements are sufficient to meet the needs of inmates with mobility disabilities. A major association representing county jails throughout the country stated that the 2004 ADAAG 2 percent requirement for accessible cells is sufficient to meet the needs of county jails. Similarly, a large county sheriff's department advised that the 2 percent requirement far exceeds the need at its detention facility, where the average age of the population is 32. This commenter stressed that the regulations need to address the differences between a local detention facility with low average lengths of stay as opposed to a State prison housing inmates for lengthy periods. This commenter asserted that more stringent requirements will raise construction costs by requiring modifications that are not needed. If more stringent requirements are adopted, the commenter suggested that they apply only to State and Federal prisons that house prisoners sentenced to long terms. The Department notes that a prisoner with a mobility disability needs a cell with mobility features regardless of the length of incarceration. However, the length of incarceration is most relevant in addressing the needs of an aging population.

The overwhelming majority of commenters responded that the 2 percent ADAAG requirement is inadequate to meet the needs of the incarcerated. Many commenters suggested that the requirement be expanded to apply to each

area, type, use, and class of cells in a facility. They asserted that if a facility has separate areas for specific programs, such as a dog training program or a substance abuse unit, each of these areas should also have 2 percent accessible cells but not less than one. These same commenters suggested that 5–7 percent of cells should be accessible to meet the needs of both an aging population and the larger number of inmates with mobility disabilities. One organization recommended that the requirement be increased to 5 percent overall, and that at least 2 percent of each type and use of cell be accessible. Another commenter recommended that 10 percent of cells be accessible. An organization with extensive corrections experience noted that the integration mandate requires a sufficient number and distribution of accessible cells so as to provide distribution of locations relevant to programs to ensure that persons with disabilities have access to the programs.

Through its investigations and compliance reviews, the Department has found that in most detention and correctional facilities, a 2 percent accessible cell requirement is inadequate to meet the needs of the inmate population with disabilities. That finding is supported by the majority of the commenters that recommended a 5–7 percent requirement. Indeed, the Department itself requires more than 2 percent of the cells to be accessible at its own corrections facilities. The Federal Bureau of Prisons is subject to the requirements of the 2004 ADAAG through the General Services Administration's adoption of the 2004 ADAAG as the enforceable accessibility standard for Federal facilities under the Architectural Barriers Act of 1968. 70 FR 67786, 67846–47 (Nov. 8, 2005). However, in order to meet the needs of inmates with mobility disabilities, the Bureau of Prisons has elected to increase that percentage and require that 3 percent of inmate housing at its facilities be accessible. Bureau of Prisons, Design Construction Branch, Design Guidelines, Attachment A: Accessibility Guidelines for Design, Construction, and Alteration of Federal Bureau of Prisons (Oct. 31, 2006).

The Department believes that a 3 percent accessible requirement is reasonable. Moreover, it does not believe it should impose a higher percentage on detention and corrections facilities than it utilizes for its own facilities. Thus, the Department has adopted a 3 percent requirement in § 35.151(k) for both new construction and alterations. The Department notes that the 3 percent requirement is a minimum. As corrections systems plan for new facilities or alterations, the Department urges planners to include numbers of inmates with disabilities in their population projections in order to take the necessary steps to provide a sufficient number of accessible cells to meet inmate needs.

Dispersion of Cells. The NPRM did not contain express language addressing dispersion of cells in a facility. However, Advisory 232.2 of the 2004 ADAAG recommends that ''[a]ccessible cells or rooms should be dispersed among different levels of security, housing categories, and holding classifications (*e.g.*, male/female and adult/juvenile) to facilitate access.'' In explaining the basis for recommending, but not requiring, this type of dispersal, the Access Board stated that ''[m]any detention and correctional facilities are designed so that certain areas (*e.g.*, 'shift' areas) can be adapted to serve as different types of housing according to need'' and that ''[p]lacement of accessible cells or rooms in shift areas may allow additional flexibility in meeting requirements for dispersion of accessible cells or rooms.''

The Department notes that inmates are typically housed in separate areas of detention and correctional facilities based on a number of factors, including their classification level. In many instances, detention and correctional facilities have housed inmates in inaccessible cells, even though accessible cells were available elsewhere in the facility, because there were

no cells in the areas where they needed to be housed, such as in administrative or disciplinary segregation, the women's section of the facility, or in a particular security classification area.

The Department received a number of comments stating that dispersal of accessible cells together with an adequate number of accessible cells is necessary to prevent inmates with disabilities from placement in improper security classification and to ensure integration. Commenters recommended modification of the scoping requirements to require a percentage of accessible cells in each program, classification, use or service area. The Department is persuaded by these comments. Accordingly, § 35.151(k)(1) and (k)(2) of the final rule require accessible cells in each classification area.

Medical facilities. The NPRM also did not propose language addressing the application of the 2004 ADAAG to medical and long-term care facilities in correctional and detention facilities. The provisions of the 2004 ADAAG contain requirements for licensed medical and long-term care facilities, but not those that are unlicensed. A disability advocacy group and a number of other commenters recommended that the Department expand the application of section 232.4 to apply to all such facilities in detention and correctional facilities, regardless of licensure. They recommended that whenever a correctional facility has a program that is addressed specifically in the 2004 ADAAG, such as a long-term care facility, the 2004 ADAAG scoping and design features should apply for those elements. Similarly, a building code organization noted that its percentage requirements for accessible units is based on what occurs in the space, not on the building type.

The Department is persuaded by these comments and has added § 35.151(k)(3), which states that ''[w]ith respect to medical and long-term care facilities in jails, prisons, and other detention and correctional facilities, public entities shall apply the 2010 Standards technical and scoping requirements for those facilities irrespective of whether those facilities are licensed.''

Section 35.152 Detention and correctional facilities—program requirements

As noted in the discussion of § 35.151(k), the Department has determined that inmates with mobility and other disabilities in detention and correctional facilities do not have equal access to prison services. The Department's concerns are based not only on complaints it has received, but the Department's substantial experience in investigations and compliance reviews of jails, prisons, and other detention and correctional facilities. Based on that review, the Department has found that many detention and correctional facilities have too few or no accessible cells, toilets, and shower facilities to meet the needs of their inmates with mobility disabilities. These findings, coupled with statistics regarding the current percentage of inmates with mobility disabilities and the changing demographics of the inmate population reflecting thousands of prisoners serving life sentences and increasingly large numbers of aging inmates who are not eligible for parole, led the Department to conclude that a new regulation was necessary to address these concerns.

In the NPRM, the Department proposed a new section, § 35.152, which combined a range of provisions relating to both program accessibility and application of the proposed standards to detention and correctional facilities. As mentioned above, in the final rule, the Department is placing those provisions that refer to design, construction, and alteration of detention and correction facilities in new paragraph (k) in § 35.151 dealing with new construction and alterations for covered entities. Those portions of the final rule that address other program requirements remain in § 35.152.

The Department received many comments in

response to the program accessibility requirements in proposed § 35.152. These comments are addressed below.

Facilities operated through contractual, licensing, or other arrangements with other public entities or private entities. The Department is aware that some public entities are confused about the applicability of the title II requirements to correctional facilities built or run by other public entities or private entities. It has consistently been the Department's position that title II requirements apply to correctional facilities used by State or local government entities, irrespective of whether the public entity contracts with another public or private entity to build or run the correctional facility. The power to incarcerate citizens rests with the State or local government, not a private entity. As the Department stated in the preamble to the original title II regulation, ''[a]ll governmental activities of public entities are covered, even if they are carried out by contractors.'' 28 CFR part 35, app. A at 558 (2009). If a prison is occupied by State prisoners and is inaccessible, the State is responsible under title II of the ADA. The same is true for a county or city jail. In essence, the private builder or contractor that operates the correctional facility does so at the direction of the government entity. Moreover, even if the State enters into a contractual, licensing, or other arrangement for correctional services with a public entity that has its own title II obligations, the State is still responsible for ensuring that the other public entity complies with title II in providing these services.

Also, through its experience in investigations and compliance reviews, the Department has noted that public entities contract for a number of services to be run by private or other public entities, for example, medical and mental health services, food services, laundry, prison industries, vocational programs, and drug treatment and substance abuse programs, all of which must be operated in accordance with title II requirements.

Proposed § 35.152(a) in the NPRM was designed to make it clear that title II applies to all State and local detention and correctional facilities, regardless of whether the detention or correctional facility is directly operated by the public entity or operated by a private entity through a contractual, licensing, or other arrangement. Commenters specifically supported the language of this section. One commenter cited Department of Justice statistics stating that of the approximately 1.6 million inmates in State and Federal facilities in December 2006, approximately 114,000 of these inmates were held in private prison facilities. *See* William J. Sabol *et al*., *Prisoners in 2006*, Bureau of Justice Statistics Bulletin, Dec. 2007, at 1, 4, available at *http:// bjs.ojp.usdoj.gov/ index.cfm?ty=pbdetail&iid=908*. Some commenters wanted the text ''through contracts or other arrangements'' changed to read ''through contracts or any other arrangements'' to make the intent clear. However, a large number of commenters recommended that the text of the rule make explicit that it applies to correctional facilities operated by private contractors. Many commenters also suggested that the text make clear that the rule applies to adult facilities, juvenile justice facilities, and community correctional facilities. In the final rule, the Department is adopting these latter two suggestions in order to make the section's intent explicit.

Section 35.152(a) of the final rule states specifically that the requirements of the section apply to public entities responsible for the operation or management of correctional facilities, ''either directly or through contractual, licensing, or other arrangements with public or private entities, in whole or in part, including private correctional facilities.'' Additionally, the section explicitly provides that it applies to adult and juvenile justice detention and correctional facilities and community correctional facilities.

Discrimination prohibited. In the NPRM, § 35.152(b)(1) proposed language stating that public entities are prohibited from excluding

qualified detainees and inmates from participation in, or denying, benefits, services, programs, or activities because a facility is inaccessible to persons with disabilities ''unless the public entity can demonstrate that the required actions would result in a fundamental alteration or undue burden.'' 73 FR 34446, 34507 (June 17, 2008). One large State department of corrections objected to the entire section applicable to detention and correctional facilities, stating that it sets a higher standard for correctional and detention facilities because it does not provide a defense for undue administrative burden. The Department has not retained the proposed NPRM language referring to the defenses of fundamental alteration or undue burden because the Department believes that these exceptions are covered by the general language of 35.150(a)(3), which states that a public entity is not required to take ''any action that it can demonstrate would result in a fundamental alteration in the nature of a service, program, or activity, or in undue financial and administrative burdens.'' The Department has revised the language of § 35.152(b)(1) accordingly.

Integration of inmates and detainees with disabilities. In the NPRM, the Department proposed language in § 35.152(b)(2) specifically applying the ADA's general integration mandate to detention and correctional facilities. The proposed language would have required public entities to ensure that individuals with disabilities are housed in the most integrated setting appropriate to the needs of the individual. It further stated that unless the public entity can demonstrate that it is appropriate to make an exception for a specific individual, a public entity:

(1) Should not place inmates or detainees with disabilities in locations that exceed their security classification because there are no accessible cells or beds in the appropriate classification;

(2) should not place inmates or detainees with disabilities in designated medical areas unless they are actually receiving medical care or treatment;

(3) should not place inmates or detainees with disabilities in facilities that do not offer the same programs as the facilities where they would ordinarily be housed; and

(4) should not place inmates or detainees with disabilities in facilities farther away from their families in order to provide accessible cells or beds, thus diminishing their opportunity for visitation based on their disability. 73 FR 34466, 34507 (June 17, 2008).

In the NPRM, the Department recognized that there are a wide range of considerations that affect decisions to house inmates or detainees and that in specific cases there may be compelling reasons why a placement that does not meet the general requirements of § 35.152(b)(2) may, nevertheless, comply with the ADA. However, the Department noted that it is essential that the planning process initially assume that inmates or detainees with disabilities will be assigned within the system under the same criteria that would be applied to inmates who do not have disabilities. Exceptions may be made on a case-by-case basis if the specific situation warrants different treatment. For example, if an inmate is deaf and communicates only using sign language, a prison may consider whether it is more appropriate to give priority to housing the prisoner in a facility close to his family that houses no other deaf inmates, or if it would be preferable to house the prisoner in a setting where there are sign language interpreters and other sign language users with whom he can communicate.

In general, commenters strongly supported the NPRM's clarification that the title II integration mandate applies to State and local corrections agencies and the facilities in which they house inmates. Commenters pointed out that inmates with disabilities continue to be segregated based on their disabilities and also excluded from participation in programs. An organization actively involved in addressing the needs of prisoners cited a number of recent lawsuits in which prisoners allege such discrimination.

The majority of commenters objected to

the language in proposed § 35.152(b)(2) that creates an exception to the integration mandate when the ''public entity can demonstrate that it is appropriate to make an exception for a specific individual.'' 73 FR 34466, 34507 (June 17, 2008). The vast majority of commenters asserted that, given the practice of many public entities to segregate and cluster inmates with disabilities, the exception will be used to justify the status quo. The commenters acknowledged that the intent of the section is to ensure that an individual with a disability who can be better served in a less integrated setting can legally be placed in that setting. They were concerned, however, that the proposed language would allow certain objectionable practices to continue, *e.g.*, automatically placing persons with disabilities in administrative segregation. An advocacy organization with extensive experience working with inmates recommended that the inmate have ''input'' in the placement decision.

Others commented that the exception does not provide sufficient guidance on when a government entity may make an exception, citing the need for objective standards. Some commenters posited that a prison administration may want to house a deaf inmate at a facility designated and equipped for deaf inmates that is several hundred miles from the inmate's home. Although under the exception language, such a placement may be appropriate, these commenters argued that this outcome appears to contradict the regulation's intent to eliminate or reduce the segregation of inmates with disabilities and prevent them from being placed far from their families. The Department notes that in some jurisdictions, the likelihood of such outcomes is diminished because corrections facilities with different programs and levels of accessibility are clustered in close proximity to one another, so that being far from family is not an issue. The Department also takes note of advancements in technology that will ease the visitation dilemma, such as family visitation through the use of videoconferencing.

Only one commenter, a large State department of corrections, objected to the integration requirement. This commenter stated it houses all maximum security inmates in maximum security facilities. Inmates with lower security levels may or may not be housed in lower security facilities depending on a number of factors, such as availability of a bed, staffing, program availability, medical and mental health needs, and enemy separation. The commenter also objected to the proposal to prohibit housing inmates with disabilities in medical areas unless they are receiving medical care. This commenter stated that such housing may be necessary for several days, for example, at a stopover facility for an inmate with a disability who is being transferred from one facility to another. Also, this commenter stated that inmates with disabilities in disciplinary status may be housed in the infirmary because not every facility has accessible cells in disciplinary housing. Similarly the commenter objected to the prohibition on placing inmates in facilities without the same programs as facilities where they normally would be housed. Finally, the commenter objected to the prohibition on placing an inmate at a facility distant from where the inmate would normally be housed. The commenter stressed that in its system, there are few facilities near most inmates' homes. The commenter noted that most inmates are housed at facilities far from their homes, a fact shared by all inmates, not just inmates with disabilities. Another commenter noted that in some jurisdictions, inmates who need assistance in activities of daily living cannot obtain that assistance in the general population, but only in medical facilities where they must be housed.

The Department has considered the concerns raised by the commenters with respect to this section and recognizes that corrections systems may move inmates routinely and for a variety of reasons, such as crowding, safety, security, classification change, need for specialized programs, or to provide medical care. Sometimes

these moves are within the same facility or prison system. On other occasions, inmates may be transferred to facilities in other cities, counties, and States. Given the nature of the prison environment, inmates have little say in their placement and administrators must have flexibility to meet the needs of the inmates and the system. The Department has revised the language of the exception contained in renumbered § 35.152(b)(2) to better accommodate corrections administrators' need for flexibility in making placement decisions based on legitimate, specific reasons. Moreover, the Department believes that temporary, short-term moves that are necessary for security or administrative purposes (*e.g.,* placing an inmate with a disability in a medical area at a stopover facility during a transfer from one facility to another) do not violate the requirements of § 35.152(b)(2).

The Department notes that § 35.150(a)(3) states that a public entity is not required to take ''any action that it can demonstrate would result in a fundamental alteration in the nature of a service, program, or activity or in undue financial and administrative burdens.'' Thus, corrections systems would not have to comply with the requirements of § 35.152(b)(1) in any specific circumstance where these defenses are met.

Several commenters recommended that the word ''should'' be changed to ''shall'' in the subparts to § 35.152(b)(2). The Department agrees that because the rule contains a specific exception and because the integration requirement is subject to the defenses provided in paragraph (a) of that section, it is more appropriate to use the word ''shall'' and the Department accordingly is making that change in the final rule.

Program requirements. In a unanimous decision, the Supreme Court, in *Pennsylvania Department of Corrections v. Yeskey*, 524 U.S. 206 (1998), stated explicitly that the ADA covers the operations of State prisons; accordingly, title II's program accessibility requirements apply to State and local correctional and detention facilities. In the NPRM, in addressing the accessibility of existing correctional and detention facilities, the Department considered the challenges of applying the title II program access requirement for existing facilities under § 31.150(a) in light of the realities of many inaccessible correctional facilities and strained budgets.

Correctional and detention facilities commonly provide a variety of different programs for education, training, counseling, or other purposes related to rehabilitation. Some examples of programs generally available to inmates include programs to obtain GEDs, computer training, job skill training and on-the-job training, religious instruction and guidance, alcohol and substance abuse groups, anger management, work assignments, work release, halfway houses, and other programs. Historically, individuals with disabilities have been excluded from such programs because they are not located in accessible locations, or inmates with disabilities have been segregated in units without equivalent programs. In light of the Supreme Court's decision in *Yeskey* and the requirements of title II, however, it is critical that public entities provide these opportunities to inmates with disabilities. In proposed § 35.152, the Department sought to clarify that title II required equal access for inmates with disabilities to participate in programs offered to inmates without disabilities.

The Department wishes to emphasize that detention and correctional facilities are unique facilities under title II. Inmates cannot leave the facilities and must have their needs met by the corrections system, including needs relating to a disability. If the detention and correctional facilities fail to accommodate prisoners with disabilities, these individuals have little recourse, particularly when the need is great (*e.g.*, an accessible toilet; adequate catheters; or a shower chair). It is essential that corrections systems fulfill their nondiscrimination and program access obligations by adequately addressing the needs of prisoners with disabilities, which include, but

are not limited to, proper medication and medical treatment, accessible toilet and shower facilities, devices such as a bed transfer or a shower chair, and assistance with hygiene methods for prisoners with physical disabilities.

In the NPRM, the Department also sought input on whether it should establish a program accessibility requirement that public entities modify additional cells at a detention or correctional facility to incorporate the accessibility features needed by specific inmates with mobility disabilities when the number of cells required by sections 232.2 and 232.3 of the 2004 ADAAG are inadequate to meet the needs of their inmate population.

Commenters supported a program accessibility requirement, viewing it as a flexible and practical means of allowing facilities to meet the needs of inmates in a cost effective and expedient manner. One organization supported a requirement to modify additional cells when the existing number of accessible cells is inadequate. It cited the example of a detainee who was held in a hospital because the local jail had no accessible cells. Similarly, a State agency recommended that the number of accessible cells should be sufficient to accommodate the population in need. One group of commenters voiced concern about accessibility being provided in a timely manner and recommended that the rule specify that the program accessibility requirement applies while waiting for the accessibility modifications. A group with experience addressing inmate needs recommended the inmate's input should be required to prevent inappropriate segregation or placement in an inaccessible or inappropriate area.

The Department is persuaded by these comments. Accordingly, § 35.152(b)(3) requires public entities to ''implement reasonable policies, including physical modifications to additional cells in accordance with the 2010 Standards, so as to ensure that each inmate with a disability is housed in a cell with the accessible elements necessary to afford the inmate access to safe, appropriate housing.''

Communication. Several large disability advocacy organizations commented on the 2004 ADAAG section 232.2.2 requirement that at least 2 percent of the general holding cells and housing cells must be equipped with audible emergency alarm systems. Permanently installed telephones within these cells must have volume control. Commenters said that the communication features in the 2004 ADAAG do not address the most common barriers that deaf and hard-of-hearing inmates face. They asserted that few cells have telephones and the requirements to make them accessible is limited to volume control, and that emergency alarm systems are only a small part of the amplified information that inmates need. One large association commented that it receives many inmate complaints that announcements are made over loudspeakers or public address systems, and that inmates who do not hear announcements for inmate count or other instructions face disciplinary action for failure to comply. They asserted that inmates who miss announcements miss meals, exercise, showers, and recreation. They argued that systems that deliver audible announcements, signals, and emergency alarms must be made accessible and that TTYs must be made available. Commenters also recommended that correctional facilities should provide access to advanced forms of telecommunications. Additional commenters noted that few persons now use TTYs, preferring instead to communicate by email, texting, and videophones.

The Department agrees with the commenters that correctional facilities and jails must ensure that inmates who are deaf or hard of hearing actually receive the same information provided to other inmates. The Department believes, however, that the reasonable modifications, program access, and effective communications requirements of title II are sufficient to address the needs of individual deaf and hard of hearing inmates, and as a result, declines to add specific requirements for communications features in cells

for deaf and hard of hearing inmates at this time. The Department notes that as part of its ongoing enforcement of the reasonable modifications, program access, and effective communications requirements of title II, the Department has required correctional facilities and jails to provide communication features in cells serving deaf and hard of hearing inmates.

Subpart E—Communications

Section 35.160 Communications.

Section 35.160 of the 1991 title II regulation requires a public entity to take appropriate steps to ensure that communications with applicants, participants, and members of the public with disabilities are as effective as communications with others. 28 CFR 35.160(a). In addition, a public entity must ''furnish appropriate auxiliary aids and services where necessary to afford an individual with a disability an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity conducted by a public entity.'' 28 CFR 35.160(b)(1). Moreover, the public entity must give ''primary consideration to the requests of the individual with disabilities'' in determining what type of auxiliary aid and service is necessary. 28 CFR 35.160(b)(2).

Since promulgation of the 1991 title II regulation, the Department has investigated hundreds of complaints alleging failures by public entities to provide effective communication, and many of these investigations resulted in settlement agreements and consent decrees. From these investigations, the Department has concluded that public entities sometimes misunderstand the scope of their obligations under the statute and the regulation. Section 35.160 in the final rule codifies the Department's longstanding policies in this area and includes provisions that reflect technological advances in the area of auxiliary aids and services.

In the NPRM, the Department proposed adding ''companion'' to the scope of coverage under § 35.160 to codify the Department's longstanding position that a public entity's obligation to ensure effective communication extends not just to applicants, participants, and members of the public with disabilities, but to companions as well, if any of them are individuals with disabilities. The NPRM defined companion as a person who is a family member, friend, or associate of a program participant, who, along with the program participant, is ''an appropriate person with whom the public entity should communicate.'' 73 FR 34466, 34507 (June 17, 2008).

Many commenters supported inclusion of ''companions'' in the rule, and urged even more specific language about public entities' obligations. Some commenters asked the Department to clarify that a companion with a disability may be entitled to effective communication from a public entity even though the applicants, participants, or members of the general public seeking access to, or participating in, the public entity's services, programs, or activities are not individuals with disabilities. Others requested that the Department explain the circumstances under which auxiliary aids and services should be provided to companions. Still others requested explicit clarification that where the individual seeking access to or participating in the public entity's program, services, or activities requires auxiliary aids and services, but the companion does not, the public entity may not seek out, or limit its communications to, the companion instead of communicating directly with the individual with a disability when it would be appropriate to do so.

Some in the medical community objected to the inclusion of any regulatory language regarding companions, asserting that such language is overbroad, seeks services for individuals whose presence is not required by the public entity, is not necessary for the delivery of the services or participation in the program, and places additional burdens on the medical community.

These commenters asked that the Department limit the public entity's obligation to communicate effectively with a companion to situations where such communications are necessary to serve the interests of the person who is receiving the public entity's services.

After consideration of the many comments on this issue, the Department believes that explicit inclusion of ''companions'' in the final rule is appropriate to ensure that public entities understand the scope of their effective communication obligations. There are many situations in which the interests of program participants without disabilities require that their companions with disabilities be provided effective communication. In addition, the program participant need not be physically present to trigger the public entity's obligations to a companion. The controlling principle is that auxiliary aids and services must be provided if the companion is an appropriate person with whom the public entity should or would communicate.

Examples of such situations include back-to-school nights or parent-teacher conferences at a public school. If the faculty writes on the board or otherwise displays information in a visual context during a back-to-school night, this information must be communicated effectively to parents or guardians who are blind or have low vision. At a parent-teacher conference, deaf parents or guardians must be provided with appropriate auxiliary aids and services to communicate effectively with the teacher and administrators. It makes no difference that the child who attends the school does not have a disability. Likewise, when a deaf spouse attempts to communicate with public social service agencies about the services necessary for the hearing spouse, appropriate auxiliary aids and services to the deaf spouse must be provided by the public entity to ensure effective communication. Parents or guardians, including foster parents, who are individuals with disabilities, may need to interact with child services agencies on behalf of their children; in such a circumstance, the child services agencies would need to provide appropriate auxiliary aids and services to those parents or guardians.

Effective communication with companions is particularly critical in health care settings where miscommunication may lead to misdiagnosis and improper or delayed medical treatment. The Department has encountered confusion and reluctance by medical care providers regarding the scope of their obligation with respect to such companions. Effective communication with a companion is necessary in a variety of circumstances. For example, a companion may be legally authorized to make health care decisions on behalf of the patient or may need to help the patient with information or instructions given by hospital personnel. A companion may be the patient's next-of-kin or health care surrogate with whom hospital personnel must communicate about the patient's medical condition. A companion could be designated by the patient to communicate with hospital personnel about the patient's symptoms, needs, condition, or medical history. Or the companion could be a family member with whom hospital personnel normally would communicate.

Accordingly, § 35.160(a)(1) in the final rule now reads, ''[a] public entity shall take appropriate steps to ensure that communications with applicants, participants, members of the public, and companions with disabilities are as effective as communications with others.'' Section 35.160(a)(2) further defines ''companion'' as ''a family member, friend, or associate of an individual seeking access to a service, program, or activity of a public entity, who, along with the individual, is an appropriate person with whom the public entity should communicate.'' Section 35.160(b)(1) clarifies that the obligation to furnish auxiliary aids and services extends to companions who are individuals with disabilities, whether or not the individual accompanied also is an individual with a disability. The provision now states that ''[a] public entity shall furnish

appropriate auxiliary aids and services where necessary to afford individuals with disabilities, including applicants, participants, companions, and members of the public, an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity of a public entity.''

These provisions make clear that if the companion is someone with whom the public entity normally would or should communicate, then the public entity must provide appropriate auxiliary aids and services to that companion to ensure effective communication with the companion. This common-sense rule provides the guidance necessary to enable public entities to properly implement the nondiscrimination requirements of the ADA.

As set out in the final rule, § 35.160(b)(2) states, in pertinent part, that ''[t]he type of auxiliary aid or service necessary to ensure effective communication will vary in accordance with the method of communication used by the individual, the nature, length, and complexity of the communication involved, and the context in which the communication is taking place. In determining what types of auxiliary aids and services are necessary, a public entity shall give primary consideration to the requests of individuals with disabilities.''

The second sentence of § 35.160(b)(2) of the final rule restores the ''primary consideration'' obligation set out at § 35.160(b)(2) in the 1991 title II regulation. This provision was inadvertently omitted from the NPRM, and the Department agrees with the many commenters on this issue that this provision should be retained. As noted in the preamble to the 1991 title II regulation, and reaffirmed here: ''The public entity shall honor the choice [of the individual with a disability] unless it can demonstrate that another effective means of communication exists or that use of the means chosen would not be required under § 35.164. Deference to the request of the individual with a disability is desirable because of the range of disabilities, the variety of auxiliary aids and services, and different circumstances requiring effective communication.'' 28 CFR part 35, app. A at 580 (2009).

The first sentence in § 35.160(b)(2) codifies the axiom that the type of auxiliary aid or service necessary to ensure effective communication will vary with the situation, and provides factors for consideration in making the determination, including the method of communication used by the individual; the nature, length, and complexity of the communication involved; and the context in which the communication is taking place. Inclusion of this language under title II is consistent with longstanding policy in this area. *See, e.g., The Americans with Disabilities Act Title II Technical Assistance Manual Covering State and Local Government Programs and Services,* section II–7.1000, available at *www.ada.gov/taman2.html* (''The type of auxiliary aid or service necessary to ensure effective communication will vary in accordance with the length and complexity of the communication involved. * * * Sign language or oral interpreters, for example, may be required when the information being communicated in a transaction with a deaf individual is complex, or is exchanged for a lengthy period of time. Factors to be considered in determining whether an interpreter is required include the context in which the communication is taking place, the number of people involved, and the importance of the communication.''); *see also* 28 CFR part 35, app. A at 580 (2009). As explained in the NPRM, an individual who is deaf or hard of hearing may need a qualified interpreter to communicate with municipal hospital personnel about diagnoses, procedures, tests, treatment options, surgery, or prescribed medication (*e.g.*, dosage, side effects, drug interactions, etc.), or to explain follow-up treatments, therapies, test results, or recovery. In comparison, in a simpler, shorter interaction, the method to achieve effective communication can be more basic. An individual who is seeking local tax forms may only need an exchange of written notes to achieve effective

communication.

Section 35.160(c)(1) has been added to the final rule to make clear that a public entity shall not require an individual with a disability to bring another individual to interpret for him or her. The Department receives many complaints from individuals who are deaf or hard of hearing alleging that public entities expect them to provide their own sign language interpreters. Proposed § 35.160(c)(1) was intended to clarify that when a public entity is interacting with a person with a disability, it is the public entity's responsibility to provide an interpreter to ensure effective communication. It is not appropriate to require the person with a disability to bring another individual to provide such services.

Section 35.160(c)(2) of the NPRM proposed codifying the Department's position that there are certain limited instances when a public entity may rely on an accompanying individual to interpret or facilitate communication: (1) In an emergency involving a threat to the public safety or welfare; or (2) if the individual with a disability specifically requests it, the accompanying individual agrees to provide the assistance, and reliance on that individual for this assistance is appropriate under the circumstances.

Many commenters supported this provision, but sought more specific language to address what they see as a particularly entrenched problem. Some commenters requested that the Department explicitly require the public entity first to notify the individual with a disability that the individual has a right to request and receive appropriate auxiliary aids and services without charge from the public entity before using that person's accompanying individual as a communication facilitator. Advocates stated that an individual who is unaware of his or her rights may decide to use a third party simply because he or she believes that is the only way to communicate with the public entity.

The Department has determined that inclusion of specific language requiring notification is unnecessary. Section 35.160(b)(1) already states that is the responsibility of the public entity to provide auxiliary aids and services. Moreover, § 35.130(f) already prohibits the public entity from imposing a surcharge on a particular individual with a disability or on any group of individuals with disabilities to cover the costs of auxiliary aids. However, the Department strongly advises public entities that they should first inform the individual with a disability that the public entity can and will provide auxiliary aids and services, and that there would be no cost for such aids or services.

Many commenters requested that the Department make clear that the public entity cannot request, rely upon, or coerce an adult accompanying an individual with a disability to provide effective communication for that individual with a disability—that only a voluntary offer is acceptable. The Department states unequivocally that consent of, and for, the adult accompanying the individual with a disability to facilitate communication must be provided freely and voluntarily both by the individual with a disability and the accompanying third party—absent an emergency involving an imminent threat to the safety or welfare of an individual or the public where there is no interpreter available. The public entity may not coerce or attempt to persuade another adult to provide effective communication for the individual with a disability. Some commenters expressed concern that the regulation could be read by public entities, including medical providers, to prevent parents, guardians, or caregivers from providing effective communication for children or that a child, regardless of age, would have to specifically request that his or her caregiver act as interpreter. The Department does not intend § 35.160(c)(2) to prohibit parents, guardians, or caregivers from providing effective communication for children where so doing would be appropriate. Rather, the rule prohibits public entities, including medical

providers, from requiring, relying on, or forcing adults accompanying individuals with disabilities, including parents, guardians, or caregivers, to facilitate communication.

Several commenters asked that the Department make absolutely clear that children are not to be used to provide effective communication for family members and friends, and that it is the public entity's responsibility to provide effective communication, stating that often interpreters are needed in settings where it would not be appropriate for children to be interpreting, such as those involving medical issues, domestic violence, or other situations involving the exchange of confidential or adult-related material. Commenters observed that children are often hesitant to turn down requests to provide communication services, and that such requests put them in a very difficult position vis-a-vis family members and friends. The Department agrees. It is the Department's position that a public entity shall not rely on a minor child to facilitate communication with a family member, friend, or other individual, except in an emergency involving imminent threat to the safety or welfare of an individual or the public where there is no interpreter available. Accordingly, the Department has revised the rule to state: ''A public entity shall not rely on a minor child to interpret or facilitate communication, except in an emergency involving imminent threat to the safety or welfare of an individual or the public where there is no interpreter available.'' § 35.160(c)(3). Sections 35.160(c)(2) and (3) have no application in circumstances where an interpreter would not otherwise be required in order to provide effective communication (*e.g.*, in simple transactions such as purchasing movie tickets at a theater). The Department stresses that privacy and confidentiality must be maintained but notes that covered entities, such as hospitals, that are subject to the Health Insurance Portability and Accountability Act of 1996 (HIPAA), Public Law 104–191, Privacy Rules are permitted to disclose to a patient's relative, close friend, or any other person identified by the patient (such as an interpreter) relevant patient information if the patient agrees to such disclosures. *See* 45 CFR parts 160 and 164. The agreement need not be in writing. Covered entities should consult the HIPAA Privacy Rules regarding other ways disclosures might be able to be made to such persons.

With regard to emergency situations, the NPRM proposed permitting reliance on an individual accompanying an individual with a disability to interpret or facilitate communication in an emergency involving a threat to the public safety or welfare. Commenters requested that the Department make clear that often a public entity can obtain appropriate auxiliary aids and services in advance of an emergency by making necessary advance arrangements, particularly in anticipated emergencies such as predicted dangerous weather or certain medical situations such as childbirth. These commenters did not want public entities to be relieved of their responsibilities to provide effective communication in emergency situations, noting that the obligation to provide effective communication may be more critical in such situations. Several commenters requested a separate rule that requires public entities to provide timely and effective communication in the event of an emergency, noting that the need for effective communication escalates in an emergency.

Commenters also expressed concern that public entities, particularly law enforcement authorities and medical personnel, would apply the ''emergency situation'' provision in inappropriate circumstances and would rely on accompanying individuals without making any effort to seek appropriate auxiliary aids and services. Other commenters asked that the Department narrow this provision so that it would not be available to entities that are responsible for emergency preparedness and response. Some commenters noted that certain exigent circumstances, such as those that exist during and perhaps immediately

after, a major hurricane, temporarily may excuse public entities of their responsibilities to provide effective communication. However, they asked that the Department clarify that these obligations are ongoing and that, as soon as such situations begin to abate or stabilize, the public entity must provide effective communication.

The Department recognizes that the need for effective communication is critical in emergency situations. After due consideration of all of these concerns raised by commenters, the Department has revised § 35.160(c) to narrow the exception permitting reliance on individuals accompanying the individual with a disability during an emergency to make it clear that it only applies to emergencies involving an ''imminent threat to the safety or welfare of an individual or the public.'' *See* § 35.160(c)(2)–(3). Arguably, all visits to an emergency room or situations to which emergency workers respond are by definition emergencies. Likewise, an argument can be made that most situations that law enforcement personnel respond to involve, in one way or another, a threat to the safety or welfare of an individual or the public. The imminent threat exception in § 35.160(c)(2)– (3) is not intended to apply to the typical and foreseeable emergency situations that are part of the normal operations of these institutions. As such, a public entity may rely on an accompanying individual to interpret or facilitate communication under the § 35.160(c)(2)–(3) imminent threat exception only where in truly exigent circumstances, *i.e.*, where any delay in providing immediate services to the individual could have life-altering or life-ending consequences.

Many commenters urged the Department to stress the obligation of State and local courts to provide effective communication. The Department has received many complaints that State and local courts often do not provide needed qualified sign language interpreters to witnesses, litigants, jurors, potential jurors, and companions and associates of persons participating in the legal process. The Department cautions public entities that without appropriate auxiliary aids and services, such individuals are denied an opportunity to participate fully in the judicial process, and denied benefits of the judicial system that are available to others.

Another common complaint about access to State and local court systems is the failure to provide effective communication in deferral programs that are intended as an alternative to incarceration, or for other court-ordered treatment programs. These programs must provide effective communication, and courts referring individuals with disabilities to such programs should only refer individuals with disabilities to programs or treatment centers that provide effective communication. No person with a disability should be denied access to the benefits conferred through participation in a court-ordered referral program on the ground that the program purports to be unable to provide effective communication.

The general nondiscrimination provision in § 35.130(a) provides that no individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity. The Department consistently interprets this provision and § 35.160 to require effective communication in courts, jails, prisons, and with law enforcement officers. Persons with disabilities who are participating in the judicial process as witnesses, jurors, prospective jurors, parties before the court, or companions of persons with business in the court, should be provided auxiliary aids and services as needed for effective communication. The Department has developed a variety of technical assistance and guidance documents on the requirements for title II entities to provide effective communication; those materials are available on the Department Web site at: *http:// www.ada.gov.*

Many advocacy groups urged the Department to add language in the final rule that would require public entities to provide accessible material in a

manner that is timely, accurate, and private. The Department has included language in § 35.160(b)(2) stating that ''[i]n order to be effective, auxiliary aids and services must be provided in accessible formats, in a timely manner, and in such a way so as to protect the privacy and independence of the individual with a disability.''

Because the appropriateness of particular auxiliary aids and services may vary as a situation changes, the Department strongly encourages public entities to do a communication assessment of the individual with a disability when the need for auxiliary aids and services is first identified, and to reassess communication effectiveness regularly throughout the communication. For example, a deaf individual may go to an emergency department of a public community health center with what is at first believed to be a minor medical emergency, such as a sore knee, and the individual with a disability and the public community health center both believe that exchanging written notes will be effective. However, during that individual's visit, it is determined that the individual is, in fact, suffering from an anterior cruciate ligament tear and must have surgery to repair the torn ligament. As the situation develops and the diagnosis and recommended course of action evolve into surgery, an interpreter most likely will be necessary. A public entity has a continuing obligation to assess the auxiliary aids and services it is providing, and should consult with individuals with disabilities on a continuing basis to assess what measures are required to ensure effective communication. Public entities are further advised to keep individuals with disabilities apprised of the status of the expected arrival of an interpreter or the delivery of other requested or anticipated auxiliary aids and services.

Video remote interpreting (VRI) services. In § 35.160(d) of the NPRM, the Department proposed the inclusion of four performance standards for VRI (which the NPRM termed video interpreting services (VIS)), for effective communication: (1) High-quality, clear, real-time, full-motion video and audio over a dedicated high-speed Internet connection; (2) a clear, sufficiently large, and sharply delineated picture of the participating individual's head, arms, hands, and fingers, regardless of his body position; (3) clear transmission of voices; and (4) persons who are trained to set up and operate the VRI quickly. Commenters generally approved of those performance standards, but recommended that some additional standards be included in the final rule. Some State agencies and advocates for persons with disabilities requested that the Department add more detail in the description of the first standard, including modifying the term ''dedicated high-speed Internet connection'' to read ''dedicated high-speed, wide-bandwidth video connection.'' These commenters argued that this change was necessary to ensure a high-quality video image that will not produce lags, choppy images, or irregular pauses in communication. The Department agrees with those comments and has amended the provision in the final rule accordingly.

For persons who are deaf with limited vision, commenters requested that the Department include an explicit requirement that interpreters wear high-contrast clothing with no patterns that might distract from their hands as they are interpreting, so that a person with limited vision can see the signs made by the interpreter. While the Department reiterates the importance of such practices in the delivery of effective VRI, as well as in-person interpreting, the Department declines to adopt such performance standards as part of this rule. In general, professional interpreters already follow such practices—the Code of Professional Conduct for interpreters developed by the Registry of Interpreters for the Deaf, Inc. and the National Association of the Deaf incorporates attire considerations into their standards of professionalism and conduct. (This code is available at *http:// www.vid.org/userfiles/file/pdfs/codeofethics. pdf* (Last visited July 18, 2010).

Moreover, as a result of this code, many VRI agencies have adopted detailed dress standards that interpreters hired by the agency must follow. In addition, commenters urged that a clear image of the face and eyes of the interpreter and others be explicitly required. Because the face includes the eyes, the Department has amended § 35.160(d)(2) of the final rule to include a requirement that the interpreter's face be displayed.

In response to comments seeking more training for users and non-technicians responsible for VRI in title II facilities, the Department is extending the requirement in § 35.160(d)(4) to require training for ''users of the technology'' so that staff who would have reason to use the equipment in an emergency room, State or local court, or elsewhere are properly trained. Providing for such training will enhance the success of VRI as means of providing effective communication.

Captioning at sporting venues. In the NPRM at § 35.160(e), the Department proposed that sports stadiums that have a capacity of 25,000 or more shall provide captioning for safety and emergency information on scoreboards and video monitors. In addition, the Department posed four questions about captioning of information, especially safety and emergency information announcements, provided over public address (PA) systems. The Department received many extremely detailed and divergent responses to each of the four questions and the proposed regulatory text. Because comments submitted on the Department's title II and title III proposals were intertwined, because of the similarity of issues involved for title II entities and title III entities, and in recognition of the fact that many large sports stadiums are covered by both title II and title III as joint operations of State or local governments and one or more public accommodations, the Department presents here a single consolidated review and summary of the issues raised in comments.

The Department asked whether requiring captioning of safety and emergency information made over the public address system in stadiums seating fewer than 25,000 would create an undue burden for smaller entities, whether it would be feasible for small stadiums, or whether a larger threshold, such as sports stadiums with a capacity of 50,000 or more, would be appropriate.

There was a consensus among the commenters, including disability advocates as well as venue owners and stadium designers and operators, that using the stadium size or seating capacity as the exclusive deciding factor for any obligation to provide captioning for safety and emergency information broadcast over the PA system is not preferred. Most disability advocacy organizations and individuals with disabilities complained that using size or seating capacity as a threshold for captioning safety and emergency information would undermine the ''undue burden'' defense found in both titles II and III. Many commenters provided examples of facilities like professional hockey arenas that seat less than 25,000 fans but which, commenters argued, should be able to provide real-time captioning. Other commenters suggested that some high school or college stadiums, for example, may hold 25,000 fans or more and yet lack the resources to provide real-time captioning. Many commenters noted that real-time captioning would require trained stenographers and that most high school and college sports facilities rely upon volunteers to operate scoreboards and PA systems, and they would not be qualified stenographers, especially in case of an emergency. One national association noted that the typical stenographer expense for a professional football game in Washington, DC is about $550 per game. Similarly, one trade association representing venues estimated that the cost for a professional stenographer at a sporting event runs between $500 and $1,000 per game or event, the cost of which, they argued, would be unduly burdensome in many cases. Some commenters posited that schools that do not sell tickets to athletic events would find it difficult to meet such expenses, in contrast to major college athletic programs and professional sports teams,

which would be less likely to prevail using an ''undue burden'' defense.

Some venue owners and operators and other covered entities argued that stadium size should not be the key consideration when requiring scoreboard captioning. Instead, these entities suggested that equipment already installed in the stadium, including necessary electrical equipment and backup power supply, should be the determining factor for whether captioning is mandated. Many commenters argued that the requirement to provide captioning should only apply to stadiums with scoreboards that meet the National Fire Protection Association (NFPA) National Fire Alarm Code (NFPA 72). Commenters reported that NFPA 72 requires at least two independent and reliable power supplies for emergency information systems, including one source that is a generator or battery sufficient to run the system in the event the primary power fails. Alternatively, some stadium designers and title II entities commented that the requirement should apply when the facility has at least one elevator providing firefighter emergency operation, along with approval of authorities with responsibility for fire safety. Other commenters argued for flexibility in the requirements for providing captioning and that any requirement should only apply to stadiums constructed after the effective date of the regulation.

In the NPRM, the Department also asked whether the rule should address the specific means of captioning equipment, whether it should be provided through any effective means (scoreboards, line boards, handheld devices, or other means), or whether some means, such as handheld devices, should be eliminated as options. This question elicited many comments from advocates for persons with disabilities as well as from covered entities. Advocacy organizations and individuals with experience using handheld devices argue that such devices do not provide effective communication. These commenters noted that information is often delayed in the transmission to such devices, making them hard to use when following action on the playing field or in the event of an emergency when the crowd is already reacting to aural information provided over the PA system well before it is received on the handheld device.

Several venue owners and operators and others commented that handheld technology offers advantages of flexibility and portability so that it may be used successfully regardless of where in the facility the user is located, even when not in the line of sight of a scoreboard or other captioning system. Still other commenters urged the Department not to regulate in such a way as to limit innovation and use of such technology now and in the future. Cost considerations were included in some comments from some stadium designers and venue owners and operators, who reported that the cost of providing handheld systems is far less than the cost of real-time captioning on scoreboards, especially in facilities that do not currently have the capacity to provide real-time captions on existing equipment. Others noted that handheld technology is not covered by fire and safety model codes, including the NFPA, and thus would be more easily adapted into existing facilities if captioning were required by the Department.

The Department also asked about providing open captioning of all public address announcements, and not limiting captioning to safety and emergency information. A variety of advocates and persons with disabilities argued that all information broadcast over a PA system should be captioned in real time at all facilities in order to provide effective communication and that a requirement only to provide emergency and safety information would not be sufficient. A few organizations for persons with disabilities commented that installation of new systems should not be required, but that all systems within existing facilities that are capable of providing captioning must be utilized to the maximum extent possible to provide captioning of as much

information as possible. Several organizations representing persons with disabilities commented that all facilities must include in safety planning the requirement to caption all aurally-provided information for patrons with communication disabilities. Some advocates suggested that demand for captions will only increase as the number of deaf and hard of hearing persons grows with the aging of the general population and with increasing numbers of veterans returning from war with disabilities. Multiple comments noted that the captioning would benefit others as well as those with communication disabilities.

By contrast, venue owners and operators and others commented that the action on the sports field is self-explanatory and does not require captioning and they objected to an explicit requirement to provide real-time captioning for all information broadcast on the PA system at a sporting event. Other commenters objected to requiring captioning even for emergency and safety information over the scoreboard rather than through some other means. By contrast, venue operators, State government agencies, and some model code groups, including NFPA, commented that emergency and safety information must be provided in an accessible format and that public safety is a paramount concern. Other commenters argued that the best method to deliver safety and emergency information would be television monitors showing local TV broadcasts with captions already mandated by the FCC. Some commenters posited that the most reliable information about a major emergency would be provided on the television news broadcasts. Several commenters argued that television monitors may be located throughout the facility, improving line of sight for patrons, some of whom might not be able to see the scoreboard from their seats or elsewhere in the facility. Some stadium designers, venue operators, and model code groups pointed out that video monitors are not regulated by the NFPA or other agencies, so that such monitors could be more easily provided. Video monitors may receive transmissions from within the facility and could provide real-time captions if there is the necessary software and equipment to feed the captioning signal to a closed video network within the facility. Several comments suggested that using monitors would be preferable to requiring captions on the scoreboard if the regulation mandates realtime captioning. Some venue owners and operators argued that retrofitting existing stadiums with new systems could easily cost hundreds of thousands of dollars per scoreboard or system. Some stadium designers and others argued that captioning should only be required in stadiums built after the effective date of the regulation. For stadiums with existing systems that allow for real-time captioning, one commenter posited that dedicating the system exclusively to real-time captioning would lead to an annual loss of between $2 and $3 million per stadium in revenue from advertising currently running in that space.

After carefully considering the wide range of public comments on this issue, the Department has concluded that the final rule will not provide additional requirements for effective communication or emergency information provided at sports stadiums at this time. The 1991 title II and title III regulations and statutory requirements are not in any way affected by this decision. The decision to postpone rulemaking on this complex issue is based on a number of factors, including the multiple layers of existing regulation by various agencies and levels of government, and the wide array of information, requests, and recommendations related to developing technology offered by the public. In addition, there is a huge variety of covered entities, information and communication systems, and differing characteristics among sports stadiums. The Department has concluded that further consideration and review would be prudent before it issues specific regulatory requirements.

Section 35.161 Telecommunications.

The Department proposed to retitle this section ''Telecommunications'' to reflect situations in which the public entity must provide an effective means to communicate by telephone for individuals with disabilities. First, the NPRM proposed redesignating § 35.161 as § 35.161(a) and replacing the term ''Telecommunications devices for the deaf (TDD)'' with ''Text telephones (TTY).'' Public comment was universally supportive of this change in nomenclature to TTY.

In the NPRM, at § 35.161(b), the Department addressed automated-attendant systems that handle telephone calls electronically. Often individuals with disabilities, including persons who are deaf or hard of hearing, are unable to use such automated systems. Some systems are not compatible with TTYs or the telecommunications relay service. Automated systems can and often do disconnect calls from TTYs or relay calls, making it impossible for persons using a TTY or relay system to do business with title II entities in the same manner as others. The Department proposed language that would require a telecommunications service to permit persons using relay or TTYs or other assistive technology to use the automated-attendant system provided by the public entity. The FCC raised this concern with the Department after the 1991 title II regulation went into effect, and the Department acted upon that request in the NPRM. Comments from disability advocates and persons with disabilities consistently requested the provision be amended to cover ''voice mail, messaging, auto-attendant, and interactive voice response systems.'' The Department recognizes that those are important features of widely used telecommunications technology that should be as accessible to persons who are deaf or hard of hearing as they are to others, and has amended the section in the final rule to include the additional features.

Many commenters, including advocates and persons with disabilities, as well as State agencies and national organizations, asked that all automated systems have an option for the caller to bypass the automated system and speak to a live person who could communicate using relay services. The Department understands that automated telecommunications systems typically do not offer the opportunity to avoid or bypass the automated system and speak to a live person. The Department believes that at this time it is inappropriate to add a requirement that all such systems provide an override capacity that permits a TTY or relay caller to speak with a live clerk on a telecommunications relay system. However, if a system already provides an option to speak to a person, that system must accept TTY and relay calls and must not disconnect or refuse to accept such calls.

Other comments from advocacy organizations and individuals urged the Department to require specifications for the operation of such systems that would involve issuing technical requirements for encoding and storage of automated text, as well as controls for speed, pause, rewind, and repeat, and prompts without any background noise. The same comments urged that these requirements should be consistent with a pending advisory committee report to the Access Board, submitted in April 2008. *See* Telecommunications and Electronic Information Technology Advisory Committee, Report to the Access Board Refreshed Accessibility Standards and Guidelines in Telecommunications and Electronic and Information Technology (Apr. 2008) available at *http://www.access-board. gov/sec508/refresh/report/.* The Department is declining at this time to preempt ongoing consideration of these issues by the Board. Instead, the Department will monitor activity by the Board. The Department is convinced that the general requirement to make such automated systems usable by persons with disabilities is appropriate at this time and title II entities should evaluate their automated systems in light of concerns about providing systems that

offer effective communication to persons with disabilities.

Finally, the Department has adopted in § 35.161(c) of the final rule the requirement that all such systems must not disconnect or refuse to take calls from all forms of FCC-approved telecommunications relay systems, including Internet-based relay systems. (Internet-based relay systems refer to the mechanism by which the message is relayed). They do not require a public entity to have specialized computer equipment. Commenters from some State agencies, many advocacy organizations, and individuals strongly urged the Department to mandate such action because of the high proportion of TTY calls and relay service calls that are not completed because the title II entity's phone system or employees do not take the calls. This presents a serious obstacle for persons doing business with State and local government and denies persons with disabilities access to use the telephone for business that is typically handled over the phone for others.

In addition, commenters requested that the Department include ''real-time'' before any mention of ''computer-aided'' technology to highlight the value of simultaneous translation of any communication. The Department has added ''real-time'' before ''computer-aided transcription services'' in the definition of ''auxiliary aids in § 35.104 and before ''communication'' in § 35.161(b).

Subpart F—Compliance Procedures

Section 35.171 Acceptance of complaints.

In the NPRM, the Department proposed changing the current language in § 35.171(a)(2)(i) regarding misdirected complaints to make it clear that if an agency receives a complaint for which it lacks jurisdiction either under section 504 or as a designated agency under the ADA, the agency may refer the complaint to the appropriate agency with title II or section 504 jurisdiction or to the Department of Justice. The language of the 1991 title II regulation only requires the agency to refer such a complaint to the Department, which in turn refers the complaint to the appropriate designated agency. The proposed revisions to § 35.171 made it clear that an agency can refer a misdirected complaint either directly to the appropriate agency or to the Department. This amendment was intended to protect against the unnecessary backlogging of complaints and to prevent undue delay in an agency taking action on a complaint.

Several commenters supported this amendment as a more efficient means of directing title II complaints to the appropriate enforcing agency. One commenter requested that the Department emphasize the need for timeliness in referring a complaint. The Department does not believe it is appropriate to adopt a specific time frame but will continue to encourage designated agencies to make timely referrals. The final rule retains, with minor modifications, the language in proposed § 35.171(a)(2)(i). The Department has also amended § 35.171(a)(2)(ii) to be consistent with the changes in the rule at § 35.190(e), as discussed below.

Section 35.172 Investigations and compliance reviews.

In the NPRM, the Department proposed a number of changes to language in § 35.172 relating to the resolution of complaints. Subtitle A of title II of the ADA defines the remedies, procedures, and rights provided for qualified individuals with disabilities who are discriminated against on the basis of disability in the services, programs, or activities of State and local governments. 42 U.S.C. 12131–12134. Subpart F of the current regulation establishes administrative procedures for the enforcement of title II of the ADA. 28 CFR 35.170–35.178. Subpart G identifies eight ''designated agencies,'' including the Department, that have responsibility for investigating complaints under title II. *See* 28

CFR 35.190(b).

The Department's 1991 title II regulation is based on the enforcement procedures established in regulations implementing section 504. Thus, the Department's 1991 title II regulation provides that the designated agency ''shall investigate each complete complaint'' alleging a violation of title II and shall ''attempt informal resolution'' of such complaint. 28 CFR 35.172(a). The full range of remedies (including compensatory damages) that are available to the Department when it resolves a complaint or resolves issues raised in a compliance review are available to designated agencies when they are engaged in informal complaint resolution or resolution of issues raised in a compliance review under title II.

In the years since the 1991 title II regulation went into effect, the Department has received many more complaints alleging violations of title II than its resources permit it to resolve. The Department has reviewed each complaint that the Department has received and directed its resources to resolving the most critical matters. In the NPRM, the Department proposed deleting the word ''each'' as it appears before ''complaint'' in § 35.172(a) of the 1991 title II regulation as a means of clarifying that designated agencies may exercise discretion in selecting title II complaints for resolution.

Many commenters opposed the removal of the term ''each,'' requesting that all title II complaints be investigated. The commenters explained that complaints against title II entities implicate the fundamental right of access to government facilities and programs, making an administrative enforcement mechanism critical. Rather than aligning enforcement discretion of title II complaints with the discretion under the enforcement procedures of title III, the commenters favored obtaining additional resources to address more complaints. The commenters highlighted the advantage afforded by Federal involvement in complaint investigations in securing favorable voluntary resolutions. When Federal involvement results in settlement agreements, commenters believed those agreements are more persuasive to other public entities than private settlements. Private litigation as a viable alternative was rejected by the commenters because of the financial limitations of many complainants, and because in some scenarios legal barriers foreclose private litigation as an option.

Several of those opposing this amendment argued that designated agencies are required to investigate each complaint under section 504, and a departure for title II complaints would be an inconsistency. The Department believes that § 35.171(a) of the final rule is consistent with the obligation to evaluate all complaints. However, there is no statutory requirement that every title II complaint receive a full investigation. Section 203 of the ADA, 42 U.S.C. 12133, adopts the ''remedies, procedures, and rights set forth in section 505 of the Rehabilitation Act of 1973'' (29 U.S.C. 794a). Section 505 of the Rehabilitation Act, in turn, incorporates the remedies available under title VI of the Civil Rights Act of 1964 into section 504. Under these statutes, agencies may engage in conscientious enforcement without fully investigating each citizen complaint. An agency's decision to conduct a full investigation requires a complicated balancing of a number of factors that are particularly within its expertise. Thus, the agency must not only assess whether a violation may have occurred, but also whether agency resources are best spent on this complaint or another, whether the agency is likely to succeed if it acts, and whether the particular enforcement action requested best fits the agency's overall policies. Availability of resources will always be a factor, and the Department believes discretion to maximize these limited resources will result in the most effective enforcement program. If agencies are bound to investigate each complaint fully, regardless of merit, such a requirement could have a deleterious effect on their overall enforcement efforts. The Department continues to expect that

each designated agency will review the complaints the agency receives to determine whether further investigation is appropriate.

The Department also proposed revising § 35.172 to add a new paragraph (b) that provided explicit authority for compliance reviews consistent with the Department's longstanding position that such authority exists. The proposed section stated, ''[t]he designated agency may conduct compliance reviews of public entities based on information indicating a possible failure to comply with the nondiscrimination requirements of this part.'' Several commenters supported this amendment, identifying title III compliance reviews as having been a successful means for the Department and designated agencies to improve accessibility. The Department has retained this section. However, the Department has modified the language of the section to make the authority to conduct compliance reviews consistent with that available under section 504 and title VI. *See, e.g.,* 28 CFR 42.107(a). The new provision reads as follows: ''(b) The designated agency may conduct compliance reviews of public entities in order to ascertain whether there has been a failure to comply with the nondiscrimination requirements of this part.'' The Department has also added a provision to § 35.172(c)(2) clarifying the Department's longstanding view that agencies may obtain compensatory damages on behalf of complainants as the result of a finding of discrimination pursuant to a compliance review or in informal resolution of a complaint.

Finally, in the NPRM, the Department proposed revising the requirements for letters of findings for clarification and to reflect current practice. Section 35.172(a) of the 1991 title II regulation required designated agencies to issue a letter of findings at the conclusion of an investigation if the complaint was not resolved informally, and to attempt to negotiate a voluntary compliance agreement if a violation was found. The Department's proposed changes to the 1991 title II regulation moved the discussion of letters of findings to a new paragraph (c) in the NPRM, and clarified that letters of findings are only required when a violation is found.

One commenter opposed the proposal to eliminate the obligation of the Department and designated agencies to issue letters of finding at the conclusion of every investigation. The commenter argued that it is beneficial for public entities, as well as complainants, for the Department to provide a reasonable explanation of both compliance and noncompliance findings.

The Department has considered this comment but continues to believe that this change will promote the overall effectiveness of its enforcement program. The final rule retains the proposed language.

Subpart G—Designated Agencies

Section 35.190 Designated agencies.

Subpart G of the 1991 title II regulation designates specific Federal agencies to investigate certain title II complaints. Paragraph 35.190(b) specifies these agency designations. Paragraphs 35.190(c) and (d), respectively, grant the Department discretion to designate further oversight responsibilities for matters not specifically assigned or where there are apparent conflicts of jurisdiction. The NPRM proposed adding a new § 35.190(e) further refining procedures for complaints filed with the Department of Justice. Proposed § 35.190(e) provides that when the Department receives a complaint alleging a violation of title II that is directed to the Attorney General but may fall within the jurisdiction of a designated agency or another Federal agency with jurisdiction under section 504, the Department may exercise its discretion to retain the complaint for investigation under this part. The Department would, of course, consult with the designated agency when the Department plans to retain a complaint.

In appropriate circumstances, the Department and the designated agency may conduct a joint investigation.

Several commenters supported this amendment as a more efficient means of processing title II complaints. The commenters supported the Department using its discretion to conduct timely investigations of such complaints. The language of the proposed § 35.190(e) remains unchanged in the final rule.

Other Issues

Questions Posed in the NPRM Regarding Costs and Benefits of Complying With the 2010 Standards

In the NPRM, the Department requested comment on various cost and benefit issues related to eight requirements in the Department's Initial Regulatory Impact Analysis (Initial RIA), available at *ada.gov/ NPRM2008/ria.htm)*, that were projected to have incremental costs exceeding monetized benefits by more than $100 million when using the 1991 Standards as the comparative baseline, *i.e.*, side reach, water closet clearances in single-user toilet rooms with in-swinging doors, stairs, elevators, location of accessible routes to stages, accessible attorney areas and witness stands, assistive listening systems, and accessible teeing grounds, putting greens, and weather shelters at golf courses. 73 FR 34466, 34469 (June 17, 2008). The Department noted that pursuant to the ADA, the Department does not have statutory authority to modify the 2004 ADAAG and is required instead to issue regulations implementing the ADA that are consistent with the Board's guidelines. In that regard, the Department also requested comment about whether any of these eight elements in the 2010 Standards should be returned to the Access Board for further consideration, in particular as applied to alterations. Many of the comments received by the Department in response to these questions addressed both titles II and III. As a result, the Department's discussion of these comments and its response are collectively presented for both titles.

Side reach. The 1991 Standards at section 4.2.6 establish a maximum side-reach height of 54 inches. The 2010 Standards at section 308.3 reduce that maximum height to 48 inches. The 2010 Standards also add exceptions for certain elements to the scoping requirement for operable parts.

The vast majority of comments the Department received were in support of the lower side-reach maximum of 48 inches in the 2010 Standards. Most of these comments, but not all, were received from individuals of short stature, relatives of individuals of short stature, or organizations representing the interests of persons with disabilities, including individuals of short stature. Comments from individuals with disabilities and disability advocacy groups stated that the 48-inch side reach would permit independence in performing many activities of daily living for individuals with disabilities, including individuals of short stature, persons who use wheelchairs, and persons who have limited upper body strength. In this regard, one commenter who is a business owner pointed out that as a person of short stature there were many occasions when he was unable to exit a public restroom independently because he could not reach the door handle. The commenter said that often elevator control buttons are out of his reach and, if he is alone, he often must wait for someone else to enter the elevator so that he can ask that person to press a floor button for him. Another commenter, who is also a person of short stature, said that he has on several occasions pulled into a gas station only to find that he was unable to reach the credit card reader on the gas pump. Unlike other customers who can reach the card reader, swipe their credit or debit cards, pump their gas and leave the station, he must use another method to pay for his gas. Another comment from

a person of short stature pointed out that as more businesses take steps to reduce labor costs—a trend expected to continue—staffed booths are being replaced with automatic machines for the sale, for example, of parking tickets and other products. He observed that the ''ability to access and operate these machines becomes ever more critical to function in society,'' and, on that basis, urged the Department to adopt the 48-inch side-reach requirement. Another individual commented that persons of short stature should not have to carry with them adaptive tools in order to access building or facility elements that are out of their reach, any more than persons in wheelchairs should have to carry ramps with them in order to gain access to facilities.

Many of the commenters who supported the revised side-reach requirement pointed out that lowering the side-reach requirement to 48 inches would avoid a problem sometimes encountered in the built environment when an element was mounted for a parallel approach at 54 inches only to find afterwards that a parallel approach was not possible. Some commenters also suggested that lowering the maximum unobstructed side reach to 48 inches would reduce confusion among design professionals by making the unobstructed forward and side-reach maximums the same (the unobstructed forward reach in both the 1991 and 2010 Standards is 48 inches maximum). These commenters also pointed out that the ICC/ANSI A117.1 Standard, which is a private sector model accessibility standard, has included a 48-inch maximum high side-reach requirement since 1998. Many jurisdictions have already incorporated this requirement into their building codes, which these commenters believed would reduce the cost of compliance with the 2010 Standards. Because numerous jurisdictions have already adopted the 48-inch side-reach requirement, the Department's failure to adopt the 48-inch side-reach requirement in the 2010 Standards, in the view of many commenters, would result in a significant reduction in accessibility, and would frustrate efforts that have been made to harmonize private sector model construction and accessibility codes with Federal accessibility requirements. Given these concerns, they overwhelmingly opposed the idea of returning the revised side-reach requirement to the Access Board for further consideration.

The Department also received comments in support of the 48-inch side-reach requirement from an association of professional commercial property managers and operators and from State governmental entities. The association of property managers pointed out that the revised side-reach requirement provided a reasonable approach to ''regulating elevator controls and all other operable parts'' in existing facilities in light of the manner in which the safe harbor, barrier removal, and alterations obligations will operate in the 2010 Standards. One governmental entity, while fully supporting the 48-inch side-reach requirement, encouraged the Department to adopt an exception to the lower reach range for existing facilities similar to the exception permitted in the ICC/ANSI A117.1 Standard. In response to this latter concern, the Department notes that under the safe harbor, existing facilities that are in compliance with the 1991 Standards, which require a 54-inch side-reach maximum, would not be required to comply with the lower side-reach requirement, unless there is an alteration. *See* § 35.150(b)(2).

A number of commenters expressed either concern with, or opposition to, the 48-inch side-reach requirement and suggested that it be returned to the Access Board for further consideration. These commenters included trade and business associations, associations of retail stores, associations of restaurant owners, retail and convenience store chains, and a model code organization. Several businesses expressed the view that the lower side-reach requirement would discourage the use of their products and equipment by most of the general public. In particular, concerns were expressed by a national association of pay phone service providers

regarding the possibility that pay telephones mounted at the lower height would not be used as frequently by the public to place calls, which would result in an economic burden on the pay phone industry. The commenter described the lower height required for side reach as creating a new ''barrier'' to pay phone use, which would reduce revenues collected from pay phones and, consequently, further discourage the installation of new pay telephones. In addition, the commenter expressed concern that phone service providers would simply decide to remove existing pay phones rather than incur the costs of relocating them at the lower height. With regard to this latter concern, the commenter misunderstood the manner in which the safe harbor obligation will operate in the revised title II regulation for elements that comply with the 1991 Standards. If the pay phones comply with the 1991 Standards or UFAS, the adoption of the 2010 Standards does not require retrofitting of these elements to reflect incremental changes in the 2010 Standards (*see* § 35.150(b)(2)). However, pay telephones that were required to meet the 1991 Standards as part of new construction or alterations, but do not in fact comply with those standards, will need to be brought into compliance with the 2010 Standards as of 18 months from the publication date of this final rule. *See* § 35.151(c)(5)(ii).

The Department does not agree with the concerns expressed by the commenter about reduced revenues from pay phones mounted at lower heights. The Department believes that, while given the choice some individuals may prefer to use a pay phone that is at a higher height, the availability of some phones at a lower height will not deter individuals from making needed calls.

The 2010 Standards will not require every pay phone to be installed or moved to a lowered height. The table accompanying section 217.2 of the 2010 Standards makes clear that, where one or more telephones are provided on a floor, level, or an exterior site, only one phone per floor, level, or exterior site must be placed at an accessible height. Similarly, where there is one bank of phones per floor, level, or exterior site, only one phone per floor, level, or exterior site must be accessible. And if there are two or more banks of phones per floor, level, or exterior site, only one phone per bank must be placed at an accessible height.

Another comment in opposition to the lower reach range requirement was submitted on behalf of a chain of convenience stores with fuel stops. The commenter expressed the concern that the 48-inch side reach ''will make it uncomfortable for the majority of the public,'' including persons of taller stature who would need to stoop to use equipment such as fuel dispensers mounted at the lower height. The commenter offered no objective support for the observation that a majority of the public would be rendered uncomfortable if, as required in the 2010 Standards, at least one of each type of fuel dispenser at a facility was made accessible in compliance with the lower reach range. Indeed, the Department received no comments from any individuals of tall stature expressing concern about accessible elements or equipment being mounted at the 48-inch height.

Several convenience store, restaurant, and amusement park commenters expressed concern about the burden the lower side-reach requirement would place on their businesses in terms of self-service food stations and vending areas if the 48-inch requirement were applied retroactively. The cost of lowering counter height, in combination with the lack of control businesses exercise over certain prefabricated service or vending fixtures, outweighed, they argued, any benefits to persons with disabilities. For this reason, they suggested the lower side-reach requirement be referred back to the Access Board.

These commenters misunderstood the safe harbor and barrier removal obligations that will be in effect under the 2010 Standards. Those existing

self-service food stations and vending areas that already are in compliance with the 1991 Standards will not be required to satisfy the 2010 Standards unless they engage in alterations. With regard to prefabricated vending machines and food service components that will be purchased and installed in businesses after the 2010 Standards become effective, the Department expects that companies will design these machines and fixtures to comply with the 2010 Standards in the future, as many have already done in the 10 years since the 48-inch side-reach requirement has been a part of the model codes and standards used by many jurisdictions as the basis for their construction codes.

A model code organization commented that the lower side-reach requirement would create a significant burden if it required entities to lower the mounting height for light switches, environmental controls, and outlets when an alteration did not include the walls where these elements were located, such as when ''an area is altered or as a path of travel obligation.'' The Department believes that the final rule adequately addresses those situations about which the commenter expressed concern by not requiring the relocation of existing elements, such as light switches, environmental controls, and outlets, unless they are altered. Moreover, under § 35.151(b)(4)(iii) of the final rule, costs for altering the path of travel to an altered area of primary function that exceed 20 percent of the overall costs of the alteration will be deemed disproportionate.

The Department has determined that the revised side-reach requirement should not be returned to the Access Board for further consideration, based in large part on the views expressed by a majority of the commenters regarding the need for, and importance of, the lower side-reach requirement to ensure access for persons with disabilities.

Alterations and Water Closet Clearances in Single-User Toilet Rooms With In-Swinging Doors

The 1991 Standards allow a lavatory to be placed a minimum of 18 inches from the water closet centerline and a minimum of 36 inches from the side wall adjacent to the water closet, which precludes side transfers. The 1991 Standards do not allow an in-swinging door in a toilet or bathing room to overlap the required clear floor space at any accessible fixture. To allow greater transfer options, section 604.3.2 of the 2010 Standards prohibits lavatories from overlapping the clear floor space at water closets, except in residential dwelling units. Section 603.2.3 of the 2010 Standards maintains the prohibition on doors swinging into the clear floor space or clearance required for any fixture, except that they permit the doors of toilet or bathing rooms to swing into the required turning space, provided that there is sufficient clearance space for the wheelchair outside the door swing. In addition, in single-user toilet or bathing rooms, exception 2 of section 603.2.3 of the 2010 Standards permits the door to swing into the clear floor space of an accessible fixture if a clear floor space that measures at least 30 inches by 48 inches is available outside the arc of the door swing.

The majority of commenters believed that this requirement would increase the number of toilet rooms accessible to individuals with disabilities who use wheelchairs or mobility scooters, and will make it easier for them to transfer. A number of commenters stated that there was no reason to return this provision to the Access Board. Numerous commenters noted that this requirement is already included in other model accessibility standards and many State and local building codes and that the adoption of the 2010 Standards is an important part of harmonization efforts.

Other commenters, mostly trade associations, opposed this requirement, arguing that the added cost to the industry outweighs any increase in accessibility. Two commenters stated that these proposed requirements would add two feet to the width of an accessible single-user toilet room; however, another commenter said the drawings in the proposed regulation demonstrated that

there would be no substantial increase in the size of the toilet room. Several commenters stated that this requirement would require moving plumbing fixtures, walls, or doors at significant additional expense. Two commenters wanted the permissible overlap between the door swing and clearance around any fixture eliminated. One commenter stated that these new requirements will result in fewer alterations to toilet rooms to avoid triggering the requirement for increased clearances, and suggested that the Department specify that repairs, maintenance, or minor alterations would not trigger the need to provide increased clearances. Another commenter requested that the Department exempt existing guest room bathrooms and single-user toilet rooms that comply with the 1991 Standards from complying with the increased clearances in alterations.

After careful consideration of these comments, the Department believes that the revised clearances for single-user toilet rooms will allow safer and easier transfers for individuals with disabilities, and will enable a caregiver, aide, or other person to accompany an individual with a disability into the toilet room to provide assistance. The illustrations in Appendix B to the final title III rule, ''Analysis and Commentary on the 2010 ADA Standards for Accessible Design,'' published elsewhere in this volume and codified as Appendix B to 28 CFR part 36, describe several ways for public entities and public accommodations to make alterations while minimizing additional costs or loss of space. Further, in any isolated instances where existing structural limitations may entail loss of space, the public entity and public accommodation may have a technical infeasibility defense for that alteration. The Department also recognizes that in attempting to create the required clear floor space pursuant to section 604.3.2, there may be certain specific circumstances where it would be technically infeasible for a covered entity to comply with the clear floor space requirement, such as where an entity must move a plumbing wall in a multistory building where the mechanical chase for plumbing is an integral part of a building's structure or where the relocation of a wall or fixture would violate applicable plumbing codes. In such circumstances, the required clear floor space would not have to be provided although the covered entity would have to provide accessibility to the maximum extent feasible. The Department has, therefore, decided not to return this requirement to the Access Board.

Alterations to stairs. The 1991 Standards only require interior and exterior stairs to be accessible when they provide access to levels that are not connected by an elevator, ramp, or other accessible means of vertical access. In contrast, section 210.1 of the 2010 Standards requires all newly constructed stairs that are part of a means of egress to be accessible. However, exception 2 of section 210.1 of the 2010 Standards provides that in alterations, stairs between levels connected by an accessible route need not be accessible, except that handrails shall be provided. Most commenters were in favor of this requirement for handrails in alterations, and stated that adding handrails to stairs during alterations was not only feasible and not cost-prohibitive, but also provided important safety benefits. One commenter stated that making all points of egress accessible increased the number of people who could use the stairs in an emergency. A majority of the commenters did not want this requirement returned to the Access Board for further consideration.

The International Building Code (IBC), which is a private sector model construction code, contains a similar provision, and most jurisdictions enforce a version of the IBC as their building code, thereby minimizing the impact of this provision on public entities and public accommodations. The Department believes that by requiring only the addition of handrails to altered stairs where levels are connected by an accessible route, the costs of compliance for public entities and public accommodations are minimized, while

safe egress for individuals with disabilities is increased. Therefore, the Department has decided not to return this requirement to the Access Board.

Alterations to elevators. Under the 1991 Standards, if an existing elevator is altered, only that altered elevator must comply with the new construction requirements for accessible elevators to the maximum extent feasible. It is therefore possible that a bank of elevators controlled by a single call system may contain just one accessible elevator, leaving an individual with a disability with no way to call an accessible elevator and thus having to wait indefinitely until an accessible elevator happens to respond to the call system. In the 2010 Standards, when an element in one elevator is altered, section 206.6.1 will require the same element to be altered in all elevators that are programmed to respond to the same call button as the altered elevator.

Most commenters favored the proposed requirement. This requirement, according to these commenters, is necessary so a person with a disability need not wait until an accessible elevator responds to his or her call. One commenter suggested that elevator owners could also comply by modifying the call system so the accessible elevator could be summoned independently. One commenter suggested that this requirement would be difficult for small businesses located in older buildings, and one commenter suggested that this requirement be sent back to the Access Board.

After considering the comments, the Department agrees that this requirement is necessary to ensure that when an individual with a disability presses a call button, an accessible elevator will arrive in a timely manner. The IBC contains a similar provision, and most jurisdictions enforce a version of the IBC as their building code, minimizing the impact of this provision on public entities and public accommodations. Public entities and businesses located in older buildings need not comply with this requirement where it is technically infeasible to do so. Further, as pointed out by one commenter, modifying the call system so the accessible elevator can be summoned independently is another means of complying with this requirement in lieu of altering all other elevators programmed to respond to the same call button. Therefore, the Department has decided not to return this requirement to the Access Board.

Location of accessible routes to stages. The 1991 Standards at section 4.33.5 require an accessible route to connect the accessible seating and the stage, as well as other ancillary spaces used by performers. The 2010 Standards at section 206.2.6 provide in addition that where a circulation path directly connects the seating area and the stage, the accessible route must directly connect the accessible seating and the stage, and, like the 1991 Standards, an accessible route must connect the stage with the ancillary spaces used by performers.

In the NPRM, the Department asked operators of auditoria about the extent to which auditoria already provide direct access to stages and whether there were planned alterations over the next 15 years that included accessible direct routes to stages. The Department also asked how to quantify the benefits of this requirement for persons with disabilities, and invited commenters to provide illustrative anecdotal experiences about the requirement's benefits. The Department received many comments regarding the costs and benefits of this requirement. Although little detail was provided, many industry and governmental entity commenters anticipated that the costs of this requirement would be great and that it would be difficult to implement. They noted that premium seats may have to be removed and that load-bearing walls may have to be relocated. These commenters suggested that the significant costs would deter alterations to the stage area for a great many auditoria. Some commenters suggested that ramps to the front of the stage may interfere with means of egress and emergency exits. Several commenters requested that the requirement

apply to new construction only, and one industry commenter requested an exemption for stages used in arenas or amusement parks where there is no audience participation or where the stage is a work area for performers only. One commenter requested that the requirement not apply to temporary stages.

The final rule does not require a direct accessible route to be constructed where a direct circulation path from the seating area to the stage does not exist. Consequently, those commenters who expressed concern about the burden imposed by the revised requirement (*i.e.*, where the stage is constructed with no direct circulation path connecting the general seating and performing area) should note that the final rule will not require the provision of a direct accessible route under these circumstances. The final rule applies to permanent stages, as well as ''temporary stages,'' if there is a direct circulation path from the seating area to the stage. However, the Department does recognize that in some circumstances, such as an alteration to a primary function area, the ability to provide a direct accessible route to a stage may be costly or technically infeasible, the auditorium owner is not precluded by the revised requirement from asserting defenses available under the regulation. In addition, the Department notes that since section 4.33.5 of the 1991 Standards requires an accessible route to a stage, the safe harbor will apply to existing facilities whose stages comply with the 1991 Standards.

Several governmental entities supported accessible auditoria and the revised requirement. One governmental entity noted that its State building code already required direct access, that it was possible to provide direct access, and that creative solutions had been found to do so.

Many advocacy groups and individual commenters strongly supported the revised requirement, discussing the acute need for direct access to stages as it impacts a great number of people at important life events such as graduations and awards ceremonies, at collegiate and competitive performances and other school events, and at entertainment events that include audience participation. Many commenters expressed the belief that direct access is essential for integration mandates to be satisfied and that separate routes are stigmatizing and unequal. The Department agrees with these concerns.

Commenters described the impact felt by persons in wheelchairs who are unable to access the stage at all when others are able to do so. Some of these commenters also discussed the need for performers and production staff who use wheelchairs to have direct access to the stage and provided a number of examples that illustrated the importance of the rule proposed in the NPRM. Personal anecdotes were provided in comments and at the Department's public hearing on the NPRM. One mother spoke passionately and eloquently about the unequal treatment experienced by her daughter, who uses a wheelchair, at awards ceremonies and band concerts. Her daughter was embarrassed and ashamed to be carried by her father onto a stage at one band concert. When the venue had to be changed for another concert to an accessible auditorium, the band director made sure to comment that he was unhappy with the switch. Rather than endure the embarrassment and indignities, her child dropped out of band the following year. Another father commented about how he was unable to speak from the stage at a PTA meeting at his child's school. Speaking from the floor limited his line of sight and his participation. Several examples were provided of children who could not participate on stage during graduation, awards programs, or special school events, such as plays and festivities. One student did not attend his college graduation because he would not be able to get on stage. Another student was unable to participate in the class Christmas programs or end-of-year parties unless her father could attend and lift her onto the stage. These commenters did not provide a method to quantify

the benefits that would accrue by having direct access to stages. One commenter stated, however, that ''the cost of dignity and respect is without measure.''

Many industry commenters and governmental entities suggested that the requirement be sent back to the Access Board for further consideration. One industry commenter mistakenly noted that some international building codes do not incorporate the requirement and that therefore there is a need for further consideration. However, the Department notes that both the 2003 and 2006 editions of the IBC include scoping provisions that are almost identical to this requirement and that these editions of the model code are the most frequently used. Many individuals and advocacy group commenters requested that the requirement be adopted without further delay. These commenters spoke of the acute need for direct access to stages and the amount of time it would take to resubmit the requirement to the Access Board. Several commenters noted that the 2004 ADAAG tracks recent model codes and thus there is no need for further consideration. The Department agrees that no further delay is necessary and therefore has decided not to return the requirement to the Access Board for further consideration.

Attorney areas and witness stands. The 1991 Standards do not require that public entities meet specific architectural standards with regard to the construction and alteration of courtrooms and judicial facilities. Because it is apparent that the judicial facilities of State and local governments have often been inaccessible to individuals with disabilities, as part of the NPRM, the Department proposed the adoption of sections 206.2.4, 231.2, 808, 304, 305, and 902 of the 2004 ADAAG concerning judicial facilities and courtrooms, including requirements for accessible courtroom stations and accessible jury boxes and witness stands.

Those who commented on access to judicial facilities and courtrooms uniformly favored the adoption of the 2010 Standards. Virtually all of the commenters stated that accessible judicial facilities are crucial to ensuring that individuals with disabilities are afforded due process under law and have an equal opportunity to participate in the judicial process. None of the commenters favored returning this requirement to the Access Board for further consideration.

The majority of commenters, including many disability rights and advocacy organizations, stated that it is crucial for individuals with disabilities to have effective and meaningful access to our judicial system so as to afford them due process under law. They objected to asking the Access Board to reconsider this requirement. In addition to criticizing the initial RIA for virtually ignoring the intangible and non-monetary benefits associated with accessible courtrooms, these commenters frequently cited the Supreme Court's decision in *Tennessee v. Lane,* 541 U.S. 509, 531 (2004),[4] as ample justification for the requirement, noting the Court's finding that ''[t]he unequal treatment of disabled persons in the administration of judicial services has a long history, and has persisted despite several legislative efforts to remedy the problem of disability discrimination.'' *Id.* at 531. These commenters also made a number of observations, including the following: providing effective access to individuals with mobility impairments is not possible when architectural barriers impede their path of travel and negatively emphasize an individual's disability; the perception generated by makeshift accommodations discredits witnesses and attorneys with disabilities, who should not be stigmatized or treated like second-class citizens; the cost of accessibility modifications to existing courthouses can often be significantly decreased

[4] The Supreme Court in *Tennessee v. Lane*, 541 U.S. 509, 5330534 (2004), held that title II of the ADA constitutes a valid exercise of Congress' enforcement power under the Fourteenth Amendment in cases implicating the fundamental access to the courts.

by planning ahead, by focusing on low-cost options that provide effective access, and by addressing existing barriers when reasonable modifications to the courtroom can be made; by planning ahead and by following best practices, jurisdictions can avoid those situations where it is apparent that someone's disability is the reason why ad hoc arrangements have to be made prior to the beginning of court proceedings; and accessibility should be a key concern during the planning and construction process so as to ensure that both courtroom grandeur and accessibility are achieved. One commenter stated that, in order for attorneys with disabilities to perform their professional duties to their clients and the court, it is essential that accessible courtrooms, conference rooms, law libraries, judicial chambers, and other areas of a courthouse be made barrier-free by taking accessible design into account prior to construction.

Numerous commenters identified a variety of benefits that would accrue as a result of requiring judicial facilities to be accessible. These included the following: maintaining the decorum of the courtroom and eliminating the disruption of court proceedings when individuals confront physical barriers; providing an accessible route to the witness stand and attorney area and clear floor space to accommodate a wheelchair within the witness area; establishing crucial lines of sight between the judge, jury, witnesses, and attorneys—which commenters described as crucial; ensuring that the judge and the jury will not miss key visual indicators of a witness; maintaining a witness's or attorney's dignity and credibility; shifting the focus from a witness's disability to the substance of that person's testimony; fostering the independence of an individual with disability; allowing persons with mobility impairments to testify as witnesses, including as expert witnesses; ensuring the safety of various participants in a courtroom proceeding; and avoiding unlawful discrimination. One commenter stated that equal access to the well of the courtroom for both attorney and client is important for equal participation and representation in our court system. Other commenters indicated that accessible judicial facilities benefit a wide range of people, including many persons without disabilities, senior citizens, parents using strollers with small children, and attorneys and court personnel wheeling documents into the courtroom. One commenter urged the adoption of the work area provisions because they would result in better workplace accessibility and increased productivity. Several commenters urged the adoption of the rule because it harmonizes the ADAAG with the model IBC, the standards developed by the American National Standards Institute (ANSI), and model codes that have been widely adopted by State and local building departments, thus increasing the prospects for better understanding and compliance with the ADAAG by architects, designers, and builders.

Several commenters mentioned the report ''Justice for All: Designing Accessible Courthouses'' (Nov. 15, 2006), available at *http://www.access-board.gov/caac/ report.htm* (Nov. 24, 2009) (last visited June 24, 2010). The report, prepared by the Courthouse Access Advisory Committee for the Access Board, contained recommendations for the Board's use in developing and disseminating guidance on accessible courthouse design under the ADA and the ABA. These commenters identified some of the report's best practices concerning courtroom accessibility for witness stands, jury boxes, and attorney areas; addressed the costs and benefits arising from the use of accessible courtrooms; and recommended that the report be incorporated into the Department's final rule. With respect to existing courtrooms, one commenter in this group suggested that consideration be given to ensuring that there are barrier-free emergency evacuation routes for all persons in the courtroom, including different evacuation routes for different classes of individuals given the unique nature of judicial facilities and courtrooms.

The Department declines to incorporate the report into the regulation. However, the Department encourages State and local governments to consult the Committee report as a useful guide on ways to facilitate and increase accessibility of their judicial facilities. The report includes many excellent examples of accessible courtroom design.

One commenter proposed that the regulation also require a sufficient number of accessible benches for judges with disabilities. Under section 206.2.4 of the 2004 ADAAG, raised courtroom stations used by judges and other judicial staff are not required to provide full vertical access when first constructed or altered, as long as the required clear floor space, maneuvering space, and any necessary electrical service for future installation of a means of vertical access, is provided at the time of new construction or can be achieved without substantial reconstruction during alterations. The Department believes that this standard easily allows a courtroom station to be adapted to provide vertical access in the event a judge requires an accessible judge's bench.

The Department received several anecdotal accounts of courtroom experiences of individuals with disabilities. One commenter recalled numerous difficulties that her law partner faced as the result of inaccessible courtrooms, and their concerns that the attention of judge and jury was directed away from the merits of case to the lawyer and his disability. Among other things, the lawyer had to ask the judges on an appellate panel to wait while he maneuvered through insufficient space to the counsel table; ask judges to relocate bench conferences to accessible areas; and make last-minute preparations and rearrangements that his peers without disabilities did not have to make. Another commenter with extensive experience as a lawyer, witness, juror, and consultant observed that it is common practice for a witness who uses mobility devices to sit in front of the witness stand. He described how disconcerting and unsettling it has been for him to testify in front of the witness stand, which allowed individuals in the courtroom to see his hands or legs shaking because of spasticity, making him feel like a second-class citizen.

Two other commenters with mobility disabilities described their experiences testifying in court. One accessibility consultant stated that she was able to represent her clients successfully when she had access to an accessible witness stand because it gave her the ability ''to look the judge in the eye, speak comfortably and be heard, hold up visual aids that could be seen by the judge, and perform without an architectural stigma.'' She did not believe that she was able to achieve a comparable outcome or have meaningful access to the justice system when she testified from an inaccessible location. Similarly, a licensed clinical social worker indicated that she has testified in several cases in accessible courtrooms, and that having full access to the witness stand in the presence of the judge and the jury was important to her effectiveness as an expert witness. She noted that accessible courtrooms often are not available, and that she was aware of instances in which victims, witnesses, and attorneys with disabilities have not been able to obtain needed disability accommodations in order to fulfill their roles at trial.

Two other commenters indicated that they had been chosen for jury duty but that they were effectively denied their right to participate as jurors because the courtrooms were not accessible. Another commenter indicated that he has had to sit apart from the other jurors because the jury box was inaccessible.

A number of commenters expressed approval of actions taken by States to facilitate access in judicial facilities. A member of a State commission on disability noted that the State had been working toward full accessibility since 1997 when the Uniform Building Code required interior accessible routes. This commenter stated that the State's district courts had been renovated to the maximum extent feasible to provide

greater access. This commenter also noted that a combination of Community Development Block Grant money and State funds are often awarded for renovations of courtroom areas. One advocacy group that has dealt with court access issues stated that members of the State legal community and disability advocates have long been promoting efforts to ensure that the State courts are accessible to individuals with disabilities. The comment cited a publication distributed to the Washington State courts by the State bar association entitled, ''Ensuring Equal Access to the Courts for Persons with Disabilities.'' (Aug. 2006), available at *http:// www.wsba.org/ ensuringaccessguidebook.pdf* (last visited July 20, 2010). In addition, the commenter also indicated that the State supreme court had promulgated a new rule governing how the courts should respond to requests of accommodation based upon disability; the State legislature had created the position of Disability Access Coordinator for Courts to facilitate accessibility in the court system; and the State legislature had passed a law requiring that all planned improvements and alterations to historic courthouses be approved by the ADA State facilities program manager and committee in order to ensure that the alterations will enhance accessibility.

The Department has decided to adopt the requirements in the 2004 ADAAG with respect to judicial facilities and courtrooms and will not ask the Access Board to review these requirements. The final rule is wholly consistent with the objectives of the ADA. It addresses a well-documented history of discrimination with respect to judicial administration and significantly increases accessibility for individuals with disabilities. It helps ensure that they will have an opportunity to participate equally in the judicial process. As stated, the final rule is consistent with a number of model and local building codes that have been widely adopted by State and local building departments and provides greater uniformity for planners, architects, and builders.

Assistive listening systems. The 1991 Standards at sections 4.33.6 and 4.33.7 require assistive listening systems (ALS) in assembly areas and prescribe general performance standards for ALS systems. In the NPRM, the Department proposed adopting the technical specifications in the 2004 ADAAG for ALS that are intended to ensure better quality and effective delivery of sound and information for persons with hearing impairments, especially those using hearing aids. The Department noted in the NPRM that since 1991, advancements in ALS and the advent of digital technology have made these systems more amenable to uniform standards, which, among other things, should ensure that a certain percentage of required ALS systems are hearing-aid compatible. 73 FR 34466, 34471 (June 17, 2008). The 2010 Standards at section 219 provide scoping requirements and at section 706 address receiver jacks, hearing aid compatibility, sound pressure level, signal-to-noise ratio, and peak clipping level. The Department requested comments specifically from arena and assembly area administrators on the cost and maintenance issues associated with ALS, asked generally about the costs and benefits of ALS, and asked whether, based upon the expected costs of ALS, the issue should be returned to the Access Board for further consideration.

Comments from advocacy organizations noted that persons who develop significant hearing loss often discontinue their normal routines and activities, including meetings, entertainment, and large group events, due to a sense of isolation caused by the hearing loss or embarrassment. Individuals with longstanding hearing loss may never have participated in group activities for many of the same reasons. Requiring ALS may allow individuals with disabilities to contribute to the community by joining in government and public events, and increasing economic activity associated with community activities and entertainment. Making public events and entertainment accessible to persons

with hearing loss also brings families and other groups that include persons with hearing loss into more community events and activities, thus exponentially increasing the benefit from ALS.

Many commenters noted that when a person has significant hearing loss, that person may be able to hear and understand information in a quiet situation with the use of hearing aids or cochlear implants; however, as background noise increases and the distance between the source of the sound and the listener grows, and especially where there is distortion in the sound, an ALS becomes essential for basic comprehension and understanding. Commenters noted that among the 31 million Americans with hearing loss, and with a projected increase to over 78 million Americans with hearing loss by 2030, the benefit from ALS is huge and growing. Advocates for persons with disabilities and individuals commented that they appreciated the improvements in the 2004 ADAAG standards for ALS, including specifications for the ALS systems and performance standards. They noted that neckloops that translate the signal from the ALS transmitter to a frequency that can be heard on a hearing aid or cochlear implant are much more effective than separate ALS system headsets, which sometimes create feedback, often malfunction, and may create distractions for others seated nearby. Comments from advocates and users of ALS systems consistently noted that the Department's regulation should, at a minimum, be consistent with the 2004 ADAAG. Although there were requests for adjustments in the scoping requirements from advocates seeking increased scoping requirements, and from large venue operators seeking fewer requirements, there was no significant concern expressed by commenters about the technical specifications for ALS in the 2004 ADAAG.

Some commenters from trade associations and large venue owners criticized the scoping requirements as too onerous and one commenter asked for a remand to the Access Board for new scoping rules. However, one State agency commented that the 2004 ADAAG largely duplicates the requirements in the 2006 IBC and the 2003 ANSI codes, which means that entities that comply with those standards would not incur additional costs associated with ADA compliance.

According to one State office of the courts, the cost to install either an infrared system or an FM system at average-sized facilities, including most courtrooms covered by title II, would be between $500 and $2,000, which the agency viewed as a small price in comparison to the benefits of inclusion. Advocacy organizations estimated wholesale costs of ALS systems at about $250 each and individual neckloops to link the signal from the ALS transmitter to hearing aids or cochlear implants at less than $50 per unit. Many commenters pointed out that if a facility already is using induction neckloops, it would already be in compliance and would not have any additional installation costs. One major city commented that annual maintenance is about $2,000 for the entire system of performance venues in the city. A trade association representing very large venues estimated annual maintenance and upkeep expenses, including labor and replacement parts, to be at most about $25,000 for a very large professional sports stadium.

One commenter suggested that the scoping requirements for ALS in the 2004 ADAAG were too stringent and that the Department should return them to the Access Board for further review and consideration. Others commented that the requirement for new ALS systems should mandate multichannel receivers capable of receiving audio description for persons who are blind, in addition to a channel for amplification for persons who are hard of hearing. Some comments suggested that the Department should require a set schedule and protocol of mandatory maintenance. Department regulations already require maintenance of accessible features at § 35.133(a) of the title II regulation, which obligates a title II entity

to maintain ALS in good working order. The Department recognizes that maintenance of ALS is key to its usability. Necessary maintenance will vary dramatically from venue to venue based upon a variety of factors including frequency of use, number of units, quality of equipment, and others items. Accordingly, the Department has determined that it is not appropriate to mandate details of maintenance, but notes that failure to maintain ALS would violate § 35.133(a) of this rule.

The NPRM asked whether the Department should return the issue of ALS requirements to the Access Board. The Department has received substantial feedback on the technical and scoping requirements for ALS and is convinced that these requirements are reasonable and that the benefits justify the requirements. In addition, the Department believes that the new specifications will make ALS work more effectively for more persons with disabilities, which, together with a growing population of new users, will increase demand for ALS, thus mooting criticism from some large venue operators about insufficient demand. Thus, the Department has determined that it is unnecessary to refer this issue back to the Access Board for reconsideration.

Accessible teeing grounds, putting greens, and weather shelters. In the NPRM, the Department sought public input on the proposed requirements for accessible golf courses. These requirements specifically relate to accessible routes within the boundaries of courses, as well as the accessibility of golfing elements (*e.g.*, teeing grounds, putting greens, weather shelters).

In the NPRM, the Department sought information from the owners and operators of golf courses, both public and private, on the extent to which their courses already have golf car passages, and, if so, whether they intended to avail themselves of the proposed accessible route exception for golf car passages. 73 FR 34466, 34471 (June 17, 2008).

Most commenters expressed support for the adoption of an accessible route requirement that includes an exception permitting golf car passage as all or part of an accessible route. Comments in favor of the proposed standard came from golf course owners and operators, individuals, organizations, and disability rights groups, while comments opposing adoption of the golf course requirements generally came from golf courses and organizations representing the golf course industry.

The majority of commenters expressed the general viewpoint that nearly all golf courses provide golf cars and have either well-defined paths or permit golf cars to drive on the course where paths are not present, thus meeting the accessible route requirement. Several commenters disagreed with the assumption in the initial RIA, that virtually every tee and putting green on an existing course would need to be regraded in order to provide compliant accessible routes. According to one commenter, many golf courses are relatively flat with little slope, especially those heavily used by recreational golfers. This commenter concurred with the Department that it is likely that most existing golf courses have a golf car passage to tees and greens, thereby substantially minimizing the cost of bringing an existing golf course into compliance with the proposed standards. One commenter reported that golf course access audits found that the vast majority of public golf courses would have little difficulty in meeting the proposed golf course requirements. In the view of some commenters, providing access to golf courses would increase golf participation by individuals with disabilities.

The Department also received many comments requesting clarification of the term ''golf car passage.'' For example, one commenter requesting clarification of the term ''golf car passage'' argued that golf courses typically do not provide golf car paths or pedestrian paths onto the actual teeing grounds or greens, many of which are higher or lower than the car path. This commenter argued that if golf car passages were required to extend

onto teeing grounds and greens in order to qualify for an exception, then some golf courses would have to substantially regrade teeing grounds and greens at a high cost.

After careful consideration of the comments, the Department has decided to adopt the 2010 Standards specific to golf facilities. The Department believes that in order for individuals with mobility disabilities to have an opportunity to play golf that is equal to golfers without disabilities, it is essential that golf courses provide an accessible route or accessible golf car passage to connect accessible elements and spaces within the boundary of the golf course, including teeing grounds, putting greens, and weather shelters.

Public Comments on Other NPRM Issues

Equipment and furniture. In the 1991 title II regulation, there are no specific provisions addressing equipment and furniture, although § 35.150(b) states that one means by which a public entity can make its program accessible to individuals with disabilities is ''redesign of equipment.'' In the NPRM, the Department announced its intention not to regulate equipment, proposing instead to continue with the current approach, under which equipment and furniture are covered by other provisions, including those requiring reasonable modifications of policies, practices, or procedures, program accessibility, and effective communication. The Department suggested that entities apply the accessibility standards for fixed equipment in the 2004 ADAAG to analogous free-standing equipment in order to ensure that such equipment is accessible, and that entities consult relevant portions of the 2004 ADAAG and standards from other Federal agencies to make equipment accessible to individuals who are blind or have low vision (*e.g.*, the communication-related standards for ATMs in the 2004 ADAAG).

The Department received numerous comments objecting to this decision and urging the Department to issue equipment and furniture regulations. Based on these comments, the Department has decided that it needs to revisit the issuance of equipment and furniture regulations and it intends to do so in future rulemaking.

Among the commenters' key concerns, many from the disability community and some public entities, were objections to the Department's earlier decision not to issue equipment regulations, especially for medical equipment. These groups recommended that the Department list by name certain types of medical equipment that must be accessible, including exam tables (that lower to 15 inches above floor or lower), scales, medical and dental chairs, and radiologic equipment (including mammography equipment). These commenters emphasized that the provision of medically related equipment and furniture should also be specifically regulated since they are not included in the 2004 ADAAG (while depositories, change machines, fuel dispensers, and ATMs were) and because of their crucial role in the provision of healthcare. Commenters described how the lack of accessible medical equipment negatively affects the health of individuals with disabilities. For example, some individuals with mobility disabilities do not get thorough medical care because their health providers do not have accessible examination tables or scales.

Commenters also said that the Department's stated plan to assess the financial impact of free-standing equipment on businesses was not necessary, as any regulations could include a financial balancing test. Other commenters representing persons who are blind or have low vision urged the Department to mandate accessibility for a wide range of equipment—including household appliances (stoves, washers, microwaves, and coffee makers), audiovisual equipment (stereos and DVD players), exercise machines, vending equipment, ATMs, computers at Internet cafes or hotel business centers, reservations kiosks at hotels, and point-of-sale

devices— through speech output and tactile labels and controls. They argued that modern technology allows such equipment to be made accessible at minimal cost. According to these commenters, the lack of such accessibility in point-of-sale devices is particularly problematic because it forces blind individuals to provide personal or sensitive information (such as personal identification numbers) to third parties, which exposes them to identity fraud. Because the ADA does not apply directly to the manufacture of products, the Department lacks the authority to issue design requirements for equipment designed exclusively for use in private homes. *See* Department of Justice, Americans with Disabilities Act, *ADA Title III Technical Assistance Manual Covering Public Accommodations and Commercial Facilities,* III–4.4200, available at *http://www.ada.gov/ taman3*.

Some commenters urged the Department to require swimming pool operators to provide aquatic wheelchairs for the use of persons with disabilities when the swimming pool has a sloped entry. If there is a sloped entry, a person who uses a wheelchair would require a wheelchair designed for use in the water in order to gain access to the pool because taking a personal wheelchair into water would rust and corrode the metal on the chair and damage any electrical components of a power wheelchair. Providing an aquatic wheelchair made of non-corrosive materials and designed for access into the water will protect the water from contamination and avoid damage to personal wheelchairs or other mobility aids.

Additionally, many commenters urged the Department to regulate the height of beds in accessible hotel guest rooms and to ensure that such beds have clearance at the floor to accommodate a mechanical lift. These commenters noted that in recent years, hotel beds have become higher as hotels use thicker mattresses, thereby making it difficult or impossible for many individuals who use wheelchairs to transfer onto hotel beds. In addition, many hotel beds use a solid-sided platform base with no clearance at the floor, which prevents the use of a portable lift to transfer an individual onto the bed. Consequently, individuals who bring their own lift to transfer onto the bed cannot independently get themselves onto the bed. Some commenters suggested various design options that might avoid these situations.

The Department intends to provide specific guidance relating to both hotel beds and aquatic wheelchairs in a future rulemaking. For the present, the Department reminds covered entities that they have an obligation to undertake reasonable modifications to their current policies and to make their programs accessible to persons with disabilities. In many cases, providing aquatic wheelchairs or adjusting hotel bed heights may be necessary to comply with those requirements.

The Department has decided not to add specific scoping or technical requirements for equipment and furniture in this final rule. Other provisions of the regulation, including those requiring reasonable modifications of policies, practices, or procedures, program accessibility, and effective communication may require the provision of accessible equipment in individual circumstances. The 1991 title II regulation at § 35.150(a) requires that entities operate each service, program, or activity so that, when viewed in its entirety, each is readily accessible to, and usable by, individuals with disabilities, subject to a defense of fundamental alteration or undue financial and administrative burdens. Section 35.150(b) specifies that such entities may meet their program accessibility obligation through the ''redesign of equipment.'' The Department expects to undertake a rulemaking to address these issues in the near future.

Accessible golf cars. An accessible golf car means a device that is designed and manufactured to be driven on all areas of a golf course, is independently usable by individuals with mobility disabilities, has a hand-operated brake and accelerator, carries golf clubs in an accessible

location, and has a seat that both swivels and raises to put the golfer in a standing or semi-standing position.

The 1991 title II regulation contained no language specifically referencing accessible golf cars. After considering the comments addressing the ANPRM's proposed requirement that golf courses make at least one specialized golf car available for the use of individuals with disabilities, and the safety of accessible golf cars and their use on golf course greens, the Department stated in the NPRM that it would not issue regulations specific to golf cars.

The Department received many comments in response to its decision to propose no new regulation specific to accessible golf cars. The majority of commenters urged the Department to require golf courses to provide accessible golf cars. These comments came from individuals, disability advocacy and recreation groups, a manufacturer of accessible golf cars, and representatives of local government. Comments supporting the Department's decision not to propose a new regulation came from golf course owners, associations, and individuals.

Many commenters argued that while the existing title II regulation covered the issue, the Department should nonetheless adopt specific regulatory language requiring golf courses to provide accessible golf cars. Some commenters noted that many local governments and park authorities that operate public golf courses have already provided accessible golf cars. Experience indicates that such golf cars may be used without damaging courses. Some argued that having accessible golf cars would increase golf course revenue by enabling more golfers with disabilities to play the game. Several commenters requested that the Department adopt a regulation specifically requiring each golf course to provide one or more accessible golf cars. Other commenters recommended allowing golf courses to make ''pooling'' arrangements to meet demands for such cars. A few commenters expressed support for using accessible golf cars to accommodate golfers with and without disabilities. Commenters also pointed out that the Departments of the Interior and Defense have already mandated that golf courses under their jurisdictional control must make accessible golf cars available unless it can be demonstrated that doing so would change the fundamental nature of the game.

While an industry association argued that at least two models of accessible golf cars meet the specifications recognized in the field, and that accessible golf cars cause no more damage to greens or other parts of golf courses than players standing or walking across the course, other commenters expressed concerns about the potential for damage associated with the use of accessible golf cars. Citing safety concerns, golf organizations recommended that an industry safety standard be developed.

Although the Department declines to add specific scoping or technical requirements for golf cars to this final rule, the Department expects to address requirements for accessible golf cars in future rulemaking. In the meantime, the Department believes that golfers with disabilities who need accessible golf cars are protected by other existing provisions in the title II regulation, including those requiring reasonable modifications of policies, practices, or procedures, and program accessibility.

Web site accessibility. Many commenters expressed disappointment that the NPRM did not require title II entities to make their Web sites, through which they offer programs and services, accessible to individuals with disabilities, including those who are blind or have low vision. Commenters argued that the cost of making Web sites accessible, through Web site design, is minimal, yet critical to enabling individuals with disabilities to benefit from the entity's programs and services. Internet Web sites, when accessible, provide individuals with disabilities great independence, and have become an essential tool for many Americans. Commenters recommended

that the Department require covered entities, at a minimum, to meet the section 508 Standard for Electronic and Information Technology for Internet accessibility. Under section 508 of the Rehabilitation Act of 1973, Federal agencies are required to make their Web sites accessible. 29 U.S.C. 794(d); 36 CFR 1194.

The Department agrees that the ability to access, on an equal basis, the programs and activities offered by public entities through Internet-based Web sites is of great importance to individuals with disabilities, particularly those who are blind or who have low vision. When the ADA was enacted in 1990, the Internet was unknown to most Americans. Today, the Internet plays a critical role in daily life for personal, civic, commercial, and business purposes. In a period of shrinking resources, public entities increasingly rely on the web as an efficient and comprehensive way to deliver services and to inform and communicate with their citizens and the general public. In light of the growing importance Web sites play in providing access to public services and to disseminating the information citizens need to participate fully in civic life, accessing the Web sites of public entities can play a significant role in fulfilling the goals of the ADA.

Although the language of the ADA does not explicitly mention the Internet, the Department has taken the position that title II covers Internet Web site access. Public entities that choose to provide services through web-based applications (*e.g.*, renewing library books or driver's licenses) or that communicate with their constituents or provide information through the Internet must ensure that individuals with disabilities have equal access to such services or information, unless doing so would result in an undue financial and administrative burden or a fundamental alteration in the nature of the programs, services, or activities being offered. The Department has issued guidance on the ADA as applied to the Web sites of public entities in a 2003 publication entitled, *Accessibility of State and Local Government Web sites to People with Disabilities*, (June 2003) available at *http:// www.ada.gov/websites2.htm*. As the Department stated in that publication, an agency with an inaccessible Web site may also meet its legal obligations by providing an alternative accessible way for citizens to use the programs or services, such as a staffed telephone information line. However, such an alternative must provide an equal degree of access in terms of hours of operation and the range of options and programs available. For example, if job announcements and application forms are posted on an inaccessible Web site that is available 24 hours a day, seven days a week to individuals without disabilities, then the alternative accessible method must also be available 24 hours a day, 7 days a week. Additional guidance is available in the Web Content Accessibility Guidelines (WCAG), (May 5, 1999) available at *http:// www.w3.org/ TR/WAI–WEBCONTENT* (last visited June 24, 2010) which are developed and maintained by the Web Accessibility Initiative, a subgroup of the World Wide Web Consortium (W3C®).

The Department expects to engage in rulemaking relating to website accessibility under the ADA in the near future. The Department has enforced the ADA in the area of website accessibility on a case-by-case basis under existing rules consistent with the guidance noted above, and will continue to do so until the issue is addressed in a final regulation.

Multiple chemical sensitivities. The Department received comments from a number of individuals asking the Department to add specific language to the final rule addressing the needs of individuals with chemical sensitivities. These commenters expressed concern that the presence of chemicals interferes with their ability to participate in a wide range of activities. These commenters also urged the Department to add multiple chemical sensitivities to the definition of a disability.

The Department has determined not to include

specific provisions addressing multiple chemical sensitivities in the final rule. In order to be viewed as a disability under the ADA, an impairment must substantially limit one or more major life activities. An individual's major life activities of respiratory or neurological functioning may be substantially limited by allergies or sensitivity to a degree that he or she is a person with a disability. When a person has this type of disability, a covered entity may have to make reasonable modifications in its policies and practices for that person. However, this determination is an individual assessment and must be made on a case-by-case basis.

Examinations and Courses. The Department received one comment requesting that it specifically include language regarding examinations and courses in the title II regulation. Because section 309 of the ADA 42 U.S.C. 12189, reaches ''[a]ny person that offers examinations or courses related to applications, licensing, certification, or credentialing for secondary or post secondary education, professional, or trade purposes,'' public entities also are covered by this section of the ADA. Indeed, the requirements contained in title II (including the general prohibitions against discrimination, the program access requirements, the reasonable modifications requirements, and the communications requirements) apply to courses and examinations administered by public entities that meet the requirements of section 309. While the Department considers these requirements to be sufficient to ensure that examinations and courses administered by public entities meet the section 309 requirements, the Department acknowledges that the title III regulation, because it addresses examinations in some detail, is useful as a guide for determining what constitutes discriminatory conduct by a public entity in testing situations. *See* 28 CFR 36.309.

Hotel Reservations. In the NPRM, at § 36.302(e), the Department proposed adding specific language to title III addressing the requirements that hotels, timeshare resorts, and other places of lodging make reasonable modifications to their policies, practices, or procedures, when necessary to ensure that individuals with disabilities are able to reserve accessible hotel rooms with the same efficiency, immediacy, and convenience as those who do not need accessible guest rooms. The NPRM did not propose adding comparable language to the title II regulation as the Department believes that the general nondiscrimination, program access, effective communication, and reasonable modifications requirements of title II provide sufficient guidance to public entities that operate places of lodging (*i.e.*, lodges in State parks, hotels on public college campuses). The Department received no public comments suggesting that it add language on hotel reservations comparable to that proposed for the title III regulation. Although the Department continues to believe that it is unnecessary to add specific language to the title II regulation on this issue, the Department acknowledges that the title III regulation, because it addresses hotel reservations in some detail, is useful as a guide for determining what constitutes discriminatory conduct by a public entity that operates a reservation system serving a place of lodging. *See* 28 CFR 36.302(e).

•18. Revise the heading to Appendix B to read as follows:

Appendix B to Part 35—Guidance on ADA Regulation on Nondiscrimination on the Basis of Disability in State and Local Government Services Originally Published July 26, 1991

Dated: July 23, 2010.
Eric H. Holder, Jr., Attorney General.

Title II Regulations

1991 Section-by-Section Analysis

Department of Justice

Appendix B to the title II rule incorporates the guidance, i.e., the 1991 Section-by-Section Analysis, to the title II rule published July 26, 1991. The 1991 analysis remains relevant to the extent it is not contradicted by the amendments to the rules or it provides guidance on provisions of the rules unchanged by the revised 2010 ADA regulations.

APPENDIX B TO PART 35 — GUIDANCE ON ADA REGULATION ON NONDISCRIMINATION ON THE BASIS OF DISABILITY IN STATE AND LOCAL GOVERNMENT SERVICES ORIGINALLY PUBLISHED JULY 26, 1991

SECTION-BY-SECTION ANALYSIS

Subpart A—General

Section 35.101 Purpose

Section 35.101 states the purpose of the rule, which is to effectuate subtitle A of title II of the Americans with Disabilities Act of 1990 (the Act), which prohibits discrimination on the basis of disability by public entities. This part does not, however, apply to matters within the scope of the authority of the Secretary of Transportation under subtitle B of title II of the Act.

Section 35.102 Application

This provision specifies that, except as provided in paragraph (b), the regulation applies to all services, programs, and activities provided or made available by public entities, as that term is defined in §35.104. Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794), which prohibits discrimination on the basis of handicap in federally assisted programs and activities, already covers those programs and activities of public entities that receive Federal financial assistance. Title II of the ADA extends this prohibition of discrimination to include all services, programs, and activities provided or made available by State and local governments or any of their instrumentalities or agencies, regardless of the receipt of Federal financial assistance. Except as provided in §35.134, this part does not apply to private entities.

The scope of title II's coverage of public entities is comparable to the coverage of Federal Executive agencies under the 1978 amendment to section 504, which extended section 504's application to all programs and activities ''conducted by'' Federal Executive agencies, in that title II applies to anything a public entity does. Title II coverage, however, is not limited to ''Executive'' agencies, but includes activities of the legislative and judicial branches of State and local governments. All governmental activities of public

entities are covered, even if they are carried out by contractors. For example, a State is obligated by title II to ensure that the services, programs, and activities of a State park inn operated under contract by a private entity are in compliance with title II's requirements. The private entity operating the inn would also be subject to the obligations of public accommodations under title III of the Act and the Department's title III regulations at 28 CFR part 36.

Aside from employment, which is also covered by title I of the Act, there are two major categories of programs or activities covered by this regulation: those involving general public contact as part of ongoing operations of the entity and those directly administered by the entities for program beneficiaries and participants. Activities in the first category include communication with the public (telephone contacts, office walk-ins, or interviews) and the public's use of the entity's facilities. Activities in the second category include programs that provide State or local government services or benefits.

Paragraph (b) of §35.102 explains that to the extent that the public transportation services, programs, and activities of public entities are covered by subtitle B of title II of the Act, they are subject to the regulation of the Department of Transportation (DOT) at 49 CFR part 37, and are not covered by this part. The Department of Transportation's ADA regulation establishes specific requirements for construction of transportation facilities and acquisition of vehicles. Matters not covered by subtitle B, such as the provision of auxiliary aids, are covered by this rule. For example, activities that are covered by the Department of Transportation's regulation implementing subtitle B are not required to be included in the self-evaluation required by §35.105. In addition, activities not specifically addressed by DOT's ADA regulation may be covered by DOT's regulation implementing section 504 for its federally assisted programs and activities at 49 CFR part 27. Like other programs of public entities that are also recipients of Federal financial assistance, those programs would be covered by both the section 504 regulation and this part. Although airports operated by public entities are not subject to DOT's ADA regulation, they are subject to subpart A of title II and to this rule.

Some commenters asked for clarification about the responsibilities of public school systems under section 504 and the ADA with respect to programs, services, and activities that are not covered by the Individuals with Disabilities Education Act (IDEA), including, for example, programs open to parents or to the public, graduation ceremonies, parent-teacher organization meetings, plays and other events open to the public, and adult education classes. Public school systems must comply with the ADA in all of their services, programs, or activities, including those that are open to parents or to the public. For instance, public school systems must provide program accessibility to parents and guardians with disabilities to these programs, activities, or services, and appropriate auxiliary aids and services whenever necessary to ensure effective communication, as long as the provision of the auxiliary aids results neither in an undue burden or in a fundamental alteration of the program.

Section 35.103 Relationship to Other Laws

Section 35.103 is derived from sections 501 (a) and (b) of the ADA. Paragraph (a) of this section provides that, except as otherwise specifically provided by this part, title II of the ADA is not intended to apply lesser standards than are required under title V of the Rehabilitation Act of 1973, as amended (29 U.S.C. 790–94), or the regulations implementing that title. The standards of title V of the Rehabilitation Act apply for purposes of the ADA to the extent that the ADA has not explicitly adopted a different standard than title V. Because title II of the ADA essentially extends the antidiscrimination prohibition embodied in section 504 to all actions of State and local governments, the standards adopted in this part are generally the same as those required under section 504 for federally assisted programs. Title II, however, also incorporates those provisions of titles I and III of the ADA that are not inconsistent with the regulations implementing section 504. Judiciary Committee report, H.R. Rep. No. 485, 101st Cong., 2d Sess., pt. 3, at 51 (1990) (hereinafter ''Judiciary report'') ; Education and Labor Committee report, H.R. Rep. No. 485, 101st Cong., 2d Sess., pt. 2, at 84 (1990) (hereinafter ''Education and Labor report''). Therefore, this part also includes appropriate provisions derived from the regulations implementing those titles. The inclusion of specific language in this part, however, should not be interpreted as an indication that a requirement is not included under a regulation implementing section 504.

Paragraph (b) makes clear that Congress did not intend to displace any of the rights or remedies provided by other Federal laws (including section 504) or other State laws (including State common law) that provide greater or equal protection to individuals with disabilities. As discussed above, the standards adopted by title II of the ADA for State and local government services are generally the same as those required under section 504 for federally assisted programs and activities. Subpart F of the regulation establishes compliance procedures for processing complaints covered by both this part and section 504.

With respect to State law, a plaintiff may choose to pursue claims under a State law that does not confer greater substantive rights, or even confers fewer substantive rights, if the alleged violation is protected under the alternative law and the remedies are greater. For example, a person with a physical disability could seek damages under a State law that allows compensatory and punitive damages for discrimination on the basis of physical disability, but not on the basis of mental disability. In that situation, the State law would provide narrower coverage, by excluding mental disabilities, but broader remedies, and an individual covered by both laws could choose to bring an action under both laws. Moreover, State tort claims confer greater remedies and are not preempted by the ADA. A plaintiff may join a State tort claim to a case brought under the ADA. In such a case, the plaintiff must, of course, prove all the elements of the State tort claim in order to prevail under that cause of action.

Section 35.104 Definitions

''Act.'' The word ''Act'' is used in this part to refer to the Americans with Disabilities Act of 1990, Public Law 101–336, which is also referred to as the ''ADA.''

''Assistant Attorney General.'' The term ''Assistant Attorney General'' refers to the Assistant Attorney General of the Civil Rights Division of the Department of Justice.

''Auxiliary aids and services.'' Auxiliary aids and services include a wide range of services and devices for ensuring effective communication. The proposed definition in §35.104 provided a list of examples of auxiliary aids and services that were taken from the definition of auxiliary aids and services in section 3(1) of the ADA and were supplemented by examples from regulations implementing section 504 in federally conducted programs (see 28 CFR 39.103).

A substantial number of commenters suggested that additional examples be added to this list. The Department has added several items to this list but wishes to clarify that the list is not an all-inclusive or exhaustive catalogue of possible or available auxiliary aids or services. It is not possible to provide an exhaustive list, and an attempt to do so would omit the new devices that will become available with emerging technology.

Subparagraph (1) lists several examples, which would be considered auxiliary aids and services to make aurally delivered materials available to individuals with hearing impairments. The Department has changed the phrase used in the proposed rules, ''orally delivered materials,'' to the statutory phrase, ''aurally delivered materials,'' to track section 3 of the ADA and to include non-verbal sounds and alarms, and computer generated speech.

The Department has added videotext displays, transcription services, and closed and open captioning to the list of examples. Videotext displays have become an important means of accessing auditory communications through a public address system. Transcription services are used to relay aurally delivered material almost simultaneously in written form to persons who are deaf or hearing-impaired. This technology is often used at conferences, conventions, and hearings. While the proposed rule expressly included television decoder equipment as an auxiliary aid or service, it did not mention captioning itself. The final rule rectifies this omission by mentioning both closed and open captioning.

Several persons and organizations requested that the Department replace the term ''telecommunications devices for deaf persons'' or ''TDD's'' with the term ''text telephone.'' The Department has declined to do so. The Department is aware that the Architectural and Transportation Barriers Compliance Board (ATBCB) has used the phrase ''text telephone'' in lieu of the statutory term ''TDD'' in its final accessibility guidelines. Title IV of the ADA, however, uses the term ''Telecommunications Device for the Deaf'' and the Department believes it would be inappropriate to abandon this statutory term at this time.

Several commenters urged the Department to include in the definition of ''auxiliary aids and services'' devices that are now available or that may become available with emerging technology. The Department declines to do so in the rule. The Department, however, emphasizes that, although the definition would include ''state of the art'' devices, public entities are not required to use the newest or most advanced technologies as long as the auxiliary aid or service that is selected affords effective communication.

Subparagraph (2) lists examples of aids and services for making visually delivered materials accessible to persons with visual impairments. Many commenters proposed additional examples, such as signage or mapping, audio description services, secondary auditory programs, telebraillers, and reading machines. While the Department declines to add these items to the list, they are auxiliary aids and services and may be appropriate depending on the circumstances.

Subparagraph (3) refers to acquisition or modification of equipment or devices. Several commenters suggested the addition of current technological innovations in microelectronics and computerized control systems (e.g., voice recognition systems, automatic dialing telephones, and infrared elevator and light control systems) to the list of auxiliary aids. The Department interprets auxiliary aids and services as those aids and

services designed to provide effective communications, i.e., making aurally and visually delivered information available to persons with hearing, speech, and vision impairments. Methods of making services, programs, or activities accessible to, or usable by, individuals with mobility or manual dexterity impairments are addressed by other sections of this part, including the provision for modifications in policies, practices, or procedures (§35.130 (b)(7)).

Paragraph (b)(4) deals with other similar services and actions. Several commenters asked for clarification that ''similar services and actions'' include retrieving items from shelves, assistance in reaching a marginally accessible seat, pushing a barrier aside in order to provide an accessible route, or assistance in removing a sweater or coat. While retrieving an item from a shelf might be an ''auxiliary aid or service'' for a blind person who could not locate the item without assistance, it might be a method of providing program access for a person using a wheelchair who could not reach the shelf, or a reasonable modification to a self-service policy for an individual who lacked the ability to grasp the item. As explained above, auxiliary aids and services are those aids and services required to provide effective communications. Other forms of assistance are more appropriately addressed by other provisions of the final rule.

''Complete complaint.'' ''Complete complaint'' is defined to include all the information necessary to enable the Federal agency designated under subpart G as responsible for investigation of a complaint to initiate its investigation.

''Current illegal use of drugs.'' The phrase ''current illegal use of drugs'' is used in §35.131. Its meaning is discussed in the preamble for that section.

''Designated agency.'' The term ''designated agency'' is used to refer to the Federal agency designated under subpart G of this rule as responsible for carrying out the administrative enforcement responsibilities established by subpart F of the rule.

''Disability.'' The definition of the term ''disability'' is the same as the definition in the title III regulation codified at 28 CFR part 36. It is comparable to the definition of the term ''individual with handicaps'' in section 7(8) of the Rehabilitation Act and section 802(h) of the Fair Housing Act. The Education and Labor Committee report makes clear that the analysis of the term ''individual with handicaps'' by the Department of Health, Education, and Welfare (HEW) in its regulations implementing section 504 (42 FR 22685 (May 4, 1977)) and the analysis by the Department of Housing and Urban Development in its regulation implementing the Fair Housing Amendments Act of 1988 (54 FR 3232 (Jan. 23, 1989)) should also apply fully to the term ''disability'' (Education and Labor report at 50).

The use of the term ''disability'' instead of ''handicap'' and the term ''individual with a disability'' instead of ''individual with handicaps'' represents an effort by Congress to make use of up-to-date, currently accepted terminology. As with racial and ethnic epithets, the choice of terms to apply to a person with a disability is overlaid with stereotypes, patronizing attitudes, and other emotional connotations. Many individuals with disabilities, and organizations representing such individuals, object to the use of such terms as ''handicapped person'' or ''the handicapped.'' In other recent legislation, Congress also recognized this shift in terminology, e.g., by changing the name of the National Council on the Handicapped to the National Council on Disability (Pub. L. 100–630).

In enacting the Americans with Disabilities Act, Congress concluded that it was important for the current legislation to use terminology most in line with the sensibilities of most Americans with disabilities. No change in definition or substance is intended nor should one be attributed to this change in phraseology.

The term ''disability'' means, with respect to an individual—

(A) A physical or mental impairment that substantially limits one or more of the major life activities of such individual;

(B) A record of such an impairment; or

(C) Being regarded as having such an impairment. If an individual meets any one of these three tests, he or she is considered to be an individual with a disability for purposes of coverage under the Americans with Disabilities Act.

Congress adopted this same basic definition of ''disability,'' first used in the Rehabilitation Act of 1973 and in the Fair Housing Amendments Act of 1988, for a number of reasons. First, it has worked well since it was adopted in 1974. Second, it would not be possible to guarantee comprehensiveness by providing a list of specific disabilities, especially because new disorders may be recognized in the future, as they have since the definition was first established in 1974.

TEST A—A PHYSICAL OR MENTAL IMPAIRMENT THAT SUBSTANTIALLY LIMITS ONE OR MORE OF THE MAJOR LIFE ACTIVITIES OF SUCH INDIVIDUAL

Physical or mental impairment. Under the first test, an individual must have a physical or mental impairment. As explained in paragraph (1)(i) of the definition, ''impairment'' means any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological; musculoskeletal; special sense organs (which would

include speech organs that are not respiratory such as vocal cords, soft palate, tongue, etc.); respiratory, including speech organs; cardiovascular; reproductive; digestive; genitourinary; hemic and lymphatic; skin; and endocrine. It also means any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities. This list closely tracks the one used in the regulations for section 504 of the Rehabilitation Act of 1973 (see, *e.g.*, 45 CFR 84.3(j)(2)(i)).

Many commenters asked that ''traumatic brain injury'' be added to the list in paragraph (1)(i). Traumatic brain injury is already included because it is a physiological condition affecting one of the listed body systems, i.e., ''neurological.'' Therefore, it was unnecessary to add the term to the regulation, which only provides representative examples of physiological disorders.

It is not possible to include a list of all the specific conditions, contagious and noncontagious diseases, or infections that would constitute physical or mental impairments because of the difficulty of ensuring the comprehensiveness of such a list, particularly in light of the fact that other conditions or disorders may be identified in the future. However, the list of examples in paragraph (1)(ii) of the definition includes: orthopedic, visual, speech and hearing impairments, cerebral palsy, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, emotional illness, specific learning disabilities, HIV disease (symptomatic or asymptomatic), tuberculosis, drug addiction, and alcoholism. The phrase ''symptomatic or asymptomatic'' was inserted in the final rule after ''HIV disease'' in response to commenters who suggested the clarification was necessary.

The examples of ''physical or mental impairments'' in paragraph (1)(ii) are the same as those contained in many section 504 regulations, except for the addition of the phrase ''contagious and noncontagious'' to describe the types of diseases and conditions included, and the addition of ''HIV disease (symptomatic or asymptomatic)'' and ''tuberculosis'' to the list of examples. These additions are based on the committee reports, caselaw, and official legal opinions interpreting section 504. In *School Board of Nassau County* v. *Arline,* 480 U.S. 273 (1987), a case involving an individual with tuberculosis, the Supreme Court held that people with contagious diseases are entitled to the protections afforded by section 504. Following the *Arline* decision, this Department's Office of Legal Counsel issued a legal opinion that concluded that symptomatic HIV disease is an impairment that substantially limits a major life activity; therefore it has been included in the definition of disability under this part. The opinion also concluded that asymptomatic HIV disease is an impairment that substantially limits a major life activity, either because of its actual effect on the individual with HIV disease or because the reactions of other people to individuals with HIV disease cause such individuals to be treated as though they are disabled. See Memorandum from Douglas W. Kmiec, Acting Assistant Attorney General, Office of Legal Counsel, Department of Justice, to Arthur B. Culvahouse, Jr., Counsel to the President (Sept. 27, 1988), reprinted in Hearings on S. 933, the Americans with Disabilities Act, Before the Subcomm. on the Handicapped of the Senate Comm. on Labor and Human Resources, 101st. Cong., 1st Sess. 346 (1989).

Paragraph (1)(iii) states that the phrase ''physical or mental impairment'' does not include homosexuality or bisexuality. These conditions were never considered impairments under other Federal disability laws. Section 511(a) of the statute makes clear that they are likewise not to be considered impairments under the Americans with Disabilities Act.

Physical or mental impairment does not include simple physical characteristics, such as blue eyes or black hair. Nor does it include environmental, cultural, economic, or other disadvantages, such as having a prison record, or being poor. Nor is age a disability. Similarly, the definition does not include common personality traits such as poor judgment or a quick temper where these are not symptoms of a mental or psychological disorder. However, a person who has these characteristics and also has a physical or mental impairment may be considered as having a disability for purposes of the Americans with Disabilities Act based on the impairment.

Substantial Limitation of a Major Life Activity. Under Test A, the impairment must be one that ''substantially limits a major life activity.'' Major life activities include such things as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working.

For example, a person who is paraplegic is substantially limited in the major life activity of walking, a person who is blind is substantially limited in the major life activity of seeing, and a person who is mentally retarded is substantially limited in the major life activity of learning. A person with traumatic brain injury is substantially limited in the major life activities of caring for one's self, learning, and working because of memory deficit, confusion, contextual difficulties, and inability to reason appropriately.

A person is considered an individual with a disability for purposes of Test A, the first prong of the definition, when the individual's important life activities are restricted as to the conditions, manner, or duration under

which they can be performed in comparison to most people. A person with a minor, trivial impairment, such as a simple infected finger, is not impaired in a major life activity. A person who can walk for 10 miles continuously is not substantially limited in walking merely because, on the eleventh mile, he or she begins to experience pain, because most people would not be able to walk eleven miles without experiencing some discomfort.

The Department received many comments on the proposed rule's inclusion of the word ''temporary'' in the definition of ''disability.'' The preamble indicated that impairments are not necessarily excluded from the definition of ''disability'' simply because they are temporary, but that the duration, or expected duration, of an impairment is one factor that may properly be considered in determining whether the impairment substantially limits a major life activity. The preamble recognized, however, that temporary impairments, such as a broken leg, are not commonly regarded as disabilities, and only in rare circumstances would the degree of the limitation and its expected duration be substantial. Nevertheless, many commenters objected to inclusion of the word ''temporary'' both because it is not in the statute and because it is not contained in the definition of ''disability'' set forth in the title I regulations of the Equal Employment Opportunity Commission (EEOC). The word ''temporary'' has been deleted from the final rule to conform with the statutory language.

The question of whether a temporary impairment is a disability must be resolved on a case-by-case basis, taking into consideration both the duration (or expected duration) of the impairment and the extent to which it actually limits a major life activity of the affected individual.

The question of whether a person has a disability should be assessed without regard to the availability of mitigating measures, such as reasonable modification or auxiliary aids and services. For example, a person with hearing loss is substantially limited in the major life activity of hearing, even though the loss may be improved through the use of a hearing aid. Likewise, persons with impairments, such as epilepsy or diabetes, that substantially limit a major life activity, are covered under the first prong of the definition of disability, even if the effects of the impairment are controlled by medication.

Many commenters asked that environmental illness (also known as multiple chemical sensitivity) as well as allergy to cigarette smoke be recognized as disabilities. The Department, however, declines to state categorically that these types of allergies or sensitivities are disabilities, because the determination as to whether an impairment is a disability depends on whether, given the particular circumstances at issue, the impairment substantially limits one or more major life activities (or has a history of, or is regarded as having such an effect).

Sometimes respiratory or neurological functioning is so severely affected that an individual will satisfy the requirements to be considered disabled under the regulation. Such an individual would be entitled to all of the protections afforded by the Act and this part. In other cases, individuals may be sensitive to environmental elements or to smoke but their sensitivity will not rise to the level needed to constitute a disability. For example, their major life activity of breathing may be somewhat, but not substantially, impaired. In such circumstances, the individuals are not disabled and are not entitled to the protections of the statute despite their sensitivity to environmental agents.

In sum, the determination as to whether allergies to cigarette smoke, or allergies or sensitivities characterized by the commenters as environmental illness are disabilities covered by the regulation must be made using the same case-by-case analysis that is applied to all other physical or mental impairments. Moreover, the addition of specific regulatory provisions relating to environmental illness in the final rule would be inappropriate at this time pending future consideration of the issue by the Architectural and Transportation Barriers Compliance Board, the Environmental Protection Agency, and the Occupational Safety and Health Administration of the Department of Labor.

TEST B—A RECORD OF SUCH AN IMPAIRMENT

This test is intended to cover those who have a record of an impairment. As explained in paragraph (3) of the rule's definition of disability, this includes a person who has a history of an impairment that substantially limited a major life activity, such as someone who has recovered from an impairment. It also includes persons who have been misclassified as having an impairment.

This provision is included in the definition in part to protect individuals who have recovered from a physical or mental impairment that previously substantially limited them in a major life activity. Discrimination on the basis of such a past impairment is prohibited. Frequently occurring examples of the first group (those who have a history of an impairment) are persons with histories of mental or emotional illness, heart disease, or cancer; examples of the second group (those who have been misclassified as having an impairment) are persons who have been misclassified as having mental retardation or mental illness.

TEST C—BEING REGARDED AS HAVING SUCH AN IMPAIRMENT

This test, as contained in paragraph (4) of the definition, is intended to cover persons who are treated by a public entity as having a physical or mental impairment that substantially limits a major life activity. It applies when a person is treated as if he or she has an impairment that substantially limits a major life activity, regardless of whether that person has an impairment.

The Americans with Disabilities Act uses the same ''regarded as'' test set forth in the regulations implementing section 504 of the Rehabilitation Act. See, e.g., 28 CFR 42.540(k)(2)(iv), which provides:

(iv) ''Is regarded as having an impairment'' means (A) Has a physical or mental impairment that does not substantially limit major life activities but that is treated by a recipient as constituting such a limitation; (B) Has a physical or mental impairment that substantially limits major life activities only as a result of the attitudes of others toward such impairment; or (C) Has none of the impairments defined in paragraph (k)(2)(i) of this section but is treated by a recipient as having such an impairment.

The perception of the covered entity is a key element of this test. A person who perceives himself or herself to have an impairment, but does not have an impairment, and is not treated as if he or she has an impairment, is not protected under this test.

A person would be covered under this test if a public entity refused to serve the person because it perceived that the person had an impairment that limited his or her enjoyment of the goods or services being offered.

For example, persons with severe burns often encounter discrimination in community activities, resulting in substantial limitation of major life activities. These persons would be covered under this test based on the attitudes of others towards the impairment, even if they did not view themselves as ''impaired.''

The rationale for this third test, as used in the Rehabilitation Act of 1973, was articulated by the Supreme Court in *Arline,* 480 U.S. 273 (1987). The Court noted that although an individual may have an impairment that does not in fact substantially limit a major life activity, the reaction of others may prove just as disabling. ''Such an impairment might not diminish a person's physical or mental capabilities, but could nevertheless substantially limit that person's ability to work as a result of the negative reactions of others to the impairment.'' *Id.* at 283. The Court concluded that, by including this test in the Rehabilitation Act's definition, ''Congress acknowledged that society's accumulated myths and fears about disability and diseases are as handicapping as are the physical limitations that flow from actual impairment.'' *Id.* at 284.

Thus, a person who is denied services or benefits by a public entity because of myths, fears, and stereotypes associated with disabilities would be covered under this third test whether or not the person's physical or mental condition would be considered a disability under the first or second test in the definition.

If a person is refused admittance on the basis of an actual or perceived physical or mental condition, and the public entity can articulate no legitimate reason for the refusal (such as failure to meet eligibility criteria), a perceived concern about admitting persons with disabilities could be inferred and the individual would qualify for coverage under the ''regarded as'' test. A person who is covered because of being regarded as having an impairment is not required to show that the public entity's perception is inaccurate (e.g., that he will be accepted by others) in order to receive benefits from the public entity.

Paragraph (5) of the definition lists certain conditions that are not included within the definition of ''disability.'' The excluded conditions are: Transvestism, transsexualism, pedophilia, exhibitionism, voyeurism, gender identity disorders not resulting from physical impairments, other sexual behavior disorders, compulsive gambling, kleptomania, pyromania, and psychoactive substance use disorders resulting from current illegal use of drugs. Unlike homosexuality and bisexuality, which are not considered impairments under either section 504 or the Americans with Disabilities Act (see the definition of ''disability,'' paragraph (1)(iv)), the conditions listed in paragraph (5), except for transvestism, are not necessarily excluded as impairments under section 504. (Transvestism was excluded from the definition of disability for section 504 by the Fair Housing Amendments Act of 1988, Pub. L. 100–430, section 6(b)).

''Drug.'' The definition of the term ''drug'' is taken from section 510(d)(2) of the ADA.

''Facility.'' ''Facility'' means all or any portion of buildings, structures, sites, complexes, equipment, rolling stock or other conveyances, roads, walks, passageways, parking lots, or other real or personal property, including the site where the building, property, structure, or equipment is located. It includes both indoor and outdoor areas where human-constructed improvements, structures, equipment, or property have been added to the natural environment.

Commenters raised questions about the applicability of this part to activities operated in mobile facilities, such as bookmobiles or mobile health screening units. Such activities would be covered by the requirement for program accessibility in §35.150, and would be included in the definition of ''facility'' as

''other real or personal property,'' although standards for new construction and alterations of such facilities are not yet included in the accessibility standards adopted by §35.151. Sections 35.150 and 35.151 specifically address the obligations of public entities to ensure accessibility by providing curb ramps at pedestrian walkways.

''Historic preservation programs'' and ''Historic properties'' are defined in order to aid in the interpretation of §§35.150 (a)(2) and (b)(2), which relate to accessibility of historic preservation programs, and §35.151(d), which relates to the alteration of historic properties.

''Illegal use of drugs.'' The definition of ''illegal use of drugs'' is taken from section 510(d)(1) of the Act and clarifies that the term includes the illegal use of one or more drugs.

''Individual with a disability'' means a person who has a disability but does not include an individual who is currently illegally using drugs, when the public entity acts on the basis of such use. The phrase ''current illegal use of drugs'' is explained in §35.131.

''Public entity.'' The term ''public entity'' is defined in accordance with section 201(1) of the ADA as any State or local government; any department, agency, special purpose district, or other instrumentality of a State or States or local government; or the National Railroad Passenger Corporation, and any commuter authority (as defined in section 103(8) of the Rail Passenger Service Act).

''Qualified individual with a disability.'' The definition of ''qualified individual with a disability'' is taken from section 201(2) of the Act, which is derived from the definition of ''qualified handicapped person'' in the Department of Health and Human Services' regulation implementing section 504 (45 CFR §84.3(k)). It combines the definition at 45 CFR 84.3(k)(1) for employment (''a handicapped person who, with reasonable accommodation, can perform the essential functions of the job in question'') with the definition for other services at 45 CFR 84.3(k)(4) (''a handicapped person who meets the essential eligibility requirements for the receipt of such services'').

Some commenters requested clarification of the term ''essential eligibility requirements.'' Because of the variety of situations in which an individual's qualifications will be at issue, it is not possible to include more specific criteria in the definition. The ''essential eligibility requirements'' for participation in some activities covered under this part may be minimal. For example, most public entities provide information about their operations as a public service to anyone who requests it. In such situations, the only ''eligibility requirement'' for receipt of such information would be the request for it. Where such information is provided by telephone, even the ability to use a voice telephone is not an ''essential eligibility requirement,'' because §35.161 requires a public entity to provide equally effective telecommunication systems for individuals with impaired hearing or speech.

For other activities, identification of the ''essential eligibility requirements'' may be more complex. Where questions of safety are involved, the principles established in §36.208 of the Department's regulation implementing title III of the ADA, to be codified at 28 CFR, part 36, will be applicable. That section implements section 302(b)(3) of the Act, which provides that a public accommodation is not required to permit an individual to participate in or benefit from the goods, services, facilities, privileges, advantages and accommodations of the public accommodation, if that individual poses a direct threat to the health or safety of others.

A ''direct threat'' is a significant risk to the health or safety of others that cannot be eliminated by a modification of policies, practices, or procedures, or by the provision of auxiliary aids or services. In *School Board of Nassau County* v. *Arline*, 480 U.S. 273 (1987), the Supreme Court recognized that there is a need to balance the interests of people with disabilities against legitimate concerns for public safety. Although persons with disabilities are generally entitled to the protection of this part, a person who poses a significant risk to others will not be ''qualified,'' if reasonable modifications to the public entity's policies, practices, or procedures will not eliminate that risk.

The determination that a person poses a direct threat to the health or safety of others may not be based on generalizations or stereotypes about the effects of a particular disability. It must be based on an individualized assessment, based on reasonable judgment that relies on current medical evidence or on the best available objective evidence, to determine: the nature, duration, and severity of the risk; the probability that the potential injury will actually occur; and whether reasonable modifications of policies, practices, or procedures will mitigate the risk. This is the test established by the Supreme Court in *Arline*. Such an inquiry is essential if the law is to achieve its goal of protecting disabled individuals from discrimination based on prejudice, stereotypes, or unfounded fear, while giving appropriate weight to legitimate concerns, such as the need to avoid exposing others to significant health and safety risks. Making this assessment will not usually require the services of a physician. Sources for medical knowledge include guidance from public health authorities, such as the U.S. Public Health Service, the Centers for Disease Control, and the National Institutes of Health, including the National Institute of Mental Health.

''Qualified interpreter.'' The Department received substantial comment regarding the

lack of a definition of ''qualified interpreter.'' The proposed rule defined auxiliary aids and services to include the statutory term, ''qualified interpreters'' (§35.104), but did not define it. Section 35.160 requires the use of auxiliary aids including qualified interpreters and commenters stated that a lack of guidance on what the term means would create confusion among those trying to secure interpreting services and often result in less than effective communication.

Many commenters were concerned that, without clear guidance on the issue of ''qualified'' interpreter, the rule would be interpreted to mean ''available, rather than qualified'' interpreters. Some claimed that few public entities would understand the difference between a qualified interpreter and a person who simply knows a few signs or how to fingerspell.

In order to clarify what is meant by ''qualified interpreter'' the Department has added a definition of the term to the final rule. A qualified interpreter means an interpreter who is able to interpret effectively, accurately, and impartially both receptively and expressively, using any necessary specialized vocabulary. This definition focuses on the actual ability of the interpreter in a particular interpreting context to facilitate effective communication between the public entity and the individual with disabilities.

Public comment also revealed that public entities have at times asked persons who are deaf to provide family members or friends to interpret. In certain circumstances, notwithstanding that the family member of friend is able to interpret or is a certified interpreter, the family member or friend may not be qualified to render the necessary interpretation because of factors such as emotional or personal involvement or considerations of confidentiality that may adversely affect the ability to interpret''effectively, accurately, and impartially.''

The definition of ''qualified interpreter'' in this rule does not invalidate or limit standards for interpreting services of any State or local law that are equal to or more stringent than those imposed by this definition. For instance, the definition would not supersede any requirement of State law for use of a certified interpreter in court proceedings.

''Section 504.'' The Department added a definition of ''section 504'' because the term is used extensively in subpart F of this part.

''State.'' The definition of ''State'' is identical to the statutory definition in section 3(3) of the ADA.

Section 35.105 Self-evaluation

Section 35.105 establishes a requirement, based on the section 504 regulations for federally assisted and federally conducted programs, that a public entity evaluate its current policies and practices to identify and correct any that are not consistent with the requirements of this part. As noted in the discussion of §35.102, activities covered by the Department of Transportation's regulation implementing subtitle B of title II are not required to be included in the self-evaluation required by this section.

Experience has demonstrated the self-evaluation process to be a valuable means of establishing a working relationship with individuals with disabilities, which has promoted both effective and efficient implementation of section 504. The Department expects that it will likewise be useful to public entities newly covered by the ADA.

All public entities are required to do a self-evaluation. However, only those that employ 50 or more persons are required to maintain the self-evaluation on file and make it available for public inspection for three years. The number 50 was derived from the Department of Justice's section 504 regulations for federally assisted programs, 28 CFR 42.505(c). The Department received comments critical of this limitation, some suggesting the requirement apply to all public entities and others suggesting that the number be changed from 50 to 15. The final rule has not been changed. Although many regulations implementing section 504 for federally assisted programs do use 15 employees as the cut-off for this record-keeping requirement, the Department believes that it would be inappropriate to extend it to those smaller public entities covered by this regulation that do not receive Federal financial assistance. This approach has the benefit of minimizing paperwork burdens on small entities.

Paragraph (d) provides that the self-evaluation required by this section shall apply only to programs not subject to section 504 or those policies and practices, such as those involving communications access, that have not already been included in a self-evaluation required under an existing regulation implementing section 504. Because most self-evaluations were done from five to twelve years ago, however, the Department expects that a great many public entities will be re-examining all of their policies and programs. Programs and functions may have changed, and actions that were supposed to have been taken to comply with section 504 may not have been fully implemented or may no longer be effective. In addition, there have been statutory amendments to section 504 which have changed the coverage of section 504, particularly the Civil Rights Restoration Act of 1987, Public Law No. 100–259, 102 Stat. 28 (1988), which broadened the definition of a covered ''program or activity.''

Several commenters suggested that the Department clarify public entities' liability during the one-year period for compliance with the self-evaluation requirement. The self-evaluation requirement does not stay the effective date of the statute nor of this part. Public entities are, therefore, not

shielded from discrimination claims during that time.

Other commenters suggested that the rule require that every self-evaluation include an examination of training efforts to assure that individuals with disabilities are not subjected to discrimination because of insensitivity, particularly in the law enforcement area. Although the Department has not added such a specific requirement to the rule, it would be appropriate for public entities to evaluate training efforts because, in many cases, lack of training leads to discriminatory practices, even when the policies in place are nondiscriminatory.

Section 35.106 Notice

Section 35.106 requires a public entity to disseminate sufficient information to applicants, participants, beneficiaries, and other interested persons to inform them of the rights and protections afforded by the ADA and this regulation. Methods of providing this information include, for example, the publication of information in handbooks, manuals, and pamphlets that are distributed to the public to describe a public entity's programs and activities; the display of informative posters in service centers and other public places; or the broadcast of information by television or radio. In providing the notice, a public entity must comply with the requirements for effective communication in §35.160. The preamble to that section gives guidance on how to effectively communicate with individuals with disabilities.

Section 35.107 Designation of Responsible Employee and Adoption of Grievance Procedures

Consistent with §35.105, self-evaluation, the final rule requires that public entities with 50 or more employees designate a responsible employee and adopt grievance procedures. Most of the commenters who suggested that the requirement that self-evaluation be maintained on file for three years not be limited to those employing 50 or more persons made a similar suggestion concerning §35.107. Commenters recommended either that all public entities be subject to §35.107, or that ''50 or more persons'' be changed to ''15 or more persons.'' As explained in the discussion of §35.105, the Department has not adopted this suggestion.

The requirement for designation of an employee responsible for coordination of efforts to carry out responsibilities under this part is derived from the HEW regulation implementing section 504 in federally assisted programs. The requirement for designation of a particular employee and dissemination of information about how to locate that employee helps to ensure that individuals dealing with large agencies are able to easily find a responsible person who is familiar with the requirements of the Act and this part and can communicate those requirements to other individuals in the agency who may be unaware of their responsibilities. This paragraph in no way limits a public entity's obligation to ensure that all of its employees comply with the requirements of this part, but it ensures that any failure by individual employees can be promptly corrected by the designated employee.

Section 35.107(b) requires public entities with 50 or more employees to establish grievance procedures for resolving complaints of violations of this part. Similar requirements are found in the section 504 regulations for federally assisted programs (see, e.g., 45 CFR 84.7(b)). The rule, like the regulations for federally assisted programs, provides for investigation and resolution of complaints by a Federal enforcement agency. It is the view of the Department that public entities subject to this part should be required to establish a mechanism for resolution of complaints at the local level without requiring the complainant to resort to the Federal complaint procedures established under subpart F. Complainants would not, however, be required to exhaust the public entity's grievance procedures before filing a complaint under subpart F. Delay in filing the complaint at the Federal level caused by pursuit of the remedies available under the grievance procedure would generally be considered good cause for extending the time allowed for filing under §35.170(b).

Subpart B—General Requirements

Section 35.130 General Prohibitions Against Discrimination

The general prohibitions against discrimination in the rule are generally based on the prohibitions in existing regulations implementing section 504 and, therefore, are already familiar to State and local entities covered by section 504. In addition, §35.130 includes a number of provisions derived from title III of the Act that are implicit to a certain degree in the requirements of regulations implementing section 504.

Several commenters suggested that this part should include the section of the proposed title III regulation that implemented section 309 of the Act, which requires that courses and examinations related to applications, licensing, certification, or credentialing be provided in an accessible place and manner or that alternative accessible arrangements be made. The Department has not adopted this suggestion. The requirements of this part, including the general prohibitions of discrimination in this section, the program access requirements of subpart D, and the communications requirements of subpart E, apply to courses and examinations provided by public entities. The Department considers these requirements to

be sufficient to ensure that courses and examinations administered by public entities meet the requirements of section 309. For example, a public entity offering an examination must ensure that modifications of policies, practices, or procedures or the provision of auxiliary aids and services furnish the individual with a disability an equal opportunity to demonstrate his or her knowledge or ability. Also, any examination specially designed for individuals with disabilities must be offered as often and in as timely a manner as are other examinations. Further, under this part, courses and examinations must be offered in the most integrated setting appropriate. The analysis of §35.130(d) is relevant to this determination.

A number of commenters asked that the regulation be amended to require training of law enforcement personnel to recognize the difference between criminal activity and the effects of seizures or other disabilities such as mental retardation, cerebral palsy, traumatic brain injury, mental illness, or deafness. Several disabled commenters gave personal statements about the abuse they had received at the hands of law enforcement personnel. Two organizations that commented cited the Judiciary report at 50 as authority to require law enforcement training.

The Department has not added such a training requirement to the regulation. Discriminatory arrests and brutal treatment are already unlawful police activities. The general regulatory obligation to modify policies, practices, or procedures requires law enforcement to make changes in policies that result in discriminatory arrests or abuse of individuals with disabilities. Under this section law enforcement personnel would be required to make appropriate efforts to determine whether perceived strange or disruptive behavior or unconsciousness is the result of a disability. The Department notes that a number of States have attempted to address the problem of arresting disabled persons for noncriminal conduct resulting from their disability through adoption of the Uniform Duties to Disabled Persons Act, and encourages other jurisdictions to consider that approach.

Paragraph (a) restates the nondiscrimination mandate of section 202 of the ADA. The remaining paragraphs in §35.130 establish the general principles for analyzing whether any particular action of the public entity violates this mandate.

Paragraph (b) prohibits overt denials of equal treatment of individuals with disabilities. A public entity may not refuse to provide an individual with a disability with an equal opportunity to participate in or benefit from its program simply because the person has a disability.

Paragraph (b)(1)(i) provides that it is discriminatory to deny a person with a disability the right to participate in or benefit from the aid, benefit, or service provided by a public entity. Paragraph (b)(1)(ii) provides that the aids, benefits, and services provided to persons with disabilities must be equal to those provided to others, and paragraph (b)(1)(iii) requires that the aids, benefits, or services provided to individuals with disabilities must be as effective in affording equal opportunity to obtain the same result, to gain the same benefit, or to reach the same level of achievement as those provided to others. These paragraphs are taken from the regulations implementing section 504 and simply restate principles long established under section 504.

Paragraph (b)(1)(iv) permits the public entity to develop separate or different aids, benefits, or services when necessary to provide individuals with disabilities with an equal opportunity to participate in or benefit from the public entity's programs or activities, but only when necessary to ensure that the aids, benefits, or services are as effective as those provided to others. Paragraph (b)(1)(iv) must be read in conjunction with paragraphs (b)(2), (d), and (e). Even when separate or different aids, benefits, or services would be more effective, paragraph (b)(2) provides that a qualified individual with a disability still has the right to choose to participate in the program that is not designed to accommodate individuals with disabilities. Paragraph (d) requires that a public entity administer services, programs, and activities in the most integrated setting appropriate to the needs of qualified individuals with disabilities.

Paragraph (b)(2) specifies that, notwithstanding the existence of separate or different programs or activities provided in accordance with this section, an individual with a disability shall not be denied the opportunity to participate in such programs or activities that are not separate or different. Paragraph (e), which is derived from section 501(d) of the Americans with Disabilities Act, states that nothing in this part shall be construed to require an individual with a disability to accept an accommodation, aid, service, opportunity, or benefit that he or she chooses not to accept.

Taken together, these provisions are intended to prohibit exclusion and segregation of individuals with disabilities and the denial of equal opportunities enjoyed by others, based on, among other things, presumptions, patronizing attitudes, fears, and stereotypes about individuals with disabilities. Consistent with these standards, public entities are required to ensure that their actions are based on facts applicable to individuals and not on presumptions as to what a class of individuals with disabilities can or cannot do.

Integration is fundamental to the purposes of the Americans with Disabilities Act. Provision of segregated accommodations and services relegates persons with disabilities to second-class status. For example, it would be a violation of this provision to require persons with disabilities to eat in the back room of a government cafeteria or to refuse to allow a person with a disability the full use of recreation or exercise facilities because of stereotypes about the person's ability to participate.

Many commenters objected to proposed paragraphs (b)(1)(iv) and (d) as allowing continued segregation of individuals with disabilities. The Department recognizes that promoting integration of individuals with disabilities into the mainstream of society is an important objective of the ADA and agrees that, in most instances, separate programs for individuals with disabilities will not be permitted. Nevertheless, section 504 does permit separate programs in limited circumstances, and Congress clearly intended the regulations issued under title II to adopt the standards of section 504. Furthermore, Congress included authority for separate programs in the specific requirements of title III of the Act. Section 302(b)(1)(A)(iii) of the Act provides for separate benefits in language similar to that in §35.130(b)(1)(iv), and section 302(b)(1)(B) includes the same requirement for ''the most integrated setting appropriate'' as in §35.130(d).

Even when separate programs are permitted, individuals with disabilities cannot be denied the opportunity to participate in programs that are not separate or different. This is an important and overarching principle of the Americans with Disabilities Act. Separate, special, or different programs that are designed to provide a benefit to persons with disabilities cannot be used to restrict the participation of persons with disabilities in general, integrated activities.

For example, a person who is blind may wish to decline participating in a special museum tour that allows persons to touch sculptures in an exhibit and instead tour the exhibit at his or her own pace with the museum's recorded tour. It is not the intent of this section to require the person who is blind to avail himself or herself of the special tour. Modified participation for persons with disabilities must be a choice, not a requirement.

In addition, it would not be a violation of this section for a public entity to offer recreational programs specially designed for children with mobility impairments. However, it would be a violation of this section if the entity then excluded these children from other recreational services for which they are qualified to participate when these services are made available to nondisabled children, or if the entity required children with disabilities to attend only designated programs.

Many commenters asked that the Department clarify a public entity's obligations within the integrated program when it offers a separate program but an individual with a disability chooses not to participate in the separate program. It is impossible to make a blanket statement as to what level of auxiliary aids or modifications would be required in the integrated program. Rather, each situation must be assessed individually. The starting point is to question whether the separate program is in fact necessary or appropriate for the individual. Assuming the separate program would be appropriate for a particular individual, the extent to which that individual must be provided with modifications in the integrated program will depend not only on what the individual needs but also on the limitations and defenses of this part. For example, it may constitute an undue burden for a public accommodation, which provides a full-time interpreter in its special guided tour for individuals with hearing impairments, to hire an additional interpreter for those individuals who choose to attend the integrated program. The Department cannot identify categorically the level of assistance or aid required in the integrated program.

Paragraph (b)(1)(v) provides that a public entity may not aid or perpetuate discrimination against a qualified individual with a disability by providing significant assistance to an agency, organization, or person that discriminates on the basis of disability in providing any aid, benefit, or service to beneficiaries of the public entity's program. This paragraph is taken from the regulations implementing section 504 for federally assisted programs.

Paragraph (b)(1)(vi) prohibits the public entity from denying a qualified individual with a disability the opportunity to participate as a member of a planning or advisory board.

Paragraph (b)(1)(vii) prohibits the public entity from limiting a qualified individual with a disability in the enjoyment of any right, privilege, advantage, or opportunity enjoyed by others receiving any aid, benefit, or service.

Paragraph (b)(3) prohibits the public entity from utilizing criteria or methods of administration that deny individuals with disabilities access to the public entity's services, programs, and activities or that perpetuate the discrimination of another public entity, if both public entities are subject to common administrative control or are agencies of the same State. The phrase ''criteria or methods of administration'' refers to official written policies of the public entity and to the actual practices of the public entity. This paragraph prohibits both blatantly exclusionary

policies or practices and nonessential policies and practices that are neutral on their face, but deny individuals with disabilities an effective opportunity to participate. This standard is consistent with the interpretation of section 504 by the U.S. Supreme Court in *Alexander* v. *Choate*, 469 U.S. 287 (1985). The Court in *Choate* explained that members of Congress made numerous statements during passage of section 504 regarding eliminating architectural barriers, providing access to transportation, and eliminating discriminatory effects of job qualification procedures. The Court then noted: ''These statements would ring hollow if the resulting legislation could not rectify the harms resulting from action that discriminated by effect as well as by design.'' *Id.* at 297 (footnote omitted).

Paragraph (b)(4) specifically applies the prohibition enunciated in §35.130(b)(3) to the process of selecting sites for construction of new facilities or selecting existing facilities to be used by the public entity. Paragraph (b)(4) does not apply to construction of additional buildings at an existing site.

Paragraph (b)(5) prohibits the public entity, in the selection of procurement contractors, from using criteria that subject qualified individuals with disabilities to discrimination on the basis of disability.

Paragraph (b)(6) prohibits the public entity from discriminating against qualified individuals with disabilities on the basis of disability in the granting of licenses or certification. A person is a ''qualified individual with a disability'' with respect to licensing or certification if he or she can meet the essential eligibility requirements for receiving the license or certification (see §35.104).

A number of commenters were troubled by the phrase ''essential eligibility requirements'' as applied to State licensing requirements, especially those for health care professions. Because of the variety of types of programs to which the definition of ''qualified individual with a disability'' applies, it is not possible to use more specific language in the definition. The phrase ''essential eligibility requirements,'' however, is taken from the definitions in the regulations implementing section 504, so caselaw under section 504 will be applicable to its interpretation. In *Southeastern Community College* v. *Davis*, 442 U.S. 397, for example, the Supreme Court held that section 504 does not require an institution to ''lower or effect substantial modifications of standards to accommodate a handicapped person,'' 442 U.S. at 413, and that the school had established that the plaintiff was not ''qualified'' because she was not able to ''serve the nursing profession in all customary ways,'' *id.* Whether a particular requirement is ''essential'' will, of course, depend on the facts of the particular case.

In addition, the public entity may not establish requirements for the programs or activities of licensees or certified entities that subject qualified individuals with disabilities to discrimination on the basis of disability. For example, the public entity must comply with this requirement when establishing safety standards for the operations of licensees. In that case the public entity must ensure that standards that it promulgates do not discriminate against the employment of qualified individuals with disabilities in an impermissible manner.

Paragraph (b)(6) does not extend the requirements of the Act or this part directly to the programs or activities of licensees or certified entities themselves. The programs or activities of licensees or certified entities are not themselves programs or activities of the public entity merely by virtue of the license or certificate.

Paragraph (b)(7) is a specific application of the requirement under the general prohibitions of discrimination that public entities make reasonable modifications in policies, practices, or procedures where necessary to avoid discrimination on the basis of disability. Section 302(b)(2)(A)(ii) of the ADA sets out this requirement specifically for public accommodations covered by title III of the Act, and the House Judiciary Committee Report directs the Attorney General to include those specific requirements in the title II regulation to the extent that they do not conflict with the regulations implementing section 504. Judiciary report at 52.

Paragraph (b)(8), a new paragraph not contained in the proposed rule, prohibits the imposition or application of eligibility criteria that screen out or tend to screen out an individual with a disability or any class of individuals with disabilities from fully and equally enjoying any service, program, or activity, unless such criteria can be shown to be necessary for the provision of the service, program, or activity being offered. This prohibition is also a specific application of the general prohibitions of discrimination and is based on section 302(b)(2)(A)(i) of the ADA. It prohibits overt denials of equal treatment of individuals with disabilities, or establishment of exclusive or segregative criteria that would bar individuals with disabilities from participation in services, benefits, or activities.

Paragraph (b)(8) also prohibits policies that unnecessarily impose requirements or burdens on individuals with disabilities that are not placed on others. For example, public entities may not require that a qualified individual with a disability be accompanied by an attendant. A public entity is not, however, required to provide attendant care, or assistance in toileting, eating, or dressing to

individuals with disabilities, except in special circumstances, such as where the individual is an inmate of a custodial or correctional institution.

In addition, paragraph (b)(8) prohibits the imposition of criteria that ''tend to'' screen out an individual with a disability. This concept, which is derived from current regulations under section 504 (*see, e.g.,* 45 CFR 84.13), makes it discriminatory to impose policies or criteria that, while not creating a direct bar to individuals with disabilities, indirectly prevent or limit their ability to participate. For example, requiring presentation of a driver's license as the sole means of identification for purposes of paying by check would violate this section in situations where, for example, individuals with severe vision impairments or developmental disabilities or epilepsy are ineligible to receive a driver's license and the use of an alternative means of identification, such as another photo I.D. or credit card, is feasible.

A public entity may, however, impose neutral rules and criteria that screen out, or tend to screen out, individuals with disabilities if the criteria are necessary for the safe operation of the program in question. Examples of safety qualifications that would be justifiable in appropriate circumstances would include eligibility requirements for drivers' licenses, or a requirement that all participants in a recreational rafting expedition be able to meet a necessary level of swimming proficiency. Safety requirements must be based on actual risks and not on speculation, stereotypes, or generalizations about individuals with disabilities.

Paragraph (c) provides that nothing in this part prohibits a public entity from providing benefits, services, or advantages to individuals with disabilities, or to a particular class of individuals with disabilities, beyond those required by this part. It is derived from a provision in the section 504 regulations that permits programs conducted pursuant to Federal statute or Executive order that are designed to benefit only individuals with disabilities or a given class of individuals with disabilities to be limited to those individuals with disabilities. Section 504 ensures that federally assisted programs are made available to all individuals, without regard to disabilities, unless the Federal program under which the assistance is provided is specifically limited to individuals with disabilities or a particular class of individuals with disabilities. Because coverage under this part is not limited to federally assisted programs, paragraph (c) has been revised to clarify that State and local governments may provide special benefits, beyond those required by the nondiscrimination requirements of this part, that are limited to individuals with disabilities or a particular class of individuals with disabilities, without thereby incurring additional obligations to persons without disabilities or to other classes of individuals with disabilities.

Paragraphs (d) and (e), previously referred to in the discussion of paragraph (b)(1)(iv), provide that the public entity must administer services, programs, and activities in the most integrated setting appropriate to the needs of qualified individuals with disabilities, *i.e.,* in a setting that enables individuals with disabilities to interact with nondisabled persons to the fullest extent possible, and that persons with disabilities must be provided the option of declining to accept a particular accommodation.

Some commenters expressed concern that §35.130(e), which states that nothing in the rule requires an individual with a disability to accept special accommodations and services provided under the ADA, could be interpreted to allow guardians of infants or older people with disabilities to refuse medical treatment for their wards. Section 35.130(e) has been revised to make it clear that paragraph (e) is inapplicable to the concern of the commenters. A new paragraph (e)(2) has been added stating that nothing in the regulation authorizes the representative or guardian of an individual with a disability to decline food, water, medical treatment, or medical services for that individual. New paragraph (e) clarifies that neither the ADA nor the regulation alters current Federal law ensuring the rights of incompetent individuals with disabilities to receive food, water, and medical treatment. See, *e.g.,* Child Abuse Amendments of 1984 (42 U.S.C. 5106a(b)(10), 5106g(10)); Rehabilitation Act of 1973, as amended (29 U.S.C. 794); the Developmentally Disabled Assistance and Bill of Rights Act (42 U.S.C. 6042).

Sections 35.130(e) (1) and (2) are based on section 501(d) of the ADA. Section 501(d) was designed to clarify that nothing in the ADA requires individuals with disabilities to accept special accommodations and services for individuals with disabilities that may segregate them:

The Committee added this section [501(d)] to clarify that nothing in the ADA is intended to permit discriminatory treatment on the basis of disability, even when such treatment is rendered under the guise of providing an accommodation, service, aid or benefit to the individual with disability. For example, a blind individual may choose not to avail himself or herself of the right to go to the front of a line, even if a particular public accommodation has chosen to offer such a modification of a policy for blind individuals. Or, a blind individual may choose to decline to participate in a special museum tour that allows persons to touch sculptures in an exhibit and instead tour the exhibits at his or her own pace with the museum's recorded tour.

Judiciary report at 71–72. The Act is not to be construed to mean that an individual with

disabilities must accept special accommodations and services for individuals with disabilities when that individual can participate in the regular services already offered. Because medical treatment, including treatment for particular conditions, is not a special accommodation or service for individuals with disabilities under section 501(d), neither the Act nor this part provides affirmative authority to suspend such treatment. Section 501(d) is intended to clarify that the Act is not designed to foster discrimination through mandatory acceptance of special services when other alternatives are provided; this concern does not reach to the provision of medical treatment for the disabling condition itself.

Paragraph (f) provides that a public entity may not place a surcharge on a particular individual with a disability, or any group of individuals with disabilities, to cover any costs of measures required to provide that individual or group with the nondiscriminatory treatment required by the Act or this part. Such measures may include the provision of auxiliary aids or of modifications required to provide program accessibility.

Several commenters asked for clarification that the costs of interpreter services may not be assessed as an element of ''court costs.'' The Department has already recognized that imposition of the cost of courtroom interpreter services is impermissible under section 504. The preamble to the Department's section 504 regulation for its federally assisted programs states that where a court system has an obligation to provide qualified interpreters, ''it has the corresponding responsibility to pay for the services of the interpreters.'' (45 FR 37630 (June 3, 1980)). Accordingly, recouping the costs of interpreter services by assessing them as part of court costs would also be prohibited.

Paragraph (g), which prohibits discrimination on the basis of an individual's or entity's known relationship or association with an individual with a disability, is based on sections 102(b)(4) and 302(b)(1)(E) of the ADA. This paragraph was not contained in the proposed rule. The individuals covered under this paragraph are any individuals who are discriminated against because of their known association with an individual with a disability. For example, it would be a violation of this paragraph for a local government to refuse to allow a theater company to use a school auditorium on the grounds that the company had recently performed for an audience of individuals with HIV disease.

This protection is not limited to those who have a familial relationship with the individual who has a disability. Congress considered, and rejected, amendments that would have limited the scope of this provision to specific associations and relationships. Therefore, if a public entity refuses admission to a person with cerebral palsy and his or her companions, the companions have an independent right of action under the ADA and this section.

During the legislative process, the term ''entity'' was added to section 302(b)(1)(E) to clarify that the scope of the provision is intended to encompass not only persons who have a known association with a person with a disability, but also entities that provide services to or are otherwise associated with such individuals. This provision was intended to ensure that entities such as health care providers, employees of social service agencies, and others who provide professional services to persons with disabilities are not subjected to discrimination because of their professional association with persons with disabilities.

Section 35.131 Illegal Use of Drugs

Section 35.131 effectuates section 510 of the ADA, which clarifies the Act's application to people who use drugs illegally. Paragraph (a) provides that this part does not prohibit discrimination based on an individual's current illegal use of drugs.

The Act and the regulation distinguish between illegal use of drugs and the legal use of substances, whether or not those substances are ''controlled substances,'' as defined in the Controlled Substances Act (21 U.S.C. 812). Some controlled substances are prescription drugs that have legitimate medical uses. Section 35.131 does not affect use of controlled substances pursuant to a valid prescription under supervision by a licensed health care professional, or other use that is authorized by the Controlled Substances Act or any other provision of Federal law. It does apply to illegal use of those substances, as well as to illegal use of controlled substances that are not prescription drugs. The key question is whether the individual's use of the substance is illegal, not whether the substance has recognized legal uses. Alcohol is not a controlled substance, so use of alcohol is not addressed by §35.131 (although alcoholics are individuals with disabilities, subject to the protections of the statute).

A distinction is also made between the use of a substance and the status of being addicted to that substance. Addiction is a disability, and addicts are individuals with disabilities protected by the Act. The protection, however, does not extend to actions based on the illegal use of the substance. In other words, an addict cannot use the fact of his or her addiction as a defense to an action based on illegal use of drugs. This distinction is not artificial. Congress intended to deny protection to people who engage in the illegal use of drugs, whether or not they are addicted, but to provide protection to addicts so long as they are not currently using drugs.

A third distinction is the difficult one between current use and former use. The definition of ''current illegal use of drugs'' in §35.104, which is based on the report of the Conference Committee, H.R. Conf. Rep. No. 596, 101st Cong., 2d Sess. 64 (1990) (hereinafter ''Conference report''), is ''illegal use of drugs that occurred recently enough to justify a reasonable belief that a person's drug use is current or that continuing use is a real and ongoing problem.''

Paragraph (a)(2)(i) specifies that an individual who has successfully completed a supervised drug rehabilitation program or has otherwise been rehabilitated successfully and who is not engaging in current illegal use of drugs is protected. Paragraph (a)(2)(ii) clarifies that an individual who is currently participating in a supervised rehabilitation program and is not engaging in current illegal use of drugs is protected. Paragraph (a)(2)(iii) provides that a person who is erroneously regarded as engaging in current illegal use of drugs, but who is not engaging in such use, is protected.

Paragraph (b) provides a limited exception to the exclusion of current illegal users of drugs from the protections of the Act. It prohibits denial of health services, or services provided in connection with drug rehabilitation to an individual on the basis of current illegal use of drugs, if the individual is otherwise entitled to such services. A health care facility, such as a hospital or clinic, may not refuse treatment to an individual in need of the services it provides on the grounds that the individual is illegally using drugs, but it is not required by this section to provide services that it does not ordinarily provide. For example, a health care facility that specializes in a particular type of treatment, such as care of burn victims, is not required to provide drug rehabilitation services, but it cannot refuse to treat an individual's burns on the grounds that the individual is illegally using drugs.

Some commenters pointed out that abstention from the use of drugs is an essential condition of participation in some drug rehabilitation programs, and may be a necessary requirement in inpatient or residential settings. The Department believes that this comment is well-founded. Congress clearly intended to prohibit exclusion from drug treatment programs of the very individuals who need such programs because of their use of drugs, but, once an individual has been admitted to a program, abstention may be a necessary and appropriate condition to continued participation. The final rule therefore provides that a drug rehabilitation or treatment program may prohibit illegal use of drugs by individuals while they are participating in the program.

Paragraph (c) expresses Congress' intention that the Act be neutral with respect to testing for illegal use of drugs. This paragraph implements the provision in section 510(b) of the Act that allows entities ''to adopt or administer reasonable policies or procedures, including but not limited to drug testing,'' that ensure that an individual who is participating in a supervised rehabilitation program, or who has completed such a program or otherwise been rehabilitated successfully is no longer engaging in the illegal use of drugs. The section is not to be ''construed to encourage, prohibit, restrict, or authorize the conducting of testing for the illegal use of drugs.''

Paragraph 35.131(c) clarifies that it is not a violation of this part to adopt or administer reasonable policies or procedures to ensure that an individual who formerly engaged in the illegal use of drugs is not currently engaging in illegal use of drugs. Any such policies or procedures must, of course, be reasonable, and must be designed to identify accurately the illegal use of drugs. This paragraph does not authorize inquiries, tests, or other procedures that would disclose use of substances that are not controlled substances or are taken under supervision by a licensed health care professional, or other uses authorized by the Controlled Substances Act or other provisions of Federal law, because such uses are not included in the definition of ''illegal use of drugs.'' A commenter argued that the rule should permit testing for lawful use of prescription drugs, but most commenters preferred that tests must be limited to unlawful use in order to avoid revealing the lawful use of prescription medicine used to treat disabilities.

Section 35.132 Smoking

Section 35.132 restates the clarification in section 501(b) of the Act that the Act does not preclude the prohibition of, or imposition of restrictions on, smoking in transportation covered by title II. Some commenters argued that this section is too limited in scope, and that the regulation should prohibit smoking in all facilities used by public entities. The reference to smoking in section 501, however, merely clarifies that the Act does not require public entities to accommodate smokers by permitting them to smoke in transportation facilities.

Section 35.133 Maintenance of Accessible Features

Section 35.133 provides that a public entity shall maintain in operable working condition those features of facilities and equipment that are required to be readily accessible to and usable by persons with disabilities by the Act or this part. The Act requires that, to the maximum extent feasible, facilities must be accessible to, and usable by, individuals with disabilities. This section recognizes that it is not sufficient to provide

features such as accessible routes, elevators, or ramps, if those features are not maintained in a manner that enables individuals with disabilities to use them. Inoperable elevators, locked accessible doors, or ''accessible'' routes that are obstructed by furniture, filing cabinets, or potted plants are neither ''accessible to'' nor ''usable by'' individuals with disabilities.

Some commenters objected that this section appeared to establish an absolute requirement and suggested that language from the preamble be included in the text of the regulation. It is, of course, impossible to guarantee that mechanical devices will never fail to operate. Paragraph (b) of the final regulation provides that this section does not prohibit isolated or temporary interruptions in service or access due to maintenance or repairs. This paragraph is intended to clarify that temporary obstructions or isolated instances of mechanical failure would not be considered violations of the Act or this part. However, allowing obstructions or ''out of service'' equipment to persist beyond a reasonable period of time would violate this part, as would repeated mechanical failures due to improper or inadequate maintenance. Failure of the public entity to ensure that accessible routes are properly maintained and free of obstructions, or failure to arrange prompt repair of inoperable elevators or other equipment intended to provide access would also violate this part.

Other commenters requested that this section be expanded to include specific requirements for inspection and maintenance of equipment, for training staff in the proper operation of equipment, and for maintenance of specific items. The Department believes that this section properly establishes the general requirement for maintaining access and that further details are not necessary.

Section 35.134 Retaliation or Coercion

Section 35.134 implements section 503 of the ADA, which prohibits retaliation against any individual who exercises his or her rights under the Act. This section is unchanged from the proposed rule. Paragraph (a) of §35.134 provides that no private or public entity shall discriminate against any individual because that individual has exercised his or her right to oppose any act or practice made unlawful by this part, or because that individual made a charge, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the Act or this part.

Paragraph (b) provides that no private or public entity shall coerce, intimidate, threaten, or interfere with any individual in the exercise of his or her rights under this part or because that individual aided or encouraged any other individual in the exercise or enjoyment of any right granted or protected by the Act or this part.

This section protects not only individuals who allege a violation of the Act or this part, but also any individuals who support or assist them. This section applies to all investigations or proceedings initiated under the Act or this part without regard to the ultimate resolution of the underlying allegations. Because this section prohibits any act of retaliation or coercion in response to an individual's effort to exercise rights established by the Act and this part (or to support the efforts of another individual), the section applies not only to public entities subject to this part, but also to persons acting in an individual capacity or to private entities. For example, it would be a violation of the Act and this part for a private individual to harass or intimidate an individual with a disability in an effort to prevent that individual from attending a concert in a State-owned park. It would, likewise, be a violation of the Act and this part for a private entity to take adverse action against an employee who appeared as a witness on behalf of an individual who sought to enforce the Act.

Section 35.135 Personal Devices and Services

The final rule includes a new §35.135, entitles ''Personal devices and services,'' which states that the provision of personal devices and services is not required by title II. This new section, which serves as a limitation on all of the requirements of the regulation, replaces §35.160(b)(2) of the proposed rule, which addressed the issue of personal devices and services explicitly only in the context of communications. The personal devices and services limitation was intended to have general application in the proposed rule in all contexts where it was relevant. The final rule, therefore, clarifies this point by including a general provision that will explicitly apply not only to auxiliary aids and services but across-the-board to include other relevant areas such as, for example, modifications in policies, practices, and procedures (§35.130(b)(7)). The language of §35.135 parallels an analogous provision in the Department's title III regulations (28 CFR 36.306) but preserves the explicit reference to ''readers for personal use or study'' in §35.160(b)(2) of the proposed rule. This section does not preclude the short-term loan of personal receivers that are part of an assistive listening system.

Subpart C—Employment

Section 35.140 Employment Discrimination Prohibited

Title II of the ADA applies to all activities of public entities, including their employment practices. The proposed rule cross-referenced the definitions, requirements, and

procedures of title I of the ADA, as established by the Equal Employment Opportunity Commission in 29 CFR part 1630. This proposal would have resulted in use, under §35.140, of the title I definition of ''employer,'' so that a public entity with 25 or more employees would have become subject to the requirements of §35.140 on July 26, 1992, one with 15 to 24 employees on July 26, 1994, and one with fewer than 15 employees would have been excluded completely.

The Department received comments objecting to this approach. The commenters asserted that Congress intended to establish nondiscrimination requirements for employment by all public entities, including those that employ fewer than 15 employees; and that Congress intended the employment requirements of title II to become effective at the same time that the other requirements of this regulation become effective, January 26, 1992. The Department has reexamined the statutory language and legislative history of the ADA on this issue and has concluded that Congress intended to cover the employment practices of all public entities and that the applicable effective date is that of title II.

The statutory language of section 204(b) of the ADA requires the Department to issue a regulation that is consistent with the ADA and the Department's coordination regulation under section 504, 28 CFR part 41. The coordination regulation specifically requires nondiscrimination in employment, 28 CFR 41.52–41.55, and does not limit coverage based on size of employer. Moreover, under all section 504 implementing regulations issued in accordance with the Department's coordination regulation, employment coverage under section 504 extends to all employers with federally assisted programs or activities, regardless of size, and the effective date for those employment requirements has always been the same as the effective date for nonemployment requirements established in the same regulations. The Department therefore concludes that §35.140 must apply to all public entities upon the effective date of this regulation.

In the proposed regulation the Department cross-referenced the regulations implementing title I of the ADA, issued by the Equal Employment Opportunity Commission at 29 CFR part 1630, as a compliance standard for §35.140 because, as proposed, the scope of coverage and effective date of coverage under title II would have been coextensive with title I. In the final regulation this language is modified slightly. Subparagraph (1) of new paragraph (b) makes it clear that the standards established by the Equal Employment Opportunity Commission in 29 CFR part 1630 will be the applicable compliance standards if the public entity is subject to title I. If the public entity is not covered by title I, or until it is covered by title I, subparagraph (b)(2) cross-references section 504 standards for what constitutes employment discrimination, as established by the Department of Justice in 28 CFR part 41. Standards for title I of the ADA and section 504 of the Rehabilitation Act are for the most part identical because title I of the ADA was based on requirements set forth in regulations implementing section 504.

The Department, together with the other Federal agencies responsible for the enforcement of Federal laws prohibiting employment discrimination on the basis of disability, recognizes the potential for jurisdictional overlap that exists with respect to coverage of public entities and the need to avoid problems related to overlapping coverage. The other Federal agencies include the Equal Employment Opportunity Commission, which is the agency primarily responsible for enforcement of title I of the ADA, the Department of Labor, which is the agency responsible for enforcement of section 503 of the Rehabilitation Act of 1973, and 26 Federal agencies with programs of Federal financial assistance, which are responsible for enforcing section 504 in those programs. Section 107 of the ADA requires that coordination mechanisms be developed in connection with the administrative enforcement of complaints alleging discrimination under title I and complaints alleging discrimination in employment in violation of the Rehabilitation Act. Although the ADA does not specifically require inclusion of employment complaints under title II in the coordinating mechanisms required by title I, Federal investigations of title II employment complaints will be coordinated on a government-wide basis also. The Department is currently working with the EEOC and other affected Federal agencies to develop effective coordinating mechanisms, and final regulations on this issue will be issued on or before January 26, 1992.

Subpart D—Program Accessibility

Section 35.149 Discrimination Prohibited

Section 35.149 states the general nondiscrimination principle underlying the program accessibility requirements of §§35.150 and 35.151.

Section 35.150 Existing Facilities

Consistent with section 204(b) of the Act, this regulation adopts the program accessibility concept found in the section 504 regulations for federally conducted programs or activities (e.g., 28 CFR part 39). The concept of ''program accessibility'' was first used in the section 504 regulation adopted by the Department of Health, Education, and Welfare for its federally assisted programs and activities in 1977. It allowed recipients to make

their federally assisted programs and activities available to individuals with disabilities without extensive retrofitting of their existing buildings and facilities, by offering those programs through alternative methods. Program accessibility has proven to be a useful approach and was adopted in the regulations issued for programs and activities conducted by Federal Executive agencies. The Act provides that the concept of program access will continue to apply with respect to facilities now in existence, because the cost of retrofitting existing facilities is often prohibitive.

Section 35.150 requires that each service, program, or activity conducted by a public entity, when viewed in its entirety, be readily accessible to and usable by individuals with disabilities. The regulation makes clear, however, that a public entity is not required to make each of its existing facilities accessible (§35.150(a)(1)). Unlike title III of the Act, which requires public accommodations to remove architectural barriers where such removal is ''readily achievable,'' or to provide goods and services through alternative methods, where those methods are ''readily achievable,'' title II requires a public entity to make its programs accessible in all cases, except where to do so would result in a fundamental alteration in the nature of the program or in undue financial and administrative burdens. Congress intended the ''undue burden'' standard in title II to be significantly higher than the ''readily achievable'' standard in title III. Thus, although title II may not require removal of barriers in some cases where removal would be required under title III, the program access requirement of title II should enable individuals with disabilities to participate in and benefit from the services, programs, or activities of public entities in all but the most unusual cases.

Paragraph (a)(2), which establishes a special limitation on the obligation to ensure program accessibility in historic preservation programs, is discussed below in connection with paragraph (b).

Paragraph (a)(3), which is taken from the section 504 regulations for federally conducted programs, generally codifies case law that defines the scope of the public entity's obligation to ensure program accessibility. This paragraph provides that, in meeting the program accessibility requirement, a public entity is not required to take any action that would result in a fundamental alteration in the nature of its service, program, or activity or in undue financial and administrative burdens. A similar limitation is provided in §35.164.

This paragraph does not establish an absolute defense; it does not relieve a public entity of all obligations to individuals with disabilities. Although a public entity is not required to take actions that would result in a fundamental alteration in the nature of a service, program, or activity or in undue financial and administrative burdens, it nevertheless must take any other steps necessary to ensure that individuals with disabilities receive the benefits or services provided by the public entity.

It is the Department's view that compliance with §35.150(a), like compliance with the corresponding provisions of the section 504 regulations for federally conducted programs, would in most cases not result in undue financial and administrative burdens on a public entity. In determining whether financial and administrative burdens are undue, all public entity resources available for use in the funding and operation of the service, program, or activity should be considered. The burden of proving that compliance with paragraph (a) of §35.150 would fundamentally alter the nature of a service, program, or activity or would result in undue financial and administrative burdens rests with the public entity.

The decision that compliance would result in such alteration or burdens must be made by the head of the public entity or his or her designee and must be accompanied by a written statement of the reasons for reaching that conclusion. The Department recognizes the difficulty of identifying the official responsible for this determination, given the variety of organizational forms that may be taken by public entities and their components. The intention of this paragraph is that the determination must be made by a high level official, no lower than a Department head, having budgetary authority and responsibility for making spending decisions.

Any person who believes that he or she or any specific class of persons has been injured by the public entity head's decision or failure to make a decision may file a complaint under the compliance procedures established in subpart F.

Paragraph (b)(1) sets forth a number of means by which program accessibility may be achieved, including redesign of equipment, reassignment of services to accessible buildings, and provision of aides.

The Department wishes to clarify that, consistent with longstanding interpretation of section 504, carrying an individual with a disability is considered an ineffective and therefore an unacceptable method for achieving program accessibility. Department of Health, Education, and Welfare, Office of Civil Rights, Policy Interpretation No. 4, 43 FR 36035 (August 14, 1978). Carrying will be permitted only in manifestly exceptional cases, and only if all personnel who are permitted to participate in carrying an individual with a disability are formally instructed on the safest and least humiliating means of carrying. ''Manifestly exceptional'' cases in which carrying would be permitted

might include, for example, programs conducted in unique facilities, such as an oceanographic vessel, for which structural changes and devices necessary to adapt the facility for use by individuals with mobility impairments are unavailable or prohibitively expensive. Carrying is not permitted as an alternative to structural modifications such as installation of a ramp or a chairlift.

In choosing among methods, the public entity shall give priority consideration to those that will be consistent with provision of services in the most integrated setting appropriate to the needs of individuals with disabilities. Structural changes in existing facilities are required only when there is no other feasible way to make the public entity's program accessible. (It should be noted that ''structural changes'' include all physical changes to a facility; the term does not refer only to changes to structural features, such as removal of or alteration to a load-bearing structural member.) The requirements of §35.151 for alterations apply to structural changes undertaken to comply with this section. The public entity may comply with the program accessibility requirement by delivering services at alternate accessible sites or making home visits as appropriate.

Historic Preservation Programs

In order to avoid possible conflict between the congressional mandates to preserve historic properties, on the one hand, and to eliminate discrimination against individuals with disabilities on the other, paragraph (a)(2) provides that a public entity is not required to take any action that would threaten or destroy the historic significance of an historic property. The special limitation on program accessibility set forth in paragraph (a)(2) is applicable only to historic preservation programs, as defined in §35.104, that is, programs that have preservation of historic properties as a primary purpose. Narrow application of the special limitation is justified because of the inherent flexibility of the program accessibility requirement. Where historic preservation is not a primary purpose of the program, the public entity is not required to use a particular facility. It can relocate all or part of its program to an accessible facility, make home visits, or use other standard methods of achieving program accessibility without making structural alterations that might threaten or destroy significant historic features of the historic property. Thus, government programs located in historic properties, such as an historic State capitol, are not excused from the requirement for program access.

Paragraph (a)(2), therefore, will apply only to those programs that uniquely concern the preservation and experience of the historic property itself. Because the primary benefit of an historic preservation program is the experience of the historic property, paragraph (b)(2) requires the public entity to give priority to methods of providing program accessibility that permit individuals with disabilities to have physical access to the historic property. This priority on physical access may also be viewed as a specific application of the general requirement that the public entity administer programs in the most integrated setting appropriate to the needs of qualified individuals with disabilities (§35.130(d)). Only when providing physical access would threaten or destroy the historic significance of an historic property, or would result in a fundamental alteration in the nature of the program or in undue financial and administrative burdens, may the public entity adopt alternative methods for providing program accessibility that do not ensure physical access. Examples of some alternative methods are provided in paragraph (b)(2).

Time Periods

Paragraphs (c) and (d) establish time periods for complying with the program accessibility requirement. Like the regulations for federally assisted programs (e.g., 28 CFR 41.57(b)), paragraph (c) requires the public entity to make any necessary structural changes in facilities as soon as practicable, but in no event later than three years after the effective date of this regulation.

The proposed rule provided that, aside from structural changes, all other necessary steps to achieve compliance with this part must be taken within sixty days. The sixty day period was taken from regulations implementing section 504, which generally were effective no more than thirty days after publication. Because this regulation will not be effective until January 26, 1992, the Department has concluded that no additional transition period for non-structural changes is necessary, so the sixty day period has been omitted in the final rule. Of course, this section does not reduce or eliminate any obligations that are already applicable to a public entity under section 504.

Where structural modifications are required, paragraph (d) requires that a transition plan be developed by an entity that employs 50 or more persons, within six months of the effective date of this regulation. The legislative history of title II of the ADA makes it clear that, under title II, ''local and state governments are required to provide curb cuts on public streets.'' Education and Labor report at 84. As the rationale for the provision of curb cuts, the House report explains, ''The employment, transportation, and public accommodation sections of * * * (the ADA) would be meaningless if people who use wheelchairs were not afforded the opportunity to travel on and between the

streets.'' Id. Section 35.151(e), which establishes accessibility requirements for new construction and alterations, requires that all newly constructed or altered streets, roads, or highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway, and all newly constructed or altered street level pedestrian walkways must have curb ramps or other sloped areas at intersections to streets, roads, or highways. A new paragraph (d)(2) has been added to the final rule to clarify the application of the general requirement for program accessibility to the provision of curb cuts at existing crosswalks. This paragraph requires that the transition plan include a schedule for providing curb ramps or other sloped areas at existing pedestrian walkways, giving priority to walkways serving entities covered by the Act, including State and local government offices and facilities, transportation, public accommodations, and employers, followed by walkways serving other areas. Pedestrian ''walkways'' include locations where access is required for use of public transportation, such as bus stops that are not located at intersections or crosswalks.

Similarly, a public entity should provide an adequate number of accessible parking spaces in existing parking lots or garages over which it has jurisdiction.

Paragraph (d)(3) provides that, if a public entity has already completed a transition plan required by a regulation implementing section 504, the transition plan required by this part will apply only to those policies and practices that were not covered by the previous transition plan. Some commenters suggested that the transition plan should include all aspects of the public entity's operations, including those that may have been covered by a previous transition plan under section 504. The Department believes that such a duplicative requirement would be inappropriate. Many public entities may find, however, that it will be simpler to include all of their operations in the transition plan than to attempt to identify and exclude specifically those that were addressed in a previous plan. Of course, entities covered under section 504 are not shielded from their obligations under that statute merely because they are included under the transition plan developed under this section.

Section 35.151 New Construction and Alterations

Section 35.151 provides that those buildings that are constructed or altered by, on behalf of, or for the use of a public entity shall be designed, constructed, or altered to be readily accessible to and usable by individuals with disabilities if the construction was commenced after the effective date of this part. Facilities under design on that date will be governed by this section if the date that bids were invited falls after the effective date. This interpretation is consistent with Federal practice under section 504.

Section 35.151(c) establishes two standards for accessible new construction and alteration. Under paragraph (c), design, construction, or alteration of facilities in conformance with the Uniform Federal Accessibility Standards (UFAS) or with the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (hereinafter ADAAG) shall be deemed to comply with the requirements of this section with respect to those facilities except that, if ADAAG is chosen, the elevator exemption contained at §§36.401(d) and 36.404 does not apply. ADAAG is the standard for private buildings and was issued as guidelines by the Architectural and Transportation Barriers Compliance Board (ATBCB) under title III of the ADA. It has been adopted by the Department of Justice and is published as appendix A to the Department's title III rule in today's FEDERAL REGISTER. Departures from particular requirements of these standards by the use of other methods shall be permitted when it is clearly evident that equivalent access to the facility or part of the facility is thereby provided. Use of two standards is a departure from the proposed rule.

The proposed rule adopted UFAS as the only interim accessibility standard because that standard was referenced by the regulations implementing section 504 of the Rehabilitation Act promulgated by most Federal funding agencies. It is, therefore, familiar to many State and local government entities subject to this rule. The Department, however, received many comments objecting to the adoption of UFAS. Commenters pointed out that, except for the elevator exemption, UFAS is not as stringent as ADAAG. Others suggested that the standard should be the same to lessen confusion.

Section 204(b) of the Act states that title II regulations must be consistent not only with section 504 regulations but also with ''this Act.'' Based on this provision, the Department has determined that a public entity should be entitled to choose to comply either with ADAAG or UFAS.

Public entities who choose to follow ADAAG, however, are not entitled to the elevator exemption contained in title III of the Act and implemented in the title III regulation at §36.401(d) for new construction and §36.404 for alterations. Section 303(b) of title III states that, with some exceptions, elevators are not required in facilities that are less than three stories or have less than 3000 square feet per story. The section 504 standard, UFAS, contains no such exemption. Section 501 of the ADA makes clear that nothing in the Act may be construed to apply a lesser

standard to public entities than the standards applied under section 504. Because permitting the elevator exemption would clearly result in application of a lesser standard than that applied under section 504, paragraph (c) states that the elevator exemption does not apply when public entities choose to follow ADAAG. Thus, a two-story courthouse, whether built according to UFAS or ADAAG, must be constructed with an elevator. It should be noted that Congress did not include an elevator exemption for public transit facilities covered by subtitle B of title II, which covers public transportation provided by public entities, providing further evidence that Congress intended that public buildings have elevators.

Section 504 of the ADA requires the ATBCB to issue supplemental Minimum Guidelines and Requirements for Accessible Design of buildings and facilities subject to the Act, including title II. Section 204(c) of the ADA provides that the Attorney General shall promulgate regulations implementing title II that are consistent with the ATBCB's ADA guidelines. The ATBCB has announced its intention to issue title II guidelines in the future. The Department anticipates that, after the ATBCB's title II guidelines have been published, this rule will be amended to adopt new accessibility standards consistent with the ATBCB's rulemaking. Until that time, however, public entities will have a choice of following UFAS or ADAAG, without the elevator exemption.

Existing buildings leased by the public entity after the effective date of this part are not required by the regulation to meet accessibility standards simply by virtue of being leased. They are subject, however, to the program accessibility standard for existing facilities in §35.150. To the extent the buildings are newly constructed or altered, they must also meet the new construction and alteration requirements of §35.151.

The Department received many comments urging that the Department require that public entities lease only accessible buildings. Federal practice under section 504 has always treated newly leased buildings as subject to the existing facility program accessibility standard. Section 204(b) of the Act states that, in the area of ''program accessibility, existing facilities,'' the title II regulations must be consistent with section 504 regulations. Thus, the Department has adopted the section 504 principles for these types of leased buildings. Unlike the construction of new buildings where architectural barriers can be avoided at little or no cost, the application of new construction standards to an existing building being leased raises the same prospect of retrofitting buildings as the use of an existing Federal facility, and the same program accessibility standard should apply to both owned and leased existing buildings. Similarly, requiring that public entities only lease accessible space would significantly restrict the options of State and local governments in seeking leased space, which would be particularly burdensome in rural or sparsely populated areas.

On the other hand, the more accessible the leased space is, the fewer structural modifications will be required in the future for particular employees whose disabilities may necessitate barrier removal as a reasonable accommodation. Pursuant to the requirements for leased buildings contained in the Minimum Guidelines and Requirements for Accessible Design published under the Architectural Barriers Act by the ATBCB, 36 CFR 1190.34, the Federal Government may not lease a building unless it contains (1) One accessible route from an accessible entrance to those areas in which the principal activities for which the building is leased are conducted, (2) accessible toilet facilities, and (3) accessible parking facilities, if a parking area is included within the lease (36 CFR 1190.34). Although these requirements are not applicable to buildings leased by public entities covered by this regulation, such entities are encouraged to look for the most accessible space available to lease and to attempt to find space complying at least with these minimum Federal requirements.

Section 35.151(d) gives effect to the intent of Congress, expressed in section 504(c) of the Act, that this part recognize the national interest in preserving significant historic structures. Commenters criticized the Department's use of descriptive terms in the proposed rule that are different from those used in the ADA to describe eligible historic properties. In addition, some commenters criticized the Department's decision to use the concept of ''substantially impairing'' the historic features of a property, which is a concept employed in regulations implementing section 504 of the Rehabilitation Act of 1973. Those commenters recommended that the Department adopt the criteria of ''adverse effect'' published by the Advisory Council on Historic Preservation under the National Historic Preservation Act, 36 CFR 800.9, as the standard for determining whether an historic property may be altered.

The Department agrees with these comments to the extent that they suggest that the language of the rule should conform to the language employed by Congress in the ADA. A definition of ''historic property,'' drawn from section 504 of the ADA, has been added to §35.104 to clarify that the term applies to those properties listed or eligible for listing in the National Register of Historic Places, or properties designated as historic under State or local law.

The Department intends that the exception created by this section be applied only in those very rare situations in which it is not possible to provide access to an historic

property using the special access provisions established by UFAS and ADAAG. Therefore, paragraph (d)(1) of §35.151 has been revised to clearly state that alterations to historic properties shall comply, to the maximum extent feasible, with section 4.1.7 of UFAS or section 4.1.7 of ADAAG. Paragraph (d)(2) has been revised to provide that, if it has been determined under the procedures established in UFAS and ADAAG that it is not feasible to provide physical access to an historic property in a manner that will not threaten or destroy the historic significance of the property, alternative methods of access shall be provided pursuant to the requirements of §35.150.

In response to comments, the Department has added to the final rule a new paragraph (e) setting out the requirements of §36.151 as applied to curb ramps. Paragraph (e) is taken from the statement contained in the preamble to the proposed rule that all newly constructed or altered streets, roads, and highways must contain curb ramps at any intersection having curbs or other barriers to entry from a street level pedestrian walkway, and that all newly constructed or altered street level pedestrian walkways must have curb ramps at intersections to streets, roads, or highways.

Subpart E—Communications

Section 35.160 General

Section 35.160 requires the public entity to take such steps as may be necessary to ensure that communications with applicants, participants, and members of the public with disabilities are as effective as communications with others.

Paragraph (b)(1) requires the public entity to furnish appropriate auxiliary aids and services when necessary to afford an individual with a disability an equal opportunity to participate in, and enjoy the benefits of, the public entity's service, program, or activity. The public entity must provide an opportunity for individuals with disabilities to request the auxiliary aids and services of their choice. This expressed choice shall be given primary consideration by the public entity (§35.160(b)(2)). The public entity shall honor the choice unless it can demonstrate that another effective means of communication exists or that use of the means chosen would not be required under §35.164.

Deference to the request of the individual with a disability is desirable because of the range of disabilities, the variety of auxiliary aids and services, and different circumstances requiring effective communication. For instance, some courtrooms are now equipped for ''computer-assisted transcripts,'' which allow virtually instantaneous transcripts of courtroom argument and testimony to appear on displays. Such a system might be an effective auxiliary aid or service for a person who is deaf or has a hearing loss who uses speech to communicate, but may be useless for someone who uses sign language.

Although in some circumstances a notepad and written materials may be sufficient to permit effective communication, in other circumstances they may not be sufficient. For example, a qualified interpreter may be necessary when the information being communicated is complex, or is exchanged for a lengthy period of time. Generally, factors to be considered in determining whether an interpreter is required include the context in which the communication is taking place, the number of people involved, and the importance of the communication.

Several commenters asked that the rule clarify that the provision of readers is sometimes necessary to ensure access to a public entity's services, programs or activities. Reading devices or readers should be provided when necessary for equal participation and opportunity to benefit from any governmental service, program, or activity, such as reviewing public documents, examining demonstrative evidence, and filling out voter registration forms or forms needed to receive public benefits. The importance of providing qualified readers for examinations administered by public entities is discussed under §35.130. Reading devices and readers are appropriate auxiliary aids and services where necessary to permit an individual with a disability to participate in or benefit from a service, program, or activity.

Section 35.160(b)(2) of the proposed rule, which provided that a public entity need not furnish individually prescribed devices, readers for personal use or study, or other devices of a personal nature, has been deleted in favor of a new section in the final rule on personal devices and services (see §35.135).

In response to comments, the term ''auxiliary aids and services'' is used in place of ''auxiliary aids'' in the final rule. This phrase better reflects the range of aids and services that may be required under this section.

A number of comments raised questions about the extent of a public entity's obligation to provide access to television programming for persons with hearing impairments. Television and videotape programming produced by public entities are covered by this section. Access to audio portions of such programming may be provided by closed captioning.

Section 35.161 Telecommunication Devices for the Deaf (TDD's)

Section 35.161 requires that, where a public entity communicates with applicants and beneficiaries by telephone, TDD's or equally effective telecommunication systems be used to communicate with individuals with impaired speech or hearing.

Problems arise when a public entity which does not have a TDD needs to communicate with an individual who uses a TDD or vice versa. Title IV of the ADA addresses this problem by requiring establishment of telephone relay services to permit communications between individuals who communicate by TDD and individuals who communicate by the telephone alone. The relay services required by title IV would involve a relay operator using both a standard telephone and a TDD to type the voice messages to the TDD user and read the TDD messages to the standard telephone user.

Section 204(b) of the ADA requires that the regulation implementing title II with respect to communications be consistent with the Department's regulation implementing section 504 for its federally conducted programs and activities at 28 CFR part 39. Section 35.161, which is taken from §39.160(a)(2) of that regulation, requires the use of TDD's or equally effective telecommunication systems for communication with people who use TDD's. Of course, where relay services, such as those required by title IV of the ADA are available, a public entity may use those services to meet the requirements of this section.

Many commenters were concerned that public entities should not rely heavily on the establishment of relay services. The commenters explained that while relay services would be of vast benefit to both public entities and individuals who use TDD's, the services are not sufficient to provide access to all telephone services. First, relay systems do not provide effective access to the increasingly popular automated systems that require the caller to respond by pushing a button on a touch tone phone. Second, relay systems cannot operate fast enough to convey messages on answering machines, or to permit a TDD user to leave a recorded message. Third, communication through relay systems may not be appropriate in cases of crisis lines pertaining to rape, domestic violence, child abuse, and drugs. The Department believes that it is more appropriate for the Federal Communications Commission to address these issues in its rulemaking under title IV.

Some commenters requested that those entities with frequent contacts with clients who use TDD's have on-site TDD's to provide for direct communication between the entity and the individual. The Department encourages those entities that have extensive telephone contact with the public such as city halls, public libraries, and public aid offices, to have TDD's to insure more immediate access. Where the provision of telephone service is a major function of the entity, TDD's should be available.

Section 35.162 Telephone Emergency Services

Many public entities provide telephone emergency services by which individuals can seek immediate assistance from police, fire, ambulance, and other emergency services. These telephone emergency services—including ''911'' services—are clearly an important public service whose reliability can be a matter of life or death. The legislative history of title II specifically reflects congressional intent that public entities must ensure that telephone emergency services, including 911 services, be accessible to persons with impaired hearing and speech through telecommunication technology (Conference report at 67; Education and Labor report at 84–85).

Proposed §35.162 mandated that public entities provide emergency telephone services to persons with disabilities that are ''functionally equivalent'' to voice services provided to others. Many commenters urged the Department to revise the section to make clear that direct access to telephone emergency services is required by title II of the ADA as indicated by the legislative history (Conference report at 67–68; Education and Labor report at 85). In response, the final rule mandates ''direct access,'' instead of ''access that is functionally equivalent'' to that provided to all other telephone users. Telephone emergency access through a third party or through a relay service would not satisfy the requirement for direct access.

Several commenters asked about a separate seven-digit emergency call number for the 911 services. The requirement for direct access disallows the use of a separate seven-digit number where 911 service is available. Separate seven-digit emergency call numbers would be unfamiliar to many individuals and also more burdensome to use. A standard emergency 911 number is easier to remember and would save valuable time spent in searching in telephone books for a local seven-digit emergency number.

Many commenters requested the establishment of minimum standards of service (e.g., the quantity and location of TDD's and computer modems needed in a given emergency center). Instead of establishing these scoping requirements, the Department has established a performance standard through the mandate for direct access.

Section 35.162 requires public entities to take appropriate steps, including equipping their emergency systems with modern technology, as may be necessary to promptly receive and respond to a call from users of TDD's and computer modems. Entities are allowed the flexibility to determine what is the appropriate technology for their particular needs. In order to avoid mandating

use of particular technologies that may become outdated, the Department has eliminated the references to the Baudot and ASCII formats in the proposed rule.

Some commenters requested that the section require the installation of a voice amplification device on the handset of the dispatcher's telephone to amplify the dispatcher's voice. In an emergency, a person who has a hearing loss may be using a telephone that does not have an amplification device. Installation of speech amplification devices on the handsets of the dispatchers' telephones would respond to that situation. The Department encourages their use.

Several commenters emphasized the need for proper maintenance of TDD's used in telephone emergency services. Section 35.133, which mandates maintenance of accessible features, requires public entities to maintain in operable working condition TDD's and other devices that provide direct access to the emergency system.

Section 35.163 Information and Signage

Section 35.163(a) requires the public entity to provide information to individuals with disabilities concerning accessible services, activities, and facilities. Paragraph (b) requires the public entity to provide signage at all inaccessible entrances to each of its facilities that directs users to an accessible entrance or to a location with information about accessible facilities.

Several commenters requested that, where TDD-equipped pay phones or portable TDD's exist, clear signage should be posted indicating the location of the TDD. The Department believes that this is required by paragraph (a). In addition, the Department recommends that, in large buildings that house TDD's, directional signage indicating the location of available TDD's should be placed adjacent to banks of telephones that do not contain a TDD.

Section 35.164 Duties

Section 35.164, like paragraph (a)(3) of §35.150, is taken from the section 504 regulations for federally conducted programs. Like paragraph (a)(3), it limits the obligation of the public entity to ensure effective communication in accordance with *Davis* and the circuit court opinions interpreting it. It also includes specific requirements for determining the existence of undue financial and administrative burdens. The preamble discussion of §35.150(a) regarding that determination is applicable to this section and further explains the public entity's obligation to comply with §§35.160–35.164. Because of the essential nature of the services provided by telephone emergency systems, the Department assumes that §35.164 will rarely be applied to §35.162.

Subpart F—Compliance Procedures

Subpart F sets out the procedures for administrative enforcement of this part. Section 203 of the Act provides that the remedies, procedures, and rights set forth in section 505 of the Rehabilitation Act of 1973 (29 U.S.C. 794a) for enforcement of section 504 of the Rehabilitation Act, which prohibits discrimination on the basis of handicap in programs and activities that receive Federal financial assistance, shall be the remedies, procedures, and rights for enforcement of title II. Section 505, in turn, incorporates by reference the remedies, procedures, and rights set forth in title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d to 2000d–4a). Title VI, which prohibits discrimination on the basis of race, color, or national origin in federally assisted programs, is enforced by the Federal agencies that provide the Federal financial assistance to the covered programs and activities in question. If voluntary compliance cannot be achieved, Federal agencies enforce title VI either by the termination of Federal funds to a program that is found to discriminate, following an administrative hearing, or by a referral to this Department for judicial enforcement.

Title II of the ADA extended the requirements of section 504 to all services, programs, and activities of State and local governments, not only those that receive Federal financial assistance. The House Committee on Education and Labor explained the enforcement provisions as follows:

It is the Committee's intent that administrative enforcement of section 202 of the legislation should closely parallel the Federal government's experience with section 504 of the Rehabilitation Act of 1973. The Attorney General should use section 504 enforcement procedures and the Department's coordination role under Executive Order 12250 as models for regulation in this area.

The Committee envisions that the Department of Justice will identify appropriate Federal agencies to oversee compliance activities for State and local governments. As with section 504, these Federal agencies, including the Department of Justice, will receive, investigate, and where possible, resolve complaints of discrimination. If a Federal agency is unable to resolve a complaint by voluntary means, * * * the major enforcement sanction for the Federal government will be referral of cases by these Federal agencies to the Department of Justice.

The Department of Justice may then proceed to file suits in Federal district court. As with section 504, there is also a private right of action for persons with disabilities, which includes the full panoply of remedies. Again, consistent with section 504, it is not the

Committee's intent that persons with disabilities need to exhaust Federal administrative remedies before exercising their private right of action.

Education & Labor report at 98. See also S. Rep. No. 116, 101st Cong., 1st Sess., at 57–58 (1989).

Subpart F effectuates the congressional intent by deferring to section 504 procedures where those procedures are applicable, that is, where a Federal agency has jurisdiction under section 504 by virtue of its provision of Federal financial assistance to the program or activity in which the discrimination is alleged to have occurred. Deferral to the 504 procedures also makes the sanction of fund termination available where necessary to achieve compliance. Because the Civil Rights Restoration Act (Pub. L. 100–259) extended the application of section 504 to all of the operations of the public entity receiving the Federal financial assistance, many activities of State and local governments are already covered by section 504. The procedures in subpart F apply to complaints concerning services, programs, and activities of public entities that are covered by the ADA.

Subpart G designates the Federal agencies responsible for enforcing the ADA with respect to specific components of State and local government. It does not, however, displace existing jurisdiction under section 504 of the various funding agencies. Individuals may still file discrimination complaints against recipients of Federal financial assistance with the agencies that provide that assistance, and the funding agencies will continue to process those complaints under their existing procedures for enforcing section 504. The substantive standards adopted in this part for title II of the ADA are generally the same as those required under section 504 for federally assisted programs, and public entities covered by the ADA are also covered by the requirements of section 504 to the extent that they receive Federal financial assistance. To the extent that title II provides greater protection to the rights of individuals with disabilities, however, the funding agencies will also apply the substantive requirements established under title II and this part in processing complaints covered by both this part and section 504, except that fund termination procedures may be used only for violations of section 504.

Subpart F establishes the procedures to be followed by the agencies designated in subpart G for processing complaints against State and local government entities when the designated agency does not have jurisdiction under section 504.

Section 35.170 Complaints

Section 35.170 provides that any individual who believes that he or she or a specific class of individuals has been subjected to discrimination on the basis of disability by a public entity may, by himself or herself or by an authorized representative, file a complaint under this part within 180 days of the date of the alleged discrimination, unless the time for filing is extended by the agency for good cause. Although §35.107 requires public entities that employ 50 or more persons to establish grievance procedures for resolution of complaints, exhaustion of those procedures is not a prerequisite to filing a complaint under this section. If a complainant chooses to follow the public entity's grievance procedures, however, any resulting delay may be considered good cause for extending the time allowed for filing a complaint under this part.

Filing the complaint with any Federal agency will satisfy the requirement for timely filing. As explained below, a complaint filed with an agency that has jurisdiction under section 504 will be processed under the agency's procedures for enforcing section 504.

Some commenters objected to the complexity of allowing complaints to be filed with different agencies. The multiplicity of enforcement jurisdiction is the result of following the statutorily mandated enforcement scheme. The Department has, however, attempted to simplify procedures for complainants by making the Federal agency that receives the complaint responsible for referring it to an appropriate agency.

The Department has also added a new paragraph (c) to this section providing that a complaint may be filed with any agency designated under subpart G of this part, or with any agency that provides funding to the public entity that is the subject of the complaint, or with the Department of Justice. Under §35.171(a)(2), the Department of Justice will refer complaints for which it does not have jurisdiction under section 504 to an agency that does have jurisdiction under section 504, or to the agency designated under subpart G as responsible for complaints filed against the public entity that is the subject of the complaint or in the case of an employment complaint that is also subject to title I of the Act, to the Equal Employment Opportunity Commission. Complaints filed with the Department of Justice may be sent to the Coordination and Review Section, P.O. Box 66118, Civil Rights Division, U.S. Department of Justice, Washington, DC 20035–6118.

Section 35.171 Acceptance of Complaints

Section 35.171 establishes procedures for determining jurisdiction and responsibility for processing complaints against public entities. The final rule provides complainants an opportunity to file with the Federal funding agency of their choice. If that agency does not have jurisdiction under section 504, however, and is not the agency designated

under subpart G as responsible for that public entity, the agency must refer the complaint to the Department of Justice, which will be responsible for referring it either to an agency that does have jurisdiction under section 504 or to the appropriate designated agency, or in the case of an employment complaint that is also subject to title I of the Act, to the Equal Employment Opportunity Commission.

Whenever an agency receives a complaint over which it has jurisdiction under section 504, it will process the complaint under its section 504 procedures. When the agency designated under subpart G receives a complaint for which it does not have jurisdiction under section 504, it will treat the complaint as an ADA complaint under the procedures established in this subpart.

Section 35.171 also describes agency responsibilities for the processing of employment complaints. As described in connection with §35.140, additional procedures regarding the coordination of employment complaints will be established in a coordination regulation issued by DOJ and EEOC. Agencies with jurisdiction under section 504 for complaints alleging employment discrimination also covered by title I will follow the procedures established by the coordination regulation for those complaints. Complaints covered by title I but not section 504 will be referred to the EEOC, and complaints covered by this part but not title I will be processed under the procedures in this part.

Section 35.172 Resolution of Complaints

Section 35.172 requires the designated agency to either resolve the complaint or issue to the complainant and the public entity a Letter of Findings containing findings of fact and conclusions of law and a description of a remedy for each violation found.

The Act requires the Department of Justice to establish administrative procedures for resolution of complaints, but does not require complainants to exhaust these administrative remedies. The Committee Reports make clear that Congress intended to provide a private right of action with the full panoply of remedies for individual victims of discrimination. Because the Act does not require exhaustion of administrative remedies, the complainant may elect to proceed with a private suit at any time.

Section 35.173 Voluntary Compliance Agreements

Section 35.173 requires the agency to attempt to resolve all complaints in which it finds noncompliance through voluntary compliance agreements enforceable by the Attorney General.

Section 35.174 Referral

Section 35.174 provides for referral of the matter to the Department of Justice if the agency is unable to obtain voluntary compliance.

Section 35.175 Attorney's Fees

Section 35.175 states that courts are authorized to award attorneys fees, including litigation expenses and costs, as provided in section 505 of the Act. Litigation expenses include items such as expert witness fees, travel expenses, etc. The Judiciary Committee Report specifies that such items are included under the rubric of ''attorneys fees'' and not ''costs'' so that such expenses will be assessed against a plaintiff only under the standard set forth in *Christiansburg Garment Co.* v. *Equal Employment Opportunity Commission,* 434 U.S. 412 (1978). (Judiciary report at 73.)

Section 35.176 Alternative Means of Dispute Resolution

Section 35.176 restates section 513 of the Act, which encourages use of alternative means of dispute resolution.

Section 35.177 Effect of Unavailability of Technical Assistance

Section 35.177 explains that, as provided in section 506(e) of the Act, a public entity is not excused from compliance with the requirements of this part because of any failure to receive technical assistance.

Section 35.178 State Immunity

Section 35.178 restates the provision of section 502 of the Act that a State is not immune under the eleventh amendment to the Constitution of the United States from an action in Federal or State court for violations of the Act, and that the same remedies are available for any such violations as are available in an action against an entity other than a State.

Subpart G—Designated Agencies

Section 35.190 Designated Agencies

Subpart G designates the Federal agencies responsible for investigating complaints under this part. At least 26 agencies currently administer programs of Federal financial assistance that are subject to the nondiscrimination requirements of section 504 as well as other civil rights statutes. A majority of these agencies administer modest programs of Federal financial assistance and/or devote minimal resources exclusively to ''external'' civil rights enforcement activities. Under Executive Order 12250, the Department of Justice has encouraged the use of delegation agreements under which certain civil rights compliance responsibilities

for a class of recipients funded by more than one agency are delegated by an agency or agencies to a ''lead'' agency. For example, many agencies that fund institutions of higher education have signed agreements that designate the Department of Education as the ''lead'' agency for this class of recipients.

The use of delegation agreements reduces overlap and duplication of effort, and thereby strengthens overall civil rights enforcement. However, the use of these agreements to date generally has been limited to education and health care recipients. These classes of recipients are funded by numerous agencies and the logical connection to a lead agency is clear (e.g., the Department of Education for colleges and universities, and the Department of Health and Human Services for hospitals).

The ADA's expanded coverage of State and local government operations further complicates the process of establishing Federal agency jurisdiction for the purpose of investigating complaints of discrimination on the basis of disability. Because all operations of public entities now are covered irrespective of the presence or absence of Federal financial assistance, many additional State and local government functions and organizations now are subject to Federal jurisdiction. In some cases, there is no historical or single clear-cut subject matter relationship with a Federal agency as was the case in the education example described above. Further, the 33,000 governmental jurisdictions subject to the ADA differ greatly in their organization, making a detailed and workable division of Federal agency jurisdiction by individual State, county, or municipal entity unrealistic.

This regulation applies the delegation concept to the investigation of complaints of discrimination on the basis of disability by public entities under the ADA. It designates eight agencies, rather than all agencies currently administering programs of Federal financial assistance, as responsible for investigating complaints under this part. These ''designated agencies'' generally have the largest civil rights compliance staffs, the most experience in complaint investigations and disability issues, and broad yet clear subject area responsibilities. This division of responsibilities is made functionally rather than by public entity type or name designation. For example, all entities (regardless of their title) that exercise responsibilities, regulate, or administer services or programs relating to lands and natural resources fall within the jurisdiction of the Department of Interior.

Complaints under this part will be investigated by the designated agency most closely related to the functions exercised by the governmental component against which the complaint is lodged. For example, a complaint against a State medical board, where such a board is a recognizable entity, will be investigated by the Department of Health and Human Services (the designated agency for regulatory activities relating to the provision of health care), even if the board is part of a general umbrella department of planning and regulation (for which the Department of Justice is the designated agency). If two or more agencies have apparent responsibility over a complaint, §35.190(c) provides that the Assistant Attorney General shall determine which one of the agencies shall be the designated agency for purposes of that complaint.

Thirteen commenters, including four proposed designated agencies, addressed the Department of Justice's identification in the proposed regulation of nine ''designated agencies'' to investigate complaints under this part. Most comments addressed the proposed specific delegations to the various individual agencies. The Department of Justice agrees with several commenters who pointed out that responsibility for ''historic and cultural preservation'' functions appropriately belongs with the Department of Interior rather than the Department of Education. The Department of Justice also agrees with the Department of Education that ''museums'' more appropriately should be delegated to the Department of Interior, and that ''preschool and daycare programs'' more appropriately should be assigned to the Department of Health and Human Services, rather than to the Department of Education. The final rule reflects these decisions.

The Department of Commerce opposed its listing as the designated agency for ''commerce and industry, including general economic development, banking and finance, consumer protection, insurance, and small business''. The Department of Commerce cited its lack of a substantial existing section 504 enforcement program and experience with many of the specific functions to be delegated. The Department of Justice accedes to the Department of Commerce's position, and has assigned itself as the designated agency for these functions.

In response to a comment from the Department of Health and Human Services, the regulation's category of ''medical and nursing schools'' has been clarified to read ''schools of medicine, dentistry, nursing, and other health-related fields''. Also in response to a comment from the Department of Health and Human Services, ''correctional institutions'' have been specifically added to the public safety and administration of justice functions assigned to the Department of Justice.

The regulation also assigns the Department of Justice as the designated agency responsible for all State and local government functions not assigned to other designated agencies. The Department of Justice, under an agreement with the Department of the

Treasury, continues to receive and coordinate the investigation of complaints filed under the Revenue Sharing Act. This entitlement program, which was terminated in 1986, provided civil rights compliance jurisdiction for a wide variety of complaints regarding the use of Federal funds to support various general activities of local governments. In the absence of any similar program of Federal financial assistance administered by another Federal agency, placement of designated agency responsibilities for miscellaneous and otherwise undesignated functions with the Department of Justice is an appropriate continuation of current practice.

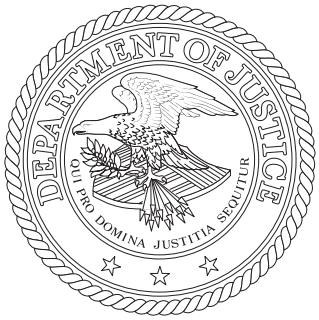
The Department of Education objected to the proposed rule's inclusion of the functional area of ''arts and humanities'' within its responsibilities, and the Department of Housing and Urban Development objected to its proposed designation as responsible for activities relating to rent control, the real estate industry, and housing code enforcement. The Department has deleted these areas from the lists assigned to the Departments of Education and Housing and Urban Development, respectively, and has added a new paragraph (c) to §35.190, which provides that the Department of Justice may assign responsibility for components of State or local governments that exercise responsibilities, regulate, or administer services, programs, or activities relating to functions not assigned to specific designated agencies by paragraph (b) of this section to other appropriate agencies. The Department believes that this approach will provide more flexibility in determining the appropriate agency for investigation of complaints involving those components of State and local governments not specifically addressed by the listings in paragraph (b). As provided in §§35.170 and 35.171, complaints filed with the Department of Justice will be referred to the appropriate agency.

Several commenters proposed a stronger role for the Department of Justice, especially with respect to the receipt and assignment of complaints, and the overall monitoring of the effectiveness of the enforcement activities of Federal agencies. As discussed above, §§35.170 and 35.171 have been revised to provide for referral of complaints by the Department of Justice to appropriate enforcement agencies. Also, language has been added to §35.190(a) of the final regulation stating that the Assistant Attorney General shall provide policy guidance and interpretations to designated agencies to ensure the consistent and effective implementation of this part.

NOTICE:

The title III regulation was modified by the Pool Extension Final Rule, the ADA Amendments Act Final Rule, and the Movie Captioning and Audio Description Final Rule, which can be found in the Title III Regulation Supplement. This document and the supplement should be read together for the most up-to-date regulation.

Alternatively, the fully updated regulation is available in html.



Americans with Disabilities Act Title III Regulations

Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities

Department of Justice
September 15, 2010

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Supplementary Information

Department of Justice

DEPARTMENT OF JUSTICE

28 CFR Part 36

[CRT Docket No. 106; AG Order No. 3181–2010]

RIN 1190–AA44

Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities

AGENCY: Department of Justice, Civil Rights Division.
ACTION: Final rule.

SUMMARY: This final rule revises the Department of Justice (Department) regulation that implements title III of the Americans with Disabilities Act (ADA), relating to nondiscrimination on the basis of disability by public accommodations and in commercial facilities. The Department is issuing this final rule in order to adopt enforceable accessibility standards under the Americans with Disabilities Act of 1990 (ADA) that are consistent with the minimum guidelines and requirements issued by the Architectural and Transportation Barriers Compliance Board, and to update or amend certain provisions of the title III regulation so that they comport with the Department's legal and practical experiences in enforcing the ADA since 1991. Concurrently with the publication of the final rule for title III, the Department is publishing a final rule amending its ADA title II regulation, which covers nondiscrimination on the basis of disability in State and local government services.

DATES: *Effective Date*: March 15, 2011.
FOR FURTHER INFORMATION CONTACT:
Janet L. Blizard, Deputy Chief, or Christina Galindo-Walsh, Attorney Advisor, Disability Rights Section, Civil Rights Division, U.S. Department of Justice, at (202) 307–0663 (voice or TTY). This is not a toll-free number. Information may also be obtained from the Department's toll-free ADA Information Line at (800) 514–0301 (voice) or (800) 514–0383 (TTY).

This rule is also available in an accessible format on the ADA Home Page at *http://www.ada.gov*. You may obtain copies of this rule in large print or on computer disk by calling the ADA Information Line listed above.

SUPPLEMENTARY INFORMATION:

The Roles of the Access Board and the Department of Justice

The Access Board was established by section 502 of the Rehabilitation Act of 1973. 29 U.S.C. 792. The Board consists of 13 public members appointed by the President, the majority of whom must be individuals with disabilities, and the heads of 12 Federal departments and agencies specified by statute, including the heads of the Department of Justice and the Department of Transportation (DOT). Originally, the Access Board was established to develop and maintain accessibility guidelines for facilities designed, constructed, altered, or leased with Federal dollars under the Architectural Barriers Act of 1968 (ABA). 42 U.S.C. 4151 *et seq.* The passage of the ADA expanded the Access Board's responsibilities.

The ADA requires the Access Board to ''issue minimum guidelines that shall supplement the existing Minimum Guidelines and Requirements for Accessible Design for purposes of subchapters II and III of this chapter * * * to ensure that buildings, facilities, rail passenger cars, and vehicles are accessible, in terms of architecture and design, transportation, and communication, to individuals with disabilities.'' 42 U.S.C. 12204. The ADA requires the Department to issue regulations that include enforceable accessibility standards applicable to facilities subject to title II or title III that are consistent with the ''minimum guidelines'' issued by the Access Board, 42 U.S.C. 12134(c),

12186(c), but vests in the Attorney General sole responsibility for the promulgation of those standards that fall within the Department's jurisdiction and enforcement of the regulations.

The ADA also requires the Department to develop regulations with respect to existing facilities subject to title II (Subtitle A) and title III. How and to what extent the Access Board's guidelines are used with respect to the barrier removal requirement applicable to existing facilities under title III of the ADA and to the provision of program accessibility under title II of the ADA are solely within the discretion of the Department.

Enactment of the ADA and Issuance of the 1991 Regulations

On July 26, 1990, President George H.W. Bush signed into law the ADA, a comprehensive civil rights law prohibiting discrimination on the basis of disability.[1] The ADA broadly protects the rights of individuals with disabilities in employment, access to State and local government services, places of public accommodation, transportation, and other important areas of American life. The ADA also requires newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities. 42 U.S.C. 12101 *et seq*. Section 306(a) of the ADA directs the Secretary of Transportation to issue regulations for demand responsive or fixed route systems operated by private entities not primarily engaged in the business of transporting people (sections 302(b)(2)(B) and (C)) and for private entities that are primarily engaged in the business of transporting people (section 304). *See* 42 U.S.C. 12182(b), 12184, 12186(a). Section 306(b) directs the Attorney General to promulgate regulations to carry out the provisions of the rest of title III. 42 U.S.C. 12186(b).

Title II applies to State and local government entities, and, in Subtitle A, protects qualified individuals with disabilities from discrimination on the basis of disability in services, programs, and activities provided by State and local government entities. Title II extends the prohibition on discrimination established by section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. 794 (section 504), to all activities of State and local governments regardless of whether these entities receive Federal financial assistance. 42 U.S.C. 12131–65.

Title III, which this rule addresses, prohibits discrimination on the basis of disability in the activities of places of public accommodation (businesses that are generally open to the public and that fall into one of 12 categories listed in the ADA, such as restaurants, movie theaters, schools, day care facilities, recreation facilities, and doctors' offices) and requires newly constructed or altered places of public accommodation—as well as commercial facilities (privately owned, nonresidential facilities such as factories, warehouses, or office buildings)—to comply with the ADA Standards. 42 U.S.C. 12181–89.

On July 26, 1991, the Department issued rules implementing title II and title III, which are codified at 28 CFR part 35 (title II) and part 36 (title III). Appendix A of the 1991 title III regulation, which is republished as Appendix D to 28 CFR part 36, contains the ADA Standards for Accessible Design (1991 Standards), which were based upon the version of the Americans with Disabilities Act Accessibility Guidelines (1991 ADAAG) published by the Access Board on the same date. Under the Department's 1991 title III regulation,

[1] On September 25, 2008, President George W.Bush signed into law the Americans with Disabilities Amendments Act of 2008 (ADA Amendments Act), Public Law 110–325. The ADA Amendments Act amended the ADA definition of disability to clarify its coverage of persons with disabilities and to provide guidance on the application of the definition. This final rule does not contain regulatory language implementing the ADA Amendments Act. The Department intends to publish a supplemental rule to amend the regulatory definition of ''disability'' to implement the changes mandated by that law.

places of public accommodation and commercial facilities currently are required to comply with the 1991 Standards with respect to newly constructed or altered facilities.

The Access Board's publication of the 2004 ADA/ABA Guidelines was the culmination of a long-term effort to facilitate ADA compliance by eliminating, to the extent possible, inconsistencies among Federal accessibility requirements and between Federal accessibility requirements and State and local building codes. In support of this effort, the Department is amending its regulation implementing title III and adopting standards consistent with ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines. The Department is also amending its title II regulation, which prohibits discrimination on the basis of disability in State and local government services, concurrently with the publication of this rule in this issue of the **Federal Register.**

Development of the 2004 ADA/ABA Guidelines

In 1994, the Access Board began the process of updating the 1991 ADAAG by establishing an advisory committee composed of members of the design and construction industry, the building code community, and State and local government entities, as well as individuals with disabilities. In 1998, the Access Board added specific guidelines on State and local government facilities, 63 FR 2000 (Jan. 13, 1998), and building elements designed for use by children, 63 FR 2060 (Jan. 13, 1998). In 1999, based largely on the report and recommendations of the advisory committee, the Access Board issued a notice of proposed rulemaking (NPRM) to update and revise its ADA and ABA Accessibility Guidelines. *See* 64 FR 62248 (Nov. 16, 1999). In 2000, the Access Board added specific guidelines on play areas. *See* 65 FR 62498 (Oct. 18, 2000). The Access Board released an interim draft of its guidelines to the public on April 2, 2002, 67 FR 15509, in order to provide an opportunity for entities with model codes to consider amendments that would promote further harmonization. In September of 2002, the Access Board set forth specific guidelines on recreation facilities. 67 FR 56352 (Sept. 3, 2002).

By the date of its final publication on July 23, 2004, the 2004 ADA/ABA Guidelines had been the subject of extraordinary review and public participation. The Access Board received more than 2,500 comments from individuals with disabilities, affected industries, State and local governments, and others. The Access Board provided further opportunity for participation by holding public hearings.

The Department was involved extensively in the development of the 2004 ADA/ABA Guidelines. As a Federal member of the Access Board, the Attorney General's representative voted to approve the revised guidelines. ADA Chapter 1 and ADA Chapter 2 of the 2004 ADA/ABA Guidelines provide scoping requirements for facilities subject to the ADA; ''scoping'' is a term used in the 2004 ADA/ABA Guidelines to describe requirements that prescribe which elements and spaces—and, in some cases, how many—must comply with the technical specifications. ABA Chapter 1 and ABA Chapter 2 provide scoping requirements for facilities subject to the ABA (*i.e.,* facilities designed, built, altered, or leased with Federal funds). Chapters 3 through 10 of the 2004 ADA/ABA Guidelines provide uniform technical specifications for facilities subject to either the ADA or the ABA. This revised format is designed to eliminate unintended conflicts between the two sets of Federal accessibility standards and to minimize conflicts between the Federal regulations and the model codes that form the basis of many State and local building codes. For the purposes of this final rule, the Department will refer to ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines as the 2004 ADAAG.

These amendments to the 1991 ADAAG have not been adopted previously by the Department as ADA Standards. Through this rule, the Depart-

ment is adopting revised ADA Standards consistent with the 2004 ADAAG, including all of the amendments to the 1991 ADAAG since 1998. For the purposes of this part, the Department's revised standards are entitled ''The 2010 Standards for Accessible Design'' and consist of the 2004 ADAAG and the requirements contained in subpart D of 28 CFR part 36. Because the Department has adopted the 2004 ADAAG as part of its title II and title III regulations, once the Department's final rules become effective, the 2004 ADAAG will have legal effect with respect to the Department's title II and title III regulations and will cease to be mere guidance for those areas regulated by the Department. In 2006, DOT adopted the 2004 ADAAG. With respect to those areas regulated by DOT, these guidelines, as adopted by DOT, have had legal effect since 2006.

Under this regulation, the Department of Justice covers passenger vessels operated by private entities not primarily engaged in the business of transporting people with respect to the provision of goods and services of a public accommodation on the vessel. For example, a vessel operator whose vessel departs from Point A, takes passengers on a recreational trip, and returns passengers to Point A without ever providing for disembarkation at a Point B (*e.g.,* a dinner or harbor cruise, a fishing charter) is a public accommodation operated by a private entity not primarily engaged in the business of transporting people. This regulation covers those aspects of the vessel's operation relating to the use and enjoyment of the public accommodation, including, for example, the boarding process, safety policies, accessible routes on the vessel, and the provision of effective communication. Persons with complaints or concerns about discrimination on the basis of disability by vessel operators who are private entities not primarily engaged in the business of transporting people, or questions about how this regulation applies to such operators and vessels, should contact the Department of Justice.

Vessels operated by private entities primarily engaged in the business of transporting people and that provide the goods and services of a public accommodation are covered by this regulation and the Department of Transportation's passenger vessel rule, 49 CFR part 39. A vessel operator whose vessel takes passengers from Point A to Point B (*e.g.,* a cruise ship that sails from Miami to one or more Caribbean islands, a private ferry boat between two points on either side of a river or bay, a water taxi between two points in an urban area) is most likely a private entity primarily engaged in the business of transporting people. Persons with questions about how this regulation applies to such operators and vessels may contact the Department of Justice or the Department of Transportation for guidance or further information. However, the Department of Justice has enforcement authority for all private entities under title III of the ADA, so individuals with complaints about noncompliance with part 39 should provide those complaints to the Department of Justice.

The provisions of this rule and 49 CFR part 39 are intended to be substantively consistent with one another. Consequently, in interpreting the application of this rule to vessel operators who are private entities not primarily engaged in the business of transporting people, the Department of Justice views the obligations of those vessel operators as being similar to those of private entities primarily engaged in the business of transporting people under the provisions of 49 CFR part 39.

The Department's Rulemaking History

The Department published an advance notice of proposed rulemaking (ANPRM) on September 30, 2004, 69 FR 58768 for two reasons: (1) To begin the process of adopting the 2004 ADAAG by soliciting public input on issues relating to the potential application of the Access Board's revisions once the Department adopts them as revised standards; and (2) to request background information that would assist the Department in preparing a regulatory analysis under the guidance provided in Office of Management and

Budget (OMB) Circular A–4 sections D (Analytical Approaches) and E (Identifying and Measuring Benefits and Costs) (Sept. 17, 2003), available at *http://www.whitehouse.gov/OMB/ circulars/ a004/a-4.pdf* (last visited June 24, 2010). While underscoring that the Department, as a member of the Access Board, already had reviewed comments provided to the Access Board during its development of the 2004 ADAAG, the Department specifically requested public comment on the potential application of the 2004 ADAAG to existing facilities. The extent to which the 2004 ADAAG is used with respect to the barrier removal requirement applicable to existing facilities under title III (as well as with respect to the program access requirement in title II) is within the sole discretion of the Department. The ANPRM dealt with the Department's responsibilities under both title II and title III.

The public response to the ANPRM was substantial. The Department extended the comment deadline by four months at the public's request. 70 FR 2992 (Jan. 19, 2005). By the end of the extended comment period, the Department had received more than 900 comments covering a broad range of issues. Many of the commenters responded to questions posed specifically by the Department, including questions regarding the Department's application of the 2004 ADAAG once adopted by the Department and the Department's regulatory assessment of the costs and benefits of particular elements. Many other commenters addressed areas of desired regulation or of particular concern.

To enhance accessibility strides made since the enactment of the ADA, commenters asked the Department to focus on previously unregulated areas, such as ticketing in assembly areas; reservations for hotel rooms, rental cars, and boat slips; and captioning. They also asked for clarification on some issues in the 1991 regulations, such as the requirements regarding service animals. Other commenters dealt with specific requirements in the 2004 ADAAG or responded to questions regarding elements scoped for the first time in the 2004 ADAAG, including recreation facilities and play areas. Commenters also provided some information on how to assess the cost of elements in small facilities, office buildings, hotels and motels, assembly areas, hospitals and long-term care facilities, residential units, recreation facilities, and play areas. Still other commenters addressed the effective date of the proposed standards, the triggering event by which the effective date is calculated for new construction, and variations on a safe harbor that would excuse elements built in compliance with the 1991 Standards from compliance with the proposed standards.

After careful consideration of the public comments in response to the ANPRM, on June 17, 2008, the Department published an NPRM covering title III. 73 FR 34508. The Department also published an NPRM on that day covering title II. 73 FR 34466. The NPRMs addressed the issues raised in the public's comments to the ANPRM and sought additional comment, generally and in specific areas, such as the Department's adoption of the 2004 ADAAG, the Department's regulatory assessment of the costs and benefits of the rule, its updates and amendments of certain provisions of the existing title II and III regulations, and areas that were in need of additional clarification or specificity.

A public hearing was held on July 15, 2008, in Washington, DC. Forty-five individuals testified in person or by phone. The hearing was streamed live over the Internet. By the end of the 60-day comment period, the Department had received 4,435 comments addressing a broad range of issues, many of which were common to the title II and title III NPRMs, from representatives of businesses and industries, State and local government agencies, disability advocacy organizations, and private individuals.

The Department notes that this rulemaking was unusual in that much of the proposed regulatory text and many of the questions asked across titles II and III were the same. Consequently,

many of the commenters did not provide separate sets of documents for the proposed title II and title III rules, and in many instances, the commenters did not specify which title was being commented upon. As a result, where comments could be read to apply to both titles II and III, the Department included them in the comments and responses for each final rule.

Most of the commenters responded to questions posed specifically by the Department, including what were the most appropriate definitions for terms such as ''wheelchair,'' ''mobility device,'' and ''service animal''; how to quantify various benefits that are difficult to monetize; what requirements to adopt for ticketing and assembly areas; whether to adopt safe harbors for small businesses; and how best to regulate captioning. Some comments addressed specific requirements in the 2004 ADAAG or responded to questions regarding elements scoped for the first time in the 2004 ADAAG, including recreation facilities and play areas. Other comments responded to questions posed by the Department concerning certain specific requirements in the 2004 ADAAG.

Relationship to Other Laws

The Department of Justice regulation implementing title III, 28 CFR 36.103, provides the following:

(a) *Rule of interpretation*. Except as otherwise provided in this part, this part shall not be construed to apply a lesser standard than the standards applied under title V of the Rehabilitation Act of 1973 (29 U.S.C. 791) or the regulations issued by Federal agencies pursuant to that title.

(b) *Section 504*. This part does not affect the obligations of a recipient of Federal financial assistance to comply with the requirements of section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and regulations issued by Federal agencies implementing section 504.

(c) *Other laws*. This part does not invalidate or limit the remedies, rights, and procedures of any other Federal, State, or local laws (including State common law) that provide greater or equal protection for the rights of individuals with disabilities or individuals associated with them.

These provisions remain unchanged by the final rule. The Department recognizes that public accommodations subject to title III of the ADA may also be subject to title I of the ADA, which prohibits discrimination on the basis of disability in employment; section 504 of the Rehabilitation Act of 1973 and other Federal statutes that prohibit discrimination on the basis of disability in the programs and activities of recipients of Federal financial assistance; and other Federal statutes such as the Air Carrier Access Act (ACAA), 49 U.S.C. 41705 *et seq.*, and the Fair Housing Act (FHAct), 42 U.S.C. 3601 *et seq*. Compliance with the Department's title II and title III regulations does not ensure compliance with other Federal statutes.

Public accommodations that are subject to the ADA as well as other Federal disability discrimination laws must be aware of the requirements of all applicable laws and must comply with these laws and their implementing regulations. Although in many cases similar provisions of different statutes are interpreted to impose similar requirements, there are circumstances in which similar provisions are applied differently because of the nature of the covered entity or activity, or because of distinctions between the statutes. For example, emotional support animals that do not qualify as service animals under the Department's title III regulations may nevertheless qualify as permitted reasonable accommodations for persons with disabilities under the FHAct and the ACAA. *See, e.g., Overlook Mutual Homes, Inc. v. Spencer,* 666 F. Supp. 2d 850 (S.D. Ohio 2009). Public accommodations that operate housing facilities must ensure that they apply the reasonable accommodation requirements of the FHAct in determining whether to allow a particular animal needed by a person with a disability into housing and may not use the ADA definition as a justification for reducing their FHAct obligations. In addition, nothing

in the ADA prevents a public accommodation subject to one statute from modifying its policies and providing greater access in order to assist individuals with disabilities in achieving access to entities subject to other Federal statutes. For example, a quick service restaurant at an airport is, as a public accommodation, subject to the title III requirements, not to the ACAA requirements. Conversely, an air carrier that flies in and out of the same airport is required to comply with the ACAA, but is not covered by title III of the ADA. If a particular animal is a service animal for purposes of the ACAA and is thus allowed on an airplane, but is not a service animal for purposes of the ADA, nothing in the ADA prohibits an airport restaurant from allowing a ticketed passenger with a disability who is traveling with a service animal that meets the ACAA's definition of a service animal to bring that animal into the facility even though under the ADA's definition of service animal the animal lawfully could be excluded.

Organization of This Rule

Throughout this rule, the original ADA Standards, which are republished as Appendix D to 28 CFR part 36, will be referred to as the ''1991 Standards.'' The original title III regulation, codified at 28 CFR part 36 (2009), will be referred to as the ''1991 regulation'' or the ''1991 title III regulation.'' ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines, 36 CFR part 1191, app. B and D (2009), will be referred to as the ''2004 ADAAG.'' The Department's Notice of Proposed Rulemaking, 73 FR 34508 (June 17, 2008), will be referred to as the ''NPRM.'' As noted above, the 2004 ADAAG, taken together with the requirements contained in subpart D of 28 CFR part 36 (New Construction and Alterations) of the final rule, will be referred to as the ''2010 Standards.'' The amendments made to the 1991 title III regulation and the adoption of the 2004 ADAAG, taken together, will be referred to as the ''final rule.''

In performing the required periodic review of its existing regulation, the Department has reviewed the title III regulation section by section, and, as a result, has made several clarifications and amendments in this rule. Appendix A of the final rule, ''Guidance on Revisions to ADA Regulation on Nondiscrimination on the Basis of Disability by Public Accommodations and Commercial Facilities,'' codified as Appendix A to 28 CFR part 36, provides the Department's response to comments and its explanations of the changes to the regulation. The section entitled ''Section-by-Section Analysis and Response to Comments'' in Appendix A provides a detailed discussion of the changes to the title III regulation. The Section-by-Section Analysis follows the order of the 1991 title III regulation, except that regulatory sections that remain unchanged are not referenced. The discussion within each section explains the changes and the reasoning behind them, as well as the Department's response to related public comments. Subject areas that deal with more than one section of the regulation include references to the related sections, where appropriate. The Section-by-Section Analysis also discusses many of the questions asked by the Department for specific public response. The section of Appendix A entitled ''Other Issues'' discusses public comment on several issues of concern to the Department that were the subject of questions that are not specifically addressed in the Section-by-Section Analysis.

The Department's description of the 2010 Standards, as well as a discussion of the public comments on specific sections of the 2004 ADAAG, is found in Appendix B of this final rule, ''Analysis and Commentary on the 2010 ADA Standards for Accessible Design,'' codified as Appendix B to 28 CFR part 36.

The provisions of this rule generally take effect six months from its publication in the **Federal Register.** The Department has determined, however, that compliance with the requirements related to new construction and alterations and reservations at a place of lodging shall not be

required until 18 months from the publication date of this rule. These exceptions are set forth in §§ 36.406(a) and 36.302(e)(3), respectively, and are discussed in greater detail in Appendix A. *See* discussions in Appendix A entitled ''Section 36.406 Standards for New Construction and Alterations'' and ''Section 36.302(e) Hotel Reservations.''

This final rule only addresses issues that were identified in the NPRM as subjects the Department intended to regulate through this rulemaking proceeding. Because the Department indicated in the NPRM that it did not intend to regulate certain areas, including equipment and furniture, accessible golf cars, and movie captioning and video description, as part of this rulemaking proceeding, the Department believes it would be appropriate to solicit more public comment about these areas prior to making them the subject of a rulemaking. The Department intends to engage in additional rulemaking in the near future addressing accessibility in these areas and others, including next generation 9–1–1 and accessibility of Web sites operated by covered public entities and public accommodations.

ADDITIONAL INFORMATION:

Regulatory Process Matters (SBREFA, Regulatory Flexibility Act, and Executive Orders)

The Department must provide two types of assessments as part of its final rule: An analysis of the costs and benefits of adopting the changes contained in this rule, and a periodic review of its existing regulations to consider their impact on small entities, including small businesses, small nonprofit organizations, and small governmental jurisdictions. *See* E.O. 12866, 58 FR 51735, 3 CFR, 1994 Comp., p. 638, as amended; Regulatory Flexibility Act of 1980 (RFA), 5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 610(a); OMB Circular A–4, available at *http://www.whitehouse.gov/OMB/circulars/a004/a-4.pdf* (last visited June 24, 2010); E.O. 13272, 67 FR 53461, 3 CFR, 2003 Comp., p. 247.

In the NPRM, the Department kept open the possibility that, if warranted by public comments received on an issue raised by the 2004 ADAAG or by the results of the Department's Initial Regulatory Impact Analysis (Initial RIA), available at *http://www.ada.gov/NPRM2008/ria.htm*, showing that the likely costs of making a particular feature or facility accessible were disproportionate to the benefits (including both monetized and nonmonetized benefits) to persons with disabilities, the Attorney General, as a member of the Access Board, could return the issue to the Access Board for further consideration. After careful consideration, the Department has determined that it is unnecessary to return any issues to the Access Board for additional consideration.

Executive Order 12866

This rule has been reviewed by the Office of Management and Budget (OMB) under Executive Order 12866. The Department has evaluated its existing regulations for title II and title III section by section, and many of the provisions in the final rule for both titles reflect its efforts to mitigate any negative effects on small entities. A Final Regulatory Impact Analysis (Final RIA or RIA) was prepared by the Department's contractor, HDR|HLB Decision Economics, Inc. (HDR). In accordance with Executive Order 12866, as amended, and OMB Circular A–4, the Department has reviewed and considered the Final RIA and has accepted the results of this analysis as its assessment of the benefits and costs of the final rules.

Executive Order 12866 refers explicitly not only to monetizable costs and benefits but also to ''distributive impacts'' and ''equity,'' *see* E.O. 12866, section 1(a), and it is important to recognize that the ADA is intended to provide important benefits that are distributional and equitable in character. The ADA states, ''[i]t is the purpose

of this [Act] (1) to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities; [and] (2) to provide clear, strong, consistent, enforceable standards addressing discrimination against individuals with disabilities[.]'' 42 U.S.C. 12101(b). Many of the benefits of this rule stem from the provision of such standards, which will promote inclusion, reduce stigma and potential embarrassment, and combat isolation, segregation, and second-class citizenship of individuals with disabilities. Some of these benefits are, in the words of Executive Order 12866, ''difficult to quantify, but nevertheless essential to consider.'' E.O. 12866, section 1(a). The Department has considered such benefits here.

Final Regulatory Impact Analysis

The Final RIA embodies a comprehensive benefit-cost analysis of the final rules for both title II and title III and assesses the incremental benefits and costs of the 2010 Standards relative to a primary baseline scenario (1991 Standards). In addition, the Department conducted additional research and analyses for requirements having the highest negative net present values under the primary baseline scenario. This approach was taken because, while the 1991 Standards are the only uniform set of accessibility standards that apply to public accommodations, commercial facilities, and State and local government facilities nationwide, it is also understood that many State and local jurisdictions have already adopted IBC/ANSI model code provisions that mirror those in the 2004 ADAAG. The assessments based on this approach assume that covered entities currently implementing codes that mirror the 2004 ADAAG will not need to modify their code requirements once the rules are finalized. They also assume that, even without the final rules, the current level of compliance would be unchanged. The Final RIA contains specific information, including data in chart form, detailing which States have already adopted the accessibility standards for this subset of six requirements. The Department believes that the estimates resulting from this approach represent a reasonable upper and lower measure of the likely effects these requirements will have that the Department was able to quantify and monetize.

The Final RIA estimates the benefits and costs for all new (referred to as ''supplemental'') requirements and revised requirements across all types of newly constructed and existing facilities. The Final RIA also incorporates a sophisticated risk analysis process that quantifies the inherent uncertainties in estimating costs and benefits and then assesses (through computer simulations) the relative impact of these factors when varied simultaneously. A copy of the Final RIA will be made available online for public review on the Department's ADA Home Page (*http://www.ada.gov*).

From an economic perspective (as specified in OMB Circular A–B4), the results of the Final RIA demonstrate that the Department's final rules increase social resources and thus represent a public good because monetized benefits exceed monetized costs—that is, the regulations have a positive net present value (NPV). Indeed, under every scenario assessed in the Final RIA, the final rules have a positive NPV. The Final RIA's first scenario examines the incremental impact of the final rules using the ''main'' set of assumptions (*i.e.,* assuming a primary baseline (1991 Standards), that the safe harbor applies, and that for title III entities barrier removal is readily achievable for 50 percent of elements subject to supplemental requirements).

Under this set of assumptions, the final rules have an expected NPV of $9.3 billion (7 percent discount rate) and $40.4 billion (3 percent discount rate). *See* Final RIA, table ES–1 & figure ES–2.

Expected Impact of the Rules[2]
(in billions)

Discount rate	Expected NPV	Total Expected PV (Benefits)	Total Expected PV (Costs)
3%	$40.4	$66.2	$25.8
7%	$9.3	$22.0	$12.8

Water Closet Clearances

The Department gave careful consideration to the costs and benefits of its adoption of the standards relating to water closet clearances in single-user toilet rooms. The primary effect of the Department's proposed final rules governing water closet clearances in single-user toilet rooms with in-swinging and out-swinging doors is to allow sufficient room for ''side'' or ''parallel'' methods of transferring from a wheelchair to a toilet. Under the current 1991 Standards, the requisite clearance space in single-user toilet rooms between and around the toilet and the lavatory does not permit these methods of transfer. Side or parallel transfers are used by large numbers of persons who use wheelchairs and are regularly taught in rehabilitation and occupational therapy. Currently, persons who use side or parallel transfer methods from their wheelchairs are faced with a stark choice at establishments with single-user toilet rooms—*i.e.,* patronize the establishment but run the risk of needing assistance when using the restroom, travel with someone who would be able to provide assistance in toileting, or forgo the visit entirely. The revised water closet clearance regulations would make single-user toilet rooms accessible to all persons who use wheelchairs, not just those with the physical strength, balance, and dexterity and the training to use a front-transfer method. Single-user toilet rooms are located in a wide variety of public and private facilities, including restaurants, fast-food establishments, schools, retail stores, parks, sports stadiums, and hospitals. Final promulgation of these requirements might thus, for example, enable a person who uses a side or parallel transfer method to use the restroom (or use the restroom independently) at his or her local coffee shop for the first time.

Because of the complex nature of its cost-benefit analysis, the Department is providing ''plain language'' descriptions of the benefits calculations for the two revised requirements with the highest estimated total costs: Water closet clearance in single-user toilet rooms with out-swinging doors (RIA Req. #28) (section 604.3 of the 2010 Standards) and water closet clearance in single-user toilet rooms with in-swinging doors (RIA Req. #32) (sections 604.3 and 603.2.3 Exception 2 of the 2010 Standards). Since many of the concepts and calculations in the Final RIA are highly technical, it is hoped that, by providing ''lay'' descriptions of how benefits are monetized for an illustrative set of requirements, the Final RIA will be more transparent and afford readers a more complete understanding of the benefits model generally. Because of the widespread adoption of the water closet clearance standards in existing State and local building codes, the following calculations use the IBC/ANSI baseline.

General description of monetized benefits for water closet clearance in single-user toilet rooms—out-swinging doors (Req. #28). In order to assess monetized benefits for the requirement covering water closet clearances in single-user toilet rooms with out-swinging doors, a determination needed to be made concerning the population of users with disabilities who would

[2] The analysis assumes these regulations will be in force for 15 years. Incremental costs and benefits are calculated for all construction, alterations, and barrier removal that is expected to occur during these 15 years. The analysis also assumes that any new or revised ADA rules enacted 15 years from now will include a safe harbor provision. Thus, any facilities constructed in year 14 of the final rules are assumed to continue to generate benefits to users, and to incur any operating or replacement costs for the life of these buildings, which is assumed to be 40 years.

likely benefit from this revised standard. Based on input received from a panel of experts jointly convened by HDR and the Department to discuss benefits-related estimates and assumptions used in the RIA model, it was assumed that accessibility changes brought about by this requirement would benefit persons with any type of ambulatory (*i.e*., mobility-related) disability, such as persons who use wheelchairs, walkers, or braces. Recent census figures estimate that about 11.9 percent of Americans ages 15 and older have an ambulatory disability, or about 35 million people. This expert panel also estimated that single-user toilet rooms with out-swinging doors would be used slightly less than once every other visit to a facility with such toilet rooms covered by the final rules (or, viewed another way, about once every two hours spent at a covered facility assumed to have one or more single-user toilet rooms with out-swinging doors) by an individual with an ambulatory disability. The expert panel further estimated that, for such individuals, the revised requirement would result in an average time savings of about five and a half minutes when using the restroom. This time savings is due to the revised water closet clearance standard, which permits, among other things, greater flexibility in terms of access to the toilet by parallel or side transfer, thereby perhaps reducing the wait for another person to assist with toileting and the need to twist or struggle to access the toilet independently. Based on average hourly wage rates compiled by the U.S. Department of Labor, the time savings for Req. #28 is valued at just under $10 per hour.

For public and private facilities covered by the final rules, it is estimated that there are currently about 11 million single-user toilet rooms with out-swinging doors. The majority of these types of single-user toilet rooms, nearly 7 million, are assumed to be located at ''Indoor Service Establishments,'' a broad facility group that encompasses various types of indoor retail stores such as bakeries, grocery stores, clothing stores, and hardware stores. Based on construction industry data, it was estimated that approximately 3 percent of existing single-user toilet rooms with out-swinging doors would be altered each year, and that the number of newly constructed facilities with these types of toilet rooms would increase at the rate of about 1 percent each year. However, due to the widespread adoption at the State and local level of model code provisions that mirror Req. #28, it is further understood that about half of all existing facilities assumed to have single-user toilet rooms with out-swinging doors already are covered by State or local building codes that require equivalent water closet clearances. Due to the general element-by-element safe harbor provision in the final rules, no unaltered single-user toilet rooms that comply with the current 1991 Standards will be required to retrofit to meet the revised clearance requirements in the final rules.

With respect to new construction, it is assumed that each single-user toilet room with an out-swinging door will last the life of the building, about 40 years. For alterations, the amount of time such a toilet room will be used depends upon the remaining life of the building (*i.e.,* a period of time between 1 and 39 years).

Summing up monetized benefits to users with disabilities across all types of public and private facilities covered by the final rules, and assuming 46 percent of covered facilities nationwide are located in jurisdictions that have adopted the relevant equivalent IBC/ ANSI model code provisions, it is expected that the revised requirement for water closet clearance in single-user toilet rooms with out-swinging doors will result in net benefits of approximately $900 million over the life of these regulations.

General description of monetized benefits for water closet clearance in single-user toilet rooms—in-swinging doors (Req. # 32). For the water closet clearance in single-user toilet rooms with the in-swinging door requirement (Req. #32), the expert panel determined that the primary beneficiaries would be persons who use wheelchairs. As compared to single-user toilet rooms with out-

swinging doors, those with in-swinging doors tend to be larger (in terms of square footage) in order to accommodate clearance for the in-swinging door and, thus, are already likely to have adequate clear floor space for persons with disabilities who use other types of mobility aids such as walkers and crutches.

The expert benefits panel estimated that single-user toilet rooms with in-swinging doors are used less frequently on average—about once every 20 visits to a facility with such a toilet room by a person who uses a wheelchair—than their counterpart toilet rooms with out-swinging doors. This panel also determined that, on average, each user would realize a time savings of about 9 minutes as a result of the enhanced clearances required by this revised standard.

The RIA estimates that there are about 4 million single-user toilet rooms with in-swinging doors in existing facilities. About half of the single-user toilet rooms with in-swinging doors are assumed to be located in single-level stores, and about a quarter of them are assumed to be located in restaurants. Based on construction industry data, it was estimated that approximately 3 percent of existing single-user toilet rooms with in-swinging doors would be altered each year, and that the number of newly constructed facilities with these types of toilet rooms would increase at the rate of about 1 percent each year. However, due to the widespread adoption at the State and local level of model code provisions that mirror Req. #32, it is further understood that slightly more than 70 percent of all existing facilities assumed to have single-user toilet rooms with in-swinging doors already are covered by State or local building codes that require equivalent water closet clearances. Due to the general element-by-element safe harbor provision in the final rules, no unaltered single-user toilet rooms that comply with the current 1991 Standards will be required to retrofit to meet the revised clearance requirements in the final rules.

Similar to the assumptions for Req. #28, it is assumed that newly constructed single-user toilet rooms with in-swinging doors will last the life of the building, about 40 years. For alterations, the amount of time such a toilet room will be used depends upon the remaining life of the building (*i.e.,* a period of time between 1 and 39 years). Over this time period, the total estimated value of benefits to users of water closets with in-swinging doors from the time they will save and decreased discomfort they will experience is nearly $12 million.

Additional benefits of water closet clearance standards. The standards requiring sufficient space in single-user toilet rooms for a wheelchair user to effect a side or parallel transfer are among the most costly (in monetary terms) of the new provisions in the Access Board's guidelines that the Department adopts in this rule—but also, the Department believes, one of the most beneficial in non-monetary terms. Although the monetized costs of these requirements substantially exceed the monetized benefits, the additional benefits that persons with disabilities will derive from greater safety, enhanced independence, and the avoidance of stigma and humiliation— benefits that the Department's economic model could not put in monetary terms—are, in the Department's experience and considered judgment, likely to be quite high. Wheelchair users, including veterans returning from our Nation's wars with disabilities, are taught to transfer onto toilets from the side. Side transfers are the safest, most efficient, and most independence-promoting way for wheelchair users to get onto the toilet. The opportunity to effect a side transfer will often obviate the need for a wheelchair user or individual with another type of mobility impairment to obtain the assistance of another person to engage in what is, for most people, among the most private of activities. Executive Order 12866 refers explicitly not only to monetizable costs and benefits but also to ''distributive impacts'' and ''equity,'' *see* E.O. 12866, section 1(a), and it is important to recognize that the ADA is intended to provide important benefits that are distributional and equitable in character. These

water closet clearance provisions will have non-monetized benefits that promote equal access and equal opportunity for individuals with disabilities, and will further the ADA' s purpose of providing ''a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities.'' 42 U.S.C. 12101(b)(1).

The Department's calculations indicated that, in fact, people with the relevant disabilities would have to place only a very small monetary value on these quite substantial benefits for the costs and benefits of these water closet clearance standards to break even. To make these calculations, the Department separated out toilet rooms with out-swinging doors from those with in-swinging doors, because the costs and benefits of the respective water closet clearance requirements are significantly different. The Department estimates that, assuming 46 percent of covered facilities nationwide are located in jurisdictions that have adopted the relevant equivalent IBC/ANSI model code provisions, the costs of the requirement as applied to toilet rooms with out-swinging doors will exceed the monetized benefits by $454 million, an annualized net cost of approximately $32.6 million. But a large number of people with disabilities will realize benefits of independence, safety, and avoided stigma and humiliation as a result of the requirement's application in this context. Based on the estimates of its expert panel and its own experience, the Department believes that both wheelchair users and people with a variety of other mobility disabilities will benefit. The Department estimates that people with the relevant disabilities will use a newly accessible single-user toilet room with an out-swinging door approximately 677 million times per year. Dividing the $32.6 million annual cost by the 677 million annual uses, the Department concludes that for the costs and benefits to break even in this context, people with the relevant disabilities will have to value safety, independence, and the avoidance of stigma and humiliation at just under 5 cents per visit. The Department believes, based on its experience and informed judgment, that 5 cents substantially understates the value people with the relevant disabilities would place on these benefits in this context.

There are substantially fewer single-user toilet rooms with in-swinging doors, and substantially fewer people with disabilities will benefit from making those rooms accessible. While both wheelchair users and individuals with other ambulatory disabilities will benefit from the additional space in a room with an out-swinging door, the Department believes, based on the estimates of its expert panel and its own experience, that wheelchair users likely will be the primary beneficiaries of the in-swinging door requirement. The Department estimates that people with the relevant disabilities will use a newly accessible single-user toilet room with an in-swinging door approximately 8.7 million times per year. Moreover, the alteration costs to make a single-user toilet room with an in-swinging door accessible are substantially higher (because of the space taken up by the door) than the equivalent costs of making a room with an out-swinging door accessible. Thus, the Department calculates that, assuming 72 percent of covered facilities nationwide are located in jurisdictions that have adopted the relevant equivalent IBC/ANSI model code provisions, the costs of applying the toilet room accessibility standard to rooms with in-swinging doors will exceed the monetized benefits of doing so by $266.3 million over the life of the regulations, or approximately $19.14 million per year. Dividing the $19.14 million annual cost by the 8.7 million annual uses, the Department concludes that for the costs and benefits to break even in this context, people with the relevant disabilities will have to value safety, independence, and the avoidance of stigma and humiliation at approximately $2.20 per visit. The Department believes, based on its experience and informed judgment, that this figure approximates, and probably understates, the value wheelchair users place on safety, independence, and the avoidance of stigma and humiliation in this context.

Alternate Scenarios

Another scenario in the Final RIA explores the incremental impact of varying the assumptions concerning the percentage of existing elements subject to supplemental requirements for which barrier removal would be readily achievable. Readily achievable barrier removal rates are modeled at 0 percent, 50 percent, and 100 percent levels. The results of this scenario show that the expected NPV is positive for each readily achievable barrier removal rate and that varying this assumed rate has little impact on expected NPV. *See* Final RIA, figure ES–3.

A third set of analyses in the Final RIA demonstrates the impact of using alternate baselines based on model codes instead of the primary baseline. The IBC model codes, which have been widely adopted by State and local jurisdictions around the country, are significant because many of the requirements in the final rules mirror accessibility provisions in the IBC model codes (or standards incorporated therein by reference, such as ANSI A117.1). The actual economic impact of the Department's final rules is, therefore, tempered by the fact that many jurisdictions nationwide have already adopted and are enforcing portions of the final rules—indeed, this was one of the goals underlying the Access Board's efforts to harmonize the 2004 ADAAG Standards with the model codes. However, capturing the economic impact of this reality poses a difficult modeling challenge due to the variety of methods by which States and localities have adopted the IBC/ANSI model codes (*e.g.,* in whole, in part, and with or without amendments), as well as the lack of a national ''facility census' establishing the location, type, and age of existing ADA-covered facilities.

As a result, in the first set of alternate IBC baseline analyses, the Final RIA assumes that all of the three IBC model codes—IBC 2000, IBC 2003, and IBC 2006—have been fully adopted by all jurisdictions and apply to all facilities nationwide. As with the primary baseline scenarios examined in the Final RIA, use of these three alternate IBC baselines results in positive expected NPVs in all cases. *See* Final RIA, figure ES–4. These results also indicate that IBC 2000 and IBC 2006 respectively have the highest and lowest expected NPVs. These results are due to changes in the make-up of the set of requirements that is included in each alternative baseline.

Additionally, a second, more limited alternate baseline analysis in the Final RIA uses a State-specific and requirement-specific alternate IBC/ANSI baseline in order to demonstrate the likely actual incremental impact of an illustrative subset of 20 requirements under current conditions nationwide. For this analysis, research was conducted on a subset of 20 requirements in the final rules that have negative net present values under the primary baseline and readily identifiable IBC/ANSI counterparts to determine the extent to which they each respectively have been adopted at the State or local level. With respect to facilities, the population of adopting jurisdictions was used as a proxy for facility location. In other words, it was assumed that the number of ADA-covered facilities respectively compliant with these 20 requirements was equal to the percentage of the United States population (based on statistics from the Census Bureau) currently residing in those States or local jurisdictions that have adopted the IBC/ANSI counterparts to these requirements. The results of this more limited analysis, using State-specific and requirement-specific alternate IBC/ANSI baselines for these 20 requirements, demonstrate that the widespread adoption of IBC model codes by States and localities significantly lessens the financial impact of these specific requirements. Indeed, the Final RIA estimates that, if the NPVs for these 20 requirements resulting from the requirement-specific alternate IBC/ANSI baseline are substituted for their respective results under the primary baseline, the overall NPV for the final rules increases from $9.2 billion to $12.0 billion. *See* Final RIA, section 6.2.2 & table 10.

Benefits Not Monetized in the Formal Analysis

Finally, the RIA recognizes that additional benefits are likely to result from the new standards. Many of these benefits are more difficult to quantify. Among the potential benefits that have been discussed by researchers and advocates are reduced administrative costs due to harmonized guidelines, increased business opportunities, increased social development, and improved health benefits. For example, the final rules will substantially increase accessibility at newly scoped facilities such as recreation facilities and judicial facilities, which previously have been very difficult for persons with disabilities to access. Areas where the Department believes entities may incur benefits that are not monetized in the formal analysis include, but may not be limited to, the following:

Use benefits accruing to persons with disabilities. The final rules should improve the overall sense of well-being of persons with disabilities, who will know that public entities and places of public accommodation are generally accessible, and who will have improved individual experiences. Some of the most frequently cited qualitative benefits of increased access are the increase in one's personal sense of dignity that arises from increased access and the decrease in possibly humiliating incidents due to accessibility barriers. Struggling to join classmates on a stage, to use a bathroom with too little clearance, or to enter a swimming pool all negatively affect a person's sense of independence and can lead to humiliating accidents, derisive comments, or embarrassment. These humiliations, together with feelings of being stigmatized as different or inferior from being relegated to use other, less comfortable or pleasant elements of a facility (such as a bathroom instead of a kitchen sink for rinsing a coffee mug at work), all have a negative effect on persons with disabilities.

Use benefits accruing to persons without disabilities. Improved accessibility can affect more than just the rule's target population; persons without disabilities may also benefit from many of the requirements. Even though the requirements were not designed to benefit persons without disabilities, any time savings or easier access to a facility experienced by persons without disabilities are also benefits that should properly be attributed to that change in accessibility. Curb cuts in sidewalks make life easier for those using wheeled suitcases or pushing a baby stroller. For people with a lot of luggage or a need to change clothes, the larger bathroom stalls can be highly valued. A ramp into a pool can allow a child (or adult) with a fear of water to ease into that pool. All are examples of ''unintended'' benefits of the rule. And ideally, all should be part of the calculus of the benefits to society of the rule.

Social benefits. Evidence supports the notion that children with and without disabilities benefit in their social development from interaction with one another. Therefore, there will likely be social development benefits generated by an increase in accessible play areas. However, these benefits are nearly impossible to quantify for several reasons. First, there is no guarantee that accessibility will generate play opportunities between children with and without disabilities. Second, there may be substantial overlap between interactions at accessible play areas and interactions at other facilities, such as schools and religious facilities. Third, it is not certain what the unit of measurement for social development should be.

Non-use benefits. There are additional, indirect benefits to society that arise from improved accessibility. For instance, resource savings may arise from reduced social service agency outlays when people are able to access centralized points of service delivery rather than receiving home-based care. Home-based and other social services may include home health care visits and welfare benefits. Third-party employment effects can arise when enhanced accessibility results in increasing rates of consumption by disabled and non-disabled populations, which in turn results in reduced unemployment.

Two additional forms of benefits are discussed less often, let alone quantified: Option value and existence value. Option value is the value that people with and without disabilities derive from the option of using accessible facilities at some point in the future. As with insurance, people derive benefit from the knowledge that the option to use the accessible facility exists, even if it ultimately goes unused. Simply because an individual is a nonuser of accessible elements today does not mean that he or she will remain so tomorrow. In any given year, there is some probability that an individual will develop a disability (either temporary or permanent) that will necessitate use of these features. For example, the 2000 Census found that 41.9 percent of adults 65 years and older identified themselves as having a disability. Census Bureau figures, moreover, project that the number of people 65 years and older will more than double between 2000 and 2030—from 35 million to 71.5 million. Therefore, even individuals who have no direct use for accessibility features today get a direct benefit from the knowledge of their existence should such individuals need them in the future.

Existence value is the benefit that individuals get from the plain existence of a good, service or resource—in this case, accessibility. It can also be described as the value that people both with and without disabilities derive from the guarantees of equal treatment and non-discrimination that are accorded through the provision of accessible facilities. In other words, people value living in a country that affords protections to individuals with disabilities, whether or not they themselves are directly or indirectly affected. Unlike use benefits and option value, existence value does not require an individual ever to use the resource or plan on using the resource in the future. There are numerous reasons why individuals might value accessibility even if they do not require it now and do not anticipate needing it in the future.

Costs Not Monetized in the Formal Analysis

The Department also recognizes that in addition to benefits that cannot reasonably be quantified or monetized, there may be negative consequences and costs that fall into this category as well. The absence of a quantitative assessment of such costs in the formal regulatory analysis is not meant to minimize their importance to affected entities; rather, it reflects the inherent difficulty in estimating those costs. Areas where the Department believes entities may incur costs that are not monetized in the formal analysis include, but may not be limited to, the following:

Costs from deferring or forgoing alterations. Entities covered by the final rules may choose to delay otherwise desired alterations to their facilities due to the increased incremental costs imposed by compliance with the new requirements. This may lead to facility deterioration and decrease in the value of such facilities. In extreme cases, the costs of complying with the new requirements may lead some entities to opt to not build certain facilities at all. For example, the Department estimates that the incremental costs of building a new wading pool associated with the final rules will increase by about $142,500 on average. Some facilities may opt to not build such pools to avoid incurring this increased cost.

Loss of productive space while modifying an existing facility. During complex alterations, such as where moving walls or plumbing systems will be necessary to comply with the final rules, productive space may be unavailable until the alterations are complete. For example, a hotel altering its bathrooms to comply with the final rules will be unable to allow guests to occupy these rooms while construction activities are underway, and thus the hotel may forgo revenue from these rooms during this time. While the amount of time necessary to perform alterations varies significantly, the costs associated with unproductive space could be high in certain cases, especially if space is already limited or if an entity or facility is

located in an area where real estate values are particularly high (*e.g.,* New York or San Francisco).

Expert fees. Another type of cost to entities that is not monetized in the formal analysis is legal fees to determine what, if anything, a facility needs to do in order to comply with the new rules or to respond to lawsuits. Several commenters indicated that entities will incur increased legal costs because the requirements are changing for the first time since 1991. Since litigation risk could increase, entities could spend more on legal fees than in the past. Likewise, covered entities may face incremental costs when undertaking alterations because their engineers, architects, or other consultants may also need to consider what modifications are necessary to comply with the new requirements. The Department has not quantified the incremental costs of the services of these kinds of experts.

Reduction in facility value and losses to individuals without disabilities due to the new accessibility requirements. It is possible that some changes made by entities to their facilities in order to comply with the new requirements may result in fewer individuals without disabilities using such facilities (because of decreased enjoyment) and may create a disadvantage for individuals without disabilities, even though the change might increase accessibility for individuals with disabilities. For example, the new requirements for wading pools might decrease the value of the pool to the entity that owns it due to fewer individuals using it (because the new requirements for a sloped entry might make the pool too shallow). Similarly, several commenters from the miniature golf industry expressed concern that it would be difficult to comply with the regulations for accessible holes without significantly degrading the experience for other users. Finally, with respect to costs to individuals who do not have disabilities, a very tall person, for example, may be inconvenienced by having to reach further for a lowered light switch.

Section 610 Review

The Department also is required to conduct a periodic regulatory review pursuant to section 610 of the RFA, as amended by the SBREFA.

The review requires agencies to consider five factors: (1) The continued need for the rule; (2) the nature of complaints or comments received concerning the rule from the public; (3) the complexity of the rule; (4) the extent to which the rule overlaps, duplicates, or conflicts with other Federal rules, and, to the extent feasible, with State and local governmental rules; and (5) the length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed in the area affected by the rule. 5 U.S.C. 610(b). Based on these factors, the agency is required to determine whether to continue the rule without change or to amend or rescind the rule, to minimize any significant economic impact of the rule on a substantial number of small entities. *See id.* 610(a).

In developing the 2010 Standards, the Department reviewed the 1991 Standards section by section, and, as a result, has made several clarifications and amendments in both the title II and title III implementing regulations. The changes reflect the Department's analysis and review of complaints or comments from the public, as well as changes in technology. Many of the amendments aim to clarify and simplify the obligations of covered entities. As discussed in greater detail above, one significant goal of the development of the 2004 ADAAG was to eliminate duplication or overlap in Federal accessibility guidelines, as well as to harmonize the Federal guidelines with model codes. The Department also has worked to create harmony where appropriate between the requirements of titles II and III. Finally, while the regulation is required by statute and there is a continued need for it as a whole, the Department proposes several modifications that are intended to reduce its effects on small entities.

The Department has consulted with the Small Business Administration's Office of Advocacy

about this process. The Office of Advocacy has advised that although the process followed by the Department was ancillary to the proposed adoption of revised ADA Standards, the steps taken to solicit public input and to respond to public concerns are functionally equivalent to the process required to complete a section 610 review. Therefore, this rulemaking fulfills the Department's obligations under the RFA.

Final Regulatory Flexibility Analysis

This final rule also has been reviewed by the Small Business Administration's Office of Advocacy (Advocacy) in accordance with Executive Order 13272, 67 FR 53461, 3 CFR, 2003 Comp., p. 247. Chapter Seven of the Final RIA demonstrates that the final rule will not have a significant economic impact on a substantial number of small entities. The Department has also conducted a final regulatory flexibility analysis (FRFA) as a component of this rulemaking. Collectively, the ANPRM, NPRM, Initial RIA, Final RIA, and 2010 Standards include all of the elements of a FRFA required by the RFA. *See* 5 U.S.C. 604(a)(1)–(5).

Section 604(a) lists the specific requirements for a FRFA. The Department has addressed these RFA requirements throughout the ANPRM, NPRM, the 2010 Standards, and the RIA. In summary, the Department has satisfied its FRFA obligations under section 604(a) by providing the following:

1. *Succinct summaries of the need for, and objectives of, the final rule.* The Department is issuing this final rule in order to comply with its obligations under both the ADA and the SBREFA. The Department is also updating or amending certain provisions of the existing title III regulation so that they are consistent with the title II regulations and comport with the Department's legal and practical experiences in enforcing the ADA.

The ADA requires the Department to adopt enforceable accessibility standards under the ADA that are consistent with the Access Board's minimum accessibility guidelines and requirements. Accordingly, this rule adopts ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines as part of the 2010 Standards, which will give the guidelines legal effect with respect to the Department's title II and title III regulations.

Under the SBREFA, the Department is required to perform a periodic review of its 1991 rule because the rule may have a significant economic impact on a substantial number of small entities. The SBREFA also requires the Department to make a regulatory assessment of the costs and benefits of any significant regulatory action. *See* preamble sections of the final rules for titles II and III entitled ''Summary''; Department of Justice Advanced Notice of Proposed Rulemaking, 69 FR 58768, 58768B70, (Sept. 30, 2004) (outlining the regulatory history, goals, and rationale underlying the Department's proposal to revise its regulations implementing titles II and III of the ADA); and Department of Justice Notice of Proposed Rulemaking, 73 FR 34508, 34508B14 (June 17, 2008) (outlining the regulatory history and rationale underlying the Department's proposal to revise its regulations implementing titles II and III of the ADA).

2. *Summaries of significant issues raised by public comments in response to the Department's initial regulatory flexibility analysis (IRFA) and discussions of regulatory revisions made as a result of such comments.* The majority of the comments received by the Department addressing its IRFA set forth in the title III NPRM were submitted by the Advocacy. Advocacy acknowledged that the Department took into account the comments and concerns of small businesses; however, Advocacy remained concerned about certain items in the Department's NPRM and requested clarification or additional guidance on certain items.

General Safe Harbor. Advocacy expressed support for the Department's proposal to allow an

element-by-element safe harbor for elements that now comply with the 1991 Standards and encouraged the Department to include specific technical assistance in the Small Business Compliance Guide that the Department is required to publish pursuant to section 212 of the SBREFA, 5 U.S.C. 610 *et seq*. Advocacy requested that technical assistance outlining which standards are subject to the safe harbor be included in the Department's guidance. The Department has provided a list of the new requirements in the 2010 Standards that are not eligible for the safe harbor in § 36.304(d)(2)(iii)(A)–(L) of the final rule and plans to include additional information about the application of the safe harbor in the Department's Small Business Compliance Guide. Advocacy also requested that guidance regarding the two effective dates for regulations also be provided, and the Department plans to include such guidance in its Small Business Compliance Guide.

Small Business Safe Harbor. Advocacy expressed disappointment that the Department did not include a small business safe harbor in the final rule. In the NPRM, the Department proposed to include a small business safe harbor. Advocacy conceptually supported this safe harbor but had concerns regarding its application. Commenters from both the disability community and the business community uniformly, and quite adamantly, opposed the Department's proposal. Some business commenters suggested alternative safe harbors, but there was no common thread among their suggestions that would enable the Department to craft a proposal that would draw support from the affected communities.

Advocacy recommended that the Department continue to study how the proposed small business safe harbor might be made workable in future rulemakings, and recommended that the Department also seek other alternatives that minimize the economic impact of the ADA rulemakings in the future. The Department is mindful of its obligations under the SBREFA and will be sensitive to the need to mitigate costs for small businesses in any future rulemaking; however, based on the information currently available, the Department has declined to commit to a specific regulatory approach in the final rule.

Indirect Costs. Advocacy and other commenters representing business interests expressed concern that businesses would incur substantial indirect costs under the final rule for accessibility consultants, legal counsel, training, and the development of new policies and procedures. The Department believes that such ''indirect costs,'' even assuming they would occur as described by these commenters, are not properly attributed to the Department's final rule implementing the ADA.

The vast majority of the new requirements are incremental changes subject to a safe harbor. All businesses currently in compliance with the 1991 Standards will neither need to undertake further retrofits nor require the services of a consultant to tell them so. If, on the other hand, elements at an existing facility are not currently in compliance with the 1991 Standards, then the cost of making such a determination and bringing these elements into compliance are not properly attributed to the final rule, but to lack of compliance with the 1991 Standards.

For the limited number of requirements in the final rule that are supplemental, the Department believes that covered entities simply need to determine whether they have an element covered by a supplemental requirement (*e.g.,* a swimming pool) and then conduct any necessary barrier removal work either in-house or by contacting a local contractor. Determining whether such an element exists is expected to take only a minimal amount of staff time. Nevertheless, Chapter 5 of the Final RIA has a high-end estimate of the additional management costs of such evaluation (from 1 to 8 hours of staff time).

The Department also anticipates that businesses will incur minimal costs for accessibility consultants to ensure compliance with the new requirements for New Construction and Altera-

tions in the final rule. Both the 2004 ADAAG and the proposed requirements have been made public for some time and are already being incorporated into design plans by architects and builders. Further, in adopting the final rule, the Department has sought to harmonize, to the greatest extent possible, the ADA Standards with model codes that have been adopted on a widespread basis by State and local jurisdictions across the country. Accordingly, many of the requirements in the final rule are already incorporated into building codes nationwide. Additionally, it is assumed to be part of the regular course of business—and thereby incorporated into standard professional services or construction contracts—for architects and contractors to keep abreast of changes in applicable Federal, State, and local laws and building codes. Given these considerations, the Department has determined that the additional costs, if any, for architectural or contractor services that arise out of the final rule should be minimal.

Some commenters stated that the final rule would require them to develop new policies or manuals to retrain employees on the revised ADA standards. However, it is the Department's view that because the revised and supplemental requirements address architectural issues and features, the final rule would require minimal, if any, changes to the overall policies and procedures of covered entities.

Finally, commenters representing business interests expressed the view that the final rule would cause businesses to incur significant legal costs in order to defend ADA lawsuits. However, regulatory impact analyses are not an appropriate forum for assessing the cost covered entities may bear, or the repercussions they may face, for failing to comply (or allegedly failing to comply) with current law. *See* Final RIA, Ch. 3, section 3.1.4, ''Other Management Transition Costs''; Ch. 5,''Updates to the Regulatory Impact Analysis''; and table 15, ''Impact of NPV of Estimated Managerial Costs for Supplemental Requirements at All Facilities.''

3. *Estimates of the number and type of small entities to which the final rule will apply*. The Department estimates that the final rule will apply to approximately three million small entities or facilities covered by title III. *See* Final RIA, Ch. 7, ''Small Business Impact Analysis,'' table 17, and app. 5, ''Small Business Data''; *see also* 73 FR 36964, 36996–37009 (June 30, 2008) (estimating the number of small entities the Department believes may be impacted by the NPRM and calculating the likely incremental economic impact of the rule on small facilities/entities versus ''typical'' (*i.e.,* average-sized facilities/entities).

4. *A description of the projected reporting, record-keeping, and other compliance requirements of the final rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record.* The final rule imposes no new recordkeeping or reporting requirements. *See* preamble section entitled ''Paperwork Reduction Act.'' Small entities may incur costs as a result of complying with the final rules. These costs are detailed in the Final RIA, Chapter 7, ''Small Business Impact Analysis'' and accompanying Appendix 5, ''Small Business Data.''

5. *Descriptions of the steps taken by the Department to minimize any significant economic impact on small entities consistent with the stated objectives of the ADA, including the reasons for selecting the alternatives adopted in the final rule and for rejecting other significant alternatives.* From the outset of this rulemaking, the Department has been mindful of small entities and has taken numerous steps to minimize the impact of the final rule on small businesses. Several of these steps are summarized below.

As an initial matter, the Department— as a voting member of the Access Board—was extensively involved in the development of the 2004 ADAAG. These guidelines, which are incorporated into the 2010 Standards, reflect a conscious effort to mitigate any significant economic impact

on small businesses in several respects. First, one of the express goals of the 2004 ADAAG is harmonization of Federal accessibility guidelines with industry standards and model codes that often form the basis of State and local building codes, thereby minimizing the impact of these guidelines on all covered entities, but especially small businesses. Second, the 2004 ADAAG is the product of a 10-year rulemaking effort in which a host of private and public entities, including small business groups, worked cooperatively to develop accessibility guidelines that achieved an appropriate balance between accessibility and cost. For example, as originally recommended by the Access Board's Recreation Access Advisory Committee, all holes on a miniature golf course would be required to be accessible except for sloped surfaces where the ball could not come to rest. *See, e.g.,* ''ADA Accessibility Guidelines for Buildings and Facilities—Recreation Facilities and Outdoor Developed Areas,'' Access Board Advance Notice of Proposed Rulemaking, 59 FR 48542 (Sept. 21, 1994). Miniature golf trade groups and facility operators, who are nearly all small businesses, expressed significant concern that such requirements would be prohibitively expensive, would require additional space, and might fundamentally alter the nature of their courses. *See, e.g.*, ''ADA Accessibility Guidelines for Buildings and Facilities—Recreation Facilities,'' Access Board Notice of Proposed Rulemaking, 64 FR 37326 (July 9, 1999). In consideration of such concerns and after holding informational meetings with miniature golf representatives and persons with disabilities, the Access Board significantly revised the final miniature golf guidelines. The final guidelines not only reduced significantly the number of holes required to be accessible to 50 percent of all holes (with one break in the sequence of consecutive holes permitted), but also added an exemption for carpets used on playing surfaces, modified ramp landing slope and size requirements, and reduced the space required for start of play areas. *See, e.g.,* Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities—Recreation Facilities Final Rule, 36 CFR parts 1190 and 1191.

The Department also published an ANPRM to solicit public input on the adoption of the 2004 ADAAG as the revised Federal accessibility standards implementing titles II and III of the ADA. Among other things, the ANPRM specifically invited comment from small entities regarding the proposed rule's potential economic impact and suggested regulatory alternatives to ameliorate any such impact. *See* ''Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities,'' Department of Justice Advance Notice of Proposed Rulemaking, 69 FR 58768, 58778–79 (Sept. 30, 2004). The Department received over 900 comments, and small business interests figured prominently. *See* ''Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities,'' Department of Justice Notice of Proposed Rulemaking, 73 FR 34508, 34511, 34550 (June 17, 2008).

Subsequently, when the Department published its NPRM in June 2008, several regulatory proposals were included to address concerns raised by the small business community in ANPRM comments. First, to mitigate costs to existing facilities, the Department proposed an element-by-element safe harbor that would exempt elements in compliance with applicable technical and scoping requirements in the 1991 Standards from any retrofit obligations under the revised title III rule. *Id.* at 34514–15, 34532–33. While this proposed safe harbor applied to title III covered entities irrespective of size, it was small businesses that especially stood to benefit since, according to comments from small business advocates, small businesses are more likely to operate in older buildings and facilities. The title III NPRM also offered for public comment a novel safe harbor provision specifically designed to address small business advocates' request for clearer guidance on the readily achievable barrier removal requirement.

This proposal provided that qualified small businesses would be deemed to have satisfied their readily achievable barrier removal obligations for a given year if, during that tax year, they had spent at least 1 percent of their respective gross revenues undertaking measures in compliance with title III barrier removal requirements. *Id.* at 34538–39. Lastly, the NPRM sought public input on the inclusion of reduced scoping provisions for certain types of small existing recreation facilities (*i.e.,* swimming pools, play areas, and saunas). *Id.* at 34515, 34534–37.

During the NPRM comment period, the Department engaged in considerable public outreach to the small business community. A public hearing was held in Washington, D.C., during which nearly 50 persons, including several small business owners, testified in person or by phone. *See Transcript of the Public Hearing on Notices of Proposed Rulemaking* (July 15, 2008), available at *www.ada.gov/NPRM2008/ public_hearing_transcript.htm*. This hearing was also streamed live over the Internet. By the end of the 60-day comment period, the Department had also received nearly 4,500 public comments on the title III NPRM, including a significant number of comments reflecting small businesses' perspectives on a wide range of regulatory issues.

In addition to soliciting input from small entities through the formal process for public comment, the Department also targeted the small business community with less formal regulatory discussions, including a Small Business Roundtable convened by the Office of Advocacy and held at the offices of the Small Business Administration in Washington, D.C., and an informational question-and-answer session concerning the titles II and III NPRMs at the Department of Justice in which business representatives attended in-person and by telephone. These outreach efforts provided the small business community with information on the NPRM proposals being considered by the Department and gave small businesses the opportunity to ask questions of the Department and provide feedback.

As a result of the feedback provided by representatives of small business interests on the title III NPRM, the Department was able to assess the impact of various alternatives on small businesses before adopting its final rule and took steps to minimize any significant impact on small entities. Most notably, the final rule retains the element-by-element safe harbor for which the small business community voiced strong support. *See* Appendix A discussion of removal of barriers (§ 36.304). The Department believes that this element-by-element safe harbor provision will go a long way toward mitigating the economic impact of the final rule on existing facilities owned or operated by small businesses. Indeed, as demonstrated in the Final RIA, the element-by-element safe harbor will provide substantial relief to small businesses that is estimated at $ 7.5 billion over the expected life of the final rule.

Additional regulatory measures mitigating the economic impact of the final rule on title III-covered entities (including small businesses) include deletion of the proposed requirement for captioning of safety and emergency information on scoreboards at sporting venues, retention of the proposed path of travel safe harbor, extension of the compliance date of the 2010 Standards as applied to new construction and alterations from 6 months to 18 months after publication of the final rule, and, in response to public comments, modification of the triggering event for application of the 2010 Standards to new construction and alterations from a unitary approach (commencement of physical construction) to a two-pronged approach (date of last application for building permit or commencement of physical construction) depending on whether a building permit is or is not required for the type of construction at issue by State or local building authorities. *See* Appendix A discussions of captioning at sporting venues (§36.303), alterations and path of travel (§ 36.403), and com-

pliance dates and triggering events for new construction and alterations (§ 36.406).

Two sets of proposed alternative measures that would have potentially provided some cost savings to small businesses—the safe harbor for qualified small businesses and reduced scoping for certain existing recreation facilities—were not adopted by the Department in the final rule. As discussed in more depth previously, the safe harbor for qualified small businesses was omitted from the final rule because the general safe harbor already provides significant relief for small businesses located in existing facilities, the proposed safe harbor provision lacked support from the small business community and no consensus emerged from business commenters concerning feasible bases for the final regulatory provision, and commenters noted practical considerations that would potentially make some small businesses incur greater expense or administrative burden. *See* Appendix A discussion of the safe harbor for qualified small businesses (§ 36.304).

The Department also omitted the proposals to reduce scoping for certain existing recreation facilities in the final rule. While these proposals were not specific to small entities, they nonetheless might have mitigated the impact of the final rule for some small businesses that owned or operated existing facilities at which these recreational elements were located. *See* Appendix A discussion of reduced scoping for play areas and other recreation facilities (§ 36.304). The Department gave careful consideration to how best to insulate small businesses from overly burdensome barrier removal costs under the 2010 Standards for existing small play areas, swimming pools, and saunas, while still providing accessible and integrated recreation facilities that are of great importance to persons with disabilities. The Department concluded that the existing readily achievable barrier removal standard, rather than specific exemptions for these types of existing facilities, is the most efficacious method by which to protect small businesses.

Once the final rule is promulgated, small businesses will also have a wealth of documents to assist them in complying with the 2010 Standards. For example, accompanying the final rule in the **Federal Register** is the Department's"Analysis and Commentary on the 2010 ADA Standards for Accessible Design," which provides a plain language description of the revised scoping and technical requirements in these Standards and provides illustrative figures. The Department also expects to publish guidance specifically tailored to small businesses in the form of a small business compliance guide, as well as to publish technical assistance materials of general interest to all covered entities following promulgation of the final rule. Additionally, the Access Board has published a number of guides that discuss and illustrate application of the 2010 Standards to play areas and various types of recreation facilities.

Executive Order 13132: Federalism

Executive Order 13132, 64 FR 43255, 3 CFR, 2000 Comp., p. 206, requires executive branch agencies to consider whether a rule will have federalism implications. That is, the rulemaking agency must determine whether the rule is likely to have substantial direct effects on State and local governments, a substantial direct effect on the relationship between the Federal government and the States and localities, or a substantial direct effect on the distribution of power and responsibilities among the different levels of government. If an agency believes that a rule is likely to have federalism implications, it must consult with State and local elected officials about how to minimize or eliminate the effects.

Title III of the ADA covers public accommodations and commercial facilities. These facilities are generally subject to regulation by different levels of government, including Federal, State, and local governments. The ADA and the 2010 Standards set minimum civil rights protections for individuals with disabilities that in turn may affect the implementation of State and local laws,

particularly building codes. The 2010 Standards address federalism concerns and mitigate federalism implications, particularly the provisions that streamline the administrative process for State and local governments seeking ADA code certification under title III.

As a member of the Access Board, the Department was privy to substantial feedback from State and local governments throughout the development of the Board's 2004 guidelines. Before those guidelines were finalized as the 2004 ADA/ABA Guidelines, they addressed and minimized federalism concerns expressed by State and local governments during the development process. Because the Department adopted ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the 2004 ADA/ABA Guidelines as part of the 2010 Standards, the steps taken in the 2004 ADA/ABA Guidelines to address federalism concerns are reflected in the 2010 Standards.

The Department also solicited and received input from public entities in the September 2004 ANPRM and the June 2008 NPRM. Through the ANPRM and NPRM processes, the Department solicited comments from elected State and local officials and their representative national organizations about the potential federalism implications. The Department received comments addressing whether the ANPRM and NPRM directly affected State and local governments, the relationship between the Federal government and the States, and the distribution of power and responsibilities among the various levels of government. The rule preempts State laws affecting entities subject to the ADA only to the extent that those laws conflict with the requirements of the ADA, as set forth in the rule.

National Technology Transfer and Advancement Act of 1995

The National Technology Transfer and Advancement Act of 1995 (NTTAA) directs that, as a general matter, all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, which are private, generally non-profit organizations that develop technical standards or specifications using well-defined procedures that require openness, balanced participation among affected interests and groups, fairness and due process, and an opportunity for appeal, as a means to carry out policy objectives or activities. Public Law 104–113 section 12(d)(1) (15 U.S.C. 272 Note). In addition, the NTTAA directs agencies to consult with voluntary, private sector, consensus standards bodies and requires that agencies participate with such bodies in the development of technical standards when such participation is in the public interest and is compatible with agency and departmental missions, authorities, priorities, and budget resources. *Id.* section 12(d)1). The Department, as a member of the Access Board, was an active participant in the lengthy process of developing the 2004 ADAAG, on which the 2010 Standards are based. As part of this update, the Board has made its guidelines more consistent with model building codes, such as the IBC, and industry standards. It coordinated extensively with model code groups and standard-setting bodies throughout the process so that differences could be reconciled. As a result, an historic level of harmonization has been achieved that has brought about improvements to the guidelines, as well as to counterpart provisions in the IBC and key industry standards, including those for accessible facilities issued through the American National Standards Institute.

Plain Language Instructions

The Department makes every effort to promote clarity and transparency in its rulemaking. In any regulation, there is a tension between drafting language that is simple and straightforward and drafting language that gives full effect to issues of legal interpretation. The Department operates a toll-free ADA Information Line (800) 514–0301(voice); (800) 514–0383 (TTY) that the public is welcome to call at any time to obtain assistance in under-

standing anything in this rule. If any commenter has suggestions for how the regulation could be written more clearly, please contact Janet L. Blizard, Deputy Chief, Disability Rights Section, whose contact information is provided in the introductory section of this rule, entitled **FOR FURTHER INFORMATION CONTACT.**

Paperwork Reduction Act

The Paperwork Reduction Act of 1980 (PRA) requires agencies to clear forms and recordkeeping requirements with OMB before they can be introduced. 44 U.S.C. 3501 *et seq*. This rule does not contain any paperwork or recordkeeping requirements and does not require clearance under the PRA.

Unfunded Mandates Reform Act

Section 4(2) of the Unfunded Mandates Reform Act of 1995, 2 U.S.C. 1503(2), excludes from coverage under that Act any proposed or final Federal regulation that ''establishes or enforces any statutory rights that prohibit discrimination on the basis of race, color, religion, sex, national origin, age, handicap, or disability.'' Accordingly, this rulemaking is not subject to the provisions of the Unfunded Mandates Reform Act.

List of Subjects for 28 CFR Part 36

Administrative practice and procedure, Buildings and facilities, Business and industry, Civil rights, Individuals with disabilities, Penalties, Reporting and recordkeeping requirements.

•By the authority vested in me as Attorney General by law, including 28 U.S.C. 509 and 510, 5 U.S.C. 301, and section 306 of the Americans with Disabilities Act of 1990, Public Law 101–336 (42 U.S.C. 12186), and for the reasons set forth in Appendix A to 28 CFR part 36, chapter I of title 28 of the Code of Federal Regulations is amended as follows:

Title III Regulations

Revised Final Title III Regulation with Integrated Text

Department of Justice

Part 36 Nondiscrimination on the Basis of Disability in Public Accommodations and Commercial Facilities (as amended by the final rule published on September 15, 2010)

Authority:
5 U.S.C. 301; 28 U.S.C. 509, 510; 42 U.S.C. 12186(b).

Subpart A – General

§ 36.101 Purpose.

The purpose of this part is to implement title III of the Americans with Disabilities Act of 1990 (42 U.S.C. 12181), which prohibits discrimination on the basis of disability by public accommodations and requires places of public accommodation and commercial facilities to be designed, constructed, and altered in compliance with the accessibility standards established by this part.

§ 36.102 Application.

(a) *General*. This part applies to any –

(1) Public accommodation;

(2) Commercial facility; or

(3) Private entity that offers examinations or courses related to applications, licensing, certification, or credentialing for secondary or postsecondary education, professional, or trade purposes.

(b) *Public accommodations*.

(1) The requirements of this part applicable to public accommodations are set forth in subparts B, C, and D of this part.

(2) The requirements of subparts B and C of this part obligate a public accommodation only with respect to the operations of a place of public accommodation.

(3) The requirements of subpart D of this part obligate a public accommodation only with respect to –

(i) A facility used as, or designed or constructed for use as, a place of public accommodation; or

(ii) A facility used as, or designed and constructed for use as, a commercial facility.

(c) *Commercial facilities*. The requirements of this part applicable to commercial facilities are set forth in subpart D of this part.

(d) *Examinations and courses.* The requirements of this part applicable to private entities that offer examinations or courses as specified in paragraph (a) of this section are set forth in § 36.309.

(e) *Exemptions and exclusions*. This part does not apply to any private club (except to the extent that the facilities of the private club are made available to customers or patrons of a place of public accommodation), or to any religious entity or public entity.

§ 36.103 Relationship to other laws.

(a) *Rule of interpretation.* Except as otherwise provided in this part, this part shall not be construed to apply a lesser standard than the standards applied under title V of the Rehabilitation Act of 1973 (29 U.S.C. 791) or the regulations issued by Federal agencies pursuant to that title.

(b) *Section 504*. This part does not affect the obligations of a recipient of Federal financial assistance to comply with the requirements of section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and regulations issued by Federal agencies implementing section 504.

(c) *Other laws.* This part does not invalidate or limit the remedies, rights, and procedures of any other Federal laws, or State or local laws (including State common law) that provide greater or equal protection for the rights of individuals with disabilities or individuals associated with them.

§ 36.104 Definitions.

For purposes of this part, the term–

1991 Standards means requirements set forth in the ADA Standards for Accessible Design, originally published on July 26, 1991, and republished as Appendix D to this part.

2004 ADAAG means the requirements set forth in appendices B and D to 36 CFR part 1191 (2009).

2010 Standards means the 2010 ADA Standards for Accessible Design, which consist of the 2004 ADAAG and the requirements contained in subpart D of this part.

Act means the Americans with Disabilities Act of 1990 (Pub. L. 101 - 336, 104 Stat. 327, 42 U.S.C. 12101 - 12213 and 47 U.S.C. 225 and 611).

Commerce means travel, trade, traffic, commerce, transportation, or communication –

(1) Among the several States;

(2) Between any foreign country or any territory or possession and any State; or

(3) Between points in the same State but through another State or foreign country.

Commercial facilities means facilities –

(1) Whose operations will affect commerce;

(2) That are intended for nonresidential use by a private entity; and

(3) That are not –

(i) Facilities that are covered or expressly exempted from coverage under the Fair Housing Act of 1968, as amended (42 U.S.C. 3601 - 3631);

(ii) Aircraft; or

(iii) Railroad locomotives, railroad freight cars, railroad cabooses, commuter or intercity passenger rail cars (including coaches, dining cars, sleeping cars, lounge cars, and food service cars), any other railroad cars described in section 242 of the Act or covered under title II of the Act, or railroad rights-of-way. For purposes of this definition, "rail" and "railroad" have the meaning given the term "railroad" in section 202(e) of the Federal Railroad Safety Act of 1970 (45 U.S.C. 431(e)).

Current illegal use of drugs means illegal use of drugs that occurred recently enough to justify a reasonable belief that a person´s drug use is current or that continuing use is a real and ongoing problem.

Direct threat means a significant risk to the health or safety of others that cannot be eliminated by a modification of policies, practices, or procedures, or by the provision of auxiliary aids or services, as provided in § 36.208.

Disability means, with respect to an individual, a physical or mental impairment that substantially limits one or more of the major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment.

(1) The phrase *physical or mental impairment* means –

(i) Any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological; musculoskeletal; special sense organs; respiratory, including speech organs; cardiovascular; reproductive; digestive; genitourinary; hemic and lymphatic; skin; and endocrine;

(ii) Any mental or psychological disorder such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities;

(iii) The phrase *physical or mental impairment* includes, but is not limited to, such contagious and noncontagious diseases and conditions as orthopedic, visual, speech, and hearing impairments, cerebral palsy, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, emotional illness, specific learning disabilities, HIV disease (whether symptomatic or asymptomatic), tuberculosis, drug addiction, and alcoholism;

(iv) The phrase *physical or mental impairment* does not include homosexuality or bisexuality.

2) The phrase *major life activities* means functions such as caring for one´s self, performing

manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working.

(3) The phrase *has a record of such an impairment* means has a history of, or has been misclassified as having, a mental or physical impairment that substantially limits one or more major life activities.

(4) The phrase *is regarded as having an impairment* means –

(i) Has a physical or mental impairment that does not substantially limit major life activities but that is treated by a private entity as constituting such a limitation;

(ii) Has a physical or mental impairment that substantially limits major life activities only as a result of the attitudes of others toward such impairment; or

(iii) Has none of the impairments defined in paragraph (1) of this definition but is treated by a private entity as having such an impairment.

(5) The term *disability* does not include –

(i) Transvestism, transsexualism, pedophilia, exhibitionism, voyeurism, gender identity disorders not resulting from physical impairments, or other sexual behavior disorders;

(ii) Compulsive gambling, kleptomania, or pyromania; or

(iii) Psychoactive substance use disorders resulting from current illegal use of drugs.

Drug means a controlled substance, as defined in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812).

Existing facility means a facility in existence on any given date, without regard to whether the facility may also be considered newly constructed or altered under this part.

Facility means all or any portion of buildings, structures, sites, complexes, equipment, rolling stock or other conveyances, roads, walks, passageways, parking lots, or other real or personal property, including the site where the building, property, structure, or equipment is located.

Housing at a place of education means housing operated by or on behalf of an elementary, secondary, undergraduate, or postgraduate school, or other place of education, including dormitories, suites, apartments, or other places of residence.

Illegal use of drugs means the use of one or more drugs, the possession or distribution of which is unlawful under the Controlled Substances Act (21 U.S.C. 812). The term "illegal use of drugs" does not include the use of a drug taken under supervision by a licensed health care professional, or other uses authorized by the Controlled Substances Act or other provisions of Federal law.

Individual with a disability means a person who has a disability. The term "individual with a disability" does not include an individual who is currently engaging in the illegal use of drugs, when the private entity acts on the basis of such use.

Other power-driven mobility device means any mobility device powered by batteries, fuel, or other engines – whether or not designed primarily for use by individuals with mobility disabilities – that is used by individuals with mobility disabilities for the purpose of locomotion, including golf cars, electronic personal assistance mobility devices (EPAMDs), such as the Segway® PT, or any mobility device designed to operate in areas without defined pedestrian routes, but that is not a wheelchair within the meaning of this section. This definition does not apply to Federal wilderness areas; wheelchairs in such areas are defined in section 508(c)(2) of the ADA, 42 U.S.C. 12207(c)(2).

Place of public accommodation means a facility operated by a private entity whose operations affect commerce and fall within at least one of the following categories –

(1) Place of lodging, except for an establishment located within a facility that contains not more than five rooms for rent or hire and that actually is occupied by the proprietor of the establishment as the residence of the proprietor. For purposes of this part, a facility is a "place of lodging" if it is –

(i) An inn, hotel, or motel; or

(ii) A facility that –

(A) Provides guest rooms for sleeping for stays that primarily are short-term in nature (generally 30 days or less) where the occupant does not have the right to return to a specific room or unit after the conclusion of his or her stay; and

(B) Provides guest rooms under conditions and with amenities similar to a hotel, motel, or inn, including the following –

(*1*) On- or off-site management and reservations service;

(*2*) Rooms available on a walk-up or call-in basis;

(*3*) Availability of housekeeping or linen service; and

(*4*) Acceptance of reservations for a guest room type without guaranteeing a particular unit or room until check-in, and without a prior lease or security deposit.

(2) A restaurant, bar, or other establishment serving food or drink;

(3) A motion picture house, theater, concert hall, stadium, or other place of exhibition or entertainment;

(4) An auditorium, convention center, lecture hall, or other place of public gathering;

(5) A bakery, grocery store, clothing store, hardware store, shopping center, or other sales or rental establishment;

(6) A laundromat, dry-cleaner, bank, barber shop, beauty shop, travel service, shoe repair service, funeral parlor, gas station, office of an accountant or lawyer, pharmacy, insurance office, professional office of a health care provider, hospital, or other service establishment;

(7) A terminal, depot, or other station used for specified public transportation;

(8) A museum, library, gallery, or other place of public display or collection;

(9) A park, zoo, amusement park, or other place of recreation;

(10) A nursery, elementary, secondary, undergraduate, or postgraduate private school, or other place of education;

(11) A day care center, senior citizen center, homeless shelter, food bank, adoption agency, or other social service center establishment; and

(12) A gymnasium, health spa, bowling alley, golf course, or other place of exercise or recreation.

Private club means a private club or establishment exempted from coverage under title II of the Civil Rights Act of 1964 (42 U.S.C. 2000a(e)).

Private entity means a person or entity other than a public entity.

Public accommodation means a private entity that owns, leases (or leases to), or operates a place of public accommodation.

Public entity means –

(1) Any State or local government;

(2) Any department, agency, special purpose district, or other instrumentality of a State or States or local government; and

(3) The National Railroad Passenger Corporation, and any commuter authority (as defined in section 103(8) of the Rail Passenger Service Act). (45 U.S.C. 541)

Qualified interpreter means an interpreter who, via a video remote interpreting (VRI) service or an on-site appearance, is able to interpret effectively, accurately, and impartially, both receptively and expressively, using any necessary specialized

vocabulary. Qualified interpreters include, for example, sign language interpreters, oral transliterators, and cued-language transliterators.

Qualified reader means a person who is able to read effectively, accurately, and impartially using any necessary specialized vocabulary.

Readily achievable means easily accomplishable and able to be carried out without much difficulty or expense. In determining whether an action is readily achievable factors to be considered include –

(1) The nature and cost of the action needed under this part;

(2) The overall financial resources of the site or sites involved in the action; the number of persons employed at the site; the effect on expenses and resources; legitimate safety requirements that are necessary for safe operation, including crime prevention measures; or the impact otherwise of the action upon the operation of the site;

(3) The geographic separateness, and the administrative or fiscal relationship of the site or sites in question to any parent corporation or entity;

(4) If applicable, the overall financial resources of any parent corporation or entity; the overall size of the parent corporation or entity with respect to the number of its employees; the number, type, and location of its facilities; and

(5) If applicable, the type of operation or operations of any parent corporation or entity, including the composition, structure, and functions of the workforce of the parent corporation or entity.

Religious entity means a religious organization, including a place of worship.

Service animal means any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability. Other species of animals, whether wild or domestic, trained or untrained, are not service animals for the purposes of this definition. The work or tasks performed by a service animal must be directly related to the individual´s disability. Examples of work or tasks include, but are not limited to, assisting individuals who are blind or have low vision with navigation and other tasks, alerting individuals who are deaf or hard of hearing to the presence of people or sounds, providing non-violent protection or rescue work, pulling a wheelchair, assisting an individual during a seizure, alerting individuals to the presence of allergens, retrieving items such as medicine or the telephone, providing physical support and assistance with balance and stability to individuals with mobility disabilities, and helping persons with psychiatric and neurological disabilities by preventing or interrupting impulsive or destructive behaviors. The crime deterrent effects of an animal´s presence and the provision of emotional support, well-being, comfort, or companionship do not constitute work or tasks for the purposes of this definition.

Specified public transportation means transportation by bus, rail, or any other conveyance (other than by aircraft) that provides the general public with general or special service (including charter service) on a regular and continuing basis.

State means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, the Trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands.

Undue burden means significant difficulty or expense. In determining whether an action would result in an undue burden, factors to be considered include –

(1) The nature and cost of the action needed under this part;

(2) The overall financial resources of the site or sites involved in the action; the number of per-

sons employed at the site; the effect on expenses and resources; legitimate safety requirements that are necessary for safe operation, including crime prevention measures; or the impact otherwise of the action upon the operation of the site;

(3) The geographic separateness, and the administrative or fiscal relationship of the site or sites in question to any parent corporation or entity;

(4) If applicable, the overall financial resources of any parent corporation or entity; the overall size of the parent corporation or entity with respect to the number of its employees; the number, type, and location of its facilities; and

(5) If applicable, the type of operation or operations of any parent corporation or entity, including the composition, structure, and functions of the workforce of the parent corporation or entity.

Video remote interpreting (VRI) service means an interpreting service that uses video conference technology over dedicated lines or wireless technology offering high-speed, wide-bandwidth video connection that delivers high-quality video images as provided in § 36.303(f).

Wheelchair means a manually-operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor or of both indoor and outdoor locomotion. This definition does not apply to Federal wilderness areas; wheelchairs in such areas are defined in section 508(c)(2) of the ADA, 42 U.S.C. 12207(c)(2).

§§ 36.105 – 36.199 [Reserved]

Subpart B – General Requirements

§ 36.201 General.

(a) *Prohibition of discrimination*. No individual shall be discriminated against on the basis of disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation by any private entity who owns, leases (or leases to), or operates a place of public accommodation.

(b) *Landlord and tenant responsibilities.* Both the landlord who owns the building that houses a place of public accommodation and the tenant who owns or operates the place of public accommodation are public accommodations subject to the requirements of this part. As between the parties, allocation of responsibility for complying with the obligations of this part may be determined by lease or other contract.

§ 36.202 Activities.

(a) *Denial of participation*. A public accommodation shall not subject an individual or class of individuals on the basis of a disability or disabilities of such individual or class, directly, or through contractual, licensing, or other arrangements, to a denial of the opportunity of the individual or class to participate in or benefit from the goods, services, facilities, privileges, advantages, or accommodations of a place of public accommodation.

(b) *Participation in unequal benefit.* A public accommodation shall not afford an individual or class of individuals, on the basis of a disability or disabilities of such individual or class, directly, or through contractual, licensing, or other arrangements, with the opportunity to participate in or benefit from a good, service, facility, privilege, advantage, or accommodation that is not equal to that afforded to other individuals.

(c) *Separate benefit*. A public accommodation shall not provide an individual or class of individuals, on the basis of a disability or disabilities of such individual or class, directly, or through contractual, licensing, or other arrangements with a good, service, facility, privilege, advantage, or accommodation that is different or separate from that provided to other individuals, unless such action is necessary to provide the individual or class of individuals with a good, service, facility, privilege, advantage, or accommodation, or other

opportunity that is as effective as that provided to others.
(d) *Individual or class of individuals.* For purposes of paragraphs (a) through (c) of this section, the term "individual or class of individuals" refers to the clients or customers of the public accommodation that enters into the contractual, licensing, or other arrangement.

§ 36.203 Integrated settings.
(a) *General*. A public accommodation shall afford goods, services, facilities, privileges, advantages, and accommodations to an individual with a disability in the most integrated setting appropriate to the needs of the individual.
(b) *Opportunity to participate*. Notwithstanding the existence of separate or different programs or activities provided in accordance with this subpart, a public accommodation shall not deny an individual with a disability an opportunity to participate in such programs or activities that are not separate or different.
(c) *Accommodations and services.*

(1) Nothing in this part shall be construed to require an individual with a disability to accept an accommodation, aid, service, opportunity, or benefit available under this part that such individual chooses not to accept.

(2) Nothing in the Act or this part authorizes the representative or guardian of an individual with a disability to decline food, water, medical treatment, or medical services for that individual.

§ 36.204 Administrative methods.
A public accommodation shall not, directly or through contractual or other arrangements, utilize standards or criteria or methods of administration that have the effect of discriminating on the basis of disability, or that perpetuate the discrimination of others who are subject to common administrative control.

§ 36.205 Association.
A public accommodation shall not exclude or otherwise deny equal goods, services, facilities, privileges, advantages, accommodations, or other opportunities to an individual or entity because of the known disability of an individual with whom the individual or entity is known to have a relationship or association.

§ 36.206 Retaliation or coercion.
(a) No private or public entity shall discriminate against any individual because that individual has opposed any act or practice made unlawful by this part, or because that individual made a charge, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the Act or this part.
(b) No private or public entity shall coerce, intimidate, threaten, or interfere with any individual in the exercise or enjoyment of, or on account of his or her having exercised or enjoyed, or on account of his or her having aided or encouraged any other individual in the exercise or enjoyment of, any right granted or protected by the Act or this part.
(c) Illustrations of conduct prohibited by this section include, but are not limited to:

(1) Coercing an individual to deny or limit the benefits, services, or advantages to which he or she is entitled under the Act or this part;

(2) Threatening, intimidating, or interfering with an individual with a disability who is seeking to obtain or use the goods, services, facilities, privileges, advantages, or accommodations of a public accommodation;

(3) Intimidating or threatening any person because that person is assisting or encouraging an individual or group entitled to claim the rights granted or protected by the Act or this part to exercise those rights; or

(4) Retaliating against any person because that person has participated in any investigation or action to enforce the Act or this part.

§ 36.207 Places of public accommodation located in private residences.

(a) When a place of public accommodation is located in a private residence, the portion of the residence used exclusively as a residence is not covered by this part, but that portion used exclusively in the operation of the place of public accommodation or that portion used both for the place of public accommodation and for residential purposes is covered by this part.

(b) The portion of the residence covered under paragraph (a) of this section extends to those elements used to enter the place of public accommodation, including the homeowner´s front sidewalk, if any, the door or entryway, and hallways; and those portions of the residence, interior or exterior, available to or used by customers or clients, including restrooms.

§ 36.208 Direct threat.

(a) This part does not require a public accommodation to permit an individual to participate in or benefit from the goods, services, facilities, privileges, advantages and accommodations of that public accommodation when that individual poses a direct threat to the health or safety of others.

(b) In determining whether an individual poses a direct threat to the health or safety of others, a public accommodation must make an individualized assessment, based on reasonable judgment that relies on current medical knowledge or on the best available objective evidence, to ascertain: The nature, duration, and severity of the risk; the probability that the potential injury will actually occur; and whether reasonable modifications of policies, practices, or procedures or the provision of auxiliary aids or services will mitigate the risk.

§ 36.209 Illegal use of drugs.

(a) *General.*

(1) Except as provided in paragraph (b) of this section, this part does not prohibit discrimination against an individual based on that individual´s current illegal use of drugs.

(2) A public accommodation shall not discriminate on the basis of illegal use of drugs against an individual who is not engaging in current illegal use of drugs and who –

(i) Has successfully completed a supervised drug rehabilitation program or has otherwise been rehabilitated successfully;

(ii) Is participating in a supervised rehabilitation program; or

(iii) Is erroneously regarded as engaging in such use.

(b) *Health and drug rehabilitation services.*

(1) A public accommodation shall not deny health services, or services provided in connection with drug rehabilitation, to an individual on the basis of that individual´s current illegal use of drugs, if the individual is otherwise entitled to such services.

(2) A drug rehabilitation or treatment program may deny participation to individuals who engage in illegal use of drugs while they are in the program.

(c) Drug testing.

(1) This part does not prohibit a public accommodation from adopting or administering reasonable policies or procedures, including but not limited to drug testing, designed to ensure that an individual who formerly engaged in the illegal use of drugs is not now engaging in current illegal use of drugs.

(2) Nothing in this paragraph (c) shall be construed to encourage, prohibit, restrict, or authorize the conducting of testing for the illegal use of drugs.

§ 36.210 Smoking.

This part does not preclude the prohibition of, or the imposition of restrictions on, smoking in places of public accommodation.

§ 36.211 Maintenance of accessible features.

(a) A public accommodation shall maintain in operable working condition those features of facilities and equipment that are required to be readily

accessible to and usable by persons with disabilities by the Act or this part.
(b) This section does not prohibit isolated or temporary interruptions in service or access due to maintenance or repairs.
(c) If the 2010 Standards reduce the technical requirements or the number of required accessible elements below the number required by the 1991 Standards, the technical requirements or the number of accessible elements in a facility subject to this part may be reduced in accordance with the requirements of the 2010 Standards.

§ 36.212 Insurance.
(a) This part shall not be construed to prohibit or restrict –

(1) An insurer, hospital or medical service company, health maintenance organization, or any agent, or entity that administers benefit plans, or similar organizations from underwriting risks, classifying risks, or administering such risks that are based on or not inconsistent with State law; or

(2) A person or organization covered by this part from establishing, sponsoring, observing or administering the terms of a bona fide benefit plan that are based on underwriting risks, classifying risks, or administering such risks that are based on or not inconsistent with State law; or

(3) A person or organization covered by this part from establishing, sponsoring, observing or administering the terms of a bona fide benefit plan that is not subject to State laws that regulate insurance.

(b) Paragraphs (a) (1), (2), and (3) of this section shall not be used as a subterfuge to evade the purposes of the Act or this part.
(c) A public accommodation shall not refuse to serve an individual with a disability because its insurance company conditions coverage or rates on the absence of individuals with disabilities.

§ 36.213 Relationship of subpart B to subparts C and D of this part.
Subpart B of this part sets forth the general principles of nondiscrimination applicable to all entities subject to this part. Subparts C and D of this part provide guidance on the application of the statute to specific situations. The specific provisions, including the limitations on those provisions, control over the general provisions in circumstances where both specific and general provisions apply.

§§ 36.214 – 36.299 [Reserved]

Subpart C – Specific Requirements

§ 36.301 Eligibility criteria.
(a) *General.* A public accommodation shall not impose or apply eligibility criteria that screen out or tend to screen out an individual with a disability or any class of individuals with disabilities from fully and equally enjoying any goods, services, facilities, privileges, advantages, or accommodations, unless such criteria can be shown to be necessary for the provision of the goods, services, facilities, privileges, advantages, or accommodations being offered.
(b) *Safety.* A public accommodation may impose legitimate safety requirements that are necessary for safe operation. Safety requirements must be based on actual risks and not on mere speculation, stereotypes, or generalizations about individuals with disabilities.
(c) *Charges*. A public accommodation may not impose a surcharge on a particular individual with a disability or any group of individuals with disabilities to cover the costs of measures, such as the provision of auxiliary aids, barrier removal, alternatives to barrier removal, and reasonable modifications in policies, practices, or procedures, that are required to provide that individual or group with the nondiscriminatory treatment required by the Act or this part.

§ 36.302 Modifications in policies, practices, or procedures.

(a) *General.* A public accommodation shall make reasonable modifications in policies, practices, or procedures, when the modifications are necessary to afford goods, services, facilities, privileges, advantages, or accommodations to individuals with disabilities, unless the public accommodation can demonstrate that making the modifications would fundamentally alter the nature of the goods, services, facilities, privileges, advantages, or accommodations.

(b) *Specialties –*

(1) *General.* A public accommodation may refer an individual with a disability to another public accommodation, if that individual is seeking, or requires, treatment or services outside of the referring public accommodation´s area of specialization, and if, in the normal course of its operations, the referring public accommodation would make a similar referral for an individual without a disability who seeks or requires the same treatment or services.

(2) *Illustration – medical specialties*. A health care provider may refer an individual with a disability to another provider, if that individual is seeking, or requires, treatment or services outside of the referring provider´s area of specialization, and if the referring provider would make a similar referral for an individual without a disability who seeks or requires the same treatment or services. A physician who specializes in treating only a particular condition cannot refuse to treat an individual with a disability for that condition, but is not required to treat the individual for a different condition.

(c) *Service animals.*

(1) *General.* Generally, a public accommodation shall modify policies, practices, or procedures to permit the use of a service animal by an individual with a disability.

(c)(2) *Exceptions.* A public accommodation may ask an individual with a disability to remove a service animal from the premises if:

(i) The animal is out of control and the animal´s handler does not take effective action to control it; or

(ii) The animal is not housebroken.

(3) *If an animal is properly excluded.* If a public accommodation properly excludes a service animal under § 36.302(c)(2), it shall give the individual with a disability the opportunity to obtain goods, services, and accommodations without having the service animal on the premises.

(4) *Animal under handler´s control.* A service animal shall be under the control of its handler. A service animal shall have a harness, leash, or other tether, unless either the handler is unable because of a disability to use a harness, leash, or other tether, or the use of a harness, leash, or other tether would interfere with the service animal´s safe, effective performance of work or tasks, in which case the service animal must be otherwise under the handler´s control (*e.g.,* voice control, signals, or other effective means).

(5) *Care or supervision*. A public accommodation is not responsible for the care or supervision of a service animal.

(6) *Inquiries*. A public accommodation shall not ask about the nature or extent of a person´s disability, but may make two inquiries to determine whether an animal qualifies as a service animal. A public accommodation may ask if the animal is required because of a disability and what work or task the animal has been trained to perform. A public accommodation shall not require documentation, such as proof that the animal has been certified, trained, or licensed as a service animal. Generally, a public accommodation may not make these inquiries about a service animal when it is readily apparent that an animal is trained to do work or perform tasks for an individual with a disability (*e.g.,* the dog is observed guiding an individual who is blind or has low vision, pulling a person´s wheelchair, or providing assistance with stability or balance to an individual with an observable mobility disability).

(7) *Access to areas of a public accommodation*. Individuals with disabilities shall be permitted to be accompanied by their service animals in all areas of a place of public accommodation where members of the public, program participants, clients, customers, patrons, or invitees, as relevant, are allowed to go.

(8) *Surcharges*. A public accommodation shall not ask or require an individual with a disability to pay a surcharge, even if people accompanied by pets are required to pay fees, or to comply with other requirements generally not applicable to people without pets. If a public accommodation normally charges individuals for the damage they cause, an individual with a disability may be charged for damage caused by his or her service animal.

(9) *Miniature horses.*

(i) A public accommodation shall make reasonable modifications in policies, practices, or procedures to permit the use of a miniature horse by an individual with a disability if the miniature horse has been individually trained to do work or perform tasks for the benefit of the individual with a disability.

(ii) *Assessment factors*. In determining whether reasonable modifications in policies, practices, or procedures can be made to allow a miniature horse into a specific facility, a public accommodation shall consider –

(A) The type, size, and weight of the miniature horse and whether the facility can accommodate these features;

(B) Whether the handler has sufficient control of the miniature horse;

(C) Whether the miniature horse is housebroken; and

(D) Whether the miniature horse´s presence in a specific facility compromises legitimate safety requirements that are necessary for safe operation.

(iii) *Other requirements*. Sections 36.302(c)(3) through (c)(8), which apply to service animals, shall also apply to miniature horses.

(d) *Check-out aisles*. A store with check-out aisles shall ensure that an adequate number of accessible check-out aisles are kept open during store hours, or shall otherwise modify its policies and practices, in order to ensure that an equivalent level of convenient service is provided to individuals with disabilities as is provided to others. If only one check-out aisle is accessible, and it is generally used for express service, one way of providing equivalent service is to allow persons with mobility impairments to make all their purchases at that aisle.

(e)

(1) *Reservations made by places of lodging*. A public accommodation that owns, leases (or leases to), or operates a place of lodging shall, with respect to reservations made by any means, including by telephone, in-person, or through a third party –

(i) Modify its policies, practices, or procedures to ensure that individuals with disabilities can make reservations for accessible guest rooms during the same hours and in the same manner as individuals who do not need accessible rooms;

(ii) Identify and describe accessible features in the hotels and guest rooms offered through its reservations service in enough detail to reasonably permit individuals with disabilities to assess independently whether a given hotel or guest room meets his or her accessibility needs;

(iii) Ensure that accessible guest rooms are held for use by individuals with disabilities until all other guest rooms of that type have been rented and the accessible room requested is the only remaining room of that type;

(iv) Reserve, upon request, accessible guest rooms or specific types of guest rooms and ensure that the guest rooms requested are blocked and removed from all reservations systems; and

(v) Guarantee that the specific accessible guest room reserved through its reservations

service is held for the reserving customer, regardless of whether a specific room is held in response to reservations made by others.

(2) *Exception*. The requirements in paragraphs (iii), (iv), and (v) of this section do not apply to reservations for individual guest rooms or other units not owned or substantially controlled by the entity that owns, leases, or operates the overall facility.

(3) *Compliance date*. The requirements in this section will apply to reservations made on or after March 15, 2012.

(f) *Ticketing*.

(1)

(i) For the purposes of this section, "accessible seating" is defined as wheelchair spaces and companion seats that comply with sections 221 and 802 of the 2010 Standards along with any other seats required to be offered for sale to the individual with a disability pursuant to paragraph (4) of this section.

(ii) *Ticket sales*. A public accommodation that sells tickets for a single event or series of events shall modify its policies, practices, or procedures to ensure that individuals with disabilities have an equal opportunity to purchase tickets for accessible seating –

(A) During the same hours;

(B) During the same stages of ticket sales, including, but not limited to, presales, promotions, lotteries, wait-lists, and general sales;

(C) Through the same methods of distribution;

(D) In the same types and numbers of ticketing sales outlets, including telephone service, in-person ticket sales at the facility, or third-party ticketing services, as other patrons; and

(E) Under the same terms and conditions as other tickets sold for the same event or series of events.

(2) *Identification of available accessible seating.* A public accommodation that sells or distributes tickets for a single event or series of events shall, upon inquiry –

(i) Inform individuals with disabilities, their companions, and third parties purchasing tickets for accessible seating on behalf of individuals with disabilities of the locations of all unsold or otherwise available accessible seating for any ticketed event or events at the facility;

(ii) Identify and describe the features of available accessible seating in enough detail to reasonably permit an individual with a disability to assess independently whether a given accessible seating location meets his or her accessibility needs; and

(iii) Provide materials, such as seating maps, plans, brochures, pricing charts, or other information, that identify accessible seating and information relevant thereto with the same text or visual representations as other seats, if such materials are provided to the general public.

(3) *Ticket prices.* The price of tickets for accessible seating for a single event or series of events shall not be set higher than the price for other tickets in the same seating section for the same event or series of events. Tickets for accessible seating must be made available at all price levels for every event or series of events. If tickets for accessible seating at a particular price level cannot be provided because barrier removal in an existing facility is not readily achievable, then the percentage of tickets for accessible seating that should have been available at that price level but for the barriers (determined by the ratio of the total number of tickets at that price level to the total number of tickets in the assembly area) shall be offered for purchase, at that price level, in a nearby or similar accessible location.

(4) *Purchasing multiple tickets.*

(i) *General.* For each ticket for a wheelchair space purchased by an individual with a disability or a third-party purchasing such a ticket at his or her request, a public accommodation shall make available for purchase three addi-

tional tickets for seats in the same row that are contiguous with the wheelchair space, provided that at the time of purchase there are three such seats available. A public accommodation is not required to provide more than three contiguous seats for each wheelchair space. Such seats may include wheelchair spaces.

(ii) *Insufficient additional contiguous seats available*. If patrons are allowed to purchase at least four tickets, and there are fewer than three such additional contiguous seat tickets available for purchase, a public accommodation shall offer the next highest number of such seat tickets available for purchase and shall make up the difference by offering tickets for sale for seats that are as close as possible to the accessible seats.

(iii) *Sales limited to fewer than four tickets*. If a public accommodation limits sales of tickets to fewer than four seats per patron, then the public accommodation is only obligated to offer as many seats to patrons with disabilities, including the ticket for the wheelchair space, as it would offer to patrons without disabilities.

(iv) *Maximum number of tickets patrons may purchase exceeds four.* If patrons are allowed to purchase more than four tickets, a public accommodation shall allow patrons with disabilities to purchase up to the same number of tickets, including the ticket for the wheelchair space.

(v) *Group sales.* If a group includes one or more individuals who need to use accessible seating because of a mobility disability or because their disability requires the use of the accessible features that are provided in accessible seating, the group shall be placed in a seating area with accessible seating so that, if possible, the group can sit together. If it is necessary to divide the group, it should be divided so that the individuals in the group who use wheelchairs are not isolated from their group.

(5) *Hold and release of tickets for accessible seating*.

(i) *Tickets for accessible seating may be released for sale in certain limited circumstances.* A public accommodation may release unsold tickets for accessible seating for sale to individuals without disabilities for their own use for a single event or series of events only under the following circumstances –

(A) When all non-accessible tickets (excluding luxury boxes, club boxes, or suites) have been sold;

(B) When all non-accessible tickets in a designated seating area have been sold and the tickets for accessible seating are being released in the same designated area; or

(C) When all non-accessible tickets in a designated price category have been sold and the tickets for accessible seating are being released within the same designated price category.

(ii) *No requirement to release accessible tickets.* Nothing in this paragraph requires a facility to release tickets for accessible seating to individuals without disabilities for their own use.

(iii) *Release of series-of-events tickets on a series-of-events basis*.

(A) *Series-of-events tickets sell-out when no ownership rights are attached*. When series-of-events tickets are sold out and a public accommodation releases and sells accessible seating to individuals without disabilities for a series of events, the public accommodation shall establish a process that prevents the automatic reassignment of the accessible seating to such ticket holders for future seasons, future years, or future series, so that individuals with disabilities who require the features of accessible seating and who become newly eligible to purchase tickets when these series-of-events tickets are available for purchase have an opportunity to do so.

(B) *Series-of-events tickets when ownership rights are attached.* When series-of-events tickets with an ownership right in accessible seating areas are forfeited or otherwise returned to a public accommodation, the public accommodation shall make reasonable modifications in its policies, practices, or procedures to afford individuals with mobility disabilities or individuals with disabilities that require the features of accessible seating an opportunity to purchase such tickets in accessible seating areas.

(6) *Ticket transfer.* Individuals with disabilities who hold tickets for accessible seating shall be permitted to transfer tickets to third parties under the same terms and conditions and to the same extent as other spectators holding the same type of tickets, whether they are for a single event or series of events.

(7) *Secondary ticket market.*

(i) A public accommodation shall modify its policies, practices, or procedures to ensure that an individual with a disability may use a ticket acquired in the secondary ticket market under the same terms and conditions as other individuals who hold a ticket acquired in the secondary ticket market for the same event or series of events.

(ii) If an individual with a disability acquires a ticket or series of tickets to an inaccessible seat through the secondary market, a public accommodation shall make reasonable modifications to its policies, practices, or procedures to allow the individual to exchange his ticket for one to an accessible seat in a comparable location if accessible seating is vacant at the time the individual presents the ticket to the public accommodation.

(8) *Prevention of fraud in purchase of tickets for accessible seating.* A public accommodation may not require proof of disability, including, for example, a doctor´s note, before selling tickets for accessible seating.

(i) *Single-event tickets.* For the sale of single-event tickets, it is permissible to inquire whether the individual purchasing the tickets for accessible seating has a mobility disability or a disability that requires the use of the accessible features that are provided in accessible seating, or is purchasing the tickets for an individual who has a mobility disability or a disability that requires the use of the accessible features that are provided in the accessible seating.

(ii) *Series-of-events tickets.* For series-of-events tickets, it is permissible to ask the individual purchasing the tickets for accessible seating to attest in writing that the accessible seating is for a person who has a mobility disability or a disability that requires the use of the accessible features that are provided in the accessible seating.

(iii) *Investigation of fraud.* A public accommodation may investigate the potential misuse of accessible seating where there is good cause to believe that such seating has been purchased fraudulently.

§ 36.303 Auxiliary aids and services.

(a) *General*. A public accommodation shall take those steps that may be necessary to ensure that no individual with a disability is excluded, denied services, segregated or otherwise treated differently than other individuals because of the absence of auxiliary aids and services, unless the public accommodation can demonstrate that taking those steps would fundamentally alter the nature of the goods, services, facilities, privileges, advantages, or accommodations being offered or would result in an undue burden, *i.e.,* significant difficulty or expense.

(b) *Examples.* The term "auxiliary aids and services" includes –

(1) Qualified interpreters on-site or through video remote interpreting (VRI) services; notetakers; real-time computer-aided transcription services; written materials; exchange of written

notes; telephone handset amplifiers; assistive listening devices; assistive listening systems; telephones compatible with hearing aids; closed caption decoders; open and closed captioning, including real-time captioning; voice, text, and video-based telecommunications products and systems, including text telephones (TTYs), videophones, and captioned telephones, or equally effective telecommunications devices; videotext displays; accessible electronic and information technology; or other effective methods of making aurally delivered information available to individuals who are deaf or hard of hearing;

(2) Qualified readers; taped texts; audio recordings; Brailled materials and displays; screen reader software; magnification software; optical readers; secondary auditory programs (SAP); large print materials; accessible electronic and information technology; or other effective methods of making visually delivered materials available to individuals who are blind or have low vision;

(3) Acquisition or modification of equipment or devices; and

(4) Other similar services and actions.

(c) *Effective communication.*

(1) A public accommodation shall furnish appropriate auxiliary aids and services where necessary to ensure effective communication with individuals with disabilities. This includes an obligation to provide effective communication to companions who are individuals with disabilities.

(i) For purposes of this section, "companion" means a family member, friend, or associate of an individual seeking access to, or participating in, the goods, services, facilities, privileges, advantages, or accommodations of a public accommodation, who, along with such individual, is an appropriate person with whom the public accommodation should communicate.

(ii) The type of auxiliary aid or service necessary to ensure effective communication will vary in accordance with the method of communication used by the individual; the nature, length, and complexity of the communication involved; and the context in which the communication is taking place. A public accommodation should consult with individuals with disabilities whenever possible to determine what type of auxiliary aid is needed to ensure effective communication, but the ultimate decision as to what measures to take rests with the public accommodation, provided that the method chosen results in effective communication. In order to be effective, auxiliary aids and services must be provided in accessible formats, in a timely manner, and in such a way as to protect the privacy and independence of the individual with a disability.

(2) A public accommodation shall not require an individual with a disability to bring another individual to interpret for him or her.

(3) A public accommodation shall not rely on an adult accompanying an individual with a disability to interpret or facilitate communication, except –

(i) In an emergency involving an imminent threat to the safety or welfare of an individual or the public where there is no interpreter available; or

(ii) Where the individual with a disability specifically requests that the accompanying adult interpret or facilitate communication, the accompanying adult agrees to provide such assistance, and reliance on that adult for such assistance is appropriate under the circumstances.

(4) A public accommodation shall not rely on a minor child to interpret or facilitate communication, except in an emergency involving an imminent threat to the safety or welfare of an individual or the public where there is no interpreter available.

(d) *Telecommunications*.

(1) When a public accommodation uses an automated-attendant system, including, but not

limited to, voicemail and messaging, or an interactive voice response system, for receiving and directing incoming telephone calls, that system must provide effective real-time communication with individuals using auxiliary aids and services, including text telephones (TTYs) and all forms of FCC-approved telecommunications relay systems, including Internet-based relay systems.

(2) A public accommodation that offers a customer, client, patient, or participant the opportunity to make outgoing telephone calls using the public accommodation´s equipment on more than an incidental convenience basis shall make available public telephones, TTYs, or other telecommunications products and systems for use by an individual who is deaf or hard of hearing, or has a speech impairment.

(3) A public accommodation may use relay services in place of direct telephone communication for receiving or making telephone calls incident to its operations.

(4) A public accommodation shall respond to telephone calls from a telecommunications relay service established under title IV of the ADA in the same manner that it responds to other telephone calls.

(5) This part does not require a public accommodation to use a TTY for receiving or making telephone calls incident to its operations.

(e) *Closed caption decoders.* Places of lodging that provide televisions in five or more guest rooms and hospitals that provide televisions for patient use shall provide, upon request, a means for decoding captions for use by an individual with impaired hearing.

(f) *Video remote interpreting (VRI) services*. A public accommodation that chooses to provide qualified interpreters via VRI service shall ensure that it provides –

(1) Real-time, full-motion video and audio over a dedicated high-speed, wide-bandwidth video connection or wireless connection that delivers high-quality video images that do not produce lags, choppy, blurry, or grainy images, or irregular pauses in communication;

(2) A sharply delineated image that is large enough to display the interpreter´s face, arms, hands, and fingers, and the participating individual´s face, arms, hands, and fingers, regardless of his or her body position;

(3) A clear, audible transmission of voices; and

(4) Adequate training to users of the technology and other involved individuals so that they may quickly and efficiently set up and operate the VRI.

(g) *Alternatives.* If provision of a particular auxiliary aid or service by a public accommodation would result in a fundamental alteration in the nature of the goods, services, facilities, privileges, advantages, or accommodations being offered or in an undue burden, *i.e.,* significant difficulty or expense, the public accommodation shall provide an alternative auxiliary aid or service, if one exists, that would not result in an alteration or such burden but would nevertheless ensure that, to the maximum extent possible, individuals with disabilities receive the goods, services, facilities, privileges, advantages, or accommodations offered by the public accommodation.

§ 36.304 Removal of barriers.

(a) *General.* A public accommodation shall remove architectural barriers in existing facilities, including communication barriers that are structural in nature, where such removal is readily achievable, *i.e.,* easily accomplishable and able to be carried out without much difficulty or expense.

(b) *Examples*. Examples of steps to remove barriers include, but are not limited to, the following actions –

(1) Installing ramps;

(2) Making curb cuts in sidewalks and entrances;

(3) Repositioning shelves;

(4) Rearranging tables, chairs, vending machines, display racks, and other furniture;

(5) Repositioning telephones;

(6) Adding raised markings on elevator control buttons;

(7) Installing flashing alarm lights;

(8) Widening doors;

(9) Installing offset hinges to widen doorways;

(10) Eliminating a turnstile or providing an alternative accessible path;

(11) Installing accessible door hardware;

(12) Installing grab bars in toilet stalls;

(13) Rearranging toilet partitions to increase maneuvering space;

(14) Insulating lavatory pipes under sinks to prevent burns;

(15) Installing a raised toilet seat;

(16) Installing a full-length bathroom mirror;

(17) Repositioning the paper towel dispenser in a bathroom;

(18) Creating designated accessible parking spaces;

(19) Installing an accessible paper cup dispenser at an existing inaccessible water fountain;

(20) Removing high pile, low density carpeting; or

(21) Installing vehicle hand controls.

(c) *Priorities.* A public accommodation is urged to take measures to comply with the barrier removal requirements of this section in accordance with the following order of priorities.

(1) First, a public accommodation should take measures to provide access to a place of public accommodation from public sidewalks, parking, or public transportation. These measures include, for example, installing an entrance ramp, widening entrances, and providing accessible parking spaces.

(2) Second, a public accommodation should take measures to provide access to those areas of a place of public accommodation where goods and services are made available to the public. These measures include, for example, adjusting the layout of display racks, rearranging tables, providing Brailled and raised character signage, widening doors, providing visual alarms, and installing ramps.

(3) Third, a public accommodation should take measures to provide access to restroom facilities. These measures include, for example, removal of obstructing furniture or vending machines, widening of doors, installation of ramps, providing accessible signage, widening of toilet stalls, and installation of grab bars.

(4) Fourth, a public accommodation should take any other measures necessary to provide access to the goods, services, facilities, privileges, advantages, or accommodations of a place of public accommodation.

(d) *Relationship to alterations requirements of subpart D of this part*.

(1) Except as provided in paragraph (d)(3) of this section, measures taken to comply with the barrier removal requirements of this section shall comply with the applicable requirements for alterations in § 36.402 and §§ 36.404 through 36.406 of this part for the element being altered. The path of travel requirements of §36.403 shall not apply to measures taken solely to comply with the barrier removal requirements of this section.

(2)

(i) *Safe harbor*. Elements that have not been altered in existing facilities on or after March 15, 2012, and that comply with the corresponding technical and scoping specifications for those elements in the 1991 Standards are not required to be modified in order to comply with the requirements set forth in the 2010 Standards.

(ii)

(A) Before March 15, 2012, elements in existing facilities that do not comply with the corresponding technical and scoping specifications for those elements in the 1991 Standards must be modified to the extent readily achievable to comply with either the 1991 Standards or the 2010 Standards. Noncomplying newly constructed and altered elements may also be

subject to the requirements of § 36.406(a)(5).

(B) On or after March 15, 2012, elements in existing facilities that do not comply with the corresponding technical and scoping specifications for those elements in the 1991 Standards must be modified to the extent readily achievable to comply with the requirements set forth in the 2010 Standards. Noncomplying newly constructed and altered elements may also be subject to the requirements of § 36.406(a)(5).

(iii) The safe harbor provided in § 36.304(d)(2)(i) does not apply to those elements in existing facilities that are subject to supplemental requirements (*i.e.,* elements for which there are neither technical nor scoping specifications in the 1991 Standards), and therefore those elements must be modified to the extent readily achievable to comply with the 2010 Standards. Noncomplying newly constructed and altered elements may also be subject to the requirements of § 36.406(a)(5). Elements in the 2010 Standards not eligible for the element-by-element safe harbor are identified as follows –

(A) *Residential facilities and dwelling units*, sections 233 and 809.

(B) *Amusement rides*, sections 234 and 1002; 206.2.9; 216.12.

(C) *Recreational boating facilities*, sections 235 and 1003; 206.2.10.

(D) *Exercise machines and equipment,* sections 236 and 1004; 206.2.13.

(E) *Fishing piers and platforms,* sections 237 and 1005; 206.2.14.

(F) *Golf facilities,* sections 238 and 1006; 206.2.15.

(G) *Miniature golf facilities*, sections 239 and 1007; 206.2.16.

(H) *Play areas*, sections 240 and 1008; 206.2.17.

(I) *Saunas and steam rooms,* sections 241 and 612.

(J) *Swimming pools, wading pools, and spas*, sections 242 and 1009.

(K) *Shooting facilities with firing positions,* sections 243 and 1010.

(L) *Miscellaneous.*

(1) Team or player seating, section 221.2.1.4.

(2) Accessible route to bowling lanes, section 206.2.11.

(3) Accessible route in court sports facilities, section 206.2.12.

(3) If, as a result of compliance with the alterations requirements specified in paragraph (d)(1) and (d)(2) of this section, the measures required to remove a barrier would not be readily achievable, a public accommodation may take other readily achievable measures to remove the barrier that do not fully comply with the specified requirements. Such measures include, for example, providing a ramp with a steeper slope or widening a doorway to a narrower width than that mandated by the alterations requirements. No measure shall be taken, however, that poses a significant risk to the health or safety of individuals with disabilities or others.

(e) *Portable ramps.* Portable ramps should be used to comply with this section only when installation of a permanent ramp is not readily achievable. In order to avoid any significant risk to the health or safety of individuals with disabilities or others in using portable ramps, due consideration shall be given to safety features such as nonslip surfaces, railings, anchoring, and strength of materials.

(f) *Selling or serving space*. The rearrangement of temporary or movable structures, such as furniture, equipment, and display racks is not readily achievable to the extent that it results in a significant loss of selling or serving space.

Appendix to § 36.304(d)

Compliance Dates and Applicable Standards for Barrier Removal and Safe Harbor		
Date	Requirement	Applicable Standards
Before March 15, 2012	Elements that do not comply with the requirements for those elements in the 1991 Standards must be modified to the extent readily achievable. Note: Noncomplying newly constructed and altered elements may also be subject to the requirements of § 36.406(a)(5).	1991 Standards or 2010 Standards
On or after March 15, 2012	Elements that do not comply with the requirements for those elements in the 1991 Standards or that do not comply with the supplemental requirements (i.e., elements for which there are neither technical nor scoping specifications in the 1991 Standards) must be modified to the extent readily achievable. Note: Noncomplying newly constructed and altered elements may also be subject to the requirements of § 36.406(a)(5).	2010 Standards
Elements not altered after March 15, 2012	Elements that comply with the requirements for those elements in the 1991 Standards do not need to be modified.	Safe Harbor

(g) *Limitation on barrier removal obligations*. (1) The requirements for barrier removal under § 36.304 shall not be interpreted to exceed the standards for alterations in subpart D of this part.

(2) To the extent that relevant standards for alterations are not provided in subpart D of this part, then the requirements of § 36.304 shall not be interpreted to exceed the standards for new construction in subpart D of this part.

(3) This section does not apply to rolling stock and other conveyances to the extent that § 36.310 applies to rolling stock and other conveyances.

(4) This requirement does not apply to guest rooms in existing facilities that are places of lodging where the guest rooms are not owned by the entity that owns, leases, or operates the overall facility and the physical features of the guest room interiors are controlled by their individual owners.

§ 36.305 Alternatives to barrier removal.

(a) *General.* Where a public accommodation can demonstrate that barrier removal is not readily achievable, the public accommodation shall not fail to make its goods, services, facilities, privileges, advantages, or accommodations available through alternative methods, if those methods are readily achievable.

(b) *Examples.* Examples of alternatives to barrier

removal include, but are not limited to, the following actions –

(1) Providing curb service or home delivery;

(2) Retrieving merchandise from inaccessible shelves or racks;

(3) Relocating activities to accessible locations;

(c) *Multiscreen cinemas.* If it is not readily achievable to remove barriers to provide access by persons with mobility impairments to all of the theaters of a multiscreen cinema, the cinema shall establish a film rotation schedule that provides reasonable access for individuals who use wheelchairs to all films. Reasonable notice shall be provided to the public as to the location and time of accessible showings.

§ 36.306 Personal devices and services.

This part does not require a public accommodation to provide its customers, clients, or participants with personal devices, such as wheelchairs; individually prescribed devices, such as prescription eyeglasses or hearing aids; or services of a personal nature including assistance in eating, toileting, or dressing.

§ 36.307 Accessible or special goods.

(a) This part does not require a public accommodation to alter its inventory to include accessible or special goods that are designed for, or facilitate use by, individuals with disabilities.

(b) A public accommodation shall order accessible or special goods at the request of an individual with disabilities, if, in the normal course of its operation, it makes special orders on request for unstocked goods, and if the accessible or special goods can be obtained from a supplier with whom the public accommodation customarily does business.

(c) Examples of accessible or special goods include items such as Brailled versions of books, books on audio cassettes, closed-captioned video tapes, special sizes or lines of clothing, and special foods to meet particular dietary needs.

§ 36.308 Seating in assembly areas.

A public accommodation shall ensure that wheelchair spaces and companion seats are provided in each specialty seating area that provides spectators with distinct services or amenities that generally are not available to other spectators. If it is not readily achievable for a public accommodation to place wheelchair spaces and companion seats in each such specialty seating area, it shall provide those services or amenities to individuals with disabilities and their companions at other designated accessible locations at no additional cost. The number of wheelchair spaces and companion seats provided in specialty seating areas shall be included in, rather than in addition to, wheelchair space requirements set forth in table 221.2.1.1 in the 2010 Standards.

§ 36.309 Examinations and courses.

(a) *General.* Any private entity that offers examinations or courses related to applications, licensing, certification, or credentialing for secondary or postsecondary education, professional, or trade purposes shall offer such examinations or courses in a place and manner accessible to persons with disabilities or offer alternative accessible arrangements for such individuals.

(b) *Examinations.*

(1) Any private entity offering an examination covered by this section must assure that –

(i) The examination is selected and administered so as to best ensure that, when the examination is administered to an individual with a disability that impairs sensory, manual, or speaking skills, the examination results accurately reflect the individual´s aptitude or achievement level or whatever other factor the examination purports to measure, rather than reflecting the individual´s impaired sensory, manual, or speaking skills (except where those skills are the factors that the examination purports to measure);

(ii) An examination that is designed for individuals with impaired sensory, manual, or

speaking skills is offered at equally convenient locations, as often, and in as timely a manner as are other examinations; and

(iii) The examination is administered in facilities that are accessible to individuals with disabilities or alternative accessible arrangements are made.

(iv) Any request for documentation, if such documentation is required, is reasonable and limited to the need for the modification, accommodation, or auxiliary aid or service requested.

(v) When considering requests for modifications, accommodations, or auxiliary aids or services, the entity gives considerable weight to documentation of past modifications, accommodations, or auxiliary aids or services received in similar testing situations, as well as such modifications, accommodations, or related aids and services provided in response to an Individualized Education Program (IEP) provided under the Individuals with Disabilities Education Act or a plan describing services provided pursuant to section 504 of the Rehabilitation Act of 1973, as amended (often referred as a Section 504 Plan).

(vi) The entity responds in a timely manner to requests for modifications, accommodations, or aids to ensure equal opportunity for individuals with disabilities.

(2) Required modifications to an examination may include changes in the length of time permitted for completion of the examination and adaptation of the manner in which the examination is given.

(3) A private entity offering an examination covered by this section shall provide appropriate auxiliary aids for persons with impaired sensory, manual, or speaking skills, unless that private entity can demonstrate that offering a particular auxiliary aid would fundamentally alter the measurement of the skills or knowledge the examination is intended to test or would result in an undue burden. Auxiliary aids and services required by this section may include taped examinations, interpreters or other effective methods of making orally delivered materials available to individuals with hearing impairments, Brailled or large print examinations and answer sheets or qualified readers for individuals with visual impairments or learning disabilities, transcribers for individuals with manual impairments, and other similar services and actions.

(4) Alternative accessible arrangements may include, for example, provision of an examination at an individual´s home with a proctor if accessible facilities or equipment are unavailable. Alternative arrangements must provide comparable conditions to those provided for nondisabled individuals.

(c) *Courses*.

(1) Any private entity that offers a course covered by this section must make such modifications to that course as are necessary to ensure that the place and manner in which the course is given are accessible to individuals with disabilities.

(2) Required modifications may include changes in the length of time permitted for the completion of the course, substitution of specific requirements, or adaptation of the manner in which the course is conducted or course materials are distributed.

(3) A private entity that offers a course covered by this section shall provide appropriate auxiliary aids and services for persons with impaired sensory, manual, or speaking skills, unless the private entity can demonstrate that offering a particular auxiliary aid or service would fundamentally alter the course or would result in an undue burden. Auxiliary aids and services required by this section may include taped texts, interpreters or other effective methods of making orally delivered materials available to individuals with hearing impairments, Brailled or large print texts or qualified readers for individuals with visual impairments and learning disabilities, classroom equipment adapted for use by

individuals with manual impairments, and other similar services and actions.

(4) Courses must be administered in facilities that are accessible to individuals with disabilities or alternative accessible arrangements must be made.

(5) Alternative accessible arrangements may include, for example, provision of the course through videotape, cassettes, or prepared notes. Alternative arrangements must provide comparable conditions to those provided for nondisabled individuals.

§ 36.310 Transportation provided by public accommodations.

(a) *General.*

(1) A public accommodation that provides transportation services, but that is not primarily engaged in the business of transporting people, is subject to the general and specific provisions in subparts B, C, and D of this part for its transportation operations, except as provided in this section.

(2) *Examples*. Transportation services subject to this section include, but are not limited to, shuttle services operated between transportation terminals and places of public accommodation, customer shuttle bus services operated by private companies and shopping centers, student transportation systems, and transportation provided within recreational facilities such as stadiums, zoos, amusement parks, and ski resorts.

(b) *Barrier removal.* A public accommodation subject to this section shall remove transportation barriers in existing vehicles and rail passenger cars used for transporting individuals (not including barriers that can only be removed through the retrofitting of vehicles or rail passenger cars by the installation of a hydraulic or other lift) where such removal is readily achievable.

(c) *Requirements for vehicles and systems.* A public accommodation subject to this section shall comply with the requirements pertaining to vehicles and transportation systems in the regulations issued by the Secretary of Transportation pursuant to section 306 of the Act.

§ 36.311 Mobility devices.

(a) *Use of wheelchairs and manually-powered mobility aids.* A public accommodation shall permit individuals with mobility disabilities to use wheelchairs and manually-powered mobility aids, such as walkers, crutches, canes, braces, or other similar devices designed for use by individuals with mobility disabilities in any areas open to pedestrian use.

(b)

(1) *Use of other power-driven mobility devices.* A public accommodation shall make reasonable modifications in its policies, practices, or procedures to permit the use of other power-driven mobility devices by individuals with mobility disabilities, unless the public accommodation can demonstrate that the class of other power-driven mobility devices cannot be operated in accordance with legitimate safety requirements that the public accommodation has adopted pursuant to § 36.301(b).

(2) *Assessment factors.* In determining whether a particular other power-driven mobility device can be allowed in a specific facility as a reasonable modification under paragraph (b)(1) of this section, a public accommodation shall consider –

(i) The type, size, weight, dimensions, and speed of the device;

(ii) The facility´s volume of pedestrian traffic (which may vary at different times of the day, week, month, or year);

(iii) The facility´s design and operational characteristics (*e.g.,* whether its business is conducted indoors, its square footage, the density and placement of stationary devices, and the availability of storage for the device, if requested by the user);

(iv) Whether legitimate safety requirements can be established to permit the safe operation of the other power-driven mobility device in the specific facility; and

(v) Whether the use of the other power-driven mobility device creates a substantial risk of serious harm to the immediate environment or natural or cultural resources, or poses a conflict with Federal land management laws and regulations.

(c)

(1) *Inquiry about disability.* A public accommodation shall not ask an individual using a wheelchair or other power-driven mobility device questions about the nature and extent of the individual´s disability.

(2) *Inquiry into use of other power-driven mobility device*. A public accommodation may ask a person using an other power-driven mobility device to provide a credible assurance that the mobility device is required because of the person´s disability. A public accommodation that permits the use of an other power-driven mobility device by an individual with a mobility disability shall accept the presentation of a valid, State-issued disability parking placard or card, or State-issued proof of disability, as a credible assurance that the use of the other power-driven mobility device is for the individual´s mobility disability. In lieu of a valid, State-issued disability parking placard or card, or State-issued proof of disability, a public accommodation shall accept as a credible assurance a verbal representation, not contradicted by observable fact, that the other power-driven mobility device is being used for a mobility disability. A "valid" disability placard or card is one that is presented by the individual to whom it was issued and is otherwise in compliance with the State of issuance´s requirements for disability placards or cards.

§§ 36.312 – 36.399 [Reserved]

Subpart D – New Construction and Alterations

§ 36.401 New construction.

(a) *General.*

(1) Except as provided in paragraphs (b) and (c) of this section, discrimination for purposes of this part includes a failure to design and construct facilities for first occupancy after January 26, 1993, that are readily accessible to and usable by individuals with disabilities.

(2) For purposes of this section, a facility is designed and constructed for first occupancy after January 26, 1993, only –

(i) If the last application for a building permit or permit extension for the facility is certified to be complete, by a State, County, or local government after January 26, 1992 (or, in those jurisdictions where the government does not certify completion of applications, if the last application for a building permit or permit extension for the facility is received by the State, County, or local government after January 26, 1992); and

(ii) If the first certificate of occupancy for the facility is issued after January 26, 1993.

(b) *Commercial facilities located in private residences.*

(1) When a commercial facility is located in a private residence, the portion of the residence used exclusively as a residence is not covered by this subpart, but that portion used exclusively in the operation of the commercial facility or that portion used both for the commercial facility and for residential purposes is covered by the new construction and alterations requirements of this subpart.

(2) The portion of the residence covered under paragraph (b)(1) of this section extends to those elements used to enter the commercial facility, including the homeowner´s front sidewalk, if any, the door or entryway, and hallways; and those portions of the residence, interior or exterior, available to or used by employees or visitors

of the commercial facility, including restrooms.

(c) *Exception for structural impracticability.*

(1) Full compliance with the requirements of this section is not required where an entity can demonstrate that it is structurally impracticable to meet the requirements. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features.

(2) If full compliance with this section would be structurally impracticable, compliance with this section is required to the extent that it is not structurally impracticable. In that case, any portion of the facility that can be made accessible shall be made accessible to the extent that it is not structurally impracticable.

(3) If providing accessibility in conformance with this section to individuals with certain disabilities (*e.g.,* those who use wheelchairs) would be structurally impracticable, accessibility shall nonetheless be ensured to persons with other types of disabilities (*e.g.,* those who use crutches or who have sight, hearing, or mental impairments) in accordance with this section.

(d) *Elevator exemption.*

(1) For purposes of this paragraph (d) –

(i) Professional office of a health care provider means a location where a person or entity regulated by a State to provide professional services related to the physical or mental health of an individual makes such services available to the public. The facility housing the "professional office of a health care provider" only includes floor levels housing at least one health care provider, or any floor level designed or intended for use by at least one health care provider.

(ii) Shopping center or shopping mall means –

(A) A building housing five or more sales or rental establishments; or

(B) A series of buildings on a common site, either under common ownership or common control or developed either as one project or as a series of related projects, housing five or more sales or rental establishments. For purposes of this section, places of public accommodation of the types listed in paragraph (5) of the definition of "place of public accommodation" in section § 36.104 are considered sales or rental establishments. The facility housing a "shopping center or shopping mall" only includes floor levels housing at least one sales or rental establishment, or any floor level designed or intended for use by at least one sales or rental establishment.

(2) This section does not require the installation of an elevator in a facility that is less than three stories or has less than 3000 square feet per story, except with respect to any facility that houses one or more of the following:

(i) A shopping center or shopping mall, or a professional office of a health care provider.

(ii) A terminal, depot, or other station used for specified public transportation, or an airport passenger terminal. In such a facility, any area housing passenger services, including boarding and debarking, loading and unloading, baggage claim, dining facilities, and other common areas open to the public, must be on an accessible route from an accessible entrance.

(3) The elevator exemption set forth in this paragraph (d) does not obviate or limit, in any way the obligation to comply with the other accessibility requirements established in paragraph (a) of this section. For example, in a facility that houses a shopping center or shopping mall, or a professional office of a health care provider, the floors that are above or below an accessible ground floor and that do not house sales or rental establishments or a professional office of a health care provider, must meet the requirements of this section but for the elevator.

§ 36.402 Alterations.

(a) *General.*

(1) Any alteration to a place of public accommodation or a commercial facility, after January 26, 1992, shall be made so as to ensure that, to the maximum extent feasible, the altered portions of the facility are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs.

(2) An alteration is deemed to be undertaken after January 26, 1992, if the physical alteration of the property begins after that date.

(b) *Alteration.* For the purposes of this part, an alteration is a change to a place of public accommodation or a commercial facility that affects or could affect the usability of the building or facility or any part thereof.

(1) Alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, changes or rearrangement in structural parts or elements, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, asbestos removal, or changes to mechanical and electrical systems are not alterations unless they affect the usability of the building or facility.

(2) If existing elements, spaces, or common areas are altered, then each such altered element, space, or area shall comply with the applicable provisions of appendix A to this part.

(c) *To the maximum extent feasible.* The phrase "to the maximum extent feasible," as used in this section, applies to the occasional case where the nature of an existing facility makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alteration shall provide the maximum physical accessibility feasible. Any altered features of the facility that can be made accessible shall be made accessible. If providing accessibility in conformance with this section to individuals with certain disabilities (*e.g.,* those who use wheelchairs) would not be feasible, the facility shall be made accessible to persons with other types of disabilities (*e.g.,* those who use crutches, those who have impaired vision or hearing, or those who have other impairments).

§ 36.403 Alterations: Path of travel.

(a) *General.*

(1) An alteration that affects or could affect the usability of or access to an area of a facility that contains a primary function shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the altered area and the restrooms, telephones, and drinking fountains serving the altered area, are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, unless the cost and scope of such alterations is disproportionate to the cost of the overall alteration.

(2) If a private entity has constructed or altered required elements of a path of travel at a place of public accommodation or commercial facility in accordance with the specifications in the 1991 Standards, the private entity is not required to retrofit such elements to reflect the incremental changes in the 2010 Standards solely because of an alteration to a primary function area served by that path of travel.

(b) *Primary function.* A "primary function" is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the customer services lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the facility are carried out. Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors, and restrooms are not areas containing a primary function.

(c) *Alterations to an area containing a primary function*.

(1) Alterations that affect the usability of or access to an area containing a primary function include, but are not limited to –

(i) Remodeling merchandise display areas or employee work areas in a department store;

(ii) Replacing an inaccessible floor surface in the customer service or employee work areas of a bank;

(iii) Redesigning the assembly line area of a factory; or

(iv) Installing a computer center in an accounting firm.

(2) For the purposes of this section, alterations to windows, hardware, controls, electrical outlets, and signage shall not be deemed to be alterations that affect the usability of or access to an area containing a primary function.

(d) *Landlord/tenant:* If a tenant is making alterations as defined in § 36.402 that would trigger the requirements of this section, those alterations by the tenant in areas that only the tenant occupies do not trigger a path of travel obligation upon the landlord with respect to areas of the facility under the landlord´s authority, if those areas are not otherwise being altered.

(e) *Path of travel.*

(1) A "path of travel" includes a continuous, unobstructed way of pedestrian passage by means of which the altered area may be approached, entered, and exited, and which connects the altered area with an exterior approach (including sidewalks, streets, and parking areas), an entrance to the facility, and other parts of the facility.

(2) An accessible path of travel may consist of walks and sidewalks, curb ramps and other interior or exterior pedestrian ramps; clear floor paths through lobbies, corridors, rooms, and other improved areas; parking access aisles; elevators and lifts; or a combination of these elements.

(3) For the purposes of this part, the term "path of travel" also includes the restrooms, telephones, and drinking fountains serving the altered area.

(f) *Disproportionality.*

(1) Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20% of the cost of the alteration to the primary function area.

(2) Costs that may be counted as expenditures required to provide an accessible path of travel may include:

(i) Costs associated with providing an accessible entrance and an accessible route to the altered area, for example, the cost of widening doorways or installing ramps;

(ii) Costs associated with making restrooms accessible, such as installing grab bars, enlarging toilet stalls, insulating pipes, or installing accessible faucet controls;

(iii) Costs associated with providing accessible telephones, such as relocating the telephone to an accessible height, installing amplification devices, or installing a text telephone (TTY);

(iv) Costs associated with relocating an inaccessible drinking fountain.

(g) *Duty to provide accessible features in the event of disproportionality.*

(1) When the cost of alterations necessary to make the path of travel to the altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the extent that it can be made accessible without incurring disproportionate costs.

(2) In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access, in the following order:

(i) An accessible entrance;

(ii) An accessible route to the altered area;

(iii) At least one accessible restroom for each sex or a single unisex restroom;

(iv) Accessible telephones;

(v) Accessible drinking fountains; and

(vi) When possible, additional accessible elements such as parking, storage, and alarms.

(h) *Series of smaller alterations.*

(1) The obligation to provide an accessible path of travel may not be evaded by performing a series of small alterations to the area served by a single path of travel if those alterations could have been performed as a single undertaking.

(2)

(i) If an area containing a primary function has been altered without providing an accessible path of travel to that area, and subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to the primary function areas on that path of travel during the preceding three year period shall be considered in determining whether the cost of making that path of travel accessible is disproportionate.

(ii) Only alterations undertaken after January 26, 1992, shall be considered in determining if the cost of providing an accessible path of travel is disproportionate to the overall cost of the alterations.

§ 36.404 Alterations: Elevator exemption.

(a) This section does not require the installation of an elevator in an altered facility that is less than three stories or has less than 3,000 square feet per story, except with respect to any facility that houses a shopping center, a shopping mall, the professional office of a health care provider, a terminal, depot, or other station used for specified public transportation, or an airport passenger terminal.

(1) For the purposes of this section, "professional office of a health care provider" means a location where a person or entity regulated by a State to provide professional services related to the physical or mental health of an individual makes such services available to the public. The facility that houses a "professional office of a health care provider" only includes floor levels housing by at least one health care provider, or any floor level designed or intended for use by at least one health care provider.

(2) For the purposes of this section, shopping center or shopping mall means –

(i) A building housing five or more sales or rental establishments; or

(ii) A series of buildings on a common site, connected by a common pedestrian access route above or below the ground floor, that is either under common ownership or common control or developed either as one project or as a series of related projects, housing five or more sales or rental establishments. For purposes of this section, places of public accommodation of the types listed in paragraph (5) of the definition of "place of public accommodation" in § 36.104 are considered sales or rental establishments. The facility housing a "shopping center or shopping mall" only includes floor levels housing at least one sales or rental establishment, or any floor level designed or intended for use by at least one sales or rental establishment.

(b) The exemption provided in paragraph (a) of this section does not obviate or limit in any way the obligation to comply with the other accessibility requirements established in this subpart. For example, alterations to floors above or below the accessible ground floor must be accessible regardless of whether the altered facility has an elevator.

§ 36.405 Alterations: Historic preservation.

(a) Alterations to buildings or facilities that are eligible for listing in the National Register of Historic Places under the National Historic Preservation Act (16 U.S.C. 470 *et seq*.) or are designated as historic under State or local law, shall comply to the maximum extent feasible with this part.

(b) If it is determined that it is not feasible to provide physical access to an historic property that

is a place of public accommodation in a manner that will not threaten or destroy the historic significance of the building or the facility, alternative methods of access shall be provided pursuant to the requirements of subpart C of this part.

§ 36.406 Standards for new construction and alterations.

(a) *Accessibility standards and compliance date.*

(1) New construction and alterations subject to §§ 36.401 or 36.402 shall comply with the 1991 Standards if the date when the last application for a building permit or permit extension is certified to be complete by a State, county, or local government (or, in those jurisdictions where the government does not certify completion of applications, if the date when the last application for a building permit or permit extension is received by the State, county, or local government) is before September 15, 2010, or if no permit is required, if the start of physical construction or alterations occurs before September 15, 2010.

(2) New construction and alterations subject to §§ 36.401 or 36.402 shall comply either with the 1991 Standards or with the 2010 Standards if the date when the last application for a building permit or permit extension is certified to be complete by a State, county, or local government (or, in those jurisdictions where the government does not certify completion of applications, if the date when the last application for a building permit or permit extension is received by the State, county, or local government) is on or after September 15, 2010, and before March 15, 2012, or if no permit is required, if the start of physical construction or alterations occurs on or after September 15, 2010, and before March 15, 2012.

(3) New construction and alterations subject to §§ 36.401 or 36.402 shall comply with the 2010 Standards if the date when the last application for a building permit or permit extension is certified to be complete by a State, county, or local government (or, in those jurisdictions where the government does not certify completion of applications, if the date when the last application for a building permit or permit extension is received by the State, county, or local government) is on or after March 15, 2012, or if no permit is required, if the start of physical construction or alterations occurs on or after March 15, 2012.

(4) For the purposes of this section, "start of physical construction or alterations" does not mean ceremonial groundbreaking or razing of structures prior to site preparation.

(5) *Noncomplying new construction and alterations.* (i) Newly constructed or altered facilities or elements covered by §§ 36.401 or 36.402 that were constructed or altered before March 15, 2012, and that do not comply with the 1991 Standards shall, before March 15, 2012, be made accessible in accordance with either the 1991 Standards or the 2010 Standards.

(ii) Newly constructed or altered facilities or elements covered by §§ 36.401 or 36.402 that were constructed or altered before March 15, 2012 and that do not comply with the 1991 Standards shall, on or after March 15, 2012, be made accessible in accordance with the 2010 Standards.

Appendix to § 36.406(a)

Compliance Dates for New Construction and Alterations	Applicable Standards
On or after January 26, 1993 and before September 15, 2010	1991 Standards
On or after September 15, 2010 and before March 15, 2012	1991 Standards or 2010 Standards
On or after March 15, 2012	2010 Standards

(b) *Scope of coverage.* The 1991 Standards and the 2010 Standards apply to fixed or built-in elements of buildings, structures, site improvements, and pedestrian routes or vehicular ways located on a site. Unless specifically stated otherwise, advisory notes, appendix notes, and figures contained in the 1991 Standards and 2010 Standards explain or illustrate the requirements of the rule; they do not establish enforceable requirements.

(c) *Places of lodging.* Places of lodging subject to this part shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806 of the 2010 Standards.

(1) *Guest rooms*. Guest rooms with mobility features in places of lodging subject to the transient lodging requirements of 2010 Standards shall be provided as follows –

(i) Facilities that are subject to the same permit application on a common site that each have 50 or fewer guest rooms may be combined for the purposes of determining the required number of accessible rooms and type of accessible bathing facility in accordance with table 224.2 to section 224.2 of the 2010 Standards.

(ii) Facilities with more than 50 guest rooms shall be treated separately for the purposes of determining the required number of accessible rooms and type of accessible bathing facility in accordance with table 224.2 to section 224.2 of the 2010 Standards.

(2) *Exception.* Alterations to guest rooms in places of lodging where the guest rooms are not owned or substantially controlled by the entity that owns, leases, or operates the overall facility and the physical features of the guest room interiors are controlled by their individual owners are not required to comply with § 36.402 or the alterations requirements in section 224.1.1 of the 2010 Standards.

(3) *Facilities with residential units and transient lodging units.* Residential dwelling units that are designed and constructed for residential use exclusively are not subject to the transient lodging standards.

(d) *Social service center establishments.* Group homes, halfway houses, shelters, or similar social service center establishments that provide either temporary sleeping accommodations or residential dwelling units that are subject to this part shall comply with the provisions of the 2010 Standards applicable to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

(1) In sleeping rooms with more than 25 beds covered by this part, a minimum of 5% of the beds shall have clear floor space complying with section 806.2.3 of the 2010 Standards.

(2) Facilities with more than 50 beds covered by this part that provide common use bathing facilities shall provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat, and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower shall be provided for each group.

(e) *Housing at a place of education.* Housing at a place of education that is subject to this part shall comply with the provisions of the 2010 Standards applicable to transient lodging, including, but not limited to, the requirements for transient lodging guest rooms in sections 224 and 806, subject to the following exceptions. For the purposes of the application of this section, the term "sleeping room" is intended to be used interchangeably with the term "guest room" as it is used in the transient lodging standards.

(1) Kitchens within housing units containing accessible sleeping rooms with mobility features (including suites and clustered sleeping rooms)

or on floors containing accessible sleeping rooms with mobility features shall provide turning spaces that comply with section 809.2.2 of the 2010 Standards and kitchen work surfaces that comply with section 804.3 of the 2010 Standards.

(2) Multi-bedroom housing units containing accessible sleeping rooms with mobility features shall have an accessible route throughout the unit in accordance with section 809.2 of the 2010 Standards.

(3) Apartments or townhouse facilities that are provided by or on behalf of a place of education, which are leased on a year-round basis exclusively to graduate students or faculty and do not contain any public use or common use areas available for educational programming, are not subject to the transient lodging standards and shall comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

(f) *Assembly areas*. Assembly areas that are subject to this part shall comply with the provisions of the 2010 Standards applicable to assembly areas, including, but not limited to, sections 221 and 802. In addition, assembly areas shall ensure that –

(1) In stadiums, arenas, and grandstands, wheelchair spaces and companion seats are dispersed to all levels that include seating served by an accessible route;

(2) In assembly areas that are required to horizontally disperse wheelchair spaces and companion seats by section 221.2.3.1 of the 2010 Standards and that have seating encircling, in whole or in part, a field of play or performance, wheelchair spaces and companion seats are dispersed around that field of play or performance area;

(3) Wheelchair spaces and companion seats are not located on (or obstructed by) temporary platforms or other movable structures, except that when an entire seating section is placed on temporary platforms or other movable structures in an area where fixed seating is not provided, in order to increase seating for an event, wheelchair spaces and companion seats may be placed in that section. When wheelchair spaces and companion seats are not required to accommodate persons eligible for those spaces and seats, individual, removable seats may be placed in those spaces and seats;

(4) In stadium-style movie theaters, wheelchair spaces and companion seats are located on a riser or cross-aisle in the stadium section that satisfies at least one of the following criteria –

(i) It is located within the rear 60% of the seats provided in an auditorium; or

(ii) It is located within the area of an auditorium in which the vertical viewing angles (as measured to the top of the screen) are from the 40th to the 100th percentile of vertical viewing angles for all seats as ranked from the seats in the first row (1st percentile) to seats in the back row (100th percentile).

(g) *Medical care facilities.* Medical care facilities that are subject to this part shall comply with the provisions of the 2010 Standards applicable to medical care facilities, including, but not limited to, sections 223 and 805. In addition, medical care facilities that do not specialize in the treatment of conditions that affect mobility shall disperse the accessible patient bedrooms required by section 223.2.1 of the 2010 Standards in a manner that is proportionate by type of medical specialty.

§ §36.407 – 36.499 [Reserved]

Subpart E – Enforcement

§ 36.501 Private suits.

(a) *General*. Any person who is being subjected to discrimination on the basis of disability in violation of the Act or this part or who has reasonable grounds for believing that such person is about to be subjected to discrimination in violation of section 303 of the Act or subpart D of this part may institute a civil action for preventive relief, includ-

ing an application for a permanent or temporary injunction, restraining order, or other order. Upon timely application, the court may, in its discretion, permit the Attorney General to intervene in the civil action if the Attorney General or his or her designee certifies that the case is of general public importance. Upon application by the complainant and in such circumstances as the court may deem just, the court may appoint an attorney for such complainant and may authorize the commencement of the civil action without the payment of fees, costs, or security. Nothing in this section shall require a person with a disability to engage in a futile gesture if the person has actual notice that a person or organization covered by title III of the Act or this part does not intend to comply with its provisions.

(b) *Injunctive relief.* In the case of violations of § 36.304, §§ 36.308, 36.310(b), 36.401, 36.402, 36.403, and 36.405 of this part, injunctive relief shall include an order to alter facilities to make such facilities readily accessible to and usable by individuals with disabilities to the extent required by the Act or this part. Where appropriate, injunctive relief shall also include requiring the provision of an auxiliary aid or service, modification of a policy, or provision of alternative methods, to the extent required by the Act or this part.

§ 36.502 Investigations and compliance reviews.

(a) The Attorney General shall investigate alleged violations of the Act or this part.

(b) Any individual who believes that he or she or a specific class of persons has been subjected to discrimination prohibited by the Act or this part may request the Department to institute an investigation.

(c) Where the Attorney General has reason to believe that there may be a violation of this part, he or she may initiate a compliance review.

§ 36.503 Suit by the Attorney General.

Following a compliance review or investigation under § 36.502, or at any other time in his or her discretion, the Attorney General may commence a civil action in any appropriate United States district court if the Attorney General has reasonable cause to believe that –

(a) Any person or group of persons is engaged in a pattern or practice of discrimination in violation of the Act or this part; or

(b) Any person or group of persons has been discriminated against in violation of the Act or this part and the discrimination raises an issue of general public importance.

§ 36.504 Relief.

(a) *Authority of court*. In a civil action under § 36.503, the court –

(1) May grant any equitable relief that such court considers to be appropriate, including, to the extent required by the Act or this part –

(i) Granting temporary, preliminary, or permanent relief;

(ii) Providing an auxiliary aid or service, modification of policy, practice, or procedure, or alternative method; and

(iii) Making facilities readily accessible to and usable by individuals with disabilities;

(2) May award other relief as the court considers to be appropriate, including monetary damages to persons aggrieved when requested by the Attorney General; and

(3) May, to vindicate the public interest, assess a civil penalty against the entity in an amount

(i) Not exceeding $50,000 for a first violation occurring before September 29, 1999, and not exceeding $55,000 for a first violation occurring on or after September 29, 1999; and

(ii) Not exceeding $100,000 for any subsequent violation occurring before September 29, 1999, and not exceeding $110,000 for any subsequent violation occurring on or after September 29, 1999.

(b) *Single violation*. For purposes of paragraph (a)(3) of this section, in determining whether a first or subsequent violation has occurred, a determination in a single action, by judgment or settlement,

that the covered entity has engaged in more than one discriminatory act shall be counted as a single violation.

(c) *Punitive damages*. For purposes of paragraph (a)(2) of this section, the terms "monetary damages" and "such other relief" do not include punitive damages.

(d) *Judicial consideration*. In a civil action under § 36.503, the court, when considering what amount of civil penalty, if any, is appropriate, shall give consideration to any good faith effort or attempt to comply with this part by the entity. In evaluating good faith, the court shall consider, among other factors it deems relevant, whether the entity could have reasonably anticipated the need for an appropriate type of auxiliary aid needed to accommodate the unique needs of a particular individual with a disability.

§ 36.505 Attorneys fees.

In any action or administrative proceeding commenced pursuant to the Act or this part, the court or agency, in its discretion, may allow the prevailing party, other than the United States, a reasonable attorney´s fee, including litigation expenses, and costs, and the United States shall be liable for the foregoing the same as a private individual.

§ 36.506 Alternative means of dispute resolution.

Where appropriate and to the extent authorized by law, the use of alternative means of dispute resolution, including settlement negotiations, conciliation, facilitation, mediation, factfinding, minitrials, and arbitration, is encouraged to resolve disputes arising under the Act and this part.

§ 36.507 Effect of unavailability of technical assistance.

A public accommodation or other private entity shall not be excused from compliance with the requirements of this part because of any failure to receive technical assistance, including any failure in the development or dissemination of any technical assistance manual authorized by the Act.

§ 36.508 Effective date.

(a) *General*. Except as otherwise provided in this section and in this part, this part shall become effective on January 26, 1992.

(b) *Civil actions.* Except for any civil action brought for a violation of section 303 of the Act, no civil action shall be brought for any act or omission described in section 302 of the Act that occurs –

(1) Before July 26, 1992, against businesses with 25 or fewer employees and gross receipts of $1,000,000 or less.

(2) Before January 26, 1993, against businesses with 10 or fewer employees and gross receipts of $500,000 or less.

(c) Transportation services provided by public accommodations. Newly purchased or leased vehicles required to be accessible by § 36.310 must be readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, if the solicitation for the vehicle is made after August 25, 1990.

§§ 36.509 – 36.599 [Reserved]

Subpart F – Certification of State Laws or Local Building Codes

§ 36.601 Definitions.

Assistant Attorney General means the Assistant Attorney General for Civil Rights or his or her designee.

Certification of equivalency means a final certification that a code meets or exceeds the minimum requirements of title III of the Act for accessibility and usability of facilities covered by that title.

Code means a State law or local building code or similar ordinance, or part thereof, that establishes accessibility requirements.

Model code means a nationally recognized document developed by a private entity for use by State or local jurisdictions in developing codes as

defined in this section. A model code is intended for incorporation by reference or adoption in whole or in part, with or without amendment, by State or local jurisdictions.

Preliminary determination of equivalency means a preliminary determination that a code appears to meet or exceed the minimum requirements of title III of the Act for accessibility and usability of facilities covered by that title.

Submitting official means the State or local official who –

(1) Has principal responsibility for administration of a code, or is authorized to submit a code on behalf of a jurisdiction; and

(2) Files a request for certification under this subpart.

§ 36.602 General rule.

On the application of a State or local government, the Assistant Attorney General may certify that a code meets or exceeds the minimum requirements of the Act for the accessibility and usability of places of public accommodation and commercial facilities under this part by issuing a certification of equivalency. At any enforcement proceeding under title III of the Act, such certification shall be rebuttable evidence that such State law or local ordinance does meet or exceed the minimum requirements of title III.

§ 36.603 Preliminary determination. (*Redesignated from Section 36.604*)

Upon receipt and review of all information relevant to a request filed by a submitting official for certification of a code, and after consultation with the Architectural and Transportation Barriers Compliance Board, the Assistant Attorney General shall make a preliminary determination of equivalency or a preliminary determination to deny certification.

§ 36.604 Procedure following preliminary determination of equivalency. ***(Redesignated from Section 36.605)***

(a) If the Assistant Attorney General makes a preliminary determination of equivalency under § 36.603, he or she shall inform the submitting official, in writing, of that preliminary determination. The Assistant Attorney General also shall –

(1) Publish a notice in the **Federal Register** that advises the public of the preliminary determination of equivalency with respect to the particular code, and invite interested persons and organizations, including individuals with disabilities, during a period of at least 60 days following publication of the notice, to file written comments relevant to whether a final certification of equivalency should be issued;

(2) After considering the information received in response to the notice described in paragraph (a) of this section, and after publishing a separate notice in the **Federal Register,** hold an informal hearing, in the State or local jurisdiction charged with administration and enforcement of the code, at which interested individuals, including individuals with disabilities, are provided an opportunity to express their views with respect to the preliminary determination of equivalency; and

(b) The Assistant Attorney General, after consultation with the Architectural and Transportation Barriers Compliance Board and consideration of the materials and information submitted pursuant to this section, as well as information provided previously by the submitting official, shall issue either a certification of equivalency or a final determination to deny the request for certification. The Assistant Attorney General shall publish notice of the certification of equivalency or denial of certification in the **Federal Register.**

§ 36.605 Procedure following preliminary denial of certification. (*Redesignated from Section 36.606*)

(a) If the Assistant Attorney General makes a preliminary determination to deny certification of a code under § 36.603, he or she shall notify the submitting official of the determination.

(b) The Assistant Attorney General shall allow the submitting official not less than 15 days to submit data, views, and arguments in opposition to the preliminary determination to deny certification. If the submitting official does not submit materials, the Assistant Attorney General shall not be required to take any further action. If the submitting official submits materials, the Assistant Attorney General shall evaluate those materials and any other relevant information. After evaluation of any newly submitted materials, the Assistant Attorney General shall make either a final denial of certification or a preliminary determination of equivalency.

§ 36.606 Effect of certification. (*Redesignated from Section 36.607*)

(a)

(1) A certification shall be considered a certification of equivalency only with respect to those features or elements that are both covered by the certified code and addressed by the standards against which equivalency is measured.

(2) For example, if certain equipment is not covered by the code, the determination of equivalency cannot be used as evidence with respect to the question of whether equipment in a building built according to the code satisfies the Act´s requirements with respect to such equipment. By the same token, certification would not be relevant to construction of a facility for children, if the regulations against which equivalency is measured do not address children´s facilities.

(b) A certification of equivalency is effective only with respect to the particular edition of the code for which certification is granted. Any amendments or other changes to the code after the date of the certified edition are not considered part of the certification.

(c) A submitting official may reapply for certification of amendments or other changes to a code that has already received certification.

(d) When the standards of the Act against which a code is deemed equivalent are revised or amended substantially, a certification of equivalency issued under the preexisting standards is no longer effective, as of the date the revised standards take effect. However, construction in compliance with a certified code during the period when a certification of equivalency was effective shall be considered rebuttable evidence of compliance with the Standards then in effect as to those elements of buildings and facilities that comply with the certified code. A submitting official may reapply for certification pursuant to the Act´s revised standards, and, to the extent possible, priority will be afforded the request in the review process.

§ 36.607 Guidance concerning model codes. (*Redesignated from Section 36.608*)

Upon application by an authorized representative of a private entity responsible for developing a model code, the Assistant Attorney General may review the relevant model code and issue guidance concerning whether and in what respects the model code is consistent with the minimum requirements of the Act for the accessibility and usability of places of public accommodation and commercial facilities under this part.

Title III Regulations

2010 Guidance and Section-by-Section Analysis

Department of Justice

This revised title III regulation integrates the Department's new regulatory provisions with the text of the existing title III regulation that was unchanged by the 2010 revisions.

Appendix A to Part 36—Guidance on Revisions to ADA Regulation on Nondiscrimination on the Basis of Disability by Public Accommodations and Commercial Facilities

Note: This Appendix contains guidance providing a section-by-section analysis of the revisions to 28 CFR part 36 published on September 15, 2010.

Section-By-Section Analysis and Response to Public Comments

This section provides a detailed description of the Department's changes to the title III regulation, the reasoning behind those changes, and responses to public comments received on these topics. The Section-by-Section Analysis follows the order of the title III regulation itself, except that if the Department has not changed a regulatory section, the unchanged section has not been mentioned.

Subpart A—General

Section 36.104 Definitions

''1991 Standards'' and ''2004 ADAAG''

The Department has included in the final rule new definitions of both the ''1991 Standards'' and the ''2004 ADAAG.'' The term ''1991 Standards'' refers to the ADA Standards for Accessible Design, originally published on July 26, 1991, and republished as Appendix D to 28 CFR part 36. The term ''2004 ADAAG'' refers to ADA Chapter 1, ADA Chapter 2, and Chapters 3 through 10 of the Americans with Disabilities Act and the Architectural Barriers Act Accessibility Guidelines, which were issued by the Access Board on July 23, 2004, codified at 36 CFR 1191, app. B and D (2009), and which the Department has adopted in this final rule. These terms are included in the definitions section for ease of reference.

''2010 Standards''

The Department has added to the final rule a definition of the term ''2010 Standards.'' The term ''2010 Standards'' refers to the 2010 ADA Standards for Accessible Design, which consist of the 2004 ADAAG and the requirements contained in subpart D of 28 CFR part 36.

''Direct Threat''

The final rule moves the definition of direct threat from § 36.208(b) to the definitions section at §36.104. This is an editorial change. Consequently, § 36.208(c) becomes § 36.208(b) in the final rule.

''Existing Facility''

The 1991 title III regulation provided definitions for ''new construction'' at § 36.401(a) and ''alterations'' at § 36.402(b). In contrast, the term ''existing facility'' was not explicitly defined, although it is used in the statute and regulations for titles II and III. *See, e.g.,* 42 U.S.C. 12182(b)(2)(A)(iv); 28 CFR 35.150. It has been the Department's view that newly constructed or altered facilities are also existing facilities subject to title III's continuing barrier removal obligation, and that view is made explicit in this rule.

The classification of facilities under the ADA is neither static nor mutually exclusive. Newly constructed or altered facilities are also existing facilities. A newly constructed facility remains subject to the accessibility standards in effect at the time of design and construction, with respect to those elements for which, at that time, there were applicable ADA Standards. That same facility, however, after construction, is also an existing facility, and subject to the public accommodation's continuing obligation to remove barriers where it is readily achievable to do so. The fact that the facility is also an existing facility does not relieve the public accommodation of its obligations under the new construction requirements of this part. Rather, it means that in addition to the new construction

requirements, the public accommodation has a continuing obligation to remove barriers that arise, or are deemed barriers, only after construction. Such barriers include but are not limited to the elements that are first covered in the 2010 Standards, as that term is defined in § 36.104.

At some point, the same facility may undergo alterations, which are subject to the alterations requirements in effect at that time. This facility remains subject to its original new construction standards for elements and spaces not affected by the alterations; the facility is subject to the alterations requirements and standards in effect at the time of the alteration for the elements and spaces affected by the alteration; and, throughout, the facility remains subject to the continuing barrier removal obligation.

The Department's enforcement of the ADA is premised on a broad understanding of ''existing facility.'' The ADA contemplates that as the Department's knowledge and understanding of accessibility advances and evolves, this knowledge will be incorporated into and result in increased accessibility in the built environment. Title III's barrier removal provisions strike the appropriate balance between ensuring that accessibility advances are reflected in the built environment and mitigating the costs of those advances to public accommodations. With adoption of the final rule, public accommodations engaged in barrier removal measures will now be guided by the 2010 Standards, defined in § 36.104, and the safe harbor in § 36.304(d)(2).

The NPRM included the following proposed definition of ''existing facility'': ''[A] facility that has been constructed and remains in existence on any given date.'' 73 FR 34508, 34552 (June 17, 2008). While the Department intended the proposed definition to provide clarity with respect to public accommodations' continuing obligation to remove barriers where it is readily achievable to do so, some commenters pointed out arguable ambiguity in the language and the potential for misapplication of the rule in practice.

The Department received a number of comments on this issue. The commenters urged the Department to clarify that all buildings remain subject to the standards in effect at the time of their construction, that is, that a facility designed and constructed for first occupancy between January 26, 1993, and the effective date of the final rule is still considered ''new construction'' and that alterations occurring between January 26, 1993, and the effective date of the final rule are still considered ''alterations.''

The final rule includes clarifying language to ensure that the Department's interpretation is accurately reflected. As established by this rule, existing facility means a facility in existence on any given date, without regard to whether the facility may also be considered newly constructed or altered under this part. Thus, this definition reflects the Department's longstanding interpretation that public accommodations have obligations in existing facilities that are independent of but may coexist with requirements imposed by new construction or alteration requirements in those same facilities.

''Housing at a Place of Education''

The Department has added a new definition to § 36.104, ''housing at a place of education,'' to clarify the types of educational housing programs that are covered by this title. This section defines ''housing at a place of education'' as ''housing operated by or on behalf of an elementary, secondary, undergraduate, or postgraduate school, or other place of education, including dormitories, suites, apartments, or other places of residence.'' This definition does not apply to social service programs that combine residential housing with social services, such as a residential job training program.

''Other Power-Driven Mobility Device'' and ''Wheelchair''

Because relatively few individuals with disabili-

ties were using nontraditional mobility devices in 1991, there was no pressing need for the 1991 title III regulation to define the terms ''wheelchair'' or ''other power-driven mobility device,'' to expound on what would constitute a reasonable modification in policies, practices, or procedures under § 36.302, or to set forth within that section specific requirements for the accommodation of mobility devices. Since the issuance of the 1991 title III regulation, however, the choices of mobility devices available to individuals with disabilities have increased dramatically. The Department has received complaints about and has become aware of situations where individuals with mobility disabilities have utilized devices that are not designed primarily for use by an individual with a mobility disability, including the Segway® Personal Transporter (Segway® PT), golf cars, all-terrain vehicles (ATVs), and other locomotion devices.

The Department also has received questions from public accommodations and individuals with mobility disabilities concerning which mobility devices must be accommodated and under what circumstances. Indeed, there has been litigation concerning the legal obligations of covered entities to accommodate individuals with mobility disabilities who wish to use an electronic personal assistance mobility device (EPAMD), such as the Segway® PT, as a mobility device. The Department has participated in such litigation as amicus curiae. *See Ault v. Walt Disney World Co*., No. 6:07–cv–1785–Orl–31KRS, 2009 WL 3242028 (M.D. Fla. Oct. 6, 2009). Much of the litigation has involved shopping malls where businesses have refused to allow persons with disabilities to use EPAMDs. *See, e.g., McElroy v. Simon Property Group,* No. 08– 404 RDR, 2008 WL 4277716 (D. Kan. Sept. 15, 2008) (enjoining mall from prohibiting the use of a Segway® PT as a mobility device where an individual agrees to all of a mall's policies for use of the device, except indemnification); Shasta Clark, *Local Man Fighting Mall Over Right to Use Segway,* WATE 6 News, July 26, 2005, available at http://*www.wate.com/ Global/ story.asp?s=3643674* (last visited June 24, 2010).

In response to questions and complaints from individuals with disabilities and covered entities concerning which mobility devices must be accommodated and under what circumstances, the Department began developing a framework to address the use of unique mobility devices, concerns about their safety, and the parameters for the circumstances under which these devices must be accommodated. As a result, the Department's NPRM proposed two new approaches to mobility devices. First, the Department proposed a two-tiered mobility device definition that defined the term ''wheelchair'' separately from ''other power-driven mobility device.'' Second, the Department proposed requirements to allow the use of devices in each definitional category. In § 36.311(a), the NPRM proposed that wheelchairs and manually-powered mobility aids used by individuals with mobility disabilities shall be permitted in any areas open to pedestrian use. Section 36.311(b) of the NPRM proposed that a public accommodation ''shall make reasonable modifications in its policies, practices, and procedures to permit the use of other power-driven mobility devices by individuals with disabilities, unless the public accommodation can demonstrate that the use of the device is not reasonable or that its use will result in a fundamental alteration in the nature of the public accommodation's goods, services, facilities, privileges, advantages, or accommodations.'' 73 FR 34508, 34556 (June 17, 2008).

The Department sought public comment with regard to whether these steps would, in fact, achieve clarity on these issues. Toward this end, the Department's NPRM asked several questions relating to the definitions of ''wheelchair,'' ''other power-driven mobility device,'' and ''manually-powered mobility aids''; the best way to categorize different classes of mobility devices, the types of devices that should be included in each category; and the circumstances under which certain

types of mobility devices must be accommodated or may be excluded pursuant to the policy adopted by the public accommodation.

Because the questions in the NPRM that concerned mobility devices and their accommodation were interrelated, many of the commenters' responses did not identify the specific question to which they were responding. Instead, commenters grouped the questions together and provided comments accordingly. Most commenters spoke to the issues addressed in the Department's questions in broad terms and using general concepts. As a result, the responses to the questions posed are discussed below in broadly grouped issue categories rather than on a question-by-question basis.

T*wo-tiered definitional approach.* Commenters supported the Department's proposal to use a two-tiered definition of mobility device. Commenters nearly universally said that wheelchairs always should be accommodated and that they should never be subject to an assessment with regard to their admission to a particular public accommodation. In contrast, the vast majority of commenters indicated they were in favor of allowing public accommodations to conduct an assessment as to whether, and under which circumstances, other power-driven mobility devices will be allowed onsite.

Many commenters also indicated their support for the two-tiered approach in responding to questions concerning the definition of ''wheelchair'' and ''other power-driven mobility device.'' Nearly every disability advocacy group said that the Department's two-tiered approach strikes the proper balance between ensuring access for individuals with disabilities and addressing fundamental alteration and safety concerns held by public accommodations; however, a minority of disability advocacy groups wanted other power-driven mobility devices to be included in the definition of ''wheelchair.'' Most advocacy, nonprofit, and individual commenters supported the concept of a separate definition for ''other power-driven mobility device'' because a separate definition would maintain existing legal protections for wheelchairs while recognizing that some devices that are not designed primarily for individuals with mobility disabilities have beneficial uses for individuals with mobility disabilities. They also favored this concept because it recognizes technological developments and that innovative uses of varying devices may provide increased access to individuals with mobility disabilities.

While two business associations indicated that they opposed the concept of ''other power-driven mobility device'' in its entirety, other business commenters expressed general and industry-specific concerns about permitting their use. They indicated that such devices create a host of safety, cost, and fraud issues that do not exist with wheelchairs. On balance, however, business commenters indicated that they support the establishment of a two-tiered regulatory approach because defining ''other power-driven mobility device'' separately from ''wheelchair'' means that businesses will be able to maintain some measure of control over the admission of the former. Virtually all of these commenters indicated that their support for the dual approach and the concept of other power-driven mobility devices was, in large measure, due to the other power-driven mobility device assessment factors in § 36.311(c) of the NPRM.

By maintaining the two-tiered approach to mobility devices and defining ''wheelchair'' separately from ''other power-driven mobility device,'' the Department is able to preserve the protection users of traditional wheelchairs and other manually-powered mobility aids have had since the ADA was enacted, while also recognizing that human ingenuity, personal choice, and new technologies have led to the use of devices that may be more beneficial for individuals with certain mobility disabilities.

Moreover, the Department believes the two-tiered approach gives public accommodations guidance to follow in assessing whether reasonable modifications can be made to permit the use of other power-driven mobility devices on-site

and to aid in the development of policies describing the circumstances under which persons with disabilities may use such devices. The two-tiered approach neither mandates that all other power-driven mobility devices be accommodated in every circumstance, nor excludes these devices from all protection. This approach, in conjunction with the factor assessment provisions in § 36.311(b)(2), will serve as a mechanism by which public accommodations can evaluate their ability to accommodate other power-driven mobility devices. As will be discussed in more detail below, the assessment factors in § 36.311(b)(2) are specifically designed to provide guidance to public accommodations regarding whether it is permissible to bar the use of a specific other power-driven mobility device in a specific facility. In making such a determination, a public accommodation must consider the device's type, size, weight dimensions, and speed; the facility's volume of pedestrian traffic; the facility's design and operational characteristics; whether the device conflicts with legitimate safety requirements; and whether the device poses a substantial risk of serious harm to the immediate environment or natural or cultural resources, or conflicts with Federal land management laws or regulations. In addition, under § 36.311(b)(i) if the public accommodation claims that it cannot make reasonable modifications to its policies, practices, or procedures to permit the use of other power-driven mobility devices by individuals with disabilities, the burden of proof to demonstrate that such devices cannot be operated in accordance with legitimate safety requirements rests upon the public accommodation.

Categorization of wheelchair versus other power-driven mobility devices. Implicit in the creation of the two-tiered mobility device concept is the question of how to categorize which devices are wheelchairs and which are other power-driven mobility devices. Finding weight and size to be too restrictive, the vast majority of advocacy, nonprofit, and individual commenters opposed using the Department of Transportation's definition of ''common wheelchair'' to designate the mobility device's appropriate category. Business commenters who generally supported using weight and size as the method of categorization did so because of their concerns about having to make physical changes to their facilities to accommodate oversized devices. The vast majority of business commenters also favored using the device's intended use to categorize which devices constitute wheelchairs and which are other power-driven mobility devices. Furthermore, the intended-use determinant received a fair amount of support from advocacy, nonprofit, and individual commenters, either because they sought to preserve the broad accommodation of wheelchairs or because they sympathized with concerns about individuals without mobility disabilities fraudulently bringing other power-driven mobility devices into places of public accommodation.

Commenters seeking to have the Segway® PT included in the definition of ''wheelchair'' objected to classifying mobility devices on the basis of their intended use because they felt that such a classification would be unfair and prejudicial to Segway® PT users and would stifle personal choice, creativity, and innovation. Other advocacy and nonprofit commenters objected to employing an intended-use approach because of concerns that the focus would shift to an assessment of the device, rather than the needs or benefits to the individual with the mobility disability. They were of the view that the mobility-device classification should be based on its function—whether it is used to address a mobility disability. A few commenters raised the concern that an intended-use approach might embolden public accommodations to assess whether an individual with a mobility disability really needs to use the other power-driven mobility device at issue or to question why a wheelchair would not provide sufficient mobility. Those citing objections to the intended-use determinant indicated it would be more appropriate to make the categorization determination based on whether the device is being used for a mobility

disability in the context of the impact of its use in a specific environment. Some of these commenters preferred this approach because it would allow the Segway® PT to be included in the definition of ''wheelchair.''

Some commenters were inclined to categorize mobility devices by the way in which they are powered, such as battery-powered engines versus fuel or combustion engines. One commenter suggested using exhaust level as the determinant. Although there were only a few commenters who would make the determination based on indoor or outdoor use, there was nearly universal support for banning from indoor use devices that are powered by fuel or combustion engines.

A few commenters thought it would be appropriate to categorize the devices based on their maximum speed. Others objected to this approach, stating that circumstances should dictate the appropriate speed at which mobility devices should be operated— for example, a faster speed may be safer when crossing streets than it would be for sidewalk use—and merely because a device can go a certain speed does not mean it will be operated at that speed.

The Department has decided to maintain the device's intended use as the appropriate determinant for which devices are categorized as ''wheelchairs.'' However, because wheelchairs may be intended for use by individuals who have temporary conditions affecting mobility, the Department has decided that it is more appropriate to use the phrase ''primarily designed'' rather than ''solely designed'' in making such categorizations. The Department will not foreclose any future technological developments by identifying or banning specific devices or setting restrictions on size, weight, or dimensions. Moreover, devices designed primarily for use by individuals with mobility disabilities often are considered to be medical devices and are generally eligible for insurance reimbursement on this basis. Finally, devices designed primarily for use by individuals with mobility disabilities are less subject to fraud concerns because they were not designed to have a recreational component. Consequently, rarely, if ever, is any inquiry or assessment as to their appropriateness for use in a public accommodation necessary.

Definition of ''wheelchair.'' In seeking public feedback on the NPRM's definition of ''wheelchair,'' the Department explained its concern that the definition of ''wheelchair'' in section 508(c)(2) of the ADA (formerly section 507(c)(2), July 26, 1990, 104 Stat. 372, 42 U.S.C. 12207, renumbered section 508(c)(2), Public Law 110–325 section 6(a)(2), Sept. 25, 2008, 122 Stat. 3558), which pertains to Federal wilderness areas, is not specific enough to provide clear guidance in the array of settings covered by title III and that the stringent size and weight requirements for the Department of Transportation's definition of ''common wheelchair'' are not a good fit in the context of most public accommodations. The Department noted in the NPRM that it sought a definition of ''wheelchair'' that would include manually-operated and power-driven wheelchairs and mobility scooters (*i.e.,* those that typically are single-user, have three to four wheels, and are appropriate for both indoor and outdoor pedestrian areas), as well as a variety of types of wheelchairs and mobility scooters with individualized or unique features or models with different numbers of wheels. The NPRM defined a wheelchair as ''a device designed solely for use by an individual with a mobility impairment for the primary purpose of locomotion in typical indoor and outdoor pedestrian areas. A wheelchair may be manually-operated or power-driven.'' 73 FR 34508, 34553 (June 17, 2008).

Although the NPRM's definition of ''wheelchair'' excluded mobility devices that are not designed solely for use by individuals with mobility disabilities, the Department, noting that the use of the Segway® PT by individuals with mobility disabilities is on the upswing, inquired as to whether this device should be included in the definition of

''wheelchair.''

Most business commenters wished the definition of ''wheelchair'' had included size, weight, and dimension maximums. Ultimately, however, they supported the definition because it excludes other power-driven mobility devices and enables them to engage in an assessment to determine whether a particular device can be allowed as a reasonable modification. These commenters felt this approach gave them some measure of control over whether, and under what circumstances, other power-driven mobility devices may be used in their facilities by individuals with mobility disabilities. Two commenters noted that because many mobility scooters are oversized, they are misplaced in the definition of ''wheelchair'' and belong with other power-driven mobility devices. Another commenter suggested using maximum size and weight requirements to allocate which mobility scooters should be categorized as wheelchairs, and which should be categorized as other power-driven mobility devices.

Many advocacy, nonprofit, and individual commenters indicated that as long as the Department intends the scope of the term ''mobility impairments'' to include other disabilities that cause mobility impairments (*e.g.,* respiratory, circulatory, stamina, etc.), they were in support of the language. Several commenters indicated a preference for the definition of ''wheelchair'' in section 508(c)(2) of the ADA. One commenter indicated a preference for the term ''assistive device,'' as it is defined in the Rehabilitation Act of 1973, over the term ''wheelchair.'' A few commenters indicated that strollers should be added to the preamble's list of examples of wheelchairs because parents of children with disabilities frequently use strollers as mobility devices until their children get older.

In the final rule, the Department has rearranged some wording and has made some changes in the terminology used in the definition of ''wheelchair,'' but essentially has retained the definition, and therefore the rationale, that was set forth in the NPRM. Again, the text of the ADA makes the definition of ''wheelchair'' contained in section 508(c)(2) applicable only to the specific context of uses in designated wilderness areas, and therefore does not compel the use of that definition for any other purpose. Moreover, the Department maintains that limiting the definition to devices suitable for use in an ''indoor pedestrian area'' as provided for in section 508(c)(2) of the ADA would ignore the technological advances in wheelchair design that have occurred since the ADA went into effect and that the inclusion of the phrase''indoor pedestrian area'' in the definition of ''wheelchair'' would set back progress made by individuals with mobility disabilities who, for many years now, have been using devices designed for locomotion in indoor and outdoor settings. The Department has concluded that same rationale applies to placing limits on the size, weight, and dimensions of wheelchairs.

With regard to the term ''mobility impairments,'' the Department intended a broad reading so that a wide range of disabilities, including circulatory and respiratory disabilities, that make walking difficult or impossible, would be included. In response to comments on this issue, the Department has revisited the issue and has concluded that the most apt term to achieve this intent is ''mobility disability.''

In addition, the Department has decided that it is more appropriate to use the phrase, ''primarily'' designed for use by individuals with disabilities in the final rule, rather than, ''solely'' designed for use by individuals with disabilities—the phrase, proposed in the NPRM. The Department believes that this phrase more accurately covers the range of devices the Department intends to fall within the definition of ''wheelchair.''

After receiving comments that the word ''typical'' is vague and the phrase ''pedestrian areas'' is confusing to apply, particularly in the context of similar, but not identical, terms used in the proposed Standards, the Department decided to delete the term ''typical indoor and outdoor pedestrian areas'' from the final rule. Instead, the final rule

references ''indoor or * * * both indoor and outdoor locomotion,'' to make clear that the devices that fall within the definition of ''wheelchair'' are those that are used for locomotion on indoor and outdoor pedestrian paths or routes and not those that are intended exclusively for traversing undefined, unprepared, or unimproved paths or routes. Thus, the final rule defines the term ''wheelchair'' to mean ''a manually operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor or of both indoor and outdoor locomotion.''

Whether the definition of ''wheelchair'' includes the Segway® PT. As discussed above, because individuals with mobility disabilities are using the Segway® PT as a mobility device, the Department asked whether it should be included in the definition of ''wheelchair.'' The basic Segway® PT model is a two-wheeled, gyroscopically-stabilized, battery-powered personal transportation device. The user stands on a platform suspended three inches off the ground by wheels on each side, grasps a T-shaped handle, and steers the device similarly to a bicycle. Most Segway® PTs can travel up to 12½ miles per hour, compared to the average pedestrian walking speed of 3 to 4 miles per hour and the approximate maximum speed for power-operated wheelchairs of 6 miles per hour. In a study of trail and other non-motorized transportation users including EPAMDs, the Federal Highway Administration (FHWA) found that the eye height of individuals using EPAMDs ranged from approximately 69 to 80 inches. *See* Federal Highway Administration, *Characteristics of Emerging Road and Trail Users and Their Safety* (Oct. 14, 2004), available at *http://www.tfhrc.gov/safety/pubs/04103* (last visited June 24, 2010). Thus, the Segway® PT can operate at much greater speeds than wheelchairs, and the average user stands much taller than most wheelchair users.

The Segway® PT has been the subject of debate among users, pedestrians, disability advocates, State and local governments, businesses, and bicyclists. The fact that the Segway® PT is not designed primarily for use by individuals with disabilities, nor used primarily by persons with disabilities, complicates the question of to what extent individuals with disabilities should be allowed to operate them in areas and facilities where other power-driven mobility devices are not allowed. Those who question the use of the Segway® PT in pedestrian areas argue that the speed, size, and operating features of the devices make them too dangerous to operate alongside pedestrians and wheelchair users.

Comments regarding whether to include the Segway® PT in the definition of ''wheelchair'' were, by far, the most numerous received in the category of comments regarding wheelchairs and other power-driven mobility devices. Significant numbers of veterans with disabilities, individuals with multiple sclerosis, and those advocating on their behalf made concise statements of general support for the inclusion of the Segway® PT in the definition of ''wheelchair.'' Two veterans offered extensive comments on the topic, along with a few advocacy and nonprofit groups and individuals with disabilities for whom sitting is uncomfortable or impossible.

While there may be legitimate safety issues for EPAMD users and bystanders in some circumstances, EPAMDs and other nontraditional mobility devices can deliver real benefits to individuals with disabilities. Among the reasons given by commenters to include the Segway® PT in the definition of ''wheelchair'' were that the Segway® PT is well-suited for individuals with particular conditions that affect mobility including multiple sclerosis, Parkinson's disease, chronic obstructive pulmonary disease, amputations, spinal cord injuries, and other neurological disabilities, as well as functional limitations, such as gait limitation, inability to sit or discomfort in sitting, and diminished stamina issues. Such individuals often find that EPAMDs are more comfortable and easier to use than more traditional mobility devices and assist with balance, circulation, and digestion in ways that wheelchairs do not. *See* Rachel Metz,

D*isabled Embrace Segway*, New York Times, Oct. 14, 2004. Commenters specifically cited pressure relief, reduced spasticity, increased stamina, and improved respiratory, neurologic, and muscular health as secondary medical benefits from being able to stand.

Other arguments for including the Segway® PT in the definition of ''wheelchair'' were based on commenters' views that the Segway® PT offers benefits not provided by wheelchairs and mobility scooters, including its intuitive response to body movement, ability to operate with less coordination and dexterity than is required for many wheelchairs and mobility scooters, and smaller footprint and turning radius as compared to most wheelchairs and mobility scooters. Several commenters mentioned improved visibility, either due to the Segway® PT's raised platform or simply by virtue of being in a standing position. And finally, some commenters advocated for the inclusion of the Segway® PT simply based on civil rights arguments and the empowerment and self-esteem obtained from having the power to select the mobility device of choice.

Many commenters, regardless of their position on whether to include the Segway® PT in the definition of ''wheelchair,'' noted that the Segway® PT's safety record is as good as, if not better, than the record for wheelchairs and mobility scooters.

Most business commenters were opposed to the inclusion of the Segway® PT in the definition of ''wheelchair'' but were supportive of its inclusion as an ''other power-driven mobility device.'' They raised industry- or venue-specific concerns about including the Segway® PT in the definition of ''wheelchair.'' For example, civic centers, arenas, and theaters were concerned about the impact on sight-line requirements if Segway® PT users remain on their devices in a designated wheelchair seating area; amusement parks expressed concern that rides have been designed, purchased, and installed to enable wheelchair users to transfer easily or to accommodate wheelchairs on the ride itself; and retail stores mentioned size constraints in some stores. Nearly all business commenters expressed concern—and perceived liability issues—related to having to store or stow the Segway® PT, particularly if it could not be stored in an upright position. These commenters cited concerns about possible damage to the device, injury to customers who may trip over it, and theft of the device as a result of not being able to stow the Segway® PT securely.

Virtually every business commenter mentioned concerns about rider safety, as well as concerns for pedestrians unexpectedly encountering these devices or being hit or run over by these devices in crowded venues where maneuvering space is limited. Their main safety objection to the inclusion of the Segway® PT in the definition of ''wheelchair'' was that the maximum speed at which the Segway® PT can operate is far faster than that of motorized wheelchairs. There was a universal unease among these commenters with regard to relying on the judgment of the Segway® PT user to exercise caution because its top speed is far in excess of a wheelchair's top speed. Many other safety concerns were industry-specific. For example, amusement parks were concerned that the Segway® PT is much taller than children; that it is too quiet to warn pedestrians, particularly those with low vision or who are blind, of their presence; that it may keep moving after a rider has fallen off or power system fails; and that it has a full-power override which automatically engages when an obstacle is encountered. Hotels and retail stores mentioned that maneuvering the Segway® PT through their tight quarters would create safety hazards.

Business commenters also expressed concern that if the Segway® PT were included in the definition of ''wheelchair'' they would have to make physical changes to their facilities to accommodate Segway® PT riders who stand much taller in these devices than do users of wheelchairs. They also were concerned that if the Segway® 7 PT was included in the definition of ''wheelchair,'' they would have no ability to assess whether it is ap-

propriate to allow the entry of the Segway® PT into their facilities the way they would have if the device is categorized as an ''other power-driven mobility device.''

Many disability advocacy and nonprofit commenters did not support the inclusion of the Segway® PT in the definition of ''wheelchair.'' Paramount to these commenters was the maintenance of existing protections for wheelchair users. Because there was unanimous agreement that wheelchair use rarely, if ever, may be restricted, these commenters strongly favored categorizing wheelchairs separately from the Segway® PT and other power-driven mobility devices and applying the intended-use determinant to assign the devices to either category. They indicated that while they support the greatest degree of access in public accommodations for all persons with disabilities who require the use of mobility devices, they recognize that under certain circumstances allowing the use of other power-driven mobility devices would result in a fundamental alteration or run counter to legitimate safety requirements necessary for the safe operation of a public accommodation. While these groups supported categorizing the Segway® PT as an ''other power-driven mobility device,'' they universally noted that because the Segway® PT does not present environmental concerns and is as safe to use as, if not safer than, a wheelchair, it should be accommodated in most circumstances.

The Department has considered all the comments and has concluded that it should not include the Segway® PT in the definition of ''wheelchair.'' The final rule provides that the test for categorizing a device as a wheelchair or an other power-driven mobility device is whether the device is designed primarily for use by individuals with mobility disabilities. Mobility scooters are included in the definition of ''wheelchair'' because they are designed primarily for users with mobility disabilities. However, because the current generation of EPAMDs, including the Segway® PT, was designed for recreational users and not primarily for use by individuals with mobility disabilities, the Department has decided to continue its approach of excluding EPAMDs from the definition of ''wheelchair'' and including them in the definition of ''other power-driven mobility device.'' Although EPAMDs, such as the Segway® PT, are not included in the definition of a ''wheelchair,'' public accommodations must assess whether they can make reasonable modifications to permit individuals with mobility disabilities to use such devices on their premises. The Department recognizes that the Segway® PT provides many benefits to those who use them as mobility devices, including a measure of privacy with regard to the nature of one's particular disability, and believes that in the vast majority of circumstances, the application of the factors described in § 36.311 for providing access to other powered mobility devices will result in the admission of the Segway® PT.

Treatment of ''manually-powered mobility aids.'' The Department's NPRM did not define the term ''manually-powered mobility aids.'' Instead, the NPRM included a non-exhaustive list of examples in § 36.311(a). The NPRM queried whether the Department should maintain this approach to manually-powered mobility aids or whether it should adopt a more formal definition.

Only a few commenters addressed ''manually-powered mobility aids.'' Virtually all commenters were in favor of maintaining a non-exhaustive list of examples of ''manually-powered mobility aids'' rather than adopting a definition of the term. Of those who commented, a couple sought clarification of the term ''manually-powered.'' One commenter suggested that the term be changed to ''human-powered.'' Other commenters requested that the Department include ordinary strollers in the non-exhaustive list of manually-powered mobility aids. Since strollers are not devices designed primarily for individuals with mobility disabilities, the Department does not consider them to be manually-powered mobility aids; however, strollers used in the context of transporting individuals with disabilities are subject to the same

assessment required by the ADA's reasonable modification standards at § 36.302. The Department believes that because the existing approach is clear and understood easily by the public, no formal definition of the term ''manually-powered mobility aids'' is required.

Definition of ''other power-driven mobility device.'' The Department's NPRM defined the term ''other power-driven mobility device'' in § 36.104 as ''any of a large range of devices powered by batteries, fuel, or other engines— whether or not designed solely for use by individuals with mobility impairments—that are used by individuals with mobility impairments for the purpose of locomotion, including golf cars, bicycles, electronic personal assistance mobility devices (EPAMDs), or any mobility aid designed to operate in areas without defined pedestrian routes.'' 73 FR 34508, 34552 (June 17, 2008).

Business commenters mostly were supportive of the definition of ''other power-driven mobility device'' because it gave them the ability to develop policies pertaining to the admission of these devices, but they expressed concern that individuals will feign mobility disabilities so that they can use devices that are otherwise banned in public accommodations. Advocacy, nonprofit, and several individual commenters supported the definition of ''other power-driven mobility device'' because it allows new technologies to be added in the future, maintains the existing legal protections for wheelchairs, and recognizes that some devices, particularly the Segway® PT, which are not designed primarily for individuals with mobility disabilities, have beneficial uses for individuals with mobility disabilities.

Despite support for the definition of ''other power-driven mobility device,'' however, most advocacy and nonprofit commenters expressed at least some hesitation about the inclusion of fuel-powered mobility devices in the definition. While virtually all of these commenters noted that a blanket exclusion of any device that falls under the definition of ''other power-driven mobility device'' would violate basic civil rights concepts, they also specifically stated that certain devices, particularly off-highway vehicles, cannot be permitted in certain circumstances. They also made a distinction between the Segway® PT and other power-driven mobility devices, noting that the Segway® PT should be accommodated in most circumstances because it satisfies the safety and environmental elements of the policy analysis. These commenters indicated that they agree that other power-driven mobility devices must be assessed, particularly as to their environmental impact, before they are accommodated.

Business commenters were even less supportive of the inclusion of fuel-powered devices in the other power-driven mobility devices category. They sought a complete ban on fuel-powered devices because they believe they are inherently dangerous and pose environmental and safety concerns.

Although many commenters had reservations about the inclusion of fuel-powered devices in the definition of other power-driven mobility devices, the Department does not want the definition to be so narrow that it would foreclose the inclusion of new technological developments, whether powered by fuel or by some other means. It is for this reason that the Department has maintained the phrase ''any mobility device designed to operate in areas without defined pedestrian routes'' in the final rule's definition of other power-driven mobility devices. The Department believes that the limitations provided by ''fundamental alteration'' and the ability to impose legitimate safety requirements will likely prevent the use of fuel and combustion engine-driven devices indoors, as well as in outdoor areas with heavy pedestrian traffic. The Department notes, however, that in the future technological developments may result in the production of safe fuel-powered mobility devices that do not pose environmental and safety concerns. The final rule allows consideration to be given as to whether the use of a fuel-powered device would create a substantial risk of serious harm to the

environment or natural or cultural resources, and to whether the use of such a device conflicts with Federal land management laws or regulations; this aspect of the final rule will further limit the inclusion of fuel-powered devices where they are not appropriate. Consequently, the Department has maintained fuel-powered devices in the definition of ''other power-driven mobility devices.'' The Department has also added language to the definition of ''other power-driven mobility device'' to reiterate that the definition does not apply to Federal wilderness areas, which are not covered by title II of the ADA; the use of wheelchairs in such areas is governed by section 508(c)(2) of the ADA, 42 U.S.C. 12207(c)(2).

''Place of Public Accommodation''

Definition of "place of lodging." The NPRM stated that a covered ''place of lodging'' is a facility that provides guest rooms for sleeping for stays that are primarily short-term in nature (generally two weeks or less), to which the occupant does not have the right or intent to return to a specific room or unit after the conclusion of his or her stay, and which operates under conditions and with amenities similar to a hotel, motel, or inn, particularly including factors such as: (1) An on-site proprietor and reservations desk; (2) rooms available on a walk-up basis; (3) linen service; and (4) a policy of accepting reservations for a room type without guaranteeing a particular unit or room until check-in, without a prior lease or security deposit. The NPRM stated that timeshares and condominiums or corporate hotels that did not meet this definition would not be covered by § 36.406(c) of the proposed regulation, but may be covered by the requirements of the Fair Housing Act (FHAct).

In the NPRM, the Department sought comment on its definition of ''place of lodging,'' specifically seeking public input on whether the most appropriate time period for identifying facilities used for stays that primarily are short-term in nature should be set at 2 weeks or 30 days.

The vast majority of the comments received by the Department supported the use of a 30-day limitation on places of lodging as more consistent with building codes, local laws, and common real estate practices that treat stays of 30 days or less as transient rather than residential use. One commenter recommended using the phrase ''fourteen days or less.'' Another commenter objected to any bright line standard, stating that the difference between two weeks and 30 days for purposes of title III is arbitrary, viewed in light of conflicting regulations by the States. This commenter argued the Department should continue its existing practice under title III of looking to State law as one factor in determining whether a facility is used for stays that primarily are short-term in nature.

The Department is persuaded by the majority of commenters to adopt a 30-day guideline for the purposes of identifying facilities that primarily are short-term in nature and has modified the section accordingly. The 30-day guideline is intended only to determine when the final rule's transient lodging provisions apply to a facility. It does not alter an entity's obligations under any other applicable statute. For example, the Department recognizes that the FHAct does not employ a bright line standard for determining which facilities qualify as residential facilities under that Act and that there are circumstances where units in facilities that meet the definition of places of lodging will be covered under both the ADA and the FHAct and will have to comply with the requirements of both laws.

The Department also received comments about the factors used in the NPRM's definition of ''place of lodging.'' One commenter proposed modifications to the definition as follows: changing the words ''guest rooms'' to ''accommodations for sleeping''; and adding a fifth factor that states that ''the in-room decor, furnishings and equipment being specified by the owner or operator of the lodging operation rather than generally being determined by the owner of the individual unit or room.'' The Department does not believe that ''guest room'' should be changed to ''accommoda-

tions for sleeping.'' Such a change would create confusion because the transient lodging provisions in the 2004 ADAAG use the term ''guest rooms'' and not ''accommodations for sleeping.'' In addition, the Department believes that it would be confusing to add a factor relating to who dictates the in-room decor and furnishings in a unit or room, because there may be circumstances where particular rental programs require individual owners to use certain decor and furnishings as a condition of participating in that program.

One commenter stated that the factors the Department has included for determining whether a rental unit is a place of lodging for the purposes of title III, and therefore a ''place of public accommodation'' under the ADA, address only the way an establishment appears to the public. This commenter recommended that the Department also consider the economic relationships among the unit owners, rental managers, and homeowners' associations, noting that where revenues are not pooled (as they are in a hotel), the economic relationships do not make it possible to spread the cost of providing accessibility features over the entire business enterprise. Another commenter argued that private ownership of sleeping accommodations sets certain facilities apart from traditional hotels, motels, and inns, and that the Department should revise the definition of places of lodging to exempt existing places of lodging that have sleeping accommodations separately owned by individual owners (*e.g.*, condominiums) from the accessible transient lodging guest room requirements in sections 224 and 806 of the 2004 ADAAG, although the commenter agreed that newly constructed places of lodging should meet those standards.

One commenter argued that the Department's proposed definition of place of lodging does not reflect fully the nature of a timeshare facility and one single definition does not fit timeshares, condo hotels, and other types of rental accommodations. This commenter proposed that the Department adopt a separate definition for timeshare resorts as a subcategory of place of lodging. The commenter proposed defining timeshare resorts as facilities that provide the recurring right to occupancy for overnight accommodations for the owners of the accommodations, and other occupancy rights for owners exchanging their interests or members of the public for stays that primarily are short-term in nature (generally 30 consecutive days or less), where neither the owner nor any other occupant has the right or intent to use the unit or room on other than a temporary basis for vacation or leisure purposes. This proposed definition also would describe factors for determining when a timeshare resort is operating in a manner similar to a hotel, motel, or inn, including some or all of the following: rooms being available on a walk-in or call-in basis; housekeeping or linen services being available; on-site management; and reservations being accepted for a room type without guaranteeing any guest or owner use of a particular unit or room until check-in, without a prior lease or security deposit. Timeshares that do not meet this definition would not be subject to the transient lodging standards.

The Department has considered these comments and has revised the definition of ''place of accommodation'' in § 36.104 to include a revised subcategory (B), which more clearly defines the factors that must be present for a facility that is not an inn, motel, or hotel to qualify as a place of lodging. These factors include conditions and amenities similar to an inn, motel, or hotel, including on- or off-site management and reservations service, rooms available on a walk-up or call-in basis, availability of housekeeping or linen service, and accepting reservations for a room type without guaranteeing a particular unit or room until check-in without a prior lease or security deposit.

Although the Department understands some of the concerns about the application of the ADA requirements to places of lodging that have ownership structures that involve individually owned units, the Department does not believe that the

definitional section of the regulation is the place to address these concerns and has addressed them in § 36.406(c)(2) and the accompanying discussion in Appendix A.

''Qualified Interpreter''

In the NPRM, the Department proposed adding language to the definition of ''qualified interpreter'' to clarify that the term includes, but is not limited to, sign language interpreters, oral interpreters, and cued-speech interpreters. As the Department explained, not all interpreters are qualified for all situations. For example, a qualified interpreter who uses American Sign Language (ASL) is not necessarily qualified to interpret orally. In addition, someone with only a rudimentary familiarity with sign language or finger spelling is not qualified, nor is someone who is fluent in sign language but unable to translate spoken communication into ASL or to translate signed communication into spoken words.

As further explained, different situations will require different types of interpreters . For example, an oral interpreter who has special skill and training to mouth a speaker's words silently for individuals who are deaf or hard of hearing may be necessary for an individual who was raised orally and taught to read lips or was diagnosed with hearing loss later in life and does not know sign language. An individual who is deaf or hard of hearing may need an oral interpreter if the speaker's voice is unclear, if there is a quick-paced exchange of communication *(e.g.*, in a meeting), or when the speaker does not directly face the individual who is deaf or hard of hearing. A cued-speech interpreter functions in the same manner as an oral interpreter except that he or she also uses a hand code or cue to represent each speech sound.

The Department received many comments regarding the proposed modifications to the definition of ''qualified interpreter.'' Many commenters requested that the Department include within the definition a requirement that interpreters be certified, particularly if they reside in a State that licenses or certifies interpreters. Other commenters opposed a certification requirement as unduly limiting, noting that an interpreter may well be qualified even if that same interpreter is not certified. These commenters noted the absence of nationwide standards or universally accepted criteria for certification.

On review of this issue, the Department has decided against imposing a certification requirement under the ADA. It is sufficient under the ADA that the interpreter be qualified. With respect to the proposed additions to the rule, most commenters supported the expansion of the list of qualified interpreters, and some advocated for the inclusion of other types of interpreters on the list as well, such as deaf-blind interpreters, certified deaf interpreters, and speech-to-speech interpreters. As these commenters explained, deaf-blind interpreters are interpreters who have specialized skills and training to interpret for individuals who are deaf and blind. Certified deaf interpreters are deaf or hard of hearing interpreters who work with hearing sign language interpreters to meet the specific communication needs of deaf individuals. Speech-to-speech interpreters have special skill and training to interpret for individuals who have speech disabilities.

The list of interpreters in the definition of ''qualified interpreter'' is illustrative, and the Department does not believe it is necessary or appropriate to attempt to provide an exhaustive list of qualified interpreters. Accordingly, the Department has decided not to expand the proposed list. However, if a deaf and blind individual needs interpreting services, an interpreter who is qualified to handle the interpreting needs of that individual may be required. The guiding criterion is that the public accommodation must provide appropriate auxiliary aids and services to ensure effective communication with the individual.

Commenters also suggested various definitions for the term ''cued-speech interpreters,'' and different descriptions of the tasks they performed. After reviewing the various comments, the De-

partment has determined that it is more accurate and appropriate to refer to such individuals as ''cued-language transliterators.'' Likewise, the Department has changed the term ''oral interpreters'' to ''oral transliterators.'' These two changes have been made to distinguish between sign language interpreters, who translate one language into another language (*e.g.*, ASL to English and English to ASL), from transliterators, who interpret within the same language between deaf and hearing individuals. A cued-language transliterator is an interpreter who has special skill and training in the use of the Cued Speech system of handshapes and placements, along with non-manual information, such as facial expression and body language, to show auditory information visually, including speech and environmental sounds. An oral transliterator is an interpreter who has special skill and training to mouth a speaker's words silently for individuals who are deaf or hard of hearing. While the Department included definitions for ''cued speech interpreter'' and ''oral interpreter'' in the regulatory text proposed in the NPRM, the Department has decided that it is unnecessary to include such definitions in the text of the final rule.

Many commenters questioned the proposed deletion of the requirement that a qualified interpreter be able to interpret both receptively and expressively, noting the importance of both these skills. Commenters noted that this phrase was carefully crafted in the original regulation to make certain that interpreters both (1) are capable of understanding what a person with a disability is saying and (2) have the skills needed to convey information back to that individual. These are two very different skill sets and both are equally important to achieve effective communication. For example, in a medical setting, a sign language interpreter must have the necessary skills to understand the grammar and syntax used by an ASL user (receptive skills) and the ability to interpret complicated medical information—presented by medical staff in English—back to that individual in ASL (expressive skills). The Department agrees and has put the phrase ''both receptively and expressively'' back in the definition.

Several advocacy groups suggested that the Department make clear in the definition of qualified interpreter that the interpreter may appear either on-site or remotely using a video remote interpreting (VRI) service. Given that the Department has included in this rule both a definition of VRI services and standards that such services must satisfy, such an addition to the definition of qualified interpreter is appropriate.

After consideration of all relevant information submitted during the public comment period, the Department has modified the definition from that initially proposed in the NPRM. The final definition now states that ''[q]ualified interpreter means an interpreter who, via a video remote interpreting (VRI) service or an on-site appearance, is able to interpret effectively, accurately, and impartially, both receptively and expressively, using any necessary specialized vocabulary. Qualified interpreters include, for example, sign language interpreters, oral transliterators, and cued-language transliterators.''

''Qualified Reader''

The 1991 title III regulation identified a qualified reader as an auxiliary aid, but did not define the term. Based upon the Department's investigation of complaints alleging that some entities have provided ineffective readers, the Department proposed in the NPRM to define ''qualified reader'' similarly to ''qualified interpreter'' to ensure that public accommodations select qualified individuals to read an examination or other written information in an effective, accurate, and impartial manner. This proposal was suggested in order to make clear to public accommodations that a failure to provide a qualified reader to a person with a disability may constitute a violation of the requirement to provide appropriate auxiliary aids and services.

The Department received comments supporting

the inclusion in the regulation of a definition of a ''qualified reader.'' Some commenters suggested the Department add to the definition a requirement prohibiting the use of a reader whose accent, diction, or pronunciation makes full comprehension of material being read difficult. Another commenter requested that the Department include a requirement that the reader ''will follow the directions of the person for whom he or she is reading.'' Commenters also requested that the Department define ''accurately'' and ''effectively'' as used in this definition.

While the Department believes that the regulatory definition proposed in the NPRM adequately addresses these concerns, the Department emphasizes that a reader, in order to be ''qualified,'' must be skilled in reading the language and subject matter and must be able to be easily understood by the individual with the disability. For example, if a reader is reading aloud the questions for a bar examination, that reader, in order to be qualified, must know the proper pronunciation of all legal terminology used and must be sufficiently articulate to be easily understood by the individual with a disability for whom he or she is reading. In addition, the terms ''effectively'' and ''accurately'' have been successfully used and understood in the Department's existing definition of ''qualified interpreter'' since 1991 without specific regulatory definitions. Instead, the Department has relied upon the common use and understanding of those terms from standard English dictionaries. Thus, the definition of ''qualified reader'' has not been changed from that contained in the NPRM. The final rule defines a ''qualified reader'' to mean ''a person who is able to read effectively, accurately, and impartially using any necessary specialized vocabulary.''

''Service Animal''

Section 36.104 of the 1991 title III regulation defines a ''service animal'' as ''any guide dog, signal dog, or other animal individually trained to do work or perform tasks for the benefit of an individual with a disability, including, but not limited to, guiding individuals with impaired vision, alerting individuals with impaired hearing to intruders or sounds, providing minimal protection or rescue work, pulling a wheelchair, or fetching dropped items.'' Section 36.302(c)(1) of the 1991 title III regulation requires that ''[g]enerally, a public accommodation shall modify policies, practices, or procedures to permit the use of a service animal by an individual with a disability.'' Section 36.302(c)(2) of the 1991 title III regulation states that ''a public accommodation [is not required] to supervise or care for a service animal.''

The Department has issued guidance and provided technical assistance and publications concerning service animals since the 1991 regulations became effective. In the NPRM, the Department proposed to modify the definition of service animal and asked for public input on several issues related to the service animal provisions of the 1991 title III regulation: whether the Department should clarify the phrase ''providing minimal protection'' in the definition or remove it; whether there are any circumstances where a service animal ''providing minimal protection'' would be appropriate or expected; whether certain species should be eliminated from the definition of ''service animal,'' and, if so, which types of animals should be excluded; whether ''common domestic animal'' should be part of the definition; and whether a size or weight limitation should be imposed for common domestic animals, even if the animal satisfies the ''common domestic animal'' part of the NPRM definition.

The Department received extensive comments on these issues, as well as requests to clarify the obligations of public accommodations to accommodate individuals with disabilities who use service animals, and has modified the final rule in response. In the interests of avoiding unnecessary repetition, the Department has elected to discuss the issues raised in the NPRM questions about service animals and the corresponding public comments in the following discussion of the definition

of ''service animal.''

The Department's final rule defines ''service animal'' as ''any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability. Other species of animals, whether wild or domestic, trained or untrained, are not service animals for the purposes of this definition. The work or tasks performed by a service animal must be directly related to the individual's disability. Examples of work or tasks include, but are not limited to, assisting individuals who are blind or have low vision with navigation and other tasks, alerting individuals who are deaf or hard of hearing to the presence of people or sounds, providing non-violent protection or rescue work, pulling a wheelchair, assisting an individual during a seizure, alerting individuals to the presence of allergens, retrieving items such as medicine or the telephone, providing physical support and assistance with balance and stability to individuals with mobility disabilities, and helping persons with psychiatric and neurological disabilities by preventing or interrupting impulsive or destructive behaviors. The crime deterrent effects of an animal's presence and the provision of emotional support, well-being, comfort, or companionship do not constitute work or tasks for the purposes of this definition.''

This definition has been designed to clarify a key provision of the ADA. Many covered entities indicated that they are confused regarding their obligations under the ADA with regard to individuals with disabilities who use service animals. Individuals with disabilities who use trained guide or service dogs are concerned that if untrained or unusual animals are termed ''service animals,'' their own right to use guide or service dogs may become unnecessarily restricted or questioned. Some individuals who are not individuals with disabilities have claimed, whether fraudulently or sincerely (albeit mistakenly), that their animals are service animals covered by the ADA, in order to gain access to hotels, restaurants, and other places of public accommodation. The increasing use of wild, exotic, or unusual species, many of which are untrained, as service animals has also added to the confusion.

Finally, individuals with disabilities who have the legal right under the Fair Housing Act (FHAct) to use certain animals in their homes as a reasonable accommodation to their disabilities have assumed that their animals also qualify under the ADA. This is not necessarily the case, as discussed below.

The Department recognizes the diverse needs and preferences of individuals with disabilities protected under the ADA, and does not wish to unnecessarily impede individual choice. Service animals play an integral role in the lives of many individuals with disabilities, and with the clarification provided by the final rule, individuals with disabilities will continue to be able to use their service animals as they go about their daily activities. The clarification will also help to ensure that the fraudulent or mistaken use of other animals not qualified as service animals under the ADA will be deterred. A more detailed analysis of the elements of the definition and the comments responsive to the service animal provisions of the NPRM follows.

Providing minimal protection. The 1991 title III regulation included language stating that ''minimal protection'' was a task that could be performed by an individually trained service animal for the benefit of an individual with a disability. In the Department's ''ADA Business Brief on Service Animals'' (2002), the Department interpreted the ''minimal protection'' language within the context of a seizure (*i.e.,* alerting and protecting a person who is having a seizure). The Department received many comments in response to the question of whether the ''minimal protection'' language should be clarified. Many commenters urged the removal of the ''minimal protection'' language from the service animal definition for two reasons: (1) The phrase can be interpreted to

allow any dog that is trained to be aggressive to qualify as a service animal simply by pairing the animal with a person with a disability; and (2) The phrase can be interpreted to allow any untrained pet dog to qualify as a service animal, since many consider the mere presence of a dog to be a crime deterrent, and thus sufficient to meet the minimal protection standard. These commenters argued, and the Department agrees, that these interpretations were not contemplated under the original title III regulation.

While many commenters stated that they believe that the ''minimal protection'' language should be eliminated, other commenters recommended that the language be clarified, but retained. Commenters favoring clarification of the term suggested that the Department explicitly exclude the function of attack or exclude those animals that are trained solely to be aggressive or protective. Other commenters identified nonviolent behavioral tasks that could be construed as minimally protective, such as interrupting self-mutilation, providing safety checks and room searches, reminding the individual to take medications, and protecting the individual from injury resulting from seizures or unconsciousness.

Several commenters noted that the existing direct threat defense, which allows the exclusion of a service animal if the animal exhibits unwarranted or unprovoked violent behavior or poses a direct threat, prevents the use of ''attack dogs'' as service animals. One commenter noted that the use of a service animal trained to provide ''minimal protection'' may impede access to care in an emergency, for example, where the first responder is unable or reluctant to approach a person with a disability because the individual's service animal is in a protective posture suggestive of aggression.

Many organizations and individuals stated that in the general dog training community, ''protection'' is code for attack or aggression training and should be removed from the definition. Commenters stated that there appears to be a broadly held misconception that aggression-trained animals are appropriate service animals for persons with post traumatic stress disorder (PTSD). While many individuals with PTSD may benefit by using a service animal, the work or tasks performed appropriately by such an animal would not involve unprovoked aggression, but could include actively cuing the individual by nudging or pawing the individual to alert to the onset of an episode and removing the individual from the anxiety-provoking environment.

The Department recognizes that despite its best efforts to provide clarification, the ''minimal protection'' language appears to have been misinterpreted. While the Department maintains that protection from danger is one of the key functions that service animals perform for the benefit of persons with disabilities, the Department recognizes that an animal individually trained to provide aggressive protection, such as an attack dog, is not appropriately considered a service animal. Therefore, the Department has decided to modify the ''minimal protection'' language to read ''nonviolent protection,'' thereby excluding so-called 'attack dogs'' or dogs with traditional ''protection training'' as service animals. The Department believes that this modification to the service animal definition will eliminate confusion, without restricting unnecessarily the type of work or tasks that service animals may perform. The Department's modification also clarifies that the crime-deterrent effect of a dog's presence, by itself, does not qualify as work or tasks for purposes of the service animal definition.

Alerting to intruders. The phrase ''alerting to intruders'' is related to the issues of minimal protection and the work or tasks an animal may perform to meet the definition of a service animal. In the original 1991 regulatory text, this phrase was intended to identify service animals that alert individuals who are deaf or hard of hearing to the presence of others. This language has been misinterpreted by some to apply to dogs that are trained specifically to provide aggressive protection, resulting in the assertion that such training

qualifies a dog as a service animal under the ADA. The Department reiterates that public accommodations are not required to admit any animal whose use poses a direct threat. In addition, the Department has decided to remove the word ''intruders'' from the service animal definition and replace it with the phrase ''the presence of people or sounds.'' The Department believes this clarifies that so-called ''attack training'' or other aggressive response types of training that cause a dog to provide an aggressive response do not qualify a dog as a service animal under the ADA.

Conversely, if an individual uses a breed of dog that is perceived to be aggressive because of breed reputation, stereotype, or the history or experience the observer may have with other dogs, but the dog is under the control of the individual with a disability and does not exhibit aggressive behavior, the public accommodation cannot exclude the individual or the animal from the place of public accommodation. The animal can only be removed if it engages in the behaviors mentioned in § 36.302(c) (as revised in the final rule) or if the presence of the animal constitutes a fundamental alteration to the nature of the goods, services, facilities, and activities of the place of public accommodation.

''Doing work'' or ''performing tasks.'' The NPRM proposed that the Department maintain the requirement first articulated in the 1991 title III regulation that in order to qualify as a service animal, the animal must ''perform tasks'' or ''do work'' for the individual with a disability. The phrases ''perform tasks'' and ''do work'' describe what an animal must do for the benefit of an individual with a disability in order to qualify as a service animal.

The Department received a number of comments in response to the NPRM proposal urging the removal of the term ''do work'' from the definition of a service animal. These commenters argued that the Department should emphasize the performance of tasks instead. The Department disagrees. Although the common definition of work includes the performance of tasks, the definition of work is somewhat broader, encompassing activities that do not appear to involve physical action.

One service dog user stated that, in some cases, ''critical forms of assistance can't be construed as physical tasks,'' noting that the manifestations of ''brain-based disabilities,'' such as psychiatric disorders and autism, are as varied as their physical counterparts. The Department agrees with this statement but cautions that unless the animal is individually trained to do something that qualifies as work or a task, the animal is a pet or support animal and does not qualify for coverage as a service animal. A pet or support animal may be able to discern that the individual is in distress, but it is what the animal is trained to do in response to this awareness that distinguishes a service animal from an observant pet or support animal.

The NPRM contained an example of ''doing work'' that stated ''a psychiatric service dog can help some individuals with dissociative identity disorder to remain grounded in time or place.'' 73 FR 34508, 34521 (June 17, 2008). Several commenters objected to the use of this example, arguing that grounding was not a ''task'' and therefore the example inherently contradicted the basic premise that a service animal must perform a task in order to mitigate a disability. Other commenters stated that ''grounding'' should not be included as an example of ''work'' because it could lead to some individuals claiming that they should be able to use emotional support animals in public because the dog makes them feel calm or safe. By contrast, one commenter with experience in training service animals explained that grounding is a trained task based upon very specific behavioral indicators that can be observed and measured. These tasks are based upon input from mental health practitioners, dog trainers, and individuals with a history of working with psychiatric service dogs.

It is the Department's view that an animal that is trained to ''ground'' a person with a psychiatric disorder does work or performs a task that would

qualify it as a service animal as compared to an untrained emotional support animal whose presence affects a person's disability. It is the fact that the animal is trained to respond to the individual's needs that distinguishes an animal as a service animal. The process must have two steps: Recognition and response. For example, if a service animal senses that a person is about to have a psychiatric episode and it is trained to respond, for example, by nudging, barking, or removing the individual to a safe location until the episode subsides, then the animal has indeed performed a task or done work on behalf of the individual with the disability, as opposed to merely sensing an event.

One commenter suggested defining the term ''task,'' presumably to improve the understanding of the types of services performed by an animal that would be sufficient to qualify the animal for coverage. The Department believes that the common definition of the word ''task'' is sufficiently clear and that it is not necessary to add to the definitions section. However, the Department has added examples of other kinds of work or tasks to help illustrate and provide clarity to the definition. After careful evaluation of this issue, the Department has concluded that the phrases ''do work'' and ''perform tasks'' have been effective during the past two decades to illustrate the varied services provided by service animals for the benefit of individuals with all types of disabilities. Thus, the Department declines to depart from its longstanding approach at this time.

Species limitations. When the Department originally issued its title III regulation in the early 1990s, the Department did not define the parameters of acceptable animal species. At that time, few anticipated the variety of animals that would be promoted as service animals in the years to come, which ranged from pigs and miniature horses to snakes, iguanas, and parrots. The Department has followed this particular issue closely, keeping current with the many unusual species of animals represented to be service animals. Thus, the Department has decided to refine further this aspect of the service animal definition in the final rule.

The Department received many comments from individuals and organizations recommending species limitations. Several of these commenters asserted that limiting the number of allowable species would help stop erosion of the public's trust, which has resulted in reduced access for many individuals with disabilities who use trained service animals that adhere to high behavioral standards. Several commenters suggested that other species would be acceptable if those animals could meet nationally recognized behavioral standards for trained service dogs. Other commenters asserted that certain species of animals *(e.g.,* reptiles) cannot be trained to do work or perform tasks, so these animals would not be covered.

In the NPRM, the Department used the term ''common domestic animal'' in the service animal definition and excluded reptiles, rabbits, farm animals (including horses, miniature horses, ponies, pigs, and goats), ferrets, amphibians, and rodents from the service animal definition. 73 FR 34508, 34553 (June 17, 2008). However, the term ''common domestic animal'' is difficult to define with precision due to the increase in the number of domesticated species. Also, several State and local laws define a ''domestic'' animal as an animal that is not wild.

The Department is compelled to take into account the practical considerations of certain animals and to contemplate their suitability in a variety of public contexts, such as restaurants, grocery stores, hospitals, and performing arts venues, as well as suitability for urban environments. The Department agrees with commenters' views that limiting the number and types of species recognized as service animals will provide greater predictability for public accommodations as well as added assurance of access for individuals with disabilities who use dogs as service animals. As a consequence, the Department has decided to limit this rule's coverage of service animals to dogs, which are the most common service animals used by individuals with disabilities.

Wild animals, monkeys, and other nonhuman primates. Numerous business entities endorsed a narrow definition of acceptable service animal species, and asserted that there are certain animals *(e.g.,* reptiles) that cannot be trained to do work or perform tasks. Other commenters suggested that the Department should identify excluded animals, such as birds and llamas, in the final rule. Although one commenter noted that wild animals bred in captivity should be permitted to be service animals, the Department has decided to make clear that all wild animals, whether born or bred in captivity or in the wild, are eliminated from coverage as service animals. The Department believes that this approach reduces risks to health or safety attendant with wild animals. Some animals, such as certain nonhuman primates, including certain monkeys, pose a direct threat; their behavior can be unpredictably aggressive and violent without notice or provocation. The American Veterinary Medical Association (AVMA) issued a position statement advising against the use of monkeys as service animals, stating that ''[t]he AVMA does not support the use of nonhuman primates as assistance animals because of animal welfare concerns, and the potential for serious injury and zoonotic [animal to human disease transmission] risks.'' AVMA Position Statement, *Nonhuman Primates as Assistance Animals* (2005), available at h*ttp://www.avma.org/issues/policy/ nonhuman_ primates.asp* (last visited June 24, 2010).

An organization that trains capuchin monkeys to provide in-home services to individuals with paraplegia and quadriplegia was in substantial agreement with the AVMA's views but requested a limited recognition in the service animal definition for the capuchin monkeys it trains to provide assistance for persons with disabilities. The organization commented that its trained capuchin monkeys undergo scrupulous veterinary examinations to ensure that the animals pose no health risks, and are used by individuals with disabilities exclusively in their homes. The organization acknowledged that the capuchin monkeys it trains are not necessarily suitable for use in a place of public accommodation but noted that the monkeys may need to be used in circumstances that implicate title III coverage, *e.g.,* in the event the handler had to leave home due to an emergency, to visit a veterinarian, or for the initial delivery of the monkey to the individual with a disability. The organization noted that several State and local government entities have local zoning, licensing, health, and safety laws that prohibit non-human primates, and that these prohibitions would prevent individuals with disabilities from using these animals even in their homes.

The organization argued that including capuchin monkeys under the service animal umbrella would make it easier for individuals with disabilities to obtain reasonable modifications of State and local licensing, health, and safety laws that would permit the use of these monkeys. The organization argued that this limited modification to the service animal definition was warranted in view of the services these monkeys perform, which enable many individuals with paraplegia and quadriplegia to live and function with increased independence.

The Department has carefully considered the potential risks associated with the use of nonhuman primates as service animals in places of public accommodation, as well as the information provided to the Department about the significant benefits that trained capuchin monkeys provide to certain individuals with disabilities in residential settings. The Department has determined, however, that nonhuman primates, including capuchin monkeys, will not be recognized as service animals for purposes of this rule because of their potential for disease transmission and unpredictable aggressive behavior. The Department believes that these characteristics make nonhuman primates unsuitable for use as service animals in the context of the wide variety of public settings subject to this rule. As the organization advocating the inclusion of capuchin monkeys acknowledges, capuchin monkeys are not suitable for use in public

facilities.

The Department emphasizes that it has decided only that capuchin monkeys will not be included in the definition of service animals for purposes of its regulation implementing the ADA. This decision does not have any effect on the extent to which public accommodations are required to allow the use of such monkeys under other Federal statutes, like the FHAct or the Air Carrier Access Act (ACAA). For example, a public accommodation that also is considered to be a ''dwelling'' may be covered under both the ADA and the FHAct. While the ADA does not require such a public accommodation to admit people with service monkeys, the FHAct may. Under the FHAct an individual with a disability may have the right to have an animal other than a dog in his or her home if the animal qualifies as a ''reasonable accommodation'' that is necessary to afford the individual equal opportunity to use and enjoy a dwelling, assuming that the use of the animal does not pose a direct threat. In some cases, the right of an individual to have an animal under the FHAct may conflict with State or local laws that prohibit all individuals, with or without disabilities, from owning a particular species. However, in this circumstance, an individual who wishes to request a reasonable modification of the State or local law must do so under the FHAct, not the ADA.

Having considered all of the comments about which species should qualify as service animals under the ADA, the Department has determined the most reasonable approach is to limit acceptable species to dogs.

Size or weight limitations. The vast majority of commenters did not support a size or weight limitation. Commenters were typically opposed to a size or weight limit because many tasks performed by service animals require large, strong dogs. For instance, service animals may perform tasks such as providing balance and support or pulling a wheelchair. Small animals may not be suitable for large adults. The weight of the service animal user is often correlated with the size and weight of the service animal. Others were concerned that adding a size and weight limit would further complicate the difficult process of finding an appropriate service animal. One commenter noted that there is no need for a limit because ''if, as a practical matter, the size or weight of an individual's service animal creates a direct threat or fundamental alteration to a particular public entity or accommodation, there are provisions that allow for the animal's exclusion or removal.'' Some common concerns among commenters in support of a size and weight limit were that a larger animal may be less able to fit in various areas with its handler, such as toilet rooms and public seating areas, and that larger animals are more difficult to control.

Balancing concerns expressed in favor of and against size and weight limitations, the Department has determined that such limitations would not be appropriate. Many individuals of larger stature require larger dogs. The Department believes it would be inappropriate to deprive these individuals of the option of using a service dog of the size required to provide the physical support and stability these individuals may need to function independently. Since large dogs have always served as service animals, continuing their use should not constitute fundamental alterations or impose undue burdens on public accommodations.

Breed limitations. A few commenters suggested that certain breeds of dogs should not be allowed to be used as service animals. Some suggested that the Department should defer to local laws restricting the breeds of dogs that individuals who reside in a community may own. Other commenters opposed breed restrictions, stating that the breed of a dog does not determine its propensity for aggression and that aggressive and non-aggressive dogs exist in all breeds.

The Department does not believe that it is either appropriate or consistent with the ADA to defer to local laws that prohibit certain breeds of dogs based on local concerns that these breeds may have a history of unprovoked aggression or attacks. Such deference would have the effect

of limiting the rights of persons with disabilities under the ADA who use certain service animals based on where they live rather than on whether the use of a particular animal poses a direct threat to the health and safety of others. Breed restrictions differ significantly from jurisdiction to jurisdiction. Some jurisdictions have no breed restrictions. Others have restrictions that, while well-meaning, have the unintended effect of screening out the very breeds of dogs that have successfully served as service animals for decades without a history of the type of unprovoked aggression or attacks that would pose a direct threat, *e.g.,* German Shepherds. Other jurisdictions prohibit animals over a certain weight, thereby restricting breeds without invoking an express breed ban. In addition, deference to breed restrictions contained in local laws would have the unacceptable consequence of restricting travel by an individual with a disability who uses a breed that is acceptable and poses no safety hazards in the individual's home jurisdiction but is nonetheless banned by other jurisdictions. Public accommodations have the ability to determine, on a case-by-case basis, whether a particular service animal can be excluded based on that particular animal's actual behavior or history—not based on fears or generalizations about how an animal or breed might behave. This ability to exclude an animal whose behavior or history evidences a direct threat is sufficient to protect health and safety.

Recognition of psychiatric service animals, but not "emotional support animals." The definition of "service animal" in the NPRM stated the Department's longstanding position that emotional support animals are not included in the definition of "service animal." The proposed text provided that "[a]nimals whose sole function is to provide emotional support, comfort, therapy, companionship, therapeutic benefits, or to promote emotional well-being are not service animals." 73 FR 34508, 34553 (June 17, 2008).

Many advocacy organizations expressed concern and disagreed with the exclusion of comfort and emotional support animals. Others have been more specific, stating that individuals with disabilities may need their emotional support animals in order to have equal access. Some commenters noted that individuals with disabilities use animals that have not been trained to perform tasks directly related to their disability. These animals do not qualify as service animals under the ADA. These are emotional support or comfort animals.

Commenters asserted that excluding categories such as "comfort" and "emotional support" animals recognized by laws such as the FHAct or the ACAA is confusing and burdensome. Other commenters noted that emotional support and comfort animals perform an important function, asserting that animal companionship helps individuals who experience depression resulting from multiple sclerosis.

Some commenters explained the benefits emotional support animals provide, including emotional support, comfort, therapy, companionship, therapeutic benefits, and the promotion of emotional well-being. They contended that without the presence of an emotional support animal in their lives they would be disadvantaged and unable to participate in society. These commenters were concerned that excluding this category of animals will lead to discrimination against and excessive questioning of individuals with non-visible or non-apparent disabilities. Other commenters expressing opposition to the exclusion of individually trained "comfort" or "emotional support" animals asserted that the ability to soothe or de-escalate and control emotion is "work" that benefits the individual with the disability.

Many commenters requested that the Department carve out an exception that permits current or former members of the military to use emotional support animals. They asserted that a significant number of service members returning from active combat duty have adjustment difficulties due to combat, sexual assault, or other traumatic experiences while on active duty. Commenters noted that some current or former members of the mili-

tary service have been prescribed animals for conditions such as PTSD. One commenter stated that service women who were sexually assaulted while in the military use emotional support animals to help them feel safe enough to step outside their homes. The Department recognizes that many current and former members of the military have disabilities as a result of service-related injuries that may require emotional support and that such individuals can benefit from the use of an emotional support animal and could use such animal in their home under the FHAct. However, having carefully weighed the issues, the Department believes that its final rule appropriately addresses the balance of issues and concerns of both the individual with a disability and the public accommodation. The Department also notes that nothing in this part prohibits a public entity from allowing current or former military members or anyone else with disabilities to utilize emotional support animals if it wants to do so.

Commenters asserted the view that if an animal's ''mere presence'' legitimately provides such benefits to an individual with a disability and if those benefits are necessary to provide equal opportunity given the facts of the particular disability, then such an animal should qualify as a ''service animal.'' Commenters noted that the focus should be on the nature of a person's disability, the difficulties the disability may impose and whether the requested accommodation would legitimately address those difficulties, not on evaluating the animal involved. The Department understands this approach has benefitted many individuals under the FHAct and analogous State law provisions, where the presence of animals poses fewer health and safety issues and where emotional support animals provide assistance that is unique to residential settings. The Department believes, however, that the presence of such animals is not required in the context of public accommodations, such as restaurants, hospitals, hotels, retail establishments, and assembly areas.

Under the Department's previous regulatory framework, some individuals and entities assumed that the requirement that service animals must be individually trained to do work or perform tasks excluded all individuals with mental disabilities from having service animals. Others assumed that any person with a psychiatric condition whose pet provided comfort to them was covered by the 1991 title III regulation. The Department reiterates that psychiatric service animals that are trained to do work or perform a task for individuals whose disability is covered by the ADA are protected by the Department's present regulatory approach. Psychiatric service animals can be trained to perform a variety of tasks that assist individuals with disabilities to detect the onset of psychiatric episodes and ameliorate their effects. Tasks performed by psychiatric service animals may include reminding the individual to take medicine, providing safety checks or room searches for individuals with PTSD, interrupting self-mutilation, and removing disoriented individuals from dangerous situations.

The difference between an emotional support animal and a psychiatric service animal is the work or tasks that the animal performs. Traditionally, service dogs worked as guides for individuals who were blind or had low vision. Since the original regulation was promulgated, service animals have been trained to assist individuals with many different types of disabilities.

In the final rule, the Department has retained its position on the exclusion of emotional support animals from the definition of ''service animal.'' The definition states that ''[t]he provision of emotional support, well-being, comfort, or companionship * * * do[es] not constitute work or tasks for the purposes of this definition.'' The Department notes, however, that the exclusion of emotional support animals from coverage in the final rule does not mean that individuals with psychiatric or mental disabilities cannot use service animals that meet the regulatory definition. The final rule defines service animal as follows: ''Service animal means any dog that is individually trained to do work or

perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability.'' This language simply clarifies the Department's longstanding position.

The Department's position is based on the fact that the title II and title III regulations govern a wider range of public settings than the housing and transportation settings for which the Department of Housing and Urban Development (HUD) and the DOT regulations allow emotional support animals or comfort animals. The Department recognizes that there are situations not governed by the title II and title III regulations, particularly in the context of residential settings and transportation, where there may be a legal obligation to permit the use of animals that do not qualify as service animals under the ADA, but whose presence nonetheless provides necessary emotional support to persons with disabilities. Accordingly, other Federal agency regulations, case law, and possibly State or local laws governing those situations may provide appropriately for increased access for animals other than service animals as defined under the ADA. Public officials, housing providers, and others who make decisions relating to animals in residential and transportation settings should consult the Federal, State, and local laws that apply in those areas (*e.g.,* the FHAct regulations of HUD and the ACAA) and not rely on the ADA as a basis for reducing those obligations.

Retain term "service animal." Some commenters asserted that the term ''assistance animal'' is a term of art and should replace the term ''service animal''; however, the majority of commenters preferred the term ''service animal'' because it is more specific. The Department has decided to retain the term ''service animal'' in the final rule. While some agencies, like HUD, use the terms ''assistance animal, ''assistive animal,'' or ''support animal,'' these terms are used to denote a broader category of animals than is covered by the ADA. The Department has decided that changing the term used in the final rule would create confusion, particularly in view of the broader parameters for coverage under the FHAct, *cf.* Preamble to HUD's Final Rule for Pet Ownership for the Elderly and Persons with Disabilities, 73 FR 63834–38 (Oct. 27, 2008); HUD Handbook No. 4350.3 Rev–1, Chapter 2, *Occupancy Requirements of Subsidized Multifamily Housing Programs* (June 2007), available at *http://www.hud.gov/offices/adm/ hudclips/handbooks/hsgh/4350.3* (last visited June 24, 2010). Moreover, as discussed above, the Department's definition of ''service animal'' in the final rule does not affect the rights of individuals with disabilities who use assistance animals in their homes under the FHAct or who use ''emotional support animals'' that are covered under the ACAA and its implementing regulations. *See* 14 CFR 382.7 *et seq.; see also* Department of Transportation, *Guidance Concerning Service Animals in Air Transportation,* 68 FR 24874, 24877 (May 9, 2003) (discussing accommodation of service animals and emotional support animals on aircraft).

''Video Remote Interpreting (VRI) Services''
In the NPRM, the Department proposed adding ''Video Interpreting Services (VIS)'' to the list of auxiliary aids available to provide effective communication. In the preamble to the NPRM, VIS was defined as ''a technology composed of a video phone, video monitors, cameras, a high-speed Internet connection, and an interpreter. The video phone provides video transmission to a video monitor that permits the individual who is deaf or hard of hearing to view and sign to a video interpreter (*i.e.,* a live interpreter in another location), who can see and sign to the individual through a camera located on or near the monitor, while others can communicate by speaking. The video monitor can display a split screen of two live images, with the interpreter in one image and the individual who is deaf or hard of hearing in the other image.'' 73 FR 34508, 34522 (June 17, 2008). Comments from advocacy organizations and individuals unanimously requested that the

Department use the term ''video remote interpreting (VRI),'' instead of VIS, for consistency with Federal Communications Commission (FCC) regulations, FCC Public Notice, DA–0502417 (Sept. 7, 2005), and with common usage by consumers. The Department has made that change throughout the regulation to avoid confusion and to make the regulation more consistent with existing regulations.

Many commenters also requested that the Department distinguish between VRI and ''video relay service (VRS).'' Both VRI and VRS use a remote interpreter who is able to see and communicate with a deaf person and a hearing person, and all three individuals may be connected by a video link. VRI is a fee-based interpreting service conveyed via videoconferencing where at least one person, typically the interpreter, is at a separate location. VRI can be provided as an on-demand service or by appointment. VRI normally involves a contract in advance for the interpreter who is usually paid by the covered entity.

VRS is a telephone service that enables persons with disabilities to use the telephone to communicate using video connections and is a more advanced form of relay service than the traditional voice to text telephones (TTY) relay systems that were recognized in the 1991 title III regulation. More specifically, VRS is a video relay service using interpreters connected to callers by video hook-up and is designed to provide telephone services to persons who are deaf and use American Sign Language that are functionally equivalent to those services provided to users who are hearing. VRS is funded through the Interstate Telecommunications Relay Services Fund and overseen by the FCC. *See* 47 CFR 64.601(a)(26). There are no fees for callers to use the VRS interpreters and the video connection, although there may be relatively inexpensive initial costs to the title III entities to purchase the videophone or camera for on-line video connection, or other equipment to connect to the VRS service. The FCC has made clear that VRS functions as a telephone service and is not intended to be used for interpreting services where both parties are in the same room; the latter is reserved for VRI. The Department agrees that VRS cannot be used as a substitute for in-person interpreters or for VRI in situations that would not, absent one party's disability, entail use of the telephone.

Many commenters strongly recommended limiting the use of VRI to circumstances where it will provide effective communication. Commenters from advocacy groups and persons with disabilities expressed concern that VRI may not always be appropriate to provide effective communication, especially in hospitals and emergency rooms. Examples were provided of patients who are unable to see the video monitor because they are semi-conscious or unable to focus on the video screen; other examples were given of cases where the video monitor is out of the sightline of the patient or the image is out of focus; still other examples were given of patients who could not see the image because the signal was interrupted, causing unnatural pauses in the communication, or the image was grainy or otherwise unclear. Many commenters requested more explicit guidelines on the use of VRI and some recommended requirements for equipment maintenance, high-speed, wide-bandwidth video links using dedicated lines or wireless systems, and training of staff using VRI, especially in hospital and health care situations. Several major organizations requested a requirement to include the interpreter's face, head, arms, hands, and eyes in all transmissions.

After consideration of the comments and the Department's own research and experience, the Department has determined that VRI can be an effective method of providing interpreting services in certain circumstances, but not in others. For example, VRI should be effective in many situations involving routine medical care, as well as in the emergency room where urgent care is important, but no in-person interpreter is available; however, VRI may not be effective in situations involving surgery or other medical procedures where the

patient is limited in his or her ability to see the video screen. Similarly, VRI may not be effective in situations where there are multiple people in a room and the information exchanged is highly complex and fast paced. The Department recognizes that in these and other situations, such as where communication is needed for persons who are deaf-blind, it may be necessary to summon an in-person interpreter to assist certain individuals. To ensure that VRI is effective in situations where it is appropriate, the Department has established performance standards in § 36.303(f).

Subpart B—General Requirements

Section 36.208(b) Direct Threat

The Department has revised the language of § 36.208(b) (formerly § 36.208(c) in the 1991 title III regulation) to include consideration of whether the provision of auxiliary aids or services will mitigate the risk that an individual will pose a direct threat to the health or safety of others. Originally, the reference to auxiliary aids or services as a mitigating factor was part of § 36.208. However, that reference was removed from the section when, for editorial purposes, the Department removed the definition of ''direct threat'' from § 36.208 and placed it in § 36.104. The Department has put the reference to auxiliary aids or services as a mitigating factor back into § 36.208(b) in order to maintain consistency with the current regulation.

Section 36.211 Maintenance of Accessible Features

Section 36.211 of the 1991 title III regulation provides that a public accommodation must maintain in operable working condition those features of facilities and equipment that are required to be readily accessible to and usable by individuals with disabilities. 28 CFR 36.211. In the NPRM, the Department clarified the application of this provision and proposed one change to the section to address the discrete situation in which the scoping requirements provided in the 2010 Standards reduce the number of required elements below the requirements of the 1991 Standards. In that discrete event, a public accommodation may reduce such accessible features in accordance with the requirements in the 2010 Standards.

The Department received only four comments on this proposed amendment. None of the commenters opposed the change. In the final rule, the Department has revised the section to make it clear that if the 2010 Standards reduce either the technical requirements or the number of required accessible elements below that required by the 1991 Standards, then the public accommodation may reduce the technical requirements or the number of accessible elements in a covered facility in accordance with the requirements of the 2010 Standards. One commenter, an association of convenience stores, urged the Department to expand the language of the section to include restocking of shelves as a permissible activity for isolated or temporary interruptions in service or access. It is the Department's position that a temporary interruption that blocks an accessible route, such as restocking of shelves, is already permitted by existing § 36.211(b), which clarifies that ''isolated or temporary interruptions in service or access due to maintenance or repairs'' are permitted. Therefore, the Department will not make any additional changes in the language of § 36.211 other than those discussed in the preceding paragraph.

Subpart C—Specific Requirements

Section 36.302 Modifications in Policies, Practices, or Procedures

Section 36.302(c) Service Animals Section 36.302(c)(1) of the 1991 title III regulation states that ''[g]enerally, a public accommodation shall modify [its] policies, practices, or procedures to permit the use of service animals by an individual with a disability.'' Section 36.302(c)(2) of the 1991 title III regulation states that ''[n]othing in

this part requires a public accommodation to supervise or care for a service animal.'' The Department has decided to retain the scope of the 1991 title III regulation while clarifying the Department's longstanding policies and interpretations. Toward that end, the final rule has been revised to include the Department's policy interpretations as outlined in published technical assistance, *Commonly Asked Questions about Service Animals in Places of Business* (1996), available at *http://www.ada.gov/qasrvc.htm,*and *ADA Guide for Small Businesses* (1999), available at *http://www.ada.gov/smbustxt.htm,* and to add that a public accommodation may exclude a service animal in certain circumstances where the service animal fails to meet certain behavioral standards. The Department received extensive comments in response to proposed § 36.302(c) from individuals, disability advocacy groups, organizations involved in training service animals, and public accommodations. Those comments and the Department's response are discussed below.

Exclusion of service animals. The 1991 regulatory provision in § 36.302(c) addresses reasonable modification and remains unchanged in the final rule. However, based on comments received and the Department's analysis, the Department has decided to clarify those circumstances where otherwise eligible service animals may be excluded by public accommodations.

In the NPRM, in § 36.302(c)(2)(i), the Department proposed that a public accommodation may ask an individual with a disability to remove a service animal from the place of public accommodation if ''[t]he animal is out of control and the animal's handler does not take effective action to control it.'' 73 FR 34508, 34553 (June 17, 2008). The Department has long held that a service animal must be under the control of the handler at all times. Commenters overwhelmingly were in favor of this language, but noted that there are occasions when service animals are provoked to disruptive or aggressive behavior by agitators or troublemakers, as in the case of a blind individual whose service dog is taunted or pinched. While all service animals are trained to ignore and overcome these types of incidents, misbehavior in response to provocation is not always unreasonable. In circumstances where a service animal misbehaves or responds reasonably to a provocation or injury, the public accommodation must give the handler a reasonable opportunity to gain control of the animal. Further, if the individual with a disability asserts that the animal was provoked or injured, or if the public accommodation otherwise has reason to suspect that provocation or injury has occurred, the public accommodation should seek to determine the facts and, if provocation or injury occurred, the public accommodation should take effective steps to prevent further provocation or injury, which may include asking the provocateur to leave the place of public accommodation. This language is unchanged in the final rule.

The NPRM also proposed language at § 36.302(c)(2)(ii) to permit a public accommodation to exclude a service animal if the animal is not housebroken (*i.e.,* trained so that, absent illness or accident, the animal controls its waste elimination) or the animal's presence or behavior fundamentally alters the nature of the service the public accommodation provides (*e.g.,* repeated barking during a live performance). Several commenters were supportive of this NPRM language, but cautioned against overreaction by the public accommodation in these instances. One commenter noted that animals get sick, too, and that accidents occasionally happen. In these circumstances, simple clean up typically addresses the incident. Commenters noted that the public accommodation must be careful when it excludes a service animal on the basis of ''fundamental alteration,'' asserting for example, that a public accommodation should not exclude a service animal for barking in an environment where other types of noise, such as loud cheering or a child crying, is tolerated. The Department maintains that the appropriateness of an exclusion can be assessed by reviewing how a public accommodation addresses comparable situ-

ations that do not involve a service animal. The Department has retained in § 36.302(c)(2) of the final rule the exception requiring animals to be housebroken. The Department has not retained the specific NPRM language stating that animals can be excluded if their presence or behavior fundamentally alters the nature of the service provided by the public accommodation, because the Department believes that this exception is covered by the general reasonable modification requirement contained in § 36.302(c)(1).

The NPRM also proposed in § 36.302(c)(2)(iii) that a service animal can be excluded where ''[t]he animal poses a direct threat to the health or safety of others that cannot be eliminated by reasonable modifications.'' 73 FR 34508, 34553 (June 17, 2008). Commenters were universally supportive of this provision as it makes express the discretion of a public accommodation to exclude a service animal that poses a direct threat. Several commenters cautioned against the overuse of this provision and suggested that the Department provide an example of the rule's application. The Department has decided not to include regulatory language specifically stating that a service animal can be excluded if it poses a direct threat. The Department believes that the direct threat provision in § 36.208 already provides this exception to public accommodations.

Access to a public accommodation following the proper exclusion of a service animal. The NPRM proposed that in the event a public accommodation properly excludes a service animal, the public accommodation must give the individual with a disability the opportunity to obtain the goods and services of the public accommodation without having the service animal on the premises. Most commenters welcomed this provision as a common sense approach. These commenters noted that they do not wish to preclude individuals with disabilities from the full and equal enjoyment of the goods and services simply because of an isolated problem with a service animal. The Department has elected to retain this provision in § 36.302(c)(2).

Other requirements. The NPRM also proposed that the regulation include the following requirements: that the work or tasks performed by the service animal must be directly related to the handler's disability; that a service animal must be individually trained to do work or perform a task, be housebroken, and be under the control of the handler; and that a service animal must have a harness, leash, or other tether. Most commenters addressed at least one of these issues in their responses. Most agreed that these provisions are important to clarify further the 1991 service animal regulation. The Department has moved the requirement that the work or tasks performed by the service animal must be related directly to the individual's disability to the definition of ''service animal'' in § 36.104. In addition, the Department has modified the proposed language relating to the handler's control of the animal with a harness, leash, or other tether to state that ''[a] service animal shall have a harness, leash, or other tether, unless either the handler is unable because of a disability to use a harness, leash, or other tether, or the use of a harness, leash, or other tether would interfere with the service animal's safe, effective performance of work or tasks, in which case the service animal must be otherwise under the handler's control (*e.g.,* voice control, signals, or other effective means).'' The Department has retained the requirement that the service animal must be individually trained, as well as the requirement that the service animal be housebroken.

Responsibility for supervision and care of a service animal. The 1991 title III regulation, in § 36.302(c)(2), states that ''[n]othing in this part requires a public accommodation to supervise or care for a service animal.'' The NPRM modified this language to state that ''[a] public accommodation is not responsible for caring for or supervising a service animal.'' 73 FR 34508, 34553 (June 17, 2008). Most commenters did not address this particular provision. The Department notes that there are occasions when a person with a disability is

confined to bed in a hospital for a period of time. In such an instance, the individual may not be able to walk or feed the service animal. In such cases, if the individual has a family member, friend, or other person willing to take on these responsibilities in the place of the individual with a disability, the individual's obligation to be responsible for the care and supervision of the service animal would be satisfied. The language of this section is retained, with minor modifications, in § 36.302(c)(5) of the final rule.

Inquiries about service animals. The NPRM proposed language at § 36.302(c)(6) setting forth parameters about how a public accommodation may determine whether an animal qualifies as a service animal. The proposed section stated that a public accommodation may ask if the animal is required because of a disability and what task or work the animal has been trained to do but may not require proof of service animal certification or licensing. Such inquiries are limited to eliciting the information necessary to make a decision without requiring disclosure of confidential disability-related information that a public accommodation does not need.

This language is consistent with the policy guidance outlined in two Department publications, *Commonly Asked Questions about Service Animals in Places of Business* (1996), available at *http://www.ada.gov/ qasrvc.htm*, and *ADA Guide for Small Businesses* (1999), available a*t http://www.ada.gov/smbustxt.htm*.

Although some commenters contended that the NPRM service animal provisions leave unaddressed the issue of how a public accommodation can distinguish between a psychiatric service animal, which is covered under the final rule, and a comfort animal, which is not, other commenters noted that the Department's published guidance has helped public accommodations to distinguish between service animals and pets on the basis of an individual's response to these questions. Accordingly, the Department has retained the NPRM language incorporating its guidance concerning the permissible questions into the final rule.

Some commenters suggested that a title III entity be allowed to require current documentation, no more than one year old, on letterhead from a mental health professional stating the following: (1) That the individual seeking to use the animal has a mental health-related disability; (2) that having the animal accompany the individual is necessary to the individual's mental health or treatment or to assist the person otherwise; and (3) that the person providing the assessment of the individual is a licensed mental health professional and the individual seeking to use the animal is under that individual's professional care. These commenters asserted that this will prevent abuse and ensure that individuals with legitimate needs for psychiatric service animals may use them. The Department believes that this proposal would treat persons with psychiatric, intellectual, and other mental disabilities less favorably than persons with physical or sensory disabilities. The proposal would also require persons with disabilities to obtain medical documentation and carry it with them any time they seek to engage in ordinary activities of daily life in their communities— something individuals without disabilities have not been required to do. Accordingly, the Department has concluded that a documentation requirement of this kind would be unnecessary, burdensome, and contrary to the spirit, intent, and mandates of the ADA.

Service animal access to areas of a public accommodation. The NPRM proposed at § 36.302(c)(7) that an individual with a disability who uses a service animal has the same right of access to areas of a public accommodation as members of the public, program participants, and invitees. Commenters indicated that allowing individuals with disabilities to go with their service animals into the same areas as members of the public, program participants, clients, customers, patrons, or invitees is accepted practice by most places of public accommodation. The Department has included a slightly modified version of this provision in § 36.302(c)(7) of the final rule. The Department

notes that under the final rule, a healthcare facility must also permit a person with a disability to be accompanied by a service animal in all areas of the facility in which that person would otherwise be allowed. There are some exceptions, however. The Department follows the guidance of the Centers for Disease Control and Prevention (CDC) on the use of service animals in a hospital setting. Zoonotic diseases can be transmitted to humans through bites, scratches, direct contact, arthropod vectors, or aerosols.

Consistent with CDC guidance, it is generally appropriate to exclude a service animal from limited-access areas that employ general infection-control measures, such as operating rooms and burn units. *See* Centers for Disease Control and Prevention, *Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee* (June 2003), available at *http://www.cdc.gov/hicpac/pdf/guidelines/ eic_in_HCF_03.pdf* (last visited June 24, 2010). A service animal may accompany its handler to such areas as admissions and discharge offices, the emergency room, inpatient and outpatient rooms, examining and diagnostic rooms, clinics, rehabilitation therapy areas, the cafeteria and vending areas, the pharmacy, restrooms, and all other areas of the facility where healthcare personnel, patients, and visitors are permitted without taking added precautions.

Prohibition against surcharges for use of a service animal. In the NPRM, the Department proposed to incorporate the previously mentioned policy guidance, which prohibits the assessment of a surcharge for the use of a service animal, into proposed § 36.302(c)(8). Several commenters agreed that this provision makes clear the obligation of a place of public accommodation to admit an individual with a service animal without surcharges, and that any additional costs imposed should be factored into the overall cost of doing business and passed on as a charge to all participants, rather than an individualized surcharge to the service animal user. Commenters also noted that service animal users cannot be required to comply with other requirements that are not generally applicable to other persons. If a public accommodation normally charges individuals for the damage they cause, an individual with a disability may be charged for damage caused by his or her service animals. The Department has retained this language, with minor modifications, in the final rule at § 36.302(c)(8).

Training requirement. Certain commenters recommended the adoption of formal training requirements for service animals. The Department has rejected this approach and will not impose any type of formal training requirements or certification process, but will continue to require that service animals be individually trained to do work or perform tasks for the benefit of an individual with a disability. While some groups have urged the Department to modify this position, the Department has determined that such a modification would not serve the full array of individuals with disabilities who use service animals, since individuals with disabilities may be capable of training, and some have trained, their service animal to perform tasks or do work to accommodate their disability. A training and certification requirement would increase the expense of acquiring a service animal and might limit access to service animals for individuals with limited financial resources.

Some commenters proposed specific behavior or training standards for service animals, arguing that without such standards, the public has no way to differentiate between untrained pets and service animals. Many of the suggested behavior or training standards were lengthy and detailed. The Department believes that this rule addresses service animal behavior sufficiently by including provisions that address the obligations of the service animal user and the circumstances under which a service animal may be excluded, such as the requirements that an animal be housebroken and under the control of its handler.

Miniature horses. The Department has been

persuaded by commenters and the available research to include a provision that would require public accommodations to make reasonable modifications to policies, practices, or procedures to permit the use of a miniature horse by a person with a disability if the miniature horse has been individually trained to do work or perform tasks for the benefit of the individual with a disability. The traditional service animal is a dog, which has a long history of guiding individuals who are blind or have low vision, and over time dogs have been trained to perform an even wider variety of services for individuals with all types of disabilities. However, an organization that developed a program to train miniature horses, modeled on the program used for guide dogs, began training miniature horses in 1991.

Although commenters generally supported the species limitations proposed in the NPRM, some were opposed to the exclusion of miniature horses from the definition of a service animal. These commenters noted that these animals have been providing assistance to persons with disabilities for many years. Miniature horses were suggested by some commenters as viable alternatives to dogs for individuals with allergies, or for those whose religious beliefs preclude the use of dogs. Another consideration mentioned in favor of the use of miniature horses is the longer life span and strength of miniature horses in comparison to dogs. Specifically, miniature horses can provide service for more than 25 years while dogs can provide service for approximately seven years, and, because of their strength, miniature horses can provide services that dogs cannot provide. Accordingly, use of miniature horses reduces the cost involved to retire, replace, and train replacement service animals.

The miniature horse is not one specific breed, but may be one of several breeds, with distinct characteristics that produce animals suited to service animal work. These animals generally range in height from 24 inches to 34 inches measured to the withers, or shoulders, and generally weigh between 70 and 100 pounds. These characteristics are similar to those of large breed dogs, such as Labrador Retrievers, Great Danes, and Mastiffs. Similar to dogs, miniature horses can be trained through behavioral reinforcement to be ''housebroken.'' Most miniature service horse handlers and organizations recommend that when the animals are not doing work or performing tasks, the miniature horses should be kept outside in a designated area instead of indoors in a house.

According to information provided by an organization that trains service horses, these miniature horses are trained to provide a wide array of services to their handlers, primarily guiding individuals who are blind or have low vision, pulling wheelchairs, providing stability and balance for individuals with disabilities that impair the ability to walk, and supplying leverage that enables a person with a mobility disability to get up after a fall. According to the commenter, miniature horses are particularly effective for large stature individuals. The animal can be trained to stand (and in some cases, lie down) at the handler's feet in venues where space is at a premium, such as assembly areas or inside some vehicles that provide public transportation. Some individuals with disabilities have traveled by train and have flown commercially with their miniature horses.

The miniature horse is not included in the definition of service animal, which is limited to dogs. However, the Department has added a specific provision at § 36.302(c)(9) of the final rule covering miniature horses. Under this provision, public accommodations must make reasonable modifications in policies, practices, or procedures to permit the use of a miniature horse by an individual with a disability if the miniature horse has been individually trained to do work or perform tasks for the benefit of the individual with a disability. The public accommodation may take into account a series of assessment factors in determining whether to allow a miniature horse into a specific facility. These include the type, size, and weight of the miniature horse, whether the handler has

sufficient control of the miniature horse, whether the miniature horse is housebroken, and whether the miniature horse's presence in a specific facility compromises legitimate safety requirements that are necessary for safe operation. In addition, paragraphs (c)(3)B–(8) of this section, which are applicable to dogs, also apply to miniature horses.

Ponies and full-size horses are not covered by § 36.302(c)(9). Also, because miniature horses can vary in size and can be larger and less flexible than dogs, covered entities may exclude this type of service animal if the presence of the miniature horse, because of its larger size and lower level of flexibility, results in a fundamental alteration to the nature of the services provided.

Section 36.302(e) Hotel Reservations

Section 36.302 of the 1991 title III regulation requires public accommodations to make reasonable modifications in policies, practices, or procedures when such modifications are necessary to afford access to any goods, services, facilities, privileges, advantages, or accommodations, unless the entity can demonstrate that making such modifications would fundamentally alter the nature of such goods, services, facilities, privileges, advantages, or accommodations. Hotels, timeshare resorts, and other places of lodging are subject to this requirement and must make reasonable modifications to reservations policies, practices, or procedures when necessary to ensure that individuals with disabilities are able to reserve accessible hotel rooms with the same efficiency, immediacy, and convenience as those who do not need accessible guest rooms.

Each year the Department receives many complaints concerning failed reservations. Most of these complaints involve individuals who have reserved an accessible hotel room only to discover upon arrival that the room they reserved is either not available or not accessible. Although problems with reservations services were not addressed in the ANPRM, commenters independently noted an ongoing problem with hotel reservations and urged the Department to provide regulatory guidance. In response, the Department proposed specific language in the NPRM to address hotel reservations. In addition, the Department posed several questions regarding the current practices of hotels and other reservations services including questions about room guarantees and the holding and release of accessible rooms. The Department also questioned whether public accommodations that provide reservations services for a place or places of lodging but do not own, lease (or lease to), or operate a place of lodging—referred to in this discussion as ''third-party reservations services''—should also be subject to the NPRM's proposals concerning hotel reservations.

Although reservations issues were discussed primarily in the context of traditional hotels, the new rule modifies the definition of ''places of lodging'' to clarify the scope of the rule's coverage of rental accommodations in timeshare properties, condominium hotels, and mixed-use and corporate hotel facilities that operate as places of public accommodation (as that term is now defined in § 36.104), and the Department received detailed comments, discussed below, regarding the application of reservations requirements to this category of rental accommodations.

General rule on reservations. Section 36.302(e)(1) of the NPRM required a public accommodation that owns, leases (or leases to), or operates a place of lodging to:

Modify its policies, practices, or procedures to ensure that individuals with disabilities can make reservations, including reservations made by telephone, in-person, or through a third party, for accessible guest rooms during the same hours and in the same manner as individuals who do not need accessible rooms. 73 FR 34508, 34553 (June 17, 2008).

Most individual commenters and organizations that represent individuals with disabilities strongly supported the requirement that individuals with disabilities should be able to make reservations

for accessible guest rooms during the same hours and in the same manner as individuals who do not need accessible rooms. In many cases individuals with disabilities expressed frustration because, while they are aware of improvements in architectural access brought about as a result of the ADA, they are unable to take advantage of these improvements because of shortcomings in current hotel reservations systems. A number of these commenters pointed out that it can be difficult or impossible to obtain information about accessible rooms and hotel features and that even when information is provided it often is found to be incorrect upon arrival. They also noted difficulty reserving accessible rooms and the inability to guarantee or otherwise ensure that the appropriate accessible room is available when the guest arrives. The ability to obtain information about accessible guest rooms, to make reservations for accessible guest rooms in the same manner as other guests, and to be assured of an accessible room upon arrival was of critical importance to these commenters.

Other commenters, primarily hotels, resort developers, travel agencies, and organizations commenting on their behalf, did not oppose the general rule on reservations, but recommended that the language requiring that reservations be made ''in the same manner'' be changed to require that reservations be made ''in a substantially similar manner.'' These commenters argued that hotel reservations are made in many different ways and through a variety of systems. In general, they argued that current reservations database systems may not contain s guests, travel agents, or other third-party reservations services to select the most appropriate room without consulting directly with the hotel, and that updating these systems might be expensive and time consuming. They also noted that in some cases, hotels do not always automatically book accessible rooms when requested to do so. Instead, guests may select from a menu of accessibility and other room options when making reservations. This information is transmitted to the hotel's reservations staff, who then contact the individual to verify the guest's accessibility needs. Only when such verification occurs will the accessible room be booked.

The Department is not persuaded that individuals who need to reserve accessible rooms cannot be served in the same manner as those who do not, and it appears that there are hotels of all types and sizes that already meet this requirement. Further, the Department has been able to accomplish this goal in settlement agreements resolving complaints about this issue. As stated in the preamble to the NPRM, basic nondiscrimination principles mandate that individuals with disabilities should be able to reserve hotel rooms with the same efficiency, immediacy, and convenience as those who do not need accessible guest rooms. The regulation does not require reservations services to create new methods for reserving hotel rooms or available timeshare units; instead, covered entities must make the modifications needed to ensure that individuals who need accessible rooms are able to reserve them in the same manner as other guests. If, for example, hotel reservations are not final until all hotel guests have been contacted by the hotel to discuss the guest's needs, a hotel may follow the same process when reserving accessible rooms. Therefore, the Department declines to change this language, which has been moved to § 36.302(e)(1)(i). However, in response to the commenters who recommended a transition period that would allow reservations services time to modify existing reservations systems to meet the requirements of this rule, § 36.302(e)(3) now provides a 18-month transition period before the requirements of § 36.302(e)(1) will be enforced.

Hotels and organizations commenting on their behalf also requested that the language be changed to eliminate any liability for reservations made through third parties, arguing that they are unable to control the actions of unrelated parties. The rule, both as proposed and as adopted, requires

covered public accommodations to ensure that reservations made on their behalf by third parties are made in a manner that results in parity between those who need accessible rooms and those who do not.

Hotels and other places of lodging that use third-party reservations services must make reasonable efforts to make accessible rooms available through at least some of these services and must provide these third-party services with information concerning the accessible features of the hotel and the accessible rooms. To the extent a hotel or other place of lodging makes available such rooms and information to a third-party reservation provider, but the third party fails to provide the information or rooms to people with disabilities in accordance with this section, the hotel or other place of lodging will not be responsible.

Identification of accessible features in hotels and guest rooms. NPRM § 36.302(e)(2) required public accommodations that provide hotel reservations services to identify and describe the accessible features in the hotels and guest rooms offered through that service. This requirement is essential to ensure that individuals with disabilities receive the information they need to benefit from the services offered by the place of lodging. As a practical matter, a public accommodation's designation of a guest room as ''accessible'' will not ensure necessarily that the room complies with all of the 1991 Standards. In older facilities subject to barrier removal requirements, strict compliance with the 1991 Standards is not required. Instead, public accommodations must remove barriers to the extent that it is readily achievable to do so.

Further, hotel rooms that are in full compliance with current standards may differ, and individuals with disabilities must be able to ascertain which features—in new and existing facilities—are included in the hotel's accessible guest rooms. For example, under certain circumstances, an accessible hotel bathroom may meet accessibility requirements with either a bathtub or a roll-in shower. The presence or absence of particular accessible features such as these may be the difference between a room that is usable by a particular person with a disability and one that is not.

Individuals with disabilities strongly supported this requirement. In addition to the importance of information about specific access features, several commenters pointed out the importance of knowing the size and number of beds in a room. Many individuals with disabilities travel with family members, personal care assistants, or other companions and require rooms with at least two beds. Although most hotels provide this information when generally categorizing the type or class of room (*e.g.,* deluxe suite with king bed), as described below, all hotels should consider the size and number of beds to be part of the basic information they are required to provide.

Comments made on behalf of reservations services expressed concern that unless the word ''hotels'' is stricken from the text, § 36.302(e)(2) of the NPRM essentially would require reservations systems to include a full accessibility report on each hotel or resort property in its system. Along these lines, commenters also suggested that the Department identify the specific accessible features of hotel rooms that must be described in the reservations system. For example, commenters suggested limiting features that must be included to bathroom type (tub or roll-in shower) and communications features.

The Department recognizes that a reservations system is not intended to be an accessibility survey. However, specific information concerning accessibility features is essential to travelers with disabilities. Because of the wide variations in the level of accessibility that travelers will encounter, the Department cannot specify what information must be included in every instance. For hotels that were built in compliance with the 1991 Standards, it may be sufficient to specify that the hotel is accessible and, for each accessible room, to describe the general type of room (*e.g.,* deluxe executive suite), the size and number of beds (*e.g.,* two queen beds), the type of accessible bathing facility

(*e.g.,* roll-in shower), and communications features available in the room (*e.g.*, alarms and visual notification devices). Based on that information, many individuals with disabilities will be comfortable making reservations.

For older hotels with limited accessibility features, information about the hotel should include, at a minimum, information about accessible entrances to the hotel, the path of travel to guest check-in and other essential services, and the accessible route to the accessible room or rooms. In addition to the room information described above, these hotels should provide information about important features that do not comply with the 1991 Standards. For example, if the door to the ''accessible'' room or bathroom is narrower than required, this information should be included (*e.g.*, door to guest room measures 30 inches clear). This width may not meet current standards but may be adequate for some wheelchair users who use narrower chairs. In many cases, older hotels provide services through alternatives to barrier removal, for example, by providing check-in or concierge services at a different, accessible location. Reservations services for these entities should include this information and provide a way for guests to contact the appropriate hotel employee for additional information. To recognize that the information and level of detail needed will vary based on the nature and age of the facility, § 36.302(e)(2) has been moved to § 36.302(e)(1)(ii) in the final rule and modified to require reservations services to:

Identify and describe accessible features in the hotels and guest rooms offered through its reservations service *in enough detail to reasonably permit individuals with disabilities to assess independently whether a given hotel or guest room meets his or her accessibility needs*. [Emphasis added]

As commenters representing hotels have described, once reservations are made, some hotels may wish to contact the guest to offer additional information and services. Or, many individuals with disabilities may wish to contact the hotel or reservations service for more detailed information. At that point, trained staff (including staff located on-site at the hotel and staff located off-site at a reservations center) should be available to provide additional information such as the specific layout of the room and bathroom, shower design, grab-bar locations, and other amenities available (*e.g.,* bathtub bench).

In the NPRM, the Department sought guidance concerning whether this requirement should be applied to third-party reservations services. Comments made by or on behalf of hotels, resort managers, and other members of the lodging and resort industry pointed out that, in most cases, these third parties do not have direct access to this information and must obtain it from the hotel or other place of lodging. Because third-party reservations services must rely on the place of lodging to provide the requisite information and to ensure that it is accurate and timely, the Department has declined to extend this requirement directly to third-party reservations services.

Hold and release of accessible guest rooms. The Department has addressed the hold and release of accessible guest rooms in settlement agreements and recognizes that current practices vary widely. The Department is concerned about current practices by which accessible guest rooms are released to the general public even though the hotel is not sold out. In such instances, individuals with disabilities may be denied an equal opportunity to benefit from the services offered by the public accommodation, *i.e.*, a hotel guest room. In the NPRM, the Department requested information concerning the current practices of hotels and third-party reservations services with respect to (1) holding accessible rooms for individuals with disabilities and (2) releasing accessible rooms to individuals without disabilities.

Individuals with disabilities and organizations commenting on their behalf strongly supported requiring accessible rooms to be held back for rental by individuals with disabilities. In some cases commenters supported holding back all accessible

rooms until all non-accessible rooms were rented. Others supported holding back accessible rooms in each category of rooms until all other rooms of that type were reserved. This latter position was also supported in comments received on behalf of the lodging industry; commenters also noted that this is the current practice of many hotels. In general, holding accessible rooms until requested by an individual who needs a room with accessible features or until it is the only available room of its type was viewed widely as a sensible approach to allocating scarce accessible rooms without imposing unnecessary costs on hotels.

The Department agrees with this latter approach and has added § 36.302(e)(1)(iii), which requires covered entities to hold accessible rooms for use by individuals with disabilities until all other guest rooms of that type have been rented and the accessible room requested is the only remaining room of that type. For example, if there are 25 rooms of a given type and two of these rooms are accessible, the reservations service is required to rent all 23 non-accessible rooms before it is permitted to rent these two accessible rooms to individuals without disabilities. If a one-of-a-kind room is accessible, that room is available to the first party to request it. The Department believes that this is the fairest approach available since it reserves accessible rooms for individuals who require them until all non-accessible rooms of that type have been reserved, and then provides equal access to any remaining rooms. It is also fair to hotels because it does not require them to forego renting a room that actually has been requested in favor of the possibility that an individual with a disability may want to reserve it at a later date.

Requirement to block accessible guest room reservations. NPRM § 36.302(e)(3) required a public accommodation that owns, leases (or leases to), or operates a place of lodging to guarantee accessible guest rooms that are reserved through a reservations service to the same extent that it guarantees rooms that are not accessible. In the NPRM, the Department sought comment on the current practices of hotels and third party reservations services with respect to ''guaranteed'' hotel reservations and on the impact of requiring a public accommodation to guarantee accessible rooms to the extent it guarantees other rooms.

Comments received by the Department by and on behalf of both individuals with disabilities and public accommodations that provide reservations services made clear that, in many cases, when speaking of room guarantees, parties who are not familiar with hotel terminology actually mean to refer to policies for blocking and holding specific hotel rooms. Several commenters explained that, in most cases, when an individual makes ''reservations,'' hotels do not reserve specific rooms; rather the individual is reserving a room with certain features at a given price. When the hotel guest arrives, he or she is provided with a room that has those features.

In most cases, this does not pose a problem because there are many available rooms of a given type. However, in comparison, accessible rooms are much more limited in availability and there may be only one room in a given hotel that meets a guest's needs. As described in the discussion on the identification of accessible features in hotels and guest rooms, the presence or absence of particular accessible features may be the difference between a room that is usable by a particular person with a disability and one that is not.

For that reason, the Department has added § 36.302(e)(1)(iv) to the final rule. Section 36.302(e)(1)(iv) requires covered entities to reserve, upon request, accessible guest rooms or specific types of guest rooms and ensure that the guest rooms requested are blocked and removed from all reservations systems (to eliminate double-booking, which is a common problem that arises when rooms are made available to be reserved through more than one reservations service). Of course, if a public accommodation typically requires a payment or deposit from its patrons in order to reserve a room, it may require the same payment or deposit from individuals with dis-

abilities before it reserves an accessible room and removes it from all its reservations systems. These requirements should alleviate the widely-reported problem of arriving at a hotel only to discover that, although an accessible room was reserved, the room available is not accessible or does not have the specific accessible features needed. Many hotels already have a similar process in place for other guest rooms that are unique or one-of-a-kind, such as ''Presidential'' suites. The Department has declined to extend this requirement directly to third-party reservations services. Comments the Department received in response to the NPRM indicate that most of the actions required to implement these requirements primarily are within the control of the entities that own the place of lodging or that manage it on behalf of its owners.

Guarantees of reservations for accessible guest rooms. The Department recognizes that not all reservations are guaranteed, and the rule does not impose an affirmative duty to guarantee reservations. When a public accommodation does guarantee hotel or other room reservations, it must provide the same guarantee for accessible guest rooms as it makes for other rooms, except that it must apply that guarantee to the specific room reserved and blocked, even if in other situations, its guarantee policy only guarantees that a room of a specific type will be available at the guaranteed price. Without this reasonable modification to its guarantee policy, any guarantee for accessible rooms would be meaningless. If, for example, a hotel makes reservations for an accessible ''Executive Suite'' but, upon arrival, offers its guest an inaccessible Executive Suite that the guest is unable to enter, it would be meaningless to consider the hotel's guarantee fulfilled. As with the requirements for identifying, holding, and blocking accessible rooms, the Department has declined to extend this requirement directly to third-party reservations services because the fulfillment of guarantees largely is beyond their power to control.

Application to rental units in timeshare, vacation communities, and condo-hotels. Because the Department has revised the definition of ''Places of Lodging'' in the final rule, the reservations requirements now apply to guest rooms and other rental units in timeshares, vacation communities, and condo-hotels where some or all of the units are owned and controlled by individual owners and rented out some portion of time to the public, as compared to traditional hotels and motels that are owned, controlled, and rented to the public by one entity. If a reservations service owns and controls one or more of the guest rooms or other units in the rental property (*e.g.,* a developer who retains and rents out unsold inventory), it is subject to the requirements set forth in § 36.302(e).

Several commenters expressed concern about any rule that would require accessible units that are owned individually to be removed from the rental pool and rented last. Commenters pointed out that this would be a disadvantage to the owners of accessible units because they would be rented last, if at all. Further, certain vacation property managers consider holding specific units back to be a violation of their ethical responsibility to present all properties they manage at an equal advantage. To address these concerns, the Department has added § 36.302(e)(2), which exempts reservations for individual guest rooms and other units that are not owned or substantially controlled by the entity that owns, leases, or operates the overall facility from the requirement that accessible guest rooms be held back from rental until all other guest rooms of that type have been rented. Section 36.302(e)(2) also exempts such rooms from requirements for blocking and guaranteeing reserved rooms. In resort developments with mixed ownership structures, such as a resort where some units are operated as hotel rooms and others are owned and controlled individually, a reservations service operated by the owner of the hotel portion may apply the exemption only to the rooms that are not owned or substantially controlled by the entity that owns, manages, or other-

wise controls the overall facility.

Other reservations-related comments made on behalf of these entities reflected concerns similar to the general concerns expressed with respect to traditional hotel properties. For example, commenters noted that because of the unique nature of the timeshare industry, additional flexibility is needed when making reservations for accessible units. One commenter explained that reservations are sometimes made through unusual entities such as exchange companies, which are not public accommodations and which operate to trade ownership interests of millions of individual owners. The commenter expressed concern that developers or resort owners would be held responsible for the actions of these exchange entities. If, as described, the choice to list a unit with an exchange company is made by the individual owner of the property and the exchange company does not operate on behalf of the reservations service, the reservations service is not liable for the exchange company's actions.

As with hotels, the Department believes that within the 18-month transition period these reservations services should be able to modify their systems to ensure that potential guests with disabilities who need accessible rooms can make reservations during the same hours and in the same manner as those who do not need accessible rooms.

Section 36.302(f) Ticketing

The 1991 title III regulation did not contain specific regulatory language on ticketing. The ticketing policies and practices of public accommodations, however, are subject to title III's nondiscrimination provisions. Through the investigation of complaints, enforcement actions, and public comments related to ticketing, the Department became aware that some venue operators, ticket sellers, and distributors were violating title III's nondiscrimination mandate by not providing individuals with disabilities the same opportunities to purchase tickets for accessible seating as provided to spectators purchasing conventional seats. In the NPRM, the Department proposed § 36.302(f) to provide explicit direction and guidance on discriminatory practices for entities involved in the sale or distribution of tickets.

The Department received comments from advocacy groups, assembly area trade associations, public accommodations, and individuals. Many commenters supported the addition of regulatory language pertaining to ticketing and urged the Department to retain it in the final rule. Several commenters, however, questioned why there were inconsistencies between the title II and title III provisions and suggested that the same language be used for both titles. The Department has decided to retain ticketing regulatory language and to ensure consistency between the ticketing provisions in title II and title III.

Because many in the ticketing industry view season tickets and other multi-event packages differently from individual tickets, the Department bifurcated some season ticket provisions from those concerning single-event tickets in the NPRM. This structure, however, resulted in some provisions being repeated for both types of tickets but not for others even though they were intended to apply to both types of tickets. The result was that it was not entirely clear that some of the provisions that were not repeated also were intended to apply to season tickets. The Department is addressing the issues raised by these commenters using a different approach. For the purposes of this section, a single event refers to an individual performance for which tickets may be purchased. In contrast, a series of events includes, but is not limited to, subscription events, event packages, season tickets, or any other tickets that may be purchased for multiple events of the same type over the course of a specified period of time whose ownership right reverts to the public accommodation at the end of each season or time period. Series-of-events tickets that give their holders an enhanced ability to purchase such tick-

ets from the public accommodation in seasons or periods of time that follow, such as a right of first refusal or higher ranking on waiting lists for more desirable seats, are subject to the provisions in this section. In addition, the final rule merges together some NPRM paragraphs that dealt with related topics and has reordered and renamed some of the paragraphs that were in the NPRM.

Ticket sales. In the NPRM, the Department proposed, in § 36.302(f)(1), a general rule that a public accommodation shall modify its policies, practices, or procedures to ensure that individuals with disabilities can purchase tickets for accessible seating for an event or series of events in the same way as others (*i.e.,* during the same hours and through the same distribution methods as other seating is sold). ''Accessible seating'' is defined in § 36.302(f)(1)(i) of the final rule to mean ''wheelchair spaces and companion seats that comply with sections 221 and 802 of the 2010 Standards along with any other seats required to be offered for sale to the individual with a disability pursuant to paragraph (4) of this section.'' The defined term does not include designated aisle seats. A ''wheelchair space'' refers to a space for a single wheelchair and its occupant.

The NPRM proposed requiring that accessible seats be sold through the ''same methods of distribution'' as non-accessible seats. 73 FR 34508, 34554 (June 17, 2008). Comments from venue managers and others in the business community, in general, noted that multiple parties are involved in ticketing, and because accessible seats may not be allotted to all parties involved at each stage, such parties should be protected from liability. For example, one commenter noted that a third-party ticket vendor, like Ticketmaster, can only sell the tickets it receives from its client. Because § 36.302(f)(1) of the final rule requires venue operators to make available accessible seating through the same methods of distribution they use for their regular tickets, venue operators that provide tickets to third-party ticket vendors are required to provide accessible seating to the third-party ticket vendor. This provision will enhance third-party ticket vendors' ability to acquire and sell accessible seating for sale in the future. The Department notes that once third-party ticket vendors acquire accessible tickets, they are obligated to sell them in accordance with these rules.

The Department also has received frequent complaints that individuals with disabilities have not been able to purchase accessible seating over the Internet, and instead have had to engage in a laborious process of calling a customer service line, or sending an email to a customer service representative and waiting for a response. Not only is such a process burdensome, but it puts individuals with disabilities at a disadvantage in purchasing tickets for events that are popular and may sell out in minutes. Because § 36.302(f)(5) of the final rule authorizes venues to release accessible seating in case of a sell-out, individuals with disabilities effectively could be cut off from buying tickets unless they also have the ability to purchase tickets in real time over the Internet. The Department's new regulatory language is designed to address this problem.

Several commenters representing assembly areas raised concerns about offering accessible seating for sale over the Internet. They contended that this approach would increase the incidence of fraud since anyone easily could purchase accessible seating over the Internet. They also asserted that it would be difficult technologically to provide accessible seating for sale in real time over the Internet, or that to do so would require simplifying the rules concerning the purchase of multiple additional accompanying seats. Moreover, these commenters argued that requiring an individual purchasing accessible seating to speak with a customer service representative would allow the venue to meet the patron's needs most appropriately and ensure that wheelchair spaces are reserved for individuals with disabilities who require wheelchair spaces. Finally, these commenters argued that individuals who can transfer

effectively and conveniently from a wheelchair to a seat with a movable armrest seat could instead purchase designated aisle seats.

The Department considered these concerns carefully and has decided to continue with the general approach proposed in the NPRM. Although fraud is an important concern, the Department believes that it is best combated by other means that would not have the effect of limiting the ability of individuals with disabilities to purchase tickets, particularly since restricting the purchase of accessible seating over the Internet will, of itself, not curb fraud. In addition, the Department has identified permissible means for covered entities to reduce the incidence of fraudulent accessible seating ticket purchases in § 36.302(f)(8) of the final rule.

Several commenters questioned whether ticket Web sites themselves must be accessible to individuals who are blind or have low vision, and if so, what that requires. The Department has consistently interpreted the ADA to cover Web sites that are operated by public accommodations and stated that such sites must provide their services in an accessible manner or provide an accessible alternative to the Web site that is available 24 hours a day, seven days a week. The final rule, therefore, does not impose any new obligation in this area. The accessibility of Web sites is discussed in more detail in the section entitled ''Other Issues.''

In § 36.302(f)(2) of the NPRM, the Department also proposed requiring public accommodations to make accessible seating available during all stages of tickets sales including, but not limited to, presales, promotions, lotteries, waitlists, and general sales. For example, if tickets will be presold or an event that is open only to members of a fan club, or to holders of a particular credit card, then tickets for accessible seating must be made available for purchase through those means. This requirement does not mean that any individual with a disability would be able to purchase those seats. Rather, it means that an individual with a disability who meets the requirement for such a sale (*e.g.,* who is a member of the fan club or holds that credit card) will be able to participate in the special promotion and purchase accessible seating. The Department has maintained the substantive provisions of the NPRM's §§ 36.302(f)(1) and (f)(2) but has combined them in a single paragraph at § 36.302(f)(1)(ii) of the final rule so that all of the provisions having to do with the manner in which tickets are sold are located in a single paragraph.

Identification of available accessible seating. In the NPRM, the Department proposed § 36.302(f)(3), which, as modified and renumbered § 36.302(f)(2)(iii) in the final rule, requires a facility to identify available accessible seating through seating maps, brochures, or other methods if that information is made available about other seats sold to the general public. This rule requires public accommodations to provide information about accessible seating to the same degree of specificity that it provides information about general seating. For example, if a seating map displays color-coded blocks pegged to prices for general seating, then accessible seating must be similarly color-coded. Likewise, if covered entities provide detailed maps that show exact seating and pricing for general seating, they must provide the same for accessible seating.

The NPRM did not specify a requirement to identify prices for accessible seating. The final rule requires that if such information is provided for general seating, it must be provided for accessible seating as well.

In the NPRM, the Department proposed in § 36.302(f)(4) that a public accommodation, upon being asked, must inform persons with disabilities and their companions of the locations of all unsold or otherwise available seating. This provision is intended to prevent the practice of ''steering'' individuals with disabilities to certain accessible seating so that the facility can maximize potential ticket sales by releasing unsold accessible seating, especially in preferred or desirable locations, for sale to the general public. The Department received no significant comment on this proposal.

The Department has retained this provision in the final rule but has added it, with minor modifications, to § 36.302(f)(2) as paragraph (i).

Ticket prices. In the NPRM, the Department proposed § 36.302(f)(7) requiring that ticket prices for accessible seating be set no higher than the prices for other seats in that seating section for that event. The NPRM's provision also required that accessible seating be made available at every price range, and if an existing facility has barriers to accessible seating within a particular price range, a proportionate amount of seating (determined by the ratio of the total number of seats at that price level to the total number of seats in the assembly area) must be offered in an accessible location at that same price. Under this rule, for example, if it is not readily achievable for a 20,000-seat facility built in 1980 to place accessible seating in the $20-price category, which is on the upper deck, it must place a proportionate number of seats in an accessible location for $20. If the upper deck has 2,000 seats, then the facility must place 10 percent of its accessible seating in an accessible location for $20 provided that it is part of a seating section where ticket prices are equal to or more than $20—a facility may not place the $20-accessible seating in a $10-seating section. The Department received no significant comment on this rule, and it has been retained, as amended, in the final rule in § 36.302(f)(3).

Purchase of multiple tickets. In the NPRM, the Department proposed § 36.302(f)(9) to address one of the most common ticketing complaints raised with the Department: that individuals with disabilities are not able to purchase more than two tickets. The Department proposed this provision to facilitate the ability of individuals with disabilities to attend events with friends, companions, or associates who may or may not have a disability by enabling individuals with disabilities to purchase the maximum number of tickets allowed per transaction to other spectators; by requiring venues to place accompanying individuals in general seating as close as possible to accessible seating (in the event that a group must be divided because of the large size of the group); and by allowing an individual with a disability to purchase up to three additional contiguous seats per wheelchair space if they are available at the time of sale. Section 36.302(f)(9)(ii) of the NPRM required that a group containing one or more wheelchair users must be placed together, if possible, and that in the event that the group could not be placed together, the individuals with disabilities may not be isolated from the rest of the group.

The Department asked in the NPRM whether this rule was sufficient to effectuate the integration of individuals with disabilities. Many advocates and individuals praised it as a welcome and much-needed change, stating that the trade-off of being able to sit with their family or friends was worth reducing the number of seats available for individuals with disabilities. Some commenters went one step further and suggested that the number of additional accompanying seats should not be restricted to three.

Although most of the substance of the proposed provision on the purchase of multiple tickets has been maintained in the final rule, it has been renumbered as § 36.302(f)(4), reorganized, and supplemented. To preserve the availability of accessible seating for other individuals with disabilities, the Department has not expanded the rule beyond three additional contiguous seats. Section 36.302(f)(4)(i) of the final rule requires public accommodations to make available for purchase three additional tickets for seats in the same row that are contiguous with the wheelchair space, provided that at the time of purchase there are three such seats available. The requirement that the additional seats be ''contiguous with the wheelchair space'' does not mean that each of the additional seats must be in actual contact or have a border in common with the wheelchair space; however, at least one of the additional seats should be immediately adjacent to the wheelchair space. The Department recognizes that it will often be necessary to use vacant wheelchair spaces to pro-

vide for contiguous seating.

The Department has added paragraphs (4)(ii) and (4)(iii) to clarify that in situations where there are insufficient unsold seats to provide three additional contiguous seats per wheelchair space or a ticket office restricts sales of tickets to a particular event to less than four tickets per customer, the obligation to make available three additional contiguous seats per wheelchair space would be affected. For example, if at the time of purchase, there are only two additional contiguous seats available for purchase because the third has been sold already, then the ticket purchaser would be entitled to two such seats. In this situation, the public entity would be required to make up the difference by offering one additional ticket for sale that is as close as possible to the accessible seats. Likewise, if ticket purchases for an event are limited to two per customer, a person who uses a wheelchair who seeks to purchase tickets would be entitled to purchase only one additional contiguous seat for the event.

The Department has also added paragraph (4)(iv) to clarify that the requirement for three additional contiguous seats is not intended to serve as a cap if the maximum number of tickets that may be purchased by members of the general public exceeds the four tickets an individual with a disability ordinarily would be allowed to purchase (*i.e.,* a wheelchair space and three additional contiguous seats). If the maximum number of tickets that may be purchased by members of the general public exceeds four, an individual with a disability is to be allowed to purchase the maximum number of tickets; however, additional tickets purchased by an individual with a disability beyond the wheelchair space and the three additional contiguous seats provided in § 36.302(f)(4)(i) do not have to be contiguous with the wheelchair space.

The NPRM proposed at § 36.302(f)(9)(ii) that for group sales, if a group includes one or more individuals who use a wheelchair, then the group shall be placed in a seating area with accessible seating so that, if possible, the group can sit together. If it is necessary to divide the group, it should be divided so that the individuals in the group who use wheelchairs are not isolated from the rest of the members of their group. The final rule retains the NPRM language in paragraph (4)(v).

Hold and release of unsold accessible seating. The Department recognizes that not all accessible seating will be sold in all assembly areas for every event to individuals with disabilities who need such seating and that public accommodations may have opportunities to sell such seating to the general public. The Department proposed in the NPRM a provision aimed at striking a balance between affording individuals with disabilities adequate time to purchase accessible seating and the entity's desire to maximize ticket sales. In the NPRM, the Department proposed § 36.302(f)(6), which allowed for the release of accessible seating under the following circumstances: (i) When all seating in the facility has been sold, excluding luxury boxes, club boxes, or suites; (ii) when all seating in a designated area has been sold and the accessible seating being released is in the same area; or (iii) when all seating in a designated price range has been sold and the accessible seating being released is within the same price range.

The Department's NPRM asked ''whether additional regulatory guidance is required or appropriate in terms of a more detailed or set schedule for the release of tickets in conjunction with the three approaches described above. For example, does the proposed regulation address the variable needs of assembly areas covered by the ADA? Is additional regulatory guidance required to eliminate discriminatory policies, practices and procedures related to the sale, hold, and release of accessible seating? What considerations should appropriately inform the determination of when unsold accessible seating can be released to the general public?'' 73 FR 34508, 34527 (June 17, 2008).

The Department received comments both supporting and opposing the inclusion of a hold-and-release provision. One side proposed loosening

the restrictions on the release of unsold accessible seating. One commenter from a trade association suggested that tickets should be released regardless of whether there is a sell-out, and that these tickets should be released according to a set schedule. Conversely, numerous individuals, advocacy groups, and at least one public entity urged the Department to tighten the conditions under which unsold tickets for accessible seating may be released. These commenters suggested that venues should not be permitted to release tickets during the first two weeks of sale, or alternatively, that they should not be permitted to be released earlier than 48 hours before a sold-out event. Many of these commenters criticized the release of accessible seating under the second and third prongs of § 36.302(f)(6) in the NPRM (when there is a sell-out in general seating in a designated seating area or in a price range), arguing that it would create situations where general seating would be available for purchase while accessible seating would not be.

Numerous commenters—both from the industry and from advocacy groups—asked for clarification of the term ''sell-out.'' Business groups commented that industry practice is to declare a sell-out when there are only ''scattered singles'' available— isolated seats that cannot be purchased as a set of adjacent pairs. Many of those same commenters also requested that ''sell-out'' be qualified with the phrase ''of all seating available for sale'' since it is industry practice to hold back from release tickets to be used for groups connected with that event (*e.g.,* the promoter, home team, or sports league). They argued that those tickets are not available for sale and any return of these tickets to the general inventory happens close to the event date. Noting the practice of holding back tickets, one advocacy group suggested that covered entities be required to hold back accessible seating in proportion to the number of tickets that are held back for later release.

The Department has concluded that it would be inappropriate to interfere with industry practice by defining what constitutes a ''sell-out'' and that a public accommodation should continue to use its own approach to defining a ''sell-out.'' If, however, a public accommodation declares a sell-out by reference to those seats that are available for sale, but it holds back tickets that it reasonably anticipates will be released later, it must hold back a proportional percentage of accessible seating to be released as well.

Adopting any of the alternatives proposed n the comments summarized above would have upset the balance between protecting the rights of individuals with disabilities and meeting venues' concerns about lost revenue from unsold accessible seating. As a result, the Department has retained § 36.302(f)(6) renumbered as § 36.302(f)(5) in the final rule. The Department has, however, modified the regulation text to specify that accessible seating may be released only when ''all non-accessible tickets in a designated seating area have been sold and the tickets for accessible seating are being released in the same designated area.'' As stated in the NPRM, the Department intended for this provision to allow, for example, the release of accessible seating at the orchestra level when all other seating at the orchestra level is sold. The Department has added this language to the final rule at § 36.302(f)(5)(B) to clarify that venues cannot designate or redesignate seating areas for the purpose of maximizing the release of unsold accessible seating. So, for example, a venue may not determine on an ad hoc basis that a group of seats at the orchestra level is a designated seating area in order to release unsold accessible seating in that area.

The Department also has maintained the hold-and-release provisions that appeared in the NPRM, but has added a provision to address the release of accessible seating for series-of-events tickets on a series-of-events basis. Many commenters asked the Department whether unsold accessible seating may be converted to general seating and released to the general public on a season-ticket basis or longer when tickets typically are

sold as a season-ticket package or other long-term basis. Several disability rights organizations and individual commenters argued that such a practice should not be permitted, and, if it were, that conditions should be imposed to ensure that individuals with disabilities have future access to those seats.

The Department interprets the fundamental principle of the ADA as a requirement to give individuals with disabilities equal, not better, access to those opportunities available to the general public. Thus, for example, a public accommodation that sells out its facility on a season-ticket only basis is not required to leave unsold its accessible seating if no persons with disabilities purchase those season-ticket seats. Of course, public accommodations may choose to go beyond what is required by reserving accessible seating for individuals with disabilities (or releasing such seats for sale to the general public) on an individual-game basis.

If a covered entity chooses to release unsold accessible seating for sale on a season-ticket or other long-term basis, it must meet at least two conditions. Under § 36.302(f)(5)(iii) of the final rule, public accommodations must leave flexibility for game-day change-outs to accommodate ticket transfers on the secondary market. And public accommodations must modify their ticketing policies so that, in future years, individuals with disabilities will have the ability to purchase accessible seating on the same basis as other patrons (*e.g.,* as season tickets). Put differently, releasing accessible seating to the general public on a season-ticket or other long-term basis cannot result in that seating being lost to individuals with disabilities in perpetuity. If, in future years, season tickets become available and persons with disabilities have reached the top of the waiting list or have met any other eligibility criteria for season ticket purchases, public accommodations must ensure that accessible seating will be made available to the eligible individuals. In order to accomplish this, the Department has added § 36.302(f)(5)(iii)(A) to require public accommodations that release accessible season tickets to individuals who do not have disabilities that require the features of accessible seating to establish a process to prevent the automatic reassignment of such ticket holders to accessible seating. For example, a public accommodation could have in place a system whereby accessible seating that was released because it was not purchased by individuals with disabilities is not in the pool of tickets available for purchase for the following season unless and until the conditions for ticket release have been satisfied in the following season. Alternatively, a public accommodation might release tickets for accessible seating only when a purchaser who does not need its features agrees that he or she has no guarantee of or right to the same seats in the following season, or that if season tickets are guaranteed for the following season, the purchaser agrees that the offer to purchase tickets is limited to non-accessible seats with, to the extent practicable, comparable price, view, and amenities to the accessible seats such individuals held in the prior year. The Department is aware that this rule may require some administrative changes but believes that this process will not create undue financial and administrative burdens. The Department believes that this approach is balanced and beneficial. It will allow public accommodations to sell all of their seats and will leave open the possibility, in future seasons or series of events, that persons who need accessible seating may have access to it.

The Department also has added § 36.302(f)(5)(iii)(B) to address how season tickets or series-of-events tickets that have attached ownership rights should be handled if the ownership right returns to the public accommodation (*e.g.,* when holders forfeit their ownership right by failing to purchase season tickets or sell their ownership right back to a public accommodation). If the ownership right is for accessible seating, the public accommodation is required to adopt a process that allows an eligible individual with a disability who requires the features of such seating to purchase the rights and tickets for such seating.

Nothing in the regulatory text prevents a public accommodation from establishing a process whereby such ticket holders agree to be voluntarily reassigned from accessible seating to another seating area so that individuals with mobility disabilities or disabilities that require the features of accessible seating and who become newly eligible to purchase season tickets have an opportunity to do so. For example, a public accommodation might seek volunteers to relocate to another location that is at least as good in terms of its location, price, and amenities or a public accommodation might use a seat with forfeited ownership rights as an inducement to get a ticket holder to give up accessible seating he or she does not need.

Ticket transfer. The Department received many comments asking whether accessible seating has the same transfer rights as general seats. The proposed regulation at § 36.302(f)(5) required that individuals with disabilities must be allowed to purchase season tickets for accessible seating on the same terms and conditions as individuals purchasing season tickets for general seating, including the right—if it exists for other ticketholders—to transfer individual tickets to friends or associates. Some commenters pointed out that the NPRM proposed explicitly allowing individuals with disabilities holding season tickets to transfer tickets but did not address the transfer of tickets purchased for individual events. Several commenters representing assembly areas argued that persons with disabilities holding tickets for an individual event should not be allowed to sell or transfer them to third parties because such ticket transfers would increase the risk of fraud or would make unclear the obligation of the entity to accommodate secondary ticket transfers. They argued that individuals holding accessible seating should either be required to transfer their tickets to another individual with a disability or return them to the facility for a refund.

Although the Department is sympathetic to concerns about administrative burden, curtailing transfer rights for accessible seating when other ticket holders are permitted to transfer tickets would be inconsistent with the ADA's guiding principle that individuals with disabilities must have rights equal to others. Thus, the Department has added language in the final rule in § 36.302(f)(6) that requires that individuals with disabilities holding accessible seating for any event have the same transfer rights accorded other ticket holders for that event. Section 36.302(f)(6) also preserves the rights of individuals with disabilities who hold tickets to accessible seats for a series of events to transfer individual tickets to others, regardless of whether the transferee needs accessible seating. This approach recognizes the common practice of individuals splitting season tickets or other multi-event ticket packages with friends, colleagues, or other spectators to make the purchase of season tickets affordable; individuals with disabilities should not be placed in the burdensome position of having to find another individual with a disability with whom to share the package.

This provision, however, does not require public accommodations to seat an individual who holds a ticket to an accessible seat in such seating if the individual does not need the accessible features of the seat. A public accommodation may reserve the right to switch these individuals to different seats if they are available, but a public accommodation is not required to remove a person without a disability who is using accessible seating from that seating, even if a person who uses a wheelchair shows up with a ticket from the secondary market for a non-accessible seat and wants accessible seating.

Secondary ticket market. Section 36.302(f)(7) is a new provision in the final rule that requires a public accommodation to modify its policies, practices, or procedures to ensure that an individual with a disability, who acquires a ticket in the secondary ticket market, may use that ticket under the same terms and conditions as other ticket holders who acquire a ticket in the secondary market for an event or series of events. This principle was discussed in the NPRM in connection with

§ 36.302(f)(5), pertaining to season-ticket sales. There, the Department asked for public comment regarding a public accommodation's proposed obligation to accommodate the transfer of accessible seating tickets on the secondary ticket market to those who do not need accessible seating and vice versa.

The secondary ticket market, for the purposes of this rule, broadly means any transfer of tickets after the public accommodation's initial sale of tickets to individuals or entities. It thus encompasses a wide variety of transactions, from ticket transfers between friends to transfers using commercial exchange systems. Many commenters noted that the distinction between the primary and secondary ticket market has become blurred as a result of agreements between teams, leagues, and secondary market sellers. These commenters noted that the secondary market may operate independently of the public accommodation, and parts of the secondary market, such as ticket transfers between friends, undoubtedly are outside the direct jurisdiction of the public accommodation. To the extent that venues seat persons who have purchased tickets on the secondary market, they must similarly seat persons with disabilities who have purchased tickets on the secondary market. In addition, some public accommodations may acquire ADA obligations directly by formally entering the secondary ticket market.

The Department's enforcement experience with assembly areas also has revealed that venues regularly provide for and make last-minute seat transfers. As long as there are vacant wheelchair spaces, requiring venues to provide wheelchair spaces for patrons who acquired inaccessible seats and need wheelchair spaces is an example of a reasonable modification of a policy under title III of the ADA. Similarly, a person who has a ticket for a wheelchair space but who does not require its accessible features could be offered non-accessible seating if such seating is available.

The Department's longstanding position that title III of the ADA requires venues to make reasonable modifications in their policies to allow individuals with disabilities who acquired non-accessible tickets on the secondary ticket market to be seated in accessible seating, where such seating is vacant, is supported by the only Federal court to address this issue. *See* I*ndependent Living Resources v. Oregon Arena Corp.,* 1 F. Supp. 2d 1159, 1171 (D. Or. 1998). The Department has incorporated this position into the final rule at § 36.302(f)(7)(ii).

The NPRM contained two questions aimed at gauging concern with the Department's consideration of secondary ticket market sales. The first question asked whether a secondary purchaser who does not have a disability and who buys an accessible seat should be required to move if the space is needed for someone with a disability.

Many disability rights advocates answered that the individual should move provided that there is a seat of comparable or better quality available for him and his companion. Some venues, however, expressed concerns about this provision, and asked how they are to identify who should be moved and what obligations apply if there are no seats available that are equivalent or better in quality.

The Department's second question asked whether there are particular concerns about the obligation to provide accessible seating, including a wheelchair space, to an individual with a disability who purchases an inaccessible seat through the secondary market.

Industry commenters contended that this requirement would create a ''logistical nightmare,'' with venues scrambling to reseat patrons in the short time between the opening of the venues' doors and the commencement of the event. Furthermore, they argued that they might not be able to reseat all individuals and that even if they were able to do so, patrons might be moved to inferior seats (whether in accessible or non-accessible seating). These commenters also were concerned that they would be sued by patrons moved under such circumstances.

These commenters seem to have misconstrued the rule. Covered entities are not required to seat every person who acquires a ticket for inaccessible seating but needs accessible seating, and are not required to move any individual who acquires a ticket for accessible seating but does not need it. Covered entities that allow patrons to buy and sell tickets on the secondary market must make reasonable modifications to their policies to allow persons with disabilities to participate in secondary ticket transfers. The Department believes that there is no one-size-fits-all rule that will suit all assembly areas. In those circumstances where a venue has accessible seating vacant at the time an individual with a disability who needs accessible seating presents his ticket for inaccessible seating at the box office, the venue must allow the individual to exchange his ticket for an accessible seat in a comparable location if such an accessible seat is vacant. Where, however, a venue has sold all of its accessible seating, the venue has no obligation to provide accessible seating to the person with a disability who purchased an inaccessible seat on the secondary market. Venues may encourage individuals with disabilities who hold tickets for inaccessible seating to contact the box office before the event to notify them of their need for accessible seating, even though they may not require ticketholders to provide such notice.

The Department notes that public accommodations are permitted, though not required, to adopt policies regarding moving patrons who do not need the features of an accessible seat. If a public accommodation chooses to do so, it might mitigate administrative concerns by marking tickets for accessible seating as such, and printing on the ticket that individuals who purchase such seats but who do not need accessible seating are subject to being moved to other seats in the facility if the accessible seating is required for an individual with a disability. Such a venue might also develop and publish a ticketing policy to provide transparency to the general public and to put holders of tickets for accessible seating who do not require it on notice that they may be moved.

Prevention of fraud in purchase of accessible seating. Assembly area managers and advocacy groups have informed the Department that the fraudulent purchase of accessible seating is a pressing concern. Curbing fraud is a goal that public accommodations and individuals with disabilities share. Steps taken to prevent fraud, however, must be balanced carefully against the privacy rights of individuals with disabilities. Such measures also must not impose burdensome requirements upon, nor restrict the rights of, individuals with disabilities.

In the NPRM, the Department struck a balance between these competing concerns by proposing § 36.302(f)(8), which prohibited public accommodations from asking for proof of disability before the purchase of accessible seating but provided guidance in two paragraphs on appropriate measures for curbing fraud. Paragraph (i) proposed allowing a public accommodation to ask individuals purchasing single-event tickets for accessible seating whether they are wheelchair users. Paragraph (ii) proposed allowing a public accommodation to require individuals purchasing accessible seating for season tickets or other multi-event ticket packages to attest in writing that the accessible seating is for a wheelchair user. Additionally, the NPRM proposed to permit venues, when they have good cause to believe that an individual has fraudulently purchased accessible seating, to investigate that individual.

Several commenters objected to this rule on the ground that it would require a wheelchair user to be the purchaser of tickets. The Department has reworded this paragraph to reflect that the individual with a disability does not have to be the ticket purchaser. The final rule allows third parties to purchase accessible tickets at the request of an individual with a disability.

Commenters also argued that other individuals with disabilities who do not use wheelchairs should be permitted to purchase accessible seating. Some individuals with disabilities who do not

use wheelchairs urged the Department to change the rule, asserting that they, too, need accessible seating. The Department agrees that such seating, although designed for use by a wheelchair user, may be used by non-wheelchair users, if those persons are persons with a disability who need to use accessible seating because of a mobility disability or because their disability requires the use of the features that accessible seating provides (*e.g.,* individuals who cannot bend their legs because of braces, or individuals who, because of their disability, cannot sit in a straight-back chair).

Some commenters raised concerns that allowing venues to ask questions to determine whether individuals purchasing accessible seating are doing so legitimately would burden individuals with disabilities in the purchase of accessible seating. The Department has retained the substance of this provision in § 36.302(f)(8) of the final rule, but emphasizes that such questions should be asked at the initial time of purchase. For example, if the method of purchase is via the Internet, then the question(s) should be answered by clicking a yes or no box during the transaction. The public accommodation may warn purchasers that accessible seating is for individuals with disabilities and that individuals purchasing such tickets fraudulently are subject to relocation.

One commenter argued that face-to-face contact between the venue and the ticket holder should be required in order to prevent fraud and suggested that individuals who purchase accessible seating should be required to pick up their tickets at the box office and then enter the venue immediately. The Department has declined to adopt that suggestion. It would be discriminatory to require individuals with disabilities to pick up tickets at the box office when other spectators are not required to do so. If the assembly area wishes to make face-to-face contact with accessible seating ticket holders to curb fraud, it may do so through its ushers and other customer service personnel located within the seating area.

Some commenters asked whether it is permissible for assembly areas to have voluntary clubs where individuals with disabilities self-identify to the public accommodation in order to become a member of a club that entitles them to purchase accessible seating reserved for club members or otherwise receive priority in purchasing accessible seating. The Department agrees that such clubs are permissible, provided that a reasonable amount of accessible seating remains available at all prices and dispersed at all locations for individuals with disabilities who are non-members.

Section 36.303 Auxiliary Aids and Services

Section 36.303(a) of the 1991 title III regulation requires a public accommodation to take such steps as may be necessary to ensure that no individual with a disability is excluded, denied services, segregated, or otherwise treated differently than other individuals because of the absence of auxiliary aids and services, unless the public accommodation can demonstrate that taking such steps would fundamentally alter the nature of the goods, services, facilities, advantages, or accommodations being offered or would result in an undue burden. Implicit in this duty to provide auxiliary aids and services is the underlying obligation of a public accommodation to communicate effectively with customers, clients, patients, companions, or participants who have disabilities affecting hearing, vision, or speech. The Department notes that § 36.303(a) does not require public accommodations to provide assistance to individuals with disabilities that is unrelated to effective communication, although requests for such assistance may be otherwise subject to the reasonable modifications or barrier removal requirements.

The Department has investigated hundreds of complaints alleging that public accommodations have failed to provide effective communication, and many of these investigations have resulted in settlement agreements and consent decrees. During the course of these investigations, the Department has determined that public accommodations

sometimes misunderstand the scope of their obligations under the statute and the regulation. Section 36.303 in the final rule codifies the Department's longstanding policies in this area, and includes provisions based on technological advances and breakthroughs in the area of auxiliary aids and services that have occurred since the 1991 title III regulation was published.

Video remote interpreting (VRI). Section 36.303(b)(1) sets out examples of auxiliary aids and services. In the NPRM, the Department proposed adding video remote services (hereafter referred to as ''video remote interpreting'' or ''VRI'') and the exchange of written notes among the examples. The Department also proposed amending the provision to reflect technological advances, such as the wide availability of real-time capability in transcription services and captioning.

VRI is defined in the final rule at § 36.104 as ''an interpreting service that uses video conference technology over dedicated lines or wireless technology offering high-speed, wide-bandwidth video connection or wireless connection that delivers high-quality video images as provided in § 36.303(f).'' The Department notes that VRI generally consists of a videophone, monitors, cameras, a high-speed video connection, and an interpreter provided by the public accommodation pursuant to a contract for services. The term's inclusion within the definition of ''qualified interpreter'' makes clear that a public accommodation's use of VRI satisfies its title III obligations only where VRI affords effective communication. Comments from advocates and persons with disabilities expressed concern that VRI may not always provide effective communication, especially in hospitals and emergency rooms. Examples were provided of patients who are unable to see the video monitor because they are semi-conscious or unable to focus on the video screen; other examples were given of cases where the video monitor is out of the sightline of the patient or the image is out of focus; still other examples were given of patients who cannot see the screen because the signal is interrupted, causing unnatural pauses in communication, or the image is grainy or otherwise unclear. Many commenters requested more explicit guidelines on the use of VRI, and some recommended requirements for equipment maintenance, dedicated high-speed, wide-bandwidth video connections, and training of staff using VRI, especially in hospital and health care situations. Several major organizations requested a requirement to include the interpreter's face, head, arms, hands, and eyes in all transmissions.

The Department has determined that VRI can be an effective method of providing interpreting service in certain situations, particularly when a live interpreter cannot be immediately on the scene. To ensure that VRI is effective, the Department has established performance standards for VRI in § 36.303(f).The Department recognizes that reliance on VRI may not be effective in certain situations, such as those involving the exchange of complex information or involving multiple parties, and for some individuals, such as for persons who are deaf-blind, and using VRI in those circumstances would not satisfy a public accommodation's obligation to provide effective communication.

Comments from several disability advocacy organizations and individuals discouraged the Department from adding the exchange of written notes to the list of available auxiliary aids in § 36.303(b). The Department consistently has recognized that the exchange of written notes may provide effective communication in certain contexts. The NPRM proposed adding an explicit reference to written notes because some title III entities do not understand that exchange of written notes using paper and pencil may be an available option in some circumstances. Advocates and persons with disabilities requested explicit limits on the use of written notes as a form of auxiliary aid because, they argued, most exchanges are not simple, and handwritten notes do not afford effective communication. One major advocacy organization,

for example, noted that the speed at which individuals communicate orally or use sign language averages about 200 words per minute or more, and thus, the exchange of notes may provide only truncated or incomplete communication. For persons whose primary language is American Sign Language (ASL), some commenters pointed out, using written English in exchange of notes often is ineffective because ASL syntax and vocabulary is dissimilar from English. By contrast, some commenters from professional medical associations sought more specific guidance on when notes are allowed, especially in the context of medical offices and health care situations.

Exchange of notes likely will be effective in situations that do not involve substantial conversation, for example, when blood is drawn for routine lab tests or regular allergy shots are administered. However, interpreters should be used when the matter involves more complexity, such as in communication of medical history or diagnoses, in conversations about medical procedures and treatment decisions, or in communication of instructions for care at home or elsewhere. The Department discussed in the NPRM the kinds of situations in which use of interpreters or captioning is necessary. Additional guidance on this issue can be found in a number of agreements entered into with health care providers and hospitals that are available on the Department's Web site at *http://www.ada.gov.*

In addition, commenters requested that the Department include ''real-time'' before any mention of ''computer-aided'' or ''captioning'' technology to highlight the value of simultaneous translation of any communication. The Department has added to the final rule appropriate references to ''real-time'' to recognize this aspect of effective communication. Lastly, in this provision and elsewhere in the title III regulation, the Department has replaced the term ''telecommunications devices for deaf persons (TDD)'' with ''text telephones (TTYs).'' As noted in the NPRM, TTY has become the commonly accepted term and is consistent with the terminology used by the Access Board in the 2004 ADAAG. Comments from advocates and persons with disabilities expressed approval of the substitution of TTY for TDD in the proposed regulation, but expressed the view that the Department should expand the definition to ''voice, text, and video-based telecommunications products and systems, including TTY's, videophones, and captioned telephones, or equally effective telecommunications systems.'' The Department has expanded its definition of 'auxiliary aids and services'' in § 36.303 to include those examples in the final rule. Other additions proposed in the NPRM, and retained in the final rule, include Brailled materials and displays, screen reader software, magnification software, optical readers, secondary auditory programs (SAP), and accessible electronic and information technology.

As the Department noted in the preamble to the NPRM, the list of auxiliary aids in § 36.303(b) is merely illustrative. The Department does not intend that every public accommodation covered by title III must have access to every device or all new technology at all times, as long as the communication provided is effective.

Companions who are individuals with disabilities. The Department has added several new provisions to § 36.303(c), but these provisions do not impose new obligations on places of public accommodation. Rather, these provisions simply codify the Department's longstanding positions. Section 36.303(c)(1) now states that ''[a] public accommodation shall furnish appropriate auxiliary aids and services where necessary to ensure effective communication with individuals with disabilities. This includes an obligation to provide effective communication to companions who are individuals with disabilities.'' Section 36.303(c)(1)(i) defines ''companion'' as ''a family member, friend, or associate of an individual seeking access to, or participating in, the goods, services, facilities, privileges, advantages, or accommodations of a public accommodation, who, along with such individual, is an appropriate person with whom

the public accommodation should communicate.''

This provision makes clear that if the companion is someone with whom the public accommodation normally would or should communicate, then the public accommodation must provide appropriate auxiliary aids and services to that companion to ensure effective communication with the companion. This commonsense rule provides the necessary guidance to public accommodations to implement properly the nondiscrimination requirements of the ADA. Commenters also questioned why, in the NPRM, the Department defined companion as ''a family member, friend, or associate of a program participant * * *,'' noting that the scope of a public accommodation's obligation is not limited to ''program participants'' but rather includes all individuals seeking access to, or participating in, the goods, services, facilities, privileges, advantages, or accommodations of the public accommodation. 73 FR 34508, 34554 (June 17, 2008). The Department agrees and has amended the regulatory language accordingly. Many commenters supported inclusion of companions in the rule and requested that the Department clarify that a companion with a disability may be entitled to effective communication from the public accommodation, even though the individual seeking access to, or participating in, the goods, services, facilities, privileges, advantages, or accommodations of the public accommodation is not an individual with a disability. Some commenters asked the Department to make clear that if the individual seeking access to or participating in the public accommodation's program or services is an individual with a disability and the companion is not, the public accommodation may not limit its communication to the companion, instead of communicating directly with the individual with a disability, when it would otherwise be appropriate to communicate with the individual with the disability.

Most entities and individuals from the medical field objected to the Department's proposal, suggesting that medical and health care providers, and they alone, should determine to whom medical information should be communicated and when auxiliary aids and services should be provided to companions. Others asked that the Department limit the public accommodation's obligation to communicate effectively with a companion to situations where such communication is necessary to serve the interests of the person who is receiving the public accommodation's services. It also was suggested that companions should receive auxiliary aids and services only when necessary to ensure effective communication with the person receiving the public accommodation's services, with an emphasis on the particular needs of the patient requiring assistance, not the patient's family or guardian. Some in the medical community objected to the inclusion of any regulatory language regarding companions, asserting that such language is overbroad, seeks services for individuals whose presence is neither required by the public accommodation nor necessary for the delivery of the services or good, places additional burdens on the medical community, and represents an uncompensated mandate. One medical association commenter stated that such a mandate was particularly burdensome in situations where a patient is fully and legally capable of participating in the decision-making process and needs little or no assistance in obtaining care and following through on physician's instructions.

The final rule codifies the Department's longstanding interpretation of the ADA, and clarifies that public accommodations have effective communication obligations with respect to companions who are individuals with disabilities even where the individual seeking to participate in or benefit from what a public accommodation offers does not have a disability. There are many instances in which such an individual may not be an individual with a disability but his or her companion is an individual with a disability. The effective communication requirement applies equally to that companion.

Effective communication with companions is

particularly critical in health care settings where miscommunication may lead to misdiagnosis and improper or delayed medical treatment. The Department has encountered confusion and reluctance by medical care providers regarding the scope of their obligation with respect to such companions. Effective communication with a companion is necessary in a variety of circumstances. For example, a companion may be legally authorized to make health care decisions on behalf of the patient or may need to help the patient with information or instructions given by hospital personnel. In addition, a companion may be the patient's next of kin or health care surrogate with whom hospital personnel need to communicate concerning the patient's medical condition. Moreover, a companion could be designated by the patient to communicate with hospital personnel about the patient's symptoms, needs, condition, or medical history. Furthermore, the companion could be a family member with whom hospital personnel normally would communicate. It has been the Department's longstanding position that public accommodations are required to provide effective communication to companions when they accompany patients to medical care providers for treatment.

The individual with a disability does not need to be present physically to trigger the public accommodation's obligation to provide effective communication to a companion. The controlling principle regarding whether appropriate auxiliary aids and services should be provided is whether the companion is an appropriate person with whom the public accommodation should communicate. Examples of such situations include back-to-school night or parent-teacher conferences at a private school. If the faculty writes on the board or otherwise displays information in a visual context during back-to-school night, this information must be communicated effectively to parents or guardians who are blind or have low vision. At a parent-teacher conference, deaf parents or guardians are to be provided with appropriate auxiliary aids and service to communicate effectively with the teacher and administrators. Likewise, when a deaf spouse attempts to communicate with private social service agencies about the services necessary for the hearing spouse, appropriate auxiliary aids and services must be provided to the deaf spouse by the public accommodation to ensure effective communication.

One medical association sought approval to impose a charge against an individual with a disability, either the patient or the companion, where that person had stated he or she needed an interpreter for a scheduled appointment, the medical provider had arranged for an interpreter to appear, and then the individual requiring the interpreter did not show up for the scheduled appointment. Section 36.301(c) of the 1991 title III regulation prohibits the imposition of surcharges to cover the costs of necessary auxiliary aids and services. As such, medical providers cannot pass along to their patients with disabilities the cost of obtaining an interpreter, even in situations where the individual cancels his or her appointment at the last minute or is a ''no-show'' for the scheduled appointment. The medical provider, however, may charge for the missed appointment if all other patients are subject to such a charge in the same circumstances.

Determining appropriate auxiliary aids. The type of auxiliary aid the public accommodation provides is dependent on which auxiliary aid is appropriate under the particular circumstances. Section 36.303(c)(1)(ii) codifies the Department's longstanding interpretation that the type of auxiliary aid or service necessary to ensure effective communication will vary in accordance with the method of communication used by the individual; the nature, length, and complexity of the communication involved; and the context in which the communication is taking place. As the Department explained in the NPRM, this provision lists factors the public accommodation should consider in determining which type of auxiliary aids and services are necessary. For example, an individual with a disability who is deaf or hard of hearing

may need a qualified interpreter to discuss with hospital personnel a diagnosis, procedures, tests, treatment options, surgery, or prescribed medication (*e.g.,* dosage, side effects, drug interactions, etc.). In comparison, an individual who is deaf or hard of hearing who purchases an item in the hospital gift shop may need only an exchange of written notes to achieve effective communication.

The language in the first sentence of § 36.303(c)(1)(ii) is derived from the Department's Technical Assistance Manual. *See* Department of Justice, Americans with Disabilities Act, *ADA Title III Technical Assistance Manual Covering Public Accommodations and Commercial Facilities*, III–4.3200, available at *http://www.ada.gov/taman3.html*. There were few comments regarding inclusion of this policy in the regulation itself, and those received were positive.

Many advocacy groups, particularly those representing blind individuals and those with low vision, urged the Department to add language in the final rule requiring the provision of accessible material in a manner that is timely, accurate, and private. This, they argued, would be especially important with regard to billing information, other time-sensitive material, or confidential information. The Department has added a provision in § 36.303(c)(1)(ii) stating that in ''order to be effective, auxiliary aids and services must be provided in accessible formats, in a timely manner, and in such a way so as to protect the privacy and independence of the individual with a disability.''

The second sentence of § 36.303(c)(1)(ii) states that ''[a] public accommodation should consult with individuals with disabilities whenever possible to determine what type of auxiliary aid is needed to ensure effective communication, but the ultimate decision as to what measures to take rests with the public accommodation, provided that the method chosen results in effective communication.'' Many commenters urged the Department to amend this provision to require public accommodations to give primary consideration to the expressed choice of an individual with a disability. However, as the Department explained when it initially promulgated the 1991 title III regulation, the Department believes that Congress did not intend under title III to impose upon a public accommodation the requirement that it give primary consideration to the request of the individual with a disability. *See* 28 CFR part 36, app. B at 726 (2009). The legislative history does, however, demonstrate congressional intent to strongly encourage consulting with persons with disabilities. *Id.* As the Department explained in the 1991 preamble, ''the House Education and Labor Committee stated that it 'expects' that 'public accommodation(s) will consult with the individual with a disability before providing a particular auxiliary aid or service.' (Education and Labor report at 107).'' *Id.*

The commenters who urged that primary consideration be given to the individual with a disability noted, for example, that a public accommodation would not provide effective communication by using written notes where the individual requiring an auxiliary aid is in severe pain, or by providing a qualified ASL interpreter when an individual needs an oral interpreter instead. Both examples illustrate the importance of consulting with the individual with a disability in order to ensure that the communication provided is effective. When a public accommodation ignores the communication needs of the individual requiring an auxiliary aid or service, it does so at its peril, for if the communication provided is not effective, the public accommodation will have violated title III of the ADA.

Consequently, the regulation strongly encourages the public accommodation to engage in a dialogue with the individual with a disability to determine what auxiliary aids and services are appropriate under the circumstances. This dialogue should include a communication assessment of the individual with a disability initially, regularly, and as needed, because the auxiliary aids and services necessary to provide effective communication to the individual may fluctuate. For example, a deaf

individual may go to a private community health center with what is at first believed to be a minor medical emergency, such as a sore knee, and the individual with a disability and the community health center both may believe that exchanging written notes will be effective; however, during that individual's visit, it may be determined that the individual is, in fact, suffering from an anterior cruciate ligament tear and must have surgery to repair the torn ligament. As the situation develops and the diagnosis and recommended course of action evolve into surgery, an interpreter likely will be necessary. The community health center has a continuing obligation to assess the auxiliary aids and services it is providing, and should consult with individuals with disabilities on a continuing basis to assess what measures are required to ensure effective communication.

Similarly, the Department strongly encourages public accommodations to keep individuals with disabilities apprised of the status of the expected arrival of an interpreter or the delivery of other requested or anticipated auxiliary aids and services. Also, when the public accommodation decides not to provide the auxiliary aids and services requested by an individual with a disability, the public accommodation should provide that individual with the reason for its decision.

Family members and friends as interpreters. Section 36.303(c)(2), which was proposed in the NPRM, has been included in the final rule to make clear that a public accommodation shall not require an individual with a disability to bring another individual to interpret for him or her. The Department has added this regulatory requirement to emphasize that when a public accommodation is interacting with a person with a disability, it is the public accommodation's responsibility to provide an interpreter to ensure effective communication. It is not appropriate to require the person with a disability to bring another individual to provide such services. any commenters supported inclusion of this language in the new rule. A representative from a cruise line association opined, however, that if a guest chose to cruise without an interpreter or companion, the ship would not be compelled to provide an interpreter for the medical facility. On the contrary, when an individual with a disability goes on a cruise, the cruise ship has an obligation to provide effective communication, including, if necessary, a qualified interpreter as defined in the rule.

Some representatives of pediatricians objected to this provision, stating that parents of children with disabilities often know best how to interpret their children's needs and health status and relay that information to the child's physician, and to remove that parent, or add a stranger into the examining room, may frighten children. These commenters requested clarification in the regulation that public accommodations should permit parents, guardians, or caregivers of children with disabilities to accompany them in medical settings to ensure effective communication. The regulation does not prohibit parents, guardians, or caregivers from being present or providing effective communication for children. Rather, it prohibits medical professionals (and other public accommodations) from requiring or forcing individuals with disabilities to bring other individuals with them to facilitate communication so that the public accommodation will not have to provide appropriate auxiliary aids and services. The public accommodation cannot avoid its obligation to provide an interpreter except under the circumstances described in § 36.303(c)(3)–(4).

A State medical association also objected to this provision, opining that medical providers should have the authority to ask patients to bring someone with them to provide interpreting services if the medical provider determines that such a practice would result in effective communication and that patient privacy and confidentiality would be maintained. While the public accommodation has the obligation to determine what type of auxiliary aids and services are necessary to ensure effective communication, it cannot unilaterally determine whether the patient's privacy and confidentiality

would be maintained.

Section 36.303(c)(3) of the final rule codifies the Department's position that there are certain limited instances when a public accommodation may rely on an accompanying adult to interpret or facilitate communication: (1) In an emergency involving an imminent threat to the safety or welfare of an individual or the public; or (2) f the individual with a disability specifically requests it, the accompanying adult agrees to provide the assistance, and reliance on that adult for this assistance is appropriate under the circumstances. In such instances, the public accommodation should first offer to provide appropriate auxiliary aids and services free of charge.

Commenters requested that the Department make clear that the public accommodation cannot request, rely on, or coerce an accompanying adult to provide effective communication for an individual with a disability, and that only a voluntary offer of assistance is acceptable. The Department states unequivocally that consent of, and for, the accompanying adult to facilitate communication must be provided freely and voluntarily both by the individual with a disability and the accompanying adult— absent an emergency involving an imminent threat to the safety or welfare of an individual or the public. The public accommodation cannot coerce or attempt to persuade another adult to provide effective communication for the individual with a disability.

Several commenters asked that the Department make clear that children are not to be used to provide effective communication for family members and friends and that it is the responsibility of the public accommodation to provide effective communication, stating that interpreters often are needed in settings where it would not be appropriate for children to be interpreting, such as those involving medical issues, domestic violence, or other situations involving the exchange of confidential or adult-related material. Children often are hesitant to decline requests to provide communication services, which puts them in a very difficult position vis-a-vis family members and friends. The Department agrees. It is the Department's position that a public accommodation shall not rely on a minor child to facilitate communication with a family member, friend, or other individual except in an emergency involving an imminent threat to the safety or welfare of an individual or the public where no interpreter is available. Accordingly, the Department has revised the rule to state that ''[a] public accommodation shall not rely on a minor child to interpret or facilitate communication, except in an emergency involving an imminent threat to the safety or welfare of an individual or the public where there is no interpreter available.'' § 36.303(c)(4). Sections 36.303(c)(3) and (c)(4) have no application in circumstances where an interpreter would not otherwise be required in order to provide effective communication (*e.g.*, in simple transactions such as purchasing movie tickets at a theater).

The Department stresses that privacy and confidentiality must be maintained but notes that covered entities, such as hospitals, that are subject to the Privacy Rules, 45 CFR parts 160 and 164, of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), Public Law 104–191, are permitted to disclose to a patient's relative, close friend, or any other person identified by the patient (such as an interpreter) relevant patient information if the patient agrees to such disclosures. *See* 45 CFR parts 160 and 164. The agreement need not be in writing. Covered entities should consult the HIPAA Privacy Rules regarding other ways disclosures may be made to such persons.

With regard to emergency situations, proposed § 36.303(c)(3) permitted reliance on an individual accompanying an individual with a disability to interpret or facilitate communication in an emergency involving a threat to the safety or welfare of an individual or the public. Commenters requested that the Department make clear that often a public accommodation can obtain appropriate auxiliary aids and services in advance of an emergency, particularly in anticipated emergencies, such as

predicted dangerous weather, or in certain medical situations, such as pending childbirth, by making necessary pre-arrangements. These commenters did not want public accommodations to be relieved of their responsibilities to provide effective communication in emergency situations noting that the need for effective communication in emergencies is heightened. For the same reason, several commenters requested a separate rule that requires public accommodations to provide timely and effective communication in the event of an emergency.

One group of commenters asked that the Department narrow the regulation permitting reliance on a companion to interpret or facilitate communication in emergency situations so that it is not available to entities with responsibilities for emergency preparedness and response. Some commenters noted that certain exigent circumstances, such as those that exist during and, perhaps, immediately after a major hurricane, temporarily may excuse public accommodations of their responsibilities to provide effective communication. However, they asked that the Department clarify that these obligations are ongoing, and that as soon as such situations begin to abate or become stabilized, the public accommodation must provide effective communication.

The Department recognizes the need for effective communication is critical in emergency situations. After due consideration of all of these concerns raised by commenters, the Department has revised § 36.303(c) to narrow the exception-permitting reliance on individuals accompanying the individual with a disability during an emergency to make it clear that it applies only to emergencies involving an ''imminent threat to the safety or welfare of an individual or the public * * *.'' § 36.303(c)(3)–(4). The Department wishes to emphasize, however, that application of this exception is narrowly tailored to emergencies involving an imminent threat to the safety or welfare of individuals or the public. Arguably, all visits to an emergency room are by definition emergencies. Likewise, an argument can be made that most situations to which emergency workers respond involve, in one way or another, a threat to the safety or welfare of an individual or the public. The imminent threat exception in § 36.303(c)(3)– (4) is not intended to apply to typical and foreseeable emergency situations that are part of the normal operations of these institutions. As such, a public accommodation may rely on an accompanying individual to interpret or facilitate communication under the § 36.303(c)(3)–(4) imminent threat exception only where there is a true emergency, *i.e.,* where any delay in providing immediate services to the individual could have life-altering or life-ending consequences.

Telecommunications. In addition to the changes discussed in § 36.303(b) regarding telecommunications, telephones, and text telephones, the Department has adopted provisions in § 36.303(d) of the final rule (which also were included in the NPRM) requiring that public accommodations must not disconnect or refuse to take calls from FCC-approved telecommunications relay systems, including Internet-based relay systems. Commenters from some State agencies, many advocacy organizations, and individuals strongly urged the Department to mandate such action because of the high proportion of TTY calls and relay service calls to title III entities that are not completed because of phone systems or employees not taking the calls. This refusal presents a significant obstacle for persons using TTYs who do business with public accommodations and denies persons with disabilities telephone access for business that typically is handled over the telephone.

Section 36.303(d)(1)(ii) of the NPRM added public telephones equipped with volume control mechanisms and hearing aid compatible telephones to the examples of types of telephone equipment to be provided. Commenters from the disability community and from telecommunications relay service providers argued that requirements for these particular features on telephones are obsolete not only because the deaf and hard of

hearing community uses video technology more frequently than other types of telecommunication, but also because all public coin phones have been hearing-aid compatible since 1983, pursuant to the Telecommunications for the Disabled Act of 1982, 47 U.S.C. 610. The Hearing Aid Compatibility Act of 1988, 47 U.S.C. 610, extended this requirement to all wireline telephones imported into or manufactured in the United States since 1989. In 1997, the FCC further required that all such phones also be equipped with volume control. *See* 47 CFR 68.6. Given these existing statutory obligations, the proposed language is unnecessary. Accordingly, the Department has deleted that language from the final rule.

The Department understands that there are many new devices and advances in technology that should be included in the definition of available auxiliary aids and is including many of the telecommunications devices and some new technology. While much of this technology is not expensive and should be available to most title III entities, there may be legitimate reasons why in a particular situation some of these new and developing auxiliary aids may not be available, may be prohibitively costly (thus supporting an undue burden defense), or may otherwise not be suitable given other circumstances related to the particular terrain, situation, or functionality in specialized areas where security, among other things, may be a factor limiting the appropriateness of the use of a particular technology or device. The Department recognizes that the available new technology may provide more effective communication than existing technology and that providing effective communication often will include use of new technology and video relay services, as well as interpreters. However, the Department has not mandated that title III entities make all technology or services available upon demand in all situations. When a public accommodation provides the opportunity to make outgoing phone calls on more than an incidental-convenience basis, it shall make available accessible public telephones, TTYs, or other telecommunications products and systems for use by an individual who is deaf or hard of hearing, or has a speech impairment.

Video remote interpreting (VRI) services. In § 36.303(f) of the NPRM, the Department proposed the inclusion of four performance standards for VRI (which the NPRM termed video interpreting services (VIS)), for effective communication: (1) High-quality, clear, real-time, full-motion video, and audio over a dedicated high-speed Internet connection; (2) a clear, sufficiently large, and sharply delineated picture of the participants' heads, arms, hands, and fingers, regardless of their body position; (3) clear transmission of voices; and (4) persons who are trained to set up and operate the VIS quickly and efficiently.

Commenters generally approved of these proposed performance standards, but recommended that some additional standards be included in the final rule. For persons who are deaf with limited vision, commenters requested that the Department include an explicit requirement that interpreters wear high-contrast clothing with no patterns that might distract from their hands as they are interpreting, so that a person with limited vision could still see the signs made by the interpreter. While the Department reiterates the importance of such practices in the delivery of effective VRI as well as in-person interpreting, the Department declines to adopt such performance standards as part of this rule. In general, professional interpreters already follow such practices, as the Code of Professional Conduct for interpreters the Deaf and the National Association of the Deaf incorporates attire considerations into their standards of professionalism and conduct. Moreover, as a result of this code, many VRI agencies have adopted detailed dress standards that interpreters hired by the agency must follow. Commenters also urged explicit requirement of a clear image of the face and eyes of the interpreter and others. Because the face includes the eyes, the Department has amended § 36.303(f)(2) of the final rule to include a requirement that the interpreter's face be displayed. Other

commenters requested requirement of a wide-bandwidth video connection for the VRI system, and the Department has included this requirement in § 36.303(f)(1) of the final rule.

ATMs. The 2010 Standards set out detailed requirements for ATMs, including communication-related requirements to make ATMs usable by individuals who are blind or have low vision. In the NPRM, the Department discussed the application of a safe harbor to the communication-related elements of ATMs. The NPRM explained that the Department considers the communication-related elements of ATMs to be auxiliary aids and services, to which the safe harbor for elements built in compliance with the 1991 standards does not apply.

The Department received several comments regarding this issue. Several commenters representing banks objected to the exclusion of communication-related aspects of ATMs from the safe harbor provision. They explained that the useful life of ATMs—on average 10 years—was longer than the Department noted; thus, without the safe harbor, banks would be forced to retrofit many ATMs in order to comply with the proposed regulation. Such retrofitting, they noted, would be costly to the industry. A few representatives of the disability community commented that communication-related aspects of ATMs should be excluded from the safe harbor.

The Department consistently has taken the position that the communication-related elements of ATMs are auxiliary aids and services, rather than structural elements. *See* 28 CFR part 36, app. B at 728 (2009). Thus, the safe harbor provision does not apply to these elements. The Department believes that the limitations on the effective communication requirements, which provide that a covered entity does not have to take measures that would result in a fundamental alteration of its program or would cause undue burdens, provide adequate protection to covered entities that operate ATMs.

Captioning at sporting venues. In § 36.303(g) of the NPRM, the Department proposed that sports stadiums that have a capacity of 25,000 or more shall provide captioning for safety and emergency information on scoreboards and video monitors. In addition, the Department posed four questions about captioning of information, especially safety and emergency information announcements, provided over public address (PA) systems. The Department received many detailed and divergent responses to each of the four questions and the proposed regulatory text. Because comments submitted on the Department's title II and title III proposals were intertwined, because of the similarity of issues involved for title II entities and title III entities, and in recognition of the fact that many large sports stadiums are covered by both title II and title III as joint operations of State or local government and one or more public accommodations, the Department presents here a single consolidated review and summary of the issues raised in comments.

The Department asked whether requiring captioning of safety and emergency information made over the public address system in stadiums seating fewer than 25,000 would create an undue burden for smaller entities, and whether it would be feasible for small stadiums to provide such captioning, or whether a larger threshold, such as sports stadiums with a capacity of 50,000 or more, would be appropriate.

There was a consensus among the commenters, including disability advocates as well as venue owners and stadium designers and operators, that using the stadium size or seating capacity should not be the exclusive deciding factor for any obligation to provide captioning for safety and emergency information broadcast over the PA system. Most disability advocacy organizations and individuals with disabilities complained that using size or seating capacity as a threshold for captioning safety and emergency information would undermine the ''undue burden'' defense found in both titles II and III. Many commenters provided examples of facilities such as professional hockey

arenas that seat less than 25,000 fans but that, commenters argued, should be able to provide real-time captioning. Other commenters suggested that some high school or college stadiums, for example, may hold 25,000 fans or more and yet lack the resources to provide real-time captioning. Many commenters noted that real-time captioning would require use of trained stenographers, and that most high school and college sports facilities rely upon volunteers to operate scoreboards and PA systems and they would not be qualified stenographers, especially in case of an emergency. One national association noted that the typical stenographer expense for a professional football game in Washington, DC, is about $550 per game. Similarly, one trade association representing venues estimated that the cost for a professional stenographer at a sporting event runs between $500 and $1,000 per game or event, the cost of which, they argued, would be unduly burdensome in many cases. Some commenters posited that schools that do not sell tickets to athletic events would be challenged to meet such expenses, in contrast to major college athletic programs and professional sports teams, which would be less likely to prevail using an ''undue burden'' defense.

Some venue owners and operators and other covered entities also argued that stadium size should not be the key consideration for whether scoreboard captioning will be required. Instead, these entities suggested that equipment already installed in the stadium, including necessary electrical equipment and backup power supply, should be the determining factor for whether captioning is mandated. Many commenters argued that the requirement to provide captioning should apply only to stadiums with scoreboards that meet the National Fire Protection Association (NFPA) National Fire Alarm Code. Commenters reported that NFPA 72 requires at least two independent and reliable power supplies for emergency information systems, including one source that is a generator or a battery sufficient to run the system in the event the primary power fails. Alternatively, some stadium designers and title II entities commented that the requirement should arise when the facility has at least one elevator providing firefighter emergency operation, along with approval of authorities with responsibility for fire safety. An organization concerned with fire safety codes commented that the Department lacks the expertise to regulate on this topic. Other commenters argued for flexibility in the requirements for providing captioning and contended that any requirement should apply only to stadiums constructed after the effective date of the regulation.

In the NPRM, the Department also asked whether the rule should address the specific means of captioning equipment, whether captioning should be provided through any effective means (*e.g.,* scoreboards, line boards, handheld devices, or other means), or whether some means, such as handheld devices, should be eliminated as options. This question elicited many comments from advocates for persons with disabilities as well as from covered entities. Advocacy organizations and individuals with experience using handheld devices argued that such devices do not provide effective communication. These commenters noted that information is often delayed in the transmission to such devices, making them hard to use when following action on the playing field or in the event of an emergency when the crowd is already reacting to aural information provided over the PA system well before it is received on the handheld device.

Several venue owners and operators and others commented that handheld technology offers advantages of flexibility and portability so that it may be used successfully regardless of where in the facility the user is located, even when not in the line of sight of a scoreboard or other captioning system. Still other commenters urged the Department not to regulate in such a way as to limit innovation and use of such technology now and in the future. Cost considerations were included in comments from some stadium designers and venue owners and operators who reported that

the cost of providing handheld systems is far less than the cost of providing real-time captioning on scoreboards, especially in facilities that do not currently have the capacity to provide real-time captions on existing equipment. Others noted that handheld technology is not covered by fire and safety model codes, including the NFPA, and thus would be more easily adapted into existing facilities if captioning were required by the Department.

The Department also asked about requiring open captioning of all public address announcements, rather than limiting the captioning requirement to safety and emergency information. A variety of advocates and persons with disabilities argued that all information broadcast over a PA system should be captioned in real time at all facilities in order to provide effective communication, and that a requirement only to provide emergency and safety information would not be sufficient. A few organizations representing persons with disabilities commented that installation of new systems should not be required, but that all systems within existing facilities that are capable of providing captioning should provide captioning of information to the maximum extent possible. Several organizations for persons with disabilities commented that all facilities should include in their safety planning measures a requirement that all aurally provided information for patrons with communication disabilities be captioned. Some advocates suggested that demand for captions will only increase as the number of deaf and hard of hearing persons grows with the aging of the general population and with increasing numbers of veterans returning from war with disabilities. Multiple commenters noted that the captioning would benefit others as well as those with communication disabilities.

By contrast, venue owners and operators and others commented that the action on the sports field is self-explanatory and does not require captioning. These commenters objected to an explicit requirement to provide real-time captioning for all information broadcast on the PA system at a sporting event. Other commenters objected to requiring captioning even for emergency and safety information over the scoreboard rather than through some other means. By contrast, venue operators, State government agencies, and some model code groups, including the NFPA, commented that emergency and safety information must be provided in an accessible format and that public safety is a paramount concern. Other commenters argued that the best method to deliver safety and emergency information would be television monitors showing local TV broadcasts with captions already mandated by the FCC. Some commenters posited that the most reliable information about a major emergency would be provided on the television news broadcasts. They argued that television monitors may be located throughout the facility, improving line of sight for patrons, some of whom might not be able to see the scoreboard from their seats or elsewhere in the facility. Some stadium designers, venue operators, and model code groups pointed out that video monitors are not regulated by the NFPA or other agencies, so that such monitors could be more easily provided. Video monitors may receive transmissions from within the facility and could provide real-time captions if there is the necessary software and equipment to feed the captioning signal to a closed video network within the facility. Several commenters suggested that using monitors would be preferable to requiring captions on the scoreboard if the regulation mandates real-time captioning. Some venue owners and operators argued that retrofitting existing stadiums with new systems could easily cost in the hundreds of thousands of dollars per scoreboard or system. Some stadium designers and others argued that captioning should be required only in stadiums built after the effective date of the regulation. For stadiums with existing systems that allow for real-time captioning, one commenter posited that dedicating the system exclusively to real-time captioning would lead to an annual loss of between two and three million

dollars per stadium in revenue from advertising currently running in that space.

After carefully considering the wide range of public comments on this issue, the Department has concluded that the final rule will not provide additional requirements for effective communication or emergency information provided at sports stadiums at this time. The 1991 title II and title III regulations and statutory requirements are not in any way affected by this decision. The decision to postpone rulemaking on this complex issue is based on a number of factors, including the multiple layers of existing regulations by various agencies and levels of government, and the wide array of information, requests, and recommendations related to developing technology offered by the public. The diversity of existing information and communication systems and other characteristics among sports stadiums also complicates the regulation of captioning. The Department has concluded that further consideration and review is prudent before it issues specific regulatory requirements.

Movie captioning. In the NPRM, the Department stated that options were being considered to require movie theater owners and operators to exhibit movies that are captioned for patrons who are deaf or hard of hearing. Captioning makes films accessible to individuals whose hearing is too limited to benefit from assistive listening devices. Both open and closed captioning are examples of auxiliary aids and services required under the Department's 1991 title III regulation. *See* 28 CFR 36.303(b)(1). Open captions are similar to subtitles in that the text is visible to everyone in the theater, while closed captioning displays the written text of the audio only to those individuals who request it.

In the NPRM, the Department also stated that options were being considered to require movie theater owners and operators to exhibit movies with video description,[3] a technology that enables individuals who are blind or have low vision to enjoy movies by providing a spoken interpretation of key visual elements of a movie, such as actions, settings, facial expressions, costumes, and scene changes. The descriptions are narrated and recorded onto an audiotape or disk that can be synchronized with the film as it is projected. An audio recording is an example of an auxiliary aid and service required under the Department's 1991 title III regulation. *See* 28 CFR 36.303(b)(2).

The NPRM stated that technological advances since the early 1990s have made open and closed captioning and video description for movies more readily available and effective and noted that the Department was considering options to require captioning and video description for movies exhibited by public accommodations. The NPRM also noted that the Department is aware that the movie industry is transitioning, in whole or in part, to movies in digital format and that movie theater owners and operators are beginning to purchase digital projectors. The Department noted in the NPRM that movie theater owners and operators with digital projectors may have available to them different capabilities than those without digital projectors. The Department sought comment regarding whether and how to require captioning and video description while the film industry makes this transition. In addition, the NPRM stated the Department's concern about the potential cost to exhibit captioned movies, noting that cost may vary depending upon whether open or closed captioning is used and whether or not digital projectors are used, and stated that the cost of captioning must stay within the parameters of the undue burden requirement in 28 CFR 36.303(a). The Department further noted that it understands the cost of video description equipment to be less than that for closed captioning. The Department then stated that it was considering the possibility

[3] In the NPRM, the Department referred to this technology as ''narrative description.'' 73 FR 34508, 34531 (June 17, 2008). Several commenters informed the Department that the more accurate and commonly understood term is ''videodescription,'' even though the subject is movies, not video, and so the Department decided to employ that term.

of requiring public accommodations to exhibit all new movies in captioned format and with video description at every showing. The NPRM stated that the Department would not specify the types of captioning required, leaving such decisions to the discretion of the movie theater owners and operators.

In the NPRM, the Department requested public comment as to whether public accommodations should be required to exhibit all new movies in captioned format at every showing, whether it would be more appropriate to require captioning less frequently, and, if so, with what frequency captioning should be provided. The Department also inquired as to whether the requirement for captioning should be tied to the conversion of movies from film to the use of a digital format. The Department also asked for public comment regarding the exhibition of all new movies with narrative description, whether it would it be more appropriate to require narrative description less frequently, and whether narrative description of movies should be tied to the use of a digital format.

Representatives from the movie industry, a commenter from a non-profit organization, and a disability rights advocacy group provided information in their comments on the status of captioning and video description technology today as well as an update on the transition to digital cinema in the industry. A representative of major movie producers and distributors commented that traditionally open captions were created by ''burning'' the captions onto a special print of a selected movie, which the studios would make available to the exhibitors (movie theater owners and operators). Releases with open captions typically would be presented at special screenings. More recently, according to this commenter, alternative methods have been developed for presenting movies with open captions, but their common feature is that the captions are visible to all theater-goers. Closed captioning is an innovation in technology that was first made available in a feature film presentation in late 1997. Closed captioning technology currently in use allows viewers to see captions using a clear panel that is mounted in front of the viewer's seat.[4] According to commenters from the industry, the panel reflects captions that are shown in reverse on an LED display in the back of the theater, with captions appearing on or near the movie image. Moviegoers may use this technology at any showing at a theater that has been equipped with the technology, so that the theater does not have to arrange limited special screenings.

Video description technology also has existed since 1997, according to a commenter who works with the captioning and video description industry. According to a movie industry commenter, video description requires the creation of a separate script written by specially trained writers called ''describers.'' As the commenter explained, a describer initially listens to the movie without watching it in order to approximate the experience of an audience member who is blind or has low vision. Using software to map out the pauses in the soundtrack, the describer writes a description in the space available. After an initial script is written for video description, it is edited and checked for timing, continuity, accuracy, and a natural flow. A narrator then records the new script to match the corresponding movie. This same industry commenter said that video description currently is provided in theaters through screens equipped with the same type of technology as that used for closed captioning. As commenters explained, technologies in use today deliver video descriptions via infrared or FM listening systems to headsets worn by individuals who are blind or

[4] Other closed captioning technologies for movies that have been developed but are not in use at this time include hand-held displays similar to a PDA (personal digital assistant); eyeglasses fitted with a prism over one lens; and projected bitmap captions. The PDA and eyeglass systems use a wireless transmitter to send the captions to the display device.

have low vision.

According to the commenter representing major movie producers and distributors, the percentage of motion pictures produced with closed captioning by its member studios had grown to 88 percent of total releases by 2007; the percentage of motion pictures produced with open captioning by its member studios had grown to 78 percent of total releases by 2007; and the percentage of motion pictures provided with video description has ranged consistently between 50 percent and 60 percent of total releases. It is the movie producers and distributors, not the movie theater owners and operators, who determine what to caption and describe, the type of captioning to use, and the content of the captions and video description script. These same producers and distributors also assume the costs of captioning and describing movies. Movie theater owners and operators simply purchase the equipment to display the captions and play the video description in their auditoria.

The transition to digital cinema, considered by the industry to be one of the most profound advancements in motion picture production and technology of the last 100 years, will provide numerous advantages both for the industry and the audience. According to one commenter, currently there are sufficient standards and interim solutions to support captioning and video description now in digital format. Additionally, movie studios are supporting those efforts by providing accessibility tracks (captioning and video description) in many digital cinema content packages. Moreover, a group of industry commenters composed in pertinent part of members of the motion picture industry, the central standards organizations for this industry, and key digital equipment vendors, noted that they are participating in a joint venture to establish the remaining accessibility specifications and standards for access audio tracks. Access audio tracks are supplemental sound audio tracks for the hard of hearing and narrative audio tracks for individuals who have vision disabilities. According to a commenter and to industry documents, these standards were expected to be in place by spring 2009. According to a commenter, at that time, all of the major digital cinema equipment vendors were expected to have support for a variety of closed caption display and video description products. This same commenter stated that these technologies will be supported by the studios that produce and distribute feature films, by the theaters that show these films to the public, and by the full complement of equipment in the production, distribution, and display chain.

The initial investment for movie theater owners and operators to convert to digital cinema is expensive. One industry commenter estimated that converting theaters to digital projection costs between $70,000 and $100,000 per screen and that maintenance costs for digital projectors are estimated to run between $5,000 and $10,000 a year—approximately five times as expensive as the maintenance costs for film projectors. According to this same commenter, while there has been progress in making the conversion, only approximately 5,000 screens out of 38,794 nationwide have been converted, and the cost to make the remaining conversions involves a total investment of several billion dollars. According to another commenter, predictions as to when more than half of all screens will have been converted to digital projection are 10 years or more, depending on the finances of the movie theater owners and operators, the state of the economy, and the incentives supporting conversion. That said, according to one commenter who represents movie theater owners and operators, the majority of screens in the United States were expected to enter into agreements by the end of 2008 to convert to digital cinema. Most importantly, however, according to a few commenters, the systems in place today for captioning and video description will not become obsolete once a theater has converted to digital cinema but still can be used by the movie theater owner and operator to exhibit captions and video

description. The only difference for a movie theater owner or operator will be the way the data is delivered to the captioning and video description equipment in place in an auditorium. Despite the current availability of movies that are captioned and provide video description, movie theater owners and operators rarely exhibit the captions or descriptions. According to several commenters, less than 1 percent of all movies being exhibited in theaters are shown with captions.

Individuals with disabilities, advocacy groups, the representative from a non-profit, and representatives of State governments, including 11 State attorneys general, overwhelmingly supported issuance of a regulation requiring movie theater owners and operators to exhibit captioned and video described movies at all showings unless doing so would result in an undue burden or fundamental alteration of the goods and services offered by the public accommodation. In addition, this same group of commenters urged that any such regulation should be made effective now, and should not be tied to the conversion to digital cinema by the movie theater owners and operators. In support of such arguments, these commenters stated that the technology exists now to display movies with captions and video descriptions, regardless of whether the movie is exhibited on film or using digital cinema. Moreover, since the technology in use for displaying captions and video descriptions on film will be compatible with digital projection systems, they argued, there is no need to postpone implementation of a captioning or video description regulation until the conversion to digital has been made. Furthermore, since the conversion to digital may take years, commenters urged the Department to issue a regulation requiring captioning and video description now, rather than several years from now.

Advocacy groups and the 11 State attorneys general also requested that any regulation include factors describing what constitutes effective captioning and video description. Recommendations included requiring that captioning be within the same line of sight to the screen as the movie so that individuals who are deaf or hard of hearing can watch the movie and read the captions at the same time; that the captioning be accessible from each seat; that the captions be of sufficient size and contrast to the background so as to be readable easily; and that the recent recommendations of the Telecommunications and Electronics and Information Technology Advisory Committee Report to the Access Board that captions be ''timely, accurate, complete, and efficient'' [5] also be included.

The State attorneys general supported the Department's statement in the NPRM that the Department did not anticipate specifying which type of captioning to provide or what type of technology to use to provide video description, but would instead leave that to the discretion of the movie theater owners and operators. These State attorneys general opined that such discretion in the selection of the type of technology was consistent with the statutory and regulatory scheme of the ADA and would permit any new regulation to keep pace with future advancements in captioning and video description technology. These same commenters stated that such discretion may result in a mixed use of both closed captioning and open captioning, affording more choices both for the movie theater owners and operators and for individuals who are deaf or hard of hearing.

The representatives from the movie theater industry strongly urged the Department against issuing a regulation requiring captioning or video description. These commenters argued that the legislative history of the ADA expressly precluded regulating in the area of captioning. (These same commenters were silent with regard to video de-

[5] *Refreshed Accessibility Standards and Guidelines in Telecommunications and Electronic and Information Technology* (April 2008), available at *http://www.access-board.gov/sec508/refresh/report/* (last visited June 24, 2010).

scription on this issue.) The industry commenters also argued that to require movie theater owners and operators to exhibit captioned and video described movies would constitute a fundamental alteration in the nature of the goods and services offered by the movie theater owners and operators. In addition, some industry commenters argued that any such regulation by the Department would be inconsistent with the Access Board's guidelines. Also, these commenters noted the progress that has been made in the industry in making cinema more accessible even though there is no mandate to caption or describe movies, and they questioned whether any mandate is necessary. Finally, all the industry commenters argued that to require captioning or video description in 100 percent of movie theater screens for all showings would constitute an undue burden.

The comments have provided the Department with significant information on the state of the movie industry with regard to the availability of captioning and video description, the status of closed captioning technology, and the status of the transition to digital cinema. The Department also has given due consideration to the comments it has received from individuals, advocacy groups, governmental entities, and representatives of the movie industry. Recently, the United States Court of Appeals for the Ninth Circuit held that the ADA requires a chain of movie theaters to exhibit movies with closed captioning and video description unless the theaters can show that to do so would amount to a fundamental alteration or undue burden. *Arizona ex rel. Goddard v. Harkins Amusement Enterprises, Inc.*, 603 F.3d 666 (9th Cir. 2010). However, rather than issue specific regulatory text at this time, the Department has determined that it should obtain additional information regarding issues raised by commenters that were not contemplated at the time of the 2008 NPRM, supplemental technical information, and updated information regarding the current and future status of the conversion to digital cinema by movie theater owners and operators. To this end, the Department is planning to engage in rulemaking relating specifically to movie captioning under the ADA in the near future.

Section 36.304 Removal of Barriers

With the adoption of the 2010 Standards, an important issue that the Department must address is the effect that the new (referred to as ''supplemental'') and revised ADA Standards will have on the continuing obligation of public accommodations to remove architectural, transportation, and communication barriers in existing facilities to the extent that it is readily achievable to do so. *See* 42 U.S.C. 12182(b)(2)(A)(iv). This issue was not addressed in the 2004 ADAAG because it was outside the scope of the Access Board's statutory authority under the ADA and section 502 of the Rehabilitation Act of 1973. *See* 29 U.S.C. 792(b)(3)(A)–(B) (authorizing the Access Board to establish and maintain minimum guidelines for the standards issued pursuant to the Architectural Barriers Act of 1968 and titles II and III of the ADA). Responsibility for implementing title III's requirement that public accommodations eliminate barriers in existing facilities where such removal is readily achievable rests solely with the Department. The term ''existing facility'' is defined in § 36.104 of the final rule. This definition is discussed in more detail above. *See* Appendix A discussion of definitions (§ 36.104).

The requirements for barrier removal by public accommodations are established in the Department's title III regulation. 28 CFR 36.304. Under this regulation, the Department used the 1991 Standards as a guide to identify what constitutes an architectural barrier, as well as the specifications that covered entities must follow in making architectural changes to remove the barrier to the extent that such removal is readily achievable. 28 CFR 36.304(d); 28 CFR part 36, app. A (2009). With adoption of the final rule, public accommodations will now be guided by the 2010 Standards,

defined in § 36.104 as the 2004 ADAAG and the requirements contained in subpart D of 28 CFR part 36.

The 2010 Standards include technical and scoping specifications for a number of elements that were not addressed specifically in the 1991 Standards; these new requirements were identified as ''supplemental requirements'' in the NPRM. The 2010 Standards also include revisions to technical or scoping specifications for certain elements that were addressed in the 1991 Standards, *i.e.,* elements for which there already were technical and scoping specifications. Requirements for which there are revised technical or scoping specifications in the 2010 Standards are referred to in the NPRM as ''incremental changes.''

The Department expressed concern that requiring barrier removal for incremental changes might place unnecessary cost burdens on businesses that already had removed barriers in existing facilities in compliance with the 1991 Standards. With this rulemaking, the Department sought to strike an appropriate balance between ensuring that individuals with disabilities are provided access to facilities and mitigating potential financial burdens from barrier removal on existing places of public accommodation that satisfied their obligations under the 1991 Standards.

In the NPRM, the Department proposed several potential additions to § 36.304(d) that might reduce such financial burdens. First, the Department proposed a safe harbor for elements in existing facilities that were compliant with the 1991 Standards. Under this approach, an element that is not altered after the effective date of the 2010 Standards and that complies with the scoping and technical requirements for that element in the 1991 Standards would not be required to undergo modification to comply with the 2010 Standards to satisfy the ADA's barrier removal obligations. The public accommodation would thus be deemed to have met its barrier removal obligation with respect to that element.

The Department received many comments on this issue during the 60-day public comment period. After consideration of all relevant information presented on the issue, it is the Department's view that this element-by-element safe harbor provision should be retained in the final rule. This issue is discussed further below.

Second, the NPRM proposed several exceptions and exemptions from certain supplemental requirements to mitigate the barrier removal obligations of existing play areas and recreation facilities under the 2004 ADAAG. These proposals elicited many comments from both the business and disability communities. After consideration of all relevant information presented on the issue, it is the Department's view that these exceptions and exemptions should not be retained in the final rule. The specific proposals and comments, and the Department's conclusions, are discussed below.

Third, the NPRM proposed a new safe harbor approach to readily achievable barrier removal as applied to qualified small businesses. This proposed small business safe harbor was based on suggestions from small business advocacy groups that requested clearer guidance on the barrier removal obligations for small businesses. According to these groups, the Department's traditional approach to barrier removal disproportionately affects small businesses. They argued that most small businesses owners neither are equipped to understand the ADA Standards nor can they afford the architects, consultants, and attorneys that might provide some level of assurance of compliance with the ADA. For these same reasons, these commenters contended, small business owners are vulnerable to litigation, particularly lawsuits arising under title III, and often are forced to settle because the ADA Standards' complexity makes inadvertent noncompliance likely, even when a small business owner is acting in good faith, or because the business cannot afford the costs of litigation.

To address these and similar concerns, the

NPRM proposed a level of barrier removal expenditures at which qualified small businesses would be deemed to have met their readily achievable barrier removal obligations for certain tax years. This safe harbor would have provided some protection from litigation because compliance could be assessed easily. Such a rule, the Department believed, also could further accessibility, because qualified small businesses would have an incentive to incorporate barrier removal into short- and long-term planning. The Department recognized that a qualified small business safe harbor would be a significant change to the Department's title III enforcement scheme. Accordingly, the Department sought comment on whether such an approach would further the aims underlying the statute's barrier removal provisions, and, if so, the appropriate parameters of the provision.

After consideration of the many comments received on this issue, the Department has decided not to include a qualified small business safe harbor in the final rule. This decision is discussed more fully below.

Element-by-element safe harbor for public accommodations. Public accommodations have a continuing obligation to remove certain architectural, communications, and transportation barriers in existing facilities to the extent readily achievable. 42 U.S.C. 12182(b)(2)(A)(iv). Because the Department uses the ADA Standards as a guide to identifying what constitutes an architectural barrier, the 2010 Standards, once they become effective, will provide a new reference point for assessing an entity's barrier removal obligations. The 2010 Standards introduce technical and scoping specifications for many elements that were not included in the 1991 Standards. Accordingly, public accommodations will have to consider these supplemental requirements when evaluating whether there are covered barriers in existing facilities, and, if so, remove them to the extent readily achievable. Also included in the 2010 Standards are revised technical and scoping requirements for elements that were addressed in the 1991 Standards. These incremental changes were made to address technological changes that have occurred since the promulgation of the 1991 Standards, to reflect additional study by the Access Board, and to harmonize ADAAG requirements with the model codes.

In the NPRM, the Department sought input on a safe harbor in proposed § 36.304(d)(2) intended to address concerns about the practical effects of the incremental changes on public accommodations' readily achievable barrier removal obligations. The proposed element-by-element safe harbor provided that in existing facilities elements that are, as of the effective date of the 2010 Standards, fully compliant with the applicable technical and scoping requirements in the 1991 Standards, need not be modified or retrofitted to meet the 2010 Standards, until and unless those elements are altered. The Department posited that it would be an inefficient use of resources to require covered entities that have complied with the 1991 Standards to retrofit already compliant elements when the change might only provide a minimal improvement in accessibility. In addition, the Department was concerned that covered entities would have a strong disincentive for voluntary compliance if every time the applicable standards were revised covered entities would be required once again to modify elements to keep pace with new requirements. The Department recognized that revisions to some elements might confer a significant benefit on some individuals with disabilities and because of the safe harbor these benefits would be unavailable until the facility undergoes alterations.

The Department received many comments on this issue from the business and disability communities. Business owners and operators, industry groups and trade associations, and business advocacy organizations strongly supported the element-by-element safe harbor. By contrast, disability advocacy organizations and individuals commenting on behalf of the disability community were opposed to this safe harbor with near una-

nimity.

Businesses and business groups agreed with the concerns outlined by the Department in the NPRM, and asserted that the element-by-element safe harbor is integral to ensuring continued good faith compliance efforts by covered entities. These commenters argued that the financial cost and business disruption resulting from retrofitting elements constructed or previously modified to comply with 1991 Standards would be detrimental to nearly all businesses and not readily achievable for most. They contended that it would be fundamentally unfair to place these entities in a position where, despite full compliance with the 1991 Standards, the entities would now, overnight, be vulnerable to barrier removal litigation. They further contended that public accommodations will have little incentive to undertake large barrier removal projects or incorporate barrier removal into long-term planning if there is no assurance that the actions taken and money spent for barrier removal would offer some protection from litigation. One commenter also pointed out that the proposed safe harbor would be consistent with practices under other Federal accessibility standards, including the Uniform Federal Accessibility Standards (UFAS) and the ADAAG.

Some business commenters urged the Department to expand the element-by-element safe harbor to include supplemental requirements. These commenters argued that imposing the 2010 Standards on existing facilities will provide a strong incentive for such facilities to eliminate some elements entirely, particularly where the element is not critical to the public accommodation's business or operations (*e.g.,* play areas in fast food restaurants) or the cost of retrofitting is significant. Some of these same commenters urged the Department to include within the safe harbor those elements not covered by the 1991 Standards, but which an entity had built in compliance with State or local accessibility laws. Other commenters requested safe harbor protection where a business had attempted barrier removal prior to the establishment of technical and scoping requirements for a particular element (*e.g*., play area equipment) if the business could show that the element now covered by the 2010 Standards was functionally accessible.

Other commenters noted ambiguity in the NPRM as to whether the element-by-element safe harbor applies only to elements that comply fully with the 1991 Standards, or also encompasses elements that comply with the 1991 Standards to the extent readily achievable. Some commenters proposed that the safe harbor should exist in perpetuity— that an element subject to a safe harbor at one point in time also should be afforded the same protection with respect to all future revisions to the ADA Standards (as with many building codes). These groups contended that allowing permanent compliance with the 1991 Standards will ensure readily accessible and usable facilities while also mitigating the need for expensive and time-consuming documentation of changes and maintenance.

A number of commenters inquired about the effect of the element-by-element safe harbor on elements that are not in strict compliance with the 1991 Standards, but conform to the terms of settlement agreements or consent decrees resulting from private litigation or Federal enforcement actions. These commenters noted that litigation or threatened litigation often has resulted in compromise among parties as to what is readily achievable. Business groups argued that facilities that have made modifications subject to those negotiated agreements should not be subject to the risk of further litigation as a result of the 2010 Standards.

Lastly, some business groups that supported the element-by-element safe harbor nevertheless contended that a better approach would be to separate barrier removal altogether from the 2010 Standards, such that the 2010 Standards would not be used to determine whether access to an existing facility is impeded by architectural barriers. These commenters argued that application of the 2010 Standards to barrier removal obligations is con-

trary to the ADA's directive that barrier removal is required only where ''easily accomplishable and able to be carried out without much difficulty or expense,'' 42 U.S.C. 12181(9).

Nearly all commenters from the disability community objected to the proposed element-by-element safe harbor. These commenters asserted that the adoption of this safe harbor would permit and sanction the retention of outdated access standards even in cases where retrofitting to the 2010 Standards would be readily achievable. They argued that title III's readily achievable defense is adequate to address businesses' cost concerns, and rejected the premise that requiring businesses to retrofit currently compliant elements would be an inefficient use of resources where readily achievable to do so. The proposed regulations, these commenters asserted, incorporate advances in technology, design, and construction, and reflect congressional and societal understanding that accessibility is not a static concept and that the ADA is a civil rights law intended to maximize accessibility. Additionally, these commenters noted that since the 2004 revision of the ADAAG will not be the last, setting a precedent of safe harbors for compliant elements will have the effect of preserving and protecting layers of increasingly outdated accessibility standards.

Many commenters objected to the Department's characterization of the requirements subject to the safe harbor as reflecting only incremental changes and asserted that many of these incremental changes will result in significantly enhanced accessibility at little cost. The requirement concerning side-reach ranges was highlighted as an example of such requirements. Commenters from the disability community argued that the revised maximum side-reach range (from 54 inches to 48 inches) will result in a substantial increase in accessibility for many persons with disabilities—particularly individuals of short stature, for whom the revised reach range represents the difference between independent access to many features and dependence—and that the revisions should be made where readily achievable to do so. Business commenters, on the other hand, contended that application of the safe harbor to this requirement is critical because retrofitting items, such as light switches and thermostats often requires work (*e.g.,* rewiring, patching, painting, and re-wallpapering), that would be extremely burdensome for entities to undertake. These commenters argued that such a burden is not justified where many of the affected entities already have retrofitted to meet the 1991 Standards.

Some commenters that were opposed to the element-by-element safe harbor proposed that an entity's past efforts to comply with the 1991 Standards might appropriately be a factor in the readily achievable analysis. Several commenters proposed a temporary 5- year safe harbor that would provide reassurance and stability to covered entities that have recently taken proactive steps for barrier removal, but would also avoid the problems of preserving access deficits in perpetuity and creating multiple standards as subsequent updates are adopted.

After consideration of all relevant information presented on this issue during the comment period, the Department has decided to retain the proposed element-by-element safe harbor. Title III's architectural barrier provisions place the most significant requirements of accessibility on new construction and alterations. The aim is to require businesses to make their facilities fully accessible at the time they are first constructing or altering those facilities, when burdens are less and many design elements will necessarily be in flux, and to impose a correspondingly lesser duty on businesses that are not changing their facilities. The Department believes that it would be consistent with this statutory structure not to change the requirements for design elements that were specifically addressed in our prior standards for those facilities that were built or altered in full compliance with those standards. The Department similarly believes it would be consistent with the statutory scheme not to change the requirements for design

elements that were specifically addressed in our prior standards for those existing facilities that came into full compliance with those standards. Accordingly, the final rule at § 36.304(d)(2)(i) provides that elements that have not been altered in existing facilities on or after March 15, 2012 and that comply with the corresponding technical and scoping specifications for those elements in the 1991 Standards are not required to be modified in order to comply with the requirements set forth in the 2010 Standards. The safe harbor adopted is consistent in principle with the proposed provision in the NPRM, and reflects the Department's determination that this approach furthers the statute's barrier removal provisions and promotes continued good-faith compliance by public accommodations.

The element-by-element safe harbor adopted in this final rule is a narrow one. The Department recognizes that this safe harbor will delay, in some cases, the increased accessibility that the incremental changes would provide and that for some individuals with disabilities the impact may be significant. This safe harbor, however, is not a blanket exemption for every element in existing facilities. Compliance with the 1991 Standards is determined on an element-by-element basis in each existing facility.

Section 36.304(d)(2)(ii)(A) provides that prior to the compliance date of the rule March 15, 2012, noncompliant elements that have not been altered are obligated to be modified to the extent readily achievable to comply with the requirements set forth in the 1991 Standards or the 2010 Standards. Section 36.304(d)(2)(ii)(B) provides that after the date the 2010 Standards take effect (18 months after publication of the rule), noncompliant elements that have not been altered must be modified to the extent readily achievable to comply with the requirements set forth in the 2010 Standards. Noncomplying newly constructed and altered elements may also be subject to the requirements of § 36.406(a)(5).

The Department has not expanded the scope of the element-by-element safe harbor beyond those elements subject to the incremental changes. The Department has added § 36.304(d)(2)(iii), explicitly clarifying that existing elements subject to supplemental requirements for which scoping and technical specifications are provided for the first time in the 2010 Standards (*e.g.,* play area requirements) are not covered by the safe harbor and, therefore, must be modified to comply with the 2010 Standards to the extent readily achievable. Section 36.304(d)(2)(iii) also identifies the elements in the 2010 Standards that are not eligible for the element-by-element safe harbor. The safe harbor also does not apply to the accessible routes not previously scoped in the 1991 standards, such as those required to connect the boundary of each area of sport activity, including soccer fields, basketball courts, baseball fields, running tracks, skating rinks, and areas surrounding a piece of gymnastic equipment. *See* Advisory note to section F206.2.2 of the 2010 Standards. The resource and fairness concerns underlying the element-by-element safe harbor are not implicated by barrier removal involving supplemental requirements. Public accommodations have not been subject previously to technical and scoping specifications for these supplemental requirements. Thus, with respect to supplemental requirements, the existing readily achievable standard best maximizes accessibility in the built environment without imposing unnecessary burdens on public accommodations.

The Department also has declined to expand the element-by-element safe harbor to cover existing elements subject to supplemental requirements that also may have been built in compliance with State or local accessibility laws. Measures taken to remove barriers under a Federal accessibility provision logically must be considered in regard to Federal standards, in this case the 2010 Standards. This approach is based on the Department's determination that reference to ADA Standards for barrier removal will promote certainty, safety, and good design while still permitting slight deviations through readily achievable alternative meth-

ods. The Department continues to believe that this approach provides an appropriate and workable framework for implementation of title III's barrier removal provisions. Because compliance with State or local accessibility codes is not a reliable indicator of effective access for purposes of the ADA Standards, the Department has decided not to include reliance on such codes as part of the safe harbor provision.

Only elements compliant with the 1991 Standards are eligible for the safe harbor. Thus, where a public accommodation attempted barrier removal but full compliance with the 1991 Standards was not readily achievable, the modified element does not fall within the scope of the safe harbor provision. A public accommodation at any point in time must remove barriers to the extent readily achievable. For existing elements, for which removal is not readily achievable at any given time, the public accommodation must provide its goods, services, facilities, privileges, advantages, or accommodations through alternative methods that are readily achievable. *See* 42 U.S.C. 12182(b)(2)(A)(iv), (v).

One-time evaluation and implementation of the readily achievable standard is not the end of the public accommodation's barrier-removal obligation. Public accommodations have a continuing obligation to reevaluate barrier removal on a regular basis. For example, if a public accommodation identified barriers under the 1991 Standards but did not remove them because removal was not readily achievable based on cost considerations, it has a continuing obligation to remove these barriers if the economic considerations for the public accommodation change. The fact that the public accommodation has been providing its goods or services through alternative methods does not negate the continuing obligation to assess whether removal of the barrier at issue has become readily achievable. Public accommodations should incorporate consideration of their continuing barrier removal obligations in both short-term and long-term business planning.

The Department notes that commenters across the board expressed concern with recordkeeping burdens implicated by the element-by-element safe harbor. Businesses noted the additional costs and administrative burdens associated with identifying elements that fall within the element-by-element safe harbor, as well as tracking, documenting, and maintaining data on installation dates. Disability advocates expressed concern that varying compliance standards will make enforcement efforts more difficult, and urged the Department to clarify that title III entities bear the burden of proof regarding entitlement to safe harbor protection. The Department emphasizes that public accommodations wishing to benefit from the element-by-element safe harbor must demonstrate their safe harbor eligibility. The Department encourages public accommodations to take appropriate steps to confirm and document the compliance of existing elements with the 1991 Standards. Finally, while the Department has decided not to adopt in this rulemaking the suggestion by some commenters to make the protection afforded by the element-by-element safe harbor temporary, the Department believes this proposal merits further consideration. The Department, therefore, will continue to evaluate the efficacy and appropriateness of a safe harbor expiration or sunset provision.

Application to specific scenarios raised in comments. In response to the NPRM, the Department received a number of comments that raised issues regarding application of the element-by-element safe harbor to particular situations. Business commenters requested guidance on whether the replacement for a broken or malfunctioning element that is covered by the 1991 Standards would have to comply with the 2010 Standards. These commenters expressed concern that in some cases replacement of a broken fixture might necessitate moving a number of other accessible fixtures (such as in a bathroom) in order to comply with the fixture and space requirements of the 2010 Standards. Others questioned the effect of the new

standards where an entity replaces an existing element currently protected by the safe harbor provision for water or energy conservation reasons. The Department intends to address these types of scenarios in technical guidance.

Effective date for barrier removal. Several commenters expressed concern that the NPRM did not propose a transition period for applying the 2004 ADAAG to barrier removal in existing facilities in cases where the safe harbors do not apply. These commenters argued that for newly covered elements, they needed time to hire attorneys and consultants to assess the impact of the new requirements, determine whether they need to make additional retrofits, price those retrofits, assess whether the change actually is ''readily achievable,'' obtain approval for the removal from owners who must pay for the changes, obtain permits, and then do the actual work. The commenters recognized that there may be some barrier removal actions that require little planning, but stated that other actions cost significantly more and require more budgeting, planning, and construction time.

Barrier removal has been an ongoing requirement that has applied to public accommodations since the original regulation took effect on January 26, 1992. The final rule maintains the existing regulatory provision that barrier removal does not have to be undertaken unless it is ''readily achievable.'' The Department has provided in § 36.304(d)(2)(ii)(B) that public accommodations are not required to apply the 2010 Standards to barrier removal until 18 months after the publication date of this rule. It is the Department's view that 18 months is a sufficient amount of time for application of the 2010 Standards to barrier removal for those elements not subject to the safe harbor. This is also consistent with the compliance date the Department has specified for applying the 2010 Standards to new construction and alterations.

Reduced scoping for play areas and other recreation facilities.

Play areas. The Access Board published final guidelines for play areas in October 2000. 65 FR 62498 (Oct. 18, 2000). The guidelines include requirements for ground-level and elevated play components, accessible routes connecting the components, accessible ground surfaces, and maintenance of those surfaces. They have been referenced in Federal playground construction and safety guidelines and in some State and local codes and have been used voluntarily when many play areas across the country have been altered or constructed.

In adopting the 2004 ADAAG (which includes the play area guidelines published in 2000), the Department acknowledges both the importance of integrated, full access to play areas for children and parents with disabilities as well as the need to avoid placing an untenable fiscal burden on businesses. Consequently, the Department asked seven questions in the NPRM related to existing play areas. Two questions related to safe harbors: one on the appropriateness of a general safe harbor for existing play areas and another on public accommodations that have complied with State or local standards specific to play areas. The others related to reduced scoping, limited exemptions, and whether there is a ''tipping point'' at which the costs of compliance with supplemental requirements would be so burdensome that a public accommodation would shut down a program rather than comply with the new requirements. In the nearly 100 comments received on title III play areas, the majority of commenters strongly opposed all safe harbors, exemptions, and reductions in scoping, and questioned the feasibility of determining a tipping point. A smaller number of commenters advocated for a safe harbor from compliance with the 2004 ADAAG play area requirements along with reduced scoping and exemptions for both readily achievable barrier removal and alterations.

Commenters were split as to whether the Department should exempt owners and operators of public accommodations from compliance with the supplemental requirements for play areas and rec-

reation facilities and instead continue to determine accessibility in these facilities on a case-by-case basis under existing law. Many commenters were of the view that the exemption was not necessary because concerns of financial burden are addressed adequately by the defenses inherent in the standard for what constitutes readily achievable barrier removal. A number of commenters found the exemption inappropriate because no standards for play areas previously existed. Commenters also were concerned that a safe harbor applicable only to play areas and recreation facilities (but not to other facilities operated by a public accommodation) would create confusion, significantly limit access for children and parents with disabilities, and perpetuate the discrimination and segregation individuals with disabilities face in the important social arenas of play and recreation—areas where little access has been provided in the absence of specific standards. Many commenters suggested that instead of an exemption, the Department should provide guidance on barrier removal with respect to play areas and other recreation facilities.

Several commenters supported the exemption, mainly on the basis of the cost of barrier removal. More than one commenter noted that the most expensive aspect of barrier removal on existing play areas is the surfaces for the accessible routes and use zones. Several commenters expressed the view that where a play area is ancillary to a public accommodation (*e.g.,* in quick service restaurants or shopping centers), the play area should be exempt from compliance with the supplemental requirements because barrier removal would be too costly, and as a result, the public accommodation might eliminate the area.

The Department has been persuaded that the ADA's approach to barrier removal, the readily achievable standard, provides the appropriate balance for the application of the 2010 Standards to existing play areas. Thus, in existing playgrounds, public accommodations will be required to remove barriers to access where these barriers can be removed without much difficulty or expense.

The NPRM asked if there are State and local standards specifically regarding play and recreation area accessibility and whether facilities currently governed by, and in compliance with, such State and local standards or codes should be subject to a safe harbor from compliance with similar applicable requirements in the 2004 ADAAG. The Department also requested comments on whether it would be appropriate for the Access Board to consider the implementation of guidelines that would extend such a safe harbor to play and recreation areas undertaking alterations. In response, no comprehensive State or local codes were identified, and commenters generally noted that because the 2004 ADAAG contained comprehensive accessibility requirements for these unique areas, public accommodations should not be afforded a safe harbor from compliance with them when altering play and recreation areas. The Department is persuaded by these comments that there is insufficient basis to apply a safe harbor for readily achievable barrier removal or alterations for play areas built in compliance with State or local laws.

In the NPRM, the Department requested that public accommodations identify a ''tipping point'' at which the costs of compliance with the supplemental requirements for existing play areas would be so burdensome that the entity simply would shut down the playground. In response, no tipping point was identified. Some commenters noted, however, that the scope of the requirements may create the choice between wholesale replacement of play areas and discontinuance of some play areas, while others speculated that some public accommodations may remove play areas that are merely ancillary amenities rather than incur the cost of barrier removal under the 2010 Standards. The Department has decided that the comments did not establish any clear tipping point and therefore that no regulatory response is appropriate in this area.

The NPRM also asked for comment about the potential effect of exempting existing play areas of less than 1,000 square feet in size from the re-

quirements applicable to play areas. Many trade and business associations favored exempting these small play areas, with some arguing that where the play areas are only ancillary amenities, the cost of barrier removal may dictate that they be closed down. Some commenters sought guidance on the definition of a 1,000-square-foot play area, seeking clarification that seating and bathroom spaces associated with a play area are not included in the size definition. Disability rights advocates, by contrast, overwhelmingly opposed this exemption, arguing that these play areas may be some of the few available in a community; that restaurants and day care facilities are important places for socialization between children with disabilities and those without disabilities; that integrated play is important to the mission of day care centers and that many day care centers and play areas in large cities, such as New York City, have play areas that are less than 1,000 square feet in size; and that 1,000 square feet was an arbitrary size requirement.

The Department agrees that children with disabilities are entitled to access to integrated play opportunities. However, the Department is aware that small public accommodations are concerned about the costs and efforts associated with barrier removal. The Department has given careful consideration as to how best to insulate small entities from overly burdensome costs and undertakings and has concluded that the existing readily achievable standard, not a separate exemption, is an effective and employable method by which to protect these entities. Under the existing readily achievable standard, small public accommodations would be required to comply only with the scoping and technical requirements of the 2010 Standards that are easily accomplishable and able to be carried out without much difficulty or expense. Thus, concerns about prohibitive costs and efforts clearly are addressed by the existing readily achievable standard. Moreover, as evidenced by comments inquiring as to how 1,000- square-foot play areas are to be measured and complaining that the 1,000-square-foot cutoff is arbitrary, the exemption posited in the NPRM would have been difficult to apply. Finally, a separate exemption would have created confusion as to whether, or when, to apply the exemption or the readily achievable standard. Consequently, the Department has decided that an exemption, separate and apart from the readily achievable standard, is not appropriate or necessary for small private play areas.

In the NPRM, the Department requested public comment as to whether existing play areas should be permitted to substitute additional ground-level play components for the elevated play components that they otherwise would have been required to make accessible. Most commenters opposed this substitution because the guidelines as well as considerations of ''readily achievable barrier removal'' inherently contain the flexibility necessary for a variety of situations. Such commenters also noted that the Access Board adopted extensive guidelines with ample public input, including significant negotiation and balancing of costs. In addition, commenters advised that including additional ground level play components might result in higher costs because more accessible route surfaces might be required. A limited number of commenters favored substitution. The Department is persuaded by these comments that the proposed substitution of elements may not be beneficial. The current rules applicable to readily achievable barrier removal will be used to determine the number and type of accessible elements appropriate for a specific facility.

In the NPRM, the Department requested public comment on whether it would be appropriate for the Access Board to consider issuing guidelines for alterations to play and recreation facilities that would permit reduced scoping of accessible components or substitution of ground level play components in lieu of elevated play components. The Department received little input on this issue, and most commenters disfavored the suggestion. One commenter that supported this approach con-

jectured that it would encourage public accommodations to maintain and improve their playgrounds as well as provide more accessibility. The Department is persuaded that it is not necessary to ask the Access Board to revisit this issue.

The NPRM also asked whether only one play area of each type should be required to comply at existing sites with multiple play areas and whether there are other select requirements applicable to play areas in the 2004 ADAAG for which the Department should consider exemptions or reduced scoping. Some commenters were opposed to the concept of requiring compliance at one play area of each type at a site with multiple play areas, citing lack of choice and ongoing segregation of children and adults with disabilities. Other commenters who supported an exemption and reduced scoping for alterations noted that the play equipment industry has adjusted to, and does not take issue with, the provisions of the 2004 ADAAG; however, they asked for some flexibility in the barrier removal requirements as applied to play equipment, arguing that augmentation of the existing equipment and installation of accessible play surfacing equates to wholesale replacement of the play equipment. The Department is persuaded that the current rules applicable to readily achievable barrier removal should be used to decide which play areas must comply with the supplemental requirements presented in the 2010 Standards.

Swimming pools, wading pools, saunas, and steam rooms. Section 36.304(d)(3)(ii) in the NPRM specified that for measures taken to comply with the barrier removal requirements, existing swimming pools with at least 300 linear feet of swimming pool wall would need to provide only one accessible means of entry that complies with section 1009.2 or section 1009.3 of the 2004 ADAAG, instead of the two means required for new construction. Commenters opposed the Department's reducing the scoping from that required in the 2004 ADAAG. The following were among the factors cited in comments: that swimming is a common therapeutic form of exercise for many individuals with disabilities; that the cost of a swimming pool lift or other options for pool access is readily achievable and can be accomplished without much difficulty or expense; and that the readily achievable standard already provides public accommodations with a means to reduce their scoping requirements. A few commenters cited safety concerns resulting from having just one accessible means of access, and stated that because pools typically have one ladder for every 75 linear feet of pool wall, they should have more than one accessible means of egress. Other commenters either approved or did not oppose providing one accessible means of access for larger pools so long as a lift was used.

Section 36.304(d)(4)(ii) of the NPRM proposed to exempt existing swimming pools with fewer than 300 linear feet of swimming pool wall from the obligation to provide an accessible means of entry. Most commenters strongly opposed this provision, arguing that aquatic activity is a safe and beneficial form of exercise that is particularly appropriate for individuals with disabilities. Many argued that the readily achievable standard for barrier removal is available as a defense and is preferable to creating an exemption for pool operators for whom providing an accessible means of entry would be readily achievable. Commenters who supported this provision apparently assumed that providing an accessible means of entry would be readily achievable and that therefore the exemption is needed so that small pool operators do not have to provide an accessible means of entry.

The Department has carefully considered all the information available to it as well as the comments submitted on these two proposed exemptions for swimming pools owned or operated by title III entities. The Department acknowledges that swimming provides important therapeutic, exercise, and social benefits for many individuals with disabilities and is persuaded that exemption of the vast majority of privately owned or operated pools from the 2010 Standards is neither appropriate nor necessary. The Department

agrees with the commenters that title III already contains sufficient limitations on private entities' obligations to remove barriers. In particular, the Department agrees that those public accommodations that can demonstrate that making particular existing swimming pools accessible in accordance with the 2010 Standards is not readily achievable are sufficiently protected from excessive compliance costs. Thus, the Department has eliminated proposed § 36.304(d)(3)(ii) and (d)(4)(ii) from the final rule.

Proposed § 36.304(d)(4)(iii) would have exempted existing saunas and steam rooms that seat only two individuals from the obligation to remove barriers. This provision generated far fewer comments than the provisions for swimming pools. People who commented were split fairly evenly between those who argued that the readily achievable standard for barrier removal should be applied to all existing saunas and steam rooms and those who argued that all existing saunas and steam rooms, regardless of size, should be exempt from any barrier removal obligations. The Department considered these comments and has decided to eliminate the exemption for existing saunas and steam rooms that seat only two people. Such an exemption for saunas and steam rooms that seat only two people is unnecessary because the readily achievable standard provides sufficient protection against barrier removal that is overly expensive or too difficult. Moreover, the Department believes barrier removal likely will not be readily achievable for most of these small saunas because the nature of their prefabricated forms, which include built-in seats, make it either technically infeasible or too difficult or expensive to remove barriers. Consequently a separate exemption for saunas and steam rooms would have been superfluous. Finally, employing the readily achievable standard for small saunas and steam rooms is consistent with the Department's decisions regarding the proposed exemptions for play areas and swimming pools.

Several commenters also argued in favor of a specific exemption for existing spas. The Department notes that the technically infeasible and readily achievable defenses are applicable equally to existing spas and declines to adopt such an exemption.

The Department also solicited comment on the possibility of exempting existing wading pools from the obligation to remove barriers where readily achievable. Most commenters stated that installing a sloped entry in an existing wading pool is not likely to be feasible. Because covered entities are not required to undertake modifications that are not readily achievable or that would be technically infeasible, the Department believes that the rule as drafted provides sufficient protection from unwarranted expense to the operators of small existing wading pools. Other existing wading pools, particularly those large wading pools found in facilities such as water parks, must be assessed on a case-by-case basis. Therefore, the Department has not included an exemption for wading pools in its final rule.

The Department received several comments recommending that existing wave pools be exempt from barrier removal requirements. The commenters pointed out that existing wave pools often have a sloped entry, but do not have the handrails, level landings, or edge protection required for accessible entry. Because pool bottom slabs are structural, they could be subject to catastrophic failure if the soil pressure stability or the under slab dewatering are not maintained during the installation of these accessibility features in an already constructed pool. They also argue that the only safe design scenario is to design the wheelchair ramp, pool lift, or transfer access in a side cove where the mean water level largely is unaffected by the wave action, and that this additional construction to an existing wave pool is not readily achievable. If located in the main pool area, the handrails, stanchions, and edge protection for sloped entry will become underwater hazards when the wave action is pushing onto pool users, and the use of a pool lift will not be safe without a means of

stabilizing the person against the forces of the waves while using the lift. They also pointed out that a wheelchair would pose a hazard to all wave pool users, in that the wave action might push other pool users into the wheelchair or push the wheelchair into other pool users. The wheelchair would have to be removed from the pool after the user has entered (and has transferred to a flotation device if needed). The commenters did not specify if these two latter concerns are applicable to all wave pools or only to those with more aggressive wave action. The Department has decided that the issue of modifications to wave pools is best addressed on a case-by-case basis, and therefore, this rule does not contain barrier removal exemptions applicable to wave pools.

The Department also received comments suggesting that it is not appropriate to require two accessible means of entry to wave pools, lazy rivers, sand bottom pools, and other water amusements that have only one point of entry. The Department agrees. The 2010 Standards (at section 242.2, Exception 2) provide that only one means of entry is required for wave pools, lazy rivers, sand bottom pools, and other water amusement where user access is limited to one area.

Other recreation facilities. In the NPRM, the Department asked about a number of issues relating to recreation facilities, such as team or player seating areas, areas of sport activity, exercise machines, boating facilities, fishing piers and platforms, golf courses, and miniature golf courses. The Department asked for public comment on the costs and benefits of applying the 2004 ADAAG to these spaces and facilities. The discussion of the comments received by the Department on these issues and the Department's response to those comments can be found in either the section entitled ''Other Issues'' of Appendix A to this final rule.

Safe harbor for qualified small businesses. Section 36.304(d)(5) of the NPRM would have provided that a qualified small business would meet its obligation to remove architectural barriers where readily achievable for a given year if, during that tax year, the entity spent at least 1 percent of its gross revenue in the preceding tax year on measures undertaken in compliance with barrier removal requirements. Proposed § 36.304(d)(5) has been omitted from the final rule. The qualified small business safe harbor was proposed in response to small business advocates' requests for clearer guidance on when barrier removal is, and is not, readily achievable. According to these groups, the Department's approach to readily achievable barrier removal disproportionately affects small business for the following reasons: (1) Small businesses are more likely to operate in older buildings and facilities; (2) the 1991 Standards are too numerous and technical for most small business owners to understand and determine how they relate to State and local building or accessibility codes; and (3) small businesses are vulnerable to title III litigation and often are compelled to settle because they cannot afford the litigation costs involved in proving that an action is not readily achievable.

The 2010 Standards go a long way toward meeting the concern of small businesses with regard to achieving compliance with both Federal and State accessibility requirements, because the Access Board harmonized the 2004 ADAAG with the model codes that form the basis of most State and local accessibility codes. Moreover, the element-by-element safe harbor will ensure that unless and until a small business engages in alteration of affected elements, the small business will not have to retrofit elements that were constructed in compliance with the 1991 Standards or, with respect to elements in an existing facility, that were retrofitted to the 1991 Standards in conjunction with the business's barrier removal obligation prior to the rule's compliance date.

In proposing an additional safe harbor for small businesses, the Department had sought to promulgate a rule that would provide small businesses a level of certainty in short-term and long-term planning with respect to barrier removal. This in turn would benefit individuals with disabilities in

that it would encourage small businesses to consider and incorporate barrier removal in their yearly budgets. Such a rule also would provide some protection, through diminished litigation risks, to small businesses that undertake significant barrier removal projects.

As proposed in the NPRM, the qualified small business safe harbor would provide that a qualified small business has met its readily achievable barrier removal obligations for a given year if, during that tax year, the entity has spent at least 1 percent of its gross revenue in the preceding tax year on measures undertaken to comply with title III barrier removal requirements. (Several small business advocacy organizations pointed out an inconsistency between the Department's description of the small business safe harbor in the Section-by- Section Analysis for § 36.304 and the proposed regulatory text for that provision. The proposed regulatory text sets out the correct parameters of the proposed rule. The Department does not believe that the error substantively affected the comments on this issue. Some commenters noted the discrepancy and commented on both; others commented more generally on the proposal, so the discrepancy was not relevant.) The Department noted that the efficacy of any proposal for a small business safe harbor would turn on the following two determinations: (1) The definition of a qualified small business, and (2) the formula for calculating what percentage of revenue is sufficient to satisfy the readily achievable presumption.

As proposed in § 36.104 in the NPRM, a ''qualified small business'' is a business entity defined as a small business concern under the regulations promulgated by the Small Business Administration (SBA) pursuant to the Small Business Act. *See* 15 U.S.C. 632; 13 CFR part 121. The Department noted that under section 3(a)(2)(C) of the Small Business Act, Federal departments and agencies are prohibited from prescribing a size standard for categorizing a business concern as a small business unless the department or agency has been authorized specifically to do so or has proposed a size standard in compliance with the criteria set forth in the SBA regulations, has provided an opportunity for public notice and comment on the proposed standard, and has received approval from the Administrator of the SBA to use the standard. *See* 15 U.S.C. 632(a)(2)(C). The Department further noted that Federal agencies or departments promulgating regulations relating to small businesses usually use SBA size criteria, and they otherwise must be prepared to justify how they arrived at a different standard and why the SBA's regulations do not satisfy the agency's program requirements. *See* 13 CFR 121.903. The ADA does not define ''small business'' or specifically authorize the Department to prescribe size standards.

In the NPRM, the Department indicated its belief that the size standards developed by the SBA are appropriate for determining which businesses subject to the ADA should be eligible for the small business safe harbor provisions, and proposed to adopt the SBA's size standards to define small businesses for purposes of the qualified small business safe harbor. The SBA's small business size standards define the maximum size that a concern, together with all of its affiliates, may be if it is to be eligible for Federal small business programs or to be considered a small business for the purpose of other Federal agency programs. Concerns primarily engaged in the same kind of economic activity are classified in the same industry regardless of their types of ownership (such as sole proprietorship, partnership, or corporation). Approximately 1200 industries are described in detail in the North American Industry Classification System—United States, 2007. For most businesses, the SBA has established a size standard based on average annual receipts. The majority of places of public accommodation will be classified as small businesses if their average annual receipts are less than $6.5 million. However, some will qualify with higher annual receipts. The SBA small business size standards should be familiar

to many if not most small businesses, and using these standards in the ADA regulation would provide some certainty to owners, operators, and individuals because the SBA's current size standards can be changed only after notice and comment rulemaking.

The Department explained in the NPRM that the choice of gross revenue as the basis for calculating the safe harbor threshold was intended to avoid the effect of differences in bookkeeping practices and to maximize accessibility consistent with congressional intent. The Department recognized, however, that entities with similar gross revenue could have very different net revenue, and that this difference might affect what is readily achievable for a particular entity. The Department also recognized that adopting a small business safe harbor would effect a marked change to the Department's current position on barrier removal. Accordingly, the Department sought public comment on whether a presumption should be adopted whereby qualifying small businesses are presumed to have done what is readily achievable for a given year if, during that tax year, the entity spent at least 1 percent of its gross revenue in the preceding tax year on barrier removal, and on whether 1 percent is an appropriate amount or whether gross revenue would be the appropriate measure.

The Department received many comments on the proposed qualified small business safe harbor. From the business community, comments were received from individual business owners and operators, industry and trade groups, and advocacy organizations for business and industry. From the disability community, comments were received from individuals, disability advocacy groups, and nonprofit organizations involved in providing services for persons with disabilities or involved in disability-related fields. The Department has considered all relevant matter submitted on this issue during the 60-day public comment period.

Small businesses and industry groups strongly supported a qualified small business safe harbor of some sort, but none supported the structure proposed by the Department in the NPRM. All felt strongly that clarifications and modifications were needed to strengthen the provision and to provide adequate protection from litigation.

Business commenters' objections to the proposed qualified small business safe harbor fell generally into three categories: (1) That gross revenue is an inappropriate and inaccurate basis for determining what is readily achievable by a small business since it does not take into account expenses that may result in a small business operating at a loss; (2) that courts will interpret the regulation to mean that a small business must spend 1 percent of gross revenue each year on barrier removal, *i.e.,* that expenditure of 1 percent of gross revenue on barrier removal is always ''readily achievable''; and (3) that a similar misinterpretation of the 1 percent gross revenue concept, *i.e.,* that 1 percent of gross revenue is always ''readily achievable,'' will be applied to public accommodations that are not small businesses and that have substantially larger gross revenue. Business groups also expressed significant concern about the recordkeeping burdens they viewed as inherent in the Department's proposal.

Across the board, business commenters objected to the Department's proposed use of gross revenue as the basis for calculating whether the small business safe harbor has been met. All contended that 1 percent of gross revenue is too substantial a trigger for safe harbor protection and would result in barrier removal burdens far exceeding what is readily achievable or ''easily accomplishable and able to be carried out without much difficulty or expense.'' 42U.S.C. 12181(9). These commenters further pointed out that gross revenue and receipts vary considerably from industry to industry depending on the outputs sold in each industry, and that the use of gross revenue or receipts would therefore result in arbitrary and inequitable burdens on those subject to the rule. These commenters stated that the readily achievable analysis, and thus the safe harbor threshold, should be premised

on a business's net revenue so that operating expenses are offset before determining what amount might be available for barrier removal. Many business commenters contended that barrier removal is not readily achievable if an entity is operating at a loss, and that a spending formula premised on net revenue can reflect more accurately businesses' ability to engage in barrier removal.

There was no consensus among the business commenters as to a formula that would reflect more accurately what is readily achievable for small businesses with respect to barrier removal. Those that proposed alternative formulas offered little in the way of substantive support for their proposals. One advocacy organization representing a large cross-section of small businesses provided some detail on the gross and net revenue of various industry types and sizes in support of its position that for nearly all small businesses, net revenue is a better indicator of a business's financial ability to spend money on barrier removal. The data also incidentally highlighted the importance and complexity of ensuring that each component in a safe harbor formula accurately informs and contributes to the ultimate question of what is and is not readily achievable for a small business.

Several business groups proposed that a threshold of 0.5 percent (or one-half of 1 percent) of gross revenue, or 2.5 percent of net revenue, spent on ADA compliance might be a workable measure of what is ''readily achievable'' for small businesses. Other groups proposed 3 to 5 percent of net revenue as a possible measure. Several commenters proposed affording small businesses an option of using gross or net revenue to determine safe harbor eligibility. Another commenter proposed premising the safe harbor threshold on a designated percentage of the amount spent on renovation in a given year. Others proposed averaging gross or net revenue over a number of years to account for cyclical changes in economic and business environments. Additionally, many proposed that an entity should be able to roll over expenditures in excess of the safe harbor for inclusion in safe harbor analysis in subsequent years, to facilitate barrier removal planning and encourage large-scale barrier removal measures.

Another primary concern of many businesses and business groups is that the 1 percent threshold for safe harbor protection would become a de facto ''floor'' for what is readily achievable for any small business entity. These commenters urged the Department to clarify that readily achievable barrier removal remains the standard, and that in any given case, an entity retains the right to assert that barrier removal expenditures below the 1 percent threshold are not readily achievable. Other business groups worried that courts would apply the 1 percent calculus to questions of barrier removal by businesses too large to qualify for the small business safe harbor. These commenters requested clarification that the rationale underlying the Department's determination that a percentage of gross revenue can appropriately approximate readily achievable barrier removal for small businesses does not apply outside the small business context.

Small businesses and business groups uniformly requested guidance as to what expenses would be included in barrier removal costs for purposes of determining whether the safe harbor threshold has been met. These commenters contended that any and all expenses associated with ADA compliance—*e.g.,* consultants, architects, engineers, staff training, and recordkeeping— should be included in the calculation. Some proposed that litigation-related expenses, including defensive litigation costs, also should be accounted for in a small business safe harbor. Additionally, several commenters urged the Department to issue a small business compliance guide with detailed guidance and examples regarding application of the readily achievable barrier removal standard and the safe harbor. Some commenters felt that the Department's regulatory efforts should be focused on clarifying the readily achievable standard rather than on introducing a safe harbor based on a set spending level.

Businesses and business groups expressed con-

cern that the Department's proposed small business safe harbor would not alleviate small business vulnerability to litigation. Individuals and advocacy groups were equally concerned that the practical effect of the Department's proposal likely would be to accelerate or advance the initiation of litigation. These commenters pointed out that an individual encountering barriers in small business facilities will not know whether the entity is noncompliant or entitled to safe harbor protection. Safe harbor eligibility can be evaluated only after review of the small business's barrier removal records and financial records. Individuals and advocacy groups argued that the Department should not promulgate a rule by which individuals must file suit to obtain the information needed to determine whether a lawsuit is appropriate in a particular case, and that, therefore, the rule should clarify that small businesses are required to produce such documentation to any individual upon request.

Several commenters noted that a small business safe harbor based on net, rather than gross, revenue would complicate exponentially its efficacy as an affirmative defense, because accounting practices and asserted expenses would be subject to discovery and dispute. One business advocacy group representing a large cross-section of small businesses noted that some small business owners and operators likely would be uncomfortable with producing detailed financial information, or could be prevented from using the safe harbor because of inadvertent recordkeeping deficiencies.

Individuals, advocacy groups, and nonprofit organizations commenting on behalf of the disability community uniformly and strongly opposed a safe harbor for qualified small businesses, saying it is fundamentally at odds with the intent of Congress and the plain language of the ADA. These commenters contended that the case-specific factors underlying the statute's readily achievable standard cannot be reconciled with a formulaic accounting approach, and that a blanket formula inherently is less fair, less flexible, and less effective than the current case-by-case determination for whether an action is readily achievable. Moreover, they argued, a small business safe harbor for readily achievable barrier removal is unnecessary because the statutory standard explicitly provides that a business need only spend what is readily achievable—an amount that may be more or less than 1 percent of revenue in any given year.

Several commenters opined that the formulaic approach proposed by the Department overlooks the factors that often prove most conducive and integral to readily achievable barrier removal—planning and prioritization. Many commenters expressed concern that the safe harbor creates an incentive for business entities to forego large-scale barrier removal in favor of smaller, less costly removal projects, regardless of the relative access the measures might provide. Others commented that an emphasis on a formulaic amount rather than readily achievable barrier removal might result in competition among types of disabilities as to which barriers get removed first, or discrimination against particular types of disabilities if barrier removal for those groups is more expensive.

Many commenters opposed to the small business safe harbor proposed clarifications and limiting rules. A substantial number of commenters were strongly opposed to what they perceived as a vastly overbroad and overly complicated definition of ''qualified small business'' for purposes of eligibility for the safe harbor, and urged the Department to limit the qualified small business safe harbor to those businesses eligible for the ADA small business tax credit under section 44 of the Tax Code. Some commenters from the disability community contended that the spending level that triggers the safe harbor should be cumulative, to reflect the continuing nature of the readily achievable barrier obligation and to preclude a business from erasing years of unjustifiable inaction or insufficient action by spending up to the safe harbor threshold for one year. These commenters also sought explicit clarification that the small business safe harbor is an affirmative defense.

A number of commenters proposed that a busi-

ness seeking to use the qualified small business safe harbor should be required to have a written barrier removal plan that contains a prioritized list of significant access barriers, a schedule for removal, and a description of the methods used to identify and prioritize barriers. These commenters argued that only spending consistent with the plan should count toward the qualified small business threshold.

After consideration of all relevant matter presented, the Department has concluded that neither the qualified small business safe harbor proposed in the NPRM nor any of the alternatives proposed by commenters will achieve the Department's intended results. Business and industry commenters uniformly objected to a safe harbor based on gross revenue, argued that 1 percent of gross revenue was out of reach for most, if not all, small businesses, and asserted that a safe harbor based on net revenue would better capture whether and to what extent barrier removal is readily achievable for small businesses. Individuals and disability advocacy groups rejected a set formula as fundamentally inconsistent with the case-specific approach reflected in the statute.

Commenters on both sides noted ambiguity as to which ADA-related costs appropriately should be included in the calculation of the safe harbor threshold, and expressed concern about the practical effect of the proposed safe harbor on litigation. Disability organizations expressed concern that the proposal might increase litigation because individuals with disabilities confronted with barriers in places of public accommodation would not be able to independently assess whether an entity is noncompliant or is, in fact, protected by the small business safe harbor. The Department notes that the concerns about enforcement-related complexity and expense likely would increase exponentially with a small business safe harbor based on net revenue.

The Department continues to believe that promulgation of a small business safe harbor would be within the scope of the Attorney General's mandate under 42 U.S.C. 12186(b) to issue regulations to carry out the provisions of title III. Title III defines ''readily achievable'' to mean ''easily accomplishable and able to be carried out without much difficulty or expense,'' 42 U.S.C. 12181(9), and sets out factors to consider in determining whether an action is readily achievable. While the statutory factors reflect that whether an action is readily achievable is a fact-based determination, there is no inherent inconsistency with the Department's proposition that a formula based on revenue and barrier removal expenditure could accurately approximate the high end of the level of expenditure that can be considered readily achievable for a circumscribed subset of title III entities defined, in part, by their maximum annual average receipts. Moreover, the Department's obligation under the SBREFA to consider alternative means of compliance for small businesses, *see* 5 U.S.C. 603(c), further supports the Department's conclusion that a well-targeted formula is a reasonable approach to implementation of the statute's readily achievable standard. While the Department ultimately has concluded that a small business safe harbor should not be included in the final rule, the Department continues to believe that it is within the Department's authority to develop and implement such a safe harbor.

As noted above, the business community strongly objected to a safe harbor premised on gross revenue, on the ground that gross revenue is an unreliable indicator of an entity's ability to remove barriers, and urged the Department to formulate a safe harbor based on net revenue. The Department's proposed use of gross revenue was intended to offer a measure of certainty for qualified small businesses while ensuring that those businesses continue to meet their ongoing obligation to remove architectural barriers where doing so is readily achievable.

The Department believes that a qualified small business safe harbor based on net revenue would be an unreliable indicator of what is readily achievable and would be unworkable in practice.

Evaluation of what is readily achievable for a small business cannot rest solely on a business's net revenue because many decisions about expenses are inherently subjective, and in some cases a net loss may be more beneficial (in terms of taxes, for example) than a small net profit. The Department does not read the ADA's readily achievable standard to mean necessarily that architectural barrier removal is to be, or should be, a business's last concern, or that a business can claim that every barrier removal obligation is not readily achievable. Therefore, if a qualified small business safe harbor were to be premised on net revenue, assertion of the affirmative defense would trigger discovery and examination of the business's accounting methods and the validity or necessity of offsetting expenses. The practical benefits and legal certainty intended by the NPRM would be lost.

Because there was little to no support for the Department's proposed use of gross revenue and no workable alternatives are available at this time, the Department will not adopt a small business safe harbor in this final rule. Small business public accommodations are subject to the barrier removal requirements set out in § 36.304 of the final rule. In addition, the Department plans to provide small businesses with more detailed guidance on assessing and meeting their barrier removal obligations in a small business compliance guide.

Section 36.308 Seating in Assembly Areas

In the 1991 rule, § 36.308 covered seating obligations for public accommodations in assembly areas. It was bifurcated into (a) existing facilities and (b) new construction and alterations. The new construction and alterations provision, § 36.308(b), merely stated that assembly areas should be built or altered in accordance with the applicable provisions in the 1991 Standards. Section 36.308(a), by contrast, provided detailed guidelines on what barrier removal was required.

The Department explained in the preamble to the 1991 rule that § 36.308 provided specific rules on assembly areas to ensure that wheelchair users, who typically were relegated to inferior seating in the back of assembly areas separate from their friends and family, would be provided access to seats that were integrated and equal in quality to those provided to the general public. Specific guidance on assembly areas was desirable because they are found in many different types of places of public accommodation, ranging from opera houses (places of exhibition or entertainment) to private university lecture halls (places of education), and include assembly areas that range in size from small movie theaters of 100 or fewer seats to 100,000-seat sports stadiums.

In the NPRM, the Department proposed to update § 36.308(a) by incorporating some of the applicable assembly area provisions from the 2010 Standards. Upon further review, however, the Department has determined that the need to provide special guidance for assembly areas in a separate section no longer exists, except for specialty seating areas, as discussed below. Since enactment of the ADA, the Department has interpreted the 1991 Standards as a guide for determining the existence of barriers. Courts have affirmed this interpretation. *See, e.g., Colorado Cross Disability Coalition v. Too, Inc.,* 344 F. Supp. 2d 707 (D. Colo. 2004); *Access Now, Inc. v. AMH CGH, Inc.*, 2001 WL 1005593 (S.D. Fla. 2001); *Pascuiti v. New York Yankees*, 87 F. Supp. 2d 221 (S.D.N.Y. 1999).

The 2010 Standards now establish detailed guidance for newly constructed and altered assembly areas, which is provided in § 36.406(f), and these Standards will serve as a new guide for barrier removal. Accordingly, the former § 36.308(a) has been replaced in the final rule. Assembly areas will benefit from the same safe harbor provisions applicable to barrier removal in all places of public accommodations as provided in § 36.304(d)(2) of the final rule.

The Department has also decided to remove proposed § 36.308(c)(2) from the final rule. This provision would have required assembly

areas with more than 5,000 seats to provide five wheelchair spaces with at least three designated companion seats for each of those five wheelchair spaces. The Department agrees with commenters who asserted that group seating already is addressed more appropriately in ticketing under § 36.302(f).

The Department has determined that proposed § 36.308(c)(1), addressing specialty seating in assembly areas, should remain as § 36.308 in the final rule with additional language. This paragraph is designed to ensure that individuals with disabilities have an opportunity to access specialty seating areas that entitle spectators to distinct services or amenities not generally available to others. This provision is not, as several commenters mistakenly thought, designed to cover luxury boxes and suites. Those areas have separate requirements outlined in section 221 of the 2010 Standards.

Section 36.308 requires only that accessible seating be provided in each area with distinct services or amenities. To the extent a covered entity provides multiple seating areas with the same services and amenities, each of those areas would not be distinct and thus all of them would not be required to be accessible. For example, if a facility has similar dining service in two areas, both areas would not need to be made accessible; however, if one dining service area is open to families, while the other is open only to individuals over the age of 21, both areas would need to be made accessible. Factors distinguishing specialty seating areas generally are dictated by the type of facility or event, but may include, for example, such distinct services and amenities as access to wait staff for in-seat food or beverage service; availability of catered food or beverages for pre-game, intermission, or post-game events; restricted access to lounges with special amenities, such as couches or flat-screen televisions; or access to team personnel or facilities for team-sponsored events (*e.g.,* autograph sessions, sideline passes, or facility tours) not otherwise available to other spectators.

The NPRM required public accommodations to locate wheelchair seating spaces and companion seats in each specialty seating area within the assembly area. The Department has added language in the final rule stating that public accommodations that cannot place wheelchair seating spaces and companion seats in each specialty area because it is not readily achievable to do so may meet their obligation by providing specialty services or amenities to individuals with disabilities and their companions at other designated accessible locations at no additional cost. For example, if a theater that only has barrier removal obligations provides wait service to spectators in the mezzanine, and it is not readily achievable to place accessible seating there, it may meet its obligation by providing wait service to patrons with disabilities who use wheelchairs and their companions at other designated accessible locations at no additional cost. This provision does not obviate the obligation to comply with applicable requirements for new construction and alterations, including dispersion of accessible seating.

Section 36.309 Examinations and Courses

Section 36.309(a) sets forth the general rule that any private entity that offers examinations or courses relating to applications, licensing, certification, or credentialing for secondary or postsecondary education, professional, or trade purposes shall offer such examinations or courses in a place and manner accessible to persons with disabilities or offer alternative accessible arrangements for such individuals. In the NPRM preamble and proposed regulatory amendment and in this final rule, the Department relied on its history of enforcement efforts, research, and body of knowledge of testing and modifications, accommodations, and aids in detailing steps testing entities should take to ensure that persons with disabilities receive appropriate modifications, accommodations, or auxiliary aids in examination and course settings as required by the ADA. The Department received comments from disability rights groups, organi-

zations that administer tests, State governments, professional associations, and individuals on the language appearing in the NPRM preamble and amended regulation and has carefully considered these comments.

The Department initially set out the parameters of appropriate documentation requests relating to examinations and courses covered by this section in the 1991 preamble at 28 CFR part 36, stating that ''requests for documentation must be reasonable and must be limited to the need for the modification or aid requested.'' *See* 28 CFR part 36, app. B at 735 (2009). Since that time, the Department, through its enforcement efforts pursuant to section 309, has addressed concerns that requests by testing entities for documentation regarding the existence of an individual's disability and need for a modification or auxiliary aid or service were often inappropriate and burdensome. The Department proposed language stating that while it may be appropriate for a testing entity to request that an applicant provide documentation supporting the existence of a disability and the need for a modification, accommodation, or auxiliary aid or service, the request by the testing entity for such documentation must be reasonable and limited. The NPRM proposed that testing entities should narrowly tailor requests for documentation, limiting those requests to materials that will allow the testing entities to ascertain the nature of the disability and the individual's need for the requested modification, accommodation, or auxiliary aid or service. This proposal codified the 1991 rule's preamble language regarding testing entities' requests for information supporting applicants' requests for testing modifications or accommodations.

Overall, most commenters supported this addition to the regulation. These commenters generally agreed that documentation sought by testing entities to support requests for modifications and testing accommodations should be reasonable and tailored. Commenters noted, for example, that the proposal to require reasonable and tailored documentation requests ''is not objectionable. Indeed, it largely tracks DOJ's long-standing informal guidance that 'requests for documentation must be reasonable and limited to the need for the modification or aid requested.' '' Commenters including disability rights groups, State governments, professional associations, and individuals made it clear that, in addition to the proposed regulatory change, other significant problems remain for individuals with disabilities who seek necessary modifications to examinations and courses. These problems include detailed questions about the nature of documentation materials submitted by candidates, testing entities' questioning of documentation provided by qualified professionals with expertise in the particular disability at issue, and lack of timeliness in determining whether to provide requested accommodations or modifications. Several commenters expressed enthusiasm for the preamble language addressing some of these issues, and some of these commenters recommended the incorporation of portions of this preamble language into the regulatory text. Some testing entities expressed concerns and uncertainty about the language in the preamble and sought clarifications about its meaning. These commenters focused most of their attention on the following language from the NPRM preamble:

Generally, a testing entity should accept without further inquiry documentation provided by a qualified professional who has made an individualized assessment of the applicant. Appropriate documentation may include a letter from a qualified professional or evidence of a prior diagnosis, or accommodation, or classification, such as eligibility for a special education program. When an applicant's documentation is recent and demonstrates a consistent history of a diagnosis, there is no need for further inquiry into the nature of the disability. A testing entity should consider an applicant's past use of a particular auxiliary aid or service. 73 FR 34508, 34539 (June 17, 2008).

Professional organizations, State governments, individuals, and disability rights groups fully sup-

ported the Department's preamble language and recommended further modification of the regulations to encompass the issues raised in the preamble. A disability rights group recommended that the Department incorporate the preamble language into the regulations to ensure that ''documentation demands are strictly limited in scope and met per se when documentation of previously provided accommodations or aids is provided.'' One professional education organization noted that many testing corporations disregard the documented diagnoses of qualified professionals, and instead substitute their own, often unqualified diagnoses of individuals with disabilities. Commenters confirmed that testing entities sometimes ask for unreasonable information that is either impossible, or extremely onerous, to provide. A disability rights organization supported the Department's proposals and noted that private testing companies impose burdensome documentation requirements upon applicants with disabilities seeking accommodations and that complying with the documentation requests is frequently so difficult, and negotiations over the requests so prolonged, that test applicants ultimately forgo taking the test. Another disability rights group urged the Department to ''expand the final regulatory language to ensure that regulations accurately provide guidance and support the comments made about reducing the burden of documenting the diagnosis and existence of a disability.''

Testing entities, although generally supportive of the proposed regulatory amendment, expressed concern regarding the Department's proposed preamble language. The testing entities provided the Department with lengthy comments in which they suggested that the Department's rationale delineated in the preamble potentially could limit them from gathering meaningful and necessary documentation to determine whether, in any given circumstance, a disability is presented, whether modifications are warranted, and which modifications would be most appropriate. Some testing entities raised concerns about individuals skewing testing results by falsely claiming or feigning disabilities as an improper means of seeking advantage on an examination. Several testing entities raised concerns about and sought clarification regarding the Department's use of certain terms and concepts in the preamble, including ''without further inquiry,'' ''appropriate documentation,'' ''qualified professional,'' ''individualized assessment,'' and ''consider.'' These entities discussed the preamble language at length, noting that testing entities need to be able to question some aspects of testing applicants' documentation or to request further documentation from some candidates when the initial documentation is unclear or incomplete. One testing entity expressed concern that the Department's preamble language would require the acceptance of a brief note on a doctor's prescription pad as adequate documentation of a disability and the need for an accommodation. One medical examination organization stated that the Department's preamble language would result in persons without disabilities receiving accommodations and passing examinations as part of a broad expansion of unwarranted accommodations, potentially endangering the health and welfare of the general public. Another medical board ''strenuously objected'' to the ''without further inquiry'' language. Several of the testing entities expressed concern that the Department's preamble language might require testing companies to accept documentation from persons with temporary or questionable disabilities, making test scores less reliable, harming persons with legitimate entitlements, and resulting in additional expense for testing companies to accommodate more test takers.

It remains the Department's view that, when testing entities receive documentation provided by a qualified professional who has made an individualized assessment of an applicant that supports the need for the modification, accommodation, or aid requested, they shall generally accept such documentation and provide the accommodation.

Several commenters sought clarifications on what types of documentation are acceptable to

demonstrate the existence of a disability and the need for a requested modification, accommodation, or aid. The Department believes that appropriate documentation may vary depending on the nature of the disability and the specific modification or aid requested, and accordingly, testing entities should consider a variety of types of information submitted. Examples of types of information to consider include recommendations of qualified professionals familiar with the individual, results of psycho-educational or other professional evaluations, an applicant's history of diagnosis, participation in a special education program, observations by educators, or the applicant's past use of testing accommodations. If an applicant has been granted accommodations post-high school by a standardized testing agency, there is no need for reassessment for a subsequent examination.

Some commenters expressed concern regarding the use of the term ''letter'' in the proposed preamble sentence regarding appropriate documentation. The NPRM preamble language stated that ''[a]ppropriate documentation may include a letter from a qualified professional or evidence of a prior diagnosis, accommodation, or classification, such as eligibility for a special education program.'' 73 FR 34508, 34539 (June 17, 2008). Some testing entities posited that the preamble language would require them to accept a brief letter from a doctor or even a doctor's note on a prescription pad indicating ''I've been treating (student) for ADHD and he/she is entitled to extend time on the ACT.'' The Department's reference in the NPRM preamble to letters from physicians or other professionals was provided in order to offer examples of some types of acceptable documentation that may be considered by testing entities in evaluating the existence of an applicant's disability and the need for a certain modification, accommodation, or aid. No one piece of evidence may be dispositive in make a testing accommodation determination. The significance of a letter or other communication from a doctor or other qualified professional would depend on the professional's relationship with the candidate and the specific content of the communication, as well as how the letter fits in with the totality of the other factors used to determine testing accommodations under this rule. Similarly, an applicant's failure to provide results from a specific test or evaluation instrument should not of itself preclude approval of requests for modifications, accommodations, or aids if the documentation provided by the applicant, in its entirety, is sufficient to demonstrate that the individual has a disability and requires a requested modification, accommodation, or aid on the relevant examination. This issue is discussed in more detail below.

One disability rights organization noted that requiring a 25-year old who was diagnosed in junior high school with a learning disability and accommodated ever since ''to produce elementary school report cards to demonstrate symptomology before the age of seven is unduly burdensome.'' The same organization commented that requiring an individual with a long and early history of disability to be assessed within three years of taking the test in question is similarly burdensome, stating that ''[t]here is no scientific evidence that learning disabilities abate with time, nor that Attention Deficits abate with time * * *.'' This organization noted that there is no justification for repeatedly subjecting people to expensive testing regimens simply to satisfy a disbelieving industry. This is particularly true for adults with, for example, learning disabilities such as dyslexia, a persistent condition without the need for retesting once the diagnosis has been established and accepted by a standardized testing agency.

Some commenters from testing entities sought clarification regarding who may be considered a ''qualified professional.'' Qualified professionals are licensed or otherwise properly credentialed and possess expertise in the disability for which modifications or accommodations are sought. For example, a podiatrist would not be considered to be a qualified professional to diagnose a learning disability or support a request for testing accom-

modations on that basis. Types of professionals who might possess the appropriate credentials and expertise are doctors (including psychiatrists), psychologists, nurses, physical therapists, occupational therapists, speech therapists, vocational rehabilitation specialists, school counselors, and licensed mental health professionals. Additionally, while testing applicants should present documentation from qualified professionals with expertise in the pertinent field, it also is critical that testing entities that review documentation submitted by prospective examinees in support of requests for testing modifications or accommodations ensure that their own reviews are conducted by qualified professionals with similarly relevant expertise.

Commenters also sought clarification of the term individualized assessment. The Department's intention in using this term is to ensure that documentation provided on behalf of a testing candidate is not only provided by a qualified professional, but also reflects that the qualified professional has individually and personally evaluated the candidate as opposed to simply considering scores from a review of documents. This is particularly important in the learning disabilities context, where proper diagnosis requires face-to-face evaluation. Reports from experts who have personal familiarity with the candidate should take precedence over those from, for example, reviewers for testing agencies, who have never personally met the candidate or conducted the requisite assessments for diagnosis and treatment.

Some testing entities objected to the NPRM preamble's use of the phrase ''without further inquiry.'' The Department's intention here is to address the extent to which testing entities should accept documentation provided by an applicant when the testing entity is determining the need for modifications, accommodations, or auxiliary aids or services. The Department's view is that applicants who submit appropriate documentation, *e.g.*, documentation that is based on the careful individual consideration of the candidate by a professional with expertise relating to the disability in question, should not be subjected to unreasonably burdensome requests for additional documentation. While some testing commenters objected to this standard, it reflects the Department's longstanding position. When an applicant's documentation demonstrates a consistent history of a diagnosis of a disability, and is prepared by a qualified professional who has made an individualized evaluation of the applicant, there is little need for further inquiry into the nature of the disability and generally testing entities should grant the requested modification, accommodation, or aid.

After a careful review of the comments, the Department has decided to maintain the proposed regulatory language on the scope of appropriate documentation in § 36.309(b)(1)(iv). The Department has also added new regulatory language at § 36.309(b)(1)(v) that provides that testing entities shall give considerable weight to documentation of past modifications, accommodations, or auxiliary aids or services received in similar testing situations as well as such modifications, accommodations, or related aids and services provided in response to an Individualized Education Program (IEP) provided under the Individuals with Disabilities Education Act (IDEA) or a plan providing services pursuant to section 504 of the Rehabilitation Act of1973, as amended (often referred to as a Section 504 Plan). These additions to the regulation are necessary because the Department's position on the bounds of appropriate documentation contained in Appendix B, 28 CFR part 36, app. B (2009), has not been implemented consistently and fully by organizations that administer tests.

The new regulatory language clarifies that an applicant's past use of a particular modification, accommodation, or auxiliary aid or service in a similar testing setting or pursuant to an IEP or Section 504 Plan provides critical information in determining those examination modifications that would be applicable in a given circumstance. The addition of this language and the appropriate weight to be accorded it is seen as important by the Department because the types of accommoda-

tions provided in both these circumstances are typically granted in the context of individual consideration of a student's needs by a team of qualified and experienced professionals. Even though these accommodations decisions form a common sense and logical basis for testing entities to rely upon, they are often discounted and ignored by testing entities.

For example, considerable weight is warranted when a student with a Section 504 Plan in place since middle school that includes the accommodations of extra time and a quiet room for testing is seeking these same accommodations from a testing entity covered by section 309 of the Act. In this example, a testing entity receiving such documentation should clearly grant the request for accommodations. A history of test accommodations in secondary schools or in post-secondary institutions, particularly when determined through the rigors of a process required and detailed by Federal law, is as useful and instructive for determining whether a specific accommodation is required as accommodations provided in standardized testing situations.

It is important to note, however, that the inclusion of this weight does not suggest that individuals without IEPs or Section 504 Plans are not also entitled to receive testing accommodations. Indeed, it is recommended that testing entities must consider the entirety of an applicant's history to determine whether that history, even without the context of a IEP or Section 504 Plan, indicates a need for accommodations. In addition, many students with learning disabilities have made use of informal, but effective accommodations. For example, such students often receive undocumented accommodations such as time to complete tests after school or at lunchtime, or being graded on content and not form or spelling of written work. Finally, testing entities shall also consider that because private schools are not subject to the IDEA, students at private schools may have a history of receiving accommodations in similar settings that are not pursuant to an IEP or Section 504 Plan.

Some testing entities sought clarification that they should only be required to consider particular use of past modifications, accommodations, auxiliary aids or services received by testing candidates for prior testing and examination settings. These commenters noted that it would be unhelpful to consider the classroom accommodations for a testing candidate, as those accommodations would not typically apply in a standardized test setting. The Department's history of enforcement in this area has demonstrated that a recent history of past accommodations is critical to an understanding of the applicant's disability and the appropriateness of testing accommodations.

The Department also incorporates the NPRM preamble's ''timely manner'' concept into the new regulatory language at § 36.309(b)(1)(vi). Under this provision, testing entities are required to respond in a timely manner to requests for testing accommodations in order to ensure equal opportunity for persons with disabilities. Testing entities are to ensure that their established process for securing testing accommodations provides applicants with a reasonable opportunity to supplement the testing entities' requests for additional information, if necessary, and still be able to take the test in the same testing cycle. A disability rights organization commented that testing entities should not subject applicants to unreasonable and intrusive requests for information in a process that should provide persons with disabilities effective modifications in a timely manner, fulfilling the core objective of title III to provide equal access. Echoing this perspective, several disability rights organizations and a State government commenter urged that testing entities should not make unreasonably burdensome demands for documentation, particularly where those demands create impediments to receiving accommodations in a timely manner. Access to examinations should be offered to persons with disabilities in as timely a manner as it is offered to persons without disabilities. Failure by a testing entity to act in a timely manner,

coupled with seeking unnecessary documentation, could result in such an extended delay that it constitutes a denial of equal opportunity or equal treatment in an examination setting for persons with disabilities.

Section 36.311 Mobility Devices

Section 36.311 of the NPRM clarified the scope and circumstances under which covered entities are legally obligated to accommodate various ''mobility devices.'' Section 36.311 set forth specific requirements for the accommodation of mobility devices, including wheelchairs, manually-powered mobility aids, and other power-driven mobility devices.

In both the NPRM and the final rule, § 36.311(a) states the general rule that in any areas open to pedestrians, public accommodations shall permit individuals with mobility disabilities to use wheelchairs and manually-powered mobility aids, including walkers, crutches, canes, braces, or similar devices. Because mobility scooters satisfy the definition of ''wheelchair'' (*i.e.,* ''a manually-operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor, or of both indoor and outdoor locomotion''), the reference to them in § 36.311(a) of the final rule has been omitted to avoid redundancy.

Most business commenters expressed concern that permitting the use of other power-driven mobility devices by individuals with mobility disabilities would make such devices akin to wheelchairs and would require them to make physical changes to their facilities to accommodate their use. This concern is misplaced. If a facility complies with the applicable design requirements in the 1991 Standards or the 2010 Standards, the public accommodation will not be required to exceed those standards to accommodate the use of wheelchairs or other power-driven mobility devices that exceed those requirements.

Legal standard for other power-driven mobility devices. The NPRM version of § 36.311(b) provided that a public accommodation ''shall make reasonable modifications in its policies, practices, and procedures to permit the use of other power-driven mobility devices by individuals with disabilities, unless the public accommodation can demonstrate that the use of the device is not reasonable or that its use will result in a fundamental alteration in the nature of the public accommodation's goods, services, facilities, privileges, advantages, or accommodations.'' 73 FR 34508, 34556 (June 17, 2008). In other words, public accommodations are by default required to permit the use of other power-driven mobility devices; the burden is on them to prove the existence of a valid exception. Most commenters supported the notion of assessing whether the use of a particular device is reasonable in the context of a particular venue. Commenters, however, disagreed about the meaning of the word ''reasonable'' as it is used in § 36.311(b) of the NPRM. Virtually every business and industry commenter took the use of the word ''reasonable'' to mean that a general reasonableness standard would be applied in making such an assessment. Advocacy and nonprofit groups almost universally objected to the use of a general reasonableness standard with regard to the assessment of whether a particular device should be allowed at a particular venue. They argued that the assessment should be based on whether reasonable modifications could be made to allow a particular device at a particular venue, and that the only factors that should be part of the calculus that results in the exclusion of a particular device are undue burden, direct threat, and fundamental alteration.

A few commenters opposed the proposed provision requiring public accommodations to assess whether reasonable modifications can be made to allow other power-driven mobility devices, preferring instead that the Department issue guidance materials so that public accommodations would not have to incur the cost of such analyses. Another commenter noted a ''fox guarding the hen house''-type of concern with regard to public

accommodations developing and enforcing their own modification policy. In response to comments received, the Department has revised § 36.311(b) to provide greater clarity regarding the development of legitimate safety requirements regarding other power-driven mobility devices. The Department has not retained the proposed NPRM language stating that an other power-driven mobility device can be excluded if a public accommodation can demonstrate that the use of the device is not reasonable or that its use fundamentally alters the nature of the goods, services, facilities, privileges, advantages, or accommodations offered by the public accommodation because the Department believes that these exceptions are covered by the general reasonable modification requirement contained in § 36.302.

Assessment factors. Section 36.311(c) of the NPRM required public accommodations to ''establish policies to permit the use of other power-driven mobility devices'' and articulated four factors upon which public accommodations must base decisions as to whether a modification is reasonable to allow the use of a class of other power-driven mobility devices by individuals with disabilities in specific venues (*e.g.,* doctors' offices, parks, commercial buildings, etc.). 73 FR 34508, 34556 (June 17, 2008).

The Department has relocated and modified the NPRM text that appeared in § 36.311(c) to new paragraph § 36.311(b)(2) to clarify what factors the public accommodation shall use in determining whether a particular other power-driven mobility device can be allowed in a specific facility as a reasonable modification. Section 36.311(b)(2) now states that ''[i]n determining whether a particular other power-driven mobility device can be allowed in a specific facility as a reasonable modification under (b)(1), a public accommodation shall consider'' certain enumerated factors. The assessment factors are designed to assist public accommodations in determining whether allowing the use of a particular other power-driven mobility device in a specific facility is reasonable. Thus, the focus of the analysis must be on the appropriateness of the use of the device at a specific facility, rather than whether it is necessary for an individual to use a particular device.

The NPRM proposed the following specific assessment factors: (1) The dimensions, weight, and operating speed of the mobility device in relation to a wheelchair; (2) the potential risk of harm to others by the operation of the mobility device; (3) the risk of harm to the environment or natural or cultural resources or conflict with Federal land management laws and regulations; and (4) the ability of the public accommodation to stow the mobility device when not in use, if requested by the user.

Factor 1 was designed to help public accommodations assess whether a particular device was appropriate, given its particular physical features, for a particular location. Virtually all commenters said the physical features of the device affected their view of whether a particular device was appropriate for a particular location. For example, while many commenters supported the use of an other power-driven mobility device if the device were a Segway® PT, because of environmental and health concerns they did not offer the same level of support if the device were an off-highway vehicle, all-terrain vehicle (ATV), golf car, or other device with a fuel-powered or combustion engine. Most commenters noted that indicators such as speed, weight, and dimension really were an assessment of the appropriateness of a particular device in specific venues and suggested that factor 1 say this more specifically.

The term ''in relation to a wheelchair'' in the NPRM's factor 1 apparently created some concern that the same legal standards that apply to wheelchairs would be applied to other power-driven mobility devices. The Department has omitted the term ''in relation to a wheelchair'' from § 36.311(b)(2)(i) to clarify that if a facility that is in compliance with the applicable provisions of the 1991 Standards or the 2010 Standards grants per-

mission for an other power-driven mobility device to go on-site, it is not required to exceed those standards to accommodate the use of other power-driven mobility devices. In response to requests that NPRM factor 1 state more specifically that it requires an assessment of an other power-driven mobility device's appropriateness under particular circumstances or in particular venues, the Department has added several factors and more specific language. In addition, although the NPRM made reference to the operation of other power-driven mobility devices in ''specific venues,'' the Department's intent is captured more clearly by referencing ''specific facility'' in paragraph (b)(2). The Department also notes that while speed is included in factor 1, public accommodations should not rely solely on a device's top speed when assessing whether the device can be accommodated; instead, public accommodations should also consider the minimum speeds at which a device can be operated and whether the development of speed limit policies can be established to address concerns regarding the speed of the device. Finally, since the ability of the public accommodation to stow the mobility device when not in use is an aspect of its design and operational characteristics, the text proposed as factor 4 in the NPRM has been incorporated in paragraph (b)(2)(iii).

The NPRM's version of factor 2 provided that the ''potential risk of harm to others by the operation of the mobility device'' is one of the determinants in the assessment of whether other power-driven mobility devices should be excluded from a site. With this language, the Department intended to incorporate the safety standard found in § 36.301(b), which provides that public accommodations may ''impose legitimate safety requirements that are necessary for safe operation'' into the assessment. However, several commenters indicated that they read this language, particularly the phrase 'potential risk of harm'' to mean that the Department had adopted a concept of risk analysis different from that which is in the existing standards. The Department did not intend to create a new standard and has changed the language in paragraphs (b)(1) and (b)(2) to clarify the applicable standards, thereby avoiding the introduction of new assessments of risk beyond those necessary for the safe operation of the public accommodation.

While all applicable affirmative defenses are available to public accommodations in the establishment and execution of their policies regarding other power-driven mobility devices, the Department did not explicitly incorporate the direct threat defense into the assessment factors because § 36.301(b) provides public accommodations the appropriate framework with which to assess whether legitimate safety requirements that may preclude the use of certain other power-driven mobility devices are necessary for the safe operation of the public accommodation. In order to be legitimate, the safety requirement must be based on actual risks and not mere speculation regarding the device or how it will be operated. Of course, public accommodations may enforce legitimate safety rules established for the operation of other-power driven mobility devices (*e.g.*, reasonable speed restrictions). Finally, NPRM factor 3 concerning environmental resources and conflicts of law has been relocated to paragraph (b)(2)(v).

As a result of these comments and requests, NPRM factors 1, 2, 3, and 4 have been revised and renumbered within paragraph 36.311(b)(2) in the final rule.

Several commenters requested that the Department provide guidance materials or more explicit concepts of which considerations might be appropriate for inclusion in a policy that allows the use of other power-driven mobility devices. A public accommodation that has determined that reasonable modifications can be made in its policies, practices, or procedures to allow the use of other power-driven mobility devices should develop a policy that clearly states the circumstances under which the use of other power-driven mobility devices by individuals with a mobility disability will be permitted. It also should include clear, concise

statements of specific rules governing the operation of such devices. Finally, the public accommodation should endeavor to provide individuals with disabilities who use other power-driven mobility devices with advanced notice of its policy regarding the use of such devices and what rules apply to the operation of these devices.

For example, the U.S. General Services Administration (GSA) has developed a policy allowing the use of the Segway® PT and other EPAMDs in all Federal buildings under GSA's jurisdiction. *See* General Services Administration, *Interim Segway® Personal Transporter Policy* (Dec. 3, 2007), available at *http://www.gsa.gov/graphics/pbs/Interim_Segway_Policy_121007.pdf* (last visited June 24, 2010). The GSA policy defines the policy's scope of coverage by setting out what devices are and are not covered by the policy. The policy also sets out requirements for safe operation, such as a speed limit, prohibits the use of EPAMDs on escalators, and provides guidance regarding security screening of these devices and their operators.

A public accommodation that determines that it can make reasonable modifications to permit the use of an other power-driven mobility device by an individual with a mobility disability might include in its policy the procedure by which claims that the other power-driven mobility device is being used for a mobility disability will be assessed for legitimacy (*i.e.,* a credible assurance that the device is being used for a mobility disability, including a verbal representation by the person with a disability that is not contradicted by observable fact, or the presentation of a disability parking space placard or card, or State-issued proof of disability); the type or classes of other power-driven mobility devices are permitted to be used by individuals with mobility disabilities; the size, weight, and dimensions of the other power-driven mobility devices that are permitted to be used by individuals with mobility disabilities; the speed limit for the other power-driven mobility devices that are permitted to be used by individuals with mobility disabilities; the places, times, or circumstances under which the use of the other power-driven mobility devices is or will be restricted or prohibited; safety, pedestrian, and other rules concerning the use of the other power-driven mobility devices; whether, and under which circumstances, storage for the other power-driven mobility devices will be made available; and how and where individuals with a mobility disability can obtain a copy of the other power-driven mobility device policy.

Public accommodations also might consider grouping other power-driven mobility devices by type (*e.g.*, EPAMDs, golf cars, gasoline-powered vehicles, and other devices). For example, an amusement park may determine that it is reasonable to allow individuals with disabilities to use EPAMDs in a variety of outdoor programs and activities, but that it would not be reasonable to allow the use of golf cars as mobility devices in similar circumstances. At the same time, the entity may address its concerns about factors such as space limitations by disallowing use of EPAMDs by members of the general public who do not have mobility disabilities.

The Department anticipates that in many circumstances, public accommodations will be able to develop policies that will allow the use of other power-driven mobility devices by individuals with mobility disabilities without resulting in a fundamental alteration of a public accommodation's goods, services, facilities, privileges, advantages, or accommodations. Consider the following examples:

Example 1: Although individuals who do not have mobility disabilities are prohibited from operating EPAMDs at a theme park, the park has developed a policy allowing individuals with mobility disabilities to use EPAMDs as their mobility device at the park. The policy states that EPAMDs are allowed in all areas of the theme park that are open to pedestrians as a reasonable modification to its general policy on EPAMDs. The public accommodation has determined that the facility provides adequate space for a taller device, such as an EPAMD, and that it does not fundamentally

alter the nature of the theme park's goods and services. The theme park's policies do, however, require that EPAMDs be operated at a safe speed limit. A theme park employee may inquire at the ticket gate whether the device is needed due to the user's disability or may request the presentation of a valid, State-issued, disability parking placard (though presentation of such a placard is not necessary), or other State-issued proof of disability or a credible assurance that the use of the EPAMD is for the individual's mobility disability. The park employee also may inform an individual with a disability using an EPAMD that the theme park's policy requires that it be operated at or below the park's designated speed limit.

Example 2: A shopping mall has developed a policy whereby EPAMDs may be operated by individuals with mobility disabilities in the common pedestrian areas of the mall if the operator of the device agrees to the following: to operate the device no faster than the speed limit set by the policy; to use the elevator, not the escalator, to transport the EPAMD to different levels; to yield to pedestrian traffic; not to leave the device unattended unless it can stand upright and has a locking system; to refrain from using the device temporarily if the mall manager determines that the volume of pedestrian traffic is such that the operation of the device would interfere with legitimate safety requirements; and to present the mall management office with a valid, State-issued, disability parking placard (though presentation of such a placard is not necessary), or State-issued proof of disability, as a credible assurance that the use of the EPAMD is for the individual's mobility disability, upon entry to the mall.

Inquiry into the use of other power-driven mobility device. Section 36.311(d) of the NPRM provided that a ''public accommodation may ask a person using a power-driven mobility device if the mobility device is required because of the person's disability. A public accommodation shall not ask a person using a mobility device questions about the nature and extent of the person's disability.'' 73 FR 34508, 34556 (June 17, 2008).

While business commenters did not take issue with applying this standard to individuals who use wheelchairs, they were not satisfied with the application of this standard to other power-driven mobility devices. Business commenters expressed concern about people feigning mobility disabilities to be able to use other power-driven mobility devices in public accommodations in which their use is otherwise restricted. These commenters felt that a mere inquiry into whether the device is being used for a mobility disability was an insufficient mechanism by which to detect fraud by other power-driven mobility device users who do not have mobility disabilities. These commenters believed they should be given more latitude to make inquiries of other power-driven mobility device users claiming a mobility disability than they would be given for wheelchair users. They sought the ability to establish a policy or method by which public accommodations may assess the legitimacy of the mobility disability. They suggested some form of certification, sticker, or other designation. One commenter suggested a requirement that a sticker bearing the international symbol for accessibility be placed on the device or that some other identification be required to signal that the use of the device is for a mobility disability. Other suggestions included displaying a disability parking placard on the device or issuing EPAMDs, like the Segway® PT, a permit that would be similar to permits associated with parking spaces reserved for those with disabilities.

Advocacy, nonprofit, and several individual commenters balked at the notion of allowing any inquiry beyond whether the device is necessary for a mobility disability and encouraged the Department to retain the NPRM's language on this topic. Other commenters, however, were empathetic with commenters who had concerns about fraud. At least one Segway® PT advocate suggested it would be permissible to seek documentation of the mobility disability in the form of a simple

sign or permit.

The Department has sought to find common ground by balancing the needs of businesses and individuals with mobility disabilities wishing to use other power-driven mobility devices with the Department's longstanding, well-established policy of not allowing public accommodations or establishments to require proof of a mobility disability. There is no question that public accommodations have a legitimate interest in ferreting out fraudulent representations of mobility disabilities, especially given the recreational use of other power-driven mobility devices and the potential safety concerns created by having too many such devices in a specific facility at one time. However, the privacy of individuals with mobility disabilities and respect for those individuals are also vitally important.

Neither § 36.311(d) of the NPRM nor § 36.311(c) of the final rule permits inquiries into the nature of a person's mobility disability. However, the Department does not believe it is unreasonable or overly intrusive for an individual with a mobility disability seeking to use an other power-driven mobility device to provide a credible assurance to verify that the use of the other power-driven mobility device is for a mobility disability. The Department sought to minimize the amount of discretion and subjectivity exercised by public accommodations in assessing whether an individual has a mobility disability and to allow public accommodations to verify the existence of a mobility disability. The solution was derived from comments made by several individuals who said they have been admitted with their Segway® PTs into public entities and public accommodations that ordinarily do not allow these devices onsite when they have presented or displayed State-issued disability parking placards. In the examples provided by commenters, the parking placards were accepted as verification that the Segway® PTs were being used as mobility devices.

Because many individuals with mobility disabilities avail themselves of State programs that issue disability parking placards or cards and because these programs have penalties for fraudulent representations of identity and disability, utilizing the parking placard system as a means to establish the existence of a mobility disability strikes a balance between the need for privacy of the individual and fraud protection for the public accommodation. Consequently, the Department has decided to include regulatory text in § 36.311(c)(2) of the final rule that requires public accommodations to accept the presentation of a valid, State-issued disability parking placard or card, or State-issued proof of disability, as verification that an individual uses the other power-driven mobility device for his or her mobility disability. A ''valid'' disability placard or card is one that is presented by the individual to whom it was issued and is otherwise in compliance with the State of issuance's requirements for disability placards or cards. Public accommodations are required to accept a valid, State-issued disability parking placard or card, or State-issued proof of disability, as a credible assurance, but they cannot demand or require the presentation of a valid disability placard or card, or State-issued proof of disability, as a prerequisite for use of an other power-driven mobility device, because not all persons with mobility disabilities have such means of proof. If an individual with a mobility disability does not have such a placard or card, or State-issued proof of disability, he or she may present other information that would serve as a credible assurance of the existence of a mobility disability.

In lieu of a valid, State-issued disability parking placard or card, or State-issued proof of disability, a verbal representation, not contradicted by observable fact, shall be accepted as a credible assurance that the other power-driven mobility device is being used because of a mobility disability. This does not mean, however, that a mobility disability must be observable as a condition for allowing the use of an other power-driven mobility device by an individual with a mobility disability, but rather that if an individual represents that a device is be-

ing used for a mobility disability and that individual is observed thereafter engaging in a physical activity that is contrary to the nature of the represented disability, the assurance given is no longer credible and the individual may be prevented from using the device.

Possession of a valid, State-issued disability parking placard or card or a verbal assurance does not trump a public accommodation's valid restrictions on the use of other power-driven mobility devices. Accordingly, a credible assurance that the other power-driven mobility device is being used because of a mobility disability is not a guarantee of entry to a public accommodation because notwithstanding such a credible assurance, use of the device in a particular venue may be at odds with the legal standard in § 36.311(b)(1) or with one or more of the § 36.311(b)(2) factors. Only after an individual with a disability has satisfied all of the public accommodation's policies regarding the use of other power-driven mobility devices does a credible assurance become a factor in allowing the use of the device. For example, if an individual seeking to use an other power-driven mobility device fails to satisfy any of the public accommodation's stated policies regarding the use of other power-driven mobility devices, the fact that the individual legitimately possesses and presents a valid, State-issued disability parking placard or card, or State-issued proof of disability, does not trump the policy and require the public accommodation to allow the use of the device. In fact, in some instances, the presentation of a legitimately held placard or card, or State-issued proof of disability, will have no relevance or bearing at all on whether the other power-driven mobility device may be used, because the public accommodation's policy does not permit the device in question on-site under any circumstances (*e.g.,* because its use would create a substantial risk of serious harm to the immediate environment or natural or cultural resources). Thus, an individual with a mobility disability who presents a valid disability placard or card, or State-issued proof of disability, will not be able to use an ATV as an other power-driven mobility device in a mall or a restaurant if the mall or restaurant has adopted a policy banning their use for any or all of the above-mentioned reasons.

However, an individual with a mobility disability who has complied with a public accommodation's stated policies cannot be refused use of the other power-driven mobility device if he or she has provided a credible assurance that the use of the device is for a mobility disability.

Subpart D—New Construction and Alterations

Subpart D establishes the title I requirements applicable to new construction and alterations. The Department has amended this subpart to adopt the 2004 ADAAG, set forth the effective dates for implementation of the 2010 Standards, and make related revisions as described below.

Section 36.403 Alterations: Path of Travel

In the NPRM, the Department proposed one change to Sec. 36.403 on alterations and path of travel by adding a path of travel safe harbor. Proposed Sec. 36.403(a)(1) stated that if a private entity has constructed or altered required elements of a path of travel in accordance with the 1991 Standards, the private entity is not required to retrofit such elements to reflect incremental changes in the 2010 Standards solely because of an alteration to a primary function area served by that path of travel.

A substantial number of commenters objected to the Department's creation of a safe harbor for alterations to required elements of a path of travel that comply with the current 1991 Standards. These commenters argued that if a public accommodation already is in the process of altering its facility, there should be a legal requirement that individuals with disabilities are entitled to increased accessibility provided by the 2004 ADAAG for path of travel work. These comment-

ers also stated that they did not believe there was a statutory basis for "grandfathering" facilities that comply with the 1991 Standards. Another commenter argued that the updates incorporated into the 2004 ADAAG provide very substantial improvements for access, and that since there already is a 20 percent cost limit on the amount that can be expended on path of travel alterations, there is no need for a further limitation.

Some commenters supported the safe harbor as lessening the economic costs of implementing the 2004 ADAAG for existing facilities. One commenter also stated that without the safe harbor, entities that already have complied with the 1991 Standards will have to make and pay for compliance twice, as compared to those entities that made no effort to comply in the first place. Another commenter asked that the safe harbor be revised to include pre-ADA facilities that have been made compliant with the 1991 Standards to the extent "readily achievable" or, in the case of alterations, " to the maximum extent feasible," but that are not in full compliance with the 1991 Standards.

The final rule retains the safe harbor for required elements of a path of travel to altered primary function areas for private entities that already have complied with the 1991 Standards with respect to those required elements. As discussed with respect to Sec. 36.304, the Department believes that this safe harbor strikes an appropriate balance between ensuring that individuals with disabilities are provided access to buildings and facilities and mitigating potential financial burdens on existing places of public accommodation that are undertaking alterations subject to the 2010 Standards. This safe harbor is not a blanket exemption for facilities. If a private entity undertakes an alteration to a primary function area, only the required elements of a path of travel to that area that already comply with the 1991 Standards are subject to the safe harbor. If a private entity undertakes an alteration to a primary function area and the required elements of a path of travel to the altered area do not comply with the 1991 Standards, then the private entity must bring those elements into compliance with the 2010 Standards.

Section 36.405 Alterations: Historic Preservation

In the 1991 rule, the Department provided guidance on making alterations to buildings or facilities that are eligible for listing in the National Register of Historic Places under the National Historic Preservation Act or that are designated as historic under State or local law. That provision referenced the 1991 Standards. Because those cross-references to the 1991 Standards are no longer applicable, it is necessary in this final rule to provide new regulatory text. No substantive change in the Department's approach in this area is intended by this revision.

Section 36.406 Standards for New Construction and Alterations

Applicable standards. Section 306 of the ADA, 42 U.S.C. 12186, directs the Attorney General to issue regulations to implement title III that are consistent with the guidelines published by the Access Board. As described in greater detail elsewhere in this Appendix, the Department is a statutory member of the Access Board and was involved significantly in the development of the 2004 ADAAG. Nonetheless, the Department has reviewed the standards and has determined that additional regulatory provisions are necessary to clarify how the Department will apply the 2010 Standards to places of lodging, social service center establishments, housing at a place of education, assembly areas, and medical care facilities. Those provisions are contained in Sec. 36.406(c)-(g). Each of these provisions is discussed below.

Section 36.406(a) adopts the 2004 ADAAG as part of the 2010 Standards and establishes the compliance date and triggering events for the application of those standards to both new construction and alterations. Appendix B of this final rule (Analysis and Commentary on the 2010

ADA Standards for Accessible Design) provides a description of the major changes in the 2010 Standards (as compared to the 1991 ADAAG) and a discussion of the public comments that the Department received on specific sections of the 2004 ADAAG. A number of commenters asked the Department to revise certain provisions in the 2004 ADAAG in a manner that would reduce either the required scoping or specific technical accessibility requirements. As previously stated, the ADA requires the Department to adopt standards consistent with the guidelines adopted by the Access Board. The Department will not adopt any standards that provide less accessibility than is provided under the guidelines contained in the 2004 ADAAG because the guidelines adopted by the Access Board are " minimum guidelines." 42 U.S.C. 12186(c).

In the NPRM, the Department specifically proposed amending Sec. 36.406(a) by dividing it into two sections. Proposed Sec. 36.406(a)(1) specified that new construction and alterations subject to this part shall comply with the 1991 Standards if physical construction of the property commences less than six months after the effective date of the rule. Proposed Sec. 36.406(a)(2) specified that new construction and alterations subject to this part shall comply with the proposed standards if physical construction of the property commences six months or more after the effective date of the rule. The Department also proposed deleting the advisory information now published in a table at Sec. 36.406(b).

Compliance date. When the ADA was enacted, the compliance dates for various provisions were delayed in order to provide time for covered entities to become familiar with their new obligations. Titles II and III of the ADA generally became effective on January 26, 1992, six months after the regulations were published. *See* 42 U.S.C. 12131 note; 42 U.S.C. 12181 note. New construction under title II and alterations under either title II or title III had to comply with the design standards on that date. *See* 42 U.S.C. 12131 note; 42 U.S.C. 12183(a)(2). For new construction under title III, the requirements applied to facilities designed and constructed for first occupancy after January 26, 1993--18 months after the 1991 Standards were published by the Department. *See* 42 U.S.C. 12183(a)(1).

The Department received numerous comments on the issue of effective date, many of them similar to those received in response to the ANPRM. A substantial number of commenters advocated a minimum of 18 months from publication of the final rule to the effective date for application of the standards to new construction, consistent with the time period used for implementation of the 1991 Standards. Many of these commenters argued that the 18-month period was necessary to minimize the likelihood of having to redesign projects already in the design and permitting stages at the time that the final rule is published. According to these commenters, large projects take several years from design to occupancy, and can be subject to delays from obtaining zoning, site approval, third-party design approval (*i.e.,* architectural review), and governmental permits. To the extent the new standards necessitate changes in any previous submissions or permits already issued, businesses might have to expend significant funds and incur delays due to redesign and resubmission.

Some commenters also expressed concern that a six-month period would be hard to implement given that many renovations are planned around retail selling periods, holidays, and other seasonal concerns. For example, hotels plan renovations during their slow periods, retail establishments avoid renovations during the major holiday selling periods, and businesses in certain parts of the country cannot do any major construction during parts of the winter.

Some commenters argued that chain establishments need additional time to redesign their "master facility" designs for replication at multiple locations, taking into account both the new standards and applicable State and local accessibility

requirements.

Other commenters argued for extending the effective date from six months to a minimum of 12 months for many of the same reasons, and one commenter argued that there should be a tolling of the effective date for those businesses that are in the midst of the permitting process if the necessary permits are delayed due to legal challenges or other circumstances outside the business's control.

Several commenters took issue with the Department's characterization of the 2004 ADAAG and the 1991 Standards as two similar rules. These commenters argued that many provisions in the 2004 ADAAG represent a "substantial and significant" departure from the 1991 Standards and that it will take a great deal of time and money to identify all the changes and implement them. In particular, they were concerned that small businesses lacked the internal resources to respond quickly to the new changes and that they would have to hire outside experts to assist them. One commenter expressed concern that regardless of familiarity with the 2004 ADAAG, since the 2004 ADAAG standards are organized in an entirely different manner from the 1991 Standards, and contain, in the commenter's view, extensive changes, it will make the shift from the old to the new standards quite complicated.

Several commenters also took issue with the Department's proffered rationale that by adopting a six-month effective date, the Department was following the precedent of other Federal agencies that have adopted the 2004 ADAAG for facilities whose accessibility they regulate. These commenters argued that the Department's title III regulation applies to a much broader range and number of facilities and programs than the other Federal agencies (*i.e.,* Department of Transportation and the General Services Administration) and that those agencies regulate accessibility primarily in either governmental facilities or facilities operated by quasi-governmental authorities.

Several commenters representing the travel, vacation, and golf industries argued that the Department should adopt a two-year effective date for new construction. In addition to many of the arguments made by commenters in support of an 18-month effective date, these commenters also argued that a two-year time frame would allow States with DOJ-certified building codes to have the time to amend their codes to meet the 2004 ADAAG so that design professionals can work from compatible codes and standards.

Several commenters recommended treating alterations differently than new construction, arguing for a one-year effective date for alterations. Another commenter representing building officials argued that a minimum of a six-month phase-in for alterations was sufficient, since a very large percentage of alteration projects "are of a scale that they should be able to accommodate the phase-in."

In contrast, many commenters argued that the proposed six-month effective date should be retained in the final rule.

The Department has been persuaded by concerns raised by some of the commenters that the six month compliance date proposed in the NPRM for application of the 2010 Standards may be too short for certain projects that are already in the midst of the design and permitting process. The Department has determined that for new construction and alterations, compliance with the 2010 Standards will not be required until 18 months from the date the final rule is published. This is consistent with the amount of time given when the 1991 regulation was published. Since many State and local building codes contain provisions that are consistent with 2004 ADAAG, the Department has decided that public accommodations that choose to comply with the 2010 Standards as defined in Sec. 36.104 before the compliance date will still be considered in compliance with the ADA. However, public accommodations that choose to comply with the 2010 Standards in lieu of the 1991 Standards prior to the compliance date described in this rule must choose one or the other

standard, and may not rely on some of the requirements contained in one standard and some of the requirements contained in the other standard.

Triggering event. In the NPRM, the Department proposed using the start of physical construction as the triggering event for applying the proposed standards to new construction under title III. This triggering event parallels that for the alterations provisions (*i.e.,* the date on which construction begins), and would apply clearly across all types of covered public accommodations. The Department also proposed that for prefabricated elements, such as modular buildings and amusement park rides and attractions, or installed equipment, such as ATMs, the start of construction means the date on which the site preparation begins. Site preparation includes providing an accessible route to the element.

The Department's NPRM sought public comment on how to define the start of construction and the practicality of applying commencement of construction as a triggering event. The Department also requested input on whether the proposed definition of the start of construction was sufficiently clear and inclusive of different types of facilities. The Department also sought input about facilities subject to title III for which commencement of construction would be ambiguous or problematic.

The Department received numerous comments recommending that the Department adopt a two-pronged approach to defining the triggering event. In those cases where permits are required, the Department should use "date of permit application'' as the effective date triggering event, and if no permit is required, the Department should use "start of construction.'' A number of these commenters argued that the date of permit application is appropriate because the applicant would have to consider the applicable State and Federal accessibility standards in order to submit the designs usually required with the application. Moreover, the date of permit application is a typical triggering event in other code contexts, such as when jurisdictions introduce an updated building code. Some commenters expressed concern that using the date of " start of construction'' was problematic because the date can be affected by factors that are outside the control of the owner. For example, an owner can plan construction to start before the new standards take effect and therefore use the 1991 Standards in the design. If permits are not issued in a timely manner, then the construction could be delayed until after the effective date, and then the project would have to be redesigned. This problem would be avoided if the permit application date was the triggering event. Two commenters expressed concern that the term "start of construction'' is ambiguous, because it is unclear whether start of construction means the razing of structures on the site to make way for a new facility or means site preparation, such as regrading or laying the foundation.

One commenter recommended using the "signing date of a construction contract," and an additional commenter recommended that the new standards apply only to "buildings permitted after the effective date of the regulations."

One commenter stated that for facilities that fall outside the building permit requirements (ATMs, prefabricated saunas, small sheds), the triggering event should be the date of installation, rather than the date the space for the facility is constructed.

The Department is persuaded by the comments to adopt a two-pronged approach to defining the triggering event for new construction and alterations. The final rule states that in those cases where permits are required, the triggering event shall be the date when the last application for a building permit application or permit extension is certified to be complete by a State, county, or local government, or in those jurisdictions where the government does not certify completion of applications, the date when the last application for a building permit or permit extension is received by the State, county, or local government. If no permits are required, then the triggering event shall be the "start of physical construction or alterations.'' The Department has also added clarifying

language related to the term "start of physical construction or alterations'' to make it clear that "start of physical construction or alterations'' is not intended to mean the date of ceremonial groundbreaking or the date a structure is razed to make it possible for construction of a facility to take place.

Amusement rides. Section 234 of the 2010 Standards provides accessibility guidelines for newly designed and constructed amusement rides. The amusement ride provisions do not provide a "triggering event'' for new construction or alteration of an amusement ride. An industry commenter requested that the triggering event of "first use'' as noted in the Advisory note to section 234.1 of the 2004 ADAAG be included in the final rule. The Advisory note provides that "[a] custom designed and constructed ride is new upon its first use, which is the first time amusement park patrons take the ride.'' The Department declines to treat amusement rides differently than other types of new construction and alterations and under the final rule, they are subject to Sec. 36.406(a)(3). Thus, newly constructed and altered amusement rides shall comply with the 2010 Standards if the start of physical construction or the alteration is on or after 18 months from the publication date of this rule. The Department also notes that section 234.4.2 of the 2010 Standards only applies where the structural or operational characteristics of an amusement ride are altered. It does not apply in cases where the only change to a ride is the theme.

Noncomplying new construction and alterations. The element-by-element safe harbor referenced in Sec. 36.304(d)(2) has no effect on new or altered elements in existing facilities that were subject to the 1991 Standards on the date that they were constructed or altered, but do not comply with the technical and scoping specifications for those elements in the 1991 Standards. Section 36.406(a)(5) of the final rule sets forth the rules for noncompliant new construction or alterations in facilities that were subject to the requirements of this part. Under those provisions, noncomplying new construction and alterations constructed or altered after the effective date of the applicable ADA requirements and before March 15, 2012 shall, before March 15, 2012, be made accessible in accordance with either the 1991 Standards or the 2010 Standards. Noncomplying new construction and alterations constructed or altered after the effective date of the applicable ADA requirements and before March 15, 2012, shall, on or after March 15, 2012, be made accessible in accordance with the 2010 Standards.

Section 36.406(b) Application of Standards to Fixed Elements

The final rule contains a new Sec. 36.406(b) that clarifies that the requirements established by this section, including those contained in the 2004 ADAAG, prescribe the requirements necessary to ensure that fixed or built-in elements in new or altered facilities are accessible to individuals with disabilities. Once the construction or alteration of a facility has been completed, all other aspects of programs, services, and activities conducted in that facility are subject to the operational requirements established elsewhere in this final rule. Although the Department has often chosen to use the requirements of the 1991 Standards as a guide to determining when and how to make equipment and furnishings accessible, those coverage determinations fall within the discretionary authority of the Department.

The Department is also clarifying that the advisory notes, appendix notes, and figures that accompany the 1991 and 2010 Standards do not establish separately enforceable requirements unless otherwise specified in the text of the standards. This clarification has been made to address concerns expressed by ANPRM commenters who mistakenly believed that the advisory notes in the 2004 ADAAG established requirements beyond those established in the text of the guidelines (*e.g.,* Advisory 504.4 suggests, but does not require, that covered entities provide visual contrast on stair tread nosings to make them more visible to individuals with low vision). The Department received

no comments on this provision in the NPRM.

Section 36.406(c) Places of Lodging

In the NPRM, the Department proposed a new definition for public accommodations that are "places of lodging" and a new Sec. 36.406(c) to clarify the scope of coverage for places of public accommodation that meet this definition. For many years the Department has received inquiries from members of the public seeking clarification of ADA coverage of rental accommodations in timeshares, condominium hotels, and mixed-use and corporate hotel facilities that operate as places of public accommodation (as that term is now defined in Sec. 36.104). These facilities, which have attributes of both residential dwellings and transient lodging facilities, have become increasingly popular since the ADA's enactment in 1990 and make up the majority of new hotel construction in some vacation destinations. The hybrid residential and lodging characteristics of these new types of facilities, as well as their ownership characteristics, complicate determinations of ADA coverage, prompting questions from both industry and individuals with disabilities. While the Department has interpreted the ADA to encompass these hotel-like facilities when they are used to provide transient lodging, the regulation previously has specifically not addressed them. In the NPRM, the Department proposed a new Sec. 36.406(c), entitled "Places of Lodging," which was intended to clarify that places of lodging, including certain timeshares, condominium hotels, and mixed-use and corporate hotel facilities, shall comply with the provisions of the proposed standards, including, but not limited to, the requirements for transient lodging in sections 224 and 806 of the 2004 ADAAG.

The Department's NPRM sought public input on this proposal. The Department received a substantial number of comments on these issues from industry representatives, advocates for persons with disabilities, and individuals. A significant focus of these comments was on how the Department should define and regulate vacation rental units in timeshares, vacation communities, and condo-hotels where the units are owned and controlled by individual owners and rented out some portion of time to the public, as compared to traditional hotels and motels that are owned, controlled, and rented to the public by one entity.

Scoping and technical requirements applicable to "places of lodging." In the NPRM, the Department asked for public comment on its proposal in Sec. 36.406(c) to apply to places of lodging the scoping and technical requirements for transient lodging, rather than the scoping and technical requirements for residential dwelling units.

Commenters generally agreed that the transient lodging requirements should apply to places of lodging. Several commenters stated that the determination as to which requirements apply should be made based on the intention for use at the time of design and construction. According to these commenters, if units are intended for transient rentals, then the transient lodging standards should apply, and if they are intended to be used for residential purposes, the residential standards should apply. Some commenters agreed with the application of transient lodging standards to places of lodging in general, but disagreed about the characterization of certain types of facilities as covered places of lodging.

The Department agrees that the scoping and technical standards applicable to transient lodging should apply to facilities that contain units that meet the definition of "places of lodging."

Scoping for timeshare or condominium hotels. In the NPRM, the Department sought comment on the appropriate basis for determining scoping for a timeshare or condominium-hotel. A number of commenters indicated that scoping should be based on the usage of the facility. Only those units used for short-term stays should be counted for application of the transient lodging standards, while units sold as residential properties should be treated as residential units not subject to the ADA.

One commenter stated that scoping should be based on the maximum number of sleeping units available for public rental. Another commenter pointed out that unlike traditional hotels and motels, the number of units available for rental in a facility or development containing individually owned units is not fixed over time. Owners have the right to participate in a public rental program some, all, or none of the time, and individual owner participation changes from year to year.

The Department believes that the determination for scoping should be based on the number of units in the project that are designed and constructed with the intention that their owners may participate in a transient lodging rental program. The Department cautions that it is not the number of owners that actually exercise their right to participate in the program that determines the scoping. Rather it is the units that could be placed into an on-site or off-site transient lodging rental program. In the final rule, the Department has added a provision to Sec. 36.406(c)(3), which states that units intended to be used exclusively for residential purposes that are contained in facilities that also meet the definition of place of lodging are not covered by the transient lodging standards. Title III of the ADA does not apply to units designed and constructed with the intention that they be rented or sold as exclusively residential units. Such units are covered by the Fair Housing Act (FHAct), which contains requirements for certain features of accessible and adaptable design both for units and for public and common use areas. All units designed and constructed with the intention that they may be used for both residential and transient lodging purposes are covered by the ADA and must be counted for determining the required number of units that must meet the transient lodging standards in the 2010 Standards. Public use and common use areas in facilities containing units subject to the ADA also must meet the 2010 Standards. In some developments, units that may serve as residential units some of the time and rental units some of the time will have to meet both the FHAct and the ADA requirements. For example, all of the units in a vacation condominium facility whose owners choose to rent to the public when they are not using the units themselves would be counted for the purposes of determining the appropriate number of units that must comply with the 2010 Standards. In a newly constructed condominium that has three floors with units dedicated to be sold solely as residential housing and three floors with units that may be used as residences or hotel units, only the units on the three latter floors would be counted for applying the 2010 Standards. In a newly constructed timeshare development containing 100 units, all of which may be made available to the public through an exchange or rental program, all 100 units would be counted for purposes of applying the 2010 Standards.

One commenter also asked the Department for clarification of how to count individually owned "lock-off units." Lock-off units are units that are multi-bedroom but can be "locked off" into two separate units, each having individual external access. This commenter requested that the Department state in the final rule that individually owned lock-off units do not constitute multiple guest rooms for purposes of calculating compliance with the scoping requirements for accessible units, since for the most part the lock-off units are used as part of a larger accessible unit, and portions of a unit not locked off would constitute both an accessible one-bedroom unit or an accessible two-bedroom unit with the lock-off unit.

It is the Department's view that lock-off units that are individually owned that can be temporarily converted into two units do not constitute two separate guest rooms for purposes of calculating compliance with the scoping requirements.

One commenter asked the Department how developers should scope units where buildings are constructed in phases over a span of years, recommending that the scoping be based on the total number of units expected to be constructed at the project and not on a building-by-building basis or

on a phase-by-phase basis. The Department does not think scoping should be based on planned number of units, which may or may not be actually constructed over a period of years. However, the Department recognizes that resort developments may contain buildings and facilities that are of all sizes from single-unit cottages to facilities with hundreds of units. The Department believes it would be appropriate to allow designers, builders, and developers to aggregate the units in facilities with 50 or fewer units that are subject to a single permit application and that are on a common site or that are constructed at the same time for the purposes of applying the scoping requirements in table 224.2. Facilities with more than 50 units should be scoped individually in accordance with the table. The regulation has been revised to reflect this application of the scoping requirements.

One commenter also asked the Department to use the title III regulation to declare that timeshares subject to the transient lodging standards are exempt from the design and construction requirements of the FHAct. The coverage of the FHAct is set by Congress and interpreted by regulations issued by the Department of Housing and Urban Development. The Department has no authority to exempt anyone from coverage of the FHAct.

Application of ADA to places of lodging that contain individually owned units. The Department believes that regardless of ownership structure for individual units, rental programs (whether they are on- or off-site) that make transient lodging guest rooms available to the public must comply with the general nondiscrimination requirements of the ADA. In addition, as provided in Sec. 36.406(c), newly constructed facilities that contain accommodations intended to be used for transient lodging purposes must comply with the 2010 Standards.

In the NPRM, the Department asked for public comment on several issues related to ensuring the availability of accessible units in a rental program operated by a place of lodging. The Department sought input on how it could address a situation in which a new or converted facility constructs the required number of accessible units, but the owners of those units choose not to participate in the rental program; whether the facility has an obligation to encourage or require owners of accessible units to participate in the rental program; and whether the facility developer, the condominium association, or the hotel operator has an obligation to retain ownership or control over a certain number of accessible units to avoid this problem.

In the NPRM, the Department sought public input on how to regulate scoping for a timeshare or condominium-rental facility that decides, after the sale of units to individual owners, to begin a rental program that qualifies the facility as a place of lodging, and how the condominium association, operator, or developer should determine which units to make accessible.

A number of commenters expressed concerns about the ability of the Department to require owners of accessible units to participate in the rental program, to require developers, condo associations, or homeowners associations to retain ownership of accessible units, and to impose accessibility requirements on individual owners who choose to place inaccessible units into a rental program after purchase. These commenters stated that individuals who purchase accessible vacation units in condominiums, individual vacation homes, and timeshares have ownership rights in their units and may choose lawfully to make their units available to the public some, all, or none of the time. Commenters advised the Department that the Securities and Exchange Commission takes the position that if condominium units are offered in connection with participation in a required rental program for any part of the year, require the use of an exclusive rental agent, or impose conditions otherwise restricting the occupancy or rental of the unit, then that offering will be viewed as an offering of securities in the form of an investment (rather than a real estate offering). SEC Release No. 33-5347, Guidelines as to

the Applicability of the Federal Securities Laws to Offers and Sales of Condominiums or Units in a Real Estate Development (Jan. 4, 1973). Consequently, most condominium developers do not impose such restrictions at the time of sale. Moreover, owners who choose to rent their units as a short-term vacation rental can select any rental or management company to lease and manage their unit, or they may rent them out on their own. They also may choose never to lease those units. Thus, there are no guarantees that at any particular time, accessible units will be available for rental by the public. According to this commenter, providing incentives for owners of accessible units to place their units in the rental program will not work, because it does not guarantee the availability of the requisite number of rooms dispersed across the development, and there is not any reasonable, identifiable source of funds to cover the costs of such incentives.

A number of commenters also indicated that it potentially is discriminatory as well as economically infeasible to require that a developer hold back the accessible units so that the units can be maintained in the rental program year-round. One commenter pointed out that if a developer did not sell the accessible condominiums or timeshares in the building inventory, the developer would be subject to a potential ADA or FHAct complaint because persons with disabilities who wanted to buy accessible units rather than rent them each year would not have the option to purchase them. In addition, if a developer held back accessible units, the cost of those units would have to be spread across all the buyers of the inaccessible units, and in many cases would make the project financially infeasible. This would be especially true for smaller projects. Finally, this commenter argued that requiring units to be part of the common elements that are owned by all of the individual unit owners is infeasible because the common ownership would result in pooled rental income, which would transform the owners into participants in a rental pool, and thus turn the sale of the condominiums into the sale of securities under SEC Release 33-5347.

Several commenters noted that requiring the operator of the rental program to own the accessible units is not feasible either because the operator of the rental program would have to have the funds to invest in the purchase of all of the accessible units, and it would not have a means of recouping its investment. One commenter stated that in Texas, it is illegal for on-site rental programs to own condominium units. Another commenter noted that such a requirement might lead to the loss of on-site rental programs, leaving owners to use individual third-party brokers, or rent the units privately. One commenter acknowledged that individual owners cannot be required to place their units in a rental pool simply to offer an accessible unit to the public, since the owners may be purchasing units for their own use. However, this commenter recommended that owners who choose to place their units in a rental pool be required to contribute to a fund that would be used to renovate units that are placed in the rental pool to increase the availability of accessible units. One commenter argued that the legal entity running the place of lodging has an obligation to retain control over the required number of accessible units to ensure that they are available in accordance with title III.

A number of commenters also argued that the Department has no legal authority to require individual owners to engage in barrier removal where an existing development adds a rental program. One commenter stated that Texas law prohibits the operator of on-site rental program from demanding that alterations be made to a particular unit. In addition, under Texas law, condominium declarations may not require some units and not others to make changes, because that would lead to unequal treatment of units and owners, which is not permissible.

One commenter stated that since it was not possible for operators of rental programs offer-

ing privately owned condominiums to comply with accessible scoping, the Department should create exemptions from the accessible scoping, especially for existing facilities. In addition, this commenter stated that if an operator of an on-site rental program were to require renovations as a condition of participation in the rental program, unit owners might just rent their units through a different broker or on their own, in which case such requirements would not apply.

A number of commenters argued that if a development decides to create a rental program, it must provide accessible units. Otherwise the development would have to ensure that units are retrofitted. A commenter argued that if an existing building is being converted, the Department should require that if alterations of the units are performed by an owner or developer prior to sale of the units, then the alterations requirements should apply, in order to ensure that there are some accessible units in the rental pool. This commenter stated that because of the proliferation of these type of developments in Hawaii, mandatory alteration is the only way to guarantee the availability of accessible units in the long run. In this commenter's view, since conversions almost always require makeover of existing buildings, this will not lead to a significant expense.

The Department agrees with the commenters that it would not be feasible to require developers to hold back or purchase accessible units for the purposes of making them available to the public in a transient lodging rental program, nor would it be feasible to require individual owners of accessible units to participate in transient lodging rental programs.

The Department recognizes that places of lodging are developed and financed under myriad ownership and management structures and agrees that there will be circumstances where there are legal barriers to requiring compliance with either the alterations requirements or the requirements related to barrier removal. The Department has added an exception to Sec. 36.406(c), providing that in existing facilities that meet the definition of places of lodging, where the guest rooms are not owned or substantially controlled by the entity that owns, leases, or operates the overall facility and the physical features of the guest room interiors are controlled by their individual owners, the units are not subject to the alterations requirement, even where the owner rents the unit out to the public through a transient lodging rental program. In addition, the Department has added an exception to the barrier removal requirements at Sec. 36.304(g) providing that in existing facilities that meet the definition of places of lodging, where the guest rooms are not owned or substantially controlled by the entity that owns, leases, or operates the overall facility and the physical features of the guest room interiors are controlled by their individual owners, the units are not subject to the barrier removal requirement. The Department notes, however, that there are legal relationships for some timeshares and cooperatives where the ownership interests do not convey control over the physical features of units. In those cases, it may be the case that the facility has an obligation to meet the alterations or barrier removal requirements or to maintain accessible features.

Section 36.406(d) Social Service Center Establishments

In the NPRM, the Department proposed a new Sec. 36.406(d) requiring group homes, halfway houses, shelters, or similar social service center establishments that provide temporary sleeping accommodations or residential dwelling units to comply with the provisions of the 2004 ADAAG that apply to residential facilities, including, but not limited to, the provisions in sections 233 and 809.

The NPRM explained that this proposal was based on two important changes in the 2004 ADAAG. First, for the first time, residential dwelling units are explicitly covered in the 2004 ADAAG in section 233. Second, the 2004

ADAAG eliminates the language contained in the 1991 Standards addressing scoping and technical requirements for homeless shelters, group homes, and similar social service center establishments. Currently, such establishments are covered in section 9.5 of the transient lodging section of the 1991 Standards. The deletion of section 9.5 creates an ambiguity of coverage that must be addressed.

The NPRM explained the Department's belief that transferring coverage of social service center establishments from the transient lodging standards to the residential facilities standards would alleviate conflicting requirements for social service providers. The Department believes that a substantial percentage of social service providers are recipients of Federal financial assistance from the Department of Housing and Urban Development (HUD). The Department of Health and Human Services (HHS) also provides financial assistance for the operation of shelters through the Administration for Children and Families programs. As such, they are covered both by the ADA and section 504. UFAS is currently the design standard for new construction and alterations for entities subject to section 504. The two design standards for accessibility--the 1991 Standards and UFAS--have confronted many social service providers with separate, and sometimes conflicting, requirements for design and construction of facilities. To resolve these conflicts, the residential facilities standards in the 2004 ADAAG have been coordinated with the section 504 requirements. The transient lodging standards, however, are not similarly coordinated. The deletion of section 9.5 of the 1991 Standards from the 2004 ADAAG presented two options: (1) Require coverage under the transient lodging standards, and subject such facilities to separate, conflicting requirements for design and construction; or (2) require coverage under the residential facilities standards, which would harmonizes the regulatory requirements under the ADA and section 504. The Department chose the option that harmonizes the regulatory requirements: coverage under the residential facilities standards.

In the NPRM, the Department expressed concern that the residential facilities standards do not include a requirement for clear floor space next to beds similar to the requirement in the transient lodging standards; as a result, the Department proposed adding a provision that would require certain social service center establishments that provide sleeping rooms with more than 25 beds to ensure that a minimum of 5 percent of the beds have clear floor space in accordance with section 806.2.3 of the 2004 ADAAG.

The Department requested information from providers who operate homeless shelters, transient group homes, halfway houses, and other social service center establishments, and from the clients of these facilities who would be affected by this proposed change. In the NPRM, the Department asked to what extent conflicts between the ADA and section 504 have affected these facilities and what the effect would be of applying the residential dwelling unit requirements to these facilities, rather than the requirements for transient lodging guest rooms.

Many of the commenters supported applying the residential facilities requirements to social service center establishments stating that even though the residential facilities requirements are less demanding, in some instances, the existence of one clear standard will result in an overall increased level of accessibility by eliminating the confusion and inaction that are sometimes caused by the current existence of multiple requirements. One commenter stated that the residential facilities guidelines were more appropriate because individuals housed in social service center establishments typically stay for a prolonged period of time, and guests of a transient lodging facility typically are not housed to participate in a program or receive services.

One commenter opposed to the proposed section argued for the application of the transient

lodging standards to all social service center establishments except those that were "intended as a person's place of abode," referencing the Department's question related to the definition of place of lodging in the title III NPRM. A second commenter stated that the use of transient lodging guidelines would lead to greater accessibility.

The Department continues to be concerned about alleviating the challenges for social service providers that are also subject to section 504 and that would likely be subject to conflicting requirements if the transient lodging standard were applied. Thus, the Department has retained the requirement that social service center establishments comply with the residential dwelling standards. The Department did not receive comments regarding adding a requirement for bathing options, such as a roll-in shower, in social service center establishments operated by public accommodations. The Department did, however, receive comments in support of adding such a requirement regarding public entities under title II. The Department believes that social service center establishments that provide emergency shelter to large transient populations should be able to provide bathing facilities that are accessible to persons with mobility disabilities who need roll-in showers. Because of the transient nature of the population of these large shelters, it will not be feasible to modify bathing facilities in a timely manner when faced with a need to provide a roll-in shower with a seat when requested by an overnight visitor. As a result, the Department has added a requirement that social service center establishments with sleeping accommodations for more than 50 individuals must provide at least one roll-in shower with a seat that complies with the relevant provisions of section 608 of the 2010 Standards. Transfer-type showers are not permitted in lieu of a roll-in shower with a seat, and the exceptions in sections 608.3 and 608.4 for residential dwelling units are not permitted. When separate shower facilities are provided for men and for women, at least one roll-in shower must be provided for each group. This supplemental requirement to the residential facilities standards is in addition to the supplemental requirement that was proposed in the NPRM for clear floor space in sleeping rooms with more than 25 beds.

The Department also notes that while dwelling units at some social service center establishments are also subject to FHAct design and construction requirements that require certain features of adaptable and accessible design, FHAct units do not provide the same level of accessibility that is required for residential facilities under the 2010 Standards. The FHAct requirements, where also applicable, should not be considered a substitute for the 2010 Standards. Rather, the 2010 Standards must be followed in addition to the FHAct requirements.

The Department also notes that while in the NPRM the Department used the term "social service establishment," the final rule uses the term " social service center establishment." The Department has made this editorial change so that the final rule is consistent with the terminology used in the ADA. *See* 42 U.S.C. 12181(7)(K).

Section 36.406(e) Housing at a Place of Education

The Department of Justice and the Department of Education share responsibility for regulation and enforcement of the ADA in postsecondary educational settings, including architectural features. Housing types in educational settings range from traditional residence halls and dormitories to apartment or townhouse-style residences. In addition to title III of the ADA, universities and schools that are recipients of Federal financial assistance also are subject to section 504, which contains its own accessibility requirements currently through the application of UFAS. Residential housing, including housing in an educational setting, is also covered by the FHAct, which requires newly constructed multifamily housing

to include certain features of accessible and adaptable design. Covered entities subject to the ADA must always be aware of, and comply with, any other Federal statutes or regulations that govern the operation of residential properties.

Although the 1991 Standards mention dormitories as a form of transient lodging, they do not specifically address how the ADA applies to dormitories and other types of residential housing provided in an educational setting. The 1991 Standards also do not contain any specific provisions for residential facilities, allowing covered entities to elect to follow the residential standards contained in UFAS. Although the 2004 ADAAG contains provisions for both residential facilities and transient lodging, the guidelines do not indicate which requirements apply to housing provided in an educational setting, leaving it to the adopting agencies to make that choice. After evaluating both sets of standards, the Department concluded that the benefits of applying the transient lodging standards outweighed the benefits of applying the residential facilities standards. Consequently, in the NPRM, the Department proposed a new Sec. 36.406(e) that provided that residence halls or dormitories operated by or on behalf of places of education shall comply with the provisions of the proposed standards for transient lodging, including, but not limited to, the provisions in sections 224 and 806 of the 2004 ADAAG.

Private universities and schools covered by title III as public accommodations are required to make their programs and activities accessible to persons with disabilities. The housing facilities that they provide have varied characteristics. College and university housing facilities typically provide housing for up to one academic year, but may be closed during school vacation periods. In the summer, they often are used for short-term stays of one to three days, a week, or several months. Graduate and faculty housing often is provided year-round in the form of apartments, which may serve individuals or families with children. These housing facilities are diverse in their layout. Some are double-occupancy rooms with a shared toilet and bathing room, which may be inside or outside the unit. Others may contain cluster, suite, or group arrangements where several rooms are located inside a defined unit with bathing, kitchen, and similar common facilities. In some cases, these suites are indistinguishable in features from traditional apartments. Universities may build their own housing facilities or enter into agreements with private developers to build, own, or lease housing to the educational institution or to its students. Academic housing may be located on the campus of the university or may be located in nearby neighborhoods.

Throughout the school year and the summer, academic housing can become program areas in which small groups meet, receptions and educational sessions are held, and social activities occur. The ability to move between rooms--both accessible rooms and standard rooms--in order to socialize, to study, and to use all public use and common use areas is an essential part of having access to these educational programs and activities. Academic housing also is used for short-term transient educational programs during the time students are not in regular residence and may be rented out to transient visitors in a manner similar to a hotel for special university functions.

The Department was concerned that applying the new construction requirements for residential facilities to educational housing facilities could hinder access to educational programs for students with disabilities. Elevators generally are not required under the 2004 ADAAG residential facilities standards unless they are needed to provide an accessible route from accessible units to public use and common use areas, while under the 2004 ADAAG as it applies to other types of facilities, multistory private facilities must have elevators unless they meet very specific exceptions. In addition, the residential facilities standards do not require accessible roll-in showers in bathrooms, while the transient lodging requirements require some of the accessible units to be served by bath-

rooms with roll-in showers. The transient lodging standards also require that a greater number of units have accessible features for persons with communication disabilities. The transient lodging standards provide for installation of the required accessible features so that they are available immediately, but the residential facilities standards allow for certain features of the unit to be adaptable. For example, only reinforcements for grab bars need to be provided in residential dwellings, but the actual grab bars must be installed under the transient lodging standards. By contrast, the residential facilities standards do require certain features that provide greater accessibility within units, such as usable kitchens and an accessible route throughout the dwelling. The residential facilities standards also require 5 percent of the units to be accessible to persons with mobility disabilities, which is a continuation of the same scoping that is currently required under UFAS and is therefore applicable to any educational institution that is covered by section 504. The transient lodging standards require a lower percentage of accessible sleeping rooms for facilities with large numbers of rooms than is required by UFAS. For example, if a dormitory has 150 rooms, the transient lodging standards would require 7 accessible rooms, while the residential standards would require 8. In a large dormitory with 500 rooms, the transient lodging standards would require 13 accessible rooms, and the residential facilities standards would require 25. There are other differences between the two sets of standards, including requirements for accessible windows, alterations, kitchens, an accessible route throughout a unit, and clear floor space in bathrooms allowing for a side transfer.

In the NPRM, the Department requested public comment on how to scope educational housing facilities, and it asked whether the residential facilities requirements or the transient lodging requirements in the 2004 ADAAG would be more appropriate for housing at places of education and asked how the different requirements would affect the cost of building new dormitories and other student housing. *See* 73 FR 34508, 34545 (June 17, 2008).

The Department received several comments on this issue under title III. One commenter stated that the Department should adopt the residential facilities standards for housing at a place of education. In the commenter's view, the residential facilities standards are congruent with overlapping requirements imposed by HUD, and the residential facilities requirements would ensure dispersion of accessible features more effectively. This commenter also argued that while the increased number of required accessible units for residential facilities as compared to transient lodging may increase the cost of construction or alteration, this cost would be offset by a reduced need later to adapt rooms if the demand for accessible rooms exceeds the supply. The commenter also encouraged the Department to impose a visitability (accessible doorways and necessary clear floor space for turning radius) requirement for both the residential facilities and transient lodging requirements to allow students with mobility impairments to interact and socialize in a fully integrated fashion. Another commenter stated that while dormitories should be treated like residences as opposed to transient lodging, the Department should ensure that "all floors are accessible," thus ensuring community integration and visitability. Another commenter argued that housing at a place of education is comparable to residential housing, and that most of the housing types used by schools do not have the same amenities and services or function like transient lodging and should not be treated as such.

Several commenters focused on the length of stay at this type of housing and suggested that if the facilities are subject to occupancy for greater than 30 days, the residential standards should apply. Another commenter supported the Department's adoption of the transient lodging standards, arguing this will provide greater accessibility and therefore increase opportunities for students with

disabilities to participate. One commenter, while supporting the use of transient lodging standards in this area, argued that the Department also should develop regulations relating to the usability of equipment in housing facilities by persons who are blind or visually impaired. Another commenter argued that the Department should not impose the transient lodging requirements on K-12 schools because the cost of adding elevators can be prohibitive, and because there are safety concerns related to evacuating students in wheelchairs living on floors above the ground floor in emergencies causing elevator failures.

The Department has considered the comments recommending the use of the residential facilities standards and acknowledges that they require certain features that are not included in the transient lodging standards and that should be required for housing provided at a place of education. In addition, the Department notes that since educational institutions often use their academic housing facilities as short-term transient lodging in the summers, it is important that accessible features be installed at the outset. It is not realistic to expect that the educational institution will be able to adapt a unit in a timely manner in order to provide accessible accommodations to someone attending a one-week program during the summer.

The Department has determined that the best approach to this type of housing is to continue to require the application of transient lodging standards but, at the same time, to add several requirements drawn from the residential facilities standards related to accessible turning spaces and work surfaces in kitchens, and the accessible route throughout the unit. This will ensure the maintenance of the transient lodging standard requirements related to access to all floors of the facility, roll-in showers in facilities with more than 50 sleeping rooms, and other important accessibility features not found in the residential facilities standards, but also will ensure usable kitchens and access to all the rooms in a suite or apartment.

The Department has added a new definition to Sec. 36.104, "Housing at a Place of Education," and has revised Sec. 36.406(e) to reflect the accessible features that now will be required in addition to the requirements set forth under the transient lodging standards. The Department also recognizes that some educational institutions provide some residential housing on a year-round basis to graduate students and staff that is comparable to private rental housing but contains no facilities for educational programming. Section 36.406(e)(3) exempts from the transient lodging standards apartments or townhouse facilities that are provided with a lease on a year-round basis exclusively to graduate students or faculty and that do not contain any public use or common use areas available for educational programming; instead, such housing must comply with the requirements for residential facilities in sections 233 and 809 of the 2010 Standards.

The regulatory text uses the term "sleeping room" in lieu of the term "guest room," which is the term used in the transient lodging standards. The Department is using this term because it believes that for the most part, it provides a better description of the sleeping facilities used in a place of education than "guest room." The final rule states in Sec. 36.406(e) that the Department intends the terms to be used interchangeably in the application of the transient lodging standards to housing at a place of education.

Section 36.406(f) Assembly Areas

In the NPRM, the Department proposed Sec. 36.406(f) to supplement the assembly area requirements of the 2004 ADAAG, which the Department is adopting as part of the 2010 Standards. The NPRM proposed at Sec. 36.406(f)(1) to require wheelchair spaces and companion seating locations to be dispersed to all levels of the facility that are served by an accessible route. The Department received no significant comments on this paragraph and has decided to adopt the proposed language with minor modifications.

Section 36.406(f)(1) ensures that there is greater

dispersion of wheelchair spaces and companion seats throughout stadiums, arenas, and grandstands than would otherwise be required by sections 221 and 802 of the 2004 ADAAG. In some cases, the accessible route may not be the same route that other individuals use to reach their seats. For example, if other patrons reach their seats on the field by an inaccessible route (*e.g.*, by stairs), but there is an accessible route that complies with section 206.3 of the 2004 ADAAG that could be connected to seats on the field, wheelchair spaces and companion seats must be placed on the field even if that route is not generally available to the public.

Regulatory language that was included in the 2004 ADAAG advisory, but that did not appear in the NPRM, has been added by the Department in Sec. 36.406(f)(2). Section 36.406(f)(2) now requires an assembly area that has seating encircling, in whole or in part, a field of play or performance area, such as an arena or stadium, to place wheelchair spaces and companion seats around the entire facility. This rule, which is designed to prevent a public accommodation from placing wheelchair spaces and companion seats on one side of the facility only, is consistent with the Department's enforcement practices and reflects its interpretation of section 4.33.3 of the 1991 Standards.

In the NPRM, the Department proposed Sec. 36.406(f)(2), which prohibits wheelchair spaces and companion seating locations from being "located on (or obstructed by) temporary platforms * * *." 73 FR 34508, 34557 (June 17, 2008). Through its enforcement actions, the Department discovered that some venues place wheelchair spaces and companion seats on temporary platforms that, when removed, reveal conventional seating underneath, or cover the wheelchair spaces and companion seats with temporary platforms on top of which they place risers of conventional seating. These platforms cover groups of conventional seats and are used to provide groups of wheelchair seats and companion seats.

Several commenters requested an exception to the prohibition of the use of temporary platforms for public accommodations that sell most of their tickets on a season-ticket or other multi-event basis. Such commenters argued that they should be able to use temporary platforms because they know, in advance, that the patrons sitting in certain areas for the whole season do not need wheelchair spaces and companion seats. The Department declines to adopt such an exception. As it explained in detail in the NPRM, the Department believes that permitting the use of movable platforms that seat four or more wheelchair users and their companions have the potential to reduce the number of available wheelchair seating spaces below the level required, thus reducing the opportunities for persons who need accessible seating to have the same choice of ticket prices and amenities that are available to other patrons in the facility. In addition, use of removable platforms may result in instances where last minute requests for wheelchair and companion seating cannot be met because entire sections of accessible seating will be lost when a platform is removed. *See* 73 FR 34508, 34546 (June 17, 2008). Further, use of temporary platforms allows facilities to limit persons who need accessible seating to certain seating areas, and to relegate accessible seating to less desirable locations. The use of temporary platforms has the effect of neutralizing dispersion and other seating requirements (*e.g.,* line of sight) for wheelchair spaces and companion seats. *Cf. Independent Living Resources v. Oregon Arena Corp.,* 1 F. Supp. 2d 1159, 1171 (D. Or. 1998) (holding that while a public accommodation may "infill" wheelchair spaces with removable seats when the wheelchair spaces are not needed to accommodate individuals with disabilities, under certain circumstances "[s]uch a practice might well violate the rule that wheelchair spaces must be dispersed throughout the arena in a manner that is roughly proportionate to the overall distribution of seating"). In addition, using temporary platforms to

convert unsold wheelchair spaces to conventional seating undermines the flexibility facilities need to accommodate secondary ticket market exchanges as required by Sec. 36.302(f)(7) of the final rule.

As the Department explained in the NPRM, however, this provision was not designed to prohibit temporary seating that increases seating for events (*e.g.*, placing temporary seating on the floor of a basketball court for a concert). Consequently, the final rule, at Sec. 36.406(f)(3), has been amended to clarify that if an entire seating section is on a temporary platform for a particular event, then wheelchair spaces and companion seats may also be in that seating section. However, adding a temporary platform to create wheelchair spaces and companion seats that are otherwise dissimilar from nearby fixed seating and then simply adding a small number of additional seats to the platform would not qualify as an "entire seating section" on the platform. In addition, Sec. 36.406(f)(3) clarifies that facilities may fill in wheelchair spaces with removable seats when the wheelchair spaces are not needed by persons who use wheelchairs.

The Department has been responsive to assembly areas' concerns about reduced revenues due to unused accessible seating. Accordingly, the Department has reduced scoping requirements significantly—by almost half in large assembly areas—and determined that allowing assembly areas to in-fill unsold wheelchair spaces with readily removable temporary individual seats appropriately balances their economic concerns with the rights of individuals with disabilities. *See* section 221.1 of the 2010 Standards.

For stadium-style movie theaters, in Sec. 36.406(f)(4) of the NPRM the Department proposed requiring placement of wheelchair seating spaces and companion seats on a riser or cross-aisle in the stadium section of the theater that satisfies at least one of the following criteria: (1) It is located within the rear 60 percent of the seats provided in the auditorium; or (2) It is located within the area of the auditorium where the vertical viewing angles are between the 40th and 100th percentile of vertical viewing angles for all seats in that theater as ranked from the first row (1st percentile) to the back row (100th percentile). The vertical viewing angle is the angle between a horizontal line perpendicular to the seated viewer's eye to the screen and a line from the seated viewer's eye to the top of the screen.

The Department proposed this bright-line rule for two reasons: (1) the movie theater industry petitioned for such a rule; and (2) the Department has acquired expertise in the design of stadium-style theaters during its litigation with several major movie theater chains. *See United States. v. AMC Entertainment, Inc.*, 232 F. Supp.2d 1092 (C.D. Cal. 2002), *rev'd in part*, 549 F.3d 760 (9th Cir. 2008); *United States v. Cinemark USA, Inc.*, 348 F.3d 569 (6th Cir. 2003). Two industry commenters—at least one of whom otherwise supported this rule—requested that the Department explicitly state that this rule does not apply retroactively to existing theaters. Although this provision on its face applies to new construction and alterations, these commenters were concerned that the rule could be interpreted to apply retroactively because of the Department's statements in the NPRM and ANPRM that this bright line rule, although newly articulated, is not a new standard but "merely codifi[es] longstanding Department requirement[s]," 73 FR 34508, 34534 (June 17, 2008), and does not represent a "substantive change from the existing line-of-sight requirements" of section 4.33.3 of the 1991 Standards, 69 FR 58768, 58776 (Sept. 30, 2004).

Although the Department intends for Sec. 36.406(f)(4) of this rule to apply prospectively to new construction and alterations, this rule is not a departure from, and is consistent with, the line-of-sight requirements in the 1991 Standards. The Department has always interpreted the line-of-sight requirements in the 1991 Standards to require viewing angles provided to patrons who use wheelchairs to be comparable to those afforded

to other spectators. Section 36.406(f)(4) merely represents the application of these requirements to stadium-style movie theaters.

One commenter from a trade association sought clarification whether Sec. 36.406(f)(4) applies to stadium-style theaters with more than 300 seats, and argued that it should not since dispersion requirements apply in those theaters. The Department declines to limit this rule to stadium-style theaters with 300 or fewer seats; stadium-style theaters of all sizes must comply with this rule. So, for example, stadium-style theaters that must vertically disperse wheelchair spaces and companion seats must do so within the parameters of this rule.

The NPRM included a provision that required assembly areas with more than 5,000 seats to provide at least five wheelchair spaces with at least three companion seats for each of those five wheelchair spaces. The Department agrees with commenters who asserted that group seating is better addressed through ticketing policies rather than design and has deleted that provision from this section of the final rule.

Section 36.406(g) Medical Care Facilities

In the 1991 title III regulation, there was no provision addressing the dispersion of accessible sleeping rooms in medical care facilities. The Department is aware, however, of problems that individuals with disabilities face in receiving full and equal medical care when accessible sleeping rooms are not adequately dispersed. When accessible rooms are not fully dispersed, a person with a disability is often placed in an accessible room in an area that is not medically appropriate for his or her condition, and is thus denied quick access to staff with expertise in that medical specialty and specialized equipment. While the Access Board did not establish specific design requirements for dispersion in the 2004 ADAAG, in response to extensive comments in support of dispersion it added an advisory note, Advisory 223.1 General, encouraging dispersion of accessible rooms within the facility so that accessible rooms are more likely to be proximate to appropriate qualified staff and resources.

In the NPRM, the Department sought additional comment on the issue, asking whether it should require medical care facilities, such as hospitals, to disperse their accessible sleeping rooms, and if so, by what method (by specialty area, floor, or other criteria). All of the comments the Department received on this issue supported dispersing accessible sleeping rooms proportionally by specialty area. These comments from individuals, organizations, and a building code association, argued that it would not be difficult for hospitals to disperse rooms by specialty area, given the high level of regulation to which hospitals are subject and the planning that hospitals do based on utilization trends. Further, comments suggest that without a requirement, it is unlikely that hospitals would disperse the rooms. In addition, concentrating accessible rooms in one area perpetuates segregation of individuals with disabilities, which is counter to the purpose of the ADA.

The Department has decided to require medical care facilities to disperse their accessible sleeping rooms in a manner that is proportionate by type of medical specialty. This does not require exact mathematical proportionality, which at times would be impossible. However, it does require that medical care facilities disperse their accessible rooms by medical specialty so that persons with disabilities can, to the extent practical, stay in an accessible room within the wing or ward that is appropriate for their medical needs. The language used in this rule (“in a manner that is proportionate by type of medical specialty’’) is more specific than that used in the NPRM (“in a manner that enables patients with disabilities to have access to appropriate specialty services’’) and adopts the concept of proportionality proposed by the commenters. Accessible rooms should be dispersed throughout all medical specialties, such as obstet-

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clinics, orthopedics, pediatrics, and cardiac care.

Subpart F—Certification of State Laws or Local Building Codes

Subpart F contains procedures implementing section 308(b)(1)(A)(ii) of the ADA, which provides that on the application of a State or local jurisdiction, the Attorney General may certify that a State or local building code or similar ordinance meets or exceeds the minimum accessibility requirements of the Act. In enforcement proceedings, this certification will constitute rebuttable evidence that the law or code meets or exceeds the ADA's requirements. In its NPRM, the Department proposed three changes in subpart F that would streamline the process for public entities seeking certification, all of which are adopted in this final rule.

First, the Department proposed deleting the existing § 36.603, which establishes the obligations of a submitting authority that is seeking certification of its code, and issue in its place informal regulatory guidance regarding certification submission requirements. Due to the deletion of § 36.603, §§ 36.604 through 36.608 are renumbered, and § 36.603 in the final rule is modified to indicate that the Assistant Attorney General for the Civil Rights Division (Assistant Attorney General) shall make a preliminary determination of equivalency after ''receipt and review of all information relevant to a request filed by a submitting official for certification of a code.'' Second, the Department proposed that the requirement in renumbered § 36.604 (previously § 36.605) that an informal hearing be held in Washington, DC, if the Assistant Attorney General makes a preliminary determination of equivalency be changed to a requirement that the hearing be held in the State or local jurisdiction charged with administration and enforcement of the code. Third, the Department proposed adding language to renumbered § 36.606 (previously § 36.607) to explain the effect of the 2010 Standards on the codes of State or local jurisdictions that were determined in the past to meet or exceed the 1991 Standards. Once the 2010 Standards take effect, certifications issued under the 1991 Standards would not have any future effect, and States and local jurisdictions with codes certified under the 1991 Standards would need to reapply for certification under the 2010 Standards. With regard to elements of existing buildings and facilities constructed in compliance with a code when a certification of equivalency was in effect, the final rule requires that in any enforcement action this compliance would be treated as rebuttable evidence of compliance with the standards then in effect. The new provision added to § 36.606 may also have implications in determining an entity's eligibility for the element-by-element safe harbor.

No substantive comments were received regarding the Department's proposed changes in subpart F, and no other changes have been made to this subpart in the final rule. The Department did receive several comments addressing other issues raised in the NPRM that are related to subpart F. Because the 2010 Standards include specific design requirements for recreation facilities and play areas that may be new to many title III facilities, the Department sought comments in the NPRM about how the certification review process would be affected if the State or local jurisdiction allocates the authority to implement the new requirements to State or local agencies that are not ordinarily involved in administering building codes. One commenter, an association of building owners and managers, suggested that because of the increased scope of the 2010 Standards, it is likely that parts of covered elements in the new standards will be under the jurisdiction of multiple State or local agencies. In light of these circumstances, the commenter recommended that the Department allow State or local agencies to seek certification even if only one State or local regulatory agency requests certification. For example, if a State agency that regulates buildings seeks certification of its building code, it should be able to

do so, even if another State agency that regulates amusement rides and miniature golf courses does not seek certification.

The Department's discussion of this issue in the NPRM contemplated that all of a State or local government's accessibility requirements for title III facilities would be the subject of a request for certification. Any other approach would require the Department to certify only part of a State or local government's accessibility requirements as compared to the entirety of the revised ADA standards. As noted earlier, the Attorney General is authorized by section 308(b)(1)(A)(ii) of the ADA to certify that a State or local building code meets or exceeds the ADA's minimum accessibility requirements, which are contained in this regulation. The Department has concluded that this is a decision that must be made on a case-by-case basis because of the wide variety of enforcement schemes adopted by the States. Piecemeal certification of laws or codes that do not contain all of the minimum accessibility requirements could fail to satisfy the Attorney General's responsibility to ensure that a State or local building code meets or exceeds the minimum accessibility requirements of the Act before granting certification. However, the Department wants to permit State and local code administrators to have maximum flexibility, so the Department will leave open the possibility for case-by-case review to determine if a State has successfully met the burden of demonstrating that its accessibility codes or other laws meet or exceed the ADA requirements.

The commenter representing building owners and managers also urged the Department to extend the proposed effective date for the final rule. The commenter explained that a six-month phase-in period is inadequate for States to begin and complete a code amendment process. The commenter asserted that the inadequate phase-in period will place entities undertaking new construction and alterations, particularly in those States with certified codes, in a difficult position because State officials will continue to enforce previously certified State or local accessibility requirements that may be in conflict with the new 2010 Standards. The Department received numerous comments on the issue of the effective date, many of them similar to the concerns expressed above, in response to both the NPRM and the ANPRM. *See* Appendix A discussion of compliance dates for new construction and alterations (§ 36.406). The Department has been persuaded by the concerns raised by many commenters addressing the time and costs related to the design process for both new construction and alterations, and has determined that for new construction and alterations, compliance with the 2010 Standards will not be required until 18 months from the date the final rule is published. For more information on the issue of the compliance date, refer to subpart D—New Construction and Alterations.

One commenter, an association of theater owners, recommended that the Department establish a training program for State building inspectors for those States that receive certification to ensure more consistent ADA compliance and to facilitate the review of builders' architectural plans. The commenter also recommended that State building inspectors, once trained, review architectural plans, and after completion and inspection of facilities, be authorized to certify that the inspected building or facility meets both the certified State and the Federal accessibility requirements. Although supportive of the idea of additional training for State and local building code officials regarding ADA compliance, the Department believes that the approach suggested by the commenter of allowing State and local code officials to determine if a covered facility is in compliance with Federal accessibility requirements is not consistent with or permissible under the statutory enforcement scheme established by the ADA. As the Department stated in the NPRM, certification of State and local codes serves, to some extent, to mitigate the absence of a Federal mechanism for conducting at the national level a review of all architectural plans and inspecting all covered build-

ings under construction to ensure compliance with the ADA. In this regard, certification operates as a bridge between the obligation to comply with the 1991 Standards in new construction and alterations, and the administrative schemes of State and local governments that regulate the design and construction process. By ensuring consistency between State or local codes and Federal accessibility standards, certification has the additional benefit of streamlining the regulatory process, thereby making it easier for those in the design and construction industry to satisfy both State and Federal requirements. The Department notes, however, that although certification has the potential to increase compliance with the ADA, this result, however desirable, is not guaranteed. The ADA contemplated that there could be enforcement actions brought even in States with certified codes, and it provided some protection in litigation to builders who adhered to the provisions of the code certified to be ADA-equivalent. The Department's certification determinations make it clear that to get the benefit of certification, a facility must comply with the applicable code requirements—without relying on waivers or variances. The certified code, however, remains within the authority of the adopting State or local jurisdiction to interpret and enforce: Certification does not transform a State's building code into Federal law. Nor can certification alone authorize State and local building code officials implementing a certified code to do more than they are authorized to do under State or local law, and these officials cannot acquire authority through certification to render binding interpretations of Federal law. Therefore, the Department, while understanding the interest in obtaining greater assurance of compliance with the ADA through the interpretation and enforcement of a certified code by local code officials, declined in the NPRM to confer on local officials the authority not granted to them under the ADA to certify the compliance of individual facilities. The Department in the final rule finds no reason to alter its position on this issue in response to the comments that were received.

The commenter representing theater owners also urged the Department to provide a safe harbor to facilities constructed in compliance with State or local building codes certified under the 1991 Standards. With regard to elements of facilities constructed in compliance with a certified code prior to the effective date of the 2010 Standards, and during the period when a certification of equivalency was in effect, the Department noted in the NPRM that its approach would be consistent with the approach to the safe harbor discussed in subpart C, § 36.304 of the NPRM, with respect to elements in existing facilities constructed in compliance with the 1991 Standards. For example, elements in existing facilities in States with codes certified under the 1991 Standards would be eligible for a safe harbor if they were constructed in compliance with an ADA-certified code. In this scenario, compliance with the certified code would be treated as evidence of compliance with the 1991 Standards for purposes of determining the application of the safe harbor provision to those elements. For more information on safe harbor, refer to subpart C, § 36.304 of the final rule.

One commenter, an advocacy group for the blind, suggested that, similar to the procedures for certifying a State or local building code, the Department should establish a program to certify an entity's obligation to make its goods and services accessible to persons with sensory disabilities. The Department believes that this commenter was suggesting that covered entities should be able to request that the Department review their business operations to determine if they have met their ADA obligations. As noted earlier, subpart F contains procedures implementing section 308(b)(1)(A)(ii) of the ADA, which provides that on the application of a State or local jurisdiction, the Attorney General may certify that a State or local building code or similar ordinance meets or exceeds the minimum accessibility requirements of the ADA. The only mechanism through which the Department is authorized to ensure a covered

entity's compliance with the ADA is the enforcement scheme established under section 308(b)(1)(A)(i) of the ADA. The Department notes, however, that title III of the ADA and its implementing regulation, which includes the standards for accessible design, already require existing, altered, and newly constructed places of public accommodation, such as retail stores, hotels, restaurants, movie theaters, and stadiums, to make their facilities readily accessible to and usable by individuals with disabilities, which includes individuals with sensory disabilities, so that individuals with disabilities have a full and equal opportunity to enjoy the benefits of a public accommodation's goods, services, facilities, privileges and advantages.

Other Issues

Questions Posed in the NPRM Regarding Costs and Benefits of Complying With the 2010 Standards

In the NPRM, the Department requested comments on various cost and benefit issues related to eight requirements in the Department's Initial RIA, that were projected to have incremental costs that exceeded monetized benefits by more than $100 million when using the 1991 Standards as a comparative baseline, *i.e.,* side reach, water closet clearances in single-user toilet rooms with in-swinging doors, stairs, elevators, location of accessible routes to stages, accessible attorney areas and witness stands, assistive listening systems, and accessible teeing grounds, putting greens, and weather shelters at golf courses. 73 FR 34508, 34512 (June 17, 2008). The Department was particularly concerned about how these costs applied to alterations. The Department noted that pursuant to the ADA, the Department does not have statutory authority to modify the 2004 ADAAG and is required instead to issue regulations implementing the ADA that are consistent with the Board's guidelines. In that regard, the Department also requested comment about whether any of these eight elements in the 2010 Standards should be returned to the Access Board for further consideration, in particular as applied to alterations. Many of the comments received by the Department in response to these questions addressed both titles II and III. As a result, the Department's discussion of these comments and its response are collectively presented for both titles.

Side reach. The 1991 Standards at section 4.2.6 establish a maximum side-reach height of 54 inches. The 2010 Standards at section 308.3.1 reduce that maximum height to 48 inches. The 2010 Standards also add exceptions for certain elements to the scoping requirement for operable parts. The vast majority of comments the Department received were in support of the lower side-reach maximum of 48 inches in the 2010 Standards. Most of these comments, but not all, were received from individuals of short stature, relatives of individuals of short stature, or organizations representing the interests of persons with disabilities, including individuals of short stature. Comments from individuals with disabilities and disability advocacy groups stated that the 48-inch side reach would permit independence in performing many activities of daily living for individuals with disabilities, including individuals of short stature, persons who use wheelchairs, and persons who have limited upper body strength. In this regard, one commenter who is a business owner pointed out that as a person of short stature there were many occasions when he was unable to exit a public restroom independently because he could not reach the door handle. The commenter said that often elevator control buttons are out of his reach, and, if he is alone, he often must wait for someone else to enter the elevator so that he can ask that person to press a floor button for him. Another commenter, who is also a person of short stature, said that he has on several occasions pulled into a gas station only to find that he was unable to reach the credit card reader on the gas pump. Unlike other customers who can reach the card reader, swipe their credit or debit cards, pump their gas, and leave the station, he must use an-

other method to pay for his gas. Another comment from a person of short stature pointed out that as more businesses take steps to reduce labor costs—a trend expected to continue—staffed booths are being replaced with automatic machines for the sale, for example, of parking tickets and other products. He observed that the ''ability to access and operate these machines becomes ever more critical to function in society,'' and, on that basis, urged the Department to adopt the 48-inch side-reach requirement. Another individual commented that persons of short stature should not have to carry with them adaptive tools in order to access building or facility elements that are out of their reach, any more than persons in wheelchairs should have to carry ramps with them in order to gain access to facilities.

Many of the commenters who supported the revised side-reach requirement pointed out that lowering the side-reach requirement to 48 inches would avoid a problem sometimes encountered in the built environment when an element was mounted for a parallel approach at 54 inches, only to find afterwards that a parallel approach was not possible. Some commenters also suggested that lowering the maximum unobstructed side-reach to 48 inches would reduce confusion among design professionals by making the unobstructed forward and side-reach maximums the same (the unobstructed forward reach in both the 1991 and 2010 Standards is 48 inches maximum). These commenters also pointed out that the ICC/ANSI A117.1 Standard, which is a private sector model accessibility standard, has included a 48-inch maximum high side-reach requirement since 1998. Many jurisdictions have already incorporated this requirement into their building codes, which these commenters believed would reduce the cost of compliance with the 2010 Standards. Because numerous jurisdictions have already adopted the 48-inch side-reach requirement, the Department's failure to adopt the 48-inch side-reach requirement in the 2010 Standards, in the view of many commenters, would result in a significant reduction in accessibility, and would frustrate efforts that have been made to harmonize private sector model construction and accessibility codes with Federal accessibility requirements. Given these concerns, they overwhelmingly opposed the idea of returning the revised side-reach requirement to the Access Board for further consideration.

The Department also received comments in support of the 48-inch side-reach requirement from an association of professional commercial property managers and operators and from State governmental entities. The association of property managers pointed out that the revised side-reach requirement provided a reasonable approach to ''regulating elevator controls and all other operable parts'' in existing facilities in light of the manner in which the safe harbor, barrier removal, and alterations obligations will operate in the 2010 Standards. One governmental entity, while fully supporting the 48-inch side-reach requirement, encouraged the Department to adopt an exception to the lower reach range for existing facilities similar to the exception permitted in the ICC/ANSI A117.1 Standard. In response to this latter concern, the Department notes that under the safe harbor, existing facilities that are in compliance with the 1991 Standards, which required a 54-inch side-reach maximum, would not be required to comply with the lower side-reach requirement, unless there is an alteration. *See* § 36.304(d)(2)(i).

A number of commenters expressed either concern with, or opposition to, the 48-inch side-reach requirement and suggested that it be returned to the Access Board for further consideration. These commenters included trade and business associations, associations of retail stores, associations of restaurant owners, retail and convenience store chains, and a model code organization. Several businesses expressed the view that the lower side-reach requirement would discourage the use of their products and equipment by most of the general public. In particular, concerns were expressed by a national association of pay phone service providers regarding the possibility that pay

telephones mounted at the lower height would not be used as frequently by the public to place calls, which would result in an economic burden on the pay phone industry. The commenter described the lower height required for side reach as creating a new ''barrier'' to pay phone use, which would reduce revenues collected from pay phones and, consequently, further discourage the installation of new pay telephones. In addition, the commenter expressed concern that phone service providers would simply decide to remove existing pay phones rather than incur the costs of relocating them at the lower height. With regard to this latter concern, the commenter misunderstood the manner in which the safe harbor and barrier removal obligations under § 36.304 willoperate in the revised title III regulation for elements that comply with the 1991 Standards.

The Department does not anticipate that wholesale relocation of pay telephones in existing facilities will be required under the final rule where the telephones in existing facilities already are in compliance with the 1991 Standards. If the pay phones comply with the 1991 Standards, the adoption of the 2010 Standards does not require retrofitting of these elements to reflect incremental changes in the 2010 Standards. *See* § 36.304(d)(2). However, pay telephones that were required to meet the 1991 Standards as part of new construction or alterations, but do not in fact comply with those standards, will need to be brought into compliance with the 2010 Standards as of 18 months from the publication date of this final rule. *See* § 36.406(a)(5).

The Department does not agree with the concerns expressed by the commenter about reduced revenues from pay phones mounted at lower heights. The Department believes that while given the choice some individuals may prefer to use a pay phone that is at a higher height, the availability of some phones at a lower height will not deter individuals from making needed calls.

The 2010 Standards will not require every pay phone to be installed or moved to a lowered height. The table accompanying section 217.2 of the 2010 Standards makes clear that where one or more telephones are provided on a floor, level, or an exterior site, only one phone per floor, level, or exterior site must be placed at an accessible height. Similarly, where there is one bank of phones per floor, level, or exterior site, only one phone per floor, level, or exterior site must be accessible. And if there are two or more banks of phones per floor, level, or exterior site, only one phone per bank must be placed at an accessible height.

Another comment in opposition to the lower reach range requirement was submitted on behalf of a chain of convenience stores with fuel stops. The commenter expressed the concern that the 48-inch side reach ''will make it uncomfortable for the majority of the public,'' including persons of taller stature who would need to stoop to use equipment such as fuel dispensers mounted at the lower height. The commenter offered no objective support for the observation that a majority of the public would be rendered uncomfortable if, as required in the 2010 Standards, at least one of each type of fuel dispenser at a facility was made accessible in compliance with the lower reach range. Indeed, the Department received no comments from any individuals of tall stature expressing concern about accessible elements or equipment being mounted at the 48-inch height.

Several retail, convenience store, restaurant, and amusement park commenters expressed concern about the burden the lower side-reach requirement would place on their businesses in terms of self-service food stations and vending areas if the 48-inch requirement were applied retroactively. The cost of lowering counter height, in combination with the lack of control businesses exercise over certain prefabricated service or vending fixtures, outweighed, they argued, any benefits to persons with disabilities. For this reason, they suggested the lower side-reach requirement be referred back to the Access Board.

These commenters misunderstood the safe har-

bor and barrier removal obligations that will be in effect under the 2010 Standards. Those existing self-service food stations and vending areas that already are in compliance with the 1991 Standards will not be required to satisfy the 2010 Standards unless they engage in alterations. With regard to prefabricated vending machines and food service components that will be purchased and installed in businesses after the 2010 Standards become effective, the Department expects that companies will design these machines and fixtures to comply with the 2010 Standards in the future, as many have already done in the 10 years since the 48- inch side-reach requirement has been a part of the model codes and standards used by many jurisdictions as the basis for their construction codes.

A model code organization commented that the lower side-reach requirement would create a significant burden if it required entities to lower the mounting height for light switches, environmental controls, and outlets when an alteration did not include the walls where these elements were located, such as when ''an area is altered or as a path of travel obligation.'' The Department believes that the final rule adequately addresses those situations about which the commenter expressed concern by not requiring the relocation of existing elements, such as light switches, environmental controls, and outlets, unless they are altered. Moreover, under § 36.403 of the 1991 rule, costs for altering the path of travel to an altered area of primary function that exceed 20 percent of the overall costs of the alteration will continue to be deemed disproportionate.

The Department has determined that the revised side-reach requirement should not be returned to the Access Board for further consideration based in large part on the views expressed by a majority of thecommenters regarding the need for, and importance of, the lower side-reach requirement to ensure access for persons with disabilities.

Alterations and water closet clearances in single-user toilet rooms with in-swinging doors. The 1991 Standards allow a lavatory to be placed a minimum of 18 inches from the water closet centerline and a minimum of 36 inches from the side wall adjacent to the water closet, which precludes side transfers. The 1991 Standards do not allow an in-swinging door in a toilet or bathing room to overlap the required clear floor space at any accessible fixture. To allow greater transfer options, section 604.3.2 of the 2010 Standards prohibits lavatories from overlapping the clear floor space at water closets, except in certain residential dwelling units. Section 603.2.3 of the 2010 Standards maintains the prohibition on doors swinging into the clear floor space or clearance required for any fixture, except that they permit the doors of toilet or bathing rooms to swing into the required turning space, provided that there is sufficient clearance space for the wheelchair outside the door swing. In addition, in single-user toilet or bathing rooms, exception 2 of section 603.2.3 of the 2010 Standards permits the door to swing into the clear floor space of an accessible fixture if a clear floor space that measures at least 30 inches by 48 inches is available outside the arc of the door swing.

The majority of commenters believed that this requirement would increase the number of toilet rooms accessible to individuals with disabilities who use wheelchairs or mobility scooters, and will make it easier for them to transfer. A number of commenters stated thatthere was no reason to return this provision to the Access Board. Numerous commenters noted that this requirement is already included in other model accessibility standards and many State and local building codes and that the adoption of the 2010 Standards is an important part of harmonization efforts.

Other commenters, mostly trade associations, opposed this requirement, arguing that the added cost to the industry outweighs any increase in accessibility. Two commenters stated that these proposed requirements would add two feet to the width of an accessible single-user toilet room; however, another commenter said the drawings in the proposed regulation demonstrated that there

would be no substantial increase in the size of the toilet room. Several commenters stated that this requirement would require moving plumbing fixtures, walls, or doors at significant additional expense. Two commenters wanted the permissible overlap between the door swing and clearance around any fixture eliminated. One commenter stated that these new requirements will result in fewer alterations to toilet rooms to avoid triggering the requirement for increased clearances, and suggested that the Department specify that repairs, maintenance, or minor alterations would not trigger the need to provide increased clearances. Another commenter requested that the Department exempt existing guest room bathrooms and single-user toilet rooms that comply with the 1991Standards from complying with the increased clearances in alterations.

After careful consideration of these comments, the Department believes that the revised clearances for single-user toilet rooms will allow safer and easier transfers for individuals with disabilities, and will enable a caregiver, aide, or other person to accompany an individual with a disability into the toilet room to provide assistance. The illustrations in Appendix B to this final rule, ''Analysis and Commentary on the 2010 ADA Standards for Accessible Design,''describe several ways for public entities and public accommodations to make alterations while minimizing additional costs or loss of space. Further, in any isolated instances where existing structural limitations may entail loss of space, the public entity and public accommodation may have a technical infeasibility defense for that alteration. The Department has, therefore, decided not to return this requirement to the Access Board.

Alterations to stairs. The 1991 Standards only require interior and exterior stairs to be accessible when they provide access to levels that are not connected by an elevator, ramp, or other accessible means of vertical access.In contrast, section 210.1 of the 2010 Standards requires all newly constructed stairs that are part of a means of egress to be accessible. However, exception 2 of section 210.1 of the 2010 Standards provides that in alterations, stairs between levels connected by an accessible route need not be accessible, except that handrails shall be provided. Most commenters were in favor of this requirement for handrails in alterations, and stated that adding handrails to stairs during alterations was not only feasible and not cost prohibitive, but also provided important safety benefits. One commenter stated that making all points of egress accessible increased the number of people who could use the stairs in an emergency. A majority of the commenters did not want this requirement returned to the Access Board for further consideration. The International Building Code (IBC), which is a private sector model construction code, contains a similar provision, and most jurisdictions enforce a version of the IBC as their building code, thereby minimizing the impact of this provision on public entities and public accommodations. The Department believes that by requiring only the addition of handrails to altered stairs where levels are connected by an accessible route, the costs of compliance for public entities and public accommodations are minimized, while safe egress for individuals with disabilities is increased. Therefore, the Department has decided not to return this requirement to the Access Board.

Alterations to elevators. Under the 1991 Standards, if an existing elevator is altered, only that altered elevator must comply with the new construction requirements for accessible elevators to the maximum extent feasible. It is therefore possible that a bank of elevators controlled by a single call system may contain just one accessible elevator, leaving an individual with a disability with no way to call an accessible elevator and thus having to wait indefinitely until an accessible elevator happens to respond to the call system. In the 2010 Standards, when an element in one elevator is altered, section 206.6.1 will require the same element to be altered in all elevators that are programmed to respond to the same call button as the altered elevator. Almost all commenters

favored the proposed requirement. This requirement, according to these commenters, is necessary so a person with a disability need not wait until an accessible elevator responds to his or her call. One commenter suggested that elevator owners also could comply by modifying the call system so the accessible elevator could be summoned independently. One commenter suggested that this requirement would be difficult for small businesses located in older buildings,and one commenter suggested that this requirement be sent back to the Access Board.

After considering the comments, the Department agrees that this requirement is necessary to ensure that when an individual with a disability presses a call button, an accessible elevator will arrive. The IBC contains a similar provision, and most jurisdictions enforce a version of the IBC as their building code, minimizing the impact of this provision on public entities and public accommodations. Public entities and small businesses located in older buildings need not comply with this requirement where it is technically infeasible to do so. Further, as pointed out by one commenter, modifying the call system so the accessible elevator can be summoned independently is another means of complying with this requirement in lieu of altering all other elevators programmed to respond to the same call button. Therefore, the Department has decided not to return this requirement to the Access Board.

Location of accessible routes to stages. The 1991 Standards, at section 4.33.5, require an accessible route to connect the accessible seating and the stage, as well as other ancillary spaces used by performers. The 2010 Standards, at section 206.2.6, provide in addition that where a circulation path directly connects the seating area and the stage, the accessible route must connect directly the accessible seating and the stage, and, like the 1991 Standards, an accessible route must connect the stage with the ancillary spaces used by performers.

In the NPRM, the Department asked operators of auditoria about the extent to which auditoria already provide direct access to stages and whether there were planned alterations over the next 15 years that included accessible direct routes to stages. The Department also asked how to quantify the benefits of this requirement for persons with disabilities, and invited commenters to provide illustrative anecdotal experiences about the requirement's benefits.

The Department received many comments regarding the costs and benefits of this requirement. Although little detail was provided, many industry and governmental entity commenters anticipated that the costs of this requirement would be great and that it would be difficult to implement. They noted that premium seats may have to be removed and that load-bearing walls may have to be relocated. These commenters suggested that the significant costs would deter alterations to the stage area for a great many auditoria. Some commenters suggested that ramps to the front of the stage may interfere with means of egress and emergency exits. Several commenters requested that the requirement apply to new construction only, and one industry commenter requested an exemption for stages used in arenas or amusement parks where there is no audience participation or where the stage is a work area for performers only. One commenter requested that the requirement not apply to temporary stages.

The final rule does not require a direct accessible route to be constructed where a direct circulation path from the seating area to the stage does not exist. Consequently, those commenters who expressed concern about the burden imposed by the revised requirement *(i.e.,* where the stage is constructed with no direct circulation path connecting the general seating and performing area) should note that the final rule will not require the provision of a direct accessible route under these circumstances. The final rule applies to permanent stages, as well as ''temporary stages,'' if there is a direct circulation path from the seating area to the stage. However, the Department recognizes

that in some circumstances, such as an alteration to a primary function area, the ability to provide a direct accessible route to a stage may be costly or technically infeasible, and the auditorium owner is not precluded by the revised requirement from asserting defenses available under the regulation. In addition, the Department notes that since section 4.33.5 of the 1991 Standards requires an accessible route to a stage, the safe harbor will apply to existing facilities whose stages comply with the 1991 Standards.

Several governmental entities supported accessible auditoria and the revised requirement. One governmental entity noted that its State building code already required direct access, that it was possible to provide direct access, and that creative solutions had been found to do so.

Many advocacy groups and individual commenters strongly supported the revised requirement, discussing the acute need for direct access to stages, as such access has an impact on a great number of people at important life events, such as graduations and awards ceremonies, at collegiate and competitive performances and other school events, and at entertainment events that include audience participation. Many commenters expressed the belief that direct access is essential for integration mandates to be satisfied, and that separate routes are stigmatizing and unequal. The Department agrees with these concerns.

Commenters described the impact felt by persons in wheelchairs who are unable to access the stage at all when others are able to do so. Some of these commenters also discussed the need for the performers and production staff who use wheelchairs to have direct access to the stage, and they provided a number of examples that illustrated the importance of the rule proposed in the NPRM. Personal anecdotes were provided in comments and at the Department's public hearing on the NPRM. One mother spoke passionately and eloquently about the unequal treatment experienced by her daughter, who uses a wheelchair, at awards ceremonies and band concerts. Her daughter was embarrassed and ashamed to be carried by her father onto a stage at one band concert. When the venue had to be changed for another concert to an accessible auditorium, the band director made sure to comment that he was unhappy with the switch. Rather than endure the embarrassment and indignities, her child dropped out of band the following year.

Another father commented about how he was unable to speak from the stage at a PTA meeting at his child's school. Speaking from the floor limited his line of sight and his participation. Several examples were provided of children who could not participate on stage during graduation, awards programs, or special school events, such as plays and festivities. One student did not attend his college graduation because he would not be able to get on stage. Anotherstudent was unable to participate in the class Christmas programs or end-of-year parties unless her father could attend and lift her onto the stage. These commenters did not provide a method to quantify the benefits that would accrue by having direct access to stages. One commenter stated, however, that''the cost of dignity and respect is without measure.''

Many industry commenters and governmental entities suggested that the requirement be sent back to the Access Board for further consideration. One industry commenter mistakenly noted that some international building codes do not incorporate the requirement and that, therefore, there is a need for further consideration. However, the Department notes that both the 2003 and 2006 editions of the IBC include scoping provisions that are almost identical to this requirement and that these editions of the model code are the most frequently used. Many individuals and advocacy group commenters requested that the requirement be adopted without further delay. These commenters spoke of the acute need for direct access to stages and the amount of time it would take to resubmit the requirement to the Access Board. Several commenters noted that the 2004 ADAAG tracks recent model codes, and that there is thus

no need for further consideration. The Department agrees that no further delay is necessary and therefore has decided it will not return the requirement to the Access Board for further consideration.

Assistive listening systems. The 1991 Standards at sections 4.33.6 and 4.33.7 require assistive listening systems (ALS) in assembly areas and prescribe general performance standards for ALS systems. In the NPRM, the Department proposed adopting the technical specifications in the 2004 ADAAG for ALS that are intended to ensure better quality and effective delivery of sound and information for persons with hearing impairments, especially those using hearing aids. The Department noted in the NPRM that since 1991, advancements in ALS and the advent of digital technology have made these systems more amenable to uniform standards, which, among other things, should ensure that a certain percentage of required ALS systems arehearing-aid compatible. 73 FR 34508, 34513 (June 17, 2008). The 2010 Standards at section 219 provide scoping requirements and at section 706 address receiver jacks, hearing aid compatibility, sound pressure level, signal-to-noise ratio, and peak clipping level. The Department requested comments specifically from arena and assembly area administrators on the cost and maintenance issues associated with ALS, and asked generally about the costs and benefits of ALS, and asked whether, based upon the expected costs of ALS, the issue should be returned to the Access Board for further consideration.

Commenters from advocacy organizations noted that persons who develop significant hearing loss often discontinue their normal routines and activities, including meetings, entertainment, and large group events, due to a sense of isolation caused by the hearing loss or embarrassment. Individuals with longstanding hearing loss may never have participated in group activities for many of the same reasons. Requiring ALS may allow individuals with disabilities to contribute to the community by joining in government and public events, and through increased economic activity associated with community activities and entertainment. Making public events and entertainment accessible to persons with hearing loss also brings families and other groups that include persons with hearing loss into more community events and activities, thus exponentially increasing the benefit from ALS.

Many commenters noted that when a person has significant hearing loss, that person may be able to hear and understand information in a quiet situation with the use of hearing aids or cochlear implants; however, as background noise increases and the distance between the source of the sound and the listener grows, and especially where there is distortion in the sound, an ALS becomes essential for basic comprehension and understanding. Commenters noted that among the 31 million Americans with hearing loss, and with a projected increase to over 78 million Americans with hearing loss by 2030, the benefit from ALS is huge and growing. Advocates for persons with disabilities and individuals commented that they appreciated the improvements in the 2004 ADAAG standards for ALS, including specifications for the ALS systems and performance standards. They noted that providing neckloops that translate the signal from the ALS transmitter to a frequency that can be heard on a hearing aid or cochlear implant are much more effective than separate ALS system headsets, which sometimes create feedback, often malfunction, and may create distractions for others seated nearby. Comments from advocates and users of ALS systems consistently noted that the Department's regulation should, at a minimum, be consistent with the 2004 ADAAG. Although there were requests for adjustments in the scoping requirements from advocates seeking increased scoping requirements, and from large venue operators seeking fewer requirements, there was no significant concern expressed by commenters about the technical specifications for ALS in the 2004 ADAAG.

Some commenters from trade associations and

large venue owners criticized the scoping requirements as too onerous, and one commenter asked for a remand to the Access Board for new scoping rules. However, one State agency commented that the 2004 ADAAG largely duplicates the requirements in the 2006 IBC and the 2003 ANSI codes,which means that entities that comply with those standards would not incur additional costs associated with ADA compliance.

According to one State office of the courts, the costs to install either an infrared system or an FM system at average-sized facilities, including most courtrooms covered by title II, would be between $500 and $2,000, which the agency viewed as a small price in comparison to the benefits of inclusion. Advocacy organizations estimated wholesale costs of ALS systems at about $250 each, and individual neckloops to link the signal from the ALS transmitter to hearing aids or cochlear implants at less than $50 per unit.Many commenters pointed out that if a facility already is using induction neckloops, it would already be in compliance already and would not have any additional installation costs. One major city commented that annual maintenance is about $2,000 for the entire system of performance venues in the city. A trade association representing very large venues estimated annual maintenance and upkeep expenses, including labor and replacement parts, to be at most about $25,000 for a very large professionalsports stadium.

One commenter suggested that the scoping requirements for ALS in the 2004 ADAAG were too stringent and that the Department should refer them back to the Access Board for further review and consideration. Others commented that the requirement for new ALS systems should mandate multichannel receivers capable of receiving audio description for persons who are blind, in addition to a channel for amplification for persons who are hard of hearing. Some commenters suggested that the Department should require a set schedule and protocol of mandatory maintenance. Department regulations already require maintenance of accessible features at § 36.211(a) of the title III regulation, which obligates a title III entity to maintain ALS in good working order. The Department recognizes that maintenance of ALS is key to its usability. Necessary maintenance will vary dramatically from venue to venue based upon a variety of factors including frequency of use, number of units, quality of equipment, and other items. Accordingly, the Department has determined that it is not appropriate to mandate details of maintenance, but notes that failure to maintain ALS would violate § 36.211(a) of this rule.

The NPRM asked whether the Department should return the issue of ALS requirements to the Access Board for further review. The Department has received substantial feedback on the technical and scoping requirements for ALS and is convinced that these requirements are reasonable—especially in light of the fact that the requirements largely duplicate those in the 2006 IBC and the 2003 ANSI codes already adopted in many States—and that the benefits justify the requirements. In addition, the Department believes that the new specifications will make ALS work more effectively for more persons with disabilities, which, together with a growing population of new users, will increase demand for ALS, thus mooting criticism from some large venue operators about insufficient demand. Thus, the Department has determined that it is unnecessary to refer this issue back to the Access Board for reconsideration.

Accessible teeing grounds, putting greens, and weather shelters. The Department's NPRM sought public input on the proposed requirements for accessible golf courses. These requirements specifically relate to accessible routes within the boundaries of the courses, as well as the accessibility of golfing elements (*e.g.,* teeing grounds, putting greens, weather shelters).

In the NPRM, the Department sought information from the owners and operators of golf courses, both public and private, on the extent to which their courses already have golf car passages, and, if so, whether they intended to avail themselves

of the proposed accessible route exception for golf car passages. 73 FR 34508, 34513 (June 17, 2008).

Most commenters expressed support for the adoption of an accessible route requirement that includes an exception permitting golf car passage as all or part of an accessible route. Comments in favor of the proposed standard came from golf course owners and operators, individuals, organizations, and disability rights groups, golf course requirements generally came from golf courses and organizations representing the golf course industry.

The majority of commenters expressed the general viewpoint that nearly all golf courses provide golf cars and have either well-defined paths or permit golf cars to drive on the course where paths are not present—and thus meet the accessible route requirement. Several commenters disagreed with the assumption in the Initial RIA that virtually every tee and putting green on an existing course would need to be regraded in order to provide compliant accessible routes. According to one commenter, many golf courses are relatively flat with little slope, especially those heavily used by recreational golfers. This commenter concurred with the Department that it is likely that most existing golf courses have a golf car passage to tees and greens, thereby substantially minimizing the cost of bringing an existing golf course into compliance with the proposed standards. One commenter reported that golf course access audits found that the vast majority of public golf courses would have little difficulty in meeting the proposed golf course requirements. In the view of some commenters, providing access to golf courses would increase golf participation by individuals with disabilities.

The Department also received many comments requesting clarification of the term ''golf car passage.'' For example, one commenter requesting clarification of the term ''golf car passage'' argued that golf courses typically do not provide golf car paths or pedestrian paths onto the actual teeing grounds or greens, many of which are higher or lower than the car path. This commenter argued that if golf car passages were required to extend onto teeing grounds and greens in order to qualify for an exception, then some golf courses would have to substantially regrade teeing grounds and greens at a high cost.

After careful consideration of the comments, the Department has decided to adopt the 2010 Standards specific to golf facilities. The Department believes that in order for individuals with mobility disabilities to have an opportunity to play golf that is equal to golfers without disabilities, it is essential that golf courses provide an accessible route or accessible golf car passage to connect accessible elements and spaces within the boundary of the golf course, including teeing grounds, putting greens, and weather shelters.

Public Comments on Other NPRM Issues

Equipment and furniture. Equipment and furniture are covered under the Department's ADA regulations, including under the provision requiring modifications in policies, practices, and procedures and the provision requiring barrier removal. *See* 28 CFR 36.302,36.304. The Department has not issued specific regulatory guidance on equipment and furniture, but proposed such regulations in 1991. The Department decided not to establish specific equipment requirements at that time because the requirements could be addressed under other sections of the regulation and because there were no appropriate accessibility standards applicable to many types of equipment at that time. *See* 28 CFR part 36, app. B (2009) (''Proposed Section 36.309 Purchase of Furniture and Equipment'').

In the NPRM, the Department announced its intention not to regulate equipment, proposing instead to continue with the current approach. The Department received numerous comments objecting to this decision and urging the Department to issue equipment and furniture regulations. Based

on these comments, the Department has decided that it needs to revisit the issuance of equipment and furniture regulations, and it intends to do so in future rulemaking.

Among the commenters' key concerns, many from the disability community objected to the Department's earlier decision not to issue equipment regulations, especially for medical equipment. These groups recommended that the Department list by name certain types of medical equipment that must be accessible, including exam tables (that lower to 15 inches above the floor or lower), scales, medical and dental chairs, and radiologic equipment (including mammography equipment). These commenters emphasized that the provision of medically-related equipment and furniture also should be specifically regulated since they are not included in the 2004 ADAAG (while depositories, change machines, fuel dispensers, and ATMs are) and because of their crucial role in the provision of healthcare. Commenters described how the lack of accessible medical equipment negatively affects the health of individuals with disabilities. For example, some individuals with mobility disabilities do not get thorough medical care because their health providers do not have accessible examination tables or scales.

Commenters also said that the Department's stated plan to assess the financial impact of free-standing equipment on businesses was not necessary, as any regulations could include a financial balancing test. Other commenters representing persons who are blind or have low vision urged the Department to mandate accessibility for a wide range of equipment— including household appliances (stoves, washers, microwaves, and coffee makers), audiovisual equipment (stereos and DVD players), exercise machines, vending equipment, ATMs, computers at Internet cafes or hotel business centers, reservations kiosks at hotels, and point-of-sale devices— through speech output and tactile labels and controls. They argued that modern technology allows such equipment to be made accessible at minimal cost. According to these commenters, the lack of such accessibility in point-of-sale devices is particularly problematic because it forces blind individuals to provide personal or sensitive information (such as personal identification numbers) to third parties, which exposes them to identity fraud. Because the ADA does not apply directly to the manufacture of products, the Department lacks the authority to issue design requirements for equipment designed exclusively for use in private homes. *See* Department of Justice, Americans with Disabilities Act, *ADA Title III Technical Assistance Manual Covering Public Accommodations and Commercial Facilities,* III–4.4200, available at *http://www.ada.gov/taman3.html.* To the extent that equipment intended for such use is used by a covered entity to facilitate a covered service or activity, that covered entity must make the equipment accessible to the extent that it can. *See id.*: 28 CFR part 36, app. B (2009) (''Proposed Section 36.309 Purchase of Furniture and Equipment'').

Some commenters urged the Department to require swimming pool operators to provide aquatic wheelchairs for the use of persons with disabilities when the swimming pool has a sloped entry. If there is a sloped entry, a person who uses a wheelchair would require a wheelchair designed for use in the water in order to gain access to the pool since taking a personal wheelchair into water would rust and corrode the metal on the chair and damage any electrical components of a power wheelchair. Providing an aquatic wheelchair made of non-corrosive materials and designed for access into the water will protect the water from contamination and avoid damage to personal wheelchairs or other mobility aids.

Additionally, many commenters urged the Department to regulate the height of beds in accessible hotel guest rooms and to ensure that such beds have clearance at the floor to accommodate a mechanical lift. These commenters noted that in recent years, hotel beds have become higher as hotels use thicker mattresses, thereby making it difficult or impossible for many individuals who

use wheelchairs to transfer onto hotel beds. In addition, many hotel beds use a solid-sided platform base with no clearance at the floor,which prevents the use of a portable lift to transfer an individual onto the bed. Consequently, individuals who bring their own lift to transfer onto the bed cannot independently get themselves onto the bed. ome commenters suggested various design options that might avoid these situations.

The Department intends to provide specific guidance relating to both hotel beds and aquatic wheelchairs in a future rulemaking. For the present, the Department reminds covered entities that they have the obligation to undertake reasonable modifications to their current policies and procedures and to undertake barrier removal or provide alternatives to barrier removal to make their facilities accessible to persons with disabilities. In many cases, providing aquatic wheelchairs or adjusting hotel bed heights may be necessary to comply with those requirements.

Commenters from the business community objected to the lack of clarity from the NPRM as to which equipment must be accessible and how to make it accessible. Several commenters urged the Department to clarify that equipment located in a public accommodation need not meet the technical specifications of ADAAG so long as the service provided by the equipment can be provided by alternative means, such as an employee. For example, the commenters suggested that a self-service check-in kiosk in a hotel need not comply with the reach range requirement so long as a guest can check in at the front desk nearby. Several commenters argued that the Department should not require that point-of-sale devices be accessible to individuals who are blind or have low vision (although complying with accessible route and reach range was acceptable), especially until the Department adopts specific standards governing such access.

The Department has decided not to add specific scoping or technical requirements for equipment and furniture in this final rule. Other provisions of the regulation, including those requiring reasonable modifications of policies, practices, or procedures, readily achievable barrier removal, and effective communication will require the provision of accessible equipment in appropriate circumstances. Because it is clear that many commenters want the Department to provide additional specific requirements for accessible equipment, the Department plans to initiate a rulemaking to address these issues in the near future.

Accessible golf cars. An accessible golf car means a device that is designed and manufactured to be driven on all areas of a golf course, is independently usable by individuals with mobility disabilities, has a hand-operated brake and accelerator, carries golf clubs in an accessible location, and has a seat that both swivels and raises to put the golfer in a standing or semi-standing position. The 1991 regulation contained no language specifically referencing accessible golf cars. After considering the comments addressing the ANPRM's proposed requirement that golf courses make at least one specialized golf car available for the use of individuals with disabilities, and the safety of accessible golf cars and their use on golf course greens, the Department stated in the NPRM that it would not issue regulations specific to golf cars.

The Department received many comments in response to its decision to propose no new regulation specific to accessible golf cars. The majority of commenters urged the Department to require golf courses to provide accessible golf cars. These comments came from individuals, disability advocacy and recreation groups, a manufacturer of accessible golf cars, and representatives of local government. Comments supporting the Department's decision not to propose a new regulation came from golf course owners, associations, and individuals.

Many commenters argued that while the existing title III regulation covered the issue, the Department should nonetheless adopt specific regulatory language requiring golf courses to provide accessible golf cars. Some commenters noted

that many local governments and park authorities that operate public golf courses have already provided accessible golf cars. Experience indicates that such golf cars may be used without damaging courses. Some argued that having accessible golf cars would increase golf course revenue by enabling more golfers with disabilities to play the game. Several commenters requested that the Department adopt a regulation specifically requiring each golf course to provide one or more accessible golf cars. Other commenters recommended allowing golf courses to make ''pooling'' arrangements to meet demands for such cars. A few commenters expressed support for using accessible golf cars to accommodate golfers with and without disabilities. Commenters also pointed out that the Departments of the Interior and Defense have already mandated that golf courses under their jurisdictional control must make accessible golf cars available unless it can be demonstrated that doing so would change the fundamental nature of the game.

While an industry association argued that at least two models of accessible golf cars meet the specifications recognized in the field, and that accessible golf cars cause no more damage to greens or other parts of golf courses than players standing or walking across the course, other commenters expressed concerns about the potential for damage associated with the use of accessible golf cars. Citing safety concerns, golf organizations recommended that an industry safety standard be developed.

Although the Department declines to add specific scoping or technical requirements for golf cars to this final rule, the Department expects to address requirements for accessible golf cars in future rulemaking. In the meantime, the Department believes that golfers with disabilities who need accessible golf cars are protected by other existing provisions in the title III regulation, including those requiring reasonable modifications of policies, practices, or procedures, and readily achievable barrier removal.

Web site accessibility. Many commenters expressed disappointment that the NPRM did not specifically require title III-covered entities to make their Web sites, through which they offer goods and services, accessible to individuals with disabilities. Commenters urged the Department to require specifically that entities that provide goods or services on the Internet make their Websites accessible, regardless of whether or not these entities also have a ''bricks and mortar' location. The commenters explained that such clarification was needed because of the current ambiguity caused by court decisions as to whether web-only businesses are covered under title III. Commenters argued that the cost of making Web sites accessible through Web site design is minimal, yet critical, to enabling individuals with disabilities to benefit from the goods and services an entity offers through its Web site. The Internet has become an essential tool for many Americans and, when accessible, provides individuals with disabilities great independence. Commenters recommended that, at a minimum, the Department require covered entities to meet the Electronic and Information Technology Accessibility Standards issued pursuant to section 508. Under section 508 of the Rehabilitation Act of 1973, Federal agencies are required to make their Web sites accessible. 29 U.S.C. 794(d); 36 CFR Part 1194.

The Department agrees that the ability to access the goods and services offered on the Internet through the Web sites of public accommodations is of great importance to individuals with disabilities, particularly those who are blind or who have low vision. When the ADA was enacted in 1990, the Internet was unknown to most of the public. Today, the Internet plays a critical role in daily life for personal, civic, commercial, and business purposes. In light of the growing importance of eBcommerce, ensuring nondiscriminatory access to the goods and services offered through the Web sites of covered entities can play a significant role

in fulfilling the goals of the ADA.

Although the language of the ADA does not explicitly mention the Internet, the Department has taken the position that title III covers access to Web sites of public accommodations. The Department has issued guidance on the ADA as applied to the Web sites of public entities, which includes the availability of standards for Web site accessibility. *See Accessibility of State and Local Government Websites to People with Disabilities* (June 2003), available at *www.ada.gov/websites2.htm*. As the Department stated in that publication, an agency (and similarly a public accommodation) with an inaccessible Web site also may meet its legal obligations by providing an accessible alternative for individuals to enjoy its goods or services, such as a staffed telephone information line. However, such an alternative must provide an equal degree of access in terms of hours of operation and range of options and programs available. For example, if retail goods or bank services are posted on an inaccessible Web site that is available 24 hours a day, 7 days a week to individuals without disabilities, then the alternative accessible method must also be available 24 hours a day, 7 days a week. Additional guidance is available in the Web Content Accessibility Guidelines (WCAG), available at *http://www.w3.org/TR/WAIWEBCONTENT* (last visited June 24, 2010), which are developed and maintained by the Web Accessibility Initiative, a subgroup of the World Wide Web Consortium (W3C®).

The Department did not issue proposed regulations as part of its NPRM, and thus is unable to issue specific regulatory language on Web site accessibility at this time. However, the Department expects to engage in rulemaking relating to Web site accessibility under the ADA in the near future.

Multiple chemical sensitivities. The Department received comments from a number of individuals asking the Department to add specific language to the final rule addressing the needs of individuals with chemical sensitivities. These commenters expressed concern that the presence of chemicals interferes with their ability to participate in a wide range of activities. These commenters also urged the Department to add multiple chemical sensitivities to the definition of a disability.

The Department has determined not to include specific provisions addressing multiple chemical sensitivities in the final rule. In order to be viewed as a disability under the ADA, an impairment must substantially limit one or more major life activities. An individual's major life activities of respiratory or neurological functioning may be substantially limited by allergies or sensitivity to a degree that he or she is a person with a disability. When a person has this type of disability, a covered entity may have to make reasonable modifications in its policies and practices for that person. However, this determination is an individual assessment and must be made on a case-by-case basis.

Title III Regulations

1991 Preamble and Section-by-Section Analysis

Department of Justice

Appendix C to the title III rule incorporates the guidance, i.e., the 1991 Section-by-Section Analysis, to the title III rule published July 26, 1991. The 1991 analysis remains relevant to the extent it is not contradicted by the amendments to the rules or it provides guidance on provisions of the rules unchanged by the revised 2010 ADA regulations.

APPENDIX C TO PART 36 — GUIDANCE ON ADA REGULATION ON NONDISCRIMINATION ON THE BASIS OF DISABILITY BY PUBLIC ACCOMMODATIONS AND IN COMMERCIAL FACILITIES ORIGINALLY PUBLISHED ON JULY 26, 1991

SECTION-BY-SECTION ANALYSIS AND RESPONSE TO COMMENTS

Subpart A—General

Section 36.101 Purpose

Section 36.101 states the purpose of the rule, which is to effectuate title III of the Americans with Disabilities Act of 1990. This title prohibits discrimination on the basis of disability by public accommodations, requires places of public accommodation and commercial facilities to be designed, constructed, and altered in compliance with the accessibility standards established by this part, and requires that examinations or courses related to licensing or certification for professional or trade purposes be accessible to persons with disabilities.

Section 36.102 Application

Section 36.102 specifies the range of entities and facilities that have obligations under the final rule. The rule applies to any public accommodation or commercial facility as those terms are defined in §36.104. It also applies, in accordance with section 309 of the ADA, to private entities that offer examinations or courses related to applications, licensing, certification, or credentialing for secondary or postsecondary education, professional, or trade purposes. Except as provided in §36.206, ''Retaliation or coercion,'' this part does not apply to individuals other than public accommodations or to public entities. Coverage of private individuals and public entities is discussed in the preamble to §36.206.

As defined in §36.104, a public accommodation is a private entity that owns, leases or leases to, or operates a place of public accommodation. Section 36.102(b)(2) emphasizes that the general and specific public accommodations requirements of subparts B and C obligate a public accommodation only with respect to the operations of a place of public accommodation. This distinction is drawn in recognition of the fact that a private entity that meets the regulatory definition of public accommodation could also own, lease or lease to, or operate facilities that are not places of public accommodation. The rule would exceed the reach of the ADA if it were to apply the public accommodations requirements of subparts B and C to the operations of a private entity that do not involve a place of public accommodation. Similarly, §36.102(b)(3) provides that the new construction and alterations requirements of subpart D obligate a public accommodation only with respect to facilities used as, or designed or constructed for use as, places of public accommodation or commercial facilities.

On the other hand, as mandated by the ADA and reflected in §36.102(c), the new construction and alterations requirements of subpart D apply to a commercial facility whether or not the facility is a place of public accommodation, or is owned, leased, leased to, or operated by a public accommodation.

Section 36.102(e) states that the rule does not apply to any private club, religious entity, or public entity. Each of these terms is defined in §36.104. The exclusion of private clubs and religious entities is derived from section 307 of the ADA; and the exclusion of public entities is based on the statutory definition of public accommodation in section 301(7) of the ADA, which excludes entities other than private entities from coverage under title III of the ADA.

Section 36.103 Relationship to Other Laws

Section 36.103 is derived from sections 501 (a) and (b) of the ADA. Paragraph (a) provides that, except as otherwise specifically provided by this part, the ADA is not intended to apply lesser standards than are required under title V of the Rehabilitation Act of 1973, as amended (29 U.S.C. 790–794), or the regulations implementing that title. The standards of title V of the Rehabilitation Act apply for purposes of the ADA to the extent that the ADA has not explicitly adopted a different standard from title V. Where the ADA explicitly provides a different standard from section 504, the ADA standard applies to the ADA, but not to section 504. For example, section 504 requires that all federally assisted programs and activities be readily accessible to and usable by individuals with handicaps, even if major structural alterations are necessary to make a program accessible. Title III of the ADA, in contrast, only requires alterations to existing facilities if the modifications are ''readily achievable,'' that is, able to be accomplished easily and without much difficulty or expense. A public accommodation that is covered under both section 504 and the ADA is still required to meet the ''program accessibility'' standard in order to comply with section 504, but would not be in violation of the ADA unless

it failed to make ''readily achievable'' modifications. On the other hand, an entity covered by the ADA is required to make ''readily achievable'' modifications, even if the program can be made accessible without any architectural modifications. Thus, an entity covered by both section 504 and title III of the ADA must meet both the ''program accessibility'' requirement and the ''readily achievable'' requirement.

Paragraph (b) makes explicit that the rule does not affect the obligation of recipients of Federal financial assistance to comply with the requirements imposed under section 504 of the Rehabilitation Act of 1973.

Paragraph (c) makes clear that Congress did not intend to displace any of the rights or remedies provided by other Federal laws or other State or local laws (including State common law) that provide greater or equal protection to individuals with disabilities. A plaintiff may choose to pursue claims under a State law that does not confer greater substantive rights, or even confers fewer substantive rights, if the alleged violation is protected under the alternative law and the remedies are greater. For example, assume that a person with a physical disability seeks damages under a State law that allows compensatory and punitive damages for discrimination on the basis of physical disability, but does not allow them on the basis of mental disability. In that situation, the State law would provide narrower coverage, by excluding mental disabilities, but broader remedies, and an individual covered by both laws could choose to bring an action under both laws. Moreover, State tort claims confer greater remedies and are not preempted by the ADA. A plaintiff may join a State tort claim to a case brought under the ADA. In such a case, the plaintiff must, of course, prove all the elements of the State tort claim in order to prevail under that cause of action.

A commenter had concerns about privacy requirements for banking transactions using telephone relay services. Title IV of the Act provides adequate protections for ensuring the confidentiality of communications using the relay services. This issue is more appropriately addressed by the Federal Communications Commission in its regulation implementing title IV of the Act.

Section 36.104 Definitions

''Act.'' The word ''Act'' is used in the regulation to refer to the Americans with Disabilities Act of 1990, Pub. L. 101–336, which is also referred to as the ''ADA.''

''Commerce.'' The definition of ''commerce'' is identical to the statutory definition provided in section 301(1) of the ADA. It means travel, trade, traffic, commerce, transportation, or communication among the several States, between any foreign country or any territory or possession and any State, or between points in the same State but through another State or foreign country. Commerce is defined in the same manner as in title II of the Civil Rights Act of 1964, which prohibits racial discrimination in public accommodations.

The term ''commerce'' is used in the definition of ''place of public accommodation.'' According to that definition, one of the criteria that an entity must meet before it can be considered a place of public accommodation is that its operations affect commerce. The term ''commerce'' is similarly used in the definition of ''commercial facility.''

The use of the phrase ''operations affect commerce'' applies the full scope of coverage of the Commerce Clause of the Constitution in enforcing the ADA. The Constitution gives Congress broad authority to regulate interstate commerce, including the activities of local business enterprises (e.g., a physician's office, a neighborhood restaurant, a laundromat, or a bakery) that affect interstate commerce through the purchase or sale of products manufactured in other States, or by providing services to individuals from other States. Because of the integrated nature of the national economy, the ADA and this final rule will have extremely broad application.

''Commercial facilities'' are those facilities that are intended for nonresidential use by a private entity and whose operations affect commerce. As explained under §36.401, ''New construction,'' the new construction and alteration requirements of subpart D of the rule apply to all commercial facilities, whether or not they are places of public accommodation. Those commercial facilities that are not places of public accommodation are not subject to the requirements of subparts B and C (e.g., those requirements concerning auxiliary aids and general nondiscrimination provisions).

Congress recognized that the employees within commercial facilities would generally be protected under title I (employment) of the Act. However, as the House Committee on Education and Labor pointed out, ''[t]o the extent that new facilities are built in a manner that make[s] them accessible to all individuals, including potential employees, there will be less of a need for individual employers to engage in reasonable accommodations for particular employees.'' H.R. Rep. No. 485, 101st Cong., 2d Sess., pt. 2, at 117 (1990) [hereinafter ''Education and Labor report'']. While employers of fewer than 15 employees are not covered by title I's employment discrimination provisions, there is no such limitation with respect to new construction covered under title III. Congress chose not to so limit the new construction provisions because of its desire for a uniform requirement of accessibility in new construction, because accessibility can be accomplished easily in the design and construction

stage, and because future expansion of a business or sale or lease of the property to a larger employer or to a business that is a place of public accommodation is always a possibility.

The term ''commercial facilities'' is not intended to be defined by dictionary or common industry definitions. Included in this category are factories, warehouses, office buildings, and other buildings in which employment may occur. The phrase, ''whose operations affect commerce,'' is to be read broadly, to include all types of activities reached under the commerce clause of the Constitution.

Privately operated airports are also included in the category of commercial facilities. They are not, however, places of public accommodation because they are not terminals used for ''specified public transportation.'' (Transportation by aircraft is specifically excluded from the statutory definition of ''specified public transportation.'') Thus, privately operated airports are subject to the new construction and alteration requirements of this rule (subpart D) but not to subparts B and C. (Airports operated by public entities are covered by title II of the Act.) Places of public accommodation located within airports, such as restaurants, shops, lounges, or conference centers, however, are covered by subparts B and C of this part.

The statute's definition of ''commercial facilities'' specifically includes only facilities ''that are intended for nonresidential use'' and specifically exempts those facilities that are covered or expressly exempted from coverage under the Fair Housing Act of 1968, as amended (42 U.S.C. 3601–3631). The interplay between the Fair Housing Act and the ADA with respect to those facilities that are ''places of public accommodation'' was the subject of many comments and is addressed in the preamble discussion of the definition of ''place of public accommodation.''

''Current illegal use of drugs.'' The phrase ''current illegal use of drugs'' is used in §36.209. Its meaning is discussed in the preamble for that section.

''Disability.'' The definition of the term ''disability'' is comparable to the definition of the term ''individual with handicaps'' in section 7(8)(B) of the Rehabilitation Act and section 802(h) of the Fair Housing Act. The Education and Labor Committee report makes clear that the analysis of the term ''individual with handicaps'' by the Department of Health, Education, and Welfare in its regulations implementing section 504 (42 FR 22685 (May 4, 1977)) and the analysis by the Department of Housing and Urban Development in its regulation implementing the Fair Housing Amendments Act of 1988 (54 FR 3232 (Jan. 23, 1989)) should also apply fully to the term ''disability'' (Education and Labor report at 50).

The use of the term ''disability'' instead of ''handicap'' and the term ''individual with a disability'' instead of ''individual with handicaps'' represents an effort by the Congress to make use of up-to-date, currently accepted terminology. The terminology applied to individuals with disabilities is a very significant and sensitive issue. As with racial and ethnic terms, the choice of words to describe a person with a disability is overlaid with stereotypes, patronizing attitudes, and other emotional connotations. Many individuals with disabilities, and organizations representing such individuals, object to the use of such terms as ''handicapped person'' or ''the handicapped.'' In other recent legislation, Congress also recognized this shift in terminology, e.g., by changing the name of the National Council on the Handicapped to the National Council on Disability (Pub. L. 100–630).

In enacting the Americans with Disabilities Act, Congress concluded that it was important for the current legislation to use terminology most in line with the sensibilities of most Americans with disabilities. No change in definition or substance is intended nor should be attributed to this change in phraseology.

The term ''disability'' means, with respect to an individual—

(A) A physical or mental impairment that substantially limits one or more of the major life activities of such individual;

(B) A record of such an impairment; or

(C) Being regarded as having such an impairment.

If an individual meets any one of these three tests, he or she is considered to be an individual with a disability for purposes of coverage under the Americans with Disabilities Act.

Congress adopted this same basic definition of ''disability,'' first used in the Rehabilitation Act of 1973 and in the Fair Housing Amendments Act of 1988, for a number of reasons. It has worked well since it was adopted in 1974. There is a substantial body of administrative interpretation and judicial precedent on this definition. Finally, it would not be possible to guarantee comprehensiveness by providing a list of specific disabilities, especially because new disorders may be recognized in the future, as they have since the definition was first established in 1974.

Test A—A Physical or Mental Impairment That Substantially Limits One or More of the Major Life Activities of Such Individual

Physical or mental impairment. Under the first test, an individual must have a physical or mental impairment. As explained in paragraph (1) (i) of the definition, ''impairment'' means any physiological disorder or condition, cosmetic disfigurement, or anatomical

loss affecting one or more of the following body systems: Neurological; musculoskeletal; special sense organs (including speech organs that are not respiratory, such as vocal cords, soft palate, and tongue); respiratory, including speech organs; cardiovascular; reproductive; digestive; genitourinary; hemic and lymphatic; skin; and endocrine. It also means any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities. This list closely tracks the one used in the regulations for section 504 of the Rehabilitation Act of 1973 (see, *e.g.*, 45 CFR 84.3(j)(2)(i)).

Many commenters asked that ''traumatic brain injury'' be added to the list in paragraph (1)(i). Traumatic brain injury is already included because it is a physiological condition affecting one of the listed body systems, i.e., ''neurological.'' Therefore, it was unnecessary for the Department to add the term to the regulation.

It is not possible to include a list of all the specific conditions, contagious and noncontagious diseases, or infections that would constitute physical or mental impairments because of the difficulty of ensuring the comprehensiveness of such a list, particularly in light of the fact that other conditions or disorders may be identified in the future. However, the list of examples in paragraph (1)(iii) of the definition includes: Orthopedic, visual, speech and hearing impairments; cerebral palsy; epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, emotional illness, specific learning disabilities, HIV disease (symptomatic or asymptomatic), tuberculosis, drug addiction, and alcoholism.

The examples of ''physical or mental impairments'' in paragraph (1)(iii) are the same as those contained in many section 504 regulations, except for the addition of the phrase ''contagious and noncontagious'' to describe the types of diseases and conditions included, and the addition of ''HIV disease (symptomatic or asymptomatic)'' and ''tuberculosis'' to the list of examples. These additions are based on the ADA committee reports, caselaw, and official legal opinions interpreting section 504. In *School Board of Nassau County* v. *Arline*, 480 U.S. 273 (1987), a case involving an individual with tuberculosis, the Supreme Court held that people with contagious diseases are entitled to the protections afforded by section 504. Following the *Arline* decision, this Department's Office of Legal Counsel issued a legal opinion that concluded that symptomatic HIV disease is an impairment that substantially limits a major life activity; therefore it has been included in the definition of disability under this part. The opinion also concluded that asymptomatic HIV disease is an impairment that substantially limits a major life activity, either because of its actual effect on the individual with HIV disease or because the reactions of other people to individuals with HIV disease cause such individuals to be treated as though they are disabled. See Memorandum from Douglas W. Kmiec, Acting Assistant Attorney General, Office of Legal Counsel, Department of Justice, to Arthur B. Culvahouse, Jr., Counsel to the President (Sept. 27, 1988), *reprinted in* Hearings on S. 933, the Americans with Disabilities Act, Before the Subcomm. on the Handicapped of the Senate Comm. on Labor and Human Resources, 101st Cong., 1st Sess. 346 (1989). The phrase ''symptomatic or asymptomatic'' was inserted in the final rule after ''HIV disease'' in response to commenters who suggested that the clarification was necessary to give full meaning to the Department's opinion.

Paragraph (1)(iv) of the definition states that the phrase ''physical or mental impairment'' does not include homosexuality or bisexuality. These conditions were never considered impairments under other Federal disability laws. Section 511(a) of the statute makes clear that they are likewise not to be considered impairments under the Americans with Disabilities Act.

Physical or mental impairment does not include simple physical characteristics, such as blue eyes or black hair. Nor does it include environmental, cultural, economic, or other disadvantages, such as having a prison record, or being poor. Nor is age a disability. Similarly, the definition does not include common personality traits such as poor judgment or a quick temper where these are not symptoms of a mental or psychological disorder. However, a person who has these characteristics and also has a physical or mental impairment may be considered as having a disability for purposes of the Americans with Disabilities Act based on the impairment.

Substantial limitation of a major life activity. Under Test A, the impairment must be one that ''substantially limits a major life activity.'' Major life activities include such things as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working. For example, a person who is paraplegic is substantially limited in the major life activity of walking, a person who is blind is substantially limited in the major life activity of seeing, and a person who is mentally retarded is substantially limited in the major life activity of learning. A person with traumatic brain injury is substantially limited in the major life activities of caring for one's self, learning, and working because of memory deficit, confusion, contextual difficulties, and inability to reason appropriately.

A person is considered an individual with a disability for purposes of Test A, the first prong of the definition, when the individual's

important life activities are restricted as to the conditions, manner, or duration under which they can be performed in comparison to most people. A person with a minor, trivial impairment, such as a simple infected finger, is not impaired in a major life activity. A person who can walk for 10 miles continuously is not substantially limited in walking merely because, on the eleventh mile, he or she begins to experience pain, because most people would not be able to walk eleven miles without experiencing some discomfort.

The Department received many comments on the proposed rule's inclusion of the word ''temporary'' in the definition of ''disability.'' The preamble indicated that impairments are not necessarily excluded from the definition of ''disability'' simply because they are temporary, but that the duration, or expected duration, of an impairment is one factor that may properly be considered in determining whether the impairment substantially limits a major life activity. The preamble recognized, however, that temporary impairments, such as a broken leg, are not commonly regarded as disabilities, and only in rare circumstances would the degree of the limitation and its expected duration be substantial: Nevertheless, many commenters objected to inclusion of the word ''temporary'' both because it is not in the statute and because it is not contained in the definition of ''disability'' set forth in the title I regulations of the Equal Employment Opportunity Commission (EEOC). The word ''temporary'' has been deleted from the final rule to conform with the statutory language. The question of whether a temporary impairment is a disability must be resolved on a case-by-case basis, taking into consideration both the duration (or expected duration) of the impairment and the extent to which it actually limits a major life activity of the affected individual.

The question of whether a person has a disability should be assessed without regard to the availability of mitigating measures, such as reasonable modifications or auxiliary aids and services. For example, a person with hearing loss is substantially limited in the major life activity of hearing, even though the loss may be improved through the use of a hearing aid. Likewise, persons with impairments, such as epilepsy or diabetes, that substantially limit a major life activity, are covered under the first prong of the definition of disability, even if the effects of the impairment are controlled by medication.

Many commenters asked that environmental illness (also known as multiple chemical sensitivity) as well as allergy to cigarette smoke be recognized as disabilities. The Department, however, declines to state categorically that these types of allergies or sensitivities are disabilities, because the determination as to whether an impairment is a disability depends on whether, given the particular circumstances at issue, the impairment substantially limits one or more major life activities (or has a history of, or is regarded as having such an effect).

Sometimes respiratory or neurological functioning is so severely affected that an individual will satisfy the requirements to be considered disabled under the regulation. Such an individual would be entitled to all of the protections afforded by the Act and this part. In other cases, individuals may be sensitive to environmental elements or to smoke but their sensitivity will not rise to the level needed to constitute a disability. For example, their major life activity of breathing may be somewhat, but not substantially, impaired. In such circumstances, the individuals are not disabled and are not entitled to the protections of the statute despite their sensitivity to environmental agents.

In sum, the determination as to whether allergies to cigarette smoke, or allergies or sensitivities characterized by the commenters as environmental illness are disabilities covered by the regulation must be made using the same case-by-case analysis that is applied to all other physical or mental impairments. Moreover, the addition of specific regulatory provisions relating to environmental illness in the final rule would be inappropriate at this time pending future consideration of the issue by the Architectural and Transportation Barriers Compliance Board, the Environmental Protection Agency, and the Occupational Safety and Health Administration of the Department of Labor.

Test B—A Record of Such an Impairment

This test is intended to cover those who have a record of an impairment. As explained in paragraph (3) of the rule's definition of disability, this includes a person who has a history of an impairment that substantially limited a major life activity, such as someone who has recovered from an impairment. It also includes persons who have been misclassified as having an impairment.

This provision is included in the definition in part to protect individuals who have recovered from a physical or mental impairment that previously substantially limited them in a major life activity. Discrimination on the basis of such a past impairment is prohibited. Frequently occurring examples of the first group (those who have a history of an impairment) are persons with histories of mental or emotional illness, heart disease, or cancer; examples of the second group (those who have been misclassified as having an impairment) are persons who have been misclassified as having mental retardation or mental illness.

Test C—Being Regarded as Having Such an Impairment

This test, as contained in paragraph (4) of the definition, is intended to cover persons who are treated by a private entity or public accommodation as having a physical or mental impairment that substantially limits a major life activity. It applies when a person is treated as if he or she has an impairment that substantially limits a major life activity, regardless of whether that person has an impairment.

The Americans with Disabilities Act uses the same ''regarded as'' test set forth in the regulations implementing section 504 of the Rehabilitation Act. *See, e.g.*, 28 CFR 42.540(k)(2)(iv), which provides:

(iv) ''Is regarded as having an impairment'' means (A) Has a physical or mental impairment that does not substantially limit major life activities but that is treated by a recipient as constituting such a limitation; (B) Has a physical or mental impairment that substantially limits major life activities only as a result of the attitudes of others toward such impairment; or (C) Has none of the impairments defined in paragraph (k)(2)(i) of this section but is treated by a recipient as having such an impairment.

The perception of the private entity or public accommodation is a key element of this test. A person who perceives himself or herself to have an impairment, but does not have an impairment, and is not treated as if he or she has an impairment, is not protected under this test. A person would be covered under this test if a restaurant refused to serve that person because of a fear of ''negative reactions'' of others to that person. A person would also be covered if a public accommodation refused to serve a patron because it perceived that the patron had an impairment that limited his or her enjoyment of the goods or services being offered.

For example, persons with severe burns often encounter discrimination in community activities, resulting in substantial limitation of major life activities. These persons would be covered under this test based on the attitudes of others towards the impairment, even if they did not view themselves as ''impaired.''

The rationale for this third test, as used in the Rehabilitation Act of 1973, was articulated by the Supreme Court in *Arline*, 480 U.S. 273 (1987). The Court noted that, although an individual may have an impairment that does not in fact substantially limit a major life activity, the reaction of others may prove just as disabling. ''Such an impairment might not diminish a person's physical or mental capabilities, but could nevertheless substantially limit that person's ability to work as a result of the negative reactions of others to the impairment.'' *Id*. at 283. The Court concluded that, by including this test in the Rehabilitation Act's definition, ''Congress acknowledged that society's accumulated myths and fears about disability and disease are as handicapping as are the physical limitations that flow from actual impairment.'' *Id*. at 284.

Thus, a person who is not allowed into a public accommodation because of the myths, fears, and stereotypes associated with disabilities would be covered under this third test whether or not the person's physical or mental condition would be considered a disability under the first or second test in the definition.

If a person is refused admittance on the basis of an actual or perceived physical or mental condition, and the public accommodation can articulate no legitimate reason for the refusal (such as failure to meet eligibility criteria), a perceived concern about admitting persons with disabilities could be inferred and the individual would qualify for coverage under the ''regarded as'' test. A person who is covered because of being regarded as having an impairment is not required to show that the public accommodation's perception is inaccurate (e.g., that he will be accepted by others, or that insurance rates will not increase) in order to be admitted to the public accommodation.

Paragraph (5) of the definition lists certain conditions that are not included within the definition of ''disability.'' The excluded conditions are: transvestism, transsexualism, pedophilia, exhibitionism, voyeurism, gender identity disorders not resulting from physical impairments, other sexual behavior disorders, compulsive gambling, kleptomania, pyromania, and psychoactive substance use disorders resulting from current illegal use of drugs. Unlike homosexuality and bisexuality, which are not considered impairments under either the Americans with Disabilities Act (see the definition of ''disability,'' paragraph (1)(iv)) or section 504, the conditions listed in paragraph (5), except for transvestism, are not necessarily excluded as impairments under section 504. (Transvestism was excluded from the definition of disability for section 504 by the Fair Housing Amendments Act of 1988, Pub. L. 100–430, §6(b).) The phrase ''current illegal use of drugs'' used in this definition is explained in the preamble to §36.209.

''Drug.'' The definition of the term ''drug'' is taken from section 510(d)(2) of the ADA.

''Facility.'' ''Facility'' means all or any portion of buildings, structures, sites, complexes, equipment, rolling stock or other conveyances, roads, walks, passageways, parking lots, or other real or personal property, including the site where the building, property, structure, or equipment is located. Committee reports made clear that the definition of facility was drawn from the definition of facility in current Federal regulations (*see, e.g.*, Education and Labor report

at 114). It includes both indoor and outdoor areas where human-constructed improvements, structures, equipment, or property have been added to the natural environment.

The term ''rolling stock or other conveyances'' was not included in the definition of facility in the proposed rule. However, commenters raised questions about the applicability of this part to places of public accommodation operated in mobile facilities (such as cruise ships, floating restaurants, or mobile health units). Those places of public accommodation are covered under this part, and would be included in the definition of ''facility.'' Thus the requirements of subparts B and C would apply to those places of public accommodation. For example, a covered entity could not discriminate on the basis of disability in the full and equal enjoyment of the facilities (§36.201). Similarly, a cruise line could not apply eligibility criteria to potential passengers in a manner that would screen out individuals with disabilities, unless the criteria are ''necessary,'' as provided in §36.301.

However, standards for new construction and alterations of such facilities are not yet included in the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) adopted by §36.406 and incorporated in appendix A. The Department therefore will not interpret the new construction and alterations provisions of subpart D to apply to the types of facilities discussed here, pending further development of specific requirements.

Requirements pertaining to accessible transportation services provided by public accommodations are included in §36.310 of this part; standards pertaining to accessible vehicles will be issued by the Secretary of Transportation pursuant to section 306 of the Act, and will be codified at 49 CFR part 37.

A public accommodation has obligations under this rule with respect to a cruise ship to the extent that its operations are subject to the laws of the United States.

The definition of ''facility'' only includes the site over which the private entity may exercise control or on which a place of public accommodation or a commercial facility is located. It does not include, for example, adjacent roads or walks controlled by a public entity that is not subject to this part. Public entities are subject to the requirements of title II of the Act. The Department's regulation implementing title II, which will be codified at 28 CFR part 35, addresses the obligations of public entities to ensure accessibility by providing curb ramps at pedestrian walkways.

''Illegal use of drugs.'' The definition of ''illegal use of drugs'' is taken from section 510(d)(1) of the Act and clarifies that the term includes the illegal use of one or more drugs.

''Individual with a disability'' means a person who has a disability but does not include an individual who is currently illegally using drugs, when the public accommodation acts on the basis of such use. The phrase ''current illegal use of drugs'' is explained in the preamble to §36.209.

''Place of public accommodation.'' The term ''place of public accommodation'' is an adaptation of the statutory definition of ''public accommodation'' in section 301(7) of the ADA and appears as an element of the regulatory definition of public accommodation. The final rule defines ''place of public accommodation'' as a facility, operated by a private entity, whose operations affect commerce and fall within at least one of 12 specified categories. The term ''public accommodation,'' on the other hand, is reserved by the final rule for the private entity that owns, leases (or leases to), or operates a place of public accommodation. It is the public accommodation, and not the place of public accommodation, that is subject to the regulation's nondiscrimination requirements. Placing the obligation not to discriminate on the public accommodation, as defined in the rule, is consistent with section 302(a) of the ADA, which places the obligation not to discriminate on any person who owns, leases (or leases to), or operates a place of public accommodation.

Facilities operated by government agencies or other public entities as defined in this section do not qualify as places of public accommodation. The actions of public entities are governed by title II of the ADA and will be subject to regulations issued by the Department of Justice under that title. The receipt of government assistance by a private entity does not by itself preclude a facility from being considered as a place of public accommodation.

The definition of place of public accommodation incorporates the 12 categories of facilities represented in the statutory definition of public accommodation in section 301(7) of the ADA:

1. Places of lodging.
2. Establishments serving food or drink.
3. Places of exhibition or entertainment.
4. Places of public gathering.
5. Sales or rental establishments.
6. Service establishments.
7. Stations used for specified public transportation.
8. Places of public display or collection.
9. Places of recreation.
10. Places of education.
11. Social service center establishments.
12. Places of exercise or recreation.

In order to be a place of public accommodation, a facility must be operated by a private entity, its operations must affect commerce, and it must fall within one of these 12

categories. While the list of categories is exhaustive, the representative examples of facilities within each category are not. Within each category only a few examples are given. The category of social service center establishments would include not only the types of establishments listed, day care centers, senior citizen centers, homeless shelters, food banks, adoption agencies, but also establishments such as substance abuse treatment centers, rape crisis centers, and halfway houses. As another example, the category of sales or rental establishments would include an innumerable array of facilities that would sweep far beyond the few examples given in the regulation. For example, other retail or wholesale establishments selling or renting items, such as bookstores, videotape rental stores, car rental establishment, pet stores, and jewelry stores would also be covered under this category, even though they are not specifically listed.

Several commenters requested clarification as to the coverage of wholesale establishments under the category of ''sales or rental establishments.'' The Department intends for wholesale establishments to be covered under this category as places of public accommodation except in cases where they sell exclusively to other businesses and not to individuals. For example, a company that grows food produce and supplies its crops exclusively to food processing corporations on a wholesale basis does not become a public accommodation because of these transactions. If this company operates a road side stand where its crops are sold to the public, the road side stand would be a sales establishment covered by the ADA. Conversely, a sales establishment that markets its goods as ''wholesale to the public'' and sells to individuals would not be exempt from ADA coverage despite its use of the word ''wholesale'' as a marketing technique.

Of course, a company that operates a place of public accommodation is subject to this part only in the operation of that place of public accommodation. In the example given above, the wholesale produce company that operates a road side stand would be a public accommodation only for the purposes of the operation of that stand. The company would be prohibited from discriminating on the basis of disability in the operation of the road side stand, and it would be required to remove barriers to physical access to the extent that it is readily achievable to do so (see §36.304); however, in the event that it is not readily achievable to remove barriers, for example, by replacing a gravel surface or regrading the area around the stand to permit access by persons with mobility impairments, the company could meet its obligations through alternative methods of making its goods available, such as delivering produce to a customer in his or her car (see §36.305). The concepts of readily achievable barrier removal and alternatives to barrier removal are discussed further in the preamble discussion of §§36.304 and 36.305.

Even if a facility does not fall within one of the 12 categories, and therefore does not qualify as a place of public accommodation, it still may be a commercial facility as defined in §36.104 and be subject to the new construction and alterations requirements of subpart D.

A number of commenters questioned the treatment of residential hotels and other residential facilities in the Department's proposed rule. These commenters were essentially seeking resolution of the relationship between the Fair Housing Act and the ADA concerning facilities that are both residential in nature and engage in activities that would cause them to be classified as ''places of public accommodation'' under the ADA. The ADA's express exemption relating to the Fair Housing Act applies only to ''commercial facilities'' and not to ''places of public accommodation.''

A facility whose operations affect interstate commerce is a place of public accommodation for purposes of the ADA to the extent that its operations include those types of activities engaged in or services provided by the facilities contained on the list of 12 categories in section 301(7) of the ADA. Thus, a facility that provides social services would be considered a ''social service center establishment.'' Similarly, the category ''places of lodging'' would exclude solely residential facilities because the nature of a place of lodging contemplates the use of the facility for short-term stays.

Many facilities, however, are mixed use facilities. For example, in a large hotel that has a separate residential apartment wing, the residential wing would not be covered by the ADA because of the nature of the occupancy of that part of the facility. This residential wing would, however, be covered by the Fair Housing Act. The separate nonresidential accommodations in the rest of the hotel would be a place of lodging, and thus a public accommodation subject to the requirements of this final rule. If a hotel allows both residential and short-term stays, but does not allocate space for these different uses in separate, discrete units, both the ADA and the Fair Housing Act may apply to the facility. Such determinations will need to be made on a case-by-case basis. Any place of lodging of the type described in paragraph (1) of the definition of place of public accommodation and that is an establishment located within a building that contains not more than five rooms for rent or hire and is actually occupied by the proprietor of the establishment as his or her residence is not covered by the ADA. (This exclusion from coverage does not apply to other categories of public accommodations, for example, professional offices or homeless

shelters, that are located in a building that is also occupied as a private residence.)

A number of commenters noted that the term ''residential hotel'' may also apply to a type of hotel commonly known as a ''single room occupancy hotel.'' Although such hotels or portions of such hotels may fall under the Fair Housing Act when operated or used as long-term residences, they are also considered ''places of lodging'' under the ADA when guests of such hotels are free to use them on a short-term basis. In addition, ''single room occupancy hotels'' may provide social services to their guests, often through the operation of Federal or State grant programs. In such a situation, the facility would be considered a ''social service center establishment'' and thus covered by the ADA as a place of public accommodation, regardless of the length of stay of the occupants.

A similar analysis would also be applied to other residential facilities that provide social services, including homeless shelters, shelters for people seeking refuge from domestic violence, nursing homes, residential care facilities, and other facilities where persons may reside for varying lengths of time. Such facilities should be analyzed under the Fair Housing Act to determine the application of that statute. The ADA, however, requires a separate and independent analysis. For example, if the facility, or a portion of the facility, is intended for or permits short-term stays, or if it can appropriately be categorized as a service establishment or as a social service establishment, then the facility or that portion of the facility used for the covered purpose is a place of public accommodation under the ADA. For example, a homeless shelter that is intended and used only for long-term residential stays and that does not provide social services to its residents would not be covered as a place of public accommodation. However, if this facility permitted short-term stays or provided social services to its residents, it would be covered under the ADA either as a ''place of lodging'' or as a ''social service center establishment,'' or as both.

A private home, by itself, does not fall within any of the 12 categories. However, it can be covered as a place of public accommodation to the extent that it is used as a facility that would fall within one of the 12 categories. For example, if a professional office of a dentist, doctor, or psychologist is located in a private home, the portion of the home dedicated to office use (including areas used both for the residence and the office, e.g., the entrance to the home that is also used as the entrance to the professional office) would be considered a place of public accommodation. Places of public accommodation located in residential facilities are specifically addressed in §36.207.

If a tour of a commercial facility that is not otherwise a place of public accommodation, such as, for example, a factory or a movie studio production set, is open to the general public, the route followed by the tour is a place of public accommodation and the tour must be operated in accordance with the rule's requirements for public accommodations. The place of public accommodation defined by the tour does not include those portions of the commercial facility that are merely viewed from the tour route. Hence, the barrier removal requirements of §36.304 only apply to the physical route followed by the tour participants and not to work stations or other areas that are merely adjacent to, or within view of, the tour route. If the tour is not open to the general public, but rather is conducted, for example, for selected business colleagues, partners, customers, or consultants, the tour route is not a place of public accommodation and the tour is not subject to the requirements for public accommodations.

Public accommodations that receive Federal financial assistance are subject to the requirements of section 504 of the Rehabilitation Act as well as the requirements of the ADA.

Private schools, including elementary and secondary schools, are covered by the rule as places of public accommodation. The rule itself, however, does not require a private school to provide a free appropriate education or develop an individualized education program in accordance with regulations of the Department of Education implementing section 504 of the Rehabilitation Act of 1973, as amended (34 CFR part 104), and regulations implementing the Individuals with Disabilities Education Act (34 CFR part 300). The receipt of Federal assistance by a private school, however, would trigger application of the Department of Education's regulations to the extent mandated by the particular type of assistance received.

''Private club.'' The term ''private club'' is defined in accordance with section 307 of the ADA as a private club or establishment exempted from coverage under title II of the Civil Rights Act of 1964. Title II of the 1964 Act exempts any ''private club or other establishment not in fact open to the public, except to the extent that the facilities of such establishment are made available to the customers or patrons of [a place of public accommodation as defined in title II].'' The rule, therefore, as reflected in §36.102(e) of the application section, limits the coverage of private clubs accordingly. The obligations of a private club that rents space to any other private entity for the operation of a place of public accommodation are discussed further in connection with §36.201.

In determining whether a private entity qualifies as a private club under title II, courts have considered such factors as the degree of member control of club operations, the selectivity of the membership selection

process, whether substantial membership fees are charged, whether the entity is operated on a nonprofit basis, the extent to which the facilities are open to the public, the degree of public funding, and whether the club was created specifically to avoid compliance with the Civil Rights Act. See *e.g., Tillman* v. *Wheaton-Haven Recreation Ass'n,* 410 U.S. 431 (1973); *Daniel* v. *Paul,* 395 U.S. 298 (1969); *Olzman* v. *Lake Hills Swim Club, Inc.,* 495 F.2d 1333 (2d Cir. 1974); *Anderson* v. *Pass Christian Isles Golf Club, Inc.,* 488 F.2d 855 (5th Cir. 1974); *Smith* v. *YMCA,* 462 F.2d 634 (5th Cir. 1972); *Stout* v. *YMCA,* 404 F.2d 687 (5th Cir. 1968); *United States* v. *Richberg,* 398 F.2d 523 (5th Cir. 1968); *Nesmith* v. *YMCA,* 397 F.2d 96 (4th Cir. 1968); *United States* v. *Lansdowne Swim Club,* 713 F. Supp. 785 (E.D. Pa. 1989); *Durham* v. *Red Lake Fishing and Hunting Club, Inc.,* 666 F. Supp. 954 (W.D. Tex. 1987); *New York* v. *Ocean Club, Inc.,* 602 F. Supp. 489 (E.D.N.Y. 1984); *Brown* v. *Loudoun Golf and Country Club, Inc.,* 573 F. Supp. 399 (E.D. Va. 1983); *United States* v. *Trustees of Fraternal Order of Eagles,* 472 F. Supp. 1174 (E.D. Wis. 1979); *Cornelius* v. *Benevolent Protective Order of Elks,* 382 F. Supp. 1182 (D. Conn. 1974).

''Private entity.'' The term ''private entity'' is defined as any individual or entity other than a public entity. It is used as part of the definition of ''public accommodation'' in this section.

The definition adds ''individual'' to the statutory definition of private entity (see section 301(6) of the ADA). This addition clarifies that an individual may be a private entity and, therefore, may be considered a public accommodation if he or she owns, leases (or leases to), or operates a place of public accommodation. The explicit inclusion of individuals under the definition of private entity is consistent with section 302(a) of the ADA, which broadly prohibits discrimination on the basis of disability by any person who owns, leases (or leases to), or operates a place of public accommodation.

''Public accommodation.'' The term ''public accommodation'' means a private entity that owns, leases (or leases to), or operates a place of public accommodation. The regulatory term, ''public accommodation,'' corresponds to the statutory term, ''person,'' in section 302(a) of the ADA. The ADA prohibits discrimination ''by any person who owns, leases (or leases to), or operates a place of public accommodation.'' The text of the regulation consequently places the ADA's nondiscrimination obligations on ''public accommodations'' rather than on ''persons'' or on ''places of public accommodation.''

As stated in §36.102(b)(2), the requirements of subparts B and C obligate a public accommodation only with respect to the operations of a place of public accommodation. A public accommodation must also meet the requirements of subpart D with respect to facilities used as, or designed or constructed for use as, places of public accommodation or commercial facilities.

''Public entity.'' The term ''public entity'' is defined in accordance with section 201(1) of the ADA as any State or local government; any department, agency, special purpose district, or other instrumentality of a State or States or local government; and the National Railroad Passenger Corporation, and any commuter authority (as defined in section 103(8) of the Rail Passenger Service Act). It is used in the definition of ''private entity'' in §36.104. Public entities are excluded from the definition of private entity and therefore cannot qualify as public accommodations under this regulation. However, the actions of public entities are covered by title II of the ADA and by the Department's title II regulations codified at 28 CFR part 35.

''Qualified interpreter.'' The Department received substantial comment regarding the lack of a definition of ''qualified interpreter.'' The proposed rule defined auxiliary aids and services to include the statutory term, ''qualified interpreters'' (§36.303(b)), but did not define that term. Section 36.303 requires the use of a qualified interpreter where necessary to achieve effective communication, unless an undue burden or fundamental alteration would result. Commenters stated that a lack of guidance on what the term means would create confusion among those trying to secure interpreting services and often result in less than effective communication.

Many commenters were concerned that, without clear guidance on the issue of ''qualified'' interpreter, the rule would be interpreted to mean ''available, rather than qualified'' interpreters. Some claimed that few public accommodations would understand the difference between a qualified interpreter and a person who simply knows a few signs or how to fingerspell.

In order to clarify what is meant by ''qualified interpreter'' the Department has added a definition of the term to the final rule. A qualified interpreter means an interpreter who is able to interpret effectively, accurately, and impartially both receptively and expressively, using any necessary specialized vocabulary. This definition focuses on the actual ability of the interpreter in a particular interpreting context to facilitate effective communication between the public accommodation and the individual with disabilities.

Public comment also revealed that public accommodations have at times asked persons who are deaf to provide family members or friends to interpret. In certain circumstances, notwithstanding that the family member or friend is able to interpret or is a certified interpreter, the family member or friend may not be qualified to render the necessary interpretation because of factors such as emotional or personal involvement

or considerations of confidentiality that may adversely affect the ability to interpret ''effectively, accurately, and impartially.''

''Readily achievable.'' The definition of ''readily achievable'' follows the statutory definition of that term in section 301(9) of the ADA. Readily achievable means easily accomplishable and able to be carried out without much difficulty or expense. The term is used as a limitation on the obligation to remove barriers under §§36.304(a), 36.305(a), 36.308(a), and 36.310(b). Further discussion of the meaning and application of the term ''readily achievable'' may be found in the preamble section for §36.304.

The definition lists factors to be considered in determining whether barrier removal is readily achievable in any particular circumstance. A significant number of commenters objected to §36.306 of the proposed rule, which listed identical factors to be considered for determining ''readily achievable'' and ''undue burden'' together in one section. They asserted that providing a consolidated section blurred the distinction between the level of effort required by a public accommodation under the two standards. The readily achievable standard is a ''lower'' standard than the ''undue burden'' standard in terms of the level of effort required, but the factors used in determining whether an action is readily achievable or would result in an undue burden are identical (See Education and Labor report at 109). Although the preamble to the proposed rule clearly delineated the relationship between the two standards, to eliminate any confusion the Department has deleted §36.306 of the proposed rule. That section, in any event, as other commenters noted, had merely repeated the lists of factors contained in the definitions of readily achievable and undue burden.

The list of factors included in the definition is derived from section 301(9) of the ADA. It reflects the congressional intention that a wide range of factors be considered in determining whether an action is readily achievable. It also takes into account that many local facilities are owned or operated by parent corporations or entities that conduct operations at many different sites. This section makes clear that, in some instances, resources beyond those of the local facility where the barrier must be removed may be relevant in determining whether an action is readily achievable. One must also evaluate the degree to which any parent entity has resources that may be allocated to the local facility.

The statutory list of factors in section 301(9) of the Act uses the term ''covered entity'' to refer to the larger entity of which a particular facility may be a part. ''Covered entity'' is not a defined term in the ADA and is not used consistently throughout the Act. The definition, therefore, substitutes the term ''parent entity'' in place of ''covered entity'' in paragraphs (3), (4), and (5) when referring to the larger private entity whose overall resources may be taken into account. This usage is consistent with the House Judiciary Committee's use of the term ''parent company'' to describe the larger entity of which the local facility is a part (H.R. Rep. No. 485, 101st Cong., 2d Sess., pt. 3, at 40–41, 54–55 (1990) (hereinafter ''Judiciary report'')).

A number of commenters asked for more specific guidance as to when and how the resources of a parent corporation or entity are to be taken into account in determining what is readily achievable. The Department believes that this complex issue is most appropriately resolved on a case-by-case basis. As the comments reflect, there is a wide variety of possible relationships between the site in question and any parent corporation or other entity. It would be unwise to posit legal ramifications under the ADA of even generic relationships (e.g., banks involved in foreclosures or insurance companies operating as trustees or in other similar fiduciary relationships), because any analysis will depend so completely on the detailed fact situations and the exact nature of the legal relationships involved. The final rule does, however, reorder the factors to be considered. This shift and the addition of the phrase ''if applicable'' make clear that the line of inquiry concerning factors will start at the site involved in the action itself. This change emphasizes that the overall resources, size, and operations of the parent corporation or entity should be considered to the extent appropriate in light of ''the geographic separateness, and the administrative or fiscal relationship of the site or sites in question to any parent corporation or entity.''

Although some commenters sought more specific numerical guidance on the definition of readily achievable, the Department has declined to establish in the final rule any kind of numerical formula for determining whether an action is readily achievable. It would be difficult to devise a specific ceiling on compliance costs that would take into account the vast diversity of enterprises covered by the ADA's public accommodations requirements and the economic situation that any particular entity would find itself in at any moment. The final rule, therefore, implements the flexible case-by-case approach chosen by Congress.

A number of commenters requested that security considerations be explicitly recognized as a factor in determining whether a barrier removal action is readily achievable. The Department believes that legitimate safety requirements, including crime prevention measures, may be taken into account so long as they are based on actual risks and are necessary for safe operation of the public accommodation. This point has been included in the definition.

Some commenters urged the Department not to consider acts of barrier removal in complete isolation from each other in determining whether they are readily achievable. The Department believes that it is appropriate to consider the cost of other barrier removal actions as one factor in determining whether a measure is readily achievable.

''Religious entity.'' The term ''religious entity'' is defined in accordance with section 307 of the ADA as a religious organization or entity controlled by a religious organization, including a place of worship. Section 36.102(e) of the rule states that the rule does not apply to any religious entity.

The ADA's exemption of religious organizations and religious entities controlled by religious organizations is very broad, encompassing a wide variety of situations. Religious organizations and entities controlled by religious organizations have no obligations under the ADA. Even when a religious organization carries out activities that would otherwise make it a public accommodation, the religious organization is exempt from ADA coverage. Thus, if a church itself operates a day care center, a nursing home, a private school, or a diocesan school system, the operations of the center, home, school, or schools would not be subject to the requirements of the ADA or this part. The religious entity would not lose its exemption merely because the services provided were open to the general public. The test is whether the church or other religious organization operates the public accommodation, not which individuals receive the public accommodation's services.

Religious entities that are controlled by religious organizations are also exempt from the ADA's requirements. Many religious organizations in the United States use lay boards and other secular or corporate mechanisms to operate schools and an array of social services. The use of a lay board or other mechanism does not itself remove the ADA's religious exemption. Thus, a parochial school, having religious doctrine in its curriculum and sponsored by a religious order, could be exempt either as a religious organization or as an entity controlled by a religious organization, even if it has a lay board. The test remains a factual one—whether the church or other religious organization controls the operations of the school or of the service or whether the school or service is itself a religious organization.

Although a religious organization or a religious entity that is controlled by a religious organization has no obligations under the rule, a public accommodation that is not itself a religious organization, but that operates a place of public accommodation in leased space on the property of a religious entity, which is not a place of worship, is subject to the rule's requirements if it is not under control of a religious organization. When a church rents meeting space, which is not a place of worship, to a local community group or to a private, independent day care center, the ADA applies to the activities of the local community group and day care center if a lease exists and consideration is paid.

''Service animal.'' The term ''service animal'' encompasses any guide dog, signal dog, or other animal individually trained to provide assistance to an individual with a disability. The term is used in §36.302(c), which requires public accommodations generally to modify policies, practices, and procedures to accommodate the use of service animals in places of public accommodation.

''Specified public transportation.'' The definition of ''specified public transportation'' is identical to the statutory definition in section 301(10) of the ADA. The term means transportation by bus, rail, or any other conveyance (other than by aircraft) that provides the general public with general or special service (including charter service) on a regular and continuing basis. It is used in category (7) of the definition of ''place of public accommodation,'' which includes stations used for specified public transportation.

The effect of this definition, which excludes transportation by aircraft, is that it excludes privately operated airports from coverage as places of public accommodation. However, places of public accommodation located within airports would be covered by this part. Airports that are operated by public entities are covered by title II of the ADA and, if they are operated as part of a program receiving Federal financial assistance, by section 504 of the Rehabilitation Act. Privately operated airports are similarly covered by section 504 if they are operated as part of a program receiving Federal financial assistance. The operations of any portion of any airport that are under the control of an air carrier are covered by the Air Carrier Access Act. In addition, airports are covered as commercial facilities under this rule.

''State.'' The definition of ''State'' is identical to the statutory definition in section 3(3) of the ADA. The term is used in the definitions of ''commerce'' and ''public entity'' in §36.104.

''Undue burden.'' The definition of ''undue burden'' is analogous to the statutory definition of ''undue hardship'' in employment under section 101(10) of the ADA. The term undue burden means ''significant difficulty or expense'' and serves as a limitation on the obligation to provide auxiliary aids and services under §36.303 and §§36.309 (b)(3) and (c)(3). Further discussion of the meaning and application of the term undue burden may be found in the preamble discussion of §36.303.

The definition lists factors considered in determining whether provision of an auxiliary aid or service in any particular circumstance would result in an undue burden.

The factors to be considered in determining whether an action would result in an undue burden are identical to those to be considered in determining whether an action is readily achievable. However, ''readily achievable'' is a lower standard than ''undue burden'' in that it requires a lower level of effort on the part of the public accommodation (see Education and Labor report at 109).

Further analysis of the factors to be considered in determining undue burden may be found in the preamble discussion of the definition of the term ''readily achievable.''

Subpart B—General Requirements

Subpart B includes general prohibitions restricting a public accommodation from discriminating against people with disabilities by denying them the opportunity to benefit from goods or services, by giving them unequal goods or services, or by giving them different or separate goods or services. These general prohibitions are patterned after the basic, general prohibitions that exist in other civil rights laws that prohibit discrimination on the basis of race, sex, color, religion, or national origin.

Section 36.201 General

Section 36.201(a) contains the general rule that prohibits discrimination on the basis of disability in the full and equal enjoyment of goods, services, facilities, privileges, advantages, and accommodations of any place of public accommodation.

Full and equal enjoyment means the right to participate and to have an equal opportunity to obtain the same results as others to the extent possible with such accommodations as may be required by the Act and these regulations. It does not mean that an individual with a disability must achieve an identical result or level of achievement as persons without a disability. For example, an exercise class cannot exclude a person who uses a wheelchair because he or she cannot do all of the exercises and derive the same result from the class as persons without a disability.

Section 302(a) of the ADA states that the prohibition against discrimination applies to ''any person who owns, leases (or leases to), or operates a place of public accommodation,'' and this language is reflected in §36.201(a). The coverage is quite extensive and would include sublessees, management companies, and any other entity that owns, leases, leases to, or operates a place of public accommodation, even if the operation is only for a short time.

The first sentence of paragraph (b) of §36.201 reiterates the general principle that both the landlord that owns the building that houses the place of public accommodation, as well as the tenant that owns or operates the place of public accommodation, are public accommodations subject to the requirements of this part. Although the statutory language could be interpreted as placing equal responsibility on all private entities, whether lessor, lessee, or operator of a public accommodation, the committee reports suggest that liability may be allocated. Section 36.201(b) of that section of the proposed rule attempted to allocate liability in the regulation itself. Paragraph (b)(2) of that section made a specific allocation of liability for the obligation to take readily achievable measures to remove barriers, and paragraph (b)(3) made a specific allocation for the obligation to provide auxiliary aids.

Numerous commenters pointed out that these allocations would not apply in all situations. Some asserted that paragraph (b)(2) of the proposed rule only addressed the situation when a lease gave the tenant the right to make alterations with permission of the landlord, but failed to address other types of leases, e.g., those that are silent on the right to make alterations, or those in which the landlord is not permitted to enter a tenant's premises to make alterations. Several commenters noted that many leases contain other clauses more relevant to the ADA than the alterations clause. For example, many leases contain a ''compliance clause,'' a clause which allocates responsibility to a particular party for compliance with all relevant Federal, State, and local laws. Many commenters pointed out various types of relationships that were left unaddressed by the regulation, e.g., sale and leaseback arrangements where the landlord is a financial institution with no control or responsibility for the building; franchises; subleases; and management companies which, at least in the hotel industry, often have control over operations but are unable to make modifications to the premises.

Some commenters raised specific questions as to how the barrier removal allocation would work as a practical matter. Paragraph (b)(2) of the proposed rule provided that the burden of making readily achievable modifications within the tenant's place of public accommodation would shift to the landlord when the modifications were not readily achievable for the tenant or when the landlord denied a tenant's request for permission to make such modifications. Commenters noted that the rule did not specify exactly when the burden would actually shift from tenant to landlord and whether the landlord would have to accept a tenant's word that a particular action is not readily achievable. Others questioned if the tenant should be obligated to use alternative methods of barrier removal before the burden shifts. In light of the fact that readily achievable removal of barriers can include such actions as moving of racks and displays, some commenters doubted the appropriateness of requiring a

landlord to become involved in day-to-day operations of its tenants' businesses.

The Department received widely differing comments in response to the preamble question asking whether landlord and tenant obligations should vary depending on the length of time remaining on an existing lease. Many suggested that tenants should have no responsibilities in ''shorter leases,'' which commenters defined as ranging anywhere from 90 days to three years. Other commenters pointed out that the time remaining on the lease should not be a factor in the rule's allocation of responsibilities, but is relevant in determining what is readily achievable for the tenant. The Department agrees with this latter approach and will interpret the rule in that manner.

In recognition of the somewhat limited applicability of the allocation scheme contained in the proposed rule, paragraphs (b)(2) and (b)(3) have been deleted from the final rule. The Department has substituted instead a statement that allocation of responsibility as between the parties for taking readily achievable measures to remove barriers and to provide auxiliary aids and services both in common areas and within places of public accommodation may be determined by the lease or other contractual relationships between the parties. The ADA was not intended to change existing landlord/tenant responsibilities as set forth in the lease. By deleting specific provisions from the rule, the Department gives full recognition to this principle. As between the landlord and tenant, the extent of responsibility for particular obligations may be, and in many cases probably will be, determined by contract.

The suggested allocation of responsibilities contained in the proposed rule may be used if appropriate in a particular situation. Thus, the landlord would generally be held responsible for making readily achievable changes and providing auxiliary aids and services in common areas and for modifying policies, practices, or procedures applicable to all tenants, and the tenant would generally be responsible for readily achievable changes, provision of auxiliary aids, and modification of policies within its own place of public accommodation.

Many commenters objected to the proposed rule's allocation of responsibility for providing auxiliary aids and services solely to the tenant, pointing out that this exclusive allocation may not be appropriate in the case of larger public accommodations that operate their businesses by renting space out to smaller public accommodations. For example, large theaters often rent to smaller traveling companies and hospitals often rely on independent contractors to provide childbirth classes. Groups representing persons with disabilities objected to the proposed rule because, in their view, it permitted the large theater or hospital to evade ADA responsibilities by leasing to independent smaller entities. They suggested that these types of public accommodations are not really landlords because they are in the business of providing a service, rather than renting space, as in the case of a shopping center or office building landlord. These commenters believed that responsibility for providing auxiliary aids should shift to the landlord, if the landlord relies on a smaller public accommodation or independent contractor to provide services closely related to those of the larger public accommodation, and if the needed auxiliary aids prove to be an undue burden for the smaller public accommodation. The final rule no longer lists specific allocations to specific parties but, rather, leaves allocation of responsibilities to the lease negotiations. Parties are, therefore, free to allocate the responsibility for auxiliary aids.

Section 36.201(b)(4) of the proposed rule, which provided that alterations by a tenant on its own premises do not trigger a path of travel obligation on the landlord, has been moved to §36.403(d) of the final rule.

An entity that is not in and of itself a public accommodation, such as a trade association or performing artist, may become a public accommodation when it leases space for a conference or performance at a hotel, convention center, or stadium. For an entity to become a public accommodation when it is the lessee of space, however, the Department believes that consideration in some form must be given. Thus, a Boy Scout troop that accepts donated space does not become a public accommodation because the troop has not ''leased'' space, as required by the ADA.

As a public accommodation, the trade association or performing artist will be responsible for compliance with this part. Specific responsibilities should be allocated by contract, but, generally, the lessee should be responsible for providing auxiliary aids and services (which could include interpreters, Braille programs, etc.) for the participants in its conference or performance as well as for assuring that displays are accessible to individuals with disabilities.

Some commenters suggested that the rule should allocate responsibilities for areas other than removal of barriers and auxiliary aids. The final rule leaves allocation of all areas to the lease negotiations. However, in general landlords should not be given responsibility for policies a tenant applies in operating its business, if such policies are solely those of the tenant. Thus, if a restaurant tenant discriminates by refusing to seat a patron, it would be the tenant, and not the landlord, who would be responsible, because the discriminatory policy is imposed solely by the tenant and not by the landlord. If, however, a tenant refuses to modify a ''no

pets'' rule to allow service animals in its restaurant because the landlord mandates such a rule, then both the landlord and the tenant would be liable for violation of the ADA when a person with a service dog is refused entrance. The Department wishes to emphasize, however, that the parties are free to allocate responsibilities in any way they choose.

Private clubs are also exempt from the ADA. However, consistent with title II of the Civil Rights Act (42 U.S.C. 2000a(e), a private club is considered a public accommodation to the extent that ''the facilities of such establishment are made available to the customers or patrons'' of a place of public accommodation. Thus, if a private club runs a day care center that is open exclusively to its own members, the club, like the church in the example above, would have no responsibility for compliance with the ADA. Nor would the day care center have any responsibilities because it is part of the private club exempt from the ADA.

On the other hand, if the private club rents to a day care center that is open to the public, then the private club would have the same obligations as any other public accommodation that functions as a landlord with respect to compliance with title III within the day care center. In such a situation, both the private club that ''leases to'' a public accommodation and the public accommodation lessee (the day care center) would be subject to the ADA. This same principle would apply if the private club were to rent to, for example, a bar association, which is not generally a public accommodation but which, as explained above, becomes a public accommodation when it leases space for a conference.

Section 36.202 Activities

Section 36.202 sets out the general forms of discrimination prohibited by title III of the ADA. These general prohibitions are further refined by the specific prohibitions in subpart C. Section 36.213 makes clear that the limitations on the ADA's requirements contained in subpart C, such as ''necessity'' (§36.301(a)) and ''safety'' (§36.301(b)), are applicable to the prohibitions in §36.202. Thus, it is unnecessary to add these limitations to §36.202 as has been requested by some commenters. In addition, the language of §36.202 very closely tracks the language of section 302(b)(1)(A) of the Act, and that statutory provision does not expressly contain these limitations.

Deny participation—Section 36.202(a) provides that it is discriminatory to deny a person with a disability the right to participate in or benefit from the goods, services, facilities, privileges, advantages, or accommodations of a place of public accommodation.

A public accommodation may not exclude persons with disabilities on the basis of disability for reasons other than those specifically set forth in this part. For example, a public accommodation cannot refuse to serve a person with a disability because its insurance company conditions coverage or rates on the absence of persons with disabilities. This is a frequent basis of exclusion from a variety of community activities and is prohibited by this part.

Unequal benefit—Section 36.202(b) prohibits services or accommodations that are not equal to those provided others. For example, persons with disabilities must not be limited to certain performances at a theater.

Separate benefit—Section 36.202(c) permits different or separate benefits or services only when necessary to provide persons with disabilities opportunities as effective as those provided others. This paragraph permitting separate benefits ''when necessary'' should be read together with §36.203(a), which requires integration in ''the most integrated setting appropriate to the needs of the individual.'' The preamble to that section provides further guidance on separate programs. Thus, this section would not prohibit the designation of parking spaces for persons with disabilities.

Each of the three paragraphs (a)–(c) prohibits discrimination against an individual or class of individuals ''either directly or through contractual, licensing, or other arrangements.'' The intent of the contractual prohibitions of these paragraphs is to prohibit a public accommodation from doing indirectly, through a contractual relationship, what it may not do directly. Thus, the ''individual or class of individuals'' referenced in the three paragraphs is intended to refer to the clients and customers of the public accommodation that entered into a contractual arrangement. It is not intended to encompass the clients or customers of other entities. A public accommodation, therefore, is not liable under this provision for discrimination that may be practiced by those with whom it has a contractual relationship, when that discrimination is not directed against its own clients or customers. For example, if an amusement park contracts with a food service company to operate its restaurants at the park, the amusement park is not responsible for other operations of the food service company that do not involve clients or customers of the amusement park. Section 36.202(d) makes this clear by providing that the term ''individual or class of individuals'' refers to the clients or customers of the public accommodation that enters into the contractual, licensing, or other arrangement.

Section 36.203 Integrated Settings

Section 36.203 addresses the integration of persons with disabilities. The ADA recognizes that the provision of goods and services in an integrated manner is a fundamental tenet of nondiscrimination on the basis of

disability. Providing segregated accommodations and services relegates persons with disabilities to the status of second-class citizens. For example, it would be a violation of this provision to require persons with mental disabilities to eat in the back room of a restaurant or to refuse to allow a person with a disability the full use of a health spa because of stereotypes about the person's ability to participate. Section 36.203(a) states that a public accommodation shall afford goods, services, facilities, privileges, advantages, and accommodations to an individual with a disability in the most integrated setting appropriate to the needs of the individual. Section 36.203(b) specifies that, notwithstanding the existence of separate or different programs or activities provided in accordance with this section, an individual with a disability shall not be denied the opportunity to participate in such programs or activities that are not separate or different. Section 306.203(c), which is derived from section 501(d) of the Americans with Disabilities Act, states that nothing in this part shall be construed to require an individual with a disability to accept an accommodation, aid, service, opportunity, or benefit that he or she chooses not to accept.

Taken together, these provisions are intended to prohibit exclusion and segregation of individuals with disabilities and the denial of equal opportunities enjoyed by others, based on, among other things, presumptions, patronizing attitudes, fears, and stereotypes about individuals with disabilities. Consistent with these standards, public accommodations are required to make decisions based on facts applicable to individuals and not on the basis of presumptions as to what a class of individuals with disabilities can or cannot do.

Sections 36.203 (b) and (c) make clear that individuals with disabilities cannot be denied the opportunity to participate in programs that are not separate or different. This is an important and overarching principle of the Americans with Disabilities Act. Separate, special, or different programs that are designed to provide a benefit to persons with disabilities cannot be used to restrict the participation of persons with disabilities in general, integrated activities.

For example, a person who is blind may wish to decline participating in a special museum tour that allows persons to touch sculptures in an exhibit and instead tour the exhibit at his or her own pace with the museum's recorded tour. It is not the intent of this section to require the person who is blind to avail himself or herself of the special tour. Modified participation for persons with disabilities must be a choice, not a requirement.

Further, it would not be a violation of this section for an establishment to offer recreational programs specially designed for children with mobility impairments in those limited circumstances. However, it would be a violation of this section if the entity then excluded these children from other recreational services made available to nondisabled children, or required children with disabilities to attend only designated programs.

Many commenters asked that the Department clarify a public accommodation's obligations within the integrated program when it offers a separate program, but an individual with a disability chooses not to participate in the separate program. It is impossible to make a blanket statement as to what level of auxiliary aids or modifications are required in the integrated program. Rather, each situation must be assessed individually. Assuming the integrated program would be appropriate for a particular individual, the extent to which that individual must be provided with modifications will depend not only on what the individual needs but also on the limitations set forth in subpart C. For example, it may constitute an undue burden for a particular public accommodation, which provides a full-time interpreter in its special guided tour for individuals with hearing impairments, to hire an additional interpreter for those individuals who choose to attend the integrated program. The Department cannot identify categorically the level of assistance or aid required in the integrated program.

The preamble to the proposed rule contained a statement that some interpreted as encouraging the continuation of separate schools, sheltered workshops, special recreational programs, and other similar programs. It is important to emphasize that §36.202(c) only calls for separate programs when such programs are ''necessary'' to provide as effective an opportunity to individuals with disabilities as to other individuals. Likewise, §36.203(a) only permits separate programs when a more integrated setting would not be ''appropriate.'' Separate programs are permitted, then, in only limited circumstances. The sentence at issue has been deleted from the preamble because it was too broadly stated and had been erroneously interpreted as Departmental encouragement of separate programs without qualification.

The proposed rule's reference in §36.203(b) to separate programs or activities provided in accordance with ''this section'' has been changed to ''this subpart'' in recognition of the fact that separate programs or activities may, in some limited circumstances, be permitted not only by §36.203(a) but also by §36.202(c).

In addition, some commenters suggested that the individual with the disability is the only one who can decide whether a setting is ''appropriate'' and what the ''needs'' are.

Others suggested that only the public accommodation can make these determinations. The regulation does not give exclusive responsibility to either party. Rather, the determinations are to be made based on an objective view, presumably one which would take into account views of both parties.

Some commenters expressed concern that §36.203(c), which states that nothing in the rule requires an individual with a disability to accept special accommodations and services provided under the ADA, could be interpreted to allow guardians of infants or older people with disabilities to refuse medical treatment for their wards. Section 36.203(c) has been revised to make it clear that paragraph (c) is inapplicable to the concern of the commenters. A new paragraph (c)(2) has been added stating that nothing in the regulation authorizes the representative or guardian of an individual with a disability to decline food, water, medical treatment, or medical services for that individual. New paragraph (c) clarifies that neither the ADA nor the regulation alters current Federal law ensuring the rights of incompetent individuals with disabilities to receive food, water, and medical treatment. See, *e.g.*, Child Abuse Amendments of 1984 (42 U.S.C. 5106a(b)(10), 5106g(10)); Rehabilitation Act of 1973, as amended (29 U.S.C 794); Developmentally Disabled Assistance and Bill of Rights Act (42 U.S.C. 6042).

Sections 36.203(c) (1) and (2) are based on section 501(d) of the ADA. Section §501(d) was designed to clarify that nothing in the ADA requires individuals with disabilities to accept special accommodations and services for individuals with disabilities that may segregate them:

The Committee added this section (501(d)) to clarify that nothing in the ADA is intended to permit discriminatory treatment on the basis of disability, even when such treatment is rendered under the guise of providing an accommodation, service, aid or benefit to the individual with disability. For example, a blind individual may choose not to avail himself or herself of the right to go to the front of a line, even if a particular public accommodation has chosen to offer such a modification of a policy for blind individuals. Or, a blind individual may choose to decline to participate in a special museum tour that allows persons to touch sculptures in an exhibit and instead tour the exhibits at his or her own pace with the museum's recorded tour.

(Judiciary report at 71–72.) The Act is not to be construed to mean that an individual with disabilities must accept special accommodations and services for individuals with disabilities when that individual chooses to participate in the regular services already offered. Because medical treatment, including treatment for particular conditions, is not a special accommodation or service for individuals with disabilities under section 501(d), neither the Act nor this part provides affirmative authority to suspend such treatment. Section 501(d) is intended to clarify that the Act is not designed to foster discrimination through mandatory acceptance of special services when other alternatives are provided; this concern does not reach to the provision of medical treatment for the disabling condition itself.

Section 36.213 makes clear that the limitations contained in subpart C are to be read into subpart B. Thus, the integration requirement is subject to the various defenses contained in subpart C, such as safety, if eligibility criteria are at issue (§36.301(b)), or fundamental alteration and undue burden, if the concern is provision of auxiliary aids (§36.303(a)).

Section 36.204 Administrative Methods

Section 36.204 specifies that an individual or entity shall not, directly, or through contractual or other arrangements, utilize standards or criteria or methods of administration that have the effect of discriminating on the basis of disability or that perpetuate the discrimination of others who are subject to common administrative control. The preamble discussion of §36.301 addresses eligibility criteria in detail.

Section 36.204 is derived from section 302(b)(1)(D) of the Americans with Disabilities Act, and it uses the same language used in the employment section of the ADA (section 102(b)(3)). Both sections incorporate a disparate impact standard to ensure the effectiveness of the legislative mandate to end discrimination. This standard is consistent with the interpretation of section 504 by the U.S. Supreme Court in *Alexander* v. *Choate,* 469 U.S. 287 (1985). The Court in *Choate* explained that members of Congress made numerous statements during passage of section 504 regarding eliminating architectural barriers, providing access to transportation, and eliminating discriminatory effects of job qualification procedures. The Court then noted: ''These statements would ring hollow if the resulting legislation could not rectify the harms resulting from action that discriminated by effect as well as by design.'' *Id* at 297 (footnote omitted).

Of course, §36.204 is subject to the various limitations contained in subpart C including, for example, necessity (§36.301(a)), safety (§36.301(b)), fundamental alteration (§36.302(a)), readily achievable (§36.304(a)), and undue burden (§36.303(a)).

Section 36.205 Association

Section 36.205 implements section 302(b)(1)(E) of the Act, which provides that a public accommodation shall not exclude or

otherwise deny equal goods, services, facilities, privileges, advantages, accommodations, or other opportunities to an individual or entity because of the known disability of an individual with whom the individual or entity is known to have a relationship or association. This section is unchanged from the proposed rule.

The individuals covered under this section include any individuals who are discriminated against because of their known association with an individual with a disability. For example, it would be a violation of this part for a day care center to refuse admission to a child because his or her brother has HIV disease.

This protection is not limited to those who have a familial relationship with the individual who has a disability. If a place of public accommodation refuses admission to a person with cerebral palsy and his or her companions, the companions have an independent right of action under the ADA and this section.

During the legislative process, the term ''entity'' was added to section 302(b)(1)(E) to clarify that the scope of the provision is intended to encompass not only persons who have a known association with a person with a disability, but also entities that provide services to or are otherwise associated with such individuals. This provision was intended to ensure that entities such as health care providers, employees of social service agencies, and others who provide professional services to persons with disabilities are not subjected to discrimination because of their professional association with persons with disabilities. For example, it would be a violation of this section to terminate the lease of an entity operating an independent living center for persons with disabilities, or to seek to evict a health care provider because that individual or entity provides services to persons with mental impairments.

Section 36.206 Retaliation or Coercion

Section 36.206 implements section 503 of the ADA, which prohibits retaliation against any individual who exercises his or her rights under the Act. This section is unchanged from the proposed rule. Paragraph (a) of §36.206 provides that no private entity or public entity shall discriminate against any individual because that individual has exercised his or her right to oppose any act or practice made unlawful by this part, or because that individual made a charge, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the Act or this part.

Paragraph (b) provides that no private entity or public entity shall coerce, intimidate, threaten, or interfere with any individual in the exercise of his or her rights under this part or because that individual aided or encouraged any other individual in the exercise or enjoyment of any right granted or protected by the Act or this part.

Illustrations of practices prohibited by this section are contained in paragraph (c), which is modeled on a similar provision in the regulations issued by the Department of Housing and Urban Development to implement the Fair Housing Act (see 24 CFR 100.400(c)(1)). Prohibited actions may include:

(1) Coercing an individual to deny or limit the benefits, services, or advantages to which he or she is entitled under the Act or this part;

(2) Threatening, intimidating, or interfering with an individual who is seeking to obtain or use the goods, services, facilities, privileges, advantages, or accommodations of a public accommodation;

(3) Intimidating or threatening any person because that person is assisting or encouraging an individual or group entitled to claim the rights granted or protected by the Act or this part to exercise those rights; or

(4) Retaliating against any person because that person has participated in any investigation or action to enforce the Act or this part.

This section protects not only individuals who allege a violation of the Act or this part, but also any individuals who support or assist them. This section applies to all investigations or proceedings initiated under the Act or this part without regard to the ultimate resolution of the underlying allegations. Because this section prohibits any act of retaliation or coercion in response to an individual's effort to exercise rights established by the Act and this part (or to support the efforts of another individual), the section applies not only to public accommodations that are otherwise subject to this part, but also to individuals other than public accommodations or to public entities. For example, it would be a violation of the Act and this part for a private individual, e.g., a restaurant customer, to harass or intimidate an individual with a disability in an effort to prevent that individual from patronizing the restaurant. It would, likewise, be a violation of the Act and this part for a public entity to take adverse action against an employee who appeared as a witness on behalf of an individual who sought to enforce the Act.

Section 36.207 Places of Public Accommodation Located in Private Residences

A private home used exclusively as a residence is not covered by title III because it is neither a ''commercial facility'' nor a ''place of public accommodation.'' In some situations, however, a private home is not used exclusively as a residence, but houses a place of public accommodation in all or part of a home (e.g., an accountant who meets with his or her clients at his or her residence). Section 36.207(a) provides that those portions of the private residence used in the operation

of the place of public accommodation are covered by this part.

For instance, a home or a portion of a home may be used as a day care center during the day and a residence at night. If all parts of the house are used for the day care center, then the entire residence is a place of public accommodation because no part of the house is used exclusively as a residence. If an accountant uses one room in the house solely as his or her professional office, then a portion of the house is used exclusively as a place of public accommodation and a portion is used exclusively as a residence. Section 36.207 provides that when a portion of a residence is used exclusively as a residence, that portion is not covered by this part. Thus, the portions of the accountant's house, other than the professional office and areas and spaces leading to it, are not covered by this part. All of the requirements of this rule apply to the covered portions, including requirements to make reasonable modifications in policies, eliminate discriminatory eligibility criteria, take readily achievable measures to remove barriers or provide readily achievable alternatives (e.g., making house calls), provide auxiliary aids and services and undertake only accessible new construction and alterations.

Paragraph (b) was added in response to comments that sought clarification on the extent of coverage of the private residence used as the place of public accommodation. The final rule makes clear that the place of accommodation extends to all areas of the home used by clients and customers of the place of public accommodation. Thus, the ADA would apply to any door or entry way, hallways, a restroom, if used by customers and clients; and any other portion of the residence, interior or exterior, used by customers or clients of the public accommodation. This interpretation is simply an application of the general rule for all public accommodations, which extends statutory requirements to all portions of the facility used by customers and clients, including, if applicable, restrooms, hallways, and approaches to the public accommodation. As with other public accommodations, barriers at the entrance and on the sidewalk leading up to the public accommodation, if the sidewalk is under the control of the public accommodation, must be removed if doing so is readily achievable.

The Department recognizes that many businesses that operate out of personal residences are quite small, often employing only the homeowner and having limited total revenues. In these circumstances the effect of ADA coverage would likely be quite minimal. For example, because the obligation to remove existing architectural barriers is limited to those that are easily accomplishable without much difficulty or expense (*see* §36.304), the range of required actions would be quite modest. It might not be readily achievable for such a place of public accommodation to remove any existing barriers. If it is not readily achievable to remove existing architectural barriers, a public accommodation located in a private residence may meet its obligations under the Act and this part by providing its goods or services to clients or customers with disabilities through the use of alternative measures, including delivery of goods or services in the home of the customer or client, to the extent that such alternative measures are readily achievable (*See* §36.305).

Some commenters asked for clarification as to how the new construction and alteration standards of subpart D will apply to residences. The new construction standards only apply to the extent that the residence or portion of the residence was designed or intended for use as a public accommodation. Thus, for example, if a portion of a home is designed or constructed for use exclusively as a lawyer's office or for use both as a lawyer's office and for residential purposes, then it must be designed in accordance with the new construction standards in the appendix. Likewise, if a homeowner is undertaking alterations to convert all or part of his residence to a place of public accommodation, that work must be done in compliance with the alterations standards in the appendix.

The preamble to the proposed rule addressed the applicable requirements when a commercial facility is located in a private residence. That situation is now addressed in §36.401(b) of subpart D.

Section 36.208 Direct Threat

Section 36.208(a) implements section 302(b)(3) of the Act by providing that this part does not require a public accommodation to permit an individual to participate in or benefit from the goods, services, facilities, privileges, advantages and accommodations of the public accommodation, if that individual poses a direct threat to the health or safety of others. This section is unchanged from the proposed rule.

The Department received a significant number of comments on this section. Commenters representing individuals with disabilities generally supported this provision, but suggested revisions to further limit its application. Commenters representing public accommodations generally endorsed modifications that would permit a public accommodation to exercise its own judgment in determining whether an individual poses a direct threat.

The inclusion of this provision is not intended to imply that persons with disabilities pose risks to others. It is intended to address concerns that may arise in this area. It establishes a strict standard that must be met before denying service to an individual

with a disability or excluding that individual from participation.

Paragraph (b) of this section explains that a ''direct threat'' is a significant risk to the health or safety of others that cannot be eliminated by a modification of policies, practices, or procedures, or by the provision of auxiliary aids and services. This paragraph codifies the standard first applied by the Supreme Court in *School Board of Nassau County* v. *Arline*, 480 U.S. 273 (1987), in which the Court held that an individual with a contagious disease may be an ''individual with handicaps'' under section 504 of the Rehabilitation Act. In *Arline*, the Supreme Court recognized that there is a need to balance the interests of people with disabilities against legitimate concerns for public safety. Although persons with disabilities are generally entitled to the protection of this part, a person who poses a significant risk to others may be excluded if reasonable modifications to the public accommodation's policies, practices, or procedures will not eliminate that risk. The determination that a person poses a direct threat to the health or safety of others may not be based on generalizations or stereotypes about the effects of a particular disability; it must be based on an individual assessment that conforms to the requirements of paragraph (c) of this section.

Paragraph (c) establishes the test to use in determining whether an individual poses a direct threat to the health or safety of others. A public accommodation is required to make an individualized assessment, based on reasonable judgment that relies on current medical evidence or on the best available objective evidence, to determine: The nature, duration, and severity of the risk; the probability that the potential injury will actually occur; and whether reasonable modifications of policies, practices, or procedures will mitigate the risk. This is the test established by the Supreme Court in *Arline*. Such an inquiry is essential if the law is to achieve its goal of protecting disabled individuals from discrimination based on prejudice, stereotypes, or unfounded fear, while giving appropriate weight to legitimate concerns, such as the need to avoid exposing others to significant health and safety risks. Making this assessment will not usually require the services of a physician. Sources for medical knowledge include guidance from public health authorities, such as the U.S. Public Health Service, the Centers for Disease Control, and the National Institutes of Health, including the National Institute of Mental Health.

Many of the commenters sought clarification of the inquiry requirement. Some suggested that public accommodations should be prohibited from making any inquiries to determine if an individual with a disability would pose a direct threat to other persons. The Department believes that to preclude all such inquiries would be inappropriate. Under §36.301 of this part, a public accommodation is permitted to establish eligibility criteria necessary for the safe operation of the place of public accommodation. Implicit in that right is the right to ask if an individual meets the criteria. However, any eligibility or safety standard established by a public accommodation must be based on actual risk, not on speculation or stereotypes; it must be applied to all clients or customers of the place of public accommodation; and inquiries must be limited to matters necessary to the application of the standard.

Some commenters suggested that the test established in the *Arline* decision, which was developed in the context of an employment case, is too stringent to apply in a public accommodations context where interaction between the public accommodation and its client or customer is often very brief. One suggested alternative was to permit public accommodations to exercise ''good faith'' judgment in determining whether an individual poses a direct threat, particularly when a public accommodation is dealing with a client or customer engaged in disorderly or disruptive behavior.

The Department believes that the ADA clearly requires that any determination to exclude an individual from participation must be based on an objective standard. A public accommodation may establish neutral eligibility criteria as a condition of receiving its goods or services. As long as these criteria are necessary for the safe provision of the public accommodation's goods and services and applied neutrally to all clients or customers, regardless of whether they are individuals with disabilities, a person who is unable to meet the criteria may be excluded from participation without inquiry into the underlying reason for the inability to comply. In places of public accommodation such as restaurants, theaters, or hotels, where the contact between the public accommodation and its clients is transitory, the uniform application of an eligibility standard precluding violent or disruptive behavior by any client or customer should be sufficient to enable a public accommodation to conduct its business in an orderly manner.

Some other commenters asked for clarification of the application of this provision to persons, particularly children, who have short-term, contagious illnesses, such as fevers, influenza, or the common cold. It is common practice in schools and day care settings to exclude persons with such illnesses until the symptoms subside. The Department believes that these commenters misunderstand the scope of this rule. The ADA only prohibits discrimination against an individual with a disability. Under the ADA and

this part, a ''disability'' is defined as a physical or mental impairment that substantially limits one or more major life activities. Common, short-term illnesses that predictably resolve themselves within a matter of days do not ''substantially limit'' a major life activity; therefore, it is not a violation of this part to exclude an individual from receiving the services of a public accommodation because of such transitory illness. However, this part does apply to persons who have long-term illnesses. Any determination with respect to a person who has a chronic or long-term illness must be made in compliance with the requirements of this section.

Section 36.209 Illegal Use of Drugs

Section 36.209 effectuates section 510 of the ADA, which clarifies the Act's application to people who use drugs illegally. Paragraph (a) provides that this part does not prohibit discrimination based on an individual's current illegal use of drugs.

The Act and the regulation distinguish between illegal use of drugs and the legal use of substances, whether or not those substances are ''controlled substances,'' as defined in the Controlled Substances Act (21 U.S.C. 812). Some controlled substances are prescription drugs that have legitimate medical uses. Section 36.209 does not affect use of controlled substances pursuant to a valid prescription, under supervision by a licensed health care professional, or other use that is authorized by the Controlled Substances Act or any other provision of Federal law. It does apply to illegal use of those substances, as well as to illegal use of controlled substances that are not prescription drugs. The key question is whether the individual's use of the substance is illegal, not whether the substance has recognized legal uses. Alcohol is not a controlled substance, so use of alcohol is not addressed by §36.209. Alcoholics are individuals with disabilities, subject to the protections of the statute.

A distinction is also made between the use of a substance and the status of being addicted to that substance. Addiction is a disability, and addicts are individuals with disabilities protected by the Act. The protection, however, does not extend to actions based on the illegal use of the substance. In other words, an addict cannot use the fact of his or her addiction as a defense to an action based on illegal use of drugs. This distinction is not artificial. Congress intended to deny protection to people who engage in the illegal use of drugs, whether or not they are addicted, but to provide protection to addicts so long as they are not currently using drugs.

A third distinction is the difficult one between current use and former use. The definition of ''current illegal use of drugs'' in §36.104, which is based on the report of the Conference Committee, H.R. Conf. Rep. No. 596, 101st Cong., 2d Sess. 64 (1990), is ''illegal use of drugs that occurred recently enough to justify a reasonable belief that a person's drug use is current or that continuing use is a real and ongoing problem.''

Paragraph (a)(2)(i) specifies that an individual who has successfully completed a supervised drug rehabilitation program or has otherwise been rehabilitated successfully and who is not engaging in current illegal use of drugs is protected. Paragraph (a)(2)(ii) clarifies that an individual who is currently participating in a supervised rehabilitation program and is not engaging in current illegal use of drugs is protected. Paragraph (a)(2)(iii) provides that a person who is erroneously regarded as engaging in current illegal use of drugs, but who is not engaging in such use, is protected.

Paragraph (b) provides a limited exception to the exclusion of current illegal users of drugs from the protections of the Act. It prohibits denial of health services, or services provided in connection with drug rehabilitation, to an individual on the basis of current illegal use of drugs, if the individual is otherwise entitled to such services. As explained further in the discussion of §36.302, a health care facility that specializes in a particular type of treatment, such as care of burn victims, is not required to provide drug rehabilitation services, but it cannot refuse to treat an individual's burns on the grounds that the individual is illegally using drugs.

A commenter argued that health care providers should be permitted to use their medical judgment to postpone discretionary medical treatment of individuals under the influence of alcohol or drugs. The regulation permits a medical practitioner to take into account an individual's use of drugs in determining appropriate medical treatment. Section 36.209 provides that the prohibitions on discrimination in this part do not apply when the public accommodation acts on the basis of current illegal use of drugs. Although those prohibitions do apply under paragraph (b), the limitations established under this part also apply. Thus, under §36.208, a health care provider or other public accommodation covered under §36.209(b) may exclude an individual whose current illegal use of drugs poses a direct threat to the health or safety of others, and, under §36.301, a public accommodation may impose or apply eligibility criteria that are necessary for the provision of the services being offered, and may impose legitimate safety requirements that are necessary for safe operation. These same limitations also apply to individuals with disabilities who use alcohol or prescription drugs. The Department believes that these provisions address this commenter's concerns.

Other commenters pointed out that abstention from the use of drugs is an essential

condition for participation in some drug rehabilitation programs, and may be a necessary requirement in inpatient or residential settings. The Department believes that this comment is well-founded. Congress clearly did not intend to exclude from drug treatment programs the very individuals who need such programs because of their use of drugs. In such a situation, however, once an individual has been admitted to a program, abstention may be a necessary and appropriate condition to continued participation. The final rule therefore provides that a drug rehabilitation or treatment program may deny participation to individuals who use drugs while they are in the program.

Paragraph (c) expresses Congress' intention that the Act be neutral with respect to testing for illegal use of drugs. This paragraph implements the provision in section 510(b) of the Act that allows entities ''to adopt or administer reasonable policies or procedures, including but not limited to drug testing,'' that ensure an individual who is participating in a supervised rehabilitation program, or who has completed such a program or otherwise been rehabilitated successfully, is no longer engaging in the illegal use of drugs. Paragraph (c) is not to be construed to encourage, prohibit, restrict, or authorize the conducting of testing for the illegal use of drugs.

Paragraph (c) of §36.209 clarifies that it is not a violation of this part to adopt or administer reasonable policies or procedures to ensure that an individual who formerly engaged in the illegal use of drugs is not currently engaging in illegal use of drugs. Any such policies or procedures must, of course, be reasonable, and must be designed to identify accurately the illegal use of drugs. This paragraph does not authorize inquiries, tests, or other procedures that would disclose use of substances that are not controlled substances or are taken under supervision by a licensed health care professional, or other uses authorized by the Controlled Substances Act or other provisions of Federal law, because such uses are not included in the definition of ''illegal use of drugs.''

One commenter argued that the rule should permit testing for lawful use of prescription drugs, but most favored the explanation that tests must be limited to *unlawful* use in order to avoid revealing the use of prescription medicine used to treat disabilities. Tests revealing legal use of prescription drugs might violate the prohibition in §36.301 of attempts to unnecessarily identify the existence of a disability.

Section 36.210 Smoking

Section 36.210 restates the clarification in section 501(b) of the Act that the Act does not preclude the prohibition of, or imposition of restrictions on, smoking. Some commenters argued that §36.210 does not go far enough, and that the regulation should prohibit smoking in all places of public accommodation. The reference to smoking in section 501 merely clarifies that the Act does not require public accommodations to accommodate smokers by permitting them to smoke in places of public accommodations.

Section 36.211 Maintenance of Accessible Features

Section 36.211 provides that a public accommodation shall maintain in operable working condition those features of facilities and equipment that are required to be readily accessible to and usable by persons with disabilities by the Act or this part. The Act requires that, to the maximum extent feasible, facilities must be accessible to, *and usable by*, individuals with disabilities. This section recognizes that it is not sufficient to provide features such as accessible routes, elevators, or ramps, if those features are not maintained in a manner that enables individuals with disabilities to use them. Inoperable elevators, locked accessible doors, or ''accessible'' routes that are obstructed by furniture, filing cabinets, or potted plants are neither ''accessible to'' nor ''usable by'' individuals with disabilities.

Some commenters objected that this section appeared to establish an absolute requirement and suggested that language from the preamble be included in the text of the regulation. It is, of course, impossible to guarantee that mechanical devices will never fail to operate. Paragraph (b) of the final regulation provides that this section does not prohibit isolated or temporary interruptions in service or access due to maintenance or repairs. This paragraph is intended to clarify that temporary obstructions or isolated instances of mechanical failure would not be considered violations of the Act or this part. However, allowing obstructions or ''out of service'' equipment to persist beyond a reasonable period of time would violate this part, as would repeated mechanical failures due to improper or inadequate maintenance. Failure of the public accommodation to ensure that accessible routes are properly maintained and free of obstructions, or failure to arrange prompt repair of inoperable elevators or other equipment intended to provide access, would also violate this part.

Other commenters requested that this section be expanded to include specific requirements for inspection and maintenance of equipment, for training staff in the proper operation of equipment, and for maintenance of specific items. The Department believes that this section properly establishes the general requirement for maintaining access and that further, more detailed requirements are not necessary.

Section 36.212 Insurance

The Department received numerous comments on proposed §36.212. Most supported the proposed regulation but felt that it did not go far enough in protecting individuals with disabilities and persons associated with them from discrimination. Many commenters argued that language from the preamble to the proposed regulation should be included in the text of the final regulation. Other commenters argued that even that language was not strong enough, and that more stringent standards should be established. Only a few commenters argued that the Act does not apply to insurance underwriting practices or the terms of insurance contracts. These commenters cited language from the Senate committee report (S. Rep. No. 116, 101st Cong., 1st Sess., at 84–86 (1989) (hereinafter ''Senate report'')), indicating that Congress did not intend to affect existing insurance practices.

The Department has decided to adopt the language of the proposed rule without change. Sections 36.212 (a) and (b) restate section 501(c) of the Act, which provides that the Act shall not be construed to restrict certain insurance practices on the part of insurance companies and employers, as long as such practices are not used to evade the purposes of the Act. Section 36.212(c) is a specific application of §36.202(a), which prohibits denial of participation on the basis of disability. It provides that a public accommodation may not refuse to serve an individual with a disability because of limitations on coverage or rates in its insurance policies (see Judiciary report at 56).

Many commenters supported the requirements of §36.212(c) in the proposed rule because it addressed an important reason for denial of services by public accommodations. One commenter argued that services could be denied if the insurance coverage required exclusion of people whose disabilities were reasonably related to the risks involved in that particular place of public accommodation. Sections 36.208 and 36.301 establish criteria for denial of participation on the basis of legitimate safety concerns. This paragraph does not prohibit consideration of such concerns in insurance policies, but provides that any exclusion on the basis of disability must be based on the permissible criteria, rather than on the terms of the insurance contract.

Language in the committee reports indicates that Congress intended to reach insurance practices by prohibiting differential treatment of individuals with disabilities in insurance offered by public accommodations unless the differences are justified. ''Under the ADA, a person with a disability cannot be denied insurance or be subject to different terms or conditions of insurance based on disability alone, if the disability does not pose increased risks'' (Senate report at 84; Education and Labor report at 136). Section 501(c) (1) of the Act was intended to emphasize that ''insurers may continue to sell to and underwrite individuals applying for life, health, or other insurance on an individually underwritten basis, or to service such insurance products, *so long as the standards used are based on sound actuarial data and not on speculation*'' (Judiciary report at 70 (emphasis added); see also Senate report at 85; Education and Labor report at 137).

The committee reports indicate that underwriting and classification of risks must be ''based on sound actuarial principles or be related to actual or reasonably anticipated experience'' (see, *e.g.*, Judiciary report at 71). Moreover, ''while a plan which limits certain kinds of coverage based on classification of risk would be allowed * * *, the plan may not refuse to insure, or refuse to continue to insure, or limit the amount, extent, or kind of coverage available to an individual, or charge a different rate for the same coverage solely because of a physical or mental impairment, except where the refusal, limitation, or rate differential is based on sound actuarial principles or is related to actual or reasonably anticipated experience'' (Senate report at 85; Education and Labor report at 136–37; Judiciary report at 71). The ADA, therefore, does not prohibit use of legitimate actuarial considerations to justify differential treatment of individuals with disabilities in insurance.

The committee reports provide some guidance on how nondiscrimination principles in the disability rights area relate to insurance practices. For example, a person who is blind may not be denied coverage based on blindness independent of actuarial risk classification. With respect to group health insurance coverage, an individual with a pre-existing condition may be denied coverage for that condition for the period specified in the policy, but cannot be denied coverage for illness or injuries unrelated to the pre-existing condition. Also, a public accommodation may offer insurance policies that limit coverage for certain procedures or treatments, but may not entirely deny coverage to a person with a disability.

The Department requested comment on the extent to which data that would establish statistically sound correlations are available. Numerous commenters cited pervasive problems in the availability and cost of insurance for individuals with disabilities and parents of children with disabilities. No commenters cited specific data, or sources of data, to support specific exclusionary practices. Several commenters reported that, even when statistics are available, they are often outdated and do not reflect current medical technology and treatment methods. Concern was expressed that adequate efforts are not made to distinguish those individuals

who are high users of health care from individuals in the same diagnostic groups who may be low users of health care. One insurer reported that ''hard data and actuarial statistics are not available to provide precise numerical justifications for every underwriting determination,'' but argued that decisions may be based on ''logical principles generally accepted by actuarial science and fully consistent with state insurance laws.'' The commenter urged that the Department recognize the validity of information other than statistical data as a basis for insurance determinations.

The most frequent comment was a recommendation that the final regulation should require the insurance company to provide a copy of the actuarial data on which its actions are based when requested by the applicant. Such a requirement would be beyond anything contemplated by the Act or by Congress and has therefore not been included in the Department's final rule. Because the legislative history of the ADA clarifies that different treatment of individuals with disabilities in insurance may be justified by sound actuarial data, such actuarial data will be critical to any potential litigation on this issue. This information would presumably be obtainable in a court proceeding where the insurer's actuarial data was the basis for different treatment of persons with disabilities. In addition, under some State regulatory schemes, insurers may have to file such actuarial information with the State regulatory agency and this information may be obtainable at the State level.

A few commenters representing the insurance industry conceded that underwriting practices in life and health insurance are clearly covered, but argued that property and casualty insurance are not covered. The Department sees no reason for this distinction. Although life and health insurance are the areas where the regulation will have its greatest application, the Act applies equally to unjustified discrimination in all types of insurance provided by public accommodations. A number of commenters, for example, reported difficulties in obtaining automobile insurance because of their disabilities, despite their having good driving records.

Section 36.213 Relationship of Subpart B to Subparts C and D

This section explains that subpart B sets forth the general principles of nondiscrimination applicable to all entities subject to this regulation, while subparts C and D provide guidance on the application of this part to specific situations. The specific provisions in subparts C and D, including the limitations on those provisions, control over the general provisions in circumstances where both specific and general provisions apply. Resort to the general provisions of subpart B is only appropriate where there are no applicable specific rules of guidance in subparts C or D. This interaction between the specific requirements and the general requirements operates with regard to contractual obligations as well.

One illustration of this principle is its application to the obligation of a public accommodation to provide access to services by removal of architectural barriers or by alternatives to barrier removal. The general requirement, established in subpart B by §36.203, is that a public accommodation must provide its services to individuals with disabilities in the most integrated setting appropriate. This general requirement would appear to categorically prohibit ''segregated'' seating for persons in wheelchairs. Section 36.304, however, only requires removal of architectural barriers to the extent that removal is ''readily achievable.'' If providing access to all areas of a restaurant, for example, would not be ''readily achievable,'' a public accommodation may provide access to selected areas only. Also, §36.305 provides that, where barrier removal is not readily achievable, a public accommodation may use alternative, readily achievable methods of making services available, such as curbside service or home delivery. Thus, in this manner, the specific requirements of §§36.304 and 36.305 control over the general requirement of §36.203.

Subpart C—Specific Requirements

In general, subpart C implements the ''specific prohibitions'' that comprise section 302(b)(2) of the ADA. It also addresses the requirements of section 309 of the ADA regarding examinations and courses.

Section 36.301 Eligibility Criteria

Section 36.301 of the rule prohibits the imposition or application of eligibility criteria that screen out or tend to screen out an individual with a disability or any class of individuals with disabilities from fully and equally enjoying any goods, services, facilities, privileges, advantages, and accommodations, unless such criteria can be shown to be necessary for the provision of the goods, services, facilities, privileges, advantages, or accommodations being offered. This prohibition is based on section 302(b)(2)(A)(i) of the ADA.

It would violate this section to establish exclusive or segregative eligibility criteria that would bar, for example, all persons who are deaf from playing on a golf course or all individuals with cerebral palsy from attending a movie theater, or limit the seating of individuals with Down's syndrome to only particular areas of a restaurant. The wishes, tastes, or preferences of other customers may not be asserted to justify criteria that

would exclude or segregate individuals with disabilities.

Section 36.301 also prohibits attempts by a public accommodation to unnecessarily identify the existence of a disability; for example, it would be a violation of this section for a retail store to require an individual to state on a credit application whether the applicant has epilepsy, mental illness, or any other disability, or to inquire unnecessarily whether an individual has HIV disease.

Section 36.301 also prohibits policies that unnecessarily impose requirements or burdens on individuals with disabilities that are not placed on others. For example, public accommodations may not require that an individual with a disability be accompanied by an attendant. As provided by §36.306, however, a public accommodation is not required to provide services of a personal nature including assistance in toileting, eating, or dressing.

Paragraph (c) of §36.301 provides that public accommodations may not place a surcharge on a particular individual with a disability or any group of individuals with disabilities to cover the costs of measures, such as the provision of auxiliary aids and services, barrier removal, alternatives to barrier removal, and reasonable modifications in policies, practices, and procedures, that are required to provide that individual or group with the nondiscriminatory treatment required by the Act or this part.

A number of commenters inquired as to whether deposits required for the use of auxiliary aids, such as assistive listening devices, are prohibited surcharges. It is the Department's view that reasonable, completely refundable, deposits are not to be considered surcharges prohibited by this section. Requiring deposits is an important means of ensuring the availability of equipment necessary to ensure compliance with the ADA.

Other commenters sought clarification as to whether §36.301(c) prohibits professionals from charging for the additional time that it may take in certain cases to provide services to an individual with disabilities. The Department does not intend §36.301(c) to prohibit professionals who bill on the basis of time from charging individuals with disabilities on that basis. However, fees may not be charged for the provision of auxiliary aids and services, barrier removal, alternatives to barrier removal, reasonable modifications in policies, practices, and procedures, or any other measures necessary to ensure compliance with the ADA.

Other commenters inquired as to whether day care centers may charge for extra services provided to individuals with disabilities. As stated above, §36.302(c) is intended only to prohibit charges for measures necessary to achieve compliance with the ADA.

Another commenter asserted that charges may be assessed for home delivery provided as an alternative to barrier removal under §36.305, when home delivery is provided to all customers for a fee. Charges for home delivery are permissible if home delivery is not considered an alternative to barrier removal. If the public accommodation offers an alternative, such as curb, carry-out, or sidewalk service for which no surcharge is assessed, then it may charge for home delivery in accordance with its standard pricing for home delivery.

In addition, §36.301 prohibits the imposition of criteria that ''tend to'' screen out an individual with a disability. This concept, which is derived from current regulations under section 504 (see, *e.g.*, 45 CFR 84.13), makes it discriminatory to impose policies or criteria that, while not creating a direct bar to individuals with disabilities, indirectly prevent or limit their ability to participate. For example, requiring presentation of a driver's license as the sole means of identification for purposes of paying by check would violate this section in situations where, for example, individuals with severe vision impairments or developmental disabilities or epilepsy are ineligible to receive a driver's license and the use of an alternative means of identification, such as another photo I.D. or credit card, is feasible.

A public accommodation may, however, impose neutral rules and criteria that screen out, or tend to screen out, individuals with disabilities, if the criteria are necessary for the safe operation of the public accommodation. Examples of safety qualifications that would be justifiable in appropriate circumstances would include height requirements for certain amusement park rides or a requirement that all participants in a recreational rafting expedition be able to meet a necessary level of swimming proficiency. Safety requirements must be based on actual risks and not on speculation, stereotypes, or generalizations about individuals with disabilities.

Section 36.302 Modifications in Policies, Practices, or Procedures

Section 36.302 of the rule prohibits the failure to make reasonable modifications in policies, practices, and procedures when such modifications may be necessary to afford any goods, services, facilities, privileges, advantages, or accommodations, unless the entity can demonstrate that making such modifications would fundamentally alter the nature of such goods, services, facilities, privileges, advantages, or accommodations. This prohibition is based on section 302(b)(2)(A)(ii) of the ADA.

For example, a parking facility would be required to modify a rule barring all vans or all vans with raised roofs, if an individual who uses a wheelchair-accessible van wishes to park in that facility, and if overhead structures are high enough to accommodate

the height of the van. A department store may need to modify a policy of only permitting one person at a time in a dressing room, if an individual with mental retardation needs and requests assistance in dressing from a companion. Public accommodations may need to revise operational policies to ensure that services are available to individuals with disabilities. For instance, a hotel may need to adopt a policy of keeping an accessible room unoccupied until an individual with a disability arrives at the hotel, assuming the individual has properly reserved the room.

One example of application of this principle is specifically included in a new §36.302(d) on check-out aisles. That paragraph provides that a store with check-out aisles must ensure that an adequate number of accessible check-out aisles is kept open during store hours, or must otherwise modify its policies and practices, in order to ensure that an equivalent level of convenient service is provided to individuals with disabilities as is provided to others. For example, if only one check-out aisle is accessible, and it is generally used for express service, one way of providing equivalent service is to allow persons with mobility impairments to make all of their purchases at that aisle. This principle also applies with respect to other accessible elements and services. For example, a particular bank may be in compliance with the accessibility guidelines for new construction incorporated in appendix A with respect to automated teller machines (ATM) at a new branch office by providing one accessible walk-up machine at that location, even though an adjacent walk-up ATM is not accessible and the drive-up ATM is not accessible. However, the bank would be in violation of this section if the accessible ATM was located in a lobby that was locked during evening hours while the drive-up ATM was available to customers without disabilities during those same hours. The bank would need to ensure that the accessible ATM was available to customers during the hours that any of the other ATM's was available.

A number of commenters inquired as to the relationship between this section and §36.307, ''Accessible or special goods.'' Under §36.307, a public accommodation is not required to alter its inventory to include accessible or special goods that are designed for, or facilitate use by, individuals with disabilities. The rule enunciated in §36.307 is consistent with the ''fundamental alteration'' defense to the reasonable modifications requirement of §36.302. Therefore, §36.302 would not require the inventory of goods provided by a public accommodation to be altered to include goods with accessibility features. For example, §36.302 would not require a bookstore to stock Brailled books or order Brailled books, if it does not do so in the normal course of its business.

The rule does not require modifications to the legitimate areas of specialization of service providers. Section 36.302(b) provides that a public accommodation may refer an individual with a disability to another public accommodation, if that individual is seeking, or requires, treatment or services outside of the referring public accommodation's area of specialization, and if, in the normal course of its operations, the referring public accommodation would make a similar referral for an individual without a disability who seeks or requires the same treatment or services.

For example, it would not be discriminatory for a physician who specializes only in burn treatment to refer an individual who is deaf to another physician for treatment of an injury other than a burn injury. To require a physician to accept patients outside of his or her specialty would fundamentally alter the nature of the medical practice and, therefore, not be required by this section.

A clinic specializing exclusively in drug rehabilitation could similarly refuse to treat a person who is not a drug addict, but could not refuse to treat a person who is a drug addict simply because the patient tests positive for HIV. Conversely, a clinic that specializes in the treatment of individuals with HIV could refuse to treat an individual that does not have HIV, but could not refuse to treat a person for HIV infection simply because that person is also a drug addict.

Some commenters requested clarification as to how this provision would apply to situations where manifestations of the disability in question, itself, would raise complications requiring the expertise of a different practitioner. It is not the Department's intention in §36.302(b) to prohibit a physician from referring an individual with a disability to another physician, if the disability itself creates specialized complications for the patient's health that the physician lacks the experience or knowledge to address (see Education and Labor report at 106).

Section 36.302(c)(1) requires that a public accommodation modify its policies, practices, or procedures to permit the use of a service animal by an individual with a disability in any area open to the general public. The term ''service animal'' is defined in §36.104 to include guide dogs, signal dogs, or any other animal individually trained to provide assistance to an individual with a disability.

A number of commenters pointed to the difficulty of making the distinction required by the proposed rule between areas open to the general public and those that are not. The ambiguity and uncertainty surrounding these provisions has led the Department to adopt a single standard for all public accommodations.

Section 36.302(c)(1) of the final rule now provides that ''[g]enerally, a public accommodation shall modify policies, practices, and procedures to permit the use of a service animal by an individual with a disability.'' This formulation reflects the general intent of Congress that public accommodations take the necessary steps to accommodate service animals and to ensure that individuals with disabilities are not separated from their service animals. It is intended that the broadest feasible access be provided to service animals in all places of public accommodation, including movie theaters, restaurants, hotels, retail stores, hospitals, and nursing homes (see Education and Labor report at 106; Judiciary report at 59). The section also acknowledges, however, that, in rare circumstances, accommodation of service animals may not be required because a fundamental alteration would result in the nature of the goods, services, facilities, privileges, or accommodations offered or provided, or the safe operation of the public accommodation would be jeopardized.

As specified in §36.302(c)(2), the rule does not require a public accommodation to supervise or care for any service animal. If a service animal must be separated from an individual with a disability in order to avoid a fundamental alteration or a threat to safety, it is the responsibility of the individual with the disability to arrange for the care and supervision of the animal during the period of separation.

A museum would not be required by §36.302 to modify a policy barring the touching of delicate works of art in order to enhance the participation of individuals who are blind, if the touching threatened the integrity of the work. Damage to a museum piece would clearly be a fundamental alteration that is not required by this section.

Section 36.303 Auxiliary Aids and Services.

Section 36.303 of the final rule requires a public accommodation to take such steps as may be necessary to ensure that no individual with a disability is excluded, denied services, segregated or otherwise treated differently than other individuals because of the absence of auxiliary aids and services, unless the public accommodation can demonstrate that taking such steps would fundamentally alter the nature of the goods, services, facilities, advantages, or accommodations being offered or would result in an undue burden. This requirement is based on section 302(b)(2)(A)(iii) of the ADA.

Implicit in this duty to provide auxiliary aids and services is the underlying obligation of a public accommodation to communicate effectively with its customers, clients, patients, or participants who have disabilities affecting hearing, vision, or speech. To give emphasis to this underlying obligation, §36.303(c) of the rule incorporates language derived from section 504 regulations for federally conducted programs (see *e.g.*, 28 CFR 39.160(a)) that requires that appropriate auxiliary aids and services be furnished to ensure that communication with persons with disabilities is as effective as communication with others.

Auxiliary aids and services include a wide range of services and devices for ensuring effective communication. Use of the most advanced technology is not required so long as effective communication is ensured. The Department's proposed §36.303(b) provided a list of examples of auxiliary aids and services that was taken from the definition of auxiliary aids and services in section 3(1) of the ADA and was supplemented by examples from regulations implementing section 504 in federally conducted programs (see *e.g.*, 28 CFR 39.103). A substantial number of commenters suggested that additional examples be added to this list. The Department has added several items to this list but wishes to clarify that the list is not an all-inclusive or exhaustive catalogue of possible or available auxiliary aids or services. It is not possible to provide an exhaustive list, and such an attempt would omit new devices that will become available with emerging technology.

The Department has added videotext displays, computer-aided transcription services, and open and closed captioning to the list of examples. Videotext displays have become an important means of accessing auditory communications through a public address system. Transcription services are used to relay aurally delivered material almost simultaneously in written form to persons who are deaf or hard of hearing. This technology is often used at conferences, conventions, and hearings. While the proposed rule expressly included television decoder equipment as an auxiliary aid or service, it did not mention captioning itself. The final rule rectifies this omission by mentioning both closed and open captioning.

In this section, the Department has changed the proposed rule's phrase, ''orally delivered materials,'' to the phrase, ''aurally delivered materials.'' This new phrase tracks the language in the definition of ''auxiliary aids and services'' in section 3 of the ADA and is meant to include nonverbal sounds and alarms and computer-generated speech.

Several persons and organizations requested that the Department replace the term ''telecommunications devices for deaf persons'' or ''TDD's'' with the term ''text telephone.'' The Department has declined to do so. The Department is aware that the Architectural and Transportation Barriers Compliance Board has used the phrase ''text telephone'' in lieu of the statutory term ''TDD'' in its final accessibility guidelines. Title IV of the ADA, however, uses the term ''Telecommunications Device for the Deaf,''

and the Department believes it would be inappropriate to abandon this statutory term at this time.

Paragraph (b)(2) lists examples of aids and services for making visually delivered materials accessible to persons with visual impairments. Many commenters proposed additional examples such as signage or mapping, audio description services, secondary auditory programs (SAP), telebraillers, and reading machines. While the Department declines to add these items to the list in the regulation, they may be considered appropriate auxiliary aids and services.

Paragraph (b)(3) refers to the acquisition or modification of equipment or devices. For example, tape players used for an audio-guided tour of a museum exhibit may require the addition of Brailled adhesive labels to the buttons on a reasonable number of the tape players to facilitate their use by individuals who are blind. Similarly, permanent or portable assistive listening systems for persons with hearing impairments may be required at a hotel conference center.

Several commenters suggested the addition of current technological innovations in microelectronics and computerized control systems (e.g., voice recognition systems, automatic dialing telephones, and infrared elevator and light control systems) to the list of auxiliary aids and services. The Department interprets auxiliary aids and services as those aids and services designed to provide effective communications, i. e., making aurally and visually delivered information available to persons with hearing, speech, and vision impairments. Methods of making services, programs, or activities accessible to, or usable by, individuals with mobility or manual dexterity impairments are addressed by other sections of this part, including the requirements for modifications in policies, practices, or procedures (§36.302), the elimination of existing architectural barriers (§36.304), and the provision of alternatives to barriers removal (§36.305).

Paragraph (b)(4) refers to other similar services and actions. Several commenters asked for clarification that ''similar services and actions'' include retrieving items from shelves, assistance in reaching a marginally accessible seat, pushing a barrier aside in order to provide an accessible route, or assistance in removing a sweater or coat. While retrieving an item from a shelf might be an ''auxiliary aid or service'' for a blind person who could not locate the item without assistance, it might be a readily achievable alternative to barrier removal for a person using a wheelchair who could not reach the shelf, or a reasonable modification to a self-service policy for an individual who lacked the ability to grasp the item. (Of course, a store would not be required to provide a personal shopper.) As explained above, auxiliary aids and services are those aids and services required to provide effective communications. Other forms of assistance are more appropriately addressed by other provisions of the final rule.

The auxiliary aid requirement is a flexible one. A public accommodation can choose among various alternatives as long as the result is effective communication. For example, a restaurant would not be required to provide menus in Braille for patrons who are blind, if the waiters in the restaurant are made available to read the menu. Similarly, a clothing boutique would not be required to have Brailled price tags if sales personnel provide price information orally upon request; and a bookstore would not be required to make available a sign language interpreter, because effective communication can be conducted by notepad.

A critical determination is what constitutes an effective auxiliary aid or service. The Department's proposed rule recommended that, in determining what auxiliary aid to use, the public accommodation consult with an individual before providing him or her with a particular auxiliary aid or service. This suggestion sparked a significant volume of public comment. Many persons with disabilities, particularly persons who are deaf or hard of hearing, recommended that the rule should require that public accommodations give ''primary consideration'' to the ''expressed choice'' of an individual with a disability. These commenters asserted that the proposed rule was inconsistent with congressional intent of the ADA, with the Department's proposed rule implementing title II of the ADA, and with longstanding interpretations of section 504 of the Rehabilitation Act.

Based upon a careful review of the ADA legislative history, the Department believes that Congress did not intend under title III to impose upon a public accommodation the requirement that it give primary consideration to the request of the individual with a disability. To the contrary, the legislative history demonstrates congressional intent to strongly encourage consulting with persons with disabilities. In its analysis of the ADA's auxiliary aids requirement for public accommodations, the House Education and Labor Committee stated that it ''expects'' that ''public accommodation(s) will consult with the individual with a disability before providing a particular auxiliary aid or service'' (Education and Labor report at 107). Some commenters also cited a different committee statement that used mandatory language as evidence of legislative intent to require primary consideration. However, this statement was made in the context of reasonable accommodations required by title I with respect to employment (Education and Labor report at 67). Thus, the Department finds that strongly encouraging consultation with

persons with disabilities, in lieu of mandating primary consideration of their expressed choice, is consistent with congressional intent.

The Department wishes to emphasize that public accommodations must take steps necessary to ensure that an individual with a disability will not be excluded, denied services, segregated or otherwise treated differently from other individuals because of the use of inappropriate or ineffective auxiliary aids. In those situations requiring an interpreter, the public accommodations must secure the services of a qualified interpreter, unless an undue burden would result.

In the analysis of §36.303(c) in the proposed rule, the Department gave as an example the situation where a note pad and written materials were insufficient to permit effective communication in a doctor's office when the matter to be decided was whether major surgery was necessary. Many commenters objected to this statement, asserting that it gave the impression that only decisions about major surgery would merit the provision of a sign language interpreter. The statement would, as the commenters also claimed, convey the impression to other public accommodations that written communications would meet the regulatory requirements in all but the most extreme situations. The Department, when using the example of major surgery, did not intend to limit the provision of interpreter services to the most extreme situations.

Other situations may also require the use of interpreters to ensure effective communication depending on the facts of the particular case. It is not difficult to imagine a wide range of communications involving areas such as health, legal matters, and finances that would be sufficiently lengthy or complex to require an interpreter for effective communication. In some situations, an effective alternative to use of a notepad or an interpreter may be the use of a computer terminal upon which the representative of the public accommodation and the customer or client can exchange typewritten messages.

Section 36.303(d) specifically addresses requirements for TDD's. Partly because of the availability of telecommunications relay services to be established under title IV of the ADA, §36.303(d)(2) provides that a public accommodation is not required to use a telecommunication device for the deaf (TDD) in receiving or making telephone calls incident to its operations. Several commenters were concerned that relay services would not be sufficient to provide effective access in a number of situations. Commenters argued that relay systems (1) do not provide effective access to the automated systems that require the caller to respond by pushing a button on a touch tone phone, (2) cannot operate fast enough to convey messages on answering machines, or to permit a TDD user to leave a recorded message, and (3) are not appropriate for calling crisis lines relating to such matters as rape, domestic violence, child abuse, and drugs where confidentiality is a concern. The Department believes that it is more appropriate for the Federal Communications Commission to address these issues in its rulemaking under title IV.

A public accommodation is, however, required to make a TDD available to an individual with impaired hearing or speech, if it customarily offers telephone service to its customers, clients, patients, or participants on more than an incidental convenience basis. Where entry to a place of public accommodation requires use of a security entrance telephone, a TDD or other effective means of communication must be provided for use by an individual with impaired hearing or speech.

In other words, individual retail stores, doctors' offices, restaurants, or similar establishments are not required by this section to have TDD's, because TDD users will be able to make inquiries, appointments, or reservations with such establishments through the relay system established under title IV of the ADA. The public accommodation will likewise be able to contact TDD users through the relay system. On the other hand, hotels, hospitals, and other similar establishments that offer nondisabled individuals the opportunity to make outgoing telephone calls on more than an incidental convenience basis must provide a TDD on request.

Section 36.303(e) requires places of lodging that provide televisions in five or more guest rooms and hospitals to provide, upon request, a means for decoding closed captions for use by an individual with impaired hearing. Hotels should also provide a TDD or similar device at the front desk in order to take calls from guests who use TDD's in their rooms. In this way guests with hearing impairments can avail themselves of such hotel services as making inquiries of the front desk and ordering room service. The term ''hospital'' is used in its general sense and should be interpreted broadly.

Movie theaters are not required by §36.303 to present open-captioned films. However, other public accommodations that impart verbal information through soundtracks on films, video tapes, or slide shows are required to make such information accessible to persons with hearing impairments. Captioning is one means to make the information accessible to individuals with disabilities.

The rule specifies that auxiliary aids and services include the acquisition or modification of equipment or devices. For example, tape players used for an audio-guided tour of a museum exhibit may require the addition of Brailled adhesive labels to the buttons on a reasonable number of the tape players to

facilitate their use by individuals who are blind. Similarly, a hotel conference center may need to provide permanent or portable assistive listening systems for persons with hearing impairments.

As provided in §36.303(f), a public accommodation is not required to provide any particular aid or service that would result either in a fundamental alteration in the nature of the goods, services, facilities, privileges, advantages, or accommodations offered or in an undue burden. Both of these statutory limitations are derived from existing regulations and caselaw under section 504 and are to be applied on a case-by-case basis (see, e.g., 28 CFR 39.160(d) and *Southeastern Community College* v. *Davis,* 442 U.S. 397 (1979)). Congress intended that ''undue burden'' under §36.303 and ''undue hardship,'' which is used in the employment provisions of title I of the ADA, should be determined on a case-by-case basis under the same standards and in light of the same factors (Judiciary report at 59). The rule, therefore, in accordance with the definition of undue hardship in section 101(10) of the ADA, defines undue burden as ''significant difficulty or expense'' (see §§36.104 and 36.303(a)) and requires that undue burden be determined in light of the factors listed in the definition in 36.104.

Consistent with regulations implementing section 504 in federally conducted programs (see, e.g., 28 CFR 39.160(d)), §36.303(f) provides that the fact that the provision of a particular auxiliary aid or service would result in an undue burden does not relieve a public accommodation from the duty to furnish an alternative auxiliary aid or service, if available, that would not result in such a burden.

Section 36.303(g) of the proposed rule has been deleted from this section and included in a new §36.306. That new section continues to make clear that the auxiliary aids requirement does not mandate the provision of individually prescribed devices, such as prescription eyeglasses or hearing aids.

The costs of compliance with the requirements of this section may not be financed by surcharges limited to particular individuals with disabilities or any group of individuals with disabilities (§36.301(c)).

Section 36.304 Removal of Barriers

Section 36.304 requires the removal of architectural barriers and communication barriers that are structural in nature in existing facilities, where such removal is readily achievable, i.e., easily accomplishable and able to be carried out without much difficulty or expense. This requirement is based on section 302(b)(2)(A)(iv) of the ADA.

A number of commenters interpreted the phrase ''communication barriers that are structural in nature'' broadly to encompass the provision of communications devices such as TDD's, telephone handset amplifiers, assistive listening devices, and digital check-out displays. The statute, however, as read by the Department, limits the application of the phrase ''communications barriers that are structural in nature'' to those barriers that are an integral part of the physical structure of a facility. In addition to the communications barriers posed by permanent signage and alarm systems noted by Congress (see Education and Labor report at 110), the Department would also include among the communications barriers covered by §36.304 the failure to provide adequate sound buffers, and the presence of physical partitions that hamper the passage of sound waves between employees and customers. Given that §36.304's proper focus is on the removal of physical barriers, the Department believes that the obligation to provide communications equipment and devices such as TDD's, telephone handset amplifiers, assistive listening devices, and digital check-out displays is more appropriately determined by the requirements for auxiliary aids and services under §36.303 (see Education and Labor report at 107–108). The obligation to remove communications barriers that are structural in nature under §36.304, of course, is independent of any obligation to provide auxiliary aids and services under §36.303.

The statutory provision also requires the readily achievable removal of certain barriers in existing vehicles and rail passenger cars. This transportation requirement is not included in §36.304, but rather in §36.310(b) of the rule.

In striking a balance between guaranteeing access to individuals with disabilities and recognizing the legitimate cost concerns of businesses and other private entities, the ADA establishes different standards for existing facilities and new construction. In existing facilities, which are the subject of §36.304, where retrofitting may prove costly, a less rigorous degree of accessibility is required than in the case of new construction and alterations (see §§36.401–36.406) where accessibility can be more conveniently and economically incorporated in the initial stages of design and construction.

For example, a bank with existing automatic teller machines (ATM's) would have to remove barriers to the use of the ATM's, if it is readily achievable to do so. Whether or not it is necessary to take actions such as ramping a few steps or raising or lowering an ATM would be determined by whether the actions can be accomplished easily and without much difficulty or expense.

On the other hand, a newly constructed bank with ATM's would be required by §36.401 to have an ATM that is ''readily accessible to and usable by'' persons with disabilities in accordance with accessibility guidelines incorporated under §36.406.

The requirement to remove architectural barriers includes the removal of physical

barriers of any kind. For example, §36.304 requires the removal, when readily achievable, of barriers caused by the location of temporary or movable structures, such as furniture, equipment, and display racks. In order to provide access to individuals who use wheelchairs, for example, restaurants may need to rearrange tables and chairs, and department stores may need to reconfigure display racks and shelves. As stated in §36.304(f), such actions are not readily achievable to the extent that they would result in a significant loss of selling or serving space. If the widening of all aisles in selling or serving areas is not readily achievable, then selected widening should be undertaken to maximize the amount of merchandise or the number of tables accessible to individuals who use wheelchairs. Access to goods and services provided in any remaining inaccessible areas must be made available through alternative methods to barrier removal, as required by §36.305.

Because the purpose of title III of the ADA is to ensure that public accommodations are accessible to their customers, clients, or patrons (as opposed to their employees, who are the focus of title I), the obligation to remove barriers under §36.304 does not extend to areas of a facility that are used exclusively as employee work areas.

Section 36.304(b) provides a wide-ranging list of the types of modest measures that may be taken to remove barriers and that are likely to be readily achievable. The list includes examples of measures, such as adding raised letter markings on elevator control buttons and installing flashing alarm lights, that would be used to remove communications barriers that are structural in nature. It is not an exhaustive list, but merely an illustrative one. Moreover, the inclusion of a measure on this list does not mean that it is readily achievable in all cases. Whether or not any of these measures is readily achievable is to be determined on a case-by-case basis in light of the particular circumstances presented and the factors listed in the definition of readily achievable (§36.104).

A public accommodation generally would not be required to remove a barrier to physical access posed by a flight of steps, if removal would require extensive ramping or an elevator. Ramping a single step, however, will likely be readily achievable, and ramping several steps will in many circumstances also be readily achievable. The readily achievable standard does not require barrier removal that requires extensive restructuring or burdensome expense. Thus, where it is not readily achievable to do, the ADA would not require a restaurant to provide access to a restroom reachable only by a flight of stairs.

Like §36.405, this section permits deference to the national interest in preserving significant historic structures. Barrier removal would not be considered ''readily achievable'' if it would threaten or destroy the historic significance of a building or facility that is eligible for listing in the National Register of Historic Places under the National Historic Preservation Act (16 U.S.C. 470, *et seq.*), or is designated as historic under State or local law.

The readily achievable defense requires a less demanding level of exertion by a public accommodation than does the undue burden defense to the auxiliary aids requirements of §36.303. In that sense, it can be characterized as a ''lower'' standard than the undue burden standard. The readily achievable defense is also less demanding than the undue hardship defense in section 102(b)(5) of the ADA, which limits the obligation to make reasonable accommodation in employment. Barrier removal measures that are not easily accomplishable and are not able to be carried out without much difficulty or expense are not required under the readily achievable standard, even if they do not impose an undue burden or an undue hardship.

Section 36.304(f)(1) of the proposed rule, which stated that ''barrier removal is not readily achievable if it would result in significant loss of profit or significant loss of efficiency of operation,'' has been deleted from the final rule. Many commenters objected to this provision because it impermissibly introduced the notion of profit into a statutory standard that did not include it. Concern was expressed that, in order for an action not to be considered readily achievable, a public accommodation would inappropriately have to show, for example, not only that the action could not be done without ''much difficulty or expense'', but that a significant loss of profit would result as well. In addition, some commenters asserted use of the word ''significant,'' which is used in the definition of undue hardship under title I (the standard for interpreting the meaning of undue burden as a defense to title III's auxiliary aids requirements) (see §§36.104, 36.303(f)), blurs the fact that the readily achievable standard requires a lower level of effort on the part of a public accommodation than does the undue burden standard.

The obligation to engage in readily achievable barrier removal is a continuing one. Over time, barrier removal that initially was not readily achievable may later be required because of changed circumstances. Many commenters expressed support for the Department's position that the obligation to comply with §36.304 is continuing in nature. Some urged that the rule require public accommodations to assess their compliance on at least an annual basis in light of changes in resources and other factors that would be relevant to determining what barrier removal measures would be readily achievable.

Although the obligation to engage in readily achievable barrier removal is clearly a continuing duty, the Department has declined to establish any independent requirement for an annual assessment or self-evaluation. It is best left to the public accommodations subject to §36.304 to establish policies to assess compliance that are appropriate to the particular circumstances faced by the wide range of public accommodations covered by the ADA. However, even in the absence of an explicit regulatory requirement for periodic self-evaluations, the Department still urges public accommodations to establish procedures for an ongoing assessment of their compliance with the ADA's barrier removal requirements. The Department recommends that this process include appropriate consultation with individuals with disabilities or organizations representing them. A serious effort at self-assessment and consultation can diminish the threat of litigation and save resources by identifying the most efficient means of providing required access.

The Department has been asked for guidance on the best means for public accommodations to comply voluntarily with this section. Such information is more appropriately part of the Department's technical assistance effort and will be forthcoming over the next several months. The Department recommends, however, the development of an implementation plan designed to achieve compliance with the ADA's barrier removal requirements before they become effective on January 26, 1992. Such a plan, if appropriately designed and diligently executed, could serve as evidence of a good faith effort to comply with the requirements of §36.104. In developing an implementation plan for readily achievable barrier removal, a public accommodation should consult with local organizations representing persons with disabilities and solicit their suggestions for cost-effective means of making individual places of public accommodation accessible. Such organizations may also be helpful in allocating scarce resources and establishing priorities. Local associations of businesses may want to encourage this process and serve as the forum for discussions on the local level between disability rights organizations and local businesses.

Section 36.304(c) recommends priorities for public accommodations in removing barriers in existing facilities. Because the resources available for barrier removal may not be adequate to remove all existing barriers at any given time, §36.304(c) suggests priorities for determining which types of barriers should be mitigated or eliminated first. The purpose of these priorities is to facilitate long-term business planning and to maximize, in light of limited resources, the degree of effective access that will result from any given level of expenditure.

Although many commenters expressed support for the concept of establishing priorities, a significant number objected to their mandatory nature in the proposed rule. The Department shares the concern of these commenters that mandatory priorities would increase the likelihood of litigation and inappropriately reduce the discretion of public accommodations to determine the most effective mix of barrier removal measures to undertake in particular circumstances. Therefore, in the final rule the priorities are no longer mandatory.

In response to comments that the priorities failed to address communications issues, the Department wishes to emphasize that the priorities encompass the removal of communications barriers that are structural in nature. It would be counter to the ADA's carefully wrought statutory scheme to include in this provision the wide range of communication devices that are required by the ADA's provisions on auxiliary aids and services. The final rule explicitly includes Brailled and raised letter signage and visual alarms among the examples of steps to remove barriers provided in §36.304(c)(2).

Section 36.304(c)(1) places the highest priority on measures that will enable individuals with disabilities to physically enter a place of public accommodation. This priority on ''getting through the door'' recognizes that providing actual physical access to a facility from public sidewalks, public transportation, or parking is generally preferable to any alternative arrangements in terms of both business efficiency and the dignity of individuals with disabilities.

The next priority, which is established in §36.304(c)(2), is for measures that provide access to those areas of a place of public accommodation where goods and services are made available to the public. For example, in a hardware store, to the extent that it is readily achievable to do so, individuals with disabilities should be given access not only to assistance at the front desk, but also access, like that available to other customers, to the retail display areas of the store.

The Department agrees with those commenters who argued that access to the areas where goods and services are provided is generally more important than the provision of restrooms. Therefore, the final rule reverses priorities two and three of the proposed rule in order to give lower priority to accessible restrooms. Consequently, the third priority in the final rule (§36.304(c)(3)) is for measures to provide access to restroom facilities and the last priority is placed on any remaining measures required to remove barriers.

Section 36.304(d) requires that measures taken to remove barriers under §36.304 be subject to subpart D's requirements for alterations (except for the path of travel requirements in §36.403). It only permits deviations from the subpart D requirements

when compliance with those requirements is not readily achievable. In such cases, §36.304(d) permits measures to be taken that do not fully comply with the subpart D requirements, so long as the measures do not pose a significant risk to the health or safety of individuals with disabilities or others.

This approach represents a change from the proposed rule which stated that ''readily achievable'' measures taken solely to remove barriers under §36.304 are exempt from the alterations requirements of subpart D. The intent of the proposed rule was to maximize the flexibility of public accommodations in undertaking barrier removal by allowing deviations from the technical standards of subpart D. It was thought that allowing slight deviations would provide access and release additional resources for expanding the amount of barrier removal that could be obtained under the readily achievable standard.

Many commenters, however, representing both businesses and individuals with disabilities, questioned this approach because of the likelihood that unsafe or ineffective measures would be taken in the absence of the subpart D standards for alterations as a reference point. Some advocated a rule requiring strict compliance with the subpart D standard.

The Department in the final rule has adopted the view of many commenters that (1) public accommodations should in the first instance be required to comply with the subpart D standards for alterations where it is readily achievable to do so and (2) safe, readily achievable measures must be taken when compliance with the subpart D standards is not readily achievable. Reference to the subpart D standards in this manner will promote certainty and good design at the same time that permitting slight deviations will expand the amount of barrier removal that may be achieved under §36.304.

Because of the inconvenience to individuals with disabilities and the safety problems involved in the use of portable ramps, §36.304(e) permits the use of a portable ramp to comply with §36.304(a) only when installation of a permanent ramp is not readily achievable. In order to promote safety, §36.304(e) requires that due consideration be given to the incorporation of features such as nonslip surfaces, railings, anchoring, and strength of materials in any portable ramp that is used.

Temporary facilities brought in for use at the site of a natural disaster are subject to the barrier removal requirements of §36.304.

A number of commenters requested clarification regarding how to determine when a public accommodation has discharged its obligation to remove barriers in existing facilities. For example, is a hotel required by §36.304 to remove barriers in all of its guest rooms? Or is some lesser percentage adequate? A new paragraph (g) has been added to §36.304 to address this issue. The Department believes that the degree of barrier removal required under §36.304 may be less, but certainly would not be required to exceed, the standards for alterations under the ADA Accessibility Guidelines incorporated by subpart D of this part (ADAAG). The ADA's requirements for readily achievable barrier removal in existing facilities are intended to be substantially less rigorous than those for new construction and alterations. It, therefore, would be obviously inappropriate to require actions under §36.304 that would exceed the ADAAG requirements. Hotels, then, in order to satisfy the requirements of §36.304, would not be required to remove barriers in a higher percentage of rooms than required by ADAAG. If relevant standards for alterations are not provided in ADAAG, then reference should be made to the standards for new construction.

Section 36.305 Alternatives to Barrier Removal

Section 36.305 specifies that where a public accommodation can demonstrate that removal of a barrier is not readily achievable, the public accommodation must make its goods, services, facilities, privileges, advantages, or accommodations available through alternative methods, if such methods are readily achievable. This requirement is based on section 302(b)(2)(A)(v) of the ADA.

For example, if it is not readily achievable for a retail store to raise, lower, or remove shelves or to rearrange display racks to provide accessible aisles, the store must, if readily achievable, provide a clerk or take other alternative measures to retrieve inaccessible merchandise. Similarly, if it is not readily achievable to ramp a long flight of stairs leading to the front door of a restaurant or a pharmacy, the restaurant or the pharmacy must take alternative measures, if readily achievable, such as providing curb service or home delivery. If, within a restaurant, it is not readily achievable to remove physical barriers to a certain section of a restaurant, the restaurant must, where it is readily achievable to do so, offer the same menu in an accessible area of the restaurant.

Where alternative methods are used to provide access, a public accommodation may not charge an individual with a disability for the costs associated with the alternative method (see §36.301(c)). Further analysis of the issue of charging for alternative measures may be found in the preamble discussion of §36.301(c).

In some circumstances, because of security considerations, some alternative methods may not be readily achievable. The rule does not require a cashier to leave his or her post to retrieve items for individuals with disabilities, if there are no other employees on duty.

Section 36.305(c) of the proposed rule has been deleted and the requirements have been included in a new §36.306. That section makes clear that the alternative methods requirement does not mandate the provision of personal devices, such as wheelchairs, or services of a personal nature.

In the final rule, §36.305(c) provides specific requirements regarding alternatives to barrier removal in multiscreen cinemas. In some situations, it may not be readily achievable to remove enough barriers to provide access to all of the theaters of a multiscreen cinema. If that is the case, §36.305(c) requires the cinema to establish a film rotation schedule that provides reasonable access for individuals who use wheelchairs to films being presented by the cinema. It further requires that reasonable notice be provided to the public as to the location and time of accessible showings. Methods for providing notice include appropriate use of the international accessibility symbol in a cinema's print advertising and the addition of accessibility information to a cinema's recorded telephone information line.

Section 36.306 Personal Devices and Services

The final rule includes a new §36.306, entitled ''Personal devices and services.'' Section 36.306 of the proposed rule, ''Readily achievable and undue burden: Factors to be considered,'' was deleted for the reasons described in the preamble discussion of the definition of the term ''readily achievable'' in §36.104. In place of §§36.303(g) and 36.305(c) of the proposed rule, which addressed the issue of personal devices and services in the contexts of auxiliary aids and alternatives to barrier removal, §36.306 provides a general statement that the regulation does not require the provision of personal devices and services. This section states that a public accommodation is not required to provide its customers, clients, or participants with personal devices, such as wheelchairs; individually prescribed devices, such as prescription eyeglasses or hearing aids; or services of a personal nature including assistance in eating, toileting, or dressing.

This statement serves as a limitation on all the requirements of the regulation. The personal devices and services limitation was intended to have general application in the proposed rule in all contexts where it was relevant. The final rule, therefore, clarifies, this point by including a general provision that will explicitly apply not just to auxiliary aids and services and alternatives to barrier removal, but across-the-board to include such relevant areas as modifications in policies, practices, and procedures (§36.302) and examinations and courses (§36.309), as well.

The Department wishes to clarify that measures taken as alternatives to barrier removal, such as retrieving items from shelves or providing curb service or home delivery, are not to be considered personal services. Similarly, minimal actions that may be required as modifications in policies, practices, or procedures under §36.302, such as a waiter's removing the cover from a customer's straw, a kitchen's cutting up food into smaller pieces, or a bank's filling out a deposit slip, are not services of a personal nature within the meaning of §36.306. (Of course, such modifications may be required under §36.302 only if they are ''reasonable.'') Similarly, this section does not preclude the short-term loan of personal receivers that are part of an assistive listening system.

Of course, if personal services are customarily provided to the customers or clients of a public accommodation, e.g., in a hospital or senior citizen center, then these personal services should also be provided to persons with disabilities using the public accommodation.

Section 36.307 Accessible or Special Goods.

Section 36.307 establishes that the rule does not require a public accommodation to alter its inventory to include accessible or special goods with accessibility features that are designed for, or facilitate use by, individuals with disabilities. As specified in §36.307(c), accessible or special goods include such items as Brailled versions of books, books on audio-cassettes, closed captioned video tapes, special sizes or lines of clothing, and special foods to meet particular dietary needs.

The purpose of the ADA's public accommodations requirements is to ensure accessibility to the goods offered by a public accommodation, not to alter the nature or mix of goods that the public accommodation has typically provided. In other words, a bookstore, for example, must make its facilities and sales operations accessible to individuals with disabilities, but is not required to stock Brailled or large print books. Similarly, a video store must make its facilities and rental operations accessible, but is not required to stock closed-captioned video tapes. The Department has been made aware, however, that the most recent titles in videotape rental establishments are, in fact, closed captioned.

Although a public accommodation is not required by §36.307(a) to modify its inventory, it is required by §36.307(b), at the request of an individual with disabilities, to order accessible or special goods that it does not customarily maintain in stock if, in the normal course of its operation, it makes special orders for unstocked goods, and if the accessible or special goods can be obtained from a supplier with whom the public accommodation customarily does business. For example, a clothing store would be required to order specially-sized clothing at the request

of an individual with a disability, if it customarily makes special orders for clothing that it does not keep in stock, and if the clothing can be obtained from one of the store's customary suppliers.

One commenter asserted that the proposed rule could be interpreted to require a store to special order accessible or special goods of all types, even if only one type is specially ordered in the normal course of its business. The Department, however, intends for §36.307(b) to require special orders only of those particular types of goods for which a public accommodation normally makes special orders. For example, a book and recording store would not have to specially order Brailled books if, in the normal course of its business, it only specially orders recordings and not books.

Section 36.308 Seating in Assembly Areas.

Section 36.308 establishes specific requirements for removing barriers to physical access in assembly areas, which include such facilities as theaters, concert halls, auditoriums, lecture halls, and conference rooms. This section does not address the provision of auxiliary aids or the removal of communications barriers that are structural in nature. These communications requirements are the focus of other provisions of the regulation (see §§36.303–36.304).

Individuals who use wheelchairs historically have been relegated to inferior seating in the back of assembly areas separate from accompanying family members and friends. The provisions of §36.308 are intended to promote integration and equality in seating.

In some instances it may not be readily achievable for auditoriums or theaters to remove seats to allow individuals with wheelchairs to sit next to accompanying family members or friends. In these situations, the final rule retains the requirement that the public accommodation provide portable chairs or other means to allow the accompanying individuals to sit with the persons in wheelchairs. Persons in wheelchairs should have the same opportunity to enjoy movies, plays, and similar events with their families and friends, just as other patrons do. The final rule specifies that portable chairs or other means to permit family members or companions to sit with individuals who use wheelchairs must be provided only when it is readily achievable to do so.

In order to facilitate seating of wheelchair users who wish to transfer to existing seating, paragraph (a)(1) of the final rule adds a requirement that, to the extent readily achievable, a reasonable number of seats with removable aisle-side armrests must be provided. Many persons in wheelchairs are able to transfer to existing seating with this relatively minor modification. This solution avoids the potential safety hazard created by the use of portable chairs and fosters integration. The final ADA Accessibility Guidelines incorporated by subpart D (ADAAG) also add a requirement regarding aisle seating that was not in the proposed guidelines. In situations when a person in a wheelchair transfers to existing seating, the public accommodation shall provide assistance in handling the wheelchair of the patron with the disability.

Likewise, consistent vith ADAAG, the final rule adds in §36.308(a)(1)(ii)(B) a requirement that, to the extent readily achievable, wheelchair seating provide lines of sight and choice of admission prices comparable to those for members of the general public.

Finally, because Congress intended that the requirements for barrier removal in existing facilities be substantially less rigorous than those required for new construction and alterations, the final rule clarifies in §36.308(a)(3) that in no event can the requirements for existing facilities be interpreted to exceed the standards for alterations under ADAAG. For example, §4.33 of ADAAG only requires wheelchair spaces to be provided in more than one location when the seating capacity of the assembly area exceeds 300. Therefore, paragraph (a) of §36.308 may not be interpreted to require readily achievable dispersal of wheelchair seating in assembly areas with 300 or fewer seats. Similarly, §4.1.3(19) of ADAAG requires six accessible wheelchair locations in an assembly area with 301 to 500 seats. The reasonable number of wheelchair locations required by paragraph (a), therefore, may be less than six, but may not be interpreted to exceed six.

Proposed Section 36.309 Purchase of Furniture and Equipment

Section 36.309 of the proposed rule would have required that newly purchased furniture or equipment made available for use at a place of public accommodation be accessible, to the extent such furniture or equipment is available, unless this requirement would fundamentally alter the goods, services, facilities, privileges, advantages, or accommodations offered, or would not be readily achievable. Proposed §36.309 has been omitted from the final rule because the Department has determined that its requirements are more properly addressed under other sections, and because there are currently no appropriate accessibility standards addressing many types of furniture and equipment.

Some types of equipment will be required to meet the accessibility requirements of subpart D. For example, ADAAG establishes technical and scoping requirements in new construction and alterations for automated teller machines and telephones. Purchase or modification of equipment is required in certain instances by the provisions in §§36.201 and 36.202. For example, an arcade may need

to provide accessible video machines in order to ensure full and equal enjoyment of the facilities and to provide an opportunity to participate in the services and facilities it provides. The barrier removal requirements of §36.304 will apply as well to furniture and equipment (lowering shelves, rearranging furniture, adding Braille labels to a vending machine).

Section 36.309 Examinations and Courses

Section 36.309(a) sets forth the general rule that any private entity that offers examinations or courses related to applications, licensing, certification, or credentialing for secondary or postsecondary education, professional, or trade purposes shall offer such examinations or courses in a place and manner accessible to persons with disabilities or offer alternative accessible arrangements for such individuals.

Paragraph (a) restates section 309 of the Americans with Disabilities Act. Section 309 is intended to fill the gap that is created when licensing, certification, and other testing authorities are not covered by section 504 of the Rehabilitation Act or title II of the ADA. Any such authority that is covered by section 504, because of the receipt of Federal money, or by title II, because it is a function of a State or local government, must make all of its programs accessible to persons with disabilities, which includes physical access as well as modifications in the way the test is administered, e.g., extended time, written instructions, or assistance of a reader.

Many licensing, certification, and testing authorities are not covered by section 504, because no Federal money is received; nor are they covered by title II of the ADA because they are not State or local agencies. However, States often require the licenses provided by such authorities in order for an individual to practice a particular profession or trade. Thus, the provision was included in the ADA in order to assure that persons with disabilities are not foreclosed from educational, professional, or trade opportunities because an examination or course is conducted in an inaccessible site or without needed modifications.

As indicated in the ''Application'' section of this part (§36.102), §36.309 applies to any private entity that offers the specified types of examinations or courses. This is consistent with section 309 of the Americans with Disabilities Act, which states that the requirements apply to ''any person'' offering examinations or courses.

The Department received a large number of comments on this section, reflecting the importance of ensuring that the key gateways to education and employment are open to individuals with disabilities. The most frequent comments were objections to the fundamental alteration and undue burden provisions in §§36.309 (b)(3) and (c)(3) and to allowing courses and examinations to be provided through alternative accessible arrangements, rather than in an integrated setting.

Although section 309 of the Act does not refer to a fundamental alteration or undue burden limitation, those limitations do appear in section 302(b)(2)(A)(iii) of the Act, which establishes the obligation of public accommodations to provide auxiliary aids and services. The Department, therefore, included it in the paragraphs of §36.309 requiring the provision of auxiliary aids. One commenter argued that similar limitations should apply to all of the requirements of §36.309, but the Department did not consider this extension appropriate.

Commenters who objected to permitting ''alternative accessible arrangements'' argued that such arrangements allow segregation and should not be permitted, unless they are the least restrictive available alternative, for example, for someone who cannot leave home. Some commenters made a distinction between courses, where interaction is an important part of the educational experience, and examinations, where it may be less important. Because the statute specifically authorizes alternative accessible arrangements as a method of meeting the requirements of section 309, the Department has not adopted this suggestion. The Department notes, however, that, while examinations of the type covered by §36.309 may not be covered elsewhere in the regulation, courses will generally be offered in a ''place of education,'' which is included in the definition of ''place of public accommodation'' in §36.104, and, therefore, will be subject to the integrated setting requirement of §36.203.

Section 36.309(b) sets forth specific requirements for examinations. Examinations covered by this section would include a bar exam or the Scholastic Aptitude Test prepared by the Educational Testing Service. Paragraph (b)(1) is adopted from the Department of Education's section 504 regulation on admission tests to postsecondary educational programs (34 CFR 104.42(b)(3)). Paragraph (b)(1)(i) requires that a private entity offering an examination covered by the section must assure that the examination is selected and administered so as to best ensure that the examination accurately reflects an individual's aptitude or achievement level or other factor the examination purports to measure, rather than reflecting the individual's impaired sensory, manual, or speaking skills (except where those skills are the factors that the examination purports to measure).

Paragraph (b)(1)(ii) requires that any examination specially designed for individuals with disabilities be offered as often and in as timely a manner as other examinations. Some commenters noted that persons with disabilities may be required to travel long

distances when the locations for examinations for individuals with disabilities are limited, for example, to only one city in a State instead of a variety of cities. The Department has therefore revised this paragraph to add a requirement that such examinations be offered at locations that are as convenient as the location of other examinations.

Commenters representing organizations that administer tests wanted to be able to require individuals with disabilities to provide advance notice and appropriate documentation, at the applicants' expense, of their disabilities and of any modifications or aids that would be required. The Department agrees that such requirements are permissible, provided that they are not unreasonable and that the deadline for such notice is no earlier than the deadline for others applying to take the examination. Requiring individuals with disabilities to file earlier applications would violate the requirement that examinations designed for individuals with disabilities be offered in as timely a manner as other examinations.

Examiners may require evidence that an applicant is entitled to modifications or aids as required by this section, but requests for documentation must be reasonable and must be limited to the need for the modification or aid requested. Appropriate documentation might include a letter from a physician or other professional, or evidence of a prior diagnosis or accommodation, such as eligibility for a special education program. The applicant may be required to bear the cost of providing such documentation, but the entity administering the examination cannot charge the applicant for the cost of any modifications or auxiliary aids, such as interpreters, provided for the examination.

Paragraph (b)(1)(iii) requires that examinations be administered in facilities that are accessible to individuals with disabilities or alternative accessible arrangements are made.

Paragraph (b)(2) gives examples of modifications to examinations that may be necessary in order to comply with this section. These may include providing more time for completion of the examination or a change in the manner of giving the examination, e.g., reading the examination to the individual.

Paragraph (b)(3) requires the provision of auxiliary aids and services, unless the private entity offering the examination can demonstrate that offering a particular auxiliary aid would fundamentally alter the examination or result in an undue burden. Examples of auxiliary aids include taped examinations, interpreters or other effective methods of making aurally delivered materials available to individuals with hearing impairments, readers for individuals with visual impairments or learning disabilities, and other similar services and actions. The suggestion that individuals with learning disabilities may need readers is included, although it does not appear in the Department of Education regulation, because, in fact, some individuals with learning disabilities have visual perception problems and would benefit from a reader.

Many commenters pointed out the importance of ensuring that modifications provide the individual with a disability an equal opportunity to demonstrate his or her knowledge or ability. For example, a reader who is unskilled or lacks knowledge of specific terminology used in the examination may be unable to convey the information in the questions or to follow the applicant's instructions effectively. Commenters pointed out that, for persons with visual impairments who read Braille, Braille provides the closest functional equivalent to a printed test. The Department has, therefore, added Brailled examinations to the examples of auxiliary aids and services that may be required. For similar reasons, the Department also added to the list of examples of auxiliary aids and services large print examinations and answer sheets; ''qualified'' readers; and transcribers to write answers.

A commenter suggested that the phrase ''fundamentally alter the examination'' in this paragraph of the proposed rule be revised to more accurately reflect the function affected. In the final rule the Department has substituted the phrase ''fundamentally alter the measurement of the skills or knowledge the examination is intended to test.''

Paragraph (b)(4) gives examples of alternative accessible arrangements. For instance, the private entity might be required to provide the examination at an individual's home with a proctor. Alternative arrangements must provide conditions for individuals with disabilities that are comparable to the conditions under which other individuals take the examinations. In other words, an examination cannot be offered to an individual with a disability in a cold, poorly lit basement, if other individuals are given the examination in a warm, well lit classroom.

Some commenters who provide examinations for licensing or certification for particular occupations or professions urged that they be permitted to refuse to provide modifications or aids for persons seeking to take the examinations if those individuals, because of their disabilities, would be unable to perform the essential functions of the profession or occupation for which the examination is given, or unless the disability is reasonably determined in advance as not being an obstacle to certification. The Department has not changed its rule based on this comment. An examination is one stage of a licensing or certification process. An individual should not be barred from attempting

to pass that stage of the process merely because he or she might be unable to meet other requirements of the process. If the examination is not the first stage of the qualification process, an applicant may be required to complete the earlier stages prior to being admitted to the examination. On the other hand, the applicant may not be denied admission to the examination on the basis of doubts about his or her abilities to meet requirements that the examination is not designed to test.

Paragraph (c) sets forth specific requirements for courses. Paragraph (c)(1) contains the general rule that any course covered by this section must be modified to ensure that the place and manner in which the course is given is accessible. Paragraph (c)(2) gives examples of possible modifications that might be required, including extending the time permitted for completion of the course, permitting oral rather than written delivery of an assignment by a person with a visual impairment, or adapting the manner in which the course is conducted (i.e., providing cassettes of class handouts to an individual with a visual impairment). In response to comments, the Department has added to the examples in paragraph (c)(2) specific reference to distribution of course materials. If course materials are published and available from other sources, the entity offering the course may give advance notice of what materials will be used so as to allow an individual to obtain them in Braille or on tape but materials provided by the course offerer must be made available in alternative formats for individuals with disabilities.

In language similar to that of paragraph (b), paragraph (c)(3) requires auxiliary aids and services, unless a fundamental alteration or undue burden would result, and paragraph (c)(4) requires that courses be administered in accessible facilities. Paragraph (c)(5) gives examples of alternative accessible arrangements. These may include provision of the course through videotape, cassettes, or prepared notes. Alternative arrangements must provide comparable conditions to those provided to others, including similar lighting, room temperature, and the like. An entity offering a variety of courses, to fulfill continuing education requirements for a profession, for example, may not limit the selection or choice of courses available to individuals with disabilities.

Section 36.310 Transportation Provided by Public Accommodations

Section 36.310 contains specific provisions relating to public accommodations that provide transportation to their clients or customers. This section has been substantially revised in order to coordinate the requirements of this section with the requirements applicable to these transportation systems that will be contained in the regulations issued by the Secretary of Transportation pursuant to section 306 of the ADA, to be codified at 49 CFR part 37. The Department notes that, although the responsibility for issuing regulations applicable to transportation systems operated by public accommodations is divided between this Department and the Department of –Transportation, enforcement authority is assigned only to the Department of Justice.

The Department received relatively few comments on this section of the proposed rule. Most of the comments addressed issues that are not specifically addressed in this part, such as the standards for accessible vehicles and the procedure for determining whether equivalent service is provided. Those standards will be contained in the regulation issued by the Department of Transportation. Other commenters raised questions about the types of transportation that will be subject to this section. In response to these inquiries, the Department has revised the list of examples contained in the regulation.

Paragraph (a)(1) states the general rule that covered public accommodations are subject to all of the specific provisions of subparts B, C, and D, except as provided in §36.310. Examples of operations covered by the requirements are listed in paragraph (a)(2). The stated examples include hotel and motel airport shuttle services, customer shuttle bus services operated by private companies and shopping centers, student transportation, and shuttle operations of recreational facilities such as stadiums, zoos, amusement parks, and ski resorts. This brief list is not exhaustive. The section applies to any fixed route or demand responsive transportation system operated by a public accommodation for the benefit of its clients or customers. The section does not apply to transportation services provided only to employees. Employee transportation will be subject to the regulations issued by the Equal Employment Opportunity Commission to implement title I of the Act. However, if employees and customers or clients are served by the same transportation system, the provisions of this section will apply.

Paragraph (b) specifically provides that a public accommodation shall remove transportation barriers in existing vehicles to the extent that it is readily achievable to do so, but that the installation of hydraulic or other lifts is not required.

Paragraph (c) provides that public accommodations subject to this section shall comply with the requirements for transportation vehicles and systems contained in the regulations issued by the Secretary of Transportation.

Subpart D—New Construction and Alterations

Subpart D implements section 303 of the Act, which requires that newly constructed or altered places of public accommodation or commercial facilities be readily accessible to and usable by individuals with disabilities. This requirement contemplates a high degree of convenient access. It is intended to ensure that patrons and employees of places of public accommodation and employees of commercial facilities are able to get to, enter, and use the facility.

Potential patrons of places of public accommodation, such as retail establishments, should be able to get to a store, get into the store, and get to the areas where goods are being provided. Employees should have the same types of access, although those individuals require access to and around the employment area as well as to the area in which goods and services are provided.

The ADA is geared to the future—its goal being that, over time, access will be the rule, rather than the exception. Thus, the Act only requires modest expenditures, of the type addressed in §36.304 of this part, to provide access to existing facilities not otherwise being altered, but requires all new construction and alterations to be accessible.

The Act does not require new construction or alterations; it simply requires that, when a public accommodation or other private entity undertakes the construction or alteration of a facility subject to the Act, the newly constructed or altered facility must be made accessible. This subpart establishes the requirements for new construction and alterations.

As explained under the discussion of the definition of ''facility,'' §36.104, pending development of specific requirements, the Department will not apply this subpart to places of public accommodation located in mobile units, boats, or other conveyances.

Section 36.401 New Construction

General

Section 36.401 implements the new construction requirements of the ADA. Section 303 (a)(1) of the Act provides that discrimination for purposes of section 302(a) of the Act includes a failure to design and construct facilities for first occupancy later than 30 months after the date of enactment (i.e., after January 26, 1993) that are readily accessible to and usable by individuals with disabilities.

Paragraph 36.401(a)(1) restates the general requirement for accessible new construction. The proposed rule stated that ''any public accommodation or other private entity responsible for design and construction'' must ensure that facilities conform to this requirement. Various commenters suggested that the proposed language was not consistent with the statute because it substituted ''private entity responsible for design and construction'' for the statutory language; because it did not address liability on the part of architects, contractors, developers, tenants, owners, and other entities; and because it limited the liability of entities responsible for commercial facilities. In response, the Department has revised this paragraph to repeat the language of section 303(a) of the ADA. The Department will interpret this section in a manner consistent with the intent of the statute and with the nature of the responsibilities of the various entities for design, for construction, or for both.

Designed and Constructed for First Occupancy

According to paragraph (a)(2), a facility is subject to the new construction requirements only if a completed application for a building permit or permit extension is filed after January 26, 1992, and the facility is occupied after January 26, 1993.

The proposed rule set forth for comment two alternative ways by which to determine what facilities are subject to the Act and what standards apply. Paragraph (a)(2) of the final rule is a slight variation on Option One in the proposed rule. The reasons for the Department's choice of Option One are discussed later in this section.

Paragraph (a)(2) acknowledges that Congress did not contemplate having actual occupancy be the sole trigger for the accessibility requirements, because the statute prohibits a failure to ''design and construct for first occupancy,'' rather than requiring accessibility in facilities actually occupied after a particular date.

The commenters overwhelmingly agreed with the Department's proposal to use a date certain; many cited the reasons given in the preamble to the proposed rule. First, it is helpful for designers and builders to have a fixed date for accessible design, so that they can determine accessibility requirements early in the planning and design stage. It is difficult to determine accessibility requirements in anticipation of the actual date of first occupancy because of unpredictable and uncontrollable events (e.g., strikes affecting suppliers or labor, or natural disasters) that may delay occupancy. To redesign or reconstruct portions of a facility if it begins to appear that occupancy will be later than anticipated would be quite costly. A fixed date also assists those responsible for enforcing, or monitoring compliance with, the statute, and those protected by it.

The Department considered using as a trigger date for application of the accessibility standards the date on which a permit is granted. The Department chose instead the date on which a complete permit application is certified as received by the appropriate

government entity. Almost all commenters agreed with this choice of a trigger date. This decision is based partly on information that several months or even years can pass between application for a permit and receipt of a permit. Design is virtually complete at the time an application is complete (i.e., certified to contain all the information required by the State, county, or local government). After an application is filed, delays may occur before the permit is granted due to numerous factors (not necessarily relating to accessibility): for example, hazardous waste discovered on the property, flood plain requirements, zoning disputes, or opposition to the project from various groups. These factors should not require redesign for accessibility if the application was completed before January 26, 1992. However, if the facility must be redesigned for other reasons, such as a change in density or environmental preservation, and the final permit is based on a new application, the rule would require accessibility if that application was certified complete after January 26, 1992.

The certification of receipt of a complete application for a building permit is an appropriate point in the process because certifications are issued in writing by governmental authorities. In addition, this approach presents a clear and objective standard.

However, a few commenters pointed out that in some jurisdictions it is not possible to receive a ''certification'' that an application is complete, and suggested that in those cases the fixed date should be the date on which an application for a permit is received by the government agency. The Department has included such a provision in §36.401(a)(2)(i).

The date of January 26, 1992, is relevant only with respect to the last application for a permit or permit extension for a facility. Thus, if an entity has applied for only a ''foundation'' permit, the date of that permit application has no effect, because the entity must also apply for and receive a permit at a later date for the actual superstructure. In this case, it is the date of the later application that would control, unless construction is not completed within the time allowed by the permit, in which case a third permit would be issued and the date of the application for that permit would be determinative for purposes of the rule.

Choice of Option One for Defining ''Designed and Constructed for First Occupancy''

Under the option the Department has chosen for determining applicability of the new construction standards, a building would be considered to be ''for first occupancy'' after January 26, 1993, only (1) if the last application for a building permit or permit extension for the facility is certified to be complete (or, in some jurisdictions, received) by a State, county, or local government after January 26, 1992, and (2) if the first certificate of occupancy is issued after January 26, 1993. The Department also asked for comment on an Option Two, which would have imposed new construction requirements if a completed application for a building permit or permit extension was filed after the enactment of the ADA (July 26, 1990), and the facility was occupied after January 26, 1993.

The request for comment on this issue drew a large number of comments expressing a wide range of views. Most business groups and some disability rights groups favored Option One, and some business groups and most disability rights groups favored Option Two. Individuals and government entities were equally divided; several commenters proposed other options.

Those favoring Option One pointed out that it is more reasonable in that it allows time for those subject to the new construction requirements to anticipate those requirements and to receive technical assistance pursuant to the Act. Numerous commenters said that time frames for designing and constructing some types of facilities (for example, health care facilities) can range from two to four years or more. They expressed concerns that Option Two, which would apply to some facilities already under design or construction as of the date the Act was signed, and to some on which construction began shortly after enactment, could result in costly redesign or reconstruction of those facilities. In the same vein, some Option One supporters found Option Two objectionable on due process grounds. In their view, Option Two would mean that in July 1991 (upon issuance of the final DOJ rule) the responsible entities would learn that ADA standards had been in effect since July 26, 1990, and this would amount to retroactive application of standards. Numerous commenters characterized Option Two as having no support in the statute and Option One as being more consistent with congressional intent.

Those who favored Option Two pointed out that it would include more facilities within the coverage of the new construction standards. They argued that because similar accessibility requirements are in effect under State laws, no hardship would be imposed by this option. Numerous commenters said that hardship would also be eliminated in light of their view that the ADA requires compliance with the Uniform Federal Accessibility Standards (UFAS) until issuance of DOJ standards. Those supporting Option Two claimed that it was more consistent with the statute and its legislative history.

The Department has chosen Option One rather than Option Two, primarily on the

basis of the language of three relevant sections of the statute. First, section 303(a) requires compliance with accessibility standards set forth, or incorporated by reference in, regulations to be issued by the Department of Justice. Standing alone, this section cannot be read to require compliance with the Department's standards before those standards are issued (through this rulemaking). Second, according to section 310 of the statute, section 303 becomes effective on January 26, 1992. Thus, section 303 cannot impose requirements on the design of buildings before that date. Third, while section 306(d) of the Act requires compliance with UFAS if final regulations have not been issued, that provision cannot reasonably be read to take effect until July 26, 1991, the date by which the Department of Justice must issue final regulations under title III.

Option Two was based on the premise that the interim standards in section 306(d) take effect as of the ADA's enactment (July 26, 1990), rather than on the date by which the Department of Justice regulations are due to be issued (July 26, 1991). The initial clause of section 306(d)(1) itself is silent on this question:

If final regulations have not been issued pursuant to this section, for new construction for which a * * * building permit is obtained prior to the issuance of final regulations * * * (interim standards apply).

The approach in Option Two relies partly on the language of section 310 of the Act, which provides that section 306, the interim standards provision, takes effect on the date of enactment. Under this interpretation the interim standards provision would prevail over the operative provision, section 303, which requires that new construction be accessible and which becomes effective January 26, 1992. This approach would also require construing the language of section 306(d)(1) to take effect before the Department's standards are due to be issued. The preferred reading of section 306 is that it would require that, if the Department's final standards had not been issued by July 26, 1991, UFAS would apply to certain buildings until such time as the Department's standards were issued.

General Substantive Requirements of the New Construction Provisions

The rule requires, as does the statute, that covered newly constructed facilities be readily accessible to and usable by individuals with disabilities. The phrase ''readily accessible to and usable by individuals with disabilities'' is a term that, in slightly varied formulations, has been used in the Architectural Barriers Act of 1968, the Fair Housing Act, the regulations implementing section 504 of the Rehabilitation Act of 1973, and current accessibility standards. It means, with respect to a facility or a portion of a facility, that it can be approached, entered, and used by individuals with disabilities (including mobility, sensory, and cognitive impairments) easily and conveniently. A facility that is constructed to meet the requirements of the rule's accessibility standards will be considered readily accessible and usable with respect to construction. To the extent that a particular type or element of a facility is not specifically addressed by the standards, the language of this section is the safest guide.

A private entity that renders an ''accessible'' building inaccessible in its operation, through policies or practices, may be in violation of section 302 of the Act. For example, a private entity can render an entrance to a facility inaccessible by keeping an accessible entrance open only during certain hours (whereas the facility is available to others for a greater length of time). A facility could similarly be rendered inaccessible if a person with disabilities is significantly limited in her or his choice of a range of accommodations.

Ensuring access to a newly constructed facility will include providing access to the facility from the street or parking lot, to the extent the responsible entity has control over the route from those locations. In some cases, the private entity will have no control over access at the point where streets, curbs, or sidewalks already exist, and in those instances the entity is encouraged to request modifications to a sidewalk, including installation of curb cuts, from a public entity responsible for them. However, as some commenters pointed out, there is no obligation for a private entity subject to title III of the ADA to seek or ensure compliance by a public entity with title II. Thus, although a locality may have an obligation under title II of the Act to install curb cuts at a particular location, that responsibility is separate from the private entity's title III obligation, and any involvement by a private entity in seeking cooperation from a public entity is purely voluntary in this context.

Work Areas

Proposed paragraph 36.401(b) addressed access to employment areas, rather than to the areas where goods or services are being provided. The preamble noted that the proposed paragraph provided guidance for new construction and alterations until more specific guidance was issued by the ATBCB and reflected in this Department's regulation. The entire paragraph has been deleted from this section in the final rule. The concepts of paragraphs (b) (1), (2), and (5) of the proposed rule are included, with modifications and expansion, in ADAAG. Paragraphs (3) and (4) of the proposed rule, concerning fixtures and equipment, are not included in the rule or in ADAAG.

Some commenters asserted that questions relating to new construction and alterations of work areas should be addressed by the

EEOC under title I, as employment concerns. However, the legislative history of the statute clearly indicates that the new construction and alterations requirements of title III were intended to ensure accessibility of new facilities to all individuals, including employees. The language of section 303 sweeps broadly in its application to all public accommodations and commercial facilities. EEOC's title I regulations will address accessibility requirements that come into play when ''reasonable accommodation'' to individual employees or applicants with disabilities is mandated under title I.

The issues dealt with in proposed §36.401(b)(1) and (2) are now addressed in ADAAG section 4.1.1(3). The Department's proposed paragraphs would have required that areas that will be used only by employees as work stations be constructed so that individuals with disabilities could approach, enter, and exit the areas. They would not have required that all individual work stations be constructed or equipped (for example, with shelves that are accessible or adaptable) to be accessible. This approach was based on the theory that, as long as an employee with disabilities could enter the building and get to and around the employment area, modifications in a particular work station could be instituted as a ''reasonable accommodation'' to that employee if the modifications were necessary and they did not constitute an undue hardship.

Almost all of the commenters agreed with the proposal to require access to a work area but not to require accessibility of each individual work station. This principle is included in ADAAG 4.1.1(3). Several of the comments related to the requirements of the proposed ADAAG and have been addressed in the accessibility standards.

Proposed paragraphs (b) (3) and (4) would have required that consideration be given to placing fixtures and equipment at accessible heights in the first instance, and to purchasing new equipment and fixtures that are adjustable. These paragraphs have not been included in the final rule because the rule in most instances does not establish accessibility standards for purchased equipment. (See discussion elsewhere in the preamble of proposed §36.309.) While the Department encourages entities to consider providing accessible or adjustable fixtures and equipment for employees, this rule does not require them to do so.

Paragraph (b)(5) of proposed §36.401 clarified that proposed paragraph (b) did not limit the requirement that employee areas other than individual work stations must be accessible. For example, areas that are employee ''common use'' areas and are not solely used as work stations (e.g., employee lounges, cafeterias, health units, exercise facilities) are treated no differently under this regulation than other parts of a building; they must be constructed or altered in compliance with the accessibility standards. This principle is not stated in §36.401 but is implicit in the requirements of this section and ADAAG.

Commercial Facilities in Private Residences

Section 36.401(b) of the final rule is a new provision relating to commercial facilities located in private residences. The proposed rule addressed these requirements in the preamble to §36.207, ''Places of public accommodation located in private residences.'' The preamble stated that the approach for commercial facilities would be the same as that for places of public accommodation, i.e., those portions used exclusively as a commercial facility or used as both a commercial facility and for residential purposes would be covered. Because commercial facilities are only subject to new construction and alterations requirements, however, the covered portions would only be subject to subpart D. This approach is reflected in §36.401(b)(1).

The Department is aware that the statutory definition of ''commercial facility'' excludes private residences because they are ''expressly exempted from coverage under the Fair Housing Act of 1968, as amended.'' However, the Department interprets that exemption as applying only to facilities that are exclusively residential. When a facility is used as both a residence and a commercial facility, the exemption does not apply.

Paragraph (b)(2) is similar to the new paragraph (b) under §36.207, ''Places of public accommodation located in private residences.'' The paragraph clarifies that the covered portion includes not only the space used as a commercial facility, but also the elements used to enter the commercial facility, e.g., the homeowner's front sidewalk, if any; the doorway; the hallways; the restroom, if used by employees or visitors of the commercial facility; and any other portion of the residence, interior or exterior, used by employees or visitors of the commercial facility.

As in the case of public accommodations located in private residences, the new construction standards only apply to the extent that a portion of the residence is designed or intended for use as a commercial facility. Likewise, if a homeowner alters a portion of his home to convert it to a commercial facility, that work must be done in compliance with the alterations standards in appendix A.

Structural Impracticability

Proposed §36.401(c) is included in the final rule with minor changes. It details a statutory exception to the new construction requirement: the requirement that new construction be accessible does not apply where

an entity can demonstrate that it is structurally impracticable to meet the requirements of the regulation. This provision is also included in ADAAG, at section 4.1.1(5)(a).

Consistent with the legislative history of the ADA, this narrow exception will apply only in rare and unusual circumstances where unique characteristics of terrain make accessibility unusually difficult. Such limitations for topographical problems are analogous to an acknowledged limitation in the application of the accessibility requirements of the Fair Housing Amendments Act (FHAA) of 1988.

Almost all commenters supported this interpretation. Two commenters argued that the DOJ requirement is too limiting and would not exempt some buildings that should be exempted because of soil conditions, terrain, and other unusual site conditions. These commenters suggested consistency with HUD's Fair Housing Accessibility Guidelines (56 FR 9472 (1991)), which generally would allow exceptions from accessibility requirements, or allow compliance with less stringent requirements, on sites with slopes exceeding 10%.

The Department is aware of the provisions in HUD's guidelines, which were issued on March 6, 1991, after passage of the ADA and publication of the Department's proposed rule. The approach taken in these guidelines, which apply to different types of construction and implement different statutory requirements for new construction, does not bind this Department in regulating under the ADA. The Department has included in the final rule the substance of the proposed provision, which is faithful to the intent of the statute, as expressed in the legislative history. (See Senate report at 70–71; Education and Labor report at 120.)

The limited structural impracticability exception means that it is acceptable to deviate from accessibility requirements only where unique characteristics of terrain prevent the incorporation of accessibility features and where providing accessibility would destroy the physical integrity of a facility. A situation in which a building must be built on stilts because of its location in marshlands or over water is an example of one of the few situations in which the exception for structural impracticability would apply.

This exception to accessibility requirements should not be applied to situations in which a facility is located in ''hilly'' terrain or on a plot of land upon which there are steep grades. In such circumstances, accessibility can be achieved without destroying the physical integrity of a structure, and is required in the construction of new facilities.

Some commenters asked for clarification concerning when and how to apply the ADA rules or the Fair Housing Accessibility Guidelines, especially when a facility may be subject to both because of mixed use. Guidance on this question is provided in the discussion of the definitions of place of public accommodation and commercial facility. With respect to the structural impracticability exception, a mixed-use facility could not take advantage of the Fair Housing exemption, to the extent that it is less stringent than the ADA exemption, except for those portions of the facility that are subject only to the Fair Housing Act.

As explained in the preamble to the proposed rule, in those rare circumstances in which it is structurally impracticable to achieve full compliance with accessibility retirements under the ADA, places of public accommodation and commercial facilities should still be designed and constructed to incorporate accessibility features to the extent that the features are structurally practicable. The accessibility requirements should not be viewed as an all-or-nothing proposition in such circumstances.

If it is structurally impracticable for a facility in its entirety to be readily accessible to and usable by people with disabilities, then those portions that can be made accessible should be made accessible. If a building cannot be constructed in compliance with the full range of accessibility requirements because of structural impracticability, then it should still incorporate those features that are structurally practicable. If it is structurally impracticable to make a particular facility accessible to persons who have particular types of disabilities, it is still appropriate to require it to be made accessible to persons with other types of disabilities. For example, a facility that is of necessity built on stilts and cannot be made accessible to persons who use wheelchairs because it is structurally impracticable to do so, must be made accessible for individuals with vision or hearing impairments or other kinds of disabilities.

Elevator Exemption

Section 36.401(d) implements the ''elevator exemption'' for new construction in section 303(b) of the ADA. The elevator exemption is an exception to the general requirement that new facilities be readily accessible to and usable by individuals with disabilities. Generally, an elevator is the most common way to provide individuals who use wheelchairs ''ready access'' to floor levels above or below the ground floor of a multi-story building. Congress, however, chose not to require elevators in new small buildings, that is, those with less than three stories or less than 3,000 square feet per story. In buildings eligible for the exemption, therefore, ''ready access'' from the building entrance to a floor above

or below the ground floor is not required, because the statute does not require that an elevator be installed in such buildings. The elevator exemption does not apply, however, to a facility housing a shopping center, a shopping mall, or the professional office of a health care provider, or other categories of facilities as determined by the Attorney General. For example, a new office building that will have only two stories, with no elevator planned, will not be required to have an elevator, even if each story has 20,000 square feet. In other words, having either less than 3000 square feet per story or less than three stories qualifies a facility for the exemption; it need not qualify for the exemption on both counts. Similarly, a facility that has five stories of 2800 square feet each qualifies for the exemption. If a facility has three or more stories at any point, it is not eligible for the elevator exemption unless all the stories are less than 3000 square feet.

The terms ''shopping center or shopping mall'' and ''professional office of a health care provider'' are defined in this section. They are substantively identical to the definitions included in the proposed rule in §36.104, ''Definitions.'' They have been moved to this section because, as commenters pointed out, they are relevant only for the purposes of the elevator exemption, and inclusion in the general definitions section could give the incorrect impression that an office of a health care provider is not covered as a place of public accommodation under other sections of the rule, unless the office falls within the definition.

For purposes of §36.401, a ''shopping center or shopping mall'' is (1) a building housing five or more sales or rental establishments, or (2) a series of buildings on a common site, either under common ownership or common control or developed either as one project or as a series of related projects, housing five or more sales or rental establishments. The term ''shopping center or shopping mall'' only includes floor levels containing at least one sales or rental establishment, or any floor level that was designed or intended for use by at least one sales or rental establishment.

Any sales or rental establishment of the type that is included in paragraph (5) of the definition of ''place of public accommodation'' (for example, a bakery, grocery store, clothing store, or hardware store) is considered a sales or rental establishment for purposes of this definition; the other types of public accommodations (e.g., restaurants, laundromats, banks, travel services, health spas) are not.

In the preamble to the proposed rule, the Department sought comment on whether the definition of ''shopping center or mall'' should be expanded to include any of these other types of public accommodations. The Department also sought comment on whether a series of buildings should fall within the definition only if they are physically connected.

Most of those responding to the first question (overwhelmingly groups representing people with disabilities, or individual commenters) urged that the definition encompass more places of public accommodation, such as restaurants, motion picture houses, laundromats, dry cleaners, and banks. They pointed out that often it is not known what types of establishments will be tenants in a new facility. In addition, they noted that malls are advertised as entities, that their appeal is in the ''package'' of services offered to the public, and that this package often includes the additional types of establishments mentioned.

Commenters representing business groups sought to exempt banks, travel services, grocery stores, drug stores, and freestanding retail stores from the elevator requirement. They based this request on the desire to continue the practice in some locations of incorporating mezzanines housing administrative offices, raised pharmacist areas, and raised areas in the front of supermarkets that house safes and are used by managers to oversee operations of check-out aisles and other functions. Many of these concerns are adequately addressed by ADAAG. Apart from those addressed by ADAAG, the Department sees no reason to treat a particular type of sales or rental establishment differently from any other. Although banks and travel services are not included as ''sales or rental establishments,'' because they do not fall under paragraph (5) of the definition of place of public accommodation, grocery stores and drug stores are included.

The Department has declined to include places of public accommodation other than sales or rental establishments in the definition. The statutory definition of ''public accommodation'' (section 301(7)) lists 12 types of establishments that are considered public accommodations. Category (E) includes ''a bakery, grocery store, clothing store, hardware store, shopping center, or other sales or rental establishment.'' This arrangement suggests that it is only these types of establishments that would make up a shopping center for purposes of the statute. To include all types of places of public accommodation, or those from 6 or 7 of the categories, as commenters suggest, would overly limit the elevator exemption; the universe of facilities covered by the definition of ''shopping center'' could well exceed the number of multitenant facilities *not* covered, which would render the exemption almost meaningless.

For similar reasons, the Department is retaining the requirement that a building or series of buildings must house five or more sales or rental establishments before it falls within the definition of ''shopping center.''

Numerous commenters objected to the number and requested that the number be lowered from five to three or four. Lowering the number in this manner would include an inordinately large number of two-story multitenant buildings within the category of those required to have elevators.

The responses to the question concerning whether a series of buildings should be connected in order to be covered were varied. Generally, disability rights groups and some government agencies said a series of buildings should not have to be connected, and pointed to a trend in some areas to build shopping centers in a garden or village setting. The Department agrees that this design choice should not negate the elevator requirement for new construction. Some business groups answered the question in the affirmative, and some suggested a different definition of shopping center. For example, one commenter recommended the addition of a requirement that the five or more establishments be physically connected on the non-ground floors by a common pedestrian walkway or pathway, because otherwise a series of stand-alone facilities would have to comply with the elevator requirement, which would be unduly burdensome and perhaps infeasible. Another suggested use of what it characterized as the standard industry definition: ''A group of retail stores and related business facilities, the whole planned, developed, operated and managed as a unit.'' While the rule's definition would reach a series of related projects that are under common control but were not developed as a single project, the Department considers such a facility to be a shopping center within the meaning of the statute. However, in light of the hardship that could confront a series of existing small stand-alone buildings if elevators were required in alterations, the Department has included a common access route in the definition of shopping center or shopping mall for purposes of §36.404.

Some commenters suggested that access to restrooms and other shared facilities open to the public should be required even if those facilities were not on a shopping floor. Such a provision with respect to toilet or bathing facilities is included in the elevator exception in final ADAAG 4.1.3(5).

For purposes of this subpart, the rule does not distinguish between a ''shopping mall'' (usually a building with a roofed-over common pedestrian area serving more than one tenant in which a majority of the tenants have a main entrance from the common pedestrian area) and a ''shopping center'' (e.g., a ''shopping strip''). Any facility housing five or more of the types of sales or rental establishments described, regardless of the number of other types of places of public accommodation housed there (e.g., offices, movie theatres, restaurants), is a shopping center or shopping mall.

For example, a two-story facility built for mixed-use occupancy on both floors (e.g., by sales and rental establishments, a movie theater, restaurants, and general office space) is a shopping center or shopping mall if it houses five or more sales or rental establishments. If none of these establishments is located on the second floor, then only the ground floor, which contains the sales or rental establishments, would be a ''shopping center or shopping mall,'' unless the second floor was designed or intended for use by at least one sales or rental establishment. In determining whether a floor was intended for such use, factors to be considered include the types of establishments that first occupied the floor, the nature of the developer's marketing strategy, i.e., what types of establishments were sought, and inclusion of any design features particular to rental and sales establishments.

A ''professional office of a health care provider'' is defined as a location where a person or entity regulated by a State to provide professional services related to the physical or mental health of an individual makes such services available to the public. In a two-story development that houses health care providers only on the ground floor, the ''professional office of a health care provider'' is limited to the ground floor unless the second floor was designed or intended for use by a health care provider. In determining if a floor was intended for such use, factors to be considered include whether the facility was constructed with special plumbing, electrical, or other features needed by health care providers, whether the developer marketed the facility as a medical office center, and whether any of the establishments that first occupied the floor was, in fact, a health care provider.

In addition to requiring that a building that is a shopping center, shopping mall, or the professional office of a health care provider have an elevator regardless of square footage or number of floors, the ADA (section 303(b)) provides that the Attorney General may determine that a particular category of facilities requires the installation of elevators based on the usage of the facilities. The Department, as it proposed to do, has added to the nonexempt categories terminals, depots, or other stations used for specified public transportation, and airport passenger terminals. Numerous commenters in all categories endorsed this proposal; none opposed it. It is not uncommon for an airport passenger terminal or train station, for example, to have only two floors, with gates on both floors. Because of the significance of transportation, because a person with disabilities could be arriving or departing at any gate, and because inaccessible facilities could result in a total denial of transportation services, it is reasonable to require that newly constructed transit facilities be

accessible, regardless of square footage or number of floors. One comment suggested an amendment that would treat terminals and stations similarly to shopping centers, by requiring an accessible route only to those areas used for passenger loading and unloading and for other passenger services. Paragraph (d)(2)(ii) has been modified accordingly.

Some commenters suggested that other types of facilities (e.g., educational facilities, libraries, museums, commercial facilities, and social service facilities) should be included in the category of nonexempt facilities. The Department has not found adequate justification for including any other types of facilities in the nonexempt category at this time.

Section 36.401(d)(2) establishes the operative requirements concerning the elevator exemption and its application to shopping centers and malls, professional offices of health care providers, transit stations, and airport passenger terminals. Under the rule's framework, it is necessary first to determine if a new facility (including one or more buildings) houses places of public accommodation or commercial facilities that are in the categories for which elevators are required. If so, and the facility is a shopping center or shopping mall, or a professional office of a health care provider, then any area housing such an office or a sales or rental establishment or the professional office of a health care provider is not entitled to the elevator exemption.

The following examples illustrate the application of these principles:

1. A shopping mall has an upper and a lower level. There are two ''anchor stores'' (in this case, major department stores at either end of the mall, both with exterior entrances and an entrance on each level from the common area). In addition, there are 30 stores (sales or rental establishments) on the upper level, all of which have entrances from a common central area. There are 30 stores on the lower level, all of which have entrances from a common central area. According to the rule, elevator access must be provided to each store and to each level of the anchor stores. This requirement could be satisfied with respect to the 60 stores through elevators connecting the two pedestrian levels, provided that an individual could travel from the elevator to any other point on that level (i.e., into any store through a common pedestrian area) on an accessible path.

2. A commercial (nonresidential) ''townhouse'' development is composed of 20 two-story attached buildings. The facility is developed as one project, with common ownership, and the space will be leased to retailers. Each building has one accessible entrance from a pedestrian walk to the first floor. From that point, one can enter a store on the first floor, or walk up a flight of stairs to a store on the second floor. All 40 stores must be accessible at ground floor level or by accessible vertical access from that level. This does not mean, however, that 20 elevators must be installed. Access could be provided to the second floor by an elevator from the pedestrian area on the lower level to an upper walkway connecting all the areas on the second floor.

3. In the same type of development, it is planned that retail stores will be housed exclusively on the ground floor, with only office space (not professional offices of health care providers) on the second. Elevator access need not be provided to the second floor because all the sales or rental establishments (the entities that make the facility a shopping center) are located on an accessible ground floor.

4. In the same type of development, the space is designed and marketed as medical or office suites, or as a medical office facility. Accessible vertical access must be provided to all areas, as described in example 2.

Some commenters suggested that building owners who knowingly lease or rent space to nonexempt places of public accommodation would violate §36.401. However, the Department does not consider leasing or renting inaccessible space in itself to constitute a violation of this part. Nor does a change in use of a facility, with no accompanying alterations (e.g., if a psychiatrist replaces an attorney as a tenant in a second-floor office, but no alterations are made to the office) trigger accessibility requirements.

Entities cannot evade the requirements of this section by constructing facilities in such a way that no story is intended to constitute a ''ground floor.'' For example, if a private entity constructs a building whose main entrance leads only to stairways or escalators that connect with upper or lower floors, the Department would consider at least one level of the facility a ground story.

The rule requires in §36.401(d)(3), consistent with the proposed rule, that, even if a building falls within the elevator exemption, the floor or floors other than the ground floor must nonetheless be accessible, except for elevator access, to individuals with disabilities, including people who use wheelchairs. This requirement applies to buildings that do not house sales or rental establishments or the professional offices of a health care provider as well as to those in which such establishments or offices are all located on the ground floor. In such a situation, little added cost is entailed in making the second floor accessible, because it is similar in structure and floor plan to the ground floor.

There are several reasons for this provision. First, some individuals who are mobility impaired may work on a building's second floor, which they can reach by stairs and

the use of crutches; however, the same individuals, once they reach the second floor, may then use a wheelchair that is kept in the office. Secondly, because the first floor will be accessible, there will be little additional cost entailed in making the second floor, with the same structure and generally the same floor plan, accessible. In addition, the second floor must be accessible to those persons with disabilities who do not need elevators for level changes (for example, persons with sight or hearing impairments and those with certain mobility impairments). Finally, if an elevator is installed in the future for any reason, full access to the floor will be facilitated.

One commenter asserted that this provision goes beyond the Department's authority under the Act, and disagreed with the Department's claim that little additional cost would be entailed in compliance. However, the provision is taken directly from the legislative history (see Education and Labor report at 114).

One commenter said that where an elevator is not required, platform lifts should be required. Two commenters pointed out that the elevator exemption is really an exemption from the requirement for providing an accessible route to a second floor not served by an elevator. The Department agrees with the latter comment. Lifts to provide access between floors are not required in buildings that are not required to have elevators. This point is specifically addressed in the appendix to ADAAG (§4.1.3(5)). ADAAG also addresses in detail the situations in which lifts are permitted or required.

Section 36.402 Alterations

Sections 36.402–36.405 implement section 303(a)(2) of the Act, which requires that alterations to existing facilities be made in a way that ensures that the altered portion is readily accessible to and usable by individuals with disabilities. This part does not require alterations; it simply provides that when alterations are undertaken, they must be made in a manner that provides access.

Section 36.402(a)(1) provides that any alteration to a place of public accommodation or a commercial facility, after January 26, 1992, shall be made so as to ensure that, to the maximum extent feasible, the altered portions of the facility are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs.

The proposed rule provided that an alteration would be deemed to be undertaken after January 26, 1992, if the physical alteration of the property is in progress after that date. Commenters pointed out that this provision would, in some cases, produce an unjust result by requiring the redesign or retrofitting of projects initiated before this part established the ADA accessibility standards. The Department agrees that the proposed rule would, in some instances, unfairly penalize projects that were substantially completed before the effective date. Therefore, paragraph (a)(2) has been revised to specify that an alteration will be deemed to be undertaken after January 26, 1992, if the physical alteration of the property begins after that date. As a matter of interpretation, the Department will construe this provision to apply to alterations that require a permit from a State, County or local government, if physical alterations pursuant to the terms of the permit begin after January 26, 1992. The Department recognizes that this application of the effective date may require redesign of some facilities that were planned prior to the publication of this part, but no retrofitting will be required of facilities on which the physical alterations were initiated prior to the effective date of the Act. Of course, nothing in this section in any way alters the obligation of any facility to remove architectural barriers in existing facilities to the extent that such barrier removal is readily achievable.

Paragraph (b) provides that, for the purposes of this part, an ''alteration'' is a change to a place of public accommodation or a commercial facility that affects or could affect the usability of the building or facility or any part thereof. One commenter suggested that the concept of usability should apply only to those changes that affect access by persons with disabilities. The Department remains convinced that the Act requires the concept of ''usability'' to be read broadly to include any change that affects the usability of the facility, not simply changes that relate directly to access by individuals with disabilities.

The Department received a significant number of comments on the examples provided in paragraphs (b)(1) and (b)(2) of the proposed rule. Some commenters urged the Department to limit the application of this provision to major structural modifications, while others asserted that it should be expanded to include cosmetic changes such as painting and wallpapering. The Department believes that neither approach is consistent with the legislative history, which requires this Department's regulation to be consistent with the accessibility guidelines (ADAAG) developed by the Architectural and Transportation Barriers Compliance Board (ATBCB). Although the legislative history contemplates that, in some instances, the ADA accessibility standards will exceed the current MGRAD requirements, it also clearly indicates the view of the drafters that ''minor changes such as painting or papering walls * * * do not affect usability'' (Education and Labor report at 111, Judiciary report at 64), and, therefore, are not alterations. The proposed rule was based on the existing MGRAD definition of ''alteration.''

The language of the final rule has been revised to be consistent with ADAAG, incorporated as appendix A to this part.

Some commenters sought clarification of the intended scope of this section. The proposed rule contained illustrations of changes that affect usability and those that do not. The intent of the illustrations was to explain the scope of the alterations requirement; the effect was to obscure it. As a result of the illustrations, some commenters concluded that any alteration to a facility, even a minor alteration such as relocating an electrical outlet, would trigger an extensive obligation to provide access throughout an entire facility. That result was never contemplated.

Therefore, in this final rule paragraph (b)(1) has been revised to include the major provisions of paragraphs (b)(1) and (b)(2) of the proposed rule. The examples in the proposed rule have been deleted. Paragraph (b)(1) now provides that alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, changes or rearrangement in structural parts or elements, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, asbestos removal, or changes to mechanical and electrical systems are not alterations unless they affect the usability of building or facility.

Paragraph (b)(2) of this final rule was added to clarify the scope of the alterations requirement. Paragraph (b)(2) provides that if existing elements, spaces, or common areas are altered, then each such altered element, space, or area shall comply with the applicable provisions of appendix A (ADAAG). As provided in §36.403, if an altered space or area is an area of the facility that contains a primary function, then the requirements of that section apply.

Therefore, when an entity undertakes a minor alteration to a place of public accommodation or commercial facility, such as moving an electrical outlet, the new outlet must be installed in compliance with ADAAG. (Alteration of the elements listed in §36.403(c)(2) cannot trigger a path of travel obligation.) If the alteration is to an area, such as an employee lounge or locker room, that is not an area of the facility that contains a primary function, that area must comply with ADAAG. It is only when an alteration affects access to or usability of an area containing a primary function, as opposed to other areas or the elements listed in §36.403(c)(2), that the path of travel to the altered area must be made accessible.

The Department received relatively few comments on paragraph (c), which explains the statutory phrase ''to the maximum extent feasible.'' Some commenters suggested that the regulation should specify that cost is a factor in determining whether it is feasible to make an altered area accessible. The legislative history of the ADA indicates that the concept of feasibility only reaches the question of whether it is possible to make the alteration accessible in compliance with this part. Costs are to be considered only when an alteration to an area containing a primary function triggers an additional requirement to make the path of travel to the altered area accessible.

Section 36.402(c) is, therefore, essentially unchanged from the proposed rule. At the recommendation of a commenter, the Department has inserted the word ''virtually'' to modify ''impossible'' to conform to the language of the legislative history. It explains that the phrase ''to the maximum extent feasible'' as used in this section applies to the occasional case where the nature of an existing facility makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In the occasional cases in which full compliance is impossible, alterations shall provide the maximum physical accessibility feasible. Any features of the facility that are being altered shall be made accessible unless it is technically infeasible to do so. If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would not be feasible, the facility shall be made accessible to persons with other types of disabilities (e.g., those who use crutches or who have impaired vision or hearing, or those who have other types of impairments).

Section 36.403 Alterations: Path of Travel

Section 36.403 implements the statutory requirement that any alteration that affects or could affect the usability of or access to an area of a facility that contains a primary function shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the altered area, and the restrooms, telephones, and drinking fountains serving the altered area, are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, unless the cost and scope of such alterations is disproportionate to the cost of the overall alteration. Paragraph (a) restates this statutory requirement.

Paragraph (b) defines a ''primary function'' as a major activity for which the facility is intended. This paragraph is unchanged from the proposed rule. Areas that contain a primary function include, but are not limited to, the customer services lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and all other work areas in which the activities of the public accommodation or other private entities using the facility are

carried out. The concept of ''areas containing a primary function'' is analogous to the concept of ''functional spaces'' in §3.5 of the existing Uniform Federal Accessibility Standards, which defines ''functional spaces'' as ''[t]he rooms and spaces in a building or facility that house the major activities for which the building or facility is intended.''

Paragraph (b) provides that areas such as mechanical rooms, boiler rooms, supply storage rooms, employee lounges and locker rooms, janitorial closets, entrances, corridors, and restrooms are not areas containing a primary function. There may be exceptions to this general rule. For example, the availability of public restrooms at a place of public accommodation at a roadside rest stop may be a major factor affecting customers' decisions to patronize the public accommodation. In that case, a restroom would be considered to be an ''area containing a primary function'' of the facility.

Most of the commenters who addressed this issue supported the approach taken by the Department; but a few commenters suggested that areas not open to the general public or those used exclusively by employees should be excluded from the definition of primary function. The preamble to the proposed rule noted that the Department considered an alternative approach to the definition of ''primary function,'' under which a primary function of a commercial facility would be defined as a major activity for which the facility was intended, while a primary function of a place of public accommodation would be defined as an activity which involves providing significant goods, services, facilities, privileges, advantages, or accommodations. However, the Department concluded that, although portions of the legislative history of the ADA support this alternative, the better view is that the language now contained in §36.403(b) most accurately reflects congressional intent. No commenter made a persuasive argument that the Department's interpretation of the legislative history is incorrect.

When the ADA was introduced, the requirement to make alterations accessible was included in section 302 of the Act, which identifies the practices that constitute discrimination by a public accommodation. Because section 302 applies only to the operation of a place of public accommodation, the alterations requirement was intended only to provide access to clients and customers of a public accommodation. It was anticipated that access would be provided to employees with disabilities under the ''reasonable accommodation'' requirements of title I. However, during its consideration of the ADA, the House Judiciary Committee amended the bill to move the alterations provision from section 302 to section 303, which applies to commercial facilities as well as public accommodations. The Committee report accompanying the bill explains that:

New construction and alterations of both public accommodations and commercial facilities must be made readily accessible to and usable by individuals with disabilities * * *. Essentially, [this requirement] is designed to ensure that patrons *and employees* of public accommodations and commercial facilities are able to get to, enter and use the facility * * *. The rationale for making new construction accessible applies with equal force to alterations.

Judiciary report at 62–63 (emphasis added).

The ADA, as enacted, contains the language of section 303 as it was reported out of the Judiciary Committee. Therefore, the Department has concluded that the concept of ''primary function'' should be applied in the same manner to places of public accommodation and to commercial facilities, thereby including employee work areas in places of public accommodation within the scope of this section.

Paragraph (c) provides examples of alterations that affect the usability of or access to an area containing a primary function. The examples include: Remodeling a merchandise display area or employee work areas in a department store; installing a new floor surface to replace an inaccessible surface in the customer service area or employee work areas of a bank; redesigning the assembly line area of a factory; and installing a computer center in an accounting firm. This list is illustrative, not exhaustive. Any change that affects the usability of or access to an area containing a primary function triggers the statutory obligation to make the path of travel to the altered area accessible.

When the proposed rule was drafted, the Department believed that the rule made it clear that the ADA would require alterations to the path of travel only when such alterations are not disproportionate to the alteration to the primary function area. However, the comments that the Department received indicated that many commenters believe that even minor alterations to individual elements would require additional alterations to the path of travel. To address the concern of these commenters, a new paragraph (c)(2) has been added to the final rule to provide that alterations to such elements as windows, hardware, controls (e.g. light switches or thermostats), electrical outlets, or signage will not be deemed to be alterations that affect the usability of or access to an area containing a primary function. Of course, each element that is altered must comply with ADAAG (appendix A) . The cost of alterations to individual elements would be included in the overall cost of an alteration for purposes of determining disproportionality and would be counted

when determining the aggregate cost of a series of small alterations in accordance with §36.401(h) if the area is altered in a manner that affects access to or usability of an area containing a primary function.

Paragraph (d) concerns the respective obligations of landlords and tenants in the cases of alterations that trigger the path of travel requirement under §36.403. This paragraph was contained in the landlord/tenant section of the proposed rule, §36.201(b). If a tenant is making alterations upon its premises pursuant to terms of a lease that grant it the authority to do so (even if they constitute alterations that trigger the path of travel requirement), and the landlord is not making alterations to other parts of the facility, then the alterations by the tenant on its own premises do not trigger a path of travel obligation upon the landlord in areas of the facility under the landlord's authority that are not otherwise being altered. The legislative history makes clear that the path of travel requirement applies only to the entity that is already making the alteration, and thus the Department has not changed the final rule despite numerous comments suggesting that the tenant be required to provide a path of travel.

Paragraph (e) defines a ''path of travel'' as a continuous, unobstructed way of pedestrian passage by means of which an altered area may be approached, entered, and exited; and which connects the altered area with an exterior approach (including sidewalks, streets, and parking areas), an entrance to the facility, and other parts of the facility. This concept of an accessible path of travel is analogous to the concepts of ''accessible route'' and ''circulation path'' contained in section 3.5 of the current UFAS. Some commenters suggested that this paragraph should address emergency egress. The Department disagrees. ''Path of travel'' as it is used in this section is a term of art under the ADA that relates only to the obligation of the public accommodation or commercial facility to provide additional accessible elements when an area containing a primary function is altered. The Department recognizes that emergency egress is an important issue, but believes that it is appropriately addressed in ADAAG (appendix A), not in this paragraph. Furthermore, ADAAG does not require changes to emergency egress areas in alterations.

Paragraph (e)(2) is drawn from section 3.5 of UFAS. It provides that an accessible path of travel may consist of walks and sidewalks, curb ramps and other interior or exterior pedestrian ramps; clear floor paths through lobbies, corridors, rooms, and other improved areas; parking access aisles; elevators and lifts; or a combination of such elements. Paragraph (e)(3) provides that, for the purposes of this part, the term ''path of travel'' also includes the restrooms, telephones, and drinking fountains serving an altered area.

Although the Act establishes an expectation that an accessible path of travel should generally be included when alterations are made to an area containing a primary function, Congress recognized that, in some circumstances, providing an accessible path of travel to an altered area may be sufficiently burdensome in comparison to the alteration being undertaken to the area containing a primary function as to render this requirement unreasonable. Therefore, Congress provided, in section 303(a)(2) of the Act, that alterations to the path of travel that are disproportionate in cost and scope to the overall alteration are not required.

The Act requires the Attorney General to determine at what point the cost of providing an accessible path of travel becomes disproportionate. The proposed rule provided three options for making this determination.

Two committees of Congress specifically addressed this issue: the House Committee on Education and Labor and the House Committee on the Judiciary. The reports issued by each committee suggested that accessibility alterations to a path of travel might be ''disproportionate'' if they exceed 30% of the alteration costs (Education and Labor report at 113; Judiciary report at 64). Because the Department believed that smaller percentage rates might be appropriate, the proposed rule sought comments on three options: 10%, 20%, or 30%.

The Department received a significant number of comments on this section. Commenters representing individuals with disabilities generally supported the use of 30% (or more); commenters representing covered entities supported a figure of 10% (or less). The Department believes that alterations made to provide an accessible path of travel to the altered area should be deemed disproportionate to the overall alteration when the cost exceeds 20% of the cost of the alteration to the primary function area. This approach appropriately reflects the intent of Congress to provide access for individuals with disabilities without causing economic hardship for the covered public accommodations and commercial facilities.

The Department has determined that the basis for this cost calculation shall be the cost of the alterations to the area containing the primary function. This approach will enable the public accommodation or other private entity that is making the alteration to calculate its obligation as a percentage of a clearly ascertainable base cost, rather than as a percentage of the ''total'' cost, an amount that will change as accessibility alterations to the path of travel are made.

Paragraph (f)(2) (paragraph (e)(2) in the proposed rule) is unchanged. It provides examples of costs that may be counted as expenditures required to provide an accessible path of travel. They include:

• Costs associated with providing an accessible entrance and an accessible route to the altered area, for example, the cost of widening doorways or installing ramps;

• Costs associated with making restrooms accessible, such as installing grab bars, enlarging toilet stalls, insulating pipes, or installing accessible faucet controls;

• Costs associated with providing accessible telephones, such as relocating telephones to an accessible height, installing amplification devices, or installing telecommunications devices for deaf persons (TDD's);

• Costs associated with relocating an inaccessible drinking fountain.

Paragraph (f)(1) of the proposed rule provided that when the cost of alterations necessary to make the path of travel serving an altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the maximum extent feasible. In response to the suggestion of a commenter, the Department has made an editorial change in the final rule (paragraph (g)(1)) to clarify that if the cost of providing a fully accessible path of travel is disproportionate, the path of travel shall be made accessible ''to the extent that it can be made accessible without incurring disproportionate costs.''

Paragraph (g)(2) (paragraph (f)(2) in the NPRM) establishes that priority should be given to those elements that will provide the greatest access, in the following order: An accessible entrance; an accessible route to the altered area; at least one accessible restroom for each sex or a single unisex restroom; accessible telephones; accessible drinking fountains; and, whenever possible, additional accessible elements such as parking, storage, and alarms. This paragraph is unchanged from the proposed rule.

Paragraph (h) (paragraph (g) in the proposed rule) provides that the obligation to provide an accessible path of travel may not be evaded by performing a series of small alterations to the area served by a single path of travel if those alterations could have been performed as a single undertaking. If an area containing a primary function has been altered without providing an accessible path of travel to serve that area, and subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to primary function areas on that path of travel during the preceding three year period shall be considered in determining whether the cost of making the path of travel serving that area accessible is disproportionate. Only alterations undertaken after January 26, 1992, shall be considered in determining if the cost of providing accessible features is disproportionate to the overall cost of the alterations.

Section 36.404 Alterations: Elevator Exemption

Section 36.404 implements the elevator exemption in section 303(b) of the Act as it applies to altered facilities. The provisions of section 303(b) are discussed in the preamble to §36.401(d) above. The statute applies the same exemption to both new construction and alterations. The principal difference between the requirements of §36.401(d) and §36.404 is that, in altering an existing facility that is not eligible for the statutory exemption, the public accommodation or other private entity responsible for the alteration is not required to install an elevator if the installation of an elevator would be disproportionate in cost and scope to the cost of the overall alteration as provided in §36.403(f)(1). In addition, the standards referenced in §36.406 (ADAAG) provide that installation of an elevator in an altered facility is not required if it is ''technically infeasible.''

This section has been revised to define the terms ''professional office of a health care provider'' and ''shopping center or shopping mall'' for the purposes of this section. The definition of ''professional office of a health care provider'' is identical to the definition included in §36.401(d).

It has been brought to the attention of the Department that there is some misunderstanding about the scope of the elevator exemption as it applies to the professional office of a health care provider. A public accommodation, such as the professional office of a health care provider, is required to remove architectural barriers to its facility to the extent that such barrier removal is readily achievable (see §36.304), but it is not otherwise required by this part to undertake new construction or alterations. This part does not require that an existing two story building that houses the professional office of a health care provider be altered for the purpose of providing elevator access. If, however, alterations to the area housing the office of the health care provider are undertaken for other purposes, the installation of an elevator might be required, but only if the cost of the elevator is not disproportionate to the cost of the overall alteration. Neither the Act nor this part prohibits a health care provider from locating his or her professional office in an existing facility that does not have an elevator.

Because of the unique challenges presented in altering existing facilities, the Department has adopted a definition of ''shopping center or shopping mall'' for the purposes of this section that is slightly different from the definition adopted under §36.401(d). For

the purposes of this section, a ''shopping center or shopping mall'' is (1) a building housing five or more sales or rental establishments, or (2) a series of buildings on a common site, connected by a common pedestrian access route above or below the ground floor, either under common ownership or common control or developed either as one project or as a series of related projects, housing five or more sales or rental establishments. As is the case with new construction, the term ''shopping center or shopping mall'' only includes floor levels housing at least one sales or rental establishment, or any floor level that was designed or intended for use by at least one sales or rental establishment.

The Department believes that it is appropriate to use a different definition of ''shopping center or shopping mall'' for this section than for §36.401, in order to make it clear that a series of existing buildings on a common site that is altered for the use of sales or rental establishments does not become a ''shopping center or shopping mall'' required to install an elevator, unless there is a common means of pedestrian access above or below the ground floor. Without this exemption, separate, but adjacent, buildings that were initially designed and constructed independently of each other could be required to be retrofitted with elevators, if they were later renovated for a purpose not contemplated at the time of construction.

Like §36.401(d), §36.404 provides that the exemptions in this paragraph do not obviate or limit in any way the obligation to comply with the other accessibility requirements established in this subpart. For example, alterations to floors above or below the ground floor must be accessible regardless of whether the altered facility has an elevator. If a facility that is not required to install an elevator nonetheless has an elevator, that elevator shall meet, to the maximum extent feasible, the accessibility requirements of this section.

Section 36.405 Alterations: Historic Preservation

Section 36.405 gives effect to the intent of Congress, expressed in section 504(c) of the Act, that this part recognize the national interest in preserving significant historic structures. Commenters criticized the Department's use of descriptive terms in the proposed rule that are different from those used in the ADA to describe eligible historic properties. In addition, some commenters criticized the Department's decision to use the concept of ''substantially impairing'' the historic features of a property, which is a concept employed in regulations implementing section 504 of the Rehabilitation Act of 1973. Those commenters recommended that the Department adopt the criteria of ''adverse effect'' published by the Advisory Council on Historic Preservation under the National Historic Preservation Act (36 CFR 800.9) as the standard for determining whether an historic property may be altered.

The Department agrees with these comments to the extent that they suggest that the language of the rule should conform to the language employed by Congress in the ADA. Therefore, the language of this section has been revised to make it clear that this provision applies to buildings or facilities that are eligible for listing in the National Register of Historic Places under the National Historic Preservation Act (16 U.S.C. 470 *et seq.*) and to buildings or facilities that are designated as historic under State or local law. The Department believes, however, that the criteria of adverse effect employed under the National Historic Preservation Act are inappropriate for this rule because section 504(c) of the ADA specifies that special alterations provisions shall apply only when an alteration would ''threaten or destroy the historic significance of qualified historic buildings and facilities.''

The Department intends that the exception created by this section be applied only in those very rare situations in which it is not possible to provide access to an historic property using the special access provisions in ADAAG. Therefore, paragraph (a) of §36.405 has been revised to provide that alterations to historic properties shall comply, to the maximum extent feasible, with section 4.1.7 of ADAAG. Paragraph (b) of this section has been revised to provide that if it has been determined, under the procedures established in ADAAG, that it is not feasible to provide physical access to an historic property that is a place of public accommodation in a manner that will not threaten or destroy the historic significance of the property, alternative methods of access shall be provided pursuant to the requirements of Subpart C.

Section 36.406 Standards for New Construction and Alterations

Section 36.406 implements the requirements of sections 306(b) and 306(c) of the Act, which require the Attorney General to promulgate standards for accessible design for buildings and facilities subject to the Act and this part that are consistent with the supplemental minimum guidelines and requirements for accessible design published by the Architectural and Transportation Barriers Compliance Board (ATBCB or Board) pursuant to section 504 of the Act. This section of the rule provides that new construction and alterations subject to this part shall comply with the standards for accessible design published as appendix A to this part.

Appendix A contains the Americans with Disabilities Act Accessibility Guidelines for

Buildings and Facilities (ADAAG) which is being published by the ATBCB as a final rule elsewhere in this issue of the FEDERAL REGISTER. As proposed in this Department's proposed rule, §36.406(a) adopts ADAAG as the accessibility standard applicable under this rule.

Paragraph (b) was not included in the proposed rule. It provides, in chart form, guidance for using ADAAG together with subparts A through D of this part when determining requirements for a particular facility. This chart is intended solely as guidance for the user; it has no effect for purposes of compliance or enforcement. It does not necessarily provide complete or mandatory information.

Proposed §36.406(b) is not included in the final rule. That provision, which would have taken effect only if the final rule had followed the proposed Option Two for §36.401(a), is unnecessary because the Department has chosen Option One, as explained in the preamble for that section.

Section 504(a) of the ADA requires the ATBCB to issue minimum guidelines to supplement the existing Minimum Guidelines and Requirements for Accessible Design (MGRAD) (36 CFR part 1190) for purposes of title III. According to section 504(b) of the Act, the guidelines are to establish additional requirements, consistent with the Act, ''to ensure that buildings and facilities are accessible, in terms of architecture and design, . . . and communication, to individuals with disabilities.'' Section 306(c) of the Act requires that the accessibility standards included in the Department's regulations be consistent with the minimum guidelines, in this case ADAAG.

As explained in the ATBCB's preamble to ADAAG, the substance and form of the guidelines are drawn from several sources. They use as their model the 1984 Uniform Federal Accessibility Standards (UFAS) (41 CFR part 101, subpart 101–19.6, appendix), which are the standards implementing the Architectural Barriers Act. UFAS is based on the Board's 1982 MGRAD. ADAAG follows the numbering system and format of the private sector American National Standard Institute's ANSI A117.1 standards. (American National Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People (ANSI A117–1980) and American National Standard for Buildings and Facilities—Providing Accessibility and Usability for Physically Handicapped People (ANSI A117.1–1986).) ADAAG supplements MGRAD. In developing ADAAG, the Board made every effort to be consistent with MGRAD and the current and proposed ANSI Standards, to the extent consistent with the ADA.

ADAAG consists of nine main sections and a separate appendix. Sections 1 through 3 contain general provisions and definitions. Section 4 contains scoping provisions and technical specifications applicable to all covered buildings and facilities. The scoping provisions are listed separately for new construction of sites and exterior facilities; new construction of buildings; additions; alterations; and alterations to historic properties. The technical specifications generally reprint the text and illustrations of the ANSI A117.1 standard, except where differences are noted by italics. Sections 5 through 9 of the guidelines are special application sections and contain additional requirements for restaurants and cafeterias, medical care facilities, business and mercantile facilities, libraries, and transient lodging. The appendix to the guidelines contains additional information to aid in understanding the technical specifications. The section numbers in the appendix correspond to the sections of the guidelines to which they relate. An asterisk after a section number indicates that additional information appears in the appendix.

ADAAG's provisions are further explained under Summary of ADAAG below.

GENERAL COMMENTS

One commenter urged the Department to move all or portions of subpart D, New Construction and Alterations, to the appendix (ADAAG) or to duplicate portions of subpart D in the appendix. The commenter correctly pointed out that subpart D is inherently linked to ADAAG, and that a self-contained set of rules would be helpful to users. The Department has attempted to simplify use of the two documents by deleting some paragraphs from subpart D (e.g., those relating to work areas), because they are included in ADAAG. However, the Department has retained in subpart D those sections that are taken directly from the statute or that give meaning to specific statutory concepts (e.g., structural impracticability, path of travel). While some of the subpart D provisions are duplicated in ADAAG, others are not. For example, issues relating to path of travel and disproportionality in alterations are not addressed in detail in ADAAG. (The structure and contents of the two documents are addressed below under Summary of ADAAG.) While the Department agrees that it would be useful to have one self-contained document, the different focuses of this rule and ADAAG do not permit this result at this time. However, the chart included in §36.406(b) should assist users in applying the provisions of subparts A through D, and ADAAG together.

Numerous business groups have urged the Department not to adopt the proposed ADAAG as the accessibility standards, because the requirements established are too high, reflect the ''state of the art,'' and are inflexible, rigid, and impractical. Many of these objections have been lodged on the

basis that ADAAG exceeds the statutory mandate to establish ''minimum'' guidelines. In the view of the Department, these commenters have misconstrued the meaning of the term ''minimum guidelines.'' The statute clearly contemplates that the guidelines establish a level of access—a minimum—that the standards must meet or exceed. The guidelines are not to be ''minimal'' in the sense that they would provide for a low level of access. To the contrary, Congress emphasized that the ADA requires a ''high degree of convenient access.'' Education and Labor report at 117–18. The legislative history explains that the guidelines may not ''reduce, weaken, narrow or set less accessibility standards than those included in existing MGRAD'' and should provide greater guidance in communication accessibility for individuals with hearing and vision impairments. Id. at 139. Nor did Congress contemplate a set of guidelines less detailed than ADAAG; the statute requires that the ADA guidelines supplement the existing MGRAD. When it established the statutory scheme, Congress was aware of the content and purpose of the 1982 MGRAD; as ADAAG does with respect to ADA, MGRAD establishes a minimum level of access that the Architectural Barriers Act standards (i.e., UFAS) must meet or exceed, and includes a high level of detail.

Many of the same commenters urged the Department to incorporate as its accessibility standards the ANSI standard's technical provisions and to adopt the proposed scoping provisions under development by the Council of American Building Officials' Board for the Coordination of Model Codes (BCMC). They contended that the ANSI standard is familiar to and accepted by professionals, and that both documents are developed through consensus. They suggested that ADAAG will not stay current, because it does not follow an established cyclical review process, and that it is not likely to be adopted by nonfederal jurisdictions in State and local codes. They urged the Department and the Board to coordinate the ADAAG provisions and any substantive changes to them with the ANSI A117 committee in order to maintain a consistent and uniform set of accessibility standards that can be efficiently and effectively implemented at the State and local level through the existing building regulatory processes.

The Department shares the commenters' goal of coordination between the private sector and Federal standards, to the extent that coordination can lead to substantive requirements consistent with the ADA. A single accessibility standard, or consistent accessibility standards, that can be used for ADA purposes and that can be incorporated or referenced by State and local governments, would help to ensure that the ADA requirements are routinely implemented at the design stage. The Department plans to work toward this goal.

The Department, however, must comply with the requirements of the ADA, the Federal Advisory Committee Act (5 U.S.C app. 1 *et seq.*) and the Administrative Procedure Act (5 U.S.C 551 *et seq.*). Neither the Department nor the Board can adopt private requirements wholesale. Furthermore, neither the 1991 ANSI A117 Standard revision nor the BCMC process is complete. Although the ANSI and BCMC provisions are not final, the Board has carefully considered both the draft BCMC scoping provisions and draft ANSI technical standards and included their language in ADAAG wherever consistent with the ADA.

Some commenters requested that, if the Department did not adopt ANSI by reference, the Department declare compliance with ANSI/BCMC to constitute equivalency with the ADA standards. The Department has not adopted this recommendation but has instead worked as a member of the ATBCB to ensure that its accessibility standards are practical and usable. In addition, as explained under subpart F, Certification of State Laws or Local Building Codes, the proper forum for further evaluation of this suggested approach would be in conjunction with the certification process.

Some commenters urged the Department to allow an additional comment period after the Board published its guidelines in final form, for purposes of affording the public a further opportunity to evaluate the appropriateness of including them as the Departments accessibility standards. Such an additional comment period is unnecessary and would unduly delay the issuance of final regulations. The Department put the public on notice, through the proposed rule, of its intention to adopt the proposed ADAAG, with any changes made by the Board, as the accessibility standards. As a member of the Board and of its ADA Task Force, the Department participated actively in the public hearings held on the proposed guidelines and in preparation of both the proposed and final versions of ADAAG. Many individuals and groups commented directly to the Department's docket, or at its public hearings, about ADAAG. The comments received on ADAAG, whether by the Board or by this Department, were thoroughly analyzed and considered by the Department in the context of whether the proposed ADAAG was consistent with the ADA and suitable for adoption as both guidelines and standards. The Department is convinced that ADAAG as adopted in its final form is appropriate for these purposes. The final guidelines, adopted here as standards, will ensure the high level of access contemplated by Congress, consistent with the ADA's balance between the interests of people with disabilities and the business community.

A few commenters, citing the Senate report (at 70) and the Education and Labor report (at 119), asked the Department to include in the regulations a provision stating that departures from particular technical and scoping requirements of the accessibility standards will be permitted so long as the alternative methods used will provide substantially equivalent or greater access to and utilization of the facility. Such a provision is found in ADAAG 2.2 and by virtue of that fact is included in these regulations.

Comments on specific provisions of proposed ADAAG

During the course of accepting comments on its proposed rule, the Department received numerous comments on ADAAG. Those areas that elicited the heaviest response included assistive listening systems, automated teller machines, work areas, parking, areas of refuge, telephones (scoping for TDD's and volume controls) and visual alarms. Strenuous objections were raised by some business commenters to the proposed provisions of the guidelines concerning check-out aisles, counters, and scoping for hotels and nursing facilities. All these comments were considered in the same manner as other comments on the Department's proposed rule and, in the Department's view, have been addressed adequately in the final ADAAG.

Largely in response to comments, the Board made numerous changes from its proposal, including the following:

• Generally, at least 50% of public entrances to new buildings must be accessible, rather than all entrances, as would often have resulted from the proposed approach.

• Not all check-out aisles are required to be accessible.

• The final guidelines provide greater flexibility in providing access to sales counters, and no longer require a portion of every counter to be accessible.

• Scoping for TDD's or text telephones was increased. One TDD or text telephone, for speech and hearing impaired persons, must be provided at locations with 4, rather than 6, pay phones, and in hospitals and shopping malls. Use of portable (less expensive) TDD's is allowed.

• Dispersal of wheelchair seating areas in theaters will be required only where there are more than 300 seats, rather than in all cases. Seats with removable armrests (i.e., seats into which persons with mobility impairments can transfer) will also be required.

• Areas of refuge (areas with direct access to a stairway, and where people who cannot use stairs may await assistance during an emergency evacuation) will be required, as proposed, but the final provisions are based on the Uniform Building Code. Such areas are not required in alterations.

• Rather than requiring 5% of new hotel rooms to be accessible to people with mobility impairments, between 2 and 4% accessibility (depending on total number of rooms) is required. In addition, 1% of the rooms must have roll-in showers.

• The proposed rule reserved the provisions on alterations to homeless shelters. The final guidelines apply alterations requirements to homeless shelters, but the requirements are less stringent than those applied to other types of facilities.

• Parking spaces that can be used by people in vans (with lifts) will be required.

• As mandated by the ADA, the Board has established a procedure to be followed with respect to alterations to historic facilities.

SUMMARY OF ADAAG

This section of the preamble summarizes the structure of ADAAG, and highlights the more important portions.

• *Sections 1 Through 3*

Sections 1 through 3 contain general requirements, including definitions.

• *Section 4.1.1, Application*

Section 4 contains scoping requirements. Section 4.1.1, Application, provides that all areas of newly designed or newly constructed buildings and facilities and altered portions of existing buildings and facilities required to be accessible by §4.1.6 must comply with the guidelines unless otherwise provided in §4.1.1 or a special application section. It addresses areas used only by employees as work areas, temporary structures, and general exceptions.

Section 4.1.1(3) preserves the basic principle of the proposed rule: Areas that may be used by employees with disabilities shall be designed and constructed so that an individual with a disability can approach, enter, and exit the area. The language has been clarified to provide that it applies to any area used only as a work area (not just to areas ''that may be used by employees with disabilities''), and that the guidelines do not require that any area used as an individual work station be designed with maneuvering space or equipped to be accessible. The appendix to ADAAG explains that work areas must meet the guidelines' requirements for doors and accessible routes, and recommends, but does not require, that 5% of individual work stations be designed to permit a person using a wheelchair to maneuver within the space.

Further discussion of work areas is found in the preamble concerning proposed §36.401(b).

Section 4.1.1(5)(a) includes an exception for structural impracticability that corresponds to the one found in §36.401(c) and discussed in that portion of the preamble.

• *Section 4.1.2, Accessible Sites and Exterior Facilities: New Construction*

This section addresses exterior features, elements, or spaces such as parking, portable toilets, and exterior signage, in new construction. Interior elements and spaces are covered by §4.1.3.

The final rule retains the UFAS scoping for parking but also requires that at least one of every eight accessible parking spaces be designed with adequate adjacent space to deploy a lift used with a van. These spaces must have a sign indicating that they are van-accessible, but they are not to be reserved exclusively for van users.

• *Section 4.1.3, Accessible Buildings: New Construction*

This section establishes scoping requirements for new construction of buildings and facilities.

Sections 4.1.3 (1) through (4) cover accessible routes, protruding objects, ground and floor surfaces, and stairs.

Section 4.1.3(5) generally requires elevators to serve each level in a newly constructed building, with four exceptions included in the subsection. Exception 1 is the ''elevator exception'' established in §36.401(d), which must be read with this section. Exception 4 allows the use of platform lifts under certain conditions.

Section 4.1.3(6), Windows, is reserved. Section 4.1.3(7) applies to doors.

Under §4.1.3(8), at least 50% of all public entrances must be accessible. In addition, if a building is designed to provide access to enclosed parking, pedestrian tunnels, or elevated walkways, at least one entrance that serves each such function must be accessible. Each tenancy in a building must be served by an accessible entrance. Where local regulations (e.g., fire codes) require that a minimum number of exits be provided, an equivalent number of accessible entrances must be provided. (The latter provision does not require a greater number of entrances than otherwise planned.)

ADAAG Section 4.1.3(9), with accompanying technical requirements in Section 4.3, requires an area of rescue assistance (*i.e.*, an area with direct access to an exit stairway and where people who are unable to use stairs may await assistance during an emergency evacuation) to be established on each floor of a multi-story building. This was one of the most controversial provisions in the guidelines. The final ADAAG is based on current Uniform Building Code requirements and retains the requirement that areas of refuge (renamed ''areas of rescue assistance'') be provided, but specifies that this requirement does not apply to buildings that have a supervised automatic sprinkler system. Areas of refuge are not required in alterations.

The next seven subsections deal with drinking fountains (§4.1.3(10)); toilet facilities (§4.1.3(11)); storage, shelving, and display units (§4.1.3(12)), controls and operating mechanisms (§4.1.3(13)), emergency warning systems (§4.1.3(14)), detectable warnings (§4.1.3(15)), and building signage (§4.1.3(16)). Paragraph 11 requires that toilet facilities comply with §4.22, which requires one accessible toilet stall (60<″×60<″) in each newly constructed restroom. In response to public comments, the final rule requires that a second accessible stall (36<″×60<″) be provided in restrooms that have six or more stalls.

ADAAG Section 4.1.3(17) establishes requirements for accessibility of pay phones to persons with mobility impairments, hearing impairments (requiring some phones with volume controls), and those who cannot use voice telephones. It requires one interior ''text telephone'' to be provided at any facility that has a total of four or more public pay phones. (The term ''text telephone'' has been adopted to reflect current terminology and changes in technology.) In addition, text telephones will be required in specific locations, such as covered shopping malls, hospitals (in emergency rooms, waiting rooms, and recovery areas), and convention centers.

Paragraph 18 of Section 4.1.3 generally requires that at least five percent of fixed or built-in seating or tables be accessible.

Paragraph 19, covering assembly areas, specifies the number of wheelchair seating spaces and types and numbers of assistive listening systems required. It requires dispersal of wheelchair seating locations in facilities where there are more than 300 seats. The guidelines also require that at least one percent of all fixed seats be aisle seats without armrests (or with moveable armrests) on the aisle side to increase accessibility for persons with mobility impairments who prefer to transfer from their wheelchairs to fixed seating. In addition, the final ADAAG requires that fixed seating for a companion be located adjacent to each wheelchair location.

Paragraph 20 requires that where automated teller machines are provided, at least one must comply with section 4.34, which, among other things, requires accessible controls, and instructions and other information that are accessible to persons with sight impairments.

Under paragraph 21, where dressing rooms are provided, five percent or at least one must comply with section 4.35.

• *Section 4.1.5, Additions*

Each addition to an existing building or facility is regarded as an alteration subject to §§36.402 through 36.406 of subpart D, including the date established in §36.402(a). But additions also have attributes of new construction, and to the extent that a space or element in the addition is newly constructed,

each new space or element must comply with the applicable scoping provisions of sections 4.1.1 to 4.1.3 for new construction, the applicable technical specifications of sections 4.2 through 4.34, and any applicable special provisions in sections 5 through 10. For instance, if a restroom is provided in the addition, it must comply with the requirements for new construction. Construction of an addition does not, however, create an obligation to retrofit the entire existing building or facility to meet requirements for new construction. Rather, the addition is to be regarded as an alteration and to the extent that it affects or could affect the usability of or access to an area containing a primary function, the requirements in section 4.1.6(2) are triggered with respect to providing an accessible path of travel to the altered area and making the restrooms, telephones, and drinking fountains serving the altered area accessible. For example, if a museum adds a new wing that does not have a separate entrance as part of the addition, an accessible path of travel would have to be provided through the existing building or facility unless it is disproportionate to the overall cost and scope of the addition as established in §36.403(f).

• *Section 4.1.6, Alterations*

An alteration is a change to a building or facility that affects or could affect the usability of or access to the building or facility or any part thereof. There are three general principles for alterations. First, if any existing element or space is altered, the altered element or space must meet new construction requirements (section 4.1.6(1)(b)). Second, if alterations to the elements in a space when considered together amount to an alteration of the space, the entire space must meet new construction requirements (section 4.1.6(1)(c)). Third, if the alteration affects or could affect the usability of or access to an area containing a primary function, the path of travel to the altered area and the restrooms, drinking fountains, and telephones serving the altered area must be made accessible unless it is disproportionate to the overall alterations in terms of cost and scope as determined under criteria established by the Attorney General (§4.1.6(2)).

Section 4.1.6 should be read with §§36.402 through 36.405. Requirements concerning alterations to an area serving a primary function are addressed with greater detail in the latter sections than in section 4.1.6(2). Section 4.1.6(1)(j) deals with technical infeasibility. Section 4.1.6(3) contains special technical provisions for alterations to existing buildings and facilities.

• *Section 4.1.7, Historic Preservation*

This section contains scoping provisions and alternative requirements for alterations to qualified historic buildings and facilities. It clarifies the procedures under the National Historic Preservation Act and their application to alterations covered by the ADA. An individual seeking to alter a facility that is subject to the ADA guidelines and to State or local historic preservation statutes shall consult with the State Historic Preservation Officer to determine if the planned alteration would threaten or destroy the historic significance of the facility.

• *Sections 4.2 Through 4.35*

Sections 4.2 through 4.35 contain the technical specifications for elements and spaces required to be accessible by the scoping provisions (sections 4.1 through 4.1.7) and special application sections (sections 5 through 10). The technical specifications are the same as the 1980 version of ANSI A117.1 standard, except as noted in the text by italics.

• *Sections 5 Through 9*

These are special application sections and contain additional requirements for restaurants and cafeterias, medical care facilities, business and mercantile facilities, libraries, and transient lodging. For example, at least 5 percent, but not less than one, of the fixed tables in a restaurant must be accessible.

In section 7, Business and Mercantile, paragraph 7.2 (Sales and Service Counters, Teller Windows, Information Counters) has been revised to provide greater flexibility in new construction than did the proposed rule. At least one of each type of sales or service counter where a cash register is located shall be made accessible. Accessible counters shall be dispersed throughout the facility. At counters such as bank teller windows or ticketing counters, alternative methods of compliance are permitted. A public accommodation may lower a portion of the counter, provide an auxiliary counter, or provide equivalent facilitation through such means as installing a folding shelf on the front of the counter at an accessible height to provide a work surface for a person using a wheelchair.

Section 7.3., Check-out Aisles, provides that, in new construction, a certain number of each design of check-out aisle, as listed in a chart based on the total number of check-out aisles of each design, shall be accessible. The percentage of check-outs required to be accessible generally ranges from 20% to 40%. In a newly constructed or altered facility with less than 5,000 square feet of selling space, at least one of each type of check-out aisle must be accessible. In altered facilities with 5,000 or more square feet of selling space, at least one of each design of check-out aisle must be made accessible when altered, until the number of accessible aisles

of each design equals the number that would be required for new construction.

• *Section 9, Accessible Transient Lodging*

Section 9 addresses two types of transient lodging: hotels, motels, inns, boarding houses, dormitories, resorts, and other similar places (sections 9.1 through 9.4); and homeless shelters, halfway houses, transient group homes, and other social service establishments (section 9.5). The interplay of the ADA and Fair Housing Act with respect to such facilities is addressed in the preamble discussion of the definition of ''place of public accommodation'' in §36.104.

The final rule establishes scoping requirements for accessibility of newly constructed hotels. Four percent of the first hundred rooms, and roughly two percent of rooms in excess of 100, must meet certain requirements for accessibility to persons with mobility or hearing impairments, and an additional identical percentage must be accessible to persons with hearing impairments. An additional 1% of the available rooms must be equipped with roll-in showers, raising the actual scoping for rooms accessible to persons with mobility impairments to 5% of the first hundred rooms and 3% thereafter. The final ADAAG also provides that when a hotel is being altered, one fully accessible room and one room equipped with visual alarms, notification devices, and amplified telephones shall be provided for each 25 rooms being altered until the number of accessible rooms equals that required under the new construction standard. Accessible rooms must be dispersed in a manner that will provide persons with disabilities with a choice of single or multiple-bed accommodations.

In new construction, homeless shelters and other social service entities must comply with ADAAG; at least one type of amenity in each common area must be accessible. In a facility that is not required to have an elevator, it is not necessary to provide accessible amenities on the inaccessible floors if at least one of each type of amenity is provided in accessible common areas. The percentage of accessible sleeping accommodations required is the same as that required for other places of transient lodging. Requirements for facilities altered for use as a homeless shelter parallel the current MGRAD accessibility requirements for leased buildings. A shelter located in an altered facility must have at least one accessible entrance, accessible sleeping accommodations in a number equivalent to that established for new construction, at least one accessible toilet and bath, at least one accessible common area, and an accessible route connecting all accessible areas. All accessible areas in a homeless shelter in an altered facility may be located on one level.

Section 10, Transportation Facilities

Section 10 of ADAAG is reserved. On March 20, 1991, the ATBCB published a supplemental notice of proposed rulemaking (56 FR 11874) to establish special access requirements for transportation facilities. The Department anticipates that when the ATBCB issues final guidelines for transportation facilities, this part will be amended to include those provisions.

Subpart E—Enforcement

Because the Department of Justice does not have authority to establish procedures for judicial review and enforcement, subpart E generally restates the statutory procedures for enforcement.

Section 36.501 describes the procedures for private suits by individuals and the judicial remedies available. In addition to the language in section 308(a)(1) of the Act, §36.501(a) of this part includes the language from section 204(a) of the Civil Rights Act of 1964 (42 U.S.C. 2000a–3(a)) which is incorporated by reference in the ADA. A commenter noted that the proposed rule did not include the provision in section 204(a) allowing the court to appoint an attorney for the complainant and authorize the commencement of the civil action without the payment of fees, costs, or security. That provision has been included in the final rule.

Section 308(a)(1) of the ADA permits a private suit by an individual who has reasonable grounds for believing that he or she is ''about to be'' subjected to discrimination in violation of section 303 of the Act (subpart D of this part), which requires that new construction and alterations be readily accessible to and usable by individuals with disabilities. Authorizing suits to prevent construction of facilities with architectural barriers will avoid the necessity of costly retrofitting that might be required if suits were not permitted until after the facilities were completed. To avoid unnecessary suits, this section requires that the individual bringing the suit have 'reasonable grounds' for believing that a violation is about to occur, but does not require the individual to engage in a futile gesture if he or she has notice that a person or organization covered by title III of the Act does not intend to comply with its provisions.

Section 36.501(b) restates the provisions of section 308(a)(2) of the Act, which states that injunctive relief for the failure to remove architectural barriers in existing facilities or the failure to make new construction and alterations accessible ''shall include'' an order to alter these facilities to make them readily accessible to and usable by persons with disabilities to the extent required by title III. The Report of the Energy and Commerce Committee notes that ''an order to make a facility readily accessible to and usable by

individuals with disabilities is mandatory'' under this standard. H.R. Rep. No. 485, 101st Cong., 2d Sess, pt 4, at 64 (1990). Also, injunctive relief shall include, where appropriate, requiring the provision of an auxiliary aid or service, modification of a policy, or provision of alternative methods, to the extent required by title III of the Act and this part.

Section 36.502 is based on section 308(b)(1)(A)(i) of the Act, which provides that the Attorney General shall investigate alleged violations of title III and undertake periodic reviews of compliance of covered entities. Although the Act does not establish a comprehensive administrative enforcement mechanism for investigation and resolution of all complaints received, the legislative history notes that investigation of alleged violations and periodic compliance reviews are essential to effective enforcement of title III, and that the Attorney General is expected to engage in active enforcement and to allocate sufficient resources to carry out this responsibility. Judiciary Report at 67.

Many commenters argued for inclusion of more specific provisions for administrative resolution of disputes arising under the Act and this part in order to promote voluntary compliance and avoid the need for litigation. Administrative resolution is far more efficient and economical than litigation, particularly in the early stages of implementation of complex legislation when the specific requirements of the statute are not widely understood. The Department has added a new paragraph (c) to this section authorizing the Attorney General to initiate a compliance review where he or she has reason to believe there may be a violation of this rule.

Section 36.503 describes the procedures for suits by the Attorney General set out in section 308(b)(1)(B) of the Act. If the Department has reasonable cause to believe that any person or group of persons is engaged in a pattern or practice of resistance to the full enjoyment of any of the rights granted by title III or that any person or group of persons has been denied any of the rights granted by title III and such denial raises an issue of general public importance, the Attorney General may commence a civil action in any appropriate United States district court. The proposed rule provided for suit by the Attorney General ''or his or her designee.'' The reference to a ''designee'' has been omitted in the final rule because it is unnecessary. The Attorney General has delegated enforcement authority under the ADA to the Assistant Attorney General for Civil Rights. 55 FR 40653 (October 4, 1990) (to be codified at 28 CFR 0.50(1).)

Section 36.504 describes the relief that may be granted in a suit by the Attorney General under section 308(b)(2) of the Act. In such an action, the court may grant any equitable relief it considers to be appropriate, including granting temporary, preliminary, or permanent relief, providing an auxiliary aid or service, modification of policy or alternative method, or making facilities readily accessible to and usable by individuals with disabilities, to the extent required by title III. In addition, a court may award such other relief as the court considers to be appropriate, including monetary damages to persons aggrieved, when requested by the Attorney General.

Furthermore, the court may vindicate the public interest by assessing a civil penalty against the covered entity in an amount not exceeding $50,000 for a first violation and not exceeding $100,000 for any subsequent violation. Section 36.504(b) of the rule adopts the standard of section 308(b)(3) of the Act. This section makes it clear that, in counting the number of previous determinations of violations for determining whether a ''first'' or ''subsequent'' violation has occurred, determinations in the same action that the entity has engaged in more than one discriminatory act are to be counted as a single violation. A ''second violation'' would not accrue to that entity until the Attorney General brought another suit against the entity and the entity was again held in violation. Again, all of the violations found in the second suit would be cumulatively considered as a ''subsequent violation.''

Section 36.504(c) clarifies that the terms ''monetary damages'' and ''other relief'' do not include punitive damages. They do include, however, all forms of compensatory damages, including out-of-pocket expenses and damages for pain and suffering.

Section 36.504(a)(3) is based on section 308(b)(2)(C) of the Act, which provides that, ''to vindicate the public interest,'' a court may assess a civil penalty against the entity that has been found to be in violation of the Act in suits brought by the Attorney General. In addition, §36.504(d), which is taken from section 308(b)(5) of the Act, further provides that, in considering what amount of civil penalty, if any, is appropriate, the court shall give consideration to ''any good faith effort or attempt to comply with this part.'' In evaluating such good faith, the court shall consider ''among other factors it deems relevant, whether the entity could have reasonably anticipated the need for an appropriate type of auxiliary aid needed to accommodate the unique needs of a particular individual with a disability.''

The ''good faith'' standard referred to in this section is not intended to imply a willful or intentional standard—that is, an entity cannot demonstrate good faith simply by showing that it did not willfully, intentionally, or recklessly disregard the law. At the same time, the absence of such a course of conduct would be a factor a court should weigh in determining the existence of good faith.

Section 36.505 states that courts are authorized to award attorneys fees, including litigation expenses and costs, as provided in section 505 of the Act. Litigation expenses include items such as expert witness fees, travel expenses, etc. The Judiciary Committee Report specifies that such items are included under the rubric of ''attorneys fees'' and not ''costs'' so that such expenses will be assessed against a plaintiff only under the standard set forth in *Christiansburg Garment Co.* v. *Equal Employment Opportunity Commission*, 434 U.S. 412 (1978). (Judiciary report at 73.)

Section 36.506 restates section 513 of the Act, which encourages use of alternative means of dispute resolution. Section 36.507 explains that, as provided in section 506(e) of the Act, a public accommodation or other private entity is not excused from compliance with the requirements of this part because of any failure to receive technical assistance.

Section 36.305 Effective Date

In general, title III is effective 18 months after enactment of the Americans with Disabilities Act, i.e., January 26, 1992. However, there are several exceptions to this general rule contained throughout title III. Section 36.508 sets forth all of these exceptions in one place.

Paragraph (b) contains the rule on civil actions. It states that, except with respect to new construction and alterations, no civil action shall be brought for a violation of this part that occurs before July 26, 1992, against businesses with 25 or fewer employees and gross receipts of $1,000,000 or less; and before January 26, 1993, against businesses with 10 or fewer employees and gross receipts of $500,000 or less. In determining what constitutes gross receipts, it is appropriate to exclude amounts collected for sales taxes.

Paragraph (c) concerns transportation services provided by public accommodations not primarily engaged in the business of transporting people. The 18-month effective date applies to all of the transportation provisions except those requiring newly purchased or leased vehicles to be accessible. Vehicles subject to that requirement must be accessible to and usable by individuals with disabilities if the solicitation for the vehicle is made on or after August 26, 1990.

Subpart F—Certification of State Labs or Local Building Codes

Subpart F establishes procedures to implement section 308(b)(1)(A)(ii) of the Act, which provides that, on the application of a State or local government, the Attorney General may certify that a State law or local building code or similar ordinance meets or exceeds the minimum accessibility requirements of the Act. In enforcement proceedings, this certification will constitute rebuttable evidence that the law or code meets or exceeds the ADA's requirements.

Three significant changes, further explained below, were made from the proposed subpart, in response to comments. First, the State or local jurisdiction is required to hold a public hearing on its proposed request for certification and to submit to the Department, as part of the information and materials in support of a request for certification, a transcript of the hearing. Second, the time allowed for interested persons and organizations to comment on the request filed with the Department (§36.605(a)(1)) has been changed from 30 to 60 days. Finally, a new §36.608, Guidance concerning model codes, has been added.

Section 36.601 establishes the definitions to be used for purposes of this subpart. Two of the definitions have been modified, and a definition of ''model code'' has been added. First, in response to a comment, a reference to a code ''or part thereof'' has been added to the definition of ''code.'' The purpose of this addition is to clarify that an entire code need not be submitted if only part of it is relevant to accessibility, or if the jurisdiction seeks certification of only some of the portions that concern accessibility. The Department does not intend to encourage ''piecemeal'' requests for certification by a single jurisdiction. In fact, the Department expects that in some cases, rather than certifying portions of a particular code and refusing to certify others, it may notify a submitting jurisdiction of deficiencies and encourage a reapplication that cures those deficiencies, so that the entire code can be certified eventually. Second, the definition of ''submitting official'' has been modified. The proposed rule defined the submitting official to be the State or local official who has principal responsibility for administration of a code. Commenters pointed out that in some cases more than one code within the same jurisdiction is relevant for purposes of certification. It was also suggested that the Department allow a State to submit a single application on behalf of the State, as well as on behalf of any local jurisdictions required to follow the State accessibility requirements. Consistent with these comments, the Department has added to the definition language clarifying that the official can be one authorized to submit a code on behalf of a jurisdiction.

A definition of ''model code'' has been added in light of new §36.608.

Most commenters generally approved of the proposed certification process. Some approved of what they saw as the Department's attempt to bring State and local codes into alignment with the ADA. A State agency said that this section will be the backbone of the intergovernmental cooperation essential

if the accessibility provisions of the ADA are to be effective.

Some comments disapproved of the proposed process as timeconsuming and laborious for the Department, although some of these comments pointed out that, if the Attorney General certified model codes on which State and local codes are based, many perceived problems would be alleviated. (This point is further addressed by new §36.608.)

Many of the comments received from business organizations, as well as those from some individuals and disability rights groups, addressed the relationship of the ADA requirements and their enforcement, to existing State and local codes and code enforcement systems. These commenters urged the Department to use existing code-making bodies for interpretations of the ADA, and to actively participate in the integration of the ADA into the text of the national model codes that are adopted by State and local enforcement agencies. These issues are discussed in preamble section 36.406 under General comments.

Many commenters urged the Department to evaluate or certify the entire code enforcement system (including any process for hearing appeals from builders of denials by the building code official of requests for variances, waivers, or modifications). Some urged that certification not be allowed in jurisdictions where waivers can be granted, unless there is a clearly identified decision-making process, with written rulings and notice to affected parties of any waiver or modification request. One commenter urged establishment of a dispute resolution mechanism, providing for interpretation (usually through a building official) and an administrative appeals mechanism (generally called Boards of Appeal, Boards of Construction Appeals, or Boards of Review), before certification could be granted.

The Department thoroughly considered these proposals but has declined to provide for certification of processes of enforcement or administration of State and local codes. The statute clearly authorizes the Department to certify the codes themselves for equivalency with the statute; it would be ill-advised for the Department at this point to inquire beyond the face of the code and written interpretations of it. It would be inappropriate to require those jurisdictions that grant waivers or modifications to establish certain procedures before they can apply for certification, or to insist that no deviations can be permitted. In fact, the Department expects that many jurisdictions will allow slight variations from a particular code, consistent with ADAAG itself. ADAAG includes in §2.2 a statement allowing departures from particular requirements where substantially equivalent or greater access and usability is provided. Several sections specifically allow for alternative methods providing equivalent facilitation and, in some cases, provide examples. (See, e.g., section 4.31.9, Text Telephones; section 7.2(2) (iii), Sales and Service Counters.) Section 4.1.6 includes less stringent requirements that are permitted in alterations, in certain circumstances.

However, in an attempt to ensure that it does not certify a code that in practice has been or will be applied in a manner that defeats its equivalency with the ADA, the Department will require that the submitting official include, with the application for certification, any relevant manuals, guides, or any other interpretive information issued that pertain to the code. (§36.603(c)(1).) The requirement that this information be provided is in addition to the NPRM's requirement that the official provide any pertinent formal opinions of the State Attorney General or the chief legal officer of the jurisdiction.

The first step in the certification process is a request for certification, filed by a ''submitting official'' (§36.603). The Department will not accept requests for certification until after January 26, 1992, the effective date of this part. The Department received numerous comments from individuals and organizations representing a variety of interests, urging that the hearing required to be held by the Assistant Attorney General in Washington, DC, after a preliminary determination of equivalency (§36.605(a)(2)), be held within the State or locality requesting certification, in order to facilitate greater participation by all interested parties. While the Department has not modified the requirement that it hold a hearing in Washington, it has added a new subparagraph 36.603(b)(3) requiring a hearing within the State or locality before a request for certification is filed. The hearing must be held after adequate notice to the public and must be on the record; a transcript must be provided with the request for certification. This procedure will insure input from the public at the State or local level and will also insure a Washington, DC, hearing as mentioned in the legislative history.

The request for certification, along with supporting documents (§36.603(c)), must be filed in duplicate with the office of the Assistant Attorney General for Civil Rights. The Assistant Attorney General may request further information. The request and supporting materials will be available for public examination at the office of the Assistant Attorney General and at the office of the State or local agency charged with administration and enforcement of the code. The submitting official must publish public notice of the request for certification.

Next, under §36.604, the Assistant Attorney General's office will consult with the ATBCB and make a preliminary determination to either (1) find that the code is equivalent

(make a ''preliminary determination of equivalency'') or (2) deny certification. The next step depends on which of these preliminary determinations is made.

If the preliminary determination is to find equivalency, the Assistant Attorney General, under §36.605, will inform the submitting official in writing of the preliminary determination and publish a notice in the FEDERAL REGISTER informing the public of the preliminary determination and inviting comment for 60 days. (This time period has been increased from 30 days in light of public comment pointing out the need for more time within which to evaluate the code.) After considering the information received in response to the comments, the Department will hold a hearing in Washington. This hearing will not be subject to the formal requirements of the Administrative Procedure Act. In fact, this requirement could be satisfied by a meeting with interested parties. After the hearing, the Assistant Attorney General's office will consult again with the ATBCB and make a final determination of equivalency or a final determination to deny the request for certification, with a notice of the determination published in the FEDERAL REGISTER.

1If the preliminary determination is to deny certification, there will be no hearing (§36.606). The Department will notify the submitting official of the preliminary determination, and may specify how the code could be modified in order to receive a preliminary determination of equivalency. The Department will allow at least 15 days for the submitting official to submit relevant material in opposition to the preliminary denial. If none is received, no further action will be taken. If more information is received, the Department will consider it and make either a final decision to deny certification or a preliminary determination of equivalency. If at that stage the Assistant Attorney General makes a preliminary determination of equivalency, the hearing procedures set out in §36.605 will be followed.

Section 36.607 addresses the effect of certification. First, certification will only be effective concerning those features or elements that are both (1) covered by the certified code and (2) addressed by the regulations against which they are being certified. For example, if children's facilities are not addressed by the Department's standards, and the building in question is a private elementary school, certification will not be effective for those features of the building to be used by children. And if the Department's regulations addressed equipment but the local code did not, a building's equipment would not be covered by the certification.

In addition, certification will be effective only for the particular edition of the code that is certified. Amendments will not automatically be considered certified, and a submitting official will need to reapply for certification of the changed or additional provisions.

Certification will not be effective in those situations where a State or local building code official allows a facility to be constructed or altered in a manner that does not follow the technical or scoping provisions of the certified code. Thus, if an official either waives an accessible element or feature or allows a change that does not provide equivalent facilitation, the fact that the Department has certified the code itself will not stand as evidence that the facility has been constructed or altered in accordance with the minimum accessibility requirements of the ADA. The Department's certification of a code is effective only with respect to the standards in the code; it is not to be interpreted to apply to a State or local government's application of the code. The fact that the Department has certified a code with provisions concerning waivers, variances, or equivalent facilitation shall not be interpreted as an endorsement of actions taken pursuant to those provisions.

The final rule includes a new §36.608 concerning model codes. It was drafted in response to concerns raised by numerous commenters, many of which have been discussed under General comments (§36.406). It is intended to assist in alleviating the difficulties posed by attempting to certify possibly tens of thousands of codes. It is included in recognition of the fact that many codes are based on, or incorporate, model or consensus standards developed by nationally recognized organizations (e.g., the American National Standards Institute (ANSI); Building Officials and Code Administrators (BOCA) International; Council of American Building Officials (CABO) and its Board for the Coordination of Model Codes (BCMC); Southern Building Code Congress International (SBCCI)). While the Department will not certify or ''precertify'' model codes, as urged by some commenters, it does wish to encourage the continued viability of the consensus and model code process consistent with the purposes of the ADA.

The new section therefore allows an authorized representative of a private entity responsible for developing a model code to apply to the Assistant Attorney General for review of the code. The review process will be informal and will not be subject to the procedures of §§36.602 through 36.607. The result of the review will take the form of guidance from the Assistant Attorney General as to whether and in what respects the model code is consistent with the ADA's requirements. The guidance will not be binding on any entity or on the Department; it will assist in evaluations of individual State or local codes and may serve as a basis for establishing priorities for consideration of individual codes. The Department anticipates

that this approach will foster further cooperation among various government levels, the private entities developing standards, and individuals with disabilities.

THE Chazen COMPANIES®
Proud to be Employee Owned

MEMORANDUM

To: Supervisor John Strough

From: Tom Johnson

cc: Chris Round

Date: October 11, 2018

Re: Burnt Ridge Development Traffic Study

Job #: 91800.34

The Chazen Companies has completed the data collection for the Burnt Ridge Development Traffic Calming Study. Presented below are the summaries of the data collected.

A. License Plate Survey

A license plate survey was conducted on Tuesday, September 11, 2018 to identify how many vehicles were driving through the development (i.e., vehicles that did not start or end their trip from within the development.) License plates were recorded entering and exiting the development at the three access points during the typical morning and afternoon commuter periods of 7-9 a.m. and 4-6 p.m.

Table 1 shows the amount of traffic in the development in the peak one-hour periods of 7:30-8:30 a.m. and 4:30-5:30 p.m. In the morning peak, a total of 162 vehicles traveled in the development with 86 driving through (43 enter, then exit) and 76 starting/ending from within the development. In the afternoon peak, a total of 260 vehicles traveled in the development with 160 driving through (80 enter, then exit) and 100 starting/ending from within the development. The drive-thru traffic is 53% - 62% of the total development traffic volumes.

Table 1 – Traffic Volumes (vehicles per hour – vph)

	AM Peak Hour			PM Peak Hour		
	Total	**Drive-Thru**	**Within Dev.**	**Total**	**Drive-Thru**	**Within Dev.**
Entering	74	43	31	138	80	58
Exiting	88	43	45	122	80	42
Total	162	86	76	260	160	100

B. Trip Generation Comparison

A comparison was made between the actual volume of traffic occurring from within the development to the volume that would be calculated using industry standards. Traffic expected to be generated by a development is calculated using information contained in the Institute of Transportation Engineers' (ITE) publication, *Trip Generation, 10th Edition*. At the time of the data collection, the development consisted

of 60 homes, 3 of which were under construction. Table 2 shows the expected volumes, based on 57 occupied homes, and the actual volumes. The table shows that the development is generating traffic at higher volumes (69% higher) than would be projected using industry standards.

Table 2 – Trip Generation Comparison

	AM Peak Hour Volumes		PM Peak Hour Volumes	
	ITE Data	Actual Data	ITE Data	Actual Data
Entering	11	31	37	58
Exiting	34	45	22	42
Total	45	76	59	100

C. Speed Data

Vehicle speeds on Burnt Hills Drive and Wooden Lane were recorded on Monday, September 24 through Wednesday, September 26, 2018 covering a period of 48-hours. The average speed and 85th-percentile speeds are shown in Table 3. The 85th-percentile speed is the speed at which 85% of motorists are traveling at or below. The 85th-percentile speed is typically used in roadway design and in speed limit studies. As the table shows, the speeds approximate the Area Speed Limit of 30 mph.

Table 3 – Speed Data (mph)

	Burnt Hills Drive		Wooden Lane	
	Average	85th %-tile	Average	85th %-tile
Eastbound	28	32	25	29
Westbound	28	32	28	33

D. Crash History

The latest 3-year crash history was requested and received from NYSDOT's Accident Location Information System (ALIS). The data period was from June 1, 2015 through May 31, 2018. During this period one crash was reported and it occurred at the intersection of Upper Sherman Road and Burnt Hills Drive. The crash type was right-angle with no injuries reported.

The next step in the study would be to present traffic calming options that could be implemented to potentially reduce the volume of traffic driving through the development.

U.S. Department of Transportation
Federal Highway Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
202-366-4000

Safety

Traffic Calming ePrimer

The Traffic Calming ePrimer is a free, online resource openly available for public use. The ePrimer presents a thorough review of current traffic calming practice and contains the information needed to understand this complex field. The ePrimer is presented in eight distinct modules developed to allow the reader to move between each to find the desired information, without a cover-to-cover reading. The ePrimer presents:

- a definition of traffic calming, its purpose, and its relationship to other transportation initiatives (like complete streets and context sensitive solutions);
- illustrations and photographs of 22 different types of traffic calming measures;
- considerations for their appropriate application, including effects and design and installation specifics;
- research on the effects of traffic calming measures on mobility and safety for passenger vehicles; emergency response, public transit, and waste collection vehicles; and pedestrians and bicyclists;
- examples and case studies of both comprehensive traffic calming programs and neighborhood-specific traffic calming plans;
- case studies that cover effective processes used to plan and define a local traffic calming program or project and assessments of the effects of individual and series of traffic calming measures.

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Click to expand and view modules Close All

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1.2 Traffic Calming Measures Included in ePrimer
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Page last modified on February 15, 2017

Safe Roads for a Safer Future
Investment in roadway safety saves lives

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Module 8
Traffic Calming Case Studies

View Module

TRAFFIC CALMING TOOLS & DEVICES REPORT

FOR

RESIDENTIAL STREETS



City of Redondo Beach

October 18, 2005

John Mate, Transportation Engineer
Engineering & Building Services Department

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The City of Redondo Beach would like to thank the staff members of the Traffic Calming Committee for their efforts in putting this report together.

William Workman	City Manager
Robert Luman	Chief of Police Department
Robert Engler	Chief of Fire Department
Sylvia Glazer	Director of Public Works
Steve Huang	Director of Engineering & Building Services
John Mate	Transportation Engineer

CITY OF REDONDO BEACH

TRAFFIC CALMING TOOLS & DEVICES REPORT - DRAFT

1. WHAT IS TRAFFIC CALMING?

"Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicles use, alter driver behavior and improve conditions for non-motorized street users." from "*Traffic Calming, State of the Practice*", Institute of Transportation Engineers (ITE), 1999.
The University of California at Berkeley defined traffic calming as "physical retrofitting or changes in operations of management strategies on existing streets, designed to reduce adverse impacts such as speeding and excessive volumes and to improve safety and amenity."
Cities, though, have structured their traffic calming programs about the 3 E's: Education, Enforcement, and Engineering. These measures include enhanced police enforcement, speed displays, community speed watch programs, as well as physical measures such as chokers, traffic circles and speed humps.

2. RESIDENTIAL STREETS – PURPOSE?

"Streets are public spaces for many activities and functions. The first function of residential streets is to serve the land that abuts them. They provide access to homes by all who enter and leave, and all who deliver and collect. But they are also routes for those who wish only to pass through the area. It is here that conflict arises, for there is a basic discrepancy between the impact of vehicular traffic and the tranquility of a residential street." from *Residential Street Design and Traffic Control,* ITE, 1989.

The basic goals of traffic control relevant to residential streets are to enhance:

1. Safety
2. Efficient movement of vehicles consonant with local conditions and the safety objective
3. Environmental goals, such as accessibility for local traffic, minimization of unnecessary traffic, and encouragement of changes in modal choice where this promotes the quality of life and/or specific objectives of a neighborhood. (from *Residential Street Design and Traffic Control*, ITE, 1989)

The main purpose of residential streets is to provide vehicular access to the homes abutting the street, by those who live, visit or deliver there. The alternate use of residential streets as playgrounds is usually left to cul-de-sac streets and very low volume residential streets. This idea is slowly changing as more and more residents are requesting more safety, more access and mobility and a better quality of life on their particular street.
The purpose of this report is to review as many of the traffic calming measures presently available, review the legal challenges, and effect on emergency operations.

3. TRAFFIC COLLISION FACTS ON RESIDENTIAL STREETS IN REDONDO BEACH

A common complaint by many residents is the need for a speed hump or flashing lights as a result of the many collisions seen or heard over the years living at one location. Also, the residents request these additional issues as a result of the perception that safety needs to be increased on the residential streets as a result of perceived speeding.

Residential streets rarely have collisions. There is a perception of traffic hazard and exposure to possible accidents above and beyond which can be quantified. It is the feeling of being unsafe, the experience of a certain threat emanating from traffic. The Redondo Beach Police Department reviewed the past five years, 2000-2005, of accident history relating to residential streets. Police found that there were two injury accidents per year for the entire five year period where the primary factor involved was speeding and the accident occurred midblock. Also found were two collisions per year for the entire five year period relating to speed occurring within residential intersections.

4. VARIOUS TYPES OF TRAFFIC CALMING MEASURES

The following pages review the various types of traffic calming measures with a description when necessary, the advantages, disadvantages, effect on emergency vehicles and cost. They are grouped as follows: Signs, Visible Traffic Enforcement, Automatic Speed Enforcement, Signals, Traffic Reminders, Electronic Speed Reminders, Street Redesign, and Street Restrictors.

A. SIGNS

1) Stop Sign

Advantages:
- Requires traffic to stop.
- Speeds reduced at intersections where pedestrian activity is expected.
- Effect on speed is limited to within approximately 200 feet of the stop sign. Little effect on mid-block speeds.
- May discourage cut through traffic.

Disadvantages:
- Drivers may "roll" through intersections at locations that may not need a stop sign. May create disrespect for stop signs at all locations. These aspects are difficult to measure.
- Effect on traffic volume is little if the bypassed route is congested or delayed.
- Increased noise and air pollution.

Emergency response times:
- May increase emergency response times.

Cost: $300 per sign & pavement markings



2) Speed Limit Sign

- Effect on speed - Signing generally has a negligible impact on actual operating speeds. The majority of people drive at a speed that they consider reasonable and safe.
- Effect on volume – none.
- Issue – The California Vehicle Code sets a 25 mph "prima facie" speed limit automatically for all residential streets. Signing is not required for enforcement of the prima facie speed limit to occur and hold up in court. In some situations, signing is advisable to notify motorists of a change of speed limit across and intersection, and such may occur on the local residential street system. Negligible impact on speeds suggests that overuse may be counterproductive. A few well placed signs are more likely to be noticed and heeded than a proliferation of randomly placed ones.

Advantages:

- Usually popular with the neighborhood.
- Can reduce speeds if enforced.

Disadvantages:

- Requires on-going police enforcement.
- Adds additional signs in neighborhood.
- Speed limit enforcement based on radar or laser is limited by surveys and the size of the streets.

Emergency response times:

- Little or no effect on emergency vehicles.

Cost: $250 per sign



3) No Left Turn, No Right Turn, Do Not Enter Signs

Advantages:

- Safety may increase on the original street with less conflicting turn movements allowed.
- May have a significant positive effect on reducing traffic volumes on the cross street.
- Can address "time of day" problems.

Disadvantages:

- Speed on the cross street may increase slightly as a result of reduced intersection conflicts.
- May result in deliberate violations, particularly where police presence is infrequent.
- Safety may decrease at other locations if drivers are forced to make hazardous movements to compensate for restricted movements.
- Must consider impact on adjacent intersections where turns continue to be allowed.
- Residents must understand restrictions also apply to them.
- Requires enforcement.
- Adds more signs to the neighborhood.

Emergency response times:

- Does not impede emergency vehicles if the restriction is by sign only allowing emergency responder to violate the restriction with emergency lights, siren and due care.

Cost: $250 per sign



4) One-Way Sign

Advantages:

- May reduce total traffic on affected street.
- Safety is inherently greater on one-way segments, end treatments, signage and symbols, must be handled properly.

Disadvantages:

- May encourage increased speeds, although intentional one-way street discontinuities may limit this somewhat.
- May divert traffic to adjacent streets.
- Local residents may have longer travel distances.
- Restriction is subject to intentional violation.
- Too many one-way street discontinuities can confuse service vehicles and residents.
- Must consider before implementation; impacts on area-wide traffic patterns and affect on adjacent streets.

Emergency response times:

- Allows wrong way entry by emergency vehicles.
- Can reduce access by some emergency vehicles if parking on two sides reduces the usable roadway width.

Cost: $750 to $5000 depends on length/width of street, centerline striping requires removal, parking signs and entry/exit signs may need removal, replacement, pavement arrows recommended.



5) Children at Play Sign & similar signs such as Slow or Slow Entering Residential Area Signs

Advantages:

- Believed to slow drivers and enhance children's safety.
- Answers concerns of residents and shows city responsiveness.

Disadvantages:

- Not recognized by State of California or by the Federal Highway Administration as an official traffic control device.
- Not installed by the City as signs are not official traffic control devices.
- Sends wrong message of encouraging children to play within the street.
- City discourages children playing within a street as a pedestrian interaction with automobile could result in severe consequences.
- Children are falsely led to believe these signs create a safer environment.
- Unnecessary signs can confuse and annoy drivers.
- Unnecessary signs can foster disrespect for all signs.
- City provides many neighborhood parks where children may play safely.

Emergency response times:

- No effect.

Cost: $250 per sign.

6) Traffic Safety Public Awareness Campaign

This is a program such as the "Do Stop, Don't Speed" Campaign by the City of Manhattan Beach. In this campaign the City distributes free signs reading "Do Stop, Don't Speed" for placement in residents yards. Also trinkets such as Frisbees, yo-yo's and so on are given out at school functions and other public events. The City has a mascot for this program by the name of "Stopper". The campaign is aired on the local cable station.

Advantages:

- Drivers are continually educated to slow down at stop signs via signs in neighborhood and on cable television.
- May result in drivers being more aware of stop signs.
- Answers concerns of residents and shows city responsiveness.

Disadvantages:

- Not recognized by State of California or by the Federal Highway Administration as an official traffic control device.
- Unnecessary signs can confuse and annoy drivers.
- Unnecessary signs can foster disrespect for all signs.
- May result in sign blight at many locations.
- .Ongoing costs to City to maintain program.

Emergency response times:

- No effect.

Cost: Production cost for cable commercials at $6,000 to $8,000 each. Airing of commercials is approximately $10,000 per 100 airings. Ongoing replacement of signs and gifts for distribution $6,000 or more per year.

B. VISIBLE TRAFFIC ENFORCEMENT

The Redondo Beach Police Department has a traffic hotline number, (310) 937-6605, to call for assistance in obtaining speeding or stop sign enforcement, parking problems or other traffic related concerns.

1) Speeding Enforcement – typically used on collectors and arterial streets where traffic volumes and speeds are usually much higher than the posted (enforced) speed limit. Residential streets usually have lower volumes of traffic. The police unit is usually more visible, therefore, drivers 'tend' to obey the speed limit when enforcement is present.

2) Stop Sign Enforcement – turning restriction enforcement – police presence usually results in most drivers obeying the rules of the road.

Advantages:
- Visible enforcement is very effective.
- Can be used on short notice.
- Can reduce speeds temporarily.
- Can result in turn restrictions compliance temporarily.

Disadvantages:
- Temporary measure.
- Requires long term use to be effective.
- Fines are lower than enforcement costs.
- Majority of complaints will be from cited neighborhood residents.

Emergency response times
- No effect on emergency vehicles.

Costs: $75 or more per hour.



3) Parking Enforcement – police or parking enforcement officers' continuous or occasional presence results in most drivers obeying the rules of street parking, whether it is unpaid parking meters, red curb violations, non-display of disabled placards or .non display of preferential parking permits. The presence of these officers maintains better respect for the law and therefore a more livable neighborhood.

Advantages:

- Visible enforcement is very effective.
- Can be used on short notice.
- Can remove nonresident vehicles from a neighborhood.
- Can result in cleaner, friendlier neighborhoods.

Disadvantages:

- Temporary measure.
- Requires long term use to be effective.
- Fines are lower than enforcement costs.
- Majority of complaints will be from cited neighborhood residents.

Emergency response times

- No effect on emergency vehicles.

Costs: $75 or more per hour.

C. AUTOMATIC SPEED ENFORCEMENT

1) Speed camera is a portable radar unit taking picture of motorist, vehicle and speed for a citation by mail. This method is controversial and subject to various legal challenges.

Advantages:
- Can be directed to problem locations.
- May result in increased enforcement.

Disadvantages:
- Cost.
- Requires personnel to monitor equipment and violations.
- Currently disputed by court action.

2) Emergency response times:
- No effect on emergency vehicles.

So far only City of San Jose has this unit.

Cost: Santa Clara County court system receives majority of fees derived from the fines. Only 13 to 18 cents per dollar of fine is refunded back to City, if the fine is assessed.
City receives approximately $70,000 per year from citations.
Staff of 4.5 personnel, 3 vans including camera equipment costs is $350,000 per year.
Resulting in an overall cost of $280,000 per year.

3) Automated Red Light Camera is a safety device to decrease the number of broadside collisions at signalized intersections. This camera takes before and after pictures of drivers and their automobiles proceeding through a 'red light'. The owner of the vehicle will receive the processed citation. This automated enforcement system has been and is subject to various legal challenges.

Advantages:

- Does reduce the number of the more severe broadside collision.
- Can be directed to the problem intersections.
- Maintains enforcement day and night.
- Allows a police officer to improve other areas of public safety.

Disadvantages:

- Cost for installation, leasing of equipment, and assigned police personnel.
- Requires personnel to monitor equipment.
- May increase rear end collisions – although these are usually less severe than broad side collisions.
- Requires personnel to monitor equipment.
- Requires assigned police officer when two or more intersections become automated.
- Currently disputed by court action.

4) Emergency response times:

- No effect on emergency vehicles.

Cost: fines. Initially unit costs $25,000 per direction to install. A typical signalized intersection would cost $100,000 to install cameras in a four directions. City pays lessee of equipment $50- $75 per citation. City may break even with citation costs if enough fines are collected.



D. SIGNALS

Used at high volume intersections where cross traffic does not allow safe entry or turns for opposing traffic. Not used at low volume intersections unless there is a safety concern or a history of broadside collisions.

Advantages:

- Decrease of broadside collisions.
- Major street may have improved traffic flow.
- Allows pedestrians to cross intersection easily.

Disadvantages:

- Minor street traffic may wait longer before proceeding through intersection.
- Installation cost is high.
- Ongoing operation and maintenance costs.
- Red light running is always an issue.
- Effect on speed – may maintain higher speeds as drivers 'speed' through the intersection to 'make the light'.

Emergency response times:

- Effect on emergency vehicles is 3 to 5 seconds as emergency drivers must wait for traffic to clear.

Costs: installation is $150,000 or higher dependent upon size of intersection and number of lanes. Energy costs for 2005 average $1200 per year per intersection. Note: all City maintained signals have 100% LED lighting. Ongoing maintenance and operations costs.



E. TRAFFIC REMINDERS

1) Flashing Lights - used to emphasize a hazardous or unusual condition.

Advantages:

- Placed at many school crossings to alert drivers of the high number of students crossing at an intersection, specifically non stop sign or signaled controlled crossings. Also installed at many stop sign locations for additional emphasis to alert the driver to stop.
- May reduce speed, especially when children are present.

Disadvantages:

- Little or no effect on volume.

Emergency response times:

- No impact to emergency vehicle access.

Costs: $1,000 to $20,000 or more dependent upon if poles exist, size of pole, width of street, source of power, etc.



2) Larger Stop Signs Or Turn Restriction Signs
Some cities emphasize a problem intersection with the use of larger stop or regulatory signs.

Advantages:
- Alerts drivers where violations are frequent with/without police presence.
- Better visibility for drivers due to size or color.

Disadvantages:
- Adds to sign pollution within the neighborhood.
- Still may require ongoing police enforcement.

Emergency response times:
No affect.

Cost: $300 per sign

3) Light Actuated Crosswalk
Flashing pavement warning lights to advise motorists of pedestrians using the cross walk.

Advantages:
- More visible than traditional crosswalks.
- Can slow travel speeds.

Disadvantages:
- Pedestrians may ignore traffic relying more on the lights to control driver behavior.
- Only used at non-stop sign or non-signal controlled crosswalks.
- Requires more maintenance than traditional crosswalks sue to light replacement and power source issues.
- Cost increases based upon power source, number of lanes, activation type.

Emergency response times:
- No effect on emergency vehicles.

Cost: typical 2 lane road is $22,000 for solar powered system up to $60,000 for a wired system.

4) Sign Post Reflector
Reflective panels placed on the posts of stop signs and warning signs to emphasize the sign to the driver. These reflective panels are usually used at locations of critical concern, such as blatant disregard for the stop sign, the speed limit sign or the crosswalk.

Advantages:
- May alert driver to the sign posted alongside the street.
- May slow travel speeds if used with speed signs.
- Especially effective at night with the higher visibility.

Disadvantages:
- Drivers may ignore the sign locations without these reflective panels.
-
- Requires additional maintenance to clean and replace the reflective panel.

Emergency response times:
- No effect on emergency vehicles.

Cost: $50 per post.



F. SCHOOL RELATED TRAFFIC CALMING METHODS

1) Yellow Crosswalks, Adult School Crossing Guards, School Pedestrian Warning Signs, Flashing Lights and In-Roadway Crossing Guard Signs.

Advantages:

- The yellow school related colors are more visible than traditional white such as the paint for crosswalks and the signs with yellow background.
- The purpose is to slow travel speeds for the safety of the school age pedestrian.
- Adult crossing guards are able to visually see if the oncoming driver is aware of their presence before crossing the school children.

Disadvantages:

- School-age pedestrians may ignore traffic relying more on the signs and yellow crosswalks to control driver behavior.
- Drivers may become accustom to yellow related markings when not in use such as during the summer or weekends.
- Adult School Crossing Guards receive an hourly pay.

Emergency response times:

- No effect on emergency vehicles.

Cost: Varies.



2) Walk to School Routes & the Walking School Bus program

Maps have been published by the City for the various elementary schools to distribute at the beginning of the school year showing safe routes to walk to/from school.

The Walking School Bus program requires responsible parents/adults to 'collect' students as they walk their own student to school. Usually starts with one of the more distant students from the school and as the 'bus' walks more students are added. The walking school bus becomes safer as the number of pedestrians increase. Drivers show more respect for larger groups of pedestrians. Responsible parents/adults must continue to do this on a daily basis to/from school.

Advantages:

- The walking routes take advantage of the stop signs, traffic signals and crossing guards.
- The walking routes also account for other school age pedestrians on the same route.
- The walking route attempts to stay clear of any unusual traffic condition.
- Students have 'fun' walking to school together.
- The student/adult receives physical exercise.
- Removes vehicle(s) off the street.

Disadvantages:

- The school age pedestrian may be directed on a longer route in an effort to maintain the pedestrian's safety.
- Requires a commitment of time and responsibility be parent(s)/adult(s).

Emergency response times:

- No effect on emergency vehicles.

Cost: School District's cost to distribute flyer.



3) Safe School Zone Signs

During the mid 90's the state legislature passed laws in an effort to decrease the violence on and about school campuses. Some of these laws were the 'Gun-Free School Zone Act of 1993 & 1995', 'Drug –Free School Zone Act of 1993', and the reduction of criminal street gang activity about schools passed in 1993. These laws and other similar laws allowed the local enforcement agencies to increase the penalties for offenses committed within a school zone. A school zone was established as a 1000 feet zone around the school.

In an effort to promote awareness of these new laws, the Redondo Beach Unified School District requested the City to post orange and purple circular signs approximately at the 1000 feet distance from the boundaries of the school campuses. The signs state "Safe School Zone". Many of these signs still remain throughout the City.

Advantages:

- Emphasis the safe school boundaries according to state laws.
- Promotes awareness that the City of Redondo Beach and the Redondo Beach Unified School district is serious regarding maintaining safe school campuses and environs.

Disadvantages:

- A sign which has lost its significance over the years.

Emergency response times:

- No effect on emergency vehicles.

Cost: $50 per sign replacement.



G. ELECTRONIC SPEED REMINDERS

1) Radar Trailer

A portable trailer with a radar unit that detects the speed of passing vehicles and displays it on a reader board often with the speed limit sign next to the display.

Advantages:
- Encourages speed compliance.
- Can reduce speeds temporarily.
- Good public relations tool.
- Effective education tool.

Disadvantages:
- Not an enforcement tool.
- Ineffective on multilane highways.
- Less effective on high volume streets.
- Subject to vandalism.
- Effect is negligible on higher volume streets.
- Some motorists may speed up to register a higher speed.
- Requires frequent maintenance.
- Requires increase personnel for deployment.
- Personnel subject to injury on duty due to weight and manipulation concerns.
- Complaints by neighbors due to occupation of parking spaces.

Emergency response times:
- No effect on emergency vehicles.

Cost: Initial cost is $10,000 to $12,000 for a basic unit. Ongoing maintenance cost is above average. Cost of police officer to deploy unit weekly or daily.



2) Fixed Electronic Radar Signs

Electronic signs with a built-in radar unit which detects the speed of the oncoming vehicle and displays the speed. The existing speed limit sign may be posted adjacent or some electronic signs can flash 'slow down' when the speed is much higher than the speed limit or at times the sign may flash the posted speed limit.

- Same advantages and disadvantages as radar trailer.
- Some manufacturers have their signs vary the display showing the speed limit, vehicle speed or messages such as 'slow down'.

Emergency response times:
- None.

Cost: under $10,000 per unit. Ongoing cost is minimal.



H. STREET REDESIGN

1) One-Way Streets

Advantages:

- May reduce total traffic on affected street.
- Safety is inherently greater on one-way segments; end treatments must be handled properly.

Disadvantages:

- May encourage increased speeds. Although intentional one-way street discontinuities may limit this somewhat.
- May divert traffic to adjacent streets.
- Local residents may have longer travel distances.
- Restriction is subject to intentional violation.
- Too many one-way street discontinuities can confuse service vehicles and residents.
- Must consider before implementation, impacts on area-wide traffic patterns and affect on adjacent streets.
- Can reduce access by some emergency vehicles if parking on two sides reduces the usable roadway width.

Emergency response times:

- Allows wrong way entry by emergency vehicles, little or no delay unless parking on both sides reduces the usable roadway width.

Cost: $1000 to $5000 depends on length/width of street, if centerline striping requires removal, parking signs and entry/exit signs may need removal, replacement, pavement arrows recommended.



2) Narrow Lanes

Striping is usually used to create narrow lanes, often about 10 feet wide. The unused pavement can be used to stripe bicycle and/or parking lanes.

Advantages:
- Can be quickly implemented.
- Can be easily modified.
- May slow travel speeds.

Disadvantages:
- Not always perceived as an effective tool.
- Adds striping to neighborhood streets.
- Increases regular maintenance.
- Increases resurfacing costs.

Emergency response times:
- Little or no effect on emergency vehicles.

Costs: installation dependent on length of street – 1000 foot long block about $4000. On going maintenance and operations costs.



3) Raised Intersection

A raised intersection is a flat, raised area covering the entire intersection. There are ramps on all approaches. The plateau is usually about 4 inches high. Usually part of an area wide traffic calming scheme involving both streets.

Advantages:

- Reduces through-the-intersection movement speeds.
- Provides safer street crossing for pedestrians.
- Can be aesthetically pleasing, if bricks or a finished texture is used.
- Does not affect access.

Disadvantages:

- Installation cost is high.
- Requires drainage modifications.
- May increase pedestrian trip and fall incidents.
- Noise may increase due to slowing/braking.
- May result in street sweeping issues.

Emergency response times:

- Effect on emergency vehicles is 2 to 8 seconds as emergency drivers must slow for ramp portion.

Costs: installation is $40,000 or higher dependent upon size of intersection and necessary drainage improvements.

4) Raised Crosswalks

Raised crosswalks are crosswalks constructed 3 to 4 inches above the elevation of the street and across the width of the street. Usually have a flat section in the middle. Raised crosswalks are speed humps with a crosswalk. Used to reduce vehicle speeds where a high amount of pedestrians cross the street.

Advantages:
- Effectively reduces vehicle speeds
- Does not affect access.
- Good pedestrian safety treatment
- Increases pedestrian visibility and likelihood that drivers yield to pedestrians.

Disadvantages:
- May generate increased noise.
- Can require drainage modifications
- Result in a loss of parking.
- May shift some traffic to neighboring streets.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is 6 to 11 seconds depending on the size of the emergency vehicle.

Costs: installation is $8000 to $15,000 per crosswalk.

5) Traffic Circles (mini-roundabouts)

Traffic circles are raised circular islands located within the smaller local street intersections.
Requires drivers to travel around the circle in a counterclockwise pattern.
Typically controlled by “yield on entry” signs on all approaches.

Advantages:
- Effectively reduces vehicle speeds.
- Reduces broadside collision potential.
- Provides better side-street access.
- Opportunity for landscaping.

Disadvantages:
- Parking removal required.
- Can increase bike/auto conflicts.
- Can restrict large vehicle access.
- Can impede emergency vehicle access.
- Can increase sideswipe collisions.
- May result in trash collection issues.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is 3 to 6 seconds.

Costs: installation is $8,000 to $25,000, dependent upon size of intersection. Increased maintenance costs with landscaping.



6) Roundabout

Roundabouts are traffic circles used at major intersections with a high volume of traffic. Roundabouts are used to replace traffic signals in an effort to reduce delays. Typically used on streets with 20,000 vehicles per day or less.

Advantages:
- Decrease of broadside collisions.
- Major street may have improved traffic flow.
- Allows large vehicles to make U-turns.
- Removes large queues of vehicles waiting at stop controlled intersections.
- Opportunity for landscaping.

Disadvantages:
- Sometimes requires obtaining property behind the corners of the intersection.
- Installation cost is high.
- Inappropriate at locations where traffic backs up from other intersections.
- May increase sideswipe and lane change collisions.

Emergency response times:
- Effect on emergency vehicles is 2 to 10 seconds for emergency vehicle to turn left. Otherwise no more delay that at traffic signal and stop controlled intersections.

Costs: installation is $75,000 or higher dependent upon size of intersection, and number of travel lanes. This cost does not include any additional property if necessary. Increased maintenance costs with landscaping.

7) Choker

Chokers are midblock curb extensions that narrow a street by extending the sidewalk or widening the planting strip.

Advantages:
- Reduces vehicle speeds.
- Shorter pedestrian crossing.
- May reduce traffic volumes.
- Opportunity for landscaping.
- Opportunity to install fire hydrants at these locations to be away from parked cars.

Disadvantages:
- May require removal of parking.
- May create hazard for bicyclists.
- May impede the movement of larger emergency vehicles.
- May create drainage issues.
- May direct some traffic to other streets.
- May impede truck movements, such as trash haulers.
- May create street sweeping issues.

Emergency response times:
- Effect on most emergency vehicles is minimal as this location is clear of parked vehicles. Increased maintenance costs with landscaping.

Costs: installation is $15,000 each.



8) Curb Extension

Curb extensions are chokers placed at an intersection. Curb extensions are sometimes called bulbouts or neckdowns. Curb extensions result in a narrowing of the intersection.

Advantages:
- Reduces vehicle speed at street entrance.
- Shorter pedestrian crossing.
- Opportunity for landscaping or street furniture.

Disadvantages:
- May require removal of parking.
- May create drainage issues.
- Difficult for trucks or larger vehicles to turn right, including emergency vehicles.
- May impede trash haulers.

Emergency response times:
- Effect on emergency vehicles is 3 to 10 seconds. Emergency vehicles should be included in the initial design layout in order to reduce turning movement concerns.

Costs: installation is typically $15,000 to $50,000. Increased maintenance costs with landscaping.



9) Entrance Barrier

Entrance barriers are curb extensions or barriers that restrict movements into a street. They are constructed to approximately the center of the street, effectively obstructing one direction of traffic. Entrance barriers create a one-way segment at the intersection while maintaining two-way traffic for the rest of the block.

Advantages:
- Reduces cut-through traffic.
- Self enforcing.
- Shorter pedestrian crossings.
- Opportunity for landscaping.

Disadvantages:
- May divert traffic to other streets.
- Can increase trip lengths, must consider how residents will gain access to street.
- May result in a loss of parking.
- In effect at all times.
- May result in intentional violations by locals.
- May impact trash haulers.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is 3 to 5 seconds as long as emergency drivers are able to turn the wrong way on the street. Otherwise, to go around the block may increase the time by 1 minute or more.

Costs: installation is $15,000 or more depending on landscaping, irrigation, storm drains, etc. Increased maintenance costs with landscaping.



10) Chicane

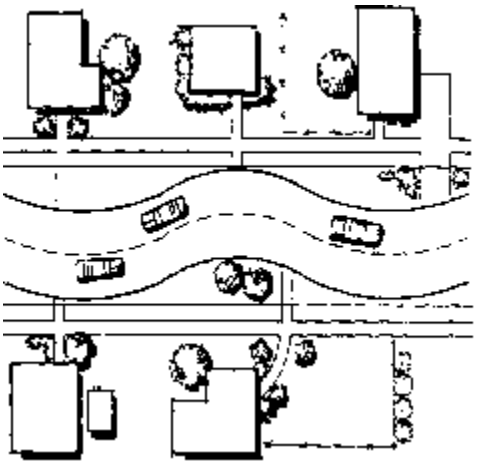
A chicane is a series of two or more staggered curb extensions on alternating sides of a roadway. Horizontal deflection influences motorists to reduce speed through the serpentine roadway.

Advantages:
- Reduces vehicular speeds.
- Opportunity for landscaping.

Disadvantages:
- Significant parking loss.
- Increases maintenance.
- Cannot be used where right-of-way is limited (width of street).
- May increase conflicts with pedestrians and bicyclists.
- Many driveways along street will negate use of chicanes.
- May result in trash hauler issues.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is 3 seconds or less on residential streets as emergency personnel are slowing to look for house numbers.

Costs: installation is $30,000 to $50,000 each. Increased maintenance costs with landscaping.



11) Median Island (restricts turn movements or narrow lanes)

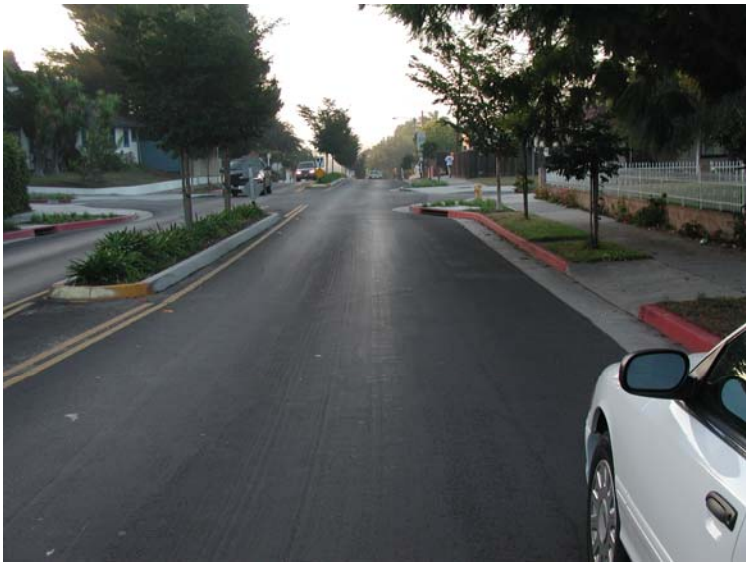
Median islands are raised islands in the center of a street that can be used to narrow lanes for speed control and/or create a barrier to prohibit left turns into or from a side street.

Advantages:
- Reduction in vehicular speeds.
- Major street may have improved traffic flow.
- Reduces collision potential.
- Opportunity for landscaping.
- May divert unwanted traffic volumes.

Disadvantages:
- Could require parking removal.
- May reduce driveway access.
- May divert traffic to other streets.
- May result in conflict with bicyclists and vehicles.
- Possibly ongoing maintenance and operations costs.

Emergency response times:
- Effect on emergency vehicles is negligible unless the median results in the emergency unit going around the block.

Costs: installation is $15,000 to $75,000 depending upon size. Increased maintenance costs with landscaping.



12) Restricted Movement Barrier

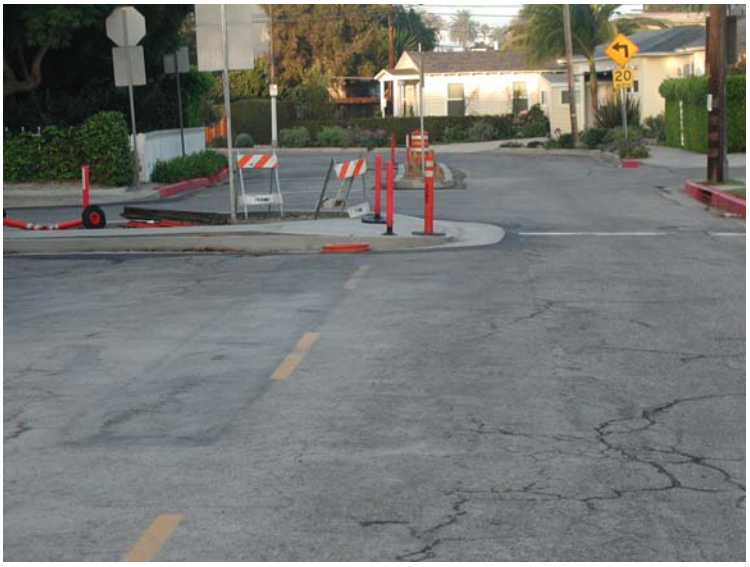
Restricted movement barriers are raised islands that prevent certain movements at an intersection. These islands are often landscaped.

Advantages:
- Reduces cut-through traffic volumes.
- Provides pedestrian refuge area.
- May reduce speeding.

Disadvantages:
- Redirects traffic to other streets.
- Will increase trip lengths.
- May be aesthetically unattractive.
- May result in street sweeping issues.
- May result in trash hauler issues.

Emergency response times:
- Effect on emergency vehicles is 3 to 5 seconds as long as emergency drivers may enter street the wrong way; otherwise must travel around the block.

Costs: installation is $15,000 or higher.



13) Diagonal Diverters

Diagonal diverters are raised areas placed diagonally across a four-legged intersection. They prohibit through movements by creating two "L" shaped intersections.

Advantages:
- Reduces cut-through traffic.
- Reduces travel speed near the intersection.
- Reduces collision potential.
- Can be landscaped.
- Circulation less impacted versus full street closure.

Disadvantages:
- Directs traffic to other streets.
- May increase trip lengths.
- Always in effect.
- May create drainage issues.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is minimal unless emergency drivers must go around the block. Diagonal diverters should be designed to allow emergency vehicles to drive over them to reduce the response time.

Costs: installation is $25,000 to $50,000 each. Increase maintenance costs with landscaping.

14) Street Closure

Used when citizens want the benefit if a cul-de-sac style street. The street closure shifts traffic onto other streets and denies critical emergency access.

Advantages:
- Reduces cut-through traffic.
- Reduces traffic volumes.
- Always in effect.
- Opportunity for landscaping.
- Design with small openings to allow for bicyclists and pedestrians.

Disadvantages:
- Directs traffic to other streets.
- Increases trip lengths.
- May lose some street parking.
- May result in drainage issues.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is major if emergency vehicles must go around the block. If street closure is designed to allow emergency vehicle access, delay may be only 5 to 10 seconds as emergency drivers must wait for traffic to clear.

Costs: installation is $10,000 to $30, 0000. Ongoing maintenance and operations costs. Increased maintenance costs with landscaping.



I. SPEED RESTRICTORS (vertical deflectors)

1) Bumps

The short raised asphalt obstructions, mainly used in private parking lots, are the speed bumps. As a result of the extreme discomfort to the vehicle and the occupants, this style of speed restriction is not recommended for cities to use on streets with their higher speeds.

Not Recommended.

2) Humps

Speed humps are areas of pavement raised from 2 inches to 4 inches in height over a length of 12 feet. They work by forcing motorists to slow down to comfortably pass over them. They are marked with signs and pavement markings.

Advantages:
- Reduces vehicle speeds.
- Can reduce traffic volumes if a 'faster' parallel route exists.
- Does not require parking removal.
- Always in effect.

Disadvantages:
- May direct traffic to other streets.
- Not aesthetically pleasing, requires additional signage and pavement markings.
- Increases noise near speed hump from braking, accelerating and vehicle suspension.
- May result in noise complaints from resident.
- Difficult to construct without proper tools (template).
- May result in trash hauler issues.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is an average delay of 6 to 11 seconds. There is also some evidence that humps stress equipment and create unnecessary wear and tear. Emergency operations prefer using speed tables or speed cushions instead.

Costs: installation is $15,000.
Ongoing maintenance and operations costs.



3) Speed Tables

A speed table has a more gradual rise than the speed hump and also has a flat length of at least 10 feet and up to 20 to 23 feet to accommodate buses.

Advantages:
- Reduces vehicle speeds.
- Can reduce traffic volumes if a 'faster' parallel route exists.
- Always in effect.
- Preferred by drivers of larger vehicles over speed humps.

Disadvantages:
- May direct traffic to other streets.
- Not aesthetically pleasing, requires additional signs and pavement markings.
- Increase in noise near speed table from braking and accelerating.
- May lose some street parking.
- May result in trash hauler issues.
- May result in street sweeping issues.
- May result in drainage issues.

Emergency response times:
- Effect on emergency vehicles is 2 to 9 seconds.

Costs: installation is $15,000 to $30,000.
Ongoing maintenance and operations costs.

4) Speed Cushions

A speed cushion is typically a rectangular section of pavement that is raised no more than 3 inches high. Speed cushions are placed across the travel way with a 2-foot space between each cushion. The 2-foot space allows for commercial vehicles to traverse the raised cushions without actually running over the cushion. This reduces the noise created by large vehicles. The vertical deflection encourages passenger vehicles to reduce speed.

Advantages:
- Reduces vehicle speeds.
- Can reduce traffic volumes if a 'faster' parallel route exists.
- Always in effect.
- Preferred by drivers of larger vehicles which can straddle the cushions.
- Preformed units are easy to install.
- May be removed and re-installed at other locations.

Disadvantages:
- May divert traffic.
- Not aesthetically pleasing, requires additional signing and pavement markings.
- Increase in noise near speed cushion from braking and accelerating.
- May result in street sweeping issues.

Emergency response times:
- Effect on emergency vehicles is 1 to 4 seconds with the smaller equipment. Larger emergency vehicles are not affected by speed cushions.

Costs: installation is $2,500 per rectangular section; for a typical narrow one lane in each direction street, 2 sections are required for a cost of $5,000. Cost includes signs and pavement marking also.
Ongoing maintenance and operations costs.



5. LIABILITY

Previous to the 1980's, the State of California adopted rules and regulations in regards to cities placing official traffic control devices within a city. These traffic control devices include, but are not limited to, stop signs, yield right of way signs, speed restriction signs, railroad warning approach signs, street name signs, lines and markings on the roadway, and stock crossing signs.(Section 21400 CVC).

During the late 1970's, the City of Berkeley installed concrete bollards and intersection diverters to reduce cut-through traffic in various neighborhoods. The City of Berkeley was challenged in court to remove all of the large concrete bollards it had installed to control the flow of traffic and to reduce collisions (*Rumford v. City of Berkeley*, 1982). The California Supreme Court ruled the diverters and half closures installed by the City of Berkeley were traffic control devices not authorized by State law. The Court stated that in California, a locality has no right to interfere with the free flow of traffic unless expressly authorized by State statute.

During 1983, the California legislature passed a bill legalizing all existing diverters as roadway design features. California Vehicle Code, (CVC) Section 440 states "An "official traffic control device" is any sign, signal, marking, or device, consistent with Section 21400, placed or erected by authority of a public body or official having jurisdiction, for the purpose of regulating, warning, or guiding traffic, *but does not include islands, curbs, traffic barriers, speed humps, speed bumps, or other roadway design feature.*

A. Regarding street closures and partial closures

Local authorities may adopt rules and regulations by ordinance on the following matters per CVC 21101 (f); "Prohibiting entry to, or exit from, or both, from any street by means of islands, curbs, traffic barriers, or other roadway design features to implement the circulation element of a general plan adopted pursuant to Article 6 (commencing with Section 65350) of Chapter 3 of Division 1 of Title 7 of the Government code. The rules and regulations authorized by this subdivision shall be consistent with the responsibility of local government to provide for the health and safety of its citizens."

A traffic barrier proposed to be installed pursuant to Vehicle Code Section 21101(f) should be:

a) based on a design approved by a traffic engineer in order to provide "design immunity" to the city;

b) generally authorized by language in the circulation element of the city's general plan;

c) constructed, sited and managed in accordance with rules and standards contained in a program approved by ordinance or resolution of the city council;

d) approved in compliance with CEQA; and

e) not involve a regionally significant roadway.

The above are conditions required for a city to implement a partial or full street closure on a city street. (taken from a paper, "Legal Issues Regarding the Implementation

of Traffic Calming" and Neighborhood Parking Control Measures", Kevin G. Ennis, Esq., March 14, 2003.

B. Regarding installation of speed humps (vertical deflections)

The issue of the installation of speed humps always initiates the response of "What about the liability?" As per CVC Section 440, speed humps are categorized as "other roadway design features". Most cities have taken the position that they can be installed without specific Vehicle Code authority or conformance to state standards.

The state standards referred to are the *Manual on Traffic Control Devices*, the Federal Highway Administration edition and the California supplement and the Caltrans *Highway Design Manual*. Previous to 2004, the State of California used the 1996 Caltrans *Traffic Manual* for the installation and requirements for signs, marking, signals, and lighting. Since 2004, California has adopted the federal standards for the installation of signs, marking, signals, etc. of the *Manual on Uniform Traffic Control Devices* (MUTCD) with a CA supplement. In regards to roadway design features such as corner radius, slopes, pavement design etc. the policies followed are published in the Caltrans *Highway Design Manual*. There is also the standard published by the American Association of State Highway and Transportation Officials, *A Policy of Geometric Design of Highways and Streets*. The MUTCD specifies pavement markings and warning signs to be used at speed humps but there are **no geometric, designs, nor placement** standards for speed humps in the previously referenced standards used by traffic engineers. The federal government and state governments at this time have relinquished this rule to the individual jurisdictions.

Per the paper, "Legal Issues Regarding …… Control Measures", Ennis, 2003, "The courts and the California Attorney General have yet to rule on this issue. Recommended by Ennis for a city considering speed bumps (humps), it is advisable for a city to:

a) base the design and proposed locations on recognized engineering standards as approved by a traffic engineer in order to provide :"design immunity" to the city;
b) make sure the circulation element of the city's general plan does not conflict with a speed hump program;
c) provide that the speed humps are constructed, sited and managed in accordance with rules and standards contained in a program approved by ordinance or resolution of the city council; and
d) ensure that the process of approving the speed humps is done in compliance with CEQA.

Therefore, if the City Council decides to implement speed humps, speed tables or speed cushions, a set of standards relating to design, placement, and speed/traffic volume criteria is necessary for approval by the City Council, all in compliance with CEQA and the general plan.

The Risk Manager of the City sent an email request to various cities to inquire if they have speed humps, and if there have been any liability issues arising as a result of the

speed humps. The Cities of Monterey Park, Downey, and Long Beach do not have speed humps. Their main concern is litigation.
Downey also stated that slowing of emergency vehicles and jarring of the occupants and equipment are concerns.
The City of Long Beach has preferred to place the radar trailer at many locations. Also, Long Beach cites drivers for traveling 9 mph or more over the speed limit. The results have been a dramatic lowering of the speeds, long after the police have left. A third item the City of Long Beach uses is a Neighborhood Watch for Speeders. Block Captains record the licenses of speeders reported by residents. Once three reports are given by three different residents on the same vehicle, the police are notified and a letter is sent to the owner. The owner is placed on notice that they were seen speeding and the police will be working the neighborhood to find such offenders.

Cities replying that they had speed humps:
The City of Monrovia has 7 speed humps with all installed just 4 months ago in regard to speeding complaints. No complaints have been received from the residents regarding speeding. No legal complaints have been filed and no other method has been found to control speeding such as speed humps.
The City of Upland had a few speed humps installed years ago. The city has denied recent requests for speed humps as there are no established standards for the implementation of speed humps. No claims have been received by Upland.

The Risk Manager also received from our contract legal counsel that there is no information regarding immunizing a public entity for the installation of speed humps. The contract legal counsel recommends that a speed hump is designed and built by the City traffic engineers like any other roadway improvement project in an effort to immunize the city from liability.

Attached is a table of responses the Public Works Department of the City of Redondo Beach received in Nov. 2003 regarding various California cities and their response to the inquiry about speed humps.

Other liability issues regarding speed humps:

C. Noise nuisance

The creation of additional noise is a nuisance and a potential for another legal liability. Residents often complain of increased noise from vehicles downshifting, decelerating, accelerating, or actually making physical contact while navigating the calming devices. This is noted in the case of *Friends of H Street v. City of Sacramento*, Oct. 21, 1993. This case also makes reference to "cut –through traffic", which is a common occurrence in neighborhoods with traffic calming devices, as the traffic tends to move to a parallel street. Residents were trying to get the City to take some action regarding heavy traffic volumes, speeds, and noise on their neighborhood street. Their preference was to place restrictions on the street so that these nuisances would be removed. "The court ruled against the residents, holding that the routing of traffic is at the discretion of the city

council, that the rerouting of traffic in this case would hurt other streets, and that the city council could not please everyone. As the court saw it, the loss of peace and quiet is a fact of life which must be endured by all who live in the vicinity of freeway, highways, and city streets."

D. Vehicle Damage Claims

"Damage claims are much more common that lawsuits filed with the courts. But damage claims are still relatively rare, and the number of claims miniscule. Given the hundreds of traffic calming measures in place for many years in featured communities, these numbers are surprisingly small. Seattle, Washington has one of the longest running programs with the most measures in place. About two claims are filed per year over the past 15 years, with only three claims having been paid. This is very low compared with the number of claims filed and paid in connection with, for example, potholes." From *Traffic Calming, State of the Practice*, ITE, 1999.

6. EMERGENCY RESPONSE

Traffic calming measures that are effective in slowing or diverting automobiles will have the same effect, or sometimes greater effect on fire-rescue vehicles. The biggest challenge is to keep the effect on emergency response time within acceptable bounds or to find new ways of slowing and diverting other traffic without substantially impeding emergency response.

A 1997 survey by the City of Berkeley revealed that four out of five cities report "some concern" on the part of emergency services over the use of speed humps versus many of the other traffic calming measures. The other most criticized traffic calming measures were diverters, street closures and traffic circles.

Several cities have performed controlled tests of speed humps, speed tables and traffic circles to see how much delay is produced by them. Regardless of the traffic calming measure or fire-rescue vehicle, the delay per slow point is always under 10 seconds. That will add up if there is more that one traffic calming measure along a route. The "Traffic Calming, State of the Practice" ITE, 1999 published a response time study results from various cities for different traffic calming measures and vehicles.

Community **Response Time Goal (seconds)**	**Measure**	**Delay at Slow Point (seconds)**
Austin, TX 3.5 (fire)	12-foot speed humps	2.8 (fire engine) 3.0 (ladder truck) **2.3 (ambulance without patient)** **9.7 (ambulance with patient)**
Berkeley, CA 4 (fire) 5 (medical)	12-foot speed humps 22-foot speed tables	10.7 (fire engine) 9.2 (ladder truck) 3.0 (fire engine) 13.5 (ladder truck)
Boulder, CO 6 (fire)	8-foot speed hump 12-foot speed hump	4.7 (fire engine) 2.8 (fire engine)

4 (medical)	37-foot speed table (6 inch rise) 40-foot speed table (6-inch rise) 25-foot diameter traffic circle	3.8 (fire engine) 3.8 (fire engine) 7.5 (fire engine)
Montgomery County, MD 5 (fire)	12-foot speed humps 18-foot diameter traffic circle	2.8 (ladder truck) 3.8 (ambulance) 4.2 (fire engine) 7.3 (pumper truck) 5.4 (ladder truck) 3.2 (ambulance) 5.0 (fire engine) 7.0 (pumper truck)
Portland, OR (assumes a 35 mph response cruising speed) 4 (fire)	14-foot speed humps 22-foot speed tables 16-24 foot oblong traffic circles	5.2 (fire engine) 2.9 (custom rescue vehicle) 6.6 (ladder truck) 3.0 (fire truck 0.3 (custom rescue vehicle) 3.0 (ladder truck) 6.1 (fire engine) 3.1 (custom rescue vehicle) 8.4 (ladder truck)
Sarasota, FL not given	12-foot humps	9.5 (ambulance)

Notice in the above table, the City of Austin, Texas timed an emergency response **with** and **also without** a patient in an ambulance, see bolded results. An additional 7.4 seconds is added to an emergency response with a patient in the ambulance. This slowing down is necessary in an effort not to give discomfort to the patient. This test was on a typical 12-foot speed hump installed by many cities. An ambulance delivering a patient to a hospital may have to travel over speed humps during this trip.

The booklet, "*Emergency Response, Traffic Calming and Traditional Neighborhood Streets*", Local Government Commission, 2001, contains a chart, (see next page) of delay caused by different traffic calming measures on emergency vehicles. This chart is not broken down into the various types of emergency vehicles or the dimensions for the calming measures. Therefore, this chart gives a range of delay in seconds with many variables which could be associated with the minimal or long delays.

For certain, the majority of traffic calming measures do slow the response times of emergency vehicles, from 2 to 6 seconds. Some traffic calming measures have a greater impact on emergency response time such as speed humps and large traffic circles than other measures such as mini-roundabouts or speed pillows.

Fire-rescue units nearly always oppose volume controls that lengthen response routes. Street closures, diagonal diverters, and median barriers may have this effect. More receptive are engineered measures that allow the emergency to travel the wrong –way in these situations.

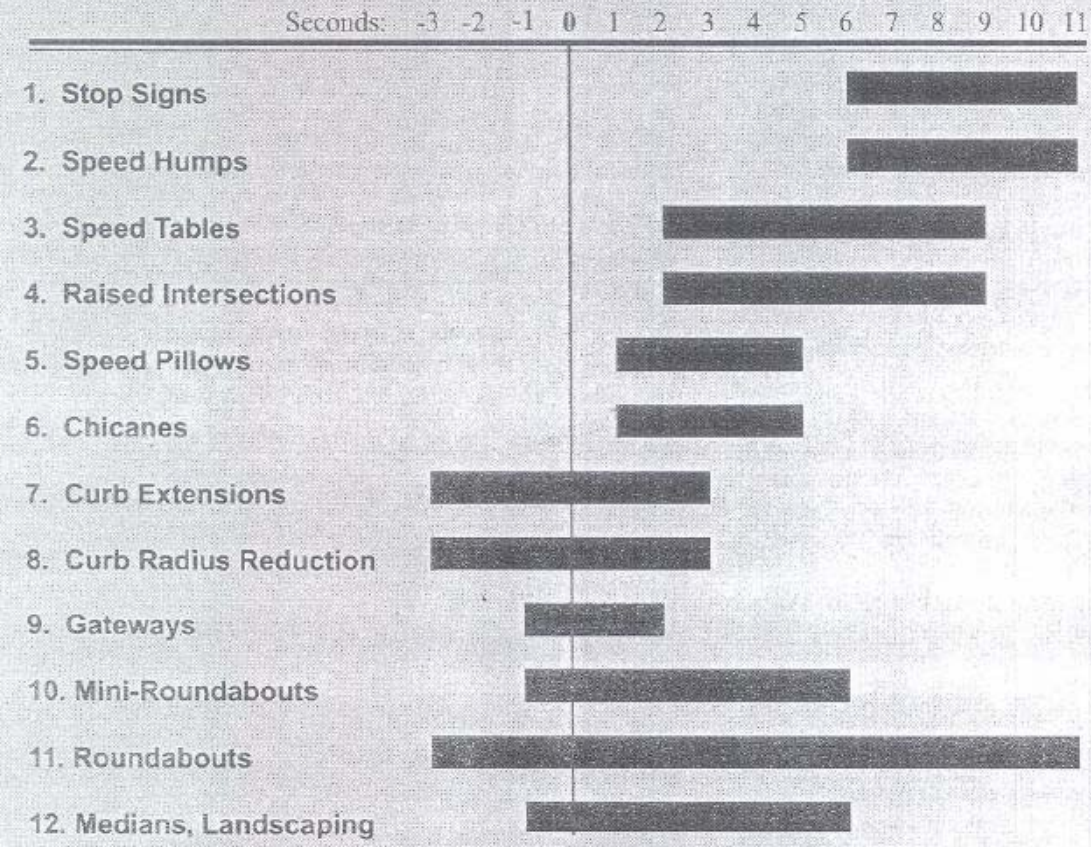
Fire-rescue units usually oppose speed humps and other vertical measures that rattle and rock speeding vehicles. Traffic circles and chicanes are preferred even though they may create a slightly longer delay but they do so without vertical displacement.

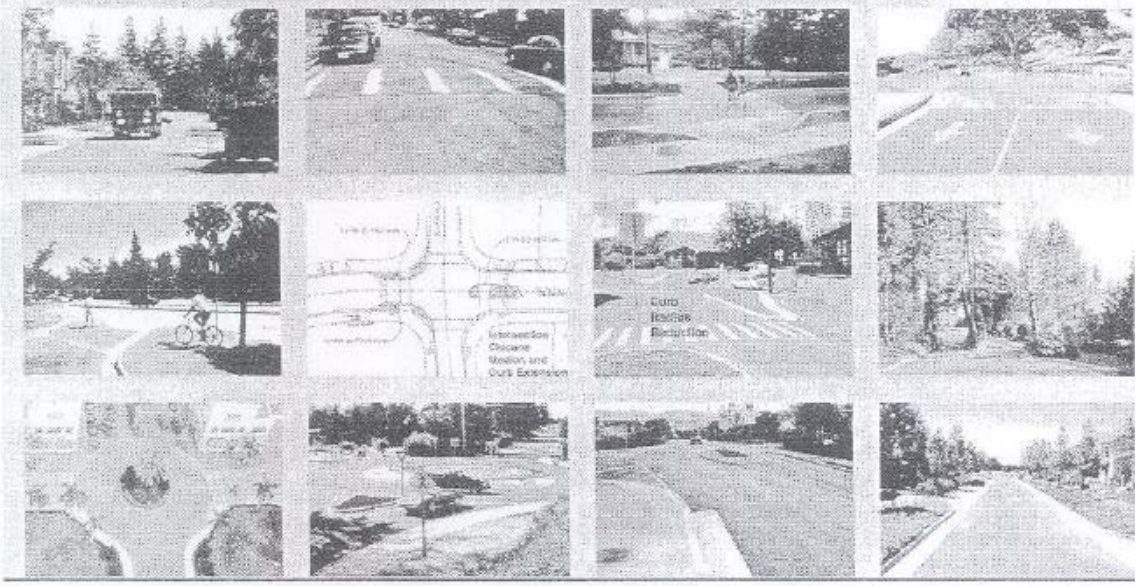
Redesign of many of the traffic calming measures may result in fire-rescue response acceptance. Items such as lowering the 'lip' of the inside circle of a traffic circle from 4 to 2 inches will make it easier for larger vehicles to turn in the circle. Lock gates or removable bollards at street closures or diverters may also be acceptable to local fire-rescue units.

The police generally support traffic calming measures for their potential to control speeding and reduce collision severity. The engineered measures are self enforcing, which takes some of the pressure off police officers to enforce traffic laws.

PART TWO: TRAFFIC CALMING

Approximate Delay Caused by Different Treatments





7. SPEED HUMP CRITERIA

A. Speed Hump Criteria from other Southern California Cities.

The issue of speed humps, even amongst other southern California Cities, is an ongoing controversial issue. The City obtained the following table of criteria used by other cities; some are noted as not using speed humps. Some of the criteria vary, such as the traffic volumes, the minimum street length, petition requirements and some cities have cost sharing with the residents for speed hump installation. These differences are a result of the traffic engineer responding to the local needs and desires of the community. Remember, for improved liability protection, since speed humps are not official traffic control devices, each city must develop their own criteria for the implementation of speed humps. The design of the speed hump will also vary between each city.

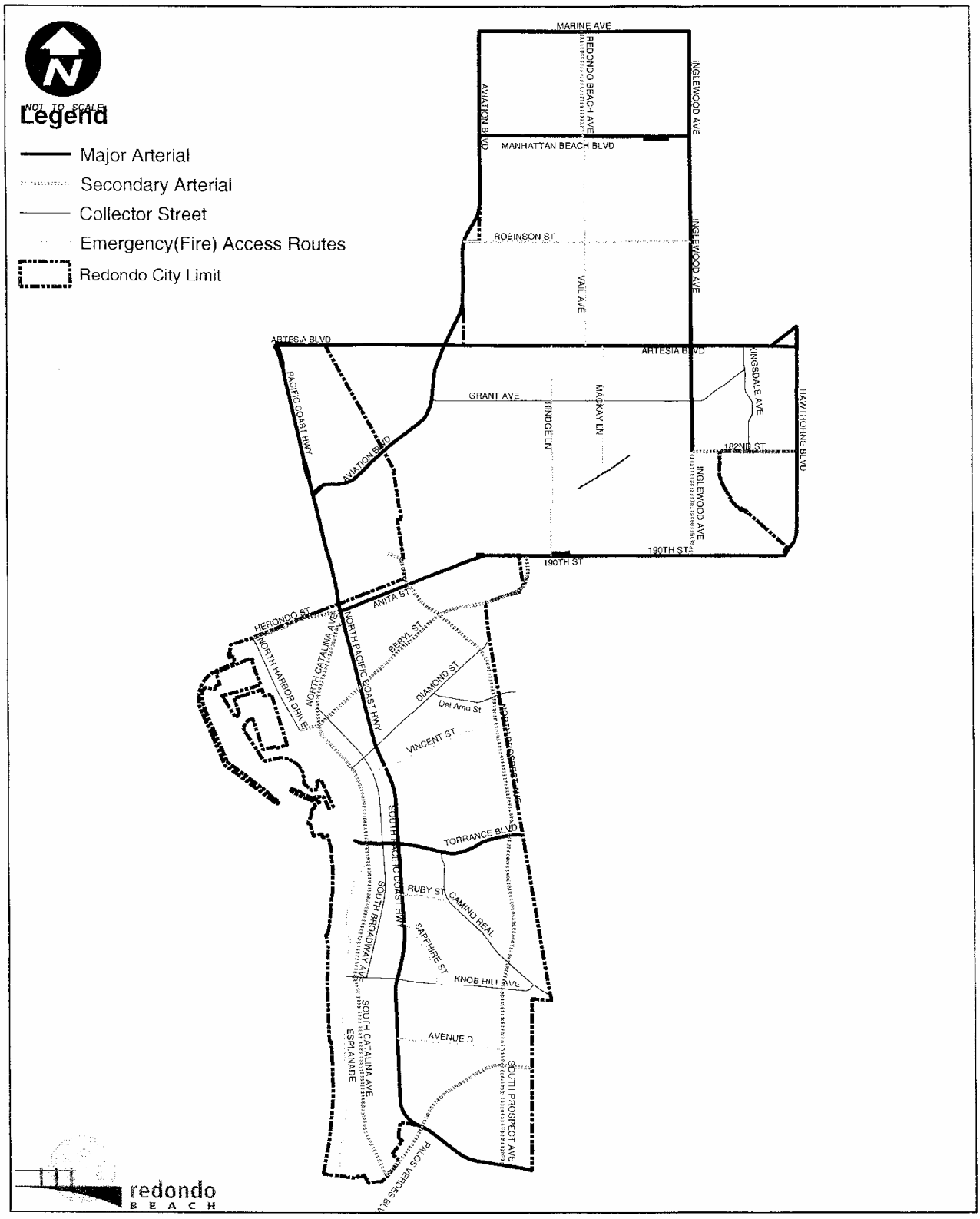
Attachment A contains a speed hump survey of various cites throughout California obtained from the Public Works Department.

B. City of Redondo Beach - possible criteria for speed humps.

The City of Redondo Beach must develop its own set of speed hump criteria and design if the City Council desires to implement a speed hump program. A possible set of criteria is given at the bottom of the speed hump table for the City of Redondo Beach. Also attached is a map showing the streets which are emergency response routes for police, fire and ambulance and should be exempt from speed hump installation.

Speed Hump Requirements
from various
Southern California Cities

CITY	CRITERIA								
	Traffic Volume Requirements VPD	Minimum	TRAVELING SPEED NO GREATER THAN M.P.H. w/in a 24 hour period)	COST City / Resident	Street Grade max.	Arterial Residential	PETITION REQUIREMENTS From Residents	Police/Fire Approval	COMMENTS
Carson	300 - 3000	40w	50% - 5m.p.h.		6%	residential	2/3	Yes	
El Segundo	**N/A**								
Gardena									
Hawthorne	500 - 2000	40w	85% - 7m.p.h.	City pays for cost by	2.50%		2/3		
Hermosa Beach	>than 2500	800' L	25	If approved,	8%	residential	67%	Yes	
Huntington Beach	not used								
Inglewood	1000 - 3000	750' L	85% - 5m.p.h.	cost sharing avaliable		residential	75%	Yes	
Lawndale	**N/A**								
Lomita	See LA County								
Manhattan Beach	not recommended								Previously installed;
Palos Verdes Estates				2K - 2.5K					
Rancho Palos Verdes	1500	1/4 mile	67% exceed 25 m.p.h.	2K - 2.5K	>than 6%	residential		Yes	
Rolling Hills									
Rolling Hills Estate	yes				>than 5%		67%		
Torrance	not allowed								
City of Los Angeles	500-10,000		85ile - 5 mph or more		<7%	25 or 30mph residential	75%	Yes	removal at city cost (no alleys)
Thousand Oaks	2500	40'W	87% exceed 5 mph			25 mph	60%	Yes	Good petition
Los Angeles County	5000						66% for 90% overall pro/con		
Culver City	3000		85% - 7 m.p.h.				60%		60% also for removal
Santa Monica			85%ile exceeds 32 mph					Yes	went from asphalt to rubberized humps?
Yorba Linda	1000 - 2000			80% petition with money		residential	80%		
Palm Springs	500 - 3000	600' L	85% - 7 m.p.h.						
Redondo Beach (tbd)	less than 2500		85%ile - 7 mph or more		< 8%		66%		



City of Redondo Beach- Streets Exempt from Speed Hump Installation

7/26/2005

8. CALIFORNIA ENVIRONMENTAL QUALITY ACT CONCERNS

The placement of traffic control devices and roadway design features such as intersection chokers or speed humps may require traffic studies to comply with the California Environmental Quality Act (CEQA). These traffic studies will most probably be required for traffic calming measures such as cul-de-sacs or partial street closures. In these instances all or the majority of traffic will be required to travel upon another street or streets. The impact to these streets must be considered and traffic mitigation, if necessary, must be provided in order to minimize the impact on these streets. Compliance with the CEQA requirements will lessen the concerns and the need for litigation against the City.

City staff will determine on a case by case basis the extent of the traffic study or other studies necessary to comply with CEQA. There are no legal cases on file which have quantified when a city must mitigate additional vehicles on a street as a result of a nearby traffic calming modification.

The cost of the study should be borne by the petitioning neighborhood. Some cities have a 50/50 split whereas other cities pay for the first $10,000 and the neighborhood the remainder. This is an item to be discussed.

9. STUDY RESULTS ON THE EFFECTS OF VARIOUS TRAFFIC CALMING METHODS

City staff, Police personnel, City Manager's Office, and the Mayor and City Council have all been inundated with requests for speed humps, street closures, chokers, or any other traffic calming method to slow drivers or reduce the amount of traffic on a street. The following tables have been included in an effort to educate the public regarding the results determined by other cities in implementing various traffic calming methods. In particular most of the emphasis is on speed humps. speed tables, and stop signs. These traffic calming methods are the most requested by residents. Staff of the various cities completed before and after studies in an effort to understand the effects of the various traffic calming methods. The following tables are taken from *Traffic Calming, State of the Practice*, ITE, August 1999.

A. Speed and Volume Data Before and After Traffic Calming

The effects of various traffic calming methods are very site specific in relation to the effects on speeds and volume of traffic. The after effect of a traffic calming installation is very dependent upon the geometrics and spacing of the measures, availability of alternate routes, the treatment of nearby streets in regards to calming improvements, and many other factors. Speed distributions are represented by 85th percentile speeds in traffic engineering studies. It represents the most probable highest safe speed driven by most motorists. The ITE *Traffic Calming* book tabled the speed results of hundreds of studies in their Appendix A. The first two pages of this information are shown on pages 44 & 45.

A summary of this information is provided on page 46. This summary table reveals the results of ten traffic calming measures and their after effects on speed. A warning must be given regarding the before and after numbers: the exact locations of the measurements may be at different locations as a result of the placement of the traffic calming device; also, the dates and times of the before and after studies maybe 1 month to 3 years before or after the installation of the measure, which could affect the results; and the number of surveyed samples may be to small to obtain a reasonable result. This table shows that the speed humps have the greatest impact on speed reduction by an average of 7 mph.

Also, at the bottom of this chart are two graphs which show the speed results as compared to the distance from the speed hump as studied by the City of Portland. The most impact is within the first one hundred feet on either side of the speed hump. Beyond one hundred feet, the affect on lowering the speed of a driver minimizes.

APPENDIX A

Speed and Volume Data Before and After Traffic Calming

Community/Location	Measure	85th Percentile Speed (mph)			Volumes (vehicles/day)			Comments
		Before	After	% Change	Before	After	% Change	
Austin, TX								
Richcreek Rd	12' humps	37	30	-19	503	543	8	Average or sum of two directions - speed data collected between humps - in most cases, before data 3 to 9 weeks before installation - after data collected from 2 weeks to 24 months after installation
Pasadena Dr	12' humps	36	31	-14	523	535	20	
Aspen Creek Pkwy	12' humps	38	26	-32	561	388	-31	
Woodland Ave	12' humps	40	28	-30	7,611	7,018	-8	
Roundup Tr	12' humps	39	31	-22	734	469	-36	
Cedar St	22' tables	35	28	-20	468	383	-18	
Broad Oaks Dr	22' tables	40	31	-23	357	290	-19	
Sunstrip Dr	22' tables	37	28	-24	932	952	2	
Rockpoint Dr	22' tables	36	30	-17	421	460	9	
Pack Saddle Pass	Diagonal diverter	N/A			3,600	1,400	-61	Data collected two blocks away - temporary diverter removed - traffic diverted to neighboring streets
Frontier Trail	Diagonal diverter	N/A			800	500	-38	Data collected one block away
Morrow St	Forced turn island and turn restriction	N/A			8,420	3,763	-55	Data collected four blocks away - Blocks westbound movement on Morrow St at Lamar Blvd
Davis St	Half closure	25	23	-8	2,233	568	-75	Data collected same block as half closure
Rainey St (70 blk)	Circle	33	35	6	389	269	-31	Part of neighborhood traffic calming treatment involving half closures, speed cushions, traffic circle, and neckdowns (temporary installations)
Rainey St (80 blk)	Speed cushions	35	28	-20	3,323	2,321	-30	
Rainey St (90 blk)	Speed cushions and neckdown	28	22	-21	835	1,869	124	
River St (600 blk)	Circle	N/A			610	590	-3	
River St (700 blk)	Circle	26	27	4	3,152	2,033	-36	

Note. In Appendix A, the 20 communities featured in this report are listed first, alphabetically. Data for several other communities follow.

Community/Location	Measure	85th Percentile Speed (mph)			Volumes (vehicles/day)			Comments
		Before	After	% Change	Before	After	% Change	
Bellevue, WA								
Somerset Dr	12' humps	39	27	-31	795	746	-6	Between humps - only alternate route consists of circuitous local streets - speeds at humps = 12–15 mph at 4" humps; 23–26 mph at 3" humps that replaced 4" humps
Highland Dr	12' humps	36	25	-31	1,702	1,934	14	No parallel route available - after measurement soon after installation
128th Ave NE (S of NE 2nd)	12' humps	33	27	-18	1,305	1,022	-22	
162nd Ave SE	12' humps	37	27	-27	1,472	1,071	-27	Good alternate route on parallel collector (161st Ave SE) - after measurement soon after installation - also report 2 years after
SE 63rd St	12' humps with chokers	36	25	-31	2,456	2,593	6	No parallel route available (Forest Dr would seem to provide good alternate) - also report speeds at humps
NE 39th St	12' humps with chokers	39	25	-35	3,685	2,931	-20	Good alternate route available on collector road (NE Northrup Way) - also report speeds at humps
108th St SE (location A)	22' tables	35	29	-17	2,540	1,942	-24	Speeds measured between tables - good alternate routes available on collector roads (Bellevue Way and 112th Ave, SE)
108th St SE (location B)	22' tables	34	31	-9	2,223	1,809	-19	
108th St SE (location C)	22' tables	35	31	-11	2,346	1,885	-20	
128th Ave NE (N of NE 5th St)	Half closure	N/A			770	442	-43	Data collected same block 20% violation rate
128th Ave NE (N of NE 5th St)	One-lane angled choker	31	28	-10	770	331	-57	Replaced half closure that was frequently violated
SE 46th Way	Circle with neckdowns	34	28	-18	N/A			
Berkeley, CA								
Acton St	12' humps	29	22	-24	N/A			Also report speeds at humps and range of speeds between and at humps - smaller range of speeds after than before installation
Berkeley Way	12' humps	31	22	-29	N/A			
Bonar St	12' humps	32	21	-34	N/A			
Capistrano Ave	12' humps	32	24	-25	N/A			
Catalina Ave	12' humps	25	22	-12	N/A			
Cornell Ave	12' humps	30	25	-17	N/A			
Curtis St	12' humps	34	28	-18	N/A			
El Camino Real St	12' humps	28	23	-18	N/A			

Table 5.1. Speed Impacts Downstream of Traffic Calming Measures.

Sample Measure	Sample Size	85th Percentile Speed (mph)*		
		Average After Calming	Average Change After Calming	Percentage Change*
12-foot humps	179	27.4 (4.0)	-7.6 (3.5)	-22 (9)
14-foot humps	15	25.6 (2.1)	-7.7 (2.1)	-23 (6)
22-foot tables	58	30.1 (2.7)	-6.6 (3.2)	-18 (8)
Longer tables	10	31.6 (2.8)	-3.2 (2.4)	-9 (7)
Raised intersections	3	34.3 (6.0)	-.3 (3.8)	-1 (10)
Circles	45	30.3 (4.4)	-3.9 (3.2)	-11 (10)
Narrowings	7	32.3 (2.8)	-2.6 (5.5)	-4 (22)
One-lane slow points	5	28.6 (3.1)	-4.8 (1.3)	-14 (4)
Half closures	16	26.3 (5.2)	-6.0 (5.2)	-19 (11)
Diagonal diverters	7	27.9 (5.2)	-1.4 (4.7)	-4 (17)

*Measures within parentheses represent the standard deviation from the average. This table is summarized from data presented in appendix A.

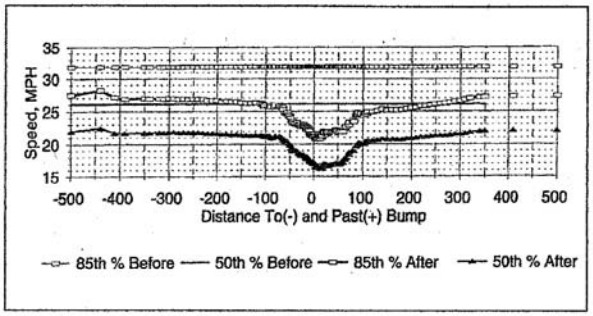


Figure 5.22. Speed Profile for a 14-foot Hump. (Portland, OR)

Source: Bureau of Traffic Management, City of Portland, June 1997.

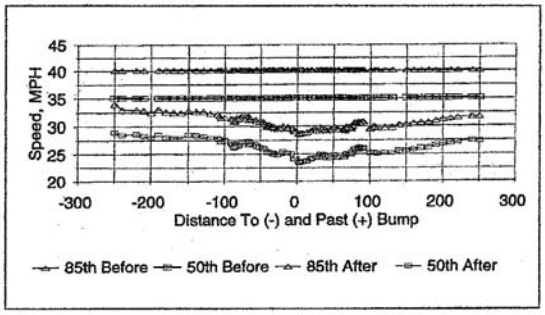


Figure 5.23. Speed Profile for a 22-foot Table. (Portland, OR)

Source: Bureau of Traffic Management, City of Portland, June 1997.

B. Accidents Before and After Traffic Calming

A question which is sometimes asked is "what are the affects of the various traffic calming methods on collisions?" Assumed is as a result of the lower speeds, eliminating conflicting movements and having drivers become more aware, that the traffic calming methods result in a lower number of collisions. Most traffic calming methods result in lowering of the volume of traffic. As a result the collisions may move elsewhere as motorists divert to other streets. In this country, traffic calming is restricted to low volume residential streets where collisions occur infrequently to begin with and collision rates get lost in the random variations from year to year. The next table reveals the collision frequencies before and after traffic calming from unpublished documents. Taken From Table 5.7, *Traffic Calming: State of the Practice*, ITE. The overall reduction is collisions after adjusting for the reduction in volumes is only 4%.

				Average Annual Collisions
Traffic Calming Measures	# of Sites	Before Calming	After Calming	Percentage Change
12-foot humps	50	2.62	2.29	-13
14-foot humps	5	4.36	2.62	-40
22-foot tables	8	6.71	3.66	-45
Circles	17	5.89	4.24	-28
Overall	193	2.54	1.24	-51
Sites with volume data	55	4.43	3.22	-27
Rate adjusted for decrease in volume data	55	3.36	3.22	-4

10. RESULTS OF 10 SPEED SURVEYS ON RESIDENTIAL STREETS

The Police Traffic Division and the Engineering Services Department of the City of Redondo Beach are aware of streets where concerns regarding speeding and high traffic volumes have been mentioned in the past. Additional enforcement and signage improvements have occurred at most of these locations. The City obtained machine speed counts for a week at these locations, as if the City were to study these locations for speed hump installations. The following table reveals the results of these machine counts. Speeds on the ten streets vary from 28 to 45 mph and average volumes varied from 243 to 884 per direction per day. From this is the type of data and variation in results, the City must develop a policy regarding the installation of speed humps or speed cushions based on traffic volumes and 85%ile speeds.

SAMPLE OF RESIDENTIAL STREET SPEEDS

Location	Direction	85th Percentile	Average # Vehicles/Day	Start Date	End Date
611 Ave. D	Westbound	46 MPH	408	8/24/05	8/30/05
	Eastbound	28 MPH	372	9/2/05	9/8/05
218 Ave. F	Westbound	38 MPH	884	8/24/05	8/30/05
	Eastbound	33 MPH	1099	9/12/05	9/18/05
3022 Dow	Northbound	28 MPH	283	8/24/05	8/30/05
	Southbound	27 MPH	279	9/2/04	9/8/05
220 S. Guadalupe	Northbound	31 MPH	251	8/24/05	8/30/05
	Southbound	31 MPH	201	9/1/05	9/7/05
1709 Huntington	Eastbound	32 MPH	579	8/24/05	8/30/05
	Westbound	31 MPH	449	8/24/05	8/30/05
222 N. Juanita St	Northbound	29 MPH	335	8/24/05	8/30/05
	Southbound	28 MPH	359	8/24/05	8/30/05
809 N. Paulina Ave	Northbound	33 MPH	243	8/24/05	8/30/05
	Southbound	33 MPH	350	8/24/05	9/19/05
2011 Rockefeller	Westbound	32 MPH	487	8/24/05	8/30/05
(one-way street)					
1916 Ruhland Ave	Eastbound	38 MPH	540	8/24/05	8/30/05
	Westbound	33 MPH	534	8/24/05	8/30/05
1808 Spreckles Ln	Eastbound	29 MPH	515	8/24/05	8/30/05
	Westbound	28 MPH	364	8/24/05	8/30/05

11. SUMMARY ASSESSMENT OF TRAFFIC CALMING MEASURES

The following table shows a summary of the various traffic calming measures and their various impacts on speed, traffic volume reduction, noise, loss of parking, access restriction to a street, the effects on emergency vehicles particularly fire rescue units, maintenance costs, if any, and the cost of implementation.

12. PRIORITY PLACEMENT OF TRAFFIC CALMING MEASURES

Once a request is received from a resident regarding traffic related problem specifically related to speeding or cut-through traffic, the complaint will be handled with the devices listed in this traffic calming report. New ideas and devices will also be considered as these are developed.

Phase 1 Measures - A majority of the complaints may be resolved through the use of the first of the two E's: Education and Enforcement. A review of the signs in the neighborhood and/or striping may result in a need to refurbish these items. Further review may result in an analysis of engineering needs and referral as a Phase 2 measure. The need to have the police respond by enforcement will also be considered and authorized if necessary. The police may use the Volunteer's In Policing (VIP's) to 'shoot' radar for 2 hours to confirm a speeding concern. The traffic engineer may also use machines to verify the traffic volume and the speeding. The resident or residents may be given pamphlets educating them on the possible upcoming procedures and the effect the requested measure may have on the street and neighborhood. The traffic calming measures used in these measures will be designated as Phase 1 measures. Phase 1 measures will be administered by staff and do not require commission or council action.

Phase 2 Measures – these measures require the determination by the City that the Phase 1 measures are not working. Phase 2 measures will require a petition from the neighborhood and public meetings at the Public Works Commission and the City Council level. Phase 2 measures will implement the Engineering portion of the 3 E's. The traffic calming measures in Phase 2 will require physical modifications to the driver's travel pattern by the use of signs or physical roadway design features. These modifications should not require an extensive Environmental Impact Report. A minor traffic study may be required to satisfy the concerns of the residents on an adjacent street which may be impacted.

Phase 3 Measures – these measures require the determination by the City that the Phase 1 and Phase 2 Measures are not working if implemented. A petition from the neighborhood will be required, if not previously provided. The Phase 3 measures most probably will require an enhanced traffic study to fulfill the requirements of the CEQA process. The Phase 3 Measures have the most probability of affecting other neighborhood or city streets. Public meetings will be required before the Public Works Commission and the City Council.

Generalized Assessment of Traffic Calming Measures

Measure ^	Phase ^	Reduces Speed	Reduces Traffic	Noise	Loss of Parking	Restricts Access	Emergency Impacts	Maint-enance	Cost
Radar Trailer	1	Maybe	No	No Change	None	None	None	No	$10-12K
Speed Limit Signing	1	Maybe	No	No Change	None	None	None	Occasional	$250 /sign
Sign Post Reflector	1	Maybe	No	No Change	None	None	None	Some	$50 per post
Police Enforcement	1	Yes	Maybe	No Change	None	None	None	No	$75/hr
Slow Children at Play Sign #	1	No	No	No Change	None	None	None	Occasional	$250 /sign
Speed Camera +	1	Yes	Maybe	No Change	None	None	None	Yes	$150K+
Narrowing Lanes	2	Maybe	Maybe	No Change	None	None	None	Yes	$1-4K
Signed Restrictions	2	No	Yes	Decrease	None	Yes	None	Occasional	$250 /sign
Fixed Electronic Signs	2	Maybe	No	No Change	None	None	None	Occasional	$10K
Lighted Crosswalks	2	Yes – when in use	Minimal	No Change	None	None	None	Occasional	$22-60K
Chicane	2	Yes	Maybe	No Change	Yes	Maybe	Some	Occasional	$30-50K
Intersection Channelizing	2	Yes	Maybe	No Change	Yes	None	None	Maybe	$15-20K
Median Islands	2	Yes	Maybe	Decrease	Yes	Yes	Yes	Yes	$15-75K
Curb Extensions	2	Yes	No	No Change	Yes	None	Yes	Yes	$15-50K
Chokers	2	Yes	Maybe	No Change	Yes	None	Some	Yes	$15K
Speed Humps	3	Yes	Maybe	Increase	None	None	Yes	Yes*	$15K
Speed Cushions	3	Yes	Maybe	Increase	None	None	Some	Yes*	$5K+
Speed Table	3	Yes	Maybe	Increase	Yes	None	Yes	Yes*	$15-30K
Raised Crosswalk	3	Yes	Maybe	Increase	Yes	None	Yes	Yes*	$8-15K
Raised Intersection	3	Yes	Maybe	Increase	Maybe	None	Yes	Yes*	$40K+
One-Way Street	3	Maybe	Yes	Decrease	None	Yes	None	None	$1-5K
Traffic Circles	3	Yes	Maybe	No Change	Yes	Maybe	Yes	Yes	$8-25K
Roundabout	3	Yes	No	No Change	Yes	None	Some	Yes	$75K+

Stop Signs	3	Maybe	Maybe	Increase	None	None	Yes	Occasional	$300 /sign
Signal	3	Maybe	No	Increase	Yes	None	Some	Ongoing	$150K+
Movement Barrier	3	Maybe	Yes	Decrease	None	Yes	Yes	Yes	$15K
Entrance Barrier	3	Maybe	Yes	No Change	Maybe	Yes	Yes	Occasional	$15-20K
Diagonal Diverter	3	Maybe	Yes	No Change	Maybe	Yes	Yes	Yes	$25-50K
Street Closure	3	Maybe	Yes	Decrease	Maybe	Yes	Yes	Yes	$10-30K
Red Light Camera	3	Maybe	No	No Change	None	None	None	Yes	$50K+

^ In no particular order

* Must be reinstalled each time a street is resurfaced.

+ Not approved by State law – only San Jose has this system

- not an official traffic control device

13. CURRENT POLICIES USED BY THE CITY OF REDONDO BEACH REGARDING VARIOUS TRAFFIC AND PARKING ISSUES

Currently the City Engineer and Transportation Engineer respond to many requests for stop signs, red curbs about driveways, residential disabled parking spaces, residential permit parking, and time limit parking affecting residential areas. The policy for each of these issues is shown on the latter pages of the attachments.

ATTACHMENTS

To: Bob English
Frm: Sylvia G.
FYI

Survey Concerning Speed Humps

November 24, 2003

Respondent agencies who allow or do not have speed humps, are as follows:

City & Respondent	Comments
City of Wasco; C. Alan Whitten; alwhitten@CI.WASCO.CA.US	We have just reciently enacted a traffic impact fee, that for the first time is giving us the option of installing traffic calming measures. We are also in the process of formulating policy for the installation of traffic calming devices. I can tell you that we have generaly had a negitive reaction to speed bumps, and a more positive reaction to the 'speed table' option. A good resource for different traffic calming measures can be found at www.trafficcalming.org I can tell you that the City of Bakersfield has quite a good speed bump policy. Contact Steve Walker at (661) 326-3724.
City of Torrance; Ted Semaan; tsemaan@tormet.com	The City of Torrance does not have any speed humps installed on our streets.....yet. Speed Humps are a component of our Neighborhood Traffic Management (Calming) Program adopted by the Council in 1998. The SH's were approved in concept but not by design. Approximately one year ago, our division prepared a design for Speed Humps and took it to the Traffic Commission for discussion and concurrence to the design with the goal of taking the design to Council for approval. The design was very similar to that used by the City of Los Angeles and many surrounding cities in which the SH's are 12' wide and 2 5/8" high. We have not taken the design to the Council yet. Our approach in addressing their consideration along with other Traffic Calming tools has been to take specific location requests into a neighborhood forum. We determine the extent of the neighborhood to be considered, which will include any surrounding streets that may be potentially impacted and homeowners we anticipate to utilize this street as part of their commute. The second parameter we use is to identify the neighborhood by the surrounding arterial streets. Lastly, we use the school attendance boundary for the notification. By utilizing the Neighborhood approach, we have had residents from surrounding streets or those utilizing the streets, yet from the "neighborhood", object to the installation of speed humps. The objections are similar to what you have heard before (noise, inconvenience, squealing wheels, etc...). In addition, some of those opposing SH's have referenced driving over ones installed in neighboring jurisdictions and their displeasure with their impact. We have taken several of these neighborhood meetings to the Traffic Commission and the City Council. In all cases, the Commission and Council have agreed not to install the speed humps. I have a feeling that will change at sometime in the future, we'll wait and see. I hope this helps, please let me know if you require any additional information.
City of Daly City; Peter Gleichenhaus; pgleichenhaus@dalycity.org	We do not permit speed bumps on city streets. Our Fire Department has convinced us that any benefits from such traffic control devices are overcome by the disadvantage to the ability to respond in emergencies in timely fashion.
City of Dublin; Ginger Russell; ginger.russell@ci.dublin.ca.us	To date, the City of Dublin has not allowed speed bumps, undulations, or anything of that type. The major reasons are liability and the fact that they slow the response time for emergency vehicles. Just an "aside" comment - there are humps (fairly severe ones) on my dad's street in Sacramento, and there is the constant sound of vehicles slowing down & revving up as they negotiate the humps, cargo banging in the back of trucks, etc., which would be really obnoxious to me if I lived there.
City of Lodi; Richard Prima; rprima@lodi.gov	Here in Lodi, we have not installed any and have had a few requests. We have considered them recently, but Police and Fire are very skeptical. There's lots of information available on designs for various conditions and I think they are worth considering. One of the biggest problems is coming up with a policy that the City Council can adhere to and the money for installations. I understand some cities require private participation in the cost. I look forward to seeing the results of your survey.
City of Covina; Vince Mastrosimone; vmastrosimone@ci.covina.ca.us	No we do not use speed bumps in Covina.
City of Fairfield; Gene S. Cortright; gcortright@ci.fairfield.ca.us	We do not allow speed bumps on public streets.

Survey Concerning Speed Humps

November 24, 2003

Respondent agencies who allow or do not have speed humps, are as follows:

City & Respondent	Comments
City of Foster; John Lisenko; llisenko@fostercity.org	We do not allow speed humps.
City of Hanford; Karen McAlister; kmcalister@ci.hanford.ca.us	No, we do not allow speed bumps in our city due to liability issues.
The City of Irvine; Barry Greenstein; bgreenstein@ci.irvine.ca.us	The City of Irvine does not permit speed bumps / humps within public streets.
City of Stockton; Barry O'Regan; Barry.O'Regan@ci.stockton.ca.us	City of Stockton does not allow. But the City of Sacrament has a good program. Check out their web page for more information.
City of San Bruno; Scott T. Munns; smunns@ci.sanbruno.ca.us	San Bruno has not allowed speed bumps in the past. We have numerous narrower than standard streets with a large volume of on street parking. This acts as a sort of natural "choker" and tends to keep travel speed down. Pls send me a copy of the results of your survey
Suisun City; Steve Baker; sbaker@suisun.com	We do not allow speed bumps, but we are asked to implement either them or stop signs all the time.

CITY OF REDONDO BEACH POLICY

REQUEST FOR STOP SIGNS AT INTERSECTIONS OF RESIDENTIAL STREETS:

1. The resident must collect signatures from residents of the impacted block in each direction of the location proposed for a stop sign. The petition must state the reasons for the request of additional stop signs at the intersections.

2. Submit the petition to the City Engineer, or Transportation Engineer, of Engineering and Building Services.

3. Engineering Services shall conduct a traffic study including traffic counts, collision history and field observations of the intersection. Engineering Services may also recommend other improvements in an effort not to add additional stop signs. The recommendation to approve additional stop signs shall follow the standards establish within the Manual on Uniform Traffic Control Devices and adopted by the State of California. This portion of the procedure may take from 12 to 18 weeks.

4. The Transportation Engineer will summit his findings and recommendations to the Public Works Commission at a public meeting. Residents will be invited from one block in all directions from the requested location. This portion of the procedure may take an additional 4 to 6 weeks.

5. The Public Works Commission shall recommend or deny the request. The recommendation to install additional stop signs will be presented before the City Council for approval. If the Public Works Commission recommends against the request, the recommendation may be appealed within 30 days to the City Council. This portion of the process may take an additional 4 to 6 weeks depending on the City Council schedule.

6. If the stop sign request is approved by the City Council, the Transportation Engineer will issue a work order to the Public Works Department for installation. This portion of the process may take an additional 4 to 6 weeks.

CITY OF REDONDO BEACH POLICY

REQUEST FOR RED CURBS AT PRIVATE DRIVEWAYS:

1. The resident must contact, via mail, phone or email, the Transportation Engineer requesting the painting of red curb about either side of the driveway. Any resident in a multi-unit residence must also obtain written authorization from the other residents in the complex. The authorization letter may be produced by the requester for the red curb.

2. The minimum red curb allowed shall be no less than 3 feet in length unless physically unable to meet the 3 feet requirement. Red curb shall be painted from 'bottom' of driveway approach.

3. Engineering Services shall conduct a field review and obtain necessary dimensions of the driveway and adjacent curb related features. This portion of the process may take 2 to 4 weeks.

4. Engineering Services will issue a work order to the Department of Public Works if the red curb is approved. This portion of the process may take 6 to 8 weeks.

5. Any additional length of red curb, not to exceed 3 additional feet, beyond the initial 3 feet will require the written authorization of the adjacent neighbor; that is the neighbor on same side as additional extended red curb. Corner residences will be requested to obtain authorization of the adjacent neighbor, regardless of which side driveway red is extended. Additional length of red curb allowed will not exceed 6 feet on either side of driveway. If the neighbor lives in a multi-unit complex, a representative of each unit must sign the authorization.

6. Any red curb requested beyond the 6 feet, per side of driveway, will require the written request from a representative of all residential units on the site. The Engineering Services Department will present the request to the Public Works Commission with 120 days of receipt of request. All residents on the block(s) affected will be invited to this meeting to provide input on the request. The action of the Public Works Commission may be appealed within 30 days to the City Council.

7. Engineering Services will issue a work order to the Department of Public Works upon the approval of the red curb and after the appeal period as ended. This portion of the process may take 6 to 8 weeks.

The above red curb policy is for clearance of parked vehicles from residential driveways. Red curbs for sight distance clearance at intersections, fire hydrants or other hazards please contact the City's Transportation Engineer.

CITY OF REDONDO BEACH POLICY

REQUEST FOR RESIDENTIAL DISABLED PARKING SPACES:

The following documents are required to be delivered to the Transportation Engineer for the City of Redondo Beach:

1. A copy of the disabled placard, license plate, or the DMV registration for the disabled plate;
2. A letter from your doctor stating the present status of your condition. This letter is kept in the file to verify your condition warrants a disabled-parking space;
3. A letter requesting a disabled parking space and the location: this letter must state why the garage cannot be used or the driveway for entry by the disabled person; and
4. A letter signed by your immediate neighbors, stating that they approve of the disabled parking space being placed in front of your residence. This includes **all** the neighbors on each side of you. Also if you live in a multi unit complex, **all** of the residents within your complex must sign the letter.

The request may be denied if the driveway is not located on an excessive slope and the topography does not make entry into the residence unreasonable.

Other parking regulations such as no parking for street sweeping are still enforced for the parking location.

There is no charge for the installation of the disabled parking space.

A work order will be written to the Public Works Department if all of the above are justified per the Transportation Engineer.

CITY OF REDONDO BEACH POLICY

REQUEST FOR PERMIT PREFERENTIAL PARKING:

1. The resident must obtain a petition of the neighborhood signed by occupants of no-less than 66% of the dwelling units comprising no-less that 50 percent of the developed frontage of the areas proposed for the preferential parking zone. The petition must state the fee charged for the preferential parking permit, the schedule of fines, and the hours and days the neighborhood is impacted by nonresident vehicles.

2. Submit the petition to the City Engineer, or Transportation Engineer, of Engineering and Building Services.

3. Engineering Services shall conduct a parking survey to determine if the street parking is excessively impacted by the parking of commuter vehicles. Street parking is excessively impacted when more than 75% of the legal on-street parking spaces are occupied by vehicles; and more than 25% of the legal on-street parking are occupied by nonresident vehicles. The City Engineer may consider other factors such as enforcement of parking regulations or impact to adjacent areas with the establishment of a preferential parking zone in regards to approving or denying the request.

4. If the City Engineer determines the street shall be so designated, the recommendation shall be presented before the Public Works Commission. A public hearing shall be given with the owners and occupants of each parcel given notice of such meeting.

5. The Public Works Commission shall recommend or deny the request. If the Public Works Commission recommends against the request, the recommendation may be appealed within 30 days to the City Council.

The above process is explained in detail in Sections 3-7.1701 through 3-7.1706 of the Redondo Beach Municipal Code.

CITY OF REDONDO BEACH POLICY

REQUEST FOR TIME LIMIT PARKING AFFECTING RESIDENTIAL PARKING:

In an effort to control on-street parking, a resident may follow the following procedures to request the installation or modifications of signs to regulate on-street parking.

1. The resident must obtain a petition of the neighborhood signed by occupants of no-less than 66% of the dwelling units comprising the street frontage affected by the non residential parking. The petition must state the times and days of the impact resulting from the non residential parking of vehicles. Time limit parking is allowed only between the hours of 8:00 a.m. and 6:00 p.m. of any day, except Sunday.

2. Submit the petition to the City Engineer, or Transportation Engineer, of Engineering and Building Services.

3. Engineering Services shall conduct a parking survey to determine if the street parking is excessively impacted as a result of proximity to nearby businesses or employment centers, or other reasons where the unrestricted parking of vehicles would cause traffic congestion or deprive the public use of available curb space.

4. If the City Engineer determines the street is impacted by the unrestricted parking of vehicles then a recommendation will be referred to the Public Works Commission to install 1 hour, 2 hour, 3 hour or 4 hour time limit parking. A public meeting shall be given with notification of the meeting sent to the owners and occupants of each parcel.

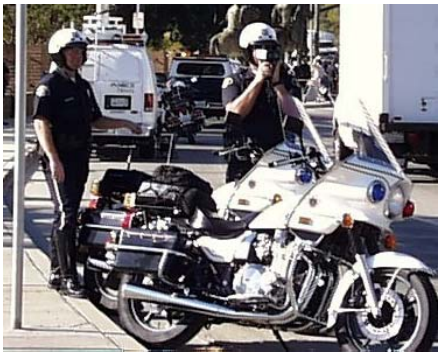
5. The Public Works Commission shall recommend or deny the request. If the Public Works Commission recommends against the request, the recommendation may be appealed within 30 days to the City Council.

The installation of time limit parking for a residential area is permitted through Redondo Beach Municipal Code Section 3-7.1302.

TRAFFIC CALMING TOOLKIT



EDUCATION



ENFORCEMENT



ENGINEERING

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

DEPARTMENT OF TRANSPORTATION

PURPOSE

The purpose of the Traffic Calming Toolkit is to provide residents and community leaders with information about the City of San José's Traffic Calming Policy (included in the Appendix). Effective traffic calming employs the **3 E's: Education, Enforcement and Engineering**. This Toolkit is designed to provide community leaders with a model to guide residents toward a better understanding of the available tools and the necessary steps to seek basic and comprehensive traffic calming services. Primary contacts for traffic calming services are:

For **traffic safety education**, contact San José's *Street Smarts* program at:

Website:	**www.getstreetsmarts.org**
Email:	**info@getstreetsmarts.org**
Phone:	**(408) 975-3238**

For **traffic enforcement**, contact the Police Department's Traffic Enforcement Unit (TEU) at:

Website:	**www.sjpd.org/TEU**
Enforcement requests:	**www.sjpd.org/_forms/TEU_Request_Form.asp**
Phone:	**(408) 277-4341**

For **parking enforcement**, contact the Parking Compliance Unit at:

Website:	**www.sanjoseca.gov/transportation/parking_enforcement.htm**
E-mail:	**parking.compliance@sanjoseca.gov**
Phone:	**(408) 534-2900**

For **traffic calming** issues regarding traffic engineering, contact the Department of Transportation (DOT) at:

Website:	**www.sanjoseca.gov/transportation/traffic_calming.htm**
E-mail:	**traffic.calming@sanjoseca.gov**
Phone:	(**408) 535-3850** [ask for Neighborhood Traffic Management and provide your City Council District or nearest cross street]

More helpful contacts available at: **www.sanjoseca.gov/transportation/c_departmentcontact.htm**.

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CITY OF SAN JOSÉ
Department of Transportation
200 East Santa Clara Street,
8th Floor Tower
San José, CA 95113-1905
(408) 535-3850
Fax: (408) 292-6090

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SECTION

1 What Is Traffic Calming?



Traffic Calming is the management of vehicular and pedestrian traffic so that its negative impacts on neighborhoods and schools are minimized.

TRAFFIC CALMING OVERVIEW

High traffic speeds and volumes, as well as inappropriate driver behavior, can adversely impact neighborhoods. These conditions can also have a negative effect on pedestrians and bicyclists, particularly near schools, community centers, libraries or parks. The City responds to these conditions by conducting traffic engineering studies which may result in the installation of traffic control devices, pedestrian and bicycle improvements or physical roadway features. San José's Police and Transportation Departments may also deploy officers to enforce traffic and parking regulations and to provide education to school children and communities. These efforts are referred to as ***traffic calming***.

San José has two levels of traffic calming: Basic and Comprehensive

San José's Traffic Calming Policy describes the general processes and responsibilities related to traffic calming so that interested parties can effectively access this City service. San José's traffic calming services are categorized into two levels: **Basic and Comprehensive**. A summary of traffic calming measures, objectives and guidelines are located in the Appendix. More general information on available traffic resources is located at the San José Department of Transportation (DOT) website at: http://www.sanjoseca.gov/transportation.

SECTION

2

Evaluation and Implementation



Comprehensive traffic calming can be considered when

Basic traffic calming has not addressed adverse conditions.

OVERVIEW

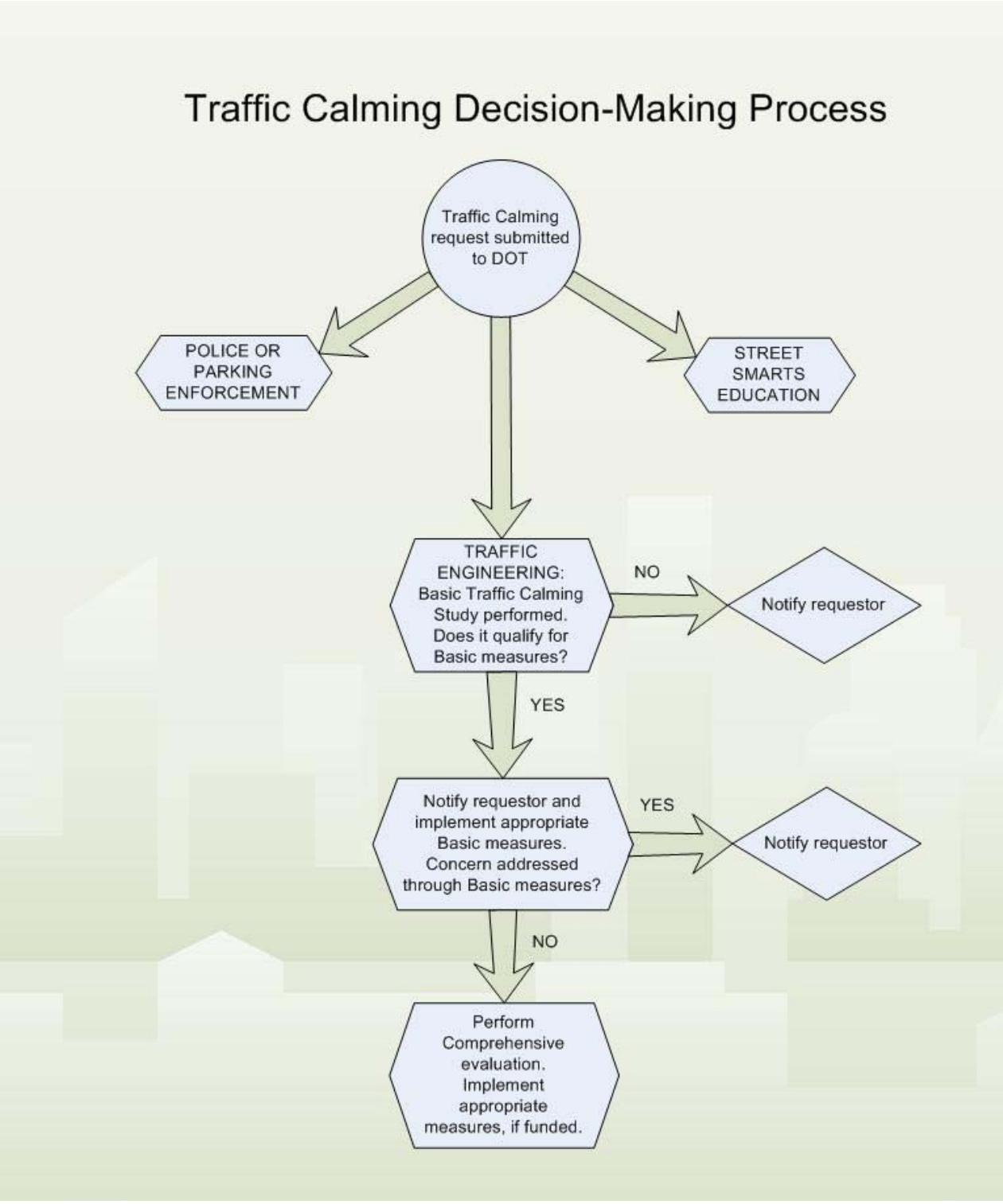
Individuals and organizations having traffic concerns may begin by contacting San José's Department of Transportation (DOT) at **traffic.calming@sanjoseca.gov or (408) 535-3850**.

San José's Traffic Calming Policy establishes the criteria and procedures for traffic calming in the City. DOT will perform the appropriate study to address the requester's specific concern and situation. The nature and severity of the concern, verified through field observation and/or data collection, will determine which traffic calming measure(s) should be implemented. The goal is to complete Basic traffic calming engineering studies within 35 days of the receipt of the request (may vary based on staffing levels). Traffic enforcement is provided by the San José Police Department's Traffic Enforcement Unit, and enforcement requests will be completed based on their current staffing and workload levels. If traffic safety education is requested or recommended to address driver, pedestrian and/or bicyclist behavior, the goal is to perform a traffic safety education presentation within eight (8) weeks. However, the presentation schedule is often dependent upon coordination of a desired timeframe with neighborhood or school representatives. Traffic concerns that require Comprehensive measures will first have trial installations to assess the effectiveness and neighborhood support for the devices, as well as to allow for minor adjustments to size and shape before final permanent installation. Installation of major roadway features requires City Council approval, which will extend the time period before installation. The goal is to take the time to conduct an appropriate level of outreach to ensure sufficient community involvement and awareness of intended actions. The traffic calming decision-making process is shown in the following diagram:

The Street Smarts program provides traffic safety education.

SJPD's Traffic Enforcement Unit provides traffic enforcement.

Parking and Traffic Compliance provides parking enforcement.


Traffic Calming Decision-Making Process
Traffic Calming request submitted to DOT
POLICE OR PARKING ENFORCEMENT
STREET SMARTS EDUCATION
TRAFFIC ENGINEERING: Basic Traffic Calming Study performed. Does it qualify for Basic measures?
NO
Notify requestor
YES
Notify requestor and implement appropriate Basic measures. Concern addressed through Basic measures?
YES
Notify requestor
NO
Perform Comprehensive evaluation. Implement appropriate measures, if funded.

BASIC TRAFFIC CALMING

Basic traffic calming services include the installation of traffic control devices (such as crosswalks, stop signs, residential permit parking, truck restrictions and bike lanes), traffic enforcement by SJPD's Traffic Enforcement Unit, and traffic safety education from DOT's Street Smarts program. The application of Basic and Comprehensive – Level 1 and 2 devices are subject to federal, state and local policies and guidelines.

COMPREHENSIVE TRAFFIC CALMING

Neighborhoods that are experiencing adverse traffic conditions that cannot be addressed using Basic traffic calming services may be eligible for a Comprehensive traffic calming project. If an adverse traffic condition cannot be addressed through Basic traffic calming services, a Comprehensive traffic calming analysis can be initiated.

Comprehensive traffic calming projects are limited to residential, 2-lane local or neighborhood collector streets.

The implementation of Comprehensive traffic calming projects is limited to residential, 2-lane local or neighborhood collector streets, with a maximum posted speed limit of 30 mph. Streets designated as General Plan streets, transit routes or used as emergency response routes are generally not considered for Comprehensive traffic calming measures, except for dynamic speed signs and messaging systems. These roadways, by their classification or function, are intended to carry higher volumes of traffic to accommodate a large vehicle mix.

THRESHOLD CRITERIA FOR COMPREHENSIVE PROJECTS

The following threshold criteria must be met to be considered for the implementation of Comprehensive traffic calming projects:

<u>Local Streets (25 mph posted speed limit, 1,000 – 3,000 vehicles/day):</u>

- ✓ 85th percentile speed of 33 mph or more

or

- ✓ 40% or more of the daily traffic is cut-through traffic, where cut-through traffic is defined as traffic entering a neighborhood with a destination outside of that neighborhood

Neighborhood Collector Streets – connects local streets to major streets (25 or 30 mph posted speed limit, 1,000 – 6,000 veh/day):

- ✓ 85th percentile speed of 33 mph or more on 25 mph posted streets

or

- ✓ 85th percentile speed of 37 mph or more on 30 mph posted streets

PRIORITIZATION OF ELIGIBLE COMPREHENSIVE PROJECTS

Eligible Comprehensive traffic calming projects will be prioritized for implementation based upon the severity of the traffic conditions by taking into account the following cumulative traffic impacts: speeding, volume, cut-through traffic, crash history, proximity to pedestrian generators (like schools, parks, community centers) and unique roadway conditions. Priority points will be assigned per the following table:

Eligible Comprehensive projects are prioritized to be implemented based on traffic impacts.

Speed	2 points for each mph difference between the 85th percentile speed and the posted or *prima facie* speed limit
Volume	1 point for each 500 vehicles over 1,000 vehicles per day; 5 points if 40 – 65% or more ADT on local street is cut-through traffic between arterials or major roadways; 10 points if higher than 65%
Crash History	5 points for each speed-related crash in the past 3 years
Pedestrian Generators (15 points max.)	5 points for each school, park or trail access, library or community center along roadway; 3 points if within 1 block; 2 points if within 2 blocks
Unique Conditions (15 points max.)	5 points for designation as a Bike Route or as a General Plan pedestrian corridor, or for proximity to neighborhood business district or existing/planned transit hub; 5 points for evidence of crashes or speeding, such as long skid marks or broken glass; 5 points for missing sidewalk section; 5 points for unique roadway geometry that substantially restricts visibility; 5 points for high crash rate

At the close of each funding cycle (fiscal year), the highest ranked projects will be considered for construction in the following fiscal year, dependent upon funding, resource availability and community support. However, adjustments in schedules of traffic calming projects may be made based on coordination with scheduled capital improvement or private development projects or on availability of funding specific to the project.

REASSESSMENT OF WARRANTED COMPREHENSIVE PROJECTS

Projects not selected in a given funding cycle will remain on the priority list for consideration in the next funding cycle and prioritized along with any newly eligible projects. As resources permit, projects may be reassessed to ensure that the priority ranking reflects any significant changes in land use, speed, volume, crash history, pedestrian activity or other conditions that may have occurred on any given roadway(s).

COMMUNITY SUPPORT FOR COMPREHENSIVE PROJECTS

Substantial community support is required for the installation of physical roadway devices on either a trial or permanent basis, including the active involvement of a neighborhood traffic committee. Generally, committee members must own property or reside within the affected project area. If the project area falls within a recognized Neighborhood Association, then the traffic committee should also include a member from that Neighborhood Association. Utilizing relevant data and community input, DOT and the traffic committee will develop a proposed traffic calming plan. Based on potential impacts of the proposed plan, DOT will determine the affected project area. The traffic committee will distribute a petition developed by DOT to all households, businesses, schools and absentee property owners within the project area. The petition must have majority support (50% + 1) of all affected households, businesses and schools within the project area for implementation of trial and permanent installations. In addition, some physical devices impact adjacent property owners more than others and have specific installation guidelines and criteria to meet.

Substantial community support is required for the installation of physical roadway devices.

COMPREHENSIVE PROJECT SCHEDULE

Most Comprehensive projects will require a trial installation, which will generally occur within four (4) months from the date the plan was finalized

and supported by the community or approved by the City Council. The duration of the trial will normally be six (6) months, during which time City staff will evaluate the effectiveness of the installation. Minor adjustments may be made to the installation based upon review by City staff and input from the community. Based on all relevant data and community input, DOT (in coordination with the traffic committee) will develop a proposed plan and schedule for permanent installation of the Comprehensive project that will be presented to the community for approval.

Level 1 projects supported by the community will be programmed for installation. Community-supported Level 2 projects will be presented to the City Council for consideration and, if approved, programmed for installation. Installation of final Comprehensive projects will be dependent on the complexity of the project and the available resources for construction and ongoing maintenance of installed devices.

The City may accept donations for implementation and ongoing maintenance of eligible Comprehensive projects.

REAPPLICATION FOR COMPREHENSIVE TRAFFIC CALMING

Neighborhoods that do not qualify for a Comprehensive traffic calming project may reapply in two (2) years from the date of DOT's final consideration. The 2-year time period may be waived by the City Traffic Engineer if significant land use changes or other significant change has occurred.

COMMUNITY FUNDING OF COMPREHENSIVE PROJECTS

The City may accept donations from residents, neighborhoods, community groups, schools and/or businesses for the implementation and ongoing maintenance of Comprehensive traffic calming projects that are eligible for installation under the Traffic Calming Policy. Donations need to comply with all provisions of City Council Policy 1-17.

OUTREACH REQUIREMENTS FOR COMPREHENSIVE PROJECTS

Residents, businesses and schools that may be affected by the outcome of a Comprehensive traffic calming project must be notified in writing of any planned actions or schedule. Comprehensive projects that involve the

installation of physical roadway features will normally require at least one community meeting with the households, businesses and schools in the project area. Notices for any community meeting must be distributed at least ten (10) calendar days in advance. Notices are to be provided to all properties within the project area (see "Community Support for Comprehensive Projects" Section), consistent with notification methods in City Council Policy 6-30. Projects will also be coordinated with providers of emergency response services, transit services, utilities and related services.

POLICY EXEMPTIONS FOR COMPREHENSIVE PROJECTS

Local residential street and neighborhood collectors that do not meet the threshold criteria may be eligible for Comprehensive traffic calming measures if the City Traffic Engineer determines that a unique or unusual condition exists which results in negative traffic impacts caused by a high crash rate, vehicles traveling at excessive speeds, significant pedestrian activity or proximity to major traffic corridors or traffic generators that contribute to extraordinary changes to normal traffic conditions. These roadways will be prioritized along with roadways that meet the threshold criteria based on the methodology outlined in the Traffic Calming Policy.

General Plan streets, transit routes and emergency response routes may be eligible for dynamic warning signs or messaging systems if substantial levels of speeding are present as determined by DOT through an engineering traffic study, and as funding is available for their installation and ongoing maintenance.

Streets that do not meet threshold criteria for Comprehensive measures may be considered if there are unique or unusual conditions.

SECTION

3

Basic Traffic Calming Measures



Basic traffic calming measures are those traffic control devices and programs implemented on a day-to-day basis.

OVERVIEW

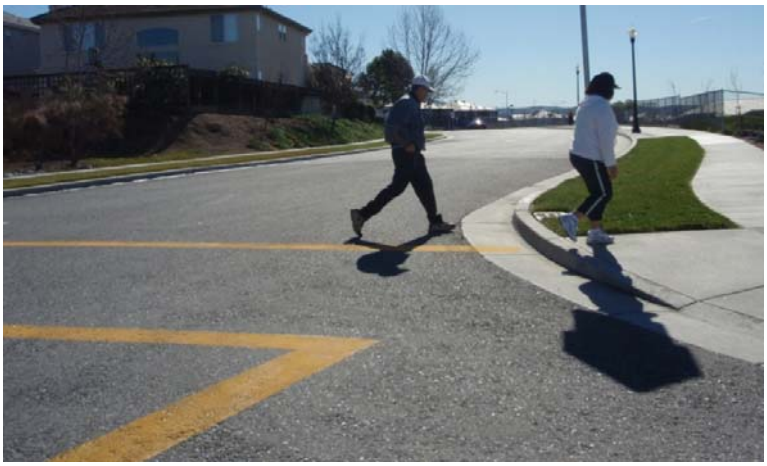
Basic traffic calming consists of those traffic control devices and programs that can be implemented on a day-to-day basis to regulate, warn, guide, enforce and educate motorists, pedestrians and bicyclists. They include standard striping and signing elements as found in the California Manual on Uniform Traffic Control Devices, minor roadway design elements to improve visibility and safety, enforcement by police and parking compliance officers, and safety education programs.

Basic traffic calming is used where most traffic concerns can be addressed using education, enforcement and/or engineering. Basic traffic calming measures include:

- Traffic Safety Education Programs
- Police Enforcement
- Parking Enforcement
- Curb Markings
- Crosswalks
- Radar Trailer
- Edgeline Striping
- High-Visibility Crosswalks
- High-Visibility Signs
- Stop Signs
- Traffic Signage
- Signed Turn Restrictions
- Truck Restrictions
- Residential Permit Parking

Basic traffic calming utilizes the 3 E's:

- ✓ Education
- ✓ Enforcement
- ✓ Engineering



EDUCATION

TRAFFIC SAFETY EDUCATION PROGRAMS

Ever run a red light, jaywalk or speed through a neighborhood or school zone? Many have, and that's why the City of San José created **Street Smarts**, a traffic safety education program to change driver, pedestrian and bicyclist behavior and enhance safety in school zones and neighborhoods. These behaviors are often the root cause of many traffic accidents, and that is why education has become the latest tool that communities are using, in conjunction with engineering and enforcement, to calm traffic. The Street Smarts program brings education about driver, pedestrian and bicyclist behaviors to schools, neighborhoods and senior centers to improve safety on San José streets.

Contact DOT for the Street Smarts traffic safety education program.

Classroom safety posters, school safety flyers, school fence banners, traffic safety education classroom kits (available on CD-ROM) and parent education seminars are available to San José schools. The Street Smarts School Safety Education Program reaches an estimated 28,000 elementary and middle school students annually, through assemblies, bike "roadeos" and helmet fittings and giveaways. This program is provided at no cost to schools.

Each neighborhood that adopts the Street Smarts program receives approximately three hours of driver, pedestrian and bicyclist behavior education, which begins with an interactive and somewhat humorous presentation by DOT staff. This introductory presentation takes approximately one hour, including a question and answer session.

Street Smarts

www.getstreetsmarts.org

In addition, the volunteer receives a Street Smarts Neighborhood Kit and coordinates the distribution of materials from the kit to their neighborhood. Each kit contains items to reinforce the Street Smarts messages through family participation and discussions.

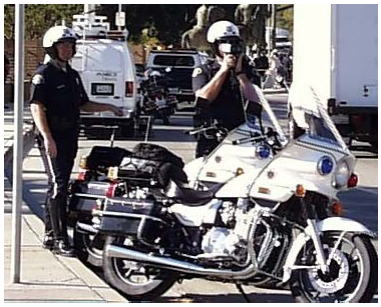
For more information about the nationally recognized Street Smarts traffic safety education program or to schedule a presentation for your school, neighborhood or senior center, please contact DOT's **Traffic Safety Education at (408) 975-3296**.

ENFORCEMENT

POLICE ENFORCEMENT

Police enforcement entails the presence of police to monitor speeds and other inappropriate driving behavior and issue citations when necessary. This method is used as an initial attempt to increase driver compliance on streets. It is most applicable on streets with documented speeding problems or notable stop sign/red light violations that need quick mitigation. It can also be used during the learning period when new devices or restrictions are first implemented. For police enforcement, contact the **Traffic Enforcement Unit (TEU)** of the Police Department via their **on-line enforcement request form or at (408) 277-4341.**

Positive Aspects



- ✓ Effective while officer is actually present at the location
- ✓ Can target specific times deemed to be most problematic
- ✓ Can be implemented on short notice
- ✓ Targets violators without affecting normal traffic

Negative Aspects

- ✓ It is a temporary measure
- ✓ Enforcement may be delayed and/or limited, due to police availability and other policing duties

PARKING ENFORCEMENT

Enforcement of parking regulations is done by DOT's **Parking Compliance**. They also have a team of officers dedicated to enforcing parking regulations in school zones and for vehicle abatement, to address vehicles parked for more than 72 hours. To request parking enforcement, contact the Parking Compliance Unit at **parking.compliance@sanjoseca.gov or (408) 534-2900**.

Positive Aspects



- ✓ Effective while officers are actually present at the location
- ✓ Can be targeted to specific time periods that are deemed to be most problematic

Negative Aspects

- ✓ It is a temporary measure
- ✓ Enforcement may be delayed and/or limited, due to officer availability and other parking duties

ENGINEERING

TRAFFIC ENGINEERING OVERVIEW

Traffic engineering includes the installation of traffic control devices – as governed by federal, state and local policies and guidelines – to address speeding, volume and/or pedestrian safety concerns. DOT will conduct an evaluation to determine the appropriate measures that can be implemented to address the concern. Examples of traffic engineering tools within Basic traffic calming are detailed below.

CURB MARKINGS

Curb markings are special curb paintings that restrict or limit parking along the curb to enhance safety and/or increase visibility of pedestrians and bicyclists or provide specific parking based on an area's parking needs. Curb marking applications include:

- ✓ Red curb at pedestrian ramps
- ✓ Red curb at crosswalk or intersection to increase visibility
- ✓ Red curb at and/or between driveways to increase visibility
- ✓ Blue curb for disabled-accessible parking
- ✓ White and yellow curbs for passenger and freight loading zones
- ✓ Green curb for timed parking



Positive Aspects

- ✓ Provides safer conditions for motorists, pedestrians & bicyclists
- ✓ Easy to install

Negative Aspect

- ✓ Could result in loss of parking, increasing parking demand in the neighborhood

TRAFFIC SIGNAGE

Traffic signs may be installed to make roadway users aware of a roadway condition, to fully utilize parking capacity or to restrict vehicular traffic. Examples include speed limit, curve warning, turn restrictions and parking signage.

Positive Aspects

- ✓ Increases driver awareness of roadway conditions
- ✓ Parking signage maximizes utilization of available parking
- ✓ Turn restrictions can reduce cut-through traffic



Negative Aspects

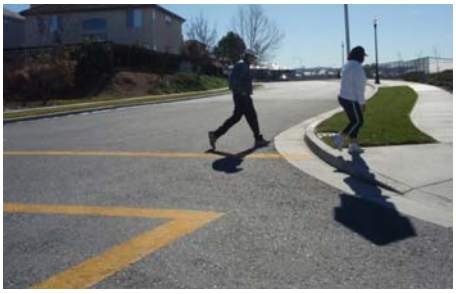
- ✓ Turn restrictions may redirect traffic to other neighborhood streets
- ✓ Too much signage may cause drivers to "tune out" most or all signs
- ✓ Signage is not self-enforcing

CROSSWALKS

Pedestrians may legally cross any City street, except midblock between signalized intersections or where expressly prohibited by signage. A marked crosswalk (at intersection or mid-block) may be installed to help pedestrians to cross a street. The primary function of marked crosswalks is to guide and channelize pedestrians to a preferred crossing location. Marked crosswalks are most appropriate near schools, recreational facilities and other pedestrian generators.

Positive Aspects

- ✓ Provides centralized location for pedestrians to cross street
- ✓ Increases driver awareness of pedestrians
- ✓ Easy to install



Negative Aspects

- ✓ Can provide false sense of security to pedestrians entering traffic
- ✓ May require removal of parking near crosswalk

HIGH-VISIBILITY CROSSWALKS

A high visibility crosswalk is a marked, uncontrolled crosswalk (uncontrolled means it has no Stop signs or traffic signals) that incorporates striping patterns and/or fluorescent green signage to improve the visibility of the crosswalk. High visibility striping is generally used at uncontrolled crosswalks, while high visibility signage is only used at uncontrolled crosswalks.

High visibility crosswalks are mainly used on high volume, multi-lane roadways.



Positive Aspects

- ✓ Further increases driver awareness of pedestrians
- ✓ May slow traffic
- ✓ Requires minimal maintenance for striped crosswalks and signage

Negative Aspect

- ✓ Can provide false sense of security to pedestrians entering traffic

RADAR TRAILER

A mobile radar display trailer informs drivers of their speeds. The radar trailer is applicable on any street where speeding is a problem and there is adequate roadside capacity to accommodate the trailer without creating a hazard.

Positive Aspects

- ✓ Educational tool
- ✓ Good public relations for neighborhoods
- ✓ Effective for temporary speed reduction



Negative Aspects

- ✓ Not self-enforcing
- ✓ Duration of effectiveness is limited
- ✓ May require temporary loss of parking

STOP SIGNS

The California Manual on Uniform Traffic Control Devices states that "Stop signs should not be used for speed control." Stop signs are intended to assign the right-of-way among motorists, pedestrians and cyclists at an intersection. Although many citizens believe that stop signs help reduce speeds on their street, numerous studies have shown that speeds are as high or higher at mid-block than those locations without stop signs. To address speeding concerns, other measures may be available. Stop signs are installed based on San José City Council Policy 8-1 (also located in the Appendix). Criteria for Stop signs include crash history, conflicting vehicular traffic at the intersection, proximity to schools or parks and any unusual conditions, such as the layout of the intersection.

Stop signs are typically used on non-arterial streets and intersections.



Positive Aspects

- ✓ Reduces right-of-way conflicts at an intersection
- ✓ Increases opportunities for pedestrians to cross the roadway
- ✓ May discourage cut-through traffic

Negative Aspects

- ✓ Unwarranted stop signs increase unnecessary delay for the main approaches
- ✓ Pedestrian safety compromised if motorists do not comply
- ✓ Penalizes all motorists on the main street, even those obeying the speed limit
- ✓ Potential traffic diversion onto other streets
- ✓ May increase speeds mid-block, as drivers attempt to make up perceived "lost time" from stopping
- ✓ Potential increase in noise and air pollution in the vicinity of the stop from added stops/starts

More Stop sign information is available on the San José DOT webpage at: **http://www.sanjoseca.gov/transportation/traffic_signsmarkings.htm**.

EDGELINE STRIPING

Edgeline striping is used to create narrow travel lanes which give the impression of a narrow street. This visual narrowing may help reduce overall speeds. Striping can be at curb end or midblock to create a median. Edgeline striping is most applicable on long, wide residential streets with speeding traffic.

Positive Aspects

- ✓ May slow traffic
- ✓ Easy to install and modify as necessary
- ✓ Low cost of implementation



Negative Aspects

- ✓ May not be self-enforcing
- ✓ Painted medians may require loss of parking

TRUCK RESTRICTIONS

Restricting the entry of trucks over 5 tons into residential neighborhoods may be achieved through the posting of truck restriction signs. This method is most applicable on residential streets to help reduce cut-through traffic of commercial vehicles not doing business within that neighborhood. Consideration is given to those streets where truck volumes are 2 – 5% or more of the total daily volume, or there are more than 50 heavy trucks consistently using the street. This element requires City Council approval.

Positive Aspects

- ✓ Redirects commercial traffic onto main streets
- ✓ Reduces noise, air pollution and street degradation due to trucks on residential streets



Negative Aspects

- ✓ Not self-enforcing
- ✓ Does not apply to local trucks doing business in the area

RESIDENTIAL PERMIT PARKING

This program is administered primarily to address continuous parking shortage in residential neighborhoods due to non-residential parking intrusion from outside the neighborhood that cannot be resolved through standard parking prohibitions. Under this program, the neighborhood is designated as a permit parking area via City Council approval. Upon approval, residents must purchase permits for themselves and their visitors to park on streets within that permit parking zone.

Permit parking is not an appropriate solution when the area is experiencing a shortage of parking due to neighborhood parking demand.



Residential permit parking zones have been established in the City of San José to address severe parking shortages adjacent to the HP Pavilion Arena, San José State University, the Convention Center, Civic Center, the Berryessa Flea Market and other areas.

More information on the Residential Permit Parking program is available on San José DOT's webpage at: **http://www.sanjoseca.gov/transportation/permits_parking.htm**.

Positive Aspects

- ✓ Protects the neighborhood from invasive commercial and business parking demand
- ✓ Preserves parking spaces for residents and guests

Negative Aspects

- ✓ Costly to implement, administer and maintain
- ✓ Regular enforcement is necessary for effectiveness
- ✓ Could result in unexpected citations issued to guests
- ✓ Inconvenient for residents due to the renewal process, guest permits, etc.

SECTION

4

Comprehensive Traffic Calming Measures



Comprehensive traffic calming uses physical design features or dynamic signage and warning systems to enhance pedestrian safety or slow traffic within, or divert traffic from, residential neighborhoods.

OVERVIEW

Neighborhoods that are experiencing adverse traffic conditions that cannot be addressed using Basic traffic calming may be eligible for a Comprehensive traffic calming project. Procedures and threshold criteria to determine adverse traffic conditions are detailed in Section 2 – "Evaluation and Implementation." Comprehensive traffic calming projects are classified into two categories – Level 1 and Level 2. All physical features placed in the roadway must not impede emergency response.



SECTION

4a Comprehensive – Level 1



Level 1 measures are intended to address speeding, volume and/or safety concerns using devices that go beyond Basic traffic calming.

OVERVIEW

Level 1 traffic calming generally consists of physical roadway design features or dynamic signage and warning systems designed to slow vehicular traffic within, or divert traffic from, residential neighborhoods, or to enhance pedestrian safety. They are employed when the use of Basic traffic calming measures do not effectively address these concerns. Level 1 traffic calming measures include:

Flashing Beacons
(School zones or crosswalks)
Radar Speed Display Signs
Median Islands
Road Humps
Chokers
Bulbouts
Traffic Circles

FLASHING BEACONS (CROSSWALKS/SCHOOL ZONES)

Flashing beacons are flashing amber lights that can be placed at entrances to school zones (on streets with posted speed limit above 25 mph) or at uncontrolled crosswalks to enhance the visibility of the school zone or crosswalk. Flashing beacons for school zones are activated during the school's pick-up and drop-off times. Flashing beacons at uncontrolled locations with high vehicle and pedestrian volumes are generally activated by pedestrian push-buttons.

Positive Aspects

- ✓ Increases driver awareness of reduced speed limit or crosswalk
- ✓ For schools, can be activated only during school pick-up and drop-off times
- ✓ For uncontrolled crosswalks, can be activated by pedestrian push-button to be visible to drivers only when pedestrians want to cross



Negative Aspects

- ✓ May create false sense of security for pedestrians
- ✓ Added cost to install and maintain
- ✓ At crosswalks, pedestrians may not use push-button
- ✓ Long-term effectiveness may be limited for everyday drivers

RADAR SPEED DISPLAY SIGNS



Radar speed display signs are a permanent version of the radar trailer, where drivers are informed of their speeds. These signs are intended for multi-lane streets with higher speed limits and moderate volumes.

Positive Aspects

- ✓ Increases driver awareness of reduced speed limit
- ✓ Can be activated only during school pick-up and drop-off times
- ✓ Educational tool

Negative Aspects

- ✓ Added cost to install and maintain
- ✓ Long-term effectiveness may be limited for everyday drivers

MID-BLOCK CHOKERS

Chokers are raised islands in the parking zone that can be detached from the curb-line to allow for drainage. Mid-block chokers narrow the roadway and are most applicable on wide streets with long blocks having speeding and cut-through problems. Chokers can have the same narrowing effect as parked vehicles on streets where there is little or no on-street parking. Chokers may be installed with either landscaping or hardscape treatment.

Positive Aspects

- ✓ Narrowed travel lanes can slow vehicle speeds
- ✓ Breaks up driver's sight-line
- ✓ Increases pedestrian and motorist visibility



Negative Aspects

- ✓ Likely loss of parking
- ✓ Narrow lanes redirects bicyclists into vehicular travel lane
- ✓ Debris can collect in between choker and gutter
- ✓ High cost to construct and maintain

MEDIANS

Medians are raised islands in the center of the roadway that separate traffic directions. Medians are used on wide streets to narrow the travel lanes and ease pedestrian crossings. The San José Fire Department must approve this feature, as it may impact their response times.

Positive Aspects

- ✓ Narrowed travel lanes can slow vehicle speeds
- ✓ Provides shorter distance for pedestrians to cross travel lanes
- ✓ Breaks up driver's sight-line
- ✓ Opportunity for landscaping and visual enhancements to the neighborhood

Negative Aspects

- ✓ May interrupt driveway access and result in U-turns at the end of medians
- ✓ Likely loss of parking
- ✓ High cost to construct and maintain



BULBOUTS (DETACHED OR ATTACHED)

Bulbouts narrow the street width at intersections, creating a shorter and safer pedestrian crossing while encouraging drivers to slow down. These may contain special paving or landscaping and are generally used at intersections where parking is already restricted.

Detached bulbouts may be striped or raised islands containing special paving or landscaping while maintaining existing drainage patterns. Attached bulbouts require altering the curb, gutter and sidewalk. These installations also affect the existing drainage patterns, possibly requiring installation of additional storm drains.

Positive Aspects

- ✓ Pedestrian crossing distance is reduced
- ✓ Narrowed roadway section may contribute to reduction of speeds
- ✓ Breaks up driver's sight-line
- ✓ Opportunity for landscaping and visual enhancements to the neighborhood

Negative Aspects

- ✓ May reduce visibility for cyclists who are less visible to turning and cross traffic
- ✓ May require partial or total loss of parking
- ✓ High cost to construct and maintain
- ✓ May increase emergency response times
- ✓ Debris can collect in gutter and crosswalk in detached bulbout installations
- ✓ Care should be taken to keep motorists from hitting bulbouts



Detached Bulbout



Attached Bulbouts

ROAD HUMPS

Road humps are areas of pavement raised three (3) inches in height over a minimum of 12 feet in length. Road humps have pavement markings, advisory signs and advanced warning signs.

Road humps can be used on residential 2-lane local or minor neighborhood collector roadways, with a maximum posted speed limit of 30 mph to address speed problems. It may also be used to deter cut-through traffic. The San José Fire Department must approve this feature, as it may impact their response times. Road humps are not used on streets designated as primary response routes for emergency vehicles and should not be used along transit routes.

Positive Aspects

- ✓ Slows speeding traffic, with minimal impact to non-speeding traffic
- ✓ May decrease volume
- ✓ Requires minimal maintenance

Negative Aspects

- ✓ Likely increase in traffic noise in the vicinity of the hump
- ✓ May increase emergency response times
- ✓ Difficult to replace when street is being resurfaced



TRAFFIC CIRCLES

Traffic circles are raised circular medians that direct traffic counterclockwise within an intersection. Vehicles must change their direction of travel to maneuver around the circle. Per the State guidelines, traffic circles are controlled by "Yield" signage on all approaches. Traffic circles can help manage speeds, reduce volume and improve side street access. The San José Fire Department must approve this feature, as it may impact response times. Traffic circles may contain low growth landscaping and/or a tree.

Positive Aspects

- ✓ Slows traffic as drivers maneuver around traffic circle
- ✓ Provides increased access to main street from side street
- ✓ Breaks up sight-lines on straight streets
- ✓ Changes the look of the street, making it more aesthetically pleasing

Negative Aspects

- ✓ Possible driver confusion entering traffic circle after yielding to traffic already in circle
- ✓ Likely impact on left turns by large vehicles
- ✓ May impact emergency response
- ✓ Bicyclists must merge with traffic around circle



CHICANES

Chicanes create a curved street alignment that can be designed into new developments or retrofitted in existing right-of-ways. The curvilinear alignment requires additional maneuvering and shortens drivers' sight-lines, resulting in lower overall speeds.

This device can be applied to any street where speed control is desired, provided the street is wide enough to accommodate the curvilinear design. Chicanes may require additional right-of-way for construction.

Positive Aspects

- ✓ May slow down traffic and reduce cut-through traffic
- ✓ Changes the look of the street, making it more aesthetically pleasing
- ✓ Has minimal impact on emergency response

Negative Aspects

- ✓ Requires extensive design and expensive implementation
- ✓ Requires major modification of drainage features and likely other utilities
- ✓ May require partial or total removal of street parking
- ✓ May have little or no impact on cut-through traffic



SECTION

4b Comprehensive – Level 2



Level 2 measures are traffic control devices and roadway design features primarily designed to discourage cut-through traffic on residential streets.

OVERVIEW

Level 2 traffic calming services are physical roadway features primarily designed to redirect cut-through traffic away from residential streets. Level 2 projects require extensive neighborhood involvement and outreach and City Council approval. Level 2 measures include:

Diverters
Partial Street Closure
Extended Medians
Full Street Closure

DIVERTERS

Diverters are raised areas placed across a four-way intersection that prohibit through movements and force turns for approaches. Diverters can be considered on local streets where cut-through traffic is a major problem.

Positive Aspects

- ✓ Reduces cut-through traffic
- ✓ Channels traffic flow, thus eliminating vehicular conflicts at an intersection
- ✓ Can be designed to accommodate emergency vehicles
- ✓ Opportunity for landscaping and visual enhancements to the neighborhood

Negative Aspects

- ✓ Will redirect traffic to other local streets
- ✓ Causes increased travel time for local residents
- ✓ High cost to construct and maintain
- ✓ Is a permanent measure, even though problem may be limited to certain times of day
- ✓ May require removal of parking near intersection
- ✓ Needs significant warning and guiding signs



EXTENDED MEDIAN

Medians are raised islands in the center of the roadway that separate traffic directions. Extended medians continue through an intersection, thus eliminating through traffic along the cross-street and all left turns. Medians can be considered on wide streets to narrow the perceived street width, break up sight-lines on straight streets and ease pedestrian crossings. Extended medians can also be considered to discourage cut-through traffic through a neighborhood.

Positive Aspects

- ✓ Narrowed travel lanes can slow vehicle speeds
- ✓ Opportunity for landscaping and visual enhancements to the neighborhood
- ✓ Reduces cut-through traffic on cross-street

Negative Aspects

- ✓ Has a significant impact on emergency access and operations
- ✓ May interrupt driveway access and result in added U-turns
- ✓ High cost to construct and maintain
- ✓ May require removal of parking near intersection



PARTIAL CLOSURE

A partial closure is a physical barrier that restricts vehicles from turning into a street, while still allowing for bicycle access. The adjacent lane is left open to allow vehicles to exit, while two-way traffic is maintained for the remainder of the block. Partial closures can be considered on local streets with cut-through traffic.

Positive Aspects

- ✓ Restricts movements into a street while maintaining full access and movement within the street block for residents
- ✓ Reduces cut-through traffic into street
- ✓ Provides shorter distance for pedestrians to cross travel lanes

Negative Aspects

- ✓ May redirect traffic to other local streets
- ✓ May increase trip length for local drivers
- ✓ Is a permanent measure, even though problem may be limited to certain times of day
- ✓ High cost to construct and maintain



FULL CLOSURE

A complete closure of the street blocks both lanes of travel, so that the street becomes a cul-de-sac. This measure eliminates all through traffic and limits street access to local residents. This measure is applicable to local streets with major cut-through concerns where an emergency vehicle response route does not exist. The closure location may be designed as a pocket park with through bicycle and pedestrian access, depending on roadway geometrics.

Positive Aspects

- ✓ Restricts all through traffic
- ✓ Effective volume and speed control measure
- ✓ Improves the aesthetic quality of the street

Negative Aspects

- ✓ May re-direct traffic to other local streets
- ✓ High cost to construct and maintain, including possible right-of-way acquisition
- ✓ May increase trip length for local drivers
- ✓ May require partial removal of on-street parking
- ✓ Not applicable for designated emergency vehicle response routes



SECTION

5 Appendix

APPENDIX A: TRAFFIC CALMING POLICY

City of San José, California

COUNCIL POLICY

TITLE TRAFFIC CALMING POLICY FOR RESIDENTIAL NEIGHBORHOODS	PAGE 1 of 6	POLICY NUMBER 5-6
EFFECTIVE DATE April 25, 2000	**REVISED DATE** June 17, 2008	

APPROVED BY COUNCIL ACTION 4/25/2000, Item 9j, Res. Nos. 69541 and 69542; 6/26/2001, Item 6.11, Res. No. 70524, 6/17/2008, Item 6.2(a), Res. No. 74443

BACKGROUND

High traffic speeds and volumes, as well as inappropriate behavior of motorists can adversely impact San José neighborhoods. Traffic can also have a negative effect on pedestrians and bicyclists, particularly near schools, community centers and parks. The City responds to these conditions by conducting traffic engineering studies which may result in the installation of traffic control devices, pedestrian and bicycle improvements, or physical roadway features. The Police and Transportation Departments may also deploy officers to enforce traffic and parking regulations, and provide traffic safety education to school children and adults. For the purpose of this policy, these efforts are referred to as ***traffic calming.***

PURPOSE

The purpose of this Council policy is to provide a framework for the general processes, responsibilities and outreach related to traffic calming so that interested parties can effectively access this City service. The performance measure goals contained in this policy are desirable, but subject to available City resources and the level of active community involvement.

POLICY

It is the policy of San José to minimize the negative impacts associated with traffic on all streets, particularly within residential neighborhoods and near schools, by applying education, enforcement, and sound engineering solutions developed with strong community involvement. Traffic calming solutions are categorized into two levels: basic and comprehensive.

Basic traffic calming services are those traffic control devices and programs that are implemented on a day-to-day basis to regulate, warn, guide, enforce and educate motorists, pedestrians and bicyclists; and generally apply to all streets. Residential neighborhoods with traffic impacts that cannot be addressed through basic traffic calming services may be eligible for additional traffic calming measures referred to as comprehensive traffic calming projects.

Comprehensive traffic calming projects are physical roadway design features or dynamic signage and warning systems which are intended to slow traffic within, or divert traffic from residential neighborhoods, or to enhance pedestrian safety.

All traffic calming services and projects are to be coordinated with other transportation policies and be consistent with the General Plan; and where possible, coordinated with other capital and private development projects. Traffic calming projects should be designed and implemented with the goal of not transferring negative traffic conditions from one neighborhood roadway to another. For the purpose of this policy, 'cut-through' traffic is defined as traffic that is using a local residential street to avoid arterial or major collector roadways, and is not traffic that has an origin or destination within the immediate neighborhood.

BASIC TRAFFIC CALMING SERVICES

A. Request for Traffic Calming Services

Individuals or organizations with concerns about negative impacts of traffic should contact the City's Department of Transportation (DOT) to request a traffic engineering analysis. If the concern regards the enforcement of traffic or parking regulations, the Traffic Enforcement Unit (TEU) of the Police Department, or the Parking Compliance Unit of DOT will be notified. If the concern regards the need for education, a traffic safety presentation will be scheduled.

B. Services and Schedules

DOT performs a wide variety of traffic engineering studies. The appropriate study will be performed to address the requester's particular concern and situation. If traffic control devices, such as signs or pavement markings are needed, DOT will coordinate the installation. The performance measure goal for evaluating a concern and installing an appropriate device is 35 calendar days from the date the request is received.

Some studies require extensive data collection and field observations, or are subject to independent policies and guidelines, such as those for stop signs, crosswalks, and bike lanes, and will require additional time. In addition, devices that require City Council approval, such as heavy truck restrictions may require several months for analysis, public review and implementation. The goal is to take the time and conduct an appropriate level of outreach to ensure sufficient community involvement and awareness of intended actions.

If traffic safety education is requested or recommended to address driver, pedestrian or bicyclist behavior, the goal is to perform a traffic safety education presentation within eight weeks. However, the presentation schedule is often dependent upon coordination of a desired timeframe with neighborhood or school representatives.

COMPREHENSIVE TRAFFIC CALMING PROJECTS

A. Initiation of Comprehensive Traffic Calming Projects

Neighborhoods that are experiencing adverse traffic conditions that cannot be addressed using Basic Traffic Calming Services may be eligible for a comprehensive traffic calming project. If an adverse traffic condition cannot be addressed through basic traffic calming services, DOT will automatically initiate a comprehensive traffic calming analysis.

B. Comprehensive Traffic Calming Projects

A comprehensive traffic calming project generally involves the construction of a physical roadway feature(s) or installation of a dynamic warning sign or message system, and includes the following types of projects:

- ***Level 1 traffic calming projects*** are intended to reduce vehicular speed or enhance pedestrian safety. Level 1 projects require neighborhood involvement and outreach as described in Section F and Outreach Requirements. Examples of roadway features or signage include, but are not limited to, median islands, chokers, traffic circles, road humps, enhanced crosswalks, and school zone beacons or radar speed display signs.

- ***Level 2 traffic calming projects*** involve the redirecting of traffic to address excessive volumes resulting from cut-through traffic. Level 2 projects require extensive neighborhood involvement and outreach as described in Section F and Outreach Requirements, and ultimately, City Council approval. Examples of projects and features in this category include traffic diversion islands, full or partial street closures, and changing the direction of travel on a street.

Examples of roadway features, dynamic warning signs and message systems are contained in DOT's Traffic Calming Toolkit, which is available for community use. The Toolkit can be viewed at www.sanjoseca.gov/transportation/forms/toolkit.pdf and is intended to provide information regarding the various traffic calming services that are available.

C. Eligible Roadways

The implementation of comprehensive traffic calming projects is limited to residential, 2-lane local or minor neighborhood collector roadways, with a maximum posted speed limit of 30 mph. Streets designated as General Plan streets, transit routes, or used as emergency response routes are generally not eligible for comprehensive traffic calming measures, except for dynamic speed signs and messaging systems. These roadways by their classification, or function, are intended to carry higher volumes of traffic and accommodate a large vehicle mix.

Threshold Criteria:

The following threshold criteria must be met for the implementation of comprehensive traffic calming projects:

Local Streets: (posted speed limit of 25 mph and 1,000—3,000 vehicles per day)

- 85th percentile speed of 33 mph or more, or
- 40% or more of the daily traffic is 'cut-through' traffic

Neighborhood Collector Streets: (posted speed limit of 25 mph or 30 mph and 1,000—6,000 vehicles per day)

- 85th percentile speed of 33 mph or more on 25 mph posted streets, or
- 85th percentile speed of 37 mph or more on 30 mph posted streets

D. Prioritization of Comprehensive Projects

Eligible comprehensive traffic calming projects will be prioritized for implementation based upon the severity of the traffic conditions by taking into account the following cumulative traffic impacts: speeding, volume, cut-through traffic, crash history, proximity to pedestrian generators such as schools, parks and community centers and unique roadway conditions. Priority points will be assigned as shown below.

Priority Ranking

Speed	2 points for each mph difference between the 85th percentile speed and the posted or prima facie speed limit
Volume	1 point for each 500 vehicles over 1,000 vehicles per day 5 points if 40—65% or more ADT on local street is cut-through traffic between arterials or major roadways, 10 points if higher than 65%
Crash History	5 points for each speed related crash in the last 3 years
Pedestrian Generators (15 points max.)	5 points for each school, park or trail access, library, or community center along roadway 3 points if within 1 block, 2 points within 2 blocks
Unique Conditions (15 points max.)	5 points for designation as a bike route or as a General Plan pedestrian corridor, or for proximity to neighborhood business district, or existing/ planned transit hub; 5 points for evidence of crashes or speeding, such as long skid marks or broken glass; 5 points for missing sidewalk section; 5 points for unique roadway geometry that substantially restricts visibility; 5 points for high crash rate

*ADT - average daily traffic

At the close of each funding cycle (fiscal year), the highest ranked projects will be considered for construction in the following fiscal year, depending upon funding, resource availability and community support. However, adjustments in schedules of traffic calming projects may be made based upon coordination with scheduled capital improvement or private development projects, or availability of funding specific to the project.

E. Reassessment of Warranted Comprehensive Projects

Projects not selected in a given funding cycle will remain on the priority list for consideration in the next funding cycle and prioritized along with newly eligible projects. As resources permit, projects may be reassessed to ensure that the priority ranking reflects significant changes in land use, speed, volume, crash history, pedestrian activity, or other conditions that may have occurred on any given roadway(s).

F. Community Support for Selected Comprehensive Projects

Substantial community support is required for the installation of physical roadway devices on either a trial or permanent basis, including the active involvement of a neighborhood traffic committee. Generally, committee members must own property or reside within the affected project area. If the project area falls within a recognized Neighborhood Association, then the traffic committee should also include a member from that Neighborhood Association. Utilizing relevant data and community input, DOT and the traffic committee will develop a proposed traffic calming plan. Based upon potential impacts of the proposed plan, DOT will determine the affected project area. The traffic committee will distribute a petition developed by DOT to all households, businesses, schools, and absentee property owners within the project area. Some physical devices impact adjacent property owners more than others, and have specific installation guidelines and criteria that must also be met.

Trial Installations: The petition must have 50% + 1 support of all affected households, businesses and schools within the project area before a trial installation is implemented (Level 1 projects) or presented to City Council (Level 2 projects) for authorization to proceed.

Permanent Installations: The petition must have 50% + 1 support of all affected households, businesses and schools within the project area for implementation of the final plan (Level 1 projects) or to be scheduled for presentation to City Council (Level 2 projects) for approval.

G. Comprehensive Project Schedule

Most comprehensive projects will require a trial installation, which will generally occur within four months from the date the plan is finalized and supported by the community or approved by City Council. The duration of the trial will normally be six months, during which time City staff will evaluate the effectiveness of the installation. During the trial, minor adjustments may be made to the plan based upon review by City staff and input from the community. Based on all relevant data and community input, DOT, in coordination with the traffic committee, will develop a proposed plan and schedule for permanent installation of the comprehensive project that will be presented to the community for approval.

Level 1 projects supported by the community will be programmed for implementation. Community supported Level 2 projects will be presented to City Council for consideration, and, if approved, programmed for implementation. Installation of final comprehensive projects will be dependent upon the complexity of the project and available resources for construction and ongoing maintenance of installed devices.

H. Reapplication for Comprehensive Traffic Calming Project

Neighborhoods that do not qualify for a comprehensive traffic calming project may reapply in two years from the date of DOT's final consideration. The two-year time period may be waived by the City Traffic Engineer if significant land use changes or other significant change has occurred.

COMMUNITY FUNDING FOR COMPREHENSIVE TRAFFIC CALMING PROJECTS

The City may accept donations from residents, neighborhoods, community groups, schools and/or businesses for the implementation and ongoing maintenance of comprehensive traffic calming projects that are eligible for installation under the provisions of this policy. Donations will need to comply with all provisions of City Council Policy 1-17.

OUTREACH REQUIREMENTS

Residents, businesses and schools that may be affected by the outcome of a comprehensive traffic calming project, will be notified in writing of any planned actions and schedule. Comprehensive projects that involve the installation of physical roadway features will normally require at least one (1) community meeting with households, businesses and schools in the project area. Notices for any community meeting will be distributed at least ten (10) calendar days in advance. Notices will be provided to all properties within the project area as defined in Section F. The methods of notification will be consistent with those contained in Council Policy 6-30. Projects will also be coordinated with providers of emergency response services, transit services, utilities and related services as needed.

POLICY EXEMPTIONS

Local residential streets and neighborhood collectors that do not meet the threshold criteria in Section C may be eligible for comprehensive traffic calming measures if the City Traffic Engineer determines that a unique or unusual condition exists which results in negative traffic impacts caused by a high number or rate of crashes, vehicles traveling at excessive speeds, significant pedestrian activity, or proximity to major traffic corridors or traffic generators that contribute to extraordinary changes to normal traffic conditions. These roadways will be prioritized along with the roadways that meet the threshold criteria based upon the ranking methodology in Section D.

General Plan streets, transit routes, emergency response routes, may be eligible for dynamic warning signs or messaging systems if substantial levels of speeding are present as determined by DOT through an engineering traffic study, and funding is available for their installation and ongoing maintenance.

DEVELOPMENT IMPACTS IN EXISTING NEIGHBORHOODS

All proposed private and public development projects will be reviewed for potential traffic calming or pedestrian safety issues and a study will be required when necessary as determined through the City's development review process. DOT, Public Works and other City staff or consultants will be actively involved in the review of any proposed development that is determined to potentially create or significantly increase an adverse traffic condition in an existing neighborhood. It is the intent of this involvement that the development will be designed or that traffic calming or pedestrian or bicycle conditions will be placed on the developer to eliminate or minimize the portion of the adverse impacts that are a result of the development.

APPENDIX B: STOP SIGN POLICY

City of San José, California

COUNCIL POLICY

TITLE	PAGE	POLICY NUMBER
CRITERIA FOR THE INSTALLATION OF STOP SIGNS	1 of 4	8-1
EFFECTIVE DATE April 3, 1972	**REVISED DATE** April 3, 2001	
APPROVED BY COUNCIL ACTION 4/3/72; 7/5/79—Item 9a; Ordinance Nos. 204 & 20500 adopted 2/10/81; 5/7/85—Item 12a; 3/22/94—Item 9l; 4/3/01, Item 6.3, Resolution No. 70257.		

BACKGROUND

Stop signs are installed to establish right-of-way at intersections between motorists, cyclists, and pedestrians, reduce delay, and enhance safety for all roadway users.

PURPOSE

To state Council Policy relative to the designation of stop intersections.

POLICY

It is the policy of the City Council that the City install stop signs in locations where the City Traffic Engineer, in the exercise of his/her engineering judgment, determines that such installation is appropriate. The City Traffic engineer should consider installation of a stop sign at an intersection that meets or exceeds the minimum guidelines set forth in this Policy. Potential conflicting City policies such as the Intersection Level of Service shall be considered, and may form the basis for the denial of stop signs despite other justifying factors. It is also the policy of the City Council that stop signs be installed at intersections as authorized by the City Traffic Engineer under the direction of the City Council or the Traffic Appeals Commission. In addition, stop signs are placed at entrances to through highways designated by the City Traffic Engineer or at intersections designated by the City Traffic Engineer as stop intersections in accordance with Title 11, Chapter 11.36, Section 11.36.030, 11.36.035 of the Municipal Code.

CRITERIA FOR INSTALLATION OF STOP SIGNS

A. **Two-Way (or One-Way) Stop Sign Analysis.**

The City Traffic Engineer should consider installation of two-way (or one-way) stop signs if an intersection obtains a minimum of 18 points as determined below:

1. **Volume conflicts (maximum 9 points)**
   a. **Higher Volume Street:** One point for every 100 vehicles per day entering the intersection in excess of 600 vehicles per day. (Maximum 5 points).
   b. **Lower Volume Street:** One point for every 100 vehicles per day entering the intersection in excess of 300 vehicles per day. (Maximum 4 points).
2. **Visibility Conditions** - One point for each one MPH that the safe approach speed to the intersection is less than 20 MPH.
3. **Crash experience** - Six points for each crash during any 12-month period within two years prior to investigation that might have been prevented by the vehicles complying with properly placed stop signs.
4. **School Warrant (maximum 6 points)** - The City Traffic Engineer shall assign points for the intersection being adjacent to or within two blocks from the school (kindergarten to twelfth grade).

If an intersection is adjacent to or within two blocks of several schools, then additional points will be assigned using the same point distribution:

INTERSECTION	SCHOOL 1	SCHOOL 2	SCHOOL 3
Adjacent	3 points	3 points	3 points
One Block	2 points	2 points	2 points
Two Block	1 point	1 point	1 point

5. **Unusual conditions (maximum 9 points)**

   Points may be assigned considering the severity of:

   a. High pedestrian and bicycle activity because of proximity to recreational facilities including school facilities, parks, senior centers, high-density housing, neighborhood library, transit stops, and other facilities that generate high pedestrian and bicycle activity;

   b. Average speeds in excess of the speed limit;

   c. Visual signs of emergency maneuvers such as skid marks and crash debris;

   d. Unique geometric conditions exist.

B. **All Way Stop Sign Analysis For Non-General Plan Streets.**

The criteria for the all-way stop analysis recognizes that delays are superseded by the desire to reduce potential crashes. An intersection qualifies for this analysis if it has residential frontage, a street not on the City's adopted General Plan, and does not exceed an average daily traffic volume of 6,000. If both streets at an intersection are residential, then the installation of all-way stop signs should be considered if the intersection obtains a minimum of 20 points as determined below.

1. **Volume conflicts (maximum 12 points)** - One point for every 100 conflicting movements per day in excess of the first 400 conflicting movements for a four-way intersection. One point for every 100 conflicting movements per day in excess of the first 300 conflicting movements for a three-way intersection.

2. **Crash experience** - Six points for each crash during any 12-month period within two years prior to investigation that might have been prevented by the vehicles complying with properly placed stop signs.

3. **School Warrant (maximum 6 points)** - Points shall be assigned for the intersection being adjacent to or within two blocks from the school. Multiple schools will generate additional points using the same point distribution:

INTERSECTION	SCHOOL 1	SCHOOL 2	SCHOOL 3
Adjacent	3 points	3 points	3 points
One Block	2 points	2 points	2 points
Two Block	1 point	1 point	1 point

5. **Unusual conditions (maximum 12 points)**

   Points may be assigned considering the severity of:

   a. High pedestrian and bicycle activity because of proximity to recreational facilities including school facilities, parks, senior centers, high-density housing, neighborhood library, transit stops, and other facilities that generate high pedestrian and bicycle activity;

   b. Intersections within a pedestrian corridor or zone as identified in the General Plan;

   c. Average speeds in excess of the speed limit;

   d. Visual signs of emergency maneuvers such as skid marks and crash debris;

   e. Unique geometric conditions exist;

   f. Visibility concerns exist.

C. **All-Way Stop Sign Analysis for General Plan Streets.**

The criteria for non-residential General Plan streets recognizes the desire to enhance safety reduce potential crashes and the desire to minimize unnecessary delays. The City Traffic Engineer should consider installing all-way stop signs if the intersection obtains a minimum of 28 points as determined below:

1. **Volume conflicts and overall delays (maximum 15 points)**

Higher Volume Approach Four-Hour Volume	Points	Lower Volume Approach Four-Hour Volume	Points
0—1400	0	600—800	1
1401—1700	1	801—1000	2
1701—2000	2	1001—1200	3
2001—2300	3	1201—1400	4
2301—2600	4	1401—1600	5
2601—2900	5	1601—1800	6
2901—3200	4	1801—2000	7
3201—3500	3	2001—2200	8
3501—3800	2	2201—2400	9
3801—4100	1	2401—Over	10
4101—Over	0		

2. **Delay on higher volume street (maximum 5 points)**

Points assigned in accordance with the following table:

Higher Volume Street to Lower Volume Street 24-Hour Volume Ratio

Volume Ratio	Points
1.0:1 to 1.4:1	5
1.5:1 to 1.9:1	4
2.0:1 to 2.9:1	3
3.0:1 to 3.9:1	2
4.0:1 to 4.9:1	1
Greater than 5.0:1	0

3. **Crash Experience** - Six points for each crash during any 12-month period within two years prior to investigation that might have been prevented by the vehicles complying with properly placed stop signs.

4. **School Warrant (maximum 6 points)** - Points shall be assigned for the intersection being adjacent to or within two blocks from the school. Multiple schools will generate additional points using the same point distribution:

INTERSECTION	SCHOOL 1	SCHOOL 2	SCHOOL 3
Adjacent	3 points	3 points	3 points
One Block	2 points	2 points	2 points
Two Block	1 point	1 point	1 point

5. **Unusual conditions (maximum 12 points)**

Points may be assigned considering the severity of:

a. High pedestrian and bicycle activity because of proximity to recreational facilities including school facilities, parks, senior centers, high-density housing, neighborhood library, transit stops, and other facilities that generate high pedestrian and bicycle activity;

b. Intersections within a pedestrian corridor or zone as identified in the General Plan;

c. Average speeds in excess of the speed limit;

d. Visual signs of emergency maneuvers such as skid marks and crash debris;
e. Low volume street;
f. Unique geometric conditions exist;
g. Visibility concerns exist.

6. The City Traffic Engineer shall do an analysis of the following items prior to installing an all-way stop on a General Plan street:
   a. Determine the crash rate for the intersection for the previous one year and three year period and compare with the City-wide average of that particular type of intersection (e.g., major collector/local controlled by two-way stop);
   b. Determine the proximity of the subject intersection with existing traffic signals and planned traffic signals;
   c. Determine if the subject intersection is warranted for a traffic signal;
   d. Determine the possible diversion of through traffic due to delays caused by an additional stop, including an assessment of the impact on other streets;
   e. Level of service shall be calculated for the intersection to assess peak hour congestion.

APPEAL OF DENIAL OF REQUEST FOR STOP SIGNS

If, after a citizen request to install stop signs at a particular intersection, the City Traffic Engineer decides for any reason not to install such stop signs, then the Traffic Appeals Commission is authorized, pursuant to the San José Municipal code, to hear an appeal. If, after hearing all the facts presented to it on appeal, the Traffic Appeals commission determines that installation of a stop sign is appropriate and safe, then it shall order the City Traffic Engineer to install such stop sign. The Traffic Appeals Commission shall order the installation of a stop sign that does not meet the warrants set forth in this Council Policy only upon making a specific written determination that installation of such stop sign is consistent with the public safety. The City Traffic Engineer shall be authorized to install stop signs as directed by the Traffic Appeals Commission.

APPENDIX C: GUIDELINE TO TRAFFIC CALMING OPTIONS

Ref	Measure	Traffic Investigation and/or Analysis Req'd?	Estimated Cost to Implement	Funding and Resource Options Available to the Community (SNI, consultants, volunteers, private funding)	Council Policy or City Guidelines
BASIC MEASURES					
1	Police Enforcement	Possible	Subject to resources	May require neighborhood involvement	Enforcement is driven by number of complaints, crash history, proximity to schools
2	Parking Enforcement	Possible	Subject to resources	May require neighborhood involvement	Presence of parking restrictions, proximity to schools, requests
3	Radar Trailer	Possible	Subject to resources		Level of speeding, requests
4	Safety Education	None	Subject to resources	Requires neighborhood involvement	
5	Curb Markings	Minor	Minor		City guidelines
6	Striping	Minor	Minor	May require neighborhood involvement and support	State and City guidelines
7	Signs (speed limit, curve warning, parking restrictions, etc)	Minor-Major, depends on signs	Minor	May require neighborhood involvement and support	State law and guidelines, City guidelines
8	High-Visibility Signs	Minor	Minor		City guidelines
9	Crosswalks	Minor	Minor		State and City guidelines
10	High-Visibility Crosswalks	Minor	Minor		City guidelines
11	Truck Restriction	Major	Minor		City guidelines, and by ordinance
12	Stop Signs	Minor	Minor		City Policy
13	Residential Permit Parking	Major	Depends on area size New zones have fee per permit (cost to residents)	Requires neighborhood involvement	City guidelines, and by ordinance
COMPREHENSIVE – LEVEL 1 MEASURES					
14	Radar Speed Display Signage	Minor	$15K-20K/sign ongoing O&M	SNI or private funding	Traffic Calming Policy
15	School Zone Beacons	Minor	$12K-$15K/pair ongoing O&M	SNI or private funding	Traffic Calming Policy
16	Enhanced Crosswalks (flashing beacons or textured - asphalt)	Minor	$15K-$20K/location ongoing O&M	SNI or private funding	Traffic Calming Policy
17	Road Bumps	Major	$7K each	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
18	Bulb-outs	Major	$200K-$600K/pair	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
19	Traffic Circle	Major	$60K-$100K ongoing O&M if landscaped	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
20	Chokers	Major	$20K/pair (detached) ongoing O&M if landscaped	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
21	Medians	Major	$10K-$20K each ongoing O&M if landscaped	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
22	Chicanes	Major	$10K each (detached) ongoing O&M if landscaped	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
COMPREHENSIVE – LEVEL 2 MEASURES					
23	Diverters	Major	Depends on design	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
24	Partial Closure	Major	Depends on design	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
25	Extended Median	Major	Depends on design	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy
26	Full Closure	Major	Depends on design	SNI or private funding. Requires neighborhood support.	Traffic Calming Policy

APPENDIX D: SUMMARY OF TRAFFIC CALMING MEASURES AND OBJECTIVES

		Impact of Traffic Calming Objectives – Desirable Effects						Impact of Traffic Calming Objectives – Undesirable Effects					
	Measure	**Reduce Speed**	**Reduce Volume**	**Increase Driver Safety**	**Increase Pedestrian Safety**	**Increase Biking Safety**	**Increase Aesthetics**	**Noise Increase**	**Pollution Increase**	**Loss of Parking**	**Restricts Access**	**Emergency Impacts**	**Increase Maintenance**
BASIC MEASURES													
1	Traffic Safety Education	Yes	No	Yes	Yes	Yes	None	No	No	No	No	No	No
2	Police Enforcement	Yes	No	Yes	Yes	Yes	None	No	No	No	No	No	No
3	Parking Enforcement	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No
4	Curb Markings	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No	Yes
5	Crosswalks	No	No	No	Yes	No	No	No	No	Yes	No	No	Yes
6	High-Visibility Crosswalks	No	No	Possible	Yes	No	No	No	No	Yes	No	No	Yes
7	High-Visibility Signs	Yes	No	Yes	Yes	Possible	No	No	No	No	No	No	Yes
8	Stop Signs	No	Possible	Yes	Yes	Yes	No	Yes	Yes	Possible	No	No	Yes
9	Radar Trailer	Yes	No	Yes	Yes	Yes	None	No	No	No	No	No	No
10	Traffic Signage (ex. speed limit, curve warning)	Possible	No	Yes	Yes	Yes	No	No	No	Possible	No	No	Yes
11	Edgeline Striping	Possible	Possible	Yes	Possible	Yes	Possible	Possible	No	Possible	No	No	Yes
12	Truck Restrictions	No	Possible	No	Yes	Yes	No	No	No	No	No	No	Yes
13	Residential Parking Permit	No	No	No	No	No	Possible	No	No	No	No	No	Yes
COMPREHENSIVE – LEVEL 1 MEASURES													
14	Flashing Beacons (crosswalks or school zones)	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
15	Radar Speed Display Signs	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
16	Medians	Yes	Possible	No	No	No	Yes	No	No	Yes	Possible	Yes	Yes
17	Mid-block Chokers	Yes	Possible	No	No	No	Yes	No	No	Yes	No	Yes	Yes
18	Bulb-outs (detached or attached)	Yes	Possible	No	Yes	No	Possible	No	No	Yes	No	Yes	Yes
19	Road Humps	Yes	Possible	No	Yes	No	No	Yes	Possible	Possible	No	Yes	Yes
20	Traffic Circles	Yes	Possible	No	No	No	Yes	No	No	Yes	Possible	Yes	Yes
21	Chicanes	Yes	Possible	No	No	No	Yes	No	No	Yes	Possible	Yes	Yes
COMPREHENSIVE – LEVEL 2 MEASURES													
23	Diverters	Possible	Yes	No	No	No	Possible	No	Possible	Possible	Yes	Yes	Yes
24	Extended Median	Possible	Yes	No	No	No	Possible	No	Possible	Possible	Yes	Yes	Yes
25	Partial Closure	Possible	Yes	No	Yes	No	Possible	No	Possible	Possible	Yes	Yes	Yes
26	Full Closure	Possible	Yes	No	Yes	No	Possible	No	Possible	Possible	Yes	Yes	Yes

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by

Leslie W. Bunte Jr.

2000

Traffic Calming Programs & Emergency Response:

A Competition of Two Public Goods

by

Leslie W. Bunte, Jr., B.S.

Professional Report

Presented to the Faculty of the Graduate School

of the University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Public Affairs

The University of Texas at Austin

May 2000

Traffic Calming Programs and Emergency Response:

A Competition of Two Public Goods

APPROVED BY

SUPERVISING COMMITTEE:

_____

_____

DEDICATION

Every minute of every day, a group of dedicated people constantly remains vigilant throughout the communities of the United States to respond and provide emergency services to the victims of those who encounter the perils of fires and medical emergencies. The Fire Chief and other subordinate Chief Officers, whether professional or volunteer, provide the leadership to direct these local emergency service responses.

The Fire Chief, who is considered the "community expert" on fire protection and emergency medical service matters, is often confronted with tough policy development choices and emergency scene decisions to ensure the protection of both his/her staff and the public they serve. I wish to dedicate this professional report to the men and women of America's fire service, particularly those Chiefs who wear the white helmets, in hopes that this research can assist them in making sound, quality decisions for their respective communities.

ACKNOWLEDGEMENTS

True professional reports, regardless of the discipline, require both the internal and external contributions of many people and organizations. This report is not different. Without their willingness to share their resources, be it time, information, or experiences, this report would have been impossible to author.

Before a report such as this can be submitted, one must have the desire to enter graduate school. My desire for such an achievement would not have been possible without the inspiration and encouragement of a former graduate of the LBJ School. My sincerest thanks goes to Elizabeth Gray (Class of 1990), who instilled the confidence within me to pursue this endeavor. At a time when I thought my formal education had ended, she saw otherwise.

I would like to thank my supervising committee, Bill Spelman and Bill Black, for their guidance and review of this report. Also, I want to thank the entire faculty at the LBJ School of Public Affairs, who has provided me, and other students, with the knowledge and ability to perform analytical public policy reviews.

Sharing professional information is not possible without networking. I wish to respectfully thank all of my colleagues throughout the U.S. fire service who were so willing to share their perspectives and experiences during

the development of this paper. Particular thanks goes to the Chief Officers and officials of the Austin, Berkeley, Boulder, Fresno, Montgomery County (MD), Portland, and Sacramento Fire Departments.

A great appreciation is also extended to Joan Hudson and the staff of the City of Austin Neighborhood Traffic Calming Program. Their generosity of information and professional interactions created a positive environment, from a proponent's perspective, to explore and expound upon the subject of this paper.

Without a doubt, the greatest contributor to my research goes to Kathleen Calongne. Her collection of documents, information and sources, from an opponent's point of view, were invaluable to this report. For all of her previous work, perseverance, and accumulation of information from networking with others, I truly consider her one of the "pioneers" of the traffic calming debate. Her cohorts, such as Amy Muhs, Emily Wilcox and Ray Bowman, are three of the many others who assisted in providing research materials or methods.

Finally, my greatest appreciation goes to my wife Linda, and my two daughters, Brande and Brittani, who have graciously endured the family pressures generated during the development of this report. However, their compassion and understanding goes far beyond that. Over the last twenty years, they have given me the utmost support and encouragement to pursue

my professional development dreams at the expense of many family sacrifices. To them, I will forever be indebted.

Traffic Calming Programs & Emergency Response:

A Competition of Two Public Goods

by

Leslie W. Bunte, Jr., M.P.Aff.

The University of Texas at Austin, 2000

SUPERVISOR: William Spelman

A natural dilemma for public policy makers occurred when two public policies conflicted with each other causing immense political and emotional stress upon both the policy maker and the public. This research paper examined the disagreement that had occurred in communities throughout the United States where traffic-calming programs were found to be in direct conflict with providing prompt emergency services. Thus, a conflict of two public goods was created.

This professional report examined the history and the positive and negative aspects of traffic calming programs. Negative impacts upon emergency services were substantiated by various emergency response time tests conducted by leading U.S. Fire Departments. Information was also

obtained on injuries that have occurred to firefighters from traffic calming devices as well as documented mechanical damages to emergency vehicles.

Traffic calming programs were found to contribute to air pollution as verified by several previous environmental studies conducted specifically for traffic calming devices. This report also revealed the enormous potential for civil liabilities for local governments, particularly with the violation of the American with Disabilities Act. In general, most U.S. local governments placed their traffic calming programs in moratorium due to all of the conflicts that were generated.

A policy analysis was conducted specifically for the conflict that had arisen in Austin, Texas. Based on quantitative processes, this analysis showed that Austin would lose an additional 37 lives per year with patients of sudden cardiac arrest if the Fire and EMS Departments experienced a 30 second delay in response times due to traffic calming. The analyses also concluded that at best, only one pedestrian life could be saved each year from traffic calming as pedestrian fatalities rarely occurred within residential neighborhoods. A *risk/benefit* analyses also demonstrated that traffic-calming devices have more of a negative impact than a positive impact to the community.

To reduce the conflict, and ensure at least a balance of these two public goods, a set of recommendations was formulated for the City of Austin

policy makers and for those of other communities who had similar circumstances.

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Chapter 1. Introduction

Vibrant societies of today utilize democratic style governments to promote and maintain quality lifestyles for their people. These governments accomplish the amenable lifestyles by adhering to various core principles and values. Being responsive to the people is one of many mainstay principles. Thus, governments should be sensitive to both the general, as well as the specific needs of those expressed by the society. One value of this *responsiveness* tenet is that the government should provide services and programs that will ensure the health, safety, and welfare of the people. Such provisions do indeed provide for a quality lifestyle enjoyed by the citizens and enhances the overall well being of the society.

At all levels of government, many questions arise on how to provide the means to accomplish or uphold these desired principles and values. Determining the policies and methods to execute public policies is not always an easy task for the decision-makers of the government. As illustrated later, this process is extremely compounded when two separate public policies or programs, each of which has positive benefits to specific portions of the society, conflict with each other.

Anyone who has ever witnessed a federal public hearing regarding where to place a nuclear power plant, or who has attended a state agency public

forum on the selection of public school textbooks, can certainly attest that such gatherings contain a large amount of debate and highly accentuated emotions from the citizenry. For the policy maker, particularly the elected official, this can be a difficult arena whereby they are faced with the dilemma of choosing between the specific interest groups of the society.

For example, those who want cheaper electricity production, that is less dependent upon fossil fuels, are often pitted against those who want policies of strict regulation that will protect the environment and mankind from technological disaster. Similar conflict occurs when determining if public school textbooks should contain explicit sex education, or strong emphasis on the Darwinism theory, versus those who desire for these subjects to be relegated to within the family unit of the home. In many instances such as these, government officials prefer to find some middle ground for compromise that is acquiescent to all parties.

Local governments too, are not immune from such volatile policy conflicts. These conflicts often have a very wide spectrum. Their intensities will vary from locale to locale, again depending upon the general and specific values of the community. The policy of prohibiting the smoking of tobacco products in most public places in Austin, Texas is quite different from those cities in the tobacco producing states such as the Carolinas. This decision for Austin may have been very easy, in contrast to the Carolina cities, where such

a policy would strongly conflict with their economic retention policies. Although this is a specific policy concern that may not apply to other cities, there are many other government policies and programs that are applicable to all local governments. Public transportation is one such example.

The central transportation concern presented to local governments by angry neighborhood residents, is that there are too many cars going too fast within the neighborhood. As a result, they fear for their safety. These governments are faced with finding solutions to this problem, whether they be building more roadway infrastructures to handle the increased volumes, or using alternative approaches to slowing the speeds of traffic.

Often, constructing larger transportation systems requires assistance from the state and federal governments. Unfortunately, this can take an immense amount of time before a remedy is implemented. Because of these difficulties, many local governments have resorted to locally funded *traffic calming* programs to "calm" the local streets. These programs can have positive and negative results, and like nuclear power plants or textbook selections, they will also generate a lot of public debate and expression of emotion.

The term *traffic calming* is complex, meaning different things to different people and locales. "Traffic calming is a process whereby people are encouraged to find alternative means of transportation, to drive more slowly,

to drive alternate routes, to drive with respect for the neighborhood through which one is traveling."[1]

Another view is that "[t]raffic calming is an attempt to strike a balance between vehicular traffic and everyone else who uses the street: pedestrians, bikers, business people and residents. That balance tilts away from cars. Some see traffic calming as a way of 'reclaiming' local streets from a traditional domination by automobiles. Others see it more modestly as a way of trying to restore the safety and peace in neighborhoods that are becoming overwhelmed with speeding traffic."[2]

Although the definitions may fluctuate, even within transportation professional circles, the best definition for the purpose of this paper is one rendered by the Institute of Transportation Engineers (ITE). "Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users".[3] This definition incorporates the use of physical street devices such speed humps, traffic circles, and street closures.

Traffic calming programs have purportedly, by some accounts, reduced traffic speed, volume, and accidents within neighborhoods, thus improving the safety and livability of the residents. Although the accuracy of results is often debated, these outcomes when they do occur can certainly be expressed as a public "good."

Another public "good" generally provided by the local government is that of efficient and prompt emergency services. Most local governments spend very large segments of their monetary resources for ensuring quality police, fire and emergency medical services (EMS). Unfortunately, providing this public good conflicts with the very core objectives of traffic calming programs.

The chief complaint is that traffic-calming devices delay the response times of emergency services to the community. Quick response times are directly correlated to the effectiveness of these emergency services. Virtually every service delivery performance measurement for fire and EMS departments is directly related to their response times. Some, but not all police services are directly impacted by quicker response times. Increasing the number of fire and EMS stations and the number of police units are actions that local governments frequently take to ensure that response times are not depredated.

Often, the response delays due to traffic calming devices are viewed as satisfying a few residents at the expense and increased risk of lesser effective emergency services, resultantly provided to the remainder of the entire community. Herein lies the debate, *Traffic calming and emergency response: A competition of two public goods.*

Like the conflicting public policy examples already presented, traffic-calming policies are full of public debate and emotion from all factions of the communities. Generally, this includes a specific group of neighborhood residents who desire traffic calming devices vying against those who routinely pass through the neighborhood, including representatives from the emergency services departments, who oppose their use.

One can easily envision the spectacle at such a public hearing debate. With fake blood cosmetology and trauma depicted bandages, young four to six year old children are marched before a city council dais, while pleading protective mothers are theatrically urging the council members to prevent child pedestrian tragedies by installing traffic calming devices within their neighborhood. Their claim is that few seconds, or even a minute, of delay encountered by emergency responders is insignificant to a child being killed by a speeding car.

On the other hand, the mayor and council is often faced with the Fire Chief, emblazoned in a full dress service uniform, advising the council members that such action will be detrimental to the emergency service delivery provided to victims and patients. Supplemented with position reinforcing remarks such as those of Fire Chief Larry Donner of the Boulder (CO) Fire Department, makes the final decision a truly high stake issue. "One minute is a long time to wait when you are the one not breathing!"[4] As he

further points out, this is even more critical when you have already waited more than three or four minutes for the emergency responders to arrive.

Now, after such "battle lines have been drawn", does the elected official go to one side or the other, or does he/she look for alternatives? What kind of analysis needs to be done for such a decision by the policy maker, or by those who assist with the policy formulation and implementation? This paper attempts to address this particular issue for the policy makers within the City of Austin, Texas. Further, this document can also serve as a model analysis for others who are responsible for policy development within their own communities.

With today's sophisticated news media access and vast explosion of electronic information dissemination within our society, public policy is being reviewed and scrutinized more than ever before. With more and more of these public accountability tools, the public is demanding that policies be well thought out, analyzed, evaluated, sensitive to all interests, and adequately planned for, rather than decisions being made on the pure intuition of the policy makers. Good sound analytical processes are needed for superior public policy formulation. This paper has been developed with that approach in mind.

In this chapter, the reader has been given an overview of the policy conflict that can erupt from traffic calming programs and response times.

There are many other conflicts with this issue that are explored in the remaining chapters. From this, a comprehensive policy analysis may be performed.

In order to fully understand the potential impacts to traffic calming, the reader should have a thorough knowledge of traffic calming devices. Chapter Two does this by providing a brief history of traffic calming in Europe and in the United States. The objectives and benefits from traffic calming programs, as well as device descriptions, are also reviewed.

Chapter Three provides an in-depth examination that traffic calming has upon the emergency service departments. This includes an understanding of the emergency response time concept and how the physical features of emergency vehicles are not compatible for traffic calming devices. A history of firefighter and paramedic injuries along with fleet damage is also presented. The most important aspect of this chapter is a summary of the field test studies performed by five different fire department agencies. The results of these studies quantify the response time delays for various traffic calming devices.

A negative impact to traffic calming that is often overlooked is that of increased vehicle emissions. Chapter Four is a literature review of how automobile exhaust emissions are another policy conflict for traffic calming. Summarized vehicle case studies are presented which quantify the impact of automobile emissions pertaining to specific traffic calming devices.

Every public policy has civil liability implications. The issue of traffic calming is no different. Chapter Five addresses the potential legal ramifications that traffic-calming devices pose to the Americans with Disabilities Act. Several other general liabilities to the local government are also covered.

As traffic calming has gained popularity in the last five to seven years, many local governments have instituted such programs or policies. The current postures of several of the U.S. cities are examined in Chapter Six. For parallel comparison, the Austin, Texas posture for traffic calming is explained. The overview of the Austin Neighborhood Traffic Calming Program serves as background information for the next chapter.

Chapter Seven is the heart of this professional report. This chapter encompasses analyses which measure the impacts of the traffic calming initiatives for Austin. Using local data and various analytical methods, a policy analysis is conducted that studies the impacts to traffic speed and volume, pedestrian accidents, sudden cardiac arrest, Austin Fire Department response times, and the projected impact of lives saved and lost due to traffic calming devices.

Although many arguments can be made for and against traffic calming, Chapter Eight serves somewhat as a forum for that debate. In this chapter, the

implications of the findings contained in Chapter Seven are discussed in detail.

And finally, Chapter Nine provides the real fruits of this policy review. A formal set of recommendations has been developed from this analysis. These recommendations are directed to the various policy makers within the City of Austin as they are based upon the Austin analysis. However, many of these recommendations would apply to most other local governments who have very similar circumstances.

Notes

[1] Build America, *Traffic Calming and Walkable Communities*, April 4, 1997. Online. Available: http://www.buildamerica.com/old97/4-7-97/wkshow.htm. Accessed: March 21, 2000.

[2] Public Technology, Inc., *Traffic Calming at a Glance*, n.d. Online. Available: http://pti.nw.dc.us/task_forces/transportation/docs/trafcalm/TRAFCAGL.HTM. Accessed: November 23, 1999.

[3] Reid Ewing, *Traffic Calming: State of the Practice*, (Washington, D.C.: Institute of Transportation Engineers, August 1999), p. 2.

[4] Telephone interview by Les Bunte with Larry Donner, Fire Chief, City of Boulder, Colorado, February 3, 2000.

Chapter 2. Traffic Calming Programs and Devices

History of Traffic Calming

Some 30 to 40 years ago the beginnings of traffic calming programs came into popularity in Europe. The earliest roots of traffic calming have been traced backed to the Netherlands, where in the late 1960's, the desires were "to turn the street into an obstacle course for motor vehicles, and an extension of home for residents."[1]

The Dutch utilized diversion schemes, such as street closings, one-way streets, and other traffic calming devices using physical measures such as speed humps. These concepts quickly spread to other countries such as Germany, Sweden, Denmark, England France, Japan, Israel, Austria, and Switzerland. With success on neighborhood streets, "[t]he Germans quickly learned that calming individual streets resulted in traffic diversion".[2] They then embarked upon a plan to extend the devices to the main roads.

Although traffic calming has been around for a number of years, Great Britain has elected, within the last decade, to aggressively implement traffic calming programs. This was developed in the shadow of a 1963 government document, *Traffic In Towns*, which is credited with initiating the shift towards

traffic calming as a viable transportation program. Colin Buchanan, the author of the document, is considered to be the father of traffic calming.[3]

Although Omaha, Nebraska experienced with the use of speed humps in the 1960's on some selected streets, their approach was not fully considered as a traffic-calming program. Two cities in America are recognized as being the pioneers for full-scale traffic calming programs. Seattle, Washington passed a $12 million dollar bond issue in 1968 for improving neighborhood streets, and thus had both the resources and public support to forge ahead with traffic calming initiatives. Following in 1975, Berkeley, California adopted a citywide traffic management plan, which specifically included traffic calming.[4]

Although residential streets have been addressed, the outlook for traffic calming devices upon larger volume streets is of question. To begin with, traffic-calming programs in the U.S. are continuing without any official sanctioning, which is extremely vulnerable to legal review. On a lesser scale than the Europeans, "U.S. programs have generated before-and-after speed, volume, and collision data, but nothing equivalent in scope or rigor to the European studies. Some European communities have long since concluded that traffic calming must encompass higher order roads if traffic safety, livability, and walkability are to be achieved outside isolated pockets."[5]

Given the unpopularity and rising opposition to traffic calming, the move to higher-class roadways in the United States may never be reached. This may be evidenced by the growing sentiment that "[e]veryone seems to want traffic calming in their neighborhood, but not on their route into the city which might be someone else's neighborhood."[6]

Traffic Calming Objectives & Strategies

Traffic calming programs, as the name implies, are an attempt to slow down automobile speeds and reduce the volume of traffic. Thus, there are several objectives that are usually established for the programs. They are: slow traffic speeds; reduce cut-through traffic; increase the safety of pedestrians, bicyclists, and vehicles; reduce traffic noise; and improve the aesthetics of the neighborhoods.

The approaches chosen by local governments to meet these objectives are centered on two distinct strategies that may be used separately or together. "These initiatives involve passive or 'soft' strategies and active or 'hard' strategies. Passive strategies are less restrictive in nature and use subtle or psychological means to influence drivers to behave in a desired fashion."[7] Examples of this strategy include traffic signals, signs, markings at pedestrian crossings, educational programs and traditional policing, through citations and fines, for enforcement.

"Active strategies are more restrictive in that they prevent or reduce movement of traffic by changing the street configuration or by the use of physical barriers or devices."[8] These type of devices are the one's that generally create the most controversy in communities. Some examples of the street re-configurations or physical barriers are street closures, partial closures, diverters, roadway gates, cul-de-sacs, chokers and curb extensions to create narrower streets. Without a doubt, the most used example of this strategy is the speed hump. "These 'hard' control devices are largely self-enforcing and create a visual impression, real or imagined, that a street isn't intended for through traffic."[9]

Unfortunately, many cities have reacted too quickly to citizen complaints about traffic, without fully identifying if a problem truly exists. This generally results in traffic calming devices being installed without being fully warranted. When this occurs, one can be sure that opposition will rapidly arise and conflict ensues. In many instances, neighborhood residents perceive there is a problem, when in fact there may not be one.

Analysis & Results

The first step for any traffic-calming program then is to identify and verify the problem. To accomplish this, local governments must utilize an array of analysis methods to help clarify the nature and extent of the problems.

This analysis should include studies and data collection of daily traffic volumes, accident rates, speed levels, cut-through traffic, and post results. Once the problem is correctly identified, then the proper traffic calming devices designed for the problem can be selected and implemented.

Traffic volume studies should always be used to determine the amount of traffic that is passing through a neighborhood. These should be conducted over a 24 hour period during the middle portion of the week or for the specific times and days of the week of concern. The best conclusive data is achieved by conducting a seven-day period survey. If possible, the analysis should include the actual empirical change in daily traffic, along with the percentage change, after devices are installed.

In general, most studies indicate that traffic calming is effective in reducing traffic volume in neighborhoods. However, the accuracy of the reductions reported may not be statistically sound. This is evidenced by the perspectives of Reid Ewing, of the Institute of Transportation Engineers (ITE), who is one of the leading experts on traffic calming issues. Regarding traffic volume surveys in his writings, Ewing is quick to "[n]ote that while sample sizes for several measures are large enough to provide meaningful results, the small sample sizes for others [cities] provide only general indicators of effectiveness. Care should be taken when considering their effectiveness."[10]

Of greater debate to the accuracy of the volume reduction reports are the inconsistencies of how and where the data is collected. As asserted further by Ewing, “results depend on where measurements are taken, with volume impacts being attenuated by intervening intersections. Data from studies …indicate that volumes in the same block as diagonal diverters decline by an average of 45 percent after installation. A block away, but with an intervening intersection, volumes decline by less than half that percentage.”[11]

Accident studies should be used to identify the nature and frequency of accidents within a neighborhood. By classifying traffic incidents, the parties and factors involved, locations can be identified where traffic calming devices can be placed to reduce the hazards. Who is involved, such as pedestrians or bicyclists, rights of way, time of day, weather and speed relationships can be of great value.

Ewing also cautions the accuracy of accident studies.

> It is often difficult to draw conclusive results from traffic calming accident analysis. Most safety studies of traffic calming compare "before and after" accident experience. Few studies take into account the influence of potential changes in accident reporting, weather conditions, and traffic diversion. Most traffic calming measures result in some reduction in traffic. Thus collisions may migrate to other streets as motorists divert to avoid traffic-calmed streets. For a comprehensive review of the safety impact, it is important to examine a wide-area, including streets with and without traffic calming.[12]

A recent Canadian report, summarizing 43 international studies, indicated that collision frequency declined anywhere from 8 to 100 percent after some sort of traffic calming was implemented.[13] This illustrates a severe variability, which suggests that all parameter measurements were not the same. An example, as noted earlier, is that many foreign countries use traffic calming devices on major arterial and collector streets, whereas that is not the case in the U.S. One could easily use these statistics to argue, either for or against, the effectiveness of traffic calming.

According to Ewing's research, the reductions of collisions in the U.S. are not as favorable as in other countries. "In most cases the number of collisions went down or stayed the same, but exceptions appear frequently. One reason for these mixed results may be due to statistics. Traffic calming in the United States is largely restricted to low-volume residential streets. Collisions occur infrequently on such streets to begin with, and systematic changes in collision rates may get lost in the random variation from year to year. This limits the confidence in drawing inferences about safety impacts of traffic calming."[14]

Most traffic calming programs include some type of speed analysis. These generally measure the frequency and range of speeds incurred upon a residential street. The nationally accepted method used by traffic engineers to determine safe speeds is the *85th percentile speed* methodology. This

percentile represents the speed below, which 85 percent of the drivers travel upon any surveyed roadway. This standard is used to establish speed limits by government officials and is used by the court systems in determining if speed limits are reasonable and thus enforceable. Due to this standard being used in the court systems, extreme care must be taken for determining speed levels within a neighborhood. For example, if current speed data reveals that the 85th percentile speed is significantly above the current posted speed limit, then this may give evidence and credence to the need for raising the posted speed limit within the neighborhood rather than slowing the speed.

The Ewing research documents the results of speed studies conducted by various cities on hundreds of streets in the U.S. Most of these studies reveal that traffic calming does indeed reduce the speed of drivers. However, Ewing notes the effectiveness of the commonly used speed humps and the suspicious statistical confidence levels associated with their dubious success.

> Speed humps have the greatest impact on 85th percentile speeds, reducing them by an average of more than 7 mph, or 20 percent. Raised intersections, long speed tables, and circles have the least impact. One critical caveat: Rarely in the researched before-and-after studies is it made clear where speed measurements were taken in relation to the traffic calming measures. Occasionally a study will report 'midpoint' or 'midblock' speeds, but because the spacing of traffic calming measures or the length of blocks is unknown, the exact location of speed measurements is also unknown. The after speeds may be 100 feet from slow points, 200 feet, or some other distance. Obviously, where the measurement is taken has a profound effect on the result, because motorists decelerate as they approach slow points

> and accelerate as they leave them. Summary statistics of this sort provide, at best, ballpark estimates of impacts.[15]

Because of the different parameters measured by each locale, Ewing points to further concern for inaccuracy in establishing a national speed reduction average:

> [t]he exact date of measurement is seldom known. The "before" measurement may be 1 month or 3 years before installation; the "after" measurement, 1 week or 2 years afterward. The exact time of measurement may affect results because of the natural growth of traffic and the tendency of travelers to adjust to the new measures…A final caveat: While sample sizes for some measures are large, and sample averages are thus likely to be close to true average by virtue of the law of large numbers, sample sizes for other measures are miniscule. The sample includes 179 studies of standard 12-foot humps, but only 3 studies of raised intersections. The potential sampling error is accordingly many times greater for raised intersections than for 12-foot humps.[16]

Cut through traffic studies should also be conducted prior to installation of traffic calming devices. Knowing when, where, and the time of day cut-through traffic is occurring is important to device selection. Another factor that has to be determined is if cut-through traffic is actually legitimate or is of those driving specifically to and from some destination within the neighborhood.

Finally, as alluded to already, post-result studies need to be performed to document the impact of the action taken. Obviously, this data is critical to the effectiveness of a specific project, but collectively the data can be helpful in evaluating the entire program within that jurisdiction.

Description of Traffic Calming Devices

Traffic calming devices can be divided into of one of two general categories which predominately addresses either traffic volume or speed. *Volume control* devices are those, which divert traffic to another route, severely limit, or eliminate through traffic within an area. Examples of these types of devices are: full street closures, half street closures, diagonal diverters and semi-diverters.

The other category is that of *speed control* devices. Within this category are three sub-categories of *vertical, horizontal* and *narrowing* type devices. Vertical devices are elevated devices upon the roadway that uses the forces of accelerated ascents and decent to discourage speed. Speed bumps are the most radical type of these devices. Horizontal devices capitalize on shifting lateral forces of the vehicle due to rapid course diversions to accomplish reduced speeds. Traffic circles and chicanes are common examples of these types of devices. Rather than using the forces of physics, narrowing devices use a "psycho-perspective sense" of enclosure to discourage speeding. Curb extensions creating "neck downs" or a diminished path of travel are the objective of these type devices.[17]

There is quite a variety of traffic calming devices. Each device has positive and negative distinctiveness. As well, some are better suited for

different types of street conditions and applications. A complete listing of all types of devices and tools with their respective descriptions is contained in Appendix A. This Appendix provides in-depth information regarding the advantages, disadvantages and applications of each traffic calming measure. Brief reviews of the more common devices are examined in the remainder of this chapter. Most of the information contained in this chapter review, and in Appendix A, is adapted from the City of Boulder (CO) Neighborhood Traffic Mitigation Program Toolkit.

Volume Control Devices

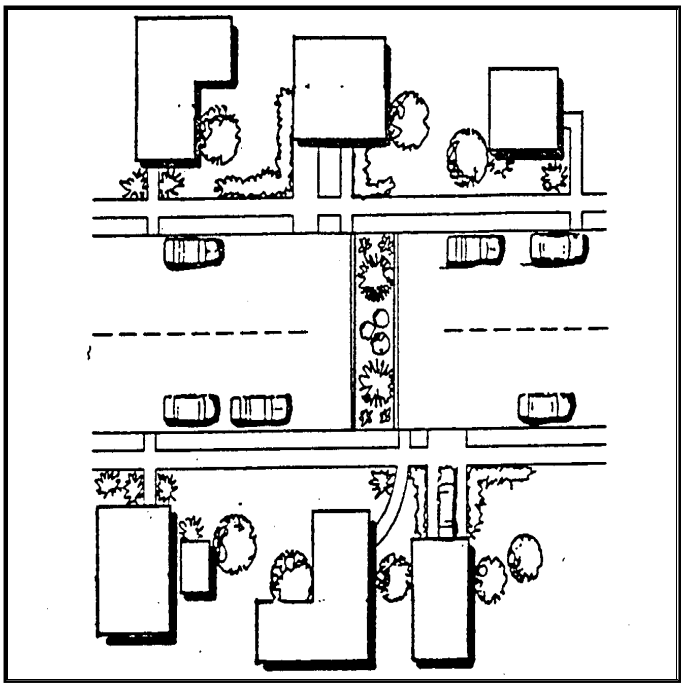
As stated earlier, the objective of volume control devices is to discourage and reduce the number of vehicles traveling through a neighborhood. Generally, this requires diverting the traffic to another route that is more suitable to handle such volume. The following are some of the more common examples of volume control devices:

Street Closure

This is probably the most drastic of all traffic calming devices as it severely limits the use of the street to the residents. Although it does eliminate cut through traffic, this device can often be perceived as an inconvenience by the residents and as an unwarranted restriction by the general public. Using planters, raised barriers, bollards or landscaping to completely block the street for traffic, accomplishes the desired effect as illustrated in Figure 2.1.

Figure 2.1

Street Closure



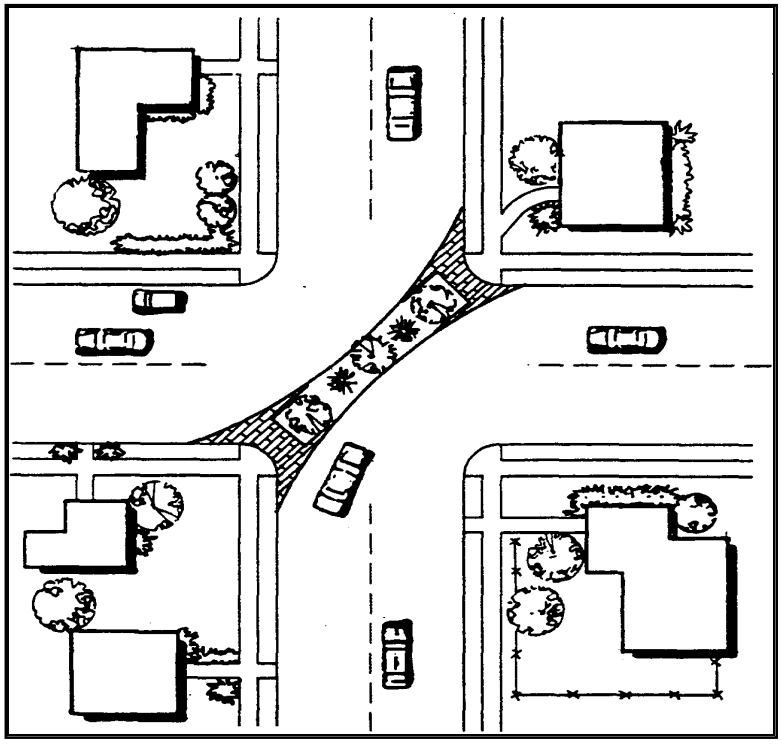
Source: City of Boulder NTMP Toolkit

Diagonal Diverter

This particular device is placed diagonally across an intersection with the design intent to interrupt traffic flow across the intersection. As a result, this installation is very effective for cut-through traffic and maintains a continuous routing of vehicles. However, because there is no opposing traffic, actual increased turning speeds by motorists can occur. As shown in Figure 2.2, this diverter could also increase trip lengths for some inconvenienced residents.

Figure 2.2

Diagonal Diverter

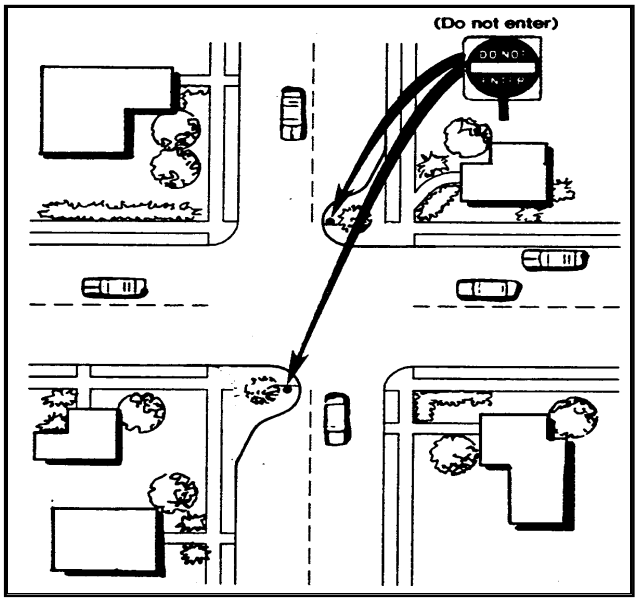


Source: City of Boulder NTMP Toolkit

Semi-Diverter

Whenever there is a desire to physically block one direction of traffic at a certain point on a two-way street, a *semi-diverter* traffic-calming device is selected similar to the one in Figure 2.3. In effect, this prevents vehicles from turning, or forcing a turn, depending upon the desire. Cut through traffic is reduced, but there is not a 100% compliance with all drivers, particularly when no on-coming traffic is encountered. Again, trip lengths could increase for some residents depending on the location of the semi-diverters.

Figure 2.3
Semi-Diverter

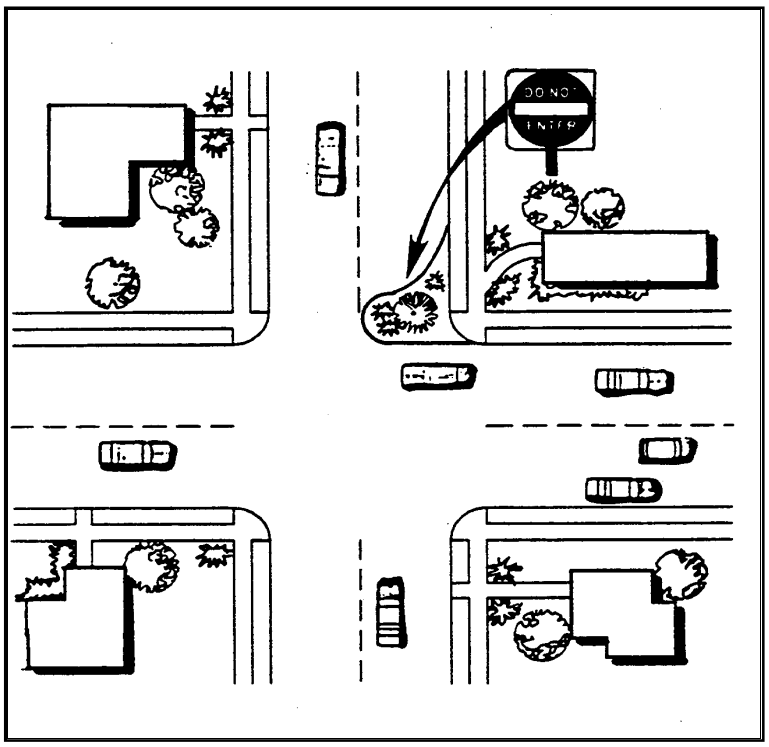


Source: City of Boulder NTMP Toolkit

Turn Prohibitions

Based on the same principle as the semi-diverter, the *turn prohibition* device is used when only a specific turning movement is desired on one particular street. This design, as shown in Figure 2.4, is very useful when only one street of the intersection experiences more traffic than the others, or when there is a need to eliminate two-way traffic conflicts. This device too, can have a detrimental effect on the access of the neighborhood to some residents.

Figure 2.4
Turn Prohibitions



Source: City of Boulder NTMP Toolkit

Speed Control Devices

Using the erratic forces of acceleration and braking to slow vehicles are the objectives of most *speed control* devices. These forces occur as a result of vertical, horizontal or narrowing deflections to the paths of travel. As with volume control devices, these installations have benefits as well as drawbacks to their intended objectives.

Horizontal Speed Controls

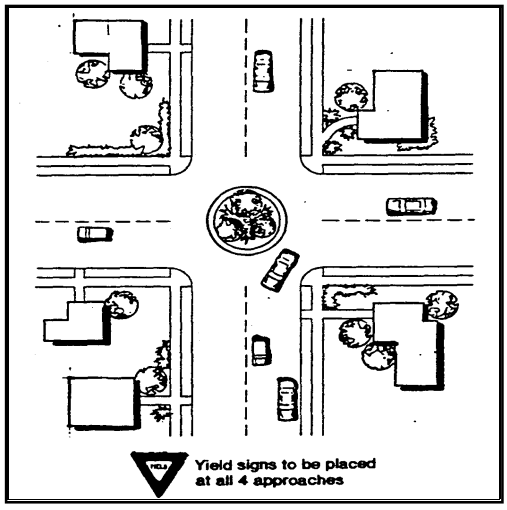
The horizontal speed controls devices have no vertical elevations within their design. They are designed to cause the driver to decelerate in order to generally maneuver from side to side, or in different directions, to successfully pass through the device. Here, the objective is to incorporate abnormal lateral forces that require the driver to reduce the speed of travel without losing control of the vehicle. Traffic circles and chicanes are the two most common types of the horizontal speed control devices.

Traffic Circles

Of all the horizontal devices, the *traffic circle* is probably the most controversial. These are raised circular medians located in the middle of a four-way intersection that requires drivers to travel in a counter-clockwise direction to reach the desired continuation street of the intersection. When properly constructed, no vehicle can travel through the intersection in a straight line as is depicted in Figure 2.5. Generally, the cars are required to "yield upon entry", thus granting the right of way to the cars already within the circle pattern. Traffic circles increase the confusion and danger for street crossing by pedestrians and bicyclists.

Figure 2.5

Traffic Circles

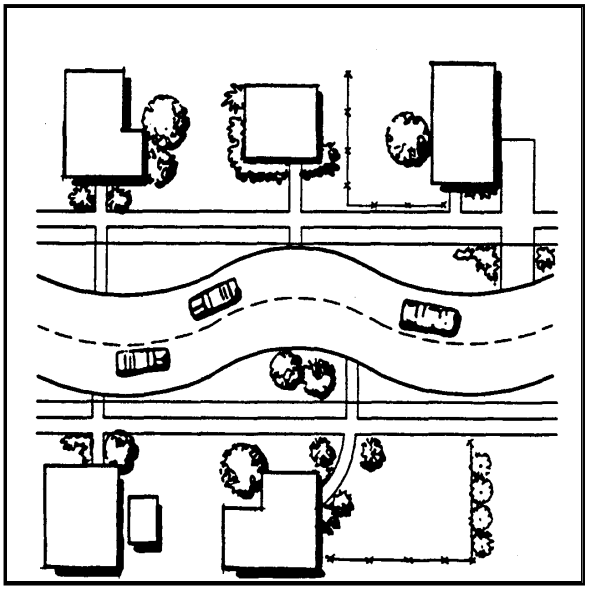


Source: City of Boulder NTMP Toolkit

Chicane Deviations

The *chicane* design redraws the path of travel so that the street is no longer straight. This is accomplished by the installation of curb extensions in between intersections. As shown in Figure 2.6, this horizontal deflection requires drivers to slow in order to maneuver to the left and right. Some residents gain additional right of way frontage to their property whereas others lose right of way frontage. Thus, this device is difficult to implement unless the street already offers a wide adequate right of way. Most residents within the entire chicane scheme lose street parking opportunities.

Figure 2.6
Chicane Deviations



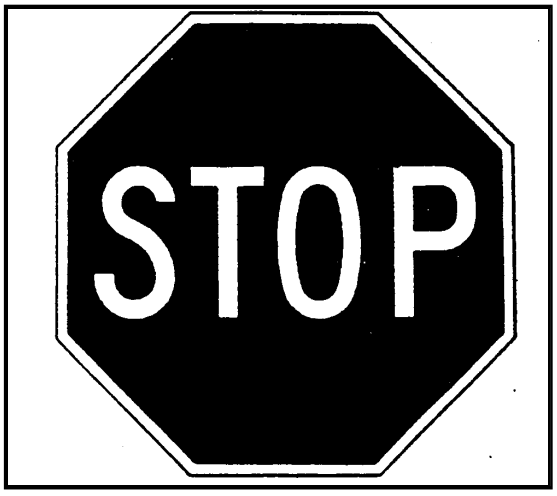
Source: City of Boulder NTMP Toolkit

Stop Signs

As most know, the red hexagonal sign containing the message to "stop", as depicted in Figure 2.7, is a traffic command established by the entity having jurisdiction. The purpose of *stop signs* is to designate the right of way of traffic at intersections. They are very useful when a low volume street intersects with a high volume street or for intersections with equal volume. If there is not enough traffic at the intersections then compliance will usually not be compelled. Many transportation officials argue that the signs do not decrease the average speed and therefore they do not support their use as a speed control tool.

Figure 2.7

Stop Signs



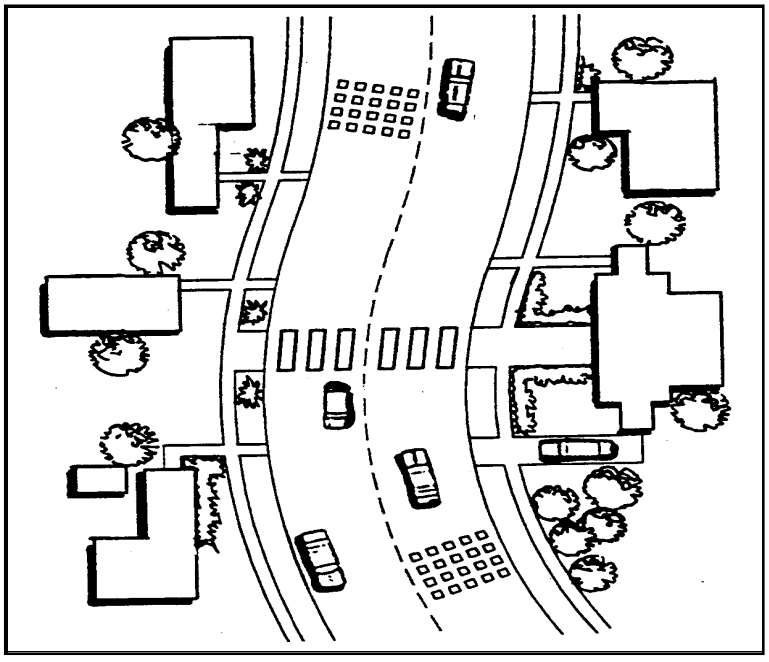
Source: City of Boulder NTMP Toolkit

Rumble Strips

These devices are patterned sections of rough pavement textures, which abruptly alert the drivers to a dangerous approaching condition. This sudden noise encountered by drivers is useful in areas of concealed stop signs or pedestrian crossings in mid-blocks. They are generally ineffective in reducing overall speeds and adversely impact bicyclists. The *rumble strips* are very noisy by design and thus are generally not recommended for neighborhood settings. Rumble strip examples are contained in Figure 2.8.

Figure 2.8

Rumble Strips



Source: City of Boulder NTMP Toolkit

Vertical Speed Controls

This device sub-category generates the most displeasure with the citizens who frequently use the roadways. The increased acceleration and braking that is necessary to traverse these vertical impediments causes speed interruptions while traveling upon the roadway. The ascent and decent of these elevated devices can cause discomfort for the passengers as well as maintaining the control of the vehicle unless they are crossed at lower speeds.

Speed humps, speed cushions, and raised intersections are the more commonly type vertical speed control devices found in communities with traffic mitigation calming plans. In general terms, the speed hump is the most economical type of vertical speed control device. As a result, this is often the most utilized device in traffic calming schemes.

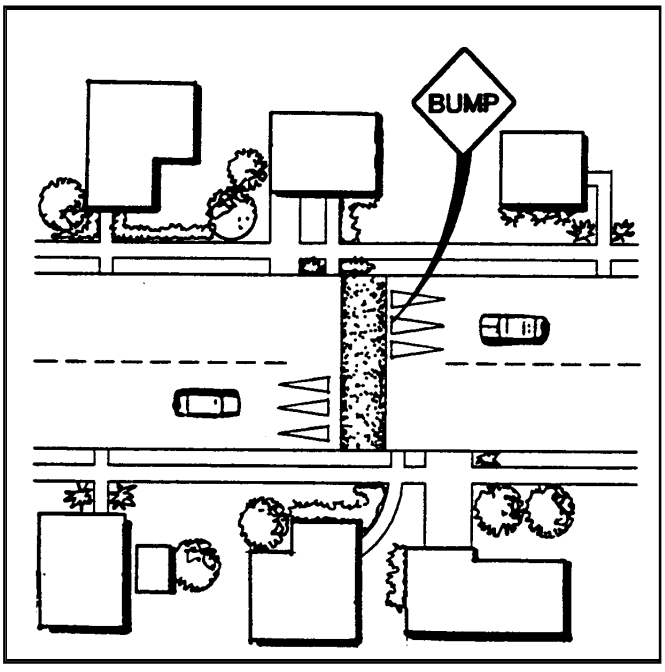
Emergency services particularly object to these devices as they contribute to delayed response times and cause repeated mechanical stresses to the suspensions of emergency vehicles. They can also increase noise and air pollution.

Speed Humps

Speed humps are wave-shaped paved humps in the street as illustrated in Figure 2.9. The height of the hump determines how fast a vehicle can traverse the device without causing discomfort to the driver or damaging the vehicle. Discomfort and the feeling of being "out of control" increases as the speed attempt increases. Without a doubt, speed humps are the most controversial traffic-calming device. Generally, the height of most humps is about four inches. They are usually 12 to 22 feet wide.

Figure 2.9

Speed Humps



Source: City of Boulder NTMP Toolkit

Speed Cushions

On a similar concept as the speed hump, *speed cushions* are designed to have a minimal impact to emergency response vehicles. Rather than extending the full width of the roadway, speed cushions partially cover the roadway. These devices, as shown in Figure 2.10, consist of either recycled rubber or asphalt, raised about 3 inches in height. The length of the cushion is about 10 feet. The spaces between the cushions allow emergency vehicles to partially straddle the device. Thus, these vehicles can traverse this device easier and faster than the speed hump.

Figure 2.10
Speed Cushion



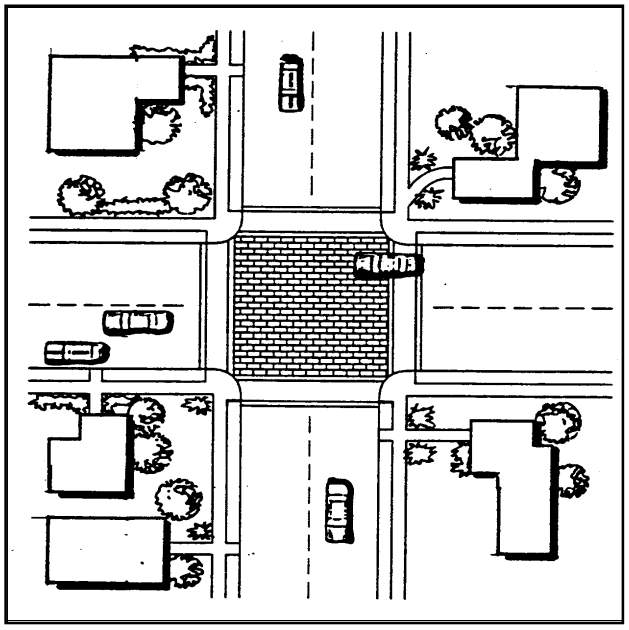
Source: City of Austin Public Works & Transportation Department

Raised Intersections

A *raised intersection* is of similar design as the speed hump except that it encompasses the entire portion of the intersection area. This raised plateau is about 4 inches higher than the surrounding streets. Thus, one must slow to enter as well as maintain a slow speed to exit the intersection. This device, like the one shown in Figure 2.11, provides excellent amenity for pedestrians and is effective for speed control at intersections. Like the speed humps, these devices have a negative impact on emergency response times.

Figure 2.11

Raised Intersections



Source: City of Boulder NTMP Toolkit

Narrowing Control Devices

In general, wider roads encourage higher motor vehicle speeds. To combat these, alterations to roadways can be made to create a "psycho-perspective sense" of enclosing or narrowing the roadway. Many of the effective traffic calming devices capitalize on this element. Decreased road widths translate to decreased traffic speeds.

There can be many variations to the type of narrowing devices used by the communities with traffic calming programs. These types of devices are more expensive than most of the speed control devices. Due to the increased expense, narrowing devices are less likely to be utilized in traffic calming programs.

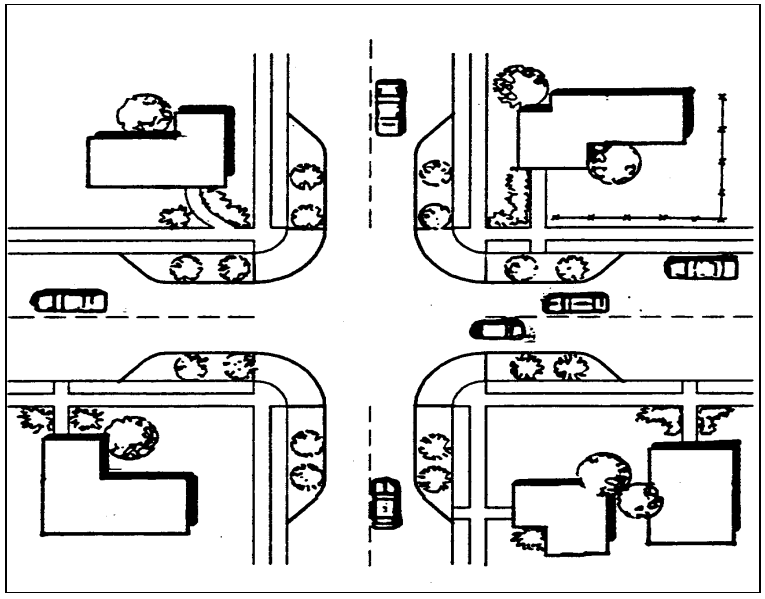
The type of devices can be used at intersections, mid-block for lane width reductions or simply to divide the center of traffic paths of a street. The following are the more commonly used narrowing control devices:

Neckdowns

The objective of these devices is to physically reduce the road width at intersections. This is accomplished by extending the curb radius of each corner point of the intersection. As the road begins to narrow, vehicles have to reduce speeds to ensure adequate fender clearances of on-coming vehicles at the entrance to an intersection. Figure 2.12 reveals how their design does not accommodate bicyclists very well.

Figure 2.12

Neckdowns



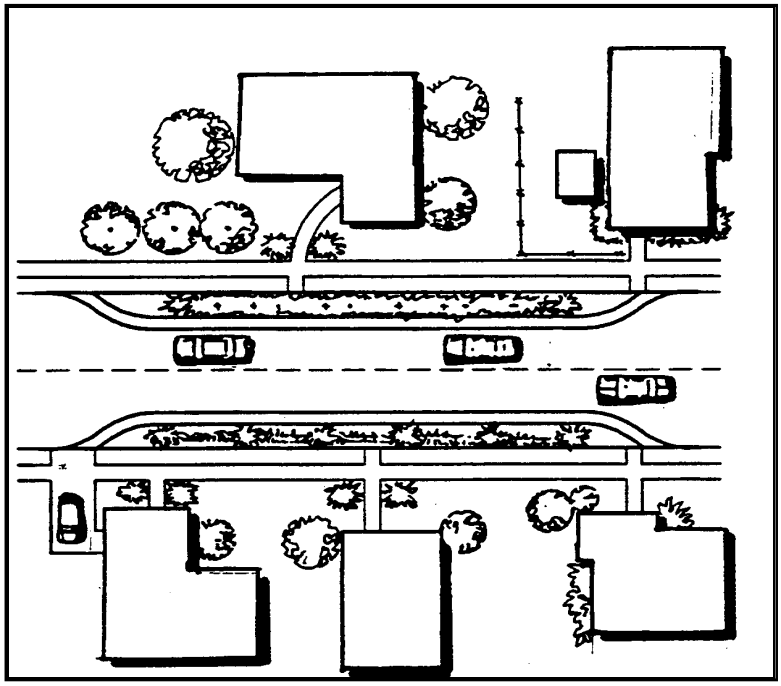
Source: City of Boulder NTMP Toolkit

Lane Narrowing

Similar to a neckdown, *lane narrowing* occurs in the mid-block portion of roadways rather than at the intersection. They are especially effective where there are long stretches of roadways between intersections. Many residents object to their placement in front of their homes as their parking is eliminated totally. These devices can also be dangerous for bike riders. Figure 2.13 illustrates a mid-block lane narrowing.

Figure 2.13

Lane Narrowing



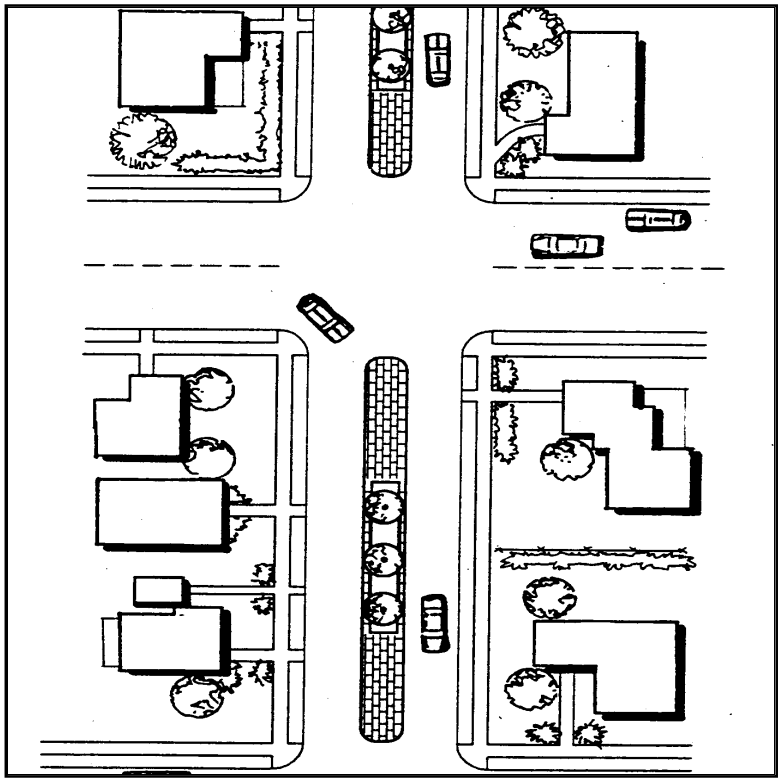
Source: City of Boulder NTMP Toolkit

Center Median

The width of the street is reduced when a median is placed longitudinally along the center of the street. This in turn narrows the path of travel for on-coming lanes as shown in Figure 2.13. The addition of landscaping can also add to the effect of a narrow passageway. This often restricts all parking where the medians may be placed.

Figure 2.14

Center Median



Source: City of Boulder NTMP Toolkit

Notes

[1] Reid Ewing, *Traffic Calming: State of the Practice*, (Washington, D.C.: Institute of Transportation Engineers, August 1999), p. 10.

[2] Ibid., p. 11.

[3] Ibid.

[4] Ibid., p. 14.

[5] Ibid.

[6] Kevin Edward Donahue, "Urban Access and Permeability: A Study of Traffic Calming," (Master's Thesis, The University of Texas at Austin, 1995), p. 120.

[7] Melinda Railey, "The Impact of Traffic Management Programs on the Delivery of Fire Suppression and Emergency Medical Services", (Master's Thesis, The University of Texas at Austin, 1996, p. 16).

[8] Ibid.

[9] Lindy McGinnis, "Things That Go Bump in the Night", *NFPA Journal*, (January/February 1997), p. 82.

[10]Ewing, *Traffic Calming: State of the Practice*, p. 105-106.

[11] Ibid., p. 106.

[12] Ibid., p. 109.

[13] Ibid.

[14] Ibid., p. 111.

[15] Ibid. p. 103.

[16] Ibid.

[17]Ibid., p. 19-39.

Chapter 3. Emergency Service Issues

Emergency Response Times & Routes

Operators of emergency service vehicles are charged with the responsibility of navigating their vehicles to emergency scenes by taking routes that will yield the shortest amount of travel time possible. This elapsed travel time, which begins when a unit is dispatched to an emergency, and ends when they arrive on the scene, is commonly referred to as *response time*. Undoubtedly, the most debatable issue regarding traffic calming devices rests with the negative impacts on response times for emergency service vehicles.

In conflicting roles, the neighborhood streets that are good candidates for traffic calming devices are also the very same streets that are often utilized by emergency services. Not unlike the general public, drivers of emergency service vehicles commonly select streets that provide for faster speeds, cut-through access to adjacent areas, and lesser physical impediments in order to achieve the shortest response time to their destinations. These type of preferred, frequently used streets by the emergency services are often referred to as *primary response routes*.

At least one, more often several, primary response routes are used on every emergency response to reach any location in the service area. Close

proximity to emergency response routes is the very premise for optimal site selections for fire and EMS stations. In addition, most emergency service departments require their vehicle operators to devote an immense amount of time to studying and maintaining a superior knowledge of the streets within their geographical service area. This is to further ensure the emergency responders select the shortest, quickest routes that will yield minimal response times.

Recognizing the crucial importance of primary response, the Institute of Transportation Engineers (ITE) recommends that these routes should remain free of impediments. "Speed humps should not be installed on streets that are defined or used as primary or routine emergency vehicle access routes."[1]

Fire and EMS Vehicles

As traffic-calming devices are designed to slow the vehicular traffic of the public, they also slow the speeds of emergency vehicles. Most passenger cars are lighter in weight, have a shorter wheelbase, and utilize much softer suspension systems than the other vehicles used upon roadways. In addition, they generally contain a higher horsepower to weight ratio and contain very effective, sophisticated braking systems. Although these vehicles are slowed somewhat by traffic calming devices, these features allow the passenger vehicles to traverse the devices much easier than any other type of vehicle.

As a result, the passenger type automobiles used by police departments do not generally experience significant delays in emergency responses when confronted by speed humps. Police cars have the ability to heavily accelerate between speed humps to compensate for lost time crossing over the humps.

Of the three major emergency services, fire and EMS departments experience much greater response delays due to traffic calming devices as compared to their counterparts in the police departments. The actual response delays for fire apparatus will vary due to their size and type when responding to an emergency.

One must also remember that the delay in responses for EMS units can have a double jeopardy. Unlike the police and fire departments, emergency responses for EMS units are not just a one-way trip to the emergency scene. In most instances, their services require a return trip of traversing traffic calming devices while transporting patients to the nearest hospital. So, the overall impact for EMS is significantly higher than for any of the other emergency services.

Fire departments use many different types of apparatus within their fleets to carry out their missions. Most utilize heavy truck type designs. Compared to automobiles, fire trucks have a longer wheelbase, stiffer suspensions, and heavy gross vehicle weights. Pumper and tanker type fire trucks carry various large volumes of water (between 500 to 2000 gallons),

which weigh many tons. Ladder trucks, which have the largest wheelbase, carry large steel, aerial extension ladder devices (75' to 135' in length) which obviously are also very heavy.

With these physical features, fire apparatus operators must greatly reduce their speeds to safely traverse vertical speed humps and to negotiate very tight turning radiuses of traffic circles, chicanes, or deflector type devices. In addition, most fire apparatus are not adept for quick acceleration or de-acceleration extremes. Thus, they struggle severely to regain normal cruising speeds between devices.

EMS vehicles too are generally of a heavy truck type of design. Although they are not as heavy as fire trucks, they contain a large box type compartment for transporting patients and medical crews. This box configuration is unusually tall, quite bulky, and thus has a high center of gravity. Due to this design, when maneuvering over or through traffic calming devices, the EMS unit has a great tendency to severely shift from front to rear or side-to-side. Obviously, this type of transport condition can have very detrimental effects upon cardiac patients or severe trauma patients, i.e. bone fractures. There have also been reports that EMS personnel have been unable to successfully begin cardio-pulmonary resuscitation (CPR), intravenous medications, or intubate patients while traversing traffic calming devices.[2]

Although the delay in response time has been the focus of most opponents of traffic calming devices, there are some other severe, negative peripheral issues to fire and EMS emergency responses. Two of these issues warrant notation as they relate to both safety and additional direct costs for traffic calming programs.

Firefighter/Paramedic Injuries

There have been documented cases where firefighters have incurred injuries while traversing speed humps. A Montgomery County firefighter, responding to a 1997 fire incident, received substantial injuries to his neck and back while wearing a seat belt and full firefighter protective clothing. This employee was out of work for two months, served limited duty for another ten months before subsequently being released on full disability retirement in July of 1998.[3]

The Sacramento (CA) Fire Department has documented several firefighter injuries due to speed humps. One fire fighter was granted an early retirement after she struck her head on the roof of an apparatus while traversing a speed hump enroute to an incident. She suffered a cervical spine compression injury. Another firefighter experienced vertebrae compression injuries in another separate incident. That firefighter was awarded permanent disability status and could no longer work as a firefighter. In both of these

cases, each firefighter was wearing a seat belt and yet the force of the jolt caused them to strike their heads on the cab roofs. The third known injury was believed to be an aggravation/recurrence injury. It is believed that this firefighter had a previous neck injury and that the speed humps aggravated or caused further injury. A fourth injury resulted during the performance of actual speed hump testing. This too was a spinal injury to the back.[4]

The Fresno (CA) Fire Department too has had at least four documented cases of "injury on the job" incidents during emergency responses from crossing speed humps in fire apparatus. The injuries have been incurred from firefighters striking their heads on the roofs of fire trucks. These injuries have mainly occurred to the Officers of the units who ride in the forward passenger side of the fire apparatus. Preliminary departmental investigations reveal that the drivers are not as severely impacted as they have "air-ride" seats whereas the Officers seating position generally have fixed "bench type" seating. In addition, the rear facing firefighter riding positions appear to be less vulnerable to this injury particularly for the fire unit models that contain a raised roof area.[5]

Fleet Damage

There is a growing concern that traffic calming devices cause increased maintenance to fire vehicles. The erratic weight shifts to the fire apparatus

creates increased flexing and stress to suspension components such as steering devices, axles and frames. The Fresno (CA) Fire Department has experienced increased incidence of apparatus frame cracks. They attribute this to additional frame stressing and twisting from speed humps.[6]

A similar situation is documented in Berkeley, California. "Driving over speed humps cause[s] the frame to flex at awkward angles and serve to stress the apparatus needlessly. Because of this, the average life span of emergency vehicles would be shortened. One of our aerial ladder trucks had to have gussets welded to the frame to strengthen the frame member in order to stop a stress fracture. This was a direct result from the speed humps on Derby Street between Shattuck and Telegraph".[7]

Probably the department that has endured the most damage is the Sacramento (CA) Fire Department. They have documented several engines as having flattened springs, and/or body welds breaking loose from the vehicles' frame. Each apparatus experiencing these problems was assigned to response districts containing a higher number of speed humps than other areas of the city.[8] Due to this higher saturation of humps, fewer alternative routes were available to these units. Thus, these units experienced more repeated trips of passing over these devices.

One very dramatic Sacramento incident involved a 1975 Calavar Firebird apparatus, which is a 150' articulating ladder platform, weighing

approximately 72,000 pounds. While responding to an incident, the apparatus had a front axle assembly shear off after crossing a speed hump. Fortunately, no one was hurt, but there obviously was significant damage to the apparatus.[9]

Although not as severe, another fleet damaging incident also occurred in Sacramento. As the ladder/tiller unit crossed over speed humps at a speed of 20 mph, tremendous flexes and twists were placed upon the unit to the extent that all of the compartment doors, on both sides, abruptly came open. This resulted in most of the loose equipment stored inside being dumped onto the street.[10] This is finding is consistent with an Austin, TX speed hump test where a "power steering dipstick was dislodged from [the] motor over hump #5; equipment bouncing noise could be easily heard within compartments at all humps; radar noted speeds at all humps was at least 20 mph."[11]

Water tanks carried on the apparatus have also been subjected to damage. "One [San Diego] Fire Department truck tank was broken as the vehicle rolled over a hump."[12] In another report, "This city's first speed hump…has cost the Louisville Fire District more than $1,000 in damage to a truck."[13]

Vehicle damage from speed humps have also been reported in other public service fleet operations. Primarily bus routes and public transportation systems seem to be the most impacted. In England, "Midland Fox has estimated that damage resulting from traffic calming costs an estimated

£40,000 a year, with double-decker buses being the worst affected. Minor incidents have occurred…resulting in broken springs, skirting and exhausts, and…collapsed suspension."[14] The Sacramento (CA) Regional Transit System experienced major bus damages also. As a result, the transit system will no longer provide bus routes on streets that contain speed humps. Whenever new humps are placed down, the transit system simply moves to another route where humps are not located.[15] This may also be true for school buses. With speed hump problems on Twain Avenue in San Diego, "[s]chool buses are opting for Estrella [Avenue] to avoid Twain's undulations."[16]

Some special transit vehicles for the disabled have also documented increased maintenance from constantly going over or around traffic calming devices. These include increase in front-end alignments, brake pads wearing more quickly, shocks and springs need more frequent replacement, and damage to water valves, fuel tanks and mufflers that are located underneath the vehicle.[17]

Response Time Tests & Studies

Although most opponents and proponents agree that traffic-calming devices cause delays to emergency services, the real heart of the issue is how much of a delay occurs and does this have a significant impact on the outcome of the emergency event? Pressed to provide quantitative and qualitative data,

several fire departments and local governments have conducted various tests and studies in an attempt to measure the effect that traffic calming devices have upon emergency vehicles. Because traffic conditions and calming devices differ from one locale to another, the results of these tests and studies can vary with each jurisdiction. Each of the known major tests or studies is reviewed here along with the summary findings of each.

Portland, OR (January 1996)

The first major metropolitan city to extensively research and measure the effects on fire vehicle travel times of traffic calming devices occurred in Portland, Oregon. Beginning in the fall of 1995, the Portland Bureaus of Fire and Traffic Management initiated quantitative testing of the relationship between traffic calming devices and emergency response times. Four variables, which were thought to influence the response time impacts, were considered. The variables identified were: the driver, the type of fire vehicle, the desired speed, and the type of traffic calming devices.

Six vehicles consisting of fire engines, rescue units, squad units, and ladder trucks were used. With four test runs per vehicle, at speeds of 25, 30, 35, and 40 mph, a total of 24 tests were administered for each street. Of the six streets tested, two had 22-feet wide speed humps, two had speed hump widths of 14-feet, and the remaining two contained one traffic circle each.

The actual elapsed time from start to finish was timed and compared to the calculated response time for the same distance without traffic devices. The time difference represented the amount of response delay.[18]

The summarized findings and conclusions of the report indicated that the performance of the individual drivers did not significantly influence the results. The delays per device were interrelated to the three remaining variables of the type of vehicle, the type of device and the desired travel speed. The range of delays for all vehicles, with the four tested speeds, and the specific device tested is as follows:

22-foot Speed Humps:	0.0 to 9.2 seconds per hump
14-foot Speed Humps:	1.0 to 9.4 seconds per hump
Traffic Circles:	1.3 to 10.7 seconds per circle[19]

A closer examination of the data results for the specific speed of 30 mph reveals that the speed hump delays experienced for a fire engine is 3.7 seconds, compared to 4.9 seconds for longer ladder trucks. The rescue unit at this speed, which is comparable to an EMS unit, encountered a 1.7 second delay per hump.[20]

Most importantly of this study, interpretations of the data for the desired speeds of 25 mph vs. 40 mph would suggest that the faster a fire or EMS unit tries to travel, the greater the impact is for the delay. Most fire and EMS operators prefer a cruising speed of 35-40 mph. In essence, the more a driver

intensifies his/her efforts to transverse the humps, the greater the impact delay. For some cases, the impact per hump could be upwards of three-fold as depicted in Table 3.1.

Table 3.1

Speed Hump Response Delays for 25 MPH vs. 40 MPH

Vehicle	Response Speed	Delay Per Hump	% Delay For Faster Speed (40 mph)
EMS Unit	At 25 mph	1.3 seconds	
	At 40 mph	5.1 seconds	292%
Fire Engine	At 25 mph	2.8 seconds	
	At 40 mph	8.5 seconds	203%
Ladder Truck	At 25 mph	4.3 seconds	
	At 40 mph	10.3 seconds	139%

Source: The Influence of Traffic Calming Devices on Fire Vehicle Travel Times, Portland Bureau of Fire, Rescue and Emergency Service and Bureau of Traffic Management, January 1996.

Austin, TX (March 1996)

In response to an explosion growth of popularity and request by citizens for speed humps on over 600+ streets, the Austin Fire Department conducted an analysis outlining the impacts to fire and EMS vehicles. This particular test measured the average time delays per each speed hump, with a total of six humps (14 feet wide) being crossed. The time increases to traverse the humps were approximately 2 to 10 seconds. This variation was due primarily to the type of emergency vehicle tested. For example, EMS units responding without a patient had an increase average of 2.2 seconds per hump compared

to a 9.6 second increase when transporting a critically injured patient. Fire engine pumper trucks and ladder trucks experienced an average delay variation of 2.8 to 3.6 seconds per hump. These results were from test parameters requiring the drivers to maneuver over the humps at speeds of their own discretion or at 15 mph. They were to then regain a 30 mph cruising speed between the humps.[21]

Another series of tests, requiring the drivers to maintain a 20 mph speed while crossing the humps and regaining to 30 mph in between humps, was found to be close to or beyond the reasonable limits of traversing speed humps. Specifically, all drivers in this test series expressed concern that they were out of control or that this speed was very potentially damaging to their apparatus.

In fact, some drivers refused to conduct seconds runs of this test at that speed. Thus, the data from this particular test was not used to determine the impact inferences. However, this confirms that apparatus cannot traverse speed humps safely at speeds of 20 mph or greater.[22]

Applying the data from this test, and using the 1999 Austin Fire Department average response time of 4.25 minutes, a simple extrapolation would reveal the impact of the increased response time expressed in a percentage.[23] A citizen living at the end of this particular test location, which

requires emergency vehicles to cross the six speed humps, would experience the increased response times noted in Figure 3.2.

Table 3.2
Response Time Increases for Six Speed Humps

Vehicle Type	Average Response Time	Average Time Increase (for 6 Speed Humps)	Total Increased Response Time	Percent Differential Increase for Delay
Pumper Truck	4.25 min.	.28 min.	4.53 min.	7%
Ladder Truck	4.25 min.	.37 min.	4.62 min.	9%
EMS (no patient)	4.25 min.	.27 min.	4.52 min.	6%
EMS (with patient)	4.25 min.	.97 min.	5.22 min.	23%

Source: An Analysis of Speed Humps Effects on Response Times, Austin Fire Department, March 1996.

Montgomery County, MD (August 1997)

Facing increased pressures from the public and from politicians, the Montgomery County Fire Department was directed to study the issue in August 1997. The scope of this study was to measure the effects of circular type speed humps and traffic circles. Two test courses were implemented, one having three speed humps, and the second course containing one traffic circle. The evaluation team, composed of Montgomery County staff personnel from the Fire and the Public Works Departments, established test methodology employing most of the same measurement techniques used previously in both

the Austin and Portland tests. Three types of fire trucks and one ambulance were used in test runs.

Similar to the Austin test, the Montgomery County Fire and Rescue units experienced an average delay of 2.8 to 7.3 seconds per hump.[24] Likewise to the Portland test, a delay range of 3.2 to 7.0 seconds was experienced for the Montgomery County units maneuvering around the traffic circle test.[25] Although these delays are similar to the other studies, the research staff discovered that the four vehicles averaged slightly less than 20 mph across the test route. This is far below the widely accepted response time study by the Rand Institute in New York City, which established that fire department apparatus travel at an average cruising speed on 39.2 mph. Thus, their findings would, in all likelihood, represent the minimum delays that one could expect from fire and EMS units.[26]

Rather than just examining response time implications, this study utilized a linear form of measurement for determining service impact. Using the data, a chart was established showing how much closer, or an equivalent distance, a unit would have to be stationed to an incident scene due to the response delays it would encounter from crossing speed humps. Assuming one wanted to maintain a 5-minute response time goal, the chart shows that every speed hump the unit has to cross, while maintaining a 25 mph cruising speed, is equivalent to being .05 (1/20) mile further from the incident scene. If the

scenario contained 5 humps to cross, this would have the effect of adding approximately ¼ mile to the equivalent response distance. Thus, a station would need to be ¼ mile closer to the incident in order to maintain a 5-minute response goal.[27]

Linear measurement of course is in direct proportion to station coverage area measurements. As noted by the Montgomery County report, the areas served by fire stations could be greatly impacted:

> Should speed hump-impeded routes taken by responding units limit average speed to 20 mph, the amount of area they can serve within 5 minutes may drop to the area within 1.3 linear miles from the station versus the area within 2.0 linear miles served within 5 minutes along unimpeded routes upon which a cruising speed of 35-40 mph is attainable. Coverage of 1.3 miles in each direction from a station would be about 6.8 square miles per station for a total of 210 square miles covered by the County's 31 fire-rescue stations. In comparison, coverage of 2.0 miles in each direction would equal 16 square miles per station for a total of 496 square miles covered by the same 31 stations. Assuming the 1.3 mile scenario, station coverage would be 42% of that available from stations unimpeded by speed humps, implying that 58% of the residents/service recipients would wait more than 5 minutes for service after dialing 911.[28]

These findings could be illustrated in a different manner. If the Montgomery County residents desired to maintain the 5.0 minute response time goal and wanted traffic calming to the level indicated above, they would have to add 42 more fire stations, for a total of 73, in order to keep their current level of service. Due to the decreased speeds and increased response

times, these stations would have to be placed closer to each other than where they presently are. In addition, the financial impact would be overwhelming.

Berkeley, CA (October 1997)

In July 1995, after the Berkeley Fire Department (BFD) and disabled residents expressed strong concern over the proliferation of speed humps, the City Council ordered for an evaluation to be conducted. Further, the analysis was directed to consider not only the effectiveness of speed humps but also the full impacts of the devices. This study was completed in October 1997.

Two types of traffic calming devices were evaluated by the Fire Department. One test was performed on a street with six 12-foot circular speed humps, while the other was conducted on a street with two 22-foot flat top designed humps. For each test, a fire engine and a ladder truck were driven over the street segment containing the humps and then over a very similar adjacent street of the same distance but containing no humps. All test runs were timed and the response delay was identified by the time differences.[29]

Test results for the 12-foot humps suggested an increase of 10 seconds per hump. This time delay was similar for both the engine and ladder units. Based on this street, which is approximately 3 blocks or 1/3 mile long, the

Fire Department would experience an increase response delay of an additional one-minute.[30]

The results for the 22-foot humps revealed a significantly less delay particularly for the engine apparatus. The delay experienced by the engine was approximately 3 seconds per hump. However, the ladder truck had a much longer delay of approximately 13 seconds for this type of hump. This report does clarify that the delays measured by the BFD was greater than the four to six second delay per hump that other cities had identified. The BFD staff attributed these variances to driver behavior and limited physical testing.[31]

Boulder, CO (April 1998)

With growing concern and heated public debate over recent traffic calming installations, the Boulder Fire Department conducted tests to determine the response delays associated with traffic circles. Two tests, approximately one year apart, were performed.

In June of 1995, after affixing temporary orange traffic cones to depict the outline of a future traffic circles, a consulting engineer firm and the Boulder Fire Department conducted tests with fire apparatus. This test required the drivers of the units to maneuver around a traffic circle within a

three-block roadway. The findings revealed that the delay was 7.5 seconds. The average speed of the units was 23 mph. [32]

One year later, the same test was performed. However, the traffic circle had the same dimensions but was constructed of temporary concrete blocks rather than the orange cones of the previous year. Under this condition, the fire units experienced an increase in the delay going from 7.5 to 10.0 seconds. Relative to the increased delay, the average speed also dropped from 23 mph to 20 mph. These increases are believed to be attributed to the more intimidating concrete barriers rather than the less harmful orange cones.[33]

Combined findings of the Portland, Austin, Montgomery County, and Berkeley tests confirm that speed humps cause considerable delays for emergency response vehicles. The Portland, Montgomery County, and Boulder tests verify that significant delays occur also from traffic circles. Thus, all of these tests substantiate that traffic-calming devices pose a negative impact to the outcome of life threatening incidents and other emergency service level deliveries. The level of this impact will be explored in Chapter Seven.

Notes

[1] Douglas W. Wiersig, *Guidelines for the Design and Application of Speed Humps,* ITE Traffic Engineering Council Speed Humps Task Force TENC-5TF-01 (Washington, D.C.: Institute of Transportation Engineers, June 1997), p. 10.

[2] Dashka Slater, "Berkeley Avoids New Speed Humps", *Berkeley Voice* (August 25, 1995), p. 2.

[3] *Mitchell v. Save Our Streets*, Civil No. 191477 (Md. Cir. Ct., September 19, 1998), Affidavit of George Gosbee.

[4] Telephone interview by Les Bunte with Gordon Duncan, Battalion Chief, Sacramento (CA) Fire Department, February 8, 2000.

[5] Telephone interview by Les Bunte with James Christiansen, Bureau Chief of Operations, Fresno (CA) Fire Department, February 10, 2000.

[6] Letter from Operations Chief James L. Christiansen, Fresno (CA) Fire Department, to District Chief Matthew Shuler, Eugene (OR) Fire Department, April 10, 1996.

[7] Letter from Assistant Fire Chief Michael J. Migliore, Berkeley (CA) Fire Department, to Susan Sanderson, Transportation Planner, City of Berkeley, May 8, 1995.

[8] Telephone interview by Les Bunte with Gordon Duncan, Battalion Chief, Sacramento (CA) Fire Department, February 8, 2000.

[9] Ibid.

[10] Ibid.

[11] City of Austin Fire Department, "An Analysis of Speed Hump Effects on Response Times", Austin, TX, March 1996, (Annex A) p. 16.

[12] Ronald W. Powell, "The speed humps make bumpy issue on Twain Street*", San Diego Union-Tribune*, (May 31, 1996), p. B-1.

[13] Sally McGrath, "Louisville may dump speed bump*", Daily Camera*, (May 14, 1997), p. B-1.

[14] P.G. Boulter and D.C. Webster, *Traffic calming and vehicle emissions: A literature review*, TRL Report 307, (Crowthorne, UK: Transport Research Laboratory, 1997), p. 26.

[15]Telephone interview by Les Bunte with Gordon Duncan, Battalion Chief, Sacramento (CA) Fire Department, February 8, 2000.

[16] Powell, "The speed humps make bumpy issue on Twain Street", p. B-1.

[17] Letter from Linda Diebert & Lenna Kottke, Executive Co-Directors, Boulder Special Transit, to Boulder City Council, April 3, 1997.

[18] City of Portland, Bureau of Fire, Rescue & Emergency Services and Bureau of Traffic Management, "The Influence of Traffic Calming Devices on Fire Vehicle Travel Times," Portland, OR, January 1996, pp. 1-4.

[19] Ibid.

[20] Ibid.

[21] City of Austin Fire Department, "An Analysis of Speed Hump Effects on Response Times", Austin, TX, March 1996, p. 3.

[22] Ibid.

[23] Piet Sybesma, "Dispatch TQM Project," personal email to Les Bunte, March 22, 2000.

[24] Montgomery County Fire and Rescue Commission, *The Effects of Speed Humps and Traffic Circles on Responding Fire-Rescue Apparatus in Montgomery County, Maryland*, Montgomery County, Maryland, August 1997, p. iv.

[25] Ibid., p. v.

[26] Ibid., p. 8-9.

[27] Ibid., p. 9.

[28] Ibid.

[29] City of Berkeley, Advance Planning Division, "An Evaluation of the Speed Hump Program in the City of Berkeley," Berkeley, CA, October 1997, p. 21.

[30] Ibid., p. 22.

[31] Ibid., p. 22-23.

[32] Memorandum from Kevin L. Jones, Transplan Associates, Inc., to David Mentor, City of Boulder, Colorado, June 3, 1996.

[33]Ibid.

Chapter 4. Environmental/Air Quality Emission Issues

Vehicle Emissions

The very core principle of local government is to adopt and enforce policies and standards that will ensure a high quality of life for the local citizens. Obviously, policies and programs that provide for safe, sustainable neighborhoods along with efficient emergency services are one of many pieces to achieve that end. Equally important to those services and programs, local government officials are mandated to protect the environment and natural resources of their region.

The relationship between traffic management calming devices and the subsequent environmental impacts is a relatively new issue that will demand further exploration and analysis.[1] Resultantly, the extent to which traffic management schemes bring about environmental improvements or degradations is difficult to quantify at present. However, like the negative impacts for emergency response times, there is some preliminary evidence that would strongly suggest that traffic calming contributes to increased air pollution.

We do know that the emissions from an individual car are generally low, in relation to the smokestack images of factories and refineries that many

people associate with air pollution. But in numerous major metropolitan areas across the U.S., the personal automobile is the single greatest polluter, as emissions from millions of vehicles add to a growing problem. Driving a car is probably the most *polluting* daily activity of a typical citizen.[2]

According to the U.S. Environmental Protection Agency (EPA), motor vehicles in this country are presently responsible for up to half of the smog-forming volatile organic compounds (VOC's). They release more that 50 percent of the hazardous air pollutants and up to 90 percent of the carbon monoxide (CO) found in urban air.[3] The EPA has identified and established acceptable concentration levels for six specific pollutants in outdoor air. They are: ground level ozone (O_3) commonly referred to as smog; nitrogen oxides (NO_x) of which nitrogen dioxide (NO_2) is the most abundant; sulfur dioxide (SO_2); carbon monoxide (CO), lead (Pb); and particulate matter (PM).[4] These serve as the target gases for measuring automobile emissions. Obviously, local governments must maintain a constant vigilance to these pollutants that contribute to air pollution.

Factors contributing to automobile emissions can be classified into two broad categories, one being *technical*, and the other *operational*. Vehicle weight, engine size and design, fuel type, exhaust configuration, and aerodynamic features are all technical factors effecting emission qualities and quantities. Operational factors relate to how the driver uses the vehicle, such

as speed, acceleration and deceleration techniques, and idling.[5] The operational factors are likely to be the most influenced by traffic calming devices since their primary objective is to change the driving patterns of vehicle operators.

Vehicle Emission Case Studies

Within the last several years, various studies have been conducted in Australia, Austria, Denmark, Germany, Holland, Sweden and the United Kingdom (UK), which show that vehicle emission pollutants, along with fuel consumption, are increased with traffic calming devices, particularly speed humps. Two of these studies related to area-wide traffic calming features, whereas the remaining six measured the emissions on single sections of roadways containing the devices. To date, only one U.S. study was identified that measured vehicle emissions resulting from traffic calming devices. All of these case studies, with the exception of the German study, revealed increases in air pollution emissions primarily due to acceleration and deceleration while traversing speed humps. Summaries of these studies can be found in Appendix B that convincingly demonstrates that traffic-calming devices contribute considerably to air pollution and fuel consumption.

Buxtehude, Germany

The lone positive test from Germany, which appears to be one of the first studies for this issue, studied the impacts of traffic calming for five major to medium size cities in Germany from 1983 to 1986. This report concludes that traffic-calming devices reduce air pollutants. Strangely, only the positive results of one of these cities (Buxtehude) were reported extensively in the report. Therefore, the Buxtehude study is regularly referenced as an example in which traffic calming has been shown to reduce vehicle emissions[6]. There is concern to the overall validity of this report since the details of the other German cities were not amply pronounced or revealed.

United Kingdom

In 1993, the Transport Research Laboratory in Crowthorne, England studied the effects of vehicle emissions in regards to acceleration and deceleration while traversing speed humps. This research group constructed hypothetical speed hump profiles at different intervals (50, 75, and 100 meters) over a 300-meter length of roadway. Both flat top and circular design humps were incorporated into the scheme. Established test assumptions were that vehicles accelerated 67 percent, and decelerated 33 percent of the time respectively, for the distances between the humps. The emission outputs of the

different hump schemes were compared to the same linear configuration without any devices, i.e. traveling unobstructed and at the same speed.

For the 75 meter scheme, with average speeds of 15-17 mph due to hump traversing, "cars showed increases in CO and HC [hydrocarbons] of around 70-80% and 70-100% respectively, and an increase in CO_2 [carbon dioxide] of around 50-60%. NO_x emissions were predicted to be around 0-20% lower after calming."[7] With emissions showing a large increase while accelerating and decelerating, the scientists also analyzed the emissions generated by cars traveling at constant speeds of 20 and 30 mph without going over speed humps. The lower speed of 20 MPH was shown to generate more harmful emissions than a vehicle traveling at 30 mph. This was evidenced by increases of both CO and HC to approximately 40-80 percent, and an increase of CO_2 by 30-40 percent. Emissions of NO_x were also seen to increase by around 20-30 percent.[8]

This study clearly demonstrates that automobile emissions increase with accelerating and decelerating. In addition, the results reveal that more emissions are emitted at slower travel speeds than higher speeds normally encountered on residential neighborhood type streets.

Sweden

A Swedish study in 1995 examined the impacts of automobile emissions in relation to the number of humps crossed and the regaining of desired vehicle speeds in between humps. The parameters of this test included the emissions for a constant speed with no humps, compared to emissions for traversing one hump, and then another test for ten humps. On tests with humps, all vehicles were to reduce their speed from 50 to 30 km/h [32 to 19 mph] before the hump, and then reestablish a speed of 50 km/h after the hump.

The analysis showed emissions increase of 20 percent and a fuel consumption increase of 5 percent while crossing over one hump. As anticipated, each of these test measurements was significantly increased when traveling over 10 humps. Rather than being solely proportional to the number of humps crossed, increases in emissions were found to be between 200-300 percent, while fuel consumption saw an increase of 40-50 percent.[9]

Austria (AIT/FIA)

One of the most disturbing findings involves a case study performed in Austria by the Alliance Internationale de Tourisme/Federation Internationale de I'Automobile (AIT/FIA) Traffic Commission. This study analyzed the emissions of vehicles limited to a travel speed of 30 km/h [19 mph] upon a

test site composed of a 1.5 km [.93 mile] containing six speed humps. The test results and findings were as follows:

> A vehicle, which slows down to 15 km/h [9 mph] before the bump and accelerates to 30 km/h immediately after the bump emits 10 times as much nitrogen oxide (NO_X) as a vehicle which maintains a constant speed of 30 km/h. NO_X emission per kilometer thus increases from 0.03 to 0.3 gm. The vehicle which drew to a halt at each bump showed a NO_X emission of 0.24 gm/km, i.e. 8 times more than that of a vehicle maintaining a constant speed of 30 km/h. On the stretch of road containing speed bumps carbon monoxide (CO) emissions were three times a great as those of a vehicle maintaining a constant speed. Fuel consumption increased from 7.9 litres to an additional two litres per 100 km on the stretch of road where the vehicle braked six times. Carbon dioxide emission (CO_2) increased in the same way. Hydrocarbon (HC) emissions were so low in all cases that they were below the probative level.[10]

Table 4.1 contains the measurements and percentage impacts of this study.

Table 4.1

Environmental Impacts of AIT/FIA Case Study

Environmental Impact	Test 1: Without speed bumps	Test 2: With 6 speed bumps	Test 3: With 6 speed bumps
Driver Behavior	Constant speed of 30 km/h (19 mph)	Slowing down from 30 to 15 km/h (9 mph)	Slowing down from 30 to 0 km/h (19-0 mph)
Fuel Consumption (litres/100 km)	7.9	9.9 (+24%)	10.8 (+36%)
Nitrogen Oxide (No_x) (gm/km)	0.03	0.3 (+900%)	0.24 (+700%)
Carbon Monoxide (CO) (gm/km)	0.23	0.6 (+160%)	0.62 (+170%)
Carbon Dioxide (CO_2)	199.9	247.3 (+24%)	271.4 (+36 %)

Notes:
Length of Test Route: 1.5 km (.93 mile) with 6 speed bumps (Tests 2 and 3)
Comparative Test: 1.5 km without speed bumps (Test 1)
Vehicle used or the test: medium-range car with tuned catalytic converter

Source: Jean-Martin Kuntschen (TCS), AIT/FIA Traffic Commission

Although the AIT/FIA report focuses on measuring vehicle emissions, the physical methodology and course layout is very similar to the previously reviewed Austin, Texas test. That analysis was conducted only to measure the time delays associated with speed humps. Due to the similarities, these two tests serve to complement each other in their findings regarding the two different elements of the research issues.

Portland, ME (Stevens Avenue)

The referencing of the Buxtehude, Germany study actually caused some extreme embarrassment and severance of federal funding for a traffic-calming project awarded to the City of Portland, Maine. The City of Portland applied for a grant under the Congestion Mitigation/Air Quality (CMAQ) program of the Federal Highway Administration (FHWA) within the U.S. Department of Transportation (DOT). This federal funding mandated that approved projects must reduce air pollution and improve air quality. In particular, the City of Portland sought the funding to install traffic calming devices on Stevens Avenue within their city.

In their justification documents for the federal funding, the City of Portland noted "There is no experience in Maine and little in the United States that documents the effect of traffic calming on air quality. Based on published data, the City of Portland believes the proposed traffic calming measures will improve the air quality."[11] The document then refers to the how the lone study of Buxtehude, Germany (population 33,000) demonstrated a decrease in emissions contrary to other studies.

The project was approved for federal funding and began in 1997. The devices were installed and DeLuca-Hoffman Associates, Inc. served as the contractor for the City to collect and analyze the results of this entire

initiative. In May 1998, De-Luca-Hoffman Associates, Inc. submitted the findings to the City of Portland, which showed increases, rather than decreases, in air pollution for the project.[12]

Based on these findings, the FHWA/DOT had no choice but to suspend the funding for the project.

> The study evaluated the impacts of the traffic-calming project, including air quality impacts. The report documents a 46% increase in VOC [volatile organic compounds] emissions and a 17% decrease in NO_X [nitrous oxide] emissions. In sum, the study indicates that the Stevens Avenue Traffic Calming project has resulted in an increase in pollutants. Indeed, the actual pollution impacts could be worse than what was presented in the report, as the report did not take into account the emission impacts of increased braking and acceleration associated with the raised crosswalks…As a result of the study, we are not willing to approve any further expenditure of CMAQ funds on this project.[13]

A total of $233,600 was originally approved for the project. However, with the increased emissions verified, and to the embarrassment of City officials, $140,000 was withheld by the FHWA/DOT from the City of Portland to complete the project.[14]

Cold Start Emissions

A new area of concern is that of vehicle *cold start* emissions. The greatest amount of tailpipe pollutants is emitted during a vehicle's cold start phase. A cold start phase is the first few minutes, or miles traveled, of an engine's operation before the catalytic converter becomes effective.[15] A 1994

Swedish Environmental Protection Agency report verifies there is "a substantial increase of CO and HC emissions during the cold start sequence."[16] In another similar study conducted in the U.S., the Society of Automotive Engineers (SAE) found that "cold engines use more fuel and generate more pollution than engines that are fully warmed up. The effect on catalyst equipped cars is marked because catalysts do no work until their temperature reaches a suitable level."[17]

In relation to traffic calming, the concern is that a large percentage of the vehicles traversing over a neighborhood's calming devices are vehicle trip departures that originate from within the neighborhood. As a result, these vehicles generate higher cold start emissions due to early acceleration and deceleration, and thus add further to the increased air emissions than those produced by the non-resident general traffic. However, the exact impact of this condition is not known.

Air Quality Impact to Austin, Texas

The significance of increased air pollution from excessive automobile emissions is currently of paramount importance to the City of Austin, Texas. Under the Federal Clean Air Act of 1970, Congress authorized the U.S. Environmental Protection Agency (EPA) to set thresholds on the quantities of which certain types of pollutants can be in the ambient air at any time. States

are required to carry out most of the enforcement responsibilities for these federal standards. The Texas Natural Resource Conservation Commission (TNRCC) is the designated state agency to fulfill this responsibility.[18]

Metropolitan areas that are considered to have air quality as good as, or better than, the National Ambient Air Quality Standards (NAAQS) as established by the EPA are classified as "attainment areas". Those areas that are close to violating the standard are "maintenance" areas. These areas are encouraged to enact voluntary policies and programs aimed at reducing pollution. Any metropolitan area that is in violation of any one of the six identified pollutant standards is classified as a "non-attainment" area. An area may be an attainment area for one pollutant and a "non-attainment" area for another pollutant.[19] These "non-attainment" areas are mandated to implement actions and programs that will reduce the pollution levels back to acceptable standards. The NAAQS establishes the limits for the six specific pollutants that were identified at the beginning of this chapter.

In 1997, the EPA implemented a tougher measurement standard for determining "attainment." Austin was on pace to fail that standard for ozone until a federal court ruled, in an unrelated case, that the new EPA methodology was unconstitutional. Although this gave Austin a reprieve for a while, the EPA is expected to be authorized to soon reestablish the new

measurement methodology. Austin will again be expected to not meet the new ozone requirements.[20]

The ramifications to the citizens of Austin for being in a "non-attainment" area can be severe and costly. For certain, the metropolitan area would be mandated to implement a basic vehicle inspection and maintenance program for vehicles. This would require all vehicle owners to have their vehicles regularly inspected for excessive emissions. A fee accompanies the inspection. Owners would also be required to repair any deficient vehicles.[21]

The other main concern deals with federal highway funding for major transportation projects. The city's failure to take mandatory and proactive actions to reduce the pollution levels could result in federal funding being withheld for the major projects within the Austin area.[22] Failure to receive such funding would place a greater burden on the citizens.

Thus, the City of Austin needs to evaluate the negative impact that increased vehicle emissions from traffic calming measures can have upon other programs and initiatives to prevent air pollution. Again, traffic calming is in competition with another public good.

Notes

[1] P.G. Boulter and D.C. Webster, *Traffic calming and vehicle emissions: A literature review,* TRL Report 307, (Crowthorne, UK: Transport Research Laboratory, 1997), p. 4.

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[5] P.G. Boulter and D.C. Webster, *Traffic calming and vehicle emissions: A literature review,* p. 18.

[6] P.G. Boulter and D.C. Webster, *Traffic calming and vehicle emissions: A literature review,* p. 21-25.

[7] Ibid., p. 23.

[8] Ibid.

[9] Ibid., p. 24.

[10] Jean-Martin Kuntschen (TCS), "Power and Speed of Vehicles: Speed Bumps Cause Ten Times More Air Pollution" (paper presented to the Alliance Internationale de Tourisme/Federation Internationale de I' Automobile [AIT/FIA] Traffic Commission, Munich, Germany, September 6, 1994), p. 1-2.

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[12] DeLuca-Hoffman Associates, Inc., *City of Portland Stevens Avenue Traffic Calming Report, Final Monitoring Report,* (South Portland, ME, May 1998).

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[14] Mark Shanahan, "Federal government pulls funds from traffic-slowing experiment," *Portland Press Herald* (August 18, 1998), p. 1A.

[15] Texas Natural Resource Conservation Commission, Office of Pollution Prevention and Recycling, "Ground-level Ozone: Cars & Trucks Pollute", (July 14, 1997). Online. Available: http://www.tnrcc.tx.us/publications/gi/210.html. Accessed: March 21, 2000.

[16] Swedish Environmental Protection Agency, Transport Section, *Cold Temperature/Cold Start Tailpipe Emissions for Light Duty Vehicles; Requirements and Standards,* (Stockholm, Sweden, June 1994), p. 3-4.

[17] Society of Automotive Engineers, *Influence of Instantaneous Speed and Acceleration on Hot Passenger Car Emissions and Fuel Consumption,* report no. 950928, (Warrendale, PA, 1995), p. 214.

[18] Texas Natural Resource Conservation Commission, Natural Outlook, "Clean Air Standards in Limbo", (November 28, 1999). Online. Available: http://www.tnrcc.texas.gov/admin/topdoc/pd/020/99-04/limbo.html. Accessed: December 15, 1999.

[19] Texas Natural Resource Conservation Commission, Office of Environmental Policy, Analysis, and Assessment, "Air Quality Issues in Texas, Background Material", (Austin, Texas, December, 1999), p. 33.

[20] Ibid., p. 2-3.

[21] Ibid., p. 9.

[22] Ibid., p. 11.

Chapter 5. Civil Liability Issues

In any high profile, controversial issue that occurs within local government, one usually can be assured that legal implications will be introduced into the debate. The issue of traffic calming is certainly not immune from the realms of civil jurisprudence. In most instances, the legal aspects are usually centered on three elements of law. The first one generally questions the statutory authority of local governments to provide for traffic calming devices. Second, for local actions and decisions, it is reasonable to expect legal challenges to the constitutionality of infringing upon the rights of residents. And the third area for review will usually involve the level of exposure the local government might incur from those seeking personal and/or property damage relief as a result of the public policy. Obviously, for these reasons, legal review is recommended for good public policy formation.

The formally adopted decisions and actions of all elected officials of government are always subject to legal scrutiny and risk. That level of risk is usually based on established precedents of case law coupled with sound practices that are reinforced with established national standards. Traffic calming actions and programs are vulnerable to suit.

Although there are national and professional standards for components of public transportation roadway systems, there are none from an adoptive

government body or agency for traffic calming devices. Two nationally accepted transportation standards, the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) established by the U.S. Federal Highway Administration, and *A Policy of Geometric Design of Highways and Streets,* produced by the American Association of State Highway and Transportation Officials, are silent as to required design features or placement of traffic calming devices. Again, with no authorizing laws, standards or accepted professional practices, a local government has potential exposure to unwanted legal challenges and claims.[1]

ADA Implications

Recently, more and more concern and debate is emerging regarding the impacts that traffic-calming devices have upon persons with disabilities. Disabled citizens charge that these devices cause undue pain, suffering, and injury whenever they routinely encounter these roadway modifications. Generally, these citizens are opposed to the vertical devices such as speed humps, raised crossings and traffic circles on public right of ways.

One legal exposure to local governments is related to the federally mandated American with Disabilities Act (ADA) of 1990 and the law's application to public roadways. A review of some of the provisions of this law reveals the potential legal exposures:

ADA, Title II, State and Local Government, Department of Justice Regulations, 28 CFR Part 35.

§35.104 Definitions.

Facility means all or any portion of buildings, structures, sites, complexes, equipment, rolling stock, or other conveyances, roads, walks, passageways, parking lots, or other real or personal property, including the site where building, property, structure, or equipment is located.[2]

The ADA law also addresses the new construction and alterations of roadways.

§35.151 New Construction and Alterations.

(a) Design and construction. Each facility or part of a facility constructed by, on behalf of, or for the use of a public entity shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by individuals with disabilities, if the construction was commenced after January 26, 1992.

(b) Alteration. Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992.[3]

Some ADA compliance problems, and even court issues, have arisen from differing interpretations of the term “alteration”. In most instances, the removal of a roadway surface and replacement with a new layer of paving is not considered by most highway agencies as an “alteration”. However, the above ADA definition of an “alteration” appears to be much broader with the

language of "affects or could affect the usability of a facility or part of a facility". This was reflected in a recent court case interpreting the definition. "In *Kinney v. Yerusalim* (812 F. Supp. 547[F.D. PA, 1993]), a Federal district appeals court decision held, 'if a street is to be altered to make it more usable by the general public, it must also be made more usable for those with ambulatory disabilities.'"[4] This ruling makes traffic calming, particularly vertical devices, more vulnerable to potential litigation.

Disabled citizens certainly view that placing speed humps upon roads is an "altered portion of the facility" that becomes less accessible and usable, and thus is in direct violation of Title II of the ADA. This is supported by the concern expressed in a City of Berkeley (CA) internal memorandum. "The Commission [on Disability] is concerned that installation of speed humps appears to be contrary to the intent of the Americans with Disabilities Act (ADA), which stipulates that new facilities must be 'readily accessible to and usable by individuals with disabilities.' The ADA Title II regulations define 'facility' to include 'roads'. The regulations go on to say that alterations to facilities must be accessible and usable 'to the maximum extent feasible.'"[5]

Most recently, the Berkeley Commission on Disability further asserted their concerns prior to City Council action slated for November 23, 1999:

> The Commission opposes installation of any traffic management tool preventing equal access. If vertical deflection devices were scientifically evaluated and show to be safe for

> vulnerable populations, there would be no such opposition; but it is not acceptable to install any vertical deflection devices for traffic management if they are designed to cause discomfort by generating up-and-down motion. Devices differing from current designs, but causing similar discomfort, also would restrict access for persons with disabilities. Examples of such variations included speed tables or raised pedestrian crosswalks, raised sections of roadway designed for vertical deflection of vehicles…Until adequate biomedical and engineering research is conducted, the moratorium should be retained on vertical deflection devices.[6]

Obviously, concerned about the legal implications regarding the ADA statute, the Berkeley City Council voted to indefinitely extend the moratorium on speed humps that had been in effect since July 1995.

Like other issues with traffic calming, the impacts upon disabled residents are difficult to quantify or qualify. There is little doubt that traveling over speed humps can be painful for those with orthopedic medical conditions and disabilities. "Contacts with disabled residents in Berkeley indicate that a number have problems with speed humps…they feel pain riding over humps in a vehicle, and they know of others who also do…Some slow down to nearly a full stop before crossing the humps, or cross them at an angle to lessen the impact."[7] The Berkeley report also revealed that crossing humps in para-transit vehicles was frequently cited as a problem. Like EMS units, these para-transit vehicles have a high center of gravity and heavy suspension systems.

Similar concerns have been expressed from other special transit providers. "Many of our passengers have called us to complain about the rough ride they experience with speed humps and traffic circles."[8] This local transit provider urged the Boulder City Council members to consider traffic device alternatives that do not use physical barriers such as humps and traffic circles.

General Local Government Liability

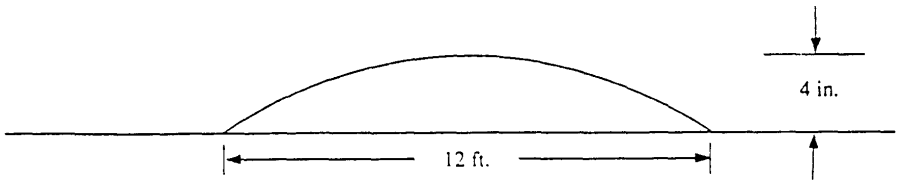
With exception of federal law, the general liabilities to local governments fall under the auspices of state law. As state laws vary within states, so do the decisions and verdicts of the state courts. This generally depends upon how much authority has been extended to local governments by the states to regulate and implement traffic control measures. Some states have retained full control of all public roadways and streets, whereas others have granted limited authorities to the local government for local control. Civil action resulting in imposed personal or property damage could be expected in a number of areas.

Speed Bumps Banned

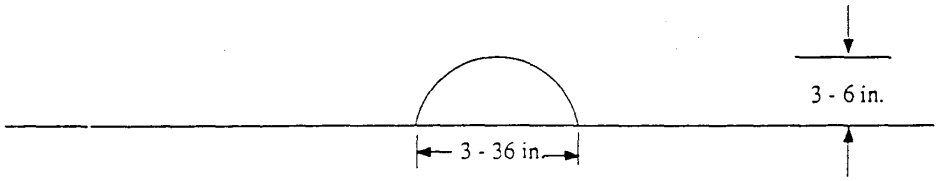
After automobiles were invented at the turn of the century, and their use became abundant and common, local governments were immediately

confronted with how to control their speeds. As such, the traffic calming issue of today is by far nothing new for policy makers. The actual idea of using physical barriers began early on with the installation of *speed bumps* on public streets. Speed bumps differ greatly than speed humps as they are much narrower and have a greater degree of rise, as do the more modern speed humps of today. Speed humps generally are 12 feet to 22 feet wide, and are generally 3 or 4 inches in height. Whereas, the older speed bump were only 3 to 36 inches wide and 3 to 6 inches high.[9] However, their public use was short lived. Figure 5.1 displays the differences of the two:

Figure 5.1
Speed Hump vs. Speed Bump Design



Typical Speed Hump



Typical Speed Bump

Source: *Transportation Quarterly*, Vol. 47, No.3, July 1993, p.459.

Clear, case law has been established which bans the use of speed bumps on public streets. One such case was *Vicksburg v. Harralson,* 101 So. 713 (Miss.1924); whereby the court issued a directed verdict against the City of Vicksburg. In upholding this verdict, the Mississippi Supreme Court asserted:

> We do not think the city had the right to place a dangerous device or obstruction in its street, making it unsafe, and which would likely injure persons traveling in automobiles over it.
>
> This scheme or method of warning drivers appears to us to be unreasonable, too drastic, and perilous for the purpose intended. The method of injuring one person in order to prevent danger to another is wrong in principle, as we see it, and is not such a reasonable regulation for the public safety as is warranted under the law, but is negligence. Creating one danger to prevent another is not in accord with the public safety – the very thing involved and desired.[10]

Traffic Control Device Legalities

One case in California had established that some devices used in traffic calming programs were illegal. "A locality has no right to interfere with the free flow of traffic unless expressly authorized by State statue. This fact led to the best-known legal challenge to traffic calming. *Rumford v. City of Berkeley*, 31 Cal.3d 545, 645 P.2d 124 [1982]…The California Supreme Court ruled that the diverters and half closures were traffic control devices not authorized by State law…Hence, the diverters and half closures were declared illegal."[11] However, after this case law was established, the California

Legislature responded by revising the statute to allow the local governments to use certain traffic calming devices not previously defined under the old law.

A 1998 Florida case brought the speed hump program in Sarasota to a complete halt. Challenging the City of Sarasota's authority to install speed humps, two citizens filed suit in state court. In a June 29, 1998 ruling from the Twelfth Judicial Circuit Court of Florida, Judge Robert B. Bennett ruled in favor of the plaintiffs. "In his order, the judge explained that Sarasota can put up only the traffic-control devices that are noted in the Federal Highway Administration's Manual on Uniform Traffic Control Devices (1988 Edition). Speed humps and speed tables are not included."[12]

This Court also adjudged: "Defendant [City of Sarasota] is permanently enjoined from erecting speed humps or speed tables on the streets or highways of the City of Sarasota. [Further, the] Defendant is permanently and mandatorily enjoined to forthwith remove from the streets and highways of the City of Sarasota all speed humps and speed tables previously erected and to restore the effected streets and highways to the condition they were in prior to the construction of the speed humps and speed tables."[13]

However, on appeal by the City of Sarasota, the Florida Second District Court of Appeal overturned the ruling from the lower court. "In overruling Bennett, the appellate court did not address the key question of whether speed humps are legal, however. Instead, the three-judge panel ruled that the

plaintiffs, Robert Windom and John Hartenstine, did not have legal standing to file the suit. The court's failure to address the legality of the humps themselves leaves open the possibility of another successful action against them...the appellate court stopped well short of declaring humps legal. The narrow scope of the court's ruling means that adding more humps could still pose some risk."[14]

Another case, *Marlboro Township v. Freehold Regional High School District*, involves speed bumps and the local fire code. The Freehold High School installed speed bumps at the entrance of the school and at a side entrance in an effort to keep students from speeding through the parking lot. The local fire department of Marlboro Township, New Jersey considered the speed humps a clear violation of the fire code. Adopted by ordinance, the BOCA (Building Officials and Code Administrators, Inc.) Fire Prevention Code/1978, prohibits the erection and maintenance of speed humps. Formal requests to remove the humps were denied by the school district.

After failing to obtain voluntary compliance, the fire inspector swore out a summons charging the school administrator with violation of the ordinance. The municipal court judge found the school district in violation, ordered the humps removed, and fined the school administrator $250. On appeal, the Superior Court of New Jersey reversed the decision, citing the school district was not bound by the code.

However, the State Appeals Court reversed and upheld the municipal court decision stating that the school building was exempt from the fire code, but that the surrounding parking lot was not. The court in upholding the conviction, enjoined the hump removals, and suspended the imposed fine for the administrator.

Recognizing conflicting policy and intentions the Appeals Court had this to say: "This appeal demonstrates graphically that which occurs when genuinely caring persons face each other armed with substantial and genuine conflicting policy concerns".[15]

Currently, Texas law is silent regarding the authorization or use of traffic control devices. In addition, no Texas legal cases were identified pertaining to the usage of such devices upon public streets.

Personal Injury

There is great potential for vehicle occupants to be injured from traffic calming devices. Severe injuries can occur to the head, neck and spinal vertebrae, along with various strains and/or bruising whenever a vehicle becomes out of control after crossing a device and striking another vehicle, fixed object and/or pedestrian.

Local governments lie dangerously close to the liability for such injuries. A state court appeals case from Ohio, *Sanchez v. Austintown Township*

Trustees, 1986 Ohio App., LEXIS 5410 (Ohio App. 1986) serves as notice to local governments for personal liability claims. After a passenger was unexpectedly thrown to the floor of a motor home when it crossed over a speed bump in a public park, the court ruled that a municipality could be liable for the personal injury and damage resulting from such a device.[16]

Such a liability was also found in the private sector in *Harrington v. LaBelle's of Colorado, Inc.*, 765 P.2d 732 (Mont. 1988). In this case, a bicyclist was awarded a $125,000 settlement against the parking lot owner when he was injured after striking a speed bump.[17]

Noise Nuisance

The creation of additional noise as a nuisance is potential for another legal liability. Residents often complain of increased noise from vehicles downshifting, decelerating, accelerating, or actually making physical vehicular/street contact while navigating calming devices. This is noted in the case of *Friends of H Street v. City of Sacramento*, 24 Cal.2d 607, (Cal. Ct. App. Oct. 21, 1993). This case also makes reference to "cut-through traffic", which is a common occurrence in neighborhoods with traffic calming devices, as the traffic tends to move to a parallel street. Residents were trying to get the City to take some action regarding heavy traffic volumes, speed, and noise on their neighborhood street. Their preference was to place restrictions on the

street so that these nuisances would be removed. "The court ruled against the residents, holding that the routing of traffic is at the discretion of the city council, that the rerouting of traffic in this case would hurt other streets, and that the city council could not please everyone. As the court saw it: '[l]oss of peace and quiet is a fact of life which must be endured by all who live in the vicinity of freeways, highways, and city streets."[18]

Vibration/Structure Damage

In the United Kingdom, there is growing concern that increased vibrations from vehicle weight shifting while traversing over speed humps has caused cracks in the foundations of nearby homes. Recent studies by the Transport Research Laboratory (TRL), England's leading authority on transportation issues, have shown that certain soils can transmit harmful tremors straight into the foundations of buildings. As a result of these findings, the TRL will recommend local governments to test soil stability before installing any speed humps.

"Amanda Dickson is one of many homeowners whose worst fears have been confirmed by the latest studies. Large cracks appeared in the basement of her north London house soon after humps were laid outside."[19] She went on to report that trucks and vans caused the worst vibrations. Further, a chartered building surveyor of the area noted that vibrations from speed

humps can be a serious contributing factor to damage of older buildings. "The new findings will worry local authorities, many of which first installed humps on the TRL's advice and now face lawsuits from disgruntled householders which could run into millions of pounds".[20]

Accidental Air Bag Deployment

With more and more U.S. vehicles being required to install airbags, there is a growing concern that accidental deployments of these safety devices will increase. This has been evidenced by Nissan's four confirmed incidents of air bag deployments involving Maxima sedans after striking speed bumps.[21] "The vertical jolt of going over a speed bump can trigger some crash sensors to go off and inflate the airbag…Air bags have been triggered when going over speed bumps and potholes on the road, hitting curbs at low speeds, and by other minor disturbances…Air bag-caused injuries to the face, chest, hands, and arms could occur to the driver and passenger, as have occurred in crashes as low as 8 to 15 miles per hour. Of the approximately 42 children who have been tragically killed by airbags, the vast majority has been in low-speed accidents below 15 miles per hour."[22]

Failure to Warn Drivers

Associated with unexpected impacts, significant liability could be imposed particularly when the local government fails to properly sign and adequately warn the motorist of traffic calming devices. This duty to warn was established in *Polk County v. Donna M. Sofka.*

"If, however, the governmental entity knows when it creates a curve that a vehicle cannot safely negotiate the curve at speeds of more than twenty-five miles per hour, such entity must take steps to warn the public of the danger."[23]

Street Damage

There is debate, within transportation professionals, over whether or not speed humps cause damage to the actual streets they are placed upon. The City of Griffin, Georgia failed to meet the legalities of a policy interpretation by the State Department of Transportation (DOT). In Georgia, the State DOT provides financial assistance for street paving within cities. In order to receive state funding of $285,000 to repave 18 streets, this City had to meet all of the terms of the DOT. One of those terms was DOT's refusal to repave any street that contained speed humps. The City agreed to remove speed humps so as to receive the funding.[24]

"DOT Commissioner Wayne Shackelford confirmed in an interview that speed humps are against department policy and have been for years. 'We

don't fund resurfacing on any street that has speed humps,' he said. Shackelford believes speed humps cause pavement to wear out quicker."[25] Additionally, severe gouging and abrasion can occur to the pavement from the undercarriages of vehicles when crossing speed humps too fast.

Vehicle Damage Claims

In some cases, one could certainly argue that calming devices cause damages likewise to the undercarriages of vehicles while traversing over humps at posted speed limits. In turn, one could expect a higher frequency of damage claims rather than actual law suits. "Montgomery County has paid two claims involving speed humps. In one case, the driver of a community college van went over a hump at a speed alleged to be too high, and a student was injured. The county agreed to pay $2,500 in medical expenses to avoid the expense of litigation. In the other case, hump markings came off on the undercarriage of a car that had bottomed out traveling too fast. Because the hump markings had been improperly applied, the county assumed liability…"[26]

Summary

On the surface, one would not expect significant liability potential with the use of traffic calming devices. However, there are numerous legal

vulnerabilities that exist for local governments with traffic calming programs. The largest exposure appears to rest with the modifications to roadways while complying with the Americans with Disabilities Act. Another area that is not very clear is the authority of the local government to use traffic calming devices since they are not recognized within national transportation standards.

As has been reviewed, there are also numerous potential liabilities relating to personal liability and property damage from traffic calming devices. In short, there are no precedent setting cases that have outright declared speed humps illegal. However, there is strong evidence that some citizens are turning more towards the court systems in an attempt to suspend traffic calming programs. As such, local governments must fully examine their legal liability potential prior to adopting traffic calming initiatives.

Notes

[1] Reid Ewing, *Traffic Calming: State of the Practice*, (Washington, D.C.: Institute of Transportation Engineers, August 1999), p. 130.

[2] 28 CFR 35.104: Nondiscrimination on the Basis of disability in State and Local Government Services. (Current through March 8, 2000). Text from Code of Federal Regulations. Available from: Congressional Universe (Online Service). Bethesda, MD: Congressional Information Service.

[3]28 CFR 35.151: Nondiscrimination on the Basis of disability in State and Local Government Services. (Current through March 8, 2000). Text from Code of Federal Regulations. Available from: Congressional Universe (Online Service). Bethesda, MD: Congressional Information Service.

[4] U.S. Architectural and Transportation Barriers Compliance Board, "Accessible Rights-of-Way: A Design Guide", (Washington, D.C., November 1999), p. 20.

[5] Memorandum from Karen Craig, Chair, Commission on Disability, City of Berkeley (CA), to Mayor and Members of the City Council of Berkeley (CA), November 10, 1998.

[6] Memorandum from Karen Craig, Chair, Commission on Disability, City of Berkeley (CA), to Mayor and Members of the City Council of Berkeley (CA), November 23, 1999.

[7] City of Berkeley, Advance Planning Division, "An Evaluation of the Speed Hump Program in the City of Berkeley," Berkeley, CA, October 1997, p. 29.

[8] Letter from Linda Diebert & Lenna Kottke, Executive Co-Directors, Boulder Special Transit, to Boulder City Council, April 3, 1997.

[9] Marcel Klik and Ardeshir Faghri, "A Comparative Evaluation of Speed Humps and Deviations", *Transportation Quarterly*, vol. 47, no. 3 (July, 1993), p. 459.

[10] *Vicksburg v. Harralson*, 136 Miss. 872, 101 So. 713 (Miss. November 17, 1924)

[11] Ewing, *Traffic Calming: State of the Practice*, p. 131.

[12] Joanne B. Walker, "Speed bumps, tables meet legal obstacle", *St. Petersburg Times*, Neighborhood Times, Neighbor to Neighbor Section, (July 5, 1998), p. 6.

[13] *Windom v. City of Sarasota*, Case No. 96-4501-CA-01 (Fla. 12th Cir. Ct., June 29, 1998).

[14] Gordon Russell, "Speed control devices allowed; the appellate court ruling skirted the issue, however, so it may not be over", *Sarasota Herald-Tribune*, June 24, 1999, p. 1-A.

[15] *Marlboro Township v. Freehold Regional High School District*, 195 N.J. Super. 245; 478 A.2d 1228; 1984 N.J. Super. (N.J. Super. Ct. App. Div. August 7, 1984).

[16] *Sanchez v. Austintown Township Trustees*, No. 85 C.A.1, LEXIS 5410, at *1 (Ohio Ct. App., January 28, 1986).

[17] *Harrington v. LaBelle's of Colorado*, Inc., 235 Mont. 80, 765 P.2d 732 (Mont. December 6, 1988)

[18] Ewing, *Traffic Calming: State of the Practice*, p. 134.

[19] Jonathan Leake, "Road humps can damage houses", *Sunday Times*, Home news (December 28, 1997).

[20] Ibid.

[21] [21] Bryon Bloch, "Speed Bumps Can Cause Vehicle Airbag Activation", (paper presented to the "Save Our Streets" citizen organization of Rockville, MD, August 4, 1997), p. 1-2.

[22] Ibid.

[23] *Polk County v. Donna M. Sofka*, 95-01886, 675 So. 2d 615 (Fla. Dist. Ct. App., April 19, 1996).

[24] Joey Ledford, "DOT thinks humps are for camels", Atlanta Journal-Constitution, (July 31, 1988), p. 1C.

[25] Ibid.

[26] Ewing, *Traffic Calming: State of the Practice*, p. 135-136.

Chapter 6. Traffic Calming Postures of Local Governments

With limited planning and awareness in the early beginning, many major, "progressive oriented" cities within the U.S. entered the uncharted waters of traffic calming devices and programs. Their use was viewed as a fresh new approach for managing transportation problems within these cities. The concept for this strategy emphasizes the intellectual placement and force of physics rather than the traditional oppressive force of policing. As this approach came into vogue by the mid-1990's, there was an immense proliferation of placing these devices in the communities without ensuring that all stakeholders had ample input for widely accepted support. As a result, objections, complaints, and concerns began to engulf politicians who soon began looking for neutral ground.

Realizing the difficulty in reaching neutral ground, actions were taken by many local governments to slow down the issue. These de-escalations took on many forms such as moratoriums, reduced funding, or pending legal litigation. A summary review of several U.S. cities is provided to illustrate the status of many traffic-calming programs across this country. A more in-depth policy review is given for the City of Austin, Texas, as this information will

provide a good background for the analysis contained in upcoming Chapter Seven.

Postures of Various U.S. Cities

In the publication *Traffic Calming: State of the Practice*, author Reid Ewing examined the top 20 most innovative cities with traffic calming programs. From this literature, it is evident that many traffic-calming programs have been "calmed" in and of themselves. The following reports from this source reveal the postures or current states of practice by ten of those cities:[1]

Montgomery County, Maryland

Citizens challenging the legality of its speed hump program filed a lawsuit against the county. This was then followed by an anti-hump petition drive calling for a vote to prohibit speed humps. Both the lawsuit and the petition were dismissed, thus there was no legal or voter decision. In response to the controversy, the county council imposed a moratorium on new speed hump applications, which was later lifted after eligibility requirements were established. However, due to the stringent approval guidelines, a virtual moratorium still exists.

Portland, Oregon

Similar to Montgomery County, Portland has been sued and had a moratorium on the continuance of traffic calming devices. The City won the lawsuit, however it is under appeal, so the legality is yet to be determined. Because of emergency services concerns, a moratorium was put into effect restricting speed humps and circles on the primary response routes. Once the moratorium was lifted, city leaders discontinued the funding for the program.

San Diego, California

A moratorium was imposed in this city over the dispute of warrants for the placement of traffic calming devices. Under pressure from citizens, city council members violated previously established warrants and had speed humps installed on some collector roads. As a result, some citizens and fire officials were outraged by the action. To immediately alleviate the situation, a moratorium has been put into effect for all new speed humps until new warrants can be established.

Boulder, Colorado

The issue of traffic calming in the City of Boulder was attacked from two sides. Many first questioned the $900,000 annual budget for this "general reentrenchment of traffic calming" program. Again, with growing public

opposition, along with the never-ending debate of emergency response times, the City Council eventually reduced the budget to $250,000 each year. Since then, it has been cut again to $100,000 annually. In addition, the funding can only be used for demonstration, education and enforcement projects until the response time issue can be satisfactorily addressed.

Gwinnett County, Georgia

In an attempt to ensure that all stake holders were considered, this County expanded the notification area of the neighborhoods so that all of those involved would be informed. This resulted in opposition groups being formed from the adjacent streets that became active in opposing new applications for neighborhoods wanting traffic calming. Reacting to the revolts of the program, the Commissioners placed all applications on hold until it could be determined what level of public support there is for the program.

Five Other Local Governments

"Sarasota, FL, has been sued, and lost; the decision is being [was] appealed. Berkeley, CA, has a total moratorium in effect. Eugene, OR, has a moratorium on speed humps, while Howard County, MD, has a moratorium on speed humps and most other vertical measures. San Jose, CA, has stopped funding comprehensive neighborhood traffic calming plans."[2] Director

Wayne Tanda, Department of Streets and Traffic with the City of San Jose was quite blunt with their posture. According to Tanda, "San Jose decided to stop penalizing 95 percent of the its drivers for problems caused by the other five percent."[3]

Posture of Austin, Texas

"Traffic management programs often focus entirely on the installation of one or two types of traffic control devices with little or no area-wide planning…A neighborhood group complains and a speed hump, stop sign or other device is installed where requested and that is the end of the process. This strategy has occasionally been successful."[4] Austin's initial traffic calming strategy in 1994 certainly would have fit that description during its early era.

Actually, Austin's experience and current posture toward traffic calming is very similar to those cities already noted. What began as a full-blown proliferation of speed hump installations, has now been reduced to a very limited use of speed humps, while other devices are being tested in pilot neighborhoods.

In response to citizens expressing concerns to intensified traffic volumes, speed and safety for pedestrians, the City of Austin Transportation staff developed the Neighborhood Traffic Management Program during the mid-

1980's. This program was designed to conduct neighborhood surveys to analyze the growing traffic problems. However, this concept was short-lived, as the program was not funded due to budget constraints from a souring economy.

The requests for action by citizens kept coming in at City Hall. During 1994, the Department of Public Works and Transportation (PW&T), along with several neighborhood associations, was successful in getting the City Council to include funding in the Fiscal Year 1994-95 budget for a Speed Hump Program.[5] After the initiation of the program, the PW&T Department received requests for speed humps on over 600 streets. Currently, that list has grown to 1400 streets.[6] Many of the streets requested multiple humps. For this type of demand, the level of funding was not adequate for all requests, much less conducting comprehensive traffic studies to determine their need.

Realizing that the funding would not meet the demand, the Department of PW&T began allowing the installation of humps that were privately paid for by the neighborhoods. Resultantly, a flooding of speed hump installations began to proliferate the city, particularly in the wealthier northwest quadrants.

In 1995, as the Austin Fire Department was denying many installation requests, the Department quickly found itself on the opposing side of many neighborhood associations. The separate Austin Emergency Medical Services Department joined the Fire Department in expressing reservations about speed

hump installations. Both of the departments' concerns focused upon the increased response times for fires and medical emergencies, damage to apparatus, along with the safety and effectiveness of medical care during patient transport.[7] Compounding the issue, the PW&T Department quickly pointed blame to the Fire Department, whenever irate citizens called in reaction to their speed hump applications being rejected.

In March 1996, the Austin City Manager requested that the Fire and EMS Departments conduct tests to measure the delays in response times due to the humps. As previously discussed in Chapter Three, the average delay for emergency response vehicles was found to be between 2 and 10 seconds per hump. This test helped substantiate the similar findings of the Portland test conducted earlier that year.

Neighborhood Traffic Calming Program

Due to the concerns expressed by the emergency service departments, and the potential for shifting traffic from one neighborhood street to another neighborhood street, the Speed Hump Program was temporarily suspended in the spring of 1997. Later that year as directed by the City Council, a focus group of stakeholders from the neighborhood associations, city council appointees, transportation officials, and other city staff, addressed the issues

and made recommendations. These recommendations were incorporated into the Neighborhood Traffic Calming Program (NTCP).[8]

"The purpose of the Neighborhood Traffic Calming activity is to provide transportation improvements for neighborhood residents in order to enhance the safety and quality of neighborhoods in Austin."[9] This program allows for neighborhoods to submit an application for program consideration. Annually, five project areas are chosen in different geographical sections of the city. These selections are based on a needs assessment.

The heart of the program requires that city staff and the selected neighborhoods work together in developing a traffic-calming plan for the awarded area. An equal amount of funding is designated for the devices in each neighborhood. Once selected, a neighborhood group is formed to create the neighborhood traffic plan. After the plan is finalized, the plan is submitted to the residents of the neighborhood for voter approval. If more than 60 percent of the returned ballots approve the plan, then the plan is implemented.

Initially, the NTCP requires city staff to conduct a comprehensive traffic study to identify and prioritize the traffic problems of the selected neighborhood. Measurements and levels of traffic volume, vehicular speed, pedestrian activity, and other observations are recorded. This data is later used in developing the neighborhood plan.

Representatives from the neighborhood, working as committee, meet with the city staff to develop effective area-wide solutions to the problem. This working group, no larger than 15 people, is comprised of residents living within the area and at least one board member from the neighborhood association. No more than two members can reside on the same street. In addition, representatives of local businesses within the project area may participate. This generally includes the actual selection and placement of the devices to match the traffic study findings.

There are many traffic calming devices that a neighborhood may select. The devices selected will depend upon the traffic problem, i.e. vehicular speeding or cut-through traffic. Also, the device cost is a factor, as each plan must stay within a prescribed budget. The devices may include traffic circles, speed humps/cushions, diverters, curb extensions, textured crosswalks, chicanes, slow points, and/or others.

Once some consensus is achieved for the types and locations of devices, the PW & T Department staff then analyzes the proposal. "The evaluation may result in changing the proposed device. The technical expertise of the Transportation Division staff governs the selection and location of the proposed devices. For example, steep grades may preclude the installation of a device. Staff identifies these barriers and informs the working group."[10] Interestingly, the Austin guidelines allow for the Transportation

Division to prohibit devices but the same authority is not given to public safety departments. Further, public safety departments are not given the opportunity for staff comment prior to the plan being revealed to the working group.

Once the plan is developed it is presented for review to the other neighborhood residents. The plan is mailed to each resident within the project area along with a ballot. Prior to the vote submission, an "open house" is conducted within the neighborhood where residents may "come and go" at their pleasure to ask questions about the plan. Members of the neighborhood working group and city officials, including emergency services representatives, are on hand to answer any questions.

Originally, the plan review required a public meeting within the neighborhood that was conducted by the residents' working group and city staff members. This was a more formalized meeting where the staff and working group would present the plan and answer questions from the audience. This forum generated much debate, however the residents in attendance were able to hear and witness collectively the pros and cons of the plan and the respective views of their neighbors.

In 1998, after a very heated public meeting, the residents of a northwest Austin neighborhood voted down the proposed plan. This was the first neighborhood to reject a traffic-calming plan. Shortly thereafter, the PW&T

Department staff revised the requirement for a formal public meeting and substituted the "open house" forum which has generated a lot less public discussion, participation, and input.

Residents may mail in their vote or turn in their ballot at the "open house" meeting. Each household, and property owner (if different) along with each business is allowed to vote. If 60 percent of those voting are in favor of the plan, then the project is approved for construction and implementation.

Currently, the Traffic Calming Section administers the program with 7 FTE's (full-time equivalent) employees. For the 1999-2000 fiscal year, the operating budget for this section is $413,371.[11] However, "[f]unding for the construction of traffic calming devices in 1999-2000 is anticipated from a $1,053,000 transfer from the General Fund to the traffic calming Capital Improvement Fund (CIP)."[12] With this expenditure for 1999-2000, the Department projects the program will reduce the current neighborhood speeds by 20 percent, in the project areas only.[13] In summary, the City of Austin expends approximately $1.5 million each year in an attempt to lower current speeds by approximately five to seven mph or less only within five distinct neighborhoods.

Traffic Calming Viewpoints of PW&T Staff

The City of Austin Public Works and Transportation Department (PW&T) has been actively involved in traffic calming for over the last six years. Currently, Ms. Joan Hudson administers the Neighborhood Traffic Calming Program for the PW&T. A personal interview was conducted with Ms. Hudson to obtain the positive and negative aspects of traffic calming from a local proponent point of view.

Ms. Hudson was asked to outline the general benefits of traffic calming initiatives. She stated, "at the forefront, there should be three major objectives. Reduction of speed, and cut-through traffic, should be accomplished along with meeting other desires of the neighborhood to increase the quality of life for the residents."[14] As examples of the "other desires", she pointed to residents being able to walk their streets or ride bicycles without being in fear of their safety. Quality of life is an important aspect of neighborhood livability. However, Ms. Hudson did point out that the City of Austin has yet to conduct any follow-up surveys to determine if citizens have indeed felt that their quality of life has improved from the traffic calming initiatives.

When asked to expound upon any negatives to traffic calming, Ms. Hudson gave the following response. "As a whole, to the neighborhood and

city, no significant negative aspects have been identified. Now, for the individual, there are some negatives that develop, such as how to go around traffic circles, parking in front of their house is disturbed, or the impacts of increased response times".[15] In general she felt that the negatives presented to her thus far were more so from individual concerns rather than resident groups or clusters.

When specifically asked about the impact to emergency response times, Ms. Hudson confirmed that traffic calming would have some delay. According to Ms. Hudson, "with traffic calming, if you delay anybody, then your delaying everybody, as there will be some impact. The level of that impact is the main question that needs to be considered."[16]

Ms. Hudson revealed that there have definitely been improvements and benefits to the City of Austin with the newer Neighborhood Traffic Calming Program compared to the older Speed Hump Program. "We are now looking at the whole neighborhood and allowing everyone to be involved and vote on a plan. Whereas before, the Speed Hump Program was too isolated. Neighborhood association members who were pushing for speed humps did not necessarily seek or gain the approval of the majority of residents."[17]

The current program is more responsive to the neighborhood. In general, there is greater neighborhood acceptance as the process now allows for the residents to be better informed and to be involved. The group is now

offered a greater array of traffic calming devices to choose from rather than just speed humps. Landscaping options allow for the neighborhood to be beautified or aesthetically pleasing. Also, the program is receiving more financial support allowing for more resources to be applied to the projects. Equally important, representatives from the emergency services are directly involved with the neighborhood working groups in developing traffic calming plans.

When asked how the program has directly benefited the City of Austin, Ms. Hudson was quick to point out that Austin's approach has employed several features and alternatives that other cities have not. As an example, Austin conducts a comprehensive study of the applicant neighborhood to determine if it qualifies for traffic calming and to identify what devices would be most effective. When concerns by the emergency services departments arose, the PW&T explored and implemented the speed cushion. This modified vertical device, was designed to be less detrimental to emergency vehicles yet maintain similar effects for ordinary traffic vehicles.

Ms. Hudson was asked to identify the greatest successful traffic calming projects undertaken in Austin. She felt that the Rainey Street project was a success as that neighborhood experienced a one-third traffic volume reduction. She also pointed to the accomplishments of the Bouldin Creek

neighborhood as speed reductions reached 17 percent. In addition, the devices selected blended in well with the neighborhood creating more acceptance.

As she noted Rainey Street as a success story, a follow-up question was asked if that neighborhood would have been better served with a street closure rather than all of the calming devices used. She expressed that such an action certainly would have yielded better results but we "should respect the desire of the neighborhood and that it is up to the neighborhood residents to decide what to accept."[18]

In regards to measuring the effectiveness of the program, Ms. Hudson indicated that performance measurements relating to speed and volume reductions within project neighborhoods are reported to the City Council. She was not aware of any other alternative performance methodology that was being used by other entities.

When asked to project the future of traffic calming programs, Ms. Hudson felt that there would be a continuance as the demand for the devices continues to increase as more and more citizens hear about and witness the programs in other areas of the city. She readily admits that the program will continue to be very controversial. With a follow-up question to that response, she was asked to identify, in her opinion, the biggest threat to traffic calming issues. Without any hesitancy she cited the "conflict of emergency response impacts upon the community" as the greatest obstacle for the program. She

also identified the difficult balancing of "resident inconvenience" as a horizon issue for neighborhood acceptance. Further, Ms. Hudson was not aware of any threats to the program from discrimination or violation claims of the ADA.

In closing, Ms. Hudson revealed the value of this program to the citizens of Austin. "Building community teams to bring forth their ideas in improving their neighborhoods, in their minds—and fulfilling the goal of improving the quality of life in their neighborhood has been a very rewarding thing."[19]

Program Results

The first year, 1998-99, included funding projects in the neighborhoods of Rainey Street, Bouldin Creek, Windsor Hills, Hyde Park/Hancock, and Northwest. Four of these approved traffic calming plans, while the Northwest neighborhood rejected their plan. For 1999-2000, the included neighborhoods are Highland, Wooten, Zilker, Old West Austin, and East Town Lake. Currently, one plan has passed, one has failed, and the other three are still being developed with resident approval/rejection to be determined later this year.

Notes

[1] Reid Ewing, *Traffic Calming: State of the Practice*, (Washington, D.C.: Institute of Transportation Engineers, August 1999), p. 7-8.

[2] Ibid., p. 8.

[3] Public Technology, Inc., *San Jose, CA, Taking the Highway*, http://pti.nw.dc.us/task_forces/transportation/docs/trafcalm/CASE18.htm. Accessed November 23, 1999

[4] Melinda Railey, "The Impact of Traffic Management Programs on the Delivery of Fire Suppression and Emergency Medical Services", (Master's Thesis, The University of Texas at Austin, 1996, p. 15).

[5] City of Austin, Transportation Division, Department of Public Works and Transportation, "Neighborhood Traffic Calming Program Guidelines", Austin, April 1999 (draft), p. 2-3.

[6] Joan Hudson, "City of Austin", Personal email to Les Bunte, March 1, 2000.

[7]Railey, "The Impact of Traffic Management Programs on the Delivery of Fire Suppression and Emergency Medical Services", p. 6.

[8] City of Austin, Transportation Division, Department of Public Works and Transportation, "Neighborhood Traffic Calming Program Guidelines", p. 3

[9] City of Austin, Finance and Administrative Services Department, "1999-2000 Proposed Budget Volume I", Austin, Texas, n.d., p. 518.

[10] City of Austin, "Neighborhood Traffic Calming Program Guidelines", p. 8

[11] City of Austin, "1999-2000 Proposed Budget Volume I", p. 517.

[12] Ibid., p. 414

[13] Ibid., p. 413.

[14] Interview with Joan Hudson, Supervisor, Neighborhood Traffic Calming Program, Public Works & Transportation Department, City of Austin, Texas, April 25, 2000.

[15] Ibid.

[16] Ibid.

[17] Ibid.

[18] Ibid.

[19] Ibid.

Chapter 7. Impact Analysis for Traffic Calming Devices

Overview of Analysis Methodology

Although there have been several studies conducted by various fire departments for determining the response delays of specific traffic calming devices, little has been done to evaluate the effect of these delays. This section will be devoted to analyzing and quantifying the impacts to the public safety responders and to the citizens whom they serve. Specifically, this analysis will be conducted utilizing the data trends and inputs from the City of Austin, Texas.

Conducting a valid analysis of reduced speeds and cut-through traffic is difficult to accomplish due to many variable factors. Good "before and after" data, that is collected at the same time periods, days, seasons, etc., is often very hard to procure consistently. Also, the timing of how soon or how long after the device installation the study is conducted is a major factor regarding data validity. More importantly, with cut-through traffic, area wide surveys need to be conducted as the traffic generally moves somewhere else. These area wide surveys are obviously very labor and cost intensive. However, with these known variables, an attempt will be made to evaluate the effectiveness

of the traffic devices for reducing speed and traffic volume within one Austin neighborhood.

Accident reduction rates require an intense study of historical data to determine any effectiveness. To fully study the aspects of accident reduction goes far beyond the resources and capability of this research paper. Also, due to the many contributing external factors of accidents, interpretation of accident rates in relation to traffic calming should be viewed with extreme caution. Therefore, no attempt will be made to analyze the actual impact of the use of traffic calming devices to reduce the number of accidents occurring in Austin. This approach is consistent with a recent publication from the Institute of Traffic Engineers (ITE), who certainly has the resources to conduct such studies:

> It is often difficult to draw conclusive results from traffic calming accident analyses. Most safety studies of traffic calming compare "before and after" accident experiences. Few studies take into account the influence of potential changes in accident reporting, weather, conditions, and traffic diversion…In addition, the before-and-after studies presented here do not control for time trends or regression to the mean or other factors that could possibly affect the validity and reliability of the results. These limitations should be kept in mind when interpreting the results…[1]

In addition to speeding and traffic volume, residents of neighborhoods always voice their concerns for pedestrian safety. An examination of the pedestrian fatality rate in Austin over the last few years will be conducted. Although there is significant numbers of pedestrian accidents each year, this

analysis will focus upon those occurring only upon neighborhood streets excluding major thoroughfares.

As the population increases, so does the demand for public safety services. With the Austin Fire Department being an integral component of the emergency medical system, a review of their response time data in conjunction with Austin's growth patterns will be reviewed. Since they respond to both fire and medical emergencies, their response data would appear to reflect a more inclusive impact to public safety services.

Incidents in which someone's life is in immediate jeopardy are the highest priority of all emergency calls. These most frequently are the incidents involving sudden cardiac arrest (SCA) victims. The sooner, or conversely later, that a victim of SCA receives field medical intervention will have a direct impact on the survivability rate of that patient.

With the response time history established, and identifying the frequency and survival of SCA, one can then examine the impact that traffic calming devices has on providing emergency services. A statistical analysis will be conducted utilizing this data to predict the number of lives of SCA victims that can be saved or lost due to changes in response times within Austin.

Finally, from the data perils of pedestrian accidents and sudden cardiac arrest victims, a parallel can be drawn discerning their comparative impacts. Utilizing a risk/benefit ratio, one could determine the value, in terms of lives

saved or lost, for measuring the effectiveness of traffic calming programs. By determining the greater value or "good", official decision-makers would then be formulating policy more so on fact rather than perception or mere intuition.

Reduced Speeds & Volume/Cut-Through Traffic

Caution must always be used in interpreting the effectiveness of traffic calming with speed and volume reduction statistics. What may appear as positives on the surface, can translate into a negative situation when comparing the whole. Because of the low established speed of 30 mph for most neighborhood streets, speed reductions reported in percentages may sound appealing, but are they really significant reductions to make a neighborhood calmer? As depicted in Table 7.1, the Davis Street observations of the Rainey Street Neighborhood Traffic Calming Project serve as a good example. The accompanying map of the Rainey Street Neighborhood is contained in Figure 7.1.

Table 7.1

Rainey Street Neighborhood Traffic Calming Project

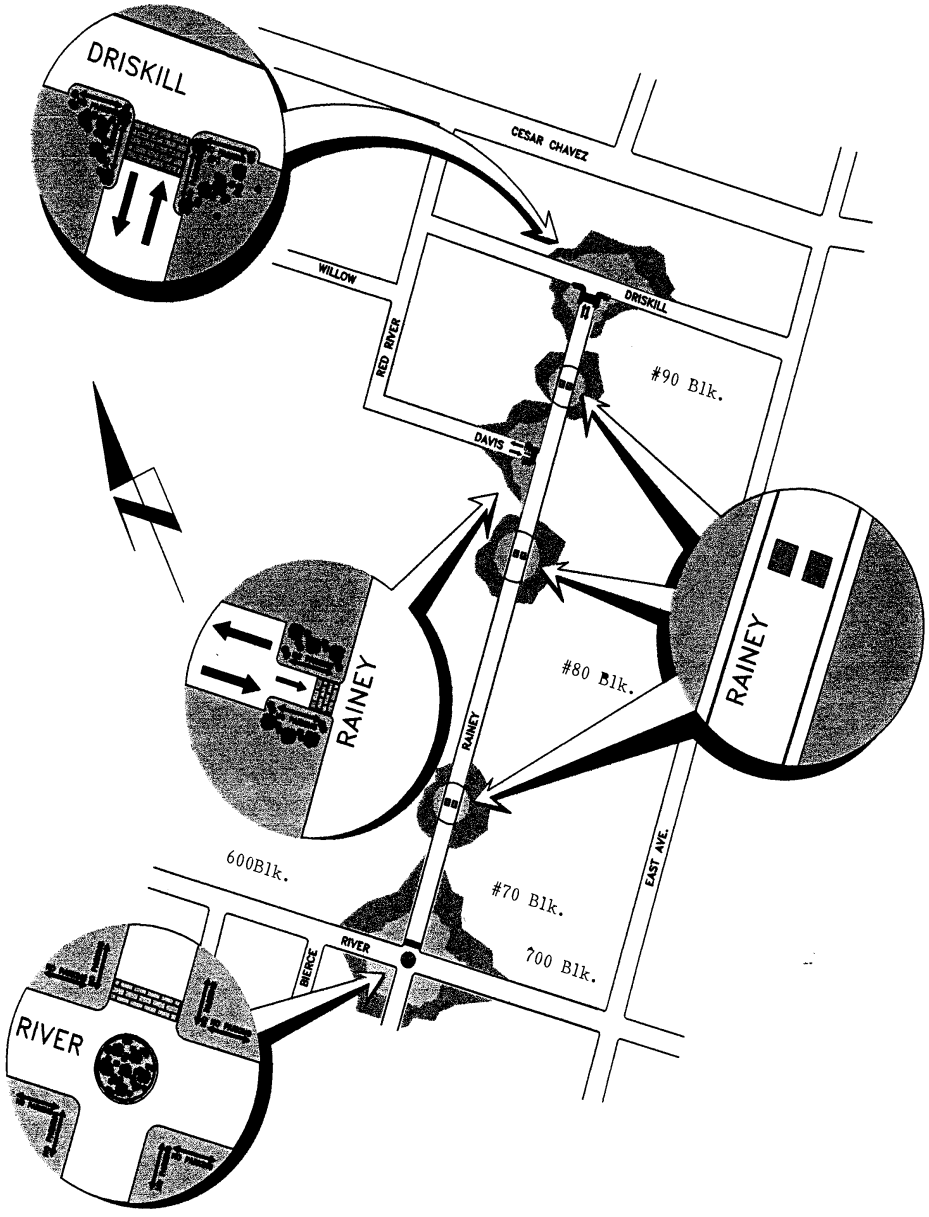
Location	TC Device	85th Percentile Speed (mph)			Volumes (vehicles/day)		
		Before	After	% Change	Before	After	% Change
Davis St.	Half Closure	25	23	-8	2233	568	-75
Rainey St. (60 Blk.)	Circle	33	35	6	389	269	-31
Rainey St. (70 & 80 Blk.)	Speed Cushions	35	28	-20	3323	2321	-30
Rainey St. (90 Blk.)	Speed Cushions & Neckdown	28	22	-21	835	1869	124
River St. (600 Blk.)	Circle	N/A	N/A	N/A	610	590	-3
River St. (700 Blk.)	Circle	26	27	4	3152	2033	-36

Source: Adapted from Reid Ewing, *Traffic Calming: State of the Practice*, (Washington, D.C.: Institute of Transportation Engineers, August 1999), Appendix A: Speed and Volume Data, p. 207.

After traffic calming, speed reduced by eight percent, a mild reduction but certainly not one with glowing results. However, in contrast to the eight percent reduction, speed was reduced by only two mph! Albeit a reduction, reducing the speed from 25 mph to 23 mph on a street with a designated speed limit of 30 mph can hardly be considered as a very productive yield in relation to the cost.

Figure 7.1

Map of the Rainey Street Calming Project



Source: City of Austin, Department of Public Works & Transportation

Did the neighborhood actually gain that much with this installation? Perhaps the greater question is did this street warrant traffic calming in the first place, since the 85th percentile speed was 25 mph or below? A closer look shows this street had a volume problem rather than a speeding problem.

In fairness, however, one of the other streets showed a favorable increase. The #70 & #80 block of Rainey Street showed a 20 percent reduction in speed. This was a seven mph decrease from 35 mph down to 28 mph. Given that the existing condition prior to traffic calming was in excess of the established 30 mph norm, bringing the speed down below the posted speed should be viewed as a success. However, one must also consider the 85th percentile again. This percentile standard is used universally in transportation studies to establish speed limits, as 85 percent of the drivers travel at a reasonable safe speed. In this case, one could argue that the speed limit on this section of road should be 35 mph instead of 30 mph, thus again, no need for traffic calming devices. Nonetheless, a 30 mph speed for a non-collector street would appear to be reasonable to maintain a safe neighborhood.

These two speed comparisons, both positive and negative, illustrate that the evaluation of a program needs to encompass the entire project rather than just providing a blanket success statement heard by many transportation officials that “we have accomplished speed and volume reductions”. Again, Table 7.1 reveals that only two locations of the five (with data) had speeding

in excess of 30 mph. Although small, two of the locations actually saw speed increase rather than decrease after traffic calming. Three locations actually had speed decreases, including the one that was only by two mph.

Of the other two locations, the cautionary advice previously expressed by Ewing regarding the unreliability of "after" speed data may be in order here. One of these sets of data could have easily been skewed, as persons traveling on this portion of the street were accustomed to making a turn onto another street in this area.

However, with the data taken right after the implementation of the half closure, many travelers probably found themselves slowing at this intersection realizing they could not turn and would have to change their traffic patterns and proceed on through the portion of the route they were not fully acquainted with. Thus, a lower speed would immediately be expected thereafter until driver/region familiarity increases. Also, the 85th percentile speed for this particular street was also below 30 mph to begin with.

The fifth street does indeed show a reasonable decrease. Thus, one could say that traffic-calming devices realistically reduced the speeds for this neighborhood on one out of five streets. Again, knowing when the "after" data collection was taken for this location, along with ensuring consistent methodology with the "before" collections, is critical in trying to make any reasonable inferences.

A similar interpretation can be made for the traffic volume impacts within this neighborhood. At first glance, an immediate impression would show a large decrease in traffic volume as five out of the six locations show volume decreases. The overall mathematical decrease for the neighborhood is approximately 27.5 percent, which is an admirable decrease. But a closer examination using the data, along with a field visit to the site, can lead to different interpretations than just what the raw data portrays.

Introspectively, a look at who has actually benefited might not be as nearly uplifting. Two of the locations, #60 Block of Rainey Street and the 600 block of River Street have only one dwelling and very minimal traffic volumes. Thus, their effect on the registered decrease has very little impact on neighborhood satisfaction. The device for the 700 block of River Street apparently had a good effect in reducing volume, with a 36 percent decrease. Unfortunately, this portion of the street has only two dwellings facing the street.

The neighbors living at the #70 & #80 block of Rainey Street received a clear benefit from the program as they saw a 30 percent decrease in volume. This portion of the street contains 25 residential structures. The greatest benefactor was the lone resident on Davis Street where the half-closure device drastically reduced traffic by 75 percent. Of noteworthy mention, this one

Davis Street resident is a former Austin City Council Member who advocated traffic calming for the neighborhood.

The real losers of the neighborhood are the residents of the #90 block of Rainey Street. Due to the partial closure at Davis Street, these residents suffered an astounding 124 percent increase in traffic volume. As noted in an earlier chapter, traffic-calming devices have a tendency to divert traffic to other areas. In essence, the bulk of the traffic volume burden shifted from the lone Davis Street resident to all of the #90 block Rainey Street residents. With this heavy volume increase, coupled with a questionable decrease in speeding, one would have to wonder how supportive this section of the neighborhood is now towards the traffic-calming project. This particular section of Rainey Street has eight households.

From these findings, one could argue that 25 households clearly benefited whereas eight residential structures saw a major decline in the livability of their neighborhood. The net gain was that 17 households benefited from this $150,000 to $200,000 project to improve the safety and livability of the neighborhood. In other words, for every three households that improved, one household saw a deterioration of the previous livability status. There is no doubt that a majority benefited. However, this was at the expense of others within the neighborhood.

So, one must thoroughly look at the overall impact of speeding and traffic volume to evaluate the project's effectiveness. This consists of reviewing the empirical data, as in Table 7.1, along with on-site observations, so as to better interpret the data. In this case an improvement analysis chart, contained in Table 7.2, helps illustrates the effectiveness of this particular project.

Table 7.2

Improvement Analysis of the Rainey Street Neighborhood Traffic Calming Project

POSTIVE FINDINGS (Significant Improvement)	**MARGINAL FINDINGS** (Marginal Improvement)	**NEGATIVE FINDINGS** (Negative Improvement)
Speeding/#70 & 80 Rainey St.: 7 mph decrease in speed (-20%)	*Speeding/Davis St.*: 2 mph decrease (8%); already well below 30 mph	*Speeding/#60 Rainey St.*: 6% increase in speed
Volume/#70 & 80 Rainey St.: 30% reduced volume	*Speeding/#90 Rainey St.:* Already below 30 mph; dropped 6 mph; data skew questionable	*Speeding/River St. (600 Blk.):* 4% increase in speed
Net Households Benefited: 17 (25 Benefit - 8 non-benefit=17)	*Volume/Davis St:* 75% reduction (but only 1 resident improved)	*Volume:* River St. Major 124% increase
	Volume/#60 Rainey St: small volume count of the whole "before & after"	
	Volume/River St. (600 Blk.): decrease of 20 cars per day (-3%); insignificant volume	
	Volume/River St. (700 Blk.): 36% decrease (but only effects 2 houses)	

Note: Speeding and Volume Data obtained from Table 7.1; Households benefited from on-site visit

As the improvement chart illustrates in Table 7.2, the marginal and negative findings outweigh the positives. Specifically, for this neighborhood, the analysis suggests that the overall impact of this project was of very limited success to the entire neighborhood. Although a 30-36 percent traffic volume decrease occurred on the most used street, the fact still remains that more than 2000 vehicles per day (vpd) continued to use this thoroughfare. Although better than 3000+ vpd, 2000+ vpd would still seem excessive for a truly neighborhood street like Rainey Street.

These findings also seem to be substantiated by the recent comments of residents and landowners. With almost a full year of traffic calming devices, they say "their quiet neighborhood has become nearly uninhabitable. Cut-through traffic going to Interstate 35 races past driveways. Out-of-towners use the street and driveways as satellite parking for the Austin Convention Center."[2]

Apparently, in retrospect, a full or partial street closure device at one end of the neighborhood would have resolved the volume and subsequently the speed problem. With Rainey Street not being classified as an emergency response route strengthens this choice even more. In all likelihood, this option would have been more economical than the cost of all of the other devices combined. The downside to this option is that the residents themselves are more inconvenienced by closure devices than the cut-through drivers. By

having only “one-way-in/out” routes they lose a greater freedom of movement.

For the analysis of this neighborhood, one could easily view the overall success as at best marginal, rather than optimal.

Pedestrian Fatality Data

One of the goals of traffic calming is to make the neighborhoods safer for pedestrians and bicyclists. In theory, slower speeds and less traffic volume will reduce accidents. As already indicated, accident rate studies generally are not good measurement tools due to the number of uncontrollable factors not related to traffic calming devices. However, a review of the pedestrian fatality data can at the very least establish a baseline of frequency and severity of traffic problems.

Data was obtained from the Austin Police Department for all pedestrian fatalities for the last three years. This data included deaths of both pedestrians and bicyclists. As depicted in Table 7.3 for the years of 1997 through 1999, Austin averaged 15.3 pedestrian fatalities per year. The surprising finding was that no more than one fatality occurred each year, and zero in 1999, on Austin neighborhood streets. Again, speaking in average terms, Austin experiences only .66 pedestrian deaths per year on neighborhood streets.

Table 7.3
City of Austin Pedestrian Fatality Data

Year	Pedestrian Fatalities	Pedestrian Fatalities on Neighborhood Streets	Percent of Pedestrian Fatalities on Neighborhood Streets
1997	15	1	6.6%
1998	17	1	5.8%
1999	14	0	0%
Avg. Per Year	**15.3**	**.66**	**4.3%**

Source: Austin Police Department, Planning & Research Section

Another shocking find, was that out of the 46 pedestrian fatalities for that three-year period, only five involved *failure to control speed* as a factor. None of these five speeding incidents occurred on neighborhood streets. The primary contributing factor for virtually all of the fatalities, including the two residential fatalities, involved the *pedestrian failure to yield the right of way to vehicle* or *pedestrian in roadway*.

All of the data collections revealed that both speeding and pedestrian fatalities within neighborhoods occur with low frequency. Detailed information regarding this data for each year can be found in Appendix C.

For the purpose of the impact analysis performed in this chapter, precise pedestrian fatality data was collected for the period of December 1, 1997 to November 30, 1998. During this particular analysis period, Austin recorded 17 pedestrian fatalities, of which one occurred upon residential

streets. That data, also in Appendix C, will be used comparatively as a baseline to other analyses.

Sudden Cardiac Arrest Data

As previously established, traffic calming devices have a detrimental effect upon the response times of emergency service providers. The delay in response times can have a profound impact on bringing a raging fire under control as well as providing life saving medical care. The most crucial, time sensitive emergency situations are those in which a person has undergone respiratory or cardiac arrest. Without immediately restoring these vital life functions, a person can die or suffer permanent brain damage in 6 to 8 minutes.[3]

This crucial 6 to 8 minutes begins when someone goes into an arrest, not when the fire or EMS units begin their response. Elapsed time for detecting someone in arrest, calling 911, dispatchers processing the call, notifying the fire/EMS stations, and response travel time all have to be completed within that six to eight minute window. Additional time on the scene is also needed to diagnose the problem, and set up to administer the emergency medical care.

Sudden Cardiac Arrest and Defibrillation

Cardiac arrest is not the same thing as a heart attack. A heart attack occurs when the blood arteries of the heart muscle become blocked, depriving blood to a portion of that muscle, which in turn impairs or reduces the heart's ability to adequately supply blood to the remainder of the body. The severity of a heart attack is classified by how much of the heart muscle is damaged from lack of blood flow and the changed production capacity of the heart. This condition also mandates prompt medical intervention.

Sudden cardiac arrest (SCA) is different in that the electrical nerve impulses of the heart muscle, rather than the muscle blood supply, do not operate normally. SCA is a major cause of death in the United States that claims an estimated 250,000 lives each year. "Abnormal heart rhythms called arrhythmias cause most sudden cardiac arrests. Ventricular fibrillation (VF) is the most common arrhythmia that causes cardiac arrest. It is a condition in which the heart's electrical impulses suddenly become chaotic, often without warning. This causes the heart to stop abruptly. Victims collapse and quickly lose consciousness. Death usually follows unless responders restore a normal heart rhythm within 5-7 minutes."[4]

The basic cause of SCA is not well understood. Many victims have no history of heart disease, nor have their lives been affected by this underlying

heart condition. So, much of the public is susceptible to SCA. However, unlike other life threatening diseases such as cancer or AIDS, there is a definitive therapy for SCA that can even be administered outside a hospital environment. This therapy is known as *defibrillation*.[5]

Defibrillation occurs when an electrical shock is delivered to the heart of an unconscious patient through a series of wires and telemetry from an electronic device called a *defibrillator*. This shock stops the abnormal rhythm and restores a coordinated rhythm that results in the normal pumping action of the heart to resume. Originally, defibrillators could only be used by emergency room physicians or field paramedics assigned to EMS units. However, with the advances in miniature solid-state circuitry and microcomputers, field devices have been developed to automatically recognize when a patient is in a ventricular fibrillation state. This particular device no longer requires an operator of extensive medical training background. Further, the devices advise the emergency responder that a shock is needed, and then deliver the shock automatically. These new devices are known as *automatic external defibrillators*, or AEDs.[6] Widespread deployment of AEDs throughout many emergency service departments has resulted from this new technology.

The Chain of Survival

There are four critical links to providing effective emergency treatment of SCA. Starting and implementing these links will very well determine whether one lives or dies from SCA. The American Heart Association describes and advocates the use of the "chain of survival" as follows:

1. *Early Access to Care* - In most communities, dialing 911 activates the emergency medical system, which dispatches the appropriate emergency personnel to the scene.

2. *Early Cardiopulmonary Resuscitation [CPR]*- If performed properly, CPR can add a few minutes to the time available for successful defibrillation. Millions of people have learned the breathing and chest compression techniques of CPR, but it does not replace defibrillation in saving lives.

3. *Early Defibrillation* - The critical link in treating victims in VF is delivery of an electrical shock. Each minute of delay in returning the heart to its normal pattern of beating decreases the chance of survival by 10 percent. After as little as 10 minutes, very few resuscitation attempts are successful.

4. *Early Advance Care* - After successful defibrillation, some patients require more advanced treatments, such as airway control or intravenous drugs, on the way to the hospital.[7]

The City of Austin has invested considerable resources over the last few years to ensure that this chain of survival is improved to provide better emergency medical care to its citizens. The 20 year-old 911 Center will have improvements made this year to the computer aided dispatch (CAD) system for quicker dispatching services. The EMS Department, along with other

health agencies and colleges, has aggressive public training programs for teaching citizens CPR.

AEDs have been placed on over 55 fire department front-line response units for the city. They provide the first responder role for over 22 front-line EMS units who also carry defibrillators. These EMS units also provide advance drug intervention treatments to patients while enroute to local area trauma centers.

But as in any chain, it is only as strong as its weakest link. Traffic-calming devices severely hamper and jeopardize the delivery of two of the four links of the chain of survival. Response delays will impact the most critical link of early defibrillation, and will affect the early advanced care during transport to hospitals.

Cardiac Arrest in Austin

The Austin Emergency Medical Services (AEMS) department provides basic and advanced life support services to all of the residents of Travis County. AEMS is one of the few EMS systems in the country that maintains a very thorough database on cardiac arrest cases that they respond to. This tracking includes information about the incident, patient history, and includes tracking the surviving patient's progress through their discharge from a hospital. Annually, AEMS produces a report on this data. Not to be confused

with heart attack incidents, this data collection applies only to those victims who were in cardiac arrest at some point.

For the 1998 reporting year, which began on December 1, 1997 and extended through November 30, 1998, AEMS, AFD and other county fire departments responded to 486 confirmed sudden cardiac arrest cases in Travis County. The population for Travis County for that period was 1,205,895. A total of 251 victims (52 percent) were pronounced dead at the scene after resuscitation attempts. Conversely, 235 (48 percent) patients, with positive vital life signs, were transported to a medical facility. Of those transported, 108 (22 percent) were discharged from the emergency room to a unit or floor of the hospital. Out of this, 49 patients (10 percent) were discharged alive from the hospital.[8]

The frequencies of the SCAs are maintained for each zip code within the County. Since this analysis is limited to the effects of traffic calming within the City of Austin, only the data from the zip codes within the city limits of Austin are used. Because Austin encompasses a substantial area and comprises the bulk concentration population of Travis County, AEMS, along with the Austin Fire Department responded to 442 SCAs within the city limits of Austin. This figure will be used hereafter for other quantitative analysis documented within this report. A complete listing of the Austin included zip codes and frequency for SCAs is contained in Appendix D.

AFD Response Time Data

The best trained emergency responders and the highest quality life saving equipment is of no value to the public when those resources cannot respond in an expedited efficient manner. *Response time*, without a doubt, is the most frequently used performance measure of the fire and EMS services. Virtually every other performance measure, whether positive or negative, is directly dependent upon how fast either of the departments can put their skills and resources into action. *Response time*, for the purposes of this report and the respective data collections, is the amount of time that elapses from when a dispatch signal is given to a fire or EMS station until the unit arrives on the scene of an emergency. This includes all travel time and excludes the time for dispatchers to triage and process the call for help.

Fire Responses

Although the consequences of poor response times to medical emergencies have been documented, they are also similar for fire suppression. The speed and quickness that a fire department commences actions to combat a fire has a direct relationship to fire spread, the difficulty in controlling the fire, as well as minimizing property damage from other perils such as smoke and water.

Of course, the first priority in any fire department response is that of rescuing people who may be trapped within a fire building. A fire will increase at various exponential rates for each uncontrolled minute depending upon many condition factors. At this rate, a fire can easily intensify and achieve excessive elevated temperatures to cause other nearby combustibles to reach their ignition temperatures in less than five minutes. This condition is known as *flashover*.

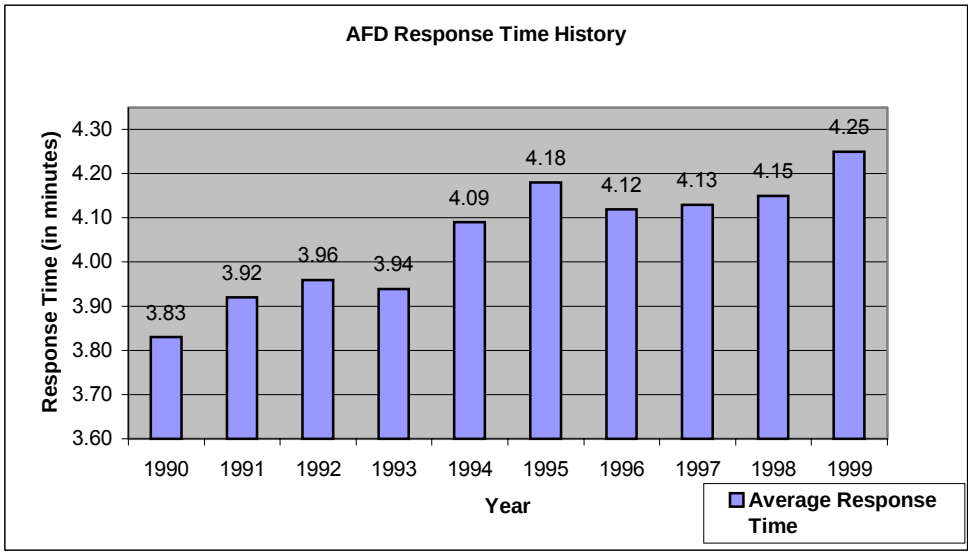
In order to prevent this stage and regain control of such an emergency, the fire department should be on the scene within five minutes. This requires the fire unit to have a travel time of not more than three minutes from the station. Like the medical emergencies, the fire must first be detected, help called for, and time to process and dispatch the fire units. So, two minutes or less generally elapses during this portion of the chain.

To compound matters, new federal standards have recently been established that require at least four firefighters to be assembled on the fireground before an interior attack can be made. Because a lot of communities cannot afford to have a minimum of four firefighters assigned to each unit, this usually requires the arrival of a second fire unit before such an attack can commence. Thus, traffic calming does not delay merely the first due unit to fire scenes. There is an old and very valid adage within the fire

service. "What gets done in the first five minutes at a fire scene determines what will occur in the next five hours".

Although a three, or even 3.5, minute goal is highly desirable, the Austin Fire Department has not enjoyed such a response time for over ten years. In 1990, AFD recorded a respectable 3.83-minute response time. Unfortunately, the department has witnessed response time increases virtually every year since. Of greater concern, is that the recorded response times have been over the four-minute mark for the last six years. As depicted in Figure 7.2, these response times are for all fire and medical emergency related incidents.

Figure 7.2
AFD Response Time History

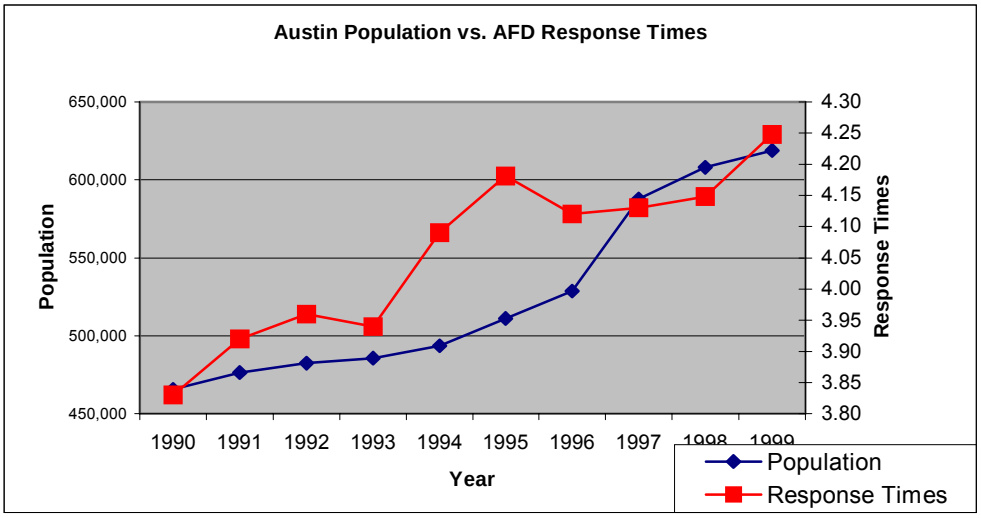


Source: Austin Fire Department, Administration Division, MIS Section

There can be numerous reasons for increased response times. Growth, both in population and landmass, is the primary contributor to the changes. More people equate to more fires, more cardiac arrests, more traumas, and other demands for increased service. Undoubtedly, more traffic and congestion accompanies this growth due to the lack of adequate arterial or collector streets. Unless the local government develops aggressive policies and capital improvement projects to stay in front of the demand, the quality of emergency services will degrade for the community.

Figure 7.3 shows that Austin has experienced a phenomenal growth rate over the last ten years. During most of that period, response times rose more than the growth rate. Only in 1997 & 1998 was the annual response time increase below the population growth rate. Regardless of the growth rate correlation, the response time is still far in excess of four minutes.

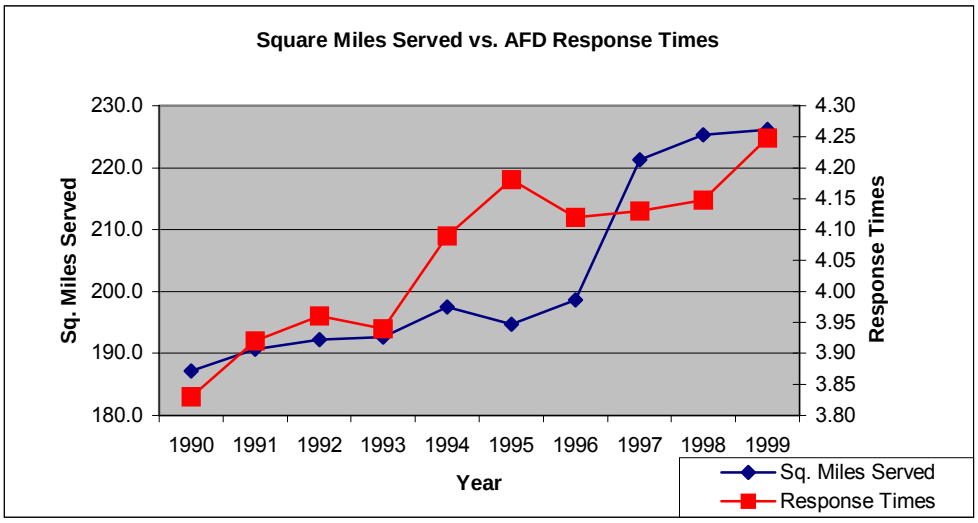
Figure 7.3
Population vs. AFD Response Times



Source: Austin Fire Department, Administration Division, MIS Section

As the land mass increases, the travel distances to emergencies also increase. Unless additional fire stations or first responder contracts with existing volunteer fire department are implemented, response times will continue to escalate for newly annexed areas. The relationship of increased landmass to increased response times is contained in Figure 7.4. Again, as for population, AFD response times escalated more with land mass increases until 1997. Yet, this is still an undesirable level. Obviously, resources were increased during that period to get under the growth curve.

Figure 7.4
Square Miles Served vs. AFD Response Times

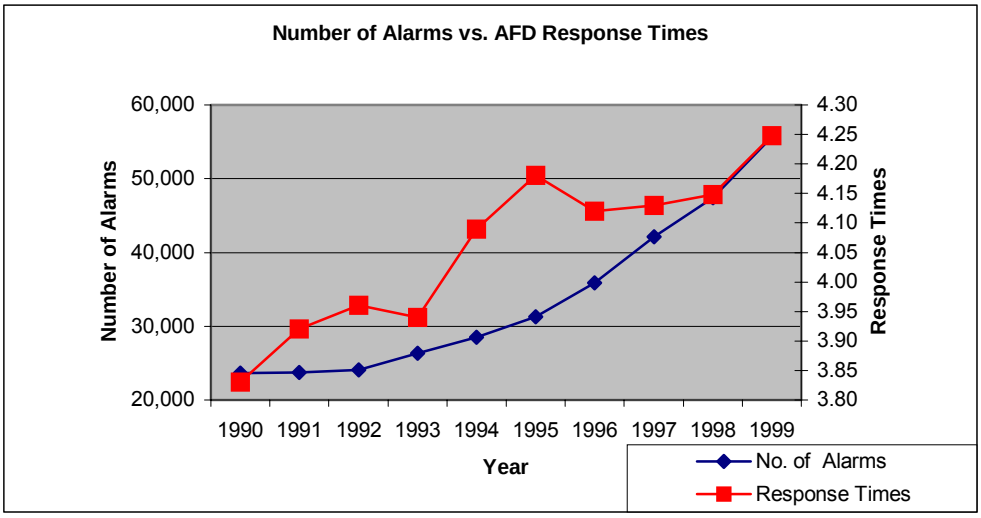


Source: Austin Fire Department, Administration Division, MIS Section

As mentioned earlier, increased populations and area will lead to more service demand. As expected, there was a sharp rise in the number of emergency incidents AFD responded to over the past ten years. Figure 7.5 reveals that response times were rising with the increased alarm volume until it dipped slightly in 1993. Then significant response time increases occurred in 1994 and 1995. A minimal decline occurred in 1996 but immediately began rising again in 1997. This data is interesting as during 1995 and 1996, the installation of speed humps in Austin was at an all-time high. Ironically, response times dropped slightly in 1996 when two fire stations were added. Responses are now at an all time high of 4.25 minutes in 1999.

Although certainly not the sole reason for these increases in response time, one could argue that traffic calming was a contributor to this escalating data finding. However, the data definitively demonstrates that response times are steadily increasing at an alarming rate. Any additional burdens or further proliferation of external increase factors such as traffic-calming devices, severely compounds the issue.

Figure 7.5
Number of Alarms vs. AFD Response Times

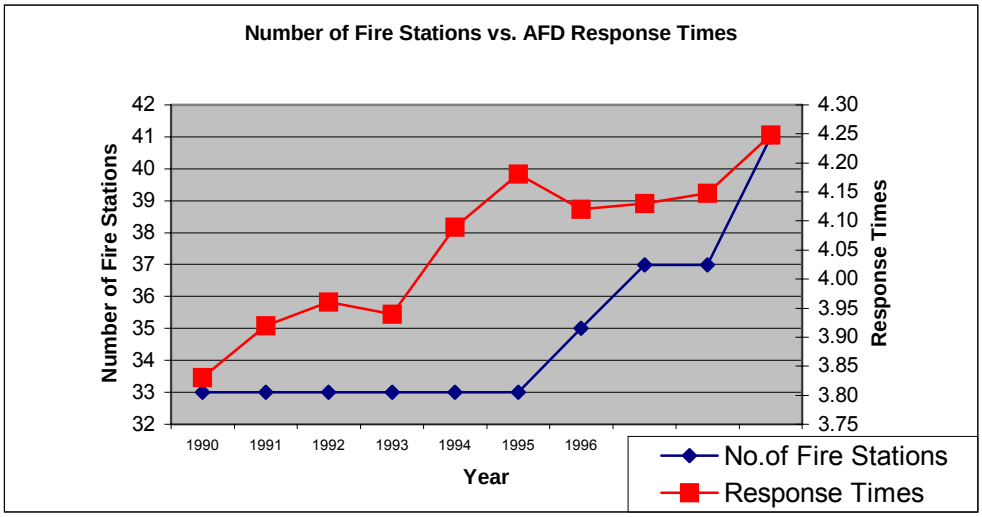


Source: Austin Fire Department, Administration Division, MIS Section

As shown in Figure 7.6, the addition of fire stations can lead to improvement to response times if done in a timely and consistent manner. However, with a "plan and build" time taking almost two years, a city can easily find itself playing "catch up". Seeing an increase to a then "all-time

high" in response times in 1995, procurement plans for two more fire stations began immediately. After increasing from 33 to 35 stations in 1996, response times showed a decrease from the year before. However, even with the addition of four other stations by 1999, the average response still rose to the highest mark yet of 4.25 minutes. Thus, increased resources are still not keeping up with other factors contributing to response time increases.

Figure 7.6
Number of Fire Stations vs. AFD Response Times



Source: Austin Fire Department, Administration Division, MIS Section

As demonstrated by the growth trends in population, land mass, call volume and increased fire station locations, the annual average response time of the Austin Fire Department has seen a significant degradation over the last ten years. With an alarming increase again in 1999, the response time is still not below the four-minute mark the department recorded in 1993.

The economic vitality forecast for Austin is still very bright, meaning that notable growth levels will continue for some time. As growth is also probably responsible for neighborhood traffic calming initiatives, the emergency service data suggest that the local government is barely able to keep services at an acceptable level. This government will be hard pressed to return to the response times achieved seven years ago. All of this suggests strongly that emergency service providers and citizens cannot afford additional delays from traffic calming with continued increases of future sustained growth.

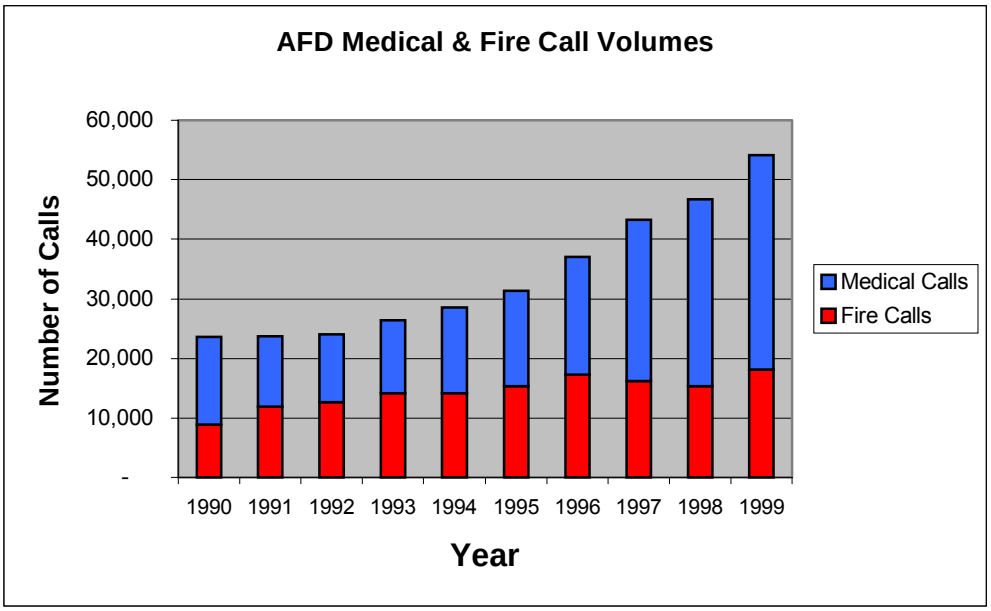
AFD Medical Responses

The Austin Fire Department, as a first responder to medical emergencies, is the first tier of a two-tier emergency medical services system within Austin. Working under the same standards and protocols with the second tier Austin Emergency Medical Services Department, AFD is an integral component of the system delivery to the citizens.

Although total call volumes have increased over the last ten years for AFD, the ratio of fire calls to medical calls has decreased significantly. This trend parallels with the rest of the U.S. With better fire detection equipment, improved hazard environments, and better safety education, the number of fires is decreasing per capita in this country. Resultantly, many fire departments now experience more than 50 percent of their call volume for

medical calls than for fire calls. Austin is no exception to this trend as revealed in Figure 7.7. For the last five years medical calls have exceeded the number of fire calls. In 1999, 67 percent of the AFD call volume was for medical calls, an all-time high. .

Figure 7.7
AFD Medical and Fire Call Volumes



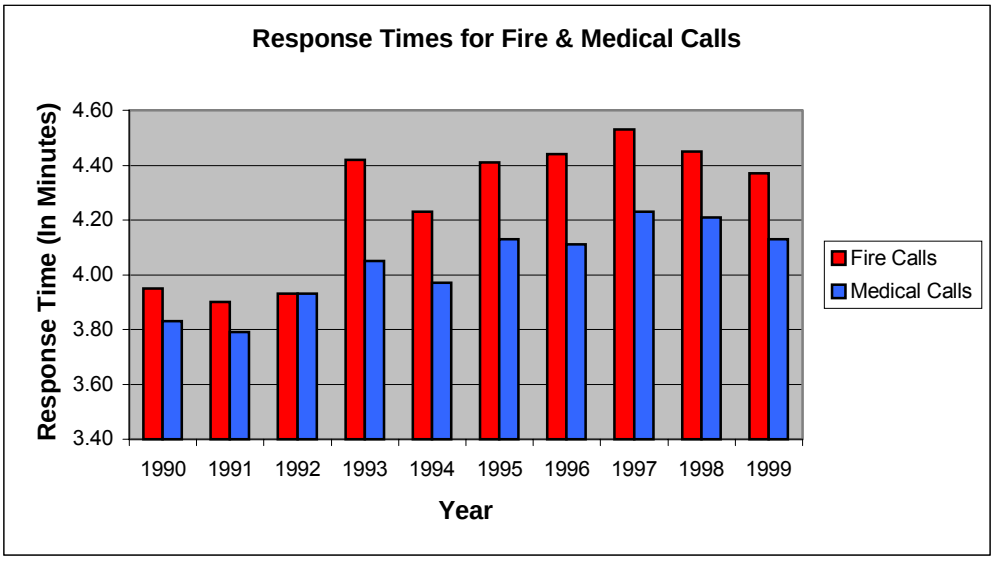
Source: Austin Fire Department, Administration Division, MIS Section

In Austin, there are 41 fire stations that house 59 fire apparatus, whereas AEMS has 22 paramedic/transport units. With this disparity and a high call volume, the AEMS units are most often likely to be migratory, rather than stationary, in moving from call to call throughout the city. Since the more abundant fire stations are strategically located throughout the city, a fire apparatus will generally arrive on the scene of a medical emergency faster

than an EMS unit. Thus, the reasoning for having fire units serve as the primary first responders and carry AEDs, for emergency medical care.

Although the routes are the same, AFD response times for medical emergencies is somewhat quicker than the response times for fire calls. In most instances, fire fighters don fire protective garments and self-contained breathing apparatus prior to leaving the station for fire calls. This equipment is not required for medical calls. Although the "scramble time" can vary, medical response times are usually one-half of a minute quicker than for fire responses. Figure 7.8 illustrates the AFD response times for medical and fire incidents for the last ten-year period.

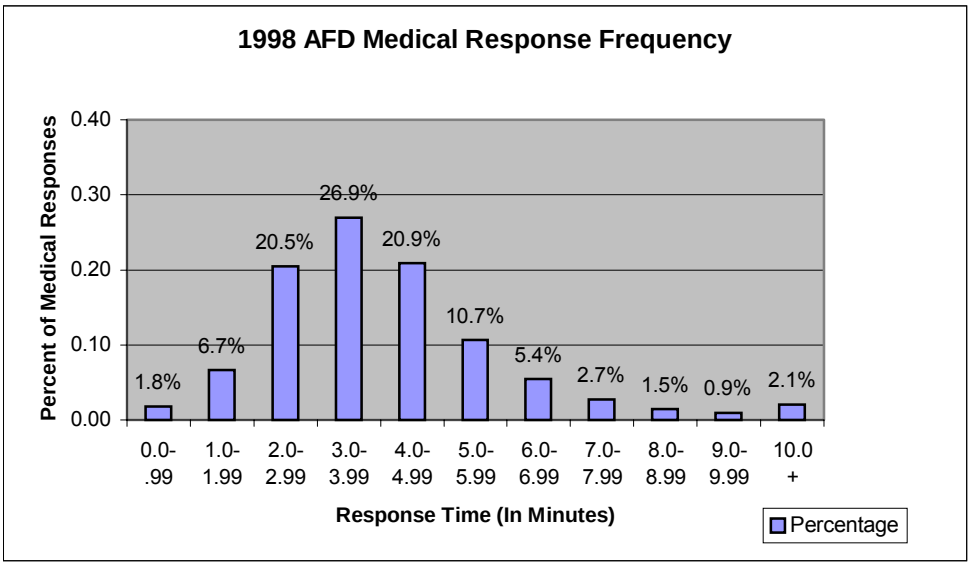
Figure 7.8
Response Times for Medical and Fire Emergencies



Source: Austin Fire Department, Administration Division, MIS Section

As already noted, the effectiveness of quality emergency medical care is directly dependent upon when that care can arrive at a scene. Call frequency distribution then has a profound effect upon the efficiency of the service. In preparation for an analysis later in this chapter, the percentage frequency distributions for medical calls responded to by AFD are contained in Figure 7.9. This 1998 data was purposely selected to coincide with the 1998 Austin SCA data reviewed earlier in this chapter.

Figure 7.9
1998 Medical Response Frequency



Source: Austin Fire Department, Administration Division

In summary, AFD has experienced increased response times over the last ten years. Emergency medical calls are now the bulk of the fire department's services to the city. Response delays due to traffic calming devices can

severely jeopardize the delivery of emergency medical care and fire protection services. The implementation of additional resources has not adequately kept up with the growth demands for the emergency service delivery of seven to ten years ago.

Impact to SCA Victims in Austin

With the availability of good data from both the Austin Fire Department and Austin Emergency Medical Services, sound statistical analyses can be performed to quantify the impacts that traffic calming devices have upon victims of sudden cardiac arrest in Austin. Utilizing probability calculations, one can project the negative impact of lives lost due to traffic calming devices. Conversely, one could also predict the positive gains of lives saved when response times are improved. This specific analysis incorporated a risk probability model spreadsheet developed by Ray Bowman of Boulder, Colorado.[9] The visual layout of the model has been modified for this analysis, however the statistical calculations for the projections have not been altered.

The time period analyzed is from December 1, 1997 to November 30, 1998. All of the source data reviewed heretofore for that period will be used for this analysis. In general, this model contains four major elements. The first element requires the current response time frequency distribution of the local fire department for medical emergencies. The second data set involves

the survival probabilities of sudden cardiac arrest as established by reputable medical authorities. The third element requires an input variable for the estimated response time delay/improvement to be tested. From this, an adjusted local survival probability can be calculated.[10] The fourth and final element requires an input variable to denote the number of sudden cardiac arrest cases experienced within the response area for the analyzed time period. From these data sets, an extrapolation can be made as to the number of SCA lives saved or lost due to the traffic calming conditions from what is currently predicted.

The versatile Bowman model can be viewed in three methods. One method makes projections based on the overall increase in response time due to any reasons, such as increased traffic volume, a fixed delay such as a blocked railroad crossing, or response delays from traffic calming. Projections can also be made for the aggregate impacts generated for each number of calming devices along a response route, i.e. three speed humps. The third option allows for one to also examine the positives from improving response times, such as the installation of electronic devices at traffic signal locations whereby the light changes in favor of the responding emergency unit. This analysis will look at all three methods. A complete listing for the response time models pertaining to the City of Austin and the statistical verification for the Bowman model can be found in Appendix D.

Analysis for a General Response Delay

For 1998, AFD maintained an average response time to medical emergencies of 3.62 minutes. For this analysis test, the current response time is increased by 14 percent (about 30 seconds). Recalling that an emergency vehicle would encounter 2 to 10 second delays per device while responding through a neighborhood containing several devices, the 14 percent (30 second) variable is not an unreasonable delay approximation. The data sources and prediction for this scenario is contained in Table 7.4.

As depicted, a 14 percent, or 30 second, increase in response time from traffic calming initiatives would now save only 177 lives compared to the predicted 215 lives saved if there were no increases in overall response times. In this case for 1998, 37 additional lives would be lost due to the delays caused by traffic calming devices. It should also be noted that this is a per year loss, that would continue year after year provided there was no decrease in the response times.

Some clarification is needed here for the "predicted lives saved" category of the model. This term relates to those victims who, in the field, maintained positive vital life signs and are transported to the hospital. The objective of the first responder is keeping the patient alive until they can be handed over to a more qualified medical authority such as an ER physician.

Table 7.4

Impact of a General Increase in Response Time

Agency:	Austin Fire Department				
Date of Analysis:	03/01/00				
Analysis Period:	12-1-97 to 11-30-98				
Analysis Type:	General Increase in Response Time				
Response Times					
Current Response Time:	3.62	Minutes			
Risk % Delay:	14%	is equal to a	0.51	Minute Delay	
Delayed Response Time:	4.13	Minutes			
Current FD Incident Information		**Cardiac Arrest**	General Delay	Current Local	Traffic Calming Adjusted
Midpoint of Arrival Interval	**1998 Arrival Fraction**	**Probable Survival Fraction**	Response Fraction 14%	Survival Rates	Survival Rates 14%
0.50	0.018	0.91	0.070	0.016	0.016
1.50	0.067	0.86	0.210	0.058	0.057
2.50	0.205	0.77	0.350	0.157	0.149
3.50	0.269	0.62	0.490	0.167	0.134
4.50	0.209	0.33	0.630	0.070	0.035
5.50	0.107	0.11	0.770	0.012	0.008
6.50	0.054	0.07	0.910	0.004	0.002
7.50	0.027	0.03	1.050	0.001	0.000
8.50	0.015	0.01	1.190	0.000	0.000
9.50	0.009	0.00	1.330	0.000	0.000
10.50	0.020	0.00	1.470	0.000	0.000
		Overall Survival Rates:		0.486	0.401
Annual SCA		**Predicted Lives Saved:**		215	177
Cases:	442	Change from Present:		0	-37
Notes:					
Risk Analysis Model Spreadsheet created by R. R. Bow man; layout modified by Les Bunte					
AFD Response Times obtained from the AFD Adminsitration Division					
AFD Arrival Fractions obtained from the AFD Administration Division					
Cardiac Arrest Fractions from the American Heart Association					
Annual SCA Cases obtained from Austin Emergency Medical Services					

Source: Adapted from the Ray Bowman spreadsheet "Consequences of Emergency Response on Cardiac Arrest Survival"

The “predicted lives saved” of 215 by the model is a very close approximation of the 235 actual SCA patients transported to a medical facility in Austin during 1998. This gives reasonable statistical validity to the Bowman Model as the prediction closely resembles the actual history data.

Analysis of Delay Per Device

The negative impact results are further illustrated when utilizing the delay per device feature of the Bowman model. In this instance, delays are incorporated for each device encountered by the emergency medical responders. The model has been inputted with three devices for the emergency responders to travel over. Table 7.5 projects the number of lives lost from this hypothetical, but real, delay.

Table 7.5

Delay Impacts For Three Traffic Calming Devices

Agency:	*Austin Fire Department*
Date of Analysis:	*03/01/00*
Analysis Period:	*12-1-97 to 11-30-98*
Analysis Type:	*Response Delay per Number of Devices*

Response Times				
Current Response Time:	3.62	*Minutes*		
Risk % Delay:	0.083	*Minute Delay per Device X*	3	*Devices =*
Total Delay	0.25	*Minute Delay*		
Delayed Response Time:	3.87			

Current FD Incident Information		***Cardiac Arrest***	*Device Delay*	*Number of*	*Current Local*	*Traffic Calming Adjusted*
Midpoint of Arrival Interval	***1998 Arrival Fraction***	***Probable Survival Fraction***	*Response Fraction* 0.083	*Devices On Route*	*Survival Rates*	*Survival Rates* 8.3%
0.50	0.018	0.91	0.25	3	0.016	0.016
1.50	0.067	0.86	0.25		0.058	0.056
2.50	0.205	0.77	0.25		0.157	0.151
3.50	0.269	0.62	0.25		0.167	0.152
4.50	0.209	0.33	0.25		0.070	0.054
5.50	0.107	0.11	0.25		0.012	0.010
6.50	0.054	0.07	0.25		0.004	0.003
7.50	0.027	0.03	0.25		0.001	0.001
8.50	0.015	0.01	0.25		0.000	0.000
9.50	0.009	0.00	0.25		0.000	0.000
10.50	0.020	0.00	0.25		0.000	0.000
		Overall Survival Rates:			0.486	0.444

Annual SCA Cases:	442	**Predicted Lives Saved:**	215	196
		Change from Present:	0	-18

Notes:

Risk Analysis Model Spreadsheet created by R. R. Bowman; layout modified by Les Bunte

AFD Response Times obtained from the AFD Adminsitration Division

AFD Arrival Fractions obtained from the AFD Administration Division

Cardiac Arrest Fractions from the American Heart Association

Annual SCA Cases obtained from Austin Emergency Medical Services

Source: Adapted from the Ray Bowman spreadsheet "Consequences of Emergency Response on Cardiac Arrest Survival"

Fire and EMS units having to cross three traffic-calming devices significantly reduces someone's probability for survival. With Austin's current history of 442 sudden cardiac arrest cases, only 196 could expect to survive rather than the predicted 215 without any traffic calming device delays. This translates into a nine percent reduction of potential lives that could be saved. According to the model, there would have been 18 less Austinites surviving SCA in 1998 had emergency responders encountered three traffic calming devices along their routes.

Analysis for a General Response Improvement

Additional lives can be saved whenever response times are improved. Reduced response times can be achieved in a number of ways such as increasing the number of arterials on the transportation grid system, adding fire stations or improving traffic control signals at intersections.

Numerous cities around the country have capitalized on the technology improvements by implementing Emergency Response Management Systems (ERMS) using the Opticom™ Priority Control System developed by the 3M Company. In general, this system allows on-coming emergency vehicles to control an approaching traffic signal in their favor, thus minimizing the delay for stopping for red lights. The technology allows an emergency vehicle to activate or hold a green light at traffic signals along its route when making an

emergency response. Each emergency vehicle is equipped with electronic emitters that sends a signal to the traffic light and modifies the normal operation sequence of the light. The emitters can activate a traffic signal from as much as a ¼ mile distance from the intersection. With a green signal captured for the emergency vehicle, a red is displayed with sufficient yellow to red intervals for the cross street traffic to safely clear the intersection or stop and allow the emergency vehicle to pass through with minimal delay.[11] In addition, the potential for accidents involving emergency vehicles is also reduced.

A 1978 study using the Opticom™ system with the Denver Fire Department revealed that their response times decreased proportionally with the number of Opticom™ controlled intersections. With three controlled intersections, the response time improved by 14.3 percent, whereas six intersections with Opticom™ equipped traffic lights saw a 22.5 percent improvement.[12] This report was further affirmed by a similar study conducted in Houston, in 1991. With tests performed from two different fire stations, response times were reduced with one station experiencing a 16 percent reduction while the other improved by 23 percent.[13]

Currently, the City of Austin has approximately 750 traffic controlled intersections within the city limits. Almost 50 of these are actually maintained by the Texas Department of Transportation (TxDOT) for the state

highways within Austin. Approximately 125 of the 750 (16 percent) controlled intersections, are equipped with the Opticom™ devices. Ninety-five of these are concentrated in the immediate downtown area rather than residential areas. Most of these were installed with grant funding from TxDOT as no permanent funding for a sustained program has ever been authorized.[14]

Again, using the Bowman model, a projection can be made of how many sudden cardiac arrest lives can be saved from the present history if Opticom™ devices allowed for a quicker response. Table 7.6 reveals the positive impact that can be attained if response time were improved by approximately 30 seconds, or 14 percent. This seems to be a reasonable target increase based on the study results of Denver and Houston.

Table 7.6

General Response Time Improvement of 30 Seconds

Agency:	*Austin Fire Department*
Date of Analysis:	*03/01/00*
Analysis Period:	*12-1-97 to 11-30-98*
Analysis Type:	*General Response Time Improvement*

Response Times				
Current Response Time:	3.62	*Minutes*		
Risk (-%) Improvement:	-14%	*is equal to a*	-0.51	*Minute Delay*
Delayed Response Time:	3.11	*Minutes*		

Current FD Incident Information		***Cardiac Arrest Probable Survival Fraction***	*Desired Improvement To Response Time*	*Current Local Survival Rates*	*New Improved Survival Rates*
Midpoint of Arrival Interval	***1998 Arrival Fraction***		-14%		-14%
0.50	0.018	0.91	-0.070	0.016	0.016
1.50	0.067	0.86	-0.210	0.058	0.059
2.50	0.205	0.77	-0.350	0.157	0.165
3.50	0.269	0.62	-0.490	0.167	0.190
4.50	0.209	0.33	-0.630	0.070	0.111
5.50	0.107	0.11	-0.770	0.012	0.028
6.50	0.054	0.07	-0.910	0.004	0.006
7.50	0.027	0.03	-1.050	0.001	0.002
8.50	0.015	0.01	-1.190	0.000	0.001
9.50	0.009	0.00	-1.330	0.000	0.000
10.50	0.020	0.00	-1.470	0.000	0.000
		Overall Survival Rates:		0.486	0.577

Annual SCA Cases:	442	**Predicted Lives Saved:**	215	255
		Change from Present:	0	41

Notes:

Risk Analysis Model Spreadsheet created by R. R. Bowman; layout modified by Les Bunte

AFD Response Times obtained from the AFD Adminsitration Division

AFD Arrival Fractions obtained from the AFD Administration Division

Cardiac Arrest Fractions from the American Heart Association

Annual SCA Cases obtained from Austin Emergency Medical Services

Source: Adapted from the Ray Bowman spreadsheet "Consequences of Emergency Response on Cardiac Arrest Survival"

With an improved response time of this extent, a projected 255 people would have been saved from SCA rather than the estimated 215 lives. This translates to 41 more Austin citizens would have been saved than what was currently projected for 1998.

This entire analysis signifies that there is a direct correlation of survival from sudden cardiac arrest to the response time arrival of emergency medical personnel. The Austin experience illustrates that their traffic-calming program does have a significant detrimental effect to SCA survivability and the quality of emergency services provided to the community.

Risk/Benefit Ratio

A number of analytical processes can be used to evaluate public policy. One such process is establishing a *risk benefit ratio* whereby the risk of one public service can be divided by the benefits of another service. In general, policy decisions are reached or reinforced with the policy option that has the lesser risk and greater benefit ratio. Such a comparison can be made for the Austin traffic-calming program. One ratio will be established for traffic calming device installations; the other will be conducted for traffic flow improvements utilizing the Opticom™ systems.

Table 7.7 shows the results of this analysis, again using the previously established data for Austin, Texas.

Table 7.7

Risk Benefit Ratio for Austin, TX

Policy/Program	Projected Risk	Projected Benefit	Risk/Benefit Ratio
Installation of Traffic Calming Devices	37 lives lost to SCA	1 pedestrian life saved	37 lives lost for 1 life saved
Installation of Opticoms to Reduce Response Time	1 pedestrian life lost	41 lives saved from SCA	1 life lost for 41 lives saved

Again, based on this analytical comparison, one can easily determine that there is a much greater risk for installing traffic calming devices compared to the benefit for a policy or program that provides a reduction in emergency vehicle response times. In essence, Austin has adopted a public policy program that loses 37 lives (SCA) for every one life saved (pedestrian).

Notes

[1] Reid Ewing, *Traffic Calming: State of the Practice*, (Washington, D.C.: Institute of Transportation Engineers, August 1999), p. 109.

[2] Dylan Rivera, "Austin council will debate plans for Rainey Street", *Austin American Statesman*, Metro & State Section, (April 5, 2000), p. B1.

[3] Bruce Browner, Lenworth Jacobs & Andrew Pollak, ed., Emergency Care and Transportation of the Sick and Injured, 7th ed. (Sudbury, MA: Jones and Bartlett Publishers, 1998).

[4] American Heart Association, "Cardiac Arrest and the Need for Early Defibrillation, When Every Second Counts", Online. Available: http://www.americanheart.org/Heart/CPR/PAD/brouchure.html. Accessed: February 6, 2000.

[5] Ibid.

[6] Ibid.

[7] Ibid.

[8] City of Austin, Emergency Medical Services, "Austin/Travis County EMS Utstein Report on Cardiac Arrest Cases", Austin, Texas, December 1, 1997 to December 1, 1998, p. 1.

[9] Ray Bowman, "Calculation Spreadsheet", Personal email to Les Bunte, October 29, 1999.

[10] William Mendenhahl and Robert J. Beaver, *Introduction to Probability and Statistics*, (Belmont, California: Duxbury Press), p. 158.

[11] Traffic Engineers, Inc., "Emergency Response Management System Study, (Houston, Texas, April 1991) p. 2.

[12] City of Denver, Department of Safety, "Time Study Effectiveness of the Opticom Traffic Control System", Denver, Colorado, October 5, 1978, Table 5.

[13]Traffic Engineers, Inc., "Emergency Response Management System Study", p. 10.

[14] Piet Sybesma, "Signals and Opticoms", Personal email to Les Bunte, March 22, 2000.

Chapter 8. Discussion of Policy Implications

Many arguments can be made for or against public policies relating to traffic calming initiatives. Often, public policies are quickly adopted in the wake of highly emotional issues, reaction to perceived fears or threats, or in response to a small interest group that may not represent the interests of the remainder of the community. In many instances, traffic-calming initiatives have been instituted in a large number of communities under these circumstances.

Traffic calming programs are established generally to improve neighborhoods by reducing traffic speeds and volumes, lower accident rates, and improve pedestrian safety. Often the traffic danger within a neighborhood is generally a *perceived danger* by the residents, rather than an established one. Because they personally witness the extremes of the data, residents often convey an exaggerated depiction of the problem than what is borne out and validated by the field data analysis.

Unless policies and programs are well thought out, analyzed, planned, and appropriately implemented that meet the overall needs of the entire community, most citizens will not be thoroughly satisfied with the local government's actions for a particular issue. The intent of this research was to review all of the aspects surrounding the traffic calming issue and attempt to

qualify and quantify the issues so that public and appointed policy makers could reach prudent decisions for their communities. These decisions would then be based on analytical processes rather than mere intuition or perceptions. Thus, this chapter should serve as the findings and interpretations of the content information reviewed herein. Chapter Nine, the final one, will contain policy recommendations from these findings, interpretations, and discussion.

Devices Useful When Warranted

Often, traffic-calming devices are used as a first, "knee jerk" reaction to a problem rather than a last resort. In many instances, there is quick response by the local government to the out crying of a few people who perceive there is a major problem. The local entity then records a quick set of speed and volume data, and devices are then put in place. As cautioned by Reid Ewing, a leading expert in traffic calming, speed, volume, and accident studies can be easily skewed. Therefore, full, in-depth, comprehensive analyses needs to be performed of the entire area to determine the problem. In addition there is often a lack of periodic efforts to increase enforcement by the police.

Most traffic control devices are effective for their intended use, i.e. slowing traffic or decreasing volume. However, their misuse is generally what comes under more scrutiny. There are certainly some situations where

some type of traffic calming is warranted. The Rainey Street project in Austin serves as one good example.

This very small neighborhood did not have a collector street, nor were there other parallel streets within the neighborhood, or adjacent neighborhoods, for cut-through traffic to divert to. Cut through traffic and speeding were the main complaints of the Rainey Street neighborhood. A quick analysis was done showing there was high traffic volume and very little speeding over the established 30 mph speed limit. Little was done from an enforcement standpoint, because there was not truly a speeding problem, only one perceived by the residents.

The traffic volume however, was a legitimate issue as over 3,000 vehicles per day (vpd) passed through the neighborhood. The neighborhood location, in very close proximity to two major arterials, was truly a result of cut-through traffic.

By not fully analyzing the problem with an intensive, thorough traffic study to establish the best remedy, the City Public Works & Transportation Department and the neighborhood-working group responded with a plan that was less than desirable for all parties. Instead, the neighborhood adopted a much more expensive plan to ensure it received its “full entitlement” of the funds allocated for the project rather selecting the best option. This is a potential problem with the City of Austin Traffic Calming Program. Too

many neighborhood-working groups focus on obtaining as many devices as the project budget will allow. Instead, the groups should be selecting the best options to solve the identified problem rather than solving the "spending problem."

Several speed cushions were placed when speeding was not a major problem. Speeding actually increased in some areas afterwards, as drivers were attempting to "make up for lost time." A traffic circle and two neck downs were placed to discourage traffic, which ended up having a limited effect on the volume. The volume was cut from 3,000 to 2,000 vpd, still a very high number of vehicles in a residential neighborhood. In fact, a portion of Rainey Street had a very dramatic increase in volume. Holding true to most traffic calming devices, the placement of a device on one street will generally move the problem to another street. In this case, it was further up the street rather than another parallel street.

Not being a major response route, this neighborhood would have been better served with a complete street closure. The cut-through traffic would have been totally eliminated and the perceived speeding problem would have disappeared with no traffic. All of the neighbors, instead of a few, would have benefited and none would have had a degradation of their current situation. More importantly, the overall goal would have been accomplished,

as all of the cut-through drivers would have had to stay on the arterial streets, which is precisely the route they needed to stay upon.

In this case, the City of Austin was treating symptoms, rather than completing a formal examination to make an accurate diagnosis and prescribe the correct actions for a cure. As a result, the neighborhood did not get completely well and still has troubling side effects. Thus, one can understand how a neighborhood would be of the opinion that the City did not fully do what they said they would do.

Although traffic-calming devices slow some traffic they do not slow all traffic. When the 85th percentile methodology is used to establish speed limits, this means that 15 percent are going faster. Is it reasonable to assume that this 15 percent is going to slow down when they encounter devices? This is probably unlikely, because if they are likely to drive at a unsafe speed to begin with, they are just as likely to accelerate and brake harder "to make up for lost ground" in between the devices. As pointed out earlier, police cars responding to emergencies are not greatly impacted by the delay, because of their smaller size, higher horsepower to weight ratio, they can navigate quicker between the devices. With this being true, then the other 15 percent of the civilian traffic can easily do the same.

Another quandary is the perceived speeding problem and the 85th percentile rule. Traffic calming devices have been put on streets with 85th

percentile speeds less than 30 mph. This is contrary to state law, as the 30 mph speed limit is the minimum established by state law for all public streets except for special designated areas such as school and park zones. Recognizing this, law enforcement will generally not write citations for speeding unless the violation is 7 to 10 mph over the speed limit. This is due to most judges not considering a guilty verdict unless the overage establishes a clear violation of the fact beyond a reasonable doubt.

Transportation officials are generally hesitant to perform actual speed studies, as the 85th percentile speed often exceeds the 30 mph limit, meaning that the speed limit should be increased to the newly field noted 85th percentile. Thus, any citations for speeding in excess of the established 30 mph, but less than the newly established 85th percentile speed, would have excellent grounds for dismissal.

Further, knowing this information, the local government is somewhat obligated to change the speed limit once it becomes aware the 85th percentile speed has increased. For this reason, these transportation officials are always willing to apply devices in places where the 85th percentile is below 30 mph, as this does not jeopardize the posted 30 mph speed limit. Again, under this scenario, devices are placed on streets when there is a perceived need, not a legitimate one, when speeds are below 30 mph.

Thus, devices are useful when their need is thoroughly analyzed and is warranted to solve the root cause of the problem. These devices should not be used to treat the symptoms of other community problems such as a lack of sufficient arterial and collector streets. Partial success leads only to partial fulfilled benefits, which increases public apathy. None of these outcomes lend themselves to good public policy.

Emergency Response Delays and Impacts

Many local governments fail to look at all of the impacts to traffic calming before making an affirmative decision to pursue such an initiative. Often these impacts outweigh the benefits. Numerous findings of the literature review and of the analytical processes contained in the previous chapters have demonstrated how traffic calming is detrimental to emergency services.

As proven with the five case studies presented, response times for fire and EMS emergency vehicles are definitely impacted. Delays in response time range from 2 to 10 seconds depending upon the type of vehicle and the type of device encountered. All of the studies showed that EMS units are in double jeopardy of their response times as they encounter delays to the emergency scene and on the return trip to the hospital when transporting patients.

There can be great financial impacts to cities with increased response times. As the response time is increased, the area of effective station coverage decreases. This situation would require local governments to build more stations to maintain the same coverage. At the very least, if traffic-calming initiatives continue, efforts should be made to modify the Austin fire station location criteria so that future stations will be closer to each other than what is presently done. Not only is this a great capital cost, a very expensive annual operational cost follows to put more firefighters and paramedics on the payroll to decrease the response times. Thus, the total cost of traffic calming goes far into the future than just the implementation costs for devices.

This is very true for the Austin Fire Department as their average annual response times for the last ten years has steadily increased. Even more critical, that average response time has been over four minutes for the last six years. Without a doubt, response times have increased with the tremendous growth rates. As a result, the Department has been unable to actively keep up with the growth curves. With projected growth rates to occur even more, it is doubtful that the Department can return to a sub-four minute response anytime soon.

Fire engine apparatus can cost up to $350,000 with ladder apparatus costing $600,000. Each has a front-line service life of about ten years if all goes well. That life is drastically reduced if the unit is very active. With

repeated damage to these vehicles from the constant flexing of traversing speed humps, the expected life will diminish. This in turn increases the average capital cost per year as replacement apparatus are needed sooner than the expected ten year service life. Again, another increased direct cost for minimal gain.

The greatest impact on response times involves those of sudden cardiac arrest (SCA). As previously shown, a 14 percent increase in response times due to traffic calming devices can lead to an additional 37 lives being lost each year. Even on a lesser time delay scale for three speed humps, 18 people of Austin could have been expected to die from SCA compared to the history established. These all are very alarming numbers.

The bottom line to this negative impact is that the citizens of Austin are already seeing a tremendous increase in response times due to growth. Additional delays due to traffic calming only intensifies that situation and causes the efficiency of emergency services to decline. One has to severely question the reasonableness and accountability of maintaining public policies that expend over $100 million per year in operational costs (capital costs excluded) for fire and EMS service, yet at the same time spend $1.5 million to diminish the quality of those services. Not to mention, the supreme measure, the number of lives at stake.

Finally, this policy analysis reveals there is a severe imbalance of trying to maintain or improve response times while allowing those response times to erode in the traffic calmed neighborhoods. One analysis strongly supports efforts to improve response time through technological improvements of traffic signals. From a risk/benefit, and a predicted lives saved standpoint, a good public policy would include provisions for improving response times. At the very minimum, policy makers should ensure that any projects that degrade response times should be offset by projects, such as Opticoms™, to at least maintain current response time levels.

Environmental/Air Quality Impacts

As local elected officials might satisfy some residents of neighborhoods, they are likely to encroach upon the sentiments of environmentalists. Several studies were presented that demonstrated that traffic calming does increase air pollution. The findings show that air pollution increases with lower speeds of around 20 mph compared to 30 or 40 mph. Greater auto emissions occur with more activities of acceleration and braking for speed bumps compared to an evenly sustained speed without any obstacles. In addition, there was validated evidence that showed that fuel consumption also increased dramatically with traffic calming devices.

Failure to recognize this pollution contributor could cause the local government unexpected financial impacts and/or political embarrassment. Since the increased pollution is established, other non-related grants, such as other transportation or air quality grants and funding could be in jeopardy. This is particularly true if they contain clauses that the City of Austin should not implement programs that would lead to further air pollution. The episodes in Portland, Maine and Griffin, Georgia serve as examples that can easily happen to any local government if they fail to evaluate how their policy on traffic calming could affect other air quality or financial policies already in place.

Austin officials in particular, face a very similar related vulnerability. Currently, Austin is precariously perched on the threshold of being classified as a "non-attainment area" by the U. S. Environmental Protection Agency (EPA). Due to this, they are mandated to take certain steps to improve air quality within the region. As traffic-calming programs contribute to air pollution, the EPA may construe such action as not being proactive measures to meet air quality standards. Again, this could pose as great political embarrassment and possible funding implications.

Civil Liabilities

There is no doubt that local governments are at great risk for potential civil litigation with their traffic calming programs. Virtually, all local governmental laws, ordinances and regulations are based upon some type of authorizations or national standards. In the case of traffic calming, neither of these conditions exists. None of the nationally accepted traffic codes, used by transportation professionals, recognize traffic calming devices as traffic controls. The inability to rely on a national standard eliminates a commonly used defense platform used for many other government litigation cases involving policies and programs.

Because speed bumps have been previously banned, one has to reason that traffic calming devices of similar design, such as speed humps, would have to be teetering on the edge of legality. Other devices such as diverters and half closures were declared illegal in California. In a related speed hump case, a Florida court remained silent of declaring speed humps illegal, thus leaving the legality of speed humps unanswered. Because of the tone of these rulings, one can easily surmise that traffic-calming devices are on the cusp of being illegal. For Texas, the law pertaining to this issue is silent, as no cases have been established yet as a precedent.

Discrimination vulnerability indeed lies within the provisions of the American with Disabilities Act (ADA). This federal law is a clear mandate to eliminate discrimination against persons with disabilities. Eliminating transportation barriers is one such objective to ensure that those with disabilities do not suffer more than those without disabilities. As speed humps have been designed to principally cause discomfort, a strong case can be made for ADA discrimination.

All local governments have an affirmative duty to make reasonable modifications to their policies, programs, practices, and procedures to avoid disability discrimination unless the modifications would fundamentally alter the nature of the service or program. Since roads are a facility covered by the ADA, any alterations must conform to ensuring they do not discriminate those with disabilities. Obviously, traffic-calming devices fall into this situation. However, no precedent cases have been established at this time.

Austin, like other cities is at great risk here, because they have not performed any biomedical or engineering studies validating that the devices are safe for those with disabilities. Such an analysis should be done prior to the installation of the devices. In addition, such validations would need to occur not only for disabled drivers, but also for the disabled passengers riding in para-transit vehicles.

There are other issues that are ripe for litigation. Property and personal damages due to noise, failure to warn, vibration damages, and accidental air bag deployments are claims that can be made. Certainly, damage claims for personal injury and vehicle damage would be a common type of litigation.

Of great concern to local governments is the potential danger to their own employees and equipment. There have been ample documented cases presented where firefighters have been seriously injured while riding in fire trucks as they traversed speed humps. Workmen compensation settlements for an injury due to one traffic-calming device can far outweigh the benefits of that device. Again, the intent of traffic calming is to reduce injuries and make a safer environment, not increase the danger to individuals. This includes public safety workers.

Undoubtedly, the largest vulnerability lies with the negligence of service delivery. Local governments who intentionally place traffic calming devices, knowing that such devices increase the risk or cause life threatening delays, will be opening themselves to negligent death lawsuits. Such lawsuits are extremely likely to originate by those who lose family members when the emergency services encounters traffic calming devices while enroute to that emergency. As most elected officials know, the court assessed damages for such a negligent death suit can be astounding.

When traffic calming began, there was little quantifiable information defining the delay potentials. However, as more and more studies are conducted by fire departments, and more risk analyses are presented similar to the ones included in this research, a much clearer validation can then be presented by those who are damaged. Policy makers should also be keenly aware that no quantitative analyses has been performed thus far demonstrating the number of lives that can be saved from traffic calming devices. Thus, there have been limited quantitative or qualitative data, if any, to justify the needs for traffic calming.

Local Government Postures

Once what was in vogue within many communities is now in the closet. Due to most of the issues revealed in this document, many elected local officials throughout the U.S. have found themselves in the midst of a conflict that has little middle ground. As a result, the only option to keep from having to take a solid position is to put the traffic calming issue on hold in the form of moratorium. That condition best describes the postures of most cities today in regards to their traffic calming programs. Many are hoping it will go away, while others resort to the political policy death of no continued funding.

Austin has a full moratorium on the installation of speed humps except for those in an approved traffic calming project area. In effect, traffic-calming

devices are still being implemented but only by a select few. Yet, when the neighborhood residents become fully notified, this issue has a tendency to falter or fail as occurred in Gwinett County, Georgia.

A Growing Public Sentiment

In an attempt to save the program, the City of Austin Public Works & Transportation Department changed its processes. Revised public type hearing formats were eliminated whereby full neighborhood debate could no longer be engaged and entered into for full public review and justification. As a end result, a neighborhood usually gets a traffic calming plan that does not fully meet its needs or is not wanted after it is implemented. Again, wasted resources for a partial benefit.

Two situations in Austin serve as examples of resident displeasure. Almost three years after the installation of speed humps on a major neighborhood street in Austin, some residents are expressing a desire to have the humps removed. This particular street, Floral Park Drive, is a primary response route for the local fire station.

As noted in an earlier chapter, fire and EMS personnel are responsible for taking the quickest routes to emergencies. Due to the numerous humps on this street, most fire apparatus operators avoid this thoroughfare for emergency responses and take a parallel side street to save time. This has been very

upsetting to the residents of the parallel street as they are awakened at night by the associated noise with a responding emergency vehicle.

Residents have requested fire department administrators to direct the fire apparatus operators to take different routes. However, due to the selection of routes being a "judgment call" by the operator, the administrators cannot give such direction without tremendous liability potential. Resultantly, the only options for the neighbors of the parallel street are to work to get the humps removed or simply "live with the decision".

The second example comes from the Hyde Park neighborhood in central Austin. In this neighborhood numerous traffic circles were installed. These circles were placed on both the north/south and east/west streets that the fire station is located on. This means that virtually every emergency incident that this station responds to, the firefighters will encounter traffic calming devices.

Not only are the firefighters unhappy, there are indications that the residents did not fully receive what they expected. The comments from Hyde Park residents contained in a neighborhood newsletter confirms the displeasure of the neighborhood:

> The City of Austin recently completed the installation of traffic calming devices in the Hyde Park neighborhood. I asked both former HPNA [Hyde Park Neighborhood Association] traffic calming committee members and non-committee Hyde Park residents about their experiences with traffic calming. A summary of these interviews follows:

The traffic circles are charming, but may be dangerous to bicyclists and pedestrians, because drivers are NOT yielding the right of way. Apparently, the worst circle (as far as failure to yield right of way goes) is the one on 42nd and Speedway. If you would like to experience this circle firsthand, approach from 42nd street rather than from Speedway. The through traffic from Speedway is not slowing and yielding, which was what the circle was supposed to achieve. It was felt that 4-way stops would have been better and cheaper than circles, although the circles themselves were thought to be "charming". It was also pointed out that emergency vehicles such as fire trucks could not negotiate the circles safely. They ended up running over parts of the circles...

One HPNA member was still mad at the City because they did NOT follow the HPNA recommendations. She said the committee was "powerless" once the City took over...

…There is another circle at 43rd and Avenue B that has been very dangerous because 43rd street is too wide to make a circle an effective device.

There were also problems with the speed "cushions" on Duval and Speedway. They are supposed to be lined up so that the fire truck can straddle them swiftly and safely as needed for emergencies. An HPNA member said they were positioned incorrectly on the road and now force the fire trucks into either the bike lanes or into the center of the street towards oncoming traffic. The Hyde Park fire station is still complaining about them. The HPNA talked to a fire department administrator who thought the traffic calming devices wouldn't be a problem. HPNA recommended that WPNA[Windsor Park Neighborhood Association] check with the ACTUAL DRIVERS of emergency vehicles (those who are actually going through and responding to calls in our neighborhood) before putting in permanent devices like circles and speed cushions to slow traffic.

Finally, I informally polled several Hyde Park neighbors about their reactions to the traffic calming devices and most of them did not like the circles.

> One problem mentioned was that pedestrians have no safe way to cross from corner to corner where there is a circle. Residents who live on corners where there are circles can no longer park on the street near their homes, because these areas are now designated "no parking" zones. Bicyclists are finding the circles to be dangerous because they have to compete for the narrowed street areas at the corners. Failure to yield right of way is a recurrent problem. One resident told me she once drove through one of the circles without even looking for other cars because she was distracted and in a hurry. She was glad that no other cars had been coming and was shook up to think what might have happened had there been another car.
>
> As to speed "cushions", several people thought they were probably a good idea, but they didn't like to travel on them on a daily basis.[1]

Although some may claim that traffic calming is supported by the neighborhood, there are strong indications that negative public sentiment is vastly growing and shifting against traffic calming programs. The trend in Austin, as illustrated by the above two situations, is that once the neighborhood residents become fully informed of the issue they generally disapprove of the initiatives. This is further supported by the earlier review of two other neighborhoods in Austin who have recently voted down proposed traffic calming plans for their neighborhoods.

All of these actions demonstrate for Austin, as is probable for other cities, that good, sound processes for validating that an overwhelming majority of the residents in a neighborhood truly desire traffic calming programs is lacking. This could also affirm that some residents truly perceive and exaggerate there is a problem when in actually one does not exist.

Been There, Done That!

During the 1990's, there was a terrific explosion of new innovative strategies for organizational development and business management. With so many new approaches, a lot of companies and businesses found themselves looking at different strategies only to find they had implemented a similar strategy before only it were now under another name. Somewhere during that time, a new catchphrase was coined "been there, done that"! That phrase describes very accurately the San Jose experience with traffic calming.

San Jose has a population of 783,000 and had a growth rate of nearly 25 percent in the early 1990's.[2] With the similarities that Austin currently is experiencing, as did San Jose about 20 years ago, the city officials of Austin may want to take heed from the "been there, done that" posture of San Jose. Their situation was best described as follows:

> In the 1970's, San Jose was the fastest-growing large city in the nation, as Silicon Valley blossomed in the former farm fields south of San Francisco. Major arteries and freeways did not keep up with growth, and traffic spilled into the old square-grid road system of San Jose's neighborhoods.
>
> City officials threw up signs announcing a host of new regulations, speed limits, turn prohibitions, truck bans, parking restrictions, [and] stop signs. Often, the new rules simply shunted traffic onto other residential streets.
>
> The city tried neighborhood watches and radar speed-display boards, but complaints kept mounting. The city adopted a

> comprehensive traffic-calming program, but in 1993 it was cancelled because of budget problems.
>
> In 1993, two major highways were finished, greatly helping to relieve congestion…The city saw a 70 percent drop in traffic complaints in the past six years, due in large to the new arterial connections and freeways.
>
> "Traffic calming, the city is discovering, is not just about installing speed humps or diverters in a roadway," says Wayne K. Tanda, director of the city's department of streets and traffic.
>
> "It's about strategy: Enhancing arterial and freeway networks; rethinking land use and urban design; and using intelligent transportation systems to better manage traffic signals, inform people of traffic conditions and travel alternatives, and monitor speeding vehicles". [Tanda]
>
> San Jose's strategy frowns on devices like road bumps and street closures, which Tanda says are aimed at the minority of lawbreakers. San Jose decided to stop penalizing 95 percent of its drivers for problems caused by the other five percent.[3]

While many policy-makers grapple over what to do with increases in traffic volume and speeding on residential streets because of congested arterials, San Jose abandoned their traffic calming initiatives in favor of addressing the root problem of insufficient arterial roadways.

In addition to the highway and arterial improvements, traffic-calming programs were limited to only proven techniques that would keep cars on the major highways and out of the adjoining neighborhoods. Again, the Rainey Street Neighborhood Project in Austin would have been better off under this San Jose strategy.

With San Jose's inability to keep up with rapid growth, increased traffic speed and volume (*been there*); and their ineffective traffic calming programs (*done that!*); Austin should give strong consideration to observe and apply similar actions of the San Jose experience.

The Final Analysis

As noted in the beginning, there is truly a competition between the two public goods of traffic calming and emergency service response times. From the onset, various literature reviews, analyses, and research functions have been performed in an attempt to establish qualitative and quantifiable data to assist policy makers and elected officials in formulating and establishing good, sound public policy for this issue.

Although, many of the issues and impacts discovered with this process may very well apply to other communities, clear findings and trends were established for Austin. The overall risks for traffic calming programs far outweigh the gains. All together, traffic calming is counter-productive to many other public policies.

Response times continue to increase while fire stations are being built at a record rate to keep those times in check. As shown by the sudden cardiac and pedestrian analyses, more lives are being lost than those that could be saved from traffic calming. Traffic calming adds to air pollution which conflicts

with the proactive steps taken by the City to prevent from becoming a “non-attainment” area for pollutants.

Like most other cities, Austin experiences a large amount of litigation, some frivolous and some legitimate. Although frivolous lawsuits can be easily filed, the current situation appears to be ripe for a legitimate Americans with Disability Act claim. Not having a national traffic-calming standard for Austin to rely upon compounds the risk. A detrimental court ruling could mean a tremendous loss to millions of tax dollars already or projected to be spent for roadways, by a magistrates' order to remove all traffic calming devices.

Growing general public apathy is a serious political atmosphere that elected officials certainly want to avoid. With the continuance of traffic calming programs being implemented without overwhelming support by the neighborhoods, an elected official can easily find himself/herself embroiled in a controversy where there appears to be minimal “middle ground”.

What makes the traffic calming programs harder to justify, is that there have been no legitimate studies that can truly quantify or project that the programs save lives. Further, with the admission of a leading transportation expert, we have been cautioned as to the validity of local speed and accident surveys that denote improvements.

And finally, there is clear substantiation and reasoning that improvements to the emergency response times would clearly benefit the citizens of Austin, both in lives and costs. Rather than spending considerable public funds for a few to improve the perception of a neighborhood problem, a better value could be gained for the whole by improving response times.

As a final policy analysis and assessment, traffic calming programs should be reviewed at the local level with the greatest amount of introspect to identify all of the impacts to the community, rather than focusing on a perceived problem often exaggerated by a few. Austin's posture should be immediately reviewed using many of the methods, data and information contained in this report. Without a doubt, more extensive research needs to be conducted on the local level as well within the professional circles of public service officials.

From the perspective of this research, Austin should give serious consideration to abandoning the current "pilot program" and adopt the San Jose strategy of redirecting its traffic calming efforts towards addressing the real problem of improving the arterials and major thoroughfares.

For the immediate, legitimate and warranted problems identified within neighborhoods, Austin policy makers should install only those devices that have a profound effect upon the situation, rather than applying "band-aid" remedies to make residents feel good about a perceived problem. Full and

partial street closures are two examples of responsive and effective devices. Most traffic control devices have very limited or marginal results. Installing such devices is only patronizing the residents, and jeopardizes the emergency services to the remainder of the community. Neither of which seems to be of good policy principles.

At the very least, the City of Austin policy should prescribe and include measures to ensure that emergency response times do not increase. By doing so, rather than there being a *competition* between two public goods, there would be a *balance* of two public goods. This would seem to be a prudent attribute for good, sound, public policy.

Notes

[1] Kate Anderson, "Information About Another Neighborhood's Experience", *Window on Windsor*, Vol. VVIII No. 2 (February 2000), pp. 4,8.

[2] Public Technology, Inc., *San Jose, CA, Taking the Highway*, http://pti.nw.dc.us/task_forces/transportation/docs/trafcalm/CASE18.htm. Accessed November 23, 1999

[3] Ibid.

Chapter 9. Recommendations

With quantitative and qualitative analytical processes, good public policy can be formulated to ensure that the overall needs of the public are met. This approach allows for all elements of the local government to rectify their policy differences prior to public introduction and implementation. In addition, citizens, residents, and policy makers can be provided with the results of the analyses so that they too are in a better position to make informed, prudent and reasonable decisions. Comprehensive analyses ensures that sound public policy, rather than conflicting policy, is rendered for the citizens and eliminates embarrassment to the policy makers.

A set of recommendations has been formulated from the findings and discussion of this professional report for the City of Austin policy makers as well as the policy makers of other communities who have been or likely will be embroiled in this debate. These recommendations are not listed in any particular order of priority or preference.

Recommendation #1:

Avoid other policy conflicts prior to adopting a traffic calming policy/program by requiring each local government department to conduct a comprehensive policy analysis containing their respective impact statements.

An in-depth review by all the affected service departments of the proposed policy at the incipient stage is extremely critical. Too often, many cities have hastily approved and implemented traffic calming programs that resulted in a policy controversy they did not expect. Unfortunately, many of these conflicts originated within another service department of the same local government after implementation.

Such an analysis should weigh all of the positive and negative impacts of the policy as included in pre-established departmental impact statements. From these identified impacts, analytical methodologies should be developed to measure the impacts. Policy approvals should be obtained, at a minimum, from the departments of public works, law, risk management, environmental protection, and the emergency services

Recommendation #2:

Verify that a legitimate problem exists, not a perceived problem.

Often there is a *perceived* danger by residents within neighborhoods when in fact the traffic characteristics fall within in the norm. Due to this,

care should be taken to not prematurely respond to a small vocal group based solely upon their observations. Extensive field analyses should be performed to properly validate the problem. Aggressively responding to small groups without verification can cause a much greater opposition group to arise in the end.

A full-scale validation should include, but not be limited to the following:

- Traffic volume analysis: This should be measured for a wide area in order to determine what volume levels exist and to evaluate if the traffic will shift to another area.
- Traffic Speed Analysis: This should verify that there is a substantial amount of traffic exceeding the posted speed limits. New 85th percentile surveys should also be conducted during this process. Local governments should not rely on data surveys older than two years old to properly assess the current situation.
- Accident Studies: These should be conducted, but verified with caution as there are many factors that contribute to accidents that are not related to traffic calming. This is particularly true as accidents occur infrequently on neighborhood streets.

- Significant Sample Sizes: All data collections should have large sample sizes to ensure statistical soundness. Caution for data inferences should be exercised with small samples.
- Limited Confidence Inferences: Contributing factors to accidents, along with speed and volume data, varies from locale to locale; approach with limited confidence in drawing safety impact improvements; do not rely heavily on other jurisdictional studies.
- Before & After Studies: Be sure that the parameters of the "before" data is exactly the same for measuring the "after" data, i.e. traffic count locations, radar locations, time and day of week, etc. Failure to follow precise measurement parameters lead to skewed and questionable results.
- Establish Pedestrian Accident Frequencies: The infrequency of these accidents within neighborhoods is often not factored into the scope of the problem. Specifically, pedestrian accident rates occurring only upon residential streets should be evaluated. Pedestrian accident data involving major thoroughfares should be discarded and not included in an analysis. Failure to remove this data will lead to exaggerated reporting of the actual situation within neighborhoods.

Recommendation #3:

Require neighborhoods to submit a petition with at least 60 to 75 percent of the residents confirming their desire for traffic calming devices.

Many times the effort to obtain traffic calming relief is spearheaded by the leadership figures of local neighborhood associations. Soon after they start the process, opposition begins to develop to a level greater than anticipated. Some people quickly find themselves opposing the plan when they find out a device will be placed in front of their house rather than someone else's house. To ensure there are no "neighborhood backfires", local governments would be well advised to require these neighborhood associations to strongly commit "up front" to this effort. Signatures on a petition of an overwhelming number, such as 60 to 75 percent of the neighborhood, would help bind residents of their stance. Such an endorsement also serves to protect the policy maker from undue scrutiny.

Recommendation #4:

Evaluate the full impact to emergency response times to all citizens.

It is imperative that local governments fully know and predict what will happen to their emergency services response times. Several fire department studies have documented the delays due to specific traffic calming devices. Most cities have the data available to conduct a medical service

analysis for cardiac arrest identical or similar to the Bowman model. With these tools, policy researchers can now establish good baseline measurements for the delays and predict potential impacts that could be expected for the community.

In addition, more information is now becoming available regarding the extent of injuries to firefighters and paramedics. Strong consideration must be given to ensuring that their work environment, like the neighborhoods, is as safe as possible. The aspect of predicted fleet damage should also be included in the emergency response assessment.

Recommendation #5:

Evaluate the full environmental impact to the air quality of the area.

Traffic calming devices contribute to air pollution. Prior to implementing a traffic-calming program, each local government should obtain verification from their respective state agency that this program will not violate any of the air standards established by that agency or other state or federal agencies. In addition, the local government should evaluate all of their air quality grant funded programs to ensure they are not in violation of any previous agreements. By accepting the funding, most local governments also agree to adopt policies and programs that do not contribute to air pollution within their area. Failure to receive any of these confirmations could

jeopardize existing funding and cause undue fiscal hardship upon the citizens as well as political embarrassment.

Recommendation # 6:

If a traffic-calming program is established, ensure that a "working group" of residents from the neighborhood is assembled to work with City staff to develop a traffic plan.

Working by the side of City staff members, neighborhood residents can help identify problem areas as well as establish alternatives to rectifying the problem. The City staff should include public works officials as well as representatives from the emergency services. The neighborhood group should consist of more than just the leadership group of the neighborhood association. This group should be a cross section of the neighborhood with representatives from different streets, and with a limitation of those from the same street, as well as those who would not necessarily be proponents of traffic calming devices. These have to be *consensus* people, meaning not those in the majority who agree, but rather, those who *accept* the plan even though they may not fully agree with the plan.

Recommendation #7:

Conduct thorough legal risk assessments, not just authorizations.

Too often questions of legality are limited to verifying that the local government has the authority to implement traffic calming devices. The local governments rarely properly evaluate other potential jurisprudence issues. As more and more risk studies are developed, as the one contained in this report for Austin, Texas, there is a clearer confirmation that response delays do occur. Knowingly and voluntarily continuing to contribute to a deteriorating situation can only lead to increased liability risks for the emergency services.

Local governments who elect to install traffic calming devices should take extra measures to ensure safe legal ground regarding the Americans with Disabilities Act. These governments should conduct bio-medical and engineering studies to validate that traffic calming devices are safe and pose no hazard to those with disabilities.

Recommendation #8:

Traffic calming devices should not be used for treating symptoms of traffic problems. Take actions to eliminate the root cause of the traffic problem.

A good analysis will reveal the primary cause of the traffic concern. Once identified, permanent remedies should be incorporated to fully remove

the problem. If a problem truly exists, then drastic measures such as a street closing may be the cure in order. Speed humps and diverters will not be the best answer to a continuing nagging problem. Failure to effectively eliminate the problem will result in disappointment from most residents.

If drastic measures are not taken, then traffic calming measures should be limited to severely warranted locations, such as neighborhoods close to freeways. Neighborhoods of high crime are other good candidates for traffic calming, as the benefit of reducing the crime and restoring the neighborhood has a greater justified benefit than those of low crime areas.

Policy makers should make sure that a traffic solution on one street doesn't move the problem to an adjacent street. Perhaps a better-cost benefit would be utilizing traffic-calming funding to expedite the construction of larger arterials. This directly addresses the root problem, as commuters would stay off the neighborhood streets in preference for adequate arterials.

Recommendation #9:

Emergency service departments should have the authority to disallow traffic calming plans that will adversely impact their response service delivery.

Emergency service officials should not be allowed to reject traffic calming plans just because "they don't like traffic calming." Reasonable

justifications should be given. However, local governments should refrain from restricting emergency service officials from having the ability to disallow plans when warranted.

Presently, the City of Austin emergency service departments are not allowed to "veto" any traffic-calming plan. If a proposed traffic calming plan causes a severe negative impact to service delivery, these departments currently must abide by the desires of a few citizens, which subsequently impacts the whole community. This situation erases all accountability to the remainder of the public. Good policy development should have checks and balances to ensure the overall benefit to the society.

In addition, this condition sets up a natural conflict within the local government, whereby the public works department can dictate their engineering designs for the placement of devices for traffic effectiveness, yet the fire or EMS department is not allowed to modify a plan that jeopardizes their service delivery.

Recommendation #10:

When a traffic calming policy is adopted, make sure that it is balanced.

As resources are allocated for traffic calming projects that increase response times, equal resources should also be implemented for improving

response times. Local governments should ensure that visible actions are taken to offset the downsides of traffic calming. Funding the remote electronic traffic control systems, such as the Opticom™ systems, is a good alternative to counter slower response times. Revising station location policies, by making them closer to each other, also compensates for the delays caused by the devices.

Recommendation #11:

Prohibit the installation of traffic calming devices on streets of fire station locations or primary response routes.

The greatest controversy erupts when devices are placed upon streets of fire station locations and the respective primary emergency response routes. The concern here is that one neighborhood's desire is negatively impacting someone who lives in an adjacent neighborhood now with a longer response time for emergency service. Restricting traffic calming devices on primary response routes does not impact the service to other neighborhoods and thus, greatly diminishes this debate, which in turn reduces opposition. Therefore, traffic calming devices should be allowed on streets whereby one does not have to travel upon to get to another neighborhood.

Although there are no national standards for traffic calming devices, there is a published guideline by the Institute of Traffic Engineers that

addresses the installation of these devices. That guideline specifically recommends that traffic calming devices not be but upon the roadways or streets of fire station locations or primary response routes. City of Austin officials should move to adopt that position.

Recommendation # 12:

Require that traffic-calming programs for neighborhoods be voted upon and approved by a super majority of the residents.

To ensure a high level of public support, and a diminished level of dissatisfaction with the local government, all proposed traffic calming programs of neighborhoods should be approved with an overwhelming majority of residents. If the problem is legitimate and validated, then a large majority of residents will be willing to endorse the plan. If the problem is not as severe as perceived, then the chance of passage is much less. Based on this, local governments should require that approval for all neighborhood plans should be based on a two-thirds or three-fourths approval.

In many instances, less than 25 percent of the ballots are returned casting a vote. One can easily see that only a few people casting an affirmative or negative vote can well control the balloting. Establishing super majority approval levels helps reduce any controversy that could develop later whenever a simple majority threshold is tabulated. Such a large approval

margin helps reveal the true sentiments of the residents, again allowing for better policy acceptance.

Recommendation #13:

Require objective evidence of material traffic problems before using traffic calming devices.

Most communities use the 85th speed percentile mark to measure acceptable speed limits. Local governments should tie their installation requirements to pre-established thresholds for speed and volume. For example, a city might not install any devices unless the 85th percentile was at least 5 mph over the posted speed limit. Another example may be 2,000 vehicles per day would make a street eligible for some type of diversion device. The establishment of these types of standards would allow traffic calming devices only where they would be fully warranted.

Recommendation #14:

Do not allow neighborhood project areas to have an established entitlement budget for a project.

Local governments that choose to have traffic calming programs should not allow citizens to pick and choose devices with accompanied budget limitations. Rather, they should obtain the device(s) that will yield the best

result. When finance entitlements are introduced or revealed, citizen groups of neighborhoods have a tendency to try and solve the money problem "of making sure we get all that we are entitled to" by attempting to get the most devices rather than properly selecting and solving the traffic problem.

Recommendation #15:

Ensure that true public hearings are held for proposed traffic calming plans within neighborhoods to ensure openness for public debate and decision-making.

A formal public hearing format should be conducted within the neighborhood prior to residents voting upon a traffic-calming plan. This type of an established forum should be presented so that residents can hear first hand the advantages and disadvantages of traffic calming. Local government staff and policy makers should be on hand to help answer questions. Although one can expect tremendous debate at such a hearing, the resident will be exposed to more information to make an informed decision with, whether that information be pro or con.

Local governments should not adopt the "open house" forum used by the City of Austin. This forum allows only those with specific questions to come and visit with City staff or the members of the neighborhood committee who formulated the plan. They are not offered the opportunity to hear from

those who may support/oppose the plan, nor is there an opportunity for those directly supporting/opposing the plan to address the remainder of undecided residents. A true public hearing forum, allowing all sides to be heard, is a basic principle of a free, open, participative, and democratic government.

Recommendation #16:

Evaluate and manage traffic calming programs with meaningful performance measurements.

Quality public policy programs of today must be constantly measured to determine their effectiveness and benefit. Traffic calming programs should be no exception. Traffic calming may be effective for the first six months or year after installation, but how does it compare two or three years later? This monitoring should be on going.

Of greater importance, is the establishment of success thresholds. What makes a successful traffic-calming program? Local governments should establish definitive methodologies that establish meaningful results. For example, the City of Austin desperately needs to modify their current measurement tool of reducing speed in project neighborhoods by 20 percent. At a posted speed of 30 mph, that is 6 mph. One would be hard pressed to consider that a meaningful result since the legal speed is set at 30 mph. However, this performance measurement could be meaningful when speeds

are 40 mph on a neighborhood street instead of the posted 30 mph. Care should be taken to only report the reductions where they are above the speed limit.

Recommendation #17:

Conduct follow-up surveys one year after the installation of devices to determine the satisfaction level of the residents.

One of the central goals of traffic calming is to improve the quality of life and livability of the neighborhoods. However, very few cities if any attempt to measure this value. Failure to collect such data, could lead to continuance of a program that is viewed as another local government program that does not meet the needs of the people. Conversely, if the results of these surveys are positive, then strong reinforcement is established for the program to continue. Sustained public approval is a cornerstone for good public policy. Therefore, it is extremely important to measure resident satisfaction long after "newness" of the project wears off.

Recommendation #18:

Policy makers, whether appointed or elected, should base their public policy/program decisions upon fact not emotions.

Too many times, policy makers allow emotions from stakeholders to greatly influence their actions rather than relying on analytical facts and findings. Many local government staff members, as well as concerned citizens, whether pro or con, often commit an immense amount of time and effort to establish facts of a situation so that reasonable decisions can be deduced from these work products. The analyses conducted should be heavily incorporated into governance decisions.

If the data reveals that traffic calming is a better benefit than longer emergency service response times, then traffic calming should be adopted. Conversely, if more lives can be saved with unchanged or reduced emergency response times, then traffic calming initiatives should not be implemented.

In the case of Austin, Texas, there is clear evidence much more overall harm to the citizens would result from traffic calming than from the very limited benefits, if any, that it might produce. With emotion to the side, one can reasonably and prudently justify a policy decision to suspend the current traffic-calming program.

This recommendation can also be applied for other cities only after they have conducted a comprehensive policy analysis similar to the one contained in this report.

Appendix A

City of Boulder, Colorado

Neighborhood Traffic Mitigation Program

Tool Kit

(Adapted)

TRADITIONAL ENFORCEMENT

Definition
Sporadic monitoring of speeding and other violations by police.
Police officers can come out to a neighborhood for short periods of time to issue tickets.
Additionally, police officers can "take a neighborhood under their wing", and monitor traffic on a regular basis.

Temporary
Enforcement is always temporary.

Street Types
Enforcement can be performed on any street.
Logistics make some locations problematic or ineffective.
Mitigation can be initiated.

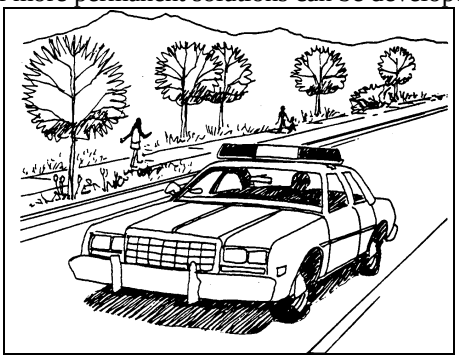
Best Used If
Excessive speed on a street and there is an urgent need for quick action.
Neighborhood is undertaking a Speed Watch program, is using the radar trailer or has newly installed mitigation measures.
Neighborhood is in design phase and needs interim assistance.

Benefits
Temporary good public relations tool.
Serves to inform public that speeding is an undesirable behavior for which there are consequences.

Don't Use If
Locations where it's physically impossible to pull vehicles over without creating a hazard.

Negatives
Effect is not permanent. Enforcement is an expensive tool (currently total cost recovery for enforcement does not exist).

Considerations
Enforcement should be regarded as supplemental to other measures, not the sole solution.
Enforcement should not be considered a permanent form of mitigation.
Used as a "quick fix" until more permanent solutions can be developed and implemented.



RADAR SPEED MONITORING TRAILER

Definition
Mobile radar display advises motorists of their speed.

Temporary
In place for several hours or days in given location.

Street Types
Acceptable for use of high or low volume two lane streets.

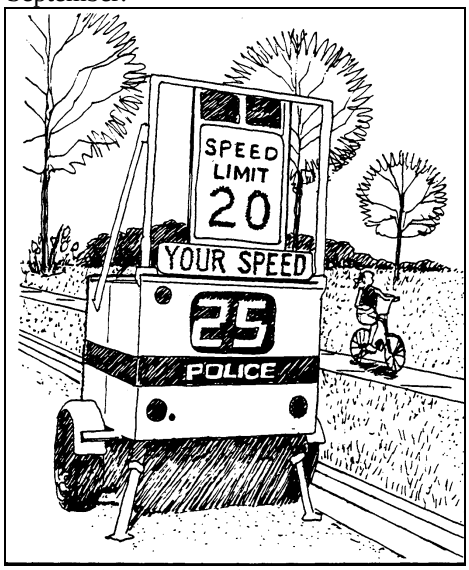
Best Used If
Excessive speed occurring.

Benefits
An educational tool.
Useful especially in school and construction zones where spot speed reduction is important.
Very good public relations tool.

Don't Use If
Very remote location. Extremely heavy traffic volume.

Negatives
Requires periodic enforcement.
Effective for limited duration.
Units moved frequently which requires manpower.

Considerations
Boulder has purchased a radar speed monitoring trailer.
Delivery is scheduled for mid-September.



EDUCATION

Definition:
Activities that change people's minds. Reading informative text, meetings & workshops with city staff, interaction with neighbors, signing campaign, enforcement activities, neighborhood speed watch, school programs, parent outreach, etc.

Brochures
Letters to the Editor
Newspaper ads & notices
Public Service Announcements
Bus Cards
Neighborhood Workshops/Discussions

Temporary
Education efforts can be flexible in duration.

Streets Types
Education can be applied in almost any situation.

Don't Use If
Education has already been seriously attempted with no significant results.

Negatives
May be difficult to measure effectiveness.
Can be expensive.
May take time to be effective.
May wear off over time.

Best Used For
A traffic problem that involves human behavior.

Benefits
Can be very effective, is relatively inexpensive, involves and empowers citizens, works well with other mitigation tools.

Considerations
Neighborhoods should share experiences with education methods.

NEIGHBORHOOD SPEED CONTROL PROGRAM

Definition
A neighborhood education process in which neighbors become more aware of the specifics of their speeding problems. Neighborhood representatives are loaned radar guns by the Police Department, to monitor speed and identify chronic speeders. The City will then send letters to offending drivers calling their attention to their behavior and requesting them to change it.

Temporary
Should be in place for two months or longer in order to gain maximum educational benefit.

Streets
More likely to be effective on local streets.

Best Used If
Neighborhood willingness to participate.
Most traffic is local traffic.
Neighborhood Speed Watch has not yet been attempted.

Benefits
Can effectively address traffic problems that are caused by neighbors.
Can heighten general awareness of neighborhood traffic concerns.
Can serve to unify neighborhoods.
Can be a good first step toward building consensus on physical mitigation measures.

Don't Use If
No willingness on the part of the neighborhood to participate.

Negatives
Not likely to be as effective on non-local traffic.
May make neighbors feel "spied on" by one another.

Considerations
Participation in Neighborhood Speed Watch will be limited to two neighborhoods at a time.
Training in use of the radar gun will be provided by the Police Department.
Neighborhoods representatives will be asked to sign an agreement to take proper care of the equipment and to use it only as specified by program guidelines.



SPEED LIMIT SIGNS

Definition
Signs that inform drivers of the maximum safe driving speed under normal conditions.

Temporary
Can be tried for six months to test effectiveness.

Street Type
Any streets, but may be unnecessary on many low volume residential streets.

Best Used If
Clear need to inform drivers of the speed limit.

Benefits
Inexpensive.

Don't Use If
Neighborhood doesn't want the "visual pollution".

Negatives
Unattractive in neighborhoods. Does not effect vehicle speed.

Consideration
Posting of artificially low speed limits will require constant enforcement and breed disrespect for traffic control devices.



STOP SIGNS

Definition
Red hexagonal signs displaying the word "STOP". Stop signs are used to designate the right of way at intersections.

Temporary
Stop signs can be tried on a temporary basis. Before the signs are installed, the objectives for installation should be clearly defined. After 6 months, if the goals have been met and the neighborhood still wants the sign(s), the installation can be made permanent. If the objectives have not been adequately met, the signs will be removed.

Street Types
Stop signs are primarily used at low volume street intersections with high volume streets, or on all four approaches of an intersection with relatively equal volumes and/or a significant, correctable accident history.

Maintenance
Low maintenance.

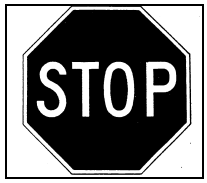
Best Used If
An unusually high number of accidents involving right of way.
Significant cross traffic at the intersection.

Benefits
Very inexpensive.
If there is a lot of cut though traffic, stop signs might work as a diversion.
Insignificant traffic volumes.

Don't Use If
Steep grades. Insignificant traffic volumes or insignificant history of correctable accidents.
Need and intention is for speed control.

Negatives
If there is not a significant amount of cross traffic at the intersection, compliance will not be compelled.
Cyclists and pedestrians relying on stop signs can be hurt, and accidents may increase.
Excessive use of stop signs renders them meaningless.
Stop signs don't decrease average speed. Increase noise and pollution.

Considerations
Most stop signs that are warranted for right-of-way control are already installed.
Neighborhoods can consider an appropriate use *of* stop signs as a possible mitigation tool in limited circumstances, but widespread installation *of* stop signs for speed control is ineffective and will not be supported.



PSYCHO-PERCEPTION

Definition
Any material or message placed around or in a street that heightens driver response or induces the desired behavior. Example is transverse markings (striping) with inconsistent spacing that gives the illusion of increased speed. Novelty signs and use of landscaping are other examples.

Street Type:
Can be tried on any type of street, although not all methods are appropriate to all streets.

Maintenance
Depends on technique.
Low for signs, higher for pavement markings and landscaping.

Best Used If
Neighborhood desire to try them.

Benefits
Gives the neighborhood an opportunity to be creative with their response to traffic concerns. Can be aesthetically pleasing to the neighborhood.

Don't Use If
Specific technique has been proven dangerous or ineffective.

Negatives
Most psycho-perception tools are not likely to be effective in the long run, due to their dependence on novelty.

Considerations
It is important that psycho-perception tools make driving fast on the street seem less safe, but that they don't actually increase danger.

NEIGHBORHOOD IDENTIFICATION ISLAND, SIGN OR OBELISK

Definition
An island in the center of a street that includes a monument identifying a neighborhood and marks the entrance to the neighborhood or a sign, banner or other structure that helps to communicate a sense of neighborhood identity.

Temporary
Can be temporary but removal unlikely.

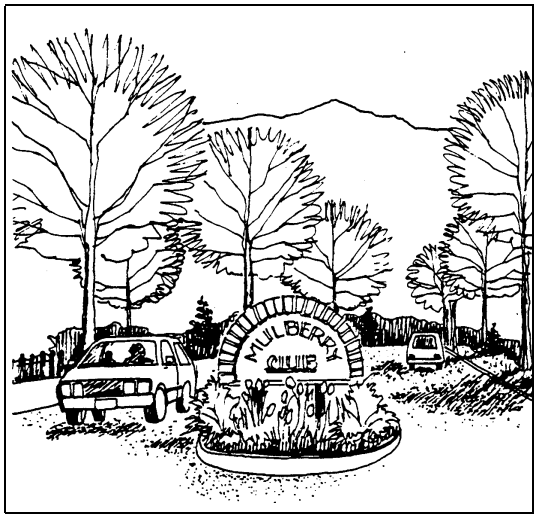
Street Type
Collector street or local street neighborhood entrance off of collectors or arterials.

Works Best If
Neighborhood boundary definition is desired.

Maintenance
Depends on type of installation.

Benefits
Alerts drivers that a change in their driving behavior is being requested.
Helps give neighborhood more of a sense of identity.
Allows neighborhoods creativity and participation in design.

Considerations:
A Neighborhood identification island is an entryway treatment that can be used most effectively in conjunction with other tools, if speed reduction is desired.



STREET CLOSURE

Definition
Street closed to motor vehicles using planters, bollards, or barriers, etc. Pedestrian and bike access maintained.

Best Used If
Other mitigation devices, i.e., speed humps, diverters would be inadequate.

Benefits
Eliminates cut-through traffic.

Don't Use If
Residents of immediate and adjacent neighborhood will not support restricted access.
Cannot substantially, adversely impact emergency vehicle response time.
Boulder's 1989 Transportation Master Plan opposes street closure unless extraordinary circumstances exist.
Conversion of street from public to private requires legal action; may need to grant easements for utilities, municipal services, etc.

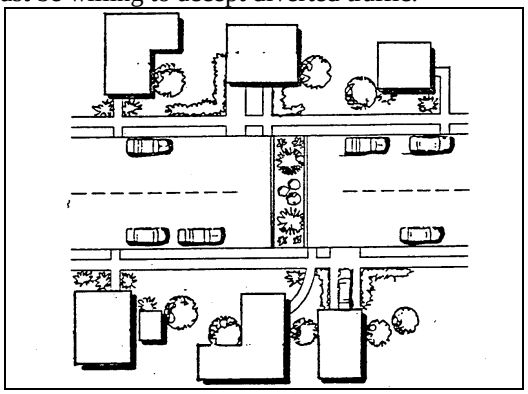
Negatives
May be perceived as inconvenience by some neighbors and an unwarranted restriction by general public.

Temporary
Can be installed temporarily.

Street Types
Low volume streets where alternative access to homes can be provided (i.e., by alleys) and a clearly more desirable and feasible route exists.

Maintenance
Landscaping.

Considerations
A large percentage of immediate neighborhood must want it.
Adjacent neighborhoods must be willing to accept diverted traffic.



DIAGONAL DIVERTERS

Definition
A barrier placed diagonally across a four legged intersection, interrupting traffic flow across the intersection. These barriers can be used to create a maze-like effect in a neighborhood.

Temporary
Can be tried on a temporary basis for 6-12 months.

Street Types
Neighborhood (local) streets.

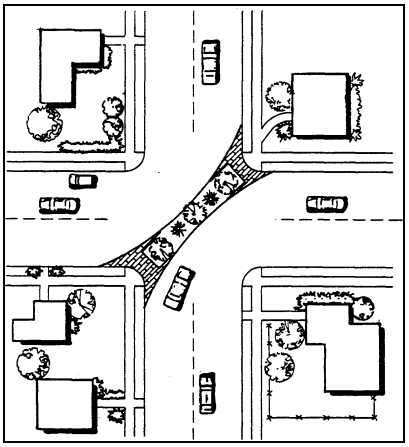
Best Used When
Cut-through traffic is the primary problem for the neighborhood.

Benefits
Practically eliminates cut-through traffic.
Maintains continuous routing opportunities (unless a cul-de-sac or street closure).

Don't Use If
No reasonable alternate routes available for both emergency response vehicles and through traffic.
Cut-through traffic is not a significant issue.

Negatives
People can turn at higher speeds because there is no opposing traffic.
May reduce emergency routing opportunities.
May increase trip length for some residents.

Considerations
These barriers should be traversable for bikes and pedestrians.
Likely to increase traffic on adjacent streets, so should be considered only where appropriate alternatives are available.



TRAVERSABLE BARRIERS

Definition
A barrier placed across any portion of a street that is traversable for bikes, pedestrians, roller bladers, and emergency vehicles, but not for other motor vehicles.

Temporary
Can be tried on a temporary basis for 6-12 months.

Street types
Low volume streets with cut-through traffic.

Maintenance
Landscaping.

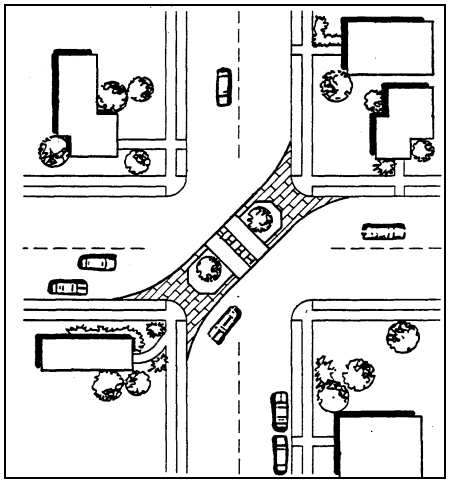
Best Used If
Cut-through traffic on a street that should be low volume.

Benefits
Reduces cut-through traffic..

Don't Use lf
No appropriate facility for diverted traffic.

Negatives
If not enforced regularly, parked cars may block access.
Depending on design, may be subject to violation by unauthorized vehicles.
Altered traffic patterns may increase trip length.

Considerations
Diversion onto neighboring streets needs to be analyzed.
Cut-through traffic needs to be evaluated.



ONE-WAY STREETS

Definition
Self-explanatory.

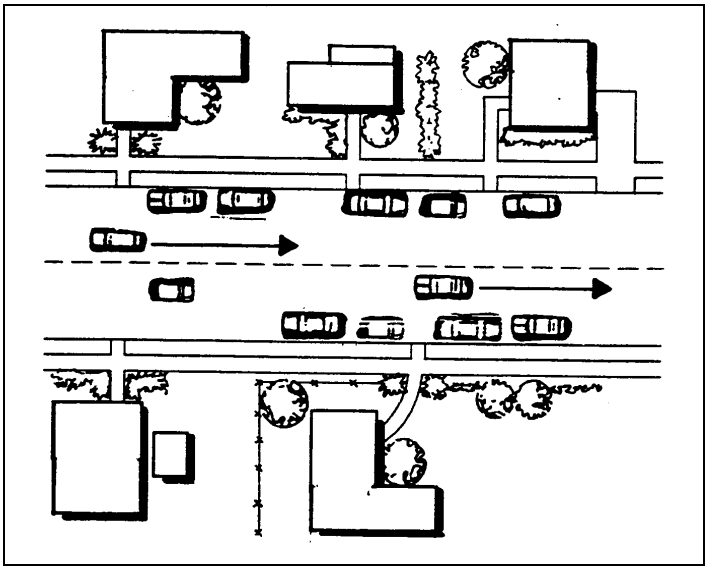
Temporary
Can implement on temporary basis (6 mo.) to ascertain if benefits outweigh disadvantages.

Best Used If
There's a need for parking on both sides of a narrow street. Pedestrian safety is a significant concern.

Benefits
Tend to be safer due to lack of friction from opposing traffic flow.
Can facilitate traffic flow through an area.
Can open up narrow street for more resident parking.
Increases pedestrian safety. Maintain reasonable access for emergency vehicles.
Maze effect of one-way streets can discourage through traffic.

Don't Use If
Generally need to provide one way streets in pairs, which is frequently not possible in a neighborhood setting.

Negatives
Can lead to increased vehicle speeds.
May result in longer trip length.
May increase emergency response time.



DROP-OFF ZONE FOR SCHOOLS

Definition
A zone placed at least two blocks from a school for parents to drop their kids off, in order to reduce traffic congestion around the school. Each school should have several zones to disperse traffic.

Temporary
May be tried on a temporary basis.

Street Types
Streets surrounding schools.

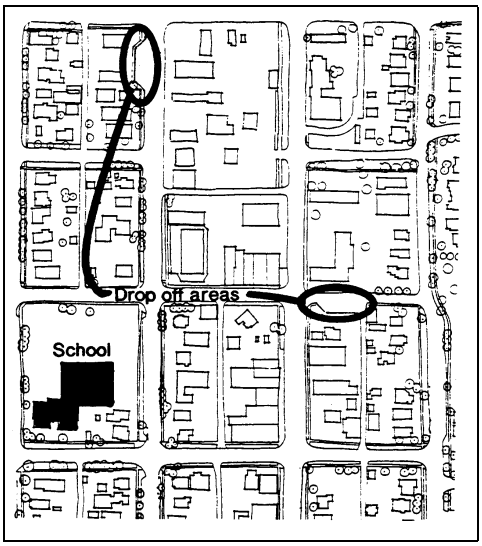
Best Used If
Problems with traffic congestion around schools.
Feasible, safe drop off locations.

Benefits
Would decrease congestion immediately adjacent to the school, increasing safety.
Would encourage walking.

Don't Use If
No drop off areas available that don't pose significant hazards for children or drivers.

Negatives
If not well considered, could simply displace congestion/hazards to another location.

Considerations
Adequate communication and support for parents and kids to make the change would be essential to the success of this concept.



SPEED HUMPS

Definition
Speed humps are wave-shaped paved humps in the street. The height of the speed hump . determines how fast it can be navigated without causing discomfort to the driver or damage to the vehicle. Discomfort increases as speed over the limit increases.

Temporary
Speed humps are impractical to install on a temporary basis.

Street Types
Speed humps are generally considered local street tools.
Applications on collector streets need to be very carefully evaluated.

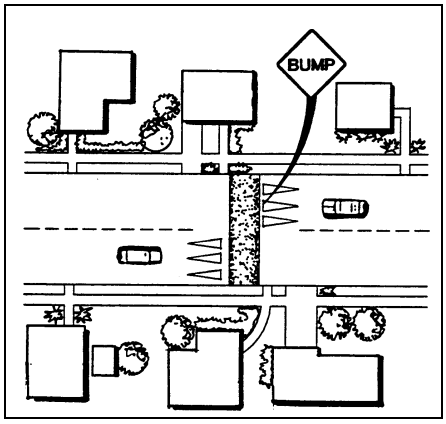
Maintenance
Well constructed humps should maintain their shape for several years, however the striping associated with them must be maintained biennially.

Best Used If
The street has a documented speeding problem.
"Soft" approaches have proven ineffective.

Benefits
Slows traffic.
Few drivers travel over speed humps with excessive speed more than once.
"Self enforcing."
Relatively inexpensive.

Don't Use If
The street is on a major emergency vehicle route and no reasonable alternative is available.
Steep grades.

Negatives
Can increase voice and air pollution by the hump (however, less negative impact than a stop sign).



RAISED INTERSECTIONS

Definition
A raised plateau of roadway where roads intersect. The plateau is generally about 4' higher than the surrounding streets.

Temporary
No temporary installations of raised intersections.

Street Types
Can be used on high or low volume streets.

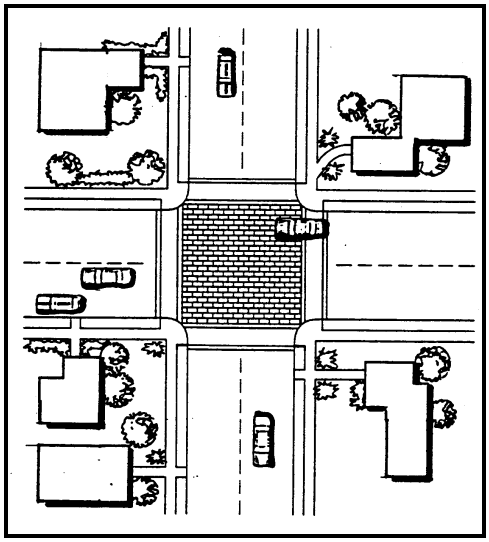
Best For
High pedestrian volumes with significant safety concerns.
Significant, excessive vehicle speed.

Benefits
Effective speed reduction, better for emergency vehicles than speed humps..
Aesthetically pleasing if well designed.
Excellent pedestrian safety treatment.

Don't Use If
Critical emergency vehicle route.

Negatives
Expensive.
Not as good as a flat street for emergency vehicles.

Considerations
Transit concerns will need to be identified and worked through.



RAISED CROSSWALKS

Definition
A speed hump designed as a pedestrian crossing.

Temporary
No.

Street Type
Can be used on medium and low volume streets.

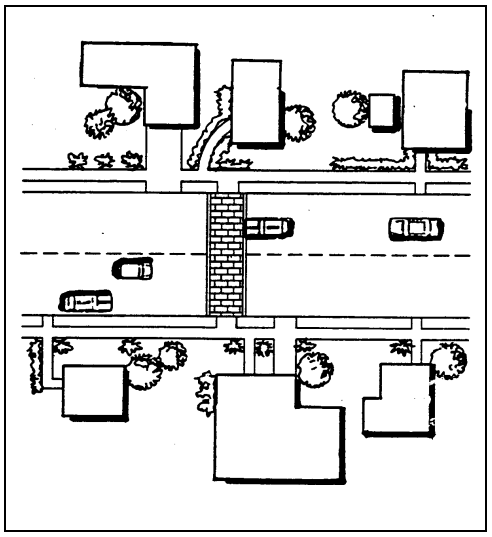
Don't Use If
Important emergency vehicle route.

Negatives
Negative impact on emergency vehicles if on primary emergency vehicle routes.

Best Used If
High volume of pedestrians.
Vehicle speed is a concern.

Benefits
Effective speed control at the installation.
Excellent pedestrian amenity.

Considerations
City will need to negotiate with RTD for acceptance of speed humps, raised crossings and intersections on bus routes. Not immediately implementable on these streets, but expect to be used in the future.



RUMBLE STRIPS

Definition
Patterned sections of rough pavement, which alert drivers to a dangerous condition of traffic control measure.

Temporary
No feasible temporary installation.

Street Types
Use of high or low volume streets.

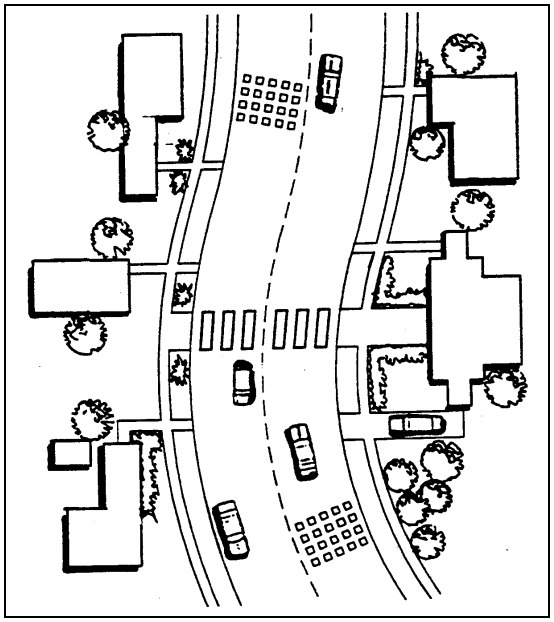
Maintenance
Snow removal equipment tends to damage them.

Best Used At
Concealed stop sign or pedestrian crossing.

Benefits
Relatively inexpensive to install.

Don't Use If
Rarely will rumble strips be the most appropriate tools.

Negatives
High maintenance. Adversely impact bicyclists. Generally ineffective in reducing vehicle speeds. Rumble strips are noisy by design, and not recommended for neighborhood settings.



DEVIATIONS

Definition:
Deviations redraw the path of travel so that the street is not straight (by the installation of offset curb extensions).

Temporary
May be tried on a temporary basis for 6-12 months.

Street Types
Any street with adequate right-of-way.

Maintenance
Landscape maintenance will constitute an ongoing expense.

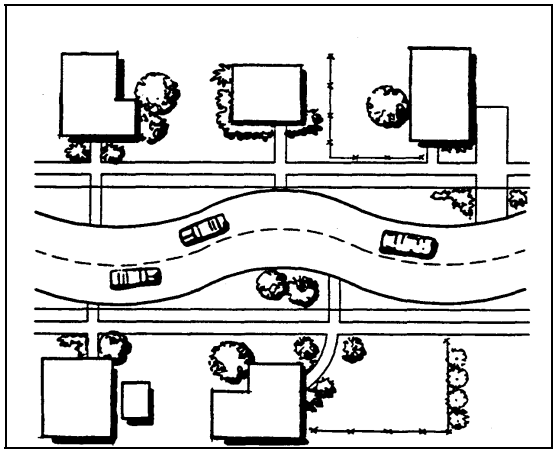
Best Used For
Excessive speed on straight street.
Adequate right-of-way exists to alter curbline.

Benefits
Accepted by public as speed control devices.
Aesthetically pleasing.
Reduce speed without significantly impacting emergency response.

Don't Use If
Roadway is already narrow.

Negatives
Expensive.

Considerations
Deviations are not very effective unless significant offsets are created.
Neighbors may be responsible for landscape maintenance.



LANE NARROWING

Definition
A lane physically narrowed to nine to eleven feet, expanding sidewalks and landscaped areas, adding medians, 'sideians', on street parking, etc.

Temporary
Can be tried on a temporary basis for 6-12 months.

Street Types
Appropriate for most street type

Maintenance
Landscape maintenance. (May need to involve neighborhood participation.)

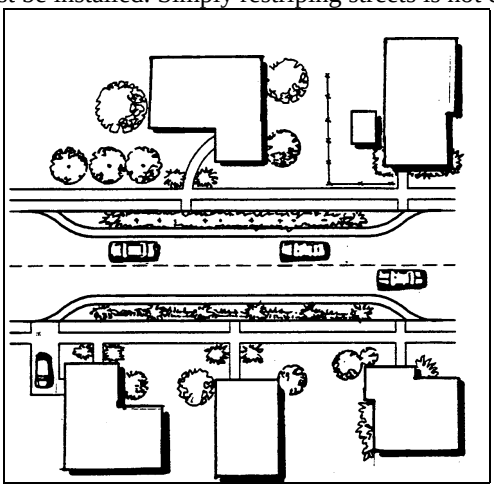
Best Used If
Excessive speed due primarily to street width.

Benefits
Good for pedestrians due to shorter crossing distance.
Slows traffic without seriously affecting emergency vehicle response time.

Don't Use If.
No possibility of eliminating on street parking.
Inadequate right-of-way to do a safe, effective treatment.

Negatives
Can be dangerous for bikes.

Considerations
For lane narrowing to slow cars, it helps to include visual distractions, such as bushes, trees, transverse markings, and other psycho perception techniques.
May increase accident potential because opposing vehicle streams are brought closer together.
Physical restrictions must be installed. Simply restriping streets is not effective.



CHOKERS: (TRAVEL BOTH WAYS)

Definition
Large lamb chop-shaped islands installed at the intersection to reduce speed. Two lanes of travel are maintained, but lanes are narrow. Bike lanes are maintained outside of the choker, on both sides.

Temporary
Chokers can be tried on a temporary basis for 6-12 months.

Street Types
Chokers will work best on low to medium volume neighborhood streets.

Maintenance
Care needs to be taken by maintenance to keep snow out of the bike and ped lanes.

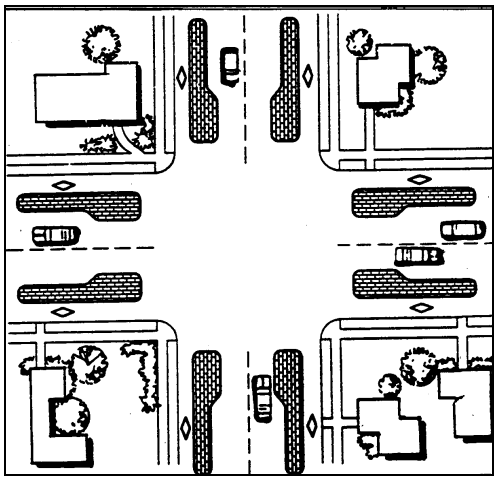
Best For
Neighborhood that desire significant slowing at an intersection.
Pedestrian safety concern at the intersection.
Bike safety concern at the intersection.

Don't Use If
The street is a snow route.

Benefits
Straight access for bikes.
Crossing distance is reduced for pedestrians.
Traffic is slowed at the intersection, possibly reducing accidents.

Negatives
Snow removal is complicated, especially in the bike lanes.

Considerations:
The bike lanes and choker should be well marked. The bike lanes should be wide enough for bike trailers.



LANE ELIMINATING CHOKER
(mid-block)

Definition
Large lamb chop shaped islands placed mid-block on either side of a street to reduce street width to one lane. Cars may travel in either direction, but must queue and takes turns. Bike lanes are maintained on the outer sides of the choker.

Temporary
Chokers can be tried on a temporary basis for 6-12 months.

Street Types
Chokers will work best on low volume neighborhood streets.

Maintenance
Care needs to be taken by maintenance workers to keep snow out of the bike/ped areas.

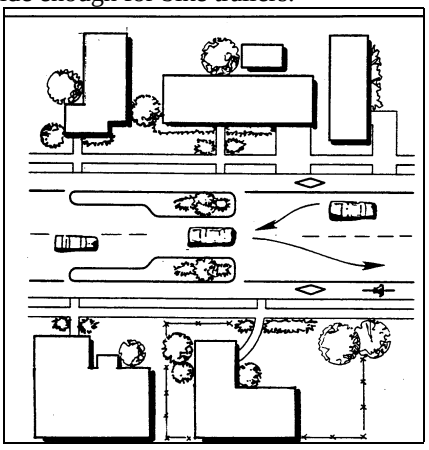
Best Used On
Low volume neighborhood streets with speed and/or cut-through traffic problems.

Benefits
Straight access for bikes.
Crossing distance is reduced for pedestrians.
Likely to reduce cut-through traffic and speed.

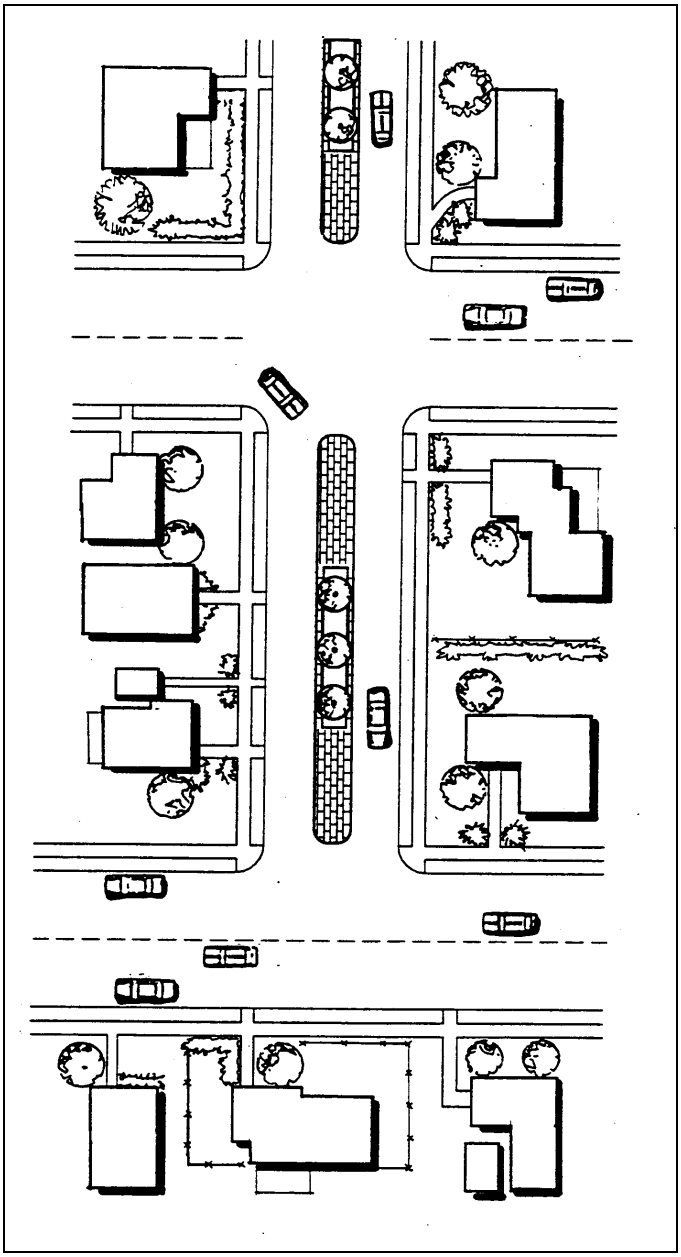
Don't Use If
High volume location.
The street is a snow route.

Negatives
Expensive if drainage issues involved.

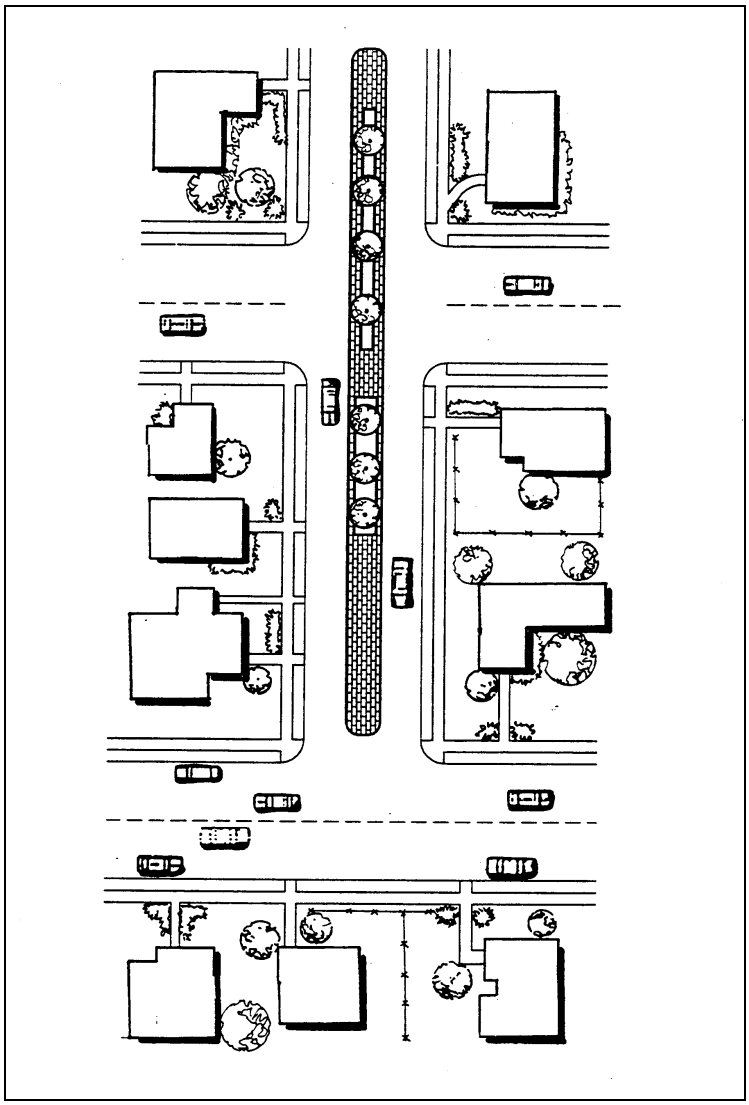
Considerations:
Adequate public information should be provided, since this is a new treatment for Boulder.
The bike lanes and choker should be well marked.
The bike lanes should be wide enough for bike trailers.



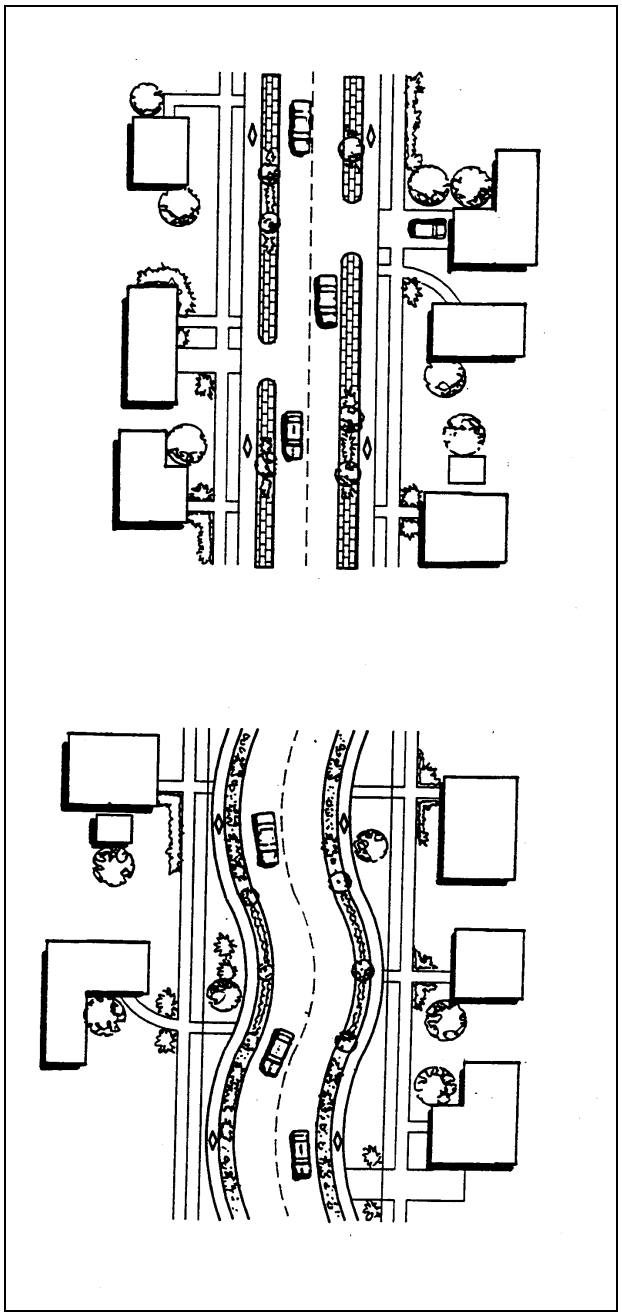
Median at center of roadway



Median barrier



SIDEIANS



NECKDOWNS

Definition
Physical reduction of road width at intersections or mid block. Neckdowns differ from chokers in that they are attached to the curb and do not maintain an 'at grade" bike lane lateral to the neckdown.

Temporary
Can be tried on a temporary basis.

Street Types
Appropriate for most street types.

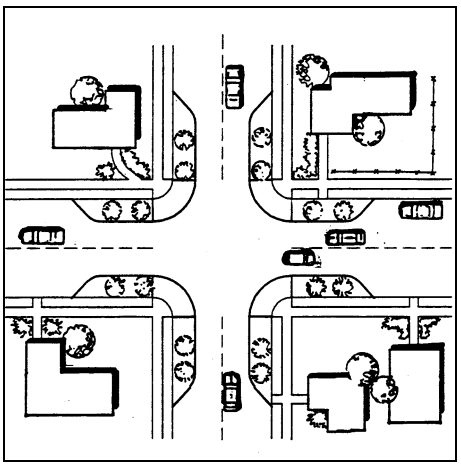
Best Used
Where speed and/or volume make pedestrian safety a concern.
In conjunction with other physical mitigation tools.

Benefits
Reduce road surface/ crossing distance.
Can add aesthetically if landscaped.

Don't Use If
The street is an established bike route.

Negatives
Can be bad for cyclists, if not designed to accommodate them. Unless the neckdown significantly reduces road width (i.e. not just eliminates parking spaces or bike lanes) neckdowns do not affect speed.

Considerations
Neckdowns alone are a pedestrian amenity, however they must be used in conjunction with other mitigation tools to be effective for speed reduction.



REALIGNED INTERSECTIONS

Definition
Starting with a T intersection of a side street into a larger through street, the realigned intersection interrupts the traffic flow on the larger street by curving it into the side street.

Temporary
Not feasible as a temporary installation.

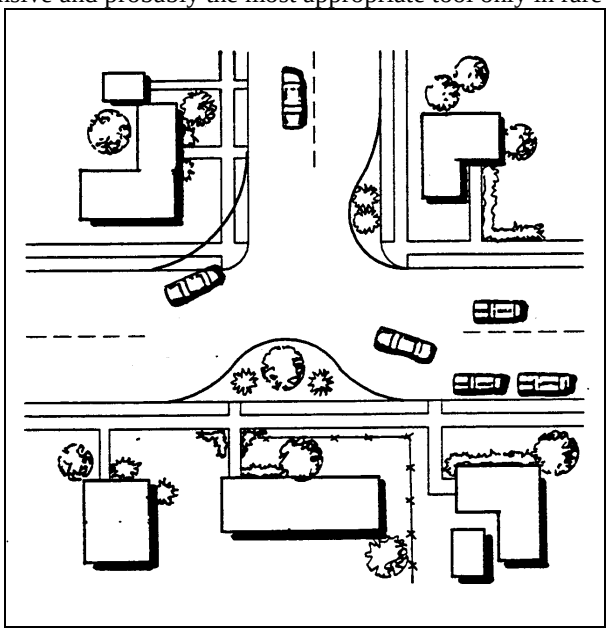
Best Used If
Enough traffic to reprioritize traffic flow.

Benefits
Slows traffic when realignment is significant.

Don't Use If
No level of additional traffic on the side street is acceptable.
Low volume street.

Negatives
Much more expensive than a stop sign.
May encourage increased traffic volume on the affected side street.
If not drastic enough, cyclists and cars may ignore the stop signs at the realigned intersection.

Considerations
Treatment is very expensive and probably the most appropriate tool only in rare conditions.



TURN PROHIBITIONS

Definition:
Physical barriers or signs ("No Right Turn," "No Left Turn," "Do Not Enter") that prohibit a particular turning movement.

Temporary
Can be installed experimentally or used during limited hours, such as rush hours or school hours.

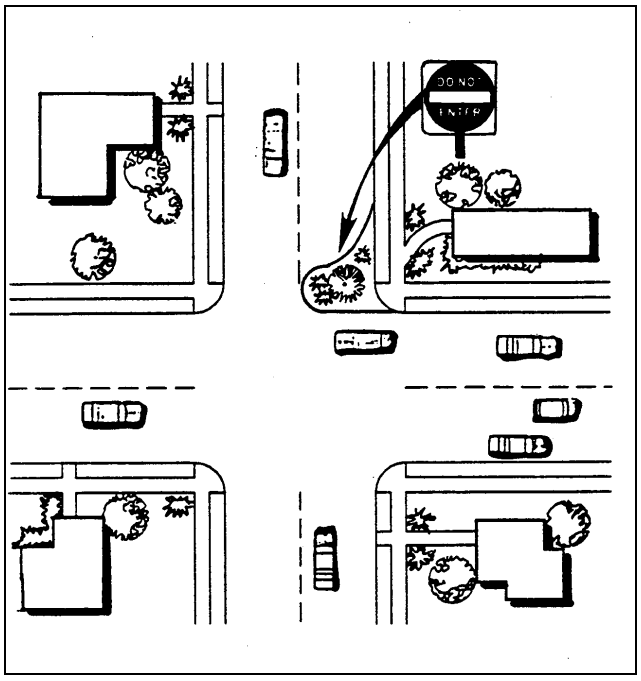
Street Tunes
Local streets or major, paired arterials.

Best Used If
Significant cut-through traffic.
Need to eliminate two way conflicts.

Benefits
Reduces cut-through traffic in neighborhoods.

Don't Use If
Neighborhood unwilling to limit its own access. No appropriate alternative facility.

Negatives
May increase trip length due to revised trip patterns.



SEMI-DIVERTERS

Definition
Physical blockage of one direction of traffic at one point on an otherwise two way street. The open lane of traffic is signed "One way", that is, traffic from the blocked lane is not allowed to go around the barrier through the open lane.

Temporary
Semi-diverters can be tried on temporary basis.

Street Types
Better on low volume streets.

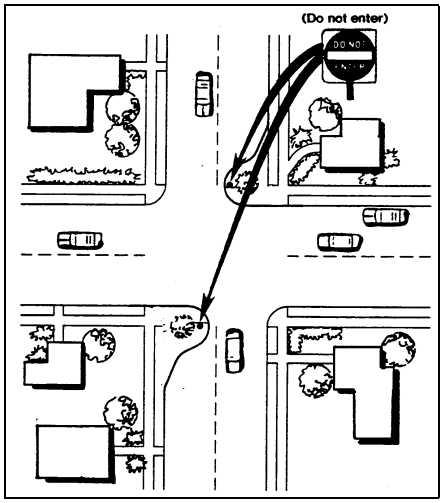
Best Used If
Neighborhood has cut through traffic, and there is an appropriate alternative route for blocked cut through traffic.

Benefits
Do not present a significant obstacle to emergency vehicles.
Good for limiting one-way cut-through traffic.
Can be designed to provide two-way access for bicycles.

Don't Use If
No cut-through traffic.
No good alternate route for diverted traffic.

Negatives
Compliance with semi-diverters is not 100%.
May increase trip length for some residents.

Considerations:
If speed reduction is desired, additional tools should be utilized.



FORCED TURN BARRIERS

Definition
Traffic islands installed to prevent or ensure certain turning movements at an intersection.

Temporary
May be tried on a temporary basis for 6-12 months.

Street Types
Primarily used to direct traffic off of local streets.

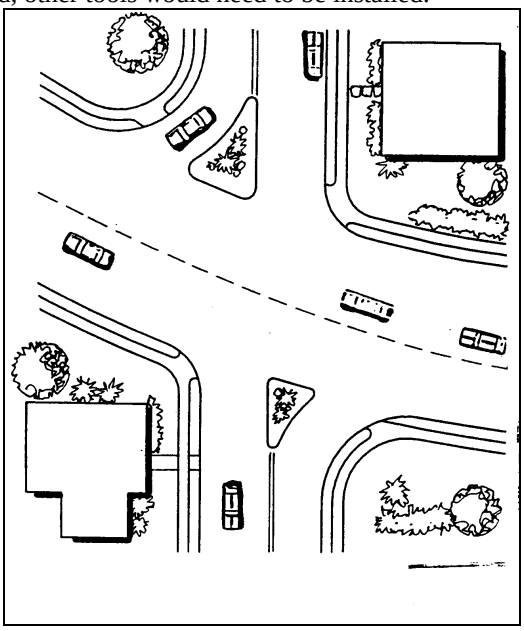
Best For
Cut-through traffic.

Benefits
Changes driving patterns. May significantly reduce cut-through traffic.

Don't Use If
Emergency response access is unacceptably hampered.

Negatives
May increase trip length for some drivers.

Considerations
If speed reduction is desired, other tools would need to be installed.



TRAFFIC CIRCLES

Definition
Traffic circles are raised circular areas (like medians) placed in an existing intersection. Drivers travel in a counter-clockwise direction around the circle. Traditional circles are “yield upon entry,” meaning that cars in the circle have the right of way and cars entering the circle must wait to do so until the path is clear. When a traffic circle is placed in an intersection, no automobile can travel in a straight line.

Temporary
Can be tried on a temporary basis, using essentially "portable" materials. The traffic circle should be made permanent or removed within 12 months.

Street Types
Traffic circles can be use on high and low volume streets.

Best Used If
Insufficient gaps for cross street traffic to traverse or access the higher volume street.
A speeding problem exists.

Benefits

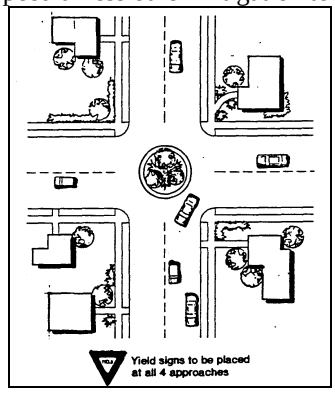
Reprioritizes traffic to increase accessibility for local residents.
Cross traffic may become a mitigation tool in itself.

Don't Use If
Creation of gaps is the primary motivation for pursuing mitigation.

Negatives
May make pedestrian crossing more confusing at the intersection

Considerations
Special consideration to bike and pedestrian safety must be given if traffic circles are installed in high volume intersections .

Traffic circles may not reduce speed unless other mitigation tools are present on the street.



Appendix B

Environmental Impacts to Air Quality

Summary Results From Automobile Emission Case Studies

Related to Traffic Calming Devices

Table B.1
Automobile Emission Case Studies
For Area Wide Traffic Calming Schemes

Area Wide Calming						
			Changes in Vehicle Emissions			
Country	***Measures***	***Vehicle Type***	***NOx***	***HC***	***CO***	***FC***
Germany	Area with extensive traffic calming	Non-catalyst	-38 to 60%	-10 to –25%	+71 to +7%	+19 to +7%
	30 km/h zone	Non-catalyst	-5 to –31%	+2 to –23%	+28 to –20%	+14 to –6%
Holland	Road humps	N/A	Decrease	No Change	Slight increase	N/A
	Extensive Calming	N/A	Decrease	Increase	Increase	N/A

Notes:
NOx: Nitrous Oxide
HC: Hydrocarbon compound
CO: Carbon Monoxide
F.C. Fuel Consumption

Source: Adapted from P.G. Boulter and D.C. Webster, "Traffic calming and vehicle emissions: A literature review, TRL Report 307", (Crowthorne, UK: Transport Research Laboratory, 1997), p.26.

Table B.2

Automobile Emission Case Studies

For Single Road Traffic Calming Schemes

Single Road Sections						
			Changes in Vehicle Emissions			
Country	***Measures***	***Vehicle Type***	***NOx***	***HC***	***CO***	***FC***
United Kingdom	Road humps, 75 m spacing, 30 mph "before"	Catalyst & Non-Catalyst	0 to –20%	+110 to +70%	+80 to +70%	+60 to +50%
Sweden 1	30 km/h limit	N/A	+1%	N/A	+2%	+<1%
Sweden 2	1 Road hump constant "before" speed	Catalyst	+18%	N/A	+20%	+4%
		Non-catalyst	+22%	N/A	+11%	+5%
	10 Road humps constant "before" speed	Catalyst	Three-fold increase	N/A	Three-fold increase	+37%
		Non-catalyst	Three-fold increase	N/A	Two-fold increase	+51%
Denmark	40 km/h limit, various calming	N/A	N/A	N/A	N/A	-9%
Austria	6 Road humps, 200 m spacing, 30 km/h "before"	Catalyst	Ten-fold increase	N/A	Three-fold increase	+25%
Australia	5 Road humps, 100 m spacing, 50 km/h "before"	N/A	N/A	N/A	N/A	+73 to +36%
	2 Traffic Circles, 250 spacing 50 km/h	N/A	N/A	N/A	N/A	+33%

Source: Adapted from P.G. Boulter and D.C. Webster, "Traffic calming and vehicle emissions: A literature review, TRL Report 307", (Crowthorne, UK: Transport Research Laboratory, 1997), p.26.

Appendix C

City of Austin, Texas

Pedestrian/Bicyclist Fatality Data

1997-1999

Table C.1

1997 Pedestrian Fatalities

Austin, Texas

Date	Offense No.	Location	Circumstances	Classification	Sex	Age
3/9/97	970680431	9300 blk US Hwy 290 E	Pedestrian in Roadway	Pedestrian	Male	
5/9/97	971290205	70 blk N IH 35 SB	Pedestrian in Roadway	Pedestrian	Male	21
5/17/97	971371776	1800 blk E Ben White Blvd	Unsafe movement-left	Pedestrian	Female	45
6/11/97	971620455	200 blk Robert T Martinez Jr	Pedestrian in Roadway	Pedestrian	Female	88
8/3/97	972150883	9414 blk N Lamar Blvd	Alcohol- speed	Pedestrian	Male	40
8/6/97	972180246	4800 blk N IH 35 WF	Failure to control speed-follow too closely	Pedestrian	Female	21
8/15/97	972271876	2200 blk Airport Blvd	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	34
8/25/97	972370998	9000 Burnet Rd	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	27
9/4/97	972470257	2203 W 35th St	Inattention pedestrian in roadway	Pedestrian	Female	56
10/13/97	972861251	4800 blk S Congress Ave	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	43
10/24/97	972971552	500 blk Bastrop Hwy	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	60
11/10/97	973141358	8100 blk US 290 East	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	49
11/11/97	973151198	9700 blk Greathills Trail	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	54
12/12/97	973461187	Lamplight Village and Alderbrook	Defective equipment	Pedestrian	Male	21
12/19/97	973531627	2300 blk E Riverside Dr	Failure to control speed	Pedestrian	Male	35
	Denotes Neighborhood Street					

Source: Austin Police Department, Planning & Research Section

Table C.2

1998 Pedestrian Fatalities

Austin, Texas

Date	Offense No.	Location	Circumstances	Classification	Sex	Age
1/3/98	980031570	30 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	33
1/25/98	980251693	6500 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	16
1/31/98	980311406	4700 blk E Ben White	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	77
3/22/98	980811446	4500 blk S IH 35 WF	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	31
3/25/98	980840267	12100 blk N IH 35 EF	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	6
6/14/98	981651499	S IH 35 EF and E Riverside Dr	Ran Red light	Bicyclist	Male	24
7/4/98	981850238	E 7th and Chalmers	Alcohol- speed; failure to control	Bicyclist	Male	35
7/13/98	981940268	1600 blk E Parmer Lane	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	49
8/12/98	982241204	E 10th and Chicon	Failure to yield ROW from stop sign	Bicyclist	Female	11
10/2/98	982751413	West MLK and Lavaca	Failure to yield ROW red light	Bicyclist	Male	24
10/17/98	982901179	4100 blk Victory Dr	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	67
10/23/98	982961489	12000 blk N IH 35 WF	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	59
10/24/98	982971382	4700 blk S Congress	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	37
11/15/98	983191499	7200 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	43
11/21/98	983251254	2500 blk Parmer Lane	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	43
12/12/98	983461341	8700 blk N Lamar Blvd	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	49
12/16/98	983501392	8600 blk N Mopac	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	63
	Denotes Neighborhood Street					

Source: Austin Police Department, Planning & Research Section

Table C.3

1999 Pedestrian Fatalities

Austin, Texas

Date	Offense No.	Location	Circumstances	Classification	Sex	Age
1/1/99	990010526	7500 blk SW Pkwy	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	34
2/14/99	990451600	7600 blk S IH 35 SB	Pedestrian in Roadway	Pedestrian	Male	42
2/19/99	990500904	2100 blk Burton Dr	Alcohol- speed	Pedestrian	Female	8
2/28/99	990590062	8500 blk S IH 35 EF	Unsafe movement-fsra	Pedestrian	Male	46
3/18/99	990770025	8700 blk S IH 35 EF	right	Pedestrian	Male	34
3/22/99	990811190	4600 blk W. Wm Cannon	Failure to yield ROW to ped in crosswalk	Pedestrian	Female	79
3/27/99	990860318	500 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	
4/10/99	991001434	Parmer/ Lamplight Village	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	38
4/17/99	991071431	2600 blk S IH 35	Pedestrian crossing where prohibited	Pedestrian	Male	34
4/29/99	991190175	6300 blk S IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	39
6/5/99	991560087	4000 block N IH 35	Pedestrian crossing where prohibited	Pedestrian	Male	23
6/7/99	991581496	700 E. Rundberg La	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	52
8/9/99	992210753	1000 Bastrop Hwy	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	37
8/10/99	992221295	Dr	Pedestrian crossing against light	Pedestrian	Male	49
	Denotes Neighborhood Street (Note: No fatalities occurred on neighborhood streets in 1999)					

Source: Austin Police Department, Planning & Research Section

Table C.4

Pedestrian Fatalities For Analysis Period

December 1, 1997 thru November 30, 1998

Austin, Texas

Date	Offense No.	Location	Circumstances	Classification	Sex	Age
12/12/97	973461187	Lamplight Village and Alderbrook Dr	Defective equipment	Pedestrian	Male	21
12/19/97	973531627	2300 blk E Riverside Dr	Failure to control speed	Pedestrian	Male	35
1/3/98	980031570	30 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	33
1/25/98	980251693	6500 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	16
1/31/98	980311406	4700 blk E Ben White	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	77
3/22/98	980811446	4500 blk S IH 35 WF	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	31
3/25/98	980840267	12100 blk N IH 35 EF	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	6
6/14/98	981651499	S IH 35 EF and E Riverside Dr	Ran Red light	Bicyclist	Male	24
7/4/98	981850238	E 7th and Chalmers	Alcohol- speed; failure to control	Bicyclist	Male	35
7/13/98	981940268	1600 blk E Parmer Lane	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	49
8/12/98	982241204	E 10th and Chicon	Failure to yield ROW from stop sign	Bicyclist	Female	11
10/2/98	982751413	West MLK and Lavaca	Failure to yield ROW red light	Bicyclist	Male	24
10/17/98	982901179	4100 blk Victory Dr	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	67
10/23/98	982961489	12000 blk N IH 35 WF	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Female	59
10/24/98	982971382	4700 blk S Congress	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	37
11/15/98	983191499	7200 blk N IH 35	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	43
11/21/98	983251254	2500 blk Parmer Lane	Pedestrian failure to yield ROW to motor veh.	Pedestrian	Male	43

Denotes Neighborhood Street

Source: Austin Police Department, Planning & Research Section

Appendix D

Austin/Travis County Zip Code Data

Sudden Cardiac Arrest Frequency

&

Austin Fire Department

Medical Emergency Response Times

Table D.1

Austin/Travis County Zip Code Data

Data for Zip Codes Complety Inside The Austin City Limits		
SCA Cases	***Zip Codes***	***Response Time***
8	78701	2.46
25	78702	3.44
10	78703	3.52
25	78704	3.24
11	78705	2.83
15	78721	3.54
10	78722	3.61
38	78723	3.81
14	78731	3.88
22	78741	3.89
6	78751	2.99
16	78752	3.67
8	78756	2.61
17	78757	3.44
22	78758	3.74
247	**Total Inside City**	

Data for Zip Codes Partially Inside The Austin City Limits		
SCA Cases	***Zip Codes***	***Response Time***
2	78610	9.60
0	78613	4.27
11	78617	4.44
2	78652	7.18
4	78653	3.32
8	78660	5.06
0	78717	5.70
3	78719	3.88
9	78724	4.34
2	78725	5.32
1	78726	6.79
10	78727	3.49
4	78728	4.77
2	78729	4.45
4	78730	4.81
1	78732	14.15
2	78733	5.18
2	78735	4.98
2	78736	4.92
3	78737	7.65
1	78739	7.23
2	78742	5.13
17	78744	3.85
37	78745	3.54
12	78746	4.59
5	78747	4.60
6	78748	4.32
5	78749	4.43
8	78750	4.72
16	78753	3.90
4	78754	4.58
20	78759	4.13
205	**Total Partially in City**	

(10 of these SCA cases are not AFD responses)

Data for Zip Codes Complety Outside The Austin City Limits		
SCA Cases	***Zip Codes***	***Response Time***
4	78641	No Data
7	78645	No Data
1	78654	No Data
1	78706	No Data
3	78734	No Data
2	78738	No Data
16	No Zip	No Data
34	**Total Outside City**	

Summary of Austin Fire Department Responses to SCA	
247	**Total Inside City**
195	**Total Partially in City**
442	**TOTAL AFD RESPONSES**

Average Austin Fire Department Response Times for All Zip Codes	
3.62	***Minutes***

Notes:
SCA Data from Austin/Travis County EMS Utstein Report on Cardiac Arrest (12-1-97 11-30-98)
All Response Times are for the AFD;reported by the AFD Administration Division (12-1-97 to 11-30-98)
"No Data" - this zip code was not in the response area of AFD; first responder by County FD's

Appendix E

Response Time Model Analyses

For the City of Austin, Texas

Table E.1 Summary of All SCA Models

Risk Analysis Model for Victims of Sudden Cardiac Arrest From Response Delays Due to Traffic Calming Devices

Name of Emergency Service Agency	***Date of Analysis***	***Analysis Period***
Austin Fire Department	*03/01/00*	*12-7-97 to 11-30-98*

Current FD Incident Information		**Cardiac Arrest**	**Installation of Traffic Calming Devices and Changes in Arrival Time**						**Estimated Risk Utilizing Arrival Probability X Survival Probability**				
Midpoint	**1998**	**Probable**	*By Percentage*		*By Devices On Route*				*1998*	*% Changes*		*Device Delays*	
of Arrival	**Arrival**	**Survival**	14%	-14%	0.085	A	0.085	B	*Arrivals*	14%	-14%	A	B
Interval	**Fraction**	**Fraction**				#		#				0.085	0.085
0.50	0.018	0.91	0.070	-0.070	0.26	3	0.43	5	0.016	0.016	0.016	0.016	0.016
1.50	0.067	0.86	0.210	-0.210	0.26		0.43		0.058	0.057	0.059	0.056	0.055
2.50	0.205	0.77	0.350	-0.350	0.26		0.43		0.157	0.149	0.165	0.151	0.147
3.50	0.269	0.62	0.490	-0.490	0.26		0.43		0.167	0.134	0.190	0.151	0.139
4.50	0.209	0.33	0.630	-0.630	0.26		0.43		0.070	0.035	0.111	0.053	0.044
5.50	0.107	0.11	0.770	-0.770	0.26		0.43		0.012	0.008	0.028	0.010	0.009
6.50	0.054	0.07	0.910	-0.910	0.26		0.43		0.004	0.002	0.006	0.003	0.003
7.50	0.027	0.03	1.050	-1.050	0.26		0.43		0.001	0.000	0.002	0.001	0.001
8.50	0.015	0.01	1.190	-1.190	0.26		0.43		0.000	0.000	0.001	0.000	0.000
9.50	0.009	0.00	1.330	-1.330	0.26		0.43		0.000	0.000	0.000	0.000	0.000
10.50	0.020	0.00	1.470	-1.470	0.26		0.43		0.000	0.000	0.000	0.000	0.000
					Total:	3	Total:	5					
	1.000		Average Survival Probability for All Cases:						0.486	0.401	0.577	0.443	0.414

Yearly Number of SCA Cases:	442	**Predicted Lives Saved:**	**215**	**177**	**255**	**196**	**183**
		Change from Present:	0	-37	41	-19	-31

NOTES: Arrival Times and Delays are in minutes

The "Probable Survival Fraction" is computed from a curve-fit formula from the American Heart Association

All Yellow Cells to be filled with local FD histogram data for response times

Table E.2

SCA Impact for General Increase in Response Times

Risk Analysis Model for Victims of Sudden Cardiac Arrest
For Response Delays Due to Traffic Calming Devices

Agency:	*Austin Fire Department*
Date of Analysis:	*03/01/00*
Analysis Period:	*12-1-97 to 11-30-98*
Analysis Type:	*General Increase in Response Time*

Response Times				
Current Response Time:	3.62	*Minutes*		
Risk % Delay:	14%	*is equal to a*	0.51	*Minute Delay*
Delayed Response Time:	4.13	*Minutes*		

Current FD Incident Information		***Cardiac Arrest Probable Survival Fraction***	*General Delay Response Fraction*	*Current Local Survival Rates*	*Traffic Calming Adjusted Survival Rates*
Midpoint of Arrival Interval	***1998 Arrival Fraction***		14%		14%
0.50	0.018	0.91	0.070	0.016	0.016
1.50	0.067	0.86	0.210	0.058	0.057
2.50	0.205	0.77	0.350	0.157	0.149
3.50	0.269	0.62	0.490	0.167	0.134
4.50	0.209	0.33	0.630	0.070	0.035
5.50	0.107	0.11	0.770	0.012	0.008
6.50	0.054	0.07	0.910	0.004	0.002
7.50	0.027	0.03	1.050	0.001	0.000
8.50	0.015	0.01	1.190	0.000	0.000
9.50	0.009	0.00	1.330	0.000	0.000
10.50	0.020	0.00	1.470	0.000	0.000
		Overall Survival Rates:		0.486	0.401

Annual SCA Cases:	442	**Predicted Lives Saved:**	215	177
		Change from Present:	0	-37

Notes:
Risk Analysis Model Spreadsheet created by R. R. Bowman; layout modified by Les Bunte
AFD Response Times obtained from the AFD Adminsitration Division
AFD Arrival Fractions obtained from the AFD Administration Division
Cardiac Arrest Fractions from the American Heart Association
Annual SCA Cases obtained from Austin Emergency Medical Services

Table E.3

SCA Impact to Response Delays for Three Calming Devices

Risk Analysis Model for Victims of Sudden Cardiac Arrest
For Response Delays Due to Traffic Calming Devices

Agency:	*Austin Fire Department*
Date of Analysis:	*03/01/00*
Analysis Period:	*12-1-97 to 11-30-98*
Analysis Type:	*Response Delay per Number of Devices*

Response Times				
Current Response Time:	3.62	*Minutes*		
Risk % Delay:	0.085	*Minute Delay per Device X*	3	*Devices =*
Total Delay	0.26	*Minute Delay*		
Delayed Response Time:	3.88			

Current FD Incident Information		***Cardiac Arrest***	*Device Delay*	*Number of*	*Current Local*	*Traffic Calming Adjusted*
Midpoint of Arrival Interval	***1998 Arrival Fraction***	***Probable Survival Fraction***	*Response Fraction* 0.085	*Devices On Route*	*Survival Rates*	*Survival Rates* 8.5%
0.50	0.018	0.91	0.26	3	0.016	0.016
1.50	0.067	0.86	0.26		0.058	0.056
2.50	0.205	0.77	0.26		0.157	0.151
3.50	0.269	0.62	0.26		0.167	0.151
4.50	0.209	0.33	0.26		0.070	0.053
5.50	0.107	0.11	0.26		0.012	0.010
6.50	0.054	0.07	0.26		0.004	0.003
7.50	0.027	0.03	0.26		0.001	0.001
8.50	0.015	0.01	0.26		0.000	0.000
9.50	0.009	0.00	0.26		0.000	0.000
10.50	0.020	0.00	0.26		0.000	0.000
		Overall Survival Rates:			0.486	0.443

Annual SCA Cases:	442	**Predicted Lives Saved:**	215	196
		Change from Present:	0	-19

Notes:

Risk Analysis Model Spreadsheet created by R. R. Bowman; layout modified by Les Bunte

AFD Response Times obtained from the AFD Adminsitration Division

AFD Arrival Fractions obtained from the AFD Administration Division

Cardiac Arrest Fractions from the American Heart Association

Annual SCA Cases obtained from Austin Emergency Medical Services

Table E.4

SCA Impact to Response Delays for Five Calming Devices

Risk Analysis Model for Victims of Sudden Cardiac Arrest For Response Delays Due to Traffic Calming Devices						
Agency:	*Austin Fire Department*					
Date of Analysis:	*03/01/00*					
Analysis Period:	*12-1-97 to 11-30-98*					
Analysis Type:	*Response Delay per Number of Devices*					
Response Times						
Current Response Time:	3.62	*Minutes*				
Risk %Delay:	0.083	*Minute Delay per Device X*			5	*Devices =*
Total Delay	0.42	*Minute Delay*				
Delayed Response Time:	4.04					

Current FD Incident Information		***Cardiac Arrest***	*Device Delay*	*Number of*	*Current Local*	*Traffic Calming Adjusted*
Midpoint of Arrival Interval	***1998 Arrival Fraction***	***Probable Survival Fraction***	*Response Fraction*	*Devices On Route*	*Survival Rates*	*Survival Rates*
			0.083			8.3%
0.50	0.018	0.91	0.42	5	0.016	0.016
1.50	0.067	0.86	0.42		0.058	0.055
2.50	0.205	0.77	0.42		0.157	0.147
3.50	0.269	0.62	0.42		0.167	0.140
4.50	0.209	0.33	0.42		0.070	0.045
5.50	0.107	0.11	0.42		0.012	0.009
6.50	0.054	0.07	0.42		0.004	0.003
7.50	0.027	0.03	0.42		0.001	0.001
8.50	0.015	0.01	0.42		0.000	0.000
9.50	0.009	0.00	0.42		0.000	0.000
10.50	0.020	0.00	0.42		0.000	0.000
		Overall Survival Rates:			0.486	0.416

Annual SCA		**Predicted Lives Saved:**	215	184
Cases:	442	Change from Present:	0	-31

Notes:

Risk Analysis Model Spreadsheet created by R. R. Bowman; layout modified by Les Bunte

AFD Response Times obtained from the AFD Adminsitration Division

AFD Arrival Fractions obtained from the AFD Administration Division

Cardiac Arrest Fractions from the American Heart Association

Annual SCA Cases obtained from Austin Emergency Medical Services

Table E.5

SCA Impact to Improvement in Response Times

Risk Analysis Model for Victims of Sudden Cardiac Arrest
For Response Delays Due to Traffic Calming Devices

Agency:	*Austin Fire Department*
Date of Analysis:	*03/01/00*
Analysis Period:	*12-1-97 to 11-30-98*
Analysis Type:	*General Response Time Improvement*

Response Times				
Current Response Time:	3.62	*Minutes*		
Risk (-%) Improvement:	-14%	*is equal to a*	-0.51	*Minute Delay*
Delayed Response Time:	3.11	*Minutes*		

Current FD Incident Information		***Cardiac Arrest Probable Survival Fraction***	*Desired Improvement To Response Time*	*Current Local Survival Rates*	*New Improved Survival Rates*
Midpoint of Arrival Interval	***1998 Arrival Fraction***		-14%		-14%
0.50	0.018	0.91	-0.070	0.016	0.016
1.50	0.067	0.86	-0.210	0.058	0.059
2.50	0.205	0.77	-0.350	0.157	0.165
3.50	0.269	0.62	-0.490	0.167	0.190
4.50	0.209	0.33	-0.630	0.070	0.111
5.50	0.107	0.11	-0.770	0.012	0.028
6.50	0.054	0.07	-0.910	0.004	0.006
7.50	0.027	0.03	-1.050	0.001	0.002
8.50	0.015	0.01	-1.190	0.000	0.001
9.50	0.009	0.00	-1.330	0.000	0.000
10.50	0.020	0.00	-1.470	0.000	0.000
		Overall Survival Rates:		0.486	0.577

Annual SCA Cases:	442	**Predicted Lives Saved:**	215	255
		Change from Present:	0	41

Notes:

Risk Analysis Model Spreadsheet created by R. R. Bowman; layout modified by Les Bunte

AFD Response Times obtained from the AFD Adminsitration Division

AFD Arrival Fractions obtained from the AFD Administration Division

Cardiac Arrest Fractions from the American Heart Association

Annual SCA Cases obtained from Austin Emergency Medical Services

Bowman Model Statistician Verification

1635 Mariposa Ave.
Boulder, Colorado 80202
March 19, 1997

Mr. Ray Bowman
Pacemark Inc.
5455 Spine Rd.
Boulder, Colorado 80301

Dear Ray:

I have checked your method for estimating the probability of surviving a heart attack when treated by the emergency services of the Boulder Fire Department and have found it to be correct. Your use of numerical integration is formalized below.

Let S = the event that a person survives a heart attack due to emergency action of the BFD.

T_i = time interval in which the BFD arrives.

Now $S = (S \cap T_1) \cup (S \cap T_2) \cup \cdots\cdots \cup (S \cap T_n)$

I am using a discrete model rather than a continuous one to avoid curve fitting and to simplify calculations.

Let P(S) = Probability that a given individual survives due to BFD action.

Then $P(S) = P(S/T_1)P(T_1) + \cdots + P(S/T_n)P(T_n)$

This equation corresponds to the righthand four columns in your table: "Consequences of Emergency Response on Cardiac Arrest Survival".

To obtain the average or expected number of survivors, E(S), multiply the number of cases, n, by P(S). $E(S) = nP(S)$. Let Q(S) be the probability that one does not survive emergency treatment; is is a fatality. Then the expected number of fatalities, E(F) is

$$E(F) = nQ(S) = n - E(S).$$

Sincerely yours,

Irving Weiss, PhD

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VITA

Leslie W. Bunte Jr. was born in Austin, Texas on April 5, 1954, the son of Leslie W. Bunte Sr. and Doris Reimers Bunte. After completing his work at Georgetown High School, Georgetown, Texas, in 1972, he entered Southwest Texas State University in San Marcos, Texas.

In 1973, he joined the Austin Fire Department (AFD) as a probationary firefighter. He quickly rose through the ranks at AFD, serving in many capacities such as Fire Inspector, Lieutenant Training Officer, Lieutenant Arson/Fire Investigator, and Fire Captain of Operations. In February 1994, he was appointed Assistant Fire Chief, a position he still holds today.

Concurrently, with his service at AFD, he also served in a part-time capacity as Fire Chief for the Georgetown Fire Department for 17 years. During his tenure with the City of Georgetown, he was also called upon to serve six months as Interim Police Chief in Georgetown while a search was conducted for a permanent chief. After being appointed Assistant Fire Chief in Austin, he subsequently relinquished his duties with the City of Georgetown.

During his fire service career, he reentered college as a part-time student. In 1978, he was awarded an Associate of Science Degree in Fire Protection Technology from Austin Community College. Later in 1980, he received a Bachelor of Science Degree from Southwest Texas State University. A 1995 graduate of the four-year

National Fire Academy's (NFA) Executive Fire Office Program, he was awarded the 1994 NFA Outstanding Research Award, which was selected from over 200 other student research programs conducted that year.

In 1995, he entered the graduate program of the LBJ School of Public Affairs at The University of Texas at Austin.

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European Commission

Science for Environment Policy



Both traffic noise and air pollution linked to stroke

Road traffic noise and air pollution both increase the risk of having a stroke, recent research from Denmark suggests. The results suggest that traffic noise is more strongly associated with ischaemic stroke, whereas only air pollution appears to be linked with more serious, fatal strokes.

23 October 2014
Issue 390

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Source: Sørensen, M., Lühdorf, P., Ketzel, M., *et al*. (2014). Combined effects of road traffic noise and ambient air pollution in relation to risk for stroke? *Environmental Research*.133: 49-55. DOI:10.1016/j.envres.2014.05.011.

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Read more about: Air pollution, Environment and health, Noise, Risk assessment

Environmental noise and air pollution are believed to have similar biological effects on our blood vessels that increase the risk of stroke. For instance, they may lead to hardened arteries and high blood pressure. Air pollution is thought to cause damage when it is inhaled and enters the bloodstream. Noise may have more indirect effects: it disturbs sleep and increases stress, which can raise blood pressure.

The study, conducted under the EU QUIET project[1], is one of few to investigate the combined effects of traffic noise and air pollution. It analysed data, from a population study of health and lifestyle of 51 569 residents in Copenhagen and Aarhus over 11 years. The participants were aged 50-64 years at the point of enrolling onto the study.

The researchers modelled air pollution and traffic noise levels for every participant's home. National medical records showed that 1999 of the participants had been diagnosed with stroke. For air pollution, the study focused on nitrogen oxides (NO_x) and nitrogen dioxide (NO_2), which are good markers of traffic air pollution and correlate closely with both ultrafine particles and PM_{10} (10 micrometres or less in diameter). Noise was calculated as L_{den}: measured over a 24 hour period, with a 10 dB penalty at night (22:00–07:00) and a 5 dB penalty in the evening (19:00–22:00) to reflect people's extra sensitivity to noise during these times.

Statistical models analysed the independent effects of noise and air pollution, as well as their combined effects. They also accounted for the influence of other factors that affect stroke risk, such as diet, physical activity and smoking, as identified from earlier research.

Participants were more likely to have had a stroke if they lived in noisy and polluted areas. Traffic noise and NO_2 levels had significant associations with ischaemic strokes in particular, a form of stroke that occurs when clots block blood flow to the brain. Similar patterns were seen between NO_x exposure and stroke risk, but they were not as statistically significant, so the study did not make a confident association between the two.

Every increase of 10 dB L_{den} of noise above 42 dB L_{den}, averaged over a year, increased the risk of ischaemic stroke for an individual by 16%, the data suggest. Every 10 micrograms of NO_2 per cubic metre of air (10 µg/m^3), also averaged over a year, increased the risk by 11%.

In combination, the greatest stroke risk of +28% was found for a NO_2-noise combination of over 15.7 µg/m^3 and above 62.1 dB L_{den}. This is compared to less than 11.3 µg/m^3 and under 55.3 dB L_{den}.

The data suggest that the body is only sensitive to air pollution, in relation to ischaemic stroke, when noise levels are high. Stroke risk increased significantly when noise levels were over 62.1 dB L_{den} even if NO_2 levels were relatively low (i.e. below 15.7 µg/m^3), but it did not increase when noise was low and pollution was high. However, the researchers say that more work is needed to investigate this pattern.

Of the 1999 stroke diagnoses, 171 were fatal. NO_2, but not noise, was associated with these serious strokes. The study's results also suggest that noise, but not air pollution, is more strongly associated with ischaemic stroke.

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

1.QUIET (Health consequences of noise exposure from road traffic) is supported by the European Commission under the Seventh Framework Programme: http://cordis.europa.eu/project/rcn/102535_en.html

regional brief

No. 5

Livable Streets, Dangerous Roads

Traffic Calming Endangers the Lives of Those in Need of Emergency Services

Jenna Ashley Robinson

November 2006



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Executive Summary

As the Triangle grows, motorists face significant increases in traffic congestion. City and county planners are hired, in part, to suggest plans that will alleviate this congestion. Unfortunately, they are doing the opposite. Based on city staff recommendations, city councils in Raleigh and neighboring cities have fallen victim to the latest planning fad: traffic calming. This seemingly worthwhile goal has significant detrimental consequences, including increased traffic congestion, more deaths due to slower emergency vehicle response times, and unnecessary costs to taxpayers.

What Is Traffic Calming?

The Institute of Transportation Engineers defines traffic calming as "changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes."[1] The City of Raleigh defines traffic calming as "the combination of mainly physical measures that reduce negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users."[2] Taken at face value, implementation of these definitions will increase traffic congestion, not alleviate it.

In Raleigh, the city's traffic-calming "toolbox" includes education and enforcement and familiar measures such as roadway striping, pavement markings, speed humps and bumps and raised crosswalks. The plan also includes bulb-outs (intersection curb extensions that reduce roadway width), raised median islands, mini-traffic circles, larger roundabouts, and mid-block street narrowings.[3]

A Short History of Traffic Calming

Traffic calming began as a grassroots movement in 1960s Europe, when *woonerven*, or "living yards" replaced streets in Delft. European "slow streets," designed for 20 mph traffic, emerged in the late 1970s. In Germany and Denmark, suburban slow streets were followed by traffic-calming measures on intercity highways in the 1980s.[4] In the United States, versions of traffic calming emerged along the West Coast in the late 1960s, and have remained common in cities in Washington, Oregon and California. In 1980, the first national study of traffic calming explored residential preferences related to traffic, collected performance data on speed humps, and reviewed legal issues.[5]

In North Carolina, traffic-calming measures have already been implemented in Asheville, Charlotte, Hickory and Winston Salem. The Town of Cary has conducted a pilot study and will likely implement traffic-calming measures in the near future.

Raleigh Is Implementing Traffic Calming

Raleigh's official Traffic Calming Program is limited to residential/local access and collector streets; 73 streets have been studied and are included on its traffic-calming priority list (see Appendix). Streets on the list are ranked based on speed, pedestrian activity, crash history and traffic volume. Construction has begun on the first three projects on the list: Ashe Avenue between Hillsborough Street and Western Boulevard, Plaza Place between Millbrook Avenue and Creedmoor Road, and Eagle Trace Drive in the Hedingham subdivision.

Traffic Calming Is Dangerous

Raleigh's traffic-calming devices are built in order to slow traffic. Curb bulb-outs, raised medians, and roundabouts are designed to slow passenger vehicles. For example, passenger vehicles on Plaza Way are forced into the center of the roadway by curb bulb-outs and then immediately forced to

the curb by a raised median. Negotiating this zigzag slalom course forces motorists to slow down. But these devices create even greater delays to emergency vehicles. Emergency vehicles' longer wheel-bases, stiff suspension, and high vehicle weights require their drivers to slow almost to a stop to negotiate the devices safely.

Scientific analysis predicts that deaths in a community rise due to delays of emergency vehicles caused by traffic-calming measures. Even minor delays to emergency vehicles caused by delay-inducing traffic-calming devices create far more risk to a community than speeding vehicles.

Researcher Ronald Bowman's analysis[6] shows that if Boulder, Colorado implemented its plans for traffic-calming devices, they would increase emergency vehicle response times. Bowman predicts that patients needing emergency treatment would incur an increased risk to their survivability of 85 to 1 for every one minute of additional delay to response times due to planned traffic calming. In other words, if emergency medical technicians were delayed one additional minute by traffic-calming devices, a heart attack patient would be 85 times more likely to die.

Assistant Fire Chief of Austin, Texas, Les Bunte applied the Bowman analytical techniques to the City of Austin.[7] His results predicted a risk factor of 35 to 1 for an additional increased delay of 30 seconds to Austin response times caused by deflection devices such as speed bumps and roundabouts. The Austin figures take into account only victims of Sudden Cardiac Arrest (heart attacks). Thus Bunte's analysis predicts that for every 30 seconds additional delay for emergency medical technicians caused by traffic-calming devices, a heart attack victim is 35 times more likely to die.

Because of delays and the risk to human life, firefighters and emergency service personnel across the country oppose traffic calming.[8] Bunte's study also showed that

Three Common Forms of Traffic Calming

1. Traffic Circle or Roundabout



2. Bulb-Out



3. Mid-Block Street Narrowing



Table 1: Effects of Traffic Calming Measures on Emergency Response Times

Community	*Traffic Calming Measure*	*Delay at Slow Point (in Seconds)*
Austin, TX	12-foot speed humps	2.8 (fire engine) 3.0 (ladder truck) 2.3 (ambulance w/o patient) 9.7 (ambulance w/ patient)
Berkeley, CA	12-foot speed humps	10.7 (fire engine) 9.2 (ladder truck)
	22-foot speed tables	3.0 (fire engine) 13.5 (ladder truck)
Boulder, CO	8-foot speed hump	4.7 (fire engine)
	12-foot speed humps	2.8 (fire engine)
	37-foot speed table	3.8 (fire engine)
	40-foot speed table	3.8 (fire engine)
	25-foot diameter traffic circle	7.5 (fire engine)
Montgomery County, MD	12-foot speed humps	2.8 (ladder truck) 3.8 (ambulance) 4.2 (fire engine) 7.3 (pumper truck)
	18-foot diameter traffic circle	5.4 (ladder truck) 3.2 (ambulance) 5.0 (fire engine) 7.0 (pumper truck)
Portland, OR	14-foot speed humps	5.2 (fire engine) 2.9 (custom rescue vehicle) 6.6 (ladder truck)
	22-foot speed tables	3.0 (fire truck) 0.3 (custom rescue vehicle) 3.0 (ladder truck)
	16-24 foot oblong traffic circles	6.1 (fire engine) 3.1 (custom rescue vehicle) 8.4 (ladder truck)
Sarasota, FL	12-foot speed humps	9.5 (ambulance)

Source: *Traffic Calming: The State of the Practice.*

in some cases, travel time of ambulances transporting heart attack victims doubled due to traffic calming.[9] Because of these risks, the Institute of Transportation Engineers' (ITE) "Guidelines for the Design and Application of Speed Humps"[10] (1997) states humps should never be placed on emergency response routes.

Studies performed by seven American cities and assembled by the Institute of Transportation Engineers show that speed humps, speed tables, and traffic circles (roundabouts) have negative effects on emergency response times[11] (see Table 1).

TABLE 2: COSTS AND EFFECTS OF VARIOUS TRAFFIC CALMING MEASURES

Measure	*Speed*	*Accidents*	*Capacity*	*Cost*
One-Way Streets	+37%	-38%	+19%	Variable
12' Speed Hump	-22%	-11%	-18%	$2000
14' Speed Hump	-23%	-41%	-18%	$2000
22' Speed Table	-18%	-45%	-12%	$2000
Longer Speed Table	-9%	-	-	$2500
Raised Intersection	-1%	-	-	$12,500
Traffic Circle	-11%	-29%	-	$3500-$15000
Narrowing	-7%	-	-	$8000
Choker	-14%	-	-20%	$7,000-$10,000
Half Choker	-19%	-	-42%	$3500-$5000
Diagonal Diverter	0%	-	-35%	$85,000

Source: Trafficcalming.org and the Institute of Traffic Engineers.

Moreover, it isn't clear that traffic-calming devices effectively combat safety hazards or protect pedestrians. While calming devices are built on the premise they will reduce accidents, a comprehensive study commissioned by the ITE and the Federal Highway Administration (FHWA) on traffic-calming projects in the United States concludes:

> Traffic calming in the U.S. is largely restricted to low volume residential streets. Collisions occur infrequently on such streets to begin with, and any systematic change in collision rates tends to get lost in the random variation from year to year. This limits our confidence in drawing inferences about safety impacts of traffic calming.[12]

When traffic-calming devices do reduce accidents, it is at considerable cost in time, money and emergency response. Table 2 shows costs and benefits of various traffic-calming measures, some of which create problems and costs for municipalities with little effect on pedestrian and motorist safety.

Two of the measures the City of Raleigh will use — narrowings and chokers — have no measurable effect on accidents but reduce capacity considerably and cost $7,000 to $10,000 apiece.

RALEIGH'S ROUNDABOUTS AND TWO-WAY STREET CONVERSIONS

Two other city programs are designed to slow traffic and increase traffic congestion, but they do not meet the city's narrow definition of traffic calming. The construction of roundabouts on Hillsborough Street near the campus of North Carolina State University and the conversion of downtown streets from one-way to two-way near the state capitol will aggravate the city's traffic-congestion problem and slow emergency vehicles, posing a threat to human life.

The city plans a return to two-way operation for several sets of one-way streets in downtown as part of Raleigh's "Livable Streets" plan. Martin and Hargett Streets, main corridors that cross through the city's new Fayetteville Street, have already been converted. As Raleigh converts one-way pairs to two-way travel, each will be re-designed "emphasizing the com-

fort and convenience of the pedestrian."[13]

With this conversion from one-way to two-way streets, Raleigh residents can expect more congestion, higher drive times through downtown and a higher frequency of accidents. Studies show that two-way streets with the same number of lanes as one-way streets move 20 to 50 percent fewer cars because of increased turn delays. According to the Center for the American Dream, seven lanes of a two-way street are needed to move as many vehicles as four lanes on a one-way grid because people turning left or right impose fewer delays on people behind them.[14]

Secondly, returning Raleigh streets to two-way operation will increase commuting time. Traffic signals on a one-way grid can easily be coordinated so drivers can proceed at a continuous speed without stopping frequently for red lights. One study found that converting two-way streets to one-way led to a 19-percent increase in traffic at speeds that averaged 37-percent faster. This wasn't because the maximum speed limit on the one-way streets was any greater than on two-way streets, but because drivers experienced 60 percent fewer stops.[15]

Most importantly, one-way streets are safer for both drivers and pedestrians. One study in the *Transportation and Traffic Engineering Handbook* found that converting two-way streets to one-way caused a 38-percent decrease in accidents.[16] Pedestrians benefit particularly from one-way streets. Two-way streets produced 163 percent more pedestrian accidents in Sacramento, and 100 percent more pedestrian accidents in Portland, Ore., Hollywood, Fla., and Raleigh, N.C. A study by the Research Triangle Institute called one-way streets "the most effective urban counter-measure" to pedestrian accidents.[17]

Raleigh's Roundabout Craze

Raleigh's plan to construct up to seven roundabouts on Hillsborough Street between Oberlin Road and Gorman Street and four in the surrounding neighborhood will cost citizens at least $17 million and do little to relieve congestion. As part of the Hillsborough Street redesign, the first roundabout was built in 2002 on Pullen Road next to N.C. State's campus. Bonds approved in 2005 will pay for most of the second stage of the project; city planners are deciding between two roundabouts near North Hall or roundabouts and a roadway extension connecting Pullen Road to Oberlin Road. The first option would cost $3.7 million if the work includes burying utility lines. Alternate plans have the city spending up to $7 million to complete two to four roundabouts. The cost for the whole project is currently estimated at $17 million.

The Hillsborough project calls for seven roundabouts in only 1.2 miles, or a roundabout every 900 feet. Because of these changes, planners predict that 30 percent of the 19,000 cars a day currently traveling on Hillsborough (mostly through traffic) will redirect to Western Boulevard and Wade Avenue – streets that are already congested. Traffic on Hillsborough is already far less than the 26,000 vehicles per day at its peak.

Other cities in the triangle are calming their streets as well. Chapel Hill is calming streets in its Oaks neighborhood. As part of the effort, the town is conducting a study of effectiveness of its program; results should be released in mid-November. In Wake Forest, the town opened its first roundabout in May at the intersection of Highway 1A and Highway 98 at Southeastern Seminary, resulting in confusion and increased congestion.[18] Despite public reaction, the town plans to install three more roundabouts in the near future.

The Cost of Calming

According to Kimley-Horn and Associates, Inc., the group that provided a background report on the city's traffic-calming plans,

the costs of calming could be considerable. Based on "starter ideas" sketched by study consultants for one neighborhood in Raleigh, it is estimated that the cost of a "typical" neighborhood traffic-calming project may total $2 million.[19] This figure is likely to change (higher or lower) based on the type of measures selected and the number of locations identified. Additionally, there is no reasonable method for estimating the latent demand citywide for traffic calming; that is, how many additional neighborhoods will want to be added to the list once they hear about the program? The city has already identified 73 streets based on its 2004 survey.

Raleigh's traffic-calming plan would also include yearly maintenance costs. The cost to maintain landscaping is estimated at $4,000 per year per mile of traffic-calmed roadway, assuming ten measures per mile.[20] This includes watering (needed for the first two years until plants are established), pruning, mulching, fertilizing, weeding, and plant replacement.

Given the anticipated mixed results of Raleigh's traffic-calming plan, the city would be better off spending its money on proven solutions.

Smart Alternatives

The City of Raleigh should consider some less costly and more effective alternatives to protect pedestrians and drivers. The Canada Safety Council suggests "preventive traffic enforcement must become the number one priority .... Police must be visible and active in problem areas."[21] Effective speed enforcement is also possible via red-light cameras. The city could also consider using roadway striping and pavement marking, stop signs, signal coordination, yield signs, turning and parking restrictions, or better illumination to increase pedestrian and motorist safety.

In Raleigh's growing downtown, the City should create as many one-way paired streets as possible. One-way pairs are safer for drivers and pedestrians and minimize congestion for commuters.

Conclusion

Planning fads come and go, but planners are seldom held responsible for the harm they cause. Once again, city government falls victim to myth vs. reality. Planners and their supporters deluge the city council with information about what traffic calming is supposed to accomplish. Rarely do city council members receive information regarding the reality of traffic calming, even though studies of the unintended consequences and disastrous results from other cities are readily available.

Perhaps the city council should hire a person whose full-time job is to throw cold water on every fantastic fad that the city staff supports. Then and only then will the council be able to make truly informed judgments.

Jenna Ashley Robinson is program assistant at the John Locke Foundation.

Appendix: The City of Raleigh's 2004 Traffic Calming Priority List[22]

Ranking	*Street Name*	*From*	*To*	*Classification*	*Total Points (max.: 100)*
1	Ashe Ave.	Western Blvd.	Hillsborough St.	Collector	83.69
2	Eagle Trace Dr.	Grand Traverse Dr.	Southall Rd.	Collector	82.01
3	Plaza Place	Creedmoor Rd.	West Millbrook Rd.	Collector	77.90
4	Mourning Dove Rd.	Heathfield Dr.	Six Forks Rd.	Collector	73.80
5	Rainwater Rd.	Harps Mill Rd.	Spring Forest Rd.	Collector	72.70
6	Anderson Dr.	Glenwood Ave.	Six Forks Rd.	Collector	70.37
7	Lake Boone Trail	Cambridge Rd.	Dixie Trail	Collector	70.35
8	Shelley Rd.	North Hills Dr.	Six Forks Rd.	Collector	68.67
9	Harps Mill Rd.	Falls of Neuse Rd.	Gresham Lake Rd.	Collector	68.58
10	North Bend Dr.	Falls of Neuse Rd.	Spring Forest Rd.	Collector	66.29
11	Wimbleton Dr.	Dixon Dr.	Shelley Rd.	Residential / Local Access	62.23
12	Lord Berkeley Rd.	New Bern Ave.	Lord Ashley Rd.	Residential / Local Access	60.25
13	Hedingham Blvd.	Southall Rd.	New Bern Ave.	Collector	59.42
14	Nazareth St.	Centennial Parkway	Western Blvd.	Residential / Local Access	58.27
15	Johnsdale Rd.	Litchford Rd.	Litchford	Residential / Local Access	58.10
16	Grove Barton Rd.	Doie Cope Rd.	Pinecrest Rd.	Collector	56.55
17	Baugh St.	Buffaloe Rd.	Starmount Dr.	Collector	55.33
18	Delany Dr.	Milburnie Rd.	Glascock St.	Residential / Local Access	53.26
19	Dartmouth Rd.	Converse Dr.	Six Forks Rd.	Residential / Local Access	51.38
20	Lord Ashley Rd.	New Bern Ave.	Lord Berkeley Rd.	Residential / Local Access	50.25
21	Yadkin Dr.	Alleghany Dr.	Inglewood Dr.	Collector	48.75
22	Waterbury Rd.	Deana Lane	Green Rd.	Residential / Local Access	46.11
23	Deblyn Ave.	Glenwood Ave.	Pleasant Valley Rd.	Residential / Local Access	45.35
24	Brentwood Rd.	Capital Blvd.	New Hope Church Rd.	Collector	45.32
25	Huntleigh Dr.	Capital Blvd.	New Hope Church Rd.	Collector	45.02
26	Pineview Dr.	Swift Dr.	Avent Ferry Rd.	Residential / Local Access	44.62
27	Dennis Ave.	Bennett St.	Timber Dr.	Collector	43.85
28	Shelley Rd.	Forest Lawn Ct.	North Hills Dr.	Residential / Local Access	43.60
29	Hilburn Rd.	Lynn Rd.	Pike Rd.	Collector	43.12
30	King William Rd.	New Bern Ave.	Peartree Lane	Residential / Local Access	41.94
31	Dennis Ave.	Capital Blvd.	Bennett St.	Residential / Local Access	40.50
32	Fairview Rd.	Glenwood Ave.	Oberlin Rd.	Collector	38.78
33	Summerton Dr.	Falls River Ave.	Whittington Dr.	Residential / Local Access	38.69
34	Thorpshire Dr.	Colesbury Dr.	Falls of Neuse Rd.	Residential / Local Access	38.69
35	Jacqueline Lane	Archibald Way-City L	Capital Blvd.	Collector	35.10
36	Timber Ridge Dr.	Forest Oak Dr.	Spring Forest Rd.	Residential / Local Access	33.73
37	Winthrop Dr.	Ray Rd.	Rembert Dr.	Collector	32.69
38	Lord Ashley Rd.	Lord Berkeley Rd.	Bertie Dr.	Collector	32.20
39	Ingram Dr.	Atlantic Ave.	New Hope Church Rd.	Residential / Local Access	31.97
40	Pineview Dr.	Swift Dr.	Kaplan Dr.	Residential / Local Access	31.08
41	Sussex Rd.	Glen Eden Dr.	Lake Boone Trail	Residential / Local Access	30.95

Ranking	*Street Name*	*From*	*To*	*Classification*	*Total Points (max.: 100)*
42	Lake Forest Dr.	Van Thomas Dr.	Falls of Neuse Rd.	Residential / Local Access	29.65
43	Sutton Dr.	Cameron St.	Nichols Dr.	Collector	29.26
44	Dennis Ave.	Timber Dr.	Mossbank Rd.	Residential / Local Access	29.20
45	Nichols Dr.	Sutton Dr.	Washington St.	Collector	29.08
46	Tarboro Rd.	Edenton St.	Oakwood Ave.	Residential / Local Access	29.04
47	Deboy St.	I-440/US-1 Ramp	Western Blvd.	Collector	28.64
48	Cameron St.	Oberlin Rd.	Smallwood Dr.	Residential / Local Access	28.05
49	Coley Forest Dr.	Glen Eden Dr.	Yarmouth Rd.	Residential / Local Access	27.50
50	Cub Trail	Durant Rd.	Hiking Trail	Residential / Local Access	27.37
51	Cox Ave.	Hillsborough St.	Park Ave.	Residential / Local Access	27.05
52	Chaney Rd.-south	Western Blvd.	Onslow Rd.	Residential / Local Access	27.00
53	Sue Ellen Dr.	Meadow Ridge Dr.	New Hope Rd.	Residential / Local Access	26.85
54	Park Dr.	Oberlin Rd.	Saint Mary's St.	Residential / Local Access	26.20
55	Hill St.	New Bern Ave.	Milburnie Rd.	Collector	26.14
58	Wimbleton Dr.	Dixon Dr.	Manchester Dr.	Collector	25.00
59	Boyer St.	N. Tarboro St.	Hill St.	Residential / Local Access	24.08
60	Maple St.	Boyer St.	Oakwood Ave.	Residential / Local Access	24.00
61	Lewis Farm Rd.	Brooks Ave.	Ridge Rd.	Collector	24.00
62	Deanwood Dr.	Cub Trail	Wildercliff St.	Residential / Local Access	23.49
63	Aycock St.	Fairview Rd.	Reaves Dr.	Collector	23.47
64	Greywood Dr.	Capital Blvd.	Huntleigh Dr.	Residential / Local Access	23.31
65	Falls River Ave.	Southwalk Lane	Dunn Rd.	Collector	22.42
66	Sutton Dr.	Daniels St.	Nichols Dr.	Residential / Local Access	22.25
67	Kilcullen Dr.	Hoyle Dr.	New Hope Church Rd.	Residential / Local Access	22.00
68	Lord Berkeley Rd.	Lord Ashley Rd.	Traffic Circle	Collector	21.70
69	Chaney Rd.—North	Reavis Rd.	Western Blvd.	Residential / Local Access	21.04
70	Westbrook Dr.	Brookhollow Dr.	Six Forks Rd.	Residential / Local Access	20.38
75	Leslieshire Dr.	Durant Rd.	Hawksmoor Dr.	Residential / Local Access	20.00
76	Mills St.	Bellaire Ave.	Wiggs St.	Residential / Local Access	20.00
80	Harvey St.	Aycock St.	Saint Mary's St.	Collector	20.00
81	Sprague Rd.	Hilburn Rd.	Leesville Rd.	Residential / Local Access	18.51
82	Hillandale Dr.	Stonehaven Dr.	Spring Valley Dr.	Residential / Local Access	17.00
84	Lewis Farm Rd.	Brooks Ave.	Canterbury Rd.	Residential / Local Access	16.18
85	Old Deer Trail	Mourning Dove Rd.	Strickland Rd.	Collector	16.00
86	Thoreau Dr.	Quail Hollow Dr.	Wingate Dr.	Residential / Local Access	15.00
87	Hilburn Rd.	Pike Rd.	Mayapple Place	Collector	13.64
88	Aaron Dr.	Dandridge Dr.	Keith Dr.	Residential / Local Access	10.00
91	Chatmoss Dr.	Barwell Rd.	Continental Way	Residential / Local Access	5.00

Notes

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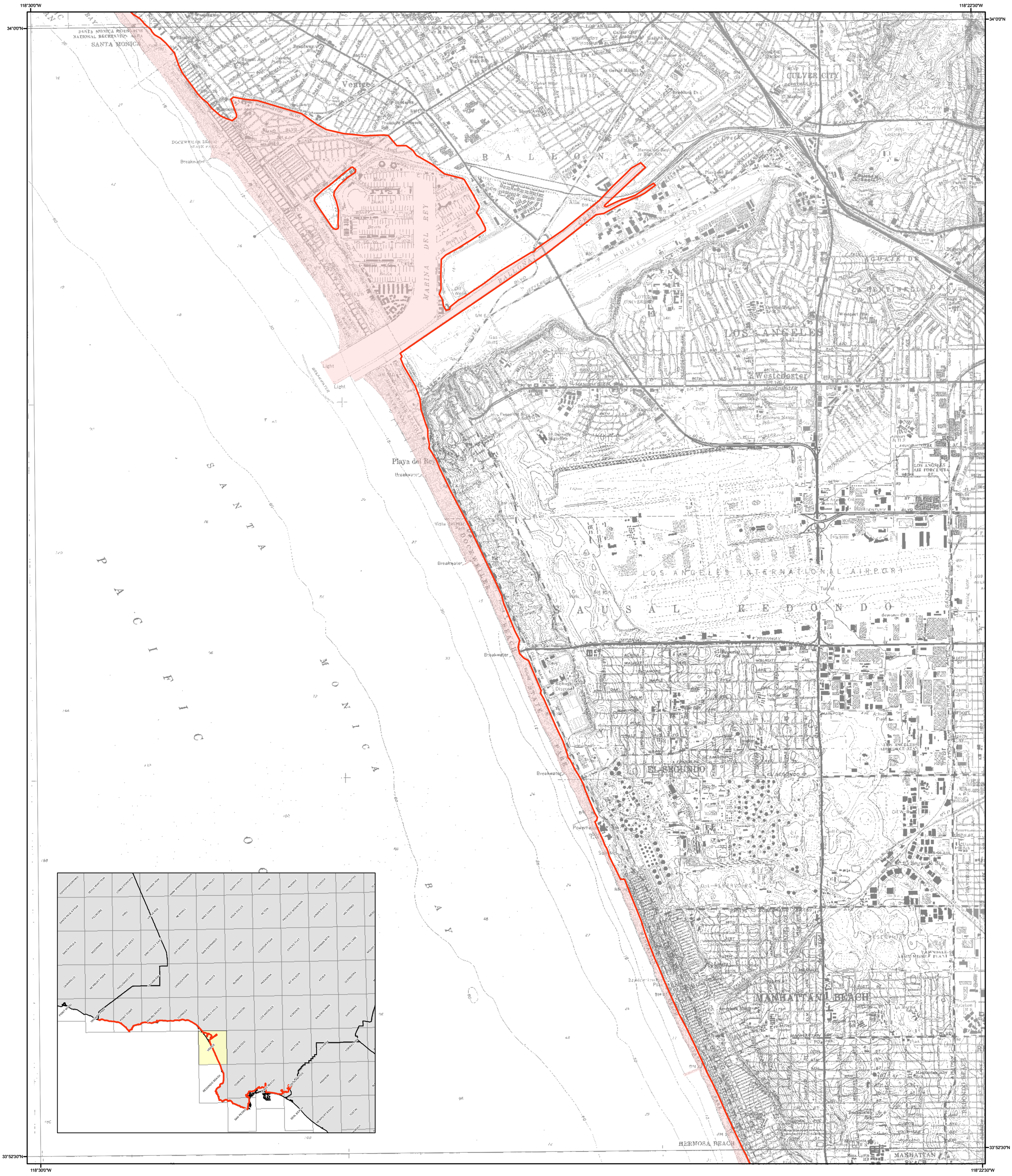
California Emergency Management Agency
California Geological Survey
University of Southern California

Tsunami Inundation Map for Emergency Planning
Venice Quadrangle

State of California
County of Los Angeles



METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to “Mean High Water” sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean “Ring of Fire.”

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

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TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of Los Angeles

VENICE QUADRANGLE

March 1, 2009

SCALE 1:24,000

0.5 0.25 0 0.5 1 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 Feet

0.5 0.25 0 0.5 1 Kilometers

Table 1: Tsunami sources modeled for the Los Angeles County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used		
		Malibu	Santa Monica	Los Angeles Harbor
Local Sources	Anacapa-Dume Fault	X	X	
	Catalina Fault	X	X	X
	Channel Island Thrust Fault		X	
	Newport-Inglewood Fault			X
	Santa Monica Fault	X	X	
	Palos Verdes Landslide #1		X	X
	Palos Verdes Landslide #2			X
Distant Sources	Cascadia Subduction Zone #2 (M9.2)		X	X
	Central Aleutians Subduction Zone#1 (M8.9)		X	X
	Central Aleutians Subduction Zone#2 (M8.9)		X	X
	Central Aleutians Subduction Zone#3 (M9.2)	X	X	X
	Chile North Subduction Zone (M9.4)	X	X	X
	1960 Chile Earthquake (M9.3)		X	X
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)		X	X
	Kuril Islands Subduction Zone #2 (M8.8)		X	X
	Kuril Islands Subduction Zone #3 (M8.8)		X	X
	Kuril Islands Subduction Zone #4 (M8.8)		X	X

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

Please refer to the following websites for additional information on the construction and/or intended use of the tsunami inundation map:

State of California Emergency Management Agency, Earthquake and Tsunami Program:
http://www.oes.ca.gov/WebPage/oeswebsite.nsf/Content/B1EC51BA215931768825741F005E8D80?OpenDocument

University of Southern California – Tsunami Research Center:
http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

APPENDIX A TO SUBPART 101–19.6—UNIFORM FEDERAL ACCESSIBILITY STANDARDS

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APPENDIX 60

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1. PURPOSE.

This document sets standards for facility accessibility by physically handicapped persons for Federal and federally-funded facilities. These standards are to be applied during the design, construction, and alteration of buildings and facilities to the extent required by the Architectural Barriers Act of 1968, as amended.

The technical provisions of these standards are the same as those of the American National Standard Institute's document A117.1-1980, except as noted in this text and on figures by italics.

2. GENERAL.

2.1 Authority. *These standards were jointly developed by the General Services Administration, the Department of Housing and Urban Development, the Department of Defense, and the United States Postal Service, under the authority of sections 2, 3, 4, and 4a, respectively, of the Architectural Barriers Act of 1968, as amended, Pub. L. No. 90-480, 42 U.S.C. 4151-4157.*

2.2 Provisions For Adults. The specifications in *these standards* are based upon adult dimensions and anthropometrics.

3. MISCELLANEOUS INSTRUCTIONS AND DEFINITIONS.

3.1 Graphic Conventions. Graphic conventions are shown in Table 1. Dimensions that are not marked "minimum" or "maximum" are absolute, unless otherwise indicated in the text or captions.

3.2 Dimensional Tolerances. All dimensions are subject to conventional building industry tolerances for field conditions.

3.3 Notes. The text of *these standards* does not contain notes or footnotes. Additional information, explanations, and advisory materials are located in the Appendix. Paragraphs marked with an asterisk have related, nonmandatory material in the Appendix. In the Appendix, the corresponding paragraph numbers are preceded by an A.

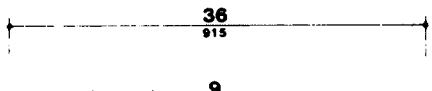
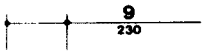
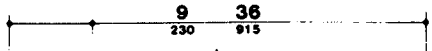
3.4 General Terminology.

comply with. Meet one or more specifications of this standard.

if, if...then. Denotes a specification that applies only when the conditions described are present.

may. Denotes an option or alternative.

Table 1
Graphic Conventions

Convention	Description
	Typical dimension line showing U.S. customary units (in inches) above the line and SI units (in millimeters) below
	Dimensions for short distances indicated on extended line
	Dimension line showing alternate dimensions required
	Direction of approach
max	Maximum
min	Minimum
	Boundary of clear floor area
℄	Centerline

shall. Denotes a mandatory specification or requirement.

should. Denotes an advisory specification or recommendation.

3.5 Definitions. The following terms shall, for the purpose of *these standards*, have the meaning indicated in this section.

Access Aisle. An accessible pedestrian space between elements, such as parking spaces, seating, and desks, that provides clearances appropriate for use of the elements.

Accessible. Describes a site, building, facility, or portion thereof that complies with *these standards* and that can be approached, entered, and used by physically disabled people.

Accessible Element. An *element* specified by *these standards* (for example, telephone, controls, and the like).

Accessible Route. A continuous unobstructed path connecting all accessible elements and spaces in a building or facility. Interior accessible routes may include corridors, floors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, walks, ramps, and lifts.

Accessible Space. Space that complies with these standards.

Adaptability. The ability of certain building *spaces and* elements, such as kitchen counters, sinks, and grab bars, to be *added or* altered so as to accommodate the needs of either disabled or nondisabled *persons*, or to accommodate the needs of persons with different types or degrees of disability.

Addition. An expansion, extension, or increase in the gross floor area of a building or facility.

Administrative Authority. A governmental agency that adopts or enforces regulations and standards for the design, construction, or alteration of buildings and facilities.

Alteration. As applied to a building or structure, means a change or rearrangement in the structural parts or elements, or in the means of egress or in moving from one location or position to another. It does not include normal maintenance, repair, reroofing, interior decoration, or changes to mechanical and electrical systems.

Assembly Area. A room or space accommodating fifty or more individuals for religious, recreational, educational, political, social, or amusement purposes, or for the consumption of food and drink, including all connected rooms or spaces with a common means of egress and ingress. Such areas as conference rooms would have to be accessible in accordance with other parts of this standard but would not have to meet all of the criteria associated with assembly areas.

Automatic Door. A door equipped with a power-operated mechanism and controls that open and close the door automatically upon receipt of a momentary actuating signal. The switch that begins the automatic cycle may be a photoelectric device, floor mat, or manual switch mounted on or near the door itself (see power-assisted door).

Circulation Path. An exterior or interior way of passage from one place to another for pedestrians, including, but not limited to, walks, hallways, courtyards, stairways, and stair landings.

Clear. Unobstructed.

Common Use. Refers to those interior and exterior rooms, spaces, or elements that are made available for the use of a restricted group of people (for example, residents of an apartment building, the occupants of an office building, or the guests of such residents or occupants).

Cross Slope. The slope that is perpendicular to the direction of travel (see running slope).

Curb Ramp. A short ramp cutting through a curb or built up to it.

Dwelling Unit. A single unit of residence which provides a kitchen or food preparation area, in addition to rooms and spaces for living, bathing, sleeping, and the like. A single family home is a dwelling unit, and dwelling units are to be found in such housing types as townhouses and apartment buildings.

Egress, Means of. *An accessible route* of exit that meets all applicable code specifications of the regulatory building agency having jurisdiction over the building or facility.

Element. An architectural or mechanical component of a building, facility, space, or site, e.g., telephone, curb ramp, door, drinking fountain, seating, water closet.

Entrance. Any access point to a building or portion of building or facility used for the purpose of entering. An entrance includes the approach walk, the vertical access leading to the entrance platform, the entrance platform itself, vestibules if provided, the entry door(s) or gate(s), and the hardware of the entry door(s) or gate(s). The principal entrance of a building or facility is the main door through which most people enter.

Essential Features. Those elements and spaces that make a building or facility usable by, or serve the needs of, its occupants or users. Essential features include but are not limited to entrances, toilet rooms, and accessible routes. Essential features do not include those spaces that house the major activities for which the building or facility is intended, such as classrooms and offices.

Extraordinary Repair. The replacement or renewal of any element of an existing building or facility for purposes other than normal maintenance.

3.5 Definitions

Facility. All or any portion of a building, structure, or area, including the site on which such building, structure or area is located, wherein specific services are provided or activities performed.

Full and Fair Cash Value. Full and fair cash value is calculated for the estimated date on which work will commence on a project and means:

(1) The assessed valuation of a building or facility as recorded in the assessor's office of the municipality and as equalized at one hundred percent (100%) valuation, or
(2) The replacement cost, or
(3) The fair market value.

Functional Spaces. The rooms and spaces in a building or facility that house the major activities for which the building or facility is intended.

Housing. A building, facility, or portion thereof, excluding inpatient health care facilities, that contains one or more dwelling units or sleeping accommodations. Housing may include, but is not limited to, one and two-family dwellings, apartments, group homes, hotels, motels, dormitories, and mobile homes.

Marked Crossing. A crosswalk or other identified path intended for pedestrian use in crossing a vehicular way.

Multifamily Dwelling. Any building containing more than two dwelling units.

Operable Part. A part of a piece of equipment or appliance used to insert or withdraw objects, or to activate, deactivate, or adjust the equipment or appliance (for example, coin slot, pushbutton, handle).

Physically Handicapped. An individual who has a physical impairment, including impaired sensory, manual, or speaking abilities, which results in a functional limitation in access to and use of a building or facility.

Power-assisted Door. A door *used for human passage* with a mechanism that helps to open the door, or relieve the opening resistance of a door, upon the activation of a switch or a continued force applied to the door itself. If the switch or door is released, such doors immediately begin to close or close completely within 3 to 30 seconds (see automatic door).

Public Use. Describes interior or exterior rooms or spaces that are made available to the general public. Public use may be provided at a building or facility that is privately or publicly owned.

Ramp. A walking surface in an accessible space that has a running slope greater than 1:20.

Running Slope. The slope that is parallel to the direction of travel (see cross slope).

Service Entrance. An entrance intended primarily for delivery of services.

Signage. Verbal, symbolic, *tactile,* and pictorial information.

Site. A parcel of land bounded by a property line or a designated portion of a public right-of-way.

Site Improvement. Landscaping, paving for pedestrian and vehicular ways, outdoor lighting, recreational facilities, and the like, added to a site.

Sleeping Accommodations. Rooms in which people sleep, for example, dormitory and hotel or motel guest rooms.

Space. A definable area, e.g., toilet room, hall, assembly area, entrance, storage room, alcove, courtyard, or lobby.

Structural Impracticability. Changes having little likelihood of being accomplished without removing or altering a load-bearing structural member and/or incurring an increased cost of 50 percent or more of the value of the element of the building or facility involved.

Tactile. Describes an object that can be perceived using the sense of touch.

Tactile Warning. A standardized surface texture applied to or built into walking surfaces or other elements to warn visually impaired people of hazards in the path of travel.

Temporary. Applies to facilities that are not of permanent construction but are extensively used or essential for public use for a given (short) period of time, for example, temporary classrooms or classroom buildings at schools and colleges, or facilities around a major construction site to make passage accessible, usable, and safe for everybody. Structures directly associated with the actual processes of major construction, such as porto potties, scaffolding, bridging, trailers, and the like, are not included. *Temporary as applied to elements means installed for less than 6 months and not required for safety reasons.*

Vehicular Way. A route intended for vehicular traffic, such as a street, driveway, or parking lot.

Walk. An exterior pathway with a prepared surface intended for pedestrian use, including general pedestrian areas such as plazas and courts.

4. ACCESSIBLE ELEMENTS AND SPACES: SCOPE AND TECHNICAL REQUIREMENTS.

4.1 Minimum Requirements.

4.1.1 Accessible Sites and Exterior Facilities: *New Construction.* An accessible site shall meet the following minimum requirements:

(1) At least one accessible route complying with 4.3 shall be provided *within the boundary of the site* from public transportation stops, accessible parking

spaces, passenger loading zones if provided, and public streets or sidewalks to an accessible building entrance.

(2) At least one accessible route complying with 4.3 shall connect accessible buildings, facilities, elements, and spaces that are on the same site.

(3) All objects that protrude from surfaces or posts into circulation paths shall comply with 4.4.

(4) Ground surfaces along accessible routes and in accessible spaces shall comply with 4.5.

(5) (a) *If parking spaces are provided for employees or visitors, or both, then accessible spaces, complying with 4.6, shall be provided in each such parking area in conformance with the following table:*

Total Parking in Lot	*Required Minimum Number of Accessible Spaces*
1 to 25	*1*
26 to 50	*2*
51 to 75	*3*
76 to 100	*4*
101 to 150	*5*
151 to 200	*6*
201 to 300	*7*
301 to 400	*8*
401 to 500	*9*
501 to 1000	*
1001 and over	**

* *2 percent of total.*
** *20 plus 1 for each 100 over 1000.*

EXCEPTION: The total number of accessible parking spaces may be distributed among parking lots, if greater accessibility is achieved.

EXCEPTION: This does not apply to parking provided for official government vehicles owned or leased by the government and used exclusively for government purposes.

(b) *If passenger loading zones are provided, then at least one passenger loading zone shall comply with 4.6.5.*

(c) *Parking spaces for side lift vans are accessible parking spaces and may be used to meet the requirements of this paragraph.*

(d) *Parking spaces at accessible housing complying with 4.6 shall be provided in accordance with the following:*

(i) Where parking is provided for all residents, one accessible parking space shall be provided for each accessible dwelling unit; and

(ii) Where parking is provided for only a portion of the residents, an accessible parking space shall be provided on request of the occupant of an accessible dwelling unit;

(iii) Where parking is provided for visitors, 2 percent of the spaces, or at least one, shall be accessible.

(e) *Parking spaces at health care facilities complying with 4.6 shall be provided in accordance with the following:*

(i) General health care facilities, employee and visitor parking: Comply with Table 4.1.1(5)(a);

(ii) Outpatient facilities: 10 percent of the total number of parking spaces provided;

(iii) Spinal cord injury facilities, employee and visitor parking: 20 percent of total parking spaces provided.

(6) *If toilet facilities are provided on a site, then each such public or common use toilet facility shall comply with 4.22. If bathing facilities are provided on a site, then each such public or common use bathing facility shall comply with 4.23.*

EXCEPTION: These provisions are not mandatory for single user portable toilet or bathing units clustered at a single location; however, at least one toilet unit complying with 4.22 or one bathing unit complying with 4.23 should be installed at each location whenever standard units are provided.

(7) All signs shall comply with 4.30.1, 4.30.2 and 4.30.3. ***Elements and spaces of accessible facilities which shall comply with 4.30.5 and shall be identified by the International Symbol of Accessibility are:***

(a) Parking spaces designated as reserved for physically handicapped people;
(b) passenger loading zones;
(c) accessible entrances;
(d) accessible toilet and bathing facilities.

4.1.2 Accessible Buildings: ***New Construction.*** Accessible buildings and facilities shall meet the following minimum requirements:

(1) At least one accessible route complying with 4.3 shall connect accessible building or facility entrances with all accessible spaces and elements within the building or facility.

(2) All objects that overhang circulation paths shall comply with 4.4.

(3) Ground and floor surfaces along accessible routes and in accessible rooms and spaces shall comply with 4.5.

(4) Stairs connecting levels that are not connected by an elevator shall comply with 4.9.

(5) *One passenger elevator complying with 4.10 shall serve each level in all multi-story buildings and facilities. If more than one elevator is provided, each elevator shall comply with 4.10.*

4.1.2 Accessible Buildings: New Construction

EXCEPTION: Elevator pits, elevator penthouses, mechanical rooms, piping or equipment catwalks are excepted from this requirement.

EXCEPTION: Accessible ramps complying with 4.8 or, if no other alternative is feasible, accessible platform lifts complying with 4.11 may be used in lieu of an elevator.

(6) Windows. *(Reserved).*

(7) Doors:

(a) *At each accessible entrance to a building or facility, at least one door shall comply with 4.13.*

(b) *Within a building or facility, at least one door at each accessible space shall comply with 4.13.*

(c) *Each door that is an element of an accessible route shall comply with 4.13.*

(d) *Each door required by 4.3.10, Egress, shall comply with 4.13.*

EXCEPTION: In multiple-story buildings and facilities where at-grade egress from each floor is impossible, either of the following is permitted: the provision within each story of approved fire and smoke partitions that create horizontal exits, or, the provision within each floor of areas of refuge approved by agencies having authority for safety.

(8) *At least one principal entrance at each grade floor level to a building or facility shall comply with 4.14, Entrances. When a building or facility has entrances which normally serve any of the following functions: transportation facilities, passenger loading zones, accessible parking facilities, taxi stands, public streets and sidewalks, or accessible interior vertical access, then at least one of the entrances serving each such function shall comply with 4.14, Entrances. Because entrances also serve as emergency exits, whose proximity to all parts of buildings and facilities is essential, it is preferable that all or most exits be accessible.*

(9) *If drinking fountains or water coolers are provided, approximately 50 percent of those provided on each floor shall comply with 4.15 and shall be on an accessible route. If only one drinking fountain or water cooler is provided on any floor, it shall comply with 4.15.*

(10) If toilet facilities are provided, *then each public and common use* toilet room shall comply with 4.22. *Other toilet rooms shall be adaptable.* If bathing facilities are provided, *then each public and common use* bathroom shall comply with 4.23. *Accessible toilet rooms and bathing facilities shall be on an accessible route.*

(11) If storage facilities such as cabinets, shelves, closets, and drawers are provided in accessible spaces, *at least one of each type provided shall contain storage space complying with 4.25. Additional storage may be provided outside of the dimensions shown in Fig. 38.*

(12) Controls and operating mechanisms in accessible spaces, along accessible routes, or as parts of accessible elements (for example, light switches and dispenser controls) shall comply with 4.27.

(13) *If emergency warning systems are provided, then they shall include both audible alarms complying with 4.28.2 and visual alarms complying with 4.28.3. In facilities with sleeping accommodations, the sleeping accommodations shall have an alarm system complying with 4.28.4. Emergency warning systems in health care facilities may be modified to suit standard health care alarm design practice.*

(14) Tactile warnings shall be provided at hazardous conditions as specified in *4.29.3.*

(15) If signs are provided, they shall comply with 4.30.1, 4.30.2 and 4.30.3. ***In addition, permanent signage that identifies rooms and spaces shall also comply with 4.30.4 and 4.30.6.***

EXCEPTION: The provisions of 4.30.4 are not mandatory for temporary information on room and space signage, such as current occupant's name, provided the permanent room or space identification complies with 4.30.4.

(16) Public telephones:

(a) If public telephones are provided, *then accessible public telephones shall comply with 4.31, Telephones, and the following table:*

Number of public telephones provided on each floor:	*Number of telephones required to be accessible:**
1 or more single unit installations	*1 per floor*
*1 bank***	*1 per floor*
*2 or more banks***	*1 per bank. Accessible unit may be installed as a single unit in proximity (either visible or with signage) to the bank. At least one public telephone per floor shall meet the requirements for a forward reach telephone.****

**Additional public telephones may be installed at any height. Unless otherwise specified, accessible telephones may be either forward or side reach telephones.*

***A bank consists of two or more adjacent public telephones, often installed as a unit.*

6

***EXCEPTION: For exterior installations only, if dial tone first service is not available, then a side reach telephone may be installed instead of the required forward reach telephone (i.e., one telephone in proximity to each bank shall comply with 4.31).

(b) At least one of the public telephones complying with 4.31, Telephones, shall be equipped with a volume control. The installation of additional volume controls is encouraged, and these may be installed on any public telephone provided.

(17) If fixed or built-in seating, tables, or work surfaces are provided in accessible spaces, at least 5 percent, but always at least one, of seating spaces, tables, or work surfaces shall comply with 4.32.

(18) Assembly areas:

(a) If places of assembly are provided, they shall comply with the following table:

Capacity of Seating & Assembly Areas	Number of Required Wheelchair Locations
50 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1,000	*
over 1,000	**

* 2 percent of total.
** 20 plus 1 for each 100 over 1,000.

(b) Assembly areas with audio-amplification systems shall have a listening system complying with 4.33 to assist a reasonable number of people, but no fewer than two, with severe hearing loss. For assembly areas without amplification systems and for spaces used primarily as meeting and conference rooms, a permanently installed or portable listening system shall be provided. If portable systems are used for conference or meeting rooms, the system may serve more than one room.

4.1.3 Accessible Housing. Accessible housing shall comply with the requirements of 4.1 and 4.34 except as noted below:

(1) ***Elevators:*** Where provided, elevators shall comply with 4.10. Elevators or other accessible means of vertical movement are not required in residential facilities when:

(a) No accessible dwelling units are located above or below the accessible grade level; and

(b) At least one of each type of common area and amenity provided for use of residents and visitors is available at the accessible grade level.

(2) ***Entrances:*** Entrances complying with 4.14 shall be provided as necessary to achieve access to and egress from buildings and facilities.

EXCEPTION: In projects consisting of one-to-four family dwellings where accessible entrances would be extraordinarily costly due to site conditions or local code restrictions, accessible entrances are required only to those buildings containing accessible dwelling units.

(3) ***Common Areas:*** At least one of each type of common area and amenity in each project shall be accessible and shall be located on an accessible route to any accessible dwelling unit.

4.1.4 Occupancy Classifications. Buildings and facilities shall comply with these standards to the extent noted in this section for various occupancy classifications, unless otherwise modified by a special application section. Occupancy classifications, and the facilities covered under each category include, but are not necessarily limited to, the listing which follows:

(1) ***General Exceptions.*** Accessibility is not required to elevator pits, elevator penthouses, mechanical rooms, piping or equipment catwalks, lookout galleries, electrical and telephone closets, and general utility rooms.

(2) ***Military Exclusions.*** The following facilities need not be designed to be accessible, but accessibility is recommended since the intended use of the facility may change with time.

(a) Unaccompanied personnel housing, closed messes, vehicle and aircraft maintenance facilities, where all work is performed by able-bodied military personnel, and, in general, all facilities which are intended for use or occupancy by able-bodied military personnel only.

(b) Those portions of Reserve and National Guard facilities which are designed and constructed primarily for use by able-bodied military personnel. This exclusion does not apply to those portions of a building or facility which may be open to the public or which may be used by the public during the conduct of normal business or which may be used by physically handicapped persons employed or seeking employment at such building or facility. These portions of the building or facility shall be accessible.

(c) Where the number of accessible spaces required is determined by the design capacity of a facility (such as parking or assembly areas), the number of able-bodied military persons used in determining the design capacity need not be counted when computing the number of accessible spaces required.

(3) ***Military Housing.*** In the case of military housing, which is primarily available for able-bodied military personnel and their dependents, at least 5

4.1.4 Occupancy Classifications

percent of the total but at least one unit (on an installation-by-installation basis) of all housing constructed will be designed and built to be either accessible or readily and easily modifiable to be accessible, but in any event, modification of individual units (including the making of adaptations), will be accomplished on a high priority basis when a requirement is identified. Common areas such as walks, streets, parking and play areas, and common entrances to multi-unit facilities shall be designed and built to be accessible.

*(4) **Assembly.** Assembly occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering together of persons for purposes such as civic, social or religious functions, recreation, food or drink consumption, or awaiting transportation. A room or space used for assembly purposes by less than fifty (50) persons and accessory to another occupancy shall be included as a part of that major occupancy. For purposes of these standards, assembly occupancies shall include the following:*

Facilities	Application
Amusement arcades Amusement park structures Arenas Armories Art galleries Auditoriums Banquet halls Bleachers Bowling alleys Carnivals Churches Clubs Community halls Courtrooms (public areas) Dance halls Drive-in theaters Exhibition halls Fairs Funeral parlors Grandstands Gymnasiums Motion picture theaters Indoor & outdoor swimming pools Indoor & outdoor tennis courts Lecture halls Libraries* Museums Night clubs Passenger stations Pool & billiard halls Restaurants** Skating rinks	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.
Stadiums Taverns & bars Television studios admitting audiences Theaters	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.

**See Part 8 for special applications.*
***See Part 5 for special applications.*

*(5) **Business.** Business occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service type transactions, including storage of records and accounts.*

Facilities	Application
Animal hospitals, kennels, pounds Automobile and other motor vehicle showrooms Banks Barber shops Beauty shops Car wash Civic administration Clinic, outpatient Dry cleaning Educational above 12th grade Electronic data processing Fire stations Florists & nurseries Laboratories: testing & research Laundries Motor vehicle service stations Police stations Post offices* Print shops Professional services: attorney, dentist, physician, engineer, etc. Radio & T.V. stations Telephone exchanges	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.

**See Part 9 for special applications.*

*(6) **Educational.** Educational occupancy includes, among others, the use of a building or structure, or portion thereof, by six or more persons at any time for educational purposes through the 12th grade.*

Schools for business or vocational training shall conform to the requirements of the trade, vocation or business taught.

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4.1.4 Occupancy Classifications

Facilities	Application
Academies Kindergarten Nursery schools Schools	All areas shall comply.

(7) Factory Industrial. Factory industrial occupancy includes, among others, the use of a building or structure, or portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, processing or other operations that are not classified as a Hazardous Occupancy.

Facilities	Application
Aircraft Appliances Athletic equipment Automobile and other motor vehicle Bakeries Beverages Bicycles Boats, building Brick and masonry Broom or brush Business machines Canvas or similar Cameras and photo equipment Carpets & rugs, including cleaning Ceramic products Clothing Construction & agricultural machinery Disinfectants Dry cleaning & dyeing Electronics Engines, including rebuilding Film, photographic Food processing Foundries Furniture Glass products Gypsum Hemp products Ice Jute products Laundries Leather products Machinery Metal Motion pictures & television film Musical instruments Optical goods Paper products Plastic products	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.
Printing or publishing Recreational vehicles Refuse incineration Shoes Soaps & detergents Steel products: fabrication, assembly Textiles Tobacco Trailers Upholstering Wood, distribution Millwork Woodworking, cabinet Postal mail: processing facilities*	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.

*See Part 9 for special applications.

(8) Hazardous. Hazardous occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of corrosive, highly toxic, highly combustible, flammable or explosive materials that constitute a high fire or explosive hazard, including loose combustible fibers, dust and unstable materials.

Facilities	Application
Combustible dust Combustible fibers Combustible liquid Corrosive liquids Explosive material Flammable gas Flammable liquid Liquified petroleum gas Nitromethane Oxidizing materials Organic peroxide	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.

(9) Institutional. Institutional occupancy includes, among others, the use of a building or structure, or any portion thereof, in which people have physical or medical treatment or care, or in which the liberty of the occupants is restricted. Institutional occupancies shall include the following subgroups:

(a) Institutional occupancies for the care of children, including:

Facilities	Application
Child care facilities	All public use, common use, or areas which may result in employment of physically handicapped persons.

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4.1.4 Occupancy Classifications

(b) Institutional occupancies used for medical or other treatment or care of persons, some of whom are suffering from physical or mental illness, disease or infirmity, including:

Facilities	Application
Long Term Care Facilities: (including Skilled Nursing Facilities, Intermediate Care Facilities, Bed & Care, and Nursing Homes).	At least 50 percent of patient toilets and bedrooms; all public use, common use or areas which may result in employment of physically handicapped persons.
Outpatient Facilities:	All patient toilets and bedrooms, all public use, common use, or areas which may result in employment of physically handicapped persons.
Hospital*:	
General Purpose Hospital:	At least 10 percent of patient toilets and bedrooms, all public use, common use, or areas which may result in employment of physically handicapped persons.
Special Purpose Hospital: (Hospitals that treat conditions that affect mobility).	All patient toilets and bedrooms, all public use, common use, or areas which may result in employment of physically handicapped persons.

* See Part 6 for special applications.

(c) Institutional occupancies where the occupants are under some degree of restraint or restriction for security reasons including:

Facilities	Application
Jails Prisons Reformatories Other detention or correctional facilities	5 percent of residential units available, or at least one unit, whichever is greater; all common use, visitor use, or areas which may result in employment of physically handicapped persons.

(10) Mercantile. Mercantile occupancy includes, among others, all buildings and structures or parts thereof, for the display and sale of merchandise, and involving stocks of goods, wares or merchandise incidental to such purposes and accessible to the public.*

Facilities	Application
Department stores Drug stores Markets Retail stores Shopping centers Sales rooms	All areas for which the intended use will require public access or which may result in employment of physically handicapped persons.

* See Part 7 for special applications.

***(11) Residential.** Residential occupancy includes, among others, the use of a building or structure, or portion thereof, for sleeping accommodations when not classed as an institutional occupancy. Residential occupancies shall comply with the requirements of 4.1 and 4.34 except as follows:*

(a) Residential occupancies where the occupants are primarily transient in nature (less than 30 days) including:

Facilities	Application
Hotels Motels Boarding houses	5 percent of the total units, or at least one, whichever is greater, and all public use, common use, and areas which may result in employment of physically handicapped persons.

(b) Residential occupancies in multiple dwellings where the occupants are primarily permanent in nature, including:

Facilities	Application
Multifamily housing (Apartment houses):	
Federally assisted	5 percent of the total, or at least one unit, whichever is greater, in projects of 15 or more dwelling units, or as determined by the appropriate Federal agency following a local needs assessment conducted by local government bodies or states under applicable regulations.
Federally owned	5 percent of the total, or at least one unit, whichever is greater.
Dormitories	5 percent of the total, or at least one unit, whichever is greater.

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(c) Residential occupancies in one (1) and two (2) family dwellings where the occupancies are primarily permanent in nature and not classified as preceding residential categories or as institutional.

Facilities	Application
One and two family dwelling:	
Federally assisted, rental	*5 percent of the total, or at least one unit, whichever is greater, in projects of 15 or more dwelling units, or as determined by the appropriate Federal agency following a local needs assessment conducted by local government bodies or states under applicable regulations.*
Federally assisted, homeownership	*To be determined by home buyer.*
Federally owned	*5 percent of the total, or at least one unit, whichever is greater.*

(12) Storage. *Storage occupancy includes, among others, the use of a building or structure, or portion thereof, for storage that is not classified as a Hazardous Occupancy.*

Facilities	Application
Metal desks *Electrical coils* *Electrical motors* *Dry cell batteries* *Metal parts* *Empty cans* *Stoves* *Washers & Dryers* *Metal cabinets* *Glass bottles with noncombustible liquid* *Mirrors* *Foods in noncombustible containers* *Frozen foods* *Meats* *Fresh fruits and vegetables* *Dairy products* *Beer or wine up to 12 percent alcohol* *Distribution transformers*	*All areas for which the intended use will require public access or which may result in employment of physically handicapped persons shall comply.*
Cement in bags *Electrical insulators* *Gypsum board* *Inert pigments* *Dry insecticides*	*All areas for which the intended use will require public access or which may result in employment of physically handicapped persons shall comply.*

(13) Utility and Miscellaneous. *Utility and miscellaneous occupancies include, among others, accessory buildings and structures, such as:*

Facilities	Application
Fences over 6 ft. high *Tanks* *Cooling towers* *Retaining walls* *Buildings of less than 1,000 sq. ft. such as:* *Private garages* *Carports* *Sheds* *Agricultural buildings*	*All areas for which the intended use will require public access or which may result in employment of physically handicapped persons shall comply.*

4.1.5 Accessible Buildings: Additions. *Each addition to an existing building shall comply with 4.1.1 to 4.1.4 of 4.1, Minimum Requirements, except as follows:*

(1) Entrances. *If a new addition to a building or facility does not have an entrance, then at least one entrance in the existing building or facility shall comply with 4.1.4, Entrances.*

(2) Accessible route. *If the only accessible entrance to the addition is located in the existing building or facility, then at least one accessible route shall comply with 4.3, Accessible Route, and shall provide access through the existing building or facility to all rooms, elements, and spaces in the new addition.*

(3) Toilet and bathing facilities. *If there are no toilet rooms and bathing facilities in the addition and these facilities are provided in the existing building, then at least one toilet and bathing facility in the existing building shall comply with 4.22, Toilet Rooms, or 4.23, Bathrooms, Bathing Facilities, and Shower Rooms.*

(4) Elements, spaces, and common areas. *If elements, spaces, or common areas are located in the existing building and they are not provided in the addition, then consideration should be given to making those elements, spaces, and common areas accessible in the existing building.*

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4.1.5 Accessible Buildings: Additions

EXCEPTIONS: Mechanical rooms, storage areas, and other such minor additions which normally are not frequented by the public or employees of the facility are excepted from 4.1.5.

*(5) **Housing:** (Reserved).*

4.1.6 Accessible Buildings: Alterations.

*(1) **General.** Alterations to existing buildings or facilities shall comply with the following:*

(a) If existing elements, spaces, essential features, or common areas are altered, then each such altered element, space, feature, or area shall comply with the applicable provisions of 4.1.1 to 4.1.4 of 4.1, Minimum Requirements.

(b) If power-driven vertical access equipment (e.g., escalator) is planned or installed where none existed previously, or if new stairs (other than stairs installed to meet emergency exit requirements) requiring major structural changes are planned or installed where none existed previously, then a means of accessible vertical access shall be provided that complies with 4.7, Curb Ramps; 4.8, Ramps; 4.10, Elevators; or 4.11, Platform Lifts; except to the extent where it is structurally impracticable in transit facilities.

(c) If alterations of single elements, when considered together, amount to an alteration of a space of a building or facility, the entire space shall be made accessible.

(d) No alteration of an existing element, space, or area of a building shall impose a requirement for greater accessibility than that which would be required for new construction. For example, if the elevators and stairs in a building are being altered and the elevators are, in turn, being made accessible, then no accessibility modifications are required to the stairs connecting levels connected by the elevator.

(e) If the alteration work is limited solely to the electrical, mechanical, or plumbing system and does not involve the alteration of any elements and spaces required to be accessible under these standards, then 4.1.6(3) does not apply.

(f) No new accessibility alterations will be required of existing elements or spaces previously constructed or altered in compliance with earlier standards issued pursuant to the Architectural Barriers Act of 1968, as amended.

(g) Mechanical rooms and other spaces which normally are not frequented by the public or employees of the building or facility or which by nature of their use are not required by the Architectural Barriers Act to be accessible are excepted from the requirements of 4.1.6.

(2) Where a building or facility is vacated and it is totally altered, then it shall be altered to comply with 4.1.1 to 4.1.5 of 4.1, Minimum Requirements, except to the extent where it is structurally impracticable.

(3) Where substantial alteration occurs to a building or facility, then each element or space that is altered or added shall comply with the applicable provisions of 4.1.1 to 4.1.4 of 4.1, Minimum Requirements, except to the extent where it is structurally impracticable. The altered building or facility shall contain:

(a) At least one accessible route complying with 4.3, Accessible Route, and 4.1.6(a);

(b) At least one accessible entrance complying with 4.14, Entrances. If additional entrances are altered then they shall comply with 4.1.6(a); and

(c) The following toilet facilities, whichever is greater:

(i) At least one toilet facility for each sex in the altered building complying with 4.22, Toilet Rooms, and 4.23, Bathrooms, Bathing Facilities, and Shower Rooms.

(ii) At least one toilet facility for each sex on each substantially altered floor, where such facilities are provided, complying with 4.22, Toilet Rooms; and 4.23, Bathrooms, Bathing Facilities, and Shower Rooms.

(d) In making the determination as to what constitutes "substantial alteration," the agency issuing standards for the facility shall consider the total cost of all alterations (including but not limited to electrical, mechanical, plumbing, and structural changes) for a building or facility within any twelve (12) month period. For guidance in implementing this provision, an alteration to any building or facility is to be considered substantial if the total cost for this twelve month period amounts to 50 percent or more of the full and fair cash value of the building as defined in 3.5.

EXCEPTION: If the cost of the elements and spaces required by 4.1.6(3)(a), (b), or (c) exceeds 15 percent of the total cost of all other alterations, then a schedule may be established by the standard-setting and/or funding agency to provide the required improvements within a 5-year period.

EXCEPTION: Consideration shall be given to providing accessible elements and spaces in each altered building or facility complying with:

(i) 4.6, Parking and Passenger Loading Zones,
(ii) 4.15, Drinking Fountains and Water Coolers,
(iii) 4.25, Storage,
(iv) 4.28, Alarms,
(v) 4.31, Telephones,
(vi) 4.32, Seating, Tables, and Work Surfaces,
(vii) 4.33, Assembly Areas.

(4) Special technical provisions for alterations to existing buildings or facilities:

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(a) *Ramps. Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as shown in Table 2 if space limitations prohibit the use of a 1:12 slope or less.*

Table 2
Allowable Ramp Dimensions for Construction in Existing Sites, Buildings, and Facilities

	Maximum Rise		Maximum Run	
Slope*	in	mm	ft	m
Steeper than 1:10 but no steeper than 1:8	3	75	2	0.6
Steeper than 1:12 but no steeper than 1:10	6	150	5	1.5

*A slope steeper than 1:8 not allowed.

(b) *Stairs. Full extension of stair handrails shall not be required in alterations where such extensions would be hazardous or impossible due to plan configuration.*

(c) *Elevators.*

(i) *If a safety door edge is provided in existing automatic elevators, then the automatic door reopening devices may be omitted (see 4.10.6).*

(ii) *Where existing shaft or structural elements prohibit strict compliance with 4.10.9, then the minimum floor area dimensions may be reduced by the minimum amount necessary, but in no case shall they be less than 48 in by 48 in (1220 mm by 1220 mm).*

(d) *Doors.*

(i) *Where existing elements prohibit strict compliance with the clearance requirements of 4.13.5, a projection of 5/8 in (16 mm) maximum will be permitted for the latch side door stop.*

(ii) *If existing thresholds measure 3/4 in (19 mm) high or less, and are beveled or modified to provide a beveled edge on each side, then they may be retained.*

(e) *Toilet rooms. Where alterations to existing facilities make strict compliance with 4.22 and 4.23 structurally impracticable, the addition of one "unisex" toilet per floor containing one water closet complying with 4.16 and one lavatory complying with 4.19, located adjacent to existing toilet facilities, will be acceptable in lieu of making existing toilet facilities for each sex accessible.*

EXCEPTION: In instances of alteration work where provision of a standard stall (Fig. 30(a)) is structurally impracticable or where plumbing code requirements prevent combining existing stalls to provide space, an alternate stall (Fig. 30(b)) may be provided in lieu of the standard stall.

(f) Assembly areas.

(i) *In alterations where it is structurally impracticable to disperse seating throughout the assembly area, seating may be located in collected areas as structurally feasible. Seating shall adjoin an accessible route that also serves as a means of emergency egress.*

(ii) *In alterations where it is structurally impracticable to alter all performing areas to be on an accessible route, then at least one of each type shall be made accessible.*

(5) Housing. *(Reserved).*

4.1.7 *Accessible Buildings: Historic Preservation.*

(1) ***Applicability.***

(a) *As a general rule, the accessibility provisions of part 4 shall be applied to "qualified" historic buildings and facilities. "Qualified" buildings or facilities are those buildings and facilities that are eligible for listing in the National Register of Historic Places, or such properties designated as historic under a statute of the appropriate state or local government body. Comments of the Advisory Council on Historic Preservation shall be obtained when required by Section 106 of the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 and 36 CFR Part 800, before any alteration to a qualified historic building.*

(b) *The Advisory Council shall determine, on a case-by-case basis, whether provisions required by part 4 for accessible routes (exterior and interior), ramps, entrances, toilets, parking, and displays and signage, would threaten or destroy the historic significance of the building or facility.*

(c) *If the Advisory Council determines that any of the accessibility requirements for features listed in 4.1.7(1) would threaten or destroy the historic significance of a building or facility, then the special application provisions of 4.1.7(2) for that feature may be utilized. The special application provisions listed under 4.1.7(2) may only be utilized following a written determination by the Advisory Council that application of a requirement contained in part 4 would threaten or destroy the historic integrity of a qualified building or facility.*

4.1.7 Accessible Buildings: Historic Preservation

(2) ***Historic Preservation: Minimum Requirements.***

(a) *At least one accessible route complying with 4.3 from a site access point to an accessible entrance shall be provided.*

EXCEPTION: A ramp with a slope no greater than 1:6 for a run not to exceed 2 ft (610 mm) may be used as part of an accessible route at an entrance.

(b) *At least one accessible entrance which is used by the public complying with 4.14 shall be provided.*

EXCEPTION: If it is determined that no entrance used by the public can comply with 4.14, then access at any entrance not used by the general public but open (unlocked) with directional signs at the primary entrance may be used.

(c) *If toilets are provided, then at least one toilet facility complying with 4.22 and 4.1.6 shall be provided along an accessible route that complies with 4.3. Such toilet facility may be "unisex" in design.*

(d) *Accessible routes from an accessible entrance to all publicly used spaces on at least the level of the accessible entrance shall be provided. Access should be provided to all levels of a building or facility in compliance with 4.1 whenever practical.*

(e) *Displays and written information, documents, etc., should be located where they can be seen by a seated person. Exhibits and signage displayed horizontally, e.g., books, should be no higher than 44 in (1120 mm) above the floor surface.*

4.2 Space Allowance and Reach Ranges

4.2.1* Wheelchair Passage Width. The minimum clear width for single wheelchair passage shall be 32 in (815 mm) at a point and 36 in (915 mm) continuously (see Fig. 1 *and 24(e)).*

4.2.2 Width for Wheelchair Passing. The minimum width for two wheelchairs to pass is 60 in (1525 mm) (see Fig. 2).

4.2.3* Wheelchair Turning Space. The space required for a wheelchair to make a 180-degree turn is a clear space of 60 in (1525 mm) diameter (see Fig. 3(a)) or a T-shaped space (see Fig. 3(b)).

4.2.4* Clear Floor or Ground Space for Wheelchairs.

4.2.4.1 Size and Approach. The minimum clear floor or ground space required to accommodate a single, stationary wheelchair occupant is 30 in by 48 in (760 mm by 1220 mm) (see Fig. 4(a)). The minimum clear floor or ground space for wheelchairs may be positioned for forward or parallel approach to an object

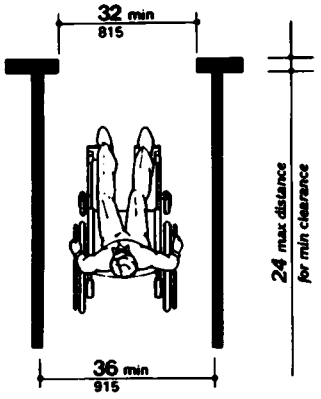


Fig. 1
Minimum Clear Width for Single Wheelchair

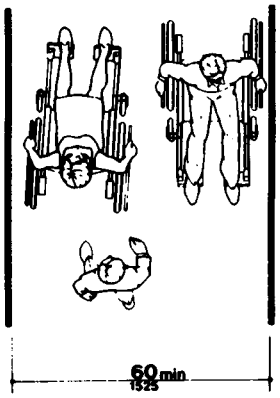
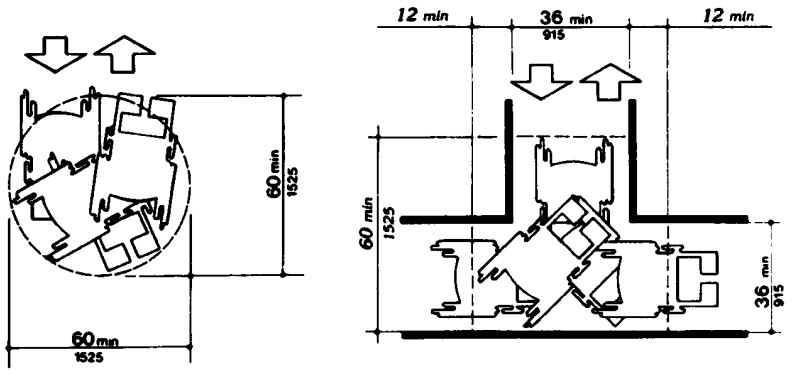


Fig. 2
Minimum Clear Width for Two Wheelchairs



(a)
60-in (1525-mm)-Diameter Space

(b)
T-Shaped Space for 180° Turns

Fig. 3
Wheelchair Turning Space

(see Fig. 4(b) and (c)). Clear floor or ground space for wheelchairs may be part of the knee space required under some objects.

4.2.4.2 Relationship of Maneuvering Clearance to Wheelchair Spaces. One full unobstructed side of the clear floor or ground space for a wheelchair shall adjoin or overlap an accessible route or adjoin another wheelchair clear floor space. If a clear floor space is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearances shall be provided as shown in Fig. 4(d) and (e).

4.2.4.3 Surfaces for Wheelchair Spaces. Clear floor or ground spaces for wheelchairs shall comply with 4.5.

4.2.5 Forward Reach. If the clear floor space only allows forward approach to an object, the maximum high forward reach allowed shall be 48 in (1220 mm) (see Fig. 5(a)). *The minimum low forward reach is 15 in (380 mm).* If the high forward reach is over an obstruction, reach and clearances shall be as shown in Fig. 5(b).

4.2.6* Side Reach. If the clear floor space allows parallel approach by a person in a wheelchair, the maximum high side reach allowed shall be 54 in (1370 mm) and the low side reach shall be no less than 9 in (230 mm) above the floor (Fig. 6(a) and (b)). If the side reach is over an obstruction, the reach and clearances shall be as shown in Fig. 6(c).

4.3 Accessible Route.

4.3.1* General. All walks, halls, corridors, aisles, and other spaces that are part of an accessible route shall comply with 4.3.

4.3.2 Location.

(1) At least one accessible route *within the boundary of the site* shall be provided from public transportation stops, accessible parking, and accessible passenger loading zones, and public streets or sidewalks to the accessible building entrance they serve.

(2) At least one accessible route shall connect accessible buildings, facilities, elements, and spaces that are on the same site.

(3) At least one accessible route shall connect accessible building or facility entrances with all accessible spaces and elements and with all accessible dwelling units within the building or facility.

(4) An accessible route shall connect at least one accessible entrance of each accessible dwelling unit with those exterior and interior spaces and facilities that serve the accessible dwelling unit.

4.3 Accessible Route

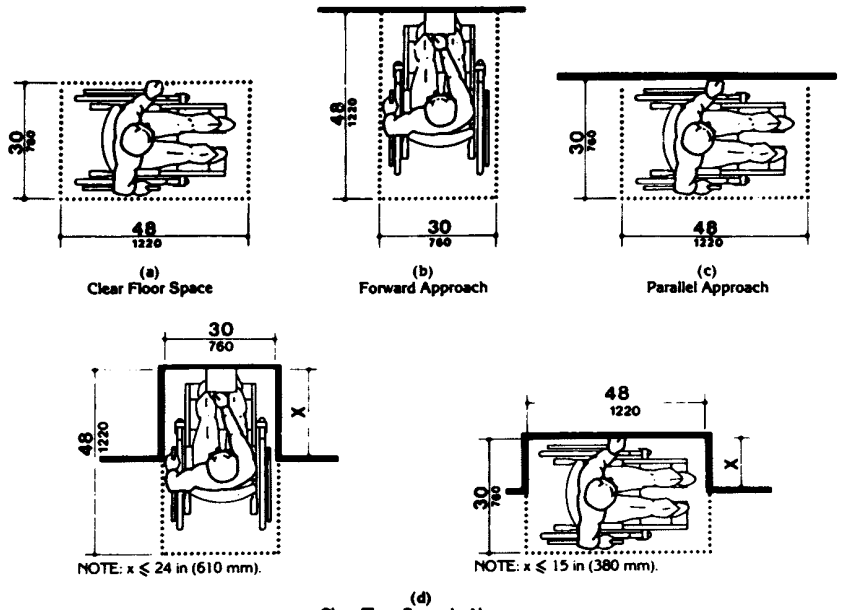


Fig. 4
Minimum Clear Floor Space for Wheelchairs

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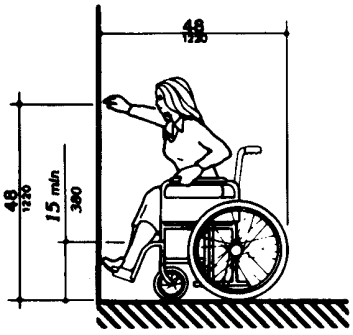
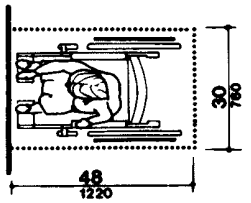
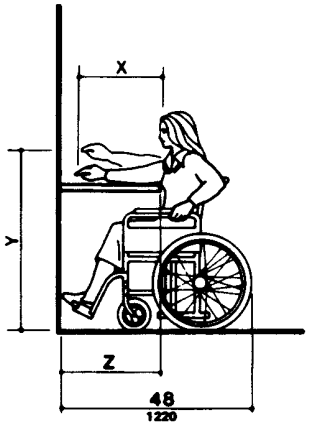
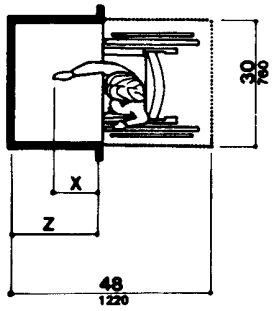
4.3 Accessible Route





(a)
High Forward Reach Limit





NOTE: x shall be ≤ 25 in (635 mm); z shall be ≥ x. When x < 20 in (510 mm), then y shall be 48 in (1220 mm) maximum. When x is 20 to 25 in (510 to 635 mm), then y shall be 44 in (1120 mm) maximum.

(b)
Maximum Forward Reach over an Obstruction

Fig. 5
Forward Reach

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4.3 Accessible Route

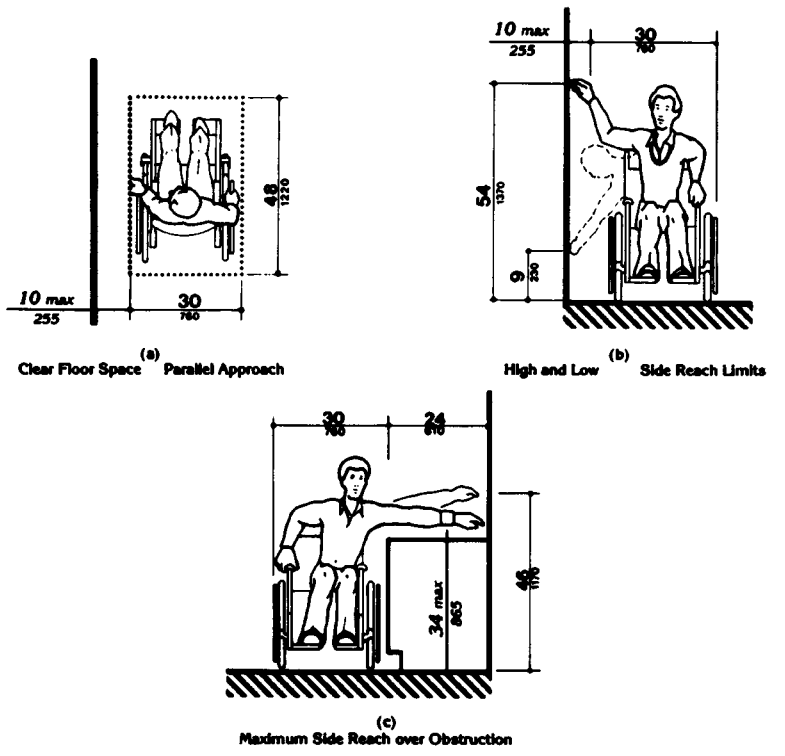

Fig. 6
Side Reach

4.3.3 Width. The minimum clear width of an accessible route shall be 36 in (915 mm) except at doors (see 4.13.5). If a person in a wheelchair must make a turn around an obstruction, the minimum clear width of the accessible route shall be as shown in Fig. 7.

4.3.4 Passing Space. If an accessible route has less than 60 in (1525 mm) clear width, then passing spaces at least 60 in by 60 in (1525 mm by 1525 mm) shall be located at reasonable intervals not to exceed 200 ft (61 m). A T-intersection of two corridors or walks is an acceptable passing place.

4.3.5 Head Room. Accessible routes shall comply with 4.4.2.

4.3.6 Surface Textures. The surface of an accessible route shall comply with 4.5.

4.3.7 Slope. An accessible route with a running slope greater than 1:20 is a ramp and shall comply with 4.8. Nowhere shall the cross slope of an accessible route exceed 1:50.

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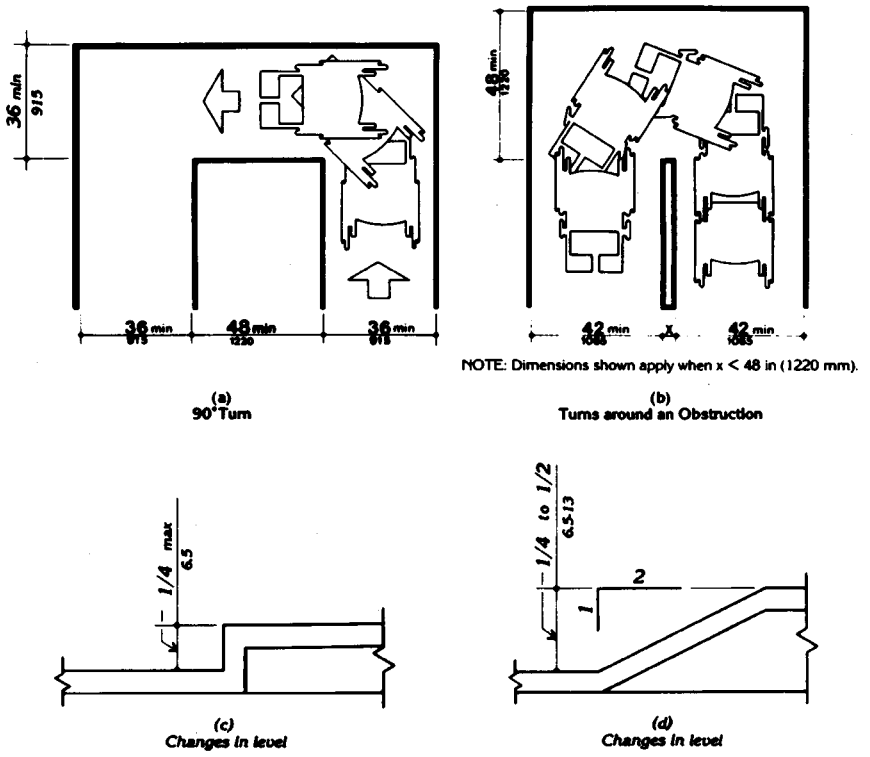


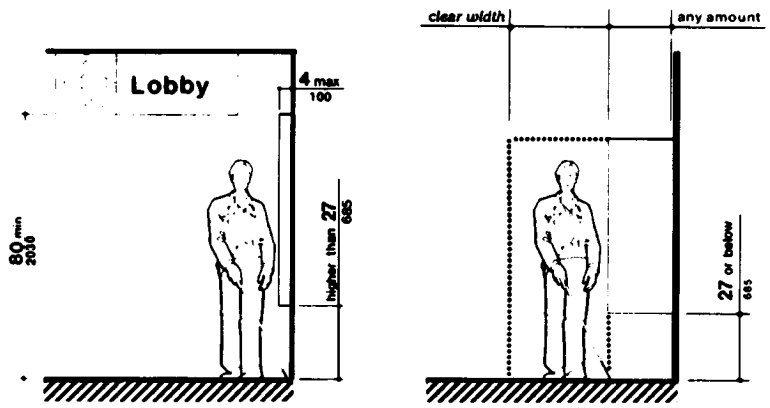
Fig. 7
Width of Accessible Route

4.3.8 Changes in Levels. Changes in levels along an accessible route shall comply with 4.5.2. If an accessible route has changes in level greater than 1/2 in (13 mm), then a curb ramp, ramp, elevator, or platform lift shall be provided that complies with 4.7, 4.8, 4.10, or 4.11, respectively. Stairs shall not be part of an accessible route.

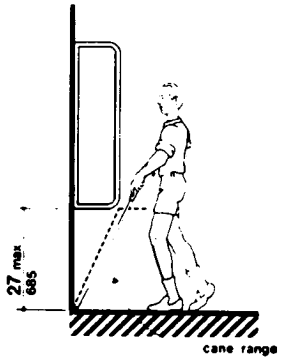
4.3.9 Doors. Doors along an accessible route shall comply with 4.13.

4.3.10* Egress. Accessible routes serving any accessible space or element shall also serve as a means of egress for emergencies or connect to an accessible place of refuge. Such accessible routes and places of refuge shall comply with the requirements of the administrative authority having jurisdiction. *Where fire code provisions require more than one means of egress from any space or room, then more than one accessible means of egress shall also be provided for handicapped people. Arrange egress so as to be readily accessible from all accessible rooms and spaces.*

4.4 Protruding Objects



(a)
Walking Parallel to a Wall



(b)
Walking Perpendicular to a Wall

Fig. 8
Protruding Objects

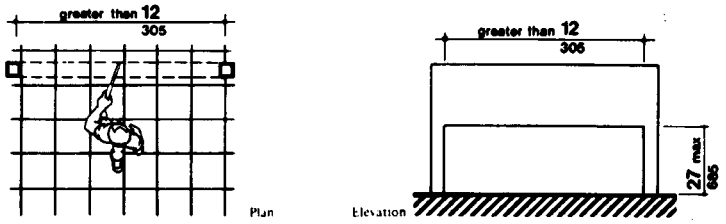
4.4 Protruding Objects.

4.4.1* General. Objects projecting from walls (for example, telephones) with their leading edges between 27 in and 80 in (685 mm and 2030 mm) above the finished floor shall protrude no more than 4 in (100 mm) into walks, halls, corridors, passageways, or aisles (see Fig. 8(a)). Objects mounted with their leading edges at or below 27 in (685 mm) above the finished floor may protrude any amount (see Fig. 8(a) and (b)). Free-standing objects mounted on posts or pylons may overhang 12 in (305 mm) maximum from 27 in to 80 in (685 mm to 2030 mm) above the ground or finished floor (see Fig. 8(c) and (d)). Protruding objects shall not reduce the clear width of an accessible route or maneuvering space (see Fig. 8(e)).

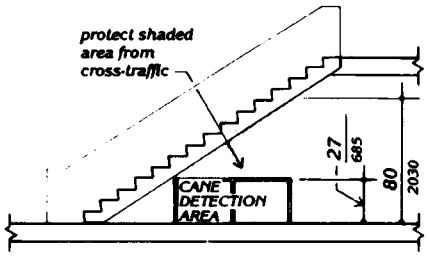
4.4.2 Head Room. Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 80 in (2030 mm) minimum clear head room (see Fig. 8(a)). *If vertical clearance of an area adjoining an accessible route is reduced to less than 80 in (nominal dimension), a barrier to warn blind or visually-impaired persons shall be provided (see Fig. 8(c)).*

20

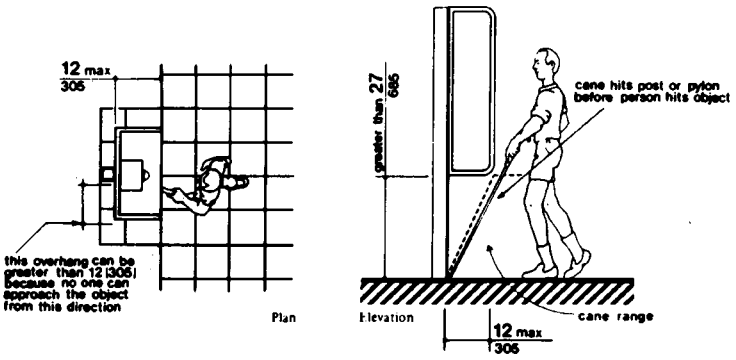
4.4 Protruding Objects



(c) Free-Standing Overhanging Objects



(c) Overhead Hazards



(d)
Objects Mounted on Posts or Pylons

Fig. 8
Protruding Objects *(Continued)*

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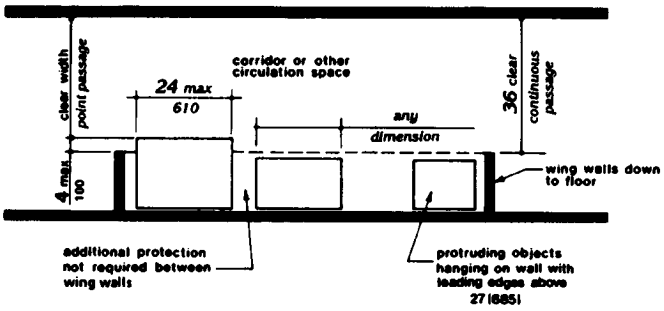
4.4 Protruding Objects



(e)
Example of Protection around Wall-Mounted Objects and Measurements of Clear Widths

Fig. 8
Protruding Objects *(Continued)*

4.5 Ground and Floor Surfaces.

4.5.1* General. Ground and floor surfaces along accessible routes and in accessible rooms and spaces, including floors, walks, ramps, stairs, and curb ramps, shall be stable, firm, *slip-resistant*, and shall comply with 4.5.

4.5.2 Changes in Level. Changes in level up to 1/4 in (6 mm) may be vertical and without edge treatment *(see Fig. 7(c))*. Changes in level between 1/4 in and 1/2 in (6 mm and 13 mm) shall be beveled with a slope no greater than 1:2 *(see Fig. 7(d))*. Changes in level greater than 1/2 in (13 mm) shall be accomplished by means of a ramp that complies with 4.7 or 4.8.

4.5.3* Carpet. If carpet or carpet tile is used on a ground or floor surface, then it shall be securely attached; have a firm cushion, pad, or backing or no cushion or pad; and have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. The maximum pile height shall be 1/2 in (13 mm). Exposed edges of carpet shall be fastened to floor surfaces and have trim along the entire length of the exposed edge. Carpet edge trim shall comply with 4.5.2. *If carpet tile is used on an accessible ground or floor surface, it shall have a maximum combined thickness of pile, cushion, and backing height of 1/2 in (13 mm) (see Fig. 8(f)).*

4.5.4 Gratings. If gratings are located in walking surfaces, then they shall have spaces no greater than 1/2 in (13 mm) wide in one direction *(see Fig. 8(g))*. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel *(see Fig. 8(h))*.

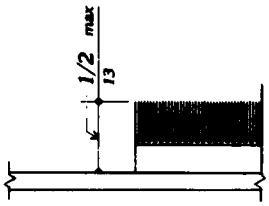


Fig. 8(f)
Carpet Tile Thickness

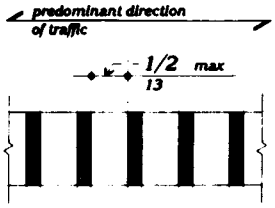


Fig. 8(g)
Gratings

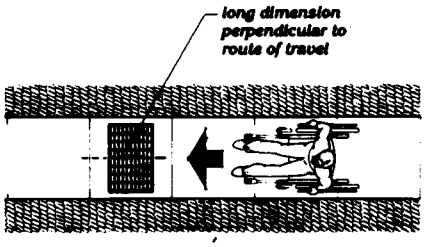


Fig. 8(h)
Grating Orientation

4.6 Parking and Passenger Loading Zones.

4.6.1 Minimum Number. *Parking spaces required to be accessible by 4.1 shall comply with 4.6.2 through 4.6.4. Passenger loading zones required to be accessible by 4.1 shall comply with 4.6.5 and 4.6.6.*

4.6.2 Location. Parking spaces for disabled people and accessible passenger loading zones that serve a particular building shall be *the spaces or zones located closest to the nearest accessible entrance on an accessible route.* In separate parking structures or lots that do not serve a particular building, parking spaces for disabled people shall be located on the shortest possible circulation route to an accessible pedestrian entrance of the parking facility.

4.6.3* Parking Spaces. Parking spaces for disabled people shall be at least 96 in (2440 mm) wide and shall have an adjacent access aisle 60 in (1525 mm) wide minimum (see Fig. 9). Parking access aisles shall be part of an accessible route to the building or facility entrance and shall comply with 4.3. Two accessible parking spaces may share a common access aisle. Parked vehicle overhangs shall not reduce the clear width of an accessible circulation route. *Parking spaces and access aisles shall be level with surface slopes not exceeding 1:50 in all directions.*

EXCEPTION: If accessible parking spaces for vans designed for handicapped persons are provided, each should have an adjacent access aisle at least 96 in (2440 mm) wide complying with 4.5, Ground and Floor Surfaces.

4.6.4* Signage. Accessible parking spaces shall be designated as reserved for the disabled by a sign showing the symbol of accessibility (see 4.30.5). Such signs shall not be obscured by a vehicle parked in the space.

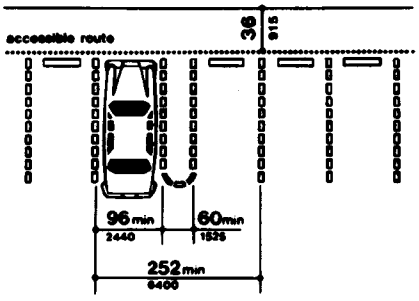


Fig. 9
Dimensions of Parking Spaces

4.6 Parking and Passenger Loading Zones

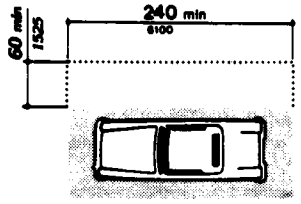


Fig. 10
Access Aisle at Passenger Loading Zones

4.6.5 Passenger Loading Zones. Passenger loading zones shall provide an access aisle at least 60 in (1525 mm) wide and 20 ft (6 m) long adjacent and parallel to the vehicle pull-up space (see Fig. 10). If there are curbs between the access aisle and the vehicle pull-up space, then a curb ramp complying with 4.7 shall be provided. *Vehicle standing spaces and access aisles shall be level with surface slopes not exceeding 1:50 in all directions.*

4.6.6 *Vertical Clearance.* *Provide minimum vertical clearances of 114 in at accessible passenger loading zones and along vehicle access routes to such areas from site entrances. If accessible van parking spaces are provided, then the minimum vertical clearance should be 114 in.*

4.7 Curb Ramps.

4.7.1 Location. Curb ramps complying with 4.7 shall be provided wherever an accessible route crosses a curb.

4.7.2 Slope. Slopes of curb ramps shall comply with 4.8.2. The slope shall be measured as shown in Fig. 11. *Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes. Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb ramp, or accessible route shall not exceed 1:20.*

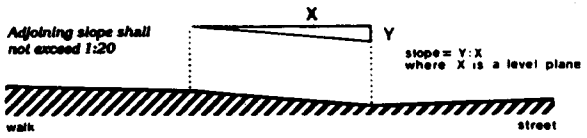
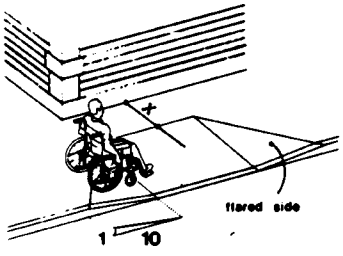
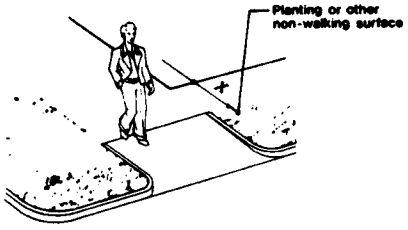


Fig. 11
Measurement of Curb Ramp Slopes



(a)
Flared Sides



(b)
Returned Curb

If X is less than 48 in, then the slope of the flared side shall not exceed 1:12.

Fig. 12
Sides of Curb Ramps

4.7.3 Width. The minimum width of a curb ramp shall be 36 in (915 mm), exclusive of flared sides.

4.7.4 Surface. Surfaces of curb ramps shall comply with 4.5.

4.7.5 Sides of Curb Ramps. If a curb ramp is located where pedestrians must walk across the ramp, *or where it is not protected by handrails or guardrails,* then it shall have flared sides; the maximum slope of the flare shall be 1:10 (see Fig. 12(a)). Curb ramps with returned curbs may be used where pedestrians would not normally walk across the ramp (see Fig. 12(b)).

4.7.6 Built-up Curb Ramps. Built-up curb ramps shall be located so that they do not project into vehicular traffic lanes (see Fig. 13).

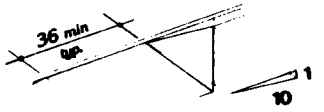


Fig. 13
Built-Up Curb Ramp

4.7.7 Warning Textures. *(Removed and reserved).*

4.7.8 Obstructions. Curb ramps shall be located or protected to prevent their obstruction by parked vehicles.

4.7.9 Location at Marked Crossings. Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides (see Fig. 15).

4.7.10 Diagonal Curb Ramps. If diagonal (or corner type) curb ramps have returned curbs or other well-defined edges, such edges shall be parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have 48 in (1220 mm) minimum clear space as shown in Fig. 15(c) and (d). If diagonal curb ramps are provided at marked crossings, the 48 in (1220 mm) clear space shall be within the markings (see Fig. 15(c) and (d)). If diagonal curb ramps have flared sides, they shall also have at least a 24 in (610 mm) long segment of straight curb located on each side of the curb ramp and within the marked crossing (see Fig. 15(c)).

4.7.11 Islands. Any raised islands in crossings shall be cut through level with the street or have curb ramps at both sides and a level area at least 48 in (1220 mm) long in the part of the island intersected by the crossings (see Fig. 15(a) and (b)).

4.7.12 Uncurbed Intersections. *(Removed and reserved).*

4.8 Ramps.

4.8.1* General. Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with 4.8.

4.8.2* Slope and Rise. The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be 30 in (760 mm) (see Fig. 16). Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as shown in Table 2 if space limitations prohibit the use of a 1:12 slope or less *(see 4.1.6).*

4.8.3 Clear Width. The minimum clear width of a ramp shall be 36 in (915 mm).

4.8.4 Landings. Ramps shall have level landings at the bottom and top of each run. Landings shall have the following features:

(1) The landing shall be at least as wide as the ramp run leading to it.

(2) The landing length shall be a minimum of 60 in (1525 mm) clear.

(3) If ramps change direction at landings, the minimum landing size shall be 60 in by 60 in (1525 mm by 1525 mm).

(4) If a doorway is located at a landing, then the area in front of the doorway shall comply with 4.13.6.

4.8.5* Handrails. If a ramp run has a rise greater than 6 in (250 mm) or a horizontal projection greater than 72 in (1830 mm), then it shall have handrails on both sides. Handrails are not required on curb ramps. Handrails shall comply with 4.26 and shall have the following features:

(1) Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback or dogleg ramps shall always be continuous.

(2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top and bottom of the ramp segment and shall be parallel with the floor or ground surface.

(3) The clear space between the handrail and the wall shall be 1-1/2 in (38 mm).

(4) Gripping surfaces shall be continuous.

(5) *Top of handrail gripping surfaces shall be mounted between 30 in and 34 in (760 mm and 865 mm) above ramp surfaces.*

(6) *Ends of handrails shall be either rounded or returned smoothly to floor, wall, or post.*

(7) *Handrails shall not rotate within their fittings.*

4.8 Ramps

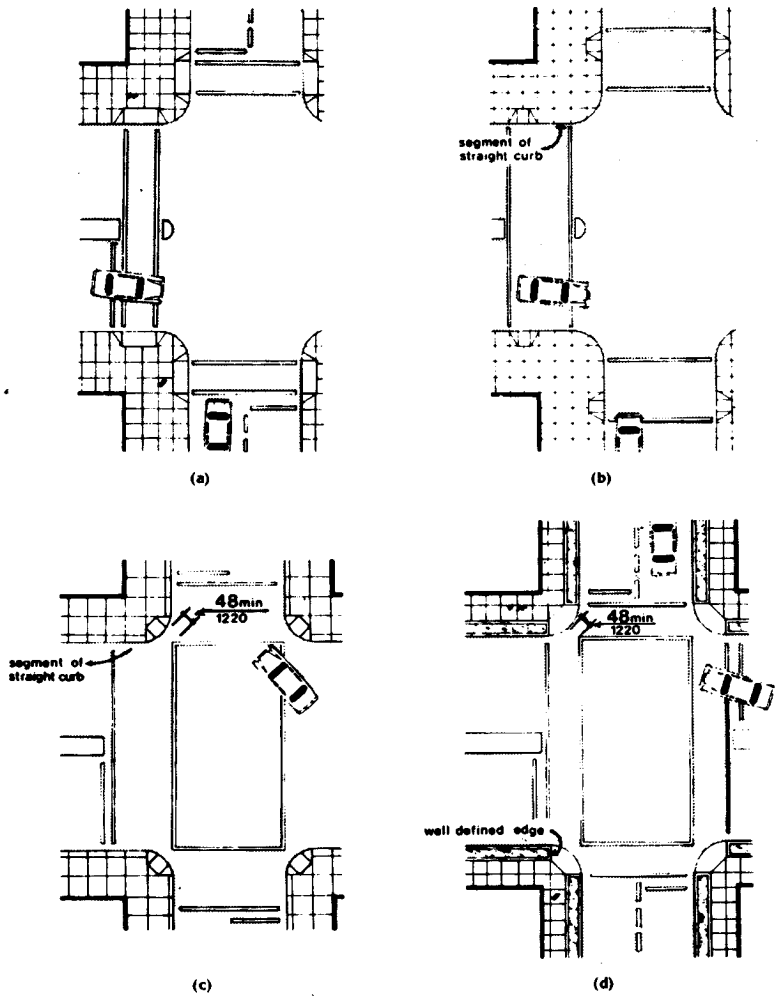


Fig. 15
Curb Ramps at Marked Crossings

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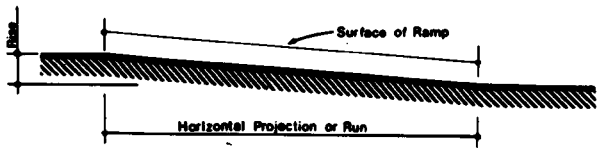

Slope	Maximum Rise in	Maximum Rise mm	Maximum Horizontal Projection ft	Maximum Horizontal Projection m
1:12 to < 1:16	30	760	30	9
1:16 to < 1:20	30	760	40	12

Fig. 16
Components of a Single Ramp Run and Sample Ramp Dimensions

4.8.6 Cross Slope and Surfaces. The cross slope of ramp surfaces shall be no greater than 1:50. Ramp surfaces shall comply with 4.5.

4.8.7 Edge Protection. Ramps and landings with drop-offs shall have curbs, walls, railings, or projecting surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 in (50 mm) high (see Fig. 17).

4.8.8 Outdoor Conditions. Outdoor ramps and their approaches shall be designed so that water will not accumulate on walking surfaces.

4.9 Stairs.

4.9.1 Minimum Number. Stairs *required to be accessible by 4.1 shall comply with 4.9.*

4.9.2 Treads and Risers. On any given flight of stairs, all steps shall have uniform riser heights and uniform tread widths. Stair treads shall be no less than 11 in (280 mm) wide, measured from riser to riser (see Fig. 18(a)). *Open risers are not permitted on accessible routes.*

4.9.3 Nosings. The undersides of nosings shall not be abrupt. The radius of curvature at the leading edge of the tread shall be no greater than 1/2 in (13 mm). Risers shall be sloped or the underside of the nosing shall have an angle not less than 60 degrees from the horizontal. Nosings shall project no more than 1-1/2 in (38 mm) (see Fig. 18).

4.9.4 Handrails. Stairways shall have handrails at both sides of all stairs. Handrails shall comply with 4.26 and shall have the following features:

(1) Handrails shall be continuous along both sides of stairs. The inside handrail on switchback or dogleg stairs shall always be continuous (see Fig. 19(a) and (b)).

(2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top riser and at least 12 in (305 mm) plus the width of one tread beyond the bottom riser. At the top, the extension shall be parallel with the floor or ground surface. At the bottom, the handrail shall continue to slope for a distance of the width of one tread from the bottom riser; the remainder of the extension shall be horizontal (see Fig. 19(c) and (d)). Handrail extensions shall comply with 4.4.

(3) The clear space between handrails and wall shall be 1-1/2 in (38 mm).

(4) Gripping surfaces shall be uninterrupted by newel posts, other construction elements, or obstructions.

(5) *Top of handrail gripping surface shall be mounted between 30 in and 34 in (760 mm and 865 mm) above stair nosings.*

(6) *Ends of handrails shall be either rounded or returned smoothly to floor, wall, or post.*

(7) *Handrails shall not rotate within their fittings.*

4.9.5 Tactile Warnings at Stairs. *(Removed and reserved).*

4.9.6 Outdoor Conditions. Outdoor stairs and their approaches shall be designed so that water will not accumulate on walking surfaces.

4.9 Stairs

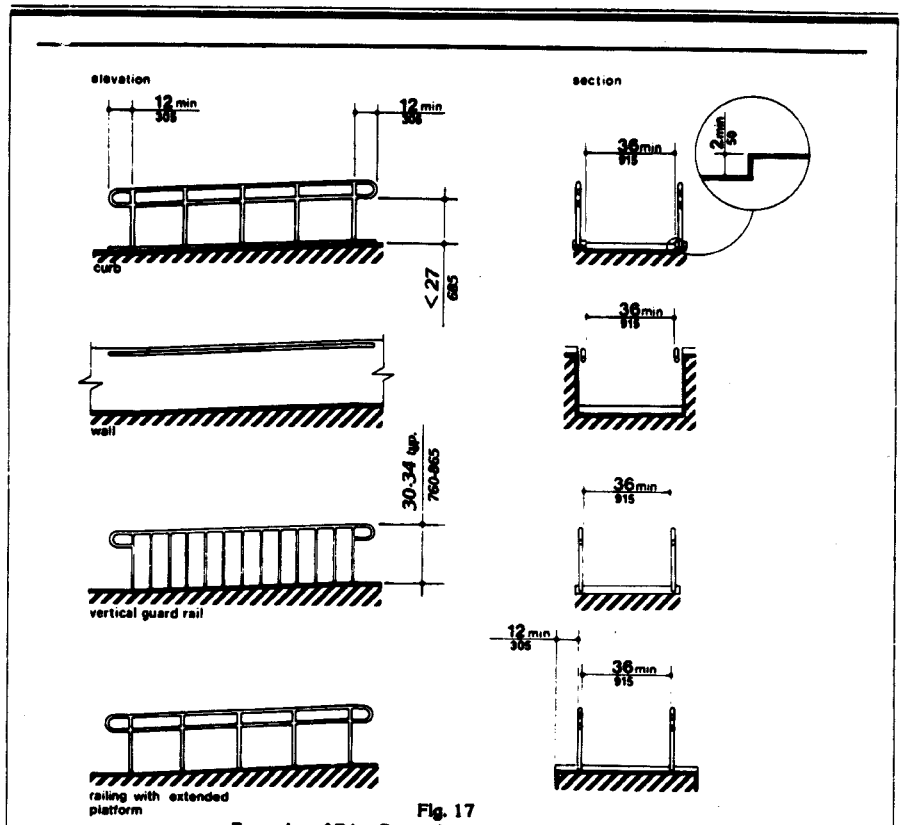

Fig. 17
Examples of Edge Protection and Handrail Extensions

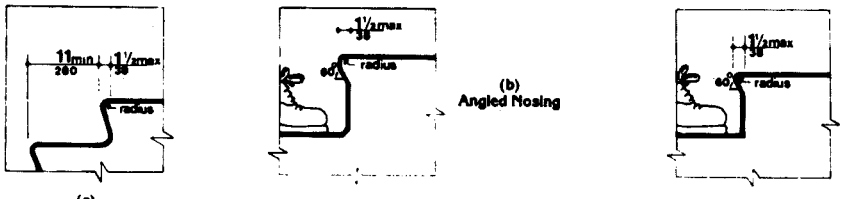

Fig. 18
Usable Tread Width and Examples of Acceptable Nosings

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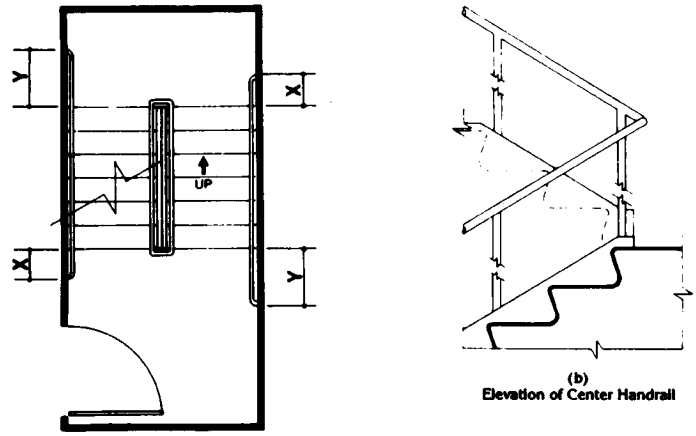
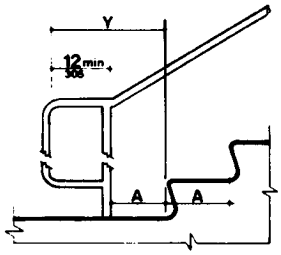
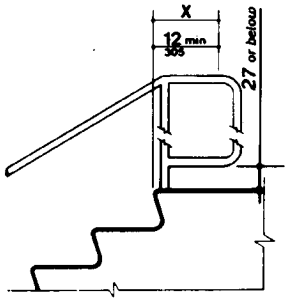


(a)
Plan

(b)
Elevation of Center Handrail



(c)
Extension at Bottom of Run



(d)
Extension at Top of Run

NOTE:
X is the 12 in minimum handrail extension required at each top riser.

Y is the minimum handrail extension of 12 in plus the width of one tread that is required at each bottom riser.

Fig. 19
Stair Handrails

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4.10 Elevators

4.10 Elevators.

4.10.1 General. *Accessible* elevators shall be on an accessible route and shall comply with 4.10 and with the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks, ANSI A17.1-1978 and A17.1a-1979. This standard does not preclude the use of residential or fully enclosed wheelchair lifts when appropriate and approved by administrative authorities. *Freight elevators shall not be considered as meeting the requirements of this section, unless the only elevators provided are used as combination passenger and freight elevators for the public and employees.*

4.10.2 Automatic Operation. Elevator operation shall be automatic. Each car shall be equipped with a self-leveling feature that will automatically bring the car to floor landings within a tolerance of 1/2 in (13 mm) under rated loading to zero loading conditions. This self-leveling feature shall be automatic and independent of the operating device and shall correct the overtravel or undertravel.

4.10.3 Hall Call Buttons. Call buttons in elevator lobbies and halls shall be centered at 42 in (1065 mm) above the floor. Such call buttons shall have visual signals to indicate when each call is registered and when each call is answered. Call buttons shall be a minimum of 3/4 in (19 mm) in the smallest dimension. The button designating the up direction shall be on top (see Fig. 20). *Buttons shall be raised or flush. Objects mounted beneath hall call buttons shall not project into the elevator lobby more than 4 in (100 mm).*

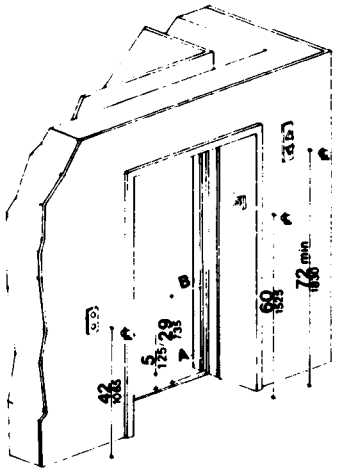
4.10.4 Hall Lanterns. A visible and audible signal shall be provided at each hoistway entrance to indicate which car is answering a call. Audible signals shall sound once for the up direction and twice for the down direction or shall have verbal annunciators that say "up" or "down." Visible signals shall have the following features:

(1) Hall lantern fixtures shall be mounted so that their centerline is at least 72 in (1830 mm) above the lobby floor.

(2) Visual elements shall be at least 2-1/2 in (64 mm) in the smallest dimension.

(3) Signals shall be visible from the vicinity of the hall call button. In-car lanterns located in cars, visible from the vicinity of hall call buttons, and conforming to the above requirements, shall be acceptable (see Fig. 20).

4.10.5 *Raised* Characters on Hoistway Entrances. All elevator hoistway entrances shall have *raised* floor designations provided on both jambs. The centerline of the characters shall be 60 in (1525 mm) from the floor. Such characters shall be 2 in (50 mm) high and shall comply with 4.30. Permanently applied plates are acceptable if they are permanently fixed to the jambs. (See Fig. 20).



NOTE: The automatic door reopening device is activated if an object passes through either line A or line B. Line A and line B represent the vertical locations of the door reopening device not requiring contact.

Fig. 20
Hoistway and Elevator Entrances

4.10.6* Door Protective and Reopening Device. Elevator doors shall open and close automatically. They shall be provided with a reopening device that will stop and reopen a car door and hoistway door automatically if the door becomes obstructed by an object or person. The device shall be capable of completing these operations without requiring contact for an obstruction passing through the opening at heights of 5 in and 29 in (125 mm and 735 mm) from the floor (see Fig. 20). Door reopening devices shall remain effective for at least 20 seconds. After such an interval, doors may close in accordance with the requirements of ANSI A17.1-1978 and A17.1a-1979.

4.10.7* Door and Signal Timing for Hall Calls. The minimum acceptable time from notification that a car is answering a call until the doors of that car start to close shall be calculated from the following equation:

$$T = \frac{D}{1.5\ ft/s} \qquad \text{or } T = \frac{D}{445\ mm/s}$$

where T = total time in seconds and D = distance (in feet or millimeters) from a point in the lobby or corridor 60 in (1525 mm) directly in front of the farthest

call button controlling that car to the centerline of its hoistway door (see Fig. 21). For cars with in-car lanterns, T begins when the lantern is visible from the vicinity of hall call buttons and an audible signal is sounded. *The minimum acceptable notification time shall be 5 seconds.*

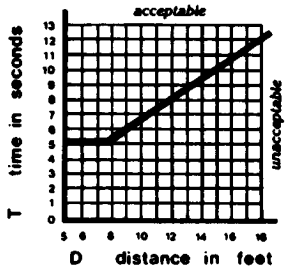


Fig. 21
Graph of Timing Equation

4.10.8 Door Delay for Car Calls. The minimum time for elevator doors to remain fully open in response to a car call shall be 3 seconds.

4.10.9 Floor Plan of Elevator Cars. The floor area of elevator cars shall provide space for wheelchair users to enter the car, maneuver within reach of controls, and exit from the car. Acceptable door opening and inside dimensions shall be as shown in Fig. 22. The clearance between the car platform sill and the edge of any hoistway landing shall be no greater than 1-1/4 in (32 mm).

4.10.10 Floor Surfaces. Floor surfaces shall comply with 4.5.

4.10.11 Illumination Levels. The level of illumination at the car controls, platform, and car threshold and landing sill shall be at least 5 footcandles (53.8 lux).

4.10.12* Car Controls. Elevator control panels shall have the following features:

(1) Buttons. All control buttons shall be at least 3/4 in (19 mm) in their smallest dimension. They may be *raised* or flush.

(2) Tactile and Visual Control Indicators. All control buttons shall be designated by *raised* standard alphabet characters for letters, arabic characters for numerals, or standard symbols as shown in Fig. 23(a), and as required in ANSI A17.1-1978 and A17.1a-1979. Raised characters and symbols shall comply with 4.30. The call button for the main entry floor shall be

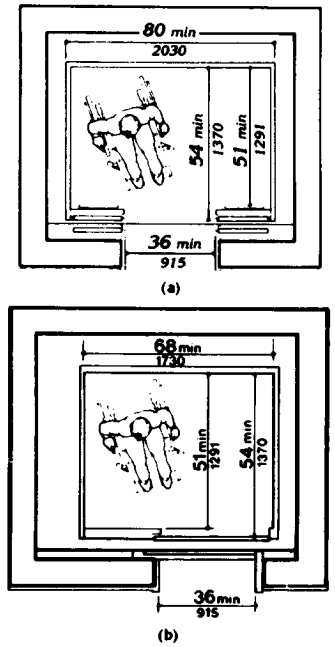
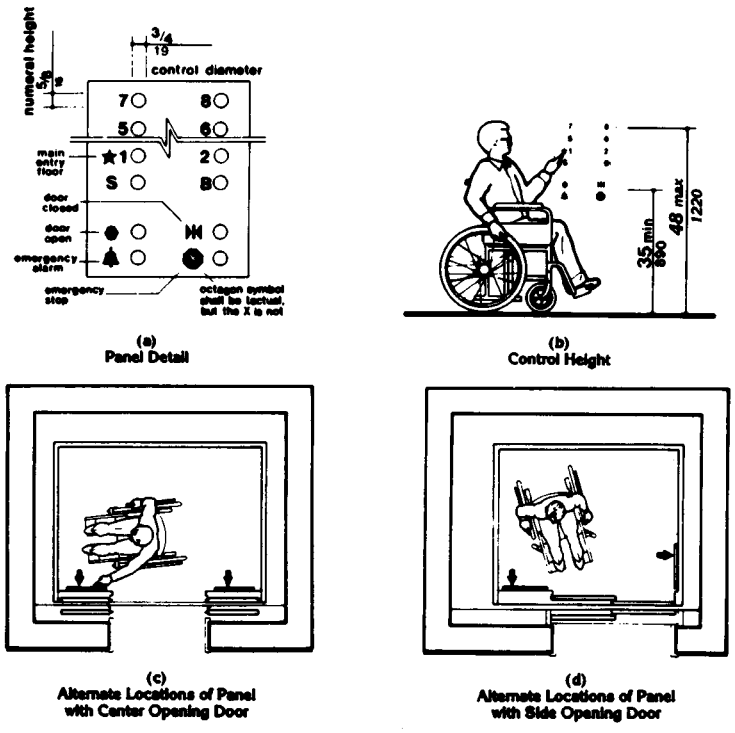


Fig. 22
Minimum Dimensions of Elevator Cars

designated by a *raised* star at the left of the floor designation (see Fig. 23(a)). All *raised* designations for control buttons shall be placed immediately to the left of the button to which they apply. Applied plates, permanently attached, are an acceptable means to provide *raised* control designations. Floor buttons shall be provided with visual indicators to show when each call is registered. The visual indicators shall be extinguished when each call is answered.

(3) Height. All floor buttons shall be no higher than *48 in (1220 mm), unless there is a substantial increase in cost, in which case the maximum mounting height may be increased to 54 in (1370 mm),* above the floor. Emergency controls, including the emergency alarm and emergency stop, shall be grouped at the bottom of the panel and shall have their centerlines no less than 35 in (890 mm) above the floor (see Fig. 23(a) and (b)).

4.10 Elevators



(a) Panel Detail

(b) Control Height

(c) Alternate Locations of Panel with Center Opening Door

(d) Alternate Locations of Panel with Side Opening Door

Fig. 23
Car Controls

(4) Location. Controls shall be located on a front wall if cars have center opening doors, and at the side wall or at the front wall next to the door if cars have side opening doors (see Fig. 23(c) and (d)).

4.10.13* Car Position Indicators. In elevator cars, a visual car position indicator shall be provided above the car control panel or over the door to show the position of the elevator in the hoistway. As the car passes or stops at a floor served by the elevators, the corresponding numerals shall illuminate, and an audible signal shall sound. Numerals shall be a minimum of 1/2 in (13 mm) high. The audible signal shall be no less than 20 decibels with a frequency no higher than 1500 Hz. An automatic verbal announcement of the floor number at which a car stops or which a car passes may be substituted for the audible signal.

4.10.14* Emergency Communications. If provided, emergency two-way communication systems between the elevator and a point outside the hoistway shall comply with ANSI A17.1-1978 and A17.1a-1979. The highest operable part of a two-way communication system shall be a maximum of 48 in (1220 mm) from the floor of the car. It shall be identified by a raised or recessed symbol and lettering complying with 4.30 and located adjacent to the device. If the system uses a handset, then the length of the cord from the panel to

the handset shall be at least 29 in (735 mm). *If the system is located in a closed compartment, the compartment door hardware shall conform to 4.27, Controls and Operating Mechanisms. The emergency intercommunication system shall not require voice communication.*

4.11* Platform Lifts.

4.11.1 Location. *Platform lifts permitted by 4.1 shall comply with the requirements of 4.11.*

4.11.2 Other Requirements. If platform lifts are used, they shall comply with 4.2.4, 4.5, 4.27, and the applicable safety regulations of administrative authorities having jurisdiction.

4.11.3 *Entrance.* *If platform lifts are used, then they should facilitate unassisted entry and exit from the lift in compliance with 4.11.2.*

4.12 Windows. *(Reserved).*

4.13 Doors.

4.13.1 General. *Doors required to be accessible by 4.1 shall comply with the requirements of 4.13.*

4.13.2 Revolving Doors and Turnstiles. Revolving doors or turnstiles shall not be the only means of passage at an accessible entrance or along an accessible route. *An accessible gate or door shall be provided adjacent to the turnstile or revolving door and shall be so designed as to facilitate the same use pattern.*

4.13.3 Gates. Gates, including ticket gates, shall meet all applicable specifications of 4.13.

4.13.4 Double-Leaf Doorways. If doorways have two *independently operated* door leaves, then at least one leaf shall meet the specifications in 4.13.5 and 4.13.6. That leaf shall be an active leaf.

4.13.5 Clear Width. Doorways shall have a minimum clear opening of 32 in (815 mm) with the door open 90 degrees, measured between the face of the door and the stop (see Fig. 24(a), (b), (c), and (d)). Openings more than 24 in (610 mm) in depth shall comply with 4.2.1 and 4.3.3 (see Fig. 24(e)).

EXCEPTION: Doors not requiring full user passage, such as shallow closets, may have the clear opening reduced to 20 in (510 mm) minimum.

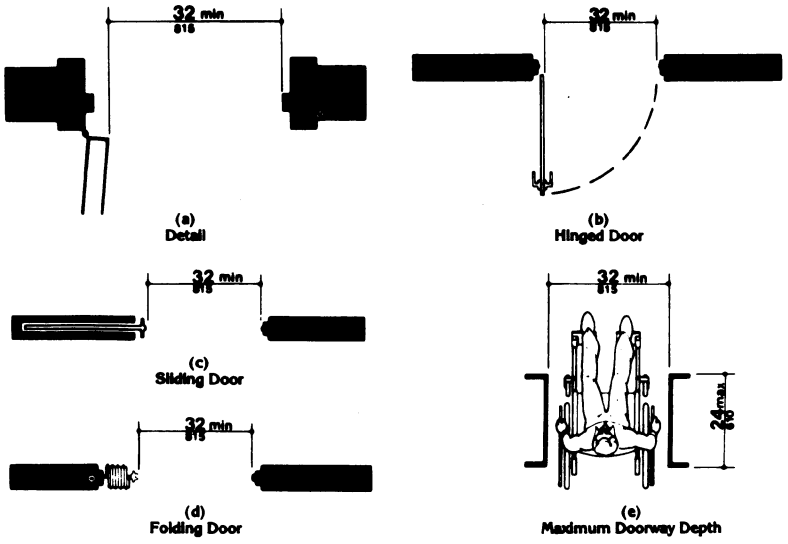
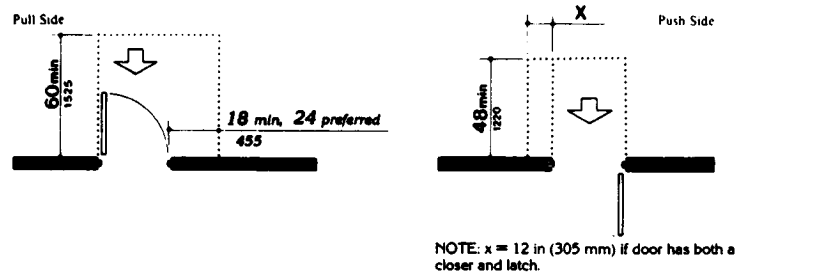


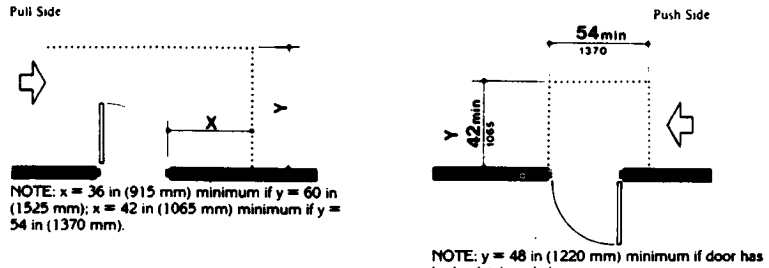
Fig. 24
Clear Doorway Width and Depth

4.13 Doors



NOTE: x = 12 in (305 mm) if door has both a closer and latch.

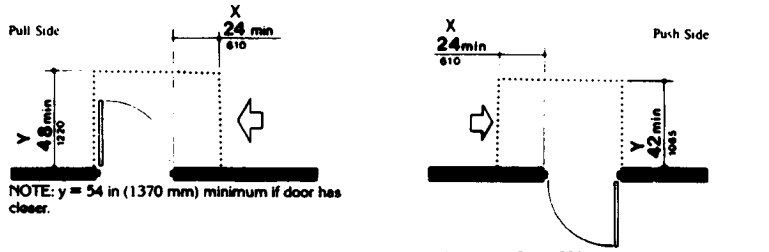
(a)
Front Approaches — Swinging Doors



NOTE: x = 36 in (915 mm) minimum if y = 60 in (1525 mm); x = 42 in (1065 mm) minimum if y = 54 in (1370 mm).

NOTE: y = 48 in (1220 mm) minimum if door has both a latch and closer.

(b)
Hinge Side Approaches — Swinging Doors



NOTE: y = 54 in (1370 mm) minimum if door has closer.

NOTE: y = 48 in (1220 mm) minimum if door has closer.

(c)
Latch Side Approaches — Swinging Doors

NOTE: All doors in alcoves shall comply with the clearances for front approaches.

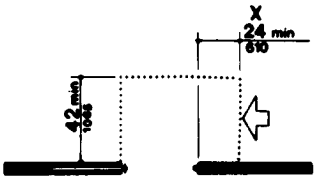
Fig. 25
Maneuvering Clearances at Doors

34



(d)
Front Approach — Sliding Doors *and Folding Doors*

(e)
Slide Side Approach — Sliding Doors *and Folding Doors*



(f)
Latch Side Approach — Sliding Doors *and Folding Doors*

NOTE: All doors in alcoves shall comply with the clearances for front approaches.

Fig. 25
Maneuvering Clearances at Doors *(Continued)*

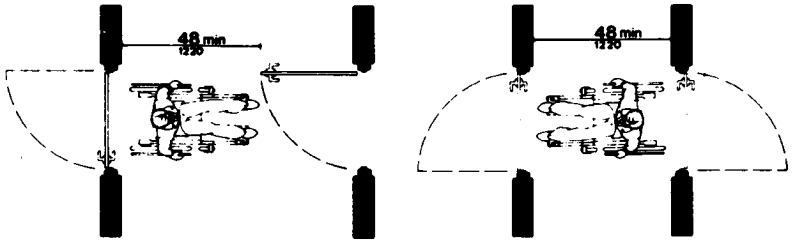


Fig. 26
Two Hinged Doors in Series

4.13 Doors

4.13.6 Maneuvering Clearances at Doors. Minimum maneuvering clearances at doors that are not automatic or power-assisted shall be as shown in Fig. 25. The floor or ground area within the required clearances shall be level and clear. Entry doors to acute care hospital bedrooms for in-patients shall be exempted from the requirement for space at the latch side of the door (see dimension "x" in Fig. 25) if the door is at least 44 in (1120 mm) wide.

4.13.7 Two Doors in Series. The minimum space between two hinged or pivoted doors in series shall be 48 in (1220 mm) plus the width of any door swinging into the space. Doors in series shall swing either in the same direction or away from the space between the doors (see Fig. 26).

4.13.8* Thresholds at Doorways. Thresholds at doorways shall not exceed 3/4 in (19 mm) in height for exterior sliding doors or 1/2 in (13 mm) for other types of doors. Raised thresholds and floor level changes at accessible doorways shall be beveled with a slope no greater than 1:2 (see 4.5.2).

4.13.9* Door Hardware. Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate. Lever-operated mechanisms, push-type mechanisms, and U-shaped handles are acceptable designs. When sliding doors are fully open, operating hardware shall be exposed and usable from both sides. In dwelling units, only doors at accessible entrances to the unit itself shall comply with the requirements of this paragraph. Doors to hazardous areas shall have hardware complying with 4.29.3. *Mount no hardware required for accessible door passage higher than 48 in (1220 mm) above finished floor.*

4.13.10* Door Closers. If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 in (75 mm) from the latch, measured to the leading edge of the door.

4.13.11* Door Opening Force. The maximum force for pushing or pulling open a door shall be as follows:

(1) Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.

(2) Other doors.

(a) exterior hinged doors: *(Reserved).*

(b) interior hinged doors: 5 lbf (22.2N)

(c) sliding or folding doors: 5 lbf (22.2N)

These forces do not apply to the force required to retract latch bolts or disengage other devices that may hold the door in a closed position.

4.13.12* Automatic Doors and Power-Assisted Doors. If an automatic door is used, then it shall comply with American National Standard for Power-Operated Doors, ANSI A156.10-1979. Slowly opening, low-powered, automatic doors shall be considered a type of custom design installation as described in paragraph 1.1.1 of ANSI A156.10-1979. Such doors shall not open to back check faster than 3 seconds and shall require no more than 15 lbf (66.6N) to stop door movement. If a power-assisted door is used, its door-opening force shall comply with 4.13.11 and its closing shall conform to the requirements in section 10 of ANSI A156.10-1979.

4.14 Entrances.

4.14.1 Minimum Number. *Entrances required to be accessible by 4.1* shall be part of an accessible route and shall comply with 4.3. Such entrances shall be connected by an accessible route to public transportation stops, to accessible parking and passenger loading zones, and to public streets or sidewalks if available (see 4.3.2(1)). They shall also be connected by an accessible route to all accessible spaces or elements within the building or facility.

4.14.2 Service Entrances. A service entrance shall not be the sole accessible entrance unless it is the only entrance to a building or facility (for example, in a factory or garage).

4.15 Drinking Fountains and Water Coolers.

4.15.1 Minimum Number. *Drinking fountains or water coolers required to be accessible by 4.1 shall comply with 4.15.*

4.15.2* Spout Height. Spouts shall be no higher than 36 in (915 mm), measured from the floor or ground surfaces to the spout outlet (see Fig. 27(a)).

4.15.3 Spout Location. The spouts of drinking fountains and water coolers shall be at the front of the unit and shall direct the water flow in a trajectory that is parallel or nearly parallel to the front of the unit. The spout shall provide a flow of water at least 4 in (100 mm) high so as to allow the insertion of a cup or glass under the flow of water.

4.15.4 Controls. Controls shall comply with 4.27.4. *Unit controls shall be front mounted or side mounted near the front edge.*

4.15.5 Clearances.

(1) Wall- and post-mounted cantilevered units shall have a clear knee space between the bottom of the apron and the floor or ground at least 27 in (685 mm) high, 30 in (760 mm) wide, and 17 in to 19 in (430 mm to 485 mm) deep (see Fig. 27(a) and (b)). Such units shall also have a minimum clear floor space 30 in by 48 in (760 mm by 1220 mm) to allow a person in a wheelchair to approach the unit facing forward.

(2) Free-standing or built-in units not having a clear space under them shall have a clear floor space at least 30 in by 48 in (760 mm by 1220 mm) that allows a person in a wheelchair to make a parallel approach to the unit (see Fig. 27(c) and (d)). This clear floor space shall comply with 4.2.4.

4.16 Water Closets.

4.16.1 General. Accessible water closets shall comply with 4.16. For water closets in *accessible* dwelling units, see 4.34.5.2.

4.16.2 Clear Floor Space. Clear floor space for water closets not in stalls shall comply with Fig. 28. Clear floor space may be arranged to allow either a left-handed or right-handed approach.

4.16.3* Height. The height of water closets shall be 17 in to 19 in (430 mm to 485 mm), measured to the top of the toilet seat (see Fig. 29(b)). *Seats shall not be sprung to return to a lifted position.*

4.16.4* Grab Bars. Grab bars for water closets not located in stalls shall comply with Fig. 29 and 4.26.

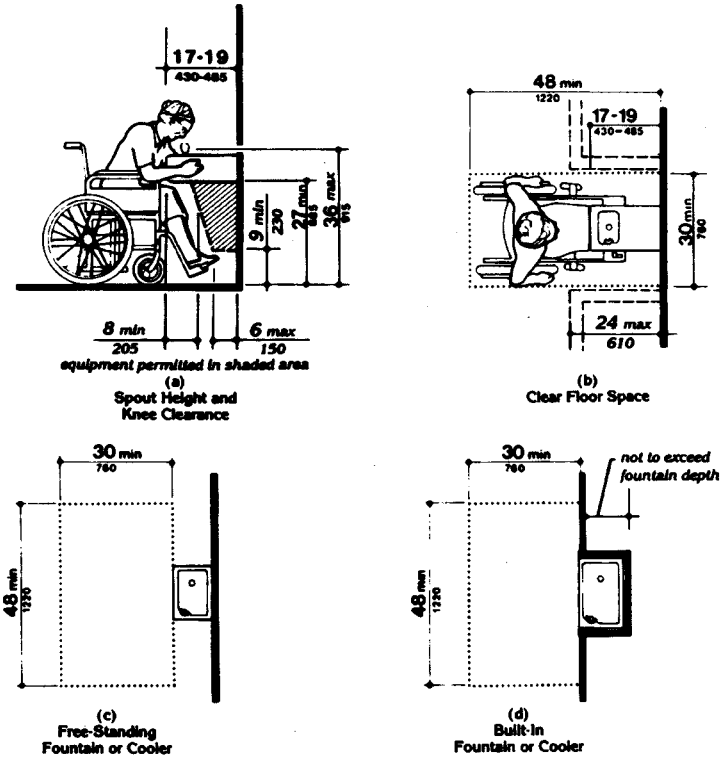


Fig. 27
Drinking Fountains and Water Coolers

37

4.16 Water Closets

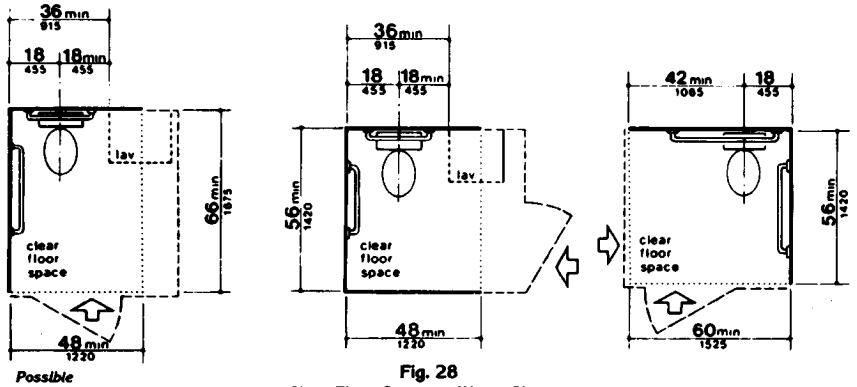


Fig. 28
Clear Floor Space at Water Closets

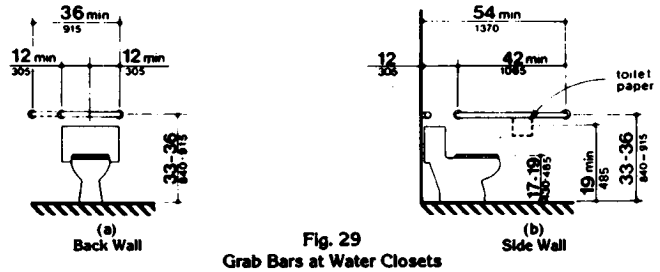


Fig. 29
Grab Bars at Water Closets

4.16.5* Flush Controls. Flush controls shall be hand operated *or automatic* and shall comply with 4.27.4. Controls for flush valves shall be mounted on the wide side of toilet areas no more than 44 in (1120 mm) above the floor.

4.16.6 Dispensers. Toilet paper dispensers shall be installed within reach, as shown in Fig. 29(b). *Dispensers that control delivery, or that do not permit continuous paper flow, shall not be used.*

4.17 Toilet Stalls.

4.17.1 Location. Accessible toilet stalls shall be on an accessible route and shall meet the requirements of 4.17.

4.17.2 Water Closets. Water closets in *accessible* stalls shall comply with 4.16.

4.17.3 Size and Arrangement. The size and arrangement of toilet stalls shall comply with Fig. 30(a). Toilet stalls with a minimum depth of 56 in (1420 mm) (see Fig. 30(a)) shall have wall-mounted water closets. If the depth of toilet stalls is increased at least 3 in (75 mm), then a floor-mounted water closet may be used. Arrangements shown for stalls may be reversed to allow either a left- or right-hand approach.

EXCEPTION: In instances of alteration work where provision of a standard stall (Fig. 30(a)) is structurally impracticable or where plumbing code requirements prevent combining existing stalls to provide space, an alternate stall (Fig. 30(b)) may be provided in lieu of the standard stall.

4.17.4 Toe Clearances. In standard stalls, the front partition and at least one side partition shall provide a toe clearance of at least 9 in (230 mm) above the floor. If the depth of the stall is greater than 60 in (1525 mm), then the toe clearance is not required.

4.17 Toilet Stalls

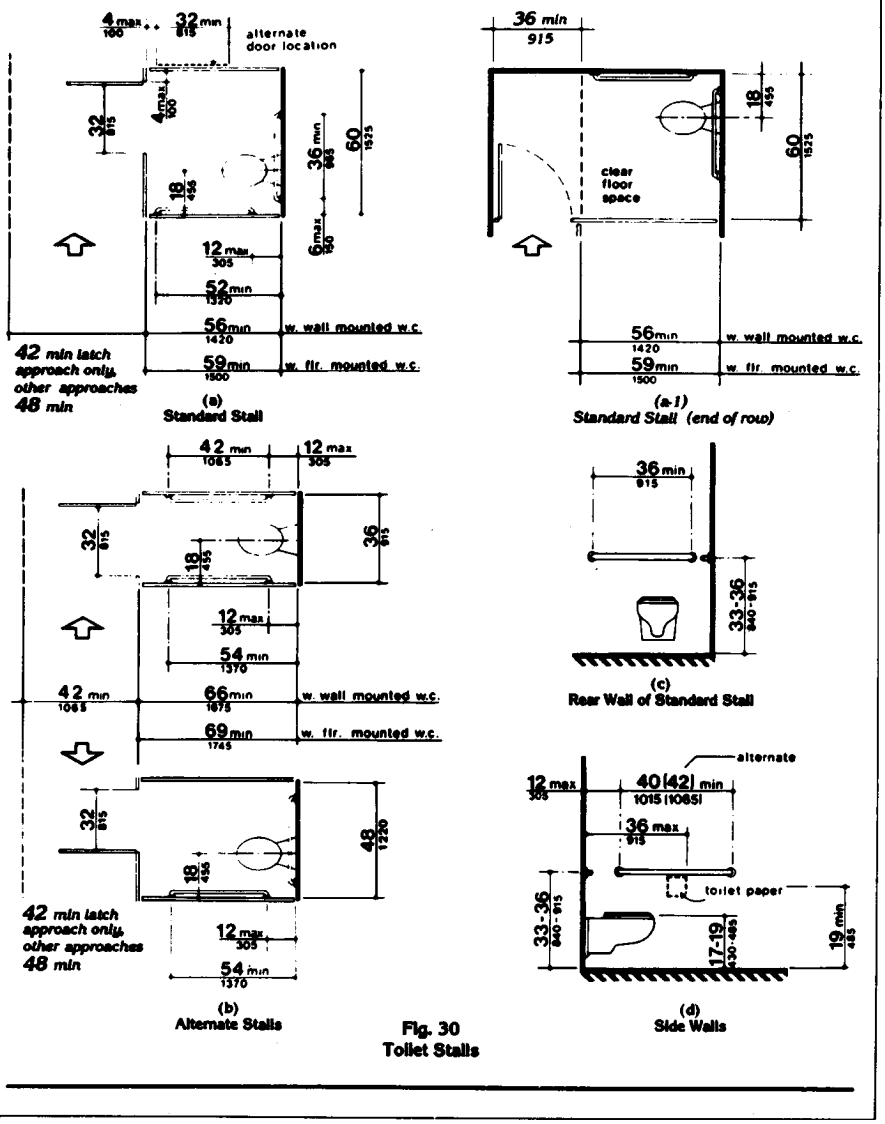


Fig. 30
Toilet Stalls

39

4.17 Toilet Stalls

4.17.5* Doors. Toilet stall doors shall comply with 4.13. *If toilet stall approach is from the latch side of the stall door, clearance between the door side of the stall and any obstruction may be reduced to a minimum of 42 in (1065 mm).*

4.17.6 Grab Bars. Grab bars complying with the length and positioning shown in Fig. 30(a), (b), (c), and (d) shall be provided. Grab bars may be mounted with any desired method as long as they have a gripping surface at the locations shown and do not obstruct the required clear floor area. Grab bars shall comply with 4.26.

4.18 Urinals.

4.18.1 General. Accessible urinals shall comply with 4.18.

4.18.2 Height. Urinals shall be stall-type or wall-hung with an elongated rim at a maximum of 17 in (430 mm) above the floor.

4.18.3 Clear Floor Space. A clear floor space 30 in by 48 in (760 mm by 1220 mm) shall be provided in front of urinals to allow forward approach. This clear space shall adjoin or overlap an accessible route and shall comply with 4.2.4. *Urinal shields that do not extend beyond the front edge of the urinal rim may be provided with 29 in (735 mm) clearance between them.*

4.18.4 Flush Controls. Flush controls shall be hand operated or automatic, and shall comply with 4.27.4, and shall be mounted no more than 44 in (1120 mm) above the floor.

4.19 Lavatories and Mirrors.

4.19.1 General. The requirements of 4.19 shall apply to lavatory fixtures, vanities, and built-in lavatories.

4.19.2 Height and Clearances. Lavatories shall be mounted with *the rim or counter surface no higher than 34 in (865 mm) above the finished floor. Provide* a clearance of at least 29 in (735 mm) from the floor to the bottom of the apron. Knee and toe clearance shall comply with Fig. 31.

4.19.3 Clear Floor Space. A clear floor space 30 in by 48 in (760 mm by 1220 mm) complying with 4.2.4 shall be provided in front of a lavatory to allow forward approach. Such clear floor space shall adjoin or overlap an accessible route and shall extend a maximum of 19 in (485 mm) underneath the lavatory (see Fig. 32).

4.19.4 Exposed Pipes and Surfaces. Hot water and drain pipes under lavatories shall be insulated or otherwise covered. There shall be no sharp or abrasive surfaces under lavatories.

4.19.5 Faucets. Faucets shall comply with 4.27.4. Lever-operated, push-type, and electronically controlled mechanisms are examples of acceptable designs. Self-closing valves are allowed if the faucet remains open for at least 10 seconds.

4.19.6* Mirrors. Mirrors shall be mounted with the bottom edge *of the reflecting surface* no higher than 40 in (1015 mm) from the floor (see Fig. 31).

4.20 Bathtubs.

4.20.1 General. Accessible bathtubs shall comply with 4.20. For bathtubs in *accessible* dwelling units, see 4.34.5.4.

4.20.2 Floor Space. Clear floor space in front of bathtubs shall be as shown in Fig. 33.

4.20.3 Seat. An in-tub seat or a seat at the head end of the tub shall be provided as shown in Fig. 33 and 34. The structural strength of seats and their attachments shall comply with 4.26.3. Seats shall be mounted securely and shall not slip during use.

4.20.4 Grab Bars. Grab bars complying with 4.26 shall be provided as shown in Fig. 33 and 34.

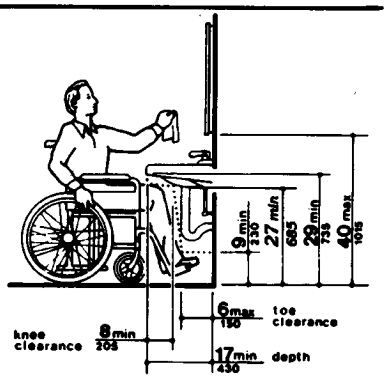


Fig. 31
Lavatory Clearances

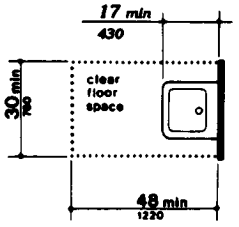


Fig. 32
Clear Floor Space at Lavatories

4.20 Bathtubs

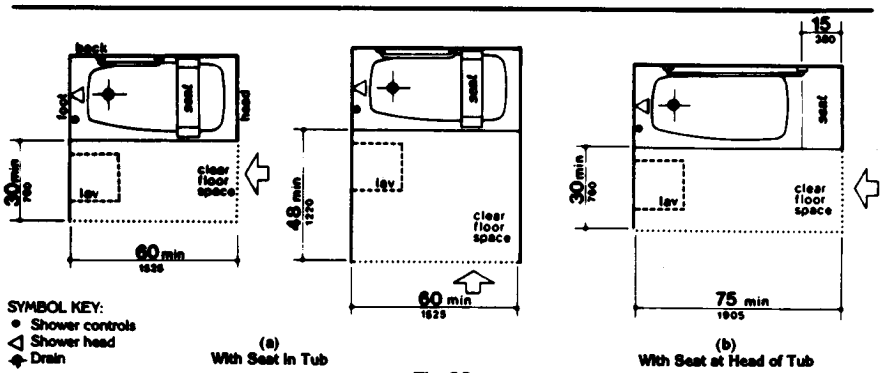


Fig. 33
Clear Floor Space at Bathtubs

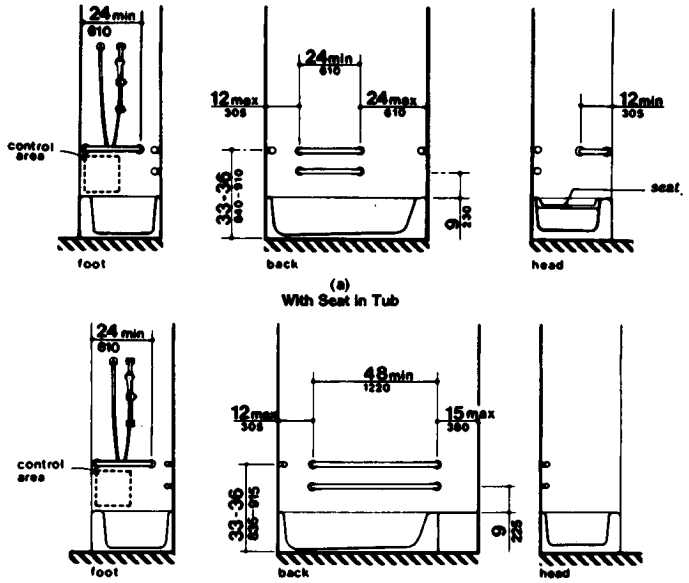


Fig. 34
Grab Bars at Bathtubs

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4.20 Bathtubs

4.20.5 Controls. Faucets and other controls complying with 4.27.4 shall be located as shown in Fig. 34.

4.20.6 Shower Unit. A shower spray unit with a hose at least 60 in (1525 mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided.

4.20.7 Bathtub Enclosures. If provided, enclosures for bathtubs shall not obstruct controls or transfer from wheelchairs onto bathtub seats or into tubs. Enclosures on bathtubs shall not have tracks mounted on their rims.

4.21 Shower Stalls.

4.21.1° General. Accessible shower stalls shall comply with 4.21. For shower stalls in *accessible* dwelling units, see 4.34.5.5.

4.21.2 Size and Clearances. Shower stall size and clear floor space shall comply with Fig. 35(a) or (b). The shower stall in Fig. 35(a) shall be 36 in by 36 in (915 mm by 915 mm). The shower stall in Fig. 35(b) will fit into the space required for a bathtub.

4.21.3 Seat. A seat shall be provided in shower stalls 36 in by 36 in (915 mm by 915 mm) and shall be as shown in Fig. 36. The seat shall be mounted 17 in to 19 in (430 mm to 485 mm) from the bathroom floor and shall extend the full depth of the stall. The seat shall be on the wall opposite the controls. The structural strength of seats and their attachments shall comply with 4.26.3.

4.21.4 Grab Bars. Grab bars complying with 4.26 shall be provided as shown in Fig. 37.

4.21.5 Controls. Faucets and other controls complying with 4.27.4 shall be located as shown in Fig. 37. In shower stalls 36 in by 36 in (915 mm by 915 mm), all controls, faucets, and the shower unit shall be mounted on the side wall opposite the seat.

4.21.6 Shower Unit. A shower spray unit with a hose at least 60 in (1525 mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided.

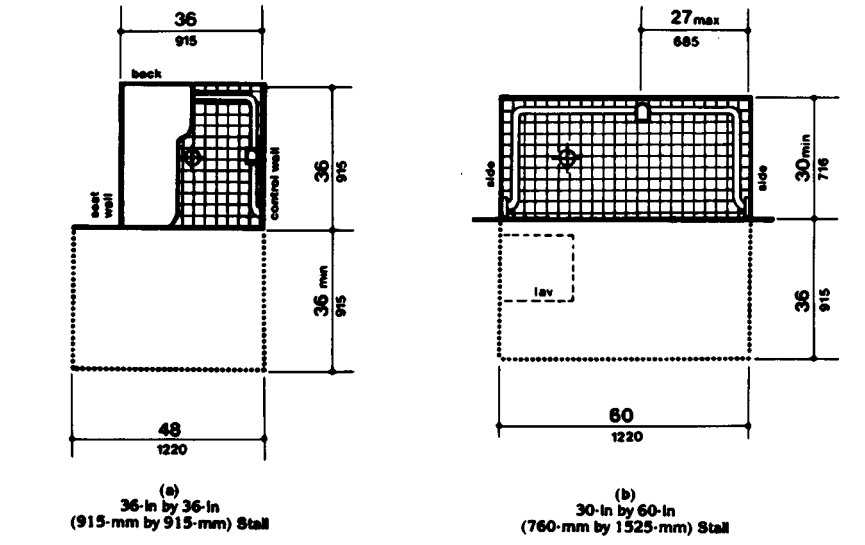


Fig. 35
Shower Size and Clearances

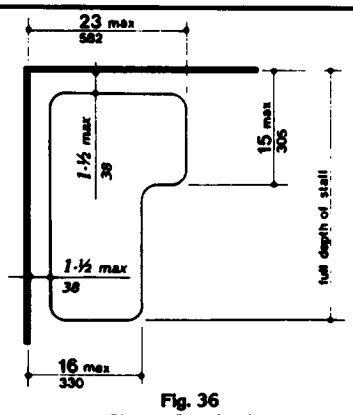


Fig. 36
Shower Seat Design

EXCEPTION: In unmonitored facilities where vandalism is a consideration, a fixed shower head mounted at 48 in (1220 mm) above the shower floor may be used in lieu of a hand-held shower head.

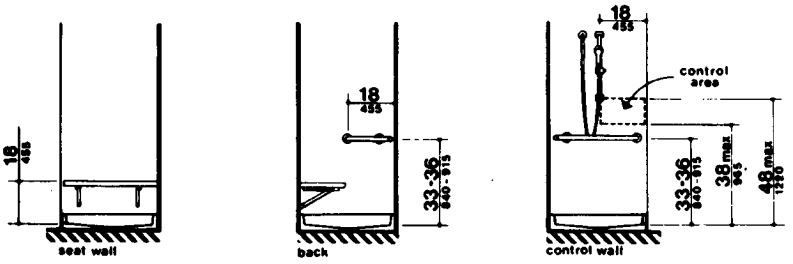
4.21.7 Curbs. If provided, curbs in shower stalls 36 in by 36 in (915 mm by 915 mm) shall be no higher than *1/2 in (13 mm).* Shower stalls that are 30 in by 60 in (760 mm by 1525 mm) shall not have curbs.

4.21.8 Shower Enclosures. If provided, enclosures for shower stalls shall not obstruct controls or obstruct transfer from wheelchairs onto shower seats.

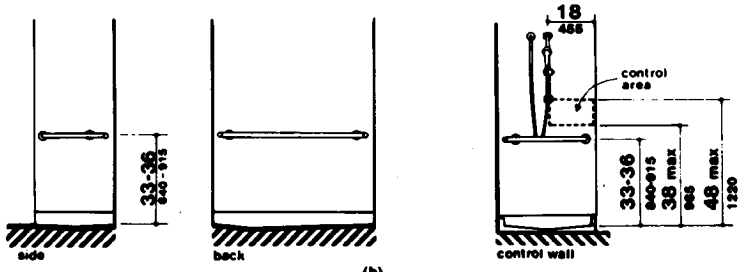
4.22 Toilet Rooms.

4.22.1 Minimum Number. *Toilet facilities required to be accessible by 4.1* shall comply with 4.22. Accessible toilet rooms shall be on an accessible route.

4.22.2 Doors. All doors to accessible toilet rooms shall comply with 4.13. Doors shall not swing into the clear floor space required for any fixture.



(a)
36-in by 36-in (915-mm by 915-mm) Stall



(b)
30-in by 60-in (760-mm by 1525-mm) Stall

Fig. 37
Grab Bars at Shower Stalls

4.22 Toilet Rooms

4.22.3 Clear Floor Space. The accessible fixtures and controls required in 4.22.4, 4.22.5, 4.22.6, and 4.22.7 shall be on an accessible route. An unobstructed turning space complying with 4.2.3 shall be provided within an accessible toilet room. The clear floor space at fixtures and controls, the accessible route, and the turning space may overlap.

EXCEPTION: In toilet rooms with only one water closet and one lavatory, a clear floor space of 30 in by 60 in (815 mm by 1525 mm) may be used in lieu of the unobstructed turning space.

4.22.4 Water Closets. If toilet stalls are provided, then at least one shall comply with 4.17; its water closet shall comply with 4.16. If water closets are not in stalls, then at least one shall comply with 4.16.

4.22.5 Urinals. If urinals are provided, *then* at least one shall comply with 4.18.

4.22.6 Lavatories and Mirrors. If lavatories and mirrors are provided, *then* at least one of each shall comply with 4.19.

4.22.7 Controls and Dispensers. If controls, dispensers, receptacles, or other equipment is provided, *then* at least one of each shall be on an accessible route and shall comply with 4.27.

4.23 Bathrooms, Bathing Facilities, and Shower Rooms.

4.23.1 Minimum Number. Bathrooms, bathing facilities, or shower rooms *required to be accessible by 4.1* shall comply with 4.23 and shall be on an accessible route. For adaptable bathrooms in accessible dwelling units, see 4.34.5.

4.23.2 Doors. Doors to accessible bathrooms shall comply with 4.13. Doors shall not swing into the floor space required for any fixture.

4.23.3 Clear Floor Space. The accessible fixtures and controls required in 4.23.4, 4.23.5, 4.23.6, 4.23.7, 4.23.8, and 4.23.9 shall be on an accessible route. An unobstructed turning space complying with 4.2.3 shall be provided within an accessible bathroom. The clear floor spaces at fixtures and controls, the accessible route, and the turning space may overlap.

EXCEPTION: In bathrooms with only one water closet, one lavatory, and one bathtub or shower, a clear floor space of 30 in by 60 in (760 mm by 1525 mm) may be used in lieu of the unobstructed turning space.

4.23.4 Water Closets. If toilet stalls are provided, then at least one shall comply with 4.17; its water closet shall comply with 4.16. If water closets are not in stalls, then at least one shall comply with 4.16.

4.23.5 Urinals. If urinals are provided, then at least one shall comply with 4.18.

4.23.6 Lavatories and Mirrors. If lavatories and mirrors are provided, then at least one of each shall comply with 4.19.

4.23.7 Controls and Dispensers. If controls, dispensers, receptacles, or other equipment is provided, *then* at least one of each shall be on an accessible route and shall comply with 4.27.

4.23.8 Bathing and Shower Facilities. If tubs or showers are provided, then at least one accessible tub that complies with 4.20 or at least one accessible shower that complies with 4.21 shall be provided.

4.23.9° Medicine Cabinets. If medicine cabinets are provided, at least one shall be located with a usable shelf no higher than 44 in (1120 mm) above the floor space. The floor space shall comply with 4.2.4.

4.24 Sinks.

4.24.1 General. *Sinks required to be accessible by 4.1* shall comply with 4.24. Sinks in kitchens of accessible dwelling units shall comply with 4.34.6.5.

4.24.2 Height. Sinks shall be mounted with the counter or rim no higher than 34 in (865 mm) from the floor.

4.24.3 Knee Clearance. Knee clearance that is *at least* 27 in (685 mm) high, 30 in (760 mm) wide, and 19 in (485 mm) deep shall be provided underneath sinks.

4.24.4 Depth. Each sink shall be a maximum of 6-1/2 in (165 mm) deep.

4.24.5 Clear Floor Space. A clear floor space at least 30 in by 48 in (760 mm by 1220 mm) complying with 4.2.4 shall be provided in front of a sink to allow forward approach. The clear floor space shall be on an accessible route and shall extend a maximum of 19 in (485 mm) underneath the sink (see Fig. 32).

4.24.6 Exposed Pipes and Surfaces. Hot water and drain pipes exposed under sinks shall be insulated or otherwise covered. There shall be no sharp or abrasive surfaces under sinks.

4.24.7 Faucets. Faucets shall comply with 4.27.4. Lever-operated, push-type, touch-type, or electronically controlled mechanisms are acceptable designs.

4.25 Storage.

4.25.1 General. *Fixed* storage facilities such as cabinets, shelves, closets, and drawers *required to be accessible by 4.1* shall comply with 4.25.

4.25.2 Clear Floor Space. A clear floor space at least 30 in by 48 in (760 mm by 1220 mm) complying with 4.2.4 that allows either a forward or parallel approach by a person using a wheelchair shall be provided at accessible storage facilities.

4.25.3 Height. Accessible storage spaces shall be within at least one of the reach ranges specified in 4.2.5 and 4.2.6. Clothes rods shall be a maximum of 54 in (1370 mm) from the floor (see Fig. 38).

4.25.4 Hardware. Hardware for accessible storage facilities shall comply with 4.27.4. Touch latches and U-shaped pulls are acceptable.

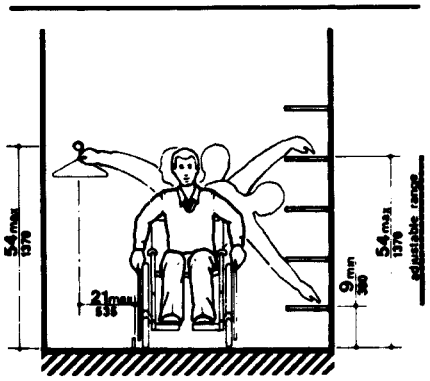


Fig. 38
Storage Shelves and Closets

4.26 Handrails, Grab Bars, and Tub and Shower Seats.

4.26.1* General. All handrails, grab bars, and tub and shower seats *required to be accessible by 4.1, 4.8, or 4.9* shall comply with 4.26

4.26.2* Size and Spacing of Grab Bars and Handrails. The diameter or width of the gripping surfaces of a handrail or grab bar shall be 1-1/4 in to 1-1/2 in (32 mm to 38 mm), or the shape shall provide an equivalent gripping surface. If handrails or grab bars are mounted adjacent to a wall, the space between the wall and the grab bar shall be 1-1/2 in (38 mm) (see Fig. 39(a), (b), and (c)). Handrails may be located in a recess if the recess is a maximum of 3 in (75 mm) deep and extends at least 18 in (455 mm) above the top of the rail (see Fig. 39(d)).

4.26.3 Structural Strength. The structural strength of grab bars, tub and shower seats, fasteners, and mounting devices shall meet the following specification:

(1) Bending stress in a grab bar or seat induced by the maximum bending moment from the application of 250 lbf (1112N) shall be less than the allowable stress for the material of the grab bar or seat.

(2) Shear stress induced in a grab bar or seat by the application of 250 lbf (1112N) shall be less than the allowable shear stress for the material of the grab bar or seat. If the connection between the grab bar or seat and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.

(3) Shear force induced in a fastener or mounting device from the application of 250 lbf (1112N) shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.

(4) Tensile force induced in a fastener by a direct tension force of 250 lbf (1112N) plus the maximum moment from the application of 250 lbf (1112N) shall be less than the allowable withdrawal and the supporting structure.

(5) Grab bars shall not rotate within their fittings.

4.26.4 Eliminating Hazards. A handrail or grab bar and any wall or other surface adjacent to it shall be free of any sharp or abrasive elements. Edges shall have a minimum radius of 1/8 in (3.2 mm).

4.27 Controls and Operating Mechanisms.

4.27.1 General. Controls and operating mechanisms *required to be accessible by 4.1* shall comply with 4.27.

4.27.2 Clear Floor Space. Clear floor space complying with 4.2.4 that allows a forward or a parallel approach by a person using a wheelchair shall be provided at controls, dispensers, receptacles, and other operable equipment.

4.27.3* Height. The highest operable part of all controls, dispensers, receptacles, and other operable equipment shall be placed within at least one of the reach ranges specified in 4.2.5 and 4.2.6. Except where the use of special equipment dictates otherwise, electrical and communications system receptacles on walls shall be mounted no less than 15 in (380 mm) above the floor.

4.27.4 Operation. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).

4.28 Alarms.

4.28.1 General. *Alarm systems required to be accessible by 4.1 shall comply with 4.28.*

4.28.2* Audible Alarms. If provided, audible emergency alarms shall produce a sound that exceeds the prevailing equivalent sound level in the room or space by at least 15 decibels or exceeds any maximum sound level with a duration of 30 seconds by 5 decibels, whichever is louder. Sound levels for alarm signals shall not exceed 120 decibels.

4.28.3* Visual Alarms. If provided, electrically powered internally illuminated emergency exit signs shall flash as a visual emergency alarm in conjunction with audible emergency alarms. The flashing frequency of visual alarm devices shall be less than 5 Hz. If such alarms use electricity from the building as a power source, then they shall be installed on the same system as the audible emergency alarms.

4.28 Alarms

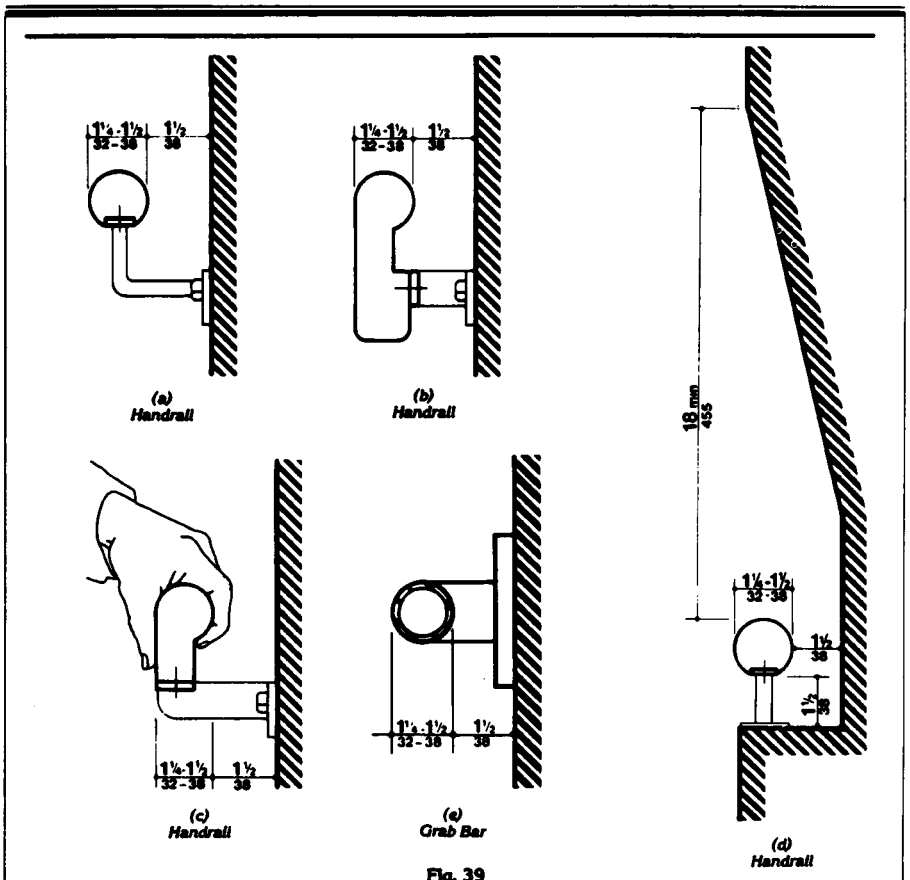


Fig. 39
Size and Spacing of Handrails and Grab Bars

EXCEPTIONS:

(1) Visual alarm devices that are mounted adjacent to emergency exit signs may be used in lieu of flashing exit signs.

(2) Specialized systems utilizing advanced technology may be substituted for the visual systems specified above if equivalent protection is afforded handicapped users of the building or facility.

4.28.4* Auxiliary Alarms. Accessible sleeping accommodations shall have a visual alarm connected to the building emergency alarm system or shall have a standard 110-volt electrical receptacle into which such an alarm could be connected. Instructions for use of the auxiliary alarm or connection shall be provided.

4.29 Tactile Warnings.

4.29.1 General. Tactile warnings *required to be accessible by 4.1* shall comply with 4.29.

4.29.2* Tactile Warnings on Walking Surfaces. *(Reserved).*

4.29.3* Tactile Warnings on Doors to Hazardous Areas. Doors that lead to areas that might prove dangerous to a blind person (for example, doors to loading platforms, boiler rooms, stages, and the like) shall be made identifiable to the touch by a textured surface on the door handle, knob, pull, or other operating hardware. This textured surface may be made by knurling or roughing or by a material applied to the contact surface. Such textured surfaces shall not be provided for emergency exit doors or any doors other than those to hazardous areas.

4.29.4 Tactile Warnings at Stairs. *(Reserved).*

4.29.5* Tactile Warnings at Hazardous Vehicular Areas. *(Reserved).*

4.29.6* Tactile Warnings at Reflecting Pools. *(Reserved).*

4.29.7* Standardization. Textured surfaces for tactile *door* warnings shall be standard within a building, facility, site, or complex of buildings.

4.30 Signage.

4.30.1* General. ***Signage shall comply with 4.30 as specified in 4.1.***

4.30.2* Character Proportion. Letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.

4.30.3* Color Contrast. Characters and symbols shall contrast with their background — either light characters on a dark background or dark characters on a light background.

4.30.4* Raised Characters or Symbols. Letters and numbers on signs shall be raised 1/32 in (0.8 mm) minimum and shall be sans serif characters. Raised characters or symbols shall be at least 5/8 in (16 mm) high, but no higher than 2 in (50 mm). Symbols or pictographs on signs shall be raised 1/32 in (0.8 mm) minimum.

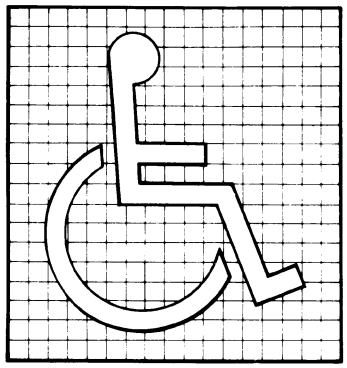
4.30.5 Symbols of Accessibility. Accessible facilities *required to be* identified *by 4.1, shall use* the international symbol of accessibility. The symbol shall be displayed as shown in Fig. 43.

4.30.6 *Mounting Location and Height.* *Interior signage shall be located alongside the door on the latch side and shall be mounted at a height of between 54 in and 66 in (1370 mm and 1675 mm) above the finished floor.*

4.31 Telephones.

4.31.1 General. *Public telephones required to be accessible by 4.1 shall comply with 4.31.*

4.31.2 Clear Floor or Ground Space. A clear floor or ground space at least 30 in by 48 in (760 mm by 1220 mm) that allows either a forward or parallel approach by a person using a wheelchair shall be provided at telephones (see Fig. 44). The clear floor or ground space shall comply with 4.2.4. Bases, enclosures, and fixed seats shall not impede approaches to telephones by people who use wheelchairs.



(a)
Proportions



(b)
Display Conditions

Fig. 43
International Symbol of Accessibility

4.31.3* Mounting Height. The highest operable part of the telephone shall be within the reach ranges specified in 4.2.5 or 4.2.6.

4.31.4 *Protruding Objects.* *Telephones shall comply with 4.4.*

4.31.5* Equipment for Hearing Impaired People. Telephones shall be equipped with a receiver that generates a magnetic field in the area of the receiver cap. *Volume controls shall be provided in accordance with 4.1.2.*

4.31.6 Controls. Telephones shall have pushbutton controls where service for such equipment is available.

4.31.7 Telephone Books. Telephone books, if provided, shall be located *in a position that complies with the reach ranges specified in 4.2.5 and 4.2.6.*

4.31 Telephones

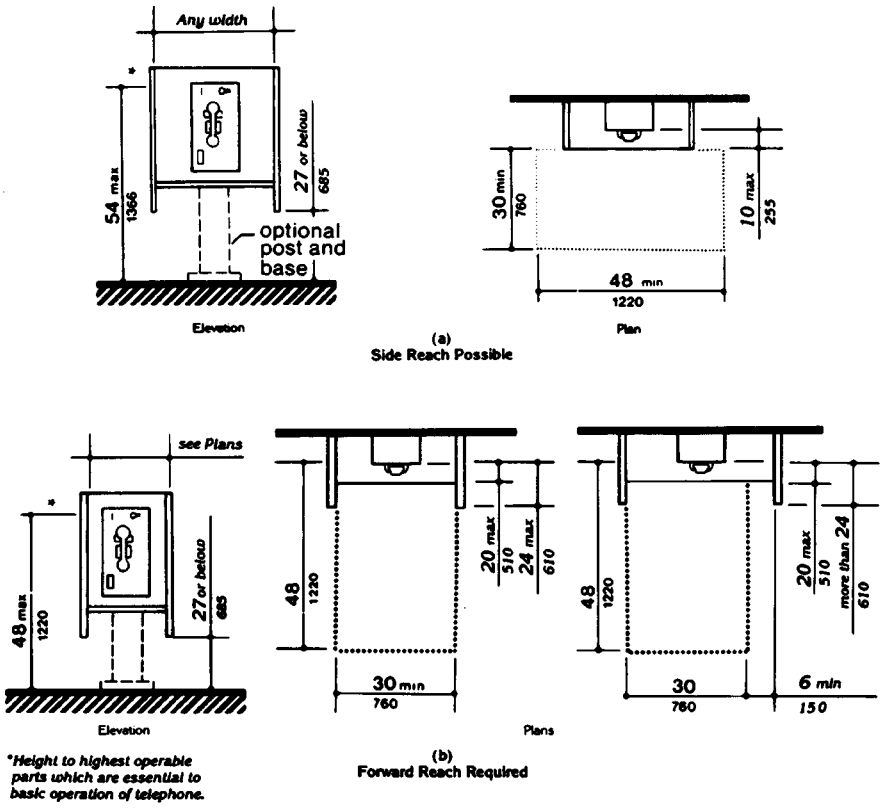


Fig. 44
Mounting Heights and Clearances for Telephones

4.31.8 Cord Length. The cord from the telephone to the handset shall be at least 29 in (735 mm) long.

4.32 Seating, Tables, and Work Surfaces.

4.32.1 Minimum Number. Fixed or built-in seating, tables, or work surfaces *required to be accessible by 4.1 shall comply with 4.32.*

4.32.2 Seating. If seating spaces for people in wheelchairs are provided at tables, counters, or work surfaces, clear floor space complying with 4.2.4 shall be provided. Such clear floor space shall not overlap knee space by more than 19 in (485 mm) (see Fig. 45).

4.32.3 Knee Clearances. If seating for people in wheelchairs is provided at tables, counters, and work surfaces, knee spaces at least 27 in (685 mm) high, 30 in (760 mm) wide, and 19 in (485 mm) deep shall be provided (see Fig. 45).

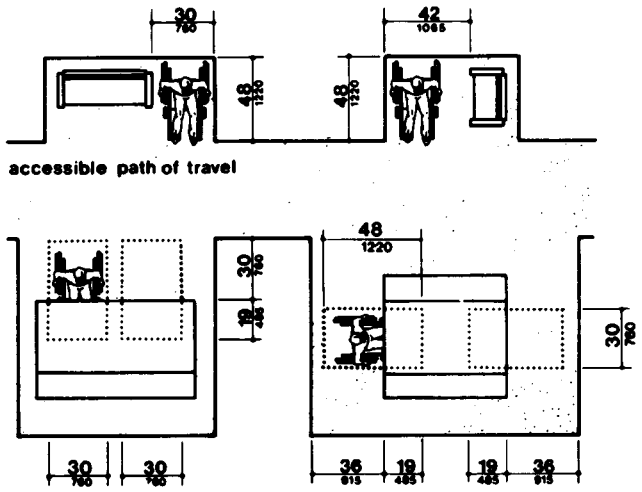


Fig. 45
Minimum Clearances for Seating and Tables

4.32.4° Height of Work Surfaces. The tops of tables and work surfaces shall be from 28 in to 34 in (710 mm to 865 mm) from the floor or ground.

4.33 Assembly Areas.

4.33.1 Minimum Number. Assembly *and associated areas required to be accessible by 4.1 shall comply with 4.33.*

4.33.2° Size of Wheelchair Locations. Each wheelchair location shall provide minimum clear ground or floor spaces as shown in Fig. 46.

4.33.3° Placement of Wheelchair Locations. Wheelchair areas shall be an integral part of any fixed seating plan and shall be dispersed throughout the seating area. They shall adjoin an accessible route that also serves as a means of egress in case of emergency and shall be located to provide lines of sight comparable to those for all viewing areas.

EXCEPTION: Accessible viewing positions may be clustered for bleachers, balconies, and other areas having sight lines that require slopes of greater than 5 percent. Equivalent accessible viewing positions may be located on levels having accessible egress.

4.33.4 Surfaces. The ground or floor at wheelchair locations shall be level and shall comply with 4.5.

4.33.5 Access to Performing Areas. An accessible route shall connect wheelchair seating locations with performing areas, including stages, arena floors, dressing rooms, locker rooms, and other spaces used by performers.

4.33.6° Placement of Listening Systems. If the listening system provided serves individual fixed seats, then such seats shall be located within a 50 ft (15 m) viewing distance of the stage or playing area and shall have a complete view of the stage or playing area.

4.33.7° Types of Listening Systems. Audio loops and radio frequency systems are two acceptable types of listening systems.

4.34 Dwelling Units.

4.34.1 General. The requirements of 4.34 apply to dwelling units *required to be accessible by 4.1.*

4.34.2° Minimum Requirements. An accessible dwelling unit shall be on an accessible route. An accessible dwelling unit shall have the following accessible elements and spaces as a minimum:

(1) Common spaces and facilities serving individual accessible dwelling units (for example, entry walks, trash disposal facilities, and mail boxes) shall comply with 4.2 through 4.33.

4.34 Dwelling Units

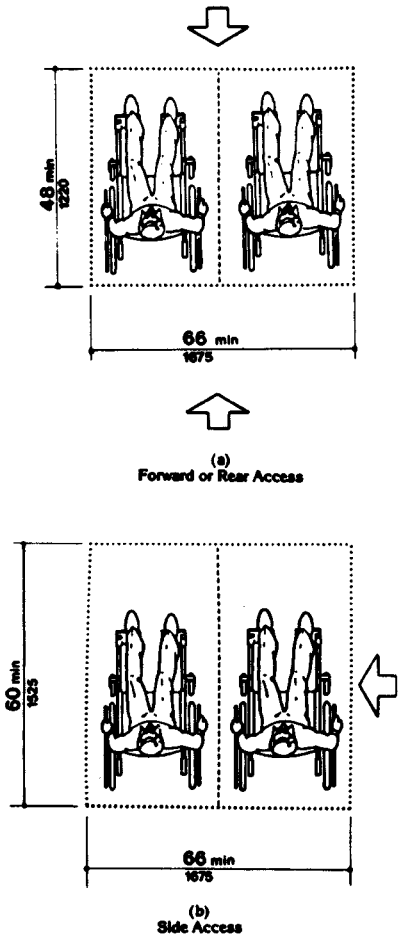


Fig. 46
Space Requirements for Wheelchair Seating Spaces in Series

(2) Accessible spaces shall have maneuvering space complying with 4.2.2 and 4.2.3 and surfaces complying with 4.5.

(3) At least one accessible route complying with 4.3 shall connect the accessible entrances with all accessible spaces and elements within the dwelling units.

(4) *See 4.1.1(5)(d) — Parking.*

(5) *Removed and reserved.*

(6) Doors to and in accessible spaces that are intended for passage shall comply with 4.13, *except that the provisions of 4.13.9 apply only to the doors at accessible entrances to the unit itself.*

(7) At least one accessible entrance to the dwelling unit shall comply with 4.14.

(8) Storage in accessible spaces in dwelling units, including cabinets, shelves, closets, and drawers, shall comply with 4.25.

(9) All controls in accessible spaces shall comply with 4.27. Those portions of heating, ventilating, and airconditioning equipment requiring regular, periodic maintenance and adjustment by the resident of a dwelling shall be accessible to people in wheelchairs. If air distribution registers must be placed in or close to ceilings for proper air circulation, this specification shall not apply to the registers.

(10) Emergency alarms *as required by 4.1 and* complying with 4.28.4 shall be provided in the dwelling unit.

(11) *Removed and reserved.*

(12) At least one full bathroom shall comply with 4.34.5. A full bathroom shall include a water closet, a lavatory, and a bathtub or a shower.

(13) The kitchen shall comply with 4.34.6.

(14) If laundry facilities are provided, they shall comply with 4.34.7.

(15) The following spaces shall be accessible and shall be on an accessible route:

(a) The living area.

(b) The dining area.

(c) The sleeping area, or the bedroom in one bedroom dwelling units, or at least two bedrooms or sleeping spaces in dwelling units with two or more bedrooms.

(d) Patios, terraces, balconies, carports, and garages, if provided with the dwelling unit.

4.34.3 Adaptability. The specifications for 4.34.5 and 4.34.6 *include* the concept of adaptability. *Accessible dwelling units may be designed for either permanent accessibility or adaptability.*

4.34.4 Consumer Information. To ensure that the existence of adaptable features will be known to the owner or occupant of a dwelling, the following con-

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sumer information shall be provided in each *adaptable* dwelling unit available for *occupancy:*

(1) Notification of the alternate heights available for the kitchen counter and sink, and the existence of removable cabinets and bases, if provided, under counters, sinks, and lavatories.

(2) Notification of the provisions for the installation of grab bars at toilets, bathtubs, and showers.

(3) Notification that the dwelling unit is equipped to have a visual emergency alarm installed.

(4) Identification of the location where information and instructions are available for changing the height of counters, removing cabinets and bases, installing a visual emergency alarm system, and installing grab bars.

(5) Notification that the dwelling unit has been designed in accordance with this *Uniform Federal Accessibility Standards.*

In addition, the *parties who will be responsible for making adaptations* shall be provided with the following information:

(1) Instructions for adjusting or replacing kitchen counter and sink heights and for removing cabinets.

(2) A scale drawing showing methods and locations for the installation of grab bars.

(3) A scale drawing showing the location of adjustable or replaceable counter areas and removable cabinets.

(4) Identification of the location of any equipment and parts required for adjusting or replacing counter tops, cabinets, and sinks.

(5) Instructions for installing a visual emergency alarm system, if the dwelling unit is equipped for such an installation.

4.34.5* Bathrooms. *Accessible or* adaptable bathrooms shall be on an accessible route and shall comply with the requirements of 4.34.5.

4.34.5.1 Doors. Doors shall not swing into the clear floor space required for any fixture.

4.34.5.2 Water Closets.

(1) Clear floor space at the water closet shall be as shown in Fig. 47(a). The water closet may be located with the clear area at either the right or left side of the toilet.

(2) The height of the water closet shall be at least 15 in (380 mm), *and no more than 19 in (485 mm),* measured to the top of the toilet seat.

(3) Structural reinforcement or other provisions that will allow installation of grab bars shall be provided in the locations shown in Fig. 47(b). If provided, grab bars shall be installed as shown in Fig. 29 and shall comply with 4.26.

(4) The toilet paper dispenser shall be installed within reach as shown in Fig. 47(b).

4.34.5.3 Lavatory, Mirrors, and Medicine Cabinets.

(1) The lavatory and mirrors shall comply with 4.22.6.

(2) If a cabinet is provided under the lavatory in adaptable bathrooms, then it shall be removable to provide the clearances specified in 4.22.6.

(3) If a medicine cabinet is provided above the lavatory, then the bottom of the medicine cabinet shall be located with a usable shelf no higher than 44 in (1120 mm) above the floor.

4.34.5.4 Bathtubs. If a bathtub is provided, then it shall have the following features:

(1) Floor space. Clear floor space at bathtubs shall be as shown in Fig. 33.

(2) Seat. An in-tub seat or a seat at the head end of the tub shall be provided as shown in Fig. 33 and 34. The structural strength of seats and their attachments shall comply with 4.26.3. Seats shall be mounted securely and shall not slip during use.

(3) Grab bars. Structural reinforcement or other provisions that will allow installation of grab bars shall be provided in the locations shown in Fig. 48. If provided, grab bars shall be installed as shown in Fig. 34 and shall comply with 4.26.

(4) Controls. Faucets and other controls shall be located as shown in Fig. 34 and shall comply with 4.27.4.

(5) Shower unit. A shower spray unit with a hose at least 60 in (1525 mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided.

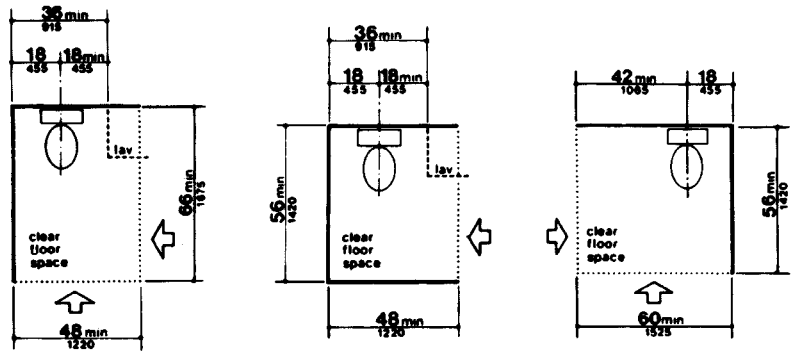
4.34.5.5 Showers. If a shower is provided, it shall have the following features:

(1) Size and clearances. Shower stall size and clear floor space shall comply with either Fig. 35(a) or (b). The shower stall in Fig. 35(a) shall be 36 in by 36 in (915 mm by 915 mm). The shower stall in Fig. 35(b) will fit into the same space as a standard 60 in (1525 mm) long bathtub.

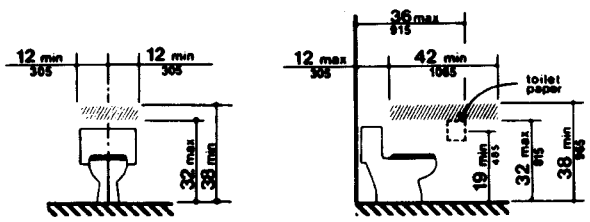
(2) Seat. A seat shall be provided in the shower stall in Fig. 35(a) as shown in Fig. 36. The seat shall be 17 in to 19 in (430 mm to 485 mm) high measured from the bathroom floor and shall extend the full depth of the stall. The seat shall be on the wall opposite the controls. The structural strength of seats and their attachments shall comply with 4.26.3. Seats shall be mounted securely and shall not slip during use.

(3) Grab bars. Structural reinforcement or other provisions that will allow installation of grab bars shall be provided in the locations shown in Fig. 49. If provided, grab bars shall be installed as shown in Fig. 37 and shall comply with 4.26.

4.34 Dwelling Units



(a)
Clear Floor Space for Adaptable Bathrooms



NOTE: The hatched areas are reinforced to receive grab bars.

(b)
Reinforced Areas for Installation of Grab Bars

Fig. 47
Water Closets in Adaptable Bathrooms

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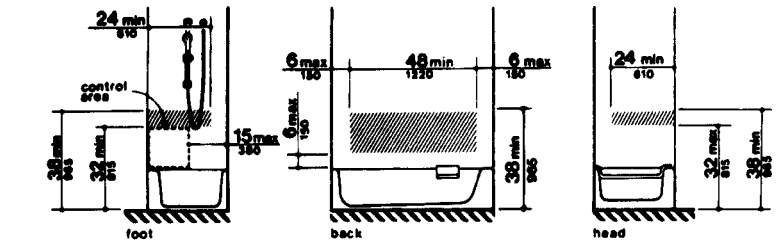
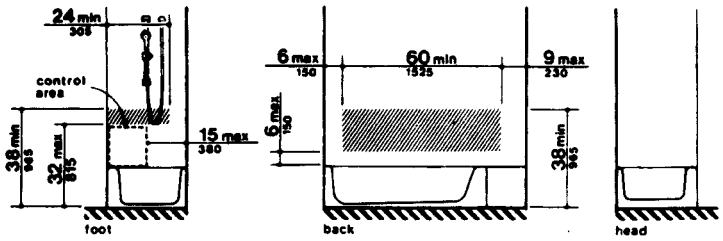


(a)
With Seat in Tub



(b)
With Seat at Head of Tub

NOTE: The hatched areas are reinforced to receive grab bars.

Fig. 48
Location of Grab Bars and Controls of Adaptable Bathtubs

(4) Controls. Faucets and other controls shall be located as shown in Fig. 37 and shall comply with 4.27.4. In the shower stall in Fig. 35(a), all controls, faucets, and the shower unit shall be mounted on the side wall opposite the seat.

(5) Shower unit. A shower spray unit with a hose at least 60 in (1525 mm) long that can be used as a fixed shower head at various heights or as a hand-held shower shall be provided.

4.34.5.6 Bathtub and Shower Enclosures. Enclosures for bathtubs or shower stalls shall not obstruct controls or transfer from wheelchairs onto shower or bathtub seats. Enclosures on bathtubs shall not have tracks mounted on their rims.

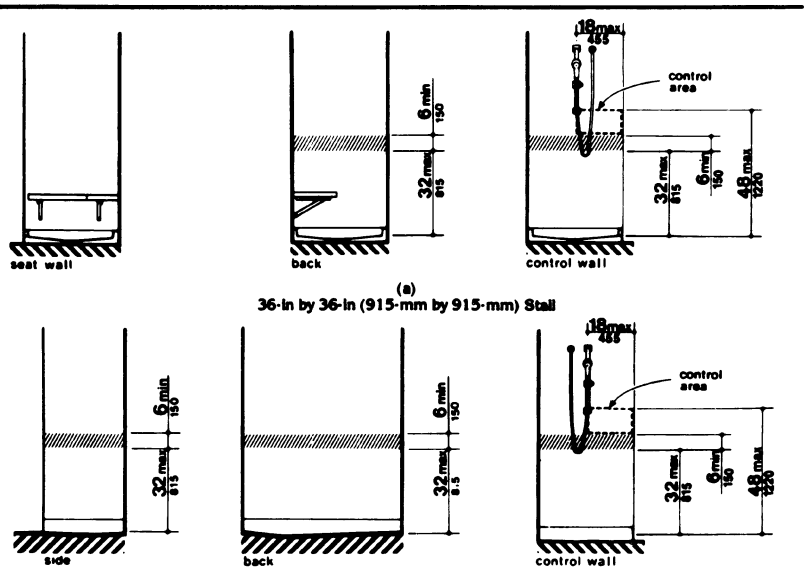
4.34.5.7 Clear Floor Space. Clear floor space at fixtures may overlap.

4.34.6 Kitchens. *Accessible or adaptable* kitchens and their components shall be on an accessible route and shall comply with the requirements of 4.34.6.

4.34.6.1* Clearance. Clearances between all opposing base cabinets, counter tops, appliances, or walls shall be 40 in (1015 mm) minimum, except in U-shaped kitchens, where such clearance shall be 60 in (1525 mm) minimum.

4.34.6.2 Clear Floor Space. A clear floor space at least 30 in by 48 in (760 mm by 1220 mm) complying with 4.2.4 that allows either a forward or a parallel approach by a person in a wheelchair shall be provided at all appliances in the kitchen, including the range or cooktop, oven, refrigerator/freezer, dishwasher, and trash compactor. Laundry equipment located in the kitchen shall comply with 4.34.7.

4.34 Dwelling Units

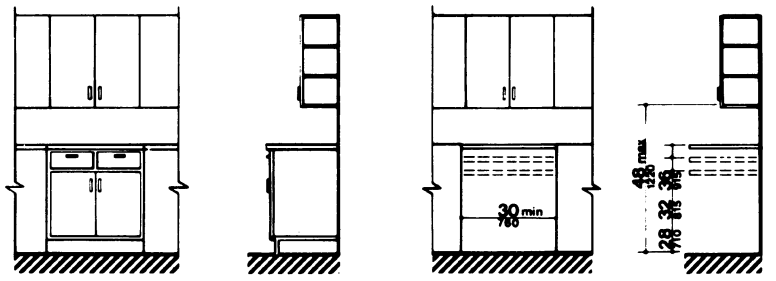


(a)
36-in by 36-in (915-mm by 915-mm) Stall

(b)
30-in by 60-in (750-mm by 1525-mm) Stall

NOTE: The hatched areas are reinforced to receive grab bars.

Fig. 49
Location of Grab Bars and Controls of Adaptable Showers



(a)
Before Removal of Cabinets and Base

(b)
Cabinets and Base Removed and Height Alternatives

Fig. 50
Counter Work Surface

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4.34.6.3 Controls. All controls in kitchens shall comply with 4.27.

4.34.6.4 Work Surfaces. At least one 30 in (760 mm) section of counter shall provide a work surface that complies with the following requirements (see Fig. 50):

(1) The counter shall be *mounted at a maximum height of 34 in (865 mm) above the floor, measured from the floor to the top of the counter surface, or shall be* adjustable or replaceable as a unit to provide alternative heights of 28 in, 32 in, and 36 in (710 mm, 815 mm, and 915 mm), measured from the top of the counter surface.

(2) Base cabinets, if provided, shall be removable under the full 30 in (760 mm) minimum frontage of the counter. The finished floor shall extend under the counter to the wall.

(3) Counter thickness and supporting structure shall be 2 in (50 mm) maximum over the required clear area.

(4) A clear floor space 30 in by 48 in (760 mm by 1220 mm) shall allow a forward approach to the counter. Nineteen inches (485 mm) maximum of the clear floor space may extend underneath the counter. The knee space shall have a minimum clear width of 30 in (760 mm) and a minimum clear depth of 19 in (485 mm).

(5) There shall be no sharp or abrasive surfaces under such counters.

4.34.6.5* Sink. The sink and surrounding counter shall comply with the following requirements (see Fig. 51):

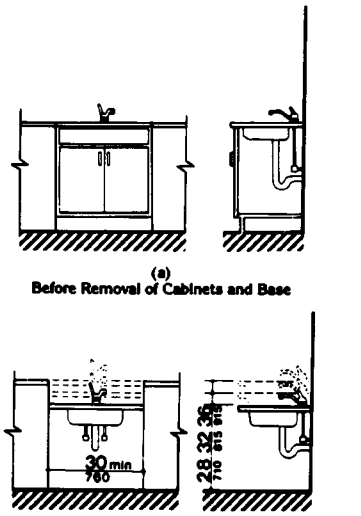
(1) The sink and surrounding counter shall be *mounted at a maximum height of 34 in (865 mm) above the floor, measured from the floor to the top of the counter surface, or shall* be adjustable or replaceable as a unit to provide alternative heights of 28 in, 32 in, and 36 in (710 mm, 815 mm, and 915 mm), measured from the floor to the top of the counter surface or sink rim. The total width of sink and counter area shall be 30 in (760 mm).

(2) Rough-in plumbing shall be located to accept connections of supply and drain pipes for sinks mounted at the height of 28 in (710 mm).

(3) The depth of a sink bowl shall be no greater than 6-1/2 in (165 mm). Only one bowl of double-or triple-bowl sinks needs to meet this requirement.

(4) Faucets shall comply with 4:27.4. Lever-operated or push-type mechanisms are two acceptable designs.

(5) Base cabinets, if provided, shall be removable under the full 30 in (760 mm) minimum frontage of the sink and surrounding counter. The finished flooring shall extend under the counter to the wall.



(a)
Before Removal of Cabinets and Base

(b)
Cabinets and Base Removed and Height Alternatives

Fig. 51
Kitchen Sink

(6) Counter thickness and supporting structure shall be 2 in (50 mm) maximum over the required clear space.

(7) A clear floor space 30 in by 48 in (760 mm by 1220 mm) shall allow forward approach to the sink. Nineteen inches (485 mm) maximum of the clear floor space may extend underneath the sink. The knee space shall have a clear width of 30 in (760 mm) and a clear depth of 19 in (485 mm).

(8) There shall be no sharp or abrasive surfaces under sinks. Hot water and drain pipes under sinks shall be insulated or otherwise covered.

4.34.6.6* Ranges and Cooktops. Ranges and cooktops shall comply with 4.34.6.2 and 4.34.6.3. If ovens or cooktops have knee spaces underneath, then they shall be insulated or otherwise protected on the exposed contact surfaces to prevent burns, abrasions, or electrical shock. The clear floor space may overlap the knee space, if provided, by 19 in (485 mm) maximum. The location of controls for ranges and cook-tops shall not require reaching across burners.

4.34 Dwelling Units

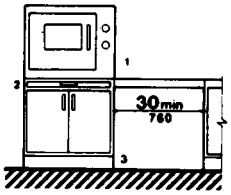
4.34.6.7° Ovens. Ovens shall comply with 4.34.6.2 and 4.34.6.3. Ovens shall be of the self-cleaning type or be located adjacent to an adjustable height counter with knee space below (see Fig. 52). For side-opening ovens, the door latch side shall be next to the open counter space, and there shall be a pull-out shelf under the oven extending the full width of the oven and pulling out not less than 10 in (255 mm) when fully extended. Ovens shall have controls on front panels; they may be located on either side of the door.

4.34.6.8° Refrigerator/Freezers. Refrigerator/freezers shall comply with 4.34.6.3. *Provision shall be made for refrigerators which are:*

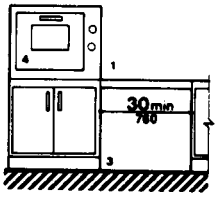
(1) Of the vertical side-by-side refrigerator/freezer type; or

(2) Of the over-and-under type and meet the following requirements:

(a) Have at least 50 percent of the freezer space below 54 in (1370 mm) above the floor.



(a)
Side-Hinged Door



(b)
Bottom-Hinged Door

SYMBOL KEY:
1. Countertop or wall-mounted oven.
2. Pull-out board preferred with side-opening door.
3. Clear open space.
4. Bottom-hinged door.

Fig. 52
Ovens without Self-Cleaning Feature

(b) Have 100 percent of the refrigerator space and controls below 54 in (1370 mm).

Freezers with less than 100 percent of the storage volume within the limits specified in 4.2.5 or 4.2.6 shall be the self-defrosting type.

4.34.6.9 Dishwashers. Dishwashers shall comply with 4.34.6.2 and 4.34.6.3. Dishwashers shall have all rack space accessible from the front of the machine for loading and unloading dishes.

4.34.6.10° Kitchen Storage. Cabinets, drawers, and shelf areas shall comply with 4.25 and shall have the following features:

(1) Maximum height shall be 48 in (1220 mm) for at least one shelf of all cabinets and storage shelves mounted above work counters (see Fig. 50).

(2) Door pulls or handles for wall cabinets shall be mounted as close to the bottom of cabinet doors as possible. Door pulls or handles for base cabinets shall be mounted as close to the top of cabinet doors as possible.

4.34.7 Laundry Facilities. If laundry equipment is provided within individual accessible dwelling units, or if separate laundry facilities serve one or more accessible dwelling units, then they shall meet the requirements of 4.34.7.1 through 4.34.7.3.

4.34.7.1 Location. Laundry facilities and laundry equipment shall be on an accessible route.

4.34.7.2 Washing Machines and Clothes Dryers. Washing machines and clothes dryers in common use laundry rooms shall be front loading.

4.34.7.3 Controls. Laundry equipment shall comply with 4.27.

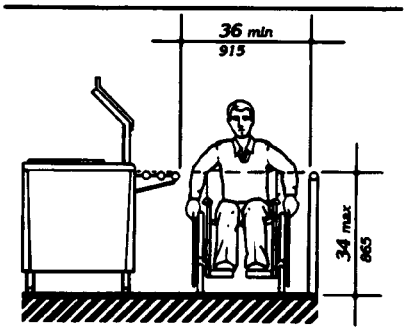


Fig. 53
Food Service Lines

5. RESTAURANTS AND CAFETERIAS.

5.1 General. *In addition to the requirements of 4.1 to 4.33, the design of at least 5 percent of all fixed seating or tables in a restaurant or cafeteria shall comply with 4.32. Access aisles between tables shall comply with 4.3. Where practical, accessible tables should be distributed throughout the space or facility. In restaurants or cafeterias where there are mezzanine levels, loggias, or raised platforms, accessibility to all such spaces is not required providing that the same services and decorative character are provided in spaces located on accessible routes.*

5.2 Food Service Lines. *Food service lines shall have a minimum clear width of 36 in (915 mm), with a preferred clear width of 42 in (1065 mm) where passage of stopped wheelchairs by pedestrians is desired. Tray slides shall be mounted no higher than 34 in (865 mm) above the floor. If self-service shelves are provided, a reasonable portion must be within the ranges shown in Fig. 53.*

5.3 Tableware Areas. *Install tableware, dishware, condiment, food and beverage display shelves, and dispensing devices in compliance with 4.2 (see Fig. 54).*

5.4 Vending Machines. *Install vending machines in compliance with 4.27.*

6. HEALTH CARE.

6.1 General. *In addition to the requirements of 4.1 to 4.33, Health Care buildings and facilities shall comply with 6.*

6.2 Entrances. *At least one accessible entrance that complies with 4.14 shall be protected from the weather by canopy or roof overhang. Such entrances shall incorporate a passenger loading zone that complies with 4.6.5 (see 4.13.6).*

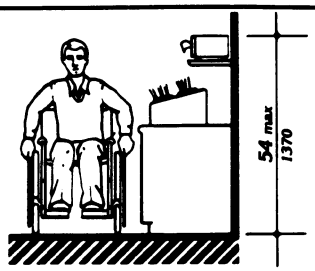


Fig. 54
Tableware Areas

6.3 Patient Bedrooms. *Provide accessible patient bedrooms in compliance with 4. Accessible patient bedrooms shall comply with the following:*

(1) *Each bedroom shall have a turning space that complies with 4.2.3, and preferably that is located near the entrance.*

(2) *Each one-bed room shall have a minimum clear floor space of 36 in (915 mm) along each side of the bed, and 42 in (1065 mm) between the foot of the bed and the wall.*

(3) *Each two-bed room shall have a minimum clear floor space of 42 in (1065 mm), preferably 48 in (1220 mm), between the foot of the bed and the wall; 36 in (915 mm) between the side of the bed and the wall; and 48 in (1220 mm) between beds.*

(4) *Each four-bed room shall have a minimum clear floor space of 48 in (1220 mm) from the foot of the bed to the foot of the opposing bed; 36 in (915 mm) between the side of the bed and the wall; and 48 in (1220 mm) between beds.*

(5) *Each bedroom shall have a door that complies with 4.13.*

6.4 Patient Toilet Rooms. *Provide each patient bedroom that is required to be accessible with an accessible toilet room that complies with 4.22 or 4.23.*

7. MERCANTILE.

7.1 General. *In addition to the requirements of 4.1 to 4.33, the design of all areas used for business transactions with the public shall comply with 7.*

7.2 Service Counters. *Where service counters exceeding 36 in (915 mm) in height are provided for standing sales or distribution of goods to the public, an auxiliary counter or a portion of the main counter shall be provided with a maximum height of between 28 in to 34 in (710 mm to 865 mm) above the floor in compliance with 4.32.4.*

7.3 Check-Out Aisles. *At least one accessible check-out aisle shall be provided in buildings or facilities with check-out aisles. Clear aisle width shall comply with 4.2.1 and maximum adjoining counter height shall not exceed 36 in (915 mm) above the floor.*

7.4 Security Bollards. *Any device used to prevent the removal of shopping carts from store premises shall not prevent access or egress to those in wheelchairs. An alternate entry that is equally convenient to that provided for the ambulatory population is acceptable.*

8.0 Libraries

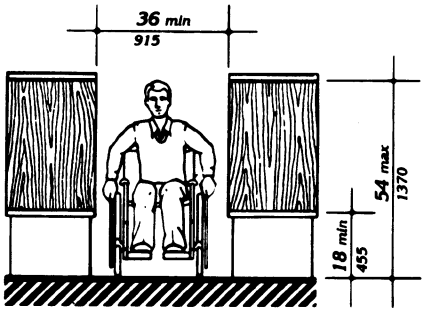


Fig. 55
Card Catalog

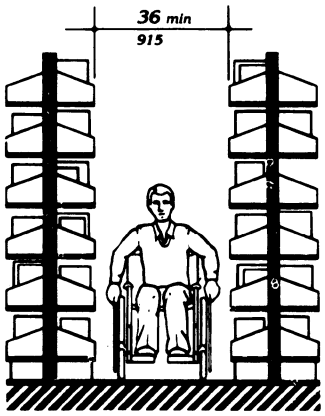


Fig. 56
Stacks

8. LIBRARIES.

8.1 General. *In addition to the requirements of 4.1 to 4.33, the design of all public areas of a library shall comply with 8, including reading and study areas, stacks, reference rooms, reserve areas, and special facilities or collections. As provided, elements such as public toilet rooms, telephones, and parking shall be accessible.*

8.2 Reading and Study Areas. *At least 5 percent or a minimum of one of each element of fixed seating, tables, or study carrels shall comply with 4.2 and 4.32. Clearances between fixed accessible tables and study carrels shall comply with 4.3.*

8.3 Check-Out Areas. *At least one lane at each check-out area shall comply with 4.32. Any traffic control or book security gates or turnstiles shall comply with 4.13.*

8.4 Card Catalogs. *Minimum clear aisle space at card catalogs, magazine displays, or reference stacks shall comply with Fig. 55. Maximum reach height shall comply with 4.2, with a height of 48 in (1220 mm) preferred, irrespective of reach allowed.*

8.5 Stacks. *Minimum clear aisle width between stacks shall comply with 4.3, with a minimum clear aisle width of 42 in (1065 mm) preferred where possible. Shelf height in stack areas is unrestricted (see Fig. 56).*

9. POSTAL FACILITIES.

9.1 General. *In addition to the requirements of 4.1 to 4.33, the design of U.S. postal facilities shall comply with the requirements of 9. In addition, employee toilet rooms, water fountains, lunchrooms, lounges, attendance-recording equipment, medical treatment rooms, emergency signals, and switches and controls shall be made accessible or adaptable in accordance with the requirements of these standards.*

9.2* Post Office Lobbies. *Where writing desks or tables are provided, a minimum of at least one writing desk or table that complies with 4.32 must be provided. Clear passageways in front of customer service counters shall be not less than 48 in (1220 mm) clear width to permit maneuvering of a wheelchair. Letter drops shall be mounted at heights that comply with 4.2.*

(1) *All fixed partitions must be installed to withstand a 250-pound force applied at any point and from any direction. Avoid designs that call for, or may necessitate, non-fixed partitions in circulation routes of handicapped people.*

(2) *Walls where handrails are provided for handicapped people must be capable of supporting handrails designed to support a 250-pound pull force in any direction.*

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9.3 *Self-Service Postal Centers.* *Parcel post depositories, stamp vending machines, multi-commodity vending machines, and currency-coin changing machines shall be installed so that the operating mechanisms of all machines comply with 4.2 and 4.27. All mechanisms must be installed to permit close parallel approach by a wheelchair user.*

9.4 *Post Office Boxes.* *At least 5 percent of the post office boxes in a facility shall be accessible to wheelchair users. The total number of accessible post office boxes provided shall include a representative number of each of the standard USPS boxes currently being installed. Accessible post office boxes shall be located in the second or third set of modules from the floor, approximately 12 in to 36 in (305 mm to 915 mm) above the finished floor. Aisles between post office boxes shall be a minimum of 66 in (1675 mm) clear width.*

9.5 *Locker Rooms.* *Lockers in easily accessible areas must be provided for use by handicapped people. When double-tier lockers are used, only the bottom row of lockers may be assigned for use by wheelchair users. When full length lockers are used, all hooks, shelves, etc., intended for use by people in wheelchairs shall be located no higher than 48 in (1220 mm) above the finished floor. Lockers intended for use by handicapped people shall be equipped with latches and latch handles that comply with 4.27. Unobstructed aisle space in front of lockers used by handicapped people shall be a minimum of 42 in (1065 mm) clear width.*

9.6 *Attendance-Recording Equipment.* *Time clocks, card racks, log books, and other work assignment or attendance-recording equipment used by people in wheelchairs must be installed at a height no more than 48 in (1220 mm) above the finished floor. Counter space at check-in areas must be no more than 36 in (915 mm) above the finished floor.*

Appendix

APPENDIX

This appendix contains additional information that should help the designer to understand the minimum requirements of the standard or to design buildings or facilities for greater accessibility. The paragraph numbers correspond to the sections or paragraphs of the standard to which the material relates and are therefore not consecutive (for example, A4.2.1 contains additional information relevant to 4.2.1). Sections for which additional material appears in this appendix have been indicated by an asterisk.

A4.2 Space Allowances and Reach Ranges.

A4.2.1 Wheelchair Passage Width.

(1) Space Requirements for Wheelchairs. Most wheelchair users need a 30 in (760 mm) clear opening width for doorways, gates, and the like, when the latter are entered head-on. If the wheelchair user is unfamiliar with a building, if competing traffic is heavy, if sudden or frequent movements are needed, or if the wheelchair must be turned at an opening, then greater clear widths are needed. For most situations, the addition of an inch of leeway on either side is sufficient. Thus, a minimum clear width of 32 in (815 mm) will provide adequate clearance. However, when an opening or a restriction in a passageway is more than 24 in (610 mm) long, it is essentially a passageway and must be at least 36 in (915 mm) wide.

(2) Space Requirements for Use of Walking Aids. Although people who use walking aids can maneuver through clear width openings of 32 in (815 mm), they need 36 in (915 mm) wide passageways and walks for comfortable gaits. Crutch tips, often extending down at a wide angle, are a hazard in narrow passageways where they might not be seen by other pedestrians. Thus, the 36 in (915 mm) width provides a safety allowance both for the disabled person and for others.

(3) Space Requirements for Passing. Able-bodied people in winter clothing, walking straight ahead with arms swinging, need 32 in (815 mm) of width, which includes 2 in (50 mm) on either side for sway, and another 1 in (25 mm) tolerance on either side for clearing nearby objects or other pedestrians. Almost all wheelchair users and those who use walking aids can also manage within this 32 in (815 mm) width for short distances. Thus, two streams of traffic can pass in 64 in (1625 mm) in a comfortable flow. Sixty inches (1525 mm) provide a minimum width for a somewhat more restricted flow. If the clear width is less than 60 in (1525 mm), two wheelchair users will not be able to pass but will have to seek a wider place for passing. Forty-eight inches (1220 mm) is the minimum width needed for an ambulatory person to pass a nonambulatory or semiambulatory person. Within this 48 in (1220 mm) width, the ambulatory person will have to twist to pass a wheelchair user, a person with a seeing eye dog, or a semiambulatory person. There will be little leeway for swaying or missteps (see Fig. A1).

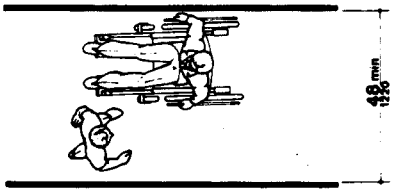


Fig. A1
Minimum Passage Width for One Wheelchair and One Ambulatory Person

A4.2.3 Wheelchair Turning Space. This standard specifies a minimum space of 60 in (1525 mm) diameter for a pivoting 180-degree turn of a wheelchair. This space is usually satisfactory for turning around, but many people will not be able to turn without repeated tries and bumping into surrounding objects. The space shown in Fig. A2 will allow most wheelchair users to complete U-turns without difficulty.

A4.2.4 Clear Floor or Ground Space for Wheelchairs. The wheelchair and user shown in Fig. A3 represent typical dimensions for a large adult male. The space requirements in this standard are based upon maneuvering clearances that will accommodate most larger wheelchairs. Fig. A3 provides a uniform reference for design not covered by this standard.

A4.2.5 & A4.2.6 Reach. *Reach ranges for persons seated in wheelchairs may be further clarified by Fig. A3(a). These drawings approximate in the plan view information shown in Fig. 4, 5, and 6 in other views.*

A4.3 Accessible Route.

A4.3.1 General.

(1) Travel Distances. Many disabled people can move at only very slow speeds; for many, traveling 200 ft (61 m) could take about 2 minutes. This assumes a rate of about 1.5 ft/s (455 mm/s) on level ground. It also assumes that the traveler would move continuously. However, on trips over 100 ft (30 m), disabled people are apt to rest frequently, which substantially increases their trip times. Resting periods of 2 minutes for every 100 ft (30 m) can be used to estimate travel times for people with severely limited stamina. In

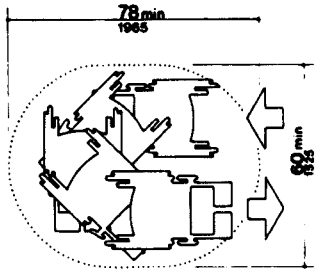
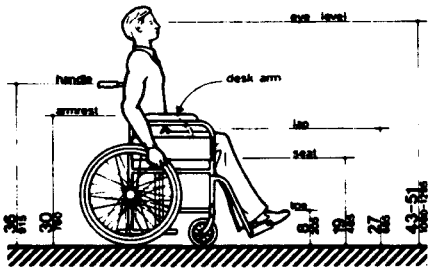
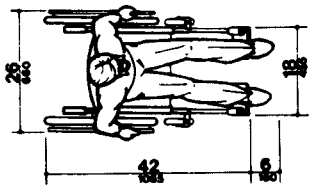


Fig. A2
Space Needed for Smooth U-Turn in a Wheelchair





NOTE: Footrests may extend further for very large people.

Fig. A3
Dimensions of Adult-Sized Wheelchairs

inclement weather, slow progress and resting can greatly increase a disabled person's exposure to the elements.

(2) Sites. Level, indirect routes or those with running slopes lower than 1:20 can sometimes provide more convenience than direct routes with maximum allowable slopes or with ramps.

A4.3.10 Egress. In buildings where physically handicapped people are regularly employed or are residents, an emergency management plan for their evacuation also plays an essential role in fire safety.

A4.4 Protruding Objects.

A4.4.1 General. Guide dogs are trained to recognize and avoid hazards. However, most people with severe impairments of vision use the long cane as an aid to mobility. The two principal cane techniques are the touch technique, where the cane arcs from side to side and touches points outside both shoulders; and the diagonal technique, where the cane is held in a stationary position diagonally across the body with the cane tip touching or just above the

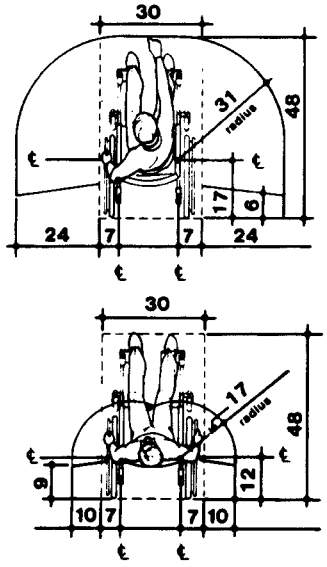


Fig. A3 (a)

A4.4 Protruding Objects

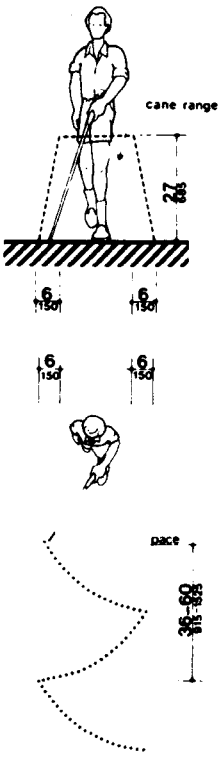


Fig. A4
Cane Technique

ground at a point outside one shoulder and the handle or grip extending to a point outside the other shoulder. The touch technique is used primarily in uncontrolled areas, while the diagonal technique is used primarily in certain limited, controlled, and familiar environments. Cane users are often trained to use both techniques.

Potential hazardous objects are noticed only if they fall within the detection range of canes (see Fig. A4). Visually impaired people walking toward an object can detect an overhang if its lowest surface is not higher than 27 in (685 mm). When walking alongside projecting objects, they cannot detect overhangs. Since proper cane and guide dog techniques keep people away from the edge of a path or from walks, a slight overhang of no more than 4 in (100 mm) is not hazardous.

A4.5 Ground and Floor Surfaces.

A4.5.1 General. Ambulant and semiambulant people who have difficulty maintaining balance and those with restricted gaits are particularly sensitive to slipping and tripping hazards. For such people, a stable and regular surface is necessary for safe walking, particularly on stairs. Wheelchairs can be propelled most easily on surfaces that are hard, stable, and regular. Soft, loose surfaces such as shag carpet, loose sand, and wet clay, and irregular surfaces, such as cobblestones, can significantly impede wheelchair movement.

Slip resistance is based on the frictional force necessary to keep a shoe heel or crutch tip from slipping on a walking surface under the conditions of use likely to be found on the surface. Although it is known that the static coefficient of friction is the basis of slip resistance, there is not as yet a generally accepted method to evaluate the slip resistance of walking surfaces.

Cross slopes on walks and ground or floor surfaces can cause considerable difficulty in propelling a wheelchair in a straight line.

A4.5.3 Carpet. Much more needs to be done in developing both quantitative and qualitative criteria for carpeting. However, certain functional characteristics are well established. When both carpet and padding are used, it is desirable to have minimum movement (preferably none) between the floor and the pad and the pad and the carpet, which would allow the carpet to hump or warp. In heavily trafficked areas, a thick, soft (plush) pad or cushion, particularly in combination with long carpet pile, makes it difficult for individuals in wheelchairs and those with other ambulatory disabilities to get about. This should not preclude their use in specific areas where traffic is light. Firm carpeting can be achieved through proper selection and combination of pad and carpet, sometimes with the elimination of the pad or cushion, and with proper installation.

A4.6 Parking and Passenger Loading Zones.

A4.6.3 Parking Spaces. High-top vans, which disabled people or transportation services often use, require higher clearances in parking garages than automobiles. *When optional van spaces are provided within a garage, only the spaces themselves and a vehicle route to them require the specified clearances.*

A4.6.4 Signage. Signs designating parking places for disabled people can be seen from a driver's seat if the signs are mounted high enough above the ground and located at the front of a parking space.

A4.8 Ramps.

A4.8.1 General. Ramps are essential for wheelchair users if elevators or lifts are not available to connect different levels. However, some people who use walking aids have difficulty with ramps and prefer stairs.

A4.8.2 Slope and Rise. The ability to manage an incline is related to both its slope and its length. Wheelchair users with disabilities affecting arms or with low stamina have serious difficulty using inclines. Most ambulatory people and most people who use wheelchairs can manage a slope of 1:16. Many people cannot manage a slope of 1:12 for 30 ft (9 m). Many people who have difficulty negotiating very long ramps at relatively shallow slopes can manage very short ramps at steeper slopes.

A4.8.5 Handrails. The requirements for stair and ramp handrails in this standard are for adults. When children are principal users in a building or facility, a second set of handrails at an appropriate height can assist them and aid in preventing accidents.

A4.10 Elevators.

A4.10.6 Door Protective and Reopening Device. The required door reopening device would hold the door open for 20 seconds if the doorway remains unobstructed. After 20 seconds, the door may begin to close. However, if designed in accordance with ANSI A17.1-1978, the door closing movement could still be stopped if a person or object exerts sufficient force at any point on the door edge.

A4.10.7 Door and Signal Timing for Hall Calls. This paragraph allows variation in the location of call buttons, advance time for warning signals, and the door-holding period used to meet the time requirement.

A4.10.12 Car Controls. Industry-wide standardization of elevator control panel design would make all elevators significantly more convenient for use by people with severe visual impairments.

In many cases, it will be possible to locate the highest control on elevator panels within 48 in (1220 mm) from the floor.

A4.10.13 Car Position Indicators. A special button may be provided that would activate the audible signal within the given elevator only for the desired trip, rather than maintaining the audible signal in constant operation.

A4.10.14 Emergency Communications. A device that requires no handset is easier to use by people who have difficulty reaching.

A4.11 Platform Lifts.

Platform lifts include porch lifts and other devices used for short-distance, vertical transportation of people in wheelchairs. At the present time, generally recognized safety standards for such lifts have not been developed. Care should be taken in selecting and installing lifts to ensure that they are free from hazards to users or to other individuals who may be in the vicinity where they are being operated.

A4.13 Doors.

A4.13.8 Thresholds at Doorways. Thresholds and surface height changes in doorways are particularly inconvenient for wheelchair users who also have low stamina or restrictions in arm movement, because complex maneuvering is required to get over the level change while operating the door.

A4.13.9 Door Hardware. Some disabled persons must push against a door with their chair or walker to open it. Applied kickplates on doors with closers can reduce required maintenance by withstanding abuse from wheelchairs and canes. To be effective, they should cover the door width, less approximately 2 in (51 mm), up to a height of 16 in (405 mm) from its bottom edge and be centered across the top.

A4.13.10 Door Closers. Closers with delayed action features give a person more time to maneuver through doorways. They are particularly useful on frequently used interior doors such as entrances to toilet rooms.

A4.13.11 Door Opening Force. Although most people with disabilities can exert at least 5 lbf (22.2N), both pushing and pulling from a stationary position, a few people with severe disabilities cannot exert even 3 lbf (13.3N). Although some people cannot manage the allowable forces in this standard and many others have difficulty, door closers must have certain minimum closing forces to close doors satisfactorily. Forces for pushing or pulling doors open are measured with a push-pull scale under the following conditions:

(1) Hinged doors: Force applied perpendicular to the door at the door opener or 30 in (760 mm) from the hinged side, whichever is farther from the hinge.

(2) Sliding or folding doors: Force applied parallel to the door at the door pull or latch.

(3) Application of force: Apply force gradually so that the applied force does not exceed the resistance of the door.

In high-rise buildings, air-pressure differentials may require a modification of this specification in order to meet the functional intent.

A4.13.12 Automatic Doors and Power-Assisted Doors. Sliding automatic doors do not need guard rails and are more convenient for wheelchair users and visually impaired people to use. If slowly opening automatic doors can be reactuated before their closing cycle is completed, they will be more convenient in busy doorways.

A4.15 Drinking Fountains and Water Coolers

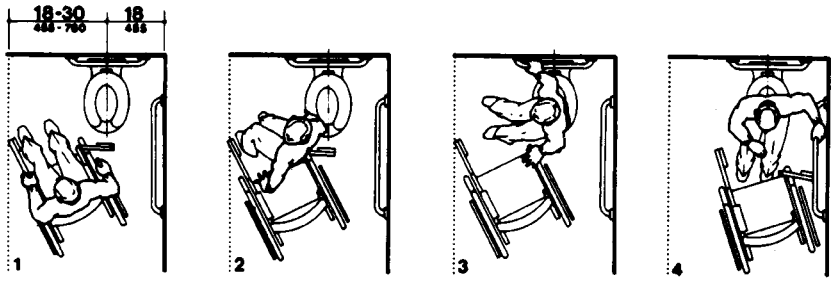
A4.15 *Drinking Fountains and Water Coolers.*

A4.15.2 *Drinking fountains with two spouts can assist both handicapped people and those people who find it difficult to bend over.*

A4.16 Water Closets.

A4.16.3 Height. Preferences for toilet seat heights vary considerably among disabled people. Higher seat heights may be an advantage to some ambulatory disabled people but a disadvantage for wheelchair users and others. Toilet seats 18 in (455 mm) high seem to be a reasonable compromise. Thick seats and filler rings are available to adapt standard fixtures to these requirements.

A4.16.4 Grab Bars. Fig. A5(a) and (b) show the diagonal and side approaches most commonly used to transfer from a wheelchair to a water closet. Some wheelchair users can transfer from the front of the toilet, while others use a 90-degree approach. Most people who use the two additional approaches can also use either the diagonal approach or the side approach.



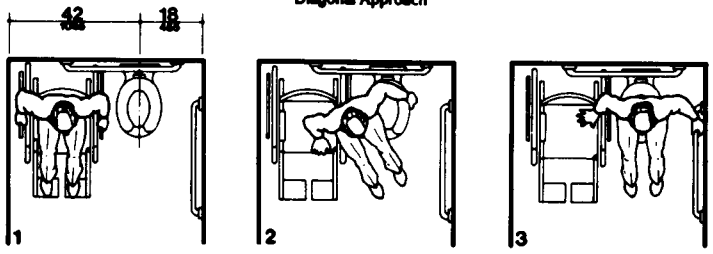
1 Takes transfer position, swings footrest out of the way, sets brakes.

2 Removes armrest, transfers.

3 Moves wheelchair out of the way, changes position (some people fold chair or pivot it 90° to the toilet).

4 Positions on toilet, releases brake.

(a)
Diagonal Approach



1 Takes transfer position, removes armrest, sets brakes.

2 Transfers.

3 Positions on toilet.

(b)
Side Approach

Fig. A5
Wheelchair Transfers

A4.16.5 Flush Controls. Flush valves and related plumbing can be located behind walls or to the side of the toilet, or a toilet seat lid can be provided if plumbing fittings are directly behind the toilet seat. Such designs reduce the chance of injury and imbalance caused by leaning back against the fittings. Flush controls for tank-type toilets have a standardized mounting location on the left side of the tank (facing the tank). Tanks can be obtained by special order with controls mounted on the right side. If administrative authorities require flush controls for flush valves to be located in a position that conflicts with the location of the rear grab bar, then that bar may be split or shifted toward the wide side of the toilet area.

A4.17 Toilet Stalls.

A4.17.5 Doors. To make it easier for wheelchair users to close toilet stall doors, doors can be provided with closers, spring hinges, or a pull bar mounted on the inside surface of the door near the hinge side.

A4.19 Lavatories and Mirrors.

A4.19.6 Mirrors. If mirrors are to be used by both ambulatory people and wheelchair users, then they must be at least 74 in (1880 mm) high at their topmost edge. A single full length mirror can accommodate all people, including children.

A4.21 Shower Stalls.

A4.21.1 General. Shower stalls that are 36 in by 36 in (915 mm by 915 mm) wide provide additional safety to people who have difficulty maintaining balance because all grab bars and walls are within easy reach. Seated people use the walls of 36 in by 36 in (915 mm by 915 mm) showers for back support. Shower stalls that are 60 in (1525 mm) wide and have no curb may increase usability of a bathroom by wheelchair users because the shower area provides additional maneuvering space.

A4.23 Bathrooms, Bathing Facilities, and Shower Rooms.

A4.23.9 Medicine Cabinets. Other alternatives for storing medical and personal care items are very useful to disabled people. Shelves, drawers, and floor-mounted cabinets can be provided within the reach ranges of disabled people.

A4.26 Handrails, Grab Bars, and Tub and Shower Seats.

A4.26.1 General. Many disabled people rely heavily upon grab bars and handrails to maintain balance and prevent serious falls. Many people brace their forearms between supports and walls to give them more leverage and stability in maintaining balance or for lifting. The maximum grab bar clearance of 1-1/2 in (38 mm) required in this standard is a safety clearance to prevent injuries from arms slipping through the opening. It also provides adequate gripping room.

A4.26.2 Size and Spacing of Grab Bars and Handrails. This specification allows for alternate shapes of handrails as long as they allow an opposing grip similar to that provided by a circular section of 1-1/4 in to 1-1/2 in (32 mm to 38 mm).

A4.27 *Controls and Operating Mechanisms.*

A4.27.3 *Height.* *Fig. A6 further illustrates mandatory and advisory control mounting height provisions for typical equipment. Note distinction between built-in equipment (considered real property) and movable equipment (considered chattel, and not covered by the Architectural Barriers Act of 1968).*

A4.28 Alarms.

A4.28.2 Audible Alarms. Audible emergency signals must have an intensity and frequency that can attract the attention of individuals who have partial hearing loss. People over 60 years of age generally have difficulty perceiving frequencies higher than 10,000 Hz.

A4.28.3 Visual Alarms. The specifications in this section do not preclude the use of zoned or coded alarm systems. In zoned systems, the emergency exit lights in an area will flash whenever an audible signal rings in the area.

A4.28.4 Auxiliary Alarms. Locating visual emergency alarms in rooms where deaf individuals may work or reside alone can ensure that they will always be warned when an emergency alarm is activated. To be effective, such devices must be located and oriented so that they will spread signals and reflections throughout a space or raise the overall light level sharply. The amount and type of light necessary to wake a deaf person from a sound sleep in a dark room will vary depending on a number of factors, including the size and configuration of the room, the distance between the source and the person, whether or not the light flashes, and the cycle of flashing. A 150-watt flashing bulb can be effective under some conditions. Certain devices currently available are designed specifically as visual alarms for deaf people. Deaf people may not need accessibility features other than the emergency alarm connections and communications devices. Thus, rooms in addition to those accessible for wheelchair users also should be equipped with emergency visual alarms or connections.

A4.29 Tactile Warnings.

A4.29.2 Tactile Warnings on Walking Surfaces. *(Reserved).*

A4.29.3 Tactile Warnings on Doors to Hazardous Areas. Tactile signals for hand reception are useful if it is certain that the signals will be touched.

A4.29.5 Tactile Warnings at Hazardous Vehicular Areas. *(Reserved).*

4.29 Tactile Warnings

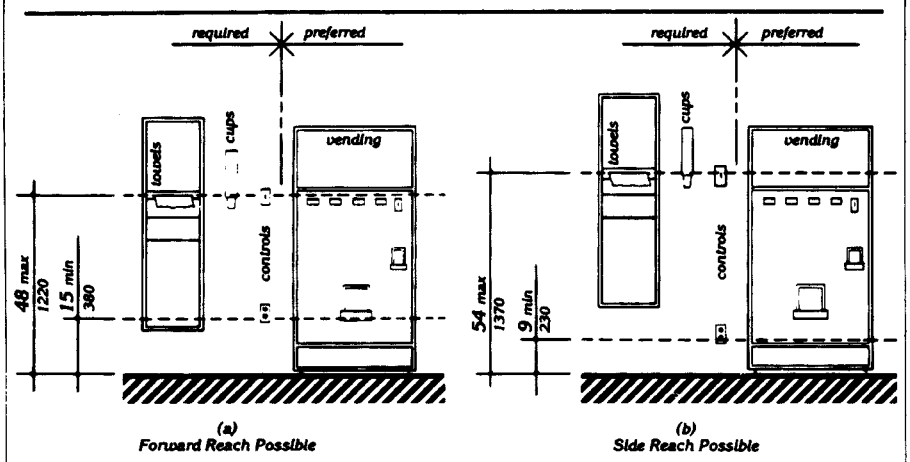


Fig. A6
Control Reach Limitations

A4.29.6 Tactile Warnings at Reflecting Pools. *(Reserved).*

A4.29.7 Standardization. Too many tactile warnings or lack of standardization weakens their usefulness. Tactile signals can also be visual signals to guide dogs, since dogs can be trained to respond to a large variety of visual cues.

A4.30 Signage.

A4.30.1 General. In building complexes where finding locations independently on a routine basis may be a necessity (for example, college campuses), tactile maps or prerecorded instructions can be very helpful to visually impaired people. Several maps and auditory instructions have been developed and tested for specific applications. The type of map or instructions used must be based on the information to be communicated, which depends highly on the type of buildings or users.

Landmarks that can easily be distinguished by visually impaired individuals are useful as orientation cues. Such cues include changes in illumination level, bright colors, unique patterns, wall murals, location of special equipment, or other architectural features (for example, an exterior view).

Many people with disabilities have limitations in movement of their head and reduced peripheral vision. Thus, signage positioned perpendicular to the path of travel is easiest for them to notice. People can generally distinguish signage within an angle of 30 degrees to either side of the centerline of their face without moving their head.

A4.30.2 Character Proportion. The legibility of printed characters is a function of the viewing distance, character height, the ratio of the stroke width to the height of the character, the contrast of color between character and background, and print font. The size of characters must be based upon the intended viewing distance. A severely nearsighted person may have to be much closer to see a character of a given size accurately than a person with normal visual acuity.

A4.30.3 Color Contrast. The greatest readability is usually achieved through the use of light-colored characters or symbols on a dark background.

A4.30.4 Raised or Indented Characters or Symbols. Signs with descriptive materials about public buildings, monuments, and objects of cultural interest can be raised or incised letters. However, a sighted guide or audio-tape device is often a more effective way to present such information. Raised characters are easier to feel at small sizes and are not susceptible to maintenance problems as are indented characters, which can fill with dirt, cleaning compounds, and the like.

Braille characters can be used in addition to standard alphabet characters and numbers. Placing braille

characters to the left of standard characters makes them more convenient to read. Standard dot sizing and spacing as used in braille publications are acceptable. Raised borders around raised characters can make them confusing to read unless the border is set far away from the characters.

A4.31 Telephones.

A4.31.3 Mounting Height. In localities where the dial-tone first system is in operation, calls can be placed at a coin telephone through the operator without inserting coins. The operator button is located at a height of 46 in (1170 mm) if the coin slot of the telephone is at 54 in (1370 mm).

A generally available public telephone with a coin slot mounted lower on the equipment would allow universal installation of telephones at a height of 48 in (1220 mm) or less to all operable parts.

A4.31.5 Equipment for Hearing Impaired People. Other aids for people with hearing impairments are telephones, teleprinter, and other telephonic devices that can be used to transmit printed messages through telephone lines to a teletype printer or television monitor.

A4.32 Seating, Tables, and Work Surfaces.

A4.32.4 Height of Work Surfaces. Different types of work require different work surface heights for comfort and optimal performance. Light detailed work such as writing requires a work surface close to elbow height for a standing person. Heavy manual work such as rolling dough requires a work surface height about 10 in (255 mm) below elbow height for a standing person. The principle of a high work surface height for light detailed work and a low work surface for heavy manual work also applies for seated persons; however, the limiting condition for seated manual work is clearance under the work surface.

Table A1 shows convenient work surface heights for seated persons. The great variety of heights for comfort and optimal performance indicates a need for alternatives or a compromise in height if people who stand and people who sit will be using the same counter area.

A4.33 Assembly Areas.

A4.33.2 Size of Wheelchair Locations. Spaces large enough for two wheelchairs allow people who are coming to a performance together to sit together.

A4.33.3 Placement of Wheelchair Locations. The location of wheelchair areas can be planned so that a variety of positions within the seating area are provided. This will allow choice in viewing and price categories.

A4.33.6 Placement of Listening Systems. A distance of 50 ft (15 m) allows a person to distinguish performers' facial expressions.

Table A1
Convenient Heights of Work Surfaces for Seated People*

Conditions of Use	Short Women in	Short Women mm	Tall Men in	Tall Men mm
Seated in a wheelchair:				
Manual work:				
Desk or removable armrests	26	660	30	760
Fixed, full-size armrests†	32‡	815	32‡	815
Light, detailed work:				
Desk or removable armrests	29	735	34	865
Fixed, full-size armrests†	32‡	815	34	865
Seated in a 16-in (405-mm) -high chair:				
Manual work	26	660	27	685
Light, detailed work	28	710	31	785

*All dimensions are based on a work-surface thickness of 1-1/2 in (38 mm) and a clearance of 1-1/2 in (38 mm) between legs and the underside of a work surface.

†This type of wheelchair arm does not interfere with the positioning of a wheelchair under a work surface.

‡This dimension is limited by the height of the armrests; a lower height would be preferable. Some people in this group prefer lower work surfaces, which require positioning the wheelchair back from the edge of the counter.

A4.33.7 Types of Listening Systems. A listening system that can be used from any seat in a seating area is the most flexible way to meet this specification. Earphone jacks with variable volume controls can benefit only people who have slight hearing losses and do not help people with hearing aids. At the present time, audio loops are the most feasible type of listening system for people who use hearing aids, but people without hearing aids or those with hearing aids not equipped with inductive pickups cannot use them. Loops can be portable and moved to various locations within a room. Moreover, for little cost, they can serve a large area within a seating area. Radio frequency systems can be extremely effective and inexpensive. People without hearing aids can use them, but people with hearing aids need custom-designed equipment to use them as they are presently designed. If hearing aids had a jack to allow a by-pass of microphones, then radio frequency systems would be suitable for people with and without hearing aids. Some listening systems may be subject to interference from other equipment and feedback from hearing aids of people who are using the systems. Such interference can be controlled by careful engineering design that anticipates feedback and sources of interference in the surrounding area.

A4.34 Dwelling Units

A4.34 Dwelling Units.

A4.34.2 Minimum Requirements. Handicapped people who live in accessible dwelling units of multi-family buildings or housing projects will want to participate in all on-site social activities, including visiting neighbors in their dwelling units. Hence, any circulation paths among all dwelling units and among all on-site facilities should be as accessible as possible. An accessible second exit to dwelling units provides an extra margin of safety in a fire.

A4.34.5 Bathrooms. Although not required by these specifications, it is important to install grab bars at toilets, bathtubs, and showers if it is known that a dwelling unit will be occupied by elderly or severely disabled people.

A4.34.6 Kitchens.

A4.34.6.1 Clearance. The minimum clearances provide satisfactory maneuvering spaces for wheelchairs only if cabinets are removed at the sink.

A4.34.6.5 Sink. Installing a sink with a drain at the rear so that plumbing is as close to the wall as possible can provide additional clear knee space for wheelchair users.

A4.34.6.6 Ranges and Cooktops. Although not required for minimum accessibility, countertop range units in a counter with adjustable heights can be an added convenience for wheelchair users.

A4.34.6.7 Ovens. Countertop or wall-mounted ovens with side-opening doors are easier for people in wheelchairs to use. Clear spaces at least 30 in (760 mm) wide under counters at the side of ovens are an added convenience. The pullout board or fixed shelf under side-opening oven doors provides a resting place for heavy items being moved from the oven to a counter.

A4.34.6.8 Refrigerator/Freezers. Side-by-side refrigerator/freezers provide the most usable freezer compartments. Locating refrigerators so that their doors can swing back 180 degrees is more convenient for wheelchair users.

A4.34.6.10 Kitchen Storage. Full height cabinets or tall cabinets can be provided rather than cabinets mounted over work counters. Additional storage space located conveniently adjacent to kitchens can be provided to make up for space lost when cabinets under counters are removed.

A9. Postal Facilities.

A9.2 ***Post Office Lobbies.*** *Furniture as chattel is not covered under the Architectural Barriers Act of 1968, but the requirements for lobby furniture and equipment are imposed by the United States Postal Service for greater accessibility in its customer lobbies.*

Note: Unedited copies of the American National Standards Institute standard, A117.1-1980, "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," are available from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

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*Bold denotes major sections of Uniform Federal Accessibility Standards

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[49 FR 31532 and 31625, Aug. 7, 1984, as amended at 50 FR 49046, Nov. 29, 1985; 54 FR 12628, Mar. 28, 1989]

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X02.6 Vehicular Ways and Facilities




X02.6.1 On-street parking.

X02.6.1.1 Minimum number required.

(A) Accessible spaces. Where on-street public convenience parking is provided in commercial districts and at civic facilities, accessible on-street parking spaces shall be included in the total provided in the project or project area in accordance with proposed ADAAG Section 208.2 and shall be dispersed within the project area.

Discussion: The committee deferred consideration of scoping for the provision of accessible parking in residential neighborhoods, where on-street parking may be permitted but not designated. Accessible parking spaces for individual residents may be designated as reserved upon request to the appropriate jurisdiction in order to ensure that convenient accessible curbside parking is available.

(B) Van accessible spaces. Where perpendicular or angled parking is provided, one in every eight accessible parking spaces within the project area, but not less than one, shall be a van parking space with an access aisle that is not less than 96 inches (2440 mm) wide.

Discussion: A vast amount of public parking in urban areas is located along public streets and within the public right-of-way. A portion of this parking needs to be accessible. For consistency, the committee agreed to use the same ratios as are already in use for parking lots.

X02.6.1.2 Location. Accessible spaces and van accessible spaces shall be dispersed within the project area and shall be provided at locations with minimum street and sidewalk slope to the extent this is consistent with reasonable dispersion within the area.

EXCEPTIONS:

1. Accessible on-street spaces shall be permitted to be clustered if equivalent or greater access is provided, with respect to distance from an accessible entrance, user cost, and convenience.

2. Accessible on-street parking shall be permitted to be combined with off-street parking under the same jurisdiction serving the same project area if equal or greater access is provided in terms of distance from an accessible entrance, user cost, and convenience.

Advisory: *The placement of accessible on-street parking spaces should take into account the type and composition of buildings and facilities located within the project area that is served by the on-street parking. Typically, no single site is served and therefore, parking should be dispersed throughout the project area. When accessible parking is dispersed within the project area, the spaces should be located in close proximity to the entrances of buildings or facilities located within the project area. In select circumstances, a project area may contain only one or two buildings within a project area (example: a municipal library that encompasses an entire city block, with only one public entrance), in which case the accessible parking spaces are permitted to be clustered together at the single entrance in order to provide equal or greater access. Also, if off-street parking is provided serving the same project area (example: a municipal park has both on-street parking as well as a lot serving the park), the total number of accessible parking spaces may be provided in the lot in lieu of the on-street parking spaces in order to provide equal or greater access to the park.*

X02.6.1.3 Minimum width and length. Accessible spaces shall not be smaller in width or length than that specified by the local jurisdictions for other spaces and in no case less than 8 feet (2449 mm) wide and 18 feet (5490 mm) long.

X02.6.1.4 Parallel parking spaces. Where accessible parallel parking is provided, a parallel access aisle at least 60 inches (1525 mm) wide shall be provided at street level the full length of the accessible parking space. The parallel access aisle shall connect at the head or foot of the parking space to a 60-inch wide minimum perpendicular access aisle that shall extend the full width of the parking space. Two parallel parking spaces may share a perpendicular access aisle. The vehicular travel lane shall not encroach on any required access aisle. The area between any curb and the *pedestrian access route* shall comply with Section X02.1.5 in order to allow the deployment of a side lift from a wheelchair accessible space and shall be connected to the pedestrian access route.

EXCEPTION: Where the width of the public pedestrian right-of-way between the extension of the normal curb and boundary of the public right-of-way is less than 12 feet (3660 mm), a parallel access aisle is not required at parallel parking spaces.

X02.6.1.5 Perpendicular or angled parking spaces. Where perpendicular or angled parking is provided, a parallel access aisle at least 60 inches (1525 mm) wide shall be provided at street level the full length of the accessible parking space. At van accessible parking spaces, a parallel access aisle at least 96 inches wide shall be provided at street level the full length of the van accessible parking space. Two perpendicular parking spaces may share an access aisle.

Advisory:*Where angled parking is provided, the entire area comprising the parking space and the access aisle should be marked uniformly to allow the driver to determine which side to park in to allow for egress from the vehicle for the person with a disability. An alternative is to provide a marked access aisle on both sides of the marked parking space.*

X02.6.1.6 Slope. The slope of the accessible space, van accessible space, access aisle for the accessible space, and access aisle for the van accessible space shall not exceed 1:48 slope in any direction.

EXCEPTION: Where steep terrain prevents the provision of on-street parking with compliant slopes, off-street parking in compliance with proposed ADAAG Section 502 may be provided as long as an accessible connection to the pedestrian access route is provided.

Discussion: For many people with disabilities, a sloped parking space is useless because of the potential hazards it presents. Not only may a sloped space be hazardous to use, a sloped space can damage a van lift.

X02.6.1.7 Curb ramps. A *curb ramp* complying with Section X02.4 shall connect the access aisle to the pedestrian access route.

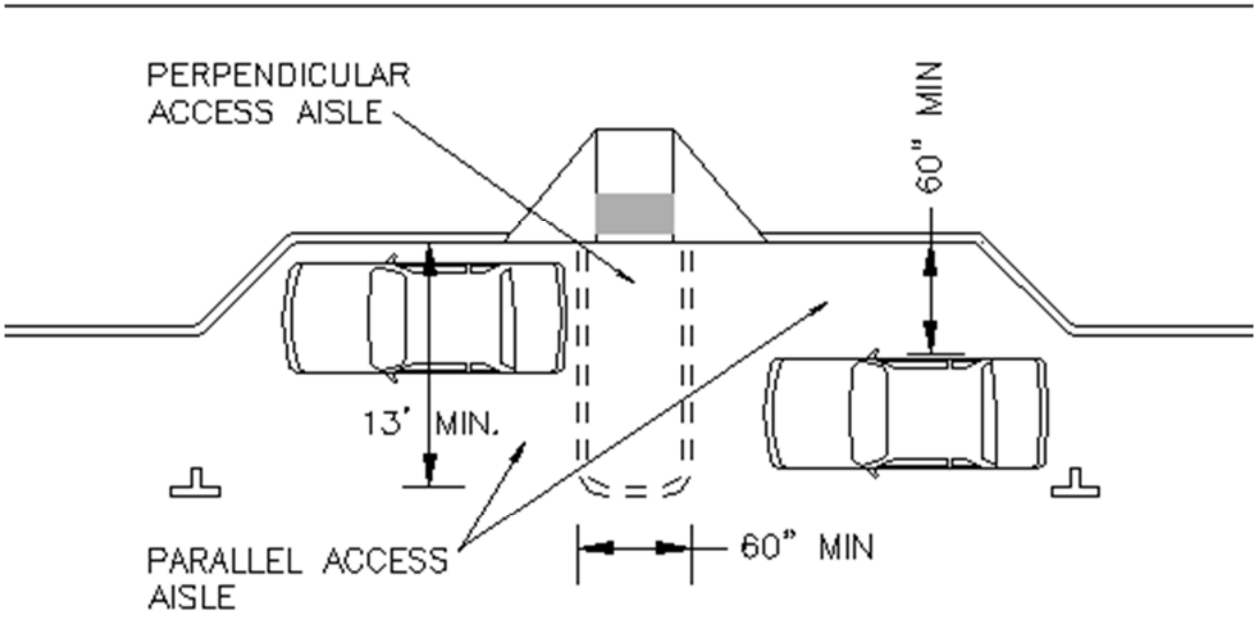
X02.6.1.8 Parking space signage. Parking spaces required to be accessible shall be designated as reserved by a sign that complies with proposed ADAAG Section 502.6. Van accessible spaces shall contain an additional sign "Van Accessible" mounted below the symbol of accessibility. Signs shall be located within the width or length of the space they serve and located within 3 feet (915 mm) of the head of the parking space so as not to interfere with the operation of a side lift or a passenger side transfer.

X02.6.1.9 Markings. Access aisles shall be marked so as to discourage parking in them.

X02.6.1.10 Obstructions. Obstructions such as *street furniture*, fire hydrants, parking meters, signs, mailboxes, landscaping, and trash receptacles shall not be placed adjacent to the accessible space in a manner that may interfere with the operation of a side lift or a passenger side transfer.

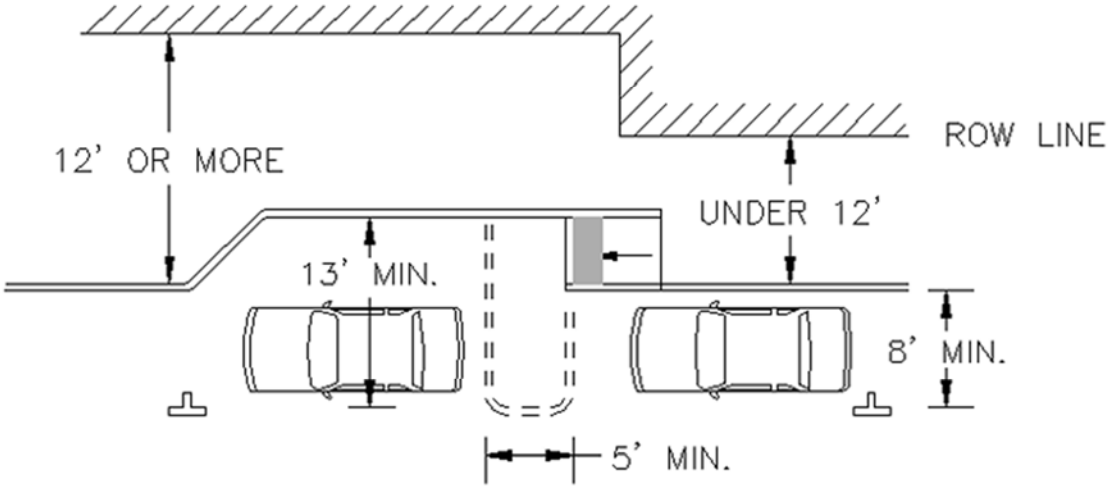
Discussion: The committee also discussed problems with accessible spaces being located next to a public sidewalk cluttered with street furniture such as trash receptacles, sign posts, trees, etc. Since various types of vehicles are driven by people with disabilities, the public sidewalk next to the parking space needs to be clear of obstructions in case it is needed for a side lift or passenger side transfer directly to the public sidewalk.

Figure X02.6 A Parallel Parking



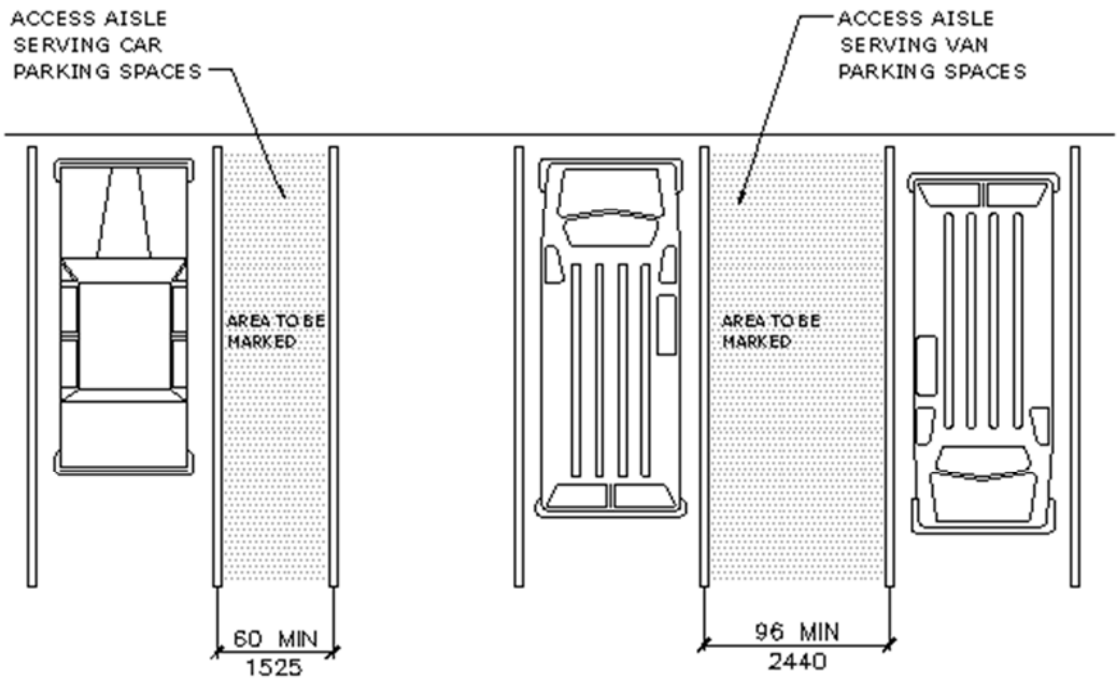
Two accessible parallel parking spaces sharing a perpendicular access aisle between the two spaces. The access aisle is 5' wide, minimum. In one space, the vehicle is shown parked close to the curb, while in the other space, the car is parked closer to traffic to allow exiting the vehicle on the curb side.

Figure X02.6 B Parallel Parking Space without Access Aisle



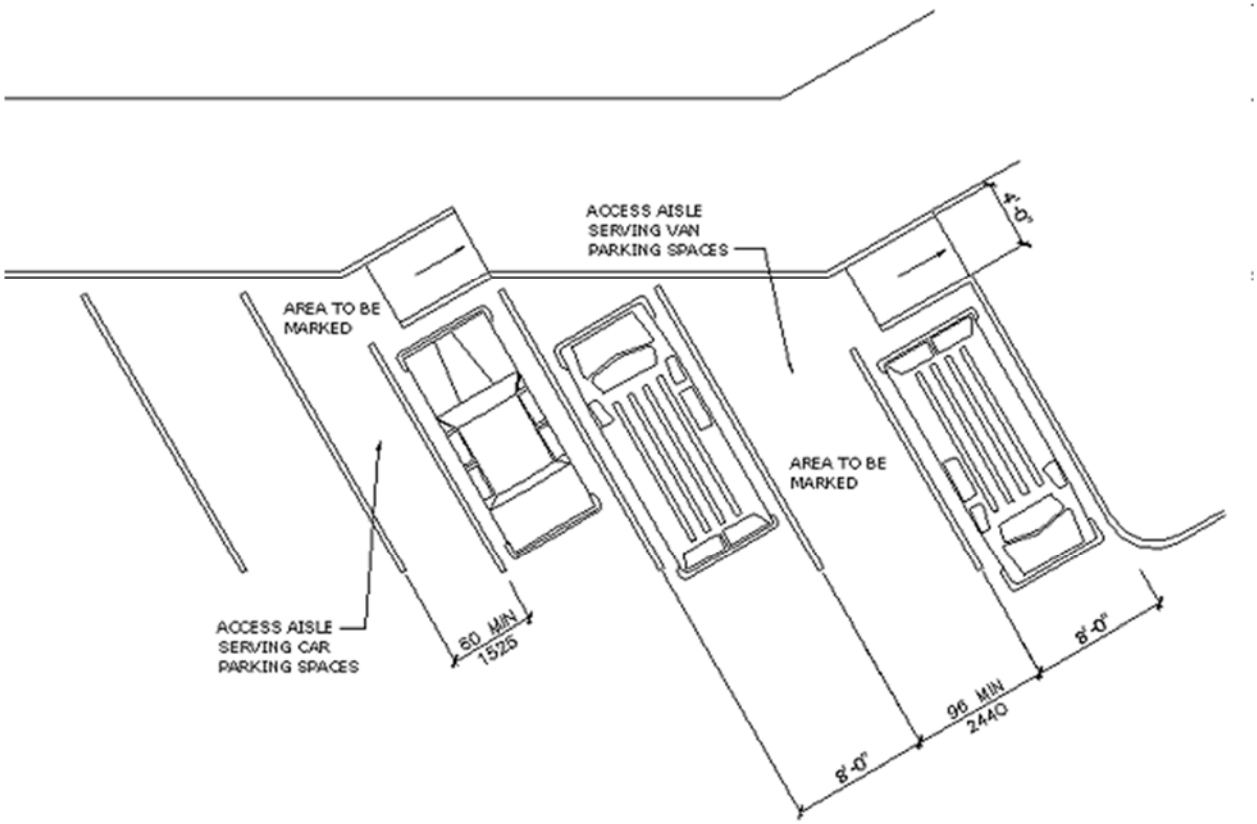
A single accessible parallel parking space with a 5' access aisle at the rear of the space. Dimensions depict the exception proposed in this report to not require the access aisle if there is less than 12' of available right of way from the normal curb line to the right of way line.

Figure X02.6 C Perpendicular Parking



A single perpendicular accessible parking space with a 5' access aisle to the right of the space. On the right, the figure shows two van accessible perpendicular parking spaces with a common 8' access aisle between them.

Figure X02.6 D Angle Parking



Two angle accessible parking spaces with a 5' access aisle between them and two van accessible angle parking spaces with an 8' access aisle between them. The figure depicts a total of 4 parking spaces with a curb ramp for each access aisle.

X02.6.2 Parking meters.

X02.6.2.1 General. Where public meters are provided, each shall comply with the requirements set forth in this section.

X02.6.2.2 Controls. The centerline of controls on all parking meters shall be no more than 42 inches (1065mm) above the *pedestrian access route*. Controls and operating mechanisms shall be operable from the pedestrian access route with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 pounds.

Discussion: The 42-inch high dimension for parking control mounting height was selected to be consistent with the mounting height for pedestrian push buttons on traffic signal poles.

X02.6.2.3 Clear space. Where parking meters serve accessible parking spaces required under this section, a stable, firm, and slip-resistant clear ground space complying with proposed ADAAG Section 305 shall be provided at the controls. Where only a parallel approach is provided, controls shall be within 10 inches horizontally of, and centered on, the clear ground space. Where only a forward approach is provided, controls shall abut and be centered on the clear ground space.

Discussion: Some committee members felt that a larger clear ground space is necessary in the public right-of-way. See discussion under X02.3.1.3.

X02.6.2.4 Location. A parking meter shall be located within 3 feet (915 mm) of the head or foot of the parking space so as not to interfere with the operation of a side lift or a passenger side transfer.

EXCEPTION: Where meters are not provided at the accessible space, but payment for parking in the accessible space is included in a centralized collection box/paying station, the accessible space shall be connected to the centralized collection point with a pedestrian access route.

X02.6.2.5 Display. Where instructions such as hours of operation are provided, they shall not be displayed solely on a horizontal surface of the meter.

Discussion: Parking meter instructions are frequently located on a horizontal plate mounted near the top of the meter. These instructions can not be viewed by a person in a wheelchair or a person of short stature.

X02.6.3 Passenger Loading Zones

X02.6.3.1 General. Where passenger loading and drop-off zones are provided in the *public right-of-way* for use by the general public, each shall meet the requirements set forth in this section.

X02.6.3.2 Minimum number of curb ramps. Where a curb adjoins a passenger loading zone serving multiple vehicle pull-up spaces (e.g., at transportation facilities), a minimum of one *curb ramp* complying with Section X02.4 shall be provided at intervals not to exceed 100 feet (30mm).

X02.6.3.3 Width and length. Loading zones shall not be smaller in width or length than that specified by the local jurisdiction and in no case less than 8 feet wide and 20 feet long (2440 by 6100mm).

X02.6.3.4 Access Aisle. Each passenger loading zone shall provide a parallel access aisle at least 60 inches wide and 20 feet long (1525 x 6100mm) adjacent and parallel to the vehicle pull-up space. The access aisle shall connect to the *pedestrian access route* in compliance with Section X02.

X02.6.3.5 Signage. Where signage is provided, it shall comply with Section X02.3.8.

Advisory: *Signing an accessible loading zone is not required. However, if signage is provided, it shall comply with specifications for accessibility.*

X02.6.4 Motorist aid communication systems.

X02.6.4.1 General. Where motorist aid communication systems are provided, each shall comply with the requirements set forth in this section.

Advisory*: When communication systems such as call boxes are located in an urban area and parking is provided, an accessible parking space should be located near the system and connected to the system with an pedestrian access route .*

X02.6.4.2 Controls and operating mechanisms. Controls and operating mechanisms shall comply with the following requirements:

(A) Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 pounds (22.2 N).

Discussion: The committee received comments from a manufacturer of a user-powered motorist aid communication system that it was not possible for their system to achieve the recommended 5 pounds maximum operating force, given the limitations of current technology. These mechanical systems use the energy imparted by the pull of a mechanical lever, using the downward pull force of a person's body weight, to generate the power required to transmit the 'help' message. Representatives indicated that some public entities wish to select systems that are able to generate their own power, due to the remote location of the installations, and noted their efforts to re-engineer their system to reduce operating force. Although the committee was sympathetic to the concerns expressed and recognized the limitations which currently exist, they were also concerned that a higher allowable force required on a control or operating mechanism might preclude its use by some people with disabilities. Furthermore, the committee did not have sufficient research to justify the appropriateness of an alternate force requirement and anticipated that those limitations might be reduced with future industry research. Thus, the committee chose to retain the 5 pound recommendation and invited the manufacturer to seek an exception in comment to the Access Board when the proposed rule is issued by the Board.

(B) Operable parts that are labeled shall be labeled in Braille complying with proposed ADAAG Section 703.5 and in large print (3/16 of an inch based on the letter I) and shall utilize a "sans serif" font.

(C) Controls shall be centered on the clear ground space and shall comply with proposed ADAAG Section 308 except that the highest operable part shall be 48 inches (1220 mm) maximum above the finished surface at the system location.

Discussion: The 48-inch dimension for the highest operable part is retained to avoid creating a roadside safety concern for vehicles leaving the roadway. Once there, the device must be designed such that persons with a variety of disabilities can use it. The user of the device is not always the driver, hence the need for Braille and large print instructions.

X02.6.4.3 Clear ground space. A stable, firm, and slip-resistant clear ground space a minimum of 72 inches by 72 inches (1830 mm by 1830 mm), with a slope no greater than 1:48 in any direction and with at least 2-inch (51mm) edge protection except at the entrance from the pedestrian access route, shall be provided at the controls and shall comply with proposed ADAAG Section 306.

Discussion: A clear ground space of 72 inches by 72 inches is required since users are typically required to leave the roadway, approach a communication system in the public right-of-way, and then make a 180 degree turn to return to their vehicle. It would be undesirable to require users to back out of a location and return to the vehicular way without a clear view of traffic. All turns will have to be made within the confines of the clear ground space due to the requirement for edge protection.

X02.6.4.4 Motor vehicle turnouts. A motor vehicle turnout with a minimum paved area of 16 feet (4880 mm) wide by 23 feet (7015 mm) long, and not exceeding a 1:48 slope in any direction, shall be

provided and shall connect to the clear ground space at the motorist aid communication system with a pedestrian access route. Where shoulder texturing is used, it shall be discontinued at the turnout.
Discussion: A person with a disability needing assistance needs sufficient space to pull out of the traffic lanes, exit their vehicle, and traverse an accessible route to the communication device. A vehicle turnout is required to ensure that enough space is available for a person with a disability to exit their vehicle, travel around the vehicle if necessary, and travel to the motorist communication device.
X02.6.4.5 Two-way communication. Where two-way voice communication is provided, the system shall comply with proposed ADAAG Section 704 and Section 708 and shall include volume controls and a permanent text telephone (TTY). The system shall also provide for VCO and HCO.
X02.6.4.6 Handsets. Handsets, if provided, shall be hearing aid compatible with inductive coupling capability and shall not cause interference with hearing aids. Handset cords shall be at least 29 inches (735 mm) long.
X02.6.4.7 Volume control. Volume controls, if provided, shall provide a gain adjustable to a minimum of 20dB. For incremental volume control, at least one intermediate step of 12dB of gain shall be provided. An automatic reset shall be provided.
Discussion: Because the roadway is a very noisy environment, at least 20dB of gain is necessary for some callers to be able to hear above the ambient noise level.
X02.6.4.8 TTY. Text telephone (TTY) communications, if provided, shall include automatic notification to the recipient that the call is a TTY call, and visual notification to the user that the call has been received.

X02.6.5 Overlooks and viewing areas.
Discussion: The committee noted that overlooks and viewing areas often occur as part of the public right-of-way, particularly as a vehicular pull-off from the roadway coupled with an area which permits the passenger to exit his or her car and to look at the scenery. The committee recognized that the Access Board's Regulatory Negotiation Committee for Outdoor Developed Areas proposed recommendations for such areas in their report published in September 1999. Rather than duplicate the work of that committee, the PROWAAC recommends that overlooks and viewing areas follow the same technical specifications as those proposed in 16.10 of the Report on Outdoor Developed Areas.

X02.6.6 Vertical and horizontal deflection measures.
X02.6.6.1 General. Where no *pedestrian access route* is provided within the *public right-of-way*, a passage of at least 36 inches (915 mm) must be provided between the vertical deflection and the curb or gutter, free of changes in level and with a *cross slope* not to exceed 1:48. Parking shall not be permitted at these locations.
Discussion: Although the committee did not provide any technical or scoping provisions for vertical or horizontal deflections, per se, they did acknowledge that there are situations where there is no pedestrian access route (or public sidewalk) on the adjacent side of the roadway and pedestrians, including wheelchair users, often use the roadway for walking. In those instances, the presence of a deflection in the roadway which traverses the entire width of the roadway will present a major barrier for wheelchair users. Thus, the committee recommended in those situations that a clear width of 36 inches without vertical deflection be provided at the outer width of the roadway to permit passage of a wheelchair user.
X02.6.6.2 Location. Reserved.
Advisory: *Vertical deflection measures are devices placed in the roadway that use the forces of vertical acceleration to discourage speeding by motorists. Vertical deflection measures include, but are not limited to, speed bumps, speed humps, speed tables and raised intersections. Horizontal deflection measures are devices placed in the roadway that use the forces of lateral acceleration to discourage speeding by motorists. Horizontal deflection measures include, but are not limited to, traffic circles, chicanes, and lateral shifts. The committee heard significant testimony from the public during each of its public meetings from individuals with a variety of disabilities, most notably spinal cord injuries or neurological conditions, about the installation of vertical or horizontal deflection measures. Anecdotal evidence presented by those testifying argued that the vertical and horizontal deflection measures were not only painful, but often exacerbated existing conditions when riding as a passenger in a motor vehicle. While the committee was not presented with data sufficient to make a policy recommendation in the area of a final recommended guideline, the committee did acknowledge and recognize that the impact of these traffic calming measures on persons with disabilities as motor vehicle passengers, rather than pedestrians, using the roadway or public rights-of-way, had not been fully addressed or researched. The committee further acknowledged that any traffic device which is intended to jolt or jar a driver in a vehicle with sufficient notice to alter (reduce) their driving speed, would similarly be felt by a person who is a passenger in the same vehicle. In the absence of research and in the face of*

anecdotal evidence, the committee suggests that entities consider other traffic calming measures which might achieve the same result of improved traffic safety in the design of a specific roadway and/or intersection. The Access Board has also received comments from operators of vehicles with low floors. These vehicles appear to be gaining popularity within the taxi industry for transporting persons with disabilities, and for personal vehicles adapted for use by a person with a disability. These operators report problems associated with bottoming out on various vertical deflection measures.

Recommended question: The committee recommends that the Access Board ask a question in the proposed rule about knowledge of any existing research in these areas.

Research need: The committee recommends that the Access Board establish a priority in its next budget/research cycle to study the effects of vertical and horizontal deflections used as traffic calming measures on persons with disabilities, especially those with spinal cord injuries or other neurological conditions, when they are passengers in motor vehicles (including paratransit and other public transportation vehicles).

X02.6.7 Motor vehicle turnouts. Reserved.

Advisory:A motor vehicle turnout is a widened, unobstructed shoulder which allows slow moving or non-functioning motor vehicles to pull out of the through lane to give passing opportunities to following vehicles. Where motor vehicle turnouts are provided, it is desirable for the turnout to have a minimum paved area of 16 feet (4880) wide by 23 feet(7015 mm) long and slopes not exceeding a 1:48 slope in any direction. This dimension will allow the turnout to also be used by a person with a disability who needs to service their vehicle. If use by people with disabilities can be accommodated at the turnout, any shoulder texturing such as rumble strips should be discontinued at the turnout.

Discussion: There was discussion about requiring all motor vehicle turnouts to be accessible by requiring minimum dimensions and level slope and grade. However, this was viewed by many on the committee as being impractical in the mountainous regions where turnouts are typically provided. Therefore, the committee decided to include only advisory language at this time.

JSTS

JOURNAL OF SOCIETY FOR TRANSPORTATION AND TRAFFIC STUDIES

ISSN 1906 - 8360

VOL.7 No.1

MARCH 2016

The Future of Human Mobility

TSTS



PREFACE

Dear Readers,

Welcome to the March issue of Volume 7 of our online peer-reviewed International Journal of the Society of Transportation and Traffic Studies (JSTS). This issue presents 5 interesting papers from various countries, Indonesia, Sri Lanka, United States of America and Thailand. Two papers deal with road network development and ridesharing, an ongoing and emerging issues in developing countries. Two deal with the improvement of pavement materials which are becoming an issue as environmental concerns are putting constraints on the use of new natural resources. One interesting paper from the US, addresses the critical subject of road safety, Guidelines for Road Diet Conversions. Road diets are about conversions of four-lane undivided roads into three lanes (two through lanes plus a centre turn lane). The fourth lane may be converted to bicycle lanes, sidewalks, or on-street parking.

Again, we thank all authors who contribute to these issues of our journal and we express our gratitude to members of the International Editorial Board and reviewers for their valuable comments and continued supports. A big thanks must go to the Editorial staff under the guidance of Assoc. Prof. Dr. Jittichai Rudjanakanoknad and Assoc. Prof. Dr. Pawinee Iamtrakul who prepared the backroom work for this issue. We trust our readers will enjoy and benefit from the articles in our online publication.

With Best wishes from all of us,

Professor Pichai Taneerananon
Chair of Editorial Board

Journal of Society for Transportation and Traffic Studies (JSTS)

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OPTIMIZATION OF MULTI-OBJECTIVE OUTBOUND LOGISTICS OPERATION

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Abstract: Distribution, one of major outbound logistics functions draws attention due to high cost incurred. This study investigates the planning of a real time distribution operation achieving three objectives simultaneously. Route optimization, truck utilization and equal delivery make-span have been accompanied in order to address the problem giving financial benefits to company and satisfying the stake-holders. It is a real challenge to fulfill these three objectives concurrently; however, this research provides promising solution for the problem combining both exact and heuristics techniques. Heuristics techniques exploits to cluster the customers ensuring equal delivery make-span and Dijikstra algorithm has been modified to generate optimal route in terms of distance and delivery quantity. Algorithm was developed in C++. Results reveal that proposed route planning reduces the cost by 11.5 % included with 50% reduction of fleet size and 37% saving of travel distance.

Keywords: Outbound logistics, Distribution, Exact, Heuristic

1. INTRODUCTION

Management of the logistics function is a crucial process for any supply chain as to function it efficiently and effectively. Under the phenomenon of globalization, deregulation, and time based competition the pressure for cost reduction and productivity improvement is ever increasing and a must for private companies as well as for the economy as a whole (Derigs, 2002). One of the most important aspects of supply chain management is maintenance of effective and efficient distribution network in order to fulfill customer requirements and expectations while achieving cost benefits. Efficient and effective logistic is all about providing the right products to the right place at the right time with the right cost (Lim, 2000).

Distribution network is an interrelated arrangement of people, storage facilities and transportation which brings products from producer to consumer. Good distribution can be used to achieve a variety of supply chain objectives ranging from low cost to high responsiveness. As a result, companies in the same industry often select very different distribution networks (Chopra, 2001).

A fast and reliable distribution network is essential for a successful company to provide goods and services to their customers right time with right quantities. Simultaneously they should highly force on distribution network optimization to sustain in highly competitive market. Complexity of the distribution networks are ever growing and in global context, therefore, many research studies have been conducted to optimize distribution network operations with efficient tools to support its decisions leading to a maximal service level at minimal costs.

According to the theoretical or mathematical programming view routing means the determination of optimum set of cycles within the graph or network. Different configurations of the underlying graphical structure, different objectives as well as different constrains have led researches to develop great varieties of optimization problems (Derigs, 2002). Optimization can be done considering single objective as well as multiple objectives. Mostly it would be cost optimization of distribution process. Moreover, the objectives may not always be limited to cost, it has extended to balancing of work load in terms of time and distance, capacity optimization can be taken into account by simply adding new objectives (Jozefowiez et al, 2008). Techniques used to solved mathematically formulated problems varies from exact algorithms to Meta-heuristics algorithms. Further many researches (Jozefowiez et al, 2008. Dharmapriya et al, 2012) accompanied hybrid of meta-heuristics in order to yield promising results in this context.

This study expands its focus into different objectives (Route optimization, truck utilization and equal delivery make-span) so as to address a current requirement of one of Sri Lankan companies. Due to the computational difficult of this problem both exact and heuristics approaches have been accompanied.

2. DATA ANALYSIS METHOD

2.1 Approaches

The proposed approach was developed integrating two main techniques such as exact algorithms and heuristics techniques at two different stages to achieve the objectives of the study.

Exact algorithm: Dijikstra algorithm was used to get the shortest path from Distribution Centre (DC) to Dealer point (DP)s. Dijikstra is the most efficient algorithm to get the shortest path for a single source problem. This algorithm itself can't provide a solution for the whole problem which only helps to derive the shortest path from DC to DP.

Heuristic Approach: To schedule the distribution operation with optimal assignment and equal delivery make-span, heuristic approach has been adopted by developing new order capturing policy. This was done with the experience gained by the current order capturing policy and redesigned it to achieve objectives of the study by

accommodating average distances. New order capturing policy is given in Table 2.

2.2 Methodology

Figure 1 shows the steps of the sequential procedure of the entire methodology. Initially clusters were identified with the heuristics technique and routes were derived within the cluster upon vehicle capacity, size of the order and optimal sub structure concept. The steps of the algorithm are clearly explained in the example given below.

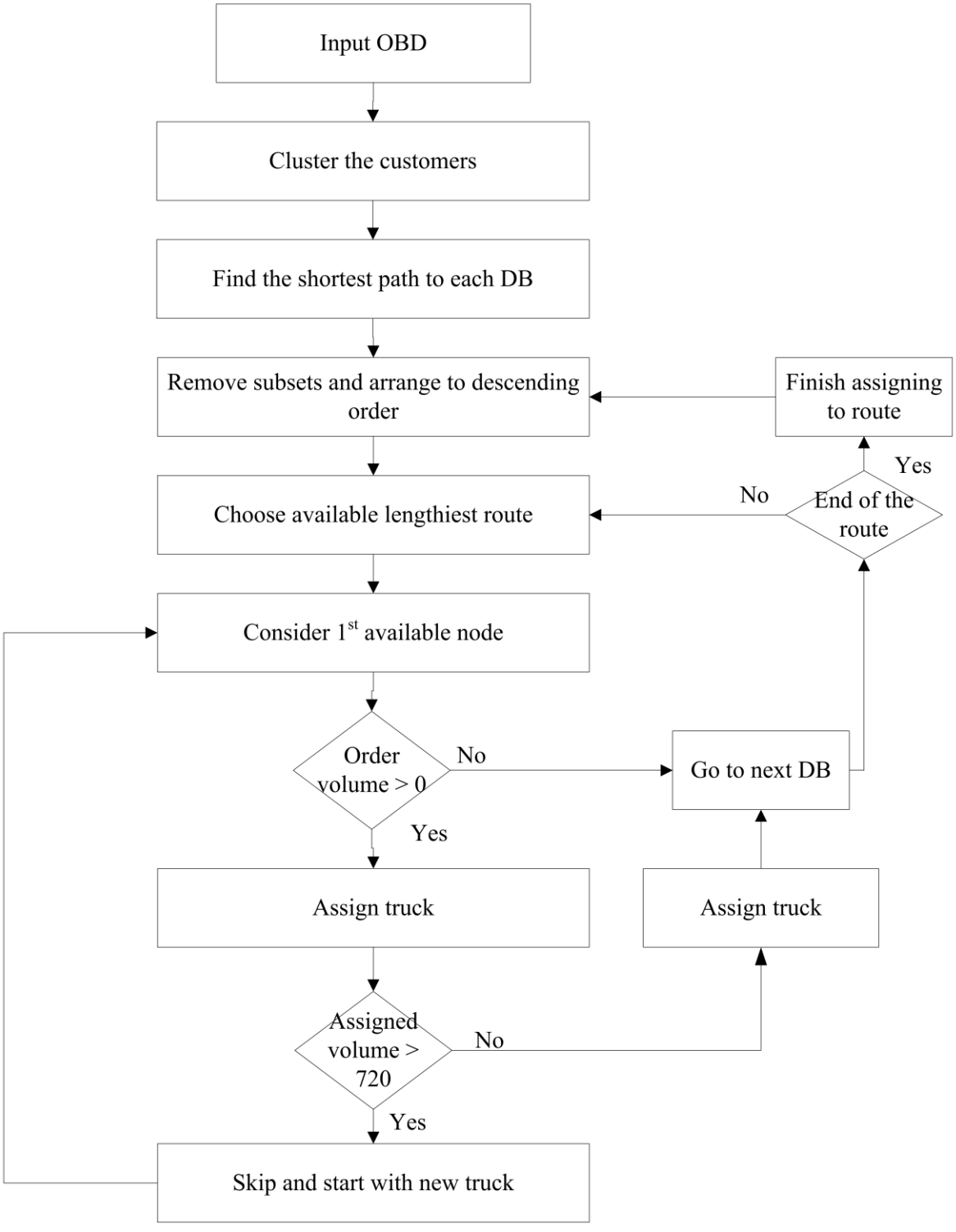

Figure 1. Flow Chart of algorithm

Example:

The steps of the proposed methodology are presented in Figure 1. Assume A,B,C,E,F,X,Y,Z,P,Q,R,S are DPs of network and O is the DC as indicated in Figure 2. Orders have been captured from all DPs except B and Y. Order placed by each DP is given in the Table 1.

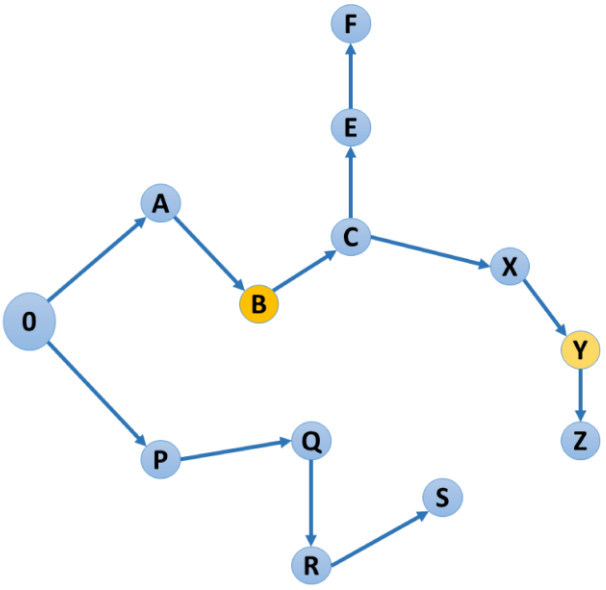

Figure 2. Example Network

Table 1. Example order volumes

A	250
B	0
C	240
E	210
F	285
X	222
Y	0
Z	274
P	212
Q	233
R	256
S	240

Step 1: Generating the shortest path from O to each DP using Dijikstra algorithm.

[O,A], [O,A,B,C], [O,A,B,C,E], [O,A,B,C,E,F], [O,A,B,C,X], [O,A,B,C,X,Y,Z], [O,P], [O,P,Q], [O,P,Q,R], [O,P,Q,R,S]

Step 2: Here author has used the technique called optimal substructure. If an optimum solution can be made from the solutions of its sub problems, it is called optimum substructure. Then these sub problems can be incorporated to main problem and remove these subsets and keep unique routes.

[O,A,B,C,E,F], [O,A,B,C,X,Y,Z], [O,P,Q,R,S]

Step 3: Re-arrange these routes according to the descending order.

[O,A,B,C,X,Y,Z], [O,A,B,C,E,F], [O,P,Q,R,S]

Step 4: These routes might contain the nodes which don't have orders. That means their order quantity is zero and they should be skipped when orders are assigned to trucks.

Start from the lengthiest route and assign orders to truck until its capacity exceeded. If truck capacity exceeded then next node should be started to assign a new truck and process continues until its capacity exceeded.

Truck 1:- [A+C+X] = [250+240+222=712]
Truck 2:- [Z] =274
Truck 3:- [E+F] = [210+285=495]
Truck 4:- [P+Q+R] = [212+233+256=701]
Truck 5:- [S] =240

In this example truck 1 and 4 have been allocated to full truck loads and truck 2, 3 didn't have suitable nodes to be paired since they were at the end of each route.

3. RESULTS

This section presents a comparison between the present system and the proposed schedule of the developed system on a sample of Outbound Delivery.

Case study: Sample 1

Order capturing policy
The entire distribution network was divided into 25 zones based on Sri Lankan district division and they were again assigned to seven days of the

week referring to the average travel distance to each zone. Average distance to each zone is calculated by taking the average displacement of all dealer points within the zone. For example, if Zone A consists of 3 DPs called X, Y, Z with distances of 10, 20, 30 average was calculated by [(10 + 20 +30) / 3]. Accordingly, following order capturing policy was developed considering the kilometer range as indicated in Table 2. This is the primary heuristics mechanism of getting fairly equal length for each route.

Table 2. Order capturing policy

Day	Average kilometer range	Zones
Monday	0-51	Gampaha, Kurunegala
Tuesday	52-100	Colombo ,Kandy, Matale,Puttalam, Kegalle
Wednesday	101-150	Kaluthara, Nuwara Eliya, Ratnapura
Thursday	151-200	Anuradhapura, Galle, Polonnaruwa, Trincomalee
Friday	201-250	Badulla, Hambantota, Matara, Monaragala, Vavuniya
Saturday	251-300	Batticaloa, Kilinochchi, Mannar
Sunday	301-400	Ampara, Jaffna, Mullattivu

Table 3 shows a sample of outbound delivery has been fed to both current system and the developed algorithm.

Table 3. Sample Outbound Delivery

Code	DP	Demand (in cases)
90	Colombo 06	231
57	Colombo 3	198
91	Moratuwa	232
58	Mount Lavinia	199
59	Piliyandala	200
61	Polgasowita	202
56	Rajagiriya	197
60	Thalawathugoda	201
89	Battaramulla	230
86	Galagedara	227
34	Galaha	223
15	Kandy	204
40	Katugastota	229
14	Kengalla	203
80	Kundasale	221
33	Peradeniya	222
13	Teldeniya	202
87	Ukuwela	228
47	Chilaw	236
48	Nainamadama	237
46	Puttalam	235

Delivery plan for above delivery sample given by the transport coordinator of current system is given in Table 4. Table 4 summarizes the details of demand points, travel distance, size of the vehicle used and related transportation cost factor. Accordingly, 16 trucks have been assigned while travelling 1292km creating the transportation cost of Rs.144, 788.

The same sample was fed to the developed algorithm and results are shown in Table 5 in the same format of Table 4. The proposed system has given priority to 32 CBM trucks considering their economic of scale.

Table 4. Truck assignment under existing system

Demand points	Travelled distance (km)	capacity of fleet (CBM)	Transportation cost (Rs)
Battaramulla & Rajagiriya	68	22	8759
Colombo 3	63	16	7804
Colombo 06 & Mount Lavinia	72	22	8775
Thalawathugoda	74	16	7913
Moratuwa	79	16	8371
Piliyandala & Polgasovita	90	22	11091
Hettipola	40	16	5751
Peradeniya	89	16	8958
Kengalla & Teldeniya	110	22	12689
Chilaw & Putalam	106	22	12689
Ukuwela	104	16	7508
Katugastota & Galaha	109	22	12111
Kandy	94	16	9457
Galagedara	75	16	8500
Kundasale	102	16	9333
Nainamadama	21	16	5079
Total	1292.5		144,788.00

Table 5. Output of Program

Truck No.	Travelled distance (km)	Capacity of the fleet	Transport Cost
1	75	32	13050
2	94	32	16356
3	106	32	18444
4	117	22	14508
5	74	32	12876
6	113	16	12882
7	112	32	19488
8	118	32	20532
Total	809		128,136.00

Results were compared and presented in table 6 in terms of Total number of trucks used, travelled distance and transportation cost. According to the results presented Table 6, it is clearly shown that new algorithm has optimized the distribution network and order assignment. No of trucks have been reduced by 50% and total kilometers have been reduced by 37% compare to the existing system. Cost reduction is 11.5% and Rs.16,652 has been reduced from original value. This significance reduction of the proposed system is mainly due to the newly implemented operation policy, fully utilization of vehicle capacity and the selection of most economical vehicle.

Table 6. Comparison between existing and proposed system

Parameter	Existing system	Proposed system
No of Trucks	16	8
Total travelled distance (km)	1292.5	809
Total cost (Rs)	144,788.00	128,136.00

In addition to minimizing the transportation cost, one of the main objectives of this study is to derive routes with equal delivery makespan. Variation of the length of truck routes in the previous and the existing system is given in Figure 3 and Figure 4 respectively.

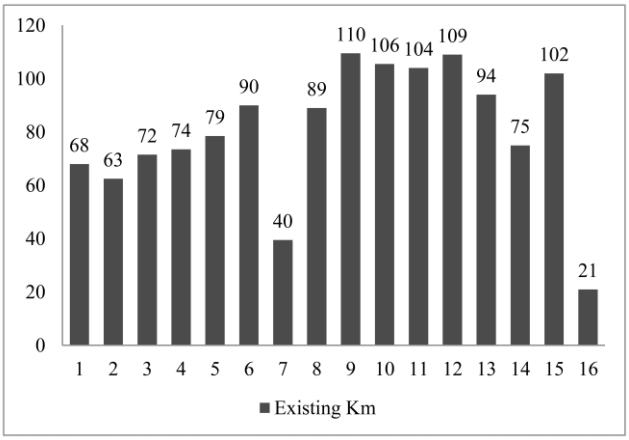

Figure 3. Distance variance of routes of the existing system

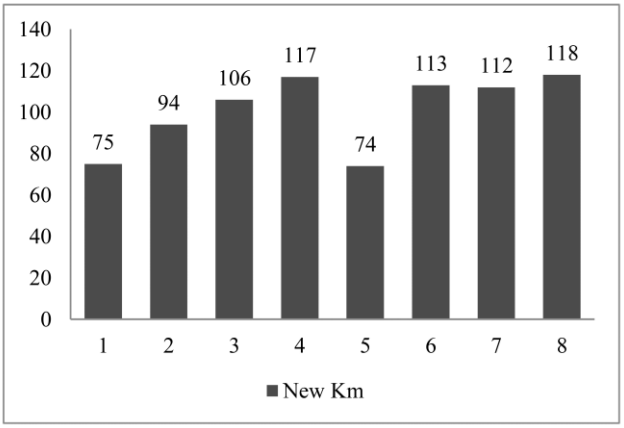

Figure 4. Travelled distance variance under new system

These results illustrate the success of proposed algorithm. Under existing situation there is a variation of 89km between lengthiest route and shortest route. But when it comes to the new system that variance has been reduced from almost 50%, which is from 89km to 44km.

4. CONCLUSION

This research has contributed to widen the boundaries of distribution optimization achieving three different objectives simultaneously. Practically, it is challenging to optimize the distribution operation with multiple objectives, however, using exact algorithms (Dijikstra) and heuristic approach objectives were achieved to a satisfactory level. Order coupling is done in the best possible way, reducing the fleet size by 50% and cost by 37%. Experience based heuristic approach ensures the total length of each route is within the acceptable km range. In addition, proposed system was able to distribute equal work load among the all transport contractors.

This research could be further developed by considering time window instead of equal delivery make span. However, distance is not the only factor affecting to same workload. Though the distances are similar there might be some routes which take more travel time than others due to traffic and road conditions. Therefore, time window would be more practicable solution to this kind of scenario.

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APPLICABILITY OF RIDESHARING USING PARATRANSITS: A CASE STUDY FROM A UNIVERSITY COMMUNITY IN SRI LANKA

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Abstract: Recent increase in number of singly hired para-transit usage in Sri Lanka favors ride shared para-transit modes. Applicability of ridesharing is studied in a selected corridor by examining the attitude of the passengers and drivers. The undergraduates of University of Moratuwa (passengers) were selected as the population and one of the access road (between Katubedda junction and university) was selected as the study area with Three-Wheel (3W) mode as common para-transit mode in Sri Lanka. Structured questionnaire was used to gather users (3W passengers) preference and drivers willingness along with road side survey on 3W movements to study the existing situation in the study area. The study focused on effects of ridesharing on three aspects while identifying barriers for ridesharing implementation; (1) demand for 3W, (2) monetary benefit for 3W operators and (3) Environment. It is found that implementing ridesharing with pool of three passengers and with fare of LKR (Sri Lankan currency-Rupees) 20 (less than ⅓ of the current fare, LKR 70) per head; (1) increases 3W ridership by 42%, (2) increases daily profit of the drivers by 13.3% compared to the existing (average vehicle occupancy=1.4) operating cost and (3) Reduces emission cost per user by 50% per passenger. Barriers to ridesharing from users are reluctant to share rides with unknown passengers (stranger-danger) and also with opposite gender while that of from operators is the fear from peer operators like other 3W drivers and bus operators. Implementing ridesharing is certainly a win-win case for both users and operators.

Keywords: Ridesharing, Para transit, Three wheel, User behavior, Questionnaire survey

1. INTRODUCTION

Ridesharing is not a new concept to the world's transportation. The roots of ridesharing goes back to the era of world war II where USA introduced 'car sharing clubs' to conserve resources, especially as rubber as it was a need of that era (Chan & Shaheen, 2012). Ever since, the concept of ridesharing has been used by people to protect resources to cope up with the challenges they faced. Today, it has evolved to the extent of 'technology enabled ride matching' where passengers can log on to websites to find another passengers who travel to the same destination.

The concept of ridesharing is a way of increasing the occupancy of the vehicle traveled and thus it will reduce the number of vehicle-kilometers traveled than a passenger travels individually. Also ridesharing is a promising approach to save the consumption of energy and it is a solution to assuage the traffic congestion while satisfying the transportation needs of the general public.

Three-Wheel (3W) is a commonly used Para-transit mode in Sri Lanka comparable to Tuk-Tuk in Thailand. 3W contribute 13.4% of all the vehicle modes in 2010 and it is tend to increase even further (DMT, 2013). The same trend is applicable to most of the other individually used modes such as cars. This may lead to higher traffic congestion, increased travel time and environment pollution due to the emission of greenhouse gasses.

As far as the impacts to the environment and safety are concerned, 3W is not the best mode for Studying for ride sharing. However, considering the nature of the selected study corridor (Figure 2), there are only two options available for captive riders namely bus and 3W. During morning (± 08:00am SL time) peak, when university community rushing towards the university, buses stopped at "Katubedda junction" at least for about 10 min to get it packed using higher demand which forces some, affordable, users to switch to 3W. With passengers this utilize the following aspects can be highlighted.

The objectives of the research were to (1) quantify the future demand for 3W under ridesharing, (2) identify monetary benefit for 3W operators and (3) quantify environmental benefit while attempted to identify barriers in implementing ridesharing.

2. CONCEPT OF RIDESHARING

Numerous number of studies have been done in the areas of ridesharing, passenger and operator attitude towards ridesharing, benefits of ridesharing and barriers to implement ridesharing. However, there were no previous research done on ridesharing using 3Ws in Sri Lanka. Most of the previous research is based on carpooling. In the developed countries, standard modes like cars and vans are used for ride sharing whereas in developing countries relatively cheaper modes are used for ride sharing (in this case 3Ws). Comparing car and a 3W for the purpose of ride sharing, both modes in terms of ride sharing have few commonalities; (a) Spatial limitation (route choice), (b) temporal limitation (time of demand need to fall into a window). Therefore, in this study, "car pool" and similar concept were reviewed for applying those to the '3W-Ridesharing'.

2.1 Types of Ridesharing

Ride sharing is considered under different concepts. Srivastava (2012) categorized it using car as depicted below in Figure1.

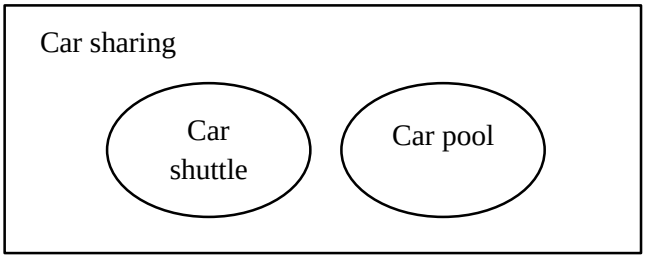

Figure 1. Venn diagram for Car Sharing, Shuttle and Pooling Relationship

Srivastava, (2012) explains that car sharing is a way of traveling which involves two or more passengers ride in a car. This category includes family trips, escorting friends who travel to the

same destination or to a destination en route. Whereas car shuttle is about one or more passengers ride on the car for monetary considerations where there is a designated driver for the vehicle. Thirdly he explains about carpooling which is about a group of car owning people traveling in one vehicle regularly from one region to the other with a rotating basis of using their own vehicle. Comparing the above three explanations, ridesharing using 3Ws has more or less the same attributes which has in car shuttles.

2.2 Benefits of Ridesharing

It is imperative that passengers shift towards ridesharing only if there are clear benefits for them. This is also declared by Dewan & Ahmad (2007) and Horowitz & Sheth (1976), where they explain ridesharing will only increase significantly if there exist clear and direct incentives to the participants. Brownstone & Golob (1991) state that this is one of the function comes under Transport Demand Management (TDM) in USA, where they focus on the means which they can provide incentives to the passengers to promote ridesharing. Their research identifies the following four incentives / privileges that can be enjoyed by the commuters if they share rides;

- Reserved or other preferential parking for ride sharers.
- Direct carpooling and/or vanpooling cost subsidies by employers.
- Guaranteed rides home for ride sharers.
- Ability to travel on high occupancy vehicle lanes (HOV lanes)

Brownstone & Golob, (1991) claim that with all the above mentioned incentives, there would be a reduction in drive- alone commuters between 11 and 18 percent. Also it was found that commuters who have large households with multiple workers, longer commuters and larger work sites are more likely to ride share.

Horowitz & Sheth (1976) claim that studies on ridesharing incentives are based on the presumption that solo drivers can be induced to carpool by offering them direct incentives. Value of arrangement such as ridesharing is immense. Implementing real-time ridesharing in Beijing (China), 120 million liters of gasoline can be saved. The amount saved is equal to 2.3 million kilograms of carbon dioxide gas. Also this proposed service serves 25% additional taxi users while saving 13% of the total distance traveled as indicated by (Ma, et al., 2013). Dewan & Ahmad (2007) conducted a similar study and found that if carpooling system is implemented in New Delhi - India, it will be able to save 301,307 kiloliters of gasoline per year.

2.3 Barriers for Ridesharing

This section identifies the barriers towards ridesharing in the context of the countries such as USA, Canada. Amey (2010) identifies the challenges for ride share from a variety of perspectives which are described below.

2.3.1 Economic barriers

- Favorable economics of all other modes

Amey (2010) argues that ridesharing (in this research, author defines carpooling as ridesharing) has been challenged by the subsidies given for the other modes of transport (i.e. employer-paid parking, transit, vanpooling and cycling). It is discussed that parking subsidies are given to HOVs (High Occupancy Vehicles) to encourage ridesharing. But, with the employer-paid parking, employees will no longer feel the impact which parking price make on their disposable income and they tend to drive alone. Transits and van pooling can also be identified as modes of ridesharing which reduce the number of vehicle kilometers traveled in the network whereas cycling is an ‘emissions free’ mode of transport. Ergo transits, vanpooling and cycling can be identified as sustainable modes of transport as same as ridesharing (carpooling).

2.3.2 Social/ Behavioral barriers

- Stranger – danger

It is found that ridesharing between unknown travelers represents a small portion of shared-rides that takes place. According to (Amey, 2010), surveys have found that as little as 3% to 10% of shared-rides occur between / among

unknown passengers whereas the majority of the shared-rides occur between / among family members, co-workers and neighbors. The statistics clearly states the phenomenon of 'stranger danger' has affected.

- Reliability of service

Amey (2010) points out that the perception of low reliability of the ride share arrangements is one of the largest behavioral challenges to overcome. Typically the passengers agree to share rides with a single driver for a long period of time with small changes as needed. In case the driver has an unexpected appointment of emergency, the passengers may not have a way to complete the return trip, which is unacceptable for many commuters. Both the passenger and the driver should understand the emergencies and adjust their perception to build-up the relationship over the time so that both of the parties will get benefited.

3. METHODOLOGY

3.1 Study Area

Access roads to the main entrance of University of Moratuwa were considered for this study to investigate ridesharing applicability. As depicted in Figure 2, among the three access roads (1) Campus road from Katubedda junction - AR1, (1) Campus road from Piliyandala - AR2 and Molpe road - AR3, AR1 was selected due to high 3W movements compared to others. There are two main three-wheel parks located at "Katubedda junction" and at the University. Two busses are being operated in the selected road link (route number 255, 255/1) with a 10 minute headway on average.

3.2 Sample of the Study

The population for this study was university community consists of staff members, post graduates and undergraduates of University of Moratuwa (6,000 students in total) as majority of the 3W users along AR1 are fall in to that category. The appropriate sample size was considered as 361 with 95%confidence level and 5% margin of error (Krejcie & Morgan, 1970) and the responses were collected from a structured online questionnaire. From the 3W number plate survey it was found that there are 37 three-wheel operate in the day time. From that a random sample of 17 three-wheel drivers were interviewed with the aid of structured questionnaire. The research was carried out in three stages (1) Online questionnaire survey, (2) road side number plate survey and (3) interview with three-wheel drivers.

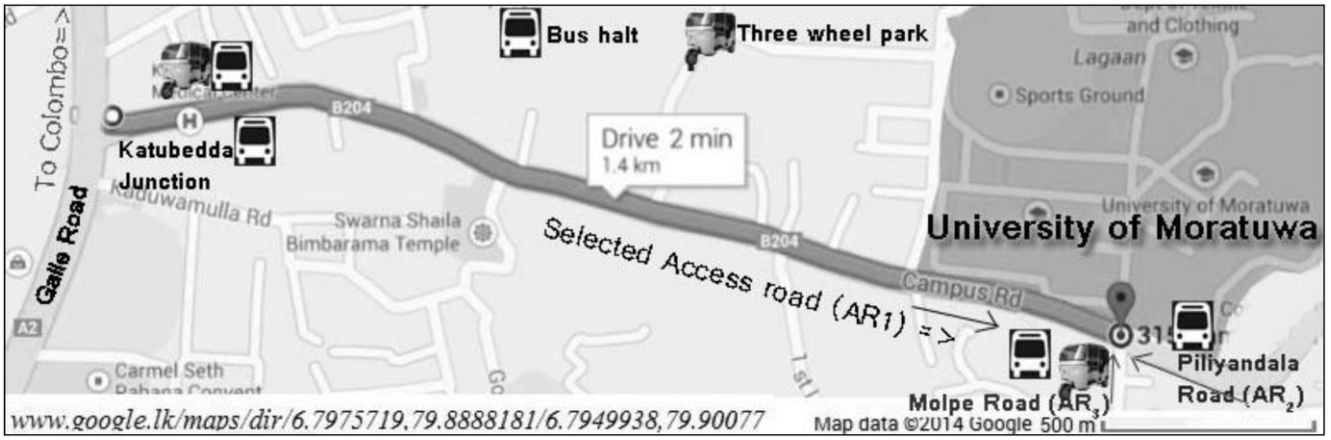

Figure 2. Location of the study area *(URL: http://goo.gl/maps/QvPEd)*

3.3 Online Questionnaire Survey for Passengers

An online questionnaire was prepared and circulated via emails to collect responses from the academic staff members, non-academic staff members, post graduates and the undergraduates of University of Moratuwa, who employed/studied in the university during the period of the research (Dec 2013 – Jan 2014). The online questionnaire survey was three fold. The first part of the questionnaire was addressed to collect passenger's demographics (age, employment category, income etc.) and present travel related characteristics (vehicle ownership, general access mode to the university etc.).

In the second part of the questionnaire, respondents were asked about their willingness to share ride under different circumstances given below;

- Sharing a ride with a friend(s).
- Sharing a ride with a person in university other than friends.
- Willingness to wait for some other person to join with rideshare.
- Willingness to share rides if one of the colleagues/ friends has already joined with ride sharing.

Seven level likert scale was used to identify the willingness of the passengers towards ridesharing.

Table 1. Measurement of variables and scale

Level	Level Value
Definitely will not	1
Very unlikely	2
Somewhat unlikely	3
Cannot say	4
Somewhat likely	5
Very likely	6
Definitely will	7

3.4 Three-wheel Number Plate Survey

A three-wheel number plate survey was conducted for 12 hours on a day time to identify the present 3W movements of the study area along with bus counts bus arriving and departing patterns were observed at the two bus stops adjacent to each 3W parks (as shown in Figure 2). The survey was conducted from 08:00am to 08:00pm on a Wednesday (18th Dec 2013). The survey was conducted using four enumerators who were strategically located at places so that the observer can observe both bus movements and 3W movements. Two of the observers gathered data about the busses (bus arrival time and departing time) and 3Ws (departing time, number of passengers on board) while other two observers observe only about the arriving time of the 3Ws and alighting passengers from each 3W.

This survey results were used to analyze the demand for 3Ws in different times of the day. Also it was used to identify the trips which were run between the selected access road and beyond the selected access road. These results were then cross-checked with planned interview with the 3W drivers (explained below). The average 3W occupancy was also measured using the data in order to identify the current situation along the selected corridor.

3.5 Personal Interviews With 3W Operators

Finally an interview was conducted with the 3W drivers from the 3W parks at Katubedda junction and in front of the main entrance of the university. The demographics factors of drivers and average daily trips operated within the selected corridor (AR1) were collected in addition to their opinion on ridesharing and barriers to it.

3.6 Analyzing the Effectiveness of Implementing Ridesharing

To calculate the variation of the trips under the existing system and proposed system of ridesharing, responders were asked a question about their current frequency as well as the future frequency of using 3Wers in the selected corridor. The below Table 2 shows the frequency related options given to the respondents and corresponding numerical values as per weekly basis.

The respondents were asked about their usage of 3Wers under the existing operating system and under ridesharing. In the existing system the

vehicle occupancy can be vary from 1 to 3 depending on passenger's choice with LKR 70 per trip whereas in ridesharing it is expected to keep the vehicle occupancy at 3, so that 3 passengers can get together and share the fare. In ridesharing situation, it is expected to offer this service at a reduced fare of about LKR 60 which translates the fare per passenger as LKR 20. Based on Q1 and Q2, as given in Table 3, the respondents were subdivided into several categories as illustrated below in Figure 3.

Table 2. Frequency of 3W usage

Frequency	Frequency of trips per week
Never1/ Rarely	0
1 time / week	1
2 times / week	2
3 times / week	3
4 times / week	4
5 times / week	5
6 times / week	6
1 time / day	7
2 times / day	14
3 times / day	21
4 times / day	28

Table 3: Questions about trip frequency

(Q1) Existing system	(Q2) Ridesharing
In any case if you use a 3Wer for the last trip, how often do you use a 3Wer to complete the last trip? (Respondent were allowed to select a frequency as shown in Table 2)	If Three-wheel ride-sharing exists with reduced fare, what will be your future trip frequency using three-wheel? (Responder were allowed again a frequency from Table 2)

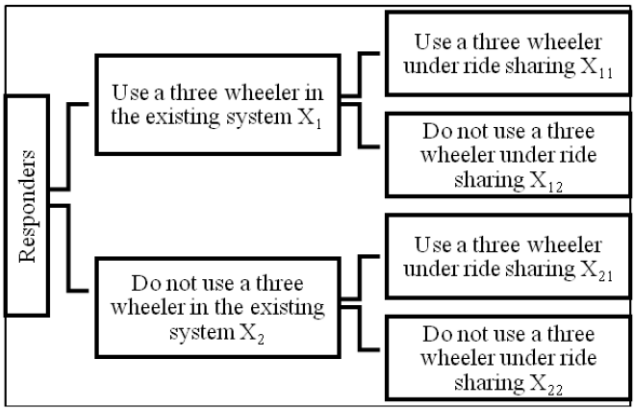

Figure 3. Method of analyzing the effectiveness of ridesharing

The above categorizations, shown in Figure 3, were elaborated below.

X1 : Expected number of trips by the students in the existing system

X2 : Expected number of trips by the students in the existing system who do not use a 3W to come to university (= 0)

X11: Expected number of trips by the students who continue to use a 3W to come to university when ride sharing is implemented.

X12: Expected number of trips by the students who do not willing to use ridesharing though they use a 3W in the existing system

X21: Expected number of trips by the students who newly attracted to 3W by the implementation of ride sharing

X22: Expected number of trips by the students who do not want to use 3W in any given method (= 0)

By multiplying the number of responses for each category (from Figure 3) with relevant trip frequency value (from Table 3), the expected number of 3W passenger trips can be calculated. The calculated total passenger trip divided by vehicle occupancy is the 3W demand (D) also known as number of 3W trip would be generated by the users. Therefore, existing demand for 3W (D_1) will be calculated using Equation 1 as given below where the current average occupancy of the 3W (O_1) was found to be 1.4 from road side occupancy count made during number plate survey.

$$D1 = (X_1 / O_1) \quad (1)$$

The future demand for 3W combined from normal and ridesharing (D_2) can then be calculated using Equation 2 as given below where ridesharing vehicle occupancy (O_2) is assumed to be three (3) while that of normal 3W (continued to operate under existing scenario) is assumed to be one (1).

$$D_2 = [(X_{11}+X_{21})/O_2] + X_{12} \quad (2)$$

Ridesharing could be said applicable if newly attracted 3W demand (D_2 - D_1) promises the benefit to the 3W operators in terms of net profit.

3.7 Calculating the Environmental Impacts

The emission cost for any vehicle operates in a given corridor can be calculated by the Equation 3 (Kumarage & Weerawardana, 2013) given below. It has been taken in to account that volumes of specific emissions are directly proportionate to the quantity of the type of fuel consumed. The emission cost for a vehicle type j on a link k during the time period t can be expressed as;

$$TEC_{j,k,t} = V_{j,k,t} \times F_{j,t} \times E_{j,k} \times D_{j,k} \quad (3)$$

Where:

$TEC_{j,k,t}$ = Emission cost by a vehicle type j on link k during time period t.

$V_{j,k,t}$ = Flow of vehicle type j on link k during time period t.

$F_{j,k}$ = Fuel consumed per unit distance traveled by vehicle type j at on a link k.

$D_{j,k}$ = Estimated value of emission cost per liter of fuel for vehicle type j at on link k

According to Department of National Planning of Sri Lanka (2001), it is calculated that the total emission cost per liter of fuel for a 3W was LKR 0.62.

4. RESULTS AND DISCUSSION

Altogether 364 responses were collected from the questionnaire survey and during data refining, there were 7 responses found with errors. Therefore only 357 (=364-7) responses were taken for the rest of the analysis. Out of those responses 334 responders were undergraduates of the University of Moratuwa. Since negligible number of responses from others (staff members and post graduates), the responses only from the undergraduates (334) were considered in this research. Out of the 334 responders, again only 189 responders were using the selected study corridor (AR1) to university thus this study analyzed only those 189 responses.

4.1 Future Demand for Three-Wheel Trip Under Ridesharing

The calculations based on the data collected is summarized in the table given below. The values which will be taken for the analysis is highlighted in Table 4.

Table 4. Summary of the data collected and calculations

Frequency		(1)		(2)		(1/1)		(1/2)		(2/1)		(2/2)	
Description	f	X_1	f X_1	X_2	f X_2	X_{11}	f X_{11}	X_{12}	f X_{12}	X_{21}	f X_{21}	X_{22}	f X_{22}
Never & Rarely (0)	0	0	0	119	0	0	0	0	0	0	0	34	0
1 time / week (1)	1	28	28	0	0	6	6	2	2	17	17	0	0
2 times / week (2)	2	14	28	0	0	11	22	0	0	28	56	0	0
3 times / week (3)	3	6	18	0	0	5	15	0	0	10	30	0	0
4 times/ week (4)	4	2	8	0	0	9	36	0	0	1	4	0	0
5 times / week (5)	5	2	10	0	0	10	50	0	0	1	5	0	0
6 time / week (6)	6	0	0	0	0	1	6	0	0	3	18	0	0
7 times / week (7)	7	10	70	0	0	13	91	0	0	13	91	0	0
14 times / week (14)	14	8	112	0	0	8	112	1	14	10	140	0	0
21 times / week (21)	21	0	0	0	0	2	42	0	0	2	42	0	0
28 times / week (28)	28	0	0	0	0	2	56	0	0	0	0	0	0
		Σ f X_1	274	Σ f X_2	0	Σ f X_{11}	436	Σ f X_{12}	16	Σ f X_{21}	403	Σ f X_{22}	0

Demand for 3W under existing and future could be then calculated using Table 4 and equations (1) and (2) as shown below.

D1 = (X1 / O1)
D1 = 274/1.4
D1 = 196 trips per week

D2 = [(X11+ X21)/O2] + X12
D2 = (436+403)/3 +16
D2 = 280+16 trips per week

Though calculation of future demand (D2) has two components (ride sharing and conventional 3W ride). The majority of the trips are generated through ride sharing (280) and while continued to using 3W under conventional method is only 16 and it is neglected for rest of the calculations.

The 'x' axis of Figure 4 represents the frequency of using a 3W per week while the 'y' axis on the left indicates the number of responses for each trip frequency in the existing system and ridesharing one and the 'y' axis on the right indicates the cumulative 3W trips traveled per week.

Based on interview conducted with 3W drivers, it was found that they run 15 trips on average in a given day. According to Figure 4, the cumulative trips traveled per week in the existing system is 196 while the cumulative trips per week in ridesharing has increased to 280. Therefore implementation of ridesharing will increase 42% ([280-196]/196) of the total trips traveled than in the existing system. With the increase of 42% of trips, a 3W operator will be able to increase his 3W trips on a given day from 15 to 22.

4.2. Monetary Benefit Three-Wheel Operators

According to daily basis calculation shown in Table 4, a 3W driver will have at least 22 trips per day if ridesharing is implemented. The Table 4 also attempts to calculate the monetary benefit in implementing ridesharing for a single operator per day where fuel economy* is assumed to be remained same even though weight (kg) carried under ridesharing would be higher than existing system as the vehicle occupancy increases. It is clear that ridesharing will increase their daily profits by 13.3%.

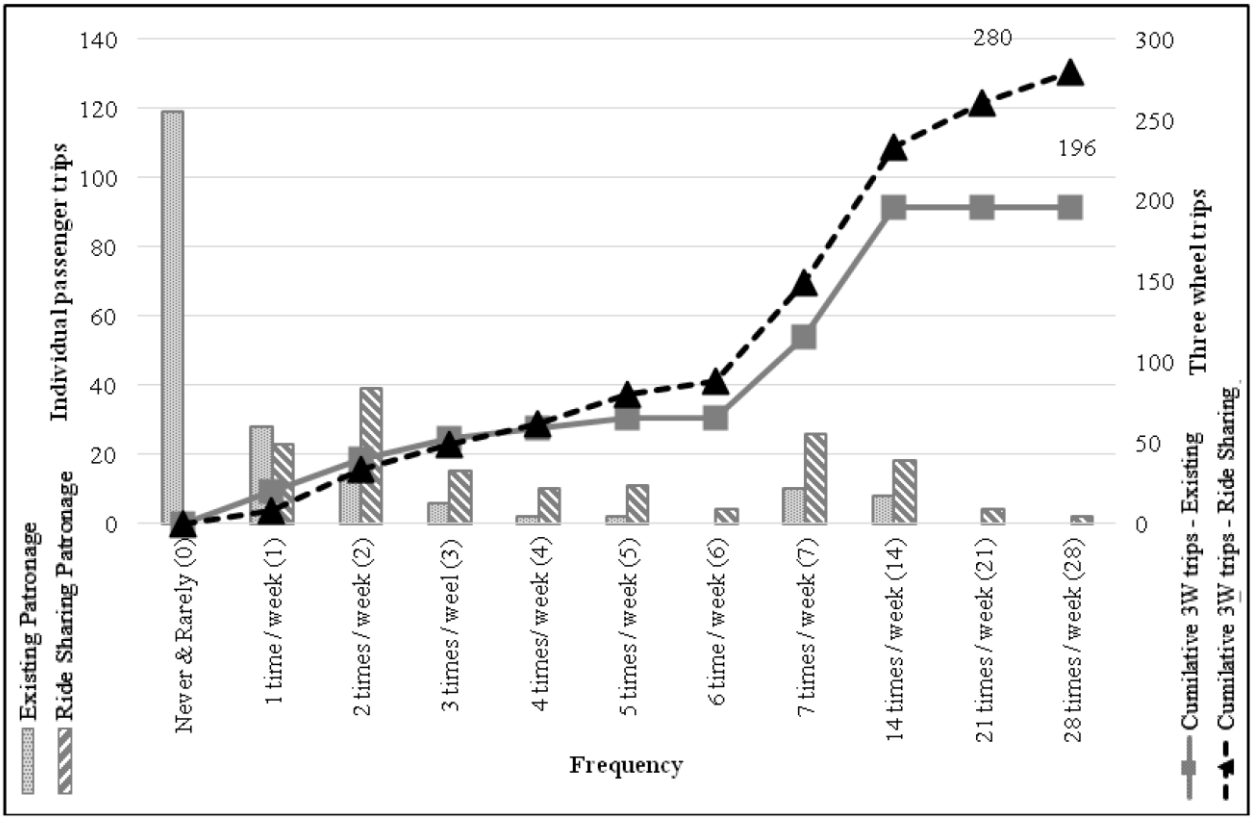

Figure 4. Comparison of Existing system and Ridesharing

Table 5. Monetary benefits to 3W operator on daily basis

Criteria	Calculation method	Cost elements		% increase / decrease
		Existing	Ridesharing	
Fare per trip (LKR)	a	70	60	14.2%↓
No of 3W trips	b	15	22	42%↑
Trip Distance – two way(km)	c	2.8	2.8	-
Fuel Price (LKR)	d	162		
Fuel Economy (km/liter)*	e	22 (Assumed same)		-
Maintenance cost (LKR per km)	f	1.92 (Assumed same)		-
Calculation				
Daily Income (LKR)	g = a×b	1,050.00	1,320.00	25.7%↑
Daily fuel usage (liters)	h = b×c/e	1.91	2.80	46.6%↑
Daily fuel expenses (LKR)	i = h×d	309.27	453.60	46.6%↑
Maintenance cost (LKR)	j = b×c×f	80.64	118.27	46.6%↑
Daily profit (LKR)	l = g-i-j	660.09	748.13	13.3%↑

Table 6. Conversion of Environmental Impacts into Monetary Values

Criteria	Calculating method	Existing	Ridesharing
Fuel Economy (km/ Liter)	a = Fj,k	15	22
Trip distance (km)	b = Dj,k	2.8	2.8
Number of Trips per week	c = Vj,k,t	196	280
Vehicle occupancy	d = O	1.4	3.0
Total number of passengers/week	g = Vj,k,t × O	274	840
Fuel Consumption per week (liters)	h = Vj,k,t × Dj,k / Fj,k	25.0	35.6
Per passenger fuel usage (liter / passenger)	i = F/E	0.09	0.04
Emission cost per liter of gasoline (LKR)	Ej,k	0.62	0.62
Emission cost per week (LKR)	TECj,k,t = Vj,k,t×Fj,k×Ej,k×Dj,k	15.5	22.1
Per passenger emission cost (LKR / passenger)	K = TECj,k,t /G	0.06	0.03

4.3 Environmental Benefit

Though implementation of ridesharing will increase the number of trips run by 3Ws in the selected corridor, it is quantified in Table 5 that ridesharing save both per user costs of fuel and emission (monetary value) approximately by 50%. The Equation (3) was used to calculate the emission cost per week.

4.4. Barriers for Ridesharing

4.4.1 Stranger – danger

The behavior of 'stranger-danger' is observed in this study based the responses from the online questionnaire. Cultural barrier from gender is also observed from Figure 5. Especially female users are reluctant to share rides with strangers when analyzing the cumulative curves.

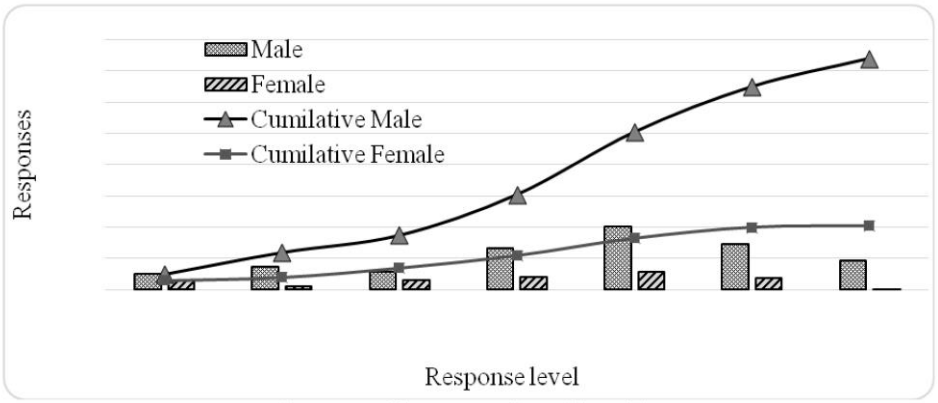

Figure 5. Willingness to share rides with strangers

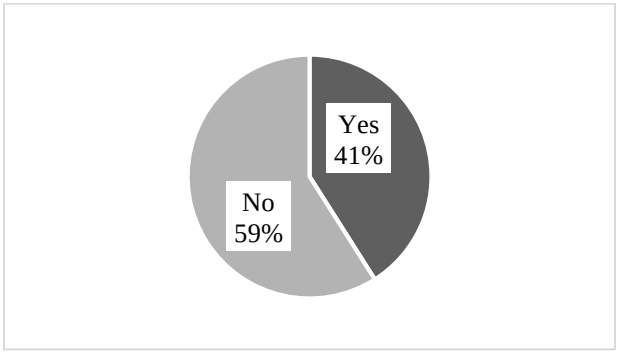

Figure 6. Willingness of operators to change to ridesharing

4.4.2 Reluctance to change

Explained the fact that ridesharing increases three-wheel trips to the drivers, the drivers were not convinced to brace the concept and implement ridesharing. Interview with drivers reveals that 59% (Figure 6) of the drivers were reluctant to implement ridesharing as they believe that there will be some 3W operators will continue to operating under current model and then it turn out to be peer pressure for ridesharing operators. They also mentioned that implementing ridesharing may create issues with the bus operators as more passengers would shift for 3W from bus thus reduces income for bus operators.

5. CONCLUSION

Based on research analysis and findings, implementing ridesharing is certainly as a win-win case for both users and operators and ridesharing is highly applicable along this selected corridor with following proven benefits;

- Increases future demand for three-wheel (ridership) under ridesharing by 42%,
- increases daily profit of a driver by 13.3% under ridesharing with vehicle occupancy of 3.0 and fare per trip of LKR 60, translated to LKR 20 per head, compared to the existing operation with average vehicle occupancy of 1.4 and fare per trip of LKR 70,
- Energy efficient by saving about 50% of fuel cost per passenger while saving emission cost per user also by 50%.

Users from Sri Lanka shows the following barriers in implementing ridesharing; (1) Attitudinal issue of ‘stranger-danger’ (insecure feeling with unknown passenger) and (2) cultural issue of ‘gender’ (dislike to travel with opposite gender) while 3W operators are also reluctant to implement ridesharing as they believe that there will be some 3W operators will continue to operate under current model and then it turn out to be peer pressure for ridesharing operators. They also mentioned that implementing ridesharing may shift a portion of passengers from ‘bus’ to ‘3W’ and they believe this would create unnecessary problems between 3W operators and bus drivers.

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GUIDELINES FOR ROAD DIET CONVERSIONS

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Abstract: Road diets, which convert four-lane highways to three-lane cross sections, are an innovative solution to address mobility and safety concerns under budgetary constraints. These improvements can assist in the development of multimodal corridors with minimal impact on automobile mobility, while retaining the original right of way. Past research has focused on evaluating road diet safety, but minimal guidance exists on determining when such conversions are appropriate from an operational perspective. The proposed guidelines focused on evaluating and comparing the operation of three- and four-lane roads at signalized intersections to provide basic guidance as to when the road diet conversion is appropriate. One of the important findings of this research is the expansion of the usable range for road diets. Prior experience has limited road diet application to roadways with ADTs less than 17,000 vehicles per day. This research identifies the importance of side street volumes and supports the utilization of road diets on roadways with volumes up to 23,000 vehicles per day. This paper provides comprehensive guidance for road diet evaluation including operational performance, correctable safety problems and identifies a list of evaluation elements that should be examined when in-depth analysis of alternatives is required.

Keywords: Road diets, safety, highway design

1. INTRODUCTION

Rural and urban roadways are becoming increasingly congested throughout the US and other countries, and solutions frequently seek to improve modal options including, bike, pedestrian and transit facilities. A typical approach for solving this problem has been the addition of lanes, but this approach is an expensive and environmentally disruptive practice that frequently offers only short-term relief. The need for innovative solutions in addressing mobility and safety concerns in an environment with budgetary constraints is paramount. Such innovative solutions seek to develop multimodal corridors while retaining the original right of way and among them is the concept of road diet, where the number of travel lanes is reduced. Road diets usually involve restriping a four-lane undivided road as a three-lane road with two through lanes and a two-way left-turn lane (TWLTL). This creates surplus roadway width that can be used to widen existing lanes, create bicycle lanes, supply on street parking, widen sidewalks, or provide opportunities for landscaping and aesthetic improvements.

On roadways with high access density, the inside through lane on a four-lane undivided roadway often acts like a de facto turn-lane. This operation can block through traffic, diminishing operations, as well as introduce crash patterns such as rear end crashes and sideswipe crashes resulting from the stopped left-turn traffic. The introduction of a TWLTL can often meet the left-turn demand for both directions of travel in a single lane. This modification can then improve safety and mobility by removing turning traffic from the through lanes. Therefore, road diets are a design tool that can be used within existing right of way at a very low cost to improve mobility, and they frequently have no or few negative impacts.

Road diets have been shown to improve operating efficiency and safety for all users. Case study review has shown road diets to be effective on roads with an average daily traffic (ADT) of up to 25,000 vpd, while other studies have indicated that capacity is not affected by the elimination of the lane and often no increase in congestion is observed (Burden and Lagerway 1999; Welch 1999). Improvements in livability conditions and associated benefits are elements to be considered during road diet conversions, as review of past case studies has indicated (Rosales and Knapp 2005). Road diets make it easier for pedestrians to cross the road at both signalized and unsignalized intersections, increase feeling of a "safer and more comfortable" street, encourage an increase in pedestrian and bicyclist traffic, and encourage economic growth and redevelopment at a quicker pace (Rosales and Knapp 2005).

Past research has focused primarily on case study evaluation of road diets and on safety performance of these treatments. However, there is little literature providing guidance on the details of the designs or information as to when such conversions will work. The first attempt in defining operational guidelines for road diet conversions was completed in 2001 relying on evaluating before-after conditions on existing road diet projects completed at that time (Knapp and Giese 2001). The study recommended that a road diet conversion could be considered feasible for roads with an ADT between 15,000 and 17,500 vpd. A more recent attempt to improve on these guidelines was completed in 2006 again based on assessing existing road diets and identifying associated benefits (Rosales 2006). However, the step-by-step process developed is general in nature and does not provide specific guidance regarding volumes or left-turn percentages indicating when such a project could result in improved operational and safety conditions.

The need to identify criteria to be considered for establishing road diets is critical and should be addressed so that state and local agencies can expand their use. A review of all State DOT design manuals did not identify any guidance for road diet conversions, which can hinder their adoption. This study provides such guidance in determining the appropriateness of road diet conversions and identifies parameters to be considered during such evaluations.

2. METHODOLOGY

Typically, road diet conversions will operate at acceptable levels as long as the signalized intersections do not present any operational problems. Therefore, this analysis focused on evaluating and comparing the operation of three- and four-lane roads at signalized intersections. In order to adequately evaluate signalized intersection operations, a full range of mainline and side street volumes, as well as left turn percentages, needed to be evaluated. Evaluation of a full range of these parameters examines a wide array of the potential operating conditions for road diet roadways. The analysis conducted through micro simulation to compare operational performance of three-lane and four-lane sections through the full range of volume combinations. A total of 480 combinations were used for the simulations, i.e. 10 volume scenarios for eight left-turn percentages and six cross street volumes. These scenarios included:

- Mainline volumes ranging from 6,000 to 24,000 vpd with 2,000 vpd increments and assuming that 10 percent of the volume will occur during the peak hour. One directional split (50/50) was utilized.
- Cross street volumes were varied between 3,000 to 13,000 vpd with 2,000 vpd increments. There was only one directional split (50/50) and a 10 percent estimate of left and right turns was used.
- Left-turn percentages were used ranging between 5 to 40 percent with increments of 5 percent.
- Right-turn percentage was set at 15 percent and not varied as right-turn volume has minimal effect on capacity of the through movement.
- All cross-street scenarios utilized a three-lane cross-section which limited the capacity of the cross street.

Simulations were performed with the CORridor SIMulation (CORSIM) and vehicular delay was calculated for each approach independently. The data obtained from the simulation analysis was then used to develop predictive models of intersection delay that could be used in establishing potential guidelines for the implementation of road diets. The Statistical Package for the Social Sciences (SPSS) was utilized to develop these models.

3. RESULTS

The analysis completed here was used to develop prediction models that could allow for establishing guidelines and identifying the conditions under which road diets could improve the operational efficiency of the roadway. Linear regression models were used to model the delay for each condition, i.e. three- and four-lane options, and identify the variables that could predict these differences. The variables considered include the volumes of the main and side streets as well as left-turn percentage.

The model for the three-lane included all three variables of concern and had a good predictive power with an R2 of 0.48. The model coefficients are summarized in Table 1. The four-lane model also utilized all three variables but the predictive power was lower (R2=0.28). The variables included in the equations reflect the effect of traffic volumes on delays and their signs indicate that increasing volumes will result in greater delays. The same is true for the left-turn percentage where larger percentages will lead to greater delays.

Table 1. Coefficients for Predictive Models

Variable	Three-lane		Four-lane	
	Parameter	P value	Parameter	P value
Intercept	-29.113	0.00	-47.968	0.00
Main street volume (vph)	0.013	0.00	0.022	0.00
Side street volume (vph)	0.025	0/00	0.037	0.00
Left-turn percentage (number)	0.313	0/00	0.314	0.00

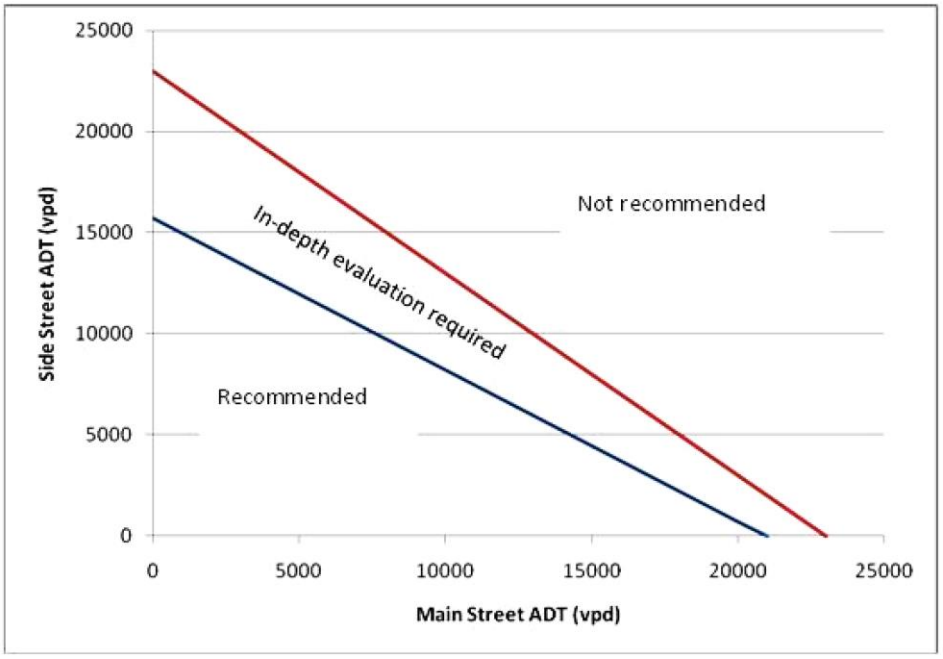

Figure 1. Guideline for operational performance at signalized intersections

These models can be used to define the scenarios where the three- and four-lane options produce a delay difference of zero, i.e. both options will perform equally well. This will produce the line of equality which can then be used to establish the regions where road diets are advisable and those where they are not. Figure 1 presents this concept with the blue line identifying when delays are the same for both options. The combinations below the blue line indicate lower delays associated with the implementation of a road diet. The red line in the figure identifies the volume combinations where the roadway will operate under capacity with a road diet and is based on the critical lane volumes between three and four-lanes are equal. Utilizing these concepts, Figure 1 defines three areas with respect to road diet installations. The lower area called "Recommended" identifies the volume combinations where the road-diet will perform below capacity and result in operational gains. The upper area "Not-recommended" identifies the volume combinations where the roadway will operate above capacity, and will have higher delays than the four-lane alternative. Undesired congestions could be the result from a road diet operating in this range. The area between the two lines is considered as the area requiring additional investigation to determine the feasibility of a road diet conversion. A road diet in this area will operate under capacity, but may have higher delays than the four-lane section. Thus analysis should be completed to determine the impacts that would result from the road diet.

The operational guidance developed is based only on main and side street volumes, since it was determined that the operation of the signalized intersection is the critical aspect for a road diet conversion based on the analysis conducted here and since road diets will result in improved conditions at unsignalized intersections. While left-turn percentage was shown to be a significant parameter for the capacity and delay of an intersection, it has the same effect for both the four-lane and three-lane sections and therefore provides no differentiation between the alternatives, i.e., the left-turn percentage does not contribute any additional delay to the difference between the two options.

The evaluation of the unsignalized intersections indicated that for all scenarios evaluated, the road diet results in lower delays along the side street, which could outweigh the minor increases along the main street. It was therefore deemed appropriate to not develop a similar guidance as the one shown in Figure 1 for unsignalized intersections. Therefore, unsignalized intersections or access points are not a significant determinant of the success or failure or a road diet

project. Even unsignalized access points with high volumes of left turn traffic on the major street will continue to operate at acceptable levels of service while signalized intersections may fail due to the reduced mainline capacity. The primary concern for unsignalized access points is overlapping left turn movements within the two-way left turn lane, which is avoided with the four-lane section. The existing KYTC auxiliary turn lane policy currently addresses this concern by recommending against the use of TWLTLs for access point densities greater than 85 access points per mile (KYTC 2009).

4. GUIDELINES

The data analyzed here was utilized to develop guidelines for road diet conversions. The guidelines have been developed as a standalone document and they can be used to determine the steps required for a road diet conversion (Stamatiadis et al. 2011). A brief description of the guidelines is provided here.

4.1 Road Diet Conversions

The guidelines focus on the determination of whether a road diet application is appropriate considering operational, safety, and other factors that could have a bearing on the decision to implement a road diet conversion. To achieve this, a flow chart was developed that identifies the various steps to be taken when such decision is evaluated (Figure 2).

The flow chart allows the user to identify the appropriate action to be undertaken to determine whether the road diet will improve the operations, safety or other performance issues. To address this, lists of possible problems correctable by a road diet implementation are identified (Table 2). In addition to these lists, the required items for conducting an in-depth evaluation are also identified in order to allow for a complete evaluation of the implications from a road diet implementation.

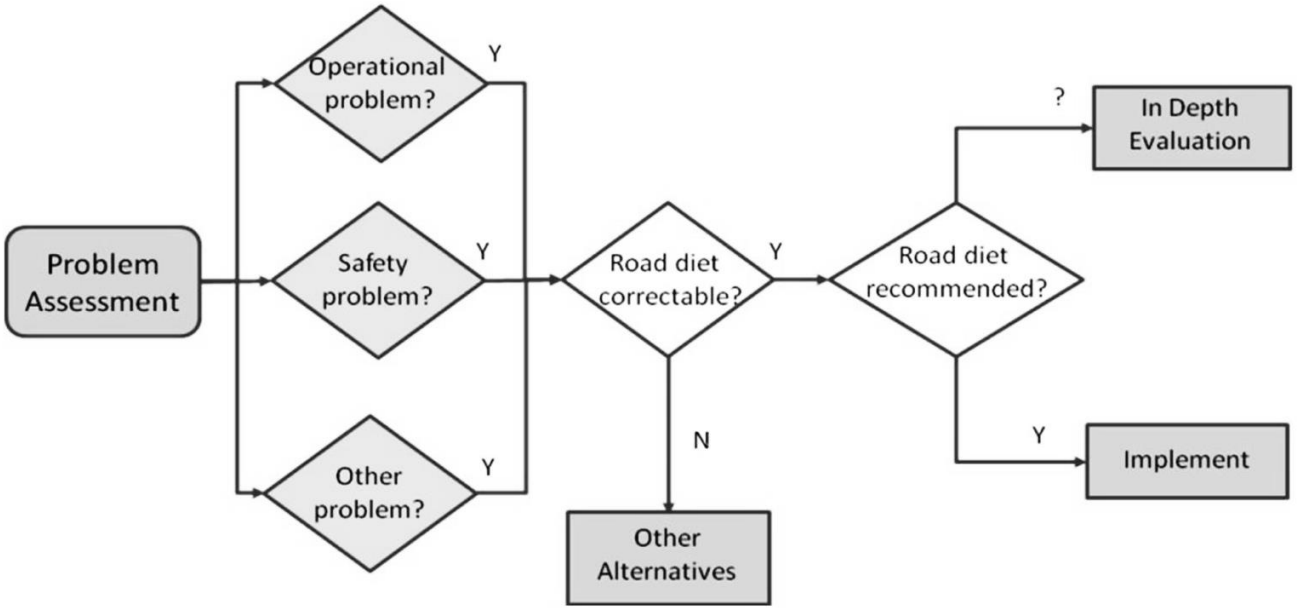

Figure 2. Decision-Action Flow Chart for Road Diet Evaluations

Table 2. Road Diet Correctable Problems

Category	Problem	Rationale
Operational	Delays associated with left-turning traffic	Separation of left-turning traffic have shown to improve delays at signalized intersections
	High side street delays at unsignalized intersections	Side street traffic requires shorter gaps due to the consolidation of left-turns into one lane
	Other operational problems	Potential inclusion of bicycle lane could reduce delays
Safety	Rear end crashes with left-turning traffic	Removal of stopped turning vehicles from the through lane could reduce rear end crashes
	Sideswipe crashes	Elimination of need to change lanes to avoid delays behind a left-turning vehicle in the inside through lane reduces sideswipe crashes
	Left-turn crashes due to offset left turns	Elimination of the negative offset between opposing left- turn vehicles and increase of available sight distance reduces left-turn crashes
	Bicycle and pedestrian crashes	Bicycle lane separates bicycles from traffic; pedestrians have shorter distance to cross and can use a refuge area (if one provided)
Other	Bicycle/pedestrian accommodation due to lack of facilities	Opportunity to provide appropriate or required facilities increasing use by such users
	Aesthetics	Provision for landscaped medians and other treatments as see fit
	Traffic calming	Potential for uniform speeds and consistency; opportunity to encourage pedestrian activity

4.2 Road Diet Considerations

Typical considerations for road diet conversions include traffic volumes of the main and side streets and main street left-turn percentages. However, compatibility of the treatment with roadway functional classification, access frequency and land use should also be considered when determining the feasibility of a road.

Road diets may be proposed to address both safety and operational issues on roadways. The guidelines provide criteria to be considered in determining whether a road diet conversion is appropriate. These criteria include operational performance ranges that would support a road diet project as well as safety considerations that need to be evaluated. The operational performance identifies three ranges: 1) Volume combinations where the road diet is recommended because it will improve the operational performance (i.e. delays will be lower with the road diet), 2) Volume combinations where the road diet is not recommended because the operational performance deteriorates (i.e. delays will increase), and 3) Volume combinations where an in-depth evaluation is needed. The last range identifies cases where the road diet will operate under capacity, but may have higher delays than the four-lane section. Thus analysis should be completed to determine the impacts that would result from the road diet.

The crashes that could be affected by a road diet implementation were also identified. These included:

- Sideswipe crashes, which can result from vehicles changing lanes to avoid delays behind a left-turning vehicle in the inside through lane. These types of crashes can occur at midblock access points and major intersections. Road diets eliminate these

types of crashes by removing the turning vehicle from the through lane. Sideswipes can also occur between vehicles traveling on the two-way left-turn lane and those attempting to enter it but these crashes are not a frequent occurrence as prior research and case studies indicate.

- Rear end crashes, which can be the result of vehicles traveling in the inside through lane behind a stopping or stopped left-turning vehicle. A road diet reduces these types of crashes by removing the stopped turning vehicle from the through lane. Road diets are anticipated to reduce rear end crashes on roadways with high volumes of left-turn traffic; however, increased congestion resulting from the lane reduction may increase rear end crashes on the main street under other conditions.
- Left-turn crashes, which can result from restricted sight distance caused by opposing turning traffic. Road diets address these types of crashes by providing a dedicated left turn lane and correcting the negative offset between opposing left-turn vehicles.

There are additional elements that should be considered when road diets are evaluated including:

- multimodal operations, which can be improved with the implementation of a road diet,
- pedestrian safety, which can be improved with the addition of the refuge within the two-way left-turn lane,
- operational consistency where more uniform speeds along the corridor can be achieved, and
- livability, which can be improved by increasing opportunities for residential and commercial growth with a road diet.

4.3 Design Considerations

Various design aspects of the road diet conversion have been identified including recommended cross sections (dimensions of elements and possible components) along with methods to properly transition to and from the road diet to the existing roadway cross section. Transitions are recommended to occur at major change points, such as intersections, since they could allow for a more appropriate accommodation of turning movements. However, if necessary, transitions can occur at midblock sections, where it is recommended to place this away from intersections and/or high volume access points that would place stopped turning traffic in the through lanes of the merging traffic.

If not designed properly, these transitions can increase crashes removing any safety benefit of the road diet. All transitions should follow AASHTO's Policy on Geometric Design for Highways and Streets and MUTCD guidance for the reduction of through lanes.

An additional design issue of concern is the potential of high access densities to increase the likelihood of conflicts between traffic turning into and exiting the access point. This could affect safety along the corridor, since there is the potential for rear end crashes from vehicles slowing down to negotiate entering the access point and overlapping of left-turns between the main street and adjacent access points. According to KTC Auxiliary Turn Lane Policy, a non-traversable median and turn restrictions are recommended when a corridor exceeds 85 access points per mile (based on number of access points on both sides of the street).

Prior to the implementation of a road diet, it is recommended that a capacity analysis be completed for the major signalized intersections on the corridor to ensure that they would operate acceptably with a revised lane configuration. Analysis based on Highway Capacity Manual (HCM) methodologies is sufficient to check intersection capacities. For special cases, such as closely spaced intersections, coordinated signal systems, or corridors with at-grade rail crossings, micro-simulation is recommended to adequately evaluate arrival patterns and queue formation and dissipation.

4.4 Road Diet Not Recommended

The guidelines provide a list of conditions when a road diet may not be appropriate. These conditions include corridors where the operational efficiency may degrade as a result of the road diet, corridors where at-grade rail crossings or other conditions exists that may create queues that require a long time to dissipate; and high crash rates resulting from conditions not correctable by road diets. The latter condition reflects cases where crashes such as right angles are a problem. The use of a road diet will not address such crashes. Other scenarios include cases where adequate transitions cannot be developed or if left-turn lanes already exist on the corridor.

The expert panel analysis was the next safety analysis performed for each case study using all the information and analyses conducted as input. The expert panel reviewed each documented crash after the completion of the given project and determined the potential influence of project design features on crash. This approach utilized specific crash data (including location, crash type, environmental conditions, etc.) and the expertise of panelists, who first examined the potential influence of the driver, roadway, environmental, and vehicular factors on crash occurrence. The second examination determined the likelihood of the crash being associated with the project design and to each design element. The expertise of the panel included highway safety, highway design, planning, project development, crash reconstruction, traffic operations, and human factors.

5. CONCLUSIONS

This paper provides the background and process used to develop a set of guidelines to determine when road diet conversions are feasible. A structured approach was followed that considered the operational evaluation of three- and four-lane roads and identified parameters significant to the successful operation of road diets.

An important aspect of the work completed here is the extension of the usable range of volumes where road diets could be beneficial. Past work recommended their application for roads with an ADT up to 17,500 vpd. The current research indicates that such conversions could work for roads with greater volumes, up to 23,000 vpd. Moreover, the findings here identify the effect of the side street volume, indicating that both volumes need to be considered when determining whether such a conversion should be considered.

Road diets may also improve the operational efficiency of signalized and unsignalized intersections on a corridor. Operational improvements are typically seen when high ADTs and high left-turn percentages are present on the primary and cross-street. Typically road diets are shown to have reduced delays and reduced queues when high left-turn percentages AND high volumes are present.

The data analysis focused on the safety and operational characteristics of each case study and is based on the before and after crash analysis, the crash type expectation analysis, the speed comparisons, and the expert panel analysis. The overall results for each case study are presented in Table 2, where the safety, operational, and expert panel analyses are summarized. The safety and operational results are assessed relative to their influence on safety with a designation of an algebraic sign (+ or -) to denote the differences between the after and before conditions of the project and statewide differences. The negative numbers indicate an improvement in safety or a lower operating speed than the design speed. The positive cells are also shaded to highlight the cases where deterioration in safety was noted or the operating speeds were higher than the design speed. Finally, the expert panel scores are presented for each case study (scoring range 0: no influence, 1: least influence, 5: most influence).

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GUIDELINES FOR THE IMPLEMENTATION OF BICYCLE LANES ON SRI LANKAN HIGHWAYS

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Abstract: Bicycle lanes have become an integral part of the highway networks of many countries including Sri Lanka. They are encouraged as a pollution free, economic and healthy mode of transport throughout the world. So it is high time that a proper guideline for the same is introduced taking into account the local conditions of this country. Bicycle lanes are so far introduced to the road projects of Sri Lanka on ad hoc basis without consideration of the proper guidelines such as continuation of bicycle lanes on the road network, intersection treatment, avoidance of abrupt termination etc. Sri Lanka being a developing country with more or less a feudal framework of thinking, there is a social stigma towards the bicycling as a poor man's vehicle. In such a context, how should a design engineer in cooperate this green technology into our local highway projects so the common man can be immensely benefitted and our cities will be left with some fresh air to breath in the coming days of the future? This research was aimed at addressing these issues and finally coming up with a proper guideline to implement bicycle lanes in the future road projects carried out by Road Development Authority.

Keywords: Bicycle lanes, Bicycle lane design, Non motorized transport

1. INTRODUCTION

1.1 General Background

Bicycle lanes are introduced to Sri Lanka as an integral part of the highway network. In an environment where the world is fast moving to the greener technologies, this introduction will offer many benefits to a country that is trying to emerge as a middle income economy in South Asia. In such a context stripping out the cons and associating the pros of this concept becomes an inevitable endeavor faced by the highway designers in the future. In Sri Lanka, bicycle lanes are so far introduced to the highways on ad hoc basis. The actual performance of such bicycle lanes is in question.

1.2 Objectives

Objectives of this research are as follows.

- Have the bicycle lanes/paths implemented been successful in the recent projects?
- What is the public opinion of the bicycle lanes?
- What could be the reasons for failures if any?
- Recommendations for the implementation for bicycle facilities in the future projects.

1.3 Scope of the Study

This study is restricted to the study of common objectives and design concepts of bicycle lanes and attempts to make recommendations on the implementation of bicycle lanes in the future road projects carried out by Road Development Authority.

2. LITERATURE REVIEW

2.1 Necessity of Bicycle Facilities

Bicycle facilities toady have become an inevitable part in highway design. In addition to the promotion of non motorized transport to save energy, it serves as a low cost alternative for the ever increasing travel demand. Michael Replogle [1991:1] says NMVs offer low cost private transport, emit no pollution, use renewable energy, emphasize use of labor rather than capital for mobility, and are well suited for short trips in most cities regardless of income, offering an alternative to motorized transport for many short trips. Thus, they are appropriate elements in strategies dealing with poverty alleviation, air pollution, management of traffic problems and motorization, and the social and economic dimensions of structural adjustment. NMVs have a most important role to play as a complementary mode to public transportation.

While most of the Sri Lankans are not so poor to afford the subsidized public transport costs, cycling is dominant in many areas outside Colombo. Bicycle population is dominant especially in North Central, North and East provinces. But no separate bicycle facilities are provided in these remote areas. This is explained by Michael Raplogle stating: In many low income Asian cities where NMVs predominate, there has been little need to create a separate cycle network because large numbers of NMVs define their own legitimacy to right-of-way. However, as motorization increases, or as traffic congestion worsens, it becomes increasingly important to develop modal separation in high traffic flow corridors. This is particularly vital in mixed traffic cities where NMV use is declining due to competition from growing motorized traffic.

2.2 Types of Bicycle Facilities

Bicycle facilities are incorporated into the traditional highway design in various magnitudes. They can be bicycle lanes running in the both sides of a highway, which are demarcated by lane marking, or separate bicycle paths. Four types of bicycle facilities are given in the Highway Design Manual [2006:1000-2] categorizes the bicycle facilities into four major groups.

2.2.1 Shared Roadway (No Bikeway Designation) In some instances, entire street systems may be fully adequate for safe and efficient bicycle travel and signing and pavement marking for bicycle use may be unnecessary. In other cases, prior to designation as a bikeway, routes may need improvements for bicycle travel. Many rural

highways are used by touring bicyclists for intercity and recreational travel. It might be inappropriate to designate the highways as bikeways because of the limited use and the lack of continuity with other bike routes. However, the development and maintenance of 1.2 m paved roadway shoulders with a standard 100 mm edge line can significantly improve the safety and convenience for bicyclists and motorists along such routes.

2.2.2 Class I Bikeway (Bike Path)
Generally, bike paths should be used to serve corridors not served by streets and highways or where wide right of way exists, permitting such facilities to be constructed away from the influence of parallel streets. Bike paths should offer opportunities not provided by the road system. They can either provide a recreational opportunity, or in some instances, can serve as direct high-speed commute routes if cross flow by motor vehicles and pedestrian conflicts can be minimized. The most common applications are along rivers, ocean fronts, canals, utility right of way, abandoned railroad right of way, within college campuses, or within and between parks. There may also be situations where such facilities can be provided as part of planned developments. Another common application of Class I facilities is to close gaps to bicycle travel caused by construction of freeways or because of the existence of natural barriers (rivers, mountains, etc.).

2.2.3 Class II Bikeway (Bike Lane)
Bike lanes are established along streets in corridors where there is significant bicycle demand, and where there are distinct needs that can be served by them. The purpose should be to improve conditions for bicyclists in the corridors. Bike lanes are intended to delineate the right of way assigned to bicyclists and motorists and to provide for more predictable movements by constructing bike lanes is to better accommodate bicyclists through corridors where insufficient room exists for safe bicycling on existing streets. This can be accomplished by reducing the number of lanes, reducing lane width, or prohibiting parking on given streets in order to delineate bike lanes. In addition, other things can be done on bike lane streets to improve the situation for bicyclists, that might not be possible on all streets (e.g., improvements to the surface, augmented sweeping programs, special signal facilities, etc.). Generally, pavement markings alone will not measurably enhance bicycling.
If bicycle travel is to be controlled by delineation, special efforts should be made to assure that high levels of service are provided with these lanes.

2.2.4 Class III Bikeway (Bike Route).
Bike routes are shared facilities which serve either to:

(a) Provide continuity to other bicycle facilities (usually Class II bikeways); or
(b) Designate preferred routes through high demand corridors.

As with bike lanes, designation of bike routes should indicate to bicyclists that there are particular advantages to using these routes as compared with alternative routes. This means that responsible agencies have taken actions to assure that these routes are suitable as shared routes and will be maintained in a manner consistent with the needs of bicyclists. Normally, bike routes are shared with motor vehicles.

The use of sidewalks as Class III bikeways is strongly discouraged.

It is emphasized that the designation of bikeways as Class I, II and III should not be construed as a hierarchy of bikeways; that one is better than the other. Each class of bikeway has its appropriate application.

In selecting the proper facility, an overriding concern is to assure that the proposed facility will not encourage or require bicyclists or motorists to operate in a manner that is inconsistent with the rules of the road.

An important consideration in selecting the type of facility is continuity. Alternating segments of Class I and Class II (or Class III) bikeways along a route are generally incompatible, as street crossings by bicyclists are required when the route changes character. Also, wrong-way bicycle

travel will occur on the street beyond the ends of bike paths because of the inconvenience of having to cross the street.

In this research, only the Bike Lanes are considered for the analysis as it is the one introduced to Sri Lankan highways for the time being.

2.3 Pros of Bicycle Facilities

Winnipeng City [3] defines cons of bicycle lanes as follows. Bike lanes help define road space, decrease the stress level of bicyclists riding in traffic, encourage bicyclists to ride in the correct direction of travel, and signal motorists that cyclists have a right to the road. Bike lanes help to better organize the flow of traffic and reduce the chance that motorists will stray into cyclists' path of travel. Bicyclists have stated their preference for marked on-street bicycle lanes in numerous surveys. In addition, several real-time studies (where cyclists of varying abilities and backgrounds ride and assess actual routes and street conditions) have found that cyclists are more comfortable and assess a street as having a better level of service for them where there are marked bike lanes present.

In summary, bike lanes do the following:

- support and encourage bicycling as a means of transportation;
- help define road space;
- promote a more orderly flow of traffic;
- encourage bicyclists to ride in the correct direction, with the flow of traffic;
- give bicyclists a clear place to be so they are not tempted to ride on the sidewalk;
- remind motorists to look for cyclists when turning or opening car doors;
- signal motorists that cyclists have a right to the road;
- reduce the chance that motorists will stray into cyclists' path of travel;
- make it less likely that passing motorists swerve toward opposing traffic;
- decrease the stress level of bicyclists riding in traffic.

2.4 Width of Bicycle Lanes

Road Development Authority recently incorporated Bicycle Lanes and Bicycle Paths into their design strategy. The general bicycle lane width maintained by Road Development Authority is 1.5m for bicycle lanes.

Toronto draft bicycle design guidelines [4] recommends following widths for bicycle lanes.

Where curbs are present, the bicycle lane width, the distance from the face of the curb to the centre of the lane line, should be between 1.5 metres and 2.0 metres. On paved shoulders without curbs, the bicycle lane width, the distance from the edge of the pavement to the centre of the lane line, should be between 1.2 metres and 1.7 metres. A wide bicycle lane (1.8 to 2.0 metres where curbs are present; 1.5 to 1.7 metres without curbs) is recommended under one or more of the following conditions:

- where lateral obstructions, such as utility poles, are within 300 mm of the edge of curb;
- where the bike lane is on a bridge or underpass;
- where the posted speed limit is 60 km/h or greater;
- where the adjacent traffic lane is 3.6 m or greater;
- where the bike lane is between two traffic lanes;
- or all contra-flow bicycle lanes.

Where on-street parking is permitted, the preferred combined width of the parking zone and bicycle lane is 4.2 metres. The minimum combined width is 3.8 metres.

2.5 Intersection Treatment

Bicycle lanes should be a component of a network of bicycle lanes that maintains the integrity of the system. Toronto Draft Bicycle Lane Design Guidelines [4] proposes following lane marking in non signalized intersections.

The bike lane striping is discontinued across the leg of the intersecting street. If the approach with

the bike lane features a stop line and crosswalks, the bike lane continues all the way to the stop line with, in most cases, the final 15 metres demarcated by a broken white line. The two exceptions are:

- where a nearside bus stop is present, the broken line begins 20 metres from the stop line; and,
- where right turns are not permitted, the solid line continues all the way to the stop line.

The solid lane line should resume immediately downstream of the farside crosswalk. The diamond and bicycle logo pavement marking should be placed within the first 15 meters of the lane.

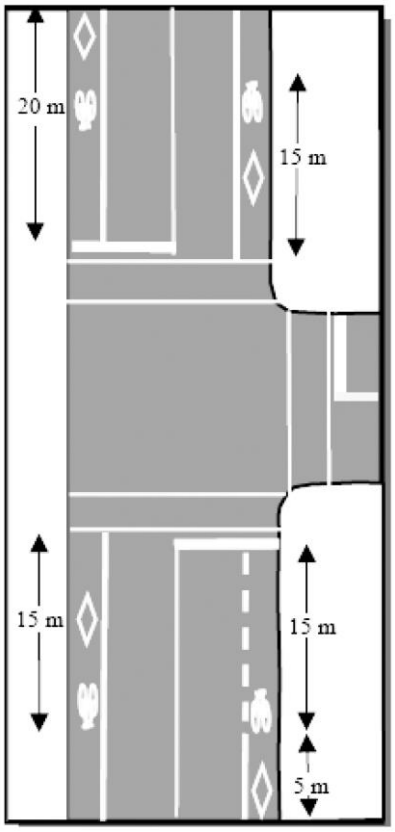

Figure 1. Typical dimensions for an intersection treatment (non-signalized - four ways)

2.6 Crashing with Car Door Opening

On street parking is either allowed or illegally enjoyed in many of the urban highways in Sri Lanka. In places where the on street parking is allowed, the bicyclist is at risk the crashing with suddenly swung open doors of the cars. Maryland SHA Bicycle and Pedestrian Design Guidelines [5] describe this situation as follows.

In locations where bike lanes are adjacent to on-street parking, consideration should be given to the possibility that bicyclists may crash into car doors that are suddenly swung open. This type of crash is typically more likely in locations with higher parking turnover, such as main streets, streets near restaurants and retail, etc. This is not typically a concern on residential streets. Bicyclists encountering an opened door must either stop short of the door, swerve into an adjacent travel lane or risk riding into the open door or being struck by the opening door. This act is commonly referred to as "dooring" by bicyclists. Bicyclists have been injured and killed due to dooring events.

To mitigate or reduce the possibility of a dooring event a number of communities have experimented with various pavement markings, regulatory signs, and or warning signs to prevent dooring incidents. The following mitigation measures have been analyzed in locations with high parking turnover, and 7 or 8 foot parking lanes adjacent to bicycle lanes; or locations with a history of dooring accidents or complaints of dooring "close calls." SHA may consider using these measures on urban streets with frequent on-street parking turnover, on an experimental basis.

2.6.1 Dooring Warning Sign

This sign can be located adjacent to existing parking regulation signs to increase theirvisibility to motorists. An example of a dooring warning sign is shown in below Figure 2.



Figure 2. A typical door warning sign

2.6.2 Modified Bicycle Lane Marking

Based upon a study performed in San Francisco, CA, marking the door zone with extension lines as shown in Figure 2.3 may encourage bicyclists to ride towards the left side of the bicycle lane outside of the door zone. Engineering judgment should be utilized to determine the frequency of placement of the door zone extension lines. Consideration may also be given to utilizing a smaller bicycle lane symbol and arrow which would be placed on the extreme left side of bicycle lane.

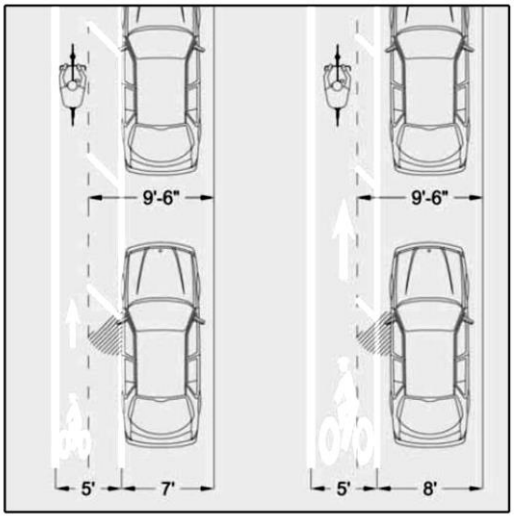

Figure 3. Modified bicycle lane marking with door zone

3 EXPERIMENTAL DETAILS

3.1 Method of Data Collection

Data were collected by the opinion surveys conducted in town areas where a bicycle lane would be beneficial. Questionnaire forms were prepared as this regard.

3.2 Groups for Opinion Surveys

Following 4 groups were selected to collect data.

- General public - Any conclusion for the integration of a new facility to a highway should incooperate the public opinion. Therefore the views of general public were extracted in an opinion survey. This survey was conducted in Malabe Town.
- School Children - School children are a potential group that can use bicycles. So an opinion survey was conducted at Boys' Model School, Malabe.
- University Students - University Students are another potential group that can use bicycles. So an opinion survey was conducted at Sri Lanka Institute of Information Technology by among the second year engineering students.
- Bicyclists - These are the people who really use bicycles for their day to day activities. Their contribution to this study cannot be overlooked at any rate. So an opinion survey was conducted with them in Malabe-Kaduwela Road.

4. DISCUSSION

4.1 Failure of the Bicycle as a Transport Mode in Sri Lanka

Long ago, one may be familiar with the bicyclists who had the dominance of our national road network. This is not the case with the recent development. This notion can be justified with the survey data collected in this research. No wonder none of the persons questioned in the category of general public responded affirmatively for their bicycle usage. While the data spectrum collected would not represent the total picture of the country's transport profile, it may be argued that the data collected were from Malabe where moderate income earning people reside. So it may be suggested that the bicycle is no more the common man's vehicle in this country, at least in the highly urbanized west. This is further consolidated with the fact that according to the survey, none of the school children use bicycle as a transport mode. In SLIIT none use the bicycle. This is a clear indication that supports the previous argument that bicycle is not used as a common transport mode among the moderate income group of this country.

In University of Moratuwa, mere 6% and in University of Colombo mere 10% of the students questioned used the bicycle as a transport mode to travel to the university. The indication given in both universities is tangible to note that the share

of the bicycle as a transport mode is very low compared to other transport modes such as public transport which was used by 72% of the general public and 60% of the school children. This clearly shows that despite various strategies used by road agencies to promote the bicycle usage, the bicycle has failed as a transport

4.2 Reasons for the Failure of the Bicycle

An astounding reality that was revealed from this research was the fact that while the bicycle usage was that much low among various groups, the bicycle possession was substantial, accounting to 83% among general public, 69% among school children, 44% among SLIIT, 38% among University of Moratuwa students and 32% among University of Colombo students. The question emerges here as to why the bicycle usage is such low while a fair number of people owned the bicycle. It may be argued that there should be a problem in our road system.

The failure of the bicycle as a common transport mode can be affiliated to various factors such as poor road condition, no facilities for the bicyclists, long distances, no safe parking, sweating and social stigma to name a few. Sweating was the major problem for school children and SLIIT students accounting to 62% and 40% respectively, while the two universities considered had their fair share. This is noted as a crucial factor in this research as Sri Lanka being a tropical country should focus its attention on these issues before investing heaps of money for the implementation of bicycle lanes. Social stigma played the least influential factor among educated masses i.e. SLIIT and the both universities while it was high among the school children where class differences as a shadow of the colonial past still haunted. It was further noted that many were reluctant to use the bicycle as a transport mode due to the long distance that they had to cycle. This was 38% among school children, 49% among SLIIT students, 29% among University of Moratuwa students and 25% among University of Colombo students. Parking was a major issue for the school children among whom 46% admitted that as a problem. This is true as the school in question did not have a safe parking place for the bicycles. This problem was not significant among students of SLIIT and both Universities where safe parking places actually existed.

4.3 Potential of a Bicycle Population

It may be argued with caution that there is a potential bicycle population in this country who really considered bicycling is convenient even in the current road network. That was 42% among bicyclists, 50% among school children and 34% among SLIIT students, while University of Moratuwa and University of Colombo held it to be 41% and 42%. The reasons for this notion could be many, among which short distance, traffic congestion, lack of doorstep transport, economy, lack of sufficient public transport and physical exercise were assessed. Short distance was the major factor for selecting the bicycle among almost all the groups. This gives a clear indication that people are ready to use the bicycle for short distances under improved road condition. Economy and physical exercise were other two major factors. A very important finding here was that bicycle was used as there was no public transport for the door step. It may be argued here that this stresses the need of improving byroads along with the national road network so the bicycles can be used effectively by those who are under privileged to have doorstep transport.

4.4 Ups and Downs for the Bicyclists in the Current Road System

Now it may be suggested that there is a potential bicycle population who would use the bicycle provided their expectations are met in the road network. A major factor those who were questioned mentioned for the convenience of the bicyclists was the separate bicycle lane. This was as high as 94% among school children. The next important point was the wide roads, which was admitted by 65% of the bicyclists and 72% of school children. May be the wide roads could reduce the negative effects of motorized traffic to the bicycles. Built up shoulders and good road surfaces did not have that much weight compared to the other factors.

The problems that prevented this potential bicycle

population from actually taking a bicycle and riding on the road were numerous. Heavy congestion and poor driver discipline were the major factors according to the survey. Bicyclists' affirmative response was as high as 79% for heavy congestion while the SLIIT students' affirmative response was as high as 89% for safety. Lack of an exclusive bicycle lane apart from the road and lack of priority while considerable, did not have that of weight compared to the other factors.

4.5 New Proposals to Encourage Bicycles

Now the problem is shortened to the fact that while the presence of bicycles in our road network is minimal, there is a potential bicycle user population who do not actually takes a bicycle and rides owing to the various problems of the current road network. This research may not be able to address all of them, such as traffic congestion which requires major strategic planning and policy decisions to mitigate the effects. Four options were put forward for the assessment i.e. Exclusive bicycle lane, Separate bicycle lane, Raised bicycle lane and green shelter. Exclusive bicycle lane was preferred by many, accounting to 46% of school children, 50% of SLIIT students, 46% of University of Moratuwa students and 49% of University of Colombo students. Raised bicycle lane was the second best choice accounting to 21% of school children, 42% of SLIIT students, 37% of University of Moratuwa students and 36% of University of Colombo students. Separate bicycle lane was the least preferred. Green shelter had its fair share of preference accounting to 35% of school children, 26% of SLIIT students, 32% of University of Moratuwa students and 24% of University of Colombo students.

4.6 Lane Width

From the literature review, following lane widths may be suggested.

- Where curbs are present, the bicycle lane width, the distance from the face of the curb to the centre of the lane line, should be between 1.5 metres and 2.0 metres.
- On paved shoulders without curbs, the bicycle lane width, the distance from the edge of the pavement to the centre of the lane line, should be between 1.2 metres and 1.7 metres.
- A wide bicycle lane (1.8 to 2.0 metres where curbs are present; 1.5 to 1.7 metres without curbs) is recommended under one or more of the following conditions:
    - where lateral obstructions, such as utility poles, are within 300 mm of the edge of curb;
    - where the bike lane is on a bridge or underpass;
    - where the posted speed limit is 60 km/h or greater;
    - where the adjacent traffic lane is 3.6 m or greater;
    - where the bike lane is between two traffic lanes;
    - -for all contra-flow bicycle lanes.

4.7 Intersection Treatment

It was observed in our intersections the ad hoc bicycle lanes vanish due to the space constraints, without being a part of an integrated bicycle lane network. So it is suggested that a proper intersection treatment system such as that of Toronto or Chicago as given in the literature review be adopted. In this research, it is proposed to adapt to a lane marking system as shown below.

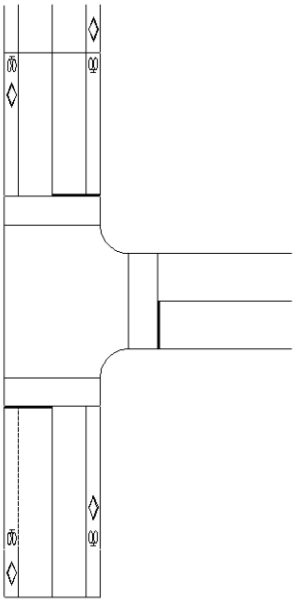

Figure 3. Lane Marking Suitable for a 3 way Intersection

This basic system can be improved to include 4 way intersections, roundabouts, signalized intersections etc. as the need arises.

4.8 Dooring Warning System

It is suggested that the warning symbol and the modified lane marking given in the literature review be adopted where the parking is allowed with the bicycle lane.

4.9 Necessity of Bicycle Parking Places

Majority of the school children accounting to be 46% admitted their inability to use the bicycle due to the fact there is no safe parking in the school. So the bicycle parking is a major issue in this country where proper bicycle parking facilities are not provided. Therefore, Alexandria government's bicycle parking technique is proposed.

4.10 By road Improvements

15% of the school children, 20% of the SLIIT students, 21% of the University of Moratuwa students and 4% of the University of Colombo students wanted to bicycle as they did not have the doorstep transport. So this is a clear indication that people use the bicycle to come to the main road hence the by roads should also be improved to cyclable condition along with the major road improvements.

4.11 Measures to Increase Bicycling Share

The suggestions of the people who were surveyed were assessed to increase the bicycling share of the transport system and highest demand was the concession on prices. This needs further investigation by means of a separate research.

The second highly demanded requirement was to provide more facilities for the bicyclists such as continuation of the bicycle lane etc. Parking shed had their fair share of demand while that for the giving priority for bicyclists was comparatively high. Bicycle registration system had the least demand of all.

5. CONCLUSION & RECOMMENDATIONS

It was explained in the discussion that there is still a fair demand for the bicycle but the common people are reluctant to use this economical transport mode due to various problems. Following recommendations can be made with regard to the literature review and data analysis.

- Where curbs are present, the bicycle lane width, the distance from the face of the curb to the centre of the lane line, should be between 1.5 metres and 2.0 metres.
- On paved shoulders without curbs, the bicycle lane width, the distance from the edge of the pavement to the centre of the lane line, should be between 1.2 metres and 1.7 metres.
- A wide bicycle lane (1.8 to 2.0 metres where curbs are present; 1.5 to 1.7 metres without curbs) is recommended under one or more of the following conditions:
    - where lateral obstructions, such as utility poles, are within 300 mm of the edge of curb;
    - where the bike lane is on a bridge or underpass;
    - where the posted speed limit is 60 km/h or greater;
    - where the adjacent traffic lane is 3.6 m or greater;
    - where the bike lane is between two traffic lanes;
    - -for all contra-flow bicycle lanes.
- Intersection treatment should be carried out as per the standards used in developed countries as given in this research.
- Dooring warning system should be implemented appropriately where parking is allowed with bicycle lanes.
- Proper bicycle parking places should be provided where a potential bicycle population is expected such as schools and universities.
- By road improvements should be carried out along with the main road improvements to facilitate the bicyclists use the road.
- Raised bicycle lanes, separated from the motorized way should be provided

wherever possible.

- Green shelter should be provided for the bicycle lanes so the sweating would be minimized.
- Since the convenient bicycling distance varies, it is proposed that at least 4km bicycle lane should be provided surrounding the institutions like universities where a potential bicycle usage is anticipated, in case the whole road is not provided with a bicycle lane.

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STABILIZATION OF EXPANSIVE CLAY SOIL USING BUTON ROCK ASPHALT THE OTHER UTILIZATION OF BUTON ROCK ASPHALT

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Abstract: Subgrade is the lowest layer of the pavement that must eventually support all the loads that come onto the pavement structure. Therefore, it is essential to make sure that the layer is stable and has sufficient shearing strength to withstand the traffic induced stresses without excessive deformation. If the subgrade soil is poor, sufficient shearing strength, then it must be stabilized to improve its properties. In this paper Buton Rock Asphalt (BRA) was studied to stabilize the expansive clay subgrade soil of Semarang-Purwodadi road in North-East Central Java Province of Indonesia. Amount of 2%, 4%, 6%, and 8% of BRA by weight of soil were added. As comparison or control, natural sand in amount of 5 to 25% in increments of 5% by weight of soil was also added. Laboratory works show that BRA can improve bearing capacity of soil far higher than the natural sand resulted. By adding 8% by weight of soil, BRA can improve bearing capacity of those of expansive clay soil, measure by using CBR, from the value of CBR 1.6% to 5.97% or increase 373%, while 20% of sand only increasing the CBR of soil become 3.90% or increase 244%. Increasing of CBR by adding BRA is in linear line with the line equiation y = 51.54x + 2.126. This mean if the percentage of BRA also 20% the CBR value of BRA-stabilized soil is 12.43% and suitable as well as very good for subgrade material.

Keywords: Buton Rock Asphalt, Stabilizer, Expansive soil, Improve, Bearing Capacity, Strength.

1. INTRODUCTION

Soil is one of nature's most abundant construction materials. Almost all construction is built with or upon soil. Found from Aggrebind.com/wp-content/…./10/Soil-Stabilization-from Caterpilar.pdf. Introduction to Soil Stabilization (2010), when unsuitable construction conditions are encountered, the following four options can be selected to be conducted: (1) Find a new construction site; (2) Redesign the structure so it can be constructed on the poor soil; (3) Remove the poor soil and replace it with good soil; (4) Improve the engineering properties of the site soil. Option (4) is being used more often today and is expected to dramatically increase in the future.

Improving on-site (in-situ) soil's engineering properties is referred to as either "soil modification" or "soil stabilization" The term of "modification" implies a minor change in the properties of soil, while stabilization means that the engineering properties of the soil have been changed enough to allow field construction to take place.

There are two primary methods of soil stabilization used today:, namely mechanical and chemical or additive method. The most common form of "mechanical" soil stabilization is compaction of soil, while the addition of cement, lime, bituminous, or other agents is referred to as a "chemical" or "additive" method of soil stabilization.

There are two basic types additives used during chemical soil stabilization: mechanical additives and chemical additives. Mechanical additives such as soil cement mechanically alter the soil by adding a quantity of material that has the engineering characteristics to upgrade the load-bearing capacity of the existing soil. Chemical additives such as lime chemically alter the soil itself, thereby improving the load-bearing capacity of the soil.

Buton Rock Asphalt (BRA), the natural asphalt discovered in Buton island located in South-East of Sulawesi Island of Indonesia, that consider as the new soil stabilizer was studied to use as soil stabilizer and will be described in this paper (Buton Asphalt Indonesia, Co. Ltd. 2006). How much the influence of BRA in improving the properties of soil as soil additive will be described in this paper, and will compare with sand, the other natural material that have been used as soil stabilizer.

2. OBJECTIVE OF THE RESEARCH

The objective of this paper is to promote the suitability of BRA in providing sufficient strength to the expansive subgrade soil, in order suitable to be used as good subgrade.

3. BUTON ROCK ASPHALT (BRA)

BRA is the natural asphalt discovered in Buton Island located in South-East Sulawesi. The areas in Buton Island which have much deposit of rock asphalt are Lawele, Kabungka, Waisnu, Wariti, and Epe. From those five areas, Lawele and Kabungka have much rock asphalt. Natural rock asphalt is found firstly in 1926 by Hetzel, a Dutch geologist. Survey conducted by Ministry of Energy and Mineral Resources Republic of Indonesia show that deposit of natural rock asphalt are estimated around 650 to 700 million tones (Buton Asphalt Indonesia, Co. Ltd. 2006). Deposit of rock asphalt can only be found in 1 to 1.5 meter depth from the land surface as shown in the Figure 1, and bitumen content in the rock asphalt range about 10 to 40%. Since the first time are discovered and mined, still only 3.4 million tons of rock asphalt has been explored.

For this research, BRA was supplied by Buton Aspal Indonesia (BAI) Co. Ltd. in form of coarse grain and was packed in bag contains 25kg per bag (Figure 2). BAI Co. Ltd. takes BRA from Lawelle quarry. Gradation of BRA and it other properties were shown in Table 1.



Figure 1. Rock asphalt in Lawelle quarry of Buton Island



Figure 2. BRA in bag (left) and coarse grains of BRA (right)

Table 1. Gradation and Properties of BRA (Buton Indonesia Co. Ltd. 2006)

No.	Test	Test Method	Result	Specification	Unit
1	Gradation	ASTM C 136			
	Sieve No. 16		100		% passing
	Sieve No. 30		54.02		% passing
	Sieve No. 50		16.97		% passing
	Sieve No. 100		3.75		% passing
	Sieve No. 200		1.82		% passing
2	Bitumen content	ASTM D 1856	22.52	18 – 22	%
3	Solubility in C2HCL3	ASTM D 2042	18.72	Minimum 18	-
4	Specific gravity	ASTM D 854	1.976	1.70 – 1.90	-
5	Flash point	ASTM D 9272	232	Minimum 230	0C
6	Water content	ASTM D 1461	0.81	Maximum 1	%
7	Volatile content by distillation	ASTM D 402	0.20	-	%

4. RESEARCH METHODOLOGY

This research was conducted in the Geotechnical Laboratory, Faculty of Engineering, Universitas Islam Sultan Agung (UNISSULA) of Semarang, Indonesia. Soil to be stabilized is expansive clay soil take from the subgrade of Semarang-Purwodadi road, the 64 km length of provincial road located in North-East Central Java Province of Indonesia.

To be able to get the correct conclusion that BRA is suitable for soil stabilizer, sand, another natural material was also used to stabilize the same soil. The improvement of strength and properties of soil after adding with stabilizer material was determined by using Atterberg Limit, California Bearing Ratio, and Direct Shear Test tests.

The amount of 2 to 8% in increments of 2% of BRA and 5 to 25% in increments of 5% of natural sand by weight of soil were added.

5. LABORATORY EXPERIMENTS

5.1 Expansive soil

Laboratory works was commenced with Atterberg Limit test for original soil, which the result is given in Table 2, and shows that Plasticity Index (PI) value is 33.9% is categorized high, and the soil can be classified as expansive clay.

Table 2. The results of Atterberg Limit tests for the expansive soil

Test	Result
Liquid Limit (LL)	75.9%
Plastic Limit (PL)	42%
Plasticity Index (PI) = LL – PL	= (75.9 – 42)% = 33.9%

5.2 Soil - BRA and soil-sand stabilization

Laboratory works of Soil–BRA stabilization was commenced by activating bitumen that contain in the BRA in order to be able to blend with soil. Activated bitumen in the BRA was conducted by adding bunker oil. Bunker oil is, used ship lubricating oil, adds to the BRA, mixed and then keeps in the shady place for 48 hours. After 48 hours, bitumen in the BRA will melt, and the particles of BRA become soft. As have been mentioned, amount of 2, 4, 6, and 8% of this melt and soft BRA then were added to the soil used as additive or stabilizer.

Laboratory test of the mix of soil-BRA and soil-sand were also commenced with Atterberg Limit test, and followed with CBR and Direct Shear test.

6. RESULT AND ANALYSIS

6.1 Soil-BRA Stabilization

6.1.1 Atterberg Limit

The Atterberg test results were given in Table 3 and Figure 3 show that the values of Plasticity Index (PI) lower with increasing of BRA content in the soil. These results correspond to the hypothesis that the lower of PI value, the less potential of soil to become expansive. This means that the more BRA adding, the less expansive of the soil. Decreasing of PI value is caused by decreasing of pores in the soil.

Table 3. Plasticity Index (PI) of soil-BRA

% of Buton-NRA	LL	PL	PI
0%	75.9	42	33.9
2%	71	39	32
4%	69	38	32
6%	69	4	25
8%	68	44	24

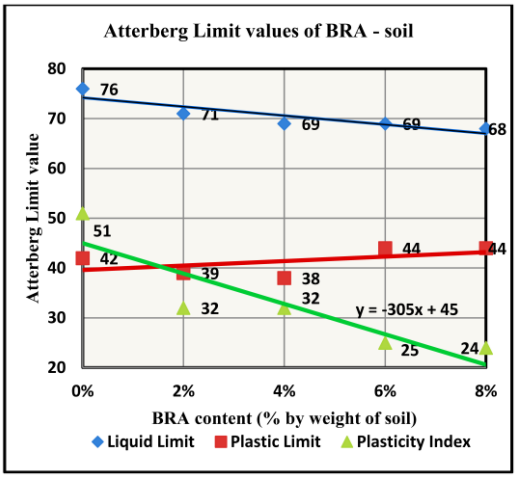

Figure 3. Atterberg values of soil-BRA

6.1.2 California Bearing Ratio (CBR) test

The results of CBR test for BRA stabilize expansive soil were given in Table 4 and shown statistically in Figure 4. The hypothesis said that the more BRA content, the higher the CBR value is. Regression model give coefficient of determination, R-square, R2 = 0.9662 and coefficient of correlation R = 0.9830. Those values of regression model show that between BRA content and CBR have strong correlation, and the contribution of BRA to CBR value is above 90%, and can be concluded that the CBR value of Soil-BRA is fit with the hypothesis.

CBR values of BRA stabilized soil also have linear line with line equation y = 51.45x + 2.126. This mean, if the BRA content adds to 20%, the CBR value will become 12.43%, suitable and very good for subgrade material.

Table 4. CBR value of soil-BRA

% BRA	CBR (%)
0%	1.6
2%	3.5
4%	4.8
6%	5.05
8%	5.97

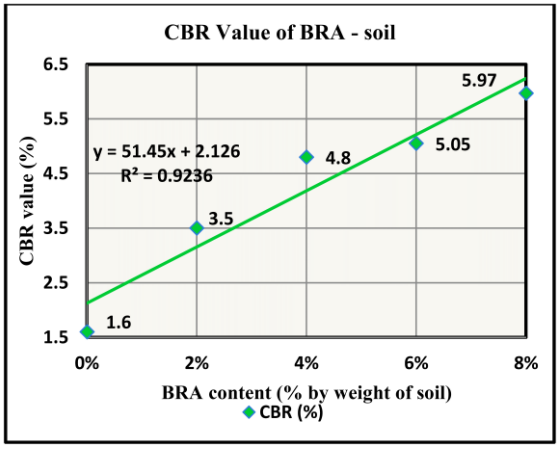

Figure 4. CBR value of soil-BRA

6.1.3 Direct shear test

The results of direct shear test of BRA stabilized soil given in Table 5 and graphically show in Figure 5 and Figure 6 both for cohesion value and angle of internal friction Ø value respectively. Attention should be paid to this direct shear test results. Normally, the higher value of cohesion of soil, the lower value of Ø is. However, soil-stabilized with BRA show the different result, where the higher cohesion also the higher angle of internal friction Ø. This result can be explained as follows: when BRA was added to the soil and thoroughly blend, the particles of soil will be bind by melt bitumen of BRA because the mix of soil-BRA becomes cohesive. Nevertheless, this cohesion is false cohesion, since the rocks particles contain in BRA make the particles of BRA – soil mixtures are clotted, hard, and make it like granular material. That is why the angle of internal friction Ø higher if the BRA content high.

Table 5. Cohesion and angle of internal friction of soil-BRA

% of BRA	Cohesion (c) (kg/cm^2)	Angle of internal friction Ø
0%	0.49	14
2%	0.31	37
4%	0.40	41
6%	0.51	43
8%	0.73	46

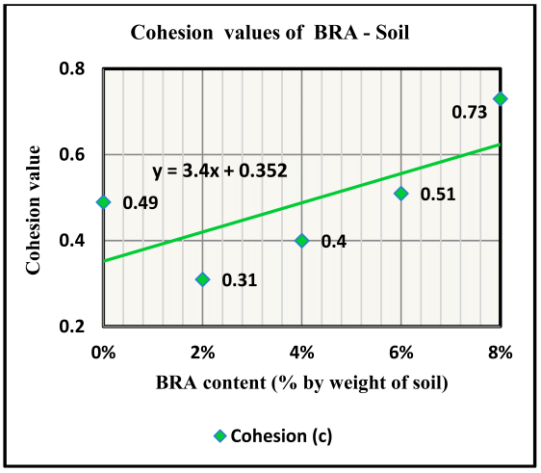

Figure 5. Cohesion value of soil-BRA

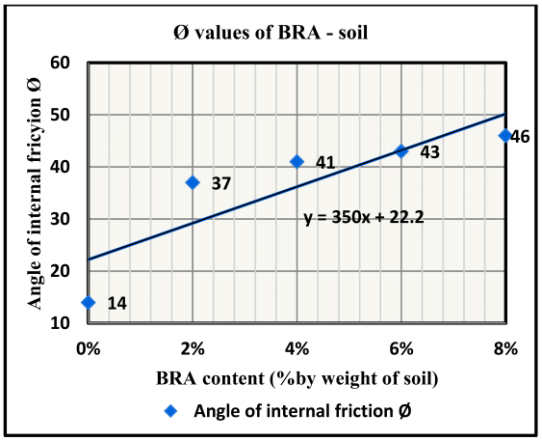

Figure 6. Angle of internal friction of soil-BRA

6.2 Soil-Sand Stabilization

6.2.1 Atterberg Limit

Similar to the soil-BRA, Plasticity Index (PI) lower with increasing of sand content in the soil. The Atterberg test results of soil-sand were given in Table 6 and Figure 7 also show that the values of PI decrease with increasing of percentage of sand content. These results correspond to the hypothesis that the lower of PI value, the less potential of soil to become expansive. This means that the more sand adding, the less expansive of the soil. Decreasing of PI value is caused by decreasing of pores in the soil.

Table 6. Plasticity Index (PI) of soil-sand

% of BRA	LL	PL	PI
0%	75.9	42	33.9
5%	72	46.3	25.7
10%	71	33.31	37.9
15%	60	31.79	28.21
20%	59	29.15	29.85
25%	52	28.18	23.82

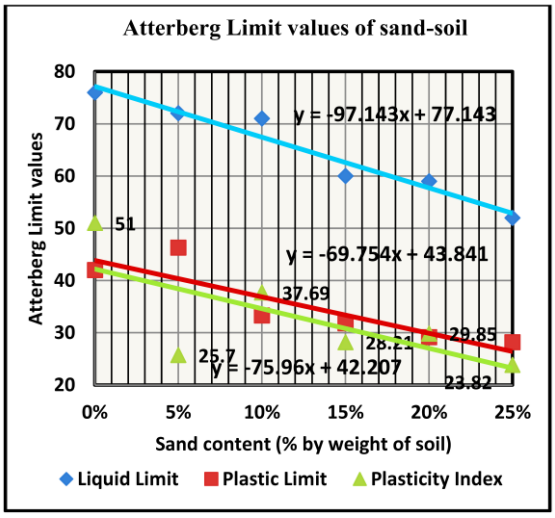

Figure 7. Atterberg Limit value of soil-sand

6.2.2 California Bearing Ratio (CBR) test

The results of CBR test for sand stabilize expansive soil shown statistically in Table 7 and Figure 8. The hypothesis said that the more stabilizer content, the higher the CBR value is. Regression model give coefficient of determination, R-square, R2 = 0.8527 and coefficient of correlation R = 0.9234. Those values of regression model show that between sand content and CBR have strong correlation, and the contribution of sand to CBR value is 85%, and can be concluded that the CBR value is fit with the hypothesis.

Table 7. CBR value of soil-sand

% BRA	CBR (%)
0%	1.6
5%	2.7
10%	2.95
15%	3.58
20%	3.9
25%	4.92

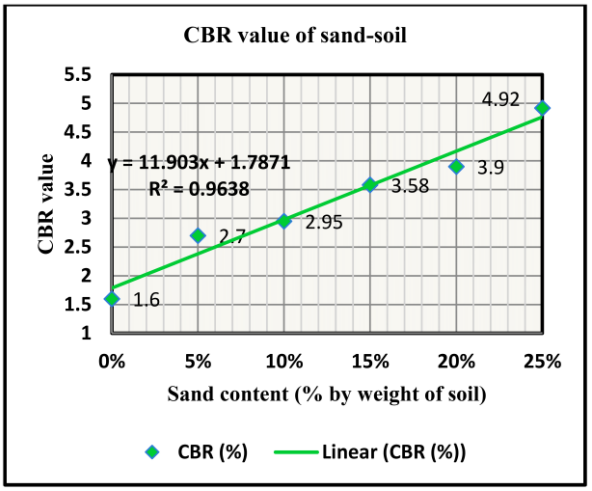

Figure 8. CBR value of sand stabilized soil

6.2.3 Direct shear test

The results of direct shear test for sand stabilized soil given in Table 8 and Figure 9 as well as Figure 10 both for cohesion value and angle of internal friction Ø respectively. The results show the normal value where the higher cohesion value, the lower angle of internal friction Ø. Original soil (0% sand content) have cohesion value 0.49 kg/cm2 and angle of internal friction Ø = 14°. The more sand content, the lower cohesion value and the higher Ø value is, since sand is naturally cohesion less material.

Table 8. Cohesion and angle of internal friction of soil-sand

% of BRA	Cohesion (c) (kg/cm^2)	Angle of internal friction Ø
0%	0.49	14
5%	0.31	15
10%	0.29	16
15%	0.27	17
20%	0.24	20
25%	0.20	24

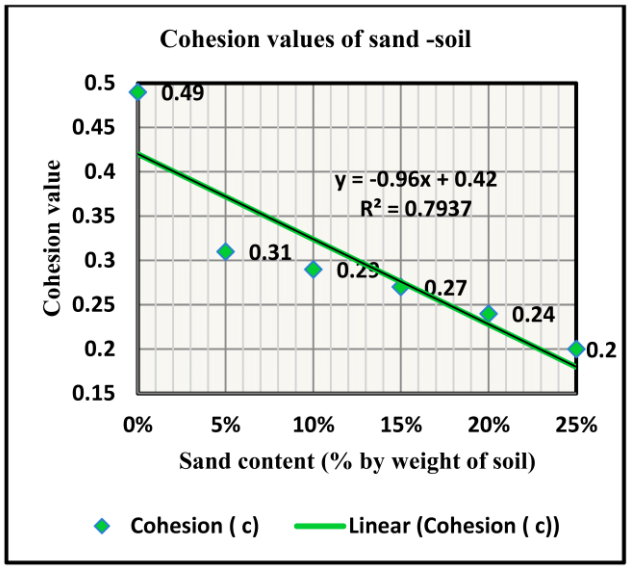

Figure 9. Cohesion values of sand stabilized soil

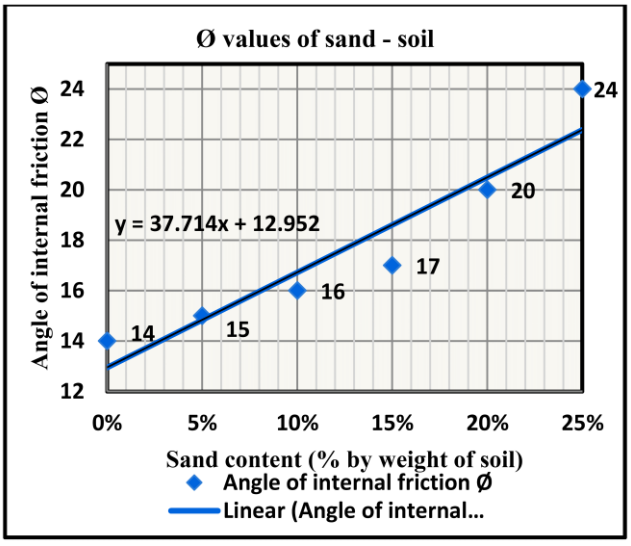

Figure 10. Angle of Internal Friction Ø values of sand stabilized soil

7. CONCLUSIONS

From the entire test results of those two soil stabilizer, the conclusions can be drawn as follows:

- Plasticity Index (PI). With 8% of BRA content in the soil, soil-BRA have PI value 24 similar to the 25% of sand content in the soil-sand where PI value is 23.82 ~ 24. Since the PI have linear value, where the higher stabilizer content, the lower of PI value, and the lower of PI, the less expansive of soil, therefore the higher of BRA content, the less expansive of the soil-BRA will be.
- BRA increase CBR of expansive clay soil significantly and according to AASHTO soil classification categorized as good material for subgrade pavement.
- The cohesion value of soil-BRA high with the higher of BRA content. But this condition cannot be concluded that soil become more cohesive if the BRA is added. As has been explained above and referring to the conclusion point 1 above as well as the angle of internal friction value, the cohesion value of soil-BRA is false value. When bitumen in the BRA become dry, the particles of BRA become clotted and hard, the soil-BRA become a granular material and not cohesive.
- Angle of internal friction Ø. Ø value show that the soil is not cohesive, the higher Ø value, and the less cohesive of soil. The results of the research show that the higher BRA, the higher of the Ø value.

8. SUGGESTIONS AND RECOMMENDATIONS

From the above test results and conclusions, the author considered to recommends and suggests using BRA to stabilize expansive subgrade soil of the entire road pavement, flexible or rigid, because:

- Many road pavement structures deteriorate early because there was no strengthening of subgrade soil.
- BRA has naturally ready and low cost because not require industrial process compare to cement, lime or petroleum asphalt.
- More than 600 hundred million deposit of BRA still have not explored yet.
- Using other methods which have been used to strengthen subgrade soil, like geotextile was proved not succeeding.

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COUNTY CLERK'S USE	CITY OF LOS ANGELES	CITY CLERK'S USE
ORIGINAL FILED FEB 01 2017 LOS ANGELES, COUNTY CLERK	OFFICE OF THE CITY CLERK ROOM 395, CITY HALL LOS ANGELES, CALIFORNIA 90012 **CALIFORNIA ENVIRONMENTAL QUALITY ACT** **NOTICE OF EXEMPTION** (Article III - City CEQA Guidelines)	DOCUMENT FILED City Clerk's Office No: CE-17-021-TR Certified by Date: 1-31-17

Filing of this form is optional. If filed, the form shall be filed with the County Clerk, 12400 E. Imperial Highway, Norwalk, CA 90650, pursuant to Public Resources Code Section 21152 (b). Pursuant to Public Resources Code Section 21167 (d), the filing of this notice starts a 35-day statute of limitations on court challenges to the approval of the project. Failure to file this notice with the County Clerk results in the statute of limitations being extended to 180 days.

LEAD CITY AGENCY	COUNCIL DISTRICT
City of Los Angeles - Los Angeles Department of Transportation	11

PROJECT TITLE	LOG REFERENCE
Venice Blvd Great Street Pilot Demonstration Project	ENV-2016-4488-CE

PROJECT LOCATION
Venice Blvd between Inglewood Blvd and Beethoven St

DESCRIPTION OF NATURE, PURPOSE, AND BENIFICARIES OF PROJECT: The subject project will provide traffic safety, bicycle and pedestrian improvements within the project limits within the public right of way. The proposed permanent treatments include pedestrian signals and curb ramps at four intersections, and the proposed temporary treatments include new protected bicycle lanes, street furniture and landscaping. The proposed bicycle and pedestrian amenity benefit the safety and travel access, and will not result in impacts to biological, or cultural resources.

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT, IF OTHER THAN LEAD CITY AGENCY:

CONTACT PERSON	AREA CODE TELEPHONE
Max Eftekhari	NUMBER (213) 978-9607

EXEMPT STATUS: (Check One)

		CITY CEQA GUIDELINES	STATE EIR GUIDELINES
☐	MINISTERIAL	Art. II, Sec. 2b	Sec. 15073
☐	DECLARED EMERGENCY	Art. II, Sec. 2a(1)	Sec. 15071(a)
☐	EMERGENCY PROJECT	Art. II, Sec. 2a(2) & (3)	Sec. 15071(b) & (c)
☐	GENERAL EXEMPTION	Art. II, Sec. 1	Sec. 15060
☑	CATEGORICAL EXEMPTION	Art. III, Sec. 1	Sec. 15100
	Class 1(3), 1(15), 1(20), 4(3), 4(13), 6(2)	City CEQA Guidelines)	
☐	OTHER: (See Public Resources Code Sec. 21080(b) and set forth state and city guideline provision.)		

JUSTIFICATION FOR PROJECT EXEMPTION:

The project has two components: permanent improvements and a temproary pilot project. The permanent installation consists of pedestrian signals and curb ramps. This qualifies as an exemption because; it as a minor alteration of existing street, and pedestrian trail [Class 1 (3)]; it installs a traffic signal [Class 1 (15)]; and it modernizes an existing street by constructing an improvement [Class 1 (20)].

The pilot project consists of temporary installation of protected bicycle lanes, street furniture and landscaping. This qualifies an exemption because; it involves basic data collection, field testing and research [Class 6 (2)]; it is a minor public alteration to condition of land to install landscaping [Class 4 (3)]; and it creates bicycle lanes on an existing right-of-way [Class 4 (13)]. There are no unusual circumstances that might prevent application. See attached narrative (Attachment A) for further discussion.

IF FILE BY APPLICANT, ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING

SIGNATURE:	TITLE: City Planner, Department of City Planning	DATE 11/28/16

FEE: $75.00	RECEIPT NO.	REC'D BY	DATE

Distribution: (1) County Clerk, (2) City Clerk, and (3) Agency Record
Form Gen. 153 (Rev. 8-80) (Appendix a)

Dean C. Logan
Los Angeles County Registrar / Recorder
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NoE - County Posting Fee 2017027370	1	$75.00

Total **$75.00**

Total Documents: 1

Customer payment(s):

Billing $75.00

Attachment A
Venice Blvd Streetscape Improvement Project

Why is this project exempt from CEQA?

The permanent component of the project, taken in the entirety of the action of pedestrian improvements to be installed within existing public right of way is categorically exempt under the California Environmental Quality Act (CEQA). The elements include pedestrian signals, curb ramps. These elements are all exempt under Class 1(3), Class 1(15), and Class 1 (20) of the City CEQA Guidelines and Class 1, Section 15301 of the State CEQA Guidelines.

The pilot project, taken in the entirety of the action of temporary installation of streetscape improvements to be installed within existing public right of way is categorically exempt under the California Environmental Quality Act (CEQA). The elements include protected bicycle lanes, street furniture and landscaping improvements. These elements are all exempt under Class 4(3), Class 4(13) and Class 6(2) of the City CEQA Guidelines and Class 1, Section 15301 and Class 4, Section 15304 (b) and (h) of the State CEQA Guidelines. See attachement B, Complete Streets Pilot Program form as to how the temporary pilot satisfies the Class 6(2) exemption criteria.

Section 15301 of the CEQA Guidelines exempts all Class 1 activities that include operation and minor alteration public facilities except where such activities involve the negligible or no expansion of use beyond that existing uses at the time of the lead agency's determination. As the project is limited to bicycle and pedestrian enhancements in existing public right of way, it constitutes no expansion of use, and therefore Class 1 exemption applies.

The City CEQA Guidelines provides that Class 1 activities that involve operation, and minor alteration of an existing street are exempt from CEQA except where the activities will involve removal of a scenic resource including but not limited to a stand of trees, a rock outcropping or a historic building.
In addition the City CEQA Guidelines states that activities that involve basic date collection, research, experimental management and resource evaluation activities which do not result in a serious major disturbance to an environmental resource are exempt under CEQA. These may be for strictly information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. Furthermore, Section of the 15300.2. of the CEQA Guidelines provides a list of exceptional circumstances that if are present for activities covered under the Class 4 categorical exemptions would preclude the application of the exemption. The exceptions include the reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances, the presence of hazardous waste, impact to resource located on an officially designated scenic highway, impact to a historic resource, or cumulative impacts caused be success projects in the same place over time. The following narrative substantiates through facts why these exceptions do not apply.

Aesthetic , Historical Resources and Hazardous Waste Sites

The street will be altered with limited tree removal of four Tipuana Tipu trees within the median at Ocean View Ave, Boise Ave. and Meier St. to accommodate median access ramps at the crosswalks. Taken together the trees to be removed are not located in a manner to be considered a stand of trees that would constitute an aesthetic resource. In addition, the Urban Forestry Division (UFD) will be replacing the four Tipuana Tipu trees on a 2:1 replacement ratio with 8 trees that are to be planted in the median along Venice Blvd. along the project corridor. The removal of trees will not constitute a removal of a scenic resource, and therefore does not render the activity ineligible for a Class 1 exemption.

Venice Boulevard is also not a designated scenic highway. The project activity is restricted to the public right of way on an existing state highway, and work would not be conducted within any site that is included on lists compiled pursuant to Section 65962.5 of the Government Code.

Biological

The removal of the four Tipuana Tipu trees were assessed to determine if the tree removal would result in impacts to biological resources, or nesting birds due to unusual circumstances. The four street trees are located in the middle of a high volume urban arterial. The exposure to high traffic noise environment is not likely to support suitable habitat for nesting birds in any of the four trees. Nonetheless, UFD routinely inspects trees to verify that there are no nesting birds prior to tree removal. If a protected native bird nest is found, the City shall delay tree removal and disturbance activities of the observed protected bird species nests during the active breeding season which generally runs from March 1- August 31.

In addition, UFD will be replacing the four Tipuana Tipu trees on a 2:1 replacement ratio with 8 trees that are to be planted in the parkway along Venice Blvd. along the project corridor, which may be more suitable habitat for nesting birds in the future. This activity would also not contribute to cumulative impacts of habitat due to tree removal.

Noise

The City will restrict demolition, construction, and striping on Venice Blvd in locations near sensitive uses (such as residences) to daytime hours in accordance with the city's noise regulations. The installation process would not be expected to exceed ambient noise by more than 5 dBA for more than 10 continual days, thus there will be no noise impact on the neighborhood immediately surrounding the project area.

Traffic

The project has two components: a permanent installation and a pilot project to be installed along a 0.9 mile stretch of Venice Boulevard in Mar Vista. It is currently three lanes in each direction, a parking lane and a Class II bike lane facility. The Los Angeles Department of Transportation will install long term pedestrian improvements, consisting of signals and ramps at Mountain View Ave, Ocean View Ave, Boise Ave and Meier St. These treatments will not contribute to traffic delay. The Venice Pilot Project consists of a road diet, with travel lanes being repurposed in each direction, using striping/paint and other temporary materials to install protected and buffered bike lanes. Other elements of the pilot project include street furniture and landscaping. The materials can easily be removed and the street returned to its original state when the pilot has completed.

The temporary pilot may result in travel delays but they are no unusual circumstances that would exacerbate travel impacts beyond the temporary restriping. The pilot is necessary to test the feedback of travel behavior and operational characteristics as a result of striping changes and physical barriers that make walking and biking more attractive. See attached "Complete Streets Pilot Program (Attachment B) for additional discussion.

Water Supply

The selection of landscaping would be climate appropriate and would require only minimal irrigation to establish, therefore there are no unusual circumstances with this project that would impact water supply.

ATTACHMENT B

Application

Complete Streets Pilot Program

The purpose of this application is to request the use of a Class 6 Categorical Exemption (CE) for the pilot project described below. In order to satisfactorily grant the CE, the applicant must ensure that the answers to the questions below can be supported by substantial evidence. Please attach any additional documents as needed as Exhibits to this application.

Should the Department of City Planning (Department), after reviewing this application, find that the project satisfies the requirements of the Class 6 Categorical Exemption, the Department will notify the applicant and prepare and submit the Class 6 CE to the Los Angeles County recorder for filing.

Date of Application: October 28, 2016

Project Contact: **Max Eftekhari**

Project Title: Venice Blvd Great Street Pilot Demonstration Project

Project Description:

The Venice Pilot Project seeks to create more public gathering spaces, make it safer and easier for people to cross the street, increase protection for pedestrians and cyclists, unify the north and south sides of the streets and give Venice Blvd the feeling of a neighborhood street.

1) A road diet, with travel lanes being repurposed in each direction, will be temporarily installed on Venice Blvd using striping/paint and other temporary materials to install protected and buffered bike lanes. Other elements of the pilot project include street furniture and landscaping.
2) Independent of the Venice Pilot Project, the Los Angeles Department of Transportation (LADOT) will install long term pedestrian improvements, consisting of signals and ramps at Mountain View Ave, Ocean View Ave, Boise Ave and Meier St.

The Pilot was developed in coordination between Mayor Garcetti's Great Streets Initiative, Council District 11 and LADOT with the support of community organizations and private consultants. The project developed after 442 community surveys, 4 public workshops, 3 outreach displays, 2 walk/bike rides and regular input from the Mar Vista Community Council.

1. Describe the purpose of the data collection, research, experimental management or resource evaluation (hereinafter, collectively, "research") that the project proposes to undertake:

   The City of Los Angeles cannot accurately predict what the results of the Venice Pilot Project using traditional methods of traffic modeling. Existing traffic modeling is based on the delay-based measurement of Level of Service which cannot effectively predict changes in travel behavior. Transportation research shows that as more bicycle

facilities are installed, more people will bike. One study projects 3.6 percent bicycle commute mode share when more bicycle facilities are completed.[1]

Additionally, the Federal Highway Administration acknowledges that active transportation is increasing, and communities' desire more livable spaces, pedestrian and bicycle facilities, and transit options. Thus, citing a multitude of research on the topic they have deemed road diets to be a "Proven Safety Countermeasure" for all users of the streets.[2]

A pilot project proposes to evaluate the effects of the listed additions on the neighborhood and surrounding area's mobility, economy, public health, safety, civic engagement and neighborhood character by analyzing the level of pedestrian and bicycle activity, rates of speeding and transit ridership.

2. Describe generally the type (and format) of evidence that is expected to be collected as a result of the research:

   The research will consist on both qualitative and quantitative measures of the above listed criteria. Measurements will be taken before and after the installation of the pilot project in order to determine the behavioral shifts that may contribute to more walking and biking, and a safer street as a result of the design. This will include but not limited to travel speed survey, transit ridership, traffic counts, pedestrian and bicycle counts, business and pedestrian surveys.

3. Has the City approved, funded, adopted or otherwise committed to the future permanent implementation of the project?

   No

4. Describe the status of the project:

   The Make It Mar Vista neighborhood group was awarded a Great Streets Challenge Grant in 2015. They staged a community engagement event where they demonstrated possible street configurations within the existing right of way.

   The project is currently in the design stage of pilot operations. In addition, the LADOT is pursuing relinquishment of Venice Blvd. from the Caltrans State Highway System, and long term improvements, pedestrian signals and crosswalks, are in final design stage and can be installed independent of temporary design features.

5. Describe when the project would be installed, how long the project would remain in place and how the time period is necessary to conduct the proposed research:

   The project will be installed February 2017 at the earliest for a length of 24 months from the time of completion of temporary striping. In order to conduct valuable research and see any marked result, traffic patterns and peoples' behaviors will need time to adjust. Based off previous pilot projects, this adjustment period last up to a year. The pilot project will need to extend beyond this time in order to measure the impacts and collect data this is available within the reporting periods.

   Not only does measuring at least a year's worth of traffic patterns and travel behavior provide a greater picture of the project's performance, it also accounts for seasonal variation. Travel behavior and traffic patterns fluctuate in

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[1] Dill, Jennifer and Theresa Carr. 2003. Bicycle Commuting and Facilities in Major Cities: If You Build Them, Commuter Will Use Them. Transportation Research Record 1828:116-123

[2] Road Diet Informational Guide - Safety | Federal Highway Administration. (n.d.). Retrieved June 29, 2016, from http://safety.fhwa.dot.gov/road_diets/info_guide/ch1.cfm#s11

reaction to the weather and holidays. Thus, the time period will compensate for any extreme lows and highs in the data.

Independently of the Venice Pilot Project, the Los Angeles Department of Transportation will install long term pedestrian improvements, consisting of signals and ramps at Mountain View Ave, Ocean View Ave, Boise Ave and Meier St.

Note: Due to the varying lengths of time that are required to obtain different types of information there is no predetermined acceptable length of time but the proposed period of time should be no longer than is reasonably necessary to conduct the proposed research, based on the professional judgment of a licensed traffic engineer.

6. Is the project reversible? Yes No
Describe the extent to which the project will be reversible and the degree to which the project will or will not involve capital improvements that cannot be reversed:

The temporary features will not involve capital improvements above or underground utility lines, water or sewage systems. Additionally, the temporary features will not involve changes to the sidewalk, curb cuts or medians along the corridor. The pilot will use temporary materials and paint them to redesign the street. The materials can easily be removed and the street returned to its original state.

Independently of the Venice Pilot Project, the Bureau of Engineering will install long term pedestrian improvements, consisting of signals and ramps at Mountain View Ave, Ocean View Ave, Boise Ave and Meier St.

7. Identify the names and titles of the traffic engineers and/or professional planners that will be involved in the research. Indicate whether they are city staff or associated with a consultant firm:

City staff will include traffic engineers and professional planners throughout the process. Planners will include Valerie Watson and David Somers. Transportation planners and engineers assigned to this project include Cullen McCormick, Max Eftekhari, and Roberto Sanchez. Other city staff from the Mayor's office and the council offices will be assisting the project's installation such as Naomi Iwasaki, Carter Rubin, and Lily O'Brien.

Carter Rubin, Project Manager, Mayor's Office, Great Streets Initiative
Cullen McCormick, Fehr and Peers, private consultant firm
Max Eftekhari, Transportation Engineer Associate III, Department of Transportation
Valerie Watson, Transportation Planning Associate II, Department of Transportation
Roberto Sanchez, Transportation Engineer Associate III, Department of Transportation

8. Will the project result in a serious or major disturbance to an environmental resource?

Yes No Explain your answer below:

The pilot projects takes place on 0.9 miles stretch of Venice Boulevard in Mar Vista. The temporary pilot may result in travel delays but they are no unusual circumstances that would exacerbate travel impacts beyond the temporary restriping.

The pilot is necessary to test the feedback of travel behavior and operational characteristics as a result of striping changes and physical barriers that make walking and biking more attractive.

9. Indicate in the checkboxes below whether the project is applicable to any of the exceptions to categorical exemptions under Section 15300.2 of the CEQA Guidelines:

Yes	No	
	X	Location-Is the project located in a particularly sensitive environment where location exception applies?
	X	Cumulative Impact- Will there or have there been successive projects of the same type in the same place, and overtime is becoming environmentally significant?
	X	Significant Effect- Is there a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances?
	X	Scenic Highway- Could the project cause damage to the environment within a highway officially designated as a state scenic highway?
	X	Hazardous Waste Site- Is the project located on a site which is included on any list compiled pursuant to Section 65962.5 of the government code?
	X	Historical Resources- Could the project cause a substantial adverse change in the significance of a historical resource?

Describe how none of the exceptions in the table above apply to the project:

The proposed changes will not be permanent in nature, and the related activities of roadway restriping, and installing protective elements, landscaping and street furniture will be exclusive to the public right of way. Installing the project would require activities that similar to basic operation and maintenance of city streets. The materials and process involved in these activities would not result in any individual or cumulative impact to the environment.

Venice Boulevard is also not a designated scenic highway. The project activity of installing temporary striping and land cape materials will be restricted to the public right of way of an existing state highway, and so would not result in a substantial adverse change in the significant of a historic resource. In addition, work would not be conducted within any site that is included on lists compiled pursuant to Section 65962.5 of the Government Code.

List of Exhibits (if applicable):

Venice Boulevard GREAT STREETS Mar Vista

WHAT ARE WE DOING? A Safer Mar Vista for All!

PROJECT OVERVIEW

Completion: May 2017

Cost $1.8 million to improve street safety, access and mobility for all road users, support local businesses, and create a more welcoming neighborhood street.





Snapshot of new street design at Venice Boulevard between Ocean View and Grand View in Mar Vista

KEY CHANGES

Four New Pedestrian Crosswalks

OBJECTIVE: Improve safety for everyone who travels on Venice Blvd., shorten distances to safe crossing points and provide greater parking access.

DESIGN: New signals and crosswalk striping increases driver's ability to see pedestrians crossing.

INSTALLATION: The new signals and crosswalks will be installed on Venice Blvd at Mountain View Ave, Ocean View Ave, Boise St, and Meier St.









Protected and Buffered Bicycle Lanes

OBJECTIVE: Provide robust protection for people traveling by bicycle on Venice Blvd, reduce sidewalk bicycle riding, and improve safety for all road users.

DESIGN: Protected bicycle lanes have a physical barrier between bicyclists and moving vehicles of a parking lane and bollards; buffered bicycle lanes have a painted buffer.

INSTALLATION: Protected and buffered bicycle lanes will be installed with the new road design.

Pedestrian Head Starts and High-Visibility Crosswalks

OBJECTIVE: To increase pedestrian visibility and safety at all existing intersections.

DESIGN: Pedestrians will receive a walk signal a few seconds before drivers get a green light; high-visibility continental crosswalks will be installed at all existing intersections.

INSTALLATION: Signals will be re-timed and crosswalks will be restriped along with all of the other improvements.





Eric Garcetti #Iamayor

MIKE BONIN

GREAT STREETS LA

LADOT

VISION ZERO LOS ANGELES | 2015-2025

Venice Boulevard

GREAT STREETS
Mar Vista

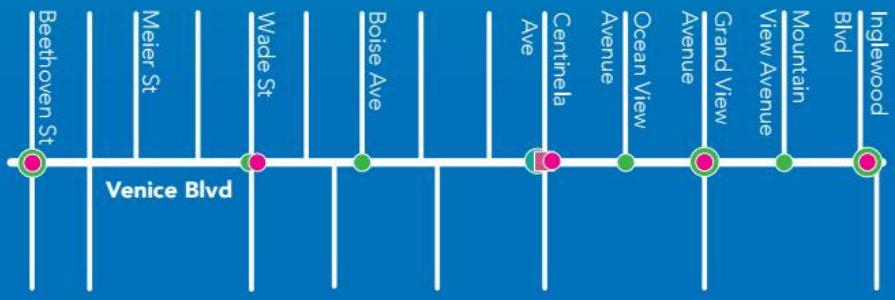
WHY ARE WE DOING IT?

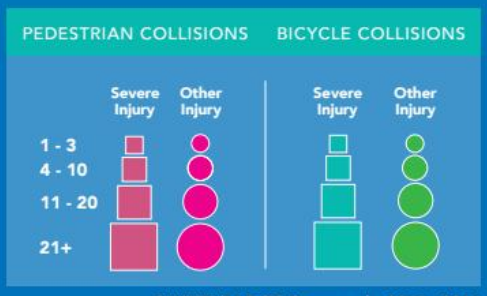
CREATING SAFER STREETS

- Venice Blvd has a higher rate of injuries compared to similar streets in LA.
- Since 2011 there have been **48 pedestrians and bicyclists injured** from crashes along Venice Blvd in Mar Vista.
- A city speed survey found that **15% to 18% of drivers were driving over the 40 MPH** speed limit on Venice Blvd, which poses a threat to the health and safety of people using the street, especially children and older adults who are walking.
- Venice Blvd is on the Citywide High-Injury Network (HIN) of streets that account for two-thirds of all deaths and injuries to people walking and biking.
- The planned street design has been used to improve safety for all road users across the U.S. including Los Angeles to improve safety for all road users.

Pedestrian & Bicycle Collisions:

This diagram shows the location and number of injury collisions involving people driving, walking and bicycling.



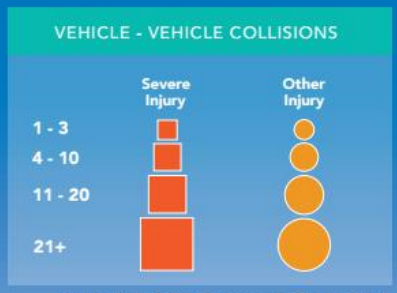


SWITRS/LADOT Crossroads, 2010 - 2014

Vehicle-Vehicle Collisions:

This diagram shows the location and number of injury collisions involving people in vehicles with other people in vehicles.





SWITRS/LADOT Crossroads, 2010 - 2014

Eric Garcetti #Iamayor

MIKE BONIN

GREAT STREETS LA

LADOT

VISION ZERO LOS ANGELES | 2015-2025

CITY OF LOS ANGELES
INTER-DEPARTMENTAL MEMORANDUM

Date: August 22, 2016

To: The Honorable Mike Bonin, Chair
Transportation Committee
Los Angeles City Council

From: Gary Lee Moore, PE, ENV SP
City Engineer
Bureau of Engineering

Seleta J. Reynolds, General Manager
Department of Transportation

Subject: **RELINQUISHMENT OF STATE ROUTE 187 (VENICE BOULEVARD) BETWEEN LINCOLN BOULEVARD AND CADILLAC AVENUE**

SUMMARY

At its meeting of February 24, 2016, the Transportation Committee considered a Motion (Bonin-O'Farrell, CF 16-0147, Attachment A), which directed the Department of Transportation (LADOT) and the Bureau of Engineering (BOE) to prepare a report relative to the relinquishment to the City of Los Angeles State Route 187 (SR-187) otherwise known as Venice Boulevard between Lincoln Boulevard and Cadillac Avenue, and State Route 1 (SR-1) otherwise known as Lincoln Boulevard between the southern city limit of the City of Santa Monica and Route 105. The City and the California Department of Transportation (Caltrans) agreed to defer the relinquishment of Lincoln Boulevard to a later date as Caltrans has not issued the final Relinquishment Assessment Report (RAR) for SR-1.

The Motion was drafted in response to a resolution (Bonin-Krekorian, CF 15-0002-S48, Attachment B) supporting Assembly Bill (AB) 810, which authorizes the California Transportation Commission (CTC) to streamline the relinquishment process to facilitate the implementation of the City's Great Streets initiative on Venice Boulevard, among other objectives. In response to the Transportation Committee instructions, BOE and LADOT entered into discussions with Caltrans.

The relinquishment process transfers control of portions of the state highway system owned and operated by the California Department of Transportation (Caltrans) to local jurisdictions when it is in the mutual interests of both parties. Caltrans policy encourages relinquishments of portions of state highways that can be characterized as conventional city streets and that do not serve regional or statewide transportation needs, as they represent opportunities to reduce ongoing maintenance costs and tort liability, among other benefits to the State. This incentive drives the State "to negotiate with local agencies a level of work or contribution to facilitate the relinquishment".

Because the proposed relinquishment would be accomplished by legislative enactment[1], Caltrans is not obligated to bring SR-187 to a "state of good repair"[2], which had been the City's

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[1] California Streets and Highways Code, Section 73, identifies four types of relinquishments: Legislative Enactment, Superseded by Relocation, Collateral Facilities, and Nonmotorized Transportation Facilities. The latter three types of relinquishments require a formal initiation process that culminates with a Project Initiation Document (PID), in which the costs and funding for

standard in previous negotiations. Caltrans has characterized its proposed financial contribution of $14M for street improvements and sidewalks and ramps and an additional $0.5M for a previously programmed project for a total of $14.5M as the "cost to relinquish"[3]. The City's estimate for rehabilitation of Venice Boulevard is $21.5M to bring the entire 5.4-mile stretch of roadway into compliance with current City standards.

RECOMMENDATIONS

That the City Council, subject to approval of the Mayor:

1. FIND that the relinquishment of Venice Boulevard (State Route 187) from Lincoln Boulevard to Cadillac Avenue to Caltrans is in the best interest of the City and approve the relinquishment and District Agreement No 07-5097.
2. AUTHORIZE the Mayor to execute District Agreement No 07-5097 with Caltrans, subject to review by the City Attorney as to form and legality, for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue.
3. AUTHORIZE the Director of the Office of Accounting, Board of Public Works, to receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue and to deposit the funds as follows:
    a. $13,000,000 into the Subventions and Grants Fund No. 305, Department No. 50, and appropriated into a new account within the Fund entitled "Venice Boulevard Relinquishment"; and,
    b. $1,500,000 into the Transportation Trust Fund No. 655, Department No. 94, and appropriated into a new account within the Fund entitled "Venice Boulevard Great Streets Improvements".
4. AUTHORIZE the Department of Transportation to issue non-participating change orders as part of ongoing transportation construction contracts in order to expedite the construction and enhance safety at five intersections along the Great Street section of Venice Boulevard.
5. AUTHORIZE the Director of the Office of Accounting, Board of Public Works, to make any technical accounting corrections or clarifications to the above instructions in order to effectuate the intent of the Mayor and City Council.

DISCUSSION

Background

In 2007, the City considered a similar proposal at the request of the request of Council District 11 for "Greening the Boulevard", a Master Plan concept prepared by the Mar Vista Community

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the relinquishment are discussed. Deletion of Routes by Legislative Enactment, in contrast, is not as clearly defined and is subject to differences in interpretation. A PID is required only if there is a cost to relinquish, as in the present case.

[2] California Streets and Highways Code, Section 73, defines a street to be "in a 'state of good repair' when it is a safe, drivable, well-maintained road. Capacity increasing improvements or betterments are not included when bringing a highway to a state of good repair" (Project Development Procedures Manual [PDPM], 12/12/14, Ch. 25, "Relinquishments"). The Bureau of Street Services defines "state of good repair" as streets having a Pavement Condition Index or PCI rating of 71 or higher on a 100-point scale.

[3] Ibid. "Cost to relinquish" is defined as "a level of work or financial contribution to facilitate the relinquishment." Caltrans proposes transferring $10.5M previously programmed for improvements to SR-187 in FY2018 in the State Highway Operation and Protection Program or SHOPP (Attachment E) and an additional $4M to the City as its financial contribution to facilitate the relinquishment.

Council. Over four months, Public Works and LADOT prepared a Class C-level estimate[4] totaling $46.9M for Venice Boulevard (Attachment D), which Caltrans rejected. Renewed interest in the relinquishment was spurred by the designation of Venice Boulevard between Beethoven Street and Inglewood Boulevard as one of 15 Great Streets, part of the Mayor's Great Streets initiative. The Great Streets initiative was one of the justifications cited for AB 810, adopted on October 7, 2015. The passage of AB 810 demonstrates support for Great Streets at the State level. Locally, Council District 11, the Mar Vista Community Council and other community stakeholders support the Venice Boulevard Great Street concept.

Venice Boulevard from Abbot Kinney Boulevard to 12th Street is also on the City's High Injury Network (HIN), so designated because of a disproportionate number of fatalities and serious injuries involving pedestrians. LADOT has proposed the installation of safety-enhancement and traffic calming measures for HIN streets as part of its Vision Zero initiative to achieve zero traffic fatalities by 2025. The pilot program proposed for Venice consists of a road diet between Beethoven and Inglewood, reducing six traffic lanes to four. The existing Class II bike lane would become a protected bike lane with bollards, and four mid-block crossings with traffic signals would be installed near unsignalized intersections. Temporary modifications for even a pilot program would require encroachment permits, entailing a lengthy review process that could jeopardize funding for time-sensitive projects. Another project supported by Council District 11, the installation of gateway signs at Bledsoe Avenue and Redwood Avenue, would face a budget shortfall if encroachment permits were required.

Accepting the relinquishment would enable the City to implement improvements and modifications that align with the City's Great Streets and Vision Zero initiatives without the need for encroachment permits[5]. These benefits should be factored into the costs of ADA-compliance and the rehabilitation, maintenance and protection of the 5.4-mile segment between Lincoln and Cadillac, as quantified in the City's revised Class "O"-level estimate[6] (Table 1).

2016 Estimate Methodology

The updated estimate represents a reasonable, but not exhaustive, effort to capture those costs and should not be construed as the cost of reconstructing SR-187 to current City standards. The following sources were used to assist in the development of the City's Class O estimate:

1. 2008 Class C level estimate (Attachment D);
2. Site visits;
3. Mapping applications such as Navigate LA and Google Maps Street View;
4. Caltrans data on projects completed after 2008[7];

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[4] Definitions for cost estimates used in this report come from BOE's Project Delivery Manual (PDM). Developed during the pre-design phase, the Class "C" level estimate is based on a rough idea of the project's size and location and also based upon similar projects in the same area. The Class C estimate includes BOE labor percentages from BOE budget templates. The Class C estimate is used to develop BOE's annual Work Programs and three-year Master Schedules.

[5] Caltrans had already committed $0.5M for its share of a project to install left-turn phasing at the intersection of Venice and Grandview. The Relinquish Agreement would include this financial commitment.

[6] The Class "O" level estimate as an "opinion of cost" developed based on a preliminary understanding of the project.

[7] Caltrans furnished a list of projects awarded or completed between 2008 and 2015 on SR-187 but not the project budgets. Site visits confirmed that Venice from Lincoln to just east of Sepulveda Boulevard saw street improvements since 2008. The most intensive project was initiated at the Director's order to address pavement failures between Lincoln to Sepulveda in 2011, with subsequent resurfacing work in 2015. A sidewalk repair project was completed in 2012, but the work does not conform to current ADA standards. Without as-built plans, the City was unable to determine the expected performance life of the improvements. The 2013 Caltrans Pavement Condition Survey Inventory and the 2013 SHOPP application indicate that both left and right lanes from Lincoln to Sawtelle Boulevard are largely in "good condition" with "no distress observed". However, pavement quality diminishes significantly east of Sepulveda.

5. 2013 application for State Highway Operation and Protection Program (SHOPP) funding in 2014 programming year [Attachment E];
6. Input from the BOE, Bureau of Street Services (BSL), Bureau of Street Lighting (BSL) and LADOT.

Table 1: City Estimate* of Cost to Relinquish SR-187 (2016)

Item	Description	Quantity	Unit	Unit Price	Item Total
1	Mobilization (10% of Subtotal)	1	LS		$ 1,209,700.00
2	Field Office	1	LS		$ 10,000.00
3	Contamination clean up	1	LS		$100,000.00
	Annual median landscaping maintenance	*1*	*LS*		*$139,462.00*
Remove:					
4	Curb and Gutter (a=2')	2,890	LF	$ 22.00	$ 63,580.00
5	Conc. Sidewalk	137,200	SF	$ 5.50	$ 754,600.00
6	Driveway	12,150	SF	$ 10.00	$ 121,500.00
7	6" AC Pavement	1,200	SF	$ 44.00	$ 52,800.00
8	8" Conc. Pavement	27,000	SF	$ 12.00	$ 324,000.00
9	Unclassified Excavation	5,000	CY	$ 70.00	$ 350,000.00
Construct:					
10	Conc. Int. Curb and Gutter (a=2', b=8')	2,890	LF	$ 38.00	$ 109,820.00
11	Conc. Curb	5,000	LF	$ 30.00	$ 150,000.00
12	Driveway	24,860	SF	$ 27.50	$ 683,650.00
13	Conc. Sidewalk (t=4")	137,610	SF	$ 11.00	$ 1,513,710.00
14	4" CMB	159,340	SF	$ 2.00	$ 318,680.00
15	AC Pavement (0.2' Hot Mix)	45,000	TON	$ 80.00	$ 3,600,000.00
16	AC Pavement (Cold Plane 0.2')	300,000	SY	$ 1.00	$ 300,000.00
16	AC Pavement (Crack Treatment)	35	Ln-Mi		$ 125,000.00
17	8" Conc. Pavement (Bus Pad)	25	EA	$ 12,960.00	$ 324,000.00
18	8" CMB	1,200	SF	$ 3.50	$ 4,200.00
19	Upgrade Drainage inlets/Grates	1	LS	$ 5,000.00	$ 5,000.00
20	Adjust Maintenance Holes and Valves to Grade	1	LS	$ 70,000.00	$ 70,000.00
21	Traffic Control /Management / Public Information	1	LS	$ 660,000.00	$ 660,000.00
22	Traffic Striping	1	LS		$ 300,000.00
23	Street Lighting	1	LS		$ 510,000.00
24	Portable Changeable Message Sign	1	LS		$ 28,000.00
25	Traffic Signal / Detectors	1	LS		$ 101,750.00
26	Relocate Electrical pull boxes, poles	1	LS		$ 500,000.00
27	Curb Ramps	150	EA	$ 5,000.00	$ 750,000.00
28	Tree Removals	58	EA	$ 1,000.00	$ 58,000.00
29	Furnish & Plant 24" Box Size Tree	116	EA	$ 1,200.00	$ 139,200.00
30	Storm water	1	LS	$ 150,000.00	$ 150,000.00
31	Road signs	1	LS	$ 10,000.00	$ 10,000.00
32	Utilities Right of Way	1	LS	$ 10,000.00	$ 10,000.00
	Subtotal:				**$ 13,407,190.00**
	Contingency (20%):				$ 2,681,438.00
	Design, Bid & Award, Construction Management & Inspection (40%):				$ 5,362,876.00
	Total:				$ 21,451,504.00
	Total Rounded Project Cost				**$ 21,500,000.00**

*Estimate does not include costs for utility relocations.

Key:
Grey - items on City's initial estimate but not counted by Caltrans in its SHOPP funding application
Yellow - items identified by both City and Caltrans (higher quantity prevails)
Blue - items on Caltrans' SHOPP funding application but not counted on City's initial estimate

BOE updated the quantities and unit costs from the 2008 estimate, cross-referencing data published in the SHOPP application (see footnote). The 2008 estimate assumed extensive structural work involving the removal and reconstruction of existing concrete, necessitating more excavation and base material and asphalt concrete based on evidence of base failure – which Caltrans partially addressed in 2011. The 2016 estimate would allow for the resurfacing of up to approximately five (5) miles and the reconstruction of certain sections within the limits of the relinquishment where resurfacing would be insufficient.

The 2008 estimate also included the cost of upgrading traffic signals, street lighting and landscaping. The street lighting request included as Line Item No. 23 for $510,000 is for funding to complete the conversion of high- to low-voltage circuitry for LED lighting. This serves the City's long term goal of reducing energy consumption and enhancing public safety.

The City's estimate includes soft costs and contingency, which the funding conveyed by the relinquishment agreement would not cover. Furthermore, the relinquishment agreement would transfer the cost of maintenance of landscaping, lighting, tree trimming, etc. from Caltrans to the City. Currently, the City receives $139,462 for annual maintenance for Venice under Delegated Maintenance Agreement 19-5939, dated January 1, 2005, and updated on January 23, 2013 (Attachment F).

Assumptions and Qualifications

The estimate incorporates sidewalks, curbs, driveways and other items not listed in the SHOPP application (grey), as well as items listed in the SHOPP application not included in initial estimates (blue). Where the City and Caltrans diverge in quantities or costs for overlapping items, BOE inserted the greater quantity (yellow).

In contrast to previous relinquishments that relied on a Class C estimate, the patchwork nature of improvements and the composite approach to developing the Class O estimate complicate predictions about the useful life of recently completed improvements to SR-187. Road failures and maintenance costs are difficult to project without boring and in-depth testing, and this could equate to substantial costs for the City in the future.

ADA Compliance

The Relinquishment Assessment Report for SR-187 (Attachment G) clearly states that "[s]idewalks and curb ramps and driveways are not fully in compliance with Americans with Disabilities Act (ADA) of 1990 and Section 4450 of the California Government Code. ADA standards are required on all resurfacing projects" (p. 18).




Examples of non-compliant sidewalks

The City has estimated that sidewalk improvements would cost at a minimum $4.4M (Line Items Nos. 4 – 14).

Other Risks

The RAR identifies potential liability issues on pp. 17-18 in addition to ADA compliance. Namely, SR-187 is located within a liquefaction zone and Seismic Zone 4.

In addition to the risks outlined in the RAR, the State's Office Environmental Engineering (OEE) memo dated May 13, 2016 (Attachment H) summarizes the findings of a literature survey evaluating the potential for releasing hazardous substances or petroleum products on Rosemead Boulevard and Venice Boulevard. For Venice, the report identified twenty properties with groundwater contamination, three of which show groundwater information on the State's Geotracker application as shown in Table 2. The City's Geotechnical Engineering Division (GED) noted that three of the twenty sites are located at the intersection of Venice and Sepulveda, with the Mobil station having tanks adjacent to SR-187. Remediating underground [fuel] storage tanks (USTs), hydrocarbon plumes and possible lead-contaminated soil would cost an estimated $100,000 (Line Item No. 3) or more, pending more extensive excavation or regulatory requirements.

Table 2: Potential Sites for Groundwater Contamination

Site	Distance from SR-187	Status	Determination
Chevron #9-0545	10 ft	Open but eligible for closure	Low threat criteria met by the regional board.
TWS Products	500 ft	Open-remediation site; quarterly groundwater monitoring has been requested	Soil and groundwater impacted by VOCs and hydrocarbons
Thrifty #247	2500 ft	Open-remediation site under semi-annual monitoring	Gradient plume may be migrating on a southwesterly direction toward Venice

Coordination with Culver City
BOE and LADOT recommend early outreach to Culver City to facilitate the relinquishment. As shown in Exhibit A - Relinquishment Map 3 (Attachment I) of the draft Relinquishment Agreement (Attachment C), the southerly portion of Venice Boulevard between Bledsoe Avenue to Overland Avenue is within Culver City's jurisdiction. Although Caltrans could relinquish the City's portion of SR-187 independently of Culver City, the City's proposed modifications would likely have traffic impacts on Culver City, suggesting the need for coordinated mitigation measures.

FISCAL IMPACT

The City will receive $14,500,000 from Caltrans for the relinquishment of Venice Boulevard between Lincoln Boulevard and Cadillac Avenue. A minimum estimated amount of $7,000,000 in improvements along Venice Boulevard would remain to be addressed. It is anticipated that the additional funds could be secured by pursuing outside grant funding opportunities.

Attachments:

Attachment A	Motion (Bonin-O'Farrell, CF 16-0147)
Attachment B	Resolution (Bonin-Krekorian, CF 15-0002-S48)
Attachment C	Draft Relinquishment Agreement and Financial Contribution Agreement, with Relinquishment Map
Attachment D	2008 City Estimate
Attachment E	Capital Preventive Maintenance Project (CPM) Report to Request SHOPP, July 30, 2013
Attachment F	2005 Delegated Maintenance Agreement 19-5939 and 2013 update
Attachment G	Relinquishment Assessment Report (RAR) dated February 28, 2015
Attachment H	Hazardous Materials Disclosure and Geotracker Maps
Attachment I	Draft Relinquishment Map 1260

VENICE
OPEN HOUSE
BLVD

Welcome to the Venice Blvd Great Street Open House!

Here's what will be happening tonight...

What's New on the Great Street

This station will bring you up to speed on the recently added turn lanes, colored paint, and other changes to make Venice Blvd safer and easier to use

The Data Lab

Here, we'll have the latest findings from the ongoing Venice Blvd project evaluation related to safety and traveling the corridor. LADOT staff will be on hand to answer your questions and help explain the data

Comment Station

LADOT is committed to a transparent and accessible process, and we look forward to sharing our findings and hearing your experiences. That's why the Comment Station will offer multiple ways for you to provide your feedback and connect with City staff

Recent Project Milestones

JULY 2017
1-Month Open House

LADOT issues a 1-Month Data Summary regarding speeding drivers. Data demonstrates a decrease in the number of drivers speeding above the 40mph speed limit. In addition, the latest data shows that the majority of trips through Venice Blvd are within 30 to 90 seconds of pre-project times

LADOT hosts a community Open House to discuss the key facets of the Venice Blvd project, one month after installation. Over 200 members of the community attend the event and many individuals shared their feedback on the project

SEPTEMBER 2017
3-Month Project Update

LADOT issues a 3-Month Data Summary. Preliminary data provided by LAPD shows a small decrease in the number of collisions and injury collisions on Venice Blvd. Additionally, the data update shows that the majority of trips on the corridor are now within zero to 60 seconds of pre-project times

OCTOBER 2017
Right-Turn Modifications

LADOT implements right-turn modifications at Grand View Blvd, Boise Ave, and Mountain View Ave along the corridor to provide better visibility

DECEMBER 2017
Left-Turn/LAFD Modifications

LADOT installs double left-turn lanes on Venice Blvd at Centinela Ave to allow more vehicles to turn during each green light

LADOT works with LAFD to provide emergency transponders that allow the fire department to temporarily change light signals that allow them to travel faster. LADOT studied emergency travel times and found that LAFD vehicles had an average speed of 39MPH along the Venice Blvd Great Street. Non-emergency vehicles had an average speed of 28MPH, meaning that emergency vehicles are traveling through the corridor at faster rates during emergencies

JANUARY 2018
Green Paint

LADOT installs green paint on the bike lanes to highlight areas where cars and bicycles mix for better visibility.

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VENICE
FREQUENTLY ASKED QUESTIONS
BLVD

Q **LADOT said this project was a 1 year pilot. What happens in June 2018? How and when will you determine whether this is a successful pilot?**

A Once the first year of the pilot project is complete in late May 2018, LADOT will perform a detailed analysis on the range of data gathered to understand the project benefits and impacts over this initial project time period. This will include the travel trend information that has been reported at the 1, 3, and 6-month timeframe, and will also include more data sources to compare to the project benchmarking report prepared in 2015. The following information will be gathered to measure desired outcomes for the project.

- **Increased Economic Activity**
- **Business operator & customer perceptions**
- **Business tax information, if available**
- **Improved Access & Mobility**
- **Driving, walking, & biking traffic volumes**
- **Vehicle speed**
- **Travel mode split**
- **Travel time through the corridor**
- **Pedestrian and bike rider observations**
- **Enhanced Neighborhood Character**
- **Neighborhood perceptions**
- **Streetscape elements**
- **Safer & More Secure Communities**
- **Crime statistics**
- **Safety perceptions**
- **Traffic collisions**

Gathering and analyzing all of this information will take some time. Most of these data require a minimum of 1-2 months to collect and synthesize. However, the longest lead time will be for traffic collisions data, which may take longer for full processing and validation from the Statewide Integrated Traffic Records System (SWITRS). Project staff will also require 1 month to develop this information into a report and present key findings to LADOT management and the Council Office.

Together, Councilmember Mike Bonin and LADOT General Manager Seleta Reynolds will consider the report findings alongside comments received throughout the process by LADOT, the Council Office, the Mayor's Office, and the Mar Vista Community Council and make a decision about the future of the project. The potential paths forward for the project include the following:

1. **Ending the pilot project and returning the street to the original configuration.**
2. **Making further changes to the corridor based on feedback and data and then continuing the pilot project.**
3. **Making the temporary project installations permanent.**

VENICE
FREQUENTLY ASKED QUESTIONS
BLVD

Q **LADOT installed the project 9 months ago. Why are we just looking at the 6-month data now?**

A Data collection and analysis takes time. In order to ensure data is collected and analyzed appropriately and accurately, the project team goes through multiple reviews before presenting information publicly, which results in a necessary delay. LADOT is committed to analyzing and presenting information in an accurate manner. Additionally, data collected at the 1, 3, and 6-month time period are very preliminary. LADOT will be conducting a more comprehensive review of project impact at the 1-year time frame to inform project next steps.

Q **Did you provide data at the 1-month and 3-month time period?**

A Yes. LADOT hosted an open house on July 22, 2017 to present preliminary 1-month data, and published a 3-month data report on the project website (https://www.veniceblvdmarvista.org/evaluation/). Additionally, LADOT mailed a hard copy of the 3-month data to the Mar Vista community.

Q **Have there been more crashes on Venice since the project was installed?**

A Preliminary analysis of available data shows that total crashes over the time period from May – December in 2017 along this portion of Venice Blvd have decreased by 1 collision (from 19 to 18) compared to that same time period in 2016. Minor injury collisions have increased by 2 collisions (from 13 to 15) during that same time period. This data is too low to be statistically significant, and our transportation engineers will perform a more detailed analysis of crash types and movements of involved parties in order to determine whether these crashes have any relation to the project design at the 1-year time frame.

Q **But I've observed many more traffic crashes than you show in your data. How can that be accurate?**

A LADOT is committed to a rigorous and reliable analysis of pre- and post-project conditions. In order to perform this type of analysis, we require collision data that is consistently collected in the same manner for the pre-project period and the post-project period. Traffic crashes that are reported through Traffic Collision Reports (TCRs) generated by LAPD and validated through the Statewide Integrated Traffic Records System (SWITRS) are the transportation industry standard for reliable collision analysis.

VENICE
FREQUENTLY ASKED QUESTIONS
BLVD

Q **What outreach has been done to date?**

A Over the course of 2015, LADOT, CD11, and the Mayor's Office conducted 12 community events to discuss the project and its potential design elements. This includes:

- 01/2015 - Community Canvas at local grocery stores, community meetings, and events
- 01/25/15 - Pop-up workshop at the Mar Vista Farmers Market
- 04/03/15 - 04/6/15 - Mobile Pop-up Workshop at Grand View Market
- 04/06/15 - 04/12/15 - Mobile Pop-up Workshop at Venice Grind
- 04/16/15 - Mobile Pop-up Workshop at Venice High School
- 04/20/15 - Mobile Pop-up Workshop at Mar Vista Branch Library
- 04/19/15 - Mobile Pop-up Workshop at the Farmers Market
- 05/02/15 - Family bike ride and mobile pop-up workshop
- 08/2015 - Invitation (email/posts) to the Community Open House
- 08/06/15 - Community Open House
- 08/09/15 - Booth and pop-up parklet at CicLAvia
- 11/28/15 - Pop-up protected bike lane and parklet at Make It Mar Vista
- Regular attendance at the MVCC Great Streets Ad Hoc Committee meetings

Q **How will LADOT provide more clarity for drivers and other users about the lane changes along the Venice Blvd Great Street?**

A LADOT has posted educational signs that provide guidance on how to use the new and improved Venice Boulevard in numerous locations along the corridor.

Q **Has pedestrian activity increased since the street reconfiguration? Has bike activity?**

A LADOT will evaluate pedestrian and bicycle activity as part of the 1-year pilot evaluation.

VENICE BLVD

FREQUENTLY ASKED QUESTIONS

Q What do you mean by “injury collisions”?

A In the Statewide Integrated Traffic Records System (SWITRS), collisions are coded based on their severity. There are five total classifications, detailed below:

- **Property Damage Only**
- **Complaint of Pain:** This classification could contain authentic internal or other non-visible injuries and fraudulent claims of injury. This includes: 1. Persons who seem dazed, confused, or incoherent (unless such behavior can be attributed to intoxication, extreme age, illness, or mental infirmities). 2. Persons who are limping but do not have visible injuries; 3. Any person who is known to have been unconscious as a result of the collision, although it appears he/she has recovered; 4. Persons who say they want to be listed as injured but do not appear to be so.
- **Other Visible Injury:** This includes: bruises (discolored or swollen); places where the body has received a blow (black eyes and bloody noses); and abrasions (areas of the skin where the surface is roughened or blotchy by scratching or rubbing which includes skinned shins, knuckles, knees, and elbows).
- **Severe Injury:** An injury other than a fatal injury which results in broken bones, dislocated or distorted limbs, severe lacerations, or unconsciousness at or when taken from the collision scene. It does not include minor laceration.
- **Fatality:** Death as a result of injuries sustained in a collision or an injury resulting in death within 30 days of the collision.

The large majority of collisions on Venice Blvd have been in the first three categories. The last two categories - collectively referred to as “KSI” (Killed or Seriously Injured) - are the most reliably reported data and used to understand transportation safety trends for a particular area over a longitudinal study, typically 2 - 5 years.

Q How has LADOT worked to improve emergency response times on Venice?

A LADOT communicates directly with the Los Angeles Fire Department (LAFD) to address any concerns and work towards minimizing impact to their operations. LADOT has provided transponders that preempt traffic signals so LAFD can move through the intersections quicker. LAFD reports that the preemption is making a difference on Venice Blvd for their fire vehicles. In late December 2017, LADOT data indicates that LAFD vehicles are consistently moving 30-40% faster than general traffic, with an average speed of 39 mph along Venice Blvd compared to an average speed of 28 mph for non-emergency vehicles. Due to this success, LAFD is working with LADOT to procure additional transponders for other fire stations in Los Angeles.

Q Can you install a protected bike lane and keep a third travel lane?

A The current roadway width would not allow for such a configuration. A buffer between the parking lane and bicycle lane is necessary to provide a separation for opening passenger car doors. Additionally, the new street design helps accomplish the project's overall goal to calm traffic and improve safety on the street.

VENICE
FREQUENTLY ASKED QUESTIONS
BLVD

Q **Has the project on Venice increased cut-through traffic on neighboring streets? Where did you conduct before/after counts to assess cut-through traffic?**

A

Traffic was counted at the following locations:

- Palms Blvd east of Beethoven St
- Palms Blvd east of Inglewood Blvd
- Charnock Rd west of Inglewood Blvd
- Victoria Ave west of Centinela Ave
- Pacific Ave west of Inglewood Blvd
- Venice Blvd at Centinela Ave

Data were collected for 24 hours (from 12:00am to 11:59pm) on the following days:

- Tuesday, September 22, 2015 (pre-project benchmarking)
- Monday, June 26, 2017 (1 month post-project evaluation)
- Tuesday, August 22, 2017 (3 months post-project evaluation)
- Thursday, January 11, 2018 (6 months post-project evaluation)

Since the installation of the pilot project, traffic has remained consistent or trended upward slightly on the four examined streets parallel to Venice Blvd (Palms Blvd, Charnock Rd, Victoria Ave, and Pacific Ave). One exception is Palms Blvd east of Beethoven St. Traffic volumes on this segment climbed after the Venice Blvd Great Street's construction but have trended downward since the Great Street project adjustments were completed in December 2017. LADOT will continue to monitor this traffic volume to see if it is still fluctuating or has begun to settle by the one-year mark. The one-year analysis will also include an evaluation of volume thresholds for street classifications, and whether LADOT recommends mitigation strategies for cut-through traffic.

Q **Have you tried to increase enforcement on the street? How successful has enforcement been in managing crash severity?**

A

LAPD has very limited resources for enforcement, and each traffic captain has discretion over details that focus on educating on and enforcing against traffic violations for people walking, bicycling, and driving. Even if this enforcement were to be enhanced, these details would still only cover limited days and times on Venice Blvd. Studies show that enforcement, while a critical tool in improving safety, has a very limited and short-term impact by itself. Combining education and enforcement with re-designed streets is the most effective method for comprehensively improving behavior and leading to safer outcomes.

Q **What studies were done (environmental or traffic) before this project was installed?**

A

As part of the Great Streets benchmarking analysis, we studied traffic counts, speeds, collisions, and travel times. This is a pilot demonstration, therefore it is exempt from an environmental process. If it is made permanent, there will be an environmental assessment and accompanying public process.

VENICE BLVD

FREQUENTLY ASKED QUESTIONS

Q **How are you measuring impacts to businesses?**

A The LA Great Streets Initiative conducted a benchmarking report in 2015 - 2016 and studied: types of businesses, revenues, commercial real estate values, business perceptions, median income, and more, and will conduct a follow up review after the 1-year pilot is complete.

Q **How much did this project cost?**

A This project cost approximately $1.8M. Approximately 95% of the cost was for the new traffic signals, pedestrian access ramps, upgrades to the median island, and other civil intensive work.

Q **How does this design impact people with disabilities?**

A LADOT is working with the Department of Disability to identify and develop accommodations at key locations for this project.

Q **Venice Boulevard is an evacuation route. How does this street design impact evacuation in emergencies?**

A Evacuation routes as a result of disaster can be safely implemented on any major roadway, regardless of the street design. In many instances, we convert the entire roadway into a one-way street flowing away from a disaster zone.

Emergency Vehicle Transponders

These additions help the Los Angeles Fire Department respond faster to emergencies by making traffic lights green for their vehicles.

Green Bike Lane Paint

This improvement highlights areas where cars and bicycles mix near intersections and driveways to improve safety.

Turn Lane Modifications

Right-turn lanes at Grand View Blvd and left-turn lanes at Centinela Ave were modified to allow more vehicles to turn and provide better visibility.

Venice Blvd

Grand View Blvd

VENICE BLVD

RECENT ADDITIONS


Centinela Ave
Ocean View Ave
Grand View Blvd
Venice Blvd
Venice Blvd
From December 2 - 4, 2017, LADOT installed dual left-turn lanes at Venice Blvd and Centinela Ave. This modification was designed after detailed observation of traffic operations at this intersection and based on community feedback. This modification is anticipated to improve traffic flow through this intersection
Green Bike Lane Paint
This improvement highlights areas where cars and bicycles mix near intersections and driveways to improve safety.
Turn Lane Modifications
Right-turn lanes at Grand View Blvd and left-turn lanes at Centinela Ave were modified to allow more vehicles to turn and provide better visibility.
Emergency Vehicle Transponders
These additions help the Los Angeles Fire Department respond faster to emergencies by making traffic lights green for their vehicles.
VENICE
RECENT ADDITIONS
BLVD

VENICE BLVD

SUMMARY OF DATA FINDINGS

Rush Hour Travel Time

What is it?

This is the average time, in minutes, it takes to drive the Venice Blvd Great Street during the morning and evening rush hours. It is collected in both travel directions: eastbound (Beethoven St to Inglewood Blvd) and westbound (Inglewood Blvd to Beethoven St).

How is it Collected?

A data collector drives the corridor. They start recording the time it takes to drive the corridor at one end and stop recording at the other end of the corridor. This process is repeated for as many trips as possible during the 2-hour data collection period. The trips are averaged together to develop a typical travel time. Data is collected using GPS and/or a stopwatch.

When and where is it Collected?

Data were collected along the Venice Blvd Great Street between 7am and 9am (the AM peak period) and again from 4pm to 6pm (the PM peak period) on the following days:

- Tuesday, August 4, 2015 (pre-project benchmarking)
- Thursday, July 13, 2017 (1 month post-project evaluation)
- Thursday, August 24, 2017 (3 months post-project evaluation)
- Thursday, January 11, 2018 (6 months post-project evaluation)

What did we Learn?

The time it takes to drive the corridor has increased slightly, by about 30 seconds, for all travel directions and time periods except eastbound PM. Eastbound PM travel times on the Venice Blvd Great Street initially increased by nearly 5 minutes. Since the Great Street project adjustments were completed in December 2017, travel time in the eastbound PM direction is decreasing.

24-Hour Travel Time

What is it?

This is the average time it takes to travel the Venice Blvd Great Street at each hour of a typical weekday. It was analyzed in both travel directions: eastbound (Beethoven St to Inglewood Blvd) and westbound (Inglewood Blvd to Beethoven St).

How is it Collected?

The data are collected and processed by a third-party big data service, INRIX. The data are collected using GPS signals from a sample of mobile device users traveling the corridor, who have allowed their location data to be shared. The data are anonymized and averaged to provide an estimate of the time it takes to travel the corridor at each hour of the day.

When and where is it Collected?

The data were collected along the Venice Blvd Great Street on Mondays, Tuesdays, Wednesdays, Thursdays, and Fridays during two 12-day periods for comparison:

- January 9 – 20, 2017
- January 8 – 19, 2018

What did we Learn?

The time it takes to travel westbound on the Venice Blvd Great Street has remained relatively constant from 2017 to 2018. In 2017, the slowest time to travel the corridor westbound was between 2pm and 3pm. In 2018, westbound travel during this time decreased by about half a minute.

Travel time in the eastbound direction has also remained relatively similar between 2017 and 2018 with the exception of the PM rush hour. During this time, it can take 30 seconds to one minute longer to travel the corridor eastbound. More investigation and analysis over different time periods is needed to make conclusive observations from this data analysis.

Emergency Responder Travel Time

What is it?

This is the average time it takes Los Angeles Fire Department (LAFD) vehicles to travel the Venice Blvd Great Street while responding to emergencies. In addition to traveling at higher speeds, LAFD vehicles are equipped with transponders that allow them to trigger green lights. The travel time is averaged from a sample of actual LAFD responses in both directions on the Venice Blvd Great Street.

How is it Collected?

During an emergency response, a transponder onboard the LAFD vehicle records the distance traveled over the Venice Blvd Great Street as well as the vehicle's travel time. Distance and travel time are used to calculate the emergency vehicle's general speed. Several emergency vehicle runs are analyzed to create an average emergency vehicle travel speed. The average emergency vehicle travel speed is compared to the average speed of non-emergency vehicles over the same corridor.

When and where is it Collected?

Emergency vehicle travel times were collected from a sample of LAFD responses on the Venice Blvd Great Street during the week of December 24, 2017 to December 31, 2017. They were compared to average speeds of non-emergency vehicles during the same period on the corridor.

What did we Learn?

During the evaluation period, LAFD vehicles had an average speed of 39MPH along the Venice Blvd Great Street. Non-emergency vehicles had an average speed of 28MPH. This means that LAFD vehicles traveled about 40% faster than regular traffic. LAFD acknowledges this effort as a success, and they are working with LADOT to identify additional transponders for additional fire stations in Los Angeles.

Travel Speed

What is it?

This is the "85th percentile" speed. It is the speed that 85 percent of surveyed motorists are traveling at or below on the Venice Blvd Great Street. Under state law, this speed is used to set speed limits. The current posted speed limit on the Venice Blvd Great Street is 40MPH, and the target operating speed, as defined in the City of Los Angeles Mobility Plan 2035, is 35MPH.

How is it Collected?

Using a radar gun, the data collector records the speed of 50 random westbound vehicles and 50 random eastbound vehicles on Venice Blvd. The speed samples for both travel directions are recorded and broken into percentile scores. The travel speed that is most commonly reported is the 85th percentile speed, which, as described above, is used to set speed limits in California.

When and where is it Collected?

Data were collected between approximately 11am and 12pm at Venice Blvd and Colonial Ave (just west of Centinela Ave) on the following days:

- Tuesday, September 22, 2015 (pre-project benchmarking)
- Thursday, July 13, 2017 (1 month post-project evaluation)
- Thursday, August 24, 2017 (3 months post-project evaluation)
- Thursday, January 11, 2018 (6 months post-project evaluation)

What did we Learn?

Before construction of the Venice Blvd Great Street, the 85th percentile speed was 41MPH, which is just above the speed limit of 40MPH. Travel speeds then dropped into the range between the speed limit and the target operating speed of 35MPH. Since the Great Street project adjustments were completed in December 2017, travel speeds have increased to pre-project, or faster, levels.

Traffic Volumes

What is it?

This is the average number of vehicles that pass over a certain section of road, in both directions, on a given weekday. It was collected on Venice Blvd and streets parallel to Venice Blvd to examine whether traffic may be diverting to other streets since the Venice Blvd Great Street's construction.

How is it Collected?

A pneumatic tube is laid down across all lanes of a street at the desired traffic counting location. It is connected to a sensor that records each time a vehicle passes over the pneumatic tube. It counts each pass as one vehicle.

When and where is it Collected?

Traffic was counted at the following locations:

- Palms Blvd east of Beethoven St
- Palms Blvd east of Inglewood Blvd
- Charnock Rd west of Inglewood Blvd
- Victoria Ave west of Centinela Ave
- Pacific Ave west of Inglewood Blvd
- Venice Blvd at Centinela Ave

Data were collected for 24 hours (from 12:00am to 11:59pm) on the following days:

- Tuesday, September 22, 2015 (pre-project benchmarking)
- Monday, June 26, 2017 (1 month post-project evaluation)
- Tuesday, August 22, 2017 (3 months post-project evaluation)
- Thursday, January 11, 2018 (6 months post-project evaluation)

What did we Learn?

Traffic has remained consistent or trended upward slightly on the four examined streets parallel to Venice Blvd (Palms Blvd, Charnock Rd, Victoria Ave, and Pacific Ave). One exception is Palms Blvd east of Beethoven St. Traffic volumes on this segment climbed after the Venice Blvd Great Street's construction but have trended downward since the Great Street project adjustments were completed in December 2017.

Traffic on Venice Blvd has decreased since building the Great Street project. Before the project's construction, about 33,000 auto trips passed through the Great Street on a typical weekday. That number has reduced to under 30,000 as of the most recent data.

Traffic Collisions

What is it?

LADOT conducted a preliminary 6-month collision analysis for the Venice Blvd pilot project using available data from the Statewide Integrated Traffic Records System (SWITRS). Multiple degrees of collision severity exist that range from property damage to fatality. For a robust safety analysis, fatal and severe injury collisions are the most reliable source of information to make informed decisions on transportation projects. Other injury collisions are not reliably reported. Industry standards for robust, statistically defensible safety analysis call for a minimum of one to two years of collision data before making informed decisions on the impact or benefit of a project. One 6-month post-analysis of all injury & collision data is not sufficient to make informed decisions.

How is it Collected?

Law enforcement officers file Traffic Collision Reports (TCR) at the time of collisions that detail the location and characteristics of the collision. Collision data are entered into a statewide database (SWITRS), and much of this data is made available for analysis and investigation.

When and where is it Collected?

The post-project data was collected from May 20, 2017 – December 31, 2017, and comes from the SWITRS database. In order to compare to pre-project conditions, LADOT analyzed SWITRS data from the same time period (May 20 – December 31) for the past 5 years, back to 2012. To understand trends, LADOT also graphed all available collision since May 20, 2012.

What did we Learn?

- The number of collisions in each analysis period are too low to make defensible conclusions on safety trends from this data. More collision data will need to be collected and analyzed at the 1-year mark
- Total collisions for motor vehicles and bicycles are below 2016 levels for the analysis period, but are up for pedestrians.
- Injury collisions for bicycles are below 2016 levels, but up for motor vehicles and pedestrians
- Injury collisions appear to be concentrated during AM and PM peak periods.
- Only 4 bike and pedestrian injury collisions have occurred since LADOT installed the project. 3 of these are right turn collisions that occurred in June & July.
- LADOT transportation engineers will perform a detailed collision analysis for pre and post-project collisions at the 1-year mark to analyze parties involved, movement preceding collision, and other collision factors to develop a detailed understanding of any safety benefits or impacts of the project.

LADOT

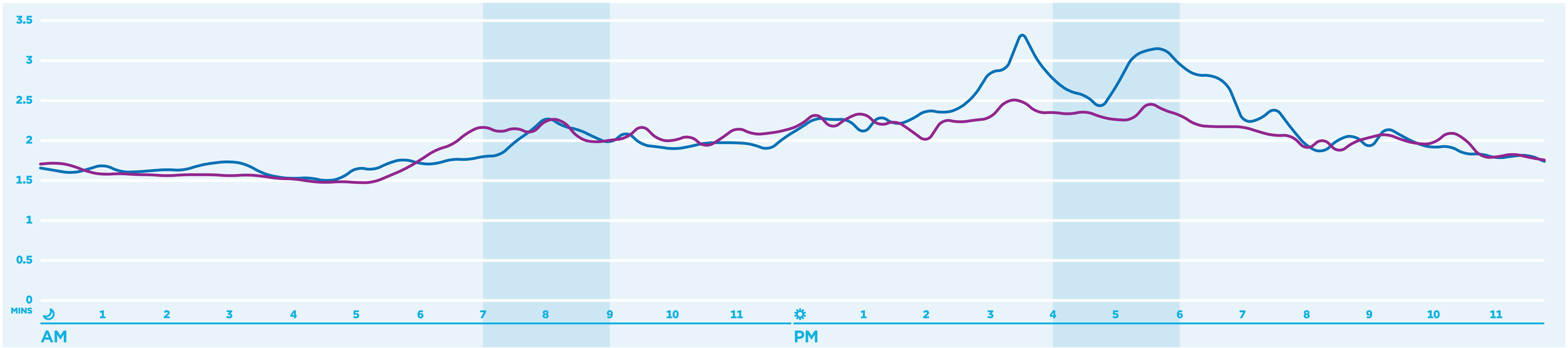
VISION ZERO LOS ANGELES | 2015-2025

GREAT STREETS LA

MIKE BONIN
Getting Things Done for Our Neighborhoods
Councilmember, 11th District

VENICE
24-HOUR TRAVEL TIME
BLVD

Eastbound Travel Time



Source: INRIX

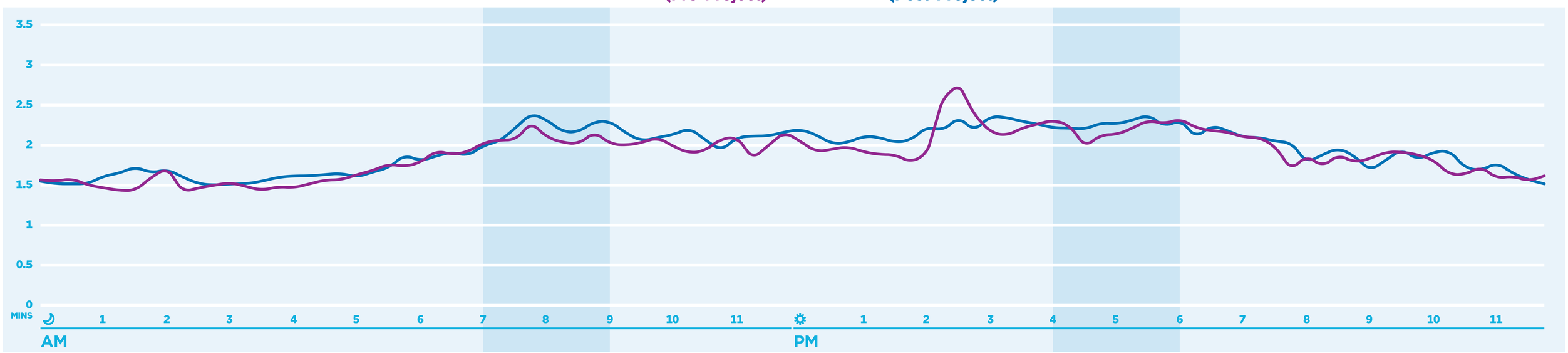
Westbound Travel Time

AM Rush Hour

January 9 – 20, 2017 (Pre-Project)

January 8 – 19, 2018 (Post-Project)

PM Rush Hour



Source: INRIX

LADOT

VISION ZERO LOS ANGELES | 2015-2025

GREAT STREETS LA

MIKE BONIN Getting Things Done for Our Neighborhoods Councilmember, 11th District

VENICE
TRAVEL TRENDS
BLVD

Project Timeline

TODAY

- 2015-2016 — Pre-Project Benchmarking
- MAY 2017 — Project Opening
- JULY 2017 — 1-Month Open House
- SEPTEMBER 2017 — 3-Month Project Update
- DECEMBER 2017 — Project Adjustments
- JANUARY 2018 — 6-Month Data
- MARCH 2018 — Open House

Travel Time

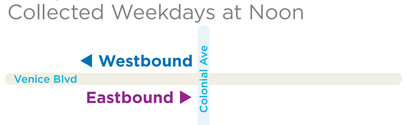
Minutes to Drive the Venice Blvd Great Street during Weekday Rush Hour

Source: Fehr & Peers

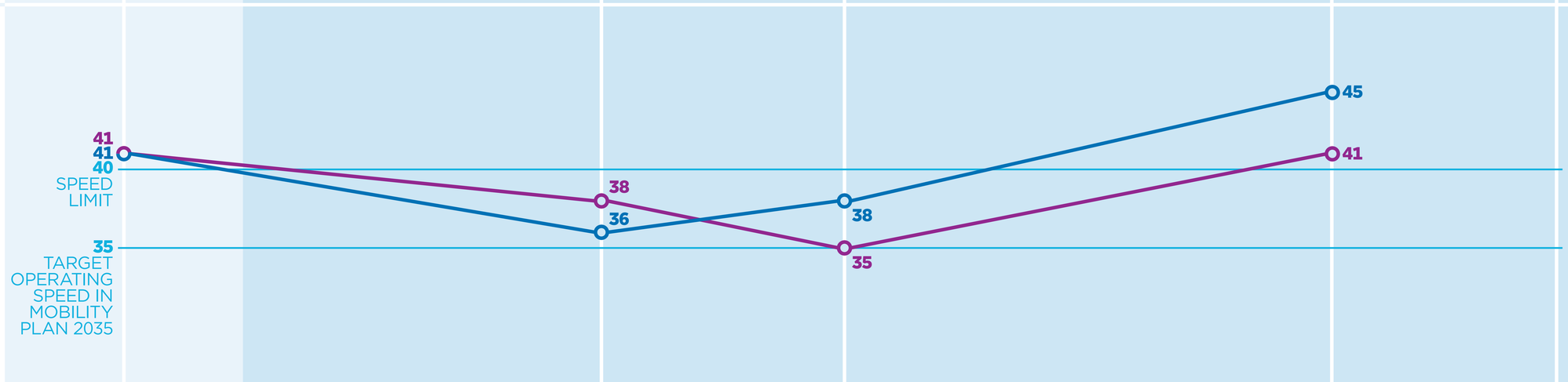


Travel Speed

Critical Travel Speeds (in MPH) along the Venice Blvd Great Street Collected Weekdays at Noon



Source: National Data & Surveying Services (NDS)



What about Emergency Response?

In late December 2017, Los Angeles Fire Department (LAFD) vehicles had an average speed of 39MPH along the Venice Blvd Great Street. Non-emergency vehicles had an average speed of 28MPH. This means that LAFD vehicles traveled about 40% faster than regular traffic. LAFD acknowledges this effort as a success, and they are working with LADOT to identify additional transponders for additional fire stations in Los Angeles.

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VENICE BLVD
TRAFFIC VOLUMES

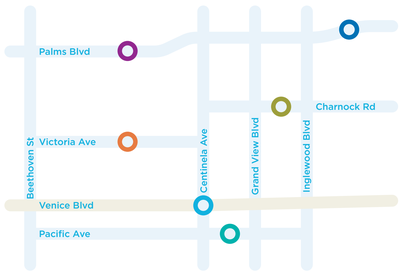
Project Timeline

TODAY

- 2015-2016 — Pre-Project Benchmarking
- MAY 2017 — Project Opening
- JULY 2017 — 1-Month Open House
- SEPTEMBER 2017 — 3-Month Project Update
- DECEMBER 2017 — Project Adjustments
- JANUARY 2018 — 6-Month Data
- MARCH 2018 — Open House

Traffic Volumes on Parallel Streets

Average Daily Auto Traffic Count Locations



Venice Blvd at Centinela Ave
Palms Blvd East of Beethoven St
Palms Blvd East of Inglewood Blvd
Charnock Rd West of Inglewood Blvd
Pacific Ave West of Inglewood Blvd
Victoria Ave West of Centinela Ave

Source: NDS



LADOT

VISION ZERO LOS ANGELES | 2015-2025

GREAT STREETS LA

MIKE BONIN
Getting Things Done for Our Neighborhoods
Councilmember, 11th District

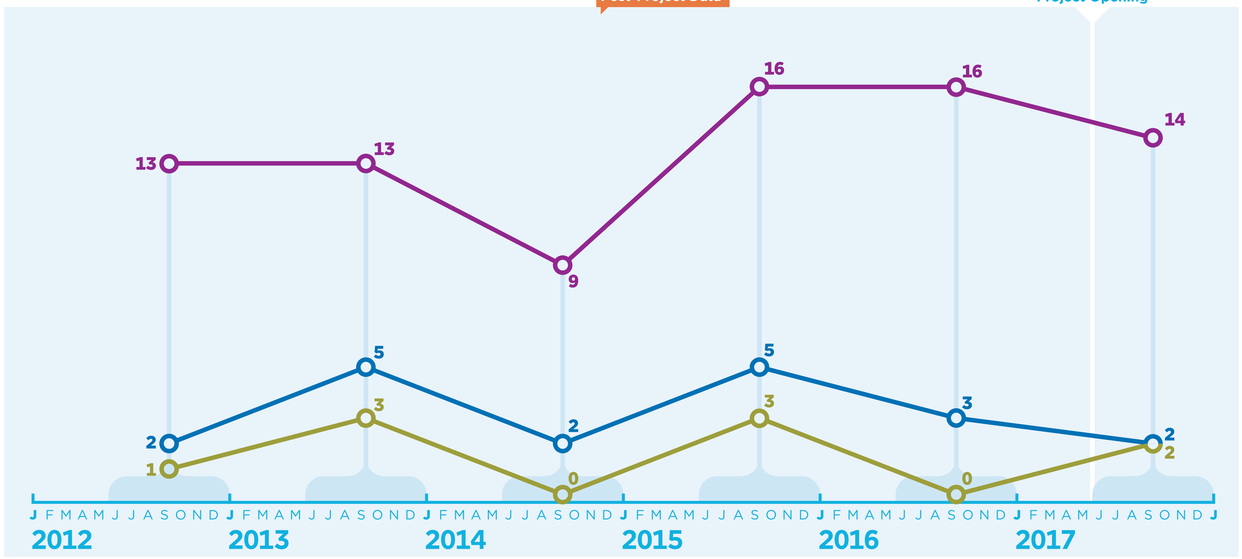
VENICE BLVD
TRAFFIC COLLISIONS

Auto Collisions | Bike Collisions | Pedestrian Collisions

All Collisions: Trends

Collisions Shown for Each Year are from May 20 to December 31 for Consistency with Post-Project Data

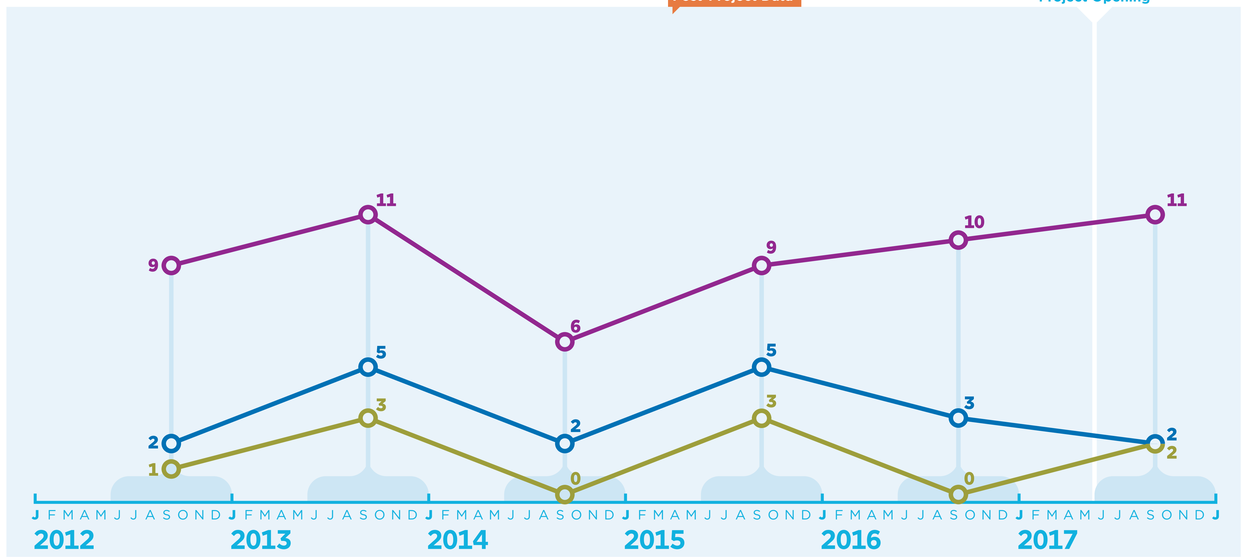
MAY 20, 2017 Project Opening



Injury Collisions: Trends

Collisions Shown for Each Year are from May 20 to December 31 for Consistency with Post-Project Data

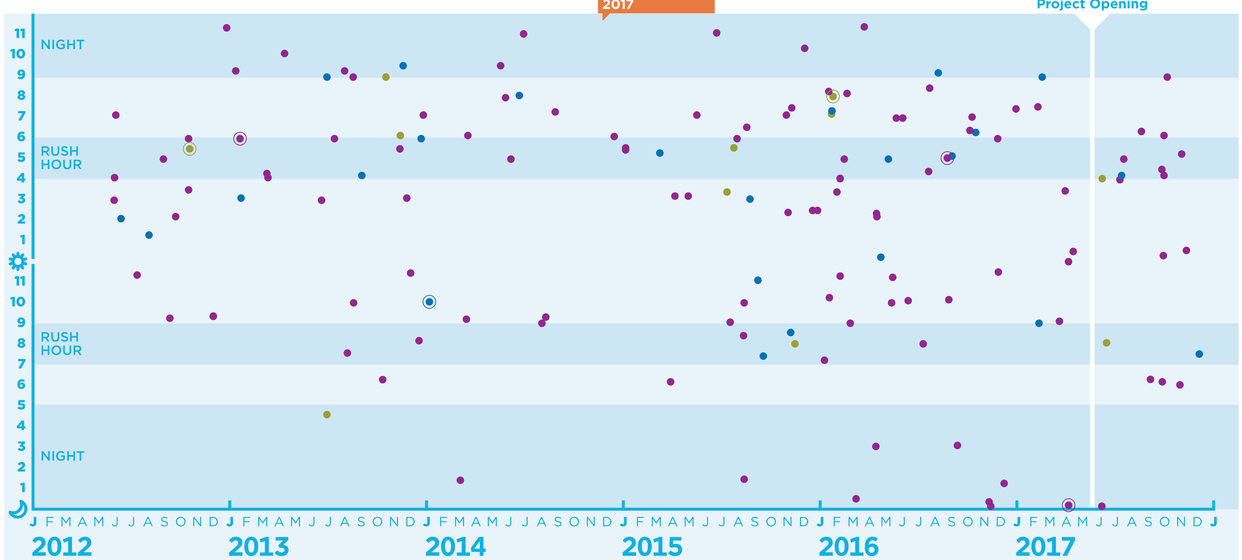
MAY 20, 2017 Project Opening



All Collisions: Raw Data

All Collisions are Shown from May 20, 2012 to December 31, 2017

MAY 20, 2017 Project Opening

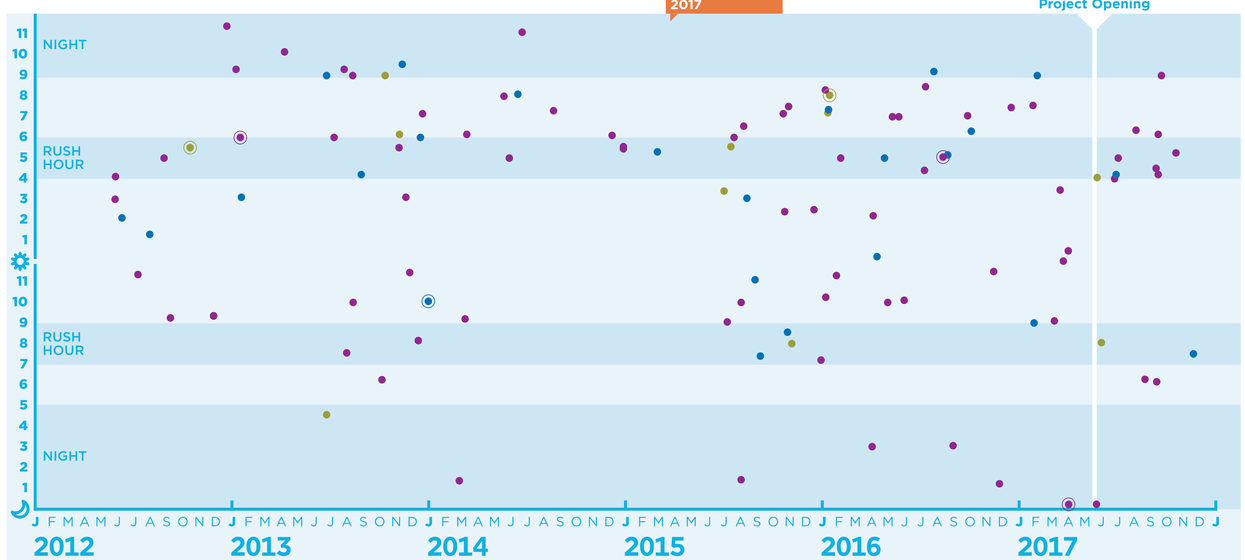


Severe Injury Collisions

Injury Collisions: Raw Data

All Collisions are Shown from May 20, 2012 to December 31, 2017

MAY 20, 2017 Project Opening



Severe Injury Collisions

LADOT | VISION ZERO LOS ANGELES | 2015-2025 | GREAT STREETS LA | MIKE BONIN Getting Things Done for Our Neighborhoods Councilmember, 11th District



DATA & EVALUATION

LADOT released project progress reports to the community at the one month, three month, and six month post-project period. LADOT committed to providing a comprehensive evaluation after the one-year pilot period was completed.

May 2018 marked the completion of the one-year pilot period. At that time, LADOT began collecting data to compare to pre-project conditions set in the Venice Boulevard Benchmarking Report (http://www.fehrandpeers.com/wp-content/uploads /2016/10/VeniceBlvd.pdf).

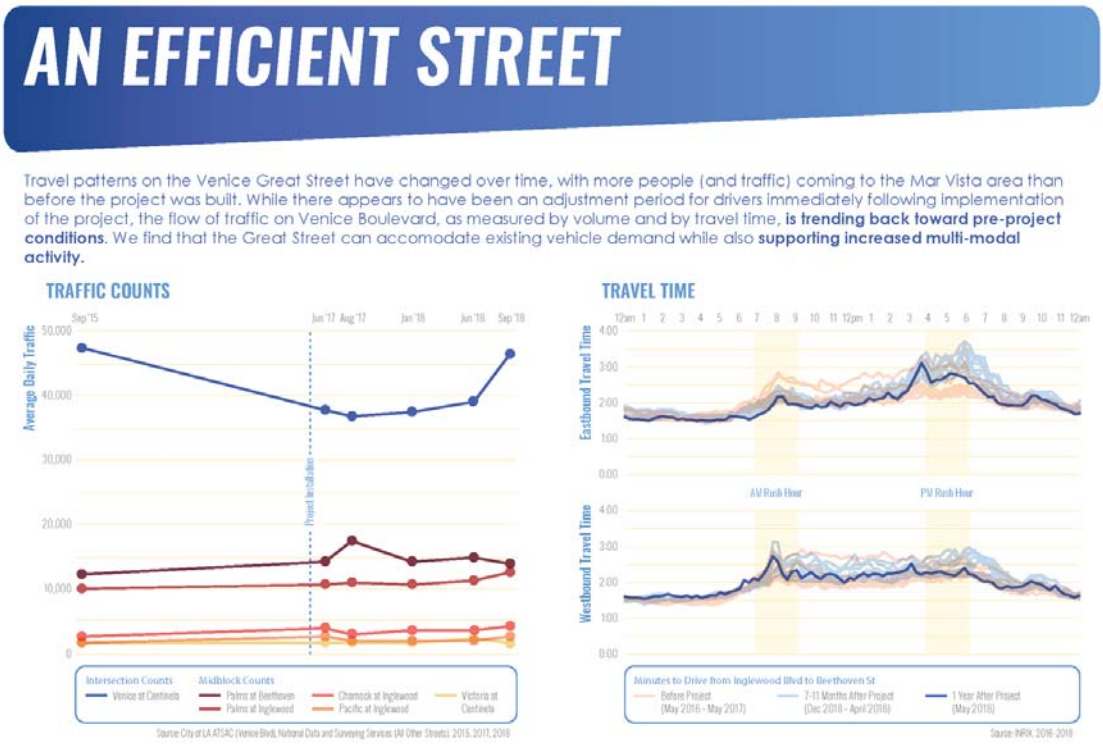
In December 2018 LADOT completed the one-year evaluation report (/s/VeniceBlvd_1-Year_Report_FINAL_.pdf).

Some of the reports key findings:

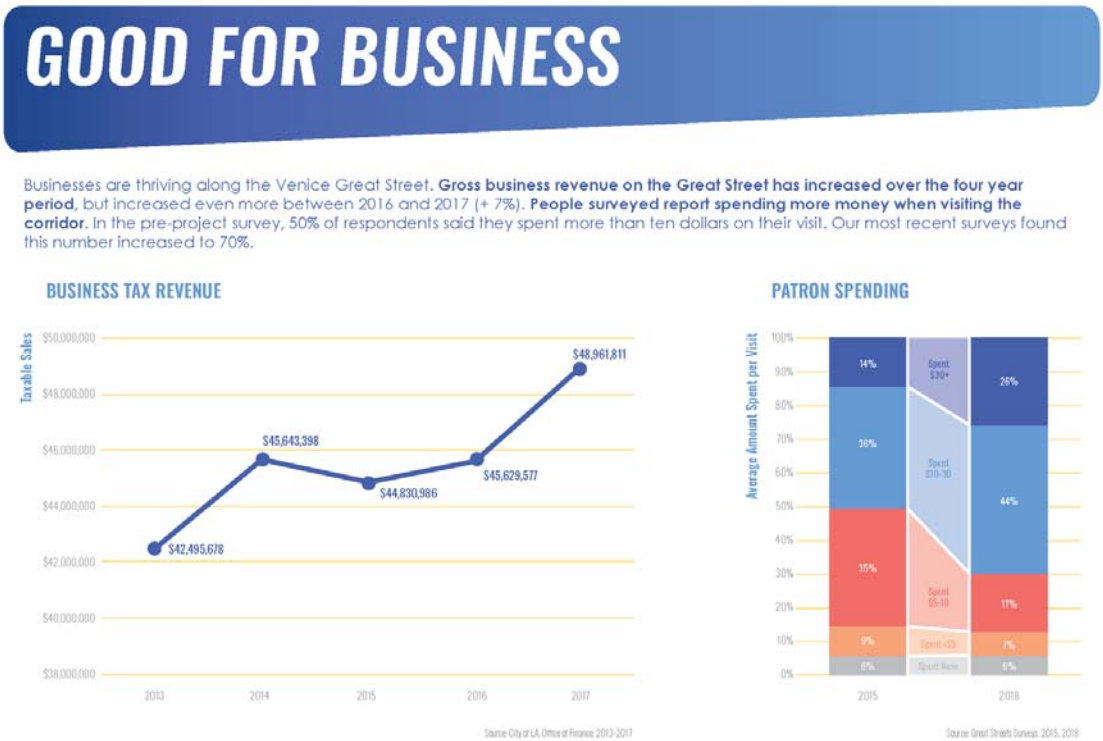
THE PROJECT IS SAFE



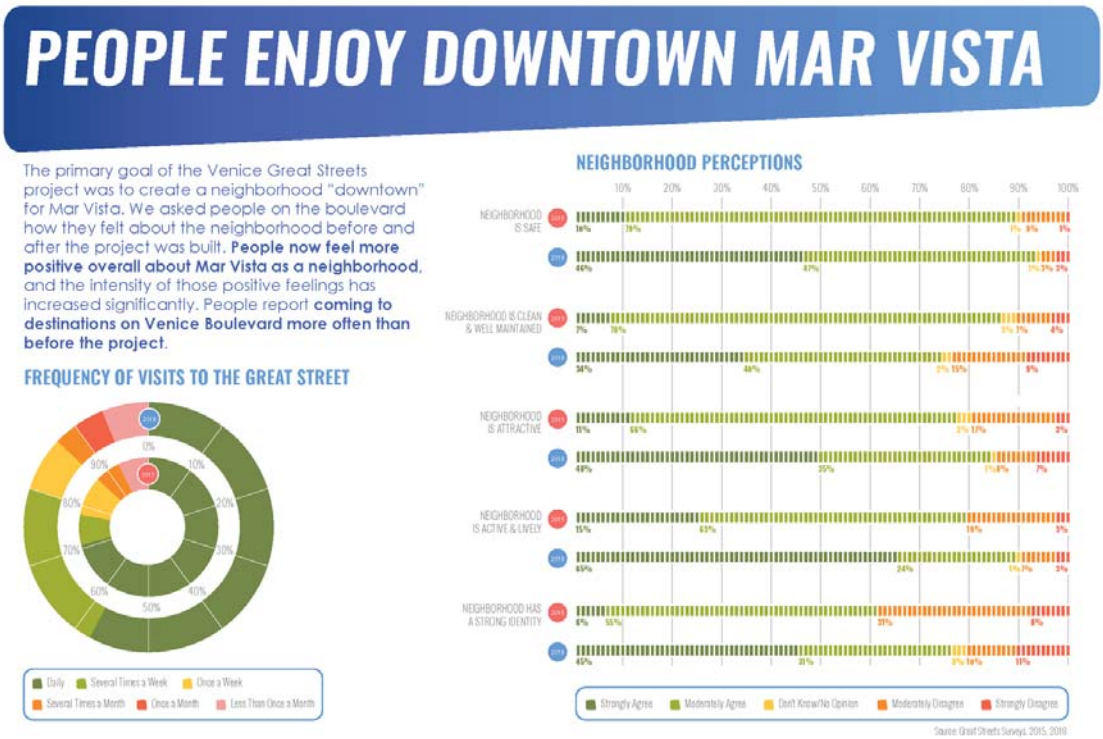
THE PROJECT IS EFFICIENT



THE PROJECT IS GOOD FOR BUSINESS



PEOPLE ENJOY DOWNTOWN MAR VISTA



The one-year evaluation report is downloadable here (/s/VeniceBlvd_1-Year_Report_FINAL_.pdf).

The report appendix, which includes the raw data that was obtained for analysis is downloadable here (/s/Appendices-COMPLETE_.pdf).

The six-month evaluation can be accessed here (https://static1.squarespace.com/static/595fd8fa5016e119d794e4b1/t/5aac103e758d46afd587c814/1521225803908/Venice_Boards.pdf).

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VENICE BLVD GREAT STREETS PROJECT

LADOT is committed to evaluating the progress of the Venice Blvd Great Streets project in Mar Vista. In July 2017, LADOT released a one-month data reveal. In September 2017, LADOT released the three-month data reveal, and in March 2018, LADOT hosted a six-month open house to present the half year data findings and to receive public feedback. LADOT committed to report the project's benefits and impacts after a full year of data could be collected.

Since the one-year mark on May 20, 2018, LADOT began assembling the data needed to conduct a detailed evaluation of the project across the six goals of the Great Streets Initiative - increased economic activity, improved access and mobility, enhanced neighborhood character, greater community engagement, improved environmental resilience, and a safer and more secure community. This data was compared to the baseline conditions established in the Venice Boulevard Benchmark Report (http://www.fehrandpeers.com/wp-content/uploads/2016/10/VeniceBlvd.pdf).

LADOT has completed the one-year evaluation study. The report can be downloaded here (/s/VeniceBlvd_1-Year_Report_FINAL_.pdf).



PROJECT INFO

The Venice Boulevard project is the result of several years of outreach and design piloted in May 2017. This new street configuration, from Beethoven Street to Inglewood Boulevard, includes two vehicle lanes in each direction, a bicycle lane physically protected by a parking lane, new high-visibility crosswalks, leading pedestrian intervals for early pedestrian crossing, and four new signals and crossing points across Venice Boulevard. Other amenities such as bus stops , bike racks, murals, and landscaping amplified the project.

Learn More → (/project-info)

PROJECT UPDATES

LADOT initiated modifications through community feedback and evaluation to further improve the project safety and increase vehicle throughput since May 2017. LADOT will continue to provide updates on any further changes to the project's design and operation, including related community initiatives, like the planned intersection mural at Grand View Avenue and Pacific Avenue.

Learn More (/project-updates)→ (/project-info)



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Learn About the Mar Vista Great Streets Project

PROJECT OVERVIEW

After a collaborative process involving the Mayor's Office, City Council staff, Los Angeles City staff, and a technical committee, Venice Boulevard in Mar Vista as one of the first 15 Great Streets corridors. Councilmember Mike Bonin facilitated community outreach and the Great Streets Initiative identified a vision for the corridor focused around safety for pedestrians and bicyclists, and a project that is supportive of business and enhances the identity of the neighborhood.

In August 2015, safety improvements along Venice Boulevard gained additional attention when the street was placed on the Vision Zero High-Injury Network. In January 2017, the City of Los Angeles selected this stretch of Venice Boulevard as a Priority Corridor in the City's first-ever Vision Zero Action Plan. Vision Zero uses collision data to prioritize safety improvements aimed at ending preventable traffic deaths by 2025.

This section of Venice Boulevard has experienced a high rate of traffic related injuries and fatalities. From 2003 to 2016, 360 collisions involving injury occurred on Venice Boulevard. Over half of the serious injuries involved people walking and biking. Five people lost their lives.

The Project Features the Following Key Enhancements and Benefits:



Protected and buffered bicycle lanes: On Venice Boulevard between Beethoven Street and Inglewood Boulevard.

New Crossing Points: LADOT installed four new crosswalks on Venice Boulevard at Mountain View Avenue, Ocean View Avenue, Boise Street, and Meier Street, with new signals to provide more safe crossing opportunities for pedestrians. The high visibility crosswalk striping will increase the visibility of people crossing the street.

Pedestrian head-start signals: LADOT modified nine intersections on Venice Boulevard to provide pedestrians a head-start when crossing the street.

Upgraded Sidewalks and High Visibility Crosswalks: The Bureau of Street Services (BSS) enhanced safety by grinding sidewalks and expanding tree wells. LADOT installed new crosswalks across Venice Boulevard and upgraded existing crosswalks to enhance their visibility.

Bus Stop Improvements: The City of Los Angeles installed two solar-powered bus benches with USB ports and one bus shelter with USB ports and free WiFi at Venice Avenue and Centinela Avenue.

Community Art Installations: As part of the Great Streets Initiative, community artists have painted more than 10 wall murals, 4 utility box murals, and are in the process of installing the City's first ever intersection mural. LADOT also launched its first Creative Catalyst program on Venice Boulevard. Alan Nakagawa, LADOT's Artist-in-Residence, worked with local artists to develop street haiku signs, installed along the entire Venice Boulevard corridor, as well as the City's first Street Perfume project. Learn more about the innovative project, see the articles below:

- **How one LA bus stop became a lab for experimental perfumes - City Lab (https://www.citylab.com/life/2017/07/how-one-la-bus-stop-became-a-lab-for-experimental-perfumes/535041/)**
- **Q&A: An LA Artist On His Year With LADOT - Urban Edge (https://urbanedge.blogs.rice.edu/2017/06/13/qa-an-l-a-artist-on-his-year-with-ladot/#.WZOvqoTytEY)**

NEIGHBORHOOD INPUT:

Between 2015 and 2016, the Great Streets Initiative, Council District 11, and LADOT facilitated extensive outreach, canvassing at the Mar Vista Farmers Market, going door-to-door along business corridors, facilitating mobile workshops, holding a community open house, and temporarily building out the proposed design of the project during the November 2015 "Make It Mar Vista" community event.

The following represents some of the outreach events were coordinated during this period:

01/2015 - Community canvas at local grocery stores, community meetings, and events
01/25/15 - Pop-up workshop at the Mar Vista Farmers Market
04/03/15 - 04/6/15 - Mobile pop-up workshop at Grand View Market
04/06/15 - 04/12/15 - Mobile pop-up workshop at Venice Grind
04/16/15 - Mobile pop-up workshop at Venice High School
04/20/15 - Mobile pop-up workshop at Mar Vista Branch Library
04/19/15 - Mobile pop-up workshop at the Farmers Market
05/02/15 - Family bike ride and mobile pop-up workshop
08/2015 - Invitation (email/posts) to the community open house
08/06/15 - Community open house
08/09/15 - Booth and pop-up parklet at CicLAvia
11/28/15 - Pop-up protected bike lane and parklet at Make It Mar Vista
Regular attendance at the Mar Vista Community Council Great Streets Ad-Hoc Committee meetings

PROJECT EVALUATION :

Learn more about the project's evaluation here (/s/VeniceBlvd_1-Year_Report_FINAL_.pdf).

If you would like to share feedback about the safety enhancements made on Venice Boulevard in Mar Vista, please email ladot.veniceblvdmarvista@lacity.org.

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PROJECT UPDATES

6-MONTH OPEN HOUSE

March 14, 2018

On March 14, 2018, LADOT hosted an open house at the Mar Vista Recreation Center to discuss project updates, present the latest data from the 6-month project evaluation, and receive comments and input heading into the project one-year evaluation. Over 100 community members attended. You can view the display boards here (/s/Venice_Boards.pdf).

IMPROVING EMERGENCY RESPONSE TIMES

December 2017

LADOT provided transponders to the Los Angeles Fire Department that preempt traffic signals so LAFD vehicles can move through the intersections quicker. LAFD reports that the preemption made a difference on Venice Boulevard, and data shows they are moving 30 to 40 percent faster than general traffic.

FACILITATING MOVEMENT THROUGH VENICE BOULEVARD

December 2017

LADOT reconfigured the left-turn lanes on Venice Boulevard at Centinela Avenue from one lane to two lanes. This allows more vehicles to make left turns in one signal cycle, which streamlined movement through Venice Boulevard.

IMPROVING RIGHT HAND TURNS AT INTERSECTIONS

October 2, 2017

LADOT improved the safety of right-hand turns at certain intersections. Some intersections received a new right-hand turn



configuration and some intersections received modifications that improve visibility.

Learn more about the proposed configurations here (/s/Outreach_Venice-Right-Hands_Final-Draft.pdf).

THREE-MONTH DATA

September 20, 2017

The number of collisions and injury collisions occurring on Venice Blvd. continued to decrease three months after the reconfiguration. The data reported (/evaluation)that the number of drivers speeding along the corridor continues to drop, making downtown Mar Vista a safer and more vibrant neighborhood.

Additionally, the three month data showed that trips on the corridor are now within zero to 60 seconds of pre-project times.



MAR VISTA OPEN HOUSE

July 22, 2017



On July 22, 2017, LADOT hosted a community Open House aimed at communicating key facets of the Mar Vista project after one-month of installation. Over 200 members of the community attended the event and many individuals shared their feedback on the project.

ONE-MONTH DATA REVEAL

July 15, 2017

Data indicated a drop in the number of drivers speeding above the 40 mph limit, which is crucial because pedestrian collisions involving cars going over 40 mph are almost always fatal.

In addition, the latest data shows that trips through Mar Vista's Venice Blvd. corridor are within 30 to 90 seconds of pre-project times.

	VENICE WEST OF LOUELLA		VENICE WEST OF COLONIAL		VENICE WEST OF BARRY	
DIRECTION	EB	WB	EB	WB	EB	WB
PRE-PROJECT	45	44	41	41	45	43
POST-PROJECT	43	41	38	36	44	44
CHANGE	-2	-3	-3	-5	-1	+1

PRESENTATION TO MAR VISTA COMMUNITY COUNCIL

July 11, 2017



On July 11, 2017 LADOT and Councilmember Mike Bonin presented project updates and information (/s/2017-07-11_Venice-Blvd-Great-Street_FORWEB-htap.pdf) at the Mar Vista Neighborhood Community Council meeting. Community members provided insights and ideas into the Great Streets Project, and after full consideration of all sides, the Council voted in support of the project.

See the data and information we presented at the council meeting here. (/s/2017-07-11_Venice-Blvd-Great-Street_FORWEB-nfsd.pdf)

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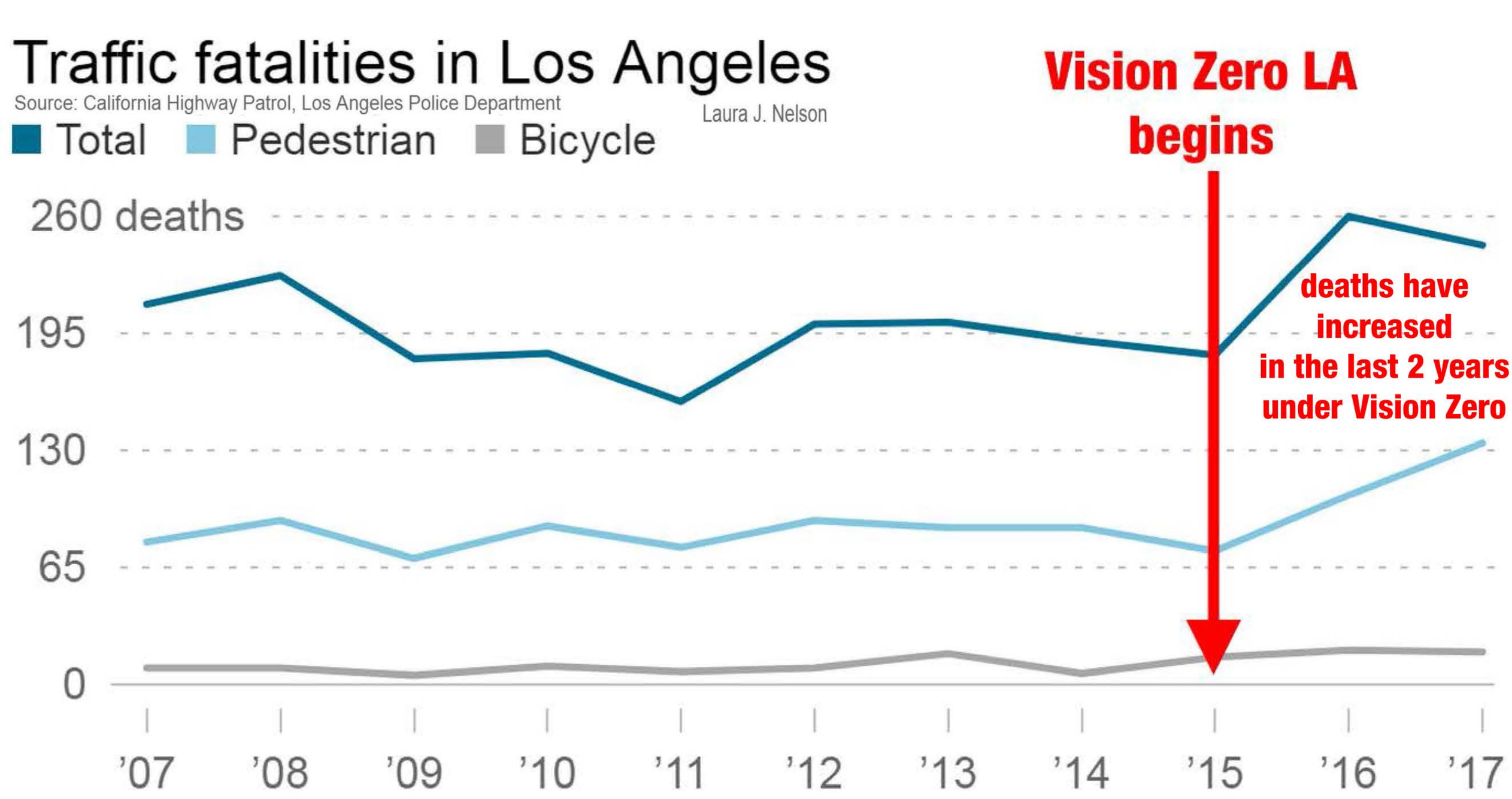
Traffic fatalities in Los Angeles

Source: California Highway Patrol, Los Angeles Police Department

Laura J. Nelson

Total Pedestrian Bicycle



"In 2015, Garcetti signed an executive order creating the Vision Zero initiative, which set the ambitious goal of eliminating traffic deaths on city streets by 2025. It called for reductions of 20% by 2017."

~Laura J. Nelson, Feb 27, 2018, LA Times

VISION ZERO

LOS ANGELES | 2015-2025



ACTION PLAN

JANUARY 2017


DOUBLETREE
Olive St
25
AHEAD

Dear Friends,

Every forty hours, a person is killed in a traffic collision in Los Angeles. Nearly half of the people who die on our streets are people walking and bicycling. Children and older adults account for an alarming number of deaths.

Our streets must be safe. Loss of life because of preventable traffic collisions is unacceptable, which is why I launched the Vision Zero initiative in 2015.

My goal is to eliminate traffic deaths in the City of Los Angeles by 2025 and to reduce deaths by 20 percent by the end of 2017. Over the past year, City leaders have mounted a comprehensive, data-driven effort to better understand the root cause of collisions and to identify and prioritize corridors where deaths and injuries occur with troubling frequency to focus the City's efforts.

The result of these efforts is the City's first Vision Zero Action Plan. This plan lays out concrete actions to help achieve our goals for a safe Los Angeles. From innovative street design to complementary education and enforcement strategies, we can reduce the likelihood of death and severe injury.

This Action Plan spells out ways for every Angeleno to get on the road to Vision Zero. Everyone has a role to play in keeping our streets safe. Working together, we can eliminate traffic deaths and make Los Angeles a safe place for every traveler.

Sincerely,



ERIC GARCETTI
Mayor



VISION ZERO
LOS ANGELES | 2015-2025

Eric Garcetti
#Iamayor

WE PLEDGE

to lead and implement the Vision Zero Action Plan to achieve the goal of zero traffic deaths by 2025.



SELETA REYNOLDS
Los Angeles Department of Transportation



CHARLIE BECK
Los Angeles Police Department



GARY LEE MOORE
Bureau of Engineering



NAZARIO SAUCEDA
Bureau of Street Services



ED EBRAHIMIAN
Bureau of Street Lighting



JOHN REAMER
Bureau of Contract Administration



VINCE BERTONI
Department of City Planning



STEVEN DAVID SIMON
Department on Disability



GRAYCE LIU
Department of Neighborhood Empowerment



CYNTHIA HARDING
Los Angeles County Department of Public Health



DAVID WRIGHT
Los Angeles Department of Water and Power



RALPH TERRAZAS
Los Angeles Fire Department



LAURA TREJO
Department of Aging





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THE STORY FOR ZERO TRAFFIC DEATHS IN LOS ANGELES

EXECUTIVE SUMMARY

About Vision Zero

Every forty hours, an Angeleno loses his or her life in a traffic collision.[1] This is an alarmingly high number, especially compared with peer cities. There is no acceptable number of traffic deaths—even one is too many.

The City of Los Angeles will not be complacent about the tragic loss of human lives on its streets. The City is committed to reversing this trend to make Los Angeles a great place where people can travel safely and securely, no matter what mode of transportation they choose. The question is: How do we get there?

The answer? Vision Zero.

Fatal traffic collisions are not accidents; they can be prevented through thoughtful intervention. In August 2015, Los Angeles Mayor Eric Garcetti launched the Vision Zero Initiative by issuing Executive Directive Number 10. The directive prioritizes human life in the design of our City streets and identifies strategies for how government and the public can partner to reduce traffic deaths to zero. Together, we will eliminate fatalities by focusing on engineering, enforcement, education, and evaluation—all with a commitment to equity and engagement.

[1] Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).

Children, seniors, and people who walk and ride bicycles are at the greatest risk to die or be seriously injured in a traffic collision.

The data-driven approach identifies proven methods and solutions to decrease traffic deaths by designing and operating a road system that accounts for human error.

Vision Zero Los Angeles anchors itself on the following principles:

1. Traffic deaths are preventable and unacceptable.
2. Human error is inevitable and unpredictable.
3. Engineering, education, enforcement, and evaluation are essential to a safe system.
4. Human life is our number-one priority.
5. Speed is a fundamental predictor of crash survival.
6. Government policies at all levels should be coordinated to promote safety as the highest priority.

Analysis of collision data finds that children, seniors, and people who walk and ride bikes are at the greatest risk for collisions that result in deaths and serious injuries.[2] A disproportionate number of collisions in Los Angeles take place on a relatively small number of streets, called the *High-Injury Network*. To meet our goals and to efficiently reduce deaths, we are prioritizing projects in these communities where the highest number of fatal and severe injury collisions are happening.

Our work aims to ensure appropriate focus on equity and engagement. As a starting point, we commit to unbiased policing in all contacts with any person(s) during traffic safety enforcement activities, regardless of race, color, ethnicity, national origin, gender, gender identity, gender expression, sexual orientation, or disability. For more details on our approach for equity and engagement, see pages 27–31.



[2] Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).

The City of Los Angeles will have zero traffic deaths by 2025. This bold statement requires equally bold leadership and actions. We will achieve our desired outcomes by executing the actions and strategies (see pages 38–39). Below is a summary of focus areas for 2017.

CREATE SAFE STREETS FOR ALL

- Install life-saving improvements on the priority corridors and intersections along the High-Injury Network, such as optimizing four-hundred traffic signals and redesigning at least twelve miles of City streets every year to accommodate safe transportation for all.
- Update 100 percent of the expired speed surveys on the priority corridors by the end of 2017.
- Update all City street-design standards used by the Bureau of Public Works, the Department of Transportation, and the Department of City Planning to be consistent with the National Association of City Transportation Officials' *Urban Street Design Guide, Transit Street Design Guide,* and *Urban Bikeway Design Guide* and prioritize the safety of people walking and biking.

DEVELOP A CULTURE OF SAFETY

- Invest at least $2 million toward a comprehensive education campaign that addresses top collision factors, such as speeding and insobriety.
- Work with the Los Angeles Police Department's (LAPD's) Community Relations Office and Community Traffic Services units on enforcement efforts on the top traffic violations that contribute to the most deaths and serious injuries for people walking and biking.
- Collaborate on education and traffic-safety awareness efforts with key stakeholders, such as the Los Angeles Vision Zero Alliance, local trauma hospitals, the County of Los Angeles, AARP, and the American Automobile Association.
- Deploy LAPD officers to priority intersections and corridors to provide education and enforcement during high traffic-collision hours.

ADOPT NEW POLICY AND LEGISLATION TO STRENGTHEN SAFETY

- Pursue legislation to enhance speed enforcement.
- Develop a state legislative strategy with the Mayor, the Los Angeles City Council, and the Los Angeles–area state delegation to strengthen laws related to moving violations that contribute to fatal and severe injury collisions.
- Pursue legislation to prevent traffic collisions with people walking in crosswalks and at other controlled intersections.

RESPOND TO RELEVANT DATA

- Include Vision Zero principles in the 2017 LAPD Traffic Plan.
- Update the High-Injury Network with 2014–16 data. Continue to expand data sharing among the Departments of Transportation, Water and Power, City Planning, Los Angeles Police and Fire, and the Bureau of Public Works.
- Work with local trauma hospitals to include Emergency Medical Services data in our database to identify magnitude and locations of underreporting of collisions that result in deaths or serious injury.

We will measure our progress of the success with the following benchmarks:

2017: 20-percent reduction in traffic deaths (compared with 2016).
2020: 50-percent reduction in traffic deaths (compared with 2016).
2025: Elimination of traffic deaths Citywide.

We all pay the price—financially, emotionally, socially—when someone gets hurt on our streets. Rather than live with this consequence, we instead can invest in making our roads safer so that severe injuries do not happen. Redesigning our streets, enforcing traffic laws, and changing behavior is a multimillion dollar endeavor. We will need sufficient funding to meet our ambitious goals. This plan will inform how the City will budget, allocate, and reallocate resources to achieve Vision Zero.

INTRODUCTION

Los Angeles leads its peer cities in traffic deaths per capita.

Los Angeles is facing a public health crisis: traffic deaths. Los Angeles experiences more traffic fatalities per capita than any other peer city in the United States (see table below).[3] In 2016, 260 people lost their lives from traffic violence in Los Angeles.

Data help illuminate who is most affected by traffic deaths. Thirty percent of all people killed or severely injured while walking and biking are youth and older adults. Motor vehicle crashes are the leading cause of death of children between the ages of 5 and 14.[4] We cannot stand by while our loved ones lose their lives. Los Angeles needs Vision Zero.

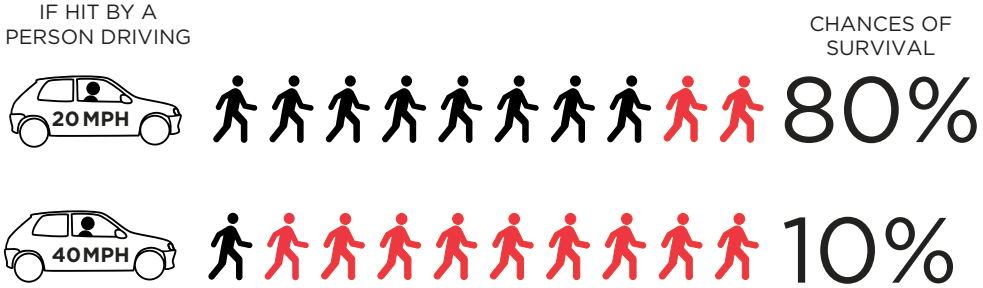
The data show that speed skills. Collisions will happen. Deaths do not have to be the consequence, however. We can stop deaths by focusing on controlling vehicle speeds.

YEAR 2012 DEATHS PER 100,000

City	Number of People
Los Angeles	6.27
Chicago	5.34
Portland	5.31
San Diego	5.23
San Jose	4.27
Seattle	4.26
Boston	3.61
San Francisco	3.51
New York	3.21

SOURCE: U.S. Department of Transportation, *Traffic Safety Facts 2012: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System* (Washington, D.C.: National Highway Traffic Safety Administration, 2012).

VEHICLE SPEED DEATH RISK



[3] U.S. Department of Transportation, *Traffic Safety Facts 2012: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System* (Washington, D.C.: National Highway Traffic Safety Administration, 2012).

[4] Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).

Getting to Zero

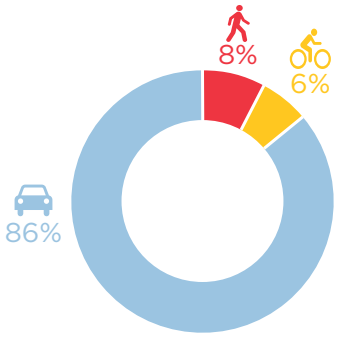
Since Vision Zero launched in 2015, we have learned a lot about traffic collisions on our streets. Bicycle and motorcycle collisions are on the rise, and high-speed arterial streets are hotspots for collisions.[5]

Through analysis of five years of collision data, we identified important trends that informed how we prioritize projects. For example, while people walking and biking are involved in only 14 percent of all traffic collisions, they represent almost 50 percent of traffic fatalities.[6] Simply protecting people from being hit while walking and biking would get us halfway to our goal of zero deaths. To do this, we will focus our early efforts on locations where collisions most often result in deaths and serious injuries for people walking and biking.

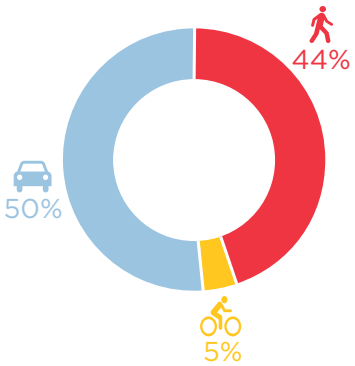
Using this data as a starting point, we conducted an analysis of City of Los Angeles streets to identify locations that account for the majority of traffic deaths for people walking and biking. We found that 65 percent of all severe and fatal collisions involving people walking and biking happen on just 6 percent of City streets.[7] These streets represent the City's initial High-Injury Network. Targeting investments along the High-Injury Network will have the greatest effect toward achieving our first benchmark of reaching a 20-percent reduction in deaths by the end of 2017.

To create projects that reach our Vision Zero goals, we are pursuing ambitious solutions in engineering, education, enforcement, and evaluation—"the 4 Es." Our work is rooted in a commitment to equity and engagement. All Angelenos have a right to safe mobility; Vision Zero ensures this by prioritizing projects that protect our most vulnerable communities.

COLLISIONS BY MODE VERSUS MODE OF PEOPLE KILLED



People Involved in Collisions



People Killed in Collisions

SOURCE: California Highway Patrol, "Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions," years 2009–13 provided by the Statewide Integrated Records Systems (SWITRS), undated, https://www.chp.ca.gov/Programs-Services/Services-Information/SWITRS-Internet-Statewide-Integrated-Traffic-Records-System/SWITRS-2013-Report#2013section1.

[5] Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).
[6] Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).
[7] Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).

There is no one-size-fits all solution to the issue of traffic collisions. However, a study of best practices helped us identify proven solutions to address collision types that often result in death or serious injury. For example, left-turn restrictions may be explored in locations where those turns have caused collisions. A speed-limit reduction may be more appropriate on streets where children walk to school. Warning devices, such as a "Stop Here for Pedestrians" sign and flashing beacons, can be useful to guide drivers at complex intersections. High-visibility bicycle treatments at major intersections on the bicycle network can help clearly delineate street space and provide organization that avoids conflict between people driving and people bicycling.[8] These pairings, called *countermeasures* in the transportation field, inform project development by helping us evaluate what will be most effective at different locations with varying conditions.

COLLISION TRENDS



70 percent of fatal or serious pedestrian and bicycle collisions involved male drivers.



Pedestrian collisions on arterial streets are **seven** times more deadly than collisions on non-arterial streets.



Turning movements at traffic signals account for about **one-fifth** of fatal or severe pedestrian and bicycle collisions.

*Left turns **(12 percent)** account for about twice as many collisions as right turns **(6.2 percent)**.*

SOURCE: Vision Zero Los Angeles, *Los Angeles Vision Zero Technical Analysis: Final Report 2015* (Los Angeles: Los Angeles Department of Transportation, 2015).

[8] Vision Zero Los Angeles, *Collision and Countermeasure Analysis: Literature Review* (Los Angeles: Los Angeles Department of Transportation, March 2016).

Prioritized Intersections and Corridors

Reducing traffic fatalities by 20 percent by 2017 requires implementation of projects that will have the greatest effect toward overall fatality reduction. While the High-Injury Network is only 6 percent of our City streets, that is still more than 450 miles. To determine the locations that warrant immediate attention, we developed a scoring methodology to identify high-priority intersections and corridors along the High-Injury Network. Each intersection was assigned a score, based on the following criteria:

Severity: the total number of fatal or severe collisions at that intersection.

Vulnerability: the presence of a senior or a child walking or biking in a fatal or severe collision at that intersection.

Social Equity: the intersection's location in a community with negative health outcomes, as identified by the *Plan for a Healthy Los Angeles*'s Community Health and Equity Index.[9]

In addition to identifying priority intersections, we identified priority corridors based on clusters of the highest priority intersections. Analysis of these priority corridors found that they account for approximately 20 percent of all severe and fatal injuries for people walking and bicycling. Focusing our initial efforts to eliminate deaths on these corridors will allow us to reach our goal of reducing traffic fatalities by 20 percent by 2017.

The map on page 18 shows these corridors and intersections, which will inform deployment of resources in 2017. But this map is just a starting point. The project development process will include more detailed analysis and outreach before determining a final scope and limits of any engineering project on a priority corridor.

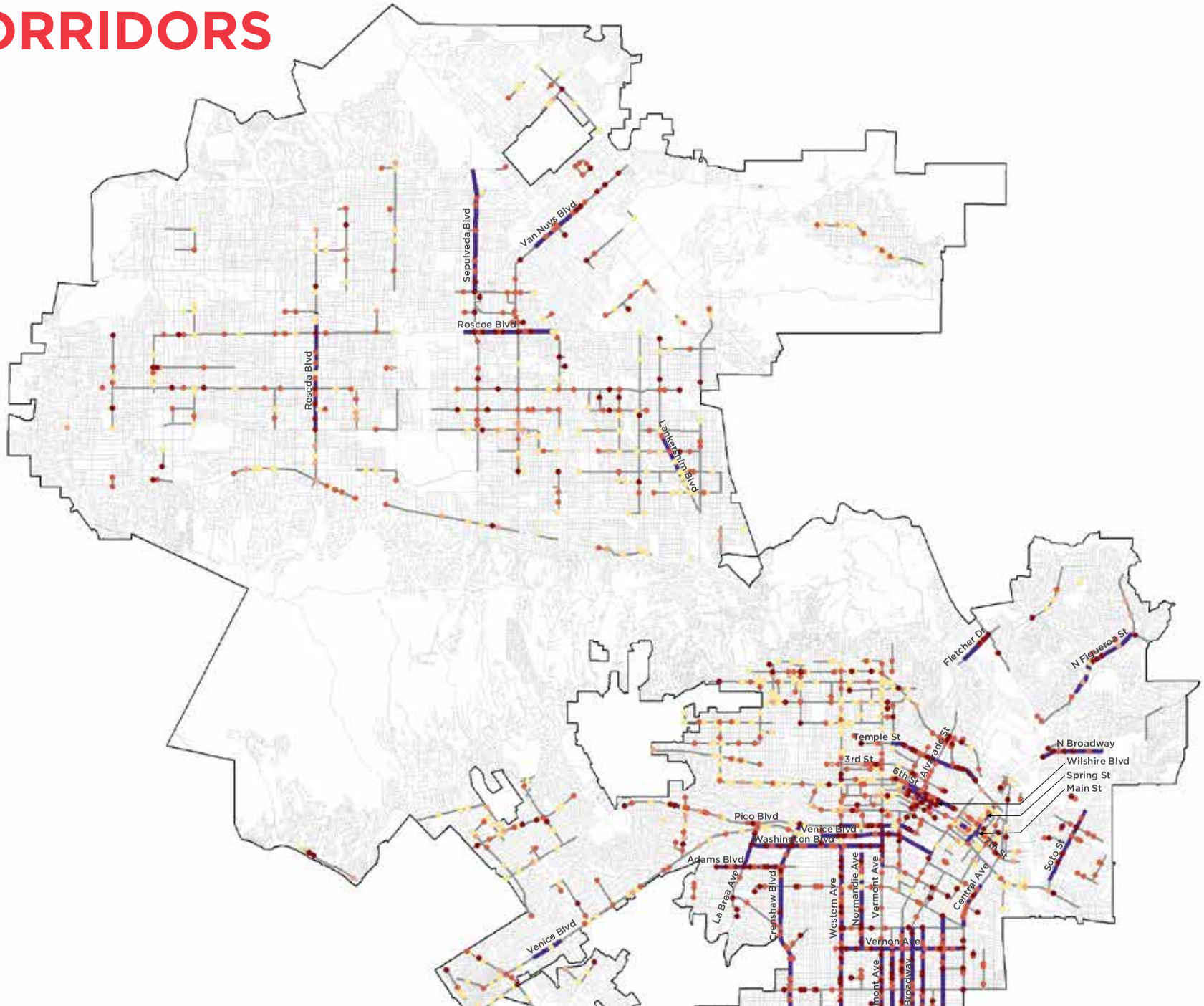
Additional data on the priority intersections and corridors can be found on the City's **GeoHub at visionzero.geohub.lacity.org.**

As the city with the most traffic deaths per capita, funding for solutions must match the severity of the problem. In fiscal year 2017, the City of Los Angeles allocated approximately $3 million to start our Vision Zero work. We have demonstrated an ability to use current resources effectively, but we will need significantly more funding to achieve our goals.

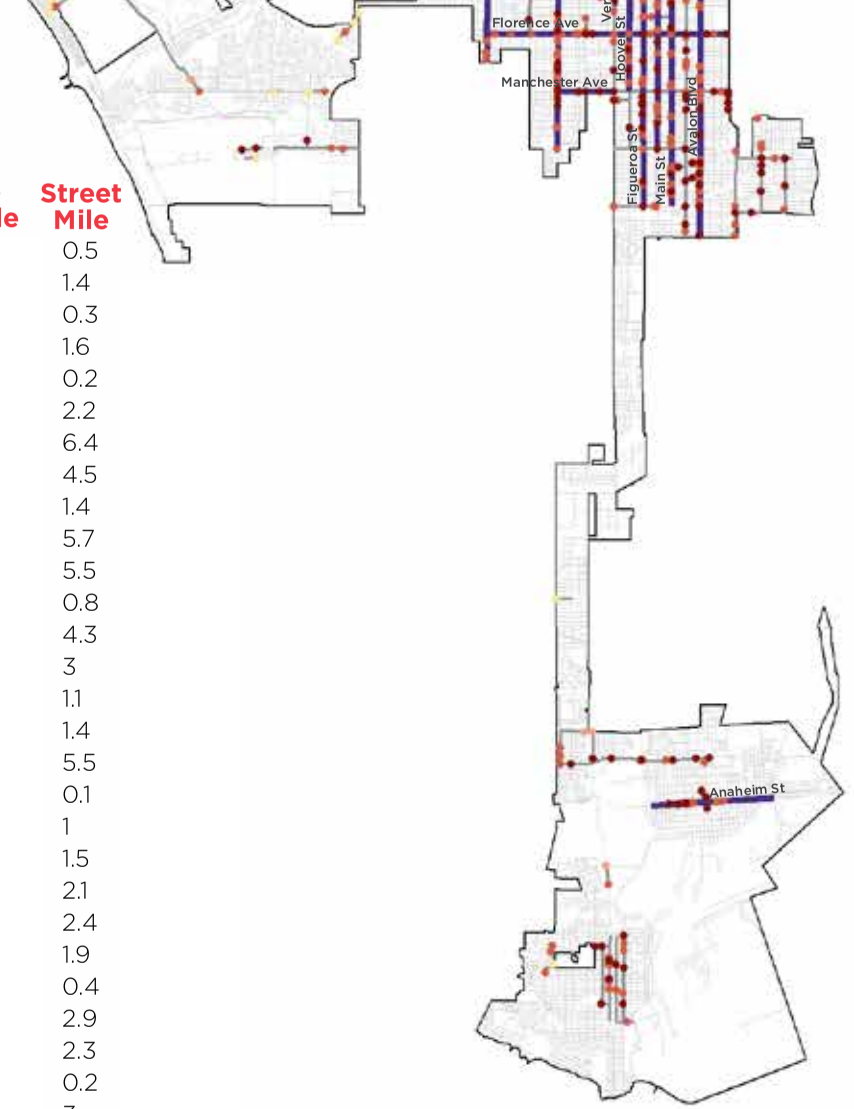
[9] Los Angeles Department of City Planning, *Plan for a Healthy Los Angeles 2015: A Health and Wellness Element of the General Plan* (Los Angeles: Los Angeles Department of City Planning, April 2015).


HERE WAIT
HERE WAIT
HERE WAIT

HIGH INJURY NETWORK
PRIORITY INTERSECTIONS AND CORRIDORS



	Priority Corridor (alphabetical order)	Average Ped/Bike KSI per Mile	Street Mile
1	**3rd Street** | Normandie Avenue to Vermont Avenue	16	0.5
2	**6th Street** | Rampart Blvd to Beaudry Ave	6	1.4
3	**7th Street** | Figueroa Street to Olive Street	2	0.3
4	**Adams Boulevard** | Hauser Boulevard to Crenshaw Boulevard	11	1.6
5	**Alvarado Street** | 6th Street to 7th Street	10	0.2
6	**Anaheim Street** | Figueroa Street to Henry Ford Avenue	5	2.2
7	**Avalon Boulevard** | San Pedro Street to 120th Street	4	6.4
8	**Broadway** | Martin Luther King Jr Boulevard to Century Boulevard	5	4.5
9	**Central Avenue** | Jefferson Boulevard to I-10	2	1.4
10	**Crenshaw Boulevard** | 79th Street to Pico Boulevard	5	5.7
11	**Figueroa Street** | Martin Luther King Jr Boulevard to Imperial Hwy	5	5.5
12	**Fletcher Drive** | I-5 to San Fernando Road	8	0.8
13	**Florence Avenue** | Crenshaw Boulevard to Central Avenue	5	4.3
14	**Hoover Street** | Vernon Avenue to Manchester Avenue	3	3
15	**La Brea Avenue** | Adams Boulevard to Pico Boulevard	9	1.1
16	**Lankershim Blvd** | Chandler Boulevard to Victory Boulevard	5	1.4
17	**Main Street** | Martin Luther King Jr Boulevard to Imperial Hwy	4	5.5
18	**Main Street** | 6th Street to 7th Street	0	0.1
19	**Manchester Avenue** | Western Avenue to Vermont Avenue	10	1
20	**N Broadway** | Mission Road to N Spring Road	5	1.5
21	**N Figueroa Street** | Avenue 43 to York Boulevard	6	2.1
22	**Normandie Avenue** | Vernon Avenue to I-10	5	2.4
23	**Pico Boulevard** | Western Avenue to Union Avenue	8	1.9
24	**Pico Boulevard** | Robertson Boulevard to La Cienega Boulevard	25	0.4
25	**Reseda Boulevard** | Parthenia Street to Victory Boulevard	7	2.9
26	**Roscoe Boulevard** | I-405 to Woodman Ave	6	2.3
27	**Saticoy Street** | Topanga Canyon Boulevard to Jordan Street	25	0.2
28	**Sepulveda Boulevard** | Nordhoff Street to Rinaldi Street	3	3
29	**Soto Street** | Wabash Avenue to 8th Street	4	1.9
30	**Spring Street** | Temple Street to 9th Street	5	1.2
31	**Temple Street** | Beverly Boulevard to Beaudry Avenue	8	2.3
32	**Van Nuys Boulevard** | Beachy Avenue to San Fernando Road	5	1.5
33	**Venice Boulevard** | Beethoven Street to Inglewood Boulevard	1	0.8
34	**Venice Boulevard** | Arlington Avenue to Figueroa Street	4	2.8
35	**Vermont Avenue** | Pico Boulevard to Adams Boulevard	7	1
36	**Vermont Avenue** | Gage Avenue to Vernon Avenue	6	1.6
37	**Vernon Avenue** | Western Avenue to Central Avenue	6	3
38	**Washington Boulevard** | La Brea Avenue to Vermont Avenue	6	3.2
39	**Western Avenue** | Century Boulevard to Washington Boulevard	8	6.5
40	**Wilshire Boulevard** | Rampart Boulevard to Valencia Street	8	0.9



Intersection Score

- 1.0
- 1.1 - 1.5
- 1.6 - 2.5
- > 2.5

Priority Corridor

High Injury Network

Intersection score = (# of fatalities * 1.5) + (# of severe injuries) + (child or senior either killed or severely injured walking and biking) + (in a community affected by negative health outcomes)

Projects That Work

We know what kind of projects will reduce traffic deaths. Our Vision Zero literature review has a detailed analysis of countermeasures that have been proven to save lives. For example, leading pedestrian intervals, which give a person walking a head start when crossing the street before vehicles enter the intersection, can reduce pedestrian collisions by up to 60 percent.[10] Cycle tracks, which separate people riding bikes from vehicles using a physical barrier like landscaping, are associated with a 95-percent reduction in risk of injury for people riding bikes compared with streets without biking infrastructure. Vision Zero will implement such proven countermeasures on our priority corridors to meet our benchmarks for 2017. We are committing to installing 180 high-visibility crosswalks near fifty schools on the High-Injury Network, building twenty-five concrete pedestrian islands, and completing twelve miles of street-design plans on the priority corridors by the end of 2017.



[10] Vision Zero Los Angeles, *Collision and Countermeasure Analysis: Literature Review* (Los Angeles: Los Angeles Department of Transportation, March 2016), 33.

Vision Zero in Action

This plan also complements the City's ongoing traffic-safety efforts. All City departments are constantly coordinating to deliver projects that improve traffic safety. For example, between 2013 and 2016, six of the High-Injury Network priority intersections underwent safety improvements and have demonstrated early successes in eliminating traffic deaths and serious injuries. Additionally, the City has secured funding for projects at an additional nine intersections on the High-Injury Network. The table below presents some examples of a larger body of projects that have been completed to improve traffic safety. Check the website as the City continues to provide project updates.

HIGH-INJURY NETWORK INTERSECTIONS: PROJECT EXAMPLES

STREET 1	STREET 2	PROJECT	CRASH-REDUCTION FACTOR
PROJECTS COMPLETED			
46th St.	Vermont Ave.	Full signal installed in 2013	25% reduction in pedestrian collisions
Beaudry Ave.	Temple St.	No left-turn sign installed in 2015	34% reduction in pedestrian collisions
Bonnie Brae St.	Olympic Blvd.	Full signal installed in 2013	25% reduction in pedestrian collisions
Century Blvd.	San Pedro St.	Lane reconfiguration completed in 2013	29% reduction in all collisions
Hollywood Blvd.	Highland Ave.	Pedestrian scramble	35% reduction in pedestrian collisions
Monroe St.	Virgil Ave.	Lane reconfiguration completed in 2014	29% reduction in all collisions
PROJECTS IN PROGRESS			
89th St.	Avalon Blvd.	Project planning in progress	
Alvarado St.	6th St.	Pedestrian scramble	35% reduction in pedestrian collisions
Alvarado St.	7th St.	Pedestrian scramble	35% reduction in pedestrian collisions
Avenue 41	Eagle Rock Blvd.	Rectangular rapid flashing beacon	50–80% increase in yield to pedestrians
Avenue 51	Figueroa St.	Full signal	25% reduction in pedestrian collisions
Bedford St.	Pico Blvd.	Full signal	25% reduction in pedestrian collisions
Manchester Ave.	Vermont Ave.	Protected-only left turn signal	99% reduction in left turn collisions
Patton St.	Temple St.	Rectangular rapid flashing beacon	50–80% increase in yield to pedestrians
Pico Blvd.	Wooster St.	Full signal	25% reduction in pedestrian collisions

Several early street-improvement projects have shown promising results for future Vision Zero interventions throughout Los Angeles. These successes will be the norm.

Since the installation of the scramble in November 2015, there have been zero deaths and serious injuries because of a collision.



HOLLYWOOD AND HIGHLAND SCRAMBLE

The recent safety improvement at Hollywood Boulevard and Highland Avenue is one example of an early win for Vision Zero. Prior to the intervention, Hollywood and Highland was averaging ten injury collisions per year. In November 2015, a scramble crosswalk was installed at the intersection. The scramble allows people to walk through the intersection in all directions while vehicles idle. When the signal changes, vehicles can make their movements without waiting for people to cross the street. Six months after installation, there were zero deaths or serious injury collisions. **In a broader study, scramble crosswalks have been shown to lead to a 35-percent reduction in vehicular collisions with people walking.**[11]

[11] Vision Zero Los Angeles, *Collision and Countermeasure Analysis: Literature Review* (Los Angeles: Los Angeles Department of Transportation, March 2016).



These treatments have resulted in up to a 60-percent reduction in vehicle collisions with people walking.

LEADING PEDESTRIAN INTERVALS

Leading Pedestrian Intervals give people walking a head start to cross the street before the light turns green for vehicles. This makes people more visible to drivers and reduces the chance of pedestrian-vehicle conflicts. As of 2016, twenty-two intersections throughout Los Angeles have been outfitted with Leading Pedestrian Interval signals. These treatments have resulted in up to a 60-percent reduction in vehicle collisions with people walking.[12]

[12] Vision Zero Los Angeles, *Collision and Countermeasure Analysis: Literature Review* (Los Angeles: Los Angeles Department of Transportation, March 2016).



PEDESTRIAN SAFETY PROJECT ON YALE STREET

Today, Yale Street provides safer access for people walking to nearby schools and the Gold Line Light Rail Station.

Yale Street in Chinatown received a makeover from the Bureau of Street Services as a part of the Safe Routes to School Strategic Plan. Street improvements included a raised landscape median, curb extensions, yellow continental crosswalks, Americans with Disabilities Act–compliant access ramps, roadway striping, and new signs. **Raised medians have been credited with up to a 46-percent reduction in vehicle collisions with pedestrians.** Curb extensions are proven to increase perceptions of safety and comfort for people crossing the street.[13] Today, Yale Street provides safer access for people walking to nearby schools and the Gold Line Light Rail Station.

[13] Vision Zero Los Angeles, *Collision and Countermeasure Analysis: Literature Review* (Los Angeles: Los Angeles Department of Transportation, March 2016).



VIRGIL AVENUE SAFETY PROJECT

In the two years since the project was installed, there have been zero fatal or serious injuries involving a person walking or biking.

The intersection of Virgil Avenue at Monroe Avenue was identified as a priority intersection because of a high number of collisions resulting in deaths and serious injuries. In 2014, the traffic lanes along the Virgil Avenue corridor, including the intersection at Monroe Avenue, were reconfigured to create a safe space for all modes of travel. In the two years since the project was installed, there have been zero fatal or serious injuries involving a person walking or biking. **Corridor-level safety projects, which typically involve a lane reconfigurations that better organize vehicular movements, can produce up to a 41-percent reduction in pedestrian collisions on problem corridors.**[14]

[14] Vision Zero Los Angeles, *Collision and Countermeasure Analysis: Literature Review* (Los Angeles: Los Angeles Department of Transportation, March 2016).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EQUITY AND ENGAGEMENT TOWARD VISION ZERO

All Angelenos deserve safe streets. Traffic deaths affect our communities more than traditional measures of crime, such as gang-related activity. In 2013, there were 201 traffic deaths in Los Angeles, compared with 149 gang-related homicides.[15] Nearly half of the streets on the High-Injury Network are neighborhoods with a greater percentage of children, seniors, people of color, immigrants, people with disabilities, or low-income households. A disproportionate percentage of serious and fatal collisions take place in Central and South Los Angeles, where people are more likely to walk, bike, or take transit as their primary mode of transportation.[16] The City's commitment to equity and engagement prioritizes communities that depend on a variety of travel modes.

[15] California Highway Patrol, "Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions," years 2009–13 provided by the Statewide Integrated Records Systems (SWITRS), undated, https://www.chp.ca.gov/Programs-Services/Services-Information/SWITRS-Internet-Statewide-Integrated-Traffic-Records-System/SWITRS-2013-Report#2013section1.

[16] Los Angeles Department of City Planning, *Plan for a Healthy Los Angeles 2015: A Health and Wellness Element of the General Plan* (Los Angeles: Los Angeles Department of City Planning, April 2015).

The first step to addressing equity and engagement through Vision Zero is to build a deeper understanding of how social inequalities affect the health and safety of Angelenos. For example, race may affect the safety of people of color as they walk from place to place. In one study, blacks trying to cross the street had to wait 32-percent longer than whites because cars did not stop to allow them to cross safely.[17] Although health equity and social equity are directly related, they have different implications for safety on our streets. We must continue to better define and understand issues of social and health equity to support traffic safety in all our communities.

We can grow our understanding of these complex issues by building relationships with communities where health disparities are concentrated alongside social inequities such as poverty, unemployment, and crime. We will engage community members from the beginning of the project planning process and work to build trust. City staff will work side by side with community members to develop plans and identify grant opportunities that accomplish Vision Zero priorities. The City has already secured $500,000 from the State of California's Office of Traffic Safety for Community-Based Outreach and Education to implement the Vision Zero education campaign. The majority of these dollars will directly fund community-based organizations to help engage and educate on the topic of traffic safety along the priority corridors.

[17] Tara Goddard, Kimberly Barsamian Kahn, and Arlie Adkins, "Racial Bias in Driver Yielding Behavior at Crosswalks" (Portland, Oregon: Transportation Research and Education Center, 2014).



EQUITY

As part of our commitment to achieve equity in Vision Zero implementation, the City of Los Angeles commissioned the Prevention Institute to conduct an initial health-equity analysis that informed the development of this plan. The Prevention Institute is a national leader on the topic of health equity, which they define as "the commitment to ensuring that every person has an equal opportunity to be healthy and safe."

Their analysis evaluated our research methodology and planning efforts, and their findings led to recommendations to strengthen our work. The complete health equity analysis can be accessed at **visionzero.lacity.org/healthequity.zip**.

Recommendations from the analysis informed our approach to equity through Vision Zero. While these recommendations focused on health equity, we must also invest in strategies that promote social equity to avoid outcomes that negatively affect people of color. We have much more to learn and study on this topic. As a starting point, we commit to pursuing the following through the implementation of this Action Plan:

- Review best practices for data collection on information such as race, ethnicity, and income.
- Continue to connect additional data sources to link key environmental variables to traffic collisions.
- Include community partners in the evaluation of safety countermeasures and consider the context of individual communities throughout the City. Look at potential unintended consequences that could exacerbate inequities in communities of color and low-income communities during project evaluations.
- Continue to grow Vision Zero as a multicity department initiative that extends beyond a transportation-engineering effort.
- Adhere to the LAPD's commitment to unbiased policing in the implementation of Vision Zero–enforcement efforts.

ENGAGEMENT

Traffic safety affects all Angelenos, and everyone must be a part of the solution. Our mission is to serve the public and work side by side to solve problems by identifying issues, opportunities, and meaningful solutions. A fundamental value of Vision Zero is to maintain two-way communication at all stages: planning, design, implementation, and evaluation.

The City's engagement efforts will be tailored to suit the context of the neighborhood of each project area. However, all City-led Vision Zero street-design projects will adhere to a set of guidelines for community engagement that are currently in development. The City commits to working closely with the community to identify and ensure that community concerns are addressed in the research and planning process of a new Vision Zero project.

The City's evolving community-based outreach and education was informed by the development of the City's first Vision Zero Education and Outreach Strategy in April 2016.[18] Deploying this strategy will provide significant opportunities to tailor education activities in a culturally and context-sensitive manner. In 2017, the City will contract with local community organizations to conduct the first phase of outreach and education along ten miles of the Vision Zero priority corridors. This work will involve coordinating a street team for two-hundred hours of door-to-door engagement with at least five thousand people, developing a weeklong creative intervention along the street to bring awareness of the problems and reaching at least one million people through social and traditional media. This project will include a pre- and post-evaluation process to help measure success and impact.

While the start of this campaign will be funded by the State of California's Office of Traffic Safety, the City will need to identify a sustainable mechanism to support Vision Zero outreach and engagement efforts. Current and future strategies may include the following:

- Conduct robust, culturally competent, and linguistically appropriate outreach, engaging with community-based organizations to gain insight, learn strategies, and increase access to residents.
- Incorporate community engagement into future prioritization of specific Vision Zero project corridors.

[18] Julia Gould and Rachel Keyser, *Vision Zero: Education and Outreach Strategy* (Los Angeles: Los Angeles Department of Transportation, April 2016).

All Angelenos are invited to join in the dialogue on traffic safety as part of our Citywide education campaign and are encouraged to take action by making safe behavior a part of their everyday routine.

- Develop and scope Vision Zero projects through community-based participatory planning and design.
- Ensure funding is dedicated for community-based organizations participating in, supporting, or facilitating community engagement.
- Develop agreed-on individual project goals, potential benefits, safety improvements, mobility issues, and other considerations.
- Establish a project-notification list and centralized project clearinghouse to inform the public of project updates.
- Conduct open houses about the project, including breakout sessions where appropriate.
- Distribute a project information fact sheet to properties along any affected block face.

As we continue to refine our engagement strategy, we will draw on the City's recent successes in engaging with community members on project development. Below are three case studies that exemplify these efforts.





CASE STUDY 1: ACTIVE STREETS L.A.

Active Streets LA is a partnership between the City of Los Angeles, the Los Angeles County Bicycle Coalition, and T.R.U.S.T. South L.A. The program is developing a process that uses robust community input and engagement to shape the technical side of conceptual design for low-stress, neighborhood network street improvements for people walking and bicycling. This partnership-based model leverages the legitimacy, relationships, and community ties that localized community-based organizations bring to the table, in turn enhancing the conceptual design process and improving our responsiveness to complex community needs and experiences.



CASE STUDY 2: GREAT STREETS

In 2015, the Mayor's Great Streets Challenge Grant provided $200,000 to community groups for innovative, creative, and authentic community engagement around ideas for street improvements. Grant resources were used for demonstrating potential improvements to street corridors during community street festivals. Artists, small businesses, and local residents hosted engaging activities to draw their neighbors to the street, and then used the audience to educate attendees on the benefits of street transformations and collect surveys on preferences for improvements.



CASE STUDY 3: SAFE ROUTES TO SCHOOL GRANT APPLICATIONS

The City of Los Angeles Department of Transportation (LADOT) submitted four successful applications to the State of California's first cycle of Active Transportation Program (ATP) grants in 2014. These proposals were awarded $18.5 million in funds for Safe Routes to School infrastructure improvements around nine schools. The project development process was an unprecedented, interdisciplinary collaboration between LADOT staff; Department of Public Works, City Planning; school administrators, teachers, and parents; community members; City Council offices; Los Angeles Unified School District; and Los Angeles School Police Department.

We will also build on the recent planning efforts for the City's Mobility Plan 2035, the Plan for a Healthy Los Angeles, and Metro's plans such as its Connect US and First/Last Mile Strategic Plans. These efforts formed valuable relationships and gathered a wealth of community knowledge that will point us in the right direction. In addition, the City will continue to strengthen and form community partnerships to develop and deliver meaningful and accessible opportunities for community engagement.


Moore
Paints
PARK IN REAR



IMPLEMENTATION

The City of Los Angeles commits to working with our growing list of community organizations. Leadership and staff from Los Angeles County, our trauma hospitals, and key stakeholder groups, such as the growing Vision Zero Alliance, will be critical in achieving our Vision Zero goals.

Engineering

Streets should be designed to prevent fatal collisions to the greatest extent possible. Engineering improvements such as marked crosswalks, protected bike lanes, or enhanced signalization will improve safety for all road users.

Education

A key component to keeping our streets safe is to learn how to practice safe roadway behavior. New, widespread education efforts involving community partners will help to ensure everyone becomes a part of the culture of safety.

Enforcement

Achieving zero traffic deaths in Los Angeles would be impossible without holding everyone accountable to the laws that keep us safe. However, concern about equitable enforcement of the law is an ongoing national discussion. The City recognizes that an enforcement effort grounded in data will encourage equitable outcomes. Enforcement of Vision Zero will focus on the top driving behaviors shown to cause deaths and serious injury collisions.

Evaluation

Clear data about traffic safety problems and the efficacy of solutions are necessary to track, measure, and achieve our goals. Improving and expanding methods for data collection, analysis, and sharing will help the City to target improvements where they are needed most and deliver cost-effective results.

GOALS

Focusing our efforts on priority intersections and corridors will help us get to zero. The action items set forth in this plan are organized around four desired outcomes outlined below.

Create Safe Streets for All

People will make mistakes on our streets and sidewalks, but those mistakes should not be fatal. Smarter roadway designs reduce the likelihood of severe traffic collisions by improving visibility, separating traffic flows, and managing safe speeds. Evidence-based engineering projects will improve safety infrastructure to create secure, livable streets for all road users, especially the City's most vulnerable. Project planning will be a partnership among the City, its community partners, and, most importantly, the people living and working in each affected community.

Develop a Culture of Safety

Engineering and enforcement are crucial strategies must be employed to uphold the rules of the road that keep us safe. Detailed collision data will focus law enforcement and engineering strategies that change the behaviors that cause the deadliest collisions.

Whether walking, bicycling, or driving a vehicle, safety is everyone's responsibility. Educating about safe transportation behavior will help keep everyone safe on our streets. Partnerships with stakeholders such as community-based organizations, community leaders, and youth will help us spread the word that everyone needs to do their part to achieve Vision Zero.

Adopt New Policy and Legislation to Strengthen Safety

An updated legal framework will strengthen the foundation for reducing traffic fatalities. Vision Zero for Los Angeles will pursue local, state, and federal legislation that strengthens traffic safety policy and gives Los Angeles greater control of street safety.

Respond to Relevant Data

Understanding where and why fatal and severe collisions happen is crucial to Vision Zero. Determining priority streets and corridors allows the City to focus its efforts on reducing injuries and fatalities. Collecting and analyzing all relevant information, beyond the collision data, will improve the City's responsiveness in making changes in communities where they are needed most. Data transparency is also a great way to hold Vision Zero accountable to its commitment to equity and engagement. As the LAPD migrates its traffic-collision reporting to a digital system, the City will explore how to best make this information available to interested parties. The City remains committed to maintaining clear communication about its progress as it works toward zero fatalities.

ACTIONS AND STRATEGIES

BENCHMARKS	2017	2020	2025	Partners
Create Safe Streets for All				
Pavement preservation	• Digitize annual Street Services work plans to allow for better coordination with the Department of Transportation.	• Inspect and repair 100 crosswalks on the High-Injury Network.	• Inspect and repair 200 crosswalks on the High-Injury Network.	BSS, *LADOT*
Speed surveys	• Complete 100% of the expired surveys along the priority corridors, 75% of the High-Injury Network and 50% Citywide.	• Complete 100% of the expired surveys Citywide.	• Continue to keep all surveys active; evaluate need for new surveys.	LADOT, *LAPD*
Temporary street closures	• Provide annual Department of Water and Power work plan to allow for better coordination with other City departments; evaluate temporary sidewalk closure procedures.	• Update the Work Area Traffic Control Handbook (WATCH) to strengthen requirements for pedestrian and bicycle detours; update training modules to incorporate changes.	• Work to update state traffic control device standards to include more innovative safety treatments.	LADWP, LADOT
Bicycle network	• Identify bike network gaps during initial project development.	• Develop a system for pavement inspection/repair of bikeway facilities.	• Repair all bikeway facilities on the High-Injury Network.	LADOT, *BSS*
Traffic signs	• Maintain and upgrade speed limit signage.	• Upgrade the existing sign maintenance program.	• Create geocoded database of all department assests.	LADOT
Safe Routes to School (SRTS)	• Install 180 high-visibility crosswalks near 50 schools on the High-Injury Network.	• Complete 50 Safe Routes to School safety plans.	• Implement 50 Safe Routes to School safety plans.	LADOT
Speed mitigation around schools	• Install 11 school safety zones (15 miles per hour zone within 500 feet of school).	• Install 50 school safety zones.	• Install 100 school safety zones.	LADOT, *LAPD*
Capital safety improvements	• Build 25 concrete pedestrian islands.	• Prioritize 50 location candidates for capital projects.	• Prioritize 100 location candidates for capital projects.	BOE, *LADOT*
Street lighting	• Identify areas for lighting improvements (i.e., bus stops, mid-block crossings, and underpasses).	• Make lighting improvements on 50 percent of the High-Injury Network.	• Complete all lighting improvements on the High-Injury Network.	BSL, *LADOT*
Street design	• Complete 12 miles of street design plans.	• Complete 48 miles of street design plans.	• Complete 120 miles of street design plans.	LADOT
City design standards	• Update City design standards using Vision Zero principles.	• Update curb ramp standards.	• Identify and complete updates to additional design standards.	LADOT, BOE
Signal timing	• Optimize 400 traffic signals for all road users; pilot signal timing strategy.	• Optimize 1,600 traffic signals for all road users.	• Optimize all traffic signals for all road users.	LADOT

NOTE: Support agency in italics

ACTIONS AND STRATEGIES

BENCHMARKS	2017	2020	2025	Partners
Adopt New Policy and Legislation to Strengthen Safety				
Legislation to discourage speeding	• Consider legislation on automated speed enforcement.	• Develop speed-specific report to help legislative strategy and public buy-in.	• Explore red-light running mitigation strategies.	Mayor, *LADOT, LAPD*
Collision reporting	• Work with the State of California to improve the collision reports for more data on crashes (Form 555).	• Provide training for police officers on updated Form 555.	• Assess additional collision data needs and make appropriate changes to form.	Mayor, *LADOT, LAPD*
Traffic law compliance	• Develop a state legislative strategy that addresses violations that contribute to fatal and severe injury collisions.	• Incorporate Vision Zero education into DMV new driver material.	• Ensure that an environment that includes autonomous vehicles will prioritize safety for people walking and biking.	Mayor, *LADOT, LAPD*
Sustainable funding strategy	• Pursue Vision Zero mitigation fund for new developments along the High-Injury Network.	• Continue to incorporate Vision Zero principles in annual transportation budget.	• Identify and establish additional funding streams.	LADOT
Respond to Relevant Data				
Collision database	• Work with LAPD on a more streamlined hand-off of collision data; incorporate 2014–16 collision data to update the High-Injury Network.	• Continue to update the High-Injury Network annually.	• Expand collision data reporting to include weekly collision updates.	LADOT, LAPD, *LACDPH*
Using data	• Publish the top five traffic violations on the GeoHub. • Identify areas for education by LAPD's Community Relations Office and Community Traffic Services unit.	• Continue to add additional data overlays (e.g., race, ethnicity, income, alcohol outlet density, adjacent land use, crime hotspots)	• Expand use of GeoHub in Vision Zero project planning.	LADOT, *Mayor*
Consideration for data-driven enforcement strategy	• Emphasize traffic enforcement on major moving violations, especially those affecting youth and older adult victims; deploy enforcement and education units to high-risk intersections.	• Prioritize enforcement along High-Injury Network on the top collision factors that result in deaths and serious injury collisions.	• Reassess and prioritize enforcement along High-Injury Network on the top collision factors that result in deaths and serious injury collisions.	LAPD, LADOT *NOTE: Support agency in italics*

ACRONYMS

BOE: Bureau of Engineering
BSL: Bureau of Street Lighting
BSS: Bureau of STreet Services
DMV: California Department of Motor Vehicles
LACDPH: Los Angeles County Department of Public Health
LADOT: Los Angeles Department of Transportation
LADWP: Los Angeles Department of Water and Power
LAPD: Los Angeles Police Department

BENCHMARKS	2017	2020	2025	Partners
Develop a Culture of Safety				
Vision Zero Los Angeles education campaign	• Build a $2 million education campaign to bring awareness and create behavior change around collision factors such as speeding and impaired driving.	• Evaluate and continue education campaign.	• Create a national platform for Vision Zero.	LADOT, *Alliance, LACDPH*
Community partnerships	• Complete a $500,000 outreach campaign along Vision Zero priority corridors; continue to conduct meetings with the bicycle community and assist in the City's bicycle plan efforts.	• Develop policies, processes, and funding opportunities to support the participation of community leaders and community-based organizations in the development and implementation of Vision Zero.	• Incorporate Vision Zero messaging into outreach efforts for both City- and neighborhood-led projects.	LADOT, *Alliance, LACDPH*
Maximum media saturation for Vision Zero	• Leverage existing resources and community leaders (e.g., government leaders, City-owned assets, school-based materials, events).	• Secure public-private partnerships (e.g., public spokespersons, gas stations, repair shops, auto sales).	• Partner with a top business for a Vision Zero commercial for a major national TV event.	LADOT, *LACDPH*
Partnering with government organizations	• Continue school bicycle and pedestrian safety education programs that reinforce the rules of the road and teaches participants how to be more visible when walking, and bicycling.	• Work with driver's education providers to expand learning to "mobility education."	• Work with state legislators to incorporate mobility education, and specifically clarification about "jaywalking," into DMV license exams.	LADOT, *Mayor*
Partnering with insurance organizations	• Produce and distribute a "Road Map for Safety" that educates road users about safe ways to behave around key road features; promote use of existing driving behavior data technology.	• Partner on school-based parent/youth safety education.	• Incentivize parents to complete the safer driving training.	LADOT, *LACDPH*
Education on impaired driving	• Develop school curriculum about the dangers of distracted driving, driving under the influence, and how to stay safe walking/biking on campus.	• Deter impaired driving by targeting education and outreach at alcohol-serving establishments.	• Secure partnerships to incentivize people from driving impaired.	LADOT, *LACDPH*
Community building	• Identify and use cultural competency training for City staff with the support of community leaders; use cadets to disseminate traffic safety flyers on the High-Injury Network and COMPSTAT-identified areas.	• Develop and implement trust-building opportunities among law enforcement and low-income communities and communities of color, especially prior to deploying any additional traffic enforcement in the areas.	• Develop a "safe intersections" campaign.	LADOT, LAPD, *Alliance*
Partnering with technology	• Continue to build relationships with companies such as Waze and Google.	• Establish a Vision Zero technology fellowship.	• Work to prepare a safe road system for autonomous vehicles.	Mayor, *LADOT*
Partnering with trauma centers	• Work to identify survivors willing to share their stories.	• Create localized safety campaigns that share the personal stories of collision victims in each neighborhood.	• Collaborate on a way to help capture data on unreported collisions.	LACDPH, *LADOT*

NOTE: Support agency in italics


Prairie
Cal State Univ
Northridge
25 MISSIONS
ONE FINAL
LANDING
NO STOPPING
ANY TIME
ELECTRIC
VEHICLE
CHARGING
STATION
INFORMATION
KIOSK
M
744



RELATED PLANS AND STUDIES

Vision Zero is first and foremost a data-driven effort. To begin developing this plan, we conducted extensive data collection and analysis to better understand issues of traffic safety in Los Angeles. Vision Zero is also one of several complementary efforts focused on improving road safety, mobility, health, and livability in Los Angeles. Related plans and efforts that provided background to the Vision Zero Action Plan are highlighted below. A full text version of each document is available on our website **visionzero.lacity.org**

VISION ZERO LAUNCH DOCUMENT

The Vision Zero launch document is an introductory document to the Vision Zero Initiative for Los Angeles. It provides a snapshot of important information on data, the planning process, and organizational structure.

Behaviors most associated with severe and fatal collisions in Los Angeles are speeding, insobriety, and failure to yield.

VISION ZERO SAFETY STUDY AND TECHNICAL ANALYSIS

We conducted a Safety Study in March 2016 to summarize what we learned from the analysis of our collision landscape. The study analyzed the most recent and available data of reported collisions (2009–13; as validated by the State of California) to identify trends in terms of where, how, why, when, and to whom collisions are happening.

Who: Pedestrians, Bicyclists, and Motorcyclists

Fatal and severe collisions in Los Angeles disproportionately affect people who walk and ride bikes, as they are physically more exposed than people in vehicles. While people walking and bicycling are involved in 14 percent of all collisions in the City, they account for almost 50 percent of traffic deaths. Motorcycle riders are also at greater risk; they are present in only 3 percent of collisions but account for 15 percent of all traffic deaths.

Who: Drivers

The majority of drivers in severe and fatal collisions involving vulnerable road users are men. However, hit-and-runs account for more than one out of five severe and fatal collisions involving pedestrians or bicyclists. Hit-and-runs make it difficult to accurately track data about drivers involved in collisions.

Where

Many fatal and serious collisions take place along major arteries and at the intersections of large two-way streets where drivers, pedestrians, and cyclists compete for space.

How

Behaviors most associated with severe and fatal collisions in Los Angeles are speeding, insobriety, and failure to yield.

Why

Collisions occur on our streets for many reasons. Our collision analysis informed us where and why collisions occur. Through this analysis, we developed "collision profiles," a group of collisions with similar contributing factors, that helped us identify physical design interventions (countermeasures) that would be most effective at addressing the collisions. For example, a solution for frequent left-turn conflicts at crossing signals might be a Leading Pedestrian Interval.

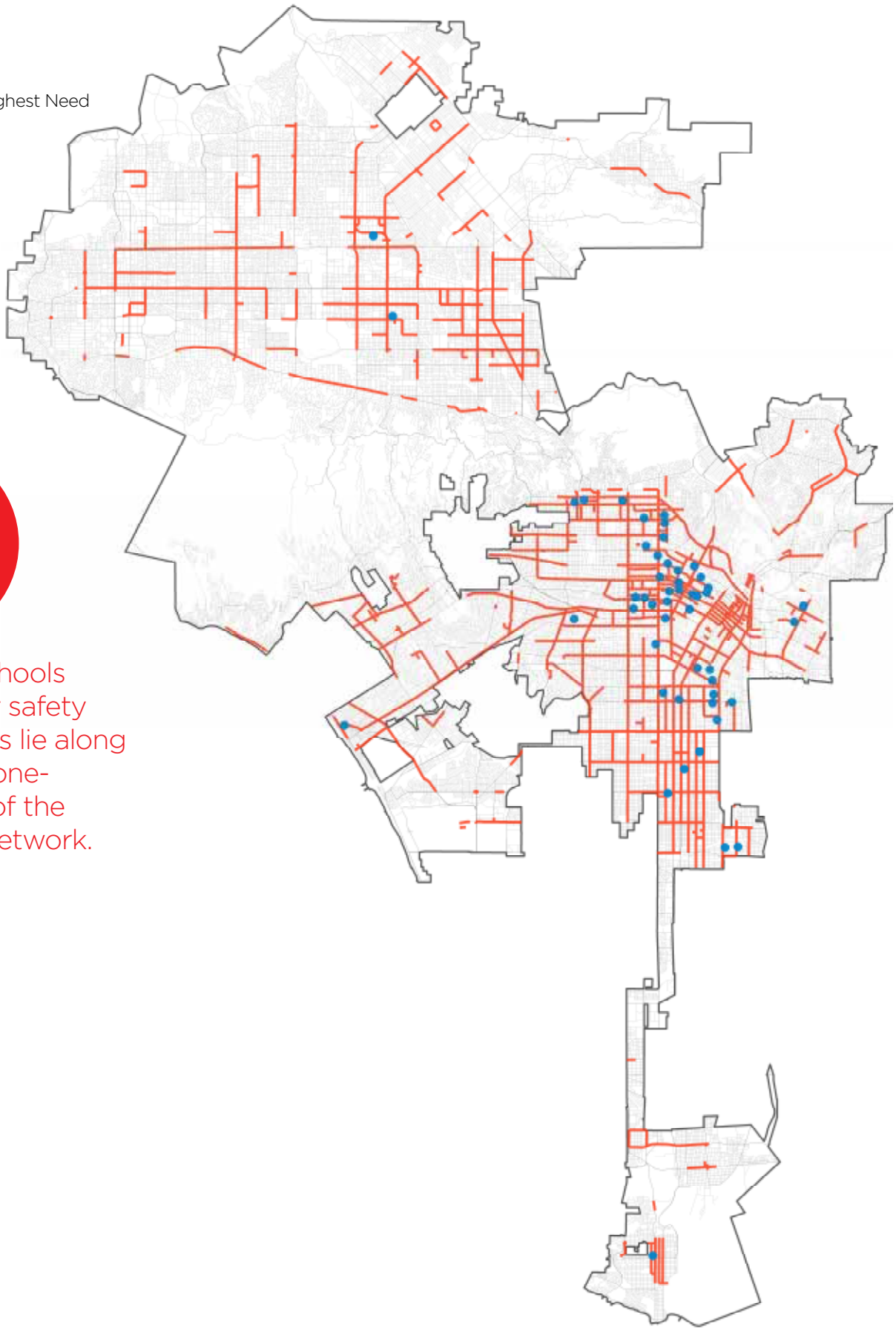
When

In Los Angeles, the highest number of all collisions take place between 3:00 p.m. and 6:00 p.m. However, serious and fatal collisions are highest between 6:00 p.m. and 9:00 p.m.

COLLISION AND COUNTERMEASURE ANALYSIS: LITERATURE REVIEW

This literature review was conducted to identify best practices in the analysis and implementation of Vision Zero–related efforts. The report investigates the collision-reduction efforts of four peer cities to uncover techniques and strategies proven to be effective for Vision Zero projects.





100%

of the fifty schools prioritized for safety improvements lie along or fall within one-quarter mile of the High-Injury Network.

The Safe Routes to School Action Plan details key actions that will be taken at each of the Top 50 school locations where there is the greatest need.

SAFE ROUTES TO SCHOOL ACTION PLAN

Safe Routes to School is a key initiative in implementing Vision Zero. The plan applies a data-driven prioritization methodology to identify the Top 50 Schools with the greatest need for traffic safety improvements in Los Angeles. All of the Top 50 schools are within one-quarter mile of the High-Injury Network.

The Safe Routes to School Action Plan details key actions that will be taken at each of the Top 50 school locations, while also looking to scale City- and district-wide by 2025. Below is a summary of key strategies and actions from the Safe Routes to School Action Plan.

Key Strategies and Actions

CREATE SAFE STREETS FOR ALL

- Conduct safety assessments and prepare Safe Routes to School Plans for each of the Top 50 schools and ultimately for every Los Angeles Unified School District school.
- Install near-term safety improvements, such as crosswalk upgrades, wherever feasible.

DEVELOP A CULTURE OF SAFETY

- Develop two targeted campaigns specific to school populations to build awareness.
- Support the Walk to School Day Program and promote "Keep Walking!" activity guides.

ADOPT NEW POLICY AND LEGISLATION TO ADDRESS SAFETY

- Formalize data-exchange agreement between the City of Los Angeles and Los Angeles Unified School District.
- Install Safety Zones at all elementary and middle schools.

RESPOND TO RELEVANT DATA

- Complete a youth data analysis memorandum.
- Scope an approach to Citywide Travel Tally data collection.


HOSTEL

Vision Zero and You

Everyone has a role to play in traffic safety. From the choices you make while moving through Los Angeles to the conversations you have with a neighbor, we must all do our part to save lives. Organizations and individuals have actively worked toward creating safe streets and healthy communities in Los Angeles. Many more groups and residents are getting involved in this work every day to make Los Angeles a safer place to walk, bike, take transit, and drive.

But the City cannot accomplish this alone. To support a collective effort, the City of Los Angeles has engaged with a diverse group of organizations and individuals to partner on the road to Vision Zero. The American Automobile Association has been a key member of our Vision Zero Task Force and Education Subcommittee. We hear from parents, teachers, and principals about safety near schools through our Safe Routes to School program. Several community-based organizations have united to form the Los Angeles Vision Zero Alliance, a coalition of diverse organizations and individuals working in partnership with the City of Los Angeles to realize Vision Zero. The group is helping to bring together community members with a wide range of strengths, interests, and skills to develop a united constituency for safe and equitable streets.

Be part of the solution: Join the Vision Zero Alliance, spread the word, or attend an event.

HOW CAN YOU GET INVOLVED?

Join the Los Angeles Vision Zero Alliance.
visionzeroalliance.org

Say "crash," not "accident," and sign the pledge.
crashnotaccident.com

Visit our website for updates.
visionzero.lacity.org



ACKNOWLEDGMENTS

Los Angeles Elected Officials

Mayor Eric Garcetti
Honorable Councilmember Gil Cedillo, Council District 1
Honorable Councilmember Paul Krekorian, Council District 2
Honorable Councilmember Bob Blumenfield, Council District 3
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AARP California
Advancement Project
Asian Pacific Islander Obesity Prevention Alliance
Communities Actively Living Independent and Free
Finish the Ride
Fixing Angelenos Stuck in Traffic (FAST)
Healthy Active Streets
Investing in Place
Los Angeles County Bicycle Coalition
Los Angeles Bicycle Advisory Committee
Los Angeles Walks
Multicultural Communities for Mobility
PALS for Health
Proyecto Pastoral
Streets Are for Everyone (SAFE)
Safe Routes to School National Partnership
T.R.U.S.T. South L.A
Youth Policy Institute
. . . and a growing number of individual Angelenos dedicated to safe, healthy streets!

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Education Subcommittee

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FOCUS GROUPS

While developing this plan, we shared collision data and collected initial input from key stakeholders to better understand the ground-level experiences of those affected by traffic-safety issues.

From July through August 2016, we conducted focus groups of community stakeholders throughout Los Angeles to learn about Vision Zero, exchange information about traffic safety issues, and identify potential solutions and partners. Ten geographically based meetings with residents and neighborhood-level leaders occurred throughout the City. At each meeting, participants responded to the High-Injury Network data, shared traffic safety issues affecting their communities, and identified potential strategies for improvement through engineering, education, evaluation, and enforcement.

Additionally, we conducted four topic-based meetings with the Vision Zero Alliance, medical/public health organizations, City legislation/policy staff from partner departments, and community leaders representing vulnerable communities. These participants also responded to the High-Injury Network data and shared their experiences and ideas for how to connect their related efforts to the Vision Zero initiative.

The following is a summary of meeting locations and groups. A full, narrative summary of each meeting can be found on the Vision Zero website at visionzero.lacity.org/focusgroups2016.

Ten Geographically Focused Meetings

Central (two meetings)
East Valley
Hollywood
Pico/Union
South Central (two meetings)
Southern Los Angeles/Harbor
West Los Angeles
West Valley

Four Topic-Based Meetings

Legal Legislative
Medical
Vision Zero Alliance
Vulnerable Populations

For information on Vision Zero
visit **visionzero.lacity.org**
email **visionzero@lacity.org**

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For information on Vision Zero
visit **visionzero.lacity.org**
email **visionzero@lacity.org**

VISION ZERO LOS ANGELES

COLLISION AND COUNTERMEASURE ANALYSIS: LITERATURE REVIEW

March 2016



ACKNOWLEDGEMENTS

Los Angeles Department of Transportation
Seleta Reynolds, General Manager
Nat Gale
Tim Fremaux
Valerie Watson
Jacqui Swartz
Tim Black

Fehr & Peers Technical Consultants
Dana Weissman
Meghan Mitman
Fatemeh Ranaiefar
Chelsea Richer
Jeremy Klop

Los Angeles County Department of Public Health
Jean Ambruster
Chandini Singh
Kim Porter

New York City Department of Transportation
Juan Martinez
Rob Viola

Seattle Department of Transportation
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Chicago Department of Transportation
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Amanda Woodall
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Florida Department of Transportation
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EXECUTIVE SUMMARY

This report documents findings from a literature review and peer agency interviews conducted to investigate current best practices in data-driven traffic collision analysis and collision reduction efforts for the Vision Zero Los Angeles Safety Study.

With assistance from Fehr & Peers Transportation Consultants, staff at the Los Angeles Department of Transportation (LADOT) reviewed relevant literature to determine the most robust collision analysis methodologies, the most effective engineering countermeasures, and the most productive public outreach strategies. Staff also interviewed four peer agencies in three cities and one state to better understand how collision analysis and reduction efforts are implemented in practice.

This report is organized into three sections: Collision Data Analysis; Safety Countermeasures; and Key Partners. Each section summarizes the relevant literature and expands on the insights from the peer agency interviews. The conclusion at the end of the report describes how the findings will inform the next steps for the Vision Zero Los Angeles Safety Study.

Key findings for each section are summarized in the following pages.

Collision Data Analysis

Although peer cities conduct multi-variate collision analyses, many of their implementation decisions are driven by simpler statistical analyses and in-depth study of specific priority locations. Some of the collision analysis findings are very consistent across agencies and academic studies, and the City of Los Angeles anticipates the same or similar results:

Speed is a very common contributing factor for collisions resulting in severe and fatal injury

Most collisions occur on arterials

Left turns and right turns are extremely common factors across all collisions

Driving under the influence is a common contributing factor for collisions resulting in severe and fatal injury

Agencies take different approaches to designating high-priority locations, with some focusing more on corridors and others prioritizing intersections. To identify high-priority locations, agencies aggregate data in a variety of ways, typically based on some measure of crash rate per distance or user. The collision history at priority locations is then investigated further to help define which countermeasures are selected. The first outcome of the Vision Zero Los Angeles Safety Study will be a prioritized list of locations for safety projects.

Data assembly and analysis is challenging for every agency, but the process is considerably easier when data are collected and maintained in-house. The City of Los Angeles will continue to assemble and refresh data as a goal to make future analysis more efficient.

Safety Countermeasures

The second major element of the Vision Zero Los Angeles Safety Study includes "countermeasure pairing," the process of identifying the physical design and engineering countermeasures that would most effectively address each "collision profile," a group of collisions with similar contributing factors.

The Federal Highway Administration is the leading source of peer-reviewed, robust research to understand the effects of safety countermeasures on collisions. Countermeasures are typically organized by mode but will often improve the safety for all modes of travel.

Rather than focus on reducing the incidence of all collisions, the City will prioritize its efforts on the types of collisions that are more likely to result in a severe or fatal injury.

Each interviewed agency uses data analyses differently to guide countermeasure pairing and infrastructure investment. Collision analyses, both univariate and multi-variate, are generally used to define programmatic interventions, such as policy changes in speed limits, the use of automated enforcement, roll-out of Leading Pedestrian Intervals (LPIs) or count-down timers, and installation of additional street-lighting.

Key Partners

Public Outreach
All agencies conduct public outreach at various stages of the process. New York City, Seattle and Chicago hold public meetings to help shape the development of specific plans or projects.

New York City Department of Transportation (NYCDOT) incorporates some public input in its selection of priority locations. However, when soliciting input online, the highest levels of engagement came from areas that were overall more educated, wealthy, and active in civic processes and therefore not representative of the areas of the city with low levels of engagement but high incidence of serious and fatal collisions. Recognizing this disparity, NYCDOT relies primarily on the results of data analysis to determine high-priority locations. Public comment was found to be most helpful augmenting patterns and trends revealed in the data analysis.

Education & Enforcement
All four agencies conduct education/ enforcement efforts in partnership with their police departments, which take the form of high-visibility public education coupled with enforcement.

The New York Police Department (NYPD) has been particularly effective reducing severe and fatal crash injuries by aligning enforcement efforts with the results of their data analysis. Recognizing that speeding and failure to yield were common collision factors among severe and fatal injuries, NYPD has launched a citywide campaign against these dangerous driving behaviors.

Next Steps

The City will continue to develop the database that includes all collisions in the most recently available ten-year period, as well as key environmental variables These data, currently available on the City's GeoHub (*geohub.lacity.org*), will be continually updated as new information becomes available.

The purpose of the forthcoming Vision Zero Los Angeles Safety Study is twofold. First, the City will identify a list of prioritized locations along the High Injury Network (HIN) for the development of safety projects.

The second major element of the analysis includes "countermeasure pairing," the process of identifying the physical design and engineering countermeasures that would most effectively address each "collision profile," a group of collisions with similar contributing factors.

At the priority locations, the City will work with local communities to scope detailed projects using the identified collision profiles and appropriate countermeasures.

INTRODUCTION

On August 24, 2015, Mayor Eric Garcetti launched Executive Directive 10, *Vision Zero*, with the goals of reducing citywide traffic deaths by 20 percent by 2017 and eliminating all traffic deaths by 2025. To meet these ambitious targets, the City has adopted a data-driven approach, focusing efforts where they are likely to have the most effect on reducing severe and fatal crash injuries.

This data-driven approach begins with a review of successful strategies. LADOT staff has reviewed the literature to determine the best collision analysis methodology for Los Angeles and summarized the effectiveness of various safety countermeasures.

In addition to the literature review, LADOT staff interviewed four peer agencies whose publications and plans related to Vision Zero are most relevant for Los Angeles' approach to reducing severe and fatal injuries. Although Los Angeles is a relatively early adopter of Vision Zero, many other cities have been employing innovative safety strategies and have already seen impressive gains. The following page includes a short description of each agency's Vision Zero effort.

The rest of this report is organized into three sections: Collision Data Analysis; Safety Countermeasures; and Key Partners. Each section summarizes the relevant literature and expands on the insights from the peer agency interviews. The conclusion at the end of the report describes how the findings will inform the next steps for the Vision Zero Los Angeles Safety Study.

New York City Department of Transportation (NYCDOT)

New York City is a national leader in Vision Zero and broader pedestrian and bicycle safety interventions. The *NYCDOT 2010 Pedestrian Safety Study and Action Plan* details the City's comprehensive multivariate collision analysis and provides recommended countermeasures to address the crash patterns identified in the analysis. This document, along with borough-specific pedestrian safety action plans released in 2015 and complementary outreach and implementation efforts, set the standard for Vision Zero initiatives.

Seattle Department of Transportation (SDOT)

Since 2008, Seattle has released an annual report with an increasingly comprehensive descriptive analysis of the City's collision data. Additional reports produced by the City emphasize data-driven solutions to collision challenges and project implementation, including the *Road Safety Action Plan*, the *Pedestrian Master Plan, the Bicycle Master Plan*, and before/after evaluations of implemented projects. Seattle also has a comprehensive citywide collision database that it plans to use to undertake a multi-variate collision analysis in the coming years.

Chicago Department of Transportation (CDOT)

Chicago completed a pedestrian crash analysis in 2011 and a bicycle crash analysis in 2012, followed by several implementation-oriented studies including the *Chicago Pedestrian Plan* and the *Chicago Forward Action Plan*. The *Chicago Pedestrian Plan* introduced a "zero in ten" policy, which functioned as a predecessor to Vision Zero by setting a goal of reducing traffic-related fatalities and severe injuries to zero within ten years. Recent implementation-focused initiatives include a roll-out of automated speed and red-light camera enforcement, as well as the accelerated construction of protected bicycle facilities.

Florida Department of Transportation (FDOT)

The Florida Department of Transportation has an ongoing initiative to reduce collisions, injuries, and fatalities on its roadways across all modes. Recent third-party reports have used robust statistical analysis to identify collision trends and pair effective safety countermeasures. The *Pedestrian and Bicycle Strategic Safety Plan* emphasized pedestrian and bicycle safety.

COLLISION DATA ANALYSIS

The first major step of the Vision Zero Los Angeles Safety Study includes assembling a comprehensive collision database and conducting an analysis to better understand trends and patterns, a process that will culminate with a list of prioritized project locations. The literature review and peer agency interviews helped identify current best practices in collision data assembly and analysis.

The literature differentiates collision analysis into multiple types: collision risk, collision frequency, collision severity, and collision contributing factors. There is extensive research on the wide range of statistical analysis methodologies developed for each of these purposes, summarized in published reviews by Lord and Mannering (2010), Savolainen et al (2011), and Mannering and Bhat (2014). Additional research focuses on identifying the most appropriate statistical model to tackle specific collision questions related to collision risk and frequency, collision severity, contributing collision factors, or contributing roadway design factors for one or more modes (Kim et al., 1995, Poch and Mannering, 1996, Wang and Nihan, 2004, Schneider et al., 2010, Zhang et al., 2012, Aziz et al., 2013, Sasidharan and Menendez, 2014).

Despite this wide breadth of statistical methodologies in the literature, many of the implementation decisions of peer cities are driven by simpler statistical analyses and in-depth study of specific priority locations. The type of priority location is also different for each peer city. Some identify intersections, corridors, and areas, while others primarily look at corridors and include intersection treatments within those corridors. After choosing the type of high-priority location, agencies aggregate data in a variety of ways, typically based on some measure of crash rate or injury rate per distance or user.

The work of the collision analysis begins by collecting and assembling data. Interviews with peer cities revealed that this is challenging for every agency, but the process is considerably easier when data are collected and maintained in-house. In partnership with the Los Angeles County of Public Health, the City is currently developing a database that includes all collisions in the most recently available ten-year period, as well as key environmental variables, many of which are highlighted here in the literature review and summary of peer agency interviews.

Peer Agency Interviews

This section summarizes the collision data assembly and analysis processes described by the four peer agencies during their interviews. No single agency has established a process that would be entirely transferable to Los Angeles, but elements of their different approaches helped inform the methodology developed for Los Angeles. Conversations with the peer agencies shaped how the collision database variables are constructed, how the collision data are categorized and represented, and what parameters are used to guide the hierarchical clustering analysis.

New York City Department of Transportation (NYCDOT)
New York City was one of the first U.S. cities to adopt a Vision Zero policy, and New York City Department of Transportation is at the forefront of collision analysis. In 2010, they released the *New York City Pedestrian Safety Study & Action Plan* and accompanying Technical Document. The report presents findings from a descriptive collision analysis and multi-variate collision analysis, which was employed to develop crash profiles based on collisions characteristics and features of the built environment where the collisions occurred. In this report, and in reports released thereafter, there is significant focus on the importance of the physical characteristics of the streets, which help guide the project development process for addressing the collisions at a particular intersection, corridor, or area.

In the interviews with NYCDOT, staff also emphasized the citywide socio-demographic factors that were found to be associated with higher pedestrian crash frequencies through the multi-variate analysis. For example, New York City neighborhoods with higher percentages of minority residents also have a higher likelihood of collisions resulting in someone being killed or severely injured while walking, even though minorities themselves are not overrepresented in those collisions citywide. Individuals with less education and those who are foreign born have a higher likelihood of being hit by a car while walking. Asian Americans over 65 years of age have almost twice the pedestrian fatality rate of non-Asian American seniors.

In 2015, NYCDOT released five borough-specific updates to the collision analysis and implementation process. These reports identify priority corridors, intersections, and areas for each borough based on the levels of serious and fatal injury collisions within a given borough (e.g., corridors in Manhattan are not compared to corridors in Staten Island). Priority locations were identified by ranking corridors by pedestrians killed or severely injured from collisions per mile and intersections by total number of pedestrians killed or severely injured from collisions.

In the past, NYCDOT has experienced a lag in receiving collision data from the state, limiting the availability of up-to-date collision information. However, in 2016 the New York Police Department (NYPD) is moving to electronic data collection. The creation of data capture fields has been closely coordinated with NYCDOT to ensure that the important data for identifying collision trends is captured and easily transferred in real time for Vision Zero analysis. This will essentially eliminate the data lag, and NYCDOT highly recommends other Vision Zero cities pursue this with their police departments.

Seattle Department of Transportation (SDOT)
SDOT completed a pedestrian collision analysis in 2006 which compared 2006 collision data to a five-year average from 2001-2005. The City completed a pedestrian and bicycle collision analysis in 2007 which compared 2007 collision data to a five-year average from 2002-2006. Since these analyses, in compliance with a section of the municipal code requiring annual reporting on traffic collisions, SDOT has released annual Traffic Reports beginning in 2008, which summarize all traffic collision data for the previous year, organized by mode. These reports provide a descriptive analysis of current year trends compared to trends across previous years. The most recent analysis was released in 2014 and looks at 2013 data.

SDOT is also in the process of completing a multi-variate collision analysis using ten years of historic bicycle and pedestrian data. One initial finding from this analysis, which SDOT staff shared during the interview, is an unexpectedly high number of severe bicycle collisions occurring on steeply graded streets. The preceding action of the collision was often a vehicle making a left turn and failing to yield to an oncoming bicyclist. SDOT staff surmised that the drivers might be misjudging the bicyclists' speed of travel as they ride downhill. Another finding from the SDOT analysis was that although most pedestrian collisions occur at intersections, mid-block pedestrian collisions are more severe.

SDOT currently identifies priority corridors based on a corridor-level crash rate of total crashes per million vehicles entering the corridor, using a screenline count for each corridor. Priority corridors are defined as 1.5 standard deviations above the City's mean collision rate. Differing lengths of corridors complicates this process, and staff are working to develop an approach that takes corridor length into account.

SDOT differs from the other peer agencies interviewed in that they receive collision data directly from the Seattle Police Department and maintain collision records at the city level. They also maintain and update all built environment data in an in-house database, which significantly reduces the effort of assembling and cleaning data. This allows for regular updates to the analysis and for new analyses to be undertaken rapidly. The biggest challenge is the sheer quantity of data that needs to be sifted through for any given analysis.

Chicago Department of Transportation (CDOT)
Two documents establish the foundation of Chicago Department of Transportation's crash reduction efforts: a pedestrian collision study in 2011 and a bicycle collision study in 2012. The analyses are primarily descriptive and include some spatial components to identify corridor and intersection hotspots.

CDOT undertakes additional data analysis as part of its implementation process for specific programmatic efforts. For example, Chicago has a speed camera and red light camera program, which rely on data analysis to determine where the cameras will be installed.

From the 2011 collision analysis and annual updates, CDOT prioritizes high-crash corridors based on the total number of pedestrian crashes per mile, with fatal and severe injury crashes receiving higher weight than other crash types.

CDOT encounters the same challenges in collision data delay experienced by New York City. Collision data come from the state, and they are made available up to two years after the calendar year concludes. Therefore, CDOT's collision data analysis has been limited and currently does not include any multi-variate analysis. The department aims to pursue this in the future.

Florida Department of Transportation (FDOT)
Florida Department of Transportation is the lead state agency for Pedestrian and Bicycle Safety. FDOT differs from the other three peer agencies in its geographic scale, conducting collision analyses at both the state and city level. Despite the differences of scale, however, we found that many of the lessons from FDOT mirror those from the other peer agencies.

FDOT's data analysis efforts are driven by the overarching goal of reducing severe and fatal injury crashes for all modes by five percent per year from the preceding five-year average, starting with 2006-2010 as the baseline. FDOT collects, analyzes, and reports on data-driven trends both internally and externally. Data are contained within a web-based geographic information system (GIS) that allows internal users to pull reports for specific geographies based on specific data features, including collision types and environmental factors. FDOT generates regular reports for particular types of crashes, such as nighttime collisions, and for particular corridors where a crash problem has been identified.

In December 2013, FDOT published the *Comprehensive Study to Reduce Pedestrian Crashes in Florida*. This report examined pedestrian crash data from 2008-2010 (a total of 6,434 crashes) and identified collision patterns using two types of analysis: a mixed logit model and a Kernel density clustering analysis to identify collision hotspots throughout the state. The report also presented countermeasures that most effectively pair with specific types of collisions in certain roadway contexts.

Fifteen variables were included in the mixed logit model, capturing a variety of crash factors and environmental factors. Overall, the analysis found that while the majority of pedestrian crashes occurred in urban areas, fatal crashes were disproportionately high in rural areas, and the proportion of all crashes that were fatal decreased with urbanization.

In addition to the *Comprehensive Study to Reduce Pedestrian Crashes in Florida*, FDOT has released several other reports related to collision analysis. The 2013 *Florida Pedestrian and Bicycle Strategic Safety Plan* includes a preliminary crash analysis with descriptive statistics only and sets priority counties based on the highest number of pedestrian fatalities and injuries between 2007 and 2011.

SAFETY COUNTERMEASURES

Vision Zero literature stresses changing the overall strategy from reducing crash incidence to reducing injury severity and shifting the burden from the individual road users to the cities and their roadway design (Belin et al 1997, Tingval and Haworth 1999). Rather than focus on reducing the incidence of all collisions, the City will prioritize its efforts on the types of collisions that are more likely to result in a severe or fatal injury. Therefore, an intersection with fewer serious and fatal injuries, even if there are more total crashes, is an acceptable outcome of Vision Zero interventions.

To this end, the second major element of the Vision Zero Los Angeles Safety Study (after the project location prioritization) includes "countermeasure pairing," the process of identifying the physical design and engineering countermeasures that would most effectively address each "collision profile," a group of collisions with similar contributing factors. The Vision Zero Los Angeles initiative will use a hierarchical clustering to develop these LA-specific collision profiles, based on variables assembled in the data analysis process. This methodology, assessed in research by Depaire, Wets and Vanhoof (2008) and Anderson (2009), is similar to regression analysis in that it identifies how variables interact, but it is simpler to implement and more efficiently employed with large datasets.

Significant research has been conducted to better understand and quantify the safety effects of specific countermeasures (Schneider et al., 2010, Chen et al., 2011, Chen et al., 2014). Safety researchers consistently identify reducing speed as the primary countermeasure to collisions that result in severe or fatal injury, arguing that the road system was designed for a higher level of force than can be tolerated by human physiology without sustaining injury or death (Belin et al., 1997, Tingval and Haworth., 1999, Johansson, 2009).

Refer to the Appendix for a comprehensive list of safety countermeasures, along with summaries of effectiveness research.

Peer Agency Interviews

This section summarizes the countermeasure pairing and project implementation processes described by the four peer agencies during their interviews. No single agency has established a process that would be entirely transferrable to Los Angeles, but elements of their different approaches will help inform the methodology developed for Los Angeles. Conversations with the peer agencies will shape which countermeasures are selected, how the countermeasures are applied, and what parameters are used to prioritize project locations.

New York Department of Transportation (NYCDOT)
NYCDOT released a *Vision Zero Action Plan* in 2014 and a *Vision Zero Year One* progress report in 2015. The 2015 report discusses the actions NYCDOT took within the first year of Action Plan implementation. Additionally, NYCDOT recently released the five 2015 Borough Pedestrian Action Plans, which serve as the primary guiding documents for each borough to implement countermeasures. The Borough Plans summarize the pedestrian collision analysis; identify priority corridors, intersections, and areas; highlight the outreach undertaken within the borough (discussed more in the following section); and present engineering, education, and enforcement countermeasures.

The identified countermeasures are largely informed by the overall findings from the 2010 and 2015 collision analyses, which point to systemic safety challenges that must be addressed at the policy level with changes such as speed limits and redirected enforcement priorities. Specific location-countermeasure pairing occurs during the implementation process on a case by case basis, once the priority areas, corridors, and intersections undergo scoping for design change. This allows for engineering judgement, feasibility considerations, and the needs and desires of the community to be considered in project definition.

Overall, NYCDOT has aggressively targeted speeding via the use of automated enforcement, signal timing updates to align with a 25 mph speed limit, aggressive ticketing, and additional speed limit signs. The department has also installed leading pedestrian intervals and pedestrian street lighting on a programmatic scale.

Researchers have investigated the safety benefits of certain adopted countermeasures in New York City using before and after data and treatment/control groups. For example, Chen et al (2011) evaluated the effects of on-street bicycle lanes, finding that the installation of bicycle lanes did not lead to an increase in collisions in New York City. The study compared data from time periods before and after the installation of bicycle lanes on the streets where lanes were constructed and on streets where no new facilities were added. Chen et al (2014) found that intersections with Barnes' Dance phases (all-way pedestrian crossings or "scrambles") had fewer pedestrian-involved crashes than those without, but in some cases had more multiple vehicle crashes, controlling for built environment characteristics.

Seattle Department of Transportation (SDOT)

Once SDOT identifies priority corridors, the agency pairs specific countermeasures during the implementation process on a case by case basis. This allows SDOT to factor in engineering judgement, feasibility considerations, and considerations of the needs and desires of the community. Overall, the department has taken an aggressive approach to reducing speed via road diets and lane narrowing.

Also guiding the implementation of countermeasures are several plans published between 2009 and 2015 that demonstrate additional efforts to reduce collisions in Seattle. In 2007, the city passed an ordinance adopting a Complete Streets policy. The subsequent 2009 *Pedestrian Master Plan* includes some safety-related goals, but it does not establish explicit targets for crash reduction. Similarly, countermeasures are included in a toolbox of strategies, but they are not specifically tied to locations where they would be most effective.

The 2012 *Road Safety Action Plan* identifies the goal of zero traffic-related fatalities and injuries by 2030 and organizes strategies to reach this goal into six focus areas. One of these focus areas includes engineering and roadway design; the other five center on behavioral issues such as driving while impaired or distracted. The 2014 Traffic Report includes an update on the Road Safety Action Plan, describing the "Be Super Safe" campaign to target the behaviors identified in the Road Safety Action Plan that contribute to collisions. This section of the 2014 *Traffic Report* analyzes the collision trends related to these behaviors.

Also in 2012, Seattle released the 2012 *Action Agenda*, a document that includes policies and actions relating to all modes of transportation, to be completed within a two-year timeframe. It includes performance measures related to five core principles, one of which is safety. Within the safety chapter, an interim goal of less than 10 fatalities by 2014 is established, working towards the previously established goal of zero fatalities by 2030. This *Action Agenda* was updated in 2013, which provides a check-in on the actions completed in 2012.

In 2014, SDOT released the *Seattle Bicycle Master Plan*, with an accompanying *Bike Master Plan Implementation Plan* 2015-2019, released in 2015. The 2014 *Master Plan* is an update from the previous 2007 *Bike Master Plan* and focuses on safety as well as providing more comfortable facilities to encourage more Seattle residents to ride a bicycle. The 2014 *Master Plan* identifies specific corridors that would help complete a network of bicycle facilities for Seattle. The 2015 *Implementation Plan* focuses on project funding, delivery, evaluation, and public engagement. It lays out a prioritization tool – with safety weighted highest – that each project would be scored against in order to establish which projects are built first.

Most recently, SDOT published the *Vision Zero Plan*, which outlines the coordinated efforts to address the most severe crash corridors first. It describes a set of countermeasures that are included to some extent in the documents above, specifically framed around the way they improve safety for all road users. This document clearly articulates the role of the Seattle Police Department and demonstrates commitment to the Vision Zero goal from both agencies.

SDOT makes an effort to demonstrate the effects of countermeasures when they are implemented. The department releases a report after each major corridor project, identifying the crash trends before and after implementation, as well as operational information such as speed and volume. This method of evaluation is similar to the before-and-after method used in NYC.

Chicago Department of Transportation (CDOT)
CDOT identifies high-crash corridors through its collision analysis, and it applies countermeasures on a case-by-case basis during specific project design and scoping. The agency considers intersections as part of high-crash corridors, looking to intersection-only countermeasures only when the intersection stands out as an anomaly with a significant number of fatal or severe pedestrian collisions. The department relies largely on countermeasures that change the cross-section of the street, such as road diets, paired with treatments at all the intersections along the corridor, such as signal modifications.

Programmatic countermeasures, such as the implementation of Leading Pedestrian Intervals (LPIs), countdown timers, and other signal modifications have their own prioritization models to direct funding when it becomes available.

Implementation of automated enforcement is also directed by a separate analysis and prioritization process. The Children's Safety Zones program, established in 2012, was authorized by city ordinance to implement speed cameras specifically within ¼ mile of schools and parks. This program, along with a red-light camera program, relies on specific data analysis to determine where the cameras will be installed, which provides a defensible prioritization model for implementation.

For speed cameras, the analysis uses rolling three-year totals of different crash types, with youth and speed-related crashes weighted twice and locations that occur in Census tracts with high residential youth populations scored higher. These factors are added up to generate a safety zone score, and the highest scores are targeted first.

Several other guiding plans assist CDOT in its countermeasure implementation. CDOT released the *Chicago Pedestrian Plan* and the *Streets for Cycling Plan 2020*, which identify strategies for improving infrastructure and general conditions for pedestrians and bicyclists.

Chicago also released the 2012 *Chicago Forward Action Agenda* and updated this document in 2013. These documents address the goals and activities related to all modes within the department, including a focus on "safety first" and stated performance measures of eliminating all collision fatalities within ten years and reducing pedestrian and bicycle crash injuries by 50 percent each within five years.

The *Complete Streets Chicago Design Guidelines*, released in 2013, established a toolkit of engineering countermeasures designed to improve safety and convenience for all modes, with a "pedestrian-first modal hierarchy," followed by transit riders, bicyclists, and automobiles.

Florida Department of Transportation (FDOT)
FDOT implements engineering countermeasures both programmatically and on a project-by-project basis. FDOT also emphasizes education and enforcement countermeasures, which are discussed in the Public Outreach section of this report.

On a programmatic level, FDOT identified a number of focus treatments that it installs at high crash locations as funding becomes available. These engineering countermeasures include enhanced striping and signing, pedestrian scale lighting at signalized intersections, rumble strips (freeway roads) and rumble strips (non- freeway roads), paved shoulders, new signal heads to provide one signal head per lane, signal head back plates for better visibility, pedestrian countdown timers, Pedestrian Hybrid Beacons and Rapid Rectangular Flashing Beacons at currently-unsignalized locations.

On a project level, FDOT uses its collision data analysis to identify the top 20 collision sites within each of seven state districts. The agency then requests that each district investigate the conditions at these locations and identify the appropriate countermeasures based on local conditions.

FDOT is also focused on developing an estimate of pedestrian volumes on its roadways. This will allow them to prioritize future safety efforts where there is high pedestrian activity and the highest potential for collision prevention.

The *Florida Pedestrian and Bicycle Strategic Safety Plan*, released in 2013, sets a five year plan to dedicate resources and funding to the areas that have the greatest opportunity to reduce pedestrian and bicycle crashes. This report includes goals, objectives, and performance metrics related to implementation of a comprehensive pedestrian and bicycle collision reduction effort.

As an accompanying report, FDOT published the *Pedestrian and Bicycle Safety Coalition Strategic Safety Plan Implementation* in July 2015, which provides updates on the implementation of the plan, identifying the progress made and the people responsible for completing each strategy for each objective.

Less used by FDOT, but perhaps more relevant to the LADOT process, the 2013 *Comprehensive Study to Reduce Pedestrian Crashes in Florida* pairs countermeasures to common crash types. These countermeasures are summarized in the Literature Review section of the report.

KEY PARTNERS

Public Outreach
All agencies conduct public outreach at various stages of the process. New York City, Seattle and Chicago hold public meetings to help shape the development of specific plans or projects.

New York City Department of Transportation (NYCDOT) incorporates some public input in its selection of priority locations. However, when soliciting input online, the highest levels of engagement came from areas that were overall more educated, wealthy, and active in civic processes and therefore not representative of the areas of the city with low levels of engagement but high incidence of severe and fatal collisions. Recognizing this disparity, NYCDOT relies primarily on the results of data analysis to determine high-priority locations. Public comment was found to be most helpful augmenting patterns and trends revealed in the data analysis.

Education & Enforcement
Education and enforcement are important complements to the engineering efforts of a Vision Zero campaign. All four agencies conduct education/enforcement efforts in partnership with their police departments, which take the form of high-visibility public education coupled with enforcement. The New York Police Department (NYPD) has been particularly effective reducing severe and fatal crash injuries by aligning enforcement efforts with the results of the data analysis. Recognizing that speeding and failure to yield were common collision factors among severe and fatal injuries, NYPD has launched a citywide campaign against these dangerous driving behaviors.

Peer Agency Interviews

This section summarizes the public outreach, education, and enforcement efforts of the four peer agencies. No single agency has established a process that would be entirely transferrable to Los Angeles, but elements of their different approaches will help shape the City's strategy.

New York City Department of Transportation (NYCDOT)
NYCDOT has solicited public input on its Vision Zero activities through a variety of means. Their interactive web-based Vision Zero Public Input Map allowed residents to identify pedestrian safety issues by location. The website was open for a three month comment period between May and July 2014, with resulting levels of engagement varying across the five boroughs, but generally very high. Similar to other traditional outreach methods, the highest levels of engagement came from areas that were overall more educated, wealthy, and active in civic processes.

Equity concerns about this type of disparate engagement in the public outreach process are, in large part, mediated by the use of a collision analysis to direct implementation. The areas that received fewer comments via the website were often priority areas identified through the data analysis. NYCDOT prioritized its investments based primarily on the collision data analysis rather than public website comments to ensure that countermeasures are implemented where crash problems are highest, regardless of anecdotal data.

In addition to the website, NYCDOT conducted public events such as town hall meetings and pedestrian safety workshops in each borough as part of the process of developing the Borough Pedestrian Action Plans. These conversations helped inform the types of countermeasures that would be appropriate and supported in particular neighborhoods.

NYCDOT also implements education and enforcement activities. In the Bronx Borough Pedestrian Action Plan, for example, education countermeasures include street team outreach along priority corridors, areas, or intersections, targeted child education within these areas, and paid placement messaging targeted towards nighttime drivers. Additionally, NYCDOT has developed a new "Street Ambassadors" unit, composed of 10 staff members who will do street level outreach, data collection, and education to assist in the project development. These activties used to occur on an ad-hoc, project specific basis, but are now institutionalized within the department's regular project development activities.

Enforcement activities are carried out in partnership with the NYPD, and they are a crucial part of the Vision Zero initiative. NYPD has been particularly effective shifting its focus of enforcement from quality of life issues (i.e. "fix-it" tickets) to instead driving behavior that is directly tied to severe and fatal injuries. Leveraging the results of the data analysis, which concluded that speeding and failure to yield were common collision factors among severe and fatal injuries, NYPD has launched a citywide campaign against these dangerous driving behaviors.

Seattle Department of Transportation (SDOT)
SDOT engages the public through outreach at various points in its planning efforts, largely during the design process rather than as part of the data analysis process.

For every project, SDOT conducts several rounds of public meetings. SDOT first goes to the community with a description of the safety issues (backed by data) and solicits feedback from the public on their experiences. SDOT then returns to the community with several design alternatives that aim to address the safety issues and the concerns raised in the first round of meetings. Based on feedback from the second round of meetings, SDOT develops final project plans and returns to the community with next steps.

SDOT engages diverse communities across Seattle by contracting with local community development organizations to reduce language and cultural barriers. In some cases, the department uses community liaisons to lead multilingual outreach efforts and holds simultaneous translation at public meetings. SDOT is working to develop relationships with community groups that will help reach a broader diversity of Seattle resident.

SDOT's enforcement effort is carried out in partnership with SPD, and it is formatted similarly to other cities' initiatives in that it focuses on public engagement and education first, followed by citation-based enforcement. High-visibility enforcement events are held where collisions occur and target the specific behaviors observed at those locations.

Chicago Department of Transportation (CDOT)
CDOT has a robust public education and enforcement strategy. Education efforts include a Safe Routes to School program and a seasonal Bicycling Ambassadors program, which serves as a "street team" at public events and summer camps. CDOT also engages in public outreach around the development of its plans, primarily relying on town hall-style meetings geographically dispersed throughout the city.

CDOT does not incorporate outreach in its data analysis process. The identification of high-crash corridors and priority locations is based on data analysis rather than community input.

CDOT has been partnering with the Chicago Police Department (CPD) Traffic Enforcement unit since 2008 to conduct high-visibility enforcement efforts with a focus on drivers that fail to stop for pedestrians in the crosswalk. These efforts begin as public outreach and education, transitioning into citation-based enforcement in a subsequent phase of activity. CDOT and CPD determine education and enforcement locations based on pedestrian injury data combined with officer knowledege of the local area.

Florida Department of Transportation (FDOT)
FDOT's public outreach efforts center on education campaigns and enforcement initiatives. These serve both as countermeasures as well as opportunities to engage the public in a conversation about traffic safety and the state's ongoing efforts to reduce injuries and fatalities.

Education campaigns initiated by FDOT include high visibility paid media on transit buses, bus shelters, billboards and TV/radio; community engagement teams at local events to distribute flyers about traffic safety and collateral materials like reflective armbands or bicycle spoke lights; and enhanced training with emergency responders to understand how to best handle pedestrian, bicycle, and vehicle collision injuries. Education materials are tailored for language and cultural differences depending on the community context. FDOT's education efforts have an online presence and a social media presence that is often used to hear feedback from the public and respond.

In addition to data analysis, FDOT uses both observational surveys and public option surveys taken at outreach events to identify high-priority locations.

Enforcement efforts coordinated by FDOT include high visibility enforcement at the top ten corridors and top ten intersections within each county, in partnership with county law enforcement and city police departments. All enforcement events begin with a public outreach campaign coupled with additional officer training specific to pedestrian and bicyclist safety. Once the media campaign ends (campaigns are usually around 10 days), officers begin the education phase, the longest phase of the effort. Following the education phase, officers move to a warning phase, and then, when necessary, a citation phase (warranted where there is a continued pattern of serious offenses).

FDOT emphasized the importance of inter-agency partnerships during the interview. In addition to the partnerships with the police departments and emergency responders necessary to execute the education and enforcement initiatives described above, FDOT has established partnerships with the state health department to bring in health and injury data that would otherwise be unavailable through the normal collision reporting process.

CONCLUSION

The next step for the City's Vision Zero effort is to move forward with the Vision Zero Los Angeles Safety Study, which will identify key trends and statistics related to injury outcomes and contributing factors for collisions Citywide.

The first outcome of this study will be a list of prioritized locations along the High Injury Network (HIN) for the development of safety projects. The second major element of the analysis includes "countermeasure pairing," the process of identifying the physical design and engineering countermeasures that would most effectively address each "collision profile," a group of collisions with similar contributing factors. At the priority locations, the City will partner with local communities to scope detailed projects using these identified collision profiles and appropriate countermeasures.

This work is already underway with the development of a database that includes all collisions in the most recently available ten-year period, as well as key environmental variables, many of which were highlighted in the literature review and peer agency interviews. These data, currently available on the City's GeoHub (*geohub.lacity.org*), will be continually updated as new information becomes available.

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APPENDIX: LIST OF SAFETY COUNTERMEASURES

There are many resources on safety countermeasures, and a wide range of technical approaches to evaluate their effectiveness. The most comprehensive resource is the Federal Highway Administration's (FHWA) Crash Modification Factors Clearinghouse, a database of studies on most safety countermeasures. Typically effectiveness is measured and reported by a crash reduction factor (CRF), the percentage reduction in collisions that could be expected after implementing a given countermeasure.

The Clearinghouse often contains multiple studies with a range of CRFs. In order to get the best estimate of effectiveness, we consulted two additional resources: The FHWA *Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes* (February 2013) and the Pedestrian and Bicycle Information Center's *Evaluation of Bicycle-Related Roadway Measures: A Summary of Available Research* (February 2014). Each of these resources provides a thorough review of the quantitative research to date by selecting only those CRFs that have been derived from studies based on rigorous research methods.

The following sections include a comprehensive list of safety countermeasures, along with summaries of effectiveness research on each countermeasure. The list of safety countermeasures is grouped according to the following categories:

- Signalization
- Geometric (Road Design)
- Signs, markings, operational
- Speed control measures, miscellaneous

This list includes all countermeasures discussed in the FHWA Toolbox with the associated CRF, as well as additional countermeasures identified in the sources described above. In some cases, countermeasures lack a quantified CRF but show some safety-related effects; these have also been included in the description below. This review does not reflect details about the feasibility or appropriateness of a proposed countermeasure for a specific location. Location-specific constraints and existing facilities must be considered when determining the most appropriate countermeasure for a given location.

Signalization

Pedestrian countdown heads
Definition: Signal head that provides pedestrian countdown, as opposed to traditional WALK/DON'T WALK signal head.

CRF: 25% reduction in pedestrian collisions

Additional research has shown that pedestrian countdown timers have reduced pedestrian collisions by between 52% and 70%.

Flashing beacons (includes RRFB signals)
Definition: Flashing beacons highlighting crosswalks and pedestrian crossing signs through the addition of a flashing light. Rectangular Rapid Flash Beacons provide a high-visibility, brighter strobe-like flashing frequency.

Research focused on the rate of drivers yielding to pedestrians has demonstrated an increase in the yield rates in most cases.

While research has focused mainly on the installation of flashing beacons as a pedestrian safety measure, these benefits could be applied to bicyclists as well. Studies have shown that flashing beacons increase the rate of drivers yielding to pedestrians by 50 – 80%.

Leading pedestrian phase / Leading pedestrian intervals (LPI)
Definition: Traffic signals timed to allow pedestrians a short head start in crossing the intersection to minimize conflicts with turning vehicles.

CRF: 5% reduction in pedestrian collisions

Additional research demonstrated a 59% reduction in the number of pedestrian collisions after implementation of the treatment.

Permissive or permissive/protected left-turn phasing conversion
Definition: Protected left-turn phasing provides an exclusive phase for left-turning vehicles to enter the intersection separate from any conflicting vehicle or pedestrian movements. Permissive/protected left-turn phasing provides the exclusive left-turn phase in addition to a phase permitting left turns simultaneously with conflicting through movements.

CRF: 99% reduction in left-turn collisions (convert permissive or permissive/protected to protected only); 16% reduction in left-turn collisions (convert permissive to permissive/protected)

Additional research has demonstrated that implementing a left turn phase can reduce the pedestrian crash rate by 34% .

Pedestrian hybrid beacon (HAWK signal)
Definition: Pedestrian-activated warning light located on a mast arm over a pedestrian crossing. The beacon stays dark until activated. It has one yellow lens and two red lenses to indicate to drivers that a pedestrian is in the crosswalk.

CRF: 29% reduction in all collisions; 69% reduction in vehicle/pedestrian collisions.

As with flashing beacons, research on pedestrian hybrid beacons has focused on benefits to pedestrians, but these benefits could have broader implications for other users, such as bicyclists. Research from 21 crossings in Tucson, AZ demonstrated a statistically significant decrease of 69% in pedestrian collisions after installation of HAWK signals. While not the primary focus of the research, bicycle collisions also decreased after installation.

Signal timing improvements (to match ITE specified intervals)
Definition: Shorter signal cycle lengths and longer walk intervals.

CRF: 37% reduction in fatal and injury pedestrian collisions.

In one study in which pedestrian crossing times were increased at over 200 intersections, the pedestrian collision rate decreased by 50%.

Signalization (continued)

Pedestrian detection to extend crossing time when pedestrian is detected within the intersection
Definition: Sensors that detect when pedestrians are present in a crossing and automatically increase crossing time when necessary.

Research examining the impact of automated pedestrian detection and crossing time extension on pedestrian collision rates has not yielded statistically significant results.

Pedestrian scrambles / Exclusive pedestrian phasing
Definition: Restricts all vehicular movements to provide an exclusive signal phase allowing pedestrians to cross in all directions, including diagonally.

CRF: 35% reduction in pedestrian collisions

Accessible Pedestrian Signals (APS)
Definition: Pedestrian signals that provide audible or tactile cues to aid visually or cognitively impaired pedestrians in safely crossing the street.

Research on accessible pedestrian signals has not focused on the impact of the treatment on pedestrian collisions. However, research has shown that they are effective in decreasing start delay and increasing the number of crossings that stay within the crosswalk.

New traffic signals at unsignalized intersections, when warranted
Definition: Traffic signal installed at previously unsignalized intersection.

CRF: 25% reduction in all collisions

Research has shown that pedestrian collision rates increased by 12% at treatment sites, compared to an increase of 60% at control sites. However, the findings were not statistically significant.

Removal of unwarranted traffic signals
Definition: Traffic signals replaced with all-way stop signs.

CRF: 17% reduction in pedestrian collisions (research is specific to one-way streets).

Optimize signal timing for bicyclists (Green Wave)
Definition: Signal timing optimized for bicyclist speeds, reducing number of times bicyclists encounter red signals along a stretch of road.

Signal timing changes have been shown to reduce pedestrian and bicyclist injury collisions by 37%.

Additional countermeasures
The following countermeasures are currently being used, but research is not yet available to indicate the effectiveness in reducing bicycle collisions.

- Bicycle signal detection (pushbutton, loop detector)
- Bicycle scramble scramble phase (not currently permitted by FHWA)
- Bicycle signal heads
- Leading bicycle interval
- Separate bicycle signal phase

Geometric

Intersection conversion to roundabout
Definition: Roundabout installed at a previously unsignalized intersection or to replace a former traffic signal. Roundabouts are large circular islands, placed in the middle of an intersection, which direct flow in a continuous circular direction around the intersection. Roundabouts can reduce the number of conflict points, compared to an uncontrolled intersection, and decrease vehicle speeds due to intersection geometry.

CRF: 27% reduction in collisions for conversion from unsignalized intersection to roundabout.

Research from the United States and Europe has demonstrated increased safety concerns for bicyclists after the installation of roundabouts, including:

- 48% increase in risk of injury for bicyclists
- 700% increase in risk of bicycling injury

Additional research from the Crash Modification Factors Clearinghouse shows a 73% reduction in pedestrian collisions after conversion of intersections to roundabouts, but it does not specify if those intersections were signalized or unsignalized prior to installation of the treatment.

Refuge islands/raised median/ pedestrian refuge islands
Definition: Curbed sections in the center of the roadway that are physically separated from vehicular traffic. Raised medians or refuge islands shorten crossing distances across wider roadways.

CRF: 46% reduction in pedestrian collisions (raised median at marked crosswalk); 39% reduction in pedestrian collisions (raised median at unmarked crosswalk); 56% reduction in pedestrian collisions (refuge island)

Research has shown that pedestrian collisions rates were 33% lower on streets with 10 foot medians than on streets with painted medians.

A study demonstrated that mid-block pedestrian collisions decreased by 73% after the installation of a pedestrian refuge island.

In a study comparing locations with raised medians to those without, the pedestrian collision rate at marked crosswalks was 0.74 in locations with a raised median and 1.37 for sites without a median. At unmarked crossings the pedestrian collision rate was 0.17 at sites with raised medians and 0.28 at sites without a raised median.

Temporary painted medians
Definition: Pavement striping that separates lanes of traffic but does not provide a raised surface.

No research is available that demonstrates the impact of installing a temporary painted median as a countermeasure for pedestrian collisions. However, research has shown that pedestrian collisions rates were 33% lower on streets with 10 foot raised medians than on streets with painted medians.

Raised pedestrian crossing/ raised crosswalks/speed tables & raised crosswalks
Definition: Pedestrian crossings that are elevated to the level of the sidewalk, with ramps on each vehicle approach.

CRF: 30% reduction in all collisions, 36% reduction in fatal and injury collisions across all modes intersection to minimize conflicts with turning vehicles.

Corner bulb outs and curb extensions
Definition: Raised devices, usually constructed from concrete and/or landscaping, that reduce the corner radius or narrow the roadway in order to reduce traffic speeds and shorten crossing distances.

No research is available that demonstrates the impact of installing curb extensions as a countermeasure for pedestrian collisions, though research shows decreases in pedestrian crossing delay and increases in drivers yielding to pedestrians.

Geometric (continued)

Closed crosswalk removal/new crosswalks
Definition: Removal of existing crosswalks, or installation of new crosswalks.

Research conducted between the 1970s and 2000s produced results stating that pedestrian collision rates were higher in marked crosswalks than in unmarked crosswalks. A 2002 study investigated the importance of various factors such as the presence of a median, ADT, and the number of lanes, demonstrating that the impact of crosswalk installation or removal on pedestrian safety is context-specific. Additional countermeasures explored within this document, including lighting, type of pavement markings, and signs, should also be considered.

On-street parking reconfiguration
Definition: Removing on-street parking near intersections and driveways, or reconfiguring parking to minimize conflict points with bicyclists.

Research has shown that biking on a road without parked cars reduces risk of bicyclist injury by 37%, when compared to roads with on-street parking. An analysis of before and after conditions at a parking reconfiguration treatment site showed that potentially dangerous actions (drivers parking in bike lane, wrong way travel) decreased, but there were no collisions before or after the treatment.

Roadway cross section reduction from 4 to 3 lanes (road diet)
Definition: Reduction in number of travel lanes in roadway from 2 lanes in each direction to 1 lane in each direction with a center turning lane.

CRF: 29% reduction in all collisions

Research has shown that for every 10 foot increase in street width, the likelihood that a bicycle collision will occur increases by 38%. In one study of over 300 road diet intersection sites in New York City, researchers found an increase in the number of bicycle collisions, but this did not account for volumes before or after implementation of the treatment.

Additional research on road diets has shown a 41% reduction in pedestrian collisions at treatment sites.

Temporary removable pedestrian refuge island with sign (curb) on two-lane road
Definition: Small, painted, raised surface in the center of the roadway, with high-visibility pedestrian crossing signs.

No research is available that demonstrates the impact of installing a temporary removable pedestrian island as a countermeasure for pedestrian collisions, though one study demonstrates reduction in speeds after installation of the treatment.

New traffic signals at unsignalized intersections, when warranted
Definition: Traffic signal installed at previously unsignalized intersection.

On-street parking reconfiguration
Definition: Removing on-street parking near intersections and driveways, or reconfiguring parking to minimize conflict points with bicyclists.

Research has shown that biking on a road without parked cars reduces risk of bicyclist injury by 37%, when compared to roads with on-street parking. An analysis of before and after conditions at a parking reconfiguration treatment site showed that potentially dangerous actions (drivers parking in bike lane, wrong way travel) decreased, but there were no collisions before or after the treatment.

Separated bike lane (cycle track)
Definition: Designated bicycle lanes, separated from vehicle traffic by a physical barrier, usually bollards, landscaping, parked cars, or through elevated separation.

Several studies have examined the effectiveness of cycle tracks as a bicycle collision countermeasure. The highlights of this research is outlined below:

Geometric (continued)

Statistically insignificant decrease in bicyclist injury rates on street segments, but a statistically significant increase of 24% at intersections. 63% decrease in rear-end vehicle-bicycle collisions, 41% decrease between left-turning bicycles and other bicycles, 38% decrease in collisions between bicycles and parked cars. 120% increase in rear-end collisions between two bicycles, 140% increase in collisions between bicycles and right-turning vehicles, 48% increase between bicycles and left-turning vehicles.

Cycle tracks associated with 28% reduction in risk of injury when compared to streets without bicycle facilities.

89% decrease in risk of bicyclist injury, when compared to major streets without bicycle infrastructure and with on-street parking.

95% decrease in risk of bicyclist injury when compared to streets without biking infrastructure.

This research, while supporting the positive impact of cycle tracks as a countermeasure to bicycle collisions, points to the need for additional considerations to increase bicyclist safety at intersections and other bicycle-vehicle conflict points.

Separate shared-use or bicycle path
Definition: Off-street path, either for exclusive use by bicyclists or by bicyclists and pedestrians, usually with minimal street crossings, and designated by signs and/or pavement markings.

Shared-use paths associated with an 88% decrease in injury risk for children and 86% decrease in injury risk for adults, when compared to bicycling in the street.

Wide curb lane
Definition: Provision of a wider curb lane that accommodates bicyclists and vehicles, where a dedicated bike lane or other bicycle facility is not possible. Research on wide curb lanes has not focused on collision rates, and studies about the lateral passing distance between vehicles and bicycles demonstrates varying results on safety impacts for bicyclists.

Traffic diverters
Definition: Physical barrier placed diagonally across an intersection, which restricts the flow of vehicular traffic, but allows for pedestrians and bicyclists to cross the intersection.

96% decrease in the risk of bicyclist injury on streets with traffic diverters, when compared with other roadway segments.

Additional countermeasures
The following countermeasures are currently being used, but research is not yet available to indicate the effectiveness in reducing collisions.

- Lane narrowing
- Curb ramps
- Rumble strips
- Paved shoulder
- Curb radius reduction
- Mini-circles
- Chicanes
- Full or partial street closures
- Streetcar track/bike lane alignment
- Protected intersections
- Medians and crossing refuge islands
- Driveway reconfigurations (narrowing, restricting turn movements, improving driveway definition)

Signs, Markings, Operational

Intersection lighting/crosswalk lighting
Definition: Lighting between the crosswalk and oncoming vehicles, usually 10 feet before the crosswalk.

CRF: 27% reduction in injury collisions across all modes; 21% reduction in all collisions

Segment lighting
Definition: Quality and consistent placement of streetlights for drivers, as well as pedestrian-scale lighting for sidewalks.

CRF: 23% reduction in injury collisions across all modes; 20% reduction in all collisions

Right turn on red restriction
Definition: Right turns prohibited on red to reduce conflicts between pedestrians and right-turning vehicles.

CRF: 3% reduction in all collisions

Additional analysis of collision rates before and after implementation of permitted right turns on red in the eastern United States demonstrates that allowing right turns on red increased pedestrian collision rates between 43% and 107%.

Left turn restriction
Definition: Left turns prohibited to reduce conflicts between pedestrians and left-turning vehicles.

CRF: 10% reduction in pedestrian collisions

Parking restriction near intersections
Definition: Parking spaces removed near crossing locations to allow for improved sightlines for both pedestrians and drivers.

CRF: 30% reduction in pedestrian collisions

Advance stop or yield lines, pedestrian yield signs
Definition: Pedestrian yield signs or warning signs for drivers installed either on a post or in the roadway in advance of the crossing. Advance stop or yield lines stop indicate that a driver should stop or yield before approaching the pedestrian crossing. They are usually placed 4 feet away from the crossing.

While studies have not examined the impact of these treatments on the pedestrian collision rate, research indicates that these advanced stop and yield lines are effective in increasing the rate at which drivers yield to pedestrians.

Pavement friction (textured pavement)
Definition: Textured pavement or a textured overlay on pavement to provide additional cues to drivers that they are reaching a pedestrian crossing, or other key area such as a tight radius corner.

CRF: 3% reduction in fatal or injury pedestrian collisions
Targeted enforcement efforts (along corridors for yielding in marked crosswalks)
Definition: Police enforcement efforts targeted at drivers at specific pedestrian crossings, or as part of a broader enforcement campaign.

CRF: 23% reduction in pedestrian collisions

High-visibility crosswalk (includes continental crosswalks)
Definition: Distinct pavement markings, such as a continental, zebra or ladder pattern, or a reflective inlay or thermoplastic tape.

CRF: 48% reduction in pedestrian collisions; 37% reduction in pedestrian collisions when high-visibility crosswalks are installed in school zones.

Research demonstrated a 37% reduction in pedestrian collisions after the installation of high-visibility crosswalks.

A study of high-visibility crosswalks in New York City shows a 48% reduction in the pedestrian collision rate after installation of the treatment.

Decorative and colored crosswalks
Definition: Crossing pavement markings in colors other than white.

A study of strong yellow/green crosswalks concluded that using the colored crosswalks had no impact on safety.

High-visibility crosswalk in

Signs, Markings, Operational (continued)

conjunction with illuminated overhead crosswalk sign
Definition: A high-visibility sign on mast arms over the roadway that calls additional attention to the crossing.

Research on this treatment has not focused on collision rates, but research has found an increased rate of drivers yielding to pedestrians after installation of a high-visibility crosswalk with illuminated overhead sign.

Pedestrian warning signage
Definitions: Signs such as "Yield Here to Pedestrians" or "Stop Here for Pedestrians" that can be placed at the roadway surface level in advance of the crosswalk, on posts, or overhead.

Research on this countermeasure has not specifically examined pedestrian collision rates, but one study has found an 80% decrease in pedestrian-motorist conflicts after installation of a "Stop Here for Pedestrians" sign.

Shared bus-bike lane
Definition: Lanes designated for use only by public transit buses, bicycles and usually right-turning vehicles.

The only study available demonstrated a statistically insignificant decrease in the rate of bicycle crashes.

Intersection and segment lighting
Definition: Quality and consistent placement of streetlights for drivers and bicyclists.

Research has shown a lack of lighting associated with 111% increase in likelihood of bicyclist fatality, and 100% increase in likelihood of incapacitating injury for bicyclists. In another study, roadway lighting associated with 60% reduction in bicyclist injury collisions.

Shared lane markings
Definition: Pavement markings on travel lanes, also called Sharrows, which indicate that road space should be shared between bicycles and vehicles.

Studies investigating the impact of sharrows on bicyclist safety show varied results. Research conducted was not focused on the rate of collisions, but several studies did demonstrate that the installation of sharrows increased the lateral distance between bicyclists and drivers, as well as the distance between bicyclists and parked cars. Additionally, sharrows have been associated with a reduction in the number of bicyclists riding on the sidewalk and riding against the flow of traffic. However, additional research showed no change in behavior after the installation of sharrows.

Bike lanes
Definition: Five to seven foot wide designated lanes for bicyclists adjacent to vehicle travel lanes, delineated with pavement markings.

Studies dating back to the mid-1970s have produced varying results on the safety impacts of bike lanes, the highlights of which are outlined below:

- Overall reduction in bicycle collisions, with an increase in the rate of collisions due to bicyclists making improper left turns
- Increase in bicycle collisions associated with turning movements in the first year, with sharp reductions in subsequent years
- Reduction in bicycle collisions along roadway segments, with increases at some intersections
- Statistically insignificant increases in bicyclist injuries and collisions, and statistically significant 73% increase in collisions involving bicycles and right-turning vehicles
- Increase in number of bicycle collisions at treatment sites versus control sites at intersections. Collisions on roadway segments decreased for treatment sites, but decreased much more significantly for control sites. However, this study did not account for bicycle volumes.

This research points the need for special consideration at intersections and other conflict points between bicyclists and vehicles to minimize collisions.

Signs, Markings, Operational (continued)

Warning and regulatory signs for drivers ("Share the Road," "No Parking in Bike Lane")
Definition: Posted signs that provide warning and regulatory messages alerting drivers to the presence of bicyclists and shared roadway facilities.

Research on the use of these signs has not focused on bicycle collision reduction, but studies have shown they may hold promise in increasing bicycle safety based on the passing distance of vehicles before and after sign installation.

Buffered bike lanes
Definition: Designated lanes for bicyclists, five to seven feet wide, separated from vehicle travel lanes and/or parked cars by pavement markings, usually 3 feet wide and with a double-line, chevron or diagonal line pattern.

In one study of a two-way buffered bike lane in Washington, D.C., the rate of bicycle crashes increased by one crash per year (accounting for the increase in bicycle use) after installation. However, the study also suggested that confusing signage at intersections may have led to the increase in collision rates.

Bike box
Definition: Designated area for bicycles to wait at red traffic signals in front of queuing vehicles, usually marked with green pavement, with the intent of reducing delay at signals, increasing visibility of bicyclists, and in some cases, facilitating left-turn positioning for bicyclists.

One study of 10 intersections showed that bicyclist-motorist conflicts decreased by 9%. However, that study and others have shown that bike boxes are not effective in encouraging drivers to yield to bicyclists more often, and in many cases drivers encroach on the bike box space.

Green colored pavement
Definition: Green markings, created with paint, epoxy, thermoplastic, or colored asphalt, used to designate bike lanes, cycle tracks, bike boxes, conflict zones or intersection crossings.

One study showed a statistically insignificant reduction in the rate of vehicle-bicyclist conflicts, as well as a significant increase in the rate of drivers yielding to bicyclists, following the installation of a green bike lane. Other studies on the use of green pavement at and across intersections were inconclusive: in some cases drivers yield to bicyclists more often, but in other cases less often.

Additional countermeasures

The following countermeasures are currently being used, but research is not yet available to indicate the effectiveness in reducing bicycle collisions.

- Automated speed enforcement (ASE)
- Right turn pockets
- Smart Lighting
- Contraflow bike lanes (for one-way streets)
- Bicycle route and bicycle boulevard signage
- Pavement markings (bike symbol, bike detector marking, yield lines)
- Two-stage turn queue box
- Right turn on red restriction
- Targeted enforcement efforts
- Parking restrictions near intersections and driveways

Speed Control Measures, Miscellaneous

Speed limit reductions
Definition: Speed limit reductions performed street by street or implemented as part of a speed reduction zone (often found near schools and parks) or bicycle boulevard program.

Research on speed limit reductions has shown a 56% decrease in pedestrian collisions along roadway segments at treatment sites, compared with a 6% increase at control sites. The same study found a 45% decrease in pedestrian collisions from speed limit reductions at intersections, though the findings were not significant in the case of intersections.

Research shows that the likelihood of a bicyclist fatality in vehicle-bicycle collisions increases by over 1,000% if the vehicle is traveling over 40 mph, when compared to speeds under 20 mph. If the vehicle is traveling between 20 and 30 mph, risk of bicyclist fatality increases 93% and over 300% for vehicles traveling between 30 and 40 mph. In a study on the implementation of 20 mph speed limit zones, bicyclist injuries decreased by 17% and severe injuries or fatalities decreased by 38%.

In another study of streets with vehicles traveling under 30 mph, there was a 48% reduction in the risk of bicyclist injury when compared with streets with speeds over 30 mph.

Speed tables and humps
Definition: Asphalt protrusions 3-4 inches high that extend the width of the roadway, varying in length depending on type. Speed humps are rounded, while speed tables have a flat top.

Research compiled in the Evaluation of Pedestrian-Related Roadway Measures report provides mixed results regarding the impact of speed hump installation on pedestrian collisions, with some studies finding increases (though statistically insignificant) and others finding decreases.

Additional research included in the FHWA Crash Modification Factor Clearinghouse demonstrates a decrease of between 40% and 50% in all collision types after speed hump installation.

Portable speed trailer/and radar speed display signs
Definition: Portable speed trailers that display the speed limit as well as the speed of the approaching vehicle in real-time, and in some cases have changeable message display boards.

Research on this countermeasure has not focused specifically on collision rates, but has shown increases in drivers yielding to pedestrians.

Hazard identification and response program
Definition: Publicly-run program that allows for two-way communication between jurisdictions and the public, including temporary signage alerting bicyclists to potential hazards, as well as technology solutions that allows the public to submit real-time information (often via cell phone) on hazards, such as debris in the road.

Construction sites – one particular type of hazard – have been associated with a 167% increase in the risk of bicycling injury.

Additional countermeasures
The following countermeasures are currently being used, but research is not yet available to indicate the effectiveness in reducing bicycle collisions.

Shared space

Visual narrowing (using street trees, paving treatments, roadway markings)

Railings and channelization

Ongoing maintenance (sweep bike and curb lanes, repair potholes)

Visual narrowing (using street trees, paving treatments, roadway markings)



VISION ZERO
EDUCATION AND OUTREACH STRATEGY

JULIA GOULD AND RACHEL KEYSER

APRIL 2016

LADOT

VISION ZERO
LOS ANGELES | 2015-2025

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SECTION 1: INTRODUCTION

Acknowledgements

We would like to sincerely thank Nat Gale and Seleta Reynolds at LADOT for providing us with the opportunity to work on developing this strategy. A special thanks to Brian Oh for his project guidance and to Jacqui Swartz, Tim Black, and Chelsea Richer for their data support throughout the process. Thank you to members of the Education Subcommittee, Vision Zero Alliance, and all other interviewees for taking the time to provide their insights, which greatly informed the content of this strategy.

A Note from the Authors

Julia Gould and Rachel Keyser are Coro Fellows in Public Affairs with Coro Southern California, a nonprofit, nonpartisan educational foundation. The Coro Fellowship in Public Affairs is a nine-month, graduate level, experienced based program, cross-sectoral fellowship to train effective leaders in public affairs. Founded in 1942, with the goal of training young leaders to strengthen the democratic system, Coro has expanded its centers to six cities across the country, with the fellowship in public affairs running in five.

Executive Summary

This document outlines specific recommendations to guide Vision Zero's education and outreach efforts in Los Angeles. The strategy was developed through both qualitative and quantitative research methods, examining best practices around public outreach and road safety campaigns, technical collision data, and the experiences of Los Angeles stakeholders.

These findings indicate that a successful Vision Zero education and outreach strategy will use multi-faceted mediums, message-tested content, and will be grounded in behavior change theory to target high-risk populations and behaviors at both the individual and institutional levels. Mass-media and on-the-ground education efforts will need to be tailored to specific population segments based on campaign priorities and additional market research. Messaging content should stem from the underlying factors that drive dangerous behavior, as well as barriers to the successful adoption of Vision Zero core principles. Overall, the campaign should seek to not only raise awareness of Vision Zero, but change behaviors through shifting social norms around transportation and traffic safety.

While this strategy pulled heavily from best practices and the work of other Vision Zero focus cities, interviews with 46 Los Angeles stakeholders help make it specific to the lived experiences and cultures of the diverse communities in this city.

The strategy first overviews components from the New York City and San Francisco Vision Zero education and marketing strategies, best practices around road safety campaigns, and behavior change theories related to injury prevention. Next, the document outlines the main findings from stakeholder interviews with regards to messaging and outreach strategies. Finally, the report establishes a set of branding and message content recommendations, including a phased-in messaging strategy, core messages, and example advertisement sketches.

Introduction

Less than a year since Mayor Eric Garcetti's Executive Directive, Vision Zero Los Angeles is on the cusp of final development and implementation. As part of this directive, four subcommittees--engineering, enforcement, evaluation, and education--will be responsible for developing the content of the Vision Zero Action Plan to be released in August.

As a foundation for the education component of the Vision Zero Los Angeles Action Plan, this strategy is deeply grounded in relevant literature, collision data, best practices, and perhaps most importantly, first-hand experiences from Los Angeles stakeholders. Synthesizing and analyzing this data informed the following recommendations for a successful campaign specific to Los Angeles.

Although Vision Zero emphasizes a shift in responsibility from individual behaviors to city-driven policy, education and outreach to Los Angeles's diverse communities is nonetheless an integral component of achieving Vision Zero's goals in reducing traffic fatalities. When considering the slow pace of engineering improvements and limitations of enforcement measures, education and outreach efforts become all the more critical in immediately addressing traffic deaths and injuries occurring on our streets.

Guiding Principles

This education and outreach strategy is founded on three main purposes that guide both the content and mediums of messaging and education efforts. These purposes were created with the recognition that in order for Vision Zero to be successful it will need to encompass a multiphase *social marketing campaign* that addresses social norms around transportation and traffic safety.

Therefore, the education and outreach strategy will seek to:

1. **Increase overall awareness** of Vision Zero, the issue of traffic safety, and impacts of dangerous road behavior;
2. **Facilitate a Los Angeles culture shift** toward shared responsibility in road safety, the preventability of traffic deaths, and the idea that even one traffic death is unacceptable;
3. **Motivate safer traffic behavior** among all those who travel in Los Angeles, with emphasis on demographics most likely to exhibit dangerous behavior.

Vision Zero needs diverse forms of both mass-media messaging and on-the-ground outreach to increase awareness, change cultural norms, and change behavior. Social marketing campaigns (i.e. those that seek to change behavior by changing social norms) require extensive time and resources, however they are possible. Looking to the success of other public health campaigns such as anti-tobacco efforts in the United States , Vision Zero has the power to change the paradigm of traffic safety in Los Angeles, across the nation, and worldwide. This education and outreach strategy seeks to make Los Angeles a leader in this effort.

How to Use

The findings and recommendations from this document will serve as a reference for the communications consultant and education subcommittee in developing both the priorities and content of the media messaging. These recommendations should also be considered when creating content for the Vision Zero Action Plan, and in implementing on-the-ground outreach and education. While this strategy is specific to Vision Zero, the findings around

messaging and community outreach can be used as a resource for other education and outreach campaigns in Los Angeles.

SECTION 2: METHODOLOGY

We conducted in-depth interviews with 46 stakeholders from both within and outside of Los Angeles. Interviewees included:

1. Transportation experts
2. Communications specialists
3. City officials
4. Vision Zero Alliance members
5. Vision Zero Education Subcommittee members
6. Vision Zero Focus Cities

We chose these different groups of interviewees in order to have varying perspectives from people who work both in and outside of city government. As behavior change theory around public health suggests, we also wanted to include the perspective from community voices, especially those who have already been advocating for safe mobility. Finally, we spoke with experts who have worked on both private and public sector communications campaigns to learn from their experiences specific to Los Angeles.

Each interview lasted 45-90 minutes with the average interview lasting an hour. Interviewees were asked a common set of questions with variations and follow-ups as the conversation saw fit. For a full list of interview questions, please refer to Appendix D.

Our questions centered on the following topics: previous campaigns, message development and community outreach experience, message development ideas, and media/platforms. Our goals were to: 1) learn best practices from media safety campaigns they had previously worked on or had experienced, 2) to understand what would be the most effective messaging and outreach strategy for the community that they worked with, and 3) to solicit their own impressions on traffic safety and behavior change. Ultimately we sought to use these interviews as a way to develop a truly Los Angeles-specific Vision Zero education and outreach strategy that considered the needs, interests, attitudes, and values of Los Angeles' diverse range of constituents.

After compiling interview notes, (See Appendix E for Interview Notes) we then coded all of the interviews separately in order to deduce common themes. These themes were then cross-checked with each other and analyzed in order to find connections and discrepancies.

In addition to qualitative research, we also examined raw collision data from police reports made available to us by LADOT and Fehr and Peers. Using the program Tableau, we were able to draw conclusions from the various data sets on victims, collision profiles, and parties in order to focus our education and outreach strategies.

Finally, we supplemented the primary qualitative and quantitative data with a background literature review on other Vision Zero focus cities' work, behavior change theories, external collision data, and best practices around public outreach generally.

SECTION 3: LITERATURE REVIEW

Overview: New York City and San Francisco Vision Zero Education and Marketing Strategies

In reviewing prepared materials and speaking with representatives from several Vision Zero focus cities around the country, New York City and San Francisco stood out as currently having the most developed education and outreach strategies, as well as being the furthest along in their implementation. This section briefly overviews the main concepts from these two cities' plans, and outlines key takeaways for consideration in the Los Angeles strategy and its implementation.

New York City Vision Zero Marketing Plan

Following the city government's 2014 commitment to implement Vision Zero in New York City, their Vision Zero Task Force outlined a marketing strategy outlining how to pursue the "Vision Zero brand and its objectives." The plan briefly covers: results of various education efforts, earned media considerations, social marketing, and the timing and continuity of marketing. Most specifically, the plan covers target audiences, priority topics, and strategies for marketing. Key points from these three sections are summarized below, with some additional insight from a NYCDOT staff member. In 2014, the NYCDOT also released a "style guide" to help community partners keep consistent guidelines for communication and marketing around Vision Zero.

Target Audiences

Below are New York City's Vision Zero target audiences and reasons for prioritizing them.

Primary audience	
Adult male drivers, ages 20-50	• Most likely to kill or severely injure a pedestrian • Males in their 40s are most likely to be involved in a pedestrian KSI crash • Males 21-29 have highest rate of impaired driving
Secondary audiences	
Street users in priority locations	• Messaging will be most effective if targeted in corridors with highest rates of KSI collisions
Fleet operators	• The Taxi and Limousine Commission (TLC) licenses 120,000 professional drivers • With over 27,000 vehicles and 80,000 full or part time drivers, the City's fleet plays a critical role in Vision Zero • Private Fleets provide another opportunity for Vision Zero education

Large vehicle drivers	• Trucks and buses were involved in 24% of 2014's pedestrian fatalities (up from 18% from 2011-2013) • Approximately 45% of fatal bus and truck crashes involve turns within intersections
Motorcycle drivers	• In 2013, 42 motorcyclists lost their lives in traffic crashes • In 2014, 37 motorcyclists lost their lives, which is also the average of the three previous years
School-age children and their caregivers	• Being struck by a car is the most common cause of injury related death among children in New York City • Have a ready access point and partner; DOT worked with the Department of Education (DOE) to provide educational services at 620 elementary, middle, and high schools in 2014
Seniors	• People over 65 make up 12% of the city's population but 33% of pedestrian fatalities

*All data and statistics are specific to New York City.

Priority Topics and Strategies

The left column lists NYC Vision Zero's priority topics around traffic safety, while the middle column provides the specific behaviors associated with each topic. The right-hand column contains the marketing strategies being implemented to address each specific topic and its associated behaviors.

Priority topics	Specific behaviors targeted	Marketing strategies
Reckless driving - driver choices	• speeding • failure to yield	☒ outdoor media ☒ television ☒ interactive digital ads ☒ radio ☒ city-owned media ☒ bumper stickers
Pedestrian safety	Pedestrians: • mid-block crossings • watching for turning cars Drivers: • speeding • watching for pedestrians (particularly left turns)	☒ flyers ☒ schools outreach ☒ truck/bus visibility for schools ('trucks eye view' hands on demonstrations at select schools) ☒ Aging New Yorkers Outreach Plan (short film and materials targeting seniors)
Large vehicle education	• turning blind spots • interactions with pedestrian and cyclists • truck side guards • truck route compliance	• city fleet outreach (materials for drivers) • "Good Operator Awards" • truck association outreach (communications kit) • waste management outreach (communications kit)
19-190 Yield to pedestrians	• yielding to pedestrians	• print media (newspapers) • DMV buck slips and posters

		• VMS boards • city resources (websites, hold music, employee checks) • Awareness Day • Social media (week-long campaign)
25 MPH - Speed cameras	• speeding	• radio • speeding tickets (buck included) • November anniversary (press releases) • social media (week-long campaign with anniversary)
Motorcycle drivers	• safe driving practices • skills development	• viral video (with celebrity) • online media • DMV (buck slips) • flyers
Taxi and livery drivers	• speeding • failure to yield	• TLC training materials • technology for "safety" tip

Messaging

Taken from anti-smoking campaign best practices and focus group testing, the NYC Vision Zero messaging content focused on "graphic" images "clearly defining the consequences" of undesirable behavior. Focus group testing data discouraged humor in order for the public to "take it seriously."

Making it Community-specific

All photo and video work for the campaign was done in NYC, highlighting common neighborhood imagery. They used geolocating technology to associate specific facts and statistics to corresponding neighborhoods and boroughs, as well us translated messaging into relevant languages.

Message Testing

Focus groups were used for pre-campaign message testing, and random sample online testing was done post-campaign to test awareness, comprehension, and impact.

San Francisco Vision Zero Citywide Strategy for Education and Outreach

Developed by the San Francisco Vision Zero Education Subcommittee, this strategy outlines a ten-year education strategy to work in conjunction with engineering, enforcement, and data and policy subcommittee work. The plan focuses on "changing the culture of traffic safety" in San Francisco to address behavior change, with emphasis on "research-based, data-driven, and culturally competent" campaigns. San Francisco's Vision Zero education and outreach strategy was used as a basic framework for this document, specifically drawing upon the extensive research into best practices for road safety campaigns (see next section).

Four Main Areas of Focus

The SF strategy focuses on the following main areas:

1. Brand identify/mission buy-in

Brand focused on two core messages: 1) a significant, achievable goal that impacts all San Francisco residents and b) that each person in San Francisco has a role in helping achieve zero fatalities. The Vision Zero SF brand is the "entity" that embodies these two goals.

2. Multifaceted safety campaigns
In addition to the Vision Zero brand awareness campaign, the city will need to continue and develop multi-year educational campaigns that target specific audiences and specific behaviors with an aim of reducing known causes of collisions that result in severe injury and death. Some will be Vision Zero branded, and some will "in support" of Vision Zero.

3. Multifaceted safety programs
Support for standalone programs that support Vision Zero goals, for example, Safe Streets for Seniors program.

4. Engineering, enforcement and policy support
Education and outreach efforts should coordinate with and complement these other Vision Zero elements.

Education Core Principals

1. Use San Francisco specific data analysis to inform education initiatives.

2. Utilize best-practices in road safety education as well as the efforts of peer cities pursuing Vision Zero when designing initiatives.

3. Rely on public health and communications theories to ensure that there is a broad, multifaceted program that impacts all aspects of San Francisco's traffic culture.

4. Develop program focus and messaging through target-audience research and interviews.

5. Develop campaigns in a culturally sensitive manner, including using multi-lingual materials and engaging community organizations whenever appropriate.

6. Focus on ensuring the safety of vulnerable populations and the areas of the City where education and outreach are needed the most.

7. Coordinate activities based on the same vision, objectives and data.

8. Utilize data and messages that are consistent with Vision Zero.

9. Are, as much as possible, coordinated with enforcement and engineering.

10. Evaluate programs in their formative stages and conduct impact evaluation to determine program effectiveness as is feasible and as funding permits.

External Goals for Education Subcommittee

1. Measurable shift in the understanding that each person using city streets has the ability to change behaviors to support the reduction in severe and fatal injury collisions.

2. Measurable increases in awareness of key traffic laws and requirements.

3. Measurable reductions in injuries and fatalities caused by speeding, vehicles making turns, pedestrians stepping into the paths of oncoming cars and bicyclists failing to yield and other factors as identified.

4. Measurable reductions in speeding on city streets.

Focus of programs and campaigns

1. Developing a common understanding that death on our streets is unacceptable and that each person has a role in ensuring it does not happen;
2. Establishing new expectations related to behaviors on San Francisco's streets that result in changes to the way that people travel and as a result, safer streets with fewer collisions and fatalities;
3. Influencing perceptions, beliefs, and attitudes;
4. Educating about risk and protection;
5. Increasing skills and knowledge;
6. Increasing support for and helping implement safety policies; and,
7. Helping leaders support safety issues and promote a commitment to safety.

Near-term Educational Actions: Core Program

The following programs are the core of the SF education strategy, and are directed to be implemented in the next 1-3 years.

Program	Overview
Vision Zero Brand Awareness Campaign	• high visibility, mass media advertising (radio, TV, billboards, social media, collateral materials) • grassroots community outreach • sponsorship at community events • community mini-grants
Safe Streets SF: It Stops Here	• maintain existing campaign focus on laws regarding crosswalk violations
Safe Streets SF: Anti-speeding	• 2-year funding request of ATP • partnership: SFMTA, SFPD, SFDPH • high visibility enforcement with HIN focus couple with media campaign on dangers of speeding
Safe Streets SF: Safe Left-turns	• media and community outreach on left-turn safety - one of top 3 dangerous behaviors • 2-year funding request of ATP • Partnership: SFMTA, SFPD, SFDPH
Safe Bicycle Behavior Education Campaign	• top dangerous biker behaviors: • failure to stop at limit line, falter to stay in lane, faultier to stop before entering crosswalk • partnership: SF Bicycle Coalition, city agencies • stakeholder outreach, grassroots engagement, mass media ads, direct education

Safe Pedestrian Behavior Education Campaign	• five most dangerous behaviors: • failure to yield to motorist, midblock crossing, running a red light, leaving the curb suddenly, violating traffic signal • integrated: Safe Routes to Schools, Safe Streets for Seniors • partnership: Walk SF, city agencies
Safe Routes to School	• currently funded through FY 17 • partnership of multiple city agencies and community organizations providing training to 40 public schools • expand program to reach additional students and program impact
Safe Streets for Seniors	• provide safety education through senior centers, organizations and housing • in partnership with engineering outreach activities and with existing SFDPH programs for seniors
Larger Vehicle Driver Training Program	• developing standards and guidelines for companies that operate fleets of larger vehicles • training video and curriculum for drivers
Taxi training	• developing standards and guidelines for professional taxi drivers • video to be implemented into existing taxi training program

Engineering, enforcement, and policy support	• sees these efforts as "teachable moments" to help with education
	• support for materials development
	• SF Street Team
	  • "Guide to SF Streets" booklet
	  • education specific to engineering treatments

Programs for Consideration for Long-term Action

Permitting additional funding and research, the following actions are first priority for consideration after the near-term actions listed above:

- Visitor and commuter campaigns
- Expanded school programs
- Taxi and TNC related programs
- Internal/Staff programs
- Grassroots and Outreach Activities (additional)
- Other local safety campaigns (DUI, public health focus)

Outcomes:

- Increased public awareness and understanding of Vision Zero as city's commitment to eliminate traffic deaths
- Increased belief that SF street travelers can play a part
- Measurable decrease in dangerous behavior related to traffic deaths
- Increasing understanding and support for engineering treatments
- Increased capacity of stakeholders to inform and educate

Key Takeaways from NYC and SF Strategies

No two cities will implement Vision Zero in the same way, given the diversity and complexity of different populations, geography, differences in traffic data, etc. However, here are some of the key takeaways from the NYC and SF education and marketing plans that can be applied in practice in Los Angeles:

- Strategies should be data and research-driven in their development, including: best practices from previous road safety campaigns, best practices around public health outreach, behavior change theory, and message testing
- There is disagreement over the effectiveness of different kinds of messaging (i.e. positive, graphic, fear-based, etc.); messaging content should be focus-group tested and specific to the particular city and its communities
- Strategies should include a variety of media and on-the-ground community outreach and education tactics, aimed at different levels population segments (including public "influencers")
- Strategies should maintain core messaging throughout tailoring to different audiences
- Cities should take advantage of their own resources (agency resources, free ad space, etc.)

Best Practices for Road Safety Campaigns

Below is a summary of the San Francisco Vision Zero Education Subcommittee's literature review of over two dozen peer-reviewed journal articles on road safety campaigns and health communication generally.

San Francisco Road Safety Campaign Literature Review Summary

Main goals of road safety campaigns:

1. To raise awareness of an issue or to inform
2. To change attitudes
3. To change behaviors
4. To decrease the frequency and severity of accidents

Characteristics of successful road safety campaigns (in no particular order):[1]

- Are supported by other actions (legislature/policy, enforcement, rewards, incentives);
- Are based on behavior change theory;
- Break audiences into groups and tailor messages so they appeal to the different group;
- Address the existing knowledge and beliefs of target audiences that impede adoption of desired behaviors;
- Present information in line with social trends, behavior patterns or lifestyles;
- Use realistic, credible messages;
- Present the message in an unusual, new manner;
- Repeat a single message;
- Involve prior qualitative or quantitative research including pre-testing and focus groups;
- Evaluate and improve the campaign while it's being implemented;
- Use different interventions simultaneously;
- Set fairly modest, attainable goals in terms of behavior change;

[1] See reference 4, 13, 14, 20, 22, 26.

- Focus on the availability of products and services that support behavioral change;
- Utilize "media advocacy" or using the campaigns to achieve a policy change;
- Use commercial marketing and social marketing strategies.

Factors that diminish the effect of a road safety campaign are (in no particular order):[2]

- Conflicting messages;
- Delivery by source(s) lacking credibility;
- Inadequate exposure to campaign messages due to infrequent presentation and poor placement;
- Hostile message environments in which messages promoting change are outnumbered by competing messages that urge the continuation of existing behaviors;
- Insufficient training of the target audience on the skills needed to start and maintain the desired behavior change;
- Insufficient financial support for the campaign;
- Use of inappropriate or poorly researched format (e.g., boring factual messages or age-inappropriate content).

Road safety campaigns are generally more difficult than commercial campaigns because they seek to change behavior with complex variables. They must be more creative and nuanced because they have to develop a brand and involve negative demand with a small budget.

Tailoring Messaging

The better the messaging is targeted to different segments of the population, the more effective the campaign will be. Segments should be based on attitudes, values, and beliefs.

The following principles should guide decisions concerning segmentation:

- those with the greatest needs (according to crash data)
- those most ready for action and able to respond
- those easiest to reach (but this should not be at the expense of those most at risk who are difficult to reach)
- those that are the best match for the organization developing the campaign in terms of expertise and resources.

While messages may be tailored to different audiences, they should remain part of the same key core messages grounding the campaign.

Message Effectiveness

Because road safety campaigns seek to change a behavior, ads must not only be remembered, but be remembered for the *behavior being advocated.* Make sure the messages are clear, concise, and credible in order to best transfer memory into action.

People have a "psychological immune system", meaning they tend to ignore or rationalize information that makes them feel vulnerable or threatened (e.g. *That would never happen to me, I'm a careful driver.)* The best way to bypass these biases is to make sure the message is credible, meaning reflecting the beliefs and experiences of the target group, so they will personally identify with the character and associated behaviors.

[2] See references 22, 29.

Stressing the positive effects of desired behavior rather than negative consequences of undesired behavior helps make the content more relatable. Researchers have found that messaging that portrays undesirable behavior can potentially normalize that behavior. "Priming" the audience with words, images, or phrases that emphasize the benefits of desirable behavior is more effective. For example, a speeding campaign should not carry the message "if you drive too fast you will be involved in a crash, be fined, and cause serious pain and damage." Rather, it should have a positive tone, and carry the message "'obeying the speed limit is safe, it is relaxed, takes less fuel, and most people roughly keep to the speed limit anyway." Positive, emotional, and actionable ads have the most inherent appeal.

Providing a positive alternative to the undesired behavior is also an effective strategy for making the message more relatable. For example, focusing on having a "plan B" instead of driving home after drinking. This may be more difficult with behaviors like speeding, and should be message tested in focus groups to determine specific applicability.

Best practices research suggests that fear-based messaging may motivate people, but may also trigger defensive responses. Audiences may avoid the message because it's perceived as too overwhelming or they feel hopeless. If one does use fear-based messaging, it should be credible and propose a positive solution.

Messaging Exposure

Health messaging advocating for behavior change tends to be well known and largely ignored, and too many ads can seem patronizing. New research suggests that it is best for all target audiences see ads at least once, and the goals is for as many to see messaging as is affordable. Most experts suggest three to ten exposures as the most effective exposure rate. Over ten exposures is too much and over fifteen can results in negative reactions. Repeated cycles of short-term mass media exposure has been found to be effective.

The Role of Enforcement in a Successful Campaign

Enforcement best enhances the effectiveness of messaging when targeting compliance-based behaviors like speeding, failure to yield, and drinking and driving. Enforcement can also overcome feelings of being patronized in the target audience. Finally, information alone is more likely to influence behavior based on deliberate choices as opposed to habitual behavior, like wearing (or not wearing) a seatbelt, speeding to save time, or driving after drinking. In these cases, the most effective change strategies impede performance of the established behavior (through punishment or rewards) while facilitating formation of new behaviors into habits.

<u>When to link enforcement with education:</u>

1. If enforcement of compliance is possible, such as with speeding, failure to yield and drinking and driving. Less visible behaviors like fatigue are harder to combine with enforcement and may benefit more from messaging alone.
2. If a law is well known but not being followed.
3. If a campaign can lead to feeling of being patronized.
4. If the behavior in question is habitual.

Target Audiences

Behavior change can happen through direct exposure to messaging or indirect exposure by the conversation sparked from messaging. In order to change social norms, behavior change theories encourage targeting multiple levels of audiences: individuals, communities, institutions, organizations, decision-makers, and social networks. Transportation is a unique

public issue area as nearly everyone engages in it. This means there is an increased likelihood of indirect pathways influencing behavior change. Large-scale mass media campaigns with high population exposure can be particularly effective at influencing the overall population response and awareness to road safety.

The information transmitted through road safety campaigns has been shown to:[3]

1. Contribute to an increase in knowledge and a change in attitudes;
2. Increase the perception of the likelihood of detection and punishment;
3. Contribute to the acceptance of unpopular but effective measures such as enforcement;
4. Help place the issue on the social agenda, which can help drive legislation or generate public support for road safety programs;
5. Lead to the emergence of new social norms.

Also important to note is that road safety offences occur within a social context—we rarely travel in isolation, but rather share the road with others. It's impossible to be anonymous. This "social regulation" means that there is great potential for factors like norms and attitudes to affect a person's decision to commit an unsafe road behavior. Traditional legal sanctions are important, but the indirect pathways should not be underestimated.

One the most important lessons from this research is the importance of grounding road safety messaging in behavior change theory in order to maximize effectiveness. Prominent behavior change theories related to public health outreach are overviewed in the next section.

Behavior Change Theories

Best practices research encourages grounding Vision Zero in widely studied theories of behavior change. There has been a history of ineffective behavior change attempts around road safety in particular.[4] However, behavioral science has increasingly emphasized and integrated injury prevention initiatives over the past few decades. Growing research shows that targeted approaches to injury prevention that are based in behavior change theories are more effective in reducing the risk of dangerous behaviors.

There is no one dominant theory of behavior change in the public health field. Researchers advocate simultaneous use of multiple theories, with emphasis on those that apply most specifically to the particular campaign context (i.e. topic, demographics, place, etc.). See Appendix A for an overview of behavior change models and concepts related specifically to injury prevention and public outreach.

SECTION 4: INTERVIEW FINDINGS

Findings from our interviews with 46 stakeholders reveal a common set of themes around the current landscape of dangerous traffic behavior within Los Angeles, as well as effective messaging and outreach practices that will work to achieve the goals of the education and outreach strategy. They also emphasize equity and cultural relevancy considerations that Vision Zero must take into account if it is to be successful. Finally, the data suggests how Vision Zero should move forward in facilitating and leveraging effective partnerships both between agencies and sectors.

Messaging Strategies

[3] See references 6, 13, 22, 26.

Modal Conflict

Almost all of our interviewees expressed the "inherent conflict" between moving cars as fast as possible and moving people safely. They cite that within the post-war period, much of Los Angeles was built with the automobile in mind, with wide, six-lane streets meant for speed, freeways cutting through neighborhoods, narrow sidewalks, and nonexistent bicycle facilities. In recent years, there has been a culture and policy shift towards prioritizing active modes of transportation such as walking and bicycling, however much of the infrastructure continues to reflect previous eras and there is still a great concern over congestion.

The clash between people and cars is evident in community debates around traffic-calming measures such as the road diet on Rowena Ave in Silver Lake. However, recent increases in traffic fatalities has galvanized many groups to say "enough is enough," we need to do more to move people safely. Several of our interviewees expressed that if we make the road safer for pedestrians and cyclists, the roads will become safer for everyone.

- Strategy 1.0: Vision Zero messaging should consider the vehicle-centric nature of Los Angeles as well as the conflict between moving cars fast versus moving people safely.

Norm Change

An overwhelming majority of our interviewees expressed that for Vision Zero to be successful in Los Angeles we will need to change social and cultural norms around traffic behavior and traffic fatalities.

A messaging strategy that seeks to shift social norms is referred to as a "social marketing campaign." A social marketing campaign differs from a traditional communications campaign in that it is not focused solely on consumer choice--where you tell someone to do something or increase brand appeal, but is rather about changing what is socially acceptable within a community. Many interviewees cited anti-tobacco campaigns in California as successful examples of social marketing. The messaging changed what people accepted as normal and created an environment where it has become less socially acceptable to smoke in California.

As in the case of tobacco, these cultural shifts take years and are more successful when paired with effective policies such as anti-smoking laws in restaurants, parks, cities, etc. In order to be successful, the message must also get to the root of why people should care about the issue. A successful norm change campaign for Vision Zero would seek to promote the ideas that Los Angeles is a place where traffic deaths are unacceptable and preventable.

- Strategy 2.0: Messaging should be part of an overall "social marketing campaign" that seeks to change social and cultural norms around transportation and traffic safety.

Core Messages

At the heart of this social marketing campaign, there needs to be strong universal messages addressing why people should care about traffic fatalities and Vision Zero. While not the specific language used for public messaging, these core messages are the foundation for the campaign. The messages are simple and can address both why people should care and potential barriers to their interest or participation in Vision Zero. Each message is simple yet broad enough to be substantiated in various ways depending on the target communities, cultures, and lifestyles. This tailoring will be especially important in Los Angeles, considering

differences in current perceptions of traffic safety (shaped by an individual's neighborhood, communities, primary mode of transportation, country of origin and so on).

- Strategy 3.0: The campaign should have a set of simple and universal core messages that serve as a foundation for all messaging, and can be substantiated in many ways depending on the audience.

Segmentation

Segmentation of the population into different audiences is critical to understanding who your audience is and how to tailor the core messages accordingly. Interviewees discussed various ways to segment the population. One way is to segment based on the collision data in which audiences are determined from those categories with the highest incidences of collisions and in accordance with LADOT's prioritization metrics. This would include: 1) pedestrians 2) bicyclists 2) children 3) seniors, and 4) male drivers ages 18-54.

While the above approach is data-driven and addresses those who are most likely to be involved in a collision, these groups are still too broad for targeted messaging. Because the demographic data from police reports is limited, the next step would be to further segment based on lifestyle, for example how often they use certain modes of transportation versus others. An example of this type of segmentation within pedestrians: 1) recreational walkers 2) joggers 4) daily walkers 5) public transit users. For male drivers: 1) daily drivers 2) weekend drivers 3) professional drivers. This will allow for a better understanding of the differences in how each segment will be reached. For example, a daily driver may be best reached through the radio or a billboard, while a public transit user may be best reached through signs at bus stations and on their smartphone.

If further demographic or geographical data permits, these segments can then also be layered with a multicultural and community centered approach. For example, if Chinatown has a high number of pedestrians collisions, the message should be framed around the types of pedestrians within Chinatown and the best way to appeal to this group that is both culturally and contextually relevant. More discussion on social equity will appear later in this section.

Often, there will be overlapping segments such as those who drive sometimes, but also ride their bicycle recreationally on the weekends or occasionally to work. A messaging strategy should actively try to find where these overlaps exist in order to efficiently reach the largest audience possible with a single message and medium.

A final segment to take into account when developing the messages and determining their modes are the individuals' proxies. Many of our interviewees commented that people often do not care about their own mortality or find ways to rationalize it by saying *that will never happen to me.* When this occurs, sometimes the most effective way to change behavior is through communicating to their family members, significant others, friends, or peers, who can then move the individual to stop the dangerous behavior.

- Strategy 4.1: The campaign should tailor messaging to segmented target audiences.
- Strategy 4.2: Audiences should be first segmented based off the campaign priorities, and then further using additional lifestyle and demographic characteristics.
- Strategy 4.3: Segmentations should be as specific as data and resources will permit.

➽Strategy 4.4: When applicable to particular segment and behavior, messaging should target individuals exhibiting dangerous behaviors as well as those close to them.

Framing

Once the segments for Vision Zero messaging are identified, the task then revolves around framing the messages in a way that is relevant to those segments. The ultimate goal here is to change their attitudes about traffic related fatalities and their own behavior accordingly, as well as support policies and infrastructure that seek to reduce fatalities.

Quality of Life

Almost all interviewees emphasized quality of life as a central concern that was universal to every demographic and geographic group within Los Angeles. They stressed that in order for people to care about Vision Zero, the messaging had to directly relate to their lives. Quality of life directly pertains to issues like public safety, commutes, children, and the quality of the built-environment.

Family

Another universal theme which resonated with almost every interviewee was the importance of family. As mentioned earlier, people worry more about their family than they do themselves, so framing a message such as “drive like your family lives here” or “that bicyclist is your family member” might effectively remove the attachment people feel towards others on the road by personalizing it to those they care about.

Children

Children were viewed by many as a strong emotional touch point when messaging to communities about the importance of traffic safety. As one interviewee noted, “people just want to make sure their children can cross the street or walk safely to school.”

Power of Personal Stories

Many of our participants noted the power of personal stories in getting people to listen and care. They argued that although statistics can be shocking to some, often times people do not really know what they mean. If you can put a face to a statistic about someone who lost a family member or even within a positive light about someone who cycles to work everyday then you will be more successful at connecting with a broader audience.

Why Should You Care?

No matter the message, interviewees stressed the need to make people understand why they should care about Vision Zero. One interviewee noted, “at the end of the day, no one wants to get into a car accident, give people more reasons to understand why not so the issues is at the front of their minds.” That way the messages can “insert themselves into the moment of decision-making” before someone pulls out their smartphone to send a text or speeds down a street because they are late for work. The goal is to get them even for just a moment in time to stop and think before making that decision.

➽Strategy 5.0: Messaging should framed in a way that makes it personal to the targeted audience and addresses why they should care.
➽Strategy 5.1: Using themes relating to quality of life, family, and children are the most effective ways to personalize messages.

➽Strategy 5.2: Messaging should use personal stories whenever possible to humanize data.

Medium Types

Messaging mediums should be tied to the content by considering how each audience segment will most likely see or hear each message. For example, bus shelters and bus ads are logical pairings for messaging targeting pedestrians, while freeway billboards and rush hour radio spots should be tailored toward commuters. Billboards and bus shelter ads in areas with many bars and clubs might find an appropriate audience for anti-drinking and driving messaging. A comprehensive campaign will also incorporate non-traditional mediums like printing messaging on objects (e.g. coasters, water bottles, coloring books, etc.) or organizing public performances (see Non-traditional Campaign Ideas).

While it may be resource-intensive, doing market research into specific groups is necessary for effective with tailoring. For example, the research might reveal that "radio spots on these specific podcasts will target white, male cyclists between 25-35." Social media advertising should be effectively tailored with services like Nationbuilder, for both demographic factors (e.g. age, gender, etc.) and lifestyle factors (e.g. use public transit, tend to go out on the weekends, etc.).

Whether it be the result of market research or common sense, best practices encourage establishing logical pairings to tailor messaging to different population segments to make the messages stick. Considering the resource limitations, particularly with mass-media advertising, priority should be given to largest segments within Vision Zero priorities.

➽Strategy 6.0: Tailored messaging content should utilize the most logical medium for that population segment, based on how they are most likely to be exposed to messaging

Earned Media

While much of the Vision Zero messaging will be disseminated through purchased media, many of our interviewees discussed the cost-efficiency and publicity advantages of earned media (i.e. any free exposure or media coverage resulting from other campaign efforts). Media might be earned through submitting op-eds, or press releases or online videos that are widely shared and lead to news coverage by major outlets. Viral social media content can also contribute to earned media.

➽Strategy 7.0: Whenever possible, Vision Zero should utilize earned media through staged events, press releases, social media, and other tactics.

Non-traditional Campaigns

Many of our conversations with communications specialists looked at the growing prevalence and power of non-traditional campaigns as a way to communicate messages to the public. Non-traditional campaigns consist of any public installation or event that seeks to communicate to the public while also maximizing potential for earned media. This includes but is not limited to flash mobs or performances in the street, actors speaking to residents, pop-up art installations, and community murals. One peer city example of this is Washington D.C. DOT who is in the process of commissioning a mural, which would raise awareness about street harassment (for more, see Non-traditional Campaign Ideas).

- Strategy 8.0: Vision Zero should strategically invest in non-traditional campaign tactics to gain earned media, and contribute to the overall theme of innovation and creativity associated with the campaign brand.

Competition

It is important to acknowledge the advertising landscape to see what the messaging will be competing against, and when a campaign will have the most potential for success. Some considerations include the upcoming June and November elections and the holiday season, in which air time will be expensive and saturated with advertisements. Additionally, private companies are adept at disseminating and marketing condensed and targeted messages to many different audiences.

For these reasons, our interviewees emphasized the importance of simplicity in Vision Zero messaging. They noted that people are exposed to so many messages throughout their day that they do not have the time or energy to read everything. Moreover, messages should be communicated in terms that can be understood by everyone and should avoid any technical transportation or public health terms such as "data-driven, prevalence, outcomes, countermeasures, infrastructure, or bike facilities" just to name a few.

Additionally, for different age groups such a youth, seniors, and non-native English speakers, there may be varying levels in literacy and English reading capacities. In such cases, images or visuals which communicate the desired message or concept without compromising its integrity may be the solution. As one interviewee noted, "images unite where words tend to divide." Language accessibility will be discussed further in the community outreach section.

- Strategy 9.1: Media purchasing should be strategically scheduled to achieve maximum efficacy.
- Strategy 9.2: Messaging should use simple, public-facing language and avoid using technical terms.

Message Testing

Message testing should incorporate both random-sampling surveying and focus groups. Lessons learned from previous outreach campaigns reveal that surveys with larger sample sizes will help inform more generalized reactions to the content (e.g. emotional tone, choice of images, etc.), while focus groups are more helpful in providing specific reasons why audiences find the content appealing or unappealing.
When the final segmentations have been determined, a sample of each of these populations should be represented in focus groups. Messaging intended to change behaviors should be tested with focus groups and survey samples that represent the populations most likely to commit the behaviors (see *Prioritization Metrics* section*).* Messaging intended to increase general brand awareness should use focus groups and survey samples that segment populations by a variety of factors: lifestyle habits, geographic location, languages spoken, race and ethnicity, age, gender, etc.

- Strategy 10.0: Messaging content should be tested through broad-based surveys and targeted focus groups both before implementation and throughout the campaign.

Social Equity

As mentioned earlier, the Vision Zero education and outreach strategy should take certain considerations into account when communicating with underserved populations and low

income communities. We want to highlight the need for a holistic approach that does not view Vision Zero, mobility, or traffic safety within a vacuum, but rather integrally linked with a host of other issues that impact these same communities.

Issues such as concerns with law enforcement, deteriorating infrastructure, zero-car households, lack of grocery stores, crime, and homelessness all impact why and how people get around and may be more pressing than traffic safety for certain communities. For example, it may be less effective to focus education efforts on the disability community without being able to feasibly ride a wheelchair on the sidewalk. Students walking home from school in an area of high homelessness may need to step into the street to avoid encampments, putting themselves in danger of passing cars.

Messaging should account for communities' different needs and ends when it comes to mobility and traffic safety. For working class communities, safe walking and biking may mean safe access to the places that are of necessity to their daily lives, such as their work, the grocery store, or school. While safe active transportation in a more affluent area may have a more peripheral impact on their daily experience, such as getting more exercise or enjoying nature.

In sum, an education and outreach strategy will be most successful if it acknowledges these considerations *before* messaging and implementing safety programs within various communities. The goal is to meet people where they are in all aspects of traffic safety, and build awareness and behavior change from there.

➽Strategy 11.0: The education and outreach strategy must consider competing and correlating issues that impact disadvantaged communities.

Community Outreach Strategies

Best Practices for On-the-Ground Public Outreach

Unlike mass media messaging, public outreach refers to in-person Vision Zero education efforts carried out by LADOT or community partners. These outreach efforts will happen in a variety of smaller settings, and will rely heavily on community-based organizations' relationships and expertise around the communities they serve. However, public outreach efforts still need to be able to answer the question, "why should they care?". This question should be answered at individual, family, organization, and community levels. The person or group best able to answer this question will vary depending on the target audience. This section will cover findings and recommendations for on-the-ground outreach for the general public.

Engaging Individuals

Many of our interviewees experienced with on-the-ground outreach discussed effective ways of engaging community members around an issue. The most important factor is making the issue matter at an individual or family level. If the average community member cannot answer the question, "why is this worth taking time out of my day?", the turnout is likely to be low. Sometimes this means taking advantage of local "hot topics" or controversies. For example, a council district office member recounted the most well attended community meeting in recent memory was a meeting with the LAPD after a recent crime spree had hit the neighborhood. Overall, people fundamentally care about safety, their families, and their quality of life, so outreach efforts should draw a strong connection to one or more of these topics.

Incorporating a broader view of the potential benefits and costs of an initiative may also make it easier to align interests with individual community members. For example, more people were supportive of an initiative to turn Oro Street in Woodland Hills into a green street when they learned that it would raise their property values. Taking advantage of certain unintended consequences or related issue areas can be effective in addressing a wider audience.

- Strategy 1.0: On-the-ground outreach should engage individuals by taking advantage of public interest in other local issues and concerns.
- Strategy 1.1: Vision Zero should engage individuals by emphasizing the specific outcomes that align with individuals' or communities' priorities.

Communication

Many interviewees, particularly those with communications expertise, highlighted the importance of using simple, clear, and concise language. Words like "data-driven", "prevalence", and "outcomes," might seem simple enough to those familiar with the terminology, however they are not as accessible to a public audience. Additionally, relying on visuals more heavily than words can be an effective way to transcend language, particularly among non-English speakers.

However, this does not replace the need for community outreach efforts to be in languages that are prevalent in a particular community. In practice, this might look like having a translator in community meetings, having materials printed in 3-4 languages, or having opportunities for public input in non-English languages that can be translated at a later date. It is important to be judicious, intentional, and competent with translation resources. Many nonprofit and city agency representatives recommended using community-based organizations to make sure translations are culturally competent.

Whether the information comes from LADOT directly or from a community partner, it will help community members contribute to the success of a city-driven initiative if they understand the role and limitations of government. Setting clear and realistic expectations around the timeline of infrastructure improvements, for example, might cause less frustration and disappointment in the future. It also helps community members feel like active partners and remain engaged in a process if they receive follow-up communications about the outcomes or next steps following a community meeting.

- Strategy 2.0: Outreach efforts should use simple and culturally competent language.
- Strategy 2.1: When applicable and possible, verbal communication and written materials should be translated by a trusted source into all languages used by the target community.
- Strategy 2.3: Outreach to the community should be framed with clear and realistic expectations, emphasizing the role and limitations of government.

Outreach Methods

Choosing the most effective outreach venue will depend on factors like the community trust in organizations, the nature of the message, and current level of engagement of community members. It will be important for LADOT to remain aware of their "brand" within different communities, and whether or not they are the best organization to spread a message within a particular neighborhood or population. For example, council district office staff representing certain areas of the valley expressed a common "anti-establishment" sentiment in some

constituent groups, where education will be more effective from trusted source (e.g. school, nonprofit, faith-based organization).

Similarly, in communities where few people are engaged in public issues or those that have distrust of government will likely need messaging from trusted CBOs and personal networks. Alternatively, a more actively engaged community with strong participation in neighborhood council meetings might request a Vision Zero presentation from LADOT staff.

Some interviewees shared previous success with outreach by finding "natural pairing opportunities" with existing community events or practices. For example, it would make sense to have community-based advocates spread the message to Southeast Asian cultural groups who tend to walk outside after dinner and talk to neighbors. Generally, pairing with existing community events or practices will garner better audience diversity, as they require less advertising and can target people participating for multiple reasons.

Some groups or people at specific events might have a bias for or against a particular initiative. Interviewees advised not to avoid speaking with groups who have reason to resist the initiative, but approach them with an awareness of how the initiative overlaps with their priorities. Simultaneously, finding groups or events (particularly highly trafficked ones) with compatible interests can be a way to effectively target resources. For instance, the LADOT team working on the "Watch the Road" Campaign partnered with T-Mobile to send active transportation-related messaging to participants of the LA Marathon.

- Strategy 3.0: Vision Zero should leverage community-trusted organizations and leaders to conduct outreach and education.
- Strategy 3.1: Education and outreach efforts should leverage existing events and lifestyle within specific demographics to maximize reach and resources.
- Strategy 3.2: Outreach efforts should recognize varying levels of support for Vision Zero and strive to meet people where they are.

Events and Meetings

Providing incentives, resources, and services are effective ways of attracting people to events. Specifically, providing food, childcare, and varying the times of the events will help bring in those who might not otherwise have the resources to come.

Advertising to a diversity of community partners, leveraging public-private partnerships, and providing interactive activities are methods of widening the reach of events and meetings. Creative working group activities or games can be fun ways to engage and educate at the same time. One city official recalled a four-hour "Iconothon" event that brought together designers, policy experts, and community members to brainstorm visual icons for The Noun Project. She was so engaged she only realized at the end that she was learning about traffic infrastructure throughout the event.

Interactive activities like mapping and explaining why a pedestrian takes a routine route help make people feel like they have an active voice in community improvements, while also providing valuable information to fill in gaps in technical data normally available to city agencies. Leaving participants with a tangible call to action will help them stay engaged in the process and thinking about the issue or initiative.

Events with multiple activities and organizations can be an opportunity to bring people together who normally do not interact. For example, a New York City DOT and Parks and Rec "bike bonanza" event had New York City police officers present to tag children's bicycles in

case of theft. This provided an opportunity for positive reinforcement between children and law enforcement, who might not interact under normal circumstances.

- Strategy 4.0: Education and outreach events should provide physical incentives to garner additional interest.
- Strategy 4.1: Vision Zero should advertise and partner with a diversity of organizations to get increased attendance at education and outreach events.
- Strategy 4.2: Outreach and education events should incorporate interactive activities in order to engage attendees while also acquiring valuable information.
- Strategy 4.3: Vision Zero should use education and outreach events to bring populations together who would not normally interact.

Special Populations

Below are interviewees' specific recommendations and considerations for special populations.

Seniors

- Target senior centers and senior housing
- Humor is more effective than telling seniors what to do; seniors are very sensitive about losing sense of independence related to mobility
- Should provide a variety of print materials---big font size, easy to see and understand, simplistic, be careful with bright colors
- Presentations are best way of reaching seniors, particularly from someone in an authoritative position
- Need to have materials in a variety of languages (Dept. of Aging has translation resources)
- Faith-based organizations are good partners for reaching seniors
- Be aware of multiple senses as they relate to traffic safety (e.g. some electric/hybrid vehicles don't make sounds and particularly important for seniors to be aware of)
- Biggest barriers: language (for non-English speakers) and ability to hear

Children

- Need structure and parental engagement to reach young children ('bike rodeos' are not effective)
- Can sometimes reach parents through their children (e.g. many parents might come to a bike safety class for their child, though they wouldn't for themselves)
- Social media is the most effective medium for young age groups (Instagram and Snapchat are more effective than Facebook for generations younger than Millennials)
- Remember to segment children in smaller age brackets (e.g. middle schoolers and high schoolers are very different)
- Humor is the most effective way to get Youth to share things, particularly on social media /

Disabled

- People with disabilities are often physically less visible in the built environment
- Many disabled people are living on small stipends and may have less access to transport/internet, though internet is still a prominent source of messaging
- It may take more resources for a physically disabled person to get to out of the house and transport themselves to an even than an able-bodied person

- Current mobility focus for disability community is on the physical environment (e.g. lack of proper sidewalk infrastructure means dangerous detours into the street for those in wheelchairs)
- Barrier: many people do not want to identify as disabled (particularly seniors) because of the associated stigma

Non-English speakers

- Culturally named neighborhoods often have multiple prevalent languages (e.g. in Chinatown has prominent Vietnamese and Cambodian populations)
- Visuals are an important tool for communicating to non-English speakers
- Resources for community events: in-person translators, audio set translators, materials printed in multiple languages, input mediums (e.g. big posters) that can be translated later

Typically Unengaged in Public Issues

- Find captive audiences in highly trafficked areas (e.g. gas stations, the DMV)
- Use online surveys and neighborhood blogs
- Urge friends who are more aware of the public sphere to reach out to friends and family who may not be.

➽ Strategy 5.0: Education and outreach efforts should take into account considerations for special populations.

Best Practices for Engaging Community Partners

As the Vision Zero organizer, LADOT should have an idea of the working landscape of the environment proximate to the initiative. Regarding community partners, this means having an awareness of the power dynamics (ability to influence the success of overall initiative or specific project) of partners, their relationships and current priorities. Having this understanding will help LADOT prioritize and utilize outreach resources most effectively. LADOT will need to trust and rely heavily on its community partners for outreach and education, as the implementation of a mission-driven initiative like Vision Zero will vary significantly in different places and communities.

Establishing Partnerships with Community-Based Organizations

A fundamental aspect of successful partnerships between government and community-based organizations is recognizing that both are experts in their own right, with different resources and limitations. With mutual trust and respect, they can more effectively leverage their respective strengths. Developing trusting relationships involves recognition of previous interactions between city agencies or departments and CBOs. Several interviewees representing CBOs expressed a lack of trust for LADOT based on previous experiences. Government transparency and collaboration with CBOs in the decision-making process were emphasized as key ways to strengthen working relationships. Conversely, government representatives expressed the need for CBOs to recognize the limitations of government structure and accept that catering to diverse needs involves sacrifices.

Just as successful campaigns involve making individuals care about the message, LADOT can more successfully engage community partners by establishing a connection between missions, and integrating Vision Zero into CBO's current activities. One way to find organizations with the most alignment and community-specific knowledge would be to send out an RFP to CBOs in each council district or neighborhood designation, with a focus on areas with higher collision prevalence. In this way, LADOT could spread out funding across the city and across organizations. Several interviewees iterated the need for adequate

funding for resource-intensive outreach, and suggested that the funding not be narrowly prescriptive as outreach methods will vary significantly by community.

There may also be opportunities for CBOs to get outside grants from CalTrans or other agencies to help do outreach work on a specific campaign. LADOT's "Watch the Road" campaign was able to broaden its community reach by giving campaign materials to CBOs with outside funding. In addition to physical materials, it would be effective to have workshops to train CBO staff and volunteers on Vision Zero core messaging, materials, and other available resources.

- Strategy 6.0: Successful partnerships between LADOT and CBOs should emphasize transparency, collaborative decision-making, and mutual respect.
- Strategy 6.1: Vision Zero should engage community partners by aligning priorities and existing outreach efforts.
- Strategy 6.2: Where possible, Vision Zero should extend its reach by finding external funding sources to sponsor CBO outreach efforts.

Going Upstream

Effective public outreach campaigns work to simultaneously reach the general public as well as decision-makers and influencers. By going "upstream" in addition to grassroots outreach, a campaign will have the potential to affect policy, legislation, and change wider social norms. One interviewee suggested Vision Zero leaders meet with the five most prominent print media editorial boards in the city to educate them on the purpose and appeal of the campaign. Getting the media on board will help brand the campaign positively as well as put it on the "public agenda."

Approaching elected officials will be another important step in successfully coordinating wider policy change and legislation. One approach is to seek out those elected officials whose priorities already align with Vision Zero, and seek their insight into how it could be successfully framed for their colleagues. At the end of the day it has to be something that they will feel comfortable and championing among their other priorities and to their constituents.

Additionally, educating leaders of other government agencies and departments is an effective way to take advantage of the government network. However, educating their leaders is not enough, as often information does not easily trickle down through an organization. Having compact and attractively packaged resources targeted toward city officials will help the information disseminated through the ranks of these organizations. Have these materials focus on how the campaign is a collaborative effort among departments, always keeping in mind the question, "how can I make it matter to them?".

- Strategy 7.0: Education and outreach efforts should simultaneously target the general public as well as decision-makers and influencers.
- Strategy 7.1: Vision Zero should engage elected officials and decision-makers by aligning it with their existing priorities and values.
- Strategy 7.2: Vision Zero should provide compact, attractive, and tailored resources that can be disseminated throughout city departments.

Other Partnerships

In addition to community-based organizations and formal decision-makers, Vision Zero can expand its reach by leveraging additional partnerships with the private sector, neighborhood councils, alternative media, schools, and/or other cities in the region. It will be the most

resource efficient to find leaders and organizations in other sectors that have aligned priorities with the Vision Zero mission. For example, AAA or car insurance companies might be interested in supporting driver education programs. See Appendix C for more detailed, sector-specific partnership considerations.

- Strategy 8.0: Efforts to leverage partnerships should take into account advantages, considerations, and barriers for specific partners.

Concerns and barriers

The most pervasive barrier to a public outreach campaign in this area is diversity of the Los Angeles population. There is no one common identity or experience as Los Angeles is one of the largest and most diverse cities in the world. Additionally, Vision Zero is city-driven but requires a regional approach in order to target commuters who live outside of the city but often travel within it. It will be impossible to reach all of the necessary audiences through resource-intensive, on-the-ground outreach. Community partners can actively engage in a conversation with city government on how to best and realistically prioritize outreach resources. Mass media purchasing and creating a cohesive, interesting brand will be the best way to reach a broader audience.

Another unique barrier to the Vision Zero campaign is that "traffic deaths" does not automatically register for many people as public problem, or they might only recognize it as a government problem instead of a community problem. While people may think they are tragic, Vision Zero requires a mindset change around traffic deaths being *unacceptable and preventable.* Some interviewees expressed that even if people accept it as a problem, some will think that zero deaths is a naively unrealistic goal, making the campaign seem less credible.

In addition, several interviewees from both government and CBOs expressed a distrust of government and law enforcement in local communities, particularly in low-income communities of color. In places where traffic deaths have been a widespread problem for decades, some will ask, "why does the city care all of the sudden?". This plays into some fears of infrastructure improvements being the first sign of gentrification and displacement, or the idea that these improvements are not for the people who live there. Addressing these concerns will involve open communication around fear over these issues, and expressly mitigating any contributions that infrastructure improvements might have towards displacement.

Fear of "over-enforcement" and distrust of law enforcement in low-income communities of color was also a theme brought up in several interviews. Some interviewees said that the community members they represent would feel less instead of more safe with increased police presence. Some also pointed to aspects of mobility can be criminalized, for example, riding without a helmet or riding on the sidewalks due to lack or resources or infrastructure. This issue could potentially be proactively addressed with collaboration between LAPD and the Vision Zero Alliance and other CBOs involved in the outreach process.

- Strategy 9.0: Education and outreach efforts should expressly and carefully address community-specific concerns around Vision Zero, such as perceived over-enforcement or displacement.

Education Topics

The education component of Vision Zero outreach should be developed and segmented for different target audiences (see Digital Curricula in Appendix B), however should focus on the following topics:

Vision Zero Awareness

The most basic part of any Vision Zero education effort will be to explain the core ideas of the initiative and why they are important. However, unlike many public education efforts, Vision Zero is not merely reminding the audience of something they know--it will involve a paradigm shift for many people around the way they think about traffic safety and education. It will be important for educators knee-deep in Vision Zero to remember that the ideas that "traffic deaths are *unacceptable and preventable*" or that "Vision Zero prioritizes moving *people* safely more than moving *cars,"* will be novel and unpalatable to many community members. Therefore the curriculum should dedicate significant time and energy and a diversity of approaches to addressing this paradigm shift, leaving room for audience discussion to help internalize these ideas.

Make it Personal

Perhaps the most important part of any education and outreach campaign is to make people care by making it relatable to their everyday lives. This portion of the curriculum/presentations should be expressly developed for the particular audience (e.g. school children of different ages, city employees within different departments, neighborhood councils, etc.). At a human level, everyone cares about their families and their quality of life, however people will quickly forget or lose interest in things without a direct call to action for how they can incorporate these ideas into their own lives or work.

Rules of the Road

Lack of public knowledge on proper rules of the road for cyclists, pedestrians, and car drivers, was emphasized by several interviewees as a major factor contributing to dangerous behaviors. There are many "rules of the road" curricula that could be easily adapted for use with Vision Zero, however they should be honed in on knowledge areas directly affecting dangerous behaviors, for example:

- Right of way between different modes
- When and where pedestrians are allowed to cross the street legally
- When and where cyclists can ride most safely and legally
- Car speed limits

This curriculum should be tailored for different age groups and languages, but can remain consistent in content. A creative video or interactive presentation (e.g. a quiz to see how many things people get right or funny animated video) will garner more attention, particularly on social media, than simple instructional language. It may sometimes be helpful to coordinate in-person education efforts with law enforcement as part of larger Vision Zero outreach events.

Mode-specific education

While we encountered multiple interviewees representing organizations with ongoing cyclist safety trainings, there is less focus on education efforts targeted toward pedestrians and drivers. While safety trainings might be more coveted by cyclists because of the lack of

cycling infrastructure, one interviewee also expressed that most people do not hold a strong identity as a "pedestrian." A coordinated curriculum that addressed both pedestrians and drivers would target a large segment of the population that both drives and walks on a regular basis.

In addition to an adopted written curriculum for in-person education efforts, current cyclist trainings should be financially supported so they can expand their capacity and marketing reach. Short-video modules addressing all modes (many are already developed for free/purchase) should be available on the Vision Zero website for community partners to use. A short, engaging video easily shareable on social media would help target audiences who will never take the time to do or be otherwise exposed to in-person trainings.

It may be valuable to discuss a possible partnership with car insurance companies to develop and promote a driver's safety class (online or in-person) in order to reduce premium costs or receive some other benefit. These could be targeted toward drivers with history of accidents or tickets.

Lastly, more formal and digital education approaches can be complemented with creative on-the-ground education. For example, one Vision Zero focus city gave out fake tickets to pedestrians and cyclists at particularly dangerous intersections that contained funny and educational messages about traffic rules.

Integration with Engineering and Enforcement

Infrastructure improvements and increased enforcement efforts will both necessitate and offer opportunities for additional education. Both are highly visible and sometimes controversial, which can result in a more engaged public audience. However, education efforts will also need to be proactive around both of these areas, so community members understand how to use infrastructure, and the purpose of engineering and enforcement within the overall mission of Vision Zero. Controversial topics may be a gateway to educate neighborhood members who might not otherwise be interested in Vision Zero. Special attention should be given to low-income communities of color who may have distrust of law enforcement or perceive new infrastructure as a sign of rising rents and displacement.

Input Mediums

All education efforts should include opportunities for input. Not only does giving community members a voice make them more likely to feel engaged, open conversation will help internalize the lessons and draw connections to their own lives. Lastly, gauging the concerns or confusion of the public will help make future education materials and presentations more effective by addressing them proactively.

SECTION 5: MESSAGING CONTENT AND BRANDING RECOMMENDATIONS

Prioritization Metrics

Community Voted Priorities

LADOT has created a safety prioritization system in order to strategically allocate Vision Zero resources for engineering, enforcement, and education. These priorities will inform where to execute engineering countermeasures as well as how to effectively enforce traffic laws. For education, the priorities will help to identify the audiences and develop messaging content. Through community surveys and public input, LADOT determined that **1) Severity 2) Prevalence and 3) Social Equity** are their top three priorities. Given these priorities, LADOT has decided to focus their efforts as follows:

Safety Priority	Reason
Pedestrians and bicyclists	They are greatly overrepresented in KSI collisions relative to both their mode share percentage and percentage of total collisions
Children and seniors	They have a higher share of pedestrian and bicyclist (aged 11-17) victims than any other age category and are overrepresented in KSIs compared to total collisions (10% and 4% respectively)
Low income communities	They are geographically overrepresented in KSI collisions

Technical Collision Analysis (2003-2013)

While the top three priorities indicate the populations who are most impacted by dangerous traffic behavior, they do not include the specific behaviors or those most likely responsible for KSI collisions (for whom the behavior change messaging should be tailored). Since the goal of the Vision Zero education and outreach strategy is to both raise awareness and change behavior, a messaging campaign must center around the populations and behaviors that pose the most danger to others on the road. Using the technical collision analysis from Fehr and Peers as well as the raw collision data from police reports, we identify the following demographic, behavioral, and geographic priorities to focus on when developing the education and outreach strategy.

Demographics

Drivers

The data show that vehicles and thus drivers pose a disproportionate danger relative to other modes of transportation. The top two highest percentages of KSI collision types involve vehicles with vehicle/pedestrian collisions at 31% and broadside collisions at 30% of the total KSIs. Although these numbers do not indicate the at-fault party, it does demonstrate that a vehicle-involved (and thus a driver) collision significantly increases the risk of a KSI collision.

Another data point revealing the disproportionate danger posed by vehicles is the overrepresentation of both pedestrians and cyclists as KSI victims and the two leading

KSI collision types for these groups. Pedestrians and bicyclists were a small percentage of all victims (11%), yet they made up 44% of KSI victims. The two most prevalent types of KSI collisions involving a pedestrian or bicyclist are "vehicle/pedestrian" and "broadside," indicating that both of the leading KSI collisions for walkers and bicyclists involved vehicles.

Finally, pedestrians and bicyclists are also overrepresented in KSI collisions relative to the percentage of those who walk or bike to work while drivers are significantly underrepresented relative to their commuter mode share. While only 17.6% and 1.4% (19% total) of commuters walk or bike to work, 44% of KSI victims were pedestrians or cyclists and 47% of fatal collisions between 2007-2009 involved a pedestrian. Conversely, 74.8% of commuters drive to work yet drivers make up only 42% of KSI victims.[5] When you include passenger KSI victims within this count, those within vehicles still only make up 56% of KSI victims. These statistics demonstrate the need for Vision Zero messaging to target drivers since they pose a significantly higher threat to others on the road.

Males (Aged 18-54)

The second high-risk population to target when developing messaging content aimed at decreasing traffic fatalities is males and more specifically, males aged 18-54, because they are disproportionately involved in KSI collisions. Males aged 18-54 nearly double females in the number of at-fault parties in all collisions and they are over five times more likely than females to be the at-fault party in KSI collisions, with 240 at-fault male parties and 52 at-fault female parties.
Males of all ages are also overrepresented within the victim count for KSIs. While they make up a slightly higher raw number of total victims within all types of collisions, they are more than twice as likely as females to be a victim within in a KSI collision (68% versus 30%). More specifically, male drivers aged 18-54 are almost four times as likely as female drivers of the same age to be killed or severely injured in a collision.

Finally, males make up the majority of collision parties under the influence of alcohol and drugs. Males made up 86% of the parties under the influence of alcohol while females made up 14%. A similar trend exists for drug-use, where males account for 83% of parties under the influence of drugs versus 17% for female parties. Thus, while drivers impose a higher risk on others while on the road, if Vision Zero wants to target their audience further, the messaging content should also focus specifically on male drivers aged 18-54 since they are disproportionately involved and found to be at-fault within KSI collisions.

Behaviors Preceding Collision

In order to have the greatest impact, the Vision Zero messaging should target not only high risk populations, but also those behaviors, which are found to be the leading causes of KSI collisions. The high-risk behaviors that Vision Zero should consider when developing the messaging strategy are outlined below.

Speed

[5] Journey to Work (2013).

Unsafe speed was cited by the data, other research, and interviewees as one of the lead contributors to all collisions in general as well as collisions which resulted in a KSI. This is demonstrated in the data as unsafe speed was found to be a preceding behavior in 26% of all collisions. Within KSI collisions specifically, 25.3% of the collisions have the primary collision factor or other associated collision factor listed as "unsafe speed" or "following too closely."[6] Additionally, 12.8% of pedestrian or bicyclist-involved KSI collisions have the primary collision factor listed as "unsafe speed" or "following too closely". As a point of comparison, these factors account for 7.4% of non-KSI collisions involving pedestrians and bicyclists.[7]

While the data show that automobile right-of-way topped unsafe speed, there is most likely an underreporting of speed as a contributing factor due to the way in which law enforcement officers are instructed to fill out the reporting forms. For example, one major reason why the percent of speed-related collisions is so much lower when you filter for "ped/bike only" is because most pedestrian-involved collisions are marked as "pedestrian right of way" or "pedestrian violation," as instructed in the California Highway Patrol manual, even if they also involve a speeding vehicle.[8]

Unsafe speeding is becoming more and more difficult to enforce since speed limits across the city of LA have expired and need to be updated in order for LAPD's citations to hold up in the court of law. Officers from within LAPD cite that they have lost the ability to enforce approximately 75% of the streets that they used to be able to due to expired speed limits. Updating the speed limit is very difficult politically because the process often leads to a 5-10 mph increase of the stated speed limit, however the increase in necessary for law enforcement to be able to enforce speeding at all. While elected officials are currently discussing the regulations around speed surveys, messaging addressing speeding is vitally important for changing behavior in the immediate future.

Inattention

A similar pattern exists for inattention as a primary collision factor. Inattention was not cited as a contributing factor for any fatal collisions, yet national data and an overwhelming majority of the interviewees we spoke with indicated otherwise. In our interviews with 46 stakeholders, a vast majority cited "distraction" as the most prevalent cause of dangerous driving behavior among themselves and those that they know. This is backed by national data which states that 3,179 were killed in motor vehicle crashes involving distracted drivers in 2014 (USDOT), and an EERIE insurance study which found that one-third of respondents admitted to texting behind the wheel while 75% say they've seen someone else do it.

Similar to speed, inattention is likely to also be underreported as a contributing factor since law enforcement officers arrive to the scene after the collision has already taken place; thus any evidence of inattention is easily no longer apparent (cell phones are put away, etc.) However, the dangers of distracted driving are evident to traffic officers who will often pull someone over for texting and driving using the same criteria that they look for in driving under the influence.

[6] LAPD has said that "following too closely" can be interpreted as traveling to fast for conditions.
[7] Chelsea Richer, Transportation Analyst at Fehr and Peers, provided us with this analysis on quote "unsafe speeding".
[8] Ibid.

For the non-KSI reports which *do* cite inattention as a contributing factor to the collision, cell phones were the most common reason for collision due to inattention for both male and females. Twenty-six percent of female parties cited inattention due to children or pets whereas only nine percent of males cited children or pets as a reason for the collision. Taking into account, messaging should consider content specifically around distraction from cell phones, children, and pets when addressing inattentive behavior.

While our interview data is not a representative sample and the national data could differ from Los Angeles-specific incidents, the overwhelming consistency in responses around inattention/distraction indicates that this behavior plays a significant role in collisions and should be prioritized when developing an education strategy. Furthermore, it is important to consider the discrepancies which may arise from the system of reporting. For these reasons, Vision Zero messaging aimed at behavior change should target underlying factors and provide safer alternatives to speeding and inattention.

Other Considerations

Bikes: Entering into traffic/merging and wrong way travelling

The next set of target behaviors and audiences are dangerous pedestrian and cyclist behaviors. While pedestrians and cyclists pose little threat to others, addressing these behaviors can help ensure their own safety.

Aside from proceeding straight, the two most prevalent bike party behaviors preceding collisions are "entering in traffic; merging" (677 collisions) and "crossing into opposing traffic; travelling wrong way" (538 collisions). These two behaviors were also the top reasons for fatal collisions involving cyclists with 19% of fatal collisions occurring from "entering in traffic; merging" and six percent from "crossing into opposing lane; travelling the wrong way."

"Crossing into opposing lane; travelling the wrong way" is particularly significant for cyclists as it was cited as the second lowest cause for an accident in all collisions, but is cited as the third most common reason for fatal bicycle collisions.

This is further exhibited within the collision profile data where "wrong side of road" violations involving cyclists account for 121 or 44% of the total number of KSI collisions resulting from wrong way violations (of any mode), and 19% of the total number of KSI collisions involving bicyclists (of any violation category).

Although this data does not explicitly state that it was the bicyclist who was killed or severely injured or the one travelling the wrong way, "it is likely that for most of these collisions that is the case, thus indicating that the bicyclist in the bicycle KSI collisions is found to be at-fault."[9]

Pedestrian Insobriety

Similar to wrong way riding, a behavior found to be a disproportionate contributor to pedestrian fatal collisions is pedestrian insobriety. While pedestrians made up 3% of all

[9] Fehr and Peers Technical Collision Analysis (2016).

parties under the influence of alcohol in all collisions, they made up 42% of all parties under the influence involved in fatal collisions.

The majority of KSI pedestrian and bicyclist collisions were categorized as the fault of the person walking or biking. However, many of our interviewees also expressed that many drivers do not know it is in fact legal to cross anywhere there is an intersection regardless of having a painted crosswalk, and therefore are not scanning for pedestrians or cyclists.

Furthermore, pedestrians that do cross mid-block (as opposed to an intersection) were likely exhibiting rational behavior, which did not align with the existing infrastructure. For example, in some parts of the valley, crosswalks can be a quarter to a half mile apart, which means the pedestrian must walk an additional half mile in each direction if their destination is on the other side of street. The same holds true for cyclists travelling the opposite direction on one way streets because of the convenience factor, or who do it because they are fearful of turning their backs to drivers.

When designing a behavior change campaign, then, it is important to understand the difference between reckless pedestrian or cyclist behavior and behavior that makes the most rational sense given the available options. Therefore, although pedestrians and cyclists are the parties exhibiting high-risk behaviors, a successful messaging campaign must target both them and drivers; raising awareness about these occurrences while also elevating the driver's responsibility in looking out for people on the road.

Geography

The final factor to take into account when developing the messaging content of the Vision Zero campaign is the geographic location of the collisions, and how that will help further segment the population within specific neighborhoods. In terms of geography, KSI collisions involving vehicles, pedestrians, and bicyclists are dispersed widely throughout the entire city of Los Angeles. However, there is a heavier concentration of KSI collisions in the central area of the city, as Downtown LA, South LA, Westlake, Pico Union, Koreatown, East Hollywood, and Hollywood all have high concentrations of KSI collisions. Notably, these are the same areas that score high on the Community Health and Equity Index, meaning these are the same communities with the poorest health outcomes.

At the experiential level, many of the interviewees who represented various low-income communities cited high density populations and vehicle-centric infrastructure, such as wide streets, freeways and fast moving pass-through traffic as contributing factors to the higher KSI collision rates within their communities.

The higher KSI rate in certain areas is compounded further by the higher rates of walking/biking/public transit use within the same areas as shown by the Journey to Work data (2013). The populations within these communities are more likely to be transit-dependent (i.e. do not own a car) and therefore more likely to be using active modes of transportation to get to and from the transit station. A study by Metro shows that 75% of Metro riders make less than $25,000 annually and 50% of Metro riders are transit dependent.[10] Moreover, biking/walking/rolling makes up 85% of access trips to bus rapid

[10] 75% and 45% of its bus riders and train riders respectively were transit-dependent (i.e. did not own a car). Bus riders had an average annual income of $14,423 while train riders had an average annual income of $26,250, which is 26% and 47% of the county average ($55,476) respectively (Metro First Last Strategic Plan, 2014).

transit and rail stations and over 95% of total system access.[11] The higher prevalence of active transportation within low-income communities as a means to access work and economic centers, paired with the overrepresentation of pedestrians and bicyclists in KSI collisions, sheds light on the need to prioritize these communities for Vision Zero education and outreach efforts.

Further, although KSI collisions are occurring all over the city, collisions may be underreported within these communities as it has been found that low-income and undocumented individuals are less likely to report a collision due to government distrust and/or a sensitive citizenship status. Therefore it is likely that the actual number of KSI collisions in these low-income communities is much higher.[12]

Factors Driving Dangerous Behaviors on the Road

In addition to looking at the technical collision data, we also used qualitative interview data to help explain what is contributing to KSI collisions. Throughout our interviews we often came back to the question, "what's driving the dangerous behavior?". Thinking about the underlying factors contributing to dangerous behaviors allows messaging to be targeted to the root cause rather than the symptoms. Below is a list what we believe to be the major factors driving dangerous behaviors on the road. These factors, along with their positive alternatives, should be at the heart of messaging content aiming to change dangerous behavior.

Underlying factor driving dangerous behavior	Explanation and specific examples
Lack of empathy	This factor manifests itself in various ways, and probably most broadly in a "dehumanization" of others on the road. Lack of empathy for those traveling around you may lead one to see others as obstacles in their path, or to see your own travel needs as paramount to all else. This is particularly evident between people in different modes of travel, for example, a driver not giving a cyclist enough space, or pedestrians and drivers forgetting what it's like to be in the others' shoes.
Rushing	Rushing, most likely due to time pressure, leads to speeding and reckless driving (e.g. not looking carefully for pedestrians and cyclists). These behaviors have become more prominent on residential streets as people cut through them at the suggestion of mapping applications.
Recklessness	Recklessness is broader than rushing as a primary cause of dangerous behaviors. It can stem from people acting in ways they know to be dangerous and are no more convenient for their end purposes. For example, drinking and driving when one could easily ride with a designated driver, or speeding for fun or to show off.
Lack of knowledge	This is one of the most important areas to address in the educational components of Vision Zero. For instance, common misconceptions that may lead to dangerous behaviors are that it's always illegal for a

[11] First Last Mile Strategic Plan, 2014. Metro.
[12] Cottrill and Thakuriah (2010).

	pedestrian to cross an arterial without a painted crosswalk or that it's safer for a cyclist to ride against traffic.
Lack of skill	Lack of skill operating a car, motorcycle, truck, or bicycle on the road will be difficult to address without direct, in-person training. This highlights the importance of existing training programs and the need for the average car driver to be able to hone their skills. Car insurance companies may have aligned interests and could provide incentives for people with poor driving records to take classes.
Impatience	Impatience can lead to speeding, as well as distraction/inattention--probably one of the most commonly underreported causes of dangerous behavior on the road. Distraction/inattention has become significantly more prominent with the use of hand-held technology. Texting and driving is the behavior that commonly comes to mind, however talking to other passengers, thinking about things other than driving, dealing with children and pets, putting on makeup, eating, or looking at a crash scene are other examples of distraction.
Convenience	People will most often act "rationally", meaning they will take the shortest route to get to their destination. For pedestrians, that might mean a midblock crossing where there is lack of crossing infrastructure. For delivery workers in Downtown LA, that may mean bicycling the wrong way down a one way street in order to make deliveries as fast as possible.
Inadequate infrastructure	Inadequate infrastructure is one of the key factors being addressed in the Vision Zero strategy, and the one of the only factors that does not mostly rely on human behavior. Many people may recognize the need for more obvious infrastructure improvements such as new bike lanes, crosswalks, stop signs, etc. It is also important to remember the way different populations interact with infrastructure. For example, how less able-bodied people may have to go into the street because of inadequate sidewalks, or seniors may need more time to cross the street.

Prioritization Considerations

Given the collision data, relevant literature, and findings from the interviews that illuminate the underlying factors behind dangerous traffic behavior, we have determined a messaging prioritization strategy that will inform the phased-in approach of purchased media. In developing these priorities, it is important to take into account current brand perceptions and barriers, as well as the size of a targeted population relative to available resources and the investment it would take to reach them.

Current Perceptions and Challenges to Vision Zero Brand

As is the case at the start of many public health campaigns, Vision Zero currently has little brand recognition in Los Angeles. Many of the people we spoke to remarked that most people they know outside of city government or transportation advocacy circles have never heard of Vision Zero. It is also not immediately obvious that the name "Vision Zero" is referring to traffic safety. People may have existing associations with the term, such as environmental causes to lower emissions or reducing homelessness. Additionally, if members of the public learn what Vision Zero is at it's most basic level--end traffic fatalities--without

having any further background, they might see the brand as representing a campaign that is unrealistic and therefore uncredible. An effective branding campaign that utilizes mass media advertising can overcome these barriers, however the campaign must target people at their starting point, who have zero current knowledge of the brand or purpose of Vision Zero.

Consider the Size of the Pie

The share of a target segment within the overall population is an important factor to consider when prioritizing messaging resources. For example, if we are targeting bicyclists who ride on the wrong side of the road, we may wish to implement proper riding curriculum within workshops rather than create a series of TV advertisements given the relatively small number of Angelenos impacted by this type of behavior.

That being said, we recommend the messaging campaign be divided into three phases, which can happen separately or overlap. Together these phases should last 1-3 years.

Phase 1: Brand Awareness	Purpose	To increase general awareness of the Vision Zero campaign, strategies, and outcomes within Los Angeles
	Audience	General Public
	Behaviors	All
	Outcomes	1. The average person who has no connection to Vision Zero will recognize the name and be able to understand the purpose of the campaign 2. There will be an initial attitude shift around traffic fatalities in that they are 1) preventable and 2) unacceptable
Phase 2: Attitudes and Behaviors (Preliminary)	Purpose	To change dangerous driving behaviors related to speeding and distraction among male drivers
	Audience	Male Drivers (Aged 18-54) • This group will be segmented further based off of lifestyle and more specific demographics such as race and country of origin (more research will need to be done to determine these groups)
	Behaviors	Speeding and distracted driving
	Outcomes	1. Reduce instances of speeding violations and distracted driving among males (distraction will be harder to measure, but focus groups and post-surveys may help evaluate)
Phase 3: Attitudes and Behaviors (Secondary)	Purpose	To shift dangerous traffic behavior within targeted groups of pedestrians and cyclists and to create a deeper attitude shift among drivers which elevates their accountability in pedestrian and bicyclist-involved traffic collisions
	Audience	Pedestrians, Bicyclists, Drivers
	Behaviors	Pedestrian insobriety, bicyclist wrong way riding, driving in general

	Outcomes	1. Decreased pedestrian fatalities due to pedestrian insobriety, higher instances of pedestrians using taxi, friends, or rideshare services to get home from bars 2. Decreased bicyclist fatalities due to wrong way riding, decreased prevalence of wrong way riding, increased awareness of bicycle riding rules 3. Increased driver's awareness of pedestrian and bicyclist right-of-way laws 4. Shift driver's attitudes around their own accountability in saving lives regardless of whether their right-of-way is violated

Messaging Content Recommendations

The prioritization of messaging and phases must be established in coordination with the actual content of the messages. Content recommendations including Vision Zero core messages, case study advertisements, and example sketches are outlined below.

Core Messages

As discussed in the section on "Messaging Strategies," mass-marketing content will be most effective if these efforts are grounded in universal core messages. While they can be tailored to different communities and demographics, the core messages should remain consistent to become *Vision Zero Los Angeles brand*. For example, in a U.S. census marketing campaign, the three core messages were:

1. Participating in the census helps communities
2. Participating in the census is safe
3. Participating in the census is fast and easy

The first message gave a relatable, personal reason for why people would want to help the effort, or why they should care. The second two messages addressed barriers to participation that were grounded in fears that the census might not be safe for them (for example, because of their immigration status) or that it will be inconvenient. Each of these core messages was then substantiated depending on the audience with specific examples, different taglines, images, and stories.

The sections below outline three core messages for Vision Zero generally, and three core messages for Vision Zero Los Angeles. All messaging content should address at least some parts of both the general Vision Zero and Los Angeles-specific core messages. Core messages are simple and can be developed in a myriad of different ways for public consumption. The core messages both promote desired attitudes and address fundamental concerns or perceptions that might prevent people from understanding and/or adopting Vision Zero. These core messages are integrated into the messaging phases described above.

Vision Zero National Core Messages

Vision Zero represents a paradigm shift in the way the public understands traffic related fatalities. Rather than accepting traffic deaths as an unavoidable side effect of human operated vehicles, Vision Zero places the onus on city governments to slow down traffic through infrastructure adjustments, while also placing an increased responsibility on every person behind the wheel. The three core messages of Vision Zero nationally are as follows:

1. Vision Zero saves lives
2. Traffic deaths are unacceptable
3. Traffic deaths are preventable

The power of these three core messages lies not only in the paradigm shift, but in the shared responsibility that the messages invoke as well. “Traffic deaths are unacceptable” implies a collective understanding that “traffic deaths do not happen here,” thus inciting a norm change of what is expected or acceptable within our streets. In turn, this creates a culture where people slow down and are alert while driving.

As with any core message, these three messages will be tailored to specific communities, as well as to targeted audiences and behaviors. For example, a daily driver who has no desire to bike, but wants his family to be safe may respond better to “Vision Zero saves your children’s lives” or “driving slower around schools saves lives.” The same follows for people who walk and drive frequently who may respond well to “your choices matter,” while someone who only drives may resonate more with “you have the power to save a life.”

Los Angeles-Specific Core Messages

These core messages were developed considering prevalent themes from interviews with stakeholders representing diverse populations throughout Los Angeles, and relating them to the factors driving dangerous behaviors (see above section). The three core messages specific to Vision Zero Los Angeles are as follows:

1. Public streets are community space
2. You are responsible for others’ safety
3. Transportation is about moving *people*

These messages build off of the general Vision Zero core messages and go a step further to address Los Angeles-specific perceptions and attitudes that might prevent successful adoption of the Vision Zero mission. The first two messages address themes of individualism, lack of respect for public space, and sense of entitlement on the road. The last core message addresses the car-centric mentality prevalent in Los Angeles. It shifts the paradigm around the idea of a successful transportation system--from one that moves cars most efficiently to instead one that moves people most efficiently and safely.

When comparing Los Angeles to New York City, for example, where there is a scarcity of public space and so many pedestrians, cyclists, and cars, there is more necessity for the recognition of one’s presence in a communal public space. By sheer force of number and the slowness of car traffic, there is a stronger “pedestrian” identity. The recognition of an “ecosystem” of different modes of travel is also prevalent in other geographically condensed areas, like San Francisco, where less people have cars and more people are likely to use public transit or active transportation.

The messages will need to be tailored to different geographic areas, cultural groups, and behaviors. For example, in suburban areas in the valley, where there is less access and interest in public and active transit, the message “Transportation is about moving people”, will have to be careful to avoid shaming people for using their cars. Geographic areas with more cyclists could use the first two messages to target the tension between car drivers and cyclists. All messaging should use the languages most appropriate for the audience, accurately reflect the diversity of the various neighborhoods with their models, and be culturally appropriate for their target audiences.

We believe these core messages can help make Los Angeles transportation culture into one of greater accountability, community-mindedness, and a move away from cars at the top of the transportation hierarchy. These are the types of changes in attitude and perceptions

specific to Los Angeles that will help the broader culture shift necessary for a successful Vision Zero program.

Case Study Ads

"NZ Anti-Drink Driving Commercial - Legend":
https://www.youtube.com/watch?v=CtWirGxV7Q8

In this one-minute commercial spot, a young Maori man stops his friend from driving home drunk from a party. He first recognizes the situation, has an internal dialogue and a few imaginary scenarios about the potential barriers to action (a girl will think he's dumb), and consequences to inaction (his friend's ghost following him around), and then publically convinces his friend to sleep at the house.

The genius of this ad is multifaceted. Firstly, the ad focuses on one clear message (don't let friends drive drunk) and targets a specific population (young Maori men), who are vastly overrepresented in DUI collisions. The internal dialogue lets the audience into the character's mind as he considers the barriers and consequences of potential actions. The commercial then highlights the "moment of confrontation" as a brave action. The main character is put on the spot in the confrontation, but is ultimately rewarded with a positive outcome and is branded as a "legend" by the tagline. The theme of death and tragedy is approached skillfully by making it both funny and approachable, but also very personal (i.e. it's clear the character knows his friend's family).

This commercial touches on all three aspects affecting behavioral intention according to the Theory of Planned Behavior. The ad shows the main character's attitude (I shouldn't let my friend drive home drunk), addresses the beliefs about whether the important people in his life will approve or disapprove of the behavior (the girl he likes, his drunk friend, his drunk friend's family), and ultimately shows that the character is capable of carrying out the behavior (successfully confronting his friend).

"NZ Anti-texting and Driving Commercial - Hello":
https://www.youtube.com/watch?v=wM75ulDRkhI

This viral 45 second commercial depicts several shots of different passengers preventing their drivers from answering a text by instead holding the driver's hand as they reach for their phones.

The ad is relatable as it shows a common situation--two people driving in the car together, and also depicts gender and racial diversity in the actors. It takes a creative and non-patronizing approach in comparison to traditional anti-texting messaging, adding a surprise factor with the unexpected and funny action of handholding between people in a non-romantic relationship. The ad also addresses the exact moment of decision for a driver, when their phone alerts them to a text message while they are driving, and provides an unrealistic but positive alternative. It takes a new twist on the effective appeal of "put others first".

True to ecological models of behavior change theory, the ad emphasizes the relationship between the individual and their environment (in this case, the other people in the car) and their ability to impact each other. Here, the passenger asserts their own agency by preventing the driver from texting, and elicits a memorable response from the driver to in turn potentially change their attitude toward the behavior.

"NZ Speed ad- Mistakes"

In this one minute viral commercial, two male drivers stop and have a conversation in the moment before the one man who is speeding is about to hit the other driver who is pulling in front of him.

The ad targets a key speeding demographic--young to middle-aged men--and incorporates the all-important theme of family and children (one man pleads to the other that his child is in the backseat). While addressing a specific behavior of speeding, the ad takes an unconventional approach by appealing to human fallibility, with the tagline "other people make mistakes, slow down". In this case, the person who is not speeding is the person who made the more obvious mistake, but the person speeding could have prevented the collision by driving slower.

While addressing almost all of the components of the Health Belief Model of behavior change, it notably hits on the following three:

- Believe they are susceptible to the condition (perceived susceptibility)
- Believe the condition has serious consequences (perceived severity)
- Believe taking action would reduce their susceptibility to the condition or its severity (perceived benefits)

The man speeding in the ad understands that he is susceptible to other drivers' poor decisions, that speeding can have serious consequences, and that slowing down can prevent the susceptibility of those serious consequences.

"City of West Hollywood Crosswalk *Wink then Walk* Ad Series":
http://www.weho.org/services/public-safety/crime-and-safety-tips/pedestrian-safety

As part of their crosswalk safety campaign, the city of West Hollywood developed three ads to target cyclists, pedestrians, and drivers. The foundational ad, *Wink then Walk,* depicts a shirtless man in theme with the sexualized branding of other traffic safety efforts in West Hollywood (Alice in WeHoland, The Pickup trolley). The brand in itself is surprising and attention-grabbing because traffic safety is not normally associated with sexual themes.

SECTION 6: NEXT STEPS

LADOT, the Vision Zero Education Subcommittee, Vision Zero Alliance, professional consultants, and other community partners will be responsible for the coordinated development and implementation of this strategy. Below are some of the immediate next steps for both mass-media messaging and education and outreach efforts.

Messaging

The consultant will need to do further market research, either through surveys and focus groups, or other marketing firms' data, in order to further segment target audiences based off of lifestyle, race and ethnicity, behaviors, and values. Once these segments are established, the consultant, with guidance from the education subcommittee and LADOT, will develop the messaging content to be tested by the public through surveys and focus groups.

This team will also need to develop the non-traditional campaigns such as staged events or public art installations. Specific strategies for earned media should be conceived in conjunction with non-traditional campaigns. Finally, the consultant will need to develop a media schedule outlining when to purchase and launch advertisements as well as roll out the non-traditional campaigns.

Education and Outreach

LADOT and the Education Subcommittee will need to secure, prioritize, and allocate funding for organizations responsible for on-the-ground outreach efforts. Funding and other limited resources should be prioritized by mapping the landscape of those who have influence and/or interest in the overall success of Vision Zero. Those actively involved in Vision Zero should continue to leverage both internal (i.e. other city departments and agencies) and external (private sector, media, council districts, CBOs, etc.) partnerships. Vision Zero can extend its reach through these networks by compiling and developing transferable educational curricula and other materials (physical incentives and digital resources), which can be further tailored for specific use by these community partners.

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SECTION 8: APPENDICES

Appendix A. Behavior Change Theories

Below is an overview of behavior change theories and concepts specific to injury prevention.

Passive Versus Active

Passive behavior change theories (BCTs) involve changing a product or the environment of the target population (e.g. water fluoridation) to achieve positive outcomes regardless of the individual's behavior. A*ctive* BCTs require an active role of target individuals. There has been historical tension between these two schools of thought, however researchers now encourage the integration of both passive and active methods of intervention.[13] For example, the widespread installation of front seat airbags required simultaneous education of parents to keep small children in the back seat. Some have warned that active BCTs can result in "blaming the victim." Messaging and outreach should take this concern into account by focusing on *empowering* individuals.

Policy-oriented Countermeasures

Many previous injury prevention interventions have been focused on the behavior of individuals that put them at risk. However, due to success with policy-oriented countermeasures it is also useful to think about how individuals can be advocates for change at within their own communities. This requires increasing education of policy changes relating to injury prevention for the general public.[14] The next two sections on ecological models describe how behavior change requires multiple levels of influence within and between individuals as well as with policies and organizational change within communities.

Ecological Models

Ecological models assume that health and well being are affected by the dynamic interaction of biology, behavior, and the environment, which unfolds over the life of individuals, families, and communities. These models also assume that demographics factors such as age, gender, race, ethnicity, and socioeconomic differences directly affect individual functioning and influence risks and resources.[15] These models reflect the importance of both individual and community level behavior change factors.

At the beginning of this century, the Institute of Medicine and US National Academy of Sciences commissioned two committees on the role of behavioral science in public health. Both committees emphasized the role of ecological models and provided foundational frameworks for how they should be integrated in practice.

Ecological Models in Action

Two key concepts of ecological models in practice are that (1) behavior affects and is affected by multiple levels of influence, and (2) individual behavior shapes and is shaped by the social environment.[16]

The levels of influence on behaviors are as follows:[17]

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[13] Green and Kreuter, p. 23; McGinnis et al., p. 24
[14] Gielen and Sleet, p. 66
[15] Smedley and Syme, p. 2-3
[16] Rimer and Glanz, p. 10
[17] McLeroy et al., p. 4

Level of influence	Definition
Individual	
Intrapersonal	Individual characteristics that influence behavior, such as knowledge, attitudes, beliefs, and personality traits
Interpersonal	Interpersonal processes and primary groups, including family, friends, and peers that provide social identity, support, and role definition
Community	
Institutional Factors	Rules, regulations, policies, and informal structures, which may constrain or promote recommended behaviors
Community Factors	Social networks and norms, or standards, which exist as formal or informal among individuals, groups, and organizations
Public Policy	Local, state, and federal policies and laws that regulate or support safer behavior

Each level of influence can affect behavior. For example, a young man may be speeding because it gives him a greater sense of confidence (intrapersonal). His friends encourage him to speed and speeding gives him greater status within his friend group (intrapersonal and community). Understaffing of the local police department means he is less likely to get pulled over (institutional), and a failure to update speed zones means that speeding laws can't be enforced (policy).

The second key concept in ecological models says that individuals influence and are influenced by those around them. For example, the girlfriend of the young man who was speeding encourages him to slow down; this behavior changes the social norm of his friend group, ultimately changing the speeding habits of his friends as well. This same model can be also applied to reinforce positive behavior.

Individual-Level Behavior Change Theories

Below are five widely recognized individual-level behavior change theories that can be applied to injury prevention behavior change.

Health Belief Model

The Health Belief Model (HBM) is one of the oldest and most widely recognized health related behavior change theories. First developed in the 1950's, the theory has evolved into the following basic premises:

An individual will engage in preventative or safer behaviors if the following conditions are met:[18]

[18] Rimer and Glanz, p. 13

- Believe they are susceptible to the condition (perceived susceptibility)
- Believe the condition has serious consequences (perceived severity)
- Believe taking action would reduce their susceptibility to the condition or its severity (perceived benefits)
- Believe costs of taking action (perceived barriers) are outweighed by the benefits
- Are exposed to factors that prompt action (e.g., a television ad) (cue to action)
- Are confident in their ability to successfully perform an action (self-efficacy)

This model is useful in prioritizing resources toward the areas with the biggest deficits. The frequently cited Vision Zero statistic that a pedestrian has a 90 percent chance of survival if hit by a car going 20 mph, and a 10 percent survival at 40 mph tries to address the perceived severity of a particular action. Focus groups and surveys would help identify how to prioritize these variables.

Theory of Planned Behavior

The Theory of Planned Behavior states that behavioral intention--to what degree an individual intends to do something--is the most important factor in predicting their actual behavior. Behavioral intention is influenced by:

- The individual's attitudes and beliefs about the behavior (e.g. wearing a seat belt is a smart thing to do);
- The individual's beliefs about whether people who are important to them approve or disapprove of the behavior (e.g. my mother likes when I wear a seatbelt);
- The individual's belief that they can do the behavior (e.g. I can easily put on a seatbelt)

Using this framework, media content might seek to address cultural norms around a particular behavior. For example, the New Zealand anti-speeding "pinkie" campaign, which received worldwide recognition, flipped the narrative from speeding being a "cool" behavior to one of obvious overcompensation.

Stages of Change (Transtheoretical) Theory

The Stages of Change Theory argues that behavior change is not a singular event, but instead happens in non-linear, repeating stages. One may enter the process at any stage and continue cycling between stages in any order until the behavior is changed.

Stage	Definition	Potential Strategies
Precontemplation	Has no intention of taking action within the next six months	Increase awareness of need for change; personalize information about risks and benefits
Contemplation	Intends to take action in the next six months	Motivate; encourage making specific plans
Preparation	Intends to take action within the next thirty days and has taken some behavioral steps in this direction	Assist with developing and implementing concrete action plans; help set gradual goals
Action	Has changed behavior for less than six months	Assist with feedback, problem solving, social support, and

		reinforcement
Maintenance	Has changed behavior for more than six months	Assist with coping, reminders, finding alternatives, avoiding slips/relapses (as applicable)

The theory highlights the necessity for a consistent, long-term education and outreach strategy with repeated messaging.

Applied Behavioral Analysis

A subfield within psychology, Applied Behavioral Analysis seeks to address the ABCs of behavior--antecedents, behavior, and consequences. Basic principles of feedback, punishment, stimulus, etc. are present in forming and stopping behaviors. The table below exemplifies Applied behavioral analysis applied to drinking and driving.

	Drinking and driving	Potential countermeasures
Antecedents	Environmental cues, social pressure	Selecting designated driver, lessening alcohol advertisements
Behaviors	Frequency of drinking, size of typical drink consumed, time between drinking and driving	Training bartenders, having BAC readers at bars
Consequences	Social reaction, punishment	Social reinforcement for not drinking and driving, penalties for being caught

Applied behavioral analysis has been successfully used in increased use of safety belts and child restraints, reduced vehicle speeding, improved child pedestrian safety and bicycle helmet use, reduced impaired driving, improved the safe driving practices of pizza deliverers, and reduced driver errors.[19]

Social Cognitive Theory

Social Cognitive Theory (SCT) describes behavior changes as the result of a dynamic and continuous interaction of personal factors, environmental factors, and human behavior. The three most important factors to an individual changing a behavior:

- Self-efficacy (belief that they can)
- Goals
- Outcome expectancies

According to SCT, an individual's behavior changes their environment and vice versa. Behaviors are learned through watching the behaviors and outcomes of others, and personal behaviors can be influenced by providing reinforcements (rewards, punishments).

Integrating the Individual-Level Behavior Change Theories

[19] Gielen and Sleet, p. 69

Surveying the most widely accepted individual-level behavior change theories, experts agreed upon eight factors most pertinent to health-related and injury-risk behaviors. In action, these factors are:[20]

1. The person forms a strong positive intention or makes a commitment to perform the behavior.
2. There are no environmental barriers that make it impossible to perform the behavior.
3. The person possesses the skills necessary to perform the behavior.
4. The person believes that the advantages of performing the behavior outweigh the disadvantages.
5. The person perceives more normative pressure to perform the behavior than to not perform it.
6. The person perceives that performance of the behavior is consistent with his or her self-image or values.
7. The person's emotional reaction to performing the behavior is more positive than negative.
8. The person perceives that he or she has the capabilities to perform the behavior under different circumstances.

The first three are viewed as necessary and sufficient for a behavior to change, while the last five relate to the strength and direction of an individual's intentions.[21]

Community-Level Behavior Change Theories

Below is an overview of community-level and communication behavior change theories and that can be applied to injury prevention behavior change.

Community Organization and other Participatory Models

The **community organization** approach focuses on the activation of communities to engage in social decision-making and problem solving. There is a focus on using "community representatives" and "local values" in accomplishing community goals. There is literature suggesting that for injury prevention programs in particular, it may be more effective to treat the community as the source and not simply the site of these programs.[22]

Community mobilization focuses on changing those economic and social structures that influence injury risk, and is more effective if including both bottom-up (grassroots) and top-down (formally initiated) strategies. The combination of community organizations and formal leadership provides a combination of engagement, resources, technical expertise, and local knowledge.[23]

The empowerment theory says that behavior change will be greatest when those whose behaviors are being targeted are directly involved in intervention planning and decisions making. This can be achieved through working with community coalitions and tailoring program components to different demographics.

The **community-based participatory research** school of thought argues that those being researched should take an active role in the research and subsequent program

[20] Fishbein, et al, p. 4
[21] Gielen and Sleet, p. 69
[22] Gielen and Collins; McLoughlin et al.
[23] Treno

implementation. It also supports extreme sensitivity to ethical issues around individual autonomy.

The Diffusion of Innovations Theory

This theory discusses how new ideas, products, and social practices are spread within and between societies. New ideas will be adopted in chronological segments: innovators, early adopters, majority early adopters, majority late adopters, and laggards. Ideas can be adopted more quickly throughout a community or society by maximizing the following factors:

- The relative advantage of an innovation shows its superiority over whatever it replaces
- Compatibility is an appropriate fit with the intended audience
- Complexity has to do with how easy it is to implement the innovation
- Trialability pertains to whether it can be tried on an experimental basis
- Observability reflects whether the innovation will produce tangible results

Communication Theory

Communication theory looks at how messages are created, transferred, received, and adopted, and can be applied specifically to how communication affects behavior change. Public safety communications "should represent an ecological perspective and foster multi-level strategies, such as tailored messages at the individual level, targeted messages at the group level, social marking at the community level, media advocacy at the policy level, and mass media campaigns at the population level."[24] However, these communications must also be supported in the physical environment in order to have lasting impact.

Media is a major part of any communications campaign seeking to change behavior, the two primary questions being:

1. What factors affect the likelihood that a person will be exposed to a given message?
2. How do media effects vary with the amount of exposure to that message?

The answers to these questions are affected by factors such as the characteristics of the target audiences, complexity of the issue, and competing messages. Repeated exposure through multiple channels may affect its impact on individuals. People will also learn from messaging in different ways and at different speeds:[25]

- Immediate learning: directly from the message
- Delayed learning: internalized sometime after the messaging
- Generalized learning: persuasion through messaging and related concepts
- Social diffusion: messages stimulate discussion among social groups and affect beliefs
- Institutional diffusion: messages garner a response from public institutions and enhance impact

Mass media can also help put a particular item on the public agenda by framing the conversation and thought topics of the public. While funding is often scarce for public safety campaigns, it can be stretched through using existing networks, in-kind donations, and earned media.

[24] Bernhardt
[25] Rimer and Glanz

Appendix B. Education and Outreach Materials

Based on interviewees' experiences and background research, below is a non-exhaustive list of suggested materials for Vision Zero education efforts that will be helpful in collaboration with community partners.

Updated websites:	Several interviewees suggested changes and additions to the current Vision Zero and Vision Zero Alliance websites, including: • Simpler, more publically accessible language on the city's Vision Zero website (for a public audience, avoid words like "prevalence, outcomes, data-driven") • Clear list of "call to action" steps for different community groups or segments (e.g. neighborhood councils, concerned resident, community-based organization, etc.) • Access to digital education curricula and marketing materials, some of which can be adapted to fit the particular context (i.e. for a non-PDF version contact _____) • More interactive, professional, and regularly updated Vision Zero Alliance website, with additional resources (videos, list of upcoming trainings), stories and pictures (can utilize social media with relevant hashtags), and opportunities for input
Digital curricula	Creating modifiable and digitally shareable curricula for various audiences will help disseminate the Vision Zero among different groups more effectively. These should include, but are not limited to: • "Train the trainer" - Lessons for community leaders looking to integrate Vision Zero into on the ground outreach and education • General public curriculum on the topics listed in the *Education topics* section, with segments for special populations and ready-to-go presentation materials for community meetings • "Brown-bag lunch" presentations for city agency and department officials to educate employees, with modifiable part for relation to their work • In-school curriculum/presentations that could be used by guest presenters or school teachers; should be segmented for elementary, middle, high school, and college ages *For more specifics on important topics, see the *education topics* section below.
Print materials	Print materials should include overviews of broader Vision Zero messaging as well as components that can be modified to specific communities or populations. These should include but are not limited to: • Infographics (broader VZ messaging) and infographic templates to be modified for specific geographic areas/demographics • Posters, fliers, banners, etc. (LADOT should develop a "style guide" similar to NYCDOT's in order to keep logos and branding consistent across materials that may be individualized for particular groups) • Bumper stickers approved by the city council to be put on all city vehicles

Short videos	A few short, engaging videos that overview the Vision Zero core messages may be costly to produce but are one of the most effective tools for getting attention. They could be used effectively in conjunction with the curricula and presentations, or in the following outreach methods: • Opening up personal meetings with influential stakeholders who have little time (editorial boards, elected officials, etc.), to be followed by a conversation on how Vision Zero fits within their specific priorities • On the homepage of the Vision Zero and Vision Zero alliance websites • Sent out with newsletters to Neighborhood Council members or posted on blogs (e.g. Next Door)
Physical incentives	Physical incentives will be important resources to attract the public to community events, and can also be used to gain engagement through other mediums. These could include but are not limited to: • Bicycle helmets • Reflective gear for walking and riding bicycles at night • Food • Dashboard cell phone holder (could be an incentive for completing an online survey or watching a safety video, etc.) • Bumper stickers

Appendix C. Partner-Specific Considerations

Below are potential partners who may have alignment with the Vision Zero mission and/or priorities. Each group contains possible advantages, considerations, and challenges to working with these groups identified by interviewees.

Council District Offices:

Advantages:

- Can reach small groups of constituents by integrating Vision Zero messaging into current outreach efforts
- Can take advantage of ongoing controversies around traffic-related issues to garner more attention to Vision Zero
- Have more awareness of the barriers and tailoring needs for different neighborhoods (e.g. suburban/urban, residential/commercial/industrial, income-levels, etc.)
- Can gain community credibility by demonstrating and integrating specific knowledge of a broad array of community issues as well as the demographics characteristics of different geographic areas in their district

Considerations:

- Will need to understand how Vision Zero aligns with their particular offices' priorities and constituent concerns

Barriers:

- May have trouble garnering attention and support from constituents who are not already engaged in public issues.

Faith-based organizations:

Advantages:

- Have strong trust and credibility with a particular subset of a community
- Can be a trusted source in areas with "anti-establishment" sentiments
- Have a natural alignment with Vision Zero mission of protecting life

Considerations:

- Successful partnerships will often rely on the individual relationship with the religious leader(s) of the organization

Barriers:

- May be reluctant to help with a particular initiative for fear of "opening the floodgates" to many others

Media:

Advantages:

- Have the power to reach community members with varying types of influence
- Have an aligned interest in prioritizing issues of public safety
- Have a wide audience for editorial pieces that can influence the Vision Zero brand and affect its prominence in public discussion
- Television media may have ad space to donate for public service announcements
- Opportunity for gaining earned media through alternative campaigns and op-ed contributions

Considerations:

- Successful partnerships will rely on personal relationships with leadership and/or reporters in related issue/geographic areas)
- Should take advantage of any possible connections from the "Watch the Road" campaign

Barriers:

- May publish unfavorable editorials or reporting on Vision Zero to a wide public audience

Neighborhood Councils:

Advantages:

- Can demonstrate knowledge of specific places to gain credibility
- Have demonstrated some level of active engagement in the public sphere
- Have established networks of communication through the Dept. of Neighborhood Empowerment (website, liaison model, social media, NC monthly profiles, DONE newsletter, etc.)

Considerations:

- Will be more willing to participate if they feel empowered to take charge of helping their own community -- need action items (particularly with liaison model)
- Some councils are significantly more engaged than others and have different roles/levels of influence within their communities (DONE can give insight into specifics)

Barriers:

- Engaging individually with all 96 neighborhood councils will be extremely resource-intensive
- May have trouble reaching members of the community who are not already aware of their presence or actively involved in the community

Nonprofits/Vision Zero Alliance (VZA)

Advantages:

- Organizations with sustained relationship and trust within a particular community will be effective allies in reaching those with distrust of government
- Have the ability and expertise to relate mobility issues to other areas of concern (employment, poverty, etc.)
- Can incorporate Vision Zero messaging and education into current efforts

Considerations:

- VZA leadership sees an ideal function as a coalition-style council with diverse group of on-the-ground experts and full-time staff to help implement Vision Zero and keep city accountable to Action Plan; would like to have access to best practices research and staff to help with production/design/storage
- Need funding to do outreach for Vision Zero
- Direct service organizations are effective partners at reaching less publically-engaged populations

Barriers:

- Have some historical tension between different active transportation advocacy groups

Private sector:

Advantages:

- Can effectively target specific populations based on consumer habits (e.g. a company that does mail order deliveries to Mexico can target Mexican immigrants of multiple generations)
- Can be effective partners without needing government resources for advertising (particularly those interested in associating their brand with public safety or community service)
- Creative media private sector partnerships may be more difficult to secure, but can provide opportunities to help creatively frame messaging/bring message to a wider audience

Considerations:

- Public private partnerships need to emphasize consistency of Vision Zero core messages
- Have opportunities for partnerships with large companies (AARP, AAA, car insurance companies) and small businesses (local "staples", those who will benefit from safer pedestrian environment) that have aligned

Barriers:

- Business owners may be against infrastructure improvements that may negatively affect (or that they perceive will negatively affect) their business

Schools:

Advantages:

- Can be ready partners for Vision Zero efforts, particularly those in HIN areas
- LAUSD requires their schools to make a new School Safety Plan every year on any topic of choice. These safety plans are crafted by parent committees, and make a natural pairing for Vision Zero outreach efforts.

Considerations:

- Vision Zero messaging will be most effective if it's incorporated directly into the safety curriculum (Safe Routes to School had success working with LAUSD on this)
- Using competitions, highlighting innovative ideas, and finding popular teachers who have connections with student leaderships are tactics to increase student engagement
- May require trusted partners in schools to get to parents who have sensitivity to working with government entities (e.g. immigration status)

Barriers:

- Traffic safety messaging may have to compete with other safety efforts to address things like prostitution, drugs, or violence
- It will be hard to get in-classroom time devoted to Vision Zero education without integration into curriculum/previously designated safety curriculum

Other Cities:

Advantages:

- Some cities have valuable knowledge and resources from experiences doing similar public outreach campaigns (e.g. West Hollywood's crosswalk campaign and communications toolkit)
- May want to adopt Vision Zero messaging and materials because of their aligned interest in public safety and Vision Zero's attraction as a regional issue
- Have the ability to use free ad space (street banners, PSAs, etc.)

Considerations:

- Are important partners in Vision Zero gaining traction as a regional issue and because of the amount of commuter traffic from outside the city of Los Angeles

Barriers:

- May have traffic priorities that do not align with Vision Zero goals or not want to contribute resources because Vision Zero is an LA city-driven initiative

Other Los Angeles City Agencies/Departments:

Advantages:

- Some departments have already expressed interest in being a Vision Zero partner because they have aligned interests in particular populations or issue areas (e.g. Dept. of Aging) or available communications resources (Dept. of Neighborhood Empowerment)
- May have the ability to devote significant ad space (e.g. Metro donated hundreds of bus and shelter ad spots to "Watch the Road" campaign)

Considerations:

- Are vital partners in the overall success of a cross-departmental initiative like Vision Zero and efforts need to be coordinated
- Need a reason to integrate Vision Zero mission into their own priorities

Barriers:

- May have no current work that aligns with Vision Zero priorities

Appendix D. Interview Questions and Themes

Current work

- Background on organizational mission, communities/populations/problems being addressed, scope, partners, etc.
- What work is the Alliance/your organization currently doing that is directly or indirectly related to Vision Zero?

Previous Campaigns:

- What kinds of public outreach strategies have you already employed? What was your most successful campaign and what made it so? How do you measure outcomes?
- What kinds of campaigns (internal or external) have targeted your community members in the past?
- On the spot recall: What campaigns have you seen that have really struck you personally?

Message Development Experience

- How do you identify and target people/groups based on "intangible" variables like "attitudes, value, and beliefs"?
- How do you develop messaging (focus groups, surveys, etc.)? What types of messaging have been most effective for what outcomes?
- What media platforms/outreach events work best with what type of messaging?

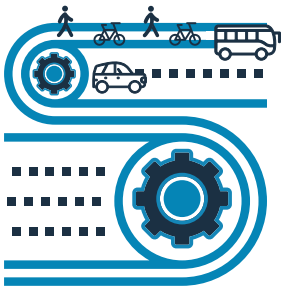
- How does communication change within different communities?
- What are the attitudes, value, and beliefs of your community members that you take into account in communication?
- What particular cultural (or other) considerations should be taken into account when reaching out to your community?
- What are barriers to effective communication with your community members?

Messaging Development Idea

- If we were to create a focus group for your community, who would be the best representatives?
- In terms of Vision Zero, what message would resonate most with you? With your community/constituency?
- If you had to come up with your own image or tagline for Vision Zero in the next minute, what would it be?
- What do you think drives dangerous traffic behavior within your constituency? What strategies could counteract this behavior or provide safer alternatives?

Message Platforms

- What types of traditional media purchasing have you found to be most effective?
- How have you been able to get “earned media”?
- What effective non-traditional platforms have you seen/tried?



CORE ELEMENTS

FOR VISION ZERO COMMUNITIES

INTRODUCTION

Vision Zero – the strategy to eliminate traffic fatalities and severe injuries – is being adopted by a growing number of communities across North America and beyond. While safe mobility is not a new concept, Vision Zero requires a shift in how communities approach decisions, actions, and attitudes around safe mobility.

A fundamental part of this shift is moving from a traditional approach to a Safe Systems approach toward traffic safety. A traditional approach accepts that a certain number of traffic deaths and severe injuries will occur as unavoidable consequences of mobility and focuses on changing individual behavior to reduce the frequency of these incidents. In contrast, Vision Zero is built on the basis that traffic deaths and severe injuries are preventable. Vision Zero emphasizes a Safe Systems approach, which acknowledges that people make mistakes and focuses on influencing system-wide practices, policies, and designs to lessen the severity of crashes.

Approaching the issue of safe mobility in a new way can be challenging, even when everyone agrees on the ultimate goal – in this case, safety for all road users. One limitation to the success and proliferation of Vision Zero in this moment is the lack of a unifying definition and "best practice benchmark." While an increasing number of jurisdictions may call themselves Vision Zero communities, the authentic and ongoing commitment to the fundamental shift in safety perspective can be uneven.

> *The Vision Zero Network and Institute of Transportation Engineers have partnered to develop a set of Vision Zero Core Elements to help communities set priorities, work toward tangible results in promoting safety, and benchmark their progress relative to best practices. This resource encourages leaders to focus on the most impactful actions and helps hold them accountable to their Vision Zero commitments.*

TRADITIONAL APPROACH

Traffic deaths are **INEVITABLE**

PERFECT human behavior

Prevent **COLLISIONS**

INDIVIDUAL responsibility

Saving lives is **EXPENSIVE**

VS

VISION ZERO

Traffic deaths are **PREVENTABLE**

Integrate **HUMAN FAILING** in approach

Prevent **FATAL AND SEVERE CRASHES**

SYSTEMS approach

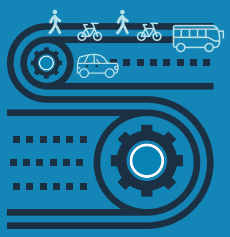
Saving lives is **NOT EXPENSIVE**

VISION ZERO NETWORK

ite A Community of Transportation Professionals

Released November 2018

Thank you to the primary collaborators on this resource: Jenn Fox & Leah Shahum, *Vision Zero Network*; Jeff Lindley, *ITE*; Dana Weissman & Meghan Mitman, *Fehr & Peers*; Richard Retting, *Sam Schwartz Consulting*.



CORE ELEMENTS
FOR VISION ZERO COMMUNITIES

Leadership and Commitment

1. Public, High-Level, and Ongoing Commitment. The Mayor and key elected officials and leaders within public agencies, including transportation, public health, and police, commit to a goal of eliminating traffic fatalities and serious injuries within a specific timeframe. Leadership across these agencies consistently engages in prioritizing safety via a collaborative working group and other resource-sharing efforts.

2. Authentic Engagement. Meaningful and accessible community engagement toward Vision Zero strategy and implementation is employed, with a focus on equity.

3. Strategic Planning. A Vision Zero Action Plan is developed, approved, and used to guide work. The Plan includes explicit goals and measurable strategies with clear timelines, and it identifies responsible stakeholders.

4. Project Delivery. Decision-makers and system designers advance projects and policies for safe, equitable multi-modal travel by securing funding and implementing projects, prioritizing roadways with the most pressing safety issues.

Equity and Engagement

Elevating equity and meaningful community engagement, particularly in low-income communities and communities of color, should be a priority in all stages of Vision Zero work.

Safe Roadways and Safe Speeds

5. Complete Streets for All. Complete Streets concepts are integrated into communitywide plans and implemented through projects to encourage a safe, well-connected transportation network for people using all modes of transportation. This prioritizes safe travel of people over expeditious travel of motor vehicles.

6. Context-Appropriate Speeds. Travel speeds are set and managed to achieve safe conditions for the specific roadway context and to protect all roadway users, particularly those most at risk in crashes. Proven speed management policies and practices are prioritized to reach this goal.

Data-driven Approach, Transparency, and Accountability

7. Equity-Focused Analysis and Programs. Commitment is made to an equitable approach and outcomes, including prioritizing engagement and investments in traditionally under-served communities and adopting equitable traffic enforcement practices.

8. Proactive, Systemic Planning. A proactive, systems-based approach to safety is used to identify and address top risk factors and mitigate potential crashes and crash severity.

9. Responsive, Hot Spot Planning. A map of the community's fatal and serious injury crash locations is developed, regularly updated, and used to guide priority actions and funding.

10. Comprehensive Evaluation and Adjustments. Routine evaluation of the performance of all safety interventions is made public and shared with decision makers to inform priorities, budgets, and updates to the Vision Zero Action Plan.

To learn more about the Vision Zero Core Elements, see the Vision Zero Network's full Vision Zero Core Elements document, which includes further details and links to examples and related resources. In addition, the Vision Zero Network website and ITE Safety Resources Toolbox offer useful information on Vision Zero principles, recommended practices, and analysis strategies.

FOUR LANE TO THREE LANE REDUCTION STUDY
FOR

Iowa Highway 3 (Bremer Avenue)
Between 20th St NW
and 8th St NE Intersections

WAVERLY, IOWA

Iowa DOT Project No. NHSN-003-6(63)220-2R--09

Prepared for:
Iowa DOT
AUGUST 2016

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa.

Eric J. Tott, P.E.

8-8-16 — 19992

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Executive Summary

The Iowa DOT has requested a study to evaluate the feasibility of implementing a "Road Diet" along Iowa Highway 3 (Bremer Avenue) from 20th Street SW to 8TH Street SE. A road diet, also called a lane reduction or road rechannelization, is a technique in transportation planning whereby the number of travel lanes and/or effective width of the road are reduced. Road diets can improve safety, convenience and functionality for all road users. This Four Lane to Three Lane Reduction Study evaluates the feasibility of reducing the existing Bremer Avenue four lane section to a three lane section, with a two-way-left turn lane (TWLTL), and documents traffic operations for 2016 (opening year) and 2036 (design year).

The crash data for the corridor suggests that converting IA 3 to a three lane section may be effective at reducing crashes. Studies done in Iowa suggest a road diet may reduce the crash rate by half. This indicates that crashes within the corridor may decrease from 111 to 60 over a three year period.

Conversion to three lanes for the existing traffic will have adequate capacity and provide acceptable Levels of Service (C or better) for all existing intersection configurations and control except for the intersection of IA 3 / 8th Street SW, which will require signalization.

Intersection turning movement volumes were projected to year 2036. For these future volumes, conversion to three lanes will have adequate capacity and provide acceptable Levels of Service (C or better) for all intersections except for Southbound 12th Street NW, Southbound 8th St NW, Eastbound IA 3 at 4th Street SW, Northbound 4th Street SW and Northbound 4th Street SE. These four intersections will need to be modified to operate with an acceptable level of service for the projected 2036 turning movement volumes.

The following modifications are proposed to improve the LOS at the four intersections:

Control Type Modifications

- Signalize the intersection of IA 3 / 12th Street SW
- Signalize the intersection of IA 3 / 4th Street SE

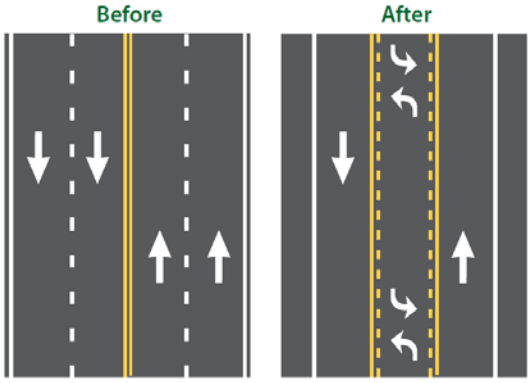
Geometric Modifications

- Provide dual WB left turn lanes at IA 3 / 4th Street SW
  On the WB approach, the two inside lanes can be used as the WB left turn lanes.
  On the NB approach, the parking on the west side of the street would need to be removed to be used for two receiving lanes from the WB approach.
  The SE curb return of the intersection will have to revised to accommodate the NB right turning trucks.

Based on the evaluation and conclusions from this study, a road diet that reduces the existing Bremer Avenue four lane section to a three lane section, with left turn lanes or a two-way-left turn lane (TWLTL), is recommended.

Introduction

The Iowa DOT has requested a study to evaluate the feasibility of implementing a "Road Diet" along Iowa Highway 3 (Bremer Avenue) from 20th Street SW to 8TH Street SE. A road diet, also called a lane reduction or road rechannelization, is a technique in transportation planning whereby the number of travel lanes and/or effective width of the road is reduced. Road diets can improve safety, convenience and functionality for all road users. The feasibility of this road diet was analyzed using the U.S. Department of Transportation Federal Highway Administration (FHWA) Safety Program's *Road Diet Informational Guide*. The following image provided in the *Road Diet Informational Guide* shows the most common road diet reconfiguration. The reduction of traffic lanes allows the roadway cross section to be reallocated for other uses such as cyclists, pedestrians, transit or parking.



The reallocated space can improve safety of cyclists by providing a space on the roadway to reduce potential vehicle conflicts. There are a number of benefits that can be achieved by implementing a road diet. The American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities 2012* provides a list of benefits for a road diet. See Table 1.

AASHTO Bicycle Facilities Guide Road Diet Benefits
The additional space gained by removing one lane can be used to provide bike lanes or shoulders on both sides of the road.
With one travel lane in each direction, top-end travel speeds are moderated by those who are following posted speed limits, which may reduce potential crash severities for all users.
It may be feasible to include a raised median or small refuge islands at some pedestrian crossing locations, making it easier for pedestrians to cross the street and reducing the likelihood of pedestrian crashes.
The reduction from two lanes to one in each direction virtually eliminates the likelihood of "multiple threat" crashes (where a driver in one lane stops to yield, but the driver in the adjacent lane continues at speed) for pedestrians and left-turning motorists and bicyclists.
Left-turn lanes provide a place for motorists and bicyclists to wait to make a left turn, reducing the incidence of left-turn and rear-end crashes.
Sideswipe crashes are reduced since motorists no longer need to change lanes to pass a vehicle waiting to turn left from the leftmost through lane.
Less traffic noise (due to reduced speeds) and greater separation from traffic for pedestrians, residents, and businesses.

Table 1 – AASHTO Bicycle Facilities Guide Road Diet Benefits

The *Road Diet Informational Guide* provides a list of positives and negatives for a road diet. See Table 2.

Road Diet Feature	Primary/Intended Impacts	Secondary/Unintended Impacts	
		Positive	Negative
Bike lanes	• Increased mobility and safety for bicyclists, and higher bicycle volumes • Increased comfort level for bicyclists due to separation from vehicles	• Increased property values	• Could reduce parking, depending on design
Fewer travel lanes	• Reallocate space for other uses	• Pedestrian crossings are easier, less complex • Can make finding a gap easier for cross-traffic • Allows for wider travel lanes	• Mail trucks and transit vehicles can block traffic when stopped • May reduce capacity • In some jurisdiction, maintenance funding is tied to the number of lane-miles, so reducing the number of lanes can have a negative impact on maintenance budgets • Similarly, some Federal funds may be reduced • If travel lanes are widened, can encourage increased speeds
Two-Way Left Turn Lane	• Provide dedicated left turn lane	• Makes efficient use of limited roadway area	• Could be difficult for drivers to access left turn lane if demand for left turns is too high
Pedestrian refuge island	• Increased mobility and safety for pedestrians	• Makes pedestrian crossings safer and easier • Prevents illegal use of the TWLTL to pass slower traffic or access an upstream turn lane	• May create issues with snow removal • Can effectively increase congestion by preventing illegal maneuvers
Buffers (grass, concrete median, plastic delineators)	• Provide barriers and space between travel modes	• Increases comfort level for bicyclists by increasing separation from vehicles • Barrier can prevent users entering a lane reserved for another mode	• Grass and delineator buffers will necessitate ongoing maintenance.

Table 2 – Road Diet Informational Guide Road Diet Benefits

The FHWA *Road Diet Informational Guide* states that road diets may reduce vehicle-to-vehicle conflicts that contribute to rear-end, left-turn, and sideswipe crashes by removing the four-lane undivided inside lanes serving both through and turning traffic. Studies indicate a 19 to 47 percent reduction in overall crashes when a Road Diet is installed on a previously four-lane undivided facility, as well as a decrease in crashes involving drivers under 35 years of age and over 65 years of age. The *Road Diet Informational Guide* also states that road diets may improve safety by reducing the speed differential. On four lane roads the speed can vary between travel lanes due to slower or stopped vehicles waiting to turn left out of the through lane. Road diets reduce the traffic speed and number of conflict points. Reducing operating speed decreases crash severity when crashes occur.

Several studies have been done to determine the potential crash reduction factors after implementing a road diet. In particular, a study done in 2006 titled *Safety Impacts of "Road Diets" in Iowa* studied 15 corridors in Iowa with several that had traffic volumes in the same range as Waverly or higher. This study was supported by comparing the road diet corridors vs. 15 control corridors that remained as four-lane undivided highways. Across these 15 Iowa corridors, the study found the following overall crash reductions percentages:

- Non-Collision (Single Vehicle) 85% reduction
- Head on 42% reduction
- Rear-end 35% reduction
- Angle, on-coming left-turn 74% reduction
- Broadside 41% reduction
- Sideswipe, same direction 49% reduction
- Unknown 84% reduction

Similarly, Iowa DOT District 2 did a conversion of IA 9 in Cresco in 2008. Based on three-years of crash data following the conversion, the IA 9 corridor saw a decrease in total crashes of 50%, a decrease in injuries of 64%, and a 52% reduction in property damage costs associated with crashes. Similar results were achieved in Clear Lake and Mason City conversions.

The Iowa DOT proposes to study reducing the existing four lane section to a three lane section with left turn lanes or a two-way-left turn lane (TWLTL). This study evaluates the feasibility of reducing the existing Bremer Avenue four lane section to a three lane section, with a two-way-left turn lane (TWLTL), and documents traffic operations for 2016 (opening year) and 2036 (design year).

Study Location

The study area lies in the southwest region of Bremer County, along IA 3 through Waverly. See Figure 1.

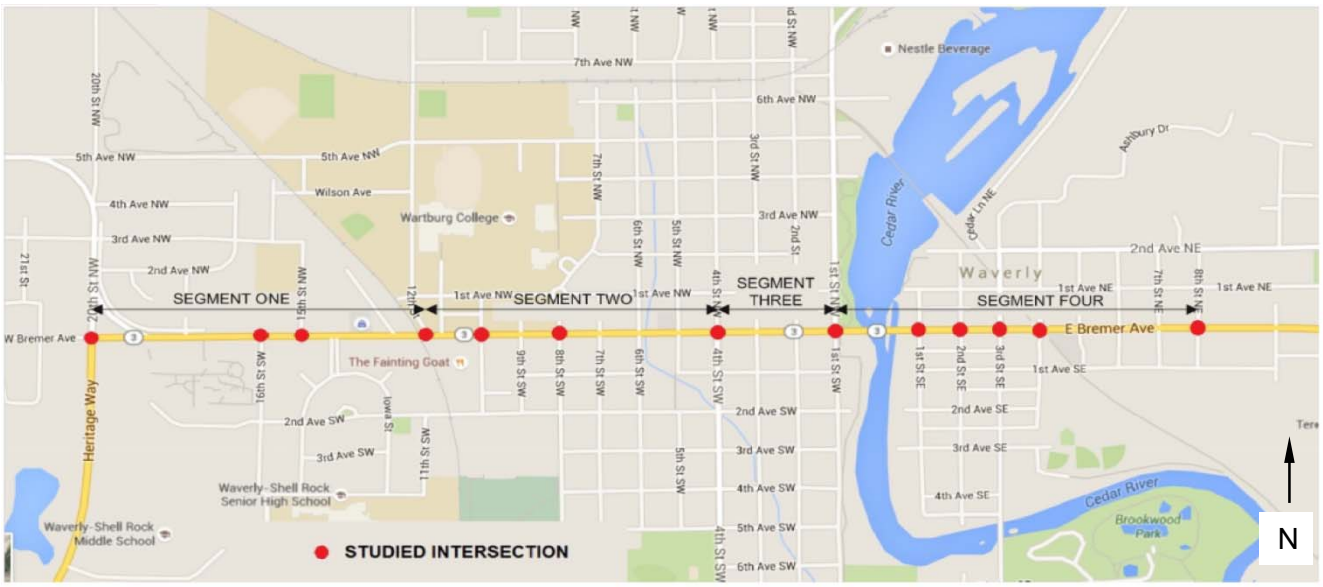


Figure 1 – Location Map

The study focuses on the following Bremer Avenue intersections from 20th Street NW to 8TH Street NE:

- IA 3 / 20th St NW
- IA 3 / 16th St SW
- IA 3 / 15th St NW
- IA 3 / 12th St NW
- IA 3 / 10th St NW
- IA 3 / 8th St NW
- IA 3 / 4th St NW
- IA 3 / 1ST St NW
- IA 3 / 1ST St NE
- IA 3 / 2ND St NE
- IA 3 / 3RD St NE
- IA 3 / 4TH St NE
- IA 3 / 8TH St NE

For the purposes of this study, IA 3 will be broken down into four segments within the study area:

- Segment One 20th Street NW to 12th Street NW
- Segment Two 12th Street NW to 4th Street NW
- Segment Three 4th Street NW to 1st Street NW
- Segment Four 1st Street NW to 8th Street NE.

Existing Roadway and Intersection Characteristics

IA 3 is currently an urban four lane road within the study area. Segment One, 20th Street NW to 12th Street NW, is 48 feet wide from face of curb to face of curb, with four 12 foot lanes.

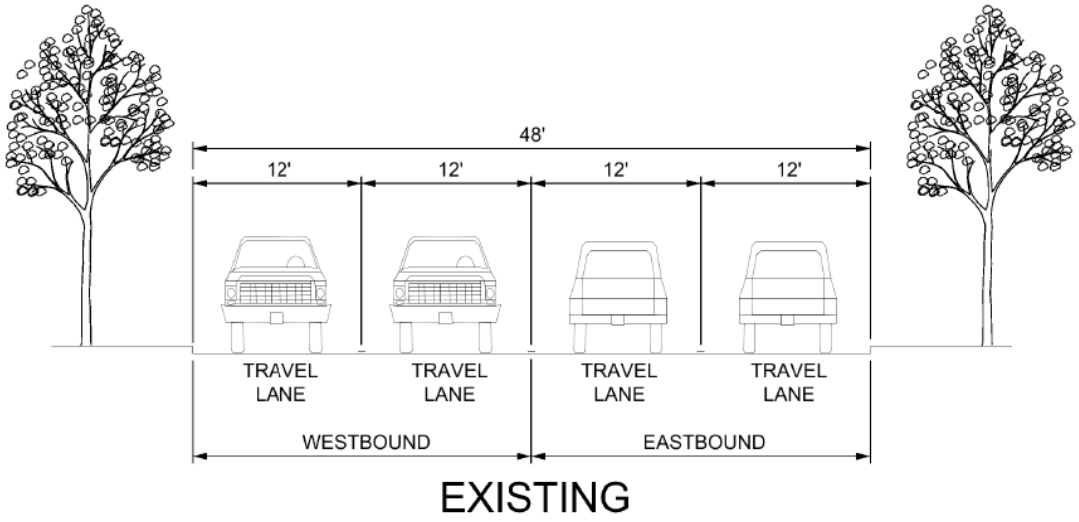


Figure 2 – Existing Segment One Roadway Typical Section

Segments Two, Three and Four, from 12th Street NW to 8th Street NE, are 66' wide from face of curb to face of curb, with four 12 foot lanes and two 9 foot parking lanes.

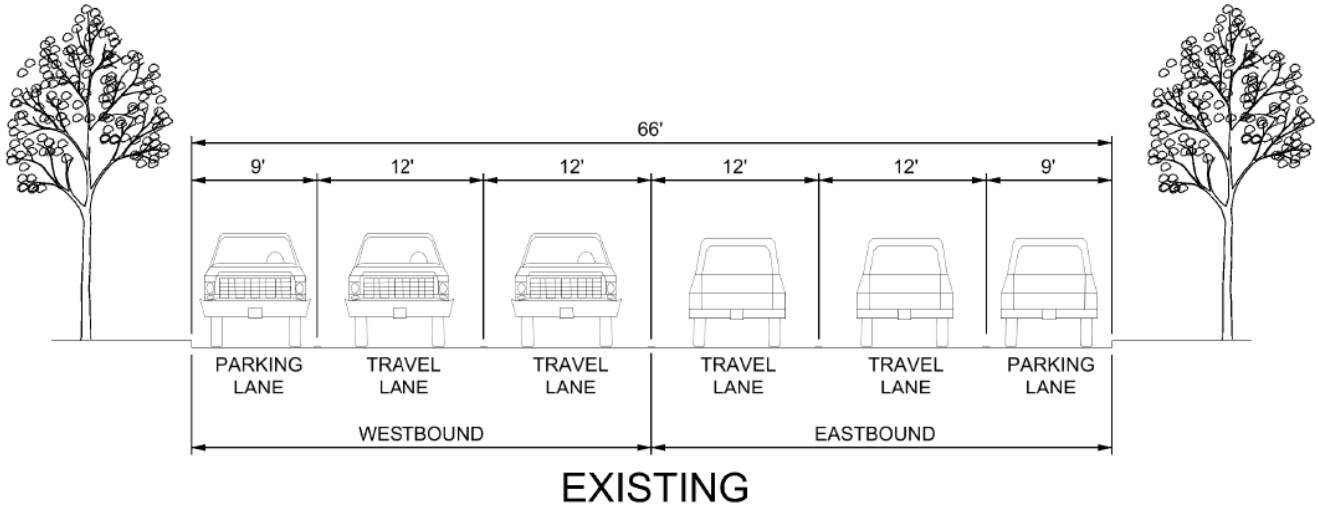


Figure 3 – Existing Segment Two, Three and Four Roadway Typical Section

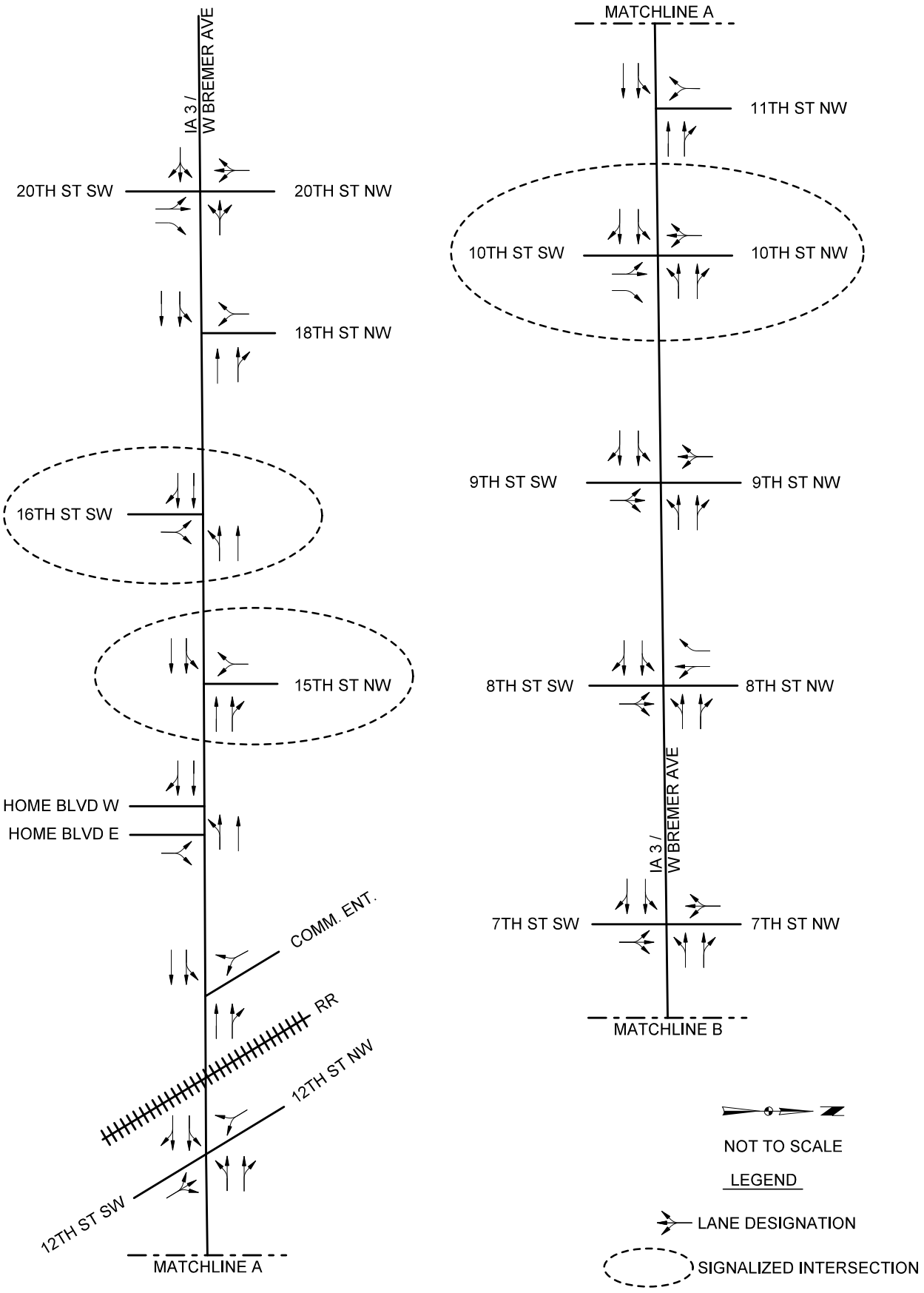
All of the intersections analyzed within the study area are signalized, except for the following.

- IA 3 / 20th St NW
- IA 3 / 12th St NW
- IA 3 / 8th St NW
- IA 3 / 4TH St NE
- IA 3 / 8TH St NE

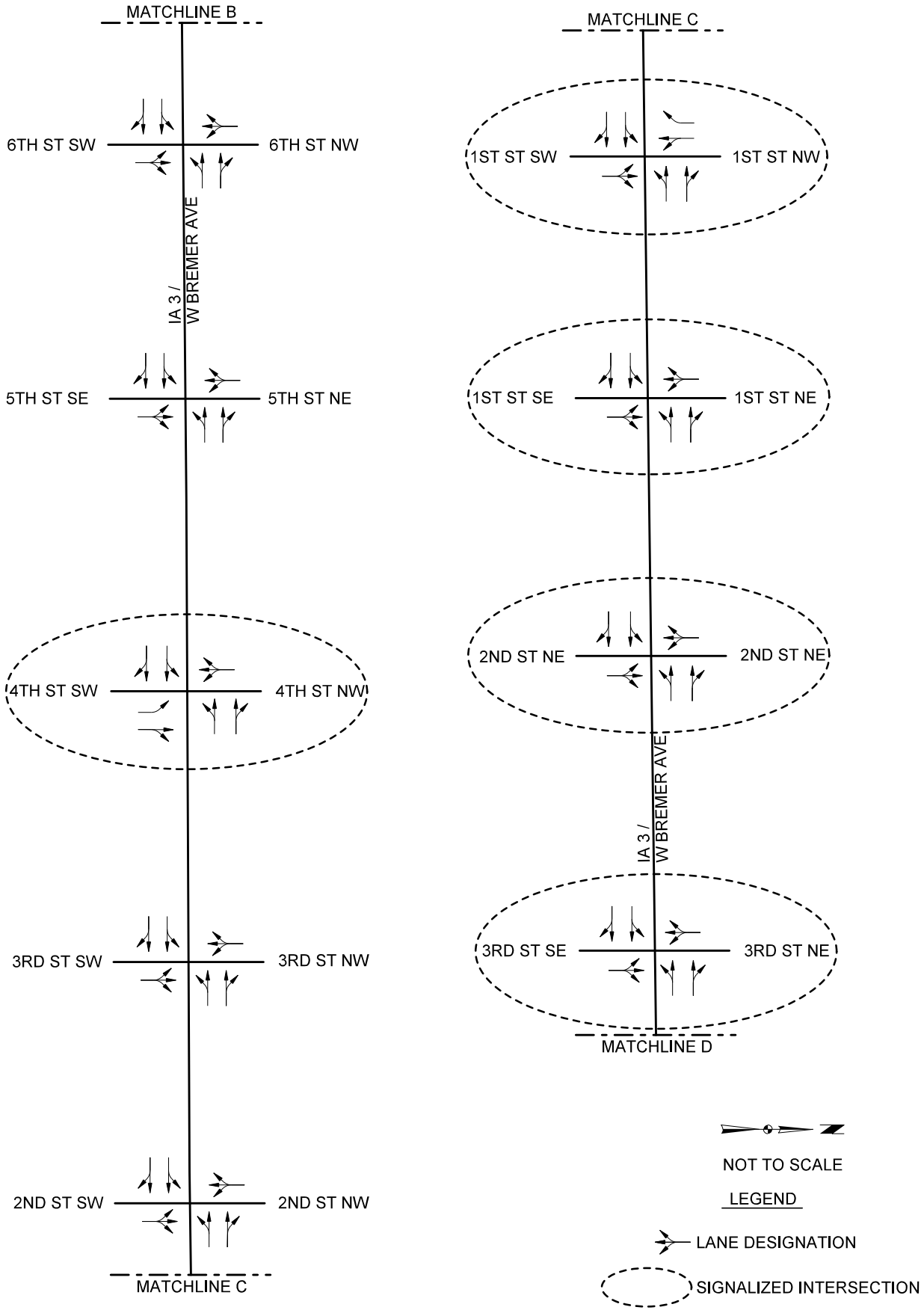
Currently, the unsignalized intersections operate with side-street stop control and free-flowing traffic on IA 3, with the exception of the IA 3 and 20th St NW intersection, which operates under four way stop control. See Figures 4 through 6 for existing lane configurations.

Land uses are a mix of residential and commercial.

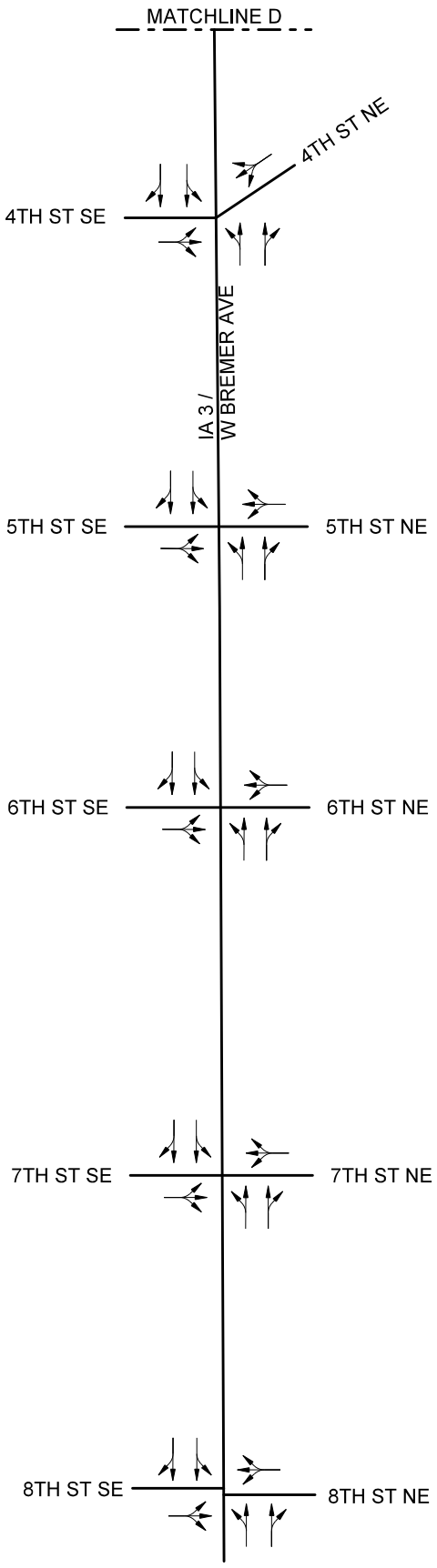
Pedestrians are accommodated with four foot sidewalks on both sides. Currently, there are no bicycle accommodations through the study area.



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING TRAFFIC LANES FIGURE 4	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING TRAFFIC LANES FIGURE 5	whks engineers + planners + land surveyors



NOT TO SCALE

LEGEND

LANE DESIGNATION

SIGNALIZED INTERSECTION

TRAFFIC IMPACT STUDY
IA 3 / BREMER AVE

WAVERLY, IOWA

EXISTING TRAFFIC LANES

FIGURE 6

whks
engineers + planners + land surveyors

Proposed Roadway and Intersection Characteristics

In order to evaluate the feasibility of reducing the existing four lane roadway, the following lane modifications were developed for each roadway segment:

For Segment One, the existing four lane would be reduced to two 12 foot traffic lanes, with a 14 foot two-way left turn lane and two 5 foot shoulders.

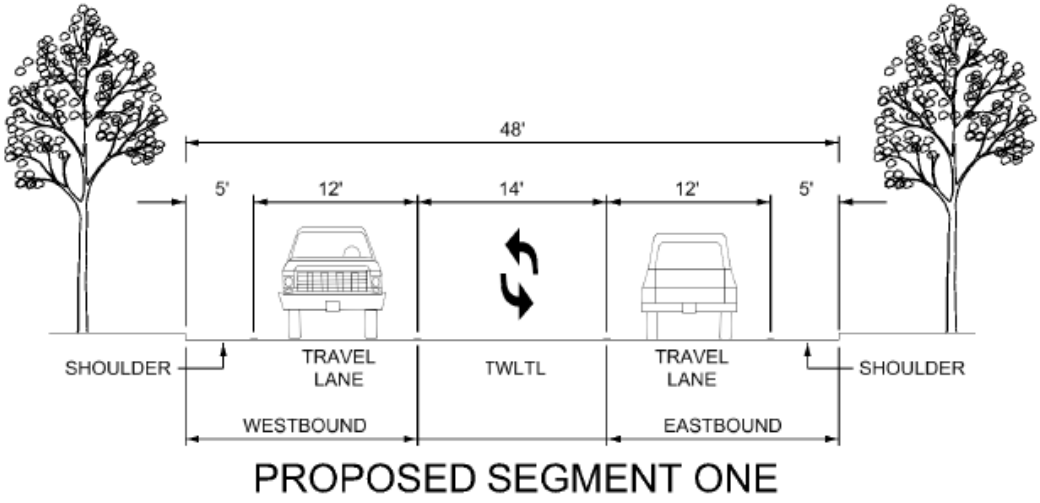


Figure 7 –Proposed Segment One Roadway Typical Section

For Segment Two, the existing four lane would be reduced to two 12 foot traffic lanes, a 14 foot two-way left turn lane, two 5 foot buffer zones and two 9 foot parking lanes.

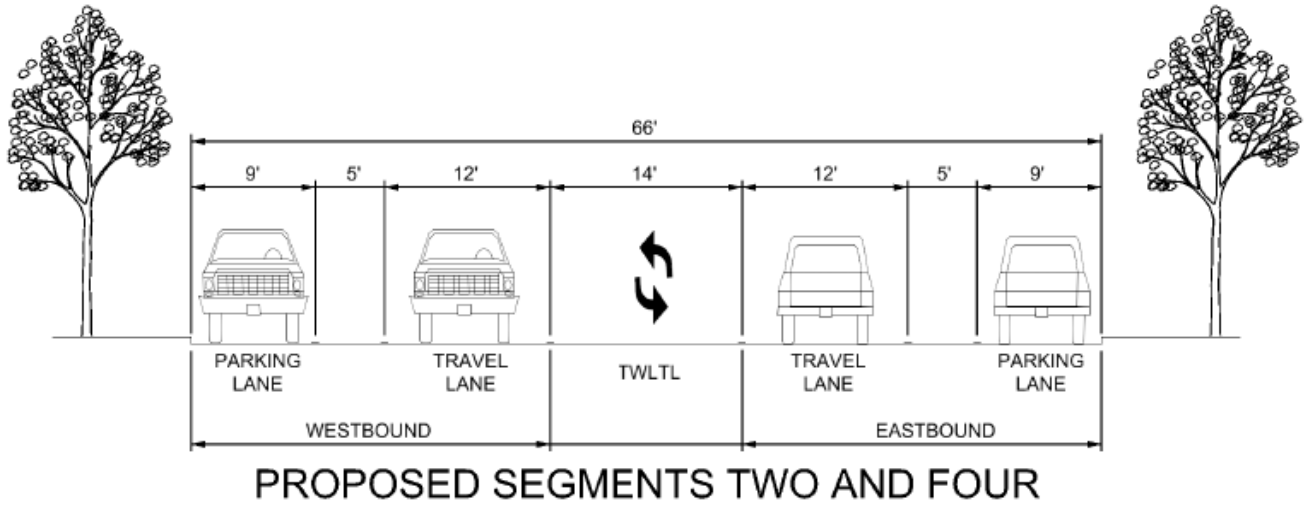


Figure 8 –Proposed Segments Two and Four Roadway Typical Section

For Segment Three, the existing four lane would be reduced to two 12 foot traffic lanes, 12 foot left turn lane, 12 foot striped median and two 9 foot parking lanes. The lane transitions to adjacent segments will be done with tapers.

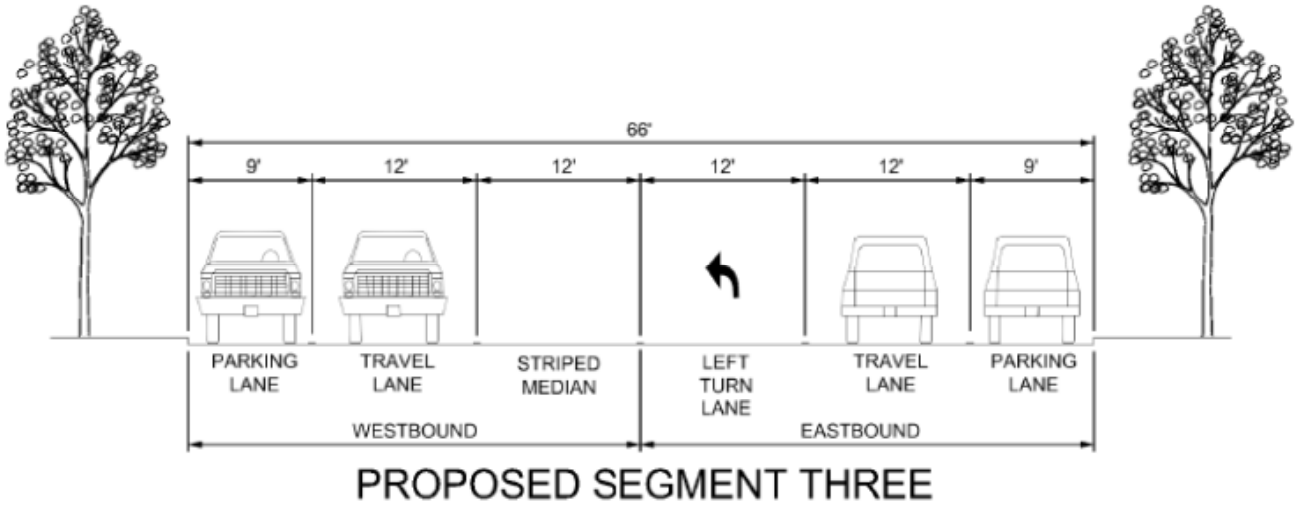
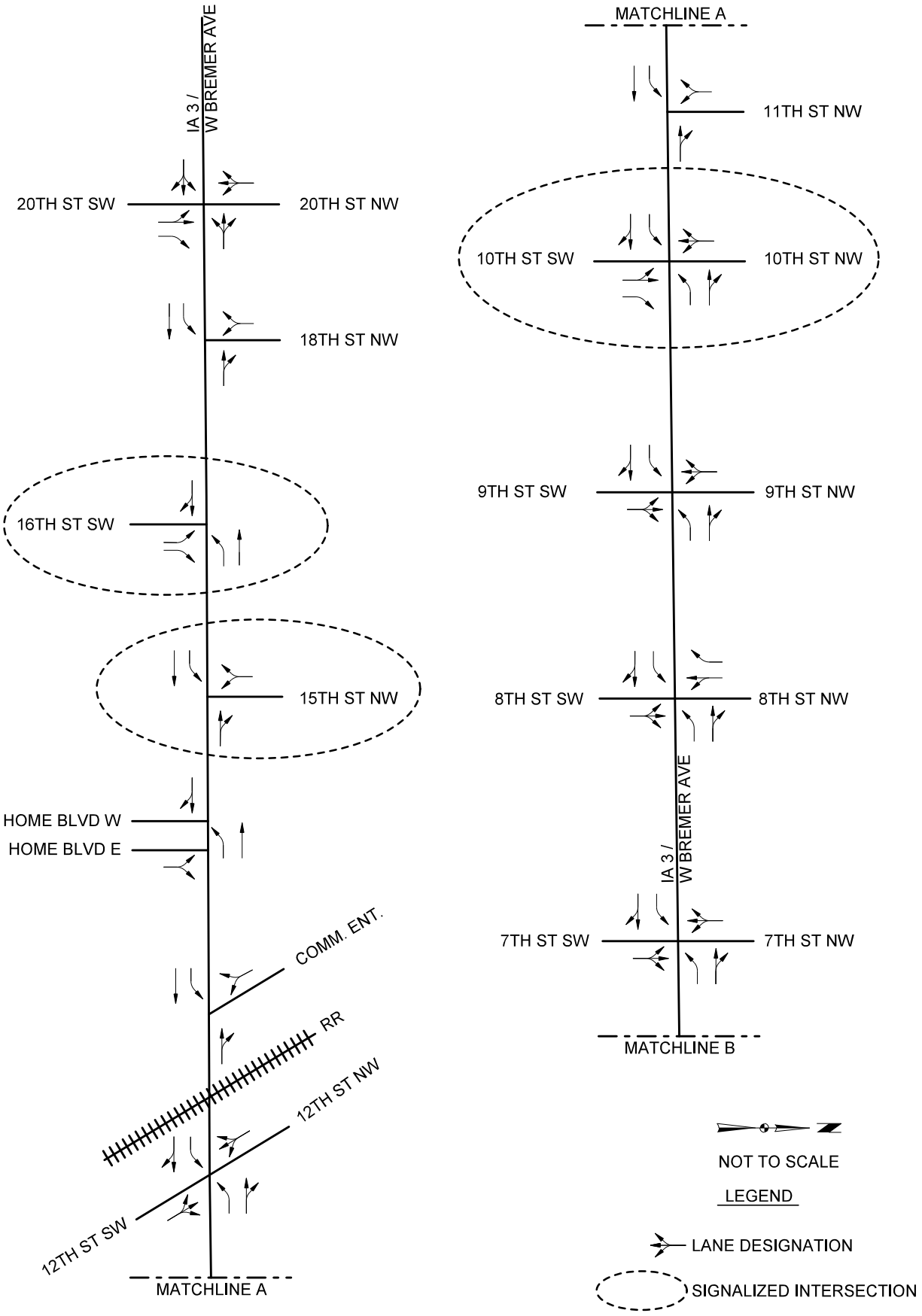


Figure 9 –Proposed Segment Three Roadway Typical Section

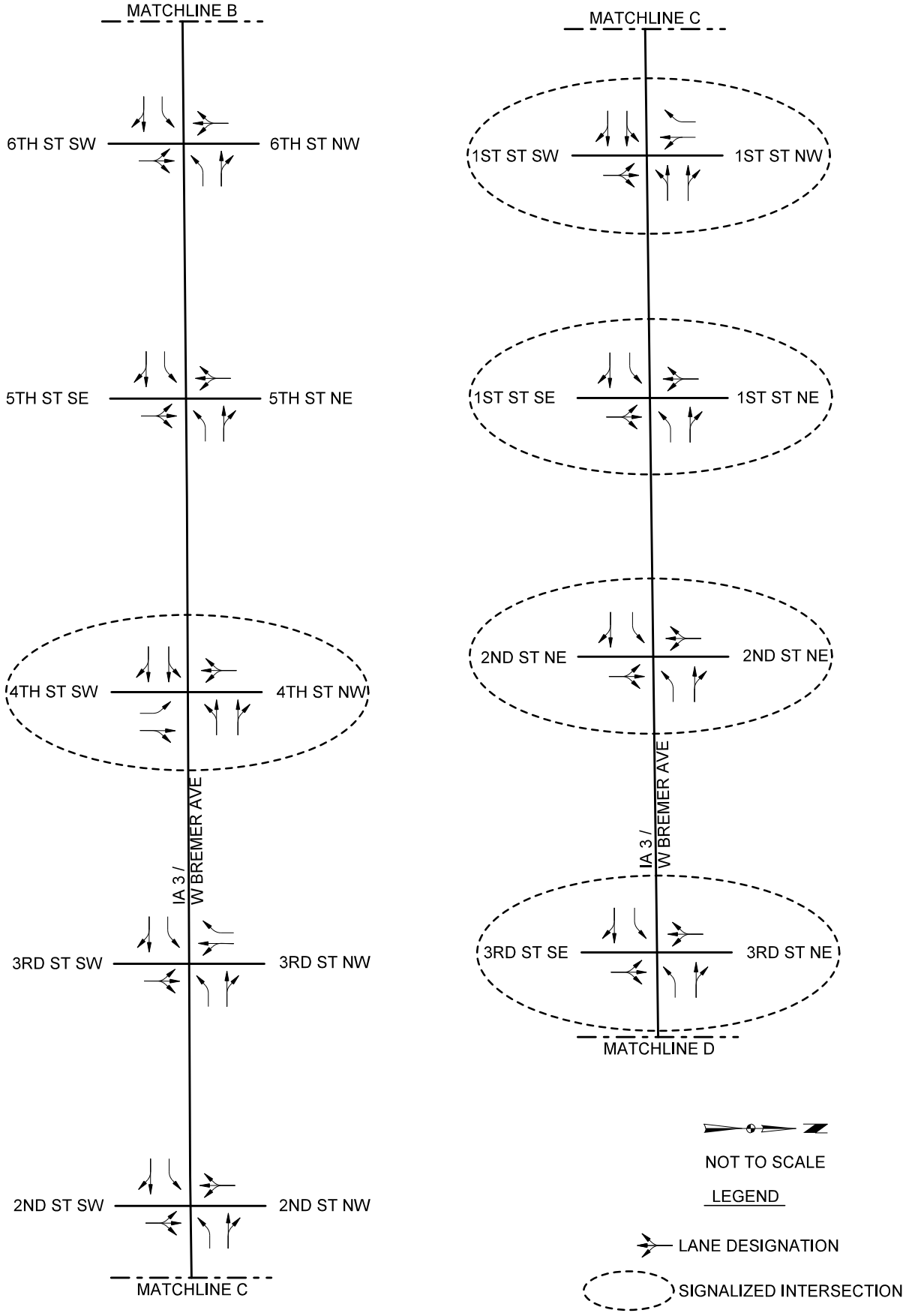
For Segment Four, the existing four lane would be reduced to two 12 foot traffic lanes, a 14 foot two-way left turn lane, two 5 foot buffer zones and two 9 foot parking lanes. See Figure 8.

See Figures 10 through 12 for proposed lane configurations.

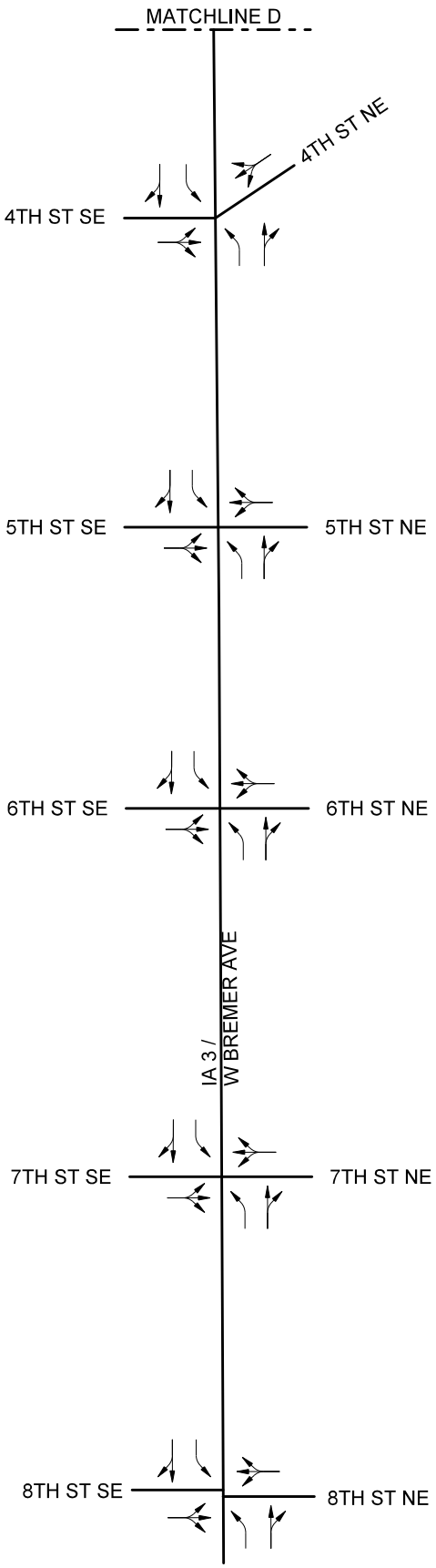
For purposes of the analysis, the existing sideroad lane configurations and the existing intersection controls will remain the same. Traffic signal heads will be modified as necessary to accommodate the lane reduction and reconfiguration.



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	PROPOSED TRAFFIC LANES FIGURE 10	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	PROPOSED TRAFFIC LANES FIGURE 11	whks engineers + planners + land surveyors



NOT TO SCALE

LEGEND

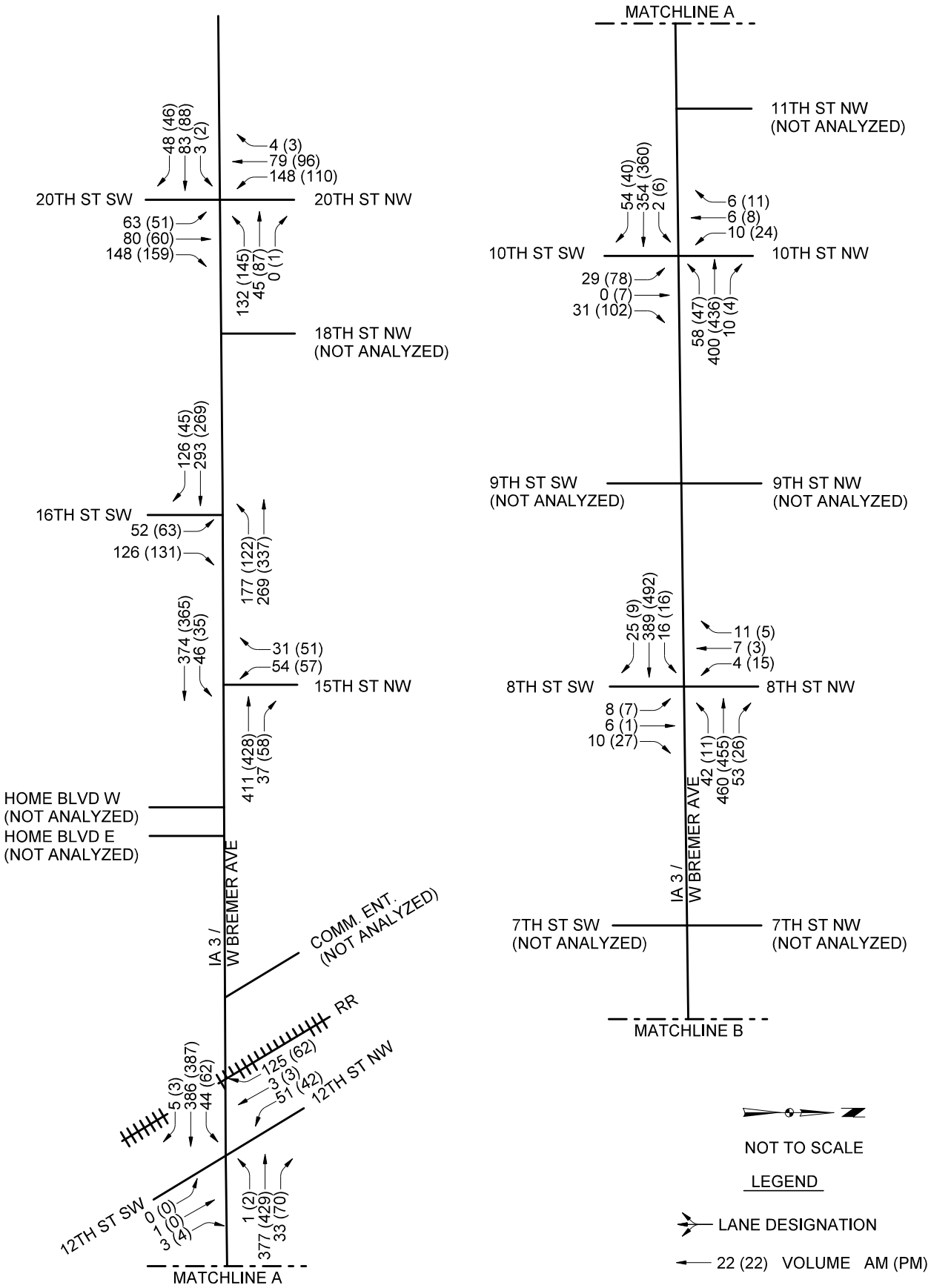
LANE DESIGNATION

SIGNALIZED INTERSECTION

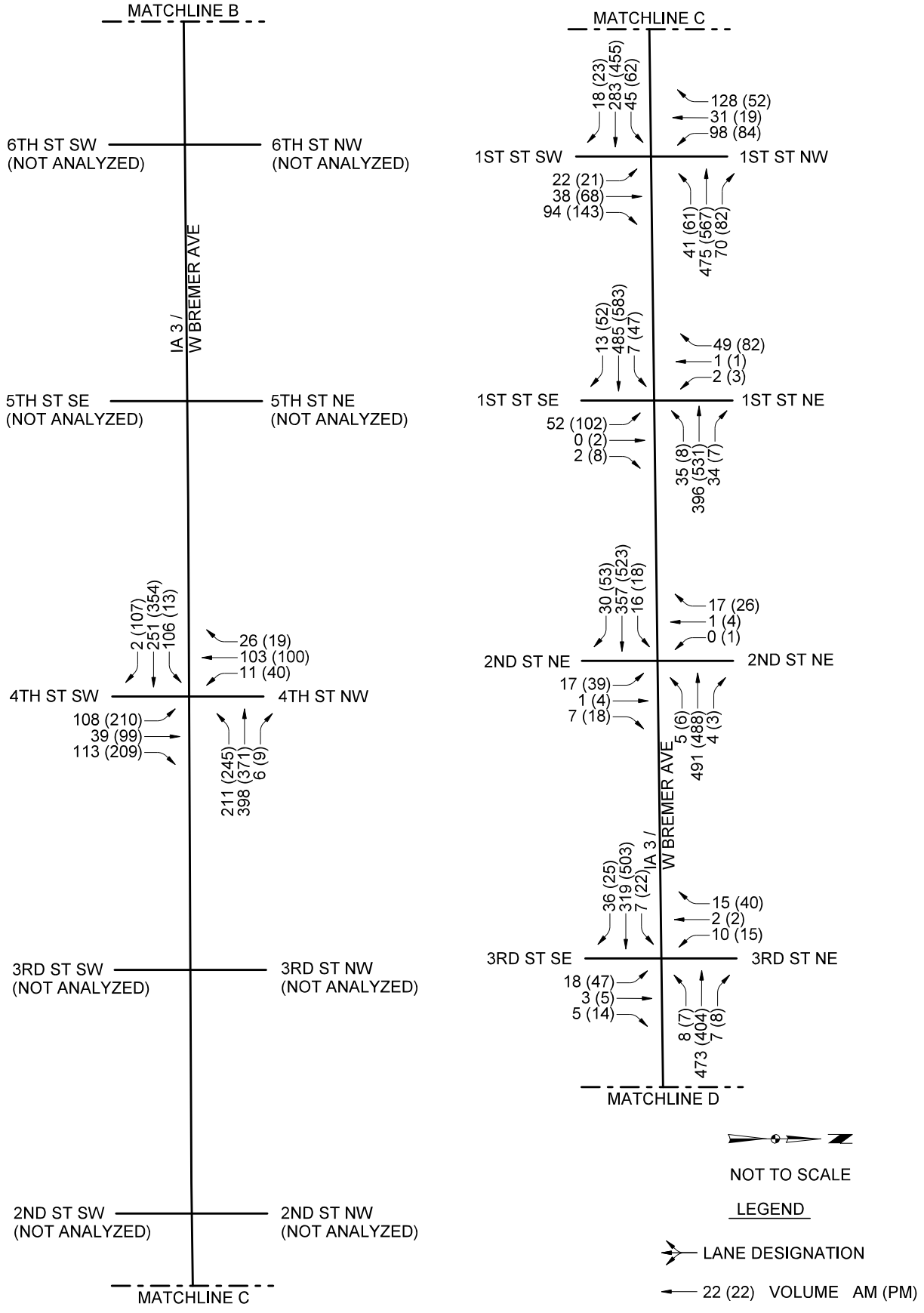
TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	PROPOSED TRAFFIC LANES FIGURE 12	whks engineers + planners + land surveyors

Traffic Volumes

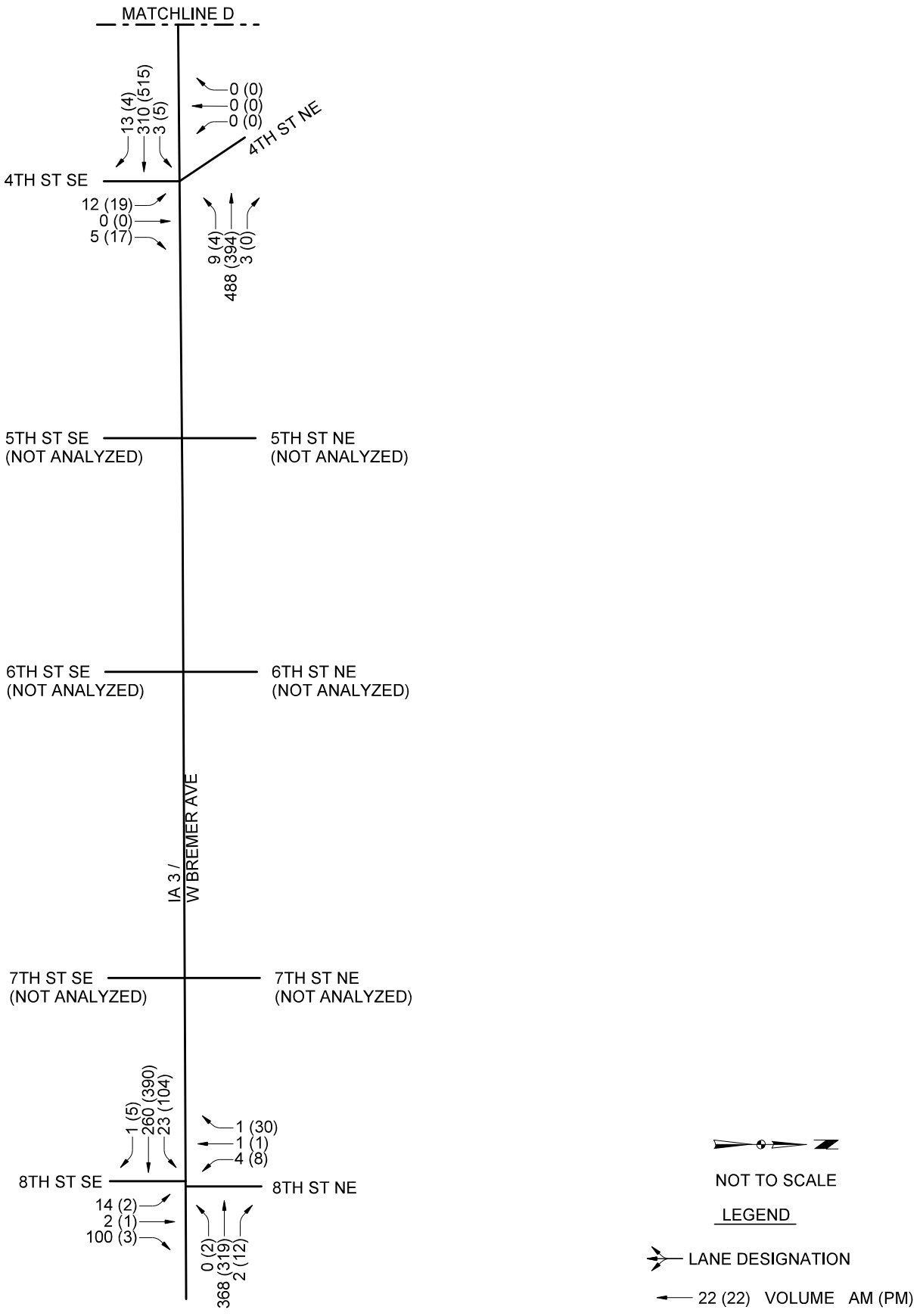
Directional intersection traffic volumes were obtained using video detection traffic counts performed December 1, 2015 (Tuesday). For the purposes of this study the December 2015 volumes will be referred to as 2016 volumes. See Appendix A for the traffic count data. Traffic was counted from 7:00-9:00 AM and 2:30-6:30 PM. A 1% compound growth rate was assumed and traffic count volumes were factored to obtain future volumes. Pedestrian traffic was counted but was not included in the analyses. See Figures 13 through 18 for a summary of the 2016 and 2036 AM and PM peak hour traffic volumes.



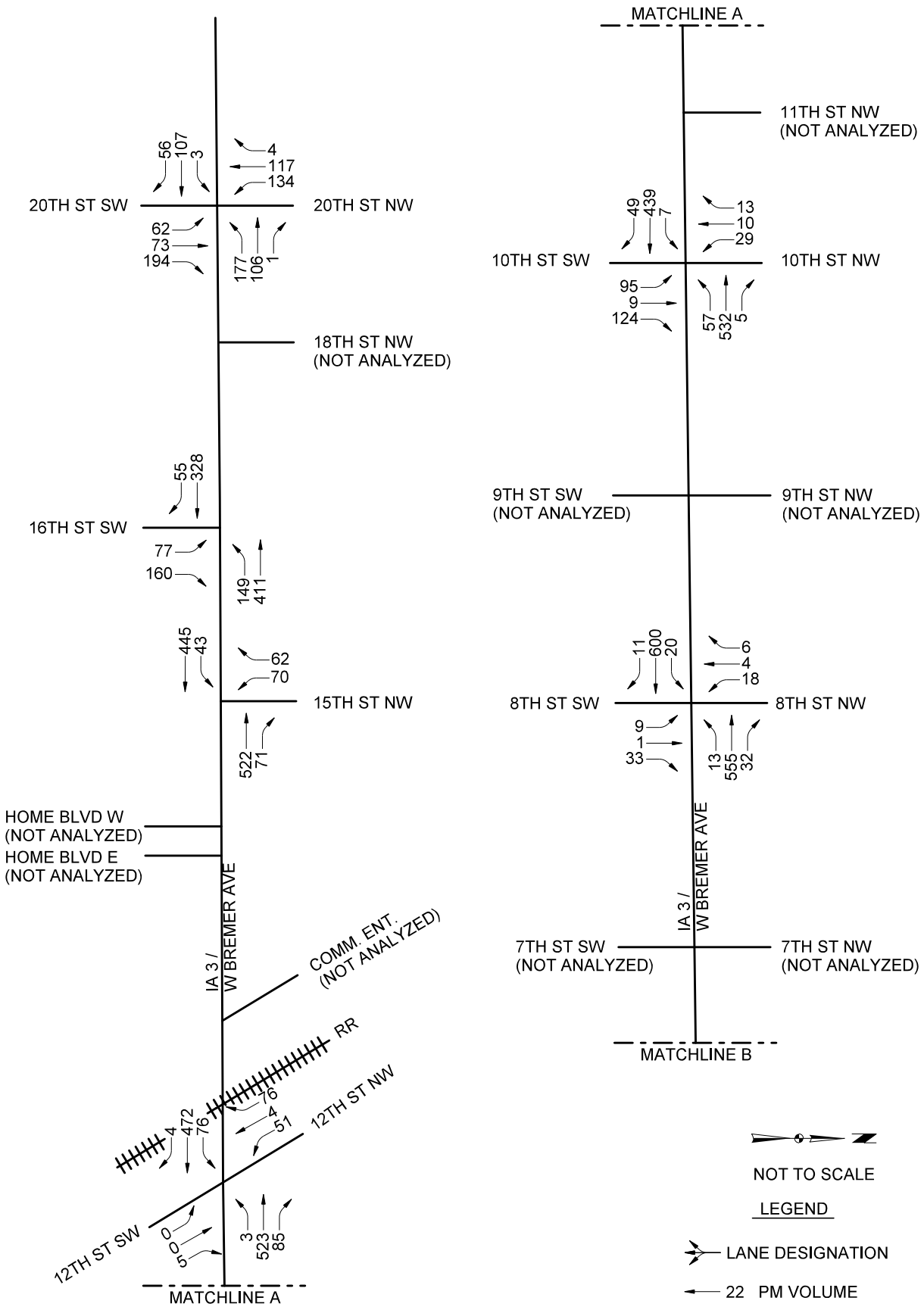
TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING (2016) TRAFFIC COUNTS FIGURE 13	whks engineers + planners + land surveyors



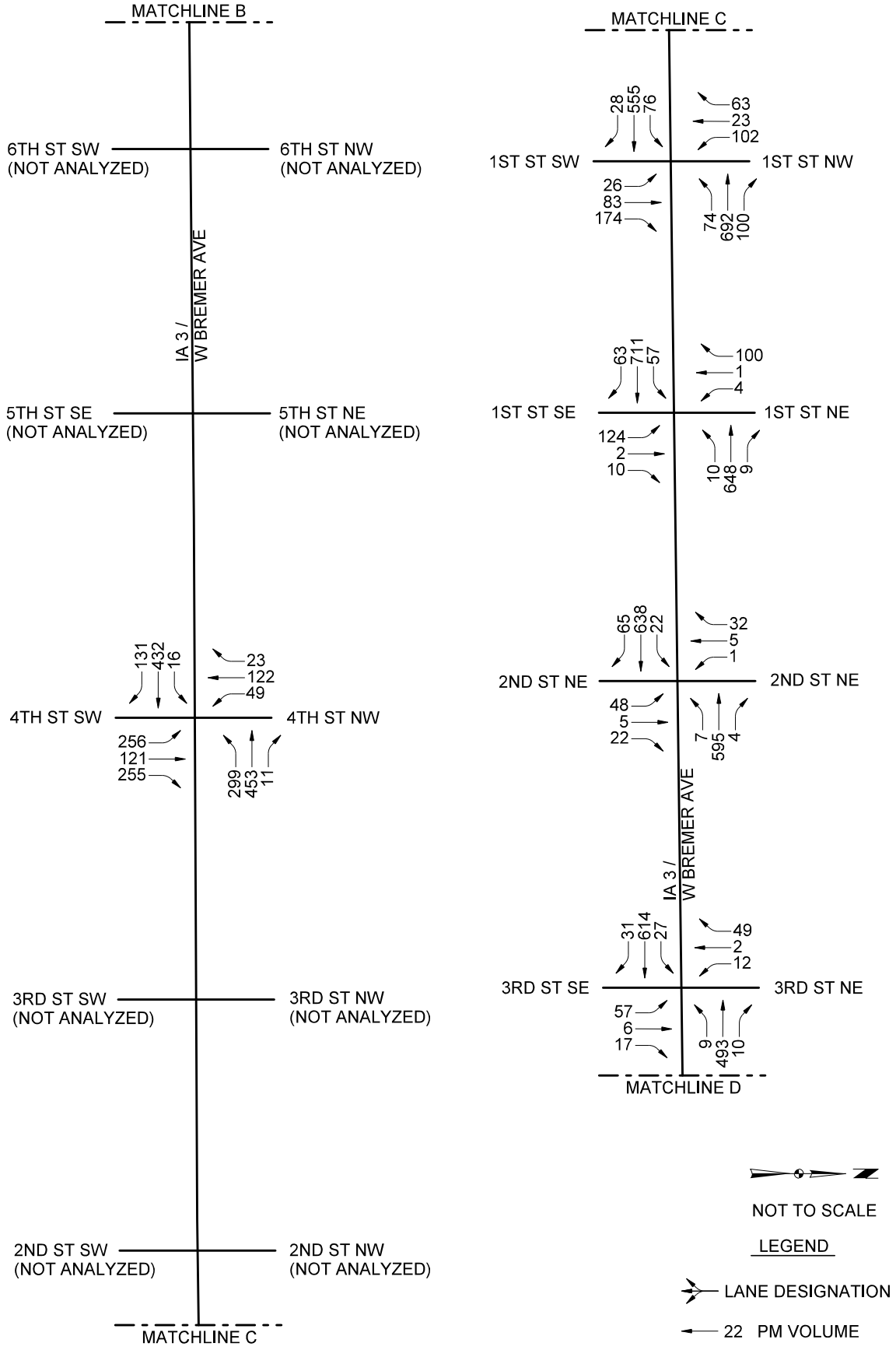
TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING (2016) TRAFFIC COUNTS FIGURE 14	whks engineers + planners + land surveyors



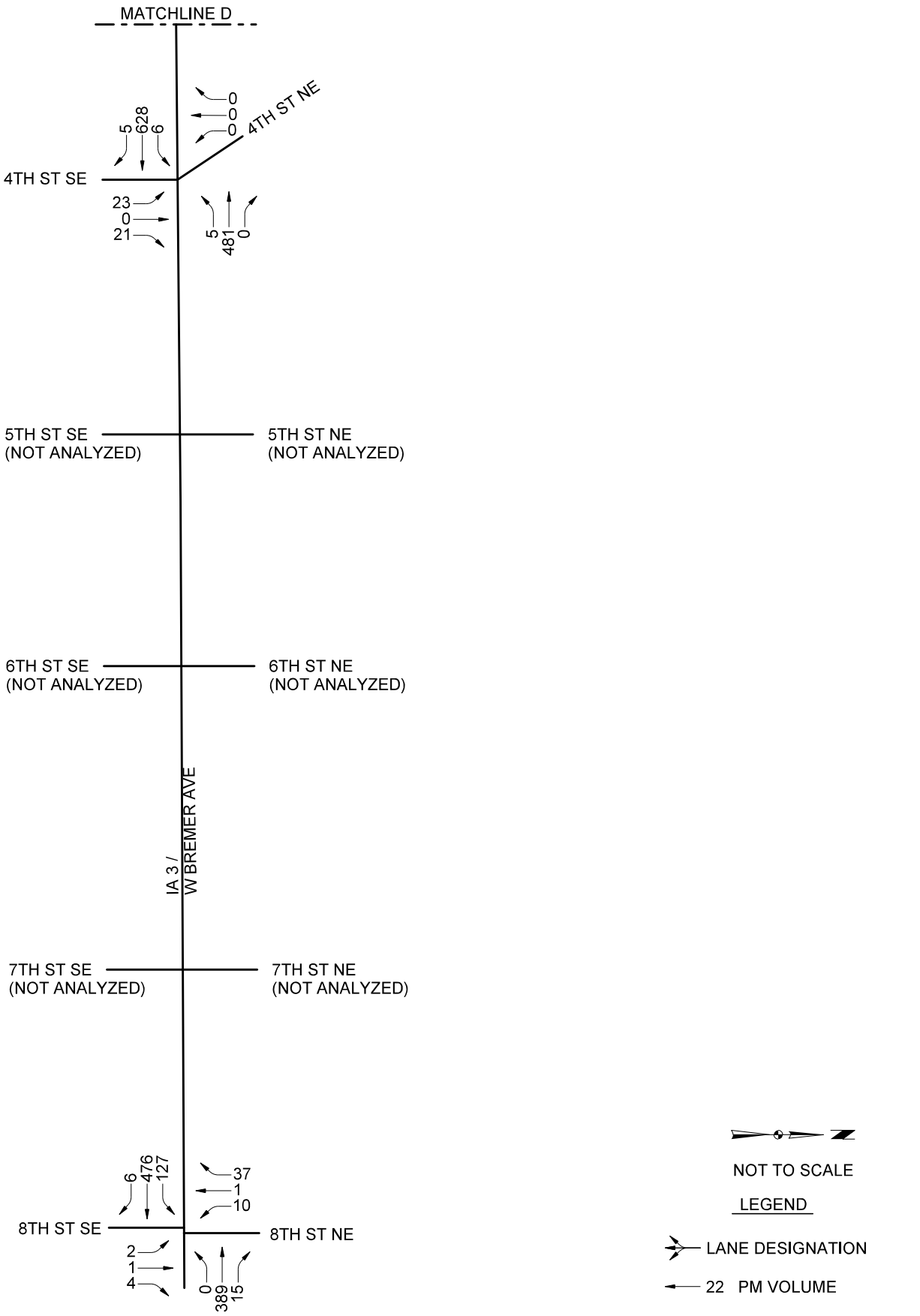
TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING (2016) TRAFFIC COUNTS FIGURE 15	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	PROJECTED PM (2036) TRAFFIC COUNTS FIGURE 16	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	PROJECTED PM (2036) TRAFFIC COUNTS FIGURE 17	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	PROJECTED PM (2036) TRAFFIC COUNTS FIGURE 18	whks engineers + planners + land surveyors

Safety Analysis

Crash Analysis

Crash data for the past three (3) years, 2012 through 2014, was tabulated and analyzed for the study corridor.
The detailed crash data are provided in Appendix B. The compiled manner of crash summary and the related number of injuries and severity level data are summarized in Table 3.

Crash Data Summary Table												
	Crashes						Injuries					
	Total	Fatal	Major	Minor	Possible	PDO*	Total	Fatal	Major	Minor	Possible	Unknown
Rear-End (Front to Rear)	53			2	7	44	13			2	10	1
Sideswipe - Same Direction	23				4	19	4				4	
Angle On-coming left turn	14				2	12	3				3	
Broadside	14			1	3	10	4			1	3	
Non-Collision	6				1	5	1				1	
Head-on (Front to Front)	1					1	0					
Sideswipe - Opposite Direction	0						0					
Unknown	0						0					
Not Reported	0						0					
Total	111	0	0	3	17	91	25	0	0	3	21	1

**Property Damage Only*

Table 3 – Intersection Crash Summary Table

The manner in which two vehicles collide while in movement provides important information. Four lane undivided highways, like IA 3 in the study area, have a history of relatively high crash rates, because the inside lanes are shared by high speed through traffic and left turning vehicles. The top four manner of crashes within the study limits are:

1. Rear End (Front to Rear)
2. Sideswipe – Same Direction
3. Angle On-coming Left Turn
4. Broadside

These crash types and the number of crashes suggest that converting the existing roadway to a three lane roadway has the potential to be an effective and low cost way to reduce the crashes and injuries within the corridor. Using the crash reduction factors reported in the 2006 study *Safety Impacts of "Road Diets" in Iowa,* it can be seen in Table 4 that the potential crash reduction is significant.

Potential Crash Reduction				
	Total	% reduction	Potential Crashes w/three-lane	Potential Crashes, rounded
Rear-End (Front to Rear)	53	35%	34.45	34
Sideswipe - Same Direction	23	49%	11.73	12
Angle On-coming left turn	14	73%	3.78	4
Broadside	14	41%	8.26	8
Non-Collision	6	85%	0.9	1
Head-on (Front to Front)	1	42%	0.58	1
Sideswipe - Opposite Direction	0	49%	0	0
Unknown	0		0	0
Not Reported	0		0	0
Total	111			60

Table 4 – Potential Crash Reduction Table

In the entire City of Waverly 429 crashes were reported in the 2012-2014 period. A total of 111 of those crashes occurred on Bremer Ave (IA 3) indicated that 26% of the crashes in the City of Waverly occur on this portion of IA 3.

These 111 crashes equate to a crash rate of 575 crashes per hundred million vehicles miles of travel for the current four-lane corridor. This compares to a 2007-2011 Statewide Average Crash Rate of 293 C/HMVM along a Municipal Primary Iowa Route. The crash rate in the existing four-lane corridor is nearly double that of the average Iowa urban highway corridor.

Within this corridor IA 3/Bremer Avenue and 4th Street NW is ranked number 3 in the list of top 5 City Safety Improvement Candidate Locations – Intersections in the City of Waverly.

Pedestrian Crossings

A lane reduction would provide an opportunity to improve the safety of the pedestrian crossings through the corridor. The FHWA *Road Diet Informational Guide* discusses adding corner or midblock curb bulb outs to reduce the length of the pedestrian crossing. The *Road Diet Informational Guide* also states that the bulb outs are best used with on street parking. IA 3 / Bremer Avenue provides numerous locations where this design will be ideal. The preliminary design has included curb bulb outs at the following intersections (see Appendix C for preliminary design sheets):

- IA 3 / 10th St NW
- IA 3 / 8th St NW
- IA 3 / 6th St NW
- IA 3 / 4th St NW
- IA 3 / 1ST St NE
- IA 3 / 2ND St NE
- IA 3 / 3RD St NE
- IA 3 / 4TH St NE

Intersection Analyses

The capacity of the intersections was analyzed using the procedures outlined in the *Highway Capacity Manual 2010* (HCM). The intersections were modeled using Synchro Studio 9 with SimTraffic 9.

Level of Service (LOS) at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the HCM defines LOS in terms of the average control delay at the intersection in seconds per vehicle. Level of service is broken down into letter grades, with LOS A representing good operations and LOS F representing poor operations. LOS E is considered to be at capacity. LOS C is generally considered acceptable for design purposes. Table 5 shows the level of service correlations to seconds of delay for signalized intersections and stop control (unsignalized) intersections.

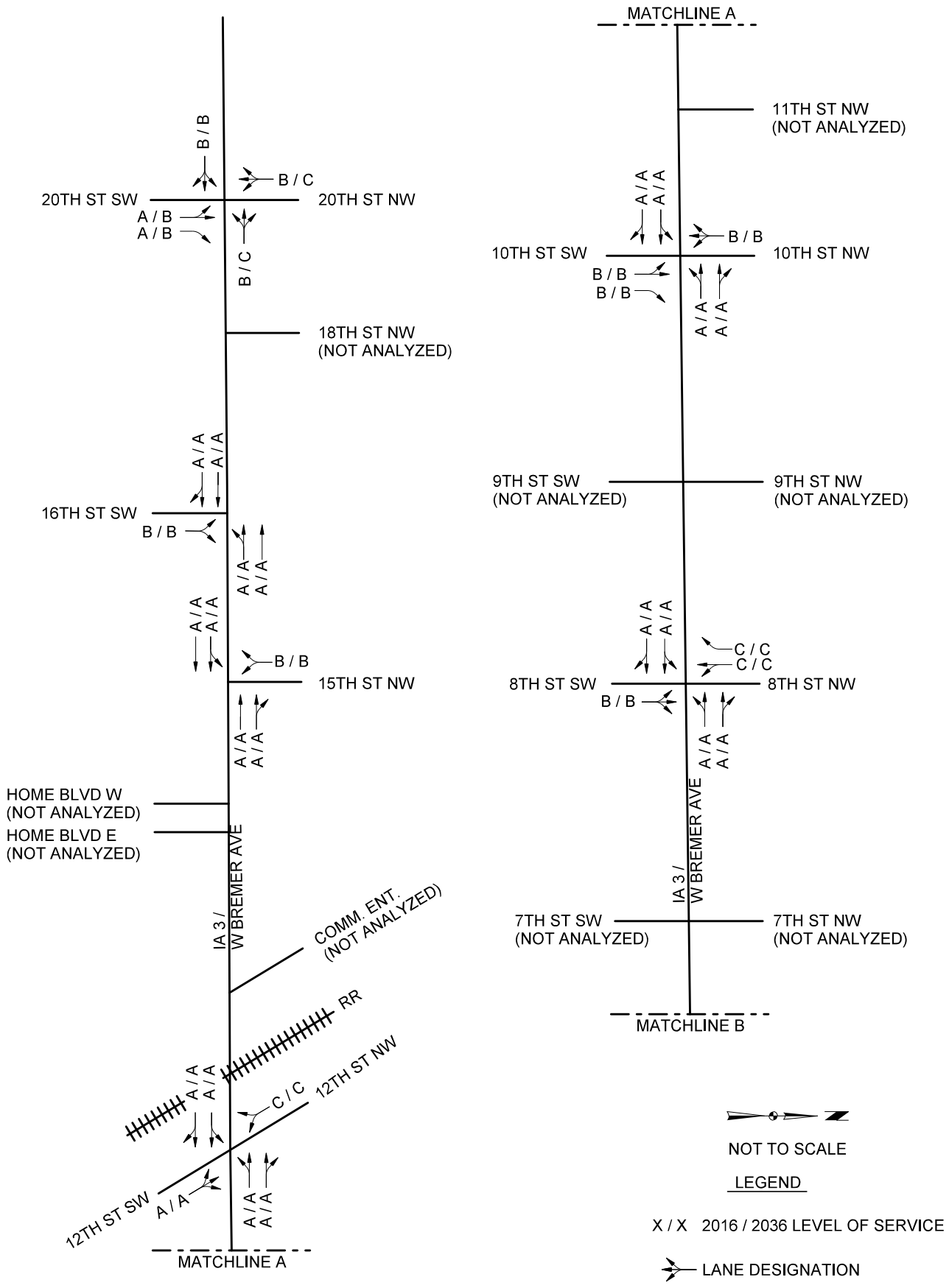
LOS	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	≤ 10 sec.	≤ 10 sec.
B	10 - 20 sec.	10 - 15 sec.
C	20 - 35 sec.	15 - 25 sec.
D	35 - 55 sec.	25 - 35 sec.
E	55 - 80 sec.	35 - 50 sec.
F	> 80 sec.	> 50 sec.

Table 5 – Intersection LOS Criteria

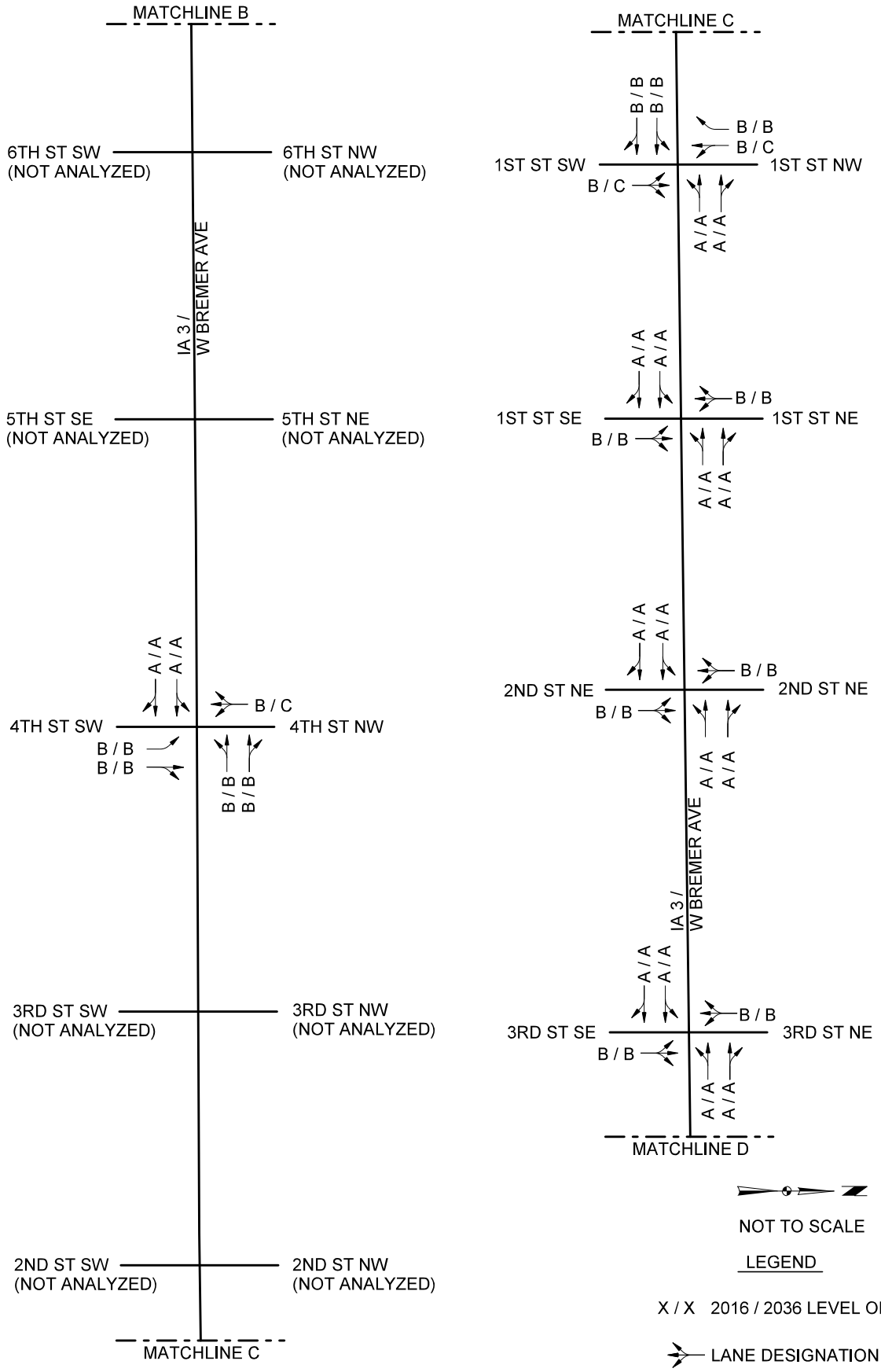
Existing Traffic Lanes Capacity Analysis

This scenario analyzed intersections using the existing traffic lane configurations for year 2016 and 2036. The 2036 traffic volumes were calculated by factoring up the existing volumes 1% per year. (See Figures 4 through 6 for lane configuration.) The LOS on the existing lane configurations is shown on Figures 19 through 21. For the detailed reports of the capacity analyses, see Appendix D. The AM traffic was analyzed but not included in the report because the PM traffic volumes are higher and the PM generally has a lower LOS.

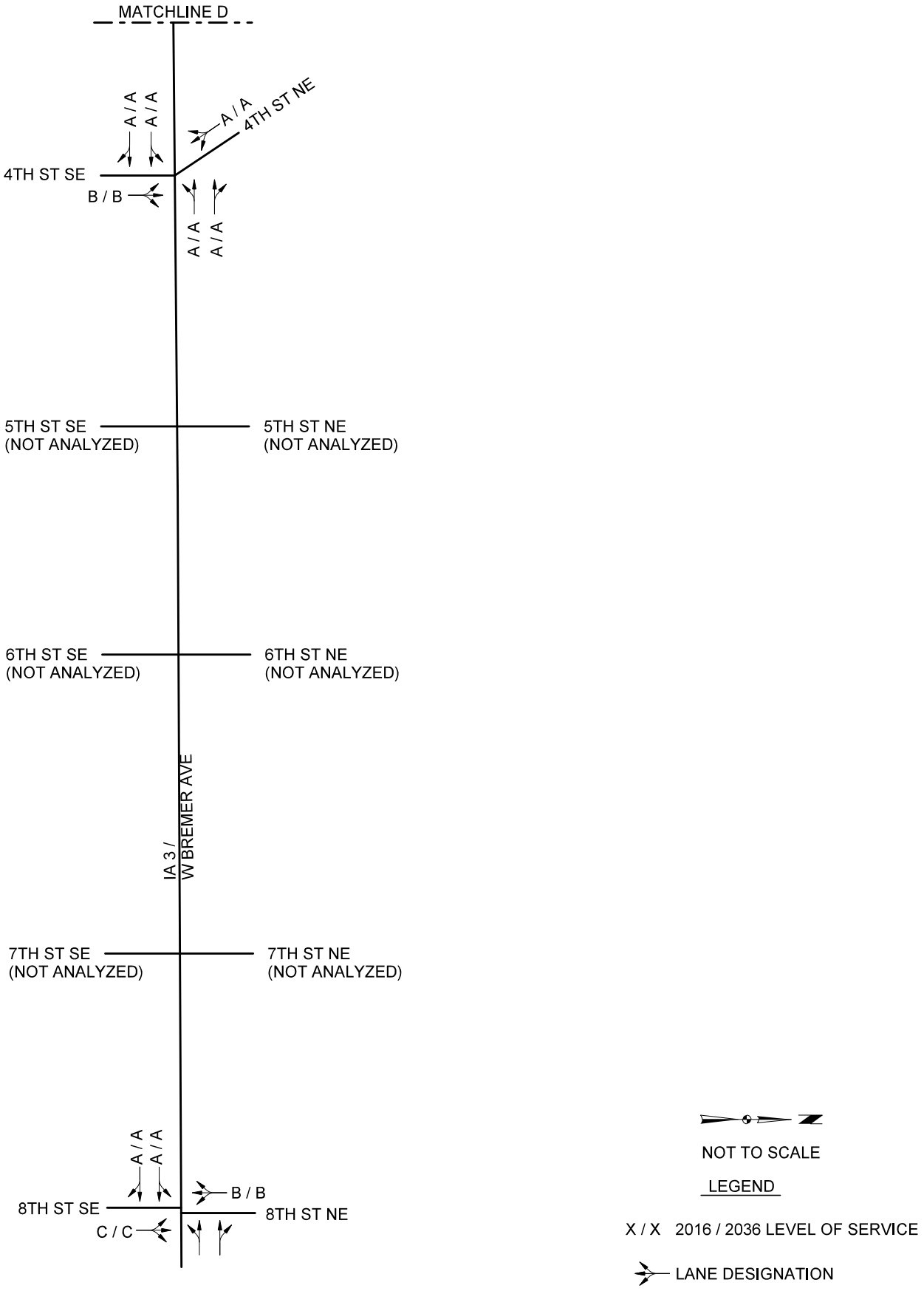
Figures 19 through 21 show that all movements for 2016 and 2036, using the existing lane configurations, operate at a LOS C or better.



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING TRAFFIC LANES LEVEL OF SERVICE FIGURE 19	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING TRAFFIC LANES LEVEL OF SERVICE FIGURE 20	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	EXISTING TRAFFIC LANES LEVEL OF SERVICE FIGURE 21	whks engineers + planners + land surveyors

Three Traffic Lanes Capacity Analysis

Using three lane undivided roadway configurations, turning movement traffic for the years 2016 and 2036 were analyzed. See Figures 10 through 12 for lane configurations. The existing sideroad lane configurations and control remained unchanged for the analysis.

Conversion to three lanes for the existing traffic will have adequate capacity and provide acceptable Levels of Service (C or better) for all existing intersection configurations and control except for the intersection of IA 3 / 8th Street SW, which will require signalization.

Based on the capacity analysis, all intersection turning movements for the year 2036, operating with the proposed three lane section with a two-way-left turn lane (TWLTL) on IA 3 and the existing sidestreet lane configurations, operate at a LOS C or better, with the exception of Southbound 12th Street NW, Eastbound IA 3 at 4th Street SW, Northbound 4th Street SW and Northbound 4th Street SE. These four intersections will need to be modified to operate with an acceptable level of service for the projected 2036 turning movement volumes.

The following modifications are proposed to improve the LOS at the four intersections:

Control Type Modifications

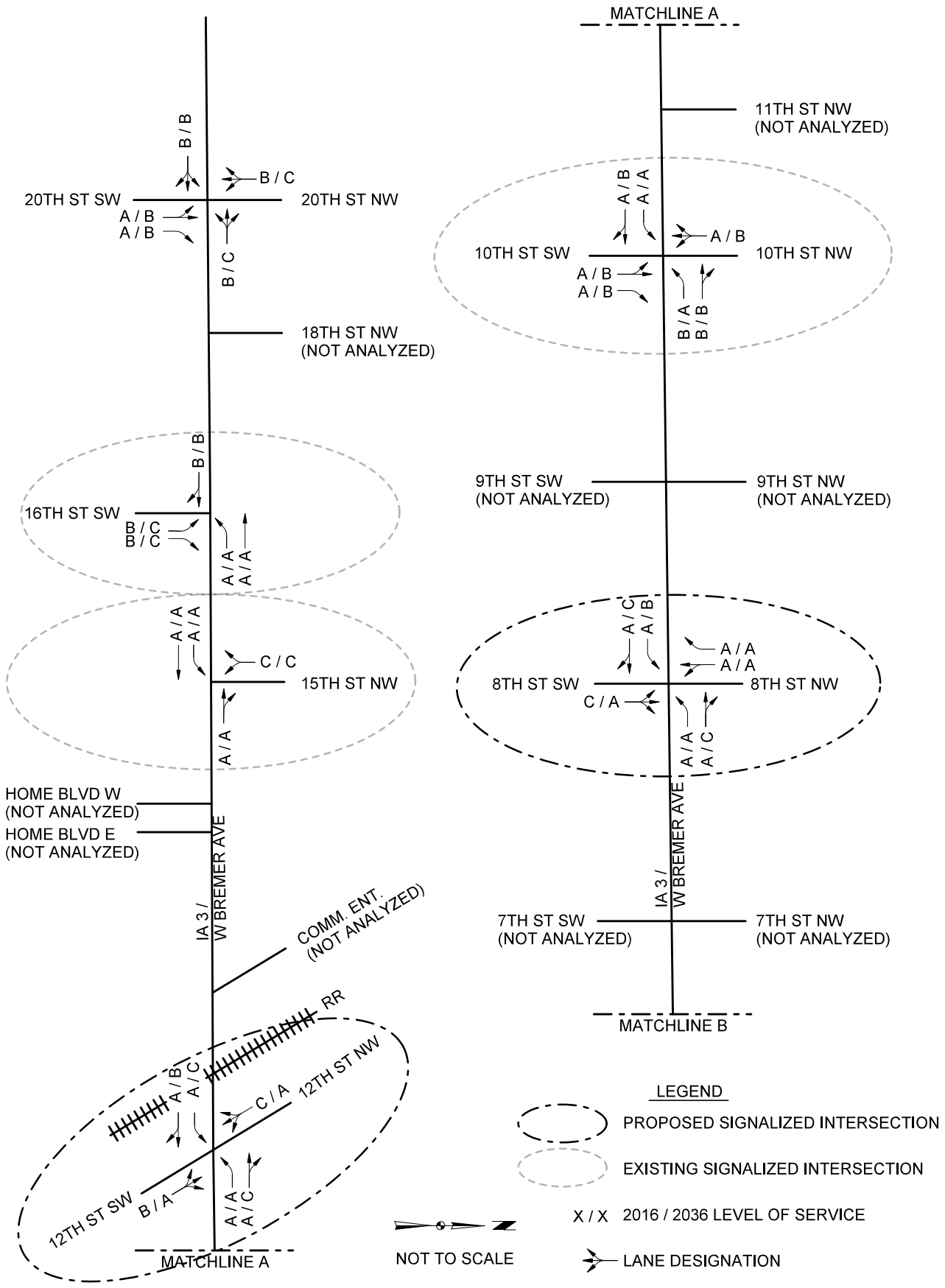
- Signalize the intersection of IA 3 / 12th Street SW
- Signalize the intersection of IA 3 / 4th Street SE

Geometric Modifications

- Provide dual WB left turn lanes at IA 3 / 4th Street SW
  - On the WB approach, the two inside lanes can be used as the WB left turn lanes.
  - On the NB approach, the parking on the west side of the street would need to be removed to be used for two receiving lanes from the WB approach.
  - The SE curb return of the intersection will have to revised to accommodate the NB right turning trucks.

With modifications, all intersection turning movements for 2036, operating with the proposed three lane section on IA 3, operate at a LOS C or better. The LOS for the proposed lane configurations with 2016 and 2036 traffic is shown on Figures 22 through 24. For the detailed capacity analyses reports, see Appendix E.

It should be noted that traffic patterns can change over time and LOS can vary. The modifications analyzed in this section may be implemented as traffic volumes increase, intersection capacity decreases and roadway users begin to experience excessive delay.



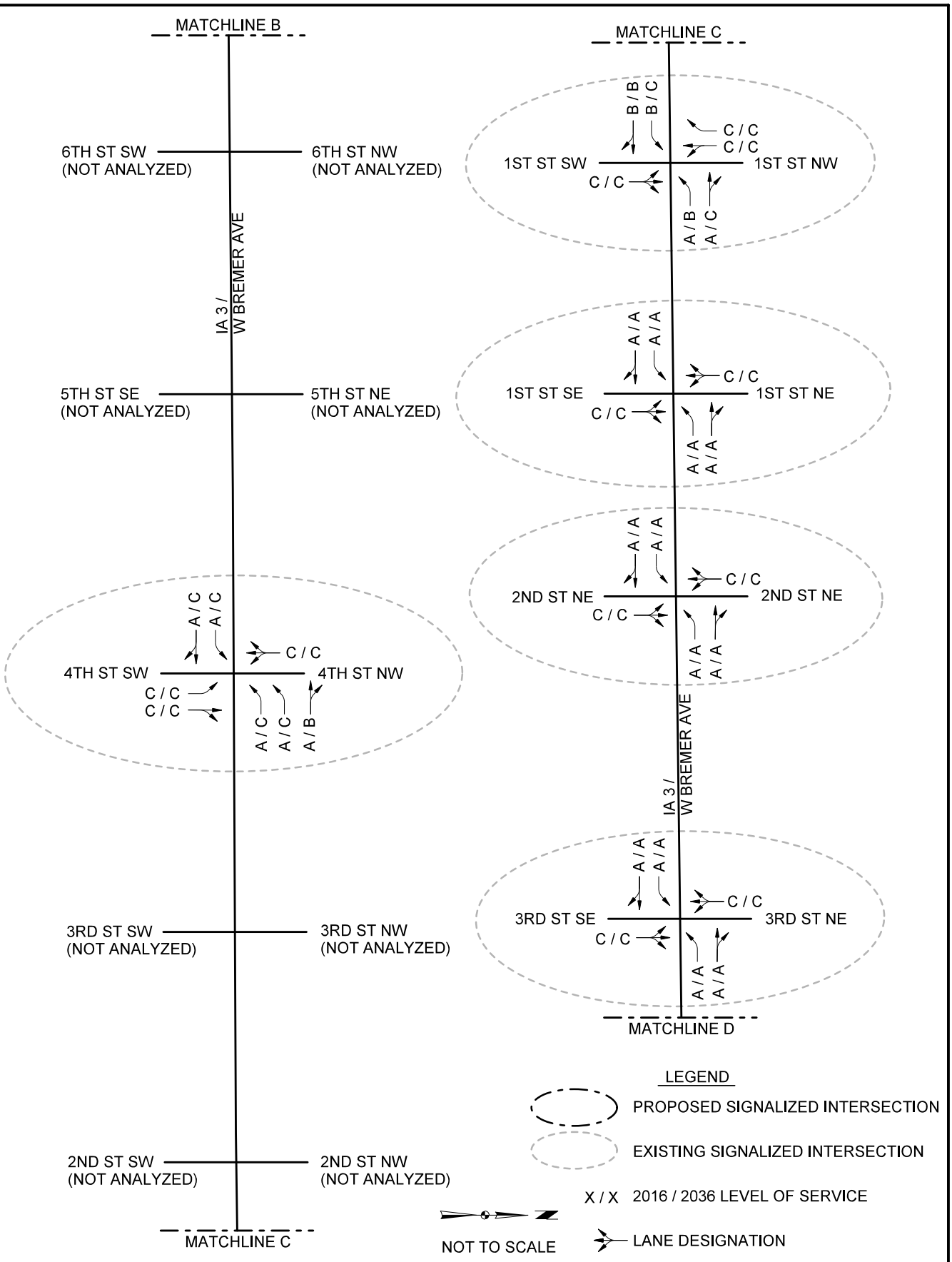
TRAFFIC IMPACT STUDY
IA 3 / BREMER AVE

WAVERLY, IOWA

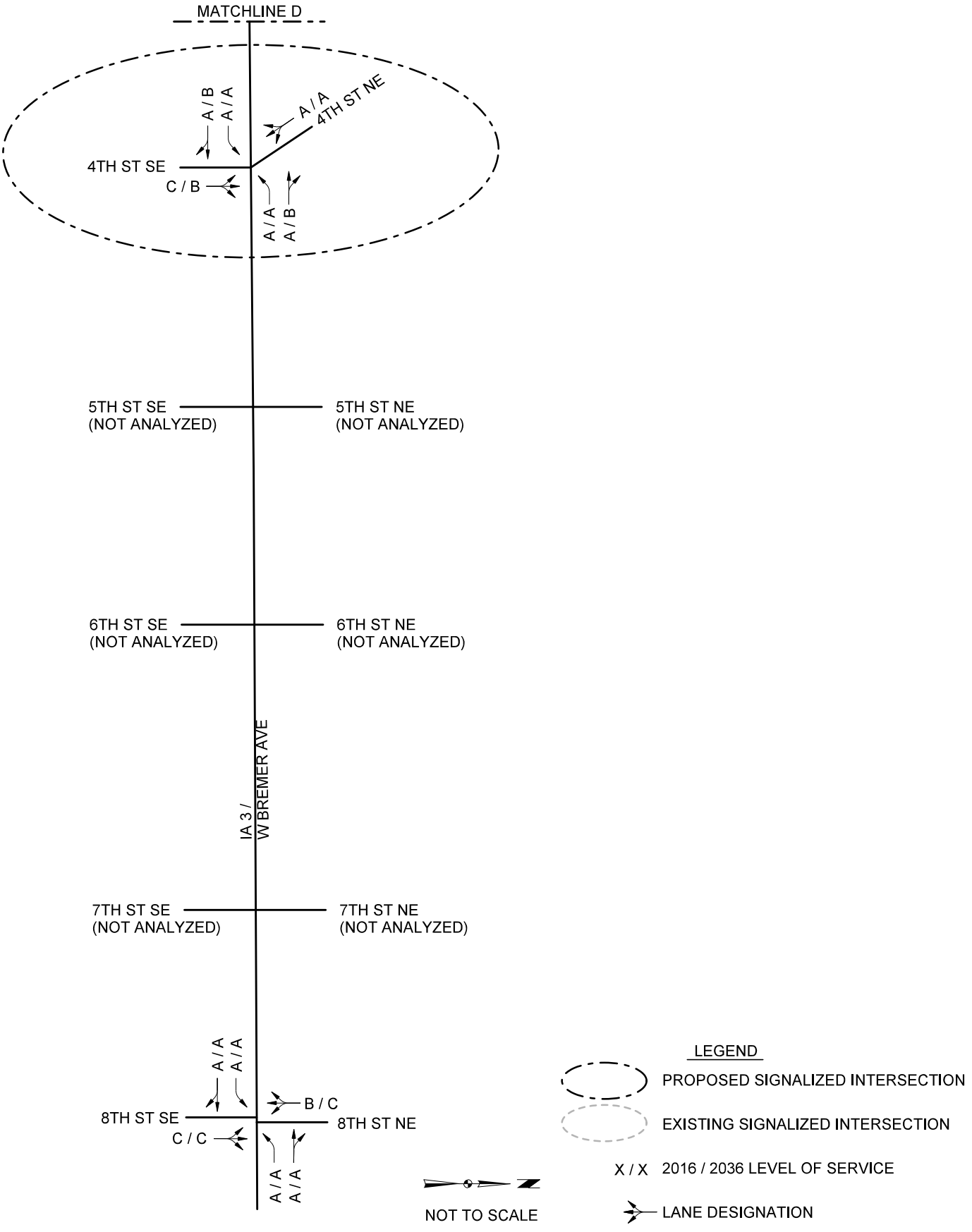
LANE REDUCTION
LEVEL OF SERVICE

FIGURE 22

whks
engineers + planners + land surveyors



TRAFFIC IMPACT STUDY IA 3 / BREMER AVE WAVERLY, IOWA	LANE REDUCTION LEVEL OF SERVICE FIGURE 23	whks engineers + planners + land surveyors



TRAFFIC IMPACT STUDY
IA 3 / BREMER AVE

WAVERLY, IOWA

LANE REDUCTION
LEVEL OF SERVICE

FIGURE 24

whks
engineers + planners + land surveyors

Findings and Recommendations

This report has evaluated the feasibility of implementing a four lane to three lane reduction along Iowa Highway 3 (Bremer Avenue) from 20th Street NW to 8TH Street NE. Based on the evaluation, the report has detailed the following safety and capacity conclusions:

- Conversion to three lanes for the existing traffic will have adequate capacity and provide acceptable Levels of Service (C or better) for all existing intersection configurations and control except for the intersection of IA 3 / 8th Street SW, which will require signalization.

- Intersection turning movement volumes were projected to year 2036. For these future volumes, conversion to three lanes will have adequate capacity and provide acceptable Levels of Service (C or better) for all intersections except for Southbound 12th Street NW, Southbound 8th St NW, Eastbound IA 3 at 4th Street SW, Northbound 4th Street SW and Northbound 4th Street SE. These four intersections will need to be modified to operate with an acceptable level of service for the projected 2036 turning movement volumes.

  The following modifications are proposed to improve the LOS at the four intersections:

  Control Type Modifications
  - Signalize the intersection of IA 3 / 12th Street SW
  - Signalize the intersection of IA 3 / 4th Street SE

  Geometric Modifications
  - Provide dual WB left turn lanes at IA 3 / 4th Street SW
    On the WB approach, the two inside lanes can be used as the WB left turn lanes.
    On the NB approach, the parking on the west side of the street would need to be removed to be used for two receiving lanes from the WB approach.
    The SE curb return of the intersection will have to revised to accommodate the NB right turning trucks.

- The crash data for the corridor suggests that converting IA 3 to a three lane section may be effective at reducing crashes. Studies done in Iowa suggest a road diet may reduce the crash rate by half. This indicates that crashes within the corridor may decrease from 111 to 60 over a three year period.

- In the entire City of Waverly, 429 crashes were reported in the 2012-2014 period. A total of 111 of those crashes occurred on Bremer Ave (IA 3) indicated that 26% of the crashes in the City of Waverly occur on this portion of IA 3.

- The traffic signal heads will need to be moved to accommodate the new lane configurations.

General benefits and conclusions:

- The lane reduction creates a buffer on Segments One, Two and Four to provide additional space between pedestrians and moving vehicles. This is especially beneficial in central business districts to improve the pedestrian experience.

- Adding corner or midblock curb bulb outs used in conjunction with on-street parking will reduce the width and improve the safety of pedestrian crossings.

- The lane reduction can essentially be done with pavement markings and signing. The reduction would be easy and inexpensive to implement, and also easy and inexpensive to reverse.

Based on the study for the existing traffic volumes, reducing the existing IA 3 / Bremer Avenue four lane section to a three lane section, with left turn lanes or two-way-left turn lane (TWLTL), is feasible for the corridor. The intersection of IA 3 / 8th Street SW will require signalization. Curb bulb outs are recommended to improve the safety at pedestrian crossings.

Reducing the existing IA 3 / Bremer Avenue four lane section to a three lane section, with left turn lanes or two-way-left turn lane (TWLTL), is feasible and recommended for the corridor for future traffic volumes, but with some additional intersection modifications. The following modifications will be required as traffic volumes increase, intersection capacity decreases and roadway users begin to experience excessive delay:

Control Type Modifications

- Signalize the intersection of IA 3 / 12th Street SW
- Signalize the intersection of IA 3 / 8th Street SW
- Signalize the intersection of IA 3 / 4th Street SE

Geometric Modifications

- Provide dual WB left turn lanes at IA 3 / 4th Street SW
  On the WB approach, the two inside lanes can be used as the WB left turn lanes.
  On the NB approach, the parking on the west side of the street would need to be removed to be used for two receiving lanes from the WB approach.
  The SE curb return of the intersection will have to revised to accommodate the NB right turning trucks.

With the additional intersection modifications, a three lane section will provide adequate capacity and Levels of Service (C or better) for the future projected traffic volumes on IA 3, while also providing improved safety within the corridor for all users.

APPENDIX A

Traffic Counts

Appendix A-1 : Traffic Counts

Appendix A-1 : Traffic Counts

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 20th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

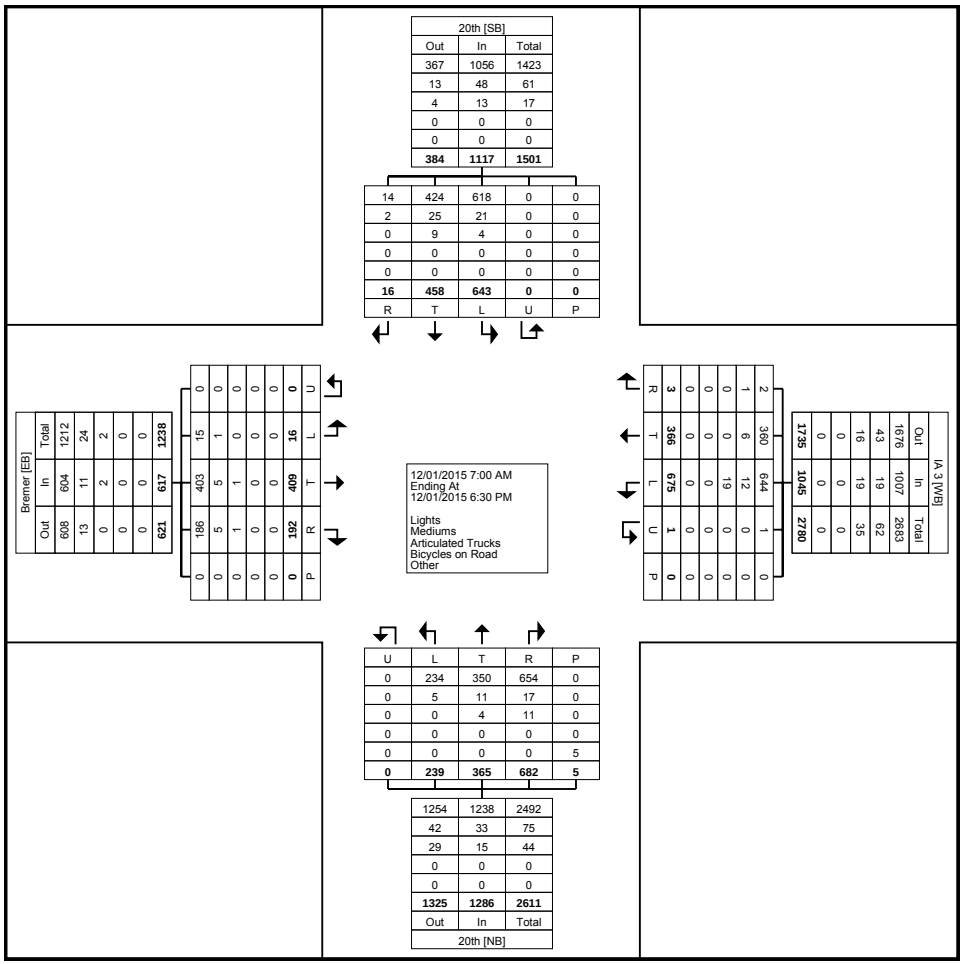
Start Time	20th Southbound						IA 3 Westbound						20th Northbound						Bremer Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	14	13	0	0	27	0	2	18	0	0	20	14	13	3	0	0	30	14	15	0	0	0	29	106
7:15 AM	0	22	19	0	0	41	0	5	38	0	0	43	19	11	5	0	1	35	12	16	1	0	0	29	148
7:30 AM	0	18	36	0	0	54	0	7	33	0	0	40	28	9	16	0	0	53	12	13	0	0	0	25	172
7:45 AM	1	27	46	0	0	74	0	6	33	0	0	39	51	17	16	0	1	84	11	22	0	0	0	33	230
Hourly Total	1	81	114	0	0	196	0	20	122	0	0	142	112	50	40	0	2	202	49	66	1	0	0	116	656
8:00 AM	1	15	45	0	0	61	0	9	35	0	0	44	44	39	18	0	0	101	19	28	1	0	0	48	254
8:15 AM	2	19	21	0	0	42	0	23	31	0	0	54	25	15	13	0	0	53	6	20	2	0	0	28	177
8:30 AM	1	7	24	0	0	32	0	18	11	0	0	29	22	14	3	0	0	39	5	17	1	0	0	23	123
8:45 AM	1	8	32	0	0	41	0	8	21	0	0	29	23	8	8	0	0	39	2	14	0	0	0	16	125
Hourly Total	5	49	122	0	0	176	0	58	98	0	0	156	114	76	42	0	0	232	32	79	4	0	0	115	679
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	1	23	30	0	0	54	2	8	27	0	0	37	14	9	6	0	0	29	7	9	0	0	0	16	136
2:45 PM	0	19	26	0	0	45	0	17	21	0	0	38	34	6	4	0	0	44	3	16	0	0	0	19	146
Hourly Total	1	42	56	0	0	99	2	25	48	0	0	75	48	15	10	0	0	73	10	25	0	0	0	35	282
3:00 PM	0	33	40	0	0	73	0	13	32	0	0	45	16	12	9	0	0	37	5	15	0	0	0	20	175
3:15 PM	2	28	20	0	0	50	0	14	30	1	0	45	23	25	13	0	0	61	7	17	2	0	0	26	182
3:30 PM	1	45	31	0	0	77	0	32	38	0	0	70	30	26	15	0	2	71	6	20	0	0	0	26	244
3:45 PM	0	14	18	0	0	32	0	27	33	0	0	60	25	17	8	0	0	50	2	14	0	0	0	16	158
Hourly Total	3	120	109	0	0	232	0	86	133	1	0	220	94	80	45	0	2	219	20	66	2	0	0	88	759
4:00 PM	0	17	28	0	0	45	0	13	26	0	0	39	43	17	10	0	0	70	6	11	1	0	0	18	172
4:15 PM	0	18	19	0	0	37	0	15	31	0	0	46	43	19	9	0	0	71	11	11	0	0	0	22	176
4:30 PM	0	40	35	0	0	75	1	19	34	0	0	54	35	13	9	0	1	57	9	20	0	0	0	29	215
4:45 PM	1	16	22	0	0	39	0	16	34	0	0	50	39	17	11	0	0	67	8	18	0	0	0	26	182
Hourly Total	1	91	104	0	0	196	1	63	125	0	0	189	160	66	39	0	1	265	34	60	1	0	0	95	745
5:00 PM	0	28	32	0	0	60	0	18	39	0	0	57	49	16	16	0	0	81	18	27	2	0	0	47	245
5:15 PM	2	12	21	0	0	35	0	34	38	0	0	72	36	14	15	0	0	65	11	23	0	0	0	34	206
5:30 PM	0	13	28	0	0	41	0	14	24	0	0	38	18	16	7	0	0	41	5	16	0	0	0	21	141
5:45 PM	0	12	18	0	0	30	0	18	18	0	0	36	14	11	8	0	0	33	7	22	1	0	0	30	129
Hourly Total	2	65	99	0	0	166	0	84	119	0	0	203	117	57	46	0	0	220	41	88	3	0	0	132	721
6:00 PM	2	6	23	0	0	31	0	20	12	0	0	32	20	13	9	0	0	42	4	7	3	0	0	14	119
6:15 PM	1	4	16	0	0	21	0	10	18	0	0	28	17	8	8	0	0	33	2	18	2	0	0	22	104
Grand Total	16	458	643	0	0	1117	3	366	675	1	0	1045	682	365	239	0	5	1286	192	409	16	0	0	617	4065
Approach %	1.4	41.0	57.6	0.0	-	-	0.3	35.0	64.6	0.1	-	-	53.0	28.4	18.6	0.0	-	-	31.1	66.3	2.6	0.0	-	-	-
Total %	0.4	11.3	15.8	0.0	-	27.5	0.1	9.0	16.6	0.0	-	25.7	16.8	9.0	5.9	0.0	-	31.6	4.7	10.1	0.4	0.0	-	15.2	-
Lights	14	424	618	0	-	1056	2	360	644	1	-	1007	654	350	234	0	-	1238	186	403	15	0	-	604	3905
% Lights	87.5	92.6	96.1	-	-	94.5	66.7	98.4	95.4	100.0	-	96.4	95.9	95.9	97.9	-	-	96.3	96.9	98.5	93.8	-	-	97.9	96.1
Mediums	2	25	21	0	-	48	1	6	12	0	-	19	17	11	5	0	-	33	5	5	1	0	-	11	111
% Mediums	12.5	5.5	3.3	-	-	4.3	33.3	1.6	1.8	0.0	-	1.8	2.5	3.0	2.1	-	-	2.6	2.6	1.2	6.3	-	-	1.8	2.7
Articulated Trucks	0	9	4	0	-	13	0	0	19	0	-	19	11	4	0	0	-	15	1	1	0	0	-	2	49

% Articulated Trucks	0.0	2.0	0.6	-	-	1.2	0.0	0.0	2.8	0.0	-	1.8	1.6	1.1	0.0	-	-	1.2	0.5	0.2	0.0	-	-	0.3	1.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.0	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 20th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 20th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:30 AM)

Start Time	20th Southbound						IA 3 Westbound						20th Northbound						Bremer Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	0	18	36	0	0	54	0	7	33	0	0	40	28	9	16	0	0	53	12	13	0	0	0	25	172
7:45 AM	1	27	46	0	0	74	0	6	33	0	0	39	51	17	16	0	1	84	11	22	0	0	0	33	230
8:00 AM	1	15	45	0	0	61	0	9	35	0	0	44	44	39	18	0	0	101	19	28	1	0	0	48	254
8:15 AM	2	19	21	0	0	42	0	23	31	0	0	54	25	15	13	0	0	53	6	20	2	0	0	28	177
Total	4	79	148	0	0	231	0	45	132	0	0	177	148	80	63	0	1	291	48	83	3	0	0	134	833
Approach %	1.7	34.2	64.1	0.0	-	-	0.0	25.4	74.6	0.0	-	-	50.9	27.5	21.6	0.0	-	-	35.8	61.9	2.2	0.0	-	-	-
Total %	0.5	9.5	17.8	0.0	-	27.7	0.0	5.4	15.8	0.0	-	21.2	17.8	9.6	7.6	0.0	-	34.9	5.8	10.0	0.4	0.0	-	16.1	-
PHF	0.500	0.731	0.804	0.000	-	0.780	0.000	0.489	0.943	0.000	-	0.819	0.725	0.513	0.875	0.000	-	0.720	0.632	0.741	0.375	0.000	-	0.698	0.820
Lights	4	77	141	0	-	222	0	45	125	0	-	170	143	74	62	0	-	279	48	82	2	0	-	132	803
% Lights	100.0	97.5	95.3	-	-	96.1	-	100.0	94.7	-	-	96.0	96.6	92.5	98.4	-	-	95.9	100.0	98.8	66.7	-	-	98.5	96.4
Mediums	0	2	6	0	-	8	0	0	2	0	-	2	3	6	1	0	-	10	0	1	1	0	-	2	22
% Mediums	0.0	2.5	4.1	-	-	3.5	-	0.0	1.5	-	-	1.1	2.0	7.5	1.6	-	-	3.4	0.0	1.2	33.3	-	-	1.5	2.6
Articulated Trucks	0	0	1	0	-	1	0	0	5	0	-	5	2	0	0	0	-	2	0	0	0	0	-	0	8
% Articulated Trucks	0.0	0.0	0.7	-	-	0.4	-	0.0	3.8	-	-	2.8	1.4	0.0	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

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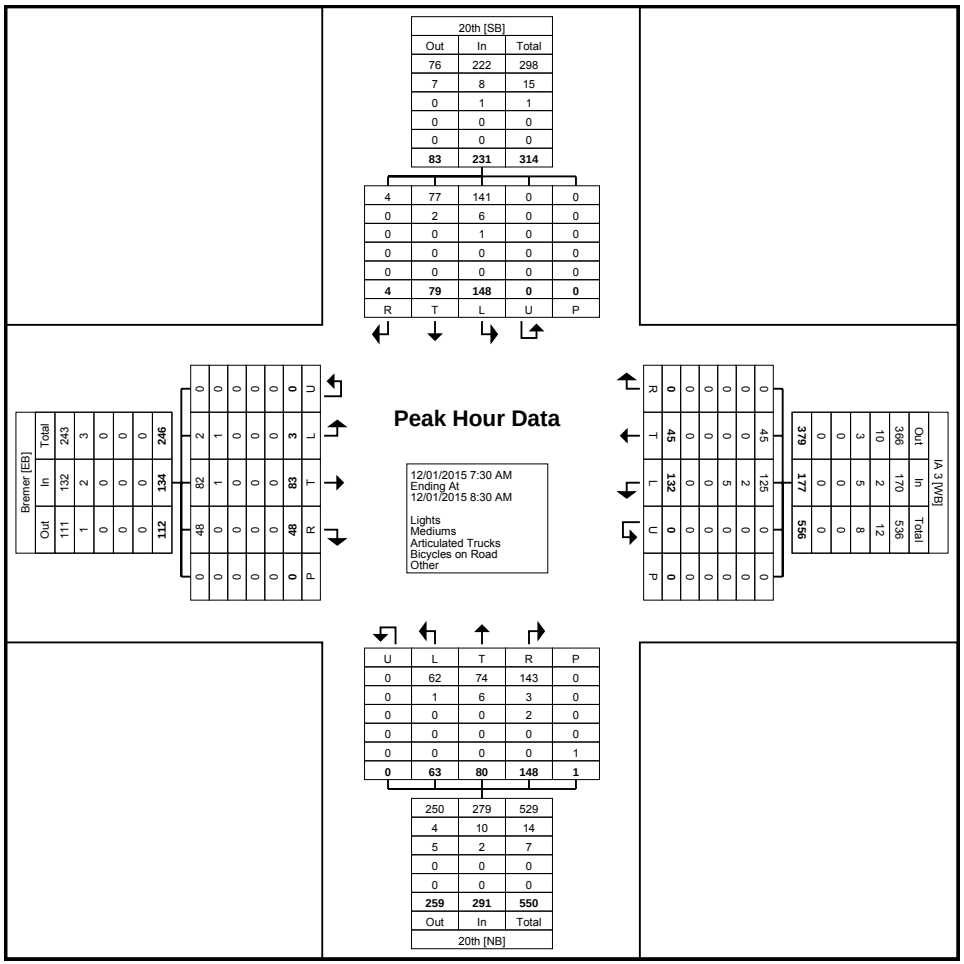

Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 20th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (4:30 PM)

Start Time	20th Southbound						IA 3 Westbound						20th Northbound						Bremer Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	0	40	35	0	0	75	1	19	34	0	0	54	35	13	9	0	1	57	9	20	0	0	0	29	215
4:45 PM	1	16	22	0	0	39	0	16	34	0	0	50	39	17	11	0	0	67	8	18	0	0	0	26	182
5:00 PM	0	28	32	0	0	60	0	18	39	0	0	57	49	16	16	0	0	81	18	27	2	0	0	47	245
5:15 PM	2	12	21	0	0	35	0	34	38	0	0	72	36	14	15	0	0	65	11	23	0	0	0	34	206
Total	3	96	110	0	0	209	1	87	145	0	0	233	159	60	51	0	1	270	46	88	2	0	0	136	848
Approach %	1.4	45.9	52.6	0.0	-	-	0.4	37.3	62.2	0.0	-	-	58.9	22.2	18.9	0.0	-	-	33.8	64.7	1.5	0.0	-	-	-
Total %	0.4	11.3	13.0	0.0	-	24.6	0.1	10.3	17.1	0.0	-	27.5	18.8	7.1	6.0	0.0	-	31.8	5.4	10.4	0.2	0.0	-	16.0	-
PHF	0.375	0.600	0.786	0.000	-	0.697	0.250	0.640	0.929	0.000	-	0.809	0.811	0.882	0.797	0.000	-	0.833	0.639	0.815	0.250	0.000	-	0.723	0.865
Lights	1	89	109	0	-	199	1	84	141	0	-	226	154	59	50	0	-	263	44	87	2	0	-	133	821
% Lights	33.3	92.7	99.1	-	-	95.2	100.0	96.6	97.2	-	-	97.0	96.9	98.3	98.0	-	-	97.4	95.7	98.9	100.0	-	-	97.8	96.8
Mediums	2	4	1	0	-	7	0	3	2	0	-	5	4	1	1	0	-	6	2	1	0	0	-	3	21
% Mediums	66.7	4.2	0.9	-	-	3.3	0.0	3.4	1.4	-	-	2.1	2.5	1.7	2.0	-	-	2.2	4.3	1.1	0.0	-	-	2.2	2.5
Articulated Trucks	0	3	0	0	-	3	0	0	2	0	-	2	1	0	0	0	-	1	0	0	0	0	-	0	6
% Articulated Trucks	0.0	3.1	0.0	-	-	1.4	0.0	0.0	1.4	-	-	0.9	0.6	0.0	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-

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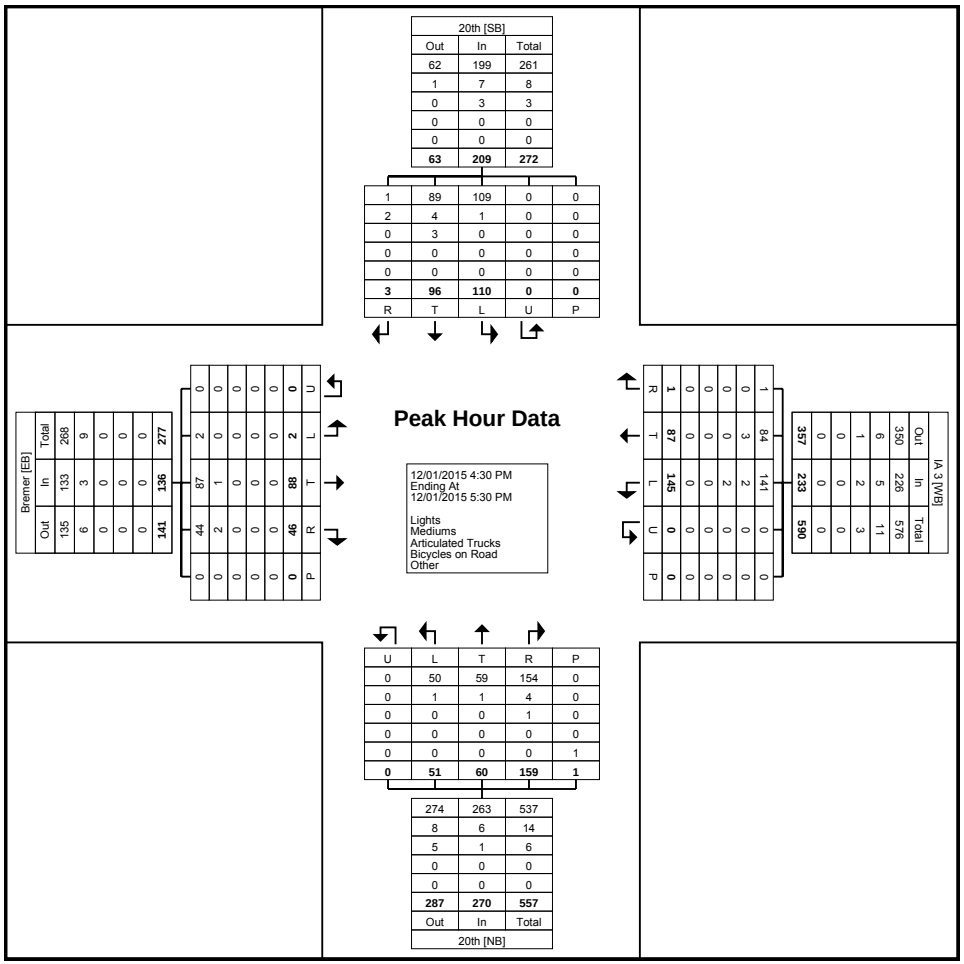

Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 20th TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: Turn Lanes TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

Start Time	NB Turn Lane Southbound		IA 3 Westbound					EB Turn Lane Northbound					IA 3 Eastbound					
	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	0	15	20	0	0	35	0	0	0	0	0	42	0	0	0	42	77
7:15 AM	0	0	30	44	0	0	74	0	0	0	0	0	55	0	0	0	55	129
7:30 AM	0	0	24	39	0	0	63	0	0	0	0	0	77	0	0	0	77	140
7:45 AM	0	0	30	38	0	0	68	0	0	0	0	0	118	0	0	0	118	186
Hourly Total	0	0	99	141	0	0	240	0	0	0	0	0	292	0	0	0	292	532
8:00 AM	0	0	31	43	0	0	74	0	0	0	0	0	116	0	0	0	116	190
8:15 AM	0	0	32	54	0	0	86	0	0	0	0	0	66	0	0	0	66	152
8:30 AM	0	0	22	29	0	0	51	0	0	0	0	0	63	0	0	0	63	114
8:45 AM	0	0	17	29	0	0	46	0	0	0	0	0	70	0	0	0	70	116
Hourly Total	0	0	102	155	0	0	257	0	0	0	0	0	315	0	0	0	315	572
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	0	0	29	37	0	0	66	0	0	0	0	0	53	0	0	0	53	119
2:45 PM	0	0	33	39	0	0	72	0	0	0	0	0	73	0	0	0	73	145
Hourly Total	0	0	62	76	0	0	138	0	0	0	0	0	126	0	0	0	126	264
3:00 PM	0	0	38	45	0	0	83	0	0	0	0	0	73	0	0	0	73	156
3:15 PM	0	0	30	44	0	0	74	0	0	0	0	0	61	0	0	0	61	135
3:30 PM	0	0	55	74	0	0	129	0	0	0	1	0	79	0	0	0	79	208
3:45 PM	0	0	40	57	0	0	97	0	0	0	0	0	60	0	0	0	60	157
Hourly Total	0	0	163	220	0	0	383	0	0	0	1	0	273	0	0	0	273	656
4:00 PM	0	0	38	41	0	0	79	0	0	0	0	0	82	0	0	0	82	161
4:15 PM	0	0	41	46	0	0	87	0	0	0	0	0	72	0	0	0	72	159
4:30 PM	0	0	33	53	0	0	86	0	0	0	0	0	90	0	0	0	90	176
4:45 PM	0	0	29	48	0	0	77	0	0	0	0	0	77	0	0	0	77	154
Hourly Total	0	0	141	188	0	0	329	0	0	0	0	0	321	0	0	0	321	650
5:00 PM	0	0	33	58	0	0	91	0	0	0	0	0	109	0	0	0	109	200
5:15 PM	0	0	31	74	0	0	105	0	0	0	0	0	81	0	0	0	81	186
5:30 PM	0	0	26	35	0	0	61	0	0	0	0	0	63	0	0	0	63	124
5:45 PM	0	0	26	37	0	0	63	0	0	0	0	0	54	0	0	0	54	117
Hourly Total	0	0	116	204	0	0	320	0	0	0	0	0	307	0	0	0	307	627
6:00 PM	0	0	23	32	0	0	55	0	0	0	0	0	51	0	0	0	51	106
6:15 PM	0	0	28	27	0	0	55	0	0	0	0	0	50	0	0	0	50	105
Grand Total	0	0	734	1043	0	0	1777	0	0	0	1	0	1735	0	0	0	1735	3512
Approach %	-	-	41.3	58.7	0.0	-	-	NaN	NaN	NaN	-	-	100.0	0.0	0.0	-	-	-
Total %	-	0.0	20.9	29.7	0.0	-	50.6	0.0	0.0	0.0	-	0.0	49.4	0.0	0.0	-	49.4	-
Lights	-	0	703	1006	0	-	1709	0	0	0	-	0	1679	0	0	-	1679	3388
% Lights	-	-	95.8	96.5	-	-	96.2	-	-	-	-	-	96.8	-	-	-	96.8	96.5
Mediums	-	0	25	16	0	-	41	0	0	0	-	0	42	0	0	-	42	83
% Mediums	-	-	3.4	1.5	-	-	2.3	-	-	-	-	-	2.4	-	-	-	2.4	2.4
Articulated Trucks	-	0	6	21	0	-	27	0	0	0	-	0	14	0	0	-	14	41
% Articulated Trucks	-	-	0.8	2.0	-	-	1.5	-	-	-	-	-	0.8	-	-	-	0.8	1.2
Bicycles on Road	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0

% Bicycles on Road	-	-	0.0	0.0	-	-	0.0	-	-	-	-	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

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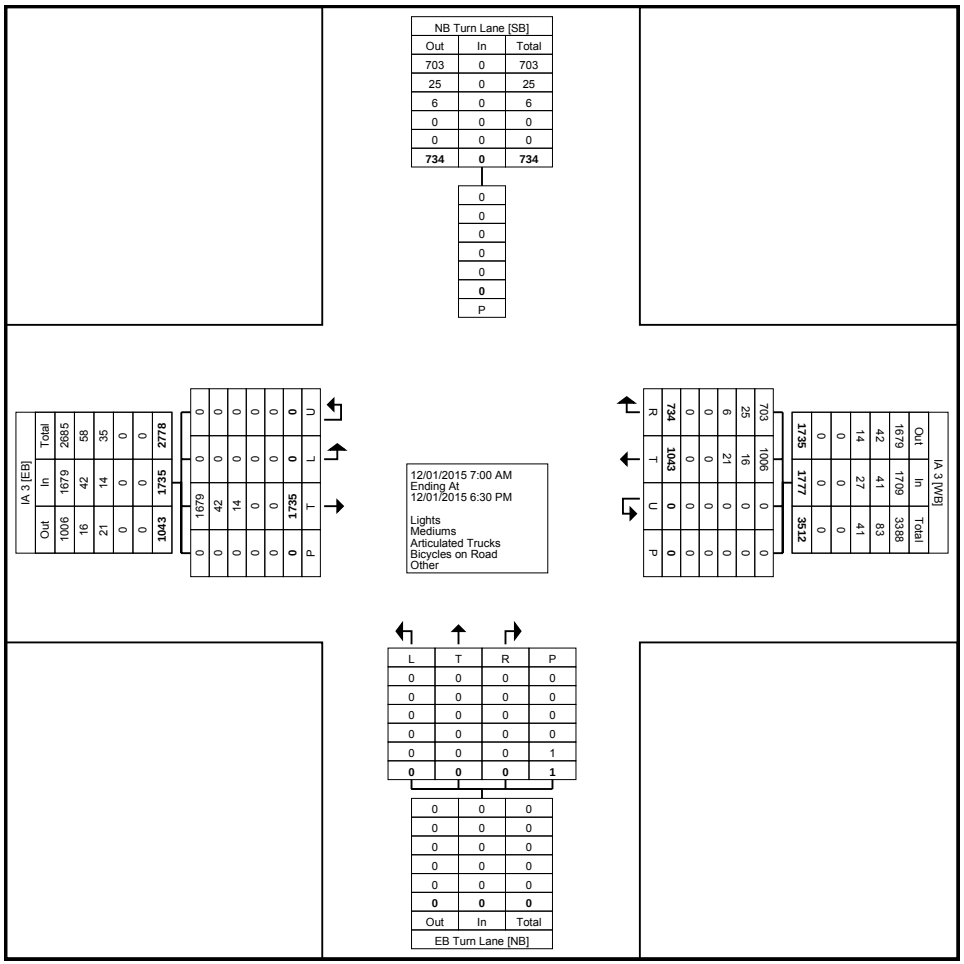
Count Name: Turn Lanes TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

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217.483.9457 etott@whks.com

Count Name: Turn Lanes TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:30 AM)

Start Time	NB Turn Lane Southbound		IA 3 Westbound					EB Turn Lane Northbound					IA 3 Eastbound					
	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:30 AM	0	0	24	39	0	0	63	0	0	0	0	0	77	0	0	0	77	140
7:45 AM	0	0	30	38	0	0	68	0	0	0	0	0	118	0	0	0	118	186
8:00 AM	0	0	31	43	0	0	74	0	0	0	0	0	116	0	0	0	116	190
8:15 AM	0	0	32	54	0	0	86	0	0	0	0	0	66	0	0	0	66	152
Total	0	0	117	174	0	0	291	0	0	0	0	0	377	0	0	0	377	668
Approach %	-	-	40.2	59.8	0.0	-	-	NaN	NaN	NaN	-	-	100.0	0.0	0.0	-	-	-
Total %	-	0.0	17.5	26.0	0.0	-	43.6	0.0	0.0	0.0	-	0.0	56.4	0.0	0.0	-	56.4	-
PHF	-	0.000	0.914	0.806	0.000	-	0.846	0.000	0.000	0.000	-	0.000	0.799	0.000	0.000	-	0.799	0.879
Lights	-	0	108	167	0	-	275	0	0	0	-	0	366	0	0	-	366	641
% Lights	-	-	92.3	96.0	-	-	94.5	-	-	-	-	-	97.1	-	-	-	97.1	96.0
Mediums	-	0	8	1	0	-	9	0	0	0	-	0	9	0	0	-	9	18
% Mediums	-	-	6.8	0.6	-	-	3.1	-	-	-	-	-	2.4	-	-	-	2.4	2.7
Articulated Trucks	-	0	1	6	0	-	7	0	0	0	-	0	2	0	0	-	2	9
% Articulated Trucks	-	-	0.9	3.4	-	-	2.4	-	-	-	-	-	0.5	-	-	-	0.5	1.3
Bicycles on Road	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	0.0	-	-	0.0	-	-	-	-	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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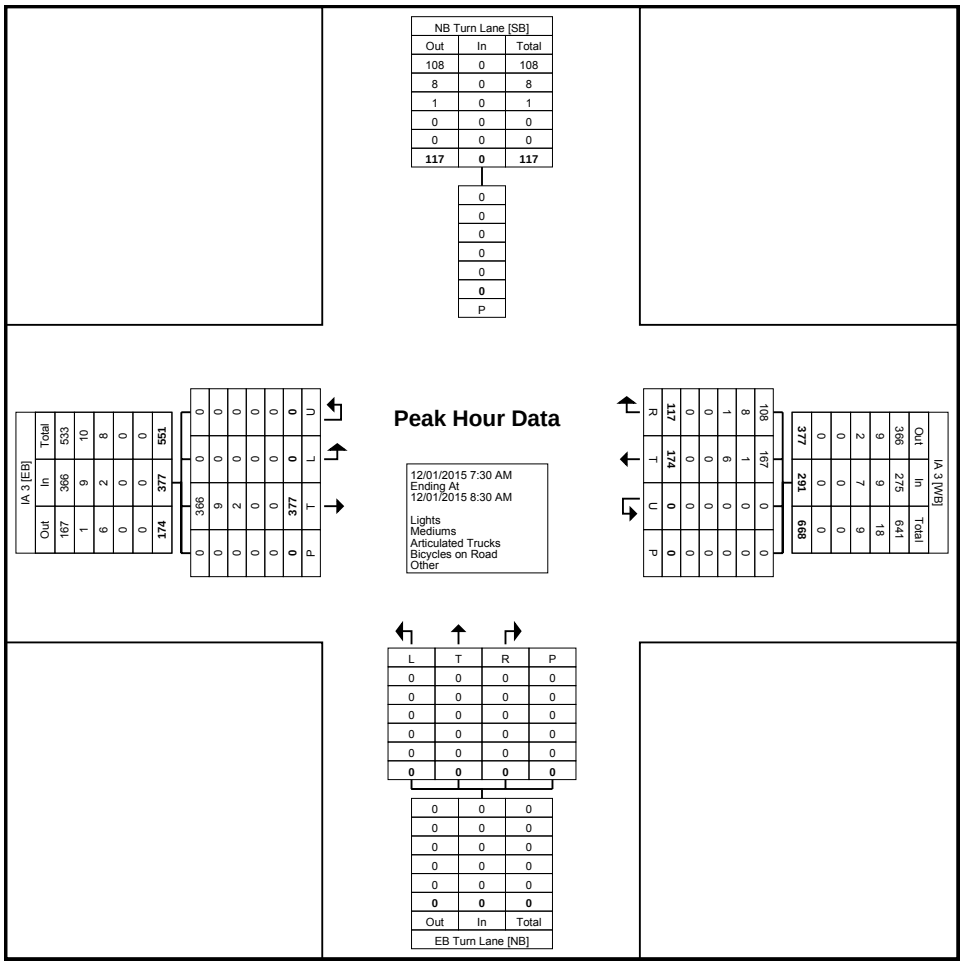
Count Name: Turn Lanes TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
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Count Name: Turn Lanes TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (4:30 PM)

Start Time	NB Turn Lane Southbound		IA 3 Westbound					EB Turn Lane Northbound					IA 3 Eastbound					
	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Int. Total
4:30 PM	0	0	33	53	0	0	86	0	0	0	0	0	90	0	0	0	90	176
4:45 PM	0	0	29	48	0	0	77	0	0	0	0	0	77	0	0	0	77	154
5:00 PM	0	0	33	58	0	0	91	0	0	0	0	0	109	0	0	0	109	200
5:15 PM	0	0	31	74	0	0	105	0	0	0	0	0	81	0	0	0	81	186
Total	0	0	126	233	0	0	359	0	0	0	0	0	357	0	0	0	357	716
Approach %	-	-	35.1	64.9	0.0	-	-	NaN	NaN	NaN	-	-	100.0	0.0	0.0	-	-	-
Total %	-	0.0	17.6	32.5	0.0	-	50.1	0.0	0.0	0.0	-	0.0	49.9	0.0	0.0	-	49.9	-
PHF	-	0.000	0.955	0.787	0.000	-	0.855	0.000	0.000	0.000	-	0.000	0.819	0.000	0.000	-	0.819	0.895
Lights	-	0	124	227	0	-	351	0	0	0	-	0	351	0	0	-	351	702
% Lights	-	-	98.4	97.4	-	-	97.8	-	-	-	-	-	98.3	-	-	-	98.3	98.0
Mediums	-	0	2	4	0	-	6	0	0	0	-	0	5	0	0	-	5	11
% Mediums	-	-	1.6	1.7	-	-	1.7	-	-	-	-	-	1.4	-	-	-	1.4	1.5
Articulated Trucks	-	0	0	2	0	-	2	0	0	0	-	0	1	0	0	-	1	3
% Articulated Trucks	-	-	0.0	0.9	-	-	0.6	-	-	-	-	-	0.3	-	-	-	0.3	0.4
Bicycles on Road	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	0.0	-	-	0.0	-	-	-	-	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
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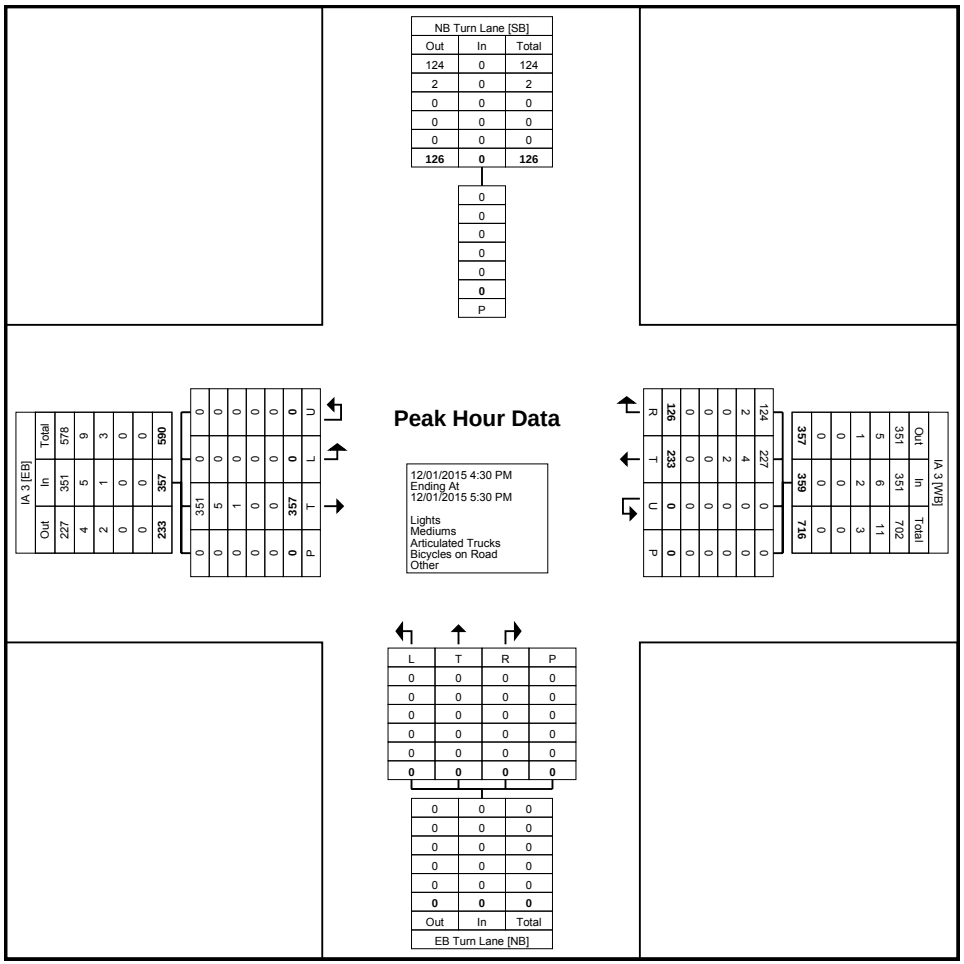
Count Name: Turn Lanes TMC
Site Code:
Start Date: 12/01/2015


NB Turn Lane [SB]
Out In Total
124 0 124
2 0 2
0 0 0
0 0 0
0 0 0
126 0 126
0 0 0 0 0 0 P
IA 3 [EB]
Out In Total
227 351 578
4 5 9
2 1 3
0 0 0
0 0 0
233 357 590
U L T P
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
351 5 1 0 0 0 357 0
0 0 0 0 0 0 0 0
Peak Hour Data
12/01/2015 4:30 PM
Ending At
12/01/2015 5:30 PM
Lights
Mediums
Articulated Trucks
Bicycles on Road
Other
R T U P
126 233 0 0
0 0 0 0
0 0 0 0
0 2 0 0
2 4 0 0
124 227 0 0
IA 3 [WB]
Out In Total
357 351 702
0 0 0
0 0 0
1 2 3
5 6 11
351 351 702
359 359 716
0 0 0
L T R P
0 0 0 0
0 0 0 0
0 0 0 0

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WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 16th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

Start Time	IA 3 Westbound					16th Northbound					IA 3 Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:00 AM	34	6	0	0	40	9	5	0	0	14	16	31	0	0	47	101
7:15 AM	76	40	0	0	116	15	7	0	0	22	18	46	0	0	64	202
7:30 AM	67	43	0	0	110	16	8	0	0	24	17	74	0	0	91	225
7:45 AM	68	58	0	0	126	14	9	0	0	23	42	89	0	0	131	280
Hourly Total	245	147	0	0	392	54	29	0	0	83	93	240	0	0	333	808
8:00 AM	62	58	0	0	120	60	18	0	0	78	53	67	0	0	120	318
8:15 AM	72	18	0	0	90	36	17	0	0	53	14	63	0	0	77	220
8:30 AM	55	15	0	0	70	6	5	0	0	11	10	67	0	0	77	158
8:45 AM	49	9	0	0	58	9	2	0	0	11	11	61	0	0	72	141
Hourly Total	238	100	0	0	338	111	42	0	0	153	88	258	0	0	346	837
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	64	6	0	1	70	7	6	0	0	13	4	53	0	0	57	140
2:45 PM	74	15	0	0	89	14	12	0	0	26	11	63	0	0	74	189
Hourly Total	138	21	0	1	159	21	18	0	0	39	15	116	0	0	131	329
3:00 PM	71	33	0	1	104	27	14	0	0	41	8	74	0	0	82	227
3:15 PM	67	63	0	2	130	22	6	0	0	28	15	63	0	0	78	236
3:30 PM	107	10	0	18	117	57	33	0	0	90	14	67	0	2	81	288
3:45 PM	92	16	0	0	108	25	10	0	0	35	8	65	0	0	73	216
Hourly Total	337	122	0	21	459	131	63	0	0	194	45	269	0	2	314	967
4:00 PM	66	27	0	2	93	33	14	0	0	47	7	80	0	0	87	227
4:15 PM	84	18	0	1	102	24	12	0	0	36	10	69	0	0	79	217
4:30 PM	84	14	0	1	98	9	11	0	0	20	8	86	0	0	94	212
4:45 PM	78	17	0	0	95	14	10	0	0	24	21	70	0	2	91	210
Hourly Total	312	76	0	4	388	80	47	0	0	127	46	305	0	2	351	866
5:00 PM	98	16	0	0	114	34	7	0	0	41	12	105	0	2	117	272
5:15 PM	94	11	0	1	105	17	8	0	0	25	10	84	0	0	94	224
5:30 PM	54	4	0	0	58	20	11	0	0	31	10	61	0	1	71	160
5:45 PM	56	15	0	4	71	20	9	0	0	29	7	51	0	0	58	158
Hourly Total	302	46	0	5	348	91	35	0	0	126	39	301	0	3	340	814
6:00 PM	46	11	0	0	57	21	10	0	0	31	12	42	0	0	54	142
6:15 PM	49	4	0	1	53	14	9	0	0	23	14	38	0	0	52	128
Grand Total	1667	527	0	32	2194	523	253	0	0	776	352	1569	0	7	1921	4891
Approach %	76.0	24.0	0.0	-	-	67.4	32.6	0.0	-	-	18.3	81.7	0.0	-	-	-
Total %	34.1	10.8	0.0	-	44.9	10.7	5.2	0.0	-	15.9	7.2	32.1	0.0	-	39.3	-
Lights	1604	516	0	-	2120	520	240	0	-	760	343	1513	0	-	1856	4736
% Lights	96.2	97.9	-	-	96.6	99.4	94.9	-	-	97.9	97.4	96.4	-	-	96.6	96.8
Mediums	38	11	0	-	49	2	13	0	-	15	9	42	0	-	51	115
% Mediums	2.3	2.1	-	-	2.2	0.4	5.1	-	-	1.9	2.6	2.7	-	-	2.7	2.4
Articulated Trucks	25	0	0	-	25	1	0	0	-	1	0	14	0	-	14	40
% Articulated Trucks	1.5	0.0	-	-	1.1	0.2	0.0	-	-	0.1	0.0	0.9	-	-	0.7	0.8
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0

% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	32	-	-	-	-	0	-	-	-	-	7	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

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Count Name: 16th TMC
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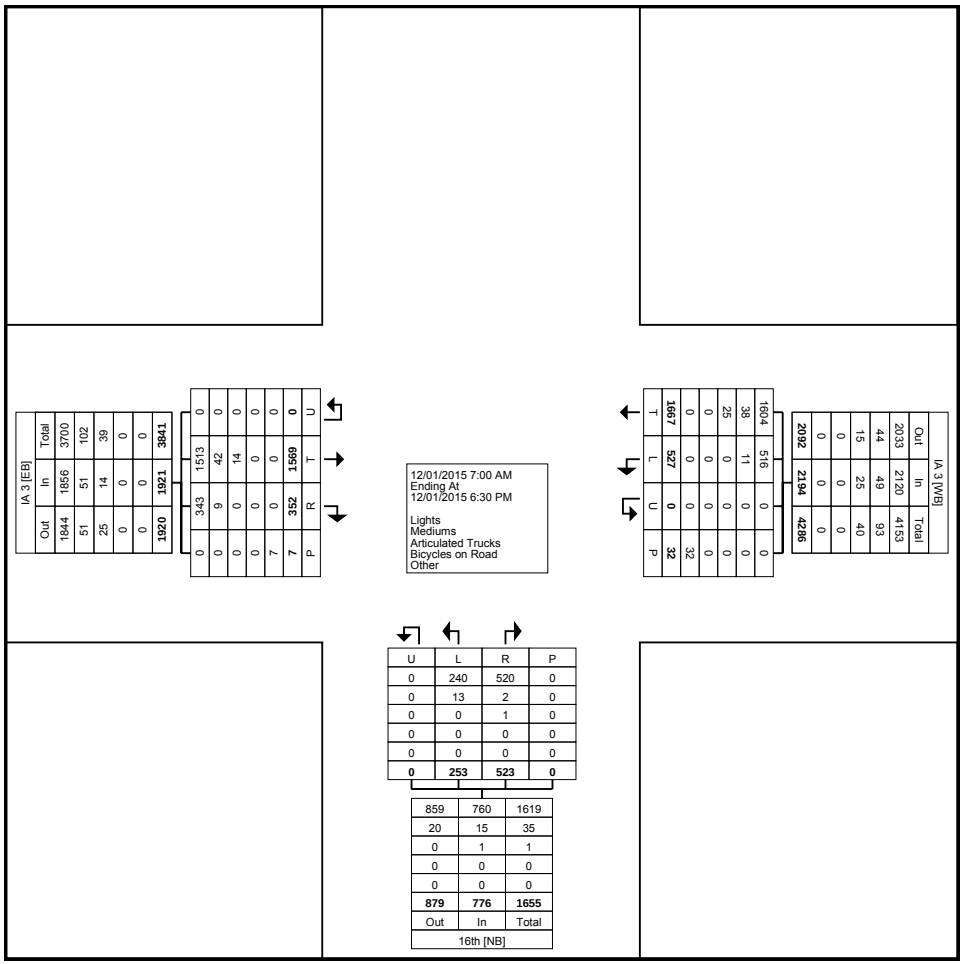


Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 16th TMC
Site Code:
Start Date: 12/01/2015

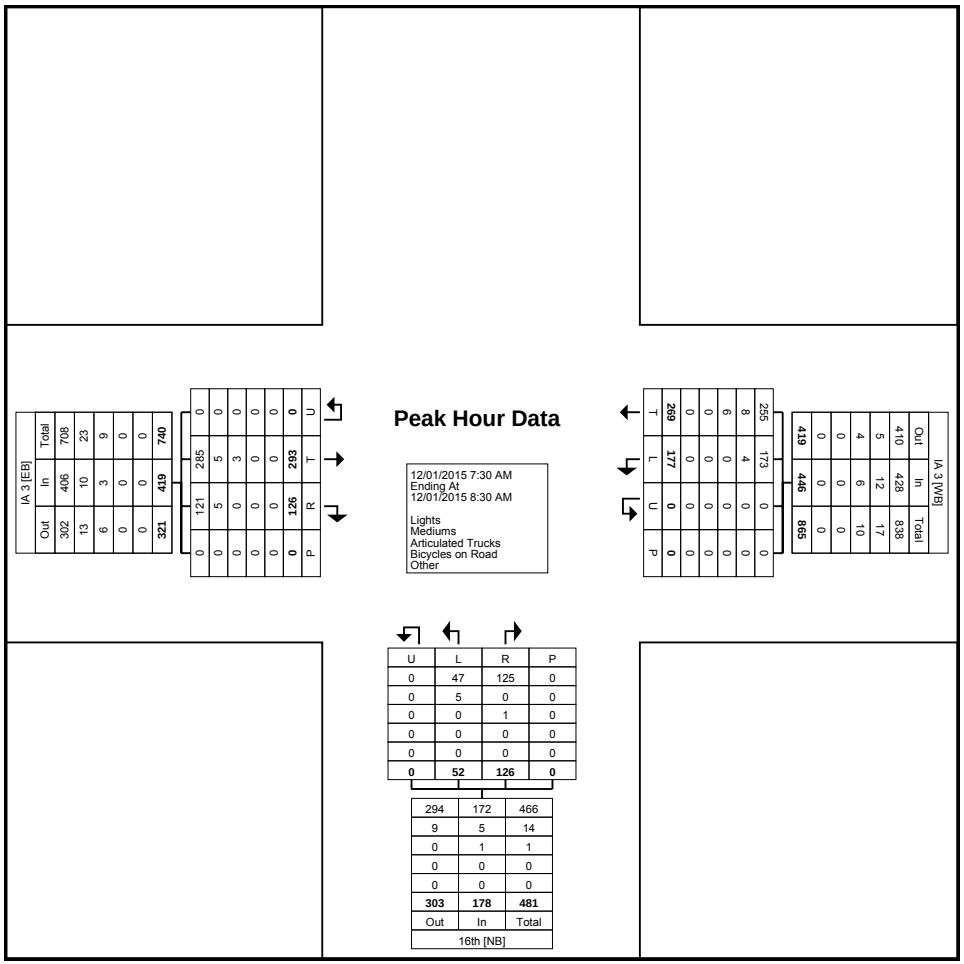
Turning Movement Peak Hour Data (7:30 AM)

Start Time	IA 3 Westbound					16th Northbound					IA 3 Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	67	43	0	0	110	16	8	0	0	24	17	74	0	0	91	225
7:45 AM	68	58	0	0	126	14	9	0	0	23	42	89	0	0	131	280
8:00 AM	62	58	0	0	120	60	18	0	0	78	53	67	0	0	120	318
8:15 AM	72	18	0	0	90	36	17	0	0	53	14	63	0	0	77	220
Total	269	177	0	0	446	126	52	0	0	178	126	293	0	0	419	1043
Approach %	60.3	39.7	0.0	-	-	70.8	29.2	0.0	-	-	30.1	69.9	0.0	-	-	-
Total %	25.8	17.0	0.0	-	42.8	12.1	5.0	0.0	-	17.1	12.1	28.1	0.0	-	40.2	-
PHF	0.934	0.763	0.000	-	0.885	0.525	0.722	0.000	-	0.571	0.594	0.823	0.000	-	0.800	0.820
Lights	255	173	0	-	428	125	47	0	-	172	121	285	0	-	406	1006
% Lights	94.8	97.7	-	-	96.0	99.2	90.4	-	-	96.6	96.0	97.3	-	-	96.9	96.5
Mediums	8	4	0	-	12	0	5	0	-	5	5	5	0	-	10	27
% Mediums	3.0	2.3	-	-	2.7	0.0	9.6	-	-	2.8	4.0	1.7	-	-	2.4	2.6
Articulated Trucks	6	0	0	-	6	1	0	0	-	1	0	3	0	-	3	10
% Articulated Trucks	2.2	0.0	-	-	1.3	0.8	0.0	-	-	0.6	0.0	1.0	-	-	0.7	1.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 16th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 16th TMC
Site Code:
Start Date: 12/01/2015

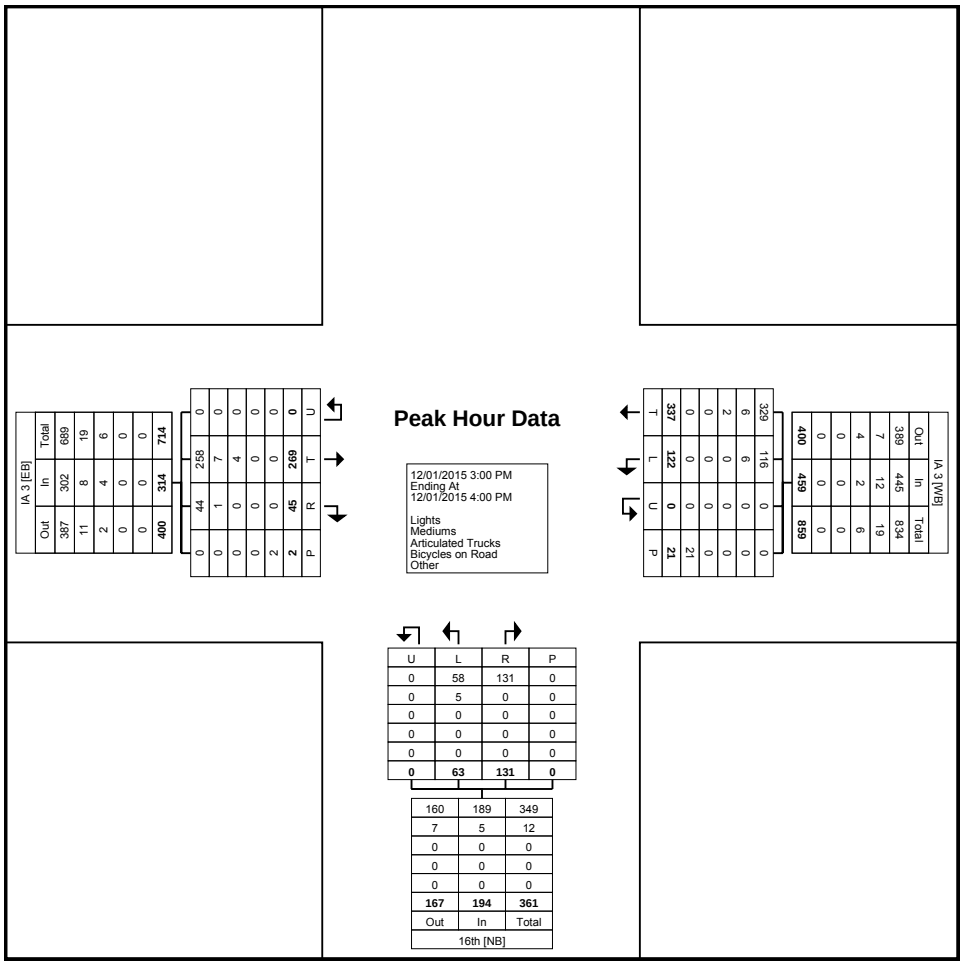
Turning Movement Peak Hour Data (3:00 PM)

Start Time	IA 3 Westbound					16th Northbound					IA 3 Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
3:00 PM	71	33	0	1	104	27	14	0	0	41	8	74	0	0	82	227
3:15 PM	67	63	0	2	130	22	6	0	0	28	15	63	0	0	78	236
3:30 PM	107	10	0	18	117	57	33	0	0	90	14	67	0	2	81	288
3:45 PM	92	16	0	0	108	25	10	0	0	35	8	65	0	0	73	216
Total	337	122	0	21	459	131	63	0	0	194	45	269	0	2	314	967
Approach %	73.4	26.6	0.0	-	-	67.5	32.5	0.0	-	-	14.3	85.7	0.0	-	-	-
Total %	34.9	12.6	0.0	-	47.5	13.5	6.5	0.0	-	20.1	4.7	27.8	0.0	-	32.5	-
PHF	0.787	0.484	0.000	-	0.883	0.575	0.477	0.000	-	0.539	0.750	0.909	0.000	-	0.957	0.839
Lights	329	116	0	-	445	131	58	0	-	189	44	258	0	-	302	936
% Lights	97.6	95.1	-	-	96.9	100.0	92.1	-	-	97.4	97.8	95.9	-	-	96.2	96.8
Mediums	6	6	0	-	12	0	5	0	-	5	1	7	0	-	8	25
% Mediums	1.8	4.9	-	-	2.6	0.0	7.9	-	-	2.6	2.2	2.6	-	-	2.5	2.6
Articulated Trucks	2	0	0	-	2	0	0	0	-	0	0	4	0	-	4	6
% Articulated Trucks	0.6	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.0	1.5	-	-	1.3	0.6
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	21	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 16th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (3:00 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 16th TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 15th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

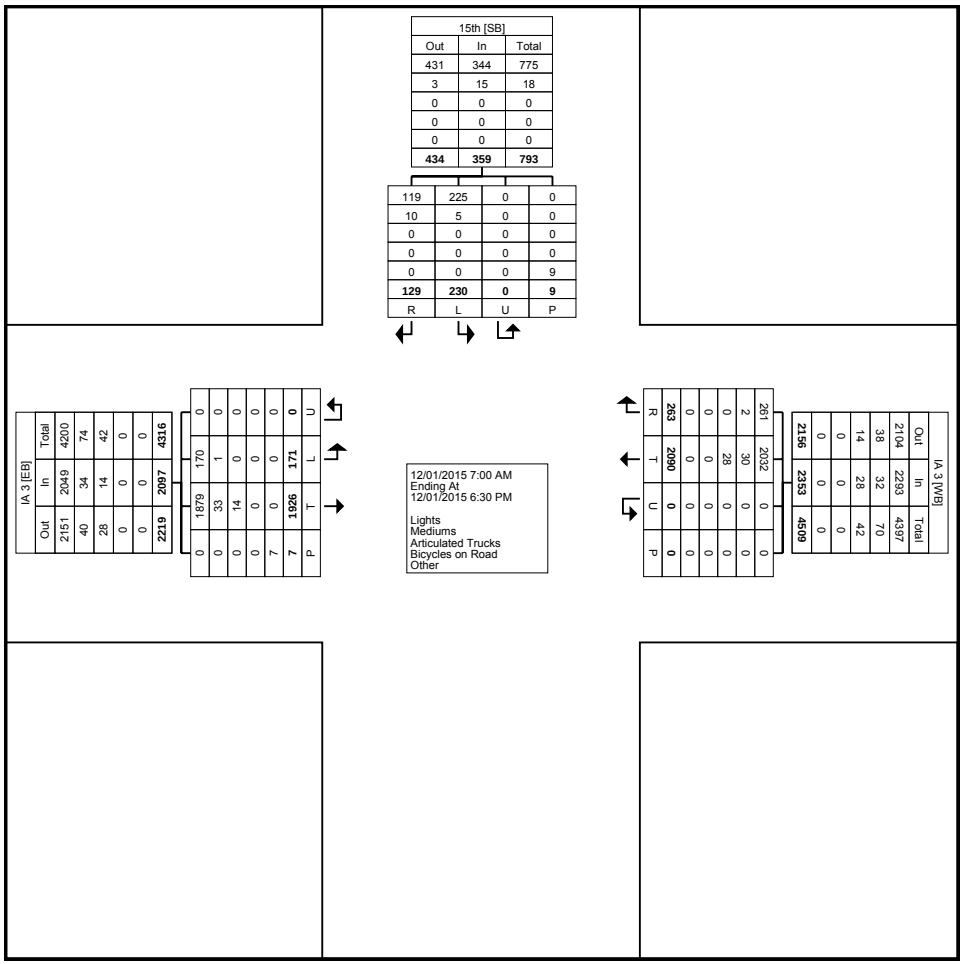
Start Time	15th Southbound					IA 3 Westbound					IA 3 Eastbound					
	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:00 AM	1	4	0	0	5	2	39	0	0	41	40	1	0	0	41	87
7:15 AM	2	2	0	0	4	2	121	0	0	123	58	5	0	0	63	190
7:30 AM	2	1	0	0	3	4	110	0	0	114	90	1	0	0	91	208
7:45 AM	3	3	0	0	6	4	126	0	0	130	98	3	0	0	101	237
Hourly Total	8	10	0	0	18	12	396	0	0	408	286	10	0	0	296	722
8:00 AM	7	15	0	0	22	12	100	0	0	112	110	20	0	1	130	264
8:15 AM	19	35	0	2	54	17	75	0	0	92	76	22	0	2	98	244
8:30 AM	2	8	0	0	10	7	65	0	0	72	69	3	0	0	72	154
8:45 AM	1	8	0	0	9	11	61	0	0	72	68	3	0	0	71	152
Hourly Total	29	66	0	2	95	47	301	0	0	348	323	48	0	3	371	814
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	2	5	0	0	7	13	70	0	0	83	57	3	0	0	60	150
2:45 PM	1	8	0	0	9	13	81	0	0	94	72	10	0	0	82	185
Hourly Total	3	13	0	0	16	26	151	0	0	177	129	13	0	0	142	335
3:00 PM	11	11	0	0	22	28	110	0	0	138	90	10	0	1	100	260
3:15 PM	24	24	0	0	48	9	101	0	0	110	83	3	0	2	86	244
3:30 PM	10	11	0	1	21	12	117	0	0	129	120	11	0	1	131	281
3:45 PM	6	11	0	0	17	9	100	0	0	109	72	11	0	0	83	209
Hourly Total	51	57	0	1	108	58	428	0	0	486	365	35	0	4	400	994
4:00 PM	7	15	0	0	22	11	83	0	0	94	98	12	0	0	110	226
4:15 PM	9	9	0	2	18	11	98	0	0	109	88	7	0	0	95	222
4:30 PM	3	5	0	0	8	10	98	0	0	108	91	4	0	0	95	211
4:45 PM	7	7	0	0	14	21	90	0	0	111	80	3	0	0	83	208
Hourly Total	26	36	0	2	62	53	369	0	0	422	357	26	0	0	383	867
5:00 PM	3	12	0	0	15	6	107	0	0	113	130	7	0	0	137	265
5:15 PM	3	5	0	0	8	9	104	0	0	113	93	9	0	0	102	223
5:30 PM	1	11	0	0	12	6	55	0	0	61	79	3	0	0	82	155
5:45 PM	2	5	0	4	7	10	72	0	0	82	68	3	0	0	71	160
Hourly Total	9	33	0	4	42	31	338	0	0	369	370	22	0	0	392	803
6:00 PM	2	6	0	0	8	17	48	0	0	65	53	8	0	0	61	134
6:15 PM	1	9	0	0	10	19	59	0	0	78	43	9	0	0	52	140
Grand Total	129	230	0	9	359	263	2090	0	0	2353	1926	171	0	7	2097	4809
Approach %	35.9	64.1	0.0	-	-	11.2	88.8	0.0	-	-	91.8	8.2	0.0	-	-	-
Total %	2.7	4.8	0.0	-	7.5	5.5	43.5	0.0	-	48.9	40.0	3.6	0.0	-	43.6	-
Lights	119	225	0	-	344	261	2032	0	-	2293	1879	170	0	-	2049	4686
% Lights	92.2	97.8	-	-	95.8	99.2	97.2	-	-	97.5	97.6	99.4	-	-	97.7	97.4
Mediums	10	5	0	-	15	2	30	0	-	32	33	1	0	-	34	81
% Mediums	7.8	2.2	-	-	4.2	0.8	1.4	-	-	1.4	1.7	0.6	-	-	1.6	1.7
Articulated Trucks	0	0	0	-	0	0	28	0	-	28	14	0	0	-	14	42
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	1.3	-	-	1.2	0.7	0.0	-	-	0.7	0.9
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0

% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	9	-	-	-	-	0	-	-	-	-	7	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 15th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 15th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:30 AM)

Start Time	15th Southbound					IA 3 Westbound					IA 3 Eastbound					
	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:30 AM	2	1	0	0	3	4	110	0	0	114	90	1	0	0	91	208
7:45 AM	3	3	0	0	6	4	126	0	0	130	98	3	0	0	101	237
8:00 AM	7	15	0	0	22	12	100	0	0	112	110	20	0	1	130	264
8:15 AM	19	35	0	2	54	17	75	0	0	92	76	22	0	2	98	244
Total	31	54	0	2	85	37	411	0	0	448	374	46	0	3	420	953
Approach %	36.5	63.5	0.0	-	-	8.3	91.7	0.0	-	-	89.0	11.0	0.0	-	-	-
Total %	3.3	5.7	0.0	-	8.9	3.9	43.1	0.0	-	47.0	39.2	4.8	0.0	-	44.1	-
PHF	0.408	0.386	0.000	-	0.394	0.544	0.815	0.000	-	0.862	0.850	0.523	0.000	-	0.808	0.902
Lights	29	54	0	-	83	36	395	0	-	431	367	46	0	-	413	927
% Lights	93.5	100.0	-	-	97.6	97.3	96.1	-	-	96.2	98.1	100.0	-	-	98.3	97.3
Mediums	2	0	0	-	2	1	7	0	-	8	3	0	0	-	3	13
% Mediums	6.5	0.0	-	-	2.4	2.7	1.7	-	-	1.8	0.8	0.0	-	-	0.7	1.4
Articulated Trucks	0	0	0	-	0	0	9	0	-	9	4	0	0	-	4	13
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	2.2	-	-	2.0	1.1	0.0	-	-	1.0	1.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

WHKS & Co.
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Count Name: 15th TMC
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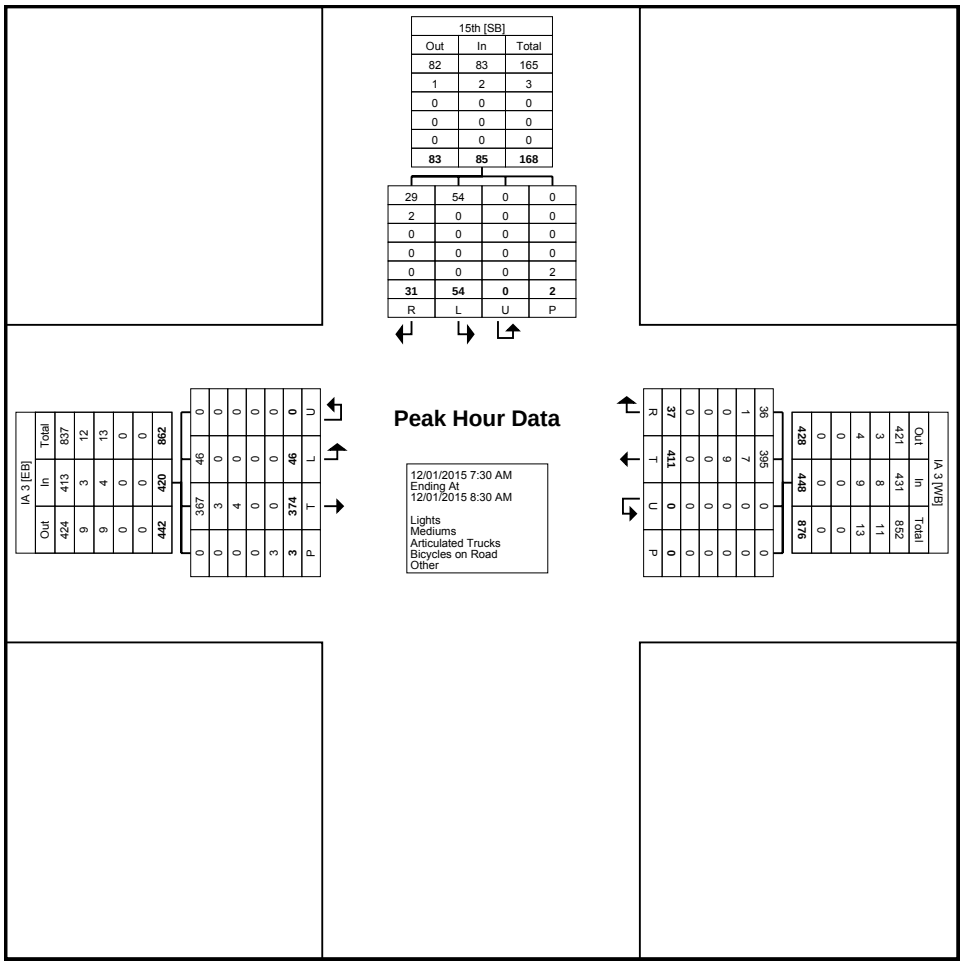
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 15th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (3:00 PM)

Start Time	15th Southbound					IA 3 Westbound					IA 3 Eastbound					
	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Int. Total
3:00 PM	11	11	0	0	22	28	110	0	0	138	90	10	0	1	100	260
3:15 PM	24	24	0	0	48	9	101	0	0	110	83	3	0	2	86	244
3:30 PM	10	11	0	1	21	12	117	0	0	129	120	11	0	1	131	281
3:45 PM	6	11	0	0	17	9	100	0	0	109	72	11	0	0	83	209
Total	51	57	0	1	108	58	428	0	0	486	365	35	0	4	400	994
Approach %	47.2	52.8	0.0	-	-	11.9	88.1	0.0	-	-	91.3	8.8	0.0	-	-	-
Total %	5.1	5.7	0.0	-	10.9	5.8	43.1	0.0	-	48.9	36.7	3.5	0.0	-	40.2	-
PHF	0.531	0.594	0.000	-	0.563	0.518	0.915	0.000	-	0.880	0.760	0.795	0.000	-	0.763	0.884
Lights	45	54	0	-	99	58	421	0	-	479	356	35	0	-	391	969
% Lights	88.2	94.7	-	-	91.7	100.0	98.4	-	-	98.6	97.5	100.0	-	-	97.8	97.5
Mediums	6	3	0	-	9	0	5	0	-	5	6	0	0	-	6	20
% Mediums	11.8	5.3	-	-	8.3	0.0	1.2	-	-	1.0	1.6	0.0	-	-	1.5	2.0
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	3	0	0	-	3	5
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.5	-	-	0.4	0.8	0.0	-	-	0.8	0.5
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
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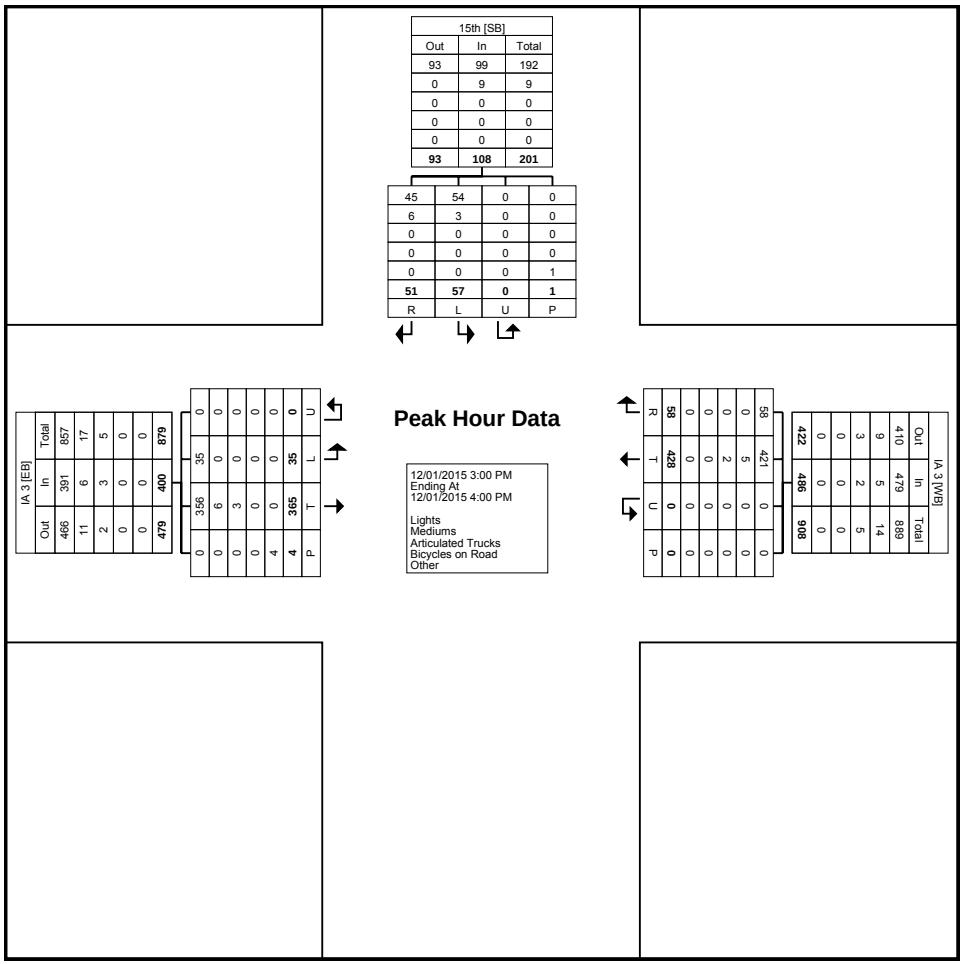
Count Name: 15th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (3:00 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
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WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 12th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

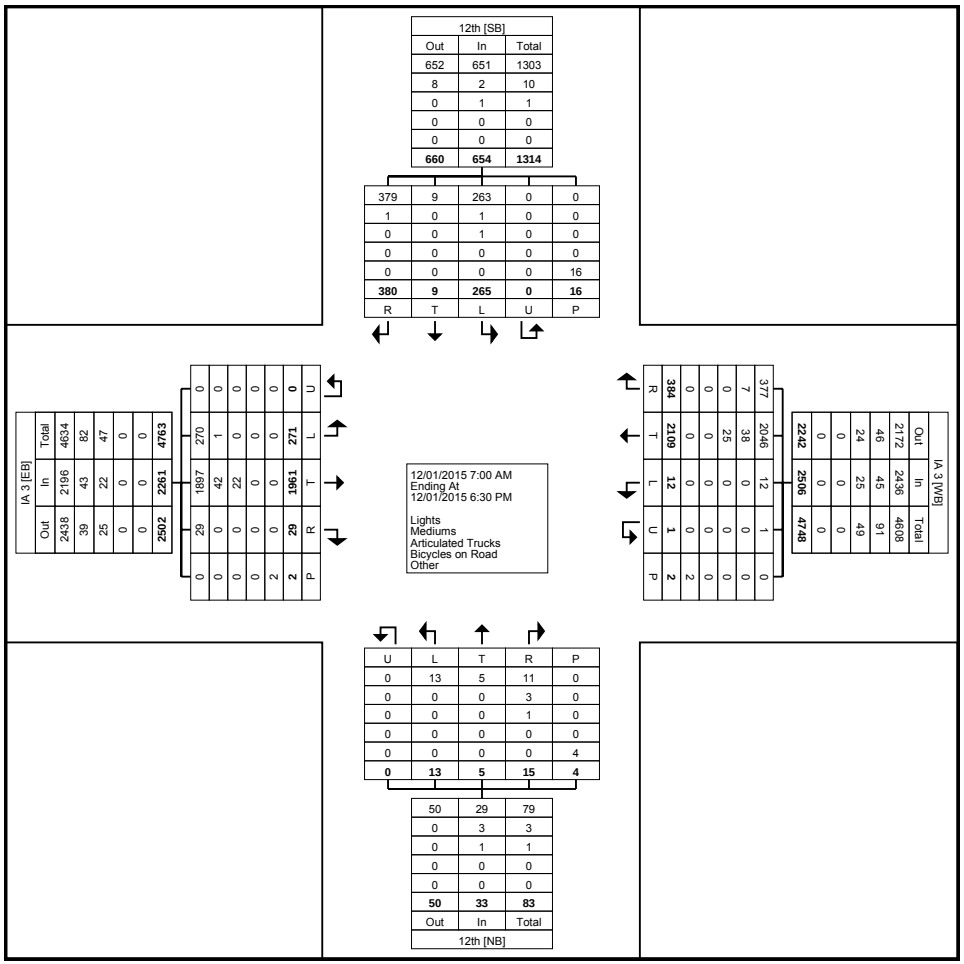
Start Time	12th Southbound						IA 3 Westbound						12th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	5	0	14	0	0	19	8	36	0	0	0	44	0	0	0	0	0	0	0	38	7	0	0	45	108
7:15 AM	29	0	12	0	0	41	12	95	0	0	0	107	0	0	0	0	1	0	0	58	5	0	0	63	211
7:30 AM	23	0	14	0	1	37	9	93	0	0	0	102	1	0	0	0	0	1	1	79	10	0	0	90	230
7:45 AM	45	1	11	0	0	57	9	108	1	0	0	118	2	0	0	0	0	2	2	98	8	0	0	108	285
Hourly Total	102	1	51	0	1	154	38	332	1	0	0	371	3	0	0	0	1	3	3	273	30	0	0	306	834
8:00 AM	41	0	17	0	0	58	7	95	0	0	0	102	0	0	0	0	0	0	1	103	14	0	0	118	278
8:15 AM	16	2	9	0	2	27	8	81	0	0	0	89	0	1	0	0	0	1	1	106	12	0	0	119	236
8:30 AM	6	0	8	0	0	14	6	68	0	0	1	74	2	0	1	0	0	3	2	68	6	0	0	76	167
8:45 AM	9	1	10	0	0	20	15	71	0	0	1	86	4	0	1	0	1	5	2	79	2	0	0	83	194
Hourly Total	72	3	44	0	2	119	36	315	0	0	2	351	6	1	2	0	1	9	6	356	34	0	0	396	875
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	6	0	11	0	1	17	9	81	2	0	0	92	0	1	1	0	0	2	1	58	5	0	0	64	175
2:45 PM	10	0	11	0	0	21	17	89	1	0	0	107	0	0	1	0	0	1	6	67	5	0	0	78	207
Hourly Total	16	0	22	0	1	38	26	170	3	0	0	199	0	1	2	0	0	3	7	125	10	0	0	142	382
3:00 PM	20	0	11	0	0	31	15	123	0	0	0	138	0	0	0	0	0	0	1	86	12	0	0	99	268
3:15 PM	20	0	8	0	0	28	12	90	2	1	0	105	0	0	0	0	0	0	2	99	8	0	0	109	242
3:30 PM	4	1	8	0	1	13	27	127	0	0	0	154	3	0	0	0	0	3	0	118	27	0	0	145	315
3:45 PM	18	2	15	0	1	35	16	89	0	0	0	105	1	0	0	0	0	1	0	84	15	0	0	99	240
Hourly Total	62	3	42	0	2	107	70	429	2	1	0	502	4	0	0	0	0	4	3	387	62	0	0	452	1065
4:00 PM	12	0	5	0	0	17	15	85	1	0	0	101	1	0	3	0	1	4	4	99	16	0	0	119	241
4:15 PM	9	0	9	0	0	18	15	104	0	0	0	119	0	1	1	0	0	2	1	88	16	0	0	105	244
4:30 PM	12	0	12	0	0	24	19	104	3	0	0	126	0	0	2	0	0	2	1	93	11	0	0	105	257
4:45 PM	16	0	12	0	2	28	29	98	1	0	0	128	0	0	1	0	0	1	0	79	9	0	0	88	245
Hourly Total	49	0	38	0	2	87	78	391	5	0	0	474	1	1	7	0	1	9	6	359	52	0	0	417	987
5:00 PM	19	1	5	0	1	25	31	109	0	0	0	140	0	1	0	0	1	1	0	122	18	0	1	140	306
5:15 PM	10	0	12	0	1	22	21	100	0	0	0	121	0	0	2	0	0	2	4	91	11	0	0	106	251
5:30 PM	8	0	10	0	1	18	28	61	0	0	0	89	0	1	0	0	0	1	0	85	18	0	1	103	211
5:45 PM	11	0	14	0	5	25	18	70	1	0	0	89	0	0	0	0	0	0	0	62	12	0	0	74	188
Hourly Total	48	1	41	0	8	90	98	340	1	0	0	439	0	2	2	0	1	4	4	360	59	0	2	423	956
6:00 PM	19	0	13	0	0	32	21	61	0	0	0	82	0	0	0	0	0	0	0	54	18	0	0	72	186
6:15 PM	12	1	14	0	0	27	17	71	0	0	0	88	1	0	0	0	0	1	0	47	6	0	0	53	169
Grand Total	380	9	265	0	16	654	384	2109	12	1	2	2506	15	5	13	0	4	33	29	1961	271	0	2	2261	5454
Approach %	58.1	1.4	40.5	0.0	-	-	15.3	84.2	0.5	0.0	-	-	45.5	15.2	39.4	0.0	-	-	1.3	86.7	12.0	0.0	-	-	-
Total %	7.0	0.2	4.9	0.0	-	12.0	7.0	38.7	0.2	0.0	-	45.9	0.3	0.1	0.2	0.0	-	0.6	0.5	36.0	5.0	0.0	-	41.5	-
Lights	379	9	263	0	-	651	377	2046	12	1	-	2436	11	5	13	0	-	29	29	1897	270	0	-	2196	5312
% Lights	99.7	100.0	99.2	-	-	99.5	98.2	97.0	100.0	100.0	-	97.2	73.3	100.0	100.0	-	-	87.9	100.0	96.7	99.6	-	-	97.1	97.4
Mediums	1	0	1	0	-	2	7	38	0	0	-	45	3	0	0	0	-	3	0	42	1	0	-	43	93
% Mediums	0.3	0.0	0.4	-	-	0.3	1.8	1.8	0.0	0.0	-	1.8	20.0	0.0	0.0	-	-	9.1	0.0	2.1	0.4	-	-	1.9	1.7
Articulated Trucks	0	0	1	0	-	1	0	25	0	0	-	25	1	0	0	0	-	1	0	22	0	0	-	22	49

% Articulated Trucks	0.0	0.0	0.4	-	-	0.2	0.0	1.2	0.0	0.0	-	1.0	6.7	0.0	0.0	-	-	3.0	0.0	1.1	0.0	-	-	1.0	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 12th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 12th TMC
Site Code:
Start Date: 12/01/2015

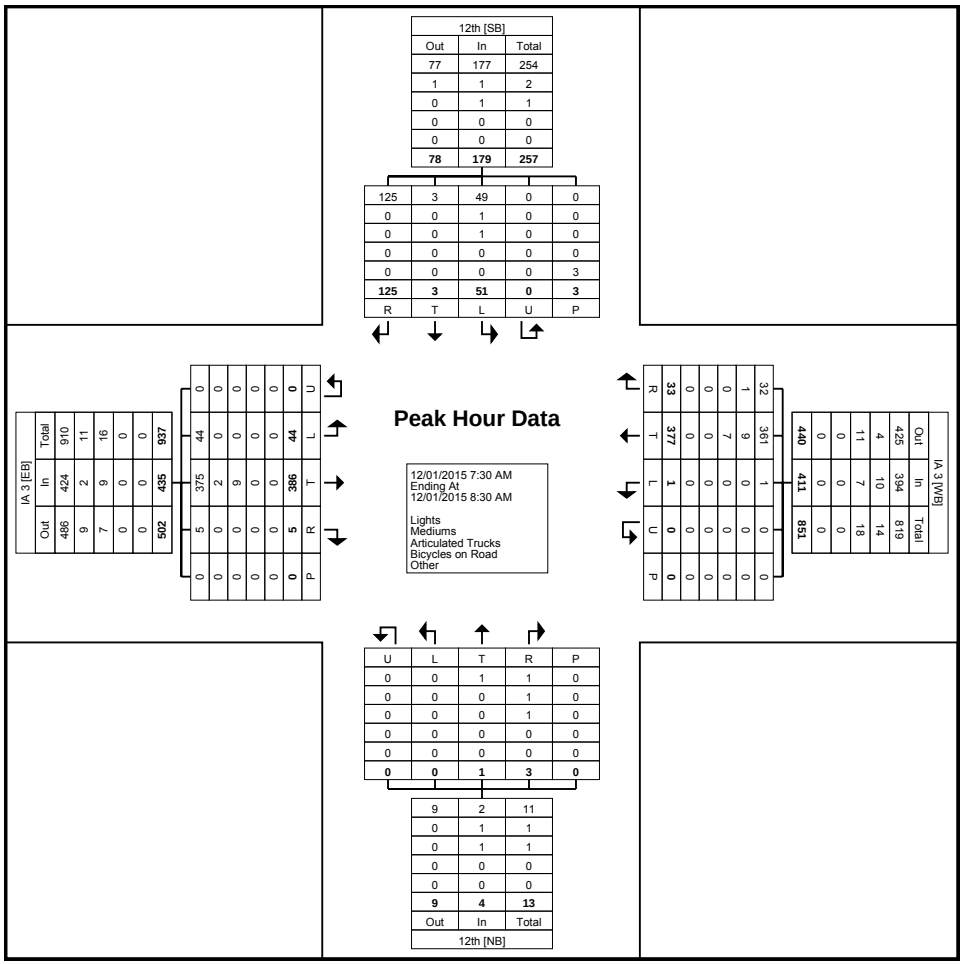
Turning Movement Peak Hour Data (7:30 AM)

Start Time	12th Southbound						IA 3 Westbound						12th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	23	0	14	0	1	37	9	93	0	0	0	102	1	0	0	0	0	1	1	79	10	0	0	90	230
7:45 AM	45	1	11	0	0	57	9	108	1	0	0	118	2	0	0	0	0	2	2	98	8	0	0	108	285
8:00 AM	41	0	17	0	0	58	7	95	0	0	0	102	0	0	0	0	0	0	1	103	14	0	0	118	278
8:15 AM	16	2	9	0	2	27	8	81	0	0	0	89	0	1	0	0	0	1	1	106	12	0	0	119	236
Total	125	3	51	0	3	179	33	377	1	0	0	411	3	1	0	0	0	4	5	386	44	0	0	435	1029
Approach %	69.8	1.7	28.5	0.0	-	-	8.0	91.7	0.2	0.0	-	-	75.0	25.0	0.0	0.0	-	-	1.1	88.7	10.1	0.0	-	-	-
Total %	12.1	0.3	5.0	0.0	-	17.4	3.2	36.6	0.1	0.0	-	39.9	0.3	0.1	0.0	0.0	-	0.4	0.5	37.5	4.3	0.0	-	42.3	-
PHF	0.694	0.375	0.750	0.000	-	0.772	0.917	0.873	0.250	0.000	-	0.871	0.375	0.250	0.000	0.000	-	0.500	0.625	0.910	0.786	0.000	-	0.914	0.903
Lights	125	3	49	0	-	177	32	361	1	0	-	394	1	1	0	0	-	2	5	375	44	0	-	424	997
% Lights	100.0	100.0	96.1	-	-	98.9	97.0	95.8	100.0	-	-	95.9	33.3	100.0	-	-	-	50.0	100.0	97.2	100.0	-	-	97.5	96.9
Mediums	0	0	1	0	-	1	1	9	0	0	-	10	1	0	0	0	-	1	0	2	0	0	-	2	14
% Mediums	0.0	0.0	2.0	-	-	0.6	3.0	2.4	0.0	-	-	2.4	33.3	0.0	-	-	-	25.0	0.0	0.5	0.0	-	-	0.5	1.4
Articulated Trucks	0	0	1	0	-	1	0	7	0	0	-	7	1	0	0	0	-	1	0	9	0	0	-	9	18
% Articulated Trucks	0.0	0.0	2.0	-	-	0.6	0.0	1.9	0.0	-	-	1.7	33.3	0.0	-	-	-	25.0	0.0	2.3	0.0	-	-	2.1	1.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 12th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 12th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (3:00 PM)

Start Time	12th Southbound						IA 3 Westbound						12th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:00 PM	20	0	11	0	0	31	15	123	0	0	0	138	0	0	0	0	0	0	1	86	12	0	0	99	268
3:15 PM	20	0	8	0	0	28	12	90	2	1	0	105	0	0	0	0	0	0	2	99	8	0	0	109	242
3:30 PM	4	1	8	0	1	13	27	127	0	0	0	154	3	0	0	0	0	3	0	118	27	0	0	145	315
3:45 PM	18	2	15	0	1	35	16	89	0	0	0	105	1	0	0	0	0	1	0	84	15	0	0	99	240
Total	62	3	42	0	2	107	70	429	2	1	0	502	4	0	0	0	0	4	3	387	62	0	0	452	1065
Approach %	57.9	2.8	39.3	0.0	-	-	13.9	85.5	0.4	0.2	-	-	100.0	0.0	0.0	0.0	-	-	0.7	85.6	13.7	0.0	-	-	-
Total %	5.8	0.3	3.9	0.0	-	10.0	6.6	40.3	0.2	0.1	-	47.1	0.4	0.0	0.0	0.0	-	0.4	0.3	36.3	5.8	0.0	-	42.4	-
PHF	0.775	0.375	0.700	0.000	-	0.764	0.648	0.844	0.250	0.250	-	0.815	0.333	0.000	0.000	0.000	-	0.333	0.375	0.820	0.574	0.000	-	0.779	0.845
Lights	62	3	42	0	-	107	67	421	2	1	-	491	4	0	0	0	-	4	3	376	61	0	-	440	1042
% Lights	100.0	100.0	100.0	-	-	100.0	95.7	98.1	100.0	100.0	-	97.8	100.0	-	-	-	-	100.0	100.0	97.2	98.4	-	-	97.3	97.8
Mediums	0	0	0	0	-	0	3	6	0	0	-	9	0	0	0	0	-	0	0	7	1	0	-	8	17
% Mediums	0.0	0.0	0.0	-	-	0.0	4.3	1.4	0.0	0.0	-	1.8	0.0	-	-	-	-	0.0	0.0	1.8	1.6	-	-	1.8	1.6
Articulated Trucks	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	4	0	0	-	4	6
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	0.0	-	0.4	0.0	-	-	-	-	0.0	0.0	1.0	0.0	-	-	0.9	0.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
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Count Name: 12th TMC
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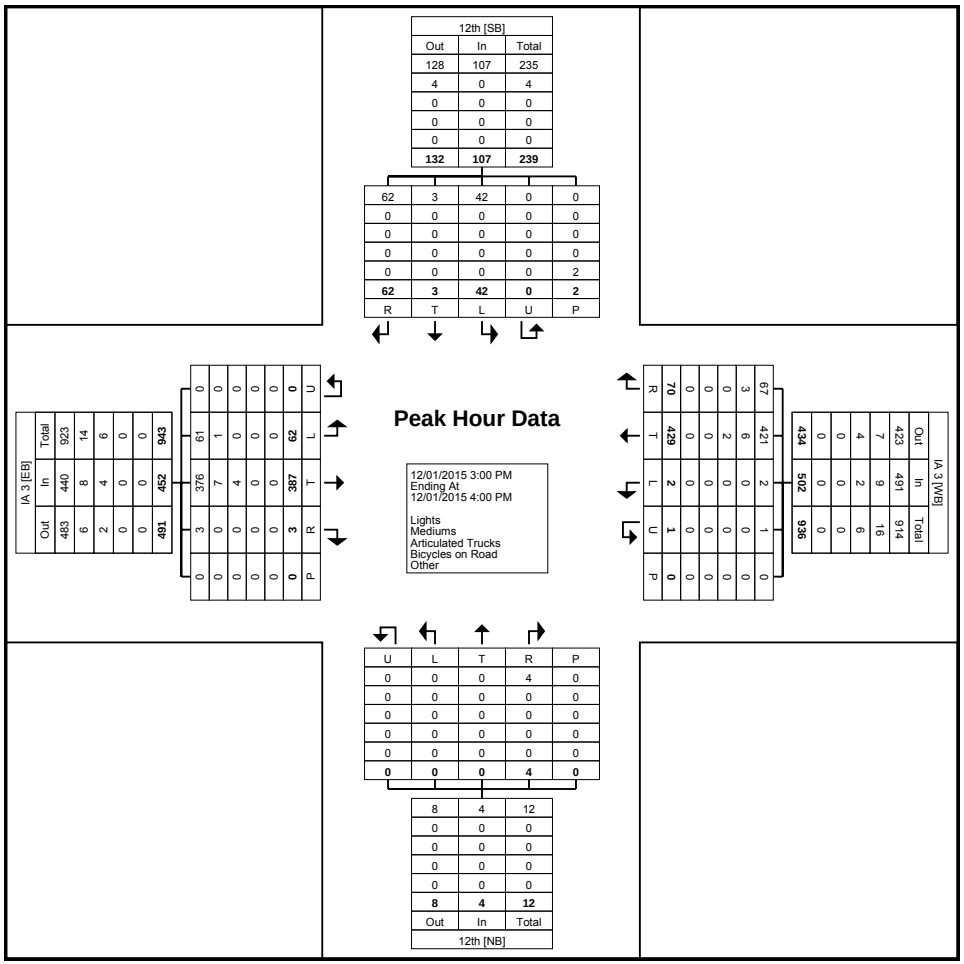
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (3:00 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
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WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 10th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

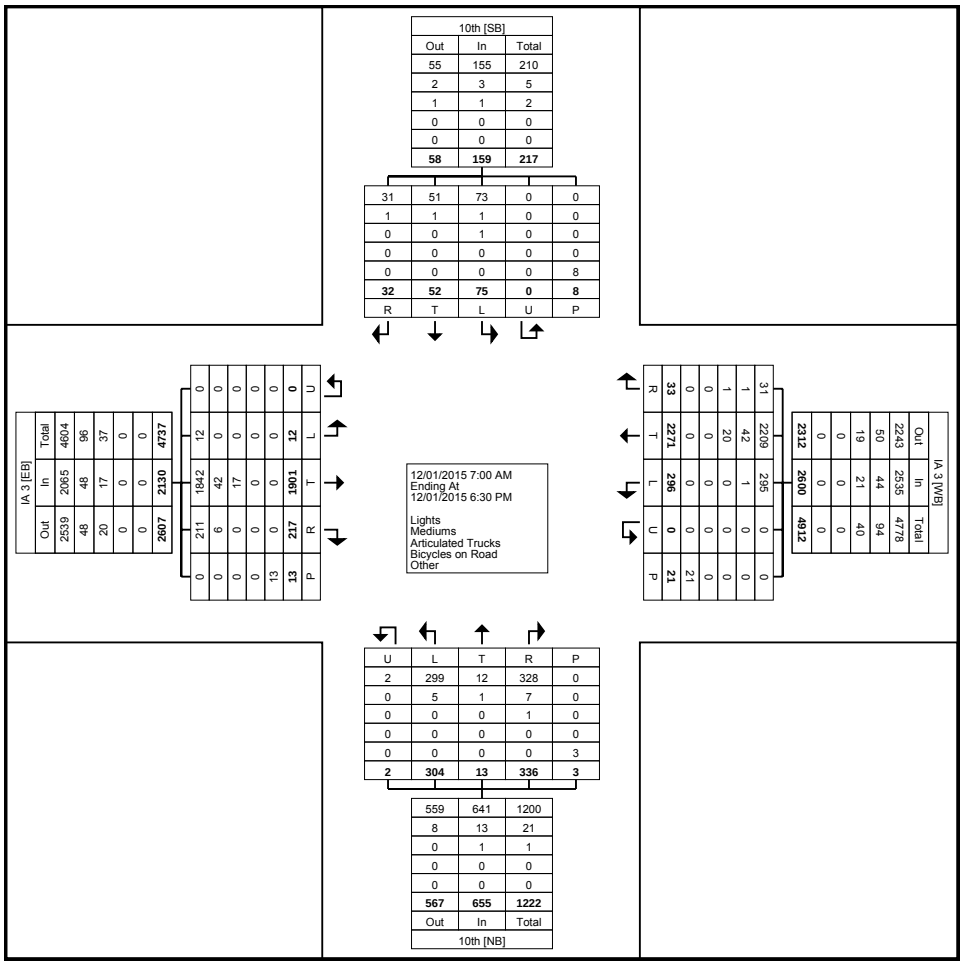
Start Time	10th Southbound						IA 3 Westbound						10th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	1	41	5	0	0	47	7	0	4	0	0	11	5	46	0	0	0	51	109
7:15 AM	1	0	0	0	0	1	2	106	8	0	0	116	6	0	3	2	1	11	6	54	1	0	0	61	189
7:30 AM	0	0	1	0	0	1	5	107	9	0	1	121	3	0	4	0	0	7	14	77	0	0	0	91	220
7:45 AM	2	0	1	0	0	3	2	118	16	0	1	136	11	0	7	0	0	18	18	82	1	0	0	101	258
Hourly Total	3	0	2	0	0	5	10	372	38	0	2	420	27	0	18	2	1	47	43	259	2	0	0	304	776
8:00 AM	4	3	5	0	0	12	1	87	22	0	0	110	11	0	12	0	0	23	13	100	0	0	0	113	258
8:15 AM	0	3	3	0	0	6	2	88	11	0	0	101	6	0	6	0	0	12	9	95	1	0	0	105	224
8:30 AM	0	1	2	0	1	3	0	77	7	0	1	84	2	0	5	0	0	7	14	59	1	0	1	74	168
8:45 AM	0	1	1	0	0	2	2	75	18	0	1	95	10	0	12	0	0	22	17	70	0	0	1	87	206
Hourly Total	4	8	11	0	1	23	5	327	58	0	2	390	29	0	35	0	0	64	53	324	2	0	2	379	856
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	0	3	3	0	1	6	2	81	8	0	1	91	18	1	17	0	0	36	10	56	0	0	1	66	199
2:45 PM	0	1	1	0	0	2	0	95	13	0	1	108	15	0	12	0	0	27	10	69	0	0	0	79	216
Hourly Total	0	4	4	0	1	8	2	176	21	0	2	199	33	1	29	0	0	63	20	125	0	0	1	145	415
3:00 PM	2	2	4	0	0	8	0	126	17	0	0	143	13	0	16	0	0	29	11	73	1	0	0	85	265
3:15 PM	7	1	2	0	0	10	2	90	10	0	2	102	28	3	18	0	1	49	14	87	1	0	2	102	263
3:30 PM	1	2	11	0	0	14	2	122	8	0	0	132	40	3	30	0	0	73	9	109	2	0	0	120	339
3:45 PM	1	3	7	0	4	11	0	98	12	0	5	110	21	1	14	0	0	36	6	91	2	0	0	99	256
Hourly Total	11	8	24	0	4	43	4	436	47	0	7	487	102	7	78	0	1	187	40	360	6	0	2	406	1123
4:00 PM	0	3	4	0	0	7	0	94	10	0	2	104	18	2	11	0	0	31	7	88	0	0	1	95	237
4:15 PM	1	4	5	0	0	10	2	98	9	0	0	109	23	1	18	0	0	42	8	91	1	0	0	100	261
4:30 PM	4	5	6	0	0	15	4	110	14	0	1	128	13	1	14	0	0	28	4	96	0	0	0	100	271
4:45 PM	6	10	6	0	1	22	1	115	24	0	0	140	13	0	21	0	1	34	14	75	0	0	0	89	285
Hourly Total	11	22	21	0	1	54	7	417	57	0	3	481	67	4	64	0	1	135	33	350	1	0	1	384	1054
5:00 PM	1	2	4	0	0	7	0	119	16	0	0	135	17	0	26	0	0	43	3	118	0	0	1	121	306
5:15 PM	2	2	1	0	0	5	0	105	9	0	1	114	8	0	16	0	0	24	4	93	0	0	0	97	240
5:30 PM	0	3	3	0	1	6	1	74	12	0	2	87	12	0	12	0	0	24	6	85	0	0	1	91	208
5:45 PM	0	1	2	0	0	3	1	77	13	0	2	91	12	0	13	0	0	25	7	68	0	0	1	75	194
Hourly Total	3	8	10	0	1	21	2	375	50	0	5	427	49	0	67	0	0	116	20	364	0	0	3	384	948
6:00 PM	0	0	3	0	0	3	1	80	19	0	0	100	14	1	7	0	0	22	4	61	1	0	4	66	191
6:15 PM	0	2	0	0	0	2	2	88	6	0	0	96	15	0	6	0	0	21	4	58	0	0	0	62	181
Grand Total	32	52	75	0	8	159	33	2271	296	0	21	2600	336	13	304	2	3	655	217	1901	12	0	13	2130	5544
Approach %	20.1	32.7	47.2	0.0	-	-	1.3	87.3	11.4	0.0	-	-	51.3	2.0	46.4	0.3	-	-	10.2	89.2	0.6	0.0	-	-	-
Total %	0.6	0.9	1.4	0.0	-	2.9	0.6	41.0	5.3	0.0	-	46.9	6.1	0.2	5.5	0.0	-	11.8	3.9	34.3	0.2	0.0	-	38.4	-
Lights	31	51	73	0	-	155	31	2209	295	0	-	2535	328	12	299	2	-	641	211	1842	12	0	-	2065	5396
% Lights	96.9	98.1	97.3	-	-	97.5	93.9	97.3	99.7	-	-	97.5	97.6	92.3	98.4	100.0	-	97.9	97.2	96.9	100.0	-	-	96.9	97.3
Mediums	1	1	1	0	-	3	1	42	1	0	-	44	7	1	5	0	-	13	6	42	0	0	-	48	108
% Mediums	3.1	1.9	1.3	-	-	1.9	3.0	1.8	0.3	-	-	1.7	2.1	7.7	1.6	0.0	-	2.0	2.8	2.2	0.0	-	-	2.3	1.9
Articulated Trucks	0	0	1	0	-	1	1	20	0	0	-	21	1	0	0	0	-	1	0	17	0	0	-	17	40

% Articulated Trucks	0.0	0.0	1.3	-	-	0.6	3.0	0.9	0.0	-	-	0.8	0.3	0.0	0.0	0.0	-	0.2	0.0	0.9	0.0	-	-	0.8	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	21	-	-	-	-	-	3	-	-	-	-	-	13	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 10th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 10th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:30 AM)

Start Time	10th Southbound						IA 3 Westbound						10th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	0	0	1	0	0	1	5	107	9	0	1	121	3	0	4	0	0	7	14	77	0	0	0	91	220
7:45 AM	2	0	1	0	0	3	2	118	16	0	1	136	11	0	7	0	0	18	18	82	1	0	0	101	258
8:00 AM	4	3	5	0	0	12	1	87	22	0	0	110	11	0	12	0	0	23	13	100	0	0	0	113	258
8:15 AM	0	3	3	0	0	6	2	88	11	0	0	101	6	0	6	0	0	12	9	95	1	0	0	105	224
Total	6	6	10	0	0	22	10	400	58	0	2	468	31	0	29	0	0	60	54	354	2	0	0	410	960
Approach %	27.3	27.3	45.5	0.0	-	-	2.1	85.5	12.4	0.0	-	-	51.7	0.0	48.3	0.0	-	-	13.2	86.3	0.5	0.0	-	-	-
Total %	0.6	0.6	1.0	0.0	-	2.3	1.0	41.7	6.0	0.0	-	48.8	3.2	0.0	3.0	0.0	-	6.3	5.6	36.9	0.2	0.0	-	42.7	-
PHF	0.375	0.500	0.500	0.000	-	0.458	0.500	0.847	0.659	0.000	-	0.860	0.705	0.000	0.604	0.000	-	0.652	0.750	0.885	0.500	0.000	-	0.907	0.930
Lights	6	6	9	0	-	21	10	385	57	0	-	452	30	0	27	0	-	57	52	344	2	0	-	398	928
% Lights	100.0	100.0	90.0	-	-	95.5	100.0	96.3	98.3	-	-	96.6	96.8	-	93.1	-	-	95.0	96.3	97.2	100.0	-	-	97.1	96.7
Mediums	0	0	0	0	-	0	0	11	1	0	-	12	1	0	2	0	-	3	2	7	0	0	-	9	24
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	2.8	1.7	-	-	2.6	3.2	-	6.9	-	-	5.0	3.7	2.0	0.0	-	-	2.2	2.5
Articulated Trucks	0	0	1	0	-	1	0	4	0	0	-	4	0	0	0	0	-	0	0	3	0	0	-	3	8
% Articulated Trucks	0.0	0.0	10.0	-	-	4.5	0.0	1.0	0.0	-	-	0.9	0.0	-	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	0.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

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217.483.9457 etott@whks.com

Count Name: 10th TMC
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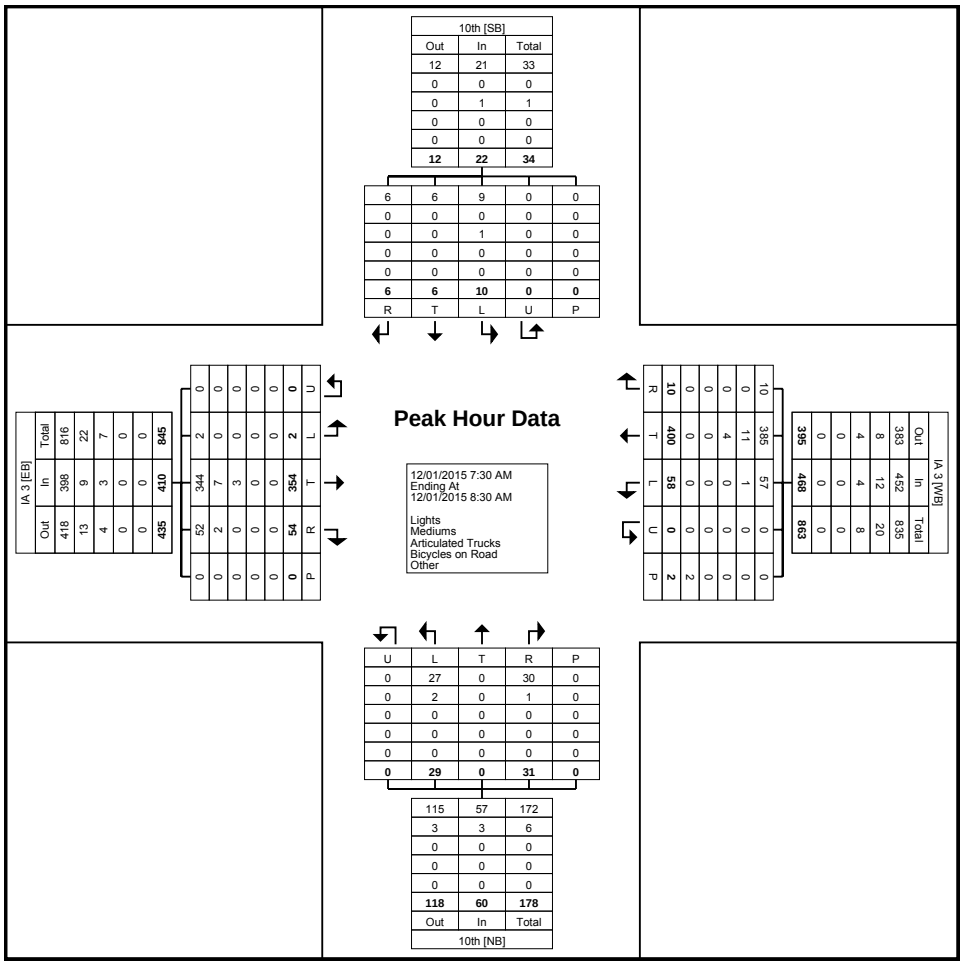
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 10th TMC
Site Code:
Start Date: 12/01/2015

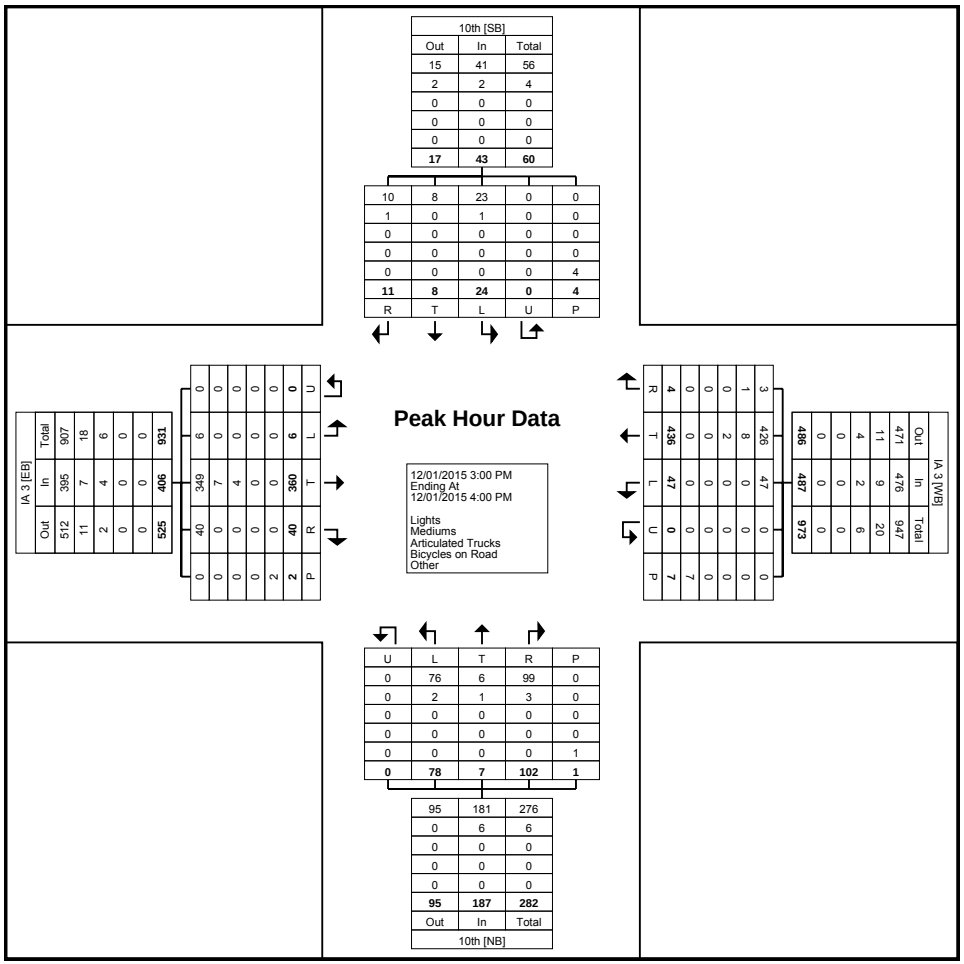
Turning Movement Peak Hour Data (3:00 PM)

Start Time	10th Southbound						IA 3 Westbound						10th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:00 PM	2	2	4	0	0	8	0	126	17	0	0	143	13	0	16	0	0	29	11	73	1	0	0	85	265
3:15 PM	7	1	2	0	0	10	2	90	10	0	2	102	28	3	18	0	1	49	14	87	1	0	2	102	263
3:30 PM	1	2	11	0	0	14	2	122	8	0	0	132	40	3	30	0	0	73	9	109	2	0	0	120	339
3:45 PM	1	3	7	0	4	11	0	98	12	0	5	110	21	1	14	0	0	36	6	91	2	0	0	99	256
Total	11	8	24	0	4	43	4	436	47	0	7	487	102	7	78	0	1	187	40	360	6	0	2	406	1123
Approach %	25.6	18.6	55.8	0.0	-	-	0.8	89.5	9.7	0.0	-	-	54.5	3.7	41.7	0.0	-	-	9.9	88.7	1.5	0.0	-	-	-
Total %	1.0	0.7	2.1	0.0	-	3.8	0.4	38.8	4.2	0.0	-	43.4	9.1	0.6	6.9	0.0	-	16.7	3.6	32.1	0.5	0.0	-	36.2	-
PHF	0.393	0.667	0.545	0.000	-	0.768	0.500	0.865	0.691	0.000	-	0.851	0.638	0.583	0.650	0.000	-	0.640	0.714	0.826	0.750	0.000	-	0.846	0.828
Lights	10	8	23	0	-	41	3	426	47	0	-	476	99	6	76	0	-	181	40	349	6	0	-	395	1093
% Lights	90.9	100.0	95.8	-	-	95.3	75.0	97.7	100.0	-	-	97.7	97.1	85.7	97.4	-	-	96.8	100.0	96.9	100.0	-	-	97.3	97.3
Mediums	1	0	1	0	-	2	1	8	0	0	-	9	3	1	2	0	-	6	0	7	0	0	-	7	24
% Mediums	9.1	0.0	4.2	-	-	4.7	25.0	1.8	0.0	-	-	1.8	2.9	14.3	2.6	-	-	3.2	0.0	1.9	0.0	-	-	1.7	2.1
Articulated Trucks	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	4	0	0	-	4	6
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.0	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 10th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (3:00 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

Start Time	8th Southbound						IA 3 Westbound						8th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	1	0	0	0	0	1	2	45	2	0	0	49	0	1	0	0	0	1	3	50	1	0	0	54	105
7:15 AM	3	1	0	0	0	4	5	111	6	0	0	122	0	1	1	0	0	2	0	64	1	0	0	65	193
7:30 AM	5	2	2	0	0	9	7	110	8	0	0	125	2	3	3	0	0	8	7	76	4	0	0	87	229
7:45 AM	2	3	2	0	0	7	19	128	16	0	0	163	2	2	0	0	0	4	11	108	3	0	0	122	296
Hourly Total	11	6	4	0	0	21	33	394	32	0	0	459	4	7	4	0	0	15	21	298	9	0	0	328	823
8:00 AM	3	2	0	0	1	5	11	114	13	0	0	138	4	1	3	0	1	8	2	107	4	0	1	113	264
8:15 AM	1	0	0	0	0	1	16	108	5	0	0	129	2	0	2	0	0	4	5	98	5	0	1	108	242
8:30 AM	1	2	0	0	1	3	5	79	5	0	0	89	2	1	1	0	0	4	4	59	2	0	0	65	161
8:45 AM	1	0	1	0	0	2	5	92	3	0	0	100	0	3	2	0	0	5	2	80	2	0	0	84	191
Hourly Total	6	4	1	0	2	11	37	393	26	0	0	456	8	5	8	0	1	21	13	344	13	0	2	370	858
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	5	0	4	0	1	9	3	83	3	0	0	89	0	1	2	0	1	3	1	78	0	0	0	79	180
2:45 PM	4	4	4	0	2	12	5	106	4	0	0	115	2	1	1	0	0	4	1	84	1	0	0	86	217
Hourly Total	9	4	8	0	3	21	8	189	7	0	0	204	2	2	3	0	1	7	2	162	1	0	0	165	397
3:00 PM	3	0	1	0	0	4	4	139	0	0	0	143	3	1	2	0	0	6	3	92	2	0	0	97	250
3:15 PM	2	1	2	0	1	5	7	101	6	0	0	114	2	2	1	0	0	5	0	104	9	0	0	113	237
3:30 PM	2	1	3	0	0	6	6	131	6	0	0	143	8	1	2	0	0	11	2	157	6	0	0	165	325
3:45 PM	1	0	3	0	1	4	4	115	2	0	0	121	8	0	1	0	0	9	1	116	3	0	1	120	254
Hourly Total	8	2	9	0	2	19	21	486	14	0	0	521	21	4	6	0	0	31	6	469	20	0	1	495	1066
4:00 PM	1	1	6	0	0	8	11	104	2	0	0	117	6	0	3	0	0	9	3	109	2	0	0	114	248
4:15 PM	1	1	3	0	0	5	5	105	1	0	0	111	5	0	1	0	0	6	3	110	5	0	1	118	240
4:30 PM	1	1	7	0	0	9	4	127	3	0	0	134	6	1	1	0	0	8	1	115	3	0	1	119	270
4:45 PM	2	4	5	0	1	11	3	137	2	0	0	142	1	2	0	0	0	3	1	94	2	0	1	97	253
Hourly Total	5	7	21	0	1	33	23	473	8	0	0	504	18	3	5	0	0	26	8	428	12	0	3	448	1011
5:00 PM	2	2	3	0	0	7	3	134	4	0	0	141	6	2	0	0	0	8	0	139	3	0	0	142	298
5:15 PM	2	0	2	0	0	4	5	114	2	0	0	121	2	3	1	0	0	6	1	108	0	0	0	109	240
5:30 PM	0	1	0	0	0	1	2	83	2	0	0	87	2	0	0	0	0	2	0	110	1	0	0	111	201
5:45 PM	2	1	4	0	0	7	2	91	4	0	0	97	3	2	0	0	0	5	0	81	0	0	0	81	190
Hourly Total	6	4	9	0	0	19	12	422	12	0	0	446	13	7	1	0	0	21	1	438	4	0	0	443	929
6:00 PM	3	0	4	0	0	7	1	105	3	0	0	109	3	2	1	0	0	6	3	76	0	0	0	79	201
6:15 PM	1	0	1	0	0	2	3	102	1	0	0	106	2	2	0	0	0	4	1	70	1	0	0	72	184
Grand Total	49	27	57	0	8	133	138	2564	103	0	0	2805	71	32	28	0	2	131	55	2285	60	0	6	2400	5469
Approach %	36.8	20.3	42.9	0.0	-	-	4.9	91.4	3.7	0.0	-	-	54.2	24.4	21.4	0.0	-	-	2.3	95.2	2.5	0.0	-	-	-
Total %	0.9	0.5	1.0	0.0	-	2.4	2.5	46.9	1.9	0.0	-	51.3	1.3	0.6	0.5	0.0	-	2.4	1.0	41.8	1.1	0.0	-	43.9	-
Lights	49	27	57	0	-	133	137	2496	102	0	-	2735	71	31	25	0	-	127	52	2220	60	0	-	2332	5327
% Lights	100.0	100.0	100.0	-	-	100.0	99.3	97.3	99.0	-	-	97.5	100.0	96.9	89.3	-	-	96.9	94.5	97.2	100.0	-	-	97.2	97.4
Mediums	0	0	0	0	-	0	1	42	1	0	-	44	0	1	2	0	-	3	3	50	0	0	-	53	100
% Mediums	0.0	0.0	0.0	-	-	0.0	0.7	1.6	1.0	-	-	1.6	0.0	3.1	7.1	-	-	2.3	5.5	2.2	0.0	-	-	2.2	1.8
Articulated Trucks	0	0	0	0	-	0	0	26	0	0	-	26	0	0	1	0	-	1	0	15	0	0	-	15	42

% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.0	-	-	0.9	0.0	0.0	3.6	-	-	0.8	0.0	0.7	0.0	-	-	0.6	0.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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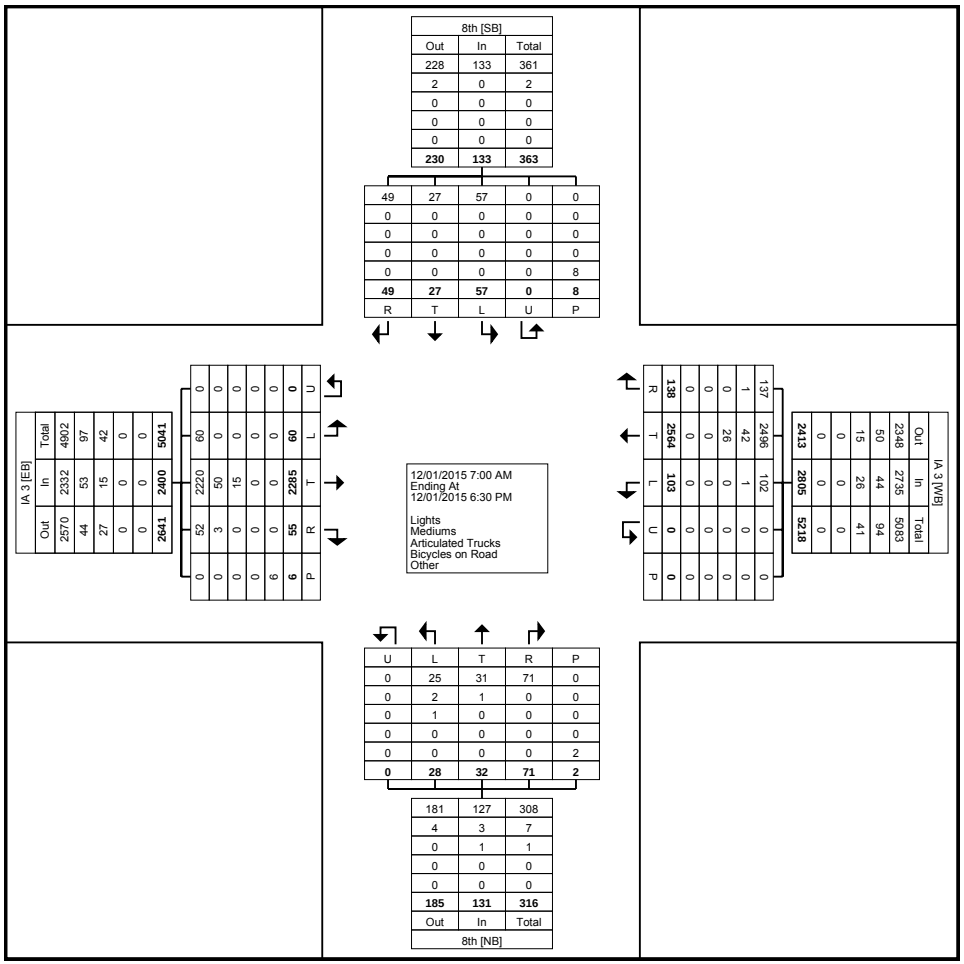

Turning Movement Data Plot

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217.483.9457 etott@whks.com

Count Name: 8th TMC
Site Code:
Start Date: 12/01/2015

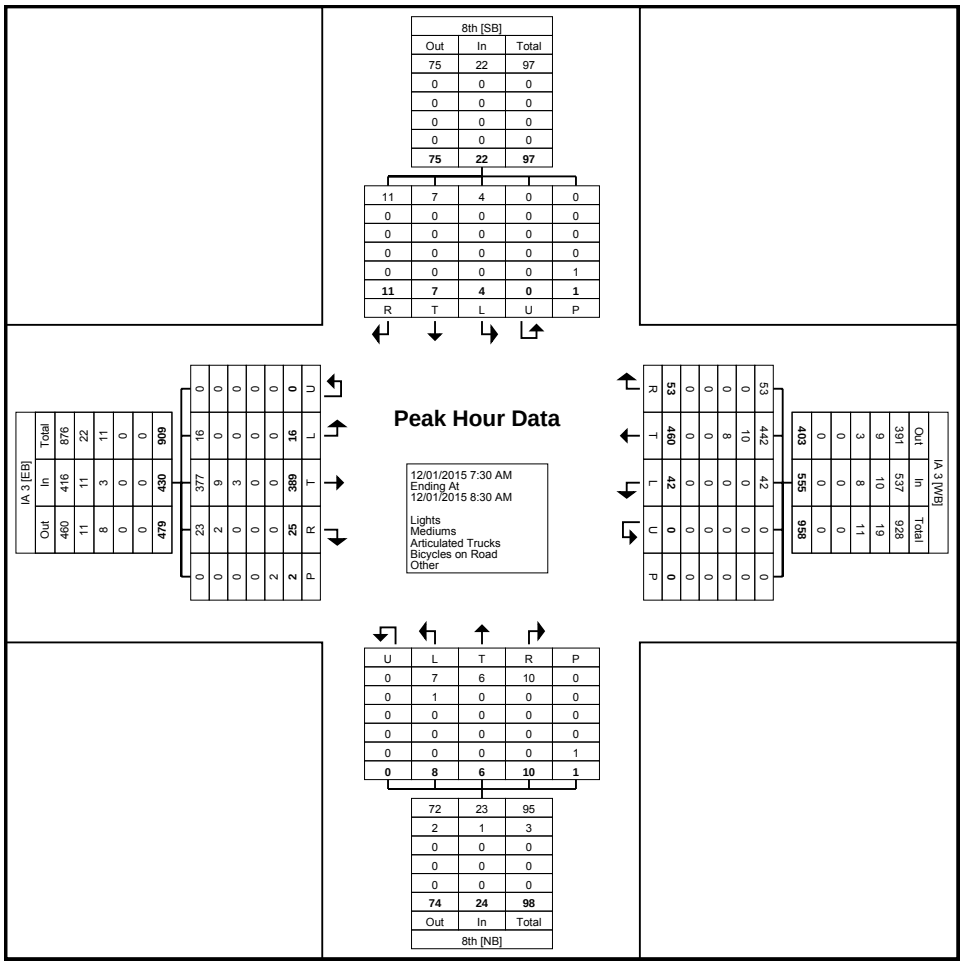
Turning Movement Peak Hour Data (7:30 AM)

Start Time	8th Southbound						IA 3 Westbound						8th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	5	2	2	0	0	9	7	110	8	0	0	125	2	3	3	0	0	8	7	76	4	0	0	87	229
7:45 AM	2	3	2	0	0	7	19	128	16	0	0	163	2	2	0	0	0	4	11	108	3	0	0	122	296
8:00 AM	3	2	0	0	1	5	11	114	13	0	0	138	4	1	3	0	1	8	2	107	4	0	1	113	264
8:15 AM	1	0	0	0	0	1	16	108	5	0	0	129	2	0	2	0	0	4	5	98	5	0	1	108	242
Total	11	7	4	0	1	22	53	460	42	0	0	555	10	6	8	0	1	24	25	389	16	0	2	430	1031
Approach %	50.0	31.8	18.2	0.0	-	-	9.5	82.9	7.6	0.0	-	-	41.7	25.0	33.3	0.0	-	-	5.8	90.5	3.7	0.0	-	-	-
Total %	1.1	0.7	0.4	0.0	-	2.1	5.1	44.6	4.1	0.0	-	53.8	1.0	0.6	0.8	0.0	-	2.3	2.4	37.7	1.6	0.0	-	41.7	-
PHF	0.550	0.583	0.500	0.000	-	0.611	0.697	0.898	0.656	0.000	-	0.851	0.625	0.500	0.667	0.000	-	0.750	0.568	0.900	0.800	0.000	-	0.881	0.871
Lights	11	7	4	0	-	22	53	442	42	0	-	537	10	6	7	0	-	23	23	377	16	0	-	416	998
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	96.1	100.0	-	-	96.8	100.0	100.0	87.5	-	-	95.8	92.0	96.9	100.0	-	-	96.7	96.8
Mediums	0	0	0	0	-	0	0	10	0	0	-	10	0	0	1	0	-	1	2	9	0	0	-	11	22
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	2.2	0.0	-	-	1.8	0.0	0.0	12.5	-	-	4.2	8.0	2.3	0.0	-	-	2.6	2.1
Articulated Trucks	0	0	0	0	-	0	0	8	0	0	-	8	0	0	0	0	-	0	0	3	0	0	-	3	11
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.7	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	1.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (3:30 PM)

Start Time	8th Southbound						IA 3 Westbound						8th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:30 PM	2	1	3	0	0	6	6	131	6	0	0	143	8	1	2	0	0	11	2	157	6	0	0	165	325
3:45 PM	1	0	3	0	1	4	4	115	2	0	0	121	8	0	1	0	0	9	1	116	3	0	1	120	254
4:00 PM	1	1	6	0	0	8	11	104	2	0	0	117	6	0	3	0	0	9	3	109	2	0	0	114	248
4:15 PM	1	1	3	0	0	5	5	105	1	0	0	111	5	0	1	0	0	6	3	110	5	0	1	118	240
Total	5	3	15	0	1	23	26	455	11	0	0	492	27	1	7	0	0	35	9	492	16	0	2	517	1067
Approach %	21.7	13.0	65.2	0.0	-	-	5.3	92.5	2.2	0.0	-	-	77.1	2.9	20.0	0.0	-	-	1.7	95.2	3.1	0.0	-	-	-
Total %	0.5	0.3	1.4	0.0	-	2.2	2.4	42.6	1.0	0.0	-	46.1	2.5	0.1	0.7	0.0	-	3.3	0.8	46.1	1.5	0.0	-	48.5	-
PHF	0.625	0.750	0.625	0.000	-	0.719	0.591	0.868	0.458	0.000	-	0.860	0.844	0.250	0.583	0.000	-	0.795	0.750	0.783	0.667	0.000	-	0.783	0.821
Lights	5	3	15	0	-	23	25	446	11	0	-	482	27	1	7	0	-	35	9	476	16	0	-	501	1041
% Lights	100.0	100.0	100.0	-	-	100.0	96.2	98.0	100.0	-	-	98.0	100.0	100.0	100.0	-	-	100.0	100.0	96.7	100.0	-	-	96.9	97.6
Mediums	0	0	0	0	-	0	1	4	0	0	-	5	0	0	0	0	-	0	0	14	0	0	-	14	19
% Mediums	0.0	0.0	0.0	-	-	0.0	3.8	0.9	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	2.8	0.0	-	-	2.7	1.8
Articulated Trucks	0	0	0	0	-	0	0	5	0	0	-	5	0	0	0	0	-	0	0	2	0	0	-	2	7
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.4	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

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Count Name: 8th TMC
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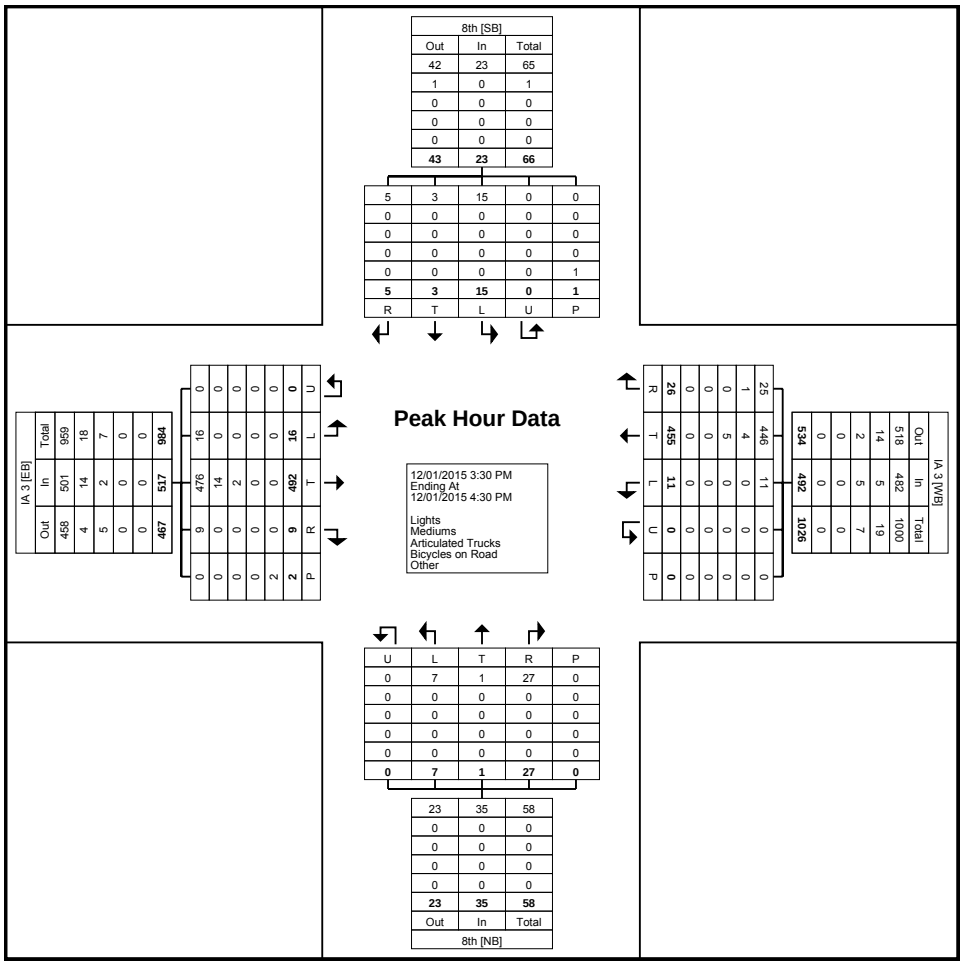

Turning Movement Peak Hour Data Plot (3:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
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WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

Start Time	4th Southbound						IA 3 Westbound						4th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	1	12	0	0	0	13	2	43	44	0	0	89	26	3	17	0	0	46	28	29	0	0	0	57	205
7:15 AM	3	23	2	0	1	28	0	95	52	0	0	147	42	7	19	0	1	68	27	41	0	0	0	68	311
7:30 AM	4	27	1	0	0	32	0	83	69	0	0	152	34	7	29	0	1	70	29	35	0	0	0	64	318
7:45 AM	7	33	5	0	0	45	0	115	53	0	0	168	35	13	28	0	0	76	16	66	0	0	0	82	371
Hourly Total	15	95	8	0	1	118	2	336	218	0	0	556	137	30	93	0	2	260	100	171	0	0	0	271	1205
8:00 AM	7	26	2	0	1	35	1	108	44	0	0	153	30	6	20	0	0	56	30	75	2	0	0	107	351
8:15 AM	8	17	3	0	1	28	5	92	45	0	0	142	14	13	31	0	0	58	31	75	0	0	0	106	334
8:30 AM	2	17	3	0	1	22	2	59	44	0	0	105	19	4	29	0	0	52	23	44	1	0	0	68	247
8:45 AM	4	14	5	0	1	23	1	72	51	0	1	124	30	6	22	0	0	58	26	59	2	0	0	87	292
Hourly Total	21	74	13	0	4	108	9	331	184	0	1	524	93	29	102	0	0	224	110	253	5	0	0	368	1224
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	3	16	2	0	0	21	1	56	50	0	0	107	48	17	24	0	0	89	24	59	1	0	0	84	301
2:45 PM	4	23	3	0	0	30	3	74	50	0	0	127	52	25	34	0	0	111	32	54	3	0	0	89	357
Hourly Total	7	39	5	0	0	51	4	130	100	0	0	234	100	42	58	0	0	200	56	113	4	0	0	173	658
3:00 PM	3	18	5	0	0	26	2	97	54	0	0	153	49	18	34	0	0	101	27	72	4	0	0	103	383
3:15 PM	10	22	5	0	0	37	2	82	44	0	0	128	43	15	34	0	0	92	36	69	1	0	0	106	363
3:30 PM	8	25	5	0	1	38	1	94	61	0	0	156	58	18	48	0	0	124	30	109	2	0	0	141	459
3:45 PM	7	32	8	0	0	47	2	79	45	0	0	126	52	25	56	0	1	133	42	88	6	0	0	136	442
Hourly Total	28	97	23	0	1	148	7	352	204	0	0	563	202	76	172	0	1	450	135	338	13	0	0	486	1647
4:00 PM	5	33	4	0	0	42	1	71	64	0	0	136	51	22	45	0	0	118	23	89	0	0	0	112	408
4:15 PM	4	20	0	0	0	24	1	71	68	0	0	140	41	13	44	0	0	98	34	88	3	0	0	125	387
4:30 PM	6	28	7	0	0	41	3	99	70	0	0	172	42	18	48	0	0	108	30	89	2	0	0	121	442
4:45 PM	4	22	12	0	0	38	2	97	62	0	0	161	58	24	49	0	1	131	18	60	4	0	0	82	412
Hourly Total	19	103	23	0	0	145	7	338	264	0	0	609	192	77	186	0	1	455	105	326	9	0	0	440	1649
5:00 PM	4	24	14	0	1	42	2	103	51	0	0	156	55	33	48	0	0	136	35	109	1	0	0	145	479
5:15 PM	5	26	7	0	3	38	2	72	62	0	0	136	54	24	65	0	0	143	24	96	6	0	1	126	443
5:30 PM	7	18	0	0	1	25	2	51	37	0	0	90	68	23	34	0	0	125	42	65	6	0	0	113	353
5:45 PM	3	12	5	0	0	20	0	65	45	0	0	110	41	14	38	0	0	93	29	65	3	0	0	97	320
Hourly Total	19	80	26	0	5	125	6	291	195	0	0	492	218	94	185	0	0	497	130	335	16	0	1	481	1595
6:00 PM	4	16	3	0	0	23	1	80	31	0	0	112	46	14	47	0	0	107	25	59	3	0	1	87	329
6:15 PM	1	10	1	0	0	12	1	63	22	0	0	86	40	10	44	0	1	94	33	40	5	0	0	78	270
Grand Total	114	514	102	0	11	730	37	1921	1218	0	1	3176	1028	372	887	0	5	2287	694	1635	55	0	2	2384	8577
Approach %	15.6	70.4	14.0	0.0	-	-	1.2	60.5	38.4	0.0	-	-	44.9	16.3	38.8	0.0	-	-	29.1	68.6	2.3	0.0	-	-	-
Total %	1.3	6.0	1.2	0.0	-	8.5	0.4	22.4	14.2	0.0	-	37.0	12.0	4.3	10.3	0.0	-	26.7	8.1	19.1	0.6	0.0	-	27.8	-
Lights	114	510	99	0	-	723	37	1871	1173	0	-	3081	994	366	874	0	-	2234	682	1589	53	0	-	2324	8362
% Lights	100.0	99.2	97.1	-	-	99.0	100.0	97.4	96.3	-	-	97.0	96.7	98.4	98.5	-	-	97.7	98.3	97.2	96.4	-	-	97.5	97.5
Mediums	0	4	2	0	-	6	0	25	27	0	-	52	16	5	11	0	-	32	7	33	1	0	-	41	131
% Mediums	0.0	0.8	2.0	-	-	0.8	0.0	1.3	2.2	-	-	1.6	1.6	1.3	1.2	-	-	1.4	1.0	2.0	1.8	-	-	1.7	1.5
Articulated Trucks	0	0	1	0	-	1	0	25	18	0	-	43	18	1	2	0	-	21	5	13	1	0	-	19	84

% Articulated Trucks	0.0	0.0	1.0	-	-	0.1	0.0	1.3	1.5	-	-	1.4	1.8	0.3	0.2	-	-	0.9	0.7	0.8	1.8	-	-	0.8	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	18.2	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	81.8	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-

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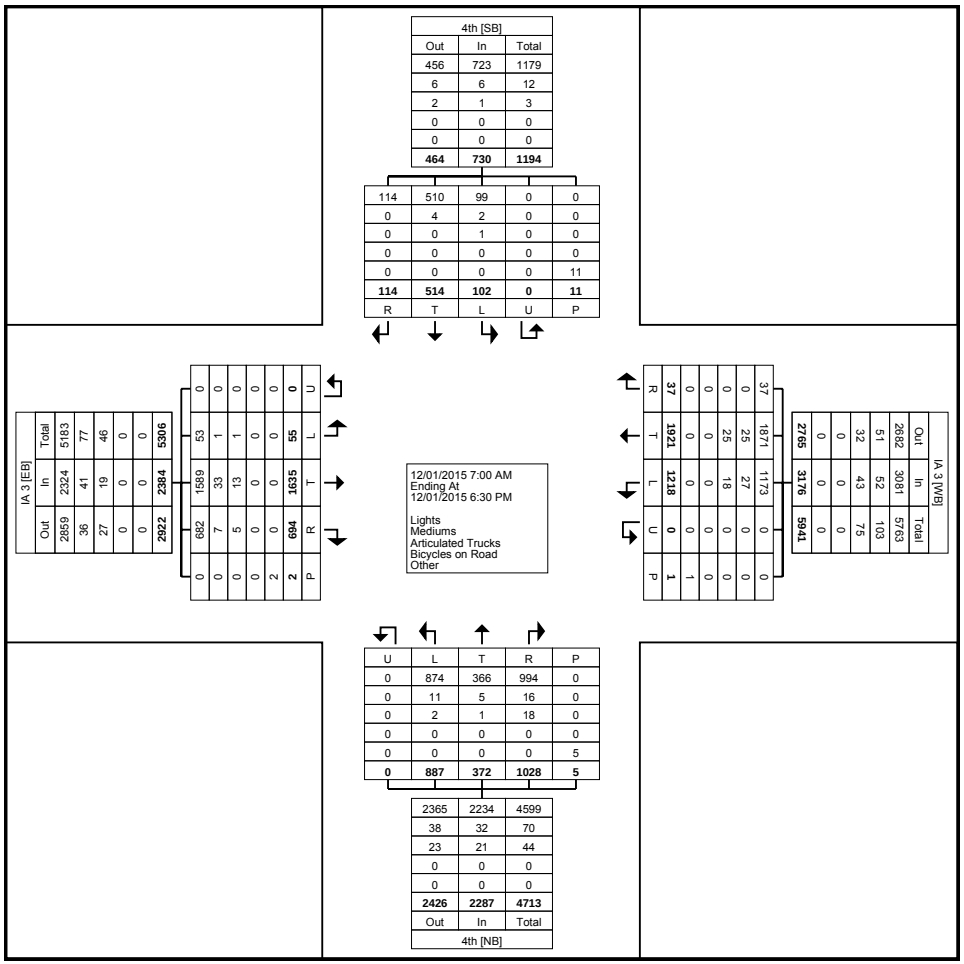

Turning Movement Data Plot

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217.483.9457 etott@whks.com

Count Name: 4th TMC
Site Code:
Start Date: 12/01/2015

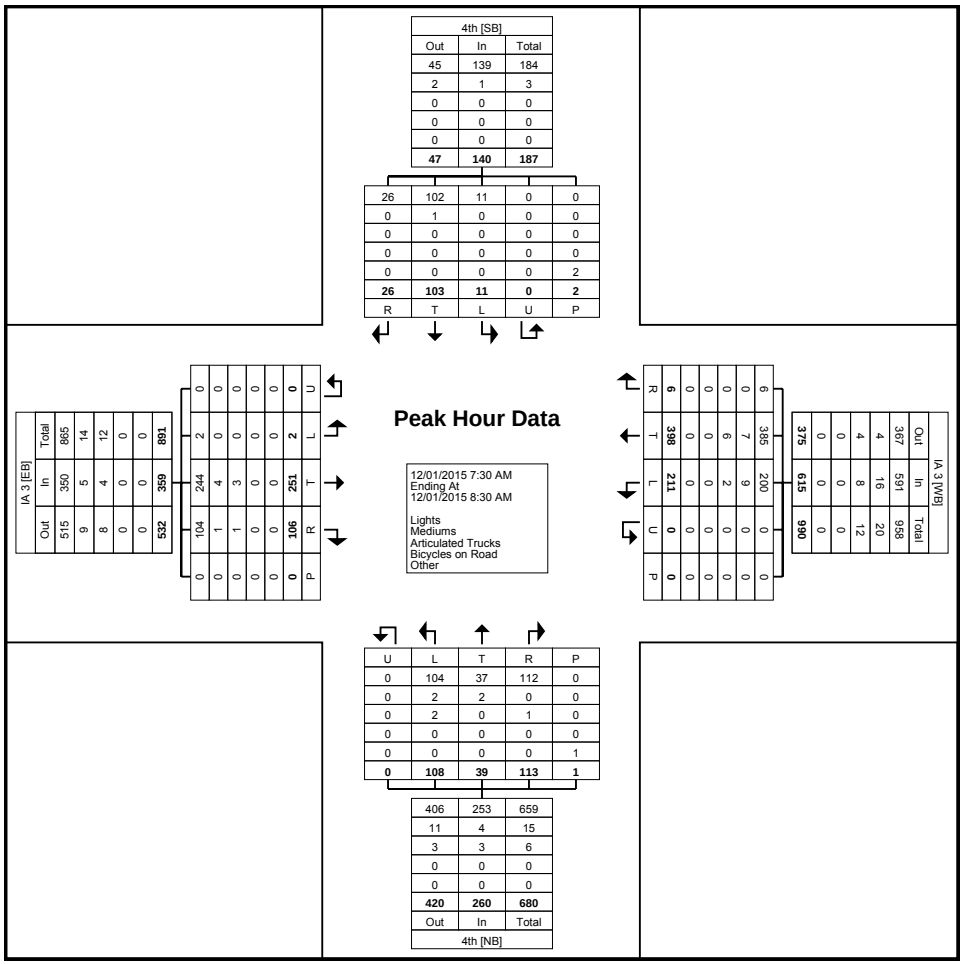
Turning Movement Peak Hour Data (7:30 AM)

Start Time	4th Southbound						IA 3 Westbound						4th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	4	27	1	0	0	32	0	83	69	0	0	152	34	7	29	0	1	70	29	35	0	0	0	64	318
7:45 AM	7	33	5	0	0	45	0	115	53	0	0	168	35	13	28	0	0	76	16	66	0	0	0	82	371
8:00 AM	7	26	2	0	1	35	1	108	44	0	0	153	30	6	20	0	0	56	30	75	2	0	0	107	351
8:15 AM	8	17	3	0	1	28	5	92	45	0	0	142	14	13	31	0	0	58	31	75	0	0	0	106	334
Total	26	103	11	0	2	140	6	398	211	0	0	615	113	39	108	0	1	260	106	251	2	0	0	359	1374
Approach %	18.6	73.6	7.9	0.0	-	-	1.0	64.7	34.3	0.0	-	-	43.5	15.0	41.5	0.0	-	-	29.5	69.9	0.6	0.0	-	-	-
Total %	1.9	7.5	0.8	0.0	-	10.2	0.4	29.0	15.4	0.0	-	44.8	8.2	2.8	7.9	0.0	-	18.9	7.7	18.3	0.1	0.0	-	26.1	-
PHF	0.813	0.780	0.550	0.000	-	0.778	0.300	0.865	0.764	0.000	-	0.915	0.807	0.750	0.871	0.000	-	0.855	0.855	0.837	0.250	0.000	-	0.839	0.926
Lights	26	102	11	0	-	139	6	385	200	0	-	591	112	37	104	0	-	253	104	244	2	0	-	350	1333
% Lights	100.0	99.0	100.0	-	-	99.3	100.0	96.7	94.8	-	-	96.1	99.1	94.9	96.3	-	-	97.3	98.1	97.2	100.0	-	-	97.5	97.0
Mediums	0	1	0	0	-	1	0	7	9	0	-	16	0	2	2	0	-	4	1	4	0	0	-	5	26
% Mediums	0.0	1.0	0.0	-	-	0.7	0.0	1.8	4.3	-	-	2.6	0.0	5.1	1.9	-	-	1.5	0.9	1.6	0.0	-	-	1.4	1.9
Articulated Trucks	0	0	0	0	-	0	0	6	2	0	-	8	1	0	2	0	-	3	1	3	0	0	-	4	15
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.9	-	-	1.3	0.9	0.0	1.9	-	-	1.2	0.9	1.2	0.0	-	-	1.1	1.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th TMC
Site Code:
Start Date: 12/01/2015

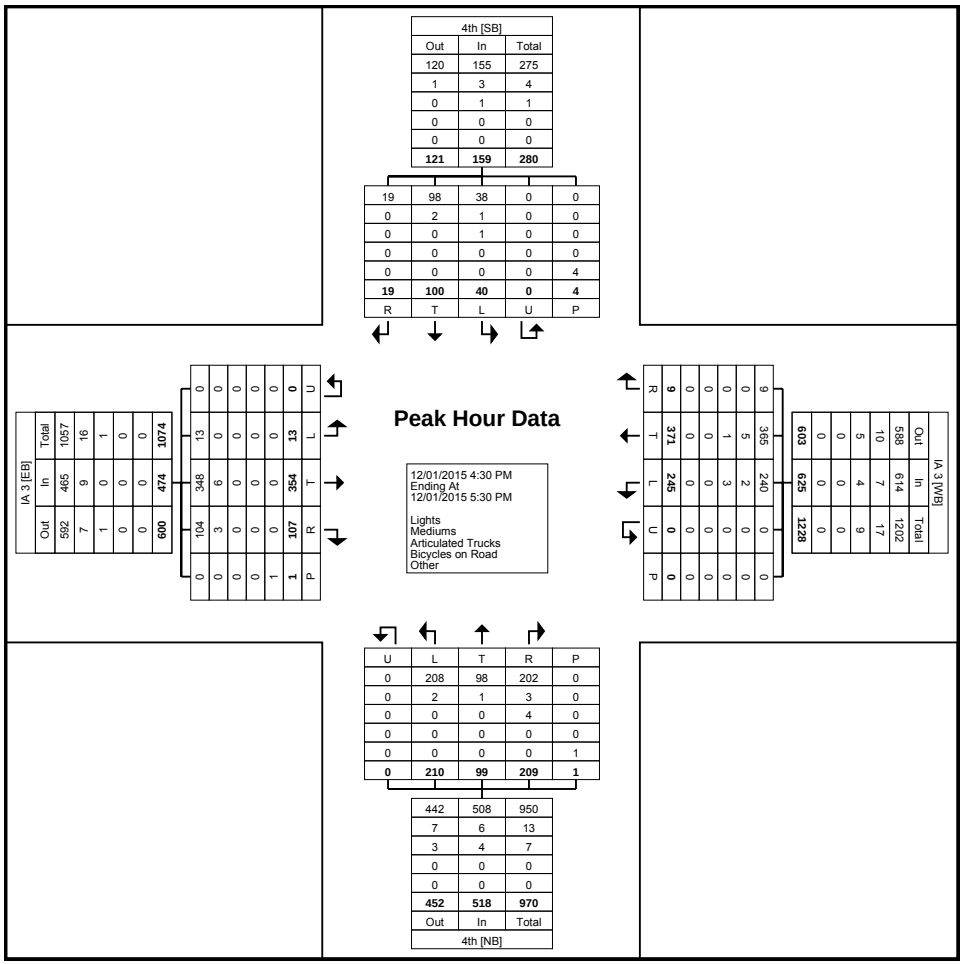
Turning Movement Peak Hour Data (4:30 PM)

Start Time	4th Southbound						IA 3 Westbound						4th Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	6	28	7	0	0	41	3	99	70	0	0	172	42	18	48	0	0	108	30	89	2	0	0	121	442
4:45 PM	4	22	12	0	0	38	2	97	62	0	0	161	58	24	49	0	1	131	18	60	4	0	0	82	412
5:00 PM	4	24	14	0	1	42	2	103	51	0	0	156	55	33	48	0	0	136	35	109	1	0	0	145	479
5:15 PM	5	26	7	0	3	38	2	72	62	0	0	136	54	24	65	0	0	143	24	96	6	0	1	126	443
Total	19	100	40	0	4	159	9	371	245	0	0	625	209	99	210	0	1	518	107	354	13	0	1	474	1776
Approach %	11.9	62.9	25.2	0.0	-	-	1.4	59.4	39.2	0.0	-	-	40.3	19.1	40.5	0.0	-	-	22.6	74.7	2.7	0.0	-	-	-
Total %	1.1	5.6	2.3	0.0	-	9.0	0.5	20.9	13.8	0.0	-	35.2	11.8	5.6	11.8	0.0	-	29.2	6.0	19.9	0.7	0.0	-	26.7	-
PHF	0.792	0.893	0.714	0.000	-	0.946	0.750	0.900	0.875	0.000	-	0.908	0.901	0.750	0.808	0.000	-	0.906	0.764	0.812	0.542	0.000	-	0.817	0.927
Lights	19	98	38	0	-	155	9	365	240	0	-	614	202	98	208	0	-	508	104	348	13	0	-	465	1742
% Lights	100.0	98.0	95.0	-	-	97.5	100.0	98.4	98.0	-	-	98.2	96.7	99.0	99.0	-	-	98.1	97.2	98.3	100.0	-	-	98.1	98.1
Mediums	0	2	1	0	-	3	0	5	2	0	-	7	3	1	2	0	-	6	3	6	0	0	-	9	25
% Mediums	0.0	2.0	2.5	-	-	1.9	0.0	1.3	0.8	-	-	1.1	1.4	1.0	1.0	-	-	1.2	2.8	1.7	0.0	-	-	1.9	1.4
Articulated Trucks	0	0	1	0	-	1	0	1	3	0	-	4	4	0	0	0	-	4	0	0	0	0	-	0	9
% Articulated Trucks	0.0	0.0	2.5	-	-	0.6	0.0	0.3	1.2	-	-	0.6	1.9	0.0	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	25.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	75.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NW TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

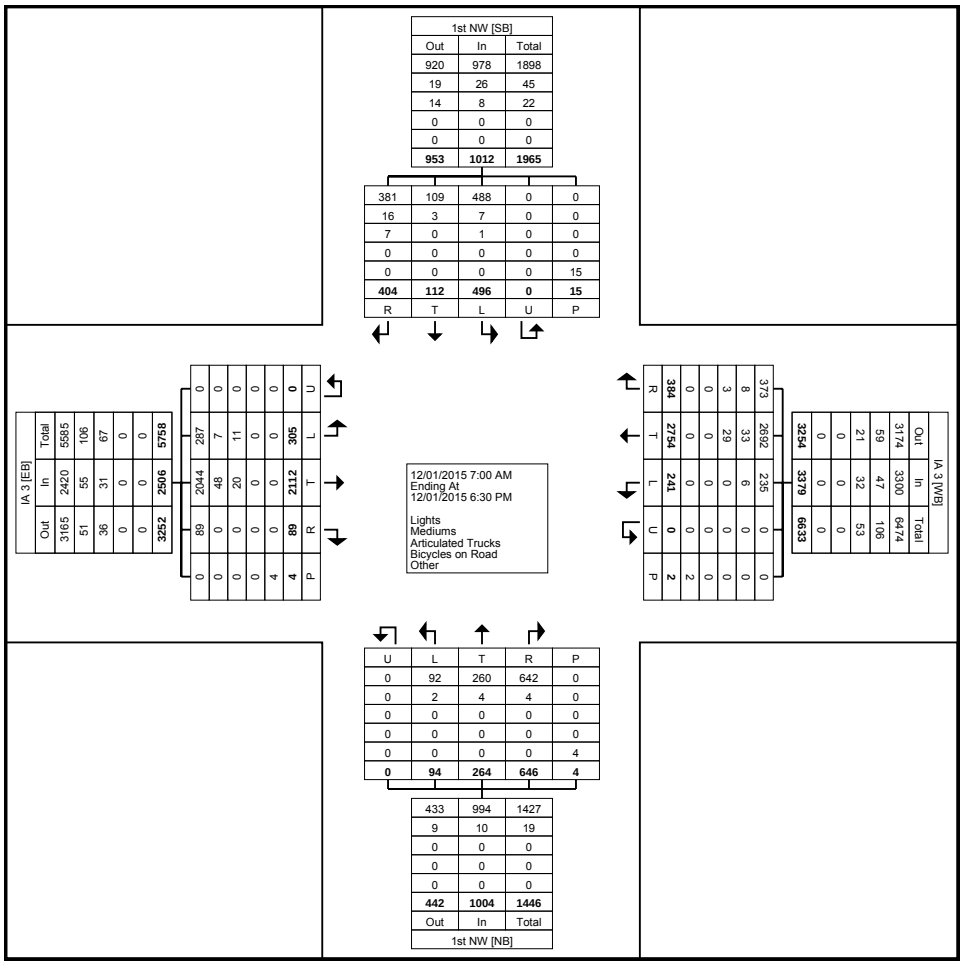
Start Time	1st NW Southbound						IA 3 Westbound						1st NW Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	14	3	12	0	0	29	9	81	8	0	0	98	11	6	0	0	0	17	1	42	9	0	0	52	196
7:15 AM	24	2	19	0	1	45	12	122	2	0	0	136	22	6	4	0	0	32	2	66	16	0	1	84	297
7:30 AM	25	4	19	0	0	48	20	122	8	0	0	150	19	10	6	0	0	35	0	49	14	0	0	63	296
7:45 AM	31	3	18	0	0	52	11	141	9	0	0	161	25	5	1	0	0	31	1	92	9	0	0	102	346
Hourly Total	94	12	68	0	1	174	52	466	27	0	0	545	77	27	11	0	0	115	4	249	48	0	1	301	1135
8:00 AM	36	7	23	0	2	66	16	109	11	0	0	136	19	13	4	0	0	36	7	75	13	0	0	95	333
8:15 AM	36	17	38	0	0	91	23	103	13	0	0	139	31	10	11	0	0	52	10	67	9	0	0	86	368
8:30 AM	11	4	27	0	0	42	12	92	6	0	0	110	27	4	6	0	1	37	2	50	9	0	0	61	250
8:45 AM	19	5	19	0	2	43	10	104	5	0	0	119	24	4	1	0	0	29	3	77	5	0	0	85	276
Hourly Total	102	33	107	0	4	242	61	408	35	0	0	504	101	31	22	0	1	154	22	269	36	0	0	327	1227
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	11	6	15	0	2	32	17	105	10	0	0	132	21	13	3	0	0	37	3	89	7	0	1	99	300
2:45 PM	14	5	14	0	0	33	17	107	14	0	0	138	26	9	2	0	0	37	2	80	13	0	1	95	303
Hourly Total	25	11	29	0	2	65	34	212	24	0	0	270	47	22	5	0	0	74	5	169	20	0	2	194	603
3:00 PM	15	5	21	0	0	41	34	125	9	0	0	168	20	10	3	0	0	33	6	81	14	0	0	101	343
3:15 PM	22	6	29	0	1	57	7	83	10	0	0	100	31	12	2	0	0	45	6	77	13	0	1	96	298
3:30 PM	13	4	29	0	1	46	26	175	14	0	0	215	46	15	7	0	0	68	0	143	12	0	0	155	484
3:45 PM	11	2	23	0	1	36	18	116	8	0	0	142	35	15	7	0	1	57	6	116	17	0	0	139	374
Hourly Total	61	17	102	0	3	180	85	499	41	0	0	625	132	52	19	0	1	203	18	417	56	0	1	491	1499
4:00 PM	18	6	25	0	0	49	12	110	13	0	1	135	33	19	2	0	0	54	4	116	15	0	0	135	373
4:15 PM	4	2	23	0	0	29	11	153	12	0	0	176	22	11	4	0	0	37	3	101	9	0	0	113	355
4:30 PM	11	6	25	0	1	42	23	163	21	0	0	207	29	21	5	0	0	55	8	98	16	0	0	122	426
4:45 PM	16	6	15	0	0	37	22	141	14	0	0	177	35	10	4	0	2	49	8	100	15	0	0	123	386
Hourly Total	49	20	88	0	1	157	68	567	60	0	1	695	119	61	15	0	2	195	23	415	55	0	0	493	1540
5:00 PM	12	4	21	0	2	37	21	144	15	0	1	180	41	21	9	0	0	71	5	130	10	0	0	145	433
5:15 PM	13	3	23	0	0	39	16	119	11	0	0	146	38	16	3	0	0	57	2	127	21	0	0	150	392
5:30 PM	11	3	15	0	0	29	11	83	9	0	0	103	28	10	2	0	0	40	0	95	21	0	0	116	288
5:45 PM	13	2	17	0	0	32	12	87	10	0	0	109	24	6	3	0	0	33	4	91	10	0	0	105	279
Hourly Total	49	12	76	0	2	137	60	433	45	0	1	538	131	53	17	0	0	201	11	443	62	0	0	516	1392
6:00 PM	13	5	11	0	1	29	16	98	5	0	0	119	20	6	4	0	0	30	3	85	11	0	0	99	277
6:15 PM	11	2	15	0	1	28	8	71	4	0	0	83	19	12	1	0	0	32	3	65	17	0	0	85	228
Grand Total	404	112	496	0	15	1012	384	2754	241	0	2	3379	646	264	94	0	4	1004	89	2112	305	0	4	2506	7901
Approach %	39.9	11.1	49.0	0.0	-	-	11.4	81.5	7.1	0.0	-	-	64.3	26.3	9.4	0.0	-	-	3.6	84.3	12.2	0.0	-	-	-
Total %	5.1	1.4	6.3	0.0	-	12.8	4.9	34.9	3.1	0.0	-	42.8	8.2	3.3	1.2	0.0	-	12.7	1.1	26.7	3.9	0.0	-	31.7	-
Lights	381	109	488	0	-	978	373	2692	235	0	-	3300	642	260	92	0	-	994	89	2044	287	0	-	2420	7692
% Lights	94.3	97.3	98.4	-	-	96.6	97.1	97.7	97.5	-	-	97.7	99.4	98.5	97.9	-	-	99.0	100.0	96.8	94.1	-	-	96.6	97.4
Mediums	16	3	7	0	-	26	8	33	6	0	-	47	4	4	2	0	-	10	0	48	7	0	-	55	138
% Mediums	4.0	2.7	1.4	-	-	2.6	2.1	1.2	2.5	-	-	1.4	0.6	1.5	2.1	-	-	1.0	0.0	2.3	2.3	-	-	2.2	1.7
Articulated Trucks	7	0	1	0	-	8	3	29	0	0	-	32	0	0	0	0	-	0	0	20	11	0	-	31	71

% Articulated Trucks	1.7	0.0	0.2	-	-	0.8	0.8	1.1	0.0	-	-	0.9	0.0	0.0	0.0	-	-	0.0	0.0	0.9	3.6	-	-	1.2	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	13.3	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	86.7	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NW TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NW TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:30 AM)

Start Time	1st NW Southbound						IA 3 Westbound						1st NW Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	25	4	19	0	0	48	20	122	8	0	0	150	19	10	6	0	0	35	0	49	14	0	0	63	296
7:45 AM	31	3	18	0	0	52	11	141	9	0	0	161	25	5	1	0	0	31	1	92	9	0	0	102	346
8:00 AM	36	7	23	0	2	66	16	109	11	0	0	136	19	13	4	0	0	36	7	75	13	0	0	95	333
8:15 AM	36	17	38	0	0	91	23	103	13	0	0	139	31	10	11	0	0	52	10	67	9	0	0	86	368
Total	128	31	98	0	2	257	70	475	41	0	0	586	94	38	22	0	0	154	18	283	45	0	0	346	1343
Approach %	49.8	12.1	38.1	0.0	-	-	11.9	81.1	7.0	0.0	-	-	61.0	24.7	14.3	0.0	-	-	5.2	81.8	13.0	0.0	-	-	-
Total %	9.5	2.3	7.3	0.0	-	19.1	5.2	35.4	3.1	0.0	-	43.6	7.0	2.8	1.6	0.0	-	11.5	1.3	21.1	3.4	0.0	-	25.8	-
PHF	0.889	0.456	0.645	0.000	-	0.706	0.761	0.842	0.788	0.000	-	0.910	0.758	0.731	0.500	0.000	-	0.740	0.450	0.769	0.804	0.000	-	0.848	0.912
Lights	124	30	96	0	-	250	65	461	40	0	-	566	93	38	21	0	-	152	18	277	43	0	-	338	1306
% Lights	96.9	96.8	98.0	-	-	97.3	92.9	97.1	97.6	-	-	96.6	98.9	100.0	95.5	-	-	98.7	100.0	97.9	95.6	-	-	97.7	97.2
Mediums	3	1	1	0	-	5	4	9	1	0	-	14	1	0	1	0	-	2	0	2	2	0	-	4	25
% Mediums	2.3	3.2	1.0	-	-	1.9	5.7	1.9	2.4	-	-	2.4	1.1	0.0	4.5	-	-	1.3	0.0	0.7	4.4	-	-	1.2	1.9
Articulated Trucks	1	0	1	0	-	2	1	5	0	0	-	6	0	0	0	0	-	0	0	4	0	0	-	4	12
% Articulated Trucks	0.8	0.0	1.0	-	-	0.8	1.4	1.1	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	1.2	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

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Count Name: 1st NW TMC
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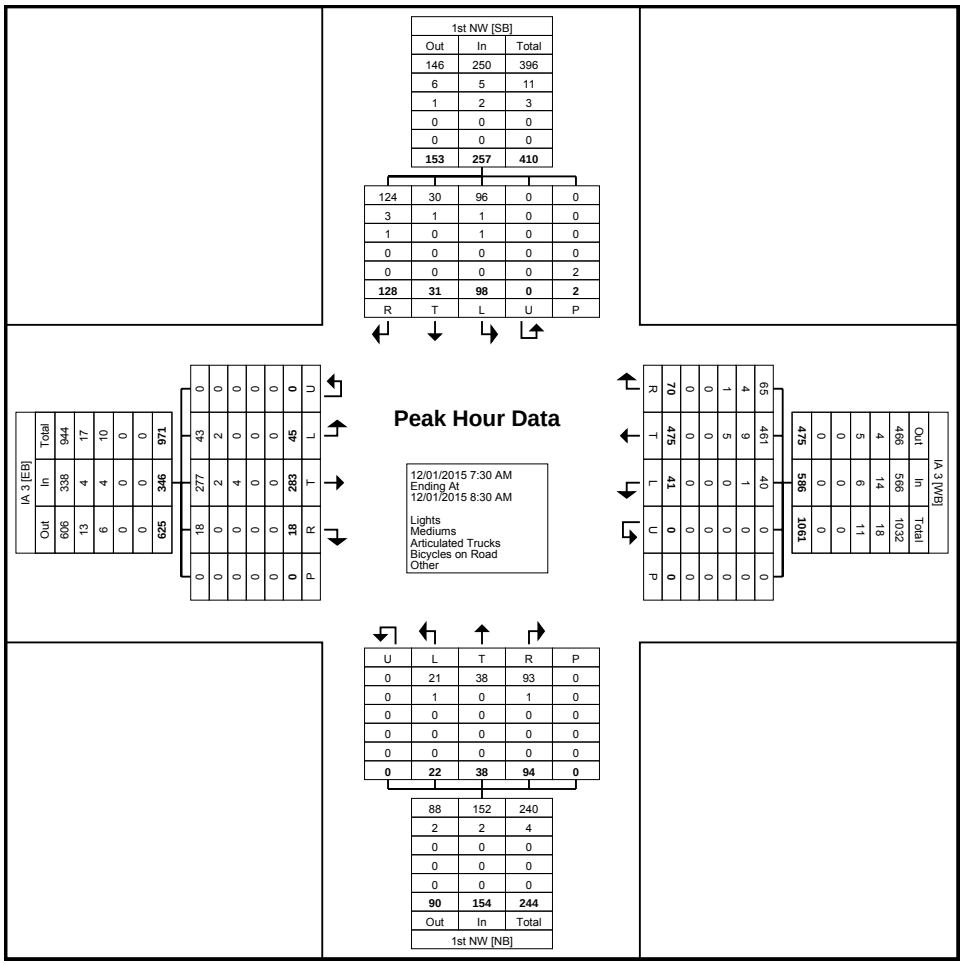


Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NW TMC
Site Code:
Start Date: 12/01/2015

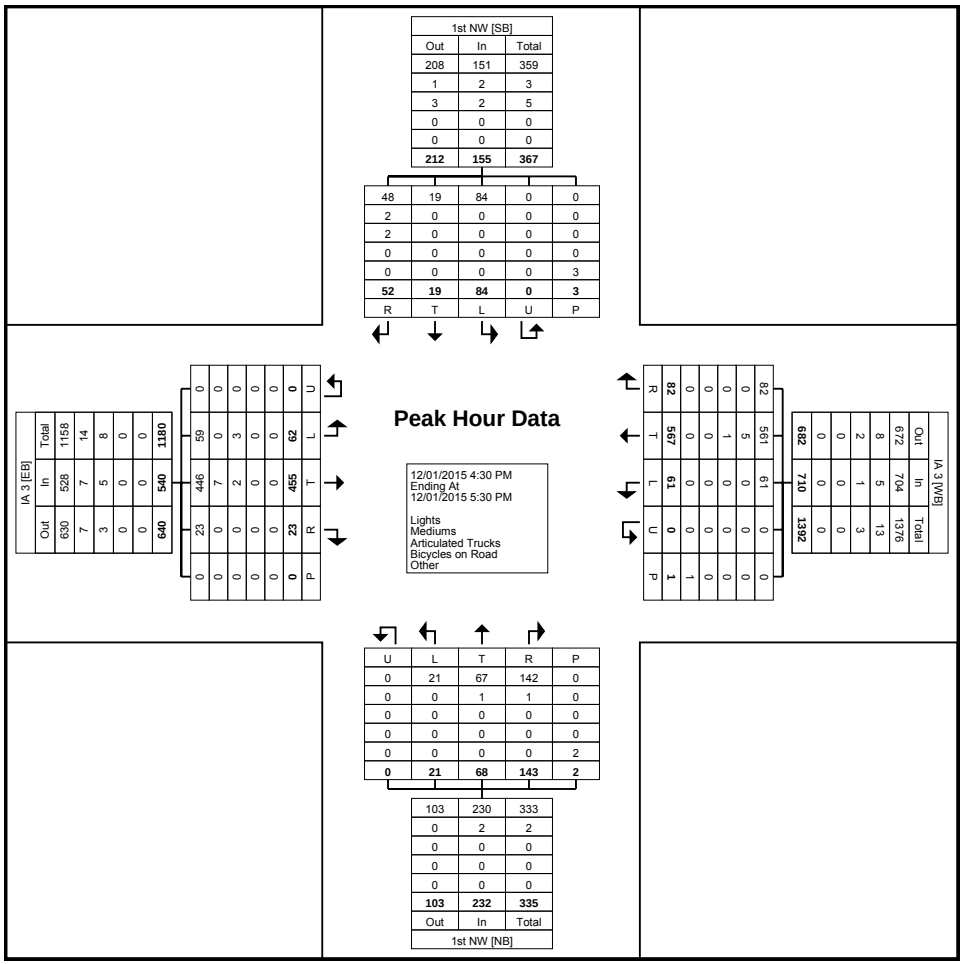
Turning Movement Peak Hour Data (4:30 PM)

Start Time	1st NW Southbound						IA 3 Westbound						1st NW Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	11	6	25	0	1	42	23	163	21	0	0	207	29	21	5	0	0	55	8	98	16	0	0	122	426
4:45 PM	16	6	15	0	0	37	22	141	14	0	0	177	35	10	4	0	2	49	8	100	15	0	0	123	386
5:00 PM	12	4	21	0	2	37	21	144	15	0	1	180	41	21	9	0	0	71	5	130	10	0	0	145	433
5:15 PM	13	3	23	0	0	39	16	119	11	0	0	146	38	16	3	0	0	57	2	127	21	0	0	150	392
Total	52	19	84	0	3	155	82	567	61	0	1	710	143	68	21	0	2	232	23	455	62	0	0	540	1637
Approach %	33.5	12.3	54.2	0.0	-	-	11.5	79.9	8.6	0.0	-	-	61.6	29.3	9.1	0.0	-	-	4.3	84.3	11.5	0.0	-	-	-
Total %	3.2	1.2	5.1	0.0	-	9.5	5.0	34.6	3.7	0.0	-	43.4	8.7	4.2	1.3	0.0	-	14.2	1.4	27.8	3.8	0.0	-	33.0	-
PHF	0.813	0.792	0.840	0.000	-	0.923	0.891	0.870	0.726	0.000	-	0.857	0.872	0.810	0.583	0.000	-	0.817	0.719	0.875	0.738	0.000	-	0.900	0.945
Lights	48	19	84	0	-	151	82	561	61	0	-	704	142	67	21	0	-	230	23	446	59	0	-	528	1613
% Lights	92.3	100.0	100.0	-	-	97.4	100.0	98.9	100.0	-	-	99.2	99.3	98.5	100.0	-	-	99.1	100.0	98.0	95.2	-	-	97.8	98.5
Mediums	2	0	0	0	-	2	0	5	0	0	-	5	1	1	0	0	-	2	0	7	0	0	-	7	16
% Mediums	3.8	0.0	0.0	-	-	1.3	0.0	0.9	0.0	-	-	0.7	0.7	1.5	0.0	-	-	0.9	0.0	1.5	0.0	-	-	1.3	1.0
Articulated Trucks	2	0	0	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	0	2	3	0	-	5	8
% Articulated Trucks	3.8	0.0	0.0	-	-	1.3	0.0	0.2	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0	0.4	4.8	-	-	0.9	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	66.7	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	33.3	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NW TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NW TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

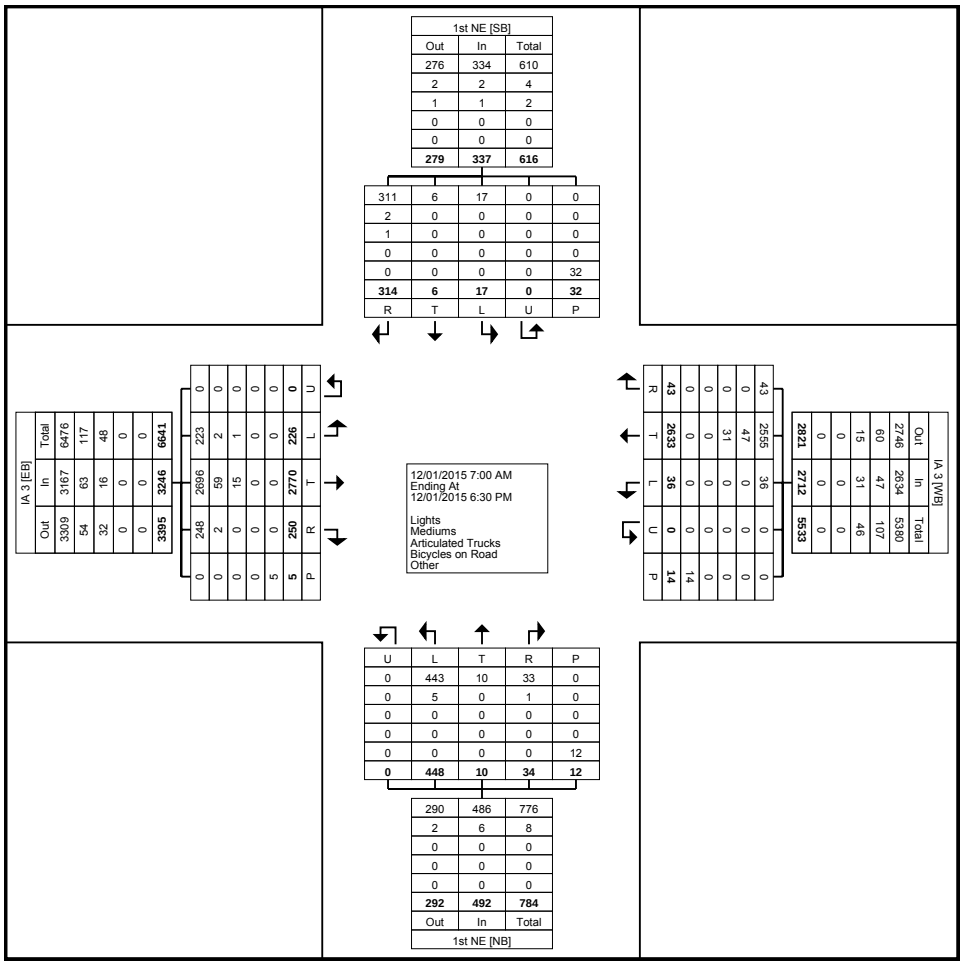
Start Time	1st NE Southbound						IA 3 Westbound						1st NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	9	0	0	0	0	9	0	81	0	0	0	81	2	0	11	0	0	13	5	57	3	0	0	65	168
7:15 AM	9	1	0	0	1	10	3	122	0	0	0	125	0	0	7	0	1	7	7	97	1	0	0	105	247
7:30 AM	8	0	1	0	2	9	2	133	0	0	0	135	0	0	9	0	0	9	2	75	8	0	0	85	238
7:45 AM	14	0	0	0	1	14	5	128	0	0	1	133	1	0	14	0	0	15	10	111	10	0	0	131	293
Hourly Total	40	1	1	0	4	42	10	464	0	0	1	474	3	0	41	0	1	44	24	340	22	0	0	386	946
8:00 AM	13	0	0	0	1	13	3	124	1	0	0	128	0	0	14	0	0	14	7	104	7	0	0	118	273
8:15 AM	14	1	1	0	0	16	3	100	6	0	0	109	1	0	15	0	0	16	15	106	10	0	0	131	272
8:30 AM	7	0	0	0	2	7	2	81	3	0	0	86	1	0	19	0	2	20	15	88	5	0	0	108	221
8:45 AM	10	0	1	0	1	11	1	99	1	0	0	101	2	1	13	0	0	16	6	96	16	0	2	118	246
Hourly Total	44	1	2	0	4	47	9	404	11	0	0	424	4	1	61	0	2	66	43	394	38	0	2	475	1012
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	12	1	0	0	1	13	2	99	2	0	0	103	1	0	19	0	0	20	14	99	9	0	1	122	258
2:45 PM	11	0	0	0	0	11	0	106	2	0	0	108	2	0	27	0	0	29	15	101	4	0	0	120	268
Hourly Total	23	1	0	0	1	24	2	205	4	0	0	211	3	0	46	0	0	49	29	200	13	0	1	242	526
3:00 PM	12	0	0	0	0	12	3	141	0	0	1	144	1	0	19	0	0	20	14	103	7	0	0	124	300
3:15 PM	10	0	0	0	3	10	2	77	1	0	0	80	1	1	22	0	0	24	18	113	9	0	0	140	254
3:30 PM	15	1	3	0	2	19	0	161	0	0	2	161	0	0	33	0	2	33	11	194	9	0	0	214	427
3:45 PM	7	0	1	0	1	8	5	100	5	0	0	110	2	1	31	0	0	34	15	147	12	0	0	174	326
Hourly Total	44	1	4	0	6	49	10	479	6	0	3	495	4	2	105	0	2	111	58	557	37	0	0	652	1307
4:00 PM	11	1	1	0	4	13	2	113	1	0	1	116	6	1	22	0	0	29	16	151	9	0	0	176	334
4:15 PM	18	0	1	0	2	19	0	118	0	0	1	118	2	0	28	0	0	30	11	122	11	0	0	144	311
4:30 PM	18	1	0	0	1	19	0	162	1	0	4	163	1	1	35	0	0	37	15	121	12	0	0	148	367
4:45 PM	17	0	1	0	2	18	3	119	2	0	0	124	3	0	36	0	2	39	14	128	9	0	0	151	332
Hourly Total	64	2	3	0	9	69	5	512	4	0	6	521	12	2	121	0	2	135	56	522	41	0	0	619	1344
5:00 PM	23	0	1	0	2	24	2	144	3	0	1	149	2	1	15	0	1	18	11	168	17	0	0	196	387
5:15 PM	24	0	1	0	2	25	2	106	2	0	1	110	2	0	16	0	4	18	12	166	9	0	0	187	340
5:30 PM	16	0	0	0	0	16	1	78	2	0	2	81	0	0	9	0	0	9	2	132	7	0	0	141	247
5:45 PM	14	0	0	0	1	14	1	85	1	0	0	87	1	1	8	0	0	10	4	108	23	0	0	135	246
Hourly Total	77	0	2	0	5	79	6	413	8	0	4	427	5	2	48	0	5	55	29	574	56	0	0	659	1220
6:00 PM	17	0	3	0	1	20	1	89	2	0	0	92	0	2	11	0	0	13	8	97	11	0	0	116	241
6:15 PM	5	0	2	0	2	7	0	67	1	0	0	68	3	1	15	0	0	19	3	86	8	0	2	97	191
Grand Total	314	6	17	0	32	337	43	2633	36	0	14	2712	34	10	448	0	12	492	250	2770	226	0	5	3246	6787
Approach %	93.2	1.8	5.0	0.0	-	-	1.6	97.1	1.3	0.0	-	-	6.9	2.0	91.1	0.0	-	-	7.7	85.3	7.0	0.0	-	-	-
Total %	4.6	0.1	0.3	0.0	-	5.0	0.6	38.8	0.5	0.0	-	40.0	0.5	0.1	6.6	0.0	-	7.2	3.7	40.8	3.3	0.0	-	47.8	-
Lights	311	6	17	0	-	334	43	2555	36	0	-	2634	33	10	443	0	-	486	248	2696	223	0	-	3167	6621
% Lights	99.0	100.0	100.0	-	-	99.1	100.0	97.0	100.0	-	-	97.1	97.1	100.0	98.9	-	-	98.8	99.2	97.3	98.7	-	-	97.6	97.6
Mediums	2	0	0	0	-	2	0	47	0	0	-	47	1	0	5	0	-	6	2	59	2	0	-	63	118
% Mediums	0.6	0.0	0.0	-	-	0.6	0.0	1.8	0.0	-	-	1.7	2.9	0.0	1.1	-	-	1.2	0.8	2.1	0.9	-	-	1.9	1.7
Articulated Trucks	1	0	0	0	-	1	0	31	0	0	-	31	0	0	0	0	-	0	0	15	1	0	-	16	48

% Articulated Trucks	0.3	0.0	0.0	-	-	0.3	0.0	1.2	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.4	-	-	0.5	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	9.4	-	-	-	-	-	0.0	-	-	-	-	-	8.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	29	-	-	-	-	-	14	-	-	-	-	-	11	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	90.6	-	-	-	-	-	100.0	-	-	-	-	-	91.7	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:30 AM)

Start Time	1st NE Southbound						IA 3 Westbound						1st NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	8	0	1	0	2	9	2	133	0	0	0	135	0	0	9	0	0	9	2	75	8	0	0	85	238
7:45 AM	14	0	0	0	1	14	5	128	0	0	1	133	1	0	14	0	0	15	10	111	10	0	0	131	293
8:00 AM	13	0	0	0	1	13	3	124	1	0	0	128	0	0	14	0	0	14	7	104	7	0	0	118	273
8:15 AM	14	1	1	0	0	16	3	100	6	0	0	109	1	0	15	0	0	16	15	106	10	0	0	131	272
Total	49	1	2	0	4	52	13	485	7	0	1	505	2	0	52	0	0	54	34	396	35	0	0	465	1076
Approach %	94.2	1.9	3.8	0.0	-	-	2.6	96.0	1.4	0.0	-	-	3.7	0.0	96.3	0.0	-	-	7.3	85.2	7.5	0.0	-	-	-
Total %	4.6	0.1	0.2	0.0	-	4.8	1.2	45.1	0.7	0.0	-	46.9	0.2	0.0	4.8	0.0	-	5.0	3.2	36.8	3.3	0.0	-	43.2	-
PHF	0.875	0.250	0.500	0.000	-	0.813	0.650	0.912	0.292	0.000	-	0.935	0.500	0.000	0.867	0.000	-	0.844	0.567	0.892	0.875	0.000	-	0.887	0.918
Lights	48	1	2	0	-	51	13	465	7	0	-	485	2	0	52	0	-	54	34	389	34	0	-	457	1047
% Lights	98.0	100.0	100.0	-	-	98.1	100.0	95.9	100.0	-	-	96.0	100.0	-	100.0	-	-	100.0	100.0	98.2	97.1	-	-	98.3	97.3
Mediums	1	0	0	0	-	1	0	12	0	0	-	12	0	0	0	0	-	0	0	3	0	0	-	3	16
% Mediums	2.0	0.0	0.0	-	-	1.9	0.0	2.5	0.0	-	-	2.4	0.0	-	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.6	1.5
Articulated Trucks	0	0	0	0	-	0	0	8	0	0	-	8	0	0	0	0	-	0	0	4	1	0	-	5	13
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.6	0.0	-	-	1.6	0.0	-	0.0	-	-	0.0	0.0	1.0	2.9	-	-	1.1	1.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

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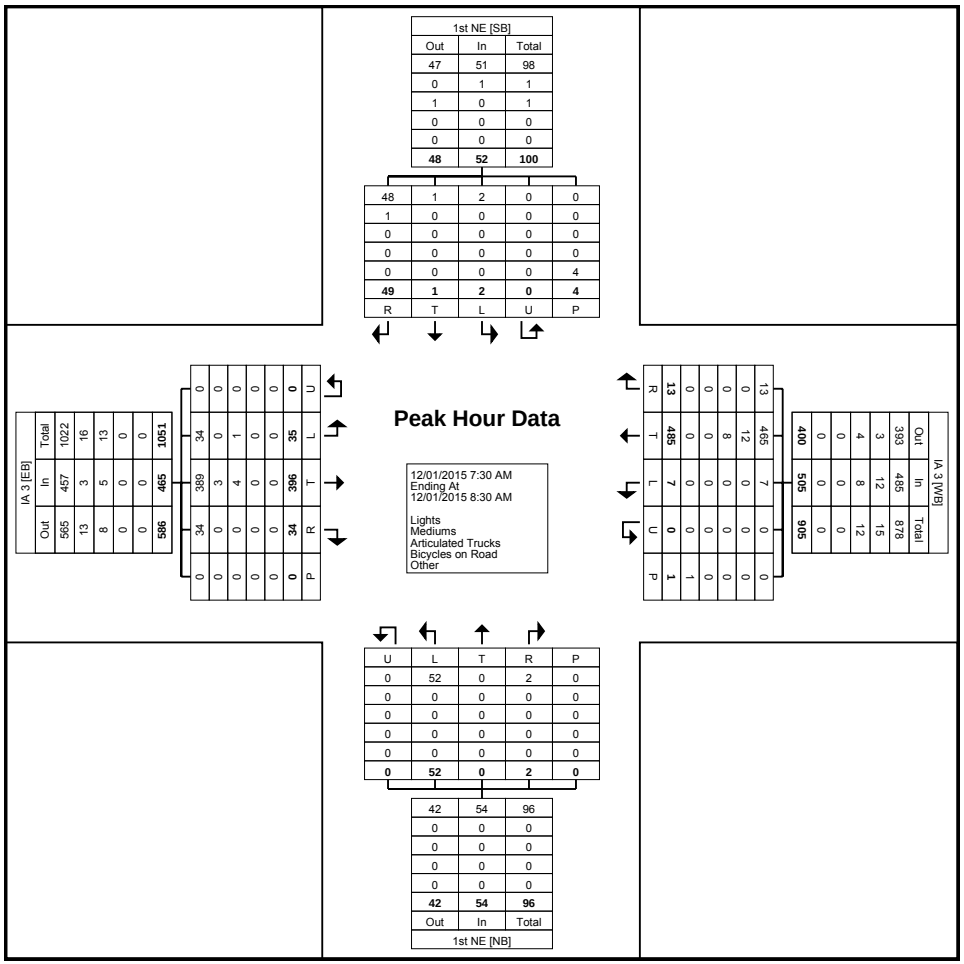

Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 1st NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (4:30 PM)

Start Time	1st NE Southbound						IA 3 Westbound						1st NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	18	1	0	0	1	19	0	162	1	0	4	163	1	1	35	0	0	37	15	121	12	0	0	148	367
4:45 PM	17	0	1	0	2	18	3	119	2	0	0	124	3	0	36	0	2	39	14	128	9	0	0	151	332
5:00 PM	23	0	1	0	2	24	2	144	3	0	1	149	2	1	15	0	1	18	11	168	17	0	0	196	387
5:15 PM	24	0	1	0	2	25	2	106	2	0	1	110	2	0	16	0	4	18	12	166	9	0	0	187	340
Total	82	1	3	0	7	86	7	531	8	0	6	546	8	2	102	0	7	112	52	583	47	0	0	682	1426
Approach %	95.3	1.2	3.5	0.0	-	-	1.3	97.3	1.5	0.0	-	-	7.1	1.8	91.1	0.0	-	-	7.6	85.5	6.9	0.0	-	-	-
Total %	5.8	0.1	0.2	0.0	-	6.0	0.5	37.2	0.6	0.0	-	38.3	0.6	0.1	7.2	0.0	-	7.9	3.6	40.9	3.3	0.0	-	47.8	-
PHF	0.854	0.250	0.750	0.000	-	0.860	0.583	0.819	0.667	0.000	-	0.837	0.667	0.500	0.708	0.000	-	0.718	0.867	0.868	0.691	0.000	-	0.870	0.921
Lights	82	1	3	0	-	86	7	526	8	0	-	541	8	2	102	0	-	112	52	572	46	0	-	670	1409
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	99.1	100.0	-	-	99.1	100.0	100.0	100.0	-	-	100.0	100.0	98.1	97.9	-	-	98.2	98.8
Mediums	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	0	10	1	0	-	11	15
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	0.0	1.7	2.1	-	-	1.6	1.1
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.1	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	28.6	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	6	-	-	-	-	-	7	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	71.4	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

WHKS & Co.
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Count Name: 1st NE TMC
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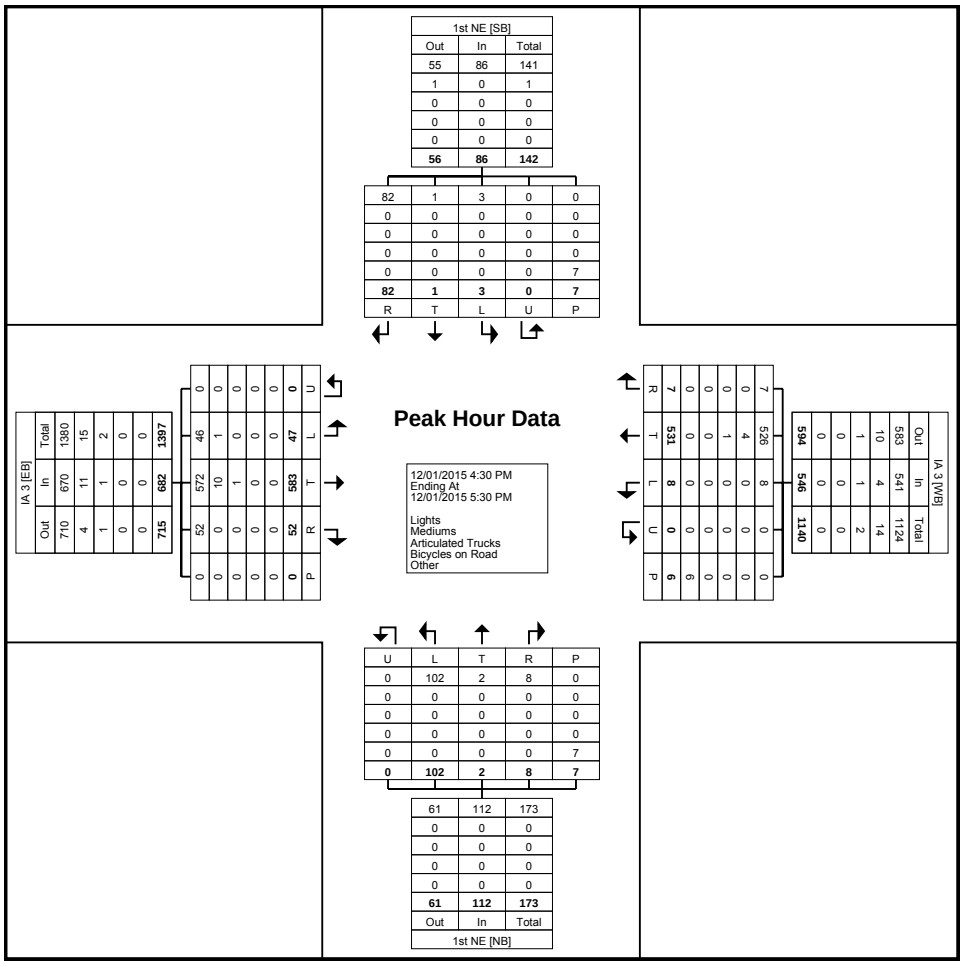

Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
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Count Name: 1st NE TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

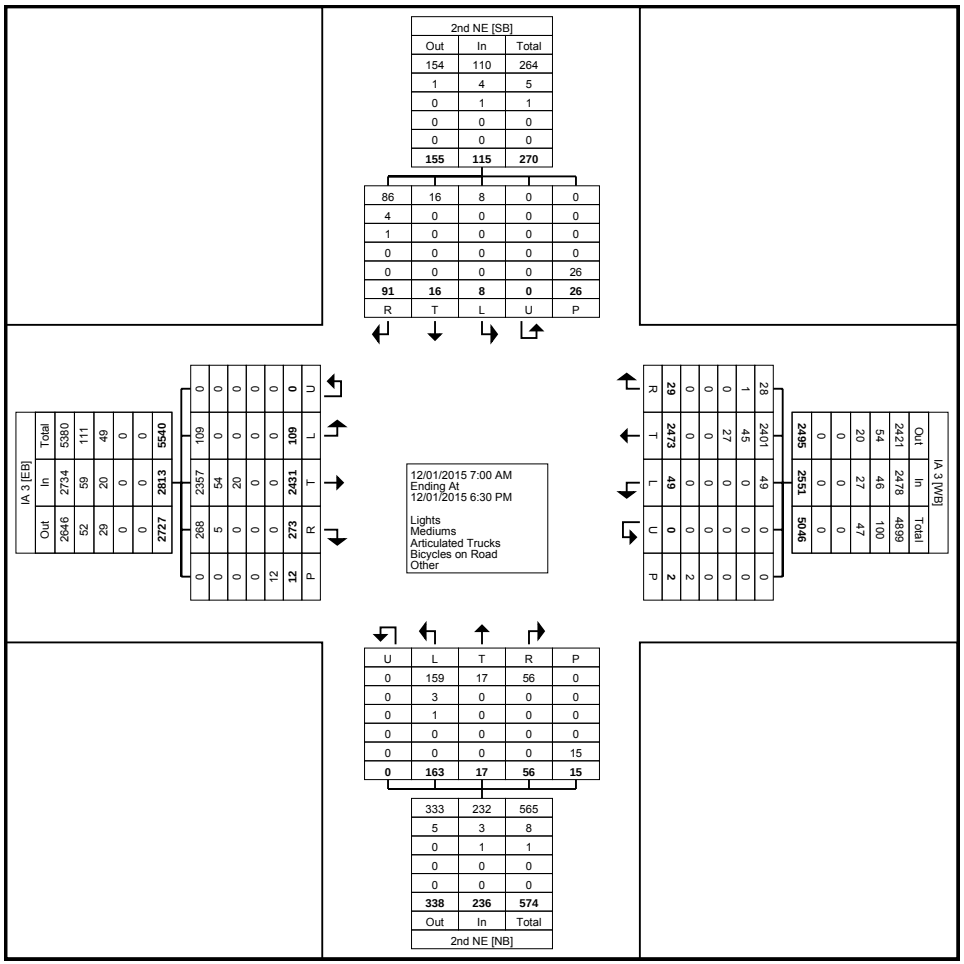
Start Time	2nd NE Southbound						IA 3 Westbound						2nd NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	2	0	0	0	0	2	0	75	1	0	0	76	0	0	1	0	0	1	2	52	2	0	0	56	135
7:15 AM	4	1	0	0	1	5	1	114	1	0	0	116	1	0	4	0	1	5	1	83	3	0	0	87	213
7:30 AM	2	0	0	0	0	2	1	136	0	0	1	137	0	0	4	0	0	4	8	69	1	0	0	78	221
7:45 AM	1	1	0	0	0	2	3	134	1	0	0	138	1	0	1	0	0	2	4	109	6	0	0	119	261
Hourly Total	9	2	0	0	1	11	5	459	3	0	1	467	2	0	10	0	1	12	15	313	12	0	0	340	830
8:00 AM	1	0	0	0	0	1	0	113	3	0	0	116	4	1	7	0	2	12	7	94	1	0	2	102	231
8:15 AM	3	0	0	0	1	3	0	108	1	0	0	109	2	0	5	0	0	7	11	85	8	0	0	104	223
8:30 AM	3	0	0	0	1	3	0	76	5	0	0	81	2	0	10	0	2	12	13	67	4	0	0	84	180
8:45 AM	2	2	0	0	2	4	6	87	3	0	0	96	3	0	11	0	0	14	12	88	6	0	0	106	220
Hourly Total	9	2	0	0	4	11	6	384	12	0	0	402	11	1	33	0	4	45	43	334	19	0	2	396	854
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	6	1	1	0	1	8	0	90	3	0	0	93	4	2	5	0	0	11	13	87	5	0	0	105	217
2:45 PM	4	1	1	0	1	6	1	97	2	0	0	100	4	1	9	0	0	14	15	84	5	0	1	104	224
Hourly Total	10	2	2	0	2	14	1	187	5	0	0	193	8	3	14	0	0	25	28	171	10	0	1	209	441
3:00 PM	5	0	0	0	0	5	3	126	3	0	0	132	2	1	12	0	1	15	13	86	4	0	0	103	255
3:15 PM	2	0	1	0	2	3	0	70	2	0	0	72	1	1	6	0	0	8	11	92	6	0	2	109	192
3:30 PM	4	0	2	0	3	6	5	152	3	0	0	160	2	0	11	0	1	13	23	148	11	0	0	182	361
3:45 PM	4	2	1	0	5	7	0	98	5	0	0	103	2	2	9	0	2	13	19	135	8	0	0	162	285
Hourly Total	15	2	4	0	10	21	8	446	13	0	0	467	7	4	38	0	4	49	66	461	29	0	2	556	1093
4:00 PM	4	1	0	0	1	5	1	106	2	0	0	109	2	0	7	0	0	9	24	118	9	0	2	151	274
4:15 PM	5	2	0	0	0	7	1	104	4	0	0	109	0	3	10	0	0	13	16	103	2	0	0	121	250
4:30 PM	3	0	0	0	0	3	1	150	2	0	0	153	9	0	15	0	0	24	18	109	2	0	0	129	309
4:45 PM	6	2	1	0	2	9	1	109	2	0	0	112	1	1	9	0	1	11	13	110	5	0	0	128	260
Hourly Total	18	5	1	0	3	24	4	469	10	0	0	483	12	4	41	0	1	57	71	440	18	0	2	529	1093
5:00 PM	9	2	0	0	0	11	0	127	1	0	1	128	5	2	12	0	2	19	13	149	7	0	2	169	327
5:15 PM	8	0	0	0	2	8	1	102	1	0	0	104	3	1	3	0	2	7	9	155	4	0	2	168	287
5:30 PM	2	0	0	0	0	2	0	76	1	0	0	77	3	0	2	0	1	5	2	132	2	0	0	136	220
5:45 PM	3	0	1	0	2	4	1	80	0	0	0	81	0	1	1	0	0	2	8	103	4	0	0	115	202
Hourly Total	22	2	1	0	4	25	2	385	3	0	1	390	11	4	18	0	5	33	32	539	17	0	4	588	1036
6:00 PM	7	1	0	0	0	8	1	80	1	0	0	82	4	1	6	0	0	11	11	89	3	0	1	103	204
6:15 PM	1	0	0	0	2	1	2	63	2	0	0	67	1	0	3	0	0	4	7	84	1	0	0	92	164
Grand Total	91	16	8	0	26	115	29	2473	49	0	2	2551	56	17	163	0	15	236	273	2431	109	0	12	2813	5715
Approach %	79.1	13.9	7.0	0.0	-	-	1.1	96.9	1.9	0.0	-	-	23.7	7.2	69.1	0.0	-	-	9.7	86.4	3.9	0.0	-	-	-
Total %	1.6	0.3	0.1	0.0	-	2.0	0.5	43.3	0.9	0.0	-	44.6	1.0	0.3	2.9	0.0	-	4.1	4.8	42.5	1.9	0.0	-	49.2	-
Lights	86	16	8	0	-	110	28	2401	49	0	-	2478	56	17	159	0	-	232	268	2357	109	0	-	2734	5554
% Lights	94.5	100.0	100.0	-	-	95.7	96.6	97.1	100.0	-	-	97.1	100.0	100.0	97.5	-	-	98.3	98.2	97.0	100.0	-	-	97.2	97.2
Mediums	4	0	0	0	-	4	1	45	0	0	-	46	0	0	3	0	-	3	5	54	0	0	-	59	112
% Mediums	4.4	0.0	0.0	-	-	3.5	3.4	1.8	0.0	-	-	1.8	0.0	0.0	1.8	-	-	1.3	1.8	2.2	0.0	-	-	2.1	2.0
Articulated Trucks	1	0	0	0	-	1	0	27	0	0	-	27	0	0	1	0	-	1	0	20	0	0	-	20	49

% Articulated Trucks	1.1	0.0	0.0	-	-	0.9	0.0	1.1	0.0	-	-	1.1	0.0	0.0	0.6	-	-	0.4	0.0	0.8	0.0	-	-	0.7	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	3.8	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	25	-	-	-	-	-	2	-	-	-	-	-	15	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	96.2	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015

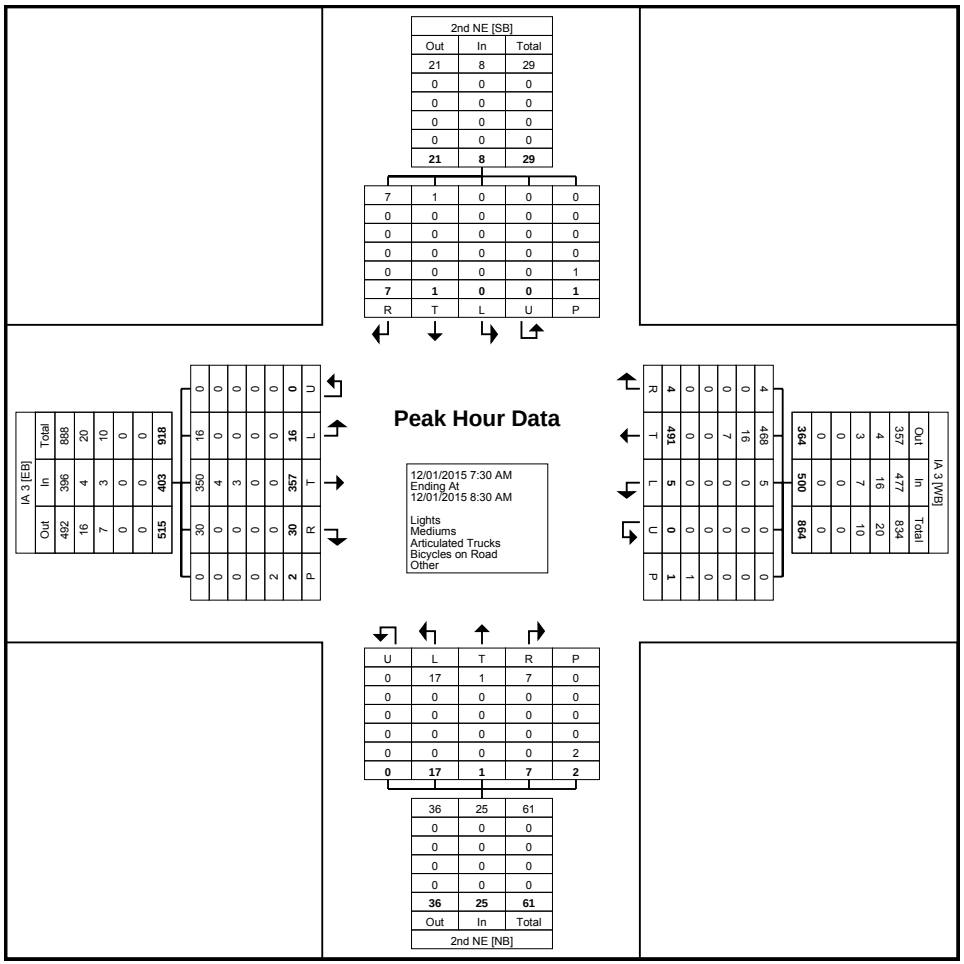
Turning Movement Peak Hour Data (7:30 AM)

Start Time	2nd NE Southbound						IA 3 Westbound						2nd NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	2	0	0	0	0	2	1	136	0	0	1	137	0	0	4	0	0	4	8	69	1	0	0	78	221
7:45 AM	1	1	0	0	0	2	3	134	1	0	0	138	1	0	1	0	0	2	4	109	6	0	0	119	261
8:00 AM	1	0	0	0	0	1	0	113	3	0	0	116	4	1	7	0	2	12	7	94	1	0	2	102	231
8:15 AM	3	0	0	0	1	3	0	108	1	0	0	109	2	0	5	0	0	7	11	85	8	0	0	104	223
Total	7	1	0	0	1	8	4	491	5	0	1	500	7	1	17	0	2	25	30	357	16	0	2	403	936
Approach %	87.5	12.5	0.0	0.0	-	-	0.8	98.2	1.0	0.0	-	-	28.0	4.0	68.0	0.0	-	-	7.4	88.6	4.0	0.0	-	-	-
Total %	0.7	0.1	0.0	0.0	-	0.9	0.4	52.5	0.5	0.0	-	53.4	0.7	0.1	1.8	0.0	-	2.7	3.2	38.1	1.7	0.0	-	43.1	-
PHF	0.583	0.250	0.000	0.000	-	0.667	0.333	0.903	0.417	0.000	-	0.906	0.438	0.250	0.607	0.000	-	0.521	0.682	0.819	0.500	0.000	-	0.847	0.897
Lights	7	1	0	0	-	8	4	468	5	0	-	477	7	1	17	0	-	25	30	350	16	0	-	396	906
% Lights	100.0	100.0	-	-	-	100.0	100.0	95.3	100.0	-	-	95.4	100.0	100.0	100.0	-	-	100.0	100.0	98.0	100.0	-	-	98.3	96.8
Mediums	0	0	0	0	-	0	0	16	0	0	-	16	0	0	0	0	-	0	0	4	0	0	-	4	20
% Mediums	0.0	0.0	-	-	-	0.0	0.0	3.3	0.0	-	-	3.2	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.0	2.1
Articulated Trucks	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	0	3	0	0	-	3	10
% Articulated Trucks	0.0	0.0	-	-	-	0.0	0.0	1.4	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	1.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:30 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015

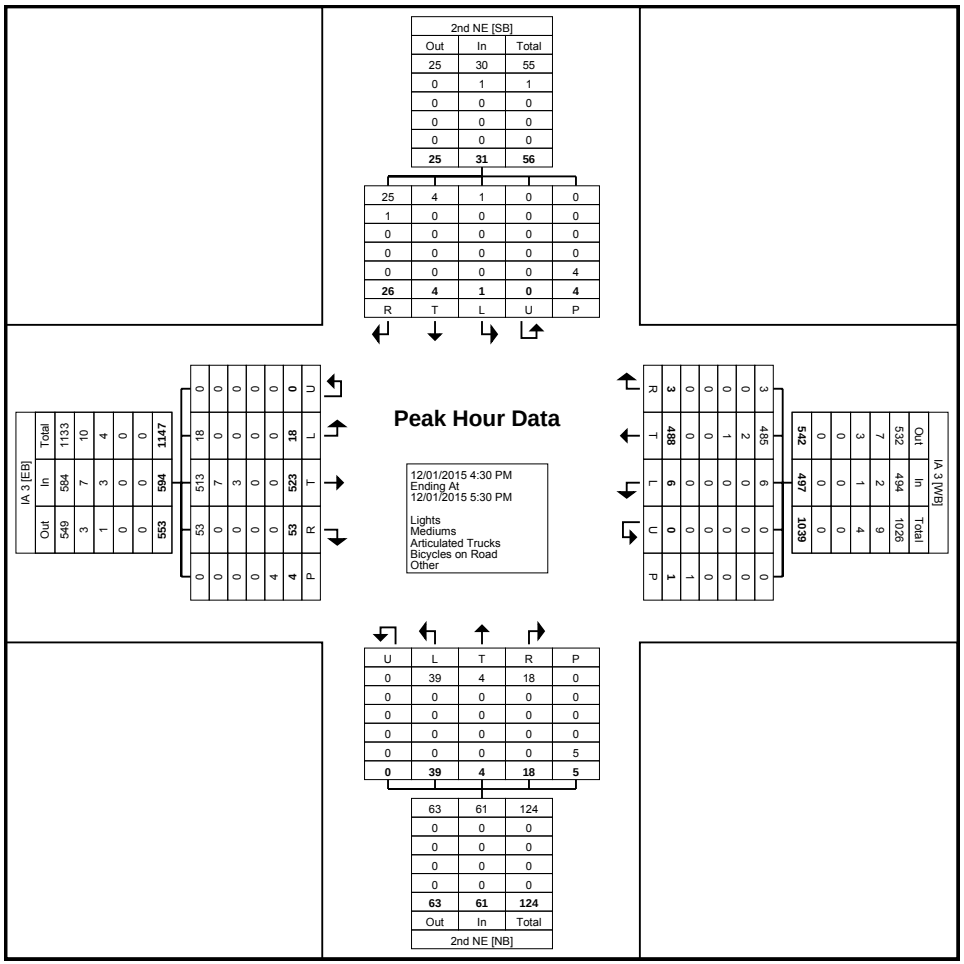
Turning Movement Peak Hour Data (4:30 PM)

Start Time	2nd NE Southbound						IA 3 Westbound						2nd NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	3	0	0	0	0	3	1	150	2	0	0	153	9	0	15	0	0	24	18	109	2	0	0	129	309
4:45 PM	6	2	1	0	2	9	1	109	2	0	0	112	1	1	9	0	1	11	13	110	5	0	0	128	260
5:00 PM	9	2	0	0	0	11	0	127	1	0	1	128	5	2	12	0	2	19	13	149	7	0	2	169	327
5:15 PM	8	0	0	0	2	8	1	102	1	0	0	104	3	1	3	0	2	7	9	155	4	0	2	168	287
Total	26	4	1	0	4	31	3	488	6	0	1	497	18	4	39	0	5	61	53	523	18	0	4	594	1183
Approach %	83.9	12.9	3.2	0.0	-	-	0.6	98.2	1.2	0.0	-	-	29.5	6.6	63.9	0.0	-	-	8.9	88.0	3.0	0.0	-	-	-
Total %	2.2	0.3	0.1	0.0	-	2.6	0.3	41.3	0.5	0.0	-	42.0	1.5	0.3	3.3	0.0	-	5.2	4.5	44.2	1.5	0.0	-	50.2	-
PHF	0.722	0.500	0.250	0.000	-	0.705	0.750	0.813	0.750	0.000	-	0.812	0.500	0.500	0.650	0.000	-	0.635	0.736	0.844	0.643	0.000	-	0.879	0.904
Lights	25	4	1	0	-	30	3	485	6	0	-	494	18	4	39	0	-	61	53	513	18	0	-	584	1169
% Lights	96.2	100.0	100.0	-	-	96.8	100.0	99.4	100.0	-	-	99.4	100.0	100.0	100.0	-	-	100.0	100.0	98.1	100.0	-	-	98.3	98.8
Mediums	1	0	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	7	0	0	-	7	10
% Mediums	3.8	0.0	0.0	-	-	3.2	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.2	0.8
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.5	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 2nd NE TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

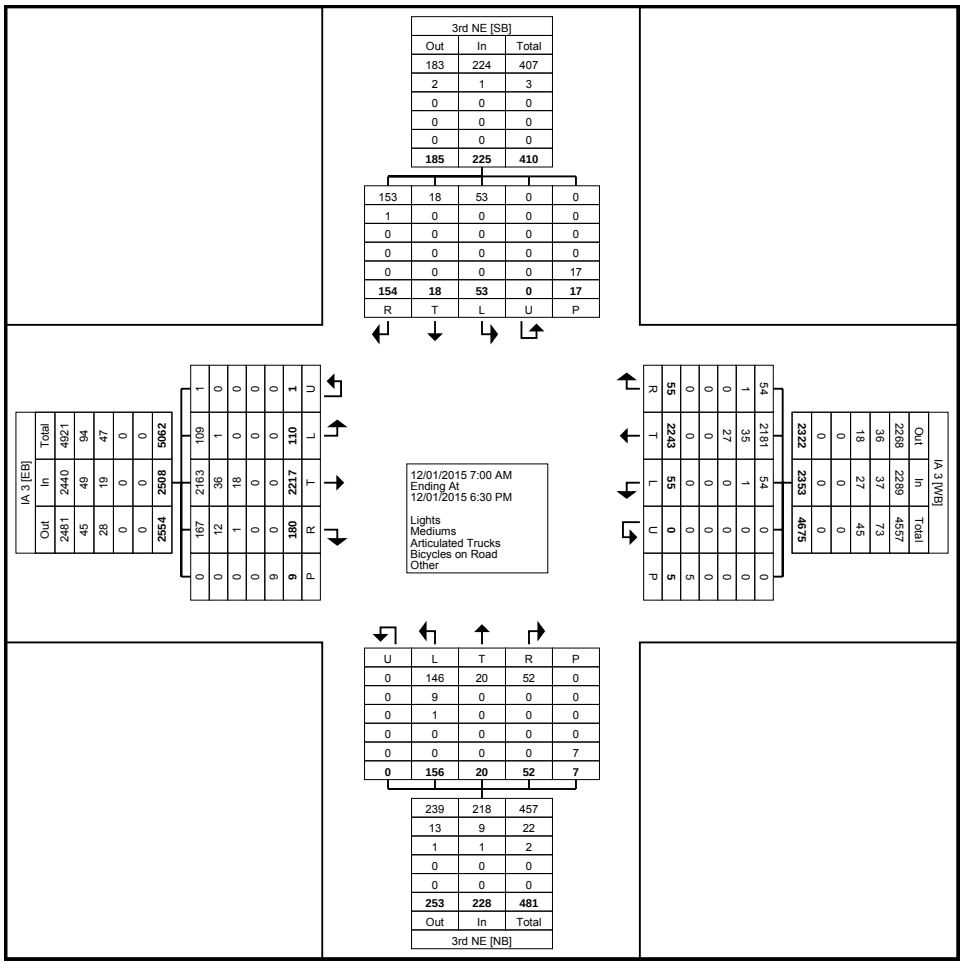
Start Time	3rd NE Southbound						IA 3 Westbound						3rd NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	1	0	3	0	0	4	1	70	1	0	0	72	1	0	5	0	0	6	2	47	2	0	0	51	133
7:15 AM	1	0	2	0	0	3	0	114	1	0	0	115	0	0	6	0	1	6	0	87	1	0	0	88	212
7:30 AM	3	2	5	0	0	10	4	125	1	0	0	130	3	1	2	0	0	6	5	61	1	0	0	67	213
7:45 AM	5	0	1	0	0	6	2	126	4	0	0	132	1	0	4	0	0	5	20	87	3	0	0	110	253
Hourly Total	10	2	11	0	0	23	7	435	7	0	0	449	5	1	17	0	1	23	27	282	7	0	0	316	811
8:00 AM	6	0	2	0	1	8	1	108	2	0	0	111	1	2	6	0	0	9	11	84	2	0	0	97	225
8:15 AM	2	0	2	0	0	4	4	103	0	0	0	107	2	1	4	0	0	7	16	67	2	0	0	85	203
8:30 AM	3	1	3	0	1	7	2	74	3	0	1	79	2	1	4	0	2	7	8	56	5	0	0	69	162
8:45 AM	5	2	1	0	1	8	3	85	1	0	0	89	4	0	6	0	0	10	5	77	7	0	0	89	196
Hourly Total	16	3	8	0	3	27	10	370	6	0	1	386	9	4	20	0	2	33	40	284	16	0	0	340	786
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	7	2	3	0	3	12	2	81	6	0	1	89	2	0	5	0	0	7	8	73	8	0	1	89	197
2:45 PM	14	0	3	0	2	17	2	76	4	0	1	82	3	0	11	0	0	14	6	72	10	0	0	88	201
Hourly Total	21	2	6	0	5	29	4	157	10	0	2	171	5	0	16	0	0	21	14	145	18	0	1	177	398
3:00 PM	6	1	3	0	1	10	3	116	6	0	0	125	2	3	8	0	0	13	6	81	4	0	0	91	239
3:15 PM	7	1	1	0	1	9	1	61	0	0	0	62	0	0	7	0	0	7	10	83	3	0	0	96	174
3:30 PM	6	3	3	0	2	12	5	136	3	0	0	144	3	4	18	0	1	25	13	134	9	0	0	156	337
3:45 PM	10	1	3	0	1	14	4	87	0	0	1	91	2	0	6	0	0	8	7	121	7	1	2	136	249
Hourly Total	29	6	10	0	5	45	13	400	9	0	1	422	7	7	39	0	1	53	36	419	23	1	2	479	999
4:00 PM	11	1	4	0	0	16	4	93	1	0	0	98	2	1	4	0	1	7	9	109	5	0	1	123	244
4:15 PM	7	1	3	0	2	11	2	99	5	0	1	106	5	1	6	0	0	12	10	80	8	0	0	98	227
4:30 PM	6	1	5	0	1	12	3	132	2	0	0	137	3	3	14	0	0	20	6	107	7	0	5	120	289
4:45 PM	10	0	2	0	1	12	2	93	4	0	0	99	2	2	9	0	1	13	9	105	4	0	0	118	242
Hourly Total	34	3	14	0	4	51	11	417	12	0	1	440	12	7	33	0	2	52	34	401	24	0	6	459	1002
5:00 PM	10	1	3	0	0	14	1	99	1	0	0	101	4	0	17	0	0	21	7	141	6	0	0	154	290
5:15 PM	14	0	0	0	0	14	2	80	0	0	0	82	5	0	7	0	0	12	3	150	5	0	0	158	266
5:30 PM	7	0	1	0	0	8	1	69	1	0	0	71	1	0	2	0	1	3	4	120	6	0	0	130	212
5:45 PM	2	1	0	0	0	3	1	82	4	0	0	87	4	1	0	0	0	5	8	102	1	0	0	111	206
Hourly Total	33	2	4	0	0	39	5	330	6	0	0	341	14	1	26	0	1	41	22	513	18	0	0	553	974
6:00 PM	5	0	0	0	0	5	3	76	2	0	0	81	0	0	4	0	0	4	5	90	2	0	0	97	187
6:15 PM	6	0	0	0	0	6	2	58	3	0	0	63	0	0	1	0	0	1	2	83	2	0	0	87	157
Grand Total	154	18	53	0	17	225	55	2243	55	0	5	2353	52	20	156	0	7	228	180	2217	110	1	9	2508	5314
Approach %	68.4	8.0	23.6	0.0	-	-	2.3	95.3	2.3	0.0	-	-	22.8	8.8	68.4	0.0	-	-	7.2	88.4	4.4	0.0	-	-	-
Total %	2.9	0.3	1.0	0.0	-	4.2	1.0	42.2	1.0	0.0	-	44.3	1.0	0.4	2.9	0.0	-	4.3	3.4	41.7	2.1	0.0	-	47.2	-
Lights	153	18	53	0	-	224	54	2181	54	0	-	2289	52	20	146	0	-	218	167	2163	109	1	-	2440	5171
% Lights	99.4	100.0	100.0	-	-	99.6	98.2	97.2	98.2	-	-	97.3	100.0	100.0	93.6	-	-	95.6	92.8	97.6	99.1	100.0	-	97.3	97.3
Mediums	1	0	0	0	-	1	1	35	1	0	-	37	0	0	9	0	-	9	12	36	1	0	-	49	96
% Mediums	0.6	0.0	0.0	-	-	0.4	1.8	1.6	1.8	-	-	1.6	0.0	0.0	5.8	-	-	3.9	6.7	1.6	0.9	0.0	-	2.0	1.8
Articulated Trucks	0	0	0	0	-	0	0	27	0	0	-	27	0	0	1	0	-	1	1	18	0	0	-	19	47

% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.2	0.0	-	-	1.1	0.0	0.0	0.6	-	-	0.4	0.6	0.8	0.0	0.0	-	0.8	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	11.8	-	-	-	-	-	0.0	-	-	-	-	-	14.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	15	-	-	-	-	-	5	-	-	-	-	-	6	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	88.2	-	-	-	-	-	100.0	-	-	-	-	-	85.7	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015

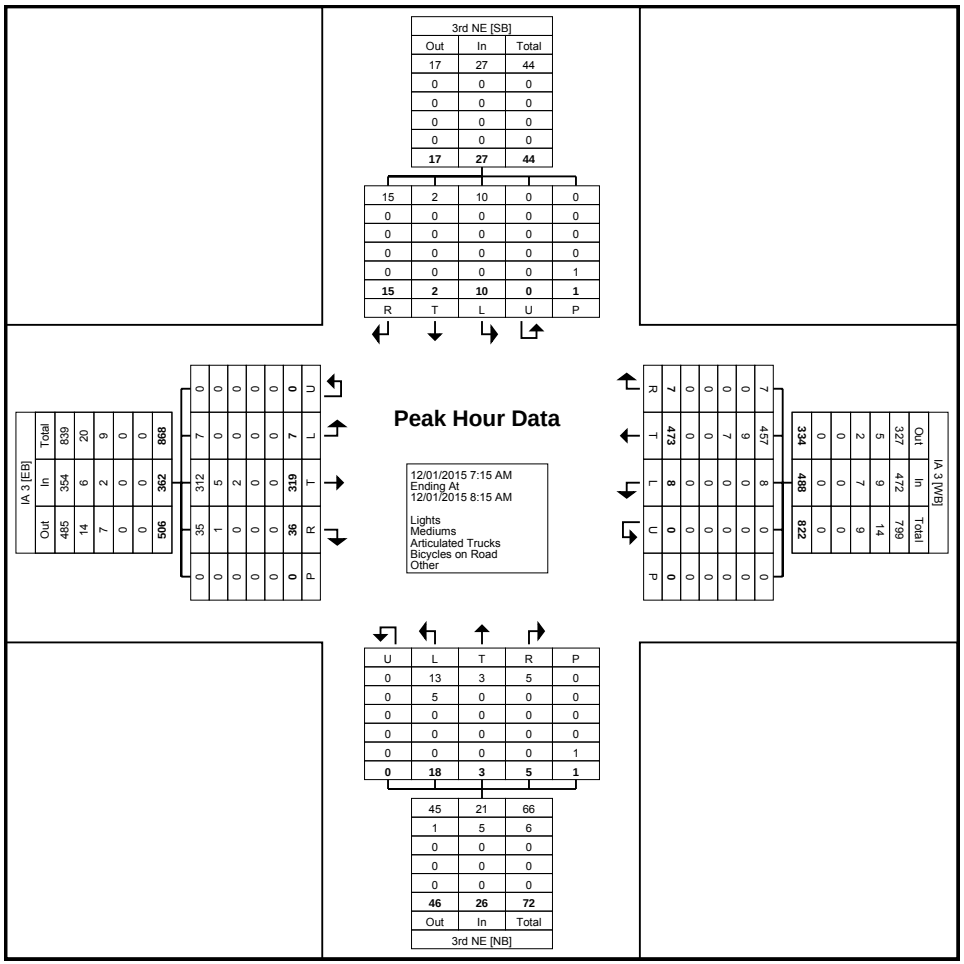
Turning Movement Peak Hour Data (7:15 AM)

Start Time	3rd NE Southbound						IA 3 Westbound						3rd NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	1	0	2	0	0	3	0	114	1	0	0	115	0	0	6	0	1	6	0	87	1	0	0	88	212
7:30 AM	3	2	5	0	0	10	4	125	1	0	0	130	3	1	2	0	0	6	5	61	1	0	0	67	213
7:45 AM	5	0	1	0	0	6	2	126	4	0	0	132	1	0	4	0	0	5	20	87	3	0	0	110	253
8:00 AM	6	0	2	0	1	8	1	108	2	0	0	111	1	2	6	0	0	9	11	84	2	0	0	97	225
Total	15	2	10	0	1	27	7	473	8	0	0	488	5	3	18	0	1	26	36	319	7	0	0	362	903
Approach %	55.6	7.4	37.0	0.0	-	-	1.4	96.9	1.6	0.0	-	-	19.2	11.5	69.2	0.0	-	-	9.9	88.1	1.9	0.0	-	-	-
Total %	1.7	0.2	1.1	0.0	-	3.0	0.8	52.4	0.9	0.0	-	54.0	0.6	0.3	2.0	0.0	-	2.9	4.0	35.3	0.8	0.0	-	40.1	-
PHF	0.625	0.250	0.500	0.000	-	0.675	0.438	0.938	0.500	0.000	-	0.924	0.417	0.375	0.750	0.000	-	0.722	0.450	0.917	0.583	0.000	-	0.823	0.892
Lights	15	2	10	0	-	27	7	457	8	0	-	472	5	3	13	0	-	21	35	312	7	0	-	354	874
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	96.6	100.0	-	-	96.7	100.0	100.0	72.2	-	-	80.8	97.2	97.8	100.0	-	-	97.8	96.8
Mediums	0	0	0	0	-	0	0	9	0	0	-	9	0	0	5	0	-	5	1	5	0	0	-	6	20
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.0	-	-	1.8	0.0	0.0	27.8	-	-	19.2	2.8	1.6	0.0	-	-	1.7	2.2
Articulated Trucks	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	0	2	0	0	-	2	9
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.6	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:15 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015

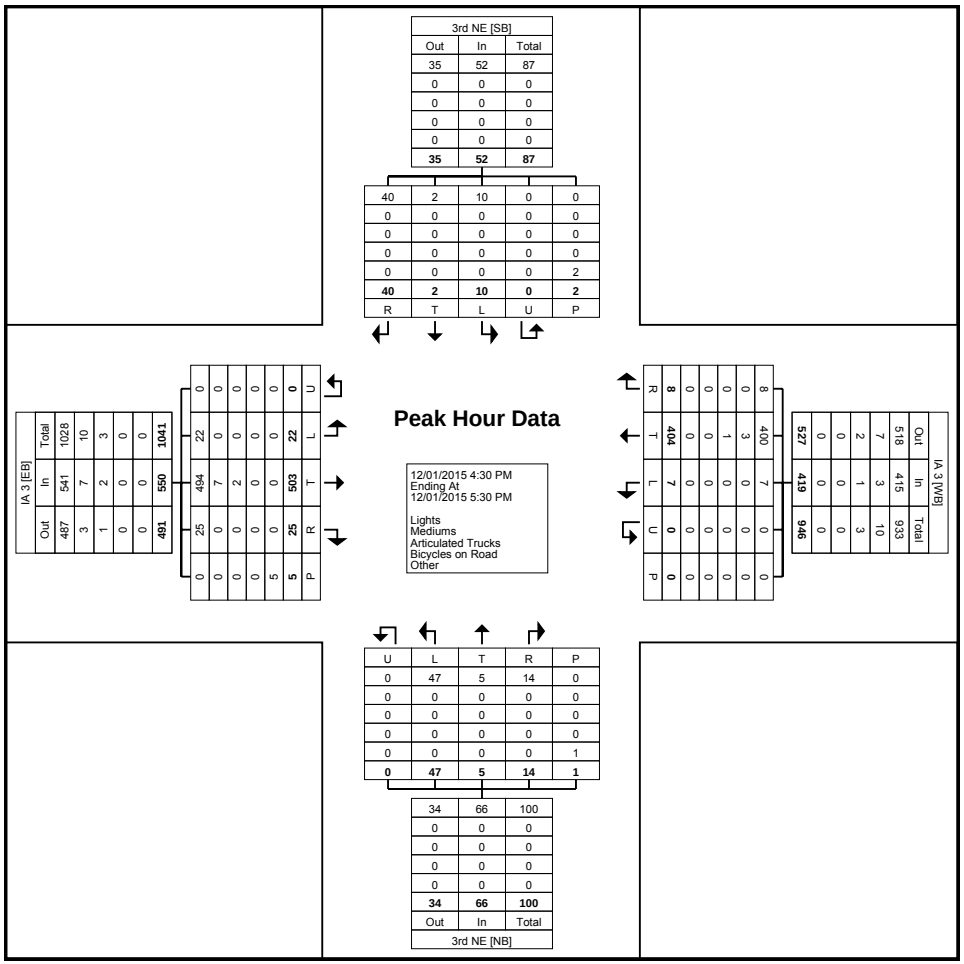
Turning Movement Peak Hour Data (4:30 PM)

Start Time	3rd NE Southbound						IA 3 Westbound						3rd NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	6	1	5	0	1	12	3	132	2	0	0	137	3	3	14	0	0	20	6	107	7	0	5	120	289
4:45 PM	10	0	2	0	1	12	2	93	4	0	0	99	2	2	9	0	1	13	9	105	4	0	0	118	242
5:00 PM	10	1	3	0	0	14	1	99	1	0	0	101	4	0	17	0	0	21	7	141	6	0	0	154	290
5:15 PM	14	0	0	0	0	14	2	80	0	0	0	82	5	0	7	0	0	12	3	150	5	0	0	158	266
Total	40	2	10	0	2	52	8	404	7	0	0	419	14	5	47	0	1	66	25	503	22	0	5	550	1087
Approach %	76.9	3.8	19.2	0.0	-	-	1.9	96.4	1.7	0.0	-	-	21.2	7.6	71.2	0.0	-	-	4.5	91.5	4.0	0.0	-	-	-
Total %	3.7	0.2	0.9	0.0	-	4.8	0.7	37.2	0.6	0.0	-	38.5	1.3	0.5	4.3	0.0	-	6.1	2.3	46.3	2.0	0.0	-	50.6	-
PHF	0.714	0.500	0.500	0.000	-	0.929	0.667	0.765	0.438	0.000	-	0.765	0.700	0.417	0.691	0.000	-	0.786	0.694	0.838	0.786	0.000	-	0.870	0.937
Lights	40	2	10	0	-	52	8	400	7	0	-	415	14	5	47	0	-	66	25	494	22	0	-	541	1074
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	99.0	100.0	-	-	99.0	100.0	100.0	100.0	-	-	100.0	100.0	98.2	100.0	-	-	98.4	98.8
Mediums	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	0	7	0	0	-	7	10
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	1.3	0.9
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	2	0	0	-	2	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.4	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 3rd NE TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

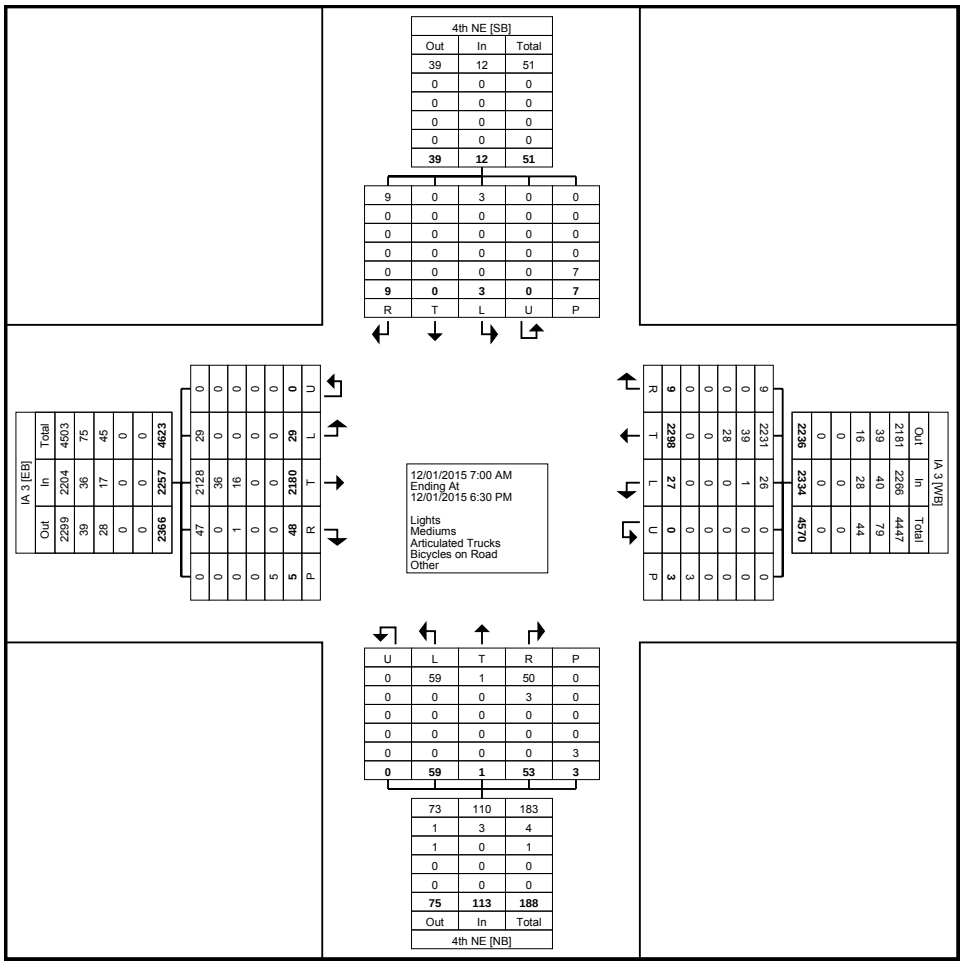
Start Time	4th NE Southbound						IA 3 Westbound						4th NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	1	0	0	0	0	1	1	73	2	0	0	76	2	0	0	0	0	2	3	48	0	0	0	51	130
7:15 AM	0	0	0	0	0	0	0	116	1	0	0	117	1	0	2	0	0	3	1	89	0	0	2	90	210
7:30 AM	0	0	0	0	0	0	0	136	2	0	0	138	1	0	1	0	0	2	3	63	0	0	0	66	206
7:45 AM	0	0	0	0	0	0	2	130	4	0	0	136	2	0	4	0	0	6	3	81	1	0	1	85	227
Hourly Total	1	0	0	0	0	1	3	455	9	0	0	467	6	0	7	0	0	13	10	281	1	0	3	292	773
8:00 AM	0	0	0	0	0	0	1	106	2	0	0	109	1	0	5	0	0	6	6	77	2	0	0	85	200
8:15 AM	0	0	0	0	0	0	0	104	2	0	0	106	2	0	2	0	0	4	2	63	1	0	0	66	176
8:30 AM	1	0	0	0	2	1	0	78	2	0	1	80	1	0	1	0	2	2	1	56	1	0	1	58	141
8:45 AM	0	0	0	0	0	0	0	84	0	0	0	84	1	0	3	0	0	4	5	69	2	0	0	76	164
Hourly Total	1	0	0	0	2	1	1	372	6	0	1	379	5	0	11	0	2	16	14	265	6	0	1	285	681
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	1	0	0	0	2	1	0	89	0	0	2	89	2	1	1	0	0	4	0	80	0	0	0	80	174
2:45 PM	0	0	0	0	0	0	0	78	0	0	0	78	5	0	3	0	0	8	2	66	2	0	0	70	156
Hourly Total	1	0	0	0	2	1	0	167	0	0	2	167	7	1	4	0	0	12	2	146	2	0	0	150	330
3:00 PM	2	0	0	0	0	2	1	126	1	0	0	128	2	0	1	0	0	3	3	81	1	0	0	85	218
3:15 PM	0	0	1	0	0	1	0	59	0	0	0	59	2	0	1	0	0	3	4	77	1	0	0	82	145
3:30 PM	1	0	0	0	0	1	1	140	1	0	0	142	4	0	4	0	0	8	0	135	1	0	1	136	287
3:45 PM	0	0	0	0	1	0	0	90	1	0	0	91	3	0	2	0	1	5	1	118	3	0	0	122	218
Hourly Total	3	0	1	0	1	4	2	415	3	0	0	420	11	0	8	0	1	19	8	411	6	0	1	425	868
4:00 PM	2	0	1	0	0	3	1	94	1	0	0	96	1	0	2	0	0	3	4	103	1	0	0	108	210
4:15 PM	1	0	0	0	1	1	1	99	1	0	0	101	4	0	5	0	0	9	0	84	1	0	0	85	196
4:30 PM	0	0	0	0	0	0	0	121	2	0	0	123	7	0	10	0	0	17	2	112	0	0	0	114	254
4:45 PM	0	0	0	0	0	0	0	96	1	0	0	97	2	0	6	0	0	8	2	103	2	0	0	107	212
Hourly Total	3	0	1	0	1	4	2	410	5	0	0	417	14	0	23	0	0	37	8	402	4	0	0	414	872
5:00 PM	0	0	0	0	1	0	0	96	0	0	0	96	2	0	1	0	0	3	0	148	1	0	0	149	248
5:15 PM	0	0	0	0	0	0	0	81	1	0	0	82	6	0	2	0	0	8	0	152	2	0	0	154	244
5:30 PM	0	0	0	0	0	0	0	75	1	0	0	76	0	0	0	0	0	0	3	115	1	0	0	119	195
5:45 PM	0	0	1	0	0	1	1	85	0	0	0	86	0	0	0	0	0	0	1	101	2	0	0	104	191
Hourly Total	0	0	1	0	1	1	1	337	2	0	0	340	8	0	3	0	0	11	4	516	6	0	0	526	878
6:00 PM	0	0	0	0	0	0	0	80	1	0	0	81	1	0	2	0	0	3	1	81	4	0	0	86	170
6:15 PM	0	0	0	0	0	0	0	62	1	0	0	63	1	0	1	0	0	2	1	78	0	0	0	79	144
Grand Total	9	0	3	0	7	12	9	2298	27	0	3	2334	53	1	59	0	3	113	48	2180	29	0	5	2257	4716
Approach %	75.0	0.0	25.0	0.0	-	-	0.4	98.5	1.2	0.0	-	-	46.9	0.9	52.2	0.0	-	-	2.1	96.6	1.3	0.0	-	-	-
Total %	0.2	0.0	0.1	0.0	-	0.3	0.2	48.7	0.6	0.0	-	49.5	1.1	0.0	1.3	0.0	-	2.4	1.0	46.2	0.6	0.0	-	47.9	-
Lights	9	0	3	0	-	12	9	2231	26	0	-	2266	50	1	59	0	-	110	47	2128	29	0	-	2204	4592
% Lights	100.0	-	100.0	-	-	100.0	100.0	97.1	96.3	-	-	97.1	94.3	100.0	100.0	-	-	97.3	97.9	97.6	100.0	-	-	97.7	97.4
Mediums	0	0	0	0	-	0	0	39	1	0	-	40	3	0	0	0	-	3	0	36	0	0	-	36	79
% Mediums	0.0	-	0.0	-	-	0.0	0.0	1.7	3.7	-	-	1.7	5.7	0.0	0.0	-	-	2.7	0.0	1.7	0.0	-	-	1.6	1.7
Articulated Trucks	0	0	0	0	-	0	0	28	0	0	-	28	0	0	0	0	-	0	1	16	0	0	-	17	45

% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	1.2	0.0	-	-	1.2	0.0	0.0	0.0	-	-	0.0	2.1	0.7	0.0	-	-	0.8	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	14.3	-	-	-	-	-	0.0	-	-	-	-	-	33.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	85.7	-	-	-	-	-	100.0	-	-	-	-	-	66.7	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Data Plot

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Peak Hour Data (7:15 AM)

Start Time	4th NE Southbound						IA 3 Westbound						4th NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	0	0	0	0	0	0	0	116	1	0	0	117	1	0	2	0	0	3	1	89	0	0	2	90	210
7:30 AM	0	0	0	0	0	0	0	136	2	0	0	138	1	0	1	0	0	2	3	63	0	0	0	66	206
7:45 AM	0	0	0	0	0	0	2	130	4	0	0	136	2	0	4	0	0	6	3	81	1	0	1	85	227
8:00 AM	0	0	0	0	0	0	1	106	2	0	0	109	1	0	5	0	0	6	6	77	2	0	0	85	200
Total	0	0	0	0	0	0	3	488	9	0	0	500	5	0	12	0	0	17	13	310	3	0	3	326	843
Approach %	NaN	NaN	NaN	NaN	-	-	0.6	97.6	1.8	0.0	-	-	29.4	0.0	70.6	0.0	-	-	4.0	95.1	0.9	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.4	57.9	1.1	0.0	-	59.3	0.6	0.0	1.4	0.0	-	2.0	1.5	36.8	0.4	0.0	-	38.7	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.375	0.897	0.563	0.000	-	0.906	0.625	0.000	0.600	0.000	-	0.708	0.542	0.871	0.375	0.000	-	0.906	0.928
Lights	0	0	0	0	-	0	3	470	8	0	-	481	5	0	12	0	-	17	13	306	3	0	-	322	820
% Lights	-	-	-	-	-	-	100.0	96.3	88.9	-	-	96.2	100.0	-	100.0	-	-	100.0	100.0	98.7	100.0	-	-	98.8	97.3
Mediums	0	0	0	0	-	0	0	10	1	0	-	11	0	0	0	0	-	0	0	2	0	0	-	2	13
% Mediums	-	-	-	-	-	-	0.0	2.0	11.1	-	-	2.2	0.0	-	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.6	1.5
Articulated Trucks	0	0	0	0	-	0	0	8	0	0	-	8	0	0	0	0	-	0	0	2	0	0	-	2	10
% Articulated Trucks	-	-	-	-	-	-	0.0	1.6	0.0	-	-	1.6	0.0	-	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.6	1.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	-	-	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
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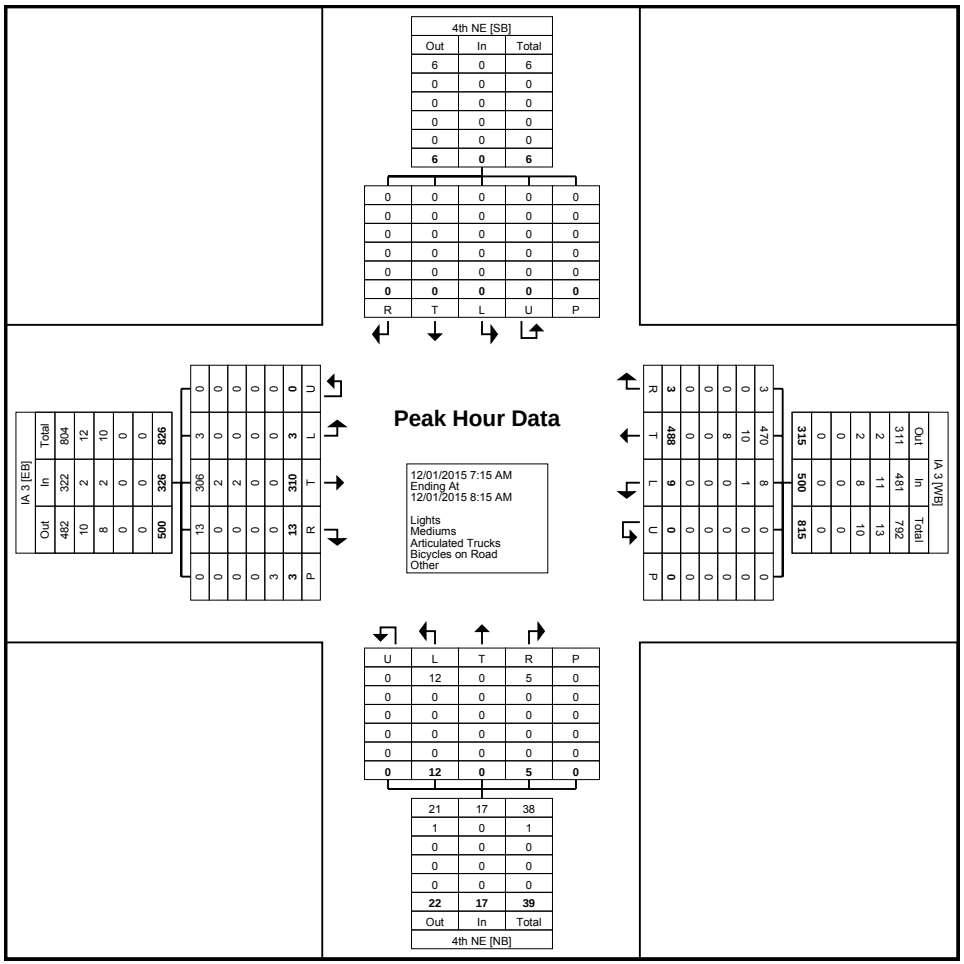
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:15 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
Site Code:
Start Date: 12/01/2015

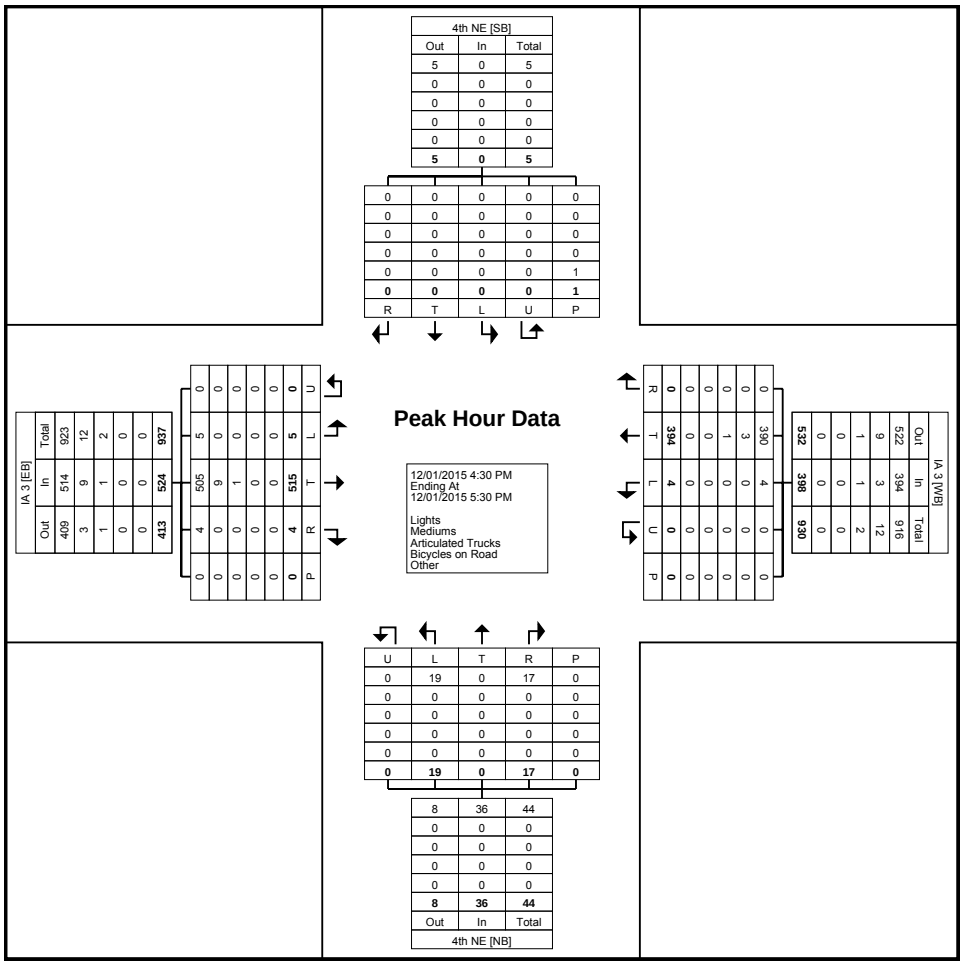
Turning Movement Peak Hour Data (4:30 PM)

Start Time	4th NE Southbound						IA 3 Westbound						4th NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	0	0	0	0	0	0	0	121	2	0	0	123	7	0	10	0	0	17	2	112	0	0	0	114	254
4:45 PM	0	0	0	0	0	0	0	96	1	0	0	97	2	0	6	0	0	8	2	103	2	0	0	107	212
5:00 PM	0	0	0	0	1	0	0	96	0	0	0	96	2	0	1	0	0	3	0	148	1	0	0	149	248
5:15 PM	0	0	0	0	0	0	0	81	1	0	0	82	6	0	2	0	0	8	0	152	2	0	0	154	244
Total	0	0	0	0	1	0	0	394	4	0	0	398	17	0	19	0	0	36	4	515	5	0	0	524	958
Approach %	NaN	NaN	NaN	NaN	-	-	0.0	99.0	1.0	0.0	-	-	47.2	0.0	52.8	0.0	-	-	0.8	98.3	1.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	41.1	0.4	0.0	-	41.5	1.8	0.0	2.0	0.0	-	3.8	0.4	53.8	0.5	0.0	-	54.7	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.814	0.500	0.000	-	0.809	0.607	0.000	0.475	0.000	-	0.529	0.500	0.847	0.625	0.000	-	0.851	0.943
Lights	0	0	0	0	-	0	0	390	4	0	-	394	17	0	19	0	-	36	4	505	5	0	-	514	944
% Lights	-	-	-	-	-	-	-	99.0	100.0	-	-	99.0	100.0	-	100.0	-	-	100.0	100.0	98.1	100.0	-	-	98.1	98.5
Mediums	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	0	9	0	0	-	9	12
% Mediums	-	-	-	-	-	-	-	0.8	0.0	-	-	0.8	0.0	-	0.0	-	-	0.0	0.0	1.7	0.0	-	-	1.7	1.3
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Articulated Trucks	-	-	-	-	-	-	-	0.3	0.0	-	-	0.3	0.0	-	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 4th NE TMC
Site Code:
Start Date: 12/01/2015

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th NE TMC
Site Code:
Start Date: 12/01/2015

Turning Movement Data

Start Time	8th NE Southbound						IA 3 Westbound						8th NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	19	0	5	0	0	24	1	57	0	0	1	58	1	0	0	0	0	1	0	51	5	0	0	56	139
7:15 AM	24	0	3	0	0	27	0	93	0	0	0	93	0	0	1	0	0	1	0	78	8	0	0	86	207
7:30 AM	27	2	4	0	0	33	2	100	0	0	1	102	0	0	2	0	0	2	0	53	7	0	0	60	197
7:45 AM	31	0	5	0	0	36	2	102	1	0	0	105	0	1	1	0	0	2	1	69	2	0	0	72	215
Hourly Total	101	2	17	0	0	120	5	352	1	0	2	358	1	1	4	0	0	6	1	251	22	0	0	274	758
8:00 AM	18	0	2	0	0	20	0	73	1	0	0	74	1	0	0	0	0	1	0	60	6	0	0	66	161
8:15 AM	12	0	3	0	0	15	1	87	0	0	0	88	0	1	0	0	0	1	0	52	11	0	0	63	167
8:30 AM	19	0	2	0	0	21	0	49	0	0	0	49	0	1	0	0	0	1	0	40	4	0	0	44	115
8:45 AM	12	0	0	0	0	12	0	60	0	0	0	60	0	0	0	0	0	0	0	43	3	0	0	46	118
Hourly Total	61	0	7	0	0	68	1	269	1	0	0	271	1	2	0	0	0	3	0	195	24	0	0	219	561
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	6	0	3	0	0	9	0	72	0	0	0	72	0	0	0	0	0	0	0	64	13	0	1	77	158
2:45 PM	13	0	0	0	0	13	0	58	0	0	0	58	0	0	1	0	0	1	0	45	10	0	0	55	127
Hourly Total	19	0	3	0	0	22	0	130	0	0	0	130	0	0	1	0	0	1	0	109	23	0	1	132	285
3:00 PM	6	0	0	0	0	6	2	110	0	0	0	112	0	0	0	0	0	0	0	52	27	0	0	79	197
3:15 PM	8	1	2	0	0	11	1	48	0	0	0	49	0	0	0	0	0	0	3	52	18	0	0	73	133
3:30 PM	3	0	1	0	0	4	5	122	0	0	0	127	1	1	1	0	0	3	1	82	34	0	0	117	251
3:45 PM	12	0	0	0	1	12	0	62	0	0	0	62	0	0	0	0	1	0	2	85	23	0	0	110	184
Hourly Total	29	1	3	0	1	33	8	342	0	0	0	350	1	1	1	0	1	3	6	271	102	0	0	379	765
4:00 PM	13	0	2	0	0	15	2	79	0	0	0	81	0	0	2	0	0	2	0	76	16	0	0	92	190
4:15 PM	11	0	1	0	1	12	3	77	0	0	0	80	0	0	1	0	0	1	1	72	22	0	0	95	188
4:30 PM	10	1	2	0	0	13	2	90	0	0	0	92	2	0	1	0	1	3	0	92	20	0	0	112	220
4:45 PM	8	0	1	0	1	9	4	80	0	0	0	84	1	0	0	0	0	1	3	72	21	0	0	96	190
Hourly Total	42	1	6	0	2	49	11	326	0	0	0	337	3	0	4	0	1	7	4	312	79	0	0	395	788
5:00 PM	4	0	2	0	0	6	4	81	0	0	0	85	0	1	1	0	1	2	1	112	25	0	0	138	231
5:15 PM	8	0	3	0	0	11	2	68	0	0	0	70	0	0	0	0	0	0	1	114	38	0	0	153	234
5:30 PM	9	0	1	0	0	10	2	56	0	0	0	58	0	0	1	0	0	1	3	84	26	0	0	113	182
5:45 PM	11	0	1	0	0	12	2	70	0	0	0	72	1	1	2	0	0	4	1	70	10	1	0	82	170
Hourly Total	32	0	7	0	0	39	10	275	0	0	0	285	1	2	4	0	1	7	6	380	99	1	0	486	817
6:00 PM	13	1	1	0	0	15	0	61	0	0	0	61	0	0	0	0	0	0	0	56	17	0	0	73	149
6:15 PM	11	0	1	0	0	12	3	49	0	0	0	52	0	1	0	0	0	1	1	53	15	0	0	69	134
Grand Total	308	5	45	0	3	358	38	1804	2	0	2	1844	7	7	14	0	3	28	18	1627	381	1	1	2027	4257
Approach %	86.0	1.4	12.6	0.0	-	-	2.1	97.8	0.1	0.0	-	-	25.0	25.0	50.0	0.0	-	-	0.9	80.3	18.8	0.0	-	-	-
Total %	7.2	0.1	1.1	0.0	-	8.4	0.9	42.4	0.0	0.0	-	43.3	0.2	0.2	0.3	0.0	-	0.7	0.4	38.2	8.9	0.0	-	47.6	-
Lights	303	5	43	0	-	351	37	1753	1	0	-	1791	7	7	14	0	-	28	17	1581	377	1	-	1976	4146
% Lights	98.4	100.0	95.6	-	-	98.0	97.4	97.2	50.0	-	-	97.1	100.0	100.0	100.0	-	-	100.0	94.4	97.2	99.0	100.0	-	97.5	97.4
Mediums	5	0	2	0	-	7	1	26	1	0	-	28	0	0	0	0	-	0	1	32	3	0	-	36	71
% Mediums	1.6	0.0	4.4	-	-	2.0	2.6	1.4	50.0	-	-	1.5	0.0	0.0	0.0	-	-	0.0	5.6	2.0	0.8	0.0	-	1.8	1.7
Articulated Trucks	0	0	0	0	-	0	0	25	0	0	-	25	0	0	0	0	-	0	0	14	1	0	-	15	40

% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.3	0.0	-	0.7	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	66.7	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	33.3	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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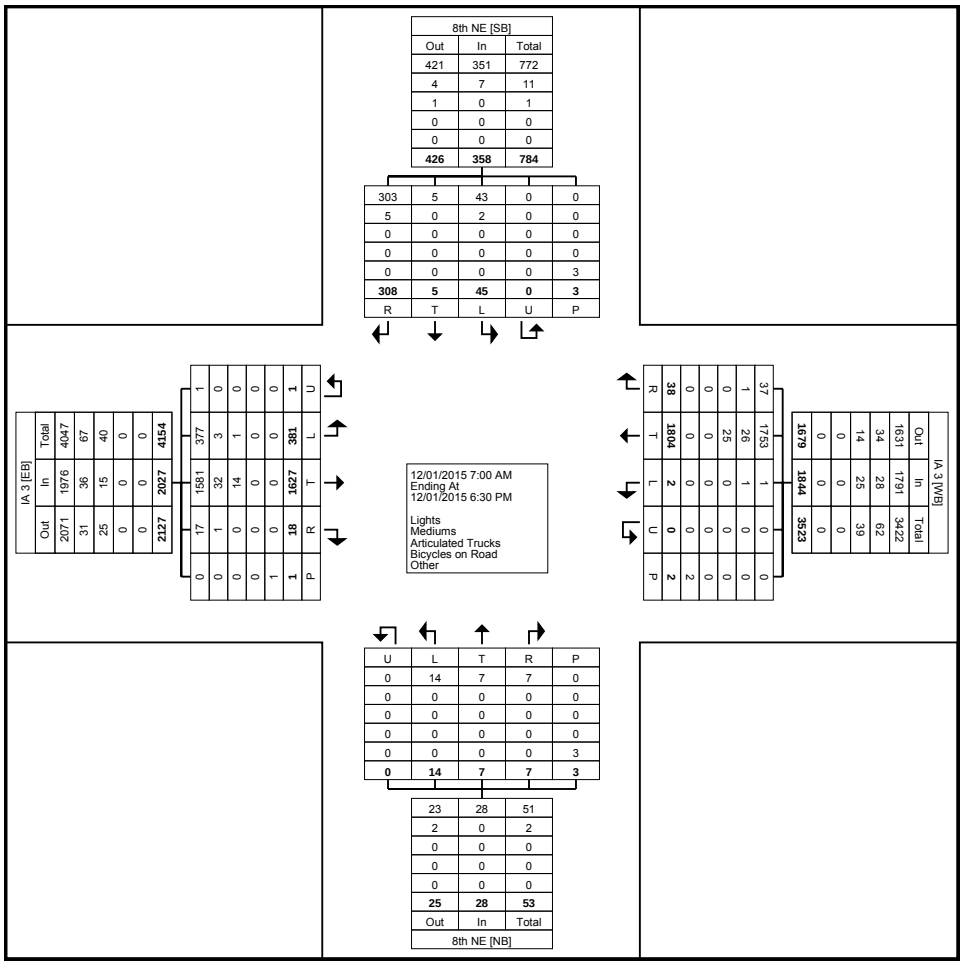

Turning Movement Data Plot

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1701 Route 35 North

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Count Name: 8th NE TMC
Site Code:
Start Date: 12/01/2015

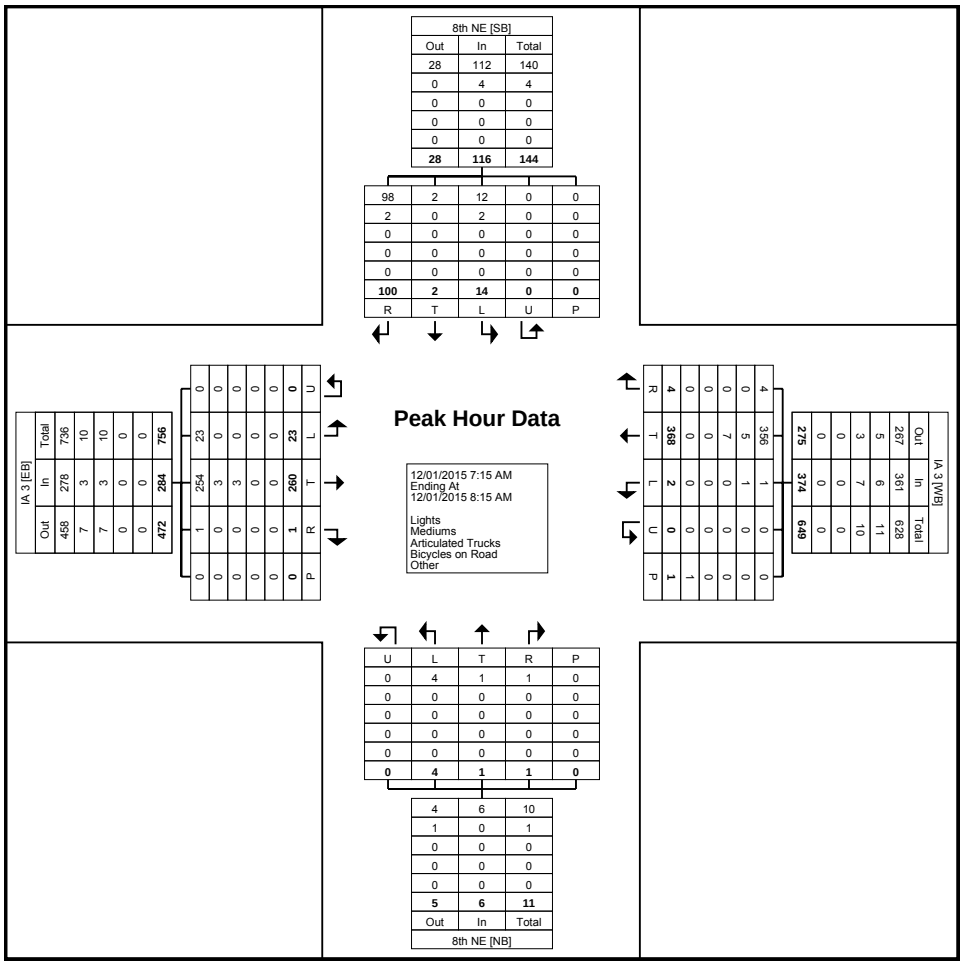
Turning Movement Peak Hour Data (7:15 AM)

Start Time	8th NE Southbound						IA 3 Westbound						8th NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	24	0	3	0	0	27	0	93	0	0	0	93	0	0	1	0	0	1	0	78	8	0	0	86	207
7:30 AM	27	2	4	0	0	33	2	100	0	0	1	102	0	0	2	0	0	2	0	53	7	0	0	60	197
7:45 AM	31	0	5	0	0	36	2	102	1	0	0	105	0	1	1	0	0	2	1	69	2	0	0	72	215
8:00 AM	18	0	2	0	0	20	0	73	1	0	0	74	1	0	0	0	0	1	0	60	6	0	0	66	161
Total	100	2	14	0	0	116	4	368	2	0	1	374	1	1	4	0	0	6	1	260	23	0	0	284	780
Approach %	86.2	1.7	12.1	0.0	-	-	1.1	98.4	0.5	0.0	-	-	16.7	16.7	66.7	0.0	-	-	0.4	91.5	8.1	0.0	-	-	-
Total %	12.8	0.3	1.8	0.0	-	14.9	0.5	47.2	0.3	0.0	-	47.9	0.1	0.1	0.5	0.0	-	0.8	0.1	33.3	2.9	0.0	-	36.4	-
PHF	0.806	0.250	0.700	0.000	-	0.806	0.500	0.902	0.500	0.000	-	0.890	0.250	0.250	0.500	0.000	-	0.750	0.250	0.833	0.719	0.000	-	0.826	0.907
Lights	98	2	12	0	-	112	4	356	1	0	-	361	1	1	4	0	-	6	1	254	23	0	-	278	757
% Lights	98.0	100.0	85.7	-	-	96.6	100.0	96.7	50.0	-	-	96.5	100.0	100.0	100.0	-	-	100.0	100.0	97.7	100.0	-	-	97.9	97.1
Mediums	2	0	2	0	-	4	0	5	1	0	-	6	0	0	0	0	-	0	0	3	0	0	-	3	13
% Mediums	2.0	0.0	14.3	-	-	3.4	0.0	1.4	50.0	-	-	1.6	0.0	0.0	0.0	-	-	0.0	0.0	1.2	0.0	-	-	1.1	1.7
Articulated Trucks	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	0	3	0	0	-	3	10
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.0	-	-	1.9	0.0	0.0	0.0	-	-	0.0	0.0	1.2	0.0	-	-	1.1	1.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (7:15 AM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th NE TMC
Site Code:
Start Date: 12/01/2015

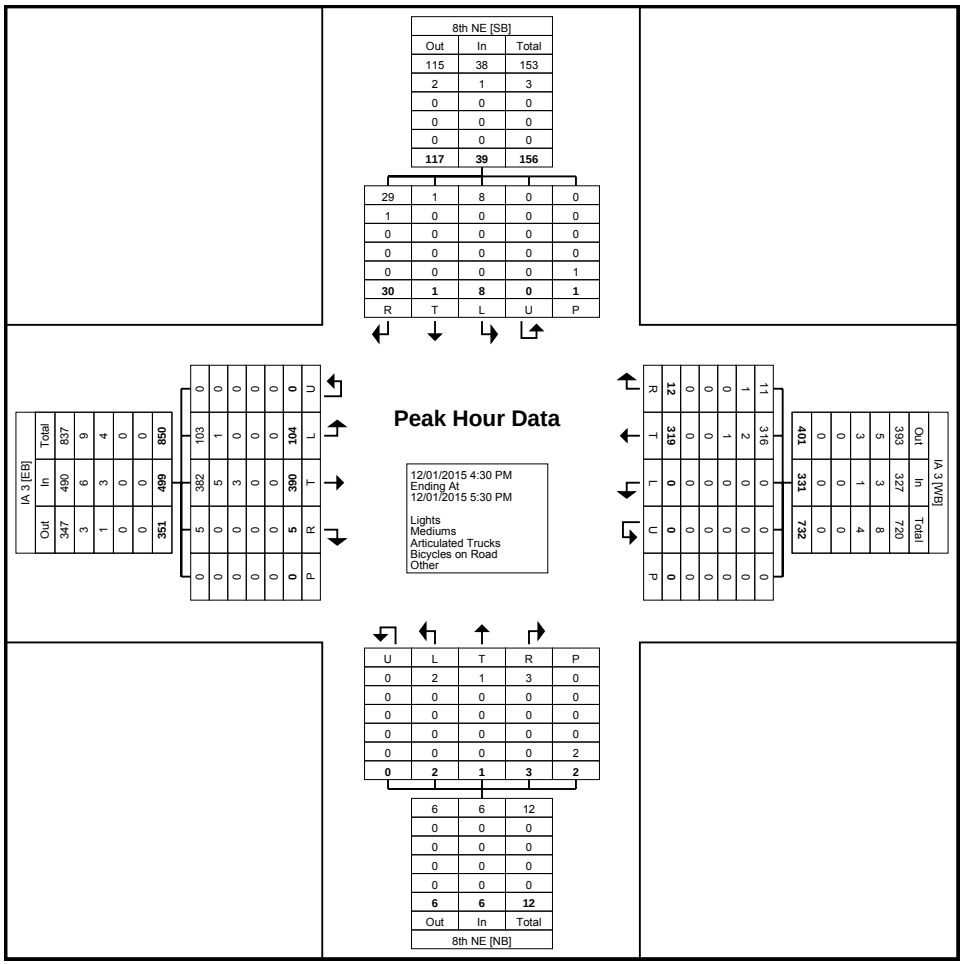
Turning Movement Peak Hour Data (4:30 PM)

Start Time	8th NE Southbound						IA 3 Westbound						8th NE Northbound						IA 3 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	10	1	2	0	0	13	2	90	0	0	0	92	2	0	1	0	1	3	0	92	20	0	0	112	220
4:45 PM	8	0	1	0	1	9	4	80	0	0	0	84	1	0	0	0	0	1	3	72	21	0	0	96	190
5:00 PM	4	0	2	0	0	6	4	81	0	0	0	85	0	1	1	0	1	2	1	112	25	0	0	138	231
5:15 PM	8	0	3	0	0	11	2	68	0	0	0	70	0	0	0	0	0	0	1	114	38	0	0	153	234
Total	30	1	8	0	1	39	12	319	0	0	0	331	3	1	2	0	2	6	5	390	104	0	0	499	875
Approach %	76.9	2.6	20.5	0.0	-	-	3.6	96.4	0.0	0.0	-	-	50.0	16.7	33.3	0.0	-	-	1.0	78.2	20.8	0.0	-	-	-
Total %	3.4	0.1	0.9	0.0	-	4.5	1.4	36.5	0.0	0.0	-	37.8	0.3	0.1	0.2	0.0	-	0.7	0.6	44.6	11.9	0.0	-	57.0	-
PHF	0.750	0.250	0.667	0.000	-	0.750	0.750	0.886	0.000	0.000	-	0.899	0.375	0.250	0.500	0.000	-	0.500	0.417	0.855	0.684	0.000	-	0.815	0.935
Lights	29	1	8	0	-	38	11	316	0	0	-	327	3	1	2	0	-	6	5	382	103	0	-	490	861
% Lights	96.7	100.0	100.0	-	-	97.4	91.7	99.1	-	-	-	98.8	100.0	100.0	100.0	-	-	100.0	100.0	97.9	99.0	-	-	98.2	98.4
Mediums	1	0	0	0	-	1	1	2	0	0	-	3	0	0	0	0	-	0	0	5	1	0	-	6	10
% Mediums	3.3	0.0	0.0	-	-	2.6	8.3	0.6	-	-	-	0.9	0.0	0.0	0.0	-	-	0.0	0.0	1.3	1.0	-	-	1.2	1.1
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.3	-	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.6	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th NE TMC
Site Code:
Start Date: 12/01/2015



Turning Movement Peak Hour Data Plot (4:30 PM)

WHKS & Co.
1701 Route 35 North

East Dubuque, Illinois, United States 61025
217.483.9457 etott@whks.com

Count Name: 8th NE TMC
Site Code:
Start Date: 12/01/2015

APPENDIX B

Crash Data

Appendix B-1 : Crash Data

Appendix B-1 : Crash Data

Iowa Department of Transportation

Crash Detail Report

Home Blvd Intersection

Report Version 1.3 Aug 2006

2012694489 07/16/2012 10:30 HOME BLVD AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Sport utility vehicle	4-tire light truck	0
Driver Age:	20	47	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012698291 08/13/2012 16:31 HOME BLVD AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Other: Vision obstructed
Roadway Type: Intersection: T - intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Non-collision
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3000
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Turning left	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	61	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Vision obstructed	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Pole: utility/light/etc	0	0

Iowa Department of Transportation

Crash Detail Report

Home Blvd Intersection

Report Version 1.3 Aug 2006

2013730907 03/18/2013 09:52 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Swerving/evasive action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Non-collision
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Snow
Drug/Alc Involved: none indicated
Property Damage: $4500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	57	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Other fixed object	0	0

Iowa Department of Transportation

Crash Detail Report

Home Blvd - 12th St NW Midblock

Report Version 1.3 Aug 2006

2013723864 01/29/2013 17:28 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Angle, oncoming left turn
Surface Conditions: Dry
Light Conditions: Dark - roadway lighted
Weather Conditions: Cloudy
Drug/Alc Involved: none indicated
Property Damage: $3000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	58	47	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013738755 05/12/2013 07:44 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY other
Roadway Type: Non-intersection: Railroad crossing

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Non-collision
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2500
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	82	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	FTY other	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

Home Blvd - 12th St NW Midblock

Report Version 1.3 Aug 2006

2013753990 08/22/2013 11:41 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY from driveway
Roadway Type: Non-intersection: Business drive

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Turning right	Changing lanes	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	21	49	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from driveway	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013759320 09/23/2013 11:15 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $6000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Overtaking/passing	0
Configuration:	4-tire light truck	4-tire light truck	0
Driver Age:	29	55	0
Driver Gender:	F	NR	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Home Blvd - 12th St NW Midblock

Report Version 1.3 Aug 2006

2013763306 10/22/2013 16:56 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Changing lanes	Legally Parked	0
Configuration:	Sport utility vehicle	Tractor/semi-trailer	0
Driver Age:	81	unknown	0
Driver Gender:	F	NR	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Other improper action	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013769751 11/26/2013 12:06 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $4500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Slowing/stopping	Changing lanes	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	26	71	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Followed too close	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

9th St W Intersection

Report Version 1.3 Aug 2006

2013736716 04/25/2013 17:16
County: 9 **City:** Waverly

9TH ST NW AND 9TH ST SW AND STATE 3/BREMER AVE

Major Cause: Followed too close

Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5700

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	30	41	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	Distracted fallen object	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

8th St W Intersection

Report Version 1.3 Aug 2006

2012669208 01/16/2012 11:56 STATE 3/BREMER AVE AND WARTBURG BLVD AND 8TH ST SW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	18	20	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012693127 07/03/2012 17:27 STATE 3/BREMER AVE AND WARTBURG BLVD AND 8TH ST SW
County: 9 **City:** Waverly

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 2
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $10000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	57	46	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

8th St W Intersection

Report Version 1.3 Aug 2006

2013743990 06/11/2013 17:04 WARTBURG BLVD AND 8TH ST SW AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk
Manner of Crash: Rear-end
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 2
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $7000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	24	58	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	Distracted fallen object	not reported	0
Fixed Object:	none	none	0

2013752580 08/12/2013 11:45 WARTBURG BLVD AND 8TH ST SW AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection
Severity: PDO
Manner of Crash: Angle, oncoming left turn
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	51	84	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

7th St W Intersection

Report Version 1.3 Aug 2006

2012666714 01/01/2012 11:58 STATE 3/BREMER AVE AND 7TH ST SW AND 7TH ST NW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: Minor
Fatalities: 0
Major Injuries: 0
Minor Injuries: 1
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Severe winds
Drug/Alc Involved: none indicated
Property Damage: $6000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	73	54	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012719119 12/19/2012 12:23 7TH ST SW AND 7TH ST NW AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $5000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	32	50	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

7th St W - 6th St W Midblock

Report Version 1.3 Aug 2006

2013759624 09/29/2013 18:06 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

Severity:	PDO	**Manner of Crash:**	Angle, oncoming left turn
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	37	20	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

6th St W Intersection

Report Version 1.3 Aug 2006

2012683072 04/26/2012 16:37 6TH ST SW AND STATE 3/BREMER AVE AND 6TH ST NW
County: 9 **City:** Waverly

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $6100

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	82	17	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

6th St W - 5th St W Midblock

Report Version 1.3 Aug 2006

2012695769 07/25/2012 12:13 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY from driveway
Roadway Type: Non-intersection: Business drive

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2800

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Turning right	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	24	82	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from driveway	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

5th St W Intersection

Report Version 1.3 Aug 2006

2012696782 07/27/2012 11:53 5TH ST SW AND 5TH ST NW AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: unknown
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $1700
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Changing lanes	Essentially straight	0
Configuration:	Passenger car	Tractor/semi-trailer	0
Driver Age:	90	28	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013757065 09/11/2013 08:15 5TH ST SW AND STATE 3/BREMER AVE AND 5TH ST NW
County: 9 **City:** Waverly

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $12000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	49	23	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

5th St W - 4th St W Midblock

Report Version 1.3 Aug 2006

2012666716 01/04/2012 15:45 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Ran off road - right
Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $4750
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Legally Parked	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	61	unknown	0
Driver Gender:	M	NR	
Driver Cond:	Illness	not reported	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012711659 11/12/2012 18:05 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Inattentive/distracted by: Use of phone or other device
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Dark - roadway lighted
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $7000
Number of Vehicles: 3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	East
Veh Action:	Stopped for sign/signal	Slowing/stopping	Essentially straight
Configuration:	Passenger car	4-tire light truck	Passenger car
Driver Age:	50	29	22
Driver Gender:	F	M	F
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	none	none	Distracted phone/device
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2012669204 01/12/2012 12:30 STATE 116/4TH ST SW AND STATE 3/BREMER AVE AND 4TH ST NW
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Snow
Drug/Alc Involved: none indicated
Property Damage: $3000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Stopped for sign/signal	Slowing/stopping	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	31	59	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Too fast for conditions	0
Drivr Contr 2:	not reported	Followed too close	0
Fixed Object:	none	none	0

2012695147 07/21/2012 21:25 STATE 116/4TH ST SW AND STATE 3/BREMER AVE AND 4TH ST NW
County: 9 **City:** Waverly

Major Cause: unknown
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Angle, oncoming left turn
Surface Conditions: Dry
Light Conditions: Dark - roadway lighted
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $5500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	65	16	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2012710815 11/05/2012 11:16 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection

Severity: Poss/Unk
Manner of Crash: Angle, oncoming left turn
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 2
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $9000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	28	71	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012716497 12/13/2012 18:14 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Manner of Crash: Rear-end
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Dark - roadway lighted
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	47	60	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2013723865 01/30/2013 15:57 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Legally Parked	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	16	unknown	0
Driver Gender:	M	NR	
Driver Cond:	Normal	not reported	0
Drivr Contr 1:	Too fast for conditions	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013725204 02/04/2013 15:00 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $7000
Number of Vehicles: 3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	South
Veh Action:	Essentially straight	Turning left	Stopped for sign/signal
Configuration:	Passenger car	Passenger car	Passenger car
Driver Age:	55	20	93
Driver Gender:	F	M	M
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	none	FTY making left turn	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2013740532 05/23/2013 16:25 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $16000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Van or mini-van	0
Driver Age:	46	78	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran traffic signal	none	0
Drivr Contr 2:	FTY other	not reported	0
Fixed Object:	none	none	0

2013743989 06/07/2013 19:54 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Angle, oncoming left turn
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $1750
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	21	44	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2013743992 06/13/2013 08:48 STATE 3/BREMER AVE AND 4TH ST NW AND STATE 116/4TH ST SW
County: 9 **City:** Waverly

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity: Poss/Unk
Manner of Crash: Broadside
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 1
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $8500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	75	42	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013767274 11/08/2013 14:20 STATE 3/BREMER AVE AND STATE 116/4TH ST SW AND 4TH ST NW
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Manner of Crash: Angle, oncoming left turn
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	86	26	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2013767275 11/14/2013 07:36 STATE 3/BREMER AVE AND STATE 116/4TH ST SW AND 4TH ST NW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $1600
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Turning right	Essentially straight	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	18	33	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Followed too close	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014784707 02/07/2014 08:00 STATE 3/BREMER AVE AND STATE 116/4TH ST SW AND 4TH ST NW
County: 9 **City:** Waverly

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $8500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	North	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	25	84	0
Driver Gender:	M	F	
Driver Cond:	Illness	Normal	0
Drivr Contr 1:	Ran traffic signal	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St W Intersection

Report Version 1.3 Aug 2006

2014788664 03/01/2014 11:05 STATE 3/BREMER AVE AND STATE 116/4TH ST SW AND 4TH ST NW
County: 9 **City:** Waverly

Major Cause: Swerving/evasive action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Non-collision
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Snow
Drug/Alc Involved: none indicated
Property Damage: $4000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	49	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

4th St W - 3rd St W Midblock

Report Version 1.3 Aug 2006

2012676129 03/07/2012 16:01 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Wet
Light Conditions: Daylight
Weather Conditions: Cloudy
Drug/Alc Involved: none indicated
Property Damage: $1700
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Changing lanes	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	21	78	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013758004 09/19/2013 20:15 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Wet
Light Conditions: Dark - roadway lighted
Weather Conditions: Rain
Drug/Alc Involved: none indicated
Property Damage: $10000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Legally Parked	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	61	unknown	0
Driver Gender:	F	NR	
Driver Cond:	Illness	not reported	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St SE Intersection

Report Version 1.3 Aug 2006

2014790755 03/11/2014 17:16 STATE 3/BREMER AVE AND 4TH ST SE
County: 9 **City:** Waverly

Major Cause: unknown
Roadway Type: Intersection: Four-way intersection

Severity: Minor
Fatalities: 0
Major Injuries: 0
Minor Injuries: 1
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $5000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	19	33	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

4th St SE - 5th St NE Midblock

Report Version 1.3 Aug 2006

2013736046 04/23/2013 16:21 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Slowing/stopping	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	40	16	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Followed too close	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

3rd St W Intersection

Report Version 1.3 Aug 2006

2013776486 12/23/2013 14:10 STATE 3/BREMER AVE AND 3RD ST SW AND 3RD ST NW
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Manner of Crash: Angle, oncoming left turn
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $5000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	68	44	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014779921 01/17/2014 11:45 STATE 3/BREMER AVE AND 3RD ST SW AND 3RD ST NW
County: 9 **City:** Waverly

Major Cause: FTY other
Roadway Type: Non-intersection: No special feature

Severity: PDO
Manner of Crash: Sideswipe, same direction
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3200
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Changing lanes	0
Configuration:	Passenger car	Tractor/semi-trailer	0
Driver Age:	55	51	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY other	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

3rd St W - 2nd St W Intersection

Report Version 1.3 Aug 2006

2013725666 02/11/2013 17:24 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Angle, oncoming left turn
Surface Conditions: Snow
Light Conditions: Dusk
Weather Conditions: Cloudy
Drug/Alc Involved: none indicated
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	41	64	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013771682 12/06/2013 16:00 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	29	30	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

3rd St E Intersection

Report Version 1.3 Aug 2006

2013768098 11/19/2013 13:26 STATE 3/BREMER AVE AND 3RD ST SE AND 3RD ST NE
County: 9 **City:** Waverly

Major Cause: FTY from parked position
Roadway Type: Non-intersection: Other

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $7000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Entering (merging)	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	62	37	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from parked position	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013775565 12/22/2013 02:09 STATE 3/BREMER AVE AND 3RD ST SE AND 3RD ST NE
County: 9 **City:** Waverly

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Non-collision
Surface Conditions: Snow
Light Conditions: Dark - roadway lighted
Weather Conditions: Snow
Drug/Alc Involved: Refused
Property Damage: $2500
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	23	0	0
Driver Gender:	M		
Driver Cond:	Infl by alc/drugs/meds	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Other fixed object	0	0

Iowa Department of Transportation

Crash Detail Report

3rd St E Intersection

Report Version 1.3 Aug 2006

2014784949 02/10/2014 15:46 STATE 3/BREMER AVE AND 3RD ST SE AND 3RD ST NE
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Ice
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Slowing/stopping	Stopped for sign/signal	0
Configuration:	Van or mini-van	Sport utility vehicle	0
Driver Age:	56	79	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Too fast for conditions	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014785779 02/14/2014 09:25 STATE 3/BREMER AVE AND 3RD ST SE AND 3RD ST NE
County: 9 **City:** Waverly

Major Cause: Ran traffic signal
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $6500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	26	55	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran traffic signal	0
Drivr Contr 2:	not reported	Too fast for conditions	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

2nd St W Intersection

Report Version 1.3 Aug 2006

2013763309 10/24/2013 11:00 2ND ST SW AND STATE 3/BREMER AVE AND 2ND ST NW
County: 9 **City:** Waverly

Major Cause: Other: No improper action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3300
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Legally Parked	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	unknown	78	0
Driver Gender:	NR	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014781834 01/28/2014 04:30 2ND ST SW AND STATE 3/BREMER AVE AND 2ND ST NW
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Ice
Light Conditions: Dark - roadway lighted
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Slowing/stopping	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	41	23	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

2nd St E Intersection

Report Version 1.3 Aug 2006

2012682796 04/19/2012 18:47 STATE 3/BREMER AVE AND 2ND ST NE AND 2ND ST SE
County: 9 **City:** Waverly

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Rain
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$3500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Slowing/stopping	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	18	31	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Lost control	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014778658 01/09/2014 13:46 2ND ST NE AND STATE 3/BREMER AVE AND 2ND ST SE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$7000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Slowing/stopping	Changing lanes	0
Configuration:	Tractor/semi-trailer	Sport utility vehicle	0
Driver Age:	61	45	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Followed too close	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

2nd St E - 3rd St E Midblock

Report Version 1.3 Aug 2006

2013749325 07/19/2013 14:25 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY from parked position
Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk
Manner of Crash: Sideswipe, same direction
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 1
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $6500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Entering (merging)	Essentially straight	0
Configuration:	Sport utility vehicle	Van or mini-van	0
Driver Age:	72	72	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from parked position	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014782209 01/29/2014 09:36 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Other: No improper action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Manner of Crash: Sideswipe, same direction
Fatalities: 0
Surface Conditions: Ice
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Slowing/stopping	Legally Parked	0
Configuration:	Tractor/semi-trailer	Passenger car	0
Driver Age:	57	unknown	0
Driver Gender:	M	NR	
Driver Cond:	Normal	unknown	0
Drivr Contr 1:	none	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

20th St W

Report Version 1.3 Aug 2006

2013729689 03/06/2013 16:14
County: 9 **City:** Waverly

W BREMER AVE AND STATE 3/20TH ST SW AND 20TH ST NW AND STATE 3/BREMER AVE

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity: Poss/Unk
Manner of Crash: Broadside
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 1
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $12500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	20	32	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013760362 10/04/2013 15:43
County: 9 **City:** Waverly

STATE 3/BREMER AVE

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Manner of Crash: Rear-end
Fatalities: 0
Surface Conditions: Wet
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Mist
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $4000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	15	40	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W Intersection

Report Version 1.3 Aug 2006

2012679497 03/30/2012 17:51 STATE 3/BREMER AVE AND 1ST ST SW AND 1ST ST NW
County: 9 **City:** Waverly

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Angle, oncoming left turn
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $13000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	21	53	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012690970 06/21/2012 17:33 STATE 3/BREMER AVE AND 1ST ST SW AND 1ST ST NW
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	25	68	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W Intersection

Report Version 1.3 Aug 2006

2013733510 04/04/2013 07:52 1ST ST SW AND STATE 3/BREMER AVE AND 1ST ST NW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Turning right	Turning right	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	16	39	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013739506 05/13/2013 18:56 1ST ST SW AND STATE 3/BREMER AVE AND 1ST ST NW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Stopped for sign/signal	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	73	22	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W Intersection

Report Version 1.3 Aug 2006

2013749035 07/18/2013 13:34 1ST ST SW AND STATE 3/BREMER AVE AND 1ST ST NW
County: 9 **City:** Waverly

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Manner of Crash: Broadside
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $7000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	88	55	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran traffic signal	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013776490 12/30/2013 15:45 STATE 3/BREMER AVE AND 1ST ST NW AND 1ST ST SW
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Manner of Crash: Rear-end
Fatalities: 0
Surface Conditions: Snow
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Snow
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3200
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Slowing/stopping	Stopped for sign/signal	0
Configuration:	4-tire light truck	3+ axle SU truck	0
Driver Age:	22	76	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Too fast for conditions	none	0
Drivr Contr 2:	Followed too close	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W Intersection

Report Version 1.3 Aug 2006

2014780945 01/22/2014 10:25 STATE 3/BREMER AVE AND 1ST ST NW AND 1ST ST SW
County: 9 **City:** Waverly

Major Cause: FTY other
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $5000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Changing lanes	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	22	22	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY other	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014782208 01/28/2014 15:50 STATE 3/BREMER AVE AND 1ST ST NW AND 1ST ST SW
County: 9 **City:** Waverly

Major Cause: Crossed centerline
Roadway Type: Intersection: Four-way intersection

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Ice
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $10500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	70	37	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	none	0
Drivr Contr 2:	Vision obstructed	not reported	0
Fixed Object:	Other fixed object	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W - 1st St E Midblock

Report Version 1.3 Aug 2006

2012669206 01/14/2012 02:12 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Traveling wrong way or on wrong side of road
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Head-on
Surface Conditions: Snow
Light Conditions: Dark - roadway lighted
Weather Conditions: Clear
Drug/Alc Involved: Alcohol: Statutory
Property Damage: $12000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Maint/construct vehicle	0
Driver Age:	22	54	0
Driver Gender:	M	M	
Driver Cond:	Infl by alc/drugs/meds	Normal	0
Drivr Contr 1:	unknown	Wrong way/wrong side	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013723866 01/31/2013 15:42 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2100
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	60	53	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W - 1st St E Midblock

Report Version 1.3 Aug 2006

2013741261 05/24/2013 07:38 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: Bridge/overpass/underpass

Severity: Minor
Fatalities: 0
Major Injuries: 0
Minor Injuries: 1
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $4150
Number of Vehicles: 4

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	West
Veh Action:	Essentially straight	Slowing/stopping	Slowing/stopping
Configuration:	Passenger car	Passenger car	Sport utility vehicle
Driver Age:	43	58	37
Driver Gender:	F	F	M
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	Followed too close	none	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2013766038 11/11/2013 10:26 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: Bridge/overpass/underpass

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Snow
Drug/Alc Involved: none indicated
Property Damage: $3000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Stopped for sign/signal	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	66	22	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Too fast for conditions	0
Drivr Contr 2:	not reported	Followed too close	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St W - 1st St E Midblock

Report Version 1.3 Aug 2006

2013766039 11/11/2013 10:32 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Snow
Drug/Alc Involved: none indicated
Property Damage: $4500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Slowing/stopping	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	50	61	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Followed too close	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014784708 02/07/2014 08:10 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: Bridge/overpass/underpass

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	not reported	0
Veh Action:	Slowing/stopping	not reported	0
Configuration:	Passenger car	unknown	0
Driver Age:	17	unknown	0
Driver Gender:	F	NR	
Driver Cond:	Normal	not reported	0
Drivr Contr 1:	Too fast for conditions	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

1st St E Intersection

Report Version 1.3 Aug 2006

2013765354 11/05/2013 13:08 1ST ST NE AND 1ST ST SE AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Wet
Light Conditions: Daylight
Weather Conditions: Rain
Drug/Alc Involved: none indicated
Property Damage: $7000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	70	67	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran traffic signal	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013775563 12/23/2013 12:30 1ST ST NE AND 1ST ST SE AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: Four-way intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Snow
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Stopped for sign/signal	Slowing/stopping	0
Configuration:	4-tire light truck	4-tire light truck	0
Driver Age:	34	78	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Too fast for conditions	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

18th St NW - 16th St SW Mid-block

Report Version 1.3 Aug 2006

2012693961 07/12/2012 12:05 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $2050

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Changing lanes	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	53	44	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Other improper action	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

16th St SW Intersection

Report Version 1.3 Aug 2006

2012669458 01/19/2012 22:15 16TH ST SW AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Intersection: T - intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Dark - roadway lighted
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $1500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	18	59	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

15th St NW Intersection

Report Version 1.3 Aug 2006

2013733865 04/07/2013 15:50 STATE 3/BREMER AVE AND 15TH ST NW
County: 9 **City:** Waverly

Major Cause: Other improper action
Roadway Type: Intersection: T - intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $2500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Stopped for sign/signal	Backing	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	69	49	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013753989 08/22/2013 08:17 STATE 3/BREMER AVE AND 15TH ST NW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Wet
Light Conditions: Daylight
Weather Conditions: Rain
Drug/Alc Involved: none indicated
Property Damage: $3500
Number of Vehicles: 3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	East
Veh Action:	Essentially straight	Slowing/stopping	Slowing/stopping
Configuration:	Sport utility vehicle	Passenger car	4-tire light truck
Driver Age:	35	31	36
Driver Gender:	F	F	M
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	Followed too close	none	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

Iowa Department of Transportation

Crash Detail Report

12th St NW Intersection

Report Version 1.3 Aug 2006

2013730760 03/18/2013 08:06 12TH ST NW AND STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Ice
Light Conditions: Daylight
Weather Conditions: Snow
Drug/Alc Involved: none indicated
Property Damage: $2500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Stopped for sign/signal	Slowing/stopping	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	62	16	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Too fast for conditions	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

11th St NW Intersection

Report Version 1.3 Aug 2006

2012688379 05/25/2012 10:44 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: FTY from driveway
Roadway Type: Non-intersection: Business drive

Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	North	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	65	68	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from driveway	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012716494 12/11/2012 17:25 STATE 3/BREMER AVE AND 11TH ST NW
County: 9 **City:** Waverly

Major Cause: Followed too close
Roadway Type: Non-intersection: Business drive

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Dusk
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $3500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	53	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

10th St W - 9th St W Midblock

Report Version 1.3 Aug 2006

2012708286 10/16/2012 15:35 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: unknown
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Rear-end
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $6500
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	20	19	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013733712 04/04/2013 18:32 STATE 3/BREMER AVE
County: 9 **City:** Waverly

Major Cause: unknown
Roadway Type: Non-intersection: Business drive

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Sideswipe, same direction
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $6000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	79	60	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

APPENDIX C

Plan and Profile Sheets

Appendix C-1 : Plan and Profile Sheets

Appendix C-1 : Plan and Profile Sheets

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities

SHADING	Design Color No.	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

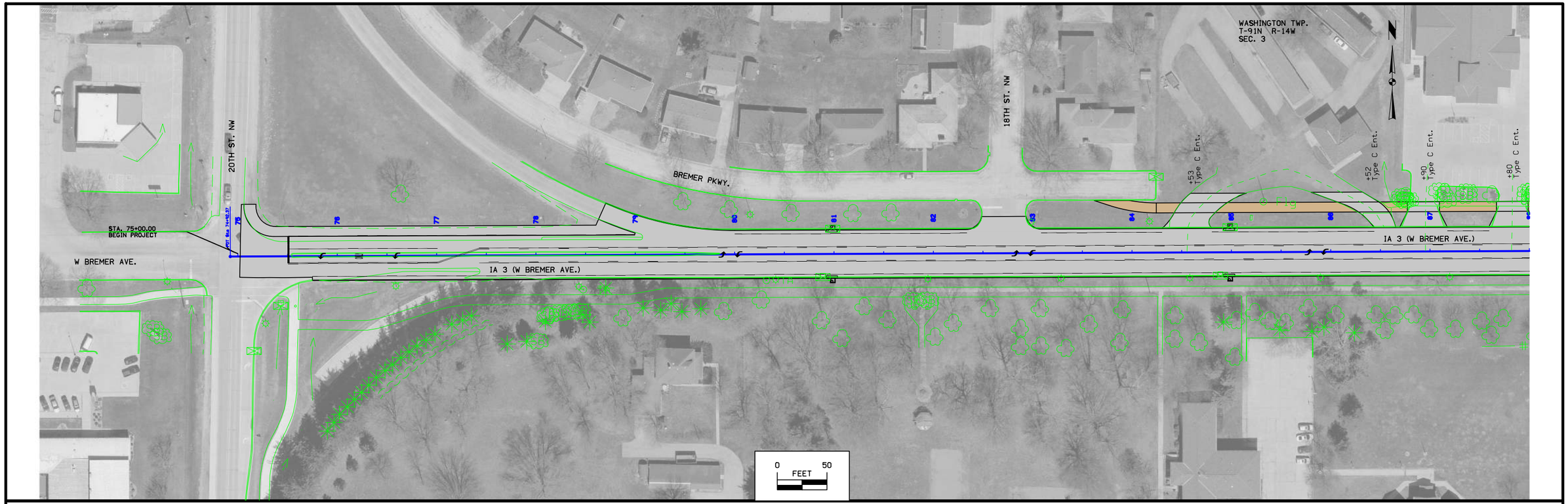
Reference Point
Station
Survey Line
Section Corner
Ground Line Intercept
Saw Cut
Guardrail
Trench Drain
HighTension Cable Guardrail
Sheet Pile
Pavement Removal
Clearing & Grubbing Area

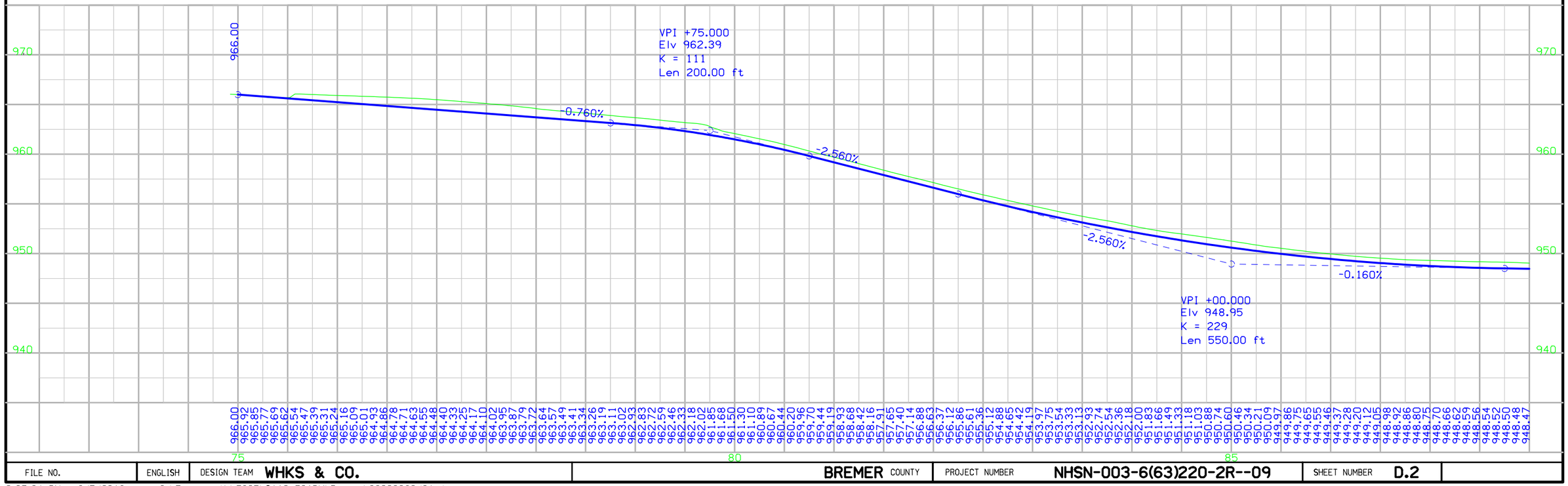
RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE

(COVERS SHEET SERIES D, E, F, & K)





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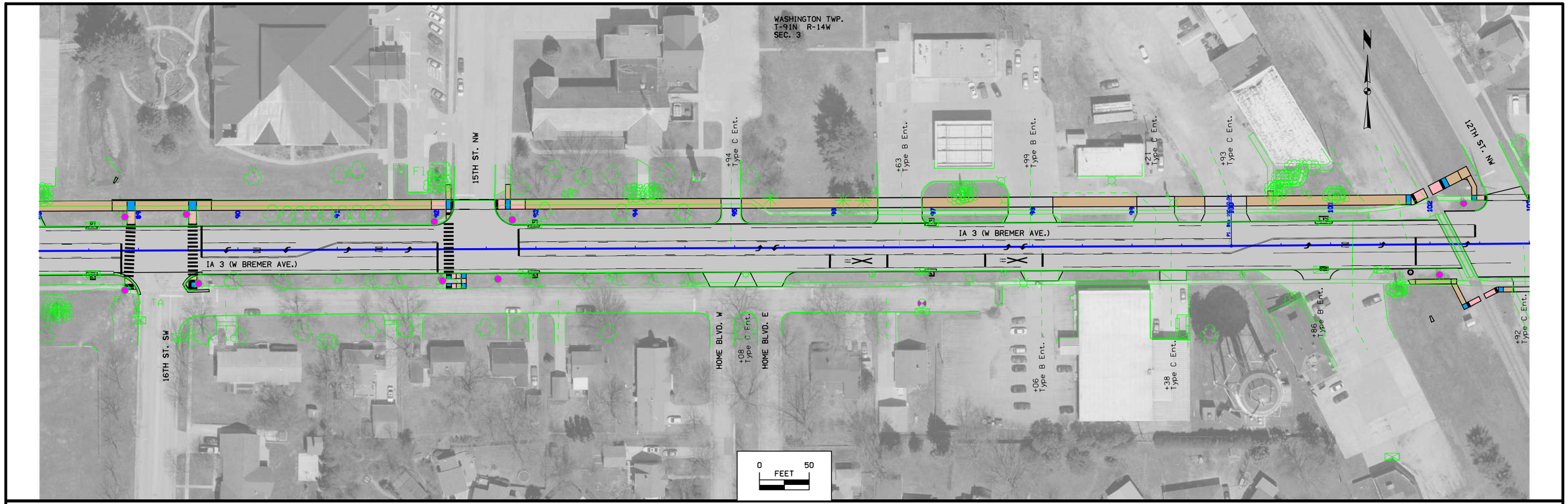

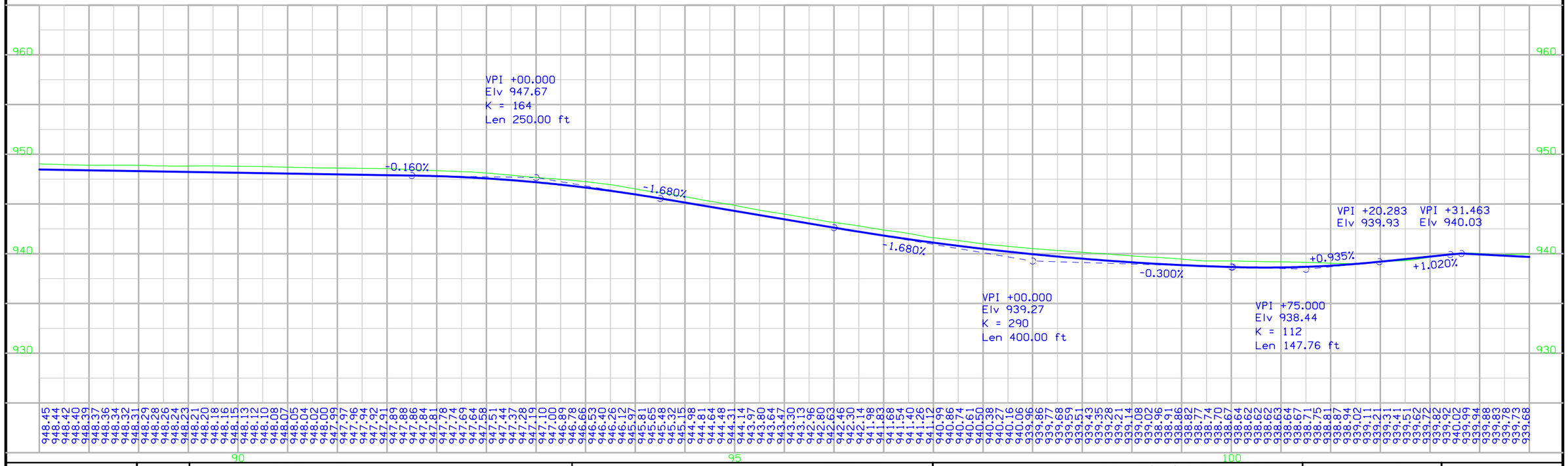

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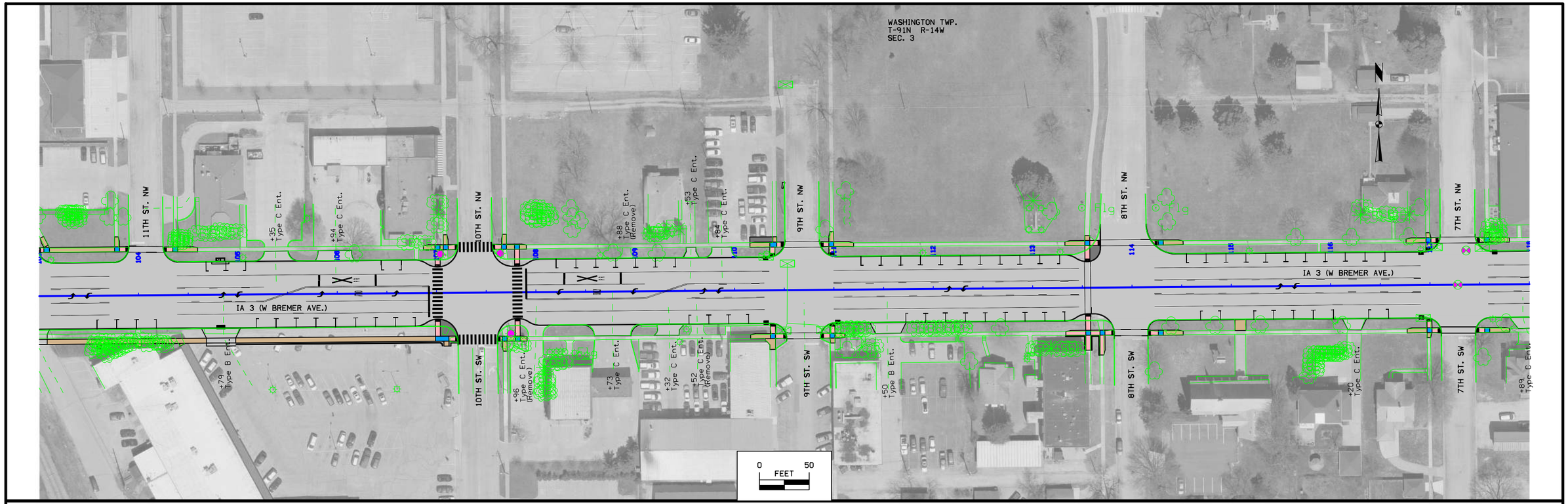

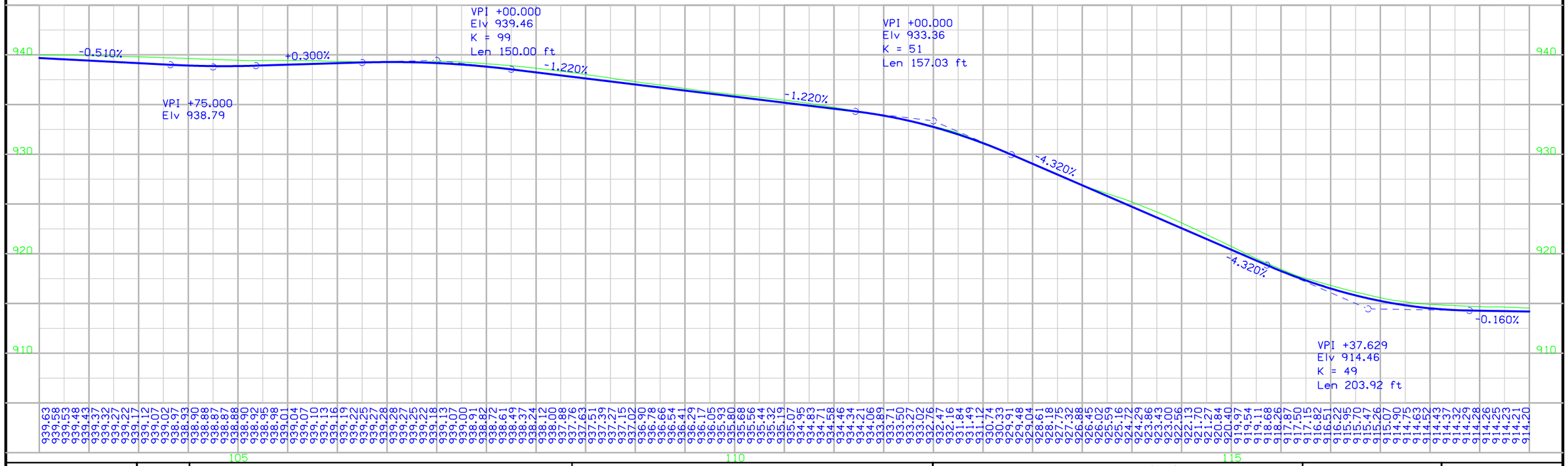

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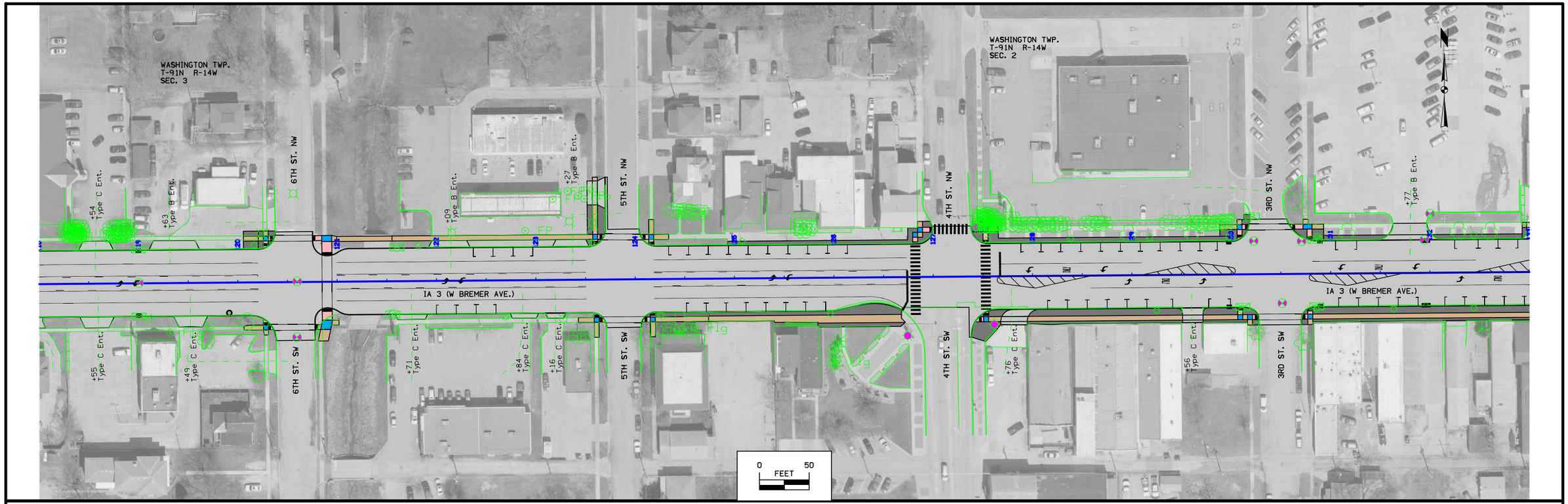

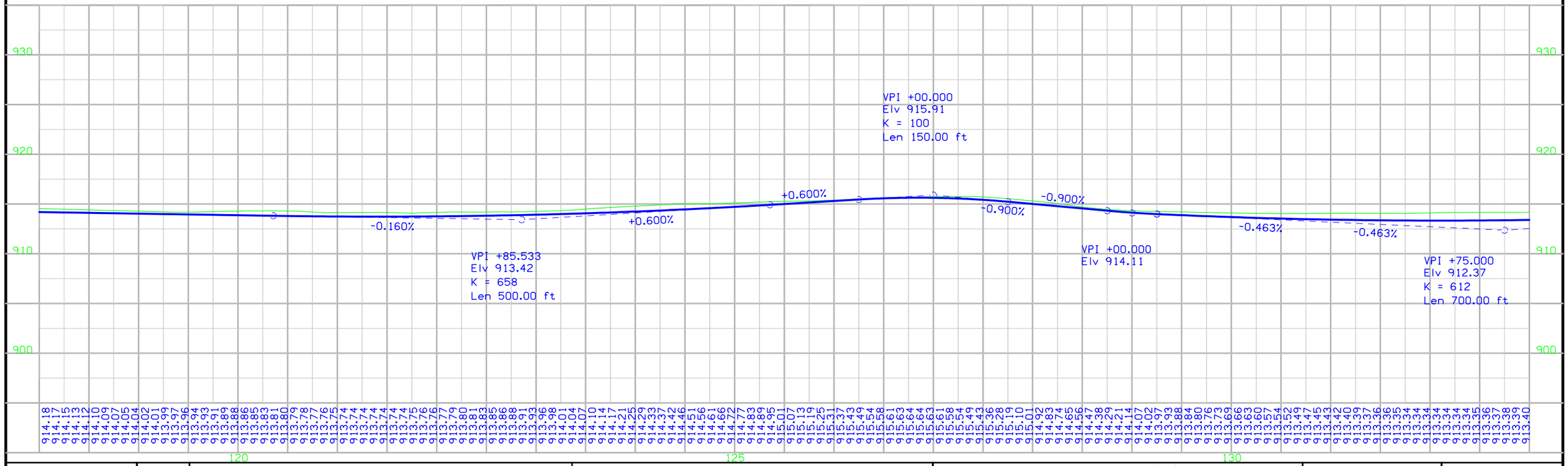

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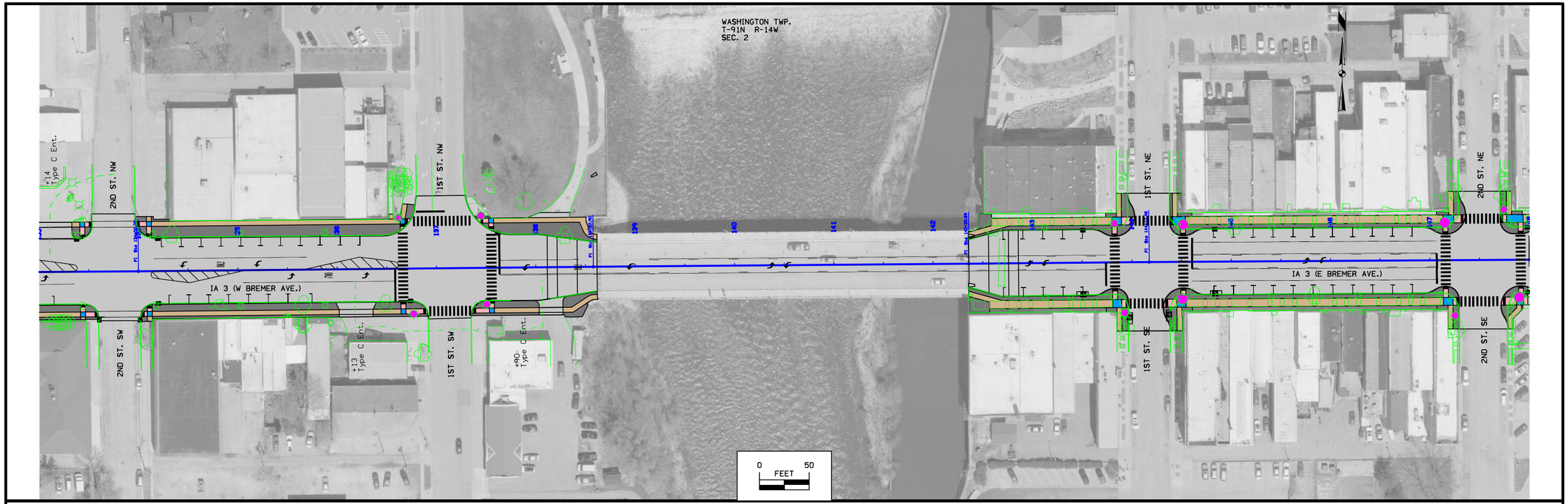

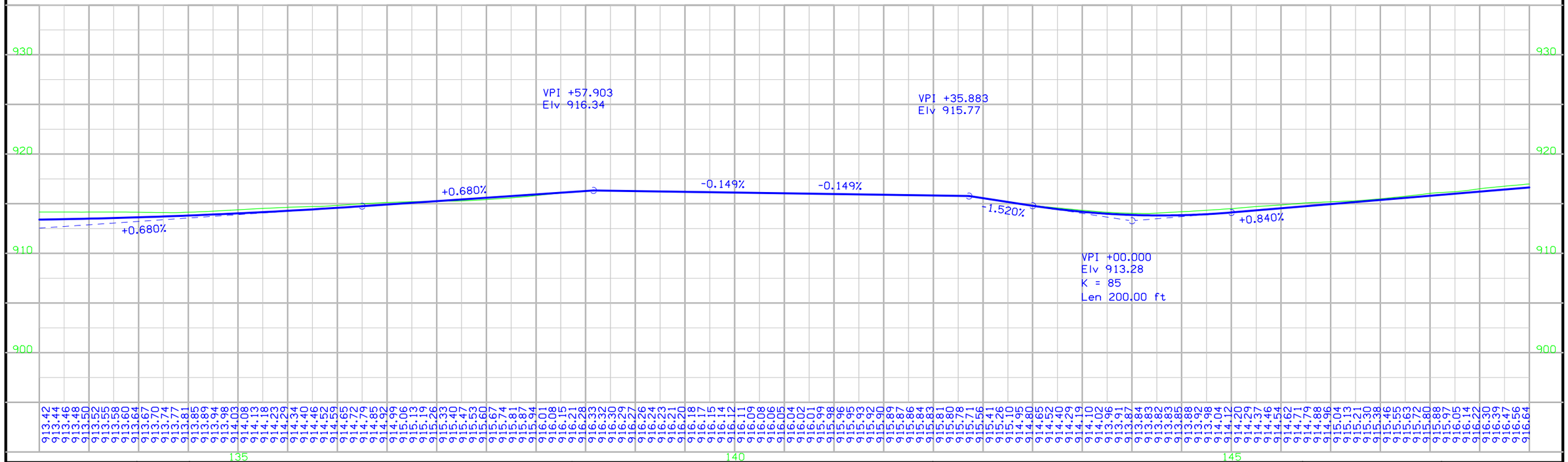

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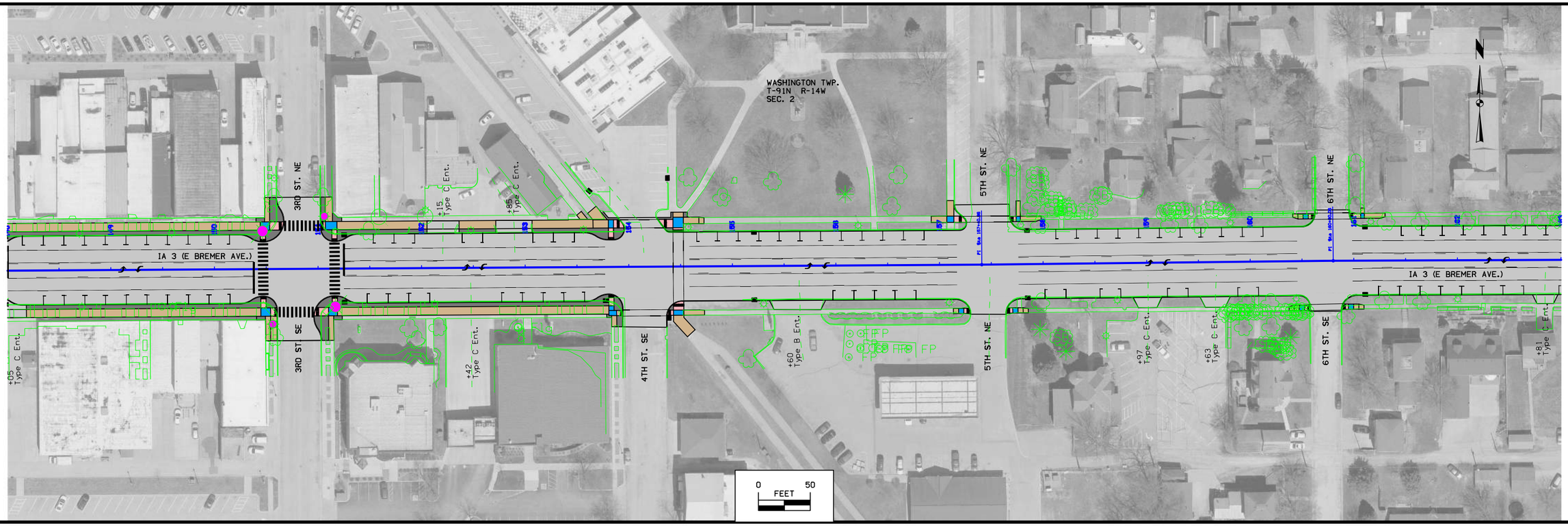

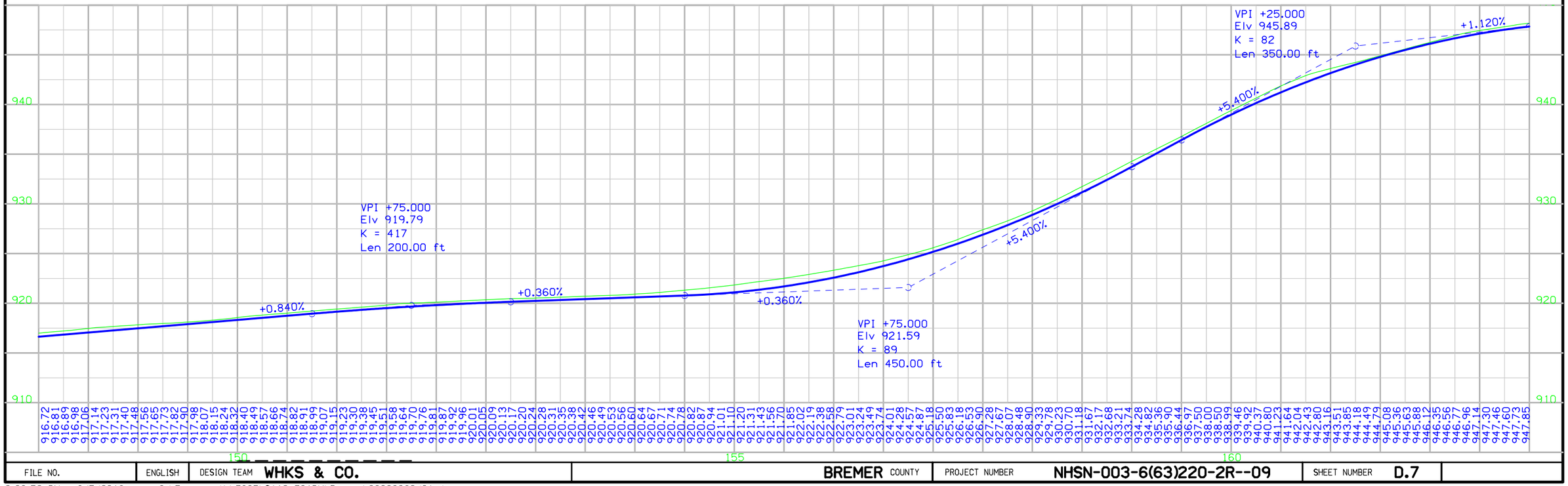

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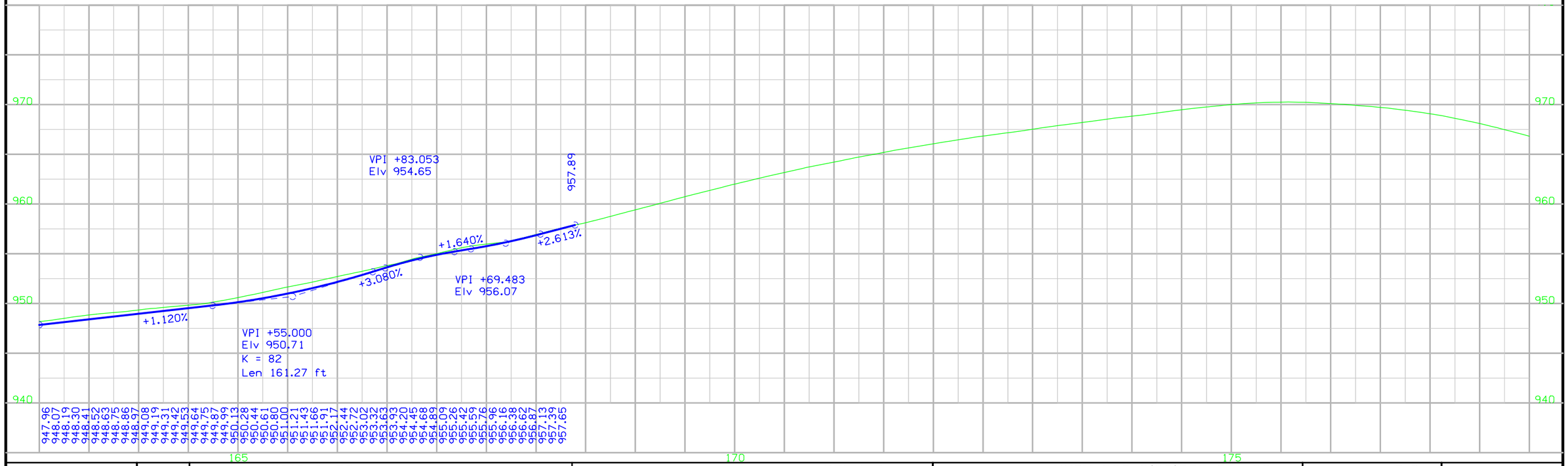

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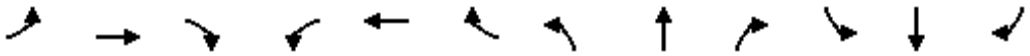
APPENDIX D

Existing Intersection Capacity Analysis Reports

Appendix D-1 : 2016
Appendix D-2 : 2036

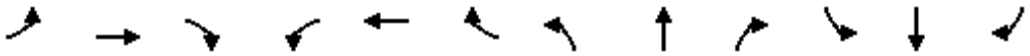
Appendix D-1: 2016



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Future Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	96	50	158	95	1	55	65	173	120	104	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	148	254	120	173	227
Volume Left (vph)	2	158	55	0	120
Volume Right (vph)	50	1	0	173	3
Hadj (s)	-0.17	0.16	0.26	-0.67	0.13
Departure Headway (s)	5.6	5.7	6.3	5.4	5.8
Degree Utilization, x	0.23	0.40	0.21	0.26	0.37
Capacity (veh/h)	571	583	535	624	577
Control Delay (s)	10.3	12.6	9.8	9.0	12.1
Approach Delay (s)	10.3	12.6	9.3		12.1
Approach LOS	B	B	A		B

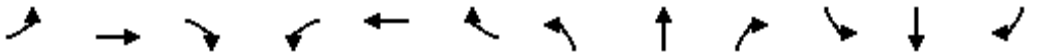
Intersection Summary				
Delay	11.1			
Level of Service	B			
Intersection Capacity Utilization	48.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	387	3	2	429	70	0	0	4	42	3	62
Future Volume (Veh/h)	62	387	3	2	429	70	0	0	4	42	3	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	421	3	2	466	76	0	0	4	46	3	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1037			464							
pX, platoon unblocked	0.95						0.95	0.95		0.95	0.95	0.95
vC, conflicting volume	542			424			862	1102	212	856	1066	271
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	411			424			748	1001	212	742	963	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	100	99	83	99	92
cM capacity (veh/h)	1087			1132			248	215	793	273	226	856

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	278	214	235	309	4	116
Volume Left	67	0	2	0	0	46
Volume Right	0	3	0	76	4	67
cSH	1087	1700	1132	1700	793	446
Volume to Capacity	0.06	0.13	0.00	0.18	0.01	0.26
Queue Length 95th (ft)	5	0	0	0	0	26
Control Delay (s)	2.5	0.0	0.1	0.0	9.6	15.9
Lane LOS	A		A		A	C
Approach Delay (s)	1.4		0.0		9.6	15.9
Approach LOS					A	C

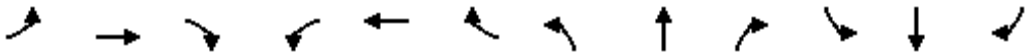
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	49.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	492	9	11	455	26	7	1	27	15	3	5
Future Volume (Veh/h)	16	492	9	11	455	26	7	1	27	15	3	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	535	10	12	495	28	8	1	29	16	3	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												6
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		654										
pX, platoon unblocked				1.00			1.00	1.00	1.00	1.00	1.00	
vC, conflicting volume	523			545			847	1121	272	864	1112	262
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	523			538			841	1115	264	858	1106	262
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			97	100	96	93	99	99
cM capacity (veh/h)	1040			1024			247	200	732	234	203	737

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	284	278	260	276	38	24
Volume Left	17	0	12	0	8	16
Volume Right	0	10	0	28	29	5
cSH	1040	1700	1024	1700	494	289
Volume to Capacity	0.02	0.16	0.01	0.16	0.08	0.08
Queue Length 95th (ft)	1	0	1	0	6	7
Control Delay (s)	0.7	0.0	0.5	0.0	12.9	19.6
Lane LOS	A		A		B	C
Approach Delay (s)	0.3		0.2		12.9	19.6
Approach LOS					B	C

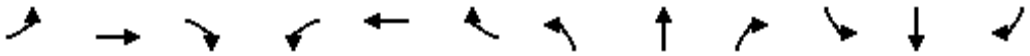
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	515	4	4	394	0	19	0	17	0	0	0
Future Volume (Veh/h)	5	515	4	4	394	0	19	0	17	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	560	4	4	428	0	21	0	18	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		328										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	428			564			794	1008	282	744	1010	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	428			354			604	837	48	550	839	214
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	98	100	100	100
cM capacity (veh/h)	1128			1106			350	275	930	375	275	791

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	285	284	218	214	39	0
Volume Left	5	0	4	0	21	0
Volume Right	0	4	0	0	18	0
cSH	1128	1700	1106	1700	491	1700
Volume to Capacity	0.00	0.17	0.00	0.13	0.08	0.00
Queue Length 95th (ft)	0	0	0	0	6	0
Control Delay (s)	0.2	0.0	0.2	0.0	13.0	0.0
Lane LOS	A		A		B	A
Approach Delay (s)	0.1		0.1		13.0	0.0
Approach LOS					B	A

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	27.9%	ICU Level of Service		A
Analysis Period (min)	15			



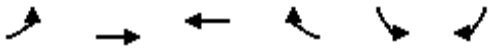
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Future Volume (Veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	113	424	5	0	347	13	2	1	3	9	1	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	360			429			860	1012	214	795	1008	180
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	360			429			860	1012	214	795	1008	180
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			99	100	100	96	100	96
cM capacity (veh/h)	1195			1127			222	215	790	256	216	832

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	325	217	174	186	6	43
Volume Left	113	0	0	0	2	9
Volume Right	0	5	0	13	3	33
cSH	1195	1700	1127	1700	344	541
Volume to Capacity	0.09	0.13	0.00	0.11	0.02	0.08
Queue Length 95th (ft)	8	0	0	0	1	6
Control Delay (s)	3.5	0.0	0.0	0.0	15.7	12.2
Lane LOS	A				C	B
Approach Delay (s)	2.1		0.0		15.7	12.2
Approach LOS					C	B

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	36.5%	ICU Level of Service		A
Analysis Period (min)	15			

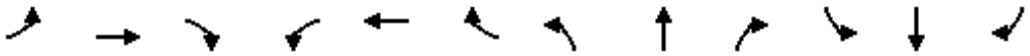
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	45	122	337	63	131
Future Volume (vph)	269	45	122	337	63	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3463			3493	1770	1583
Flt Permitted	1.00			0.77	0.95	1.00
Satd. Flow (perm)	3463			2730	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	292	49	133	366	68	142
RTOR Reduction (vph)	23	0	0	0	0	88
Lane Group Flow (vph)	318	0	0	499	68	54
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	4			8		
Permitted Phases			8		2	2
Actuated Green, G (s)	29.0			29.0	23.0	23.0
Effective Green, g (s)	29.0			29.0	23.0	23.0
Actuated g/C Ratio	0.48			0.48	0.38	0.38
Clearance Time (s)	4.0			4.0	4.0	4.0
Lane Grp Cap (vph)	1673			1319	678	606
v/s Ratio Prot	0.09					
v/s Ratio Perm				c0.18	c0.04	0.03
v/c Ratio	0.19			0.38	0.10	0.09
Uniform Delay, d1	8.8			9.8	11.9	11.8
Progression Factor	1.00			0.22	1.00	1.00
Incremental Delay, d2	0.3			0.8	0.3	0.3
Delay (s)	9.1			3.0	12.2	12.1
Level of Service	A			A	B	B
Approach Delay (s)	9.1			3.0	12.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



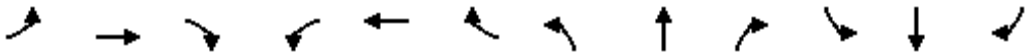
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	365	428	58	57	51
Future Volume (vph)	35	365	428	58	57	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frt		1.00	0.98		0.94	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3524	3476		1700	
Flt Permitted		0.89	1.00		0.97	
Satd. Flow (perm)		3141	3476		1700	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	397	465	63	62	55
RTOR Reduction (vph)	0	0	18	0	33	0
Lane Group Flow (vph)	0	435	510	0	84	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		4	8			
Permitted Phases	4				6	
Actuated Green, G (s)		28.0	28.0		24.0	
Effective Green, g (s)		28.0	28.0		24.0	
Actuated g/C Ratio		0.47	0.47		0.40	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1465	1622		680	
v/s Ratio Prot			c0.15			
v/s Ratio Perm		0.14			c0.05	
v/c Ratio		0.30	0.31		0.12	
Uniform Delay, d1		9.9	10.0		11.4	
Progression Factor		0.78	0.41		1.00	
Incremental Delay, d2		0.5	0.5		0.4	
Delay (s)		8.2	4.6		11.7	
Level of Service		A	A		B	
Approach Delay (s)		8.2	4.6		11.7	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Future Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frt		0.99			1.00			1.00	0.85		0.97	
Flt Protected		1.00			1.00			0.96	1.00		0.97	
Satd. Flow (prot)		3485			3518			1781	1583		1750	
Flt Permitted		0.95			0.88			0.76	1.00		0.87	
Satd. Flow (perm)		3306			3119			1418	1583		1572	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	391	43	51	474	4	85	8	111	26	9	12
RTOR Reduction (vph)	0	14	0	0	1	0	0	0	67	0	7	0
Lane Group Flow (vph)	0	427	0	0	528	0	0	93	44	0	40	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		28.0			28.0			24.0	24.0		24.0	
Effective Green, g (s)		28.0			28.0			24.0	24.0		24.0	
Actuated g/C Ratio		0.47			0.47			0.40	0.40		0.40	
Clearance Time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)		1542			1455			567	633		628	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.17			c0.07	0.03		0.03	
v/c Ratio		0.28			0.36			0.16	0.07		0.06	
Uniform Delay, d1		9.8			10.3			11.6	11.1		11.1	
Progression Factor		0.43			0.88			1.00	1.00		1.00	
Incremental Delay, d2		0.4			0.6			0.6	0.2		0.2	
Delay (s)		4.6			9.6			12.2	11.3		11.3	
Level of Service		A			A			B	B		B	
Approach Delay (s)		4.6			9.6			11.7			11.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

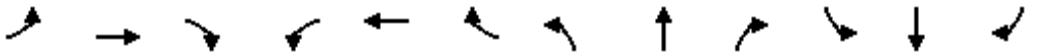


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Future Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.5	4.0			4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frt		0.97			1.00		1.00	0.90			0.98	
Flt Protected		1.00			0.98		0.95	1.00			0.99	
Satd. Flow (prot)		3415			3464		1770	1673			1810	
Flt Permitted		0.93			0.63		0.64	1.00			0.86	
Satd. Flow (perm)		3195			2233		1190	1673			1574	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	385	116	266	403	10	228	108	227	43	109	21
RTOR Reduction (vph)	0	45	0	0	2	0	0	121	0	0	9	0
Lane Group Flow (vph)	0	470	0	0	677	0	228	214	0	0	164	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0		28.0	28.0			17.0	
Effective Green, g (s)		24.0			24.0		28.0	28.0			17.0	
Actuated g/C Ratio		0.40			0.40		0.47	0.47			0.28	
Clearance Time (s)		4.0			4.0		4.5	4.0			4.0	
Lane Grp Cap (vph)		1278			893		618	780			445	
v/s Ratio Prot							c0.04	0.13				
v/s Ratio Perm		0.15			c0.30		c0.13				0.10	
v/c Ratio		0.37			0.86dl		0.37	0.27			0.37	
Uniform Delay, d1		12.7			15.5		12.7	9.8			17.2	
Progression Factor		0.57			0.52		1.00	1.00			1.00	
Incremental Delay, d2		0.8			5.6		1.7	0.9			2.4	
Delay (s)		8.1			13.6		14.4	10.7			19.6	
Level of Service		A			B		B	B			B	
Approach Delay (s)		8.1			13.6			12.2			19.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

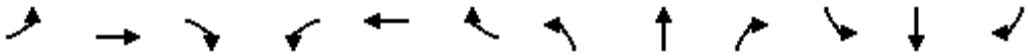
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group



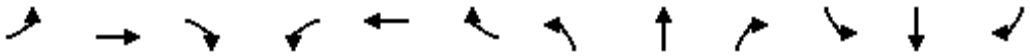
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Future Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frt		0.99			0.98			0.92			1.00	0.85
Flt Protected		0.99			1.00			1.00			0.96	1.00
Satd. Flow (prot)		3497			3463			1700			1790	1583
Flt Permitted		0.80			0.87			0.97			0.67	1.00
Satd. Flow (perm)		2831			3032			1661			1240	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	495	25	66	616	89	23	74	155	91	21	57
RTOR Reduction (vph)	0	6	0	0	17	0	0	96	0	0	0	38
Lane Group Flow (vph)	0	581	0	0	754	0	0	156	0	0	112	19
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		23.0			32.5			19.5			19.5	19.5
Effective Green, g (s)		23.0			32.5			19.5			19.5	19.5
Actuated g/C Ratio		0.38			0.54			0.32			0.32	0.32
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		1085			1678			539			403	514
v/s Ratio Prot					c0.04							
v/s Ratio Perm		c0.21			0.21			c0.09			0.09	0.01
v/c Ratio		0.54			0.45			0.29			0.28	0.04
Uniform Delay, d1		14.4			8.3			15.1			15.0	13.8
Progression Factor		0.83			0.90			1.00			1.00	1.00
Incremental Delay, d2		1.8			0.8			1.4			1.7	0.1
Delay (s)		13.8			8.3			16.4			16.7	14.0
Level of Service		B			A			B			B	B
Approach Delay (s)		13.8			8.3			16.4			15.8	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



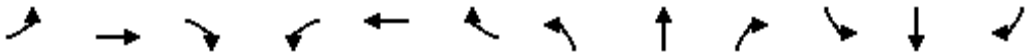
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Future Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.99			0.87	
Flt Protected		1.00			1.00			0.96			1.00	
Satd. Flow (prot)		3486			3529			1764			1619	
Flt Permitted		0.89			0.94			0.71			0.99	
Satd. Flow (perm)		3096			3338			1307			1613	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	634	57	9	577	8	111	2	9	3	1	89
RTOR Reduction (vph)	0	10	0	0	1	0	0	5	0	0	58	0
Lane Group Flow (vph)	0	732	0	0	593	0	0	117	0	0	35	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			21.0			21.0	
Effective Green, g (s)		31.0			31.0			21.0			21.0	
Actuated g/C Ratio		0.52			0.52			0.35			0.35	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		1599			1724			457			564	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.18			c0.09			0.02	
v/c Ratio		0.46			0.34			0.26			0.06	
Uniform Delay, d1		9.2			8.5			13.9			13.0	
Progression Factor		0.40			0.91			1.00			1.00	
Incremental Delay, d2		0.8			0.5			1.4			0.2	
Delay (s)		4.5			8.3			15.3			13.2	
Level of Service		A			A			B			B	
Approach Delay (s)		4.5			8.3			15.3			13.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Future Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.96			0.89	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		3486			3534			1731			1647	
Flt Permitted		0.93			0.95			0.85			1.00	
Satd. Flow (perm)		3263			3353			1525			1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	568	58	7	530	3	42	4	20	1	4	28
RTOR Reduction (vph)	0	13	0	0	0	0	0	13	0	0	18	0
Lane Group Flow (vph)	0	633	0	0	540	0	0	53	0	0	15	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			21.0			21.0	
Effective Green, g (s)		31.0			31.0			21.0			21.0	
Actuated g/C Ratio		0.52			0.52			0.35			0.35	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		1685			1732			533			575	
v/s Ratio Prot												
v/s Ratio Perm		c0.19			0.16			c0.03			0.01	
v/c Ratio		0.38			0.31			0.10			0.03	
Uniform Delay, d1		8.7			8.4			13.1			12.8	
Progression Factor		0.19			0.51			1.00			1.00	
Incremental Delay, d2		0.6			0.5			0.4			0.1	
Delay (s)		2.3			4.7			13.5			12.9	
Level of Service		A			A			B			B	
Approach Delay (s)		2.3			4.7			13.5			12.9	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Future Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.97			0.90	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		3508			3526			1747			1653	
Flt Permitted		0.93			0.95			0.82			0.96	
Satd. Flow (perm)		3272			3339			1481			1605	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	547	27	8	439	9	51	5	15	11	2	43
RTOR Reduction (vph)	0	6	0	0	2	0	0	10	0	0	28	0
Lane Group Flow (vph)	0	592	0	0	454	0	0	61	0	0	28	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			21.0			21.0	
Effective Green, g (s)		31.0			31.0			21.0			21.0	
Actuated g/C Ratio		0.52			0.52			0.35			0.35	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		1690			1725			518			561	
v/s Ratio Prot												
v/s Ratio Perm		c0.18			0.14			c0.04			0.02	
v/c Ratio		0.35			0.26			0.12			0.05	
Uniform Delay, d1		8.6			8.1			13.2			12.9	
Progression Factor		0.28			1.00			1.00			1.00	
Incremental Delay, d2		0.5			0.4			0.5			0.2	
Delay (s)		3.0			8.5			13.7			13.1	
Level of Service		A			A			B			B	
Approach Delay (s)		3.0			8.5			13.7			13.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	341	499	68	142
v/c Ratio	0.20	0.38	0.10	0.20
Control Delay	8.0	3.0	12.4	3.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.0	3.0	12.4	3.5
Queue Length 50th (ft)	29	11	15	0
Queue Length 95th (ft)	50	17	37	29
Internal Link Dist (ft)	885	250	415	
Turn Bay Length (ft)			150	150
Base Capacity (vph)	1695	1319	678	694
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.38	0.10	0.20

Intersection Summary



Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	435	528	117
v/c Ratio	0.30	0.32	0.16
Control Delay	8.4	4.4	7.6
Queue Delay	0.0	0.0	0.0
Total Delay	8.4	4.4	7.6
Queue Length 50th (ft)	32	21	13
Queue Length 95th (ft)	54	32	41
Internal Link Dist (ft)	250	957	439
Turn Bay Length (ft)			150
Base Capacity (vph)	1464	1639	713
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.30	0.32	0.16

Intersection Summary

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	441	529	93	111	47
v/c Ratio	0.28	0.36	0.16	0.16	0.07
Control Delay	4.5	9.7	12.6	3.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	9.7	12.6	3.5	9.4
Queue Length 50th (ft)	17	61	21	0	7
Queue Length 95th (ft)	26	m93	47	25	24
Internal Link Dist (ft)	384	574	285		279
Turn Bay Length (ft)				150	
Base Capacity (vph)	1556	1456	567	699	636
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.36	0.16	0.16	0.07

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	515	679	228	335	173
v/c Ratio	0.39	0.86dl	0.38	0.37	0.38
Control Delay	7.2	14.5	13.3	4.9	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	14.5	13.3	4.9	19.0
Queue Length 50th (ft)	52	103	48	21	46
Queue Length 95th (ft)	80	#138	89	62	94
Internal Link Dist (ft)	1240	905		283	283
Turn Bay Length (ft)			150		
Base Capacity (vph)	1322	894	608	901	454
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.76	0.38	0.37	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	587	771	252	112	57
v/c Ratio	0.54	0.45	0.40	0.28	0.10
Control Delay	13.9	8.2	9.3	17.4	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	8.2	9.3	17.4	1.8
Queue Length 50th (ft)	92	95	28	30	0
Queue Length 95th (ft)	142	108	77	65	9
Internal Link Dist (ft)	905	629	284	296	
Turn Bay Length (ft)					150
Base Capacity (vph)	1091	1699	635	403	581
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.54	0.45	0.40	0.28	0.10

Intersection Summary

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	742	594	122	93
v/c Ratio	0.46	0.34	0.26	0.15
Control Delay	4.5	8.4	15.1	4.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	8.4	15.1	4.7
Queue Length 50th (ft)	38	44	29	1
Queue Length 95th (ft)	57	81	64	26
Internal Link Dist (ft)	629	264	277	297
Turn Bay Length (ft)				
Base Capacity (vph)	1609	1726	462	622
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.46	0.34	0.26	0.15

Intersection Summary

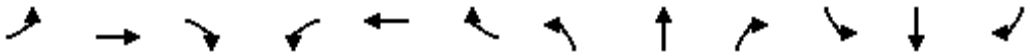
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	646	540	66	33
v/c Ratio	0.38	0.31	0.12	0.06
Control Delay	2.2	4.8	10.8	6.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.2	4.8	10.8	6.7
Queue Length 50th (ft)	1	23	11	1
Queue Length 95th (ft)	2	37	33	16
Internal Link Dist (ft)	264	246	278	288
Turn Bay Length (ft)				
Base Capacity (vph)	1700	1732	547	592
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.38	0.31	0.12	0.06

Intersection Summary

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	598	456	71	56
v/c Ratio	0.35	0.26	0.13	0.10
Control Delay	3.0	8.5	11.9	6.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.0	8.5	11.9	6.7
Queue Length 50th (ft)	15	43	13	3
Queue Length 95th (ft)	16	67	37	23
Internal Link Dist (ft)	246	248	291	292
Turn Bay Length (ft)				
Base Capacity (vph)	1696	1727	528	589
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.26	0.13	0.10

Intersection Summary

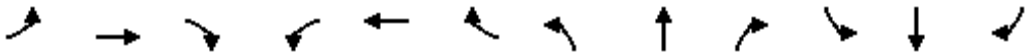
Appendix D-2: 2036



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Future Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	117	61	192	115	1	68	80	211	146	127	4

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	181	308	148	211	277
Volume Left (vph)	3	192	68	0	146
Volume Right (vph)	61	1	0	211	4
Hadj (s)	-0.16	0.16	0.26	-0.67	0.13
Departure Headway (s)	6.3	6.3	6.9	6.0	6.4
Degree Utilization, x	0.32	0.54	0.28	0.35	0.49
Capacity (veh/h)	493	532	479	550	513
Control Delay (s)	12.3	16.5	11.4	10.9	15.5
Approach Delay (s)	12.3	16.5	11.1		15.5
Approach LOS	B	C	B		C

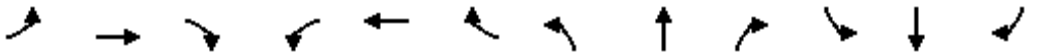
Intersection Summary				
Delay	13.9			
Level of Service	B			
Intersection Capacity Utilization	55.1%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	387	3	2	429	70	0	0	4	42	3	62
Future Volume (Veh/h)	62	387	3	2	429	70	0	0	4	42	3	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	513	4	3	569	93	0	0	5	56	4	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1037			464							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	662			517			1054	1347	258	1047	1302	331
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	474			517			897	1214	258	890	1166	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			100	100	99	73	98	90
cM capacity (veh/h)	1004			1045			180	153	740	204	163	846

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	338	260	288	378	5	142
Volume Left	82	0	3	0	0	56
Volume Right	0	4	0	93	5	82
cSH	1004	1700	1045	1700	740	359
Volume to Capacity	0.08	0.15	0.00	0.22	0.01	0.40
Queue Length 95th (ft)	7	0	0	0	1	46
Control Delay (s)	2.8	0.0	0.1	0.0	9.9	21.5
Lane LOS	A		A		A	C
Approach Delay (s)	1.6		0.1		9.9	21.5
Approach LOS					A	C

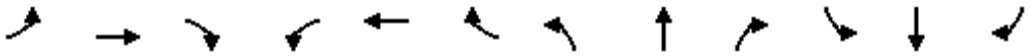
Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	57.0%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	492	9	11	455	26	7	1	27	15	3	5
Future Volume (Veh/h)	16	492	9	11	455	26	7	1	27	15	3	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	652	12	15	603	34	9	1	36	20	4	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												6
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		654										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	
vC, conflicting volume	637			664			1034	1367	332	1054	1356	318
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	637			584			966	1311	241	988	1300	318
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			95	99	95	89	97	99
cM capacity (veh/h)	943			954			190	147	735	179	149	677

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	347	338	316	336	46	31
Volume Left	21	0	15	0	9	20
Volume Right	0	12	0	34	36	7
cSH	943	1700	954	1700	446	225
Volume to Capacity	0.02	0.20	0.02	0.20	0.10	0.14
Queue Length 95th (ft)	2	0	1	0	9	12
Control Delay (s)	0.8	0.0	0.6	0.0	14.0	24.8
Lane LOS	A		A		B	C
Approach Delay (s)	0.4		0.3		14.0	24.8
Approach LOS					B	C

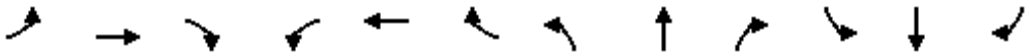
Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	47.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	515	4	4	394	0	19	0	17	0	0	0
Future Volume (Veh/h)	5	515	4	4	394	0	19	0	17	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	683	5	5	522	0	25	0	23	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		328										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	522			688			970	1232	344	910	1234	261
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	522			423			738	1029	40	671	1032	261
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			91	100	97	100	100	100
cM capacity (veh/h)	1041			1016			272	206	917	296	205	738

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	348	346	266	261	48	0
Volume Left	7	0	5	0	25	0
Volume Right	0	5	0	0	23	0
cSH	1041	1700	1016	1700	410	1700
Volume to Capacity	0.01	0.20	0.00	0.15	0.12	0.00
Queue Length 95th (ft)	1	0	0	0	10	0
Control Delay (s)	0.2	0.0	0.2	0.0	14.9	0.0
Lane LOS	A		A		B	A
Approach Delay (s)	0.1		0.1		14.9	0.0
Approach LOS					B	A

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	31.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Future Volume (Veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	138	517	7	0	423	16	3	1	4	11	1	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	439			524			1048	1236	262	970	1231	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	439			524			1048	1236	262	970	1231	220
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			98	99	99	94	99	95
cM capacity (veh/h)	1117			1039			156	153	737	186	154	785

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	396	266	212	228	8	52
Volume Left	138	0	0	0	3	11
Volume Right	0	7	0	16	4	40
cSH	1117	1700	1039	1700	256	446
Volume to Capacity	0.12	0.16	0.00	0.13	0.03	0.12
Queue Length 95th (ft)	11	0	0	0	2	10
Control Delay (s)	3.8	0.0	0.0	0.0	19.5	14.1
Lane LOS	A				C	B
Approach Delay (s)	2.3		0.0		19.5	14.1
Approach LOS					C	B

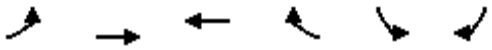
Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	41.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	45	122	337	63	131
Future Volume (vph)	269	45	122	337	63	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3463			3493	1770	1583
Flt Permitted	1.00			0.73	0.95	1.00
Satd. Flow (perm)	3463			2598	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	357	60	162	447	84	174
RTOR Reduction (vph)	19	0	0	0	0	114
Lane Group Flow (vph)	398	0	0	609	84	60
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	4			8		
Permitted Phases			8		2	2
Actuated Green, G (s)	38.0			38.0	24.0	24.0
Effective Green, g (s)	38.0			38.0	24.0	24.0
Actuated g/C Ratio	0.54			0.54	0.34	0.34
Clearance Time (s)	4.0			4.0	4.0	4.0
Lane Grp Cap (vph)	1879			1410	606	542
v/s Ratio Prot	0.11					
v/s Ratio Perm				c0.23	c0.05	0.04
v/c Ratio	0.21			0.43	0.14	0.11
Uniform Delay, d1	8.3			9.6	15.9	15.7
Progression Factor	1.00			0.22	1.00	1.00
Incremental Delay, d2	0.3			0.9	0.5	0.4
Delay (s)	8.5			3.0	16.3	16.1
Level of Service	A			A	B	B
Approach Delay (s)	8.5			3.0	16.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

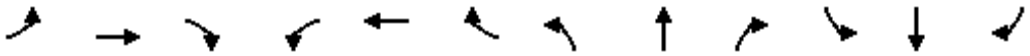
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	365	428	58	57	51
Future Volume (vph)	35	365	428	58	57	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frt		1.00	0.98		0.94	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3524	3476		1699	
Flt Permitted		0.86	1.00		0.97	
Satd. Flow (perm)		3060	3476		1699	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	46	484	568	77	76	68
RTOR Reduction (vph)	0	0	15	0	42	0
Lane Group Flow (vph)	0	530	630	0	102	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		4	8			
Permitted Phases	4				6	
Actuated Green, G (s)		35.0	35.0		27.0	
Effective Green, g (s)		35.0	35.0		27.0	
Actuated g/C Ratio		0.50	0.50		0.39	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1530	1738		655	
v/s Ratio Prot			c0.18			
v/s Ratio Perm		0.17			c0.06	
v/c Ratio		0.35	0.36		0.16	
Uniform Delay, d1		10.6	10.7		14.1	
Progression Factor		0.76	0.49		1.00	
Incremental Delay, d2		0.6	0.6		0.5	
Delay (s)		8.6	5.8		14.6	
Level of Service		A	A		B	
Approach Delay (s)		8.6	5.8		14.6	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

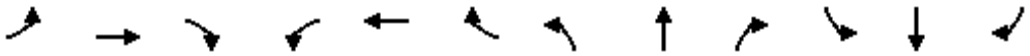
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Future Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frt		0.99			1.00			1.00	0.85		0.97	
Flt Protected		1.00			1.00			0.96	1.00		0.97	
Satd. Flow (prot)		3484			3518			1781	1583		1749	
Flt Permitted		0.95			0.86			0.73	1.00		0.85	
Satd. Flow (perm)		3302			3037			1364	1583		1534	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	8	477	53	62	578	5	103	9	135	32	11	15
RTOR Reduction (vph)	0	12	0	0	1	0	0	0	87	0	10	0
Lane Group Flow (vph)	0	526	0	0	644	0	0	112	48	0	48	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		37.0			37.0			25.0	25.0		25.0	
Effective Green, g (s)		37.0			37.0			25.0	25.0		25.0	
Actuated g/C Ratio		0.53			0.53			0.36	0.36		0.36	
Clearance Time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)		1745			1605			487	565		547	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.21			c0.08	0.03		0.03	
v/c Ratio		0.30			0.40			0.23	0.09		0.09	
Uniform Delay, d1		9.3			9.9			15.8	14.9		14.9	
Progression Factor		0.41			0.90			1.00	1.00		1.00	
Incremental Delay, d2		0.4			0.5			1.1	0.3		0.3	
Delay (s)		4.2			9.4			16.9	15.2		15.3	
Level of Service		A			A			B	B		B	
Approach Delay (s)		4.2			9.4			16.0			15.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

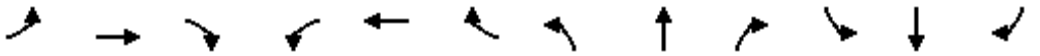


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Future Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.5	4.0			4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frt		0.97			1.00		1.00	0.90			0.98	
Flt Protected		1.00			0.98		0.95	1.00			0.99	
Satd. Flow (prot)		3415			3464		1770	1673			1810	
Flt Permitted		0.93			0.59		0.47	1.00			0.83	
Satd. Flow (perm)		3171			2090		881	1673			1514	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	17	469	142	325	492	12	278	131	277	53	133	25
RTOR Reduction (vph)	0	39	0	0	2	0	0	109	0	0	7	0
Lane Group Flow (vph)	0	589	0	0	827	0	278	299	0	0	204	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0		30.0	30.0			18.0	
Effective Green, g (s)		32.0			32.0		30.0	30.0			18.0	
Actuated g/C Ratio		0.46			0.46		0.43	0.43			0.26	
Clearance Time (s)		4.0			4.0		4.5	4.0			4.0	
Lane Grp Cap (vph)		1449			955		472	717			389	
v/s Ratio Prot							c0.06	0.18				
v/s Ratio Perm		0.19			c0.40		c0.19				0.13	
v/c Ratio		0.41			1.07dl		0.59	0.42			0.53	
Uniform Delay, d1		12.7			17.1		14.6	13.9			22.3	
Progression Factor		0.67			0.51		1.00	1.00			1.00	
Incremental Delay, d2		0.8			9.2		5.3	1.8			5.0	
Delay (s)		9.3			17.8		19.9	15.7			27.3	
Level of Service		A			B		B	B			C	
Approach Delay (s)		9.3			17.8			17.4			27.3	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

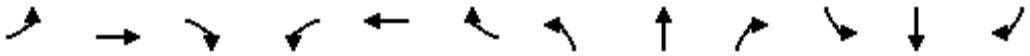
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Future Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frt		0.99			0.98			0.92			1.00	0.85
Flt Protected		0.99			1.00			1.00			0.96	1.00
Satd. Flow (prot)		3496			3463			1700			1790	1583
Flt Permitted		0.73			0.84			0.97			0.54	1.00
Satd. Flow (perm)		2560			2906			1654			998	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	82	603	30	81	752	109	28	90	190	111	25	69
RTOR Reduction (vph)	0	5	0	0	14	0	0	83	0	0	0	47
Lane Group Flow (vph)	0	711	0	0	928	0	0	225	0	0	136	22
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		30.0			39.5			22.5			22.5	22.5
Effective Green, g (s)		30.0			39.5			22.5			22.5	22.5
Actuated g/C Ratio		0.43			0.56			0.32			0.32	0.32
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		1097			1679			531			320	508
v/s Ratio Prot					c0.04							
v/s Ratio Perm		c0.28			0.27			0.14			c0.14	0.01
v/c Ratio		0.65			0.55			0.42			0.42	0.04
Uniform Delay, d1		15.8			9.7			18.7			18.7	16.3
Progression Factor		0.88			0.79			1.00			1.00	1.00
Incremental Delay, d2		2.7			1.2			2.5			4.1	0.2
Delay (s)		16.6			8.9			21.1			22.8	16.5
Level of Service		B			A			C			C	B
Approach Delay (s)		16.6			8.9			21.1			20.7	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

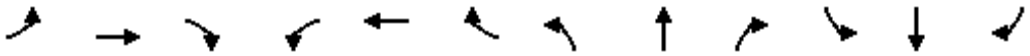
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Future Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.99			0.87	
Flt Protected		1.00			1.00			0.96			1.00	
Satd. Flow (prot)		3487			3530			1764			1619	
Flt Permitted		0.86			0.94			0.72			0.99	
Satd. Flow (perm)		3004			3325			1335			1611	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	62	773	69	11	704	9	135	3	11	4	1	109
RTOR Reduction (vph)	0	9	0	0	1	0	0	4	0	0	73	0
Lane Group Flow (vph)	0	895	0	0	723	0	0	145	0	0	41	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		39.0			39.0			23.0			23.0	
Effective Green, g (s)		39.0			39.0			23.0			23.0	
Actuated g/C Ratio		0.56			0.56			0.33			0.33	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		1673			1852			438			529	
v/s Ratio Prot												
v/s Ratio Perm		c0.30			0.22			c0.11			0.03	
v/c Ratio		0.54			0.39			0.33			0.08	
Uniform Delay, d1		9.8			8.8			17.7			16.2	
Progression Factor		0.51			0.33			1.00			1.00	
Incremental Delay, d2		1.0			0.6			2.0			0.3	
Delay (s)		6.0			3.5			19.7			16.5	
Level of Service		A			A			B			B	
Approach Delay (s)		6.0			3.5			19.7			16.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

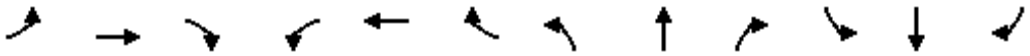
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Future Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.96			0.89	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		3487			3534			1733			1647	
Flt Permitted		0.93			0.95			0.84			1.00	
Satd. Flow (perm)		3239			3348			1494			1644	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	24	694	70	8	647	4	52	5	24	1	5	34
RTOR Reduction (vph)	0	11	0	0	0	0	0	16	0	0	23	0
Lane Group Flow (vph)	0	777	0	0	659	0	0	65	0	0	17	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		39.0			39.0			23.0			23.0	
Effective Green, g (s)		39.0			39.0			23.0			23.0	
Actuated g/C Ratio		0.56			0.56			0.33			0.33	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		1804			1865			490			540	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.20			c0.04			0.01	
v/c Ratio		0.43			0.35			0.13			0.03	
Uniform Delay, d1		9.0			8.5			16.5			15.9	
Progression Factor		0.32			0.84			1.00			1.00	
Incremental Delay, d2		0.6			0.5			0.6			0.1	
Delay (s)		3.5			7.7			17.1			16.1	
Level of Service		A			A			B			B	
Approach Delay (s)		3.5			7.7			17.1			16.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Future Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.97			0.90	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		3508			3526			1747			1654	
Flt Permitted		0.92			0.94			0.80			0.96	
Satd. Flow (perm)		3242			3333			1445			1600	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	29	667	33	9	536	11	62	7	19	13	3	53
RTOR Reduction (vph)	0	5	0	0	2	0	0	13	0	0	36	0
Lane Group Flow (vph)	0	724	0	0	554	0	0	75	0	0	33	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		39.0			39.0			23.0			23.0	
Effective Green, g (s)		39.0			39.0			23.0			23.0	
Actuated g/C Ratio		0.56			0.56			0.33			0.33	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		1806			1856			474			525	
v/s Ratio Prot												
v/s Ratio Perm		c0.22			0.17			c0.05			0.02	
v/c Ratio		0.40			0.30			0.16			0.06	
Uniform Delay, d1		8.8			8.2			16.6			16.1	
Progression Factor		0.18			1.00			1.00			1.00	
Incremental Delay, d2		0.6			0.4			0.7			0.2	
Delay (s)		2.2			8.6			17.4			16.3	
Level of Service		A			A			B			B	
Approach Delay (s)		2.2			8.6			17.4			16.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	417	609	84	174
v/c Ratio	0.22	0.43	0.14	0.26
Control Delay	7.8	3.1	16.7	4.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.8	3.1	16.7	4.2
Queue Length 50th (ft)	40	14	24	0
Queue Length 95th (ft)	62	20	53	37
Internal Link Dist (ft)	885	250	415	
Turn Bay Length (ft)			150	150
Base Capacity (vph)	1898	1410	606	657
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.43	0.14	0.26

Intersection Summary



Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	530	645	144
v/c Ratio	0.35	0.37	0.21
Control Delay	8.8	5.7	9.0
Queue Delay	0.0	0.0	0.0
Total Delay	8.8	5.7	9.0
Queue Length 50th (ft)	43	32	20
Queue Length 95th (ft)	70	50	55
Internal Link Dist (ft)	250	957	439
Turn Bay Length (ft)			150
Base Capacity (vph)	1530	1753	696
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.37	0.21

Intersection Summary



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	538	645	112	135	58
v/c Ratio	0.31	0.40	0.23	0.21	0.10
Control Delay	4.1	9.5	17.4	4.2	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	9.5	17.4	4.2	12.6
Queue Length 50th (ft)	13	63	33	0	12
Queue Length 95th (ft)	24	m78	68	32	35
Internal Link Dist (ft)	384	574	285		279
Turn Bay Length (ft)				150	
Base Capacity (vph)	1756	1606	487	652	557
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.40	0.23	0.21	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	628	829	278	408	211
v/c Ratio	0.42	1.07dl	0.60	0.49	0.53
Control Delay	8.5	19.6	20.3	9.8	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	19.6	20.3	9.8	27.2
Queue Length 50th (ft)	49	127	79	59	75
Queue Length 95th (ft)	68	#280	135	129	138
Internal Link Dist (ft)	1240	905		283	283
Turn Bay Length (ft)			150		
Base Capacity (vph)	1487	957	466	825	396
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.87	0.60	0.49	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	716	942	308	136	69
v/c Ratio	0.65	0.55	0.50	0.42	0.12
Control Delay	16.9	8.9	14.6	23.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	8.9	14.6	23.7	3.9
Queue Length 50th (ft)	119	112	60	45	0
Queue Length 95th (ft)	197	139	130	95	19
Internal Link Dist (ft)	905	629	284	296	
Turn Bay Length (ft)					150
Base Capacity (vph)	1102	1699	614	320	567
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.55	0.50	0.42	0.12

Intersection Summary

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	904	724	149	114
v/c Ratio	0.54	0.39	0.34	0.19
Control Delay	6.0	3.5	19.7	5.2
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	6.0	3.6	19.7	5.2
Queue Length 50th (ft)	63	22	46	1
Queue Length 95th (ft)	86	33	91	33
Internal Link Dist (ft)	629	264	277	297
Turn Bay Length (ft)				
Base Capacity (vph)	1684	1853	442	602
Starvation Cap Reductn	0	254	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	0.45	0.34	0.19

Intersection Summary

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	788	659	81	40
v/c Ratio	0.43	0.35	0.16	0.07
Control Delay	3.5	7.8	13.6	7.7
Queue Delay	0.1	0.2	0.0	0.0
Total Delay	3.6	8.1	13.6	7.7
Queue Length 50th (ft)	21	61	17	2
Queue Length 95th (ft)	33	83	46	21
Internal Link Dist (ft)	264	246	278	288
Turn Bay Length (ft)				
Base Capacity (vph)	1814	1865	506	563
Starvation Cap Reductn	155	543	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.47	0.50	0.16	0.07

Intersection Summary

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	729	556	88	69
v/c Ratio	0.40	0.30	0.18	0.12
Control Delay	2.2	8.7	14.9	7.7
Queue Delay	0.4	0.0	0.0	0.0
Total Delay	2.6	8.7	14.9	7.7
Queue Length 50th (ft)	22	60	21	5
Queue Length 95th (ft)	35	87	51	29
Internal Link Dist (ft)	246	248	291	292
Turn Bay Length (ft)				
Base Capacity (vph)	1810	1860	487	560
Starvation Cap Reductn	563	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.30	0.18	0.12

Intersection Summary

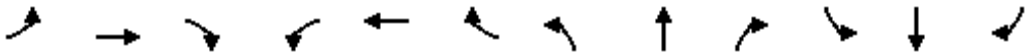
APPENDIX E

Intersection Capacity Analysis Reports Road Diet

Appendix E-1 : 2016 Road Diet

Appendix E-2 : 2036 Road Diet

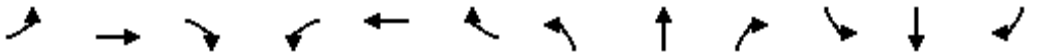
Appendix E-1 : 2016 Road Diet



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Future Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	96	50	158	95	1	55	65	173	120	104	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	148	254	120	173	227
Volume Left (vph)	2	158	55	0	120
Volume Right (vph)	50	1	0	173	3
Hadj (s)	-0.17	0.16	0.26	-0.67	0.13
Departure Headway (s)	5.6	5.7	6.3	5.4	5.8
Degree Utilization, x	0.23	0.40	0.21	0.26	0.37
Capacity (veh/h)	571	583	535	624	577
Control Delay (s)	10.3	12.6	9.8	9.0	12.1
Approach Delay (s)	10.3	12.6	9.3		12.1
Approach LOS	B	B	A		B

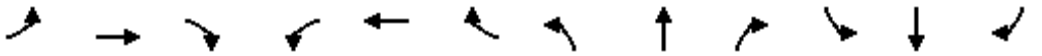
Intersection Summary				
Delay	11.1			
Level of Service	B			
Intersection Capacity Utilization	48.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	387	3	2	429	70	0	0	4	42	3	62
Future Volume (Veh/h)	62	387	3	2	429	70	0	0	4	42	3	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	421	3	2	466	76	0	0	4	46	3	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1037			464							
pX, platoon unblocked	0.80			0.98			0.82	0.82	0.98	0.82	0.82	0.80
vC, conflicting volume	542			424			1095	1102	422	1067	1066	504
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	307			397			935	944	395	900	899	259
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			100	100	99	77	99	89
cM capacity (veh/h)	1007			1133			168	199	638	199	212	626

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	67	424	2	542	4	116
Volume Left	67	0	2	0	0	46
Volume Right	0	3	0	76	4	67
cSH	1007	1700	1133	1700	638	329
Volume to Capacity	0.07	0.25	0.00	0.32	0.01	0.35
Queue Length 95th (ft)	5	0	0	0	0	39
Control Delay (s)	8.8	0.0	8.2	0.0	10.7	21.8
Lane LOS	A		A		B	C
Approach Delay (s)	1.2		0.0		10.7	21.8
Approach LOS					B	C

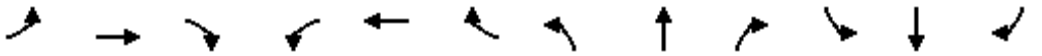
Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	53.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	515	4	4	394	0	19	0	17	0	0	0
Future Volume (Veh/h)	5	515	4	4	394	0	19	0	17	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	560	4	4	428	0	21	0	18	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		328										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	428			564			1008	1008	562	1024	1010	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	428			370			906	906	368	925	909	428
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			90	100	97	100	100	100
cM capacity (veh/h)	1131			984			212	227	561	199	226	627

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	564	4	428	39	0
Volume Left	5	0	4	0	21	0
Volume Right	0	4	0	0	18	0
cSH	1131	1700	984	1700	297	1700
Volume to Capacity	0.00	0.33	0.00	0.25	0.13	0.00
Queue Length 95th (ft)	0	0	0	0	11	0
Control Delay (s)	8.2	0.0	8.7	0.0	18.9	0.0
Lane LOS	A		A		C	A
Approach Delay (s)	0.1		0.1		18.9	0.0
Approach LOS					C	A

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	37.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Future Volume (Veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	113	424	5	0	347	13	2	1	3	9	1	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	360			429			1033	1012	426	1007	1008	354
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	360			429			1033	1012	426	1007	1008	354
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			99	100	100	96	100	95
cM capacity (veh/h)	1199			1130			185	216	628	202	218	690

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	113	429	0	360	6	43
Volume Left	113	0	0	0	2	9
Volume Right	0	5	0	13	3	33
cSH	1199	1700	1700	1700	297	443
Volume to Capacity	0.09	0.25	0.00	0.21	0.02	0.10
Queue Length 95th (ft)	8	0	0	0	2	8
Control Delay (s)	8.3	0.0	0.0	0.0	17.4	14.0
Lane LOS	A				C	B
Approach Delay (s)	1.7		0.0		17.4	14.0
Approach LOS					C	B

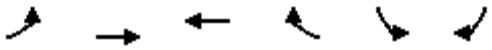
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	37.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	45	122	337	63	131
Future Volume (vph)	269	45	122	337	63	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1827		1770	1863	1770	1583
Flt Permitted	1.00		0.50	1.00	0.95	1.00
Satd. Flow (perm)	1827		939	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	292	49	133	366	68	142
RTOR Reduction (vph)	7	0	0	0	0	94
Lane Group Flow (vph)	334	0	133	366	68	48
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	4			8		
Permitted Phases			8		2	2
Actuated Green, G (s)	45.0		45.0	45.0	27.0	27.0
Effective Green, g (s)	45.0		45.0	45.0	27.0	27.0
Actuated g/C Ratio	0.56		0.56	0.56	0.34	0.34
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1027		528	1047	597	534
v/s Ratio Prot	0.18			c0.20		
v/s Ratio Perm			0.14		c0.04	0.03
v/c Ratio	0.32		0.25	0.35	0.11	0.09
Uniform Delay, d1	9.4		8.9	9.5	18.3	18.1
Progression Factor	1.00		0.62	0.58	1.00	1.00
Incremental Delay, d2	0.8		1.0	0.8	0.4	0.3
Delay (s)	10.2		6.5	6.3	18.6	18.4
Level of Service	B		A	A	B	B
Approach Delay (s)	10.2			6.4	18.5	
Approach LOS	B			A	B	

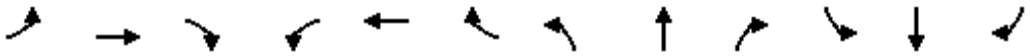
Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



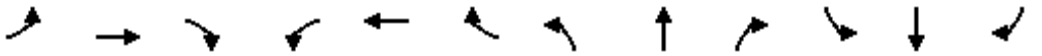
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	365	428	58	57	51
Future Volume (vph)	35	365	428	58	57	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.98		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	1863	1833		1700	
Flt Permitted	0.39	1.00	1.00		0.97	
Satd. Flow (perm)	724	1863	1833		1700	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	397	465	63	62	55
RTOR Reduction (vph)	0	0	6	0	40	0
Lane Group Flow (vph)	38	397	522	0	77	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		4	8			
Permitted Phases	4				6	
Actuated Green, G (s)	50.0	50.0	50.0		22.0	
Effective Green, g (s)	50.0	50.0	50.0		22.0	
Actuated g/C Ratio	0.62	0.62	0.62		0.28	
Clearance Time (s)	4.0	4.0	4.0		4.0	
Lane Grp Cap (vph)	452	1164	1145		467	
v/s Ratio Prot		0.21	c0.28			
v/s Ratio Perm	0.05				c0.05	
v/c Ratio	0.08	0.34	0.46		0.17	
Uniform Delay, d1	5.9	7.1	7.9		22.0	
Progression Factor	0.73	0.62	0.62		1.00	
Incremental Delay, d2	0.4	0.8	1.2		0.8	
Delay (s)	4.7	5.2	6.0		22.8	
Level of Service	A	A	A		C	
Approach Delay (s)		5.2	6.0		22.8	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



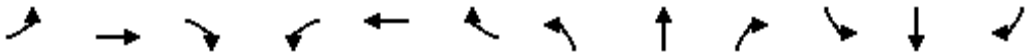
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Future Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1770	1835		1770	1860			1781	1583		1750	
Flt Permitted	0.35	1.00		0.39	1.00			0.76	1.00		0.87	
Satd. Flow (perm)	646	1835		735	1860			1424	1583		1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	391	43	51	474	4	85	8	111	26	9	12
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	67	0	7	0
Lane Group Flow (vph)	7	424	0	51	477	0	0	93	44	0	40	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40	0.40		0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)	258	734		294	744			569	633		627	
v/s Ratio Prot		0.23			c0.26							
v/s Ratio Perm	0.01			0.07				c0.07	0.03		0.03	
v/c Ratio	0.03	0.58		0.17	0.64			0.16	0.07		0.06	
Uniform Delay, d1	7.3	9.4		7.7	9.7			7.7	7.4		7.4	
Progression Factor	0.76	0.72		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	3.2		1.3	4.2			0.6	0.2		0.2	
Delay (s)	5.7	9.9		9.0	13.9			8.3	7.6		7.6	
Level of Service	A	A		A	B			A	A		A	
Approach Delay (s)		9.9			13.4			7.9			7.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



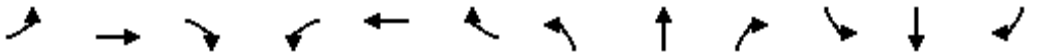
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	492	9	11	455	26	7	1	27	15	3	5
Future Volume (vph)	16	492	9	11	455	26	7	1	27	15	3	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.99			0.90			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.96	1.00
Satd. Flow (prot)	1770	1858		1770	1848			1653			1787	1583
Flt Permitted	0.30	1.00		0.28	1.00			0.97			0.86	1.00
Satd. Flow (perm)	557	1858		514	1848			1614			1605	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	535	10	12	495	28	8	1	29	16	3	5
RTOR Reduction (vph)	0	1	0	0	5	0	0	17	0	0	0	3
Lane Group Flow (vph)	17	544	0	12	518	0	0	21	0	0	19	2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	18.0
Effective Green, g (s)	18.0	18.0		18.0	18.0			18.0			18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40			0.40	0.40
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lane Grp Cap (vph)	222	743		205	739			645			642	633
v/s Ratio Prot		c0.29			0.28							
v/s Ratio Perm	0.03			0.02				c0.01			0.01	0.00
v/c Ratio	0.08	0.73		0.06	0.70			0.03			0.03	0.00
Uniform Delay, d1	8.4	11.5		8.3	11.3			8.2			8.2	8.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	0.7	6.3		0.5	5.5			0.1			0.1	0.0
Delay (s)	9.0	17.7		8.8	16.7			8.3			8.3	8.1
Level of Service	A	B		A	B			A			A	A
Approach Delay (s)		17.5			16.6			8.3			8.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



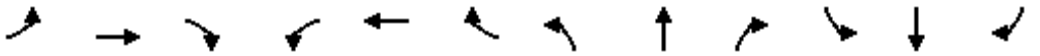
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Future Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.5	4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.90			0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1798		1770	1856		1770	1673			1810	
Flt Permitted	0.43	1.00		0.36	1.00		0.49	1.00			0.85	
Satd. Flow (perm)	800	1798		667	1856		914	1673			1559	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	385	116	266	403	10	228	108	227	43	109	21
RTOR Reduction (vph)	0	14	0	0	1	0	0	94	0	0	6	0
Lane Group Flow (vph)	14	487	0	266	412	0	228	241	0	0	167	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	42.0	42.0		42.0	42.0		30.0	30.0			18.6	
Effective Green, g (s)	42.0	42.0		42.0	42.0		30.0	30.0			18.6	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.38	0.38			0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.5	4.0			4.0	
Lane Grp Cap (vph)	420	943		350	974		416	627			362	
v/s Ratio Prot		0.27			0.22		c0.05	0.14				
v/s Ratio Perm	0.02			c0.40			c0.16				0.11	
v/c Ratio	0.03	0.52		0.76	0.42		0.55	0.38			0.46	
Uniform Delay, d1	9.2	12.4		15.0	11.6		19.3	18.3			26.4	
Progression Factor	1.00	1.00		0.37	0.31		1.00	1.00			1.00	
Incremental Delay, d2	0.1	2.0		12.0	1.1		5.1	1.8			4.2	
Delay (s)	9.3	14.4		17.7	4.7		24.4	20.0			30.6	
Level of Service	A	B		B	A		C	C			C	
Approach Delay (s)		14.3			9.8			21.8			30.6	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



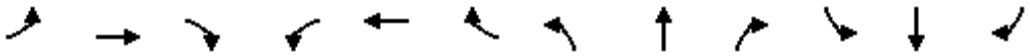
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Future Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0			4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.98			0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.96	1.00
Satd. Flow (prot)	1770	1849		1770	1827			1700			1790	1583
Flt Permitted	0.23	1.00		0.33	1.00			0.97			0.57	1.00
Satd. Flow (perm)	435	1849		620	1827			1659			1070	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	495	25	66	616	89	23	74	155	91	21	57
RTOR Reduction (vph)	0	2	0	0	7	0	0	72	0	0	0	41
Lane Group Flow (vph)	67	518	0	66	698	0	0	180	0	0	112	16
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	38.8	38.8		49.0	49.0			23.0			23.0	23.0
Effective Green, g (s)	38.8	38.8		49.0	49.0			23.0			23.0	23.0
Actuated g/C Ratio	0.48	0.48		0.61	0.61			0.29			0.29	0.29
Clearance Time (s)	4.0	4.0		4.5	4.0			4.0			4.0	4.0
Lane Grp Cap (vph)	210	896		461	1119			476			307	455
v/s Ratio Prot		0.28		0.01	c0.38							
v/s Ratio Perm	0.15			0.08				c0.11			0.10	0.01
v/c Ratio	0.32	0.58		0.14	0.62			0.38			0.36	0.04
Uniform Delay, d1	12.6	14.7		12.9	9.7			22.8			22.7	20.5
Progression Factor	1.08	1.10		0.69	0.63			1.00			1.00	1.00
Incremental Delay, d2	3.5	2.4		0.6	2.4			2.3			3.3	0.1
Delay (s)	17.0	18.7		9.5	8.5			25.1			26.0	20.7
Level of Service	B	B		A	A			C			C	C
Approach Delay (s)		18.5			8.6			25.1			24.2	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



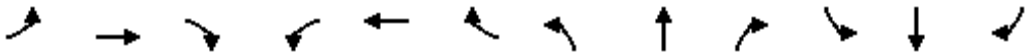
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Future Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.99			0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1770	1840		1770	1859			1764			1619	
Flt Permitted	0.36	1.00		0.29	1.00			0.73			0.99	
Satd. Flow (perm)	665	1840		543	1859			1345			1612	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	634	57	9	577	8	111	2	9	3	1	89
RTOR Reduction (vph)	0	4	0	0	1	0	0	4	0	0	66	0
Lane Group Flow (vph)	51	687	0	9	584	0	0	118	0	0	27	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	51.0	51.0		51.0	51.0			21.0			21.0	
Effective Green, g (s)	51.0	51.0		51.0	51.0			21.0			21.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.26			0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	423	1173		346	1185			353			423	
v/s Ratio Prot		c0.37			0.31							
v/s Ratio Perm	0.08			0.02				c0.09			0.02	
v/c Ratio	0.12	0.59		0.03	0.49			0.34			0.06	
Uniform Delay, d1	5.7	8.4		5.3	7.7			23.9			22.1	
Progression Factor	0.47	0.42		0.48	0.34			1.00			1.00	
Incremental Delay, d2	0.5	1.8		0.1	1.4			2.5			0.3	
Delay (s)	3.2	5.4		2.7	4.0			26.4			22.4	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.2			4.0			26.4			22.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Future Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.96			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	1837		1770	1861			1731			1647	
Flt Permitted	0.40	1.00		0.34	1.00			0.84			1.00	
Satd. Flow (perm)	738	1837		629	1861			1497			1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	568	58	7	530	3	42	4	20	1	4	28
RTOR Reduction (vph)	0	5	0	0	0	0	0	15	0	0	21	0
Lane Group Flow (vph)	20	621	0	7	533	0	0	51	0	0	12	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	52.0	52.0		52.0	52.0			20.0			20.0	
Effective Green, g (s)	52.0	52.0		52.0	52.0			20.0			20.0	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.25			0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	479	1194		408	1209			374			410	
v/s Ratio Prot		c0.34			0.29							
v/s Ratio Perm	0.03			0.01				c0.03			0.01	
v/c Ratio	0.04	0.52		0.02	0.44			0.14			0.03	
Uniform Delay, d1	5.0	7.4		5.0	6.9			23.3			22.7	
Progression Factor	0.50	0.32		0.79	0.61			1.00			1.00	
Incremental Delay, d2	0.1	1.3		0.1	1.1			0.8			0.1	
Delay (s)	2.7	3.7		4.0	5.3			24.1			22.8	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		3.7			5.3			24.1			22.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



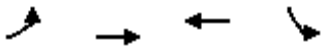
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Future Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	1850		1770	1857			1747			1653	
Flt Permitted	0.44	1.00		0.36	1.00			0.80			0.96	
Satd. Flow (perm)	827	1850		667	1857			1456			1600	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	547	27	8	439	9	51	5	15	11	2	43
RTOR Reduction (vph)	0	2	0	0	1	0	0	11	0	0	31	0
Lane Group Flow (vph)	24	572	0	8	447	0	0	60	0	0	25	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.0	50.0		50.0	50.0			22.0			22.0	
Effective Green, g (s)	50.0	50.0		50.0	50.0			22.0			22.0	
Actuated g/C Ratio	0.62	0.62		0.62	0.62			0.28			0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	516	1156		416	1160			400			440	
v/s Ratio Prot		c0.31			0.24							
v/s Ratio Perm	0.03			0.01				c0.04			0.02	
v/c Ratio	0.05	0.49		0.02	0.39			0.15			0.06	
Uniform Delay, d1	5.8	8.1		5.7	7.4			21.9			21.4	
Progression Factor	0.52	0.33		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.3		0.1	1.0			0.8			0.2	
Delay (s)	3.1	4.0		5.8	8.4			22.7			21.6	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.0			8.3			22.7			21.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



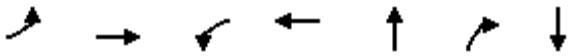
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	341	133	366	68	142
v/c Ratio	0.33	0.25	0.35	0.11	0.23
Control Delay	10.0	6.8	6.5	19.0	4.6
Queue Delay	0.0	0.0	0.3	0.0	0.0
Total Delay	10.0	6.8	6.8	19.0	4.6
Queue Length 50th (ft)	79	11	31	23	0
Queue Length 95th (ft)	130	34	75	51	36
Internal Link Dist (ft)	885		250	415	
Turn Bay Length (ft)		150		150	150
Base Capacity (vph)	1035	528	1047	597	628
Starvation Cap Reductn	0	0	255	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.25	0.46	0.11	0.23

Intersection Summary



Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	38	397	528	117
v/c Ratio	0.08	0.34	0.46	0.23
Control Delay	4.9	5.4	6.0	14.2
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	4.9	5.7	6.0	14.2
Queue Length 50th (ft)	4	40	124	23
Queue Length 95th (ft)	13	82	159	63
Internal Link Dist (ft)		250	957	439
Turn Bay Length (ft)	150			150
Base Capacity (vph)	453	1164	1151	507
Starvation Cap Reductn	0	335	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.08	0.48	0.46	0.23

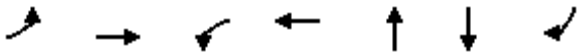
Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	7	434	51	478	93	111	47
v/c Ratio	0.03	0.58	0.17	0.64	0.16	0.16	0.07
Control Delay	5.8	9.9	9.6	14.5	8.7	2.9	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	9.9	9.6	14.5	8.7	2.9	6.5
Queue Length 50th (ft)	1	62	7	80	12	0	5
Queue Length 95th (ft)	m3	105	23	153	32	19	17
Internal Link Dist (ft)		384		574	285		279
Turn Bay Length (ft)	150		150			150	
Base Capacity (vph)	258	743	294	745	569	699	634
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.58	0.17	0.64	0.16	0.16	0.07

Intersection Summary

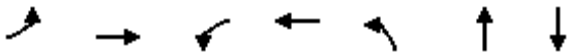
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	17	545	12	523	38	19	5
v/c Ratio	0.08	0.73	0.06	0.70	0.06	0.03	0.01
Control Delay	9.6	19.4	9.3	17.9	5.0	8.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	19.4	9.3	17.9	5.0	8.5	0.0
Queue Length 50th (ft)	3	112	2	104	1	3	0
Queue Length 95th (ft)	12	#245	9	#208	13	12	0
Internal Link Dist (ft)		574		1240	291	282	
Turn Bay Length (ft)	150		150				150
Base Capacity (vph)	222	744	205	744	663	642	654
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.73	0.06	0.70	0.06	0.03	0.01

Intersection Summary

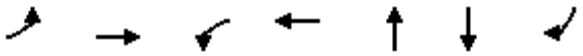
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	14	501	266	413	228	335	173
v/c Ratio	0.03	0.52	0.76	0.42	0.56	0.46	0.47
Control Delay	9.5	14.1	20.3	4.8	24.6	12.4	30.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	14.1	20.3	4.8	24.6	12.4	30.1
Queue Length 50th (ft)	3	144	60	42	81	63	71
Queue Length 95th (ft)	12	227	#197	71	138	134	131
Internal Link Dist (ft)		1240		905		283	283
Turn Bay Length (ft)	150		150		150		
Base Capacity (vph)	420	957	350	974	410	721	368
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.76	0.42	0.56	0.46	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	67	520	66	705	252	112	57
v/c Ratio	0.32	0.58	0.14	0.63	0.46	0.36	0.11
Control Delay	18.4	19.1	5.7	8.7	16.9	26.9	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	19.1	5.7	8.7	16.9	26.9	4.4
Queue Length 50th (ft)	22	194	9	129	59	44	0
Queue Length 95th (ft)	m50	270	m17	176	125	91	19
Internal Link Dist (ft)		905		629	284	296	
Turn Bay Length (ft)	150		150				150
Base Capacity (vph)	211	899	457	1125	548	307	508
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.58	0.14	0.63	0.46	0.36	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	51	691	9	585	122	93
v/c Ratio	0.12	0.59	0.03	0.49	0.34	0.19
Control Delay	3.3	5.5	2.8	4.1	26.2	7.2
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	3.3	5.5	2.8	4.2	26.2	7.2
Queue Length 50th (ft)	7	99	1	36	47	1
Queue Length 95th (ft)	m11	144	m2	58	94	35
Internal Link Dist (ft)		629		264	277	297
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	423	1176	345	1185	356	489
Starvation Cap Reductn	0	0	0	107	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.59	0.03	0.54	0.34	0.19

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	20	626	7	533	66	33
v/c Ratio	0.04	0.52	0.02	0.44	0.17	0.08
Control Delay	2.7	3.8	4.2	5.4	19.1	11.1
Queue Delay	0.0	0.1	0.0	0.2	0.0	0.0
Total Delay	2.7	3.9	4.2	5.7	19.1	11.1
Queue Length 50th (ft)	1	33	1	62	18	2
Queue Length 95th (ft)	m2	58	m3	95	49	23
Internal Link Dist (ft)		264		246	278	288
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	479	1198	409	1210	389	431
Starvation Cap Reductn	0	77	0	202	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.56	0.02	0.53	0.17	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

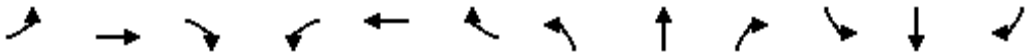


Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	24	574	8	448	71	56
v/c Ratio	0.05	0.50	0.02	0.39	0.17	0.12
Control Delay	3.2	4.1	5.9	8.6	19.6	10.3
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	3.2	4.2	5.9	8.6	19.6	10.3
Queue Length 50th (ft)	1	32	1	98	21	5
Queue Length 95th (ft)	m4	63	6	152	53	31
Internal Link Dist (ft)		246		248	291	292
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	516	1158	416	1161	410	470
Starvation Cap Reductn	0	93	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.54	0.02	0.39	0.17	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

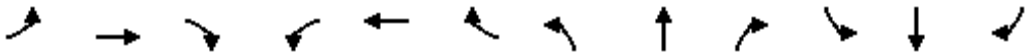
Appendix E-2 : 2036 Road Diet



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Future Volume (vph)	2	88	46	145	87	1	51	60	159	110	96	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	117	61	192	115	1	68	80	211	146	127	4

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	181	308	148	211	277
Volume Left (vph)	3	192	68	0	146
Volume Right (vph)	61	1	0	211	4
Hadj (s)	-0.16	0.16	0.26	-0.67	0.13
Departure Headway (s)	6.3	6.3	6.9	6.0	6.4
Degree Utilization, x	0.32	0.54	0.28	0.35	0.49
Capacity (veh/h)	493	532	479	550	513
Control Delay (s)	12.3	16.5	11.4	10.9	15.5
Approach Delay (s)	12.3	16.5	11.1		15.5
Approach LOS	B	C	B		C

Intersection Summary				
Delay	13.9			
Level of Service	B			
Intersection Capacity Utilization	55.1%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Future Volume (Veh/h)	104	390	5	0	319	12	2	1	3	8	1	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	138	517	7	0	423	16	3	1	4	11	1	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	439			524			1260	1236	520	1228	1231	431
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	439			524			1260	1236	520	1228	1231	431
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			98	99	99	92	99	94
cM capacity (veh/h)	1121			1043			124	155	556	138	155	624

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	138	524	0	439	8	52
Volume Left	138	0	0	0	3	11
Volume Right	0	7	0	16	4	40
cSH	1121	1700	1700	1700	212	347
Volume to Capacity	0.12	0.31	0.00	0.26	0.04	0.15
Queue Length 95th (ft)	10	0	0	0	3	13
Control Delay (s)	8.7	0.0	0.0	0.0	22.7	17.2
Lane LOS	A				C	C
Approach Delay (s)	1.8		0.0		22.7	17.2
Approach LOS					C	C

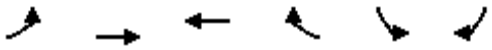
Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	42.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	45	122	337	63	131
Future Volume (vph)	269	45	122	337	63	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1827		1770	1863	1770	1583
Flt Permitted	1.00		0.45	1.00	0.95	1.00
Satd. Flow (perm)	1827		843	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	357	60	162	447	84	174
RTOR Reduction (vph)	6	0	0	0	0	120
Lane Group Flow (vph)	411	0	162	447	84	54
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	4			8		
Permitted Phases			8		2	2
Actuated Green, G (s)	61.0		61.0	61.0	31.0	31.0
Effective Green, g (s)	61.0		61.0	61.0	31.0	31.0
Actuated g/C Ratio	0.61		0.61	0.61	0.31	0.31
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1114		514	1136	548	490
v/s Ratio Prot	0.22			c0.24		
v/s Ratio Perm			0.19		c0.05	0.03
v/c Ratio	0.37		0.32	0.39	0.15	0.11
Uniform Delay, d1	9.8		9.4	10.0	25.0	24.6
Progression Factor	1.00		0.53	0.52	1.00	1.00
Incremental Delay, d2	0.9		1.4	0.9	0.6	0.5
Delay (s)	10.8		6.4	6.1	25.6	25.1
Level of Service	B		A	A	C	C
Approach Delay (s)	10.8			6.2	25.3	
Approach LOS	B			A	C	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	365	428	58	57	51
Future Volume (vph)	35	365	428	58	57	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.98		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	1863	1833		1699	
Flt Permitted	0.33	1.00	1.00		0.97	
Satd. Flow (perm)	623	1863	1833		1699	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	46	484	568	77	76	68
RTOR Reduction (vph)	0	0	5	0	32	0
Lane Group Flow (vph)	46	484	640	0	112	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		4	8			
Permitted Phases	4				6	
Actuated Green, G (s)	68.0	68.0	68.0		24.0	
Effective Green, g (s)	68.0	68.0	68.0		24.0	
Actuated g/C Ratio	0.68	0.68	0.68		0.24	
Clearance Time (s)	4.0	4.0	4.0		4.0	
Lane Grp Cap (vph)	423	1266	1246		407	
v/s Ratio Prot		0.26	c0.35			
v/s Ratio Perm	0.07				c0.07	
v/c Ratio	0.11	0.38	0.51		0.28	
Uniform Delay, d1	5.5	6.9	7.9		30.9	
Progression Factor	0.68	0.55	1.00		1.00	
Incremental Delay, d2	0.5	0.8	1.5		1.7	
Delay (s)	4.2	4.7	9.4		32.6	
Level of Service	A	A	A		C	
Approach Delay (s)		4.6	9.4		32.6	
Approach LOS		A	A		C	

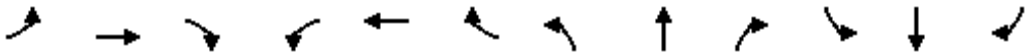
Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	387	3	2	429	70	0	0	4	42	3	62
Future Volume (vph)	62	387	3	2	429	70	0	0	4	42	3	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.86			0.92	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1770	1861		1770	1823			1611			1684	
Flt Permitted	0.22	1.00		0.31	1.00			1.00			0.90	
Satd. Flow (perm)	414	1861		568	1823			1611			1549	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	82	513	4	3	569	93	0	0	5	56	4	82
RTOR Reduction (vph)	0	1	0	0	13	0	0	3	0	0	49	0
Lane Group Flow (vph)	82	516	0	3	649	0	0	2	0	0	93	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40			0.40	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	165	744		227	729			644			619	
v/s Ratio Prot		0.28			c0.36			0.00				
v/s Ratio Perm	0.20			0.01							c0.06	
v/c Ratio	0.50	0.69		0.01	0.89			0.00			0.15	
Uniform Delay, d1	10.1	11.2		8.1	12.6			8.1			8.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.3	5.3		0.1	15.3			0.0			0.5	
Delay (s)	20.4	16.5		8.2	27.8			8.1			9.1	
Level of Service	C	B		A	C			A			A	
Approach Delay (s)		17.0			27.8			8.1			9.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

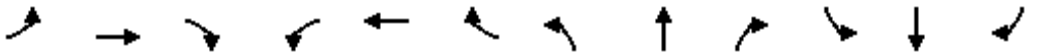
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Future Volume (vph)	6	360	40	47	436	4	78	7	102	24	8	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1770	1835		1770	1860			1781	1583		1749	
Flt Permitted	0.29	1.00		0.33	1.00			0.74	1.00		0.85	
Satd. Flow (perm)	537	1835		622	1860			1372	1583		1536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	8	477	53	62	578	5	103	9	135	32	11	15
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	86	0	10	0
Lane Group Flow (vph)	8	522	0	62	582	0	0	112	49	0	48	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			18.0	18.0		18.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			18.0	18.0		18.0	
Actuated g/C Ratio	0.48	0.48		0.48	0.48			0.36	0.36		0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)	257	880		298	892			493	569		552	
v/s Ratio Prot		0.28			c0.31							
v/s Ratio Perm	0.01			0.10				c0.08	0.03		0.03	
v/c Ratio	0.03	0.59		0.21	0.65			0.23	0.09		0.09	
Uniform Delay, d1	6.9	9.5		7.5	9.8			11.2	10.6		10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	2.9		1.6	3.7			1.1	0.3		0.3	
Delay (s)	7.1	12.4		9.1	13.6			12.2	10.9		10.9	
Level of Service	A	B		A	B			B	B		B	
Approach Delay (s)		12.3			13.1			11.5			10.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

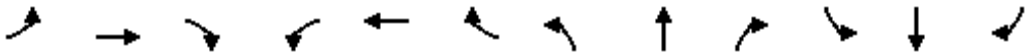
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	492	9	11	455	26	7	1	27	15	3	5
Future Volume (vph)	16	492	9	11	455	26	7	1	27	15	3	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.99			0.89			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.96	1.00
Satd. Flow (prot)	1770	1858		1770	1848			1650			1788	1583
Flt Permitted	0.22	1.00		0.22	1.00			0.97			0.85	1.00
Satd. Flow (perm)	414	1858		414	1848			1611			1585	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	21	652	12	15	603	34	9	1	36	20	4	7
RTOR Reduction (vph)	0	1	0	0	5	0	0	22	0	0	0	4
Lane Group Flow (vph)	21	663	0	15	632	0	0	24	0	0	24	3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	18.0
Effective Green, g (s)	18.0	18.0		18.0	18.0			18.0			18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40			0.40	0.40
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lane Grp Cap (vph)	165	743		165	739			644			634	633
v/s Ratio Prot		c0.36			0.34							
v/s Ratio Perm	0.05			0.04				c0.02			0.02	0.00
v/c Ratio	0.13	0.89		0.09	0.86			0.04			0.04	0.00
Uniform Delay, d1	8.5	12.6		8.4	12.3			8.2			8.2	8.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	1.6	15.2		1.1	12.1			0.1			0.1	0.0
Delay (s)	10.1	27.8		9.5	24.5			8.3			8.3	8.1
Level of Service	B	C		A	C			A			A	A
Approach Delay (s)		27.3			24.1			8.3			8.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Future Volume (vph)	13	354	107	245	371	9	210	99	209	40	100	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.90			0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1798		3433	1856		1770	1673			1810	
Flt Permitted	0.27	1.00		0.15	1.00		0.58	1.00			0.74	
Satd. Flow (perm)	512	1798		556	1856		1083	1673			1349	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	17	469	142	325	492	12	278	131	277	53	133	25
RTOR Reduction (vph)	0	11	0	0	1	0	0	76	0	0	5	0
Lane Group Flow (vph)	17	600	0	325	503	0	278	332	0	0	206	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	42.0	42.0		33.0	33.0		39.0	39.0			39.0	
Effective Green, g (s)	42.0	42.0		33.0	33.0		39.0	39.0			39.0	
Actuated g/C Ratio	0.42	0.42		0.33	0.33		0.39	0.39			0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Grp Cap (vph)	416	755		384	612		422	652			526	
v/s Ratio Prot	0.01	c0.33		0.06	c0.27			0.20				
v/s Ratio Perm	0.01			c0.22			c0.26				0.15	
v/c Ratio	0.04	0.79		0.85	0.82		0.66	0.51			0.39	
Uniform Delay, d1	24.3	25.2		27.5	30.8		25.0	23.2			22.0	
Progression Factor	1.00	1.00		0.47	0.42		1.00	1.00			1.00	
Incremental Delay, d2	0.2	8.5		12.0	6.9		7.8	2.8			2.2	
Delay (s)	24.5	33.7		25.0	19.8		32.9	26.0			24.1	
Level of Service	C	C		C	B		C	C			C	
Approach Delay (s)		33.5			21.8			28.8			24.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Future Volume (vph)	62	455	23	61	567	82	21	68	143	84	19	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0			4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.98			0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.96	1.00
Satd. Flow (prot)	1770	1849		1770	1827			1700			1790	1583
Flt Permitted	0.09	1.00		0.29	1.00			0.97			0.48	1.00
Satd. Flow (perm)	160	1849		534	1827			1651			892	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	82	603	30	81	752	109	28	90	190	111	25	69
RTOR Reduction (vph)	0	2	0	0	5	0	0	58	0	0	0	47
Lane Group Flow (vph)	82	632	0	81	856	0	0	250	0	0	136	22
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	50.1	50.1		52.5	52.5			31.5			31.5	31.5
Effective Green, g (s)	50.1	50.1		52.5	52.5			31.5			31.5	31.5
Actuated g/C Ratio	0.50	0.50		0.52	0.52			0.32			0.32	0.32
Clearance Time (s)	4.5	4.0		4.5	4.0			4.0			4.0	4.0
Lane Grp Cap (vph)	136	926		353	959			520			280	498
v/s Ratio Prot	0.02	c0.34		0.01	c0.47							
v/s Ratio Perm	0.28			0.11				0.15			c0.15	0.01
v/c Ratio	0.60	0.68		0.23	0.89			0.48			0.49	0.04
Uniform Delay, d1	22.5	18.9		21.9	21.2			27.6			27.7	23.8
Progression Factor	0.59	0.64		0.66	0.63			1.00			1.00	1.00
Incremental Delay, d2	13.4	2.9		1.3	10.9			3.2			5.9	0.2
Delay (s)	26.8	15.1		15.6	24.3			30.8			33.6	24.0
Level of Service	C	B		B	C			C			C	C
Approach Delay (s)		16.4			23.6			30.8			30.4	
Approach LOS		B			C			C			C	

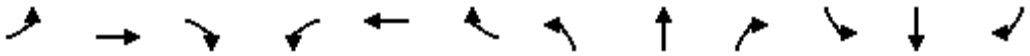
Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Future Volume (vph)	47	583	52	8	531	7	102	2	8	3	1	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.99			0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1770	1840		1770	1859			1764			1619	
Flt Permitted	0.27	1.00		0.20	1.00			0.64			0.99	
Satd. Flow (perm)	509	1840		370	1859			1178			1611	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	62	773	69	11	704	9	135	3	11	4	1	109
RTOR Reduction (vph)	0	3	0	0	0	0	0	3	0	0	78	0
Lane Group Flow (vph)	62	839	0	11	713	0	0	146	0	0	36	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	64.0	64.0		64.0	64.0			28.0			28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0			28.0			28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.28			0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	325	1177		236	1189			329			451	
v/s Ratio Prot		c0.46			0.38							
v/s Ratio Perm	0.12			0.03				c0.12			0.02	
v/c Ratio	0.19	0.71		0.05	0.60			0.44			0.08	
Uniform Delay, d1	7.4	11.9		6.7	10.5			29.6			26.5	
Progression Factor	0.52	0.45		0.76	0.59			1.00			1.00	
Incremental Delay, d2	1.0	2.9		0.3	2.0			4.3			0.3	
Delay (s)	4.8	8.3		5.4	8.3			33.9			26.8	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		8.0			8.2			33.9			26.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

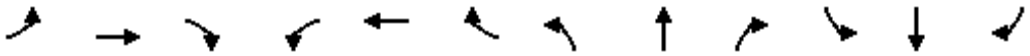
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Future Volume (vph)	18	523	53	6	488	3	39	4	18	1	4	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.96			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	1837		1770	1861			1733			1647	
Flt Permitted	0.34	1.00		0.28	1.00			0.81			1.00	
Satd. Flow (perm)	642	1837		529	1861			1455			1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	24	694	70	8	647	4	52	5	24	1	5	34
RTOR Reduction (vph)	0	4	0	0	0	0	0	15	0	0	27	0
Lane Group Flow (vph)	24	760	0	8	651	0	0	66	0	0	13	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	71.0	71.0		71.0	71.0			21.0			21.0	
Effective Green, g (s)	71.0	71.0		71.0	71.0			21.0			21.0	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.21			0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	455	1304		375	1321			305			345	
v/s Ratio Prot		c0.41			0.35							
v/s Ratio Perm	0.04			0.02				c0.05			0.01	
v/c Ratio	0.05	0.58		0.02	0.49			0.22			0.04	
Uniform Delay, d1	4.4	7.2		4.3	6.5			32.7			31.5	
Progression Factor	0.06	0.03		0.84	0.62			1.00			1.00	
Incremental Delay, d2	0.2	1.3		0.1	1.2			1.6			0.2	
Delay (s)	0.4	1.6		3.7	5.2			34.3			31.7	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		1.5			5.2			34.3			31.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

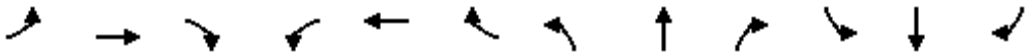
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Future Volume (vph)	22	503	25	7	404	8	47	5	14	10	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	1850		1770	1857			1747			1654	
Flt Permitted	0.40	1.00		0.31	1.00			0.78			0.95	
Satd. Flow (perm)	745	1850		583	1857			1404			1590	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	29	667	33	9	536	11	62	7	19	13	3	53
RTOR Reduction (vph)	0	2	0	0	1	0	0	10	0	0	41	0
Lane Group Flow (vph)	29	698	0	9	546	0	0	78	0	0	28	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	70.0	70.0		70.0	70.0			22.0			22.0	
Effective Green, g (s)	70.0	70.0		70.0	70.0			22.0			22.0	
Actuated g/C Ratio	0.70	0.70		0.70	0.70			0.22			0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	521	1295		408	1299			308			349	
v/s Ratio Prot		c0.38			0.29							
v/s Ratio Perm	0.04			0.02				c0.06			0.02	
v/c Ratio	0.06	0.54		0.02	0.42			0.25			0.08	
Uniform Delay, d1	4.7	7.2		4.6	6.4			32.2			31.0	
Progression Factor	0.13	0.08		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	1.3		0.1	1.0			2.0			0.4	
Delay (s)	0.8	1.9		4.7	7.4			34.2			31.4	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		1.9			7.3			34.2			31.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	515	4	4	394	0	19	0	17	0	0	0
Future Volume (vph)	5	515	4	4	394	0	19	0	17	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5				
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00				
Frt	1.00	1.00		1.00	1.00			0.94				
Flt Protected	0.95	1.00		0.95	1.00			0.97				
Satd. Flow (prot)	1770	1861		1770	1863			1698				
Flt Permitted	0.36	1.00		0.24	1.00			0.90				
Satd. Flow (perm)	678	1861		438	1863			1565				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	7	683	5	5	522	0	25	0	23	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	18	0	0	0	0
Lane Group Flow (vph)	7	688	0	5	522	0	0	30	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.5	31.5		31.5	31.5			19.5				
Effective Green, g (s)	31.5	31.5		31.5	31.5			19.5				
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.32				
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5				
Lane Grp Cap (vph)	355	977		229	978			508				
v/s Ratio Prot		c0.37			0.28							
v/s Ratio Perm	0.01			0.01				c0.02				
v/c Ratio	0.02	0.70		0.02	0.53			0.06				
Uniform Delay, d1	6.8	10.7		6.8	9.4			13.9				
Progression Factor	1.00	1.00		1.00	1.00			1.00				
Incremental Delay, d2	0.1	4.2		0.2	2.1			0.2				
Delay (s)	6.9	15.0		7.0	11.5			14.2				
Level of Service	A	B		A	B			B				
Approach Delay (s)		14.9			11.4			14.2			0.0	
Approach LOS		B			B			B			A	

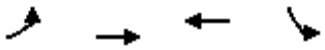
Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	417	162	447	84	174
v/c Ratio	0.37	0.32	0.39	0.15	0.29
Control Delay	10.6	6.7	6.2	26.0	5.3
Queue Delay	0.0	0.0	0.4	0.0	0.0
Total Delay	10.6	6.7	6.6	26.0	5.3
Queue Length 50th (ft)	118	20	55	39	0
Queue Length 95th (ft)	178	33	76	75	47
Internal Link Dist (ft)	885		250	415	
Turn Bay Length (ft)		150		150	150
Base Capacity (vph)	1120	513	1136	548	610
Starvation Cap Reductn	0	0	291	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.32	0.53	0.15	0.29

Intersection Summary



Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	46	484	645	144
v/c Ratio	0.11	0.38	0.52	0.33
Control Delay	4.4	4.8	9.4	24.4
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	4.4	5.2	9.4	24.4
Queue Length 50th (ft)	4	47	175	53
Queue Length 95th (ft)	15	98	254	108
Internal Link Dist (ft)		250	957	439
Turn Bay Length (ft)	150			150
Base Capacity (vph)	422	1266	1251	439
Starvation Cap Reductn	0	352	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.11	0.53	0.52	0.33

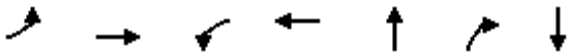
Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	82	517	3	662	5	142
v/c Ratio	0.50	0.69	0.01	0.89	0.01	0.21
Control Delay	24.4	17.7	8.3	31.0	0.0	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	17.7	8.3	31.0	0.0	5.5
Queue Length 50th (ft)	15	104	0	145	0	9
Queue Length 95th (ft)	#63	#202	4	#324	0	34
Internal Link Dist (ft)		957		384	178	193
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	165	745	227	742	766	668
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.69	0.01	0.89	0.01	0.21

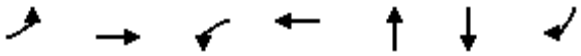
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	8	530	62	583	112	135	58
v/c Ratio	0.03	0.60	0.21	0.65	0.23	0.21	0.10
Control Delay	7.4	12.7	9.8	14.2	12.7	3.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	12.7	9.8	14.2	12.7	3.6	9.2
Queue Length 50th (ft)	1	100	10	118	22	0	8
Queue Length 95th (ft)	6	178	29	207	51	26	26
Internal Link Dist (ft)		384		574	285		279
Turn Bay Length (ft)	150		150			150	
Base Capacity (vph)	257	888	298	893	494	656	562
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.60	0.21	0.65	0.23	0.21	0.10

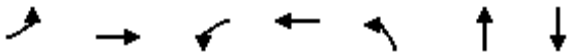
Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	21	664	15	637	46	24	7
v/c Ratio	0.13	0.89	0.09	0.86	0.07	0.04	0.01
Control Delay	10.9	31.4	10.1	27.3	4.7	8.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	31.4	10.1	27.3	4.7	8.5	0.2
Queue Length 50th (ft)	3	150	2	140	1	4	0
Queue Length 95th (ft)	14	#328	11	#308	15	13	1
Internal Link Dist (ft)		574		1240	291	282	
Turn Bay Length (ft)	150		150				150
Base Capacity (vph)	165	744	165	744	665	634	654
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.89	0.09	0.86	0.07	0.04	0.01

Intersection Summary

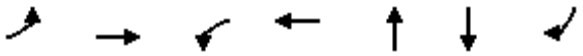
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	17	611	325	504	278	408	211
v/c Ratio	0.04	0.80	0.84	0.82	0.66	0.56	0.40
Control Delay	18.3	33.9	26.2	21.1	34.1	19.5	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	33.9	26.2	21.1	34.1	19.5	23.9
Queue Length 50th (ft)	6	323	47	250	143	136	92
Queue Length 95th (ft)	19	#478	m63	m277	241	231	155
Internal Link Dist (ft)		1240		905		283	283
Turn Bay Length (ft)	150		150		150		
Base Capacity (vph)	416	766	385	612	421	728	530
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.80	0.84	0.82	0.66	0.56	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	82	634	81	861	308	136	69
v/c Ratio	0.61	0.68	0.23	0.89	0.53	0.49	0.12
Control Delay	24.2	15.4	10.9	25.6	23.9	34.8	2.1
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	24.2	15.4	10.9	25.7	23.9	34.8	2.1
Queue Length 50th (ft)	19	290	17	312	115	70	0
Queue Length 95th (ft)	m26	397	m31	#735	200	131	12
Internal Link Dist (ft)		905		629	284	296	
Turn Bay Length (ft)	150		150				150
Base Capacity (vph)	135	928	350	964	578	280	573
Starvation Cap Reductn	0	0	0	4	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.68	0.23	0.90	0.53	0.49	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	62	842	11	713	149	114
v/c Ratio	0.19	0.71	0.05	0.60	0.45	0.22
Control Delay	5.1	8.5	5.7	8.5	34.0	7.2
Queue Delay	0.0	0.1	0.0	0.1	0.0	0.0
Total Delay	5.1	8.6	5.7	8.6	34.0	7.2
Queue Length 50th (ft)	11	171	2	125	76	2
Queue Length 95th (ft)	m18	238	m4	162	137	43
Internal Link Dist (ft)		629		264	277	297
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	325	1180	236	1190	332	529
Starvation Cap Reductn	0	26	0	36	0	0
Spillback Cap Reductn	0	0	0	55	0	3
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.73	0.05	0.63	0.45	0.22

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	24	764	8	651	81	40
v/c Ratio	0.05	0.58	0.02	0.49	0.25	0.11
Control Delay	0.4	1.6	3.7	5.4	28.1	13.9
Queue Delay	0.0	0.5	0.0	0.2	0.0	0.0
Total Delay	0.4	2.0	3.7	5.6	28.1	13.9
Queue Length 50th (ft)	0	6	1	89	33	3
Queue Length 95th (ft)	m0	8	m3	127	75	30
Internal Link Dist (ft)		264		246	278	288
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	455	1308	375	1321	320	372
Starvation Cap Reductn	0	196	0	178	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.69	0.02	0.57	0.25	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	29	700	9	547	88	69
v/c Ratio	0.06	0.54	0.02	0.42	0.28	0.18
Control Delay	0.8	1.9	4.8	7.5	30.2	13.7
Queue Delay	0.0	0.2	0.0	4.2	0.0	0.0
Total Delay	0.8	2.1	4.8	11.7	30.2	13.7
Queue Length 50th (ft)	1	16	2	129	40	8
Queue Length 95th (ft)	m1	21	6	187	84	44
Internal Link Dist (ft)		246		248	291	292
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	521	1296	408	1300	319	390
Starvation Cap Reductn	0	120	0	657	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.60	0.02	0.85	0.28	0.18

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT
Lane Group Flow (vph)	7	688	5	522	48
v/c Ratio	0.02	0.70	0.02	0.53	0.09
Control Delay	7.2	15.7	7.2	11.9	9.1
Queue Delay	0.0	8.7	0.0	0.0	0.0
Total Delay	7.2	24.4	7.2	11.9	9.1
Queue Length 50th (ft)	1	170	1	113	5
Queue Length 95th (ft)	6	284	5	188	24
Internal Link Dist (ft)		248		1242	283
Turn Bay Length (ft)	150		150		
Base Capacity (vph)	355	977	229	978	526
Starvation Cap Reductn	0	254	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.95	0.02	0.53	0.09

Intersection Summary

Neighborhood Council of Westchester Playa

8726 South Sepulveda Boulevard, PMB 191A Los Angeles, CA 90045
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email: inquiries@ncwpdr.org • www.ncwpdr.org

August 15, 2017

Hon. Mike Bonin
Mike.Bonin@lacity.org
Los Angeles City Council, District 11
200 N Spring Street
Los Angeles, CA 90012

RE: NCWP Recommends Immediate Reversal of the Lane Reductions in Playa del Rey

Dear Councilmember Bonin:

We, the Neighborhood Council of Westchester/Playa, ask that with the exception of the changes to Pershing Drive, you immediately reverse the lane reductions in Playa del Rey and implement other strategies to improve the safety, efficiency, and accessibility of our roads for pedestrians, cyclists, and vehicles. As representatives of your constituents and your elected advisory body, we believe strongly that this is the only remedy that addresses the constant, voluminous, community outcry on this issue.

In the history of our Neighborhood Council, no single issue has energized members of our community to become active and involved in such significant numbers. Although perhaps a well-intentioned effort to increase safety, it is impossible to overstate the frustration currently experienced by the majority of residents and stakeholders in Playa del Rey following the alteration of the streets and traffic patterns implemented two months ago.

Residents are experiencing significantly increased and oppressive traffic congestion, travel time, and collisions at all times of day – not just rush hour – and this is during summer, when school is out and we typically have the lowest traffic volume of the year. This takes precious time away from being with family with no real identifiable connection to an increase in safety that makes the sacrifice worthwhile.

Understand that we are all in favor of increased pedestrian, bicyclist, and vehicle safety goals of Vision Zero, but the exclusive use of lane reductions rather than alternative options cannot be afforded by our PDR community – least of all our PDR businesses. Furthermore, neither Pershing Drive, nor Culver Blvd. nor Jefferson Blvd. was prioritized by Vision Zero as being one of the "40 high injury corridors in the city" as you cited on NBC last week.

After two months and some attempted modifications, the massively overwhelming opposition in both our business and residential communities far outweighs the limited support we have heard in favor of the changes.

LOCAL BUSINESS IS SUFFOCATING DUE TO THE ROAD DIET:

Most urgently, our businesses which are the key to a vibrant Playa del Rey community are suffocating because of the oppressive traffic congestion and limited parking access that deters customers from patronizing their establishments during the "pilot" project. More than a dozen Playa del Rey businesses met with you last week to tell you firsthand how their businesses are suffering severe economic losses directly related to the "PDR Road Diet." They are not satisfied with private apologies and are outraged that no consideration was given to the impact on

business before the Road Diet was implemented. There are very real problems: Restaurants are seeing significant reductions in diners; gas stations cannot achieve minimum sales targets to meet their contractual obligations and retail businesses are experiencing severe losses of sales volume. We share their dire concern that the perception of Playa del Rey as a destination for business and pleasure is being permanently and irreparably damaged with every passing day. They reportedly requested immediate reversal of the roadway changes made two months ago, a request we share because we cannot wait for the Safe Streets Initiative Task Force to meet and then start considering what to do.

OPEN AND TRANSPARENT PROCESS:

People are frustrated - not just by the changes, but at the feeling that their voices are not being heard. We were told that the Safe Streets pilot project would be evaluated at 1-, 3-, and 6-month intervals; through the PDR traffic and road safety survey your office is sponsoring (http://www.11thdistrict.com/preventing_the_next_tragedy); and a Town Hall meeting. To date:

Community Meeting - The community was grossly disappointed by the indefinite postponement of the LADOT Open House merely days before it was to occur. The July 29th community meeting would have been an opportunity for those in support of and opposed to the road changes to express first-hand accounts of the Safe Streets impacts, as well as hear directly from LADOT on the plans for PDR streets in the name of safety. The NCWP asks that you ensure the LADOT community meeting is rescheduled within the next 30 days, and that there is a mechanism for public testimony with a timeline for responsiveness to their comments.

Results From CD11's Playa del Rey Safety Improvements - Initial Feedback Survey-You provided a mechanism for the community to register their opinion and suggestions through the survey sponsored by CD11 (http://www.11thdistrict.com/preventing_the_next_tragedy). However, as of this writing, the survey remains open and you have not revealed the results. We are concerned also that in discussions with constituents, there needs more outreach to inform community members of this survey including mailings as not everyone is internet connected and a timeline for when the final results of this survey including not only a summary but complete raw data will be released.

Online Surveys of Local Residents Show Overwhelmingly Opposition to the Road Diet – While we do not have the results of your online survey, we do have two others conducted on the Nextdoor website for Playa del Rey residents. One survey had over 400 participants and a second one almost 200 participants and each found by a ratio of more than 4 to 1 that locals (not South Bay commuters) do not support the Road Diet. While neither these surveys nor your survey are in any way scientific, the comments posted in the hundreds make it clear local residents want the Road Diet immediately removed and reversed.

CD11 Safe Streets for PDR Task Force – It would have been a great idea to have had such a task force meeting in public before implementing the road restrictions. After rolling back the Road Diet changes, such a task force can be helpful in assisting LADOT with ideas for safety, efficiency and accessibility without lane closures. But, we are concerned that the proposed membership selection process for the Task Force needs to be open, transparent, and balanced. The concern is to prevent the perception of creating a closed group comprised of hand-picked members to avoid public comment or "stack the deck" toward a pre-ordained outcome. We ask that the Neighborhood Council is given representation on the Task Force since they were created to specifically to advise the City Council and are comprised of elected representatives. If the community does not feel they were provided a fair and open process, they will likely not accept

the outcome. We are further concerned that waiting 90 days for the task force to meet and make recommendations before any action is taken is another means of delay.

NCWP Safe Streets PDR June 2017 Motion - With your staff present, the NCWP passed the following motion on June 6, 2017:

> Safe Streets PDR Motion to: 1) Request the implementation of mitigation measures designed to lessen the impact of the lane reductions on Culver Blvd. and Vista del Mar on the areas of upper Playa del Rey and Westchester; and, 2) Request that the Los Angeles Department of Transportation and/or the CD11 Council Office immediately provide a copy of any traffic study done in advance of the commencement of the lane closures included in the Safe Streets Initiative; and, a) Provide any available data regarding traffic on the community streets impacted by the Safe Streets Initiative for the area bounded by Sepulveda to the East, Imperial to the South, Culver to the North and Vista del Mar to the West; and, b) Provide a detailed plan for traffic enforcement for the next 90 days; and, c) Provide written explanation of the feasibility of reducing Vista del Mar to one lane each way commencing South of Imperial Highway; and, d) Respond in writing to all community suggestions and questions given at this meeting; e) create an Ad Hoc Committee to develop alternative and immediate mitigation measures for the Safe Streets Initiative; f) and set metrics for the success of the Vista del Mar pilot restriping project.
>
> Although your Field Deputy, Mobility Director and DOT representative were all present at the June Board Meeting when this motion was passed, by this letter, we formally request for the information set forth in the motion as well as other information requested herein.

CRITERIA/COMPONENTS OF SUCCESS:

Although labeled as a "pilot" project, the criteria for success (accept, reject, modify) have yet to be shared. We believe that **the evaluation criteria should be safety, efficiency and accessibility**.

a) **Safety** – Grade "F". We ask that you implement all parts of the Vision Zero "toolkit" to improve safety without first resorting to removing traffic lanes. We can keep traffic moving while protecting pedestrians and cyclists at the same time. LADOT recently gave testimony relating to Vista del Mar listing a plethora of recommended safety improvements -- without suggesting removing lanes in the name of safety. We strongly support better lighting, more crosswalks, pedestrian bridges, speed limit reductions and traffic enforcement. These and other safety improvements are lesser impactful ways of providing greater pedestrian safety that should be used first before taking lanes away. In the words of the LADOT official who spoke at our June 6th NCWP Board meeting, "We did what we were told to do by the resident group. We didn't study it."

We want to know exactly how LADOT is monitoring the number of accidents on Culver/Jefferson/Pershing/VDM - both before and after implementation of the changes. A total of 24 accidents have been documented since the commencement of the Road Diet over two months and counting - some with injuries. By comparison, you have cited to an annual average of 11 accidents.

LAPD data is different but show accidents nearly doubled year over year. From May 21, 2017 through July 31, 2017 compared to the same period in 2016 there was an increase in accidents from five in 2016 to nine in 2017 as reported on Pershing Drive between Imperial Hwy and Jefferson Blvd together with Culver Blvd between Vista Del Mar and Jefferson.

Both sets of data show that there have been more accidents after the Road Diet was implemented than before. If these statistics continue, it means Playa del Rey is experiencing a massive increase in accidents -- contrary to the stated intent of the project.

Further, a sad reality is that drunk driving is a huge part of the risk to safety and yet, removing traffic lanes does nothing to solve the drunk driving problem. The City's own Vision Zero Literature Review from March 2016 says that "Driving under the influence is a common contributing factor for collisions resulting in severe and fatal injury." We need more law enforcement to reduce the severity of this problem, not fewer traffic lanes.

The impact on commuters is very real as demonstrated by their expressed outrage on social media and in every outlet on which they can find a voice from radio to newspaper. Unless and until it can be proven that there is a demonstrable improvement in safety, lane reductions cannot be viewed as a success. Presently, at best they can be characterized as counterproductive.

b) **Efficiency** – Grade "F". The perceived portrayal of safety versus commute time is an inflammatory argument. Instead, the focus should be on reducing congestion without increasing risk to pedestrians or bicyclists. Time spent commuting takes away from family - and it does so each and every day of every week of the year. The tax payers recent passage of the multi-billion dollar Measure M to reduce Los Angeles congestion should be used to this end, not to reduce capacity and increase congestion. As stated previously, we fully support and need safety/protective measures. But if the issue is speed, then address it directly with law enforcement placed regularly and strategically throughout Playa del Rey. Removing lanes to reduce speed is ineffectual because it produces gridlock (as evidenced over the past two months). Gridlock is not safer nor is it better for the environment.

We can find better ways of slowing traffic without turning streets into parking lots. Surely speed reduction alone cannot be considered the determinant of success. If that is the metric of success, then 100% gridlock is the same as 100% better! We do have families to get home to and jobs to pay for the rent so we must be able to carry on our lives in an efficient manner.

In the further interest of efficiency, for many years the lower Playa del Rey business community has sought increased parking on Culver Boulevard. LADOT must investigate options for angled compact vehicle parking to provide parking spaces in close proximity to businesses on Culver. Angled parking was apparently dismissed early on because of the space required for two bike lanes. As discussed below, immediate efforts should be implemented to safely connect bicyclists to beaches, Playa Vista, and the extant seven miles of bike paths in Ballona. Congestion reduction and increased parking should be laudable goals - not enemies of safety. They should coexist through implementation of other safety measures as identified above.

c) **Accessibility** – Grade "F". Unrelated to safety, improvements to access for bicycles and pedestrians is a good thing, but must be weighed against the impact it creates. For every family benefitting from better bike access there are scores of families who are losing precious time together to longer commutes. But we believe that in the project area we can accommodate improved access without removing traffic lanes (once restored).

The Ballona Bike Path and the Beach Bike Path together provide an uninterrupted path from Palos Verdes all the way to Culver City where the bicyclist can transit without ever once crossing a roadway with vehicles. A centerpiece of our efforts should be to make the Ballona path safely accessible to Playa Vista residents. If designed correctly, it would provide a safer, and more relaxing bike ride to the beach. Many helpful suggestions from the community have been made

to achieve this "accessibility" goal instead of bike lanes through the wetlands at a fraction of the societal and economic cost of increased commute times.

CONCLUSION:

There was no sudden need to close down lanes on Pershing and Culver. Indeed, as noted above, the City of Los Angeles identified that these streets are not the priority for attention. The irony is that some of the support for the Road Diet has been from those who want a vital thriving downtown Playa del Rey yet the changes made are having the immediate and opposite effect. The reversal of Vista del Mar lane closures addresses the concerns of the South Bay while leaving your own constituents adversely impacted. However, the cut-through traffic on residential streets because of lane reductions remains a significant and dangerous problem. There is an overwhelming groundswell of opposition to the PDR pilot project as expressed to the NCWP. There is simply no question that the majority of the local community does not like it as it stands and wants the lanes restored without delay.

We are confident that you and your staff will respond to our questions and requests and facilitate other City agencies in being timely and responsive. More urgently, we hope that the flexibility you have already shown will be extended to reversing course and improving the planning, evaluation (both pre- and post-intervention), and proactive and transparent communication regarding the PDR Safe Streets initiative. The NCWP and your constituents look forward to collaborating with you in an alternate improved and comprehensive means of addressing safety, efficiency and accessibility other than the current pilot project reduced lanes.

Sincerely,

The Neighborhood Council of Westchester/Playa

cc: Seleta Reynolds, LADOT via email
Los Angeles Mayor Eric Garcetti via email

Westwood South of Santa Monica Blvd
Homeowner's Association
Incorporated November 8, 1971
P. O. Box 64213
Los Angeles, CA 90064-0213

November 8, 2015

LA City Council
Transportation and Planning and Land Use Committees
200 North Spring Street
Los Angeles, CA 90012

Via email: Adam.Lid@lacity.org, Sharon.Dickinson@lacity.org, Councilmember.bonin@lacity.org, councilmember.huizar@lacity.org, david.ryu@lacity.org, councilmember.cedillo@lacity.org, councilmember.martinez@lacity.org, councilmember.harris-dawson@lacity.org, councilmember.fuentes@lacity.org, councilmember.englander@lacity.org, councilmember.koretz@lacity.org, councilmember.harris-dawson@lacity.org

RE: COUNCIL FILE 15-0719-S11 / Mobility Element

Dear Chairpersons Huizar and Bonin and Committee Members:

It was our understanding that the Mobility Element has been adopted by the full City Council and, as such, any proposed changes must first be reviewed by the City Planning Commission before any changes can be contemplated to it., as noted in Charter Section 555. We do admit having been a bit confused at the time of the Mobility Element's original consideration in that the concerns of some of the Councilmembers (and requests for changes) were handled in a rather unorthodox manner. The amendments that resulted in additional language that would consider "community input" before any Mobility Plan projects are implemented was and is an important factor for our community. It is of critical importance to our stakeholders to know that emergency first responders will be able to reach their destinations in good time. After all, the protection of public safety is one of the key roles that local government is meant to fulfill. We simply cannot implement mobility strategies that are designed to slow traffic on major arterials upon which first responders and our communities depend. We can and should increase multii-modal options for mobility in Los Angeles. However, in doing so we should not be pitting drivers against bicyclists or intentionally clogging traffic on streets that are critical to regional access.

Pressure has been placed on the LAFD to improve response times. However, there is little they can do to reach a person in need of accident/medical aid IF the roadways have been calmed to such a degree that passage in good time has been rendered impossible. While the intent of much of the Mobility Element is laudable, as we all know, the devil is in the details and, sadly, the direction of this plan has been launched without adequate

attention to necessary detail. The Rowena road diet/traffic calming experience is an excellent example of the unintended consequences that can occur IF plans are implemented without adequate preparation and understanding. Why weren't traffic counts taken on nearby streets BEFORE traffic calming was implemented? Why wasn't community input sought BEFORE project implementation to discuss alternate streets likely to be used by travelers should new congestions result in the road diet? And why wasn't a plan for data capture designed for evaluation and feedback all along the way so that the city could learn both the positive and negative impacts of this roadway experiment? The experience on Rowena shakes our very confidence in the commitment of this City to a reasoned and reasonable approach to bike facility implementation. Just because bike facilities have been exempted from CEQA analysis does not mean that the City should abandon the philosophy underlying CEQA which is to identify best possible alternatives and to identify mitigations to lessen community impacts. In weighing options we look to policy makers to balance the needs of all constituents. While the City wishes to encourage more bike and pedestrian activity, it still must acknowledge that the overwhelming numbers of Angelenos rely on a vehicle for their travel. One cannot blame the driver (blame the victim) for as we all know too well, our region is vast and our transit offerings are yet to provide a comprehensive web of coverage over the region to enable many to rely upon transit for their daily commute.

It is too easy to say that road diets and the slowing of traffic are being done in the name of safety or to reach "Zero Fatality" figures in the future. Average citizens know that when traffic is significantly slowed, those waiting do not simply sit quietly behind the wheel (eating, drinking, shaving, texting or reading billboard signs). When congestion reaches certain levels drivers make and take alternative routes. In our community those alternative routes are residential streets on which our residents and their children walk, ride bikes and walk their dogs. We do not see adequate attention having been paid to the unintended consequences of various elements of the Mobility Plan.
No one can deny the need for Los Angeles to be weaned from its reliance on the automobile. No one can deny the need for improved safety on our streets—for pedestrians, bicyclists and those in vehicles. What we question is the ability of those involved to engineer the transition from "what is" to "what can be." This transition is critical to the success of our City's future. No amount of enthusiasm, no collection of petition signatures can overshadow the serious issues that this plan ignores (or creates).

On the matter of safety, for example, it is assumed that a Westwood bike lane will improve safety for bike riders. Yet, those most familiar with the street and the immediate area know that increased (planned) congestion will result in additional vehicles leaving the busy boulevard leading them to cut through the nearby residential neighborhoods. This situation will decrease overall safety on our streets. Our children will no longer have safe routes to school. Placing bicyclists under HUNDREDS of buses (over 900 buses each day) is a recipe for disaster. We have few north/south through streets in the area and the addition of significant numbers of bikes on our major Westwood Blvd. is counterproductive to the coming of EXPO. We must be able to move buses to and from EXPO Westwood station. The negative impacts of the proposed placement of the bike facility has not been adequately assessed. We understand that CEQA analysis is no

longer required for bike facilities; that does not mean that we should not identify and recognize any related negative impacts so that decision-making is done with the best possible information available.

Further, we are getting conflicting messages from the City. On the one hand, the City seeks to increase density and incentivize the locating of multi-story mixed use buildings on Westwood Bld. thus leading to an increase of driveway entrances which will be a further danger to bicyclists on the street. On the other hand, Westwood is being eyed for major bike facility designation.

It is wishful thinking to believe that placing a designated bike facility on Westwood Blvd. will improve safety. Many of us have seen buses stuck behind bikes on other streets. Many of us desire to ride our bicycles to and from Westwood Blvd. However, our community members have clearly stated that they will not ride (nor will they allow their children to ride) bicycles on Westwood Blvd. in this area and into the Village. **We support the establishment of a bike facility for UCLA-bound riders on a street other than Westwood Blvd. We will happily participate in any process to establish such a route.**

The fact that there was not an earlier effort to bring together bicycle and community advocates to identify a route that will serve the needs of UCLA bicyclists, community bicyclists, transit providers and all concerned is a sign that there is a serious shortcoming in this planning process. We should not be pitting bike riders against community members. We should be seeking ways to bring together stakeholders with the goal of finding consensus.

We thank Councilmember Koretz's efforts to remove the Westwood Blvd. bike facility from the Mobilitly Plan. Further work is needed to engage all stakeholders and it is our sincere hope that a truly safe route for UCLA bound riders can be identified –one that all can embrace. With the pace of transit construction, growth of telecommuting, etc., we cannot help but feel (as expressed in earlier correspondence) that the focus of the Mobility Plan should be reduced to not more than ten years. We do not have an official City crystal ball and the pace of change suggests that our battleship may need to change course mid-journey.

We continue to believe that while "aspirational" planning can be inspiring, REAL planning must be more evidence-based. LA's change from a car dominated society to a multi-modal one should be the product of an evolutionary process. The citizens of Los Angeles do not expect to be looked at as subject guinea pigs in a social experiment known as the Mobility Element. We look to our leaders to bring us together – not to approve a plan that divides us.

Sincerely,

Barbara Broide, President



White Paper Series

Road Diet Conversions: A Synthesis of Safety Research

May 2013

Libby Thomas, Senior Associate, UNC HSRC

For:
Federal Highway Administration
DTFH61-11-H-00024

This material is based upon work supported by the Federal Highway Administration under Cooperative Agreement No. DTFH610110H-00024. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.

Summary

The primary purpose of this review is to assess the available evidence regarding the safety effectiveness of reductions in the number of motorized traffic lanes, widely known as road diet conversions. Although road diets have been implemented since at least the 1970s, earlier reviews and a search of the literature identified no controlled safety evaluation studies conducted prior to the year 2002. A systematic search of literature dating from 2002 was conducted. Six studies in total were initially identified, with four serving as the basis for most conclusions in this review. Several of the studies have used overlapping data from many of the same implementation sites, with the more recent studies employing the more robust study methodologies. As a result, the strongest evidence comes from relatively few studies building on earlier ones. However, a sizeable number of sites have been encompassed in the studies. Studies using data from sites in California, Iowa, and Washington provide the strongest evidence of safety effects, with additional reports providing corroborating, but somewhat weaker evidence.

Road diets can be seen as one of the transportation safety field's greatest success stories. Total crashes might be expected to decline by an average of29 percent by converting from four, undivided lanes to three lanes (plus other uses such as bike lanes). Additionally, the studies determined total crash reductions were higher (47 percent) for treated sections of more rural thoroughfares passing through smaller towns (Iowa sites) and lower (19 percent) for road diet corridors in large urban areas (California and Washington sites) (Harkey et al., 2008).

Thus far, only a single study from New York City has examined effects on pedestrian crashes (Chen et al., 2013). Although the researchers were unable to use the most robust methodology due to a lack of traffic volume data, the inclusion of 460 road diet sites and large number of comparison locations supports the findings of significant reductions in total crashes, significant reductions in injurious and fatal crashes, and a trend of lower pedestrian crashes at segments. Total crashes and injurious crashes also declined significantly at intersections abutting the road diet sections.

Each potential road diet should be vetted on a case by case basis. Case study and modeling results suggest that added caution is warranted before implementing road diets when volumes approach 1,700 vehicles per peak hour or are in the range of 20,000 to 24,000 vehicles per day (HSIS, 2010; Knapp and Giese, 2001; Welch, 1999). However, high quality disaggregate estimates of safety effects of road diets for different volume roadways are lacking. Further study of potential traffic and safety effects on surrounding roads and access from side streets to the road diet corridor may also be needed.

Introduction and Purpose of this Review

Road diets, also known as road conversions, are the reallocation of road space through reduction of the number of motorized traffic lanes. They are of interest to communities that may be seeking to smooth traffic flows and reduce traffic speeds, improve access management, reduce crashes, improve safety and accessibility for pedestrians or bicyclists, improve parking utilization, improve economic function of the street, or in general gain space for uses more compatible with the purposes of the street. Some streets that were built with peak flows in mind, or because the thinking at the time was that more lanes are better, may have excess capacity for most periods of the day, and roadway space that is not well-utilized. The intent of this review was to assess the available evidence regarding the safety effects of road diet conversions.

In addition to the safety effects, roadway managers are interested in knowing what traffic volume and roadway conditions are most amenable to treatment, while still providing adequate mobility. In general, road diets have been described as maintaining motor vehicle capacity for converted roads with average daily traffic volumes (AADTs) up to approximately 20,000 vehicles per day under most conditions tested. Road diets may also provide safety and mobility benefits to other modes of travel, including bicycling and walking (HSIS, 2010).

As mentioned, the reallocation of space can further goals for pedestrian safety and mobility. Even if the reallocated lane space is not used directly for pedestrian facilities, the use of space to add parking or bicycle lanes increases the buffer between motorized traffic and pedestrians walking along the sidewalk. Bike lanes may also add to the buffer between motorized traffic and fixed objects such as trees and street furniture along the roadside. The fewer number of motorized lanes associated with a four-lane to three-lane conversion, or two lanes with median, also reduces pedestrians' exposure to traffic when crossing streets. A center, two-way left turn lane (TWLTL), or median islands also provide space for pedestrian refuge. More capital-intensive conversions include curb realignments or the addition of center medians or median islands. If curbs are realigned, space may be allocated to green space or other buffers, or to increase sidewalk width.

The most commonly studied reallocations of space have been conversions of undivided, four-lane roads into three lanes (one through lane in each direction plus TWLTL), and typically involve reallocation through striping or re-channelization. Many conversions include the addition of dedicated bike lanes in both directions as part of the space reallocation, a change in parking space allocation, or the addition of both parking and bike lane space. Therefore, these types of road diets rely on relatively inexpensive re-striping, perhaps in association with re-paving. Such actions can be very cost-effective if combined with regular maintenance activity. Conversions may also incorporate signal timing or phasing changes at intersections to optimize operations and safety benefits. Some communities are also combining road diets with roundabout intersection designs.

Background on Safety and Operational Effects

Welch (1999), in a paper presented to the Transportation Research Board (TRB) and Institute of Transportation Engineers' (ITE) Urban Street Symposium in 1999 reported on observations that led to the first four-to three-lane roadway conversions in Iowa. Prior to the mid-1980s, it was common practice to widen two-lane urban arterials to four-lane, undivided roads if traffic volumes exceeded 6,000 vehicles per day. According to Welch, "At public hearings,

project engineers would state that corridor safety would improve if the two-lane roadway were widened to a four lane undivided roadway. Graphics would be shown to illustrate that additional acceptable gaps in the traffic stream would result, and motorists could avoid rear-end collisions by changing lanes and going around slowing/stopping vehicles. Those in opposition to the widening would argue that travel speeds would increase, pedestrians would have to cross a wider street, and noise would increase. In most cases, however, the four-lane undivided cross-section was selected as the preferred alternative because the only other alternative was generally to do nothing (i.e.: the roadway remains a two-lane facility)."

Welch's Table 1 shows the actual trends he found following such a two-lane to four-lane conversion of a road with average traffic volumes of 10,000 – 14,000 vehicles per day (vpd). It highlights the slight increase in traffic volume, delay, and speed, with a more substantial increase in accident and injury rates, and total value loss.

Table 1

Corridor Element	Change
• Traffic Volume	Increased 4 percent
• Corridor Travel Delay	Increased 4 percent
• Mid-block 85th% Speed	Increased 2.5 mph
• Traffic Traveling More than 5 mph Over Speed Limit	Increased from 0.5 percent to 4.2 percent
• Accident Rate	Increased 14 percent
• Injury Rate	Increased 88 percent
• Total Value Loss	Increased 280 percent

Table 1 –Table from Welch's 1999 Report following a two-lane to four-lane conversion

In contrast, positive safety and operations effects were experienced by localities that converted some wide, two-lane roads to three-lanes (one narrower lane in each direction with a TWLTL), suggesting the possibility of four to three-lane conversions as a potential way to improve safety and provide acceptable mobility. Welch (1999) reported data from nine conversions in Seattle, Washington and found that volumes were maintained while crash numbers went down.

Burden and Lagerwey (1999) provided traffic volume data for 18 road diets from four states and Canada, including the nine Seattle locations described by Welch. "Before" traffic volumes from the 18 road diets described in Burden and Lagerwey were between 9,700 and 23,000. In each case except one, traffic volumes were maintained or increased after the conversion. Lake Washington Blvd., in Kirkland, WA, with an initial volume of 23,000 vehicles per day, increased to nearly 26,000 after the conversion, and during one period was carrying about 30,000 vehicles per day. The one exception where the after volume decreased somewhat carried an initial 20,000 vehicles per day, which dropped to 18,000 in the after period suggesting the potential for traffic diversion to other routes. Huang, Stewart, and Zegeer (2002) also mentioned two road diet examples where traffic volumes decreased on the treated streets and increased somewhat on

nearby routes: A conversion of Polk St from three lanes to two lanes in San Francisco was followed by an ADT decrease of 2% and ADT increases on two nearby parallel streets by 8% and 15% (actual volumes not reported). However, Polk Street also saw an increase in bicycle traffic from 37 to 52 during the peak hour. The conversion of Valencia Street in San Francisco also resulted in a 10% decrease in ADT, to 19,979, while the ADTs on four parallel streets increased by 2% to 8%. The number of bicycles, however, more than doubled on Valencia during the peak hour, from 88 to 215.

The City of Orlando, Transportation Planning Bureau carried out a variety of studies prior to a road diet conversion of Edgewater Drive. Following the conversion, traffic volumes dropped initially from 20,500 vehicles per day to 18,000, but then recovered to 21,000. Pedestrian volumes increased by 23 percent, and bicycle volumes increased by 30 percent. Parking use on Edgewater Drive also increased, and motorized traffic did not increase on nearby roads. All of these outcomes helped to meet eight of nine community objectives for the road diet conversion (*Edgewater Drive – Before and After Re-striping Results*, 2002).

In the case study examples described above, it is unclear how long after the implementation that traffic volume or other data were collected, or whether volumes had stabilized in the after period.

Knapp and Giese (2001) also carried out detailed simulation sensitivity analyses to attempt to confirm the reported operational impacts of four to three-lane road diet conversions. The results of the simulation analyses primarily confirmed the case studies assessments. Knapp and Giese (2001) noted that there may be some impacts to motor vehicles during peak periods of greater than about 1750 vehicles per hour. Simulation results indicated that a decrease in average arterial speed (ranging from 0 to 4 mph) for through vehicles would be expected for a three-lane configuration compared with a four-lane design, given a large range of peak-hour volumes, access densities, and access-point left-turn volumes (Knapp and Giese, 2001). The simulated arterial level of service for a converted roadway began to show a decrease when the bi-directional peak-hour volume was about 1,750 vehicles per hour (or 17,500 vehicles per day if 10 percent of the daily volume is assumed to occur in the peak hour) (Knapp and Giese, 2001). The models found that at higher access point densities (around 40 - 50 points per mile), four-lane undivided roadways with high left turning volumes begin to operate more like de-facto three-lane roadways in terms of speeds, as drivers avoid the left lanes on such four-lane roads.

Considering past research by others, Knapp recommended that a four-lane undivided to three-lane conversion be considered as a feasible option (with respect to volume only) when bi-directional peak-hour volumes are less than 1,500 vehicles per hour, but that some caution be exercised when the roadway has a bi-directional peak-hour volume between 1,500 and 1,750 vehicles per hour. However, Knapp pointed out that the results are for one idealized simulation case study, which included optimization of signal timing to minimize vehicle delay along the corridor.

Knapp and Giese (2001) also reported on 13 road diets in California, Montana, Minnesota and Iowa. A number of sites had volumes of around 20,000 to 24,000 ADT. Observed crashes decreased at all of the sites reported on by Knapp and Giese (for which data were available, see p. 28). Note that the observed crash reductions could have been affected by random effects due to regression toward the mean, although such effects would not be expected at all sites. Over all, travel speeds decreased at three of 10 sites with speed data available. Average speed increased at one location. The largest effects were on high end speeders (more than 5 mph over the limit, or above the 85th percentile). Maximum

85th percentile or average speed reductions noted were three to four miles per hour. However, well-controlled estimates of crash reductions and operational data for different volume roadways were not provided.

Burden and Lagerwey (1999) indicated that road diet conversions prior to 1999 maintained capacity by keeping the same number of lanes (often as intermittent turn lanes/pockets) at intersections, where capacity and delay are usually most affected. However, if bicycle lanes or parking are added, as occurs more frequently in more recent conversions, it may not always be possible to maintain the same number of motorized vehicle lanes at intersections as in the before condition.

Knapp and Giese (2001) also identified detailed factors to consider in assessing the feasibility (and desirability) of road diet conversions. These factors included the desired as well as current purposes (function and environment) of the roadway, and a number of operational, design, network, and safety factors including:

- turning patterns and access density,
- signal timing and phasing,
- presence of turn lanes,
- presence of frequently stopping or slow-moving vehicles,
- the acceptable levels of service or delay for the corridor and intersections,
- the current situation and acceptable operations for side streets and driveways,
- pedestrian and bicycle activity and safety,
- availability of parallel routes,
- prevalence of crash types that may be most amenable to improvement with a road diet,
- The ability to enforce the left-turn-only function of the center lane (if created).

Earlier research and reviews (Zegeer, Stewart, Huang, and Lagerwey, 2002; Welch, 1999; Knapp and Giese, 2001) suggest that optimal safety benefits from road diets may be attained when:

- the roadway has a moderately high density of driveways and other uncontrolled access,
- crash severities are high,
- speeding contributes to safety problems,
- pedestrians and others crossing/accessing the main corridor are affected by the higher exposure of crossing multiple lanes, and
- frequent crash types that may be most amenable to improvement.

Clearly, each candidate site should be reviewed on a case by case basis (Knapp, Giese, and Lee, 2003a).

From analysis of crash patterns and operations, the crash types expected to benefit most include pedestrian crashes (by reducing the multiple threat risk), rear-end crashes involving left-turning vehicles, left-turning crashes involving far lane opposite direction vehicles, and sideswipe types of crashes involving same direction vehicles changing lanes to go around slowing, turning vehicles (Welch, 1999; Burden and Lagerwey, 1999). However, all types of crashes as well as crash severity may be reasonably expected to decline if speed reductions are obtained (AASHTO, 2010).

A conversion from four lanes may be unacceptable to a community, per Knapp, Giese, and Lee (2003b) if peak hour volumes exceed about 20,000 vehicles per day (or about 1000 vpd by direction). Yet the acceptability may depend on the change in level of service more than the magnitude. Additionally, Knapp et al. indicate that careful assessment is warranted if additional turn lanes are required at intersections along the corridor. The studies by Knapp and Giese (2001), Knapp, Giese, and Lee (2003a and 2003b) and Rosales (2007) provide more information on road diet case studies, goals and implementation considerations. Rosales relied heavily on Knapp and Giese and from case studies from around the globe to develop guidelines for identifying and developing potential road diet sites.

The remainder of this paper focuses on the safety effects of road diets. A secondary goal was to assess, if possible, the safety effects with regard to different volume roadways.

Study Methods

A search of road diet safety evaluation studies was performed. The search focused on identifying peer-reviewed safety evaluation articles and reports, particularly focusing on the period of 2002 through early 2013. The TRID (TRB Transportation Research Information Services Database joined with the OECD's Joint Transport Research Centre's International Transport Research Documentation Database) was searched, along with Web of Science, PubMed, and PsychInfo electronic databases for literature published since 2001. In addition, the Crash Modification Factors (CMF) Clearinghouse (http://www.cmfclearinghouse.org/) was searched. Correspondents also provided some papers. Search terms included "road diet" and "lane reduction." For earlier literature, we relied on several past reports and literature reviews that were conducted for preparation of the Highway Safety Manual (AASHTO, 2010). Targeted internet searching was performed, as well as review of secondary sources.

Results and Discussion

Six road diet safety evaluation studies were identified. Three of the studies have been published in peer-reviewed publications (Chen et al., 2013; Huang, Stewart, and Zegeer, 2002; and Pawlovich, Wen, Carriquiry, and Welch, 2006). A fourth was part of a large National Cooperative Highway Research Program (NCHRP) study that developed CMFs for the Highway Safety Manual (Harkey et al., 2008). For the NCHRP study, data previously used by Pawlovich et al. (15 Iowa sites), and by Huang et al. (30 sites from California and Washington) were reanalyzed using an empirical Bayes (EB) approach and larger groups of reference sites (Figure 1). An additional paper by Persaud et al. (2010) reported further estimates derived from using both full Bayes and empirical Bayes methods, again using the Iowa data. Thus, three of the key studies have used overlapping data from a total of 45 treated sites plus comparison sites. A few additional studies were identified. Most were reanalyses of data covered by the other papers.

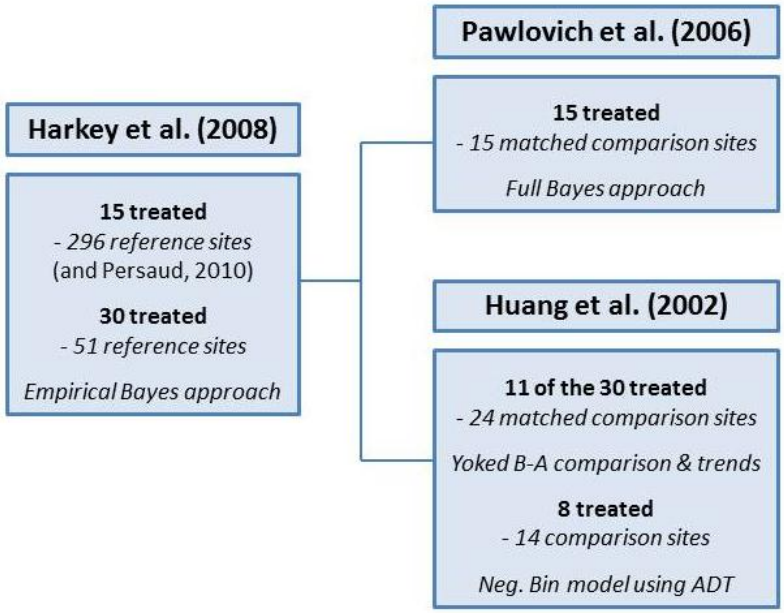

Figure 1. Data and relationships of three of four reviewed studies.

The most robust evaluations use methods to control for regression to the mean (RTM, the tendency for crashes to fluctuate around a mean, and thus change year-to-year whether or not a treatment is implemented), changes in traffic flow, and general crash trends using a comparison group and statistical procedures. By using large groups of reference sites that are similar to the treated sites to generate estimates of expected crashes for similar types of roads (in the absence of treatment), the EB methodology can help reduce the influence of random fluctuations in crashes and therefore control for regression toward the mean (RTM) effect. In addition, effects of changes in traffic volume over time, or due to the treatment are controlled with this method.

CMFs provide estimates of the safety effects of treatments as a multiplier of prior crashes. To obtain an estimate of the expected percent change (reduction) in crashes, use the calculation of (1 – CMF)*100. Study characteristics and estimates of crash effects (percent increase or decrease) with standard errors or confidence intervals are reported in Table 2 for the four studies listed.

Based on the CMFs produced, Harkey et al reported (in Appendix C) estimates of total crash reductions of 47 percent for the Iowa sites (Table 2). For this set of sites, Pawlovich et al. had used full Bayesian methods and derived expected total crash reductions of 25 percent normalized to a per mile basis. Due to the different outcome measures, the estimates are not strictly comparable, but both indicate substantial, significant crash reductions with small standard errors of the estimates. In addition, Persaud et al. also analyzed the Iowa data using a full Bayes approach, and with both the smaller and larger sets of comparison sites, and obtained very similar estimates of 47 to 49 percent total crash reductions per site per year.

The 47 percent expected crash reduction would be most accurate when considering road diets for routes (mostly State or U.S. highways) passing through small urban areas of around 17,000 average population, and with traffic

volumes in the range of about 5,000 to 12,000 per day. The average before and after traffic volumes reported also suggest that traffic volumes were maintained or increased slightly between the before and after periods, although the data for individual sites were not available. Thus, there was no evidence of volume shifts implying potential traffic diversion to other roads. There were, however, no estimates of disaggregate effects for different volumes or other conditions of the roadway, nor of particular crash types (rear-end, pedestrian, left-turn, etc.).

Estimates of 19 percent total crash reductions were obtained for the sites from California and Washington (Harkey et al.., 2008). The 19 percent estimates based on California and Washington data would be most applicable to corridors in larger suburban/urban areas (populations up to 269,000) with average daily traffic volumes ranging from 5,500 to 24,000 vehicles (HSIS, 2010). Again, estimates by disaggregate crash types, traffic volumes, or other conditions were not reported.

The Harkey et al. 19 percent estimated reduction is considered a more reliable estimate to replace the earlier estimate by Huang et al. of a non-significant change in crashes (Table 2). In using empirical Bayes procedures, Harkey et al., were able to use all 30 of the initial study sites considered by Huang, and a large group of reference sites to develop estimates of safety effects.

The reason for the larger crash reductions in Iowa compared to the California and Washington sites was speculated to be due to potentially larger speed reductions at the Iowa sites (Harkey et al., 2008). There were up to 5 mph reductions in 85th percentile speeds and large reductions in percentages of vehicles exceeding by 5 or more mph at one of the Iowa sites. Researchers speculated that speed reductions for vehicles approaching and going through small urban centers in Iowa on mainly U.S. and state highways might be greater than those expected in the larger urban areas of California and Washington, where speeds may have been lower before treatment (HSIS, 2010).

A combined estimate of 29 percent (1.6 percent standard error) in total crash reductions resulted for all the Iowa, Washington State and California sites combined (not shown in the table). This estimate could be used as a more general estimate of expected effect of road diets or for localities with location types intermediate to the Iowa compared with California and Washington sites.

Most recently, a study of 460 road diet sites in New York City estimated total, multi-vehicle, pedestrian, and injury and fatal crash effects for 460 segments, and for 324 intersections adjacent to the road diet sections (Chen et al., 2013). The intersections' zones of influence included crashes within 100 feet of the intersection. Total crash reductions of 67 percent were estimated for treated segments with an estimate of 13 percent reduction in total crashes at the nearby intersections. In addition, significant reductions in multi-vehicle and fatal and injurious crashes were reported for both segments and intersections along with a lower trend in pedestrian crashes for segments only (Table 22). Study design and analysis methods were used to control for potential regression to the mean effect. However, traffic volume data were unavailable for use in analyses, so a potential influence of changes in traffic volume on crashes cannot be ruled out.

The paper by Gates, et al. 2007 was not published, and due to an incomplete description of the data and study, the crash data results are not further described. However, speed data reported by Gates et al., indicated that mean speeds were reduced at 18 out of 20 sites, and 85th percentile speeds were reduced at 15 out of 20 sites. Reductions of around 2 mph in mean speeds were statistically significant at 3 of the 18 sites with reducing trends.

Table 2. Study Characteristics and Results of Safety Evaluations of Road Diet (mostly four to three-lane including center, two-way left turn lane) conversions.

Reference	Study Methods	Treatment Sites	Comparison Group	Control for ADT	Control for RTM	Other	Study Periods	Outcome Measures	Observed Crashes - Treatment	Observed Crashes - Comparison	Estimated Change in Crashes due to treatment
Chen et al., In Press	Before-After with comparison group; ANCOVA model to estimate coefficients, combining treated and untreated sites to estimate expected crashes without treatment	460 segments, NYC	3364 matched segments with geographic proximity, but not adjacent (to avoid spillover effects)	No	Possibly. The method has been used in the medical research field but not yet validated in road safety	No information available on whether traffic volumes changed before to after	±B: 5 years A: 2 years all sites	Total (reportable) crashes	B: 0.12 avg. crashes per location year; A: 0.05 avg. crashes per location-year	B: 0.10 average crashes per location year A: 0.12 avg. crashes per location-year	*(-67% +/- 7%)
								Injurious and fatal crashes	n.a.	n.a.	*(-70% +/- 9%)
								Multi-vehicle crashes	n.a.	n.a.	*(-67% +/- 7%)
								Ped crashes	n.a.	n.a.	(-41% +/- 27%)
	Before-After with comparison group; same ANCOVA methodology as for segments	324 intersections adjacent to road diet sites, NYC	2342 matched intersections	No	Possibly. See above	No information available on whether traffic volumes changed before to after	B: 5 years A: 2 years	Total (reportable) crashes	B: 0.84 avg. per location-year A: 0.82 avg. per location-year	B: 0.98 avg. per location-year A: 0.82 avg. per location-year	*(-13% +/-5%)
								Injurious and fatal crashes	n.a.	n.a.	*(-17% +/- 6%)
								Multi-vehicle crashes	n.a.	n.a.	*(-19% +/- 10%)
								Ped crashes	n.a.	n.a.	5% +/- 16%
								Bicycle crashes	n.a.	n.a.	21% +/- 30%
Harkey et al., 2008; also Persaud et al., 2010	Empirical Bayes Before-After with reference group to develop safety performance functions and expected crashes with and without treatment	15 IA sites	296 reference sites	Yes	Yes		Trt. Group B: mean 17.5 years (range 11 to 21 years); Trt. Group A: mean 4.5 years (range 1 to 11 years); Ref. group: mean 21.8 years (range 5 to 23 years)	Total crashes	B: 23.7 per mile-year; A: 12.2 per mile-year	26.8 per mile-year	*(-46.6%) (2%) (-47%) (1%) using full Bayes (from Persaud et al.)

Reference	Study Methods	Treatment Sites	Comparison Group	Control for ADT	Control for RTM	Other	Study Periods	Outcome Measures	Observed Crashes - Treatment	Observed Crashes - Comparison	Estimated Change in Crashes due to treatment
	Empirical Bayes Before-After with reference group to develop safety performance functions and expected crashes with and without treatment	30 CA & WA sites	51 reference sites	Yes	Yes		Trt. Group B: mean 4.7 years (range 1.8 to 8.5 years); Trt. Group A: mean 3.5 years (range 0.6 to 8.8 years); Ref. Group: mean 7.8 years (range 4.5 to 12.2)	Total crashes	B: 28.6 crashes per mile-year; A: 24.1 crashes per mile-year	42.2 crashes per mile-year	*(-18.9%) (2.5%)
Huang et al., 2002	Before-After with Matched (yoked) Comparison	11 (of 30 original sites, CA & WA)	25 matched comparison sites	Yes	Possibly. But pre-EB, not as effective as EB method.	Excluded crashes at intersections or other transition areas. Excluded crashes for 3-month transition period around intervention completion.	B: at least 1 year for most sites A: at least 1 year for most sites.	After-period proportion of total Before and After crashes	B: 1327 total crashes, all sites A: 741 total crashes, all sites	B: 5045 total crashes, all sites A: 3510 total crashes, all sites	*(-6%) (0.3% to 10.6%, 95% Conf. limits) Lower proportion of after period crashes for road diet sites relative to comparison sites
	Before-After with Comparison group	8 (of 30 original sites, CA & WA)	14 matched comparison sites	Yes	Yes	Crashes per mile of roadway treated as a log-linear function of ADT, and other explanatory variables.	B: at least 1 year for most sites A: at least 1 year for most sites.	Total crashes per mile	Not reported for this subset	Not reported for this subset	No significant effect of treatment
Pawlovich et al., 2006	Full Bayes Before - After comparison with same before-after change point used for untreated, matched comparison group	15 IA	14 matched sites (1 dropped due to unreliable data)	Yes	Yes	ADT treated as a linear predictor, but volumes did not change significantly between Before and After periods	B: mean 17.5 years (range 11 to 21 years); A: mean 4.5 years (range 1 to 11 years)	Total crashes per mile	not reported, but same data, in part, as in Harkey et al.	n.a.	*(-25.2%) (23.2 to 27.8%, 95% C.I.)
								Total crash rate per mile	not reported, but same data in part, as in Harkey et al.	n.a.	*(-18.8%) (17.9% to 20%, 95% C.I.)

‡B = Before period; A = After period in any column in the table.

*Statistically significant effects

Michigan study

The sixth study identified is a report for a State agency that also has not yet been published in a peer-reviewed format. Lyles et al. (2012) reported on the crash effects of 24 road diets around Michigan. Several crash effect estimates using different methodologies were provided in the study. An average CMF developed using a naïve before-after comparison was estimated at 0.63 (a 37% crash reduction). A CMF of 0.91 (9 percent total crash reduction) was derived from a simple unweighted average for all 24 sites combined (regardless of corridor length or number of crashes per site). The latter CMF was adjusted based on city-wide crash trends rather than by using a similar comparison group of untreated roadways. Potential regression toward the mean may not be fully controlled by either of the two previous approaches, and it is not clear how volume trends were accounted for. It appears that for the estimate adjusted by the city-wide crash trends, the comparison group was included the treated corridors. If so, the trend adjustment factor would incorporate crash effects due to the treatment, potentially causing an understatement of effect, especially if the treated corridors accounted for a large percentage of crashes. When conducting controlled, before-after evaluations, it is essential that a comparison group with similar characteristics to those treated, but that are not affected by the treatment, be used to estimate the crash effects likely attributable to the treatment (Hauer, 1997).

State-of-the art E-B methods were used to derive disaggregate estimates for four of the 24 sites for which suitable comparison sites could be identified. Three years of before and after crash data, apart from the construction year, were used for each site. However, it is not clear how AADT data were used in the evaluation. These individual corridor comparisons resulted in CMFs of .98, 0.97, 0.93, and 0.83 (expected crash reductions of 2 percent, 3 percent, 7 percent and 17 percent, respectively). However, the estimated crash reductions were not statistically significantly different from zero for any of the four corridors. It is not clear why data for all of the four sites were not combined, for, perhaps, a more robust analysis. In addition, if a larger reference group is used, the importance of matching of exact characteristics takes on less importance. A larger reference group is also more effective in accounting for RTM (Harwood, et al., 2002)

The authors focused their main conclusions on the CMF estimates derived from an unweighted average of before-after comparisons using all 24 sites (without accounting for similarity of corridors to those treated, nor length, or numbers of crashes by corridor) and adjusted for city-wide trends. In addition, certain crash types thought not to be affected by the treatment were excluded. However, since road diets may reduce operating speeds, all crash types might reasonably be reduced, particularly more severe crashes. As mentioned, there are some issues with control for traffic volumes, description and suitability of comparison groups used, and other study details that limit confidence in the findings. As acknowledged by the authors, the estimates derived are clearly affected by the comparison group used, with very different estimates of effect being reported, depending on which reference group was used.

Data provided also showed that there were 33 fatal and A-type (disabling injury) crashes in the three year before period for all 24 sites combined, and 9 fatal and A-type crashes in the three-year after period for all sites combined. Although there is mention of an overarching decreasing trend in crashes of all severities in Michigan for a 15 year period spanning the study period, specific data for the comparison city(ies) during the study period were not provided.

Although the primary intent of this review was not to review operational impacts, these impacts are of course a concern to network providers and transportation consumers. Lyles et al. also modeled intersection approach delay for one or both road diet approaches at nine different intersections within road diet corridors. They used baseline peak-hour

traffic volumes and turning percentages to establish the baseline worst case delay. Volume increments used were 750, 1,000, 1,250, 1,500, 1,750, and 2,000 vehicles per hour (vph), holding turning percentages constant. The authors concluded that delay was affected with volumes as low as 10,000 vehicles per day (vpd), or more particularly 1,000 vehicles per hour (vph). The earlier studies by Knapp et al. suggested less sensitivity to volumes up to levels of 1,750 vph, and that caution begin to be exercised with volume thresholds of around 1,500 – 1,750 vph. As reported by Lyles et al., most of the models showed virtually no difference in delay between 3-lane and 4-lane at 1,000 vph, with 3-lane delay beginning to rise at a higher rate at around 1,000 – 1,250 vehicles per hour compared to a more gradual rise for 4-lane sites. (Interpretation was somewhat complicated by using display graphics with different scales for different graphs). Over the 17 model results shown, the average "failure" point (defined as an LOS D or lower with 55 seconds intersection delay) was not reached until 1,500 vph, which is more in line with the earlier Knapp study. This study also reported that "An analysis of existing conditions was done for each site and results were checked for any major issues such as high delay or queue length values (there was none)." As mentioned in the introduction of this review, some jurisdictions, when feasible, maintain capacity at intersections by using intermittent turn lanes and signal timing adjustments. In their models, Lyles et al. generally held signal phasing as a constant.

Others have modeled the potential impacts of different forms of intersection traffic control in conjunction with a conversion, with one paper finding that a modern, single-lane roundabout, in conjunction with a three-lane configuration, would be a viable and safer alternative to four-lane undivided, or three-lane with two-way stop control with up to 50 percent higher traffic volume (Russell and Mandavilli, 2003). Rosales (2007) describes other examples, including analysis of Grand Blvd., Vancouver, WA. A 20-year forecast was conducted that found that the addition of right-turn lanes at three intersections along the converted corridor would yield an intersection LOS of D or higher, the same as the four-lane configuration. In addition, the potential for traffic diversion was analyzed, with a finding that an adjacent parallel roadway might expect a 5 percent increase from diverted traffic. This percentage was considered acceptable.

Conclusions

A relatively small number of robust studies have analyzed the safety impacts of road diet conversions, mostly from four-lane, undivided corridors to three-lane corridors including TWLTL (frequently with added bike lanes). The most robust studies have, however, encompassed a substantial number of converted sites and comparison locations. Based on these studies, road diet treatments seem to be one of the success stories with regard to crash and speed reductions.

Road diets are also compatible with providing a number of other community and roadway use benefits. In addition, conversions utilizing existing right of way can be very economically implemented through the use of paint, but perhaps enhanced with additional measures such as raised medians and turn pockets.

The most robust estimates range from 19 percent average reduction in total crashes on corridors in larger urban areas to 47 percent for more rural highways passing through small urban areas. Crash reductions have been documented for a range of conditions including highways passing through smaller localities, for corridors in larger urban/suburban areas, as well as intensively urban New York City.

Actual crash reductions can be expected to vary depending on the site conditions, crash types analyzed, and methodologies used. In terms of site conditions, there has been significant conjecture that pre-conversion conditions such as density of unsignalized junctions, frequency of left turning movements, numbers of slowing or stopping vehicles, changes in operating speeds, and prevalence of certain crash types, among other factors may affect results obtained, but there are insufficient data at present to support or refute these conjectures. The extent of speed reductions achieved may also help to explain variation in the degree of safety effects that has been noted in different environments. Lower operating speeds have the potential to affect all types of crashes and crash severity

Impacts on more severe crashes (fatalities and injuries) and operating speed changes should be a prime consideration in future evaluations. Since it is typically more challenging to detect effects on lower numbers of severe crashes, documenting effects on travel speed distributions would help to document safety benefits and reduction in risk of more severe injuries. Motor vehicle speed is a prime safety consideration for pedestrians.

However, there are still questions about what conditions are most conductive to the greatest safety benefits, as well as maintenance of good operational and access conditions for various users. Road diet treatment generally seems compatible with maintaining motor vehicle capacity under the volume conditions studied, most often in moderate ranges from around 5,000 up to 24,000 vehicles per day, or up to around 1,500 – 1,750 vehicles per peak hour. Case study evidence suggests that other types of traffic, including bicycles and pedestrians, may increase after a road conversion.

It is not entirely clear whether the mobility assessments to date have well-captured actual operational effects of road diets, or whether short term traffic diversion noted in some instances have continued over time. Some studies have shown a short term shift in flows to other corridors, with volumes returning in time. Much of the information to date is in anecdotal or case study format, or based on simulation modeling exercises, which necessarily simplify and omit parameters that may have a bearing on flows. Many of the "worst case" volume scenarios in simulation studies might never occur, or might be mitigated through optimizing signal timing, provision of intermittent turn pockets or roundabouts at intersections, shifts in travel mode if alternate facilities are provided, and other outcomes that have been reported by practitioners.

Road diet conversions to three-lanes seem to be a low-cost way to enhance safety for a fairly wide range of urban and suburban four-lane, undivided corridors of low to moderate volumes. If a road diet additionally meets other local objectives, then it should be considered a viable option based on the safety evidence.

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Reply-To: Action Network <info@actionnetwork.org>

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Timestamp: 2019-02-26 18:54:04 UTC
First Name: Pamela
Last Name: Day
Email: pday@paladintrust.com
Zip Code: 90066
Country: US
Street: 12492 Venice Blvd
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

The great streets mess has been a disaster. The lane closures were not well thought out. What we learned from the test is that it failed. Please start over with a different plan.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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First Name: Cigdem
Last Name: Akbay
Email: chigma711@hotmail.com
Zip Code: 90066
Country: US
Street: 3905 Inglewood Blvd # 105
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

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Last Name: Alves
Email: emal03@hotmail.com
Zip Code: 90291
Country: US
Street: 112 Thornton place
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 11:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:36:35 UTC
First Name: Richard
Last Name: Sinclair
Email: rdsinclair@earthlink.net
Zip Code: 90064
Country: US
Street: 2922 Tilden Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 11:40 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:40:39 UTC
First Name: Stefanie
Last Name: Krutilek
Email: krutilek@mac.com
Zip Code: 90291
Country: US
Street: 3003 Grand Canal
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 11:41 AM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:41:07 UTC
First Name: James
Last Name: Naughton
Email: jnaught@outlook.com
Zip Code: 90405
Country: US
City: Santa Monica
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 11:47 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:47:23 UTC
First Name: susan
Last Name: loewenberg
Email: saloewenberg@aol.com
Zip Code: 90034
Country: US
Street: 3451 greenfield ave
City: los angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 11:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:53:45 UTC
First Name: Helen
Last Name: Fallon
Email: fallons@earthlink.net
Zip Code: 90291
Country: US
Street: 425 Linnie Canal
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 11:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:54:29 UTC
First Name: Alia
Last Name: Congdon
Email: Historify@yahoo.com
Zip Code: 90291
Country: US
Street: 521 Grand Blvd
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 11:55 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:54:01 UTC
First Name: David
Last Name: Wire
Email: espeefan@hotmail.com
Zip Code: 90066
Country: US
Street: 3945 Frances Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:00 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 19:59:54 UTC
First Name: Todd
Last Name: Kohn
Email: tkohn1@gmail.com
Zip Code: 90292
Country: US
City: Marina Del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:11 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:11:38 UTC
First Name: Wendy
Last Name: Kaysing
Email: taratree123@yahoo.com
Zip Code: 90004
Country: US
Street: 566 N. Windsor Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:19 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:18:49 UTC
First Name: Wendy
Last Name: Wheat
Email: creamof@aol.com
Zip Code: 90066
Country: US
Street: 12412 Victoria Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:24 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:22:30 UTC
First Name: SCOTT
Last Name: zuber
Email: szzuber@yahoo.com
Zip Code: 90066
Country: US
Street: 11918 Palms blvd
City: La
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

The additional Cut through traffic is endangering our neighborhood.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:24 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:23:51 UTC
First Name: mark
Last Name: rosenberg
Email: rosenbergconsulting@mac.com
Zip Code: 90066
Country: US
Street: 12405 venice blvd, ste 260
City: L.A.
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:27 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:27:26 UTC
First Name: Tia
Last Name: Triplett
Email: tia@anlf.com
Zip Code: 90066
Country: US
Street: 3959 Berryman Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:28:37 UTC
First Name: Mina
Last Name: Friedler
Email: elimina@ca.rr.com
Zip Code: 90291
Country: US
Street: 2342 Clark Ave.
City: Venice
Verification: Blvd.
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:29 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:29:13 UTC
First Name: Eli
Last Name: Friedler
Email: elimina@ca.rr.com
Zip Code: 90291
Country: US
Street: 2342 Clark Ave.
City: Venice
Verification: Blvd.
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:33 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:33:05 UTC
First Name: Sheri
Last Name: Odere
Email: sheri@odereinc.com
Zip Code: 90066
Country: US
Street: 3650 wade st
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:36 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:35:45 UTC
First Name: mary
Last Name: boehle
Email: itstnab@ca.rr.com
Zip Code: 90066
Country: US
Street: 3282 grand view blvd
City: los angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:38 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:38:23 UTC
First Name: Tia
Last Name: Triplett
Email: tia@anlf.com
Zip Code: 90066
Country: US
Street: 3959 Berryman Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:41 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:41:01 UTC
First Name: Gail
Last Name: Blamires
Email: gblamires@aol.com
Zip Code: 90066
Country: US
Street: 3620 Redwood Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:43 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:43:03 UTC
First Name: Sheri
Last Name: Odere
Email: sheri@odereinc.com
Zip Code: 90066
Country: US
Street: 3650 wade st
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 12:44 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 20:43:12 UTC
First Name: James
Last Name: Jefferis
Email: jvj4th1968@gmail.com
Zip Code: 91401
Country: US
Street: 13520 Victory Blvd. Apt 6
City: Van Nuys
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 1:37 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 21:37:16 UTC
First Name: Jose
Last Name: Figueroa
Email: figueroaj95@yahoo.com
Zip Code: 90291
Country: US
Street: 920 Venice Blvd Apt 110
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 1:46 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 21:46:12 UTC
First Name: Jorge
Last Name: Cicalese
Email: caballito@verizon.net
Zip Code: 90066
Country: US
Street: 3868 S Centinela Ave #5
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 2:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:05:39 UTC
First Name: Andrew
Last Name: Clark
Email: andrew.clark.1727@gmail.com
Zip Code: 90291
Country: US
Street: 2409 Grand Canal
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

I go out of my way to avoid Venice blvd and search for alternate routing east as the reduction in lanes created a terrible bottle neck that is instantly alleviated when the third lane is restored. The traffic study that indicates that there is no increased drive times for people traveling through this bottleneck is absurd. I've witnessed an increased drive time since the inception of the project.

I appreciate your attempt to create "safe streets", but I don't think the streets are any less safe with three lanes, and your constituency would appreciate the elimination of the created bottle neck.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 2:12 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:11:55 UTC
First Name: Lynne
Last Name: Glick
Email: Mrslynnelucky@gmail.com
Zip Code: 90066
Country: US
Street: 3820 Lyceum Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 2:14 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:12:57 UTC
First Name: Todd
Last Name: Shays
Email: tshays@me.com
Zip Code: 90230
Country: US
City: Culver City
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 2:16 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:15:41 UTC
First Name: Gabriela
Last Name: teissier
Email: gabrielateissier@msn.com
Zip Code: 90066
Country: US
Street: 3671 MOUNTAIN VIEW AVE
City: LOS ANGELES
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 2:21 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:21:07 UTC
First Name: Renee
Last Name: Glass
Email: renee@acburke.com
Zip Code: 90291
Country: US
Street: 861 Amoroso Place
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 2:38 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:37:57 UTC
First Name: Lisa
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 2:50 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 22:49:31 UTC
First Name: Merl
Last Name: Berry
Email: merleberry@gmail.com
Zip Code: 90066
Country: US
Street: Wasatch Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:02 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:02:24 UTC
First Name: Devon
Last Name: Brand
Email: dbrand@latw.org
Zip Code: 90291
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:07 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:05:44 UTC
First Name: Joe
Last Name: Lisanti
Email: tonedeaf@ix.netcom.com
Zip Code: 90291
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Dear members of the council,

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Thank you for your consideration,
Joe Lisanti

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:09:04 UTC
First Name: Gene
Last Name: Cunningham
Email: deltabuilders@yahoo.com
Zip Code: 90291
Country: US
Street: 243 San Juan Ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:13 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:13:05 UTC
First Name: Dennis and Anne
Last Name: Dwyer
Email: dennisanne48@yahoo.com
Zip Code: 90045
Country: US
Street: 7207 W 91st St
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:15 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:15:12 UTC
First Name: Paul
Last Name: ABASCAL
Email: PAULABASCAL1@GMAIL.COM
Zip Code: 90291
Country: US
Street: 35 THORNTON AVE.
City: VENICE
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:23 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:22:57 UTC
First Name: Carol
Last Name: Reynes
Email: carol.reynes@win-results.com
Zip Code: 90291
Country: US
Street: 1344 Glenavon Avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:24 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:24:04 UTC
First Name: Maria
Last Name: D'Orsogna
Email: mariadorsogna@gmail.com
Zip Code: 90291
Country: US
Street: 333 1/2 5th avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:26 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:14:55 UTC
First Name: Peter
Last Name: Nott
Email: peternott65@gmail.com
Zip Code: 90292
Country: US
Street: 578 Washington Bl # 193
City: Marina del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 3:26 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:25:53 UTC
First Name: tom
Last Name: chou
Email: tc208@yahoo.com
Zip Code: 90291
Country: US
Street: 333 5th avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:26 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:26:09 UTC
First Name: Tom
Last Name: Chou
Email: tc208@yahoo.co.uk
Zip Code: 90291
Country: US
Street: 333 5th Ave.
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:27:46 UTC
First Name: Melodie
Last Name: Meyer
Email: melodiemmeyer@gmail.com
Zip Code: 90291
Country: US
Street: pacific ave
City: Venice
Verification: Blvd.
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:27:51 UTC
First Name: Lisa
Last Name: Mayer
Email: bcgcreative@yahoo.com
Zip Code: 90066
Country: US
City: LA
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:30 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:28:47 UTC
First Name: Tracy
Last Name: Blumenthal
Email: tkatz@gursey.com
Zip Code: 90291
Country: US
Street: 2319 Ocean Front Walk, #2
City: VENICE
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:36 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:36:24 UTC
First Name: MariaPia
Last Name: altavilla
Email: maltavil@alumni.nd.edu
Zip Code: 90291
Country: US
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:37 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:37:46 UTC
First Name: Nichol
Last Name: Carlson
Email: NICHOLCARLSON1@GMAIL.COM
Zip Code: 90291
Country: US
Street: 913 Main Street
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 3:51 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:50:22 UTC
First Name: Sam
Last Name: Woolsey
Email: sam.woolsey@gmail.com
Zip Code: 90066
Country: US
Street: 3724 Moore St.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:06 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:06:16 UTC
First Name: Stephen
Last Name: Schiller
Email: mrhandyman@aol.com
Zip Code: 90066
Country: US
Street: Keeshen Drive
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:08 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:07:57 UTC
First Name: Judy
Last Name: Schiller
Email: flipperjam@aol.com
Zip Code: 90066
Country: US
Street: Keeshen Drive
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:08:57 UTC
First Name: Stephen Patrick
Last Name: Schiller
Email: sps2spocko@aol.com
Zip Code: 90066
Country: US
Street: Keeshen Drive
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:35 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:35:33 UTC
First Name: james
Last Name: kaplan
Email: me@jameskap.com
Zip Code: 90292
Country: US
Street: 700 Main Street
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:45 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:37:36 UTC
First Name: Mark
Last Name: Ryavec
Email: venicestakeholders@ca.rr.com
Zip Code: 90291
Country: US
Street: 1615 Andalusia Ave, 28
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project that support the argument that the removal of the two traffic lanes has significantly slowed traffic, re-routed traffic to residential neighborhoods endangering residents, and had a negative impact upon the environment. These issues have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

The City of Los Angeles should honor its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please grant the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:47 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:45:40 UTC
First Name: Marjorie
Last Name: Weitzman
Email: Marjorie@madwomanproductions.com
Zip Code: 90291
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:48 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:47:32 UTC
First Name: Nancy
Last Name: Howell
Email: nghowell@verizon.net
Zip Code: 90066
Country: US
Street: 12607 Rose Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:48 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:33:23 UTC
First Name: Vincent
Last Name: Hartung
Email: vhartung@netzero.net
Zip Code: 90291
Country: US
Street: 2418 Walnut Ave.
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

This project has caused a significant number of problems requiring "adjustments" to compensate for the increase in unsafe traffic situations. These "adjustments" have been done at considerable cost to the City of Los Angeles, and tax payer constituents. Throwing more money at the situation is only throwing good money after bad, and all for the narrow special interest of the L.A. County Bicycle Coalition.

The traffic lanes need to be restored to their original configuration, before this terrible experiment, so that traffic flows can return to normal, and match those on either side of this purposely-created bottleneck.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:49 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 23:06:42 UTC
First Name: Adilia
Last Name: Aguilar
Email: adiliaaguilar@yahoo.com
Zip Code: 90291
Country: US
Street: Vista Place
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 4:56 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 00:56:16 UTC
First Name: Sharyl
Last Name: Beebe
Email: sbeebe@prismpermits.com
Zip Code: 90291
Country: US
Street: 1421 Venice Blvd. #10
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 5:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 01:04:12 UTC
First Name: Dara
Last Name: Lasky
Email: citizenVenice@yahoo.com
Zip Code: 90291
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 5:16 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 01:16:12 UTC
First Name: Lydia
Last Name: Matkovich
Email: lydlil@aol.com
Zip Code: 90291
Country: US
Street: 738 Nowita Place
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 5:17 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 01:17:37 UTC
First Name: Deazen
Last Name: Begovic
Email: begovic.drazen@gmail.com
Zip Code: 90291
Country: US
Street: 728 Nowita Place
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 5:57 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 01:57:30 UTC
First Name: Mary
Last Name: Kelsey
Email: 1marykelsey@gmail.com
Zip Code: 90291
Country: US
Street: 116 Thornton Pl
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 5:58 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 01:53:49 UTC
First Name: Ken
Last Name: Davis
Email: kdplayaguy@yahoo.com
Zip Code: 90066
Country: US
Street: 3946 East Blvd
City: Los Agneles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvementsv
Letter Body:

My family had lived in Mar Vista since 1949. Venice Blvd is a disaster. I refuse to patronize any business as well as the farmers market.
This travesty needs to go away along with Mike Bonin. Recall!!!
strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 5:59 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 01:54:08 UTC
First Name: Penny
Last Name: Akashi
Email: penny.akashi@gmail.com
Zip Code: 90292
Country: US
Street: 135 Ketch Mall
City: Marina del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There have been too many green lighted huge developments in Marina del Rey to continue to cut off one of few street life lines we have to get in and out...god forbid we ever need to evacuate. It makes absolutely no sense to okay huge developments in a pocket (surrounded by water on 2 sides) and then take away a lane in one of the only streets we have to exit in case of an emergency or even on a good beach day. Please wake up and give us our lane back. This was a stupid decision that only negatively affects all local residents.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 6:07 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 02:03:59 UTC
First Name: Stephan
Last Name: Kaden
Email: stevek@techie.com
Zip Code: 90066
Country: US
Street: 3783 Stewart Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

I would like to add that due to the INSANELY bad design of the Venice to Stuart Avenue right turn, a hot dogging moped driver going about 25 mph through the inviting cones slammed into my car - placed in the ONLY place that was safe to look up the Bike path. He was ambulance'd off and never could be found by my insurance company. I worry he died. Bonin fixed his Boise turn, others left like mine. INSANE 90 degree turns even while there is room to angle in.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 6:31 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 02:31:00 UTC
First Name: Joyce
Last Name: Seko
Email: joyceseko@gmail.com
Zip Code: 90066
Country: US
Street: 3721 Moore St
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 6:35 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 02:34:22 UTC
First Name: Judith
Last Name: Penchansky
Email: jpenchansky@gmail.com
Zip Code: 90291
Country: US
Street: 37 Breeze Ave, Venice CA 90291
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 6:48 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 02:48:28 UTC
First Name: Gary
Last Name: Brown
Email: g.brown1511@sbcglobal.net
Zip Code: 90066
Country: US
Street: 12135 Mitchell Ave., Apt. 227
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 6:59 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 02:58:47 UTC
First Name: Demetrios
Last Name: Mavromichalis
Email: dememavro@gmail.com
Zip Code: 90066
Country: US
Street: 12224 Venice Blvd
City: Mar Vista
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 7:10 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 02:53:44 UTC
First Name: Dov
Last Name: Paz
Email: mailboxq@gmail.com
Zip Code: 90066
Country: US
Street: 3730 May street
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

I would like to add also that the public is falsly lead to belive Vision Zero was a success by Bonin office and DOT. They claim for example increase in use of public transportion and bike/scooter use to the 5 blocks of the project totally ignoring confounding verables such as population growth, new homes built and new transporting sharing business concept adding to the increase use of public transportation over thae last two years. Moreover, DOT does not even take time to study or meassure the amount of traffic on all the streets around Venice Blvd as a logical impact of restricting traffic flow. In their eyes the reduction in thousands of cars was an instant sucess and people just stopped driving their cars. Short vision or bised vision assuming that nodrivrt would have the motivation to find short cuts around the traffic jams. In short very faulty research. Last, the WSJ recent article declared Vision Zero to be a complete failure arround the world and in the US. Moreover, it is bewn proven it increases the amount of injuries.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 7:27 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 03:15:21 UTC
First Name: Aaron
Last Name: Donaldson
Email: aaron23donaldson@yahoo.com
Zip Code: 90405
Country: US
Street: 2411 S Centinela Ave
City: Santa Monica
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Bikers are getting run over from cars making right hand turns. I personally have seen three accidents when they occurred. The parked cars block the view of the bike path. The bikers seem to pop up out of nowhere. Almost hit someone also. Way dangerous! Oh, and with only two lanes, and an island in the middle, I've seen emergency response vehicles unable to pass. There is no where to pull over to let them pass. Way dangerous. Not very well thought out or designed.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 7:35 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 03:35:27 UTC
First Name: Pamela
Last Name: Juba
Email: pamelajuba@yahoo.com
Zip Code: 90066
Country: US
Street: 3887 Lyceum Ave
City: Los Angrles
Verification: I support Restore Venice
State: California
Target Name: Alek Bartrosouf
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

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Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 7:35 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 03:35:27 UTC
First Name: Pamela
Last Name: Juba
Email: pamelajuba@yahoo.com
Zip Code: 90066
Country: US
Street: 3887 Lyceum Ave
City: Los Angrles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:06 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 04:01:23 UTC
First Name: Steve
Last Name: Bevilacqua
Email: emb233@yahoo.com
Zip Code: 90291
Country: US
Street: 248 Market Street
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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In addition, I carpool a bunch of kids to school through there every day and it's awful. Gridlock, congestion, close call accidents, and many actual accidents for the kids to see. Most of the traffic has been diverted to the side streets, through neighbor hoods where they shouldn't be driving (and yet still there's gridlock - that's how failed this plan is.) Most of the businesses that I used to frequent in Mar Vista have now closed. This plan has been bad for over a year and it's not getting better. Idling cars stuck in traffic are not good for air quality or for the environment. Please don't give in to the special interest groups trying to force this through. Please listen to the residents and do what is right for the neighborhood.

Thank you,
Steve Bevilacqua

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:29 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 04:29:25 UTC
First Name: Wm
Last Name: Mcglynn
Email: mcg_js@verizon.net
Zip Code: 90066
Country: US
Street: 3721 Moore st
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 8:30 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 04:29:13 UTC
First Name: Natalie
Last Name: M
Email: intd.gal@gmail.com
Zip Code: 90066
Country: US
City: mar vista
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:32 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 04:30:12 UTC
First Name: MARIE
Last Name: BROWN
Email: MBROWN1247@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3714 Boise Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 8:40 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 04:40:05 UTC
First Name: Laura
Last Name: Smith
Email: akasmith63@yahoo.com
Zip Code: 90066
Country: US
Street: 4273 Lyceum Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:55 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 04:55:45 UTC
First Name: Gina
Last Name: Sommo
Email: gibasommo@gmail.com
Zip Code: 90066
Country: US
Street: East Blvd.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:10 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 05:10:22 UTC
First Name: Renee
Last Name: Khoury
Email: renee@astatic.net
Zip Code: 90066-3116
Country: US
Street: 3744 Ocean View Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:20 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 05:20:06 UTC
First Name: Sally
Last Name: Leboeuf
Email: saultine48@gmail.com
Zip Code: 90038
Country: US
Street: 6245 Santa Monica Blvd
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:34 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 05:32:33 UTC
First Name: Jennifer
Last Name: Rafeedie
Email: drrafeedie@gmail.com
Zip Code: 90066
Country: US
Street: 11428 Charnock road
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:38 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 05:37:03 UTC
First Name: Cheri
Last Name: Nolan
Email: cheriannenolan@verizon.net
Zip Code: 90049
Country: US
Street: 11845 Mayfield Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 06:09:35 UTC
First Name: Jane
Last Name: Pressman
Email: jane.pressman@gmail.com
Zip Code: 90292
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:11 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 06:10:52 UTC
First Name: Barbara
Last Name: Gibson
Email: bgrealestatebroker@gmail.com
Zip Code: 90066
Country: US
Street: 4426 Alla Road
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:40 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 06:40:00 UTC
First Name: Scot
Last Name: Kramarich
Email: scot@bullseye-studio.com
Zip Code: 90291
Country: US
Street: 233 Bernard Ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:52 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 06:51:56 UTC
First Name: Chris
Last Name: Reese
Email: thatdonfc@mac.com
Zip Code: 90291
Country: US
Street: 1621 Venice Blvd
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 12:12 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 08:11:19 UTC
First Name: Brooke
Last Name: Eaton
Email: brooke_eaton@spe.sony.com
Zip Code: 90094
Country: US
Street: 13045 Pacific Promenade #430
City: Playa Vista
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 2:02 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 10:02:06 UTC
First Name: Jean
Last Name: Kaye
Email: spamvarmint@aol.com
Zip Code: 90077
Country: US
Street: 4350 Chase Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 2:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 10:36:29 UTC
First Name: Kiyomi
Last Name: Shishido
Email: kamshishido@aol.com
Zip Code: CA. 90045
Country: US
Street: 7917 Denrock Avenue
City: Los Angeles
Verification: I support Restore Venice
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 5:59 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 13:58:21 UTC
First Name: Loree
Last Name: Bryer
Email: loreeb212@gmail.com
Zip Code: 90066
Country: US
Street: 3347 Wade St.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project. Please grant the appeal and allow a full review.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 6:41 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 14:39:59 UTC
First Name: Judy
Last Name: Accardi
Email: jaccardi@ymail.com
Zip Code: 90291
Country: US
Street: 452 Rialto Avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 6:43 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 14:43:15 UTC
First Name: Pat
Last Name: Helem
Email: phelem@gmail.com
Zip Code: 90066
Country: US
Street: 12720 Venice Blvd. #202
City: LA
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 7:09 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 15:08:28 UTC
First Name: Sara
Last Name: Sluss
Email: sara.sluss@gmail.com
Zip Code: 90291
Country: US
Street: 2129 Glencoe Avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 7:23 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 15:23:22 UTC
First Name: Ingrid
Last Name: Marsten
Email: marsxii2002@yahoo.com
Zip Code: 90291
Country: US
Street: 2319 Beach Avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 8:42 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 16:42:39 UTC
First Name: Nina
Last Name: Cerbo
Email: neners56@yahoo.com
Zip Code: 90292
Country: US
City: venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 8:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 16:54:05 UTC
First Name: Randall
Last Name: Sears
Email: randallrsears@gmail.com
Zip Code: 90291
Country: US
Street: 2480 Glencoe Ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 9:03 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 17:02:47 UTC
First Name: Barbara
Last Name: Barnes
Email: barneswife@verizon.net
Zip Code: 90066
Country: US
Street: 3222 Grandview blvd
City: Los angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Fri, Mar 1, 2019 at 9:01 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 05:00:42 UTC
First Name: Dennis
Last Name: Mogerman
Email: dmogerman@hotmail.com
Zip Code: 90066
Country: US
Street: 12405 Venice Blvd. #169
City: Los Angeles, CA
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Fri, Mar 1, 2019 at 9:50 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 05:49:32 UTC
First Name: Richard
Last Name: Sinclair
Email: rdsinclair@earthlink.net
Zip Code: 90064-4014
Country: US
Street: 2922 Tilden Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Fri, Mar 1, 2019 at 10:00 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 05:59:16 UTC
First Name: Elizabeth
Last Name: Pennington
Email: eapenninnton12@gmail.com
Zip Code: 90066
Country: US
City: Los angeles
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Fri, Mar 1, 2019 at 10:34 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 06:33:43 UTC
First Name: Carol
Last Name: Reynes
Email: Carol.Reynes@win-results.com
Zip Code: 90291-2910
Country: US
City: Venice
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Sat, Mar 2, 2019 at 12:44 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 08:43:54 UTC
First Name: David
Last Name: Saltzberg
Email: dvd.sltzbrg@gmail.com
Zip Code: 90292
Country: US
Street: 6 Northstar St. Unit 304
City: Marina del rey
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Sat, Mar 2, 2019 at 7:17 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 15:16:31 UTC
First Name: Carole
Last Name: Masek
Email: themaseks@verizon.net
Zip Code: 90066
Country: US
Street: 4227 Chase Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Sat, Mar 2, 2019 at 8:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-02 16:28:52 UTC
First Name: Richard
Last Name: Simon
Email: ufobass@aol.com
Zip Code: 90066
Country: US
Street: 3924 Alla Road PO Box 661777
City: Los Angees
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Three enormous problems have accompanied this mis-named Great Streets project:
(1) congestion and delays during rush hours are obvious to anyone living in Mar Vista or commuting through it.
(2) trying to turn right onto Venice Blvd. is dangerous because of the distance between the unusable right lane and the oncoming traffic. (3) development of additional housing units since this "experiment" was implemented has brought many more cars to the area. The number of ride-sharing vehicles has also increased. The plan was bad enough before, but now that there are more vehicles squeezed into two lanes, the plan is proving to be unworkable and unacceptable to local residents.

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Sun, Mar 3, 2019 at 11:14 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-03 19:13:14 UTC
First Name: Judy
Last Name: Accardi
Email: jaccardi@ymail.com
Zip Code: 90291
Country: US
Street: 452 Rialto Avenue
City: Venice
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Sun, Mar 3, 2019 at 2:54 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-03 22:54:46 UTC
First Name: Peter
Last Name: Glick
Email: PMGlick@gmail.com
Zip Code: 90066
Country: US
Street: 3820 Lyceum Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:20 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:20:42 UTC
First Name: Alexandra
Last Name: Gucovsky
Email: beachbubbles94@gmail.com
Zip Code: 90291
Country: US
Street: 2909 Grayson Avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:57 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:57:26 UTC
First Name: Alison
Last Name: Raitt
Email: alison227@gmail.com
Zip Code: 90293
Country: US
Street: 8401 Tuscany Ave, Apt 7
City: Playa del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:36 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:36:07 UTC
First Name: angela
Last Name: mchenry
Email: tamchenry@aol.com
Zip Code: 90066
Country: US
Street: 12407 Victoria Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:04 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:52:53 UTC
First Name: Annette
Last Name: Farmer
Email: fabulousalf@gmail.com
Zip Code: 90066
Country: US
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

I have lived in Mar Vista for more than 30 years now. At one point, Venice Blvd was on the skids but small business owners started turning it around and made it into street where business could thrive and produce jobs for local people.

It distresses me greatly that some of the small businesses that needed access from Venice Blvd are now gone due to the changes to the boulevard. There were several that i patronized and now they are gone. Also gone are the **jobs** in those businesses as well as the sweat and financial equity that those business owners poured into their businesses.

My other, and main, concern is the time it takes for first responders to navigate through the gridlock on Venice during peak traffic times. I have witnessed several times when LAFD trucks, with lights and sirens going, have not been able to get thru the traffic to get to their emergency call. this will eventually result in a death or two if the lanes are not restored. it is just a matter of time.

It has become very clear that Mike Bonin and Eric Garcetti only care about a select few of their constituents. Bonin has in-home visits with constituents who are on his side only, not meeting with those who are critical of these changes. He makes it apparent that if you're not on his side, he's not interested in you.

When i participated in Bonin's survey of the boulevard at the Sunday Farmer's Market years ago, there was nothing indicated that the changes would involve the theft of a lane.

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

annette farmer
90066

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:22 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:22:09 UTC
First Name: Britt-Marie
Last Name: Potter
Email: britt-marie7@sbcglobal.net
Zip Code: 90230
Country: US
Street: 4832 Hollow Corner Rd. # 401
City: Culver City
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:17 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:13:44 UTC
First Name: Chris
Last Name: Cerbo
Email: chris.cerbo@yahoo.com
Zip Code: 90101
Country: US
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

Aside from the lack of transparency at the onset of this project including undefined success metrics before installation, as confirmed by LADOT, there were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

The City of Los Angeles should NOT make this project permanent without an environmental review, and without the neighborhood communities agreeing to do so. The City made a promise in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

The citizens expect you to actually stand by your word. We want to remove what we don't like, as Councilmember Mike Bonin promised. Please do so and please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:00 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:59:46 UTC
First Name: Chris
Last Name: Masson
Email: xboarder88@aol.com
Zip Code: 90066
Country: US
Street: 3718 Mountain View Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 9:29 AM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:07:30 UTC
First Name: Dan
Last Name: Grody
Email: dan@tellemgrodypr.com
Zip Code: 90066
Country: US
Street: Globe Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

You made a promise to us: if the Great Streets Venice Blvd project is made permanent, there will be an environmental assessment and accompanying public process. Grant the CEQA appeal for this disaster project.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:29 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:29:43 UTC
First Name: dave
Last Name: parker
Email: dupree63@ca.rr.com
Zip Code: 90291
Country: US
Street: frey ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 9:05 AM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:04:52 UTC
First Name: Davis
Last Name: R
Email: Draakstraat@gmail.com
Zip Code: 90066
Country: US
City: Mar Vista
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:07 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:06:47 UTC
First Name: Deborah
Last Name: Galambos
Email: dgalambos@hotmail.com
Zip Code: 90066
Country: US
Street: 3567 Ocean View Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:36 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:36:15 UTC
First Name: Denise
Last Name: Freed
Email: denisefreed@yahoo.com
Zip Code: 90066
Country: US
Street: 3784 Wasatch Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 7:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 15:53:25 UTC
First Name: Dhruv
Last Name: Thukral
Email: thukral@gmail.com
Zip Code: 90066
Country: US
Street: 12677 Dewey Street
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:09 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:09:14 UTC
First Name: Eg
Last Name: Mahan
Email: egmahan@gmail.com
Zip Code: 90291
Country: US
Street: Rialto
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 11:42 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 19:42:42 UTC
First Name: Garrett
Last Name: Oneal
Email: garrettoneal@yahoo.com
Zip Code: 90291
Country: US
Street: 647 1/2 crestmoore pl
City: venice
Verification: I support Restore Venice
State: California
Target Name: John White - john.white@lacity.org
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:52 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:51:29 UTC
First Name: Rochelle
Last Name: Hochberg
Email: rhochberg@ca.rr.com
Zip Code: 90291
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

THIS WHOLE PROJECT IS ABSURD. I CURSE IT EVERY DAY WHEN DRIVING EAST ON VENICE BLVD.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 8:13 AM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:13:00 UTC
First Name: Ivan
Last Name: Galambos
Email: igalambos@aol.com
Zip Code: 90066
Country: US
Street: 3567 Ocean View Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: Nury Martinez 6th District
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:06 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:06:32 UTC
First Name: Jack
Last Name: Murphy
Email: jason7pdr@gmail.com
Zip Code: 90293
Country: US
Street: 8745 Delgany Ave
City: Playa Del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:08 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:07:43 UTC
First Name: Jean
Last Name: Pappalardo
Email: injeanius71@yahoo.com
Zip Code: 90066
Country: US
Street: 12621 Mitchell Ave., Apt. 7
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:10 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:10:21 UTC
First Name: Joan
Last Name: Weamer
Email: bayley.weamer@gmail.com
Zip Code: 90066
Country: US
Street: 3570 Ocean View Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Tue, Feb 26, 2019 at 7:59 AM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 15:58:43 UTC
First Name: John
Last Name: Hobbs
Email: johnnyhobbs@GMAIL.COM
Zip Code: 90066
Country: US
Street: 3726 Sawtelle Boulevard, Apt. 6
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:39:25 UTC
First Name: john
Last Name: mc manamy
Email: jkmvenice@hotmail.com
Zip Code: 90291
Country: US
Street: grand blvd
City: venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:14 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:13:44 UTC
First Name: John Thomas
Last Name: Russo
Email: jtrusso@gmail.com
Zip Code: 90293
Country: US
Street: 8231 Delgany Ave
City: Playa Del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Return our Venice Blvd. Lanes

1 message

Judy Esposito <judy.esposito@msn.com> Thu, Feb 21, 2019 at 10:49 AM
To: councilman bonin <councilmember.bonin@lacity.org>, paul koretz <paul.koretz@lacity.org>, "councilmember.martinez@lacity.org" <councilmember.martinez@lacity.org>, "john.white@lacity.og" <john.white@lacity.og>, "eric.bruins@lacity.org" <eric.bruins@lacity.org>, "alek.bartrosouf@lacity.org" <alek.bartrosouf@lacity.org>

Dear City Officials,

As you know, all of those living in the areas surrounding Venice Blvd. have been suffering terribly with this **very ill conceived ROAD DIET plan. It has caused all of us to use residential streets to get to and from work.**

Venice Blvd. is our most important EAST / WEST thoroughfare !!

We have attended many meeting regarding the theft of our lanes, and seen hundreds of people furious at what has taken place on Venice Blvd. and yet our voices are completely ignored.

Who is this ridiculous and mad plan serving ??

We see almost NO people using the bike path !!!

This is no place to create a cutesy little neighborhood play land !!!!!

I can not imagine the WASTE of money on this hated "project" !!! These are OUR tax dollars meant to serve the community, not hurt and injure us !!!

We used to use the businesses along that strip of Venice Blvd. but navigating that mess has made patronizing those stores IMPOSSIBLE !

Judith Esposito
Frank Defurio
Pamela Harbour 30 yr. Venice residents

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:11 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:11:06 UTC
First Name: Julie
Last Name: Mann
Email: ma13nn@aol.com
Zip Code: 90291
Country: US
Street: 2454 Louella Avenue
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Wed, Feb 27, 2019 at 6:06 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-28 02:05:03 UTC
First Name: Kate
Last Name: Wafer
Email: katewafer@me.com
Zip Code: 90066
Country: US
Street: 3635 Mountain View Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:37:54 UTC
First Name: Ken
Last Name: Marek
Email: kenneth.marek@gmail.com
Zip Code: 90066
Country: US
Street: 3924 Redwood Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:54:09 UTC
First Name: Kennalee
Last Name: Mattson
Email: kennaleem@aol.com
Zip Code: 90066
Country: US
Street: Wasatch
City: Mar vista
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:30:20 UTC
First Name: Kent and Marlene
Last Name: Alves
Email: khalves@msn.com
Zip Code: 90066
Country: US
City: Mar Vista
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.
This Great Streets project has lacked transparency and has caused traffic problems on Venice and the surrounding residential streets that have been ignored until recent inadequate measures were announced.
There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:31 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:31:29 UTC
First Name: Lahra
Last Name: Welch
Email: lahrawelch@gmail.com
Zip Code: 90391
Country: US
Street: 1418 Venice Blvd
City: Venice
Verification: I support Restore Venice
State: Telšių Apskritis
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:52 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:52:15 UTC
First Name: Laurie
Last Name: Bennett
Email: 4lauriebennett@gmail.com
Zip Code: 90230
Country: US
Street: 10941 Wagner Street
City: Culver City
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 7:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 15:53:45 UTC
First Name: Laurie
Last Name: Goldfarb
Email: thetankgyrl@gmail.com
Zip Code: 90066
Country: US
Street: 4325 Berryman Ave, Apt 10
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 1:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 21:27:57 UTC
First Name: Lilith
Last Name: Borko
Email: Lilithb2000@aol.com
Zip Code: 90066
Country: US
Street: 3753 Meier Street
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:08 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:05:12 UTC
First Name: Lisa
Last Name: Lubchansky
Email: lalny@aol.com
Zip Code: 90294
Country: US
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

When this project was originally proposed by Bonin, it was presented VERY differently. He also promised that there would be a trial period and, after that trial period, the project would be subject to review. Well, the overwhelming majority of residents oppose it. END the Trial and RESTORE VENICE BLVD.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:02 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:01:58 UTC
First Name: Madelaine
Last Name: Kolisnyk
Email: madelainekproperties@gmail.com
Zip Code: 90066
Country: US
Street: 3783 Wasatch AVE
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:10 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:09:09 UTC
First Name: marianne
Last Name: pogoler
Email: spfxlavender@verizon.net
Zip Code: 90291
Country: US
City: venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:44 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:44:29 UTC
First Name: Melodie
Last Name: Meyer
Email: melodiemmeyer@gmail.com
Zip Code: 90291
Country: US
Street: pacific ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 4:15 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-28 00:13:13 UTC
First Name: Merle
Last Name: Freeman
Email: mleefent@gmail.com
Zip Code: 90292
Country: US
Street: 13010 Mindanao Way #2
City: Marina del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:41 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:41:26 UTC
First Name: Michelle
Last Name: Zweig
Email: michellezweig124@gmail.com
Zip Code: 90292
Country: US
Street: 124 Topsail Mall
City: MARINA DEL REY
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:34 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:34:31 UTC
First Name: Miles
Last Name: Perlich
Email: milesperlich@hotmail.com
Zip Code: 90066
Country: US
Street: 3761 Mountain View Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Thu, Feb 28, 2019 at 10:28 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-28 18:28:22 UTC
First Name: Nadya
Last Name: Malconian
Email: nmalconian@verizon.net
Zip Code: 90066
Country: US
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 7:57 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 15:57:31 UTC
First Name: Oscar
Last Name: Munoz
Email: teppasur@yahoo.com
Zip Code: 90291
Country: US
Street: 2215 louella.ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:09 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:08:48 UTC
First Name: Patrick
Last Name: Bertranou
Email: pb@pbcapital.us
Zip Code: 90066
Country: US
Street: 11350 Victoria Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:05 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:05:03 UTC
First Name: Peter
Last Name: Glick
Email: PMGlick@gmail.com
Zip Code: 90066
Country: US
Street: 3820 Lyceum Ave.
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Wed, Feb 27, 2019 at 5:42 PM

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-28 01:41:49 UTC
First Name: Ray
Last Name: Mattson
Email: mattsonb@aol.com
Zip Code: 90066
Country: US
Street: Wasatch
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:20 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:20:43 UTC
First Name: Rebekah
Last Name: Haraczka
Email: beaches4u@gmail.com
Zip Code: 90291
Country: US
Street: 474 Sherman Ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 11:51 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 19:48:25 UTC
First Name: Richard
Last Name: Axelrod
Email: ultedge1@gmail.com
Zip Code: 90066-1930
Country: US
Street: 3306 Mountain View Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Source: email
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 12:51 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-27 20:50:31 UTC
First Name: Richard
Last Name: Wafer
Email: richwafer@me.com
Zip Code: 90066
Country: US
Street: 3635 mountain view ave
City: L a
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Thu, Feb 28, 2019 at 6:49 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-28 14:48:42 UTC
First Name: Rick
Last Name: Swinger
Email: rickswinger@yahoo.com
Zip Code: 90291
Country: US
Street: Rose ave
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:23 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:22:14 UTC
First Name: Ridaa
Last Name: Murad
Email: rmurad@breakformre.com
Zip Code: 90291
Country: US
Street: 404 Sherman Canal
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:55 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:54:25 UTC
First Name: Robert
Last Name: Gallion
Email: gallion1@earthlink.net
Zip Code: 90066
Country: US
Street: Colonial Ave
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:12 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:07:44 UTC
First Name: Russell
Last Name: Mark
Email: russ@fastmail.us
Zip Code: 90293
Country: US
Street: 6305 Vista del Mar#2
City: Playa del Rey
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Please listen to the will of the people.
Venice Boulevard and the people using it have been negatively impacted by the changes made. People want freedom to work and move around. The changes to Venice Blvd. are specifically to prevent people's freedom of movement.

In addition, neighborhoods surrounding the restricted part of Venice Blvd have had to absorb more traffic, which negatively affects their quality of life and their property values.

As a 50-year resident of the area, I strongly object to these changes and to the suppression of public opinion by the current administration.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:05 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:05:28 UTC
First Name: sarah
Last Name: furlong
Email: sarahfurlongcasting@gmail.com
Zip Code: 90066
Country: US
Street: 11343 BIONA DRIVE
City: LOS ANGELES
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:43 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:40:56 UTC
First Name: Sarah
Last Name: Sweeney
Email: sarahflo@gmail.com
Zip Code: CA
Country: US
Street: 3549 Ashwood Avenue
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

The "Road Diet" on Venice Blvd. has caused traffic problems on Venice, spilling into the surrounding neighborhoods, while also causing problems for the businesses along that stretch of the road. Please Restore Venice Blvd.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:19 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 15:53:25 UTC
First Name: Selena Inouye on behalf of Restore
Last Name: Blvd
Email: restorevenicebIvd@gmail.com
Zip Code: 90066
Country: US
Street: PO Box 661745
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Wed, Feb 27, 2019 at 5:04 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-28 01:04:13 UTC
First Name: Sheila
Last Name: Ginsberg
Email: glencove@aol.com
Zip Code: 90066
Country: US
Street: 3537 Barry avenue
City: Los angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 9:21 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 17:21:01 UTC
First Name: sheri
Last Name: magid
Email: sheri623@gmail.com
Zip Code: 90292
Country: US
Street: 3846 VIA DOLCE
City: venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Fri, Mar 1, 2019 at 8:57 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-01 16:57:04 UTC
First Name: Sheryl
Last Name: Aubrey
Email: saubrey@lausd.net
Zip Code: 90291
Country: US
Street: 2409 Clark
City: Venice
Verification: Yes
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Thu, Feb 28, 2019 at 4:03 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-03-01 00:03:13 UTC
First Name: shura
Last Name: Reininger
Email: shurakie@hotmail.com
Zip Code: 90066
Country: US
Street: 3645 redwood Av
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:55 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:54:38 UTC
First Name: Simone
Last Name: Wallace
Email: simone.wallace64@verizon.net
Zip Code: 90291
Country: US
Street: 1213 Preston Way
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:50 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:50:15 UTC
First Name: Steven
Last Name: Cohen
Email: stevesplice@gmail.com
Zip Code: 90291
Country: US
Street: 2232 Louella Ave.
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 8:54 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 16:52:48 UTC
First Name: Steven
Last Name: Pearl
Email: noladoggie@gmail.com
Zip Code: 90291
Country: US
Street: 225 Carroll Canal
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network. In other words, the road diet do not work. Please restore Venice blvd. to its successful working past.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:50 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:47:16 UTC
First Name: Thomas
Last Name: Ricards
Email: trichards777@gmail.com
Zip Code: 90291
Country: US
Street: 2327 Louella
City: Venice
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I'm writing in regards to the changes to Venice Blvd. in Mar Vista that were enacted about a year ago as part of the Great Streets Project. Specifically the moving of the bike lane, elimination of a driving lane, addition of crosswalks/traffic lights and street side beautification.

I appreciate the planning and work that goes into a project like this as well as the passionate opinions on both sides of the issues stemming from the changes. Having both a residence and place of business in the Venice / Mar Vista area I have strong opinions as well. I am a daily bike commuter in the area as well as a driver who uses this section of Venice quite often.

I greatly appreciate the new crosswalks/traffic lights and beautification work. I am not at all in support of the moved bike lane or the loss of a traffic lane.

- As a driver, it is very difficult to see a bike rider in the new lane when turning right. As you can imagine, I neither want to hit someone nor get hit by a driver when bike commuting. The data I've seen has not supported the premise that these changes have lowered in incidence of car/bike accidents, however I assume you have the most accurate data and would like that to be made fully available to your constituents, the media, etc.

- Crossing the bike lane as a pedestrian (after street parking and walking to a shop on Venice) gives me great fear that I, or one of my children, will be hit by a bicyclist or scooter rider. I recognize this is a trade off as I certainly would not want to get "doored" as a bike rider in a traditional bike lane, but as a bike commuter I know where to look to minimize this. I do not believe driver/pedestrians are at all aware of "looking both ways" when crossing the bike lane and have personally seen very close calls.

- Traffic in that section of Venice Bl. during rush and non-rush hour is worse than ever. Intersections become gridlocked, drivers find cut through streets (which I'd rather not do) and the truly despicable drive in the bike lane because there so much space there. I can not believe that this outcome is considered a success. The new street lights that have been installed should be able to manage speed in a much more sensible (and adjustable for needs) manner than simply removing a lane.

- Merchants like my mechanic (Mar Vista Service), my record store (Timewarp Records), my digital guys (Scout/Camp) and others all are suffering because of this traffic problem and odd parking situation. There will be no great street without great merchants so I ask you to take them into consideration. The parallel area one block south on Washington Bl. is thriving with new shops, restaurants, other services and is much preferred as a biker/driver.

I ask that you amend the long term approach to Venice Bl. as you consider making these changes permanent to keep the cross walks and beautification while reverting the bike lane / driving lanes to their traditional places, as they are to both the East and West of this section of Venice Bl.

Thank you for your consideration.
Tom Richards
President, Haverty Consulting
Council District 11 Resident and Business Owner

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "February 26, 2019" page!

Action Network <info@actionnetwork.org> Tue, Feb 26, 2019 at 10:11 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "February 26, 2019" page. The information they entered is:

Timestamp: 2019-02-26 18:06:31 UTC
First Name: Whitney
Last Name: Osborne
Email: osarina@gmail.com
Zip Code: 90066
Country: US
Street: 11829 W Washington Blvd
City: Los Angeles
Verification: I support Restore Venice
State: California
Target Name: John White
Letter Subject: Council File 19-0092 and CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

In addition to the words below, as a resident I am saddened by the damage this project has done to our amazing neighborhood. The councilman has not given the community the opportunity to voice their opinion on this, and when we have voiced it, we have been silenced. This isn't political, it's about safety, small local businesses and rethinking much needed development in a way that benefits the COMMUNITY, not the politicians. Please hear our voice - we are supposed to be represented in government, and instead we are being silenced.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-la-city-council-transportation-committee

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:30 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:30:46 UTC
First Name: Chris
Last Name: Reese
Email: thatdonfc@mac.com
Zip Code: 90291
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:31 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:31:43 UTC
First Name: John
Last Name: Hobbs
Email: johnnyhobbs@GMAIL.COM
Zip Code: 90066
Country: US
Street: 3726 Sawtelle Boulevard, Apt. 6
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 8:32 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:31:50 UTC
First Name: Sarah
Last Name: Shoup
Email: s_shoup@msn.com
Zip Code: 90291
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:36:15 UTC
First Name: Merle
Last Name: Freeman
Email: mleefent@gmail.com
Zip Code: 90292
Country: US
Street: 13010 Mindanao Way #2
City: Marina del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:38:40 UTC
First Name: Laurie
Last Name: Goldfarb
Email: thetankgyrl@gmail.com
Zip Code: 90066
Country: US
Street: 4325 Berryman Ave, Apt 10
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 8:39 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:38:50 UTC
First Name: Lynne
Last Name: Glick
Email: mrslynnelucky@gmail.com
Zip Code: 90066
Country: US
Street: 3820 Lyceum Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:39:08 UTC
First Name: Richard
Last Name: Sinclair
Email: rdsinclair@earthlink.net
Zip Code: 90064
Country: US
Street: 2922 Tilden Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:41 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:40:54 UTC
First Name: Julie
Last Name: Mann
Email: ma13nn@aol.com
Zip Code: 90291
Country: US
Street: 2454 Louella Avenue
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:41 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:40:55 UTC
First Name: Oreet
Last Name: Rees
Email: oreet8@gmail.com
Zip Code: 90291
Country: US
Street: 914 venezia ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:43 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:38:26 UTC
First Name: Jordanna
Last Name: Thigpen
Email: jordannathigpen@gmail.com
Zip Code: 90291
Country: US
Street: 309 N. Venice Blvd.
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

My name is Jordanna Thigpen. I was a longtime resident of Vencie, until I moved to Councilmember Koretz's district (90064) because of the road diet on Venice Blvd. I moved because of the Road Diet on Venice Blvd, which made my commute to work impossible.
I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment, the community, safety for residents, quality of life, the business community, and more. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilmember Bonin's office. Bonin in particular has been opaque, malicious, and difficult at all times during this terrible process. His behavior is among the worst treatment of constituents I have ever seen in a politician - truly Trumpian in nature.

How can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail

Restore Venice Blvd <restorevenicblvd@gmail.com>

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:43 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:43:32 UTC
First Name: victoria
Last Name: reese
Email: tuwee26@mac.com
Zip Code: 90291
Country: US
Street: 2503 Naples Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:44 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:43:56 UTC
First Name: Wendy
Last Name: Wheat
Email: creamof@aol.com
Zip Code: 90066
Country: US
Street: 12412 Victoria Ace
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:45 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:45:20 UTC
First Name: Frank
Last Name: Gaye
Email: frankie.gaye@icloud.com
Zip Code: 90291
Country: US
Street: 2503 Naples Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:46 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:46:43 UTC
First Name: Victoria
Last Name: Minelian
Email: tuwee26@yahoo.com
Zip Code: 90291
Country: US
Street: 945 Harding Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:47 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:47:33 UTC
First Name: Jenevieve
Last Name: Minelian
Email: jminelian@gmail.com
Zip Code: 90291
Country: US
Street: 945 Harding Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:47 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:47:01 UTC
First Name: Shaan
Last Name: Kokin
Email: shaankokin72@gmail.com
Zip Code: 90066-1114
Country: US
Street: 3129 Granville Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:46 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:46:18 UTC
First Name: Avi
Last Name: Levy
Email: avilevy@gmail.com
Zip Code: 90066
Country: US
Street: 12601 MATTESON AVE APT 9
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 8:48 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:48:23 UTC
First Name: Elizabeth
Last Name: Minelian
Email: lminelian@gmail.com
Zip Code: 90291
Country: US
Street: 2503 Naples Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:49 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:49:04 UTC
First Name: David
Last Name: Cisneros
Email: dcisneros@me.com
Zip Code: 90291
Country: US
Street: 2503 Naples Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:50 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:50:11 UTC
First Name: Paul
Last Name: Kirincic
Email: paulkirincic@yahoo.com
Zip Code: 90019
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:50 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:50:45 UTC
First Name: Victoria
Last Name: Reese
Email: victoria.reese93@gmail.com
Zip Code: 90291
Country: US
Street: 945 Harding Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:52 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:52:31 UTC
First Name: Randall
Last Name: Sears
Email: randallrsears@gmail.com
Zip Code: 90291
Country: US
Street: 2480 Glencoe
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:58 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:58:48 UTC
First Name: Dara
Last Name: Lasky
Email: citizenvenice@yahoo.com
Zip Code: 90291
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 9:01 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:00:58 UTC
First Name: Jean
Last Name: Kaye
Email: spamvarmint@aol.com
Zip Code: 90066
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 9:01 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 16:44:31 UTC
First Name: Robin
Last Name: Rudisill
Email: wildrudi@mac.com
Zip Code: 90291
Country: US
Street: 3003 Ocean Front Walk
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal re. the Great Streets Venice Blvd project.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the “road diet” has had significant impacts upon the environment. These concerns have not been acknowledged, answered or addressed by the City of Los Angeles—LADOT, the Great Streets Initiative, or Councilman Bonin's office.

The City of Los Angeles cannot make this project permanent without an environmental review.

The City correctly represented to its citizens in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please correctly follow CEQA state law and grant the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:08 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:07:55 UTC
First Name: Alexandra
Last Name: Gucovsky
Email: beachbubbles94@gmail.com
Zip Code: 90291
Country: US
Street: 2909 Grayson Avenue
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:14 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:14:06 UTC
First Name: Peter
Last Name: Nott
Email: peternott65@gmail.com
Zip Code: 90291
Country: US
Street: 447 Howland Canal
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:20 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:18:40 UTC
First Name: Ken
Last Name: Rizzo
Email: kenrizzo53@gmail.com
Zip Code: 90066
Country: US
Street: 4449 harding ave
City: l a
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:21 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:21:26 UTC
First Name: Robin
Last Name: Weiss
Email: reweiss@gmail.com
Zip Code: 90292
Country: US
Street: 578 Washington Blvd.#376
City: Marina del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:32 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:32:04 UTC
First Name: Kent
Last Name: Genzlinger
Email: unk@shickany.com
Zip Code: 90296
Country: US
Street: PO Box 5403
City: Playa Del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:34 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:34:18 UTC
First Name: Ken
Last Name: Hartley
Email: Kenhartley@verizon.net
Zip Code: 90254
Country: US
Street: 723 30th st
City: HERMOSA BEACH
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:34 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:34:40 UTC
First Name: Rebekah
Last Name: Haraczka
Email: beaches4u@gmail.com
Zip Code: 90291
Country: US
Street: 474 Sherman Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:38:51 UTC
First Name: jennifer
Last Name: conway
Email: surfingbuddhainc@yahoo.com
Zip Code: 90066
Country: US
Street: 11927 Venice BLVD, # 5
City: los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:42 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:42:05 UTC
First Name: travis
Last Name: binen
Email: travis@delphix.com
Zip Code: 90291
Country: US
Street: 700 MAIN ST
City: VENICE
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:56 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:56:26 UTC
First Name: Blanca
Last Name: Garcia
Email: blancagarcia3434@gmail.com
Zip Code: 90066
Country: US
Street: Culver Blvd.
City: Los Ángeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:57 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:56:50 UTC
First Name: Dot
Last Name: Fahn
Email: dotfahn@gmail.com
Zip Code: 90066
Country: US
Street: PO Box 661861
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:01 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:01:06 UTC
First Name: Patti
Last Name: Chorn
Email: plebeauchorn@gmail.com
Zip Code: 90066
Country: US
Street: 3728 Corinth Ave
City: Los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:03 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 17:55:14 UTC
First Name: Steven
Last Name: Cohen
Email: stevesplice@gmail.com
Zip Code: 90291
Country: US
Street: 2232 Louella Ave.
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I am a bicyclist -- and I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the Great Streets Venice Blvd. project.

The goals of the project have not been met. Safety is not improved -- accidents are up, for both bikes and cars. Mobility is not improved. Traffic is worse, especially during rush hour. Cut-through traffic is also worse, because everybody avoids Venice Blvd. And roughly 20 businesses have closed for the same reason.

If the Council wants to help real estate developers gentrify Mar Vista, this project is great. But if you want to improve mobility and safety for Venice and Mar Vista, the project should be terminated.

This was sold as an experiment. The results are in and it's time to face them, and get rid of the bollards (keep the crosswalks -- they're fine).

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:04 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:04:06 UTC
First Name: Paul
Last Name: ABASCAL
Email: PAULABASCAL1@GMAIL.COM
Zip Code: 90291
Country: US
Street: 35 THORNTON AVE.
City: VENICE
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:07 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:04:05 UTC
First Name: Bert
Last Name: Fallon
Email: fallons@earthlink.net
Zip Code: 90291
Country: US
Street: 425 Linnie Canal
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I do not support Councilman Bonin's Venice Streets changes. I am aware that several Venice Blvd. business have been damaged by this change. It is unsafe for older persons, such as my wife's mother, to get out onto the street instead of the sidewalk as before.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:09 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:08:45 UTC
First Name: Karen
Last Name: Jones
Email: khjones1949@yahoo.com
Zip Code: 90291
Country: US
Street: 704 Sunset Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:20 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:20:29 UTC
First Name: Kennalee
Last Name: Mattson
Email: kennaleem@aol.com
Zip Code: 90066
Country: US
Street: Wasatch
City: Los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:24 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:24:27 UTC
First Name: Jill
Last Name: Lieberman
Email: jilliegirl@ca.rr.com
Zip Code: 90066
Country: US
Street: 3947 Beethoven Street
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:25 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:25:00 UTC
First Name: mark
Last Name: rosenberg
Email: rosenbergconsulting@mac.com
Zip Code: 90066
Country: US
Street: 12405 venice blvd, ste 260
City: L.A.
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 10:26 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:07:59 UTC
First Name: Dan
Last Name: Grody
Email: dan@tellemgrodypr.com
Zip Code: 90066
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

While other countries are working to limit the speeds of vehicles through technology, Mike Bonin and LADOT are toying with traffic lanes on key arterial roads without providing adequate transportation alternatives to Angelenos. While we expect nothing to change in Mar Vista, this poorly planned and poorly executed road diet has done a great service to other groups around Los Angeles and the country, providing a blueprint to fight projects as poorly planned and poorly implemented as this one. I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:29 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:28:27 UTC
First Name: Suzanne
Last Name: Hines
Email: dutch.cut@verizon.net
Zip Code: 90066
Country: US
Street: 12532 Matteson Ave.
City: Mar Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:35 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:35:23 UTC
First Name: Todd
Last Name: Kohn
Email: tkohn1@gmail.com
Zip Code: 90292
Country: US
City: Marina Del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:42 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:39:38 UTC
First Name: Andrew
Last Name: Clark
Email: andrew.clark.1727@gmail.com
Zip Code: 90291
Country: US
Street: 2409 Grand Canal
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Since its inception, Venice blvd has become a bottle neck for traffic. The traffic is alleviated as soon as the third lanes are restored on either side. I appreciate your attempt at creating a bike lane, but it isn't working and negatively impacts the majority of users. Please restore our streets

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 10:42 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:42:12 UTC
First Name: Lisa
Last Name: Zwarych
Email: zwarych3@yahoo.com
Zip Code: 90066-4134
Country: US
Street: 2461 Walgrove Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:49 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:49:13 UTC
First Name: Gina
Last Name: Sommo
Email: ginasommo@gmail.com
Zip Code: 90066
Country: US
Street: East Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:50 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:49:50 UTC
First Name: dave
Last Name: parker
Email: dupree63@ca.rr.com
Zip Code: 90291
Country: US
Street: frey ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:50 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:50:39 UTC
First Name: Tony
Last Name: Sommo
Email: tonymsommo@gmail.com
Zip Code: 90066
Country: US
Street: East Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:51 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:47:21 UTC
First Name: Kent and Marlene
Last Name: Alves
Email: khalves@msn.com
Zip Code: 90066
Country: US
City: Mar Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

RESTORE VENICE BIVD. TO ITS ORIGINAL CONFIGURATION.
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:52 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:50:28 UTC
First Name: Natalie
Last Name: Myers
Email: intd.gal@gmail.com
Zip Code: 90066
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Please listen to your constituents. I live just a few houses off Venice Blvd and I have never been contacted, or reach out to. My commute is not safer. I do not like walking my child down this street anymore. I want safer streets, but this is not the right solution and we feel bulldozed. Please take a fair assessment of the situation.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:55 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:55:35 UTC
First Name: David
Last Name: Shapiro
Email: shapiro5199@hotmail.com
Zip Code: 90293
Country: US
Street: 8512 Tuscany Avenue
City: Playa Del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:58 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 18:57:59 UTC
First Name: judith
Last Name: esposito
Email: judy.esposito@msn.com
Zip Code: 90281
Country: US
City: Venice
Verification: Yes
State: Texas
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:01 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:01:45 UTC
First Name: Alison
Last Name: Raitt
Email: alison227@gmail.com
Zip Code: 90293
Country: US
Street: 8401 Tuscany Ave, Apt 7
City: Playa del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:03 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:03:26 UTC
First Name: Lisa
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:04 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:04:24 UTC
First Name: John
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:05 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:04:57 UTC
First Name: Shannon
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:05 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:05:20 UTC
First Name: Kylie
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:09 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:08:52 UTC
First Name: Sandra
Last Name: Wilson
Email: cloygirl@yahoo.com
Zip Code: 90291
Country: US
Street: 2420 Cloy Avenue
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:11 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:11:01 UTC
First Name: frank
Last Name: defurio
Email: defurio@msn.com
Zip Code: 90291
Country: US
City: venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:11 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:11:38 UTC
First Name: Nina
Last Name: Cerbo
Email: neners56@yahoo.com
Zip Code: 90292
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:12 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:11:19 UTC
First Name: Michael
Last Name: Cowden
Email: Pedi4Z@aol.com
Zip Code: 90066
Country: US
Street: 3957 East Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:13 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:13:28 UTC
First Name: heidi
Last Name: mylo
Email: heidi.mylo@gmail.com
Zip Code: 90291
Country: US
Street: 2116 Penmar avenue
City: venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:21 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:20:56 UTC
First Name: mary
Last Name: boehle
Email: itstnab@ca.rr.com
Zip Code: 90066
Country: US
Street: 3282 grand view blvd
City: los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:24 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:23:59 UTC
First Name: Brian
Last Name: Miller
Email: brianmillerswiminstructor@gmail.com
Zip Code: 90066
Country: US
Street: 3665 Wade St.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 11:26 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:25:45 UTC
First Name: Richard
Last Name: Axelrod
Email: ultedge1@gmail.com
Zip Code: 90066-1930
Country: US
Street: 3306 Mountain View Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:28 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:27:53 UTC
First Name: Anton
Last Name: Balde
Email: cupertinoreview@gmail.com
Zip Code: Ca
Country: US
Street: 544 Vernon ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:29 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:28:49 UTC
First Name: Jason
Last Name: Murphy
Email: jason7pdr@gmail.com
Zip Code: 90293
Country: US
Street: 8745 Delgany Ave
City: Playa Del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:45 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:44:31 UTC
First Name: Ken
Last Name: Marek
Email: kenneth.marek@gmail.com
Zip Code: 90066
Country: US
Street: 3924 Redwood Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:48 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:48:02 UTC
First Name: Davis
Last Name: R
Email: Draakstraat@gmail.com
Zip Code: 90066
Country: US
City: Mar Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:56 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:37:46 UTC
First Name: CHARLES
Last Name: BORNSTEIN
Email: cbmontage@yahoo.com
Zip Code: 90291
Country: US
Street: 2338 clark ave
City: venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I am an avid bicyclist, and have been riding on Venice Blvd. from Venice through Mar Vista many times from before the “road diet” to the present time. I must tell you that the current road arrangement makes it much less safer for me on my bike.
Cars have a difficult enough time seeing cyclists in spite of how many flashing lights and reflective clothes we wear. Before the “road diet” the bike lane was closer to the car lanes, so at least there was a modicum of a chance that a motorist could see a cyclist. But now, with the bike lane moved further away from cars for 7/8ths of the length of the block, a false sense of security is achieved as one approaches the end/intersection, as all of a sudden cars making turns and bikes appear to each other and accidents can and do happen.
Another aspect of this “diet” that I have observed as a motorist driving between Centinela and Beethoven is that when a car attempts to parallel park in an open space in the middle of a row of parked cars (all now to the other side of the bike lane and further away from the curb) what happens is that the TWO lanes of traffic now gets reduced to ONE! This seems totally absurd.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 11:59 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:59:32 UTC
First Name: Gail
Last Name: Blamires
Email: gblamires@aol.com
Zip Code: 90066
Country: US
Street: 3620 Redwood Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 12:01 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 19:59:50 UTC
First Name: Joe
Last Name: Lisanti
Email: tonedeaf@ix.netcom.com
Zip Code: 90291
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Thank you,
Joe Lisanti

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 12:06 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 20:06:30 UTC
First Name: Sima
Last Name: Kostovetsky
Email: simakostov@hotmail.com
Zip Code: 90292
Country: US
Street: 17 Voyage Street
City: Marina del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 12:13 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 20:10:39 UTC
First Name: Loree
Last Name: Bryer
Email: loreeb212@gmail.com
Zip Code: 90066
Country: US
Street: 3347 Wade St.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Please restore Venice Blvd to the pre-Great Streets program. It looks junky and congested now and it's weird to try to walk to the remaining establishments. The traffic is now routed to more residential streets and this must be acknowledged. This will become increasingly dangerous over time.

There are unaddressed environmental concerns that need to be handled.

Please do the right thing. It was a pilot and we learned from it but the right thing to do is to revert.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 12:26 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 20:26:28 UTC
First Name: David
Last Name: Wire
Email: espeefan@hotmail.com
Zip Code: 90066
Country: US
Street: 3945 Frances Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 12:39 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 20:31:51 UTC
First Name: Diane
Last Name: Wolson
Email: di.wilson@verizon.net
Zip Code: 90066
Country: US
Street: 3629 Ashwood Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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I am very concerned that the City of Los Angeles wants to make this project permanent without an environmental review. I am strongly against the City not honoring its promise made in March 2018 to have an environmental assessment and public process - “If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please honor the promise and rectify the decision to move forward without the assessment and public process by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 12:58 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 20:58:04 UTC
First Name: Daniel
Last Name: Sutton
Email: blueskyvan@yahoo.com
Zip Code: 90066
Country: US
Street: 3775 Beethoven Street, Apt 314
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 1:02 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:01:44 UTC
First Name: Farhad
Last Name: Behroozi
Email: Laughingprince13@gmail.com
Zip Code: 90066
Country: US
Street: 3785 Maplewood Avenue
City: Mar Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 1:13 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:12:52 UTC
First Name: Haresh
Last Name: Makwana
Email: haresh.makwana@gmail.com
Zip Code: 90291
Country: US
Street: 1415 Venice Blvd, Apt 302
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 1:33 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:24:06 UTC
First Name: Renay
Last Name: Garcia
Email: gonaynay@yahoo.com
Zip Code: 90066
Country: US
Street: Venice Blvd
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I live on Venice Blvd
I've stopped counting the accidents along Venice Blvd. there are too many.
I was raised in MV since 5 years old went to Grand View Blvd School. I walk on Venice Blvd. several times I have encountered impatient drivers make a right into the side streets between Glenda to Inglewood Blvd.

The change on Venice Blvd is horrific.
First week my husband witnessed a gentleman going east on Venice Blvd slam into a car that pushed the rear end almost into the driver seat. I live on Venice and Wade I hear it daily. Bloody mess.
I have pictures.
I've actually talk to people that have almost hit me and I can say 80% are transplants & were very flippant in knowing that they almost injured somebody.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:33:46 UTC
First Name: Rick
Last Name: Swinger
Email: rickswinger@yahoo.com
Zip Code: 90291
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 1:38 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:34:24 UTC
First Name: kevin
Last Name: martin
Email: chrissy@bakesaleonline.com
Zip Code: 90066
Country: US
City: los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 1:52 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:51:55 UTC
First Name: Pamela
Last Name: Jensen
Email: pjsatbeach@yahoo.com
Zip Code: 90245
Country: US
Street: 230 Arena Street
City: El Segundo
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 2:00 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 22:00:26 UTC
First Name: Tiana
Last Name: Spencer
Email: tiana.spencer@yahoo.com
Zip Code: 90066
Country: US
Street: 3605 S Centinela Ave. #3
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 2:10 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 21:33:28 UTC
First Name: Stephen
Last Name: Schwarting
Email: Stephen@ghostshipvfx.com
Zip Code: 90045
Country: US
Street: 8737 Kittyhawk Avenue
City: LA
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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The effects on me personally traversing in the effected areas was immense, as well as to business that I frequent on Venice Bulv. You may see the small business owner Angeleno's currently suffering and who have already failed directly because of this project as expendable but they all have circles of Friends and family not just on the westside and are livid. (how I heard about the Venice bulv project) Also, strangely enough I have not seen any increase in bike usage in the designated lanes installed on Venice Bulv. (why is this supposed benefit not tracked and touted?) and the bizarre in street parking scheme is similarly way under used... It strikes me as patently dangerous as well. Please stop wasting money and discontinue the war on the majority of your vehicle driving constituents and the mom and pop shop owners also effected! Vision zero; has zero vision and is a problem looking for a solution, Do not consider expanding this project instead stop the nonsense rever se it and make it right. You really want better safety increase the yellow time by a second and destroy the disingenuous corrupt Red-Light-camera company crash grab that increases accidents as well.

Think twice before you hitch your wagon to my arrogant, and unnecessarily controversial representative's pet project! Almost with out exception people are not in-favor of this meddling!

Everyone I have personally talked about this issue is angry and c

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 2:16 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 22:16:16 UTC
First Name: James
Last Name: Naughton
Email: jnaught@outlook.com
Zip Code: 90405
Country: US
City: Santa Monica
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 2:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 22:27:59 UTC
First Name: shura
Last Name: Reininger
Email: shurakie@hotmail.com
Zip Code: 90066
Country: US
Street: 3645 redwood Av
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 2:29 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 22:28:23 UTC
First Name: Glenn
Last Name: Hruska
Email: hruskamv@aol.com
Zip Code: 90066
Country: US
Street: 3216 Grand View Blvd
City: LA
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 22:29:19 UTC
First Name: Ray
Last Name: Mattson
Email: mattsonb@aol.com
Zip Code: 90066
Country: US
Street: Wasatch
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 2:59 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 22:59:29 UTC
First Name: Laura
Last Name: Smith
Email: akasmith63@yahoo.com
Zip Code: 90066
Country: US
Street: 4273 Lyceum Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 3:03 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 23:01:53 UTC
First Name: Jesse
Last Name: Garcia
Email: laxjesse@aol.com
Zip Code: 90291
Country: US
Street: Louella ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 3:32 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 23:11:05 UTC
First Name: Chuck
Last Name: Erwin
Email: erwinddd@yahoo.com
Zip Code: 80917
Country: US
Street: 2764 Oro Blanco Dr
City: Colorado Springs
Verification: Yes
State: Colorado
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I thought you might want a tourist perspective. I come to LA, quite often (about once a month)I to visit family and friends. I always enjoyed going to the beach, getting a bite to eat, doing some shopping at local businesses, and walk along the ocean. No longer. After the needless lane diet on Venice, the areas already horrendous congestion is now unbearable.
I no longer visit the beach much.

LA is the most congested city in the country. Your transportation arteries are clogged. You want to promote alternate modes, but instead you are committing malpractice with our transportation dollars. To illustrate, what would happen if a doctor refused to perform surgery, and instead prescribed cholesterol shots to a patient needing quadruple bypass? When asked about his action, the doctor replied "If I performed the surgery, the patient would just need it again. Therefore, I refused the surgery, to encourage better eating habits." That's malpractice, but isn't that what we are doing to our transportation arteries? We as a nation love our cars and are not getting out of them. Facilitating the efficient movement of vehicles is the best way to improve air quality, and help the environment. Increasing congestion, only means of more people stuck in traffic, as their cars belch out a toxic blend of fumes, going nowhere. That doesn't help the environment.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 3:35 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 23:31:01 UTC
First Name: Georgi
Last Name: Slavchev
Email: geoslav@yahoo.com
Zip Code: 90066
Country: US
Street: 3714 Barry
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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People hate this for many reasons - safety, gridlock, cats getting run over, dangerous biking situations (I am a biker) just to name a few. If you think that you can force people to do such things and that you will be forgiven, think again. Bonin and his circle will be held responsible for arrogant and poor project being shoved down people's throats.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 3:35 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 23:34:38 UTC
First Name: Carol
Last Name: Hile
Email: carol@santamonicaescrow.com
Zip Code: 90066
Country: US
Street: 4051 Marcasel ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 3:53 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-04 23:51:09 UTC
First Name: Kraig
Last Name: Metzinger
Email: kmetzi01@yahoo.com
Zip Code: 90293
Country: US
Street: 8114 Manitoba St. Apt 202
City: Playa del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 4:01 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:00:49 UTC
First Name: Denise
Last Name: Horn
Email: deniseehorn@yahoo.com
Zip Code: 90066
Country: US
Street: 4065 McLaughlin Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 4:18 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:18:26 UTC
First Name: Eg
Last Name: Mahan
Email: egmahan@gmail.com
Zip Code: 90291
Country: US
Street: Rialto
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 4:25 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:15:59 UTC
First Name: Omer
Last Name: Salik
Email: osalik@gmail.com
Zip Code: 90254
Country: US
Street: 575 19th St.
City: Hermosa Beach
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

The city's ongoing insistence on transforming major traffic arteries into small town streets is simply misguided, particularly where our leaders have failed to provide viable alternatives to cars. "Road Diets" in the absence of viable public transportation options is nothing more than punishment for common commuters. Give us the public transportation options first, before cutting off the roads to get people out of their cars.

The fact that Measure M dollars (which I voted for) are being used for this is deeply offensive. The measure was intended to build public transportation options and not make driving more miserable than it already is. Your misuse if these funds will make me reluctant to vote in favor of any future funding measures brought by the county.

At a minimum, there are reasonable concerns that the road diet has had significant environmental impacts upon the environment. These impacts must undergo a review before making these changes permanent.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 4:26 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:22:48 UTC
First Name: Cooper
Last Name: Olson
Email: underdogco@aol.com
Zip Code: 90066
Country: US
Street: 4253 Campbell Dr
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Respectfully, I want Venice Blvd back.

I have written to Mike Bonin three times, and just receive no answer about when the public can weigh in on this one year "study."

Businesses have closed, accidents have happened--for many, many reasons, this should be called a semi-noble try, and a failure.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 4:33 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:33:30 UTC
First Name: judy
Last Name: esposito
Email: judy.esposito@msn.com
Zip Code: 90291
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 4:54 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:53:57 UTC
First Name: Mina
Last Name: Friedler
Email: elimina@ca.rr.com
Zip Code: 90292
Country: US
Street: 2342 Clark Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 5:13 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 01:13:14 UTC
First Name: Kam
Last Name: Shishido
Email: kamshishido@aol.com
Zip Code: 90045
Country: US
Street: 7917 Denrock Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 5:23 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 01:22:38 UTC
First Name: Shura
Last Name: Reininger
Email: shurakie@hotmail.com
Zip Code: 90066
Country: US
Street: 3645 Redwood Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 5:24 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 01:23:59 UTC
First Name: Martha
Last Name: Santana
Email: ms106@aol.com
Zip Code: 90066
Country: US
Street: 12426 Mitchell Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 5:36 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 01:32:05 UTC
First Name: Bruce
Last Name: Warren
Email: bruce@sendlgm.com
Zip Code: 90066
Country: US
Street: 12919 Gilmore AVe.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

Venice Blvd. should be widened, not narrowed.

First, it is a tsunami evacuation route and the City could incur huge liability in the event of a tsunami if people are unable to evacuate.

Second, the "road diet" induces drivers to go through residential streets to avoid the congestion the "road diet" has caused. A better plan is to get bicyclists to ride on residential streets.

Respectfully
Bruce M. Warren

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 5:39 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 00:59:06 UTC
First Name: Kalani
Last Name: Whittington
Email: kwhittington78@msn.com
Zip Code: 90034
Country: US
Street: 3671 Veteran Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

I ask, how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Also note: I like many others, have learned to avoid Venice Blvd. bottleneck by finding our way to Washington Place. I travel Venice Blvd. nearly everyday, I have NOT seen an increase in bike usage of Venice Blvd. With cutbacks in Physical Education programs in schools and increase in internet gaming, our youth are not attracted to physical task of cycling, as in the past.

It appears, people are opting to use electric motorized scooters/cycles that unleashes another host of issues with regard to safety. I do hope council will treat electric scooters/cycles with similar regulation as a motorcycle.

I do hope council will reverse this Great Streets experiment and return Venice Blvd. back to original state, as swiftly as they allotted funds to sand blast and remove traffic marking in the southbay when Playa Vista/Manhattan Beach residents threatened to sue after City's/LADOT attempt to IMPOSE their FAILED "Great Streets/Vision Zero/Road Diet in Playa del Rey/Vista.
https://www.latimes.com/local/lanow/la-me-ln-mike-bonin-road-diet-20171003-story.html

I do hope you will vote to end the divisiveness in Mar Vista and westside by restoring Venice Blvd. (A TIDAL EVACUATION CORRIDOR) back to original state.

Aloha,
Kalani Whittington
Phone: 310.839.5509 (Doesn't accept text)

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 5:45 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 01:41:44 UTC
First Name: Richard
Last Name: Hunter
Email: rehunterjr80@gmail.com
Zip Code: 90291-4739
Country: US
Street: 2334 Wilson Ave.
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 6:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 02:27:05 UTC
First Name: Deborah
Last Name: Galambos
Email: dgalambos@hotmail.com
Zip Code: 90066
Country: US
Street: 3567 Ocean View Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 6:32 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 02:32:01 UTC
First Name: Joan
Last Name: Weamer
Email: bayley.weamer@gmail.com
Zip Code: 90066
Country: US
Street: 3570 Ocean View Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 6:34 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 02:33:58 UTC
First Name: Ivan
Last Name: Galambos
Email: igalambos@aol.com
Zip Code: 90066
Country: US
Street: 3567 Ocean View Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 6:38 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 02:37:15 UTC
First Name: Heidi
Last Name: Barnes
Email: heidi@heidibarnesrealty.com
Zip Code: 90291
Country: US
Street: 2424 Frey Avenue
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 6:58 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 02:57:48 UTC
First Name: Chris
Last Name: Stevens
Email: chris@pwned.com
Zip Code: 90066
Country: US
Street: 12625 Pacific Ave, Apt 9
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 7:03 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 03:02:18 UTC
First Name: Tia
Last Name: Nishida
Email: tiasnishida@yahoo.com
Zip Code: 90045
Country: US
Street: 7515 W 80th street
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 7:35 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 03:35:02 UTC
First Name: Sharyl
Last Name: Beebe
Email: sbeebe@prismpermits.com
Zip Code: 90291
Country: US
Street: 1421 Venice Blvd. #10
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:32 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 04:16:47 UTC
First Name: Katherine
Last Name: Ryan
Email: kayoryan392@gmail.com
Zip Code: 90266
Country: US
Street: 700 33rd St
City: Manhattan Beach
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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I lived through the ridiculous, ignorant, clueless, dangerous changes to Playa Del Rey. The only roads out of the South Bay peninsula were blocked, we were trapped. The only iAds around LAX and the Edison plant were blocked- what if an emergency? I saw a paramedic with lights and siren slowed to 5 mph on traffic on Cukver Blvd rushing to Dockweiller and trapped. Poor victim. The egrets are gone from Ballona Wetlands after cones put up on Culver. The official tsunami escape route eastbound on Culver Blvd went from 4 lanes to 2. I have lived in Area and Westchester for 72 years. I have driven these roads weekly if not daily my entire life. NEVER saw an accident in my entire life until changed by Bonin. (Overnight with no hearing). And all the roads involved were NOT NEIGHBORHOODS- no kids have ever been seen playing on any if these roads. No housing on any but maybe 1/4 mile on Pershing. The biggest waste of money to create a very dangerous and harmful situation. And- have s een maybe ONE biker a week on the path. There are parallel bike paths about 50 yards off road, along beach and ballona creek that are far from roads. Why build a dangerous one in the middle of nowhere? This area is largely uninhabited- LAX and Ballona Wetlands are desolate and dark at night. Not safe. Cannot stand to think Venice Blvd citizens now have to endure this. Put public transportation in place, then talk about it.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 8:51 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 03:39:29 UTC
First Name: Gary
Last Name: Brown
Email: g.brown1511@sbcglobal.net
Zip Code: 90066
Country: US
Street: 12135 Mitchell Ave., Apt. 227
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

The Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project (scheduled for the City Council agenda on, March 5, 2019) has merit!!

Here's an applicable (close to the original...) quote: "I could swallow a handful of iron filings and puke out a better system than this!" Spit out by Conway Costigan, the hero of E.E. "Doc" Smith's "Triplanetary". At the time, the lives of his fellows and himself were in imminent jeopardy in the depths of a mine due to poorly-predictive engineering.

When I first encountered (it's just "around the corner" from me) this boondoggle, I diagnosed that any competent analysis would have predicted the outcome for individuals, motorists and businesses. Even the "lights" and "crosswalk" across Venice Blvd. at Mountain View Ave. are a freaking JOKE! Here, the optimum solution for both cars and pedestrians is to NOT press and wait for the "green light". To do so hinders both pedestrian and vehicle traffic. Which makes me a "criminal" for doing the right thing! Morons!

My search for "intelligence in this particular universe" leads me to 2 choices: (1) either the originators of this "ideal solution" are STUPID or (2) the originators are not operating on an "engineering" program for "behavior" into the future.

If you want to replace cars in the equation, SAY SO!!! The automotive industry fracked the public transport system in L.A. an eon ago. GROW SOME BALLS and get Detroit, Japan and Germany to fund their demise!!! DON'T frack the consumer who has a job to do or a service to deliver to the public.

The solution is NOT everyone on bicycles! LOOK at the 405!!! SCREW "Social Engineering"! I am my very best "cop", my very best "friend" and my very best "mediator". YOUR job is doing the right thing! If you do the right thing then "behavior modification" is NOT an issue!

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Mon, Mar 4, 2019 at 10:54 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 06:48:04 UTC
First Name: Cesar
Last Name: Villanueva
Email: carpdm@hotmail.com
Zip Code: 90640
Country: US
Street: 720 Via Val Verde
City: Montebello
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Please consider that most of us that are negatively affected by these changes are to busy working hard or do know how to make their voices heard to the city council. There should be consideration for all Angelenos not just special interests. Thank you for your time.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 2:02 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 10:01:07 UTC
First Name: Kathy
Last Name: Wishard
Email: wakiauntkaki@aol.com
Zip Code: 90245
Country: US
Street: 427 Concord Street
City: El Segundo
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 7:20 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 15:17:27 UTC
First Name: marianne
Last Name: pogoler
Email: spfxlavender@verizon.net
Zip Code: 90291
Country: US
City: venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Respectfully,
The Pogoler Family

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 7:25 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 15:25:10 UTC
First Name: Sara
Last Name: Sluss
Email: sara.sluss@gmail.com
Zip Code: 90291
Country: US
Street: 2129 Glencoe Avenue
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 7:47 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 15:39:46 UTC
First Name: J D
Last Name: Pepper
Email: jdanpepper@aol.com
Zip Code: 90292
Country: US
City: Marina del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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In my 45 years as a LA County taypayer, I have never witnessed a destructive force that could match that of Councilman Bonin. Mr. Bonin has proven to possess the "Midas Touch in reverse" as everything he touches turns into a public nuisance and degrades the vitality of the community.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 9:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 17:39:38 UTC
First Name: OliviA
Last Name: Shores
Email: shoresovenice@yahoo.com
Zip Code: 90291
Country: US
Street: 2333 Clement ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 9:02 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 05:01:49 UTC
First Name: Lisa
Last Name: Hiley
Email: lahiley@yahoo.com
Zip Code: 90066
Country: US
Street: 12586 rosy circle
City: Los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:08 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 06:07:40 UTC
First Name: Brooke
Last Name: Eaton
Email: brooke_eaton@spe.sony.com
Zip Code: 90094
Country: US
Street: Pacific Promenade
City: Playa Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:14 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 06:10:10 UTC
First Name: brian
Last Name: bodndar
Email: somanycars@californiamail.com
Zip Code: 91342
Country: US
City: lakeview terrace
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I grew up in Mar vista and moved away years ago. I miss it dearly, and want to go back and still go there every week, But now I avoid all businesses along the congested areas due to the road diet.

traffics is bad enough in LA but this is insanity. I will walk door to door to recall Bonin if this is not changed!.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

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Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:14 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 06:13:29 UTC
First Name: Kathleen
Last Name: LeBrun
Email: klebrun@ca.rr.com
Zip Code: 90292
Country: US
Street: Alla Road
City: Marina del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Mon, Mar 4, 2019 at 10:26 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 06:26:23 UTC
First Name: Barbara
Last Name: Gibson
Email: bgrealestatebroker@gmail.com
Zip Code: 90066
Country: US
Street: 4426 Alla Road
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 10:01 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 18:00:23 UTC
First Name: Sandy
Last Name: Szabo
Email: szabo@digitalsurgeon.com
Zip Code: 90404
Country: US
Street: 1514 Yale Street, Apt # 7
City: Santa Monica
Verification: Yes
State: California
Source: facebook
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 11:07 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 19:06:54 UTC
First Name: Richard
Last Name: Wafer
Email: richwafer@me.com
Zip Code: 90066
Country: US
Street: 3635 Mountain View Ave
City: Lis Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 11:10 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 19:10:49 UTC
First Name: Katherine
Last Name: Wafer
Email: katewafer@me.com
Zip Code: 90066
Country: US
Street: 3635 Mountain View Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 1:47 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 21:46:56 UTC
First Name: Rosalind
Last Name: Sepulveda
Email: rj.payitforward@gmail.com
Zip Code: 90066
Country: US
Street: 3621 Stewart Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 3:53 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 23:52:39 UTC
First Name: kimberly
Last Name: hoffman
Email: kimhoffman528@gmail.com
Zip Code: 90293
Country: US
Street: 8828 pershing #311
City: Playa Del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 4:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 00:07:18 UTC
First Name: Robin
Last Name: PATTON
Email: kornholeieo@hotmail.com
Zip Code: ca 90029
Country: US
Street: 4368 sunset blvd
City: los angeles
Verification: Yes
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

No I do not support any road diets or so called traffic calming measures as ben implemented by the LADOT. Which has turned into a anti car and anti mobility organization. You need only to look at the Rowena ave road diet lane reduction to see what a disaster it is. and they wont reverse it because they wont admit to it being a mistake.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 5:31 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 01:31:06 UTC
First Name: Lisa
Last Name: Zullo
Email: l.zullo@ca.rr.com
Zip Code: 90066
Country: US
Street: 3714 Moore Street
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 5:43 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 01:42:53 UTC
First Name: doric
Last Name: george
Email: nopushing@yahoo.com
Zip Code: 90066
Country: US
Street: Inglewood blvd
City: Los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 8:26 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 04:26:00 UTC
First Name: John
Last Name: Wiese
Email: wiesejc@gmail.com
Zip Code: 90278
Country: US
City: Redondo Beach
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 9:12 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-05 02:51:22 UTC
First Name: Pamela
Last Name: Day
Email: pamela@crimsonholdings.com
Zip Code: 90066
Country: US
Street: Venice
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Tue, Mar 5, 2019 at 11:20 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 07:16:02 UTC
First Name: Leslie
Last Name: Ryan
Email: lryan19@hotmail.com
Zip Code: 90292
Country: US
Street: 4050 Glencoe Ave
City: Marina del Rey
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Venice blvd is a mess with this road diet. We should be adding lanes whenever possible, not taking them away. Taking away lanes does not make people stop driving because there is inadequate public transportation in this town. Biking is not a solution either. I'm a woman who would not feel safe biking home from work in the dark with the growing homeless problem. The goal should make it easier for traffic to flow faster, not slow it down. Please reverse this awful road diet on Venice blvd.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Wed, Mar 6, 2019 at 6:06 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 14:06:10 UTC
First Name: Luis
Last Name: Valenzuela
Email: louispuck@gmail.com
Zip Code: 90291
Country: US
Street: 840 Venice Blvd.
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Wed, Mar 6, 2019 at 7:04 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 15:04:29 UTC
First Name: Sheri
Last Name: Odere
Email: sheri@odereinc.com
Zip Code: 90066
Country: US
Street: Wade st
City: Mar vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Wed, Mar 6, 2019 at 9:45 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-06 17:44:12 UTC
First Name: Dale
Last Name: Preator
Email: rdalep@dslextreme.com
Zip Code: 90045
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Wed, Mar 6, 2019 at 6:40 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 02:39:26 UTC
First Name: Paula
Last Name: Davis
Email: paulacdavis@gmail.com
Zip Code: 90266
Country: US
Street: 469 28th street
City: Manhattan Beach
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Wed, Mar 6, 2019 at 10:46 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 05:53:01 UTC
First Name: Demetrios
Last Name: Mavromichalis
Email: dememavro@gmail.com
Zip Code: 90066
Country: US
Street: 12224 Venice Blvd
City: Mar Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

To whom it may concern,

My business was instrumental to our neighborhoods revitalization. I have volunteered, organized and started the Mar Vista Farmers Market in order to help bring our neighbors together and form a sense of community.

I have also stood side by side with our late former Councilman, the late Bill Rosendahl until his last days. I have even supported our current Councilman, Mr. Bonin's election and re-election campaigns by giving him office space to run his campaigns.

I have watched my community suffer and become torn apart over the deception of the Great Streets Initiative and how we were misled from the very beginning. It has literally turned neighbors against each other.

Our community once stood in unity. Now it stands divided and bitter. I blame Mr. Bonin for this.

I have made numerous attempts to meet Mr. Bonin along with other business owners as well as stakeholders to discuss the negative impacts the road diets are having on our businesses and our community.

To this day Mr. Bonin and his staff have refused to meet with anyone who opposes this and he has misled the community over the success of the pilot project through a Facebook video last December where he stated the LADOT's (Fehr & Peers) data showed 23 new businesses have open along the corridor and that $3,000,000.00 of increased sales revenue has been generated after the implementation of the road diets.

This is not true and can be proved by facts showing the complete opposite has happened. We have looked at the data from LADOT (Fehr & Peers) and had it analyzed by experts and their data does not hold water. You cannot support this motion until you check the facts. You are our elected representatives and you must represent us by hearing our voices. My business has now closed because of this and there are more on the brink of closure.

This has not made our community safer nor has it had the economic impact stated by Mr. Bonin, LADOT or Fehr & Peers.

.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

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Action Network <info@actionnetwork.org> Wed, Mar 6, 2019 at 11:39 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 07:39:12 UTC
First Name: Jorge
Last Name: Cicalese
Email: caballito@verizon.net
Zip Code: CA
Country: US
Street: 3868 S Centinela Ave #5
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:53 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 10:11:25 UTC
First Name: Selena Inouye on behalf of Restore
Last Name: Blvd
Email: restorevenicebIvd@gmail.com
Zip Code: 90066
Country: US
Street: PO Box 661745
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

To the Los Angeles City Council
cc: City Clerk's Office

Dear Councilmember,

The reality is all Council Districts will be asked to implement Vision Zero projects as the result of the City Council's ratification of Mobility Plan 2035. And every Councilmember will face questions from their constituents when you are asked to implement a road diet and/or protected bike lane in your district.

Wouldn't you feel better about complying with these requests knowing that these projects actually work here in Los Angeles?

Granting the CEQA appeal brought before you by the Westside LA Neighbors Network will start an official Transportation Impact Study (LADOT guidelines here: https://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf) It will definitely catalog, address and answer the many significant concerns raised during the one-year pilot project about impacts on the environment. The community will get the opportunity they have been asking for, to participate in a public process and give their input.

Only a detailed and comprehensive traffic impact study done in conjunction with an Environmental Impact Report can definitively answer the questions: "Are the road diet and protected bike lane on Venice Blvd a success?" Only this level of data collection and evaluation will be able to help you answer the question, "Will a road diet and/or protected bike lane be successful in my own district?"

This is why I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project and I ask you to do the same.

Kind regards,

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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You can unsubscribe or update your email address or change your name and address by changing your subscription preferences here.

Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 8:21 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 16:08:31 UTC
First Name: Dov
Last Name: Paz
Email: mailboxq@gmail.com
Zip Code: 90066
Country: US
Street: 3730 May street
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

DOT during a community meeting stated that the safety issue and number of accidents prior to the project was not significant and actually low for a street luke Venice Blvd. DOT did not meassure the impact of the road diet on any streets beside Venice, only on Palms Blvd that is far away. Not on Centinela or Washington Blvd. WSJ article this year declared Vision zero a complete failure here in the US and in Europe. In the LA time last month Metro reported public transportation use has declined, DOT and Councilmen Bonin report "sucess as public transportation is up". He also dis not consider the increase of population in the area and even sited the scooter sharing use as a bi product of the road diet, the whole world wide inovation started about 2 years ago. Last, as a local all I see is cut through traffic including UPS, law enforcement and FedEx. No, traffic is not down it is just finding other routes and harming and endangering our children. I invite you to stand on the corner of Venice and Centinela for 10 minutes during busy hours.

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:37:33 UTC
First Name: Lisa
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:38:15 UTC
First Name: John
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:37:59 UTC
First Name: Garrett
Last Name: Oneal
Email: garrettoneal@yahoo.com
Zip Code: 90291
Country: US
Street: 647 1/2 crestmoore pl
City: venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:38:39 UTC
First Name: Shannon
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:38:59 UTC
First Name: Kylie
Last Name: Nakamine
Email: LGFN93@YAHOO.COM
Zip Code: 90066
Country: US
Street: 3541 BARRY AVE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:39 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:38:58 UTC
First Name: Jim
Last Name: Naughton
Email: jnaught@outlook.com
Zip Code: 90405
Country: US
City: Santa Monica
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:47 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:43:43 UTC
First Name: Karen
Last Name: Jones
Email: khjones1949@yahoo.com
Zip Code: 90291
Country: US
Street: 704 Sunset Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

I strongly agree with everything in this letter. I am outraged that this "improvement" was foisted on our westside community, and am particularly angry at how Councilman Bonin and the City Council have ignored the majority, who hate this thing, and stonewalled reasonable requests for environmental reviews. Now, to have this "pilot" program rammed through is a slap in the face to all of us who traverse these streets. More and more I am disgusted with the City Council and its dunderheaded decisions.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:59 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:58:58 UTC
First Name: Judith
Last Name: Esposito
Email: judy.esposito@msn.com
Zip Code: 90291-4742
Country: US
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:00 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 17:59:00 UTC
First Name: Tom
Last Name: Richards
Email: trichards777@gmail.com
Zip Code: 90291
Country: US
Street: 2554 Lincoln Bl., #530
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which was scheduled to be on the City Council agenda on Tuesday, March 5, 2019 but has now been reschedule to Friday March 8, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:11 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:02:29 UTC
First Name: Terri
Last Name: Crystal
Email: terrijean11@gmail.com
Zip Code: 90066
Country: US
Street: Meier St.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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In addition, the reconfiguration of Venice Blvd. has significantly increased traffic and wait times during peak traffic hours and has made it hazardous to enter Venice from the streets north of Venice between Centinela and Beethoven. It's not only hazardous for cars but also for cyclists traveling along Venice Blvd. on the north side of the street.

There is definitely a negative environmental impact that needs to be addressed.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:13 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:13:46 UTC
First Name: Cheyenne
Last Name: Sommo
Email: cheyennesommo@gmail.com
Zip Code: 90066
Country: US
Street: East Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:26 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:23:09 UTC
First Name: Kent
Last Name: Alves
Email: khalves@msn.com
Zip Code: 90066
Country: US
City: Mar Vista
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

PLEASE LISTEN TO THE MAR VISTA PEOPLE negatively impacted by great streets project.
I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:27 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:23:29 UTC
First Name: Richard
Last Name: Sinclair
Email: rdsinclair@earthlink.net
Zip Code: 90064
Country: US
Street: 2922 Tilden Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Venice Boulevard is an integral part of the orderly and efficient flow of traffic on the Westside of LA. It is not a proper site for a pedestrian district, which could more appropriately be sited on smaller adjacent streets. The road diet project for this location was totally ill-conceived and inappropriate.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:34 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:28:16 UTC
First Name: Patrick
Last Name: Willaims
Email: patrickbeewilliams@gmail.com
Zip Code: 90066
Country: US
Street: 3770 Wasatch Avenue
City: LOS ANGELES
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I live a half a block from Venice Blvd. and I do not like the road diet. It has made for more congestion, people confused about where to drive and driving in the bike lane or just to get around traffic. The fact that the bike lane was supposed to be safer, when actually, when you have a wall of parked cars it is hard to see the bikers and when a car goes to take a right turn, I have witnessed many close calls.
The wide right turns also slow down the right lane significantly, adding to the congestion and safety issues.
I have also seen emergency response vehicles unable to get through the Venice and Centinela light because of heavy traffic.
A friend of mine was in town recently, a former Angelino, and thought it was a horrible design, and that just because certain designs might work for some cities (ie. in Europe), they do not necessarily work for other cities, like Mar Vista.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:35:50 UTC
First Name: Michael
Last Name: Garland
Email: garland.photo@verizon.net
Zip Code: 90066-2708
Country: US
Street: 3575 Colonial Avenue
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 10:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:38:28 UTC
First Name: Rett
Last Name: Bryson
Email: rett.bryson@gmail.com
Zip Code: 90064
Country: US
Street: 2652 Westwood Blvd
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:00 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 18:59:55 UTC
First Name: LEOCRICIA
Last Name: Olmedo
Email: q.olmedo@yahoo.com
Zip Code: 90066
Country: US
Street: 12657 1/2 Venice Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:04 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:04:35 UTC
First Name: Jake
Last Name: Roussos
Email: jake.roussos@gmail.com
Zip Code: 90066
Country: US
Street: East Bl.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:06 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:05:56 UTC
First Name: Andrew
Last Name: Doering
Email: drewdoering01@gmail.com
Zip Code: 90066
Country: US
Street: East Bl.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:07 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:07:45 UTC
First Name: Sonja
Last Name: Fowler
Email: sonjale41.sl@gmail.com
Zip Code: 90066
Country: US
Street: East Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:14 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:13:34 UTC
First Name: Patricia
Last Name: Smith
Email: sawtellemayor@hotmail.com
Zip Code: 90066
Country: US
Street: Sawtelle
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:13:41 UTC
First Name: Robin
Last Name: Olson
Email: robinmarie87@yahoo.com
Zip Code: 90066
Country: US
Street: 3959 1/2 Sawtelle Blvd
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:23 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:23:36 UTC
First Name: Madelaine
Last Name: Kolisnyk
Email: madelainekproperties@gmail.com
Zip Code: 90066
Country: US
Street: 3783 Wasatch Ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:29 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:28:44 UTC
First Name: Cindy
Last Name: Wickland
Email: JWick8312@aol.com
Zip Code: 91306
Country: US
Street: 7022 Sunmy Brae Ave
City: Winnetka
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:37 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:37:04 UTC
First Name: Merle
Last Name: Freeman
Email: mleefent@gmail.com
Zip Code: 9
Country: US
Street: 13010 Mindanao Way #2
City: Marina del Rey
Verification: Yes
State: Texas
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:38 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:38:06 UTC
First Name: Chris
Last Name: Masson
Email: xboarder88@aol.com
Zip Code: 90066
Country: US
Street: 3718 Mountain View Ave.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Thu, Mar 7, 2019 at 11:47 AM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:42:55 UTC
First Name: MARCY
Last Name: KELLER
Email: marcydkeller@gmail.com
Zip Code: 90066
Country: US
Street: 11944 MODJESKA PLACE
City: LOS ANGELES
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I have lived in Mar Vista my entire life, attending Mar Vista Elementary, Webster and Venice High. I have lived on Modjeska Pl since 1975. The changes made to our streets have created chaos, accidents and horrible inconvenience.
I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 11:51 AM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 19:50:30 UTC
First Name: Francis
Last Name: Badzey
Email: fnbadzey@msn.com
Zip Code: 90066
Country: US
Street: 3600 Meier Street
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 12:01 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 20:00:50 UTC
First Name: Kathleen
Last Name: Sundquist
Email: kpsundquist@gmail.com
Zip Code: 90233
Country: US
Street: 3430 Sherbourne Drive
City: Culver City
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 12:58 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 20:57:07 UTC
First Name: Clara
Last Name: Beard
Email: clara-beard@ca.rr.com
Zip Code: 90066-2703
Country: US
Street: 3580 Frances Ave
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

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Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 12:58 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 20:57:34 UTC
First Name: Bert
Last Name: Fallon
Email: fallons@earthlink.net
Zip Code: 90291
Country: US
Street: 425 Linnie canal
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 1:33 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 21:33:29 UTC
First Name: Justin
Last Name: Gold
Email: jgold627@yahoo.com
Zip Code: 90066
Country: US
Street: 3729 Meier Street
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 1:57 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 21:56:34 UTC
First Name: Dennis
Last Name: Mogerman
Email: dmogerman@hotmail.com
Zip Code: 90066
Country: US
Street: Venice Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:14 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 22:08:10 UTC
First Name: Joseph
Last Name: Baumann
Email: joe_baumann@verizon.net
Zip Code: 90066
Country: US
Street: 3661 Stewart Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

"Bonin & Co." has terribly (and in an unprofessional manner) screwed up our downtown Mar Vista along Venice Blvd... it's LESS safe, and it looks so BAD in so many ways, etc... etc...
I STRONGLY SUPPORT the Westside Los Angeles Neighbors Network's CEQA APPEAL of the FINALIZATION of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:22 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 22:22:40 UTC
First Name: Sean
Last Name: Obrien
Email: dvpro@aol.com
Zip Code: 90291
Country: US
Street: Washington Blvd
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:32 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 22:31:59 UTC
First Name: CYNDIE
Last Name: GARELECK
Email: cyndiebeth924@gmail.com
Zip Code: 90066
Country: US
Street: 13244 Ida Ave
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:44 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 22:43:51 UTC
First Name: Judy
Last Name: Accardi
Email: jaccardi@ymail.com
Zip Code: 90291
Country: US
Street: 452 Rialto Avenue
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:46 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 22:45:52 UTC
First Name: Laura
Last Name: Smith
Email: akasmith63@yahoo.com
Zip Code: 90066
Country: US
Street: 4273 Lyceum Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 2:47 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 22:46:57 UTC
First Name: Richard
Last Name: Tapp
Email: arcotapp46@yahoo.com
Zip Code: 90066
Country: US
Street: 4273 Lyceum Avenue
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

Please rectify this error by granting the CEQA appeal brought before you by the Westside LA Neighbors Network.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 3:21 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 23:21:35 UTC
First Name: Stephen Patrick
Last Name: Schiller
Email: sps2spocko@aol.com
Zip Code: 90066
Country: US
Street: 3947 Keeshen Drive
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 3:29 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 23:28:54 UTC
First Name: Kanti
Last Name: Makwana
Email: nutrimor@gmail.com
Zip Code: 90291
Country: US
Street: 1415 Venice Blvd # 301
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 3:44 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 23:28:40 UTC
First Name: Donna
Last Name: Speckman
Email: donna.m.speckman@aero.org
Zip Code: 90066
Country: US
Street: Ocean View
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I live 3 houses from Venice Blvd, and have not seen any improvement in safety or an increase in cycling since the implementation of the road diet. On the contrary, I have seen many more near misses between cyclists and motorists due to the lack of visibility created by parked cars along the protected bike lanes.

I have yet to see any properly processed data that shows that this configuration is an improvement to the community. In fact, the early announcements of reduced accidents on Venice Blvd made by my councilman were completely "fake news" because the accident data were not analyzed properly. They did not take into account the reduced traffic flow on Venice Blvd which provides the true accident rate per million miles traveled.

The proclamation of success also did not include any data for the accident rate in the overflow streets, which is where Venice car flow has been diverted. If one just shifts a problem from one street to another, that is NOT success.

Cut through traffic in the surrounding residential streets has surged, making these streets more dangerous for people and pets. I have not seen any recent (raw) data from LADOT or my councilman that indicates that there has been a decrease in accidents on these cut-through streets.

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 3:49 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-07 23:48:37 UTC
First Name: Dean
Last Name: Lopez
Email: lldl6969@aol.com
Zip Code: 90066
Country: US
Street: 11506 Venice Bl
City: Mar Vista
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:07 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:06:41 UTC
First Name: Howard
Last Name: Harris
Email: hharris846@aol.com
Zip Code: 90066
Country: US
Street: 3269 Purdue Ave.
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:12 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:11:33 UTC
First Name: Mitchell
Last Name: Kraus
Email: mitchellskraus@gmail.com
Zip Code: 90066
Country: US
Street: 3457 Ashwood Ave
City: LA
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:18 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:15:08 UTC
First Name: Alan
Last Name: Kanter
Email: alanrkanter@gmail.com
Zip Code: 90066
Country: US
Street: 11420 KINGSLAND ST
City: LOS ANGELES
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I have an appointment every Tuesday in the building at the corner of Venice and Inglewood, across the street from the LAFD station. I have watched the firetrucks try to get on to Venice westbound but as that is the beginning of the westbound narrowing with people trying to squeeze in at the last moment, the intersection remains blocked preventing the firetrucks passage. It never was like this before this "road diet".

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:24 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:19:08 UTC
First Name: Sandy
Last Name: Goldfarb
Email: sandygoldfarb@hotmail.com
Zip Code: 90066
Country: US
Street: 12741 Pacific Ave., Apt 8
City: LOS ANGELES
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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I live within a block of the Great Street and have been unable, as a disabled senior, to find parking to shop. Or to figure out how to park in the middle of a crowded street with one one lane left for merging cars behind me. I have been to no businesses in my neighborhood except the Post Office. I received no mail asking my opinion, and I live in 90066. I know there are data bases available with addresses.

There were many significant concerns raised during the one-year pilot project to support a fair argument that the road diet has had significant impacts upon the environment. Concerns that have not been acknowledged, answered or addressed by LADOT, the Great Streets Initiative, or Councilman Bonin's office.

So how can the City of Los Angeles make this project permanent without an environmental review? How can the City go back on its promise made in March 2018 that: "If it (Great Streets Venice Blvd) is made permanent, there will be an environmental assessment and accompanying public process."

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:39 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:38:53 UTC
First Name: Robert
Last Name: Ritger
Email: hellyeahprods@msn.com
Zip Code: 90066
Country: US
Street: 3775 Meier Street
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:41 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:40:54 UTC
First Name: Matthew
Last Name: Pennington
Email: mpennington7@gmail.com
Zip Code: 90066
Country: US
Street: 4274 Grand View Blvd
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:41 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:41:16 UTC
First Name: Mary
Last Name: Breedlove
Email: breedlovepilates@gmail.com
Zip Code: 90066
Country: US
Street: Colonial
City: los angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 4:41 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 00:41:51 UTC
First Name: Elizabeth
Last Name: Pennington
Email: eapennington12@gmail.com
Zip Code: 90066
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 5:04 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 01:01:42 UTC
First Name: Natalie
Last Name: Myers
Email: intd.gal@gmail.com
Zip Code: 90066
Country: US
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Please be sure to listen to the public. I saw that no public comment was proposed, but we should be heard. This is our neighborhood. This should have had public outreach. It's something that affects everyone. Let's have all the voices heard.

I strongly object to the current configuration of Venice Blvd. Minor accidents are accidents no matter how you spin it.

Thank you for your time.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 5:09 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 01:08:28 UTC
First Name: Donna
Last Name: Egstrom
Email: donnaegstrom@gmail.com
Zip Code: 90066
Country: US
Street: 3440 S. Centinela Ave
City: LosAngeles,
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

I strongly support the Westside Los Angeles Neighbors Network's CEQA appeal of the finalization of the Great Streets Venice Blvd. project which is scheduled to be on the City Council agenda on Tuesday, March 5, 2019.

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 5:21 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 01:20:45 UTC
First Name: David
Last Name: Rojas
Email: david.rojas2454@yahoo.com
Zip Code: 90066
Country: US
Street: 3551, Grand View Blvd.
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 5:26 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 01:25:59 UTC
First Name: Nadya
Last Name: Malconian
Email: nmalconian@verizon.net
Zip Code: 90066
Country: US
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 5:29 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 01:28:25 UTC
First Name: Randy
Last Name: Freeman
Email: randyfreeman@bhhscal.com
Zip Code: 90066
Country: US
Street: 3705 Wasatch Avenue
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail

Restore Venice Blvd <restorevenicebIvd@gmail.com>

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org>
Reply-To: Action Network <info@actionnetwork.org>

Thu, Mar 7, 2019 at 6:02 PM

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 01:59:24 UTC
First Name: Joanna
Last Name: Edstrom
Email: joannaedstrom@gmail.com
Zip Code: 90066
Country: US
Street: 3470 Cabrillo Blvd
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

Please reverse the Venice road diet. It has caused a horrendous increase in side street traffic through residential areas, making the neighborhood less safe, especially for kids.

Also, getting my kids out of car seats and to the sidewalk safely is a nightmare in Venice now.

Link: https://actionnetwork.org/letters/letter-to-the-los-angeles-city-council

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 6:28 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 02:28:22 UTC
First Name: Elaine
Last Name: Cohen
Email: elainala@yahoo.com
Zip Code: 90066
Country: US
Street: 3460 Centinela Ave
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 6:42 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 02:41:37 UTC
First Name: Brian
Last Name: Finneran
Email: brianjpfinneran@gmail.com
Zip Code: 90291
Country: US
Street: 1310 Venice Blvd. #11
City: Venice
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 6:43 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 02:43:02 UTC
First Name: Matthew
Last Name: Risman
Email: mattcraigr@yahoo.com
Zip Code: 90291
Country: US
Street: 633 Oxford ave
City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 6:50 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 02:49:55 UTC
First Name: Logan
Last Name: Hobson
Email: compubox@aol.com
Zip Code: 90066
Country: US
Street: Lindblade Dr.
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 7:07 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 03:05:49 UTC
First Name: Roger
Last Name: Dawson
Email: howarddas@yahoo.com
Zip Code: 90034
Country: US
Street: 10460 national blvd
City: l.a.
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
Letter Body:

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Gmail **Restore Venice Blvd <restorevenicblvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 8:35 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 04:35:09 UTC
First Name: Richard
Last Name: Novak
Email: icenet333@gmail.com
Zip Code: 90066
Country: US
Street: 4137 McLaughlin Ave. #8
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 8:39 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 04:38:33 UTC
First Name: mary
Last Name: hruska
Email: busdisora@aaol.com
Zip Code: 90066
Country: US
Street: 3216 grand view blvd
City: los angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 8:58 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 04:58:31 UTC
First Name: Kim
Last Name: Basile
Email: km2play@aol.com
Zip Code: 90066
Country: US
City: Mar Vista
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Gmail **Restore Venice Blvd <restorevenicebIvd@gmail.com>**

Someone has taken action on your "March 1, 2019" page!

Action Network <info@actionnetwork.org> Thu, Mar 7, 2019 at 9:16 PM
Reply-To: Action Network <info@actionnetwork.org>

Someone has taken action on your "March 1, 2019" page. The information they entered is:

Timestamp: 2019-03-08 05:16:11 UTC
First Name: Carol
Last Name: Reynes
Email: Carol.Reynes@win-results.com
Zip Code: 90291-2910
Country: US
Street: 1344 Glenavon Ave
City: Venice
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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Letter Body:

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Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
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Country: US
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City: Los Angeles
Verification: Yes
State: California
Target Name: Los Angeles City Clerk CPS-LAS
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I live right in the middle of this mess which has been imposed on citizens who don't want it. It has degraded the area, contrary to what local officials claim.

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Zip Code: 90066
Country: US
Street: BarbaraAve.
City: Los Angeles
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk CPS-LAS
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State: California
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City: Mar Vista
Verification: Yes
State: California
Source: direct_link
Target Name: Los Angeles City Clerk's Office
Letter Subject: City Council Agenda: Council File 19-0092, CEQA Appeal for Venice Boulevard Great Street Project - Finalized Project and Additional Improvements
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York Blvd

THE ECONOMICS OF A ROAD DIET

By Cullen McCormick

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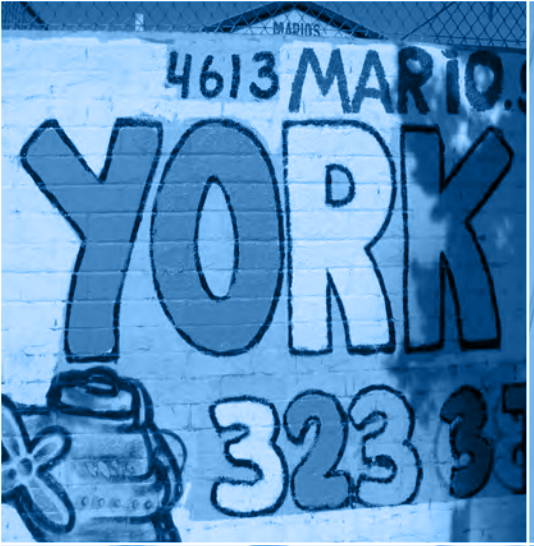
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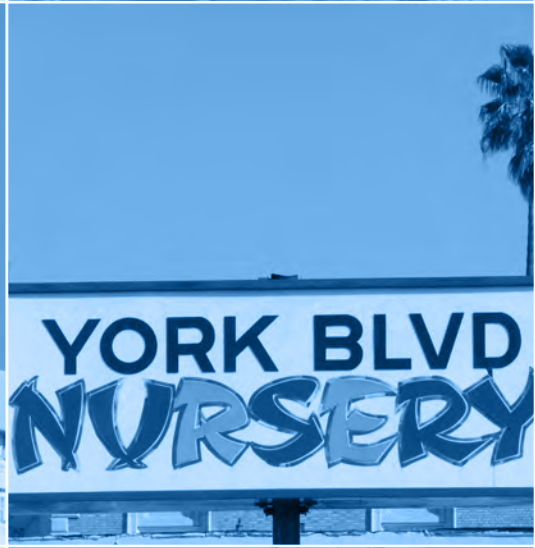
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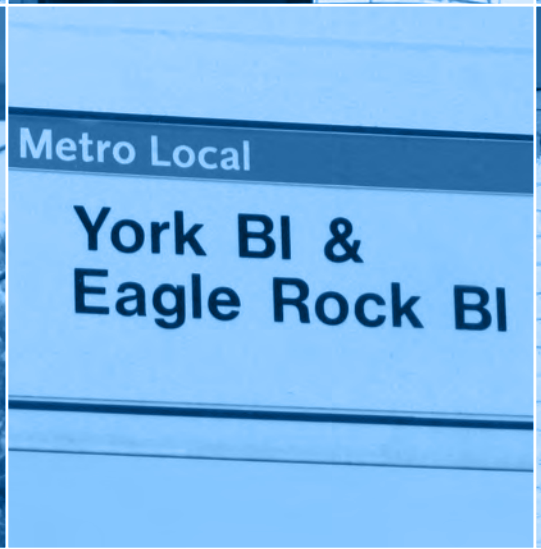
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Acknowledgements

I would like to thank the following individuals and organizations for their irreplaceable support with this project:

Bikes Belong financial sponsorship
Alexis Lantz LACBC, Client Representative
Donald Shoup, Ph.D. UCLA, Faculty Advisor
Nate Baird LADOT, Project Advisor

Daniella Alcedo LACBC
Evelyn Blumenberg, Ph.D. UCLA
Jane Choi LA Department of City Planning
Leobardo Estrada, Ph.D. UCLA
Ricardo Gutierrez LADOT, UCLA
Jen Klausner LACBC
Michelle Mowery LADOT
Miguel Ramos LACBC
Jim Schwartzenberger California State Board of Equalization
Miguel Vargas LACBC
The businesses and patrons of York Boulevard

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ES. Executive Summary

Premise

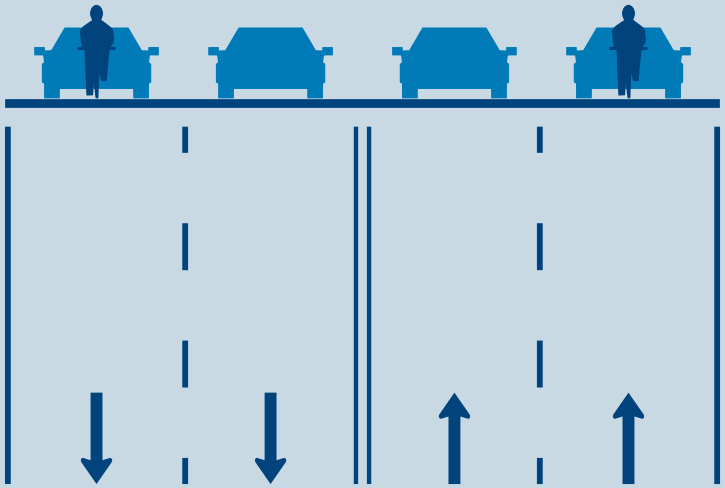
Cities throughout the United States are increasingly implementing bicycle infrastructure and related roadway modifications as a unified approach to mounting environmental, public health, and traffic safety concerns. Among the most ubiquitous modifications are “road diets,” which reapportion auto lanes used for through-moving traffic to center turn lanes, bike lanes, widened sidewalks, and/or on-street parking. Figure ES1 depicts a typical road diet conversion. While road diets have gained support in many communities, they are also a source of controversy among some merchants and residents. These constituents feel that reducing auto lanes or replacing them with bike lanes creates traffic congestion, makes it more challenging for customers to access businesses, and may negatively impact property values.

Traffic studies have consistently shown that road diets will not worsen congestion under the appropriate conditions—streets with less than about 20,000 daily vehicle trips, or roughly what one might expect on the main street of a small to medium downtown. Yet there are remarkably fewer data on how road diets affect components of surrounding

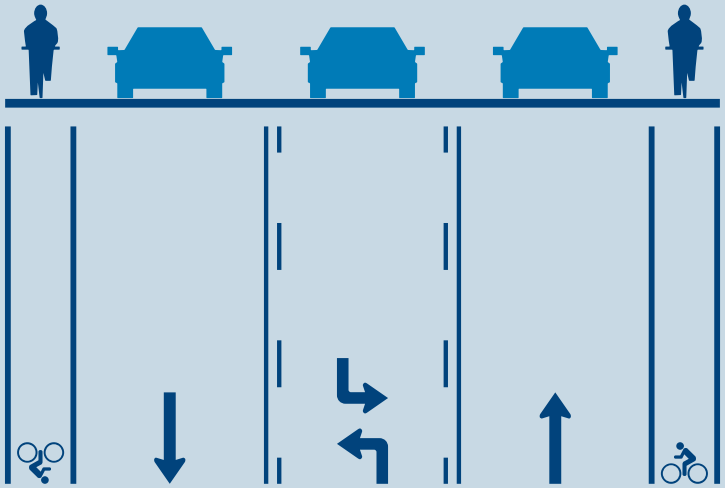


Figure ES1
Typical road diet conversion

Pre-Road Diet
Two auto lanes in each direction, shared with bicycles



Post-Road Diet
One auto lane and one bike lane in each direction, plus a center turn lane



local economies, such as property values or business revenues. In other words, while there are myriad voices linking road diets to both positive and negative economic outcomes, there is very little concrete evidence to support either claim. York Boulevard: The Economics of a Road Diet explores this relationship through case research in the Highland Park neighborhood of northeast Los Angeles, California.

The backbone of a low- to moderate-density, mixed residential and commercial neighborhood, York Boulevard is an ideal corridor for studying the economic effects of road diets because it creates a natural experiment. Land uses, socioeconomic characteristics, and the quantity and types of businesses remain fairly comparable over the entire the study corridor, but half of the corridor has a road diet and bicycle lanes and the other half does not. As Figure ES2 illustrates, the western portion of the corridor—between Eagle Rock Boulevard and Avenue 55—received a road diet in 2006 and bike lanes in 2010. The eastern half of the York Boulevard corridor, from Avenue 55 to Figueroa Street, retains its original,

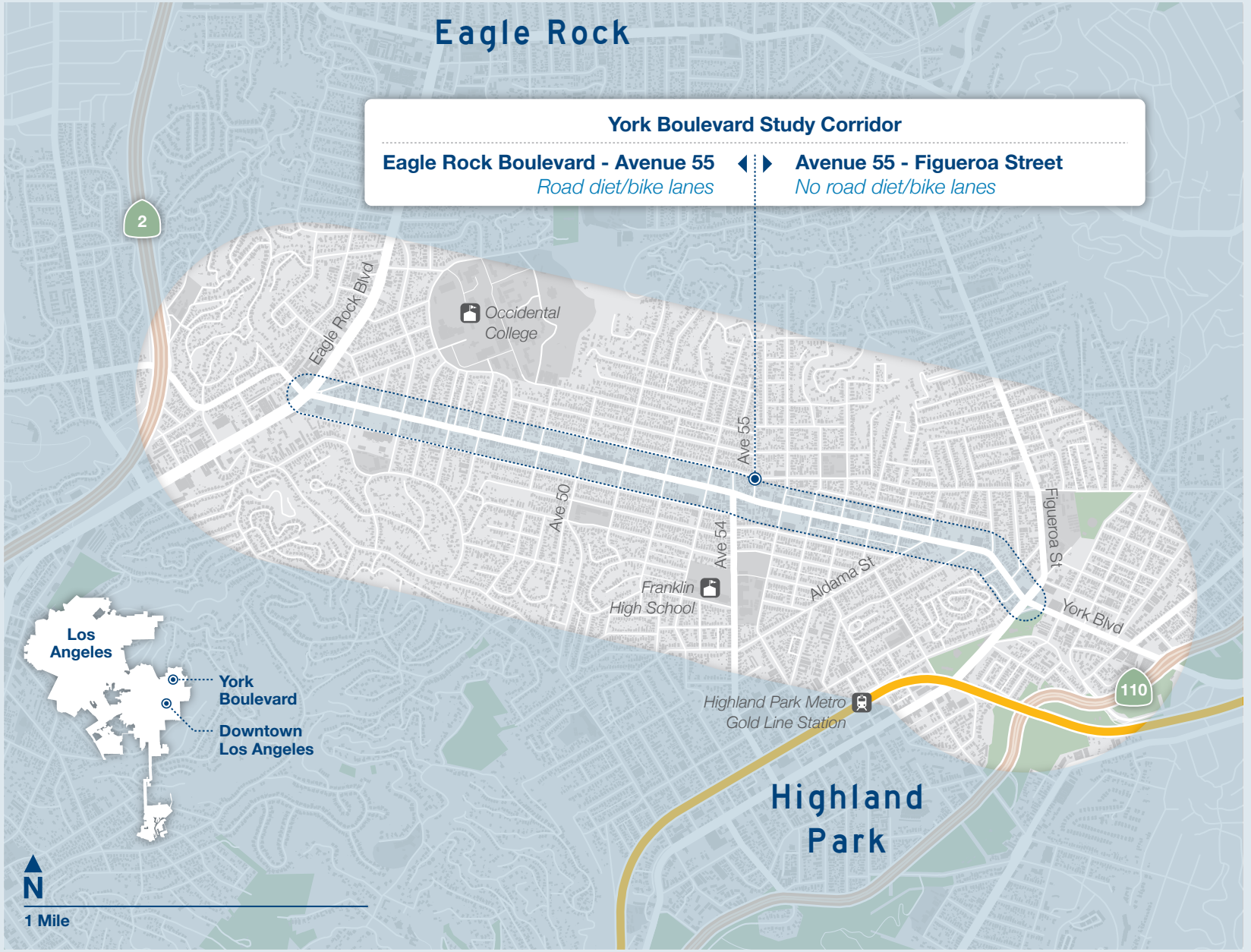


Figure ES2 York Boulevard study corridor

non-road diet configuration. These conditions present the unique opportunity to evaluate the economic effects of a road diet both temporally (before and after the road diet implementation) and spatially (how similar settings fare with and without a road diet). By controlling for differences over time and place, such an arrangement may produce more accurate findings than a comparable analysis in a less ideal setting.

Before launching into my analysis, I complete a review of the existing, albeit narrow literature on the interactions between road diets, bicycle facilities (such as bike lanes, bike routes, and bike paths), and local economies, which, for the most part, include property values, sales tax revenues, and stakeholder perceptions. This literature review yields the following overarching observations, which help inform my research approach:

Off-street bicycle paths generally have neutral or positive impacts on surrounding property values, yet findings related to off-street paths have little transferability to on-street bicycle infrastructure.

On-street bicycle facilities demonstrate no consistent effect on economic metrics such as business revenues, yet they remain contentious among adjacent businesses.

Research on road diets and economic activity is significantly limited. While existing research suggests that road diets can boost economic performance, negative perceptions of road diets persist among some segments of the public.

Methodology and Key Findings

This project seeks to determine whether the York Boulevard road diet has helped, hindered, or had no effect on economic activity in the surrounding community. Specifically, I ask, since the York Boulevard road diet implementation in 2006, has there been any change in local economic activity between the sections of York Boulevard with and without a road diet/bicycle lanes? I define local economic activity to comprise quantitative metrics of economic performance, such as property values, as well as qualitative perceptions, namely whether local

merchants and customers believe bicycle facilities have a generally positive or negative impact on their businesses and shopping patterns, respectively. I evaluate my hypothesis using the following resources:

- Qualitative merchant and customer surveys
- Quantitative data on property sale price, business turnover and new businesses openings, sales tax revenues, and a hedonic price model integrating multiple data sources

Table ES1 summarizes my research approach and principal findings. From these findings I posit the following key takeaways:

Road diets have little effect on surrounding businesses, property values, and customer shopping patterns. Therefore, opposition to road diets on economic grounds appears unfounded.

The majority of surveyed merchants do not feel that bike lanes hurt their businesses, and similarly large percentages of customers believe bike lanes are important roadway additions. Still, opinions about removing on-street parking and auto lanes for bike lanes/road diets are divided.

On-street parking is clearly an important asset to both local merchants and customers.

Merchants' perceptions about their customers' travel patterns do not align with customers' stated patterns. Merchants assume more customers drive than reflected in customer survey responses.

Businesses and customers alike seem to prefer slower vehicle speeds or feel that speed is unimportant.

Recommendations

Quantitative data do not support the notion that road diets lower surrounding local businesses and property values. Opposition to road diets on economic grounds therefore appears unfounded. Still, popular support for converting auto lanes and on-street parking to bike lanes remains lukewarm.

	Metric	Analysis	Findings
Qualitative	Business owner/ manager surveys	Assesses merchants' perceptions of road diets and bike lanes on business performance and customer shopping patterns	Survey responses are generally similar between merchants and customers and between both corridor halves. A noteworthy exception is that merchants' perceptions about their customers' travel patterns do not align with customers' stated travel modes; merchants assume more customers drive to their businesses than reflected in customers' responses
	Customer intercept surveys	Assesses customers' perceptions of road diets and bike lanes on shopping patterns	
Quantitative	Property sale price	Compares commercial and residential property sale price per square foot between the corridor halves and before/after the road diet implementation	No significant differences in property sale price exist between the corridor halves or before/after the road diet implementation
	Bradley-Burns sales tax	Compares sales tax revenues, collected as a proxy for business sales, between the corridor halves and before/after the road diet implementation	Sales tax revenues are higher on the road diet section of York Boulevard; although, since the data are provided in aggregate terms, it is not possible to conduct statistical tests or attribute the higher sales tax revenues to the presence of the road diet
	New business openings	Compares the number of new businesses that have opened on each corridor half since the road diet implementation	No significant differences exist in the number of new business openings between the two corridor halves
	Business turnover	Compares the number of businesses on each corridor half that have closed over the 2001-2011 period	No significant differences exist in business turnover between two the corridor halves
	Hedonic price model	Gauges how much the presence or absence of a road diet influences property sale price	The presence or absence of road diet is not a significant determinant of property sale price

Given pressing safety concerns for people riding bicycles—if not broader concerns for public health and the environment—simply not building bikeways in controversial situations is an untenable solution. In light of these conditions, I propose the following recommendations and potential avenues for future research.

The design of road diets and bicycle facilities must carefully involve local community members—especially those whose businesses and homes flank proposed road diets and bicycle facilities—and any roadway modifications must be sensitive to the needs of people who bicycle as well as those who do not.

Multilingual, multifaceted outreach efforts are essential to successful bikeway projects.

When faced with the decision between removing an auto travel lane or on-street parking for a bike lane installation, cities should favor removing the travel lane or defer to local preferences.

Cities and bicycle advocacy organizations should integrate localized economic impact studies into bikeway planning and conduct follow-up studies after bikeway implementation. Such studies may help rectify the dissonance between economic data on road diets, which suggest these treatments have little economic impact on surrounding communities, and community perceptions, which reflect a greater hesitance to convert travel lanes or on-street parking to bike lanes for economic reasons.

Given the stated importance of on-street parking among community members, future economic research should examine how converting on-street parking to bike lanes affects adjacent businesses.

Cities should continue their efforts to install road diets, bike lanes, and similar infrastructure.

In summary, road diets appear unlikely to harm local economies. Cities, employing proper outreach, should therefore continue to install road diets to improve safety and encourage bicycling.


Snap-on

1. Introduction

Los Angeles at a Crossroads

As Los Angeles progresses into the second decade of the twenty-first century, the city is increasingly experiencing the pressures of interwoven public health, environmental, and economic concerns. Rates of obesity and diabetes have climbed to epidemic proportions throughout the city and are highest among economically disadvantaged populations (County of Los Angeles, 2011; County of Los Angeles, 2007). On many days of the year, regional air quality remains among the worst in the country, which has spurred rising incidences of asthma and other respiratory ailments (South Coast Air Quality Management District, n.d.). Moreover, an expanding body of research suggests that exposure to ultrafine particles emitted from diesel exhaust may adversely affect the brain and heart in previously unforeseen ways (Li et al., 2010; McAuley et al., 2010; Schmid et al., 2009). These findings generate particular concern in Los Angeles given the region's numerous ports, rail terminals, and highways, many of which abut low-income communities. Los Angeles' highways, as well as local streets, also rank among the most congested in America—burning fuel and time, and fueling growing concern about global climate change (Texas Transportation Institute, 2011). Finally, and shockingly, 99 Californians lost their lives while bicycling in 2009, the second highest number of such fatalities in the country (National Highway Traffic Safety Administration, 2011). Almost a quarter of these fatalities, 22, occurred in Los Angeles County (Biking in LA, 2012).

At the same time as these traffic safety, environmental, and health issues come to a head, transportation infrastructure is crumbling. Today's municipalities operate in an increasingly constrained budgetary environment, limiting cities' abilities to upkeep infrastructure (Yglesias, 2011). The dearth of revenues has resulted in transportation maintenance needs that have largely eclipsed stagnating available funds (Taylor, 1995). Even worse, and as nearly every American is aware, national recession and sweeping home foreclosures have put countless individuals out

of work or otherwise in economic distress.

Amidst these staggering concerns, cities throughout the country are embracing strategies to promote bicycling and walking, which have emerged as a unified response to public health and environmental issues (Klein, Reiskin, and Sadik-Kahn, 2012). These travel modes afford inexpensive, healthy transportation choices; moreover, because they are human-powered, they have minimal environmental consequences (Dannenberg, Frumkin, and Jackson, 2011). The comparatively inexpensive construction costs, low maintenance costs, and generally high job creation rates of bicycle and pedestrian construction projects also resonate well with cash-strapped municipalities (Garrett-Peltier, 2010).

Trends toward bicycling and walking are nascent, yet some signs are emerging of their benefits to health (Pucher et al., 2010; De Hartog et al., 2010), traffic safety (Reynolds et al., 2009), and the environment (Frank et al., 2006). As efforts to promote bicycling have gained popularity in other major US cities, the City of Los Angeles has begun transforming the physical configurations of its streets—adding bicycle lanes, paths, and related infrastructure to accommodate the needs of people riding bicycles as well as drivers (City of Los Angeles, 2010). These actions embrace a view that streets can be more than purely corridors for cars, but shared public spaces supporting a variety transportation options.

Opposition and Need for Additional Research

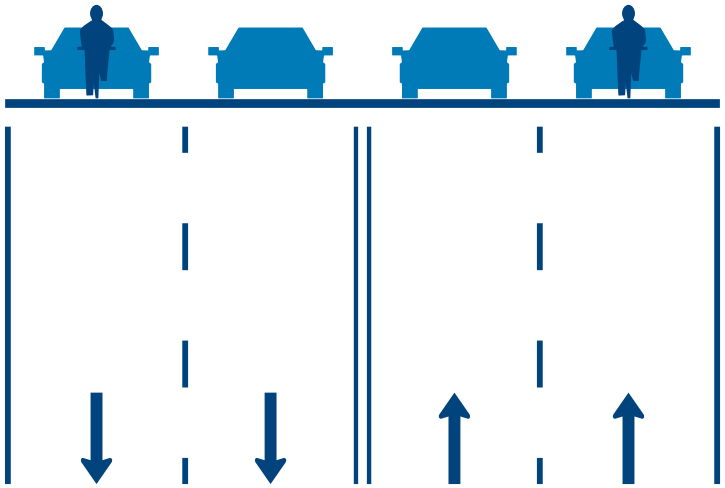
The changing landscapes of urban roadways are far from universally popular. Indeed, two modifications in particular oftentimes remain a contentious issue among some business owners, residents, and drivers. These modifications are bike lanes—street space reserved only for people bicycling—and "road diets." Road diets convert auto lanes used for through traffic into center turn lanes, bike lanes, widened sidewalks, and/or on-street parking. (See The Mechanics of a Road Diet sidebar for additional information about these treatments.) Individuals who oppose these modifications perceive that reducing auto travel

lanes or replacing them with bike lanes creates traffic congestion, makes it more challenging for customers to access businesses, and may negatively impact property values (Aldous, 2011; Banks, 2010; Bowen, 2011; Grynbaum, 2011; Lee, 2011; Scott, 2011). Indeed, road diets remain a particularly controversial subject in Los Angeles, where debates of their merit soldier on passionately in community meetings and public discourse (Banks, 2010).

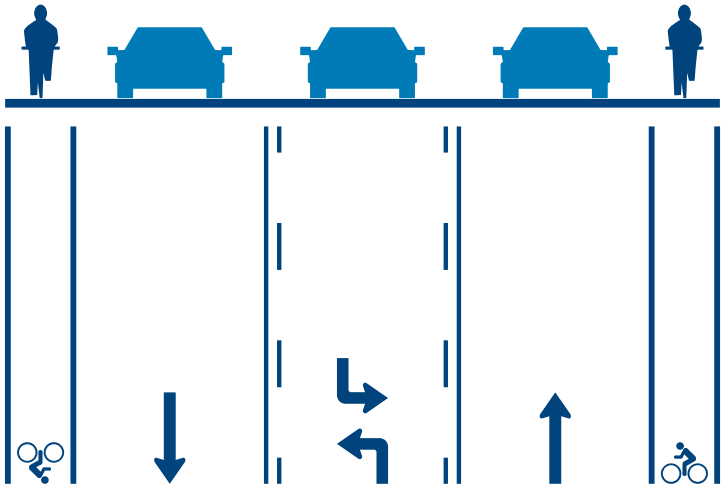
At the same time, traffic analyses have consistently found that road diets on streets that carry roughly 20,000 autos per day will generally not worsen traffic congestion (Huang, Stewart, and Zegeer, 2004; see The Mechanics of a Road Diet sidebar for additional explanation). Twenty thousand trips per day is approximately the amount of traffic York Boulevard carries, or what one might expect on the main street of a small to medium downtown. Without significantly altering auto capacity, road diets expand space for people to bicycle. This unique harmony may help allay concerns over road diets reducing auto capacity. Yet planners and economists have

Figure 1
Typical road diet conversion

Pre-Road Diet
Two auto lanes in each direction, shared with bicycles



Post-Road Diet
One auto lane and one bike lane in each direction, plus a center turn lane



The Mechanics of a Road Diet

Road diets re-purpose auto lanes on a street from serving through auto traffic to accommodating other uses, including center turn lanes, bicycle lanes, and sidewalks. Figure 1 portrays a typical road diet conversion. Here, a street with four auto lanes (two in each direction) is converted to three auto lanes (one in each direction plus a center turn lane) and bike lanes (one in each direction).

Road diets have been shown in many traffic studies to significantly "increase safety for pedestrians, bicyclists, and motorists while improving the quality of life in downtowns" (Tan, 2011). Road diets improve safety by allocating dedicated space to bicycles, reducing the number of auto lanes pedestrians must traverse when crossing the street, and reducing the number of lanes a left-turning vehicle must cross (Tan, 2011).

Although they reduce the number of lanes for through traffic, road diets on streets with less than roughly 20,000 daily auto trips will generally not worsen traffic congestion (Huang, Stewart, and Zegeer, 2004). Road diets do not worsen congestion under these conditions because adding center turn lanes allows traffic to flow more efficiently at intersections (Tan, 2011). Specifically, left-turning vehicles may wait in the center turn lane and not impede the flow of through traffic. Without the added center turn lane, left-turning vehicles would wait in a through travel lane, delaying through-moving traffic behind them. In other words, on streets that carry less than roughly 20,000 autos per day, the efficiency gained by the additional center turn lane counteracts the loss of through travel lanes.

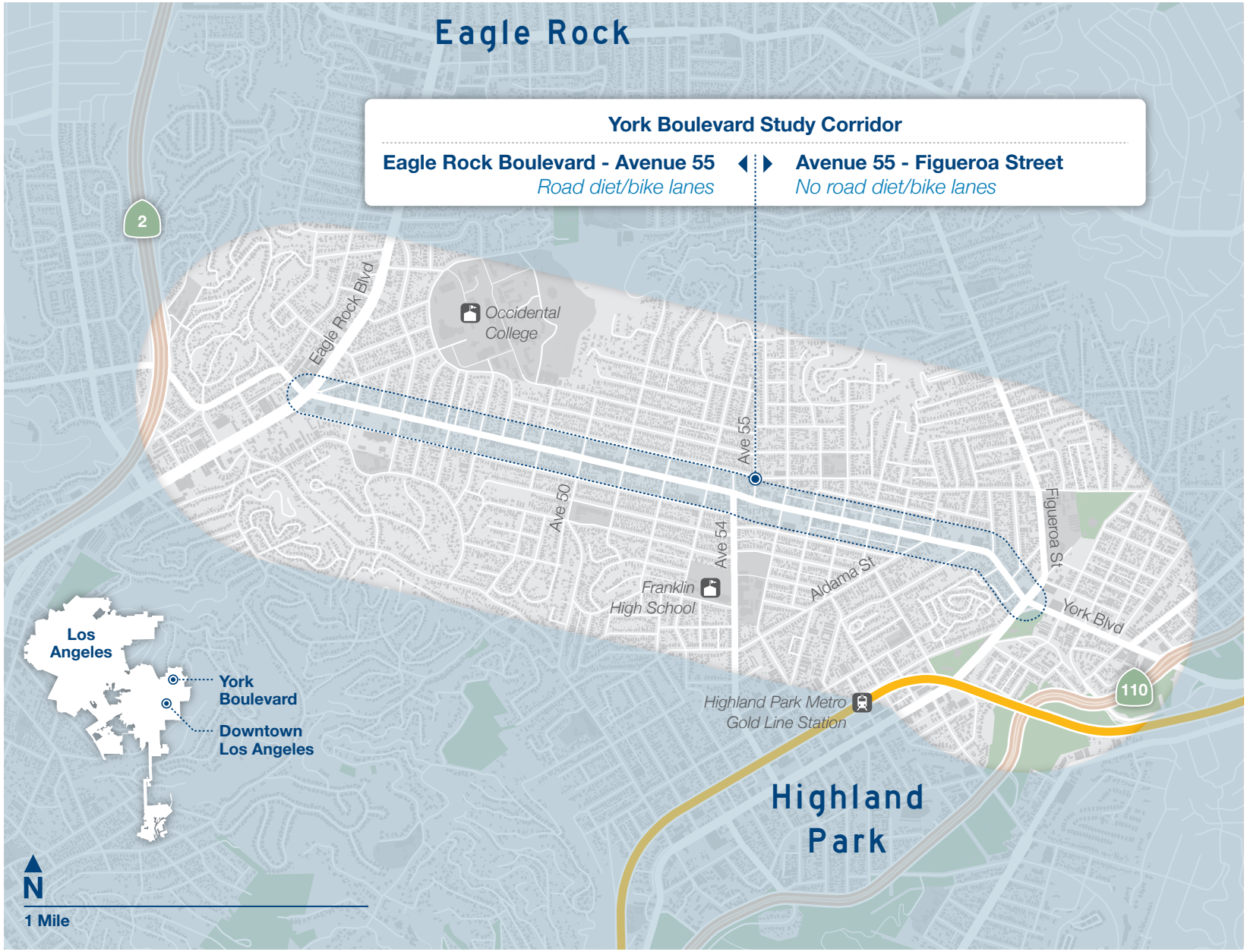


Figure 2 York Boulevard study corridor

only a limited understanding of the impacts of road diets and bicycle lanes on the economic health of adjacent communities (Krizek, 2007a). Furthermore, there is very little research into how merchants are likely to react to bike lanes/road diets and how business owners may perceive these modifications to affect their businesses. Indeed, the heads of city transportation departments in Chicago, New York, San Francisco, and other major US cities consistently call for additional research into the economic implications of bicycle infrastructure and road diets (Klein, Reiskin, and Sadik-Kahn, 2012).

This information gap detracts from arguments both favoring and opposing road diets on economic grounds since factual data to support either claim are scarce. The need for information of this nature is particularly relevant given that economic vitality remains a prevalent concern among road diet opponents, if not all Americans. York Boulevard: The Economics of a Road Diet helps close the knowledge gap by providing a definitive illustration of exactly how road diets and bike lanes interact with community economic activity. My hope is that planners, community members, and other decision-makers can apply the body of information this research generates to enhance the planning, design, and outreach efforts of future road diet and bicycle infrastructure projects.

Why York Boulevard?

This project examines the community lining the roughly two-mile section of York Boulevard between Eagle Rock Boulevard and Figueroa Street in the Highland Park neighborhood of northeast Los Angeles, California. This section of York Boulevard is the backbone of a low- to moderate-density, mixed residential and commercial neighborhood. As Figure 2 illustrates, the western portion of the corridor—between Eagle Rock Boulevard and Avenue 55—received a road diet in 2006. The road diet reconfigured the street from two travel lanes in each direction with on-street parking to one travel lane in each direction with a center turn lane and on-street parking. The Los Angeles Department of Transportation (LADOT) later added bike lanes to

About York Boulevard

Socioeconomics

Race/Ethnicity *Pie Chart*

- Asian
- Black
- Latino
- White
- Other

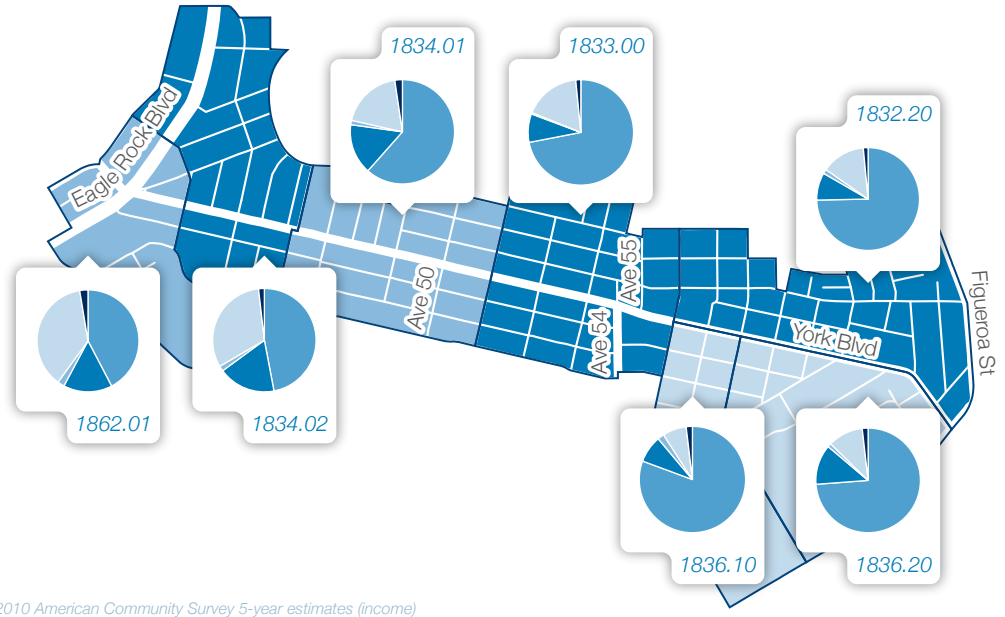
1832.20 **Census tract**

Median Income *Map*

- $40,000 - $45,000
- $45,000 - $50,000
- $50,000 - $55,000

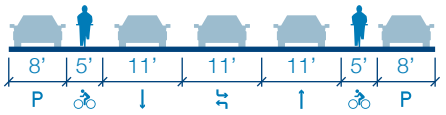
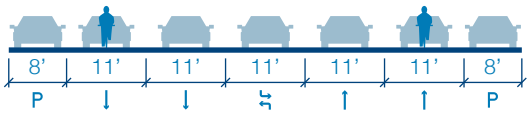
N

1 Mile



Source: US Census Bureau. 2010 US Census (race/ethnicity); 2010 American Community Survey 5-year estimates (income)

Configuration/Usage

Section	Street cross-section	Daily auto trips	Daily bicycle trips
Road Diet *Eagle Rock Blvd - Ave 55* *Length: 1.3 miles*		**22,199** **York Blvd at Ave 54** *6/25/2009* *24-hour period*	**168** **York Blvd at Ave 50** *9/13/2011* *Total of 2-hr a.m., 2hr-midday, and 2-hr p.m. counts*
Non-Road Diet *Ave 55 - Figueroa St* *Length: 0.88 miles*		**23,646** **York Blvd at Figueroa St** *10/12/2010* *24-hour period*	**No data**
Measurements: Google Earth	*Measurements: Google Earth*	*Source: LADOT*	*Source: LACBC*

About York Boulevard (Continued)

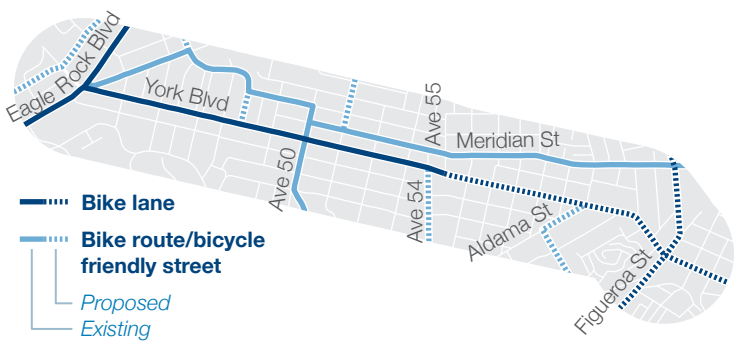
Zoning/Bikeways

Zoning



Source: Los Angeles County Assessor's Office

Bikeways



Source: Los Angeles Department of City Planning

Timeline

2006 — *LADOT implements York Blvd road diet*

2010 — *LADOT adds bike lanes to road diet section of York Blvd*

2012 — *York Boulevard: The Economics of a Road Diet study completed*

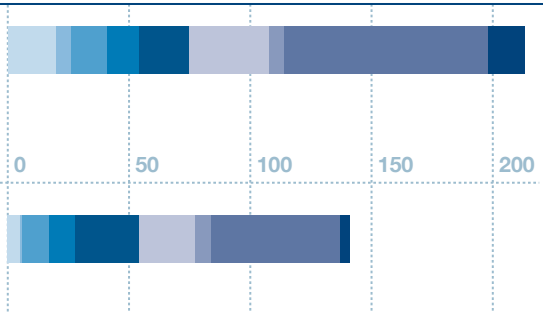
2012 — *York Blvd bike lanes planned for eastward extension to Figueroa St*

Land Uses

Section	Total businesses
Road Diet *Eagle Rock Blvd - Ave 55*	153
Non-Road Diet *Ave 55 - Figueroa St*	97

Source: Author

Distribution of uses



Source: Los Angeles County Assessor's Office

- **Automotive**
- **Industrial**
- **Office** (bank, commercial, office, medical)
- **Other** (religious, government, parking)
- **Residential** (multi family)
- **Residential** (single family)
- **Restaurant**
- **Retail**
- **Vacant**

this segment in December, 2010. The slightly wider eastern half of York Boulevard, from Avenue 55 to Figueroa Street, retains its original configuration of two travel lanes in each direction, a center turn lane, and on-street parking. Pending community support, LADOT plans to implement a road diet for this segment of York Boulevard as well, which would remove one travel lane and add bike lanes.

York Boulevard is an ideal corridor in which to study how road diets interact with surrounding economies because it creates a natural experiment. As the About York Boulevard sidebar displays, land uses, socioeconomic characteristics, and the quantity and types of businesses remain fairly comparable over the entire the study corridor, but half of the corridor has a road diet and bicycle lanes and the other half does not. This arrangement affords the unique opportunity to evaluate the economic effects of a road diet both temporally (before and after the road diet implementation) and spatially (how similar settings fare with and without a road diet). By controlling for differences over time and place, such an arrangement may produce more accurate findings than a comparable analysis in a less ideal setting.

Project Goals and Structure

This project seeks to determine whether the York Boulevard road diet has helped, hindered, or had no effect on economic activity in the surrounding community. Specifically, I ask, since the York Boulevard road diet implementation in 2006, has there been any change in local economic activity between the sections of York Boulevard with and without a road diet/bicycle lanes? I define local economic activity to comprise quantitative metrics of economic performance, such as property values, as well as qualitative perceptions, namely whether local merchants and customers believe bicycle facilities have a generally positive or negative impact on their businesses and shopping patterns, respectively. As a point of departure, I assume that there is no difference in economic activity between the road diet and non-road diet sections of York Boulevard. I evaluate my hypothesis using the following resources:

- Qualitative merchant and customer surveys
- Quantitative comparisons of property sale price data, data on business turnover and new businesses openings, sales tax data, and a hedonic price model integrating multiple data sources

I begin this investigation in Chapter 2, Abridged Literature Review, with a summary of existing research into the economic implications of bicycle infrastructure and road diets. This limited body of research yields no consistent relationship between bike lanes and economic activity but does suggest that road diets may boost economic performance based on property values, sales taxes, and stakeholder perceptions. The abridged literature review presents only major research themes and their applicability to the York Boulevard study. Appendix A contains the complete literature review.

Chapter 3, Methodology, outlines the research strategy for analyzing the economic impacts of the bike lanes and road diet along York Boulevard. As noted above, this two-pronged approach relies upon qualitative surveys of businesspersons and customers as well as quantitative property sale price, sales tax, and new business/business turnover data analyses, as well as a hedonic price model. I also address considerations and known weaknesses to my research strategy, which generally stem from the inability to obtain completely random samples in my surveying efforts.

Chapter 4, Findings, presents the results of my analyses. I first analyze the survey data and find minimal differences in survey responses between the two sections of York Boulevard. I then turn to the quantitative data sources, which likewise exhibit statistically insignificant differences in economic metrics between the road diet and non-road diet segments. I contrast and draw conclusions from the qualitative and quantitative sources, revealing that road diets and bike lanes are not likely to adversely affect surrounding local economies.

Chapter 5, Recommendations, concludes the study. Based on the quantitative analyses, opposition to road diets on economic grounds appears to be unfounded. Furthermore, under the proper conditions, there is little basis in traffic engineering for road diet opposition (Tan, 2011; Huang, Stewart, and Zegeer, 2004). Still, popular support for converting auto lanes and on-street parking to bike lanes remains lukewarm. I therefore recommend a bikeway outreach, planning, and design process that carefully involves local community members. Finally, cities and bicycle advocacy organizations should integrate studies similar to this investigation into bikeway planning and post-implementation evaluation.



2. Abridged Literature Review

Key Literature Findings

Before launching into my analysis, I complete a review of the existing, albeit narrow literature on the interactions between road diets, bicycle facilities (such as bike lanes, bike routes, and bike paths), and local economies, which, for the most part, include property values, sales tax revenues, and stakeholder perceptions. Appendix A contains a complete literature review. Here, I summarize the overarching findings of the review and discuss the literature's applicability to the York Boulevard study.

Off-street bicycle paths generally have neutral or positive impacts on surrounding property values, yet findings related to off-street paths have little transferability to on-street bicycle infrastructure.

On-street bicycle facilities demonstrate no consistent effect on economic metrics such as business revenues, yet they remain contentious among adjacent businesses.

Research on road diets and economic activity is significantly limited. While existing research suggests that road diets can boost economic performance, negative perceptions of road diets persist among some segments of the public.

Takeaway From Literature

The majority of existing research into road diets, bicycle infrastructure, and economic activity pertains to the economic impacts of off-street bike paths, which have little transferability to their on-street counterparts (Racca and Dhanju, 2006). Moreover, the limited research addressing road diets and on-street bicycle facilities in an economic light—and the even further constrained body of peer-reviewed work—produces a wide spectrum of conclusions (Krizek, 2007a). These findings vary immensely by region and perhaps even by methodology (Krizek, 2007a). Stantec's report, for example, identifies that merchants tended to overestimate losses in surveys when compared to recorded sales data (2011). Finally, the dearth of economic research on road diets makes it nearly impossible to develop meaningful

conclusions about their economic impact.

Skepticism toward on-street bicycle facilities and road diets clearly persists—particularly among merchants when such facilities come at the expense of on-street parking (Grynbaum, 2011; Lee, 2011; Scott, 2011). Although the opinions of proponents and opponents are essential to framing discussions, they alone should not guide on-street bikeway decision-making. Yet, excepting hedonic price analyses, much existing research draws upon "anecdote rather than actual market data" while existing, readily available sources, such as sales tax revenues and property values, go largely untapped (Nicholls and Crompton, 2005, 321). This incongruence calls to a need for research that balances surveys—an excellent mechanism for assessing stakeholder perceptions—with numeric sales and property data, which minimize bias in the conditions they portray. My research fuses surveys with numeric data in just this manner.

The York Boulevard study proffers recommendations to create bicycle facilities that are economically harmonious with their context. Stantec's report offers a relevant framework for such facilities, including, for example, "allocating scare [road] space to different uses according to the demand at different times" and moving "quickly to meet with the businesses that have been particularly impacted...in order to mitigate sales losses" (2011, vi).

Although Krizek (2006) and Racca and Dhanju (2006) show on-street bikeways to have little effect on property values, these studies investigate only residential environments. Examining property sale prices along a mixed commercial and residential corridor such as York Boulevard may yield differing results. Additionally, the socioeconomic contexts of Krizek (2006) and Racca and Dhanju's (2006) studies—Minneapolis-Saint Paul and Delaware, respectively—may very well be irrelevant to Los Angeles.

Perhaps the most cohesive criteria for future economic studies of road diets and bikeways comes from Krizek et al. (2007b), which establishes that research should:

1. Measure effects at a neighborhood, municipal, or regional scale
2. Inform bikeway policy decisions and implementation
3. Utilize stakeholder surveys and existing data
4. Employ units that are comparable within the individual study as well as among related studies
5. Quantify effects both for cyclists and the broader community

The methodology I employ, described in the next section, builds explicitly upon Krizek's (2007b) five recommendations.



3. Methodology

Research Question

This research asks the following question: since the York Boulevard road diet implementation in 2006, has there been any change in local economic activity between the sections of York Boulevard with and without a road diet/bicycle lanes? I define local economic activity to comprise quantitative metrics of economic performance, such as property sale prices—a close approximation of overall property value—and sales taxes—a proxy for retail sales revenues. My definition also includes qualitative perceptions, namely whether local merchants believe road diets/bike lanes to improve or hurt their businesses and whether these pieces of road infrastructure affect customers' shopping patterns.

Research Design

To determine what changes in local economic activity, if any, have occurred since the York Boulevard road diet procedure, this research utilizes the methods and resources outlined in Table 1.

Using these sources stems directly from the economic impact research framework that Krizek et al. (2007b) develops to assess bicycle infrastructure.

I use the above data sources to evaluate a number of key variables. In all instances, the independent variable is the presence or absence of a road diet. I attempt to determine how this independent variable interacts with several dependent variables that together represent economic activity. For the surveys, the dependent variable is perceptions of how bike lanes and a road diet may affect shopping patterns and business performance. The quantitative data sources all attempt to measure a dependent variable I refer to as economic performance—whether property values and sales tax revenues are higher and whether there are more new businesses in either the road diet or non-road diet section of York Boulevard.

The unit of analysis for measuring the above variables is York Boulevard between Eagle Rock Boulevard and Figueroa Street (as displayed previously in Figure 2). Specifically, my research compares the section of

	Metric	Purpose	Statistical Test	Source	Date Acquired
Qualitative	Business owner/ manager surveys	Assesses merchants' perceptions of road diets and bike lanes on business performance and customer shopping patterns	Not possible due to less-than-random sample	Collected firsthand	August, 2011
	Customer intercept surveys	Assesses customers' perceptions of road diets and bike lanes on shopping patterns	Not possible due to less-than-random sample	Collected firsthand	February, 2012
Quantitative	Property sale price	Compares commercial and residential property sale price per square foot between the corridor halves and before/after the road diet implementation	T-test	Los Angeles County Assessor's Office	February, 2012
	Bradley-Burns sales tax	Compares sales tax revenues, collected as a proxy for business sales, between the corridor halves and before/after the road diet implementation	Not possible due to aggregated data	California State Board of Equalization	March, 2012
	New business openings	Compares the number of new businesses that have opened on each corridor half since the road diet implementation	Chi-square test	Collected firsthand	August, 2011
	Business turnover	Compares the number of businesses on each corridor half that have closed over the 2001-2011 period	Chi-square test	California State Board of Equalization	March, 2012
	Hedonic price model	Gauges how much the presence or absence of a road diet influences property sale price	Multiple regression model	Los Angeles County Assessor's Office; Los Angeles Police Department; US Census	February, 2012

York Boulevard with bike lanes and a road diet—from Eagle Rock Boulevard to Avenue 55—to the section between Avenue 55 and Figueroa Street without these features.

Study populations vary depending on the given analysis. For the business surveys and new business data, the population includes all businesses directly abutting York Boulevard between Eagle Rock Boulevard and Figueroa Street. The sales tax and business turnover data include all non-chain businesses with taxable sales, which is explained in greater detail below, over this same geography. For property sale price information and the hedonic price model, the population includes all commercial and residential parcels with available data directly abutting York Boulevard. The intercept surveys target any individual shopping, dining, or walking along York Boulevard.

All surveys reflect attitudes, opinions, and other conditions present from August, 2011, until February, 2012, the period during which surveys were collected. Unfortunately, the inception of this research project in 2011 bars me from having collected surveys before the road diet and bike lane implementations. The quantitative analyses all compare conditions before and after the road diet implementation in 2006. The Los Angeles Department of Transportation (LADOT) added bike lanes to the road diet section of York Boulevard in 2010. With this narrow time frame, there are insufficient data to measure whether the bike lanes are associated with any additional change in economic conditions above and beyond those that might be linked to the road diet. Accordingly, the quantitative sources principally address the potential economic impacts associated with the road diet procedure.

Survey Methodology and Analysis Procedures

Survey Overview

I survey a sample of more than 50 businesses from each section of the York Boulevard study corridor. Additionally, I complete a patron intercept survey with 25 customers from each corridor half. The

business surveys investigate whether interviewees—comprising business owners and managers—feel that bike lanes, vehicle travel speeds, and roadway width, as well as trade-offs between vehicle travel lanes, on-street parking, and bike lanes, have any effect on business performance. The patron intercept surveys ask whether customers feel these same variables affect where they choose to shop.

Survey Question Development

I develop the businessperson and customer survey instruments, shown in Appendix C, through an iterative process with Los Angeles County Bicycle Coalition staff, Los Angeles Department of Transportation Bicycle Program staff, and UCLA Luskin School of Public Affairs faculty. For ease and speed of implementation, I primarily utilize yes/no and multiple choice question formats. I create both English and Spanish versions of the surveys, as well as an oral consent document, and administer the surveys in both languages. I administer the surveys in person and record participants' responses. Survey response rates, which I expand upon in the Considerations and Survey Results sections below, are generally about 50 percent.

The business surveys contain 11 yes/no, multiple choice, and short answer questions. The questions inquire about the following subjects:

- Business tenure
- Perceived customer modes of transport used to access York Boulevard
- Attitudes toward road width and vehicle travel speed—as proxies representing road diet/non-road diet conditions—and whether these factors have any impact on business performance
- Attitudes toward bike lanes—whether businesspersons feel that bike lanes have hurt their business and whether they would be willing to trade an auto travel lane or on-street parking for a bike lane

The customer intercept surveys comprise a shorter, six-question survey including yes/no, multiple choice, and short answer questions. This instrument asks for the following information:

- Mode of transport used to access York Boulevard
- Attitudes toward road width and vehicle travel speed—again as proxies representing road diet/non-road diet conditions—and whether these factors influence where customers choose to shop
- Attitudes toward bike lanes—whether customers feel that bike lanes are necessary infrastructure and whether they would be willing to trade an auto travel lane or on-street parking for a bike lane

Sample Development

To complete the business surveys, I first develop an accurate, comprehensive list of active businesses along the study corridor. I use the City of Los Angeles' Zone Information and Map Access System (ZIMAS) online mapping database to develop the population of businesses from which to draw a sample. Specifically, I retrieve Assessor's information for each parcel abutting York Boulevard. I note all parcels containing at least partial commercial activity on the site as determined by the parcel's Use Code. I then conduct a field visit of the York Boulevard study corridor. I cross-reference the list of commercial parcels obtained through the ZIMAS database with the observed businesses directly abutting York Boulevard.

From these sources, I create one master list of businesses fronting the York Boulevard corridor. As Figure 3 displays, I then create two sub-lists of businesses, one for each half of the corridor. To obtain random samples, I alphabetize the businesses

Figure 3
Business survey sample development

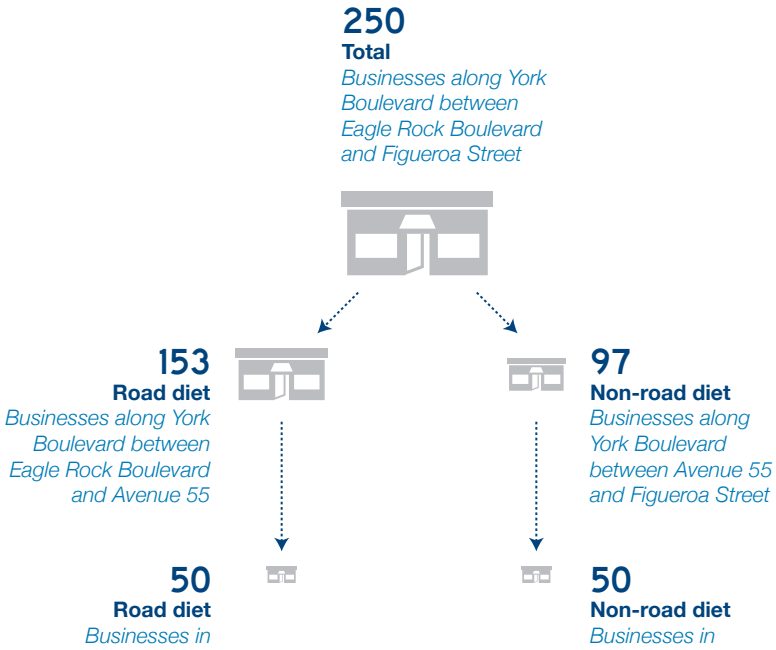
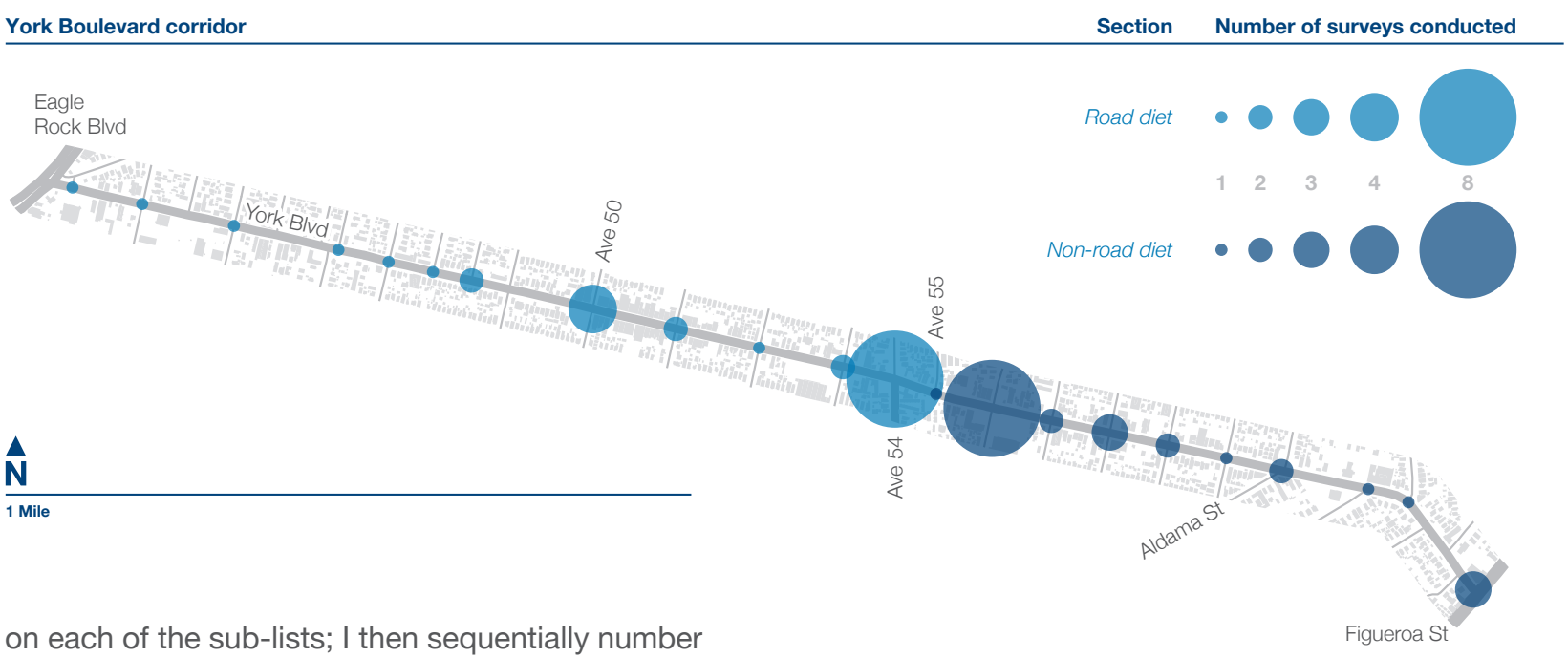


Figure 4 Customer intercept survey locations



on each of the sub-lists; I then sequentially number the businesses on each list. I use a random number generator to select 50 businesses from each list. The generator is run twice, once for each half of the corridor.

The customer intercept surveys involve a more straightforward procedure. I collect 25 survey responses for each half of the York Boulevard corridor for a total of 50 surveys. I survey any willing participant who I observe shopping, dining, or walking along York Boulevard. (Walking includes trips to/from a car or bicycle.) Figure 4 shows the locations of these surveys.

My data analysis compares merchant and customer survey responses between the two halves of the York Boulevard corridor. I examine whether opinions differ between sections with and without bike lanes/ road diets and between customers and patrons. To

protect confidentiality, I aggregate responses to the half-corridor level (i.e. road diet and non-road diet sections) and compare responses as percentages.

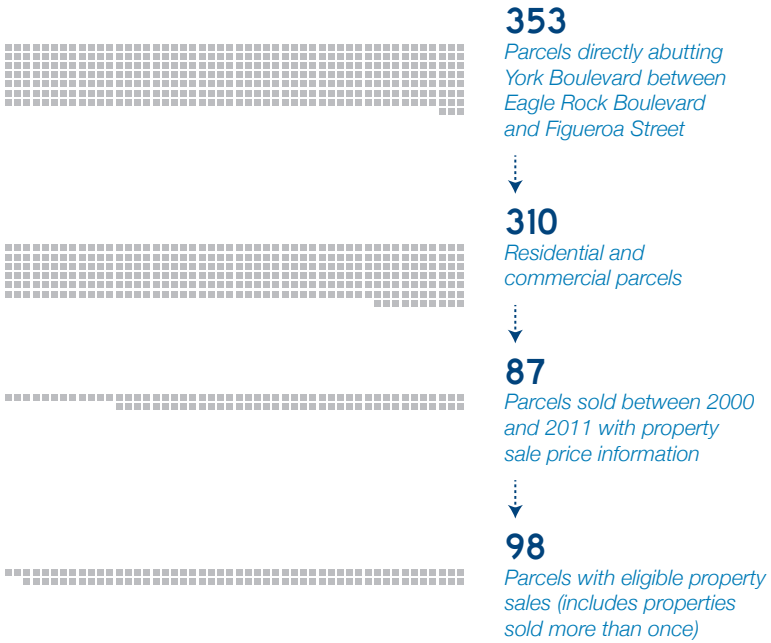
Quantitative Data Methodology and Analysis Procedures

Property Sale Price Analysis

This research component begins by acquiring Los Angeles County Assessor's Office parcel data from the Los Angeles Department of City Planning. To protect confidentiality, I only discuss parcel data in aggregate terms. I collect Secured Basic File Abstract data for all 353 parcels directly abutting York Boulevard between Eagle Rock Boulevard and Figueroa Street. These data provide recent, albeit incomplete information about the last three sale prices and dates of sale for most parcels. Since economic objections to road diets and bike lanes most commonly hinge on residential property values and impacts to businesses, I narrow my scope to only include residential and commercial parcels. Filtering the data in this manner excludes all parcels with religious, governmental, parking, and vacant uses, and narrows the number of parcels studied to 310. I then exclude all parcels that were not sold during my study period of 2000 to 2011 or that lack property sale price information. This narrows the eligible parcels to only 87 for the entire study area. However, since it is property sales I am concerned with, and not necessarily the parcels themselves, I double count any parcels that were sold more than once during either the pre- (2000-2005) or post-road diet (2006-2011) periods. Duplication increases the number of parcels with eligible property sales to 98. Figure 5 shows the parcel selection process. Since property sales can occur at any time and for a multitude of reasons, I assume this selection of parcels to be a close approximation of a random sample.

Using geographic information system (GIS) software, I display parcels spatially and classify them based on whether a parcel is located within the road diet or non-road diet section of York Boulevard. For both sections, I categorize data based on whether the property was last sold between 2000 and 2005 or

Figure 5 Sales tax analysis parcel selection process



2006 and 2011. As mentioned above, this analysis excludes parcels not sold during either of these periods and parcels with no sale information.

To account for inflation, I convert all sales values to 2011 dollars. Once prices have been adjusted for inflation, I divide a property's sale price by the square footage of the building located on the parcel. This calculation determines the property sale price per square foot. I use price per square foot to control for building size. From here, I calculate the average price per square foot for each of the two halves of the corridor and for both time periods (2000-2005 and 2006-2011). I use a T-test statistical procedure to test for significant differences both spatially and temporally.

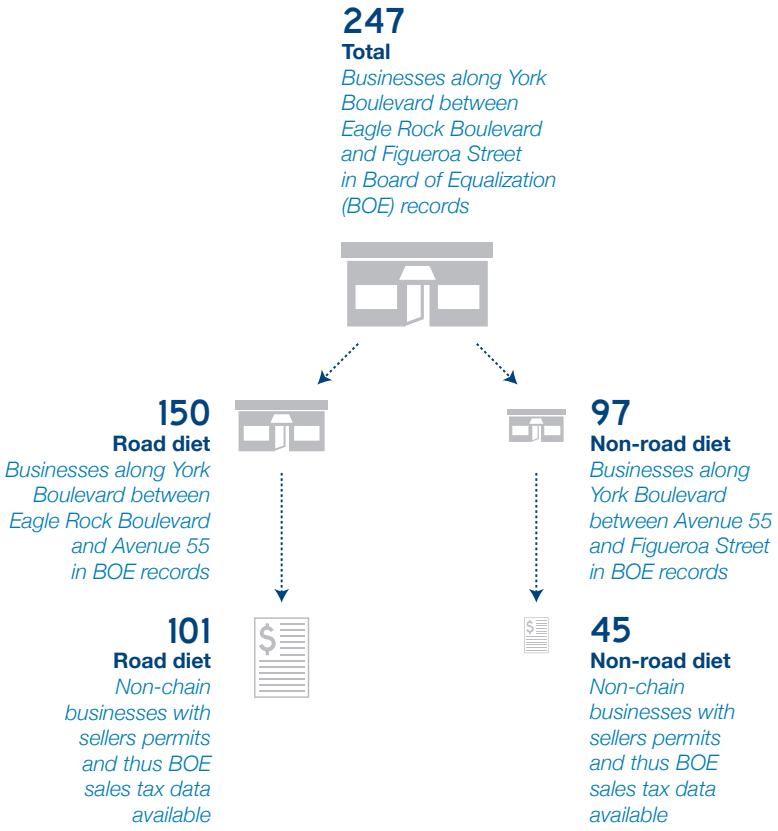
Bradley-Burns Sales Tax Analysis

Bradley-Burns sales tax data administered by the California State Board of Equalization (BOE) provide the basis for this analysis. These taxes are a percentage of a business' total sales; thus, higher sales tax revenues correlate directly with higher sales revenues. To preserve confidentiality, the Board provides aggregated sales tax data for the road diet and non-road diet halves of the York Boulevard corridor and for the 2001-2005 (pre-road diet) and 2006-2011 (post-road diet) time periods.

The Board of Equalization collects data only for businesses with sellers permits—those businesses, such as convenience stores, restaurants, and retailers, for whom the bulk of transactions are

taxable sales. The BOE data exclude service businesses—such as medical offices, financial service providers, and hair salons—which have few or no taxable sales and do not require sellers permits. Additionally, the Board of Equalization cannot isolate sales tax revenues from individual stores within a retail chain. Thus, the BOE data also exclude chain stores. Figure 6 shows that of the 150 businesses listed in the BOE records for the road diet portion of the corridor (a number that differs only slightly from the 153 businesses I observed in my field visit), 101 are non-service, non-chain businesses with available sales tax data. Similarly, 45 of the 97 businesses on the non-road diet portion of the corridor have available sales tax data. In other words, sales tax data are available for half to two-thirds of all corridor businesses.

Figure 6
Board of Equalization sales tax data availability



I compare the BOE data both in their raw form and as sales tax revenue per square foot per year. In both instances, I convert the data to 2011 dollars to control for inflation. For the latter comparison, I divide data from the five-year (2001-2005), pre-road diet period by five and the six-year (2006-2001), post-road diet period by six to produce standardized one-year figures. To compensate for differences in business size and the number of businesses on the two corridor halves, I divide sales tax data for each half-corridor by the total commercial square footage

present on each half-corridor. This square footage includes all parcels with commercial, restaurant, retail sales, and shopping center use codes; it omits all parcels with service business use codes (i.e. medical buildings, offices, and similar businesses with no taxable sales).

Since the data are only available in aggregate form, I cannot ascertain adequate information (namely the standard deviation of the data) to perform statistical tests. Instead, I complete non-statistical temporal and spatial comparisons of the sales tax data.

New Business and Business Turnover Analyses

I obtain information about new businesses that have opened along the York Boulevard corridor through my survey questionnaire, in which I ask business owners/managers how long their businesses have been located on York Boulevard (see Appendix C). From this information, I create two classes of businesses: those which have opened since the road diet implementation in 2006 and those which had been in operation prior to 2006. I use a Chi-square statistical procedure to compare the number of businesses that have opened on each section of York Boulevard since the road diet implementation in 2006. To protect confidentiality, I aggregate responses to the half-corridor level (i.e. road diet and non-road diet sections).

The California State Board of Equalization provides aggregated data on the number of businesses that have gone out of business and been replaced with a new business—referred to as business turnover—for each half of the York Boulevard corridor. As with sales tax data, turnover information is available only for non-chain businesses with taxable sales. These turnover data are not disaggregated to the pre- and post-road diet periods; they are provided only for the entire 2001-2011 timespan. Therefore, I compare the total number of properties that have had at least one turnover between the road diet and non-road diet corridor halves. Similar to the new business analysis, I use a Chi-square statistical test to compare business turnover. Contrasting the turnover data with the information on new businesses provides a more

holistic examination; it shows not just how many new businesses are opening, but the degree to which businesses are succeeding or failing along York Boulevard.

Hedonic Price Model

As a final metric of the impact of road diets on economic activity, I develop a hedonic price model. A hedonic price model is a form of regression analysis. It assumes that property sale prices are the sum of a variety of tributary components (Nicholls and Crompton, 2005). These components include both characteristics of the property itself, including building size, amenities, and upkeep, as well as neighborhood factors such as crime and transportation infrastructure (Franklin and Waddell, 2002). With the hedonic model, the degree to which a tributary component is present directly influences a property's sale price (Nicholls and Crompton, 2005). The hedonic model I develop therefore attempts to control for various property and neighborhood factors and determine how much of a property's sale price is attributable to the presence or absence of the road diet. Necessarily then, this model compares the road diet and non-road diet sections of the York Boulevard corridor during the post-road diet implementation period of 2006 to 2011.

Table 2 displays the initial variables considered for use in the hedonic pricing model. Property sale price is the dependent variable; property and neighborhood characteristics comprise the independent variables. I employ a stepwise regression, which automatically generates an optimized model employing only those variables with the strongest influence on sale price. Accordingly, not all of the variables listed in Table 2 are ultimately used in the hedonic model. The model ensuing from the stepwise regression, along with an analysis of my modeling results, is located in the Findings section below.

Considerations

Strengths and Weaknesses of Approach

In designing this research, I have attempted to build upon prior approaches, findings, and recommendations; my goal: to develop

Table 2
Initial hedonic price model variables

		Variable	Description
Independent		Property sale price	Property sale price per square foot for all parcels along the study corridor sold during the 2006-2011, post-road diet period (in 2011 dollars); a way of representing property value
Dependent	Neighborhood characteristics	Presence/absence of road diet	Dummy variable measuring whether a property is located along the road diet or non-road diet section of the corridor; the key determinant of how/whether road diets influence property sale price
		Location in commercial core	Dummy variable measuring whether a property is located along the two-block commercial core between Avenue 50 and Avenue 52; a way of controlling for walkability and gentrification, as, within the York Boulevard corridor, this section has generally been the epicenter of investment from abroad
		Crime per mile	Total number of crimes per linear mile reported along each half of the York Boulevard study corridor for the six-month period between August, 2011, and February, 2012; a means of controlling for neighborhood safety. Source: Los Angeles Police Department (http://www.crimemapping.com)
		Median income	Household median income for the census tract in which a property is located; a way of controlling for income. Source: 2010 American Community Survey 5-year estimates.
	Property characteristics	Lot square footage	Measurement of the size of a parcel; a way of controlling for parcel size
		Building size/livable area	Measurement of the size of the structure located on a parcel; a way of controlling for building size
		Land value	Assessed parcel value; a way of controlling for the value of land
		Improvement value	Assessed value of improvements made to the parcel, including buildings, landscaping, etc.; a way of controlling for the amount of investment on a given property
		Year built	The year that the structure on the parcel was constructed; a way of controlling for building age

Unless noted otherwise, the source for all variables in the above table is the Los Angeles County Assessor's Office.

a comprehensive tool for understanding the connections between bike lanes, road diets, and economic activity. I believe the model I have developed represents a sound approach for analyzing the research question. It takes into account a multitude of quantitative and qualitative factors to enhance the robustness of the findings. Despite these advantages, the research approach is not without constraints, and I attempt to enumerate known limitations in this section.

Limitations of Data Sources

The data I employ come from pre-published sources and stakeholder opinions, both of which carry implications for data accuracy and reliability. The Bradley-Burns sales tax applies only to "sales of tangible personal property" (California State Board of Equalization, 2009). Thus, businesses with minimal taxable sales, such as York Boulevard's numerous auto repair shops and hair salons, may be underrepresented in the sales tax analysis.

For all quantitative sources, it is difficult to draw correlation, and almost impossible to prove causality, between road diets/bike lanes and changes in economic metrics such as property sale prices. A host of factors independent from road diets and bike lanes certainly contribute to variation in economic performance. These influences range from broad, macroeconomic forces, namely the national economic downturn, to the localized variables of neighborhood and property characteristics. The hedonic price model attempts to control for these factors and determine how much of a property's sale price is attributable exclusively to the road diet.

Using the road diet conversion in 2006 as the threshold with which to assess economic changes places a stronger emphasis on the road diet implementation than the later bike lane addition. Nonetheless, I feel that the road diet installation warrants this emphasis. The diet's fundamental reconfiguration of York Boulevard appears more

plausible to affect surrounding conditions than the later bike lane installation, which added the lanes without modifying other elements of the road cross-section. I envision the bike lanes playing a more critical role among the perceptions of York Boulevard merchants, customers, and other community stakeholders as their addition creates a noticeable visual presence.

All survey responses represent opinions of the impacts of road diets and bike lanes on business performance and shopping patterns. By definition, individuals' subjective preferences and values frame the context for these responses. Additionally, individuals may not be able to understand all questions, or may choose to respond to questions dishonestly, both of which could potentially degrade the survey data reliability (Alwin and Krosnick, 1991).

Business owners/managers self report the number of years that their businesses have been located on York Boulevard. Although most business owners appeared knowledgeable, if not proud, of the number of years their business had been in operation, these accounts are subject to inaccurate or deceptive responses as well.

Although these inescapable potentialities exist, gaining an understanding of the support or opposition of local merchants and community members is clearly an important factor in evaluating road diets and bike lanes. Still, opinions are not a surrogate for numeric data, or vise versa. The design of this research therefore strives to blend qualitative and quantitative sources and, in doing so, maximize the objectivity of the research findings.

Nonresponses Preclude Statistical Analyses of Survey Data

The limitations of my survey implementation generally preclude statistical comparisons. For reasons of convenience, privacy, or disinterest, many patrons of the York Boulevard corridor may understandably refuse to participate in intercept surveys. This nonresponse bias represents a significant, yet unavoidable limitation of the intercept surveying

approach. It makes it difficult to obtain large volumes of survey responses. Moreover, it precludes obtaining a random sample of patrons and thereby drawing broader conclusions about York Boulevard customers in general. Figure 4 displays that survey responses tend to fall into geographic clusters. Clustered survey responses may create a locational bias; customers of businesses located near activity centers may be over-represented in survey responses.

Several randomly sampled businesses remained consistently closed after multiple survey attempts at different times on different days. I was therefore unable to survey these businesses. An additional five businesses refused to participate in surveys; individuals at these businesses cited not supporting solicitors, privacy, and being too busy as their rationales for not participating. In total, and coincidentally, I was unable to survey 23 of the 50 randomly sampled businesses on each half of the corridor.

To compensate for nonresponses yet still obtain at least 50 business surveys from each half of the corridor, I surveyed some business that were not included in my initial random sample. While I deviated from the initial random sample, I made sure to maintain a representative balance of the types of businesses I surveyed. Figure 7 shows the types of all businesses located along the York Boulevard corridor and juxtaposes them with the businesses in my survey. The figure reveals that the distribution of surveyed businesses aligns closely with the proportions of all businesses along the corridor. Still, this substitution precludes a statistical comparison of business survey responses because it results in a sample that is not purely random. While not completely random, the business and intercept surveys do afford an incredibly useful portrayal of a diverse segment of stakeholders, whose attitudes and perceptions play an important role in drawing conclusions about the interactions between road diets, bike lanes, and economic activity.

Figure 7 Business composition comparison



Business type	All businesses *Outside circle*	Surveyed businesses *Inside circle*
Automotive	12%	11%
Hair salon	8%	7%
Hotel	1%	1%
Industrial	1%	0%
Medical	7%	7%
Office	18%	22%
Restaurant	15%	14%
Retail	26%	28%
Service	13%	10%
Total	100%	100%

Considerations from the Literature

Although the literature on the economic impacts of bikeways advises that on-street bike lanes may have little effect on property values, these studies investigate only residential environments (Krizek, 2006; Racca and Dhanju, 2006). Moreover, the literature also evidences a great degree of variability in study results from different geographic locations, which suggests that findings may have limited transferability between regions (Krizek et al., 2007b; Krizek, 2006). Thus, examining property sale prices along a mixed commercial and residential corridor such as York Boulevard may yield differing results from prior studies in other contexts.

As noted above, the literature suggests it is inadvisable to generalize findings to other regions, and recommends instead repeating studies in various localities to obtain the most accurate information (Krizek et al., 2007b; Krizek, 2006). While my findings may not be directly transferable to other localities, I believe this research is valuable for designing future studies, and, at a broader level, in framing policy decisions and economic perceptions of road diets and bike lanes.

Findings

Survey Results

Figure 8 summarizes the business owner/manger survey responses. (Note: To facilitate comparison, I present Figure 8 and Figure 9, which displays customer intercept survey responses, on facing pages after Figure 10.) In total, 40 percent of businesses (60 out of 153) on the road diet section of York Boulevard (between Eagle Rock Boulevard and Avenue 55) and just under 60 percent of businesses (55 out of 97) on the non-road diet section (from Avenue 55 to Figueroa Street) participated in surveys. As explained in the Considerations section above, I was unable to survey 23 of the 50 randomly sampled businesses on each half of the corridor.

For the intercept surveys, I received 25 customer responses on each half of the York Boulevard corridor. Figure 9 shows the results of the customer intercept surveys; Figure 4, the locations of these surveys. When surveyed, three individuals indicated that they had not shopped along the York Boulevard study corridor that day. Each individual indicated that he or she lived in the neighborhood, and I chose to survey these individuals nonetheless.

Figures 8 and 9 display that responses are fairly harmonious between the two halves of the study corridor and between the businessperson and customer surveys. Most response pairs (i.e. road diet/non road diet, or merchant/customer) fall within ten percentage points of one another. Significantly, the overwhelming majority of merchants on both halves of the corridor—85 percent on the non-road diet section and 95 percent on the road diet section—feel that bike lanes have not hurt their businesses. Similarly, over 95 percent of customers surveyed on the road diet section and 80 percent of customers along the non-road diet portion feel that bike lanes are important roadway additions. Still, merchants and customers alike are divided in their feelings about removing a car lane or on-street parking for bike lanes; support for removing auto lanes or parking in favor of bike lanes waivers from roughly 40 to 60 percent.

The most noticeable dissonance in survey responses is that between merchants' perceptions of their customers' travel choices and customers' actual travel patterns. Merchants on both halves of the corridor presume the majority of their customers arrive by car, when in fact no more than about a quarter of customers indicated that they drove to York Boulevard. Figure 10 illustrates the most common responses merchants and customers offered when asked *why* they chose to support or not support removing on-street parking for bike lanes. Large numbers of merchants and customers alike voiced that on-street parking is critical to the health of businesses.

Quantitative Data Results

Table 3 summarizes the quantitative research findings.

Property Sale Price and Sales Tax

Figure 11 displays the results of the property sale price and sales tax analyses. The figure presents these results for both the road diet and non-road diet sections of York Boulevard and the pre- and



Source: Wordle

Figure 10 Reasons for supporting or not supporting bike lanes that replace on-street parking

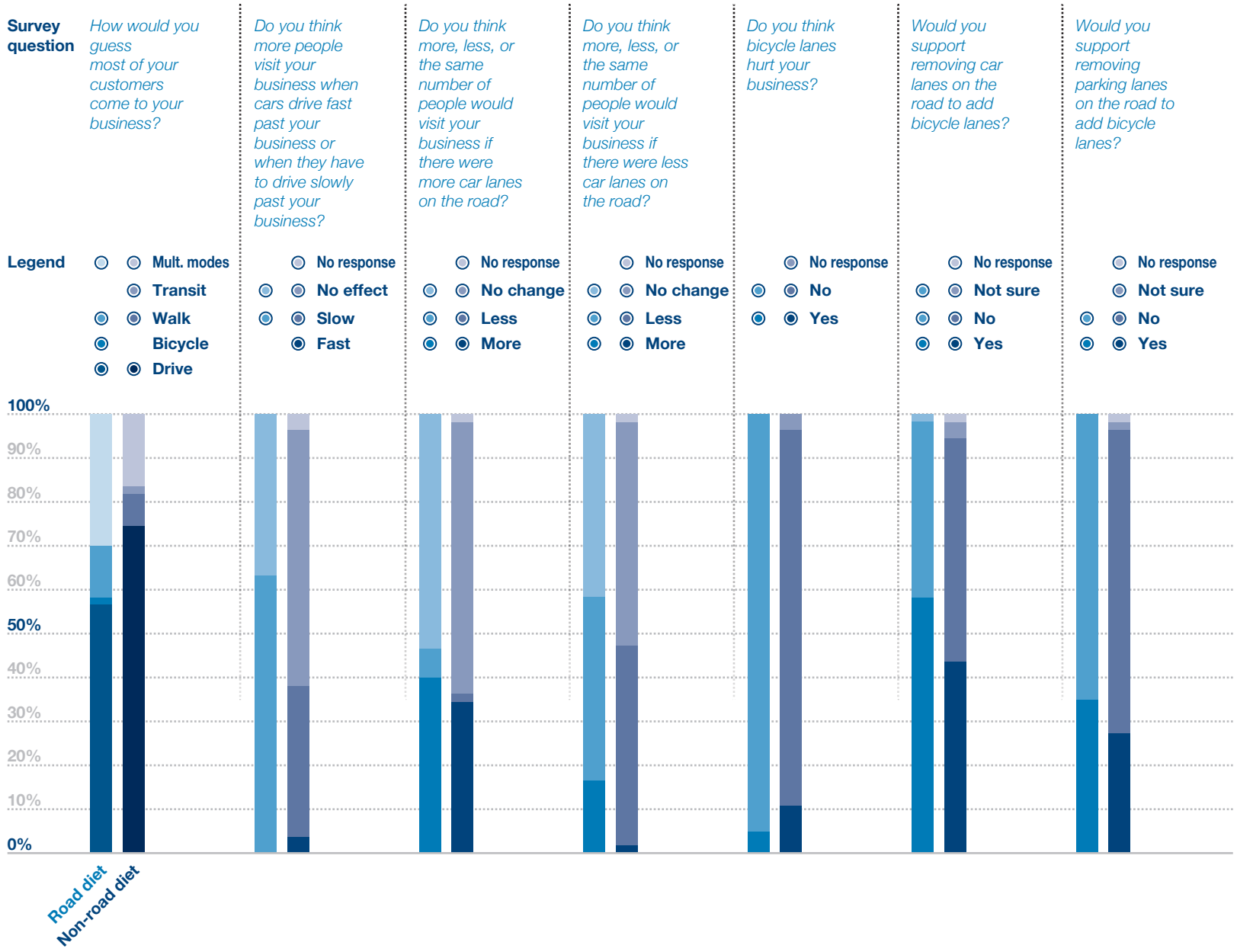
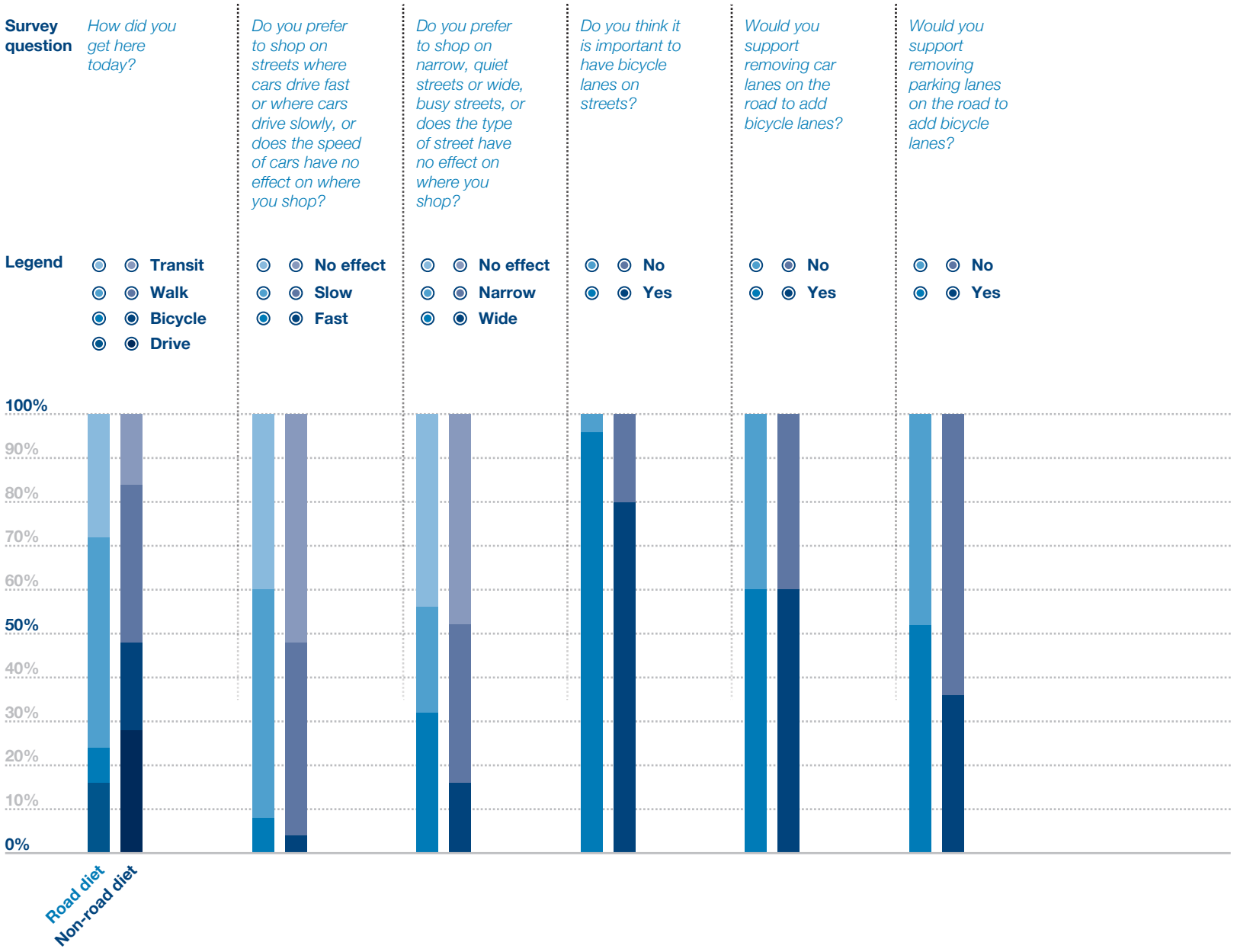

Survey question
How would you guess most of your customers come to your business?
Do you think more people visit your business when cars drive fast past your business or when they have to drive slowly past your business?
Do you think more, less, or the same number of people would visit your business if there were more car lanes on the road?
Do you think more, less, or the same number of people would visit your business if there were less car lanes on the road?
Do you think bicycle lanes hurt your business?
Would you support removing car lanes on the road to add bicycle lanes?
Would you support removing parking lanes on the road to add bicycle lanes?
Legend
Mult. modes
Transit
Walk
Bicycle
Drive
No response
No effect
Slow
Fast
No response
No change
Less
More
No response
No change
Less
More
No response
No
Yes
No response
Not sure
No
Yes
No response
Not sure
No
Yes
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Road diet
Non-road diet

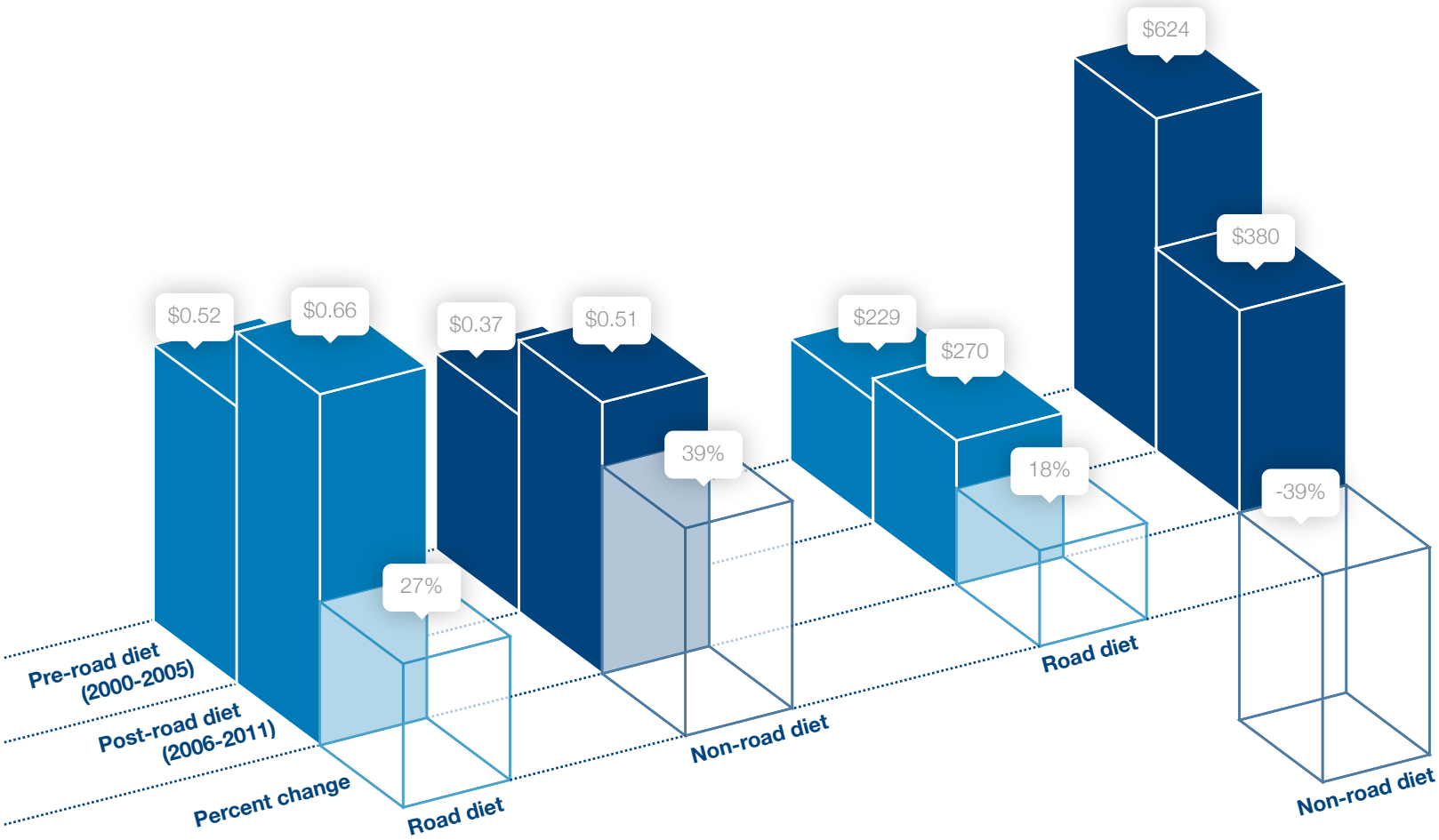
Figure 9
Customer survey responses



Metric	Analysis	Findings	Road Diet	Non-Road Diet
Property sale price	Compares commercial and residential property sale price per square foot between the corridor halves and before/after the 2006 road diet implementation	No significant differences in property sale price exist between the corridor halves or before/after the road diet implementation	**$229** *Pre-road diet implementation* **$270** *Post-road diet implementation*	**$624** *Pre-road diet implementation* **$380** *Post-road diet implementation*
Bradley-Burns sales tax	Compares sales tax revenues, collected as a proxy for business sales, between the corridor halves and before/after the road diet implementation	Sales tax revenues are higher on the road diet section of York Boulevard; although, since the data are provided in aggregate terms, it is not possible to conduct statistical tests or attribute the higher sales tax revenues to the presence of the road diet	**$727,937** *Pre-road diet implementation* **$1,116,745** *Post-road diet implementation*	**$344,623** *Pre-road diet implementation* **$574,778** *Post-road diet implementation*
New business openings	Compares the number of new businesses that have opened on each corridor half since the road diet implementation	No significant differences exist in the number of new business openings between the two corridor halves	**21** *New business openings*	**19** *New business openings*
Business turnover	Compares the number of businesses on each corridor half that have closed over the 2001-2011 period	No significant differences exist in business turnover between two the corridor halves	**55%** *Percent of businesses that have turned over at least once*	**62%** *Percent of businesses that have turned over at least once*
Hedonic price model	Gauges how much the presence or absence of a road diet influences property sale price	The presence or absence of road diet is not a significant determinant of property sale price		

Figure 11

Average property sale price per square foot and sales tax revenues in 2011 dollars



Average sales tax revenue per square foot per year

Average property sale price per square foot

post-road diet implementation periods. Additionally, Figure 12 shows the spatial distribution of property sales and sale values. What is less apparent from the two figures is that there is a high degree of sale price variation within each corridor half and time period. These extreme variations make it difficult to conclude statistically that there is a meaningful difference in property sale prices either spatially or temporally. Indeed, although Figure 11 illustrates that sale prices vary—in some cases markedly—between the road diet and non-road diet sections and over time, none of these differences are statistically significant. Therefore, adding the road diet does not appear to have meaningfully altered property values. Variations in property values are instead the result of other factors, which the Hedonic Price Model section below further discusses.

Table 4
Sales tax revenues in 2011 dollars

	Road Diet	Non-Road Diet
Pre-road diet implementation	$727,937	$344,623
Post-road diet implementation	$1,116,745	$574,778
Absolute growth	$388,808	$230,155
Percent change	53%	67%

Referencing Table 4 reveals that sales tax revenues along the road diet portion of York Boulevard are roughly double those of the non-road diet section. While tax revenues exhibit a higher growth *rate* along the non-road diet section, the *absolute* growth in revenues is higher on the road diet portion. Thus, in this instance, the growth rate is somewhat deceptive. Since sales tax data are only available in an aggregated form, it is not possible to complete more precise statistical comparisons.

New Businesses and Business Turnover

Since the 2006 road diet installation, 21 new businesses opened on the road diet section of the York Boulevard corridor, which constitutes 14 percent of the businesses on this corridor half. Nineteen new businesses opened on the non-road diet section, or

Figure 12

Property sale locations and sale values per square foot in 2011 dollars

Price per square foot

Low
$40 - $250

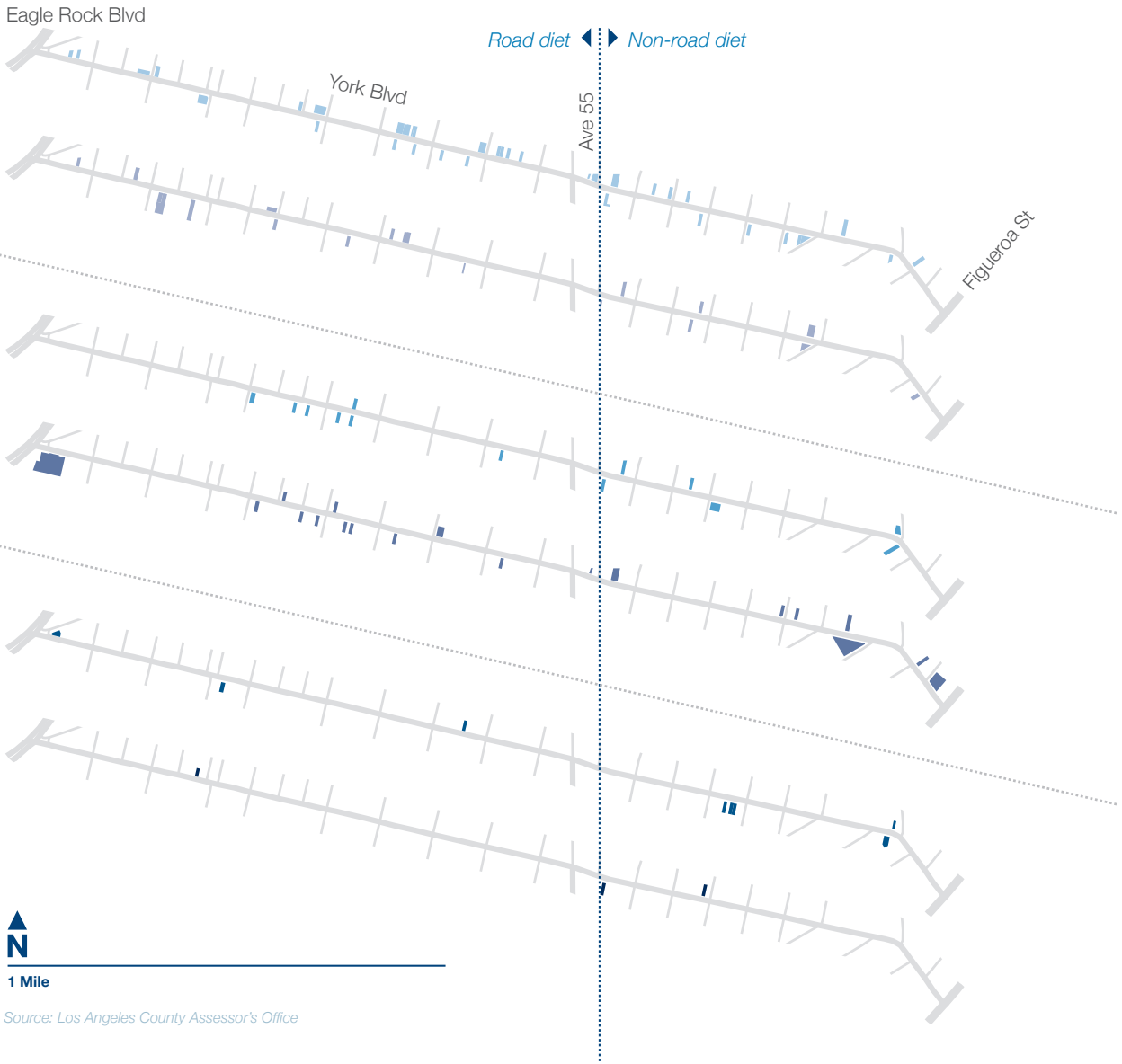
Medium
$250 - $500

High
$500 - $5,000

Property sales along York Boulevard corridor

Top: Pre-road diet (2000 - 2005)

Bottom: Post-road diet (2006 - 2011)



Source: Los Angeles County Assessor's Office

twenty percent of the businesses on this half. Neither of these changes is statistically significant.

One hundred and one business sites on the road diet section of York Boulevard have Bradley-Burns sales tax data, and thus property turnover information, available. Fifty six of these locations, or fifty five percent, had gone out of business at least once in the period between 2001 and 2011. On the non-road diet segment, 28 of 45 businesses with data, or 62 percent, turned over during the same period. These changes are not statistically significant. From these findings, the presence or absence of a road diet does not appear to influence either new business openings or business turnover.

Hedonic Price Model

Based on the results of the stepwise regression described previously in the Methodology section, the final hedonic price model employs three variables and takes the following form:

POST-ROAD DIET PROPERTY SALE PRICE PER SQUARE FOOT = -135,316.31 + 63,413.51*PRESENCE OR ABSENCE OF ROAD DIET + 109.44*BUILDING AREA + 1.28*PARCEL LAND VALUE

The host of variables initially considered for this model exhibit a strong amount of multicollinearity, or interference with one another. To minimize double counting among unique variables that measure closely related phenomena, I have employed only the variables with the highest significance, or ability to explain the dependent variable of property sale price.

The model's r-square value of 0.959 means that, in total, the model explains roughly 96 percent of variation in property sale prices. Although the model as a whole explains a substantial portion of property sale price variation, the presence or absence of a road diet is not a statistically significant variable. In other words, the model's other two variables pertaining to property characteristics have the strongest bearing on property sale price. Thus, as

with the previous analyses, the hedonic price model shows that road diets have a negligible effect on surrounding property values.

Key Takeaways

This section synthesizes the primary findings from the above data. I organize this discussion into the following major themes.

Road diets have little effect on surrounding businesses, property values, and customer shopping patterns. Therefore, opposition to road diets on economic grounds appears unfounded.

The quantitative analyses in this report do not reveal meaningful linkages between the presence of a road diet and changes in economic conditions. For example, the property sale price research demonstrates that spatial and temporal fluctuations in sale prices are statistically insignificant. Further, as the hedonic price model shows, these variations are mostly the result of factors independent from road diets.

Additionally, the data on new business starts and turnover show that there are no significant differences in these metrics between the sections of York Boulevard with and without a road diet. One could conceivably link the road diet section's slower tax revenue growth rate to the presence of the road diet. Following this logic, one would also have to attribute the higher sales tax revenues and absolute growth found on the road diet portion to the presence of the road diet. In this case, road diets would have an indeterminate effect on sales tax revenues. However, taken in context with the other business analyses and the hedonic price model, what seems more plausible is that variations in sales tax revenues stem not from road diets, but from factors related to business type, location, and broader economic forces.

Survey results also point to a weak connection between road diets and customer shopping habits. Surveyed customers exhibit no prevailing preference for shopping on wider or narrower streets (a proxy for road diet street reconfigurations used in the survey questions). These responses suggest that road diets

are not likely to alter customer shopping patterns. Convenience and availability of needed products or services are likely larger determinants affecting where customers choose to shop.

From the above findings, implementing a road diet along York Boulevard has not lowered property values or degraded business performance. Thus, the data do not support arguments that implementing road diets—reducing the number of car travel lanes on a road—hurts the surrounding local economy. While road diets are unlikely to harm surrounding economies, it is important to note that the addition of these facilities alone does not appear to improve surrounding economic conditions either.

The majority of surveyed merchants do not feel that bike lanes hurt their businesses, and similarly large percentages of customers believe bike lanes are important roadway additions. Still, opinions about removing on-street parking and auto lanes for bike lanes/road diets are divided.



Eighty five to ninety five percent of all business survey respondents do not feel that bike lanes have hurt their businesses. Eighty to ninety five percent of surveyed customers on both corridor halves also view bike lanes beneficially. Moreover, the proportions of merchants and customers who respond in these favorable manners are higher on the road diet section of the corridor. These higher percentages suggest that opposition to road diets and bike lanes may wane after the bikeway implementation.

At the same time, the above opinions assume no tradeoffs between bicycle infrastructure and other uses of road space, such as on-street parking or auto travel lanes. When presented with a tradeoff between bike lanes and auto lanes or on-street parking, only about half of all survey respondents appear willing to divert road space to bicyclists. Still, since most merchants do not perceive bike lanes to have negative business impacts, and since most customers view bike lanes favorably, building additional support for converting auto lanes or on street parking to bike lanes may be possible.

On-street parking is clearly an important asset to both local merchants and customers.

A common theme among survey responses is the perceived importance of parking to business performance. To many businesspersons and customers, removing parking translates directly to lost business revenues. This study demonstrates that road diets removing auto travel lanes do not adversely affect businesses or property values; however, the study does not directly address parking loss as parking was not removed with the York Boulevard road diet. As discussed in the following Recommendations section, future bikeway projects should be sensitive to community needs such as preserving parking. Further, since it is not possible to quantitatively evaluate the effects of parking removal on business performance with this research, the topic should be a priority for future research.

Merchants' perceptions about their customers' travel patterns do not align with customers' stated patterns.

On both halves of the study corridor, merchants indicate that they believe most customers drive to their businesses. These speculations generally do not align with customers' stated travel patterns. Almost 60 percent and 75 percent of merchants on the road diet and non-road diet sections of York Boulevard, respectively, state that customers drive to their businesses. However, only about 15 and 30 percent of customers on the same respective corridor halves indicate that they drive. The majority of customers,

56 percent on each half of the corridor, either walk or bicycle to businesses. This disconnect speaks to a need for additional outreach efforts to merchants about the importance of walking and bicycling—and appropriate infrastructure for both—on businesses. It also justifies the extension of bike lanes along the non-road diet section of York Boulevard.

Businesses and customers alike seem to prefer slower vehicle speeds or feel that speed is unimportant.

Many surveyed merchants perceive that slower traffic makes their businesses more noticeable to passing motorists, which may increase the likelihood of motorists patronizing their establishments. Those customers who favor slower traffic indicate that it creates safer conditions in which to shop. Based on these anecdotes from merchants and customers, slower traffic speeds may represent a common ground between merchant needs, customer preferences, and traffic safety goals. Assuming these anecdotes hold true among the broader population of area merchants and customers, slower travel speeds might be used to justify traffic calming projects, which employ a variety of engineering treatments, such as widened sidewalks at intersections or traffic circles, as a means of improving traffic safety (Project for Public Spaces, n.d.).



Recommendations

As the previous Findings section demonstrates, quantitative data do not support the notion that road diets negatively affect surrounding local businesses and property values. Opposition to road diets on economic grounds therefore appears unfounded. Furthermore, on streets such as York Boulevard with roughly 20,000 daily auto trips, there is little basis in traffic engineering for road diet opposition (Tan, 2011; Huang, Stewart, and Zegeer, 2004). With the majority of surveyed business customers bicycling and walking to businesses, there is a clear need for infrastructure facilitating safe travel by these modes. Still, popular support for converting auto lanes and on-street parking to bike lanes remains lukewarm. In light of these conditions, I propose the following recommendations, which aim to reshape bikeway planning, design, and outreach to include broader community input. Finally, I conclude with potential avenues for future research.

The design of road diets and bicycle facilities must carefully involve local community members—especially those whose businesses and homes flank proposed road diets and bicycle facilities—and any roadway modifications must be sensitive to the needs of people who bicycle as well as those who do not.

Most surveyed merchants indicate that they do not feel bike lanes will hurt their businesses. When surveyed, most customers also believe that bike lanes are important roadway additions. These responses suggest that there is at least some latent community support for bikeway improvements. Yet, large percentages of merchants and customers also remain hesitant to support road diets that convert on-street parking and auto lanes to bike lanes. Given pressing safety concerns for people riding bicycles—if not broader concerns for public health and the environment—simply not building bikeways in controversial situations is an untenable solution. Instead, I put forth a twofold implementation approach.

First, public agencies must enlist support for bikeway projects from bicycling advocacy organizations, supportive merchants, and sympathetic members of the public. Merchant and community member surveys, discussions with business and neighborhood leaders, and public meetings are all viable tools for assessing this support. Cities and bicycle advocacy organizations must then encourage proponents to be vocal in their support for specific bikeway projects—both in their communities and to elected officials. Some potential venues for supporting bikeway projects include:

- Advocacy campaigns
- Calls and letters to city councilmembers
- Promotional internet videos
- Social media outlets
- Window signs for homes and businesses

Second, public agencies need to work directly with community members to design bikeway projects. Neighborhood walking tours, booths at public festivals, social media, and bikeway design workshops represent opportunities for gathering stakeholder input and partnering with community members. At a minimum, government agencies must not present pre-designed bicycle facilities to the community. Municipal staff should instead listen to community members' preferences and concerns and earnestly incorporate this input into designs. In some instances it may be beneficial for planners and engineers, calling on their professional experience, to explain the benefits or tradeoffs of various bikeway designs better inform community-based decision-making.



Ideally, neighbors, merchants, bicyclists, and other stakeholders would collaborate alongside planners and engineers to first identify which corridors should be prioritized for bikeways. Likely these will be routes contained in the city's bike plan. Then, the same actors should partner to design bikeways that satisfy the needs of bicyclists, members of the general public, and opponents as best as possible. Narrowing auto lane widths while preserving the number of auto lanes, retaining some on-street parking, designing bicycle facilities on parallel routes, and employing innovative bicycle facilities (such as protected bike lanes, colored pavement along bikeways, and cycletracks) are examples of potential strategies for satisfying competing needs.

Numerous planning scholars have noted that, to be acceptable, "a change must benefit many interests, which consequently would decide to support the change" (Wachs, 2004; Altshuler, 1965). Therefore, to build support for bikeway projects, if not more broadly encourage participation in planning efforts, cities may consider incorporating additional neighborhood amenities with widespread appeal into bikeway projects. These amenities include street trees, outdoor seating, and widened sidewalks among other examples. Cities may consider partnerships with business improvement districts, if such districts exist, to help finance these additional improvements.

The above demonstrates that, although more complex and time-intensive than traditional planning efforts, a collaborative process embracing flexibility and compromise offers the most promise for designing bikeways that are suitable for a variety of stakeholders, even in controversial situations.

Multilingual, multifaceted outreach efforts are essential to successful bikeway projects.

Cities, bicycle advocates, and other supporters must outreach to neighbors and businesses at two stages during bikeway planning and implementation—particularly for substantial or controversial projects. First, outreach must announce bicycle planning

events and encourage community attendance. A second wave of outreach needs to occur prior to bikeway installation to alert neighbors and businesses of the impending roadway change. Outreach should occur in multiple languages and utilize a variety of techniques, including:

- Blog and social media posts
- Flyers
- Signs in homes and businesses, at bus stops, and in other publicly visible areas
- Stories in local newspapers

Finally, outreach efforts should cite the findings of this York Boulevard study and similar research to show that road diets can be implemented in ways that do not impact surrounding economies.

When faced with the decision between removing an auto travel lane or on-street parking for a bike lane installation, cities should favor removing the travel lane or defer to local preferences.

The loss of on-street parking appears less popular among surveyed merchants and customers than the loss of an auto travel lane. Therefore, preserving parking may represent a way to minimize opposition when designing new bike lane projects.

Furthermore, on-street parking creates a buffer between passing cars and pedestrians on the sidewalk, thereby improving pedestrian comfort and safety (Institute of Transportation Engineers, 2010). In the event that replacing an auto lane with a bike lane results in slower traffic speeds, business survey responses suggest that merchants may respond favorably to slower speeds or have no opinion of this change. Slower traffic speeds would also likely improve traffic safety (Aarts and Van Schagen, 2006).

Cities and bicycle advocacy organizations should integrate localized economic impact studies into bikeway planning and conduct follow-up studies after bikeway implementation. Such studies may help rectify the dissonance between economic data on road diets, which suggest these treatments have little economic impact on surrounding communities, and community perceptions, which reflect a greater

hesitance to convert travel lanes or on-street parking to bike lanes for economic reasons.

Among the some sectors of the public, uncertainties persist about the neighborhood-level economic impacts of road diets and bike lanes. The York Boulevard research illustrates that road diets and bike lanes insignificantly affect surrounding local economies. Yet, these results may not necessarily be transferable to other settings. Further, community members in other neighborhoods or other cities may be incredulous of findings from outside their local context. Therefore, when economic impacts are at question, cities and advocacy organizations should implement localized economic studies similar to this York Boulevard research.



Understanding constraints on municipal and advocacy organization budgets, these economic studies need not be complex undertakings. At their core, studies should strive to (1) comparatively analyze quantitative data and (2) poll local community members. I deliberately provide a detailed methodology in hopes that my approach can be duplicated and enhanced.

Economic studies should occur at two stages. Researchers should first collect baseline data along a proposed bikeway corridor during early planning stages for the bikeway. Researchers must also collect data after the bikeway project implementation. Studies during planning stages should preferably occur before community workshops so that data are available for these meetings. Studies conducted in the months, if not years, after a bikeway project

implementation can help to identify trends in economic activity over time.

Given the stated importance of on-street parking among community members, future economic research should examine how converting on-street parking to bike lanes affects adjacent businesses.

In quantitative terms, the York Boulevard study examines the economic impacts that transpire when a bike lane replaces an auto lane. The more broadly focused qualitative component of the research asks stakeholders to consider a host of factors, including on-street parking. Given the stated importance of on-street parking to businesspersons and customers, it would be helpful to study whether removing on-street parking for a bike lane has dissimilar economic outcomes to removing an auto travel lane. If disaggregated data can be obtained, a hedonic model that uses sales tax revenues as the dependent variable could be a powerful tool to understand potential effects of lost parking on adjacent businesses. With a growing body of research, the once-nebulous interactions between road diets, bicycle facilities, and local economic health will come increasingly into focus.

Cities should continue their efforts to install road diets, bike lanes, and similar infrastructure.

As shown throughout this research, road diets appear unlikely to harm local economies. Cities, employing proper outreach, should therefore continue to install road diets and related infrastructure, which improves safety, encourages bicycling, and thereby contributes to improved public health and environmental outcomes.






SPARKLETTS

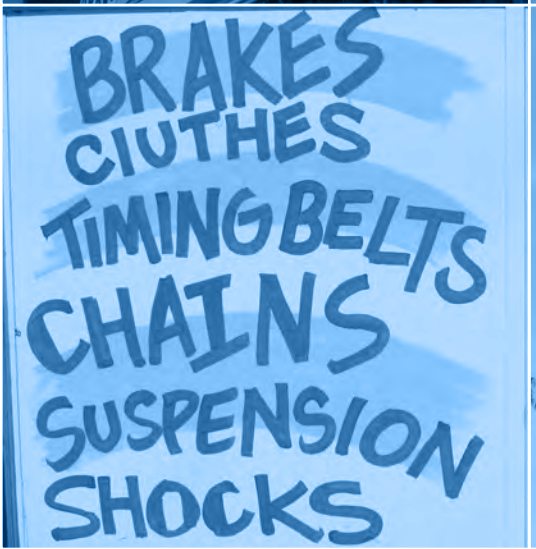

TROY
CHARBROILED
BURGERS
BREAKFAST
TACOS
BURRITOS
PASTRAMI
CHICKEN


LIQUOR
BERT'S


DONDE
HAY SABOR
hay FIESTA






BRAKES
CLUTHES
TIMING BELTS
CHAINS
SUSPENSION
SHOCKS




Sale



A. Complete Literature Review

Objectives and Structure

This literature review examines existing research into the relationship between bicycle infrastructure, road diets, and economic activity. The review asks what role existing literature may play in informing my research, and how the York Boulevard research may fill gaps in the current knowledge base.

While various studies have attempted to assess the impact of bicycle infrastructure on regional employment and job creation (Garrett-Peltier, 2010; Governor's Bicycle Coordinating Council, 2005), the goal of this review is instead to determine whether any notable trends exist between bicycle infrastructure/road diets and local-level economic activity. In other words, does the literature suggest that bicycle facilities and road diets generally improve or harm local economic activity? I define local economic activity to include property values, business performance, and attitudes of merchants and patrons toward road diets and bicycle infrastructure. For the purposes of this review, I divide bicycle infrastructure into two categories: on-street bicycle lanes and off-street bicycle paths. Although less relevant to York Boulevard, I include the latter because researchers have paid the most attention to their influence on economic activity.

There is a generally narrow body of research pertaining to the interactions between bicycle facilities/road diets and economic activity. To quote one author on the subject, "existing literature can be described as 'spotty' at best" (Krizek, 2007a). Striving to balance objectivity with comprehensiveness, I include in this review a selection of non-peer-reviewed professional reports and works of advocacy organizations.

I structure this review first by investigating the effects of off-street bicycle paths on economic activity. I digest a comparatively abundant volume of research that finds these facilities to have neutral or positive impacts on property values. At the same

time, research on off-street bicycle paths appears to have little transferability to on-street bicycle lanes, such as those lining the western half of the York Boulevard study corridor. Accordingly, I turn next to the relationship between on-street bicycle facilities and local economic activity. This body of work is less cohesive in its findings; it yields no consistent relationship between bike lanes and economic activity. Finally, I focus on the thin literature surrounding road diets and economic vitality. I find that, while road diets possibly boost economic performance, negative perceptions of these street reconfigurations persist among some segments of the public. In general, I conclude that additional, localized research into the economic impacts of bicycle lanes and road diets is essential to framing bikeway decision-making.

Literature Findings

Off-street bicycle paths generally have neutral or positive impacts on surrounding property values, yet findings related to off-street paths have little transferability to on-street bicycle infrastructure.

Researchers have employed a combination of resident, merchant, and bicyclist surveys (Krizek, 2006; Lawrie et al., 2004; Macy and MacDonald, 2005) as well as hedonic price models (Karadeniz, 2008; Krizek, 2006; Lindsey et al., 2004; Nicholls and Crompton, 2005; Racca and Dhanju, 2006) to assess the local economic impacts of off-street bicycle paths. Hedonic price models assume that one can disaggregate property sale prices, a proxy for property value, into tributary components (Nicholls and Crompton, 2005). Further, the presence or absence of these various components, such as bicycle infrastructure, influences property price (Nicholls and Crompton, 2005). Research applying surveys and hedonic models in an assortment of locations consistently finds "that the presence of a bike path/trail either increases property values and ease of sale slightly or has no effect" (Racca and Dhanju, 2006, 22). Lawrie et al.'s 2004 surveys also conclude that merchants and customers of the Outer Banks in North Carolina perceive bicycle paths to positively influence to retail sales and property values. Perhaps the only dissenting voice is Krizek

Author	Location	Bicycle Facility Studied	Methods	Economic Metric	Peer Review	Economic impact of bicycle facility
Campbell and Wittgens (2004)	Canada	All bicycle facilities	Case studies	Stakeholder preferences	No	Positive
Clean Air Partnership (2009)	Toronto, Ontario	Bike lane	Merchant and patron surveys	Stakeholder preferences	No	Positive
Drennen (2003)	San Francisco, California	Road diet/bike lane	Merchant and patron surveys	Stakeholder preferences	Yes	Positive
Hoffman and Mallavarapu (2011)	Long Beach, California	Bike lane	Sales tax data analysis	Business performance	No	Neutral
Karadeniz (2008)	Southwestern Ohio	Off-street bike path	Hedonic pricing model	Property sale prices	Yes	Positive
Krizek (2006)	Minneapolis–Saint Paul, Minnesota	Off-street bike path	Hedonic pricing model	Property sale prices	Yes	Negative
Lawrie et al. (2004)	Outer Banks, North Carolina	Off-street bike path	Merchant and patron surveys	Stakeholder preferences	No	Positive
Lindsey et al. (2004)	Indianapolis, Indiana	Off-street bike path	Hedonic pricing model	Property sale prices	Yes	Positive
Macy and MacDonald (2005)	Denver, Colorado	Off-street bike path	Resident surveys	Property value	No	Positive
Nicholls and Crompton (2005)	Austin, Texas	Off-street bike path	Hedonic pricing model	Property sale prices	Yes	Positive

Racca and Dhanju (2006)	Delaware	Off-street bike path	Hedonic pricing model	Property sale prices	Yes	Neutral to positive
Ryan, A.	Vancouver, Washington	Road diet	Sales tax data analysis	Business performance	No	Positive
Stantec Consulting Ltd. (2011)	Vancouver, British Columbia	Cycletrack	Merchant and patron surveys; some sales data analysis	Business performance	No	Neutral to negative
VanZerr (2009)	Portland, Oregon	Bicycle boulevard	Resident surveys	Stakeholder preferences	Yes	Neutral to positive

(2006), who finds that proximity to an off-street bicycle path reduces home values in the Minneapolis-Saint Paul metropolitan region.

While most of the above studies report a neutral-to-positive relationship between bike paths and economic prosperity, the nature of bike paths, which possess a strong recreational component and serve in many cases as linear parks, may have little transferability to on-street bikeways (Racca and Dhanju, 2006). Bike lanes "are for the most part indistinguishable from the road corridor itself and are more a feature of the existing road rather than the neighboring properties" (Racca and Dhanju, 2006, 1). Krizek's 2006 research confirms that only off-street bicycle paths are likely to affect property values. Additionally, nearly all of the off-street bike path studies address predominately residential, suburban or rural locations. These studies may be less applicable to the mixed commercial and residential land use makeup of York Boulevard.

On-street bicycle facilities demonstrate no consistent effect on economic metrics such as business revenues, yet they remain contentious among adjacent businesses.

Perhaps stemming from the conclusions of Racca and Dhanju (2006) and Krizek (2006) that on-street bicycle facilities seldom influence surrounding

property values, there is little academic literature on this topic. VanZerr (2009) conducted a survey of residents along a bicycle-priority street, commonly known as a bicycle boulevard, in Portland, Oregon. She finds that most respondents favorably view the bicycle boulevard and believe it to positively influence property values (VanZerr, 2009). As with the aforementioned studies of off-street bicycle paths, the purely residential nature of VanZerr's investigation may limit its applicability to the mixed commercial and residential York Boulevard corridor.

The remainder of the research concerning on-street bicycle facilities and economic performance relies on non-peer-reviewed "grey literature" and yields contrasting findings. A frequently referenced study from researchers in Toronto, Ontario, which surveyed merchants and patrons along one of the city's principal commercial corridors, finds converting on-street parking to a bike lane unlikely to harm businesses (Clean Air Partnership, 2009). The researchers find that patrons "arriving by foot and bicycle visit [stores] the most often and spend the most money per month" (Clean Air Partnership, 2009, 1). Moreover, the majority of merchants surveyed believe that bike lanes would improve business (Clean Air Partnership, 2009).

The Toronto study's positive findings are far from unanimous. From New York to San Francisco, numerous instances in the press indicate vociferous, negative reactions from merchants toward bike lanes that come at the expense of parking (Grynbaum, 2011; Lee, 2011; Scott, 2011). Interestingly, one such bike lane backlash currently transpiring in Vancouver, British Columbia, offers some of the most pertinent findings for research along York Boulevard. In Vancouver, the municipal government has installed bicycle lanes with a physical barrier between the lanes and auto traffic—known as a "cycletrack"—along two major downtown arterials. After complaints from merchants that the cycletracks stymied business, the City hired Stantec Consulting Ltd. (2011) to survey merchants along the cycletrack corridors as well as on parallel streets without bicycle infrastructure.

Stantec concludes that "the financial impact of the bike lanes has been a loss of sales and a loss of profit;" however, the loss, which is difficult to isolate from a broader economic downturn, "is relatively moderate based on industry standards and, in general, insufficient to create persistent vacancies" (2011, 54). The consultants clarify that their study is a short-term economic analysis, and that the impact of the cycletracks is likely to dissipate over time (Stantec Consulting Ltd., 2011).

Merchant disapproval of bike lanes remains an undeniably important issue; nonetheless, Stantec finds little difference in merchants' stated losses between the cycletrack corridors and comparison streets without bike lanes (2011). Furthermore, 80 percent of surveyed customers did not change their shopping patterns as a result of the bike lane introduction (Stantec Consulting Ltd., 2011). In a similar study of commercial districts with and without bicycle facilities in Long Beach, California, Hoffman and Mallavarapu (2011) observe that the presence of bike lanes does not appear to hinder retail activity.

Research on road diets and economic activity is significantly limited. While existing research suggests that road diets can boost economic performance, negative perceptions of road diets persist among some segments of the public.

One of the few studies directly addressing road diets' impacts to adjacent businesses occurred in San Francisco, California (Drennen, 2003). This collection of merchant surveys occurred four years after San Francisco narrowed Valencia Street from four to three auto lanes to include bike lanes and a center turn lane. Most merchants surveyed believe the road diet has a beneficial effect on business or no effect at all (Drennen, 2003). Another study in Vancouver, Washington, utilizing sales tax data, demonstrates that businesses along the road dieted Fourth Plain Boulevard experienced sales increases "while sales at all other comparable sites in the city during the same period went down" (Ryan, 2005, para. 17).

Campbell and Wittgens (2004) put forth a similarly positive prognosis for road diets and broader

measures to calm traffic. The authors cite case examples from a variety of commercial districts, some of similar scale to York Boulevard, to show that bicycle and "pedestrian improvements can greatly improve retail sales and generate increased sales and property tax revenues" (Campbell and Wittgens, 2004, 31). Arguably, the authors select ideal examples to build their case and do not include instances where improvements have failed to enhance economic activity. While Campbell and Wittgens (2004), Drennen (2003), and Ryan (2005) present economically successful examples of road diets, news coverage from a range of sources indicates that road diets are not without strong-willed opposition from merchants and the general public (Aldous, 2011; Banks, 2010; Bowen, 2011).

Takeaway From Literature

The majority of existing research into road diets, bicycle infrastructure, and economic activity pertains to the economic impacts of off-street bike paths, which have little transferability to their on-street counterparts (Racca and Dhanju, 2006). Moreover, the limited research addressing road diets and on-street bicycle facilities in an economic light—and the even further constrained body of peer-reviewed work—produces a wide spectrum of conclusions (Krizek, 2007a). These findings vary immensely by region and perhaps even by methodology (Krizek, 2007a). Stantec's report, for example, identifies that merchants tended to overestimate losses in surveys when compared to recorded sales data (2011). Finally, the dearth of economic research on road diets makes it nearly impossible to develop meaningful conclusions about their economic impact.

Skepticism toward on-street bicycle facilities and road diets clearly persists—particularly among merchants when such facilities come at the expense of on-street parking (Grynbaum, 2011; Lee, 2011; Scott, 2011). Although the opinions of proponents and opponents are essential to framing discussions, they alone should not guide on-street bikeway decision-making. Yet, excepting hedonic price analyses, much existing research draws upon "anecdote rather than actual market data"

while existing, readily available sources, such as sales tax revenues and property values, go largely untapped (Nicholls and Crompton, 2005, 321). This incongruence calls to a need for research that balances surveys—an excellent mechanism for assessing stakeholder perceptions—with numeric sales and property data, which minimize bias in the conditions they portray. My research fuses surveys with numeric data in just this manner.

The York Boulevard study proffers recommendations to create bicycle facilities that are economically harmonious with their context. Stantec's report offers a relevant framework for such facilities, including, for example, "allocating scare [road] space to different uses according to the demand at different times" and moving "quickly to meet with the businesses that have been particularly impacted...in order to mitigate sales losses" (2011, vi).

Although Krizek (2006) and Racca and Dhanju (2006) show on-street bikeways to have little effect on property values, these studies investigate only residential environments. Examining property sale prices along a mixed commercial and residential corridor such as York Boulevard may yield differing results. Additionally, the contexts of Krizek (2006) and Racca and Dhanju's (2006) studies—Minneapolis-Saint Paul and Delaware, respectively—may very well be irrelevant to Los Angeles.

Perhaps the most cohesive criteria for future economic studies of road diets and bikeways comes from Krizek et al. (2007b), which establishes that research should:

1. Measure effects at a neighborhood, municipal, or regional scale
2. Inform bikeway policy decisions and implementation
3. Utilize stakeholder surveys and existing data
4. Employ units that are comparable within the individual study as well as among related studies
5. Quantify effects both for cyclists and the broader community

The methodology I employ builds explicitly upon Krizek's (2007b) five recommendations.

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C. Survey Instruments

1. Oral consent script - English
2. Oral consent script - Spanish
3. Business owner/manager survey - English
4. Business owner/manager survey - Spanish
5. Customer intercept survey - English
6. Customer intercept survey - Spanish

York Boulevard business interview survey: Oral consent script

Thank you for your interest in the York Boulevard Road Diet Economic Impact Study. Your participation in this research study is voluntary, and there is no penalty if you refuse to participate or choose to end the survey at any point. The purpose of this survey is to learn about your feelings toward traffic, road size, and bicycle lanes, and how these items may affect the number of people who shop in this neighborhood. Your responses are very important as they will help us gain a better understanding of how businesses feel about traffic and bicycle lanes.

You have been selected to participate because you were observed shopping or dining or because your business is located along York Boulevard between Eagle Rock Boulevard and Figueroa Street, which is the study area for this project. If you agree to participate, we will ask you 6 to 8 short questions and we will write down your responses. Your participation should take no more than 15 minutes. We will record no personal or identifiable information about you and will not mention your name or your business' name in any reports. Further, your responses will be held confidentially, and only a small group of researchers will have access to your responses. For these reasons, we believe that there is minimal risk in your participation in this study.

Thank you again. If you have any questions, please feel free to contact:

Cullen McCormick, Masters of Urban Planning Candidate, UCLA
4611 La Mirada Ave #3
Los Angeles, CA 90029
408-781-2980
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Encuesta de negocios en York Boulevard: Consentimiento oral guión

Gracias por su interés en el estudio investigando el impacto económico del dieta en la Boulevard de York. Su participación en este estudio de investigación es voluntaria y no hay ninguna pena si se niegan a participar o elegir poner fin a la encuesta en cualquier momento. El propósito de esta encuesta es conocer sus sentimientos hacia el tráfico, tamaño de la calle y carriles de bicicleta y cómo estos elementos pueden afectar el número de personas que hacen compras en este barrio. Sus respuestas son muy importantes por que nos van a ayudar a obtener una mejor comprensión de cómo los negocios se sienten sobre carriles de tráfico y bicicleta.

Has sido seleccionado para participar porque fue visto comprando o comiendo o porque tu negocio se encuentra por el Boulevard de York entre Eagle Rock Boulevard y Figueroa, que es el área de estudio para este proyecto. Si usted acepta participar, le pediremos 6 o 8 preguntas brevementes y anotamos sus respuestas. Su participación debe durar no más que15 minutos. No registramos ninguna información personal o identificable acerca de usted y no mencionar su nombre o su negocio en los reportes. Además, sus respuestas se realizará de forma confidencial, y sólo un pequeño grupo de investigadores tendrán acceso a sus respuestas. Por estas razones, creemos que hay un riesgo mínimo en su participación en este estudio.

Gracias de nuevo. Si tiene alguna pregunta, no dude en ponerse en contacto con:

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York Boulevard business interview survey

Business information

1. Business name _____
2. Business address _____
3. What type of business is this? _____

Business tenure

4. How many years (or months if less than a year) has the business been at this current location?
   _____ YEARS / MONTHS (circle whether the number entered on the line represents months or years)
5. Does your business own or rent the building? OWN / RENT (circle one)
6. How many employees work here? _____

Business access

7. How would you guess most of your customers come to your business? Do they DRIVE, take PUBLIC TRANSIT, BICYCLE, or WALK? (circle one)
8. Do you think more people visit your business when cars drive fast past your business or when they have to drive slowly past your business? Or do you think the speed of vehicles has no effect on your business? FAST / SLOW / NO EFFECT (circle one)
9. Do you think more, less, or the same number of people would visit your business if there were more car lanes on the road?
   MORE / LESS / NO CHANGE (circle one)
   What about if there were fewer lanes?
   MORE / LESS / NO CHANGE (circle one)
10. Do you think bicycle lanes hurt your business? YES / NO (circle one)
    Why or why not? _____
    _____
    _____
11. Would you support removing car lanes on the road to add bicycle lanes? YES / NO (circle one)
    What about removing parking to add bicycle lanes? YES / NO (circle one)
    Why or why not? _____
    _____
    _____

Entrevista encuesta de negocios York Boulevard

Información del negocio

1. ¿Nombre de Negocio?_____
2. ¿Dirección del Negocio? _____
3. ¿Qué tipo de negocio es este? _____

Tenencia de negocio

4. ¿Cuántos años tiene (o meses si menos de un año) este negocio aquí en el mismo ubicación? _____ AÑOS / MESES (círculo si el número especificado en la línea representa meses o años)
5. ¿Su negocio posea o renta el edificio? POSEA / RENTA (círculo uno)
6. ¿Cuántos empleados trabajan aquí? _____

Acceso empresarial

7. ¿Cómo diría la mayoría de los clientes vienen para su negocio? MANEJAN, usan TRANSITO PÚBLICO, BICICLETA, o A PIE? (círculo uno)
8. ¿Crees que más gente visite su negocio cuando coches pasan su negocio rápido o cuando tienen que pasar su negocio lentamente ? O ¿crees que la velocidad de los vehículos no tiene ningún efecto en su negocio? RÁPIDO / LENTO / SIN EFECTO (círculo uno)
9. ¿Crees que más, menos o el mismo número de personas visitará a su negocio si hubiera más carriles de automóviles en la calle?
   MÁS / MENOS / NO CAMBIO (círculo uno)
   ¿Qué tal si hubiera menos carriles?
   MÁS / MENOS / NO CAMBIO (círculo uno)
10. ¿Crees que carriles para bicicletas dañan su negocio? SÍ / NO (círculo uno)
    ¿Por qué o por qué no? _____
    _____
    _____
11. ¿Usted soporta quitar carriles de automóviles en la calle para poner carriles de bicicleta? SÍ / NO (círculo)
    ¿ Qué tal quitando espacios de estacionamiento para poner carriles de bicicleta? SÍ / NO (círculo)
    ¿Por qué o por qué no? _____
    _____
    _____

York Boulevard customer intercept survey

1. Do you shop at businesses along York Boulevard? YES / NO (circle one)
2. How did you get here today? Did you DRIVE, take PUBLIC TRANSIT, BICYCLE, or WALK? (circle one)
3. Do you prefer to shop on streets where cars drive fast or where cars drive slowly, or does the speed of cars have no effect on where you shop? FAST / SLOW / NO EFFECT (circle one)
4. Do you prefer to shop on narrow, quiet streets or wide, busy streets, or does the type of street have no effect on where you shop? NARROW / WIDE / NO EFFECT (circle one)
5. Do you think it is important to have bicycle lanes on streets? YES / NO (circle one)
   Why or why not? _____
   _____
   _____
6. Would you support removing car lanes on the road to add bicycle lanes? YES / NO (circle one)
   What about removing parking to add bicycle lanes? YES / NO (circle one)
   Why or why not? _____
   _____
   _____

Estudio de clientes de York Boulevard

1. ¿Haces compras en las tiendas a lo largo del Boulevard de York? SÍ / NO (círculo uno)
2. ¿Cómo llegaste hoy? ¿CONDUJISTE, tomaste TRANSPORTE PÚBLICO, BICICLETA o A PIE? (círculo uno)
3. ¿Prefieres comprar en las calles donde coches conducen rápido, donde coches conducen lentamente o la velocidad de los automóviles no tiene ningún efecto en donde compras? RÁPIDO / LENTO / SIN EFECTO (círculo uno)
4. ¿Prefieres tiendas en calles estrechas, tranquilas o calles amplia, ocupadas, o ¿el tipo de la calle no tienen ningún efecto sobre donde comprar? ESTRECHO / AMPLIO / SIN EFECTO (círculo uno)
5. ¿Crees que es importante tener carriles de bicicletas en las calles? SÍ / NO (círculo uno)
   ¿Por qué o por qué no? _____
   _____
   _____
6. ¿Soportaras quitar carriles de automóviles en la carretera para agregar carriles de bicicleta? SÍ / NO (círculo uno)
   ¿Cómo quitar parking para agregar carriles de bicicleta? SÍ / NO (círculo uno)
   ¿Por qué o por qué no? _____
   _____
   _____